KING RADIO
KI 201C/KI 211C/KI 212/KI 213/KI 214
VOR/LOC- GS INDICATORS
GENERAL INDEX

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MAINTENANCE/OVERHAUL MANUAL

KI 201C / KI 211C / KI 212
KI 213 / KI 214
VOR/LOC - GS INDICATORS

MANUAL NUMBER	006-5052-02
REVISION NUMBER	2
REVISION DATE	DECEMBER, 1974
1st PRINTING	MARCH, 1971

KING RADIO CORPORATION®
400 NORTH ROGERS ROAD OLATHE, KANSAS, U.S.A.

ONE FULL YEAR WARRANTY

General Aviation Avionic products manufactured by King Radio Corporation (hereinafter called King) are warranted against defects in design, workmanship and material under normal use for which intended for one year after warranty registration provided such registration occurs within eighteen months of the factory shipping date.

King's limit of liability hereunder shall be to provide necessary parts and labor to repair said product, transportation charges prepaid at either King factory or an authorized King Service Center. King shall not be liable for consequential or other damage or expense whatsoever therefore or by reason thereof.

This warranty shall not apply to any product which has not been installed by an authorized King Installation Facility in accordance with the installation manual, or which has been repaired or altered in any way so as to adversely effect its performance or reliability, or which has been subject to misuse, contamination, negligence or accident.

This warranty is in lieu of all other General Aviation Avionics guarantees or warranties expressed or implied. King reserves the right to make design changes, additions to and improvements in its products without obligation to install such in products previously manufactured.

ATP
RECORD OF REVISIONS

REV. NO.	SECTIONS COVERED IN REVISION	REV. DATE	INSERTION DATE	BY	NOTES
1	All Sections	Mar /73			
2	All Sections	Dec /74			

KING RADIO MAINTENANCE MANUAL REVISION INSTRUCTIONS AND HISTORY

MANUAL KI 201C/KI 211C/KI 212/KI 213/KI 214

REVISION 2, Dec., 1974

Where R&R appears in the action column, remove the page now in the maintenance manual and replace it with the enclosed page; otherwise, ADD or DESTROY pages as listed. Retain these instructions in the front of the maintenance manual as a Record of Revisions.

PAGE	ACTION	REASON FOR CHANGE
Title Pages	R&R	Denote New Revision
		KI 201C/KI 213/KI 214 Section
Inst Manual	R&R	Installation Manual Updated
i, ii	Add	Service Bulletin & Memo Listing Added
iii, iv	R&R	Table of Contents Updated
5-i thru 5-46	----	Remove & Replace entire Parts List
6-i	R&R	Section VI Contents Updated
6-4	R&R	"LOC" corrected to "VOR" on last line
6-7 thru 6-11B	R&R and Add	Test & Alignment Corrected with KI 213 moved to paragraph 6.2.6
6-31 (2)	Add	Assembly & Schematic Updated by S/N Levels (insert in S/N order)
6-33	Add	Assembly & Schematic Updated
6-35	R&R	KI 201C Schematic Added, Dwg. previously here moved to Page 6-37
6-37 (3)	----	Remove old Dwg. & Replace with 3 new ones in S/N order
6-39 (2)	Add	Assembly & Schematic Updated by S/N Levels (insert in S/N order)
		KI 201C/KI 211C/KI 212 Section
5-3	R&R	Paragraph 5.2.3 (a) changed
6-1A	Add	Place at front of Parts List

KING RADIO MAINTENANCE MANUAL REVISION INSTRUCTIONS AND HISTORY

MANUAL: KI 201C/211C/212/213/214 (006-5052-01)

REVISION LEVEL 1, March, 1973

Where R&R appears in the action column, remove the page now in the maintenance manual and replace it with the enclosed page; otherwise, ADD or DESTROY pages as listed. Retain these instructions in the front of the maintenance manual as a Record of Revisions.

Do to extensive changes to the old KI 201C/211C/212 Manual and the addition of the KI 213/214 addendum a complete new Manual is being issued. Please discard old manual.

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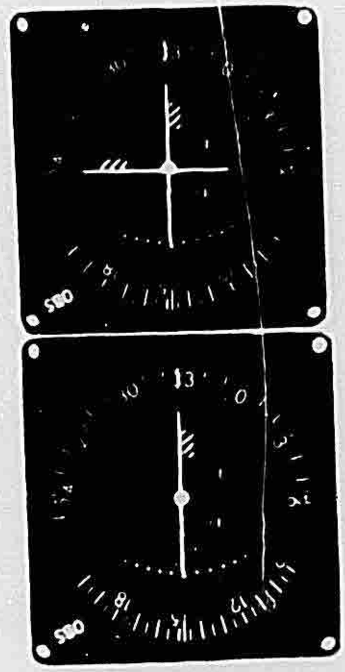

KI 201C/213/214
VOR/LOC-OBS INDICATOR

INSTALLATION MANUAL
006-0092-01

Rev. 1 December, 1974

ONE FULL YEAR WARRANTY

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This warranty is in lieu of all other General Aviation Avionics guarantees or warranties expressed or implied. King reserves the right to make design changes, additions to and improvements in its products without obligation to install such in products previously manufactured.

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SECTION II INSTALLATION

SECTION III OPERATION

LIST OF ILLUSTRATIONS

RECORD OF REVISIONS

Revision 1, December, 1974

Page	Reason for Change
Title Page	Denotes New Revision
Contents	Table of Contents Revised
History of Rev.	History of Revisions Added
1-2	Size and Weight Updated per A/N
1-3	Copy Moved
2-1	Figure Number References changed
2-2	Figure 2-1 Moved to this page
2-3	New Figure 2-2 added
2-4	Installation Drawing Revised (Figure Number Changed)
2-5	Installation Drawing Revised (Figure Number Changed)
2-6	Installation Drawing Revised (Figure Number Changed)
2-7	Installation Drawing Revised (Figure Number Changed)
2-9	Installation Drawing Revised (Figure Number Changed)

SECTION I
GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the King Radio Corporation Silver Crown, KI 201C, KI 213 and KI 214.

1.2 PURPOSE OF EQUIPMENT

The King KI 201C VOR Indicator is designed to operate with VHF navigational equipment (such as the KX 170A/B or KX 175/B) to provide OMNI (VOR) or LOCALIZER (LOC) information. The VHF navigational receiver receives and detects the omni or localizer information. The KI 201C converts this information to dc signals which drive the LEFT-RIGHT needle and the TO-OFF-FROM flag of the visual indicator.

The KI 214 ILS Indicator performs the same functions as the KI 201C. In addition, it contains a 40 channel glideslope receiver and the visual indicators include an UP-DOWN glideslope needle with an OFF warning flag.

KI 213 GS/OBS indicator performs much of the same functions as the KI 214. The basic difference being in that the KI 213 is a OMNI/LOC indicator with a glideslope receiver.

1.3 UNITS AND ACCESSORIES SUPPLIED

A. King Equipment Installation Kits which include mating connectors, mounting hardware, etc., are as follows:

1) KI 201C Installation Kit No. 050-1057-00

KPN	DESCRIPTION	QUANTITY
030-1008-00	Lever and Pivot Assembly	1
030-1009-00	Hood, Connector 14Pin Winchester MRE144	1
030-2000-00	Receptacle, 14Pin Winchester MRA14SN7	1
089-5115-12	Screw, FHP 6-32X3/4 Black	3

2) KI 213 Installation Kit No. 050-1309-00

KPN	DESCRIPTION	QUANTITY
030-0035-00	Connector, Coax TED PC-500-B-1	1
030-1047-00	Hood, Connector, 42Pin Winchester MRE42H	1
030-2106-01	Connector, Receptacle, 42Pin Winchester MRA42S-G7	1
089-5115-12	Screw, FHP 6-32X3/4, Black	3

3) KI 214 Installation Kit No. 050-1309-01

KPN	DESCRIPTION	QUANTITY
030-0035-00	Connector, Coax TED PC-500-B-1	1
030-2165-00	Connector, Receptacle, 26Pin Winchester MRE 26S-G	1
030-2166-00	Connector, Hood, 26Pin Winchester MRE 26H	1
089-5115-12	Screw, FHP 6-32X3/4, Black	3

1.4 ACCESSORIES REQUIRED, BUT NOT SUPPLIED

1. Navigation Antenna
2. Interconnecting Cables

1.5 LICENSE REQUIREMENTS

No special Federal Communications Commission license is required to operate this equipment.

1.6 TECHNICAL CHARACTERISTICS

KI 201C/KI 213/KI 214 INDICATOR

SPECIFICATION	CHARACTERISTIC	
	GENERAL	
SIZE:		
KI 201C VOR Indicator	3.25 x 3.25 x 8.3 inches (8.255 x 8.255 x 21.21 centimeters)	
KI 213 GS/OBS Indicator		
Ser. No. 1499 and below	3.25 x 3.25 x 9.02 inches (8.255 x 8.255 x 22.91 centimeters)	
Ser. No. 1500 and up	3.25 x 3.25 x 10.02 inches (8.255 x 8.255 x 25.44 centimeters)	
KI 214 ILS Indicator		
Ser. No. 5399 and below	3.25 x 3.25 x 8.71 inches (8.255 x 8.255 x 22.13 cemtimeters)	
Ser. No. 5400 and up	3.25 x 3.25 x 9.71 inches (8.255 x 8.255 x 24.66 centimeters)	
WEIGHT:		
KI 201C VOR Indicator:	2.8 lbs (1.27Kg)	
KI 213 GS/OBS Indicator:		
Ser. No. 1499 and below	2.5 lbs (1.14Kg)	
Ser. No. 1500 and above	2.6 lbs (1.17Kg)	
KI 214 ILS Indicator:		
Ser. No. 5399 and below	2.9 lbs (1.32Kg) 3.0 lbs (1.37Kg)	
POWER REQUIREMENTS:	14VDC	28VDC
KI 201C VOR Indicator:	100ma (day) 220ma (night)	100ma (day) 160ma (night)
KI 213 GS/OBS Indicator:	110ma (day) 230ma (night)	110ma (day) 170ma (night)
KI 214 ILS Indicator:	220ma (day) 340ma (night)	220ma (day) 280ma (night)

SPECIFICATION	CHARACTERISTIC	
VOR/LOC		
INPUT IMPEDANCE:	30K Ohms, Nominal	
INPUT LEVEL:	LOC: 0.35VRMS VOR: 0.50VRMS	
LOCALIZER CENTERING:	Within ±10% of standard deflection (±1/2 needle width)	
LOCALIZER SENSITIVITY:	4db tone ration will give full scale deflection	
OMNI ACCURACY:	±2°	
OMNI SENSITIVITY:	±10% of course width gives full scale deflection	
EXTERNAL LOAD:	High Z Autopilot Deviation	
GLIDESLOPE		
INPUT IMPEDANCE:	50 Ohms, Nominal	
NUMBER OF CHANNELS:	40 at 150KHz Spacing	
SENSITIVITY:	40μv hard for half flag and 60% of standard deflection	
CENTERING:	Within 10% of standard deflection 200μv to 30,000μv hard (±1 needle width)	
SPURIOUS RESPONSES:	At least 40db down	
SELECTIVITY:	100KHz minimum 6db bandwidth 600KHz maximum 50db bandwidth	
EXTERNAL LOADS:	FLAG	DEFLECTION
ARINC	One	One
AUTOPILOT (HI Z)	One	One

SECTION II
INSTALLATION

2.1 GENERAL

This section contains suggestions and factors to consider before installing the KI 201C/KI 213/KI 214 Indicator. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking each unit. Make a visual inspection of each unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When all equipment is removed, place in the shipping container all packing materials for use in unit storage or reshipment. The KI 201C/KI 213/KI 214 installation will conform to standards designated by the customer, installing agency and existing conditions as to unit location and type of installation.

2.3 KI 201C/KI 213/KI 214 INSTALLATION

(a) Carefully select the KI 201C/KI 213/KI 214 panel location for unobstructed vision, minimum parallax and adequate clearance for the instrument case and installation of cables and connectors.

(b) Refer to Figure 2-3 for the KI 201C mounting dimensions.

(c) Refer to Figure 2-4 for the KI 213 mounting dimensions.

(d) Refer to Figure 2-5 for the KI 214 mounting dimensions.

(e) A standard 3 1/8" instrument hole is required.

(f) Secure the KI 201C/213/214 firmly in place.

(g) The installing agency will supply and fabricate the external cable. The plugs required are supplied by King Radio.

(h) External Indicator Drive Connections:

(1) The KI 213/KI 214 Glideslope will drive one arinc flag load, one arinc deflection load, one autopilot (HIZ) flag load, and one autopilot (HIZ) deflection load. No readjustment is necessary with the addition of these loads. However, refer to the Indicator Drive Schedules on Figures 2-6 and 2-7 if the KI 213/KI 214 Glideslope does not drive external arinc loads.

(2) The KI 201C/KI 214 VOR/LOC will drive one autopilot (HIZ) deflection load.

(i) RNAV Connection KI 213 Only: Refer to the KNC 610 or KN 74 Maintenance/Overhaul Manual for information dealing with RNAV installations and subsequent F. A. A. Approval.

(j) GENERAL:

(1) An omni error adjust potentiometer, R316, is accessible from the front of the indicator by removing the OBS knob. This is for final calibration of the omni system after installing in aircraft. The range of the error pot is approximately ±5°. It should be noted that thus potentiometer does not affect localize centering.

(2) RG-188/U coaxial cable is recommended for the glideslope antenna interconnect. Refer to Figure 2-1 for connector assembly.

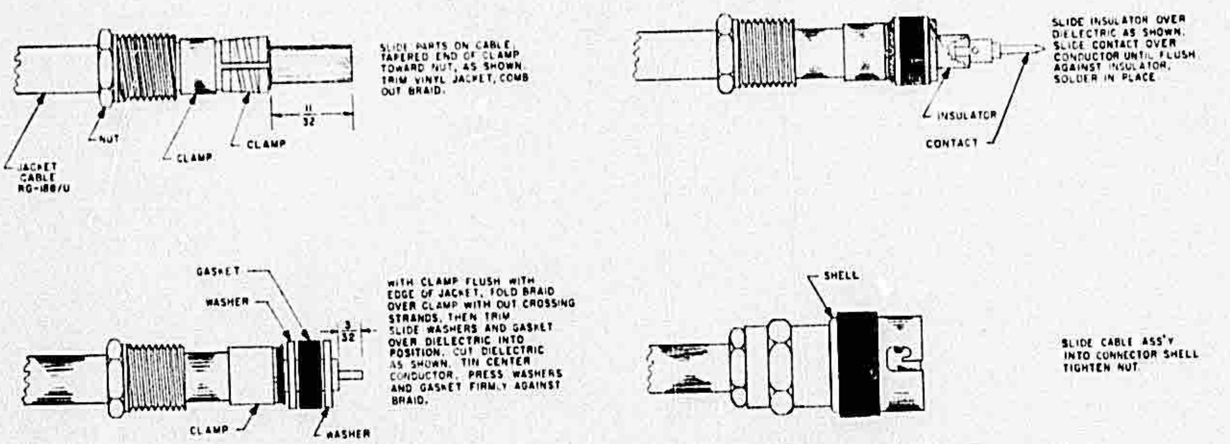
2.4 CABLING

(a) The length and routing of the external cables must be carefully studied and planned prior to installation. Avoid sharp bends and placing cables too near the aircraft control cables.

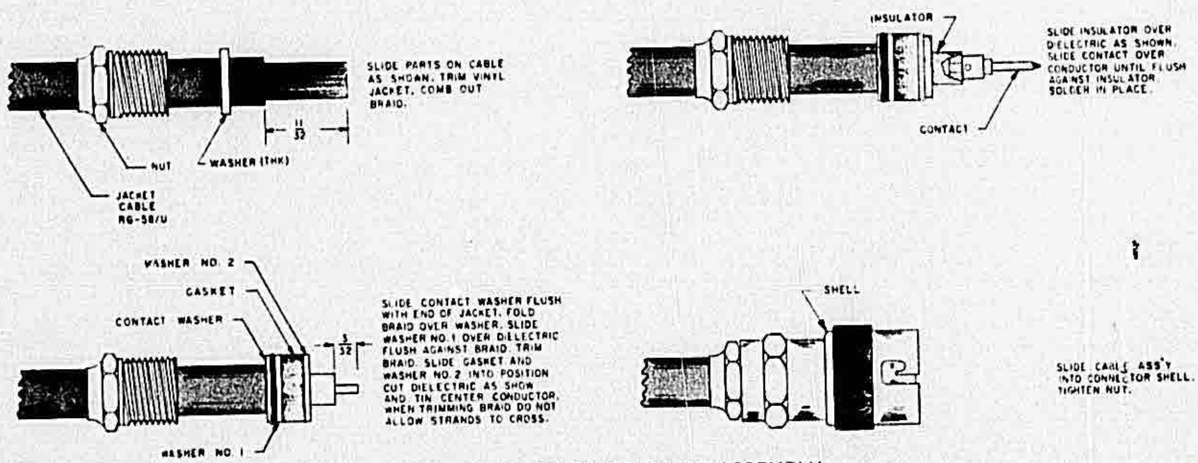
(b) Fabricate the external cables in accordance with the installation drawing that fulfills the system requirement.

-NOTE-

Use good quality stranded wire that will not support a flame and with at least 600 volt insulation. It is recommended that the mike audio line be in a shielded-twisted pair.



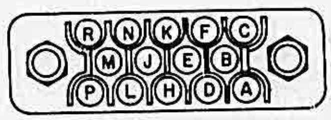
RG-188/U GLIDE SLOPE CABLE ASSEMBLY



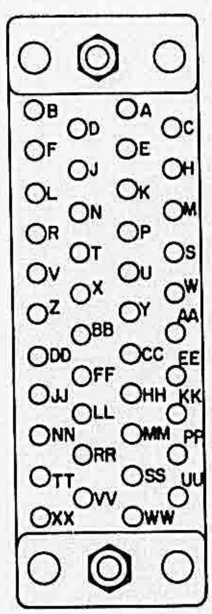
RG-58/U GLIDE SLOPE CABLE ASSEMBLY

FIGURE 2-1 GLIDESLOPE CABLE CONNECTOR ASSEMBLY

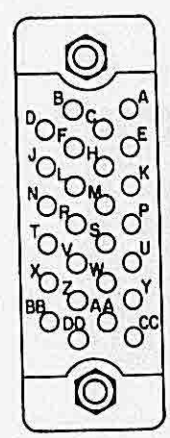
SEE BLOWUP



KI 201C



KI 213

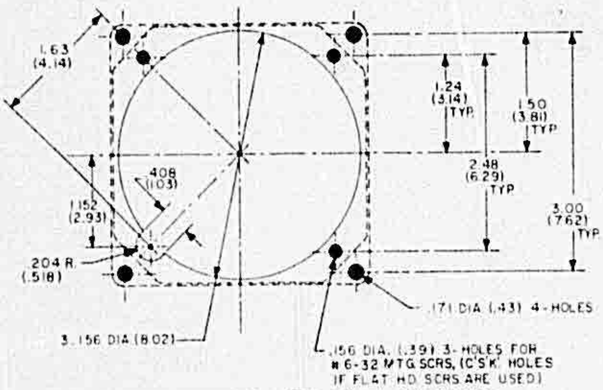


KI 214

FIGURE 2-2 KI 201C/KI 213/KI 214 CONNECTOR PIN LOCATIONS

SEE BLOWUP

NOTES:
1. DIMENSIONS IN ( ) ARE IN CENTIMETERS.
2. J 301 IS A 14 PIN CONNECTOR.
3. WEIGHT: KI-201C - 2.8 LBS (1.27 Kg)



CUTOUT DIMENSIONS FOR PANEL MOUNTING.

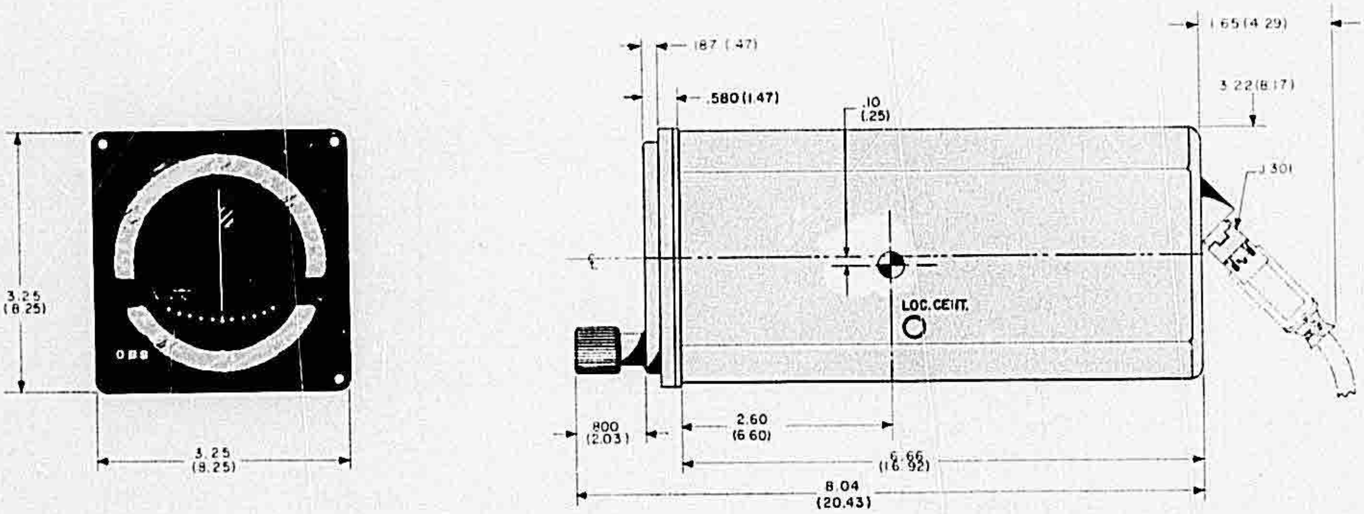
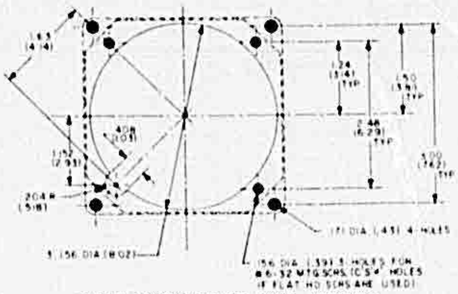


FIGURE 2-3 KI 201C INSTALLATION DRAWING
(Dwg. No. 155-5124-00, R-1)

SEE BLOWUP

NOTES:
1. DIMENSIONS IN ( ) ARE IN CENTIMETERS
2. J211 IS A 42 PIN CONNECTOR
3. WEIGHT: 2.5LBS(1.14Kg)



CUTOUT DIMENSIONS FOR PANEL MOUNTING

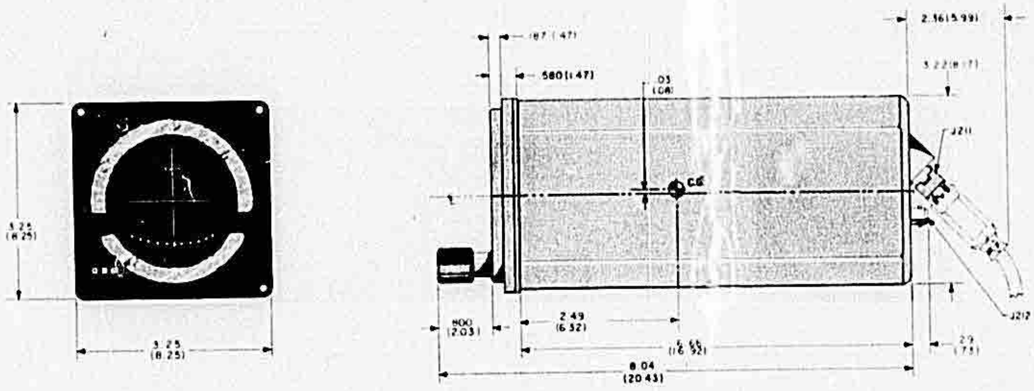
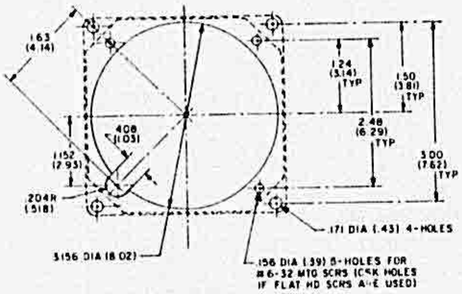


FIGURE 2-4A KI 213 INSTALLATION DRAWING (S/N1499 & Below)
(Dwg. No. 155-5125-00, R-1)

NOTES:
1. DIMENSIONS IN ( ) ARE IN CENTIMETERS.
2. J211 IS A 42 PIN CONNECTOR.
3. WEIGHT: 2.6LBS(1.17Kg)
4. THIS DWG EFFECTIVE ON SER. NO. 1500 AND UP.



CUTOUT DIMENSIONS FOR PANEL MOUNTING

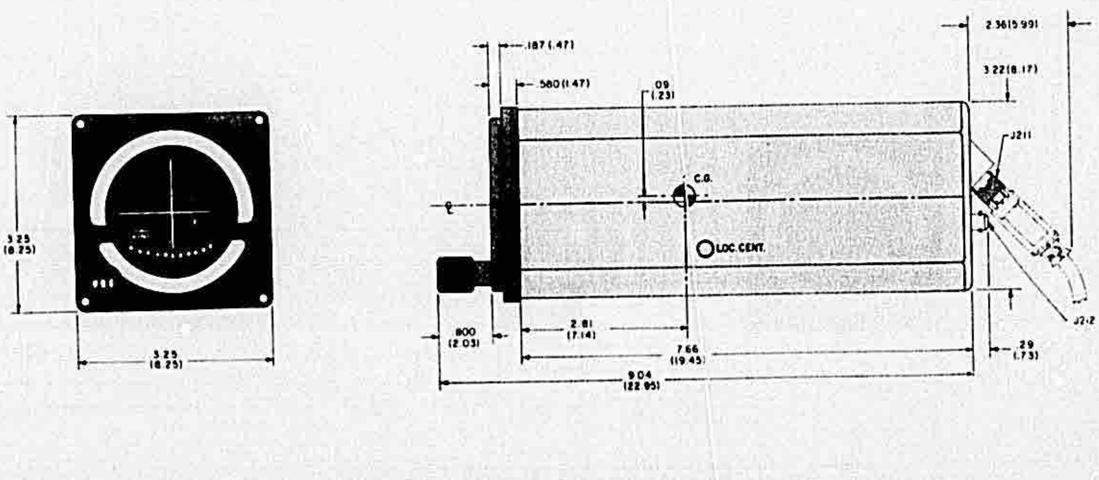


FIGURE 2-4B KI 213 INSTALLATION DRAWING (S/N 1500 & Above)
(Dwg. No. 155-5168-00, R-0)

SEE BLOWUP

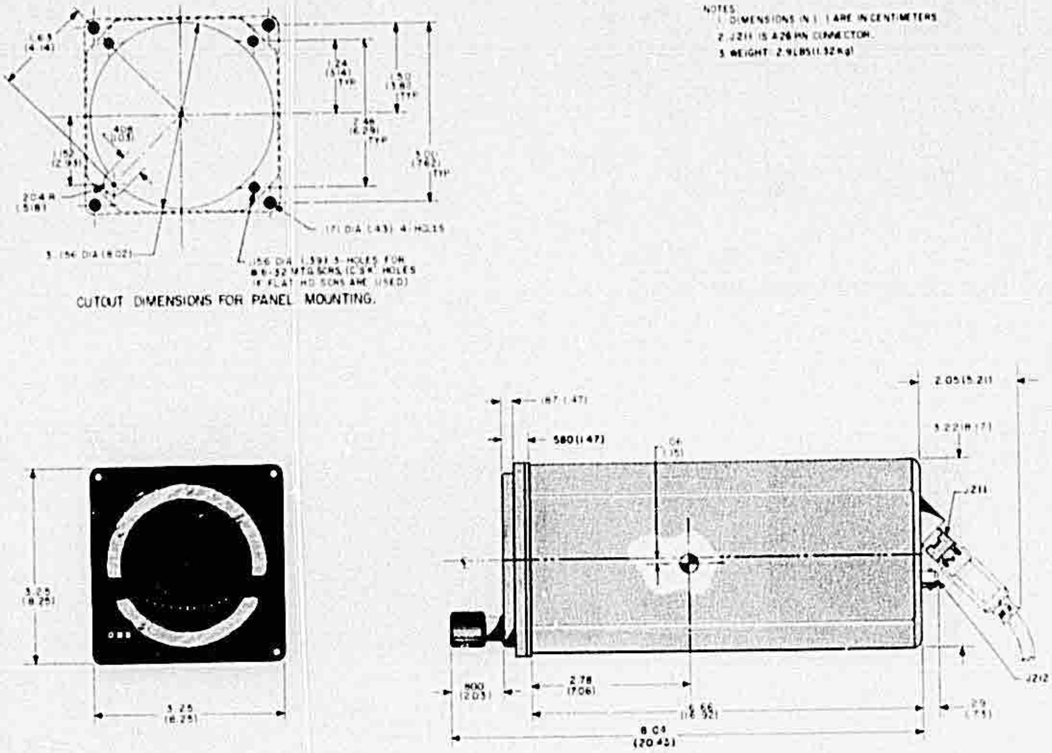


FIGURE 2-5A KI 214 INSTALLATION DRAWING (S/N 5399 & Below)
(Dwg. No. 155-5126-00, R-0)

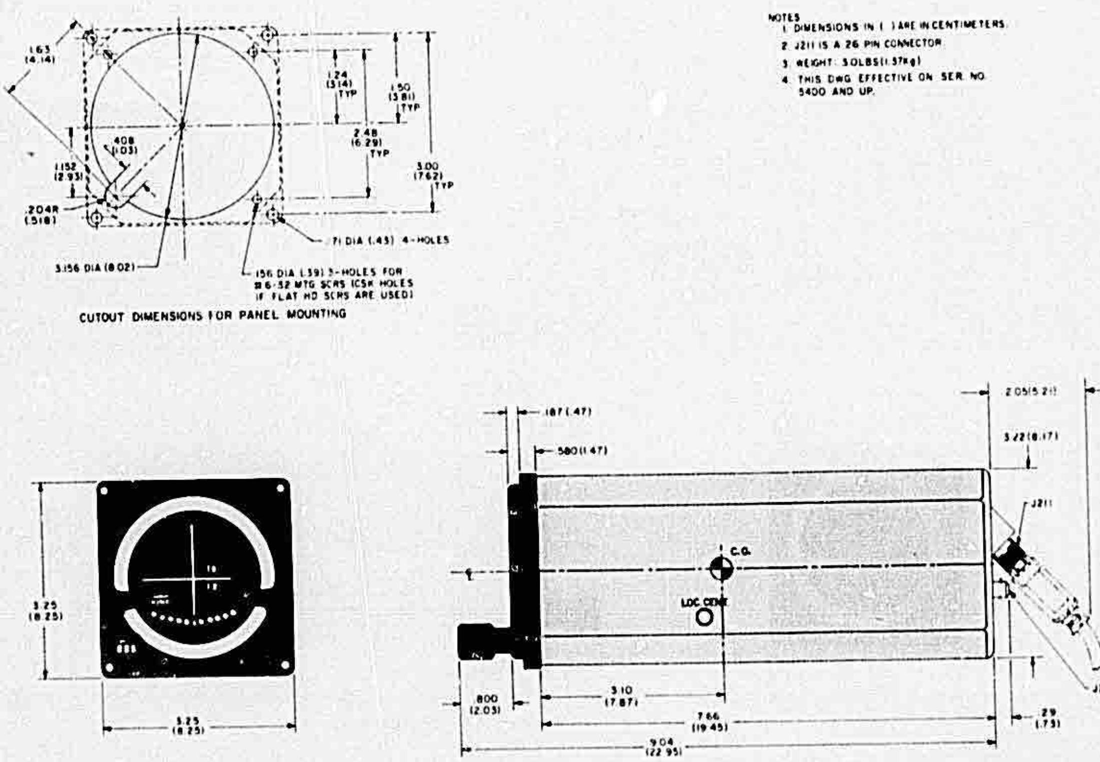


FIGURE 2-5B KI 214 INSTALLATION DRAWING (S/N 5400 & Above)
(Dwg. No. 155-5169-00, R-0)

SEE BLOWUP

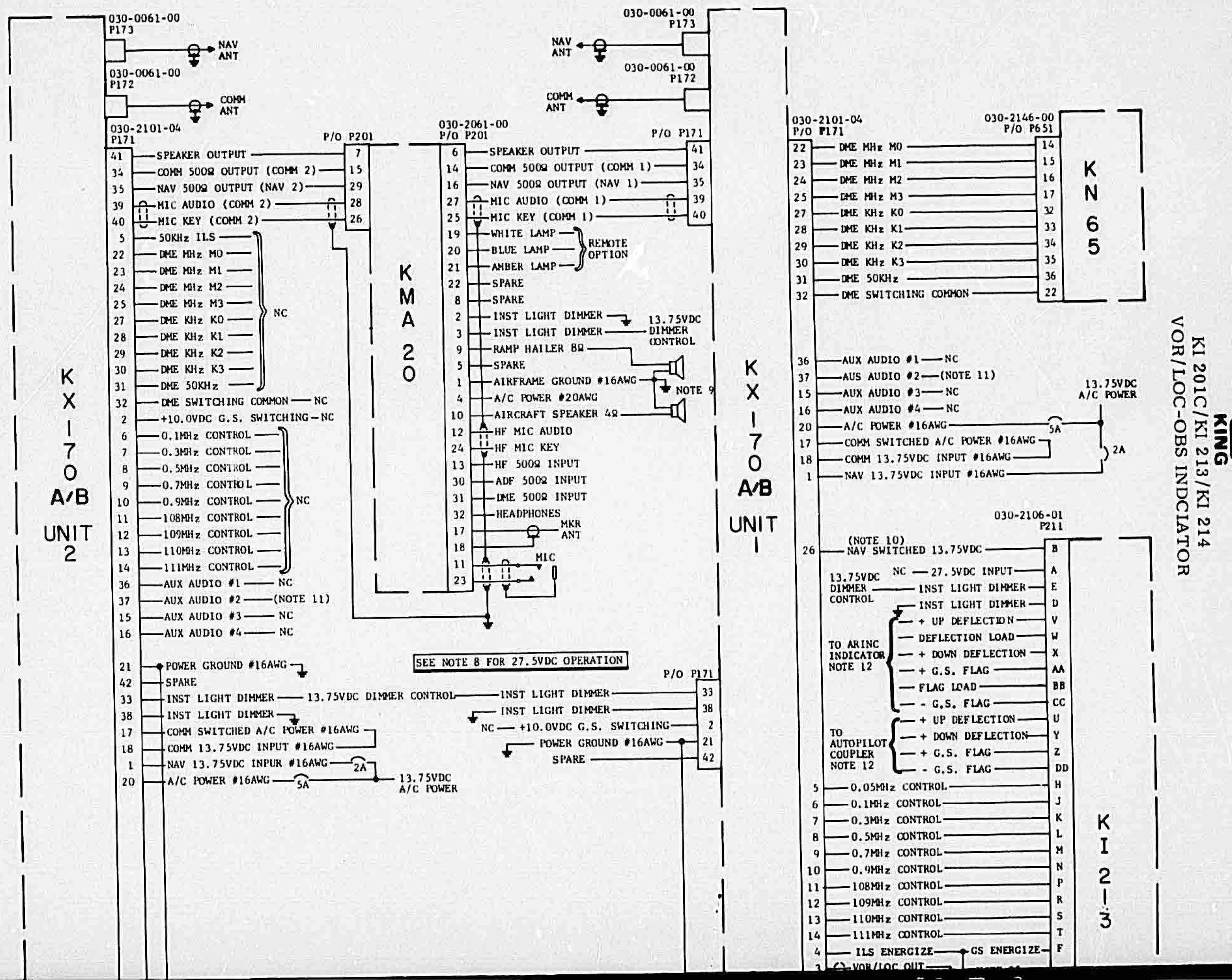
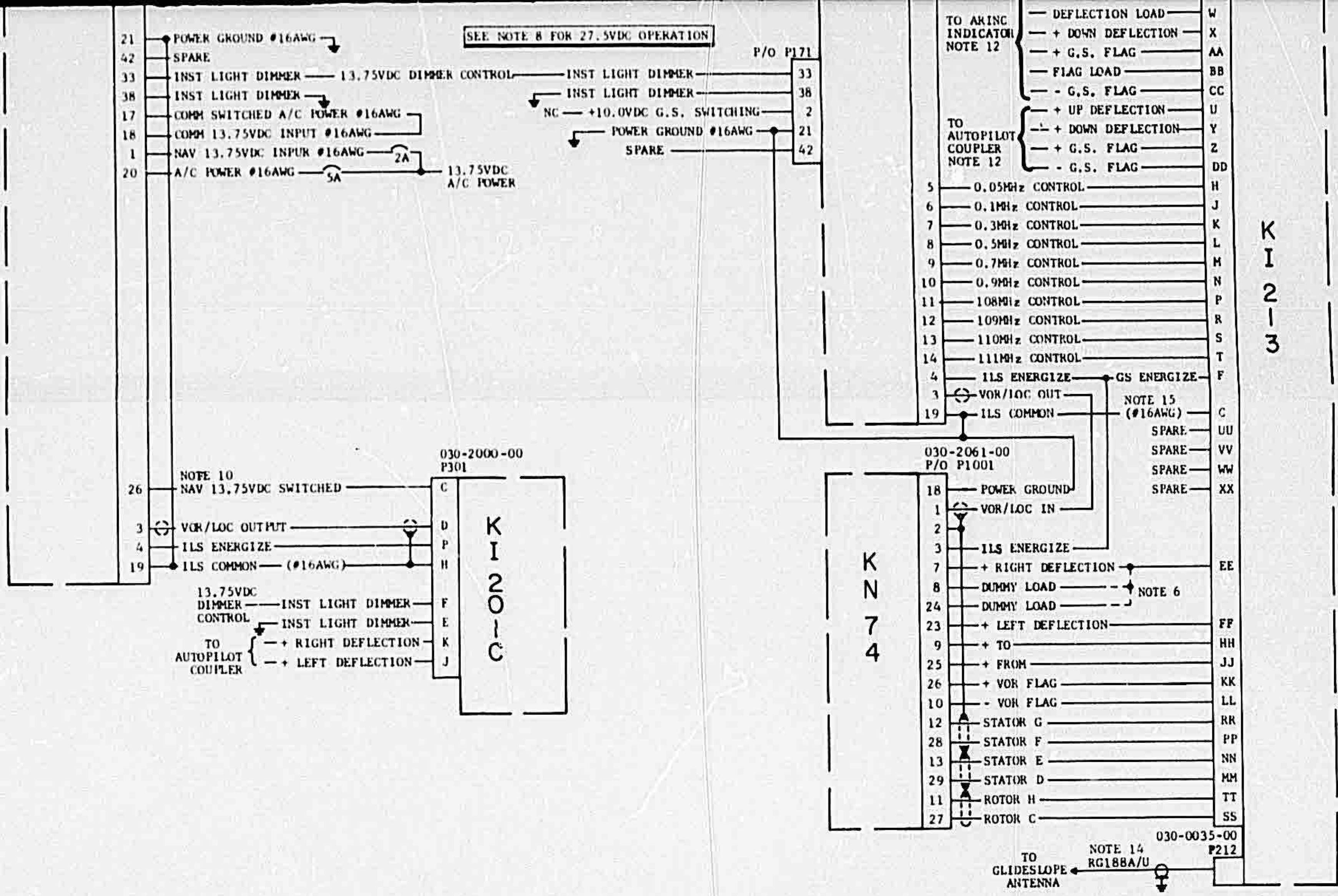


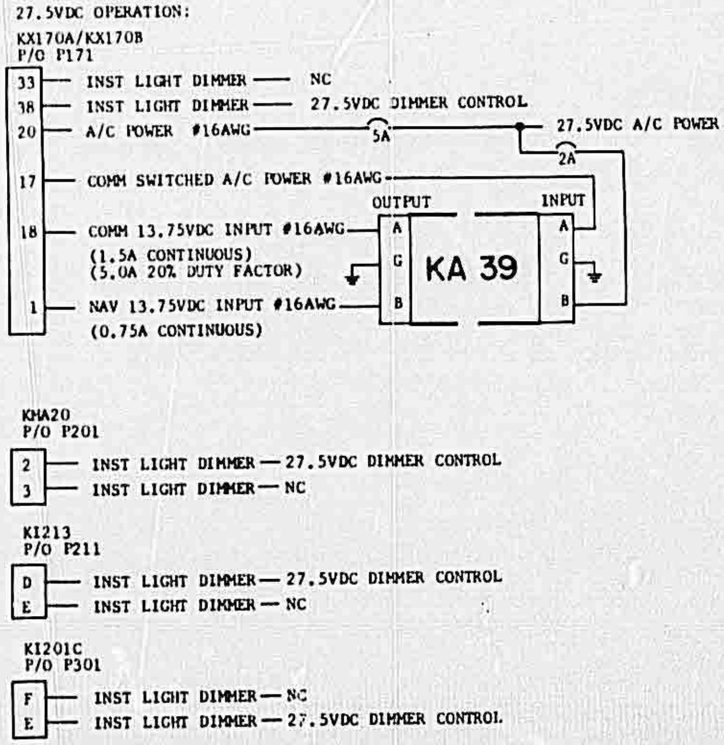
FIGURE 2-6 NON-TSO'D SILVER CROWN SYSTEM INTERCONNECT
(Dwg. No. 155-1128-00, R-3)

SEE BLOWUP



NOTES:

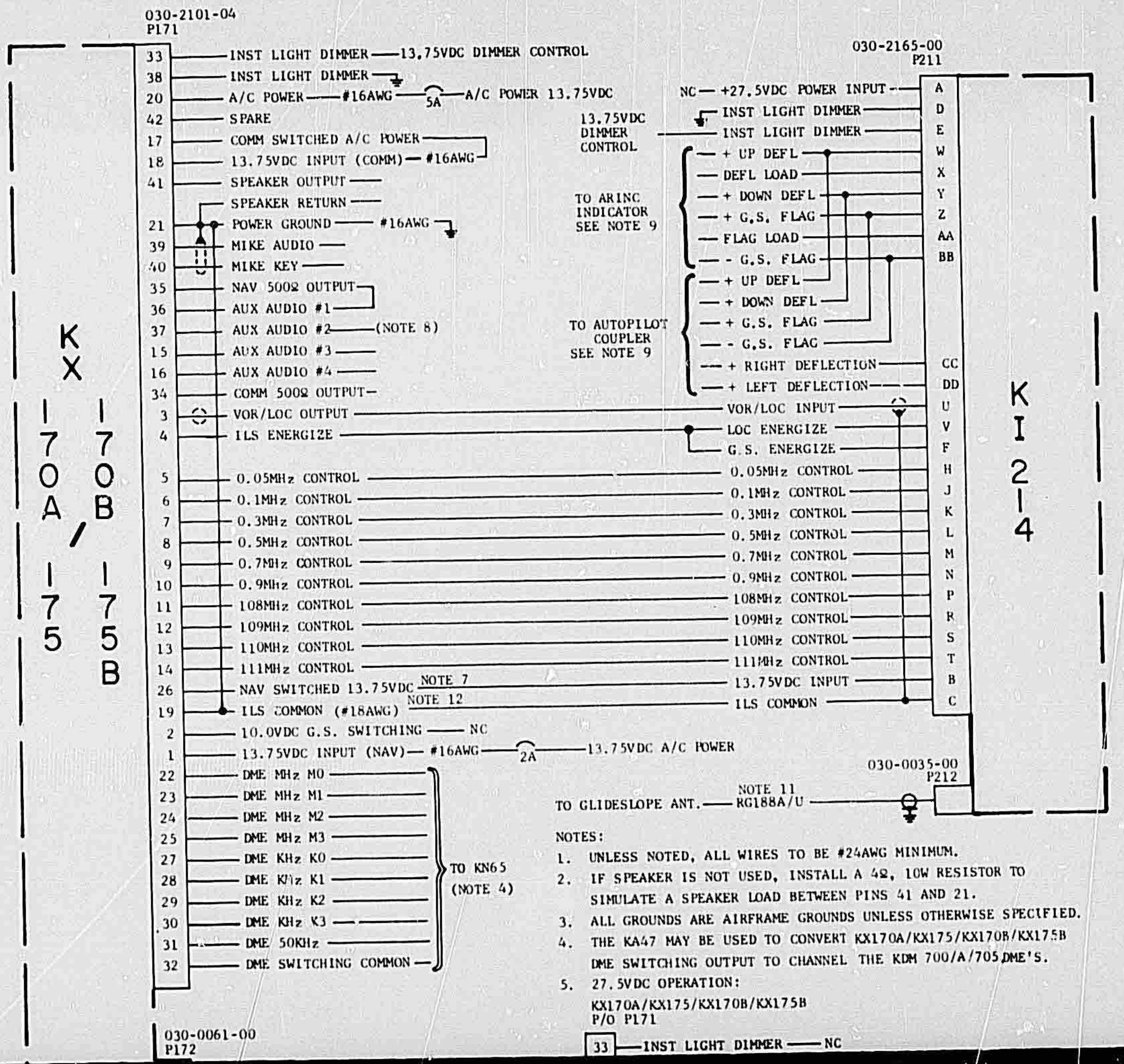
1. UNLESS NOTED; ALL WIRES #24AWG MINIMUM.
2. UNLESS NOTED; ALL ANTENNA COAX IS RG58A/U.
3. UNLESS SPECIFIED; ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX170B DME SWITCHING OUTPUTS TO CHANNEL THE KDM 700/A/705 DME'S.
5. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
6. KN74: FOR ONE INDICATOR JUMPER PINS 7, 8, AND 24.
   FOR TWO INDICATORS JUMPER PINS 7 AND 8.
   FOR THREE INDICATORS NO JUMPERS ARE REQUIRED.
7. KN65DME INDICATOR (KI265) NOT SHOWN.
8. 27.5VDC OPERATION:



9. RAMP HAILER AND AIRCRAFT SPEAKER RETURN LEADS SHOULD BE CONNECTED TO PIN 1 AT KMA20.
10. EXTERNAL SWITCHING CAPABILITY: COMM - PIN 17 - NONE
    NAV - PIN 26 - 300ma
11. AUX AUDIO #2 IS INTERCOM MIC INPUT ON KX170B.
12. THE KI213 HAS THE FOLLOWING EXTERNAL INDICATOR DRIVING CAPABILITY;

INDICATORS	VOR		GLIDESLOPE	
	FLAG	DEFLECTION	FLAG	DEFLECTION
ARINC	NONE	NONE	ONE JUMPER PINS AA & BB IF NOT USED	ONE JUMPER PINS V & W IF NOT USED
AUTOPILOT(HI Z)	NONE	NONE	ONE	ONE

13. COMPLETE INTERCONNECT INFORMATION FOR KN65 AND KN74 MAY BE FOUND IN THE RESPECTIVE INSTALLATION MANUALS.
14. GLIDESLOPE ANTENNA (KA 22 OR EQUIVALENT) MUST HAVE AIRFRAME GROUND.
15. ROUTE ILS COMMON AND POWER GROUND AWAY FROM COMM TRANSMITTER COAXIAL CABLES AND MAKE AIRFRAME GROUND NEAREST KX 170A/175/170B/175B. IF KA 39 IS USED, ROUTE OUTPUT PIN G WITH ILS COMMON AND POWER GROUND.



NOTES:

1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. IF SPEAKER IS NOT USED, INSTALL A 4Ω, 10W RESISTOR TO SIMULATE A SPEAKER LOAD BETWEEN PINS 41 AND 21.
3. ALL GROUNDS ARE AIRFRAME GROUNDS UNLESS OTHERWISE SPECIFIED.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX175/KX170B/KX175B DME SWITCHING OUTPUT TO CHANNEL THE KDM 700/A/705 DME'S.
5. 27.5VDC OPERATION:

   KX170A/KX175/KX170B/KX175B
   P/O P171

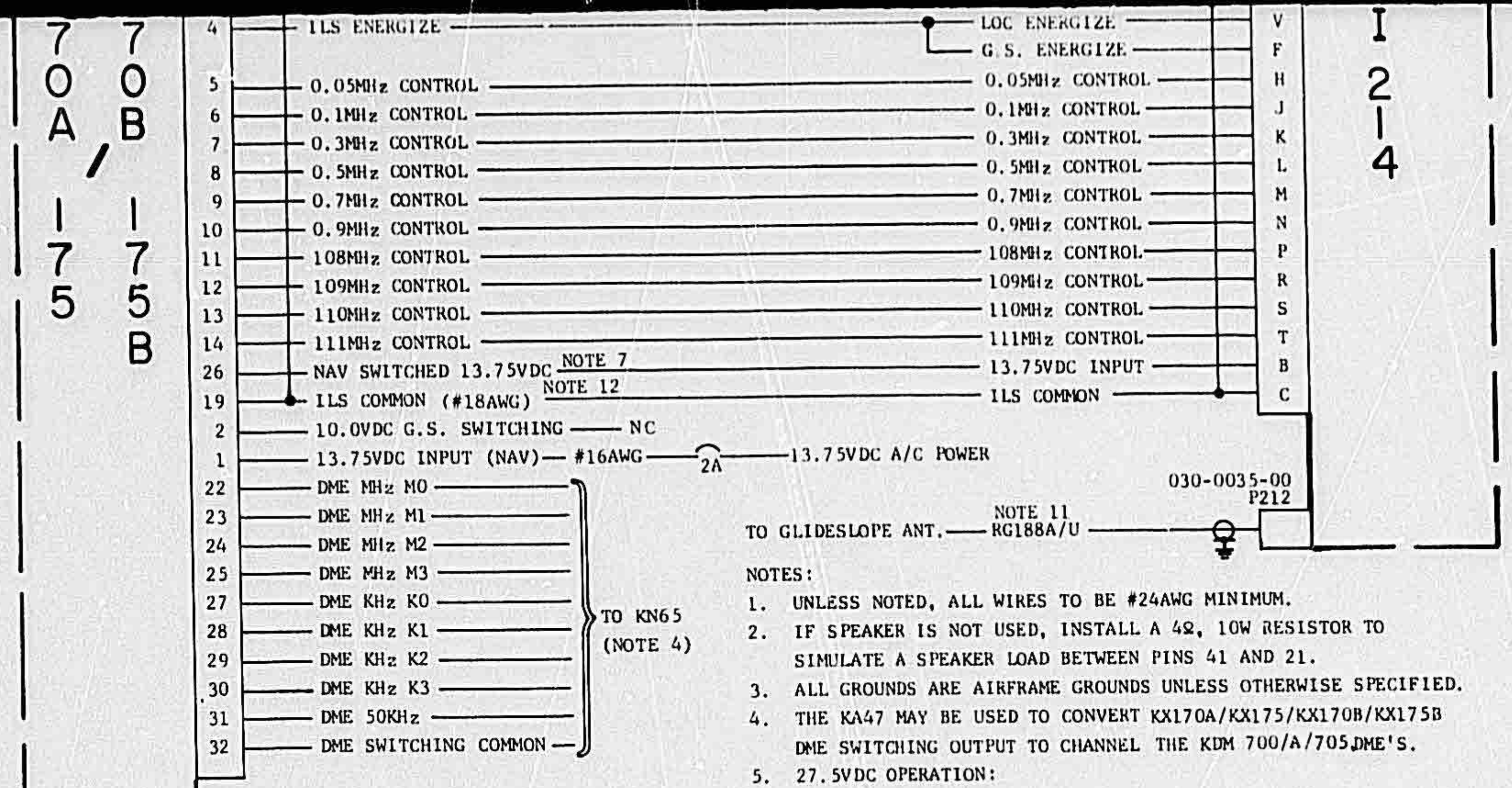
   33 — INST LIGHT DIMMER — NC

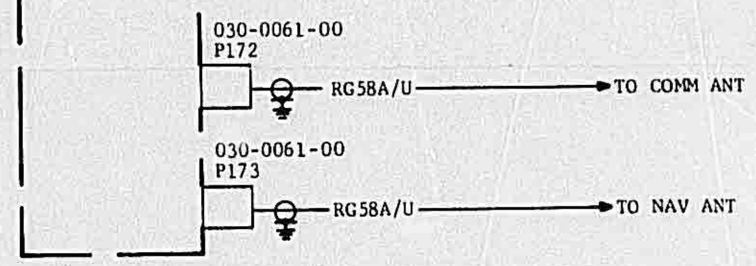
KING
KI 201C/KI 213/KI 214
VOR/LOC-OBS INDICATOR

FIGURE 2-7 KX 170A/170B/175 /175B/KI 214 INTERCONNECT
(Dwg. No. 155-1129-00 R-2)

SEE BLOWUP

KING
01C/KI 213/KI 214
OC-OBS INDICATOR





NOTES:

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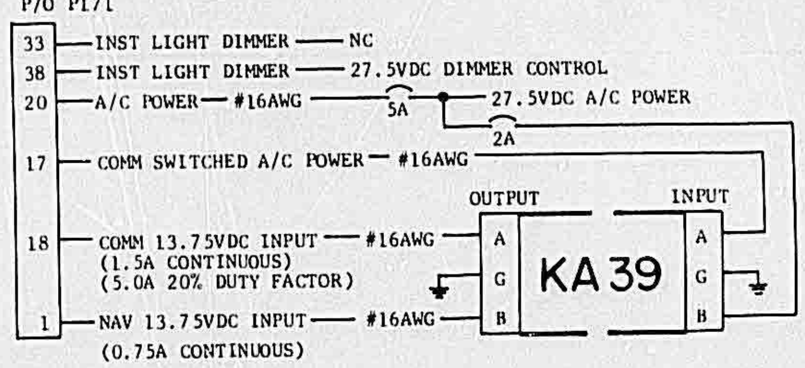
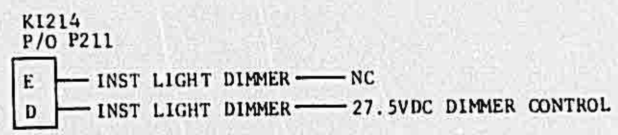
2. IF SPEAKER IS NOT USED, INSTALL A 4Ω, 10W RESISTOR TO SIMULATE A SPEAKER LOAD BETWEEN PINS 41 AND 21.
3. ALL GROUNDS ARE AIRFRAME GROUNDS UNLESS OTHERWISE SPECIFIED.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX175/KX170B/KX175B DME SWITCHING OUTPUT TO CHANNEL THE KDM 700/A/705 DME'S.
5. 27.5VDC OPERATION:





6. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
7. EXTERNAL SWITCHING CAPABILITY:

COMM	PIN 17	NONE
NAV	PIN 26	300ma

8. AUX AUDIO #2 IS INTERCOM MIC INPUT ON KX170B AND KX175B.
9. THE KI214 HAS THE FOLLOWING EXTERNAL INDICATOR DRIVING CAPABILITY:

	VOR		GLIDESLOPE	
INDICATORS	FLAG	DEFLECTION	FLAG	DEFLECTION
ARINC	NONE	NONE	ONE JUMPER PINS Z & AA IF NOT USED	ONE JUMPER PINS W & X IF NOT USED
AUTOPILOT(HI Z)	NONE	ONE	ONE	ONE

10. KI214 GLIDESLOPE AND LOCALIZER CAN BE ENERGIZED SIMULTANEOUSLY AS SHOWN OR ENERGIZED INDEPENDENTLY.
11. GLIDESLOPE ANTENNA (KA 22 OR EQUIVALENT) MUST HAVE AIRFRAME GROUND.
12. ROUTE ILS COMMON AND POWER GROUND AWAY FROM COMM TRANSMITTER COAXIAL CABLES AND MAKE AIRFRAME GROUND NEAREST KX 170A/175/170B/175B. IF KA 39 IS USED, ROUTE OUTPUT PIN G WITH ILS COMMON AND POWER GROUND.

0B/175 /175B/KI 214 INTERCONNECT
o. 155-1129-00 R-2)
LOWUP

SECTION III
OPERATION

3.1 GENERAL

All controls required to operate the KI 201C/KI 213/KI 214 are located on the unit's front panel and on the front panel of the related NAV/COMM transceivers:

3.2 KI 201C/KI 213/KI 214 INDICATOR CONTROL FUNCTIONS

3.2.1 OMNI BEARING SELECTOR (OBS)

The OMNI Bearing Selector knob rotates the azimuth card on which the desired course is selected. The course selected serves as a reference for all VOR indications.

3.2.2 VOR/LOC DEVIATION INDICATOR

The VOR/LOC deviation needle indicates the direction and amount of deviation from the selected VOR course or localizer path. The angular deviation is toward the proper flight path in normal operation.

The VOR/LOC warning flag is fully visible when the VOR or LOC signal is unreliable. The VOR TO/FROM flag indicates the direction "to" or "from" the VOR station.

3.2.3 GLIDESLOPE DEVIATION INDICATOR (KI 213/KI 214)

The glideslope deviation needle indicates the direction and amount of deflection from the glide path. The deflection is toward the direction of flight required to maintain the proper desent path. The glideslope warning flag is visible when the glideslope signal is unreliable or the receiver has malfunctioned.

3.3 KI 201C/KI 213/KI 214 OPERATION

3.3.1 VOR OPERATION

Select the desired VOR station frequency with the NAV frequency controls. The NAV receiver volume control can then be adjusted to positively identify the station or listen to FSS reports.

To intercept a selected VOR radial (from the station) and fly outbound, turn the OBS control to set the desired radial under the top indicator index. Maneuver the aircraft to fly the selected radial magnetic heading plus a 45° intercept angle which will provide a sufficient intercept angle. The intercept angle should be reduced as the deviation needle approaches an on course condition (center) to prevent excessive course bracketing.

To determine the bearing and fly "to" a selected VOR station, turn the OBS control until the "To-From" flag indicates "To" and the deviation needle is centered. Read the "to" bearing under the top indicator index and maneuver the aircraft to approximately fly the magnetic course "to" the station. If the deviation needle moves to the right, the aircraft course must be adjusted 5 or 10 degrees to the right. Similarly, if the deviation needle, goes to the left, the aircraft course must be adjusted to the left. Maintaining a centered deviation needle will provide automatic course compensation for wind drift.

While flying a selected VOR course often times it can be noted that the deviation needle moves erratically about the center or moves a few degrees to one side and eventually returns to center.

This action is refered to as VOR scalloping or course bends.

Scalloping is generally caused by irregularities in terrain and metal objects located near the VOR station. Scalloping is more noticable at lower altitudes and in any case should be ignored.

Aircraft position can be easily determined by consecutively selecting two VOR stations and determining the "from" radial. By projecting appropriate radial lines from the VOR station the aircraft location may be identified as the intersection of the two radial lines.

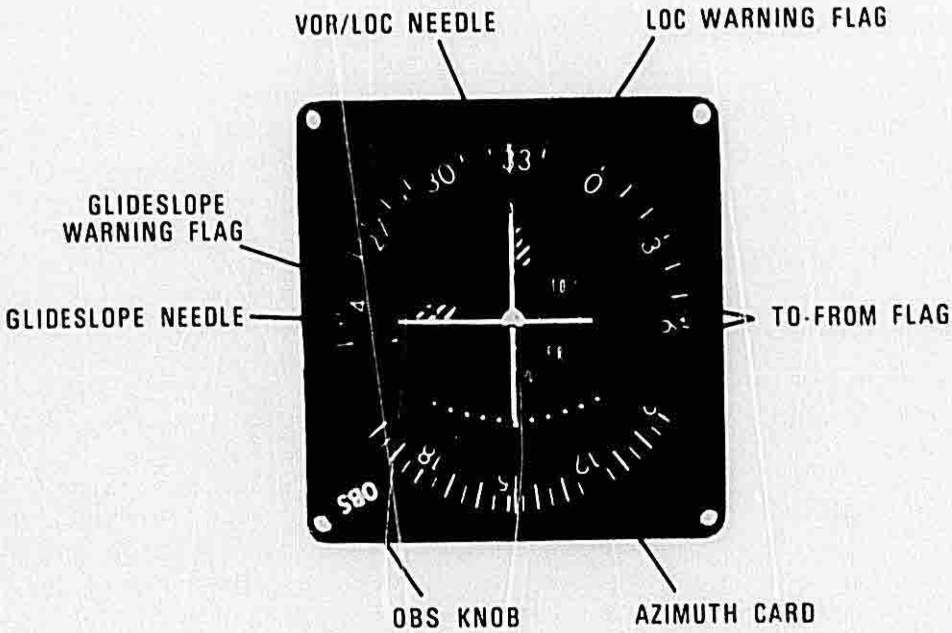


FIGURE 3-1 KI 201C /KI 213/KI 214 CONTROLS

3.3.2 KI 201C/KI 213/KI 214 LOCALIZER OPERATION

Localizer circuits are automatically energized when an ILS frequency is selected on the KX 170A/B or KX 175/B NAV receiver. By adjusting the NAV volume level the localizer station can be identified and in some cases ATIS information received. The localizer flag should disappear from view indicating the signal is reliable.

Maneuver the aircraft to fly on course centered needle. While flying a front course approach or out bound on the back course approach, magnetic heading corrections are made toward the needle deflection. Similarly, while flying the back course approach or outbound on the front course approach, corrections are made away from the needle deflection.

The localizer course width is narrow compared to VOR course width and requires much smaller course corrections to center the deviation needle. When intercepting the localizer course, the aircraft turn into the localizer course should be started when the needle moves off the meter stop.

A helpful quick reference reminder of the localizer course is to set the course on the Omni bearing readout.

3.3.3 KI 213/KI 214 GLIDESLOPE OPERATION

The glideslope (horizontal) needle provides the pilot vertical steering information during ILS approaches. The glideslope circuitry may be energized independently or when the associated localizer frequency is selected on the navigation receiver. Observe that the glideslope warning flag is concealed. The glideslope needle deflects toward the direction the pilot must fly to remain on the glideslope path. If the glideslope needle deflects upward, the aircraft is below the glideslope and must climb to center the needle. If the needle deflects downward, the aircraft is above the glide path and must descend to remain on the glide path. When the needle is centered the aircraft is on the glide path.

3.4 POST-INSTALLATION CHECKOUT

An operational performance flight test is recommended after the installation is completed to insure satisfactory performance of the equipment in its normal environment. To check the communications transceiver, maintain an appropriate altitude and contact a ground station facility at a range of at least fifty nautical miles. Contact a ground station close in. Place the squelch knob in the test position and listen for any unusual electrical noise which would reduce the COMM receiver sensitivity by increasing the squelch threshold. If possible, verify the communications capability on both the HIGH and LOW ends of the VHF COMM band.

To check the VOR/ILS System select a VOR frequency within a forth nautical mile range. Listen to the VOR audio and insure that no electrical interference such as magneto noise is present. Check the tone identifier filter operation. Fly inbound or outbound on a selected VOR radial and check for proper LEFT-RIGHT and TO-FROM indications. Check the VOR accuracy.

-NOTE-

At low altitudes VOR ground station scalloping may be present.

Flight test the ILS operation by flying a simulated ILS approach. Check localizer LEFT-RIGHT deflection and, if applicable, glideslope deflection. Check the localizer accuracy in relation to the ILS runway. Check the glideslope accuracy in relation to the published ILS approach altitude.

MAINTENANCE/OVERHAUL MANUAL

KI 201C / KI 213 / KI 214 VOR/LOC - GS INDICATORS

KING RADIO CORPORATION®
400 NORTH ROGERS ROAD
OLATHE, KANSAS, U.S.A.

ONE FULL YEAR WARRANTY

General Aviation Avionic products manufactured by King Radio Corporation (hereinafter called King) are warranted against defects in design, workmanship and material under normal use for which intended for one year after warranty registration provided such registration occurs within eighteen months of the factory shipping date.

King's limit of liability hereunder shall be to provide necessary parts and labor to repair said product, transportation charges prepaid at either King factory or an authorized King Service Center. King shall not be liable for consequential or other damage or expense whatsoever therefore or by reason thereof.

This warranty shall not apply to any product which has not been installed by an authorized King Installation Facility in accordance with the installation manual, or which has been repaired or altered in any way so as to adversely effect its performance or reliability, or which has been subject to misuse, contamination, negligence or accident.

This warranty is in lieu of all other General Aviation Avionics guarantees or warranties expressed or implied. King reserves the right to make design changes, additions to and improvements in its products without obligation to install such in products previously manufactured.

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SECTION IV

THEORY OF OPERATION

SECTION IV

THEORY OF OPERATION

4.0 GENERAL

The KI 201C and the KI 214 Indicators contain the same VOR/LOC converter. However, the KI 214 Indicator contains additional circuitry to provide glideslope information.

The KI 213 Indicator contains the same glideslope circuitry as the KI 214 and also performs the functions of a VOR/LOC Indicator without the VOR/LOC converter circuitry.

4.1 PRINCIPLES OF VOR SYSTEM

4.1.1 GENERAL

The basic function of VOR is to provide a means to determine an aircraft's position with reference to a VOR ground station and also to follow a certain path toward or away from the station. This is accomplished by indicating when the aircraft is on a selected VOR station radial or by determining which radial the aircraft is on. A means to differentiate between radials and identify them is necessary. For this purpose, advantage is taken of the fact that the phase difference between two signals can be accurately determined. The phase difference between two signals which are generated by the VOR station is varied as the direction relative to the station changes so that a particular radial is represented by a particular phase difference. Refer to Figure 4-2. One non-directional reference signal is generated with a phase that at any instant is different in in all directions. A second signal is generated with a phase that at any instant is the same different directions. The phase of the variable phase signal is the same as the phase of the reference signal only at the 0± radial (North). As the angle measured from the 0° radial increases, the phase of the variable phase signal lags the phase of the reference signal by the number of degrees of the angle from 0°. The reference and variable phase signals, which are 30Hz voltages, are carried by rf to make radio transmission and reception possible. The VOR receiving equipment must separate the 30Hz reference and variable phase signals from the rf carrier and compare the phase of the two signals. The phase difference is indicated on a course indicator or RMI.

4.1.2 VOR GENERATION

The VOR electromagnetic field is composed of the radiation from two ground based antennas radiating at the same carrier frequency. The first is a non-directional antenna radiating an amplitude modulated carrier. The frequency of the modulating signal varies from 9,480Hz to 10,440Hz back to 9,480Hz 30 times per second. That is, a 9,960Hz subcarrier amplitude modulates the rf carrier and is frequency modulated by 30Hz.

The second antenna is a horizontal dipole which rotates at the rate of 30 revolutions per second. The dipole produces a figure 8 field pattern. The rf voltages within the two lobes are 180° out of phase with each other. The rf within one of the lobes is exactly in phase with the rf radiated from the non-directional antenna and the rf within the other lobe is 180° out of phase with the non-directional field. The rotating figure 8 pattern reinforces the non-directional pattern on the in phase side of the dipole and subtracts from the non-directional pattern on the out of phase side. See figure 4-2. This results in a cardioid field pattern which rotates at the rate of 30 revolutions per second, the rate at which the dipole antenna rotates.

The signal at an aircraft within radio range of the VOR station is an rf carrier with amplitude varying at the rate of 30Hz because of the rotation of the cardioid pattern. The carrier is also amplitude modulated at the station by the 9, 960Hz signal which is, in turn, frequency modulated on a sub-carrier so that it may be separated from the 30Hz variable phase signal.

4.2 PRINCIPLES OF LOCALIZER SYSTEM

The localizer facility provides a visual display of the aircraft's position relative to a straight approach line to the runway. The ground based localizer antenna system generates two patterns. Refer to figure 4-1. One pattern is directed toward the right side of the runway, the second to the left. The two patterns have the same carrier frequency but different audio modulating signals. The pattern to the left of the runway (in normal approach) is 90Hz amplitude modulated while the pattern to the right is 150Hz amplitude modulated.

The ratio of 90Hz to 150Hz audio, after demodulation, is dependent only upon the position of the aircraft within the patterns. The patterns are adjusted so they are of equal strength on a vertical plane extending out from the runway centerline. When the aircraft is on this plane, the 90Hz and 150Hz voltages will be equal.

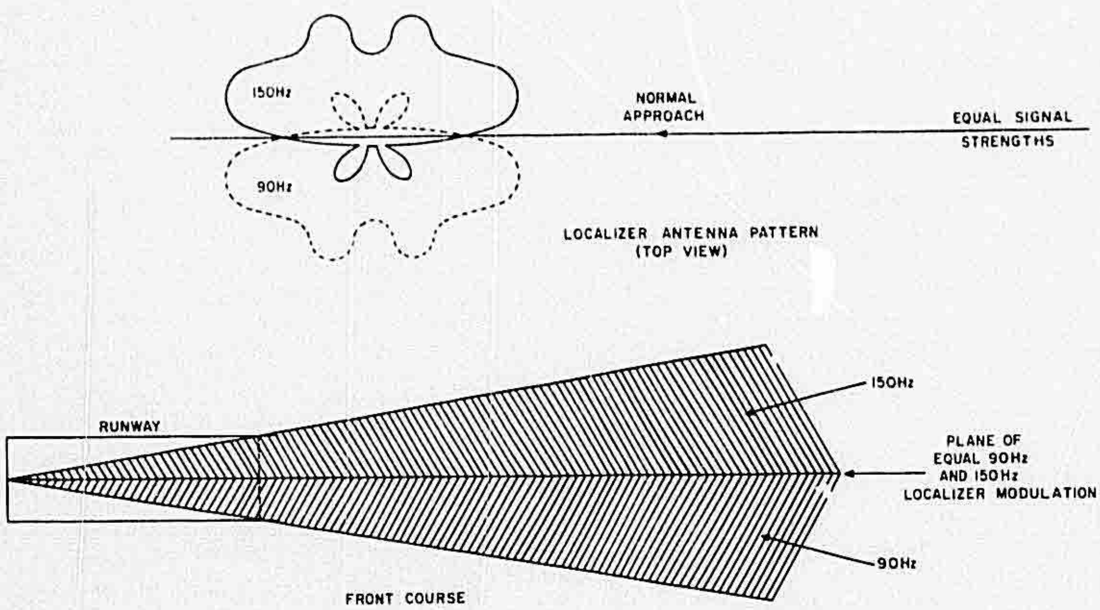


FIGURE 4-1 LOCALIZER SIGNAL GENERATION
(Dwg. No. 696-0705-00)

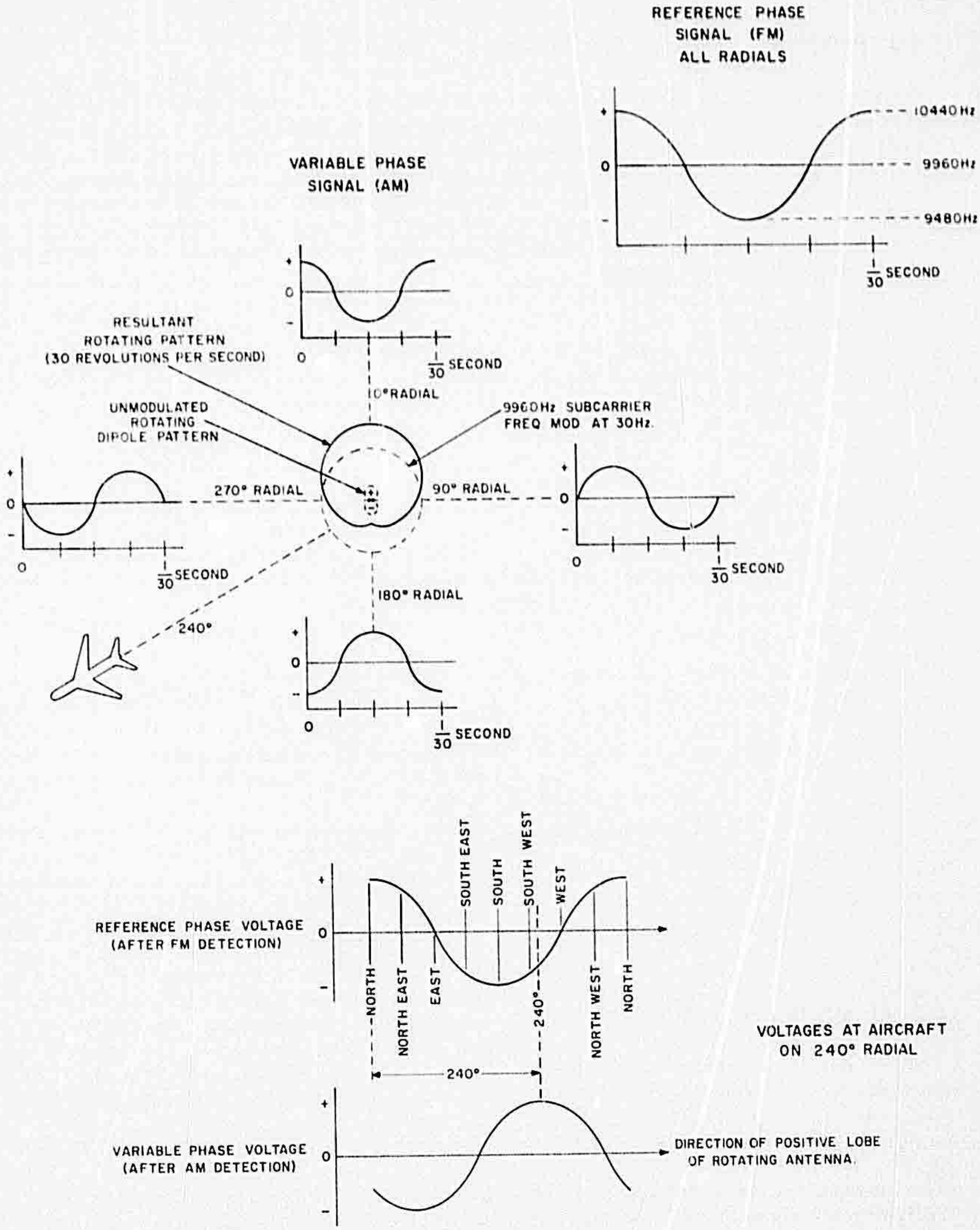


FIGURE 4-2 VOR SIGNAL GENERATION
(Dwg. No. 696-0714-00)

SEE BLOWUP

4.3 PRINCIPLES OF GLIDESLOPE SYSTEM (Figure 4-3)

The glideslope signal is radiated by a directional antenna array located near the approach end of the runway. The signal consists of two intersecting lobes of RF energy. The upper lobe contains 90Hz modulation and the lower lobe contains 150Hz modulation. The equal tone amplitude intersection of these two lobes forms the glide path. A typical glide angle is 2.5 degrees. If the aircraft is on the glide path, equal amplitudes of both tones will be received and the deviation bar will be centered. If the aircraft is above the glide path, 90Hz modulation predominates and the visual display is displaced downward. If below the glide path, 150Hz predominates and the display is displaced upward.

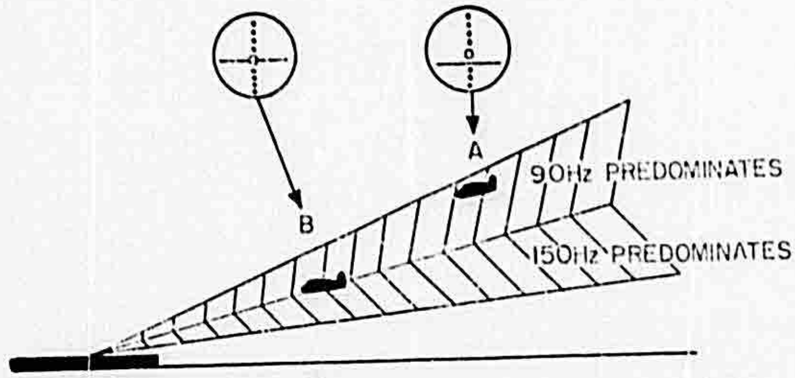


FIGURE 4-3 GLIDEPATH
(Dwg. No. 696-1539-00)

4.4 KI 201C/KI 214 VOR/LOC OPERATION (Figure 4-4 and 4-5)

The composite navigation signal is applied to potentiometer R315. The arm of R315 is DC isolated from the succeeding circuits by coupling capacitors C302, C312, and C321.

4.4.1 VARIABLE PHASE CIRCUITRY

The composite navigation signal is coupled through C302 to the base of amplifier Q301. The 30Hz selective amplifier, consisting of Q301, Q302 and Q303, provides three successive DC connected stages. Diode CR307 provides temperature compensation for Q301 and Q302. Feedback around the 30Hz amplifier is accomplished by a bridged "T" network comprised of C308, C309, R317. The bridged "T" network is tuned to 30Hz by selected resistor R317. Thus the input to the amplifier will be 30Hz and all other signals will be greatly attenuated. The amplifier output is coupled through C305 to the primary of T301.

4.4.2 VOR LIMITER/DISCRIMINATOR

The composite navigation signal is coupled to the limiter circuit by C321. The limiter, which consists of Q311 and CR303, effectively removes any amplitude modulation on the navigation signal. Capacitor C321 effectively blocks the 30Hz signal and passes the 9960 FM signal. Diode CR303 and the base to emitter junction of Q311 provide the diode limiting action. The limiter output is amplified by Q312. The amplified output from Q312 is applied to a conventional FM discrimination circuit consisting of T302, CR304, and CR305. The discriminator recovers the 30Hz reference phase signal and eliminates 9960 FM signal. The discriminator 30Hz output is the input to emitter follower Q313. The output from Q313 is applied to resolver B301 and also to VOR/LOC switch Q308. The VOR/LOC switch is turned "on" by the 30Hz applied to the base. During the conducting state of Q308, the bases of Q306, Q307, Q309 and Q310 are at ground potential and therefore are not functional. For localizer operation, (paragraph 4.4.6) no 30Hz is applied to the base of Q308, therefore Q306, Q307, Q309 and Q310 are functional.

4.4.3 RESOLVER B301

The resolver input is the output from Q313. The outputs from the two rotor windings of B301 are combined through a phase shifting network comprised of C328, R351 and R352. Potentiometer R351 permits the quadrature adjustment for VOR mode. The resolver output is the input to a three stage D-C coupled, 30Hz, selective amplifier (Reference Phase Amplifier).

4.4.4 REFERENCE PHASE AMPLIFIER

The 30Hz selective amplifier, consisting of Q314, Q315, and Q316, provides three successive D-C coupled amplifier stages. Diode CR306 provides temperature compensation for Q314 and Q315. Feedback around the three stage 30Hz amplifier is provided by a bridged "T" network comprised of C315, C316 and R338. The bridged "T" network is tuned to 30Hz and all other signals will be greatly attenuated.

The selective amplifier output is coupled through C333 to the primary of transformer T303. The output from terminal 3 (in phase with terminal 2) of T303 is coupled through flag threshold diode CR302 to transformer T301. The variable phase voltage output from T301 is connected to the secondary of T303. The phase of the two input voltages is compared and the resultant voltage is amplified by comparators Q317 and Q318. The D-C output from the comparators controls VOR/LOC indicator M101D. If the phase inputs to T303 are exactly 90° or 270° out of phase, there is no output from Q317 and Q318 and the VOR/LOC needle is centered. When the phase inputs to T303 are exactly in phase or 180° out of phase the output from Q317 and Q318 is maximum and the needle is deflected to a maximum. Thus any variation of phase change between the two maximums will deflection the VOR/LOC needle proportionally.

To illustrate the operation, suppose the aircraft is heading due north from a VOR station. The reference and variable phase signals reaching the aircraft are in phase. The 0° radial of the KI 201C/214 course card is beneath the course index, giving a 90° phase difference into the comparator and a zero output from the comparator. The VOR/LOC needle is centered. If the aircraft deviates to the 359° radial, the signals reaching the aircraft are 359° (1°) out of phase. Since the phase shift in the resolver circuit is the same as for the 0° radial, the inputs to the comparator are 91° out of phase. An output from the comparator results, and the VOR needle deviates to the right. If the aircraft deviates to the 2° radial, the reference signal requires a

92° phase shift to center the needle. It receives only a 90° shift in the circuit so the signals into the comparator are 88° out of phase. An output results, causing the needle to deviate to the left. When the aircraft is heading south from a station, the course card would normally be set so the 180° radial is beneath the course index. The resolver phase shift would then be 270°. If the aircraft drifted off course, the phase shift required to put the inputs to the comparator 90° out of phase would be less than, or greater than, 270° depending on direction of drift. An output from the phase comparator and a VOR/LOC needle deviation results.

4.4.5 VOR/LOC WARNING AND TO-FROM FLAG CIRCUITRY

The output from T301 is the input to comparators Q304 and Q305. The phase relationship between the variable 30Hz and the reference 30Hz is rectified by comparators Q304 and Q305. The output from the comparator controls the TO-FROM flag. The comparator output also controls the warning (OFF) flag which utilizes the same meter movement as the TO-FROM flag. Resistor R341, R339 and capacitors C307 and C317 phase shift the reference phase input to T301 by 90°. If the VOR needle is centered, the reference phase signal and variable phase signal entering the TO/FROM phase comparator will be either in phase or 180° out of phase. The TO/FROM phase comparator has a dc output of proper polarity to pull the "TO" indication into view when the signals are in phase, while the "FROM" indication is in view when the signals are 180° out of phase. If the signals into the comparator are not in phase or 180° out of phase, the output will be less than maximum. The output decreases to zero at 90° or 270° phase difference and the TO/FROM window is blank. The relative phase of the two signals is dependent upon the direction of the aircraft from the station with respect to the direction set beneath the course index. When a heading of the direction given beneath the course index would direct the aircraft toward the station, a "TO" indication is given. When the heading of the direction given beneath the course index would direct the aircraft away from the station, a "FROM" indication is given. Only the direction of the aircraft from the station affects the indicator, not the heading of the aircraft with respect to the station.

4.4.6 LOCALIZER CIRUCITRY

The composite navigation signal is coupled through C312 to the base of amplifier Q307. The output from Q307 is coupled through the secondary winding of resolver B301 to a three stage dc connected broadband amplifier consisting of Q314, Q315 and Q316. Since diode CR308 is forward biased, limiter Q311 is disabled and therefore VOR/LOC switch Q308 is biased off (paragraph 4.4.2). Since Q306, Q309 and Q310 are biased "on" through R333 and Q308 is biased "off" due to the absence of a 30Hz output from Q313, the converter is in the localizer mode. Amplifier Q309 eliminates the 30Hz notch filter, consisting of C315, C316 and R338. When the filter is disconnected from the base of Q314 the selective amplifier becomes broadband. Since the amplifier is now broadband, the localizer signals (90 and 150Hz) are processed in the same manner as the VOR signal (paragraph 4.4.4). The localizer signals now control the localizer needle deflection. Transistor Q310 effectively grounds one side of the meter. This assures that the output signals from the comparator provides a "TO" indication when operating in the localizer mode. Diode CR302 provides a stand-off voltage such that the alarm flag is visible when the 90 and/or 150Hz modulation signal is unreliable. Amplifier Q306 effectively disconnects the 30Hz notch filter from the base of Q301 to broadband the amplifier. The bridge "T" network is tuned to 120Hz by potentiometer R321. The bridge "T" network has the characteristic of phase shifting the signals that are coupled through the network. The frequencies below resonance (90Hz) are shifted approximately 90° lagging. The frequencies above resonance (150Hz) are shifted approximately 90° leading. Thus, the composite localizer signal is amplified by the selective amplifier, the 90Hz and 150Hz components are phase shifted (separated) permitting use of the same comparator circuit as employed in the VOR mode. The localizer signals are now compared in the same manner as the VOR signals. The resultant output from T301 and T303 control the warning and TO-FROM flags and the LEFT-RIGHT Deviation of the VOR/LOC needle, respectively.

4.5 KI 213/KI 214 GLIDESLOPE OPERATION (Figure 4-6)

4.5.1 GENERAL

The Glideslope Receiver contained in the KI 213/KI 214 is a "superregenerative" receiver. This superregenerative receiver utilizes a detector circuit that oscillates at a frequency equivalent to the mixed difference of the received frequency and local oscillator frequency. This oscillation frequency could be called an "IF" frequency. Periodically the oscillator is turned on and quenched off at a rate of approximately 7KHz. This quenching process is called squegging. The advantages are extreme sensitivity, selectivity, and simplicity.

4.5.2 PRESELECTOR AND RF AMPLIFIER

The Glideslope signal is coupled through a three-section tunable micro-strip filter (C412, C414, C416) to the base of common emitter RF amplifier Q402. The gain of this amplifier is controlled through Q428 and R481 by feedback from the D.C. amplifiers. RF output is capacitively coupled to the base of superregenerative detector Q403 by C420. Optimum power transfer is accomplished by tuning C421. The preselector and RF amplifier combined have approximately unity gain and a 3db bandwidth of 7.5MHz.

4.5.3 LOCAL OSCILLATOR

Q401, the common base colpitts oscillator utilizes a series resonant crystal in the feedback path to generate the 103.000MHz crystal controlled frequency. The oscillator output is coupled to a micro-strip tank circuit which is tuned to the third harmonic of the oscillator frequency, or 309.000MHz. The -30dbm tripled output is capacitively coupled through C408 to the emitter of Q403.

4.5.4 QUENCH OSCILLATOR

Q404 and Q405, along with their respective resistor-capacitor circuitry, form a 7KHz multivibrator. This square wave oscillator provides external quenching for the superregenerative detector. The superregenerator oscillation period is set by R418. CR405 and CR406 are protection against emitter-base reverse voltage breakdown of Q404 and Q405.

4.5.5 GLIDESLOPE TUNING MATRIX AND 150KHz INTERPOLATOR

The Glideslope tuning matrix, which supplies the D.C. voltage for tuning varactor diode CR402, consists of twenty circuits. Each contains a resistor in series with a potentiometer that is tied to the collector of a switching transistor. One circuit is switched in for each of the twenty 300 KHz spaced Glideslope channels. Wafer switch S107 in the KX 170 provides a ground for the emitter transistors, while S106 in the KX 170/170A/170B/KX 175/175B provides the base bias. The collector of each transistor is connected to a variable resistance which, when the particular transistor is on, will form a voltage divider network with R470 in the KI 213/KI 214.

When a glideslope frequency is selected, for instance 110.3MHz, the MHz wafer applies a ground to the emitters of Q416-Q420. The base bias thru S106, the KHz wafer, is applied to Q407, Q412, Q417 and Q422. This would cause only Q417 to turn "ON", connecting R446 to ground thru the transistor. R445 and R446 are connected to R470 which provides, through voltage division, the proper tuning voltage to tune varactor diode CR402.

150kHz channel tuning is achieved with an interpolation circuit. Q429 is turned on when the .05MHz line is grounded. R471 and R472 thus lower the reference voltage available to the tuning voltage matrix. The net effect is to shift downward by 150kHz, the superregenerator oscillator frequency selected by each matrix switching circuit.

4.5.6 SUPERREGENERATIVE DETECTOR

The superregenerative detector stage performs four distinct functions. It mixes the glideslope signal with the local oscillator frequency to give an intermediate frequency. Next, it oscillates exactly at the intermediate frequency. The oscillator is a Hartley Oscillator in the common emitter configuration. The mixed signal is then amplified during the buildup of the oscillation amplitude. Lastly, the modulation is detected directly from the IF signal.

The superregenerator oscillator frequency is controlled by the tuning voltage matrix through R469. This frequency varies from 20.150MHz to 26.000MHz, with 150kHz spacing between the 40 glideslope channels.

The period of oscillation during the quench cycle is monitored at TP402 and adjusted by R418. Q426 is an emitter follower that supplies current to emitter resistor R407 which varies with tuning voltage. This allows the superregenerative detector to oscillate at approximately the same bias voltage regardless of the variation in it's collector load caused by tuning diode CR402. Diode CR403 and capacitor C442 provide temperature compensation for the tank circuit.

4.5.7 AUDIO AMPLIFIERS

Audio is coupled through C422 and R416 to the audio board. I901A and I901B are audio gain stages common to both 90Hz and 150Hz. The input resistors and capacitors to these two operational amplifiers as well as those used as feedback around the amplifiers form a band pass active filter. 90Hz and 150Hz are amplified while the 7kHz quench signal is attenuated.

R943 and Q908 are connected between R910 and R940 and ground. The conductance of Q908 and hence the second stage gain is controlled by the AGC voltage from the emitter of Q902. Total gain for the two stages is approximately 40db. R939 is an audio output adjustment.

4.5.8 90Hz SELECTIVE AMPLIFIER

The 90Hz selective amplifier consists of I901C, C908, C909, R915, R916 and R913. It is an active filter tuned to 90Hz with 150Hz attenuated. 90Hz gain is approximately 26db with a 3db bandwidth of 9Hz. Emitter follower Q906 is used as isolation between the selective amplifier and the 90Hz rectifier.

4.5.9 90Hz RECTIFIER

The full wave rectifier consisting of diodes CR903 and CR904, charges C913 to the peak value of the 90Hz signal. This D.C. level varies proportionally with the amount of 90Hz signal received. The amount of signal received is dependent upon the location of the aircraft with respect to the glidepath.

4.5.10 150Hz SELECTIVE AMPLIFIER

The 150Hz selective amplifier, consisting of I901D, C910, C911, R918, R919 and R914, functions in the same manner as the 90Hz selective amplifier (paragraph 4.5.8) except that the 150Hz signal is used and the 90Hz signal is eliminated. 150Hz gain is approximately 26db with a 3db bandwidth of 15Hz. Again an emitter follower Q905 is used for isolation.

4.5.11 150Hz RECTIFIER

The 150Hz rectifier, consisting of CR405 and CR406, functions in the same manner as the 90Hz rectifier (paragraph 4.5.9) except that the D.C. level varies proportionately with the amount of 150Hz signal received.

4.5.12 FLAG AMPLIFIER

The input to flag amplifier Q902 is the summation of the D-C outputs from the 90Hz and 150Hz rectifiers the amplifier output is applied to the warning flag and meter movement. AGC voltage is obtained from the emitter of Q902.

4.5.13 DEFLECTION CIRCUITRY

The 90Hz D-C amplifier (Q403) drives the "+Down" terminal of the deflection meter, while the 150Hz D-C amplifier (Q904) drives the "+Up" meter terminal through R927. R927 is adjusted to set standard deflection. R912, the input potentiometer to the selective amplifiers, is used to center the deflection needle. C924 and C925 are damping capacitors tied to the bases of emitter followers Q903 and Q904 to negate the effects of system noise.

4.5.14 SERIES REGULATOR

The series regulator consists of pass transistor Q901, bias setting transistor Q907, reference zener diode CR901 and associated circuit elements. Transistor Q907 along with diode CR901 developes biasing for pass transistor Q901. This bias is adjusted by varying potentiometer R937 for a voltage at the emitter of Q901 of 10.0v.

4.5.15 GLIDESLOPE ENERGIZE CIRCUIT

This circuit consists of transistor Q427, diode CR404 and resistor R476. The function of this circuit is to lower the level of the quench oscillator output to the superregenerative detector. This lowered level does not allow Q403 to be turned on to enable the oscillator. When tuned to a glideslope channel, the Glideslope energize line is grounded externally, thereby turning off Q427. The voltage at the junction of R417 and R418 is unaffected when tuned to a channel which is not a glideslope channel, the glideslope energize line is open circuited. Q427 is biased on through R476. The higher conductance through the collector of Q427 shunts R418, R479 and R419, thereby lowering the quench voltage to Q403. Diode CR404 protects Q427 in the event the glideslope energize line is returned to a high positive voltage on non-glideslope channels. C440 is used as an rf bypass on the glideslope energize line.

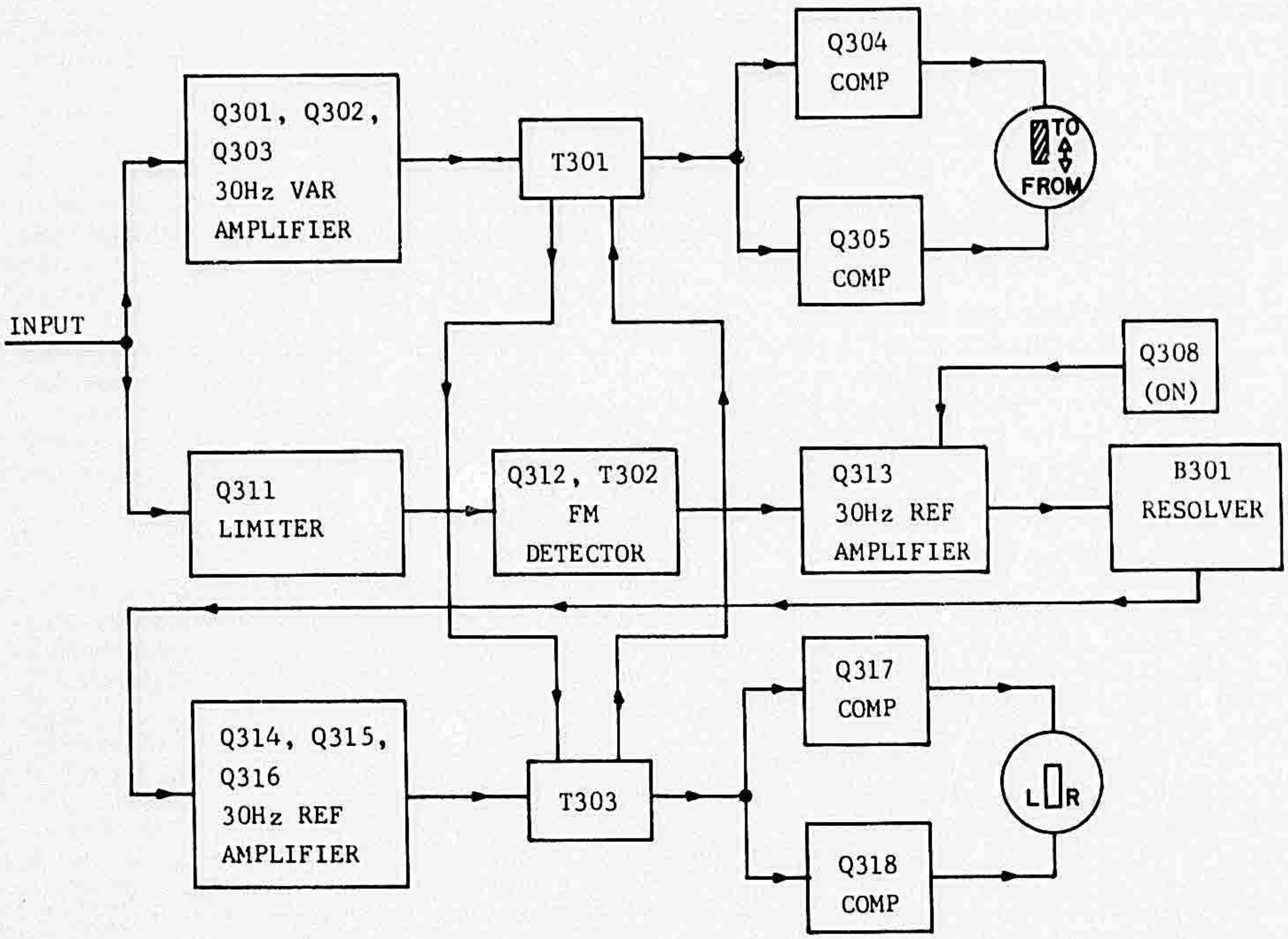


FIGURE 4-4 KI 201C/214 VOR SECTION BLOCK DIAGRAM
(Dwg. No. 696-2826-00)

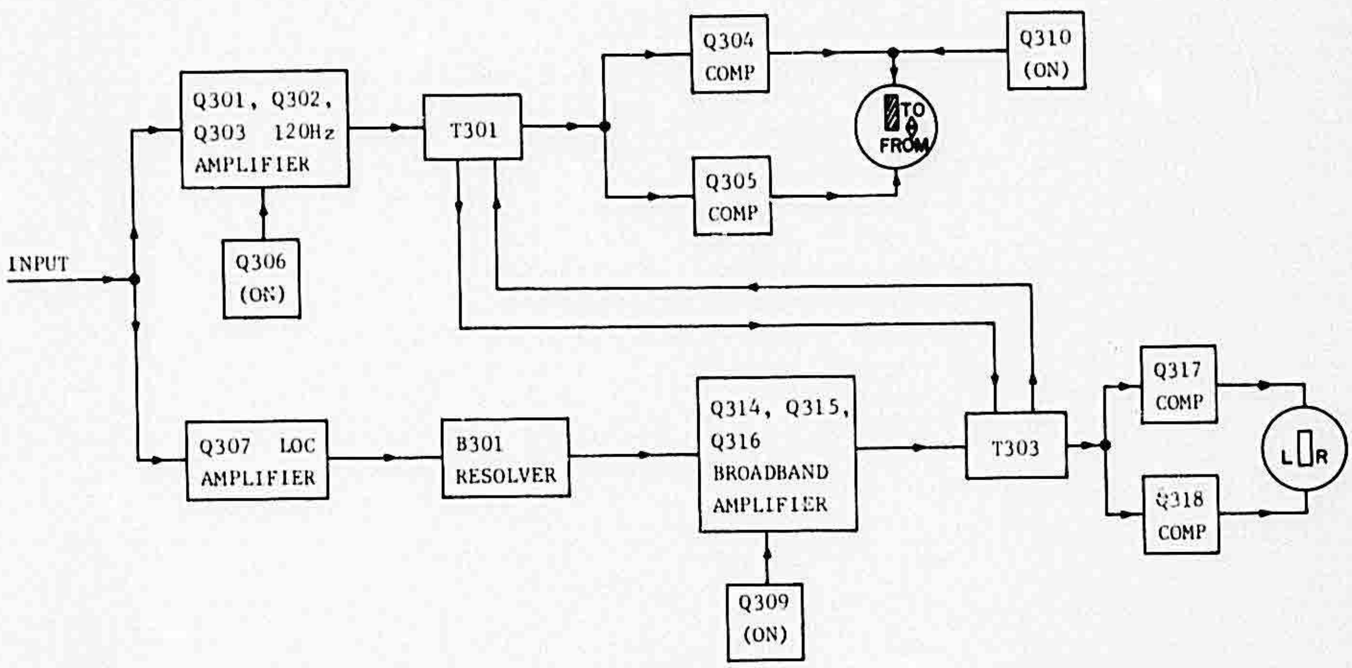


FIGURE 4-5 KI 201C/214 LOC SECTION BLOCK DIAGRAM
(Dwg. No. 696-2827-00)

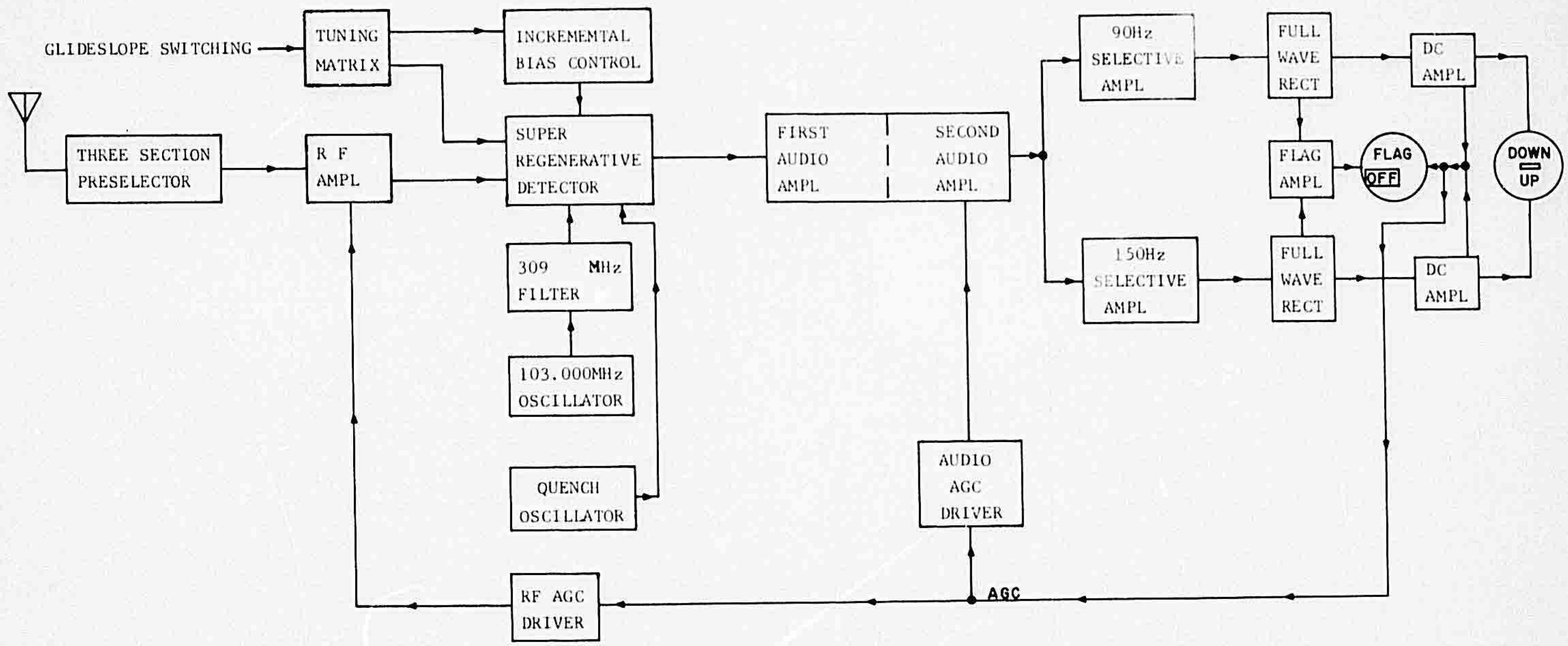


FIGURE 4-6 KI 213/214 GLIDESLOPE SECTION BLOCK DIAGRAM
(Dwg. No. 696-2828-00)

CONTENTS

SECTION V

ILLUSTRATED PARTS LIST

NAME KI 201C FINAL ASSEMBLY

ASS'Y. NO. 066-3008-02

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
Item #								
	066-3008-02	KI 201C OMNI Ind.				X		
12	008-0004-00	Solder Lug				1		
13	008-0005-01	Lug, Tinned Copper				2		
14	010-0041-00	Terminal				3		
	012-1009-00	Tape, Mylar 1/4" wide	ft.			.5		
29	023-0057-04	Meter Assembly				1		
	*	*Attaching Parts						
63	*047-2232-01	Mask				Ref		
84	*088-0052-00	Mtg. Case				Ref		
88	*088-0190-02	Cover				Ref		
	*089-5596-05	Scr, PHP, Type 25, 2-32 x 5/16				Ref		
	025-0003-03	Wire Tef. #22AWG Orn	ft.			1.5		
	025-0018-00	Wire CW #26AWG Blk	ft.			1.5		
	025-0018-29	Wire CW #26AWG Red/Wht	ft.			.9		
	025-0018-44	Wire CW #26AWG Yel	ft.			.8		
	025-0018-54	Wire CW #26AWG Grn/Yel	ft.			.9		
	025-0018-66	Wire CW #26AWG Blu	ft.			.8		
	025-0018-77	Wire CW #26AWG Vio	ft.			.5		
	025-0018-92	Wire CW #26AWG Wht/Red	ft.			.8		
	025-0018-39	Wire CW #26AWG Orn/Wht	ft.			.7		
	025-0018-99	Wire CW #26AWG Wht	ft.			.9		
	026-0003-00	Wire Buss #22AWG	ft.			.1		
56	029-0004-00	Belt, 40DP				1		
57	029-0012-00	Gear, Pully 14T				1		
59	030-1007-00	Lock Tabs				2		
	030-1008-00	Lever & Pivot				2		
	030-1009-00	Hood, Connector				1		
	030-2000-00	Connector, Recpt. 14 Pin				1		
60	030-2001-00	Connector, Plug 14 Pin				1		
61	037-0013-00	Lamp, 12V				2		

NAME KI 201C FINAL ASSEMBLY

ASS'Y. NO. 066-3008-02

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	-00	-01	-02	-03	-04
64	047-1175-00	Bracket				1		
69	047-1547-01	Frame Channel (Bottom)				1		
70	047-1967-00	Frame Channel (Top)				1		
67	047-3303-03	Dust Cover				1		
72	057-1049-01	Azimuth Decal				1		
	057-1169-00	Patent Label				1		
	057-1346-01	Ident Plate				1		
76	073-0015-00	Azimuth Dial				1		
78	073-0021-01	Front Casting				1		
79	073-0062-03	Mtg. Plate (Rear)				1		
80	073-0116-03	Face Plate				1		
81	076-0043-00	Shaft				1		
83	076-0384-02	Knob				1		
86	088-0084-02	Filter, Lamp, Clean				2		
87	088-0188-01	Cover, Wedge Lighting				1		
89	089-2009-37	Nut, Hex, 4-40				1		
	089-2013-37	Nut, Hex #6-32				1		
	089-2026-22	Nut, Swage, 4-40				2		
91	089-2105-22	Nut, "U" Type Speed				6		
92	089-2106-11	Nut, Hex, 1/4 x 5/16				1		
98	089-5436-04	Scr. FHP, 4-40 x 1/4				6		
100	089-5857-03	Scr. Set, 4-40 x 3/32				2		
101	089-5857-04	Scr. Set, 4-40 x 1/8				2		
	089-5878-04	Scr. PHP 4-40 x 1/4				6		
	089-5878-05	Scr. PHP 4-40 x 5/16				1		
	089-5878-06	Scr. PHP 4-40 X 3/8				6		
	089-5878-07	Scr. PHP 4-40 x 7/16				1		
102	089-5903-13	Scr. PHP 4-40 x 13/16				6		
93	089-6008-04	Scr. FHS 4-40 x 1/4				3		
	089-8003-34	Washer, Lock #4 S/L				7		
104	089-8042-30	Washer, Lock I/T 1/4				1		
105	089-8067-30	Washer, Flat (Pulley) .220ID				1		
106	089-8068-30	Washer, Flat .265 ID				1		
	089-8070-11	Washer, Flat				1		
	089-8079-30	Washer, Flat .005Thk				1		
108	090-0033-02	Washer, Srping				2		
107	090-0041-01	Retaining Ring				1		
	090-0042-03	Stud, 6-32 x 3/8				1		
	090-0055-00	Insert, Helicoil				3		

NAME	ASS'Y. NO.
KI 201C FINAL ASSEMBLY	066-3008-02

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
	150-0002-00	Sleeving, #26AWG	ft.			.4		
	150-0018-10	Tubing, Shrinkable	ft.			.6		
	150-0054-10	Tubing, Insul	ft.			.1		
	150-0062-10	Tubing, Tef. #10	ft.			.53		
207	187-1051-00	Gasket				1		
200	200-0493-00	Converter Bd. Ass'y.				1		
R316	133-0022-00	Res. Vari. 1K, QW				1		
B301	148-0003-00	Resolver				1		

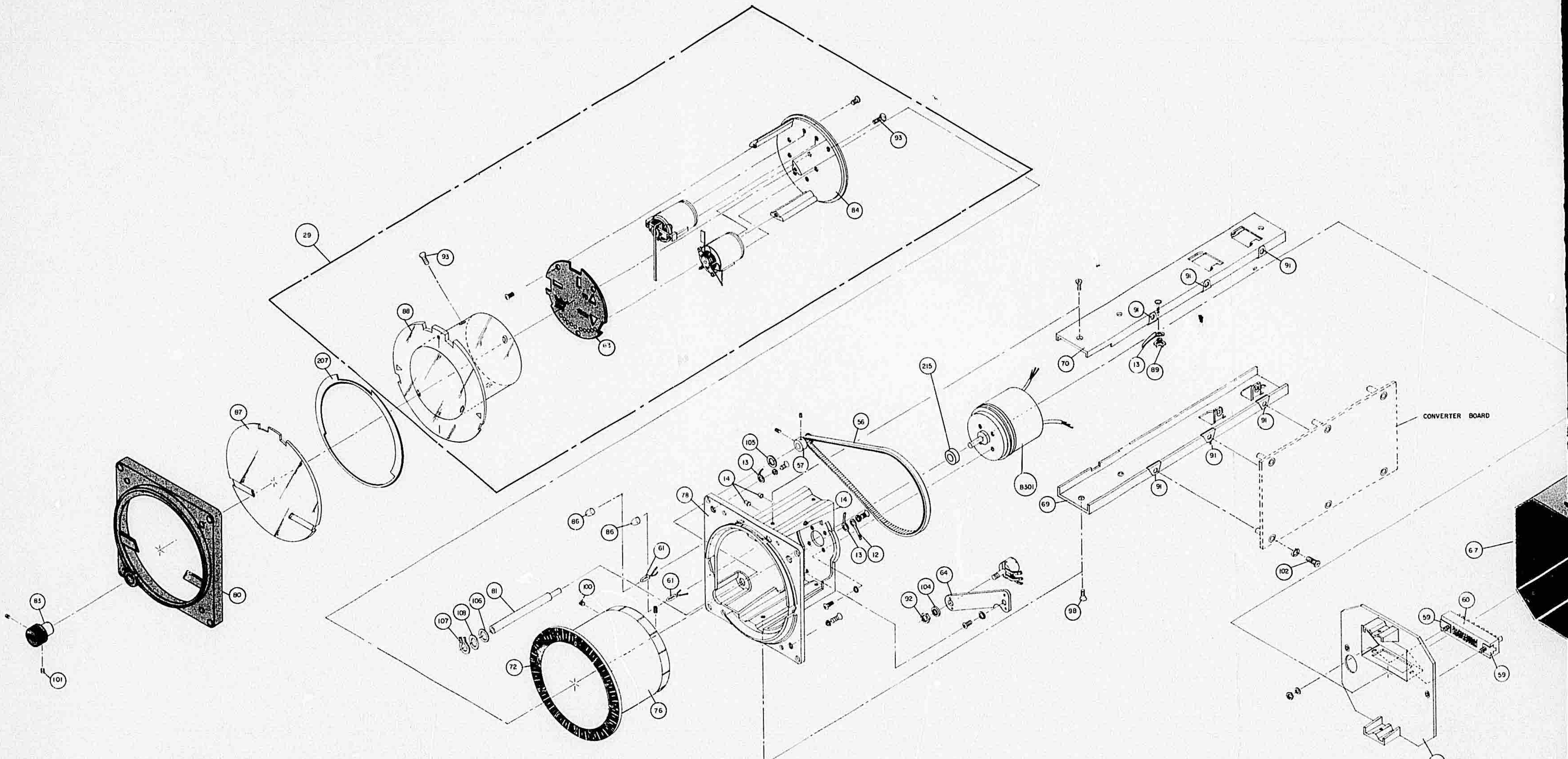
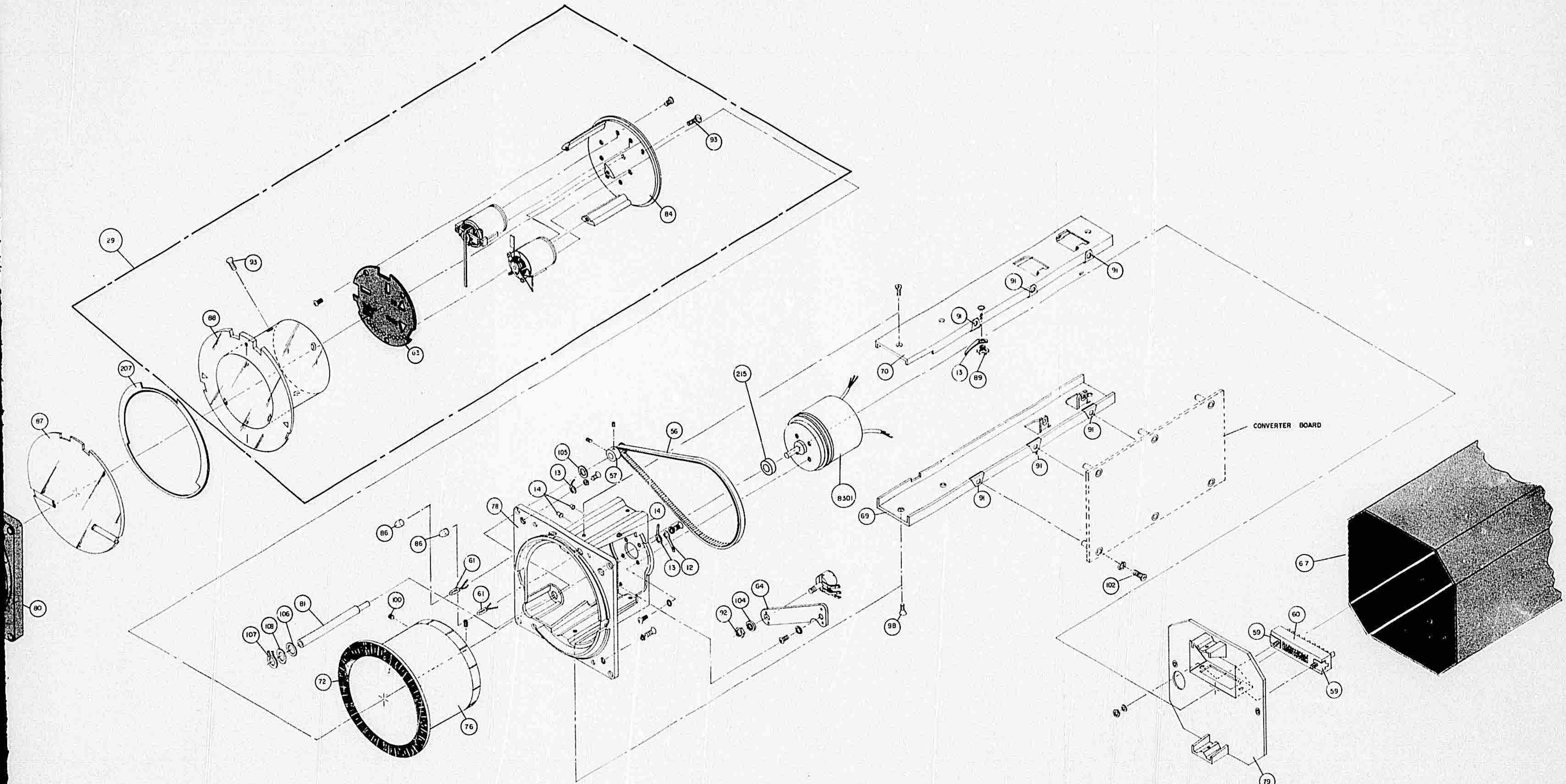


FIGURE 5-1 KI 201C FINAL ASSEMBLY

SEE BLOWUP

SEE BLOWUP



URE 5-1 KI 201C FINAL ASSEMBLY

SEE BLOWUP

SEE BLOWUP

NAME			ASS'Y. NO.				
KI 213/KI 214 FINAL ASSEMBLY			066-3025-00/01				

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-00	-01	-01
	066-3025-00	40 Ch GS/NAV Ind KI 213					
	(Fig. 5-2A)	S/N 1499 & Below		X			
	(Fig. 5-2B)	S/N 1500 & Above			X		
	066-3025-01	OMNI Conv/40 ch GS/NAV Ind. KI 214					
	(Fig. 5-2A)	S/N 5399 & Below				X	
	(Fig. 5-2B)	S/N 5400 & Above					X
	008-0004-0[illegible]	Lug, Tinned Copper		1	1	1	1
	008-0005-01	Lug, Tinned Copper		1	1	1	1
	009-0003-21	Terminal Strip		2	2	0	0
	016-1008-04	Glyptal - Blue		AR	AR	AR	AR
	016-1010-00	Glyptal - Red		AR	AR	AR	AR
	030-1007-00	Lock Tabs		2	2	2	2
	047-1546-00	Dust Cover		0	0	1	0
	047-2676-01	Dust Cover		1	0	0	0
	047-2679-02	Frame Channel (Top)		1	0	1	0
	047-2680-03	Frame Channel (Bottom)		1	0	1	0
	047-2681-02	Cover, RF		1	1	1	1
	047-3086-02	Filter Bracket w/ Attaching Parts C101 thru C125 Cap F/T 100pf 106-0004-01		0	0	0	1
	047-3086-03	Filter Bracket w/ Attaching Parts C101 thru C133 Cap F/T 100pf 106-0004-01		0	1	0	0
	047-3099-03	Frame Channel (Bottom)		0	1	0	1
	047-3304-03	Dust Cover		0	1	0	1
	047-3305-02	Frame Channel (Top)		0	1	0	1

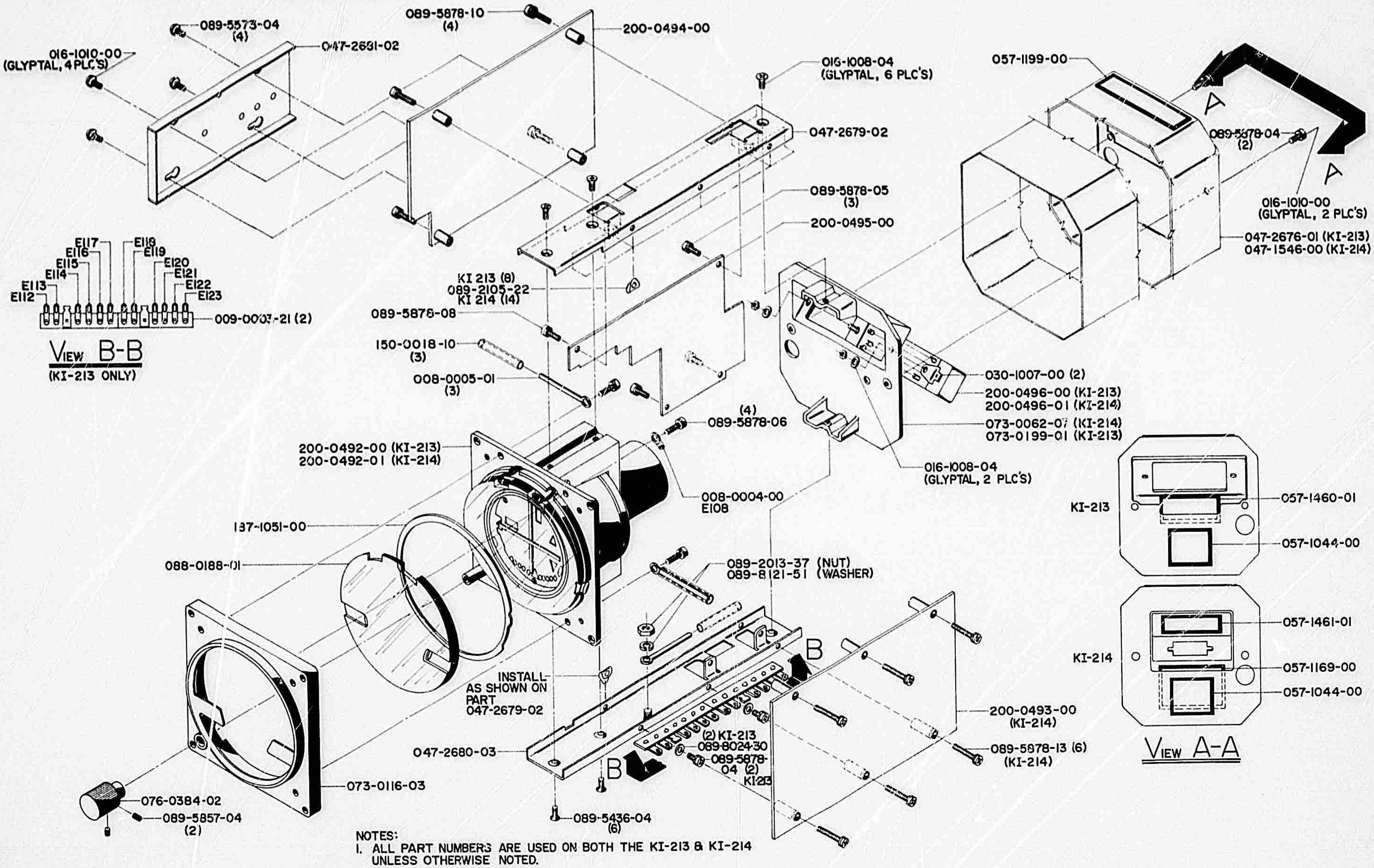
NAME			ASS'Y. NO.					
KI 213/KI 214 FINAL ASSEMBLY			066-3025-00/01					
KING RADIO CORP. PARTS LISTING			CODE	QUANTITY				
SYMBOL	PART NUMBER	DESCRIPTION		-00	-00	-01	-01	
	057-1044-00	FCC Tag		1	1	1	1	
	057-1169-00	Patent Label		0	0	1	1	
	057-1199-00	Mod Tag		1	1	1	1	
	057-1460-01	Ident Plate		1	1	0	0	
	057-1461-01	Ident Plate		0	0	1	1	
	073-0062-07	Mtg. Plate, Rear		0	0	1	0	
	073-0062-08	Mtg. Plate, Rear		0	0	0	1	
	073-0116-03	Face Plate		1	1	1	1	
	073-0199-01	Mtg. Plate, Rear		1	1	0	0	
	076-0384-02	Knob		1	1	1	1	
	088-0188-01	Cover, Lighting Wedge		1	1	1	1	
	089-2013-37	Nut, Hex 6-32		1	1	1	1	
	089-2105-22	Nut, "U" Type Speed		10	10	14	14	
	089-2188-22	Nut, Hex, Light		0	2	0	2	
	089-5436-04	Scr, FHP 4-40 x 1/4		6	6	6	6	
	089-5573-04	Scr, THP 4-40 x 1/4		4	4	4	4	
	089-5857-04	Scr. Set 4-40 x 1/8		2	2	2	2	
	089-5878-04	Scr. PHP 4-40 x 1/4		4	4	2	2	
	089-5878-05	Scr. PHP 4-40 x 5/16		4	4	4	4	
	089-5878-06	Scr. PHP 4-40 x 3/8		4	4	4	4	
	089-5878-08	Scr. PHP 4-40 x 1/2		1	1	1	1	
	089-5878-10	Scr. PHP 4-40 x 5/8		0	0	6	6	
	089-5878-13	Scr. PHP 4-40 x 13/16		0	0	6	6	
	089-8024-30	Washer, Flat #3 S/S		0	2	0	0	
	089-8121-51	Washer, Lock		1	1	1	1	
	150-0018-10	Tubing, Shrink #20 Nat.		.4	.4	.4	.4	
	187-1051-00	Gasket, Lighting		1	1	1	1	
	200-0492-00	Front Casting Ass'y		1	1	0	0	
	200-0492-01	Front Casting Ass'y		0	0	1	1	
	200-0493-00	Converter Bd. Ass'y.		0	0	1	1	
	200-0494-00	Glideslope Bd. Ass'y.		1	1	1	1	
	200-0495-00	Audio Bd. Ass'y.		1	1	1	1	
	200-0496-00	Connector Ass'y		1	1	0	0	
	200-0496-01	Connector Ass'y.		0	0	1	1	
R316	133-0022-00	Res. Vari, 1K		0	0	0	1	

PARTS LIST REVISION HISTORY	ENGR. APPROVAL Bill Kopek
NAME KI 213/KI 214 FINAL ASSEMBLY	ASS'Y. NO. 066-3025-00/01

ASS'Y. DWG. 300-0723-00	UNIT KI 213/214	USED ON

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION
			Various	Parts List Retyped, corrected and S/N effectivity added
				KI 213/214 Maintenance Manual Rev. 2, December, 1974

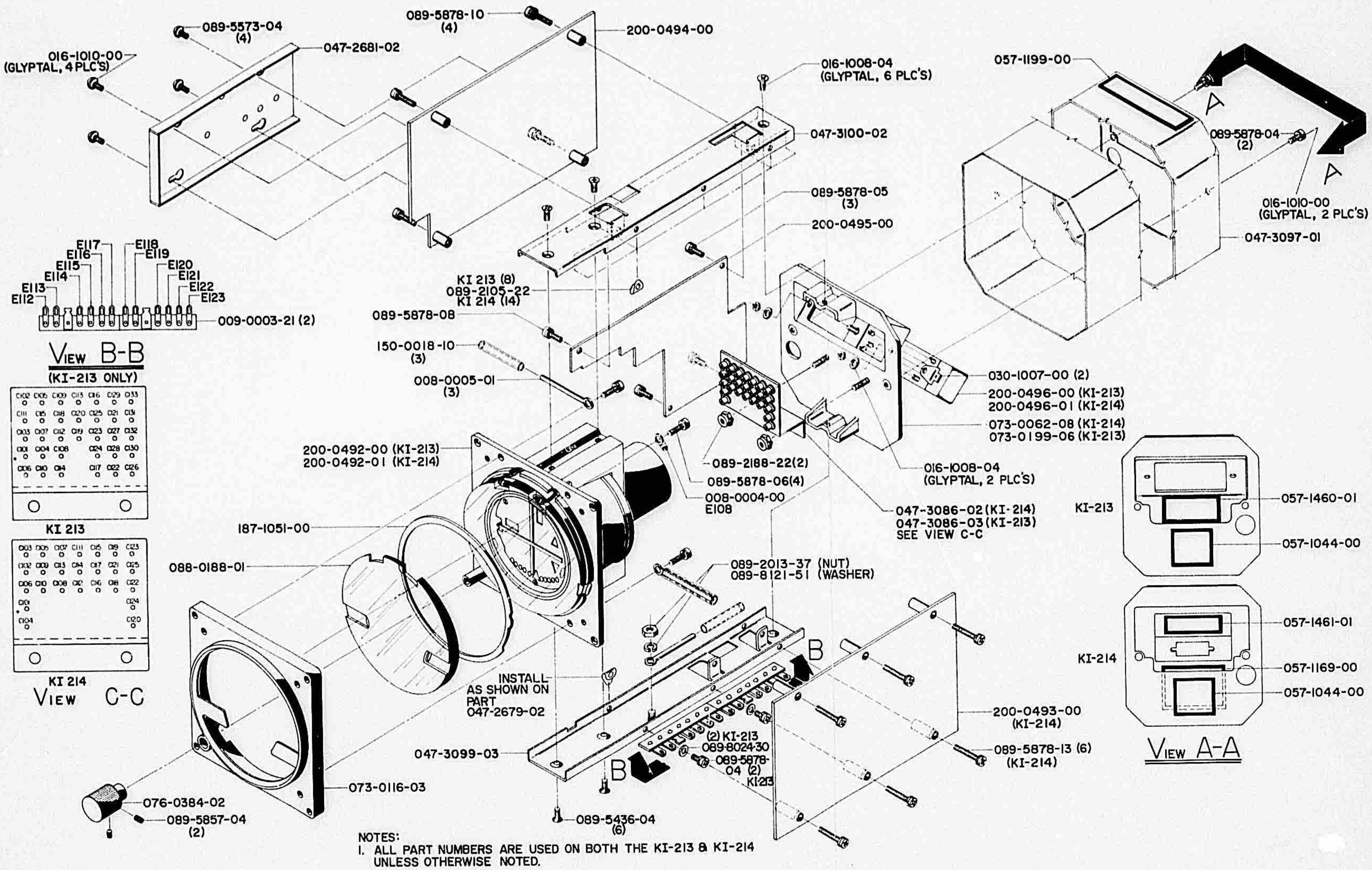
K-1650 3/73



NOTES:
1. ALL PART NUMBERS ARE USED ON BOTH THE KI-213 & KI-214 UNLESS OTHERWISE NOTED.

FIGURE 5-2A KI 213/214 FINAL ASSEMBLY
(Dwg. No. 300-0723-00, R-0)

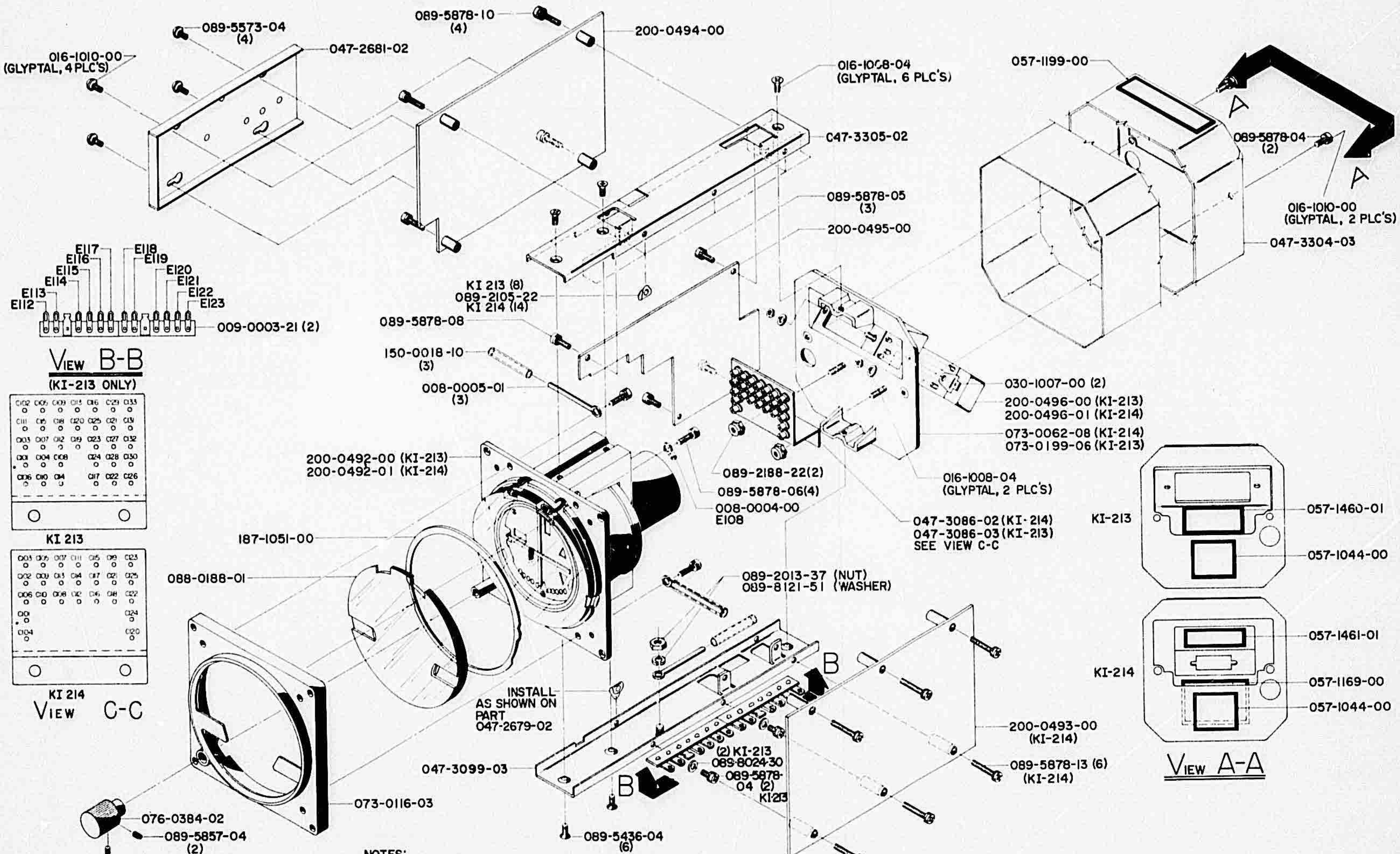
SEE BLOWUP



NOTES:
1. ALL PART NUMBERS ARE USED ON BOTH THE KI-213 & KI-214 UNLESS OTHERWISE NOTED.

FIGURE 5-2A KI 213/214 FINAL ASSEMBLY
(Dwg. No. 300-0723-00, R-2)

SEE BLOWUP



NOTES:
1. ALL PART NUMBERS ARE USED ON BOTH THE KI-213 & KI-214 UNLESS OTHERWISE NOTED.

FIGURE 5-2B KI 213/214 FINAL ASSEMBLY
(Dwg. No. 300-0723-01, R-0)

SEE BLOWUP

NAME Converter Board Assembly KI 201C/214 | ASS'Y. NO. 200-0493-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
R2		009-5013-00	P.C. Bd. Omni Conv.		1				
	Q301	007-0032-00	Tstr, 2N2924		12				
	Q302	007-0032-00	Tstr, 2N2924						
	Q303	007-0032-00	Tstr, 2N2924						
	Q304	007-0129-00	Tstr, 2N5305		2				
	Q305	007-0129-00	Tstr, 2N5305						
	Q306	007-0026-00	Tstr, 2N2714		2				
	Q307	007-0032-00	Tstr, 2N2924						
	Q308	007-0026-01	Tstr, 2N2714						
	Q309	007-0035-00	Tstr, B343		1				
	Q310	007-0026-02	Tstr, 2N3414		1				
	Q311	007-0032-00	Tstr, 2N2924						
	Q312	007-0032-00	Tstr, 2N2924						
	Q313	007-0032-00	Tstr, 2N2924						
	Q314	007-0032-00	Tstr, 2N2924						
	Q315	007-0032-00	Tstr, 2N2924						
	Q316	007-0032-00	Tstr, 2N2924						
	Q317	007-0032-00	Tstr, 2N2924						
	Q318	007-0032-00	Tstr, 2N2924						
	CR301	007-5011-08	DIO, Zen. 8.2V 5%		1				
R2	CR302	007-6029-00	DIO, 1N457A		5				
	CR303	007-6029-00	DIO, 1N457A						
	CR304	007-6029-00	DIO, 1N457A						
	CR305	007-6029-00	DIO, 1N457A						
	CR306	007-6029-00	DIO, 1N457A						
	CR308	007-6023-00	DIO, 1N277						
	T301	019-5029-00	XFMR, Phase Det.		2				
	T302	019-8024-00	XFMR, IF 10KHz		1				
	T303	019-5029-00	XFMR± Phase Det.						
	C301	096-1014-00	Cap. Tant. 40µf, 10V		6				
	C302	105-0024-07	Cap. MYL. 1µf, 10%		4				

NAME			ASS'Y. NO.					
Converter Board Assembly KI201C/214			200-0493-00					
KING RADIO CORP PARTS LISTING			CODE	QUANTITY				
				-00	-01	-02	-03	-04
	SYMBOL	PART NUMBER	DESCRIPTION					
	C304	096-1014-00	Cap. Tant, 40µf, 10V					
	C305	096-1014-00	Cap. Tant, 40µf, 10V					
	C306	097-0025-00	Cap. Elec. 485µf, 3V		2			
	C307	096-1005-00	Cap. Tant, 1µf, 35V		3			
	C308	105-0024-09	Cap. MYL, 1µf, 5%		4			
	C309	105-0024-09	Cap. MYL, 1µf, 5%					
	C311	105-0024-05	Cap. MYL, .047µf, 10%		2			
	C312	105-0024-05	Cap. MYL, .047µf, 10%					
	C313	096-1014-00	Cap. Tant. 40µf, 10V					
	C314	097-0025-00	Cap. Elec. 485µf, 3V					
	C315	105-0024-09	Cap. MYL, 1µf, 5%					
	C316	105-0024-09	Cap. MYL, 1µf, 5%					
	C317	096-1005-00	Cap. Tant. 1µf, 35V					
R2	C321	105-0024-00	Cap. MYL, .001µf, 10%		1			
	C322	105-0024-03	Cap. MYL, .01µf, 10%		2			
	C323	105-0024-03	Cap. MYL, .01µf, 10%					
	C324	096-1005-00	Cap. Tant. 1µf, 35V					
	C325	105-0024-07	Cap. MYL, 1µf, 10%					
	C326	105-0024-07	Cap. MYL, 1µf, 10%					
	C327	097-0046-00	Cap. Elec. 25µf, 6V		1			
	C328	108-5014-24	Cap. Poly 0.0µf, 5%		1			
	C329	105-0024-07	Cap. MYL, 1µf, 10%					
	C332	096-1014-00	Cap. Tant, 40µf, 10V					
	C333	096-1014-00	Cap. Tant, 40µf, 10V					
	C334	097-0057-33	Cap. Elec. 220Yf, 4V		1			
	R301	132-5006-00	Res. W/W 47, 10% QW		1			
	R302	132-5010-00	Res. W/W 200, 5% QW		1			
	R303	136-1003-22	Res. MF, 100K, 1%, QW		3			
	R304	130-0105-25	Res. F/C, 1 Meg, 10%, QW		2			
	R307	130-0153-25	Res. F/C, 15K, 10%, QW		3			
	R308	130-0102-25	Res. F/C, 1K, 10%, QW		2			
	R309	130-0472-25	Res. F/C, 4.7K, 10%, QW		3			
	R311	130-0471-25	Res. F/C, 47, 10%, QW		3			
	R312	130-0101-25	Res. F/C, 100, 10%, QW		7			
	R313	130-0101-25	Res. F/C, 100, 10%, QW					
R2	R314	130-0474-25	Res. F/C, 470K, 10%, QW		1			
	R315	133-0016-00	Res. Vari. 150K, 20%		1			
R2	R316	133-0022-00	Res. Vari. 1K, 30%		1			
	R317	136-4753-22	Res. MF, 475K, 1%, QW		2			
	R318	136-6811-22	Res. MF, 6.81K, 1%, QW		2			
	R321	133-0016-02	Res. Vari. 1K, 20%		1			
	B322	130-0104-25	Res. F/C, 100K, 10%, QW		3			

NAME Converter Board Assembly KI 201C/214

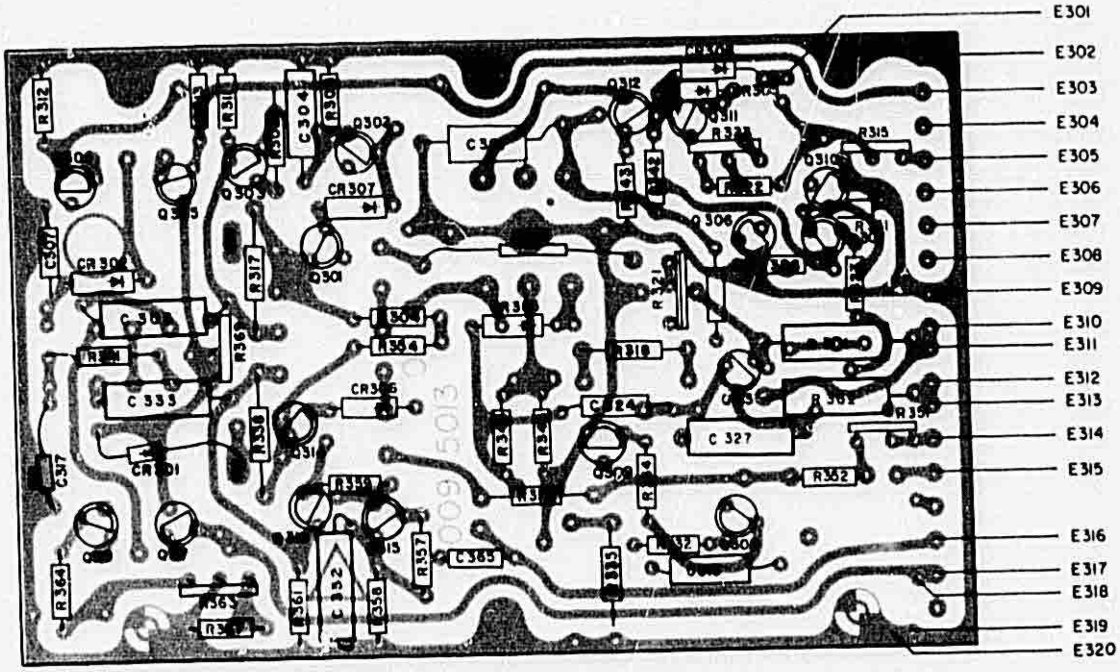
ASS'Y. NO. 200-0493-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
R2	R323	133-0016-01	Res. Vari. 600K, 20%		1				
	R324	130-0103=25	Res. F/C, 10K, 10%, QW		6				
	R325	130-0104-25	Res. F/C, 100K, 10%, QW						
	R326	130-0683-25	Res. F/C, 68K, 10%, QW		1				
	R327	130-0103-25	Res. F/C, 10K, 10%, QW						
	R328	130-0472-25	Res. F/C, 4.7K, 10%, QW						
R2	R331	130-xxxx-25	Res. Sel. Val. 10%, QW (470 to 2K)		1				
	R332	130-0103-25	Res. F/C, 10K, 10%, QW						
	R333	130-0153-25	Res. F/C, 15K, 10%, QW						
	R334	130-0103-25	Res. F/C, 10K, 10%, QW						
	R335	136-6811-22	Res. MF, 6.81K, 1%, QW						
	R337	130-0103-25	Res. F/C, 10K, 10%, QW						
	R338	136-4753-22	Res. MF, 475K, 1%, QW						
	R339	130-0103-25	Res. F/C, 10K, 10%, QW						
	R341	130-0272-25	Res. F/C, 2.7K, 10%, QW		1				
	R342	130-0104-25	Res. F/C, 100K, 10%, QW						
	R343	130-0181-25	Res. F/C, 180, 10%, QW		1				
	R344	130-0273-25	Res. F/C, 27K, 10%, QW		2				
	R345	130-0273-25	Res. F/C, 27K, 10%, QW						
	R346	136-1003-22	Res. MF, 100K, 1%, QW						
	R347	136-2743-22	Res. MF, 274K, 1%, QW		1				
	R348	130-0471-25	Res. F/C, 470, 10%, QW						
	R351	133-0016-03	Res. Vari. 10K, 20%		1				
	R352	136-4752-22	Res. MF, 47.5K, 10%, QW						
	R353	136-1003-22	Res. MF, 100K, 1%, QW						
	R354	130-0105-25	Res. F/C, 1 Meg, 10%, QW						
	R357	130-0153-25	Res. F/C, 15K, 10%, QW						
	R358	130-0102-25	Res. F/C, 1K, 10%, QW						
	R359	130-0472-25	Res. F/C, 4.7K, 10%, QW						
	R361	130-0471-25	Res. F/C, 470, 10%, QW						
	R362	130-0101-25	Res. F/C, 100, 10%, QW						
	R363	133-0016-03	Res. Vari. 10K, 20%		1				
	R364	130-0101-25	Res. F/C, 100, 10%, QW						
	R365	130-0101-25	Res. F/C, 100, 10%, QW						
	R366	130-0101-25	Res. F/C, 100, 10%, QW						
	R367	130-0101-25	Res. F/C, 100, 10%, QW						
	R368	130-0101-25	Res. F/C, 100, 10%, QW						

Parts List Revision History

ACTION	SYMBOL	PART NUMBER	DESCRIPTION
			Manual Rev. 2, Dec., 1974 KI 201C S/N 10982 & Below KI 214 S/N 2763 & Below Ref. Figure 5-3A
Delete	R316	133-0022-00	Res, Vari, 1K (Moved to Final Ass'y)
Delete	R314	130-0474-25	Res, F/C, 470K, 10%, QW
Delete	R331	130-xxxx-25	Res, F/C, Sel Val
			KI 201C S/N 10983 - 20,999 KI 214 S/N 2763 - 7999 Ref: Figure 5-3B
Chg to		009-5013-03	P.C. Bd, Omni Conv.
Add	CR309	007-6023-00	Dio. 1N?77
Delete	CR302	007-6029-00	Dio. 1N457A
Add	CR307	007-6029-00	Dio. 1N457A
Add	CJ301	026-0018-00	Circuit Jumper
Chg to	R369	133-0016-04	Res, Vari, 1M
Add	R370	130-0154-25	Res, F/C, 150K, 10% QW
Add	R331	133-0016-08	Res, Vari, 2K
Chg to	C321	105-0024-03	Cap, My, .01μf, 10%
			KI 201C S/N 21,000 & Above KI 214 S/N 8000 & Above Ref: Figure 5-3C
Chg to		009-5627-01	P.C. Bd, Omni Conv.
Chg to	R323	133-0086-11	Res, Vari, 500K



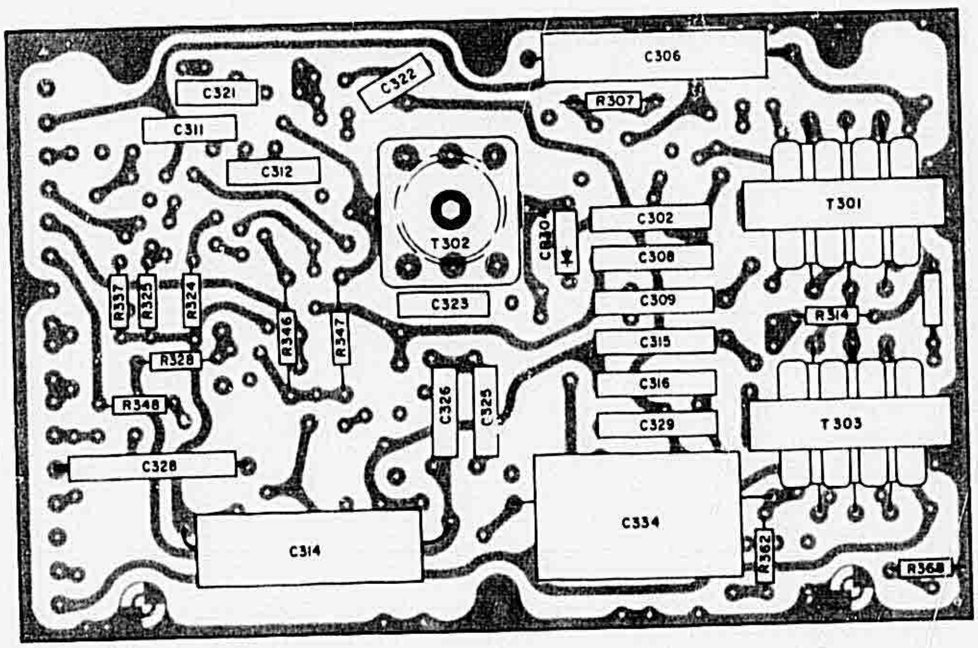
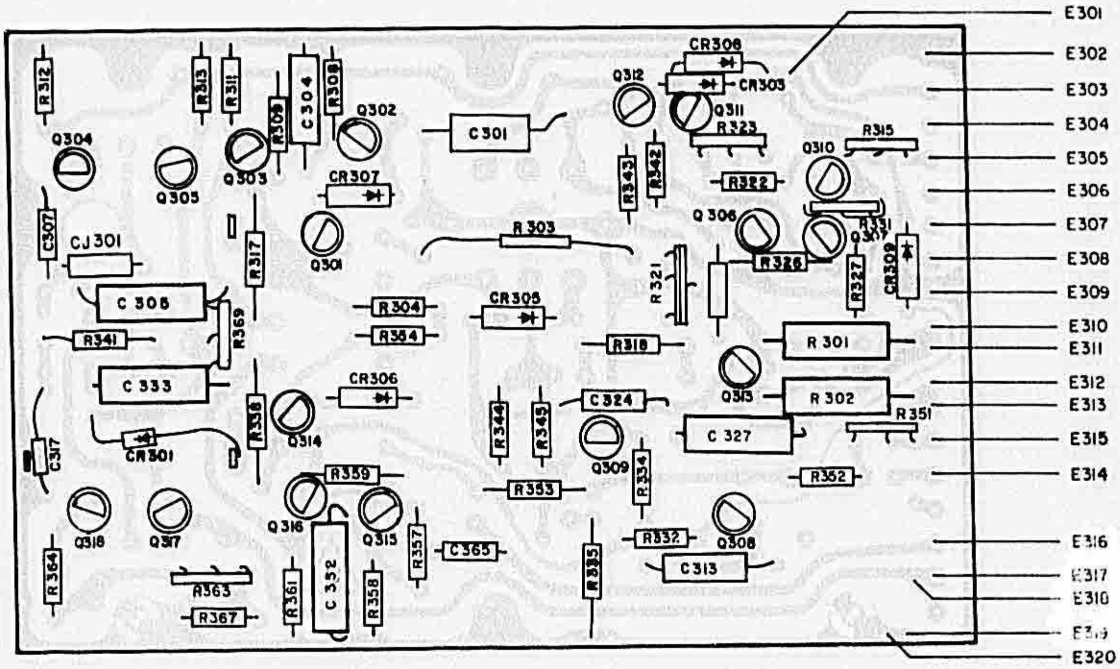


FIGURE 5-3A OMNI CONVERTER P.C. BOARD ASSEMBLY DRAWING
KI 201C S/N 10982 & Below; KI 214 S/N 2763 & Below
(Dwg. No. 300-0692-00, R-0)

SEE BLOWUP



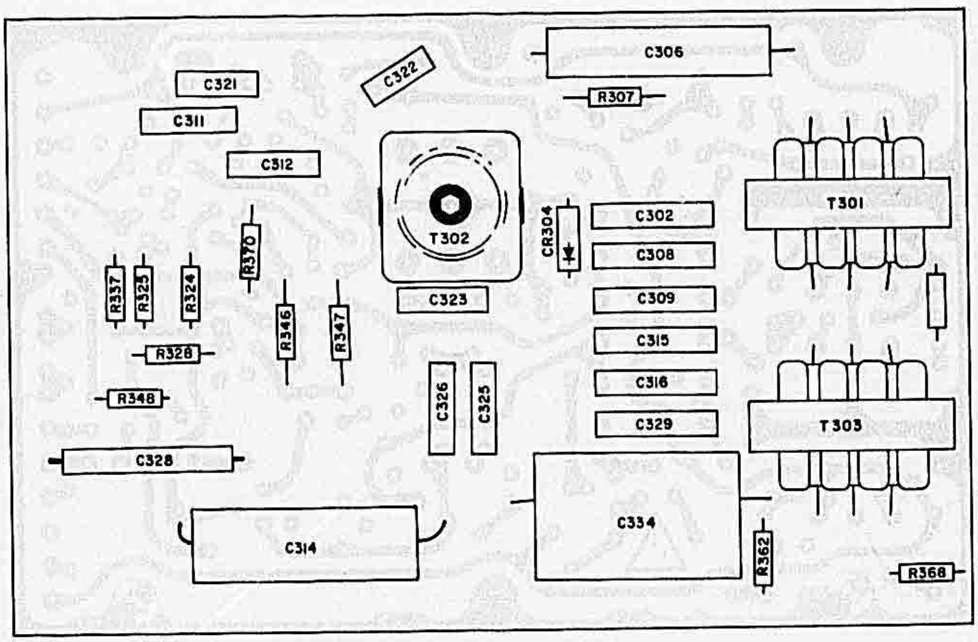
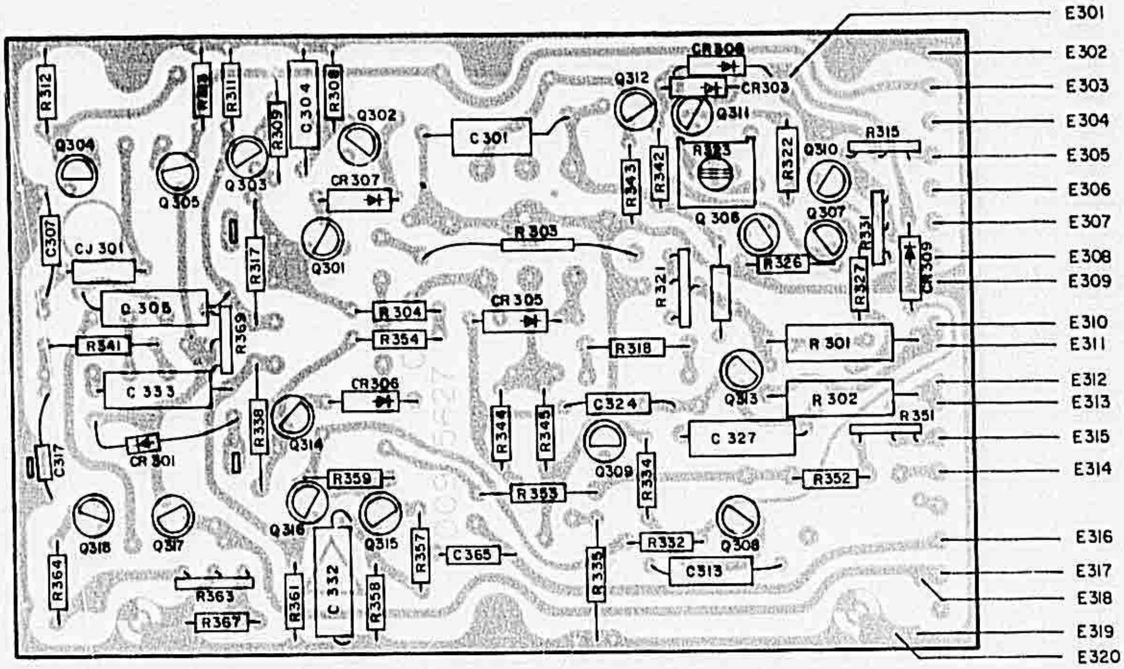


FIGURE 5-3B OMNI CONVERTER P.C. BOARD ASSEMBLY DRAWING
KI 201C S/N 10983 - 20,999, KI 214 S/N 2764 - 7999
(Dwg. No. 300-0692-01, R-4)

SEE BLOWUP



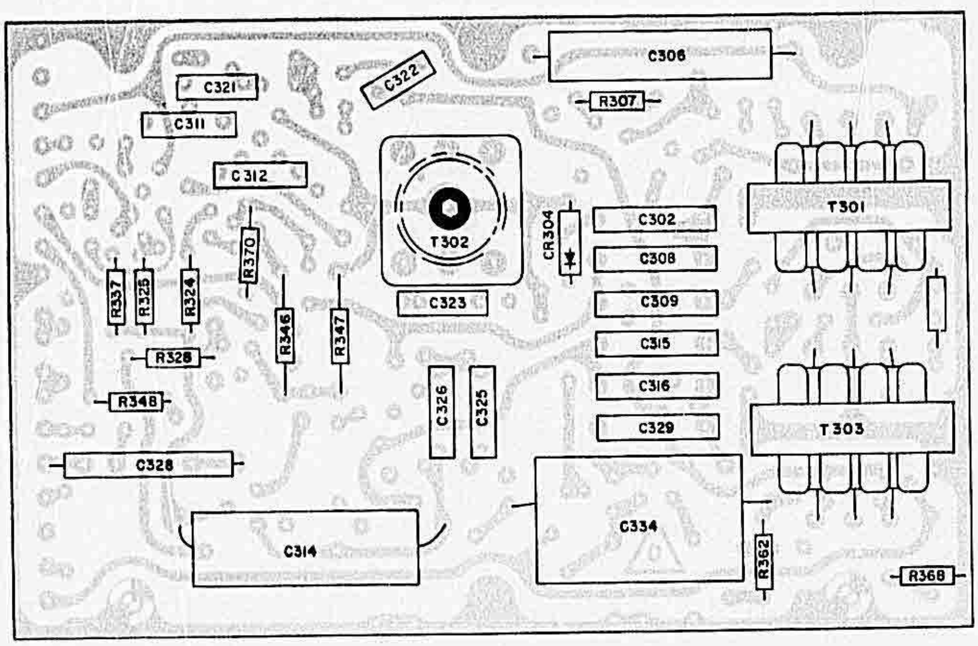


FIGURE 5-3C OMNI CONVERTER P. C. BOARD ASSEMBLY DRAWING
KI 201C S/N 21, 000 & Above, KI 214 S/N 8000 & Above
(Dwg. No. 300-0692-02, R-0)

SEE BLOWUP

NAME: Front Casting Assembly KI 213/214

ASS'Y. NO. 200-0492-00/01

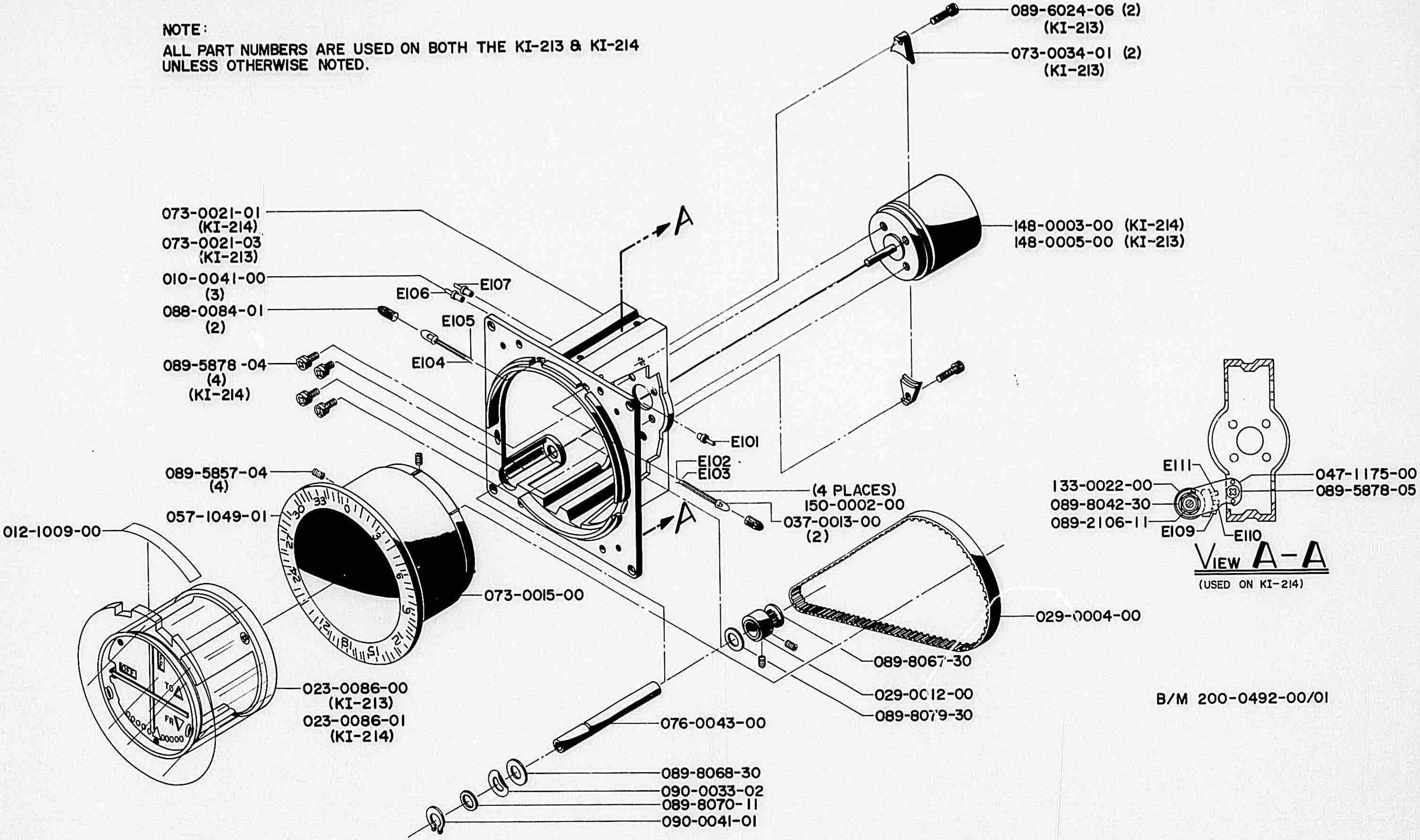
KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	-00	-01	-02	-03	-04
	200-0492-00	Front Casting Ass'y. KI213		X				
	200-0492-01	Front Casting Ass'y. KI214			X			
	010-0041-00	Terminal		1	1			
	012-1009-00	Tape MYL 1/4 in. wide		.5	.5			
	029-0004-00	Belt. 40DP		1	1			
	029-0012-00	Gear. Pulley 14 Teeth		1	1			
	037-0013-00	Lamp, 12V		2	2			
	047-1175-00	Bracket			1			
	057-1049-01	Azimuth Decal		1	1			
	073-0015-00	Azimuth Dial		1	1			
	073-0021-01	Front Casting KI 213			1			
R2	073-0021-02	Front Casting KI 214		1				
R2	073-0034-01	Synchro Clamp		2				
	076-0043-00	Shaft, OBS		1	1			
R2	088-0084-01	Lamp Filter Blue		2	2			
	089-2106-11	Nut, Hex 1/4-32			1			
	089-5857-04	Spline Set Scr. #4-40X1/8		4	4			
	089-5878-04	Scr. PHP W/LW #4-40X1/4			4			
	089-5878-05	Scr. PHP W/LW #4-40X5/16			1			
	089-6024-06	#4-40X3/8 Soc. Hd. Cap Scr.		2				
	089-8042-30	Washer 1/4 Int. Tooth			1			
	089-8067-30	Washer, Flat (Pulley 220 ID)		1	1			
	089-8068-30	Washer, Flat .257ID, 500OD		1	1			
	089-8070-11	Washer, Flat .265ID, 380OD		1	1			
	089-8070-30	Washer, Flat. .005 Thick		1	1			
	090-0033-02	Washer, Spring		1	1			
	090-0041-01	Retaining Ring		1	1			
	150-0002-00	Sleeving #26		.5	.5			
					1			
M101	023-0086-01	Meter Ass'y. KI 214			1			
M102	023-0086-00	Meter Ass'y. KI 213		1				
B301	148-0003-00	Resolver			1			
B301	148-0005-00	Resclver		1				
R316	133-0022-00	Res. Vari. 1K, 30%, QW			1			

PARTS LIST REVISION HISTORY		ENGR. APPROVAL Bill Kopek
NAME Front Casting Assembly		ASS'Y. NO. 200-0492-00/01
ASS'Y. DWG. 300-0690-01	UNIT KI 213/214	USED ON 066-3025-00/01

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION
				Maintenance Manual Rev. 2, Dec., 1974
	Chg to		073-0021-01	Typing error KI 214 Front Casting
	Chg to		073-0021-03	KI 213 Front Casting
	Chg to		088-0084-02	Lamp Filter Clear

NOTE:
ALL PART NUMBERS ARE USED ON BOTH THE KI-213 & KI-214 UNLESS OTHERWISE NOTED.



B/M 200-0492-00/01

FIGURE 5-4 FRONT CASTING ASSEMBLY (KI 213/214)
(Dwg. No. 300-0690-01, R-0)

NOTE:
ALL PART NUMBERS ARE USED ON BOTH THE KI-213 & KI-214 UNLESS OTHERWISE NOTED.

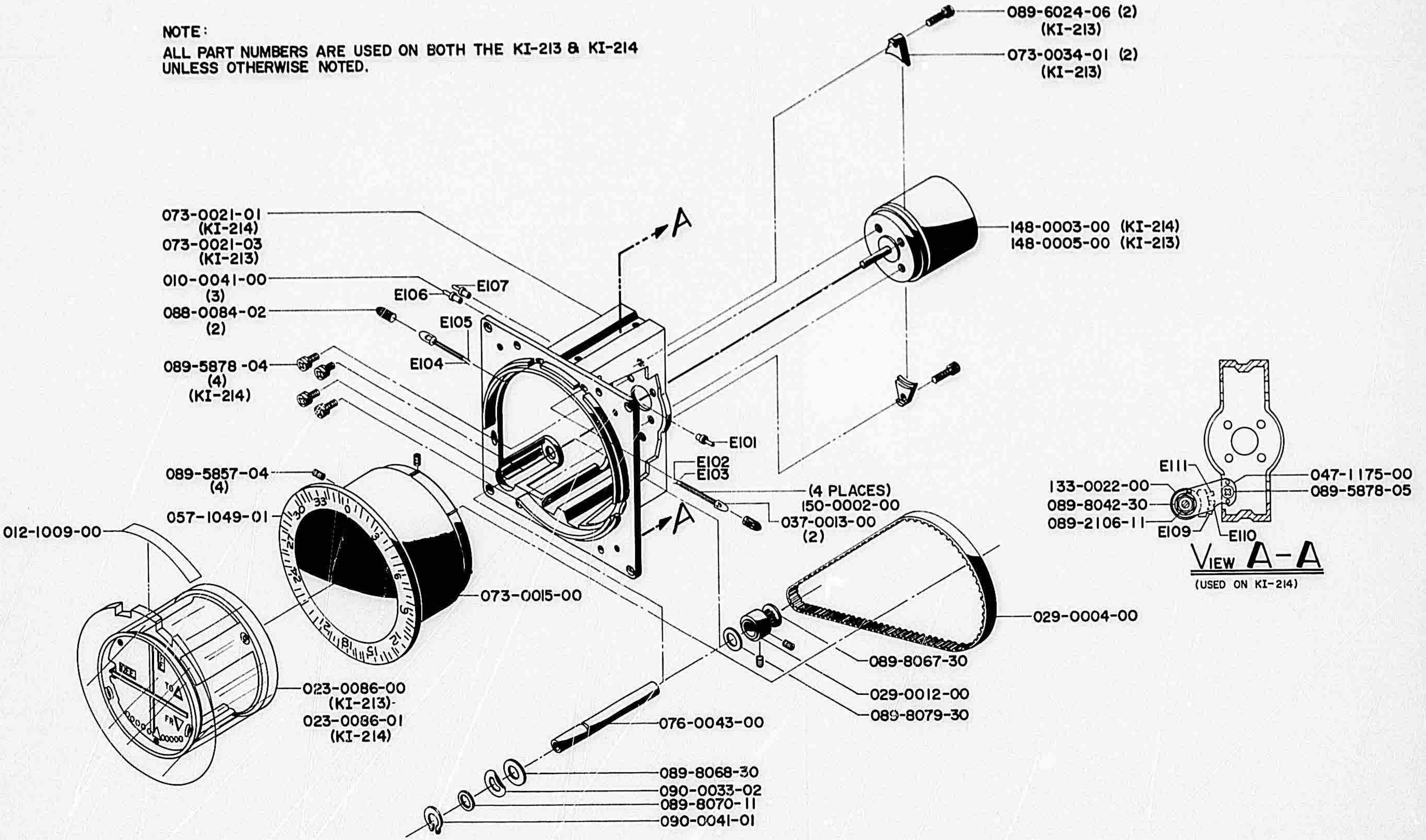


FIGURE 5-4 FRONT CASTING ASSEMBLY (KI 213/214)
(Dwg. No. 300-0690-01, R-1)

NAME Glideslope Board KI 213/214

ASS'Y. NO. 200-0494-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	-00	-01	-02	-03	-04
		047-2682-01	Fence		1				
		088-0066-00	Spacer		1				
		009-5295-01	Printed Circuit Bd.		1				
	Q401	007-0195-00	Tstr, MPS H-10		1				
	Q402	007-0236-00	Tstr, PE5031		1				
	Q403	007-0237-00	Tstr, SPS6797		1				
	Q404	007-0194-00	Tstr, MPS6518		3				
	Q405	007-0194-00	Tstr, MPS6518						
R2	Q406	007-0035-00	Tstr, B343		22				
R2	Q407	007-0035-00	Tstr, B343						
R2	Q408	007-0035-00	Tstr, B343						
R2	Q409	007-0035-00	Tstr, B343						
R2	Q410	007-0035-00	Tstr, B343						
R2	Q411	007-0035-00	Tstr, B343						
R2	Q412	007-0035-00	Tstr, B343						
R2	Q413	007-0035-00	Tstr, B343						
R2	Q414	007-0035-00	Tstr, B343						
R2	Q415	007-0035-00	Tstr, B343						
R2	Q416	007-0035-00	Tstr, B343						
R2	Q417	007-0035-00	Tstr, B343						
R2	Q418	007-0035-00	Tstr, B343						
R2	Q419	007-0035-00	Tstr, B343						
R2	Q420	007-0035-00	Tstr, B343						
R2	Q421	007-0035-00	Tstr, B343						
R2	Q422	007-0035-00	Tstr, B343						
R2	Q423	007-0035-00	Tstr, B343						
R2	Q424	007-0035-00	Tstr, B343						
R2	Q425	007-0035-00	Tstr, B343						
R2	Q426	007-0035-00	Tstr, B343						
	Q427	007-0129-00	Tstr, 2N5305		1				
R2	Q428	007-0035-00	Tstr, B343						
	Q429	007-0194-00	Tstr MPS6518						
	CR401	007-6029-00	DIO, 1N457A		5				
	CR402	007-4016-15	DIO, VCTR		1				

NAME Glideslope Board KI 213/214 | ASS'Y. NO. 200-0494-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
CR403	007-6029-00	DIO, 1N457A						
CR404	007-6029-00	DIO, 1N457A						
CR405	007-6029-00	DIO, 1N457A						
CR406	007-6029-00	DIO, 1N457A						
L401	019-2055-11	Choke, RF 0.39μh		3				
L402	019-2055-11	Choke, RF 0.39μh						
R2 L403	019-2055-11	Choke, RF 0.39μh						
L405	019-2143-01	Coil, 4T, #22, Soldereze		1				
T401	019-8054-00	XFMR,		1				
J212	030-0030-01	Conn Co-ax		1				
Y401	044-0051-00	XTAL, Quartz, 103MHz		1				
C401	113-5471-00	Cap. D/C, 470pf, 10%		2				
C402	113-5471-00	Cap, D/C, 470pf, 10%						
C403	113-3027-00	Cap, D/C, 2.7pf, ±.25		1				
C404	113-3150-00	Cap, D/C, 15pf, 5%		1				
C405	113-5470-00	Cap. D/C, 47pf, 10%		2				
C406	113-3047-00	Cap. D/C, 4.7pf, ±.25		2				
C407	104-0001-41	Cap. Mica DM, 22pf, 5%		1				
C408	113-3047-00	Cap. D/C, 4.7pf, ±.25						
C409	113-3121-00	Cap. D/C, 120pf, 5%		1				
C410	113-5470-00	Cap. D/C, 47pf, 10%						
C411	104-0001-33	Cap. Mica DM, 15pf, 5%		3				
C412	102-0024-05	Cap. D/C, Trm. 3.5-13pf		3				
C413	104-0001-33	Cap. Mica DM, 15pf, 5%						
C414	102-0024-05	Cap. D/C, 3.5-13pf						
C415	104-0001-33	Cap. Mica DM, 15pf, 5%						
C416	102-0024-05	Cap. D/C, 3.5-13pf						
C417	106-0001-33	Cap. 4.7pf, 5%, Q/C		1				
C418	106-0021-00	Cap. F/T, 470pf, 20%		1				
C419	113-5101-01	Cap. D/C, 100pf, 10%		2				
C420	113-3082-00	Cap. D/C, 8.2pf, 0.5%		1				
C421	102-0024-09	Cap. D/C, Trm. 7-35pf		1				
C422	096-0130-01	Cap. Tant. 1μf, 20V		2				
C423	113-5101-01	Cap. D/C, 100pf, 10%						

NAME Glideslope Board KI 213/214	ASS'Y. NO. 200-0494-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	-00	-01	-02	-03	-04
	C424	113-7203-00	Cap. D/C, .02µf, 20%, 12V		16				
	C425	113-5102-00	Cap. D/C, .001µf, 10%		1				
R2	C426	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C427	105-0031-21	Cap. MYL, .0047, 80V, 5%		2				
	C428	105-0031-21	Cap. MYL, .0047, 80V, 5%						
	C429	113-7203-00	Cap, D/C, .02µf, 20%, 12V						
	C430	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C431	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C432	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C433	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C434	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C435	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C436	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C437	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C438	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C439	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C440	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	C441	096-1030-01	Cap. Tant. 1µf, 20V						
	C442	118-0016-00	Cap. D/C, 10pf, 10%		1				
	C443	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
R2	C444	096-0130-06	Cap. Tant. 47µf, 15V		2				
R2	C445	096-0130-06	Cap. Tant, 47µf, 15V						
	C446	113-7203-00	Cap. D/C, .02µf, 20%, 12V						
	R401	130-0182-23	Res. F/C, 1.8K, QW, 5%		5				
	R402	130-0182-23	Res. F/C, 1.8K, QW, 5%						
	R403	130-0102-23	Res. F/C, 1K, QW, 5%		2				
	R404	130-0272-23	Res. F/C, 2.7K, QW, 5%		1				
	R405	130-0221-23	Res. F/C, 220, QW, 5%		2				
	R406	130-0101-23	Res. F/C, 100, QW, 5%		2				
	R407	135-0101-12	Res. M/F, 100, QW, 5%		1				
	R408	130-0182-23	Res. F/C, 1.8K, QW, 5%						
	R409	130-0182-23	Res. F/C, 1.8K, QW, 5%						
	R410	130-0221-23	Res. F/C, 220, QW, 5%						
	R411	130-0103-23	Res. F/C, 10K, QW, 5%		2				
	R412	130-0822-23	Res. F/C, 8.2K, QW, 5%		1				
	R413	130-0473-23	Res. F/C, 47K, QW, 5%		7				
	R414	135-0102-12	Res. M/F, 1K, QW, 5%		1				
	R415	130-0221-12	Res. M/F, 220 QW, 5%						
R2	R416	130-0103-23	Res. F/C, 10K, QW, 5%						
R2	R417	135-0202-12	Res. M/F, 2K, QW, 5%		1				

NAME Glideslope Board KI 213/214

ASS'Y. NO. 200-0494-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
	R418	133-0016-07	Res. Pot. 150, 20%		1				
	R419	135-0391-12	Res. M/F, 390, QW, 5%		1				
	R420	130-0223-23	Res. F/C, 22K, QW, 5%		2				
	R421	130-0223-23	Res. F/C, 22K, QW, 5%						
	R422	130-0222-23	Res. F/C, 2.2K, QW, 5%		1				
	R423	135-0563-12	Res. M/F, 56K, QW, 5%		1				
	R424	133-0016-06	Res. Pot. 47K, 20%		2				
	R425	135-0303-12	Res. M/F, 30K, QW, 5%		1				
	R426	133-0016-03	Res. Pot. 10K, 20%		4				
	R427	135-0242-12	Res. M/F, 2.4K, QW, 5%		2				
	R428	133-0016-08	Res. Pot. 2K, 20%		8				
	R429	135-0362-12	Res. M/F, 3.6K, QW, 5%		1				
	R430	133-0016-08	Res. Pot. 2K, 20%						
	R431	135-0222-12	Res. M/F, 2.2K, QW, 5%		1				
R2	R432	133-0016-02	Res. Pot. 1L 20%		1				
	R433	135-0562-12	Res. M/F, 5.6K, QW, 5%		1				
	R434	133-0016-08	Res. Pot. 2K, 20%						
	R435	135-0622-12	Res. M/F, 6.2K, QW, 5%		2				
	R436	133-0016-09	Res. Pot. 5K, 20%		5				
	R437	135-0912-12	Res. M/F, 9.1K, QW, 5%		1				
	R438	133-0016-09	Res. Pot. 5K, 20%						
	R439	135-0133-12	Res. M/F, 13K, QW, 5%		1				
	R440	133-0016-09	Res. Pot. 5K, 20%						
	R441	135-0203-12	Res. M/F, 20K, QW, 5%		1				
	R442	133-0016-03	Res. Pot. 10K, 20%						
	R443	135-0433-12	Res. M/F, 43K, QW, 5%		1				
	R444	133-0016-03	Res. Pot. 10K, 20%						
	R445	135-0154-12	Res. M/F, 150, QW, 5%		1				
	R446	133-0016-06	Res. Pot. 47K, 20%						
	R447	135-0242-12	Res. M/F, 2.4K, QW, 5%						
	R448	133-0016-08	Res. Pot. 2K, 20%						
	R449	135-0272-12	Res. M/F, 2.7K, QW, 5%		1				
	R450	133-0016-08	Res. Pot. 2K, 20%						
	R451	135-0392-12	Res. M/F, 3.9K, QW, 5%		1				
	R452	133-0016-08	Res. Pot. 2K, 20%						
R2	R453	135-0622-12	Res. M/F, 6.2K, QW, 5%						
	R454	133-0016-08	Res. Pot. 2K, 20%						
	R455	135-0752-12	Res. M/F, 7.5K, QW, 5%						
	R456	133-0016-09	Res. Pot. 5K, 20%						
	R457	135-0123-12	Res. M/F, 12K, QW, 5%		1				
	R458	133-0016-09	Res. Pot. 5K, 20%						
	R459	135-0153-12	Res. M/F, 15K, QW, 5%		1				
	R460	133-0016-03	Res. Pot. 10K, 20%						
	R461	135-0472-12	Res. M/F, 4.7K, QW, 5%		1				

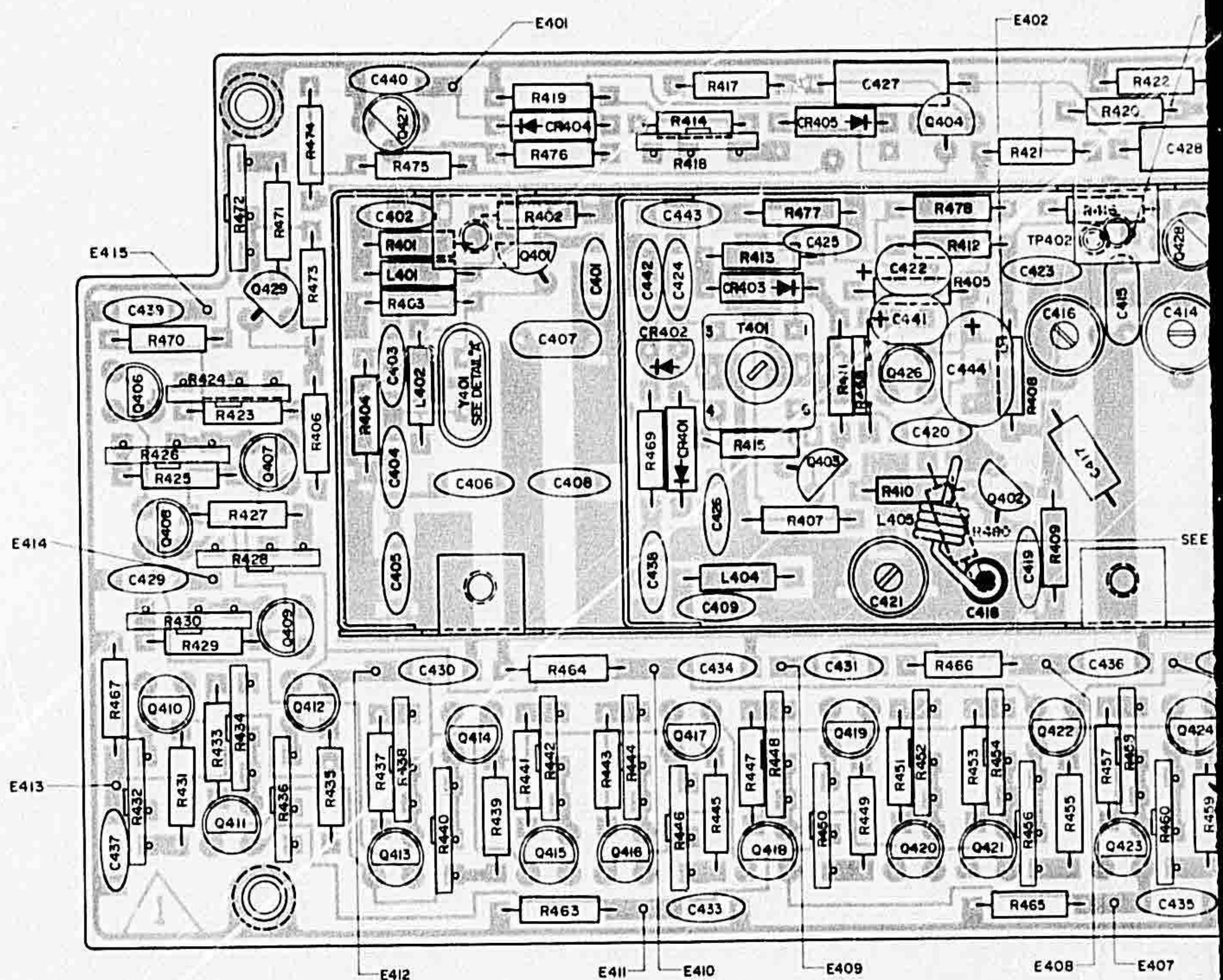
NAME Glideslope Board KI 213/214 | ASS'Y. NO. 200-0494-00

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
	R462	133-0016-08	Res. Pot. 2K, 20%						
	R463	130-0473-23	Res. F/C, 47K, QW, 5%						
	R464	130-0473-23	Res. F/C, 47K, QW, 5%						
	R465	130-0473-23	Res. F/C, 47K, QW, 5%						
	R466	130-0473-23	Res. F/C, 47K, QW, 5%						
	R467	130-0473-23	Res. F/C, 47K, QW, 5%						
R2	R468	130-0333-23	Res. F/C, 33K, QW, 5%		1				
	R469	130-0104-23	Res. F/C, 100K, QW, 5%		1				
	R470	135-0103-12	Res. M/F, 10K, QW, 5%		1				
	R471	135-0471-12	Res. M/F, 470, QW, 5%		1				
	R472	133-0016-05	Res. Pot. 500, 20%		1				
	R473	130-0102-23	Res. F/C, 1K, QW, 5%						
	R474	135-0511-12	Res. M/F, 510, QW, 5%		1				
	R475	135-0270-12	Res. M/F, 27, QW, 5%		1				
	R476	130-0473-23	Res. F/C, 47K, QW, 5%						
R2	R477	130-0511-23	Res. F/C, 510, QW, 5%		1				
R2	R478	130-0182-23	Res. F/C, 1.8K, QW, 5%						
R2	R479	135-0331-12	Res. M/F, 330, QW, 5%		1				
	R480	130-0220-23	Res. F/C, 22, QW, 5%		1				
	R481	130-0101-23	Res. F/C, 100, QW, 5%						

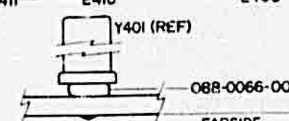
Parts List Revision History

ACTION	SYMBOL	PART NUMBER	DESCRIPTION Maintenance Manual Rev. 2, Dec., 1974
Chg to	Q406	007-0078-00	Tstr, 2N3415
Chg to	Q407	007-0078-00	Tstr, 2N3415
Chg to	Q408	007-0078-00	Tstr, 2N3415
Chg to	Q409	007-0078-00	Tstr, 2N3415
Chg to	Q410	007-0078-00	Tstr, 2N3415
Chg to	Q411	007-0078-00	Tstr, 2N3415
Chg to	Q412	007-0078-00	Tstr, 2N3415
Chg to	Q413	007-0078-00	Tstr, 2N3415
Chg to	Q414	007-0078-00	Tstr, 2N3415
Chg to	Q415	007-0078-00	Tstr, 2N3415
Chg to	Q416	007-0078-00	Tstr, 2N3415
Chg to	Q417	007-0078-00	Tstr, 2N3415
Chg to	Q418	007-0078-00	Tstr, 2N3415
Chg to	Q419	007-0078-00	Tstr, 2N3415
Chg to	Q420	007-0078-00	Tstr, 2N3415
Chg to	Q421	007-0078-00	Tstr, 2N3415
Chg to	Q422	007-0078-00	Tstr, 2N3415
Chg to	Q423	007-0078-00	Tstr, 2N3415
Chg to	Q424	007-0078-00	Tstr, 2N3415
Chg to	Q425	007-0078-00	Tstr, 2N3415
Chg to	Q426	007-0078-00	Tstr, 2N3415
Chg to	Q428	007-0078-00	Tstr, 2N3415
Delete	L403		Typo Error, should be L404
Add	L404	019-2055-01	Choke, RF 0.39µh
Chg to	C426	114-7104-00	Cap, D/C .1µf 20% 12V
Chg to	C444	096-1030-06	Typo Error P/N only
Chg to	C445	096-1030-06	Typo Error P/N only
Chg to	R416	130-0222-23	Res. F/C 2.2K, 2% QW
Chg to	R417	136-1741-22	Res. MF 1.74K 1% QW
Chg to	R432	133-0016-02	Res. Pot 1K 20% (Typo error description only)
Chg to	R453	135-0752-12	Res MF 7.5K, 5% QW
Chg to	R468	133-0016-06	Res. Pot. 47K 20%
Chg to	R477	130-0431-23	Res. F/C 430 5% QW
Chg to	R478	130-0332-23	Res. F/C 3.3K 5% QW
Delete	R479		

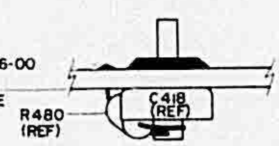


NOTES

1. FOR COMPONENT VALUES SEE BILL OF MATERIAL 200-0494-00
2. BOARDS MUST BE FREE OF FLUX AND OTHER FOREIGN PARTICLES AFTER ASSEMBLY IS COMPLETED
   RECOMMENDED CLEANING PROCEDURE: UTILIZING A SHALLOW PAN (APPROX 1½" DEEP) AND APPROX 1 PINT OF FLUX MANUFACTURES' RECOMMENDED FLUX REMOVER SCRUB BOTH SIDES OF CARD THROUGHLY WITH SOFT BRISTLED BRUSH DRY THROUGHLY WITH AN AIR BLAST.
3. SOME TRACES OF FLUX AND REMOVER MAY REMAIN AS A WHITE RESIDUE
4. C407 LEAD LENGTH BETWEEN THE CAPACITOR BODY AND THE P.C. BOARD SHALL BE NO GREATER THAN .050 INCHES.



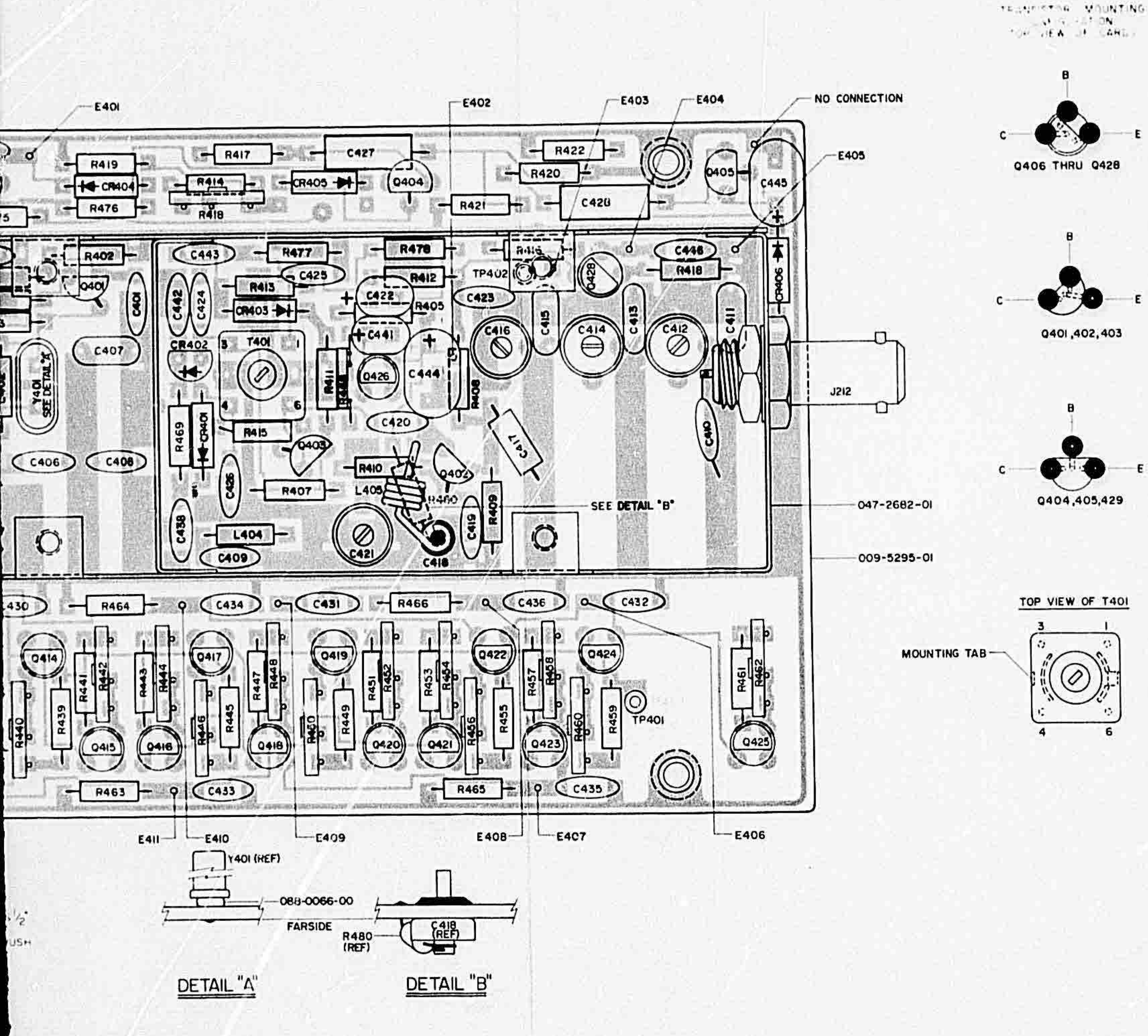
DETAIL "A"



DETAIL "B"

FIGURE 5-5 KI 213/214 GLIDESLOPE BOARD ASSEMBLY DRAWING
(Dwg. No. 300-0693-00, R-4)

SEE BLOWUP



E BOARD ASSEMBLY DRAWING
3-00, R-4)

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	-00	-01	-02	-03	-04
R2		009-5296-01	Bd. P.C.		1				
R2		150-0022-10	Tubing, Shr., #14 Nat.		1				
	Q901	007-0039-00	Tstr. 2N3403		1				
R2	Q902	007-0035-00	Tstr. B343		7				
	Q903	007-0035-00	Tstr. B343						
	Q904	007-0035-00	Tstr. B343						
	Q905	007-0035-00	Tstr. B343						
	Q906	007-0035-00	Tstr. B343						
	Q907	007-0035-00	Tstr. B343						
R2	Q909	007-0035-00	Tstr. B343						
	CR901	007-5011-00	DIO, Zen. 1N4735A, 6.2V		1				
	CR903	007-6023-00	DIO, 1N277		4				
	CR904	007-6023-00	DIO, 1N277						
	CR905	007-6023-00	DIO, 1N277						
	CR906	007-6023-00	DIO, 1N277						
R2	L901	019-2055-70	Choke, RF 2.2μf, 10%		1				
	C901	113-5101-01	Cap. D/C 100pf, 10%		5				
	C902	096-1030-06	Cap. Tant. 47μf, 15V		3				
	C903	113-6103-00	Cap. .01μf, D/C 50V		1				
R2	C904	113-6103-00	Cap. .01μf, D/C 50V						
	C905	096-1030-01	Cap. Tant. 1.0μf, 20V		4				
R2	C906	096-1030-08	Cap. Tant. 100μf, 15V		1				
	C907	096-1030-05	Cap. Tant. 10μf, 20V		1				
	C908	105-0031-57	Cap. MYL. 0.047, 5%		2				
	C909	105-0031-57	Cap. MYL. 0.047, 5%						
	C910	105-0031-48	Cap. MYL. 0.027, 5%		2				
	C911	105-0031-48	Cap. MYL. 0.027, 5%						
	C912	096-1030-01	Cap. Tant. 1.0μf, 20V						
	C913	096-1030-18	Cap. Tant. 27μf, 15V		2				
	C914	096-1030-01	Cap. Tant. 1.0μf, 20 V						
	C915	096-1030-18	Cap. Tant. 27μf, 15V						
R2	C916	113-5101-01	Cap. D/C, 100μf, 10%		5				
R2	C917	113-5101-01	Cap. D/C, 100μf, 10%						

NAME			ASS'Y. NO.					
Audio Board KI 213/214			200-0495-00					

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
R2	C918	113-5101-01	Cap. D/C, 100μf, 10%						
R2	C919	113-5101-01	Cap. D/C, 100μf, 10%						
R2	C920	113-5681-00	Cap. D/C, 680μf, 10%						
R2	C921	113-5681-00	Cap. D/C, 680μf, 10%		2				
	C922	096-1030-01	Cap. Tant. 1.0μf, 20%						
	C923	096-1030-06	Cap. Tant. 47μf, 10%						
	C924	096-1030-25	Cap. Tant. 150μf, 20%						
	C925	096-1030-25	Cap. Tant. 150μf, 20%		2				
	I901	120-3037-00	I.C. (Quad. Op. Amp.)		1				
R2	RT901	134-0112-01	TMTR. .1K, 10%		1				
	R901	132-5038-00	Res. W/W 130, 2W, 5%		1				
	R902	130-0681-23	Res. F/C, 680, QW, 5%		1				
	R903	130-0105-23	Res. F/C, 1M, QW, 5%		2				
	R904	130-0105-23	Res. F/C, 1M, QW, 5%						
	R905	130-0125-23	Res. F/C, 1.2M, QW, 5%		1				
	R906	130-0155-23	Res. F/C, 1.5M, QW, 5%		1				
R2	R907	130-0103-23	Res. F/C, 10K, QW, 5%		3				
R2	R908	130-0470-23	Res. F/C, 470K, QW, 5%		2				
R2	R909	130-1223-23	Res. F/C. 22K, QW, 5%		2				
	R910	130-0203-23	Res. F/C, 20K, QW, 5%		2				
R2	R911	130-0470-23	Res. F/C, 470K, QW, 5%						
R2	R912	133-0016-09	Res. Pot. 5K, 20%		1				
R2	R913	130-0183-23	Res. F/C, 18K, QW, 5%		2				
R2	R914	180-0188-23	Res. F/C, 18K, QW, 5%						
	R915	136-2101-22	Res. M.F. 2.10K, 1%		1				
	R916	136-7503-22	Res. M.F. 750K, 1%		1				
	R917	130-0222-23	Res. F/C, 2.2K, QW, 5%		2				
	R918	136-2151-22	Res. M.F. 2.15K, 1%		1				
	R919	136-7873-22	Res. M.F. 787K, 1%		1				
	R920	130-0222-23	Res. F/C, 2.2K, QW, 5%						
	R921	130-0104-23	Res. F/C, 100K, QW, 5%		4				
	R922	130-0104-23	Res. F/C, 100K, QW, 5%						
	R923	130-0104-23	Res. F/C, 100K, QW, 5%						
	R924	130-0104-23	Res. F/C, 100K, QW, 5%						
R2	R925	130-0103-23	Res. F/C, 10K, QW, 5%						
	R926	130-0221-23	Res. F/C, 220, QW, 5%		3				
	R927	133-0016-05	Res. Pot. 500, 20%		1				
	R928	130-0221-23	Res. F/C, 220, QW, 5%						

NAME	ASS'Y. NO.
Audio Board KI 213/214	200-0495-00

KING RADIO CORP PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
	R929	130-0223-23	Res. F/C, 22K, QW, 5%						
	R930	130-0680-23	Res. F/C, 68, QW, 5%		1				
	R931	130-0102-23	Res. F/C, 1K, QW, 5%		2				
	R932	130-0102-23	Res. F/C, 1K, QW, 5%						
	R933	130-0221-23	Res. F/C, 220, QW, 5%						
	R934	130-0101-23	Res. F/C, 100, QW, 5%						
	R935	130-0910-23	Res. F/C, 91, QW, 5%		1				
	R936	130-0471-23	Res. F/C, 470, QW, 5%		1				
	R937	133-0016-07	Res. Pot. 150, 20%		1				
	R938	130-0122-23	Res. F/C, 1.2K, QW, 5%		1				
	R939	133-0016-06	Res. Pot. 47K, 20%		1				
	R940	130-0203-23	Res. F/C, 20K, QW, 5%						
R2	R941	130-0103-23	Res. F/C, 10K, QW, 5%						
	R942	130-0333-23	Res. F/C, 33K, QW, 5%		1				
R2	R943	130-0682-23	Res. F/C, 6.8K, QW, 5%		1				

Parts List Revision History

ACTION	SYMBOL	PART NUMBER	DESCRIPTION
			Maintenance Manual, Rev. 2, Dec., 1974 KI 213 S/N 2499 & Below KI 214 S/N 7999 & Below Ref: Figure 5-6A
Delete		150-0022-10	Shrink Tubing
Add		016-1040-00	Seal Coat, #2029 Clear Urethane
Chg to	Q902	007-0187-00	Tstr, 2N5089
Delete	Q909		Typo Error should be Q908
Add	Q908	007-0035-00	Tstr, B343
Chg to	L901	019-2055-20	Choke RF 2.2μh 10%
Chg to	C904	096-1030-06	Cap, Tant 47μf 10% 15V
Delete	C906		
Chg to	C916	113-5101-01	Cap, DC 100pf 10%
Chg to	C917		Typo error only
Chg to	C918		100μh should be 100pf
Chg to	C919		
Chg to	C920	113-5681-00	Cap, DC 680pf 10%
Chg to	C921		Typo error only 680μf should be 680pf
Add	C926		
Add	C927	113-5101-01	Cap DC 100pf 10%
Add	C928		
Add	C929		
Delete	RT901		
Chg to	R907	130-0222-23	Res. F/C 2.2K 5% Qw
Chg to	R908	130-0474-23	Part Number Typo error only
Chg to	R909	130-0222-23	Part Number Typo error only
Chg to	R911	130-0474-23	Part Number Typo error only
Chg to	R913	136-1622-22	Res MF 16.2K 1%
Chg to	R914	136-1692-22	Res. MF 16.9K 1%
Chg to	R925	130-0102-23	Res. FC 1K 5% QW
Chg to	R941	130-0103-12	Res. MF 10K 1%
Chg to	R943	130-0102-23	Res. FC 1K 5% QW
			Ref: Figure 5-6B KI 213 S/N 2500 & Above KI 214 S/N 8000 & Above
Chg to		009-5628-01	P.C. Board
Chg to	R912	133-0072-12	Res. Pot. 5K 20%

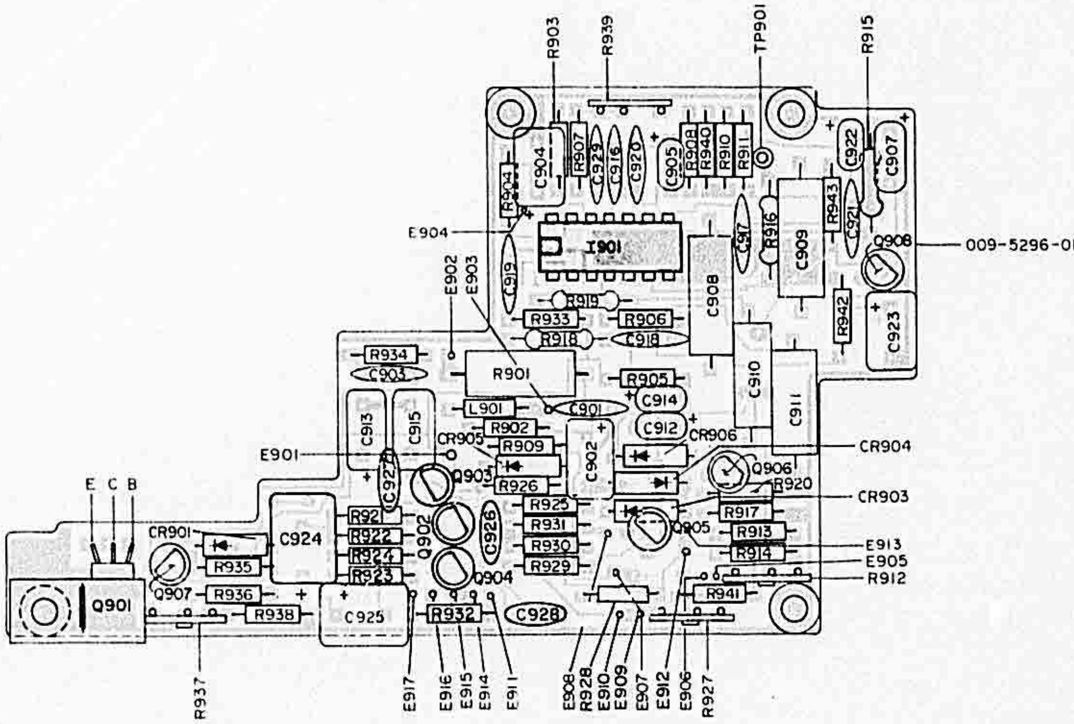


FIGURE 5-6A KI 213/214 AUDIO BOARD ASSEMBLY
KI 213 S/N 2499 & Below; KI 214 S/N 7999 & Below
(Dwg. No. 300-0694-00, R-5)

SEE BLOWUP

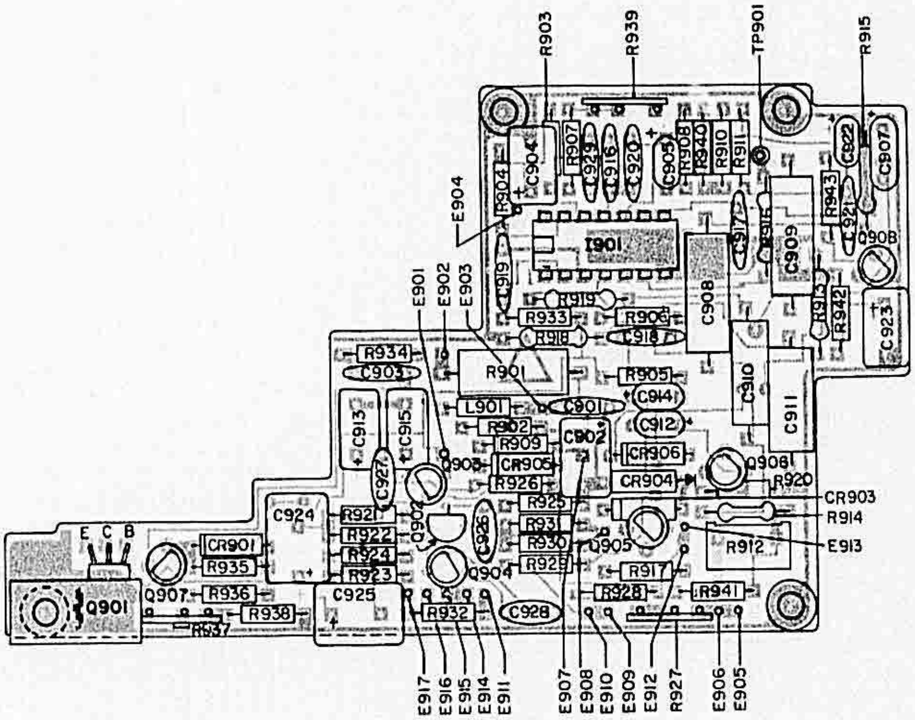


FIGURE 5-6B KI 213/214 AUDIO BOARD ASSEMBLY
KI 213 S/N2500 & Above; KI 214 S/N 8000 & Above
(Dwg. No. 300-0694-01, R-0)

SEE BLOWUP

NAME	ASS'Y. NO.
CONNECTOR ASSEMBLY KI 213/214	200-0496-00/01

KING RADIO CORP. PARTS LISTING

	SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
		200-0496-00	Connector Ass'y KI 213		X				
		200-0496-01	Connector Ass'y KI 214			X			
R2		012-1006-00	Lacing Cord. Nat. .090		AR	AR			
R2		013-0006-00	Ferrite Beads		70	52			
		025-0018-00	Wire #26AWG Blk						
		025-0018-11	Wire #26AWG Brn						
		025-0018-14	Wire #26AWG Brn/Yel						
		025-0018-20	Wire #26 AWG Red/Blk						
		025-0018-21	Wire #26AWG Red/Brn						
		025-0018-23	Wire #26AWG Red/Orn						
		025-0018-24	Wire #26AWG Red/Yel						
		025-0018-30	Wire #26AWG Orn/Blk						
		025-0018-32	Wire #26AWG Orn/Red						
		025-0018-33	Wire #26AWG Orn						
		025-0018-36	Wire #26AWG Orn/Blu						
		025-0018-40	Wire #26AWG Yel/Blk						
		025-0018-41	Wire #26AWG Yel/Brn						
		025-0018-46	Wire #26AWG Yel/Blu						
		025-0018-51	Wire #26AWG Grn/Brn						
		025-0018-52	Wire #26AWG Grn/Red						
		025-0018-54	Wire #26AWG Grn/Yel						
		025-0018-55	Wire #26AWG Grn						
		025-0018-63	Wire #26AWG Blu/Orn						
		025-0018-64	Wire #26AWG Blu/Yel						
		025-0018-74	Wire #26AWG Vio/Yel						
		025-0018-77	Wire #26AWG Vio						
		025-0018-84	Wire #26AWG Gry/Yel						
		025-0018-86	Wire #26AWG Gry/Blu						
		025-0018-89	Wire #26AWG Gry/Wht						
		025-0018-90	Wire #26AWG Wht/Blk						
		025-0018-91	Wire #26AWG Wht/Brn						
		025-0018-95	Wire #26AWG Wht/Grn						
R2		025-0018-96	Wire #26AWG Wht/Blu						
		026-0003-00	Wire, Tinned Copper		.05				
R2		150-0018-10	Tubing, Shrinkable						
R2		150-0042-00	Tubing, Shrinkable		.96	.86			
	J211	030-2106-00	Conn. (42 Pin)		1				
	J211	030-2164-00	Conn. (26 Pin)			1			

Parts List Revision History

ACTION	SYMBOL	PART NUMBER	DESCRIPTION KI 213/214 Connector Assembly	QTY -00	-01
Delete		012-1006-00	Lacing Cord	AR	AR
Add		091-0109-00	Plastic Ties	40	40
Delete		150-0018-10	Tubing Shrink		
Delete		150-0042-00	Tubing Shrink		
Add		025-0018-09	Wire #26AWG Blk/Wht		
Add		025-0018-22	Wire #26AWG Red		
Add		025-0018-29	Wire #26AWG Red/Wht		
Add		025-0018-39	Wire #26AWG Orn/Wht		
Add		025-0018-44	Wire #26AWG Yel		
Add		025-0018-66	Wire #26AWG Blu		
Add		025-0018-79	Wire #26AWG Vio/Wht		
Add		025-0018-88	Wire #26AWG Gry		
Add		025-0018-92	Wire #26AWG Wht/Red		
Add		025-0018-93	Wire #26AWG Wht/Orn		
Add		025-0018-99	Wire #26AWG Wht		
Chg to	L101 thru L134	013-0006-00	Ferrite Bead	34	0
Chg to	L101 thru L126	013-0006-00	Ferrite Bead	0	26
Delete		025-0018-96	Wire #26AWG Wht/Blu		

CONTENTS

SECTION VI

MAINTENANCE

SECTION VI

MAINTENANCE

6.1 GENERAL INFORMATION

6.1.1 SEMICONDUCTOR REPLACEMENT

It is recommended that semiconductors not be tested or replaced until unsatisfactory performance is observed.

6.1.2 SEMICONDUCTOR MAINTENANCE

6.1.2.1 GENERAL

Due to the wide utilization of semiconductors in this electronic equipment, somewhat different techniques are necessary in maintenance procedures. In solid state circuits the impedance and resistances encountered are of much lower values than those encountered in vacuum-tube circuits. Therefore, a few ohms discrepancy can greatly affect the performance of the equipment. Also, coupling and filter capacitors are of larger values and usually are of the tantalum type. Hence, when measuring resistances, an instrument very accurate in the low resistance ranges must be used, and when measuring values of capacitors, an instrument accurate in the high ranges must be employed. Capacitor polarity must be observed when measuring resistance.

6.1.2.2 SEMICONDUCTOR TEST EQUIPMENT

Damage to semiconductors by test equipment is usually the result of accidentally applying too much current or voltage to the elements. Common causes of damage from test equipment are discussed in the following paragraphs.

6.1.2.2.1 Transformerless Power Supplies

Test equipment with transformerless power supplies is one source of high current. However, this type of test equipment can be used by employing an isolation transformer in the AC power line.

6.1.2.2.2 Line Filter

It is still possible to damage semiconductors from line current, even though the test equipment has a power transformer in the power supply, if the test equipment is provided with a line filter. This filter may function as a voltage divider and apply half voltage to the semiconductor. To eliminate this condition, connect a ground wire from the chassi of the equipment under test before making any other connections.

6.1.2.2.3 Low-Sensitivity Multimeters.

Another cause of semiconductor damage is a multimeter that requires excessive current to provide adequate indications. Multimeters with sensitivities of less than 20,000 ohms-per-volt should not be used on semiconductors. A multimeter with low sensitivity will draw too much current through many types of small semiconductors, causing damage. When in doubt as to the amount of current supplied by a multimeter, check the multimeter circuits on all scales with an external, low-resistance multimeter connected in series with the multimeter leads. If more than one milliampere is drawn by the multimeter on any range, this range cannot be safely used on small semiconductors.

6.1.2.2.4 Power Supply

When using a battery-type power supply, always use fresh batteries of the proper value. Make certain that the polarity of the power supply is correct for the equipment under test. Do not use power supplies having poor voltage regulation.

6.1.2.3 SEMICONDUCTOR VOLTAGE AND RESISTANCE MEASUREMENTS

When measuring voltage or resistances in circuits containing semiconductor devices, remember that these components are polarity and voltage conscious. Since the values of capacitors used in semiconductor circuits are usually large (especially in audio, servo, or power circuits) time is required to charge these capacitors when an ohmeter is connected to a circuit in which they appear. Thus, any reading obtained is subjected to error if sufficient time is not allowed for the capacitor to fully charge. When in doubt it may be best in some cases to isolate the components in question and measure them individually.

6.1.2.4 TESTING OF TRANSISTORS

A transistor checker should be used to properly evaluate transistors. If a transistor tester is not available, a good multimeter may be used. Make sure that the multimeter meets the requirements outlined in preceeding paragraph 5.7.2.3. Always check the value of the bias resistors in series with the various transistor elements. A transistor is very sensitive to improper bias voltage therefore, a short or open circuit in the bias resistance may damage the transistor. For this reason, do not troubleshoot by shorting the various points in the circuit to ground and listening for clicks.

CAUTION

If a transistor is found to be defective, make certain that the circuit is in good operating order before installing a replacement transistor. If a short circuit exists in the circuit, putting in another transistor will most likely result in burning out the new component. Do not depend upon fuses to protect transistors.

6.1.2.4.1 PNP Transistor

To check a PNP transistor, connect the positive lead of the multimeter to the base of the transistor and the negative lead to the emitter. Generally, a resistance reading of 50,000 ohms or more should be obtained. Reconnect the multimeter with the negative lead to the base. With the positive lead connected to the emitter, a resistance value of 500 ohms or less should be obtained. When the positive lead is connected to the collector, a value of 500 ohms or less should be likewise obtained.

6.1.2.4.2 NPN Transistor

Similar tests made on an NPN transistor should produce the following results:
With the negative lead of the multimeter connected to the base of the transistor the value of resistance between the base and the collector should be high. With the positive lead of the multimeter connected to the base, the value of resistance between the base and the collector should

be low. If these results are not obtained, the transistor is probably defective and should be replaced.

6.1.2.5 REPLACING SEMICONDUCTORS

Never remove or replace a plug-in semiconductor with the supply voltage turned on. Transients thus produced may damage the semiconductor or others remaining in the circuit. If a semiconductor is to be evaluated in an external test circuit, be sure that no more voltage is applied to the semiconductor than normally is used in the circuit from which it came.

Use only a low heat soldering iron when installing or removing soldered-in-parts. Use care in the handling of printed circuit boards. When removing a part from a printed circuit board, first unbend the crimped leads. Use only the necessary amount of heat to unsolder the part. Clear excess solder from mounting eyelets, making sure that mounting holes are clear before installing new parts. When removing a transformer or other part having a multiple number of leads, straighten (unbend) all leads first and then heat leads one at a time, working around the part, until the part can be gently "rocked out".

When installing or removing a soldered-in semiconductor grasp the lead to which heat is applied between the solder joint and the semiconductor with long-nosed pliers. This will dissipate some of the heat that would otherwise conduct into the semiconductor from the soldering iron. Make certain that all wires soldered to semiconductor terminals have first been properly tinned so that the necessary connection can be made quickly. Excessive heat will permanently damage a semiconductor.

When soldering is required to remove a component from a semiconductor socket, remove the semiconductor to prevent damage to the semiconductor.

In some cases, power transistors are mounted on heat-sinks that are designed to dissipate heat away from them. In some power circuits, the transistor must also be insulated from them. In some power circuits, the transistor must also be insulated from ground. Often, this insulating is accomplished by means of insulating washers made of fiber and mica. When replacing transistors mounted in this manner, be sure that the insulating washers are replaced in proper order. Before installing the mica washers treat them with a film of silicone grease. This treatment helps in the transfer of heat. After the transistor is mounted, and before making any connections, check from the case of the transistor to ground with a multimeter to see that the insulation is effective.

6.2 TEST AND ALIGNMENT

6.2.1 TEST EQUIPMENT REQUIRED

The following test equipment, or equivalent, is required to properly adjust the KI 201C/KI 213/ KI 214. All test equipment must be properly calibrated before adjustments are started.

A. Power Supply: Heath Model IP-20

B. NAV Control Head: KX 175

C. Digital Voltmeter: Fairchild 7050 multimeter

D. VTVM: Heath Model IM-13

E. NAV/GS Signal Generator: MEC-100B with MEC-540 module

F. Oscilloscope: Tektronix Model 453

G. 6db Pad

H. AC Voltmeter: Ballantine Model 314A

I. RF Millivoltmeter: HP411A with BNC Probe 11025A

6.2.2 OTHER DOCUMENTS REQUIRED

Necessary schematics and assembly drawings.

6.2.3 TEST EQUIPMENT SETUP

Refer to KI201C/213/214 Interconnect drawings for wiring from the KX 175. Power Supply and NAV/GS signal generator to the KI 201C/213/214.

6.2.4 TEST AND ALIGNMENT PROCEDURE

A. KI 201C/KI 214 VOR/LOC

1) KI 201C/KI 214 VOR Adjustments

(a) Apply a standard localizer centering signal to the input of the converter. This input signal can be obtained from the KX 170/170A/170B KX 175/ 175B Navigation Receiver (200μv RF input level in LOC mode) or by using the demodulator output from a VOR generator such as 479S-3. If the Navigation receivers are used, make certain that R425 on the NAV COM receiver board is set for 0.35 volts RMS.

(b) Adjust R315 in the KI 201C/KI 214 to obtain a full TO flag indication.

(c) Apply a composite VOR signal of 0.50 volts RMS to the input of the converter. This input signal also can be obtained from the KX 170/170A/170- KX 175/175B Navigation Receiver (200μv RF input level in the VOR mode)

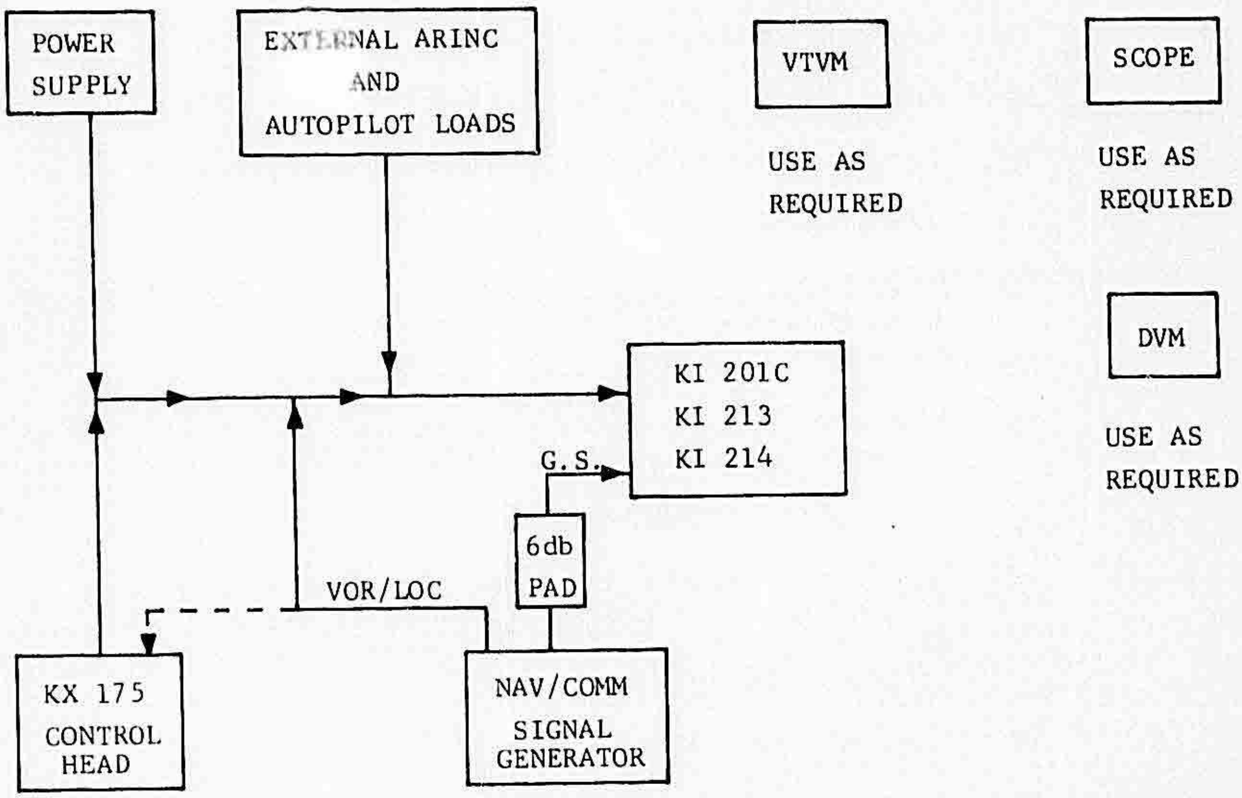


FIGURE 6-1 TEST EQUIPMENT SETUP
(Dwg. No. 696-2829-00)

or by using the demodulator output from a VOR generator such as 479S-3. If the Navigation receivers are used, the RMS level at R425 (or VOR generator) will increase to approximately 0.48 volts RMS after switching from LOC to VOR mode. (Tolerance allowed 0.50 VRMS ±.05VRMS).

(d) Adjust the bottom slug (nearest to the printed circuit board), of the 9960 discriminator transformer for maximum positive D-C voltage at TP304, (approximately 3 volts).

(e) Adjust the top slug for zero voltage at TP305.

(f) Select a "To" heading of zero (0) degrees on the VOR generator.

(g) Set R316 (variable control inside OBS shaft) to mechanical center.

(h) Set the OBS to zero (0) degrees.

(i) If the resolver has been replaced, adjust the resolver (B301) to center the needle with a "To" indication while the OBS card is set for zero (0) degrees.

(j) Adjust R363 (reciprocal potentiometer) and R316 (zero potentiometer) for zero error on zero (0) degrees heading of the KI 201C/214.

—NOTE—

Shift the VOR generator omni track from zero (0) to 180 degrees. If the error falls in the same area between zero (0) and 180 degrees, adjust R363. If the error shifts from one side to the other between zero (0) and 180 degrees adjust R316.

(k) Adjust R315 to obtain a course sensitivity of 20 degrees ± 1 degree.

(l) Change the VOR generator and KI 201C/214 to a 90 degree heading.

(m) Adjust R351, to center the VOR/LOC needle.

(n) Check reciprocal of 270 degrees to ±2 degrees. If more than ±2 degrees, adjust R351 for a balance between 90 and 270 degrees.

(o) Repeat steps m and n for proper alignment.

2) KI 201C/214 LOC Adjustments

(a) Apply a standard localizer centering signal of 0.35Vrms to the input of the converter as in step 1a, VOR adjustments.

(b) Connect an oscilloscope or ACVTVM (1.5 volt scale) to TP302.

(c) Set the tone localizer to the Cal 90Hz position. Note the indication displayed by the oscilloscope or VTVM.

(d) Set the tone localizer to the Cal 150Hz position. Note the indication displayed by the oscilloscope or VTVM

(e) Adjust R321 to obtain an equal output in steps c and d.

(f) Apply the standard localizer centering signal to the converter.

(g) Adjust LOC centering control R323 to center the VOR/LOC deviation needle.

(h) Check steps c, d, and e.

(i) Set tone loc for 4db, 150Hz and select R331 for needle deflection of 4 dots.

(j) Repeat steps f and g.

(k) Adjust R369 for a full "TO" Flag Indication (no warning flag showing) with an input centering signal of 330mVRMS.

(l) Repeat step 2.b through i.

B. KI 213/KI 214 GLIDESLOPE

—WARNING—

BEFORE TURNING ON THE UNIT, MEASURE THE RESISTANCE OF THE 10 VOLT LINE. IT SHOULD BE APPROXIMATELY 200 ohm. A SHORT ON THIS LINE WILL INSTANTLY CAUSE CATASTROPHIC FAILURE OF Q901, THE REGULATOR PASS TRANSISTOR, WHEN THE UNIT IS TURNED ON. ALSO, DURING ALIGNMENT AND TESTING, CARE MUST BE TAKEN NOT TO TOUCH METAL PROBES BETWEEN THE 10 VOLT LINE AND GROUND.

1. Set the control head to 110.3MHz and set R468 to its maximum resistance. With the DVM, monitor the reference voltage at the junction of R474 and R475. Set this voltage to 9.5 ±0.1V by adjusting R937.

2. Monitor TP401 with the DVM. Adjust R446 for a voltage of 9.0 ±0.05V.

3. Set the tuning slug of T401 three turns below the top of the transformer.

4. Monitor TP402 on the scope. Connect external sync of the scope to the collector of Q404. Adjust R418 for a pulse width of 40μs. This pulse width is measured along the vertical axis of the entire RF envelope.

5. Set the glideslope generator to 335MHz 0db tone ratio and 1000μv output. Using the scope, monitor the 90Hz channel at TP901.

6. Tune T401 for maximum audio. While tuning, decrease the RF input to maintain the audio at just below the AGC limiting level. This will be approximately 1.5Vp-p. If the 90Hz tone does not appear, increase the RF level and adjust

C412, C414, C416 and C421 until it does appear.

7. Set the control head to 109.3MHz and glideslope frequency to 332MHz, with approximately the minimum RF level established in step 6. Use test set-up as in step 5. Adjust R436 for a maximum audio at TP901 for a minimum RF input.

8. All further tuning adjustments will be set for lowest 1/2 flag RF level.

9. Adjust C412, C414, C416 and C421 for best 1/2 flag sensitivity at 109.3MHz.

10. Using R418 to adjust the pulse width at 108.95MHz and R468 to adjust the pulse width at 110.3MHz, set both channels for a pulse width of 35 ± 1μs.

11. Remove RF input. Monitor TP901 with the AC voltmeter. Adjust R939 for a nominal 0.1VRMS noise level.

12. Restore RF input. Set the control head to 108.1MHz and the glideslope generator 334.70MHz, 0db tone ratio, and 100μv RF output. Monitor tuning voltage with the DVM at TP401.

    Adjust R424 for minimum RF input required to achieve a 1/2 flag condition.

    NOTE There will be an apparent flat response for a small range of tuning voltage. For best centering and bandwidth characteristics, set each potentiometer using the DVM, at the center of this flat portion of the tuning voltage curve.

13. Use the above procedure to tune the other 19-100KHz channels. When channeled to 110.3MHz, adjust R446, not T401, to tune for 335MHz. Below is a listing of control head setting versus glideslope frequency for the forty channels.

TABLE 6-1 LOCALIZER/GLIDESLOPE FREQUENCY vs POTENTIOMETER ADJUSTMENT

Localizer	Glideslope	Adjustment	Localizer	Glideslope	Adjustment
108.10	334.70	R424	110.10	334.40	R444
108.15	334.55		110.15	334.25	
108.30	334.10	R426	110.30	335.00	R446
108.35	333.95		110.35	334.85	R472
108.50	329.90	R428	110.50	329.60	R448
108.55	329.75		110.55	329.45	
108.70	330.50	R430	110.70	330.20	R450
108.75	330.35		110.75	330.05	
108.90	329.30	R432	110.90	330.80	R452
108.95	329.15		110.95	330.65	
109.10	331.40	R434	111.10	331.70	R454
109.15	331.25		111.15	331.55	
109.30	332.00	R436	111.30	332.30	R456
109.35	331.85		111.35	332.15	
109.50	332.60	R438	111.50	332.90	R458
109.55	332.45		111.55	332.75	
109.70	333.20	R440	111.70	333.50	R460
109.75	333.05		111.75	333.35	
109.90	333.80	R442	111.90	331.10	R462
109.95	333.65		111.95	330.95	

14. If the 1/2 flag sensitivity is considerably worse at one end of the glideslope band or the other, optimize the tuning of C421 for best sensitivity across the band. This may require readjustment of C412, C414 and C416 at 109.3MHz.

15. Set the control head to 110.35MHz and glideslope generator to 334.85MHz, 0db tone ratio and 100μv RF output. Adjust R472 as in step 12.

NOTE At this point, insure that the internal flag and deviation loads are connected across their respective meters. Refer to load schedule per Figures 2-5 and 2-6 of the Installation Manual.

16. Set the control head to 109.3MHz and glideslope generator to 332.0MHz, 0db tone ratio and 700μv RF output. Adjust R912 such that the deviation bar is exactly centered.

17. Set the glideslope generator for 2db tone ratio to give an upward deflection of the deviation bar. Adjust R927 for 60% deflection, or midway between the first and second dots. Set 2db tone ratio for downward deflection. Verify an equivalent deflection.

18. Monitor TP402 with the scope. Set the control head to any channel, not a 50KHz or 100KHz channel. Verify that Glideslope energize turns off the super-regenerative oscillator.

6.2.5 KI 201C/KI 214 FINAL TEST DATA SHEET

6.2.5.1 VOR

1. FLAG__________(OK STD)__________(OK 0°C) __________(OK 55°C)

2. Course Accuracy: ±2° max. for standard tests with standard 0.5Vrms omni signal, ±4° max. for environmental tests with standard 0.5Vrms omni signal.

0°			STD		55°C
FROM	TO	TO	FROM	FROM	
	0°______,	180°______	0°______,	180°______	
	60°______,	240°______	60°______,	240°______	
0°______	120°______,	300°______	120°______,	300°______	0°______

3. Course Width: 16° minimum and 24° maximum with 0.5Vrms standard omni signal____________degrees. (OK STD).

4. To-From: Changeover shall be 90° ±15° from an on course heading ____________(OK STD).

5. Polarity: ____________(OK STD).

6.2.5.2 LOCALIZER

1. Flag_____(OK STD) _____(OK 0°C) ______(OK 55°C)

2. Centering: ±3/4 needle width from center with a standard 0.35Vrms localizer signal applied. ______(OK STD)
______(OK 0°C)
______(OK 55°C)

3. Deflection Characteristic:

90Hz______(OK STD) ______(OK 0°C) ______(OK 55°C)
150Hz______(OK STD) ______(OK 0°C) ______(OK 55°C)

4. Polarity: _______(OK STD)

6.2.5.3 ELECTRICAL REQUIREMENTS

1. Unit: Test for proper 13.75V ±20% operation.__________(OK STD)
27.5V ±15% operation. __________(OK STD)

6.2.5.4 GLIDESLOPE RECEIVER

1. Sensitivity: Half flag and 60% standard deflection. (μv hard)

LOC/G.S.	STD	0°C	55°C	LOC/G.S.	STD	0°C	55°C
108.10/334.70	______			109.10/331.40	______		
.30/334.10	______			.30/332.00	______	_____	_____
.50/329.90	______			.35/331.85	______		
.70/330.50	______			.50/332.60	______		
.90/329.30	______			.70/333.20	______		
.95/329.15	______	_____	_____	.90/333.80	______		
110.10/334.40	______			111.10/331.70	______		
.30/335.00	______	_____	_____	.30/332.30	______		
.35/334.85	______			.50/332.90	______		
.50/329.60	______			.70/333.50	______		
.70/330.20	______			.90/331.10	______		
.90/330.80	______						

2. Centering: _________(OK STD) ___________(OK 0°C) _________(OK 55°C)

3. Deflection: _________(OK STD) ___________(OK 0°C) _________(OK 55°C)

4. Selectivity: Unit channeled to 109.30/332.00
331.70____________ 332.30________________

Least adjacent channel rejection_________db (OK STD)

5. FLAG DISAPPEARS ______________ OK STD

6. FULL FLAG ______________ OK STD

7. Polarity ______________ OK STD

8. Strong Signal ______________ OK STD

6.2.5.5 EXTERNAL LOADING

1. VOR ______________ OK STD

2. Glideslope

	FLAG	DEVIATION
ARINC	______________ OK STD	______________ OK STD
Hi z	______________ OK STD	______________ OK STD

6.2.6 KI 213 FINAL TEST DATA SHEET

6.2.6.1 RESOLVER ALIGNMENT AND PHASING

ORZ________(OK STD) ________(OK ENV)
Polarity________(OK STD)
Error at 0°________(OK STD) ________° (ENV)

6.2.6.1.1 Dial Accuracy__________° (STD) ________° (ENV)

6.2.6.2 Centering________(OK STD) ________(OK ENV)
Balance__________(OK STD)

6.2.6.3 VOR/LOC Deviation Indicator

6.2.6.3.1 ACCURACY

3 dots left______μa STD 5 dots left______μa STD
______μa ENV ______μa ENV
3 dots right______μa STD 5 dots right______μa STD
______μa ENV ______μa ENV
Polarity________OK STD

6.2.6.3.2 DEFLECTION RESPONSE:

VOR/LOC: Left________sec; overshoot______OK STD
Right________sec; overshoot______OK STD

6.2.6.3.3 TO/FROM INDICATOR:

Accuracy:

Full arrow to__________μa STD __________μa ENV
Full arrow from________μa STD __________μa ENV
Polarity__________OK STD

6.2.6.3.4 VOR/LOC FLAG

Leave stop_______μa STD _______μa ENV
Fully Concealed________μa STD _______μa ENV

6.2.6.4 INTERFERENCE: ________OK STD ________OK ENV

6.2.6.5 LIGHTING:

13.75 Volt Operation________(OK STD) ________(OK ENV)
27.5 Volt Operation________(OK STD) ________(OK ENV)

6.2.6.6 MECHANICAL REQUIREMENTS

Omni Knob Rotational Torque______OK STD

6.2.6.7 UNIT: Test for proper 13.75V operation ______OK STD ______OK ENV
27.5V operation ______OK STD ______OK ENV

6.2.6.8 GLIDESLOPE RECEIVER

1. Sensitivity: Half flag and 60% standard deflection. (µv hard)

LOC/G.S.	STD	0°C	55°C	LOC/G.S.	STD	0°C	55°C
108.10/334.70	______			109.10/331.40	______		
.30/334.10	______			.30/332.00	______	______	______
.50/329.90	______			.35/331.85	______		
.70/330.50	______			.50/332.60	______		
.90/329.30	______			.70/333.20	______		
.95/329.15	______	______	______	.90/333.80	______		
110.10/334.40	______			111.10/331.70	______		
.30/335.00	______	______	______	.30/332.30	______		
.35/334.85	______			.50/332.90	______		
.50/329.60	______			.70/333.50	______		
.70/330.20	______			.90/331.10	______		
.90/330.80	______						

2. Centering: ______OK STD ______OK 0°C ______OK 55°C

3. Deflection: ______OK STD ______OK 0°C ______OK 55°C

4. Selectivity: Unit channeled to 109.30/332.00

5. Sensitivty: 331.70_____db 332.30_____db

   Least adjacent channel rejection_____db (OK STD)

6. FLAG DISAPPERS__________OK STD

7. FULL FLAG__________OK STD

8. Polarity____________OK STD

9. Strong Signal____________OK STD

6.2.6.9 EXTERNAL LOADING

1. GLIDESLOPE

	Flag	Deviation
ARINC	_______OK STD	__________OK STD
Hi z	_________	__________OK STD

6.3 OVERHAUL

6.3.1 GENERAL

Maintenance information contained in this section includes inspection procedures, cleaning, semiconductor replacement, and troubleshooting procedures.

6.3.2 VISUAL INSPECTION

The following visual inspection procedures should be performed during the course of maintenance operations.

a. Inspect all wiring for frayed, loose, or burned wires.

b. Check cable connections, making sure the plugs are free from corrosion and are properly secured.

c. Check all components for evidence of overheating, breakage, vibration, corrosion, or loose connections.

d. Check all capacitors and transformers for leaks, bulges, or loose connections.

e. Inspect relay and switch contacts for pits or arcing.

6.3.3 CLEANING

a. Using a clean lint-free cloth lightly moistened with an approved cleaning solvent remove the foreign matter from the equipment case and unit front panels. Wipe dry using a clean, dry, lint-free cloth.

b. Using a hand controlled dry air jet (not more than 15 psi), blow the dust from inaccessible areas. Care should be taken to prevent damage by the air blast.

c. Clean electrical contacts with a burnishing tool or cloth lightly moistened with an approved contact cleaner.

d. Clean the receptacles and plugs with a hand controlled dry air jet (not more than 25 psi) and a clean lint-free cloth lightly moistened with an approved cleaning solvent. Wipe dry with a clean, dry, lint-free cloth.

6.3.4 DISASSEMBLY PROCEDURES

The following instructions include procedures that are necessary to remove and disassemble the subassemblies of the KI 201C/KI 213/ KI 214. Before disassembly, verify that the power is removed and disassemble only to the extent necessary to effect test, alignment and repair. Tag or in some means identify all disconnected wires.

6.3.4.1 KI 201C/KI 213/KI 214 DISASSEMBLY PROCEDURES

The KI 213/KI 214 overall performance tests can be completed without any disassembly of the unit. In order to carry out the alignment procedures of the individual subassemblies, only the dust cover need be removed.

The support framework of the KI 201C/KI 213/KI 214 consists of the front casting, rear plate and the top and bottom frame channels.

The KI 213/KI 214 Glideslope Board is secured to the top and bottom frame channels on the unit's right side. An RF cover is fastened to an RF fence which is soldered to the Glideslope Board. Coax Connector J212 is affixed to the rear of this fence and protrudes through the rear plate.

The KI213/KI 214 Audio Board is attached between the top and bottom frame channels and directly behind the resolver.

On the KI 201C and KI 214, the Omni converter board is connected to the top and bottom frame channels on the unit's left side.

The respective meter and resolver of the KI 201C/KI 213/KI 214 are attached to the front casting. Meter and resolver removal is facilitated by the fact that none of these wires are tied directly to the connector, J211. On the KI 213, this feature is accomplished by means of a terminal strip functioning as a break point between the meter or resolver and the connector. This terminal strip is mounted to the bottom frame channel on the unit's left side.

The following procedures describe how the radio can be disassembled so that alignment or trouble-shooting can be performed on a given subassembly. They also describe how that subassembly can be completely removed from the radio in the event it is replaced by a new module. This assumes the dust cover has been separated from the unit after removing the two screws which hold it in place.

A. KI 213/KI 214 RF Cover

1. Unscrew about two turns of each of the four screws holding the cover down.
2. Slide the cover towards the front of the unit until the screwheads are centered in the large holes in the cover.
3. Lift the cover perpendicularly to the glideslope board.

B. KI 213/KI 214 Glideslope Board

1. Unscrew and remove the four mounting screws located at the corners of the board.
2. Lift the front of the board and pull it toward the front of the unit until the coax connector is clear of the rear plate.
3. Rotate the board until the farside of the board and wires are accessible.
4. Desolder each wire and tag it for identification.

C. KI 213/KI 214 Audio Board

1. Remove the Glideslope Board as in part B, steps 1, 2 and 3.

2. Unscrew and remove the four mounting screws located at the four corners of the board.

3. Lift the side of the board which had been mounted to the bottom frame channel until it clears the edge of that channel.

4. Pull the cleared side of the board until it is apparent that the opposite side of the board can clear the edge of the top frame channel.

5. Rotate the board until the farside of the board and wires are accessible.

6. Desolder each wire and tag it for identification.

D. Omni Converter Board

1. Unscrew and remove the six mounting screws located on the top and bottom edges of the board.

2. Rotate the board until the farside of the board and wires are accessible.

3. Desolder each wire and tag it for identification.

E. KI 214 Meter

1. Remove the Omni converter board as in part D, steps 1 and 2 above.

2. Desolder meter wires from the converter board.

3. Desolder the meter wires from the now-exposed farside of the audio board.

4. Remove the OBS knob by loosening the two 4-40 multispline set screws in the knob.

5. Unscrew the four screws around the circumference of the rear of the front casting.

6. Remove the front plate.

7. Slide the meter wires through the slots in the front casting.

8. Remove these items in order: wedge lighting cover, lighting system gasket and the mylar tape adhering the meter to the front casting.

9. Slide the meter out of the azimuth dial.

F. KI 213 Meter

1. Desolder the meter wires from the terminal strip.

2. Desolder the meter wires from the farside of the audio board.

3. Continue as in part E, steps 4 through 9.

G. KI 201C Meter

1. Remove as in part E, steps 1, 2, and 4 through 9.

H. KI 201C/KI 214 Resolver

1. Remove the meter as in parts G and E, respecitvely.

2. Desolder the resolver wires from the converter board.

3. Loosen the two 4-40 multispline set screws at the rear of the azimuth dial.

4. Slide the azimuth dial out of the front casting.

5. Remove the four screws which attach the top and bottom frame channels to the front casting.

6. Remove the four screws which fasten the resolver to the front casting.

7. Slide the front casting forward.

8. Remove the resolver by rotating and pulling it simultaneously.

I. KI 213 Resolver

1. Remove the meter as in part F.

2. Desolder the resolver wires from the terminal strip.

3. Continue as in part H, steps 3, 4, and 5.

4. Loosen the two 4-40 socket head cap screws until the two synchro clamp will swing clear of the resolver.

5. Continue as in part H, steps 7 and 8.

6.3.5 ASSEMBLY PROCEDURES

In general, the assembly procedures for each of the subassemblies are the reverse of the disassembly procedures. Therefore no specific assembly procedures are given in this manual.

6.4 TROUBLESHOOTING

6.4.1 TROUBLESHOOTING THE KI 201C/KI 213/KI 214

The Ki 201C and KI 214 Indicators contain the same VOR/LOC circuitry. However, the KI 214 Indicator contains additional circuitry to provide glideslope information. Therefore, information pertaining to both the KI 201C and KI 214 (VOR/LOC Troubleshooting) is given in section 6.4.2 and information pertaining to the KI 213/KI 214 (Glideslope Troubleshooting) is given in section 6.4.3.

6.4.2 TROUBLESHOOTING THE VOR/LOC CONVERTER

TABLE 6-2 KI201C/KI 214 VOR/LOC INDICATOR TROUBLE CHART

INDICATION	PROBABLE CAUSE	REMEDY
LOC OK. Omni inoperative	10KHz discriminator circuit inoperative. No 30Hz signal at emitter of Q313 to switch unit from LOC to VOR mode.	Check voltage around Q311, Q312, T302, and Q313.
Omni OK. LOC inoperative	One of the two amplifiers weak or dead	Check for open pot R321 and R323. Check voltage and waveform at TP302 and TP308.
Not enough L-R needle deflection	VOR signal from NAV receiver weak.	Check alignment per alighment instructions (200μv R-F input to NAV receiver should produce 0.5VRMS composite VOR signal at Pin D of converter). Check for open pot R315.
Flag inoperative in LOC mode. L-R needle and "TO-FROM" OK	Transistor Q310, diode CR302, or resistor R315 defective	Replace defective part
"TO-FROM" inoperative L-R OK	Defective part T301, C306, I301, CR302, R339, C307, or C317	Replace defective part.

6.4.2.1 VARIABLE PHASE CIRCUITRY

The Variable Phase circuitry consists of the three stage selective amplifier Q301, Q302, and Q303 Its selectivity is provided by the bridged "T" network consisting of C308, C309, and R317 and (depending upon VOR or LOC mode) R316, R318 and R321. Its output is coupled through C305 to the primary of T301.

A. VOR OPERATION

In the VOR mode, transistor switch Q306 is biased off, removing R321 from the circuit. The bridged "T" filter around the amplifier is tuned to 30Hz by R316. The amplifier thus becomes a 30Hz selective amplifier.

6.4.2.1.1. Troubleshooting Procedure (VOR Operation).

Using an oscilloscope check TP301 for a VOR input signal. If present, check for 30Hz signal at TP302. If no signal appears at TP302, trace the signal starting at TP301 and working towards TP302. Further aid in isolating the problem area can be obtained from the typical D-C operating voltage levels given in Figure 6-5 . Check Q306 to insure that it is disabled. Check the bridged "T" circuit by applying a variable frequency audio signal at TP301 and checking TP302 for a peaked output at 30Hz.

B. LOC OPERATION

The operation for the LOC mode is similar to that given for the VOR mode (6.4.2.1). The exception being that transistor switch Q306 is conducting and R321 is placed in parallel with R316 and R318, tuning the bridged "T" network to approximately 120Hz. The amplifier then becomes a 120Hz selective amplifier.

6.4.2.1.2 Troubleshooting Procedure (LOC Operation)

The procedure for the LOC mode is similar to that given for the VOR mode (6.4.2.1.1) with the exception of using a LOC input signal and that the bridged "T" circuit is tuned to approximately 120Hz. Q306 should be conducting (Refer to Figure 6-5 for the typical D-C operating voltage levels).

6.4.2.2 VOR LIMITER/DISCRIMINATOR

The limiter consists of CR303 and Q311. Q312 is an amplifier driving the discriminator transformer T302. Capacitors C322 and C323 allow the transformer to be tuned to provide discriminator action at 9960Hz. Diodes CR304 and CR305, resistors R344 and R345, and capacitors C325 and C326 complete the discriminator circuitry. The VOR limiter and discriminator are functional only in the VOR mode. In the LOC(ILS) mode, diode CR308 grounds the base of Q312 thus preventing it from operating.

6.4.2.2.1 Troubleshooting Procedure

Using an oscilloscope, check TP301 for a VOR input signal. Check the collector of Q311 for an amplitude limited output (square wave 9960 FM only). Check Q311 and CR 303 for proper limiting action. Check to insure CR308 is not grounding the collector of Q311 in VOR mode. Check the collector of Q312 for amplified 9960 FM. Check TP306 for proper 30Hz demodulated AM signal. If not present check the discriminator transformer T302 for proper alignment (See alignment procedure, Section 6.2.4). Check discriminator circuit components for proper operation (CR304, CR305, R344, R345, C325 and C326). Check output of emitter follower Q313. If no output is observed, check Q313 and associated circuitry (See Figure 6-5 for typical D-C operating voltage levels).

6.4.2.3 RESOLVER B301 (Figure 6-5)

The resolver is actively functional only in the VOR mode. The input winding receives its input from the output of Q313. The outputs from the two rotor windings are combined through a phase shifting network consisting of C328, R351 and R352.

6.4.2.3.1 Troubleshooting Procedure

Using an ohmmeter, check the three resistor windings for D-C continuity. The following is a chart listing the approximate resistances of the windings, measured with the resolver connected (without removing the leads).

WINDING	RESISTANCE (OHMS)
Green-Black	200
Yellow-Brown	560
Blue-Brown	400
Yellow-Blue	960

Check the phase shift network for proper operation.

6.4.2.4 VOR/LOC SWITCHING (Figure 6-5)

A. VOR OPERATION

In the VOR mode, a 30Hz output is developed at the emitter of Q313, and is coupled through C327 to the base of Q308. During each positive half cycle of the 30Hz signal Q308 conducts. C314 is therefore shorted to ground 30 times a second. Since the time constant of R333 and C314 is long compared to the 30Hz discharge rate, a net result of approximately zero volts appears across CR314. Since this point controls the bias to transistor Q306, Q307, Q309 and Q310, they will all be non-conducting in the VOR mode.

6.4.2.4.1 Troubleshooting Procedure (VOR Operation)

After determining that a 30Hz signal is present at the emitter of Q313, a voltage check of transistors Q306, Q307, Q308, and Q310 should provide an indication of proper operation (See Figure 6-5 for typical D-C operating voltage levels).

B. LOC OPERATION

In the LOC (ILS) mode, the anode of CR308 is grounded disabling the limiter and discriminator circuits. Since the discriminator is disabled and no 30Hz FM signal is present, no output is developed at the emitter of Q313 and switching transistor Q308 remain biased in the off condition. Since Q308 is biased off, C314 is allowed to charge, turning on Q306, Q307, Q309 and Q310.

6.4.2.4.2 Troubleshooting Procedure (LOC Operation)

A voltage check of transistors Q306, Q307, Q308, Q309 and Q310 should provide an indication of proper operation. Note that Q307 is forward biased in the linear operating region, whereas Q306, Q309 and Q310 are used as switches and are biased into saturation (See Figure 6-5 for typical D-C operating voltage levels).

6.4.2.5 REFERENCE PHASE AMPLIFIER (Figure 6-5)

The reference phase amplifier consists of three transistors: Q314, Q315 and Q316. Its output is coupled to T303 through capacitor C333. By the use of switching transistor Q309, and the network consisting of R335, R338, C315 and C316, this amplifier becomes a 30Hz selective amplifier with a bridged "T" feed back network when operating in the VOR mode and becomes a broadband amplifier when operating in the LOC (ILS) mode.

A. VOR/LOC OPERATION

In the VOR mode, transistor switch Q309 is biased off placing R335 into the circuit which becomes (in conjunction with R338, C315 and C316) a 30Hz bridged "T" network around the amplifier.

6.4.2.5.1 Troubleshooting Procedure (VOR Operation)

Using an oscilloscope check TP308 for a 30Hz signal at TP308. If no signal appears, trace the signal starting at the base of Q314 and working towards TP308. The typical D-C operating voltage levels (See Figure 6-5) can give further aid in isolating the problem area. Check Q309 to insure that it is disabled. Check the bridge "T" circuit by applying a variable frequency audio signal at TP301 and checking TP308 for a peaked output of 30Hz.

B. LOC OPERATION

In the LOC mode, the operation is similar to that of the VOR mode. The exception being, that transistor switch Q309 is conducting, therefore, shorting across R335. This eliminates the 30Hz bridged "T" network and the amplifier becomes broadbanded.

6.4.2.5.2 Troubleshooting Procedure (LOC Operation)

The procedure for the LOC mode is similar to that given for the VOR mode with the exception that a LOC signal is used and that the bridged "T" circuit is disabled making the amplifier broadbanded. Q309 should be conducting. (Refer to Figure 6-5 for typical D-C operating voltage levels).

6.4.2.6 LOCALIZER AMPLIFIER (Figure 6-5)

The Localizer Amplifier Q307 operates only in the localizer mode. It receives its signal from TP301 through phase shift network R322, R323, and C311. Its output is coupled to the input of the Reference Phase Amplifier through the secondary of the resolver B301.

A. VOR OPERATION

The amplifier is disabled in the VOR mode by the switching transistor Q308 which removes the bias voltage from Q307.

6.4.2.6.1 Troubleshooting Procedure

Check Q307 and Q308 for proper operation by comparing the measured D-C voltages with the typical D-C operating voltages given in Figure 6-5 for VOR mode.

B. LOC (ILS) OPERATION

Q307 operates as an amplifier only in the LOC (ILS) mode. In this mode, Q308 is biased off and Q307 is biased as a linear amplifier by the resistive network R333, R325 and R326.

6.4.2.6.2 Troubleshooting Procedure

Starting at TP301, track signal through to TP303. Check Q307 and Q308 for proper operation. (See Figure 6-5 for typical D-C operating voltage levels in the LOC mode).

6.4.2.7 VOR/LOC DEVIATION INDICATOR (Figure 6-5)

The VOR/LOC Deviation circuitry consists of transformer T303, switching transistor Q317 and Q318, bridge R362, R363, R364, R367, and R368, damping capacitor C334 and meter movement I302/M102D/M101D.

A. VOR OPERATION

During VOR operation, the 30Hz variable phase signal (from T301) is applied to Pin 5 of T308 and compared with the 30Hz reference phase signal from the Reference Phase Amplifier (TP308). For detailed operational theory refer to Section 4.2.4.

6.4.2.7.1 Troubleshooting Procedure (VOR Operation)

Check for 30Hz VOR signals at TP308 and Pin 5 of T303. Check Q317 and Q318 for proper switching operation. Check the bridge network R352, R353, R364, R367 and R368 for proper resistance values.

B. LOC OPERATION

During LOC operation, the 90/150 LOC signal is amplified by the LOC amp Q307, Reference Phase Amplifiers Q314, Q315 and Q316 and applied to T303 (from TP308) where it is compared with the 90/150 LOC signal that is amplified thru the 120Hz selective amplifer Q301, Q302 and Q303. For a detailed description of LOC circuit theory See Section 4.2.6.

6.4.2.7.2 Troubleshooting Procedure (LOC Operation)

Check for LOC signal at TP308 and Pin 5 of T303. Check Q317 and Q318 for proper switching operation. Check the bridge network R362, R363, R364, R367 and R368 for proper resistance values.

6.4.2.8 TO-FROM/OFF FLAG INDICATOR (Figure 6-5)

The To-From Indicator circuitry consists of transformer, T301, switching transistors Q304 and Q305, bridge R315 and R313, damping capacitor C306, meter movement I301, and switching transistor Q310. The OFF FLAG is mechanically a part of the To-From indicator.

A. VOR OPERATION

During VOR operation the 30Hz variable phase signal (from TP302) is applied to Pin 1 of T301 and compared with the 30Hz reference phase signal from Pin 3 of T303 through the "Flag threshold diode" CR302. This threshold provides a necessary signal level, threshold before the off flag will become pulled from view. For detail circuit theo ry see Section 4. 2. 5.

6.4.2.8.1 Troubleshooting Procedure (VOR Operation)

Check the VOR signal at TP302 and Pin 5 of T301. Check Q304 and Q305 for proper switching operation. Check R312 and R313 for proper resistance values. Check Q310 for open circuit condition.

B. LOC OPERATION

During LOC operati on Q310 is conducting which effectively grounds one side of the meter movement I301. This provides a "TO" indication any time the unit is operating in the LOC (ILS) mode.

6.4.2.8.2 Troubleshooting Procedure (LOC Operation)

Check Q310 for proper saturated operation. Check Q304 and Q305 for proper switching operation. Check TP302 for proper LOC signal level.

6.4.3. TROUBLESHOOTING THE GLIDESLOPE SECTION

The following table lists typical failure modes of the KI 213/KI 214 glideslope. Use the procedures noted in the reference paragraphs to locate the problem stage.

TABLE 6-3 KI 213/KI 214 GLIDESLOPE INDICATOR TROUBLESHOOTING GUIDE

PROBLEM	CHECK POINTS	REFERENCE PARAGRAPH
Unit Inoperative	(in sequence)	
	10V Line	6.4.3.1.1
	TP402	6.4.3.1.3, 6.4.3.1.5
	TP901	6.4.3.1.6
	TP401	6.4.3.1.2
	Glideslope Energize	6.4.3.1.4
	Meter Drive Circuitry	6.4.3.1.9
	Local Oscillator	6.4.3.1.7
	RF Amplifier	6.4.3.1.8
One Channel Dead	TP401 and Table 6-5	6.4.3.1.2
150KHz Channels not functioning	TP401 and Table 6-4	6.4.3.1.2
No Deviation Bar Activity	Emitter of Q903, Q904	6.4.3.2.9
Flag Does Not Pull	Emitter of Q902	6.4.3.2.9
Deviation Bar Deflects in one direction only	Emitters of Q905, Q906	6.4.3.2.9

6.4.3.1 GENERAL ANALYSIS OF GLIDESLOPE CIRCUITRY

If the unit fails any tests listed below, refer to the associated paragraph shown in parenthesis.

6.4.3.1.1 10V Regulator (Paragraph 6.4.3.2.1)

Before turning the unit on, measure the resistance of the 10 volt line. The value should be approximately 200 ohms. A short on this line will instantly cause catastrophic failure of Q901, the regulator pass transistor, when the unit is turned on. Also, during alignment and trouble-shooting, care must be taken not to touch metal probes between the 10 volt line and ground. Turn on unit. Check the voltage on the 10 volt line. R937 should be adjustable to 10.0V.

6.4.3.1.2. Tuning Voltage Matrix and 150KHz Interpolate Adjust (Paragraph 6.4.3.2.2)

Adjust the glideslope switching head to 110.30MHz. At TP901 verify that the tuning voltage is 9.0V. Adjust the control head to 110.35MHz. The voltage at TP901 should decrease by nearly 0.3V. Use this method for checking 108.90/108.95 MHz, 108.10/108.15 MHz, 109.50/109.55 MHz and 111.70/111.75 MHz while referring to Table 6 -4.

6.4.3.1.3 Quench Oscillator (Paragraph 6.4.3.2.3)

Using the scope, monitor the collector of either Q404 or Q405. They should reveal oscillations of a 7KHz ±10% rate or a period of 140μs ±10%.

6.4.3.1.4 Glideslope Energize (Paragraph 6.4.3.2.4)

Set the Glideslope control head to a Glideslope channel. Note the peak level of the square wave at the wiper of R418. Set the control head to a channel that is not a glideslope channel. The peak level should decrease approximately 0.4V.

6.4.3.1.5 Superregenerative Detector (Paragraph 6.4.3.2.5)

Adjust R418 for a maximum quench amplitude and monitor TP402 on the scope. The health of the detector is reflected almost entirely by the signal present at this test point. A square wave should be present at TP402. The negative-going half cycle will have an RF envelope riding on it. It is during this period that the superregenerator is oscillating.

6.4.3.1.6 Audio Processing (Paragraph 6.4.3.2.6

Set the control head to 110.3 and the Glideslope Generator tuned to 335 MHz, 0db tone ratio and 1000μv. With the scope probe on TP901, the trace should be a nearly 2V peak-to-peak 90Hz sine wave riding on an approximately 5Vdc level.

6.4.3.1.7 Local Oscillator and Tripler Filter (Paragraph 6.4.3.2.7)

Measure the bias on Q401 with the digital voltmeter. Base voltage should be 5V, while the emitter is 4.4V. The collector, since it is tied to the 10 volt line through L401, a low resistance choke, should measure almost the full 10v.

6.4.3.1.8 Preselector and RF Amplifier (Paragraph 6.4.3.2.8)

Again, bias voltages are the fastest measure of the state of a circuit. With no glideslope signal applied, the DC voltage at the collector of Q402 is 9.5V. The base voltage is 1V, and the emitter voltage is 0.4V.

6.4.3.1.9 Meter Drive Circuitry and AGC (Paragraph 6.4.3.2.9)

Since the tests for normal operation are readily apparent, no discussion is given here. Rather, a stage by stage functional discussion is given in the paragraph parenthetically noted above.

6.4.3.2 STAGE ANALYSIS OF GLIDESLOPE CIRCUITRY

Use this section to troubleshoot the problem stage.

6.4.3.2.1 10V Regulator

There are three failure modes for the 10V regulator. The first is 0V on the 10V line. This could have been caused by a short on the 10V line which would have opened Q901 from collector to emitter. If the voltage reading on the base of Q901 is almost full supply voltage, Q901 is open.

The second mode is a low voltage condition. This would imply a low voltage on the base of Q901 or a shorted diode CR901.

The third mode is a high voltage on the 10V line. This may be due to a Q907 collector to emitter open or an open CR901. The test for this condition is a high voltage on the base of Q901. Another cause may be a collector to emitter short of Q901 due to a momentary short on the 10V line. In this case, the 10V line voltage is nearly the full supply voltage.

6.4.3.2.2 Tuning Voltage Matrix and 150KHz Interpolate Adjust

With the matrix channeled to 110.30, a voltage approaching 9.0V should be present at TP401 for the tuning voltage matrix, also, there are three failure modes: High Voltage, Low Voltage, and No Voltage.

The first step towards solution is to change channels to one with different MHz and KHz readings on the control head, say 109.50MHz. A normal voltage here indicates that the problem is not common to the entire matrix. Refer to Table 6-4 for typical tuning voltage values.

The high voltage condition would be in most cases 10 volts. This condition would indicate an open collector to emitter, an open base-emitter junction or a broken switching wire associated with the transistor of interest. An open potentiometer would also cause this condition. If the problem is common to the entire matrix, an open in the tuning voltage supply line would be suspected.

A low tuning voltage infers that more than one matrix circuit is switched on. In this case lift the fixed resistor in the selected matrix circuit. This will leave the defective circuit as the only one which is turned on. Comparing the tuning voltage with the typical voltage values on Table 6-4 will locate the defective circuit to within three circuits. The final check is to measure the voltage present at the junction of the fixed resistor and the potentiometer of the suspected circuits. A full tuning voltage reading there indicates an "off" circuit. A reading significantly less than full voltage indicates that the circuit is drawing current and therefore, "on". An investigation of the bias condition of the transistor in this circuit should reveal the cause of the malfunction.

A no voltage condition on the tuning voltage line generally means that a short is present on the line. However, if there were a cold solder joint in the line supplying R470, 0V could be measured at TP401.

The lack of a change in tuning voltage when a .05MHz channel is chosen indicates a problem with the 150KHz interpolate circuit. A check to make here is to verify that the Q429 base voltage is less than the emitter voltage. If the base voltage is smaller, Q429 emitter to collector is open. If the voltages are equal, look for a broken .05MHz channeling line.

LOC Frequency (MHz)	Glideslope Frequency (MHz)	Typical Tuning Voltage (Volts)
108.1	334.7	8.38
108.3	334.1	7.26
108.5	329.9	2.43
108.7	330.5	2.89
108.9	329.3	2.05
109.1	331.4	3.69
109.3	332.0	4.32
109.5	332.6	5.05
109.7	333.2	5.82
109.9	333.8	6.74
110.1	334.4	7.78
110.3	335.0	9.00
110.5	329.6	2.22
110.7	330.2	2.65
110.9	330.8	3.14
111.1	331.7	3.98
111.3	332.3	4.69
111.5	332.9	5.43
111.7	333.5	6.29
111.9	331.1	3.42

TABLE 6-4 GLIDESLOPE TYPICAL TUNING VOLTAGE vs FREQUENCY SELECTION

ILS Channel (MHz)	Pin (Grounded)	Wire Color	Q's Effected
108	P	Blu/Yel	Q406, 407, 408, 409, 410
109	R	Red/Yel	Q411, 412, 413, 414, 415
110	S	Orn/Blk	Q416, 417, 418, 419, 420
111	T	Yel/Blk	Q421, 422, 423, 424, 425

ILS Channel (MHz)	Pin (+Voltage)	Wire Color	Q's Effected
0.1	J	Vio/Yel	Q406, 411, 416, 421
0.3	K	Blu/Wht	Q407, 412, 417, 422
0.5	L	Brn/Yel	Q408, 413, 418, 423
0.7	M	Gry/Yel	Q409, 414, 419, 424
0.9	N	Gry/Wht	Q410, 415, 420, 425

TABLE 6-5 GLIDESLOPE MATRIX FREQUENCY SELECTION

6.4.3.2.3 Quench Oscillator

If the oscillator is not running, the first check to make is whether the transistors can be made to change states. This can be done if the collector voltage is nearly 0.4V less than the emitter voltage. This signifies that the transistor is "on". To test Q404, short between the cathode of CR405 and the emitter of Q404. The voltage at the collector should decrease to 0V. To test Q405, short the cathode of CR406 to Q405's emitter. Q405's collector voltage should decrease to 0V. If this test does not produce the desired result, the respective transistor is shorted.

If the collector voltage of Q404 is 0V, CR405 cathode voltage should be equal to the emitter voltage. In this case C428 may be shorted.

With CR405 cathode voltage almost 1V less than the emitter of Q404 and the collector voltage equals 0V, Q404 is open. The above two 0V tests apply when testing Q405, C427, and CR406 also.

6.4.3.2.4 Glideslope Energize

When tuned to a glideslope channel, the voltage on the base of Q427 should be 0.6V. The peak voltage on the collector should be nearly 1.0V. If these conditions are not present, the Glideslope energize line may be broken, CR404 is open, or Q427 is open.

When not tuned to a glideslope channel, the voltage at the base of Q427 will be almost 1.1V and the peak collector voltage close to 0.6V. If this does not occur, Q427 may be open.

6.4.3.2.5 Superregenerative Detector

As a continuity check, verify that the quench wave shape is present at the base of Q403. An open R418 wiper could cause the absence of the square wave. Insure also that a full 10V is not present at the emitter of Q426, indicating a collector to emitter short.

The D-C voltage on the collector of Q403 should be nearly 1.5V.

NOTE: The superregenerative detector will not function properly with a probe on the collector of Q403.

CR403 will have almost 0.6V on its anode. Verify also that the tuning voltage is present at the cathode of CR402. Lastly, tune T401 throughout its range. If these tests do not bring results, then possibly the problem is Q403 open from collector to emitter.

6.4.3.2.6 Audio Processing

The D-C voltage levels at Pins 4, 5, 9 and 10 of I901 should be approximately 5V. If the voltage at any of these pins is near 10V, ground the associated "+" input to that operational amplifier. The output D-C voltage should decrease to nearly 0V. If there is no change, inspect the associated circuitry. If no problems are discovered, the op amp is faulty.

If the output voltages are near 0V, ground the "-" input to that op amp. The voltage should increase to almost 10V. If there is no change, proceed as in the above paragraph.

The next check to make is audio gain measurements. Lift one end of R943 and the audio output line from the glideslope board. Build the circuit shown in Figure 6-2. This circuit simulates the driving source of the audio processing stages.

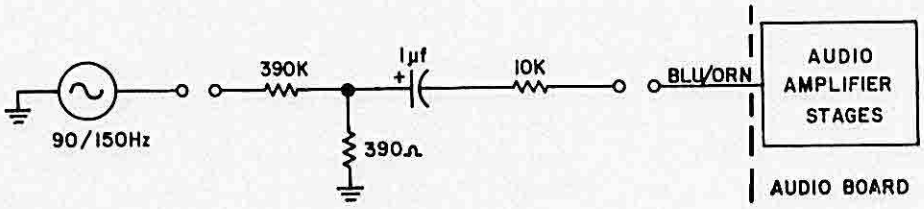


FIGURE 6-2 AUDIO TEST CONFIGURATION
(Dwg. No. 696-2830-00)

Solder the audio output line to the open end of the 10KΩ Resistor. Attach the demodulated output from the glideslope generator to the open end of the 390KΩ Resistor.

Using only the 90Hz tone and monitoring TP901 with the Ballantine Voltmeter, adjust the generator tone level for a 1.6V reading. Then read the voltage present at the junction of the capacitor and the 10KΩ resistor. This should reflect an overall gain of approximately 64db. The first and second audio amplifier stages will have a gain approaching 20db. The 90Hz selective amplifier stage has a gain of nearly 24db. Change the audio tone from 90Hz to 150Hz and monitor Pin 4 of I901. Follow the same procedure and measurements as for the 90Hz tone. A low gain stage signals a problem with the op amp or the associated circuitry.

As a final check, affirm that the 90Hz and 150Hz tones appear at the emitters of Q906 and Q905, respectively.

6.4.3.2.7 Local Oscillator and Tripler Filter

If Q401 base voltage is 5V, but the emitter voltage is 0V, the base-emitter junction is open. A low collector voltage indicates L401 is open. Lift one end of R417. Using an HP411A rf millivoltmeter equipped with BNC probe model 11025A, measure the rf level at the emitter of Q403.

NOTE: The ground lead for the probe should be as short as possible, with a coaxial connection preferred. The reading at this point should be nearly -30dbm. A low measurement would point out Q401 as a possible cause. The above measurement may also be made with the Boonton 41A microwattmeter. In this case, the lead of C408 which is connected to the emitter of Q403 must be lifted. The 41A is connected to this lead and the measurement taken.

6.4.3.2.8 Preselector and RF Amplifier

If the bias voltages are not present or are drastically different, Q402 may be the cause. RF gain may be measured in this manner: Lift one end of R417. Lift one end of L401. Using the HP411A and probe 11025A, monitor the base of Q403. Set the glideslope generator to 332 MHz and inject it into J212. Increase the level such that the HP411A reads -30dbm. Tune C412, C414, C416 and C421 for maximum rf output. Also maintain a -30dbm output level with the generator. The rf cover must be in place while making these adjustments and readings. Typical readings are 0db gain at 332MHz and 2db loss at 335.00MHz and 329.15MHz.

Preselector measurements are made by monitoring the base of Q402 with the HP411A and probe. Again, the reference level is -30dbm. Typical readings are 335MHz, 7.7db loss; 332MHz, 6db loss; 329.15MHz, 7.8db loss.

6.4.3.2.9 Meter Drive Circuitry

The 90Hz circuitry will be discussed here with the understanding that the 150Hz circuitry performs the same functions for the 150Hz tone.

At the base of Q906 is a 1.5Vpp sine wave superimposed on nearly a 5V dc level. The emitter has the same A-C component as the base. However, the emitter D-C component is a base-emitter voltage drop less than the base.

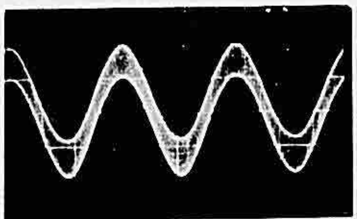
As the signal passes through C912, the D-C component is removed. Also the negative half-cycle is clamped at -0.2V by CR904 (See Figure 6.3). The rectified signal passes through CR903 to charge C913 to the peak signal level less 0.2V diode drop. This D-C voltage appears at the base of Q903. The emitter voltage of Q903 is 0.6V less than its base voltage. The emitter voltage serves as the +Down input to the deviation meter. Q904 is the +Up input to the same meter.

The junction of emitter resistors R926 and R928 serve as a reference for the flag meter, used as the -Flag input. R922 and R924 serve as an "and" gate which drives the base of Q902. The emitter is 0.6V less than the base voltage and serves three functions. It drives the rf AGC and audio AGC transistors besides driving the + lag meter input. Capacitors C924 and C925 bypass any low frequency noise to the bases of Q903 and Q904 and therefore to the +Up and +Down inputs, simultaneously. This prevents spurious movements by the deviation bar.

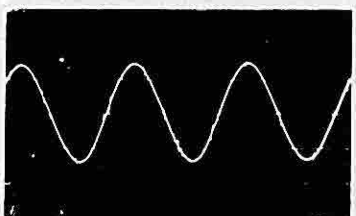
In general, a problem involving meter drive circuitry will affect the processing of one tone only. Once it is determined which tone is affected, checking the above-described A-C/D-C signals through the respective processing circuitry will reveal the problem stage.

A NOTE here is that the above problem might be due to a faulty meter movement. A simple check to do is to measure the D-C resistance of the meter movement. To measure the flag movement, lift the blue/white and brown/white wires from the audio board and measure between them. A reading of approximately 1000 ohms is expected. The deviation movement is measured in the same manner. The orange/white and green/white wires are measured for nearly 200ohms resistance.

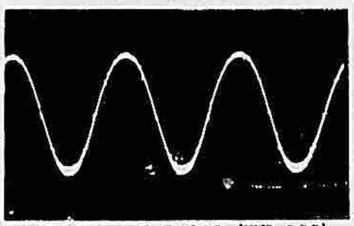
110.4 Mc, 100 Microvolts, Omni Signal 0°.



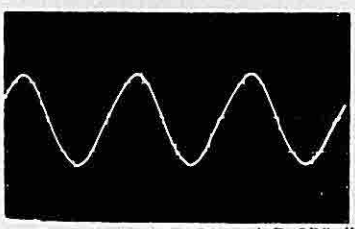
Arm of R-315 (TP-301)
Vertical - .1 Volt per cm.
Horizontal - 10 Millisecond per cm.



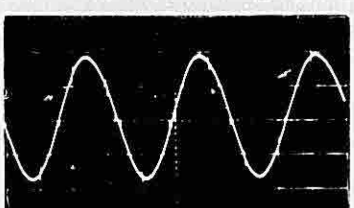
Emitter of Q-303 (TP-302)
Vertical - 1 Volt per cm.
Horizontal - 10 Millisecond per cm.



Emitter of Q-313 (TP-306)
Vertical - 1 Volt per cm.
Horizontal - 10 Millisecond per cm.

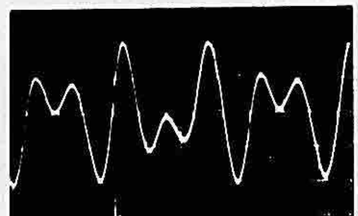


Junction of R-353 and C-328 (TP-307)
Vertical - .1 Volt per cm.
Horizontal - 10 Millisecond per cm.

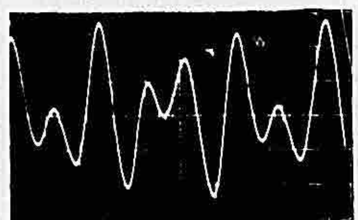


Emitter of Q-316 (TP-308)
Vertical - 1 Volt per cm.
Horizontal - 10 Millisecond per cm.

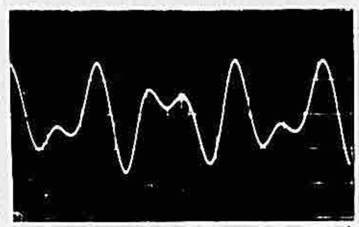
110.5 Mc, 100uv, Loc Signal, Needle Centered



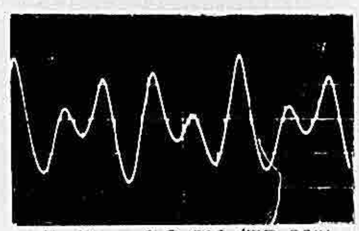
Arm of R-315 (TP-301)
Vertical - .1 Volt per cm.
Horizontal - 5 Millisecond per cm.



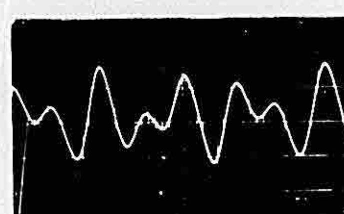
Collector of Q-307 (TP-303)
Vertical - .2 Volt per cm.
Horizontal - 5 Millisecond per cm.



Junction of R-353 and C-328 (TP-307)
Vertical - .05 Volt per cm.
Horizontal - 5 Millisecond per cm.

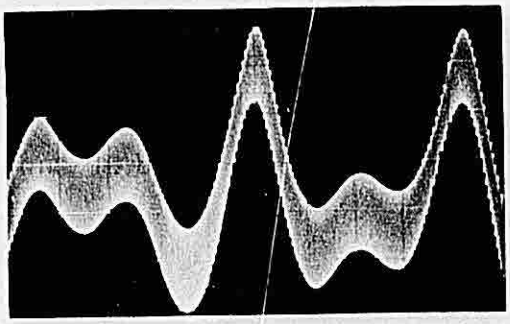


Emitter of Q-316 (TP-308)
Vertical - 1 Volt per cm.
Horizontal - 5 Millisecond per cm.

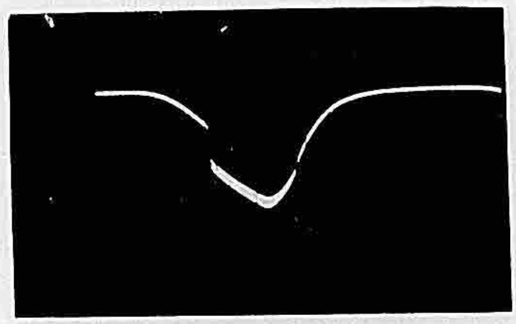


Emitter of Q-303 (TP-302)
Vertical - 1 Volt per cm.
Horizontal - 5 Millisecond per cm.

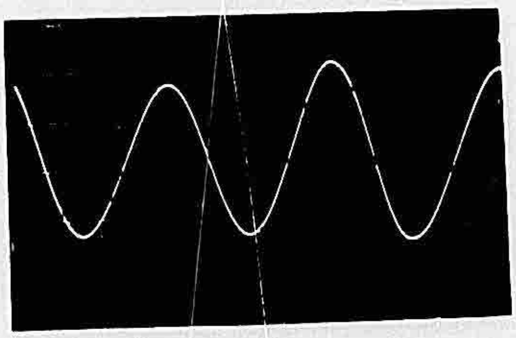
FIGURE 6-3 KI 201C/214 VOR/LOC WAVESHAPES
(Dwg. No. 696-2831-00)



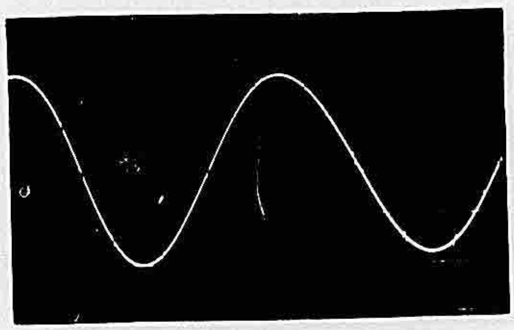
C907
332MHz, 0db, T.R. 5KμV
Vert Sens 0.05 V/div
Horiz Sens 3.5msec/div



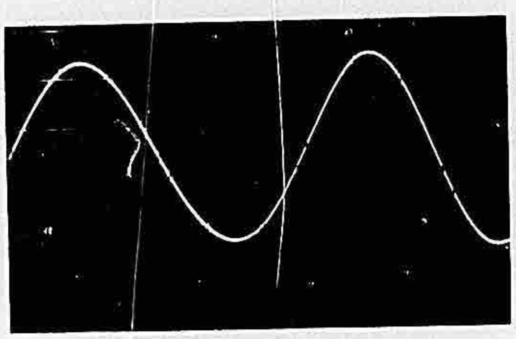
TP402
332MHz
Vert Sens 0.1V/div
Horiz sens 20μsec/div



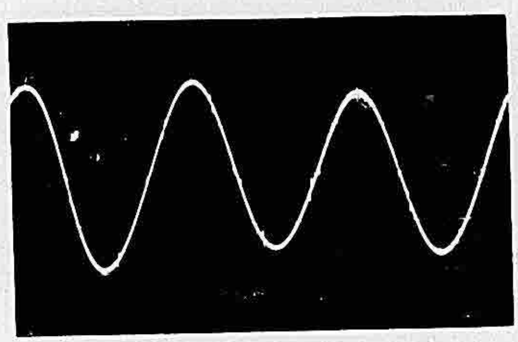
Anode of CR905 (Peak Detector)
150Hz tone
0vdc at 1 div below Center Line
Vert Sens 0.5V/div
Horiz Sens 2msec/div



Emitter of Q906
90Hz tone
Vert Sens 0.05V/div
Horiz Sens 2msec/div

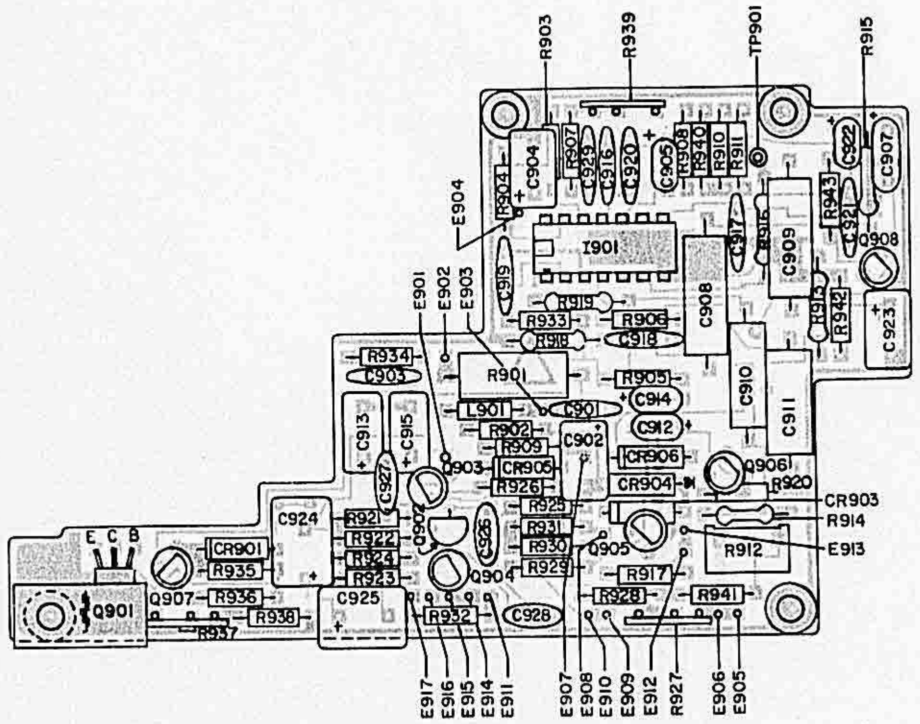


Anode of CR903 (Peak Detector)
90Hz tone
0vdc at 1 div below Center Line
Vert Sens 0.5V/div
Horiz Sens 2msec/div



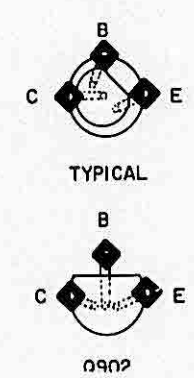
Emitter of Q905
150Hz tone
Vert Sens 0.5V/div
Horiz Sens 2msec/div

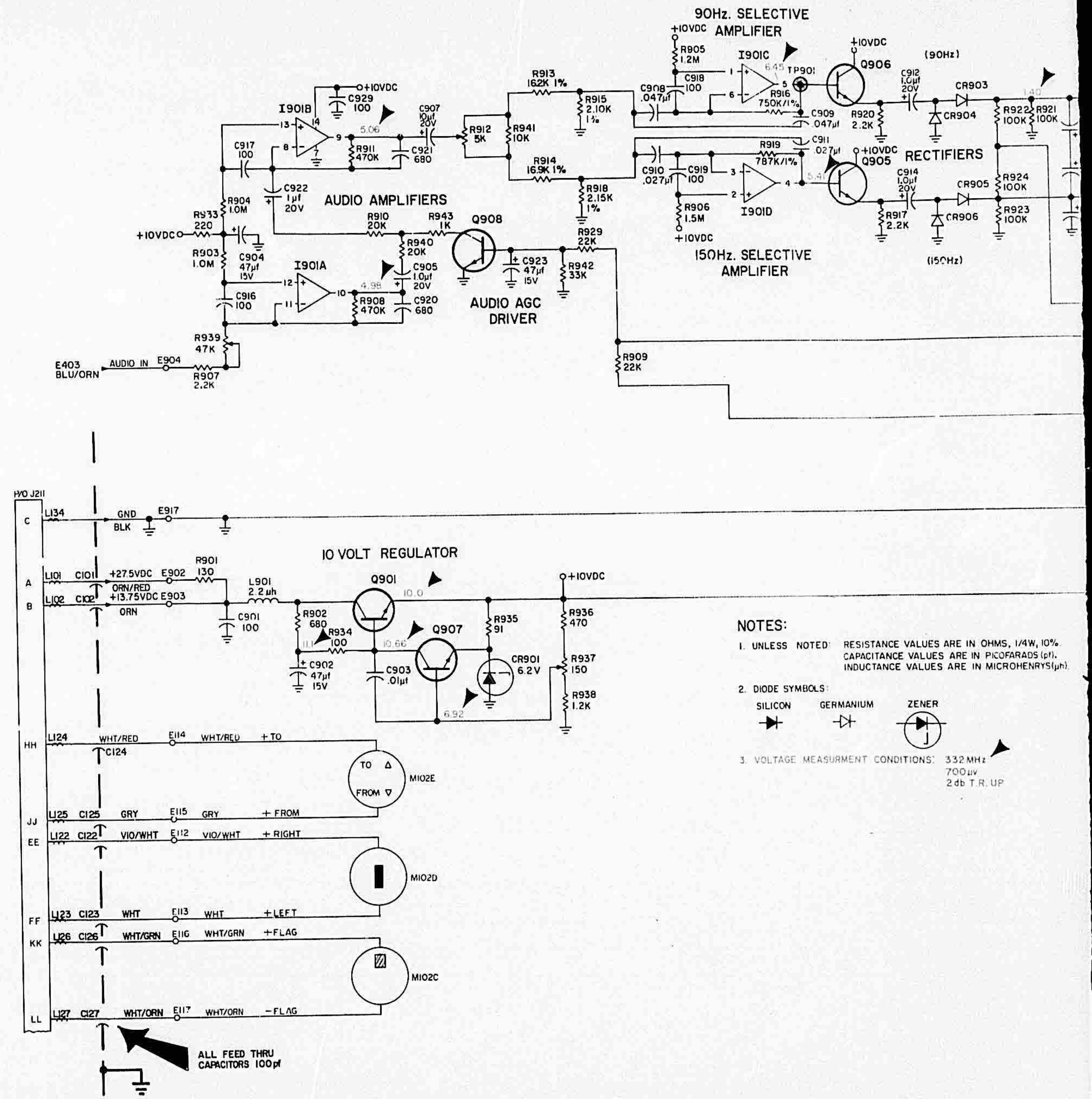
FIGURE 6-4 KI 213/KI 214 GLIDESLOPE WAVESHAPES
(Dwg. No. 696-2832-00)



TRANSISTOR MTG. CONFIGURATION

TOP VIEW





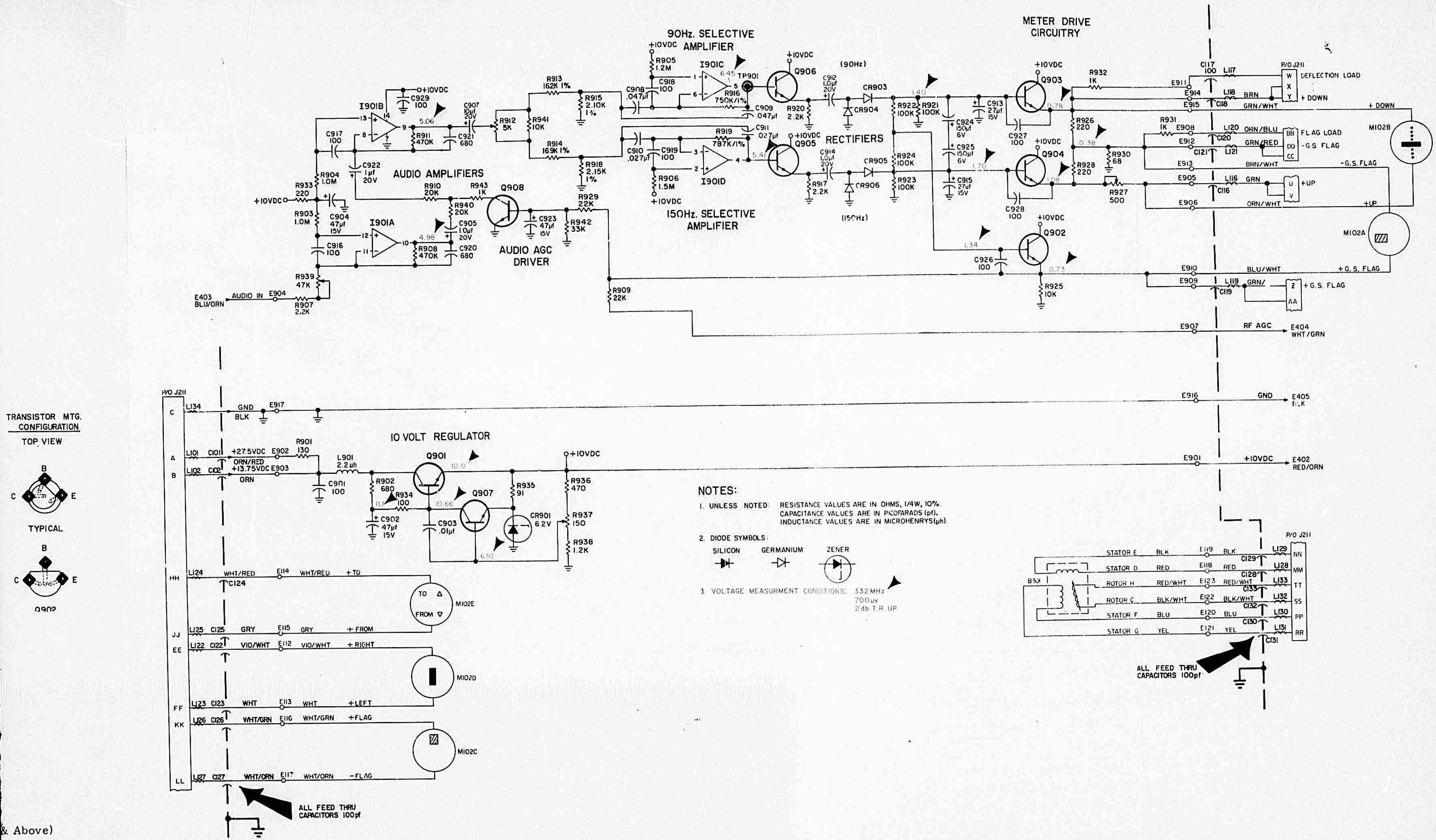
NOTES:

1. UNLESS NOTED: RESISTANCE VALUES ARE IN OHMS, 1/4W, 10%. CAPACITANCE VALUES ARE IN PICOFARADS (pf). INDUCTANCE VALUES ARE IN MICROHENRYS (μh).
2. DIODE SYMBOLS: SILICON GERMANIUM ZENER
3. VOLTAGE MEASURMENT CONDITIONS: 332MHz 700μv 2db T.R. UP

FIGURE 6-5 KI 213 AUDIO BOARD ASSEMBLY & SCHEMATIC (KI 213 S/N 2500 & Above)
(Dwg. Nos. 300-0694-01, R-0;
002-0274-04, R-6)

SEE BLOWUP

SEE BLOWUP



NOTES:

1. UNLESS NOTED: RESISTANCE VALUES ARE IN OHMS, 1/4W, 10%. CAPACITANCE VALUES ARE IN PICOFARADS (pf). INDUCTANCE VALUES ARE IN MICROHENRYS(μh).

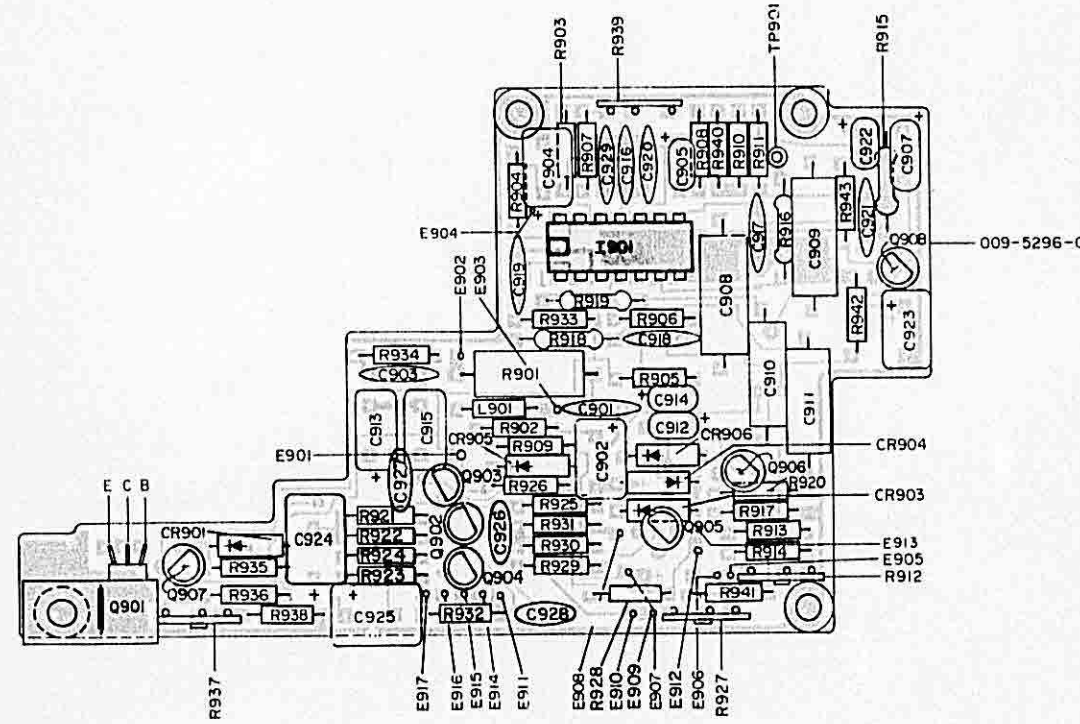
2. DIODE SYMBOLS: SILICON GERMANIUM ZENER

3. VOLTAGE MEASURMENT CONDITIONS: 332 MHz 700 μv 2db T.R. UP

KI 223 AUDIO BOARD SCHEMATIC AND ASSEMBLY DRAWING

& Above)

SEE BLOWUP



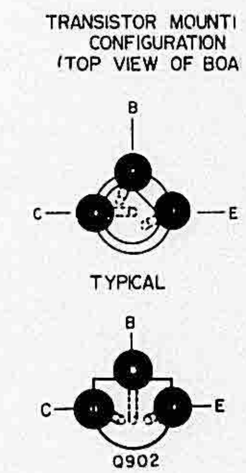
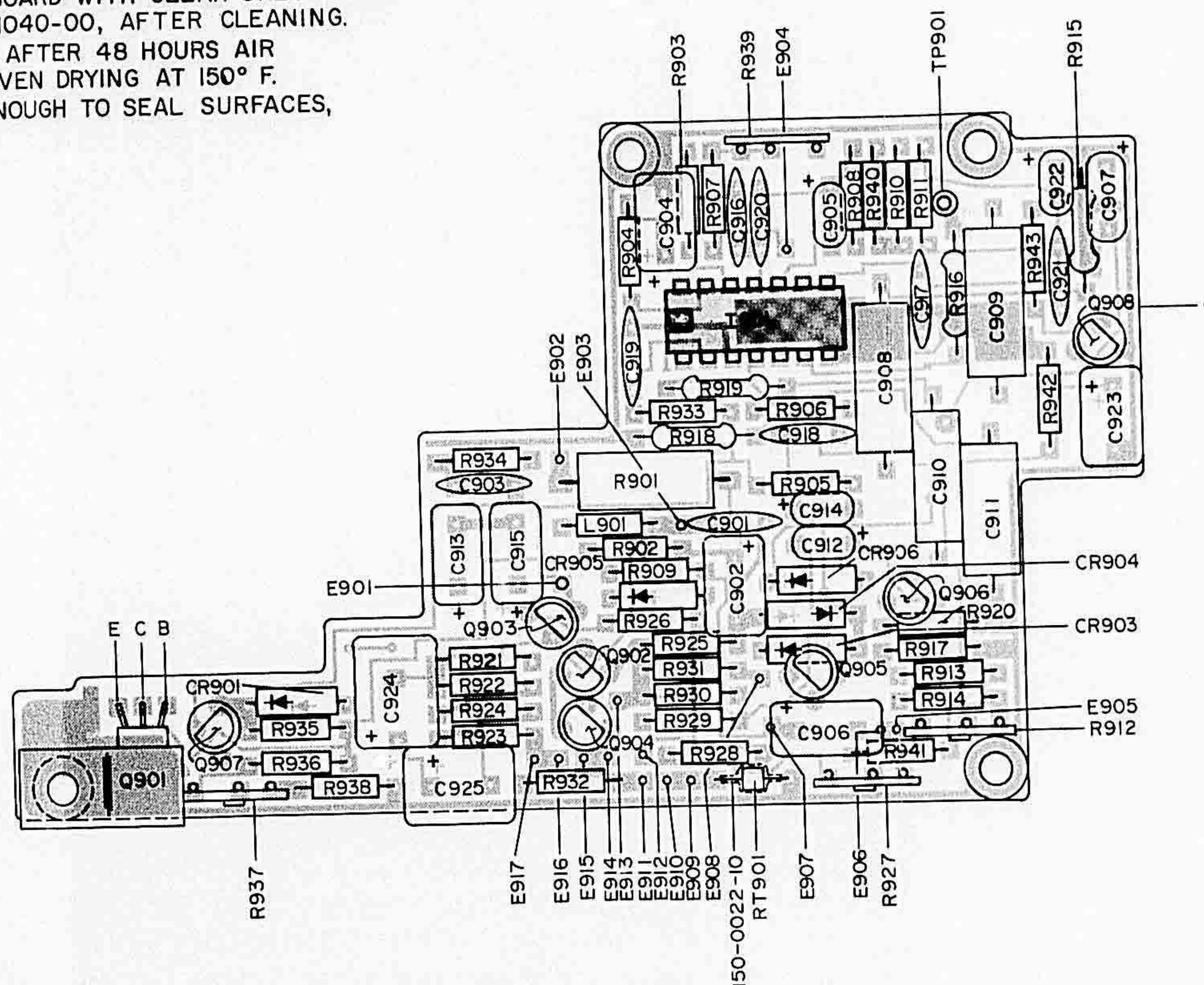


FIGURE 6-5 KI 213 AUDIO BOARD ASSEMBLY (KI 213 S/N 2499 & Below)
(Dwg. No. 300-0694-00, R-5)
(Schematics same as S/N 2500 & Above)

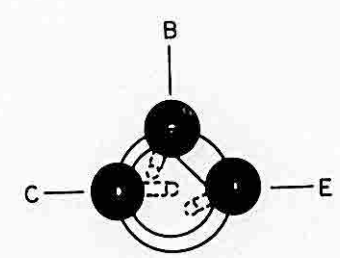
SEE BLOWUP

NOTES: (CONT.)

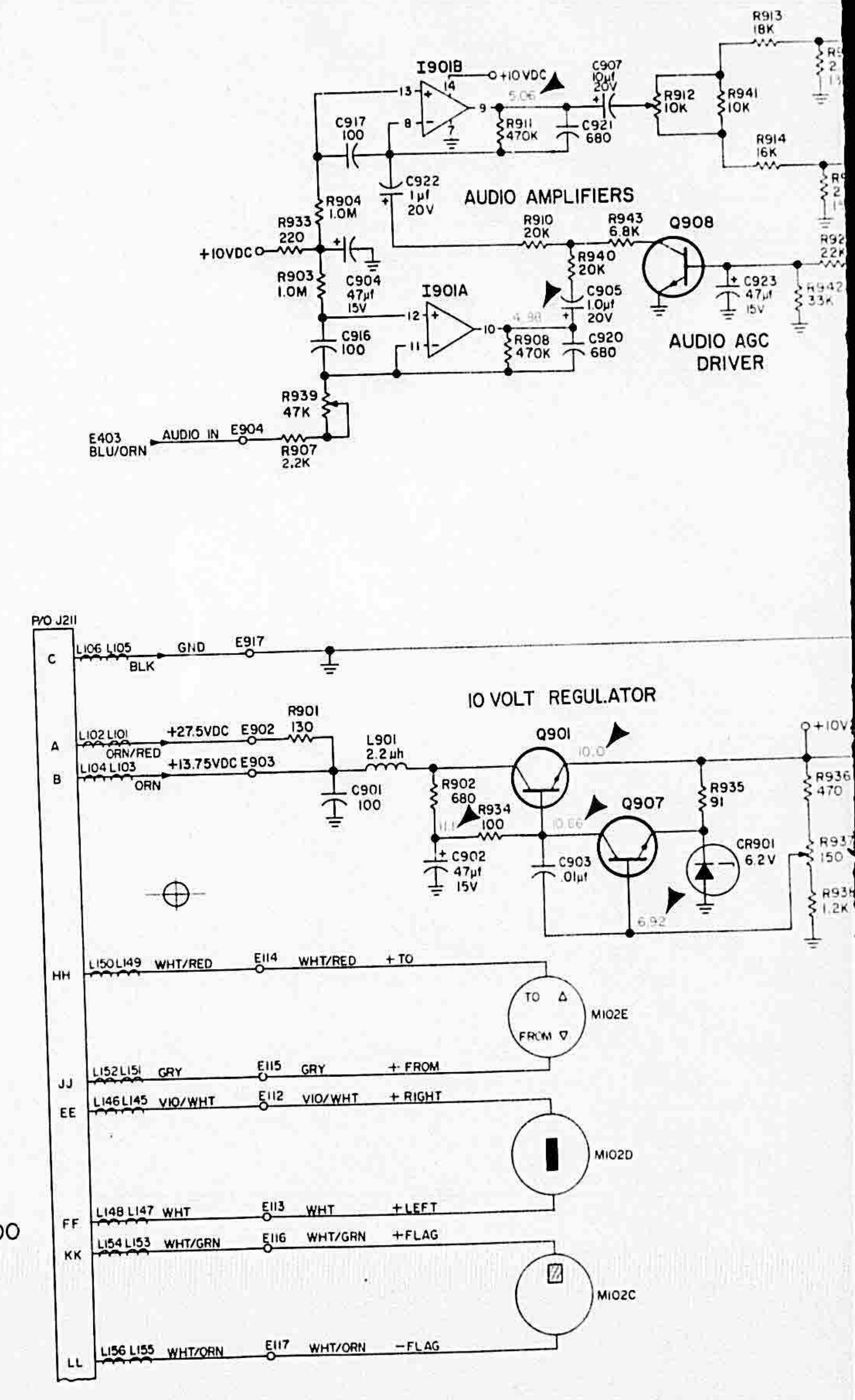
4. MASK RESISTORS R912, R927, R937 AND R939, TP901, GROUND AREA WHICH Q901 COMES IN CONTACT WITH AND GROUND THAT COMES IN CONTACT WITH MOUNTING TABS AND MOUNTING SCREWS.
SPRAY BOTH SIDES OF BOARD WITH CLEAR URETHANE SEAL COATING, KPN 016-1040-00, AFTER CLEANING. COATING IS 95% CURED AFTER 48 HOURS AIR DRYING OR 24 HOURS OVEN DRYING AT 150° F. COATING TO BE THICK ENOUGH TO SEAL SURFACES, BUT FREE OF RUNS.



TRANSISTOR MOUNTING CONFIGURATION (TOP VIEW OF BOARD)



TYPICAL



REF: B/M 200-0495-00

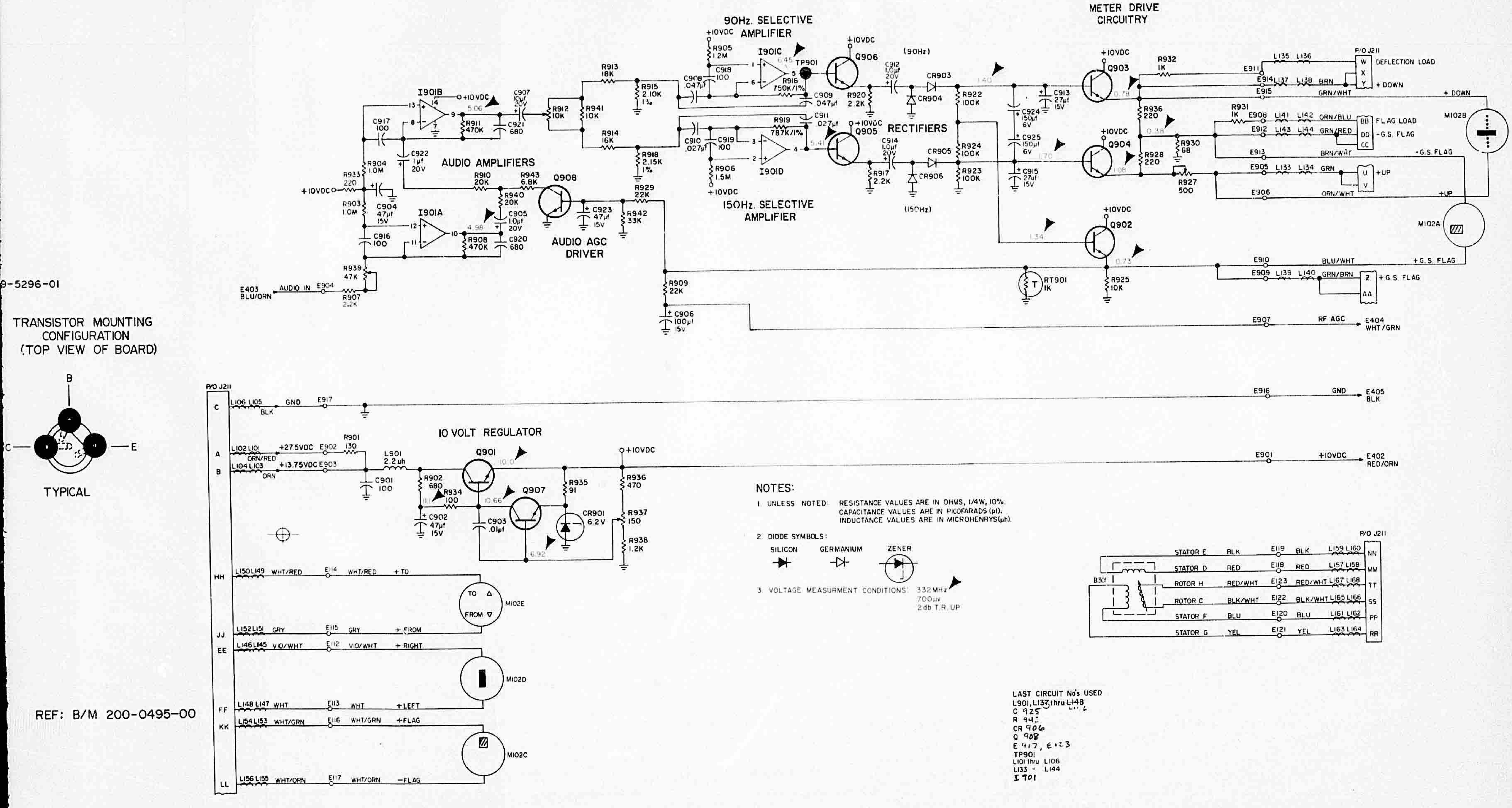
NOTES:

1. FOR COMPONENT VALUES SEE BILL OF MATERIAL 200-0495-00.
2. BOARDS MUST BE FREE OF FLUX AND OTHER FOREIGN PARTICLES AFTER ASSEMBLY IS COMPLETED.
RECOMMENDED CLEANING PROCEDURE: UTILIZING A SHALLOW PAN (APPROX. 1½" DEEP) AND APPROX. 1 PINT OF FLUX MANUFACTURES' RECOMMENDED FLUX REMOVER SCRUB BOTH SIDES OF CARD THROUGHLY WITH SOFT BRISTLED BRUSH. DRY THROUGHLY WITH AN AIR BLAST.
3. SOME TRACES OF FLUX AND REMOVER MAY REMAIN AS A WHITE RESIDUE.

FIGURE 6-5 KI 213 AUDIO BOARD SCHEMATIC AND ASSEMBLY DRAWING
(Dwg. No. 002-0274-04 R-0)
300-0694-00 R-0)

SEE BLOWUP

SEE BL



KI 213 AUDIO BOARD SCHEMATIC AND ASSEMBLY DRAWING

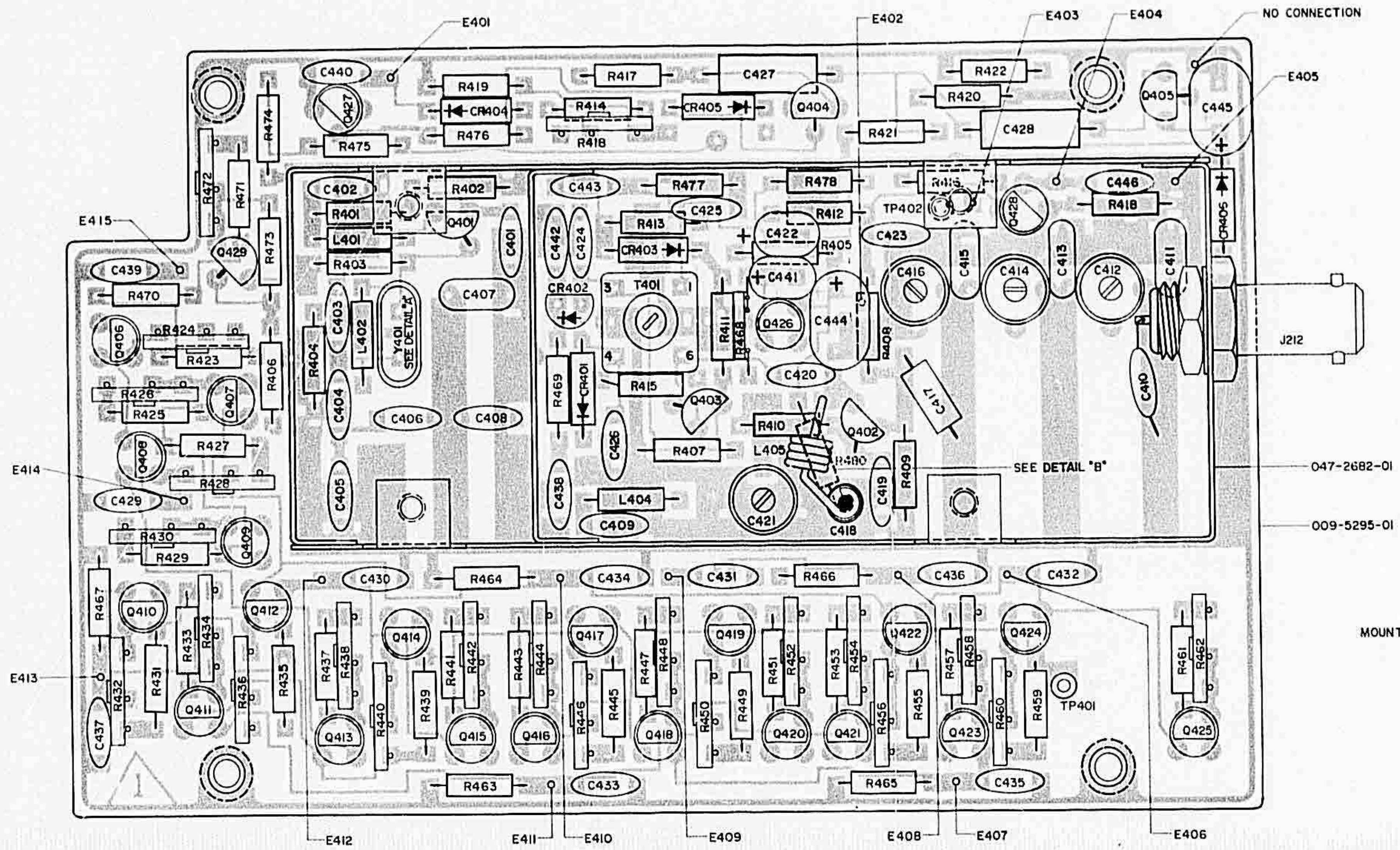
NOTES:

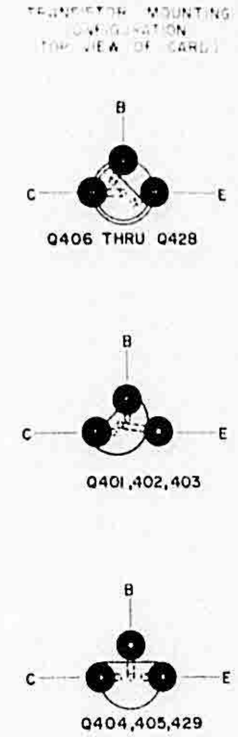
1. UNLESS NOTED: RESISTANCE VALUES ARE IN OHMS, 1/4W, 10%. CAPACITANCE VALUES ARE IN PICOFARADS (pf). INDUCTANCE VALUES ARE IN MICROHENRYS (µh).
2. DIODE SYMBOLS: SILICON, GERMANIUM, ZENER
3. VOLTAGE MEASURMENT CONDITIONS: 332MHz, 700µv, 2db T.R. UP

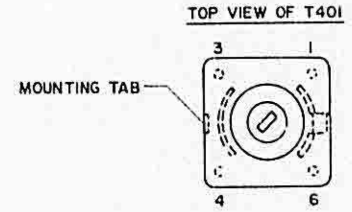
LAST CIRCUIT No's USED
L901, L133 thru L148
C 925
R 943
CR 906
Q 908
E 917, E123
TP901
L101 thru L106
L133 " L144
I 901

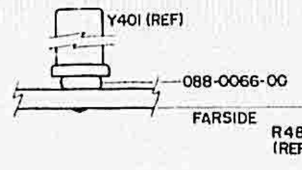
REF: B/M 200-0495-00

SEE BLOWUP

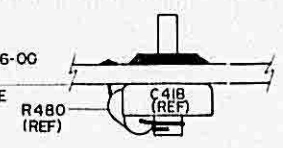








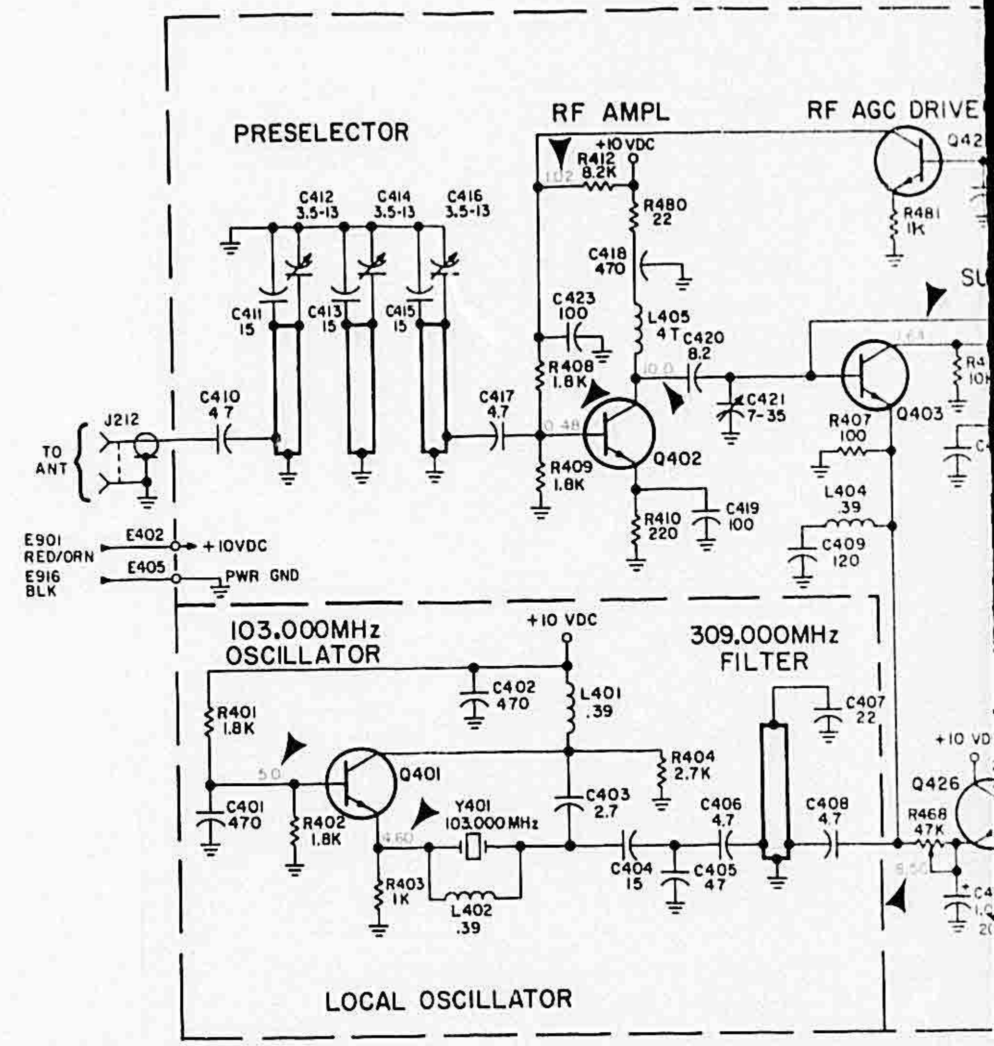
DETAIL "A"



DETAIL "B"

NOTES

1. FOR COMPONENT VALUES SEE BILL OF MATERIAL 200-0494-00
2. BOARDS MUST BE FREE OF FLUX AND OTHER FOREIGN PARTICLES AFTER ASSEMBLY IS COMPLETED
   RECOMMENDED CLEANING PROCEDURE: UTILIZING A SHALLOW PAN (APPROX 1½" DEEP) AND APPROX 1 PINT OF FLUX MANUFACTURES' RECOMMENDED FLUX REMOVER SCRUB BOTH SIDES OF CARD THROUGHLY WITH SOFT BRISTLED BRUSH DRY THROUGHLY WITH AN AIR BLAST.
3. SOME TRACES OF FLUX AND REMOVER MAY REMAIN AS A WHITE RESIDUE
4. C407 LEAD LENGTH BETWEEN THE CAPACITOR BODY AND THE P.C. BOARD SHALL BE NO GREATER THAN .050 INCHES.



NOTES:

1. UNLESS NOTED, RESISTANCE VALUES ARE IN OHMS, 1/4W, 5%.
   CAPACITANCE VALUES ARE IN PICOFARADS (pf).
   INDUCTANCE VALUES ARE IN MICROHENRYS (μh).
2. DIODE SYMBOLS:

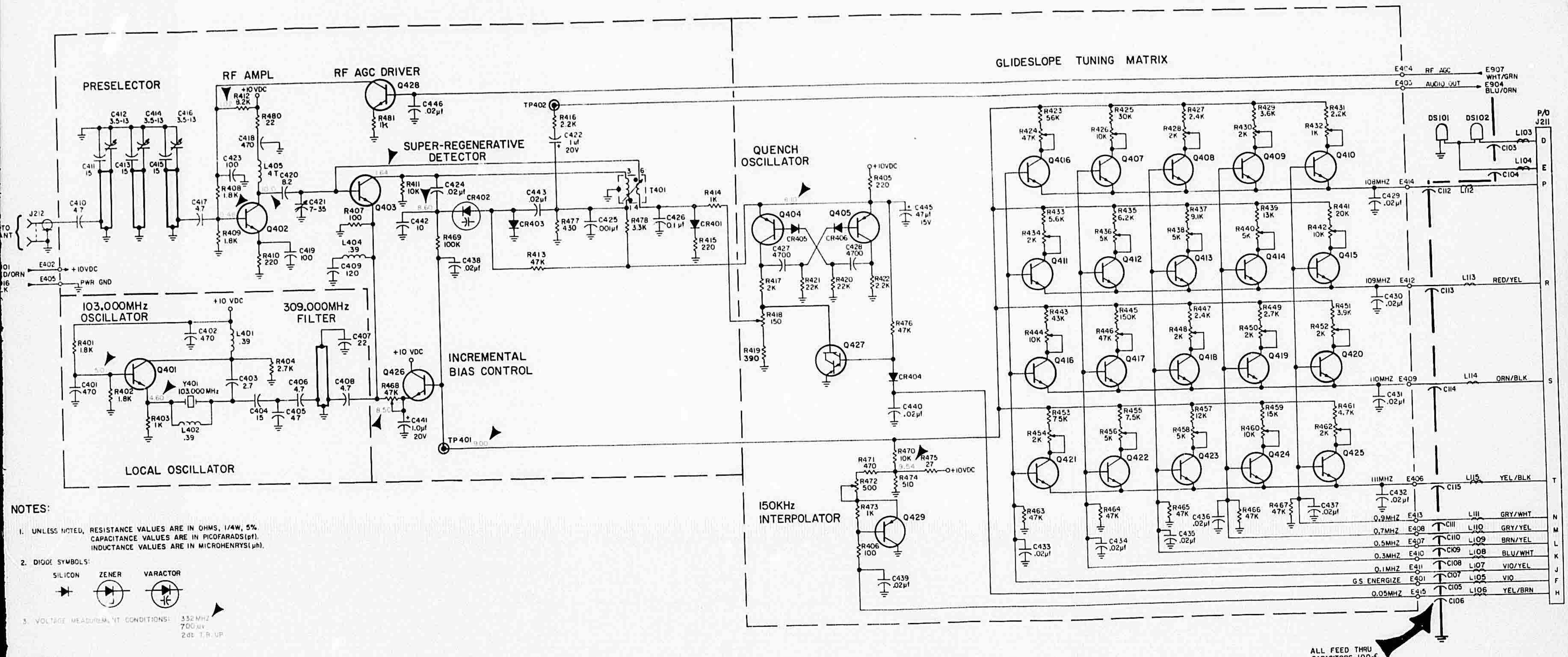
3. VOLTAGE MEASUREMENT CONDITIONS: 332 MHZ
   700 μv
   2db T.R. UP
4. LIGHTING:

   FOR 27.5 VDC OPERATION
   PIN "D" IS 27.5 VDC
   PIN "E" IS OPEN

   FOR 13.75 VDC OPERATION
   PIN "D" IS GND.
   PIN "E" IS 13.75 VDC.

FIGURE 6-6 KI 213/214 GLIDESLOPE ASSEMBLY & SCHEMATIC
(Dwg. Nos. 300-0693-00, R-4)
002-0274-02, R-3)

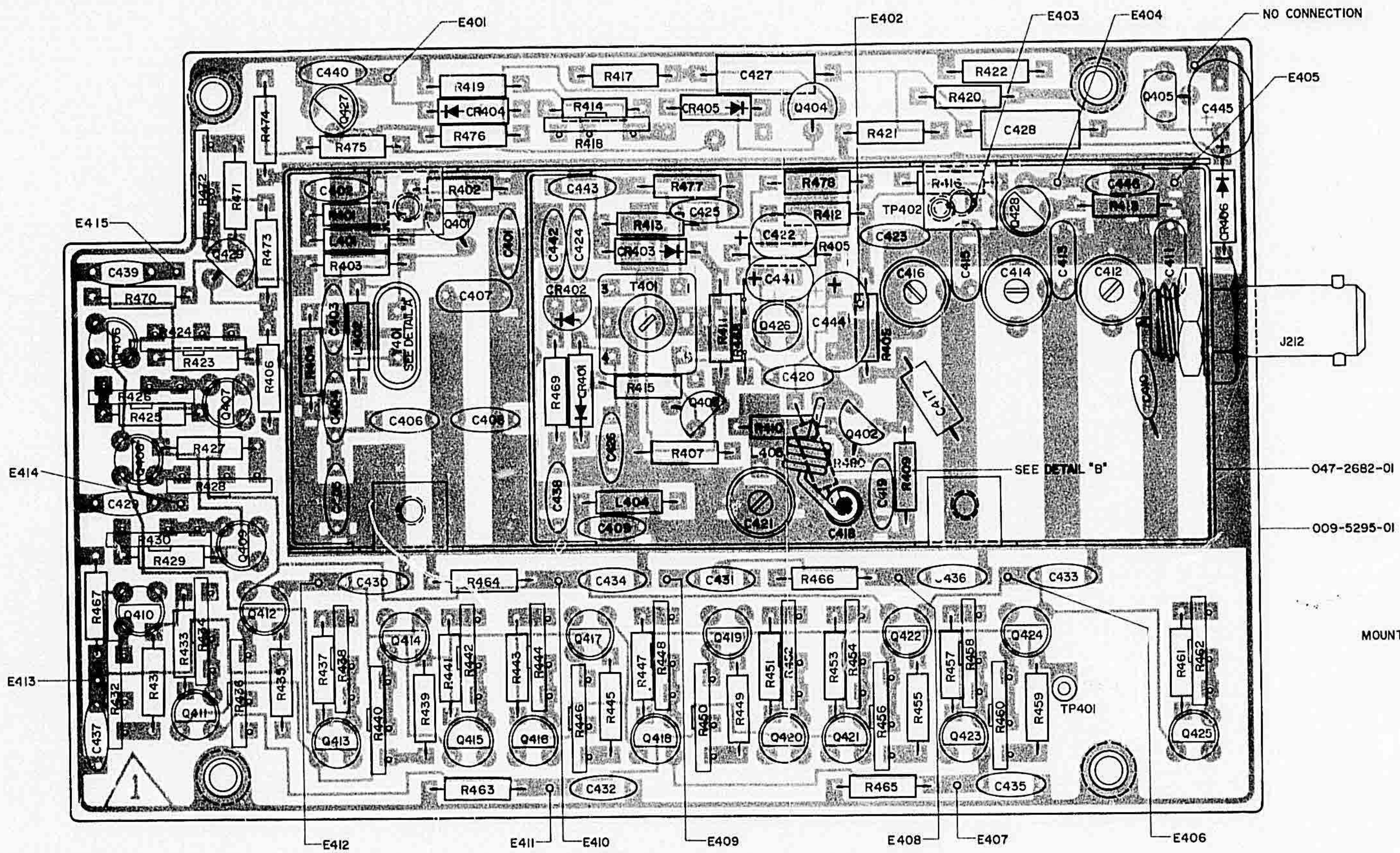
SEE BLOWUP



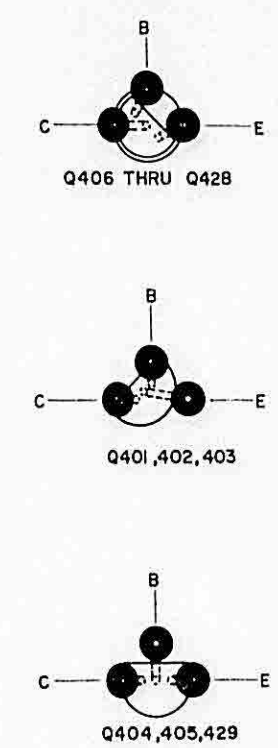
NOTES:

1. UNLESS NOTED, RESISTANCE VALUES ARE IN OHMS, 1/4W, 5%.
   CAPACITANCE VALUES ARE IN PICOFARADS(pf).
   INDUCTANCE VALUES ARE IN MICROHENRYS(μh).
2. DIODE SYMBOLS:
   SILICON ZENER VARACTOR
3. VOLTAGE MEASUREMENT CONDITIONS: 332 MHZ 700 μv 2db T.R. UP
4. LIGHTING:
   FOR 27.5 VDC OPERATION
   PIN "D" IS 27.5 VDC
   PIN "E" IS OPEN
   FOR 13.75 VDC OPERATION
   PIN "D" IS GND.
   PIN "E" IS 13.75 VDC.

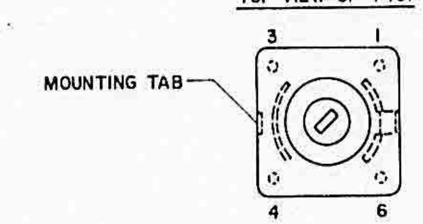
SEE BLOWUP

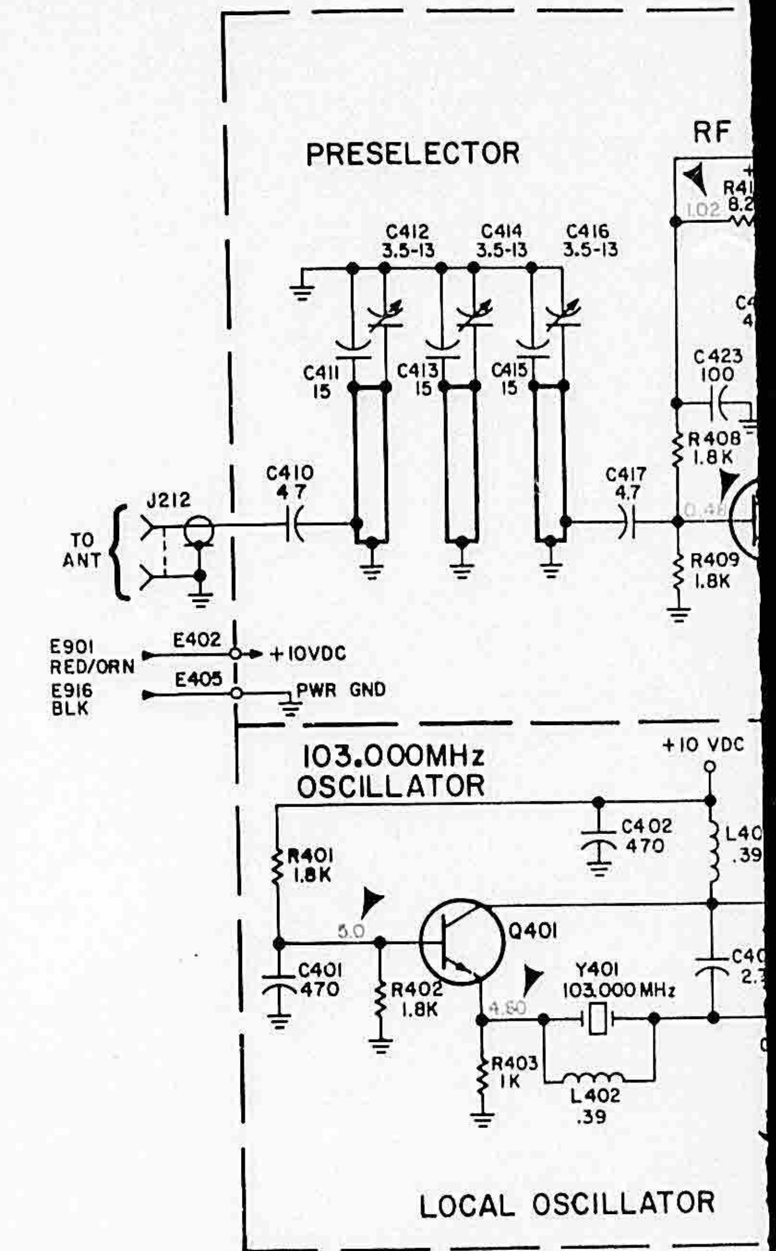


TRANSISTOR MOUNTING CONFIGURATION (TOP VIEW OF CARD)



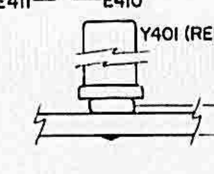
TOP VIEW OF T401



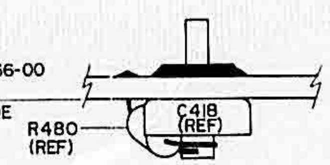


NOTES:

1. FOR COMPONENT VALUES SEE BILL OF MATERIAL 200-0494-00.
2. BOARDS MUST BE FREE OF FLUX AND OTHER FOREIGN PARTICLES AFTER ASSEMBLY IS COMPLETED.
   RECOMMENDED CLEANING PROCEDURE: UTILIZING A SHALLOW PAN (APPROX. 1½" DEEP) AND APPROX. 1 PINT OF FLUX MANUFACTURES' RECOMMENDED FLUX REMOVER SCRUB BOTH SIDES OF CARD THROUGHLY WITH SOFT BRISTLED BRUSH DRY THROUGHLY WITH AN AIR BLAST.
3. SOME TRACES OF FLUX AND REMOVER MAY REMAIN AS A WHITE RESIDUE.
4. C407 LEAD LENGTH BETWEEN THE CAPACITOR BODY AND THE P.C. BOARD SHALL BE NO GREATER THAN .050 INCHES.



DETAIL "A"



DETAIL "B"

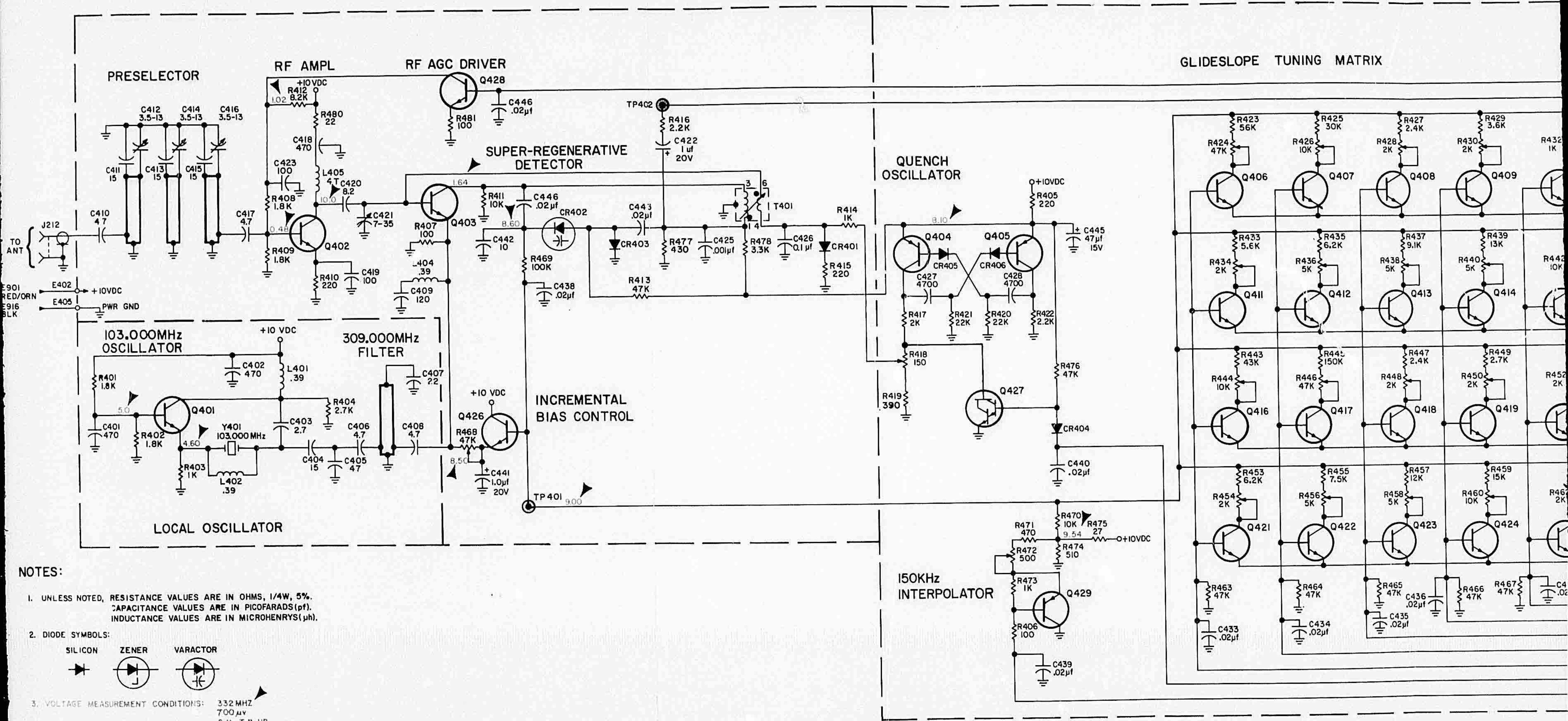
NOTES:

1. UNLESS NOTED, RESISTANCE VALUES ARE IN OHMS, 1/4W, 5%
   CAPACITANCE VALUES ARE IN PICOFARADS(pf
   INDUCTANCE VALUES ARE IN MICROHENRYS(µ
2. DIODE SYMBOLS:

3. VOLTAGE MEASUREMENT CONDITIONS: 332 MHZ 700 µv 2db T.R. UP
4. LIGHTING:
   FOR 27.5 VDC OPERATION, PIN "D" IS 27.5 VDC, PIN "E" IS OPEN
   FOR 13.75 VDC OPERATION, PIN "D" IS GND., PIN "E" IS 13.75 VDC.

FIGURE 6-6 KI 213/214 GLIDESLOPE SCHEMATIC AND ASSEMBLY DRAWING
(Dwg. No. 002-0274-02 R-0)
300-0693-00 R-2)

SEE BLOWUP



NOTES:

1. UNLESS NOTED, RESISTANCE VALUES ARE IN OHMS, 1/4W, 5%. CAPACITANCE VALUES ARE IN PICOFARADS(pf). INDUCTANCE VALUES ARE IN MICROHENRYS(μh).
2. DIODE SYMBOLS:

SILICON ZENER VARACTOR

3. VOLTAGE MEASUREMENT CONDITIONS: 332 MHZ 700 μv 2db T.R. UP
4. LIGHTING:

FOR 27.5 VDC OPERATION
PIN "D" IS 27.5 VDC
PIN "E" IS OPEN

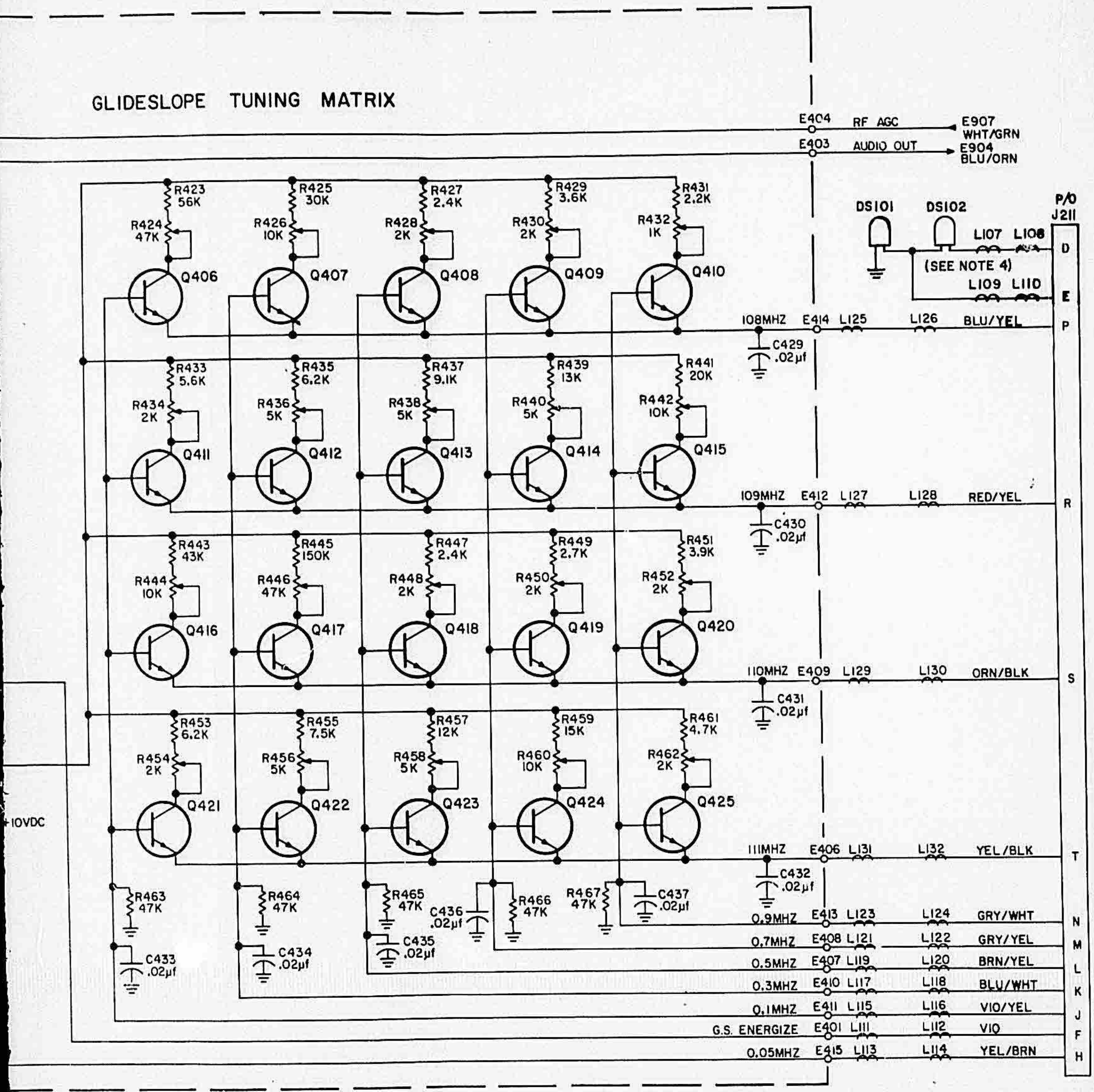
FOR 13.75 VDC OPERATION
PIN "D" IS GND.
PIN "E" IS 13.75 VDC.

LAST CIRCUIT NUMBERS USED:
R481
L405, L111-L132
C445
CR406
Q429
Y401
E415
TP402

SEE BLOWUP

SEE BLOWUP

GLIDESLOPE TUNING MATRIX



KI 213/214 GLIDESLOPE SCHEMATIC AND ASSEMBLY DRAWING

LAST CIRCUIT NUMBERS USED:

R481
L405, L111-L132
C445
CR406
Q429
Y401
E415
TP402

SEE BLOWUP

See KI 214 Converter Board on Figure 6-7 for Assembly Drawing for KI 201C Converter Board.

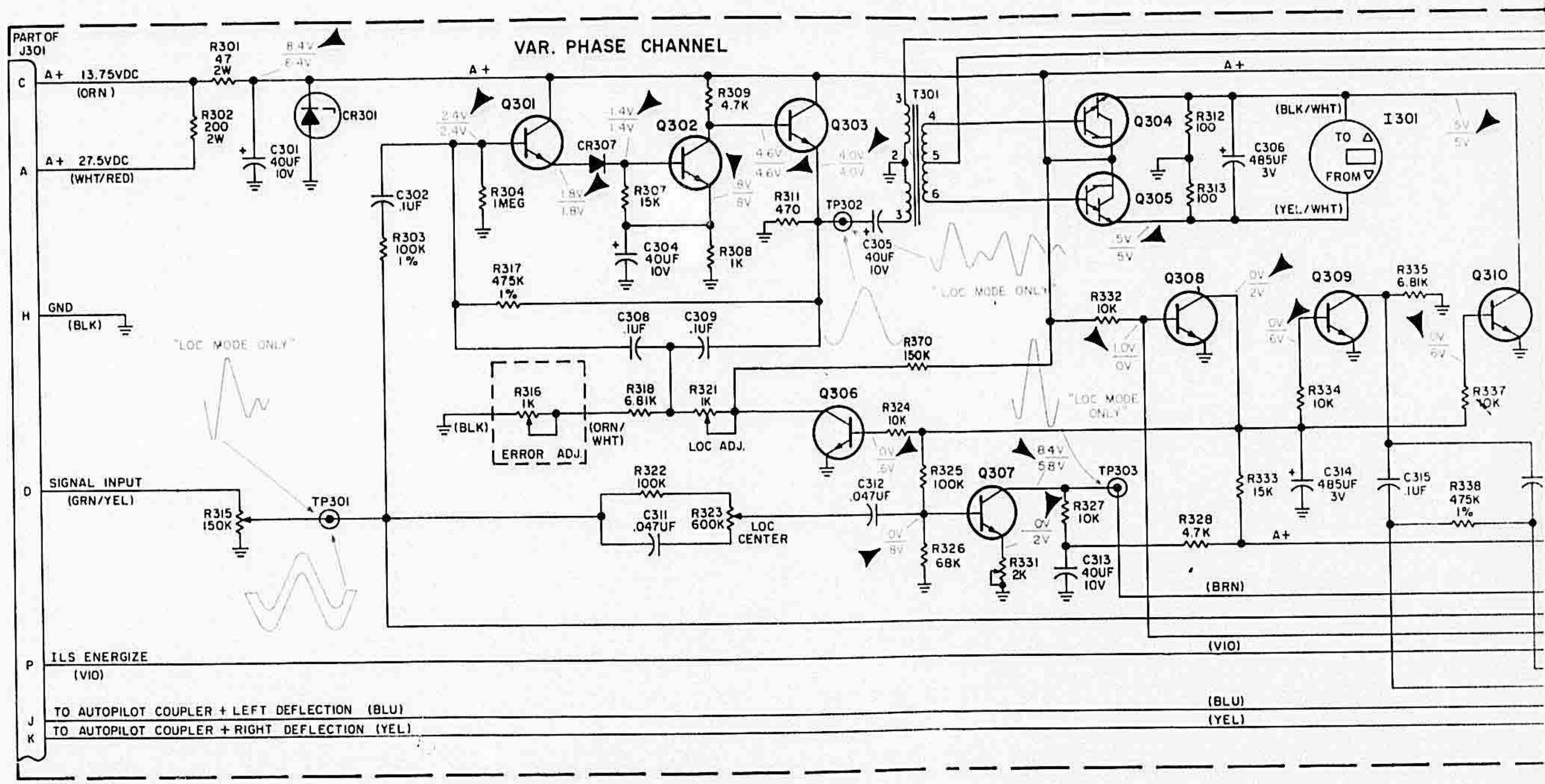
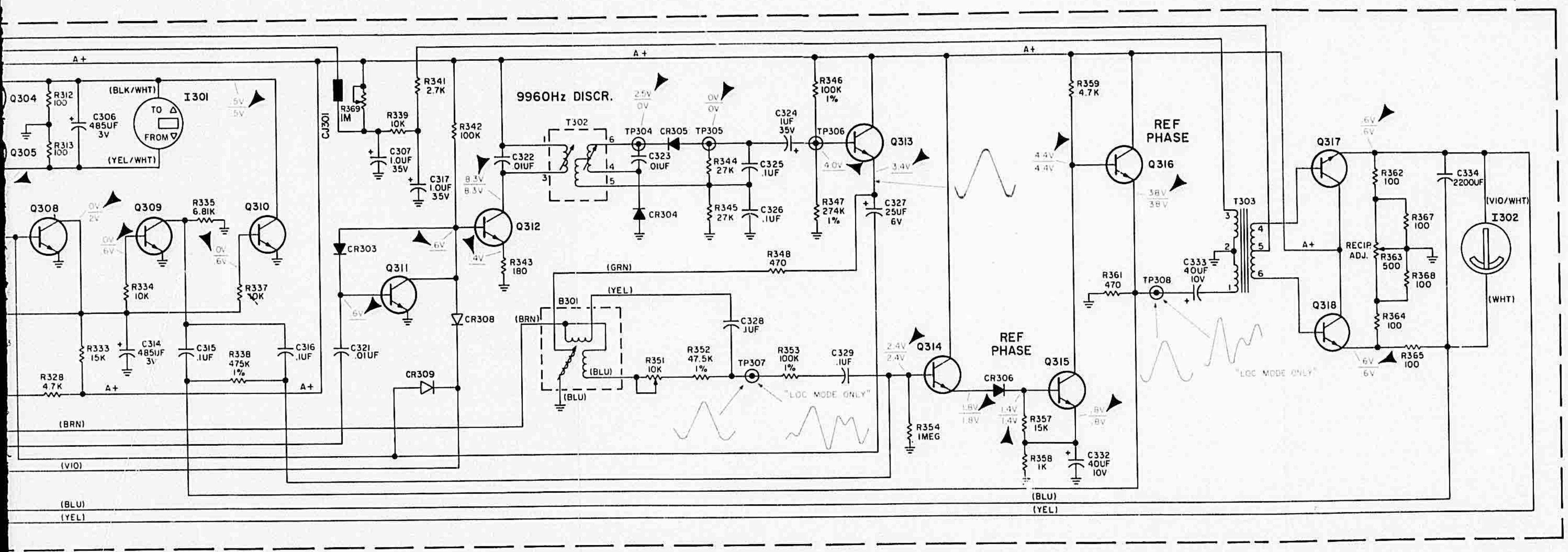


FIGURE 6-7A KI 201C SCHEMATIC (S/N 10983 and above)
(Dwg. No. P/O 002-0137-00, R-10)

SEE BLOWUP

SEE BLOWUP



NOTE:

1. UNLESS OTHERWISE INDICATED ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS, ALL INDUCTANCE VALUES ARE IN MICROHENRYS AND ALL RESISTANCE VALUES ARE IN OHMS, 1/4 WATT, 10%
2. DIODES ARE THUS:

   SILICON GERMANIUM ZENER VARACTOR

3. BOTTOM VIEW OF TRANSISTORS

   EMIT BASE COLL BASE COLL EMIT

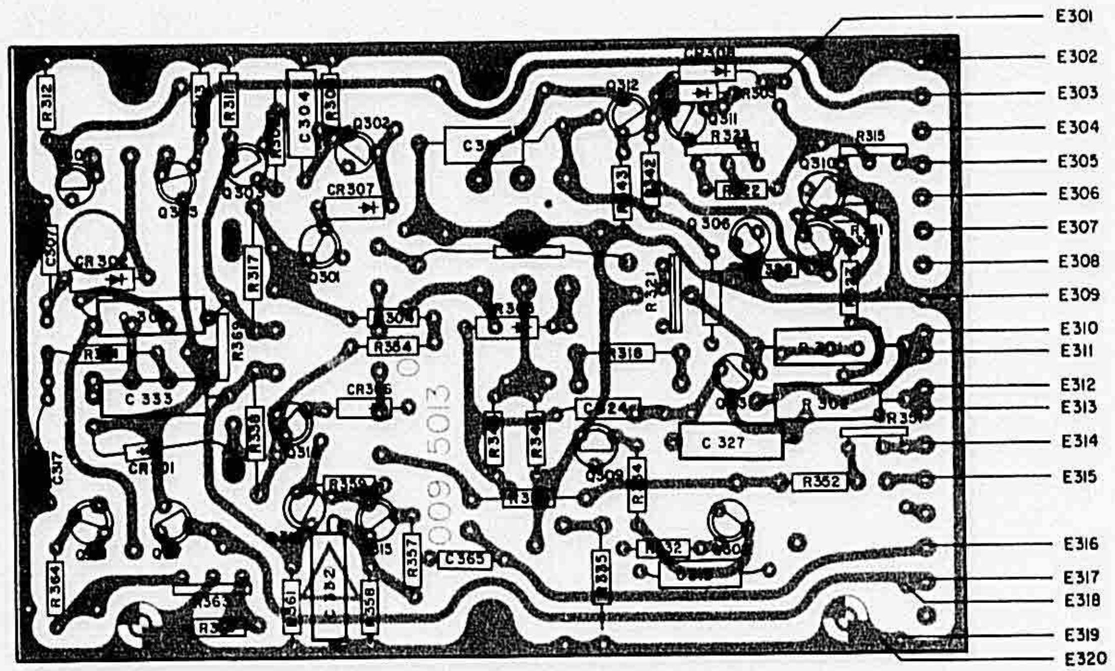
4. LIGHTING: FOR 27.5 VDC OPERATION
   PIN "E" IS +27.5 VDC
   PIN "F" IS OPEN

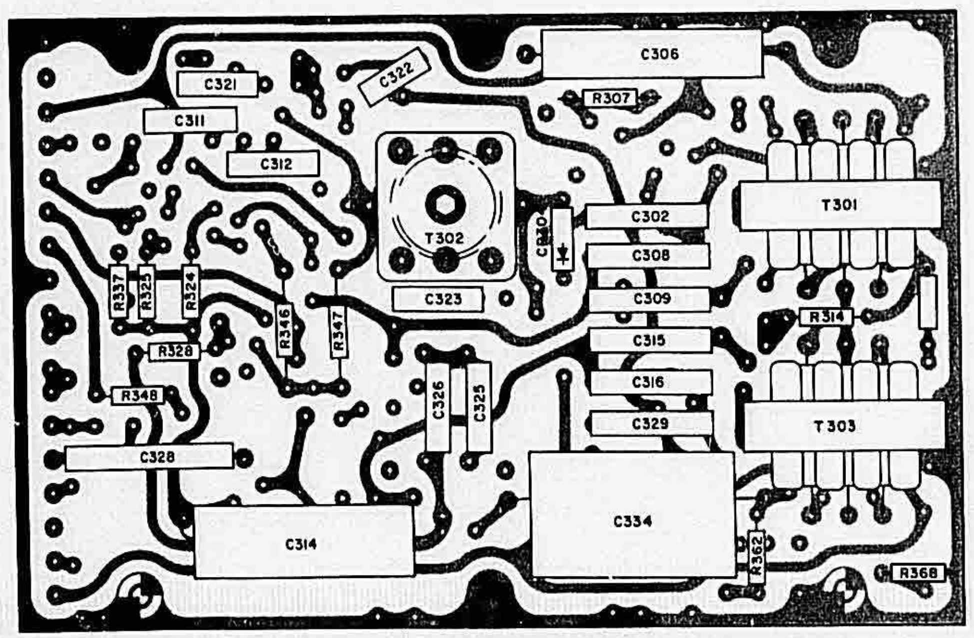
   +13.75 VDC OPERATION
   PIN "E" IS GROUNDED
   PIN "F" IS +13.75 VDC

5. VOLTAGES ABOVE THE LINE ARE WHEN UNIT IS IN "OMNI" MODE
   VOLTAGES BELOW THE LINE ARE WHEN UNIT IS IN "LOC" MODE

WUP

SEE BLOWUP





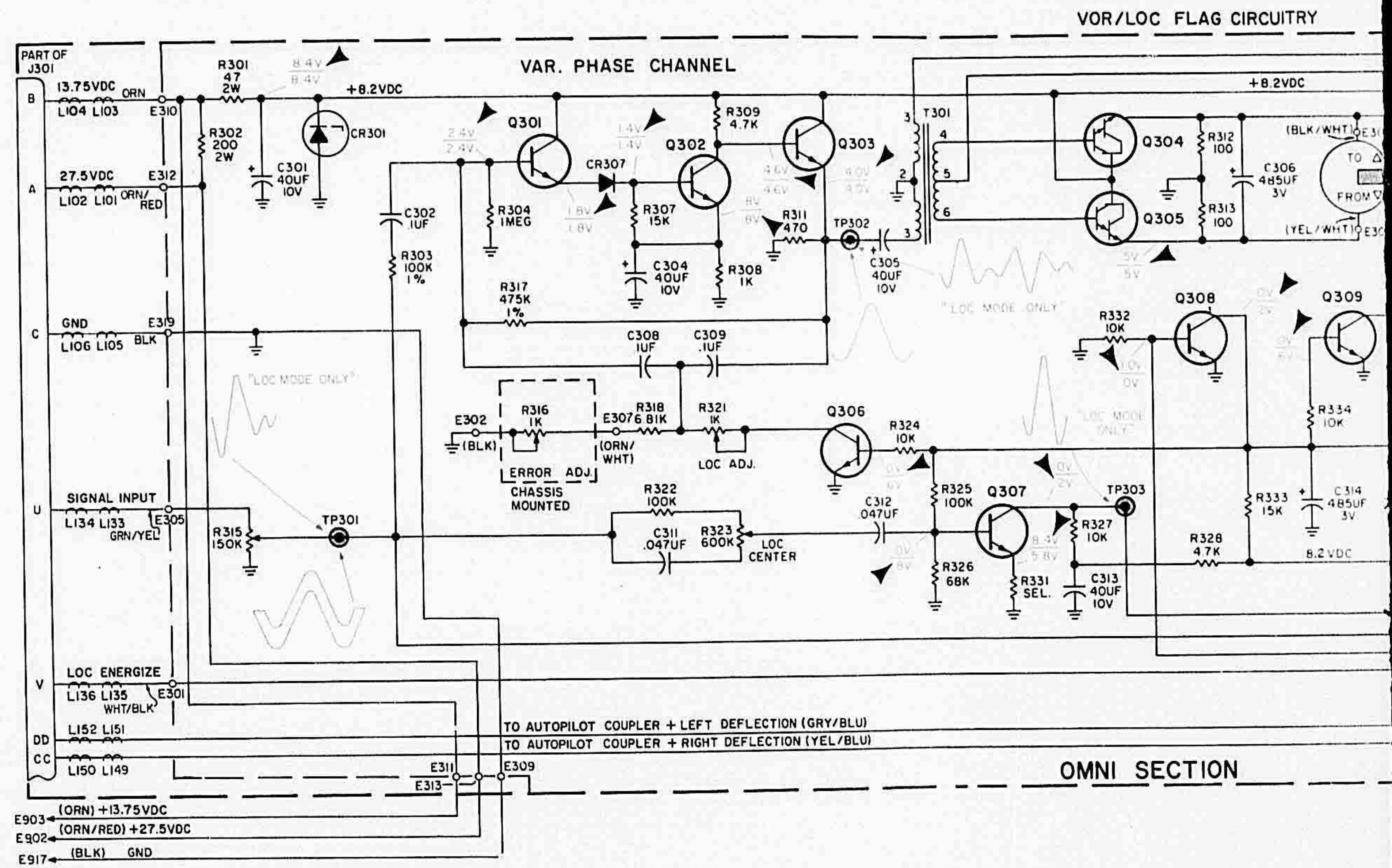
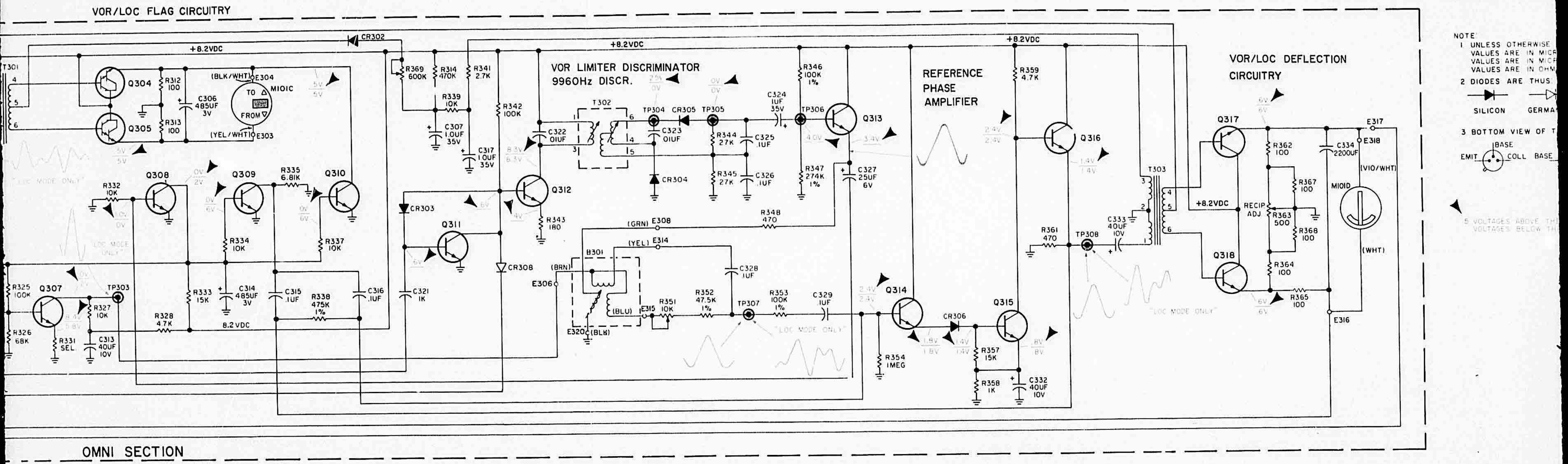


FIGURE 6-7 KI 214 CONVERTER BOARD ASSEMBLY & SCHEMATIC KI 214 S/N 2763 & Below
(Dwg. Nos. 300-0692-00, R-0;
002-0274-03, R-0)

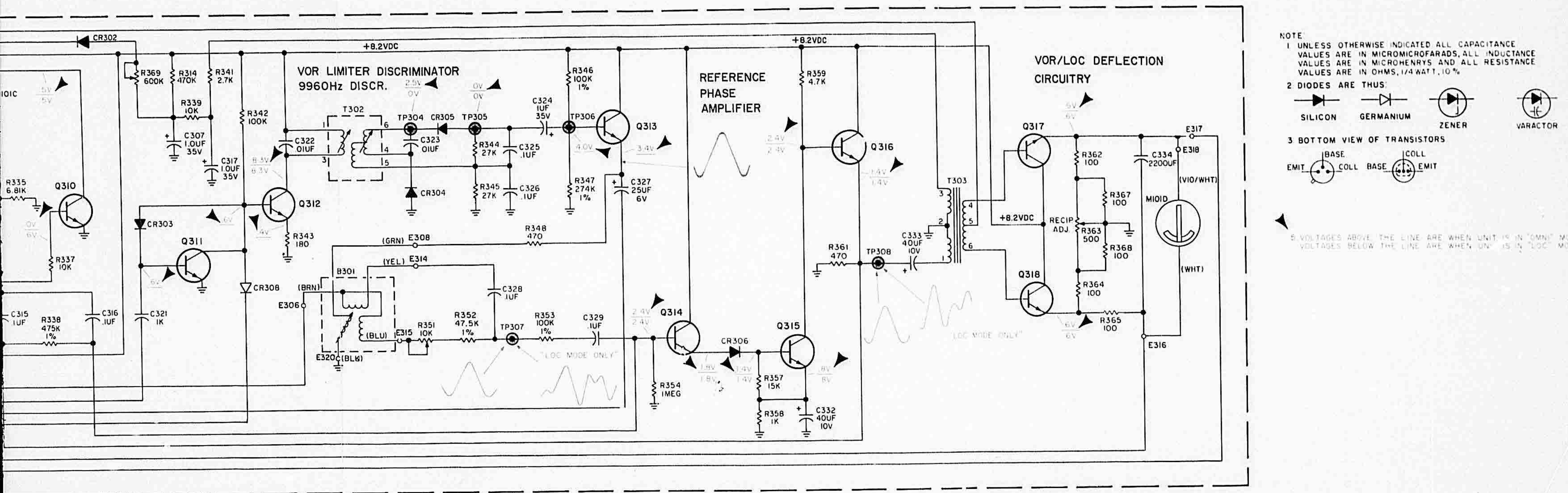
SEE BLOWUP

SEE BLOWUP



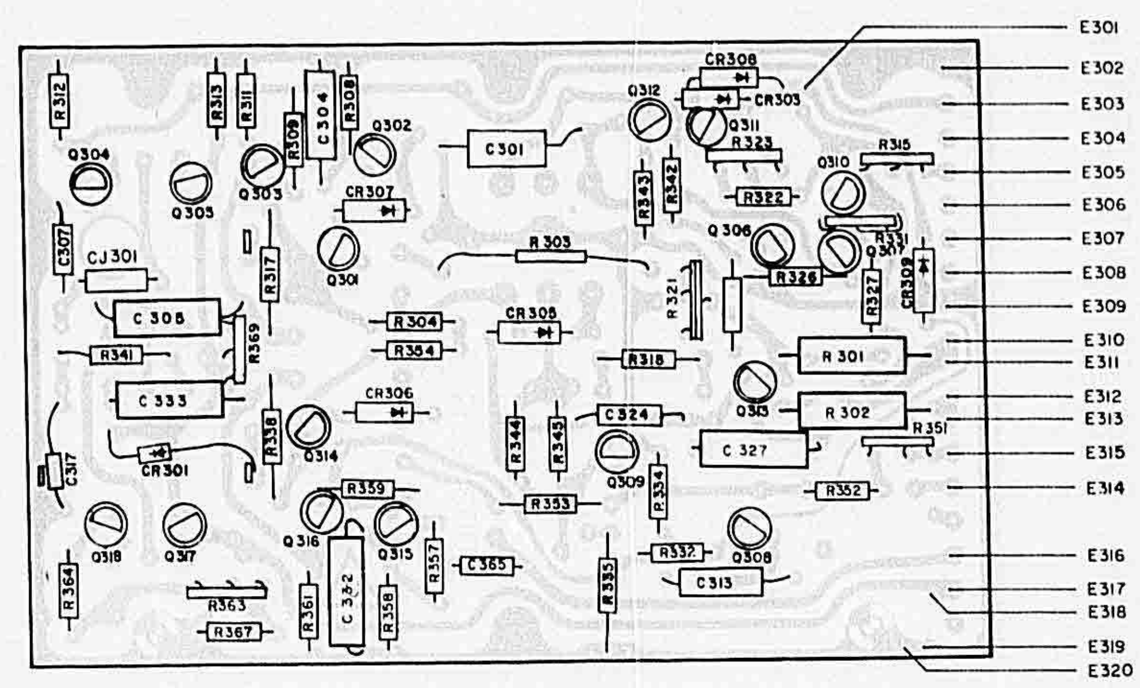
SEE BLOWUP

SEE BLOWUP



KI 214 VOR/LOC BOARD SCHEMATIC AND ASSEMBLY DRAWING

SEE BLOWUP



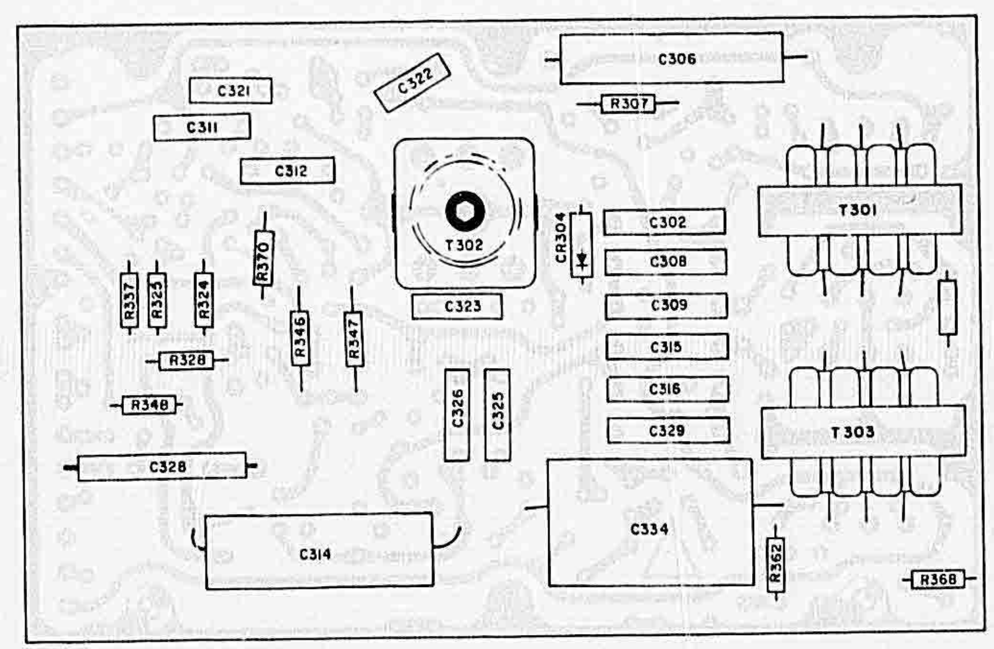
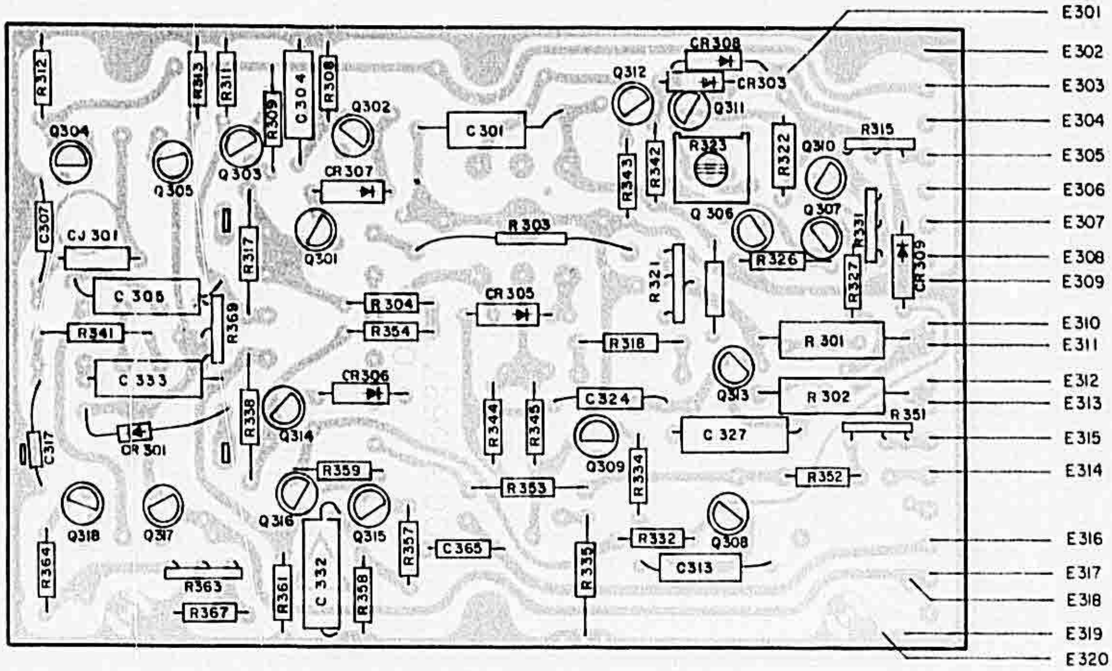


FIGURE 6-7 KI 214 CONVERTER BOARD ASSEMBLY (S/N 2764-7999)
(Dwg. No. 300-0692-01, R-4)
(Schematic See S/N 8000 above)

SEE BLOWUP



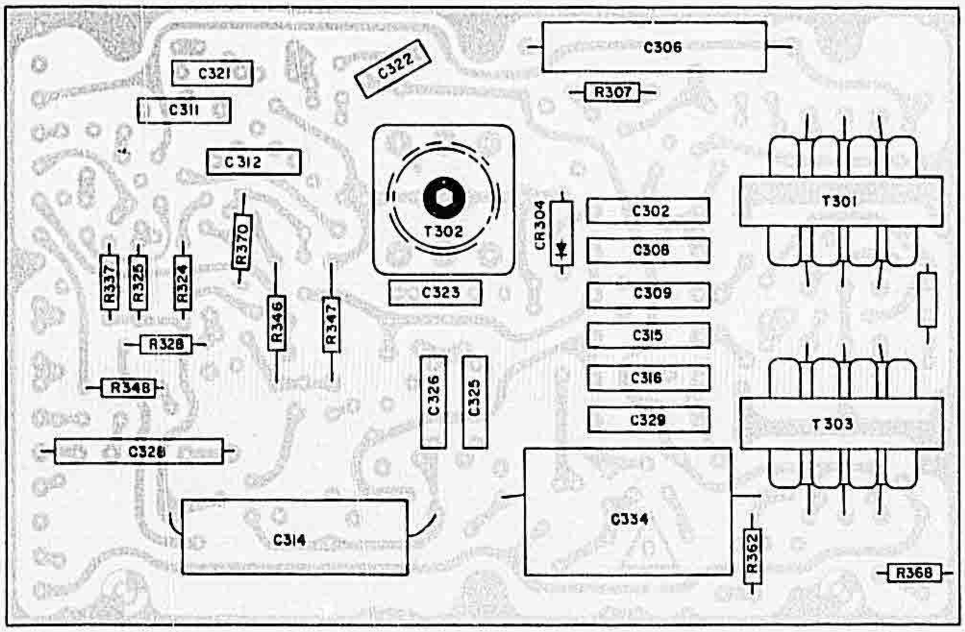
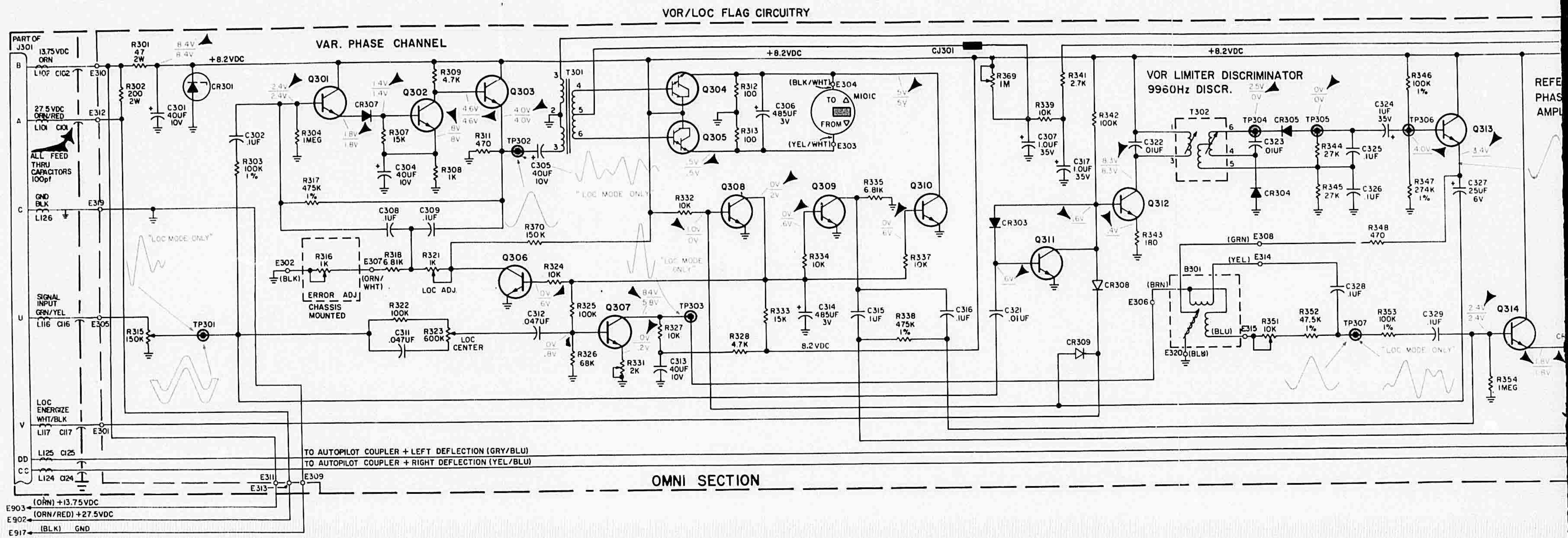
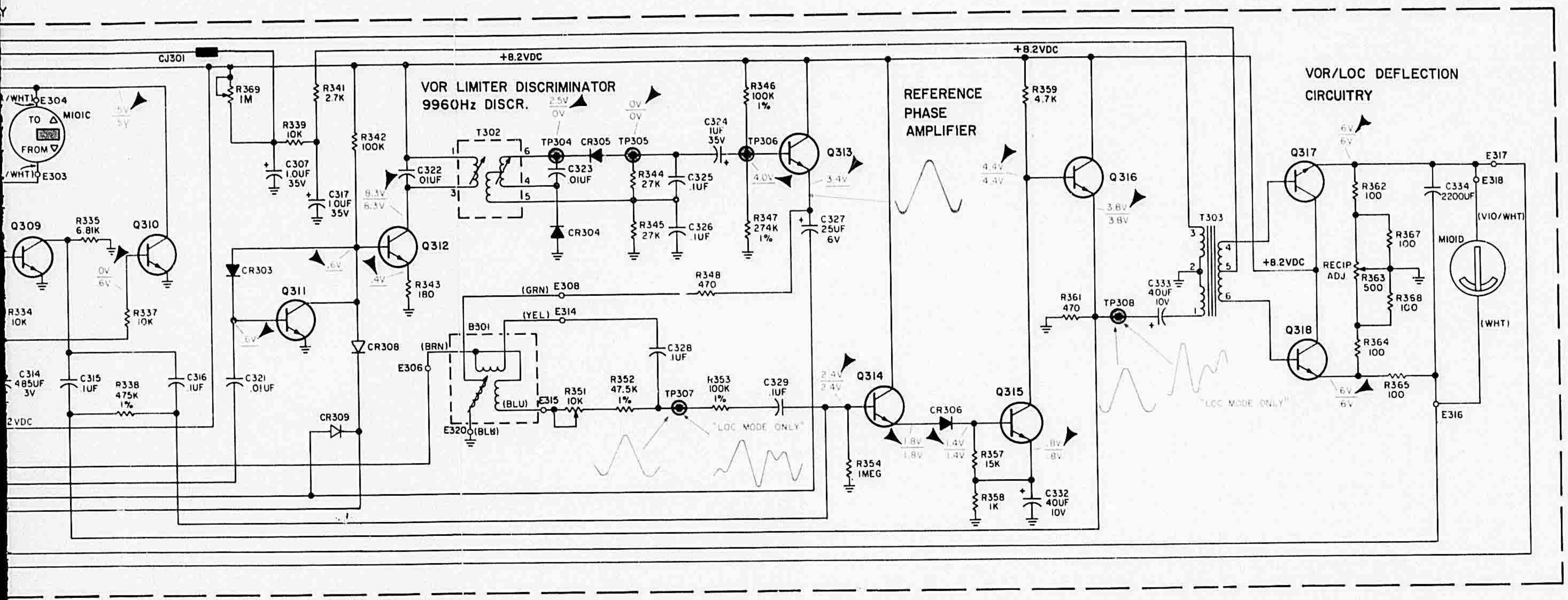


FIGURE 6-7 KI 214 CONVERTER BOARD ASSEMBLY & SCHEMATIC KI 214 S/N 8000 & Above
(Dwg. Nos. 300-0692-02, R-0;
002-0274-03, R-4)

SEE BLOWUP


VOR/LOC FLAG CIRCUITRY
VAR. PHASE CHANNEL
VOR LIMITER DISCRIMINATOR
9960Hz DISCR.
OMNI SECTION
TO AUTOPILOT COUPLER + LEFT DEFLECTION (GRY/BLU)
TO AUTOPILOT COUPLER + RIGHT DEFLECTION (YEL/BLU)
"LOC MODE ONLY"
ERROR ADJ
CHASSIS MOUNTED
LOC ADJ
LOC CENTER
(ORN) +13.75VDC
(ORN/RED) +27.5VDC
(BLK) GND
+8.2VDC

SEE BLOWUP



NOTE
1 UNLESS OTHERWISE INDICATED ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS, ALL INDUCTANCE VALUES ARE IN MICROHENRYS AND ALL RESISTANCE VALUES ARE IN OHMS, 1/4 WATT, 10%

2 DIODES ARE THUS:

SILICON GERMANIUM ZENER VARACTOR

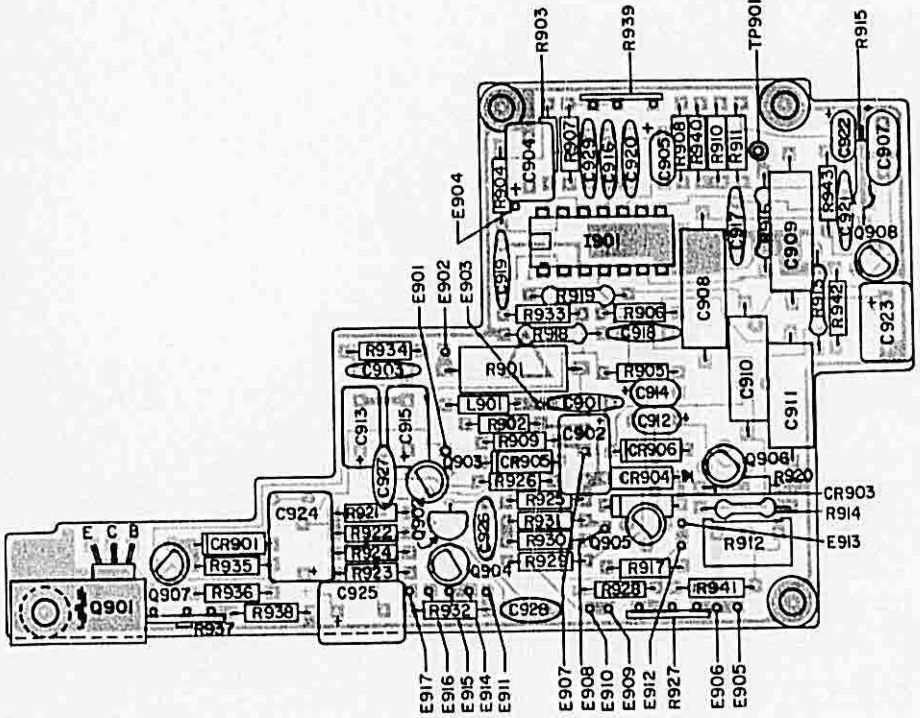
3 BOTTOM VIEW OF TRANSISTORS

EMIT BASE COLL BASE COLL EMIT

5 VOLTAGES ABOVE THE LINE ARE WHEN UNIT IS IN "OMNI" MODE VOLTAGES BELOW THE LINE ARE WHEN UNIT IS IN "LOC" MODE

KI 214 VOR/LOC BOARD SCHEMATIC AND ASSEMBLY DRAWING

SEE BLOWUP



TRANSISTOR MTG.
CONFIGURATION
TOP VIEW

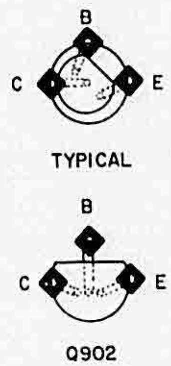
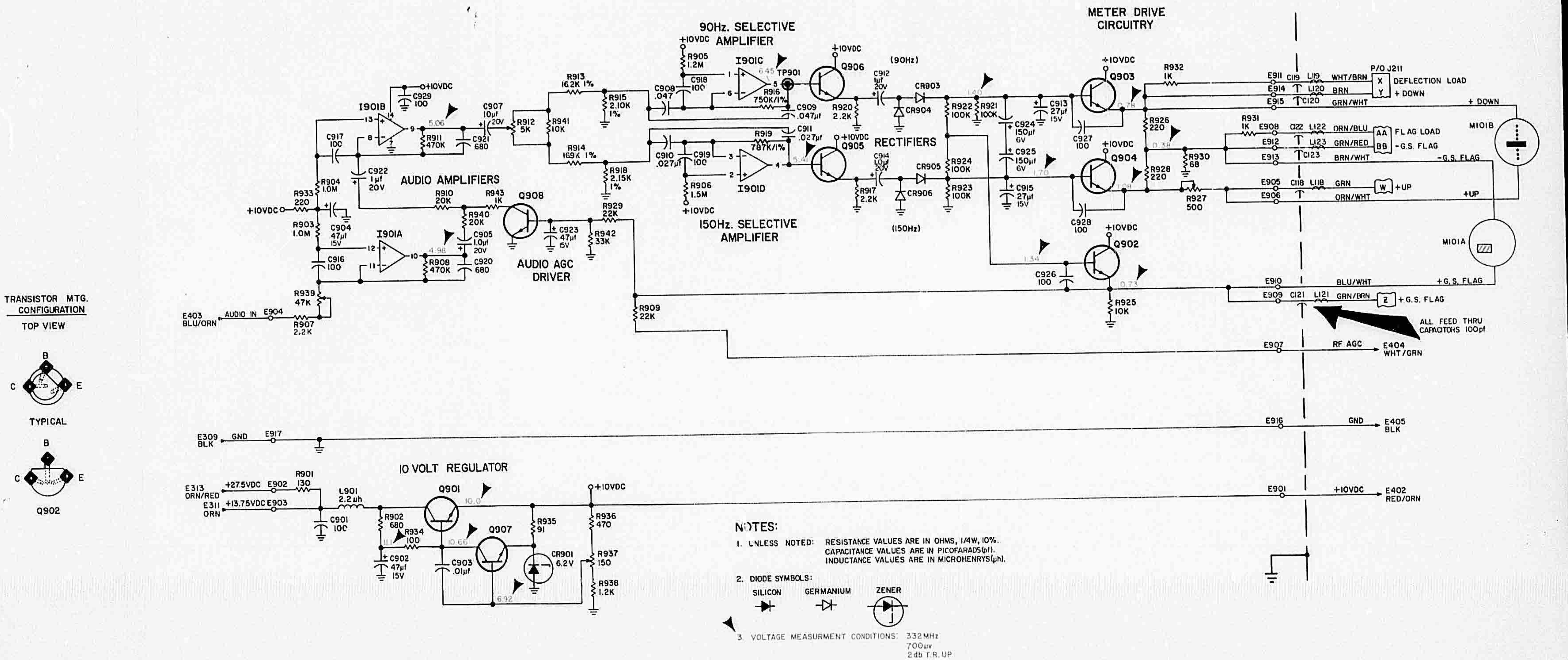


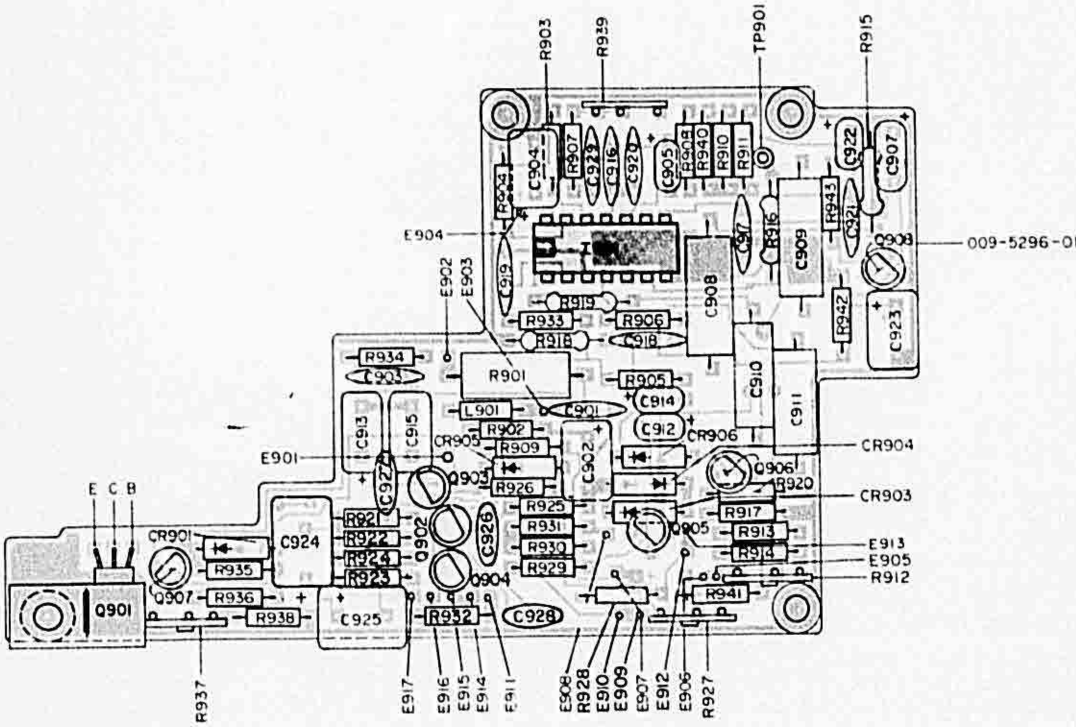
FIGURE 6-8 KI 214 AUDIO BOARD ASSEMBLY & SCHEMATIC S/N 8000 & Above
(Dwg. Nos. 300-0694-01, R-0;
002-0274-01, R-6)

SEE BLOWUP



Above

SEE BLOWUP



TRANSISTOR MOUNTING CONFIGURATION (TOP VIEW OF BOARD)

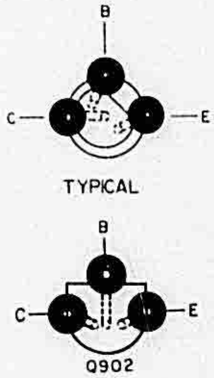


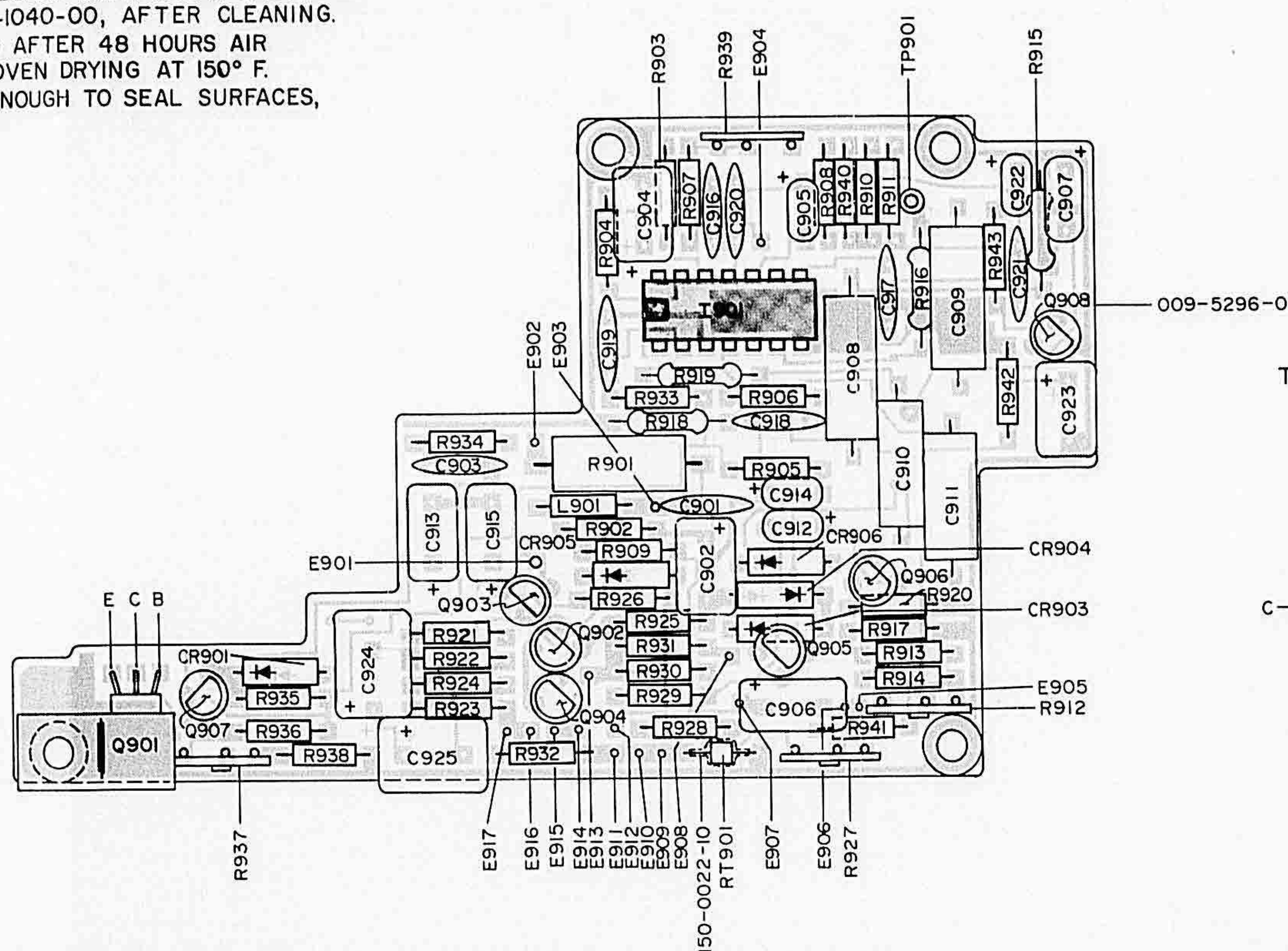
FIGURE 6-8 KI 214 AUDIO BOARD ASSEMBLY S/N 7999 & Below
(Dwg. No. 300-0694-00, R-5)
(Schematic same as S/N 8000 & Above)

SEE BLOWUP

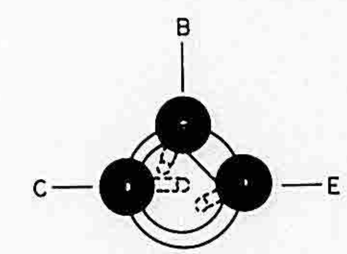
NOTES: (CONT.)

MASK RESISTORS R912, R927, R937 AND R939, TP901, GROUND AREA WHICH Q901 COMES IN CONTACT WITH AND GROUND THAT COMES IN CONTACT WITH MOUNTING TABS AND MOUNTING SCREWS.

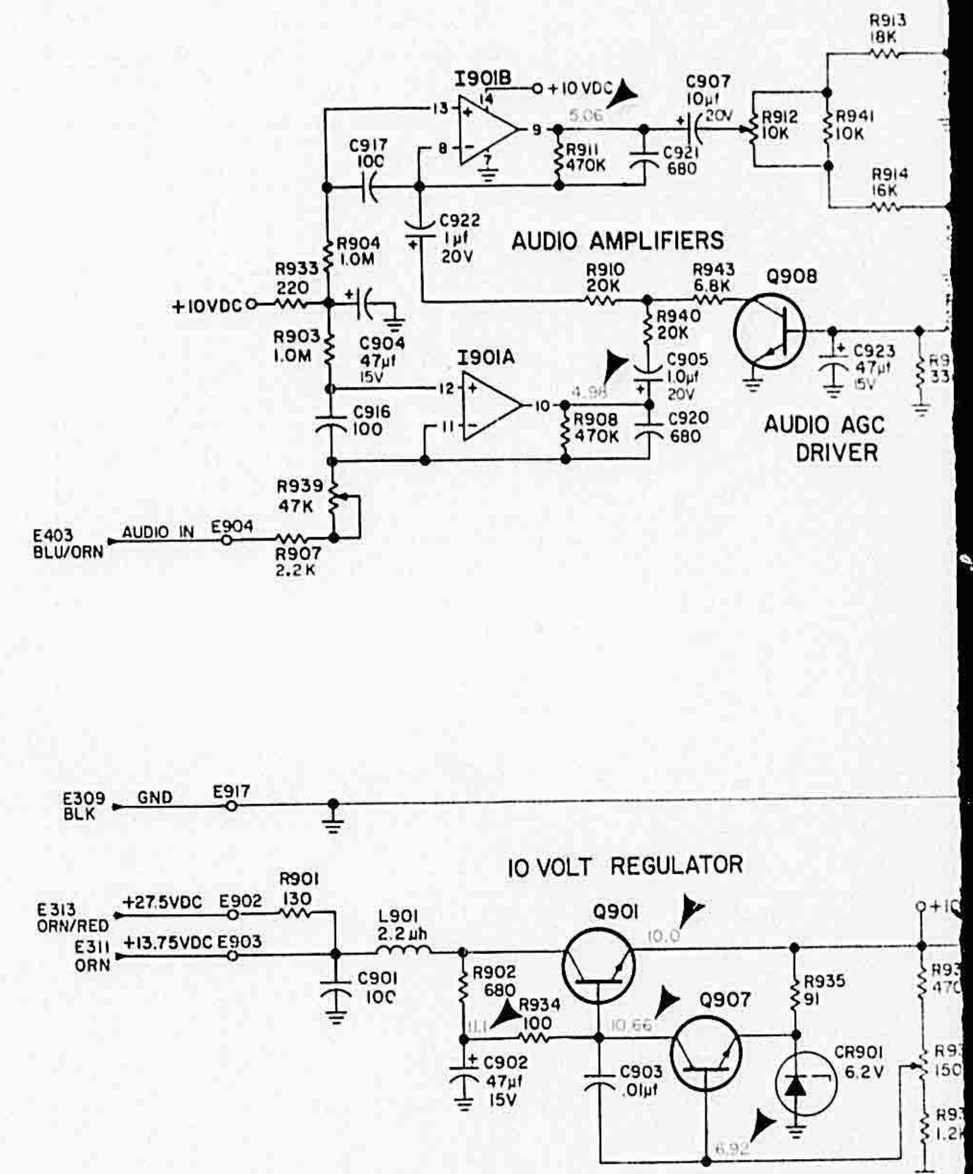
SPRAY BOTH SIDES OF BOARD WITH CLEAR URETHANE SEAL COATING, KPN 016-1040-00, AFTER CLEANING. COATING IS 95% CURED AFTER 48 HOURS AIR DRYING OR 24 HOURS OVEN DRYING AT 150° F. COATING TO BE THICK ENOUGH TO SEAL SURFACES, BUT FREE OF RUNS.



TRANSISTOR MOUNTING CONFIGURATION
(TOP VIEW OF BOARD)



TYPICAL



NOTES:

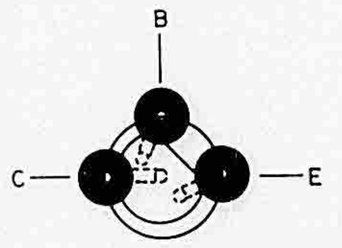
1. FOR COMPONENT VALUES SEE BILL OF MATERIAL 200-0495-00.
2. BOARDS MUST BE FREE OF FLUX AND OTHER FOREIGN PARTICLES AFTER ASSEMBLY IS COMPLETED.
   RECOMMENDED CLEANING PROCEDURE: UTILIZING A SHALLOW PAN (APPROX. 1 1/2" DEEP) AND APPROX. 1 PINT OF FLUX MANUFACTURES' RECOMMENDED FLUX REMOVER SCRUB BOTH SIDES OF CARD THROUGHLY WITH SOFT BRISTLED BRUSH. DRY THROUGHLY WITH AN AIR BLAST.
3. SOME TRACES OF FLUX AND REMOVER MAY REMAIN AS A WHITE RESIDUE.

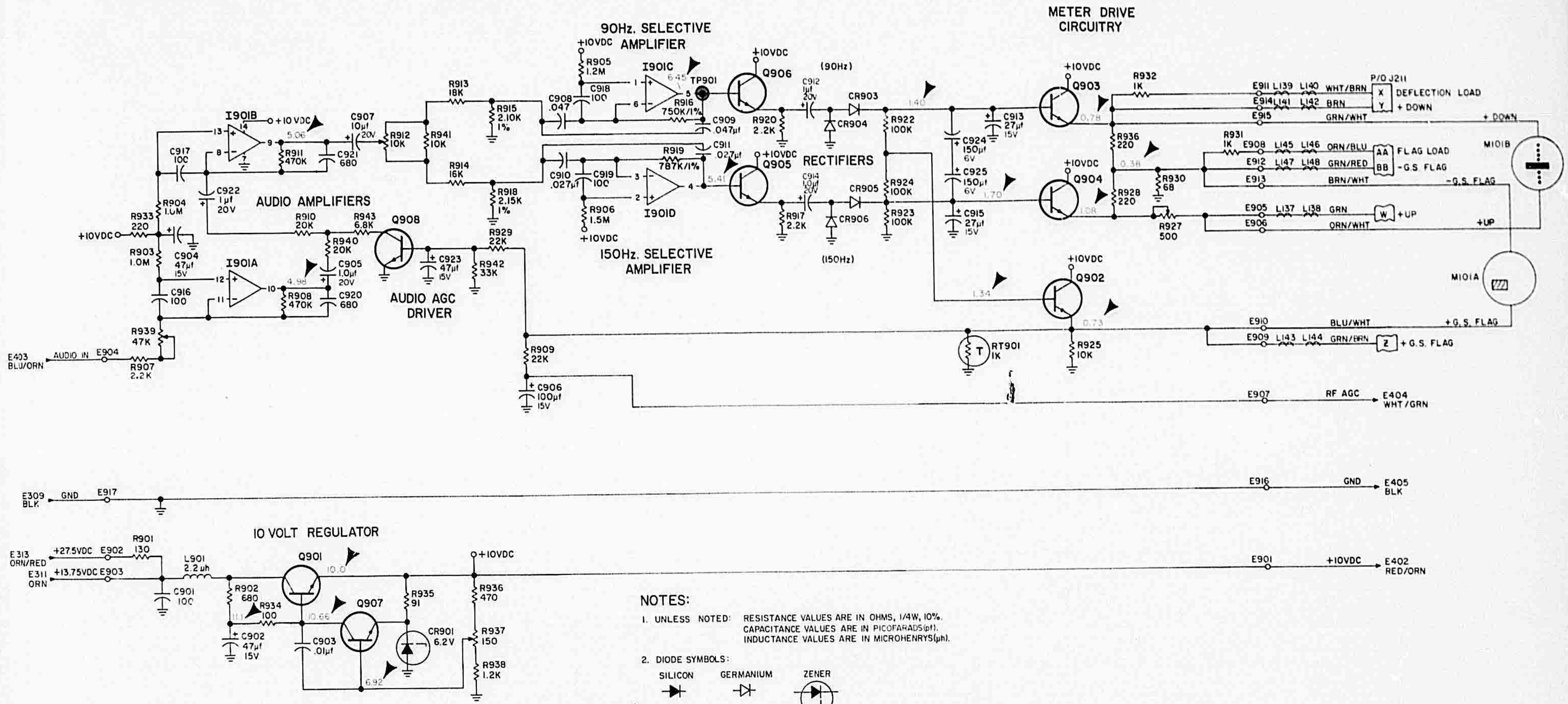
REF: B/M 200-0495-00

FIGURE 6-8 KI 214 AUDIO BOARD SCHEMATIC AND ASSEMBLY DRAWING
(Dwg. No. 002-0274-01 R-0)
300-0694-00 R-0)

SEE BLOWUP

09-5296-01





NOTES:

1. UNLESS NOTED: RESISTANCE VALUES ARE IN OHMS, 1/4W, 10%. CAPACITANCE VALUES ARE IN PICOFARADS(pf). INDUCTANCE VALUES ARE IN MICROHENRYS(μh).
2. DIODE SYMBOLS: SILICON GERMANIUM ZENER
3. VOLTAGE MEASURMENT CONDITIONS: 332 MHz 700μv 2db T.R. UP

LAST CIRCUIT No's USED
L901, L137 thru L148
C 925
R 943
CR 906
Q 908
E 917
TP901
I 901

REF: B/M 200-0495-00

SEE BLOWUP

M23 M24

MAINTENANCE/OVERHAUL MANUAL

KI 201C
KI 211C
KI 212
VOR/LOC-GS INDICATORS

KING RADIO CORPORATION®
400 NORTH ROGERS ROAD OLATHE, KANSAS, U.S.A.

ONE FULL YEAR WARRANTY

General Aviation Avionic products manufactured by King Radio Corporation (hereinafter called King) are warranted against defects in design, workmanship and material under normal use for which intended for one year after warranty registration provided such registration occurs within eighteen months of the factory shipping date.

King's limit of liability hereunder shall be to provide necessary parts and labor to repair said product, transportation charges prepaid at either King factory or an authorized King Service Center. King shall not be liable for consequential or other damage or expense whatsoever therefore or by reason thereof.

This warranty shall not apply to any product which has not been installed by an authorized King Installation Facility in accordance with the installation manual, or which has been repaired or altered in any way so as to adversely effect its performance or reliability, or which has been subject to misuse, contamination, negligence or accident.

This warranty is in lieu of all other General Aviation Avionics guarantees or warranties expressed or implied. King reserves the right to make design changes, additions to and improvements in its products without obligation to install such in products previously manufactured.

KING
KI 201C/KI 211C/KI 212
VOR/LOC-OBS INDICATOR

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LIST OF ILLUSTRATIONS

KING

KI 201C/KI 211C/KI 212

VOR/LOC-OBS INDICATOR

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LIST OF ILLUSTRATIONS

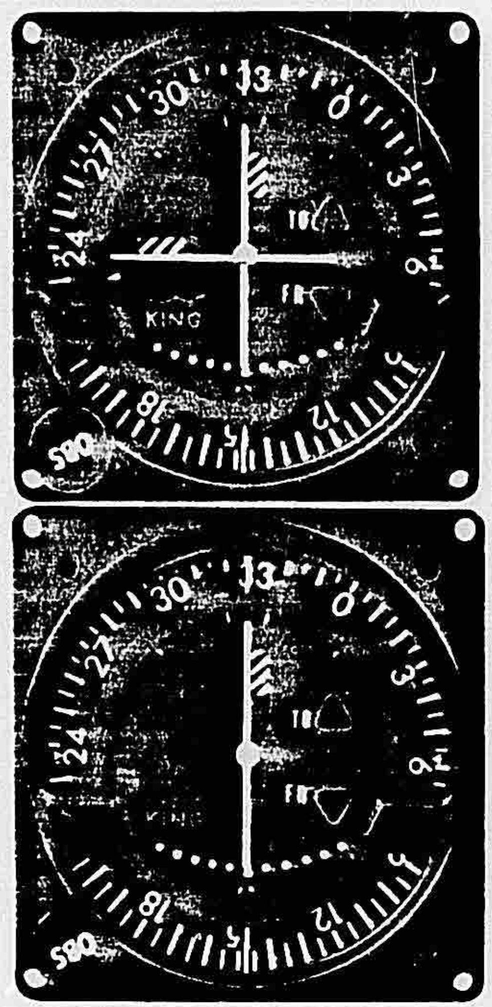


FIGURE 1-1 KI 201C/211C/212

KING

KI 201C/KI 211C/KI 212
VOR/LOC-OBS INDICATOR

SECTION I

GENERAL INFORMATION

CONTENTS

SECTION I

GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the King Radio Corporation Silver Crown, KI 201C, KI 211C and KI 212.

1.2 PURPOSE OF EQUIPMENT

The King KI 201C VOR Indicator is designed to operate with VHF navigational equipment (such as the KX 170, KX 170A or KX 175) to provide OMNI (VOR) or LOCALIZER (LOC) information. The VHF navigational receiver receives and detects the omni or localizer information. The KI 201C converts this information to dc signals which drive the LEFT-RIGHT needle and the TO-OFF-FROM flag of the visual indicator.

The KI 211C ILS Indicator performs the same functions as the KI 201C. In addition, it contains a glideslope receiver and the visual indicators include an UP-DOWN glideslope needle with an OFF warning flag.

KI 212 GS/OBS indicator performs much of the same functions as the KI 211C. The basic difference being in that the KI 212 is a OMNI/LOC indicator with a glideslope receiver.

1.3 UNITS AND ACCESSORIES SUPPLIED

A. King Equipment Installation Kits which include mating connectors, mounting racks, mounting hardware, lamp filters, etc. , are as follows.

KI 201C	Installation Kit No.	050-1057-00
KI 211C	Installation Kit No.	050-1110-00
KI 212	Installation Kit No.	050-1212-00

1.4 ACCESSORIES REQUIRED, BUT NOT SUPPLIED

A. Navigation Antenna and Cables

B. Headphones and loud speaker:

1. Headphones: Low impedance type, 300 to 1,000 ohms

2. Loud Speaker: Voice coil impedance 3 to 6 ohms nominal

1.5 LICENSE REQUIREMENTS

No special Federal Communications Commission license is required to operate this equipment.

1.6 TECHNICAL CHARACTERISTICS

KI 201C/KI 211C/KI 212 INDICATOR

SPECIFICATION	CHARACTERISTIC	
GENERAL		
SIZE:		
KI 201C VOR Indicator:	3. 25 × 3. 25 × 8. 3 inches (8. 255 × 8. 255 × 21. 082 centimeters)	
KI 211C ILS Indicator:	3. 25 × 3. 25 × 8. 3 inches (8. 255 × 8. 255 × 21. 082 centimeters)	
KI 212 GS/OBS Indicator:	3. 25 × 3. 25 × 8. 3 inches (8. 255 × 8. 255 × 21. 082 centimeters)	
WEIGHT:		
KI 201C VOR Indicator:	2. 5 lbs.	
KI 211C ILS Indicator:	3. 0 lbs.	
KI 212 GS/OBS Indicator:	lbs.	
POWER REQUIREMENTS:		
	14VDC	28VDC
KI 201C VOR Indicator:	100ma (day)	100ma (day)
	220ma (night)	160ma (night)
KI 211C ILS Indicator:	200ma (day)	200ma (day)
	320ma (night)	260ma (night)
	100ma (day)	100ma (day)
	220ma (night)	160ma (night)
VOR/LOC		
LOCALIZER CENTERING:	Within ±10% of standard deflection (±1/2 needle width)	

KI 201C/KI 211C/KI 212 INDICATOR

SPECIFICATION	CHARACTERISTIC
LOCALIZER SENSITIVITY:	4db tone ratio will give full scale deflection
OMNI ACCURACY:	±2°
OMNI SENSITIVITY:	±10° of course width gives full scale deflection
GLIDESLOPE	
SENSITIVITY:	40μv for half flag and 60% of standard deflection
CENTERING:	Within 10% of standard deflection (200μv to 30,000μv)
SPURIOUS RESPONSES:	At least 40db down
SELECTIVITY:	150KHz minimum 6db bandwidth 600KHz maximum 40db bandwidth
EXTERNAL LOAD:	Will operate an external autopilot load.

SECTION II

INSTALLATION

CONTENTS

SECTION II

INSTALLATION

2.1 GENERAL

This section contains suggestions and factors to consider before installing the KI 201C/KI 211C/KI 212 Indicator. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking each unit. Make a visual inspection of each unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When all equipment is removed, place in the shipping container all packing materials for use in unit storage or reshipment. The KI 201C/KI 211C/KI 212 installation will conform to standards designated by the customer, installing agency and existing conditions as to unit location and type of installation.

2.3 KI 201C/KI 211C/KI 212 INSTALLATION

(a) Carefully select the KI 201C/KI 211C/KI 212 panel location for unobstructed vision, minimum parallax and adequate clearance for the instrument case and installation of cables and connectors.

(b) Refer to Figure 2-6 for the KI 201C/211C mounting dimensions.

(c) Refer to Figure 2-7 for the KI 212 mounting dimensions.

(d) A standard 3 1/8" instrument hole is required.

(e) Secure the KI 201C/211C/212 firmly in place.

(f) The installing agency will supply and fabricate the external cable. The plugs required are supplied by King Radio.

– NOTE –

System interconnect wiring diagrams can be found in the installation section of the KX 170A/175 Maintenance Manual.

(g) Autopilot connection: The KI 201C/211C/212 are capable of driving an autopilot load of 1KΩ. The deflection sensitivity of the KI 211C/212 Glideslope should be readjusted. Potentiometer R465, located in the KI 211C/212 unit, is used to compensate for the additional 1KΩ load. No adjustment is necessary if the autopilot is of the high impedance type (over 10KΩ). No adjustment is necessary in the KI 201C or KI 211C VOR/LOC with the addition of an autopilot load (1KΩ) because the comparator circuit has a very low output impedance. With the addition of a 1KΩ load the deflection sensitivity will change from 20° course width to approximately 22°.

An omni error adjust potentiometer, R316, is accessible from the front of the indicator by removing the OBS knob. This is for final calibration of the omni system after installing in aircraft. The range of the error pot is approximately ±5°. It should be noted that this potentiometer does not affect localizer centering.

RG-188/U coaxial cable is recommended for the glideslope antenna interconnect. Refer to Figure 2-1 for connector assembly.

(h) RNAV Connection KI 212 Only: Refer to the KNC 610 Maintenance/Overhaul Manual for information dealing with RNAV installations and subsequent F. A. A. Approval.

2.4 CABLING

(a) The length and routing of the external cables must be carefully studied and planned prior to installation. Avoid sharp bends and placing cables too near the aircraft control cables.

(b) Fabricate the external cables in accordance with the installation drawing that fulfills the system requirement.

–NOTE–

Use good quality stranded wire that will not support a flame and with at least 600 volt insulation. It is recommended that the mike audio line be in a shielded-twisted pair.

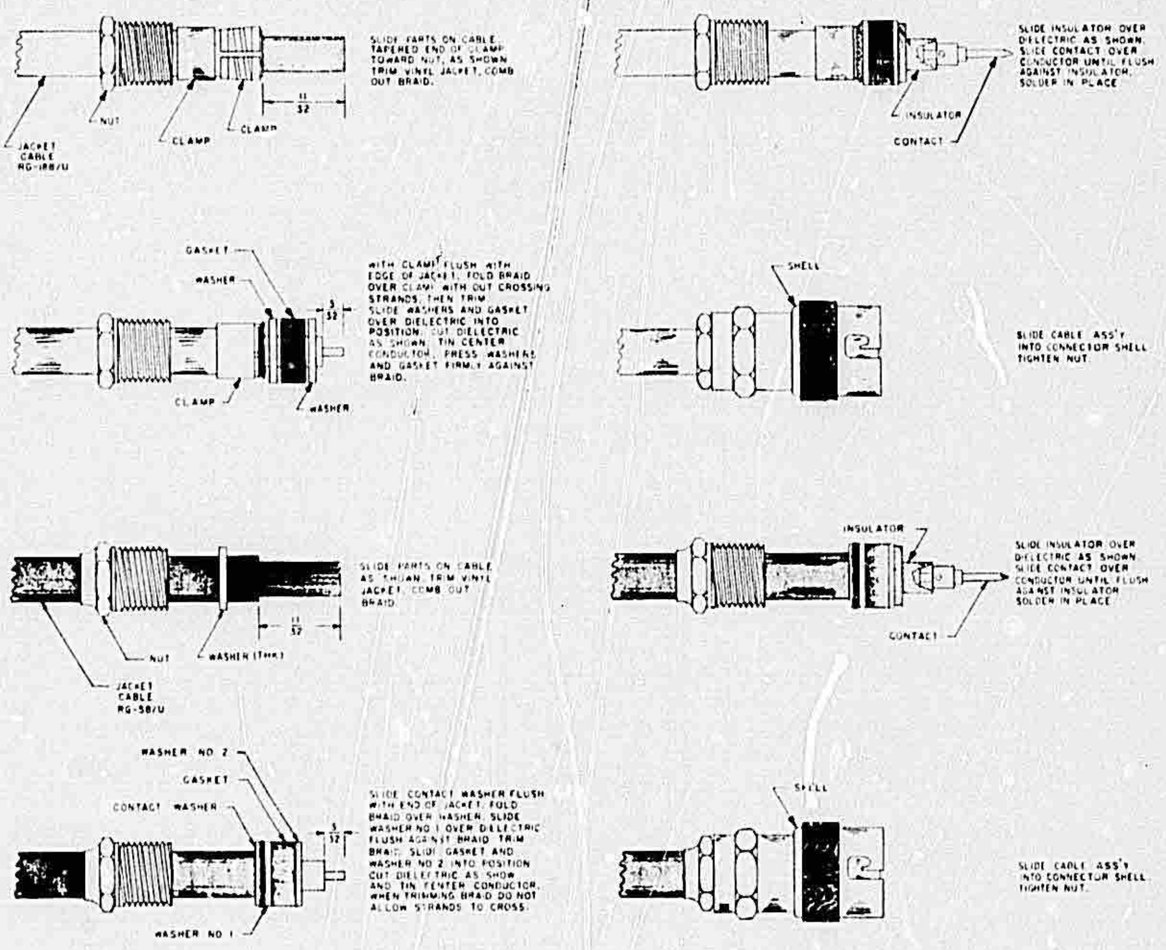


FIGURE 2-1 GLIDESLOPE CABLE CONNECTOR ASSEMBLY

SEE BLOWUP

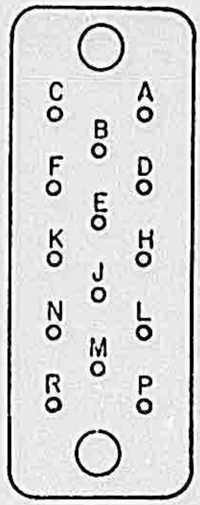


FIGURE 2-2A KI 201C CONNECTOR PIN LOCATIONS
(Dwg. No. 696-2802-00 R-0)

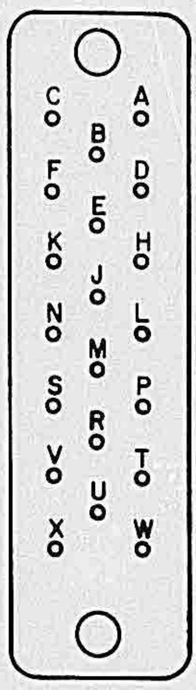


FIGURE 2-2B KI 211C CONNECTOR PIN LOCATIONS
(Dwg. No. 696-2802-01 R-0)

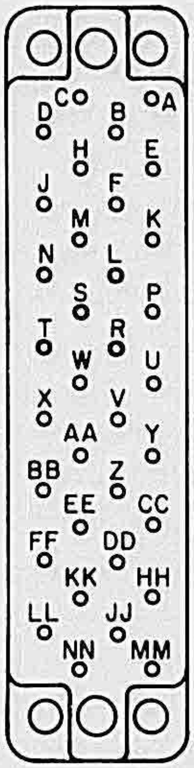


FIGURE 2-3 KI 212 CONNECTOR PIN LOCATIONS

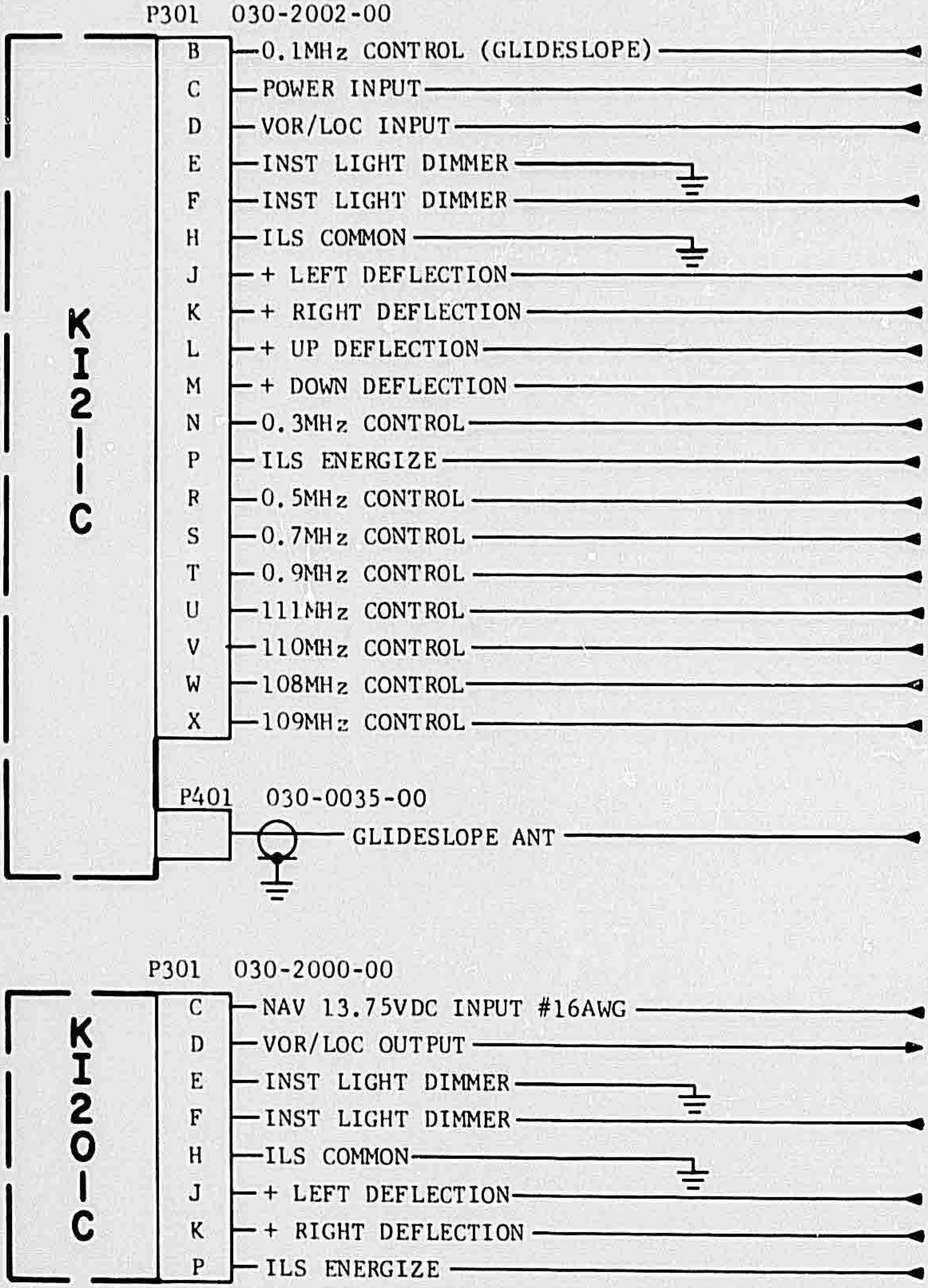


FIGURE 2-4 KI 201C/KI 211C CONNECTOR PIN FUNCTIONS

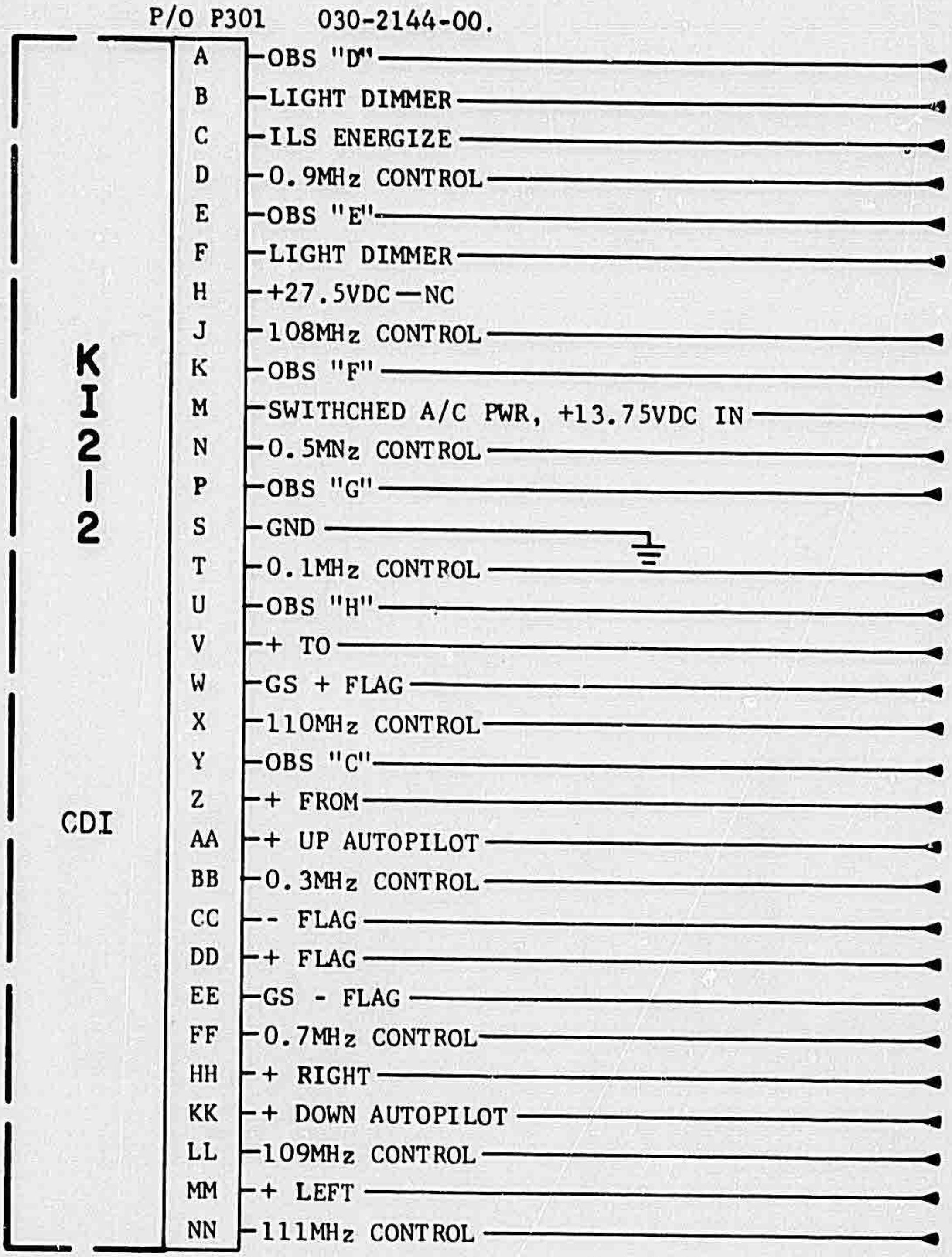
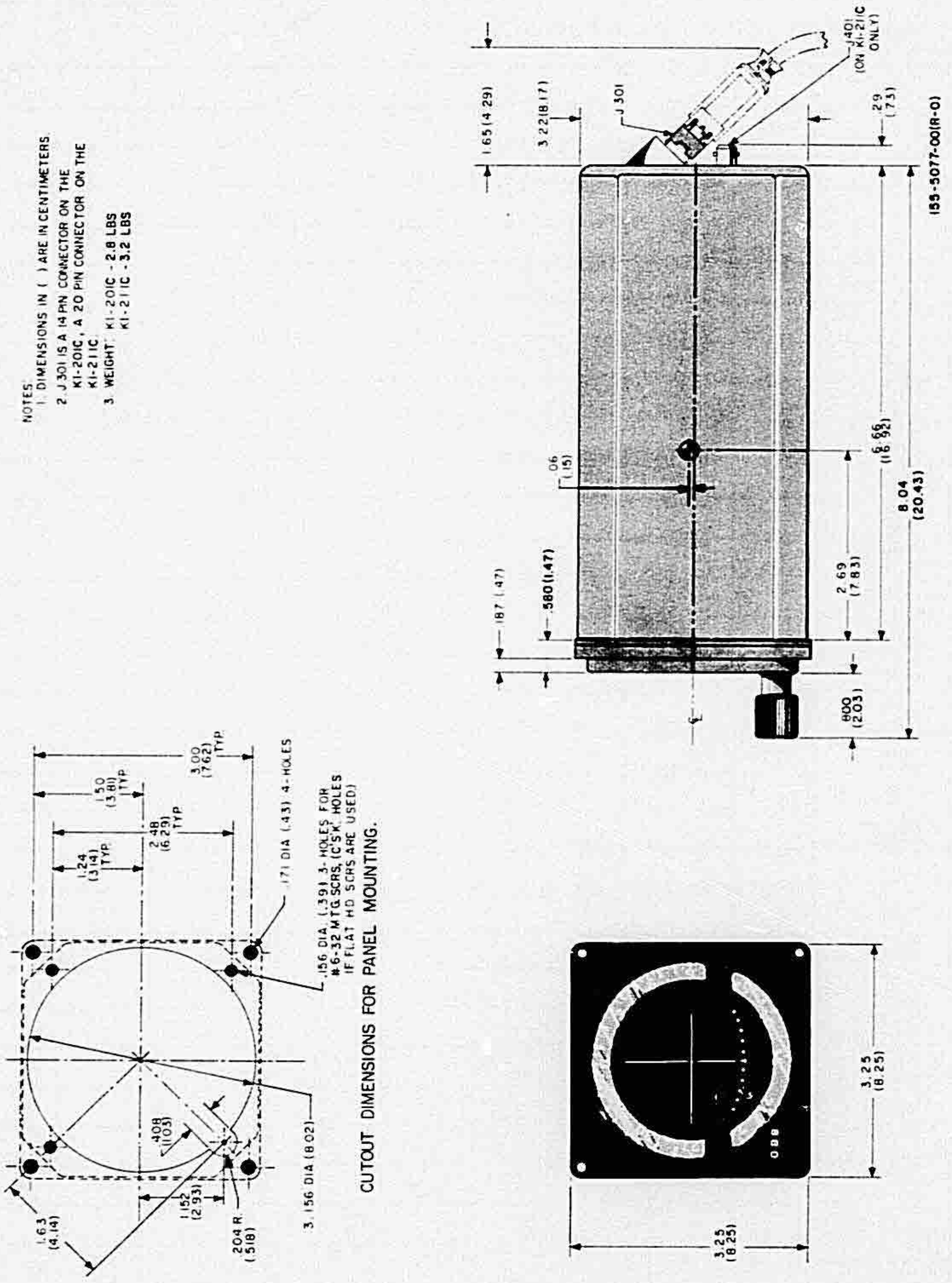
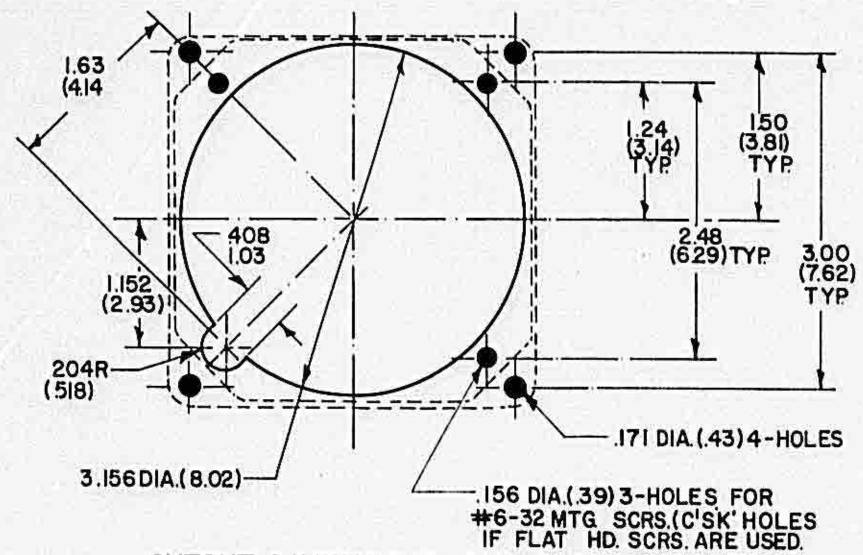


FIGURE 2-5 KI 212 CONNECTOR PIN FUNCTIONS
(Dwg. No. 696-2805-00 R-1)



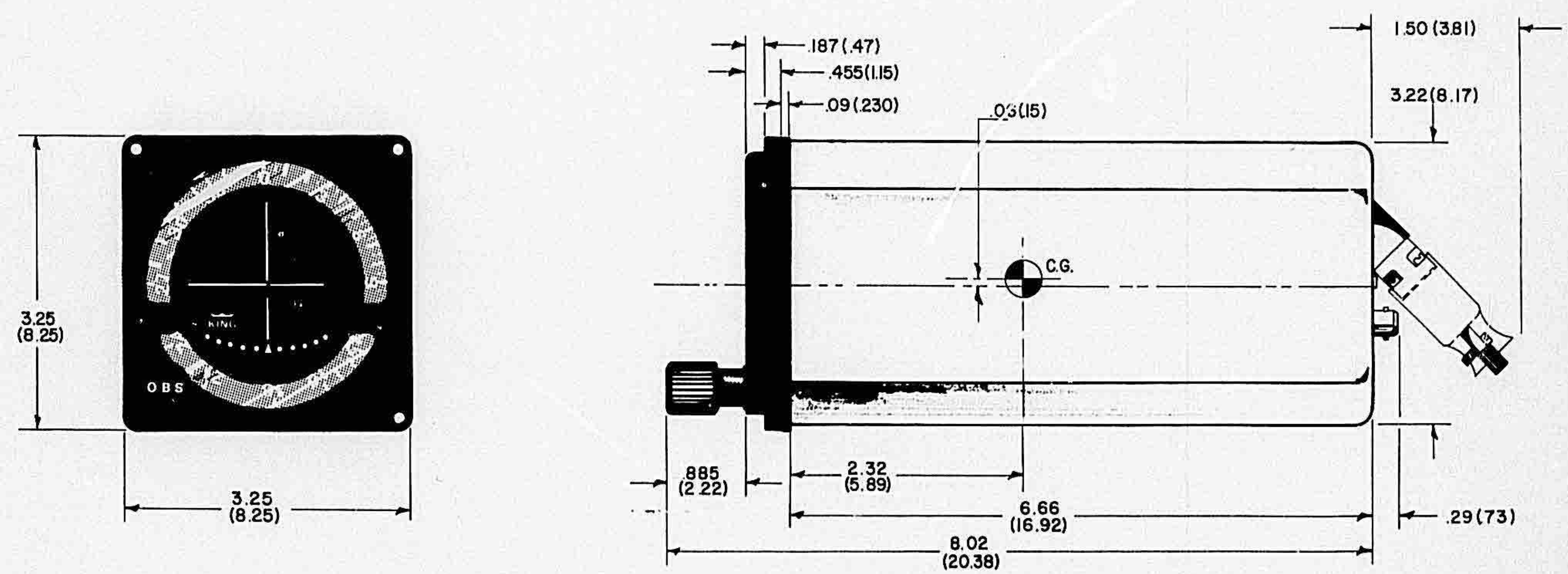
SEE BLOWUP

FIGURE 2-6 KI 201C/KI 211C INSTALLATION DRAWING



CUTOUT DIMENSIONS FOR PANEL MOUNTING

NOTE:
1. DIMENSIONS IN ( ) ARE IN CENTIMETERS.



155-5061-00(R-0)

FIGURE 2-7 KI 212 INSTALLATION DRAWING

SEE BLOWUP

SECTION III

OPERATION

CONTENTS

SECTION III

OPERATION

3.1 GENERAL

All controls required to operate the KI 201C/KI 211C/KI 212 are located on the units front panel and on the front panel of the related NAV/COMM transceivers.

3.2 KI 201C/KI 211C INDICATOR CONTROL FUNCTIONS

3.2.1 OMNI BEARING SELECTOR (OBS)

The OMNI Bearing Selector knob rotates the azimuth card on which the desired course is selected. The course selected serves as a reference for all VOR indications.

3.2.2 VOR/LOC DEVIATION INDICATOR

The VOR/LOC deviation needle indicates the direction and amount of deviation from the selected VOR course or localizer path. The angular deviation is toward the proper flight path in normal operation.

The VOR/LOC warning flag is fully visible when the VOR or LOC signal is unreliable. The VOR TO/FROM flag indicates the direction "to" or "from" the VOR station.

3.2.3 GLIDESLOPE DEVIATION INDICATOR (KI 211C/KI 212)

The glideslope deviation needle indicates the direction and amount of deflection from the glide path. The deflection is toward the direction of flight required to maintain the proper decent path. The glideslope warning flag is visible when the glideslope signal is unreliable or the receiver has malfunctioned.

3.3 KI 201C/KI 211C

3.3.1 VOR OPERATION

Select the desired VOR station frequency with the NAV frequency controls. The NAV receiver volume control can then be adjusted to positively identify the station or listen to FSS reports.

To intercept a selected VOR radial (from the station) and fly outbound, turn the OBS control to set the desired radial under the top indicator index. Maneuver the aircraft to fly the selected radial magnetic heading plus a 45° intercept angle which will provide a sufficient intercept angle. The intercept angle should be reduced as the deviation needle approaches an on course condition (center) to prevent excessive course bracketing.

To determine the bearing and fly "to" a selected VOR station, turn the OBS control unit the "To-From" flag indicates "To" and the deviation needle is centered. Read the "to" bearing under the top indicator index and maneuver the aircraft to approximately fly the magnetic course "to" the station. If the deviation needle moves to the right, the aircraft course must be adjusted 5 or 10 degrees to the right. Similarly, if the deviation needle, goes to the left, the aircraft course must be adjusted to the left. Maintaining a centered deviation needle will provide automatic course compensation for wind drift.

While flying a selected VOR course often times it can be noted that the deviation needle moves erratically about the center or moves a few degrees to one side and eventually returns to center. This action is refered to as VOR scalloping or course bends.

Scalloping is generally caused by irregularities in terrain and metal objects located near the VOR station. Scalloping is more noticable at lower altitudes and in any case should be ignored.

Aircraft position can be easily determined by consecutively selecting two VOR stations and determining the "from" radial. By projecting appropriate radial lines from the VOR station the aircraft location may be identified as the intersection of the two radial lines.

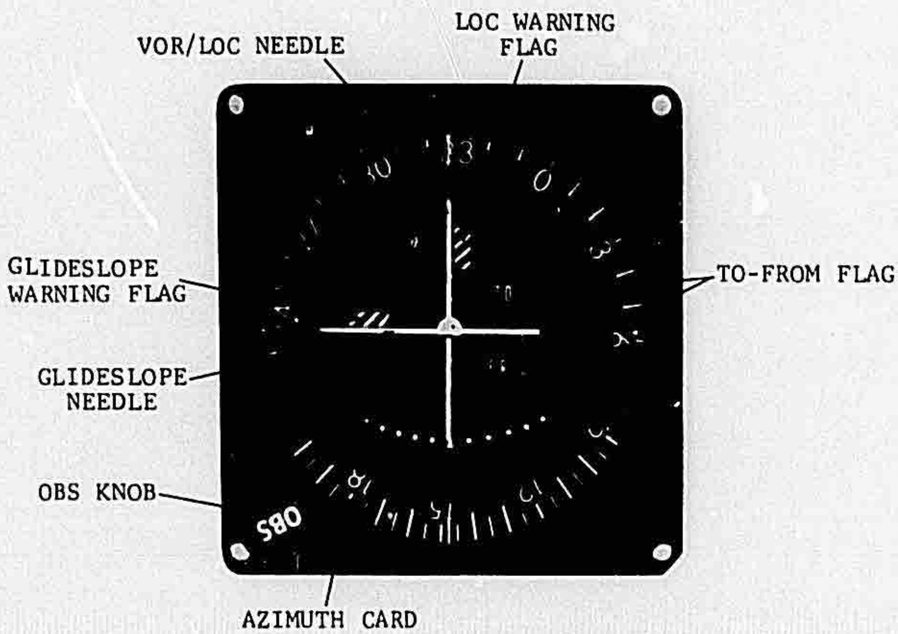


FIGURE 3-1 KI 201C/KI 211C/KI 212 CONTROLS

3.3.2 KI 201C/KI 211C/KI 212 LOCALIZER OPERATION

Localizer circuits are automatically energized when an ILS frequency is selected on the KX 170A/KX 175 NAV receiver. By adjusting the NAV volume level the localizer station can be identified and in some cases ATIS information received. The localizer flag should disappear from view indicating the signal is reliable.

Maneuver the aircraft to fly an on course centered needle. While flying a front course approach or out bound on the back course approach, magnetic heading corrections are made toward the needle deflection. Similarly, while flying the back course approach or outbound on the front course approach, corrections are made away from the needle deflection.

The localizer course width is narrow compared to VOR course width and requires much smaller course corrections to center the deviation needle. When intercepting the localizer course, the aircraft turn into the localizer course should be started when the needle moves off the meter stop.

A helpful quick reference reminder of the localizer course is to set the course on the Omni bearing readout.

3.3.3 KI 211C/KI 212 GLIDESLOPE OPERATION

The glideslope (horizontal) needle provides the pilot vertical steering information during ILS approaches. The glideslope circuitry is energized when the associated localizer frequency is selected on the navigation receiver, observe that the glideslope warning flag is concealed. The glideslope needle deflects toward the direction the pilot must fly to remain on the glideslope. If the glideslope needle deflects upward the aircraft is below the glideslope and must climb to center the needle. If the needle deflects downward the aircraft is above the glide path and must descend to remain on the glide path. When the needle is centered the aircraft is on the glide path.

3.4 POST-INSTALLATION CHECKOUT

An operational performance flight test is recommended after the installation is completed to insure satisfactory performance of the equipment in its normal environment. To check the communications transceiver, maintain an appropriate altitude and contact a ground station facility at a range of at least fifty nautical miles. Contact a ground station close in. Place the squelch knob in the test position and listen for any unusual electrical noise which would reduce the COMM receiver sensitivity by increasing the squelch threshold. If possible, verify the communications capability on both the HIGH and LOW ends of the VHF COMM band.

To check the VOR/ILS System select a VOR frequency within a forth nautical mile range. Listen to the VOR audio and insure that no electrical interference such as magneto noise is present. Check the tone identifier filter operation. Fly inbound or outbound on a selected VOR radial and check for proper LEFT-RIGHT and TO-FROM indications. Check the VOR accuracy.

–NOTE–

At low altitudes VOR ground station scalloping may be present.

Flight test the ILS operation by flying a simulated ILS approach. Check localizer LEFT-RIGHT deflection and, if applicable, glideslope deflection. Check the localizer accuracy in relation to the ILS runway. Check the glideslope accuracy in relation to the published ILS approach altitude.

SECTION IV

THEORY OF OPERATION

CONTENTS

SECTION IV

THEORY OF OPERATION

4.1 GENERAL

The KI 201C and the KI 211C Indicators contain the same VOR/LOC converter. However, the KI 211C Indicator contains additional circuitry to provide glideslope information.

The KI 212 Indicator contains the same glideslope circuitry as the KI 211C and also performs the functions of a VOR/LOC Indicator without the VOR/LOC converter circuitry.

4.2 KI 201C/KI 211C

The composite navigation signal is applied to potentiometer R315. The arm of R315 is DC isolated from the succeeding circuits by coupling capacitors C302, C312, and C321 (See Figure

4.2.1 VARIABLE PHASE CIRCUITRY

The composite navigation signal is coupled through C302 to the base of amplifier Q301. The 30Hz selective amplifier, consisting of Q301, Q302 and Q303, provides three successive DC connected stages. Diode CR307 provides temperature compensation for Q301 and Q302. Feedback around the 30Hz amplifier is accomplished by a bridged "T" network comprised of C308, C309, R317. The bridged "T" network is tuned to 30Hz by selected resistor R317. Thus the input to the amplifier will be 30Hz and all other signals will be greatly attenuated. The amplifier output is coupled through C305 to the primary of T301.

4.2.2 VOR LIMITER/DISCRIMINATOR

The composite navigation signal is coupled to the limiter circuit by C321. The limiter, which consists of Q311 and CR303, effectively removes any amplitude modulation on the navigation signal. Capacitor C321 effectively blocks the 30Hz signal and passes the 9960 FM signal. Diode C303 and the base to emitter junction of Q311 provides the diode limiting action. The limiter output is amplified by Q312. The amplified output from Q312 is applied to a conventional FM discrimination circuit consisting of T302, CR304 and CR305. The discriminator recovers the 30Hz reference phase signal and eliminates 9960 FM signal. The discriminator 30Hz output is the input to emitter follower Q313. The output from Q313 is applied to resolver B301 and also to VOR/LOC switch Q308. The VOR/LOC switch is turned "on" by the 30Hz applied to the base. During the conducting state of Q308, the bases of Q306, Q307, Q309 and Q310 are at

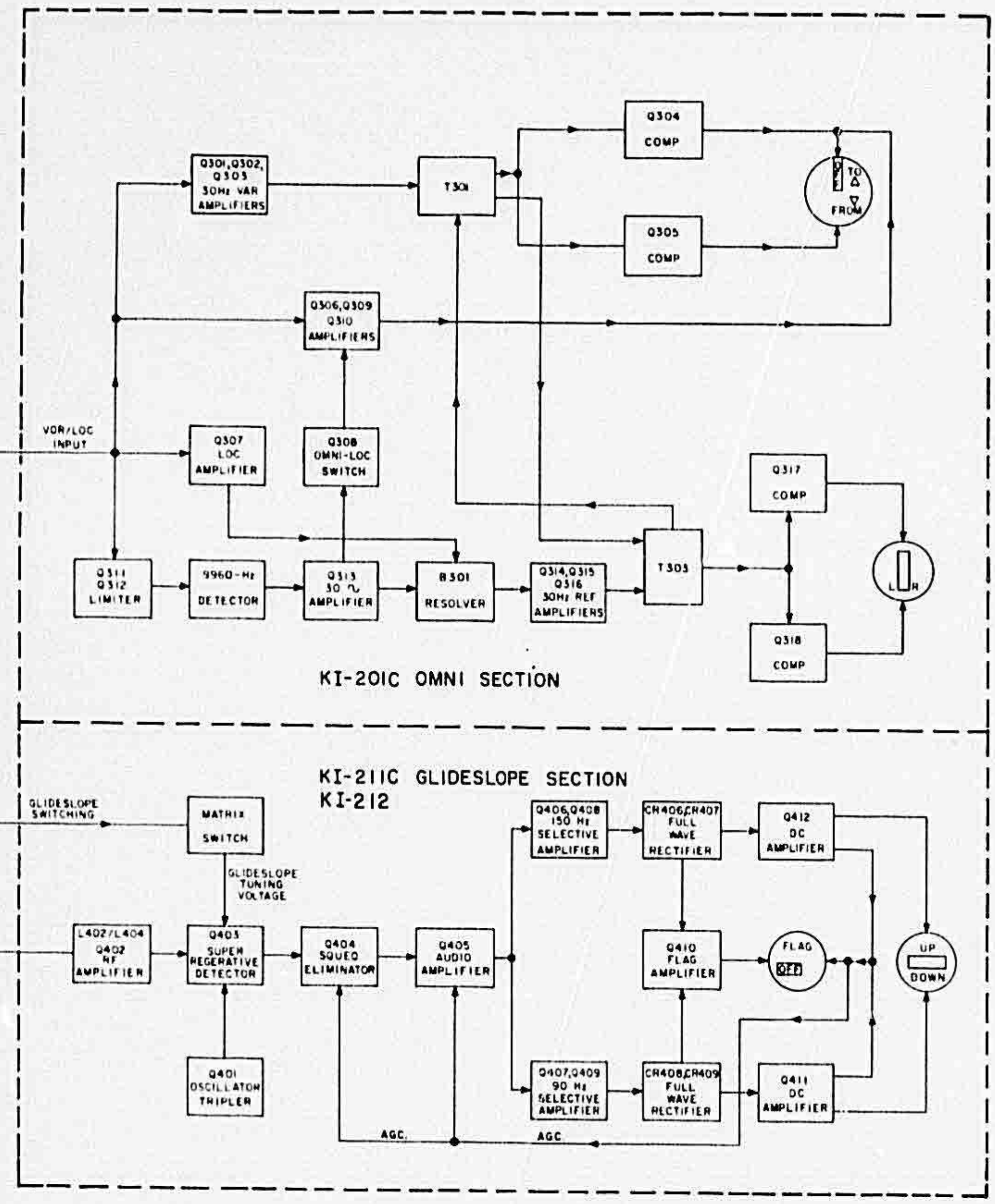


FIGURE 4-1 KI 201C/211C/212 BLOCK DIAGRAM

SEE BLOWUP

ground potential and therefore are not functional. For localizer operation, (paragraph 4.2.6) no 30Hz is applied to the base of Q308, therefore Q306, Q307, Q309 and Q310 are functional.

4.2.3 RESOLVER B301

The resolver input is the output from Q313. The outputs from the two rotor windings of B301 are combined through a phase shifting network comprised of C328, R351 and R352. Potentiometer R351 permits the quadrature adjustment for VOR mode. The resolver output is the input to a three stage D-C coupled, 30Hz, selective amplifier (Reference Phase Amplifier).

4.2.4 REFERENCE PHASE AMPLIFIER

The 30Hz selective amplifier, consisting of Q314, Q315, and Q316, provide three successive D-C coupled amplifier stages. Diode CR308 provides temperature compensation for Q314 and Q315. Feedback around the three stage 30Hz amplifier is provided by a bridged "T" network comprised of C315, C316 and R338. The bridged "T" network is tuned to 30Hz and all other signals will be greatly attenuated.

The selective amplifier output is coupled through C333 to the primary of transformer T303. The output from terminal 3 of T303 is coupled through flag threshold diode CR302 to transformer T301. The variable phase voltage output from T301 is connected to the secondary of T303. The phase of the two input voltages is compared and the resultant voltage is amplified by comparators Q317 and Q318. The D-C output from the comparators controls VOR/LOC indicator I302. If the phase inputs to T303 are exactly 90° or 270° out of phase, there is no output from Q317 and Q318 and the VOR/LOC needle is centered. When the phase inputs to T303 are exactly in phase or 180° out of phase the output from Q317 and Q318 is maximum and the needle is deflected to a maximum. Thus any variation of phase change between the two maximums will deflection the VOR/LOC needle proportionally.

To illustrate the operation, suppose the aircraft is heading due north from a VOR station. The reference and variable phase signals reaching the aircraft are in phase. The 0° radial of the KI 201C/211C course card is beneath the course index, giving a 90° phase difference into the comparator and a zero output from the comparator. The VOR/LOC needle is centered. If the aircraft deviates to the 359° radial, the signals reaching the aircraft are 359° (1°) out of phase. Since the phase shift in the resolver circuit is the same as for the 0° radial, the inputs to the comparator are 91° out of phase. An output from the comparator results, and the VOR needle deviates to the right. If the aircraft deviates to the 2° radial, the reference signal requires a 90° phase shift to center the needle. It receives only a 90° shift in the circuit so the signals into the comparator are 88° out of phase. An output results, causing the needle to deviate to the left. When the aircraft is heading south from a station, the course card would normally be set so the 180° radial is beneath the course index. The resolver phase shift would then be 270°. If the aircraft drifted off course, the phase shift required to put the inputs to the comparator 90° out of phase would be less than, or greater than, 270° depending on direction of drift. An output from the phase comparator and a VOR/LOC needle deviation results.

4.2.5 VOR/LOC WARNING AND TO-FROM FLAG CIRCUITRY

The output from T301 is the input to comparators Q304 and Q305. The phase relationship between the variable 30Hz and the reference 30Hz is rectified by comparators Q304 and Q305. The output from the comparator controls the TO-FROM flag. The comparator output also controls the warning (OFF) flag which utilizes the same meter movement as the TO-FROM flag. Resistor R341, R339 and capacitors C307 and C317 phase shifts the reference phase input to T301, 90°. If the VOR needle is centered, the reference phase signal and variable phase signal entering the TO/FROM phase comparator will be either in phase or 180° out of phase. The TO/FROM phase comparator has a dc output of proper polarity to pull the "TO" indication into view when the signals are in phase, while the "FROM" indication is in view when the signals are 180° out of phase. If the signals into the comparator are not in phase or 180° out of phase, the output will be less than maximum. The output decreases to zero at 90° or 270° phase difference and the TO/FROM window in blank. The relative phase of the two signals is dependent upon the direction of the aircraft from the station with respect to the direction set beneath the course index. When a heading of the direction given beneath the course index would direct the aircraft toward the station, a "TO" indication is given. When the heading of the direction given beneath the course index would direct the aircraft away from the station, a "FROM" indication is given. Only the direction of the aircraft from the station affects the indicator, not the heading of the aircraft with respect to the station.

4.2.6 LOCALIZER CIRCUITRY

The composite navigation signal is coupled through C312 to the base of amplifier Q307. The output from Q307 is coupled through the secondary winding of resolver B301 to a three stage dc connected boradband amplifier consisting of Q314, Q315 and Q316. Since diode CR308 is forward biased, limiter Q311 is disabled and therefore VOR/LOC switch Q308 is biased off (paragraph 4.2.1). Since Q306, Q309 and Q310 are biased "on" through R333 and Q308 is biased "off" due to the absence of a 30Hz output from Q313, the converter is in the localizer mode. Amplifier Q309 eliminates the 30Hz notch filter, consisting of C315, C316 and R338. When the filter if disconnected from the base of Q314 the selective amplifier becomes broadband. Since the amplifier is now broadband, the localizer signals (90 and 150Hz) are processed in the same manner as the VOR signal (paragraph 4.2.3). The localizer signals now control the localizer needle deflection. Transistor Q310 effectively grounds one side of the meter. This assures that the output signals from the comparator provides a "to" indication when operating in the localizer mode. Diode CR302 provides a stand-off voltage such that the alarm flag is visible when the 90 and/or 150Hz modulation signal is unreliable. Amplifier Q306 effectively disconnects the 30Hz notch filter from the base of Q301 to broadband the amplifier. The bridged "T" network is tuned to 120Hz by potentiometer R321. The bridged "T" network has the characteristic of phase shifting the signals that are coupled through the network. The frequencies below resonance (90Hz) are shifted approximately 90° lagging. Thus, the composite localizer signal is amplified by the selective amplifier, the 90Hz and 150Hz components are phase shifted (separated) permitting use of the same comparator circuit as employed in the VOR mode. The localizer signals are now compared in the same manner as the VOR signals. The resultant output from T301 and T303 control the warning and TO-FROM flags and the LEFT-RIGHT deviation of the VOR/LOC needle, respectively.

4.3 KI 211C/KI 212 GLIDESLOPE OPERATION

4.3.1 GENERAL

The glideslope receiver contained in the KI 211C/KI 212 is a "superregenerative" receiver. A superregenerative receiver uses a detector circuit that oscillates continuously at the received frequency. This oscillation is broken up or "quenched" at a frequency slightly above the upper audiability limit of the human ear, or about 15KHz. This is called the squeg frequency or rate, and is established by a separate tank circuit. This produces a third frequency, which could be called an "IF" frequency. The advantages are extreme sensitivity, simplicity and a minimum number of parts are required.

4.3.2 RF AMPLIFIER

The glideslope signal is coupled through a single section tunable LC filter (L402-C308) to the emitter of common base rf amplifier Q402. The output from Q402 is coupled through a second single section tunable LC filter (L404, C409) to the emitter of superregenerative detector Q403.

4.3.3 OSCILLATOR/TRIPLER

Oscillator Q401 generates a 96.025MHz crystal controlled frequency. The oscillator output frequency is coupled to a tank circuit consisting of C413 and L407. The tank circuit is tuned by C413 to triple the oscillator output frequency. The tripler output (228.075MHz) is capacitively coupled to the base of Q403.

4.3.4 SUPER-REGENERATIVE DETECTOR

The superregenerative detector mixes the two input signals to provide an I-F output frequency. The emitter-base junction provides the mixing and the base-collector provides amplification. The detector produces a "squeg" frequency of approximately 15KHz. The output frequency of Q403 is variable from 41.225MHz to 46.925MHz in 20 increments covering the glideslope channels. The superregenerative detector output I-F frequency is tuned to the desired frequency by varactor CR403. The varactor is tuned by a voltage from the glideslope tuning matrix. (See paragraph(4.3.4) Diode CR404 provides temperature compensation for the base circuit of Q403. Diode CR405 provides temperature compensation for varactor CR403. The superregenerative output is capatively coupled to the base of detector Q404.

4.3.5 GLIDESLOPE TUNING MATRIX

The glideslope tuning matrix which provides the D-C voltage for tuning varactor diode CR403 consists of twenty resistors and twenty switching transistors.

The wafer switch S107 (in the KX 170) provides a ground for the emitter of the transistors, while S106 (in the KX 170) provides the base bias. The collector of each transistor is connected to a precision resistor which, when the particular transistor is on, will form a voltage divider network with R409 in the KI 211C.

When a glideslope frequency is selected, for instance 110.3MHz, the MHz wafer applies a ground to the emitters of Q911-915. The base bias thru S106, the KHz wafer, is applied to Q902, Q907, Q912 and Q917. This would cause only Q912 to turn "ON", connecting R912 to ground thru the transistor. The 46.4KΩ resistor is connected thru L406 in the KI 211C to R409, providing the proper voltage to tune the varactor diode CR403.

4.3.6 DETECTOR

Detector Q404 effectively eliminates the squegging signal and detects the desired audio. The squeg signal is eliminated by the RC time constant. The audio output, which is AGC controlled, from Q404 is the input to audio amplifier Q405.

4.3.7 AUDIO AMPLIFIER

The input to audio amplifier Q405 is the detected audio output (90Hz and 150Hz) from Q404. The amplified output from Q405 which is also AGC controlled is coupled through centering potentiometer R432 to the 90Hz and 150Hz selective amplifiers.

4.3.8 90Hz SELECTIVE AMPLIFIER

The 90Hz selective amplifier, consisting of Q407 and Q409 further amplifies the audio input. The 90Hz notch filter consisting of C441 through C443 and R443 through R445, effectively removes the 150Hz component from the composite signal. Thus the output from amplifier Q409 is the 90Hz signal. The amplifier output varies proportional to the amount of 90Hz signal received. The amount of signal received is dependent upon the location of the aircraft with respect to the glide path. This 90Hz signal is the input to a full wave rectifier.

4.3.9 90Hz RECTIFIER

The full wave rectifier, consisting of diodes CR408 and CR409, provides a D-C output from the 90Hz input. The D-C output voltage varies proportional to the 90Hz input. The rectifier output is amplified by D-C amplifier Q411. If the 90Hz input to the rectifier is greater than the 150Hz input the 90Hz rectifier output is greater, thus deflecting the meter movement. The rectifier output is also employed as an AGC voltage to control the gain of Q404 and Q405.

4.3.10 150Hz SELECTIVE AMPLIFIER

The 150Hz selective amplifier, consisting of Q406 and Q408, functions in the same manner as the 90Hz selective amplifier (paragraph 4.3.8) except that the 150Hz signal is used and the 90Hz signal is eliminated.

4.3.11 150Hz RECTIFIER

The 150Hz full wave rectifier consisting of CR406 and CR407, functions in the same manner as the 90Hz rectifier (paragraph 4.3.9), except that the 150Hz signal controls the meter movement.

4.3.12 FLAG AMPLIFIER

The input to flag amplifier Q410 is the D-C output from the 90Hz or 150Hz rectifier. The amplifier output is applied to warning flag meter movement I401. Potentiometer R457 is used to set the amount of current to activate the flag movement.

SECTION V

MAINTENANCE

CONTENTS

KING
KI 201C/KI 211C/KI 212
VOR/LOC-OBS INDICATOR

MAINTENANCE

CONTENTS

SECTION V

MAINTENANCE

5.1 TEST EQUIPMENT REQUIRED

The following test equipment, or equivalent, is required to properly adjust the KI 201C/KI 211C/KI 212. All test equipment must be properly calibrated before adjustments are started.

a) Auxilary Power Supply: Heath Model IP-20

b) Digital Voltmeter: Digitec Model 201 (preferred)

c) VTVM: Heath Model IM-13

d) VOR/LOC Signal Generator: Collins Model 479S-3

e) Glideslope Signal Generator: Boonton Model 232-A (Preferred)

f) Oscilloscope: Tektronix Model 454

5.2 KI 201C/KI 211C/KI 212 ADJUSTMENTS

5.2.1 KI 201C/KI 211C VOR ADJUSTMENTS

Refer to Section 6.2.4 for VOR Adjustments in KI 213/214 Manual

d) Connect an oscilloscope or ACVTVM (1. 5 volt scale) to TP302, Figure 5-1.

e) Set the tone localizer to the Cal 90Hz position. Note the indication displayed by the oscilloscope or VTVM.

f) Set the tone localizer to the Cal 150Hz position. Note the indication displayed by the oscilloscope or VTVM.

g) Adjust R321, Figure 5-1 to obtain an equal output in steps e and f.

h) Apply a standard localizer centering signal to the converter.

i) Adjust localizer centering control R323, Figure 5-1 to center the VOR/LOC deviation needle.

j) Check steps, e, f, and g.

k) Set tone loc for 4db, 150Hz and select R331 for needle deflection to fourth Dot.

l) Repeat steps h and i.

5.2.2 KI 201C/211C LOC ADJUSTMENTS

Refer to Section 6. 2. 4 for LOC Adjustments in KI 213/214 Manual

h) Adjust R363 (reciprocal potentionmeter) Figure 5-1, and R316 (zero potentiometer) for zero error on zero (0) degrees heading of the KI 201C/KI 211C.

—NOTE—

Shift the VOR generator omni track from zero (0) to 180 degrees. If the error falls in the same area between zero (0) and 180 degrees, adjust R363. If the error shifts from one side to the other between zero (0) and 180 degrees, adjust R316.

i) Check course sensitivity for 20 degrees ± 1 degree.

j) Repeat steps b through j for proper alignment.

k) Change the VOR generator and KI 201C/211C to a 90 degree heading.

l) Adjust R351, Figure 5-1 to center the VOR/LOC needle.

m) Check reciprocal of 270 degrees to ± 2 degrees. If more than ± 2 degrees, adjust R351 for a balance between 90 and 270 degrees.

n) Repeat steps m and n for proper alignment.

5.2.3 KI 211C/KI 212 GLIDESLOPE ADJUSTMENTS

—NOTE—

KI 211C - 2 Service Bulletin installation is recommended prior to alignment.

a) Channel the NAV receiver to 109.3MHz (GS channel 332.0MHz). Connect the VTVM between chassis ground and the junction of R409 and C417, Figure 5-1. Adjust R410, Figure 5-1, to obtain a 3.2 to 3.7 volts DC indication on the VTVM.

b) Adjust C418, Figure 5-1, to the maximum clockwise (CW) position, then counter-clockwise (CCW) one-fourth (1.4) turn.

c) Connect the 232-A output to the KI 211C/KI 212 antenna jack. Set the glideslope signal generator to 332.0MHz. Set the 232-A output level to insure needle and flag deflection.

d) Connect the VTVM, (set to the +DC scale) to TP403, Figure 5-1. Adjust the 232-A output, starting at 20μv minimum, to obtain a 0.6 to 0.8 volt indication of the VTVM. If a 0.6 volt indication is not obtained, adjust the 232-A output until a maximum indication is obtained. This maximum indication may occur at 20μv or 10,000μv. The lowest possible input should be used.

e) Sequentially adjust T401, C408, C409 and C413, Figure 5-1, to obtain a maximum indication on the VTVM.

-NOTE-

It is important to decrease the 232-A output during adjustments to keep the voltage at TP403 between 0.6 and 0.8 volts.

f) Set the 232-A output to 20μv and observe that a 0.6 to 0.3 volt indication is displayed by the VTVM.

g) Adjust R457, Figure 5-1, until the alarm flag is just out of view.

h) Set the 232-A signal generator output to 700μv and tone ratio to the 0db position. Adjust R432, Figure 5-1 to center the KI 211C/KI 212 glideslope needle.

i) Set the 232-A signal generator tone ratio to 2.0db UP (150Hz). Adjust R465, Figure 5-1 for upward needle deflection, centered between the first and second dots.

j) Set the 232-A signal generator tone ratio to 2.0db DOWN (90Hz). Observe that the KI 211C/KI 212 provides equal deflection.

k) Set the 232-A signal generator output to 20,000μv and the tone ratio to CAL 150Hz. Observe that the OFF warning flag is visible and the KI 211C/KI 212 glideslope needle is deflected to the maximum up position.

l) Set the 232-A signal generator tone ratio to CAL 90Hz and observe that the OFF warning flag is visible and the glideslope needle is deflected to the maximum "down" position.

-NOTE-

If the flag is not visible, R457 is adjusted incorrectly, repeat steps g through m.

m) Set the 232-A signal generator output to 20μv at 335.0MHz. Channel the NAV receiver to 110.3MHz.

n) Adjust C418 to obtain a maximum voltage (AGC) at TP403.

o) Set the 232-A signal generator to 329.3MHz. Channel the NAV receiver to 108.9MHz.

p) Adjust T401, Figure 5-1, to obtain a maximum voltage (AGC) at TP403.

q) Perform steps n through q until a peak AGC voltage is obtained.

r) Set the NAV receiver to 109.3MHz. Set the 232-A signal generator output to 20μv at 332.0MHz. Observe that the warning flag is concealed; if necessary, repeat steps g through m.

s) Check the remaining frequencies for proper tracking. The sensitivity on any channel should be better than 20μv, full flag.

5.3 GENERAL

Maintenance information contained in this section includes inspection procedures, cleaning, semiconductor replacement, and troubleshooting procedures.

5.4 VISUAL INSPECTION

The following visual inspection procedures should be performed during the course of maintenance operations.

a. Inspect all wiring for frayed, loose, or burned wires.

b. Check cable connections, making sure the plugs are free from corrosion and are properly secured.

c. Check all components for evidence of overheating, breakage, vibration, corrosion, or loose connections.

d. Check all capacitors and transformers for leaks, bulges, or loose connections.

e. Inspect relay and switch contacts for pits or arcing.

SEE BLOWUP

signal generator output to 20μv at 335.0MHz. Channel the
: to 110.3MHz.

o obtain a maximum voltage (AGC) at TP403.

signal generator to 329.3MHz. Channel the NAV receiver

Figure 5-1, to obtain a maximum voltage (AGC) at TP403.

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and switch contacts for pits or arcing.

SEE BLOWUP

KING
KI 201C/KI 211C/KI 212
VOR/LOC-OBS INDICATOR

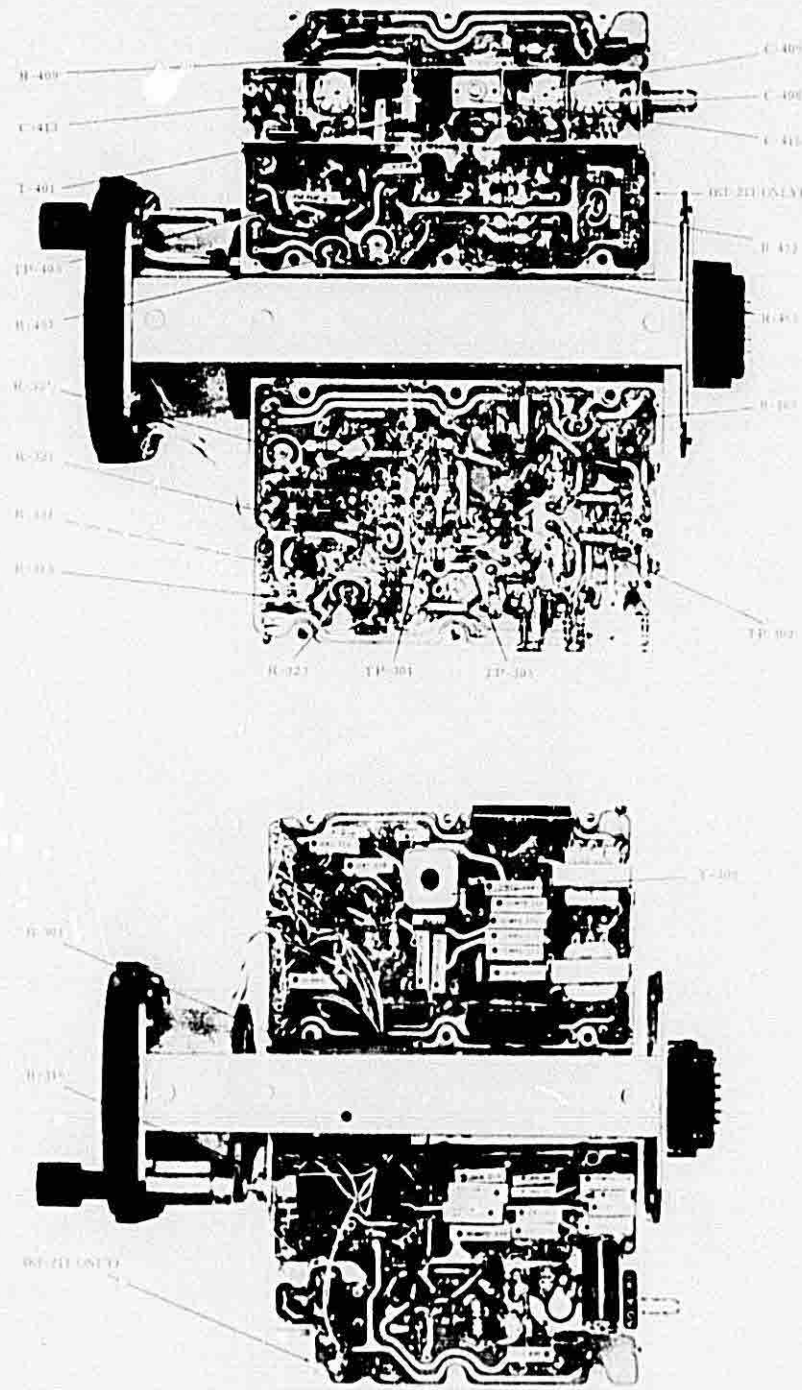


FIGURE 5-1 KI 201C/211C/212
TEST POINT AND ADJUSTMENT LOCATIONS

KING
KI 201C/KI 211C/KI 212
VOR/LOC-OBS INDICATOR

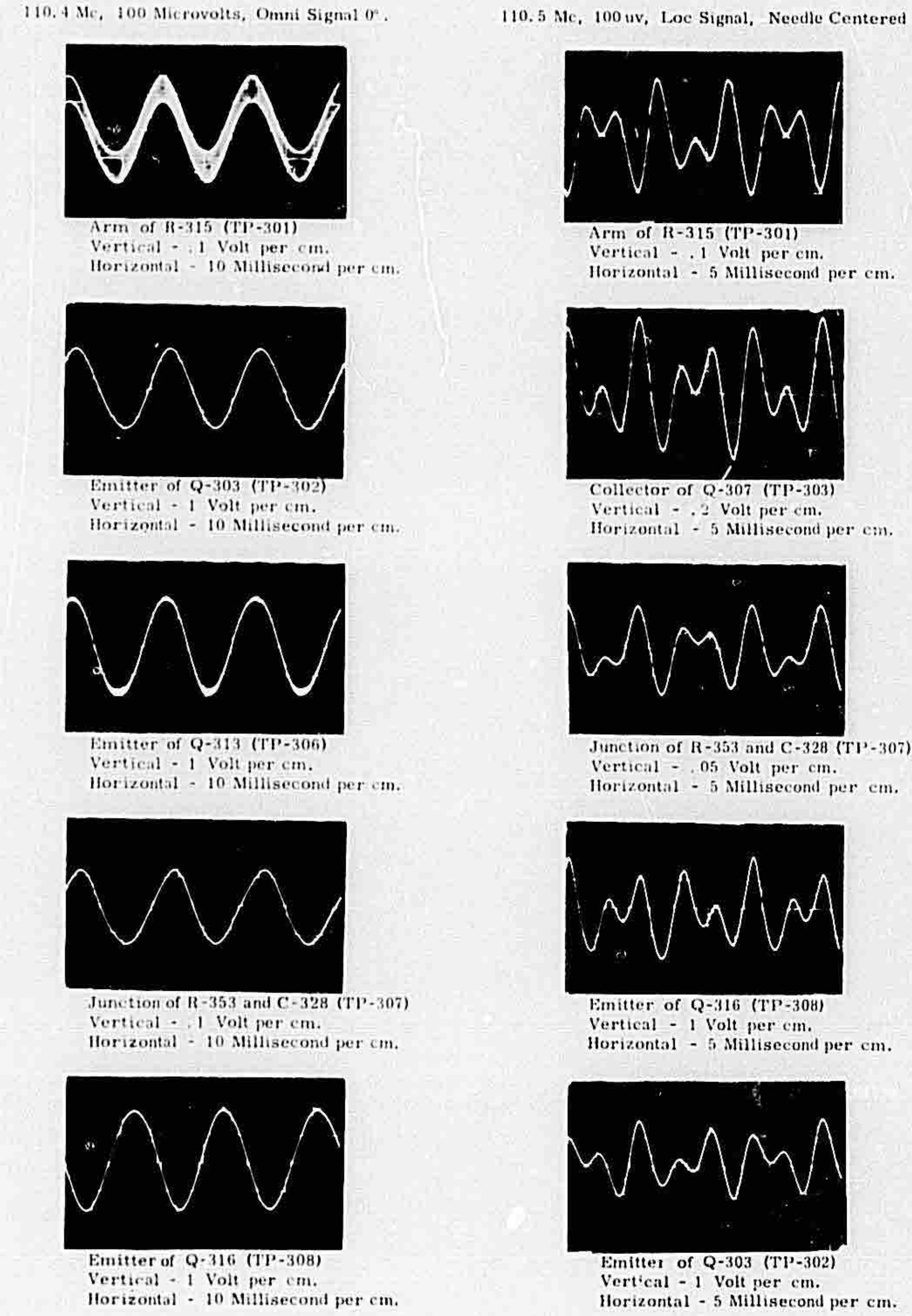


FIGURE 5-2 KI 201C/211C VOR/LOC WAVESHAPES

SEE BLOWUP

5.5 CLEANING

a. Using a clean lint-free cloth lightly moistened with an approved cleaning solvent remove the foreigh matter from the equipment case and unit front panels. Wipe dry using a clean, dry, lint-free cloth.

b. Using a hand controlled dry air jet (not more than 15 psi), blow the dust from inaccessible areas. Care should be taken to prevent damage by the air blast.

c. Clean electrical contacts with a burnishing tool or cloth lightly moistened with an approval contact cleaner.

d. Clean the receptacles and plugs with a hand controlled dry air jet (not more than 25-psi) and a clean lint-free cloth lightly moistened with an approved cleaning solvent. Wipe dry with a clean, dry, lint-free cloth.

5.6 SEMICONDUCTOR REPLACEMENT

It is recommended that semiconductors not be tested or replaced until unsatisfactory performance is observed.

5.7 SEMICONDUCTOR MAINTENANCE

5.7.1 GENERAL

Due to the wide utilization of semiconductors in this electronic equipment, somewhat different techniques are necessary in maintenance procedures. In solid state circuits the impedance and resistances encountered are of much lower values than those encountered in vacuum-tube circuits. Therefore, a few ohms discrepancy can greatly affect the performance of the equipment. Also, coupling and filter capacitors are of larger values and usually are of the tantalum type. Hence, when measuring resistances, an instrument very accurate in the low resistance ranges must be used, and when measuring values of capacitors, an instrument accurate in the high ranges must be employed. Capacitor polarity must be observed when measuring resistance.

5.7.2 SEMICONDUCTOR TEST EQUIPMENT

Damage to semiconductors by test equipment is usually the result of accidentally applying too much current or voltage to the elements. Common causes of damage from test equipment are discussed in the following paragraphs.

5.7.2.1 Transformerless Power Supplies

Test equipment with transformerless power supplies is one source of high current. However, this type of test equipment can be used by employing an isolation transformer in the AC power line.

5.7.2.2 Line Filter.

It is still possible to damage semiconductors from line current, even through the test equipment has a power transformer in the power supply, if the test equipment is provided with a line filter. This filter may function as a voltage divider and apply half voltage to the semiconductor. To eliminate this condition, connect a ground wire from the chassi of the equipment under test before making any other connections.

5.7.2.3 Low-Sensitivity Multimeters.

Another cause of semiconductor damage is a multimeter that required excessive current to provide adequate indicator. Multimeters with sensitivities of less than 20,000 ohms-per-volt should not be used on semiconductors. A multimeter with low sensitivity will craw too much current through many types of small semiconductors, causing damage. When in doubt as to the amount of current supplies by a multimeter, check the multimeter circuits on all scales with an external, low-resistance multimeter connected in series with the multimeter leads. If more than one milliampere is drawn by the multimeter on any range, this range cannot be safely used on small semi-conductors.

5.7.2.4 Power Supply

When using a battery-type power supply, always use fresh batteries of the proper value. Make certain that the polarity of the power supply is correct for the equipment under test. Do not use power supplies having poor voltage regulation.

5.7.3 SEMICONDUCTOR VOLTAGE AND RESISTANCE MEASUREMENTS

When measuring voltage or resistances in circuits containing semiconductor devices, remember that these components are polarity and voltage conscious. Since the values of capacitors used in semiconductor circuits are usually large (especially in audio, servo, or power circuits) time is required to charge these capacitors when an ohmeter is connected to a circuit in which they appear. Thus, any reading obtained is subjected to error if sufficient time is not allowed for the capacitor fo fully charge. When in doubt if may be best in some cases to isolate the components in question and measure them individually.

5.7.4 TESTING OF TRANSISTORS

A transistor checker should be used to properly evaluate transistors. If a transistor tester is not abailable, a good multimeter may be used. Make sure that the multimeter meets the requirements outlined in preceeding paragraph 5.7.2.3. Always check the value of the bias resistors in series with the various transistor elements. A transistor is very sensitive to improper bias boltage therefore, a short or open circuit in the bias resistance may damage the transistor. For this reason, do not troubleshoot by shorting the various points in the circuit to ground and listening for clicks.

–CAUTION–

If a transistor is found to be defective, make certain that the circuit is in good operating order before installing a replacement transistor. If a short circuit exists in the circuit, putting in another transistor will most likely result in burning out the new component. Do not depend upon fuses to protect transistors.

5.7.4.1 PNP Transistor.

To check a PNP transistor, connect the positive lead of the multimeter to the base of the transistor and the negative lead to the mitter. Generally, a resistance reading of 50,000 ohms or more should be obtained. Reconnect the multimeter with the negative lead to the base. With the positive lead connected to the emitter a resistance value of 500 ohms or less should be obtained. When the positive lead is connected to the collector a value of 500 ohms or less should be likewise obtained.

5.7.4.2 NPN Transistor.

Similar tests made on an NPN transistor should produce the following results: With the negative lead of the multimeter connected to the base of the transistor the value of resistance between the base and the collector should be high. With the positive lead of the multimeter connected to the base, the value of resistance between the base and the collector should be low. If these results are not obtained, the transistor is probably defective and should be replaced.

5.7.5 REPLACING SEMICONDUCTORS

Never remove or replace a plug-in semiconductor with the supply voltage turned on. Transients thus produced may damage the semiconductor or others remaining in the circuit. If a semiconductor is to be evaluated in an external test circuit, be sure that no more voltage is applied to the semiconductor than normally is used in the circuit from which it came.

Use only a low heat soldering iron when installing or removing soldered-in-parts. Use care in the handling of printed circuit boards. When removing a part from a printed circuit board, first unbend the crimped leads. Use only the necessary amount of heat to unsolder the part. Clear excess solder from mounting eyelets, making sure that mounting holes are clear before installing new parts. When removing a transformer or other part having a multiple number of leads, straighten (unbend) all leads first and then heat leads one at a time, working around the part, until the part can be gently "rocked out".

When installing or removing a soldered-in semiconductor grasp the lead to which heat is applied between the solder joint and the semiconductor with long-nosed pliers. This will dissipate some of the heat that would otherwise conduct into the semiconductor from the soldering iron. Make certain that all wires soldered to semiconductor terminals have first been properly tinned so that the necessary connection can be made quickly. Excessive heat will permanently damage a semiconductor.

When soldering is required to remove a component from a semiconductor socket, remove the semiconductor to prevent damage to the semiconductor.

In some cases, power transistors are mounted on heat-sinks that are designed to dissipate heat away from them. In some power circuits, the transistor must also be insulated from them. In some power circuits, the transistor must also be insulated from ground. Often, this insulating is accomplished by means of insulating washers made of fiber and mica. When replacing transistors mounted in this manner, be sure that the insulating washers are replaced in proper order. Before installing the mica washers treat them with a film of silicone grease. This treatment helps in the transfer of heat. After the transistor is mounted, and before making any connections, check from the case of the transistor to ground with a multimeter to see that the insulation is effective.

TABLE 5-1 KI 201C/KI 211C/KI 212 INDICATOR TROUBLE CHART

INDICATION	PROBABLE CAUSE	REMEDY
LOC OK. Omni inoperative	10KHz discriminator circuit inoperative. No 30Hz signal at emitter of Q313 to switch unit from LOC to VOR mode.	Check voltage around Q311, Q312, T302, and Q313.

INDICATION	PROBABLE CAUSE	REMEDY
Omni OK. LOC inoperative	One of the two amplifiers weak or dead	Check for open pot R321 and R323. Check voltage and waveform at TP302 and TP308.
Not enough L-R needle deflection	VOR signal from NAV receiver weak	Check alignment per alignment instructions (100μv R-F input to NAV receiver should produce 0.5VRMS composite VOR signal at Pin D of converter). Check for open pot R315.
Flag inoperative in LOC mode. L-R needle and "TO-FROM" OK	Transistor Q310, diode CR302, or resistor R315 defective	Replace defective part
"TO-FROM" inoperative L-R OK	Defective part T301, C306, I301, CR302, R339, C307 or C317	Replace defective part.
Glideslope No reception on any channel.	Oscillator nut functioning. Superregenerative detector inoperative or not properly tuned. Voltage variable capacitor CR403 defective	Check voltage around oscillator circuit given on schematic. Replace crystal. Check voltages around Q403. Replace CR403.
One channel dead	Transistor or precision resistor in matrix circuit defective	Replace transistor or tor. Also check continuity S203 and S211
Flag Alarm inoperative	Open potentiometer R457 or defective transistor Q410	Replace potentiometer or resistor

INDICATION	PROBABLE CAUSE	REMEDY
No deflection of I402 ("up-down" meter)	Open potentiometer R465. Defective meter I402.	Replace defective part.
Needle will not center.	Defective part in 90Hz or 150Hz selective amplifiers	Check voltage and waveforms around amplifiers.

5.8 TROUBLESHOOTING THE KI 201C/KI 211C/KI 212

The KI 201C and KI 211C Indicators contain the same VOR/LOC circuitry. However, the KI 211 Indicator contains additional circuitry to provide glideslope information. Therefore, information pertaining to both the KI 201C and KI 211C (VOR/LOC Troubleshooting) is given in section 5-9 and information pertaining to the KI 211C/KI 212 (Glideslope Troubleshooting) is given in Section 5-10.

5.9 TROUBLESHOOTING THE VOR/LOC CONVERTER

5.9.1 VARIABLE PHASE CIRCUITRY (Figure 5-3)

The Variable Phase circuitry consists of the three stage selective amplifier Q301, Q302, and Q303. Its selectivity is provided by the bridged "T" network consisting of C308, C309, R317 and (depending upon VOR or LOC mode) R316, R318 and R321. Its output is coupled through C305 to the primary of T301.

A. VOR OPERATION

In the VOR mode, transistor switch Q306 is biased off, removing R321 from the circuit. The bridged "T" filter around the amplifier is tuned to 30Hz by R316. The amplifier thus becomes a 30Hz selective amplifier.

5.9.1.1 Troubleshooting Procedure (VOR Operation.)

Using an oscilloscope check TP301 for a VOR input signal. If present, check for 30Hz signal at TP302. If no signal appears at TP302, trace the signal starting at TP301 and working towards TP302. Further aid in isolating the problem area can be obtained from the typical D-C operating voltage levels given in Figure   Check Q306 to insure that it is disabled. Check the bridged "T" circuit by applying a variable frequency audio signal at TP301 and checking TP302 for a peaked output at 30Hz.

B. LOC OPERATION

The operation for the LOC mode is similar to that given for the VOR mode (5.9.1). The exception being that transistor switch Q306 is conducting and R321 is placed in parallel with R316 and R318, tuning the bridged "T" network to approximately 120Hz. The amplifier then becomes a 120Hz selective amplifier.

5.9.1.2 Troubleshooting Procedure (LOC Operation)

The procedure for the LOC mode is similar to that given for the VOR mode (5.9.1.1) with the exception of using a LOC input signal and that the bridged "T" circuit is tuned to approximately 120Hz. Q306 should be conducting (Refer to Figure 5-10 for the typical D-C operating voltage levels).

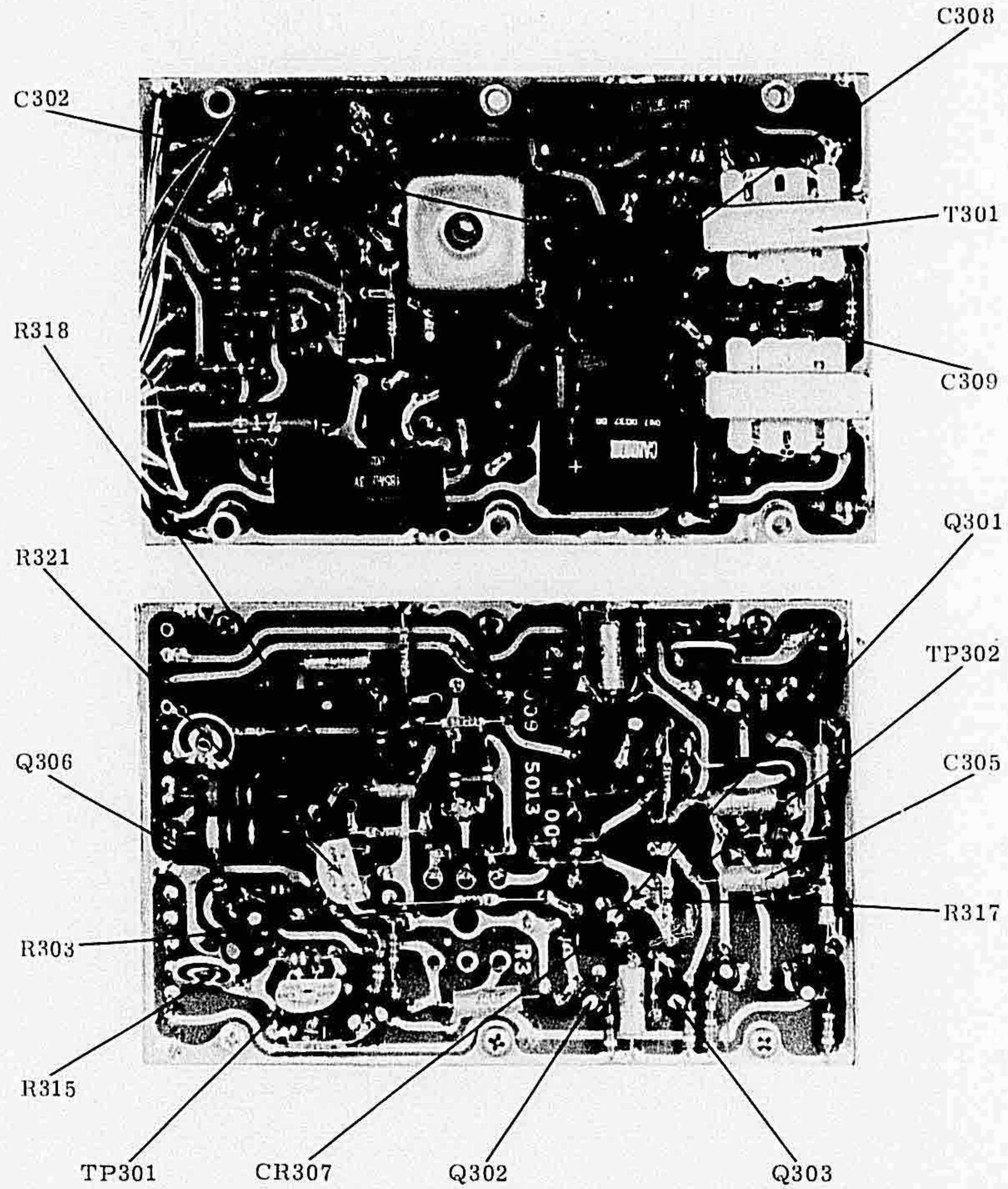
SEE BLOWUP

iilar to that given for the VOR mode
sistor switch Q306 is conducting and
d R318, tuning the bridged "T" net-
plifier then becomes a 120Hz selective

ation)

at given for the VOR mode (5.9.1.1)
l that the bridged "T" circuit is tuned
ing (Refer to Figure 5-10 for the

VUP



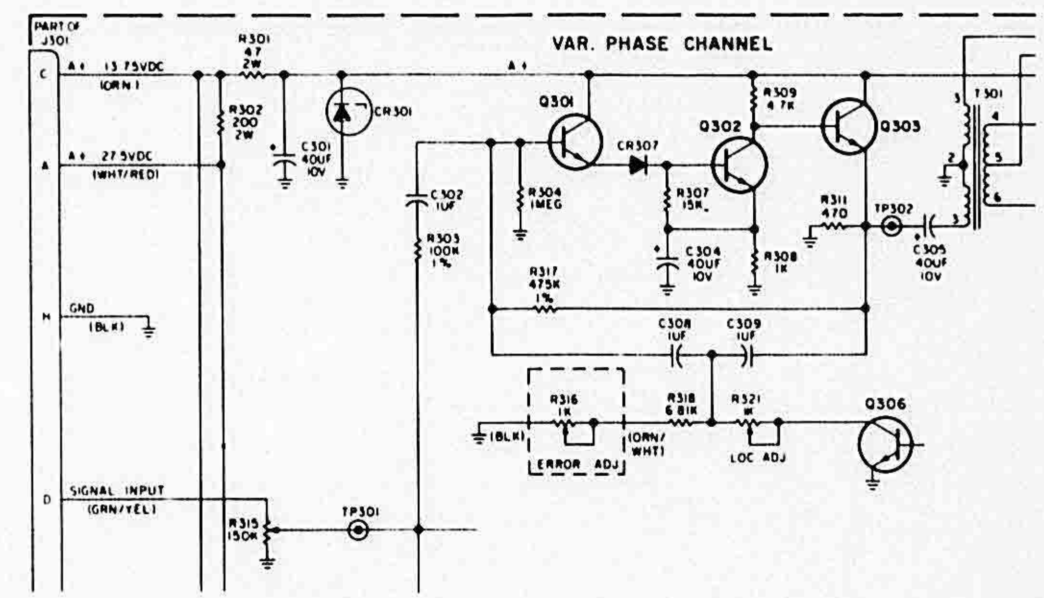


FIGURE 5-3 VARIABLE PHASE CIRCUITRY

SEE BLOWUP

5.9.2 VOR LIMITER/DISCRIMINATOR (Figure 5-4)

The limiter consists of CR303 and Q311. Q312 is an amplifier driving the discriminator transformer T302. Capacitors C322 and C323 allow the transofrmer to be tuned to provide discriminator action at 9960Hz. Diodes CR304 and CR305, resistors R344 and R345, and capacitors C325 and C326 complete the discriminator circuitry. The VOR limiter and discriminator are functional only in the VOR mode. In the LOC (ILS) mode, diode CR308 grounds the base of Q312 thus preventing it from operating.

5.9.2.1 Troubleshooting Procedure

Using an oscilloscope, check TP301 for a VOR input signal. Check the collector of Q311 for an amplitude limited output (square wave 9960FM only). Check Q311 and CR303 for proper limiting action. Check to insure CR308 is not grounding the collector of Q311 in VOR mode. Check the collector of Q312 for amplified 9960 FM. Check TP306 for proper 30Hz demodulated AM signal. If not present check the discriminator transformer T302 for proper alignment (See alignment procedure, Section 5.7). Check discriminator circuit components for proper operation (CR304, CR305, R344, R345, C325 and C326). Check output of emitter follower Q313. If no output is observed, check Q313 and associated circuitry (See Figure 5-10 for typical D-C operating voltage levels).

5.9.3 RESOLVER B301 (Figure 5-4)

The resolver is actively functional only in the VOR mode. The input winding receives its input from the output of Q313. The outputs from the two rotor windings are combined through a phase shifting network consisting of C328, R351 and R352.

5.9.3.1 Troubleshooting Procedure.

Using an ohmmeter, check the three resistor windings for D-C continuity. The following is a chart listing the approximate resistances of the windings, measured with the resolver connected (without removing the leads).

WINDING	RESISTANCE (OHMS)
Green-Black	200
Yellow-Brown	560
Blue-Brown	400
Yellow-Blue	960

Check the phase shift network for proper operation.

5.9.4 VOR/LOC SWITCHING (Figure 5-4)

A. VOR OPERATION

In the VOR mode, a 30Hz output is developed at the emitter of Q313, and is coupled through C327 to the base of Q308. During each positive half cycle of the 30Hz signal Q308 conducts. C314 is therefore shorted to ground 30 times a second. Since the time constant of R333 and C314 is long compared to the 30Hz discharge rate, a net result of approximately zero volts appears across CR314. Since this point controls the bias to transistor Q306, Q307, Q309 and Q310, they will all be non-conducting in the VOR mode.

5.9.4.1 Troubleshooting Procedure (VOR Operation).

After determining that a 30Hz signal is present at the emitter of Q313, a voltage check of transistors Q306, Q307, Q308, and Q310 should provide an indication of proper operation (See Figure 5-10 for typical D-C operating voltage levels.)

B. LOC OPERATION

In the LOC (ILS) mode, the anode of CR308 is grounded disabling the limiter and discriminator circuits. Since the discriminator is disabled and no 30Hz FM signal is present, no output is developed at the emitter of Q313 and switching transistor Q308 remain biased in the off condition. Since Q308 is biased off, C314 is allowed to charge, turning on Q306, Q307, Q309 and Q310.

5.9.4.2 Troubleshooting Procedure (LOC Operation).

A voltage check of transistors Q306, Q307, Q308, Q309 and Q310 should provide an indication of proper operation. Note that Q307 is forward biased in the linear operating region, whereas Q306, Q309 and Q310 are used as switches and are biased into saturation (See Figure 5-10 for typical D-C operating voltage levels).

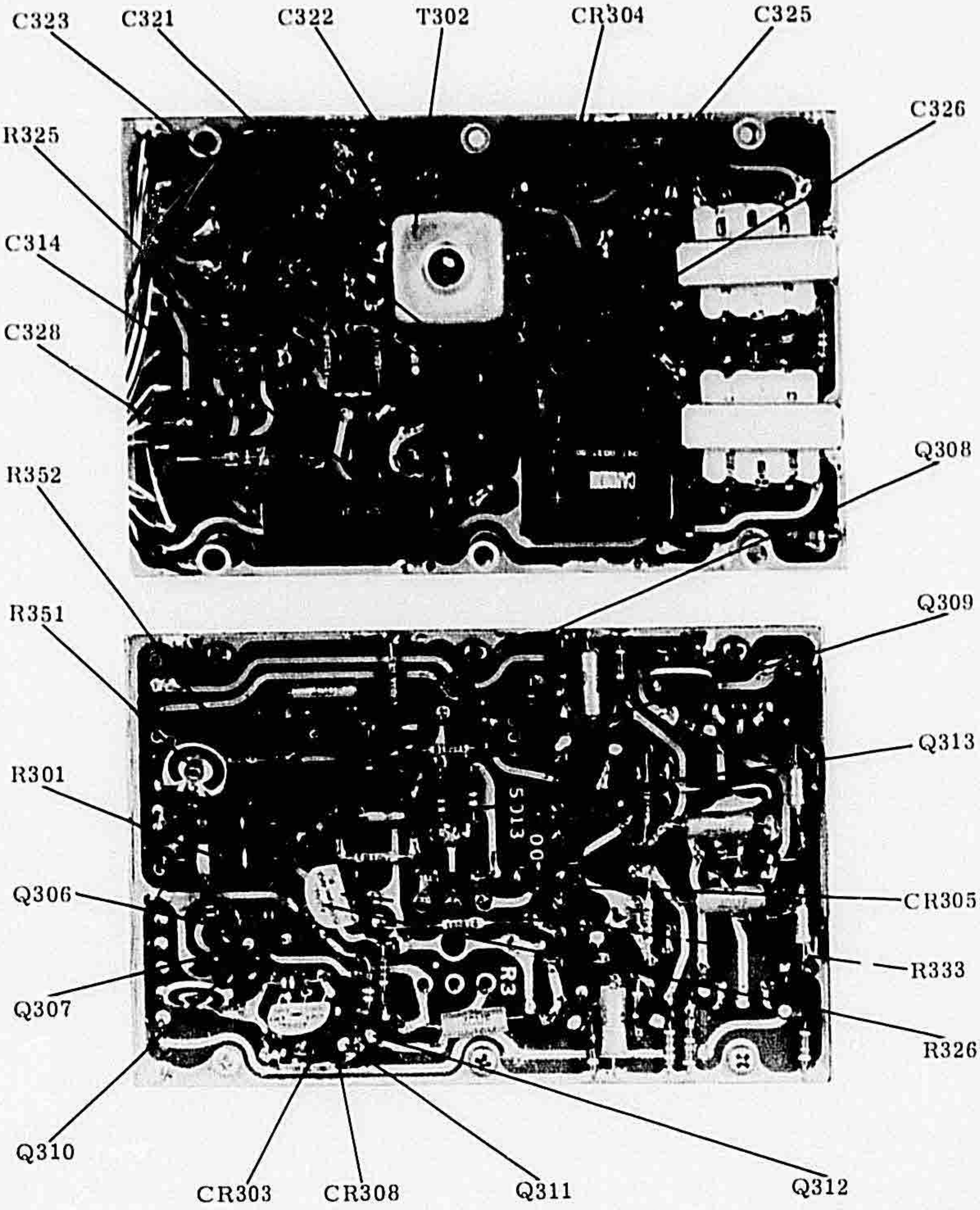
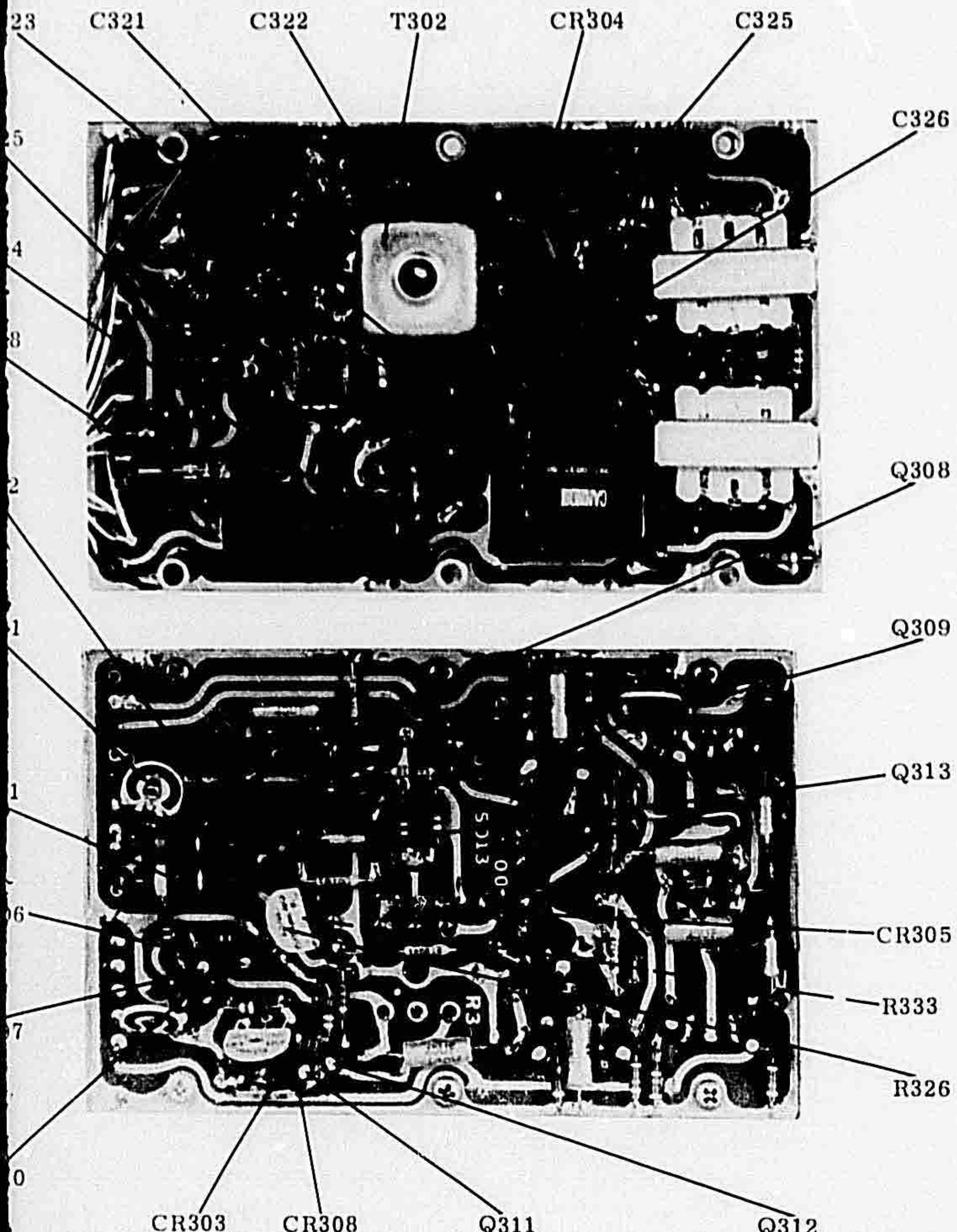


FIGURE 5-4 VOR/LOC SWITCHING

SEE BLOWUP



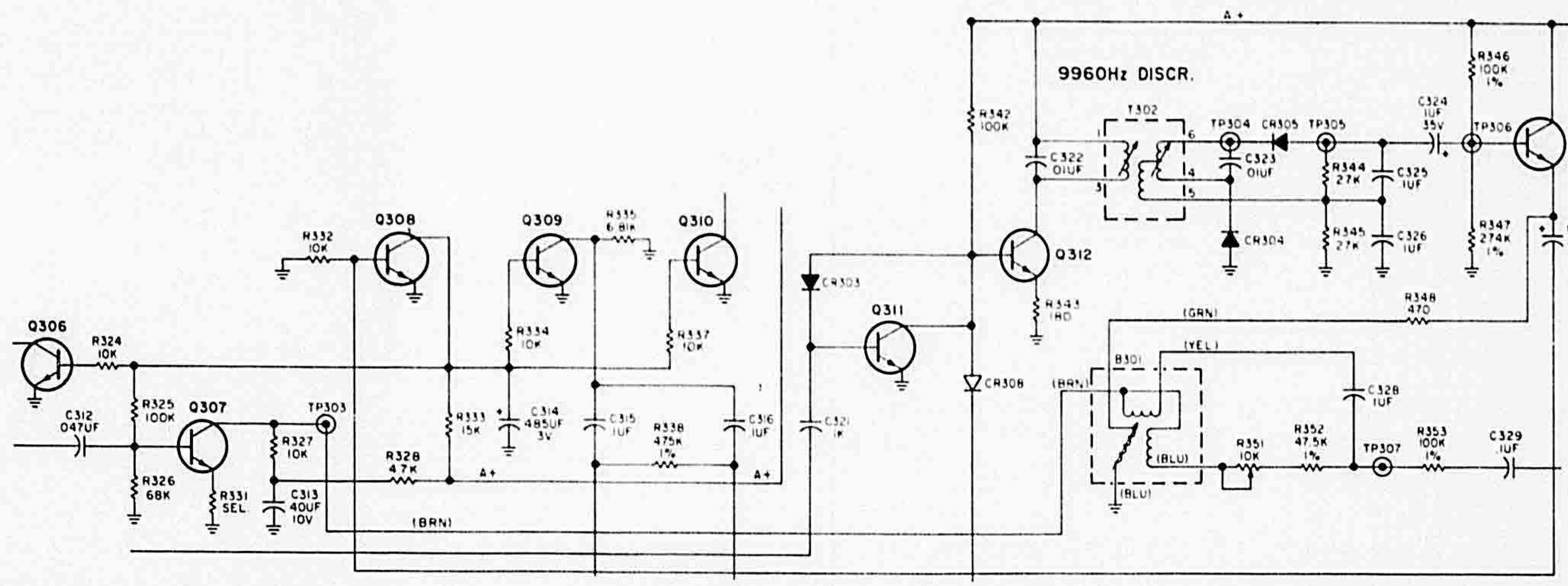


FIGURE 5-4 VOR/LOC SWITCHING

SEE BLOWUP

5.9.5 REFERENCE PHASE AMPLIFIER (Figure 5-5)

The reference phase amplifier consists of three transistors: Q314, Q315 and Q316. Its output is coupled to T303 through capacitor C333. By the use of switching transistor Q309, and the network consisting of R335, R338, C315 and C316, this amplifier becomes a 30Hz selective amplifier with a bridged "T" feed back network when operating in the VOR mode and becomes a broadband amplifier when operating in the LOC (ILS) mode.

A. VOR/LOC OPERATION

In the VOR mode, transistor switch is biased off placing R335 into the circuit which becomes (in conjunction with R338, C315 and C316) a 30Hz bridged "T" network around the amplifier.

5.9.5.1 Troubleshooting Procedure (VOR Operation).

Using an oscilloscope check TP308 for a 30Hz signal at TP308. If no signal appears, trace the signal starting at the base of Q314 and working towards TP308. The typical D-C operating voltage levels (See Figure 5-10 can give further aid in isolating the problem area. Check Q309 to insure that it is disabled. Check the bridged "T" circuit by applying a variable frequency audio signal at TP301 and checking TP 308 for a peaked output of 30Hz.

B. LOC OPERATION

In the LOC mode, the operation is similar to that of the VOR mode. The exception being, that transistor switch Q309 is conducting, therefore shorting across R335. This eliminates the 30Hz bridged "T" network and the amplifier becomes broadbanded.

5.9.5.2 Troubleshooting Procedure (LOC Operation).

The procedure for the LOC mode is similar to that given for the VOR mode with the exception that a LOC signal is used and that the bridged "T" circuit is disabled making the amplifier broadbanded. Q309 should be conducting. (Refer to Figure 5-10 for typical D-C operating voltage levels).

5.9.6 LOCALIZER AMPLIFIER (Figure 5-5)

The Localizer Amplifier Q307 operates only in the localizer mode. It receives its signal from TP301 through phase shift network R322, R323 and C311. Its output is coupled to the input of the Reference Phase Amplifier through the secondary of the resolver B301.

A. VOR OPERATION

The amplifier is disabled in the VOR mode by the switching transistor Q308 which removes the bias voltage from Q307.

5.9.6.1 Troubleshooting Procedure

Check Q307 and Q308 for proper operation by comparing the measured D-C voltages with the typical D-C operating voltages given in Figure 5-10 for VOR mode.

B. LOC (ILS) OPERATION

Q307 operates as an amplifier only in the LOC (ILS) mode. In this mode, Q308 is biased off and Q307 is biased as a linear amplifier by the resistive network R333, R325 and R326.

5.9.6.2 Troubleshooting Procedure

Starting at TP301, track signal through to TP303. Check Q307 and Q308 for proper operation. (See Figure 5-10 for typical D-C operating voltage levels in the LOC mode).

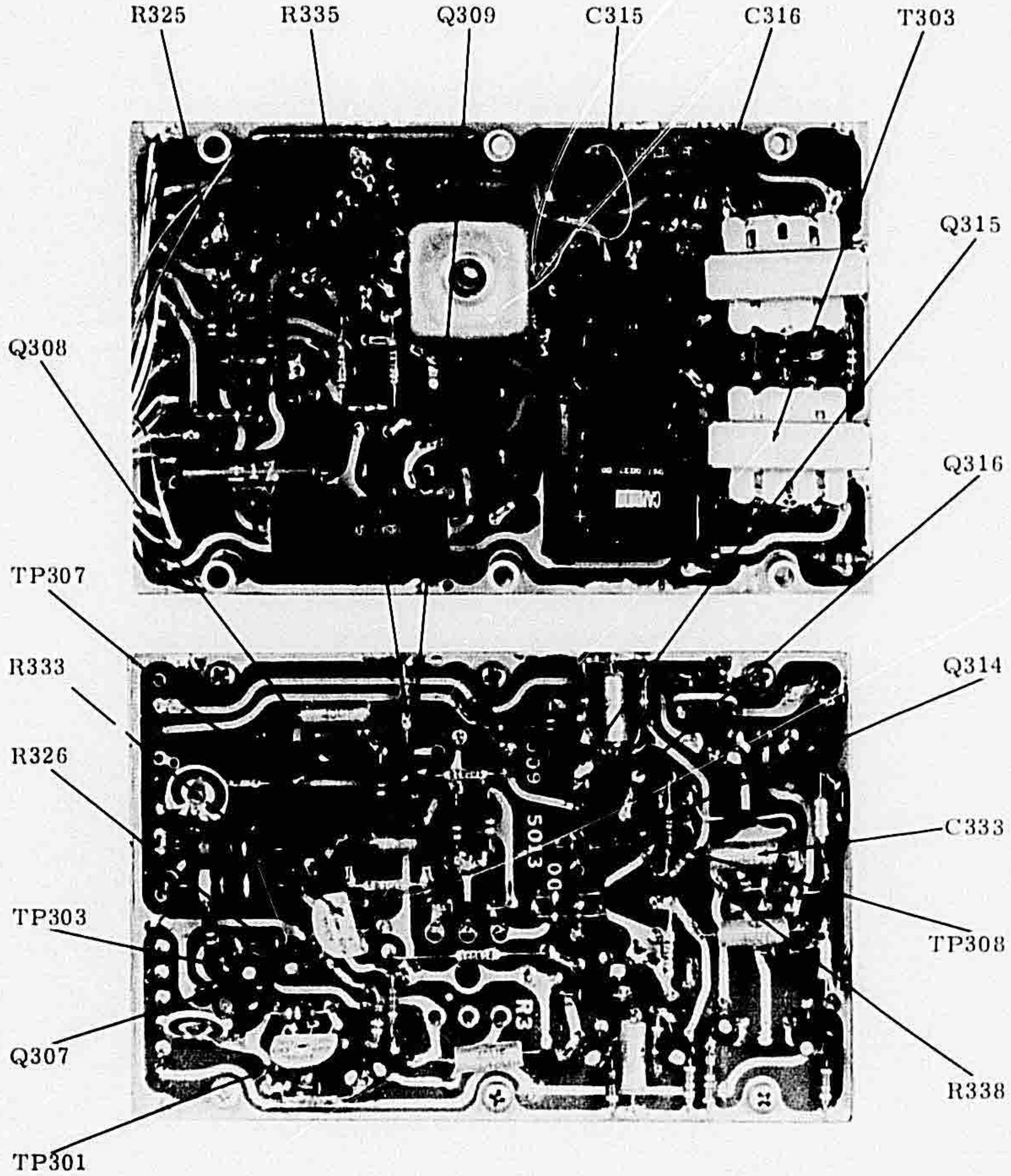
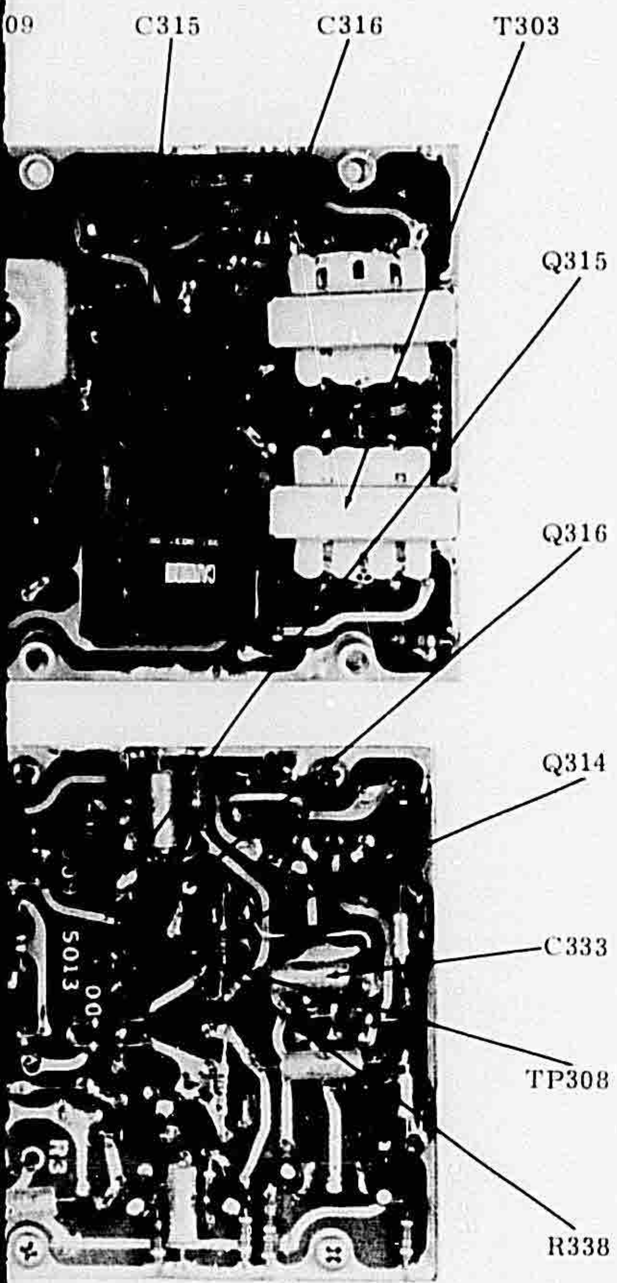
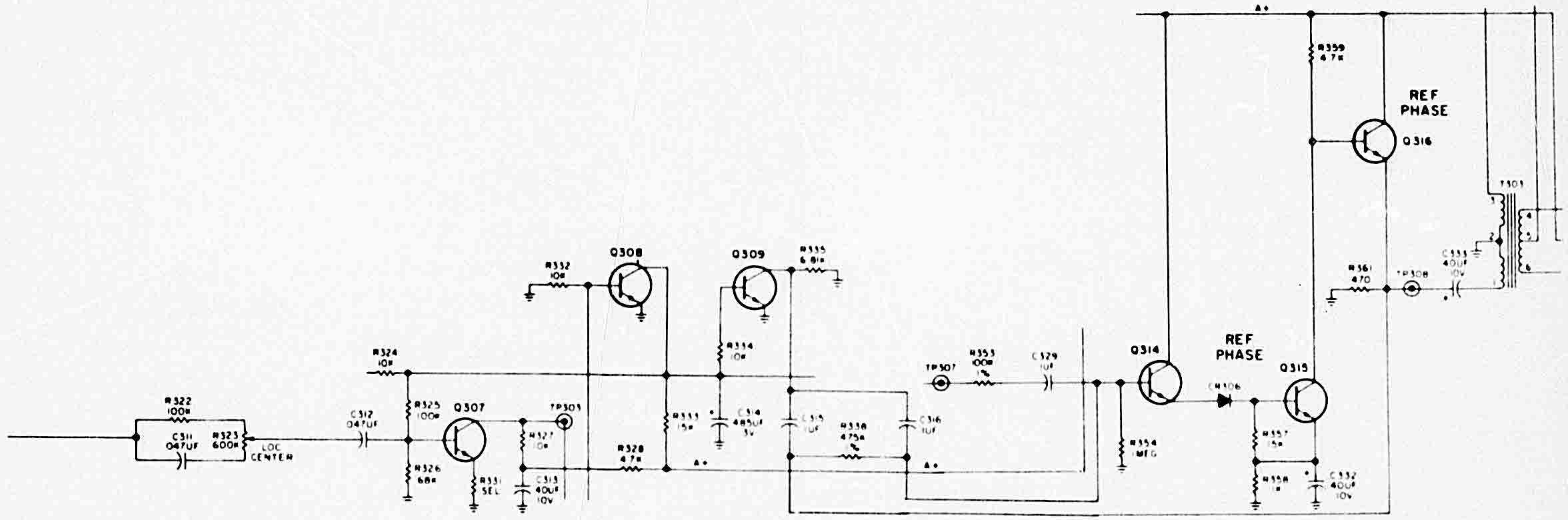


FIGURE 5-5 VOR OPERATION

SEE BLOWUP



-5 VOR OPERATION



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5.9.7 VOR/LOC DEVIATION INDICATOR (Figure 5-6)

The VOR/LOC Deviation circuitry consists of transformer T303, switching transistor Q317 and Q318, bridge R362, R363, R364, R367, and R368, damping capacitor C334 and meter movement I302.

A. VOR OPERATION

During VOR operation, the 30Hz variable phase signal (from T301) is applied to Pin 5 of T308 and compared with the 30Hz reference phase signal from the Reference Phase Amplifier (TP308). For detailed operational theory refer to Section 4.2.4.

5.9.7.1 Troubleshooting Procedure (VOR Operation).

Check for 30Hz VOR signals at TP308 and Pin 5 of T303. Check Q317 and Q318 for proper switching operation. Check the bridge network R362, R363, R364, R367 and R368 for proper resistance values.

B. LOC OPERATION

During LOC operation, the 90/150 LOC signal is amplified by the LOC amp Q307, Reference Phase Amplifiers Q314, Q315 and Q316 and applied to T303 (from TP308) where it is compared with the 90/150 LOC signal that is amplified thru the 120Hz selective amplifier Q301, Q302 and Q303. For a detailed description of LOC circuit theory See Section 4.2.6.

5.9.7.2 Troubleshooting Procedure (LOC Operation).

Check for LOC signal at TP308 and Pin 5 of T303. Check Q317 and Q318 for proper switching operation. Check the bridge network R362, R363, R364, R367 and R368 for proper resistance values.

5.9.8 TO-FROM/OFF FLAG INDICATOR (Figure 5-6)

The To-From Indicator circuitry consists of transformer, T301, switching transistors Q304 and Q305, bridge R315 and R313, damping capacitor C306, meter movement I301, and switching transistor Q310. The OFF FLAG is mechanically a part of the To-From indicator.

A. VOR OPERATION

During VOR operation the 30Hz variable phase signal (from TP302) is applied to Pin 1 of T301 and compared with the 30Hz reference phase signal from Pin 3 of T303 through the "Flag threshold diode" CR302. This threshold provides a necessary signal level, threshold before the off flag will become pulled from view. For detail circuit theory see Section 4.2.5.

5.9.8.1 Troubleshooting Procedure (VOR Operation).

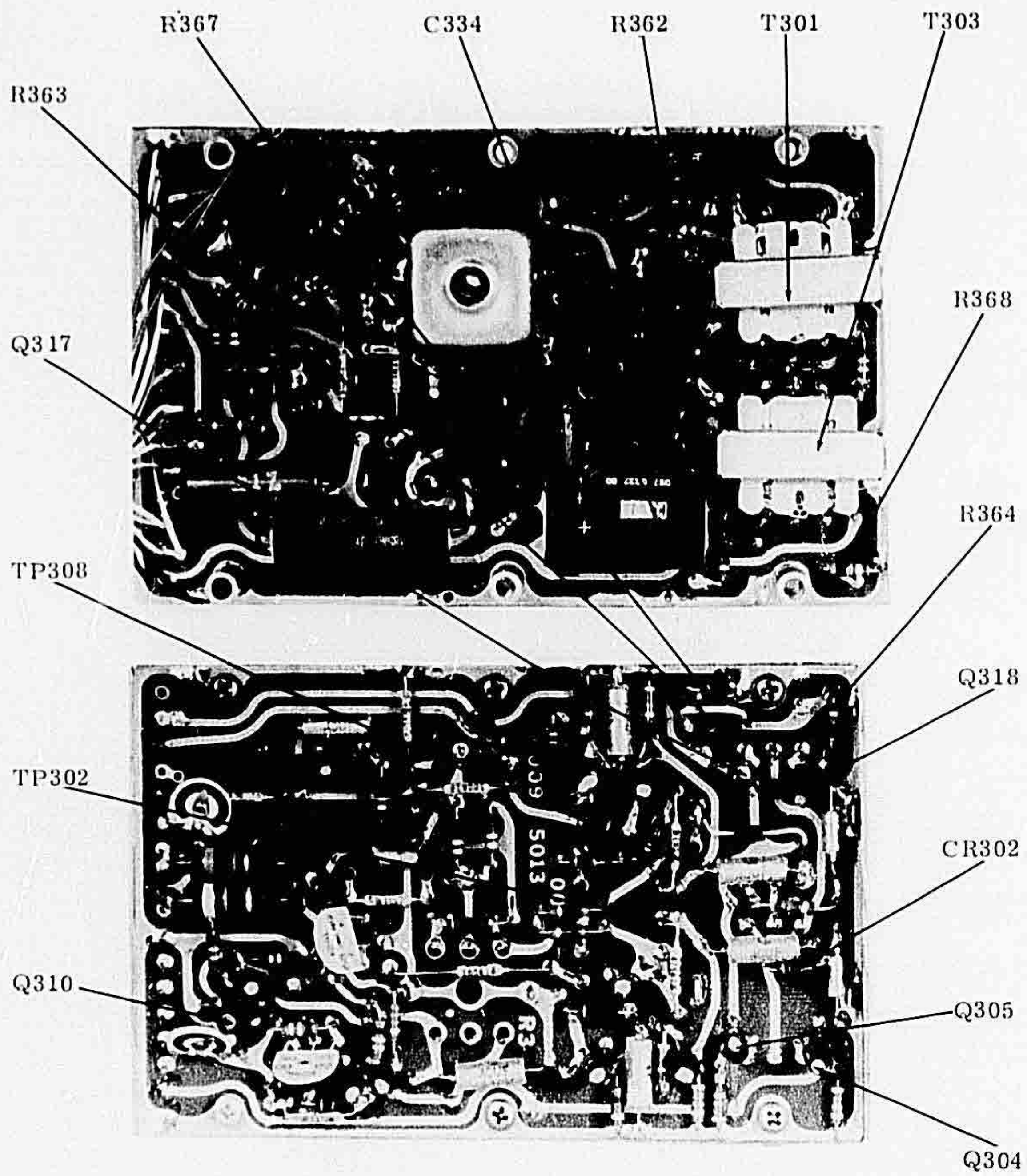
Check the VOR signal at TP302 and Pin 5 of T301. Check Q304 and Q305 for proper switching operation. Check R312 and R313 for proper resistance values. Check Q310 for open circuit condition.

B. LOC OPERATION

During LOC operation Q310 is conducting which effectively grounds one side of the meter movement I301. This provides a "TO" indication any time the unit is operating in the LOC (ILS) mode.

5.9.8.2 Troubleshooting Procedure (LOC Operation).

Check Q310 for proper saturated operation. Check Q304 and Q305 for proper switching operation. Check TP302 for proper LOC signal level.



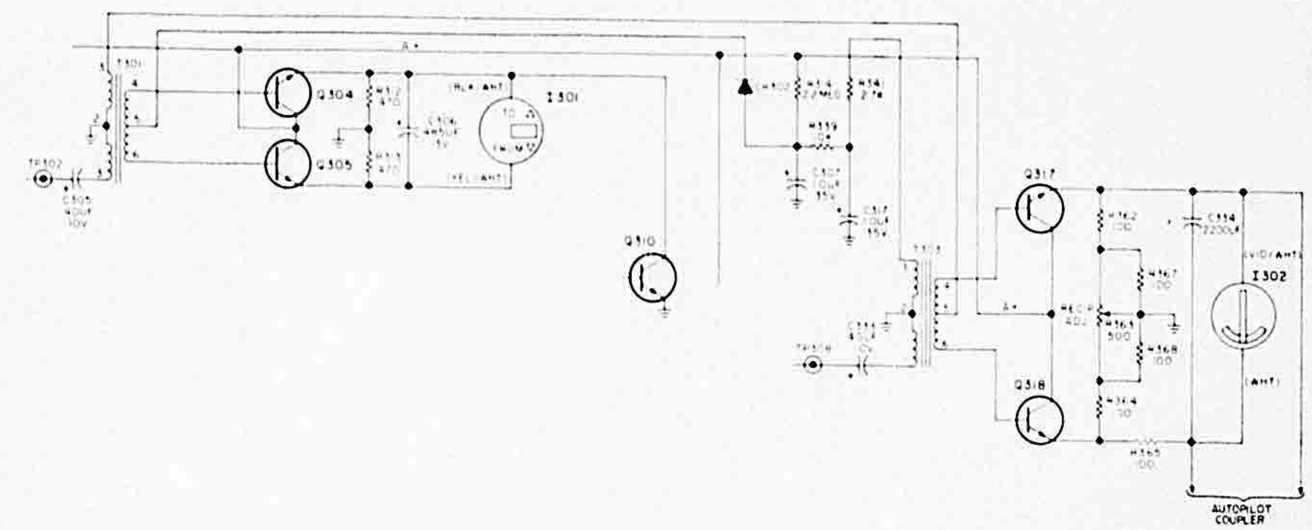
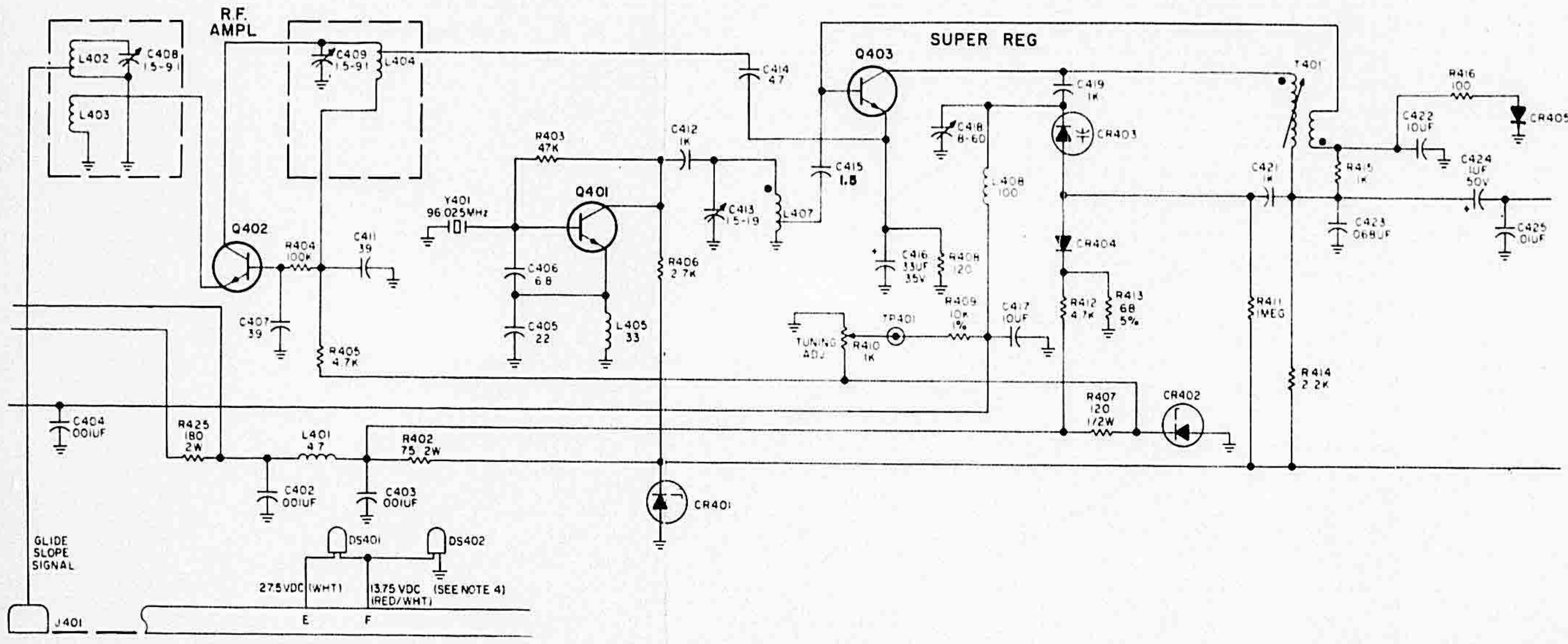
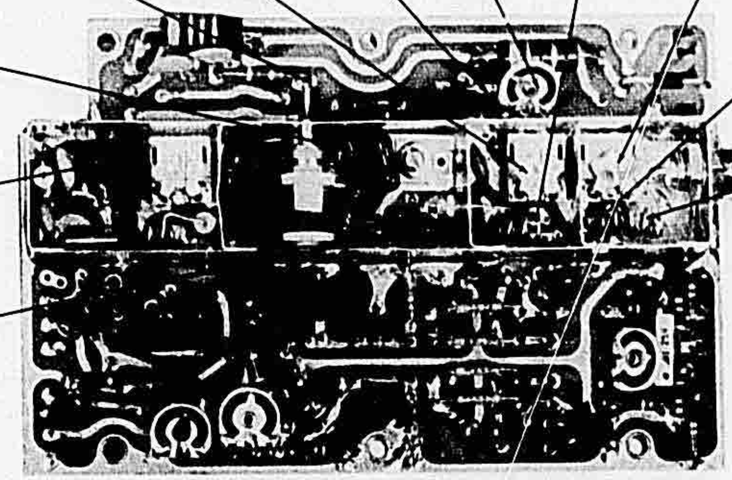


FIGURE 5-6 LOC OPERATION

SEE BLOWUP





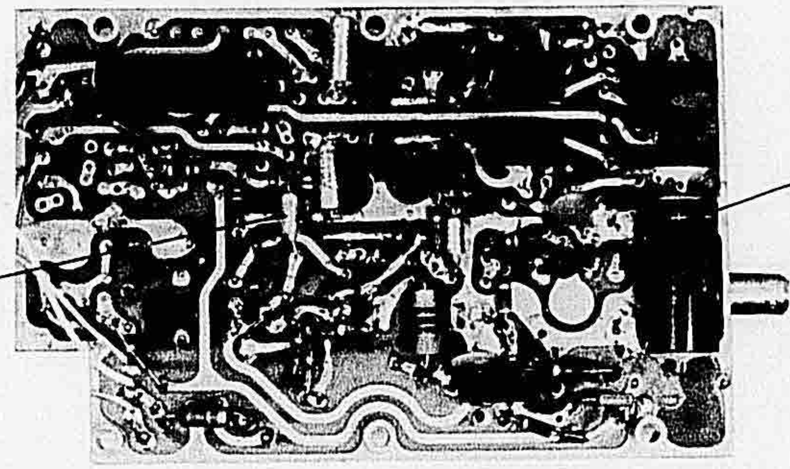


FIGURE 5-7 R. F. AMPLIFIER

SEE BLOWUP

5.10 TROUBLESHOOTING THE GLIDESLOPE SECTION

5.10.1 RF AMPLIFIER (Figure 5-7)

The RF Amplifier consists of Q302 with two single section tunable LC filters, L402-C408 and L404-C409.

5.10.1.1 Troubleshooting Procedure.

Check for Glideslope signal at top of L402. Check for signal at emitter of Q402. Check for output at the emitter of Q403 (output of Q402). See Figure 5-10 for typical D-C operating voltage levels.

5.10.2 OSCILLATOR/TRIPLER (Figure 5-7)

The oscillator/tripler consists of transistor Q401, crystal Y401 and fixed capacitors C405 and C406 in a typical Colpitts configuration. Tank circuit L407 and C413 is tuned to the tripled oscillator frequency (228.075MHz) and is capacitive coupled to the base of Q403.

5.10.2.1 Troubleshooting Procedure.

Check for oscillator operation by observing the waveform at the emitter of Q401. Check for injection (228.075MHz) at the base of Q403. Check Q401 and associated circuitry (See Figure 5-10 for proper operating voltage levels).

5.10.3 SUPER-REGENERATIVE DETECTOR (Figure 5-7)

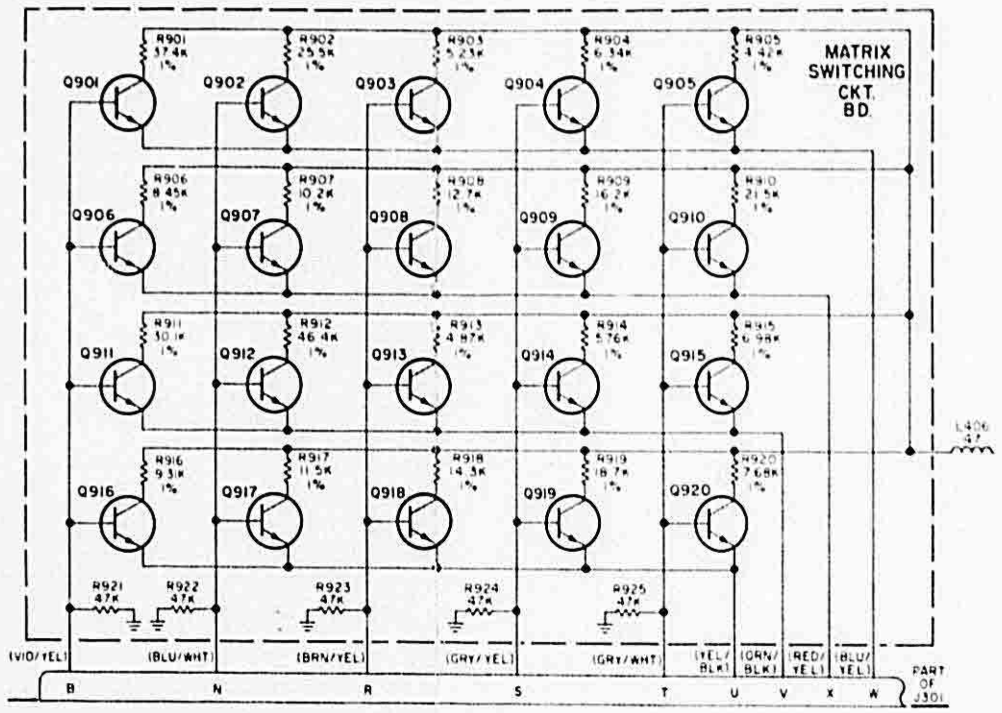
The superregenerative detector consists of Q403. Operation of the circuit is given in detail in Section 4.3.4.

5.10.3.1 Troubleshooting Procedure.

Check for Glideslope signal input to the emitter of Q403. Check for tripled oscillator frequency at the base of Q403. Check for I-F output at C424. If no output check Q403 and CR403 and associated circuitry (See Figure 5-10 for D-C operating voltage levels).

5.10.4 GLIDESLOPE TUNING MATRIX Figure 5-8)

The glideslope tuning matrix consists of twenty switching transistor Q901-Q920 and twenty precision switching resistors R901-R920. It provides an output D-C voltage which is used to tune varactor diode CR403. For detailed operation theory see Section 4.3.5.



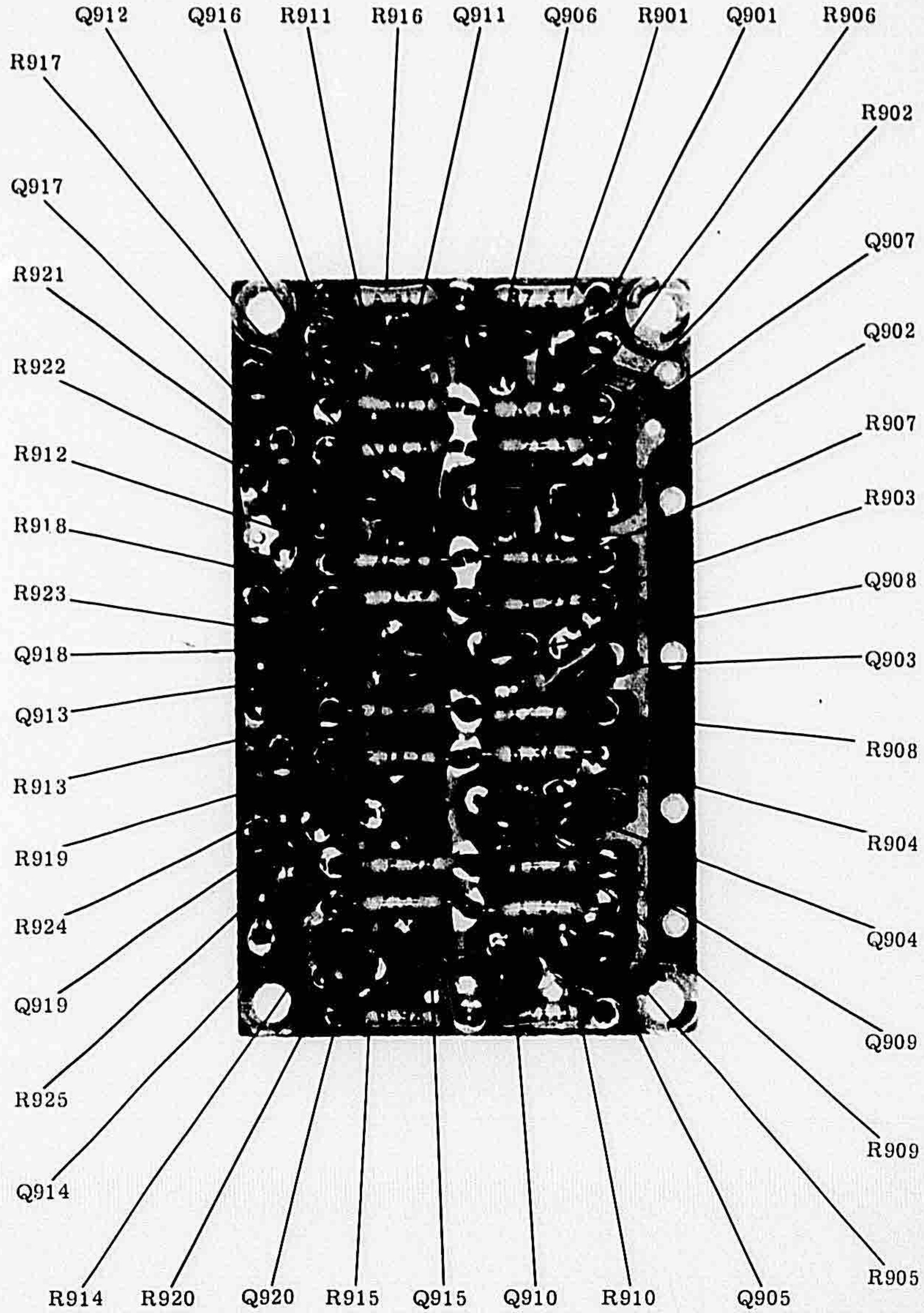


FIGURE 5-8 GLIDESLOPE TUNING MATRIX

SEE BLOWUP

5.10.4.1 Troubleshooting Procedure.

Using Tables 5-2 and 5-3 given below, check for proper switching conditions.

Table 5-2 gives the appropriate LOC (ILS) channel, the corresponding voltage or ground, and the pin number with wire color. For example, if the KX 170 NAV Channel selector is set on 109.5, from Table 5-2 it is seen that Pin X (the RED/YEL Wire) is grounded while Pin R (the BRN/YEL Wire) is connected to the positive switching line, thus switching on Q908. All other transistors would be off, since the positive base bias and grounded emitter condition existing simultaneously can be possible for only one of the transistors on any one frequency selected.

ILS Channel (MHz)	Pin (Grounded)	Wire Color	Q's Effected
108	W	BLU/YEL	Q901, 902, 903, 904, 905
109	X	RED/YEL	Q906, 907, 908, 909, 910
110	V	ORN/BLK	Q911, 912, 913, 914, 915
111	U	YEL/BLK	Q916, 917, 918, 919, 920

ILS Channel (MHz)	Pin (+Voltage)	Wire Color	Q's Effected
0.1	B	VIO/YEL	Q901, 906, 911, 916
0.3	N	BLU/WHT	Q902, 907, 912, 917
0.5	R	BRN/YEL	Q903, 908, 913, 918
0.7	S	GRY/YEL	Q904, 909, 914, 919
0.9	T	GRY/WHT	Q905, 910, 915, 920

TABLE 5-2 GLIDESLOPE MATRIX FREQUENCY SELECTION

Table 5-3 gives the effective resistance for any selected ILS Channel. To troubleshoot, remove choke L406 and place an ohmmeter between the matrix side of where L406 was removed and ground. Dial through the channels given below and check resistance. Be sure power is applied to the KX 170/170A/175 to insure having a proper positive switching voltage available for the matrix. Note that the resistance change is not a linear change as the LOC (ILS) channels are dialed. This is a result of the Glideslope Localizer frequency pairing not being linearly matched. If the glideslope frequencies are dialed from 329.3 to 335.0, the resistance would increase linearly from 4.42K to 46.4K. The table is given as a function of LOC frequency for ease of NAV channel dialing.

LOC Frequency (MHz)	Glideslope Frequency (MHz)	Resistance (Kilohms)
108.1	334.7	37.[illegible]0
108.3	334.1	25.50
108.5	329.9	5.23
108.7	330.5	6.34
108.9	329.3	4.42
109.1	331.4	8.45
109.3	332.0	10.20
109.5	332.6	12.70
109.7	333.2	16.20
109.9	333.8	21.50
110.1	334.4	30.10
110.3	335.0	46.40
110.5	329.6	4.87
110.7	330.2	5.76
110.9	330.8	6.98
111.1	331.7	9.31
111.3	332.3	11.51
111.5	332.9	14.30
111.7	333.5	18.70
111.9	331.1	7.68

TABLE 5-3 GLIDESLOPE MATRIX RESISTANCE vs FREQUENCY SELECTION

5.10.5 DETECTOR (Figure 5-9)

The detector consists of transistor Q404. The squegging signal is eliminated and the audio output is coupled to audio amplifier Q405.

5.10.5.1 Troubleshooting Procedure

Check for a standard detected glideslope signal at the base of Q405. If not present check Q404 and associated circuitry. (See Figure 5-10 for typical D-C operating voltages).

5.10.6 AUDIO AMPLIFIER (Figure 5-9)

The audio amplifier consists of transistor Q405 with switching diode CR410. In VOR mode, diode CR410 is open and Q405 has no emitter return to ground, thus becoming disabled. In LOC (ILS) mode the anode of CR410 becomes grounded through the ILS energize line and Q405 becomes a conventional audio amplifier.

5.10.6.1 Troubleshooting Procedure.

Check "ILS Energize" line for ground on ILS channel. Check for glideslope signal at base of Q405. Check for glideslope signal at TP402. If no signal is present check Q405, CR410 and associated circuitry. (See Figure 5-10 for typical D-C operating voltages.)

5.10.7 90Hz SELECTIVE AMPLIFIER (Figure 5-9)

The 90Hz selective amplifier consists of transistors Q407 and Q409 with a twin "T" filter C441, C442, C443, R443, R444 and R445 being used in the feedback loop to obtain selectivity at 150Hz.

5.10.8.1 Troubleshooting Procedure.

Using an oscilloscope check TP402 for a glideslope input signal. If present, check for a 150Hz output at the collector of Q408. If no signal is present, track the signal starting at TP402 and working towards the collector of Q408. Further aid in isolating the problem area can be obtained from the typical D-C operating voltage levels given in Figure 5-10. Check the selective notch filter by applying a variable frequency audio signal at TP402 and check the collector of Q408 for a peaking of the output at 150Hz.

5.10.9 OUTPUT DEVIATION CIRCUITRY (Figure 5-9)

Diodes CR408 and CR409 in conjunction with C445 and C446 provide full wave rectification for the 90Hz signal which is used to control transistor Q411. Diodes CR406 and CR407 in conjunction with C444 and C447 provide full wave rectification for the 150Hz signal which is used to control transistor Q412. The output of Q411 and Q412 drive the bridge network R461, R462, R463 and R464. Any difference in voltage amplitude is indicated by I402 which is connected across the network. The bridge network also supplies an AGC voltage to transistor Q404.

5.10.9.1 Troubleshooting Procedure

With a VTVM on the emitter of Q411, alternately switch the 90Hz portion of the glideslope input signal (from the 232-A Glideslope Signal Generator) in and out. The voltage should increase when a 90Hz signal is present and decrease (or go negative) when the 90Hz portion is absent.

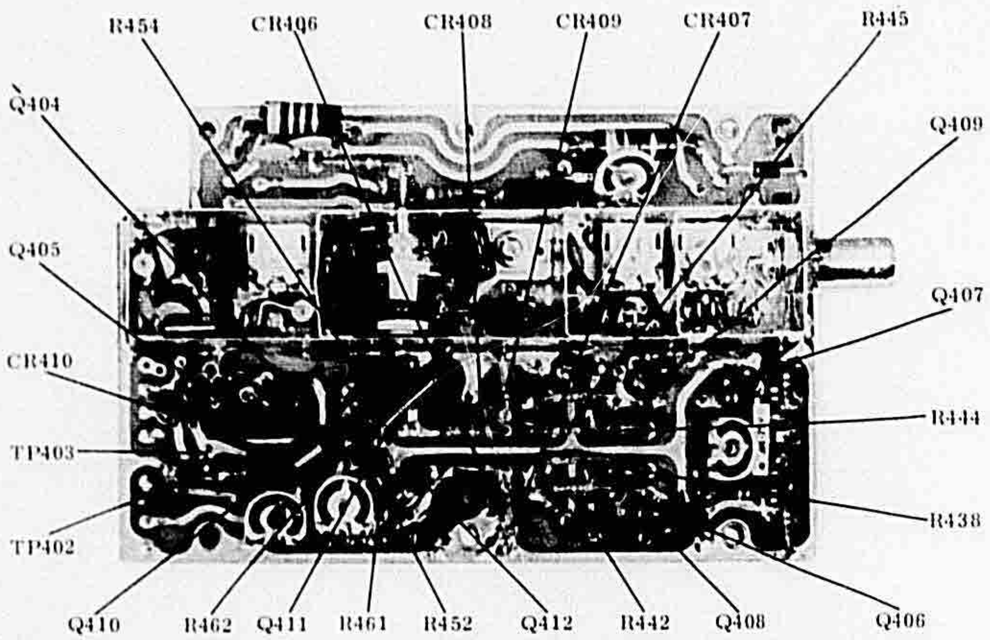
With a VTVM on the emitter of Q412, perform the same test as above but alternately switch the 150Hz portion of the glideslope signal in and out. The voltage should increase with the 150Hz signal and decrease (or go negative) when the 150Hz signal is absent.

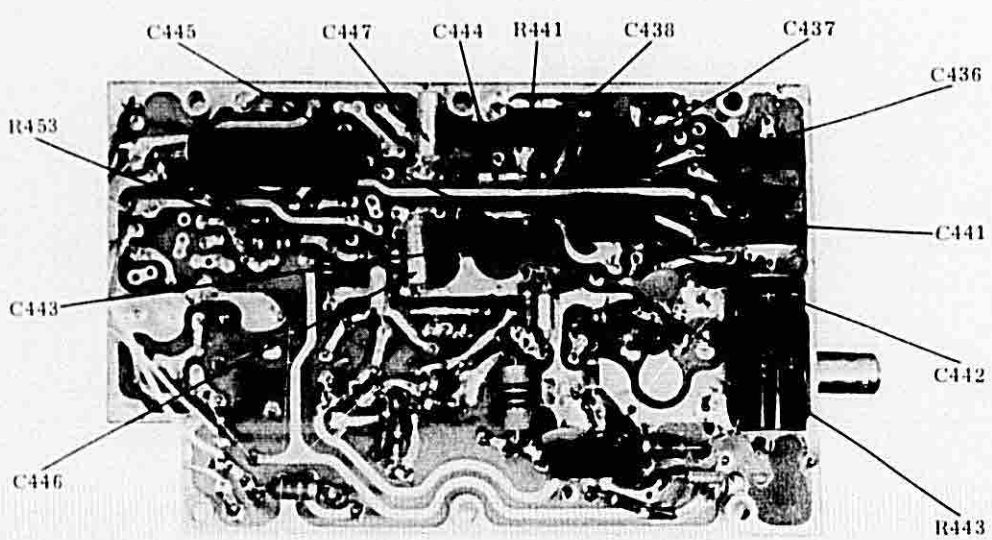
5.10.10 FLAG AMPLIFIER (Figure 5-9)

The flag amplifier consists of Q410. Its input is obtained from the rectified output of both the 90Hz rectifiers through the resistive network, R452, R453 and R454. Its output is used to drive the flag meter movement I401.

5.10.10.1 Troubleshooting Procedure.

Check resistive network R452, R454, R453 for open circuit both 90Hz and 150Hz inputs must be present to provide enough signal level for flag operation. Check Q410 and the flag adjust potentiometer R507 for proper operation. See Figure 5-10 for typical D-C operating voltages.





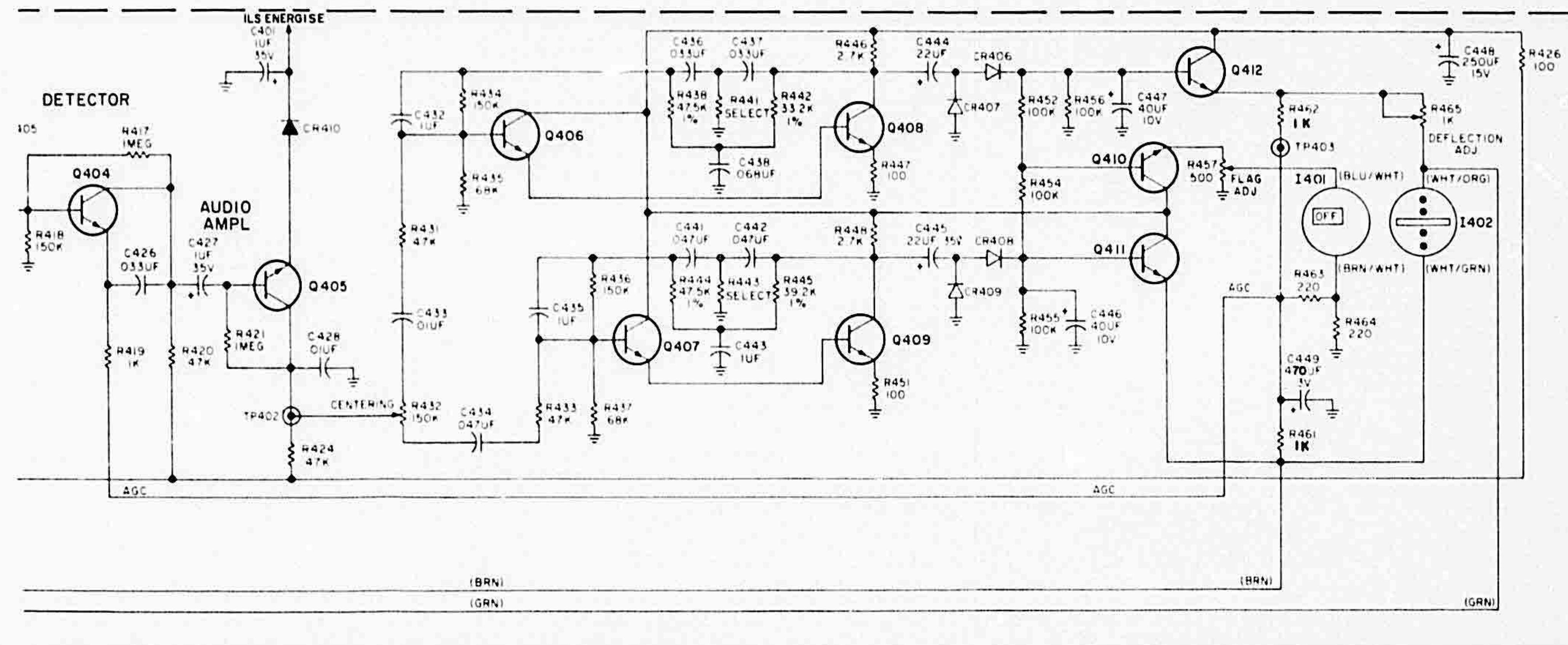


FIGURE 5-9 DETECTOR/AMPLIFIERS/OUTPUT DEVIATION CIRCUITRY

SEE BLOWUP

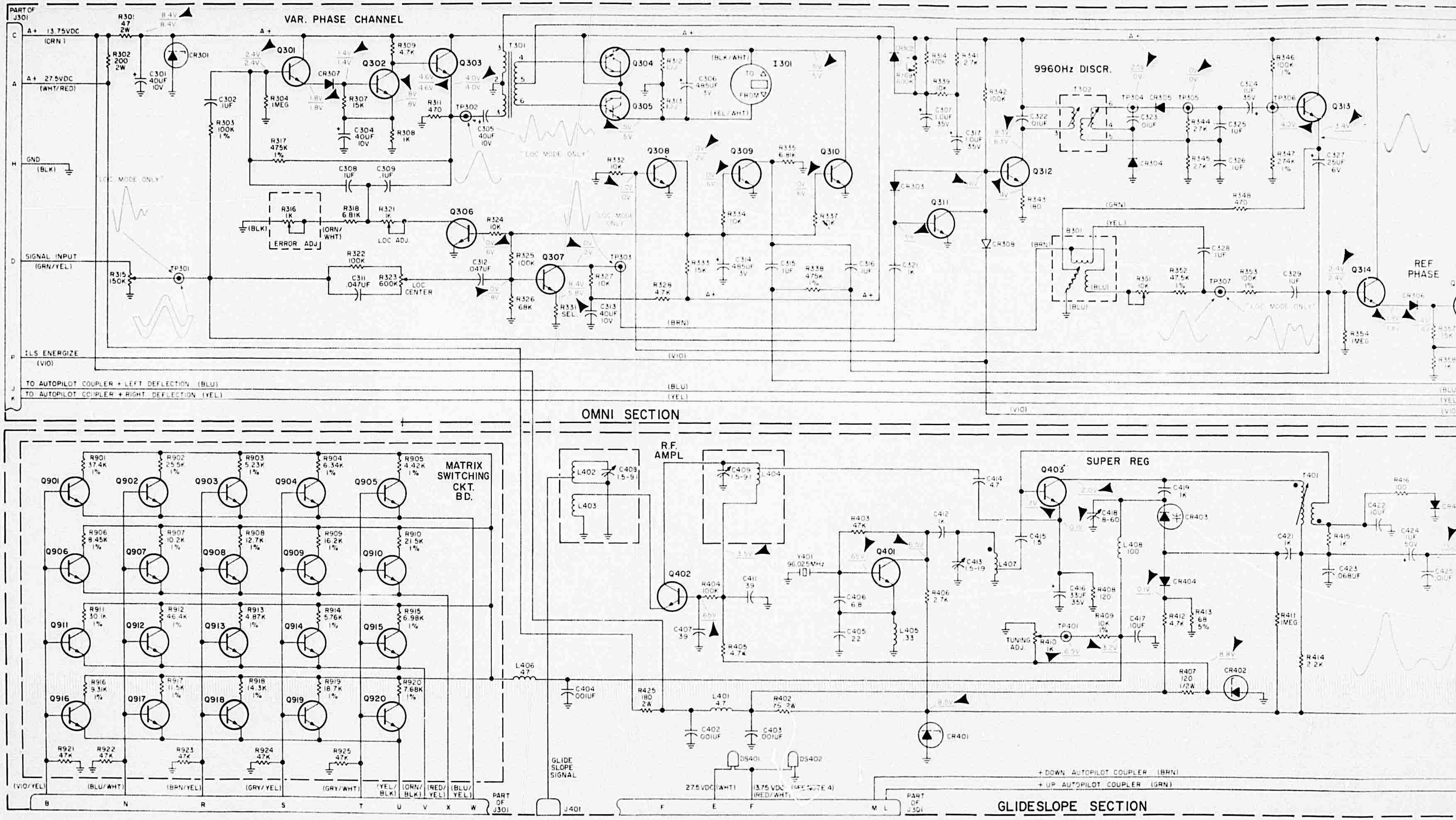
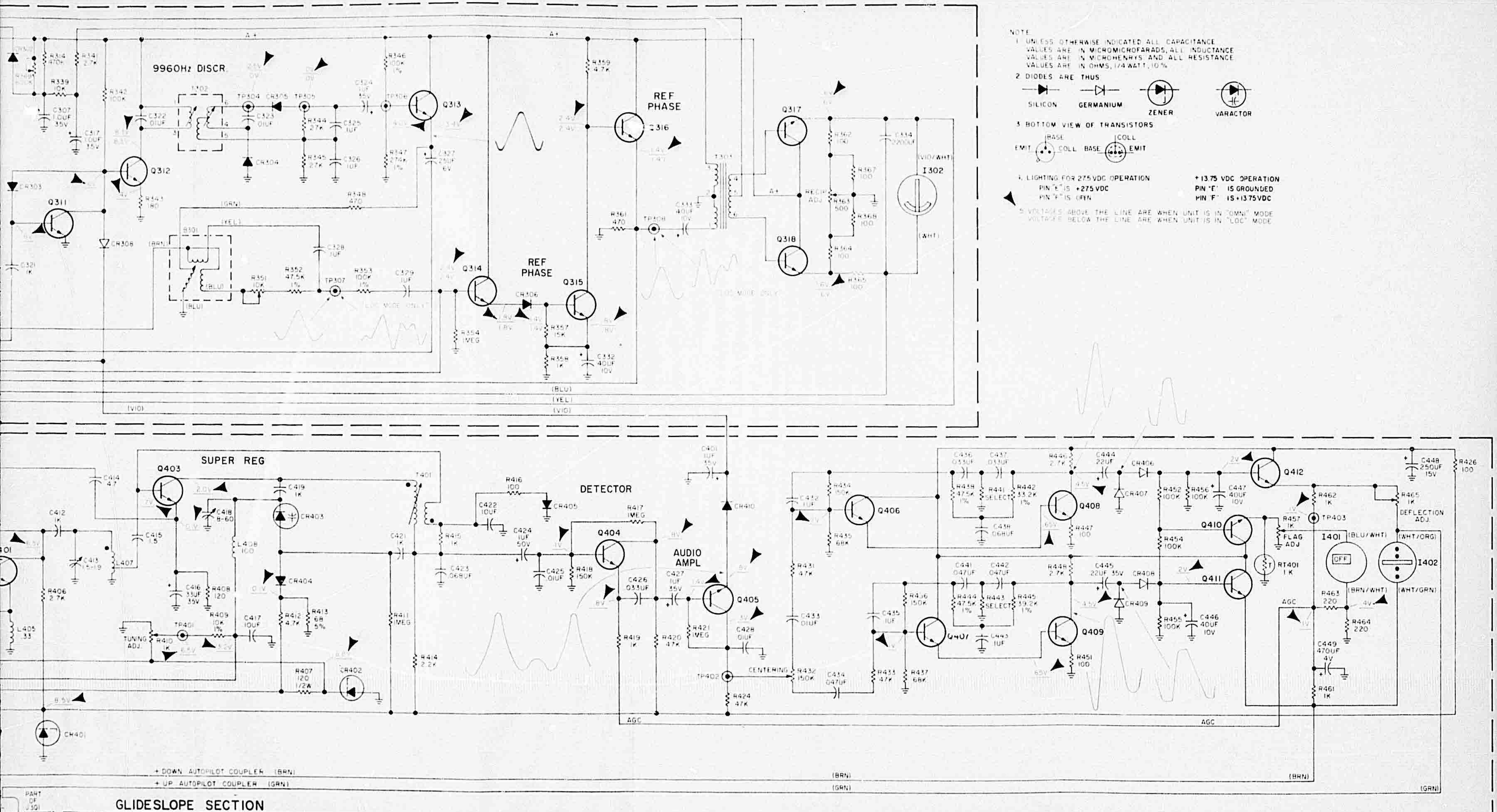


FIGURE 5-10 KI 201C/KI 211C SCHEMATIC
(Dwg. No. 002-0137-00 R-5)

SEE BLOWUP



SEE BLOWUP

SCHEMATIC

KING

KI 201C/KI 211C/KI 212
VOR/LOC-OBS INDICATOR

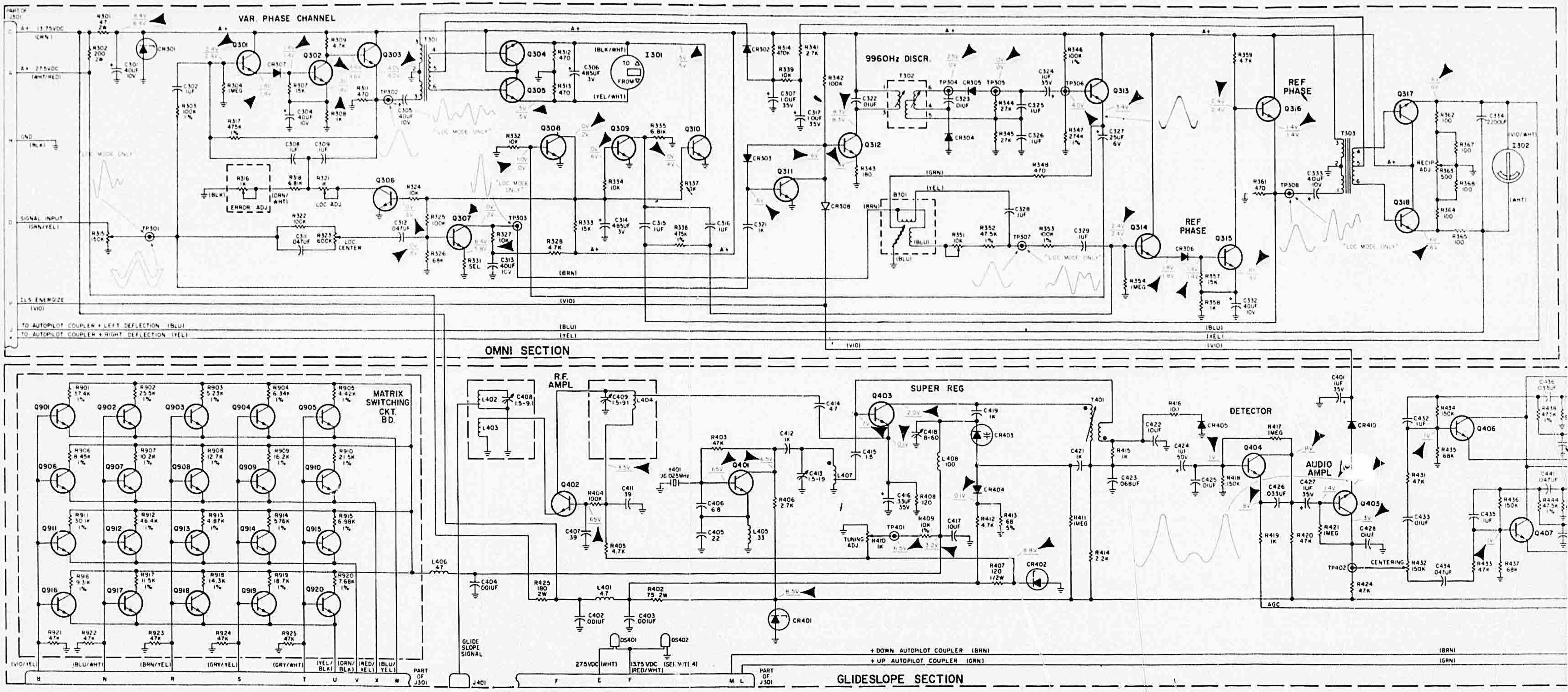


FIGURE 5-10 KI 201C/KI 211C SCHEMATIC

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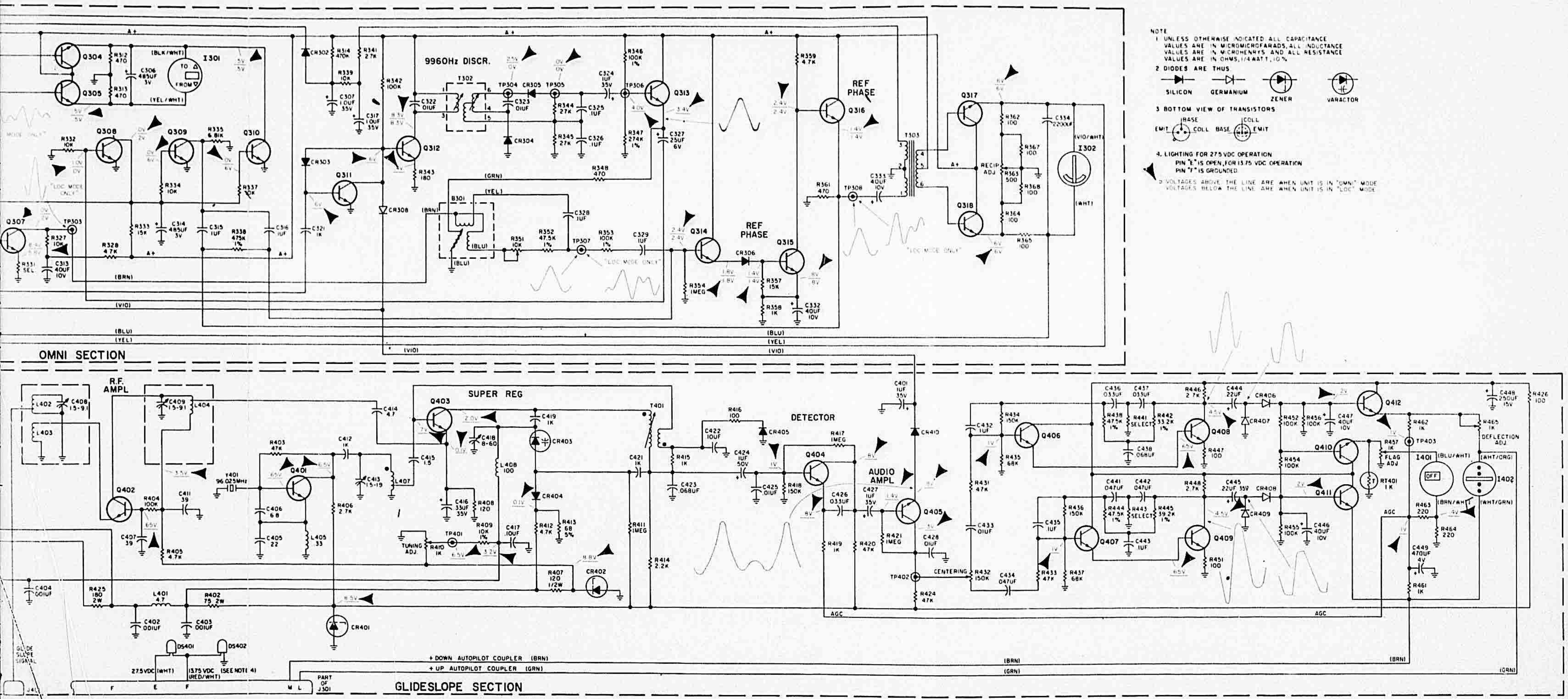
SEE BLOWUP



ATIC

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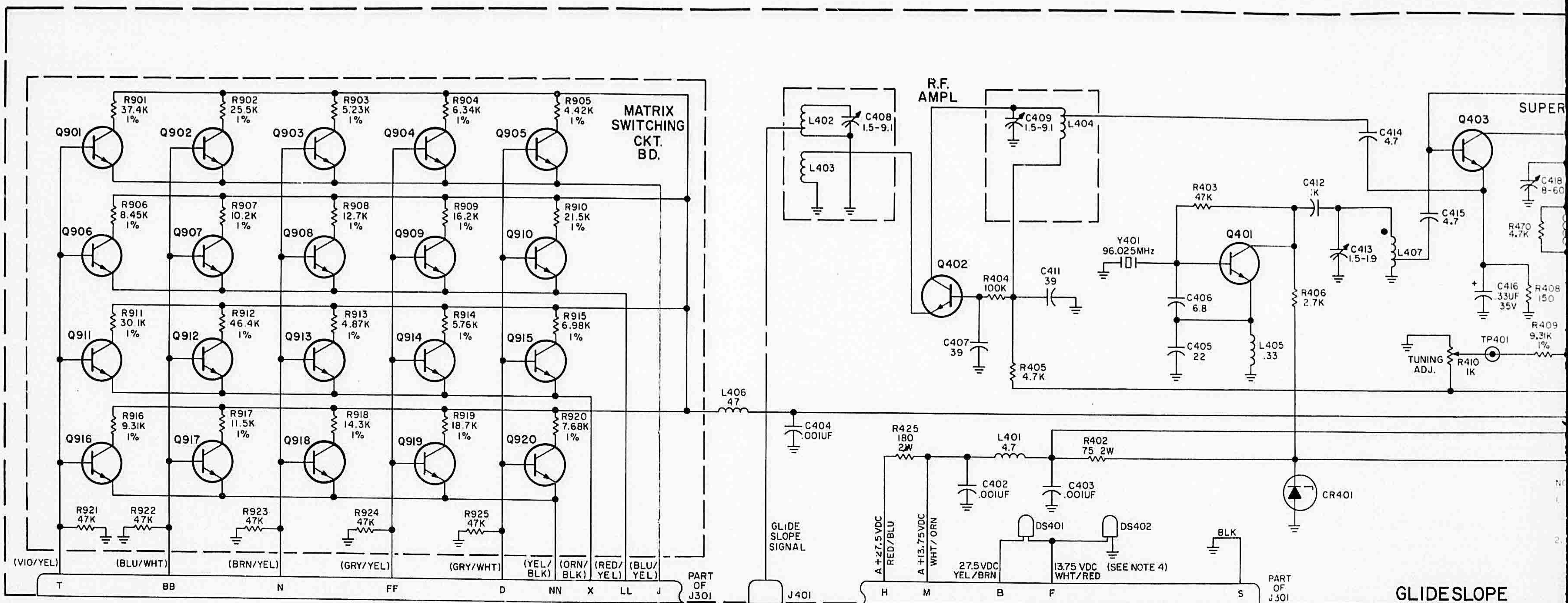

FIGURE 5-11 KI 212 SCHEMATIC
(Dwg. No. 002-0172-00 R-1)

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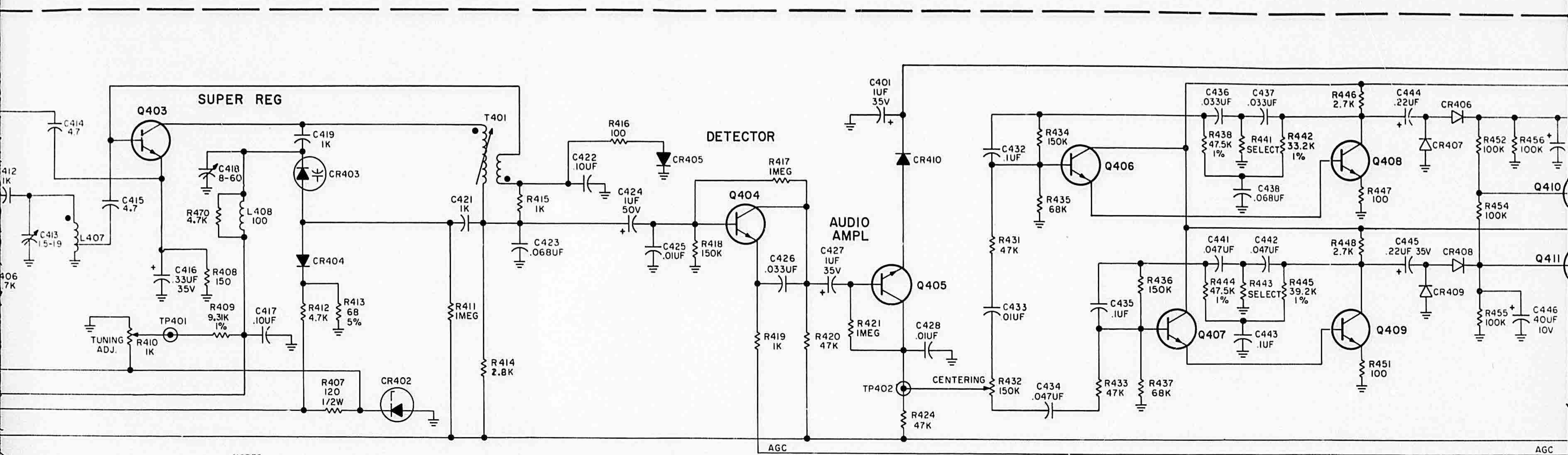


NOTES

1. UNLESS NOTED: ALL CAPACITANCES ARE IN PICOFARADS, (pf). ALL RESISTANCES ARE IN OHMS, 1/4W, 10%. ALL INDUCTANCES ARE IN MICROHENRIES, (uh)

2. DIODES ARE THUS:

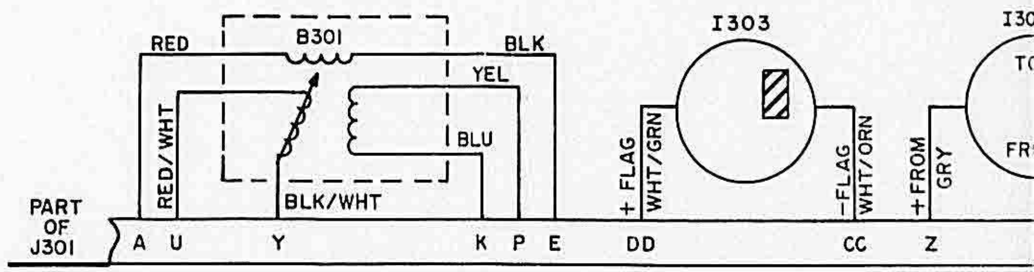
SILICON ZENER GERMANIUM VARACTOR

3. BOTTOM VIEW OF TRANSISTORS:

E B C B C E

4. LIGHTING: FOR 13.75 VDC OPERATION: PIN "B" IS GROUNDED. PIN "F" + FROM DIMMER.
FOR 27.5 VDC OPERATION: PIN "B" + FROM DIMMER. PIN "F" NO CONNECTION

GLIDESLOPE



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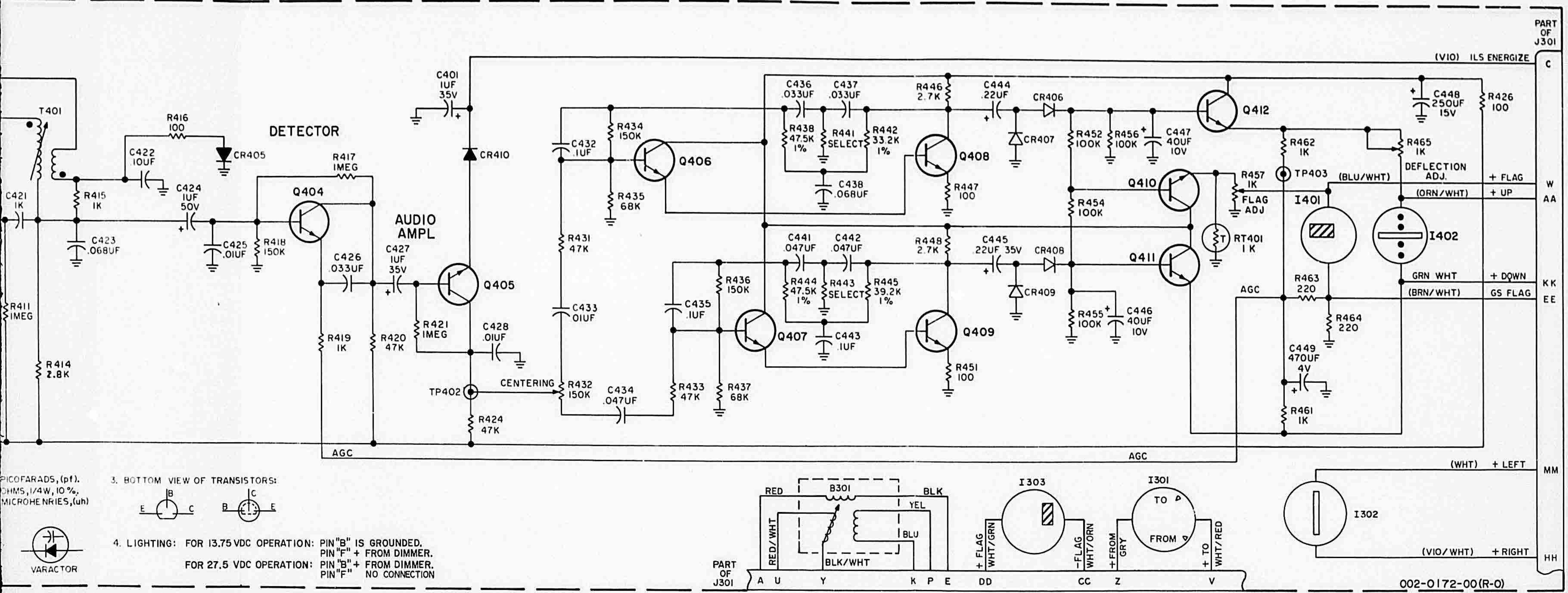


DETECTOR
AUDIO AMPL
PART OF J301
(VIO) ILS ENERGIZE
T401
R416 100
C422 .01UF
CR405
C421 1K
R415 1K
C423 .068UF
C424 1UF 50V
C425 .01UF
R418 150K
R417 1MEG
Q404
C426 .033UF
R419 1K
R420 47K
C427 1UF 35V
R421 1MEG
Q405
C401 1UF 35V
CR410
C428 .01UF
TP402
R424 47K
R411 1MEG
R414 2.8K
CENTERING
R432 150K
C434 .047UF
C432 .1UF
R431 47K
C433 .01UF
R434 150K
R435 68K
Q406
C435 .1UF
R433 47K
R436 150K
R437 68K
Q407
C436 .033UF
C437 .033UF
R438 47.5K 1%
R441 SELECT
R442 33.2K 1%
C438 .068UF
R446 2.7K
Q408
R447 100
C441 .047UF
C442 .047UF
R444 47.5K 1%
R443 SELECT
R445 39.2K 1%
C443 .1UF
R448 2.7K
Q409
R451 100
C444 .22UF
CR406
CR407
C445 .22UF 35V
CR408
CR409
R452 100K
R456 100K
C447 40UF 10V
R454 100K
R455 100K
C446 40UF 10V
Q410
Q411
Q412
RT401 1K
R457 1K
FLAG ADJ
R462 1K
TP403
C448 250UF 15V
R426 100
R465 1K
DEFLECTION ADJ.
I401
I402
(BLU/WHT) + FLAG W
(ORN/WHT) + UP AA
GRN WHT + DOWN KK
(BRN/WHT) GS FLAG EE
R463 220
R464 220
C449 470UF 4V
R461 1K
AGC
(WHT) + LEFT MM
(VIO/WHT) + RIGHT HH
B301
RED
BLK
YEL
BLU
RED/WHT
BLK/WHT
I303
+ FLAG WHT/GRN
-FLAG WHT/ORN
I301
TO
FROM
+FROM GRY
+ TO WHT/RED
I302
A U Y K P E DD CC Z V
PICOFARADS, (pf).
OHMS, 1/4W, 10%.
MICROHENRIES, (uh)
3. BOTTOM VIEW OF TRANSISTORS:
E B C
B C E
VARACTOR
4. LIGHTING: FOR 13.75 VDC OPERATION: PIN "B" IS GROUNDED. PIN "F" + FROM DIMMER.
FOR 27.5 VDC OPERATION: PIN "B" + FROM DIMMER. PIN "F" NO CONNECTION
002-0172-00(R-0)

SEE BLOWUP

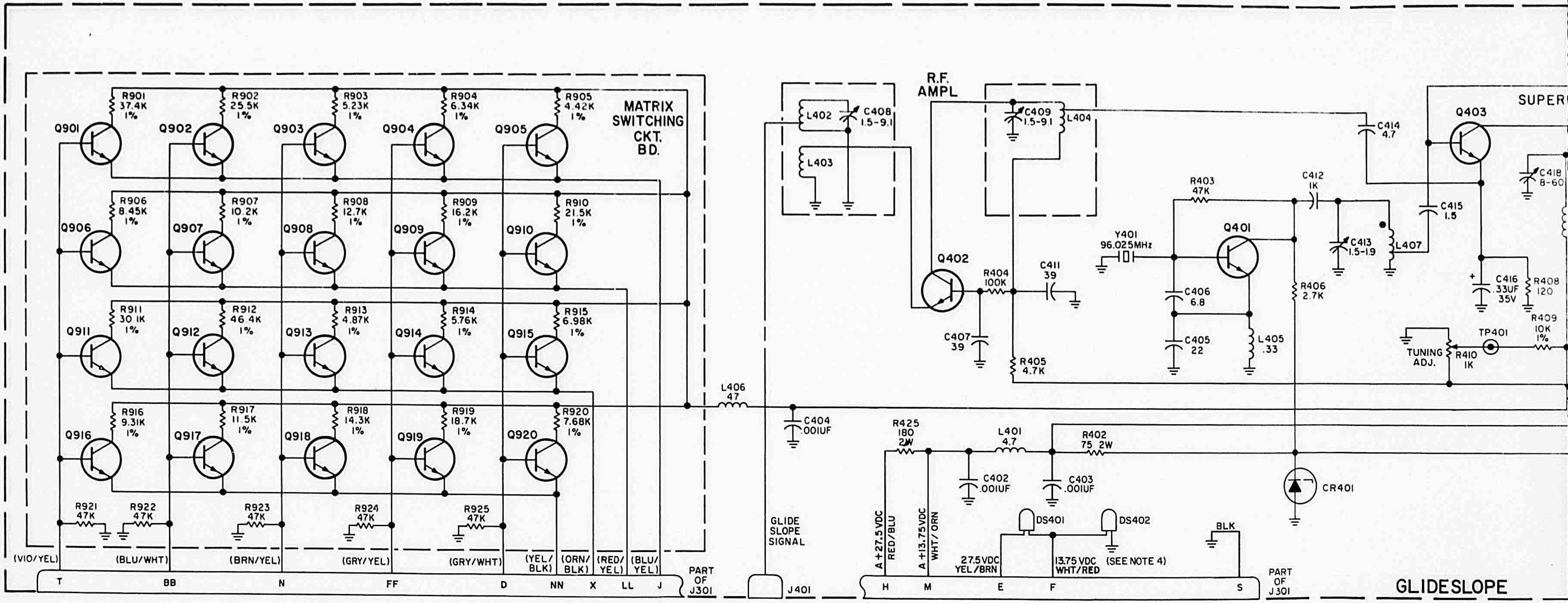
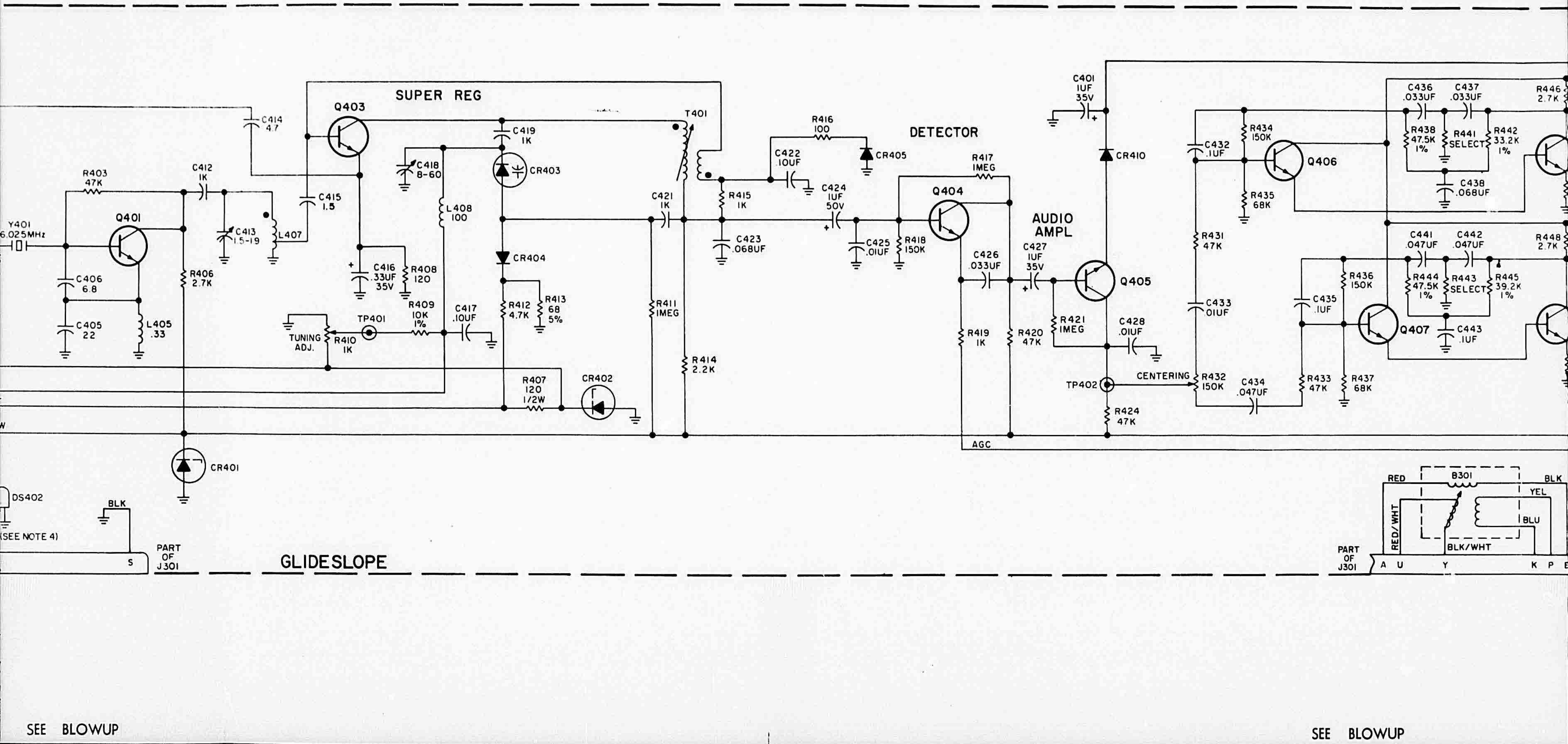


FIGURE 5-11 KI 212 SCHEMATIC

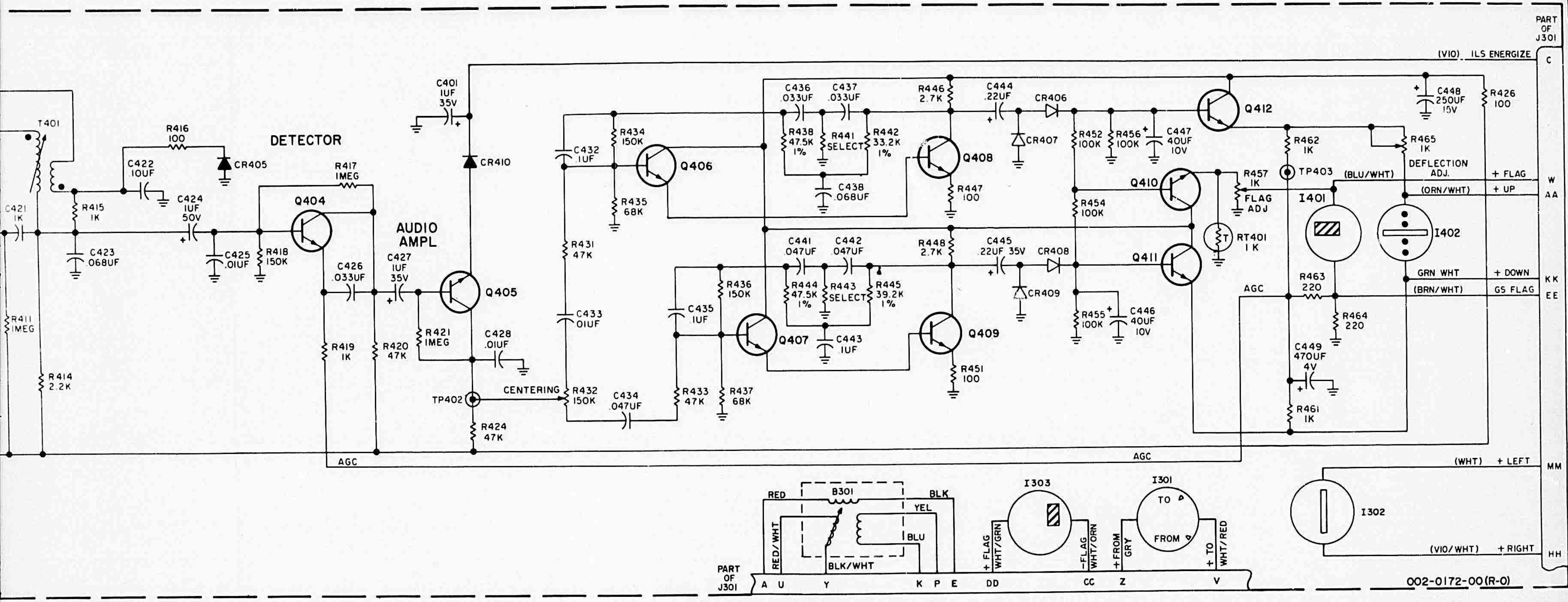
SEE BLOWUP

SEE BLOWUP



SUPER REG
DETECTOR
AUDIO AMPL
GLIDESLOPE
Y401 6.025MHz
Q401
Q403
Q404
Q405
Q406
Q407
T401
R403 47K
R406 2.7K
C406 6.8
C405 22
L405 .33
C412 1K
C413 1.5-19
L407
C414 4.7
C415 1.5
C416 .33UF 35V
R408 120
C418 8-60
L408 100
C419 1K
CR403
CR404
R412 4.7K
R413 68 5%
R409 10K 1%
C417 .10UF
TP401
TUNING ADJ.
R410 1K
R407 120 1/2W
CR402
CR401
R411 1MEG
C421 1K
R414 2.2K
R415 1K
C423 .068UF
R416 100
C422 .10UF
CR405
C424 1UF 50V
C425 .01UF
R418 150K
R417 1MEG
C426 .033UF
C427 1UF 35V
R419 1K
R420 47K
R421 1MEG
C428 .01UF
TP402
R424 47K
AGC
C401 1UF 35V
CR410
CENTERING
C432 .1UF
R434 150K
R435 68K
R431 47K
C433 .01UF
R432 150K
C434 .047UF
C435 .1UF
R436 150K
R433 47K
R437 68K
C436 .033UF
C437 .033UF
R438 47.5K 1%
R441 SELECT
R442 33.2K 1%
C438 .068UF
R446 2.7K
C441 .047UF
C442 .047UF
R444 47.5K 1%
R443 SELECT
R445 39.2K 1%
C443 .1UF
R448 2.7K
DS402
(SEE NOTE 4)
BLK
S
PART OF J301
B301
RED
BLK
YEL
BLU
RED/WHT
BLK/WHT
A U Y K P E
SEE BLOWUP
SEE BLOWUP

KI 212 SCHEMATIC



SEE BLOWUP

SECTION VI

ILLUSTRATED PARTS LIST

CONTENTS

FOR LATEST INFORMATION

on

KI 201C

SEE SECTION V

of KI 213/214

MAINTENANCE MANUAL

ASSEMBLY NO. 066-3008-02
DESCRIPTION OMNI INDICATOR
UNIT KI201C
REVISION 43
USED ON ASSEMBLY 066-3008-02
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R1	008-0004-00	LUG SOLDER #4	1
	008-0005-01	LUG SOLDER	2
	009-5013-00	BOARD PC OMNI	1
	010-0041-00	TERMINAL INSULATED	3
	012-1009-00	TAPE MYLAR	.5
R1	023-0057-02	METER ASSY	1
	025-0003-03	WIRE SPC22 ORANGE	1.5
	025-0018-00	WIRE CW26 BLACK	1.5
	025-0018-29	WIRE CW26 RED/WHT	.9
	025-0018-39	WIRE CW26 ORN/WHT	.7
	025-0018-44	WIRE CW26 YELLOW	.8
	025-0018-54	WIRE CW26 GRN/YEL	.9
	025-0018-66	WIRE CW26 BLUE	.8
	025-0018-77	WIRE CW26 VIOLET	.5
	025-0018-92	WIRE CW26 WHT RED	.8
	025-0018-99	WIRE CW26 WHITE	.9
	026-0003-00	WIRE TC 22 BUSS	.1
	029-0004-00	BELT GEAR	1
	029-0012-00	PULL GEAR 14 TEETH	1
	030-1007-00	LOCK TAB	1
	030-1007-00	LOCK TAB	1
	030-1008-00	LEVER AND PILOT	1
	030-1008-00	LEVER AND PILOT	1
	030-1009-00	CONNECTOR HOOD	1
	030-2000-00	RECPT 14 PIN	1
	035-1037-03	SHIPPING CONTAINER	1
	047-1175-00	BRACKET	1
	047-1546-01	DUST COVER	1
	047-1547-01	FRAME CHANNEL BOT	1
	047-1967-00	FRAME CHANNEL	1
	057-1049-01	AZIMUTH DECAL	1
	057-1169-00	LABEL PATENT	1
	057-1346-01	ID PLATE	1
	073-0015-00	AZIMUTH DIAL	1
	073-0021-01	FRONT CASTING	1
	073-0062-03	REAR MTG PLATE	1
	073-0116-03	FACE PLATE	1
	076-0043-00	SHAFT	1
	076-0384-02	KNOB	1
	088-0084-01	FILTER LAMP L BLUE	2
	088-0188-01	COVER LGHT WEDGE	1
	089-2009-37	NUT HEX 4 40	1
	089-2013-37	NUT HEX 6-32X5/16	1
	089-2026-22	NUT SWAGE	2
	089-2105-22	NUT SPEED 4 40	6

*R indicates Revision. See page 6-8 for Revision History of Part List.

ASSEMBLY NO. 066-3008-02
DESCRIPTION OMNI INDICATOR
UNIT KI201/B/C
REVISION 43
USED ON ASSEMBLY 066-3008-XX
ASSEMBLY DRAWING NO.

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
		089-2106-11	NUT HEX 1 4 32	1
		089-5436-04	SCR PFH 4 40X1 4	6
		089-5857-03	SC BRIS 4 40X3 32	2
		089-5857-04	SC BRIS 4 40X1 8	2
		089-5878-04	SC PPH 4 40X1 4	6
		089-5878-05	SC PPH 4 40X5 16	1
		089-5878-06	SCR PPH 4-40X3/8	3
		089-5878-07	SCR PHP 4-40X7/16	1
		089-5903-06	SCR PPH 4 40X3 8	1
		089-5903-13	SCR PPH 4-40X13/16	6
		089-6008-04	SCREW PFH 4 40X1 4	3
		089-8003-34	WASHER SPLITLOCK 4	7
		089-8003-34	WASHER SPLITLOCK 4	1
		089-8042-30	WASHER LOCK IN 1 4	1
		089-8067-30	WASHER FLAT	1
		089-8068-30	WASHER FLAT SS	1
		090-0019-02	RING RETAINING	1
R1		090-0033-02	SPRING WASHER	1
		090-0035-04	SPACER SWAGE	6
		090-0042-03	STUD SELF CLINCH	1
		090-0055-00	INSERT	3
		150-0002-00	TUBING TEF BLK 26	.4
		150-0054-10	TUBING INSUL	.1
		150-0062-10	TUBING TEF CLR 10	.5
		187-1051-00	GASKET	1
	B 301	148-0003-00	RESOLVER 30CPS	1
	C 301	096-1014-00	CAP TANT 40UF 20P	1
	C 302	105-0024-07	CAP MY .1UF 10PC	1
R1	C 304	096-1014-00	CAP TANT 40UF 20P	1
R1	C 305	096-1014-00	CAP TANT 40UF 20P	1
	C 306	097-0025-00	CAP ELECT 485UF	1
	C 307	096-1005-00	CAP TANT 1UF 20P	1
	C 308	105-0024-09	CAP MY .1UF 5PC	1
	C 309	105-0024-09	CAP MY .1UF 5PC	1
	C 311	105-0024-05	CAP MY 047UF 10PC	1
	C 312	105-0024-05	CAP MY 047UF 10PC	1
	C 313	096-1014-00	CAP TANT 40UF 20P	1
	C 314	097-0025-00	CAP ELECT 485UF	1
	C 315	105-0024-09	CAP MY .1UF 5PC	1
	C 316	105-0024-09	CAP MY .1UF 5PC	1
	C 317	096-1005-00	CAP TANT 1UF 20P	1
	C 321	105-0024-00	CAP MY 001UF 10PC	1
	C 322	105-0024-03	CAP MY 01UF 10PC	1
	C 323	105-0024-03	CAP MY 01UF 10PC	1
	C 324	096-1005-00	CAP TANT 1UF 20P	1

*R indicates Revision. See Page 6-8 for Revision History of Parts List.

ASSEMBLY NO. 066-3008-02
DESCRIPTION OMNI INDICATOR
UNIT KI201/B/C
REVISION 43
USED ON ASSEMBLY 066-3008-XX
ASSEMBLY DRAWING NO.

	SYMBOL		PART NUMBER	DESCRIPTION	QUANTITY
	C	325	105-0024-07	CAP MY .1UF 10PC	1
	C	326	105-0024-07	CAP MY .1UF 10PC	1
	C	327	097-0046-00	CAP ELECT 25UF	1
	C	328	108-5014-24	CAP FILM .1UF 1PC	1
	C	329	105-0024-07	CAP MY .1UF 10PC	1
	C	332	096-1014-00	CAP TANT 40UF 20P	1
	C	333	096-1014-00	CAP TANT 40UF 20P	1
	C	334	097-0057-33	CAP ELECT 2200UF	1
	CR	301	007-5011-08	DIODE ZENER 8 2V	1
	CR	302	007-6029-00	DIODE SIL IN457	1
	CR	303	007-6029-00	DIODE SIL IN457	1
	CR	304	007-6029-00	DIODE SIL IN457	1
	CR	305	007-6029-00	DIODE SIL IN457	1
	CR	306	007-6029-00	DIODE SIL IN457	1
	CR	307	007-6029-00	DIODE SIL IN457	1
	CR	308	007-6023-00	DIODE GERM IN277	1
	DS	401	037-0013-00	LAMP BULB 12V	1
	DS	402	037-0013-00	LAMP BULB 12V	1
	J	301	030-2001-00	MIN PLUG 14 PIN	1
	Q	301	007-0032-00	TRANS SILICON	1
	Q	302	007-0032-00	TRANS SILICON	1
	Q	303	007-0032-00	TRANS SILICON	1
R1	Q	304	007-0032-00	TRANS SILICON	1
R1	Q	305	007-0032-00	TRANS SILICON	1
	Q	306	007-0026-01	TRANSISTOR 2N2714	1
	Q	307	007-0032-00	TRANS SILICON	1
	Q	308	007-0026-01	TRANSISTOR 2N2714	1
	Q	309	007-0035-00	TRANS SILICON	1
	Q	310	007-0026-02	TRANS SILICON	1
	Q	311	007-0032-00	TRANS SILICON	1
	Q	312	007-0032-00	TRANS SILICON	1
	Q	313	007-0032-00	TRANS SILICON	1
	Q	314	007-0032-00	TRANS SILICON	1
	Q	315	007-0032-00	TRANS SILICON	1
	Q	316	007-0032-00	TRANS SILICON	1
	Q	317	007-0032-00	TRANS SILICON	1
	Q	318	007-0032-00	TRANS SILICON	1
	R	301	132-5006-00	RES WW 47 10PC 2W	1
	R	302	132-5010-00	RES WW 200 5PC 2W	1
	R	303	136-1003-22	RES 100K 1PC QW	1
	R	304	130-0105-25	RES 1MEG 10PC QW	1
	R	307	130-0153-25	RES 15K 10PC QW	1
	R	308	130-0102-25	RES 1K 10PC QW	1
	R	309	130-0472-25	RES 4 7K 10PC QW	1
	R	311	130-0471-25	RES 470 10PC QW	1

*R indicates Revision. See Page 6-8 for Revision History of Parts List.

ASSEMBLY NO. 066-3008-02
DESCRIPTION OMNI INDICATOR
UNIT KI201/B/C
REVISION 43
USED ON ASSEMBLY 066-3008-XX
ASSEMBLY DRAWING NO.

	SYMBOL		PART NUMBER	DESCRIPTION	QUANTITY
R1	R	312	130-0471-25	RES 470 10PC QW	1
R1	R	313	130-0471-25	RES 470 10PC QW	1
	R	314	130-0474-25	RES 470K 10PC QW	1
	R	315	133-0016-00	POT 150K 20PC	1
	R	316	133-0022-00	POT 1K 30PC QW	1
	R	317	136-4753-22	RES 475K 1PC QW	1
	R	318	136-6811-22	RES 6810 1PC QW	1
	R	321	133-0016-02	POT 1K 20PC	1
	R	322	130-0104-25	RES 100K 10PC QW	1
	R	323	133-0016-01	POT 600K 20PC	1
	R	324	130-0103-25	RES 10K 10PC QW	1
	R	325	130-0104-25	RES 100K 10PC QW	1
	R	326	130-0683-25	RES 68K 10PC QW	1
	R	327	130-0103-25	RES 10K 10PC QW	1
	R	328	130-0472-25	RES 4 7K 10PC QW	1
	R	331	130-0ZZZ-25	SELECTED VALUE	1
	R	332	130-0103-25	RES 10K 10PC QW	1
	R	333	130-0153-25	RES 15K 10PC QW	1
	R	334	130-0103-25	RES 10K 10PC QW	1
	R	335	136-6811-22	RES 6810 1PC QW	1
	R	337	130-0103-25	RES 10K 10PC QW	1
	R	338	136-4753-22	RES 475K 1PC QW	1
	R	339	130-0103-25	RES 10K 10PC QW	1
	R	341	130-0272-25	RES 2 7K 10PC QW	1
	R	342	130-0104-25	RES 100K 10PC QW	1
	R	343	130-0181-25	RES 180 10PC QW	1
	R	344	130-0273-25	RES 27K 10PC QW	1
	R	345	130-0273-25	RES 27K 10PC QW	1
R1	R	346	136-2743-22	RES 274K 1PC QW	1
	R	348	130-0471-25	RES 470 10PC QW	1
	R	351	133-0016-03	POT 10K 20PC	1
	R	352	136-4752-22	RES 47 5K 1PC QW	1
	R	354	130-0105-25	RES 1MEG 10PC QW	1
	R	357	130-0153-25	RES 15K 10PC QW	1
	R	358	130-0102-25	RES 1K 10PC QW	1
	R	359	130-0472-25	RES 4 7K 10PC QW	1
	R	361	130-0471-25	RES 470 10PC QW	1
	R	362	130-0101-25	RES 100 10PC QW	1
	R	363	133-0016-05	POT 500 20PC	1
	R	364	130-0101-25	RES 100 10PC QW	1
	R	365	130-0101-25	RES 100 10PC QW	1
	R	367	130-0101-25	RES 100 10PC QW	1
	R	368	130-0101-25	RES 100 10PC QW	1
	T	301	019-5029-00	TRANS PHASE DETECT	1
	T	302	019-8024-00	TRANS IF 10KC DISC	1

*R indicates Revision. See Page 6-8 for Revision History of Parts List.

ASSEMBLY NO. 066-3008-02
DESCRIPTION OMNI INDICATOR
UNIT KI201/B/C
REVISION 43
USED ON ASSEMBLY 066-3008-XX
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
T 303	019-5029-00	TRANS PHASE DETECT	1

PARTS LIST REVISION HISTORY

PARTS LIST REVISION HISTORY	ENGR. APPROVAL
NAME Omni Indicator	ASS'Y. NO. 066-3008-02
ASS'Y. DWG.	UNIT KI 201/B/C
USED ON 066-3008-xx	

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION		
	Add		090-0041-01	Retaining Ring	Qty.	1
	Change to	R312	130-0101-25	Res F/C 100 10% QW	"	1
	Change to	R313	130-0101-25	Res. F/C 100 10% QW	"	1
	Add	R369	133-0016-01	Res. Vari 600K 20%	"	1
	Change to	R346	136-1003-22	Res. 100K 1% QW	"	1
	Add	R353	136-1003-22	Res. 100K 1% QW	"	1
	Change to	Q304	007-0129-00	Tstr. 2N5305	"	1
	Change to	Q305	007-0129-00	Tstr. 2N5305	"	1
	Add		089-8070-11	Washer Flat	"	1
	Add		089-8079-30	Washer Flat .005 thk	"	1
	Add		150-0018-10	Tubing shrink	"	.6 ft.

'ASSEMBLY NO. 069-1010-04
DESCRIPTION KI211C
UNIT KI211C
REVISION 30
USED ON ASSEMBLY 069-1010-04
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	008-0004-00	LUG SOLDER NO 4	1
	008-0005-01	LUG SOLDER	3
R1	009-5013-00	BOARD PC OMNI	1
	009-5014-00	BOARD PC GLD SLOPE	1
	009-5052-00	BOARD PC MATRIX	1
	010-0041-00	TERMINAL INSULATED	3
	012-1009-00	TAPE MYLAR	.5
	013-0006-00	FERRITE BEAD	40
R1	023-0056-03	METER ASSY	1
	025-0003-03	WIRE SPC22 ORANGE	1.5
	025-0003-09	WIRE SPC22 WHITE	.9
	025-0018-00	WIRE CW26 BLACK	2.3
	025-0018-11	WIRE CW26 BROWN	1.0
	025-0018-14	WIRE CW26 BRN/YEL	.4
	025-0018-24	WIRE CW26 RED/YEL	.4
	025-0018-29	WIRE CW26 RED/WHT	.9
	025-0018-30	WIRE CW26 ORG/BLK	.4
	025-0018-40	WIRE CW26 YEL BLK	.4
	025-0018-44	WIRE CW26 YELLOW	.8
	025-0018-54	WIRE CW26 GRN/YEL	.9
	025-0018-55	WIRE CW26 GREEN	1.0
	025-0018-59	WIRE CW26 GRN/WHT	.5
	025-0018-64	WIRE CW26 BLU/YEL	.4
	025-0018-66	WIRE CW26 BLUE	.8
	025-0018-69	WIRE CW26 BLU/WHT	1.0
	025-0018-74	WIRE CW26 VIO/YEL	.4
	025-0018-77	WIRE CW26 VIOLET	.5
	025-0018-84	WIRE CW26 GRY/YEL	.4
	025-0018-89	WIRE CW26 GRY/WHT	.8
	025-0018-90	WIRE CW26 WHT BLK	1.0
	025-0018-92	WIRE CW26 WHT RED	1.5
	025-0018-93	WIRE CW26 WHT ORN	.7
	025-0018-99	WIRE CW26 WHITE	.9
	026-0003-00	WIRE TC 22 BUSS	.2
	026-0004-00	WIRE TC 20 BUSS	.5
	029-0004-00	BELT GEAR	1
	029-0012-00	PULL GEAR 14 TEETH	1
	030-1007-00	LOCK TAB	1
	030-1007-00	LOCK TAB	1
	035-1037-03	SHIPPING CONTAINER	1
	047-1175-00	BRACKET	1
	047-1178-00	FENCE GLIDE SLOPE	1
	047-1199-00	COVER FENCE	1
	047-1546-00	DUST COVER	1
	047-1547-01	FRAME CHANNEL BOT	1

*R indicates Revisions. See Page 6-16 for Revision History of Parts List.

DESCRIPTION KI211C
UNIT KI211-XX
REVISION 30
USED ON ASSEMBLY 069-1010-XX
ASSEMBLY DRAWING NO.

SYMBOL		PART NUMBER	DESCRIPTION	QUANTITY
		047-1967-00	FRAME CHANNEL	1
		057-1044-00	FCC TAG DECAL	1
		057-1049-01	AZIMUTH DIAL	1
		057-1169-00	LABEL PATENT	1
		057-1345-01	IDENT PLATE	1
		073-0015-00	AZIMUTH DIAL	1
		073-0021-01	FRONT CASTING	1
		073-0062-01	REAR MTG PLATE	1
		073-0116-03	FACE PLATE	1
		076-0043-00	SHAFT	1
		076-0384-02	KNOB	1
		088-0066-00	SPACER PLASTIC	1
		088-0084-01	LAMP FILTER L BLUE	2
		088-0188-01	COVER LGHT WEDGE	1
		089-2013-37	NUT HEX 6-32	1
		089-2026-22	NUT SWAGE	2
		089-2105-22	NUT SPEED 4 40	16
		089-2106-11	NUT HEX 1 4 32	1
		089-2136-00	NUT STOP 2-56	4
		089-5436-04	SCR PFH 4 40X1 4	6
		089-5857-03	SC BRIS 4 40X3 32	2
		089-5857-04	SC BRIS 4 40X1 8	2
		089-5878-04	SC PPH 4 40X1 4	9
		089-5878-05	SC PPH 4 40X5 16	2
		089-5878-06	SCR PPH 4-40X3/8	3
		089-5878-07	SCR PHP 4-40X7/16	1
		089-5878-10	SC PPH 4 40X5 8	6
		089-5899-05	SCREW 2-56	2
		089-5903-13	SCR PPH 4-40X13/16	6
		089-8003-34	WASHER SPLITLOCK 4	8
		089-8042-30	WASHER LOCK IN 1 4	1
		089-8067-30	WASHER FLAT	1
		089-8068-30	WASHER FLAT SS	1
		090-0019-02	RING RETAINING	1
	R1	090-0033-02	SPRING WASHER	1
	R1	090-0035-04	SPACER SWAGE	6
		090-0035-05	SPACER SWAGE	6
		090-0042-03	STUD SELF CLINCH	1
		090-0055-00	INSERT	3
		150-0002-00	TUBING TEF BLK 26	.4
		150-0054-10	TUBING INSUL	.1
		150-0062-10	TUBING TEF CLR 10	.5
		187-1051-00	GASKET LIGHTING	1
B 301		148-0003-00	RESOLVER 30CPS	1
C 301		096-1014-00	CAP TANT 40UF 20P	1

*R indicates Revisions. See Page 6-16 for Revision History of Parts List.

'ASSEMBLY NO. 069-1010-04
DESCRIPTION KI211C
UNIT KI211C
REVISION 30
USED ON ASSEMBLY 069-1010-04
ASSEMBLY DRAWING NO.

	SYMBOL		PART NUMBER	DESCRIPTION	QUANTITY
	C	302	105-0024-07	CAP MY .1UF 10PC	1
	C	304	096-1014-00	CAP TANT 40UF 20P	1
	C	305	096-1014-00	CAP TANT 40UF 20P	1
	C	306	097-0025-00	CAP ELECT 485UF	1
	C	307	096-1005-00	CAP TANT 1UF 20P	1
	C	308	105-0024-09	CAP MY .1UF 5PC	1
	C	309	105-0024-09	CAP MY .1UF 5PC	1
	C	311	105-0024-05	CAP MY 047UF 10PC	1
	C	312	105-0024-05	CAP MY 047UF 10PC	1
	C	313	096-1014-00	CAP TANT 40UF 20P	1
	C	314	097-0025-00	CAP ELECT 485UF	1
	C	315	105-0024-09	CAP MY .1UF 5PC	1
	C	316	105-0024-09	CAP MY .1UF 5PC	1
	C	317	096-1005-00	CAP TANT 1UF 20P	1
	C	321	105-0024-00	CAP MY 001UF 10PC	1
	C	322	105-0024-03	CAP MY 01UF 10PC	1
	C	323	105-0024-03	CAP MY 01UF 10PC	1
	C	324	096-1005-00	CAP TANT 1UF 20P	1
	C	325	105-0024-07	CAP MY .1UF 10PC	1
	C	326	105-0024-07	CAP MY .1UF 10PC	1
	C	327	097-0046-00	CAP ELECT 25UF	1
	C	328	108-5014-24	CAP FILM 1UF 1PC	1
	C	329	105-0024-07	CAP MY .1UF 10PC	1
	C	332	096-1014-00	CAP TANT 40UF 20P	1
	C	333	096-1014-00	CAP TANT 40UF 20P	1
	C	334	097-0057-33	CAP ELECT 2200UF	1
	C	401	096-1005-00	CAP TANT 1UF 20P	1
	C	402	113-5102-00	CAP 1KPF 10PC X5F	1
	C	403	113-5102-00	CAP 1KPF 10PC X5F	1
	C	404	113-5102-00	CAP 1KPF 10PC X5F	1
	C	405	113-3220-00	CAP 22F 5PC N150	1
	C	406	113-3068-00	CAP 6 8PF N150	1
	C	407	113-5390-00	CAP 39PF 10PC N150	1
	C	408	102-0016-00	CAP VARI 1.5 9.1PF	1
	C	409	102-0016-00	CAP VARI 1.5 9.1PF	1
	C	411	113-5390-00	CAP 39PF 10PC N150	1
	C	412	105-0024-00	CAP MY 001UF 10PC	1
	C	413	102-0016-00	CAP VARI 1.5 9.1PF	1
	C	414	106-0001-09	CAP QC 4 7PF 10PC	1
R1	C	415	106-0001-02	CAP QC 1.5PF 10%	1
	C	416	096-1050-00	CAP TANT .33UF 20P	1
	C	417	105-0024-03	CAP MY 01UF 10PC	1
	C	418	102-0015-00	CAP VARI 8 TO 60PF	1
	C	419	104-0001-07	CAP MICA 1KPF 5PC	1
	C	421	104-0001-07	CAP MICA 1KPF 5PC	1

*R indicates Revisions. See Page 6-16 for Revision History of Parts List.

DESCRIPTION KI211C
UNIT KI211-XX
REVISION 30
USED ON ASSEMBLY 069-1010-XX
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
C 422	105-0024-03	CAP MY 01UF 10PC	1
C 423	105-0024-06	CAP MY 068UF 10PC	1
C 424	096-1006-00	CAP TANT 1UF 20P	1
C 425	105-0024-03	CAP MY 01UF 10PC	1
C 426	105-0024-04	CAP MY 033UF 10PC	1
C 427	096-1005-00	CAP TANT 1UF 20P	1
C 428	105-0024-03	CAP MY 01UF 10PC	1
C 432	105-0024-07	CAP MY .1UF 10PC	1
C 433	105-0024-03	CAP MY 01UF 10PC	1
C 434	105-0024-05	CAP MY 047UF 10PC	1
C 435	105-0024-07	CAP MY .1UF 10PC	1
C 436	105-0024-04	CAP MY 033UF 10PC	1
C 437	105-0024-04	CAP MY 033UF 10PC	1
C 438	105-0024-06	CAP MY 068UF 10PC	1
C 441	105-0024-05	CAP MY 047UF 10PC	1
C 442	105-0024-05	CAP MY 047UF 10PC	1
C 443	105-0024-07	CAP MY .1UF 10PC	1
C 444	096-1013-00	CAP TANT 0 22UF 20	1
C 445	096-1013-00	CAP TANT 0 22UF 20	1
C 446	096-1014-00	CAP TANT 40UF 20P	1
C 447	096-1014-00	CAP TANT 40UF 20P	1
C 448	097-0047-00	CAP ELECT 250UF	1
C 449	097-0056-05	CAP ELECT 500UF	1
CR 301	007-5011-08	DIODE ZENER 8 2V	1
CR 302	007-6029-00	DIODE SIL IN457	1
CR 303	007-6029-00	DIODE SIL IN457	1
CR 304	007-6029-00	DIODE SIL IN457	1
CR 305	007-6029-00	DIODE SIL IN457	1
CR 306	007-6029-00	DIODE SIL IN457	1
CR 307	007-6029-00	DIODE SIL IN457	1
CR 308	007-6023-00	DIODE GERM IN277	1
CR 401	007-5011-08	DIODE ZENER 8 2V	1
CR 402	007-5005-00	DIODE 1N935A	1
CR 403	007-4001-00	DIODE CAPACITOR	1
CR 404	007-6029-00	DIODE SIL IN457	1
CR 405	007-6029-00	DIODE SIL IN457	1
CR 406	007-6023-00	DIODE GERM IN277	1
CR 407	007-6023-00	DIODE GERM IN277	1
CR 408	007-6023-00	DIODE GERM IN277	1
CR 409	007-6023-00	DIODE GERM IN277	1
CR 410	007-6029-00	DIODE SIL IN457	1
DS 401	037-0013-00	LAMP TI 12 VOLTS	1
DS 402	037-0013-00	LAMP TI 12 VOLTS	1
J 401	030-2003-00	CONN 20 PIN PLUG	1
J 402	030-0030-01	CONNECTOR COAX	1

*R indicates Revisions. See Page 6-16 for Revision History of Parts List.

ASSEMBLY NO. 069-1010-04
DESCRIPTION KI211C
UNIT KI211-XX
REVISION 30
USED ON ASSEMBLY 069-1010-XX
ASSEMBLY DRAWING NO.

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	L 401	019-2058-20	CHOKE RF 4 7UH	1
	L 402	019-3007-00	COIL RF 4T BUSS	1
	L 403	019-3036-00	COIL RF	1
	L 404	019-3007-00	COIL RF 4T BUSS	1
	L 405	019-2082-04	CHOKE O 33UH 10PC	1
	L 406	019-2058-20	CHOKE RF 4 7UH	1
	L 407	019-3008-00	COIL TRIPLER 3T	1
	L 408	019-2065-00	CHOKE RF 100UH	1
	Q 301	007-0032-00	TRANS SILICON	1
	Q 302	007-0032-00	TRANS SILICON	1
	Q 303	007-0032-00	TRANS SILICON	1
R1	Q 304	007-0032-00	TRANS SILICON	1
R1	Q 305	007-0032-00	TRANS SILICON	1
	Q 306	007-0026-01	TRANSISTOR 2N2714	1
	Q 307	007-0032-00	TRANS SILICON	1
	Q 308	007-0026-01	TRANSISTOR 2N2714	1
	Q 309	007-0035-00	TRANS SILICON	1
	Q 310	007-0026-02	TRANS SILICON	1
	Q 311	007-0032-00	TRANS SILICON	1
	Q 312	007-0032-00	TRANS SILICON	1
	Q 313	007-0032-00	TRANS SILICON	1
	Q 314	007-0032-00	TRANS SILICON	1
	Q 315	007-0032-00	TRANS SILICON	1
	Q 316	007-0032-00	TRANS SILICON	1
	Q 317	007-0032-00	TRANS SILICON	1
	Q 318	007-0032-00	TRANS SILICON	1
	Q 401	007-0028-00	TRANS SILICON	1
	Q 402	007-0028-00	TRANS SILICON	1
	Q 403	007-0028-00	TRANS SILICON	1
	Q 404	007-0033-00	TRANS SILICON	1
	Q 405	007-0033-00	TRANS SILICON	1
	Q 406	007-0033-00	TRANS SILICON	1
	Q 407	007-0033-00	TRANS SILICON	1
	Q 408	007-0033-00	TRANS SILICON	1
	Q 409	007-0033-00	TRANS SILICON	1
	Q 410	007-0033-00	TRANS SILICON	1
	Q 411	007-0033-00	TRANS SILICON	1
	Q 412	007-0033-00	TRANS SILICON	1
	Q 901	007-0026-02	TRANS SILICON	1
	Q 902	007-0026-02	TRANS SILICON	1
	Q 903	007-0026-02	TRANS SILICON	1
	Q 904	007-0026-02	TRANS SILICON	1
	Q 905	007-0026-02	TRANS SILICON	1
	Q 906	007-0026-02	TRANS SILICON	1
	Q 907	007-0026-02	TRANS SILICON	1

*R indicates Revisions. See Page 6-16 for Revision History of Parts List.

*ASSEMBLY NO. 069-1010-04
DESCRIPTION KI211C
UNIT KI211C
REVISION 30
USED ON ASSEMBLY 069-1010-04
ASSEMBLY DRAWING NO.

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	Q 908	007-0026-02	TRANS SILICON	1
	Q 909	007-0026-02	TRANS SILICON	1
	Q 910	007-0026-02	TRANS SILICON	1
	Q 911	007-0026-02	TRANS SILICON	1
	Q 912	007-0026-02	TRANS SILICON	1
	Q 913	007-0026-02	TRANS SILICON	1
	Q 914	007-0026-02	TRANS SILICON	1
	Q 915	007-0026-02	TRANS SILICON	1
	Q 916	007-0026-02	TRANS SILICON	1
	Q 917	007-0026-02	TRANS SILICON	1
	Q 918	007-0026-02	TRANS SILICON	1
	Q 919	007-0026-02	TRANS SILICON	1
	Q 920	007-0026-02	TRANS SILICON	1
	R 301	132-5006-00	RES WW 47 10PC 2W	1
	R 302	132-5010-00	RES WW 200 5PC 2W	1
	R 303	136-1003-22	RES 100K 1PC QW	1
	R 304	130-0105-25	RES 1MEG 10PC QW	1
	R 307	130-0153-25	RES 15K 10PC QW	1
	R 308	130-0102-25	RES 1K 10PC QW	1
	R 309	130-0472-25	RES 4 7K 10PC QW	1
	R 311	130-0471-25	RES 470 10PC QW	1
R1	R 312	130-0471-25	RES 470 10PC QW	1
R1	R 313	130-0471-25	RES 470 10PC QW	1
	R 314	130-0474-25	RES 470K 10PC QW	1
	R 315	133-0016-00	POT 150K 20PC	1
	R 316	133-0022-00	POT 1K 30PC QW	1
	R 317	136-4753-22	RES 475K 1PC QW	1
	R 318	136-6811-22	RES 6810 1PC QW	1
	R 321	133-0016-02	POT 1K 20PC	1
	R 322	130-0104-25	RES 100K 10PC QW	1
	R 323	133-0016-01	POT 600K 20PC	1
	R 324	130-0103-25	RES 10K 10PC QW	1
	R 325	130-0104-25	RES 100K 10PC QW	1
	R 326	130-0683-25	RES 68K 10PC QW	1
	R 327	130-0103-25	RES 10K 10PC QW	1
	R 328	130-0472-25	RES 4 7K 10PC QW	1
	R 331	130-0ZZZ-25	SELECTED VALUE	1
	R 332	130-0103-25	RES 10K 10PC QW	1
	R 333	130-0153-25	RES 15K 10PC QW	1
	R 334	130-0103-25	RES 10K 10PC QW	1
	R 335	136-6811-22	RES 6810 1PC QW	1
	R 337	130-0103-25	RES 10K 10PC QW	1
	R 338	136-4753-22	RES 475K 1PC QW	1
	R 339	130-0103-25	RES 10K 10PC QW	1
	R 341	130-0272-25	RES 2 7K 10PC QW	1

*R indicates Revisions. See Page 6-16 for Revision History of Parts.

ASSEMBLY NO. 069-1010-04
DESCRIPTION KI211C
UNIT KI211C
REVISION 30
USED ON ASSEMBLY 069-1010-04
ASSEMBLY DRAWING NO.

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	R 342	130-0104-25	RES 100K 10PC QW	1
	R 343	130-0181-25	RES 180 10PC QW	1
	R 344	130-0273-25	RES 27K 10PC QW	1
	R 345	130-0273-25	RES 27K 10PC QW	1
	R 346	136-1003-22	RES 100K 1PC QW	1
	R 347	136-2743-22	RES 274K 1PC QW	1
	R 348	130-0471-25	RES 470 10PC QW	1
	R 351	133-0016-03	POT 10K 20PC	1
	R 352	136-4752-22	RES 47 5K 1PC QW	1
	R 353	136-1003-22	RES 100K 1PC QW	1
	R 354	130-0105-25	RES 1MEG 10PC QW	1
	R 357	130-0153-25	RES 15K 10PC QW	1
	R 358	130-0102-25	RES 1K 10PC QW	1
	R 359	130-0472-25	RES 4 7K 10PC QW	1
	R 361	130-0471-25	RES 470 10PC QW	1
	R 362	130-0101-25	RES 100 10PC QW	1
	R 363	133-0016-05	POT 500 20PC	1
	R 364	130-0101-25	RES 100 10PC QW	1
	R 365	130-0101-25	RES 100 10PC QW	1
	R 367	130-0101-25	RES 100 10PC QW	1
	R 368	130-0101-25	RES 100 10PC QW	1
	R 402	132-5007-00	RES WW 75 5PC 2W	1
	R 403	130-0473-25	RES 47K 10PC QW	1
	R 404	130-0104-25	RES 100K 10PC QW	1
	R 405	130-0472-25	RES 4 7K 10PC QW	1
	R 406	130-0272-25	RES 2 7K 10PC QW	1
	R 407	130-0121-35	RES 120 10PC HW	1
R1	R 408	130-0121-25	RES 120 10PC QW	1
R1	R 409	136-1002-22	RES 10K OHM 1PC QW	1
	R 410	133-0016-02	POT 1K 20PC	1
	R 411	130-0105-25	RES 1MEG 10PC QW	1
	R 412	130-0472-25	RES 4 7K 10PC QW	1
	R 413	130-0680-23	RES 68 5PC QW	1
R1	R 414	130-0222-25	RES 2 2K 10PC QW	1
	R 415	130-0102-25	RES 1K 10PC QW	1
	R 416	130-0101-25	RES 100 10PC QW	1
	R 417	130-0105-25	RES 1MEG 10PC QW	1
	R 418	130-0154-25	RES 150K 10PC QW	1
	R 419	130-0102-25	RES 1K 10PC QW	1
	R 420	130-0473-25	RES 47K 10PC QW	1
	R 421	130-0105-25	RES 1MEG 10PC QW	1
	R 424	130-0473-25	RES 47K 10PC QW	1
	R 425	132-5001-00	RES WW 180 10PC 2W	1
	R 426	130-0101-25	RES 100 10PC QW	1
	R 431	130-0473-25	RES 47K 10PC QW	1

*R indicates Revisions. See Page 6-16 for Revision History of Parts.

ASSEMBLY NO. 069-1010-04
DESCRIPTION KI211C
UNIT KI211-XX
REVISION 30
USED ON ASSEMBLY 069-1010-XX
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R 432	133-0016-00	POT 150K 20PC	1
R 433	130-0473-25	RES 47K 10PC QW	1
R 434	130-0154-25	RES 150K 10PC QW	1
R 435	130-0683-25	RES 68K 10PC QW	1
R 436	130-0154-25	RES 150K 10PC QW	1
R 437	130-0683-25	RES 68K 10PC QW	1
R 438	136-4752-22	RES 47 5K 1PC QW	1
R 441	136-ZZZZ-22	SELECT VALUE	1
R 442	136-3322-22	RES 33 2K 1PC QW	1
R 443	136-ZZZZ-22	SELECT VALUE	1
R 444	136-4752-22	RES 47 5K 1PC QW	1
R 445	136-3922-22	RES 39 2K 1PC QW	1
R 446	130-0272-25	RES 2 7K 10PC QW	1
R 447	130-0101-25	RES 100 10PC QW	1
R 448	130-0272-25	RES 2 7K 10PC QW	1
R 451	130-0101-25	RES 100 10PC QW	1
R 452	130-0104-25	RES 100K 10PC QW	1
R 454	130-0104-25	RES 100K 10PC QW	1
R 455	130-0104-25	RES 100K 10PC QW	1
R 456	130-0104-25	RES 100K 10PC QW	1
R 457	133-0016-02	POT 1K 20PC	1
R 461	130-0102-25	RES 1K 10PC QW	1
R 462	130-0102-25	RES 1K 10PC QW	1
R 463	130-0221-25	RES 220 10PC QW	1
R 464	130-0221-25	RES 220 10PC QW	1
R 465	133-0016-02	POT 1K 20PC	1
R 901	136-3742-22	RES 37.4K 1PC QW	1
R 902	136-2552-22	RES 25 5K 1PC QW	1
R 903	136-5231-22	RES 5231 1PC QW	1
R 904	136-6341-22	RES 6340 1PC QW	1
R 905	136-4421-22	RES 4.42K 1PC QW	1
R 906	136-8451-22	RES 8450 1PC QW	1
R 907	136-1022-22	RES 10 2K 1PC QW	1
R 908	136-1272-22	RES 12 7K 1PC QW	1
R 909	136-1622-22	RES 16 2K 1PC QW	1
R 910	136-2152-22	RES 21 5K 1PC QW	1
R 911	136-3012-22	RES 30.1K 1PC QW	1
R 912	136-4642-22	RES 46 4K 1PC QW	1
R 913	136-4871-22	RES 4870 1PC QW	1
R 914	136-5761-22	RES 5760 1PC QW	1
R 915	136-6981-22	RES 6980 1PC QW	1
R 916	136-9311-22	RES 9310 1PC QW	1
R 917	136-1152-22	RES 11 5K 1PC QW	1
R 918	136-1432-22	RES 14 3K 1PC QW	1
R 919	136-1872-22	RES 18.7K 1PC QW	1

*R indicates Revisions. See Page 6-16 for Revision History of Parts.

ASSEMBLY NO. 069-1010-04
DESCRIPTION KI211C
UNIT KI211-XX
REVISION 30
USED ON ASSEMBLY 069-1010-XX
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R 920	136-7681-22	RES 7680 1PC QW	1
R 921	130-0473-25	RES 47K 10PC QW	1
R 922	130-0473-25	RES 47K 10PC QW	1
R 923	130-0473-25	RES 47K 10PC QW	1
R 924	130-0473-25	RES 47K 10PC QW	1
R 925	130-0473-25	RES 47K 10PC QW	1
RT 401	134-1012-01	THERMISTOR	1
T 301	019-5029-00	TRANS PHASE DETECT	1
T 302	019-8024-00	TRANS IF 10KC DISC	1
T 303	019-5029-00	TRANS PHASE DETECT	1
T 401	019-3012-00	TRANSFORMER SRD	1
Y 401	042-8960-25	CRYSTAL 96 0250 MC	1

*R indicates Revisions. See Page 6-16 for Revision History of Parts.

PARTS LIST REVISION HISTORY			ENGR. APPROVAL
NAME KI 211C Assembly			ASS'Y. NO. 069-1010-04
ASS'Y. DWG.	UNIT KI 211C		USED ON 069-1010-04

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION	QTY.
	ADD		090-0041-01	Retaining Ring	1
	CHANGE		090-0033-02	Washer, Spring	2
	ADD		089-8070-11	Washer, Flat	1
	ADD		089-8079-22	Washer, Flat .005 Thk	1
	ADD		150-0018-10	Shrink Tubing	6 Ft.
	ADD	R470	130-0472-25	Res. F/C 4.7K QW 10%	1
	DELETE	C415	106-0001-02	Cap QC 1.5pf 10%	1
	ADD	C415	106-0001-09	Cap 4.7pf 10% 500WV	1
	CHANGE	R408	130-0151-25	Res F/C 150 10% QW	1
	CHANGE	R414	130-0182-25	Res F/C 1.8K 10% QW	1
	DELETE	R409			0
	ADD	R409	136-9311-22	Res P/F 9.31K 1% QW	1
	DELETE	Q304			0
	DELETE	Q305			0
	CHANGE	R312	130-0101-25	Res F/C 100 10% QW	1
	CHANGE	R313	130-0101-25	Res F/C 100 10% QW	1
	CHANGE		023-0056-05	Meter Ass'y.	1
	ADD	R369	133-0016-01	Res Vari 600K	1
	DELETE		090-0035-04		0
	CHANGE		009-5013-01	Board P. C. Omni	1

ASSEMBLY NO. 069-1010-03
DESCRIPTION KI212
UNIT KI212
REVISION 39
USED ON ASSEMBLY 069-1010-03
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	008-0004-00	LUG SOLDER NO 4	1
	008-0005-01	LUG SOLDER	4
	009-5014-00	BOARD PC GLD SIOPE	1
	009-5052-00	BOARD PC MATRIX	1
	010-0041-00	TERMINAL INSULATED	3
	012-1009-00	TAPE MYLAR	.5
	013-0006-00	FERRITE BEAD	62
	023-0056-02	METER ASSY	1
	025-0018-00	WIRE CW26 BLACK	1.0
	025-0018-14	WIRE CW26 BRN/YEL	.4
	025-0018-19	WIRE CW26 BRN/WHT	1.0
	025-0018-24	WIRE CW26 RED/YEL	.4
	025-0018-26	WIRE CW26 RED/BLU	1.0
	025-0018-30	WIRE CW26 ORG/BLK	.4
	025-0018-34	WIRE CW26 ORN/YEL	1.0
	025-0018-39	WIRE CW26 ORG/WHT	.6
	025-0018-40	WIRE CW26 YEL BLK	.4
	025-0018-41	WIRE CW26 YEL/BRN	1.0
	025-0018-59	WIRE CW26 GRN/WHT	.5
	025-0018-64	WIRE CW26 BLU/YEL	.4
	025-0018-69	WIRE CW26 BLU/WHT	1.0
	025-0018-74	WIRE CW26 VIO/YEL	.4
	025-0018-77	WIRE CW26 VIOLET	1.0
	025-0018-84	WIRE CW26 GRY/YEL	.4
	025-0018-89	WIRE CW26 GRY/WHT	.8
	025-0018-90	WIRE CW26 WHT BLK	.5
	025-0018-92	WIRE CW26 WHT RED	1.5
	026-0003-00	WIRE TC 22 BUSS	.2
	029-0004-00	BELT GEAR	1
	029-0012-00	PULL GEAR 14 TEETH	1
	030-2143-00	CONNECTOR	1
	035-1037-03	SHIPPING CONTAINER	1
	047-1178-00	FENCE GLIDE SLOPE	1
	047-1199-00	COVER FENCE	1
	047-1546-00	DUST COVER	1
	047-1547-01	FRAME CHANNEL BOT	1
	047-1967-00	FRAME CHANNEL	1
	050-1212-00	INSTALLATION KIT	1
	057-1044-00	FCC TAG DECAL	1
	057-1049-01	AZIMUTH DIAL	1
	057-1169-00	LABEL PATENT	1
	057-1338-01	IDENT PLATE	1
	073-0015-00	AZIMUTH DIAL	1
	073-0021-02	FRONT CASTING	1
	073-0034-01	SYNCHRO CLAMP	2

*R indicates Revisions. See Page 6-22A for Revision History of Parts List.

ASSEMBLY NO. 069-1010-03
DESCRIPTION KI212
UNIT KI212
REVISION 39
USED ON ASSEMBLY 069-1010-03
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	073-0062-05	MTG PLATE REAR	1
	073-0116-03	FACE PLATE	1
	076-0043-00	SHAFT	1
	076-0384-02	KNOB	1
	088-0066-00	SPACER PLASTIC	1
	088-0084-01	LAMP FILTER L BLUE	2
	088-0188-01	COVER LGHT WEDGE	1
	089-2013-37	NUT HEX 6-32	1
	089-2026-22	NUT SWAGE	2
	089-2105-22	NUT SPEED 4 40	11
	089-2136-00	NUT STOP 2-56	4
	089-5436-04	SCR PFH 4 40X1 4	6
	089-5857-03	SC BRIS 4 40X3 32	2
	089-5857-04	SC BRIS 4 40X1 8	2
	089-5878-04	SC PPH 4 40X1 4	9
	089-5878-05	SC PPH 4 40X5 16	2
	089-5878-06	SCR PPH 4-40X3/8	3
	089-5878-07	SCR PHP 4-40X7/16	1
	089-5878-10	SC PPH 4 40X5 8	6
	089-5899-05	SCREW 2-56	2
	089-6024-06	SCR 4-40X3/8	2
	089-8003-34	WASHER SPLITLOCK 4	8
	089-8067-30	WASHER FLAT	1
	089-8068-30	WASHER FLAT SS	1
	090-0019-02	RING RETAINING	1
	090-0033-02	SPRING WASHER	1
	090-0035-05	SPACER SWAGE	6
	090-0042-03	STUD SELF CLINCH	1
	090-0055-00	INSERT	3
	148-0005-00	RESOLVER	1
	150-0002-00	TUBING TEF BLK 26	.4
	150-0054-10	TUBING INSUL	.1
	150-0062-10	TUBING TEF CLR 10	.5
	187-1051-00	GASKET LIGHTING	1
C 401	096-1005-00	CAP TANT 1UF 20P	1
C 402	113-5102-00	CAP 1KPF 10PC X5F	1
C 403	113-5102-00	CAP 1KPF 10PC X5F	1
C 404	113-5102-00	CAP 1KPF 10PC X5F	1
C 405	113-3220-00	CAP 22F 5PC N150	1
C 406	113-3068-00	CAP 6 8PF N150	1
C 407	113-5390-00	CAP 39PF 10PC N150	1
C 408	102-0016-00	CAP VARI 1.5 9.1PF	1
C 409	102-0016-00	CAP VARI 1.5 9.1PF	1
C 411	113-5390-00	CAP 39PF 10PC N150	1
C 412	105-0024-00	CAP MY 001UF 10PC	1

*R indicates Revisions. See Page 6-22A for Revision History of Parts List.

ASSEMBLY NO. 069-1010-03
DESCRIPTION KI212
UNIT KI212
REVISION 39
USED ON ASSEMBLY 069-1010-03
ASSEMBLY DRAWING NO.

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
	C 413	102-0016-00	CAP VARI 1.5 9.1PF	1
	C 414	106-0001-09	CAP QC 4 7PF 10PC	1
R1	C 415	106-0001-02	CAP QC 1.5PF 10%	1
	C 416	096-1050-00	CAP TANT .33UF 20P	1
	C 417	105-0024-03	CAP MY 01UF 10PC	1
	C 418	102-0015-00	CAP VARI 8 TO 60PF	1
	C 419	104-0001-07	CAP MICA 1KPF 5PC	1
	C 421	104-0001-07	CAP MICA 1KPF 5PC	1
	C 422	105-0024-03	CAP MY 01UF 10PC	1
	C 423	105-0024-06	CAP MY 068UF 10PC	1
	C 424	096-1006-00	CAP TANT 1UF 20P	1
	C 425	105-0024-03	CAP MY 01UF 10PC	1
	C 426	105-0024-04	CAP MY 033UF 10PC	1
	C 427	096-1005-00	CAP TANT 1UF 20P	1
	C 428	105-0024-03	CAP MY 01UF 10PC	1
	C 432	105-0024-07	CAP MY .1UF 10PC	1
	C 433	105-0024-03	CAP MY 01UF 10PC	1
	C 434	105-0024-05	CAP MY 047UF 10PC	1
	C 435	105-0024-07	CAP MY .1UF 10PC	1
	C 436	105-0024-04	CAP MY 033UF 10PC	1
	C 437	105-0024-04	CAP MY 033UF 10PC	1
	C 438	105-0024-06	CAP MY 068UF 10PC	1
	C 441	105-0024-05	CAP MY 047UF 10PC	1
	C 442	105-0024-05	CAP MY 047UF 10PC	1
	C 443	105-0024-07	CAP MY .1UF 10PC	1
	C 444	096-1013-00	CAP TANT 0 22UF 20	1
	C 445	096-1013-00	CAP TANT 0 22UF 20	1
	C 446	096-1014-00	CAP TANT 40UF 20P	1
	C 447	096-1014-00	CAP TANT 40UF 20P	1
	C 448	097-0047-00	CAP ELECT 250UF	1
	C 449	097-0056-05	CAP ELECT 500UF	1
	CR 401	007-5011-08	DIODE ZENER 8 2V	1
	CR 402	007-5005-00	DIODE 1N935A	1
	CR 403	007-4001-00	DIODE CAPACITOR	1
	CR 404	007-6029-00	DIODE SIL IN457	1
	CR 405	007-6029-00	DIODE SIL IN457	1
	CR 406	007-6023-00	DIODE GERM IN277	1
	CR 407	007-6023-00	DIODE GERM IN277	1
	CR 408	007-6023-00	DIODE GERM IN277	1
	CR 409	007-6023-00	DIODE GERM IN277	1
	CR 410	007-6029-00	DIODE SIL IN457	1
	DS 401	037-0013-00	LAMP TI 12 VOLTS	1
	DS 402	037-0013-00	LAMP TI 12 VOLTS	1
	J 402	030-0030-01	CONNECTOR COAX	1
	L 401	019-2058-20	CHOKE RF 4 7UH	1

*R indicates Revisions. See Page 6-22A for Revision History of Parts List.

DESCRIPTION KI212
UNIT KI211-XX
REVISION 39
USED ON ASSEMBLY 069-1010-XX
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
L 402	019-3007-00	COIL RF 4T BUSS	1
L 403	019-3036-00	COIL RF	1
L 404	019-3007-00	COIL RF 4T BUSS	1
L 405	019-2082-04	CHOKE 0 33UH 10PC	1
L 406	019-2058-20	CHOKE RF 4 7UH	1
L 407	019-3008-00	COIL TRIPLER 3T	1
L 408	019-2065-00	CHOKE RF 100UH	1
Q 401	007-0028-00	TRANS SILICON	1
Q 402	007-0028-00	TRANS SILICON	1
Q 403	007-0028-00	TRANS SILICON	1
Q 404	007-0033-00	TRANS SILICON	1
Q 405	007-0033-00	TRANS SILICON	1
Q 406	007-0033-00	TRANS SILICON	1
Q 407	007-0033-00	TRANS SILICON	1
Q 408	007-0033-00	TRANS SILICON	1
Q 409	007-0033-00	TRANS SILICON	1
Q 410	007-0033-00	TRANS SILICON	1
Q 411	007-0033-00	TRANS SILICON	1
Q 412	007-0033-00	TRANS SILICON	1
Q 901	007-0026-02	TRANS SILICON	1
Q 902	007-0026-02	TRANS SILICON	1
Q 903	007-0026-02	TRANS SILICON	1
Q 904	007-0026-02	TRANS SILICON	1
Q 905	007-0026-02	TRANS SILICON	1
Q 906	007-0026-02	TRANS SILICON	1
Q 907	007-0026-02	TRANS SILICON	1
Q 908	007-0026-02	TRANS SILICON	1
Q 909	007-0026-02	TRANS SILICON	1
Q 910	007-0026-02	TRANS SILICON	1
Q 911	007-0026-02	TRANS SILICON	1
Q 912	007-0026-02	TRANS SILICON	1
Q 913	007-0026-02	TRANS SILICON	1
Q 914	007-0026-02	TRANS SILICON	1
Q 915	007-0026-02	TRANS SILICON	1
Q 916	007-0026-02	TRANS SILICON	1
Q 917	007-0026-02	TRANS SILICON	1
Q 918	007-0026-02	TRANS SILICON	1
Q 919	007-0026-02	TRANS SILICON	1
Q 920	007-0026-02	TRANS SILICON	1
R 402	132-5007-00	RES WW 75 5PC 2W	1
R 403	130-0473-25	RES 47K 10PC QW	1
R 404	130-0104-25	RES 100K 10PC QW	1
R 405	130-0472-25	RES 4 7K 10PC QW	1
R 406	130-0272-25	RES 2 7K 10PC QW	1
R 407	130-0121-35	RES 120 10PC HW	1

*R indicates Revisions. See Page 6-22A for Revision History of Parts List.

DESCRIPTION KI212
UNIT KI211-XX
REVISION 39
USED ON ASSEMBLY 069-1010-XX
ASSEMBLY DRAWING NO.

	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R1	R 408	130-0121-25	RES 120 10PC QW	1
R1	R 409	136-1002-22	RES 10K OHM 1PC QW	1
	R 410	133-0016-02	POT 1K 20PC	1
	R 411	130-0105-25	RES 1MEG 10PC QW	1
	R 412	130-0472-25	RES 4 7K 10PC QW	1
	R 413	130-0680-23	RES 68 5PC QW	1
R1	R 414	130-0222-25	RES 2 2K 10PC QW	1
	R 415	130-0102-25	RES 1K 10PC QW	1
	R 416	130-0101-25	RES 100 10PC QW	1
	R 417	130-0105-25	RES 1MEG 10PC QW	1
	R 418	130-0154-25	RES 150K 10PC QW	1
	R 419	130-0102-25	RES 1K 10PC QW	1
	R 420	130-0473-25	RES 47K 10PC QW	1
	R 421	130-0105-25	RES 1MEG 10PC QW	1
	R 424	130-0473-25	RES 47K 10PC QW	1
	R 425	132-5001-00	RES WW 180 10PC 2W	1
	R 426	130-0101-25	RES 100 10PC QW	1
	R 431	130-0473-25	RES 47K 10PC QW	1
	R 432	133-0016-00	POT 150K 20PC	1
	R 433	130-0473-25	RES 47K 10PC QW	1
	R 434	130-0154-25	RES 150K 10PC QW	1
	R 435	130-0683-25	RES 68K 10PC QW	1
	R 436	130-0154-25	RES 150K 10PC QW	1
	R 437	130-0683-25	RES 68K 10PC QW	1
	R 438	136-4752-22	RES 47 5K 1PC QW	1
	R 441	136-ZZZZ-22	SELECT VALUE	1
	R 442	136-3322-22	RES 33 2K 1PC QW	1
	R 443	136-ZZZZ-22	SELECT VALUE	1
	R 444	136-4752-22	RES 47 5K 1PC QW	1
	R 445	136-3922-22	RES 39 2K 1PC QW	1
	R 446	130-0272-25	RES 2 7K 10PC QW	1
	R 447	130-0101-25	RES 100 10PC QW	1
	R 448	130-0272-25	RES 2 7K 10PC QW	1
	R 451	130-0101-25	RES 100 10PC QW	1
	R 452	130-0104-25	RES 100K 10PC QW	1
	R 454	130-0104-25	RES 100K 10PC QW	1
	R 455	130-0104-25	RES 100K 10PC QW	1
	R 456	130-0104-25	RES 100K 10PC QW	1
	R 457	133-0016-02	POT 1K 20PC	1
	R 461	130-0102-25	RES 1K 10PC QW	1
	R 462	130-0102-25	RES 1K 10PC QW	1
	R 463	130-0221-25	RES 220 10PC QW	1
	R 464	130-0221-25	RES 220 10PC QW	1
	R 465	133-0016-02	POT 1K 20PC	1
	R 901	136-3742-22	RES 37.4K 1PC QW	1

*R indicates Revisions. See Page 6-22A for Revision History of Parts List.

ASSEMBLY NO. 069-1010-03
DESCRIPTION KI212
UNIT KI211-XX
REVISION 39
USED ON ASSEMBLY 069-1010-XX
ASSEMBLY DRAWING NO.

SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
R 902	136-2552-22	RES 25 5K 1PC QW	1
R 903	136-5231-22	RES 5231 1PC QW	1
R 904	136-6341-22	RES 6340 1PC QW	1
R 905	136-4421-22	RES 4.42K 1PC QW	1
R 906	136-8451-22	RES 8450 1PC QW	1
R 907	136-1022-22	RES 10 2K 1PC QW	1
R 908	136-1272-22	RES 12 7K 1PC QW	1
R 909	136-1622-22	RES 16 2K 1PC QW	1
R 910	136-2152-22	RES 21 5K 1PC QW	1
R 911	136-3012-22	RES 30.1K 1PC QW	1
R 912	136-4642-22	RES 46 4K 1PC QW	1
R 913	136-4871-22	RES 4870 1PC QW	1
R 914	136-5761-22	RES 5760 1PC QW	1
R 915	136-6981-22	RES 6980 1PC QW	1
R 916	136-9311-22	RES 9310 1PC QW	1
R 917	136-1152-22	RES 11 5K 1PC QW	1
R 918	136-1432-22	RES 14 3K 1PC QW	1
R 919	136-1872-22	RES 18.7K 1PC QW	1
R 920	136-7681-22	RES 7680 1PC QW	1
R 922	130-0473-25	RES 47K 10PC QW	1
R 923	130-0473-25	RES 47K 10PC QW	1
R 924	130-0473-25	RES 47K 10PC QW	1
R 925	130-0473-25	RES 47K 10PC QW	1
R 931	130-0473-25	RES 47K 10PC QW	1
RT 401	134-1012-01	THERMISTOR	1
T 401	019-3012-00	TRANSFORMER SRD	1
Y 401	042-8960-25	CRYSTAL 96 0250 MC	1

*R indicates Revisions. See Page 6-22A for Revision History of Parts List.

PARTS LIST REVISION HISTORY

ENGR. APPROVAL

NAME: KI 212 Assembly

ASS'Y. NO.: 069-1010-03

ASS'Y. DWG.:

UNIT: KI 212

USED ON: 069-1010-03

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION	QUANTITY
			090-0041-01	Retaining Ring	1
	CHANGE		090-0033-02	Washer, Spring	
	ADD		089-8070-11	Washer, Flat	1
	ADD		089-8079-22	Washer, Flt .005Tak	1
	ADD		057-1382-02	STC Tag KNC 610	1
	ADD		057-1385-01	STC Tag KN 74	1
	ADD		150-0018-10	Tubing, Shrink	.6ft.
	DELETE	C415	106-0001-02	Cap. Mld. 1.51f, 10%	1
	ADD	C415	106-0001-09	Cap. Mld. 4.7pf, 10%	1
	CHANGE	R408	130-0151-25	Res. F/C 150 10% QW	1
	CHANGE	R414	130-0182-25	Res. F/C 1.8K, 10%, QW	1
	DELETE	R409	136-1002-22	Res. F/C 10D, 1%, QW,	1
	ADD	R409	136-9311-22	Res. P/F 9.31K, 1%, QW	1
	ADD	R470	130-0472-25	Res. F/C 4.7K, 10%, QW	1

March, 1971 SHT ___ OF ___

K-1650 3/73

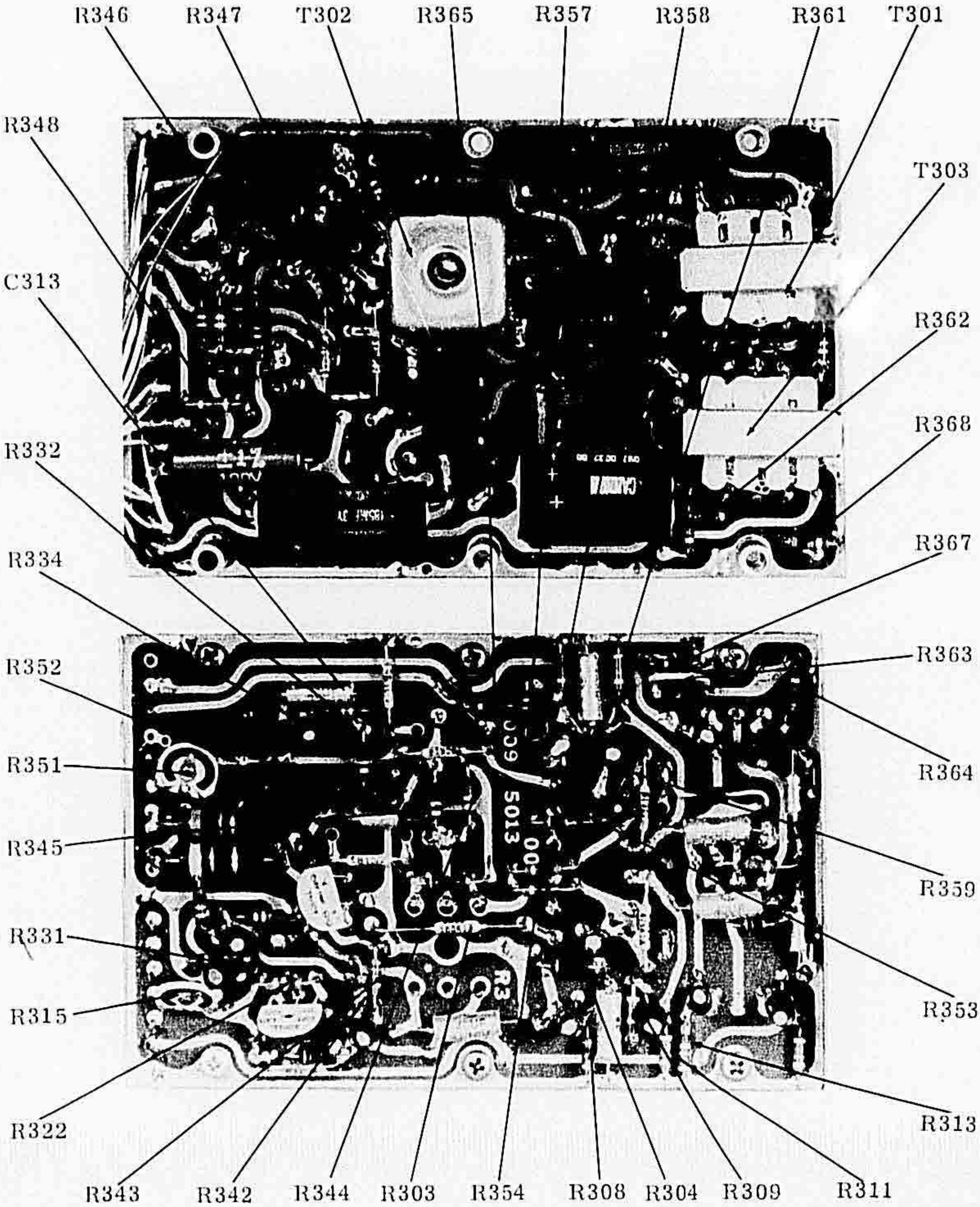


FIGURE 6-1A CONVERTER BOARD ASS'Y

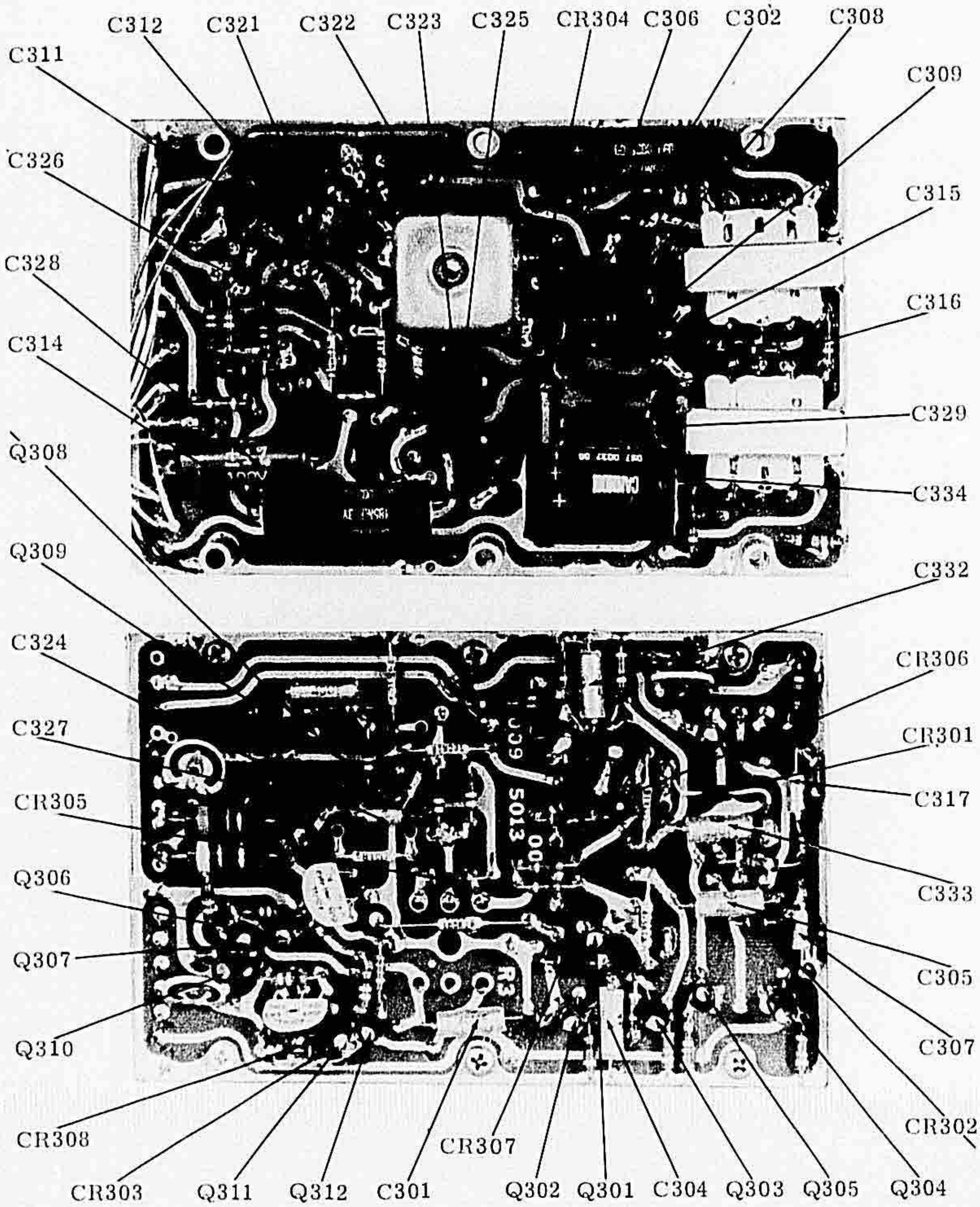


FIGURE 6-1B CONVERTER BOARD ASS'Y

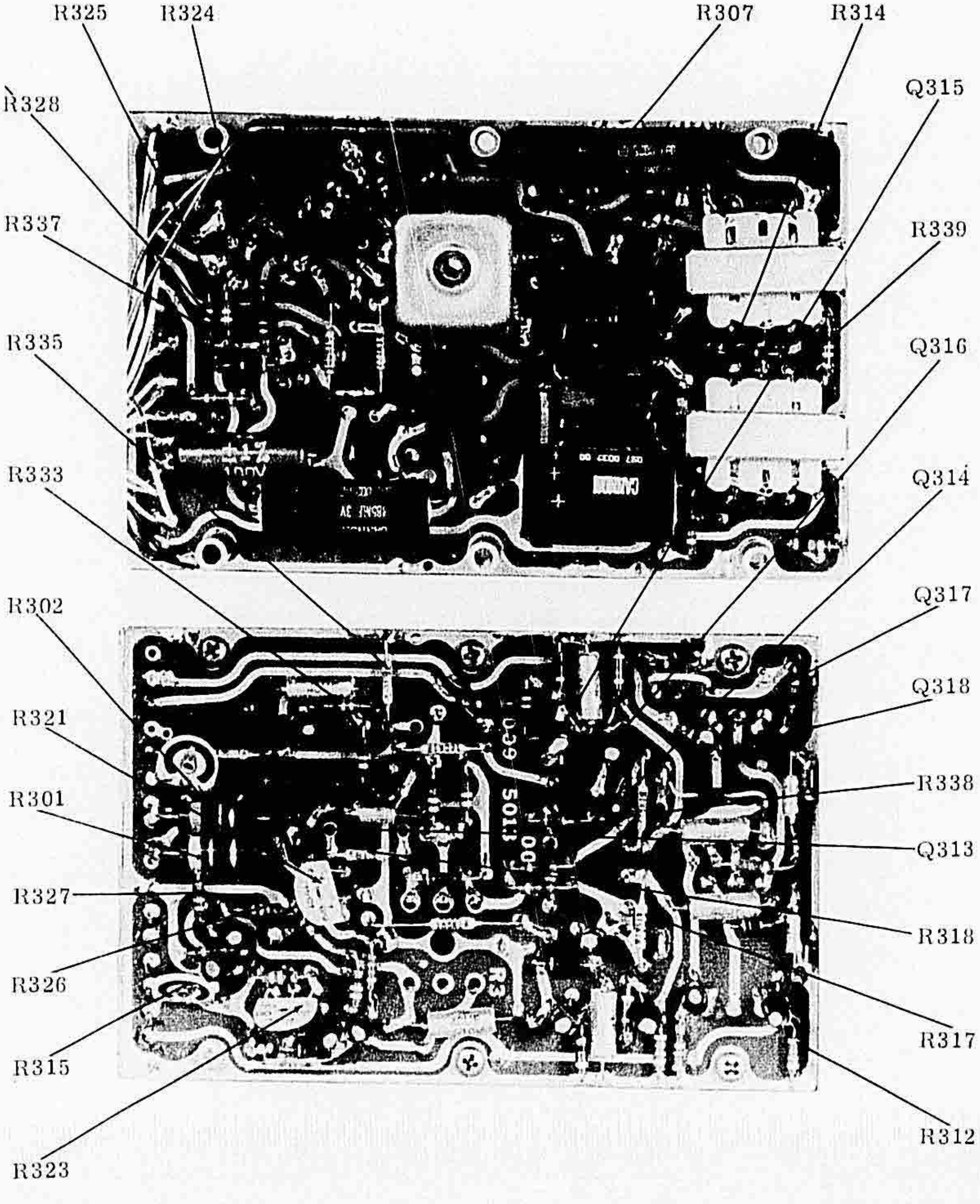


FIGURE 6-1C CONVERTER BOARD ASS'Y

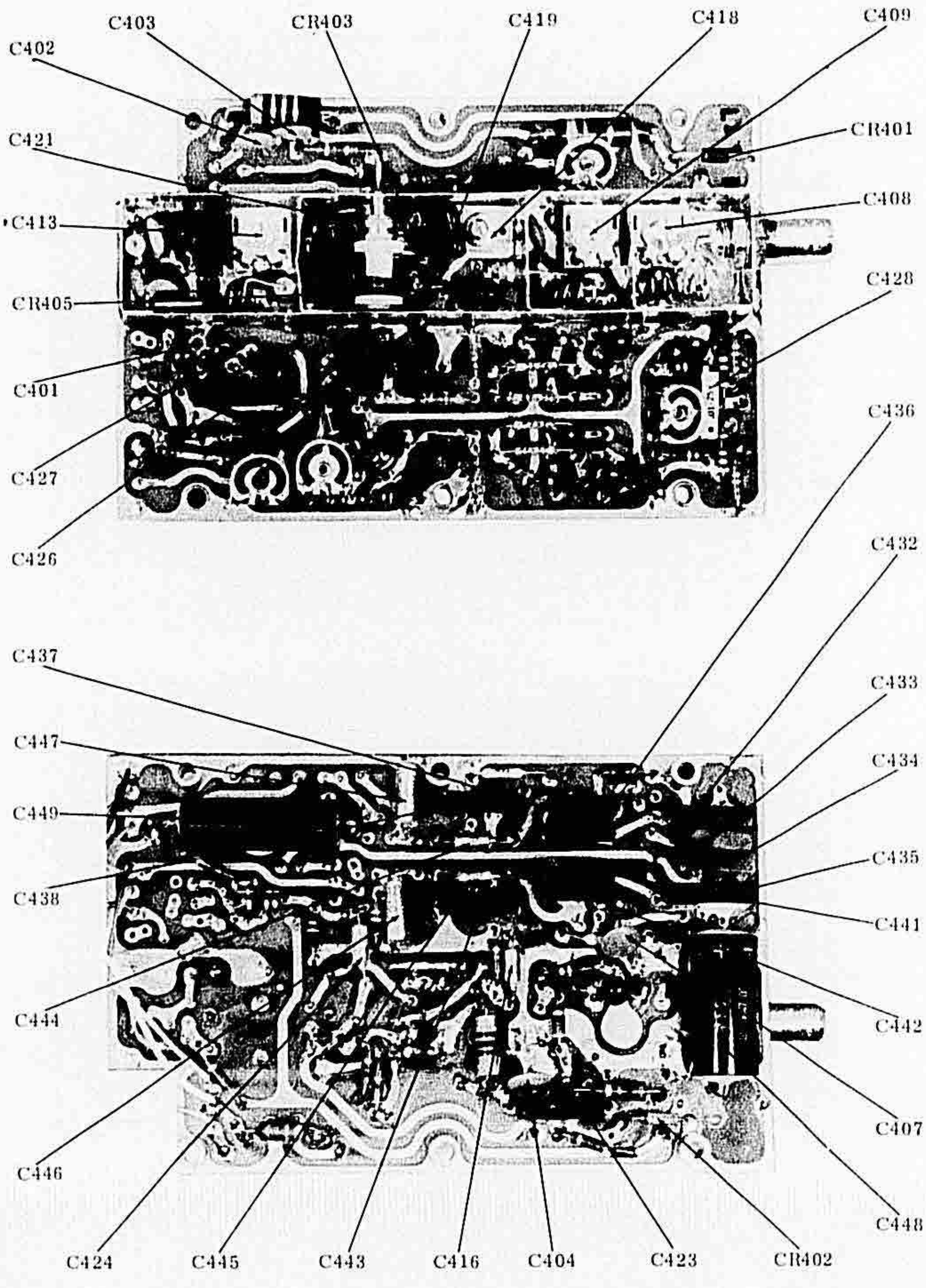
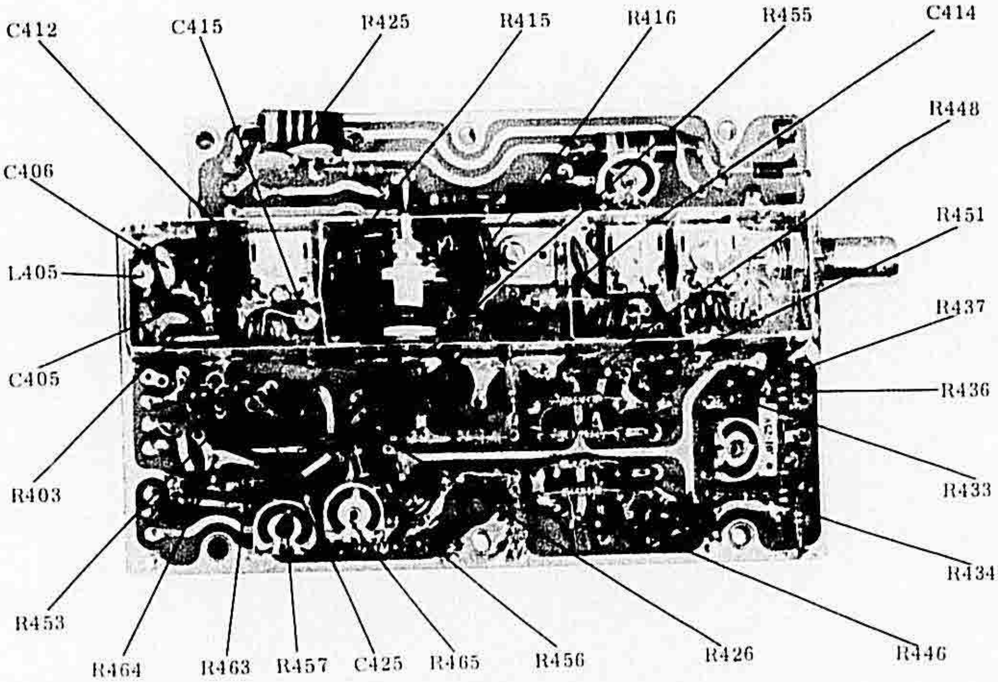


FIGURE 6-2 GLIDESLOPE BOARD ASS'Y



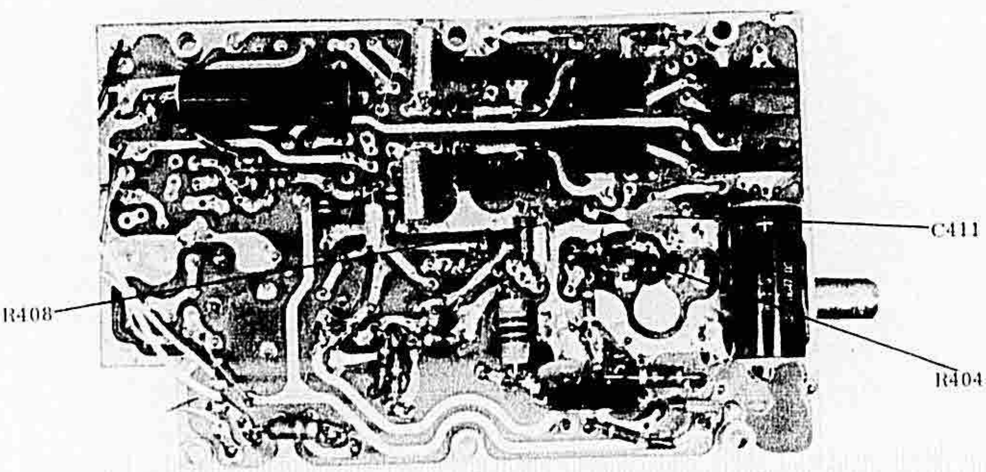


FIGURE 6-2B GLIDESLOPE BOARD ASS'Y

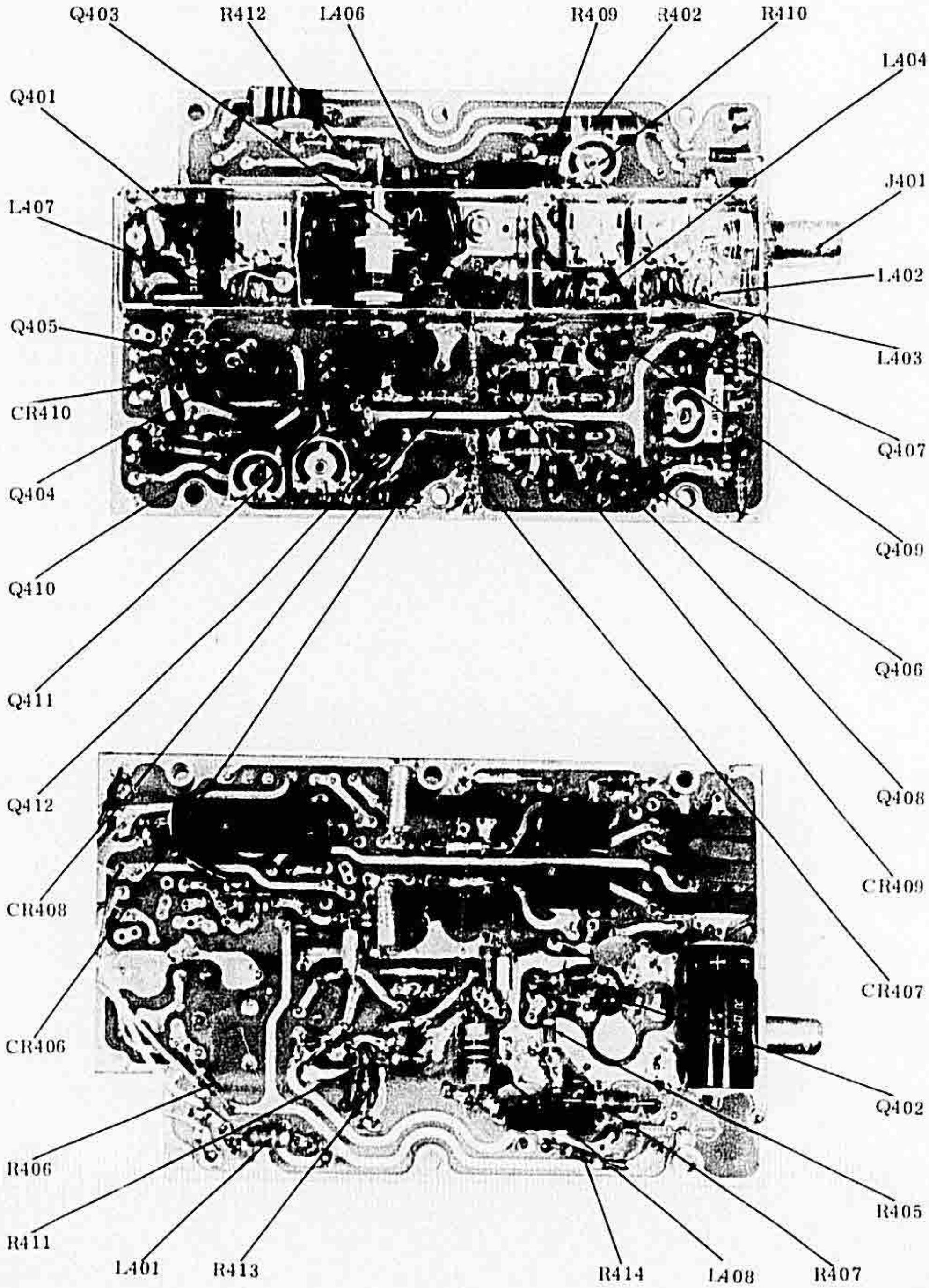


FIGURE 6-2C GLIDESLOPE BOARD ASS'Y

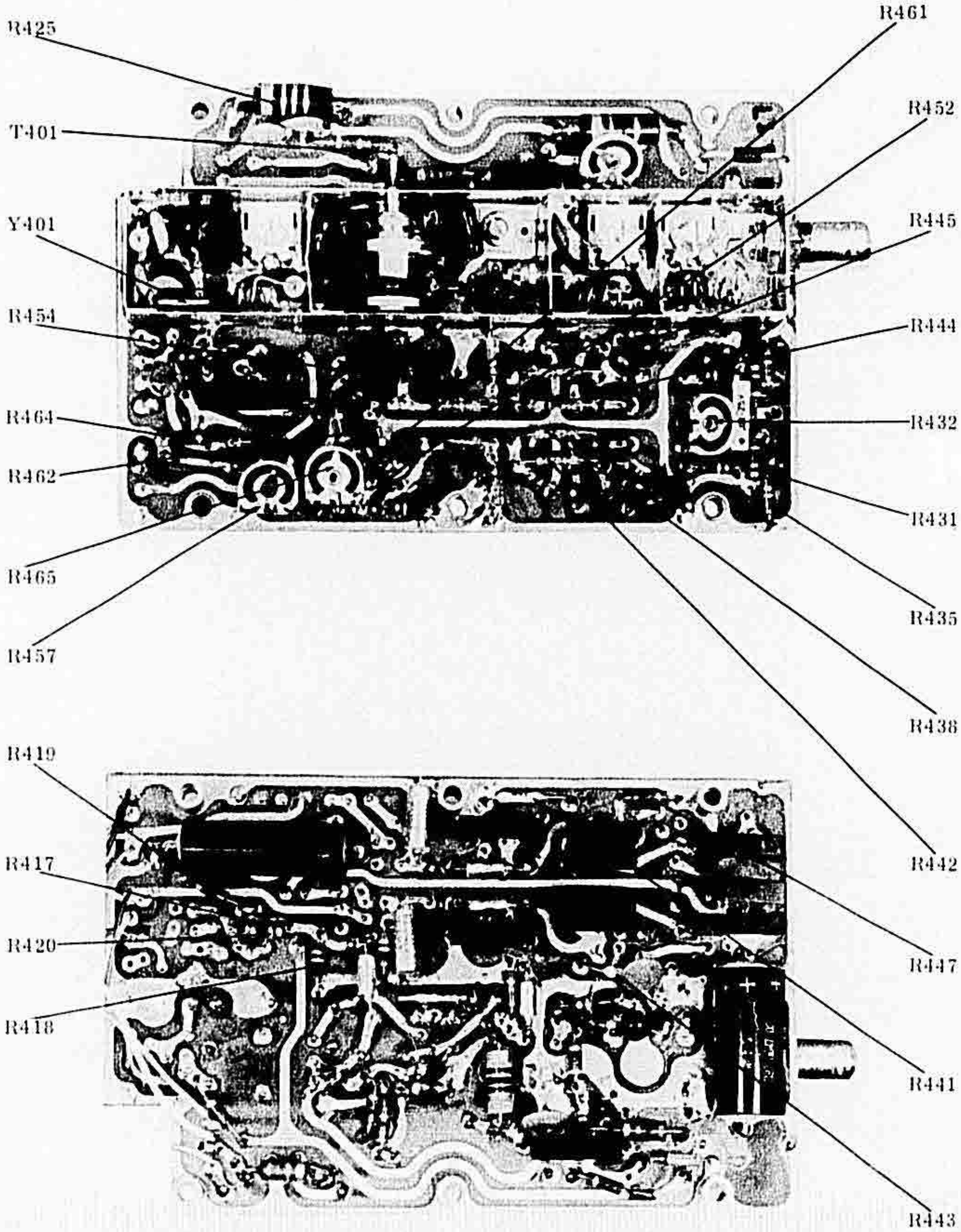


FIGURE 6-2D GLIDESLOPE BOARD ASS'Y

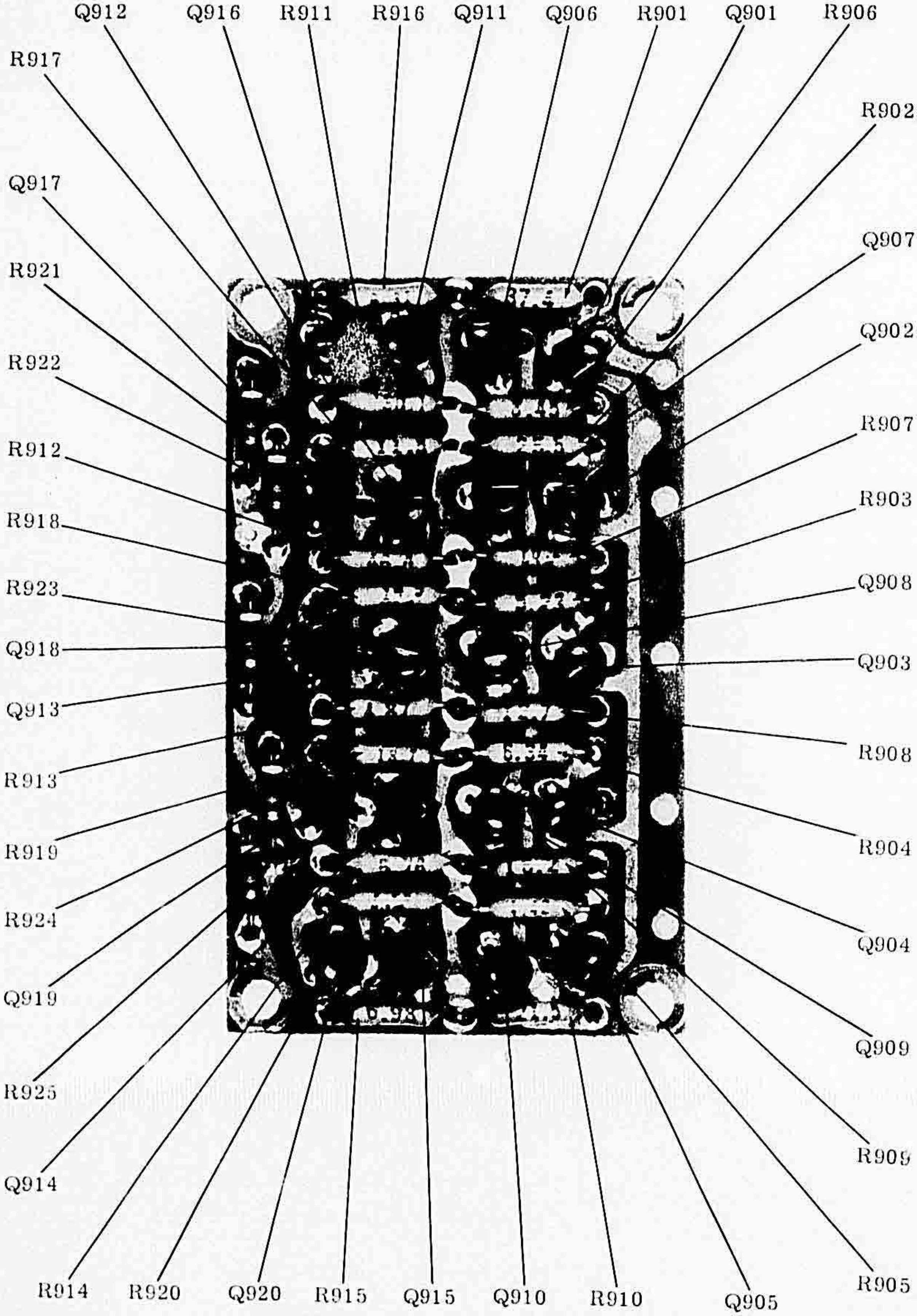


FIGURE 6-3 MATRIX BOARD ASS'Y

DESCRIPTION OMNI INDICATOR
UNIT KI201C/KI 211C/KI 212
REVISION 0
USED ON ASSEMBLY 066-3008-02,
069-1010-04, 069-1010-03

REF	PART NUMBER	DESCRIPTION
		Omni-Glideslope/GS-OBS INDICATOR
	066-3008-02	A. KI 201C
	069-1010-04	B. KI 211C
	069-1010-03	C. KI 212
12	008-0004-00	Solder Lug
13	008-0005-01	Lug, Tinned Copper
14	010-0041-00	Terminal
15	069-1010-00	Converter Board
16	069-1010-00	Matrix Board
17	069-1010-00	Glideslope Board
29	023-0057-02	Meter Assembly (A)
	023-0056-03	(B)
	023-0056-02	(C)
56	029-0004-00	Belt, 40DP
57	029-0012-00	Gear, Pully, 14 Teeth
59	030-2003-00	Lock Tabs
60	030-2001-00	Connector, Plug, A)
	030-2003-00	B)
	030-2143-00	C)
61	037-0013-00	Lamp, 12 volt
63	047-2232-01	Mask, Meter A)
	047-1148-02	B)
	047-1148-02	C)
64	047-1175-00	Bracket
67	047-1546-01	Dust Cover, A)
	047-1546-00	B)
	047-1546-00	C)
69	047-1547-01	Frame Channel (Bottom)
70	047-1967-00	Frame Channel (Top)
72	057-1049-01	Decal, Azimuth Dial
76	073-0015-00	Azimuth Dial Casting
78	073-0021-01	Front Casting A)
	073-0021-01	B)
	073-0021-02	C)

REF	PART NUMBER	DESCRIPTION
79	073-0062-03	Mount Plate Rear A)
	073-0062-01	B)
	073-0062-05	C)
80	073-0116-03	Face Plate
81	076-0043-00	Shaft
83	076-0384-02	Knob
84	088-0052-00	Mounting Case, Meter Movement
86	088-0084-01	Filter, Lamp-Light Blue
87	088-0188-01	Cover, Lighting Wedge
88	088-0190-02	Cover, Meter Movement
89	089-2009-22	Nut, Hex 4-40 (2 for cable clamps)
91	089-2105-22	Nut, Speed, "U" Type
92	089-2106-11	Nut, Hex, 1/4 - 32
93	089-6008-04	Screw, Flat Hd. Sl. 100° 4-40 × 1/4
94	089-5878-04	Screw, Pan Hd. Ph. W/1w 4-40 × 1/4
95	089-5878-05	Screw, Pan Hd. Ph. W/1w 4-40 × 5/16
96	089-5878-10	Screw, Pan Hd. Ph. W/1w 4-40 × 5/8
97	089-5903-06	Screw, Pan Hd. Ph. 4-40 × 3/8
98	089-5436-04	Screw, Pan Hd. Ph. 82° 4-40 × 1/4
99	089-5590-05	Screw, Pan Hd., Ph. Type 25 2-32 × 5/16
100	089-5857-03	Screw, Set Multispline Socket 4-40 × 3/32
101	089-5857-04	Screw, Set Multispline Socket 4-40 × 1/8
102	089-5903-13	Screw, PPH 4-40 × 13/16
103	089-8003-34	Washer, Split Ring Lock #4
104	089-8042-30	Washer, Int. Tooth Lock 1/4
105	089-8067-30	Washer, Flat (For Pulley) .220ID
106	089-8068-30	Washer, Flat .265ID
107	090-0019-02	Retaining Ring
108	090-0033-02	Washer, Spring
202	148-0003-00	Resolver (B301) A)
	148-0003-00	B)
	148-0005-00	C)
207	187-1038-00	Gasket, Wedge
208	089-6024-06	Screw
209	073-0034-01	Lug, Resolver MTG. (2)

NOTICE

Page 6-33

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(2) RG-188/U coaxial cable is recommended for the glideslope antenna interconnect. Refer to Figure 2-1 for connector assembly.

2.4 CABLING

(a) The length and routing of the external cables must be carefully studied and planned prior to installation. Avoid sharp bends and placing cables too near the aircraft control cables.

(b) Fabricate the external cables in accordance with the installation drawing that fulfills the system requirement.

·NOTE·

Use good quality stranded wire that will not support a flame and with at least 600 volt insulation. It is recommended that the mike audio line be in a shielded-twisted pair.

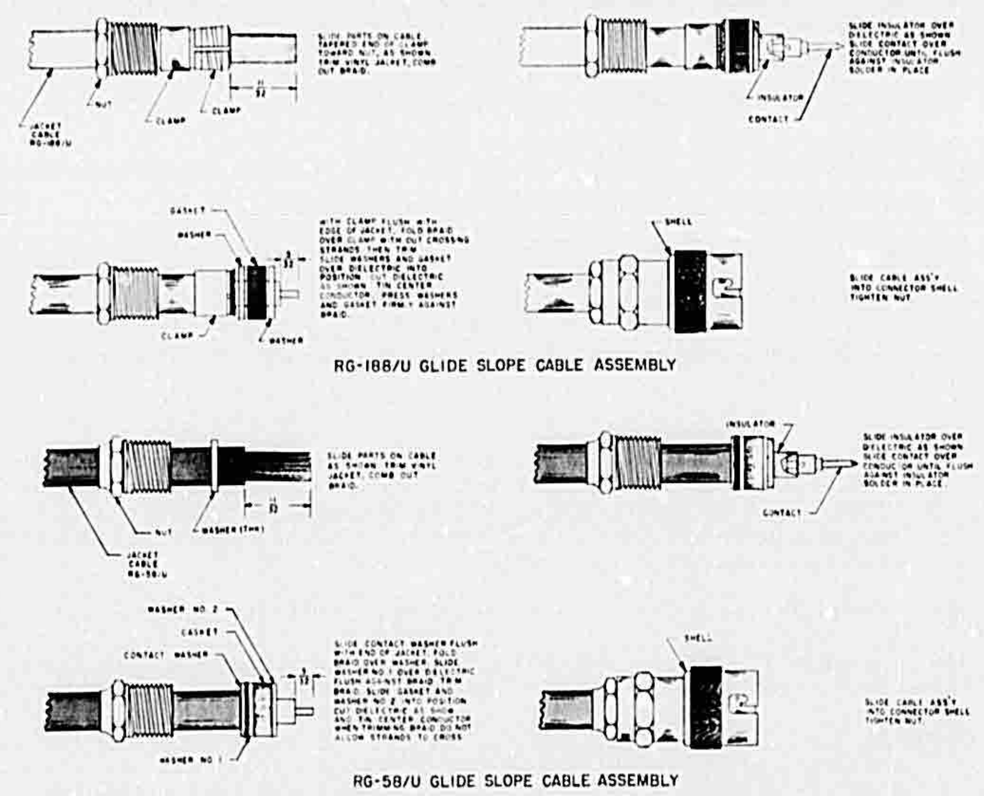


FIGURE 2-1 GLIDESLOPE CABLE CONNECTOR ASSEMBLY

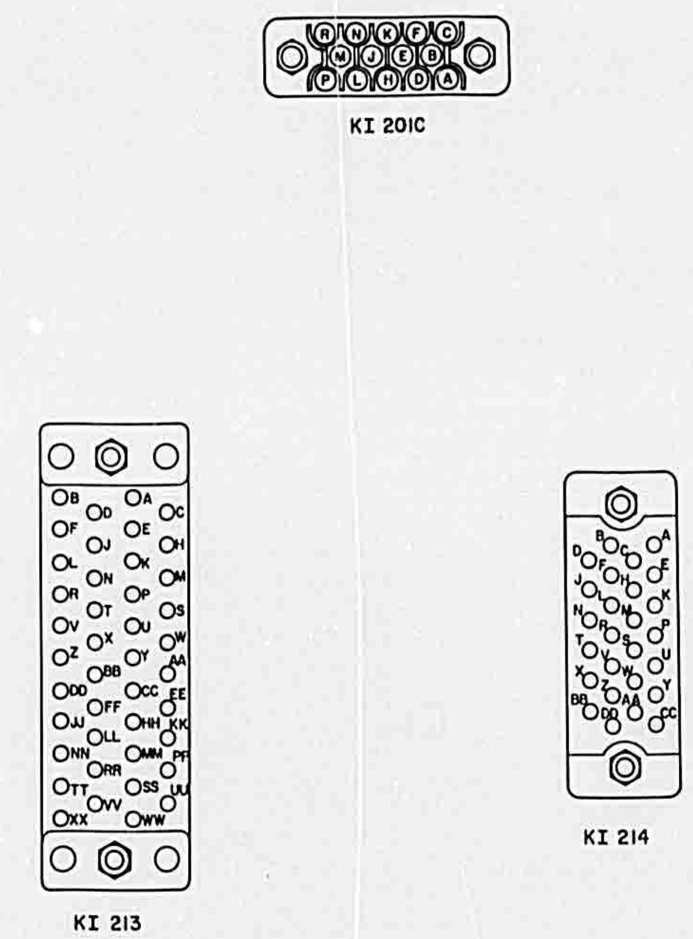


FIGURE 2-2 KI 201C/KI 213/KI 214 CONNECTOR PIN LOCATIONS

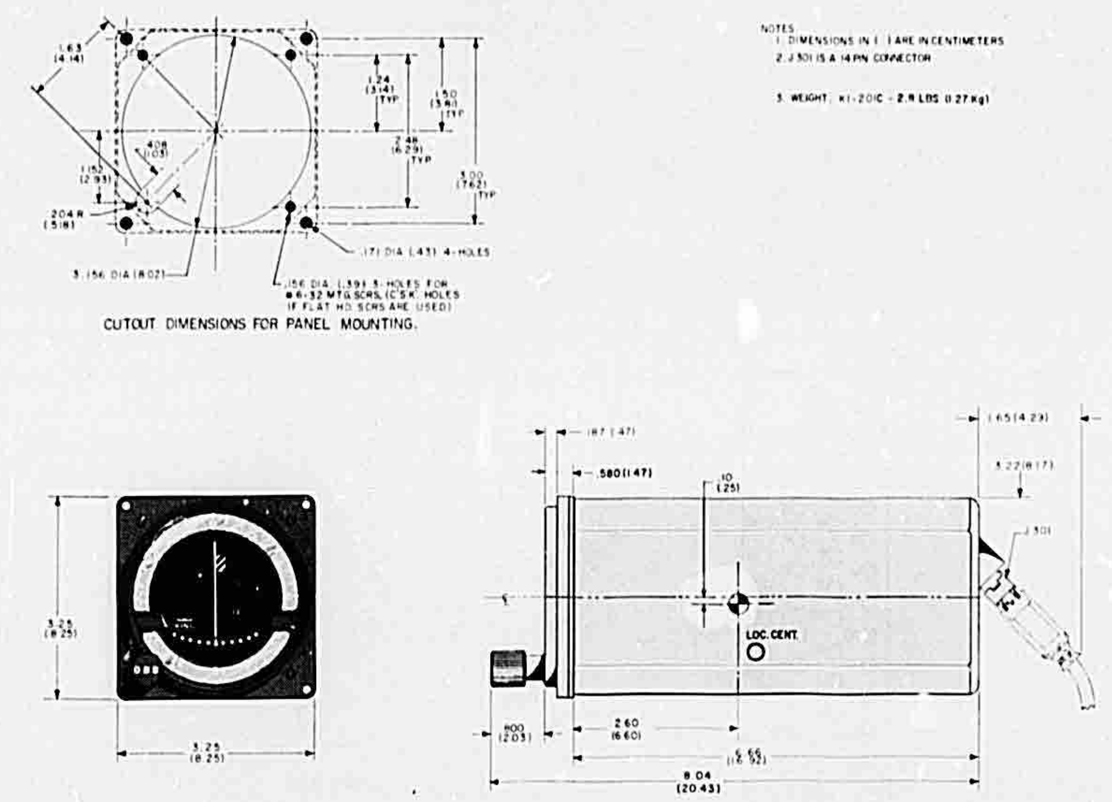


FIGURE 2-3 KI 201C INSTALLATION DRAWING
(Dwg. No. 155-5124-00, R-1)

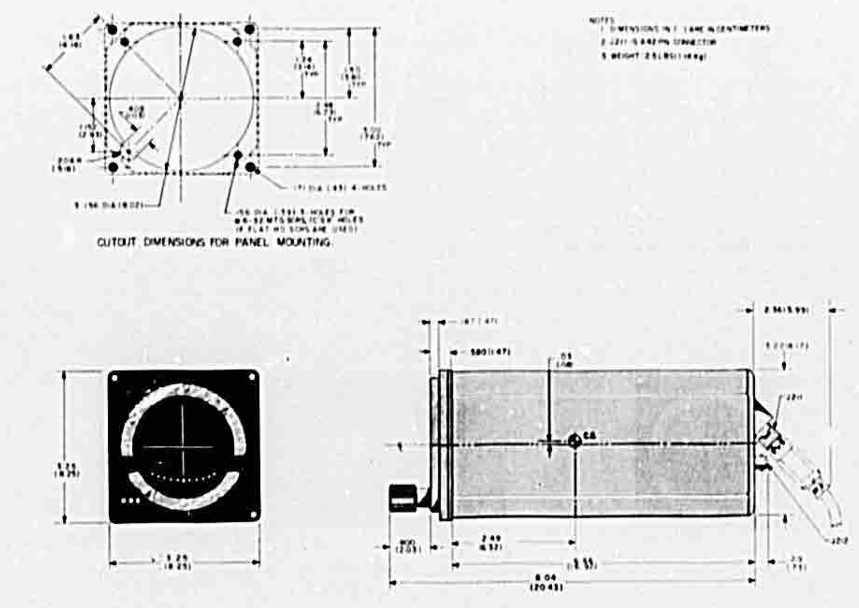


FIGURE 2-4A KI 213 INSTALLATION DRAWING (S/N1499 & Below)
(Dwg. No. 155-5125-00, R-1)

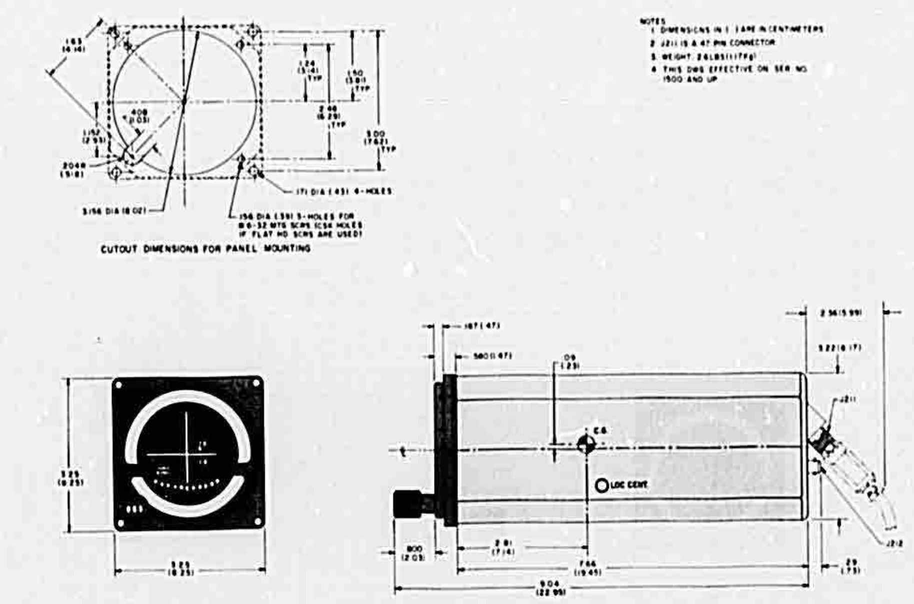


FIGURE 2-4B KI 213 INSTALLATION DRAWING (S/N 1500 & Above)
(Dwg. No. 155-5168-00, R-0)

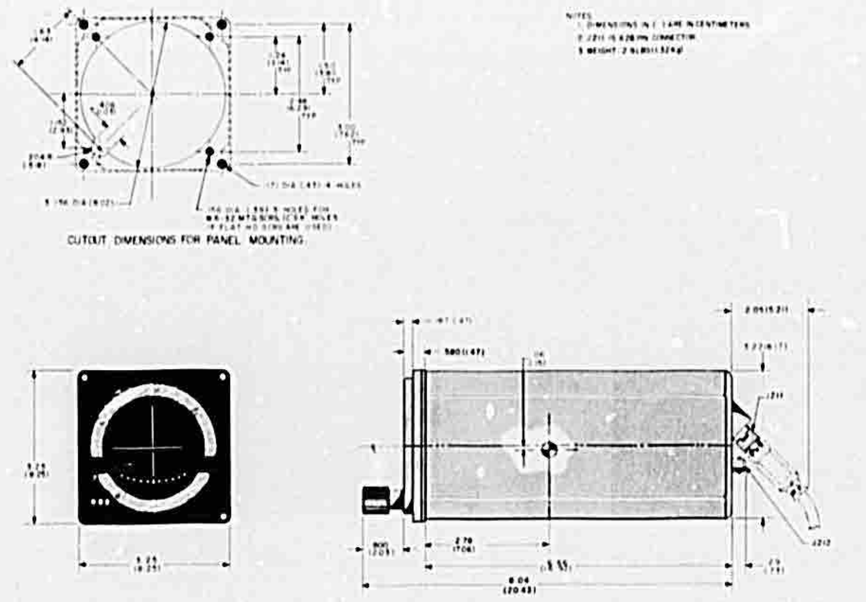


FIGURE 2-5A KI 214 INSTALLATION DRAWING (S/N 5399 & Below)
(Dwg. No. 155-5126-00, R-0)

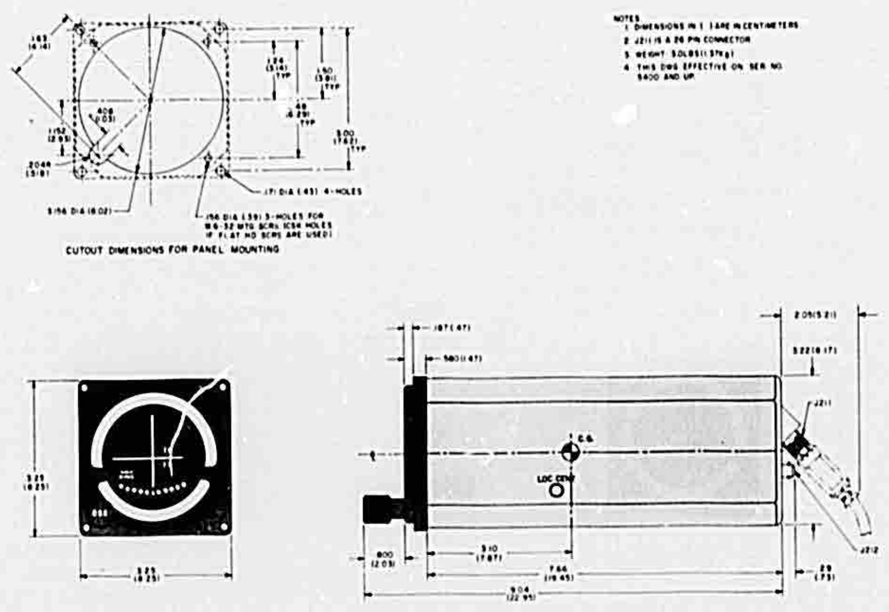


FIGURE 2-5B KI 214 INSTALLATION DRAWING (S/N 5400 & Above)
(Dwg. No. 155-5169-00, R-0)

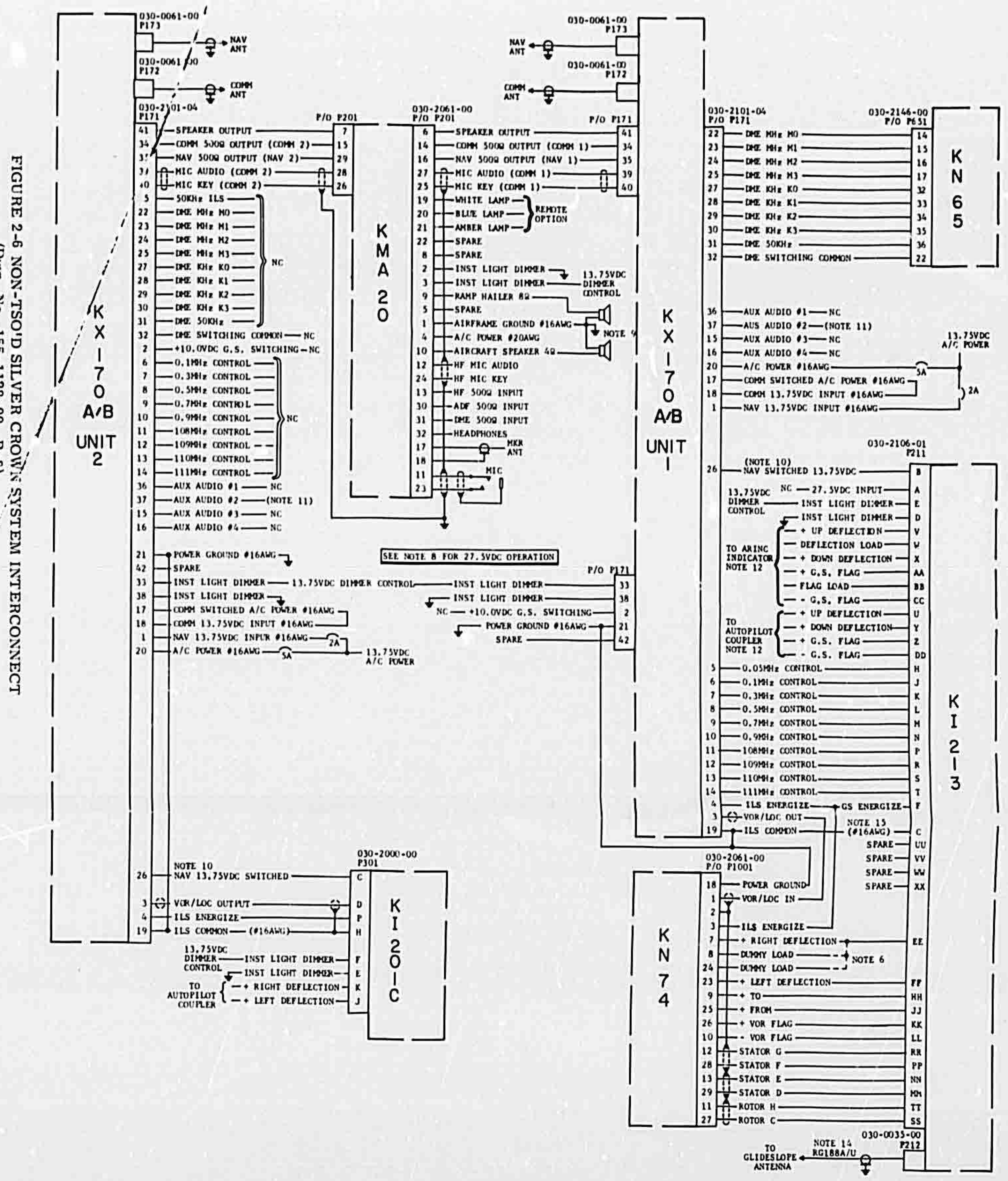
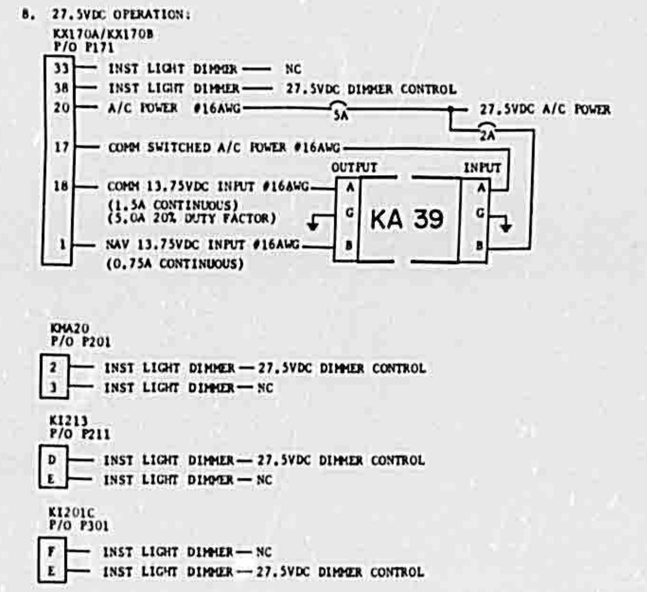


FIGURE 2-6 NON-TSO'D SILVER CROWN SYSTEM INTERCONNECT
(Dwg. No. 155-1128-00, R-5)

NOTES:

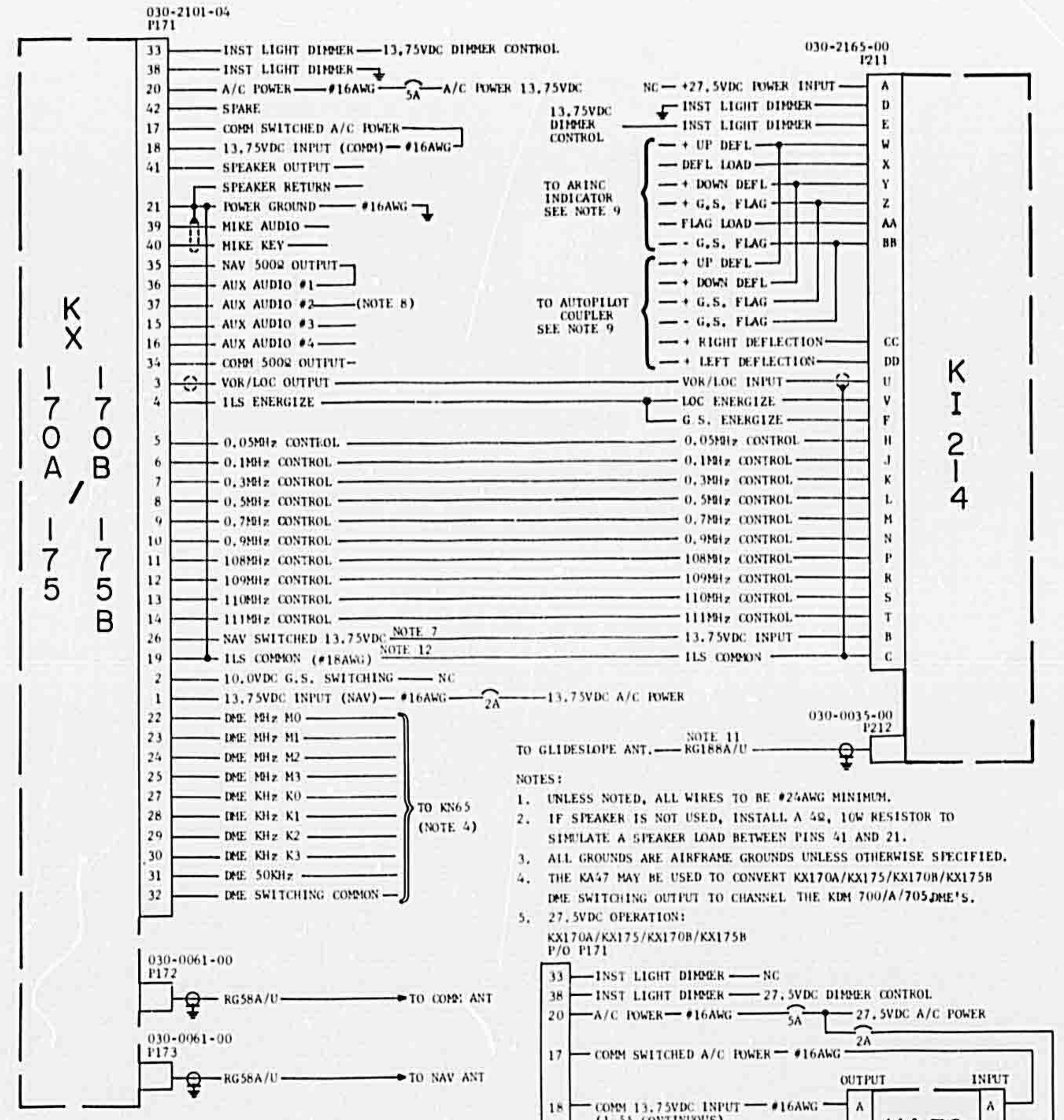
1. UNLESS NOTED; ALL WIRES #24AWG MINIMUM.
2. UNLESS NOTED; ALL ANTENNA COAX IS RG58A/U.
3. UNLESS SPECIFIED; ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX170B DME SWITCHING OUTPUTS TO CHANNEL THE KDM 700/A/705 DME'S.
5. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
6. KN74: FOR ONE INDICATOR JUMPER PINS 7, 8, AND 24.
   FOR TWO INDICATORS JUMPER PINS 7 AND 8.
   FOR THREE INDICATORS NO JUMPERS ARE REQUIRED.
7. KN65DME INDICATOR (KI265) NOT SHOWN.
8. 27.5VDC OPERATION:



9. RAMP HAILER AND AIRCRAFT SPEAKER RETURN LEADS SHOULD BE CONNECTED TO PIN 1 AT KMA20.
10. EXTERNAL SWITCHING CAPABILITY: COMM - PIN 17 - NONE
    NAV - PIN 26 - 300ma
11. AUX AUDIO #2 IS INTERCOM MIC INPUT ON KX170B.
12. THE KI213 HAS THE FOLLOWING EXTERNAL INDICATOR DRIVING CAPABILITY;

	VOR		GLIDESLOPE	
INDICATORS	FLAG	DEFLECTION	FLAG	DEFLECTION
ARINC	NONE	NONE	ONE JUMPER PINS AA & BB IF NOT USED	ONE JUMPER PINS V & W IF NOT USED
AUTOPILOT(HI Z)	NONE	NONE	ONE	ONE

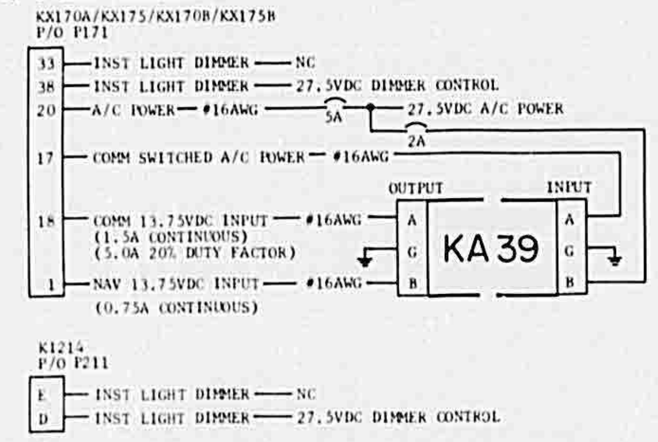
13. COMPLETE INTERCONNECT INFORMATION FOR KN65 AND KN74 MAY BE FOUND IN THE RESPECTIVE INSTALLATION MANUALS.
14. GLIDESLOPE ANTENNA (KA 22 OR EQUIVALENT) MUST HAVE AIRFRAME GROUND.
15. ROUTE ILS COMMON AND POWER GROUND AWAY FROM COMM TRANSMITTER COAXIAL CABLES AND MAKE AIRFRAME GROUND NEAREST KX 170A/175/170B/175B. IF KA 39 IS USED, ROUTE OUTPUT PIN G WITH ILS COMMON AND POWER GROUND.



TO GLIDESLOPE ANT. — NOTE 11 RG188A/U

NOTES:

1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. IF SPEAKER IS NOT USED, INSTALL A 4Ω, 10W RESISTOR TO SIMULATE A SPEAKER LOAD BETWEEN PINS 41 AND 21.
3. ALL GROUNDS ARE AIRFRAME GROUNDS UNLESS OTHERWISE SPECIFIED.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX175/KX170B/KX175B DME SWITCHING OUTPUT TO CHANNEL THE KDM 700/A/705 DME'S.
5. 27.5VDC OPERATION:



6. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
7. EXTERNAL SWITCHING CAPABILITY:
   COMM PIN 17 NONE
   NAV PIN 26 300ma
8. AUX AUDIO #2 IS INTERCOM MIC INPUT ON KX170B AND KX175B.
9. THE KI214 HAS THE FOLLOWING EXTERNAL INDICATOR DRIVING CAPABILITY:

	VOR		GLIDESLOPE	
INDICATORS	FLAG	DEFLECTION	FLAG	DEFLECTION
ARINC	NONE	NONE	ONE JUMPER PINS Z & AA IF NOT USED	ONE JUMPER PINS W & X IF NOT USED
AUTOPILOT(HI Z)	NONE	ONE	ONE	ONE

10. KI214 GLIDESLOPE AND LOCALIZER CAN BE ENERGIZED SIMULTANEOUSLY AS SHOWN OR ENERGIZED INDEPENDENTLY.
11. GLIDESLOPE ANTENNA (KA 22 OR EQUIVALENT) MUST HAVE AIRFRAME GROUND.
12. ROUTE ILS COMMON AND POWER GROUND AWAY FROM COMM TRANSMITTER COAXIAL CABLES AND MAKE AIRFRAME GROUND NEAREST KX 170A/175/170B/175B. IF KA 39 IS USED, ROUTE OUTPUT PIN G WITH ILS COMMON AND POWER GROUND.

FIGURE 2-7 KX 170A/170B/175 /175B/KI 214 INTERCONNECT
(Dwg. No. 155-1129-00 R-2)

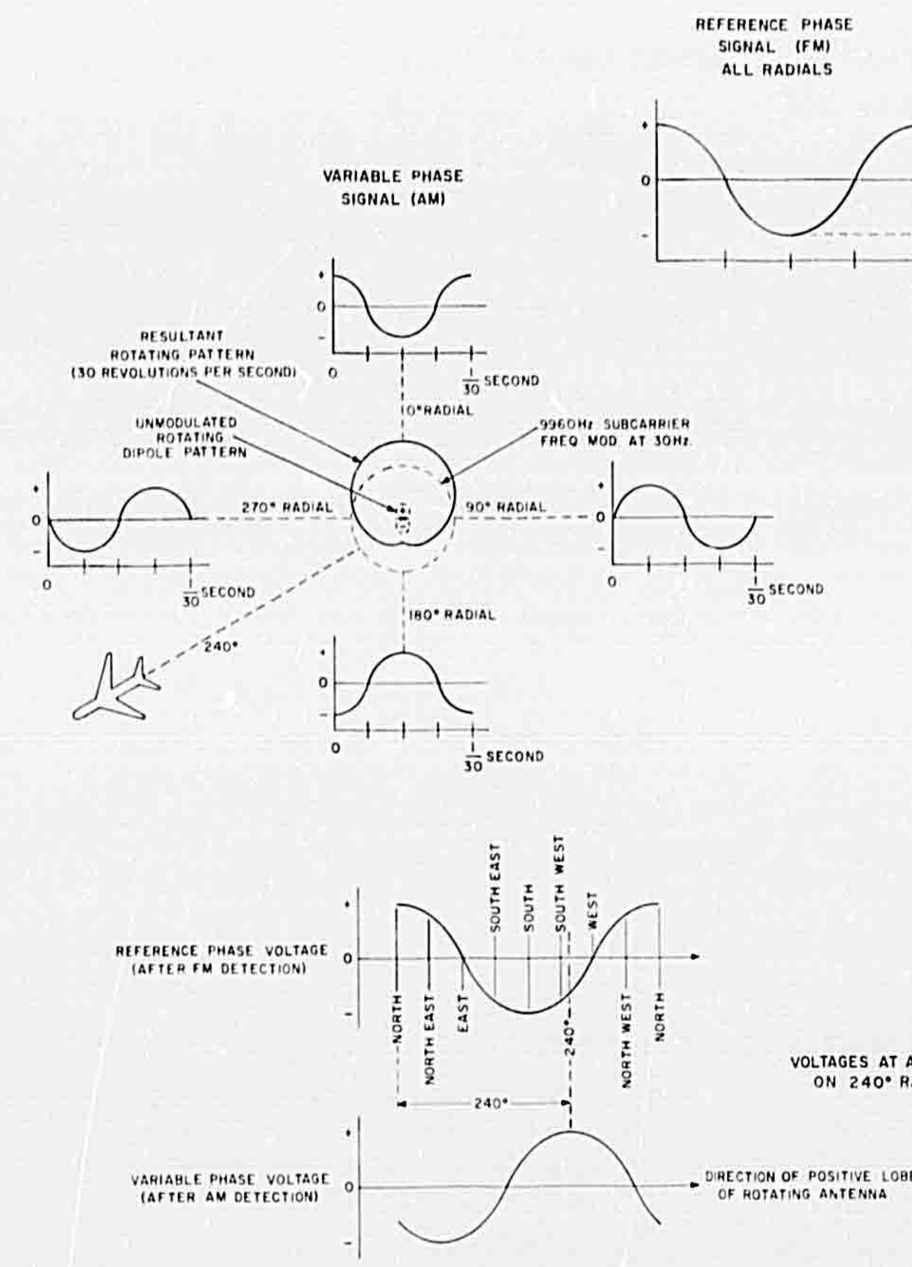


FIGURE 4-2 VOR SIGNAL GENERATION
(Dwg. No. 696-0714-00)

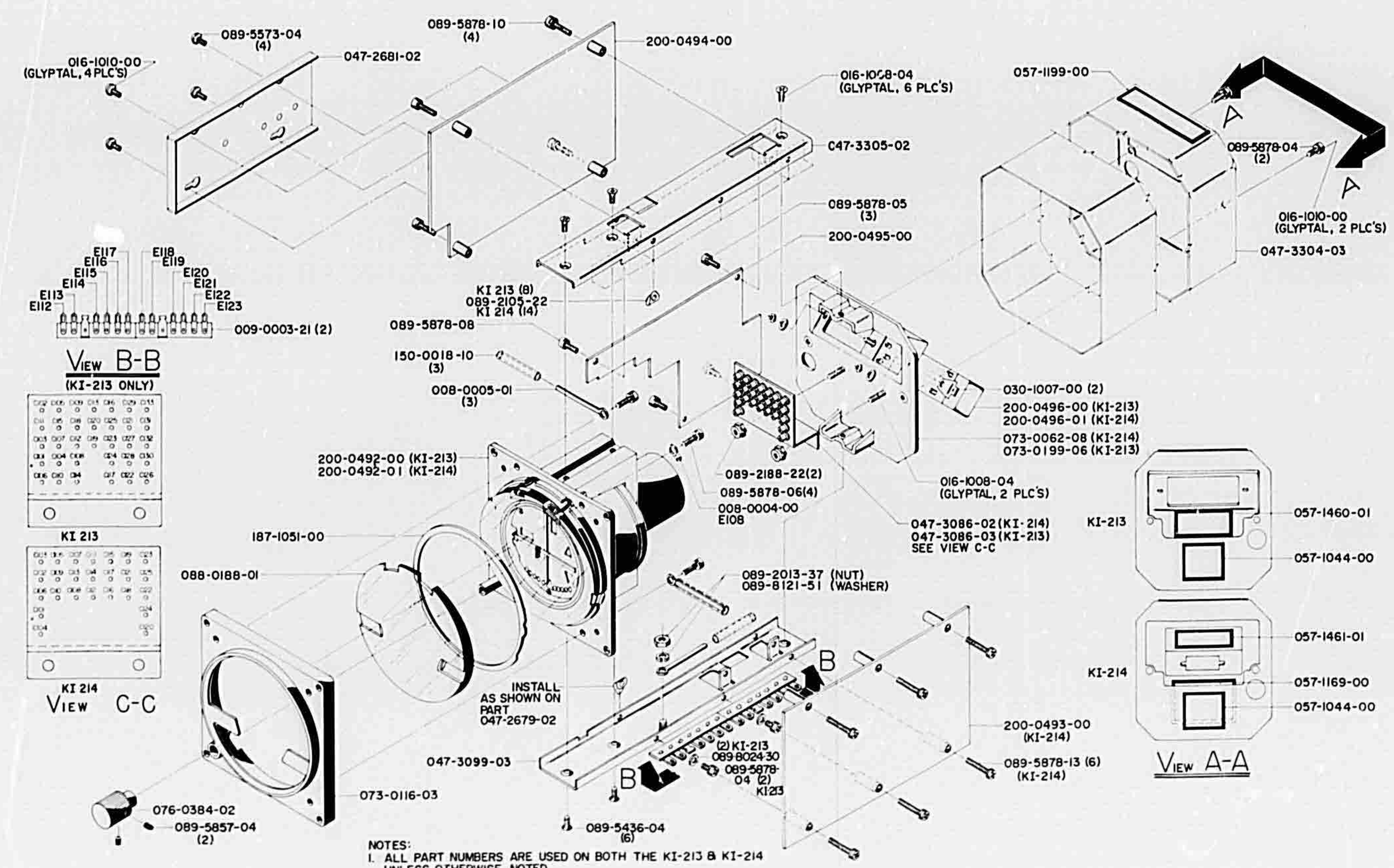


FIGURE 5-2B KI 213/214 FINAL ASSEMBLY
(Dwg. No. 300-0723-01, R-0)

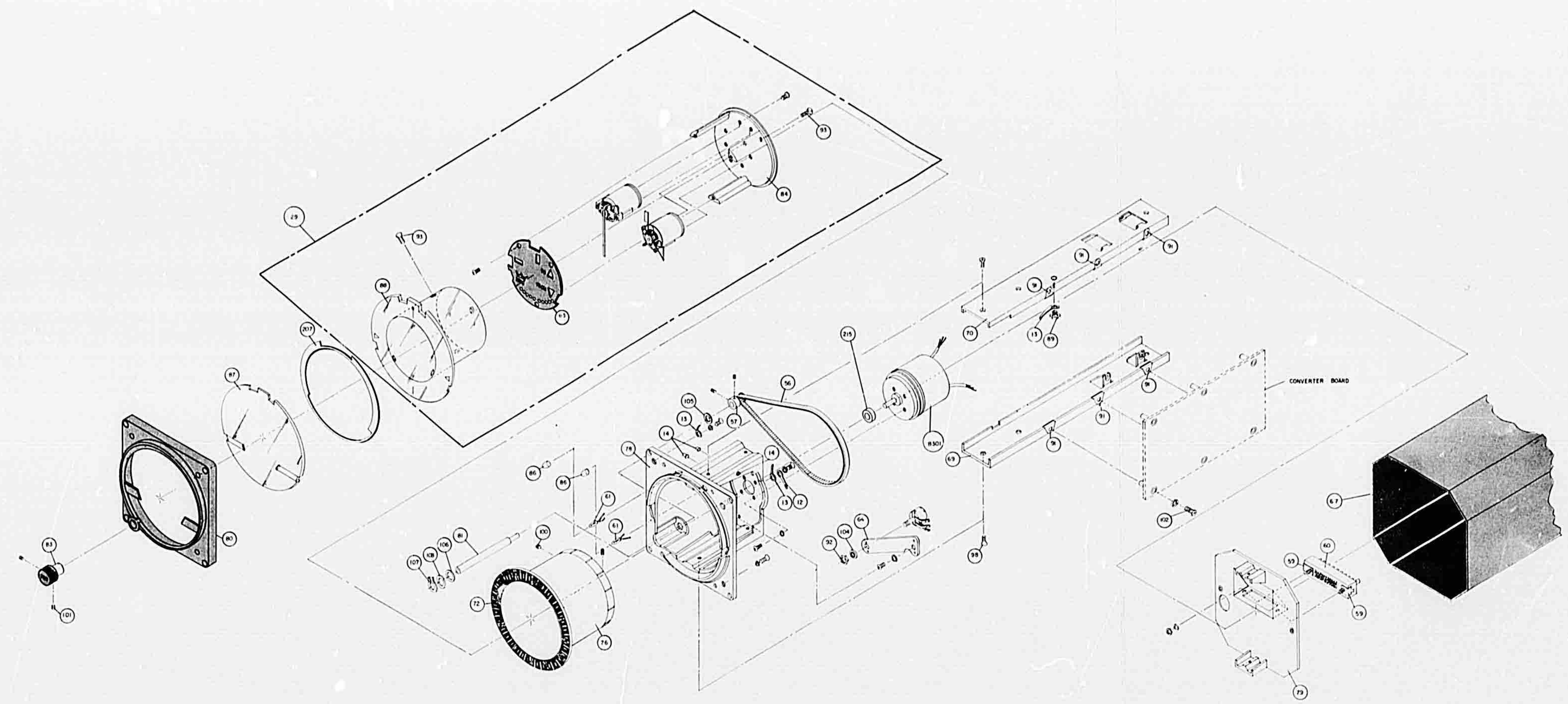


FIGURE 5-1 KI 201C FINAL ASSEMBLY

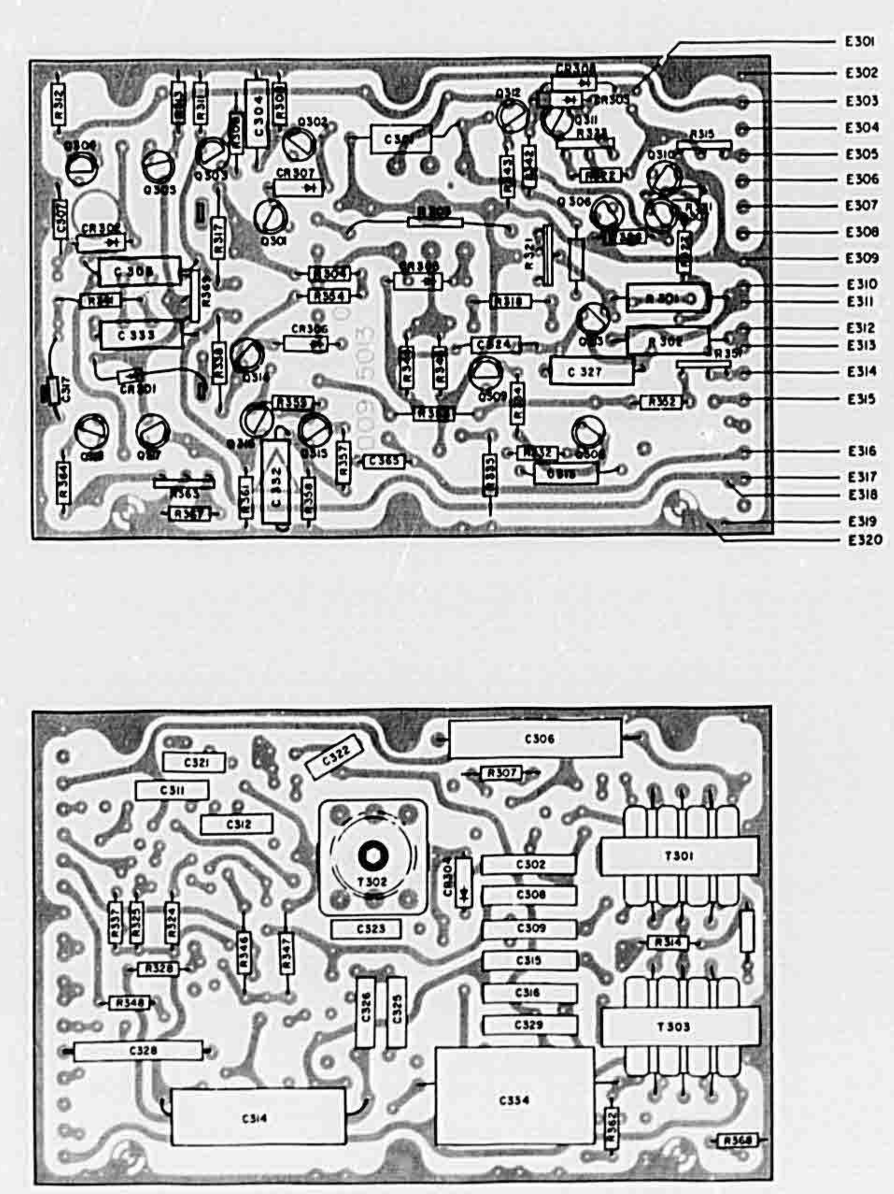


FIGURE 5-3A OMNI CONVERTER P.C. BOARD ASSEMBLY DRAWING
KI 201C S/N 10982 & Below; KI 214 S/N 2763 & Below
(Dwg. No. 300-0692-00, R-0)

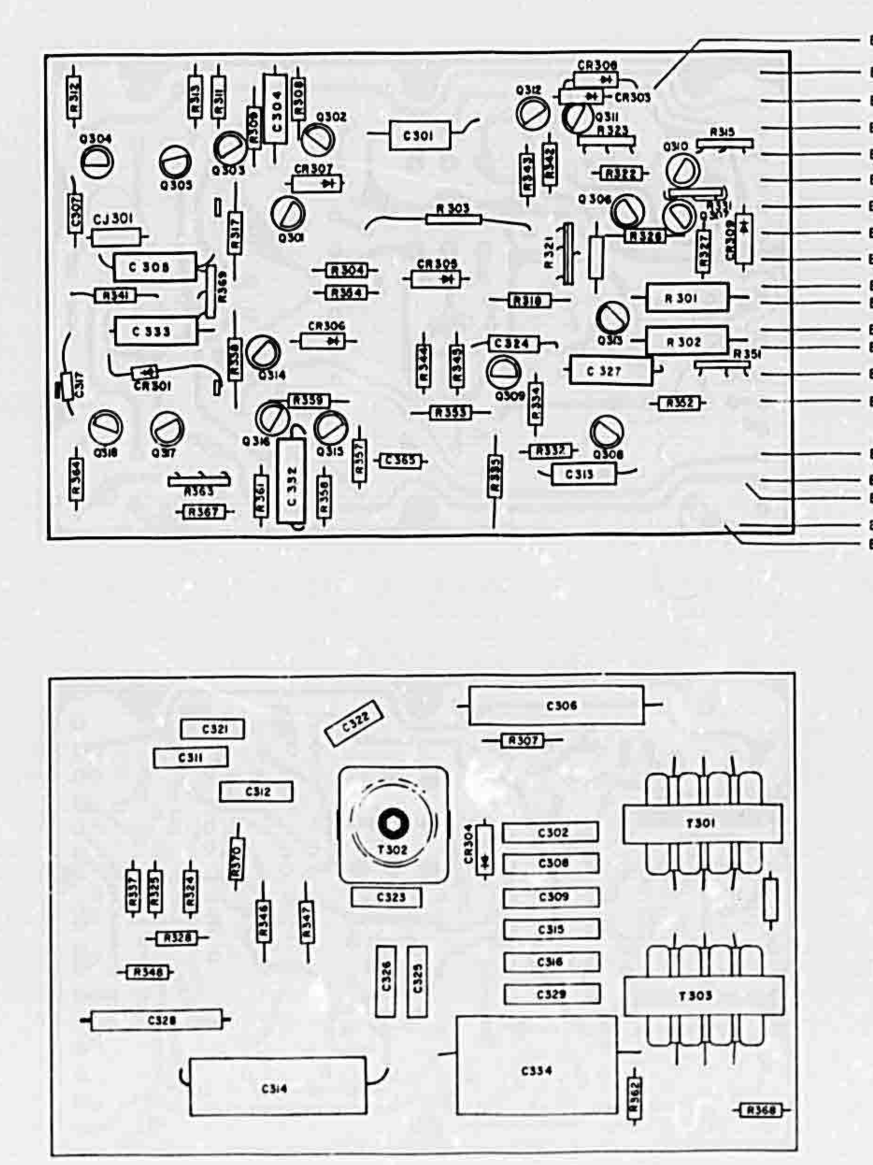


FIGURE 5-3B OMNI CONVERTER P.C. BOARD ASSEMBLY DRAWING
KI 201C S/N 10983 - 20,999. KI 214 S/N 2764 - 7999
(Dwg. No. 300-0692-01, R-4)

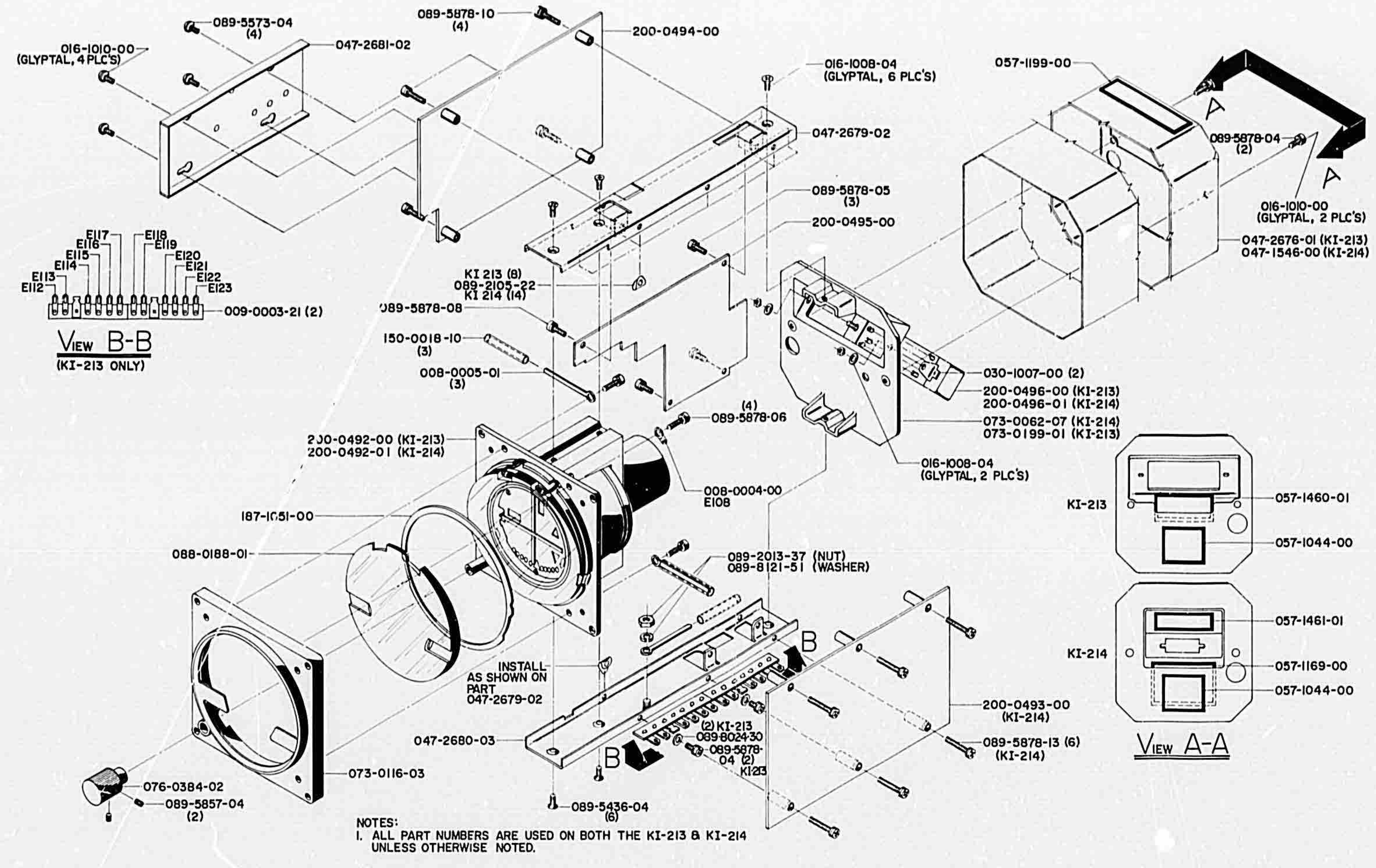


FIGURE 5-2A KI 213/214 FINAL ASSEMBLY
(Dwg. No. 300-0723-00, R-0)

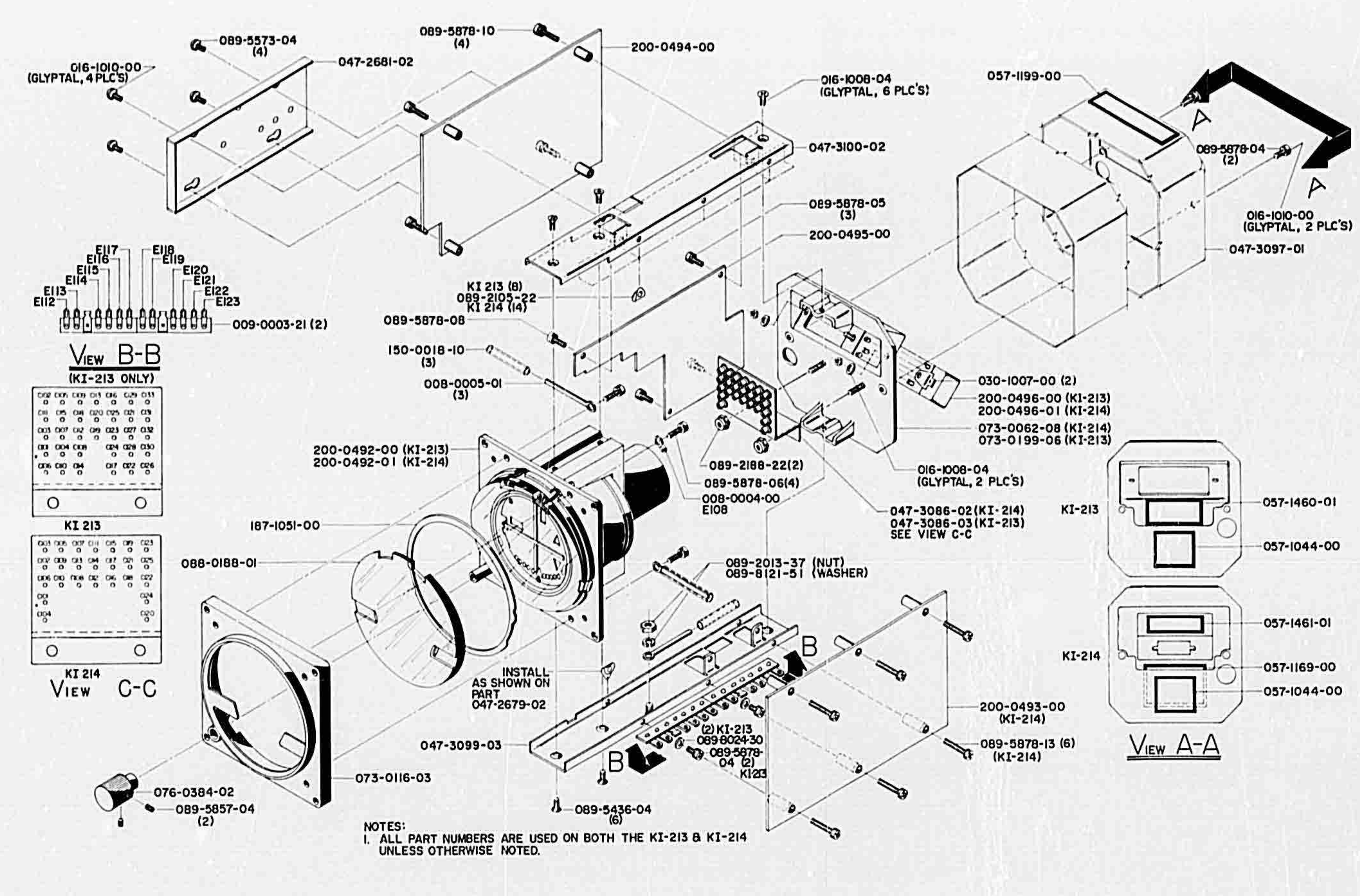


FIGURE 5-2A KI 213/214 FINAL ASSEMBLY
(Dwg. No. 300-0723-00, R-2)

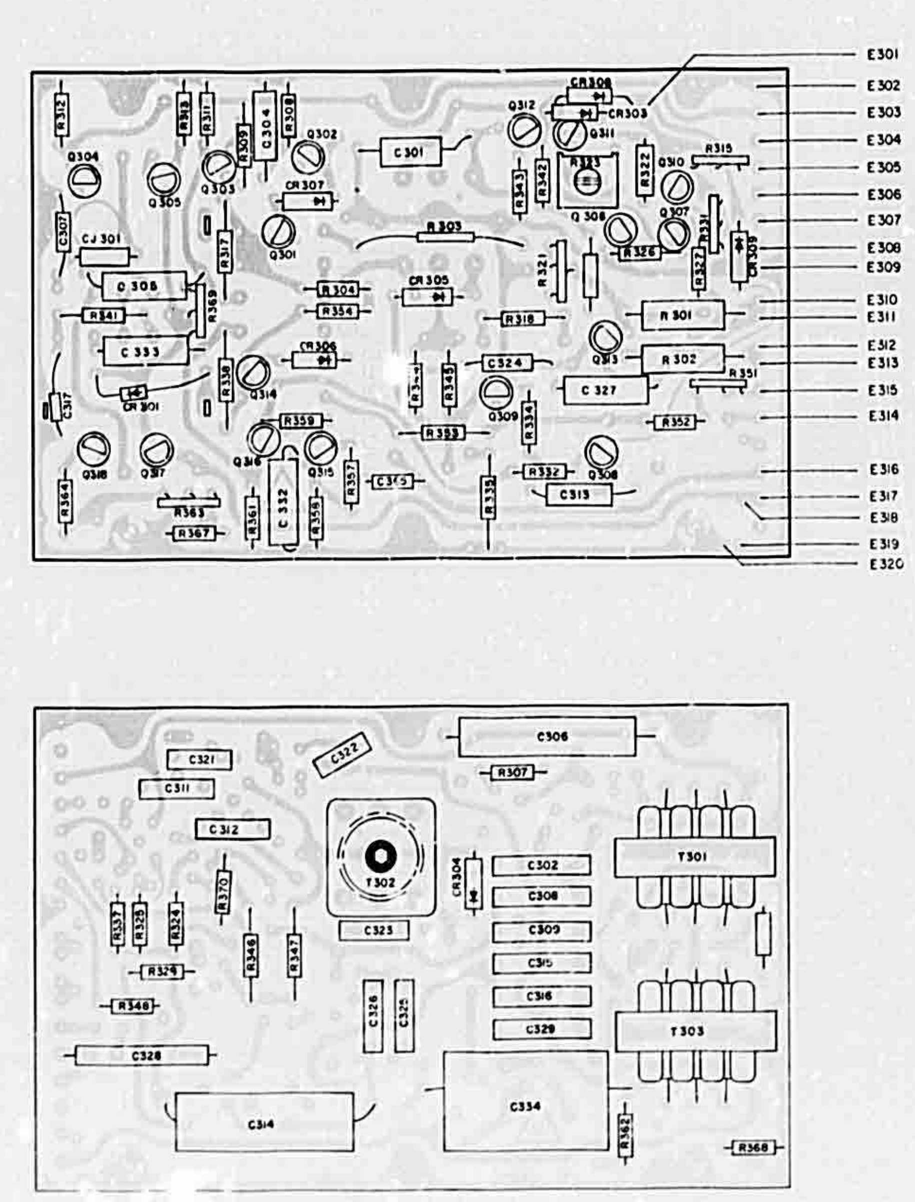


FIGURE 5-3C OMNI CONVERTER P.C. BOARD ASSEMBLY DRAWING
KI 201C S/N 21,000 & Above, KI 214 S/N 8000 & Above
(Dwg. No. 300-0692-02, R-0)

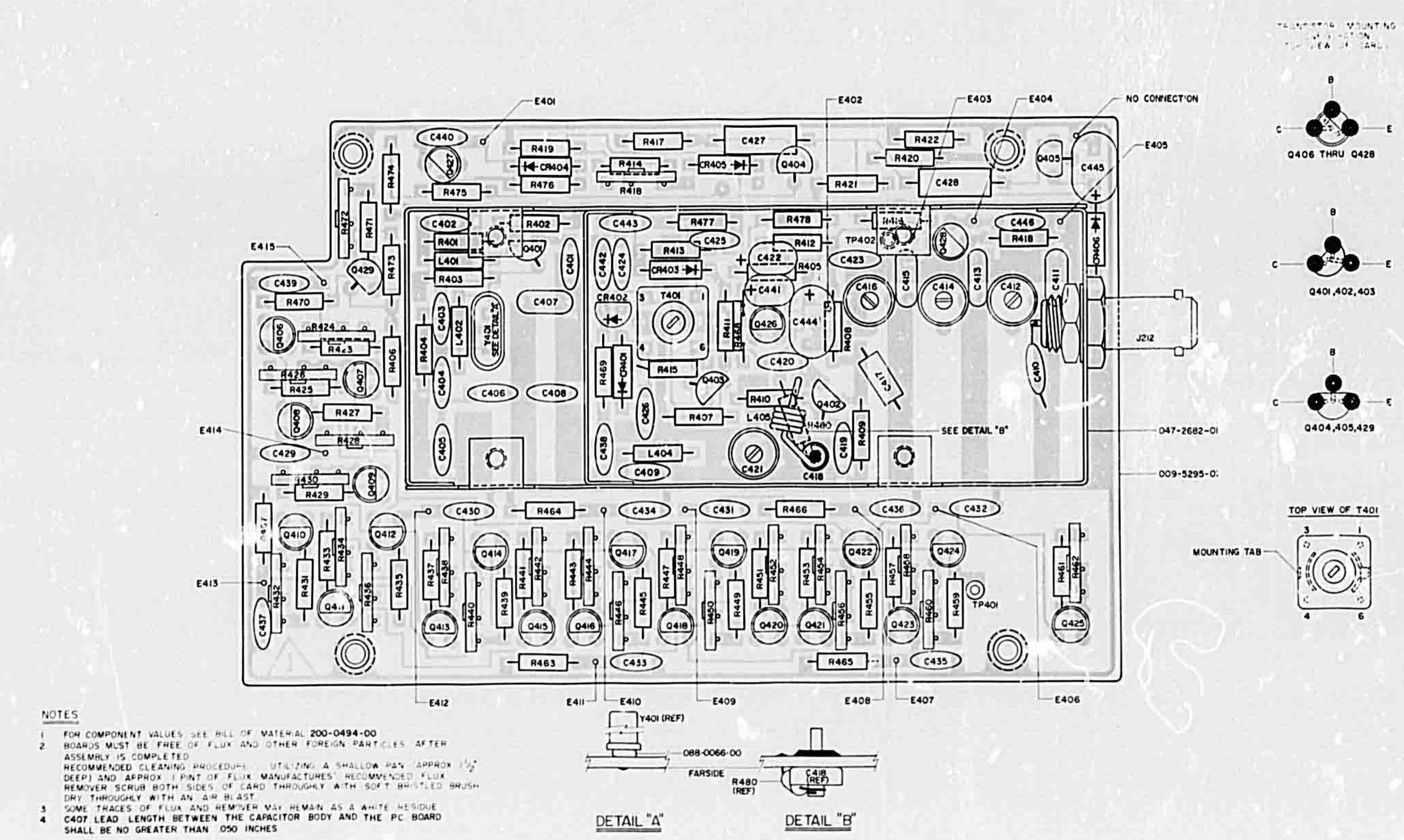
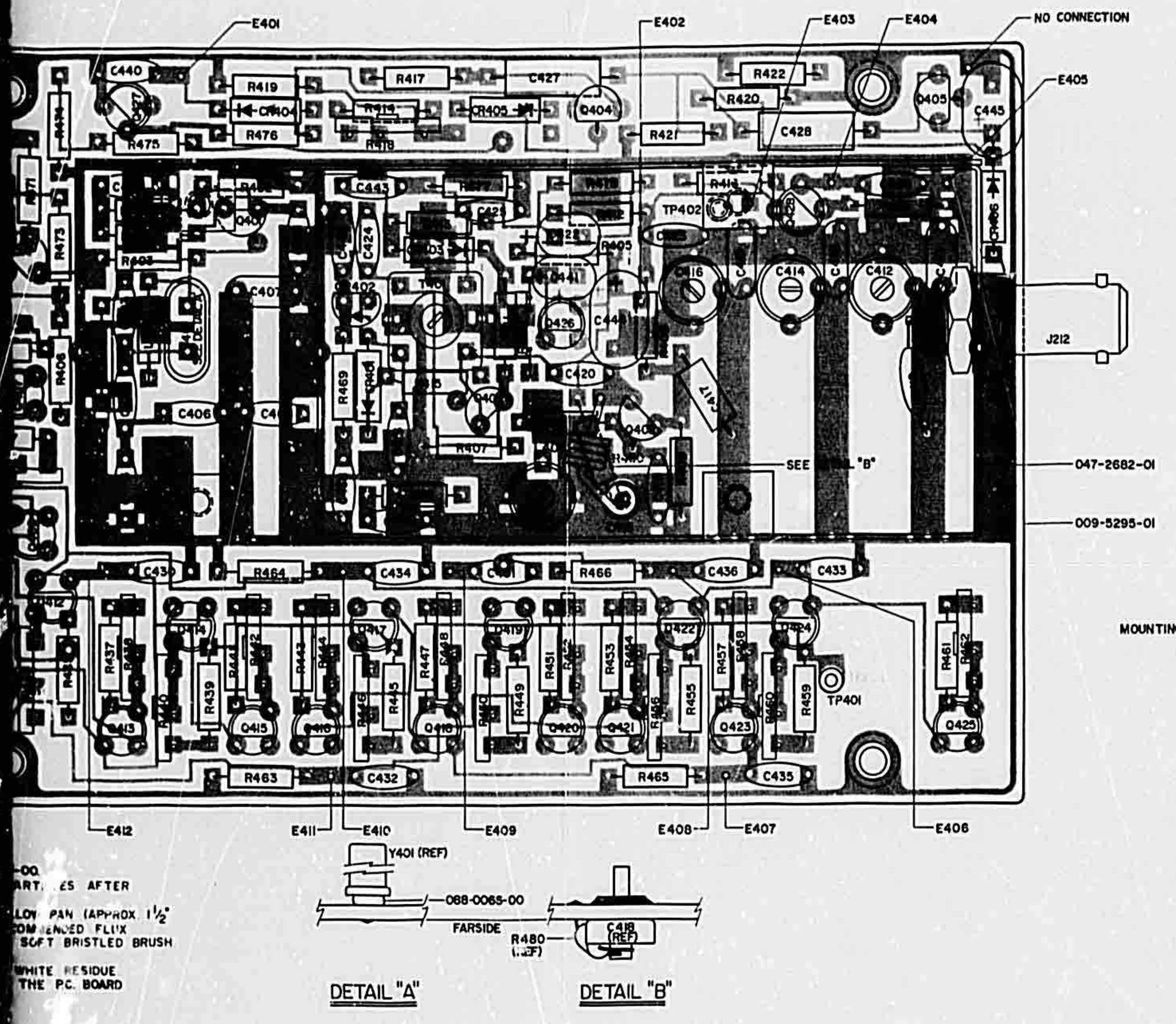
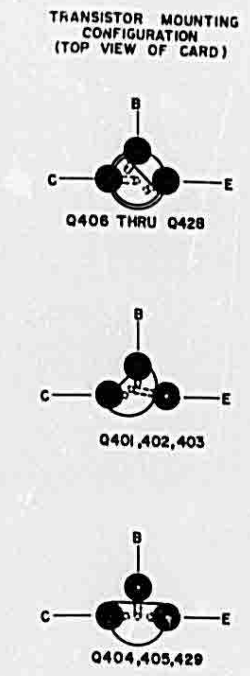
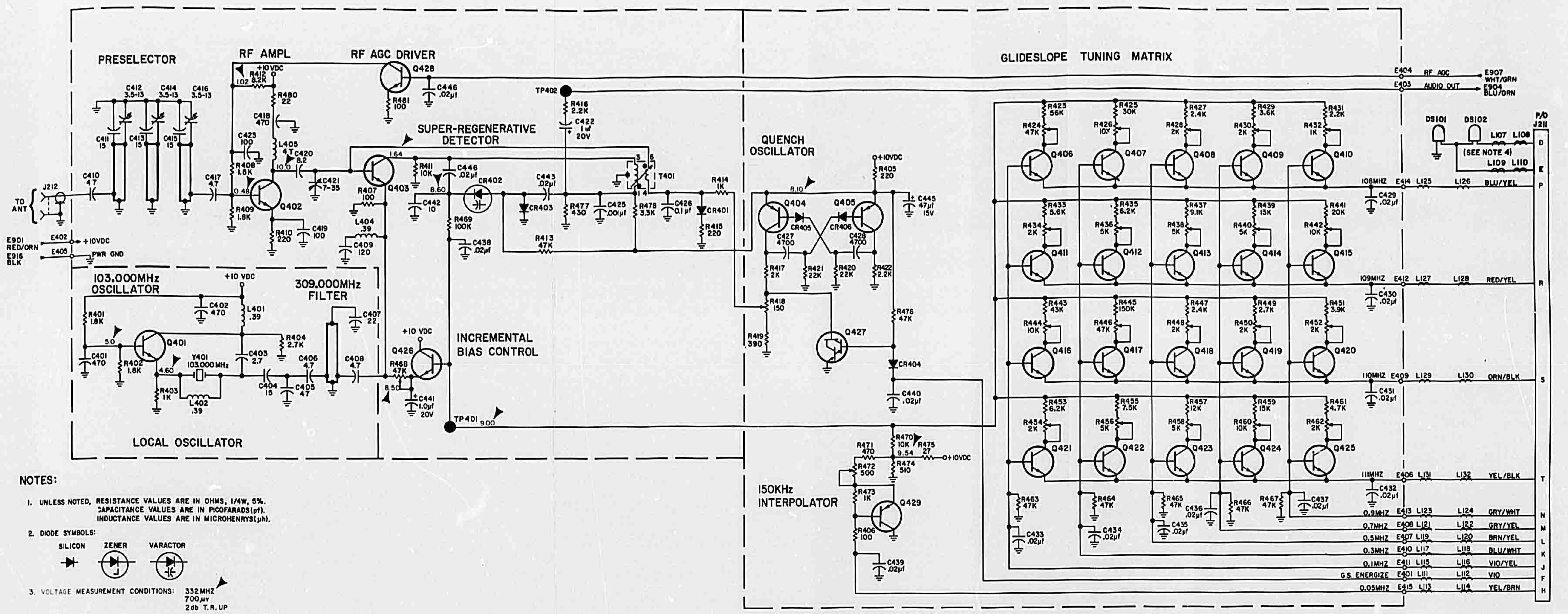


FIGURE 5-5 KI 213/214 GLIDESLOPE BOARD ASSEMBLY DRAWING
(Dwg. No. 300-0693-00, R-4)







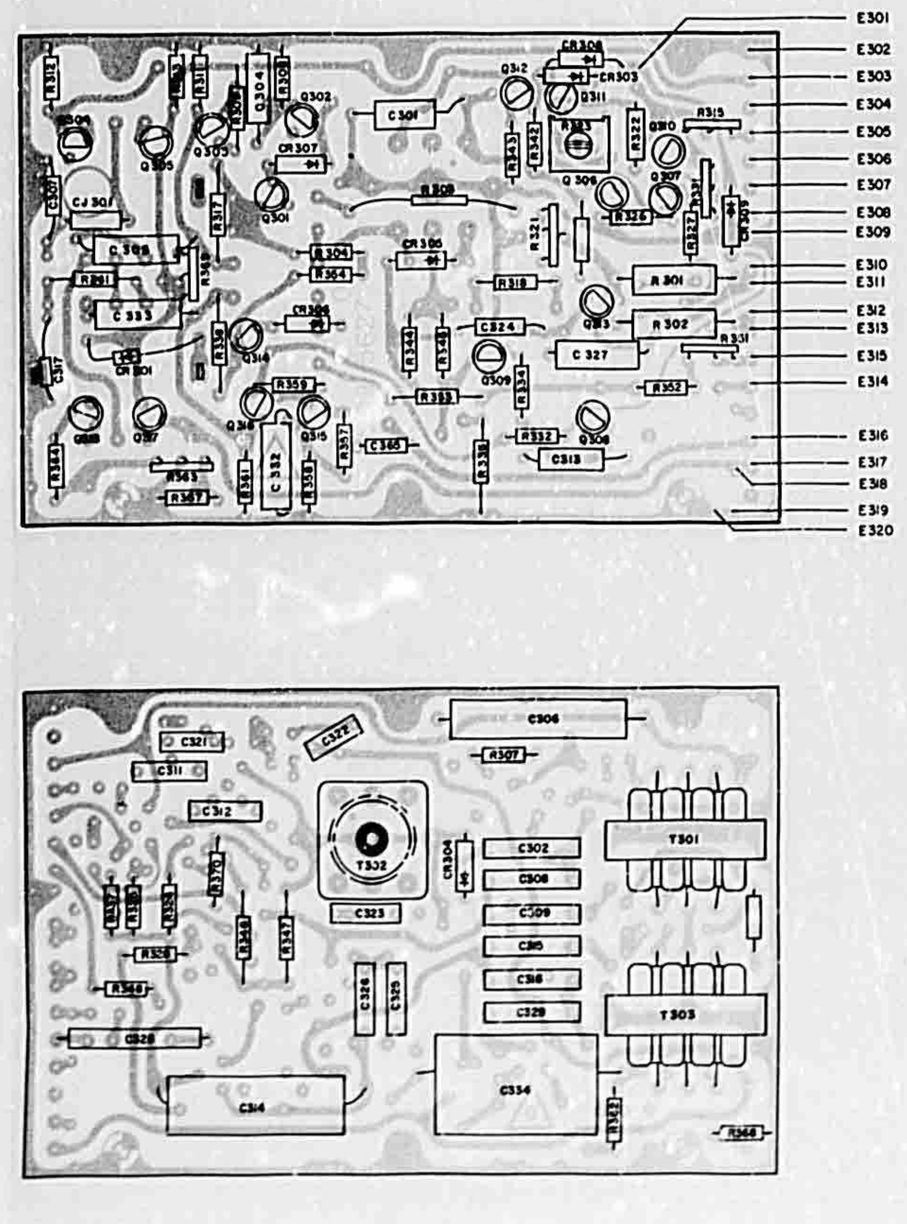
NOTES:

1. UNLESS NOTED, RESISTANCE VALUES ARE IN OHMS, 1/4W, 5%. CAPACITANCE VALUES ARE IN PICOFARADS (pf). INDUCTANCE VALUES ARE IN MICROHENRYS (µh).
2. DIODE SYMBOLS: SILICON ZENER VARACTOR
3. VOLTAGE MEASUREMENT CONDITIONS: 332 MHZ 700µv 2db T.R. UP
4. LIGHTING:
   FOR 27.5 VDC OPERATION: PIN "D" IS 27.5 VDC, PIN "E" IS OPEN
   FOR 13.75 VDC OPERATION: PIN "D" IS GND., PIN "E" IS 13.75VDC.

LAST CIRCUIT NUMBERS USED:
R481
L405, L111-L132
C445
CR406
Q429
Y401
E416
TP402

KI 213/214 GLIDESLOPE SCHEMATIC AND ASSEMBLY DRAWING

E SCHEMATIC AND ASSEMBLY DRAWING
2-0274-02 R-0)
0-069? 00 R-2)



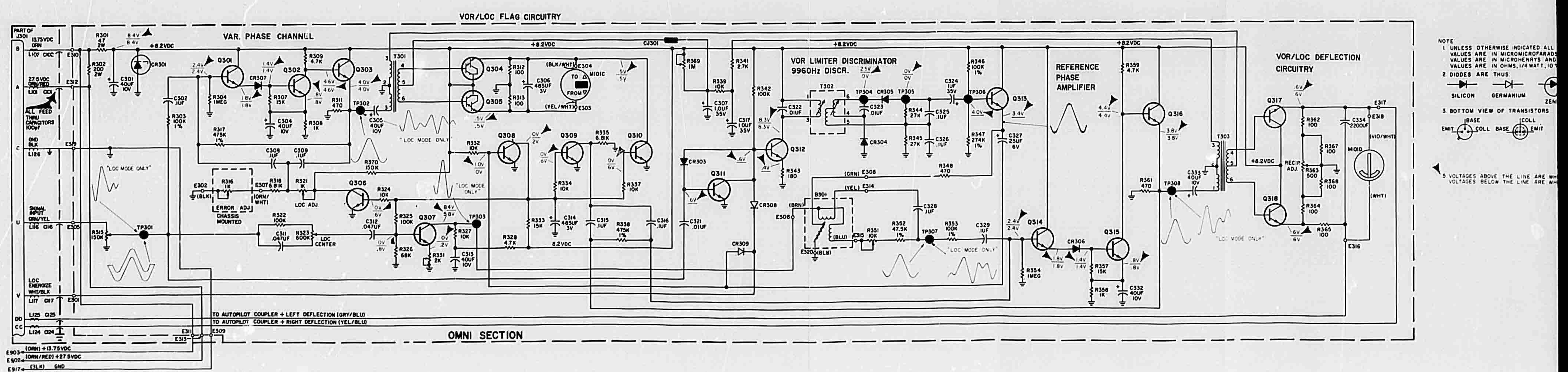
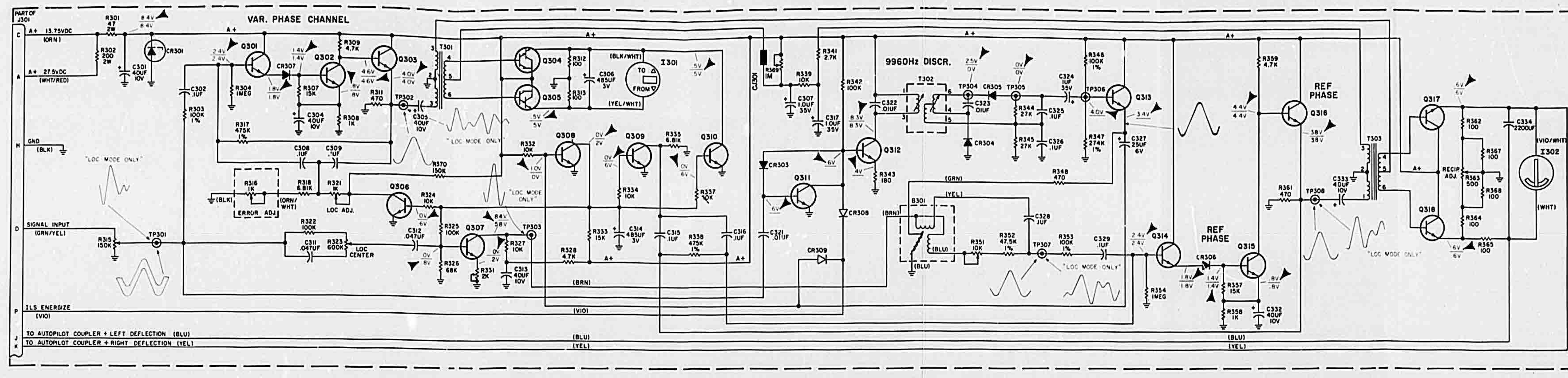


FIGURE 6-7 KI 214 CONVERTER BOARD ASSEMBLY & SCHEMATIC KI 214 S/N 8000 & Above
(Dwg. Nos. 300-0692-02, R-0;
002-0274-03, R-4)

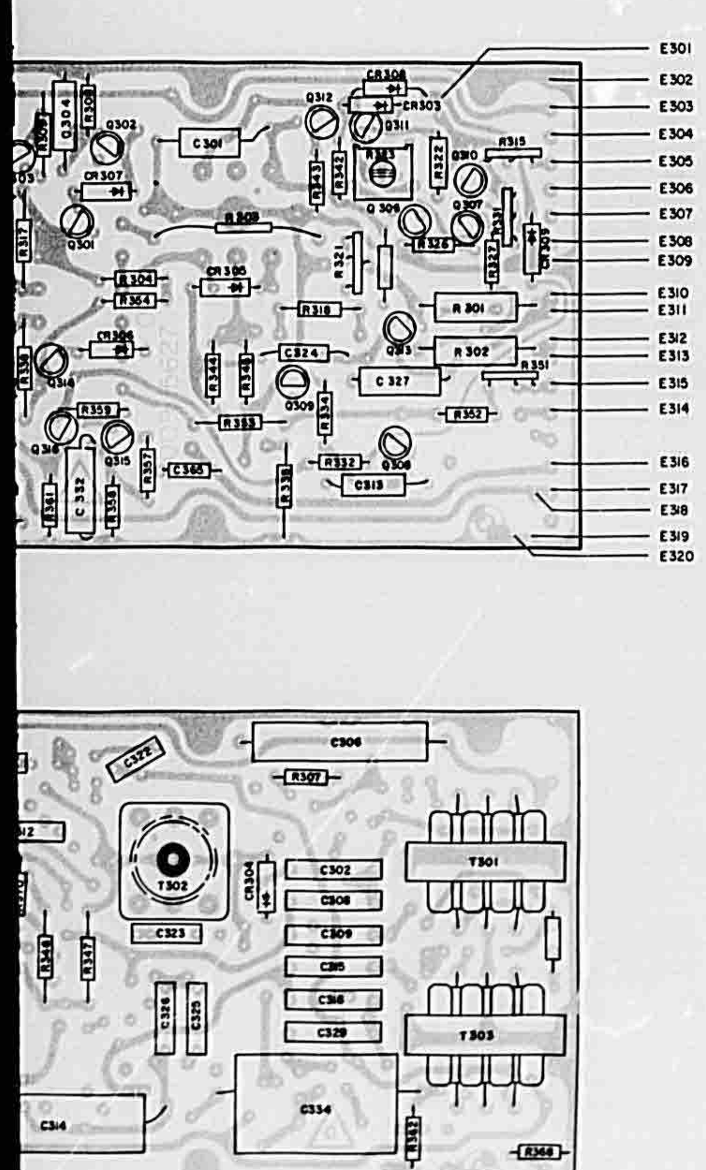
See KI 214 Converter Board on Figure 6-7 for Assembly Drawing for KI 201C Converter Board.

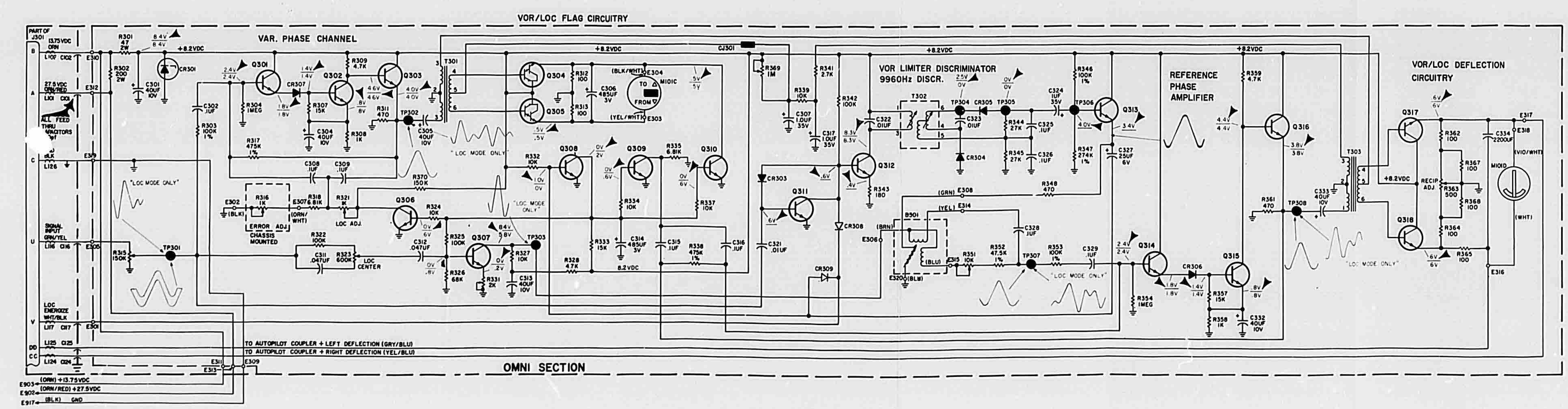


NOTE:
1 UNLESS OTHERWISE INDICATED ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS, ALL INDUCTANCE VALUES ARE IN MICROHENRYS AND ALL RESISTANCE VALUES ARE IN OHMS, 1/4 WATT, 10%
2 DIODES ARE THUS: SILICON GERMANIUM ZENER VARACTOR
3 BOTTOM VIEW OF TRANSISTORS
4 LIGHTING FOR 27.5 VDC OPERATION PIN "E" IS +27.5 VDC PIN "F" IS OPEN; +13.75 VDC OPERATION PIN "E" IS GROUNDED PIN "F" IS +13.75VDC
5 VOLTAGES ABOVE THE LINE ARE WHEN UNIT IS IN "OMNI" MODE VOLTAGES BELOW THE LINE ARE WHEN UNIT IS IN "LOC" MODE

KI201C SCHEMATIC

FIGURE 6-7A KI 201C SCHEMATIC (S/N 10983 and above)
(Dwg. No. P/O 002-0137-00, R-10)

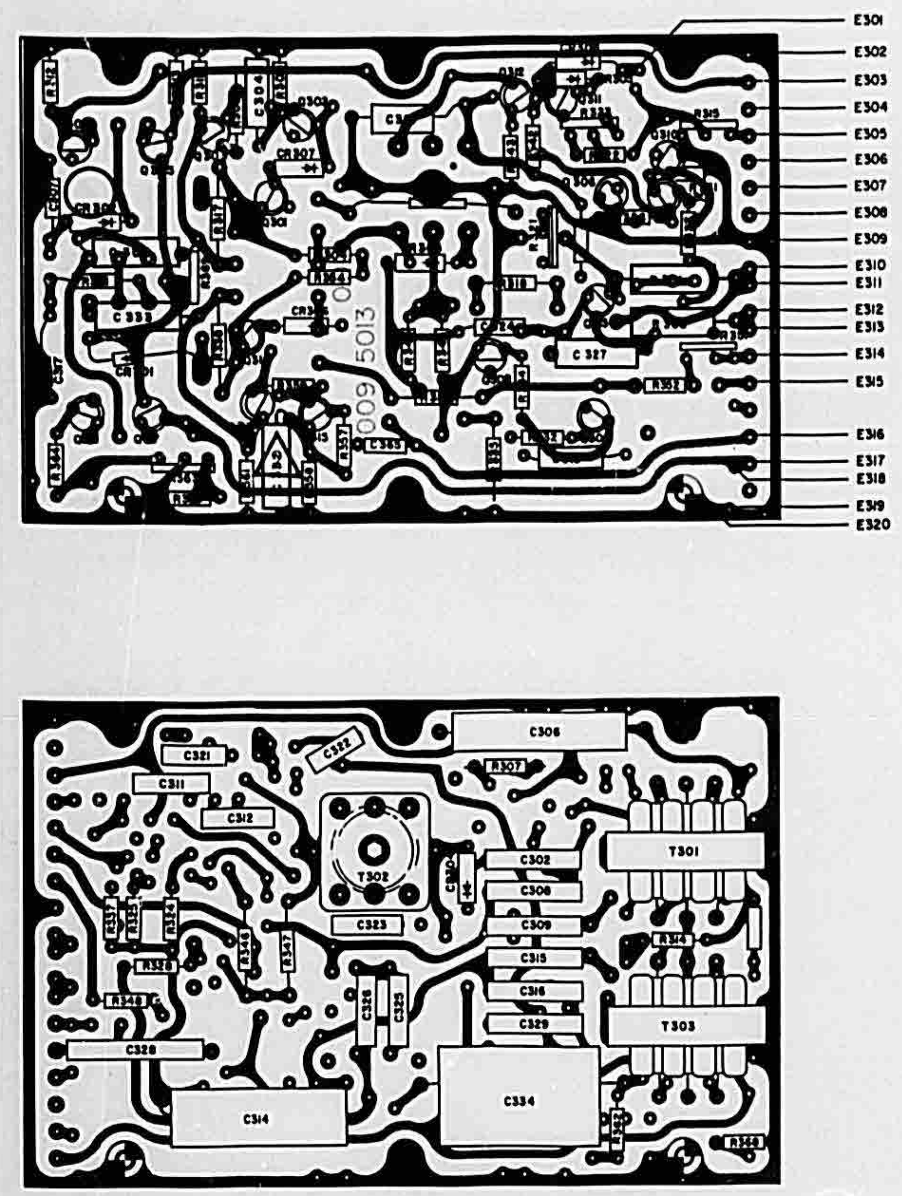


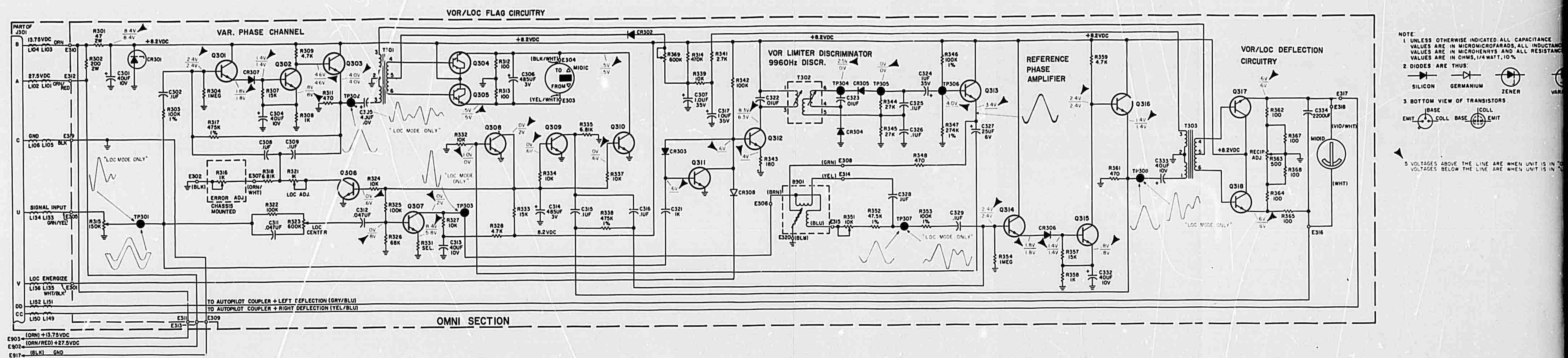


NOTE:
1 UNLESS OTHERWISE INDICATED ALL CAPACITANCE VALUES ARE IN MICROMICROFARADS, ALL INDUCTANCE VALUES ARE IN MICROHENRYS AND ALL RESISTANCE VALUES ARE IN OHMS, 1/4 WATT, 10%
2 DIODES ARE THUS: SILICON GERMANIUM ZENER VARACTOR
3 BOTTOM VIEW OF TRANSISTORS
5 VOLTAGES ABOVE THE LINE ARE WHEN UNIT IS IN "OMNI" MODE VOLTAGES BELOW THE LINE ARE WHEN UNIT IS IN "LOC" MODE

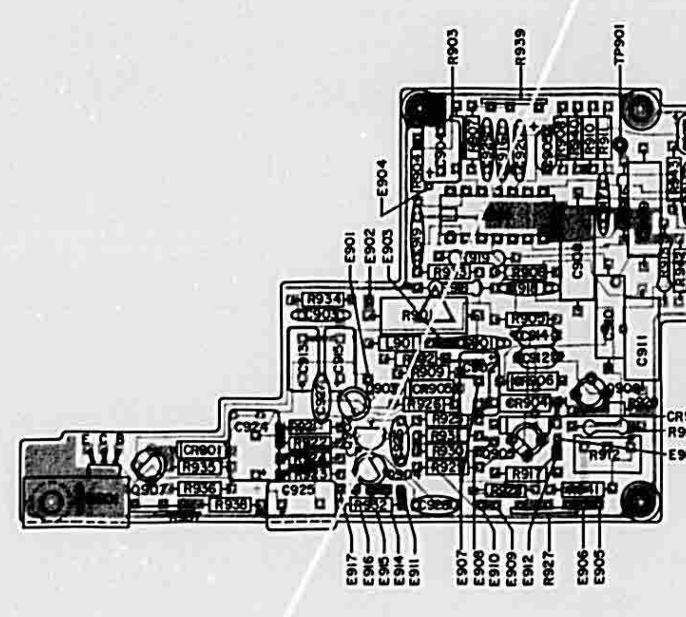
KI 214 VOR/LOC BOARD SCHEMATIC AND ASSEMBLY DRAWING

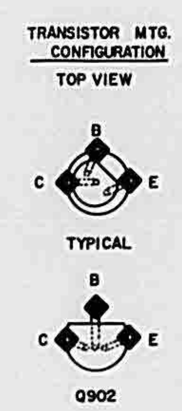
...RTER BOARD ASSEMBLY & SCHEMATIC KI 214 S/N 8000 & Above
(Dwg. Nos. 300-0692-02, R-0;
002-0274-03, R-4)

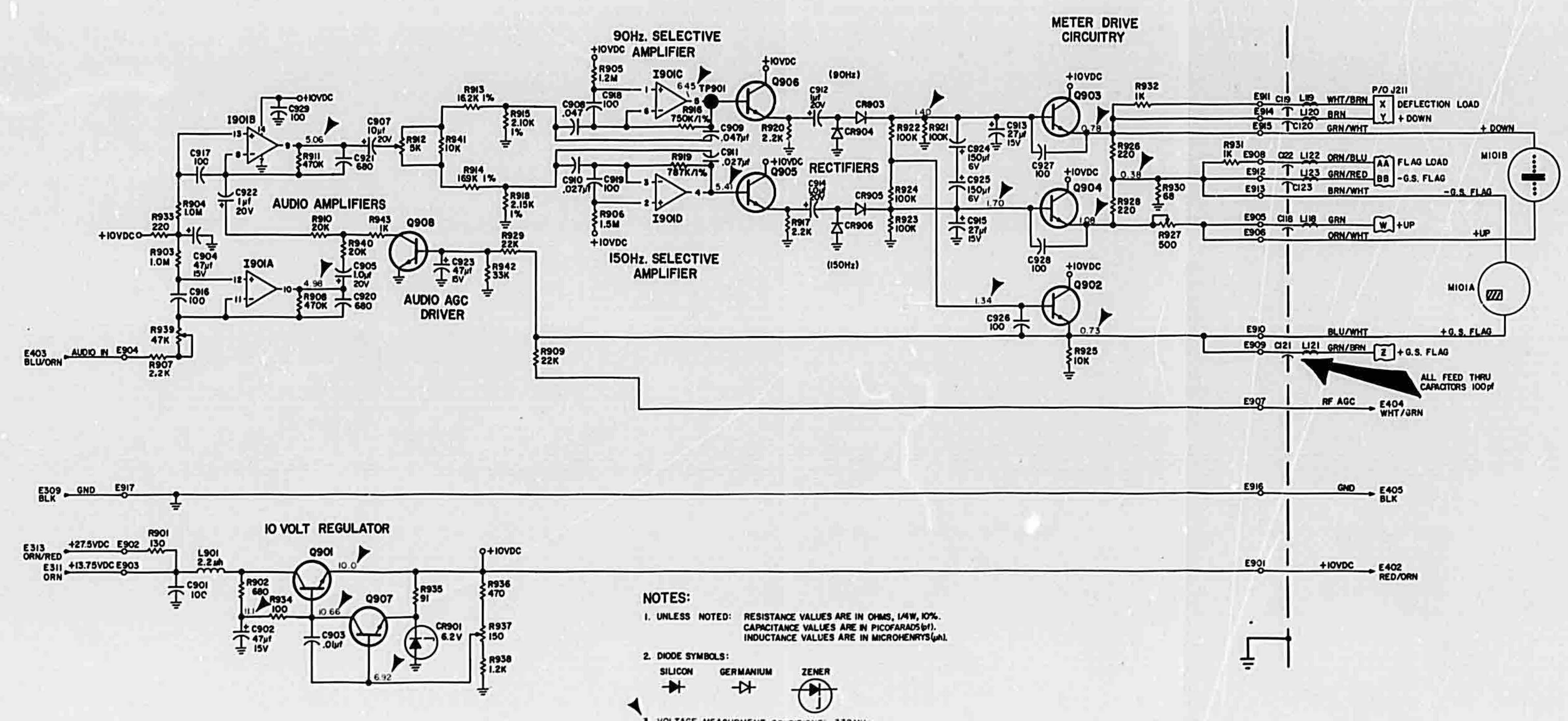




GURE 6-7 KI 214 CONVERTER BOARD ASSEMBLY & SCHEMATIC KI 214 S/N 2763 & Below
(Dwg. Nos. 300-0692-00, R-0;
002-0274-03, R-0)







KI 214 AUDIO BOARD SCHEMATIC AND ASSEMBLY DRAWING

FIGURE 6-8 KI 214 AUDIO BOARD ASSEMBLY & SCHEMATIC S/N 8000 & Above
(Dwg. Nos. 300-0694-01, R-0;
002-0274-01, R-6)

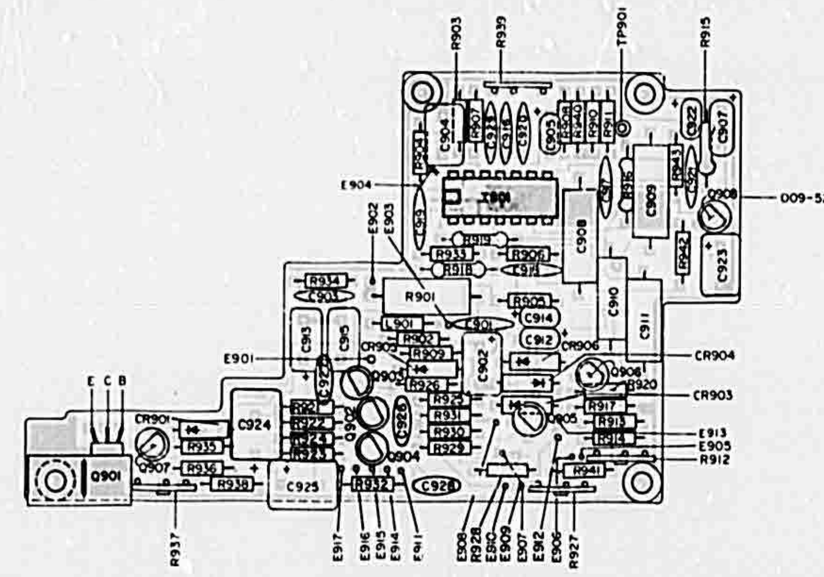


FIGURE 5-6A KI 213/214 AUDIO BOARD ASSEMBLY
KI 213 S/N 2499 & Below; KI 214 S/N 7999 & Below
(Dwg. No. 300-0694-00, R-5)

KING
KI 201C/KI 213/KI 214
VOR/LOC-GS INDICATOR

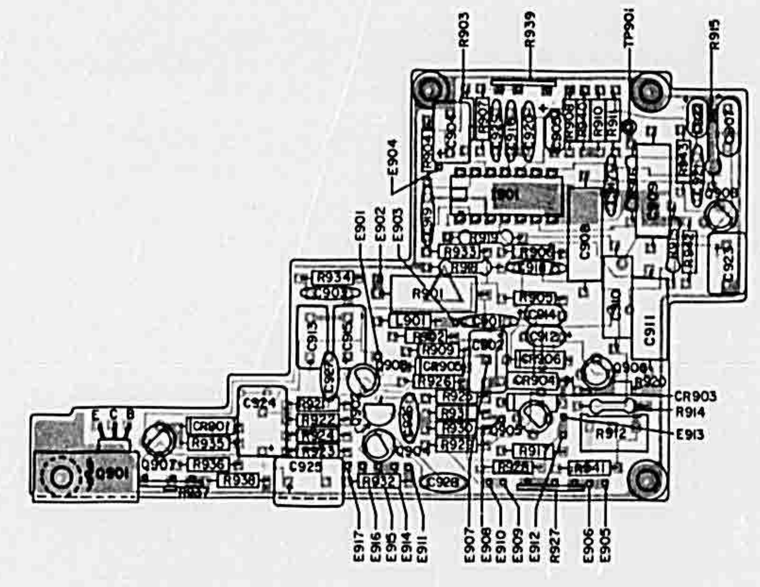
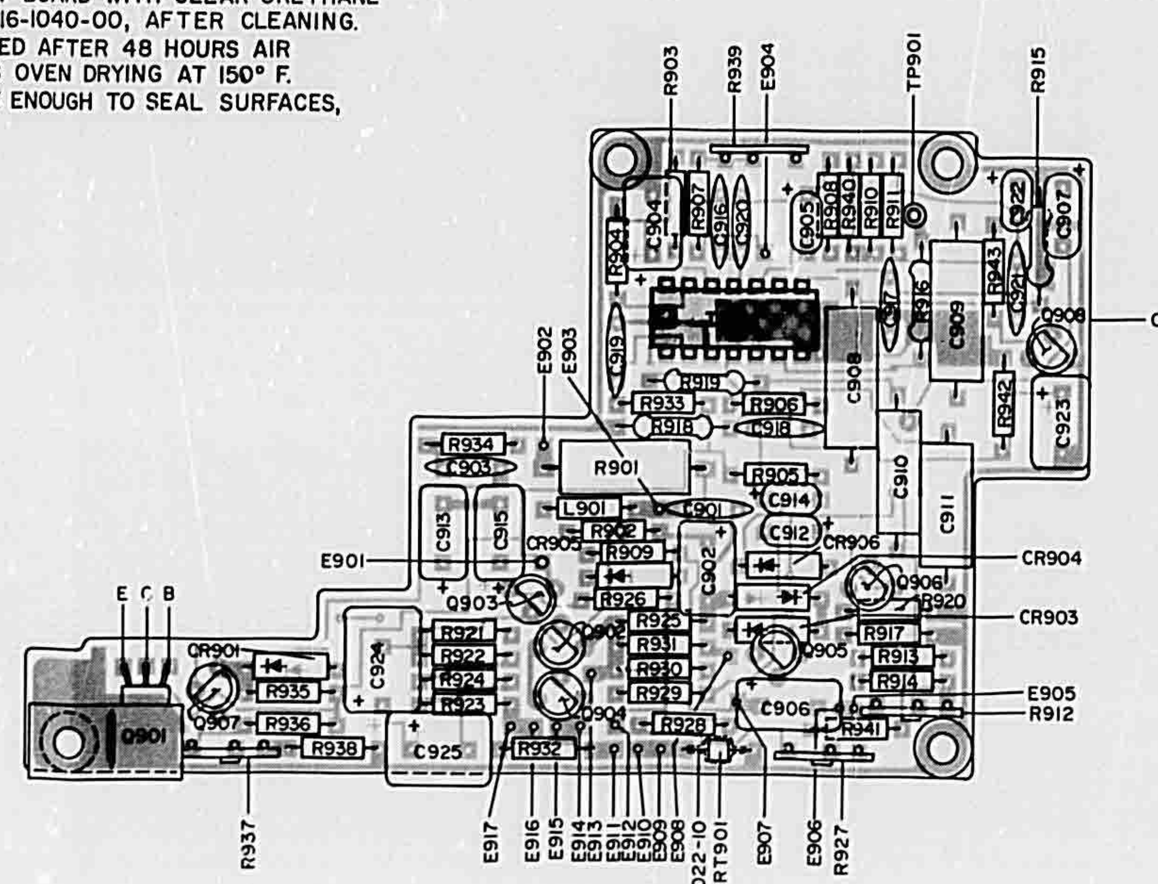
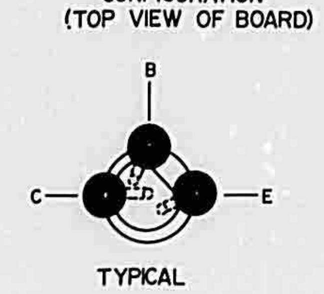


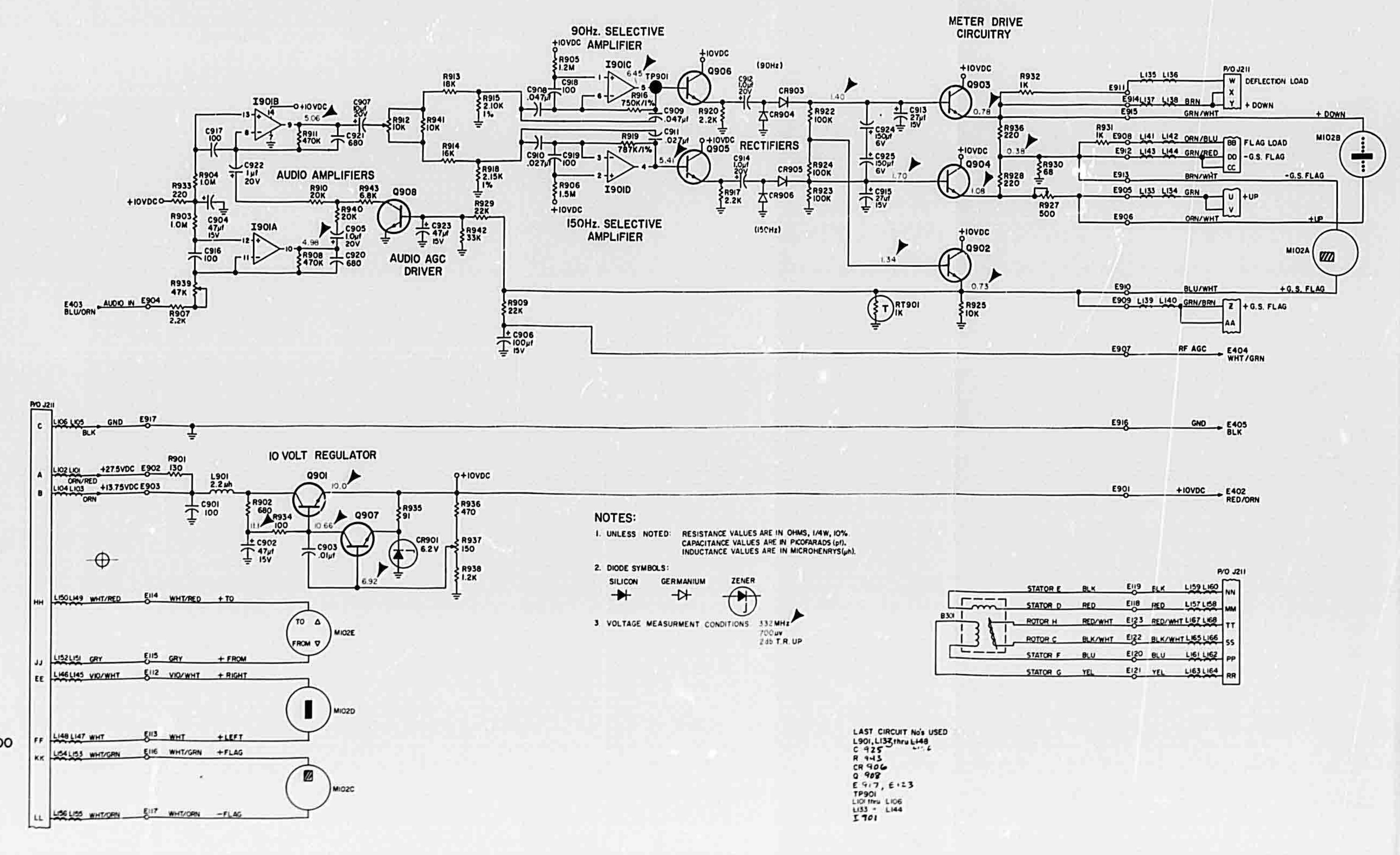
FIGURE 5-6B KI 213/214 AUDIO BOARD ASSEMBLY
KI 213 S/N2500 & Above; KI 214 S/N 8000 & Above
(Dwg. No. 300-0694-01, R-0)

NOTES: (CONT.)

4. MASK RESISTORS R912, R927, R937 AND R939, TP901, GROUND AREA WHICH Q901 COMES IN CONTACT WITH AND GROUND THAT COMES IN CONTACT WITH MOUNTING TABS AND MOUNTING SCREWS. SPRAY BOTH SIDES OF BOARD WITH CLEAR URETHANE SEAL COATING, KPN 016-1040-00, AFTER CLEANING. COATING IS 95% CURED AFTER 48 HOURS AIR DRYING OR 24 HOURS OVEN DRYING AT 150° F. COATING TO BE THICK ENOUGH TO SEAL SURFACES, BUT FREE OF RUNS.







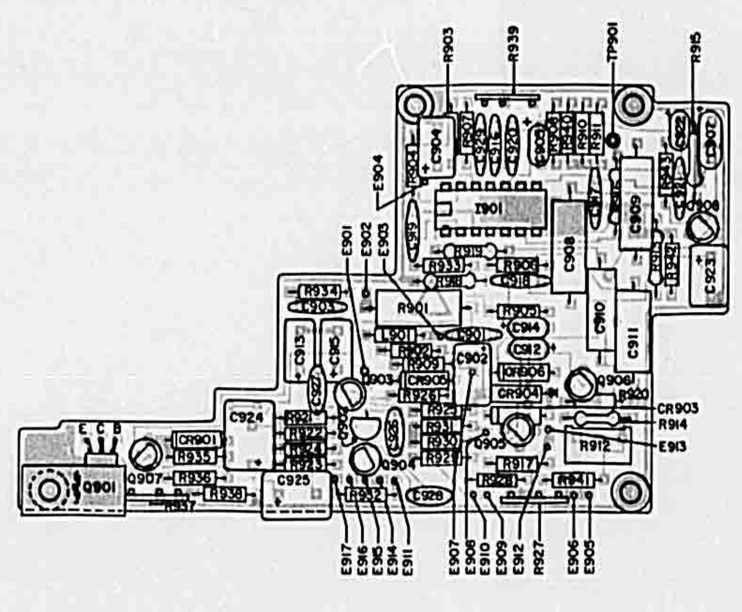
REF: B/M 200-0495-00

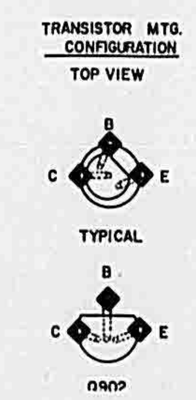
NOTES:

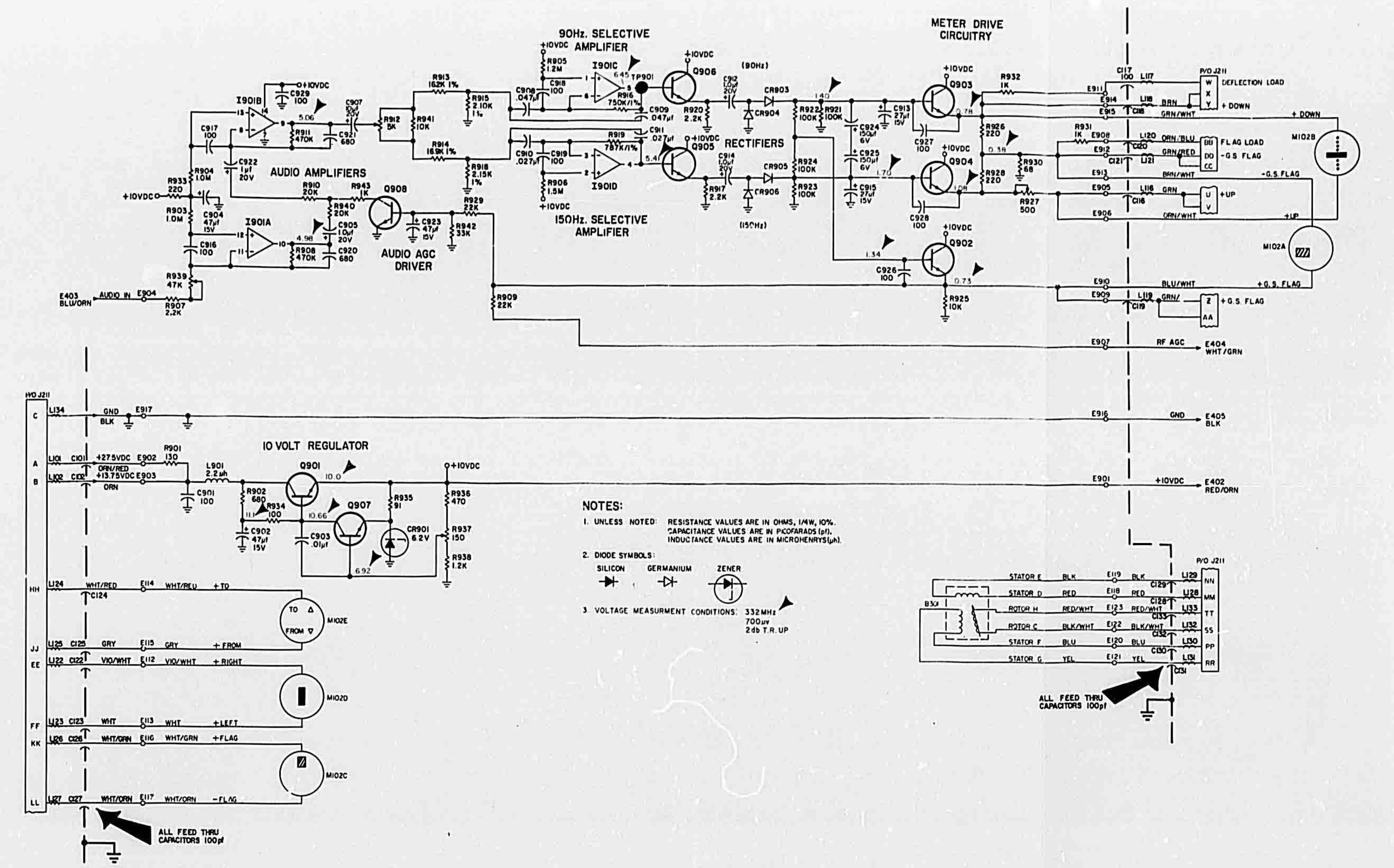
1. FOR COMPONENT VALUES SEE BILL OF MATERIAL 200-0495-00.
2. BOARDS MUST BE FREE OF FLUX AND OTHER FOREIGN PARTICLES AFTER ASSEMBLY IS COMPLETED. RECOMMENDED CLEANING PROCEDURE: UTILIZING A SHALLOW PAN (APPROX. 1½" DEEP) AND APPROX. 1 PINT OF FLUX MANUFACTURES' RECOMMENDED FLUX REMOVER SCRUB BOTH SIDES OF CARD THROUGHLY WITH SOFT BRISTLED BRUSH. DRY THROUGHLY WITH AN AIR BLAST.
3. SOME TRACES OF FLUX AND REMOVER MAY REMAIN AS A WHITE RESIDUE.

FIGURE 6-5 KI 213 AUDIO BOARD SCHEMATIC AND ASSEMBLY DRAWING
(Dwg. No. 002-0274-04 R-0)
300-0694-00 R-0)

KI 213 AUDIO BOARD SCHEMATIC AND ASSEMBLY DRAWING



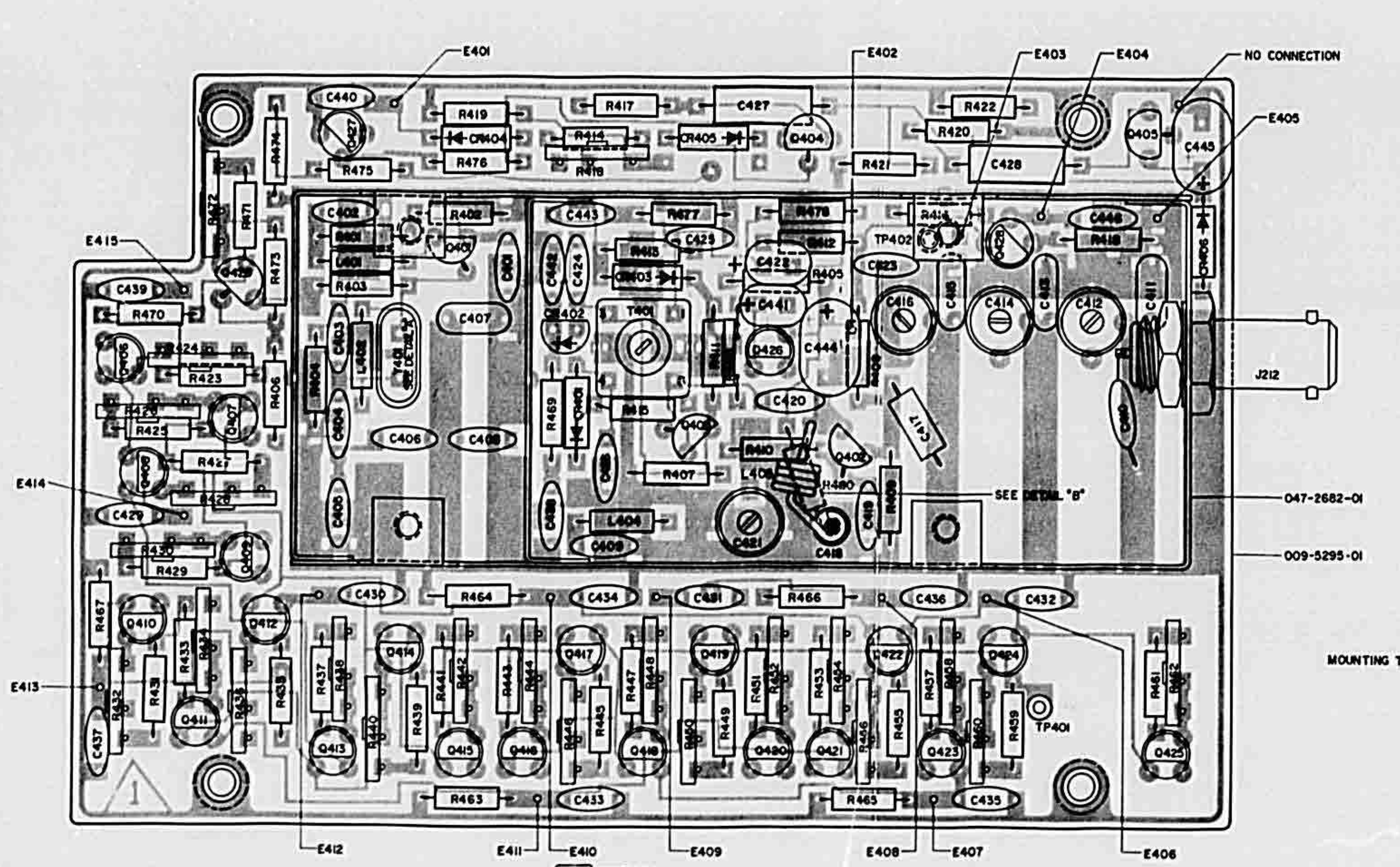


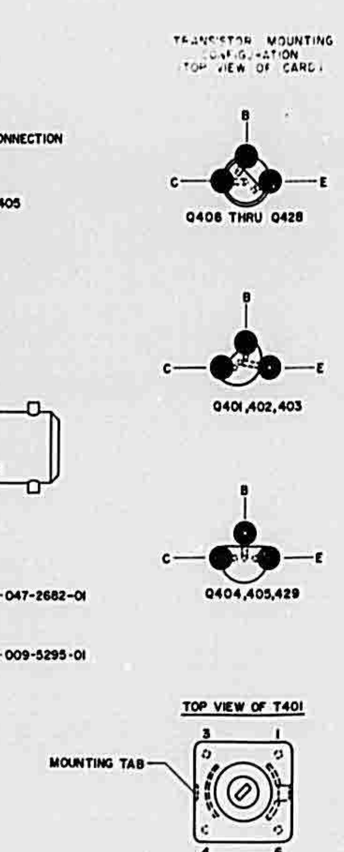


NOTES:

1. UNLESS NOTED: RESISTANCE VALUES ARE IN OHMS, 1/4W, 10%. CAPACITANCE VALUES ARE IN PICOFARADS (pf). INDUCTANCE VALUES ARE IN MICROHENRYS(µh).
2. DIODE SYMBOLS: SILICON GERMANIUM ZENER
3. VOLTAGE MEASURMENT CONDITIONS: 332MHz 700µv 2db T.R. UP

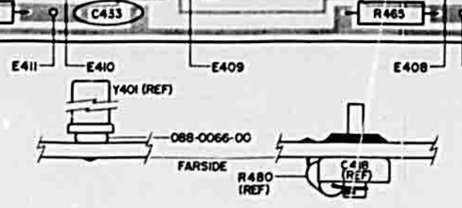
FIGURE 6-5 KI 213 AUDIO BOARD ASSEMBLY & SCHEMATIC (KI 213 S/N 2500 & Above)
(Dwg. Nos. 300-0694-01, R-0;
002-0274-04, R-6)

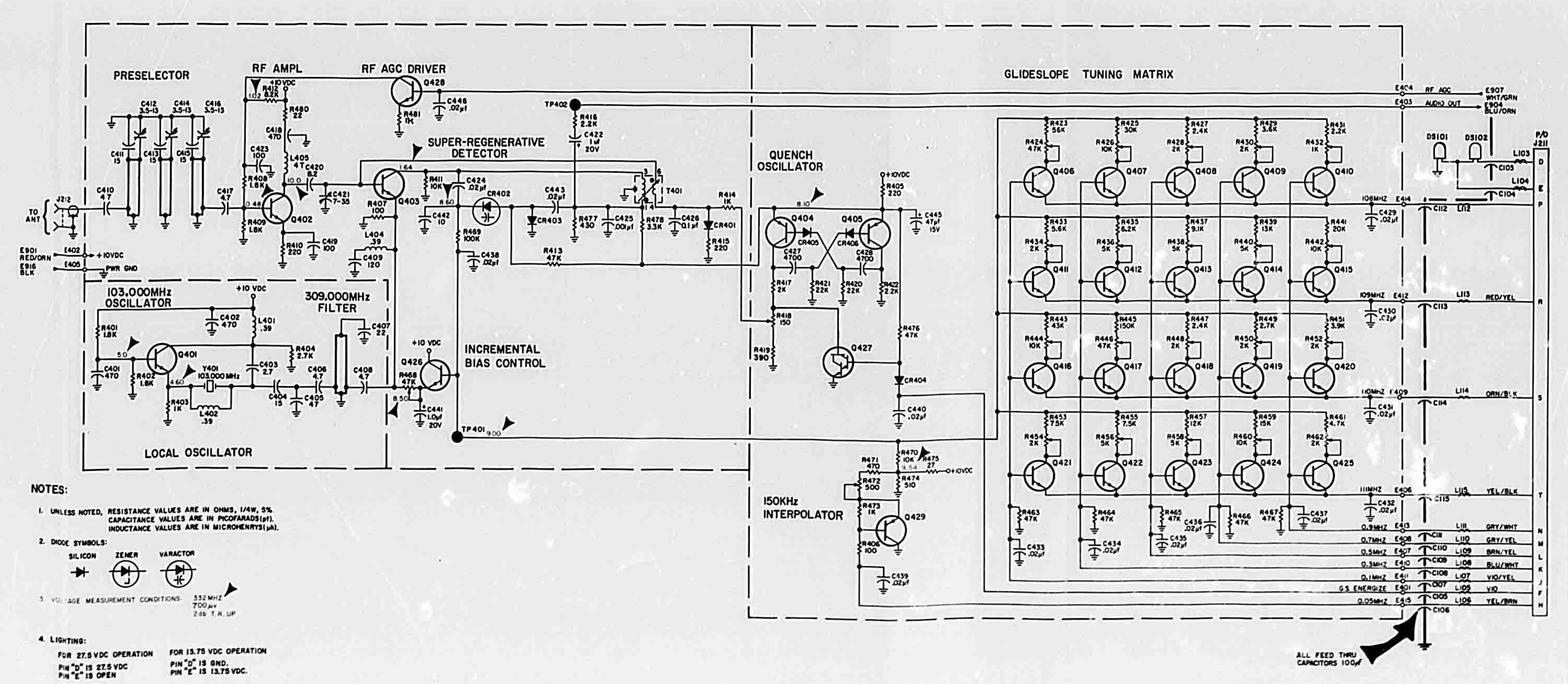




NOTES

1. FOR COMPONENT VALUES SEE BILL OF MATERIAL 200-0494-00
2. BOARDS MUST BE FREE OF FLUX AND OTHER FOREIGN PARTICLES AFTER ASSEMBLY IS COMPLETED
   RECOMMENDED CLEANING PROCEDURE: UTILIZING A SHALLOW PAN (APPROX 1½" DEEP) AND APPROX 1 PINT OF FLUX MANUFACTURES' RECOMMENDED FLUX REMOVER SCRUB BOTH SIDES OF CARD THROUGHLY WITH SOFT BRISTLED BRUSH DRY THROUGHLY WITH AN AIR BLAST.
3. SOME TRACES OF FLUX AND REMOVER MAY REMAIN AS A WHITE RESIDUE
4. C407 LEAD LENGTH BETWEEN THE CAPACITOR BODY AND THE P.C. BOARD SHALL BE NO GREATER THAN .050 INCHES.





NOTES:

1. UNLESS NOTED, RESISTANCE VALUES ARE IN OHMS, 1/4W, 5%. CAPACITANCE VALUES ARE IN PICOFARADS(pf). INDUCTANCE VALUES ARE IN MICROHENRYS(µh).
2. DIODE SYMBOLS: SILICON ZENER VARACTOR
3. VOLTAGE MEASUREMENT CONDITIONS: 332MHZ 700µv 2db T.R. UP
4. LIGHTING:

FOR 27.5 VDC OPERATION
PIN "D" IS 27.5 VDC
PIN "E" IS OPEN

FOR 13.75 VDC OPERATION
PIN "D" IS GND.
PIN "E" IS 13.75 VDC.

FIGURE 6-6 KI 213/214 GLIDESLOPE ASSEMBLY & SCHEMATIC
(Dwg. Nos. 300-0693-00, R-4)
002-0274-02, R-3)

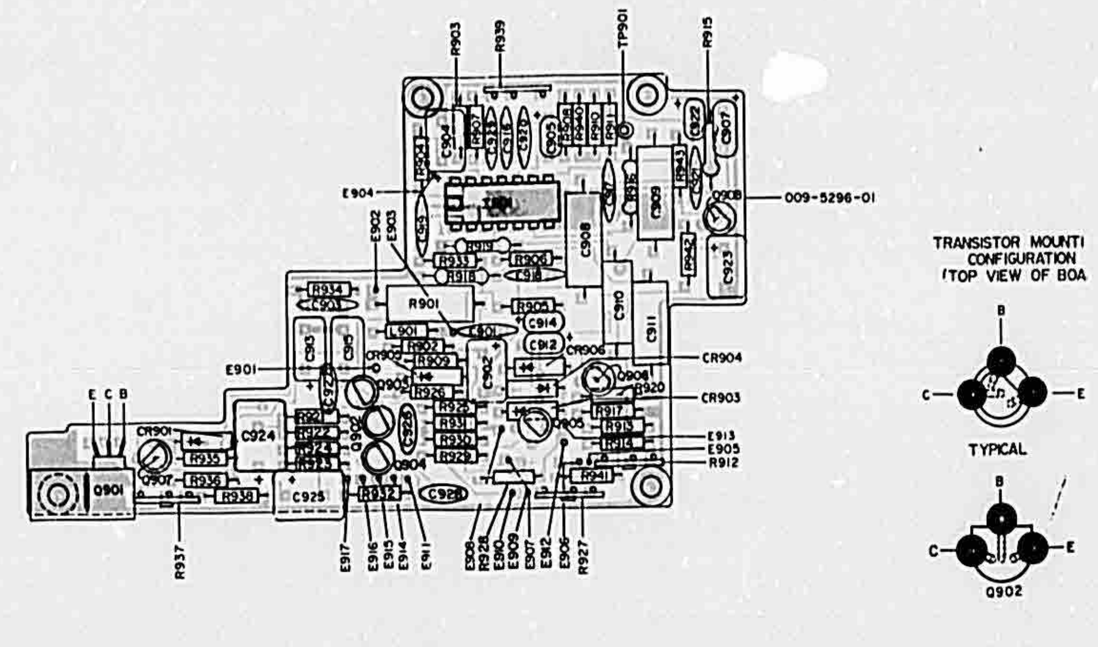
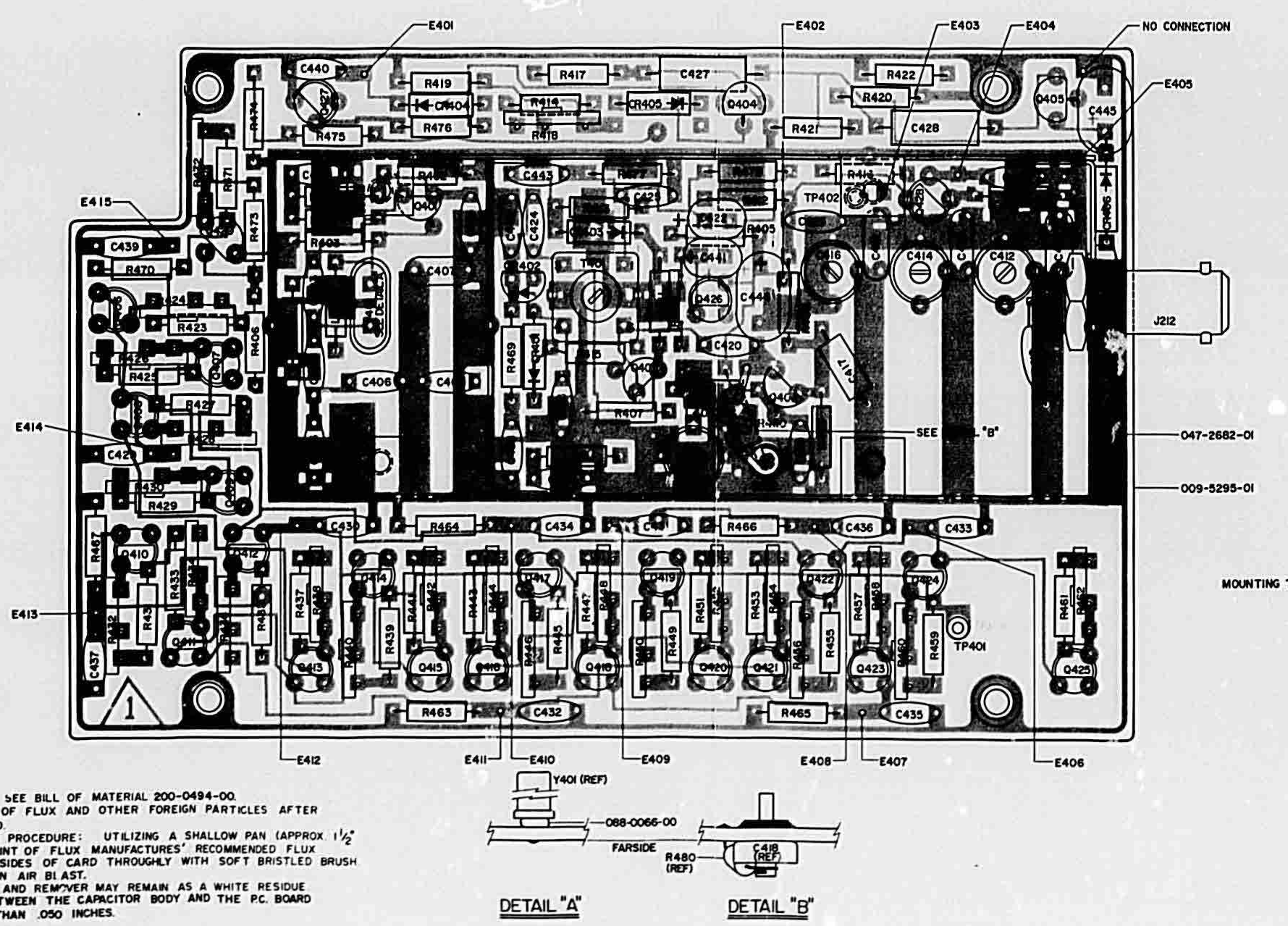
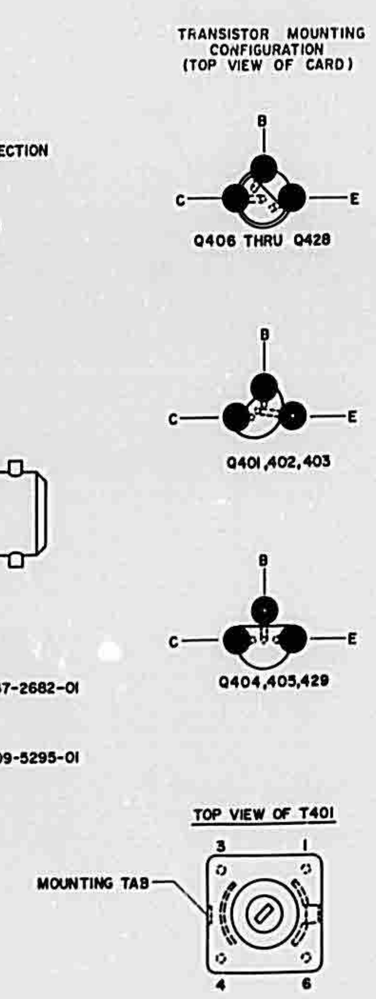


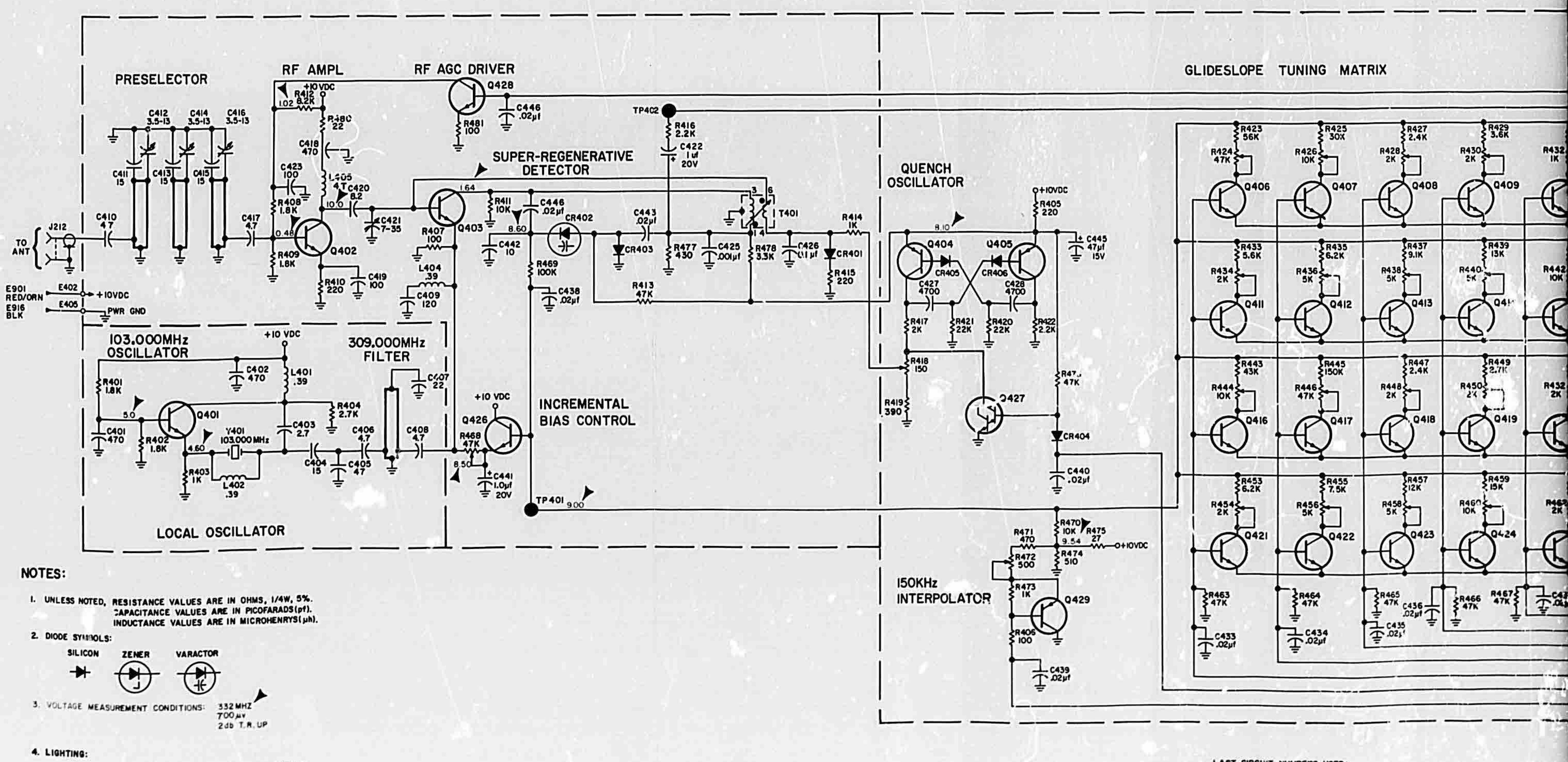
FIGURE 6-5 KI 213 AUDIO BOARD ASSEMBLY (KI 213 S/N 2499 & Below)
(Dwg. No. 300-0694-00, R-5)
(Schematics same as S/N 2500 & Above)





NOTES:

1. FOR COMPONENT VALUES SEE BILL OF MATERIAL 200-0494-00.
2. BOARDS MUST BE FREE OF FLUX AND OTHER FOREIGN PARTICLES AFTER ASSEMBLY IS COMPLETED. RECOMMENDED CLEANING PROCEDURE: UTILIZING A SHALLOW PAN (APPROX 1½" DEEP) AND APPROX. 1 PINT OF FLUX MANUFACTURES' RECOMMENDED FLUX REMOVER SCRUB BOTH SIDES OF CARD THROUGHLY WITH SOFT BRISTLED BRUSH DRY THROUGHLY WITH AN AIR BLAST.
3. SOME TRACES OF FLUX AND REMOVER MAY REMAIN AS A WHITE RESIDUE
4. C407 LEAD LENGTH BETWEEN THE CAPACITOR BODY AND THE P.C. BOARD SHALL BE NO GREATER THAN .050 INCHES.



NOTES:

1. UNLESS NOTED, RESISTANCE VALUES ARE IN OHMS, 1/4W, 5%.
   CAPACITANCE VALUES ARE IN PICOFARADS(pf).
   INDUCTANCE VALUES ARE IN MICROHENRYS(µh).
2. DIODE SYMBOLS:
   SILICON ZENER VARACTOR
3. VOLTAGE MEASUREMENT CONDITIONS: 332 MHZ
   700 µv
   2db T.R. UP
4. LIGHTING:
   FOR 27.5 VDC OPERATION
   PIN "D" IS 27.5 VDC
   PIN "E" IS OPEN
   FOR 13.75 VDC OPERATION
   PIN "D" IS GND.
   PIN "E" IS 13.75 VDC.

LAST CIRCUIT NUMBERS USED:
R481
L405, L111-L132
C445
CR406
Q429
Y401
E415
TP402

FIGURE 6-6 KI 213/214 GLIDESLOPE SCHEMATIC AND ASSEMBLY DRAWING
(Dwg. No. 002-0274-02 R-0)
300-0693-00 R-2)

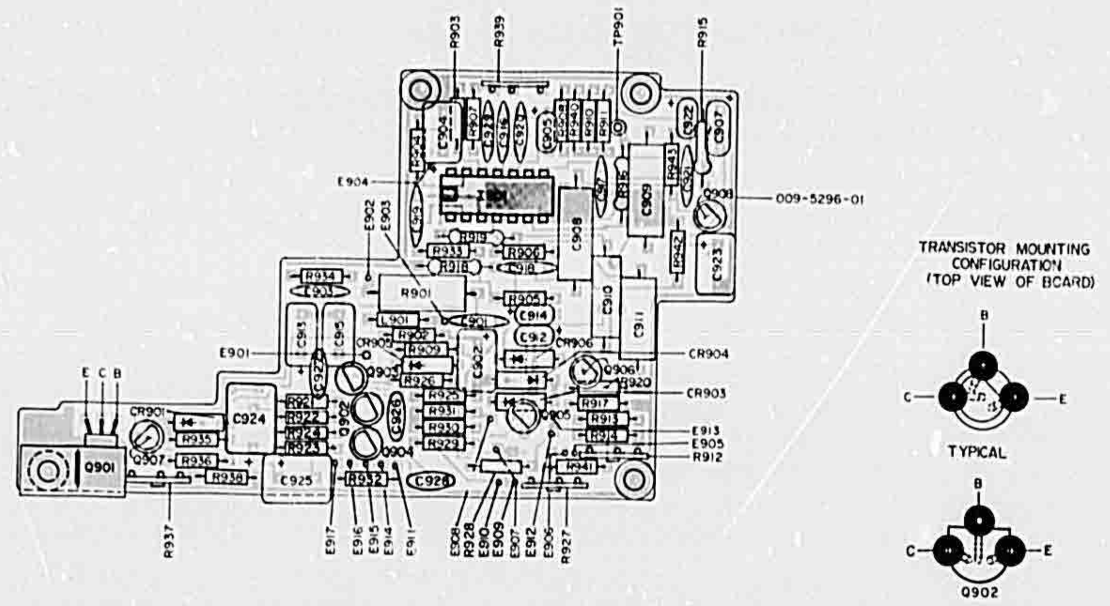
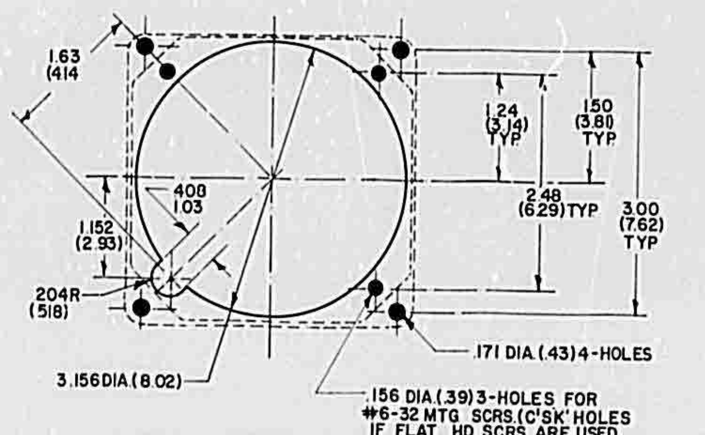


FIGURE 6-8 KI 214 AUDIO BOARD ASSEMBLY S/N 7999 & Below
(Dwg. No. 300-0694-00, R-5)
(Schematic same as S/N 8000 & Above)



CUTOUT DIMENSIONS FOR PANEL MOUNTING

NOTE:
1. DIMENSIONS IN ( ) ARE IN CENTIMETERS.

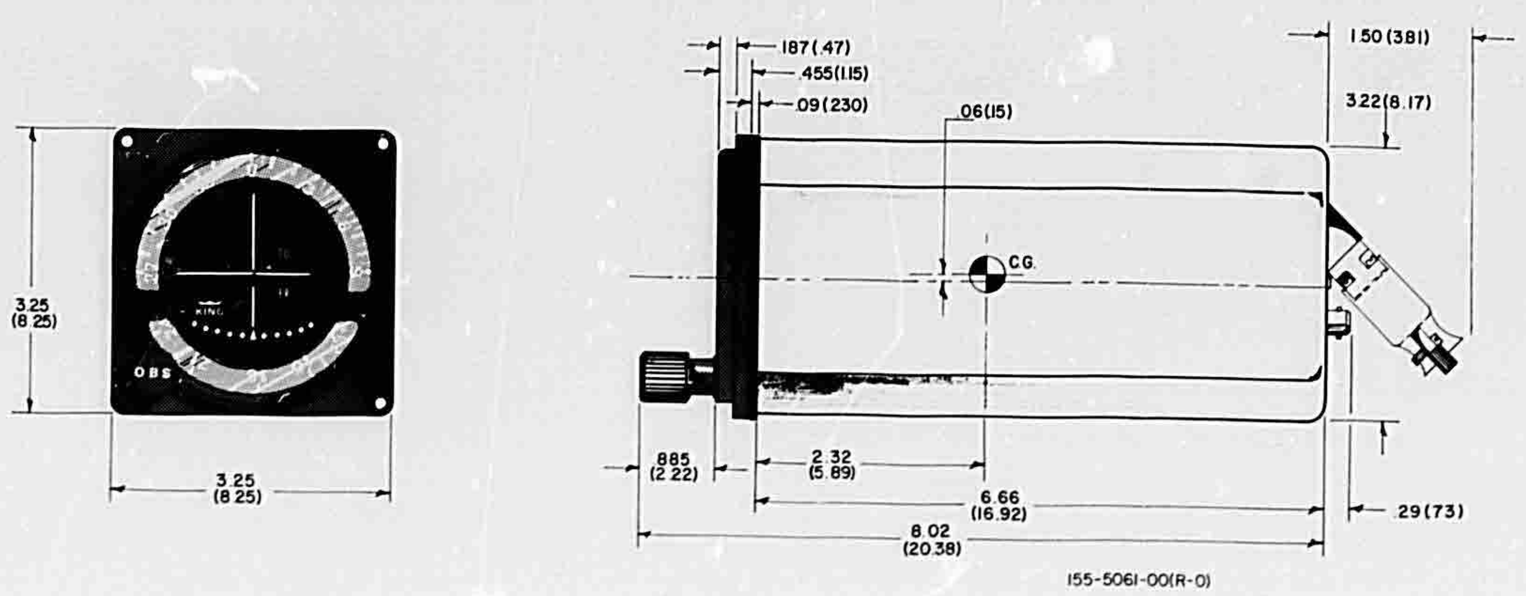


FIGURE 2-7 KI 212 INSTALLATION DRAWING

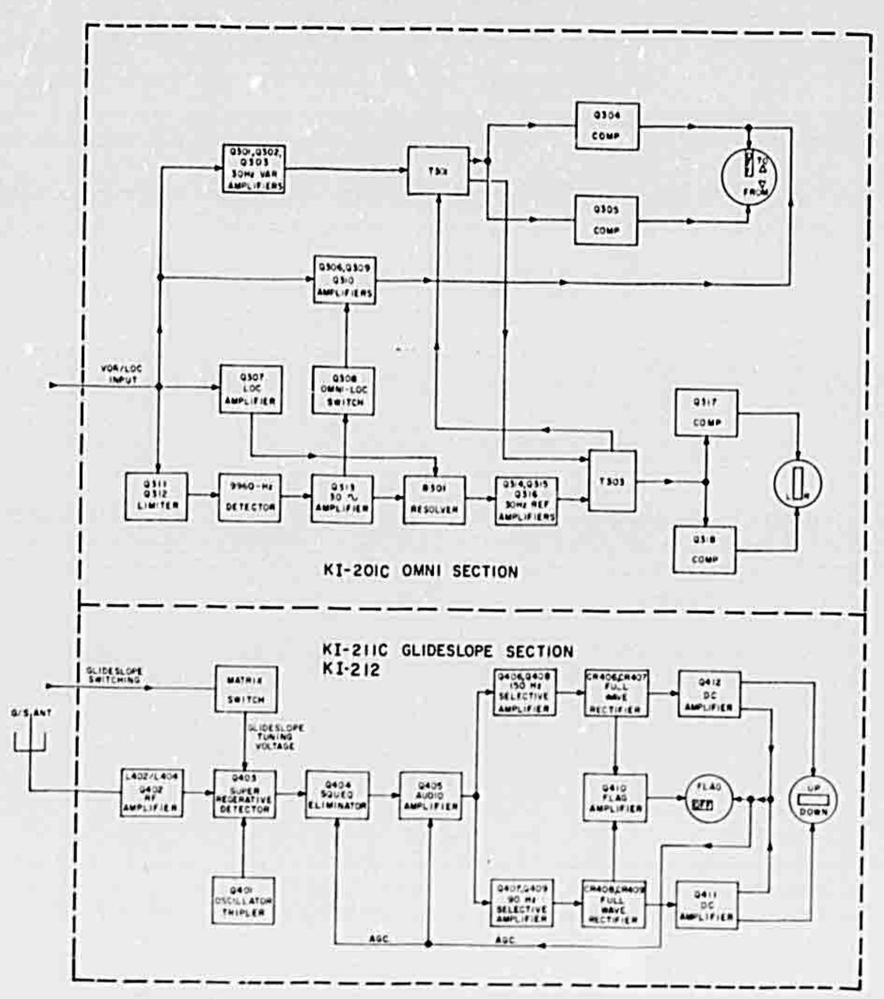
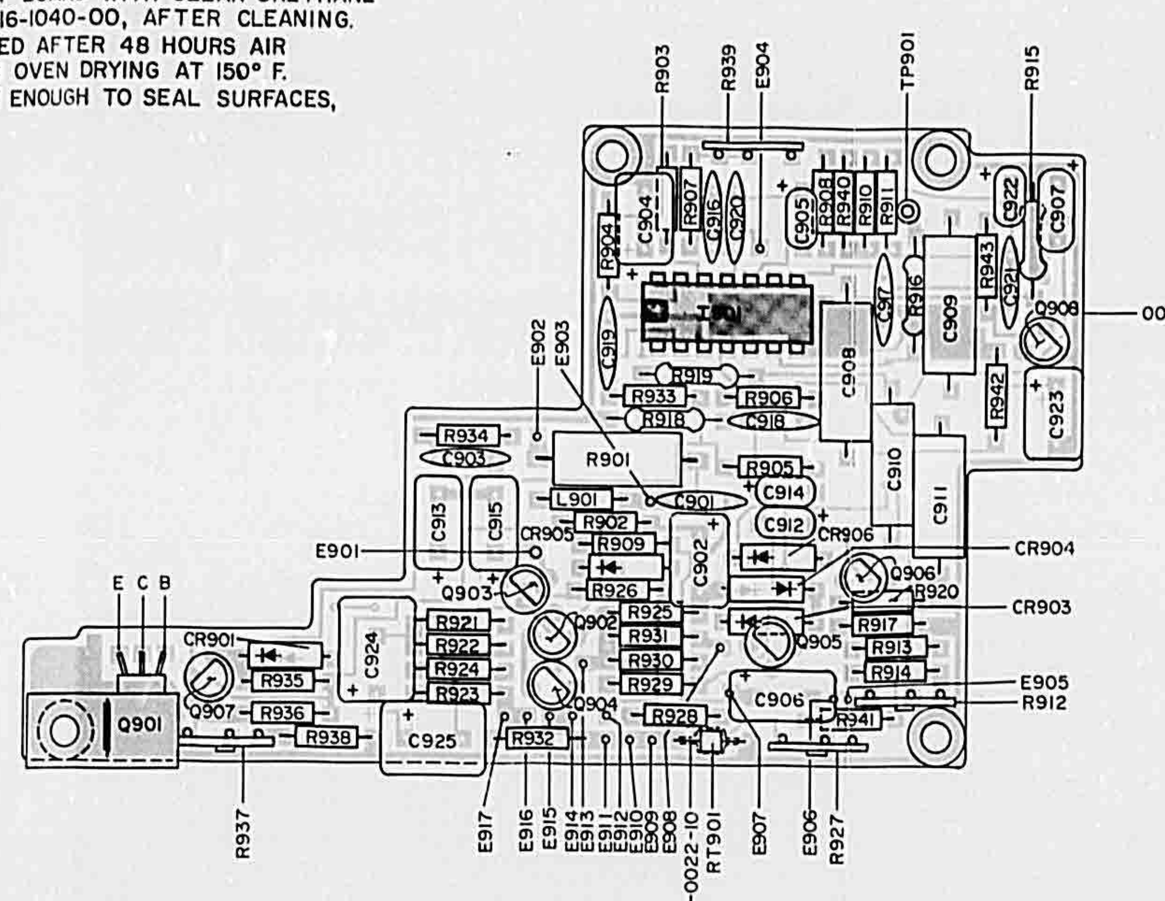


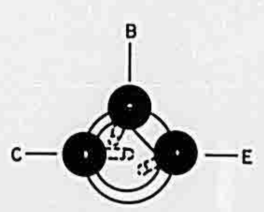
FIGURE 4-1 KI 201C/211C/212 BLOCK DIAGRAM

NOTES: (CONT.)

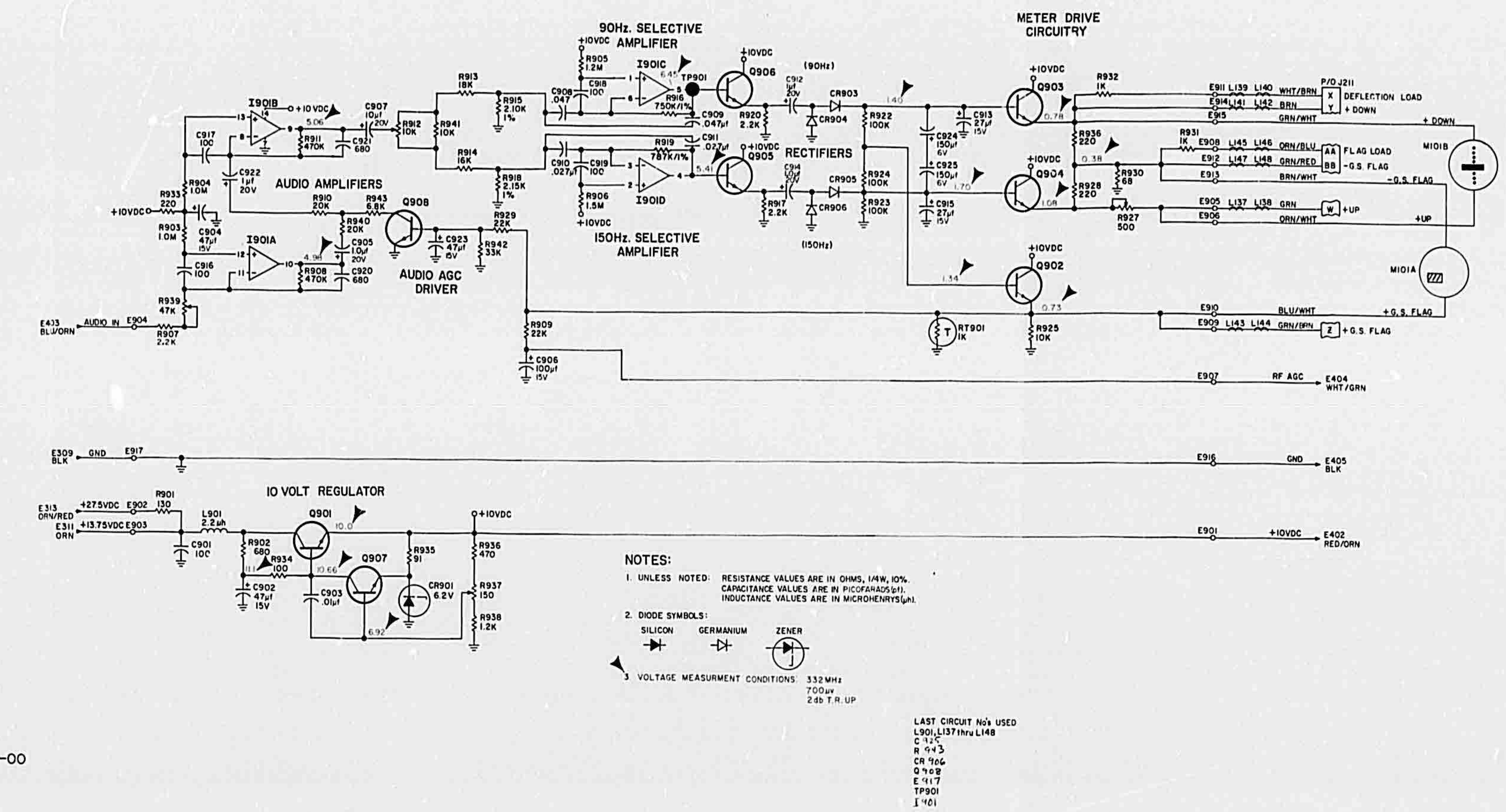
4. MASK RESISTORS R912, R927, R937 AND R939, TP901, GROUND AREA WHICH Q901 COMES IN CONTACT WITH AND GROUND THAT COMES IN CONTACT WITH MOUNTING TABS AND MOUNTING SCREWS.
SPRAY BOTH SIDES OF BOARD WITH CLEAR URETHANE SEAL COATING, KPN 016-1040-00, AFTER CLEANING. COATING IS 95% CURED AFTER 48 HOURS AIR DRYING OR 24 HOURS OVEN DRYING AT 150° F. COATING TO BE THICK ENOUGH TO SEAL SURFACES, BUT FREE OF RUNS.



TRANSISTOR MOUNTING CONFIGURATION (TOP VIEW OF BOARD)



TYPICAL



REF: B/M 200-0495-00

NOTES:

1. FOR COMPONENT VALUES SEE BILL OF MATERIAL 200-0495-00.
2. BOARDS MUST BE FREE OF FLUX AND OTHER FOREIGN PARTICLES AFTER ASSEMBLY IS COMPLETED.
RECOMMENDED CLEANING PROCEDURE: UTILIZING A SHALLOW PAN (APPROX. 1½" DEEP) AND APPROX. 1 PINT OF FLUX MANUFACTURES' RECOMMENDED FLUX REMOVER SCRUB BOTH SIDES OF CARD THROUGHLY WITH SOFT BRISTLED BRUSH. DRY THROUGHLY WITH AN AIR BLAST.
3. SOME TRACES OF FLUX AND REMOVER MAY REMAIN AS A WHITE RESIDUE.

FIGURE 6-8 KI 214 AUDIO BOARD SCHEMATIC AND ASSEMBLY DRAWING
(Dwg. No. 002-0274-01 R-0)
300-0694-00 R-0)

KI 214 AUDIO BOARD SCHEMATIC AND ASSEMBLY DRAWING

m) Set the 232-A signal generator output to 20μv at 335.0MHz. Channel the NAV receiver to 110.3MHz.

n) Adjust C418 to obtain a maximum voltage (AGC) at TP403.

o) Set the 232-A signal generator to 329.3MHz. Channel the NAV receiver to 108.9MHz.

p) Adjust T401, Figure 5-1, to obtain a maximum voltage (AGC) at TP403.

q) Perform steps n through q until a peak AGC voltage is obtained.

r) Set the NAV receiver to 109.3MHz. Set the 232-A signal generator output to 20μv at 332.0MHz. Observe that the warning flag is concealed; if necessary, repeat steps g through m.

s) Check the remaining frequencies for proper tracking. The sensitivity on any channel should be better than 20μv, full flag.

5.3 GENERAL

Maintenance information contained in this section includes inspection procedures, cleaning, semiconductor replacement, and troubleshooting procedures.

5.4 VISUAL INSPECTION

The following visual inspection procedures should be performed during the course of maintenance operations.

a. Inspect all wiring for frayed, loose, or burned wires.

b. Check cable connections, making sure the plugs are free from corrosion and are properly secured.

c. Check all components for evidence of overheating, breakage, vibration, corrosion, or loose connections.

d. Check all capacitors and transformers for leaks, bulges, or loose connections.

e. Inspect relay and switch contacts for pits or arcing.

KING
KI 201C/KI 211C/KI 212
VOR/LOC-OBS INDICATOR

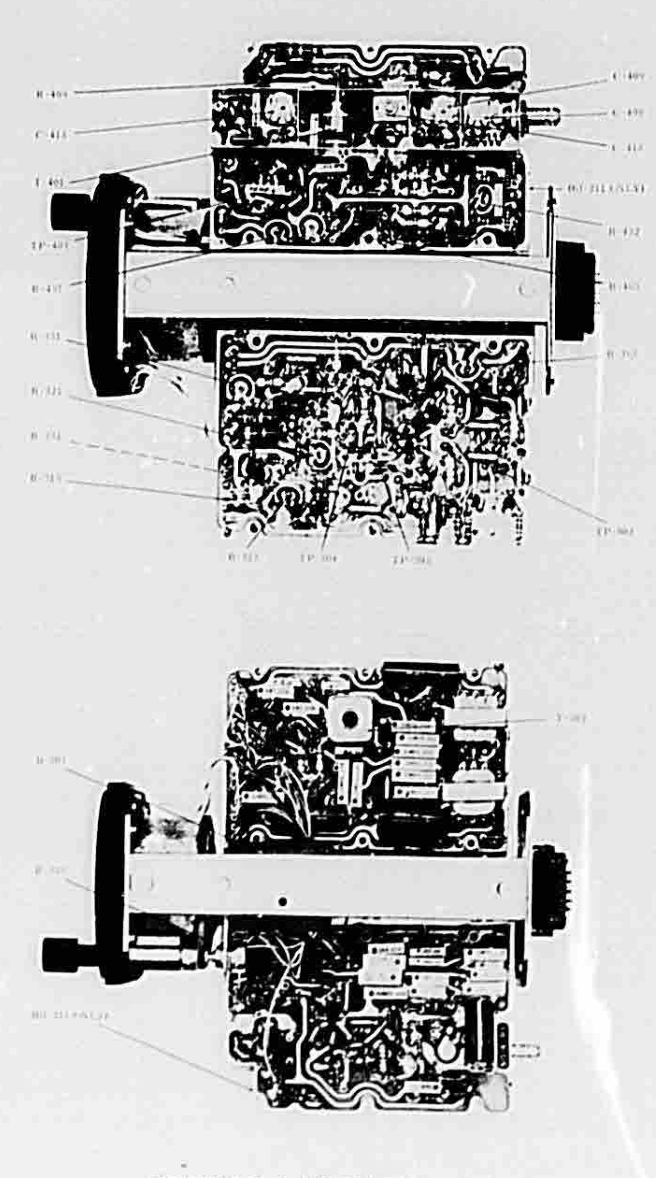
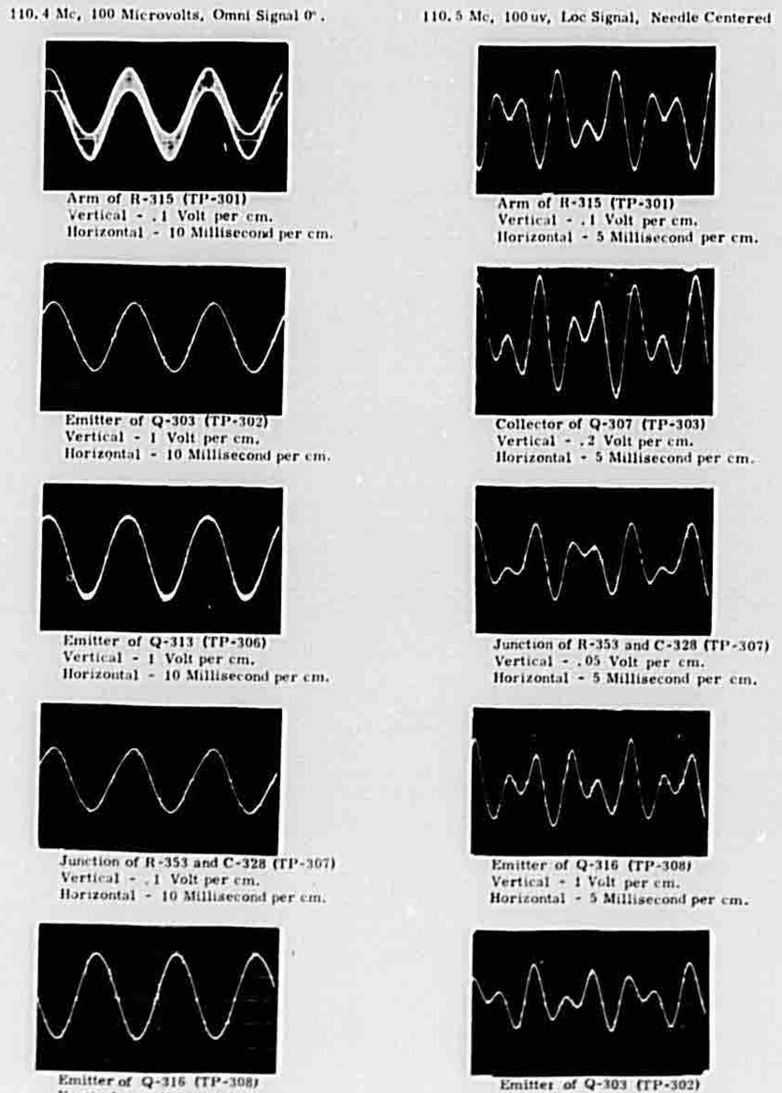


FIGURE 5-1 KI 201C/211C/212
TEST POINT AND ADJUSTMENT LOCATIONS

KING
KI 201C/KI 211C/KI 212
VOR/LOC-OBS INDICATOR

110.4 Mc, 100 Microvolts, Omni Signal 0°.

110.5 Mc, 100uv, Loc Signal, Needle Centered



Arm of R-315 (TP-301)
Vertical - .1 Volt per cm.
Horizontal - 10 Millisecond per cm.

Arm of R-315 (TP-301)
Vertical - .1 Volt per cm.
Horizontal - 5 Millisecond per cm.

Emitter of Q-303 (TP-302)
Vertical - 1 Volt per cm.
Horizontal - 10 Millisecond per cm.

Collector of Q-307 (TP-303)
Vertical - .2 Volt per cm.
Horizontal - 5 Millisecond per cm.

Emitter of Q-313 (TP-306)
Vertical - 1 Volt per cm.
Horizontal - 10 Millisecond per cm.

Junction of R-353 and C-328 (TP-307)
Vertical - .05 Volt per cm.
Horizontal - 5 Millisecond per cm.

Junction of R-353 and C-328 (TP-307)
Vertical - .1 Volt per cm.
Horizontal - 10 Millisecond per cm.

Emitter of Q-316 (TP-308)
Vertical - 1 Volt per cm.
Horizontal - 5 Millisecond per cm.

Emitter of Q-316 (TP-308)
Vertical - 1 Volt per cm.
Horizontal - 10 Millisecond per cm.

Emitter of Q-303 (TP-302)
Vertical - 1 Volt per cm.
Horizontal - 5 Millisecond per cm.

FIGURE 5-2 KI 201C/211C VOR/LOC WAVESHAPES

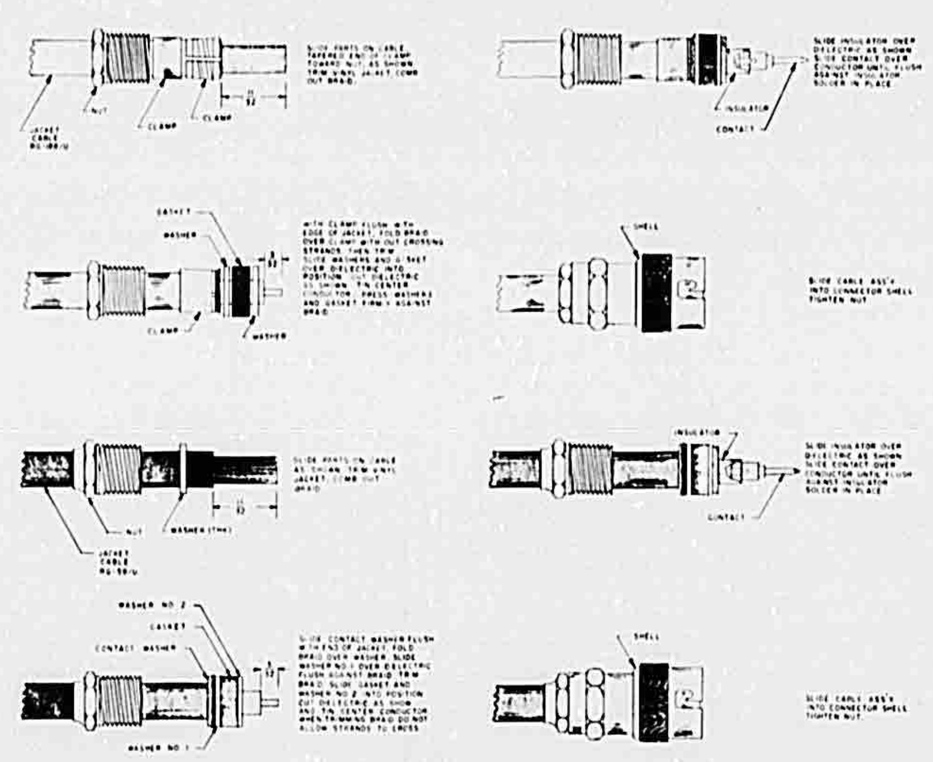


FIGURE 2-1 GLIDESLOPE CABLE CONNECTOR ASSEMBLY

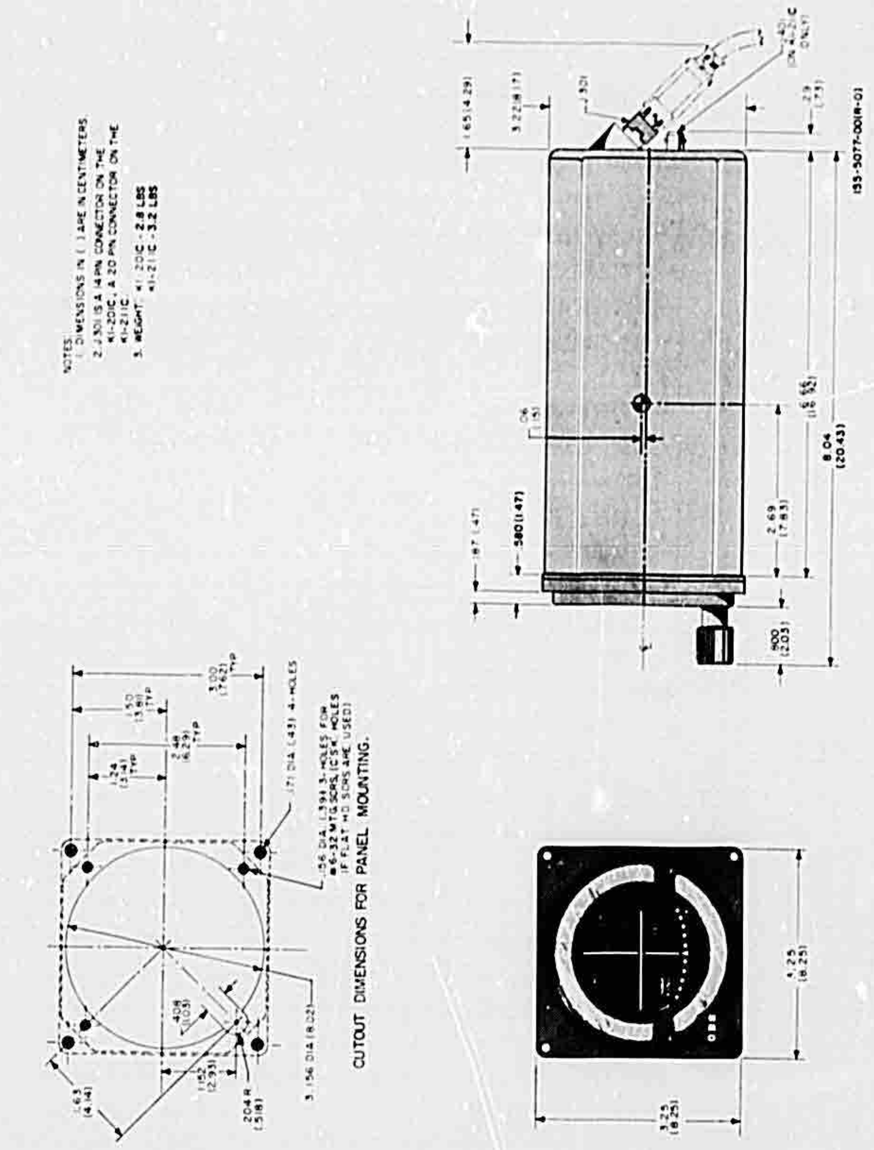


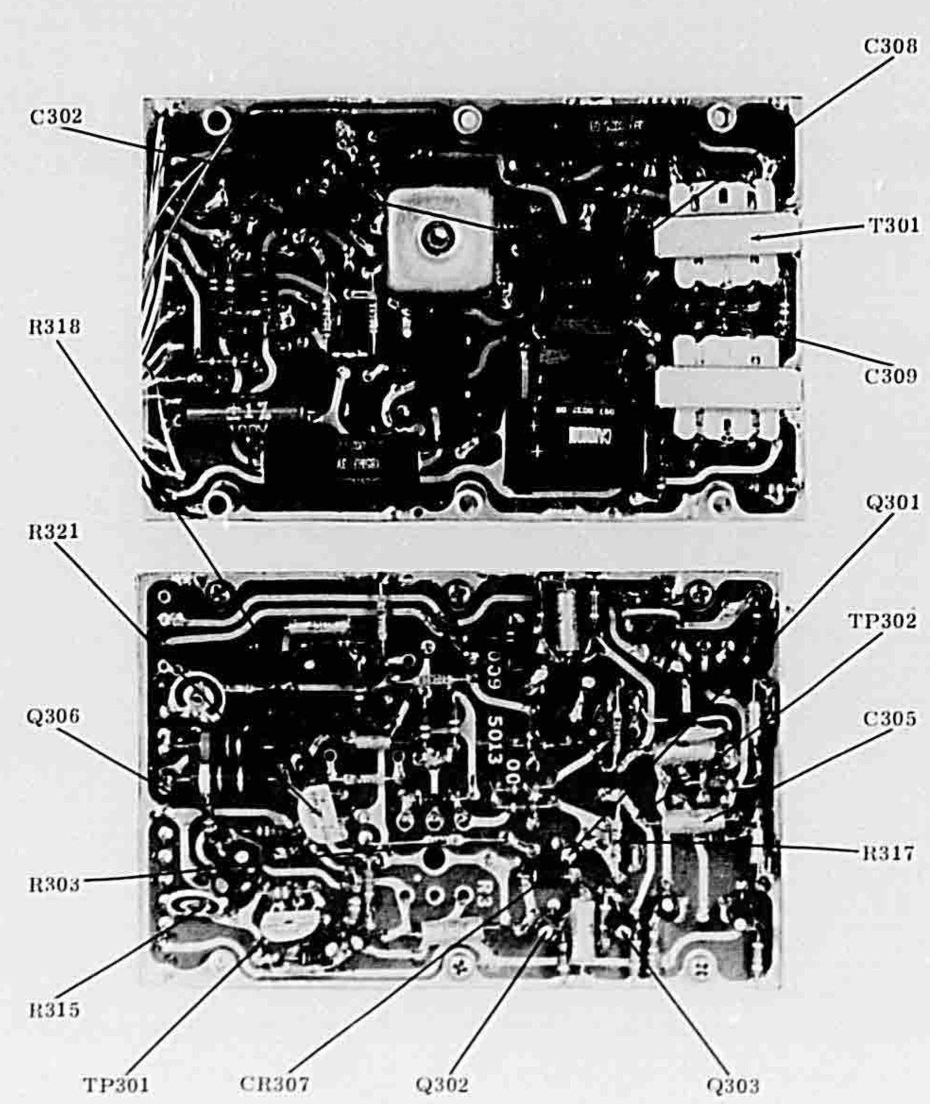
FIGURE 2-6 KI 201C/KI 211C INSTALLATION DRAWING

B. LOC OPERATION

The operation for the LOC mode is similar to that given for the VOR mode (5. 9. 1). The exception being that transistor switch Q306 is conducting and R321 is placed in parallel with R316 and R318, tuning the bridged "T" network to approximately 120Hz. The amplifier then becomes a 120Hz selective amplifier.

5. 9. 1. 2 Troubleshooting Procedure (LOC Operation)

The procedure for the LOC mode is similar to that given for the VOR mode (5. 9. 1. 1) with the exception of using a LOC input signal and that the bridged "T" circuit is tuned to approximately 120Hz. Q306 should be conducting (Refer to Figure 5-10 for the typical D-C operating voltage levels).



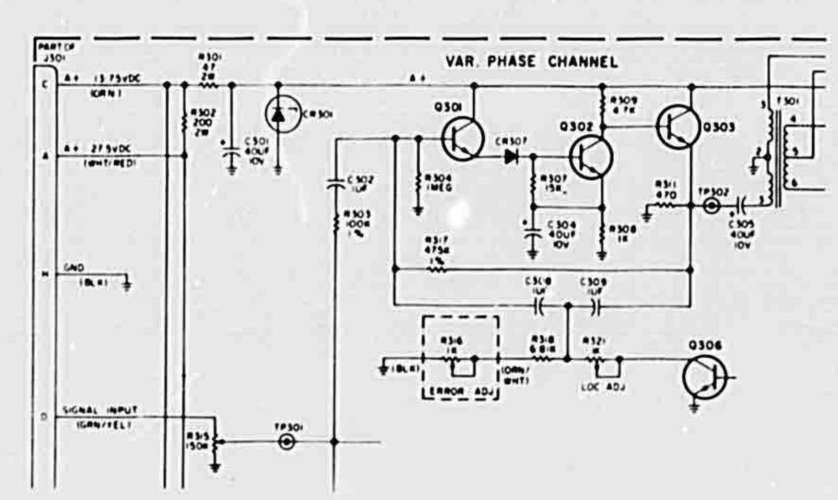
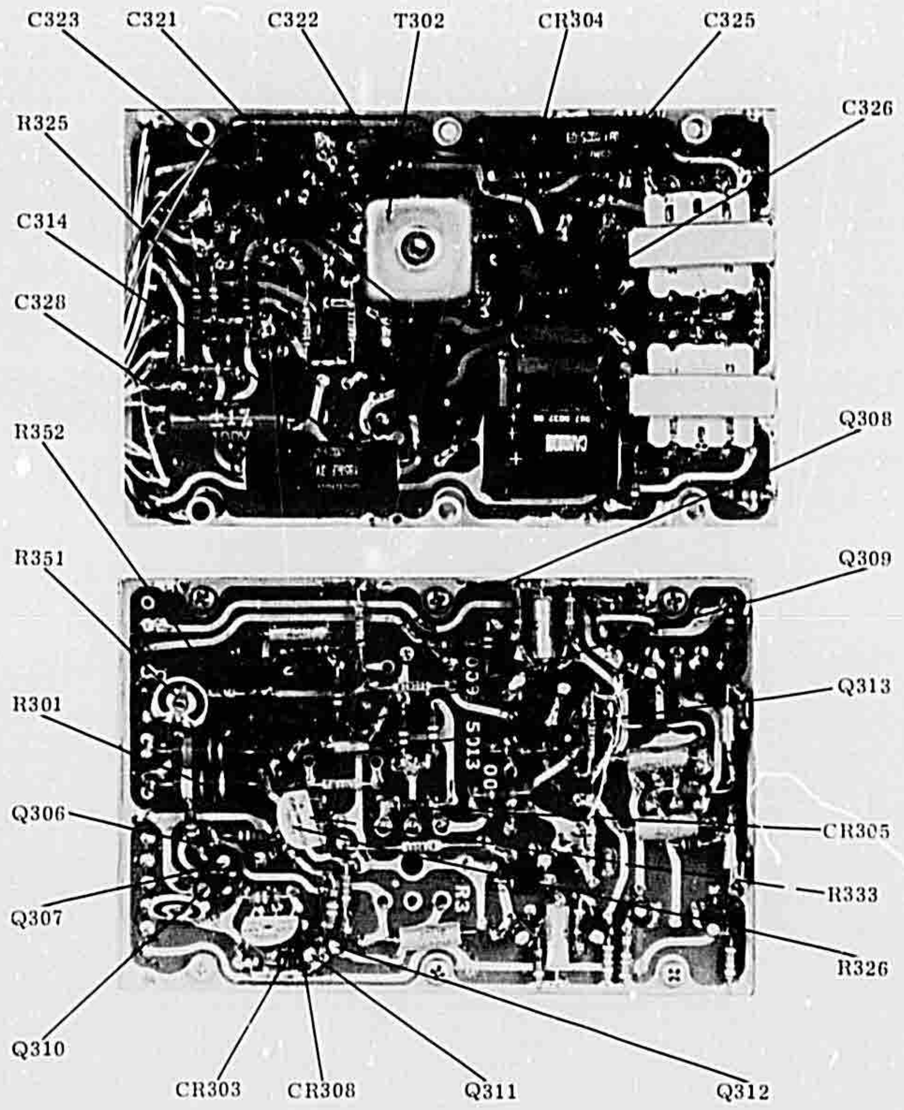


FIGURE 5-3 VARIABLE PHASE CIRCUITRY



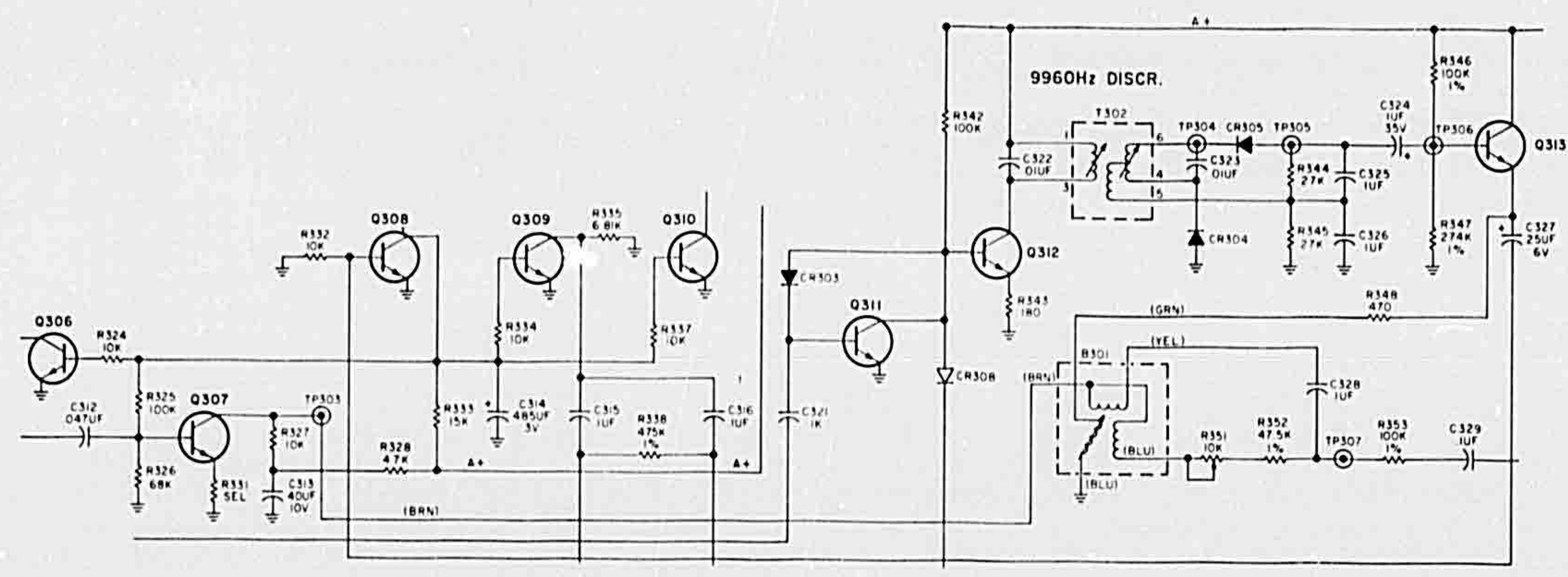
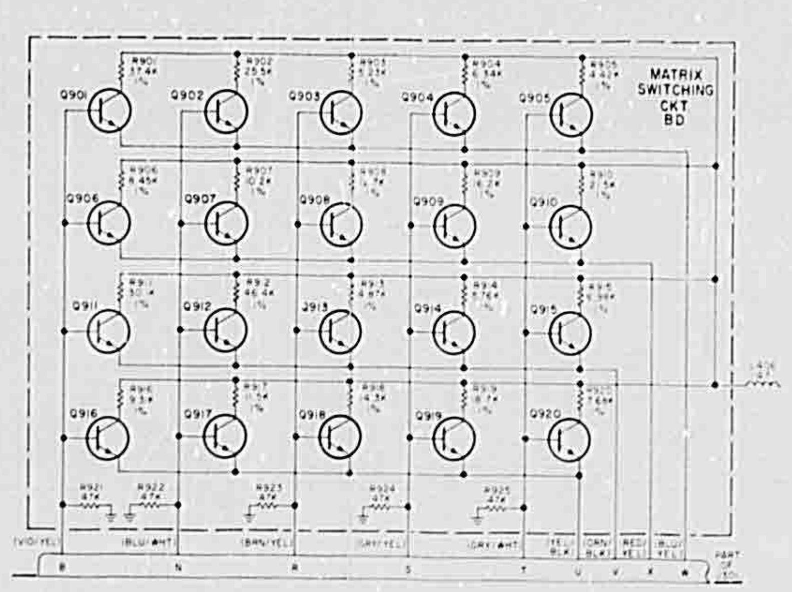


FIGURE 5-4 VOR/LOC SWITCHING



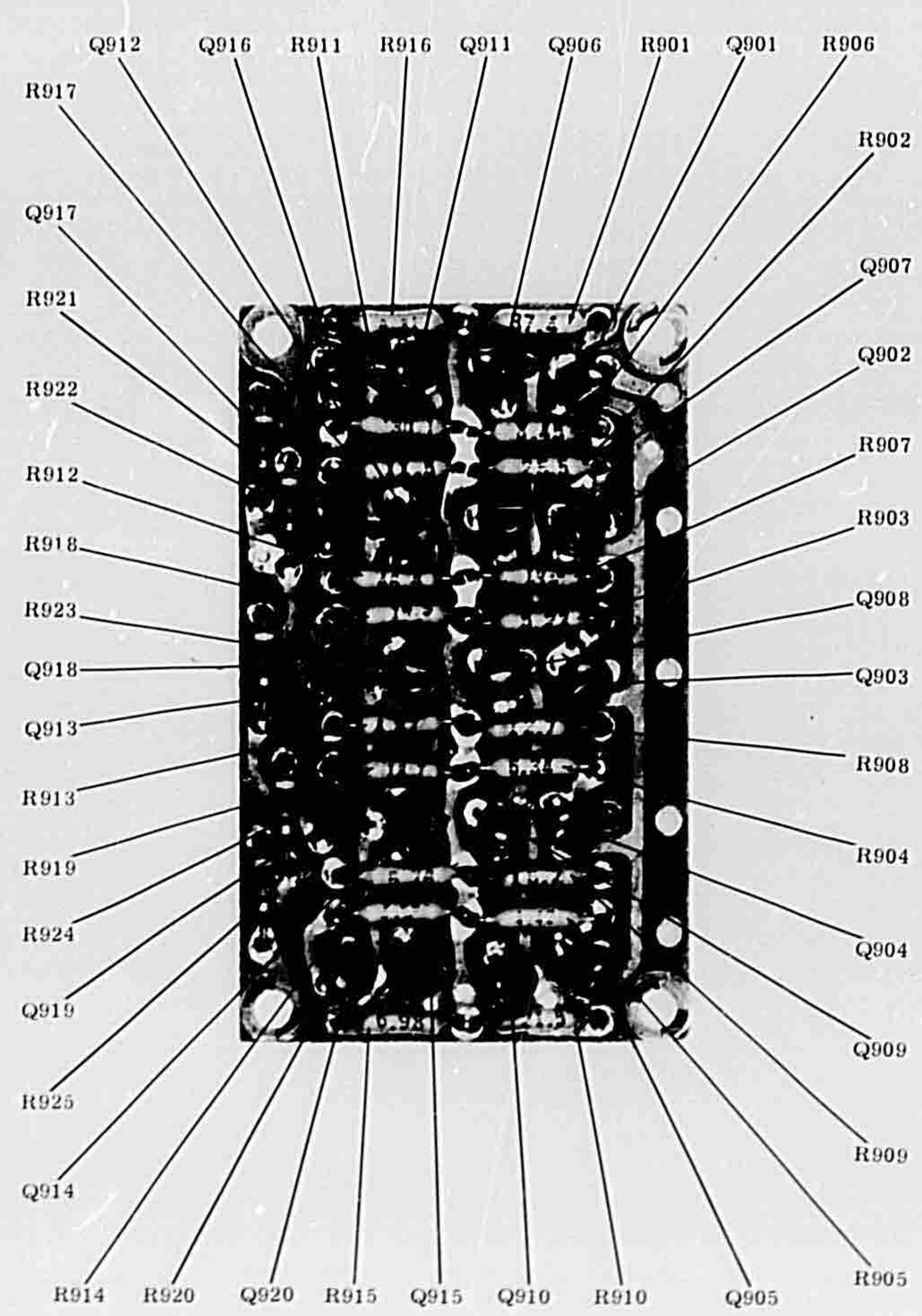
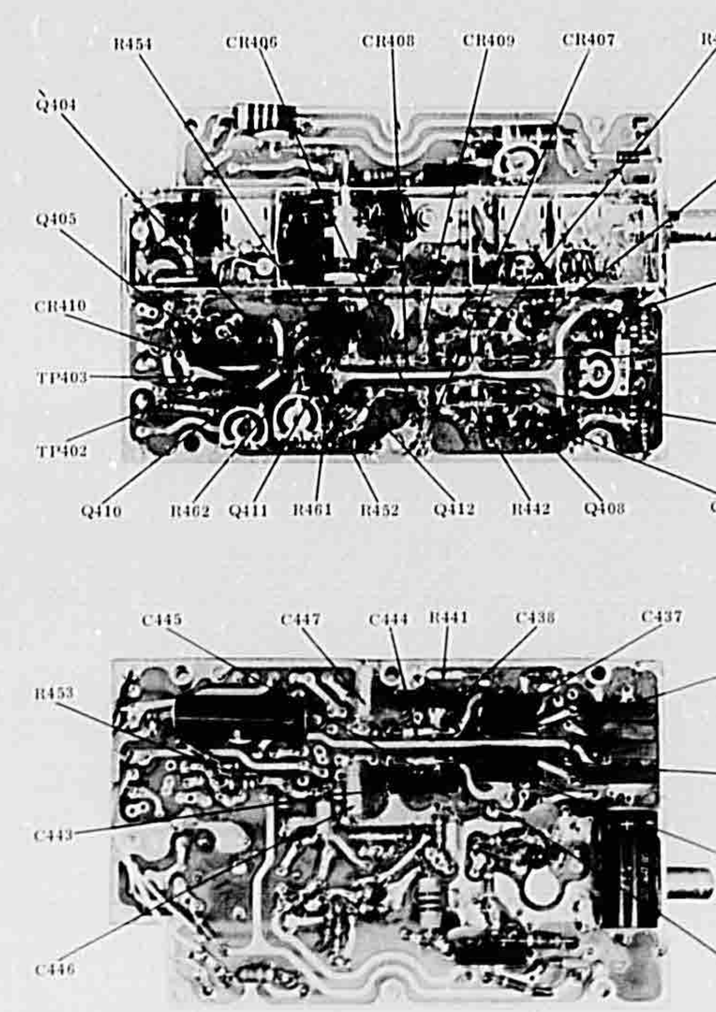


FIGURE 5-8 GLIDESLOPE TUNING MATRIX



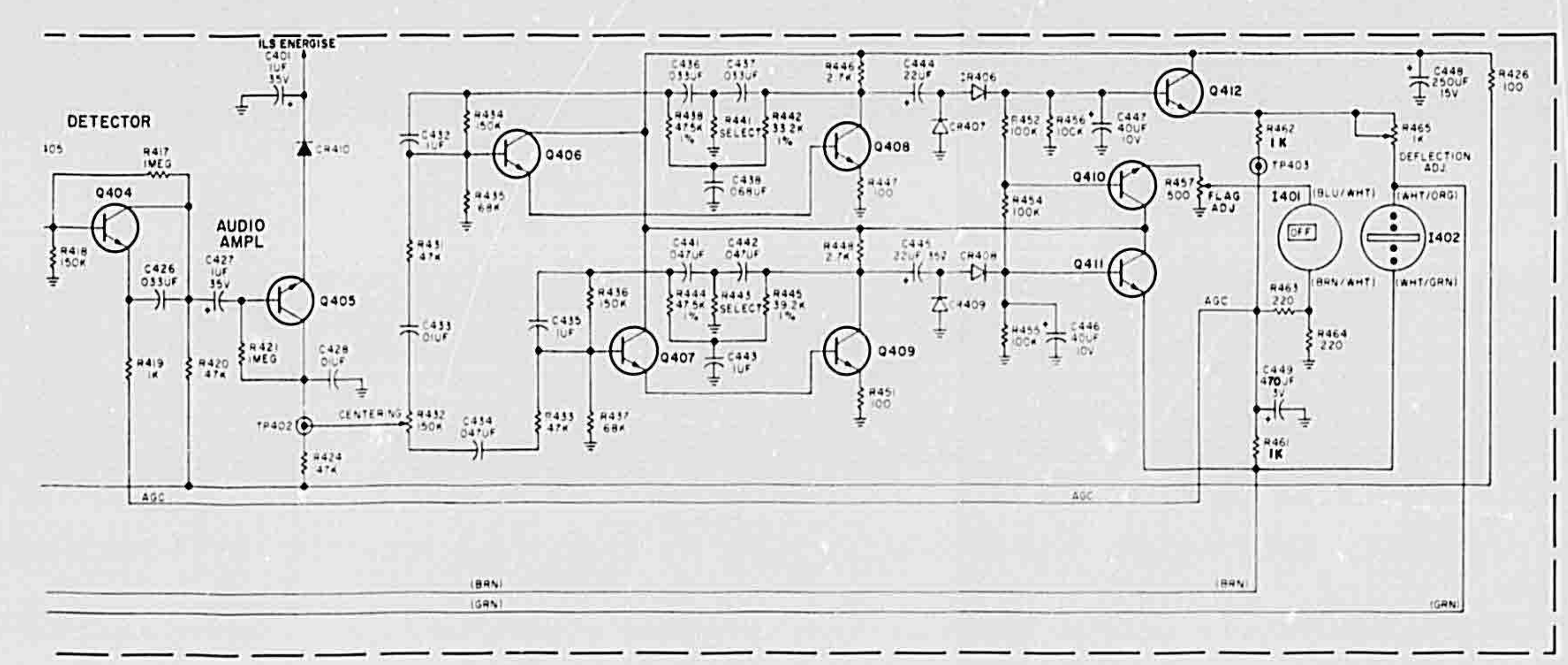


FIGURE 5-9 DETECTOR/AMPLIFIERS/OUTPUT DEVIATION CIRCUITRY

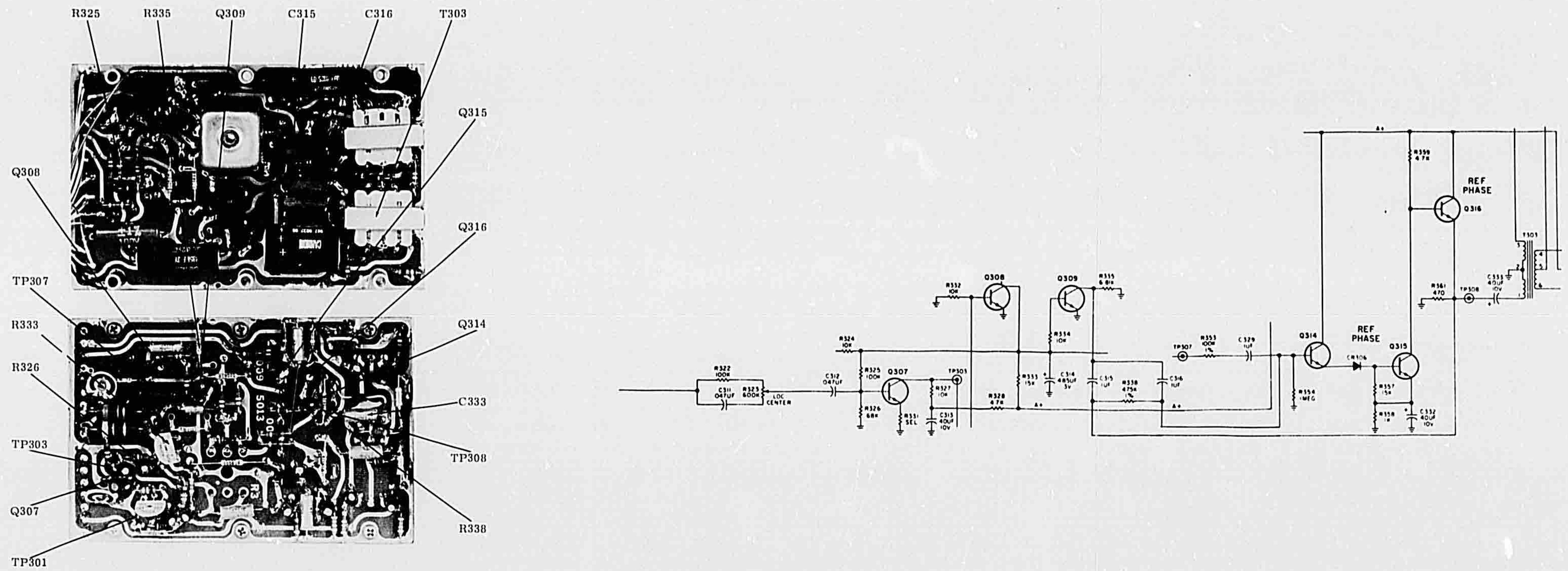


FIGURE 5-5 VOR OPERATION

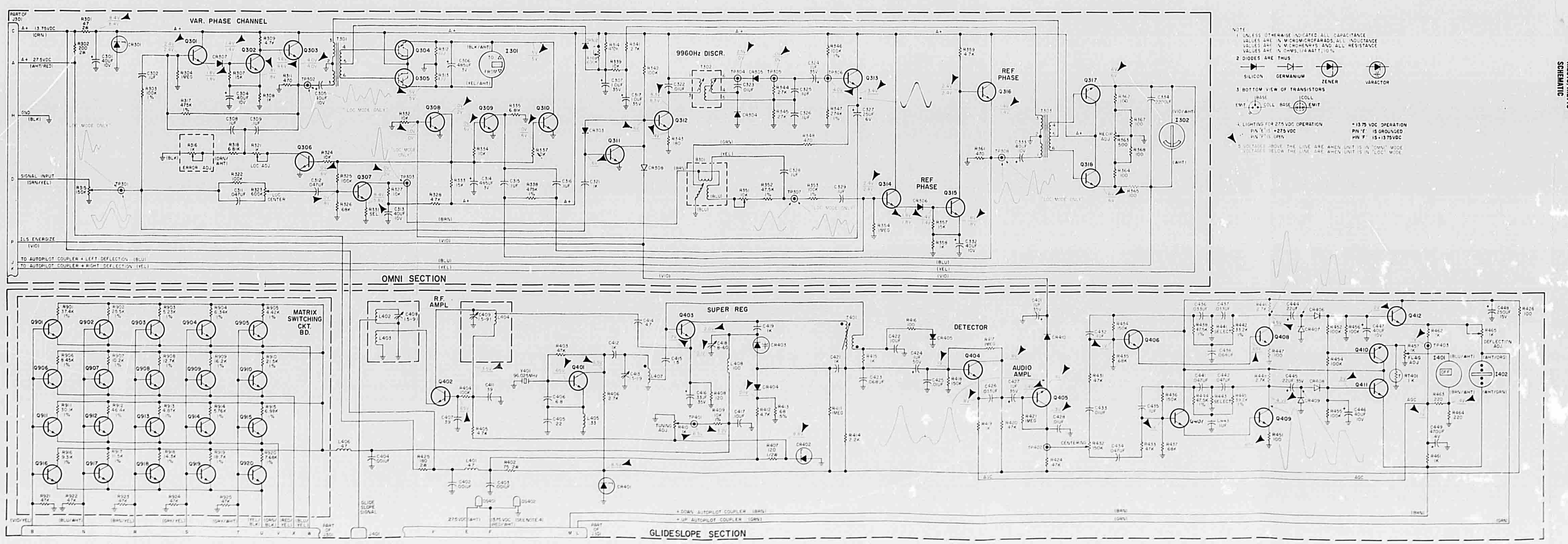
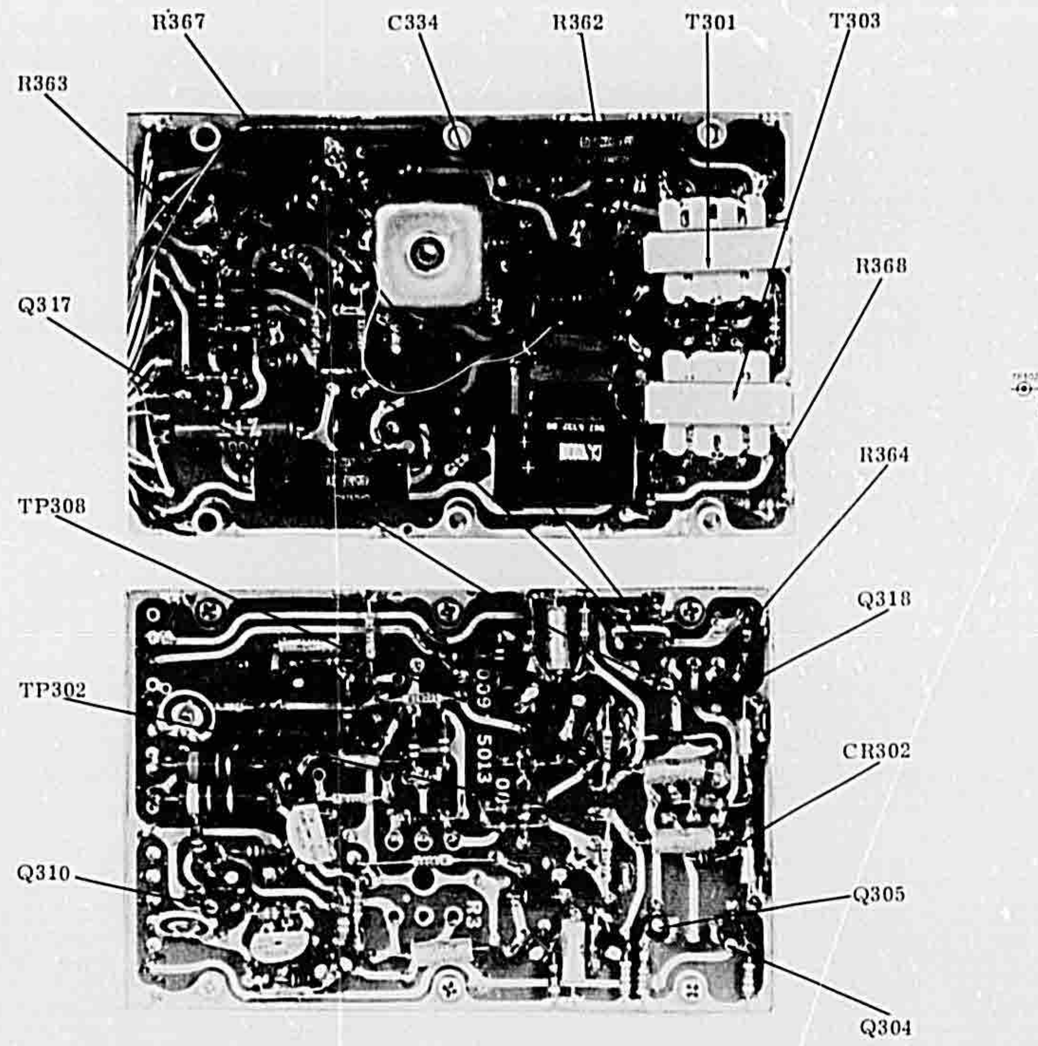


FIGURE 5-10 KI 201C/KI 211C SCHEMATIC
(Dwg. No. 002-0137-00 R-5)



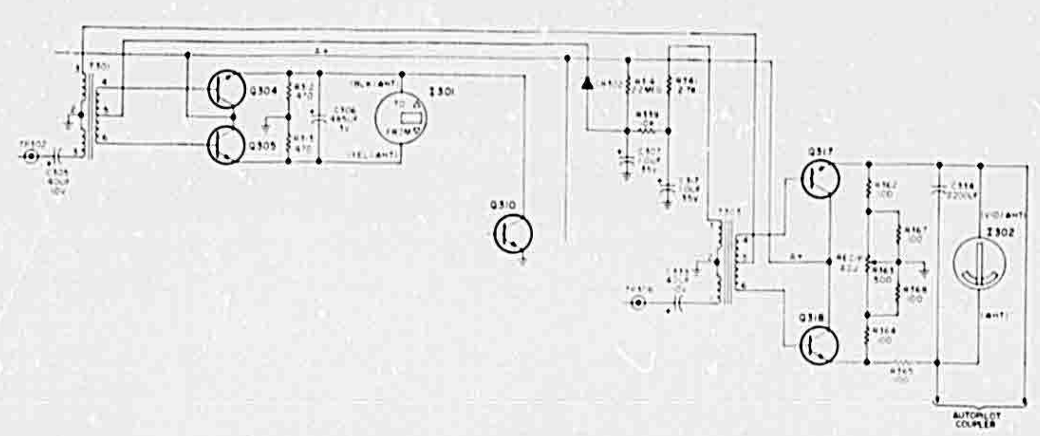
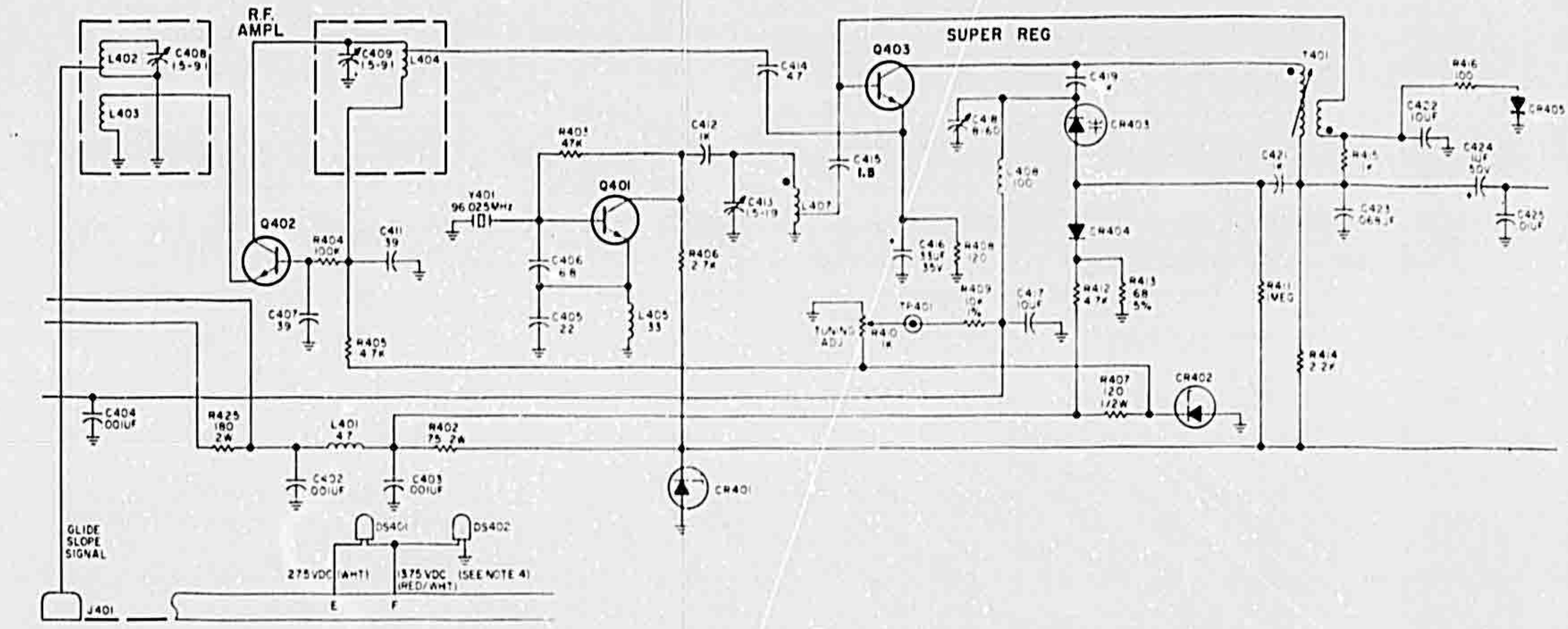


FIGURE 5-6 LOC OPERATION



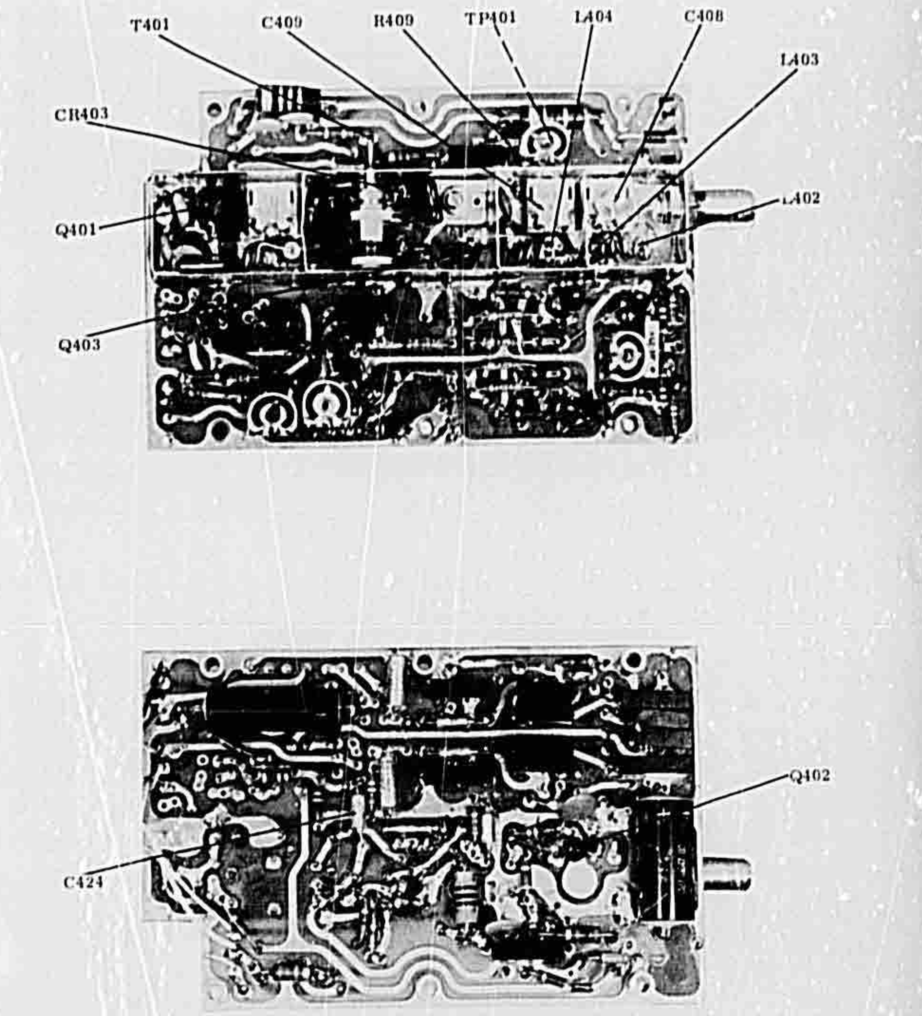


FIGURE 5-7 R. F. AMPLIFIER

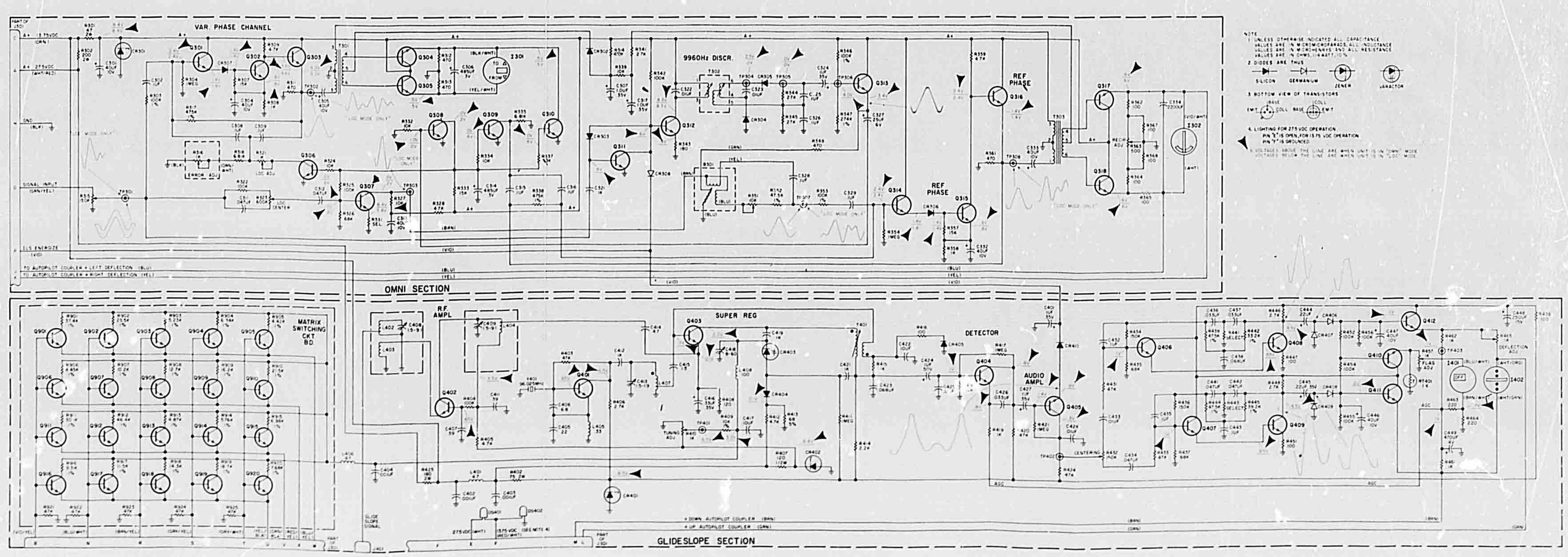


FIGURE 5-10 KI 201C/KI 211C SCHEMATIC

KI201C/KI211C SCHEMATIC

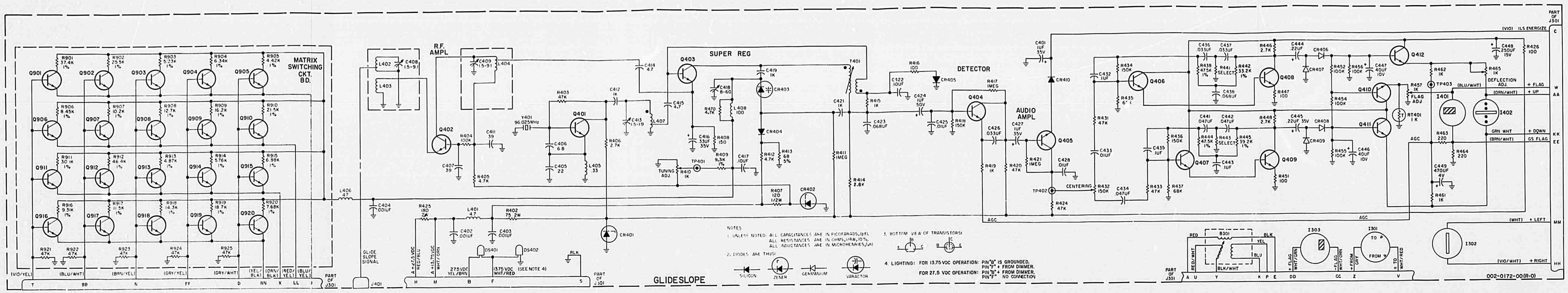


FIGURE 5-11 KI 212 SCHEMATIC
(Dwg. No. 002-0172-00 R-1)

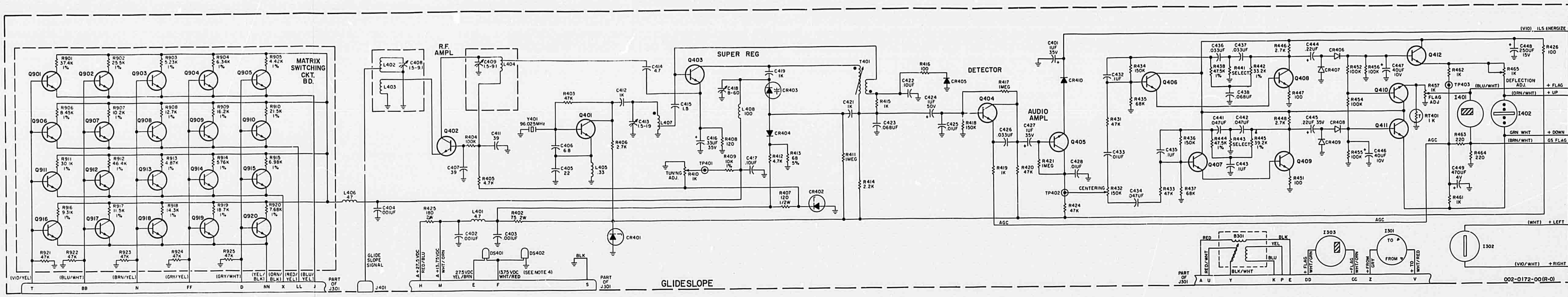


FIGURE 5-11 KI 212 SCHEMATIC

ATP INDEX

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Honeywell, Inc.
KI 202/203/204/206/207/208/209 Navigation Indic
Installation Manual

*** End of Index ***

MFG.

INTRO

RECORD OF REVISIONS

MFG REV NO	DESCRIPTION	ISSUE DATE	ATP REV DATE	INSERTED BY
5	Installation 202/203/204/206/207	8/02	1/9/03	ATP/VP
4	Installation 208/209	"	"	"

RECORD OF TEMPORARY REVISIONS

TEMP REV NO	DESCRIPTION	ISSUE DATE	ATP REV DATE	INSERT BY	DATE REMOVED	REV INCOR	REMOVE BY

REVISION HISTORY

INSTALLATION MANUAL

BENDIX/KING

KI 202, KI 203, KI 204, KI 206, KI 207

Navigation Indicators

PART NUMBER	REV	DATE	DESCRIPTION
006-00137-0005	5	Aug/2002	Replaces P/N 006-00137-0004.
006-00137-0004	4	Mar/1988	Replaces P/N 006-00137-0003.

THIS PAGE RESERVED

REVISION HISTORY

INSTALLATION MANUAL

BENDIX/KING

KI 208, KI 209

Navigation Indicators

PART NUMBER	REV	DATE	DESCRIPTION
006-00140-0004	4	Aug/2002	Replaces P/N 006-00140-0003.
006-00140-0003	3	Oct/1996	Replaces P/N 006-00140-0002.
006-00140-0002	2	Mar/1988	Replaces P/N 006-00140-0001.

THIS PAGE RESERVED

KI 202/ 203/204/ 206/207

Installation Manual

Honeywell

INSTALLATION MANUAL

BENDIX/KING®

KI 202, KI 203, KI 204, KI 206, KI 207

NAVIGATION INDICATORS

MANUAL NUMBER 006-00137-0005
Revision 5, August 2002

WARNING

PRIOR TO EXPORT OF THIS DOCUMENT, REVIEW FOR EXPORT LICENSE REQUIREMENT IS NEEDED.

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SECTION III
OPERATION

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01

SECTION I
GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical, and electrical characteristics of the Silver Crown KI 202, KI 203, KI 204, KI 206, and KI 207.

1.2 EQUIPMENT DESCRIPTION

The KI 203 is designed to operate with VHF navigational equipment (such as the KX 170, KX 170A, KX 170B, KX 175, KX 175B, KN 53, KX 155, KX 155A, KX 165A) to provide OMNI range or localizer information. The navigational information from the VHF receiver is converted to DC signals to drive the left-right needle, To-From indicator, and warning flag. The OBS knob allows the pilot to select the desired radial from the VOR station.

The KI 204 performs the same function as the KI 203. Additionally, it contains a glideslope deviation needle and glideslope warning flag.

The KI 202 contains VOR/LOC left-right needle, To-From indicator, VOR/LOC warning flag, and OBS. The KI 202 version -26 contains a 25 pin sub-D connector.

The KI 206 contains VOR/LOC left-right needle, To-From indicator, VOR/LOC warning flag, glideslope deviation needle, glideslope warning flag, and OBS.

The KI 202, KI 203, KI 204, KI 206 may or may not be equipped with a course datum synchro for autopilot use.

The KI 207 is identical to the KI 206, except it does not contain an OBS and, therefore, has no course datum synchro. (The KI 207 -25 flavor (066-3034-25) does not contain a glideslope deviation needle or a glideslope warning flag.)

The KI 202 and KI 206 is available with either a 30 Hz or 400 Hz OBS resolver. The KI 206 is also available with 5V lighting.

1.3 TECHNICAL CHARACTERISTICS

TABLE 1-1 Technical Characteristics KI 202, KI 203, KI 204, KI 206, KI 207

SPECIFICATION	CHARACTERISTIC
SIZE:	See Figure 2-5 (P/N 155-05225-0000)
WEIGHT:	See Figure 2-5 (P/N 155-05225-0000)
TEMPERATURE RANGE:	Operating -15°C to +55°C, short time to +71°C. Storage -55°C to +85°C.
TSO:	
VOR Converter, Indicator	FAA TSO C40a Operation above 15,000 ft. DO 114 (by FAA approval).
VOR	System bearing error less than 2.7° when used with any TSO'd navigation receiver having less than 1.5° phase error.
LOC Converter, Indicator	FAA TSO C36c Class D RTCA DO 131.
LOC	System centering error less than 7 uA when used with any TSO'd navigation receiver.
Glideslope Indicator	FAA TSO C34c Class D RTCA DO 132.
Glideslope	System centering error less than 10 uA when used with any TSO'd glideslope receiver/ converter having less than 7 uA centering error.
RTCA DO 138 Environmental Categories:	
Temperature, Altitude	D*
*Altitude	Tested for operation to 50,000 ft. at 25°C.
Decompression	From 50,000 ft. at 25°C per DO-138 sec. 4.5.2.
Humidity	A
Vibration	P
AF Susceptibility	A
RF Susceptibility	A
RF Emission	A

TABLE 1-1 Technical Characteristics KI 202, KI 203, KI 204, KI 206, KI 207

SPECIFICATION	CHARACTERISTIC
Typical Accuracy:	
KI 203, KI 204 VOR Converter/ Indicator	Bearing error less than 1.7°. Full scale deflection for 10° course error.
KI 203, KI 204 LOC Converter/ Indicator	Centering error less than 3 uA. Three fifths deflection for 4 dB tone ratio.
KI 202, KI 206, KI 207 VOR Indicator and KI 204, KI 206, KI 207 Glideslope Warning Flag	Centering error less than 3 uA. Full scale deflection 150 uA. Nominal impedance 1 k ohms.
KI 203,KI 204 Converter Inputs:	
VOR Composite Input Input Impedance	0.5 ±10% Vrms ARINC phasing. 100 k ohms.
KI 203,KI 204 Converter Output Drive Capability:	
VOR/LOC Deviation To-From VOR/LOC Warning Flag	Five 1 k ohm loads, 150 uA full scale. Two 200 ohm, 200-0-200 uA loads. Five 1 k ohm, 0-260 uA loads.
KI 202, KI 203, KI 204, KI 206 Course Datum Synchro Input:	Standard ARINC XYZ 11.8 Vrms, 0.030 A, 400 Hz.
KI 202, KI 203, KI 204, KI 206 Course Datum Synchro Output:	393 mV/degree, 1° accuracy typical.
Mounting:	Unit may be front or rear mounted in a standard 3 inch ATI opening. To rear mount, use standard mooring plate P/N 073-00044-0001. To front mount, use standard black adapter plate P/N 073-00045-0000 with a standard mooring plate P/N 073-00044-0001.
KI 202, KI 203, KI 204, KI 206, KI 207 Lighting Requirements:	
28 Vdc 14 Vdc 5 Vdc	100 mA ±25 mA 200 mA ±60 mA 400 mA ±120 mA
Primary Power:	
KI 202 KI 203 KI 204 KI 206 KI 207	None 11 to 33 Vdc @ 75 mA maximum 11 to 33 Vdc @ 75 mA maximum None None

1.4 UNITS AND ACCESSORIES SUPPLIED

1.4.1 KI 202, KI 203, KI 204, KI 206, KI 207

See Table 1-2 for product identification.

1.4.2 Installation Kits

1.4.2.1 Installation Kit 050-01524-0000:

NOTE: Connector pins supplied are solder pot type.

PART NUMBER	DESCRIPTION	QTY	VENDOR PART NUMBER
030-01077-0000	Contact, FM Solder	30	Positronix FS120N2-52 or Winchester 100-2520S
030-02154-0000	Hood, Conn 24P	1	Positronix G4100000J0 or Winchester MRE41H
030-02272-0000	Shell, Conn 41P	1	GMCT41F0N00VL or Winchester MRAC41SNVL

1.4.2.2 Installation Kit 050-01524-0001:

NOTE: Connector pins supplied are crimp type.

PART NUMBER	DESCRIPTION	QTY	VENDOR PART NUMBER
030-01080-0000	Contact, FM Crimp 20AWG	30	Positronix FC120N2-14 or Winchester 100-1020S112
030-02154-0000	Hood, Conn 24P	1	Positronix G4100000J0 or Winchester MRE41H
030-02272-0000	Shell, Conn 41P	1	GMCT41F0N00VL or Winchester MRAC41SNVL

1.4.2.3 KI 202 -26 Installation:

Connector pins supplied are solder pot type.

PART NUMBER	DESCRIPTION	QTY	VENDOR PART NUMBER
030-02348-0004	Shell, Conn 25P, M Sub-D	1	M24308/3-3

1.4.3 The following crimp-type pins and tool are available:

PART NUMBER	DESCRIPTION	QTY	VENDOR PART NUMBER
030-01085-0000	Contact, FM Crimp 16AWG	30	Positronix FC116N2 or Winchester 100-1016S

071-06025-0000	Crimp Tool or Crimp Tool w/ Turret Head	1	Positronix 9501 or Positronix 9502-1

1.4.4 The following VOR/LOC centering adjustment tool is available:

PART NUMBER	DESCRIPTION	QTY	VENDOR PART NUMBER
088-00706-0000	Adjustment Tool	1	

1.5 ACCESSORIES REQUIRED BUT NOT SUPPLIED

1.5.1 Extraction/ Insertion Tools:

PART NUMBER	DESCRIPTION	QTY	VENDOR PART NUMBER
005-02012-0012	Pin Extraction Tool	1	Positronix 9081
005-02012-0015	Pin Insertion Tool	1	Positronix 9099

1.5.2 For a standard 3 inch ATI opening Rear mount:

PART NUMBER	DESCRIPTION	QTY	VENDOR PART NUMBER
073-00044-0001	Mooring plate	1	

1.5.3 For a standard 3 inch ATI opening Front mount:

PART NUMBER	DESCRIPTION	QTY	VENDOR PART NUMBER
073-00045-0000	Black adapter plate	1	
073-00044-0001	with Mooring plate	1	
OR			
073-00045-0001	Gray adapter plate	1	
073-00044-0001	with Mooring plate	1	

1.5.4 A KI 202 version -26 installation requires:

PART NUMBER	DESCRIPTION	QTY	VENDOR PART NUMBER
047-10544-0003	Bezel adapter plate	1	

1.5.5 Navigation receiver and navigation antenna.

1.5.6 Fabrication of necessary cabling is left to the installing agency.

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TABLE 1-2 Version Identification Table KI 202, KI 203, KI 204, KI 206, KI 207

UNIT	PART NUMBER	BEZEL	LIGHTING	VOR/LOC CONVERTER	VOR/LOC INDICATOR (M104)	NAV FLAG (M102)	TO/FROM FLAG (M101)	GS INDICATOR (M105)	GS FLAG (M103)	6 WIRE 30 HZ OBS RESOLVER (B101)	COURSE DATUM SYNCHRO (B102)	8 WIRE 30 HZ OBS RESOLVER (B103)	8 WIRE 400 HZ OBS RESOLVER (B104)	NO OBS	UNIT
KI 203	066-3034-00	BLK	14/28V WHT	-00	-00	-00	-00			-00					KI 203
KI 203	066-3034-01	BLK	14/28V WHT	-01	-01	-01	-01			-01	-01				KI 203
KI 204	066-3034-02	BLK	14/28V WHT	-02	-02	-02	-02	-02	-02	-02					KI 204
KI 204	066-3034-03	BLK	14/28V WHT	-03	-03	-03	-03	-03	-03	-03	-03				KI 204
KI 206	066-3034-04	BLK	14/28V WHT		-04	-04	-04	-04	-04			-04			KI 206
KI 206	066-3034-05	BLK	14/28V WHT		-05	-05	-05	-05	-05		-05	-05			KI 206
KI 207	066-3034-06	BLK	14/28V WHT		-06	-06	-06	-06	-06					-06	KI 207
KI 202	066-3034-07	BLK	14/28V WHT		-07	-07	-07					-07			KI 202
KI 202	066-3034-08	BLK	14/28V WHT		-08	-08	-08				-08	-08			KI 202
KI 202	066-3034-09	BLK	14/28V WHT		-09	-09	-09				-09		-09		KI 202
KI 206	066-3034-10	BLK	14/28V WHT		-10	-10	-10	-10	-10		-10		-10		KI 206
KI 202	066-3034-11	BLK	14/28V WHT		-11	-11	-11						-11		KI 202
KI 206	066-3034-12	BLK	14/28V WHT		-12	-12	-12	-12	-12				-12		KI 206
KI 206	066-3034-13	BLK	5V WHT		-13	-13	-13	-13	-13		-13	-13			KI 206
KI 206	066-3034-14	BLK	5V WHT		-14	-14	-14	-14	-14		-14		-14		KI 206
KI 206	066-3034-15	BLK	14/28V RED		-15	-15	-15	-15	-15			-15			KI 206
KI 206	066-3034-16	BLK	14/28V RED		-16	-16	-16	-16	-16				-16		KI 206
KI 207	066-3034-17	BLK	5V WHT		-17	-17	-17	-17	-17					-17	KI 207
KI 204	066-3034-18	BLK	5V WHT	-18	-18	-18	-18	-18	-18	-18					KI 204
KI 204	066-3034-19	BLK	5V WHT	-19	-19	-19	-19	-19	-19	-19	-19				KI 204
KI 204	066-3034-20	GRY	14/28V WHT	-20	-20	-20	-20	-20	-20	-20					KI 204
KI 204	066-3034-21	GRY	14/28V WHT	-21	-21	-21	-21	-21	-21	-21	-21				KI 204
KI 204	066-3034-22	GRY	5V WHT	-22	-22	-22	-22	-22	-22	-22					KI 204
KI 204	066-3034-23	GRY	5V WHT	-23	-23	-23	-23	-23	-23	-23	-23				KI 204
KI 206	066-3034-24	GRY	5V WHT		-24	-24	-24	-24	-24				-24		KI 206
KI 207	066-3034-25	BLK	5V WHT		-25	-25	-25							-25	KI 207
KI 202	066-3034-26	BLK	14/28V WHT		-26	-26	-26						-26		KI 202

1.6 LICENSE REQUIREMENTS

None.

1.7 REQUIREMENTS FOR TSO'D VOR/ ILS/ GLIDESLOPE SYSTEMS

The additional units used in conjunction with the KI 202, KI 203, KI 204, KI 206, KI 207 must meet the specifications listed below to comprise a completely TSO'd navigation system.

1.7.1 Navigation Receiver Requirements for use with KI 203, KI 204:

1.7.1.1 The navigation receiver shall meet all the applicable requirements of TSO C40a and TSO C36c.

1.7.1.2 VOR phase error shall not exceed 1.5°.

1.7.1.3 Variation in the VOR composite output shall not exceed ±3 dB from 0.500 Vrms as the RF input level of a Standard VOR Test Signal to the receiver is varied from 10 to 10,000 uV.

1.7.1.4 Variation in the LOC composite output shall not exceed ±2 dB from 0.333 Vrms as the RF input level of a Standard Localizer Centering Signal is varied from 50 to 10,000 uV.

1.7.1.5 A control line (ILS Energize) must be provided as a low impedance to ground when an ILS frequency is selected.

1.7.2 Glideslope Receiver/ Converter Requirements for use with KI 204, KI 206, KI 207:

1.7.2.1 The glideslope receiver/ converter shall meet all the applicable requirements of TSO C34c.

1.7.2.2 Centering current to be 0 ±7 uA into a 1000 ohm load with a 95% probability under all combinations of the service conditions listed in RTCA Paper DO-132. Minimum Performance Standards - Airborne ILS Glideslope Receiving Equipment, paragraph 2.1 sub-paragraph b. Centering Accuracy.

1.7.2.3 Deviation current with a 700 uV Standard Glideslope Deviation Signal (0.091 ±0.001 ddm tone ratio) applied to the receiver input shall be 78 ±10% uA into a 1000 ohm load. Deviation current shall not change more than 15% as the RF input level of a Standard Glideslope Deviation Signal is varied from 100 to 10,000 uV. Deviation current shall be proportional within 5% to the difference in depth of modulation of the 90 Hz and 150 Hz tones.

1.7.2.4 Warning signal output shall be a DC current less than 125 uA into a 1000 ohm load for a warning flag to fully visible. Warning signal output for a fully concealed warning flag shall be a DC current of 260 uA minimum into a 1000 ohm load.

1.7.3 Navigation Receiver and Converter Subsystem Requirements for use with KI 202, KI 206, KI 207:

1.7.3.1 The navigation receiver and converter subsystem shall meet the applicable requirements of TSO C36c and TSO C40a.

1.7.3.2 Current required for a centered Course Deviation Indicator shall be 0 ±3 uA into a 1000 ohm load with an 85% probability under the conditions listed in paragraph 2.1.6 Bearing Accuracy of RTCA Document DO-114, Minimum Performance Standards Airborne VOR Receiving Equipment and paragraph 2.1, sub-paragraph b. Centering Accuracy of RTCA Document DO-131, Minimum Performance Standards Airborne ILS Localizer Equipment.

1.7.3.3 Current for a concealed warning flag shall be 260 uA minimum.

1.7.3.4 Current for a revealed warning flag shall be 125 uA maximum.

1.7.3.5 The following navigation receivers or converters when used in conjunction with KI 202, KI 206, KI 207 will meet all TSO system requirements.

KNR 630	KN 77	KX 155 (via KN 72)
KNR 631	KX 165	KX 155A (via KN 72)
KNR 632	KNS 80	KX 165A
KN 72	KNS 81	
KN 74	KNR 634	

1.7.3.6 The following glideslope receivers when used in conjunction with KI 206, KI 207 will meet all TSO system requirements.

KN 73	KNR 631	KX 155
KN 75	KNS 80	KX 155A
KGS 681	KNS 81	
KMR 691	KX 165	
KNR 630	KX 165A	

1.7.3.7 The following navigation receivers or converters when used in conjunction with KI 203, KI 204 will meet all TSO system requirements.

KX 155	KX 155A
KN 53	KX 165A
KX 170B	
KX 175B	

1.7.3.8 The following glideslope receivers when used in conjunction with KI 204 will meet all TSO system requirements.

KN 73	KX 155
KN 75	KX 155A
KGS 681	KX 165A
KMR 691	

02

SECTION II
INSTALLATION

2.1 GENERAL

This section contains suggestions to consider before installation in the aircraft. Better performance results from following these instructions.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking the equipment. Make a visual inspection of the unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. The claim should be promptly filed with the transportation company. It would be advisable to retain the container and packaging material after all equipment has been removed in the event that equipment storage or reshipment should become necessary.

2.3 UNIT INSTALLATION

2.3.1 Select a suitable panel location offering unobstructed viewing and adequate clearance.

2.3.2 Refer to Figure 2-5 (P/N 155-05225-0000) or other appropriate drawing for the unit mounting dimensions.

2.3.3 The unit may be Rear mounted in a standard 3 inch ATI opening by using mooring plate P/N 073-00044-0001 or Front mounted with black adapter plate P/N 073-00045-0000 or gray adapter plate P/N 073-00045-0001 and mooring plate P/N 073-00044-0001. Refer to Figure 2-5 (P/N 155-05225-0000) or other appropriate drawing for hole punch, decal, or filing templates.

2.3.4 The KI 202 version -26 unit is mounted using bezel adapter plate P/N 047-10544-0003.

2.3.5 The unit is secured with three #6-32 screws. Mounting screws shall not extend more than 0.625 inches (1.6 cm) into the unit.

2.4 POST INSTALLATION CHECKOUT

An operational ramp test or a performance flight test is recommended after installation to insure satisfactory performance of the equipment in its normal environment.

2.4.1 RAMP TEST

2.4.1.1 Use VOR/ILS ramp generator IFR 401L or equivalent.

2.4.1.2 Set ramp generator to VOR, 90° TO. Set NAV receiver to VOR frequency. Rotate OBS until the D-bar centers, with the To/From indicator reading TO. The OBS should read 90° TO ±2°. Change the generator to 0° TO, center the D-bar, and check the OBS reading for 0° TO ±2°.

2.4.1.3 If the error is greater than ±2°on the KI 203, KI 204, VOR centering may be readjusted by R101 (behind top left mounting screw) using adjustment tool PN 088-00706-0000.

2.4.1.4 To adjust VOR centering on the KI 203, KI 204, change the generator to 90° TO, center the D-bar, and adjust R101 for 0° TO ±2°. Change the generator to 90° FROM, center the D-bar, and readjust R101 for half the reading at 90° TO. Repeat adjustments at 90° TO and 90° FROM until both are within ±2°. If large corrections are required to center the needle the source of error may be exist in another part of the VOR/LOC navigation system.

2.4.1.5 Change the generator to 0° TO, center the D-bar for 0° TO. Set OBS to 8° and check for 4 ±1/2 dots deflection to the Left. Set OBS to 352° and check for 4 ±1/2 dots deflection to the Right.

2.4.1.6 Rotate the OBS 360° and verify that the To/From flag changes state only at 270° ±30° and at 90° ±30° OBS position.

2.4.1.7 Remove VOR RF signal and verify that NAV warning flag appears.

2.4.1.8 Set ramp generator to ILS mode. Set NAV receiver to ILS frequency. Check the levels in Table 2-1 for ILS deflection and Table 2-2 for Glideslope deflection within ±1/2 dot.

TABLE 2-1 ILS Deflection

SIGNAL	LEVEL	PREDOMINATE MODULATION	DIRECTION	DEFLECTION (±1/2 dot)
LOC	+4 dB (+.093 ddm)	150 Hz	LEFT	3 dots
LOC	+0 dB (0 ddm)		CENTERED	±1/2 dot
LOC	-4 dB (-.093 ddm)	90 Hz	RIGHT	3 dots

TABLE 2-2 Glideslope Deflection

SIGNAL	LEVEL	PREDOMINATE MODULATION	DIRECTION	DEFLECTION (±1/2 dot)
GS	+2 dB (>.091 ddm)	150 Hz	UP	2 1/2 dots
GS	+0 dB (0 ddm)		CENTERED	±1/2 dot
GS	-2 dB (.091 ddm)	90 Hz	DOWN	2 1/2 dots

2.4.1.9 If the error is greater than ±1/2 dot on the KI 203, KI 204, LOC centering may be readjusted by R102 (behind top right mounting screw) using adjustment tool P/N 088-00706-0000 at 0 dB (0 ddm).

2.4.1.10 Remove ILS RF signal and verify that NAV/GS warning flag(s) appear.

2.4.2 FLIGHT TEST

2.4.2.1 To check the VOR/ILS System, select a VOR frequency within a forty nautical mile range. Listen to the VOR audio and insure that no electrical interference such as magneto noise is present. Check the tone identifier operation. Fly inbound or outbound on a selected VOR radial and check for proper LEFT-RIGHT and TO-FROM indications. Check VOR accuracy for ±5° of a known heading.

NOTE

VOR ground station scalloping may occur under weak signal conditions.

Channel off VOR NAV receiver and verify that the NAV warning flag appears.

2.4.2.2 Flight test the ILS operation by flying a simulated ILS approach. Check localizer LEFT-RIGHT deflection and, if applicable, glideslope deflection. Check the localizer accuracy in relation to the ILS runway.

Channel off ILS NAV receiver and verify that NAV/GS warning flag(s) appear.

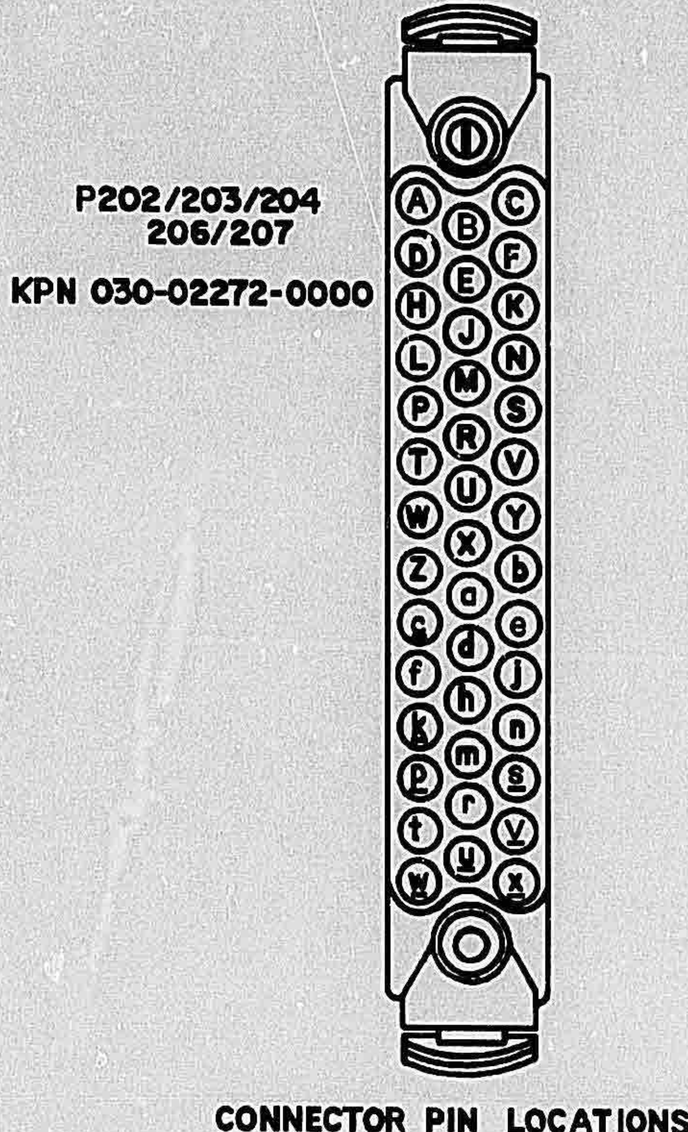

Figure 2-1 Connector, 41 Pin Shell P202, P203, P204, P206, P207

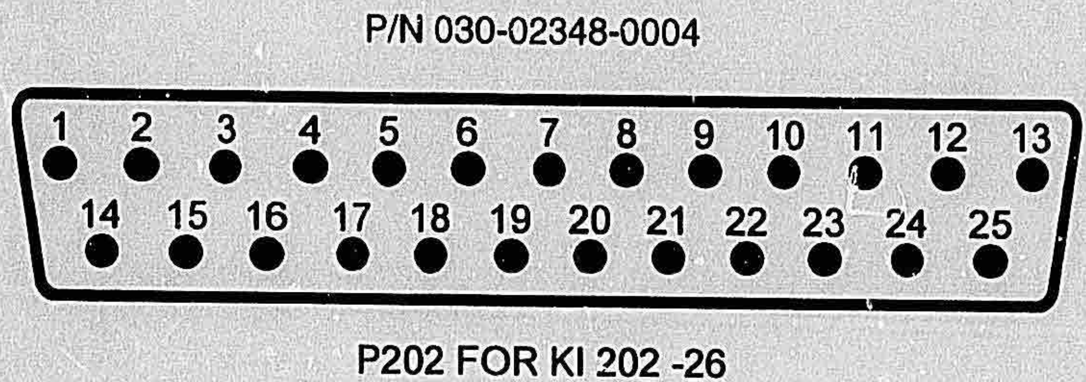

Figure 2-2 Connector, 25 Pin Sub-D P202 (KI 202 -26 only)

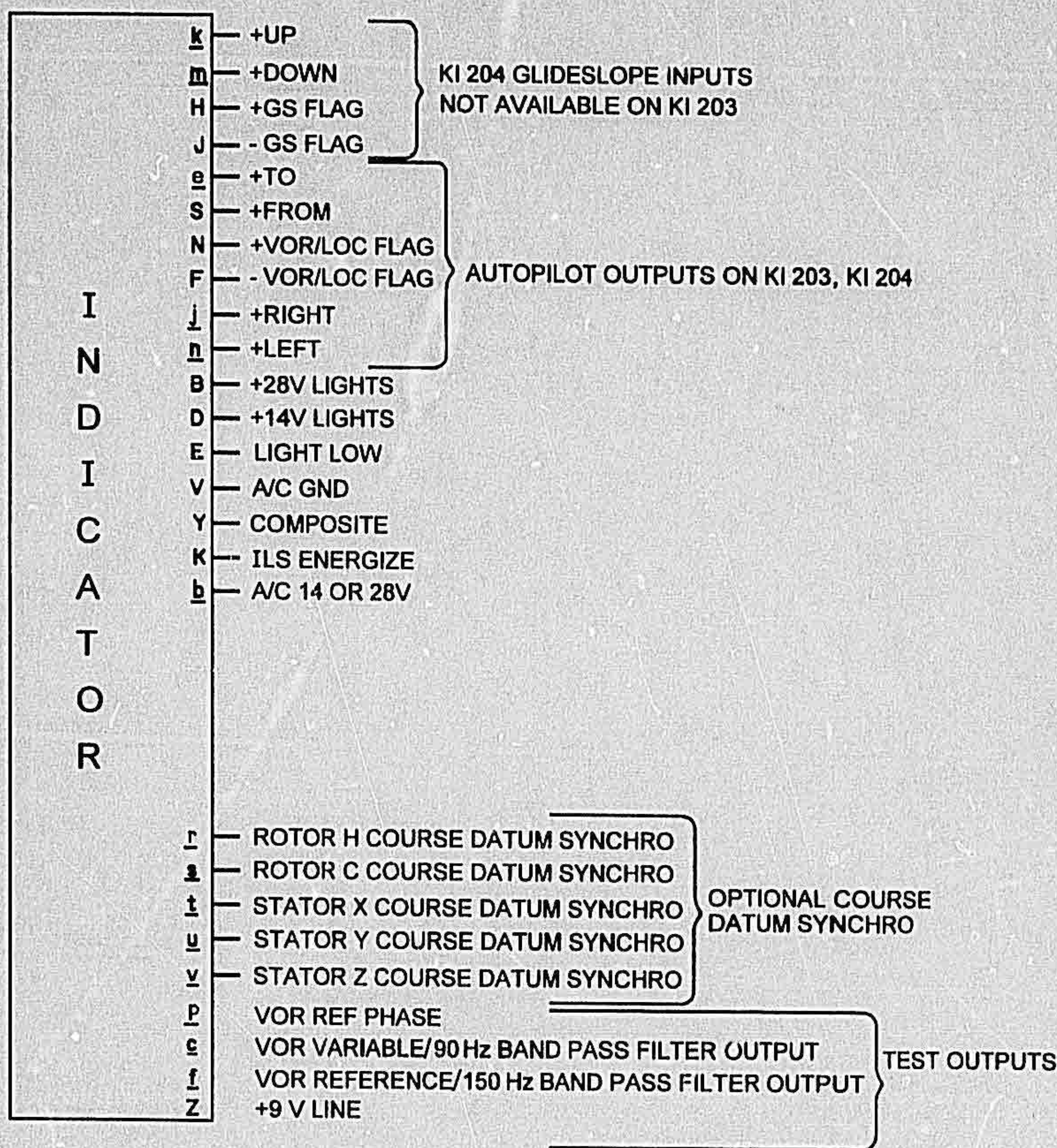

Figure 2-3 Pin Function Diagram KI 203, KI 204

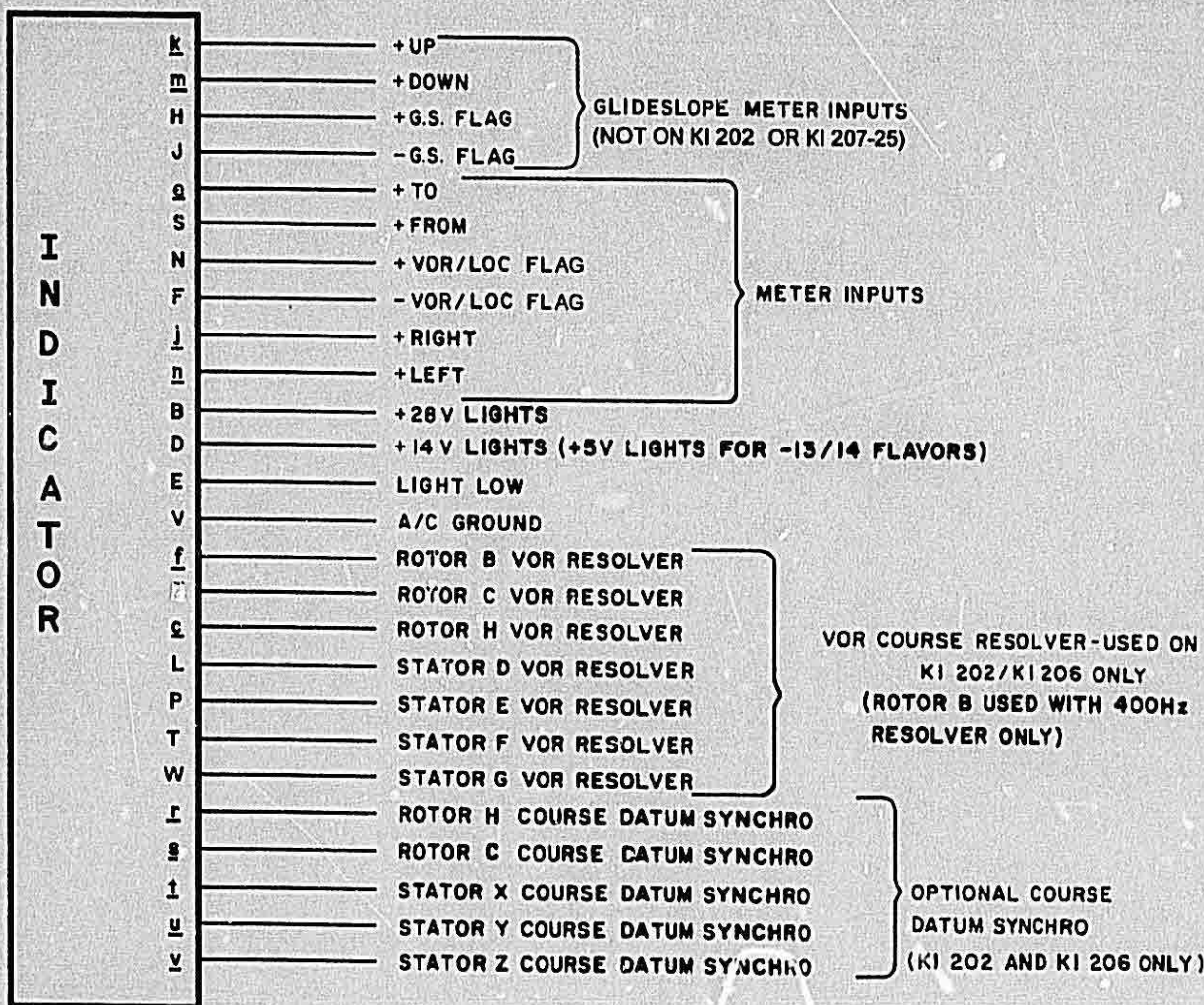

Figure 2-4 Pin Function Diagram KI 202, KI 206, KI 207

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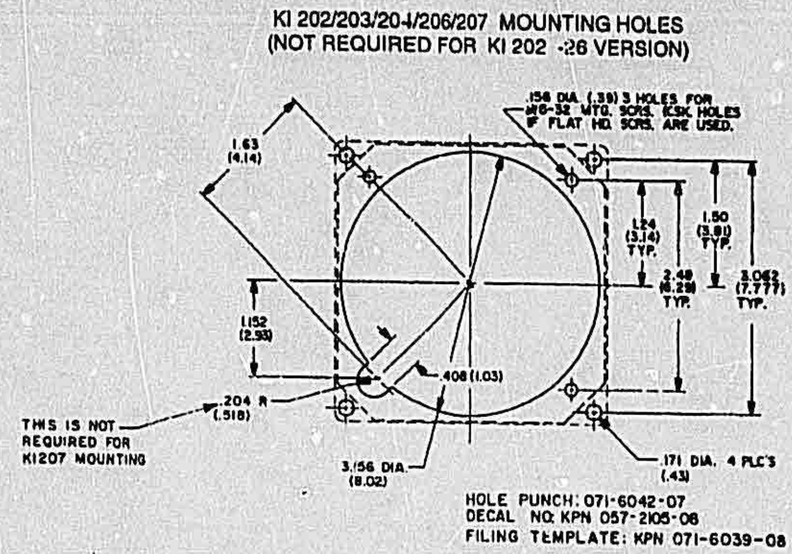
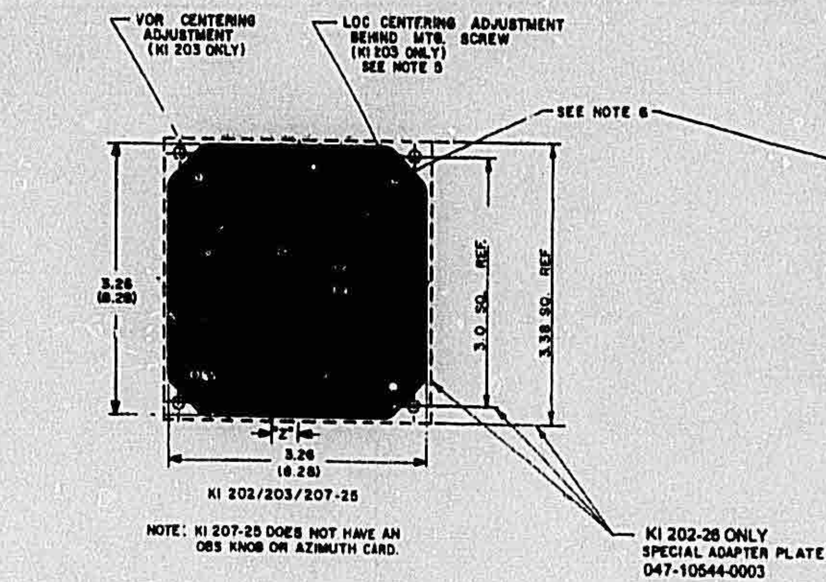
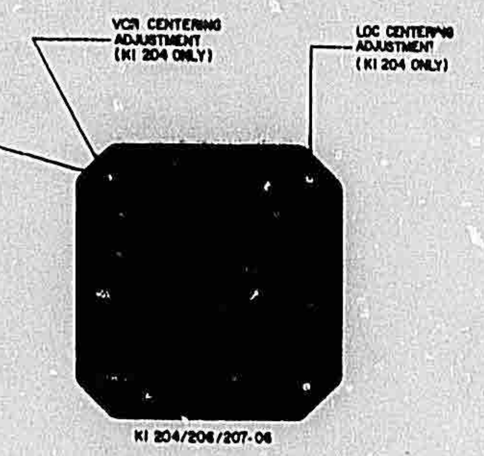


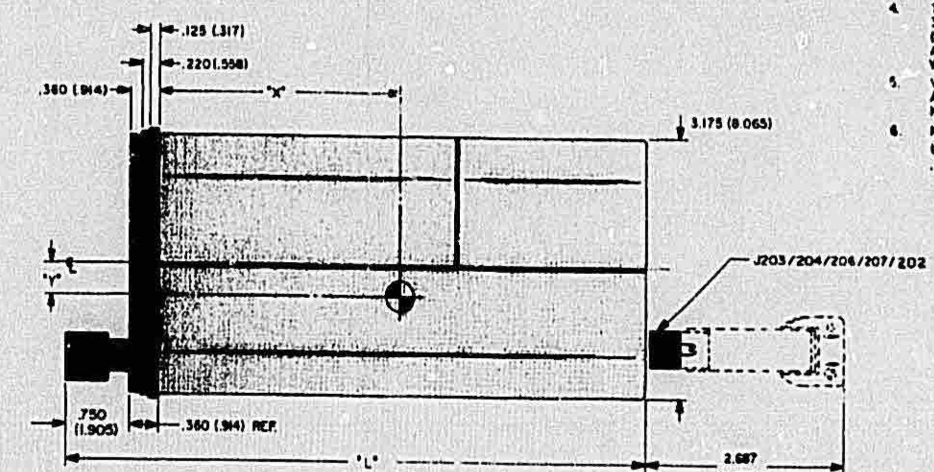




NOTE: KI 207-06 DOES NOT HAVE AN OBS KNOB OR AZIMUTH CARD.

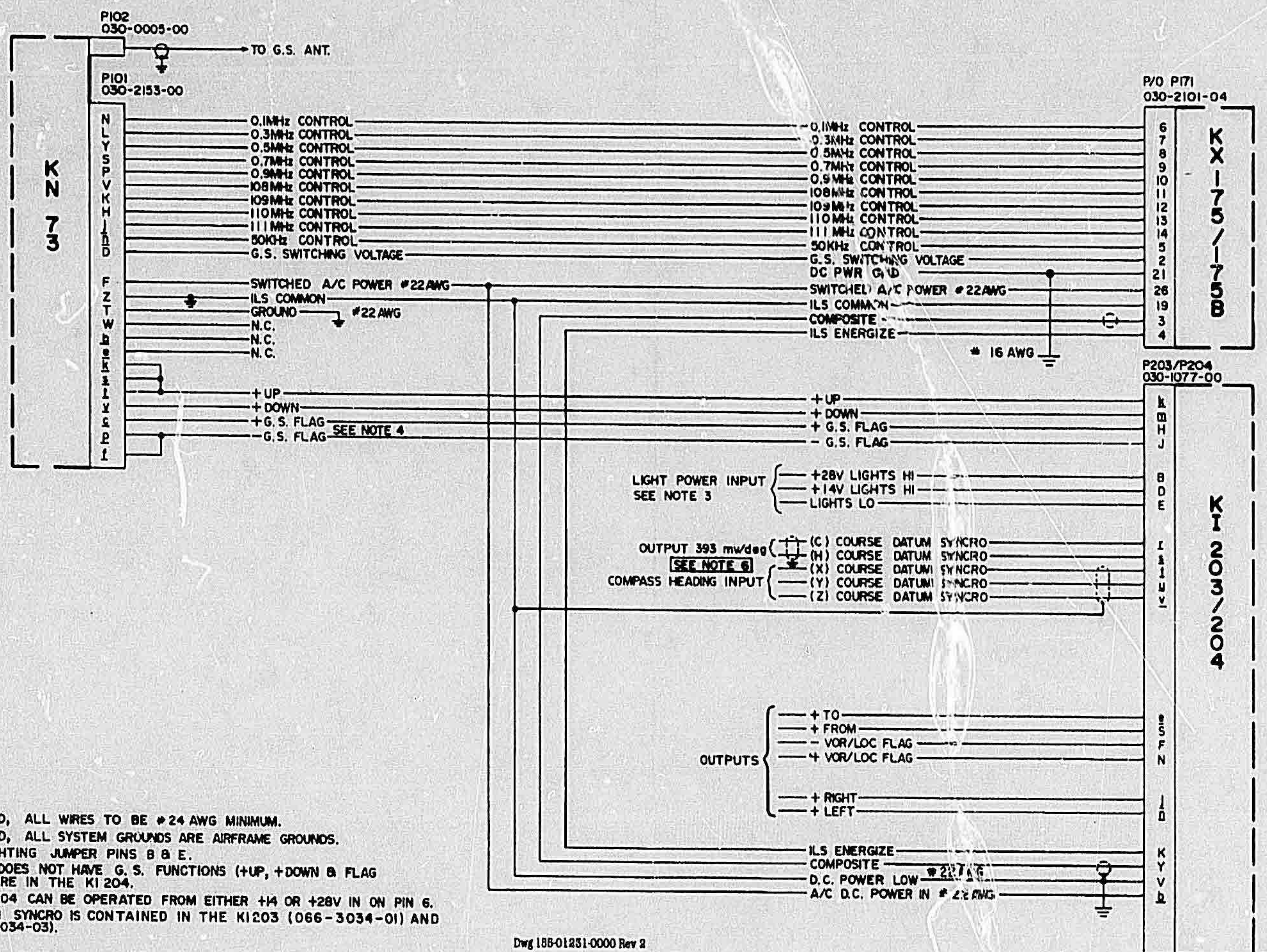
NOTES:
1. DIMENSIONS IN ( ) ARE IN CENTIMETERS.
2. J203/204/206/207 IS A 30 PIN CONNECTOR.
3. WEIGHT: SEE TABLE
4. THIS UNIT MAY BE FRONT OR REAR MOUNTED IN A STANDARD 3" A.T.I. OPENING. TO REAR MOUNT USE A STANDARD MOORING PLATE (073-0044-01). TO FRONT MOUNT UNIT USE A STANDARD BLACK ADAPTOR PLATE (073-0045-00) OR GRAY ADAPTOR PLATE (073-0045-01) WITH A STANDARD MOORING PLATE (073-0044-01).
5. VOR/LOC EXTERNAL ADJUSTMENTS CAN BE MADE BY USE OF A JEWLERS SCREWDRIVER OR SPECIAL KRC TUNING TOOL KPN 088-0706-00.
6. MOUNT WITH THE THREE # 6-32 SCREWS SHIPPED WITH EACH UNIT. MOUNTING SCREWS SHALL NOT EXTEND MORE THAN .625 (1.6 cm) INTO UNIT.

UNIT	WEIGHT	"L"	CENTER OF GRAVITY DIMENSIONS "X"	"Y"	"Z"
KI 203	1.6 LB. (.73 Kg)	7.16 (18.186)	3.000 (7.620)	.037 (.094)	.062 (.158)
KI 204	1.7 LB. (.77 Kg)	7.16 (18.186)	2.930 (7.440)	.097 (.246)	.142 (.361)
KI 206	1.3 LB. (.59 Kg)	5.37 (13.639)	2.000 (5.080)	.187 (.475)	.087 (.220)
KI 207	1.0 LB. (.45 Kg)	5.37 (13.639)	"	"	"
KI 202	1.3 LB. (.59 Kg)	5.37 (13.639)	"	"	"
ADD .1LB (.05Kg) FOR COURSE DATUM SYNCHRO					



Dwg 155-05225-0000 Rev AA

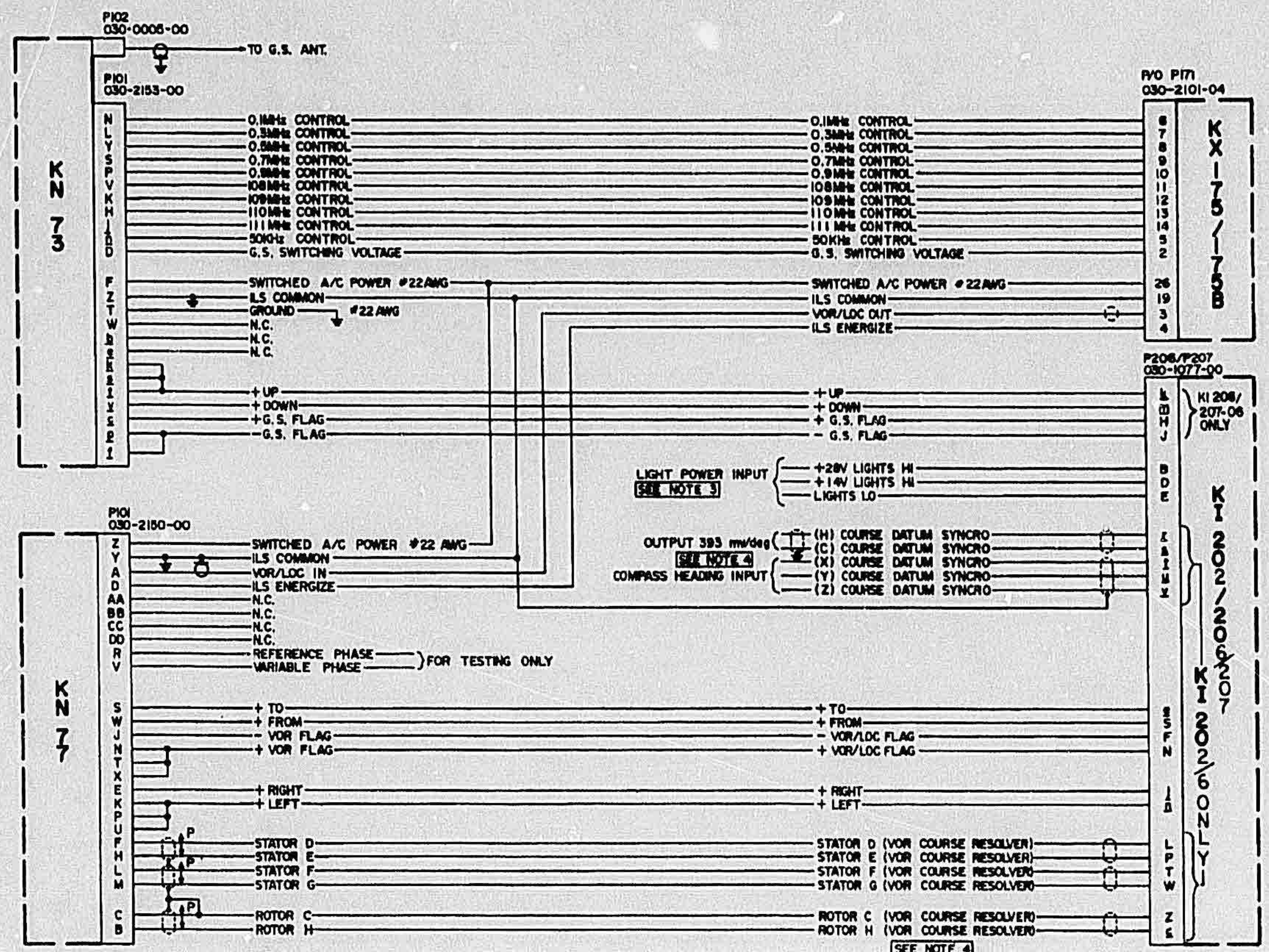
FIGURE 2-5 Installation Drawing KI 202, KI 203, KI 204, KI 206, KI 207
(Dwg No 155-05225-0000, Rev AA)



NOTES:

1. UNLESS NOTED, ALL WIRES TO BE # 24 AWG MINIMUM.
2. UNLESS NOTED, ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
3. FOR +14V LIGHTING JUMPER PINS B & E.
4. THE KI 203 DOES NOT HAVE G.S. FUNCTIONS (+UP, +DOWN & FLAG INPUTS) AS ARE IN THE KI 204.
5. THE KI 203/204 CAN BE OPERATED FROM EITHER +14 OR +28V IN ON PIN 6.
6. CORSE DATUM SYNCRO IS CONTAINED IN THE KI203 (066-3034-01) AND KI204 (066-3034-03).

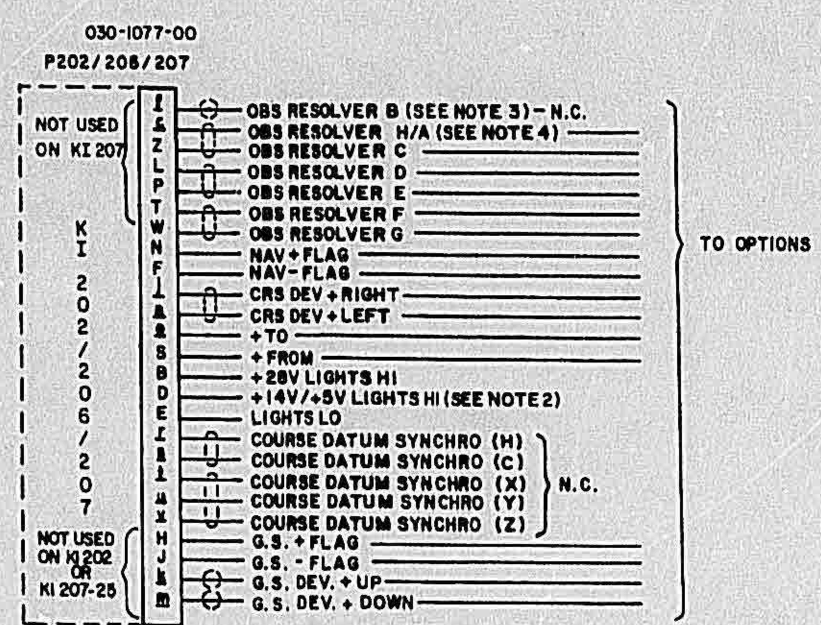
FIGURE 2-6 KI 203, KI 204 Interconnect to KN 73, KX 175, KX 175B (Dwg No 155-01231-0000, Rev 2)

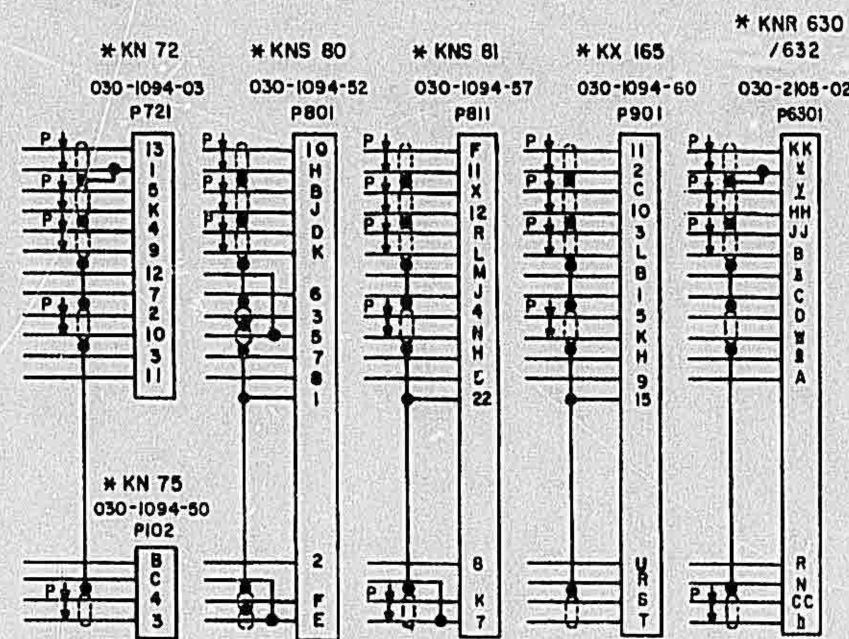


NOTES:
1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. UNLESS NOTED, ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
3. FOR +14V LIGHTING JUMPER PINS B & E.
4. THE KI 202/6 CONTAINS A VOR COURSE RESOLVER (OBS CARD) AND AN OPTIONAL COURSE DATUM SYNCRO. THE KI 207 DOES NOT CONTAIN EITHER. THE COURSE DATUM SYNCRO IS CONTAINED IN KI 202 UNIT NO. 066-3034-08 & KI 206 UNIT NO. 066-3034-05. ARINC NOTATION IS USED.

Dwg 155-01230-0000 Rev 3

FIGURE 2-7 KI 202, KI 206, KI 207 Interconnect to KN 73, KN 77, KX 175, KX 175B (Dwg No 155-01230-0000, Rev 3)

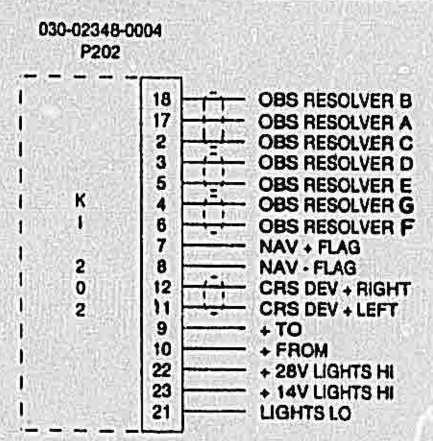




NOTES:

1. USE 24 AWG. UNLESS OTHERWISE NOTED.
2. FOR +14V/+5V LIGHTING JUMPER PINS B AND E, +5V LIGHTING IS USED ONLY ON -13 AND -14 AND -17 FLAVORS.
3. ROTOR B IS USED WITH 400 Hz RESOLVERS ONLY.
4. LINE CALLED ROTOR H WHEN 30Hz RESOLVER IS USED. LINE CALLED ROTOR A WHEN 400Hz RESOLVER IS USED.

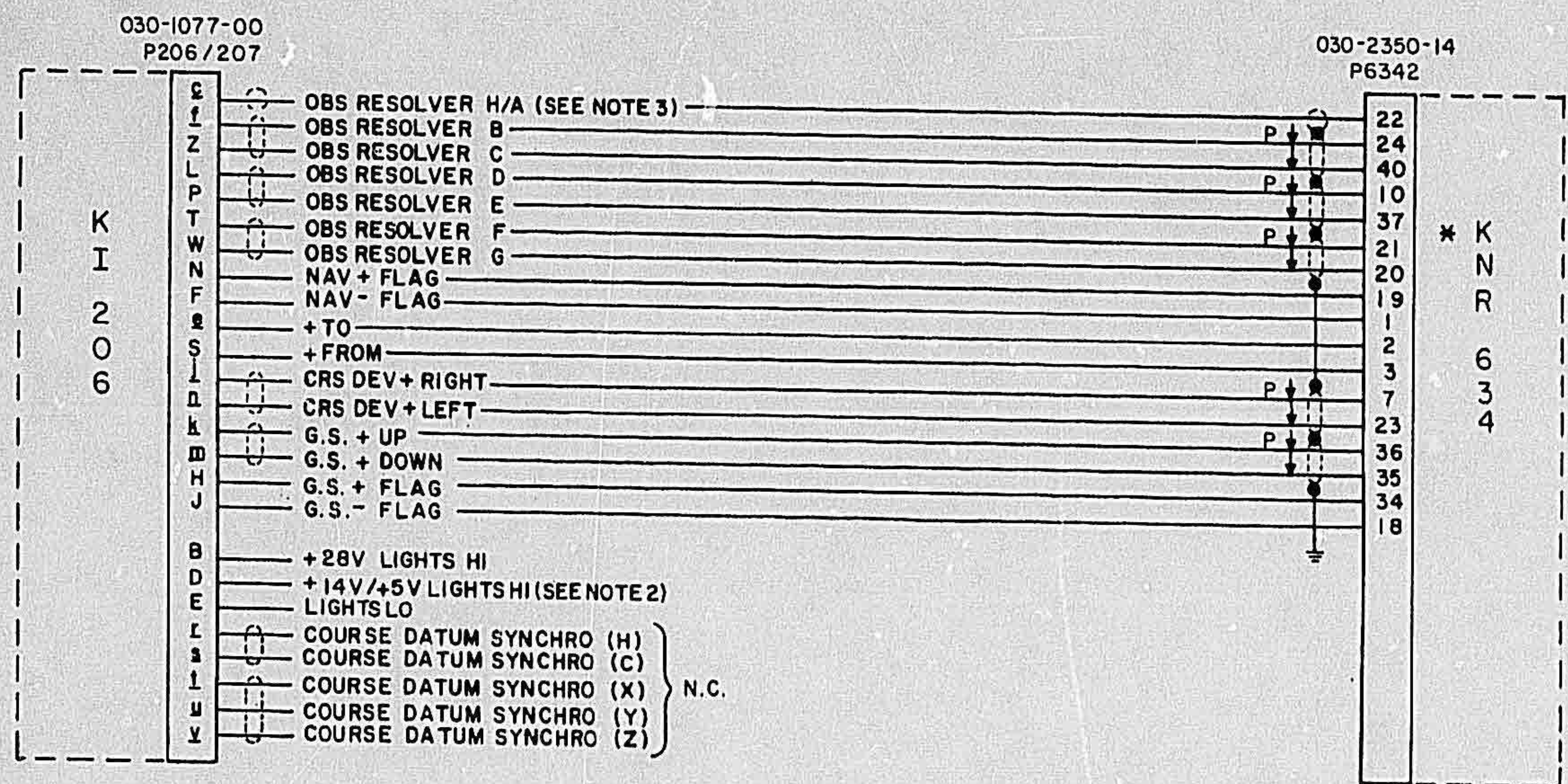
* FOR COMPLETE UNIT INTERCONNECT SEE APPLICABLE INSTALLATION MANUAL.



-26 VERSION, UNIT ONLY

Dwg 155-01414-0000 Rev 4

FIGURE 2-8 KI 202, KI 206, KI 207 Interconnect to KN 72, KNS 80, KNS 81, KX 165, KNR 630, KNR 632 (Dwg No 155-01414-0000, Rev 4)



* FOR COMPLETE KNR 634 INTERCONNECT SEE KNR 634 INSTALLATION MANUAL.

NOTES:

1. USE 24 AWG. UNLESS OTHERWISE NOTED.
2. FOR +14V/+5V LIGHTING JUMPER PINS B AND E. +5V LIGHTING IS USED ONLY ON -13 AND -14 FLAVORS.
3. LINE CALLED ROTOR H WHEN 30Hz RESOLVER IS USED. LINE CALLED ROTOR A WHEN 400Hz RESOLVER IS USED.
4. SHIELDED TWISTED PAIRS ARE HARBOUR 2XG-2634-SV OR EQUIVALENT.

Dwg 155-01415-0000 Rev 1

FIGURE 2-9 KI 206 Interconnect to KNR 634 (Dwg No 155-01415-0000, Rev 1)

03

SECTION III
OPERATION

3.1 UNIT OPERATION

3.1.1 VOR OPERATION

Channel the NAV receiver to the desired VOR and monitor the audio to positively identify the station. To intercept a selected VOR radial, turn the OBS to set the desired radial under the lubber line. The left-right needle will now deflect in the direction of the desired radial. Flying toward needle deflection will bring the aircraft to the desired radial. To fly inbound toward the station, turn the OBS to center the left-right needle while the To-From is indicating "TO." Read the bearing under the lubber line and fly that magnetic heading. When the aircraft passes over the station, the To-From will momentarily disappear and then reappear as "FROM." This indicates the aircraft is outbound from the station.

3.1.2 LOC OPERATION

Localizer circuitry is energized when the NAV receiver is channeled to an ILS frequency. The VOR/LOC flag will be out of view when the signal is usable. Corrections for approach should be made toward the needle, as in VOR, but due to increased sensitivity, corrections are smaller. When flying inbound on a back course, deflection of the needle will be reversed.

3.1.3 GLIDESLOPE OPERATION

Glideslope operation is much the same as the localizer just discussed. An Up deflection of the needle indicates the aircraft is below desired glidepath. The pilot must fly toward the needle for correction. A warning flag is provided to indicate usable signal conditions.

3.2 UNIT CONTROL FUNCTIONS

The following figure displays the control functions for the KI 204, KI 206. The KI 202, KI 203 differs in not having a glideslope needle or flag. The KI 207 -06, -17 differs in not having an OBS or azimuth card. The KI 207 -25 does not have an OBS, an azimuth card, or a glideslope needle.

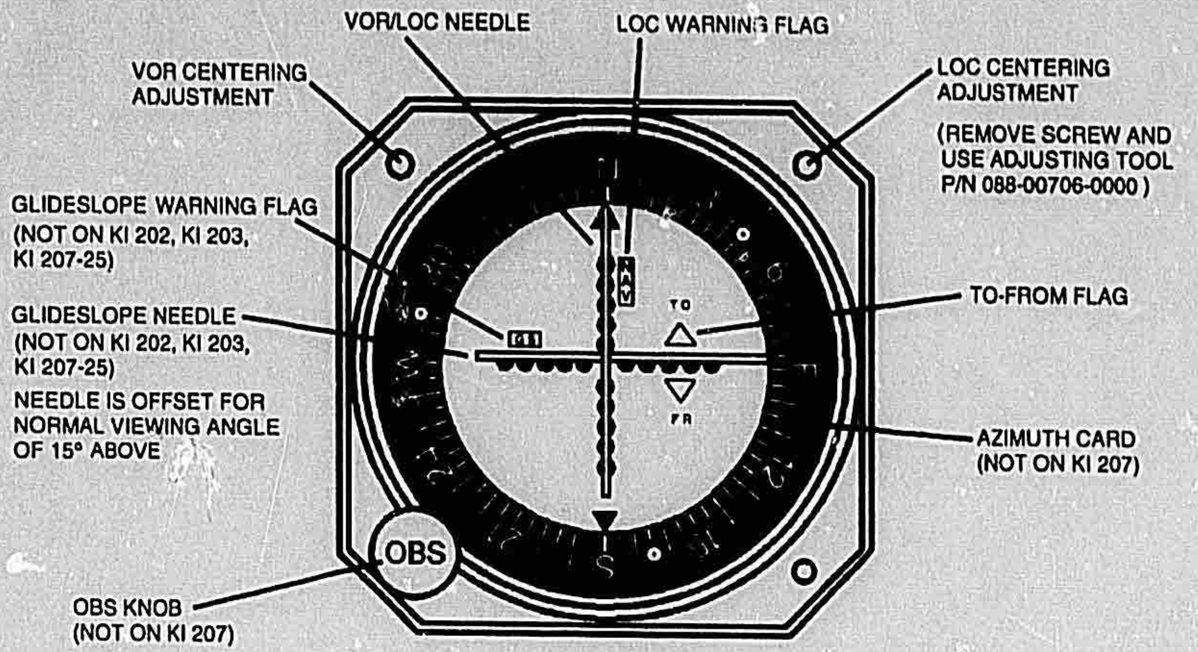


Figure 3-1 Controls and Display

KI 208/209

Installation Manual

Honeywell

INSTALLATION MANUAL

BENDIX/KING®

KI 208, KI 209

NAVIGATION INDICATORS

MANUAL NUMBER 006-00140-0004
Revision 4, August 2002

WARNING

PRIOR TO EXPORT OF THIS DOCUMENT, REVIEW FOR EXPORT LICENSE REQUIREMENT IS NEEDED.

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SECTION I
GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the Bendix/King Silver Crown KI 208 and KI 209.

1.2 EQUIPMENT DESCRIPTION

The Bendix/King KI 208 VOR Indicator is designed to operate with VHF navigational equipment (such as the KX 155, KX 155A, KX 165A) to provide OMNI (VOR) or LOCALIZER (LOC) information. The VHF navigational receiver receives and detects the omni or localizer information. The KI 208 converts this information to DC signals which drive the LEFT-RIGHT needle and the TO-OFF-FROM flag of the visual indicator.

The KI 209 ILS Indicator performs the same functions as the KI 208. In addition, it contains an UP-DOWN glideslope needle with an OFF warning flag.

An anti reflective lens coating is also available on some models of the KI 208 and KI 209.

1.3 TECHNICAL CHARACTERISTICS

TABLE 1-1 Technical Characteristics KI 208, KI 209

SPECIFICATION	CHARACTERISTIC
KI208, KI209 TSO COMPLIANCE:	C40a, C36c Class C Cat 2. DO-138 Environmental Cat. DAPAAAXXXXXX.
ADDITIONAL TSO COMPLIANCE FOR KI 209 ONLY:	C34c Class D Cat 2.
SIZE:	See Figure 2-5 (P/N 155-05235-0000).
WEIGHT:	See Figure 2-5 (P/N 155-05235-0000).
POWER REQUIREMENTS:	
KI 208, KI 209 Indicator	14 Vdc at 50 mA, 28 Vdc at 50 mA.
KI 208 Lighting KI 209 Lighting KI 208, KI 209 Lighting	14 Vdc at 80 ±20 mA. 14 Vdc at 160 ±45 mA. 28 Vdc at 80 ±20 mA.

TABLE 1-1 Technical Characteristics KI 208, KI 209

SPECIFICATION	CHARACTERISTIC
VOR/LOC:	
Input Impedance:	50 k ohms, nominal.
Nominal Composite Input Level:	LOC: 0.33 ±10% Vrms. VOR: 0.50 ±10% Vrms ARINC phased.
Localizer Sensitivity:	4 dB tone ratio will give 3 dot scale deflection.
OMNI Accuracy:	±2° max error, ±1° typical.
OMNI Sensitivity:	±10° off course gives full scale deflection.
External Load:	ARINC autopilot deviation (two 1 k loads).
GLIDESLOPE DEVIATION METER:	
Input Impedance:	1 k ±5% ohms.
Deflection Sensitivity:	150 ±5% uA for full scale deflection.
GLIDESLOPE FLAG:	
Input Impedance:	1 k ±5% ohms minimum.
Deflection Sensitivity:	125 uA for flag to leave stop. 260 uA maximum for fully concealed flag.

1.4 UNITS AND ACCESSORIES SUPPLIED

1.4.1 KI 208 VOR Indicator

066-3056-00
066-3056-02 Antireflective lens

1.4.2 KI 209 ILS Indicator

066-3056-01
066-3056-03 Antireflective lens

1.4.3 Bendix/King Equipment Installation Kit (P/N 050-01550-0000) which includes mating connectors, mounting hardware, etc., is as follows:

PART NUMBER	DESCRIPTION	QTY	VENDOR PART NUMBER
030-02227-0005	Shell, Connector Plug	1	Burndy SMS12P-1
030-02227-0009	Hood, Conn (2 pieces)	1	Burndy SMS12H1
030-02227-0023	Pin, Female Crimp	12	Burndy SC20M-6TK6
088-00706-0000	Tool, Adjustment	1	

1.5 ACCESSORIES REQUIRED, BUT NOT SUPPLIED

1.5.1	Antenna.	
1.5.2	Interconnecting Cables.	
1.5.3	Receiver.	
1.5.4	Mooring Plate	P/N 073-00044-0001.
1.5.5	Adapter Plate	P/N 073-00045-0000 (Front mounting only).
1.5.6	Punch	Refer to Figure 2-5 (P/N 155-05235-0000) or other appropriate drawing.
1.5.7	Filing Template	Refer to Figure 2-5 (P/N 155-05235-0000) or other appropriate drawing.
1.5.8	Crimp Tool	Burndy Hytool M8ND
1.5.9	Extraction Tool Handle	P/N 005-02012-0012, Burndy RXT20-4P3
1.5.10	Extraction Tool Tip	P/N 005-02012-0013, Burndy RXK20-25

1.6 LICENSE REQUIREMENTS

None.

1.7 REQUIREMENTS FOR TSO'D VOR/ILS/GLIDESLOPE SYSTEM

Units used in conjunction with the KI 208, KI 209 must meet the specifications listed below to comprise a completely TSO'd navigation system.

1.7.1 Navigation Receiver Requirements For Use with KI 208, KI 209.

1.7.1.1 The navigation receiver shall be authorized to the standards of TSO C40a, C40b, C40c, and/or TSO C36c, C36d, C36e.

1.7.1.2 VOR phase error shall not exceed 1.5°.

1.7.1.3 Variation in VOR composite output to not exceed ±3 dB from 0.500 Vrms as the RF input level of a Standard VOR Test Signal to the receiver is varied from 10 uV to 10,000 uV.

1.7.1.4 Variation in the LOC composite output shall not exceed ±2 dB from 0.333 Vrms as the RF input level of a Standard Localizer Centering Signal is varied from 50 uV to 10,000 uV.

1.7.1.5 A control line (ILS Energize) must be provided as a low impedance to ground when an ILS frequency is selected.

1.7.2 Glideslope Receiver/Converter Requirements For Use with KI 209.

1.7.2.1 The glideslope receiver/converter shall be authorized to the standards of TSO C34c, C34d, C34e.

1.7.2.2 Centering current to be 0 ±7 uA into a 1000 ohm load with a 95% probability under all combinations of the service conditions listed in RTCA Paper DO-132, Minimum Performance Standards - Airborne ILS Glideslope Receiving Equipment paragraph 2.1 sub-paragraph b, Centering Accuracy.

1.7.2.3 Deviation current with a 700 uV Standard Glideslope Deviation Signal (0.091 ±0.001 ddm tone ratio) applied to the receiver input shall be 78 ±10% uA into a 1000 ohm load. Deviation current shall not change more than 15% as the RF input level of a Standard Glideslope Deviation Signal is varied from 100 to 10,000 uV. Deviation current shall be proportional within 5% to the difference in depth of modulation of the 90 Hz and 150 Hz tones.

1.7.2.4 Warning signal output shall be a DC current less than 125 uA into a 1000 ohm load for a warning flag to be fully visible. Warning signal for a fully concealed warning flag shall be a DC current of 260 uA minimum into a 1000 ohm load.

1.7.3 Fully TSO'D Systems

The following navigation systems will meet all TSO system requirements when used in conjunction with the KI 208, KI 209:

KX 155
KX 155A
KX 165A

02

SECTION II
INSTALLATION

2.1 GENERAL

This section contains suggestions and factors to consider before installing the KI 208, KI 209 Indicator. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking each unit. Make a visual inspection of each unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When all equipment is removed, place in the shipping container all packing materials for use in unit storage or reshipment. The KI 208, KI 209 installation will conform to standards designated by the customer, installing agency and existing conditions as to unit location and type of installation.

NOTE

This equipment has plastic lenses. Use extreme caution when cleaning.

2.3 INSTALLATION KI 208, KI 209

2.3.1 Installation Procedure

2.3.1.1 Carefully select the KI 208, KI 209 panel location for unobstructed vision, minimum parallax, and adequate clearance for the instrument case and installation of cables and connectors.

2.3.1.2 Refer to Figure 2-5 (P/N 155-05235-0000), or other appropriate drawing, for the KI 208 and KI 209 mounting dimensions.

2.3.1.3 A standard 3 1/8 inch instrument hole is required. Refer to Figure 2-5 (P/N 155-05235-0000), or other appropriate drawing, for hole punch or filing templates.

2.3.1.4 Secure the KI 208, KI 209 firmly in place using the mounting screws supplied. If the mounting screw supplied are not used, #6-32 mounting screws that do not extend more than 0.625 inches (1.59 cm) into the unit may be used.

2.3.1.5 The installing agency will supply and fabricate the external cable. The plugs required are supplied by Bendix/King.

2.3.1.6 The KI 208, KI 209 will drive two external deflection indicator loads of 1000 ohms or greater impedance.

2.3.1.7 An omni phase adjust potentiometer, R233 is accessible from the front of the indicator by removing the upper left mounting screw. The 2 1/2 inch long adjustment tool (P/N 088-00706-0000) is required to adjust the omni phase adjust potentiometer. This is for final calibration of the omni system after installing in aircraft. The range of the error potentiometer is approximately ±25°. It should be noted that this potentiometer does not affect localizer centering. The localizer centering potentiometer R227 is accessible from the front of the indicator by removing the upper right mounting screw. Again the 2 1/2 inch long adjustment tool is required.

2.3.2 CABLING

2.3.2.1 The length and routing of the external cables must be carefully studied and planned prior to the installation. Avoid sharp bends and placing cables too near the aircraft control cables.

2.3.2.2 Fabricate the external cables in accordance with the installation drawing that fulfills the system requirement.

2.3.2.3 Avoid running the interconnect harness between the KI 208 and navigation receiver too close to any transmitter antenna coax cable.

2.3.2.4 Considerable savings of installation time can be realized by using the Burndy crimping tool shown in Figure 2-3.

2.4 POST INSTALLATION CHECKOUT

An operational ramp test or performance flight test is recommended after installation to insure satisfactory performance of the equipment in its normal environment.

2.4.1 RAMP TEST

2.4.1.1 Use VOR/ILS ramp generator IFR 401L or equivalent.

2.4.1.2 Set ramp generator to VOR, 90° TO. Set NAV receiver to VOR frequency. Rotate OBS until the D-bar centers, with the To/From indicator reading TO. The OBS should read 90° TO ±2°. Change the generator to 0° TO, center the D-bar, and check the OBS reading for 0° TO ±2°.

2.4.1.3 If the error is greater than ±2°, VOR centering may be readjusted by R233 (behind top left mounting screw) using adjustment tool P/N 088-00706-0000.

2.4.1.4 To adjust VOR centering, change the generator to 90° TO, center the D-bar, and adjust R233 for 0° TO ±2°. Change the generator to 90° FROM, center the D-bar, and adjust R233 for half the reading at 90° TO. Repeat adjustments at 90° TO and 90° FROM until both are within ±2°. If large corrections are required to center the needle the source of error may be exist in another part of the VOR/LOC navigation system.

2.4.1.5 Change the generator to 0° TO, center the D-bar for 0° TO. Set OBS to 8° and check for 4 ±1/2 dots deflection to the Left. Set OBS to 352° and check for 4 ±1/2 dots deflection to the Right.

2.4.1.6 Rotate the OBS 360° and verify that the To/From flag changes state only at 270° ±30° and at 90° ±30° OBS position.

2.4.1.7 Remove VOR RF signal and verify that NAV warning flag appears.

2.4.1.8 Set ramp generator to ILS mode. Set NAV receiver to ILS frequency. Check the levels in Table 2-1 for ILS deflection and Table 2-2 for Glideslope deflection within ±1/2 dot.

TABLE 2-1 ILS Deflection

SIGNAL	LEVEL	PREDOMINATE MODULATION	DIRECTION	DEFLECTION (±1/2 dot)
LOC	+4 dB (+.093 ddm)	150 Hz	LEFT	3 dots
LOC	+0 dB (0 ddm)		CENTERED	±1/2 dot
LOC	-4 dB (-.093 ddm)	90 Hz	RIGHT	3 dots

TABLE 2-2 Glideslope Deflection

SIGNAL	LEVEL	PREDOMINATE MODULATION	DIRECTION	DEFLECTION (±1/2 dot)
GS	+2 dB (>.091 ddm)	150 Hz	UP	2 1/2 dots
GS	+0 dB (0 ddm)		CENTERED	±1/2 dot
GS	-2 dB (.091 ddm)	90 Hz	DOWN	2 1/2 dots

2.4.1.9 If the error is greater than ±1/2 dot, LOC centering may be readjusted by R227 (behind top right mounting screw) using adjustment tool P/N 088-00706-0000 at 0 dB (0 ddm).

2.4.1.10 Remove ILS RF signal and verify that NAV/GS warning flag(s) appear.

2.4.2 FLIGHT TEST

2.4.2.1 To check the VOR/ILS System, select a VOR frequency within a forty nautical mile range. Listen to the VOR audio and insure that no electrical interference such as magneto noise is present. Check the tone identifier operation. Fly inbound or outbound on a selected VOR radial and check for proper LEFT-RIGHT and TO-FROM indications. Check VOR accuracy for ±5° of a known heading.

NOTE

VOR ground station scalloping may occur under weak signal conditions.

Channel off VOR NAV receiver and verify that the NAV warning flag appears.

2.4.2.2 Flight test the ILS operation by flying a simulated ILS approach. Check localizer LEFT-RIGHT deflection and, if applicable, glideslope deflection. Check the localizer accuracy in relation to the ILS runway.

Channel off ILS NAV receiver and verify that NAV/GS warning flag(s) appear.

KI 208 PINOUT LIST

P2081		DESCRIPTION
1	← ----------------	AIRCRAFT GROUND
2	← ----------------	VOR/LOC COMPOSITE
3	----------------	NO CONNECTION
4	← ----------------	LOC ENGAGE IN
5	----------------	LIGHTING 28 VOLT LO
6	----------------	NO CONNECTION
7	← ----------------	LIGHTING 14 VOLT
8	← ----------------	11–33 VDC AIRCRAFT POWER
9	----------------	NO CONNECTION
10	---------------- →	LATERAL DEVIATION +LEFT OUT
11	---------------- →	LATERAL DEVIATION +RIGHT OUT
12	----------------	NO CONNECTION

← INPUT OUTPUT →

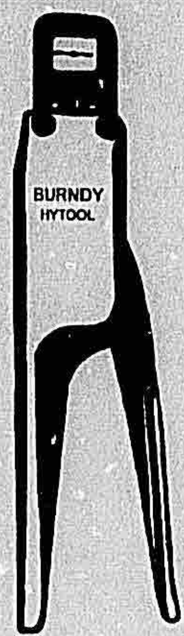
Figure 2-1 KI 208 Pinout List

KI 209 PINOUT LIST

P2091			DESCRIPTION
1	←	----------------	AIRCRAFT GROUND
2	←	----------------	VOR/LOC COMPOSITE
3	←	----------------	VERTICAL DEVIATION + UP IN
4	←	----------------	LOC ENGAGE
5		----------------	LIGHTING 28 VOLT LO
6	←	----------------	VERTICAL DEVIATION + DOWN IN
7	←	----------------	LIGHTING 14 VOLT
8	←	----------------	11-33 VDC AIRCRAFT POWER
9	←	----------------	VERTICAL +FLAG IN
10		---------------- →	LATERAL DEVIATION +LEFT OUT
11		---------------- →	LATERAL DEVIATION +RIGHT OUT
12	←	----------------	VERTICAL -FLAG IN

← INPUT OUTPUT →

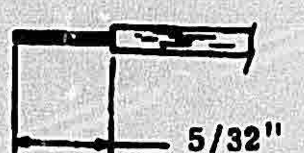
Figure 2-2 KI 209 Pinout List



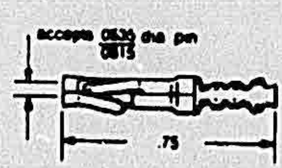
BURNDY HYTOOL M8ND
(ratchet controlled)

RXK20-25 Extraction Tool Tip (P/N 005-02012-0013)
RXT 20-4P3 Extraction Tool Handle (P/N 005-02012-0012)

Fixed outer sleeve depresses contact locking spring. With tool still in contact hole, use hand to pull out contact.



Suggested Wire Strip Length



Burndy Socket SC20M-6TK6
(P/N 030-02227-0023)

Figure 2-3 Crimping Tool

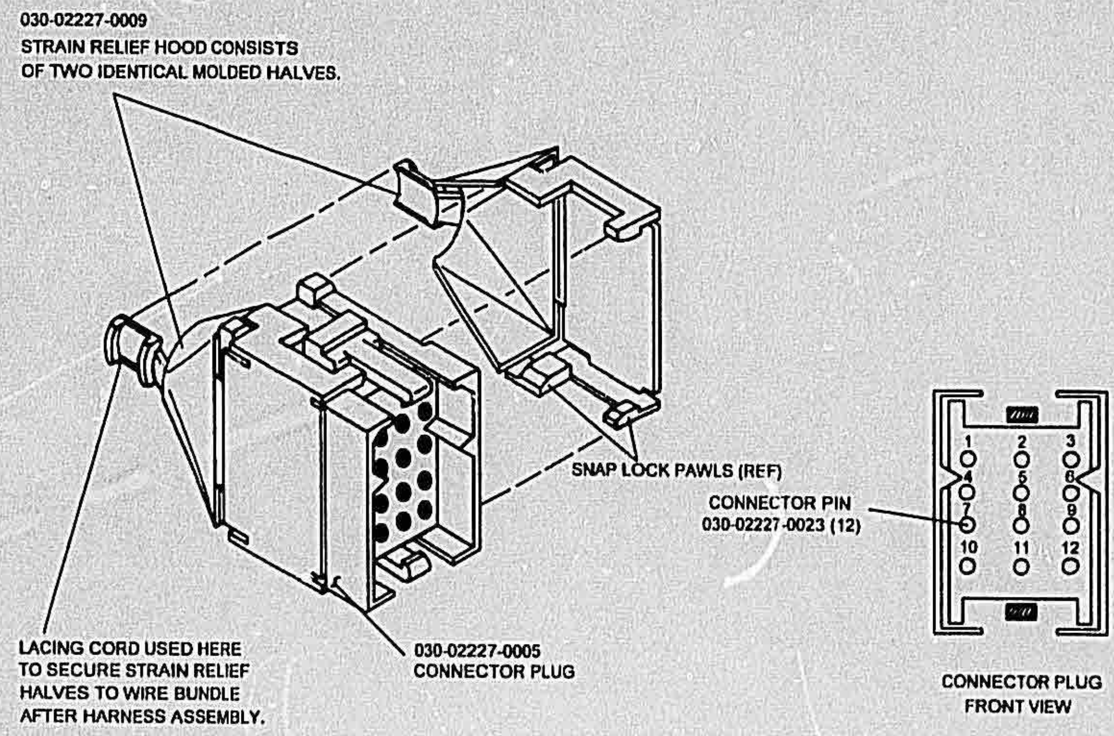
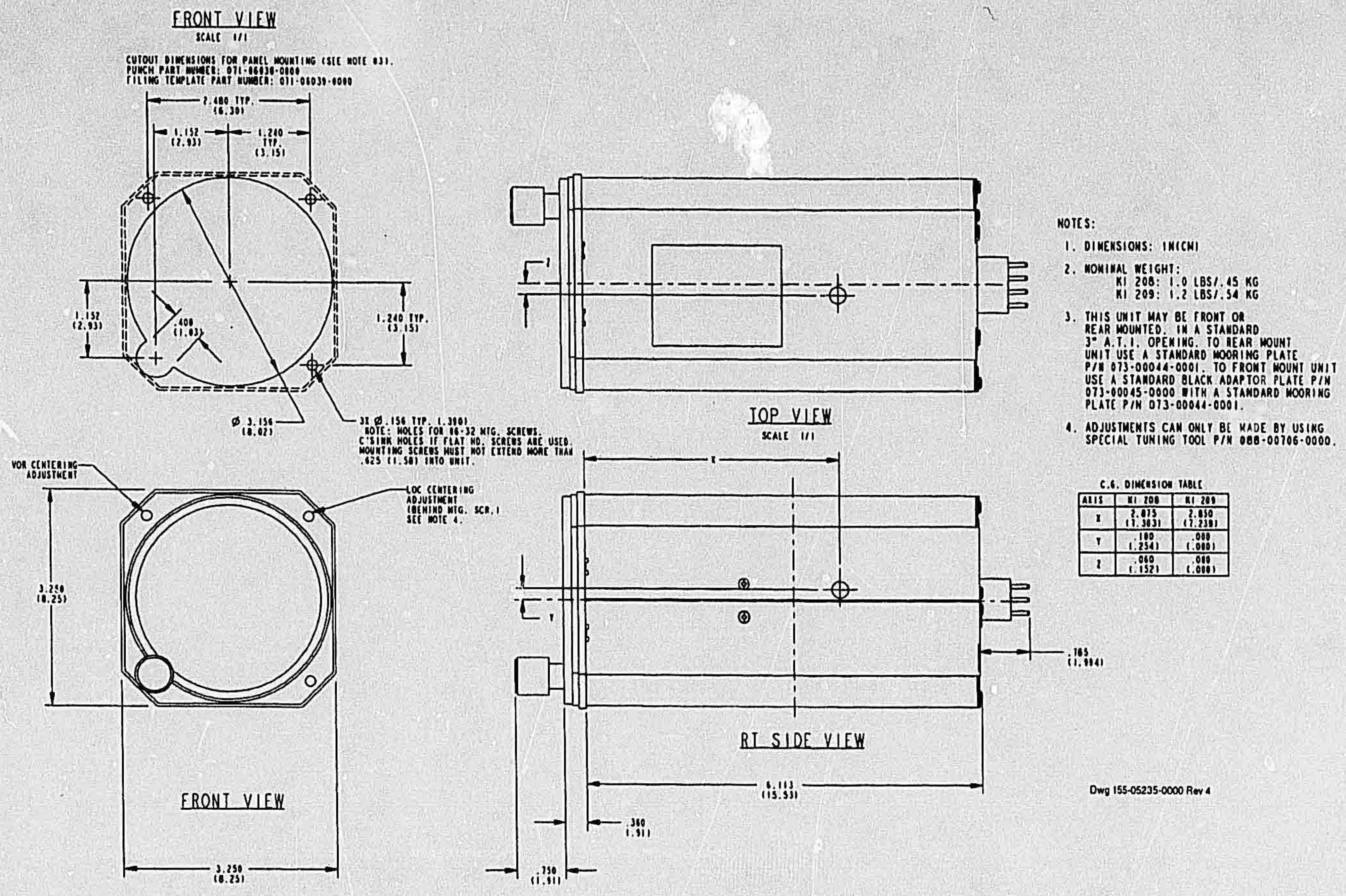
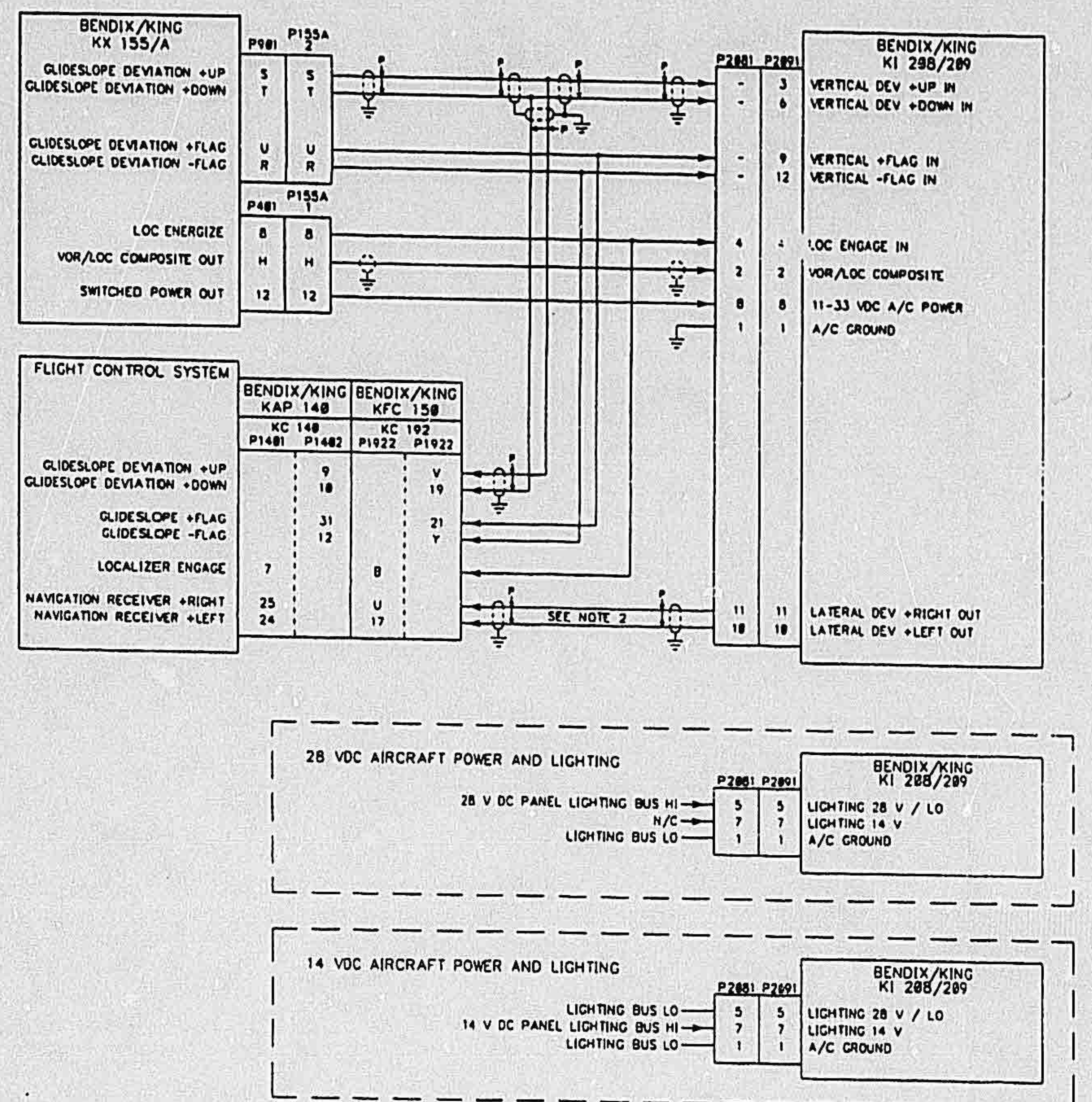


Figure 2-4 KI 208, KI 209 Connector Assembly



AXIS	KI 208	KI 209
X	2.875 (7.303)	2.850 (7.239)
Y	.100 (.254)	.000 (.000)
Z	.060 (.152)	.000 (.000)

FIGURE 2-5 KI 208, KI 209 Outline and Mounting Drawing (Dwg No 155-05235-0000, Rev 4)



NOTES:

1. ALL WIRES ARE 24 AWG MINIMUM UNLESS OTHERWISE NOTED.
2. IF THE KAP 140 IS INTERFACED TO THE KI 208/209, THE KC 140 SHOULD BE CONFIGURED FOR "NAV FORCE VALID: TRUE", SO THE KC 140 WILL NOT EXPECT A LATERAL FLAG INPUT.
3. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

FIGURE 2-6 KI 208, KI 209 Typical Interconnect

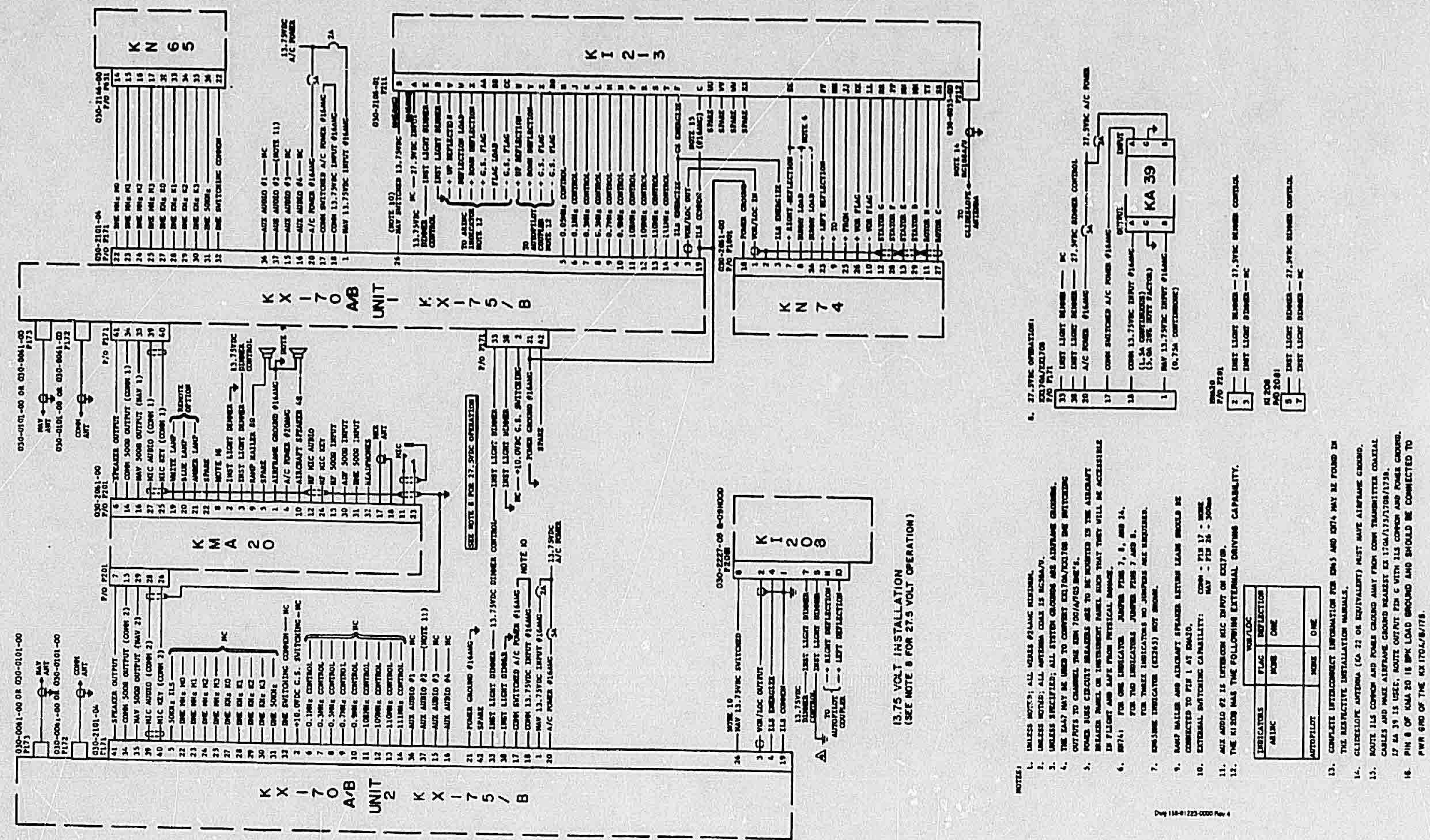


FIGURE 2-7 KI 208 Non-TSO'd Silver Crown System Interconnect
(Dwg No 155-01223-0000, Rev 4)

ALSO SEE THIS PAGE AS UPPER/LOWER (NEXT)

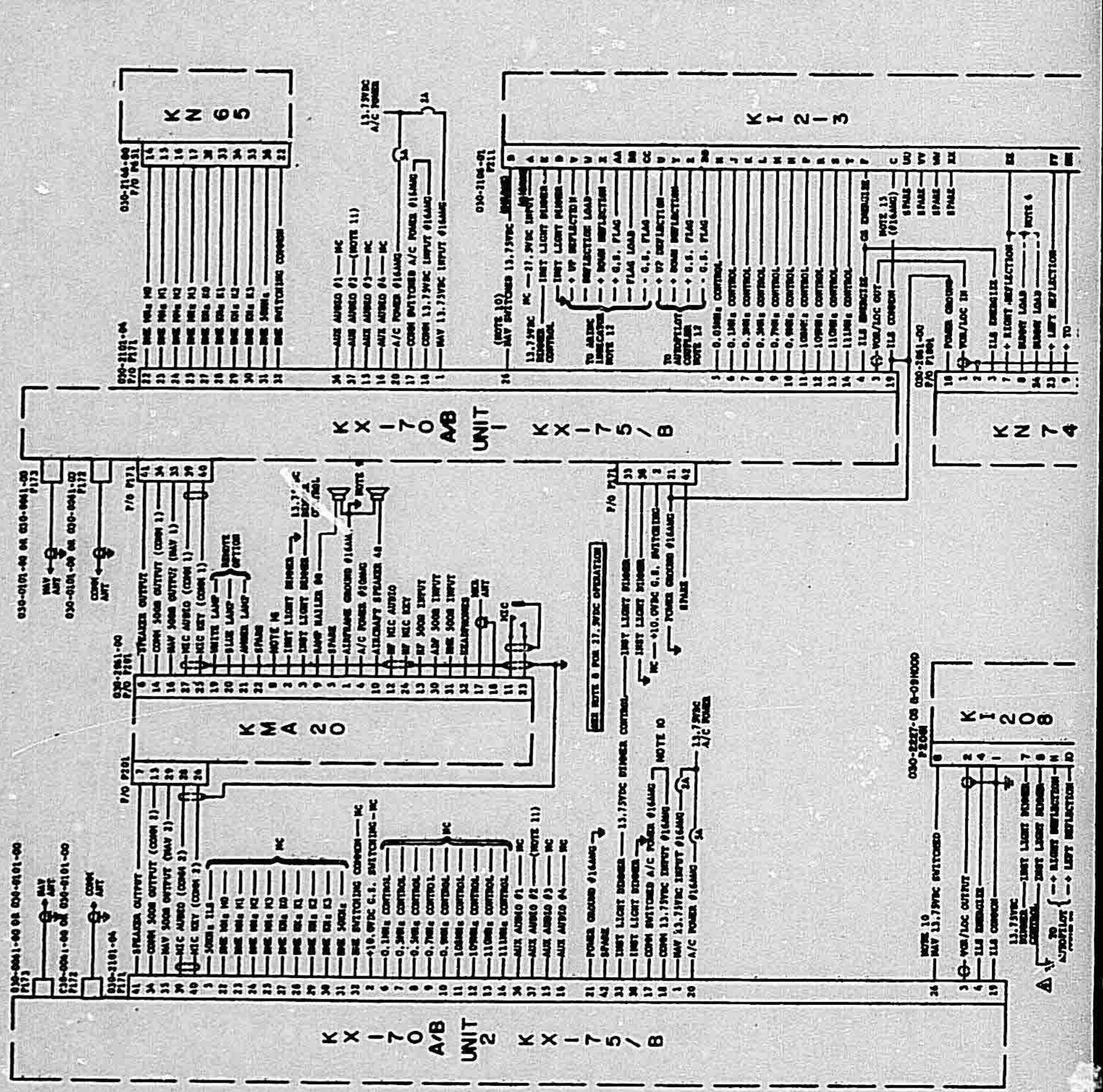
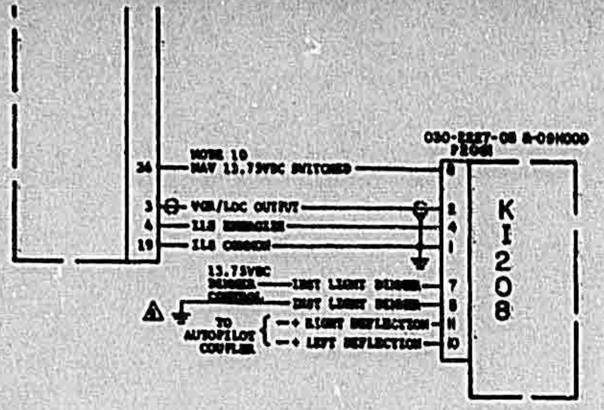
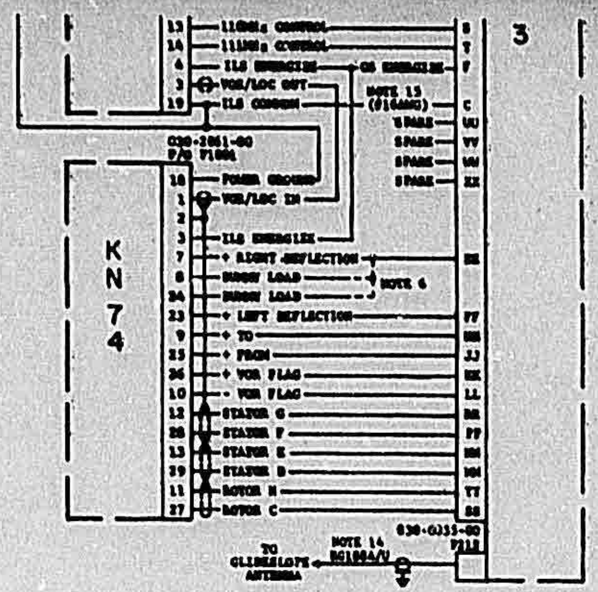


FIGURE 2-7 KI 208 Non-TSO'd Silver Crown System Interconnect (Dwg No 155-01223-0000, Rev 4)

UPPER

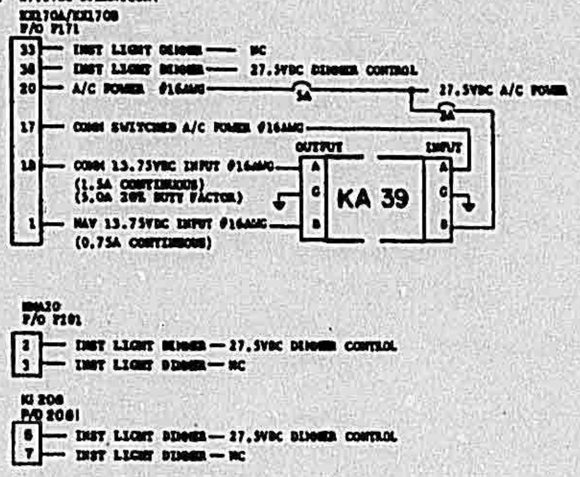


13.75 VOLT INSTALLATION
(SEE NOTE 8 FOR 27.5 VOLT OPERATION)



NOTES:

1. UNLESS NOTED; ALL WIRES #24AWG MINIMUM.
2. UNLESS NOTED; ALL ANTENNA COAX IS RG58A/U.
3. UNLESS SPECIFIED; ALL SYSTEM GROUNDS ARE AIRFRAME GROUNDS.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX170B DME SWITCHING OUTPUTS TO CHANNEL THE KDM 700/A/705 DME'S.
5. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN THE AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
6. KN74: FOR ONE INDICATOR JUMPER PINS 7, 8, AND 24.
   FOR TWO INDICATORS JUMPER PINS 7 AND 8.
   FOR THREE INDICATORS NO JUMPERS ARE REQUIRED.
7. KN65DME INDICATOR (KI265) NOT SHOWN.
8. 27.5VDC OPERATION:



9. RAMP HAILER AND AIRCRAFT SPEAKER RETURN LEADS SHOULD BE CONNECTED TO PIN 1 AT KMA20.
10. EXTERNAL SWITCHING CAPABILITY: COMM - PIN 17 - NONE
    NAV - PIN 26 - 300ma
11. AUX AUDIO #2 IS INTERCOM MIC INPUT ON KX170B.
12. THE KI 208 HAS THE FOLLOWING EXTERNAL DRIVING CAPABILITY.

	VOR/LOC	
INDICATORS	FLAG	DEFLECTION
ARINC	NONE	ONE
AUTOPILOT	NONE	ONE

13. COMPLETE INTERCONNECT INFORMATION FOR KN65 AND KN74 MAY BE FOUND IN THE RESPECTIVE INSTALLATION MANUALS.
14. GLIDESLOPE ANTENNA (KA 22 OR EQUIVALENT) MUST HAVE AIRFRAME GROUND.
15. ROUTE ILS COMMON AND POWER GROUND AWAY FROM COMM TRANSMITTER COAXIAL CABLES AND MAKE AIRFRAME GROUND NEAREST KX 170A/175/170B/175B.
    IF KA 39 IS USED, ROUTE OUTPUT PIN C WITH ILS COMMON AND POWER GROUND.
16. PIN 8 OF KMA 20 IS SPK LOAD GROUND AND SHOULD BE CONNECTED TO PWR GRD OF THE KX 170A/B/175.

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Rev 4, 1 Aug 2002

LOWER

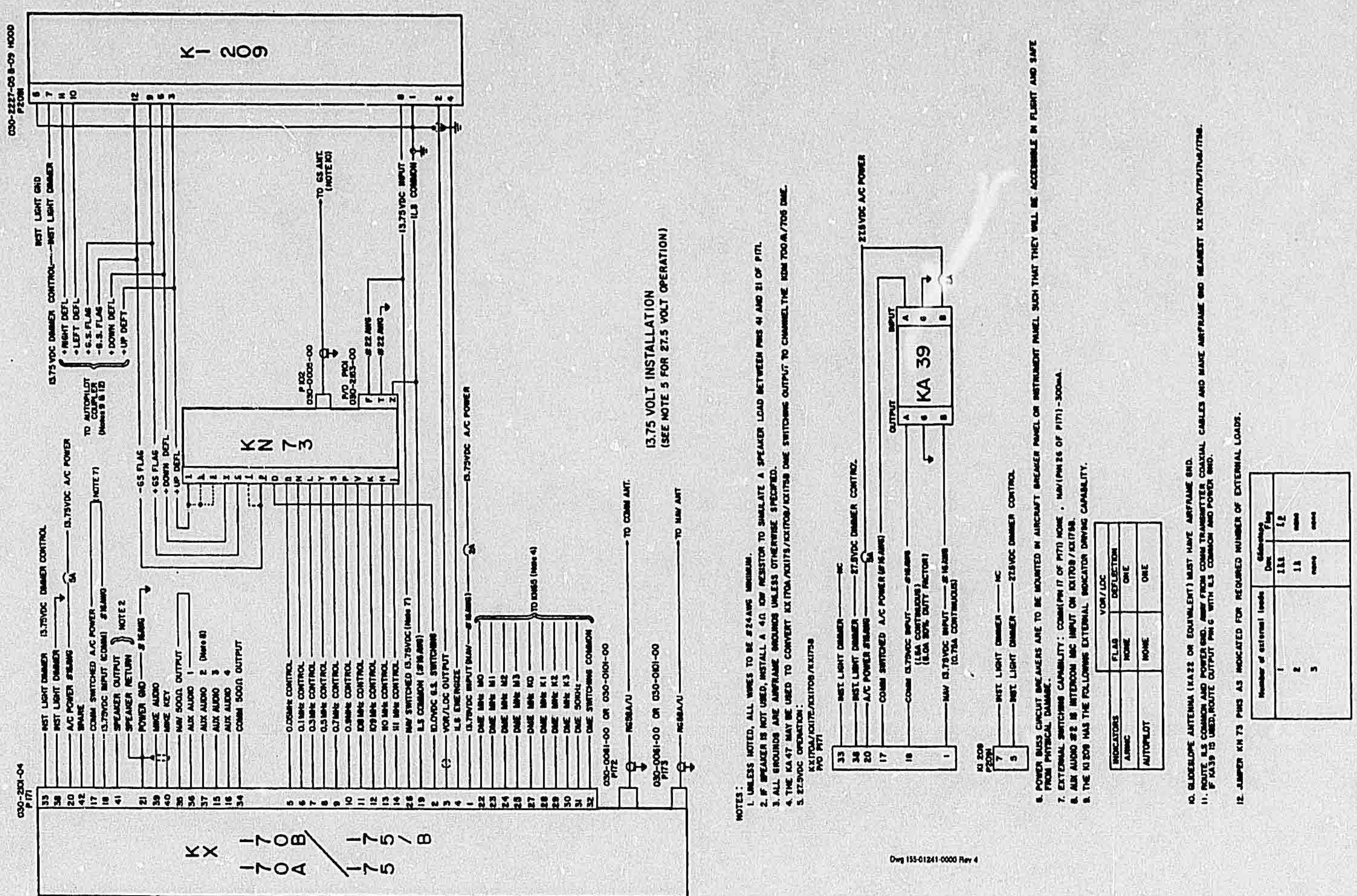
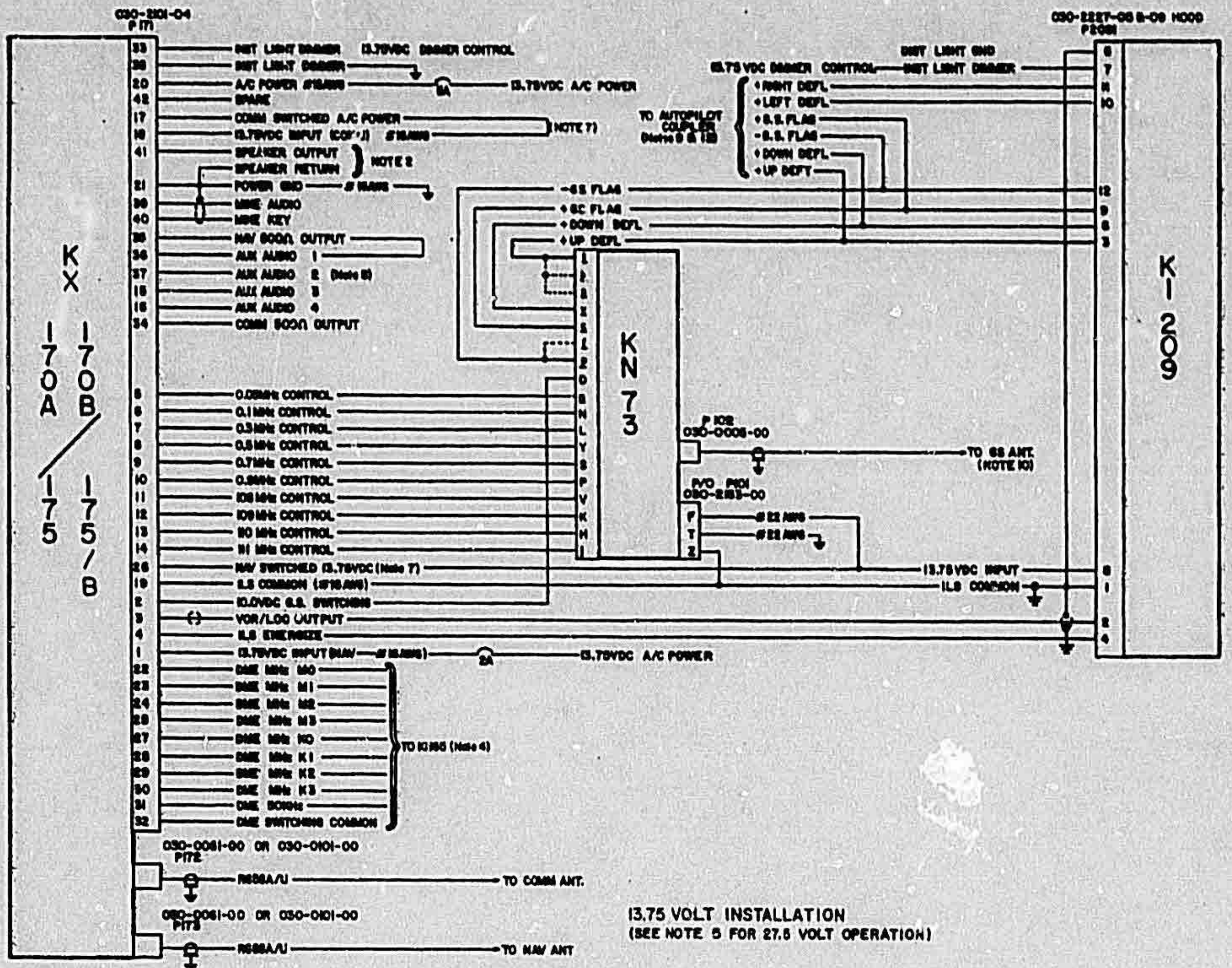


FIGURE 2-8 KI 209 System Interconnect (Dwg No 155-01241-0000, Rev 4)

ALSO SEE THIS PAGE AS UPPER/LOWER (NEXT)



NOTES:

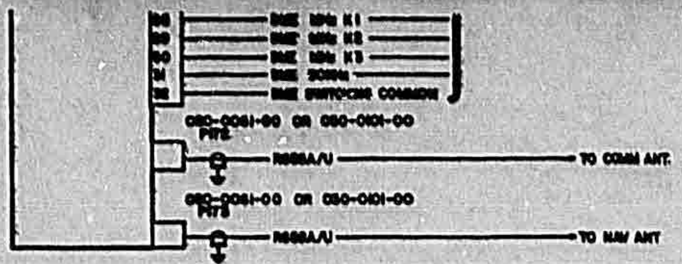
1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. IF SPEAKER IS NOT USED, INSTALL A 4Ω 10W RESISTOR TO SIMULATE A SPEAKER LOAD BETWEEN PINS 41 AND 21 OF P171.
3. ALL GROUNDS ARE AIRFRAME GROUNDS UNLESS OTHERWISE SPECIFIED.
4. THE KA 47 MAY BE USED TO CONVERT KX 170A/KX175/KX170B/KX175B DME SWITCHING OUTPUT TO CHANNEL THE KDM 700A/705 DME.
5. 27.5VDC OPERATION:

KX170A/KX175/KX170B/KX175B
P/O P171

33 — INST. LIGHT DIMMER — NC
36 — INST. LIGHT DIMMER — 27.5VDC DIMMER CONTROL

FIGURE 2-8 KI 209 System Interconnect
(Dwg No 155-01241-0000, Rev 4)

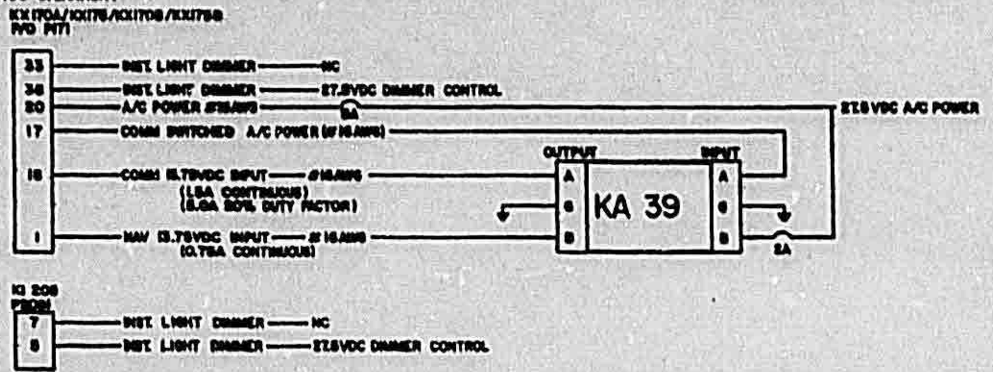
UPPER



13.75 VOLT INSTALLATION
(SEE NOTE 5 FOR 27.5 VOLT OPERATION)

NOTES:

1. UNLESS NOTED, ALL WIRES TO BE #24AWG MINIMUM.
2. IF SPEAKER IS NOT USED, INSTALL A 4Ω 10W RESISTOR TO SIMULATE A SPEAKER LOAD BETWEEN PINS 41 AND 21 OF P171.
3. ALL GROUNDS ARE AIRFRAME GROUNDS UNLESS OTHERWISE SPECIFIED.
4. THE KA47 MAY BE USED TO CONVERT KX170A/KX175/KX170B/KX175B DME SWITCHING OUTPUT TO CHANNEL THE KDM 700A/706 DME.
5. 27.5VDC OPERATION:



6. POWER BUSS CIRCUIT BREAKERS ARE TO BE MOUNTED IN AIRCRAFT BREAKER PANEL OR INSTRUMENT PANEL SUCH THAT THEY WILL BE ACCESSIBLE IN FLIGHT AND SAFE FROM PHYSICAL DAMAGE.
7. EXTERNAL SWITCHING CAPABILITY: COMM(PIN 17 OF P171) NONE, NAV(PIN 26 OF P171)-300mA.
8. AUX AUDIO #2 IS INTERCOM MIC INPUT ON KX170B/KX175B.
9. THE KI 208 HAS THE FOLLOWING EXTERNAL INDICATOR DRIVING CAPABILITY.

	VOR/LOC	
INDICATORS	FLAG	DEFLECTION
ARINC	NONE	ONE
AUTOPILOT	NONE	ONE

10. GLIDESLOPE ANTENNA (KA22 OR EQUIVALENT) MUST HAVE AIRFRAME GND.
11. ROUTE ILS COMMON AND POWER GND. AWAY FROM COMM TRANSMITTER COAXIAL CABLES AND MAKE AIRFRAME GND NEAREST KX170A/175/170B/175B. IF KA39 IS USED, ROUTE OUTPUT PIN 6 WITH ILS COMMON AND POWER GND.

12. JUMPER KN 73 PINS AS INDICATED FOR REQUIRED NUMBER OF EXTERNAL LOADS.

Number of external loads	Glideslope	
	Dev	Flag
1	[illegible]	[illegible]
2	[illegible]	none
3	none	none

Dwg 155-01201-0000 Rev 4

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LOWER

03

SECTION III
OPERATION

3.1 EQUIPMENT OPERATION

All controls required to operate the KI 208, KI 209 are located on the unit's front panel and on the front panel of the related NAV/COMM transceivers.

3.1.1 VOR OPERATION (KI 208, KI 209)

Select the desired VOR station frequency with the NAV frequency controls. The NAV receiver volume control can then be adjusted to positively identify the station or listen to FSS reports.

To intercept a selected VOR radial (from the station) and fly outbound, turn the OBS control to set the desired radial under the top indicator index. Maneuver the aircraft to fly the selected radial magnetic heading plus a 45° intercept angle which will provide a sufficient intercept angle. The intercept angle should be reduced as the deviation needle approaches an on-course condition (center) to prevent excessive course bracketing.

To determine the bearing and fly "To" a selected VOR station, turn the OBS control until the "To-From" flag resembles a white arrow pointing up and the deviation needle is centered. Read the "To" bearing under the top indicator index and maneuver the aircraft to approximately fly the magnetic course "To" the station. If the deviation needle moves to the right, the aircraft course must be adjusted 5 or 10 degrees to the right. Similarly, if the deviation needle goes to the left, the aircraft course must be adjusted to the left. Maintaining a centered deviation needle will provide automatic course compensation for wind drift.

3.1.2 LOCALIZER OPERATION (KI 208, KI 209)

Localizer circuits are automatically energized when an ILS frequency is selected on the KX 155, KX 155A. By adjusting the NAV volume level, the localizer station can be identified and in some cases, ATIS information received. The localizer flag should disappear from view into the "To" condition indicating the signal is reliable.

Maneuver the aircraft to fly an on-course centered needle. While flying a front course approach or outbound on the back course approach, magnetic heading corrections are made toward the needle deflection. Similarly, while flying the back course approach or outbound on the front course approach, corrections are made away from the needle deflection.

The localizer course width is narrow compared to VOR course width and requires much smaller course corrections to center the deviation needle. When intercepting the localizer course, the aircraft turn into localizer course should be started when the needle moves off the meter stop.

A helpful quick reference reminder of the localizer course is to set the course on the omni-bearing readout.

3.1.3 GLIDESLOPE OPERATION (KI 209)

The glideslope (horizontal) needle provides the pilot with vertical steering information during ILS approaches. The glideslope circuitry may be energized independently or when the associated localizer frequency is selected on the navigation receiver. Observe that the glideslope warning flag is concealed. The glideslope needle deflects toward the direction the pilot must fly to remain on the glideslope path. If the glideslope needle deflects upward, the aircraft is below the glideslope and must climb to center the needle. If the needle deflects downward, the aircraft is above the glide path and must descend to remain on the glide path. When the needle is centered the aircraft is on the glide path.

3.2 INDICATOR CONTROL FUNCTIONS KI 208, KI 209

Figure 3-1 displays the control functions of the KI 208. Figure 3-2 displays the control functions of the KI 209.

3.2.1 OMNI-BEARING SELECTOR (OBS)

The OMNI Bearing Selector knob rotates the azimuth card on which the desired course is selected. The course selected serves as a reference for all VOR indications. The reciprocal course is identified under the bottom course index.

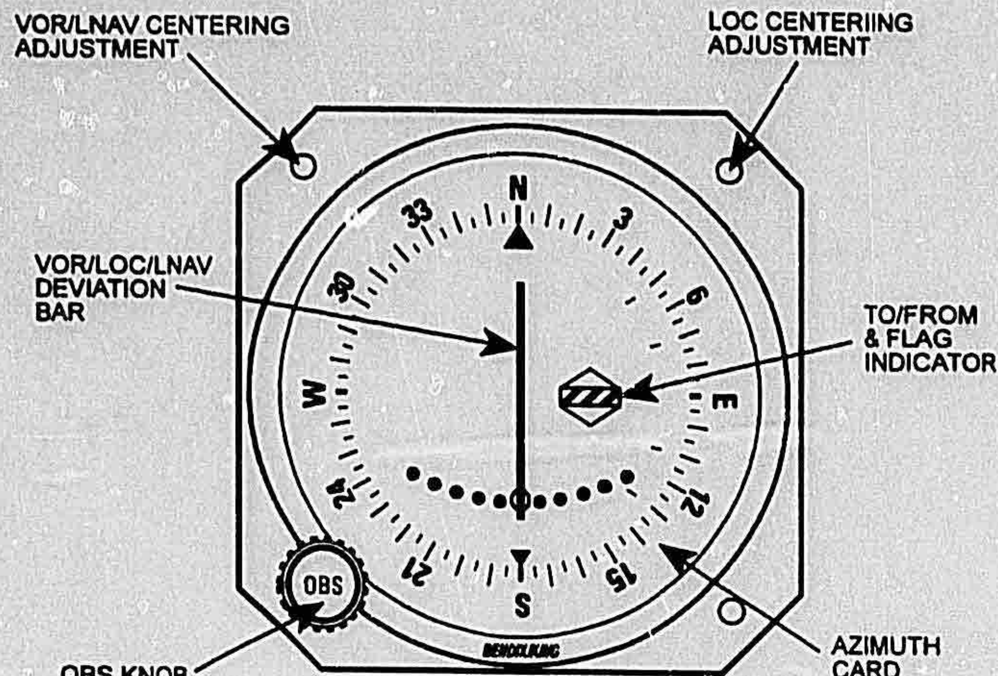
3.2.2 VOR/LOC DEVIATION INDICATOR

The VOR/LOC needle deflection indicates the amount of deviation from the selected VOR course or localizer path. The indicated angular deviation is toward the proper flight path in normal operation.

The VOR/LOC warning flag is fully visible when the VOR or LOC signal is unreliable. The VOR TO-FROM flag indicates the direction "TO" or "FROM" the VOR station.

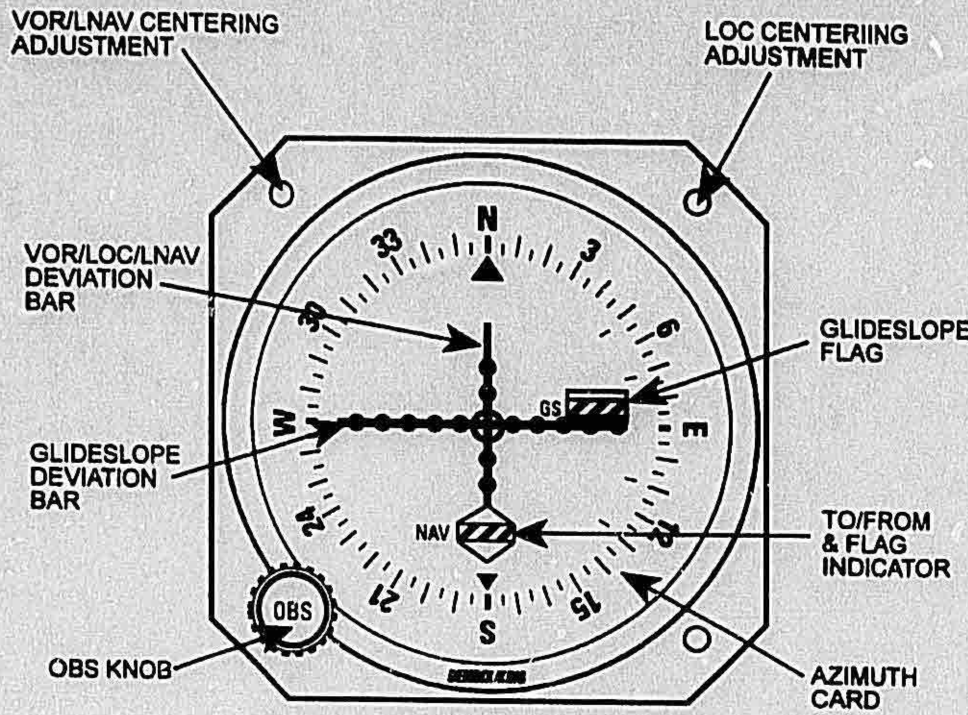
3.2.3 GLIDESLOPE DEVIATION INDICATOR (KI 209 Only)

The glideslope deviation needle deflection indicates the amount of deviation from the glide path. The deflection is toward the direction of flight required to maintain the proper descent path. The glideslope warning flag is visible when the glideslope signal is unreliable or the receiver has malfunctioned.



KI 208 CONTROL FUNCTIONS

Figure 3-1 KI 208 Control Functions



KI 209 CONTROL FUNCTIONS

Figure 3-2 KI 209 Control Functions

MFG.

INTRO

RECORD OF REVISIONS

MFG REV NO	DESCRIPTION	ISSUE DATE	ATP REV DATE	INSERTED BY
5	Maintenance 203/204	8/02	1/9/03	ATP/VP
5	Maintenance 202/206/207	"	"	"
5	Maintenance 208/209	"	"	"

RECORD OF TEMPORARY REVISIONS

TEMP REV NO	DESCRIPTION	ISSUE DATE	ATP REV DATE	INSERT BY	DATE REMOVED	REV INCOR	REMOVE BY

REVISION HISTORY

MAINTENANCE MANUAL

BENDIX/KING

KI 203, KI 204

Navigation Indicators

PART NUMBER	REV	DATE	DESCRIPTION
006-15636-0005	5	Aug/2002	New P/N 006-15636-0005 applies to KI 203, KI 204 MM only.

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REVISION HISTORY

MAINTENANCE MANUAL

BENDIX/KING

KI 202, KI 206, KI 207

Navigation Indicators

PART NUMBER	REV	DATE	DESCRIPTION
006-05137-0005	5	Aug/2002	Replaces P/N 006-05137-0004. P/N 006-05137-0005 now applies to KI 202, KI 206, KI 207 MM only.
006-05137-0004	4	Jan/1997	Revised KI 208, KI 209 MM.
006-05137-0003	3	Oct/1996	Revised KI 208, KI 209 IM.
006-05137-0002	2	Mar/1988	Revised KI 202, KI 203, KI 204, KI 206, KI 207 IM and MM.
006-05137-0001	1	Spt/1979	Added KI 202.
006-05137-0000	0	1976	Original Issue. Includes KI 203, KI 204, KI 206, KI 207, KI 208, KI 209 IM and MM.

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REVISION HISTORY

MAINTENANCE MANUAL

BENDIX/KING

KI 208, KI 209

Navigation Indicators

PART NUMBER	REV	DATE	DESCRIPTION
006-05140-0005	5	Aug/2002	New P/N 006-05140-0005 applies to KI 208, KI 209 MM only.

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KI 203/204

Maintenance Manual

Honeywell

MAINTENANCE MANUAL

BENDIX/KING®

KI 203, KI 204

NAVIGATION INDICATORS

MANUAL NUMBER 006-15636-0005
Revision 5, August 2002

WARNING

PRIOR TO EXPORT OF THIS DOCUMENT, REVIEW FOR EXPORT LICENSE REQUIREMENT IS NEEDED.

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04

SECTION IV
THEORY OF OPERATION

4.1 GENERAL

This section contains theory of operation for the KI 203 and KI 204 VOR/LOC Converter/ Indicators. Block diagram theory is presented first, followed by detailed circuit theory. The KI 203 and KI 204 contain the same VOR/LOC converter. The KI 204 also contains a GS indicator.

4.1.1 Principles of VOR System

4.1.1.1 General

The basic function of VOR is to provide a means to determine an aircraft's position with reference to a VOR ground station and also to follow a certain path toward or away from the station. This is accomplished by indicating when the aircraft is on a selected VOR station radial or by determining which radial the aircraft is on. A means to differentiate between radials and identify them is necessary. For this purpose, advantage is taken of the fact that the phase difference between two signals can be accurately determined. The phase difference between two signals which are generated by the VOR station is varied as the direction relative to the station changes so that a particular radial is represented by a particular phase difference. Refer to Figure 4-1. One non-directional reference signal is generated with a phase that at any instant is the same in all directions. A second signal is generated with a phase that at any instant is different in different directions. The phase of the variable phase signal is the same as the phase of the reference signal only at the 0° radial (north). As the angle measured from the 0° radial increases, the phase of the variable phase signal lags the phase of the reference signal by the number of degrees of the angle from 0°. The reference and variable phase signals, which are 30 Hz voltages, are carried by RF to make radio transmission and reception possible. The VOR receiving equipment must separate the 30 Hz reference and variable phase signals from the RF carrier and compare the phase of the two signals. The phase difference is indicated on a course indicator or RMI.

4.1.1.2 VOR Generation (Conventional Non-Doppler VOR System)

Refer to ICAO Annex 10 for a full description of conventional and doppler VOR systems.

The VOR electromagnetic field is composed of radiation from two ground based antennas radiating at the same carrier frequency. The first is a non-directional antenna radiating an amplitude modulated carrier. The frequency of the modulating signal varies from 9,480 Hz to 10,440 Hz back to 9,480 Hz 30 times per second. That is, a 9,960 Hz sub-carrier amplitude modulates the RF carrier and is frequency modulated by 30 Hz.

The second antenna is a horizontal dipole which rotates at the rate of 30 revolutions per second. The dipole produces a figure 8 field pattern. The RF voltages within the two lobes are 180° out of phase with each other. The RF within one of the lobes is exactly in phase with the RF radiated from the non-directional field and the RF within the other lobe is 180° out of phase with the non-directional field. The rotating figure 8 pattern reinforces the non-directional pattern on the in phase side and subtracts from the non-directional pattern on the out of phase side. See Figure 4-1. This results in a cardioid field pattern which rotates at the rate of 30 revolutions per second, the rate at which the dipole antenna rotates.

The signal at an aircraft within radio range of the VOR station is an RF carrier with amplitude varying at the rate of 30 Hz because of rotation of the cardioid pattern. The carrier is also amplitude modulated at the station by the 9,960 Hz signal which is, in turn, frequency modulated on a sub-carrier so that it may be separated from the 30 Hz variable phase signal.

4.1.2 PRINCIPLES OF LOCALIZER SYSTEM

The localizer facility provides a visual display of the aircraft's position relative to a straight approach line to the runway. The ground based localizer antenna system generates two patterns. Refer to Figure 4-2. One pattern is directed toward the right side of the runway, the second to the left. The two patterns have the same carrier frequency but different audio modulating signals. The pattern to the left of the runway (in normal approach) is 90 Hz amplitude modulated while the pattern to the right is 150 Hz amplitude modulated.

The ratio of 90 Hz to 150 Hz audio, after demodulation, is dependent only upon the position of the aircraft within the patterns. The patterns are adjusted so they are of equal strength on a vertical plane extending out from the runway centerline. When the aircraft is on this plane, the 90 Hz and 150 Hz voltages will be equal.

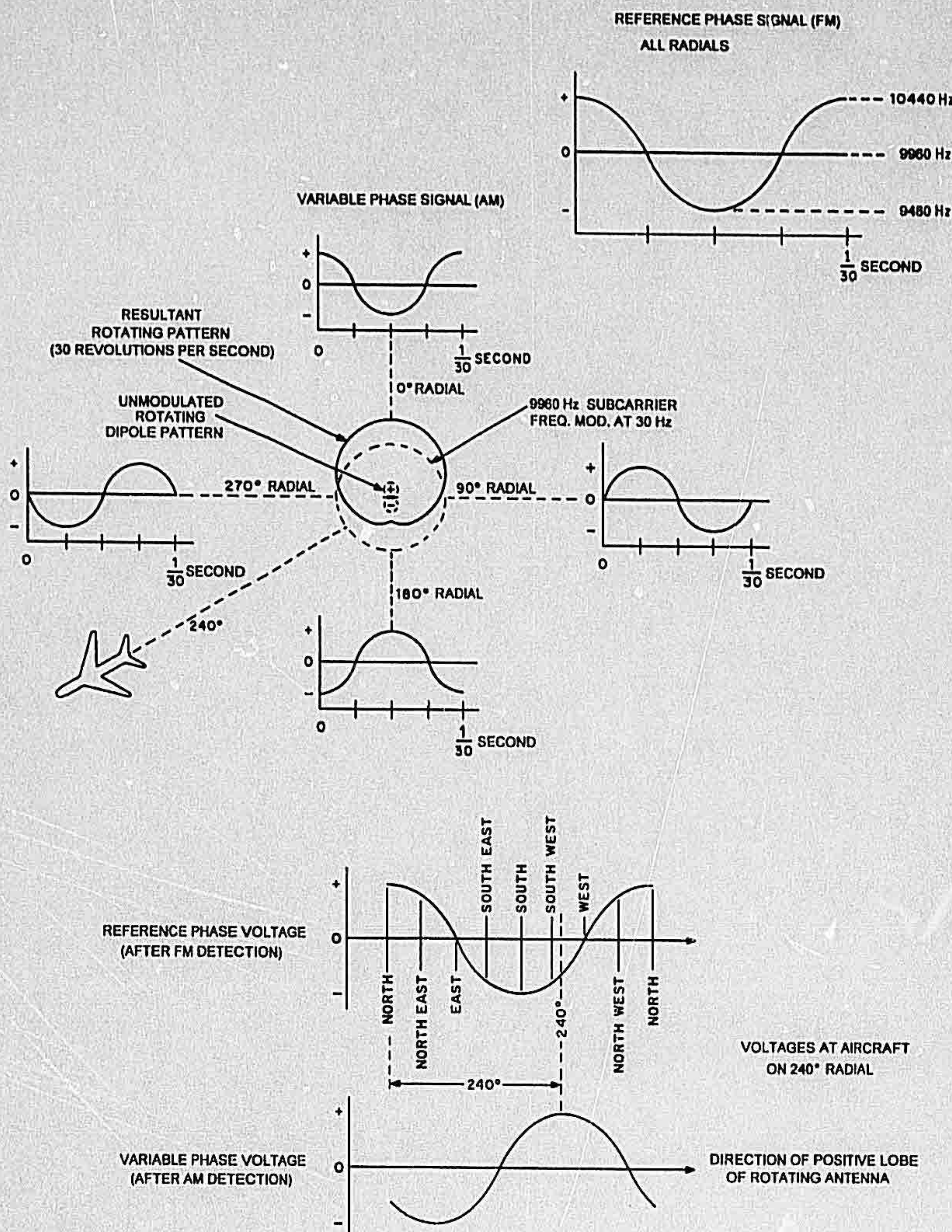


FIGURE 4-1 VOR Signal Generation (Conventional Non-Doppler VOR System)

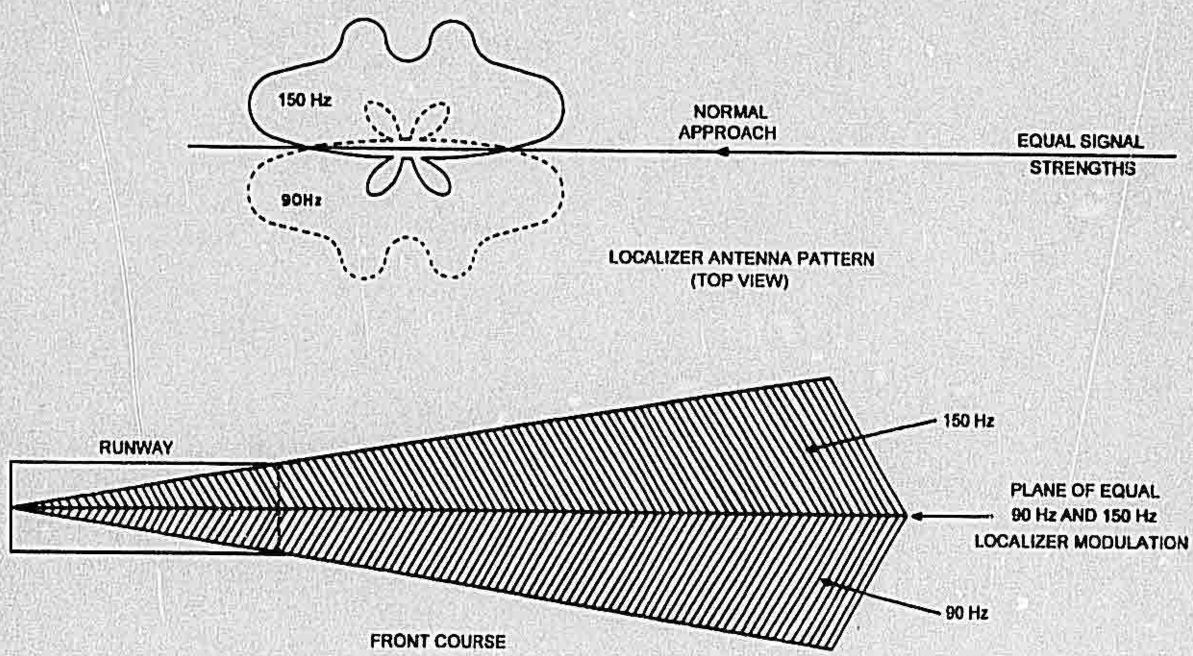


FIGURE 4-2 Localizer Signal Generation

4.1.3 Principles of Glideslope System

The glideslope signal is radiated by a directional antenna array located near the approach end of the runway. The signal consists of two intersecting lobes of RF energy. The upper lobe contains 90 Hz modulation and the lower lobe contains 150 Hz modulation. The equal tone amplitude intersection of these two lobes forms the glide path. A typical glide angle is 2.5 degrees. If the aircraft is on the glide path, equal amplitudes of both tones will be received and the deviation bar will be centered. If the aircraft is above the glide path, 90 Hz modulation predominates and the visual display is displaced downward. If below the glide path, 150 Hz predominates and the display is displaced upward.

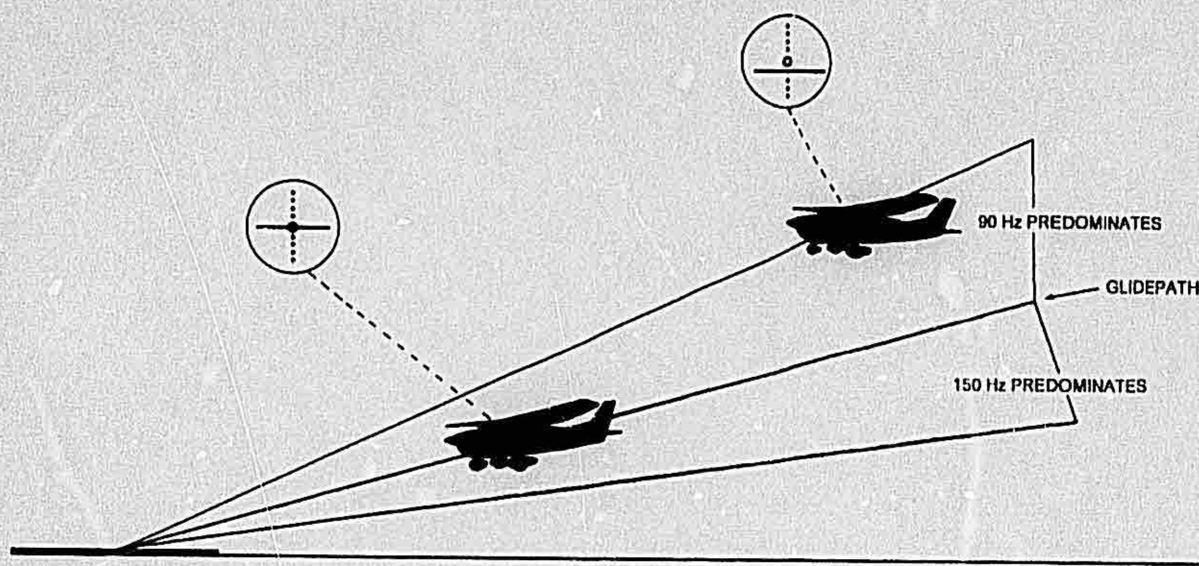


FIGURE 4-3 Glidepath Signal Generation

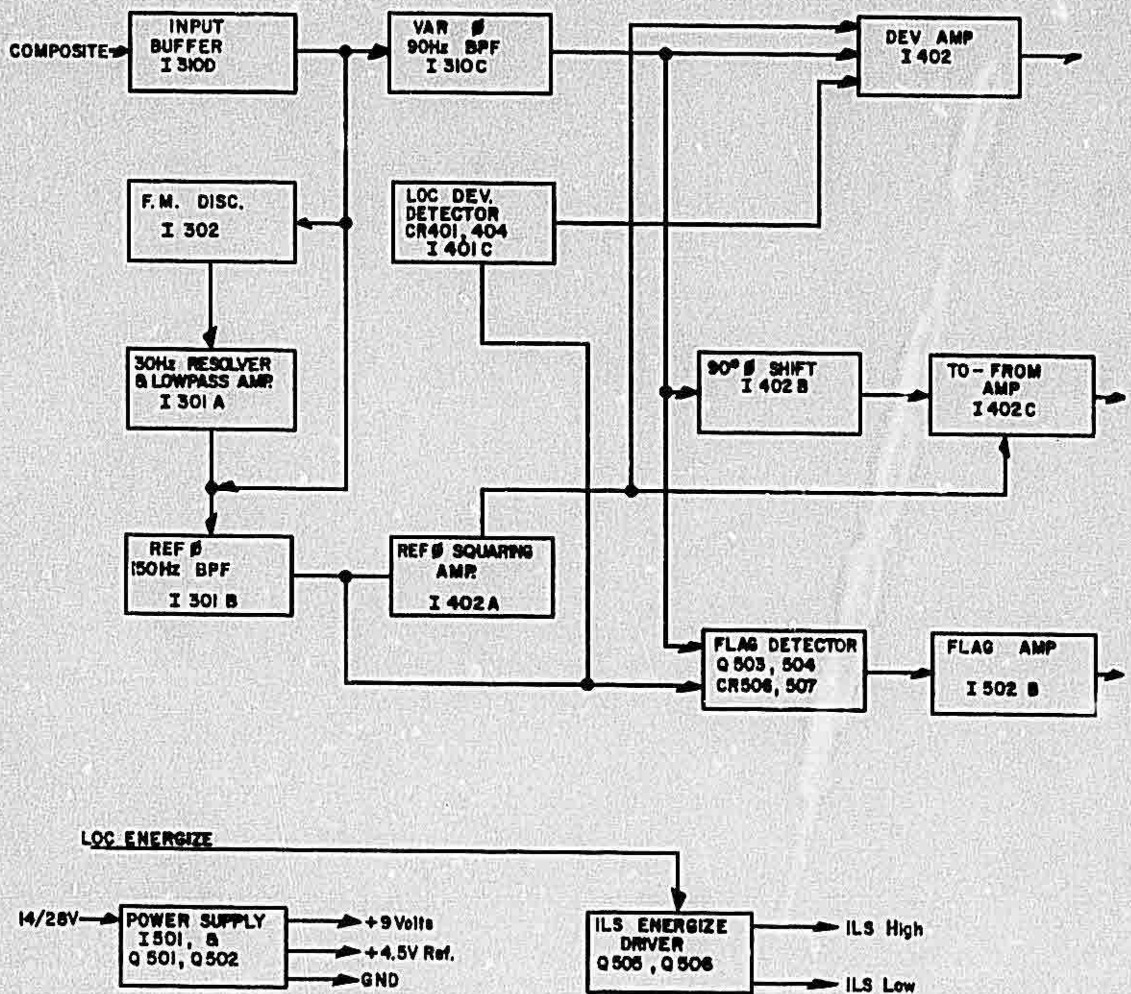


FIGURE 4-4 Block Diagram KI 203, KI 204

4.2 BLOCK DIAGRAM THEORY OF OPERATION

The navigation receiver used in conjunction with the KI 203, KI 204 receives the radio frequency energy transmitted by a VOR or ILS ground station. This radio frequency energy is demodulated and the modulation information is sent to the KI 203, KI 204. The VOR/LOC composite signal from the navigation receiver consists of the 9960 Hz frequency modulated reference phase signal and the 30 Hz variable phase signal if a VOR frequency is selected for the navigation receiver, or 90 Hz and 150 Hz audio if an ILS frequency is selected.

The VOR/LOC composite is buffered by an operational amplifier, I301D, connected as an inverting amplifier. Gain of the input buffer is adjustable to compensate for different levels of VOR/LOC composite input.

4.2.1 VOR Operation

If a VOR frequency is selected by the navigation receiver, the KI 203, KI 204 separates the variable phase 30 Hz signal from the 9960 frequency modulated reference by passing the buffered VOR/LOC composite through a 30 Hz band pass filter, I301C and associated components. This variable phase filter removes all the reference phase modulation from the variable phase signal.

The buffered VOR/LOC composite is also fed to the FM discriminator, I302, which recovers the 30 Hz reference phase signal from the frequency modulated 9960 Hz signal. The 30 Hz reference phase signal output from I302 is fed to the rotor winding of the OBS resolver, B101.

By turning the OBS knob, the pilot also turns the azimuth card and the rotor of the resolver. Output of the stator windings of the resolver is amplitude dependent upon the mechanical position of the resolver rotor. By connecting both stator windings to an R-C network, R319, R320 and C314, an output voltage that is constant amplitude but phase dependent upon the position of the resolver rotor is derived. This constant amplitude variable phase signal is amplified by a low pass amplifier, I301A and then again by a 30 Hz band pass filter, I301B. Output of the reference phase band pass filter is squared by I402A.

Output from the squaring amplifier is phase compared with the output of the variable phase band pass filter. The difference in phase of the two signals is converted to a DC voltage by the deviation amplifier, I402D, which drives the course deviation indicator, M104.

To compare the phase of the two band pass filter outputs, the reference phase band pass filter output is squared and used to drive a field effect transistor switch, I401D, which is connected from the output of the variable band pass filter to an AC (signal) ground. When the output of the squaring amplifier is a large positive voltage, the switch is closed and the variable phase band pass filter output is shorted to the AC ground. As the output voltage of the squaring amplifier approaches zero, the switch opens and the voltage output of the variable band pass filter is integrated by a resistor and capacitor. For zero voltage out of the integrator circuit, the phase difference between the variable phase band pass filter output and the reference phase band pass filter must be ninety degrees. Voltage from the integrator is fed to the deviation amplifier, I402D, which in VOR mode is connected as a voltage follower and drives the course deviation indicator.

In order to provide TO-FROM information to the pilot, the two band pass filter outputs are again phase compared. However, the variable phase band pass filter output is passed through an additional ninety degree phase shift network, so that when minimum voltage is present on the deviation amplifier output, output voltage of the TO-FROM phase comparator will be maximum. Integration of the TO-FROM phase comparator output is accomplished by the TO-FROM amplifier, I402C, which functions as an integrator for 30 Hz signals.

Output voltages from both band pass filters are monitored for usable signal levels by the flag detector circuit. As long as the output voltage of each band pass filter is above the threshold set by the flag detector circuit, the flag amplifier will provide enough voltage to pull the VOR/LOC warning flag from view. When the output of either band pass filter falls below the threshold, the flag amplifier output decreases and the VOR/LOC warning flag appears in the window.

4.2.2 Localizer Operation

When an ILS frequency is selected by the navigation receiver, the ILS energize line from the receiver will be a low impedance to ground. This control line switches the KI 203, KI 204 from the configuration for VOR operation to the configuration required for localizer operation.

Output LOC composite from the input buffer amplifier passes to the variable phase band pass filter as in VOR operation. The center frequency of the filter is now 90 Hz. Changing the center frequency is accomplished by sensing the ILS energize input from the navigation receiver. The FM discriminator, I302, is disabled so there is no output to the resolver rotor.

In localizer configuration, buffered composite is input directly to the reference phase band pass filter. By sensing the ILS energize input, center frequency of the reference phase band pass filter is switched to 150 Hz.

Proper steering information in localizer mode is obtained by comparing the difference in output levels of the two band pass filters. The difference in amplitude of the two filters is detected by the localizer detector circuit CR401, CR404, and I401C. Output from the localizer detector is connected to I401C, a field effect transistor switch that is controlled by the ILS energize input from the navigation receiver. In localizer operation the control input to I401C causes the switch to be closed, which results in the output of the localizer detector being applied to the deviation amplifier. For localizer operation the deviation amplifier integrates the output of the localizer detector. Thus, a DC voltage proportional to the ratio of 90 Hz and 150 Hz in the input LOC composite is formed.

Output of both band pass filters is summed together in localizer operation to provide voltage to pull the VOR/LOC warning flag from view. If the summed voltage from the band pass filters falls below a usable level, output voltage of the flag amplifier will not be great enough to pull the warning flag from view.

The squaring amplifier and the TO-FROM amplifier are both disabled in localizer operation by the ILS energize input.

4.2.3 Power Supply

An integrated circuit voltage regulator I501, in conjunction with external pass transistor Q502, provides a regulated 9.0 Vdc for input voltages ranging from 10 to 35 volts. Current limiting is provided by Q501 and R502. An operational amplifier I502A, connected as a voltage follower, provides a 4.5 volt reference voltage used as an AC (signal) ground within the KI 203, KI 204.

4.3 DETAILED CIRCUIT THEORY

The KI 203, KI 204 utilize mother board type construction with all electronic circuitry being contained on three plug in circuit modules. All components bearing designators from 100 to 199 are located on the front gear plate assembly. Components numbered from 200 to 299 are located on the mother board itself. Components on the converter #1 board are numbered from 300 to 399. Components numbered from 400 to 499 are located on the converter #2 board while components on the power supply and flag board are numbered from 500 to 599.

TABLE 4-1 Subassemblies KI 203, KI 204

SUBASSEMBLY	COMPONENT SERIES
Front Gear Plate Assembly	100-199
Mother Board	200-299
Converter #1 Board	300-399
Converter #2 Board	400-499
Power Supply and Flag Board	500-599

4.3.1 Input Buffer

VOR/LOC composite from the navigation receiver is capacitively coupled through C302 to the input buffer I301D. Resistor R302 in series with variable resistor R303 controls the gain of the amplifier. R301 sets the input impedance. R304 provides bias for the non-inverting input of the amplifier from the 4.5 volt line. R305 minimizes crossover distortion of the amplifier.

4.3.2 Band Pass Filter

The band pass filters utilized in the KI 203, KI 204 are of the multiple feedback type. Figure 4-5 shows a typical multiple feedback band pass filter. In VOR operation Q1 is turned off and looks like a high impedance, which effectively removes R2 from the circuit. Center frequency of the circuit is dependent upon the parallel combination of R1 and R3 along with R4, C1, and C2. Center frequency is set to 30 Hz by varying R3. Gain of the filter is set by the ratio of R4 to R1. In localizer operation Q1 will be saturated and places R2 in parallel with R3 to change the center frequency of the filter.

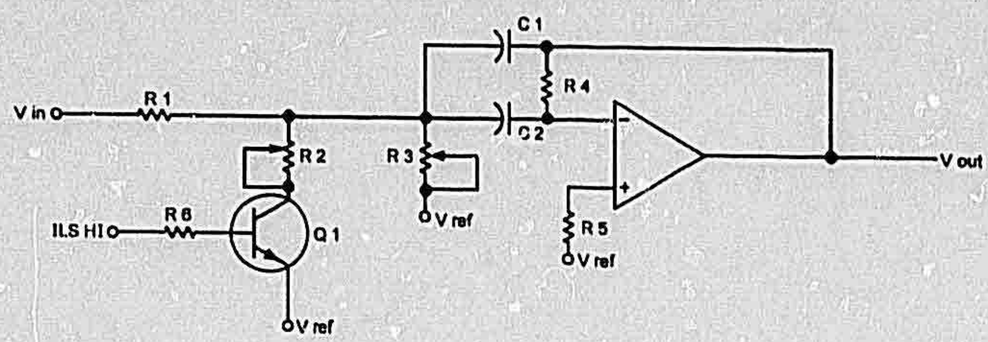


FIGURE 4-5 Band Pass Filter

Both the variable phase/90 Hz and the reference phase/150 Hz filters use the same configuration and method for switching center frequency. In the reference phase/150 Hz filter Q303 and R334 are required to provide equal filter "Qs" in localizer mode. Diode CR302 is reverse biased in VOR mode through the LOC center pot R327, and the ILS ENG HI line which is almost at ground. Input to the filter for VOR is from I301A through R325. In LOC mode CR302 is forward biased by the ILS ENG HI line, which is at approximately 9 volts in LOC mode, R327, and the ILS centering pot. By biasing CR302 in this manner, it acts as a voltage follower. Thus, for LOC mode, output of the input buffer flows through CR302 and the ILS center pot and R326 to the reference/150 Hz filter.

4.3.3 FM Discriminator

The 9960 Hz FM is coupled to I302 through a 30 Hz trap, C305 and L301. I302 operates with an internal limiter amplifier and detector multiplier connected to an external phase shifter network. Figure 4-6 shows a block diagram of the FM discriminator.

R314 is a bias resistor for the limiter amp and C309, R315, and L302 provide the external phase shift network. C307 prevents 30 Hz variation of the detector multiplier input reference. R316 and C312 provide decoupling from the 9 volt line. R317 increases the maximum AC load current into C313, R318 and the resolver rotor. CR301 disables the output in localizer mode by pulling pin 14 down.

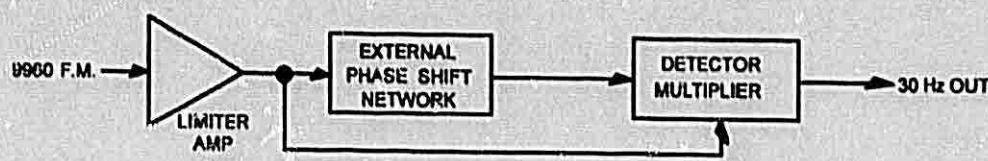


FIGURE 4-6 FM Discriminator

4.3.4 30 Hz Resolver and Low Pass Amp (I301A)

The 30 Hz resolver couples a signal from rotor to stators by transformer action. The stators by physical placement will have signals phase shifted by 90 degrees from each other, the amplitudes of which are dependent on the mechanical position of the resolver rotor. By varying the resolver rotor position, the amount of coupling between the rotor winding and both stator windings is varied. When one stator winding is at maximum coupling, the other stator will be at minimum coupling. These signals from the two stator windings are applied to the constant amplitude phase shifter network R319, R320, and C314. In this network one signal is shifted 45° leading while the other is shifted 45° lagging. The vector addition of these signals results in a constant amplitude signal with a phase dependent on the rotor position. Adjustments of R320 will balance the phase shift of the two signals. The output of this network will ideally be shifted 45° from the input. However, driving into other than an infinite impedance may affect this phase shift.

The low pass amp receives the signal from the phase shift network and amplifies it to a usable signal level while removing much of the noise picked up at the resolver. The amp, I301A also corrects for some of the phase shift from the resolver and phase network. R322 and C315 determine the cut off frequency and phase shift at 30 Hz. The ratio of the impedance of C315 in parallel with R322 to R321 sets the gain for 30 Hz signals. R323 provides DC bias for the amplifier from the 4.5 volt line. R324 and C315 are decoupling for the 9 volt line. R339 reduces crossover distortion of the low pass amplifier.

4.3.5 Reference Phase Squaring Amp (I402A)

The reference signal from I301B is capacitively coupled through C411 to I402A. Since the amp is operated essentially open loop (with no feedback), the output will switch from +9 volts to ground as the input crosses the reference voltage level. The resistive voltage divider comprised of R428 and R429 sets the minimum output level of the reference band pass filter required to cause the squaring amplifier to switch. This helps prevent an active D-bar while the warning flag is in view. This square wave drives the field effect transistor switches used in the deviation and TO-FROM phase detectors. R430 and C412 decouple I402 from the 9 volt line. CR412 is turned on in LOC mode to disable I402A and drive its output high.

In LOC mode the ILS ENG (Low) line is pulled nearly to ground when Q506 saturates. This causes the cathode of CR412 to be pulled nearly to ground also. Since the cathode of CR412 is grounded, pin 2 of I402A is pulled within 0.6 volts of ground. By pulling the non-inverting input toward ground, the output of the amplifier increases toward the positive supply until the amplifier output stage saturates. In VOR mode CR412 is reverse biased and normal DC bias for the amplifier is provided by R428 and R429.

4.3.6 Localizer Deviation Detector (CR401, CR404, I401C)

In LOC mode the difference in signal levels between the 90 and 150 Hz filters is detected by the currents through CR401, R407, R408, and CR404. The center of this network is connected to the deviation amplifier by I401C. CR401 and CR404 are both reverse biased in VOR mode by CR402, R406, R409 and CR403, the ILS ENG (low) line which is approximately +8.7 volts in VOR mode and the ILS ENG (Hi) line which is approximately 0.6 volts in VOR mode.

4.3.7 90° Phase Shift Network (I402B)

The variable phase signal from I301C is capacitively coupled by C407 to the low pass amplifier consisting of R421, R422, C408, and I402B. The phase shift of the filter for 30 Hz signals and cut off frequency is controlled by R422 and C408. Phase shift at 30 Hz is approximately 87 degrees. Gain of the amplifier is controlled by the ratio of the impedance of C408 in parallel with R422 to R421.

4.3.8 TO-FROM Amp (I402C)

The signal from I402B is coupled through C409 and R423 to I401A. I401A is driven by the square wave from I402A to chop the signal input to I402C. Since this signal is phase shifted 87° from the deviation signal, the TO-FROM signal is maximum with a centered course deviation indicator.

The chopped waveform at the junction of R423 and R424 is integrated by the circuit consisting of I402C, C410, R425, R427, and R424. The ratio of R425 to R424 sets the DC gain of the integrator. Since R427 is inside the feedback loop, it does not affect circuit performance except to provide short circuit protection for the amplifier and current limit for the TO-FROM meter. Diodes CR410 and CR411 provide overvoltage protection for the TO-FROM meter. R426 provides DC bias for the amplifier from the +4.5 volt line.

4.3.9 Deviation Amplifier

4.3.9.1 VOR Operation

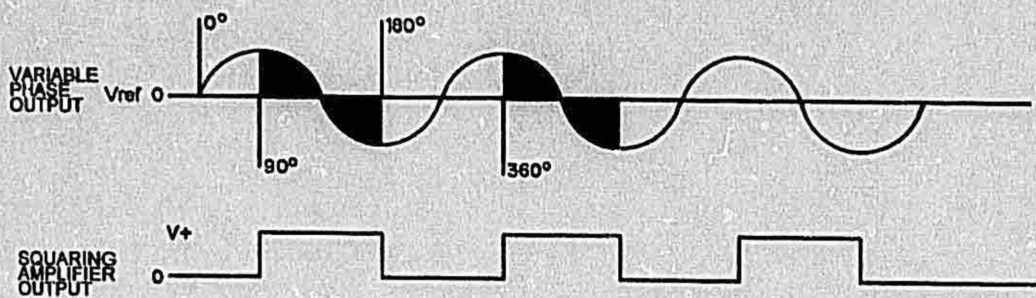
Output from the variable phase band pass filter is capacitively coupled by C401 to the phase detector consisting of R401, R402, C402, C403, and I401D. The output of the variable phase filter is chopped by I401D, a field effect transistor switch that shorts the junction of R401 and R402 to the +4.5 volt line when the squaring amplifier output is positive. R401 limits the current through the switch. The combination of R402 and C402 is used to integrate the chopped waveform. R403 and C403 further integrate the chopped waveform. This two section low pass filter provides superior rejection to high frequency VOR scalloping signals than a single section filter. This filter also sets the response time of the VOR deviation indicator.

When the variable phase band pass filter output and squaring amplifier output are exactly ninety degrees out of phase, the average voltage of the chopped wave form at the input of the two section filter will be zero. If the phase shift between the variable phase filter and the squaring amplifier is not ninety degrees, the average voltage of the chopped waveform will not be zero. The average voltage of the chopped waveform is directly related to the phase difference between the variable phase filter output and the squaring amplifier output. Figure 4-7 illustrates operation of the phase detector.

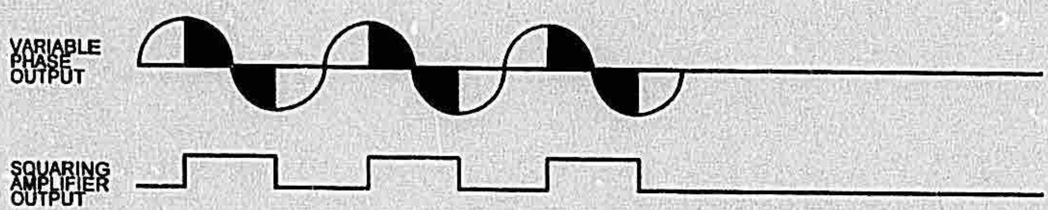
Output from the chopper is referenced to the +4.5 volt line when the switch is closed. If the average voltage of the chopped waveform is zero, the output of the integrating low pass filter at the junction of R403 and C403 will be 4.5 volts. If the average of the chopped waveform is not zero, the output of the low pass filter will be 4.5 volts plus or minus the average voltage of the chopped waveform.

Amplifier I402D is connected as a voltage follower in VOR mode. I401C is open circuit so components R410 and C404 do not affect circuit performance. R404 makes the amplifier a voltage follower. R405 provides current limit protection for the external meter while CR407 and CR408 provide overvoltage protection. Diodes CR405 and CR406 temperature compensate the deviation time constant switch circuit.

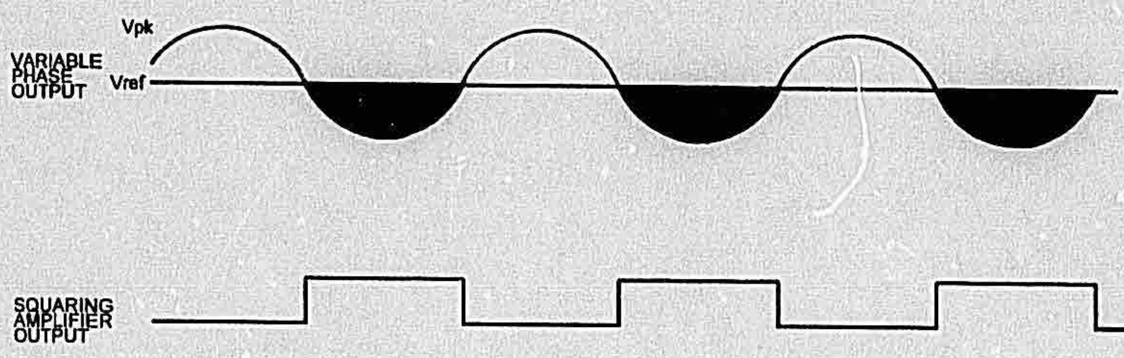
Purpose of the deviation time constant switch is to allow the pilot to more rapidly center the course deviation indicator by turning the OBS knob. The output voltage of the deviation amplifier is sensed by transistors Q401 and Q402. If the deviation output voltage exceeds the voltage established on the emitter of Q401 (by the resistive divider comprised of R414 and R415), the transistor starts to conduct. If the deviation output voltage is large enough to saturate Q401, Q403 is also saturated. This causes I401B to effectively short circuit R403. With R403 shorted out, the time constant of the deviation filter is greatly reduced. Capacitor C405 discharges through R419 to keep the filter time constant shortened after the deviation amplifier output is reduced below the threshold of Q401. Q402 is turned on for negative output of the deviation amplifier. Threshold voltage for Q402 is established by R416 and R417. When the output voltage of the deviation amplifier decreases below the reference voltage established on the base of Q402, the transistor begins to conduct and will eventually turn on Q402. Resistors R412 and R413 protect Q401 and Q402.



REFERENCE AND VARIABLE SEPARATED 90°AVERAGE = 0, D-BAR OUTPUT = 0



REFERENCE AND VARIABLE SEPARATED 60° D-BAR OUTPUT = 5 DOTS DEFLECTION



REFERENCE AND VARIABLE SEPARATED 180°AVERAGE VOLTAGE = -0.318 Vpk, D-BAR OUTPUT = MAXIMUM

FIGURE 4-7 VOR Phase Comparator Output

4.3.9.2 Localizer Operation

In localizer mode, I401D is turned on continuously by the squaring amplifier. This effectively shorts one end of R402 to the 4.5 volt line. DC bias from the 4.5 volt line through R402 and R403 is provided to I402D. I401B is switched off through CR409 and the ILS ENG (LOW) line to minimize the offset voltage of the amplifier.

Field effect transistor switch I401C is turned on in localizer mode. Outputs of the two band pass filters are halfwave rectified by CR401 and CR404. The connections of CR401, CR402, R407, and R408 are arranged so that the output of the 90 Hz filter is subtracted from the output of the 150 Hz filter. This AC voltage difference is integrated by I402D along with R410, R404, and C404. Gain of the amplifier is set by R410 while the combination of R404 and C404 set the response time of the VOR/LOC course deviation indicator in the localizer mode.

4.3.10 Flag Detector

4.3.10.1 VOR Operation

In VOR mode the outputs of both band pass filters are DC coupled to R515 and R516. Diode CR508 along with C507 detects the negative peak voltage of the variable phase band pass filter output. As long as the negative peak voltage at the base of the Q503 is less than the reference voltage produced on the emitters of Q503 and Q504, Q503 will not conduct. If the negative peak voltage on the base of Q504 is enough to keep it turned off also, current flows through R519 into the inverting input of I502B. This causes the output voltage of I502B to go negative which puts a voltage across the warning flag and keeps it concealed. Resistors R517 and R518 will turn on Q503 and Q504 if there is no signal output from the band pass filters. This causes Q503 and Q504 to saturate and reverse bias CR510. Output voltage of I502B now becomes the same as the voltage on the positive input and no voltage is present across the warning flag, so it is revealed in the window. C509 and R522 set the response time of the flag amplifier while R523 provides DC bias. CR513 and CR512 along with R524 provide protection for the flag meter.

4.3.10.2 Localizer Operation

In localizer mode the output of the band pass filters is connected through CR504 and CR505 to CR506 and CR507. Resistors R511 and R512 bias CR504 and CR505 as voltage followers in localizer mode. These diodes temperature compensate the rectifier diodes CR506 and CR507. The output from the rectifier diodes is current summed by R513 and R514. Amplifier I502B integrates the half wave rectified signals from CR506 and CR507. If the signals are large enough, the output of the flag amplifier will be negative enough to conceal the warning flag. CR504 and CR505 provide temperature compensation for CR506 and CR507 and allow the localizer flag circuit to be disabled in VOR mode.

4.3.11 ILS Energize Driver

When an ILS station is selected by the navigation receiver, the cathode of CR514 is grounded. This causes Q505 to saturate which in turn causes Q506 to saturate. Voltage of the ILS ENG (hi) line is within one transistor's Vce sat of the +9 volt line while the ILS ENG LOW line is within one transistor's Vce sat of ground. R527 is a pull down resistor for Q505 and keeps Q506 turned off in VOR mode. R525 and R528 limit base current into Q505 and Q506. R526 keeps Q505 turned off in VOR mode. R529 is a pull up resistor for Q506.

4.3.12 Power Supply

Input voltage from the aircraft is current limited by R501, filtered by C501 and over-voltage protected by CR501. If the input voltage exceeds 39 volts CR501 acts as a zener diode to clamp the voltage at 39 volts.

Generation of the regulated 9.0 volt line is accomplished by I501 and associated components. The output of Q502, the series pass element, is compared with a 1.4 volt internal reference of the integrated circuit. The voltage divider of R503, R504, and R505 sets the output voltage. The integrated circuit output at pin 2 tries to keep the voltage between pin 5 (the 1.4 volt reference) and pin 6 (a sample of the output voltage) equal. If the output voltage at the collector of Q502 increases, the voltage at pin 6 of I501 increases above the reference voltage on pin 5. The output voltage on pin 2 of I501 also increases, which reduces the collector current through Q502 and lowers the output voltage. If the output voltage at the collector of Q502 decreases, the voltage at pin 6 of I501 will be lower than the internal reference, which causes pin 2 to decrease, which turns on Q502 harder and causes more collector current to flow, which raises the output voltage through the load. By adjusting the voltage divider ratio with R505, the output voltage can be set to 9.0 volts.

C502 filters the reference voltage while C503 provides frequency compensation to prevent high frequency oscillation. Current limit for I501 is provided by R506. If the current through R506 becomes large enough, enough voltage will be produced to turn off output drive to the series pass element. R507, along with CR502 and CR503 enable the integrated circuit to stay in regulation for low input voltage levels.

Current limit protection for the series pass element is provided by Q501 and R502. When the load current through R502 becomes large enough, the voltage across R502 causes Q501 to conduct, which removes base drive to Q502, and hence reduces the load current.

The +4.5 volt line is provided by the voltage divider comprised of R508 and R509 along with voltage follower I502A. R510 provides short circuit protection for the amplifier output while C506 and C505 provide filtering. R530 provides short circuit protection for the input of I502A.

4.3.13 Course Datum Synchro

Heading information is fed from a synchro transmitter located within the slaved directional gyro system to the course datum synchro B102 as shown in Figure 4-8. A synchro control transformer (often referred to as a C.T.) does not have AC power supplied to its rotor, but the rotor is designed to supply control voltages which reach a null (zero volts) when the control transformer rotor is in effective (actually 90 degrees displaced) alignment with the transmitter rotor. Upon moving the transmitter rotor so as to disturb this alignment, the voltage appearing across the rotor of the control transformer varies as the sine of the angle of displacement. The control voltage shown in Figure 4-8 represents the amplitude envelope of the 400 Hz input. The +θ indicates the voltage of the rotor is in phase with the X, Y, Z input, while -θ indicates the rotor voltage is out of phase with the X, Y, Z input. Scale factor of the course datum output is 393 mV/degree course error with 11.8 Vrms input.

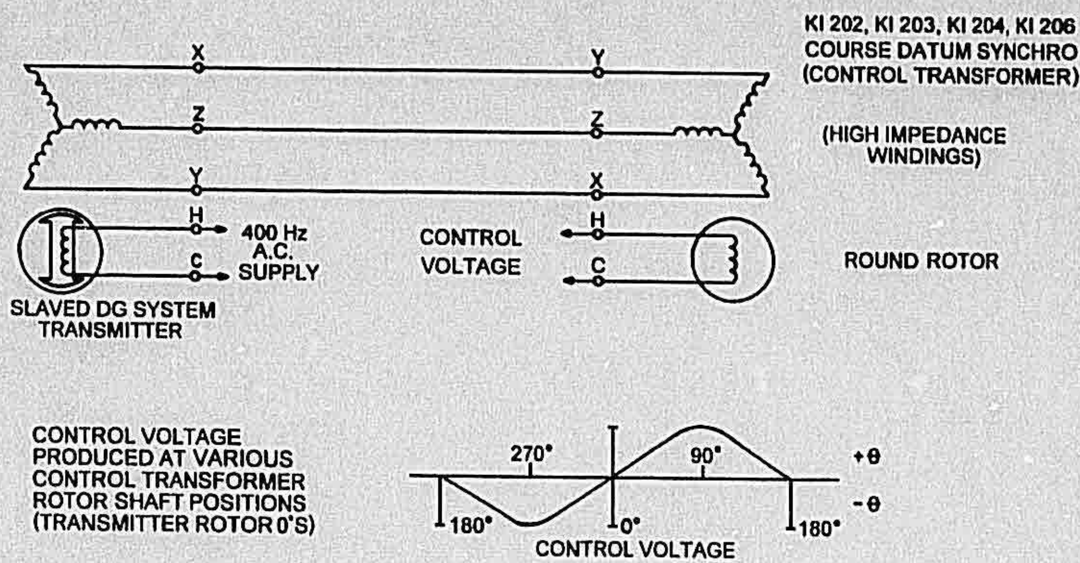


FIGURE 4-8 Course Datum Synchro Operation

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05

SECTION V
MAINTENANCE

5.1 GENERAL

This section contains maintenance information relating to the KI 203, KI 204 Navigation Indicators. A troubleshooting flow chart, alignment procedures, performance specifications and disassembly/reassembly instructions are included.

5.2 TEST EQUIPMENT REQUIRED

The following test equipment is required to test and align the KI 203, KI 204.

TABLE 5-1 Required Test Equipment

TYPE	CHARACTERISTICS	REPRESENTATIVE MODELS
Regulated DC Supply	13-18 volts at 500 mA.	
VOR/ILS Signal Generator		Collins 479S-3 or equivalent accuracy equipment.
AC Voltmeter		Ballantine 310 or equivalent.
Digital Voltmeter		Fluke 8000 or equivalent.
Oscilloscope		
AC Signal Generator	400 Hz at 11.8 Vrms.	
DC Voltage Supply	0-600 mV	
Bench Test Set		P/N 050-01551-0000 Includes:
	Contact, Female Solder	(30) P/N 030-01077-0000
	Hood, Connector 24P	(1) P/N 030-02154-0000
	Shell, Connector 41P	(1) P/N 030-02272-0000
	Board Extractor Tool	(1) P/N 047-01277-0000
	Extender Board	(1) P/N 200-05872-0000

Connect test equipment according to Figure 5-1.

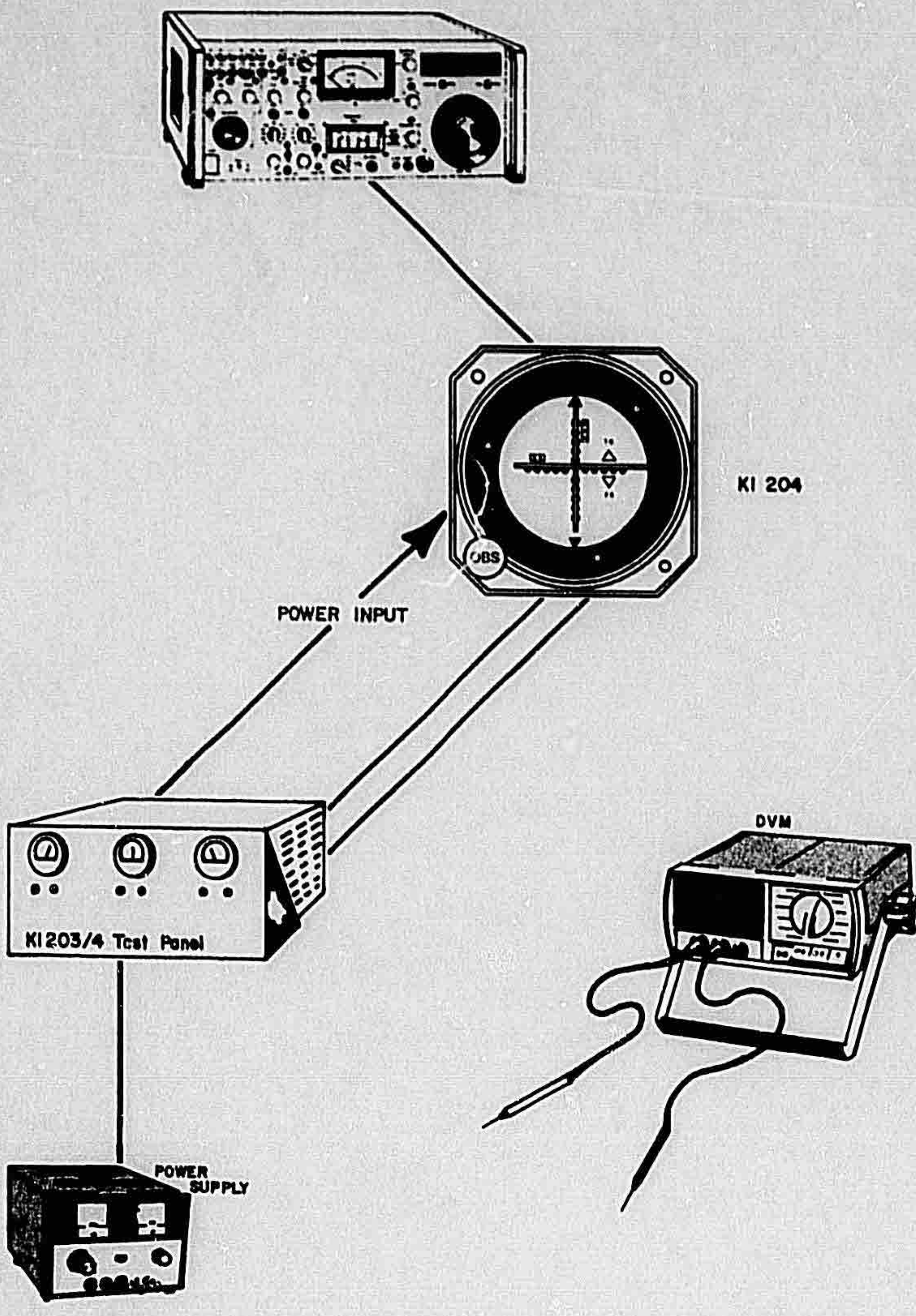


FIGURE 5-1 Test Setup

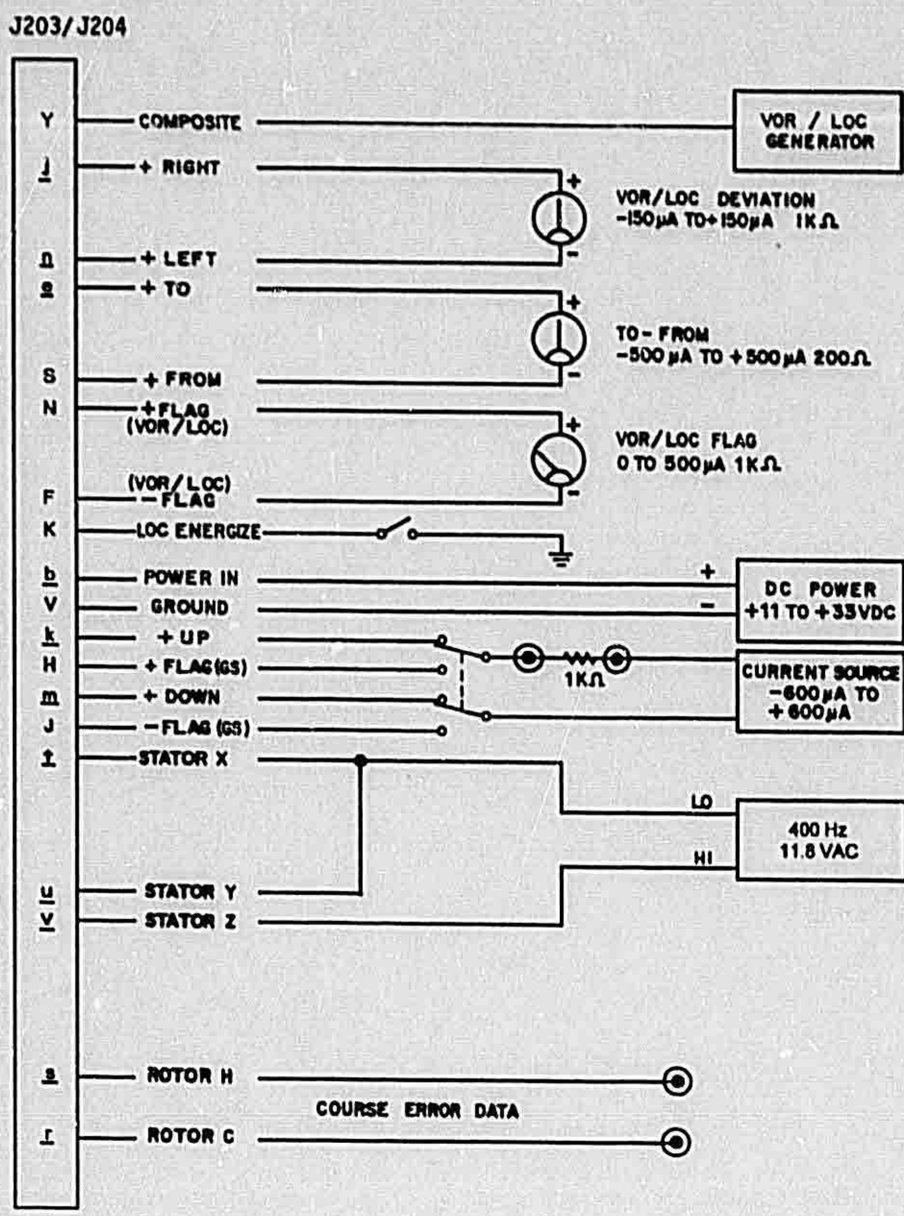


FIGURE 5-2 Test Panel Schematic

5.3 TEST PROCEDURE

This section is a cover on minimum performance test. Set up test equipment according to section 5.2.

NOTE

Standard Viewing Angle is used for all meter adjustments. This is an angle 15° above the horizontal centerline of the indicator.

5.3.1 MECHANICAL

5.3.1.1 OBS Knob Rotation

The OBS knob shall rotate smoothly in both directions. The azimuth card shall follow smoothly with no jerky or erratic movements.

5.3.1.2 Meter Centering

With no power applied and the unit resting horizontally with the OBS knob in the lower left hand corner, the VOR/LOC course deviation pointer and glideslope deviation pointers (if provided) shall be centered over the vertical and horizontal course deviation reference marks within half the width of the pointers when viewed from the standard viewing angle. The TO-FROM indicator shall be centered behind its shield and the VOR/LOC and glideslope (if provided) warning flag shall be fully revealed.

5.3.1.3 Meter Interference

All flags, pointers and indicators shall not contact any other flags, meters, indicators, the warning flag housing, or the azimuth card when moved throughout their range of movement.

5.3.1.4 Meter Deflection Range

When viewed from a standard viewing angle, minimum deflection range for the VOR/LOC pointer and glideslope (if provided) pointers shall be 0.630 inches either side of the centered meter position (each reference mark on the warning flag housing corresponds to 0.125 inch of deflection).

5.3.2 CURRENT DRAIN

Current drain shall be less than 50 mA for input voltages from 10 to 33 Vdc.

5.3.3 PANEL LIGHTING

When 28 ±10% Vdc is applied between pins B and E of J203, J204 both panel lamps shall light and current drain shall be 100 ±25 mA.

When 14 ±10% Vdc is applied between pins D and E and pin B is jumpered to pin E of J203, J204 both panel lamps shall light and current drain shall be 200 ±60 mA.

When 5 ±10% Vdc is applied between pins D and E and pin B is jumpered to pin E of J203, J204 both panel lamps shall light and current drain shall be 400 ±120 mA.

5.3.4 VOR CONVERTER AND INDICATOR REQUIREMENTS

5.3.4.1 VOR Bearing Accuracy

Maximum VOR centering error shall be 1.3° for any radial in both TO and FROM conditions.

5.3.4.2 VOR Course Deviation Indication

5.3.4.2.1 Sensitivity

With a +10° difference in the selected course and radial output from the VOR generator, the VOR/LOC course deviation indicator shall deflect 5 reference marks ±1/2 mark.

5.3.4.2.2 Deflection Linearity and Polarity

For the following course errors in Table 5-2, VOR/LOC deflection and electrical deviation output shall be as noted. Measurements are made on FROM radials. Electrical deviation output is measured as a voltage across a 1,000 ohm load connected between pins j and n of J203, J204 with a positive voltage meaning the DC voltage at pin j is greater than the DC voltage on pin n.

TABLE 5-2 VOR Course Deviation

Course Error	Pointer Deflection	Direction	Electrical Deviation
+10°	5 ±0.5 Ref Marks	Right	+121 to +181 mV
+5°	2.5 ±0.5 Ref Marks	Right	+60 to +90 mV
+2°	1 ±0.5 Ref Mark	Right	+24 to +36 mV
-2°	1 ±0.5 Ref Mark	Left	-24 to -35 mV
-5°	2.5 ±0.5 Ref Marks	Left	-60 to -90 mV
-10°	5 ±0.5 Ref Marks	Left	-121 to -181 mV

5.3.4.2.3 VOR Deviation Time Constant

For a step change in VOR course error of 10°, time for the VOR/LOC course deviation indicator to reach 70% of its final deflection shall not exceed 3 seconds.

For a step change in VOR course error of 20°, time for the VOR/LOC course deviation indicator to reach 70% of its final deflection shall not exceed two seconds.

5.3.4.3 VOR Alarm Signal

With a standard VOR test signal applied and the level varied from 0.35 to 0.50 Vrms, the VOR/LOC warning flag shall remain at least half concealed. Flag voltage output shall not be less than 150 mV. With an input level of 0.5 Vrms or greater, the flag shall be fully concealed and flag voltage into a design value load shall be 250 to 425 mV. Flag voltage is measured from pin N (+) to F (-) of J203, J204.

The VOR/LOC warning flag shall be fully revealed and flag voltage shall be less than 125 mV with the following VOR/LOC composite inputs:

Only 9960 Hz FM signal present on composite input.

Only 30 Hz AM signal present on composite input.

5.3.4.4 TO-FROM Indicator

5.3.4.4.1 Polarity and Level

With the selected course and VOR generator radial the same and the TO-FROM switch in the TO position, the TO-FROM indicator shall be visible in the TO (upward) position. The TO-FROM output on pin e of J203, J204 will be +320 ±60 mV with respect to pin s of J203, J204. When the FROM radial is selected from the VOR generator, the TO-FROM indicator shall be visible in the FROM (downward) position and the voltage on pin e of J203, J204 will be -320 ±60 mV with respect to pin s of J203, J204.

5.3.4.4.2 TO-FROM Generator Change Over

The TO-FROM indicator shall remain fully visible until a VOR course error greater than 75° is generated by rotating the azimuth card. For VOR course errors from 75° to 105°, the TO-FROM indicator may be less than fully revealed in either TO or FROM position. As the VOR course error exceeds 105°, the TO-FROM indicator shall be fully visible in the opposite position.

5.3.5 LOCALIZER CONVERTER AND INDICATOR PERFORMANCE

5.3.5.1 Localizer Centering

When a standard localizer test signal having equal amplitude components of 90 Hz and 150 Hz modulation (0.00 db tone ratio) is applied to the composite input and the ILS energize line (pin K of J203, J204) is grounded, the VOR/LOC course deviation indicator shall be centered within 1/2 pointer's width. The electrical deviation output voltage between pins j and n shall be less than 3 mV.

5.3.5.2 Localizer Deflection Linearity, Polarity and Balance

When a standard localizer test signal having the tone ratios as Table 5-3 is applied at the composite input, the VOR/LOC deflection and electrical deviation output shall be as noted. Polarity of the electrical deviation output as positive means the voltage on pin j is greater than the voltage on pin n of J203, J204.

TABLE 5-3 Localizer Deflection

Predominate Tone	Tone (db)	Ratio (ddm)	Pointer Deflection	Direction	Electrical Deviation
150 Hz	4	0.091	3 ±0.5 Marks	Left	-72 to -108 mV
150 Hz	2	0.046	1.5 ±0.5 Marks	Left	-36 to -54 mV
	0				-3 to +3 mV
90 Hz	2	0.046	1.5 ±0.5 Marks	Right	+36 to +54 mV
90 Hz	4	0.091	3 ±0.5 Marks	Right	+72 to +108 mV

5.3.5.3 Localizer Deviation Time Constant

For a step change in the localizer composite tone ratio from 0.00 ddm (0 db) to any value less than 0.155 ddm (5db) the time required for the course deviation indicator to reach 67% of its final value shall not exceed 2 seconds and pointer overshoot shall not exceed 5%. The electrical deviation output shall reach 67% of its final value within 0.6 seconds and the overshoot shall not exceed 2% for the same step change in tone ratio.

5.3.5.4 Localizer Warning Flag

With a standard localizer test signal with a 0 ddm tone ratio applied, and the level varied from 0.263 to 0.333 Vrms, the VOR/LOC warning flag shall be at least half revealed and the flag voltage shall be at least 150 mV. Flag voltage is measured from pin N (+) to F (-) of J203, J204. With a composite input level of 0.333 to 0.415 Vrms, the VOR/LOC warning flag shall be fully concealed and the flag voltage shall be between 250 and 425 mV.

The VOR/LOC warning flag shall begin to be revealed and the flag voltage shall be less than 175 mV with the following composite inputs:

Only 90 Hz modulation at a level less than or equal to 0.256 Vrms.

Only 150 Hz modulation at a level less than or equal to 0.256 Vrms.

5.3.6 GLIDESLOPE INDICATOR REQUIREMENTS (APPLICABLE TO KI 204 ONLY)

Standard Viewing Angle is used for all glideslope measurements.

5.3.6.1 Glideslope Centering Voltage

Voltage required to center the glideslope deviation indicator shall be 0 ±3 mV.

5.3.6.2 Glideslope Deviation

When a voltage of 75 ±1 mV is applied from pin k (+) to pin m (-) of J204, the glideslope deviation indicator shall deflect up (2 1/2 ±1/2 reference marks). When the polarity of voltage is reversed, the glideslope deviation indicator shall deflect down 2 1/2 ±1/2 marks.

When a voltage of 150 ±1.5 mV is applied from pin k (+) to pin m (-) of J204, the glideslope deviation indicator shall deflect up (5 ±1/2 reference marks). When the polarity of voltage is reversed, the glideslope deviation indicator shall deflect down 5 ±1/2 marks.

TABLE 5-4 Glideslope Deflection

VOLTAGE (Pin k)	DEFLECTION	DIRECTION
+75 ±1 mV	2.5 ±0.5 Reference Marks	Up
-75 ±1 mV	2.5 ±0.5 Reference Marks	Down
+150 ±1.5 mV	5 ±0.5 Reference Marks	Up
-150 ±1.5 mV	5 ±0.5 Reference Marks	Down

5.3.6.3 Glideslope Alarm Signal

With a DC voltage greater than 260 mV applied from pin H (+) to J (-) of J204, the glideslope flag shall be fully concealed.

With a DC voltage less than 125 mV applied from pin H (+) to J (-) of J204, the glideslope flag shall be fully revealed.

5.3.7 COURSE DATUM SYNCHRO PERFORMANCE

5.3.7.1 Course Datum Null Voltage

With an 11.8 ±1% Vrms, 400 ±2% Hz signal applied from pin v (high) to pin u (low) and pins u and t of J203, J204 are shorted, the voltage from pin s (high) to pin r (low) shall be 0.030 Vrms maximum with a selected heading of 0 degrees.

5.3.7.2 Course Datum Polarity

With the same input voltage as step 1 above, output voltage from pin s (high) to pin r (low) shall be 3.93 ±5% Vrms and shall be in phase with the input voltage with a selected heading of 10 degrees.

With a selected heading of 350 degrees, the output voltage shall be 3.93 ±5% Vrms and out of phase with the input.

5.3.8 TEST DATA KI 203, KI 204

I. MECHANICAL REQUIREMENTS

A. OBS knob rotation ________________

B. Meter Center
VOR/LOC DBAR_______ VOR/LOC FLAG________________
TO/FROM__________ G/S BAR__________ G/S FLAG__________

C. Meter Interference_______________
D. Meter Deflection Range____________

II. CURRENT DRAIN__________mA (less than 50 mA)

III. PANEL LIGHTING
14 volt operation________ 28 volt operation________

IV. VOR SECTION

A. VOR Bearing Accuracy 1.3° error maximum

RADIAL	Bearing Error		RADIAL	Bearing Error	
0°	To_____	From_____	180°	To_____	From_____
30°	To_____	From_____	210°	To_____	From_____
60°	To_____	From_____	240°	To_____	From_____
90°	To_____	From_____	270°	To_____	From_____
120°	To_____	From_____	300°	To_____	From_____
150°	To_____	From_____	330°	To_____	From_____

B. VOR Deflection Sensitivity____________OK

C. VOR Deflection Linearity and Polarity

Course Error	Pointer Deflection and Polarity	Electrical Deviation
+10°	______________OK	__________mV
+5°	______________OK	__________mV
+2°	______________OK	__________mV
-2°	______________OK	__________mV
-5°	______________OK	__________mV
-10°	______________OK	__________mV

D. VOR Deflection Time Constant
10° Error________sec (less than 3) 20° Error________sec (less than 2

E. VOR Alarm Signal
Flag Voltage with 0.500 Vrms composite____________
Proper Operation_____________

F. TO-FROM Indicator
TO Voltage________mV FROM Voltage________mV

V. LOCALIZER SECTION

A. Localizer Centering_________pointer OK. Centering Voltage_________OK

B. Localizer Deflection Linearity, Polarity, and Balance

Tone Ratio	Pointer Deflection Polarity	Electrical Deviation
150Hz 4db 0.091ddm	________________OK	___________mV
150Hz 2db 0.046ddm	________________OK	___________mV
0	________________OK	___________mV
90Hz 2db 0.046ddm	________________OK	___________mV
90Hz 4db 0.091ddm	________________OK	___________mV

C. Localizer Time Constant____________sec (less than 0.6 seconds)

D. Localizer Alarm Signal Flag Voltage with 0.333 Vrms centering signal______mV
Proper Operation____________

VI. GLIDESLOPE SECTION

A. Glideslope Centering__________OK
B. Half Deflection_______________OK
C. Full Deflection_______________OK
D. Glideslope Alarm Signal Proper Operation_____________OK

VII. COURSE DATUM SYNCHRO SECTION

A. Null Voltage_________Vrms (less than 0.030)
B. Course Datum Polarity________________OK

5.4 ALIGNMENT PROCEDURES

5.4.1 STATIC METER ALIGNMENT

5.4.1.1 Treat the plastic lighting wedge with an anti-static compound.

5.4.1.2 Reinstall the static treated light wedge and bezel assembly.

5.4.1.3 Place the unit in a horizontal position with the OBS knob in the lower left hand corner.

5.4.1.4 Loosen the socket head capscrews that hold the VOR/LOC deviation meter to the rear gear plate.

5.4.1.5 Move the meter assembly until the needle is centered and perpendicular to the base of the indicator. Tighten the mounting screws.

5.4.1.6 Loosen the socket head capscrews that hold the glideslope deviation meter to the rear plate.

5.4.1.7 Move the meter assembly until the needle is positioned 0.033 inches above the center line of the VOR/LOC reference marks. Tighten the mounting screws.

5.4.1.8 Rotate the indicator into a vertical plane, with the bezel facing up.

5.4.1.9 If either deviation needle deflects, adjust the counterweight until no needle deflection is noticed as the indicator is rotated from a horizontal to a vertical plane.

5.4.1.10 Place the indicator in a horizontal plane with the OBS knob in the lower left hand corner.

5.4.1.11 Rotate the unit so that the OBS knob is in the upper left hand corner.

5.4.1.12 If either needle moves from its centered position, adjust the counterweight until no needle deflection is noted as the indicator is oriented in any vertical or horizontal plane.

5.4.1.13 Check that each needle deflects at least 5 dots either side of the centered position. Bend the meter stops until proper deflection range is obtained.

5.4.1.14 Adjust the warning flags and TO-FROM indicator by adjusting the meter stops to set deflection range or by carefully adjusting the meter arms.

5.4.1.15 Check that all wiring harnesses are positioned and secured in such a manner to not interfere with any pointers, meters, or movable components.

5.4.2 COURSE DATUM SYNCHRO ALIGNMENT

5.4.2.1 Apply an 11.8 ±1% Vrms, 400 ±2% Hz signal from pin <u>v</u> (high) to pin <u>u</u> (low).

5.4.2.2 Short pins <u>u</u> and <u>t</u> together with an external jumper wire.

5.4.2.3 Monitor the heading output pins s (high) and r (low) with an AC voltmeter.

5.4.2.4 Rotate the OBS knob until a heading of zero degrees is established.

5.4.2.5 Loosen the mounting screws of the course datum synchro and rotate it until a minimum voltage is noted on the AC voltmeter.

5.4.2.6 Tighten the mounting screws.

5.4.2.7 Increase the heading to 10 degrees.

5.4.2.8 Monitor the voltage from pin s (high) to r (low) with an oscilloscope.

5.4.2.9 The voltage should be in phase ±20 degrees with the 400 Hz input.

5.4.2.10 If the voltage is not in phase, return the heading to zero degrees.

5.4.2.11 Again loosen the course datum synchro mounting screws and rotate the synchro one half revolution.

5.4.2.12 Reconnect the AC voltmeter from pin s (high) to r (low) and again rotate the synchro for a minimum AC voltage.

5.4.2.13 Tighten the mounting screws.

5.4.2.14 Increase the heading to 10 degrees.

5.4.2.15 Monitor the voltage from pin s to r with an oscilloscope.

5.4.2.16 The voltage should be in phase ±20 degrees with the 400 Hz input.

5.4.2.17 Decrease the heading from ten degrees to 0 degrees. The voltage should decrease.

5.4.2.18 As the heading is decreased to 350 degrees, the voltage should increase in level and be out of phase with the 400 Hz input.

5.4.3 POWER SUPPLY ALIGNMENT

5.4.3.1 Apply 13.75 ±2% Vdc to the indicator.

5.4.3.2 Monitor pin Z of J203, J204 with a digital voltmeter.

5.4.3.3 Adjust R505 for 9.00 Vdc at pin Z.

5.4.3.4 Decrease the input voltage to 11.0 volts. The output voltage at pin Z should not change more than 0.01 volts.

5.4.3.5 Increase the input voltage to 33.0 volts. The output voltage at pin Z should not change more than 0.05 volts.

5.4.3.6 Monitor pin S of J203, J204 with a digital voltmeter. With an input voltage of 13.75 volts, the voltage on pin S should be 4.5 ±2% Vdc.

5.4.3.7 Monitor pin Z with an oscilloscope. Ripple on the 9 volts line should not exceed 10 millivolts.

5.4.3.8 Monitor pin S with an oscilloscope. Ripple on the 4.5 volt line should not exceed 10 millivolts.

5.4.4 VOR CONVERTER ALIGNMENT

This alignment must be completed prior to localizer converter alignment.

5.4.4.1 Check that the ILS ENG input to the indicator is not grounded.

5.4.4.2 Connect the output of a VOR/ILS signal generator to the composite input of the indicator. With a standard VOR test signal applied, set the level at 0.500 ±2% Vrms.

5.4.4.3 Monitor pin 8 of I301 or pin c of J203, J204 with an AC voltmeter. Adjust R311 for maximum voltage output. This sets the center frequency of the variable phase band pass filter.

5.4.4.4 Monitor TP302 with an oscilloscope. Adjust L302 for maximum 30 Hz peak to peak voltage.

5.4.4.5 Adjust the VOR centering pot, R101 (which is accessible from the front of the indicator in the upper left hand mounting hole above the OBS knob), for a maximum AC voltage at I301 pin 7 or pin f of J203, J204. This sets the center frequency of the reference phase band pass filter.

5.4.4.6 Adjust the VOR/ILS generator output for the 90° FROM radial.

5.4.4.7 Rotate the OBS knob until 90° is the selected course.

5.4.4.8 Loosen the resolver mounting screws and rotate the resolver until the course deviation needle is centered.

5.4.4.9 If the TO-FROM indicator is in the FROM position, tighten the resolver mounting screws.

5.4.4.10 If the TO-FROM indicator is in the TO position, rotate the resolver one half revolution and again adjust its position for a centered deviation needle. Tighten the resolver mounting screws.

5.4.4.11 Change the VOR/ILS generator output to 0° FROM. Rotate the OBS knob to give a selected course of 0°.

5.4.4.12 Allow the pointer to stabilize, then adjust R320 (the resolver roundness adjustment) to move the needle half the distance to a centered position.

5.4.4.13 Adjust the VOR/ILS generator output to 90° FROM. Rotate the OBS knob to a selected course of 90°.

5.4.4.14 Allow the pointer to stabilize, then adjust R101 (VOR centering) to move the needle half the distance to a centered position.

5.4.4.15 Repeat steps 11 through 14 until the deviation needle is centered on both the 0° and 90° radials.

5.4.4.16 Return the OBS to a course of 0°. Set the VOR/ILS generator for the 10° FROM radial. Adjust R303 for 5 dots of deflection.

5.4.4.17 Check bearing accuracy for every 30°.

5.4.4.18 By adjusting the R101 (VOR centering) balance the error between TO and FROM radials.

5.4.5 LOCALIZER CONVERTER ALIGNMENT

This alignment must not be attempted until VOR converter alignment is completed.

5.4.5.1 Check that the ILS ENG input to the indicator is grounded.

5.4.5.2 Monitor pin 8 of I301 or pin c of J203, J204 with an AC voltmeter.

5.4.5.3 Apply a 90 Hz signal to the composite input of the indicator. Set the level to 0.250 Vrms.

5.4.5.4 Adjust R308 for maximum voltage on the AC voltmeter. This sets the center frequency of the 90 Hz filter.

5.4.5.5 Apply a 150 Hz signal to the composite input of the indicator. Set the level to 0.250 Vrms.

5.4.5.6 Monitor pin 7 of I301 or pin f of J203, J204 with an AC voltmeter.

5.4.5.7 Adjust R330 for a maximum voltage reading on the AC voltmeter.

5.4.5.8 Apply a standard localizer centering signal to the composite input. Set the level of the centering signal to 0.333 ±2% Vrms.

5.4.5.9 Adjust R102, the ILS centering pot, which is accessible through the upper right hand mounting screw hole at the front of the indicator, for a centered course deviation needle.

5.4.5.10 Set the tone ratio of the localizer test signal to 4 db (0.091 ddm) with 90 Hz predominate.

5.4.5.11 Adjust R410 for three fifths full scale deflection (three reference marks) to the right of the center.

5.4.5.12 Adjust the tone ratio of the VOR/ILS generator for a 0 db (0.00 ddm) tone ratio. Readjust R102 to center the needle, if necessary

5.4.5.13 Adjust the tone ratio of the VOR/ILS generator for a 4 db (0.091 ddm) tone ratio with 150 Hz predominate.

5.4.5.14 If the needle does not deflect as least three reference marks to the left, adjust R410 for a deflection of three reference marks.

5.4.5.15 Adjust the VOR/ILS generator for a 0 db (0.000 ddm) tone ratio and recheck localizer centering.

5.5 OVERHAUL

Maintenance information contained in this section includes inspection procedures, cleaning, semiconductor replacement, and troubleshooting procedures.

5.5.1 VISUAL INSPECTION

The following visual inspection procedures should be performed during the course of maintenance operations.

5.5.1.1 Inspect all wiring for frayed, loose, or burned wires.

5.5.1.2 Check cable connections, making sure the plugs are free from corrosion and are properly secured.

5.5.1.3 Check all components for evidence of overheating, breakage, vibration, corrosion, or loose connections.

5.5.1.4 Check all capacitors and transformers for leaks, bulges, or loose connections.

5.5.1.5 Inspect relay and switch contacts for pits or arcing.

5.5.2 CLEANING

5.5.2.1 Using a clean-lint free cloth, lightly moistened with an approved cleaning solvent, remove the foreign matter from the equipment case and unit front panels. Wipe dry using a clean, dry lint-free cloth.

5.5.2.2 Using a hand controlled dry air jet (not more than 15 psi), blow the dust from inaccessible areas. Care should be taken to prevent damage by the air blast.

5.5.2.3 Clean electrical contacts with a burnishing tool or cloth lightly moistened with an approved contact cleaner.

5.5.2.4 Clean the receptacles and plugs with a hand controlled dry air jet (not more than 25 psi) and a clean lint-free cloth lightly moistened with an approved cleaning solvent. Wipe dry with a clean, dry, lint-free cloth.

5.5.2.5 Apply an antistatic solution to the plastic lighting wedge. Refer to applicable field service bulletins for detailed information.

5.5.3 DISASSEMBLY PROCEDURES

The following instructions include procedures that are necessary to remove and disassemble the subassemblies of the KI 203, KI 204. Before disassembly, verify that the power is removed and disassemble only to the extent necessary to effect test, alignment and repair. Tag or in some means identify all disconnected wires.

Overall performance tests can be completed without any disassembly of the unit. In order to carry out the alignment procedures of the converter subassemblies, only the upper rear dust cover need be removed. Do not remove the bottom dust cover or front half of the top dust cover except in an instrument shop clean environment.

5.5.3.1 Top and Bottom Cover

The back half of the two piece top cover is held in place by two #2-56x1/8 flathead screws (P/N 089-06004-0002) and two #2-28x1/4 panhead screws (P/N 089-06414-0004). When this section of the top cover is removed, it will reveal only the printed circuit board area of the unit.

CAUTION

NEXT OPERATION TO BE DONE IN A CLEAN ENVIRONMENT ONLY.

The front half of the top cover and the bottom cover are held in place by six #2-56x1/8 flathead screws (P/N 089-06004-0002) and two #2-28x1/4 panhead screws (P/N 089-06414-0004).

5.5.3.2 Printed Circuit Boards

The KI 203 and KI 204 both contain three printed circuit boards. To remove Board "C" (the power supply/ flag board), it is necessary to first remove the #4-40x1/4 flathead screw (P/N 089-06299-0004) that holds the heatsink, which is attached to the board, to the side rail.

All three PC boards may now be removed, using card extractor (P/N 047-01277-0000).

5.5.3.3 Converter Assembly

This assembly, with or without the PC boards, may be separated from the meter assembly by removing four #2-28x1/4 flathead screws (P/N 089-06484-0004).

5.5.3.4 Bezel and Front Gear Plate Assemblies

Remove OBS knob (P/N 088-00696-0002) by loosening set screw (P/N 089-06218-0006). To remove the remaining front end assembly, which consists of the bezel assembly (P/N 200-01924-XXXX) and front gear plate assembly (P/N 200-01925-XXXX), remove four #4-40x5/16 panhead screws (P/N 089-05903-0005) and four lock washers (P/N 089-08109-0034).

5.5.4 REASSEMBLY PROCEDURES

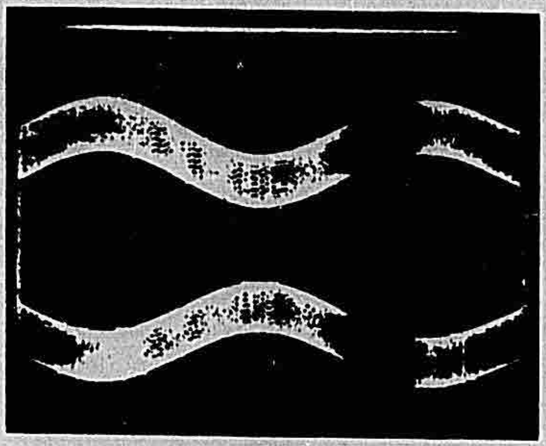
For reassembly in general, reverse the disassembly procedures. If the bezel assembly has been removed, apply an antistatic solution to the plastic lighting wedge.

5.6 TROUBLESHOOTING

For troubleshooting information consult Figure 5-3 Waveforms and Figure 5-4 Troubleshooting Flow Chart.

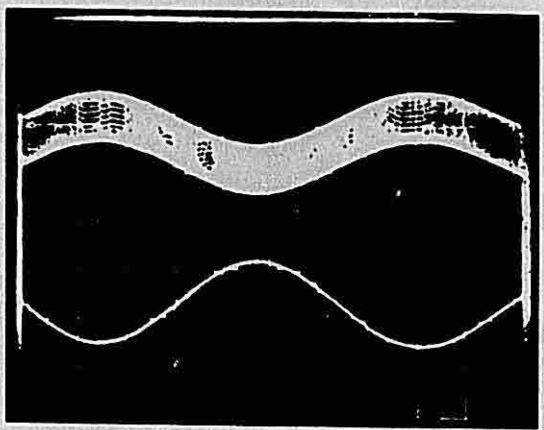
TP: P301 Pin 15
VERT: 1V/Div
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1 Trigger
DESC: VOR Composite

TP: 301
VERT: 1V/Div
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: Buffer Output



TP: 301
VERT: 1V/Div
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: Buffer Output

TP: I301 Pin 8
VERT: 2V/Div
HORIZ: 5ms
COUPL: DC, Baseline Ground
SYNC: Ch 1
DESC: VAR Phase BPF Output



TP: 302
VERT: 1V/Div
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: FM Discriminator Output

TP: I301 Pin 7
VERT: 1V/Div
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: REF Phase BPF Output

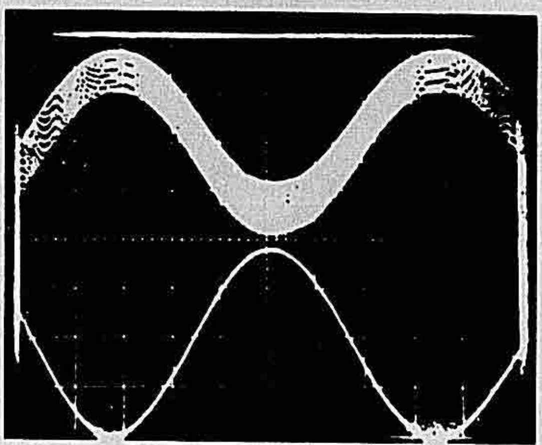
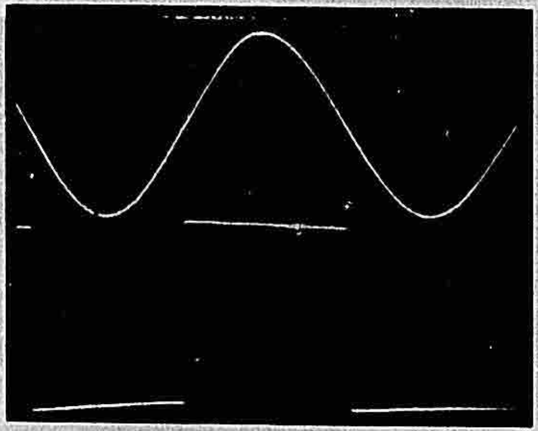


FIGURE 5-3 Waveforms KI 203, KI 204 (Sheet 1 of 3)

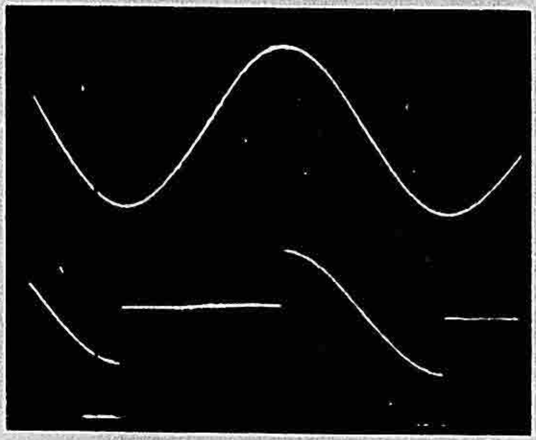
TP: P401 Pin 8
VERT: 1V/Div
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: REF Phase to Squaring Amp

TP: 403
VERT: 2V/Div
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: Squaring Amp Output



TP: P 401 Pin 7
VERT: 1V
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: VAR Phase Signal

TP: I401 Pin 10
VERT: 1V
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: Chopped VAR Phase, D-Bar Centered.



TP: P401 Pin 7
VERT: 1V
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: VAR Phase Signal

TP: 402
VERT: 1V
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: 90° Phase Shifter Output

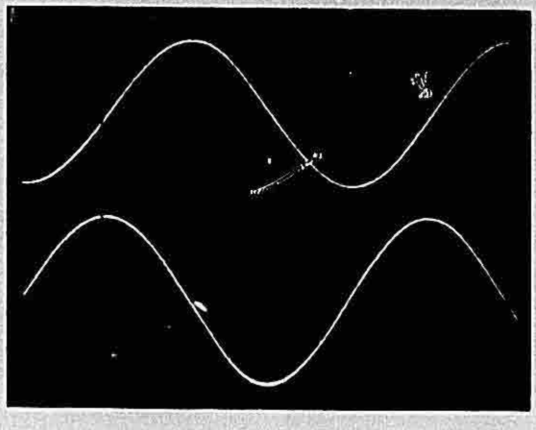
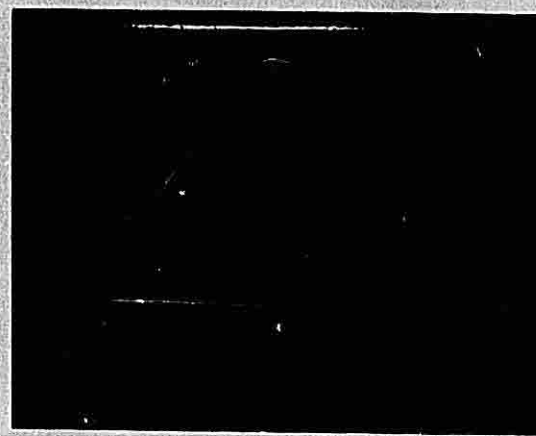


FIGURE 5-3 Waveforms KI 203, KI 204 (Sheet 2 of 3)

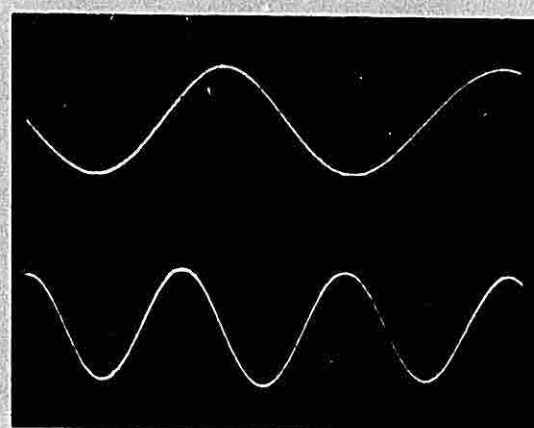
TP: P401 Pin 7
VERT: 1V
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: VAR Phase Signal

TP: I401 Pin 1
VERT: 1V
HORIZ: 5ms
COUPL: AC
SYNC: Ch 1
DESC: Chopped To-From Signal



TP: I301 Pin 8
VERT: 1V
HORIZ: 2ms
COUPL: AC
SYNC: Ch 1
DESC: 90Hz BPF Output

TP: I301 Pin 7
VERT: 1V
HORIZ: 2ms
COUPL: AC
SYNC: Ch 1
DESC: 150Hz BPF Output



TP: CR401 Anode
VERT: .5V
HORIZ: 2ms
COUPL: AC
SYNC: Ch 1
DESC: LOC Deviation Detector
90Hz signal only

TP: CR404 Cathode
VERT: .5V
HORIZ: 2ms
COUPL: AC
SYNC: Ch 1
DESC: LOC Deviation Detector
150Hz Signal only

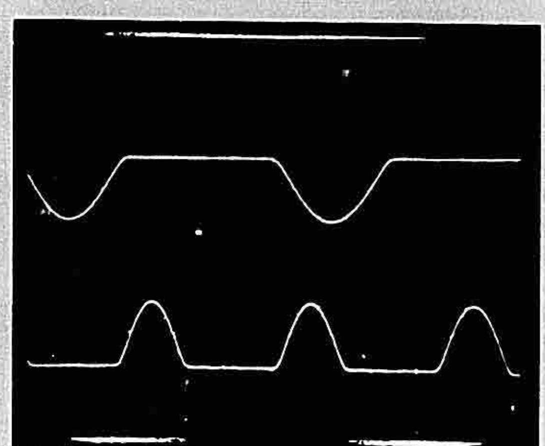


FIGURE 5-3 Waveforms KI 203, KI 204 (Sheet 3 of 3)

THIS PAGE RESERVED

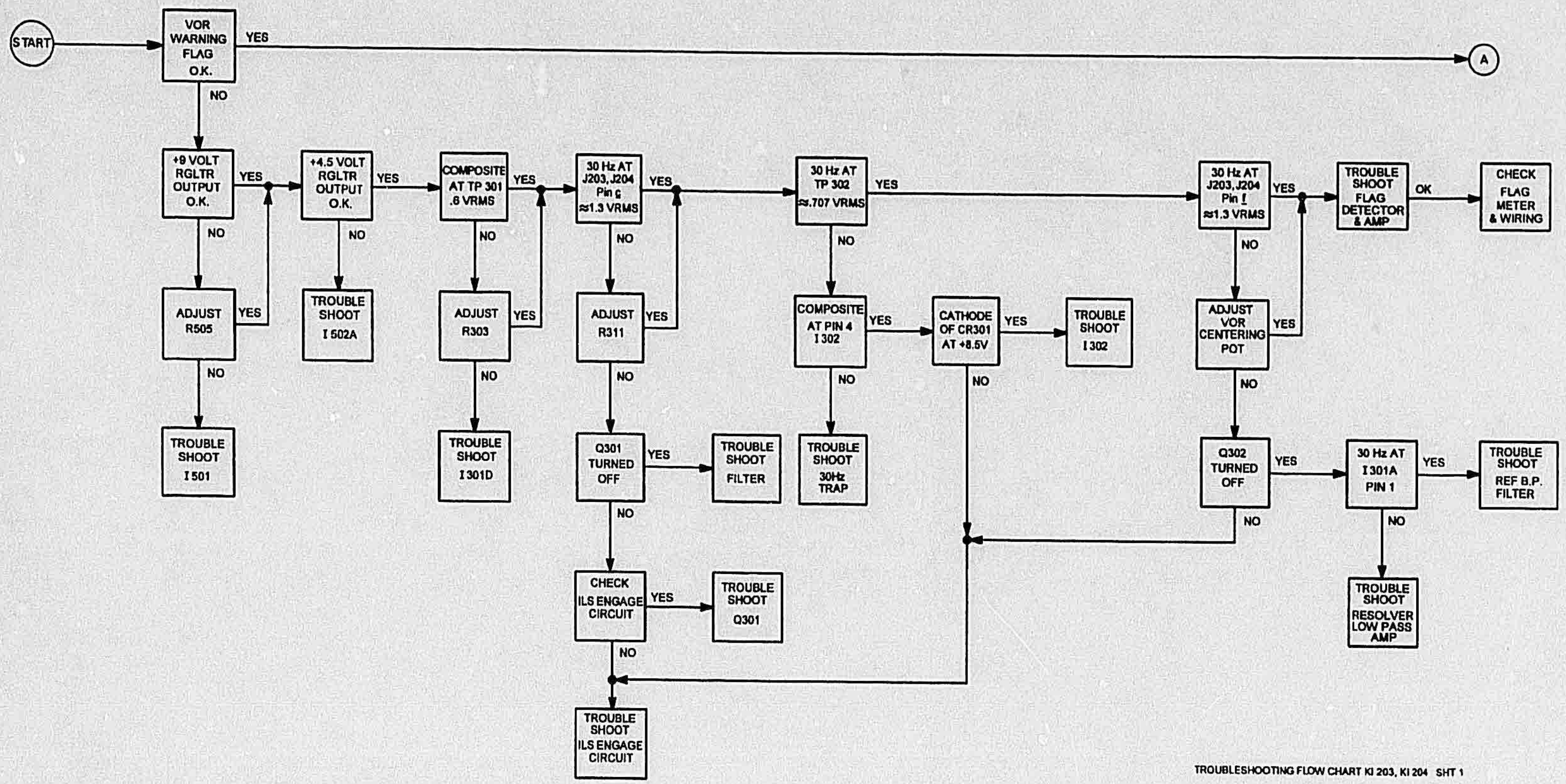


FIGURE 5-4 Troubleshooting Flow Chart KI 203, KI 204 (Sheet 1 of 3)

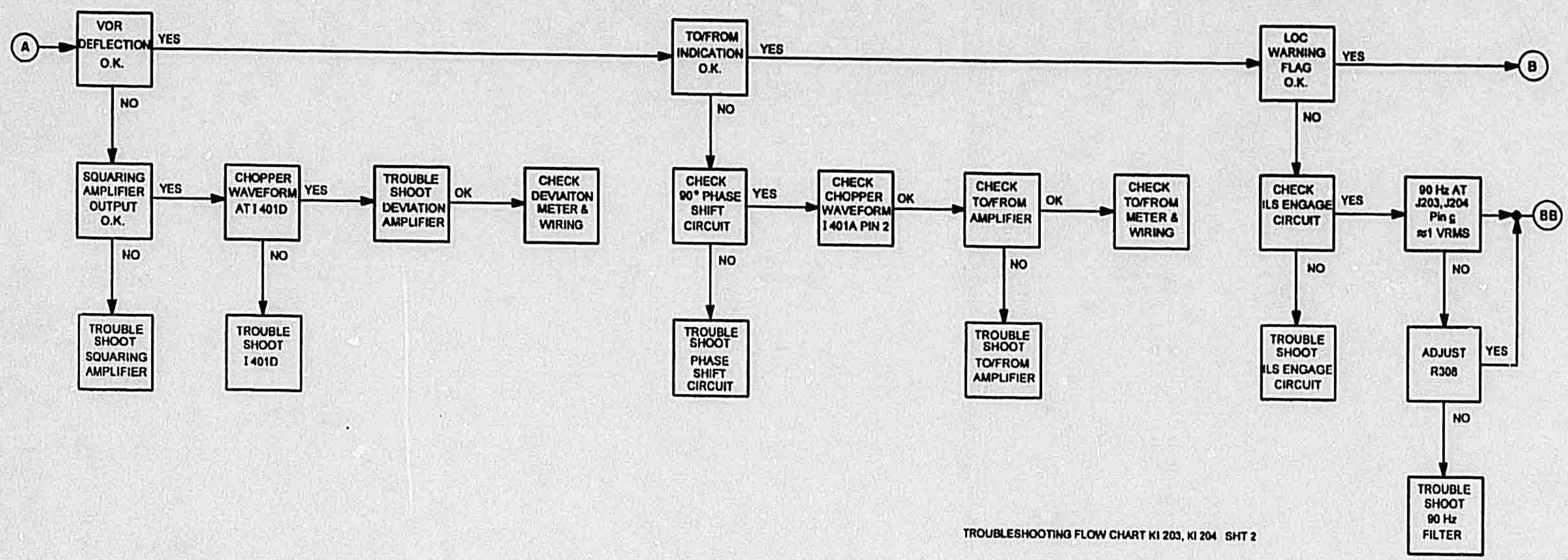


FIGURE 5-4 Troubleshooting Flow Chart KI 203, KI 204 (Sheet 2 of 3)

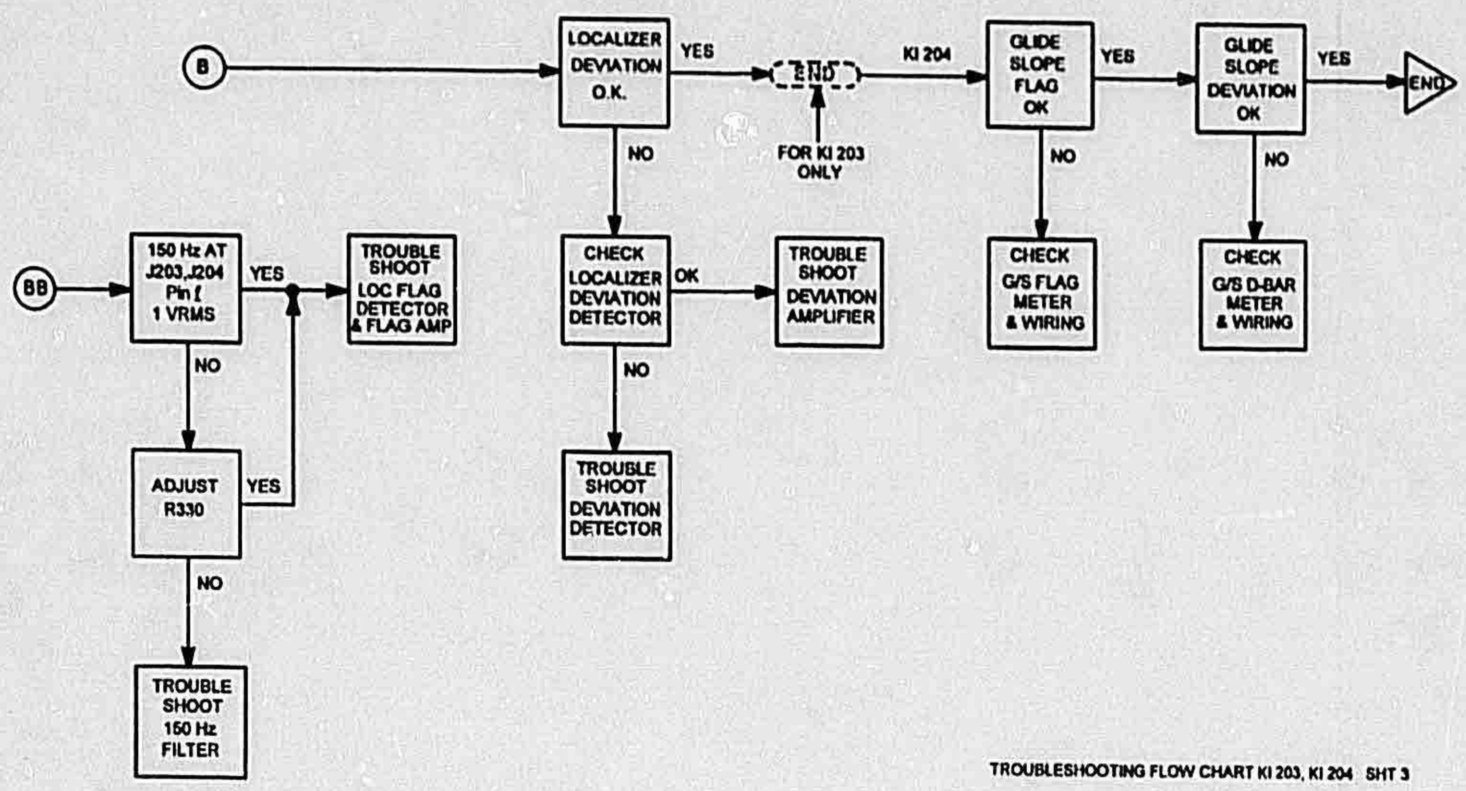


FIGURE 5-4 Troubleshooting Flow Chart KI 203, KI 204 (Sheet 3 of 3)

06

SECTION VI
ILLUSTRATED PARTS LIST

6.1 INTRODUCTION

The Illustrated Parts List (IPL) contains parts lists of assemblies and discrete components required for the unit. The IPL provides the proper identification and part number of each replacement part. The IPL starts with the top assembly and continues in sequence with the sub-assembly parts lists. Mechanical parts are grouped separately from electrical parts on each subassembly parts list. Each parts list is followed by the assembly drawing for that assembly. Parts lists may also be called "bills of material" or "BOM." Parts identified in this IPL meet design specifications for this equipment and are recommended replacement parts. Warranty information concerning replacement parts is contained in Service Memo #1, P/N 600-08001-00XX.

6.2 BILL OF MATERIAL DESCRIPTION

This section describes the various items that may appear on parts lists. Refer to figure 6-0 for the parts list format.

6.2.1 PARTS LIST (ASSEMBLY) NUMBER

Each parts list is labeled with the assembly part number at the top of the list. The assembly number is followed by the assembly description and the revision level of the parts list.

6.2.2 SYMBOL COLUMN

The symbol column contains the reference designators of electrical components on the assembly. Some mechanical parts and assembly supplies may be assigned the ITM designator. Reference documents may be assigned the REF designator. The reference designator contains a letter abbreviation to indicate the type of component, and the sequence number assigned to that part (C101, Q101, etc.). Common reference designator abbreviations are listed in table 6-1.

Table 6-1: Reference Designator Abbreviations

B	Motor, Synchro
C	Capacitor
CF	Capacitor Filter
CJ	Circuit Jumper
CQ	Capacitor
CR	Diode
D	Diode
DS	Lamp
E	Terminal, Connect Point
F	Fuse

Table 6-1: Reference Designator Abbreviations

FB	Ferrite Bead
FL	Filter
FT	Feedthru
I	Integrated Circuit
ITM	Item (Non-electrical)
J	Jack, Fixed Connector
K	Relay
L	Inductor
M	Meter, Transistor
MX	Mixer
P	Plug, Removable Connector
Q	Transistor
R	Resistor
REF	Reference Document
RP	Resistor Network
RT	Thermistor
RV	Varistor
S	Switch
SK	Socket
SW	Switch
T	Transformer
TJ	Terminal Jack
TP	Test Point
U	Integrated Circuit, Circuit Assembly, Component Network (Resistor, Capacitor, Inductor, Transistor, Diode)
V	Photocell, Vacuum Tube, Varistor
WG	Waveguide
Y	Crystal

6.2.3 PART NUMBER COLUMN

The part number column contains the Honeywell part number for each part. Special purpose part number series may appear in the parts list and are described below.

6.2.3.1 U401 122-XXXXX-9999 PLACE HOLDER

Circuit U401 is a programmed device with a -9999 place holder. Its true part number is contained on the next higher 125- P/N or 126- P/N software configuration. Refer to Section 6.3, Software Documentation, in this introduction, for a description of the software documentation system.

6.2.3.2 U402 999-09999-0090 REF SFTWARE SET

Circuit U402 is a programmed device. Its true part number is contained on the next higher 125- P/N or 126- P/N software configuration. Refer to Section 6.3, Software Documentation, in this introduction, for a description of the software documentation system.

6.2.3.3 CR401 999-09999-0096 RESERVED

Reference designator CR401 has been reserved for future use. The assembly does not currently include a CR401.

6.2.3.4 CR401 999-09999-0097 SEE NEXT ASSEMBLY

Diode CR401 is a part of the electrical circuit, but due to assembly or testing requirements, is actually assigned to the next assembly.

6.2.3.5 CR401 999-09999-0098 NOT USED

Reference designator CR401 is available for future assignment. The assembly does not currently include a CR401.

6.2.3.6 CR401 999-09999-0099 DO NOT USE

Reference designator CR401 has been previously used on this assembly and later deleted. It may not be reassigned on this assembly.

6.2.4 FIND_NO COLUMN

This column lists the find (item) number of a part. Find numbers of mechanical parts may appear on the assembly drawing. Find numbers of electrical parts do not appear on the assembly drawing. Find numbers are not assigned to every part and missing information in this column is not an error.

6.2.5 DESCRIPTION COLUMN

This column describes each part in the assembly. Common abbreviations in the description column are listed in table 6-2.

Table 6-2: Description Abbreviations

A	Ampere
ADC	Analog to Digital Converter
ADJ	Adjustable
AL, ALUM	Aluminum

Table 6-2: Description Abbreviations

AMP	Ampere, Amplifier
ANT	Antenna
ASSY	Assembly
BD	Board
BI	Two
BIFLR	Bifilar
BLK	Black
BLU	Blue
BOM	Bill of Material (= Parts List)
BRN	Brown
CA	Cable
CC	Carbon Composite
CF	Carbon Film
CH	Chip, Choke
CAP	Capacitor
CER, CR	Ceramic
CKT	Circuit
CNTCT	Contact
CONN	Connector
CVR	Cover
DAC	Digital to Analog Converter
DBL	Double
DC	Disc Ceramic
DIO	Diode
DPDT	Double Pole Double Throw
DPST	Double Pole Single Throw
DUAL, DUO	Two
DWG	Drawing
EL	Electrolytic
EW	Eighth Watt

Table 6-2: Description Abbreviations

FC	Fixed Composition
FERR	Ferrite
FET	Field Effect Transistor
FHP	Flat Head Phillips
FLTR	Filter
FREQ	Frequency
FT	Feedthru
GHZ	Gigahertz
GND	Ground
GRN	Green
GRY	Gray
HDR	Header
HDW	Hardware
HEX	Six
HF	High Frequency
HV	High Voltage
HW	Half Watt
H/W	Hardware
IC	Integrated Circuit
ID, IDT	Identification
IF	Intermediate Frequency
IND	Inductor
INTER	Interconnect
INTL	Internal
I/O	In/Out
ITM	Item
KHZ	Kilohertz
LCK, LK	Lock
LED	Light Emitting Diode
LSI	Large Scale Integrated Circuit

Table 6-2: Description Abbreviations

MA	Milliamp
MC	Monolithic Ceramic
MF	Microfarad
MH	Millihenry
MHZ	Megahertz
MOD	Modification
MOS	Metal Oxide Semiconductor
MPS	Minimum Performance Specification
MY	Mylar
NF	Nanofarad
NPN	Negative-Positive-Negative transistor type
OCTAL	Eight
OP AMP	Operational Amplifier
ORG, ORN	Orange
OSC	Oscillator
PA	Power Amplifier
PC	Polycarbonate, Printed Circuit
PCB, PCBD	Printed Circuit Board
PENTA	Five
PF	Precision Film, Picofarad
PHP	Pan Head Phillips
PKG	Package
P/L	Parts List
PLD	Programmable Logic Device
PLL	Phase-Locked Loop
PLT	Plate
P/N	Part Number
PNP	Positive-Negative-Positive transistor type
POS	Positive, Position
PP	Paper

Table 6-2: Description Abbreviations

PRGA	Programmable Gate Array
PROM	Programmable Read Only Memory
PS	Polystyrene, Power Supply
PWR	Power
QUAD	Four
QW	Quarter Watt
RAM	Random Access Memory
RCVR	Receiver
RECPT	Receptacle
REF	Reference
REG	Regulator
RES	Resistor
RF	Radio Frequency
ROM	Read Only Memory
RX	Receive, Receiver
S	Silicon
SCH	Schematic
SCR	Screw
SFTWR	Software
SM	Silver Mica, Surface Mount
SMD	Surface Mount Device
SMT	Surface Mount Technology
S/N	Serial Number
SO, SOT	Small Outline
SPDT	Single Pole Double Throw
SPST	Single Pole Single Throw
SRAM	Synchronous Random Access Memory
STDF	Standoff
SW	Switch
S/W	Software

Table 6-2: Description Abbreviations

SYN	Synthesizer
SYNC	Synchronizer
SYS	System
TCXO	Temperature Controlled Crystal Oscillator
TERM	Terminal
TN	Tantalum
TP	Test Point
TRI	Three
TRML	Terminal
TRNSB	Transorber
TST PT	Test Point
TURR	Turret
TW	Tenth Watt
TX	Transmit, Transmitter
U	Integrated Circuit
UA	Microamp
UF	Microfarad
UH	Microhenry
UHF	Ultra High Frequency
UP	Microprocessor
V	Volt
VA, VAR	Variable
VCO	Voltage Controlled Oscillator
VIO	Violet
VHF	Very High Frequency
VLT	Voltage
W	Watt
W/	With, Width
WHT	White
WW	Wire Wound

Table 6-2: Description Abbreviations

WX	Weather
XFMR	Transformer
XMIT	Transmit, Transmitter
XSTR	Transistor
XTAL	Crystal
YEL	Yellow
Z	Zener

6.2.6 ASSEMBLY (A) COLUMN

An "A" in this column indicates that the part is a sub-assembly. Each sub-assembly has a separate parts lists following the parent assembly. If the sub-assembly is a "COMMON BOM" with a -9900, -0099, or -9999 suffix, the parts for that common assembly are included in the parent assembly parts list as a separate column.

6.2.7 UNIT OF MEASURE (UM) COLUMN

This column indicates the unit of measure for each part. Common abbreviations found in this column are listed in table 6-3.

Table 6-3: Unit of Measure Abbreviations

AR	As Required
EA	Each
FT	Foot
IN	Inch
RF	Reference Only

6.2.8 VERSION AND QUANTITY COLUMN

Individual versions of an assembly are identified by the last four digits of the P/N. The quantity of parts for individual versions are listed in separate version columns -0000 through -9999. The parts indicated in -0099, -9900, or -9999 version columns are common to all versions of the assembly and constitute the "COMMON BOM." Versions may also be called "flavors" in parts lists. The terms are interchangeable.

6.3 SOFTWARE DOCUMENTATION

Not Applicable.

Figure 6-0, while closely related to a specific product, does not represent an exact configuration in use by that product. The example has been modified to clarify certain points.

Assy: 066-04020-0203 SG464 HSI W/O WX

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	016-01008-0004	3	GLYPTAL 7526 BL	AR	1.00	
	016-01131-0000	1	CNTCT CMT BND 1055	AR	1.00	
	047-02579-0002	2	HANDLE ASSEMBLY	EA	1.00	
	" "	"	" " " "	"	"	
	047-09392-0001	0	SPACER RT W/FIN	EA	1.00	
	057-02203-0002	3	FLAVOR STCKR	EA	1.00	
	057-02203-0003	3	FLAVOR STCKR	EA	1.00	
	057-05286-0000	0	SERIAL TAG SG 464	EA	1.00	
	075-05082-0002	0	GUIDE PLATE TOP	EA	1.00	
	" "	"	" " " "	"	"	
	090-00277-0000	1	HOLD DOWN BRACKET	EA	1.00	
	155-02536-0001	1	CABLE ASSY	EA	1.00	
	200-07703-0000	2	DPX CONN BD ASSY	EA	1.00	
	200-07704-0000	8	LV PS BD ASSY	EA	1.00	
	206-00118-0301	0	EFS40/50 HSI SET	EA	1.00	<--- A

Assy: 206-00118-0301 EFS40/50 HSI SET

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	057-05287-0301	0	SW MOD TAG	EA	1.00	
	205-00564-0002	0	EFIS 40/50 I/O PBS	EA	1.00	
	205-00565-0004	0	E40/50 HSI P/D PBS	EA	1.00	<--- B

Assy: 205-00565-0004 E40/50 HSI P/D PBS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	057-02241-0016	1	IDENT LABEL	EA	1.00	
	057-05252-0565	1	IDT 205-00565-0000	EA	1.00	
	125-00602-0004	0	EFIS 40/50 NAV SDS	EA	1.00	<--- C1
	125-00603-0002	0	EFIS40/50 DSPL SDS	EA	1.00	<--- C2
	126-00019-0000	1	EFS40/50 CLIPPER	EA	1.00	<--- C3
	200-07706-0000	1	PRCSR/DSPL BD ASSY	EA	1.00	

Figure 6-0 Sample Parts List
(Sheet 1 of 4)

Assy: 200-07706-0000 PRCSR/DSPL BD ASSY

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	009-07706-0000	0	PC BD PRCSR/DSPL	EA	1.00	
	" "	"	" " " "	"	"	
	150-00004-0010	3	TUBING TFLN 22AWG	IN	2.00	
	200-04969-0000	0	EXT BD PRCSR/ADI A	RF	0.00	
	126-00005-0000	1	EFS40/50 INT LOGIC	EA	1.00	<--- D1
	126-00006-0000	1	EFS40/50 VIDEO MUX	EA	1.00	<--- D2
	126-00017-0000	1	EFS40/50 SM SET	EA	1.00	<--- D3
	126-00018-0000	1	EFS40/50 SINE SET	EA	1.00	<--- D4
C 5001	111-02104-0042	26	CAP MC100KPF50V20%	EA	1.00	
	" "	"	" " " "	"	"	
I 5005	122-30001-9999	0	EFS40/50 VIDEO MUX	RF	0.00	<--- D5
I 5008	122-30002-9999	0	EFS40/50 INT LOGIC	RF	0.00	<--- D6
	" "	"	" " " "	"	"	
I 5036	122-30003-9999	0	EFS40/50 SM HIGH	RF	0.00	<--- D7
I 5037	122-30004-9999	0	EFS40/50 SM LOW	RF	0.00	<--- D8
I 5038	122-30005-9999	0	EFS40/50 SINE HIGH	RF	0.00	<--- D9
I 5039	122-30006-9999	0	EFS40/50 SINE LOW	RF	0.00	<--- D10
	" "	"	" " " "	"	"	
I 5075	122-00958-9999	0	EFS40/50 CLIPPER	RF	0.00	<--- D11
	" "	"	" " " "	"	"	
I 5138	122-00918-9999	0	EFS40/50 HSI NAV-E	RF	0.00	<--- D12
I 5139	122-00919-9999	0	EFS40/50 HSI NAV-O	RF	0.00	<--- D13
	" "	"	" " " "	"	"	
I 5158	122-00920-9999	0	EFS40/50 HSI DSP-E	RF	0.00	<--- D14
I 5159	122-00921-9999	0	EFS40/50 HSI DSP-O	RF	0.00	<--- D15

Assy: 126-00005-0000 EFS40/50 INT LOGIC

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-30002-0000	0	EFS40/50 INT LOGIC	EA	1.00	

Assy: 122-30002-0000 EFS40/50 INT LOGIC

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	120-02376-0000	1	EPLD EP320 (OTP)	EA	1.00	

Assy: 125-00602-0004 EFIS 40/50 NAV SDS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-00918-0004	0	EFS40/50 HSI NAV-E	EA	1.00	
	122-00919-0004	0	EFS40/50 HSI NAV-O	EA	1.00	

Assy: 125-00603-0002 EFIS40/50 DSPL SDS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-00920-0002	0	EFS40/50 HSI DSP-E	EA	1.00	
	122-00921-0002	0	EFS40/50 HSI DSP-O	EA	1.00	

Figure 6-0 Sample Parts List
(Sheet 2 of 4)

BOM NUMBER

ASSEMBLY VERSION

PROGRAMMABLE DEVICE SET

UNIT OF MEASURE

QUANTITY

REFERENCE DESIGNATOR

PART NUMBER

DESCRIPTION

200-08366-0000 MST67 IDP/DLP R: 2 MST0067A
200-08366-0000 MST67 IDP/DLP R: 2 MST0067A

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	0000	9900
	009-08366-0000	PC BD IDP/DLP	A	EA	1.00	1.00
	016-01040-0000	COATING TYPE AR		AR	1.00	1.00
	033-00114-0021	SOCKET IC DIP 28C	A	EA	3.00	3.00
	047-09680-0001	KEYING BRACKET	A	EA	3.00	3.00
	090-00087-0000	CLIP CRYSTAL		EA	1.00	1.00
	092-05003-0015	EYELET .049		EA	2.00	2.00
	126-00030-0000	MST67A ASIC SFTWR	A	EA	1.00	1.00
C 9001	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
C 9002	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
C 9003	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
CR 9001	007-06180-0000	DIO SW MMBD6050		EA	1.00	1.00
CR 9002	007-08092-0000	QUAD SO DIODE		EA	1.00	1.00
CR 9003	007-08092-0000	QUAD SO DIODE		EA	1.00	1.00
DS 9001	007-06408-0000	COM CATH 7 SEG LED		EA	1.00	1.00
J 9002	030-02174-0000	PIN CONT		EA	50.00	1.00
P 9003	155-02688-0003	RIBBON CABLE ASSY	A	EA	1.00	1.00
Q 9003	007-00065-0001	XSTR 2N3906 (SOT)		EA	1.00	1.00
Q 9006	007-00383-0004	SOT-23 2N2222A XST		EA	1.00	1.00
Q 9011	007-00530-0000	XSTR NPN MMBT3903	A	EA	1.00	1.00
R 9001	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9002	015-00207-0020	OCTAL SO RESISTOR		EA	1.00	1.00
R 9003	130-05472-0023	RES CHIP 4.7KEW5%		EA	1.00	1.00
R 9004	130-05471-0023	RES CHIP 470EW5%		EA	1.00	1.00
R 9005	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9006	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9007	130-05000-0025	RES CHIP 0 EW CJ		EA	1.00	1.00
TP 9001	008-00096-0001	TERMINAL TEST PNT		EA	1.00	1.00
TP 9002	008-00096-0001	TERMINAL TEST PNT		EA	1.00	1.00
U 9001	120-02208-0004	UPRGSSR 10MHZ16B.T	A	EA	1.00	1.00
U 9002	120-06129-0009	6264-15 8K X 8 RAM		EA	1.00	1.00
U 9003	120-06129-0009	6264-15 8K X 8 RAM		EA	1.00	1.00
U 9004	122-01195-9999	*MST67 PRGMD ODD	A	RF	X.	
U 9005	122-01194-9999	*MST67 PRGMD EVEN	A	RF	X.	
U 9006	124-00574-0003	IC 74HCT574		EA	1.00	1.00
U 9007	123-00138-0003	74HC138 SO PKG		EA	1.00	1.00
Y 9001	044-00009-0019	XTAL 14.75MHZ		EA	1.00	1.00
Y 9002	044-00293-0000	20 MHZ OSC		EA	1.00	1.00

Figure 6-0 Sample Parts List
(Sheet 3 of 4)

BOM NUMBER/DESCRIPTION/REVISION

DESCRIPTION

ASSEMBLY VERSION

UNIT OF MEASURE

REFEERENCE DESIGNATOR

QUANTITY

PART NUMBER

FIND NUMBER

200-09229-0000 GP BOARD, FPD500 REV 4

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C2001	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
C2002	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
C2003	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
R2038	139-03241-0000		RES CH 3.24K EW 1%	EA	1.00
R2039	139-02430-0000		RES CH 243 EW 1%	EA	1.00
R2040	139-00750-0000		RES CH 75.0 EW 1%	EA	1.00
TP2001	008-00309-0000		TEST POINT SURF MN	EA	1.00
TP2002	008-00309-0000		TEST POINT SURF MN	EA	1.00
U2005	12051354-0001		PP-IC,UPD482234G5-	EA	1.00
U2006	12051354-0001		PP-IC,UPD482234G5-	EA	1.00
U2021	12061010-0001		SI-IC,MEMORY CNTLR	EA	1.00
U2022	12061014-0001		SI-IC,DSP.CONTROLL	EA	1.00
Y2001	04416054-0015		XTAL OSC,36.000MHZ	EA	1.00
Y2002	04416054-0014		XTAL OSC,20.000MHZ	EA	1.00
	002-09229-0000		GP BOARD	RF	0.00
	009-09229-0000	1	GP BOARD	EA	1.00
	01243055-0001	2	INSULATOR,THERMAL	EA	3.00
	01250068-0001	3	SPACER, HEADER	EA	6.00
	016-01040-0000		COATING TYPE AR	AR	1.00
	016-01442-0000	4	E-6000 CLEAR SEALA	AR	1.00
	192-09229-0000		GP BOARD	RF	0.00
	300-09229-0000		GP BOARD, FPD500	RF	0.00
	34050-0084	6	SPACER,THD'D	EA	2.00
	46086-0007	5	SCREW,CAPTIVE,4-40	EA	3.00

Figure 6-0 Sample Parts List
(Sheet 4 of 4)

THIS PAGE RESERVED

6.4 ILLUSTRATED PARTS LIST

BOM 1: KI 203, KI 204 Navigation Indicator

066-3034-00	KI203 OBI BLK	REV 30
066-3034-01	KI203 OBI BLK SYNC	REV 30
066-3034-02	KI204 OBI BLK GS	REV 30
066-3034-03	KI204 OBI BLK GS/SYNC	REV 30
066-3034-18	KI204 OBI BLK GS/5V	REV 2
066-3034-19	KI204 OBI BLK GS/5V/SYNC	REV 2
066-3034-20	KI204 OBI GRY GS	REV 2
066-3034-21	KI204 OBI GRY GS/SYNC	REV 2
066-3034-22	KI204 OBI GRY GS/5V	REV 2
066-3034-23	KI204 OBI GRY GS/5V/SYNC	REV 2

					KI203	KI203	KI204	KI204	KI204	KI204	KI204	KI204	KI204	KI204
SYMBOL	PART NUMBER	FIND_NO	DESCRIPTION	UM	-00	-01	-02	-03	-18	-19	-20	-21	-22	-23
	195-00006-0000		KI203 ASSY	EA	1	-	-	-	-	-	-	-	-	-
	195-00006-0001		KI203 ASSY/SYNC	EA	-	1	-	-	-	-	-	-	-	-
	195-00006-0002		KI204 ASSY	EA	-	-	1	-	-	-	-	-	-	-
	195-00006-0003		KI204 ASSY/SYNC	EA	-	-	-	1	-	-	-	-	-	-
	195-00006-0018		KI204 ASSY/BLK/5V	EA	-	-	-	-	1	-	-	-	-	-
	195-00006-0019		KI204 ASY/SYNC/B/5V	EA	-	-	-	-	-	1	-	-	-	-
	195-00006-0020		KI204 ASSY/GRY	EA	-	-	-	-	-	-	1	-	-	-
	195-00006-0021		KI204 ASSY/SYNC/GRY	EA	-	-	-	-	-	-	-	1	-	-
	195-00006-0022		KI204 ASSY/GRY/5V	EA	-	-	-	-	-	-	-	-	1	-
	195-00006-0023		KI204 ASY/SYNC/GRY/5V	EA	-	-	-	-	-	-	-	-	-	1
REF1	155-05225-0000		INSTALL KI202/3/4/6/7	RF	X	X	X	X	X	X	X	X	X	X
REF2	002-00360-0000		INTERNAL WIRING SET	RF	X	X	X	X	X	X	X	X	X	X

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NAME: FINAL ASSY SN 10,000 & UP UNIT: KI 0202,203,204, 0206,207 ASSY NO: 066-3034-00/08

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04	-05	-06	-07	-08
	066-3034-00	KI 203 ASSEMBLY		X								
	066-3034-01	KI 203 ASSY/SYNCHRO			X							
	066-3034-02	KI 204 ASSEMBLY				X						
	066-3034-03	KI 204 ASSY/SYNCHRO					X					
	066-3034-04	KI 206 ASSEMBLY						X				
	066-3034-05	KI 206 ASSY/SYNCHRO							X			
	066-3034-06	KI 207 ASSEMBLY								X		
	066-3034-07	KI 202 ASSEMBLY									X	
	066-3034-08	KI 202 ASSY/SYNCHRO										X
	012-1005-02	MYLAR TAPE TRANS		.17	.17	.17	.17	0	0	0	0	0
	012-1005-05	MYLAR TAPE TRANS		.12	.12	.12	.12	0	0	0	0	0
	012-1006-00	NYLON LAC TAPE NAT		AR	AR	AR	AR	AR	AR	AR	AR	AR
	016-1096-00	LOCKTITE SUPERBOND		AR	AR	AR	AR	AR	AR	0	AR	AR
	023-0128-00	5 METER PKG		0	0	1	1	1	1	1	0	0
	023-0130-00	3 METER PKG		1	1	0	0	0	0	0	1	1
	025-0018-89	WIRE 26AWG GRY/WHT		.7	.7	.7	.7	.7	.7	.7	.7	.7
	025-0018-69	WIRE 26AWG BLU/WHT		.7	.7	.7	.7	.7	.7	.7	.7	.7
	025-0018-79	WIRE 26AWG VIO/WHT		.7	.7	.7	.7	.7	.7	.7	.7	.7
	025-0018-91	WIRE 26AWG WHT/BRN		.7	.7	.7	.7	0	0	0	0	0
	025-0018-93	WIRE 26AWG WHT/ORN		.5	.5	.5	.5	0	0	0	0	0
	025-0018-94	WIRE 26AWG WHT/YEL		.7	.7	.7	.7	0	0	0	0	0
	025-0018-97	WIRE 26AWG WHT/VIO		.5	.5	.5	.5	0	0	0	0	0
	029-0387-01	GEAR 110T (.090)		0	1	0	1	0	1	0	0	1
	029-0387-02	GEAR 110T (.120)		1	1	1	1	1	1	0	1	1
	029-0388-00	GEAR IDLER TRANSFR		1	1	1	1	1	1	0	1	1
J206/7	030-2271-01	CONN (W/HARDWARE)		0	0	0	0	1	1	1	1	1
	047-4809-01	CHAS R KI206/7/2		0	0	0	0	1	1	1	1	1
	047-3798-01	COV DST KI206/7/2		0	0	0	0	1	1	1	1	1
	047-3799-01	COV DST KI203/204		1	1	1	1	0	0	0	0	0
	047-3805-01	CHAS L KI206/7/2		0	0	0	0	1	1	1	1	1

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NAME: FINAL ASSY SN 10,000 & UP UNIT: KI 0202,203,204, 0206,207 ASSY NO: 066-3034-00/08

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04	-05	-06	-07	-08
	047-3870-01	COVER DUST		1	1	1	1	0	0	0	0	0
	047-3871-01	COVER DUST		1	1	1	1	0	0	0	0	0
	047-3872-01	COVER DUST		0	0	0	0	1	1	1	1	1
	057-1831-00	CAUTION TAG		1	1	1	1	1	1	1	1	1
	057-2293-02	ID TAG(KI202		0	0	0	0	0	0	0	1	1
	057-1755-02	ID TAG(KI203)		1	1	0	0	0	0	0	0	0
	057-1756-02	ID TAG (KI204)		0	0	1	1	0	0	0	0	0
	057-1757-02	ID TAG (KI206)		0	0	0	0	1	1	0	0	0
	057-1766-02	ID TAG (KI207)		0	0	0	0	0	0	1	0	0
	073-0034-00	MOUNTING LUG		0	2	0	2	0	2	0	0	2
	073-0034-01	MOUNTING LUG		3	3	3	3	3	2	2	2	2
	076-0760-01	SPACER		1	1	1	1	0	0	0	0	0
	088-0697-01	KNOB (OBS)		1	1	1	1	1	1	0	1	1
	088-0630-00	PLATE REAR MTG		0	0	0	0	1	1	1	1	1
	088-0637-00	BUSHING RESOLVER		1	1	1	1	0	0	0	0	0
	088-0676-00	RETAINER		2	2	2	2	0	0	0	0	0
	088-0804-02	FRAME		1	1	1	1	1	1	1	1	1
	089-5903-05	SCR PHP 4-40X5/16		4	4	4	4	4	4	4	4	4
	089-6004-02	SCR FHP 2-56X1/8		7	7	7	7	2	2	2	2	2
	089-6004-04	SCR FHP 2-56X1/4		1	1	1	1	0	0	0	0	0
	089-6024-05	SCR SHC 4-40X5/16		0	0	0	0	2	2	0	2	2
	089-6024-07	SCR SHC 4-40X7/16		3	3	3	3	0	0	0	0	0
	089-6141-06	SCR SET 4-40X3/16		2	4	2	4	2	4	0	2	4
	089-6167-12	SCR FHP 6-32X3/4		3	3	3	3	3	3	3	3	3
	089-6218-06	SCR SET 4-40X3/16		2	2	2	2	2	2	0	2	2
	089-6024-04	SCR SHC 4-40X1/4		0	2	0	2	0	2	0	0	2
	089-6484-04	SCR FHP 2-28X1/4		2	2	2	2	4	4	4	4	4
	089-6299-04	SCR FHP 4-40X1/4TT		0	0	0	0	2	2	2	2	2
	089-6414-04	SCR PHP 2-28X1/4		9	9	9	9	9	9	9	9	9
	089-6414-06	SCR PHP 2-28X3/8		2	2	2	2	0	0	0	0	0
	089-8023-30	WASHER FLAT		2	2	2	2	0	0	0	0	0
	089-8109-34	WASHER LOCK #4		7	9	7	9	6	8	4	6	8
	150-0018-10	TUBING SHRINK		.1	.1	.1	.1	0	0	0	0	0
	150-0020-10	TUBING SHRINK		1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0	1.0
	187-1129-00	P C BD DAMPER		1	1	1	1	0	0	0	0	0

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NAME: FINAL ASSY SN 10,000 & UP UNIT: KI 0202,203,204, 0206,207 ASSY NO: 066-3034-00/08

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04	-05	-06	-07	-08
	200-1924-00	BEZEL ASSEMBLY		1	1	1	1	1	1	0	1	1
	200-1924-01	BEZEL ASSY (KI207)		0	0	0	0	0	0	1	0	0
	200-1925-00	F GR PLT KI203/204		1	1	1	1	0	0	0	0	0
	200-1925-01	F GR PLT KI206/202		0	0	0	0	1	1	0	1	1
	200-1925-02	F GR PLT KI207		0	0	0	0	0	0	1	0	0
	200-1928-01	CONV BD (KI203/204)		1	1	1	1	0	0	0	0	0
R101	133-0096-31	RES VARI 5K OHM VOR		2	2	2	2	0	0	0	0	0
	300-1965-00	ABOVE VOR RES ASSY		AR	AR	AR	AR	0	0	0	0	0
	300-1965-01	ABOVE LOC RES ASSY		AR	AR	AR	AR	0	0	0	0	0
B101	148-0003-00	RESOLVER		1	1	1	1	0	0	0	0	0
B102	148-0026-00	SYNCHRO CONT X FORM		0	1	0	1	0	1	0	0	1
B103	148-0005-00	RESOLVER		0	0	0	0	1	1	0	1	1

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NAME: FINAL ASSY SN 10,000 & UP
ASSY DWG: 300-1923-00/03
ENGR APPROVAL: MARK PEAVY
ASSY NO: 066-3034-00/08
UNIT: KI 0202,203,204, KI 0206,207
USED ON: 000-0175-00

REV	CO NO	SYMBOL	PART NUMBER	DESCRIPTION
7				
8				
9				
10				
				KI203/204/206/207 MAINTENANCE MANUAL REVISION 0, APRIL 1976
11			089-6004-02	QTY CHG FROM 8 ON FIRST 4 FLAVORS TO 7 ON EACH
			089-6004-04	ADDED TO B/M
			089-5115-12	ADDED TO B/M
12			088-0696-02	DELETED FROM B/M
			088-0697-01	DESC CHG FROM INSERT (OBS) TO KNOB (OBS)
			089-6218-06	QTY CHG FROM 1 ON EACH TO 2 ON EACH
13			089-6414-06	ADDED TO B/M
			089-6414-04	QTYS CHG FROM 6 ON -00 THRU -03 FLAVOR TO 4 ON EACH
14			089-6024-05	QTY DELETED IN -00, -01, -02,-03 FLAVOR
			089-6024-07	ADDED TO B/M
15			025-0018-89	P/N CHG FROM 025-0018-09
			029-0387-02	QTY DELETED FROM -06 FLAVOR

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NAME: FINAL ASSY SN 10,000 & UP
ASSY DWG: 300-1923-00/03
ENGR APPROVAL: MARK PEAVY
ASSY NO: 066-3034-00/08
UNIT: KI 0202,203,204, KI 0206,207
USED ON: 000-0175-00

REV	CO NO	SYMBOL	PART NUMBER	DESCRIPTION
			029-0388-00	QTY DELETED FROM -06 FLAVOR
			057-1831-00	QTY DELETED FROM -04, 05,06 FLAVORS
16			057-1831-00	QTY ADDEED ON -04,05,06 FLAVORS
17			012-1005-05	ADDED TO B/M
18				-10/16 ADDED TO B/M
			047-4809-01	ADDED TO B/M
			200-1928-01	ADDED TO B/M
			023-0128-00	ADDED TO B/M
			023-0130-00	ADDED TO B/M
			088-0804-02	ADDED TO B/M
			076-0760-01	ADDED TO B/M
19			066-3034-00 THRU 066-3034-06	-10/16 FLAVORS CHG TO "ALTERNATE CONSTRUCTION S/N 10000+ -00/06", OLD -00/06 TITLED "UNITS PRIOR TO S/N 10000"
			057-1755-02	ADDED TO B/M
			057-1756-02	ADDED TO B/M
			057-1757-02	ADDED TO B/M
			057-1766-02	ADDED TO B/M
			089-6484-04	CHG ALT CONTS QTYS FROM 4,4,4,4,6,6,6, TO 2,2,2,2,4,4,4
			089-6414-04	CHG ALT CONTS QTYS FROM 4 TO 9 ON -00 THRU -06
20			089-6167-12	P/N CHG FROM 089-5115-12
21				202 ADDED TO UNIT
			066-3034-07	ADDED TO B/M
			066-3034-08	ADDED TO B/M
			057-2293-00	ADDED TO B/M, SN BELOW 10,000
			057-2293-02	ADDED TO B/M
				-07 AND -08 FLAVORS ADDED TO B/M
			089-6004-04	QTY ON -04,-05,-06 CHG FROM - TO 0
			089-6024-05	QTY ON -00,-01,-02,-03 CHG FROM - TO 0
				DELETED ASSY SN100,00 & UNDER FROM B/M
			047-3806-01	DELETED FROM B/M
			057-1755-00	DELETED FROM B/M
			057-1756-00	DELETED FROM B/M
			057-1757-00	DELETED FROM B/M
			057-1766-01	DELETED FROM B/M
			200-1926-00	DELETED FROM B/M
			200-1926-01	DELETED FROM B/M TWICE
			200-1928-00	DELETED FROM B/M
			133-0096-31	DELETED FROM B/M
				TYPED ON WORD PROCESSOR

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NAME: FINAL ASSY SN 10,000 & UP
ASSY DWG: 300-1923-00/03
ENGR APPROVAL: MARK PEAVY
ASSY NO: 066-3034-00/08
UNIT: KI 0202,203,204, KI 0206,207
USED ON: 000-0175-00

REV	CO NO	SYMBOL	PART NUMBER	DESCRIPTION
22				ASSY DWG NO CHG TO 300-1923-00/03
				KI 202/203/204/206/207 MAINTENANCE MANUAL REV. 1, SEPT., 1979

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NAME: Final Assembly (S/N Below 10,000) ASS'Y. NO. 066-3034-00/06

KING RADIO CORP PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	-00	-01	-02	-03	-04	-05	-06	-07	-08	-09	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29
	066-3034-00	KI 203 Assembly		X																													
	066-3034-01	KI 203 With Synchro			X																												
	066-3034-02	KI 204 Assembly				X																											
	066-3034-03	KI 204 With Synchro					X																										
	066-3034-04	KI 206 Assembly						X																									
	066-3034-05	KI 206 With Synchro							X																								
	066-3034-06	KI 207 Assembly								X																							
	012-1005-02	Mylar Tape, Transparent		.17	.17	.17	.17																										
	012-1006-00	Nylon Lacing Tape Nat.		AR	AR	AR	AR	AR	AR	AR																							
	016-1096-00	Locktite SuperBonder 150		AR	AR	AR	AR	AR	AR																								
	025-0018-09	Wire 26 AWG Blk/Wht		.7	.7	.7	.7	.7	.7	.7																							
	025-0018-69	Wire 26 AWG Blu/Wht		.7	.7	.7	.7	.7	.7	.7																							
	025-0018-79	Wire 26 AWG Vio/Wht		.7	.7	.7	.7	.7	.7	.7																							
	029-0387-01	Gear 110T (.090)			1		1		1																								
	029-0387-02	Gear 110T (.120)		1	1	1	1	1	1	1																							
	029-0388-00	Gear Idler Transfer		1	1	1	1	1	1	1																							
J206/7	030-2271-01	Conn (W/Hardware)						1	1	1																							
	047-3798-01	Cover Dust (KI 206, 207)						1	1	1																							
	047-3799-01	Cover Dust (KI 203, 204)		1	1	1	1																										
	047-3805-01	Chassis Left (KI 206, 207)						1	1	1																							
	047-3806-01	Chas Right (KI 206, 207)						1	1	1																							
	057-1831-00	Caution Tag		1	1	1	1	1	1	1																							
	057-1755-00	ID Tag (KI 203)		1	1																												
	057-1756-00	ID Tag (KI 204)				1	1																										
	057-1757-00	ID Tag (KI 206)						1	1																								
	057-1766-01	ID Tag (KI 207)								1																							
	073-0034-00	Mounting Lug			2		2		2																								
	073-0034-01	Mounting Lug		3	3	3	3	2	2																								
	088-0696-02	Knob		1	1	1	1	1	1																								
	088-0697-01	Insert (OBS)		1	1	1	1	1	1																								
	088-0630-00	Plate Rear Mtg.						1	1	1																							
	088-0637-00	Bushing, Resolver		1	1	1	1																										
	088-0676-00	Retainer		2	2	2	2																										
	089-5903-05	Screw PHP #4-40x5/16		4	4	4	4	4	4	4																							
	089-6004-02	Screw FHP #2-56x1/8		8	8	8	8	2	2	2																							
	089-6024-05	Screw SHC #4-40x5/16		3	3	3	3	2	2																								
	089-6141-06	Screw Set #4-40x3/16		2	4	2	4	2	4																								
	089-6218-06	Screw Set #4-40x3/16		1	1	1	1	1	1																								
	089-6024-04	Screw SHC #4-40x¼			2		2		2																								

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NAME: Final Assembly (S/N 10,000 & Below) — ASS'Y NO. 066-3031-00/06

KING RADIO CORP PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION		-00	-01	-02	-03	-04	-05	-06	-07	-08	-09	-10	-11	-12	-13	-14	-15	-16	-17	-18	-19	-20	-21	-22	-23	-24	-25	-26	-27	-28	-29
	089-6484-04	Screw FHP #2-28x¼		4	4	4	4	6	6	6																							
	089-6299-04	Screw FHP #4-40x¼ T.T.						2	2	2																							
	089-6414-04	Screw PHP #2-28x¼		6	6	6	6	4	4	4																							
	089-8023-30	Washer Flat		2	2	2	2																										
	089-8109-34	Washer Lock #4		7	9	7	9	6	8	4																							
	150-0018-10	Tubing Shrink		.1	.1	.1	.1																										
	150-0020-10	Tubing Shrink		1.0	1.0	1.0	1.0	1.0	1.0	1.0																							
	200-1924-00	Bezel Assembly		1	1	1	1	1	1																								
	200-1924-01	Bezel Assembly (KI 207)								1																							
	200-1925-00	Frt Gear Plt (KI 203, 204)		1	1	1	1																										
	200-1925-01	Frt Gear Plt (KI 206)						1	1																								
	200-1925-02	Frt Gear Plt (KI 207)								1																							
	200-1926-00	Meter Assy (KI 203)		1	1																												
	200-1926-01	Meter Assy (KI 204, 206 207)				1	1	1	1	1																							
	200-1928-00	Conv Bd Assy(KI 203, 204)		1	1	1	1																										
R101	133-0096-31	Res Vari 5K ohm (VOR)		2	2	2	2																										
	300-1965-00	(Avove VOR Resistor Assy)		Ref	Ref	Ref	Ref																										
R102	133-0096-31	Res Vari 5K ohm (LOC)		-	-	-	-																										
	300-1965-01	(Above LOC Resistor Assy)		Ref	Ref	Ref	Ref																										
B101	148-0003-00	Resolver		1	1	1	1																										
B102	148-0026-00	Synchro Cont. X Form			1		1		1																								
B103	148-0005-00	Resolver						1	1																								
	047-3870-01	Cover, Dust		1	1	1	1																										
	047-3871-01	Cover, Dust		1	1	1	1																										
	047-3872-01	Cover, Dust						1	1	1																							
	187 -1129-00	P. C. Board Damper		1	1	1	1																										
	025-0018-01	Wire 26 AWG Wht/Brn		.7	.7	.7	.7																										
	025-0018-93	Wire 26 AWG Wht/Orn		.5	.5	.5	.5																										
	025-0018-94	Wire 26 AWG Wht/Yel		.7	.7	.7	.7																										
	025-0018-97	Wire 26 AWG Wht/Vio		.5	.5	.5	.5																										

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PARTS LIST REVISION HISTORY				ENGR. APPROVAL
NAME: Final Assembly (S/N Below 10,000)				ASS'Y. NO.: 066-3034-00/06
ASS'Y. DWG.: 300-1923-00/04		UNIT: KI 203, 204, 206, 207		USED ON: 000-0175-00

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION
8				
9				
10				
				KI 203/204/206/207 Maintenance Manual Revision 0, April 1976
				KI 202/203/204/206/207 Maintenance Manual, Rev. 1, September, 1979

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TABLE 6-4 Reference Assembly 195-00006-00XX

UNIT	UNIT PART NO.	REFERENCE ASSEMBLY	S/N 10,000 AND ABOVE	S/N 9,999 AND BELOW
KI 203	066-3034-00	195-00006-0000	200-01923-0000	200-01923-0050
KI 203	066-3034-01	195-00006-0001	200-01923-0001	200-01923-0051
KI 204	066-3034-02	195-00006-0002	200-01923-0002	200-01923-0052
KI 204	066-3034-03	195-00006-0003	200-01923-0003	200-01923-0053
KI 206	066-3034-04	195-00006-0004	200-01923-0004	200-01923-0054
KI 206	066-3034-05	195-00006-0005	200-01923-0005	200-01923-0055
KI 207	066-3034-06	195-00006-0006	200-01923-0006	200-01923-0056
KI 202	066-3034-07	195-00006-0007	200-01923-0007	200-01923-0057
KI 202	066-3034-08	195-00006-0008	200-01923-0008	200-01923-0058
KI 202	066-3034-09	195-00006-0009	200-01923-0009	200-01923-0059
KI 206	066-3034-10	195-00006-0010	200-01923-0010	200-01923-0060
KI 202	066-3034-11	195-00006-0011	200-01923-0011	200-01923-0061
KI 206	066-3034-12	195-00006-0012	200-01923-0012	200-01923-0062
KI 206	066-3034-13	195-00006-0013	200-01923-0013	200-01923-0063
KI 206	066-3034-14	195-00006-0014	200-01923-0014	200-01923-0064
KI 206	066-3034-15	195-00006-0015	200-01923-0015	200-01923-0065
KI 206	066-3034-16	195-00006-0016	200-01923-0016	200-01923-0066
KI 207	066-3034-17	195-00006-0017	200-01923-0017	200-01923-0067
KI 204	066-3034-18	195-00006-0018	200-01923-0018	200-01923-0068
KI 204	066-3034-19	195-00006-0019	200-01923-0019	200-01923-0069
KI 204	066-3034-20	195-00006-0020	200-01923-0020	200-01923-0070
KI 204	066-3034-21	195-00006-0021	200-01923-0021	200-01923-0071
KI 204	066-3034-22	195-00006-0022	200-01923-0022	200-01923-0072
KI 204	066-3034-23	195-00006-0023	200-01923-0023	200-01923-0073
KI 206	066-3034-24	195-00006-0024	200-01923-0024	200-01923-0074
KI 207	066-3034-25	195-00006-0025	200-01923-0025	N/A
KI 202	066-3034-26	195-00006-0026	200-01923-0026	200-01923-0061

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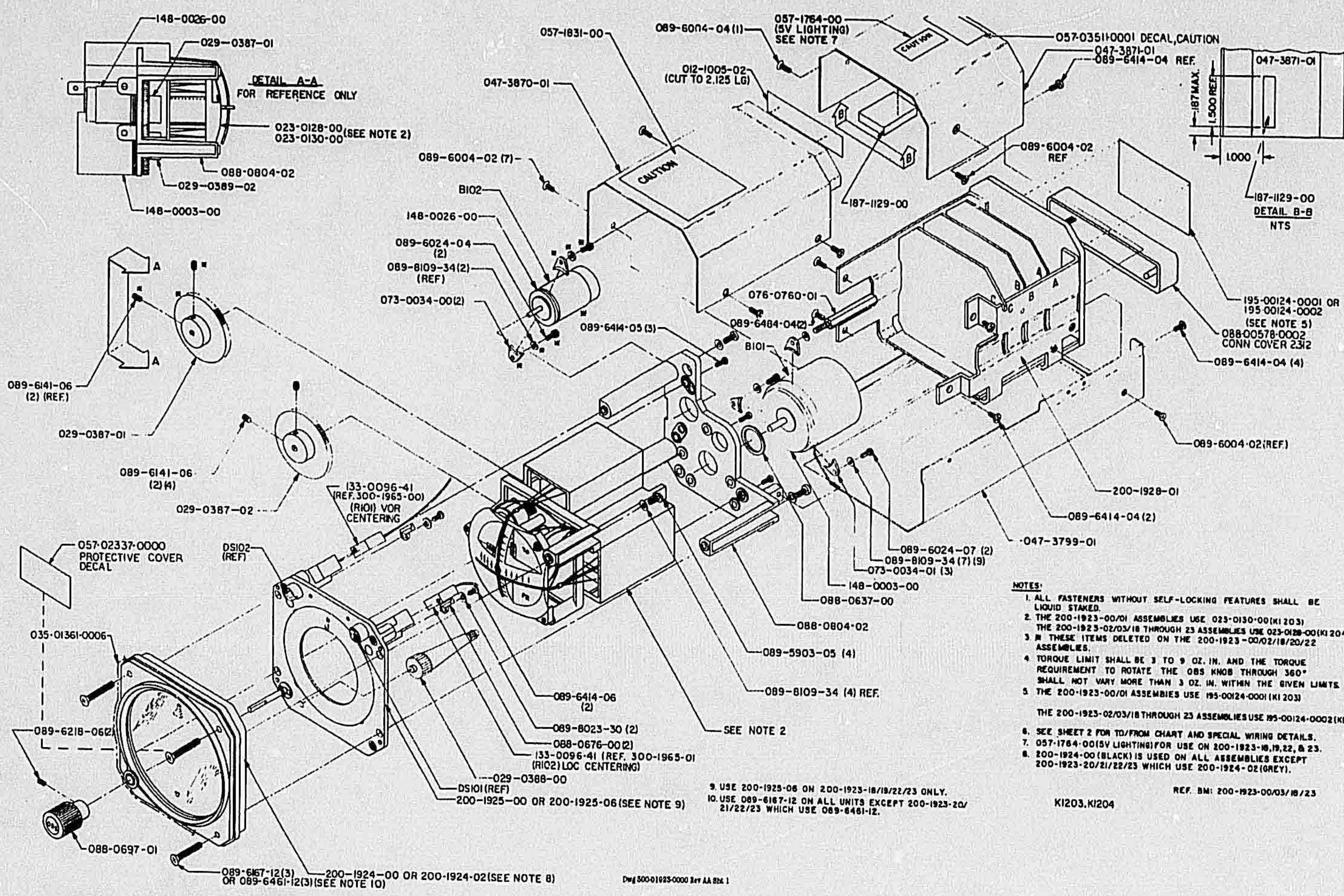
BOM 2: Final Assembly KI 203, KI 204 (S/N 10,000 and Above)

200-01923-0000	KI203 IND 3 MTR	REV AB
200-01923-0001	KI203 IND 3 MTR SYN	REV AB
200-01923-0002	KI204 IND 5 MTR	REV AB
200-01923-0003	KI204 IND 5 MTR SYN	REV AB
200-01923-0018	KI204 IND 5 MTR 5V	REV AB
200-01923-0019	KI204 IND 5 MTR 5V SYN	REV AA
200-01923-0020	KI204 IND 5 MTR GRY	REV AA
200-01923-0021	KI204 IND 5 MTR GRY SYN	REV AA
200-01923-0022	KI204 IND 5 MTR GRY 5V	REV AB
200-01923-0023	KI204 IND 5 MTR GRY 5V SYN	REV AA

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	KI203 -0000	KI203 -0001	KI204 -0002	KI204 -0003	KI204 -0018	KI204 -0019	KI204 -0020	KI204 -0021	KI204 -0022	KI204 -0023
	012-01005-0002		TAPE MYLAR .500 W	IN	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
	012-01006-0000		LACING CORD 18DR	AR	0	0	0	0	0	0	0	0	0	0
	016-01096-0000		SUPERBONDER 150	AR	-	-	-	-	0	0	0	0	-	0
	016-01140-0000		SUPERBONDER 415	AR	1	1	1	1	-	-	-	-	1	-
	023-00128-0000		5 METER PKG	EA	-	-	1	1	1	1	1	1	1	1
	023-00130-0000		3 METER PKG	EA	1	1	-	-	-	-	-	-	-	-
	025-00018-0069		WIRE 26 BU/WH	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
	025-00018-0079		WIRE 26 VI/WH	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
	025-00018-0089		WIRE 26 GY/WH	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
	025-00018-0091		WIRE 26 WH/BN	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
	025-00018-0093		WIRE 26 WH/OR	IN	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
	025-00018-0094		WIRE 26 WH/YL	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
	025-00018-0097		WIRE 26 WH/VI	IN	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
	029-00387-0001		GEAR ASSY 110T	EA	-	1	-	1	-	1	-	1	-	1
	029-00387-0002		GEAR ASSY 110T	EA	1	1	1	1	1	1	1	1	1	1
	029-00388-0000		GEAR IDLER XFR	EA	1	1	1	1	1	1	1	1	1	1
	035-01361-0006		PROTECTIVE CVR	EA	1	1	1	1	1	1	1	1	1	1
	047-03799-0001		CVR DUST BTM W/NUT	EA	1	1	1	1	1	1	1	1	1	1
	047-03870-0001		CVR TOP	EA	1	1	1	1	1	1	1	1	1	1
	047-03871-0001		CVR DUST TOP	EA	1	1	1	1	1	1	1	1	1	1
	057-01764-0000		WRN TAG 5V LGT	EA	-	-	-	-	1	1	-	-	1	1
	057-01831-0000		CAUTION TAG	EA	1	1	1	1	1	1	1	1	1	1
	057-02203-0000		FLAVOR STCKR	EA	1	-	-	-	-	-	-	-	-	-
	057-02203-0001		FLAVOR STCKR	EA	-	1	-	-	-	-	-	-	-	-
	057-02203-0002		FLAVOR STCKR	EA	-	-	1	-	-	-	-	-	-	-
	057-02203-0003		FLAVOR STCKR	EA	-	-	-	1	-	-	-	-	-	-
	057-02203-0018		FLAVOR STCKR	EA	-	-	-	-	1	-	-	-	-	-
	057-02203-0019		FLAVOR STCKR	EA	-	-	-	-	-	1	-	-	-	-
	057-02203-0020		FLAVOR STCKR	EA	-	-	-	-	-	-	1	-	-	-
	057-02203-0021		FLAVOR STCKR	EA	-	-	-	-	-	-	-	1	-	-
	057-02203-0022		FLAVOR STCKR	EA	-	-	-	-	-	-	-	-	1	-
	057-02203-0023		FLAVOR STCKR	EA	-	-	-	-	-	-	-	-	-	1
	057-02337-0000		PRTCTV CVR DECAL	EA	1	1	1	1	1	-	-	-	1	-
	057-03511-0001		DECAL, CAUTION	EA	1	1	1	1	1	-	-	-	1	-
	073-00034-0000		MOUNTING LUG	EA	-	2	-	2	-	2	-	2	-	2
	073-00034-0001		MOUNTING LUG	EA	3	3	3	3	3	3	3	3	3	3
	076-00760-0001		SPACER 1.250	EA	1	1	1	1	1	1	1	1	1	1
	088-00637-0000		BUSHING RESOLVER	EA	1	1	1	1	1	1	1	1	1	1
	088-00676-0000		RETAINER	EA	2	2	2	2	2	2	2	2	2	2
	088-00697-0001		KNOB W/F – OBS	EA	1	1	1	1	1	1	1	1	1	1
	088-00804-0002		FRAME 2/NUTS	EA	1	1	1	1	1	1	1	1	1	1
	089-05903-0005		SCR PHP 4-40X5/16	EA	4	4	4	4	4	4	4	4	4	4
	089-06004-0002		SCR FHP 2-56X1/8	EA	7	7	7	7	7	7	7	7	7	7
	089-06004-0004		SCR FHP 2-56X1/4	EA	1	1	1	1	1	1	1	1	1	1
	089-06024-0004		SCR SHC 4-40X1/4	EA	-	2	-	2	-	2	-	2	-	2
	089-06024-0007		SCR SHC 4-40X7/16	EA	2	2	2	2	2	2	2	2	2	2
	089-06141-0006		SCR SET 4-40X3/16	EA	2	4	2	4	2	4	2	4	2	4
	089-06167-0012		SCR FHP 6-32X3/4	EA	3	3	3	3	3	3	3	3	3	3
–	089-06218-0006		SCR SET 4-40X3/32	EA	2	2	2	2	2	2	2	2	2	2

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	KI203 -0000	KI203 -0001	KI204 -0002	KI204 -0003	KI204 -0018	KI204 -0019	KI204 -0020	KI204 -0021	KI204 -0022	KI204 -0023
	089-06414-0004		SCR PHP 2-28X1/4	EA	6	6	6	6	6	9	9	9	6	9
	089-06414-0005		SCR PHP 2-28X5/16	EA	3	3	3	3	3	-	-	-	3	-
	089-06414-0006		SCR PHP 2-28X3/8	EA	2	2	2	2	2	2	2	2	2	2
	089-06484-0004		SCR FHP 2-28X1/4	EA	2	2	2	2	2	2	2	2	2	2
	089-08023-0030		WSHR FLT STD #2	EA	2	2	2	2	2	2	2	2	2	2
	089-08109-0034		WSHR SPLT LK #4	EA	4	4	4	4	4	4	4	4	4	4
	150-00018-0010		TUBING SHRINK WHT	IN	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
	150-00020-0010		TUBING SHRINK 18G	IN	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
	187-01129-0000		PC BOARD DAMPER	EA	1	1	1	1	1	1	1	1	1	1
	195-00124-0001		KI203 S/N TAG OPT	EA	1	1	-	-	-	-	-	-	-	-
	195-00124-0002		KI204 S/N TAG OPT	EA	-	-	1	1	1	1	1	1	1	1
	200-01924-0000		BEZEL ASSY	EA	1	1	1	1	1	1	-	-	-	-
	200-01924-0002		BEZEL ASSY	EA	-	-	-	-	-	-	1	1	1	1
	200-01925-0000		KI203/4 FRT GR PLT	EA	1	1	1	1	-	-	1	1	-	-
	200-01925-0006		FRNT GEAR PLT ASSY	EA	-	-	-	-	1	1	-	-	1	1
	200-01928-0011		CONVERTER ASSEMBLY KI2	EA	1	1	1	1	1	1	1	1	1	1
B101	148-00003-0000		RESOLVER 30CPS	EA	1	1	1	1	1	1	1	1	1	1
B102	148-00026-0000		SYNCHRO CONT XFMR	EA	-	1	-	1	-	1	-	1	-	1
R101	133-00096-0029		RES VA 1K HW 10%	EA	1	1	1	1	1	1	1	1	1	1
R102	133-00096-0029		RES VA 1K HW 10%	EA	1	1	1	1	1	1	1	1	1	1
REF1	300-01923-0000		FINAL ASSY DWG	EA	X	X	X	X	X	X	X	X	X	X



NOTES:

1. ALL FASTENERS WITHOUT SELF-LOCKING FEATURES SHALL BE LIQUID STAKED.
2. THE 200-1923-00/01 ASSEMBLIES USE 023-0130-00(KI 203)
   THE 200-1923-02/03/18 THROUGH 23 ASSEMBLIES USE 023-0128-00(KI 204)
3. ✱ THESE ITEMS DELETED ON THE 200-1923-00/02/18/20/22 ASSEMBLIES.
4. TORQUE LIMIT SHALL BE 3 TO 9 OZ. IN. AND THE TORQUE REQUIREMENT TO ROTATE THE OBS KNOB THROUGH 360° SHALL NOT VARY MORE THAN 3 OZ. IN. WITHIN THE GIVEN LIMITS.
5. THE 200-1923-00/01 ASSEMBIES USE 195-00124-0001 (KI 203)

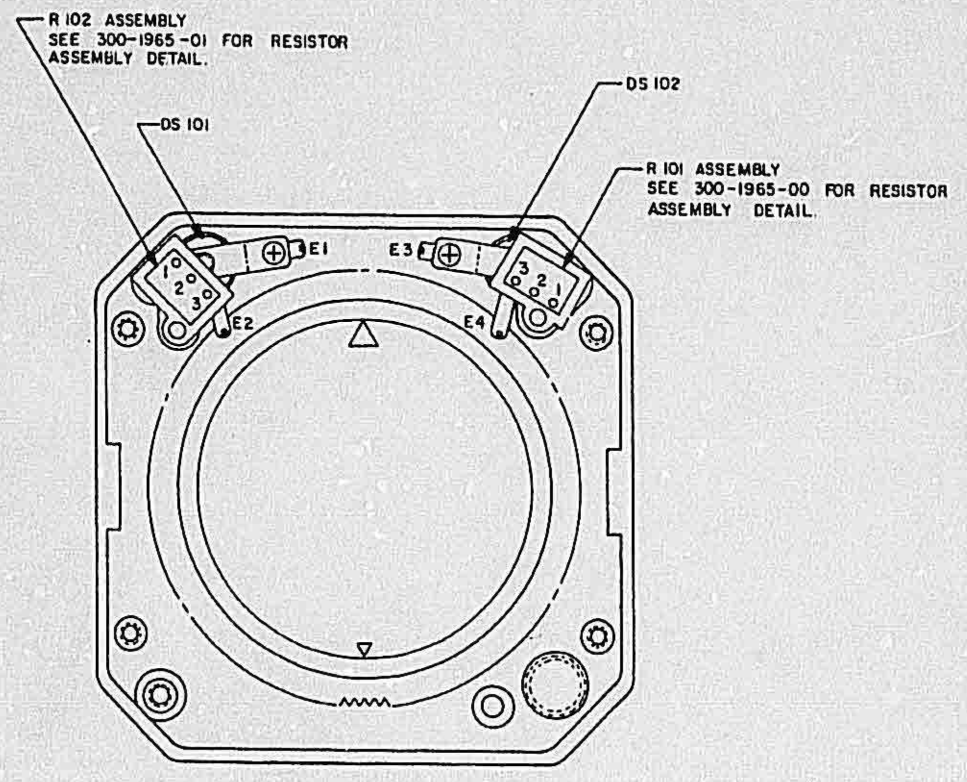
   THE 200-1923-02/03/18 THROUGH 23 ASSEMBLIES USE 195-00124-0002(KI 204)
6. SEE SHEET 2 FOR TO/FROM CHART AND SPECIAL WIRING DETAILS.
7. 057-1764-00(5V LIGHTING)FOR USE ON 200-1923-18,19,22, & 23.
8. 200-1924-00 (BLACK) IS USED ON ALL ASSEMBLIES EXCEPT 200-1923-20/21/22/23 WHICH USE 200-1924-02 (GREY).
9. USE 200-1925-06 ON 200-1923-18/19/22/23 ONLY.
10. USE 089-6167-12 ON ALL UNITS EXCEPT 200-1923-20/21/22/23 WHICH USE 089-6461-12.

REF. BM: 200-1923-00/03/18/23

KI203.KI204

Dwg 300-01923-0000 Rev AA Sht 1

**FIGURE 6-1 Final Assembly KI 203, KI 204 (S/N 10,000 and Above) (Sht 1 of 2)
(Dwg No 300-01923-0000, Rev AA, Sht 1)**



BEZEL ASSEMBLY
(REAR VIEW)

WIRING INFORMATION					
FROM	TO	PART NO.	DESCRIPTION	LENGTH	REMARKS
E 1	E 3	025-0018-79	#26 VIOLET/ WHITE	.20 FT	+14 V LIGHTS HIGH
	E 3	150-0020-10	SHRINK TUBING	.20	INSULATE E 3
E 1	E 121	025-0018-79	#26 VIOLET/ WHITE	.50	+14 V LIGHTS HIGH
	E 1	150-0020-10	SHRINK TUBING	.20	INSULATE E 1
E 2	E 122	025-0018-89	#26 GRAY/ WHITE	.70	LIGHTS LOW
	E 2	150-0020-10	SHRINK TUBING	.20	INSULATE E 2
E 4	E 101	025-0018-69	#26 BLUE/ WHITE	.70	+28 V LIGHTS HIGH
	E 4	150-0020-10	SHRINK TUBING	.20	INSULATE E 3
R 101-1	E 125	025-0018-94	#26 WHITE / YELLOW	.70	VOR CENTERING POT HIGH
	R 101-1	150-0018-10	SHRINK TUBING	.20	INSULATE R 101-1
R 101-2	R 101-3	NONE	COMPONENT LEAD	——	BEND LEAD AROUND R 101-3 AND SOLDER
R 101-3	E 105	025-0018-91	#26 WHITE / BROWN	.70	VOR CENTERING POT LOW
	R 101-3	150-0018-10	SHRINK TUBING	.20	INSULATE R 101-3
R 102-1	E 126	025-0018-93	#26 WHITE /ORANGE	.60	I L S CENTERING POT HIGH
	R 102-1	150-0018-10	SHRINK TUBING	.20	INSULATE R 102-1
R 102-2	R 102-3	NONE	COMPONENT LEAD	——	BEND LEAD AROUND R 102-3 AND SOLDER
R 102-3	E 107	025-0018-97	#26 WHITE/VIOLET	.60	I L S CENTERING POT LOW
	R 102-3	150-0018-10	SHRINK TUBING	.20	INSULATE R 102-3
B 101	E 114	COMPONENT WIRE	GREEN	.75	RESOLVER ROTOR HIGH
B 101	E 115	" "	BLACK	.75	RESOLVER ROTOR LOW
B 101	E 106	" "	YELLOW	.75	RESOLVER "STATOR D" OUT
B 101	E 128	" "	BLUE	.75	RESOLVER "STATOR F" OUT
B 101	E 113	" "	BROWN	.75	RESOLVER "STATOR COMMON"
B 102	E 108	" "	RED / WHITE	.75	COURSE DATUM OUTPUT HIGH
B 102	E 109	" "	BLACK/WHITE	.75	COURSE DATUM OUTPUT LOW
B 102	E 110	" "	YELLOW	.75	COMPASS HEADING INPUT "X"
B 102	E 130	" "	BLUE	.75	COMPASS HEADING INPUT "Y"
B 102	E 129	" "	BLACK	.75	COMPASS HEADING INPUT "Z"
M 101	E 124	" "	GREEN / WHITE	.75	TO/ FROM METER NEGATIVE
M 101	E 104	" "	YELLOW/ WHITE	.75	TO/ FROM METER POSITIVE
M 102	E 123	" "	GRAY	.75	VOR/ LOC WARNING FLAG POSITIVE
M 102	E 116	" "	WHITE	.75	VOR/ LOC WARNING FLAG NEGATIVE
M 103	E 111	" "	BROWN/ WHITE	.75	GLIDE SLOPE WARNING FLAG POSITIVE
M 103	E 112	" "	ORANGE / WHITE	.75	GLIDE SLOPE WARNING FLAG NEGATIVE
M 104	E 127	" "	ORANGE / RED	.75	VOR/LOC DEVIATION METER +
M 104	E 117	" "	ORANGE / BLACK	.75	VOR/LOC DEVIATION METER —
M 105	E 119	" "	ORANGE / RED	.75	GLIDE SLOPE DEVIATION METER +
M 105	E 118	" "	ORANGE/ BLACK	.75	GLIDE SLOPE DEVIATION METER —

TWIST THESE COMPONENT WIRES TOGETHER BEFORE BUNDLING THEM INTO A WIRING HARNESS.

TWIST THESE COMPONENT WIRES TOGETHER BEFORE BUNDLING THEM INTO A WIRING HARNESS.

Dwg 300-01923-0000 Rev AA Sht 2

REF. B/M 200-1923 -00/03

FIGURE 6-1 Final Assembly KI 203, KI 204 (S/N 10,000 and Above) (Sht 2 of 2)
(Dwg No 300-01923-0000, Rev AA, Sht 2)

BOM 3: Final Assembly KI 203, KI 204 (S/N 9,999 and Below)

200-01923-0050	KI203 IND 3 IDL	REV AA
200-01923-0051	KI203 IND 3 IDL SYN	REV AA
200-01923-0052	KI204 IND 5 IDL	REV AA
200-01923-0053	KI204 IND 5 IDL SYN	REV AA
200-01923-0068	KI204 IND 5 IDL 5V	REV AA
200-01923-0069	KI204 IND 5 IDL 5V SYN	REV AA
200-01923-0070	KI204 IND 5 IDL GRY	REV AA
200-01923-0071	KI204 IND 5 IDL GRY SYN	REV AA
200-01923-0072	KI204 IND 5 IDL GRY 5V	REV AA
200-01923-0073	KI204 IND 5 IDL GRY 5V SYN	REV AA

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	KI203 -0050	KI203 -0051	KI204 -0052	KI204 -0053	KI204 -0068	KI204 -0069	KI204 -0070	KI204 -0071	KI204 -0072	KI204 -0073
–	012-01005-0002		TAPE MYLAR .500 W	IN	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1	2.1
–	012-01006-0000		LACING CORD 18DR	AR	0	0	0	0	0	0	0	0	0	0
–	016-01096-0000		SUPERBONDER 150	AR	-	-	-	-	0	0	0	0	0	0
–	016-01140-0000		SUPERBONDER 415	AR	1	1	1	1	-	-	-	-	-	-
–	025-00018-0069		WIRE 26 BU/WH	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
–	025-00018-0079		WIRE 26 VI/WH	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
–	025-00018-0089		WIRE 26 GY/WH	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
–	025-00018-0091		WIRE 26 WH/BN	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
–	025-00018-0093		WIRE 26 WH/OR	IN	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
–	025-00018-0094		WIRE 26 WH/YL	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
–	025-00018-0097		WIRE 26 WH/VI	IN	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0	6.0
–	029-00387-0001		GEAR ASSY 110T	EA	-	1	-	1	-	1	-	1	-	1
–	029-00387-0002		GEAR ASSY 110T	EA	1	1	1	1	1	1	1	1	1	1
–	029-00388-0000		GEAR IDLER XFR	EA	1	1	1	1	1	1	1	1	1	1
–	035-01361-0006		PROTECTIVE CVR	EA	1	1	1	1	1	1	1	1	1	1
–	047-03799-0001		CVR DUST BTM W/NUT	EA	1	1	1	1	1	1	1	1	1	1
–	047-03870-0001		CVR TOP	EA	1	1	1	1	1	1	1	1	1	1
–	047-03871-0001		CVR DUST TOP	EA	1	1	1	1	1	1	1	1	1	1
–	057-01755-0000		S/N TAG	EA	1	1	-	-	-	-	-	-	-	-
–	057-01756-0000		S/N TAG	EA	-	-	1	1	1	1	1	1	1	1
–	057-01764-0000		WRN TAG 5V LGT	EA	-	-	-	-	1	1	-	-	1	1
–	057-01831-0000		CAUTION TAG	EA	1	1	1	1	1	1	1	1	1	1
–	073-00034-0000		MOUNTING LUG	EA	-	2	-	2	-	2	-	2	-	2
–	073-00034-0001		MOUNTING LUG	EA	2	2	2	2	2	2	2	2	2	2
–	076-00760-0001		SPACER 1.250	EA	1	1	1	1	1	1	1	1	1	1
–	088-00637-0000		BUSHING RESOLVER	EA	1	1	1	1	1	1	1	1	1	1
–	088-00676-0000		RETAINER	EA	2	2	2	2	2	2	2	2	2	2
–	088-00697-0001		KNOB W/F – OBS	EA	1	1	1	1	1	1	1	1	1	1
–	089-05903-0005		SCR PHP 4-40X5/16	EA	4	4	4	4	4	4	4	4	4	4
–	089-06004-0002		SCR FHP 2-56X1/8	EA	2	2	2	2	2	2	2	2	2	2
–	089-06004-0004		SCR FHP 2-56X1/4	EA	1	1	1	1	1	1	1	1	1	1
–	089-06024-0004		SCR SHC 4-40X1/4	EA	-	2	-	2	-	2	-	2	-	2
–	089-06024-0007		SCR SHC 4-40X7/16	EA	2	2	2	2	2	2	2	2	2	2
–	089-06141-0006		SCR SET 4-40X3/16	EA	2	4	2	4	2	4	2	4	2	4
–	089-06167-0012		SCR FHP 6-32X3/4	EA	3	3	3	3	3	3	3	3	3	3
–	089-06218-0006		SCR SET 4-40X3/32	EA	2	2	2	2	2	2	2	2	2	2
–	089-06414-0004		SCR PHP 2-28X1/4	EA	9	9	9	9	9	9	9	9	9	9
–	089-06414-0006		SCR PHP 2-28X3/8	EA	2	2	2	2	2	2	2	2	2	2
–	089-06484-0004		SCR FHP 2-28X1/4	EA	2	2	2	2	2	2	2	2	2	2
–	089-08023-0030		WSHR FLT STD #2	EA	2	2	2	2	2	2	2	2	2	2
–	089-08109-0034		WSHR SPLT LK #4	EA	4	4	4	4	4	4	4	4	4	4
–	150-00018-0010		TUBING SHRINK WHT	IN	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
–	150-00020-0010		TUBING SHRINK 18G	IN	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
–	187-01129-0000		PC BOARD DAMPER	EA	1	1	1	1	1	1	1	1	1	1
–	200-01924-0000		BEZEL ASSY	EA	1	1	1	1	1	1	-	-	-	-
–	200-01924-0002		BEZEL ASSY	EA	-	-	-	-	-	-	1	1	1	1
–	200-01925-0000		KI203/4 FRT GR PLT	EA	1	1	1	1	-	-	1	1	-	-
–	200-01925-0006		FRNT GEAR PLT ASSY	EA	-	-	-	-	1	1	-	-	1	1
–	200-01926-0000		METER ASSY	EA	1	1	-	-	-	-	-	-	-	-

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	KI203 -0050	KI203 -0051	KI204 -0052	KI204 -0053	KI204 -0068	KI204 -0069	KI204 -0070	KI204 -0071	KI204 -0072	KI204 -0073
–	200-01926-0001		METER ASSY	EA	-	-	1	1	1	1	1	1	1	1
–	200-01928-0010		KI203/KI204 CONVERTER	EA	1	1	1	1	1	1	1	1	1	1
B101	148-00003-0000		RESOLVER 30CPS	EA	1	1	1	1	1	1	1	1	1	1
B102	148-00026-0000		SYNCHRO CONT XFMR	EA	-	1	-	1	-	1	-	1	-	1
R101	133-00096-0029		RES VA 1K HW 10%	EA	1	1	1	1	1	1	1	1	1	1
R102	133-00096-0029		RES VA 1K HW 10%	EA	1	1	1	1	1	1	1	1	1	1
REF1	300-01923-0002		FINAL ASSY DWG	EA	X	X	X	X	X	X	X	X	X	X

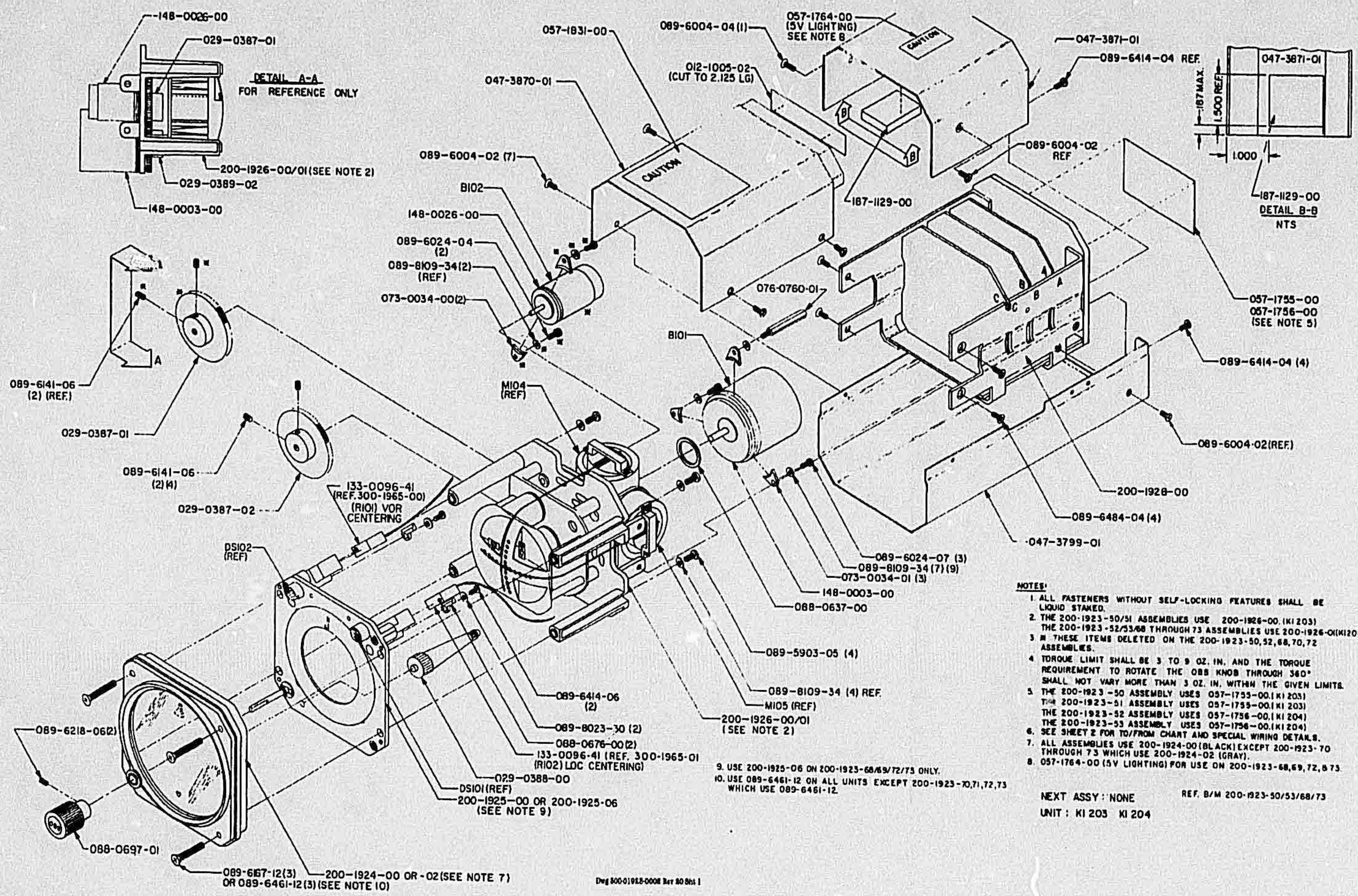
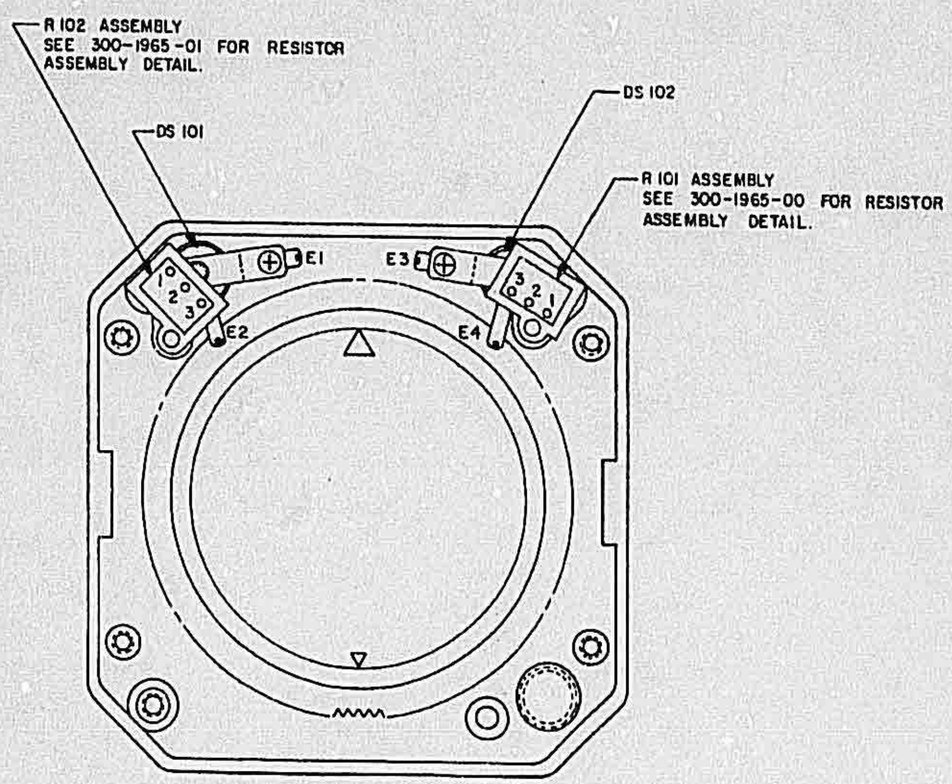


FIGURE 6-2 Final Assembly KI 203, KI 204 (S/N 9,999 and Below) (Sht 1 of 2) (Dwg No 300-01923-0002, Rev 20, Sht 1)



BEZEL ASSEMBLY
(REAR VIEW)

Dwg 300-01923-0002 Rev 20 Sht 2

WIRING INFORMATION

FROM	TO	PART NO.	DESCRIPTION	LENGTH	REMARKS
E 1	E 3	025-0018-79	*26 VIOLET/ WHITE	.20	+14 V LIGHTS HIGH
	E 3	150-0020-10	SHRINK TUBING	.20	INSULATE E 3
E 1	E 121	025-0018-79	*26 VIOLET/ WHITE	.50	+14 V LIGHTS HIGH
	E 1	150-0020-10	SHRINK TUBING	.20	INSULATE E 1
E 2	E 122	025-0018-89	*26 GRAY/ WHITE	.70	LIGHTS LOW
	E 2	150-0020-10	SHRINK TUBING	.20	INSULATE E 2
E 4	E 101	025-0018-69	*26 BLUE/ WHITE	.70	+28 V LIGHTS HIGH
	E 4	150-0020-10	SHRINK TUBING	.20	INSULATE E 3
R 101-1	E 125	025-0018-94	*26 WHITE/ YELLOW	.70	VOR CENTERING POT HIGH
	R 101-1	150-0018-10	SHRINK TUBING	.20	INSULATE R 101-1
R 101-2	R 101-3	NONE	COMPONENT LEAD	——	BEND LEAD AROUND R 101-3 AND SOLDER
R 101-3	E 106	025-0018-91	*26 WHITE / BROWN	.70	VOR CENTERING POT LOW
	R 101-3	150-0018-10	SHRINK TUBING	.20	INSULATE R101-3
R 102-1	E 126	025-0018-93	*26 WHITE/ORANGE	.50	ILS CENTERING POT HIGH
	R102-1	150-0018-10	SHRINK TUBING	.20	INSULATE R102-1
R 102-2	R102-3	NONE	COMPONENT LEAD	——	BEND LEAD AROUND R 102-3 AND SOLDER
R 102-3	E 107	025-0018-97	*26 WHITE/VIOLET	.50	ILS CENTERING POT LOW
	R 102-3	150-0018-10	SHRINK TUBING	.20	INSULATE R 102-3
B 101	E 114	COMPONENT WIRE	GREEN	.75	RESOLVER ROTOR HIGH
B 101	E 115	" "	BLACK	.75	RESOLVER ROTOR LOW
B 101	E 106	" "	YELLOW	.75	RESOLVER "STATOR D" OUT
B 101	E 128	" "	BLUE	.75	RESOLVER "STATOR F" OUT
B 101	E 113	" "	BROWN	.75	RESOLVER "STATOR COMMON"
B 102	E 108	" "	RED / WHITE	.75	COURSE DATUM OUTPUT HIGH
B 102	E 109	" "	BLACK/WHITE	.75	COURSE DATUM OUTPUT LOW
B 102	E 110	" "	YELLOW	.75	COMPASS HEADING INPUT "X"
B 102	E 130	" "	BLUE	.75	COMPASS HEADING INPUT "Y"
B 102	E 129	" "	BLACK	.75	COMPASS HEADING INPUT "Z"
M 101	E 124	" "	GREEN / WHITE	.75	TO/ FROM METER NEGATIVE
M 101	E 104	" "	YELLOW/ WHITE	.75	TO/ FROM METER POSITIVE
M 102	E 123	" "	GRAY	.75	VOR/LOC WARNING FLAG POSITIVE
M 102	E 116	" "	WHITE	.75	VOR/LOC WARNING FLAG NEGATIVE
M 103	E 111	" "	BROWN/ WHITE	.75	GLIDE SLOPE WARNING FLAG POSITIVE
M 103	E 112	" "	ORANGE / WHITE	.75	GLIDE SLOPE WARNING FLAG NEGATIVE
M 104	E 127	" "	ORANGE / RED	.75	VOR/LOC DEVIATION METER +
M 104	E 117	" "	ORANGE / BLACK	.75	VOR/LOC DEVIATION METER —
M 105	E 119	" "	ORANGE / RED	.75	GLIDE SLOPE DEVIATION METER +
M 105	E 118	" "	ORANGE/ BLACK	.75	GLIDE SLOPE DEVIATION METER —

TWIST THESE COMPONENT WIRES TOGETHER BEFORE BUNDLING THEM INTO A WIRING HARNESS.

TWIST THESE COMPONENT WIRES TOGETHER BEFORE BUNDLING THEM INTO A WIRING HARNESS.

REF B/M 200-1923-50/53

FIGURE 6-2 Final Assembly KI 203, KI 204 (S/N 9,999 and Below) (Sht 2 of 2)
(Dwg No 300-01923-0002, Rev 20, Sht 2)

BOM 4: Bezel Assembly

200-01924-0000 BEZEL ASSY BLK REV AA
200-01924-0002 BEZEL ASSY GRY REV AA

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000	-0002
_	012-05004-0000		LENS	EA	1	1
_	073-00411-0003		BEZEL W/H BLACK	EA	1	-
_	073-00411-0005		BEZEL W/H GRAY	EA	-	1
_	088-00622-0001		LIGHTING WEDGE	EA	1	1
_	088-00622-0003		WEDGE	EA	-	-
_	088-00764-0002		BEZEL	EA	-	-
_	089-06077-0003		SCR PHP 2-56X3/16	EA	3	3
_	091-00166-0000		RETAINER	EA	3	3
_	187-01023-0002		GSKT FIBER	EA	1	1
REF	300-01924-0000		BEZEL ASSY DWG	RF	X	-

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THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

NAME. BEZEL ASSEMBLY UNIT: KI 0202,203,204 206,207 ASSY NO: 200-1924-00/01

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	QUANTITY -01
	200-1924-00	KI202,203,204-206		X	
	200-1924-01	KI 207			X
	012-5004-00	LENS		1	1
	088-0764-02	BEZEL		-	1
	088-0621-03	BEZEL		1	-
	088-0622-01	WEDGE, LIGHTING		1	-
	088-0622-03	WEDGE, LIGHTING		-	1
	089-6077-03	SCR PHP #2-56 BLK		3	3
	091-0166-00	RETAINER		3	3

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

NAME: BEZEL ASSEMBLY
ASSY DWG: 300-1924-00/01

ENGR APPROVAL: ELMER W. HUBENER
ASSY NO: 200-1924-00/01
UNIT: KI 0202,203,204, 206, 207
USED ON: 066-3034-00/06

REV	CO NO	SYMBOL	PART NUMBER	DESCRIPTION
1				
				KI 203/204/206/207 MAINTENANCE MANUAL REVISION 0, APRIL, 1976
2			089-6077-03	P/N CHG FROM 091-0055-00
3			200-1924-00	P/N ADDED TO B/M
			200-1924-01	P/N ADDED TO B/M
			088-0764-02	P/N ADDED TO B/M
				QTY'S ADDED ON -01 FLAVOR
4			088-0622-01	QTY IN -01 CHG FROM 1 TO -
			088-0622-03	P/N ADDED TO B/M
5			200-1924-00	ADDED KI 202 TO UNIT LISTING
				TYPED ON WORD PROCESSOR
				KI 202/203/204/206/207 MAINTENANCE MANUAL REV. 1, SEPT., 1979

NOTES:
1.) ALL FASTENERS WITHOUT SELF-LOCKING FEATURES SHALL BE LIQUID STAKED.
2.) PART NO.'S 012-5004-00 AND 088-0622-01/03 MUST BE STATIC FREE AND FREE OF FOREIGN PARTICALS, I.E. LINT & DUST.

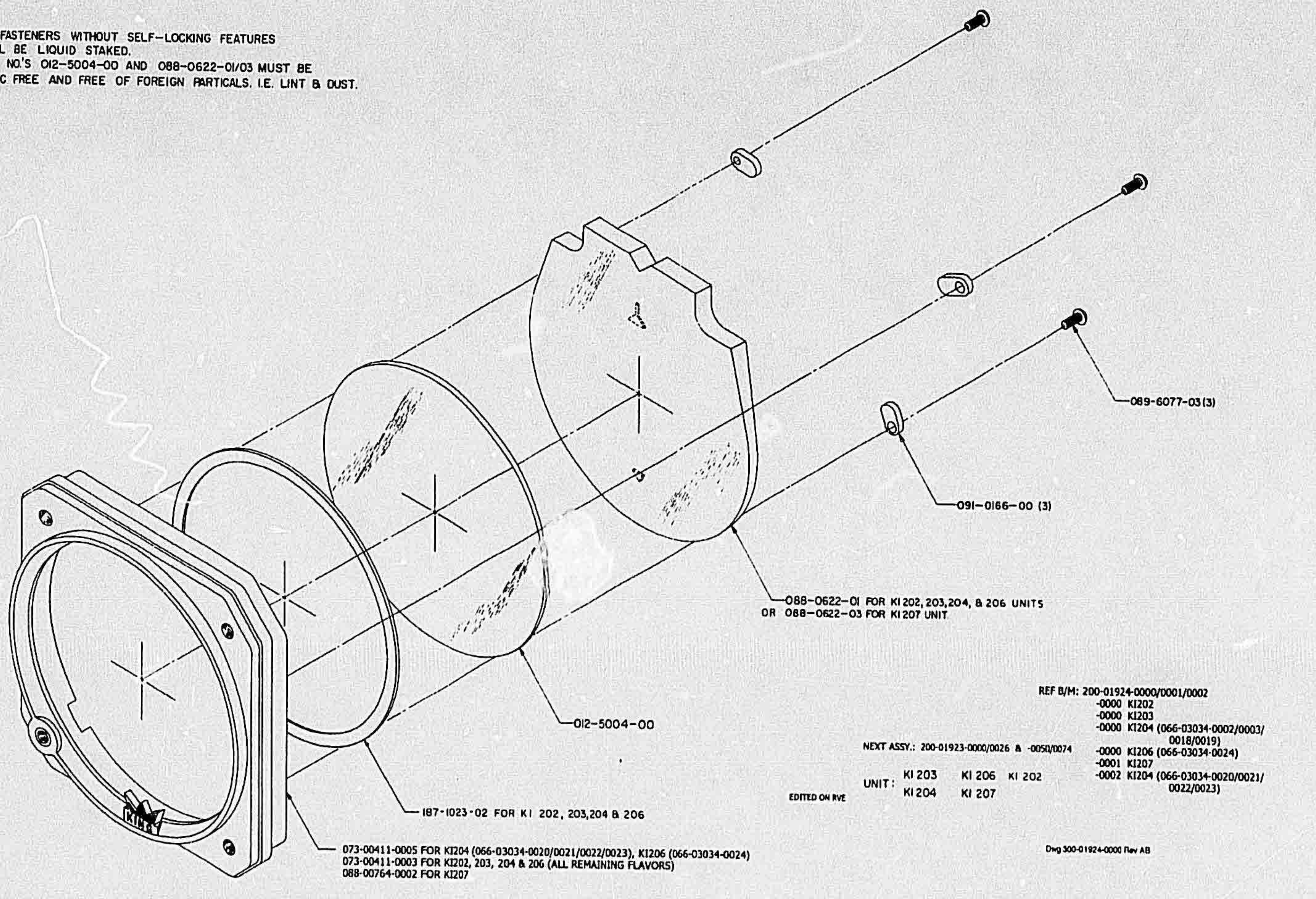

FIGURE 6-3 Bezel Assembly
(Dwg No 300-01924-0000, Rev AB)

BOM 5: Gear Plate Assembly

200-01925-0000 KI203/KI204 FRNT GR PLT REV A/\
200-01925-0006 KI204 FRNT GR PLT 5V LGT REV AC

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000	-0006
_	008-00075-0000		LAMP CONTACT	EA	2	2
_	029-00287-0004		GEAR RING 64P	EA	1	1
_	029-00386-0001		GEAR 24T DR	EA	1	1
_	047-03794-0001		CNTCT LAMP W/F	EA	2	2
_	088-00193-0008		FLTR LMP BL/WHT	EA	2	-
_	088-00624-0000		FRONT GEAR PLT	EA	1	1
_	088-00625-0000		A VARI RES MTG	EA	1	1
_	088-00626-0000		B VARI RES MTG	EA	1	1
_	088-00695-0002		AZIMUTH DIAL	EA	1	1
_	088-03291-0001		FILTER, LAMP	EA	-	2
_	089-06414-0004		SCR PHP 2-28X1/4	EA	4	4
_	089-08025-0030		WSHR FLT STD #4	EA	1	1
_	089-08076-0030		WSHR FLT STD .130	EA	1	1
_	089-08105-0005		WASHER	A	1	1
_	089-08205-0001		WSHR FELT .125	A	1	1
_	090-00019-0000		RING RTNR .125	EA	1	1
_	090-00033-0003		SPRING WASHER	EA	1	1
_	091-00203-0003		SCR FHS 0-80X.187	EA	3	3
DS101	037-00007-0001		LMP 8918 T1-3/4 14	EA	1	-
DS101	037-00199-0000		DUAL BULB ASSY	EA	-	1
DS102	037-00007-0001		LMP 8918 T1-3/4 14	EA	1	-
DS102	037-00199-0000		DUAL BULB ASSY	EA	-	1
REF	300-01925-0000		FRONT GEAR PLATE ASSY	RF	-	X

THIS PAGE RESERVED

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

NAME: FRONT GEAR PLATE ASSEMBLY UNIT: KI 0202,203,204, 206,207 ASSY NO: 200-1925-00/02

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02
	200-1925-00	KI 203, KI 204		X		
	200-1925-01	KI 206, KI 202			X	
	200-1925-02	KI 207				X
	008-0075-00	CONTACT, LAMP		2	2	2
	029-0287-04	GEAR, RING 165T		1	1	1
	029-0386-01	GEAR, 24 TOOTH DR		1	1	-
	047-3794-01	CONTACT, LAMP SPR		2	2	2
	088-0193-04	FILTER, LAMP		2	2	2
	088-0695-02	CARD, AZIMUTH DIAL		1	1	-
	088-0624-01	PLATE, FRONT GEAR		1	1	1
	088-0625-00	FIX-A-VAR RES MTG		1	-	-
	088-0626-00	FIX-B-VAR RES MTG		1	-	-
	088-0638-01	DIAL CARD		-	-	1
	089-6416-04	SCR PHP #2-28		4	2	2
	089-8105-05	WASHER, FELT		1	1	1
	089-8076-30	WASHER, FLAT		1	1	-
	089-8025-30	WASHER, FLAT		1	1	-
	089-8205-01	WASHER, FELT		1	1	-
	090-0019-00	RETAINER		1	1	-
	090-0033-03	WASHER, WAVE		1	1	-
	091-0203-03	SCR FHS #0-80X1/8		3	3	3
DS101	037-0007-01	LAMP, T-1 3/4 14V		2	2	2
DS102	037-0007-01	LAMP, T-1 3/4 14V		-	-	-

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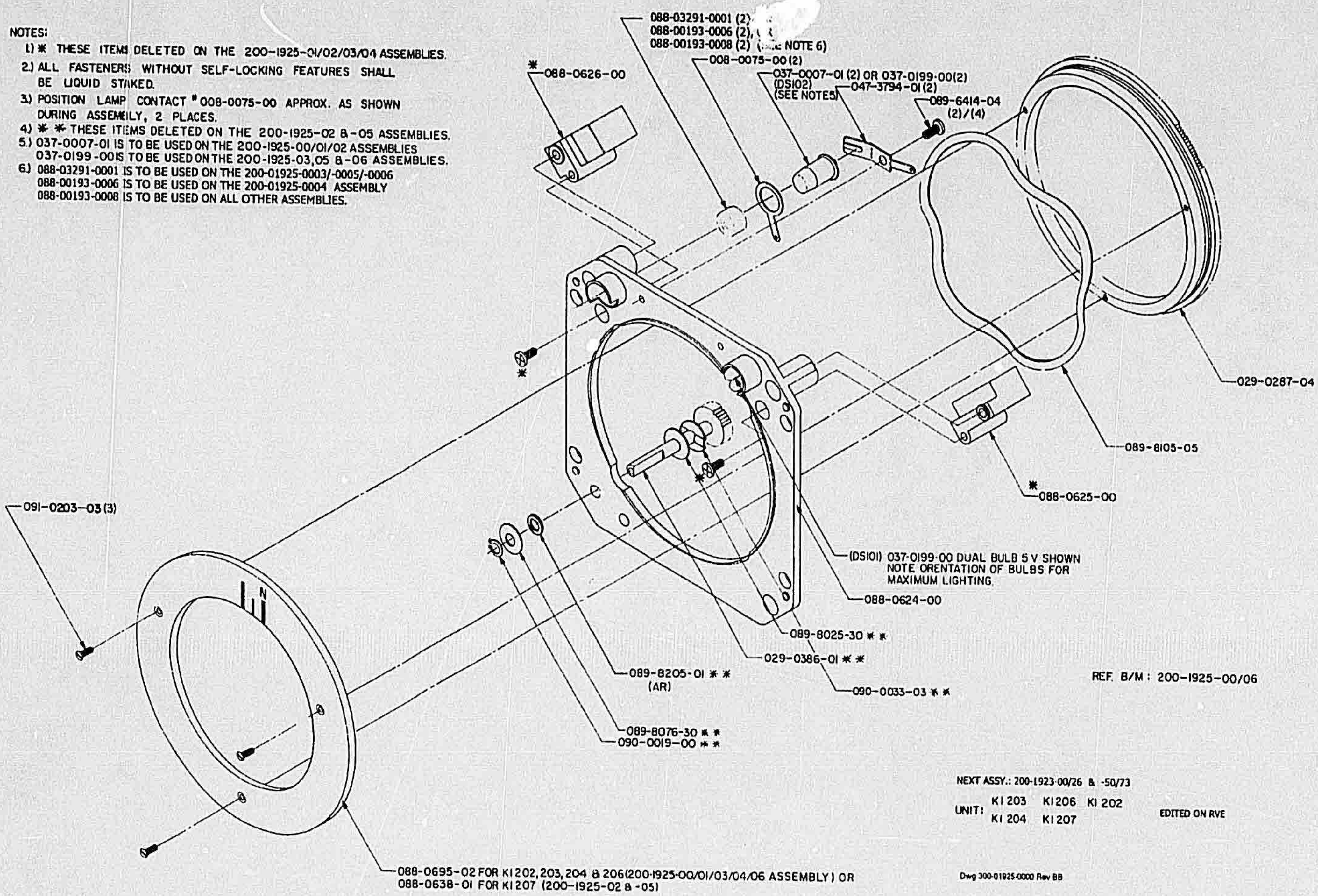
ENGR APPROVAL: ELMER W. HUBENER

NAME: FRONT GEAR PLATE ASSEMBLY
ASSY NO: 200-1925-00/02
ASSY DWG: 300-1925-00/02
UNIT: KI 0202,203,204, 206,207
USED ON: 060-3034-00/06

REV	CO NO	SYMBOL	PART NUMBER	DESCRIPTION
1				
2				
3				
4				
5				
6				
				KI 203/204/206/207 MAINTENANCE MANUAL REVISION 0, APRIL 1976
7			089-8205-01	ADDED TO B/M
8			089-8105-05	P/N CHG FROM 089-8105-04
9			029-0287-04	P/N CHG FROM 029-0287-01
10			200-1925-00	ADDED TO B/M
			200-1925-01	ADDED TO B/M
			200-1925-02	ADDED TO B/M
			088-0638-01	ADDED TO B/M
11			200-1925-01	ADDED KI 202 TO UNIT LISTING
				TYPED ON WORD PROCESSOR
12			091-0203-03	P/N CHG FROM 091-0203-02
				KI 202/203/204/206/207 MAINTENANCE MANUAL REV. 1, SEPTEMBER, 1979

NOTES:

1) * THESE ITEMS DELETED ON THE 200-1925-01/02/03/04 ASSEMBLIES.
2.) ALL FASTENERS WITHOUT SELF-LOCKING FEATURES SHALL BE LIQUID STAKED.
3) POSITION LAMP CONTACT # 008-0075-00 APPROX. AS SHOWN DURING ASSEMBLY, 2 PLACES.
4) * * THESE ITEMS DELETED ON THE 200-1925-02 & -05 ASSEMBLIES.
5.) 037-0007-01 IS TO BE USED ON THE 200-1925-00/01/02 ASSEMBLIES
037-0199-00 IS TO BE USED ON THE 200-1925-03,05 & -06 ASSEMBLIES.
6.) 088-03291-0001 IS TO BE USED ON THE 200-01925-0003/-0005/-0006
088-00193-0006 IS TO BE USED ON THE 200-01925-0004 ASSEMBLY
088-00193-0008 IS TO BE USED ON ALL OTHER ASSEMBLIES.



REF. B/M: 200-1925-00/06

NEXT ASSY.: 200-1923-00/26 & -50/73

UNIT: KI 203 KI206 KI 202
KI 204 KI207

EDITED ON RVE

Dwg 300-01925-0000 Rev BB

FIGURE 6-4 Gear Plate Assembly
(Dwg No 300-01925-0000, Rev BB)

BOM 6: Meter Assembly

200-01926-0000 3 METER ASSY REV 8
200-01926-0001 5 METER ASSY REV 9

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000	-0001
–	088-00629-0002		REAR GEAR PLT	EA	1	1
–	089-06022-0004		SCR SHC 2-56X1/4	EA	-	2
–	089-06022-0005		SCR SHC 2-56X5/16	EA	4	4
–	089-06022-0006		SCR SHC 2-56X3/8	EA	1	1
–	089-06414-0004		SCR PHP 2-28X1/4	EA	4	4
–	089-08023-0030		WSHR FLT STD #2	EA	2	4
–	091-00282-0000		SHIM	EA	1	2
–	091-00282-0001		SHIM .010	EA	2	2
–	091-00282-0002		SHIM .020	EA	2	2
–	091-00282-0003		SHIM .030	EA	2	2
–	200-01927-0000		FLAG ASSY	EA	1	-
–	200-01927-0001		FLAG ASSY	EA	-	1
M104	023-00129-0000		METER VOR HGA VIB	EA	1	1
M105	023-00120-0000		IND GSI VOR/LOC	EA	-	1

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NAME: METER ASSEMBLY UNIT: KI 0203,204, 206,207 ASSY NO: 200-1926-00/01

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01
	200-1926-00	USED IN KI 203		X	
	200-1926-01	USED IN KI204,206/7			X
	200-1927-00	FLAG ASSY (KI203)		1	0
	200-1927-01	FLAG ASSEMBLY		0	1
	088-0629-02	PLATE REAR GEAR		1	1
	089-6022-04	SCR SHC #2056X1/4		0	2
	089-6022-05	SCR SHC #2-56X5/16		4	4
	089-6022-06	SCR SHC #2-56X3/8		1	1
	089-6414-04	SCR PHP #2-28X1/4		4	4
	089-8023-30	WASHER FLAT		2	4
	091-0282-00	SHIM .010 THK		1	2
	091-0282-01	SHIM .010 THK		2	2
	091-0282-02	SHIM .020 THK		2	2
	091-0282-03	SHIM .030 THK		2	2
M104	023-0129-00	INDICATOR VOR		1	1
M102	023-0120-00	INDICATOR GS		0	1

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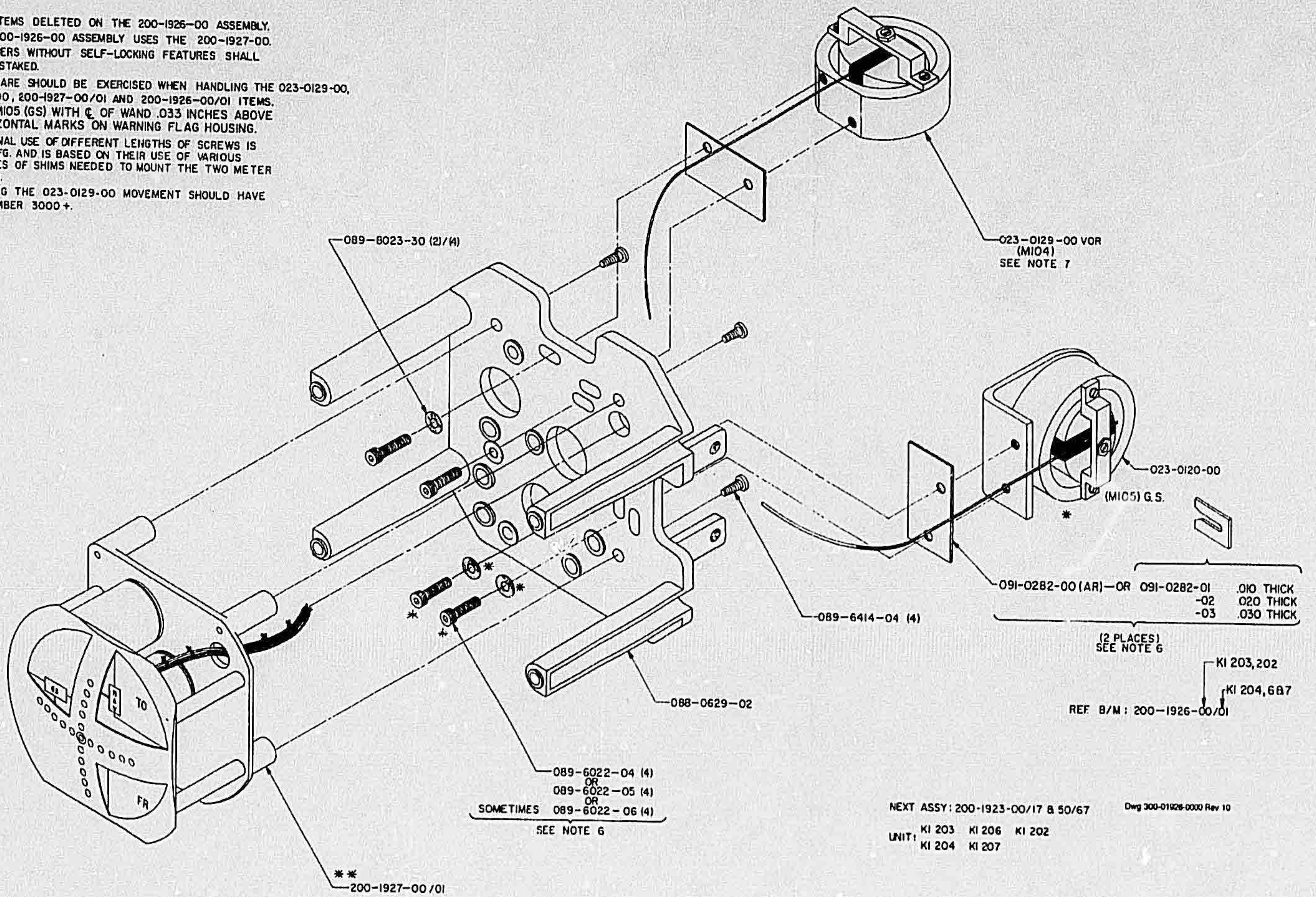
NAME: METER ASSEMBLY
ASSY DWG: 300-1926-00/01

ENGR APPROVAL:
ASSY NO: 200-1926-00/01
UNIT: KI 0203,204, 206,207
USED ON: 066-3034-00/01

REV	CO NO	SYMBOL	PART NUMBER	DESCRIPTION
1				
2				
				KI 203/204/206/207 MAINTENANCE MANUAL REVISION 0, APRIL, 1976
3			091-0282-00	DESC ADDED TO B/M
			091-0282-01	P/N ADDED TO B/M
			091-0282-02	P/N ADDED TO B/M
			091-0282-03	P/N ADDED TO B/M
			200-1926-00	P/N ADDED TO B/M
			200-1926-01	P/N ADDED TO B/M
4			089-6022-06	P/N ADDED TO B/M
			089-6022-05	QTY CHG FROM 2 ON EACH TO 4 ON EACH
			091-0282-00	QTY CHG FROM AR TO 1 & 2 ON EACH
			091-0282-01 THRU 091-0282-03	QTY CHG FROM AR TO 2 ON EACH
5		M104	023-0129-00	P/N CHG FROM 023-0120-00
		M105	023-0120-00	QTY CHG FROM - TO 1, DESC CHG FROM INDICATOR GS & VOR TO INDICATOR GS
6				UNITS SHOULD NOT BE MARKED AS MOD. 2 AS DESIGNATED IN E.C.O. 24061 BUT RATHER HAS S/N 3000+
7			200-1926-00	ADDED KI 202 TO UNIT LISTING TYPED ON WORD PROCESSOR
8			200-1926-00	KI 202 DELETED FROM HEADING KI 202 DELETED FROM DESC
				KI 202/203/204/206/207 MAINTENANCE MANUAL REVISION 1, SEPTEMBER, 1979

NOTES:

1) * THESE ITEMS DELETED ON THE 200-1926-00 ASSEMBLY.
2) ** THE 200-1926-00 ASSEMBLY USES THE 200-1927-00.
3) ALL FASTENERS WITHOUT SELF-LOCKING FEATURES SHALL BE LIQUID STAKED.
4) EXTREME CARE SHOULD BE EXERCISED WHEN HANDLING THE 023-0129-00, 023-0120-00, 200-1927-00/01 AND 200-1926-00/01 ITEMS.
5) POSITION M105 (GS) WITH ℄ OF WAND .033 INCHES ABOVE ℄ OF HORIZONTAL MARKS ON WARNING FLAG HOUSING.
6.) THIS OPTIONAL USE OF DIFFERENT LENGTHS OF SCREWS IS LEFT TO MFG. AND IS BASED ON THEIR USE OF VARIOUS THICKNESSES OF SHIMS NEEDED TO MOUNT THE TWO METER MOVEMENTS.
7) UNITS USING THE 023-0129-00 MOVEMENT SHOULD HAVE SERIAL NUMBER 3000+.



NEXT ASSY: 200-1923-00/17 & 50/67

Dwg 300-01926-0000 Rev 10

UNIT: KI 203 KI 206 KI 202
KI 204 KI 207

FIGURE 6-5 Meter Assembly
(Dwg No 300-01926-0000, Rev 10)

BOM 7: Flag Assembly

200-01927-0000 FLAG ASSY REV 6
200-01927-0001 FLAG ASSY REV 6

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000	-0001
_	088-00627-0002		WARN HOUSING	EA	1	-
_	088-00627-0003		WARN HOUSING	EA	-	1
_	088-00628-0000		METER MTG PLT	EA	1	1
_	089-05898-0003		SCR PHP 2-64X3/16	EA	4	6
_	089-06292-0004		SCR PHP 2-56X1/4	EA	4	4
_	091-00279-0000		METER SPACER	AR	0	0
M101	023-00023-0001		FLAG TO/FROM	EA	1	1
M102	023-00121-0000		FLAG WARN VOR/LOC	EA	1	1
M103	023-00122-0000		FLAG WARN GS	EA	-	1

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NAME: FLAG ASSEMBLY
ASSY DWG: 300-1927-00/01
ENGR APPROVAL:
ASSY NO: 200-1927-00/01
UNIT: KI 0203,204, 206,207
USED ON: 200-1926-00/02

REV	CO NO	SYMBOL	PART NUMBER	DESCRIPTION
1				
				KI 203/204/206/207 MAINTENANCE MANUAL REVISION 0, APRIL, 1976
2			089-5898-03	P/N CHG FROM 089-5899-03
			089-6292-04	P/N CHG FROM 089-6414-04
3		M101	023-0023-01	P/N CHG FROM 023-0023-00
4			200-1927-00/01	ADDED KI 202 TO UNIT LISTING TYPED ON WORD PROCESSOR
5				ASSY DWG NO CHG TO 300-1927-00/01
6				DELETED KI 202 FROM UNIT HEADING
				KI 202/203/204/206/207 MAINTENANCE MANUAL REVISION 1, SEPEMBER, 1979

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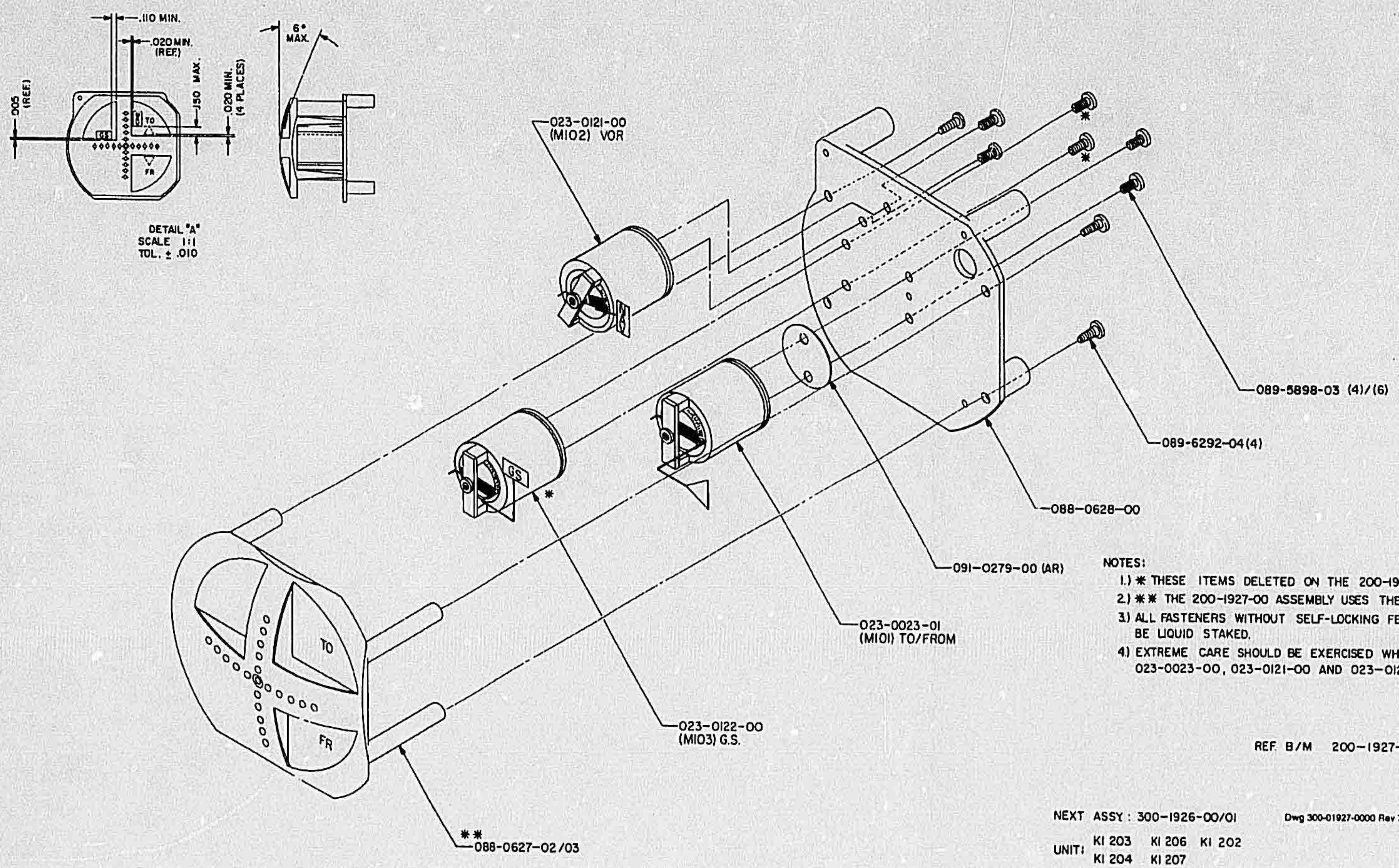

NOTES:

1.) ✱ THESE ITEMS DELETED ON THE 200-1927-00 ASSEMBLY.
2.) ✱✱ THE 200-1927-00 ASSEMBLY USES THE 088-0627-02.
3.) ALL FASTENERS WITHOUT SELF-LOCKING FEATURES SHALL BE LIQUID STAKED.
4.) EXTREME CARE SHOULD BE EXERCISED WHEN HANDLING THE 023-0023-00, 023-0121-00 AND 023-0122-00 ITEMS.

REF. B/M 200-1927-00/01

NEXT ASSY: 300-1926-00/01 Dwg 300-01927-0000 Rev 7

UNIT: KI 203 KI 206 KI 202
KI 204 KI 207

FIGURE 6-6 Flag Assembly
(Dwg No 300-01927-0000, Rev 7)

BOM 8: Converter Assembly

200-01928-0000 CONVERTER ASSY REV 8
200-01928-0001 CONVERTER ASSY REV 8

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000	-0001
–	047-03796-0001		CHAS LEFT W/FNSH	EA	1	1
–	047-03797-0001		RIGHT CHASSIS	EA	1	-
–	047-04810-0001		CHSS R/SIDE	EA	-	1
–	088-00578-0002		CONN COVER 2.312	EA	1	1
–	088-00630-0001		REAR MTG PLT	EA	1	1
–	089-05436-0004		SCR,MACH,4-40,FH82,PH	EA	2	2
–	089-06294-0004		SCR PHP 4-4X1/4	EA	4	4
–	089-06484-0004		SCR PHP 2-28X1/4	EA	2	2
–	200-05798-0000		MOTHER BD ASSY	EA	1	1
–	200-05799-0000		CONV #1 BD ASSY	EA	1	1
–	200-05800-0000		CONV #2 BD ASSY	EA	1	1
–	200-05801-0000		P/S & FLAG BD ASSY	EA	1	1
–	300-01928-0000		CONVERTER ASSY DWG	RF	X	X

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NAME Converter Assembly

ASS'Y. NO. 200-1928-00/01

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
	047-3796-01	Chassis Left		1	1			
	047-3797-01	Chassis Right		1	-			
	047-4810-01	Chassis Right		-	1			
	088-0630-01	Plate Rear Mounting		1	1			
	089-6294-04	Screw PHP #4-40x¼ T.T		4	4			
	089-6299-04	Screw FHP #4-40x¼ T.T.		2	2			
	089-6484-04	Screw FHP #2-28 x ¼		2	2			
	200-5798-00	Mother Board Assy		1	1			
	200-5799-00	Converter Board #1 Assy		1	1			
	200-5800-00	Converter Board #2 Assy		1	1			
	200-5801-00	Power Sup & Flag Bd Assy		1	1			

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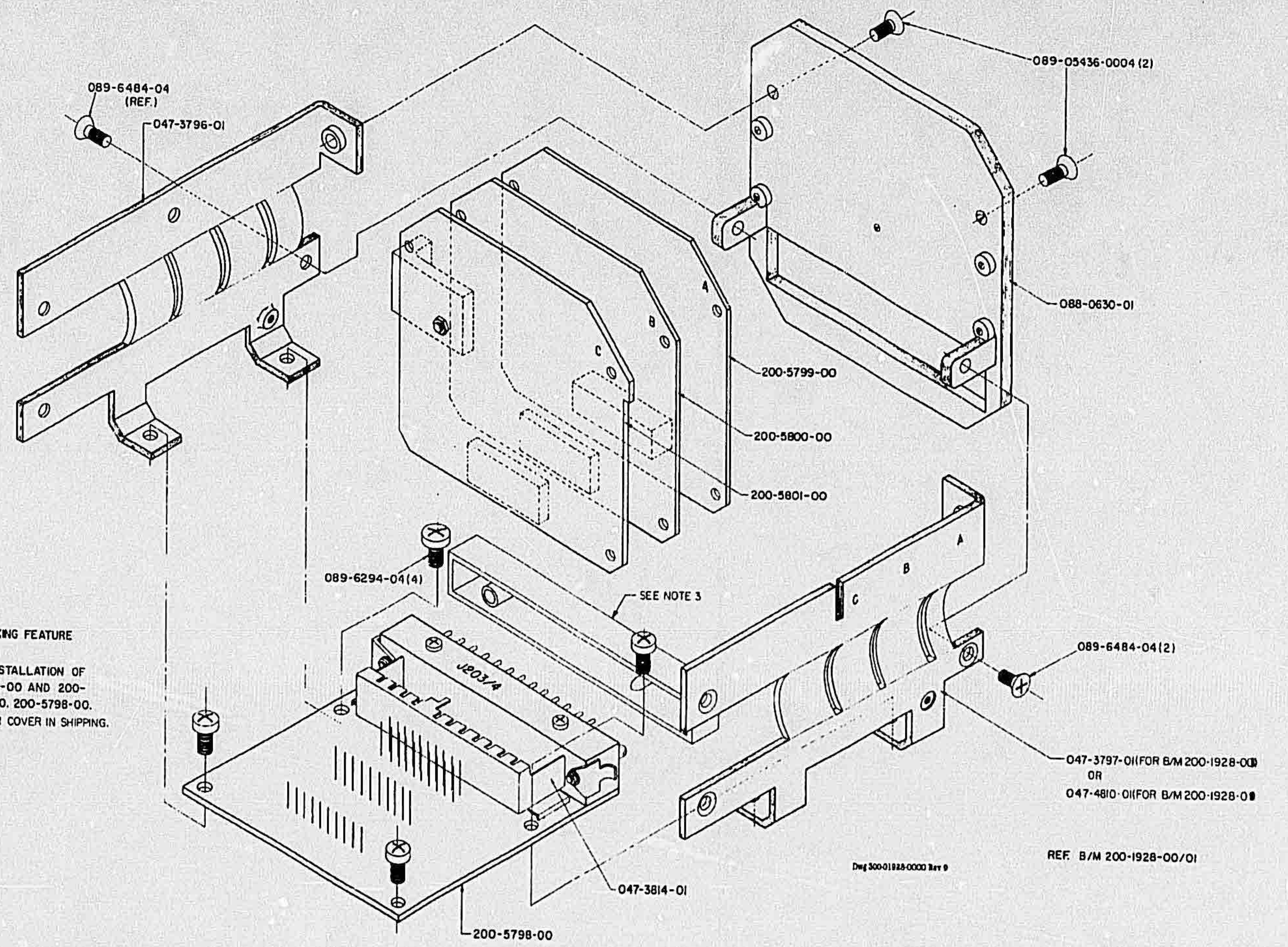
PARTS LIST REVISION HISTORY		ENGR. APPROVAL	Elmer W. Holmes
NAME	Converter Assembly	ASS'Y. NO.	200-1928-00/01
ASS'Y. DWG. 300-1928-00	UNIT KI 203,204	USED ON	066-3034-00/03

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION
1				
2				
				KI 203/204 Maintenance Manual Revision 0, April 1976
3			089-6299-04	Qty. changed from 3 to 2
4				-01 added to P/N.
5			047-4810-01	Added to B/M.
			047-3796-01	Added to -01
			088-0630-01	Added to -01
			089-6294-04	Added to -01
			089-6299-04	Added to -01
			089-6484-04	Added to -01
			200-5798-00	Added to -01
			200-5799-00	Added to -01
			200-5800-00	Added to -01
			200-5801-00	Added to -01
				KI 203/204 MAINTENANCE MANUAL REV. 1, SEPT., 1979



NOTES:

1. ALL FASTENERS WITHOUT SELF-LOCKING FEATURE SHALL BE LIQUID STAKED.
2. EXTREME CARE REQUIRED DURING INSTALLATION OF PART NO.'S 200-5799-00, 200-5800-00 AND 200-5801-00 INTO POSITION ON PART NO. 200-5798-00.
3. INSTALL 088-00578-0002 CONNECTOR COVER IN SHIPPING.

FIGURE 6-7 Converter Assembly (Dwg No 300-01928-0000, Rev 9)

BOM 9: Converter Asembly

200-01928-0010 CONVERTER ASSY REV A
200-01928-0011 CONVERTER ASSY REV A

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0010	-0011
–	047-03796-0001		CHAS LEFT W/FNSH	EA	1	1
–	047-03797-0001		RIGHT CHASSIS	EA	1	-
–	047-04810-0001		CHSS R/SIDE	EA	-	1
–	088-00578-0002		CONN COVER 2.312	EA	1	1
–	088-00630-0001		REAR MTG PLT	EA	1	1
–	089-05436-0004		SCR,MACH,4-40,FH82,PH	EA	2	2
–	089-06294-0004		SCR PHP 4-4X1/4	EA	4	4
–	089-06484-0004		SCR PHP 2-28X1/4	EA	2	2
–	200-05798-0000		MOTHER BD ASSY	EA	1	1
–	200-05799-0010		CONVERTER #1 BOARD	EA	1	1
–	200-05800-0001		CONVERTER #2 BOARD	EA	1	1
–	200-05801-0010		POWR SUPPLY AND FLAG	EA	1	1
–	300-01928-0010		CONVERTER ASSY DWG	RF	X	X

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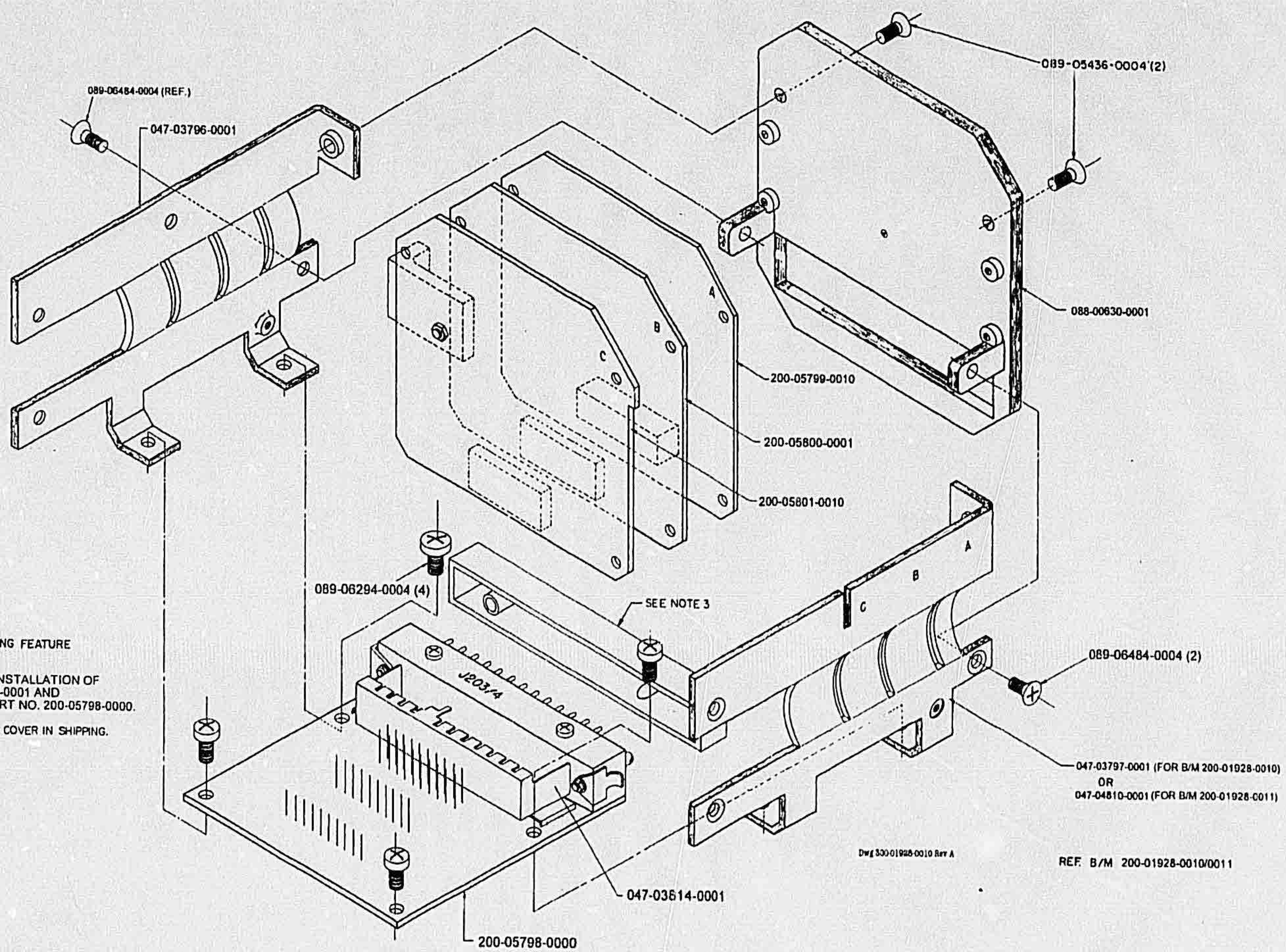

NOTES:

1. ALL FASTENERS WITHOUT SELF-LOCKING FEATURE SHALL BE LIQUID STAKED.
2. EXTREME CARE REQUIRED DURING INSTALLATION OF PART NO.'S 200-05799-0010, 200-05800-0001 AND 200-05801-0010 INTO POSITION ON PART NO. 200-05798-0000.
3. INSTALL 088-00578-0002 CONNECTOR COVER IN SHIPPING.

FIGURE 6-8 Converter Assembly (Dwg No 300-01928-0010, Rev A)

BOM 10: Mother Board Assembly

200-05798-0000 MOTHER BD ASSY REV 11

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000
_	009-05798-0001		PC BD MTHR	EA	1
_	013-00006-0004		FERR BEAD	EA	25
_	016-01071-0000		DC RTV 3140	AR	0
_	030-02270-0001		CONN 30P W/BUTTON	EA	1
_	047-03814-0001		CONN CVR RF SHLD	EA	1
_	089-02005-0037		NUT STD HEX 2-56 SS	EA	2
_	089-05899-0010		SCR PHP 2-56X5/8	EA	2
_	089-08001-0034		WSHER PLT LK #2	EA	2
_	113-03121-0000		CAP DC 120PF 500V	EA	9
R201	026-00018-0000		WIRE CKTJMPR 22AWG	EA	0.16
R201	131-00101-0023		RES CF 100 QW 5%	EA	0.16
R201	131-00201-0023		RES CF 200 QW 5%	EA	0.16
R201	131-00241-0023		RES CF 240 QW 5%	EA	0.16
R201	131-00301-0023		RES CF 300 QW 5%	EA	0.16
R201	131-00361-0023		RES CF 360 QW 5%	EA	0.16

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NAME: Mother Board Assembly

ASS'Y. NO.: 200-5798-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	-00	-01	-02	-03	-04
	016-1071-00	RTV Adhesive #3140		AR				
	009-5798-01	P/C Board		1				
	089-5899-10	Screw PHP 2-56x5/8		2				
	089-2005-37	Nut Hex #2-56		2				
	089-8001-34	Washer Lock #2		2				
	013-0006-04	Beads Ferrite		25				
L201/L225	047-3814-01	Conn Cover RF Shield		1				
J203/4	030-2270-01	Connector 30 Pin		1				
C201	113-3121-00	Cap 120pf D/C		9				
C202	113-3121-00	Cap 120pf D/C		-				
C203	113-3121-00	Cap 120pf D/C		-				
C204	113-3121-00	Cap 120pf D/C		-				
C205	113-3121-00	Cap 120pf D/C		-				
C206	113-3121-00	Cap 120pf D/C		-				
C207	113-3121-00	Cap 120pf D/C		-				
C208	113-3121-00	Cap 120pf D/C		-				
C209	113-3121-00	Cap 120pf D/C		-				
R201	130-0101-25	Res F/C 100Ω QW 10%		1				
	130-0201-23	Res F/C 200Ω QW 5%		1				
	026-0018-00	Circuit Jumper		1				
	130-0241-23	Res F/C 240Ω QW 5%		1				
	130-0301-23	Res F/C 300Ω QW 5%		1				
	130-0361-23	Res F/C 360Ω QW 5%		1				

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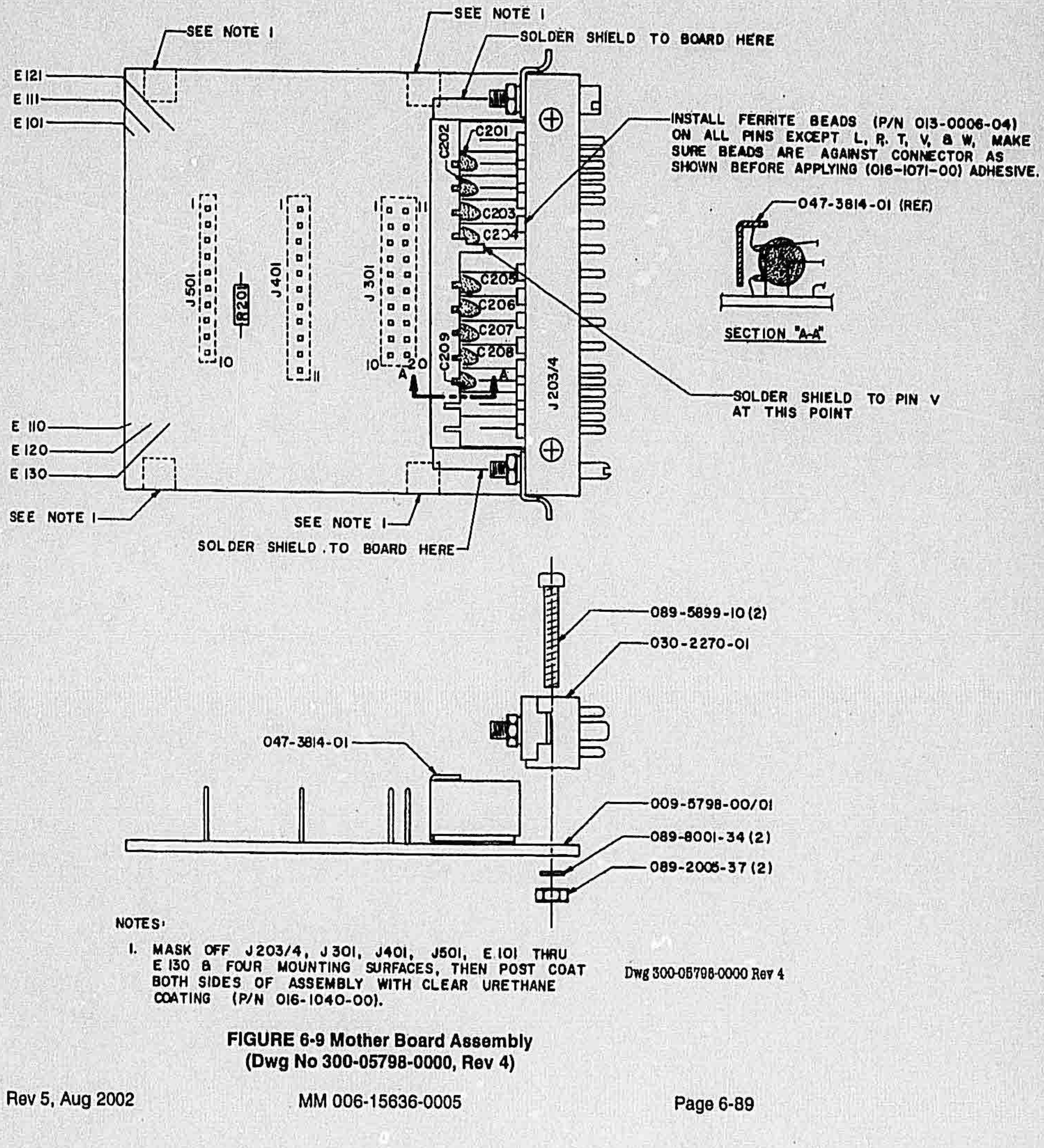
PARTS LIST REVISION HISTORY			ENGR. APPROVAL Elmer W. Hubbs	
NAME: Mother Board Assy			ASS'Y. NO. 200-5798-00	
ASS'Y. DWG. 300-5798-00		UNIT KI 203,204	USED ON 200-1928-00	
REV	**CHANGE**	**SYMBOL**	**PART NUMBER**	**DESCRIPTION**
1				
2				
3				
4				
				KI 203/204 Maintenance Manual Revision 0, April 1976
5			016-1071-00	Added to B/M
6			009-5798-01	P/N changed from 009-5798-00
			030-2174-01	Deleted from B/M
7		R201	130-0101-25	Added to B/M
8		R201	130-0201-25	Added to B/M
		R201	026-0018-00	Added toB/M
9		R201	130-0201-23	P/N changed from 130-0201-25
10		R201	130-0241-23	Added to B/M
			130-0301-23	Added to B/M
			130-0361-23	Added to B/M
				KI 203/204 MAINTENANCE MANUAL REV. 1, SEPT., 1979



NOTES:

1. MASK OFF J203/4, J301, J401, J501, E101 THRU E130 & FOUR MOUNTING SURFACES, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).

Dwg 300-05798-0000 Rev 4

FIGURE 6-9 Mother Board Assembly
(Dwg No 300-05798-0000, Rev 4)

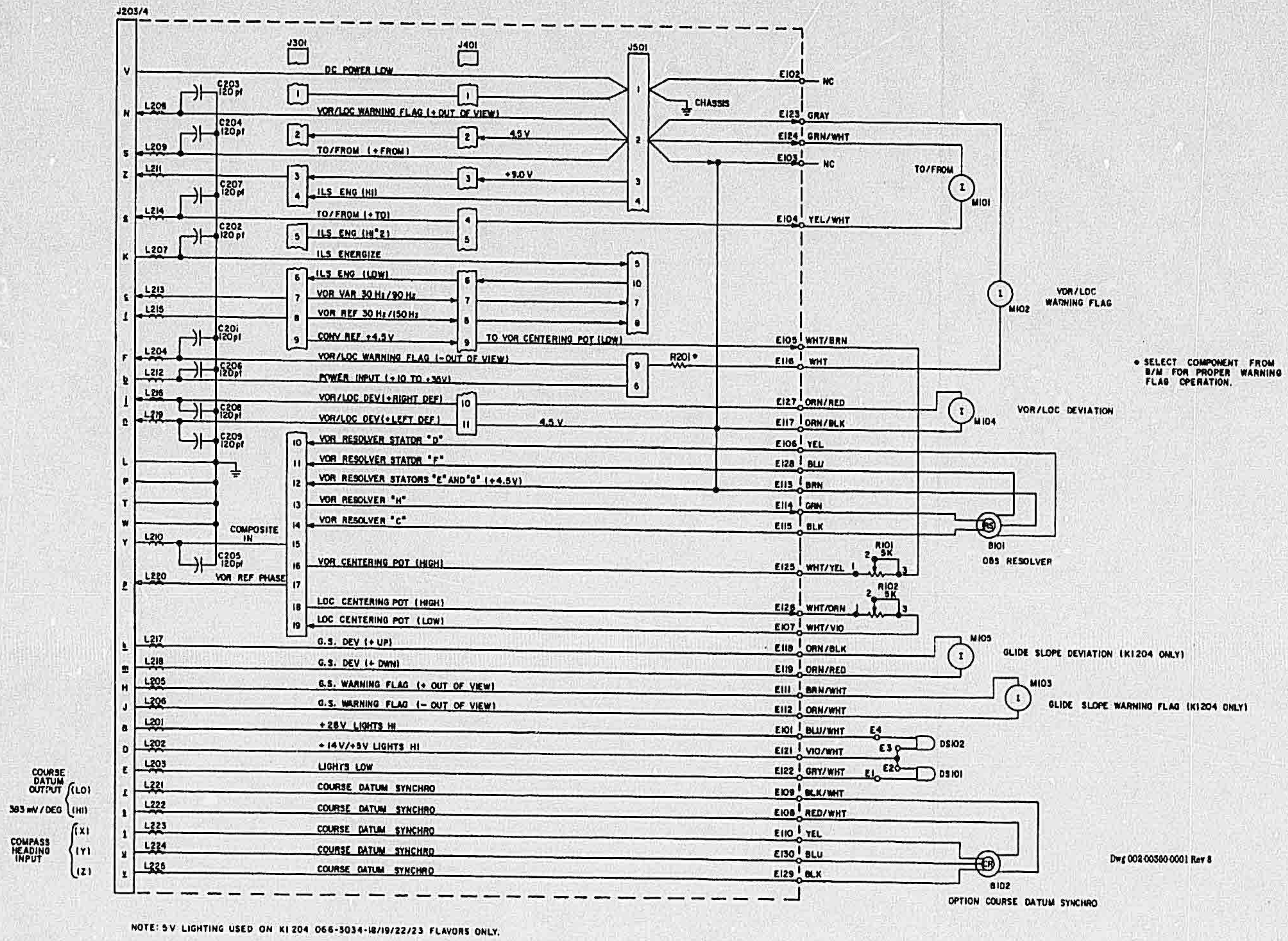
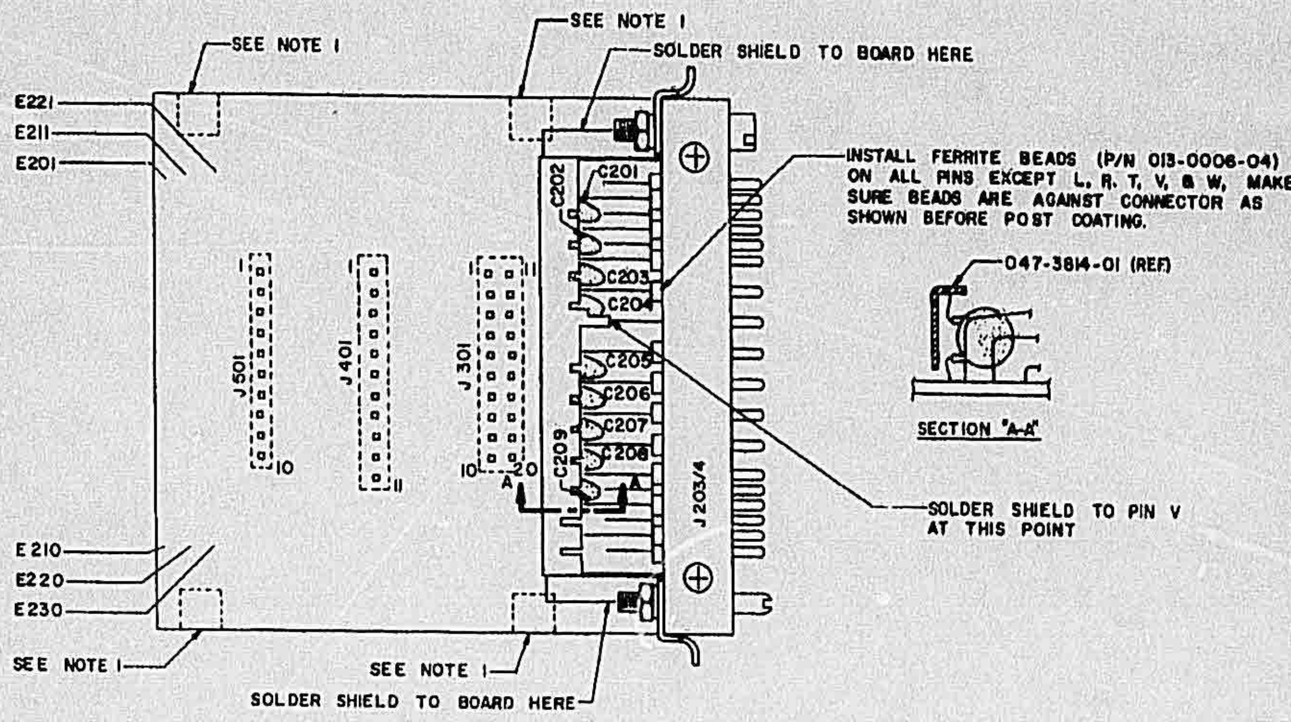
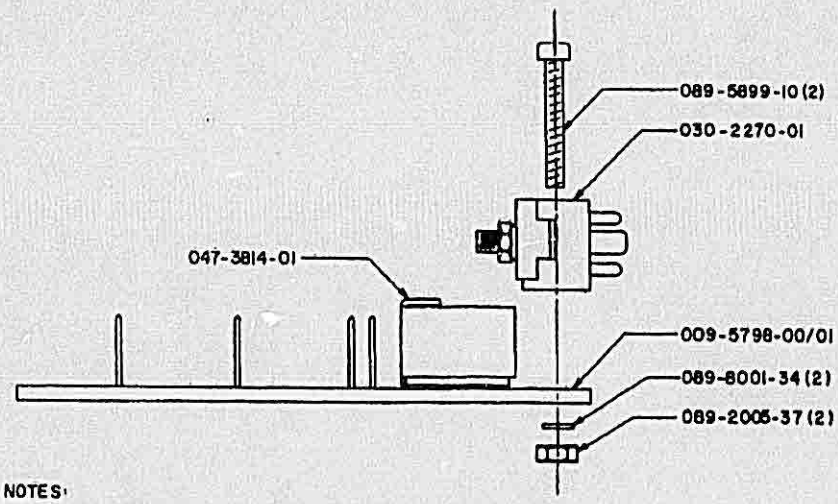


FIGURE 6-10 Internal Wiring Schematic KI 203, KI 204 (Dwg No 002-00360-0001, Rev 8)





NOTES:

1. MASK OFF J203/4, J301, J401, J501, E201 THRU E230 & FOUR MOUNTING SURFACES, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).

Dwg 300-05798-0000 Rev 1

FIGURE 6-11 Mother Board Assembly
(Dwg No 300-05798-0000, Rev 1)

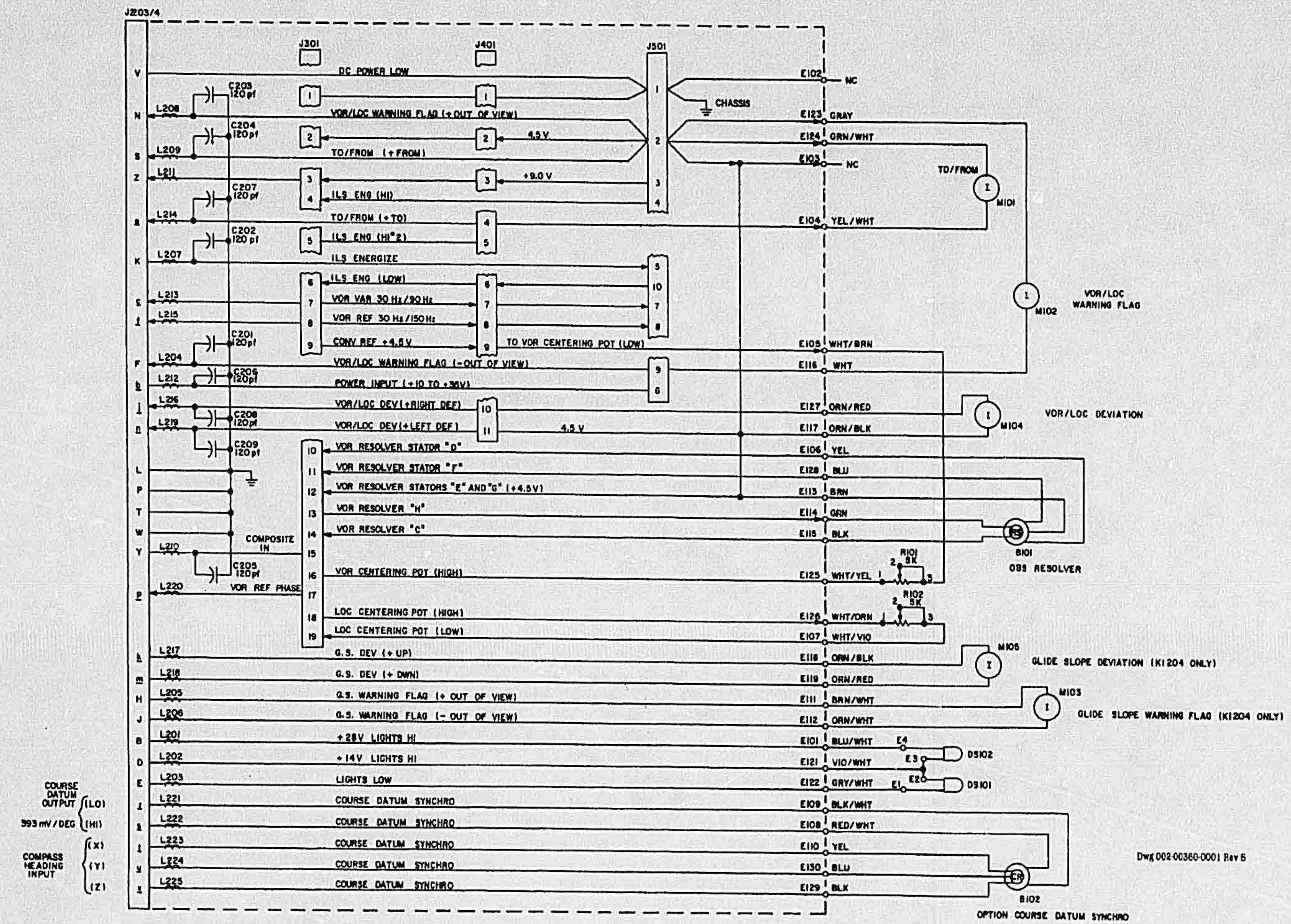


FIGURE 6-12 Internal Wiring Schematic KI 203, KI 204
(Dwg No 002-00360-0001, Rev 5)

BOM 11: Converter #1 Board

200-05799-0000 CONV #1 BD ASSY REV 20

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000
–	009-05799-0000		PC BD CONV #1	EA	1
–	030-02170-0010		CONN CARD 20C	EA	1
C302	096-01014-0000		CAP TN 40UF 10V	EA	1
C303	108-06005-0012		CAP TRKG SET/4 MATCH	EA	1
C304	108-06005-0012		CAP TRKG SET/4 MATCH	EA	1
C305	109-00007-0000		CAP DC .01UF 25V	EA	1
C306	114-07104-0000		CAP DC .1UF 16V	EA	1
C307	096-01030-0043		CAP TN 100UF20%6V	EA	1
C308	115-05502-0000		CAP DC 5KPF 100V	EA	1
C309	105-00013-0000		CAP MY .01UF 100V	EA	1
C310	114-07104-0000		CAP DC .1UF 16V	EA	1
C311	105-00013-0000		CAP MY .01UF 100V	EA	1
C312	114-07104-0000		CAP DC .1UF 16V	EA	1
C313	096-01030-0038		CAP TN 100UF10%15V	EA	1
C314	108-05016-0086		CAP PC .22UF 50V	EA	1
C315	108-05016-0062		CAP PC .047UF 50V	EA	1
C316	114-07104-0000		CAP DC .1UF 16V	EA	1
C317	108-06005-0012		CAP TRKG SET/4 MATCH	EA	1
C318	108-06005-0012		CAP TRKG SET/4 MATCH	EA	1
C319	114-07104-0000		CAP DC .1UF 16V	EA	1
C320	113-03121-0000		CAP DC 120PF 500V	EA	1
C321	113-03121-0000		CAP DC 120PF 500V	EA	1
CR301	007-06016-0000		DIO S 1N4154	EA	1
CR302	007-06016-0000		DIO S 1N4154	EA	1
CR303	007-06016-0000		DIO S 1N4154	EA	1
CR304	007-06016-0000		DIO S 1N4154	EA	1
I301	120-03052-0000		IC LM324N	EA	1
I302	120-03082-0001		IC FM DTCTR & LMTR	EA	1
L301	019-02129-0024		COIL RF 27000MH 10%	EA	1
L302	019-02109-0000		FIL NOISE 22MH	EA	1
Q301	007-00078-0000		XSTR S NPN 2N3415	EA	1
Q302	007-00078-0000		XSTR S NPN 2N3415	EA	1
Q303	007-00078-0000		XSTR S NPN 2N3415	EA	1
R301	131-00104-0023		RES CF 100K QW 5%	EA	1
R302	131-00473-0023		RES CF 47K QW 5%	EA	1
R303	133-00113-0025		RES VA 100K 20% B	EA	1
R304	131-00104-0013		RES CF 100K EW 5%	EA	1
R305	131-00222-0013		RES CF 2.2K EW 5%	EA	1
R306	136-08252-0072		RES PF 82.5K QW 1%	EA	1
R307	136-05760-0072		RES PF 576 QW 1%	EA	1
R308	133-00113-0009		RES VA 200 20% B	EA	1
R309	131-00472-0013		RES CF 4.7K EW 5%	EA	1
R310	136-05111-0072		RES PF 5.11K QW 1%	EA	1
R311	133-00096-0029		RES VA 1K HW 10%	EA	1
R312	136-05363-0072		RES PF 536K QW 1%	EA	1
R313	131-00564-0013		RES CF 560K EW 5%	EA	1
R314	131-00102-0023		RES CF 1K QW 5%|	EA	1
R315	131-00153-0023		RES CF 15K QW 5%	EA	1
R316	131-00047-0023		RES CF 4.7 QW 5%	EA	1
R317	131-00222-0023		RES CF 2.2K QW 5%	EA	1
R318	136-02001-0072		RES PF 2.0K QW 1%	EA	1
R319	136-02152-0072		RES PF 21.5K QW 1%	EA	1
R320	133-00113-0017		RES VA 5K 20% B	EA	1
R321	131-00333-0013		RES CF 33K EW 5%	EA	1

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000
R322	136-08063-0072		RES PF 806K QW 1%	EA	1
R323	131-00333-0023		RES CF 33K QW 5%	EA	1
R324	131-00470-0013		RES CF 47 EW 5%	EA	1
R325	136-02322-0072		RES PF 23.2K QW 1%	EA	1
R326	136-03322-0072		RES PF 33.2K QW 1%	EA	1
R327	136-07501-0072		RES PF 7.5K QW 1%	EA	1
R328	131-00392-0023		RES CF 3.9K QW 5%	EA	1
R329	136-03320-0072		RES PF 332 QW 1%	EA	1
R330	133-00113-0007		RES VA 100 20% B	EA	1
R331	131-00472-0013		RES CF 4.7K EW 5%	EA	1
R332	136-06341-0072		RES PF 6.34K QW 1%	EA	1
R333	136-05363-0072		RES PF 536K QW 1%	EA	1
R334	136-08063-0072		RES PF 806K QW 1%	EA	1
R335	131-00153-0013		RES CF 15K EW 5%	EA	1
R336	131-00334-0013		RES CF 330K EW 5%	EA	1
R337	131-00392-0013		RES CF 3.9K EW 5%	EA	1
R338	131-00104-0013		RES CF 100K EW 5%	EA	1
R339	131-00103-0023		RES CF 10K QW 5%	EA	1
TP301	008-00096-0001		TERMINAL TEST PNT	EA	1
TP302	008-00096-0001		TERMINAL TEST PNT	EA	1
TP303	008-00096-0001		TERMINAL TEST PNT	EA	1
TP304	008-00096-0001		TERMINAL TEST PNT	EA	1

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

NAME Converter #1 Bd. Assy. ASS'Y. NO. 200-5799-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	-00	-01	-02	-03	-04
	009-5799-00	P/C Board		1				
	030-2170-10	Edge Conn 20 Pin		1				
Q301	007-0078-00	Tstr 2N3415 NPN		3				
Q302	007-0078-00	Tstr 2N3415 NPN		-				
Q303	007-0078-00	Tstr 2N3415 NPN		-				
CR301	007-6016-00	Diode 1N4154 Si		4				
CR302	007-6016-00	Diode 1N4154 Si		-				
CR303	007-6016-00	Diode 1N4154 Si		-				
CR304	007-6016-00	Diode 1N4154 Si		-				
L301	019-2129-24	Coil 27mh		1				
L302	019-2109-00	Coil Var 22mh		1				
C302	096-1014-00	Cap 40uf 10V Tant		1				
C303/C304 C317/C318	108-6003-00	Cap .1uf PC		4				
C305	109- 0007-00	Cap .01uf D/C X5R		1				
C306	114-7104-00	Cap .1 D/C x 5R		5				
C307	096-1030-43	Cap 100uf 6V Tant		1				
C308	115-5502-00	Cap .005 D/C X5F		1				
C309	105-0013-00	Cap .01 Poly		2				
C310	114-7104-00	Cap .1 D/C X5R		-				
C311	105-0013-00	Cap .01 Poly		-				
C312	114-7104-00	Cap .1 D/C X5R		-				
C313	096-1030-38	Cap 100uf 15V		1				
C314	108-5016-86	Cap .22uf Poly		1				
C315	108-5016-62	Cap .047µf Poly 5%		1				
C316	114-7104-00	Cap .1 D/C X5R		-				
C320	113-3121-00	Cap. D/C 120pf		2				
C321	113-3121-00	Cap. D/C 120pf		-				
C319	114-7104-00	Cap .1 D/C X5R		-				
I301	120-3052-00	IC LM324N Quad		1				
I302	120-3061-00	IC ULN2113A		1				
R301	130-0104-25	Res 100K 1/4W		1				
R302	130-0473 -25	Res 47 K ¼W		1				
R303	133-0113-24	Res 100K Pot		1				
R304	130-0104-13	Res 100K 1/8W		2				
R305	130-0222-13	Res 2.2K 1/8W		1				
R306	136-8252-72	Res 82.5K 1%		1				
R307	136-5760-72	Res 576 ohm 1%		1				
R308	133-0113-08	Res 200 ohm Pot		1				

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

NAME: Converter #1 Board Assy.   ASS'Y. NO. 200-5799-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00	-01	-02	-03	-04
R309	130-0472-13	Res 4.7K 1/8W		2				
R310	136-4871-72	Res 4.87K 1%		1				
R311	133-0113-14	Res 2K Pot		1				
R312	136-5363-72	Res 536K 1%		2				
R313	130-0564-13	Res 560K 5%		1				
R314	130-0102-23	Res 1K ohm ¼W 5%		1				
R315	130-0113-23	Res 11K ¼W 5%		1				
R316	130-0047-25	Res 4.7 ohm ¼W		1				
R317	130-0222-25	Res 2.2K ¼W		-				
R318	136-2001-72	Res 2K 1%		1				
R319	136-2152-72	Res 21.5K 1%		1				
R320	133-0113-16	Res 5K Pot		1				
R321	130-0333-13	Res 33K 1/8W		1				
R322	136-8063-72	Res 806K 1%		2				
R323	130-0333-23	Res 33K 1/4W 5%		1				
R324	130-0470-13	Res 47 ohm 1/8W		1				
R325	136-2322-72	Res 23.2K 1%		1				
R326	136-3322-72	Res 33.2K 1%		1				
R327	136-7501-72	Res 7.50K 1%		1				
R328	130-0392-25	Res 3.9K ¼W		1				
R329	136-3320-72	Res 332 ohm 1%		1				
R330	133-0113-07	Res 100 ohm Pot		1				
R331	130-0472-13	Res 4.7K 1/8W		-				
R332	136-6341-72	Res 6.34K 1%		1				
R333	136-5363-72	Res 536K 1%		-				
R334	136-8063-72	Res 806K 1%		-				
R335	130-0153-13	Res 15K 1/8W		1				
R336	130-0334-13	Res 330K 1/8W 5%		1				
R337	130-0392-13	Res 3.9K 1/8W		1				
R338	130-0104-13	Res 100K 1/8W		-				
R339	130-0103-25	Res 10K 1/4W		-				

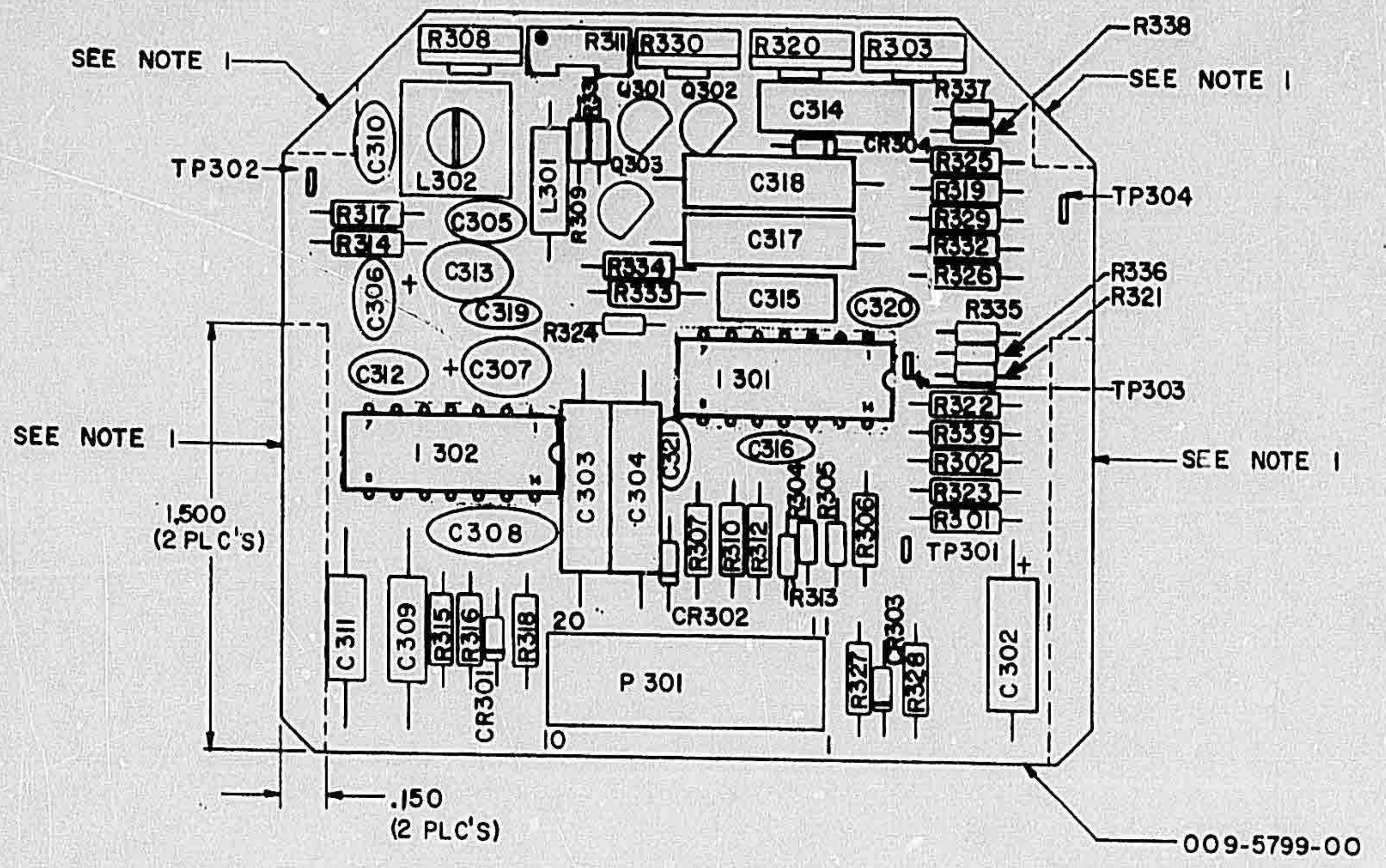
THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

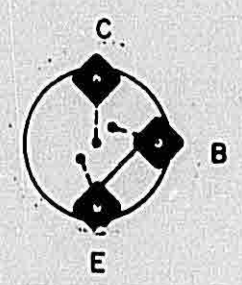
PARTS LIST REVISION HISTORY			ENGR. APPROVAL Elwin W. Hub...
NAME Converter #1 Bd. Assy.			ASS'Y. NO. 200-5799-00
ASS'Y. DWG. 300-5799-00		UNIT KI 203/204	USED ON 200-1928-00

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION
1				
2				
3				
4				
5				
6				
				KI 203/204 Maintenance Manual Revision 0, April 1976

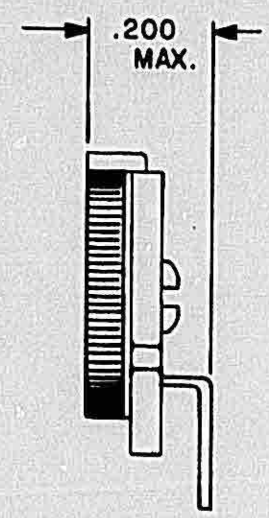
THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

PARTS LIST REVISION HISTORY				ENGR. APPROVAL
NAME Converter #1 Bd. Assy.				ASS'Y. NO. 200-5799-00
ASS'Y. DWG. 300-5799-00		UNIT KI 203/204		USED ON 200-1928-00
REV	**CHANGE**	**SYMBOL**	**PART NUMBER**	**DESCRIPTION**
7		C320/321	113-3121-00	Added to B/M
8		R303	133-0113-24	P/N changed from 133-0113-25
		R308	133-0113-08	P/N changed from 133-0113-40
		R311	133-0113-14	P/N changed from 133-0113-41
		R320	133-0113-16	P/N changed from 133-0113-42
		R330	133-0113-07	P/N changed from 133-0113-39
9		C303,304, 317,318	108-6003-00	P/N changed from 108-5022-10, deleted (set of 4) from description Qty from 1 to 4.
10		R301	130-0104-25	Qty from 3 to 1
		R304	130-0104-13	P/N changed from 130-0104-25, desc. from 1/4W to 1/8W, qty from - to 2
		R305	130-0222-13	P/N changed from 130-0222-25, desc. from 1/4W to 1/8W, qty from 2 to 1
		R309	130-0472-13	P/N changed from 130-0472-25, desc. from 1/4W to 1/8W
		R313	130-0564-13	P/N changed from 130-0564-23
		R321	130-0333-13	P/N changed from 130-0333-23, desc. from 1/4W to 1/8W, qty from 2 to 1
		R323	130-0333-23	Qty from - to 1
		R324	130-0470-13	P/N changed from 130-0470-25, desc. from 1/4W to 1/8W
		R328	130-0392-25	Qty from 2 to 1
		R331	130-0472-13	P/N changed from 130-0472-25, desc. from 1/4W to 1/8W
		R335	130-0153-13	P/N changed from 130-0153-25, desc. from 1/4W to 1/8W
		R336	130-0334-13	P/N changed from 130-0334-23, desc. from 1/4W to 1/8W
		R337	130-0392-13	P/N changed from 130-0392-25, desc. from 1/4W to 1/8W, qty from - to 1
		R338	130-0104-13	P/N changed from 130-0104-25, desc. from 1/4W to 1/8W
				KI 203/204 MAINTENANCE MANUAL REV. 1, SEPT., 1979





DETAIL "A"



DETAIL "B"

NOTES:

1. MASK OFF P301, TP301 THRU TP304, L302, R303, R308, R311, R320, R330, TWO AREAS FOR CARD GUIDES, & TWO AREAS AROUND CARD PULLER HOLES, THEN POST COAT BOTH SIDES OF ASSY WITH UNDILUTED CLEAR URETHANE POST COATING (016-01040-0000).
2. TRANSISTORS Q301, Q302, & Q303, SEE DETAIL "A".

Dwg 300-05799-0000 Rev AA

FIGURE 6-13 Converter #1 Board Assembly
(Dwg No 300-05799-0000, Rev AA)

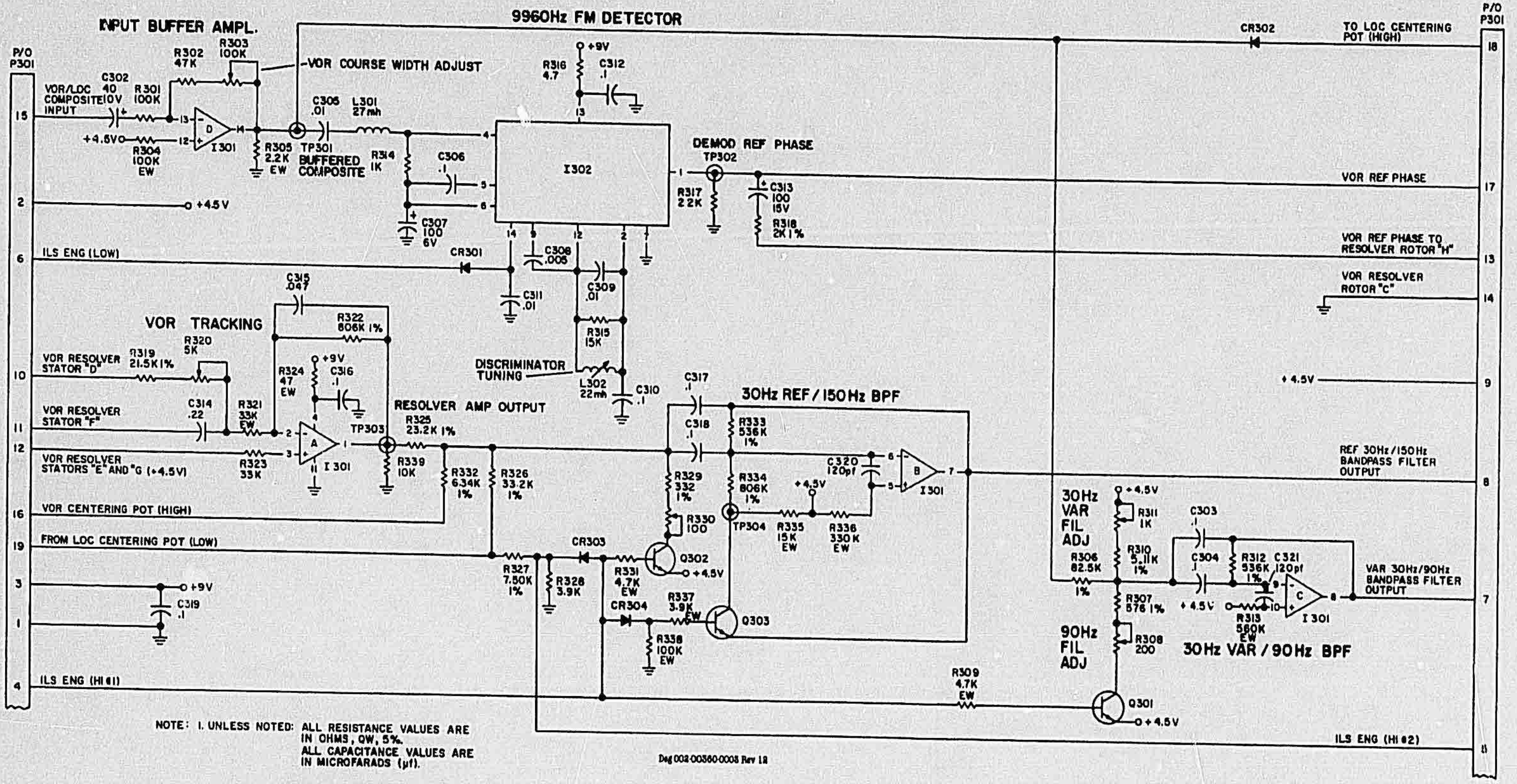
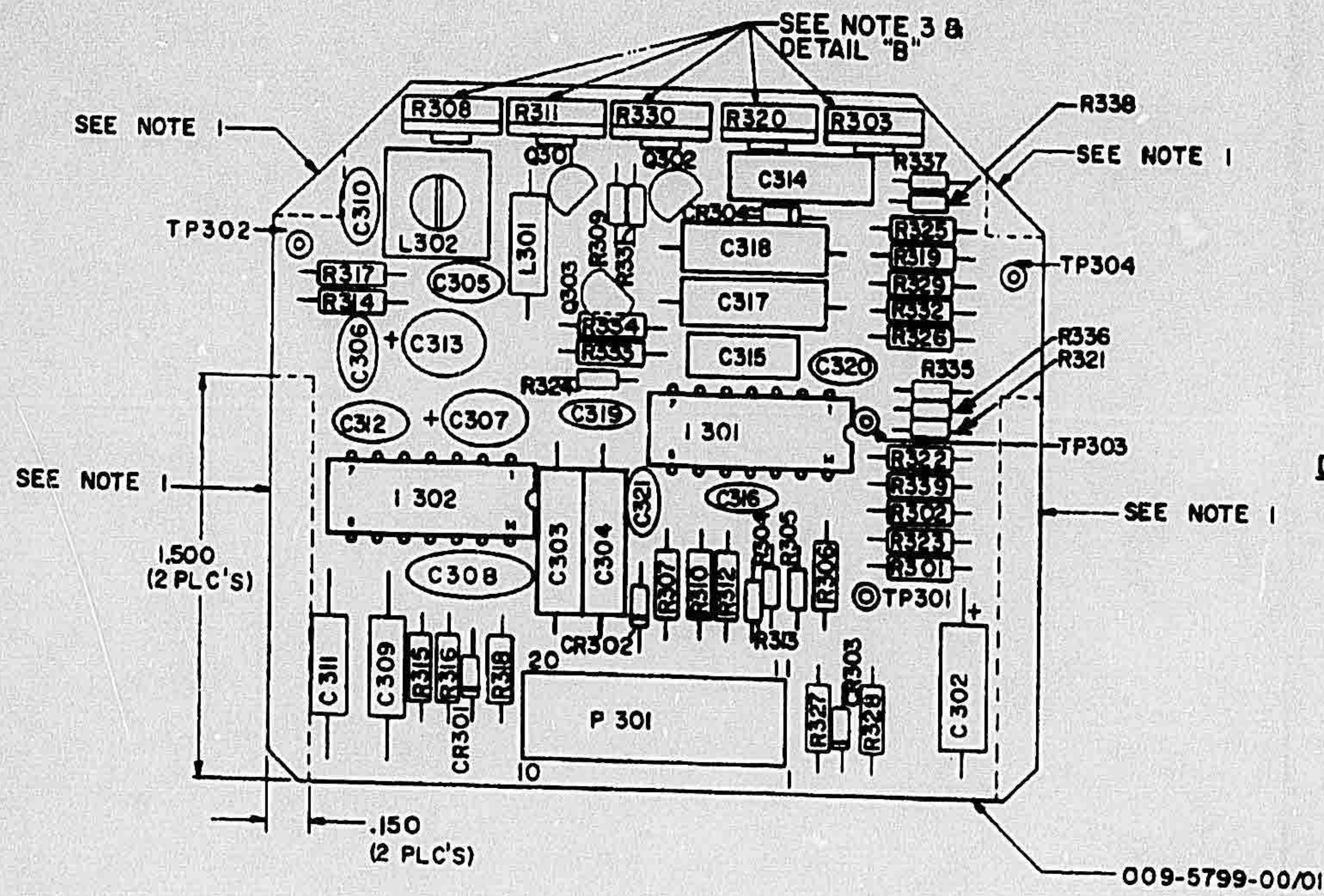
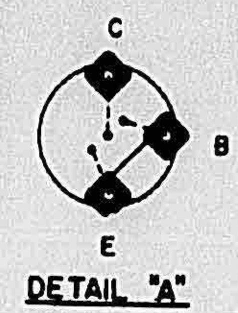
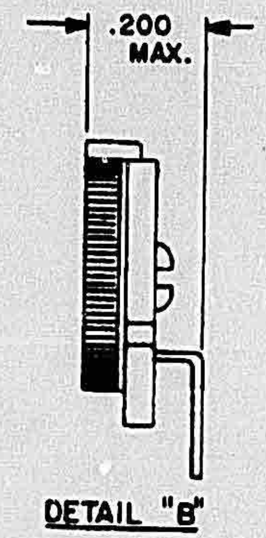


FIGURE 6-14 Converter #1 Board Schematic
(Dwg No 002-00360-0003, Rev 12)







NOTES:

1. MASK OFF P301, TP301 THRU TP304, L302, R 303, R 308, R 311, R 320, R 330, TWO AREAS FOR CARD GUIDES, & TWO AREAS AROUND CARD PULLER HOLES, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).
2. TRANSISTORS Q 301, Q 302, & Q 303, SEE DETAIL "A".
3. POT LEADS MUST BE PREFORMED AS IN DETAIL "B".

Dwg 300-05799-0000 Rev 4

FIGURE 6-15 Converter #1 Board Assembly
(Dwg No 300-05799-0000, Rev 4)

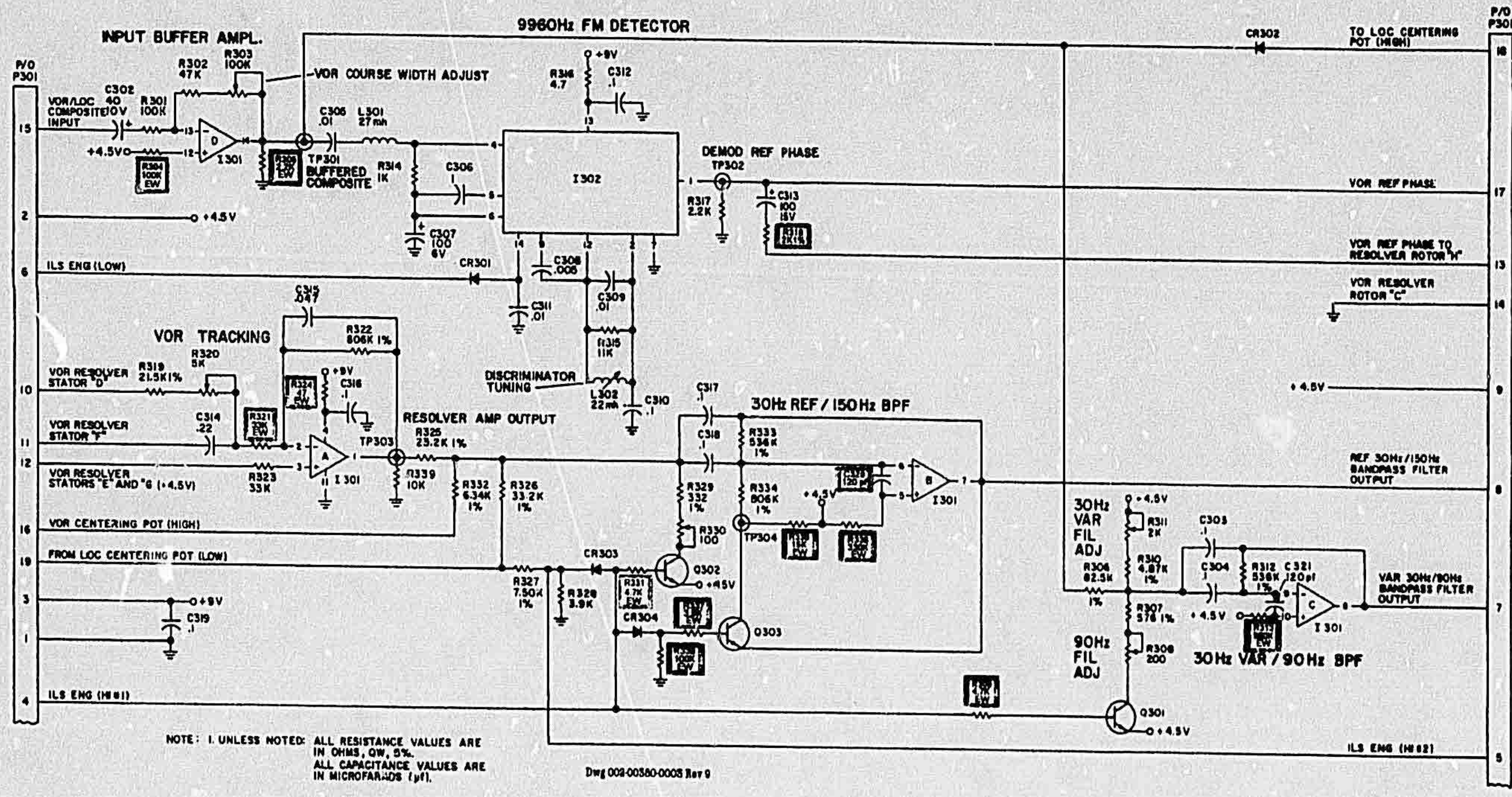
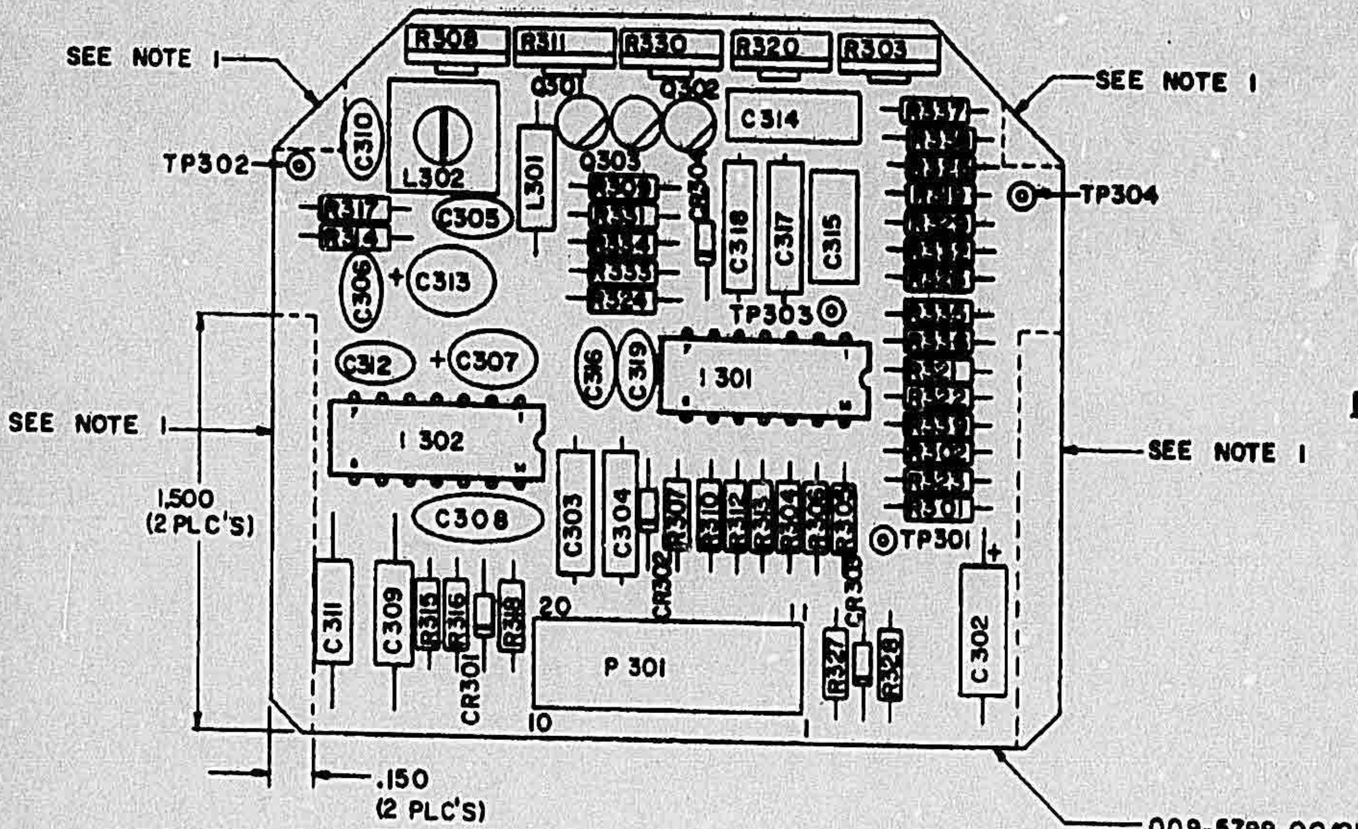
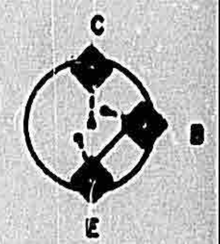


FIGURE 6-16 Converter #1 Board Schematic
(Dwg No 002-00360-0003, Rev 9)





DETAIL "A"

NOTES:

1. MASK OFF P 301, TP301 THRU TP304, L 302, R 303, R 308, R 311, R 320, R 330, TWO AREAS FOR CARD GUIDES, & TWO AREAS AROUND CARD PULLER HOLES, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).
2. TRANSISTORS Q 301, Q 302, & Q 303, SEE DETAIL "A".

Dwg 300-05799-0000 Rev 1

FIGURE 6-17 Converter #1 Board Assembly
(Dwg No 300-05799-0000, Rev 1)

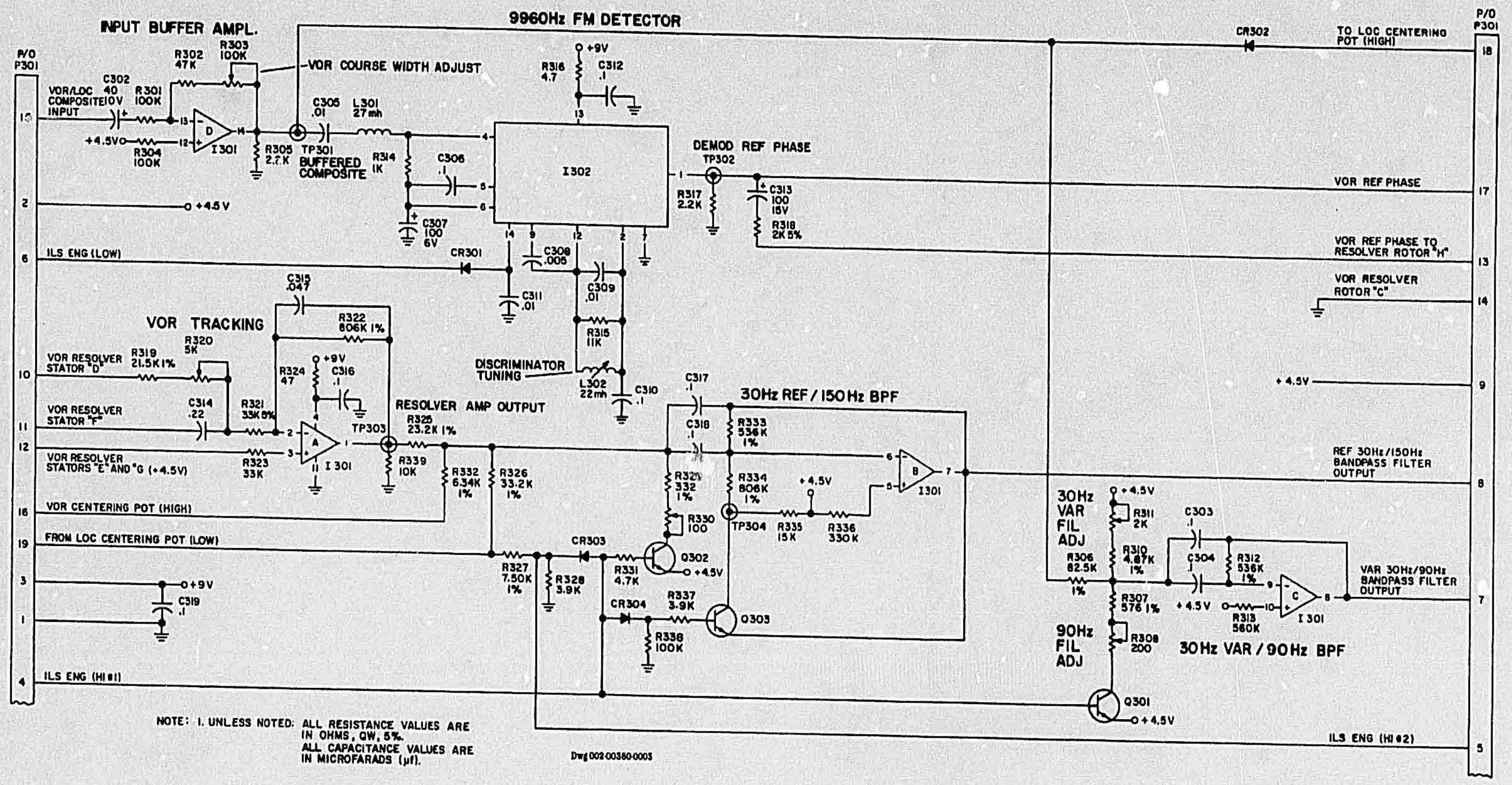


FIGURE 6-18 Converter #1 Board Schematic
(Dwg No 002-00360-0003)

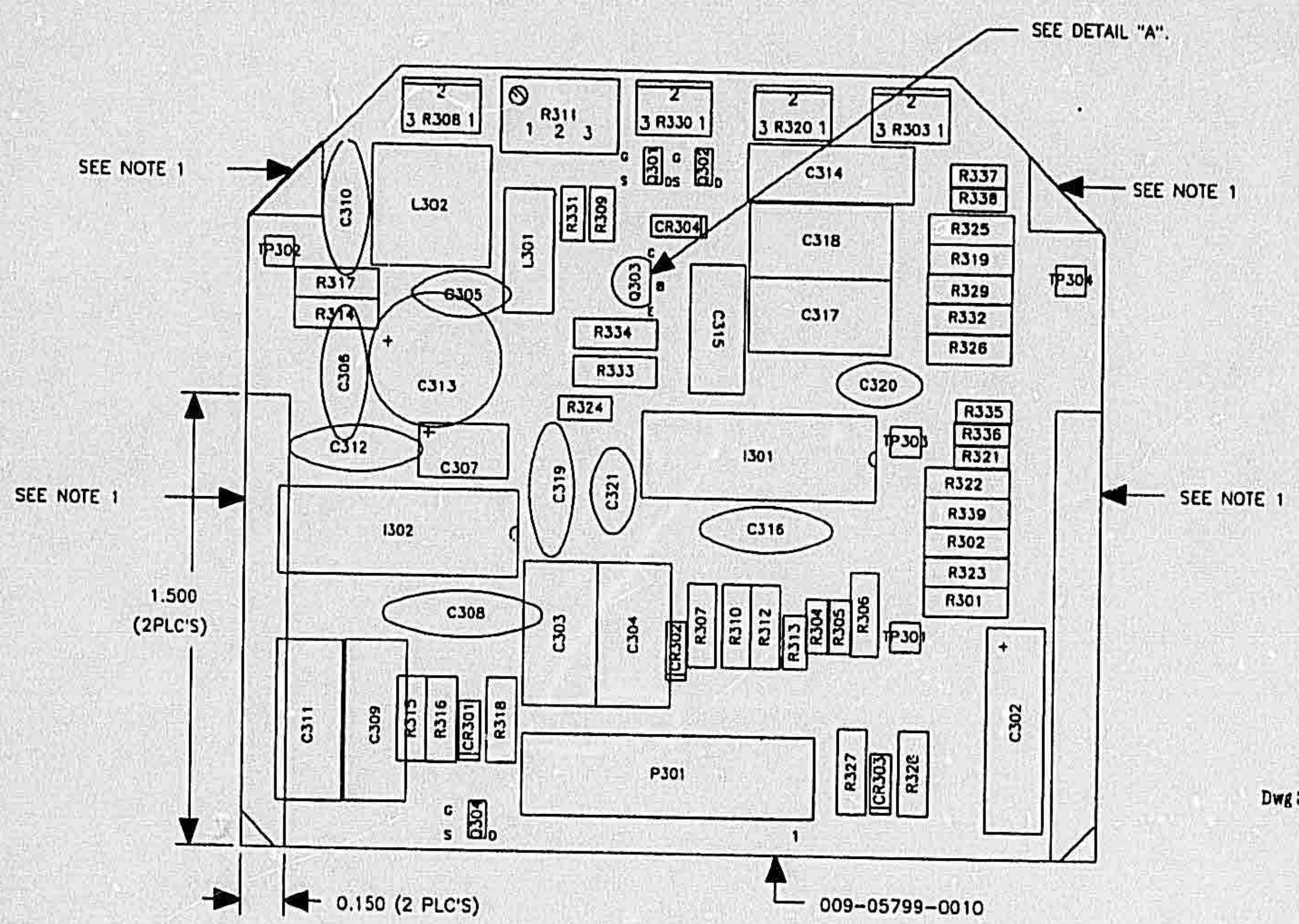
BOM 12: Converter #1 Board

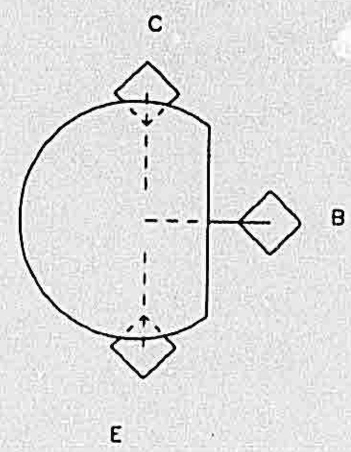
200-05799-0010 CONVERTER #1 BOARD REV -

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0010
_	009-05799-0010		CONVERTER #1 BOARD	EA	1
C302	096-01014-0000		CAP TN 40UF 10V	EA	1
C303	105-00172-0001		CAP FM PE .56UF 50V	EA	1
C304	105-00172-0001		CAP FM PE .56UF 50V	EA	1
C305	109-00007-0000		CAP DC .01UF 25V	EA	1
C306	114-07104-0000		CAP DC .1UF 16V	EA	1
C307	096-01030-0043		CAP TN 100UF20%6V	EA	1
C308	115-05502-0000		CAP DC 5KPF 100V	EA	1
C309	105-00013-0000		CAP MY .01UF 100V	EA	1
C310	114-07104-0000		CAP DC .1UF 16V	EA	1
C311	105-00013-0000		CAP MY .01UF 100V	EA	1
C312	114-07104-0000		CAP DC .1UF 16V	EA	1
C313	096-01030-0038		CAP TN 100UF10%15V	EA	1
C314	108-05016-0086		CAP PC .22UF 50V	EA	1
C315	108-05016-0062		CAP PC .047UF 50V	EA	1
C316	114-07104-0000		CAP DC .1UF 16V	EA	1
C317	105-00172-0001		CAP FM PE .56UF 50V	EA	1
C318	105-00172-0001		CAP FM PE .56UF 50V	EA	1
C319	114-07104-0000		CAP DC .1UF 16V	EA	1
C320	113-03121-0000		CAP DC 120PF 500V	EA	1
C321	113-03121-0000		CAP DC 120PF 500V	EA	1
CR301	007-06016-0000		DIO S 1N4154	EA	1
CR302	007-06016-0000		DIO S 1N4154	EA	1
CR303	007-06016-0000		DIO S 1N4154	EA	1
CR304	007-06016-0000		DIO S 1N4154	EA	1
I301	120-03052-0000		IC LM324N	EA	1
I302	120-03082-0001		IC FM DTCTR & LMTR	EA	1
L301	019-02129-0024		COIL RF 27000MH 10%	EA	1
L302	019-02109-0000		FIL NOISE 22MH	EA	1
P301	030-02170-0010		CONN CARD 20C	EA	1
Q301	007-01090-0001		N-CHANNEL MOSFET	EA	1
Q302	007-01090-0001		N-CHANNEL MOSFET	EA	1
Q303	007-00179-0000		XSTR S NPN 2N3904	EA	1
Q304	007-01090-0001		N-CHANNEL MOSFET	EA	1
R301	136-04992-0072		RES PF 49.9K QW 1%	EA	1
R302	136-02492-0072		RES PF 24.9K QW 1%	EA	1
R303	133-00110-0041		RES VA 50K HW	EA	1
R304	131-00473-0013		RES CF 47K EW 5%	EA	1
R305	131-00222-0013		RES CF 2.2K EW 5%	EA	1
R306	136-01472-0072		RES PF 14.7K QW 1%	EA	1
R307	136-01000-0072		RES PF 100 QW 1%	EA	1
R308	133-00110-0031		RES VA 50 HW	EA	1
R309	131-00472-0013		RES CF 4.7K EW 5%	EA	1
R310	136-09090-0072		RES PF 909 QW 1%	EA	1
R311	133-00096-0027		RES VA 200 HW 10%	EA	1
R312	136-09532-0072		RES PF 95.3K QW 1%	EA	1
R313	131-00823-0013		RES CF 82K EW 5%	EA	1
R314	131-00102-0023		RES CF 1K QW 5%|	EA	1
R315	131-00153-0023		RES CF 15K QW 5%	EA	1
R316	131-00047-0023		RES CF 4.7 QW 5%	EA	1
R317	131-00222-0023		RES CF 2.2K QW 5%	EA	1
R318	136-02001-0072		RES PF 2.0K QW 1%	EA	1
R319	136-02152-0072		RES PF 21.5K QW 1%	EA	1
R320	133-00110-0037		RES VA 5K HW	EA	1

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0010
R321	131-00333-0013		RES CF 33K EW 5%	EA	1
R322	136-08063-0072		RES PF 806K QW 1%	EA	1
R323	131-00333-0023		RES CF 33K QW 5%	EA	1
R324	131-00470-0013		RES CF 47 EW 5%	EA	1
R325	136-04121-0072		RES PF 4.12K QW 1%	EA	1
R326	136-05901-0072		RES PF 5.9K QW 1%	EA	1
R327	136-01331-0072		RES PF 1.33K QW 1%	EA	1
R328	131-00103-0023		RES CF 10K QW 5%	EA	1
R329	136-00511-0072		RES PF 51.1 QW 1%	EA	1
R330	133-00110-0031		RES VA 50 HW	EA	1
R331	131-00472-0013		RES CF 4.7K EW 5%	EA	1
R332	136-01001-0072		RES PF 1K QW 1%	EA	1
R333	136-09532-0072		RES PF 95.3K QW 1%	EA	1
R334	136-01433-0072		RES PF 143K QW 1%	EA	1
R335	131-00153-0013		RES CF 15K EW 5%	EA	1
R336	131-00823-0013		RES CF 82K EW 5%	EA	1
R337	131-00392-0013		RES CF 3.9K EW 5%	EA	1
R338	131-00104-0013		RES CF 100K EW 5%	EA	1
R339	131-00103-0023		RES CF 10K QW 5%	EA	1
TP301	008-00096-0001		TERMINAL TEST PNT	EA	1
TP302	008-00096-0001		TERMINAL TEST PNT	EA	1
TP303	008-00096-0001		TERMINAL TEST PNT	EA	1
TP304	008-00096-0001		TERMINAL TEST PNT	EA	1

NOTES:
1. MASK OFF P301,TP301 THRU TP304, L302 R303, R308, R311, R320, R330, TWO AREAS FOR CARD GUIDES AND TWO AREAS AROUND CARD PULLER HOLES, THEN POST COAT BOTH SIDES OF ASSY WITH CLEAR URETHANE (016-01040-0000).
2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC 001-01101-0000.





DETAIL "A"

Dwg 300-05799-0010 Rev A Sht 1

REF. B/M: 200-05799-0010

FIGURE 6-19 Converter #1 Board Assembly (Dwg No 300-05799-0010, Rev A, Sht 1)

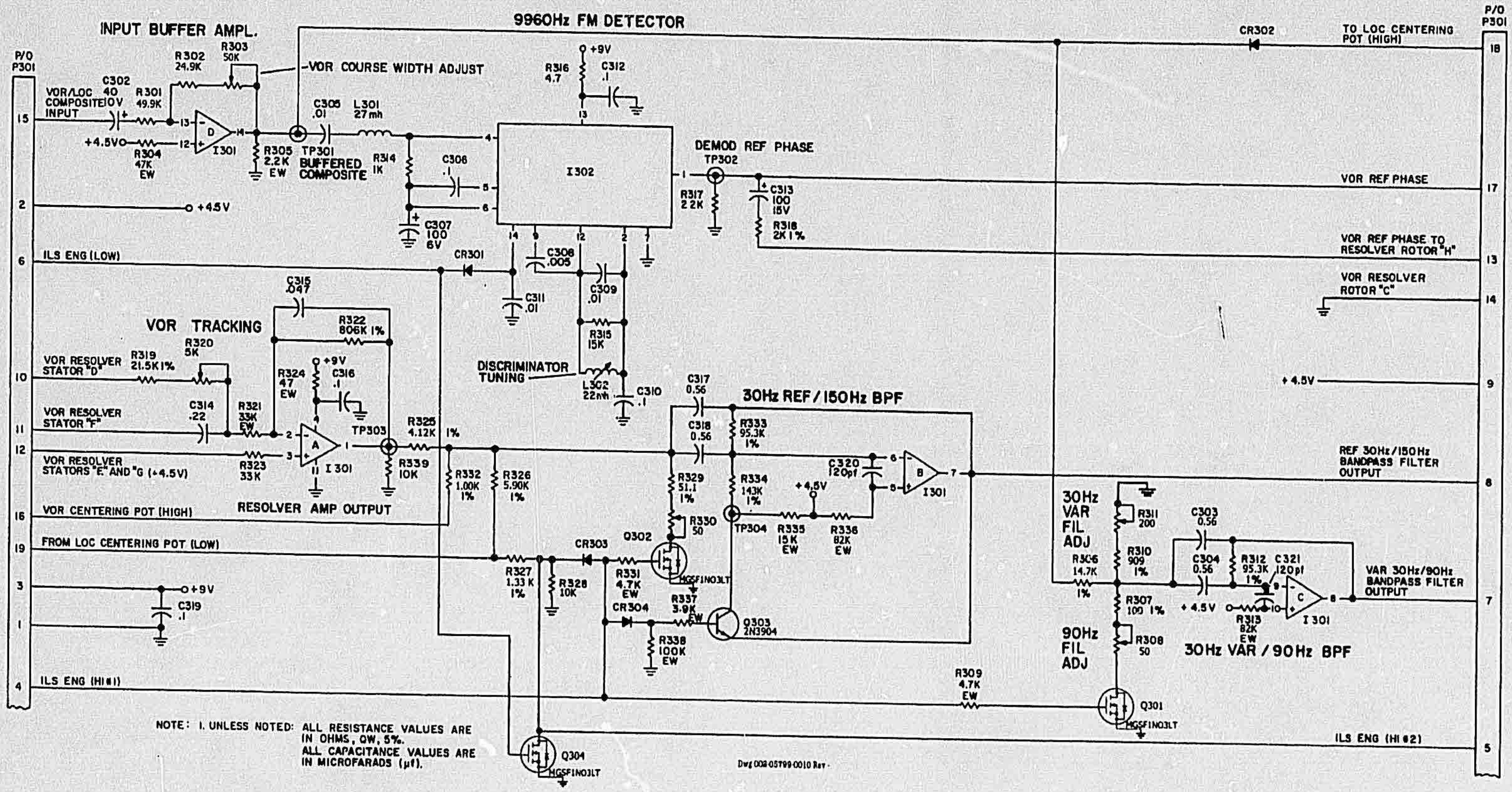


FIGURE 6-20 Converter #1 Board Schematic
(Dwg No 002-05799-0010, Rev -)

BOM 13: Converter #2 Board

200-05800-0000 CONV #2 BD ASSY REV 20

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000
–	009-05800-0000		PC BD CONV #2	EA	1
–	030-02171-0011		CONN CARD 11 CONT	EA	1
C401	096-01014-0000		CAP TN 40UF 10V	EA	1
C402	096-01030-0042		CAP TN 33UF10%15V	EA	1
C403	096-01030-0005		CAP TN 10UF 10%20V	EA	1
C404	096-01030-0012		CAP TN 3.3UF10%15V	EA	1
C405	096-01030-0027		CAP TN 15UF20%15V	EA	1
C407	096-01030-0027		CAP TN 15UF20%15V	EA	1
C408	105-00031-0074		CAP MY .15UF 80V	EA	1
C409	096-01030-0027		CAP TN 15UF20%15V	EA	1
C410	096-01030-0027		CAP TN 15UF20%15V	EA	1
C411	096-01014-0000		CAP TN 40UF 10V	EA	1
C412	111-00002-0000		CAP CR .1UF 50V	EA	1
C413	111-00002-0000		CAP CR .1UF 50V	EA	1
C414	113-03121-0000		CAP DC 120PF 500V	EA	1
C415	113-03121-0000		CAP DC 120PF 500V	EA	1
C416	113-03121-0000		CAP DC 120PF 500V	EA	1
C417	096-01082-0028		CAP TN 47UF 20V	EA	1
CR401	007-06016-0000		DIO S 1N4154	EA	1
CR402	007-06016-0000		DIO S 1N4154	EA	1
CR403	007-06016-0000		DIO S 1N4154	EA	1
CR405	007-06016-0000		DIO S 1N4154	EA	1
CR406	007-06016-0000		DIO S 1N4154	EA	1
CR407	007-06016-0000		DIO S 1N4154	EA	1
CR408	007-06016-0000		DIO S 1N4154	EA	1
CR409	007-06016-0000		DIO S 1N4154	EA	1
CR410	007-06016-0000		DIO S 1N4154	EA	1
CR411	007-06016-0000		DIO S 1N4154	EA	1
CR412	007-06016-0000		DIO S 1N4154	EA	1
I401	120-06083-0001		IC SCL4066BC	EA	1
I402	120-03052-0000		IC LM324N	EA	1
Q401	007-00078-0000		XSTR S NPN 2N3415	EA	1
Q402	007-00078-0000		XSTR S NPN 2N3415	EA	1
Q403	007-00065-0000		XSTR S PNP 2N3906	EA	1
Q404	007-00267-0001		XSTR FET J113	EA	1
Q405	007-00179-0000		XSTR S NPN 2N3904	EA	1
Q406	007-00179-0000		XSTR S NPN 2N3904	EA	1
R401	131-00682-0023		RES CF 6.8K QW 5%	EA	1
R402	131-00183-0023		RES CF 18K QW 5%	EA	1
R403	131-00104-0023		RES CF 100K QW 5%	EA	1
R404	131-00124-0023		RES CF 120K QW 5%	EA	1
R405	131-00102-0023		RES CF 1K QW 5%	EA	1
R406	131-00753-0023		RES CF 75K QW 5%	EA	1
R407	136-01003-0072		RES PF 100K QW 1%	EA	1
R408	136-01003-0072		RES PF 100K QW 1%	EA	1
R409	131-00753-0023		RES CF 75K QW 5%	EA	1
R410	133-00113-0027		RES VA 200K 20% B	EA	1
R411	131-00104-0023		RES CF 100K QW 5%	EA	1
R412	131-00302-0023		RES CF 3K QW 5%	EA	1
R413	131-00302-0023		RES CF 3K QW 5%	EA	1
R414	131-00393-0023		RES CF 39K QW 5%	EA	1
R415	131-00302-0023		RES CF 3K QW 5%	EA	1
R416	131-00302-0023		RES CF 3K QW 5%	EA	1
R417	131-00393-0023		RES CF 39K QW 5%	EA	1

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000
R418	131-00104-0023		RES CF 100K QW 5%	EA	1
R419	131-00105-0023		RES CF 1M QW 5%	EA	1
R420	131-00103-0023		RES CF 10K QW 5%	EA	1
R421	131-00433-0023		RES CF 43K QW 5%	EA	1
R422	131-00824-0023		RES CF 820K QW 5%	EA	1
R423	131-00203-0023		RES CF 20K QW 5%	EA	1
R424	131-00393-0023		RES CF 39K QW 5%	EA	1
R425	131-00243-0023		RES CF 24K QW 5%	EA	1
R426	131-00153-0023		RES CF 15K QW 5%	EA	1
R427	131-00271-0023		RES CF 270 QW 5%	EA	1
R428	131-00682-0023		RES CF 6.8K QW 5%	EA	1
R429	131-00104-0023		RES CF 100K QW 5%	EA	1
R430	131-00470-0023		RES CF 47 QW 5%	EA	1
R431	131-00682-0023		RES CF 6.8K QW 5%	EA	1
R432	131-00105-0023		RES CF 1M QW 5%	EA	1
R433	131-00103-0023		RES CF 10K QW 5%	EA	1
R434	131-00103-0023		RES CF 10K QW 5%	EA	1
TP401	008-00096-0001		TERMINAL TEST PNT	EA	1
TP402	008-00096-0001		TERMINAL TEST PNT	EA	1
TP403	008-00096-0001		TERMINAL TEST PNT	EA	1

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

NAME: CONVERTER #2 BD ASSY   UNIT: KI 0203/0204   ASSY NO: 200-5800-00

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00
	009-5800-00	P C BOARD		1
	030-2171-11	EDGE CONN 11 PIN		1
Q401	007-0078-00	TSTR 2N3415 NPN		2
Q402	007-0078-00	TSTR 2N3415 NPN		-
Q403	007-0065-00	TSTR 2N3906 PNP		1
Q404	007-0267-01	TSTS J113 FET		1
CR401	007-6016-00	DIODE 1N4154 SI		12
CR402	007-6016-00	DIODE 1N4154 SI		-
CR403	007-6016-00	DIODE 1N4154 SI		-
CR404	007-6016-00	DIODE 1N4154 SI		-
CR405	007-6016-00	DIODE 1N4154 SI		-
CR406	007-6016-00	DIODE 1N4154 SI		-
CR407	007-6016-00	DIODE 1N4154 SI		-
CR408	007-6016-00	DIODE 1N4154 SI		-
CR409	007-6016-00	DIODE 1N4154 SI		-
CR410	007-6016-00	DIODE 1N4154 SI		-
CR411	007-6016-00	DIODE 1N4154 SI		-
CR412	007-6016-00	DIODE 1N4154 SI		-
C401	096-1014-00	CAP 40UF 10V TANT		2
C402	096-1030-42	CAP 33UF 15V TANT		1
C403	096-1030-05	CAP 10UF 20V TANT		1
C404	096-1030-12	CAP 3.3UF 15V T		1
C405	096-1030-27	CAP 15UF 15V TANT		4
C407	096-1030-27	CAP 15UF 15V TANT		-
C408	105-0031-74	CAP .15UF MYLAR		1
C409	096-1030-27	CAP 15UF 15V TANT		-
C410	096-1030-27	CAP 15UF 15V TANT		-
C411	096-1014-00	CAP 40UF		-
C412	114-7104-00	CAP .1 DC X5R		2
C413	114-7104-00	CAP .1 DC X5R		-
C414	113-3121-00	CAP 120PF DC		3
C415	113-3121-00	CAP 120PF DC		-
C416	113-3121-00	CAP 120PF DC		-
I401	120-60[illegible]2-01	IC CD4016QUAD GATE		1
I402	120-3052-00	IC LM324N QUAD OP		1
R401	130-0682-23	RES 6.8K 1/4W 5%		3
R402	130-0183-23	RES 18K 1/4W 5%		1

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

NAME: CONVERTER #2 BD ASSY UNIT: KI 0203/0204 ASSY NO: 200-5800-00

SYMBOL	PART NUMBER	DESCRIPTION	CODE	QUANTITY -00
R403	130-0104-23	RES 100K 1/4W 5%		1
R404	130-0124-23	RES 120K 1/4W 5%		1
R405	130-0102-25	RES 1K 1/4W		1
R406	130-0753-23	RES 75K 1/4W 5%		2
R407	136-1003-72	RES 100K 1%		2
R408	136-1003-72	RES 100K 1%		-
R409	130-0753-23	RES 75K 1/4W 5%		-
R410	133-0016-00	RES 150K POT		1
R411	130-0104-25	RES 100K 1/4W		3
R412	130-0302-23	RES 3K 1/4W 5%		4
R413	130-0302-23	RES 3K 1/4W 5%		-
R414	130-0393-23	RES 39K 1/4W 5%		2
R415	130-0302-23	RES 3K 1/4W 5%		-
R416	130-0302-23	RES 3K 1/4W 5%		-
R417	130-0393-23	RES 39K 1/4W 5%		-
R418	130-0104-25	RES 100K 1/4W		-
R419	130-0335-25	RES 3.3M 1/4W		1
R420	130-0103-25	RES 10K 1/4W		2
R421	130-0433-23	RES 43K 1/4W 5%		1
R422	130-0824-23	RES 820K 1/4W 5%		1
R423	130-0203-23	RES 20K 1/4W 5%		1
R424	130-0393-25	RES 39K 1/4W		1
R425	130-0243-23	RES 24K 1/4W		1
R426	130-0153-25	RES 15K 1/4W		1
R427	130-0271-25	RES 270 OHM		-
R428	130-0682-23	RES 6.8K 1/4W 5%		-
R429	130-0104-25	RES 100K 1/4W		-
R430	130-0470-25	RES 47 OHM 1/4W		1
R431	130-0682-23	RES 6.8K 1/4W 5%		-
R432	130-0105-25	RES 1MEG 1/4W		1

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

ENGR APPROVAL: JOHN CAROCARI
NAME: CONVERTER #2 BD ASSY ASSY NO: 200-5800-00
ASSY DWG: 300-5800-00 UNIT: KI 0203/204 USED ON: 200-1928-00

REV	CO NO	SYMBOL	PART NUMBER	DESCRIPTION
1				
2				
3				
4				
				KI 203/304 MAINTENANCE MANUAL REVISION 0, APRIL 1976
5		R405	130-0102-25	QTY CHG FROM 2 TO 1
		R427	130-0271-25	P/N CHG FROM 130-0102-25
6		Q404	007-0267-00	ADDED TO B/M
		R432	130-0105-25	ADDED TO B/M
7		C414	113-3121-00	ADDED TO B/M
		C415	113-3121-00	ADDED TO B/M
		C416	113-3121-00	ADDED TO B/M
8		Q404	007-0267-01	P/N CHG FROM 007-0267-00, DESC FROM E113 TO J113 TYPED ON WORD PROCESSOR
				KI 203/204 MAINTENANCE MANUAL REV. 1, SEPT., 1979

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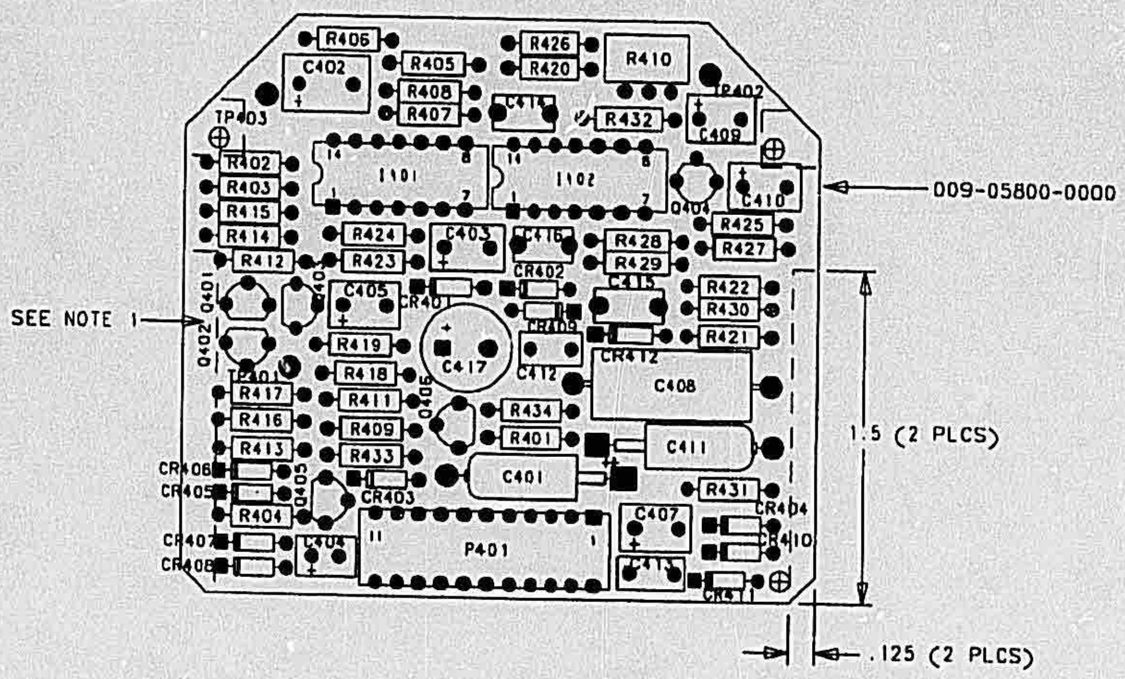


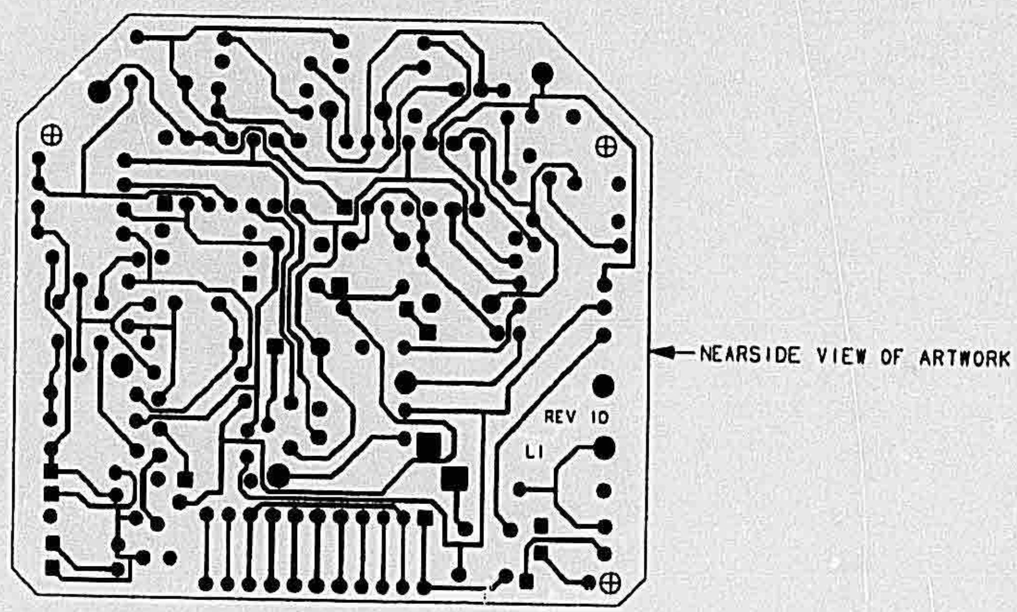
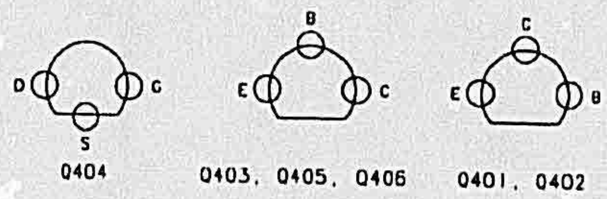


FIGURE 6-21 Converter #2 Board Assembly (Dwg No 300-05800-0000, Rev AA)

NOTES:

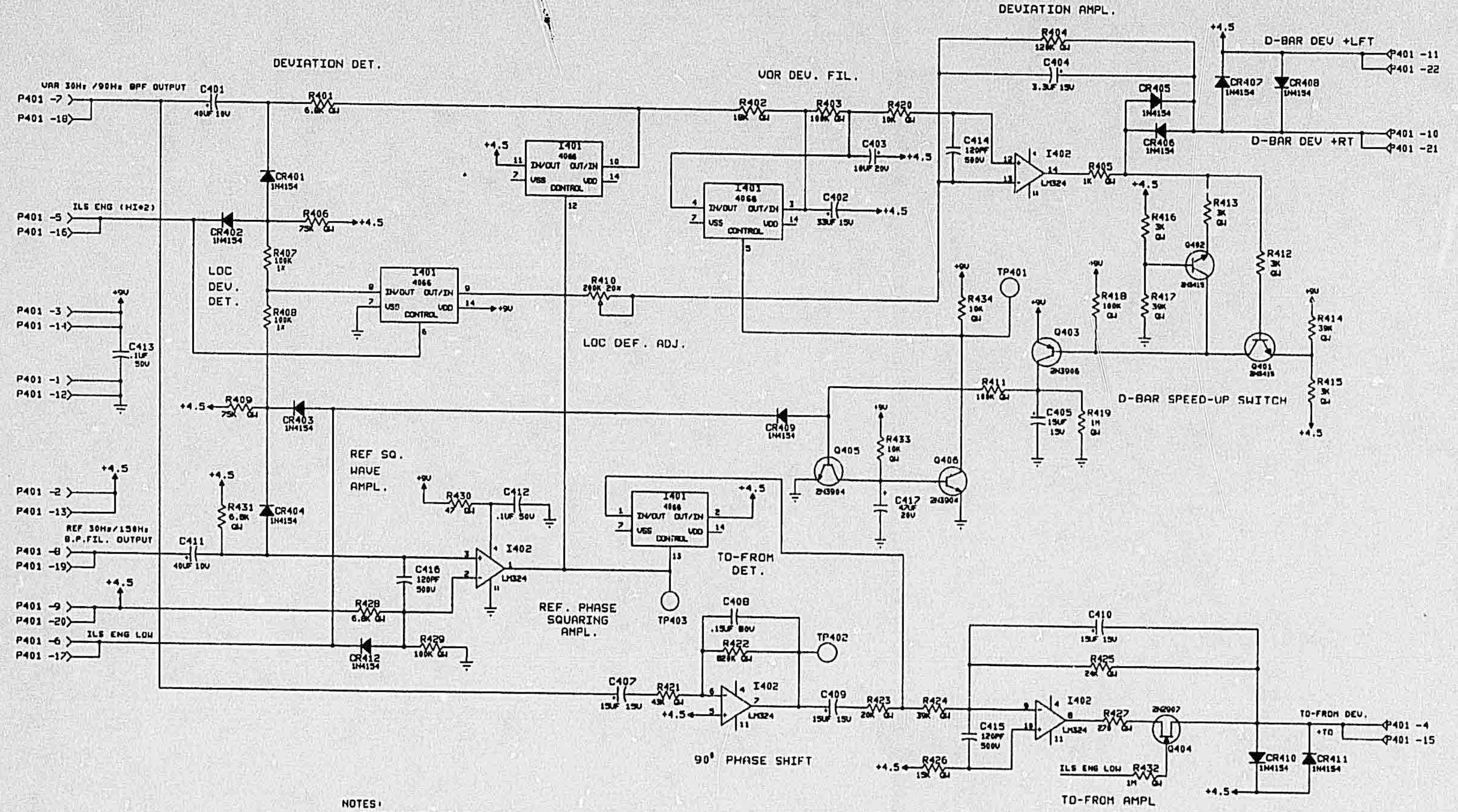
1. PRIOR TO POST COATING BOTH SIDES OF P.C. BOARD WITH UNDILUTED CLEAR URETHANE POSTCOATING P/N 016-01040-0000, MASK OFF THE FOLLOWING:
   ALL MOUNTING AREAS, ALL TEST POINTS, P401, R410, AND ALL DASHED-IN AREAS.

2. INSERT R410 FULLY INTO BOARD.



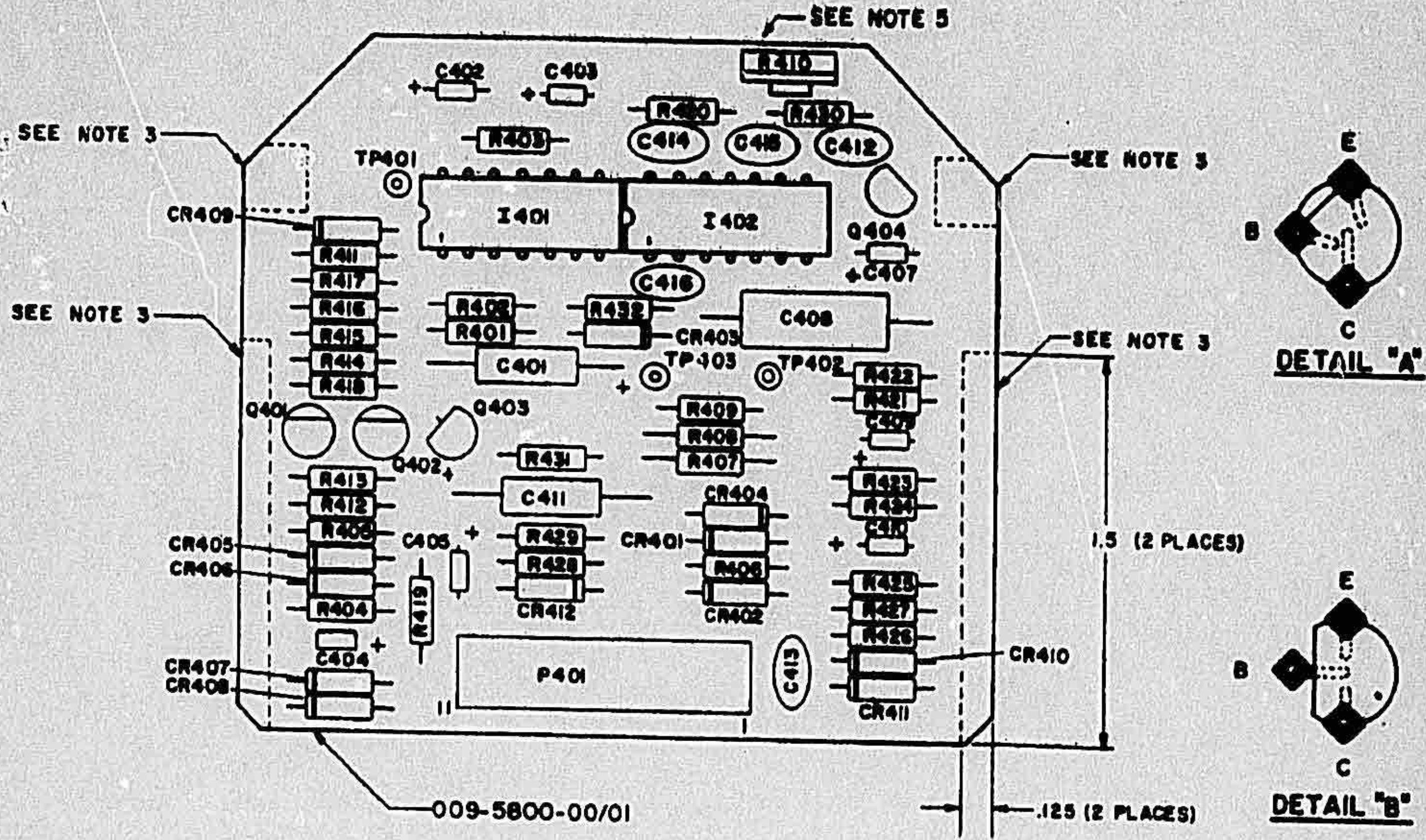
SCALE 4:1

Dwg 300-05800-0000 Rev AA



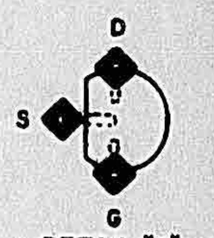
NOTES:
1. UNLESS NOTED: ALL RESISTANCE VALUES ARE OHMS, QW, 10%
2. UNLESS NOTED: ALL CAPACITANCE VALUES ARE IN MICROFARADS.

FIGURE 6-22 Converter #2 Board Schematic
(Dwg No 002-00360-0004, Rev 14)



NOTES:

1. Q401 & Q402, SEE DETAIL "A".
2. Q403, SEE DETAIL "B".
3. MASK OFF TEST POINTS, CONTACTS OF P401, R410, TWO AREAS FOR CARD GUIDES & TWO AREAS AROUND CARD PULLER HOLES, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 015-1040-00).
4. Q404, SEE DETAIL "C".
5. INSERT POT FULLY INTO BOARD.



Dwg 300-05800-0000 Rev 6

FIGURE 6-23 Converter #2 Board Assembly
(Dwg No 300-05800-0000, Rev 5)

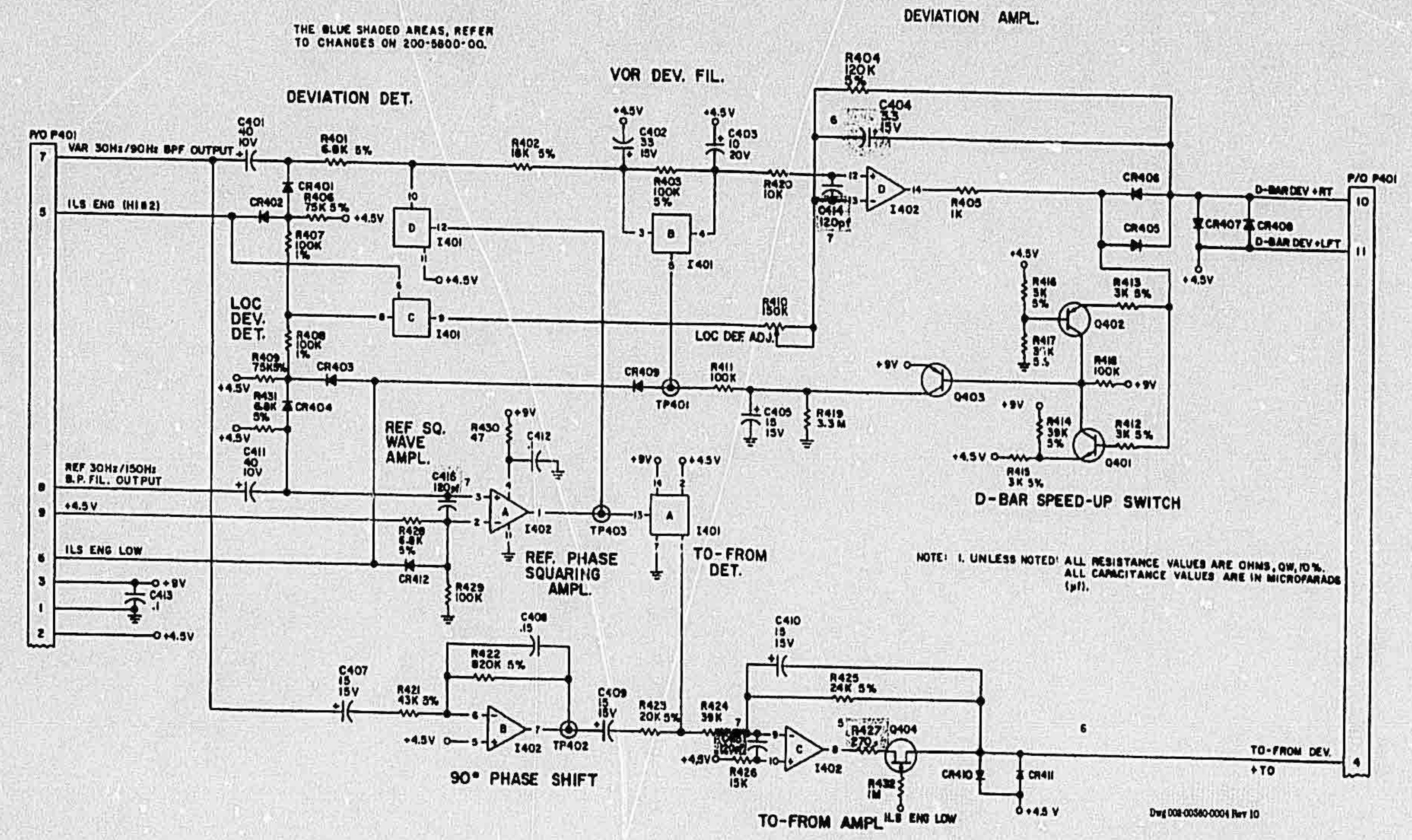
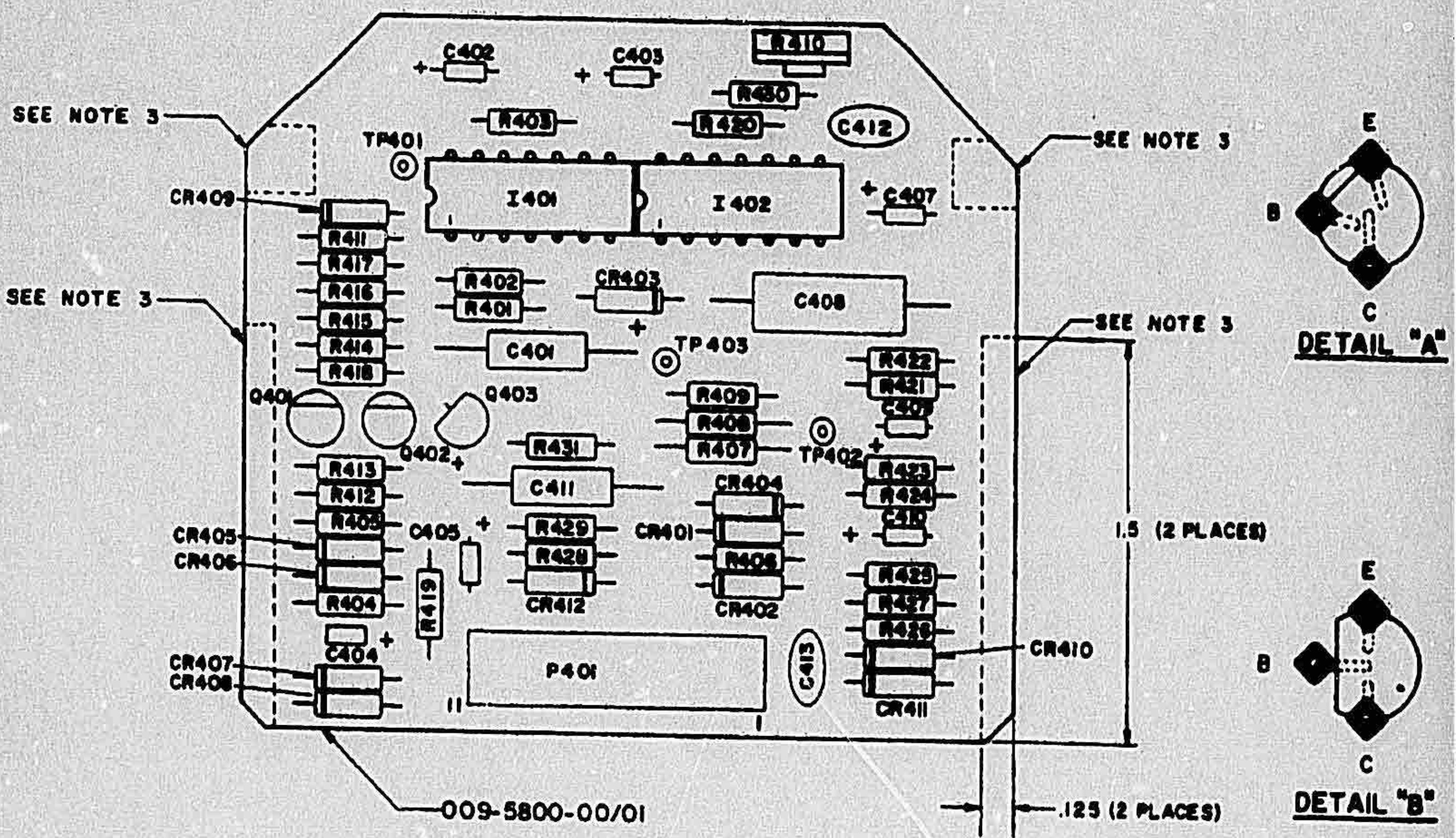


FIGURE 6-24 Converter #2 Board Schematic (Dwg No 002-00360-0004, Rev 10)



NOTES:
1. Q401 & Q402, SEE DETAIL "A".
2. Q403, SEE DETAIL "B".
3. MASK OFF TEST POINTS, CONTACTS OF P401, R410, TWO AREAS FOR CARD GUIDES & TWO AREAS AROUND CARD PULLER HOLES, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).

Dwg 300-05800-0000 Rev 1

FIGURE 6-25 Converter #2 Board Assembly
(Dwg No 300-05800-0000, Rev 1)

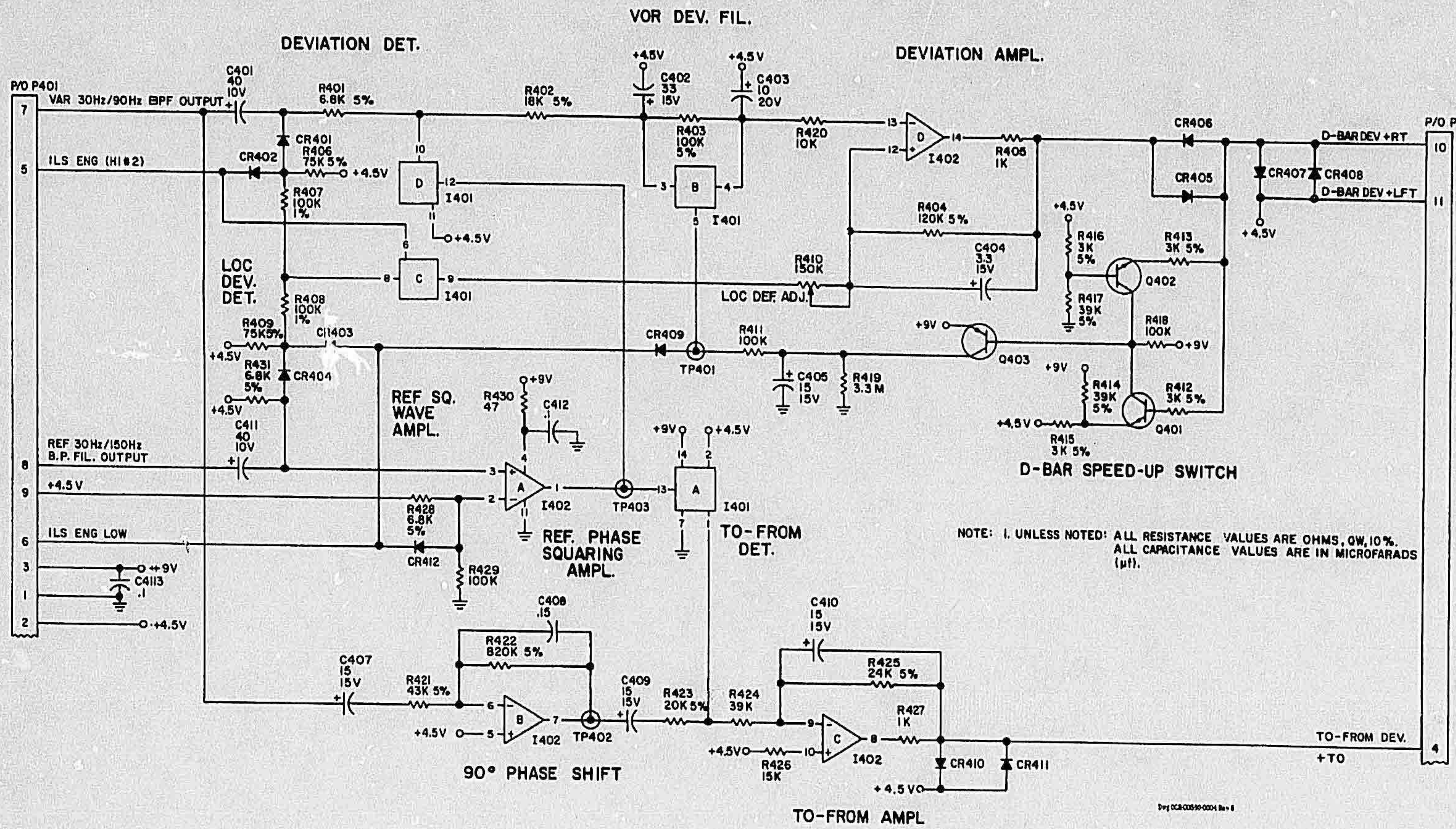


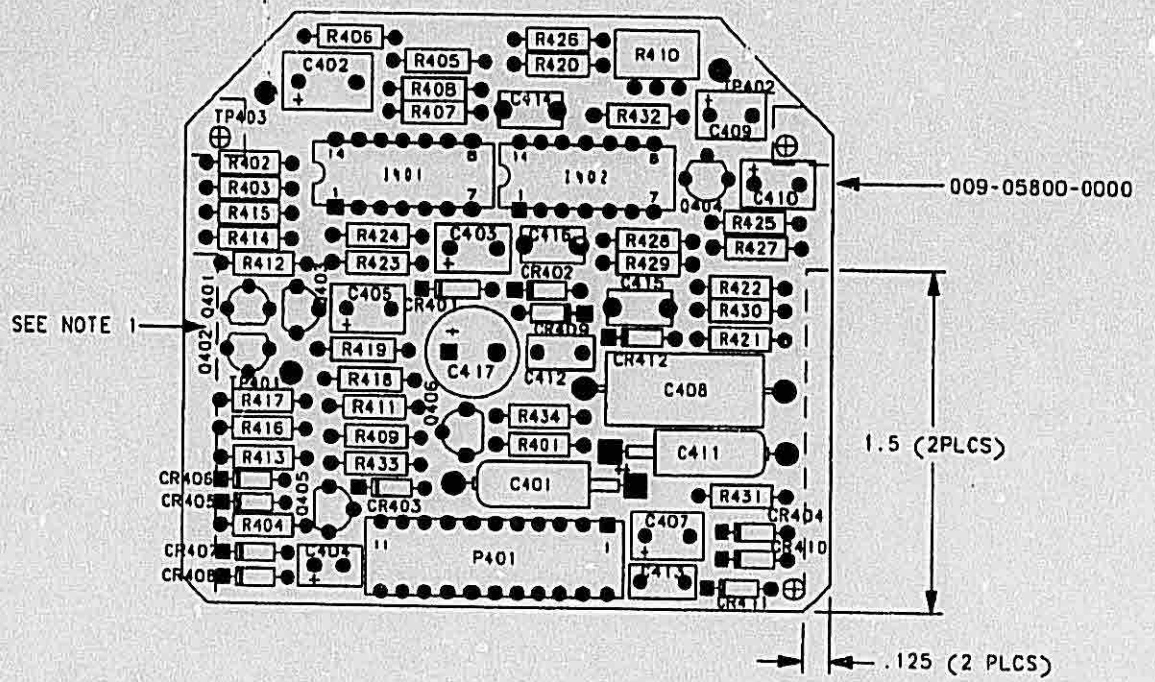
FIGURE 6-26 Converter #2 Board Schematic
(Dwg No 002-00360-0004, Rev 5)

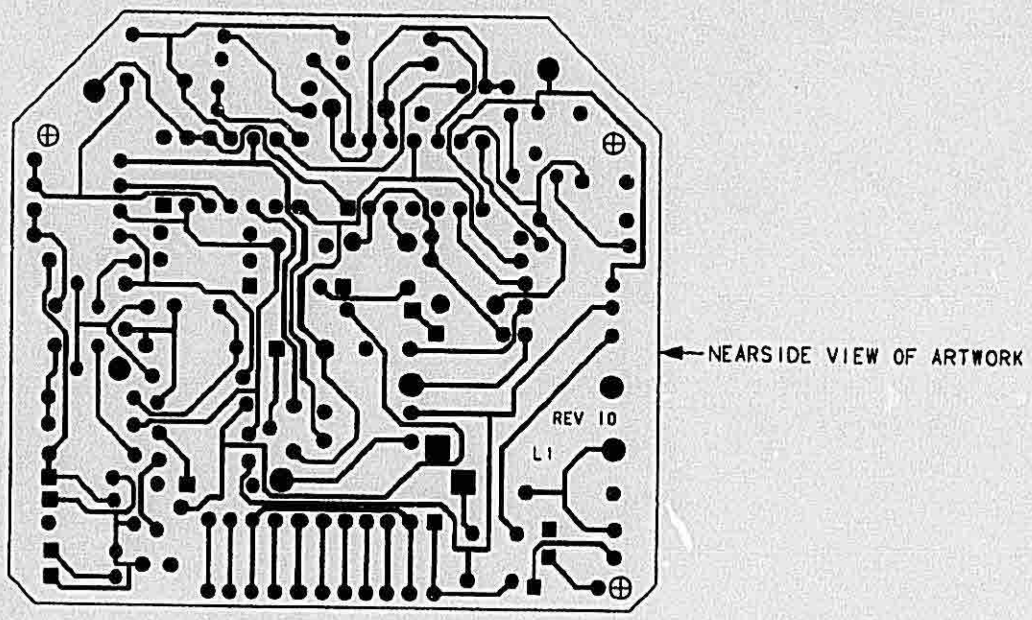
BOM 14: Converter #2 Board

200-05800-0001 CONVERTER #2 BOARD REV -

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0001
–	009-05800-0000		PC BD CONV #2	EA	1
–	030-02171-0011		CONN CARD 11 CONT	EA	1
C401	096-01014-0000		CAP TN 40UF 10V	EA	1
C402	096-01030-0042		CAP TN 33UF10%15V	EA	1
C403	096-01082-0005		CAP TN 10UF 20V	EA	1
C404	096-01082-0005		CAP TN 10UF 20V	EA	1
C405	096-01030-0027		CAP TN 15UF20%15V	EA	1
C407	096-01030-0027		CAP TN 15UF20%15V	EA	1
C408	105-00031-0074		CAP MY .15UF 80V	EA	1
C409	096-01030-0027		CAP TN 15UF20%15V	EA	1
C410	096-01030-0027		CAP TN 15UF20%15V	EA	1
C411	096-01014-0000		CAP TN 40UF 10V	EA	1
C412	111-00002-0000		CAP CR .1UF 50V	EA	1
C413	111-00002-0000		CAP CR .1UF 50V	EA	1
C414	113-03121-0000		CAP DC 120PF 500V	EA	1
C415	113-03121-0000		CAP DC 120PF 500V	EA	1
C416	113-03121-0000		CAP DC 120PF 500V	EA	1
C417	096-01082-0028		CAP TN 47UF 20V	EA	1
CR401	007-06016-0000		DIO S 1N4154	EA	1
CR402	007-06016-0000		DIO S 1N4154	EA	1
CR403	007-06016-0000		DIO S 1N4154	EA	1
CR405	007-06016-0000		DIO S 1N4154	EA	1
CR406	007-06016-0000		DIO S 1N4154	EA	1
CR407	007-06016-0000		DIO S 1N4154	EA	1
CR408	007-06016-0000		DIO S 1N4154	EA	1
CR409	007-06016-0000		DIO S 1N4154	EA	1
CR410	007-06016-0000		DIO S 1N4154	EA	1
CR411	007-06016-0000		DIO S 1N4154	EA	1
CR412	007-06016-0000		DIO S 1N4154	EA	1
I401	120-06083-0001		IC SCL4066BC	EA	1
I402	120-03052-0000		IC LM324N	EA	1
Q401	007-00078-0000		XSTR S NPN 2N3415	EA	1
Q402	007-00078-0000		XSTR S NPN 2N3415	EA	1
Q403	007-00065-0000		XSTR S PNP 2N3906	EA	1
Q404	007-00267-0001		XSTR FET J113	EA	1
Q405	007-00179-0000		XSTR S NPN 2N3904	EA	1
Q406	007-00179-0000		XSTR S NPN 2N3904	EA	1
R401	131-00682-0023		RES CF 6.8K QW 5%	EA	1
R402	131-00183-0023		RES CF 18K QW 5%	EA	1
R403	131-00104-0023		RES CF 100K QW 5%	EA	1
R404	136-03922-0072		RES PF 39.2K QW 1%	EA	1
R405	131-00102-0023		RES CF 1K QW 5%	EA	1
R406	131-00753-0023		RES CF 75K QW 5%	EA	1
R407	136-03922-0072		RES PF 39.2K QW 1%	EA	1
R408	136-03922-0072		RES PF 39.2K QW 1%	EA	1
R409	131-00753-0023		RES CF 75K QW 5%	EA	1
R410	133-00110-0010		RES VA 50K HW	EA	1
R411	131-00104-0023		RES CF 100K QW 5%	EA	1
R412	131-00302-0023		RES CF 3K QW 5%	EA	1
R413	131-00302-0023		RES CF 3K QW 5%	EA	1
R414	131-00393-0023		RES CF 39K QW 5%	EA	1
R415	131-00302-0023		RES CF 3K QW 5%	EA	1
R416	131-00302-0023		RES CF 3K QW 5%	EA	1
R417	131-00393-0023		RES CF 39K QW 5%	EA	1

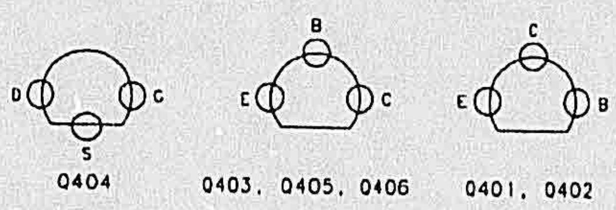
SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0001
R418	131-00104-0023		RES CF 100K QW 5%	EA	1
R419	131-00105-0023		RES CF 1M QW 5%	EA	1
R420	131-00103-0023		RES CF 10K QW 5%	EA	1
R421	131-00433-0023		RES CF 43K QW 5%	EA	1
R422	131-00824-0023		RES CF 820K QW 5%	EA	1
R423	131-00203-0023		RES CF 20K QW 5%	EA	1
R424	131-00393-0023		RES CF 39K QW 5%	EA	1
R425	131-00243-0023		RES CF 24K QW 5%	EA	1
R426	131-00153-0023		RES CF 15K QW 5%	EA	1
R427	131-00271-0023		RES CF 270 QW 5%	EA	1
R428	131-00682-0023		RES CF 6.8K QW 5%	EA	1
R429	131-00104-0023		RES CF 100K QW 5%	EA	1
R430	131-00470-0023		RES CF 47 QW 5%	EA	1
R431	131-00682-0023		RES CF 6.8K QW 5%	EA	1
R432	131-00105-0023		RES CF 1M QW 5%	EA	1
R433	131-00103-0023		RES CF 10K QW 5%	EA	1
R434	131-00103-0023		RES CF 10K QW 5%	EA	1
TP401	008-00096-0001		TERMINAL TEST PNT	EA	1
TP402	008-00096-0001		TERMINAL TEST PNT	EA	1
TP403	008-00096-0001		TERMINAL TEST PNT	EA	1





NOTES:

1. PRIOR TO POST COATING BOTH SIDES OF P.C. BOARD WITH CLEAR URETHANE POSTCOATING P/N 016-01040-0000, MASK OFF THE FOLLOWING: ALL MOUNTING AREAS, ALL TEST POINTS, P401, R410, AND ALL DASHED-IN AREAS.



SCALE 4:1

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-05800-0001

Dwg 300-05800-0001 Rev -

FIGURE 6-27 Converter #2 Board Assembly (Dwg No 300-05800-0001, Rev -)

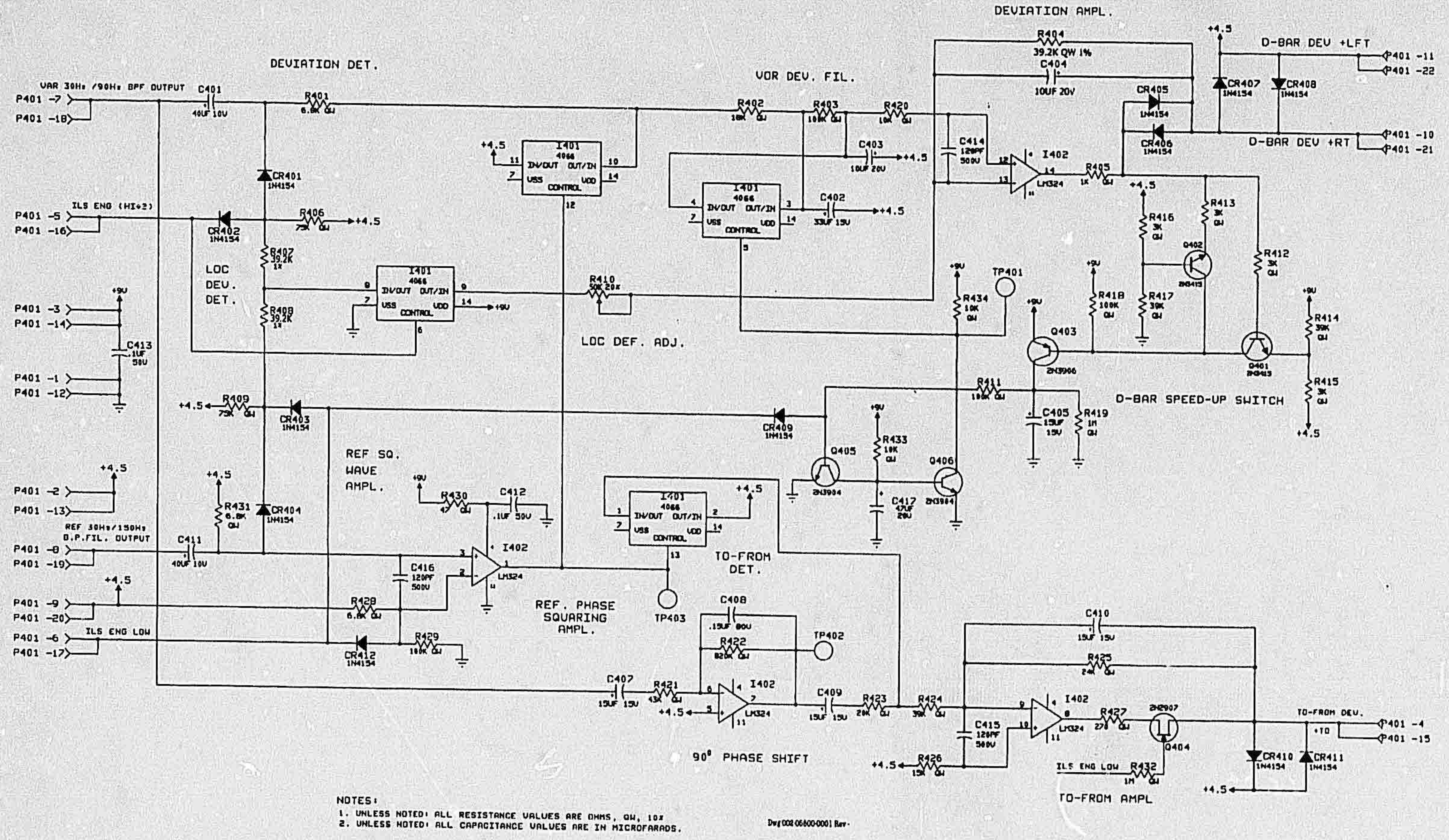


FIGURE 6-28 Converter #2 Board Schematic
(Dwg No 002-05800-0001, Rev -)

BOM 15: Power Supply and Flag Board

200-05801-0000 POWER SUPPLY & FLAG BOARD ASSY REV 13

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000
_	009-05801-0000		PC BD PWR SPLY	EA	1
_	030-02171-0010		CONN CARD 10 CONT	EA	1
_	047-03815-0001		HEAT SINK XSTR W/F	EA	1
_	089-02076-0030		NUT FLAT 4-40	EA	1
_	089-05903-0006		SCR PHP 4-40X3/8	EA	1
_	091-00156-0000		BUSHING	EA	1
_	091-00286-0002		INSUL XSTR .687	EA	1
C501	097-00056-0065		CAP AL 47UF 63V	EA	1
C502	096-01014-0000		CAP TN 40UF 10V	EA	1
C503	109-00007-0000		CAP DC .01UF 25V	EA	1
C504	097-00056-0033		CAP AL 150UF 16V	EA	1
C505	096-01030-0027		CAP TN 15UF20% 15V	EA	1
C506	096-01030-0027		CAP TN 15UF20% 15V	EA	1
C507	096-01030-0011		CAP TN 4.7UF20% 20V	EA	1
C508	096-01030-0011		CAP TN 4.7UF20% 20V	EA	1
C509	096-01030-0011		CAP TN 4.7UF20% 20V	EA	1
C510	113-03121-0000		CAP DC 120PF 500V	EA	1
C511	111-00001-0008		CAP CR 100PF 200V	EA	1
CR501	007-05039-0000		DIO Z 33.3V	EA	1
CR502	007-06016-0000		DIO S 1N4154	EA	1
CR503	007-06016-0000		DIO S 1N4154	EA	1
CR504	007-06033-0000		DIO G 1N270	EA	1
CR505	007-06033-0000		DIO G 1N270	EA	1
CR506	007-06016-0000		DIO S 1N4154	EA	1
CR507	007-06016-0000		DIO S 1N4154	EA	1
CR508	007-06016-0000		DIO S 1N4154	EA	1
CR509	007-06016-0000		DIO S 1N4154	EA	1
CR510	007-06016-0000		DIO S 1N4154	EA	1
CR511	007-06016-0000		DIO S 1N4154	EA	1
CR512	007-06016-0000		DIO S 1N4154	EA	1
CR513	007-06016-0000		DIO S 1N4154	EA	1
CR514	007-06016-0000		DIO S 1N4154	EA	1
I501	120-03060-0000		IC CA3085AE	EA	1
I502	120-03053-0000		IC LM358N	EA	1
Q501	007-00065-0000		XSTR S PNP 2N3906	EA	1
Q502	007-00930-0000		XSTR S PNP MJE15029	EA	1
Q503	007-00078-0000		XSTR S NPN 2N3415	EA	1
Q504	007-00078-0000		XSTR S NPN 2N3415	EA	1
Q505	007-00065-0000		XSTR S PNP 2N3906	EA	1
Q506	007-00078-0000		XSTR S NPN 2N3415	EA	1
R501	131-00047-0023		RES CF 4.7 QW 5%	EA	1
R502	131-00047-0023		RES CF 4.7 QW 5%	EA	1
R503	136-01002-0072		RES PF 10K QW 1%	EA	1
R504	136-01651-0072		RES PF 1.65K QW 1%	EA	1
R505	133-00113-0013		RES VA 1K 20% B	EA	1
R506	131-00470-0023		RES CF 47 QW 5%	EA	1
R507	131-00103-0023		RES CF 10K QW 5%	EA	1
R508	136-04751-0072		RES PF 4.75K QW 1%	EA	1
R509	136-04751-0072		RES PF 4.75K QW 1%	EA	1
R510	131-00470-0023		RES CF 47 QW 5%	EA	1
R511	131-00473-0023		RES CF 47K QW 5%	EA	1
R512	131-00473-0023		RES CF 47K QW 5%	EA	1
R513	136-06812-0072		RES PF 68.1K QW 1%	EA	1
R514	136-06812-0072		RES PF 68.1K QW 1%	EA	1

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000
R515	131-00202-0023		RES CF 2K QW 5%	EA	1
R516	131-00202-0023		RES CF 2K QW 5%	EA	1
R517	131-00105-0023		RES CF 1M QW 5%	EA	1
R519	131-00434-0023		RES CF 430K QW 5%	EA	1
R520	136-01821-0072		RES PF 1.82K QW 1%	EA	1
R521	136-05491-0072		RES PF 5.49K QW 1%	EA	1
R522	136-03572-0072		RES PF [illegible] QW 1%	EA	1
R523	131-00333-0013		RES CF [illegible] EW 5%	EA	1
R524	131-00102-0013		RES CF [illegible] EW 5%	EA	1
R525	131-00103-0023		RES CF [illegible] QW 5%	EA	1
R526	131-00103-0013		RES CF 10K EW 5%	EA	1
R527	131-00392-0023		RES CF 3.9K QW 5%	EA	1
R528	131-00103-0023		RES CF 10K QW 5%	EA	1
R529	131-00392-0013		RES CF 3.9K EW 5%	EA	1
R530	131-00272-0023		RES CF 2.7K QW 5%	EA	1
TP501	008-00096-0001		TERMINAL TEST PNT	EA	1
TP502	008-00096-0001		TERMINAL TEST PNT	EA	1
TP503	008-00096-0001		TERMINAL TEST PNT	EA	1

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

NAME: Power Supply & Flag Bd. Assy — ASS'Y. NO.: 200-5801-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	-00	-01	-02	-03	-04
	009-5801-00	P/C Board		1				
	030-2171-10	Edge Conn 10 Pin		1				
	047-3815-01	Heat Sink		1				
	089-2076-30	Nut Hex #4-40		1				
	089-5903-06	Screw PHP 4-40 x 3/8		1				
	091-0156-00	Shoulder Washer Nylon		1				
	091-0286-02	Insulator, Cho-Therm		1				
Q501	007-0065-00	Tstr 2N3906 PNP		2				
Q502	007-0296-00	Tstr D45C5 PNP		1				
Q503	007-0078-00	Tstr 2N3415 NPN		3				
Q504	007-0078-00	Tstr 2N3415 NPN		-				
Q505	007-0065-00	Tstr 2N3906 PNP		-				
Q506	007-0078-00	Tstr 2N3415 NPN		-				
CR501	007-5039-00	39V Transient Zener		1				
CR502	007-6016-00	Diode 1N4154 Si		11				
CR503	007-6016-00	Diode 1N4154 Si		-				
CR504	007-6033-00	Diode 1N270 Ge		2				
CR505	007-6033-00	Diode 1N270 Ge		-				
CR506	007-6016-00	Diode 1N4154 Si		-				
CR507	007-6016-00	Diode 1N4154 Si		-				
CR508	007-6016-00	Diode 1N4154 Si		-				
CR509	007-6016-00	Diode 1N4154 Si		-				
CR510	007-6016-00	Diode 1N4154 Si		-				
CR511	007-6016-00	Diode 1N4154 Si		-				
CR512	007-6016-00	Diode 1N4154 Si		-				
CR513	007-6016-00	Diode 1N4154 Si		-				
CR514	007-6016-00	Diode 1N4154 Si		-				
C501	097-0056-65	Cap 47uf 63V EL		1				
C502	096-1014-00	Cap 40uf 10V Tant		1				
C503	109-0007-00	Cap .01 D/C		1				
C504	097-0056-33	Cap 150uf 16V EL		1				
C505	096-1030-27	Cap 15uf 15V Tant		2				
C506	096-1030-27	Cap 15uf 15V Tant		-				
C507	096-1030-11	Cap 4.7uf 20V Tant		3				
C508	096-1030-11	Cap 4.7uf 20V Tant		-				
C509	096-1030-11	Cap 4.7uf 20V Tant		-				
C510	113-3121-00	Cap 120pf D/C		1				
I501	120-3060-00	Voltage Reg RCA3085A		1				
I502	120-3053-00	IC LM358 Dual OP		1				
R501	130-0047-25	Res 4.7 ohm 1/4W		2				
R502	130-0047-25	Res 4.7 ohm 1/4W		-				
R503	136-1002-72	Res 10K 1%		1				

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

NAME	ASS'Y. NO.
Power Supply & Flag Bd. Assy.	200-5801-00

KING RADIO CORP. PARTS LISTING

SYMBOL	PART NUMBER	DESCRIPTION	CODE	-00	-01	-02	-03	-04
R504	136-1651-72	Res. 1.65K 1%		1				
R505	133-0016-02	Res 1K Pot		1				
R506	130-0470-25	Res 47 ohm 1/4W		1				
R507	130-0103-25	Res 10K 1/4W		4				
R508	136-4751-72	Res 4.75K 1%		2				
R509	136-4751-72	Res 4.75K 1%		-				
R510	130-0470-23	Res 47 ohm 1/4W 5%		1				
R511	130-0473-23	Res 47K 1/4W 5%		2				
R512	130-0473-23	Res 47K 1/4W 5%		-				
R513	136-6812-72	Res 68.1K 1%		2				
R514	136-6812-72	Res 68.1K 1%		-				
R515	130-0202-23	Res 2K 1/4W 5%		2				
R516	130-0202-23	Res 2K 1/4W 5%		-				
R517	130-0105-25	Res 1M 1/4W		2				
R518	130-0105-25	Res 1M 1/4W		-				
R519	130-0434-23	Res 430K 1/4W 5%		1				
R520	136-1821-72	Res 1.82K 1%		1				
R521	136-5491-72	Res 5.49K 1%		1				
R522	136-3572-72	Res 35.7K 1%		1				
R523	130-0333-25	Res 33K 1/4W		1				
R524	130-0102-25	Res 1K 1/4W		1				
R525	130-0103-25	Res 10K 1/4W		-				
R526	130-0103-25	Res 10K 1/4W		-				
R527	130-0392-25	Res 3.9K 1/4W		2				
R528	130-0103-25	Res 10K 1/4W		-				
R529	130-0392-25	Res 3.9K 1/4W		-				
R530	130-0272-25	Res 2.7K $\frac{1}{4}$W		1				

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PARTS LIST REVISION HISTORY

ENGR. APPROVAL: Elmer W. Hechinger

NAME	ASS'Y. NO.
Power Supply & Flag Bd. Assy.	200-5801-00

ASS'Y. DWG.	UNIT	USED ON
300-5801-00	KI 203/204	200-1928-00

REV	CHANGE	SYMBOL	PART NUMBER	DESCRIPTION
1				
2				
				KI 203/204 Maintenance Manual Revision 0, April 1976
3		C510	113-3121-00	Added to B/M
4		R510	130-0470-23	P/N changed from 130-0201-23, desc. from 200 ohm to 47 ohm
5			091-0286-02	P/N changed from 091-0275-00
				KI 203/204 MAINTENANCE MANUAL REV. 1, SEPT., 1979

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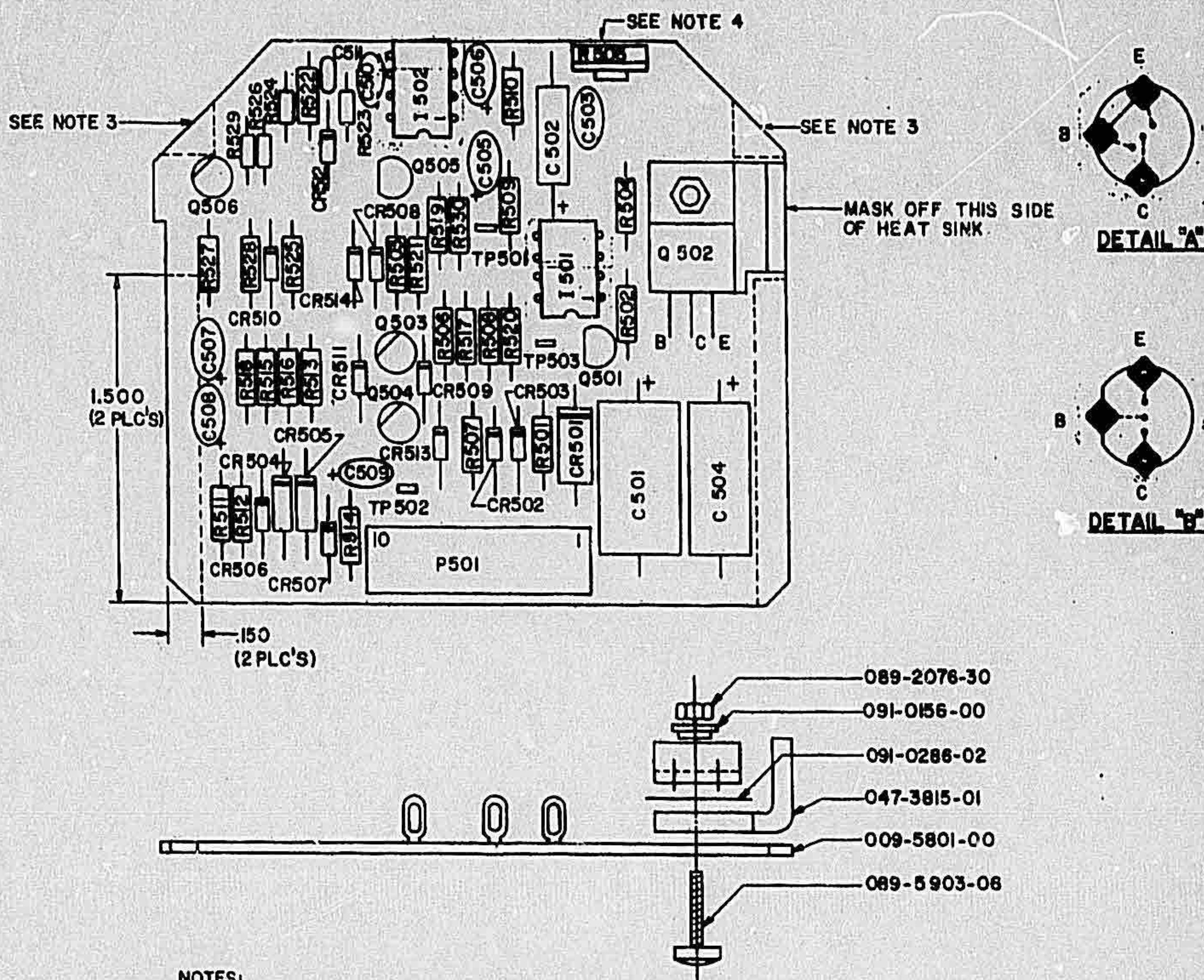


NOTES:

1. TRANSISTORS Q503, Q504, & Q506, SEE DETAIL "A".
2. TRANSISTORS Q501 & Q505, SEE DETAIL "B".
3. MASK OFF TEST POINTS, P501, R 505, HEAT SINK AS NOTED, TWO AREAS AROUND CARD PULLER HOLES, & TWO AREAS FOR CARD GUIDES, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).
4. INSERT POT FULLY INTO BOARD.

Dwg 300-05801-0000 Rev 6

FIGURE 6-29 Power Supply and Flag Board Assembly (Dwg No 300-05801-0000, Rev 6)

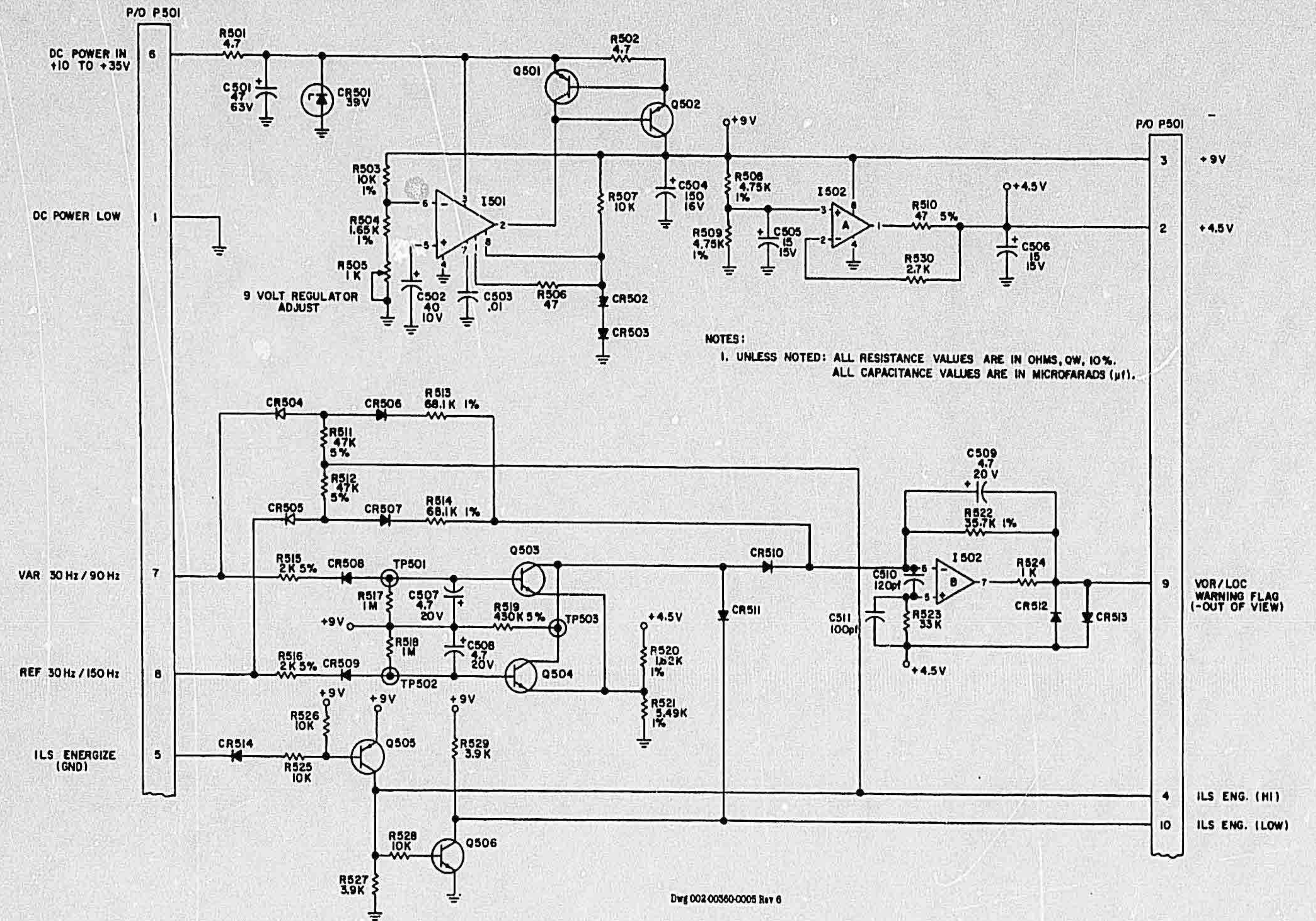
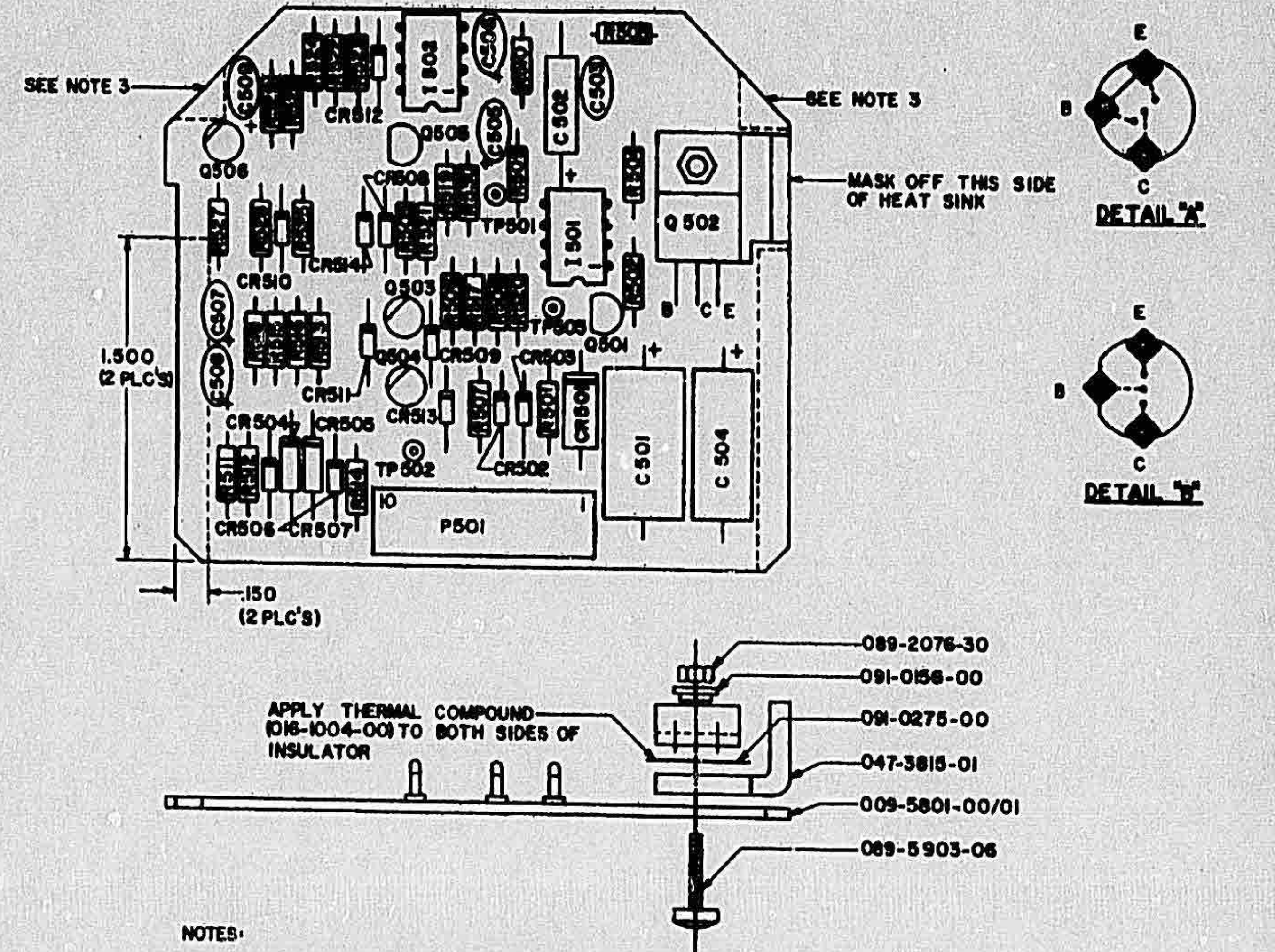


FIGURE 6-30 Power Supply and Flag Board Schematic
(Dwg No 002-00360-0005, Rev 6)



NOTES:

1. TRANSISTORS Q503, Q504, & Q506, SEE DETAIL "A".
2. TRANSISTORS Q501 & Q505, SEE DETAIL "B".
3. MASK OFF TEST POINTS, P501, R505, HEAT SINK AS NOTED, TWO AREAS AROUND CARD PULLER HOLES, & TWO AREAS FOR CARD GUIDES, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).

Dwg 300-05801-0000 Rev 1

FIGURE 6-31 Power Supply and Flag Board Assembly
(Dwg No 300-05801-0000, Rev 1)

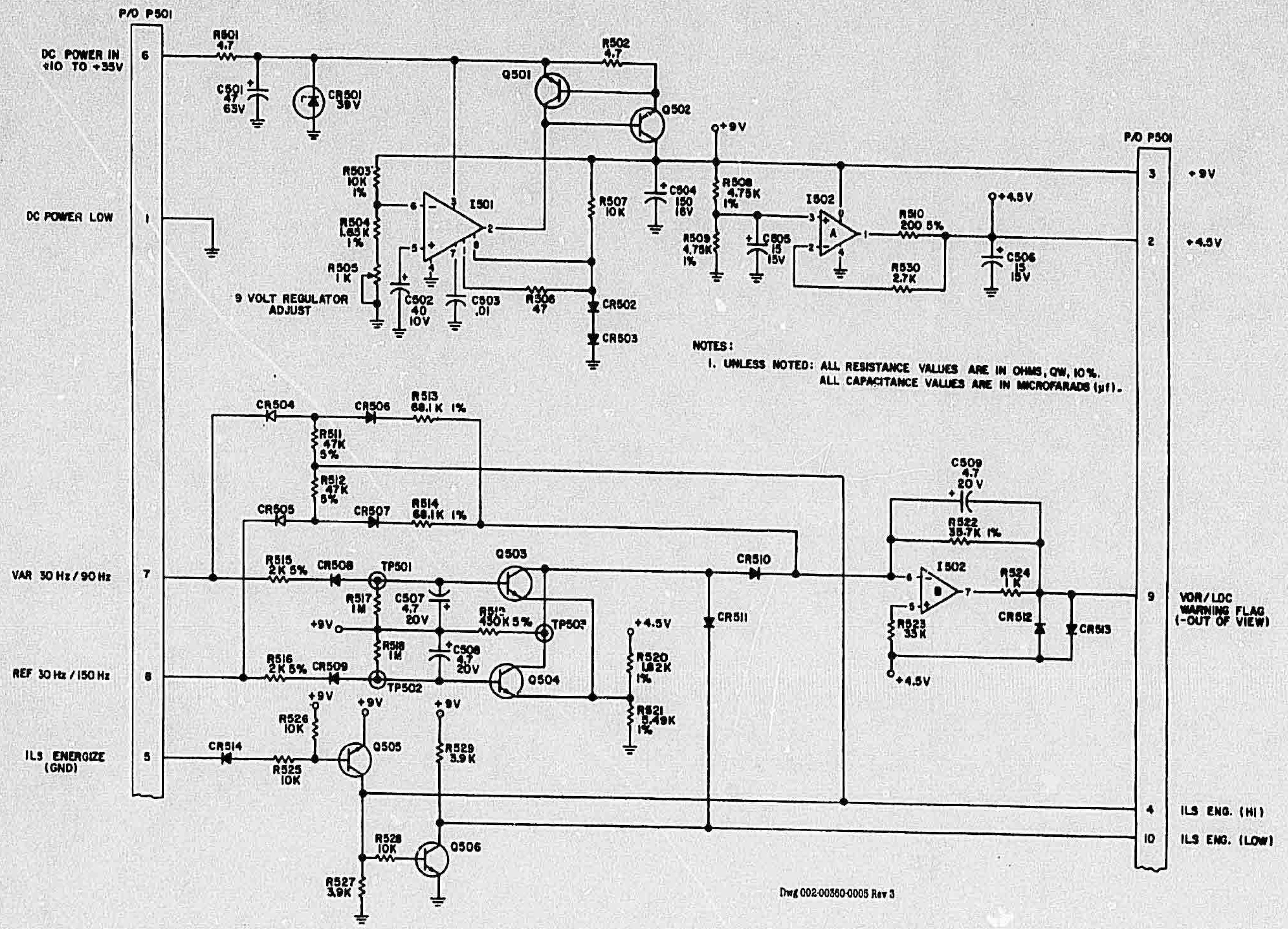


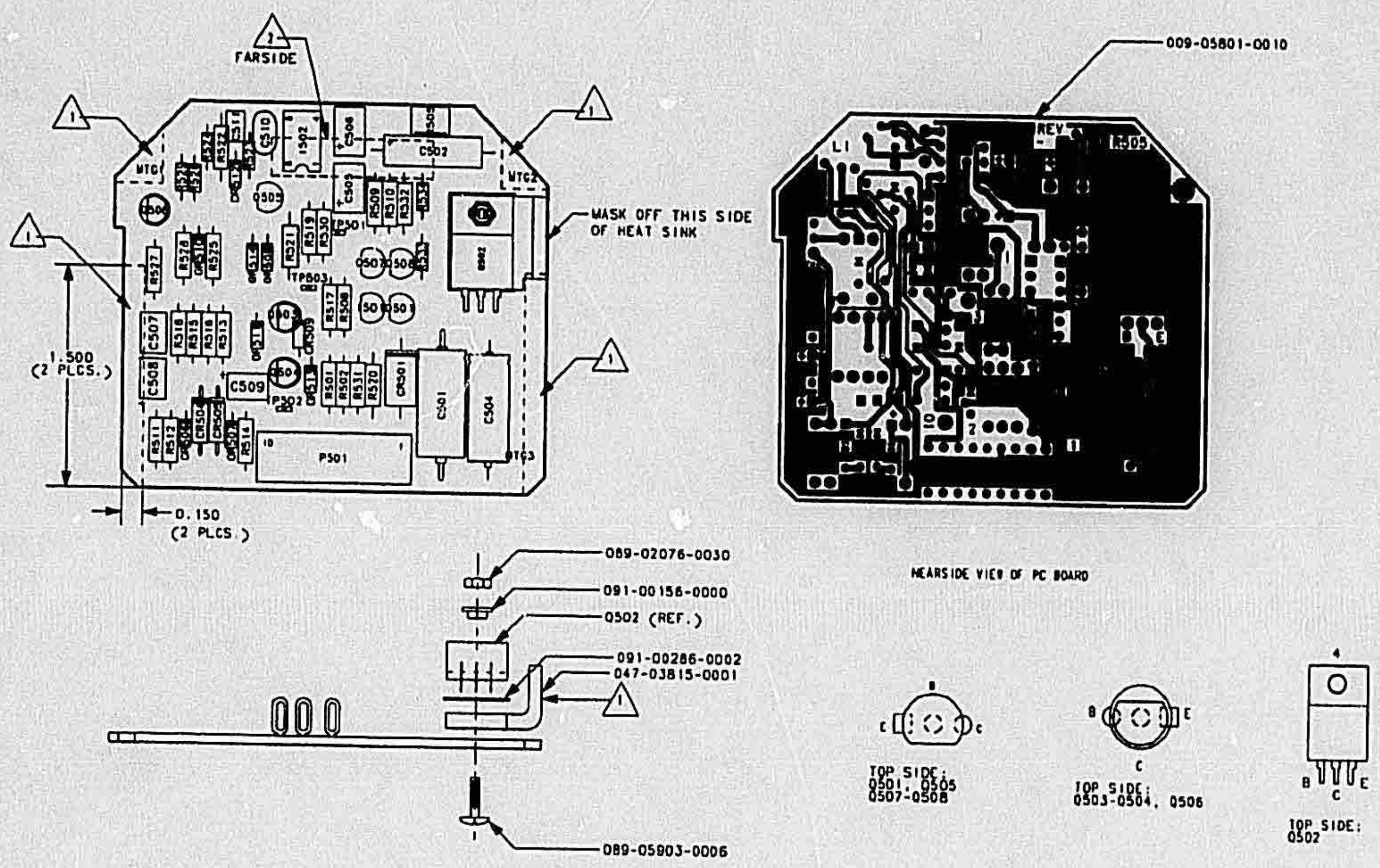
FIGURE 6-32 Power Supply and Flag Board Schematic
(Dwg No 002-00360-0005, Rev 3)

BOM 16: Power Supply and Flag Board

200-05801-0010 POWER SUPPLY & FLAG BOARD ASSY REV -

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0010
_	009-05801-0010		PWR SUPPLY AND FLAG	EA	1
_	047-03815-0001		HEAT SINK XSTR W/F	EA	1
_	089-02076-0030		NUT FLAT 4-40	EA	1
_	089-05903-0006		SCR PHP 4-40X3/8	EA	1
_	091-00156-0000		BUSHING	EA	1
_	091-00286-0002		INSUL XSTR .687	EA	1
C501	097-00056-0065		CAP AL 47UF 63V	EA	1
C502	096-01014-0000		CAP TN 40UF 10V	EA	1
C504	097-00056-0033		CAP AL 150UF 16V	EA	1
C505	096-01030-0027		CAP TN 15UF20%15V	EA	1
C506	096-01030-0027		CAP TN 15UF20%15V	EA	1
C507	096-01030-0011		CAP TN 4.7UF20%20V	EA	1
C508	096-01030-0011		CAP TN 4.7UF20%20V	EA	1
C509	096-01030-0011		CAP TN 4.7UF20%20V	EA	1
C510	113-03121-0000		CAP DC 120PF 500V	EA	1
C511	111-00001-0008		CAP CR 100PF 200V	EA	1
CR501	007-05039-0000		DIO Z 33.3V	EA	1
CR504	007-06033-0000		DIO G 1N270	EA	1
CR505	007-06033-0000		DIO G 1N270	EA	1
CR506	007-06016-0000		DIO S 1N4154	EA	1
CR507	007-06016-0000		DIO S 1N4154	EA	1
CR508	007-06016-0000		DIO S 1N4154	EA	1
CR509	007-06016-0000		DIO S 1N4154	EA	1
CR510	007-06016-0000		DIO S 1N4154	EA	1
CR511	007-06016-0000		DIO S 1N4154	EA	1
CR512	007-06016-0000		DIO S 1N4154	EA	1
CR513	007-06016-0000		DIO S 1N4154	EA	1
CR514	007-06016-0000		DIO S 1N4154	EA	1
I501	120-03744-0001		REGULATOR, 5V, TO-92	EA	1
I502	120-03053-0000		IC LM358N	EA	1
P501	030-02171-0010		CONN CARD 10 CONT	EA	1
Q501	007-00065-0000		XSTR S PNP 2N3906	EA	1
Q502	007-00930-0000		XSTR S PNPMJE15029	EA	1
Q503	007-00078-0000		XSTR S NPN 2N3415	EA	1
Q504	007-00078-0000		XSTR S NPN 2N3415	EA	1
Q505	007-00065-0000		XSTR S PNP 2N3906	EA	1
Q506	007-00078-0000		XSTR S NPN 2N3415	EA	1
Q507	007-00243-0000		XSTR S NPN MPSA06	EA	1
Q508	007-00243-0000		XSTR S NPN MPSA06	EA	1
R501	131-00047-0023		RES CF 4.7 QW 5%	EA	1
R502	131-00047-0023		RES CF 4.7 QW 5%	EA	1
R505	133-00110-0002		RES VA 200 HW	EA	1
R508	136-04751-0072		RES PF 4.75K QW 1%	EA	1
R509	136-04751-0072		RES PF 4.75K QW 1%	EA	1
R510	131-00470-0023		RES CF 47 QW 5%	EA	1
R511	131-00473-0023		RES CF 47K QW 5%	EA	1
R512	131-00473-0023		RES CF 47K QW 5%	EA	1
R513	136-06812-0072		RES PF 68.1K QW 1%	EA	1
R514	136-06812-0072		RES PF 68.1K QW 1%	EA	1
R515	131-00202-0023		RES CF 2K QW 5%	EA	1
R516	131-00202-0023		RES CF 2K QW 5%	EA	1
R517	131-00105-0023		RES CF 1M QW 5%	EA	1
R519	131-00434-0023		RES CF 430K QW 5%	EA	1
R520	136-01821-0072		RES PF 1.82K QW 1%	EA	1

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0010
R521	136-05491-0072		RES PF 5.49K QW 1%	EA	1
R522	136-03572-0072		RES PF 35.7K QW 1%	EA	1
R523	131-00333-0013		RES CF 33K EW 5%	EA	1
R524	131-00102-0013		RES CF 1K EW 5%	EA	1
R525	131-00103-0023		RES CF 10K QW 5%	EA	1
R526	131-00103-0013		RES CF 10K EW 5%	EA	1
R527	131-00392-0023		RES CF 3.9K QW 5%	EA	1
R528	131-00103-0023		RES CF 10K QW 5%	EA	1
R529	131-00392-0013		RES CF 3.9K EW 5%	EA	1
R530	131-00272-0023		RES CF 2.7K QW 5%	EA	1
R531	131-00104-0023		RES CF 100K QW 5%	EA	1
R532	131-00911-0023		RES CF 910 QW 5%	EA	1
R533	136-07500-0062		RES PF 750 EW 1%	EA	1
R534	136-08250-0062		RES PF 825 EW 1%	EA	1
REF1	300-05801-0010		PWR SUPP AND FLAG BD	RF	X
REF2	002-05801-0010		PWR SUPP BD KI203/4	RF	X
TP501	008-00096-0001		TERMINAL TEST PNT	EA	1
TP502	008-00096-0001		TERMINAL TEST PNT	EA	1
TP503	008-00096-0001		TERMINAL TEST PNT	EA	1



NOTES:

1. PRIOR TO POST COATING BOTH SIDES OF P.C. BOARD WITH PN 016-01040-0000, MASK OFF ALL MOUNTING AREAS AND REFERENCE DESIGNATORS: MTG1-MTG4, P501, R505, TP501 THRU TP503, HEAT SINK AS NOTED, TWO AREAS AROUND CARD PULLER HOLES, TWO AREAS FOR CARD GUIDES.

2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC. 001-01101-0000.

3. WHERE APPLICABLE, LIQUID STAKE ALL FASTENERS PER SPEC. 001-01080-0000.

Dwg 300-05801-0010 Rev -

FIGURE 6-33 Power Supply and Flag Board Assembly
(Dwg No 300-05801-0010, Rev -)

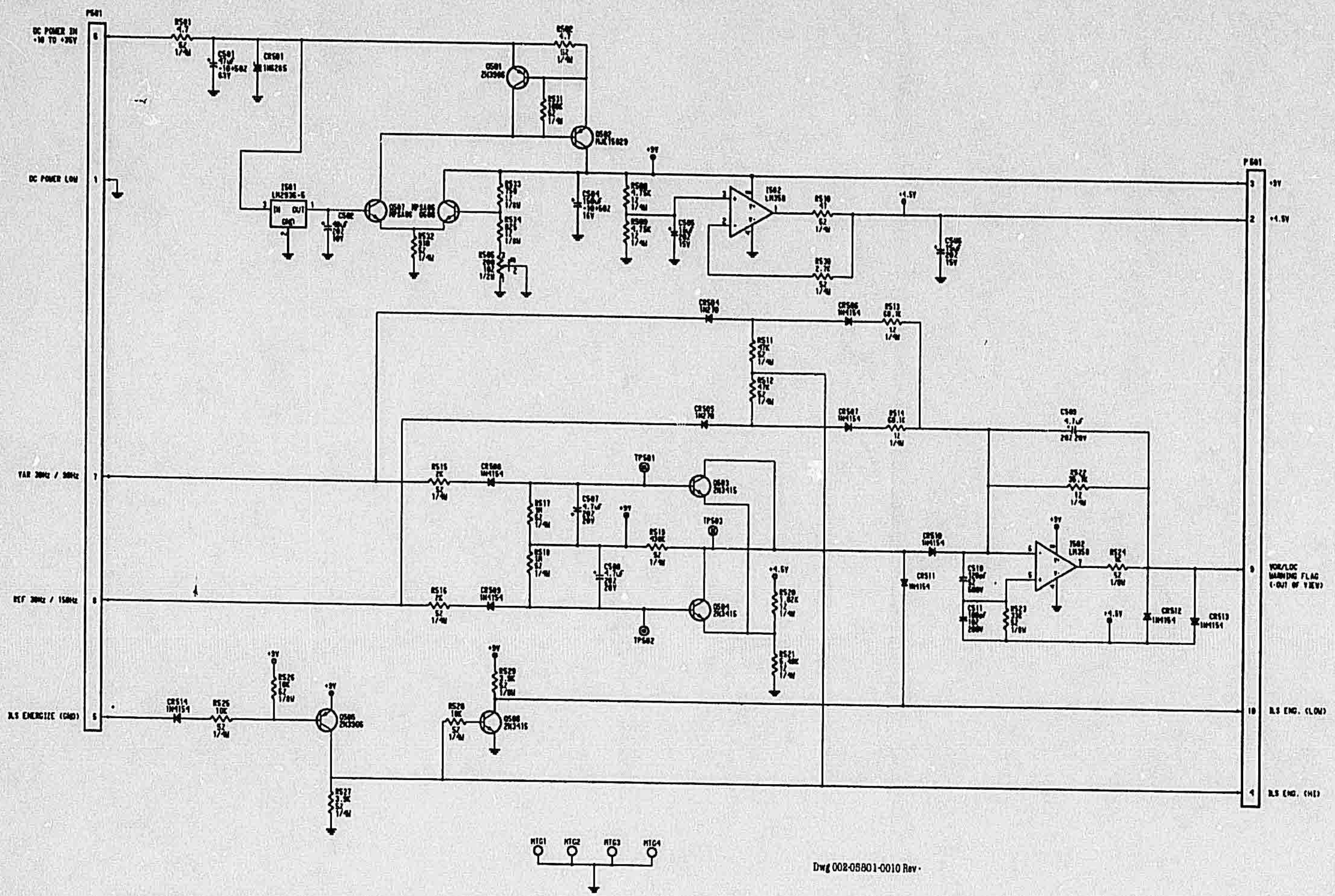


FIGURE 6-34 Power Supply and Flag Board Schematic
(Dwg No 002-05801-0010, Rev -)

KI 202/206/207

Maintenance Manual

Honeywell

MAINTENANCE MANUAL

BENDIX/KING®

KI 202, KI 206, KI 207

NAVIGATION INDICATORS

MANUAL NUMBER 006-05137-0005
Revision 5, August 2002

WARNING

PRIOR TO EXPORT OF THIS DOCUMENT, REVIEW FOR EXPORT LICENSE REQUIREMENT IS NEEDED.

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SECTION IV
THEORY OF OPERATION

4.1 GENERAL

This section contains theory of operation for the KI 202, KI 206, KI 207 VOR/LOC Glideslope Indicator.

4.2 THEORY OF OPERATION KI 202, KI 206, KI 207

4.2.1 VOR/LOC Operation (KI 202, KI 206, KI 207)

The KI 202, KI 206, KI 207 receive DC signals from a remote mounted VOR/LOC such as the Bendix/King KN 77, or panel mounted KX 155 (via KN 72), KX 155A (via KN 72), KX 165, or KX 165A. These DC signals (either current or voltage) are connected directly to the course deviation meter, To-From indicator and VOR/LOC warning flag.

4.2.2 Glideslope Presentation (KI 206, KI 207)

The KI 206, KI 207(except -25) receive DC signals from a remote mounted glideslope receiver/ converter such as the Bendix/King KNR 634A, or panel mounted KX 155, KX 155A, KX 165, or KX 165A. These DC signals (either current or voltage) are connected directly to the glideslope deviation meter and glideslope warning flag.

4.2.3 VOR Course Resolver

A standard ARINC six wire course resolver is included on the KI 202, KI 206. The KI 207 contains no resolver or azimuth card. By turning the OBS knob, the azimuth card and rotor of the course resolver are also turned. As the rotor of the resolver rotates about the stator windings, the coupling from the rotor to each of the stators varies. In normal VOR operation, a 30 Hz signal is connected to the rotor winding of the resolver as in Figure 4-1.

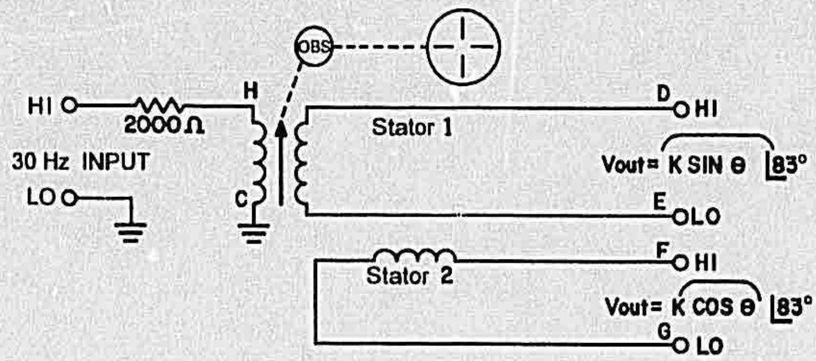

FIGURE 4-1 Resolver Operation

For each position of the rotor shaft, the amplitude of the voltages on the Stator 1 and Stator 2 windings is defined as in Figure 4-1. The angle θ is the angle of shaft rotation and is defined to be zero with an OBS (selected course) of 300 degrees and equal to 90 degrees with an OBS of 210 degrees. Phase shift between the 30 Hz input to the 2000 ohm resistor and either stator winding when at maximum coupling is 83 degrees.

4.2.4 Course Datum Synchro

(A course datum synchro is optional on the KI 202 P/N 066-3034-08 and the KI 206 PN 066-3034-05.) Heading information is fed from a synchro transmitter located within the slaved directional gyro system to the course datum synchro B102 as shown in Figure 4-2.

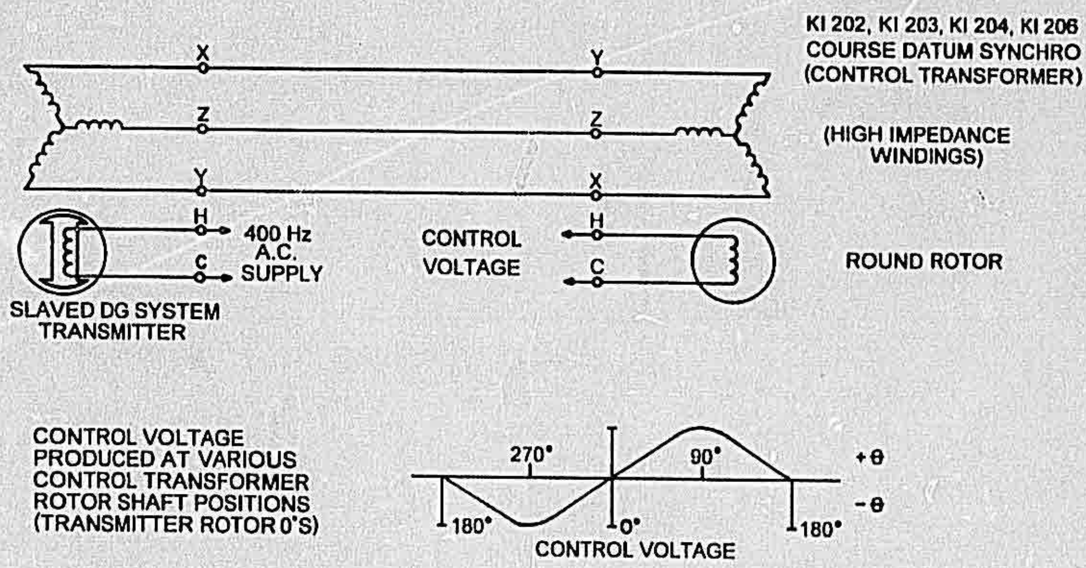

FIGURE 4-2 Course Datum Synchro

A synchro control transformer (often referred to as a C.T.) does not have AC power supplied to its rotor, but the rotor is designed to supply control voltages which reach a null (zero volts) when the control transformer rotor is in effective (actually 90 degrees displaced) alignment with the transmitter rotor. Upon moving the transmitter rotor so as to disturb this alignment, the voltage appearing across the rotor of the control transformer varies as the sine of the angle of displacement. The control voltages shown in Figure 4-2 represents the amplitude envelope of the 400 Hz input. The +θ indicates the rotor voltage is in phase with the X, Y, Z input, while -θ indicates the rotor voltage is out of phase with the X, Y, Z input. Scale factor of the course datum output is 393 mV/degree course error with 11.8 Vrms input.

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SECTION V
MAINTENANCE

5.1 GENERAL

This section contains alignment and maintenance information for the KI 202, KI 206, KI 207 VOR/LOC/Glideslope Indicators.

5.2 TEST EQUIPMENT REQUIRED

The following test equipment, or equivalent, is required to test and align the KI 202, KI 206, KI 207.

TABLE 5-1 Required Test Equipment

TYPE	CHARACTERISTICS	REPRESENTATIVE MODELS
AC Voltmeter		Ballatine Model 310 or equivalent.
AC Signal	30 Hz, 4.5 Vrms	
AC Signal	400 Hz, 11.8 Vrms	
DC Voltage Supply	-600-0+600 mV	
Oscilloscope		453 Tektronix or equivalent

5.3 TEST PROCEDURE

This section is a cover on minimum performance test.

5.3.1 Mechanical Requirements

5.3.1.1 OBS Knob Rotation

The OBS knob shall rotate smoothly in both directions. The azimuth card shall follow smoothly with no jerky or erratic movements.

5.3.1.2 Meter Centering

With no power applied and the unit resting horizontally with the OBS knob in the lower left hand corner, the VOR/LOC course deviation pointer and glideslope deviation pointers (if provided) shall be centered over the vertical and horizontal course deviation reference marks within half the width of the pointers when viewed from the Standard Viewing Angle. The TO-FROM indicator shall be centered behind its shield and the VOR/LOC and glideslope (if provided) warning flags shall be fully revealed.

5.3.1.3 Meter Interference

All flags, pointers, and indicators shall not contact any other flags, meters, indicators, the warning flag housing, or the azimuth card when moved throughout their range of movement.

5.3.1.4 Meter Deflection Range

When viewed from a Standard Viewing Angle (15° above horizontal) minimum deflection range for the VOR/LOC and glideslope (if provided) pointers shall be 0.630 inches either side of the centered meter position (each reference mark on the warning flag housing corresponds to 0.125 inches of deflection).

5.3.2 Lamp Current

When 28 ±10% Vdc is applied between pins B and E of J202, J206, J207 both panel lamps shall light and current drain shall be 100 ±25 mA.

When 14 ±10% Vdc is applied between pins D and E, and pin B is jumpered to pin E of J202, J206, J207 both panel lamps shall light and current drain shall be 200 ±60 mA.

When 5 ±10% Vdc is applied between pins D and E, and pin B is jumpered to pin E of J206, J207 both panel lamps shall light and current drain shall be 400 ±120 mA.

5.3.3 VOR/LOC Deviation Meter Requirements

5.3.3.1 Centering Voltage

Voltage required to center the VOR/LOC deviation meter shall be 0 ±3 mV.

5.3.3.2 Deflection Linearity and Polarity

When a DC voltage is applied from pin j (+) to pin n (-) of J202, J206, J207 as described below, deflection direction and amount shall be as specified in Table 5-2.

TABLE 5-2 VOR/LOC Deflection

VOLTAGE (at pin j)	DEFLECTION	DIRECTION
+75 mV	2.5 ±0.5 Reference Marks	Right
+150 mV	5.0 ±0.5 Reference Marks	Right
-150 mV	5.0 ±0.5 Reference Marks	Left
-75 mV	2.5 ±0.5 Reference Marks	Left

5.3.4 VOR/LOC Warning Flag Requirements

5.3.4.1 Flag Hold Off Voltage

When a DC voltage less than +125 mV is applied from pin N (+) to pin F (-) of J202, J206, J207 the warning flag shall remain against its stop and be fully revealed.

5.3.4.2 Half Flag Voltage

When a DC voltage of +175 ±5 mV is applied from pin N (+) to pin F (-) of J202, J206, J207 the warning flag shall be partly concealed.

5.3.4.3 Full Flag Voltage

When a DC voltage of +270 ±10 mV is applied from pin N (+) to pin F (-) of J202, J206, J207 the warning flag shall be fully concealed.

5.3.5 To-From Indicator Deflection Sensitivity and Polarity

When a DC voltage is applied from pin S (+) to pin e (-) of J202, J206, J207 deflection shall be as specified in Table 5-3.

TABLE 5-3 To-From Indicator Deflection

VOLTAGE (at pin S)	DEFLECTION
+44 mV	Full FROM
-44 mV	Full TO

5.3.6 Glideslope Deviation Meter Requirements (KI 206, KI 207 except -25)

Use Standard Viewing Angle (15° above horizontal) for all measurements.

5.3.6.1 Glideslope Centering Voltage

Voltage to center the glideslope deviation indicator shall be 0 ±3 mV.

5.3.6.2 Glideslope Deflection Linearity and Polarity

When a DC is applied from pin k (+) to pin m (-) of J206, J207 deflection shall be as specified in Table 5-4.

TABLE 5-4 Glideslope Deflection

VOLTAGE (at pin k)	DEFLECTION	DIRECTION
+150 ±1.5 mV	5.0 ±0.5 Reference Marks	Up
+75 ±1 mV	2.5 ±0.5 Reference Marks	Up
-75 ±1 mV	2.5 ±0.5 Reference Marks	Down
-150 ±1.5 mV	5.0 ±0.5 Reference Marks	Down

5.3.7 Glideslope Warning Flag Requirements (KI 206, KI 207 except -25)

5.3.7.1 Flag Hold Off Voltage

When a Dc voltage of less than +125 mV is applied from pin H (+) to pin J (-) of J206, J207 the glideslope warning flag shall remain against its stop and be fully revealed.

5.3.7.2 Half Flag Voltage

When a DC voltage of +175 ±5 mV is applied from pin H (+) to pin J (-) of J206, J207 the glideslope flag shall be partly concealed.

5.3.7.3 Full Flag Voltage

When a DC voltage of +270 ±10 mV is applied from pin H (+) to pin J (-) of J206, J207 the glideslope flag shall be fully concealed.

5.3.8 OBS Course Resolver Requirements (Applicable only to KI 202, KI 206 only)

Course Datum Resolver ORZ - When a 30 ±1% Hz, 4.5 Vrms signal is connected through a 2000 ±5% ohm resistor to pin c (high) and pin Z (low) of J202, J206 the voltage from pin T (high) to pin W (low) shall be minimum with an OBS setting of 300 ±1 degree. The voltage from pin L (high) to pin P (low) shall lead the 30 Hz input by 83 degrees.

With the same 30 Hz input, the voltage from pin L (high) to P (low) should be a minimum with an OBS of 210 ±1 degree. The voltage from pin T (high) to pin W (low) shall lead the 30 Hz input by 83 degrees.

5.3.9 Course Datum Synchro Requirements

5.3.9.1 Course Datum Null Voltage

With an 11.8 ±1% Vrms 400 ±2% Hz signal applied from pin v (high) to pin u (low) and pin u and pin t of J202, J206 shorted, the voltage from pin s (high) to pin r (low) shall be a minimum with a selected heading of 0 ±1 degrees. The null voltage shall not exceed 0.030 Vrms.

5.3.9.2 Course Datum Polarity

With the same voltage as in step 1, the output voltage measured on pin s when referenced to pin r (i.e. pin r connected to ground) shall be 3.93 ±10% Vrms, and shall be in phase with the input voltage with a selected heading of 10 degrees.

With a selected heading of 350 degrees, the output voltage shall be 3.93 ±10% Vrms and out of phase with the input.

5.3.10 KI 202, KI 206, KI 207 Test Data

1. Mechanical Requirements
   A. OBS Knob Rotation___________
   B. Meter Centering______________
   C. Meter Interference____________
   D. Meter Deflection Range_________
2. Panel Lighting 14V Operation_______ 28 V Operation__________
3. VOR/LOC Deflection Meter Requirements___________
4. VOR/LOC Warning Flag Requirements_____________
5. TO/FROM Indicator Deflection Sensitivity and Polarity____________
6. Glideslope Deviation Meter Requirements (KI 206, KI 207-06)___________
7. Glideslope Warning Flag Requirements (KI 206, KI 207-06)___________
8. OBS Course Resolver Requirements_______________
9. Course Datum Synchro Requirements______________

5.4 ALIGNMENT PROCEDURE

This section contains alignment information for the KI 202, KI 206, KI 207

5.4.1 Static Meter Alignment

Consult Flag Assembly drawing P/N 300-01927-0000.

5.4.1.1 Treat the plastic lighting wedge with an anti-static treatment.

5.4.1.2 Reinstall the static treated light wedge and bezel assembly.

5.4.1.3 Place the unit in a horizontal position with the OBS knob in the lower left hand corner.

5.4.1.4 Loosen the socket head cap screws that hold the VOR/LOC deviation meter to the rear gear plate.

5.4.1.5 Move the meter assembly until the needle is centered and perpendicular to the base of the indicator. Tighten the mounting screws.

5.4.1.6 Loosen the socket head cap screws that hold the glideslope deviation meter to the rear plate.

5.4.1.7 Move the meter assembly until the needle is positioned 0.033 inches above the center line of the VOR/LOC reference marks. Tighten the mounting screws.

5.4.1.8 Rotate the indicator into a vertical plane with the bezel facing up,

5.4.1.9 If either deviation needle deflects, adjust the counter weight until no needle deflection is noticed as the indicator is rotated from a horizontal to a vertical plane.

5.4.1.10 Place the indicator in a horizontal plane with the OBS knob in the lower left hand corner.

5.4.1.11 Rotate the unit so that the OBS knob is in the upper left hand corner.

5.4.1.12 If either needle moves from its centered position, adjust the counter weight until no needle deflection is noted as the indicator is oriented in any vertical or horizontal plane.

5.4.1.13 Check that each needle deflects at least 5 dots either side of the centered position. Bend the meter stops until proper deflection range is obtained.

5.4.1.14 Adjust the warning flags and To-From indicator by adjusting the meter stops to set deflection range or by carefully adjusting the meter arms.

5.4.1.15 Check that all wiring harnesses are positioned and secured in such a manner to not interfere with any pointers, meters, or movable components.

5.4.2 Resolver ORZ Alignment (KI 202, KI 206 only)

5.4.2.1 Connect a 4.5 Vrms 30 Hz signal through a 2000 ohm resistor to pin c (high) and pin Z (low) of J202, J206.

5.4.2.2 Rotate the OBS knob until 300 degrees is positioned directly under the selected course index.

5.4.2.3 Monitor the voltage between pins T (high) and W (low) of J202, J206 with an AC voltmeter.

5.4.2.4 Loosen the socket head cap screws holding the resolver to the rear gear plate and rotate the resolver until a minimum indication is reached on the AC voltmeter. Tighten the mounting screws.

5.4.2.5 Monitor pins L (high) and P (low) with an AC voltmeter. Rotate the OBS knob until a minimum voltage is indicated on the AC voltmeter. This should occur at headings of 210 or 30 degrees.

5.4.2.6 Return the heading to 300 degrees. Monitor pins L (high) and P (low) with an oscilloscope. Check that the voltage between pins L and P leads the 30 HZ rotor input by 83 degrees.

5.4.2.7 Monitor pins T (high) and W (low) with an oscilloscope. Rotate the OBS knob from a heading of 300 degrees to a heading of 210 degrees. The voltage between pins T and W should lead the 30 Hz rotor input voltage by 83 degrees.

5.4.3 Course Datum Synchro Alignment

5.4.3.1 Apply an 11.8 ±1% Vrms 400 ±2% Hz signal from pin v (high) to pin u (low). Short pins u and t together with an external jumper wire. Monitor the heading output pins s (high) and r (low) with an AC voltmeter.

5.4.3.2 Rotate the OBS knob until a heading of zero degrees is established. Loosen the mounting screws of the course datum synchro and rotate it until a minimum voltage is noted on the AC voltmeter. Tighten the mounting screws.

5.4.3.3 Increase the heading to 10 degrees. Monitor the voltage measured on pin s when referenced to pin r (i.e. r connected to ground) with an oscilloscope. The voltage should be in phase ±20 degrees with the 400 Hz input.

5.4.3.4 If the voltage is not in phase, return the heading to zero degrees. Again loosen the course datum synchro mounting screws and rotate the synchro one half revolution. Reconnect the AC voltmeter from pins s (high) and to r (low) and again rotate the synchro for a minimum AC voltage. Tighten the mounting screws. Increase the heading to 10 degrees. Monitor the voltage measured on pin s when referenced to pin r (i.e. r connected to ground) with an oscilloscope. The voltage should be in phase ±20 degrees with the 400 Hz input.

5.4.3.5 Decrease the heading from ten degrees to 0 degrees. The voltage should decrease. As the heading is decreased to 350 degrees, the voltage should increase in level and be out of phase with the 400 Hz input.

5.5 OVERHAUL

5.5.1 General Information

Maintenance information contained is this section includes inspection procedures, cleaning, semiconductor replacement, and troubleshooting procedures.

5.5.2 Visual Inspection

The following visual inspection procedures should be performed during the course of maintenance operations.

5.5.2.1 Inspect all wiring for frayed, loose, or burned wires.

5.5.2.2 Check cable connections, making sure the plugs are free from corrosion and are properly secured.

5.5.2.3 Check all components for evidence of overheating, breakage, vibration, corrosion, or loose connections.

5.5.2.4 Check all capacitors and transformers for leaks, bulges, or loose connections.

5.5.2.5 Inspect relay and switch contacts for pits or arcing.

5.5.3 Cleaning

5.5.3.1 Using a clean-lint free cloth, lightly moistened with an approved cleaning solvent, remove the foreign matter from the equipment case and unit front panels. Wipe dry using a clear, dry, lint-free cloth.

5.5.3.2 Using a hand controlled dry air jet (not more than 15 psi), blow the dust from inaccessible areas. Care should be taken to prevent damage by the air blast.

5.5.3.3 Clean electrical contacts with a burnishing tool or cloth lightly moistened with an approved contact cleaner.

5.5.3.4 Clean the receptacles and plugs with a hand controlled dry air jet (not more than 25 psi) and a clean lint-free cloth, lightly moistened with an approved cleaning solvent. Wipe dry with a clean, dry, lint-free cloth.

5.5.3.5 Apply an antistatic solution to the plastic lighting wedge.

5.5.4 Disassembly/Reassembly

The following instructions include procedures that are necessary to remove and disassemble the subassemblies of the KI 202, KI 206, KI 207. Before disassembly, verify that the power is removed and disassemble only to the extent necessary to effect test, alignment and repair. Tag all disconnected wires.

5.5.4.1 Top and Bottom Cover

The top and bottom covers are held in place with 2 #2-56 X 1/8 flat head screws (P/N 089-06004-0002) and 4 #2-28 X 1/4 pan head screws (P/N 089-06414-0004)

5.5.4.2 Chassis

The chassis, which consists of both side rails (P/N 047-03805-0001 and P/N 047-03806-0001) and the back plate (P/N 088-00630-0000), may be separated from the meter assembly by removing 4 #2-28 X 1/4 flat head screws (P/N 089-06484-0004).

5.5.4.3 Bezel and Front Gear Plate Assemblies

Remove OBS knob (P/N 088-00696-0002) by loosening set screw (P/N 089-06218-0006). To remove the remaining front end assembly, which consists of the bezel assembly (P/N 200-01924-0000) and the front gear plate assembly (P/N 200-01925-0000), remove 4 #4-40 X 5/16 pan head screws (P/N 089-05903-0005) and 4 lock washers (P/N 089-08109-0034).

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SECTION VI
ILLUSTRATED PARTS LIST

6.1 INTRODUCTION

The Illustrated Parts List (IPL) contains parts lists of assemblies and discrete components required for the unit. The IPL provides the proper identification and part number of each replacement part. The IPL starts with the top assembly and continues in sequence with the sub-assembly parts lists. Mechanical parts are grouped separately from electrical parts on each sub-assembly parts list. Each parts list is followed by the assembly drawing for that assembly. Parts lists may also be called "bills of material" or "BOM." Parts identified in this IPL meet design specifications for this equipment and are recommended replacement parts. Warranty information concerning replacement parts is contained in Service Memo #1, P/N 600-08001-00XX.

6.2 BILL OF MATERIAL DESCRIPTION

This section describes the various items that may appear on parts lists. Refer to figure 6-0 for the parts list format.

6.2.1 PARTS LIST (ASSEMBLY) NUMBER

Each parts list is labeled with the assembly part number at the top of the list. The assembly number is followed by the assembly description and the revision level of the parts list.

6.2.2 SYMBOL COLUMN

The symbol column contains the reference designators of electrical components on the assembly. Some mechanical parts and assembly supplies may be assigned the ITM designator. Reference documents may be assigned the REF designator. The reference designator contains a letter abbreviation to indicate the type of component, and the sequence number assigned to that part (C101, Q101, etc.). Common reference designator abbreviations are listed in table 6-1.

Table 6-1: Reference Designator Abbreviations

B	Motor, Synchro
C	Capacitor
CF	Capacitor Filter
CJ	Circuit Jumper
CQ	Capacitor
CR	Diode
D	Diode
DS	Lamp
E	Terminal, Connect Point
F	Fuse

Table 6-1: Reference Designator Abbreviations

FB	Ferrite Bead
FL	Filter
FT	Feedthru
I	Integrated Circuit
ITM	Item (Non-electrical)
J	Jack, Fixed Connector
K	Relay
L	Inductor
M	Meter, Transistor
MX	Mixer
P	Plug, Removable Connector
Q	Transistor
R	Resistor
REF	Reference Document
RP	Resistor Network
RT	Thermistor
RV	Varistor
S	Switch
SK	Socket
SW	Switch
T	Transformer
TJ	Terminal Jack
TP	Test Point
U	Integrated Circuit, Circuit Assembly, Component Network (Resistor, Capacitor, Inductor, Transistor, Diode)
V	Photocell, Vacuum Tube, Varistor
WG	Waveguide
Y	Crystal

6.2.3 PART NUMBER COLUMN

The part number column contains the Honeywell part number for each part. Special purpose part number series may appear in the parts list and are described below.

6.2.3.1 U401 122-XXXXX-9999 PLACE HOLDER

Circuit U401 is a programmed device with a -9999 place holder. Its true part number is contained on the next higher 125- P/N or 126- P/N software configuration. Refer to Section 6.3, Software Documentation, in this introduction, for a description of the software documentation system.

6.2.3.2 U402 999-09999-0090 REF SFTWARE SET

Circuit U402 is a programmed device. Its true part number is contained on the next higher 125- P/N or 126- P/N software configuration. Refer to Section 6.3, Software Documentation, in this introduction, for a description of the software documentation system.

6.2.3.3 CR401 999-09999-0096 RESERVED

Reference designator CR401 has been reserved for future use. The assembly does not currently include a CR401.

6.2.3.4 CR401 999-09999-0097 SEE NEXT ASSEMBLY

Diode CR401 is a part of the electrical circuit, but due to assembly or testing requirements, is actually assigned to the next assembly.

6.2.3.5 CR401 999-09999-0098 NOT USED

Reference designator CR401 is available for future assignment. The assembly does not currently include a CR401.

6.2.3.6 CR401 999-09999-0099 DO NOT USE

Reference designator CR401 has been previously used on this assembly and later deleted. It may not be reassigned on this assembly.

6.2.4 FIND_NO COLUMN

This column lists the find (item) number of a part. Find numbers of mechanical parts may appear on the assembly drawing. Find numbers of electrical parts do not appear on the assembly drawing. Find numbers are not assigned to every part and missing information in this column is not an error.

6.2.5 DESCRIPTION COLUMN

This column describes each part in the assembly. Common abbreviations in the description column are listed in table 6-2.

Table 6-2: Description Abbreviations

A	Ampere
ADC	Analog to Digital Converter
ADJ	Adjustable
AL, ALUM	Aluminum

Table 6-2: Description Abbreviations

AMP	Ampere, Amplifier
ANT	Antenna
ASSY	Assembly
BD	Board
BI	Two
BIFLR	Bifilar
BLK	Black
BLU	Blue
BOM	Bill of Material (= Parts List)
BRN	Brown
CA	Cable
CC	Carbon Composite
CF	Carbon Film
CH	Chip, Choke
CAP	Capacitor
CER, CR	Ceramic
CKT	Circuit
CNTCT	Contact
CONN	Connector
CVR	Cover
DAC	Digital to Analog Converter
DBL	Double
DC	Disc Ceramic
DIO	Diode
DPDT	Double Pole Double Throw
DPST	Double Pole Single Throw
DUAL, DUO	Two
DWG	Drawing
EL	Electrolytic
EW	Eighth Watt

Table 6-2: Description Abbreviations

FC	Fixed Composition
FERR	Ferrite
FET	Field Effect Transistor
FHP	Flat Head Phillips
FLTR	Filter
FREQ	Frequency
FT	Feedthru
GHZ	Gigahertz
GND	Ground
GRN	Green
GRY	Gray
HDR	Header
HDW	Hardware
HEX	Six
HF	High Frequency
HV	High Voltage
HW	Half Watt
H/W	Hardware
IC	Integrated Circuit
ID, IDT	Identification
IF	Intermediate Frequency
IND	Inductor
INTER	Interconnect
INTL	Internal
I/O	In/Out
ITM	Item
KHZ	Kilohertz
LCK, LK	Lock
LED	Light Emitting Diode
LSI	Large Scale Integrated Circuit

Table 6-2: Description Abbreviations

MA	Milliamp
MC	Monolithic Ceramic
MF	Microfarad
MH	Millihenry
MHZ	Megahertz
MOD	Modification
MOS	Metal Oxide Semiconductor
MPS	Minimum Performance Specification
MY	Mylar
NF	Nanofarad
NPN	Negative-Positive-Negative transistor type
OCTAL	Eight
OP AMP	Operational Amplifier
ORG, ORN	Orange
OSC	Oscillator
PA	Power Amplifier
PC	Polycarbonate, Printed Circuit
PCB, PCBD	Printed Circuit Board
PENTA	Five
PF	Precision Film, Picofarad
PHP	Pan Head Phillips
PKG	Package
P/L	Parts List
PLD	Programmable Logic Device
PLL	Phase-Locked Loop
PLT	Plate
P/N	Part Number
PNP	Positive-Negative-Positive transistor type
POS	Positive, Position
PP	Paper

Table 6-2: Description Abbreviations

PRGA	Programmable Gate Array
PROM	Programmable Read Only Memory
PS	Polystyrene, Power Supply
PWR	Power
QUAD	Four
QW	Quarter Watt
RAM	Random Access Memory
RCVR	Receiver
RECPT	Receptacle
REF	Reference
REG	Regulator
RES	Resistor
RF	Radio Frequency
ROM	Read Only Memory
RX	Receive, Receiver
S	Silicon
SCH	Schematic
SCR	Screw
SFTWR	Software
SM	Silver Mica, Surface Mount
SMD	Surface Mount Device
SMT	Surface Mount Technology
S/N	Serial Number
SO, SOT	Small Outline
SPDT	Single Pole Double Throw
SPST	Single Pole Single Throw
SRAM	Synchronous Random Access Memory
STDF	Standoff
SW	Switch
S/W	Software

Table 6-2: Description Abbreviations

SYN	Synthesizer
SYNC	Synchronizer
SYS	System
TCXO	Temperature Controlled Crystal Oscillator
TERM	Terminal
TN	Tantalum
TP	Test Point
TRI	Three
TRML	Terminal
TRNSB	Transorber
TST PT	Test Point
TURR	Turret
TW	Tenth Watt
TX	Transmit, Transmitter
U	Integrated Circuit
UA	Microamp
UF	Microfarad
UH	Microhenry
UHF	Ultra High Frequency
UP	Microprocessor
V	Volt
VA, VAR	Variable
VCO	Voltage Controlled Oscillator
VIO	Violet
VHF	Very High Frequency
VLT	Voltage
W	Watt
W/	With, Width
WHT	White
WW	Wire Wound

Table 6-2: Description Abbreviations

WX	Weather
XFMR	Transformer
XMIT	Transmit, Transmitter
XSTR	Transistor
XTAL	Crystal
YEL	Yellow
Z	Zener

6.2.6 ASSEMBLY (A) COLUMN

An "A" in this column indicates that the part is a sub-assembly. Each sub-assembly has a separate parts lists following the parent assembly. If the sub-assembly is a "COMMON BOM" with a -9900, -0099, or -9999 suffix, the parts for that common assembly are included in the parent assembly parts list as a separate column.

6.2.7 UNIT OF MEASURE (UM) COLUMN

This column indicates the unit of measure for each part. Common abbreviations found in this column are listed in table 6-3.

Table 6-3: Unit of Measure Abbreviations

AR	As Required
EA	Each
FT	Foot
IN	Inch
RF	Reference Only

6.2.8 VERSION AND QUANTITY COLUMN

Individual versions of an assembly are identified by the last four digits of the P/N. The quantity of parts for individual versions are listed in separate version columns -0000 through -9999. The parts indicated in -0099, -9900, or -9999 version columns are common to all versions of the assembly and constitute the "COMMON BOM." Versions may also be called "flavors" in parts lists. The terms are interchangeable.

6.3 SOFTWARE DOCUMENTATION

Not Applicable.

Figure 6-0, while closely related to a specific product, does not represent an exact configuration in use by that product. The example has been modified to clarify certain points.

Assy: 066-04020-0203 SG464 HSI W/O WX

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	016-01008-0004	3	GLYPTAL 7526 BL	AR	1.00	
	016-01131-0000	1	CNTCT CMT BND 1055	AR	1.00	
	047-02579-0002	2	HANDLE ASSEMBLY	EA	1.00	
	" "	"	" " " "	"	"	
	047-09392-0001	0	SPACER RT W/FIN	EA	1.00	
	057-02203-0002	3	FLAVOR STCKR	EA	1.00	
	057-02203-0003	3	FLAVOR STCKR	EA	1.00	
	057-05286-0000	0	SERIAL TAG SG 464	EA	1.00	
	075-05082-0002	0	GUIDE PLATE TOP	EA	1.00	
	" "	"	" " " "	"	"	
	090-00277-0000	1	HOLD DOWN BRACKET	EA	1.00	
	155-02536-0001	1	CABLE ASSY	EA	1.00	
	200-07703-0000	2	DPX CONN BD ASSY	EA	1.00	
	200-07704-0000	8	LV PS BD ASSY	EA	1.00	
	206-00118-0301	0	EFS40/50 HSI SET	EA	1.00	<--- A

Assy: 206-00118-0301 EFS40/50 HSI SET

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	057-05287-0301	0	SW MOD TAG	EA	1.00	
	205-00564-0002	0	EFIS 40/50 I/O PBS	EA	1.00	
	205-00565-0004	0	E40/50 HSI P/D PBS	EA	1.00	<--- B

Assy: 205-00565-0004 E40/50 HSI P/D PBS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	057-02241-0016	1	IDENT LABEL	EA	1.00	
	057-05252-0565	1	IDT 205-00565-0000	EA	1.00	
	125-00602-0004	0	EFIS 40/50 NAV SDS	EA	1.00	<--- C1
	125-00603-0002	0	EFIS40/50 DSPL SDS	EA	1.00	<--- C2
	126-00019-0000	1	EFS40/50 CLIPPER	EA	1.00	<--- C3
	200-07706-0000	1	PRCSR/DSPL BD ASSY	EA	1.00	

Figure 6-0 Sample Parts List
(Sheet 1 of 4)

Assy: 200-07706-0000 PRCSR/DSPL BD ASSY

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	009-07706-0000	0	PC BD PRCSR/DSPL	EA	1.00	
	" "	"	" " " "	"	"	
	150-00004-0010	3	TUBING TFLN 22AWG	IN	2.00	
	200-04969-0000	0	EXT BD PRCSR/ADI A	RF	0.00	
	126-00005-0000	1	EFS40/50 INT LOGIC	EA	1.00	<--- D1
	126-00006-0000	1	EFS40/50 VIDEO MUX	EA	1.00	<--- D2
	126-00017-0000	1	EFS40/50 SM SET	EA	1.00	<--- D3
	126-00018-0000	1	EFS40/50 SINE SET	EA	1.00	<--- D4
C 5001	111-02104-0042	26	CAP MC100KPF50V20%	EA	1.00	
	" "	"	" " " "	"	"	
I 5005	122-30001-9999	0	EFS40/50 VIDEO MUX	RF	0.00	<--- D5
I 5008	122-30002-9999	0	EFS40/50 INT LOGIC	RF	0.00	<--- D6
	" "	"	" " " "	"	"	
I 5036	122-30003-9999	0	EFS40/50 SM HIGH	RF	0.00	<--- D7
I 5037	122-30004-9999	0	EFS40/50 SM LOW	RF	0.00	<--- D8
I 5038	122-30005-9999	0	EFS40/50 SINE HIGH	RF	0.00	<--- D9
I 5039	122-30006-9999	0	EFS40/50 SINE LOW	RF	0.00	<--- D10
	" "	"	" " " "	"	"	
I 5075	122-00958-9999	0	EFS40/50 CLIPPER	RF	0.00	<--- D11
	" "	"	" " " "	"	"	
I 5138	122-00918-9999	0	EFS40/50 HSI NAV-E	RF	0.00	<--- D12
I 5139	122-00919-9999	0	EFS40/50 HSI NAV-O	RF	0.00	<--- D13
	" "	"	" " " "	"	"	
I 5158	122-00920-9999	0	EFS40/50 HSI DSP-E	RF	0.00	<--- D14
I 5159	122-00921-9999	0	EFS40/50 HSI DSP-O	RF	0.00	<--- D15

Assy: 126-00005-0000 EFS40/50 INT LOGIC

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-30002-0000	0	EFS40/50 INT LOGIC	EA	1.00	

Assy: 122-30002-0000 EFS40/50 INT LOGIC

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	120-02376-0000	1	EPLD EP320 (OTP)	EA	1.00	

Assy: 125-00602-0004 EFIS 40/50 NAV SDS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-00918-0004	0	EFS40/50 HSI NAV-E	EA	1.00	
	122-00919-0004	0	EFS40/50 HSI NAV-O	EA	1.00	

Assy: 125-00603-0002 EFIS40/50 DSPL SDS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-00920-0002	0	EFS40/50 HSI DSP-E	EA	1.00	
	122-00921-0002	0	EFS40/50 HSI DSP-O	EA	1.00	

Figure 6-0 Sample Parts List
(Sheet 2 of 4)

BOM NUMBER
ASSEMBLY VERSION
PROGRAMMABLE DEVICE SET
UNIT OF MEASURE
QUANTITY
REFERENCE DESIGNATOR
PART NUMBER
DESCRIPTION

200-08366-0000 MST67 IOP/DLP R: 2 MST0067A
200-08366-0000 MST67 IOP/DLP R: 2 MST0067A

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	0000	9900
	009-08366-0000	PC BD IOP/DLP	A	EA	1.00	1.00
	016-01040-0000	COATING TYPE AR		AR	1.00	1.00
	033-00114-0021	SOCKET IC DIP 28C	A	EA	3.00	3.00
	047-09680-0001	KEYING BRACKET	A	EA	3.00	3.00
	090-00087-0000	CLIP CRYSTAL		EA	1.00	1.00
	092-05003-0015	EYELET .049		EA	2.00	2.00
	126-00030-0000	MST67A ASIC SFTWR	A	EA	1.00	1.00
C 9001	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
C 9002	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
C 9003	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
CR 9001	007-06180-0000	DIO SW MMBD6050		EA	1.00	1.00
CR 9002	007-08092-0000	QUAD SO DIODE		EA	1.00	1.00
CR 9003	007-08092-0000	QUAD SO DIODE		EA	1.00	1.00
DS 9001	007-06408-0000	COM CATH 7 SEG LED		EA	1.00	1.00
J 9002	030-02174-0000	PIN CONT		EA	50.00	1.00
P 9003	155-02688-0003	RIBBON CABLE ASSY	A	EA	1.00	1.00
Q 9003	007-00065-0001	XSTR 2N3906 (SOT)		EA	1.00	1.00
Q 9006	007-00383-0004	SOT-23 2N2222A XST		EA	1.00	1.00
Q 9011	007-00530-0000	XSTR NPN MMBT3903	A	EA	1.00	1.00
R 9001	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9002	015-00207-0020	OCTAL SO RESISTOR		EA	1.00	1.00
R 9003	130-05472-0023	RES CHIP 4.7KEW5%		EA	1.00	1.00
R 9004	130-05471-0023	RES CHIP 470EW5%		EA	1.00	1.00
R 9005	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9006	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9007	130-05000-0025	RES CHIP 0 EW CJ		EA	1.00	1.00
TP 9001	008-00096-0001	TERMINAL TEST PNT		EA	1.00	1.00
TP 9002	008-00096-0001	TERMINAL TEST PNT		EA	1.00	1.00
U 9001	120-02208-0004	UPRGSSR 10MHZ16B.T	A	EA	1.00	1.00
U 9002	120-06129-0009	6264-15 8K X 8 RAM		EA	1.00	1.00
U 9003	120-06129-0009	6264-15 8K X 8 RAM		EA	1.00	1.00
U 9004	122-01195-9999	*MST67 PRGMD ODD	A	RF	X.	
U 9005	122-01194-9999	*MST67 PRGMD EVEN	A	RF	X.	
U 9006	124-00574-0003	IC 74HCT574		EA	1.00	1.00
U 9007	123-00138-0003	74HC138 SO PKG		EA	1.00	1.00
Y 9001	044-00009-0019	XTAL 14.75MHZ		EA	1.00	1.00
Y 9002	044-00293-0000	20 MHZ OSC		EA	1.00	1.00

Figure 6-0 Sample Parts List
(Sheet 3 of 4)

BOM NUMBER/DESCRIPTION/REVISION

DESCRIPTION

ASSEMBLY VERSION

UNIT OF MEASURE

REFEERENCE DESIGNATOR

QUANTITY

PART NUMBER

FIND NUMBER

200-09229-0000 GP BOARD, FPD500 REV 4

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C2001	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
C2002	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
C2003	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
R2038	139-03241-0000		RES CH 3.24K EW 1%	EA	1.00
R2039	139-02430-0000		RES CH 243 EW 1%	EA	1.00
R2040	139-00750-0000		RES CH 75.0 EW 1%	EA	1.00
TP2001	008-00309-0000		TEST POINT SURF MN	EA	1.00
TP2002	008-00309-0000		TEST POINT SURF MN	EA	1.00
U2005	12051354-0001		PP-IC,UPD482234G5-	EA	1.00
U2006	12051354-0001		PP-IC,UPD482234G5-	EA	1.00
U2021	12061010-0001		SI-IC,MEMORY CNTLR	EA	1.00
U2022	12061014-0001		SI-IC,DSP.CONTROLL	EA	1.00
Y2001	04416054-0015		XTAL OSC,36.000MHZ	EA	1.00
Y2002	04416054-0014		XTAL OSC,20.000MHZ	EA	1.00
	002-09229-0000		GP BOARD	RF	0.00
	009-09229-0000	1	GP BOARD	EA	1.00
	01243055-0001	2	INSULATOR,THERMAL	EA	3.00
	01250068-0001	3	SPACER, HEADER	EA	6.00
	016-01040-0000		COATING TYPE AR	AR	1.00
	016-01442-0000	4	E-6000 CLEAR SEALA	AR	1.00
	192-09229-0000		GP BOARD	RF	0.00
	300-09229-0000		GP BOARD, FPD500	RF	0.00
	34050-0084	6	SPACER,THD'D	EA	2.00
	46086-0007	5	SCREW,CAPTIVE,4-40	EA	3.00

Figure 6-0 Sample Parts List
(Sheet 4 of 4)

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6.4 ILLUSTRATED PARTS LIST

BOM 1: KI 202, KI 206, KI 207 Navigation Indicator

066-3034-04	KI206 OBI BLK GS/30HZ	REV 29
066-3034-05	KI206 OBI BLK GS/SYNC/30HZ	REV 29
066-3034-06	KI207 OBI BLK GS/NO OBS	REV 29
066-3034-07	KI202 OBI BLK 30HZ	REV 28
066-3034-08	KI202 OBI BLK SYNC/30HZ	REV 28
066-3034-09	KI202 OBI BLK SYNC/400HZ	REV 5
066-3034-10	KI206 OBI BLK GS/SYNC/400HZ	REV 5
066-3034-11	KI202 OBI BLK 400HZ	REV 4
066-3034-12	KI206 OBI BLK GS/400HZ	REV 5
066-3034-13	KI206 OBI BLK GS/5V/SYNC/30HZ	REV 6
066-3034-14	KI206 OBI BLK GS/5V/SYNC/400HZ	REV 5
066-3034-15	KI206 OBI BLK GS/RED/30HZ	REV 4
066-3034-16	KI206 OBI BLK GS/RED/400HZ	REV 3
066-3034-17	KI207 OBI BLK GS/5V/NO OBS	REV 3
066-3034-24	KI206 OBI GRY GS/5V/400HZ	REV 2
066-3034-25	KI207 OBI BLK 5V/NO OBS	REV 1
066-3034-26	KI202 OBI BLK 400HZ/SLIDE LCK	REV AA

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	KI206 -04	KI206 -05	KI207 -06	KI202 -07	KI202 -08	KI202 -09	KI206 -10	KI202 -11	KI206 -12	KI206 -13	KI206 -14	KI206 -15	KI206 -16	KI207 -17	KI206 -24	KI207 -25	KI202 -26
	195-00006-0004		KI206 ASSY	EA	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	195-00006-0005		KI206 ASSY SYNC	EA	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	195-00006-0006		KI207 ASSY	EA	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	195-00006-0007		KI202 ASSY	EA	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
	195-00006-0008		KI202 ASSY/SYNC	EA	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
	195-00006-0009		KI202 ASSY/SYNC/400	EA	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
	195-00006-0010		KI206 ASSY/SYNC/400	EA	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
	195-00006-0011		KI202 ASSY/400	EA	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
	195-00006-0012		KI206 ASSY/400	EA	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
	195-00006-0013		KI206 ASSY/SYNC/5V	EA	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
	195-00006-0014		KI206 ASSY/400/5V	EA	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
	195-00006-0015		KI206 ASSY/RED	EA	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
	195-00006-0016		KI206 ASSY/400/RED	EA	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
	195-00006-0017		KI207 ASSY/5V	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
	195-00006-0024		KI206 ASSY/GRY/5V	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
	195-00006-0025		KI207 ASSY/5V	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
	195-00006-0026		KI202 ASSY/400	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
REF1	155-01414-0000		INTRCNT KI202/6/7	RF	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
REF1	155-05225-0000		INSTALL KI202/3/4/6/7	RF	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
REF2	002-00360-0000		INTERNAL WIRING SET	RF	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

TABLE 6-4 Reference Assembly 195-00006-00XX

UNIT	UNIT PART NO.	REFERENCE ASSEMBLY	S/N 10,000 AND ABOVE	S/N 9,999 AND BELOW
KI 203	066-3034-00	195-00006-0000	200-01923-0000	200-01923-0050
KI 203	066-3034-01	195-00006-0001	200-01923-0001	200-01923-0051
KI 204	066-3034-02	195-00006-0002	200-01923-0002	200-01923-0052
KI 204	066-3034-03	195-00006-0003	200-01923-0003	200-01923-0053
KI 206	066-3034-04	195-00006-0004	200-01923-0004	200-01923-0054
KI 206	066-3034-05	195-00006-0005	200-01923-0005	200-01923-0055
KI 207	066-3034-06	195-00006-0006	200-01923-0006	200-01923-0056
KI 202	066-3034-07	195-00006-0007	200-01923-0007	200-01923-0057
KI 202	066-3034-08	195-00006-0008	200-01923-0008	200-01923-0058
KI 202	066-3034-09	195-00006-0009	200-01923-0009	200-01923-0059
KI 206	066-3034-10	195-00006-0010	200-01923-0010	200-01923-0060
KI 202	066-3034-11	195-00006-0011	200-01923-0011	200-01923-0061
KI 206	066-3034-12	195-00006-0012	200-01923-0012	200-01923-0062
KI 206	066-3034-13	195-00006-0013	200-01923-0013	200-01923-0063
KI 206	066-3034-14	195-00006-0014	200-01923-0014	200-01923-0064
KI 206	066-3034-15	195-00006-0015	200-01923-0015	200-01923-0065
KI 206	066-3034-16	195-00006-0016	200-01923-0016	200-01923-0066
KI 207	066-3034-17	195-00006-0017	200-01923-0017	200-01923-0067
KI 204	066-3034-18	195-00006-0018	200-01923-0018	200-01923-0068
KI 204	066-3034-19	195-00006-0019	200-01923-0019	200-01923-0069
KI 204	066-3034-20	195-00006-0020	200-01923-0020	200-01923-0070
KI 204	066-3034-21	195-00006-0021	200-01923-0021	200-01923-0071
KI 204	066-3034-22	195-00006-0022	200-01923-0022	200-01923-0072
KI 204	066-3034-23	195-00006-0023	200-01923-0023	200-01923-0073
KI 206	066-3034-24	195-00006-0024	200-01923-0024	200-01923-0074
KI 207	066-3034-25	195-00006-0025	200-01923-0025	N/A
KI 202	066-3034-26	195-00006-0026	200-01923-0026	200-01923-0061

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BOM 2: KI 202, KI 206, KI 207 Final Asssembly (S/N 10,000 And Above)

200-01923-0004	KI206 IND 5MTR 30HZ	REV AA
200-01923-0005	KI206 IND 5MTR SYN 30HZ	REV AA
200-01923-0006	KI207 IND 5MTR NO OBS	REV AA
200-01923-0007	KI202 IND 3MTR 30HZ	REV AA
200-01923-0008	KI202 IND 3MTR SYN 30HZ	REV 9
200-01923-0009	KI202 IND 3MTR SYN 400HZ	REV 9
200-01923-0010	KI206 IND 5MTR SYN 400HZ	REV AA
200-01923-0011	KI202 IND 3MTR 400HZ	REV 9
200-01923-0012	KI206 IND 5MTR 400HZ	REV AA
200-01923-0013	KI206 IND 5MTR 5V SYN 30HZ	REV 8
200-01923-0014	KI206 IND 5MTR 5V SYN 400HZ	REV AA
200-01923-0015	KI206 IND 5MTR RED 30HZ	REV 7
200-01923-0016	KI206 IND 5MTR RED 400HZ	REV 7
200-01923-0017	KI207 IND 5MTR 5V NO OBS	REV 7
200-01923-0024	KI206 IND 5MTR GRY 5V 400HZ	REV AB
200-01923-0025	KI207 IND 3MTR 5V NO OBS	REV 7
200-01923-0026	KI202 IND 3MTR 400 SLIDE LCK	REV AB

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	KI206 -0004	KI206 -0005	KI207 -0006	KI202 -0007	KI202 -0008	KI202 -0009	KI206 -0010	KI202 -0011	KI206 -0012	KI206 -0013	KI206 -0014	KI206 -0015	KI206 -0016	KI207 -0017	KI206 -0024	KI207 -0025	KI202 -0026
–	012-01005-0002		TAPE MYLAR .500 W	IN	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
–	012-01006-0000		LACING CORD 18DR	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	-	0	0
–	016-01096-0000		SUPERBONDER 150	AR	-	-	-	-	-	-	-	-	-	0	-	0	0	-	-	-	-
–	016-01140-0000		SUPERBONDER 415	AR	1	1	-	1	1	1	1	1	1	-	1	-	-	-	1	-	1
–	023-00128-0000		5 METER PKG	EA	1	1	1	-	-	-	1	-	1	1	1	1	1	1	1	-	-
–	023-00130-0000		3 METER PKG	EA	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-	1	1
–	025-00018-0069		WIRE 26 BU/WH	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
–	025-00018-0079		WIRE 26 VI/WH	IN	8.4	8.4	0.7	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
–	025-00018-0089		WIRE 26 GY/WH	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
–	029-00387-0001		GEAR ASSY 110T	EA	-	1	-	-	1	1	1	-	-	1	1	-	-	-	-	-	-
–	029-00387-0002		GEAR ASSY 110T	EA	1	1	-	1	1	1	1	1	1	1	1	1	1	-	1	-	1
–	029-00388-0000		GEAR IDLER XFR	EA	1	1	-	1	1	1	1	1	1	1	1	1	1	-	1	-	1
–	035-01361-0006		PROTECTIVE CVR	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
–	035-02023-0000		PROTECTIVE COVER	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
–	047-03798-0001		CVR DUST BTM W/NUT	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	047-03805-0001		CHASSIS LEFT	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	047-03872-0001		COVER DUST TOP	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	047-04809-0001		CHASSIS RIGHT	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	047-10544-0003		ADAPTER PLATE	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
–	057-01764-0000		WRN TAG 5V LGT	EA	-	-	-	-	-	-	-	-	-	1	1	-	-	1	1	1	-
–	057-01831-0000		CAUTION TAG	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	057-02203-0004		FLAVOR STCKR	EA	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
–	057-02203-0005		FLAVOR STCKR	EA	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
–	057-02203-0006		FLAVOR STCKR	EA	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
–	057-02203-0007		FLAVOR STCKR	EA	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-
–	057-02203-0008		FLAVOR STCKR	EA	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
–	057-02203-0009		FLAVOR STCKR	EA	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-	-
–	057-02203-0010		FLAVOR STICKER	EA	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-	-
–	057-02203-0011		FLAVOR STICKER	EA	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-	-
–	057-02203-0012		FLAVOR STCKR	EA	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-	-
–	057-02203-0013		FLAVOR STCKR	EA	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-	-
–	057-02203-0014		FLAVOR STCKR	EA	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-	-
–	057-02203-0015		FLAVOR STCKR	EA	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-	-
–	057-02203-0016		FLAVOR STCKR	EA	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-	-
–	057-02203-0017		FLAVOR STCKR	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-	-
–	057-02203-0024		FLAVOR STCKR	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	KI206 -0004	KI206 -0005	KI207 -0006	KI202 -0007	KI202 -0008	KI202 -0009	KI206 -0010	KI202 -0011	KI206 -0012	KI206 -0013	KI206 -0014	KI206 -0015	KI206 -0016	KI207 -0017	KI206 -0024	KI207 -0025	KI202 -0026
–	057-02203-0025		FLAVOR STCKR	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
–	057-02203-0026		FLAVOR STCKR	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
–	057-02337-0000		PRTCTV CVR DECAL	EA	1	1	1	1	-	-	1	-	1	-	1	-	-	-	1	-	1
–	057-03511-0001		DECAL, CAUTION	EA	1	1	1	1	-	-	1	-	1	-	1	-	-	-	1	-	1
–	073-00034-0000		MOUNTING LUG	EA	-	2	-	-	2	2	2	-	-	2	2	-	-	-	-	-	-
–	073-00034-0001		MOUNTING LUG	EA	2	2	2	2	2	2	2	2	2	2	2	2	2	-	2	-	2
–	088-00578-0002		CONN COVER 2.312	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
–	088-00630-0000		REAR MTG PL	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	-
–	088-00697-0001		KNOB W/F – OBS	EA	1	1	-	1	1	1	1	1	1	1	1	1	1	-	1	-	1
–	088-00804-0002		FRAME 2/NUTS	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	088-03131-0000		REAR MTG PLATE	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
–	089-05436-0004		SCR, MACH, 4-40, FH 82	EA	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
–	089-05903-0005		SCR PHP 4-40X5/16	EA	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
–	089-06004-0002		SCR FHP 2-56X1/8	EA	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
–	089-06024-0004		SCR SHC 4-40X1/4	EA	-	2	-	-	2	2	2	-	-	2	2	-	-	-	-	-	-
–	089-06024-0005		SCR SHC 4-40X5/16	EA	2	2	-	2	2	2	2	2	2	2	2	2	2	-	2	-	2
–	089-06024-0007		SCR SHC 4-40X7/16	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
–	089-06141-0006		SCR SET 4-40X3/16	EA	2	4	-	2	4	4	4	2	2	4	4	2	2	-	2	-	2
–	089-06167-0012		SCR FHP 6-32X3/4	EA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
–	089-06218-0006		SCR SET 4-40X3/32	EA	2	2	-	2	2	2	2	2	2	2	2	2	2	-	2	-	2
–	089-06414-0004		SCR PHP 2-28X1/4	EA	6	6	6	6	6	6	6	6	6	9	6	9	9	9	6	9	6
–	089-06414-0005		SCR PHP 2-28X5/16	EA	3	3	3	3	3	3	3	3	3	-	3	-	-	-	3	-	3
–	089-06484-0004		SCR FHP 2-28X1/4	EA	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
–	089-08023-0030		WSHR FLT STD #2	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
–	089-08109-0034		WSHR SPLT LK #4	EA	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
–	090-00981-0000		SLIDE LCK POST KIT	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2
–	090-00990-0005		PROTECTIVE CAP, SUB-D,	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
–	091-00109-0000		CABLE TIE	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	6	-	4
–	150-00020-0010		TUBING SHRINK 18G	IN	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
–	187-01129-0000		PC BOARD DAMPER	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
–	195-00124-0000		KI202 S/N TAG	EA	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-	-	1
–	195-00124-0003		KI206 S/N TAG OPT	EA	1	1	-	-	-	-	1	-	1	1	1	1	1	-	1	-	-
–	195-00124-0004		KI207 S/N TAG OPT	EA	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	1	-
–	200-01924-0000		BEZEL ASSY	EA	1	1	-	1	1	1	1	1	1	1	1	1	1	-	-	-	1
–	200-01924-0001		BEZEL ASSY	EA	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-	1	-
–	200-01924-0002		BEZEL ASSY	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	-
–	200-01925-0001		KI202/6 FRT GR PLT	EA	1	1	-	1	1	1	1	1	1	-	-	-	-	-	-	-	1
–	200-01925-0002		KI207 FRT GR PLT	EA	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
–	200-01925-0003		KI206 FRT GR PLT 5	EA	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1	-	-
–	200-01925-0004		KI206 RED GR PLT	EA	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-	-	-
–	200-01925-0005		KI207 FRT GR PLT 5	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-	1	-
B102	148-00026-0000		SYNCHRO CONT XFMR	EA	-	1	-	-	1	1	1	-	-	1	1	-	-	-	-	-	-
B103	148-00005-0000		SYN VCTR RSLVR	EA	1	1	-	1	1	-	-	-	-	1	-	1	-	-	-	-	-
B104	148-00043-0000		RESOLVER SIZE 11	EA	-	-	-	-	-	1	1	1	1	-	1	-	1	-	1	-	1
J202	030-02271-0001		CONN 30P W/LOCKTAB	EA	-	-	-	1	1	1	-	1	-	-	-	-	-	1	-	1	-
J202	030-02348-0004		CONN SUB-MINIATURE D2	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
J206	030-02271-0001		CONN 30P W/LOCKTAB	EA	1	1	-	-	-	-	1	-	1	1	1	1	1	-	1	-	-
J207	030-02271-0001		CONN 30P W/LOCKTAB	EA	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-	-	-
REF1	300-01923-0001		FINAL ASSY DWG	EA	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

200-1923-04 IND SMTR KI206 R: 3
200-1923-05 IND SMTR SYN KI206 R: 3
200-1923-06 INC SMTR KI207 R: 4
200-1923-07 IND 3MTR KI202 R: 3
200-1923-08 IND 3MTR SYN KI202 R: 3
200-1923-09 IND 3MSYN400 KI202 R: 3
200-1923-10 IND 5MSYN400 KI206 R: 3
200-1923-11 IND 3MTR 400 KI202 R: 3
200-1923-12 IND 5MTR 400 KI206 R: 3
200-1923-13 IND 5 5V SYN KI206 R: 4

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	04	05	06	07	08	09	10	11	12	13
	012-1006-00	LACING CORD 18DR		AR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	016-1096-00	SUPERBONDER 150		AR	0.00	0.00	.	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	023-0128-00	5 METER PKG		EA	1.00	1.00	1.00	.	.	.	1.00	.	1.00	1.00
	023-0130-00	3 METER PKG		EA	.	.	.	1.00	1.00	1.00	.	1.00	.	.
	025-0018-69	WIRE 26 BU/WH		IN	8.40	8.40	8.40	8.40	8.40	8.40	8.40	8.40	8.40	8.40
	025-0018-79	WIRE 26 VI/WH		IN	8.40	8.40	0.70	8.40	8.40	8.40	8.40	8.40	8.40	8.40
	025-0018-89	WIRE 26 GY/WH		IN	8.40	8.40	8.40	8.40	8.40	8.40	8.40	8.40	8.40	8.40
	029-0387-01	GEAR ASSY 110T		EA	.	1.00	.	.	1.00	1.00	1.00	.	.	1.00
	029-0387-02	GEAR ASSY 110T		EA	1.00	1.00	.	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	029-0388-00	GEAR IDLER XFR		EA	1.00	1.00	.	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	035-1361-06	PROTECTIVE CVR		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	047-3798-01	CVR DUST BTM W/NUT	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	047-3805-01	CHASSIS LEFT	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	047-3872-01	COVER DUST TOP	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	047-4809-01	CHASSIS RIGHT	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	057-1757-02	S/N TAG		EA	1.00	1.00	.	.	.	.	1.00	.	1.00	1.00
	057-1764-00	WRN TAG 5V LGT		EA	.	.	.	.	.	.	.	.	.	1.00
	057-1766-02	S/N TAG		EA	.	.	1.00	.	.	.	.	.	.	.
	057-1831-00	CAUTION TAG		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	057-2293-02	S/N TAG		EA	.	.	.	1.00	1.00	1.00	.	1.00	.	.
	073-0034-00	MOUNTING LUG		EA	.	2.00	.	.	2.00	2.00	2.00	.	.	2.00
	073-0034-01	MOUNTING LUG		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	088-0630-00	REAR MTG PL		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0697-01	KNOB W/F - OBS	A	EA	1.00	1.00	.	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0804-02	FRAME 2/NUTS	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	089-5903-05	SCR PHP 4-40X5/16		EA	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	089-6004-02	SCR FHP 2-56X1/8		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	089-6024-04	SCR SHC 4-40X1/4		EA	.	2.00	.	.	2.00	2.00	2.00	.	.	2.00
	089-6024-05	SCR SHC 4-40X5/16		EA	2.00	2.00	.	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	089-6141-06	SCREW		EA	2.00	4.00	.	2.00	4.00	4.00	4.00	2.00	2.00	4.00
	089-6167-12	SCR FHP 6-32X3/4		EA	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	089-6218-06	SCR SSS 4-40X3/16		EA	2.00	2.00	.	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	089-6299-04	SCR FHPH 4-40X1/4		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	089-6414-04	SCR PHP 2-28X1/4		EA	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00	9.00
	089-6484-04	SCREW		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	089-8109-34	WSHR SPLT LK #4		EA	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	150-0020-10	TUBING SHRINK 18G		IN	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00	12.00
	200-1924-00	BEZEL ASSY	A	EA	1.00	1.00	.	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	200-1924-01	BEZEL ASSY	A	EA	.	.	1.00	.	.	.	.	.	.	.
	200-1925-01	KI202/6 FRT GR PLT	A	EA	1.00	1.00	.	1.00	1.00	1.00	1.00	1.00	1.00	.
	200-1925-02	KI 207 FRT GR PLT	A	EA	.	.	1.00	.	.	.	.	.	.	.
	200-1925-03	KI206 FRT GR PLT 5	A	EA	.	.	.	.	.	.	.	.	.	1.00
B 102	148-0026-00	SYNCHRO CONT XFMR		EA	.	1.00	.	.	1.00	1.00	1.00	.	.	1.00
B 103	148-0005-00	SYN VCTR RSLVR		EA	1.00	1.00	.	1.00	1.00	.	.	.	.	1.00
B 104	148-0043-00	RESOLVER SIZE 11		EA	.	.	.	.	.	1.00	1.00	1.00	1.00	.

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SYMBOL	PART NUMBER	DESCRIPTION	A	UM	04	05	06	07	08	09	10	11	12	13
J 202	030-2271-01	CONN 30P W/LOCKTAB	A	EA	.	.	.	1.00	1.00	1.00	.	1.00	.	.
J 206	030-2271-01	CONN 30P W/LOCKTAB	A	EA	1.00	1.00	.	.	.	.	1.00	.	1.00	1.00
J 207	030-2271-01	CONN 30P W/LOCKTAB	A	EA	.	.	1.00	.	.	.	.	.	.	.

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200-1923-14 IND 5 SV 400 KI206 R: 4 ECO: 50956 KI 0206
200-1923-15 IND SMTR R KI206 R: 3 ECO: 50956 KI 0206
200-1923-16 IND SM 400 R KI206 R: 3 ECO: 50956 KI 0206
200-1923-17 IND SMTR SV KI207 R: 3 ECO: 50956 KI 0207
200-1923-24 IND 5 SV 400 KI206 R: 2 ECO: 50956 KI 0206
200-1923-25 INDICATOR R: 2 ECO: 50956 KI 0207

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	14	15	16	17	24	25
	012-1008-00	LACING CORD 180R		AR	0.00	0.00	0.00	0.00	0.00	0.00
	016-1006-00	SUPERBONDER 150		AR	0.00	0.00	0.00	.	0.00	.
	022-0128-00	5 METER PKG		EA	1.00	1.00	1.00	1.00	1.00	.
	022-0130-00	3 METER PKG		EA	.	.	.	.	.	1.00
	025-0018-09	WIRE 26 BU/WH		IN	8.40	8.40	8.40	8.40	8.40	8.40
	025-0018-79	WIRE 26 VI/WH		IN	8.40	8.40	8.40	8.40	8.40	8.40
	025-0018-89	WIRE 26 GY/WH		IN	8.40	8.40	8.40	8.40	8.40	8.40
	029-0387-01	GEAR ASSY 110T		EA	1.00	.	.	.	1.00	.
	029-0387-02	GEAR ASSY 110T		EA	1.00	1.00	1.00	.	1.00	.
	029-0388-00	GEAR IDLER XFR		EA	1.00	1.00	1.00	.	1.00	.
	035-1361-06	PROTECTIVE CVR		EA	1.00	1.00	1.00	1.00	1.00	1.00
	047-3798-01	CVR DUST BTM W/NUT	A	EA	1.00	1.00	1.00	1.00	1.00	1.00
	047-3806-01	CHASSIS LEFT	A	EA	1.00	1.00	1.00	1.00	1.00	1.00
	047-3872-01	COVER DUST TOP	A	EA	1.00	1.00	1.00	1.00	1.00	1.00
	047-4809-01	CHASSIS RIGHT	A	EA	1.00	1.00	1.00	1.00	1.00	1.00
	057-1757-02	S/N TAG		EA	1.00	1.00	1.00	.	1.00	.
	057-1764-00	WRN TAG SV LGT		EA	1.00	.	.	1.00	1.00	1.00
	057-1766-02	S/N TAG		EA	.	.	.	1.00	.	1.00
	057-1831-00	CAUTION TAG		EA	1.00	1.00	1.00	1.00	1.00	1.00
	073-0034-00	MOUNTING LUG		EA	2.00	.	.	.	2.00	.
	073-0034-01	MOUNTING LUG		EA	2.00	2.00	2.00	.	2.00	.
	088-0630-00	REAR MTG PL		EA	1.00	1.00	1.00	1.00	1.00	1.00
	088-0697-01	KNOB W/F - OBS	A	EA	1.00	1.00	1.00	.	1.00	.
	088-0804-02	FRAME 2/NUTS	A	EA	1.00	1.00	1.00	1.00	1.00	1.00
	089-5903-05	SCR PHP 4-40X5/16		EA	4.00	4.00	4.00	4.00	4.00	4.00
	089-6004-02	SCR FHP 2-56X1/8		EA	2.00	2.00	2.00	2.00	2.00	2.00
	089-6024-04	SCR SHC 4-40X1/4		EA	2.00	.	.	.	2.00	.
	089-6024-05	SCR SHC 4-40X5/16		EA	2.00	2.00	2.00	.	2.00	.
	089-6141-06	SCREW		EA	4.00	2.00	2.00	.	4.00	.
	089-6187-12	SCR FHP 6-32X3/4		EA	3.00	3.00	3.00	3.00	3.00	3.00
	089-6210-06	SCR SSS 4-40X3/16		EA	2.00	2.00	2.00	.	2.00	.
	089-6299-04	SCR FHPH 4-40X1/4		EA	2.00	2.00	2.00	2.00	2.00	2.00
	089-6414-04	SCR PHP 2-28X1/4		EA	9.00	9.00	9.00	9.00	9.00	9.00
	089-6484-04	SCREW		EA	2.00	2.00	2.00	2.00	2.00	2.00
	089-8109-34	WSHR SPLT LK #4		EA	4.00	4.00	4.00	4.00	4.00	4.00
	150-0020-10	TUBING SHRINK 18G		IN	12.00	12.00	12.00	12.00	12.00	12.00
	200-1924-00	BEZEL ASSY	A	EA	1.00	1.00	1.00	.	.	.
	200-1924-01	BEZEL ASSY	A	EA	.	.	.	1.00	.	1.00
	200-1924-02	BEZEL ASSY	A	EA	.	.	.	.	1.00	.
	200-1925-03	KI206 FRT GR PLT S	A	EA	1.00	.	.	.	1.00	.
	200-1925-04	KI 206 RED GR PLT	A	EA	.	1.00	1.00	.	.	.
	200-1925-06	KI 207 FRT GR PLTS	A	EA	.	.	.	1.00	.	1.00
B 102	148-0026-00	SYNCHRO CONT XFMR		EA	1.00	.	.	.	.	.
B 103	148-0005-00	SYN VCTR RSLVR		EA	.	1.00	.	.	.	.
B 104	148-0048-00	RESOLVER SIZE 11		EA	1.00	.	1.00	.	1.00	.
J 202	030-2271-01	CONN 30P W/LOCKTAB	A	EA	.	.	.	1.00	.	1.00
J 206	030-2271-01	CONN 30P W/LOCKTAB	A	EA	1.00	1.00	1.00	.	1.00	.

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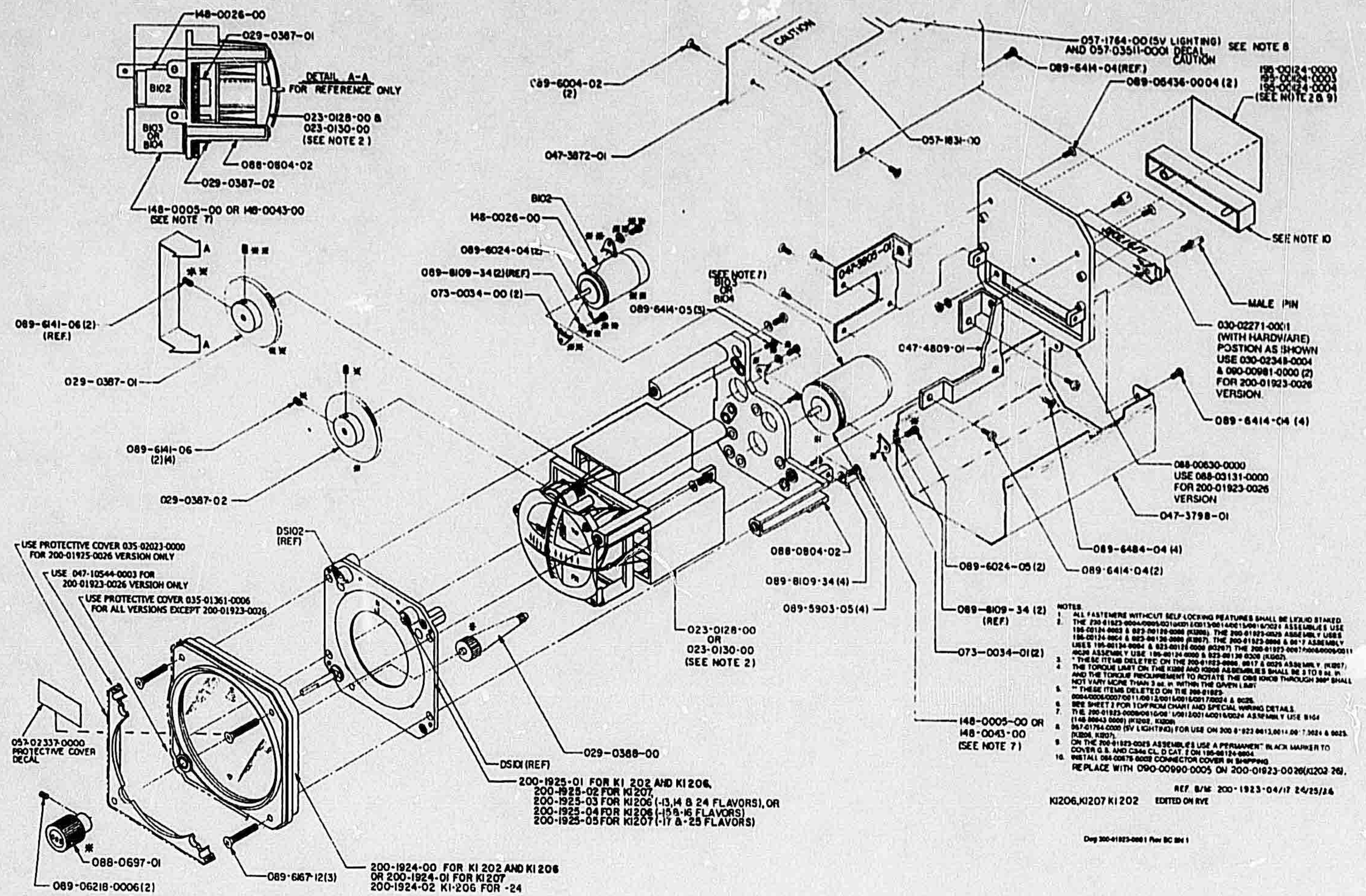
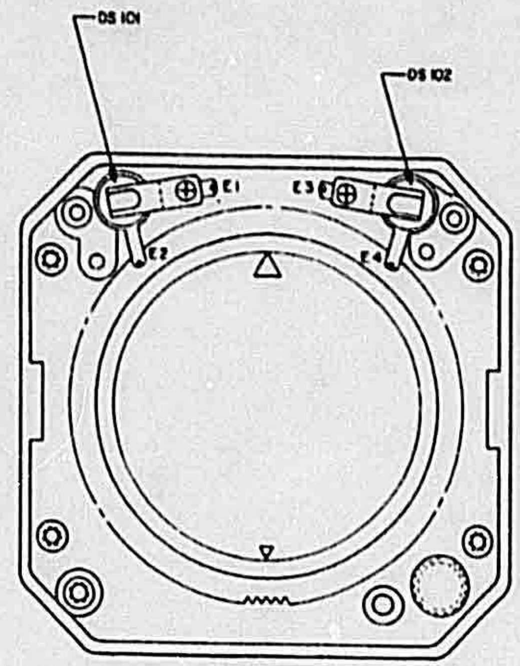


FIGURE 6-1 Final Assembly KI 202, KI 206, KI 207 (S/N 10,000 and Above) (Sht 1 of 2)
(Dwg No 300-01923-0001, Rev BC, Sht 1)



BEZEL ASSEMBLY
(REAR VIEW)

NOTES:

1. SHRINK TUBING 150-00020-0010 MUST BE INSTALLED ON EACH PIN OF J202/6/7 THAT HAS A WIRE ATTACHED.
2. REFER TO THE BOM FOR THAT PARTICULAR ASSEMBLY FOR THE NUMBER OF CABLE TIES, 091-00109-0000, USED TO BUNDLE THE WIRES TOGETHER NEATLY.

TO KI-202 (-26) ONLY	WIRING INFORMATION					
	FROM	TO	PART NO.	DESCRIPTION	LENGTH	REMARKS
E3	E1	E3	025-0018-79	*26 VIOLET/WHITE	.20 FT	+14V LIGHTS HIGH
E3		E3	150-0020-10	SHRINK TUBING	.20	INSULATE E4
J202-23	E1	J202/6/7D	025-0018-79	*26 VIOLET/WHITE	.50	+14V LIGHTS HIGH (SEE NOTE 1)
E1		E1	150-0020-10	SHRINK TUBING	.20	INSULATE E1
J202-21	E2	J202/6/7E	025-0018-89	*26 GRAY/WHITE	.50	LIGHTS LOW (SEE NOTE 1)
J202-22	E4	J202/6/7B	025-0018-69	*26 BLUE/WHITE	.50	+28V LIGHTS HIGH (SEE NOTE 1)
E4		E4	150-0020-10	SHRINK TUBING	.20	INSULATE E3
	B102	J202/6 L	COMPONENT WIRE	RED / WHITE	.50	COURSE DATUM OUTPUT C (SEE NOTE 1)
	B102	J202/6 r	• •	BLACK / WHITE	.50	COURSE DATUM OUTPUT H • •
	B102	J202/6 1	• •	YELLOW	.50	COMPASS HEADING INPUT "X" • •
	B102	J202/6 k	• •	BLUE	.50	COMPASS HEADING INPUT "Y" • •
	B102	J202/6 z	• •	BLACK	.50	COMPASS HEADING INPUT "Z" • •
	B103	J202/6 c	• •	RED/ WHITE	.50	RESOLVER ROTOR "H" • •
	B103	J202/6Z	• •	BLACK/WHITE	.50	RESOLVER ROTOR "C" • •
	B103	J202/6L	• •	RED	.50	RESOLVER STATOR "D" • •
	B103	J202/6P	• •	BLACK	.50	RESOLVER STATOR "E" • •
	B103	J202/6T	• •	BLUE	.50	RESOLVER STATOR "F" • •
	B103	J202/6W	• •	YELLOW	.50	RESOLVER STATOR "G" • •
J202-9	M101	J202/6/7a	• •	YELLOW/ WHITE	.50	TO/FROM METER +TO • •
J202-10	M101	J202/6/7S	• •	GREEN/ WHITE	.50	TO/FROM METER + FROM • •
J202-7	M102	J202/6/7N	• •	GRAY	.50	VOR/LOC WARNING FLAG POSITIVE • •
J202-8	M102	J202/6/7F	• •	WHITE	.50	VOR/LOC WARNING FLAG NEGATIVE • •
	M103	J206/7 H	• •	BROWN/ WHITE	.50	GLIDE SLOPE WARNING FLAG POSITIVE • •
	M103	J206/7 J	• •	ORANGE / WHITE	.50	GLIDE SLOPE WARNING FLAG NEGATIVE • •
J202-12	M104	J202/6/7Z	• •	ORANGE/ RED	.50	VOR/LOC DEVIATION METER POSITIVE • •
J202-11	M104	J202/6/7a	• •	ORANGE/ BLACK	.50	VOR/LOC DEVIATION METER NEGATIVE • •
	M105	J206/7 m	• •	ORANGE / RED	.50	GLIDE SLOPE DEVIATION METER POSITIVE • •
	M105	J206/7 n	• •	ORANGE/ BLACK	.50	GLIDE SLOPE DEVIATION METER NEGATIVE • •
	B104	J202/6 J	• •	YELLOW/WHITE	.50	RESOLVER ROTOR "B" • •
	B104	J202/6 S	• •	RED/WHITE	.50	RESOLVER ROTOR "A" • •
	B104	J202/6 Z	• •	BLACK/WHITE	.50	RESOLVER ROTOR "C" • •
	B104	J202/6 L	• •	RED	.50	RESOLVER STATOR "D" • •
	B104	J202/6P	• •	BLACK	.50	RESOLVER STATOR "E" • •
	B104	J202/6T	• •	YELLOW	.50	RESOLVER STATOR "F" • •
	B104	J202/6W	• •	BLUE	.50	RESOLVER STATOR "G" • •
J202-18	B104		• •	YELLOW/WHITE	.50	RESOLVER "B"
J202-17	B104		• •	RED/WHITE	.50	RESOLVER "A"
J202-2	B104		• •	BLACK/WHITE	.50	RESOLVER "C"
J202-6	B104		• •	RED	.50	RESOLVER "F"
J202-4	B104		• •	BLACK	.50	RESOLVER "G"
J202-3	B104		• •	YELLOW	.50	RESOLVER "D"
J202-5	B104		• •	BLUE	.50	RESOLVER "E"

THESE WIRES MUST BE TWISTED TOGETHER BEFORE BEING BUNDLED IN A WIRING HARNESS.

THESE WIRES MUST BE TWISTED TOGETHER BEFORE BEING BUNDLED IN A WIRING HARNESS.

THESE WIRES NOT ON KI 202

SEE LINE SAMPLE FOR WIRE ROUTING

Dwg 300-01923-0001 Rev BC Sht 2

REF. B/M 200-1923-04/11

KI 206/207/202

FIGURE 6-1 Final Assembly KI 202, KI 206, KI 207 (S/N 10,000 and Above) (Sht 2 of 2)
(Dwg No 300-01923-0001, Rev BC, Sht 2)

BOM 3: KI 202, KI 206, KI 207 Final Assembly (S/N 9,999 and Below)

200-01923-0054	KI206 IND 5 IDL 30HZ	REV 5
200-01923-0055	KI206 IND 5 IDL SYN 30HZ	REV 5
200-01923-0056	KI207 IND 5 IDL NO OBS	REV 6
200-01923-0057	KI202 IND 3 IDL 30HZ	REV 4
200-01923-0058	KI202 IND 3 IDL SYN 30HZ	REV 4
200-01923-0059	KI202 IND 3 IDL SYN 400HZ	REV 4
200-01923-0060	KI206 IND 5 IDL SYN 400HZ	REV 4
200-01923-0061	KI202 IND 3 IDL 400HZ	REV 4
200-01923-0062	KI206 IND 5 IDL 400HZ	REV 5
200-01923-0063	KI206 IND 5 IDL 5V SYN 30HZ	REV 4
200-01923-0064	KI206 IND 5 IDL 5V SYN 400HZ	REV 6
200-01923-0065	KI206 IND 5 IDL RED 30HZ	REV 4
200-01923-0066	KI206 IND 5 IDL RED 400HZ	REV 4
200-01923-0067	KI207 IND 5 IDL 5V NO OBS	REV 4
200-01923-0074	KI206 IND 5 IDL GRY 5V 400HZ	REV 4

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	KI206 -0054	KI206 -0055	KI207 -0056	KI202 -0057	KI202 -0058	KI202 -0059	KI206 -0060	KI202 -0061	KI206 -0062	KI206 -0063	KI206 -0064	KI206 -0065	KI206 -0066	KI207 -0067	KI206 -0074
–	012-01006-0000		LACING CORD 18DR	AR	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
–	016-01096-0000		SUPERBONDER 150	AR	.	.	.	0	0	0	0	0	.	0	.	0	0	.	.
–	016-01140-0000		SUPERBONDER 415	AR	1	1	.	.	.	.	.	.	1	.	1	.	.	.	1
–	025-00018-0069		WIRE 26 BU/WH	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
–	025-00018-0079		WIRE 26 VI/WH	IN	8.4	8.4	0.7	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
–	025-00018-0089		WIRE 26 GY/WH	IN	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4	8.4
–	029-00387-0001		GEAR ASSY 110T	EA	.	1	.	.	1	1	1	.	.	1	1	.	.	.	1
–	029-00387-0002		GEAR ASSY 110T	EA	1	1	.	1	1	1	1	1	1	1	1	1	1	.	1
–	029-00388-0000		GEAR IDLER XFR	EA	1	1	.	1	1	1	1	1	1	1	1	1	1	.	1
–	035-01361-0006		PROTECTIVE CVR	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	047-03798-0001		CVR DUST BTM W/NUT	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	047-03805-0001		CHASSIS LEFT	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	047-03806-0001		CHASSIS	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	047-03872-0001		COVER DUST TOP	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	057-01757-0000		S/N TAG	EA	1	1	.	.	.	.	1	.	.	.	.	.	.	.	.
–	057-01757-0002		S/N TAG	EA	.	.	.	.	.	.	.	.	1	1	1	1	1	.	1
–	057-01764-0000		WRN TAG 5V LGT	EA	.	.	.	.	.	.	.	.	.	1	1	.	.	1	1
–	057-01766-0001		S/N TAG	EA	.	.	1	.	.	.	.	.	.	.	.	.	.	.	.
–	057-01766-0002		S/N TAG	EA	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.
–	057-01831-0000		CAUTION TAG	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	057-02293-0000		S/N TAG	EA	.	.	.	1	1	1	.	1	.	.	.	.	.	.	.
–	073-00034-0000		MOUNTING LUG	EA	.	2	.	.	2	2	2	.	.	2	2	.	.	.	2
–	073-00034-0001		MOUNTING LUG	EA	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
–	088-00630-0000		REAR MTG PL	EA	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
–	088-00697-0001		KNOB W/F – OBS	EA	1	1	.	1	1	1	1	1	1	1	1	1	1	.	1
–	089-05436-0004		SCR, MACH, 4-40, FH 82	EA	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
–	089-05903-0005		SCR PHP 4-40X5/16	EA	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
–	089-06004-0002		SCR FHP 2-56X1/8	EA	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
–	089-06024-0004		SCR SHC 4-40X1/4	EA	.	2	.	.	2	2	2	.	.	2	2	.	.	.	2
–	089-06024-0005		SCR SHC 4-40X5/16	EA	2	2	.	2	2	2	2	2	2	2	2	2	2	.	2
–	089-06141-0006		SCR SET 4-40X3/16	EA	2	4	.	2	4	4	4	2	2	4	4	2	2	.	2
–	089-06167-0012		SCR FHP 6-32X3/4	EA	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
–	089-06218-0006		SCR SET 4-40X3/32	EA	2	2	.	2	2	2	2	2	2	2	2	2	2	.	2
–	089-06414-0004		SCR PHP 2-28X1/4	EA	9	9	9	9	9	9	9	9	9	9	9	9	9	9	9
–	089-06484-0004		SCR FHP 2-28X1/4	EA	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
–	089-08109-0034		WSHR SPLT LK #4	EA	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
–	150-00020-0010		TUBING SHRINK 18G	IN	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0	12.0
–	200-01924-0000		BEZEL ASSY	EA	1	1	.	1	1	1	1	1	1	1	1	1	1	.	.

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	KI206 -0054	KI206 -0055	KI207 -0056	KI202 -0057	KI202 -0058	KI202 -0059	KI206 -0060	KI202 -0061	KI206 -0062	KI206 -0063	KI206 -0064	KI206 -0065	KI206 -0066	KI207 -0067	KI206 -0074
–	200-01924-0001		BEZEL ASSY	EA	-	-	1	-	-	-	-	-	-	-	-	-	-	1	-
–	200-01924-0002		BEZEL ASSY	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1
–	200-01925-0001		KI202/6 FRT GR PLT	EA	1	1	-	1	1	1	1	1	1	-	-	-	-	-	-
–	200-01925-0002		KI207 FRT GR PLT	EA	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
–	200-01925-0003		KI206 FRT GR PLT 5V	EA	-	-	-	-	-	-	-	-	-	1	1	-	-	-	1
–	200-01925-0004		KI206 RED GR PLT	EA	-	-	-	-	-	-	-	-	-	-	-	1	1	-	-
–	200-01925-0005		KI207 FRT GR PLT 5V	EA	-	-	-	-	-	-	-	-	-	-	-	-	-	1	-
–	200-01926-0000		METER ASSY	EA	-	-	-	1	1	1	-	1	-	-	-	-	-	-	-
–	200-01926-0001		METER ASSY	EA	1	1	1	-	-	-	1	-	1	1	1	1	1	1	1
B102	148-00026-0000		SYNCHRO CONT XFMR	EA	-	1	-	-	1	1	1	-	-	1	1	-	-	-	-
B103	148-00005-0000		SYN VCTR RSLVR	EA	1	1	-	1	1	-	-	-	-	1	-	1	-	-	-
B104	148-00043-0000		RESOLVER SIZE 11	EA	-	-	-	-	-	1	1	1	1	-	1	-	1	-	1
J202	030-02271-0001		CONN 30P W/LOCKTAB	EA	-	-	-	1	1	1	-	1	-	-	-	-	-	1	-
J206	030-02271-0001		CONN 30P W/LOCKTAB	EA	1	1	-	-	-	-	1	-	1	1	1	1	1	-	1
J207	030-02271-0001		CONN 30P W/LOCKTAB	EA	-	-	1	-	-	-	-	-	-	-	-	-	-	-	-
REF1	300-01923-0003		FINAL ASSY DWG	EA	X	X	X	X	X	X	X	X	X	-	X	X	X	X	X

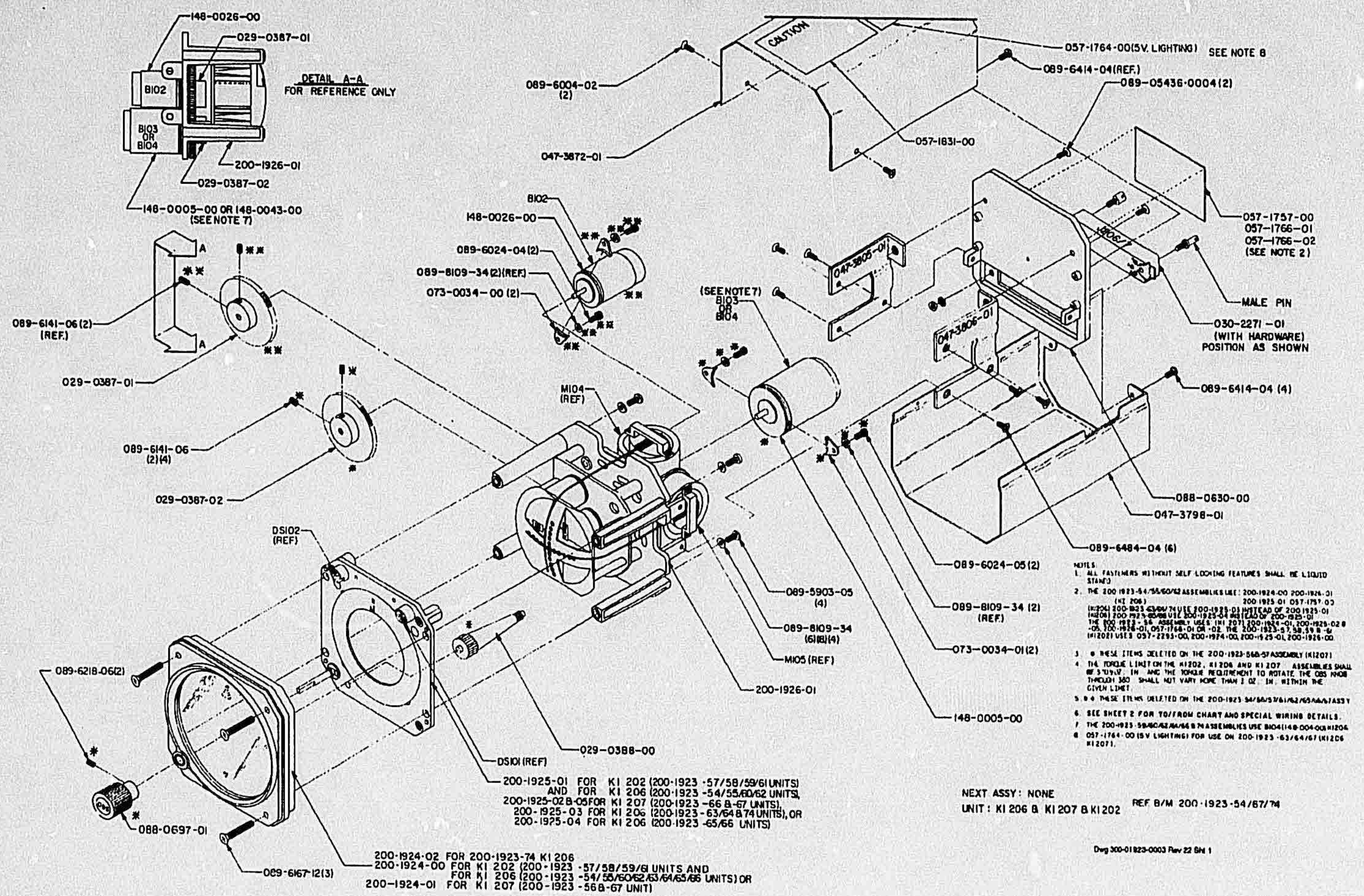
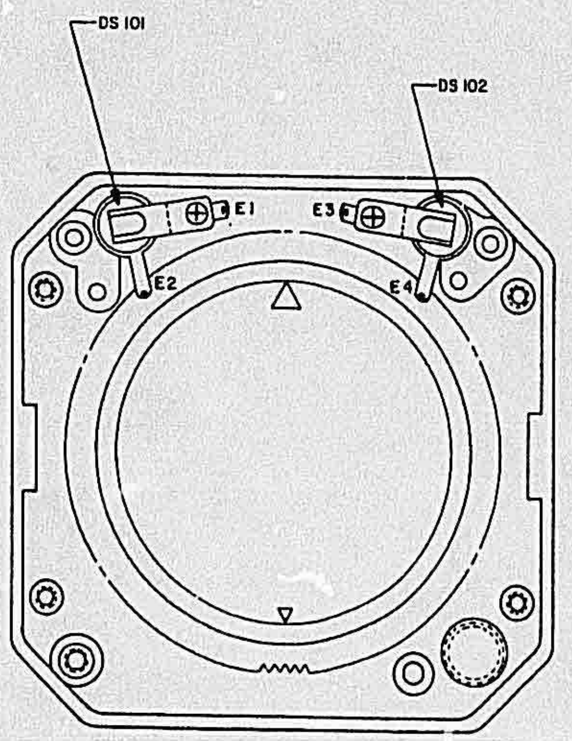


FIGURE 6-2 Final Assembly KI 202, KI 206, KI 207 (S/N 9,999 and Below) (Sht 1 of 2) (Dwg No 300-01923-0003, Rev 22, Sht 1)



BEZEL ASSEMBLY
(REAR VIEW)

WIRING INFORMATION

FROM	TO	PART NO.	DESCRIPTION	LENGTH	REMARKS
E1	E3	025-0018-79	#26 VIOLET/WHITE	.20	+14V/5V LIGHTS HIGH
	E3	150-0020-10	SHRINK TUBING	.20	INSULATE E4
E1	J206/7-D	025-0018-79	#26 VIOLET/WHITE	.50	+14V/5V LIGHTS HIGH (SEE NOTE 1)
	E1	150-0020-10	SHRINK TUBING	.20	INSULATE E1
E2	J206/7-E	025-0018-89	#26 GRAY/WHITE	.50	LIGHTS LOW (SEE NOTE 1)
E4	J206/7-B	025-0018-69	#26 BLUE/WHITE	.50	+28V LIGHTS HIGH (SEE NOTE 1)
	E4	150-0020-10	SHRINK TUBING	.20	INSULATE E3
B102	J206-s	COMPONET WIRE	RED / WHITE	.50	COURSE DATUM OUTPUT C (SEE NOTE 1)
B102	J206-r	" "	BLACK / WHITE	.50	COURSE DATUM OUTPUT H " "
B102	J206-t	" "	YELLOW	.50	COMPASS HEADING INPUT "X" " "
B102	J206-u	" "	BLUE	.50	COMPASS HEADING INPUT "Y" " "
B102	J206-v	" "	BLACK	.50	COMPASS HEADING INPUT "Z" " "
B103	J206-c	" "	RED/ WHITE	.50	RESOLVER ROTOR "H" " "
B103	J206-z	" "	BLACK / WHITE	.50	RESOLVER ROTOR "C" " "
B103	J206-L	" "	RED	.50	RESOLVER STATOR "D" " "
B103	J206-P	" "	BLACK	.50	RESOLVER STATOR "E" " "
B103	J206-T	" "	BLUE	.50	RESOLVER STATOR "F" " "
B103	J206-W	" "	YELLOW	.50	RESOLVER STATOR "G" " "
M101	J206/7-a	" "	YELLOW/ WHITE	.50	TO/FROM METER +TO " "
M101	J206/7-S	" "	GREEN / WHITE	.50	TO/FROM METER +FROM " "
M102	J206/7-N	" "	GRAY	.50	VOR/LOC WARNING FLAG POSITIVE " "
M102	J206/7-F	" "	WHITE	.50	VOR/LOC WARNING FLAG NEGATIVE " "
M103	J206/7-H	" "	BROWN / WHITE	.50	GLIDE SLOPE WARNING FLAG POSITIVE " "
M103	J206/7-J	" "	ORANGE / WHITE	.50	GLIDE SLOPE WARNING FLAG NEGATIVE " "
M104	J206/7-j	" "	ORANGE/ RED	.50	VOR/LOC DEVIATION METER POSITIVE " "
M104	J206/7-n	" "	ORANGE/ BLACK	.50	VOR/LOC DEVIATION METER NEGATIVE " "
M105	J206/7-m	" "	ORANGE/ RED	.50	GLIDE SLOPE DEVIATION METER POSITIVE " "
M105	J206/7-k	" "	ORANGE/ BLACK	.50	GLIDE SLOPE DEVIATION METER NEGATIVE " "
B104	J206 f	" "	YELLOW/WHITE	.50	RESOLVER ROTOR "B" " "
B104	J206 c	" "	RED/WHITE	.50	RESOLVER ROTOR "A" " "
B104	J206 Z	" "	BLACK/WHITE	.50	RESOLVER ROTOR "C" " "
B104	J206 L	" "	RED	.50	RESOLVER ROTOR "D" " "
B104	J206 P	" "	BLACK	.50	RESOLVER ROTOR "E" " "
B104	J206 T	" "	YELLOW	.50	RESOLVER ROTOR "F" " "
B104	J206 W	" "	BLUE	.50	RESOLVER ROTOR "G" " "

THESE WIRES MUST BE TWISTED TOGETHER BEFORE BEING BUNDLED IN A WIRING HARNESS.

THESE WIRES MUST BE TWISTED TOGETHER BEFORE BEING BUNDLED IN A WIRING HARNESS.

NOTES:
1. SHRINK TUBING 150-0018-10 MUST BE INSTALLED ON EACH PIN OF J206/7 THAT HAS A WIRE ATTACHED.

Dwg 300-01923-0003 Rev 22 Sht 2

FIGURE 6-2 Final Assembly KI 202, KI 206, KI 207 (S/N 9,999 and Below) (Sht 2 of 2)
(Dwg No 300-01923-0003, Rev 22, Sht 2)

BOM 4: Bezel Assembly

200-01924-0000	BEZEL ASSY BLK	REV AA
200-01924-0001	BEZEL ASSY BLK (NO OBS)	REV AA
200-01924-0002	BEZEL ASSY GRY	REV AA

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000	-0001	-0002
–	012-05004-0000		LENS	EA	1	1	1
–	073-00411-0003		BEZEL W/H BLACK	EA	1	-	-
–	073-00411-0005		BEZEL W/H GRAY	EA	-	-	1
–	088-00622-0001		LIGHTING WEDGE	EA	1	-	1
–	088-00622-0003		WEDGE	EA	-	1	-
–	088-00764-0002		BEZEL	EA	-	1	-
–	089-06077-0003		SCR PHP 2-56X3/16	EA	3	3	3
–	091-00166-0000		RETAINER	EA	3	3	3
–	187-01023-0002		GSKT FIBER	EA	1	-	1
REF	300-01924-0000		BEZEL ASSY DWG	RF	X	-	-

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THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

200-1924-00 BEZEL ASSY R: 8
200-1924-01 BEZEL ASSY R: 8
200-1924-02 BEZEL ASSY R: 1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	01	02
	012-5004-00	LENS		EA	1.00	1.00	1.00
	073-0411-03	BEZEL W/H BLACK	A	EA	1.00	.	.
	073-0411-05	BEZEL W/H GRAY	A	EA	.	.	1.00
	088-0622-01	LIGHTING WEDGE	A	EA	1.00	.	1.00
	088-0622-03	WEDGE	A	EA	.	1.00	.
	088-0784-02	BEZEL	A	EA	.	1.00	.
	089-6077-03	SCR PHP 2-56 3/16		EA	3.00	3.00	3.00
	091-0166-00	RETAINER		EA	3.00	3.00	3.00
	187-1023-02	GSKT FIBER		EA	1.00	.	1.00

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NOTES:
1.) ALL FASTENERS WITHOUT SELF-LOCKING FEATURES SHALL BE LIQUID STAKED.
2.) PART NO.'S 012-5004-00 AND 088-0622-01/03 MUST BE STATIC FREE AND FREE OF FOREIGN PARTICALS. I.E. LINT & DUST.

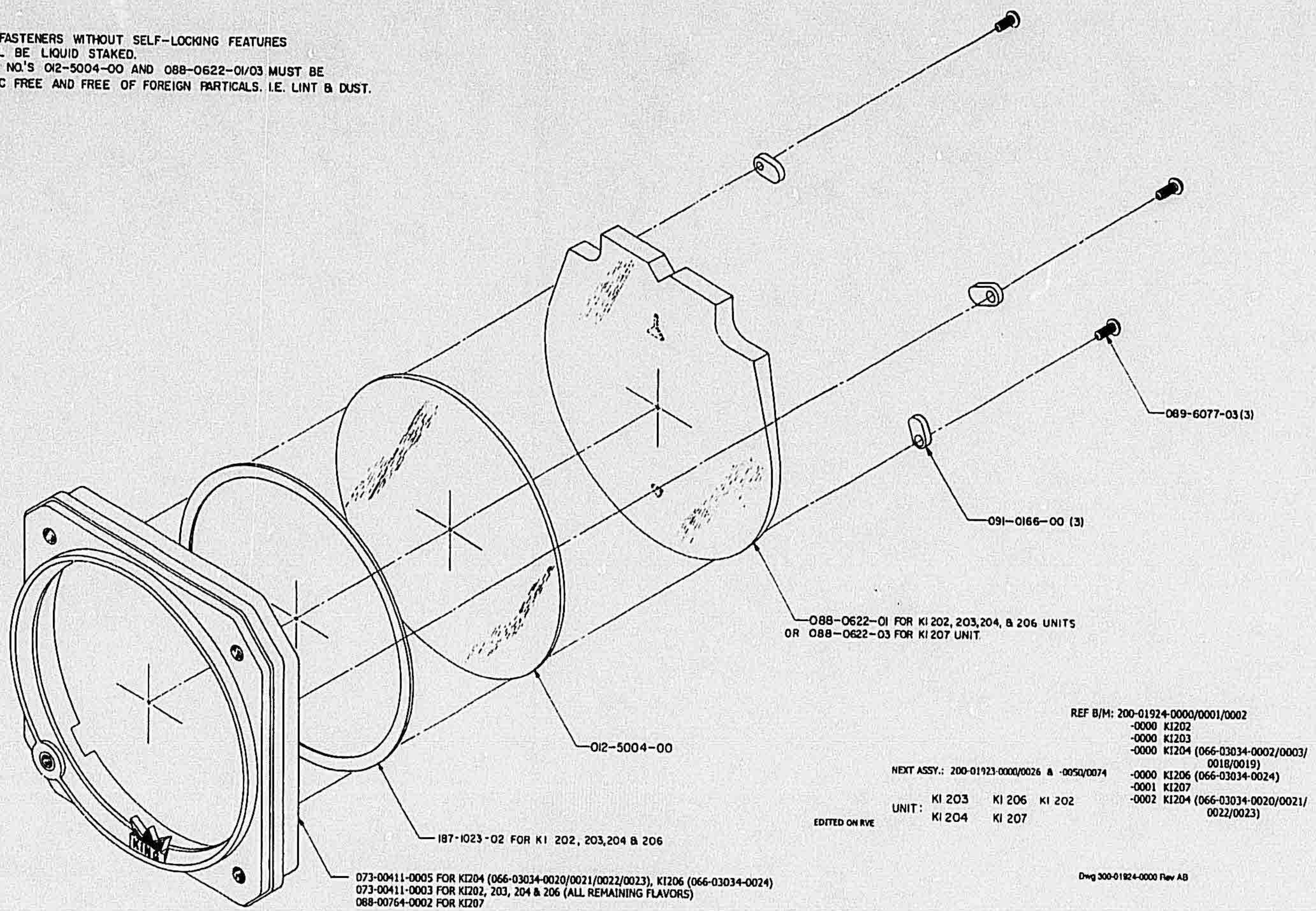

FIGURE 6-3 Bezel Assembly
(Dwg No 300-01924-0000, Rev AB)

BOM 5: Gear Plate Assembly

200-01925-0001	KI202/KI206 FRNT GR PLT	REV AB
200-01925-0002	KI207 FRNT GR PLT	REV AB
200-01925-0003	KI206 FRNT GR PLT 5V LGT	REV AC
200-01925-0004	KI206 FRNT GR PLT RED LGT	REV AA
200-01925-0005	KI207 FRNT GR PLT 5V LGT	REV AB

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0001	-0002	-0003	-0004	-0005
–	008-00075-0000		LAMP CONTACT	EA	2	2	2	2	2
–	029-00287-0004		GEAR RING 64P	EA	1	1	1	1	1
–	029-00386-0001		GEAR 24T DR	EA	1	-	1	1	-
–	047-03794-0001		CNTCT LAMP W/F	EA	2	2	2	2	2
–	088-00193-0006		FLTR LMP RED	EA	-	-	-	2	-
–	088-00193-0008		FLTR LMP BL/WHT	EA	2	2	-	-	-
–	088-00624-0000		FRONT GEAR PLT	EA	1	-	1	1	-
–	088-00624-0001		FRONT GEAR PLT	EA	-	1	-	-	1
–	088-00638-0001		DIAL CARD	EA	-	1	-	-	1
–	088-00695-0002		AZIMUTH DIAL	EA	1	-	1	1	-
–	088-03291-0001		FILTER, LAMP	EA	-	-	2	-	2
–	089-06414-0004		SCR PHP 2-28X1/4	EA	2	2	2	2	2
–	089-08025-0030		WSHR FLT STD #4	EA	1	-	1	1	-
–	089-08076-0030		WSHR FLT STD .130	EA	1	-	1	1	-
–	089-08105-0005		WASHER	A	1	1	1	1	1
–	089-08205-0001		WSHR FELT .125	A	1	-	1	1	-
–	090-00019-0000		RING RTNR .125	EA	1	-	1	1	-
–	090-00033-0003		SPRING WASHER	EA	1	-	1	1	-
–	091-00203-0003		SCR FHS 0-80X.187	EA	3	3	3	3	3
DS101	037-00007-0001		LMP 8918 T1-3/4 14	EA	1	1	-	1	-
DS101	037-00199-0000		DUAL BULB ASSY	EA	-	-	1	-	1
DS102	037-00007-0001		LMP 8918 T1-3/4 14	EA	1	1	-	1	-
DS102	037-00199-0000		DUAL BULB ASSY	EA	-	-	1	-	1
REF	300-01925-0000		FRONT GEAR PLATE ASSY	RF	X	X	X	X	X

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

200-1925-01 KI202/6 FRT GR PLT R: 14
200-1925-02 KI 207 FRT GR PLT R: 15
200-1925-03 KI206 FRT GR PLT 5 R: 3
200-1925-04 KI 206 RED GR PLT R: 2
200-1925-05 KI 207 FRT GR PLTS R: 3

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	01	02	03	04	05
	008-0075-00	LAMP CONTACT		EA	2.00	2.00	2.00	2.00	2.00
	029-0287-04	GEAR RING 64P	A	EA	1.00	1.00	1.00	1.00	1.00
	029-0386-01	GEAR 24T DR	A	EA	1.00	.	1.00	1.00	.
	047-3794-01	CNTCT LAMP W/F	A	EA	2.00	2.00	2.00	2.00	2.00
	088-0193-04	FLTR LMP LGT BLU		EA	2.00	2.00	2.00	.	2.00
	088-0193-06	FLTR LMP RED		EA	.	.	.	2.00	.
	088-0624-00	FRONT GEAR PLT		EA	1.00	.	1.00	1.00	.
	088-0624-01	FRONT GEAR PLT	A	EA	.	1.00	.	.	1.00
	088-0638-01	DIAL CARD	A	EA	.	1.00	.	.	1.00
	088-0695-02	AZIMUTH DIAL	A	EA	1.00	.	1.00	1.00	.
	089-6414-04	SCR PHP 2-28X1/4		EA	2.00	2.00	2.00	2.00	2.00
	089-8025-30	WSHR FLT STD #4		EA	1.00	.	1.00	1.00	.
	089-8076-30	WSHR FLT STD .130		EA	1.00	.	1.00	1.00	.
	089-8105-06	WASHER		EA	1.00	1.00	1.00	1.00	1.00
	089-8206-01	WSHR FELT .125		EA	1.00	.	1.00	1.00	.
	090-0019-00	RING RTNR .125		EA	1.00	.	1.00	1.00	.
	090-0033-03	SPRING WASHER		EA	1.00	.	1.00	1.00	.
	091-0208-03	SCREW		EA	3.00	3.00	3.00	3.00	3.00
DS 101	037-0007-01	LMP #918 T1-3/4 14		EA	1.00	1.00	.	1.00	.
DS 101	037-0199-00	DUAL BULB ASSY	A	EA	.	.	1.00	.	1.00
DS 102	037-0007-01	LMP #918 T1-3/4 14		EA	1.00	1.00	.	1.00	.
DS 102	037-0199-00	DUAL BULB ASSY	A	EA	.	.	1.00	.	1.00

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NOTES:
1) * THESE ITEMS DELETED ON THE 200-1925-01/02/03/04 ASSEMBLIES.
2) ALL FASTENERS WITHOUT SELF-LOCKING FEATURES SHALL BE LIQUID STAKED.
3) POSITION LAMP CONTACT # 008-0075-00 APPROX. AS SHOWN DURING ASSEMBLY, 2 PLACES.
4) * * THESE ITEMS DELETED ON THE 200-1925-02 & -05 ASSEMBLIES.
5) 037-0007-01 IS TO BE USED ON THE 200-1925-00/01/02 ASSEMBLIES 037-0199-00 IS TO BE USED ON THE 200-1925-03,05 & -06 ASSEMBLIES.
6) 088-03291-0001 IS TO BE USED ON THE 200-01925-0003/-0005/-0006 088-00193-0006 IS TO BE USED ON THE 200-01925-0004 ASSEMBLY 088-00193-0008 IS TO BE USED ON ALL OTHER ASSEMBLIES.

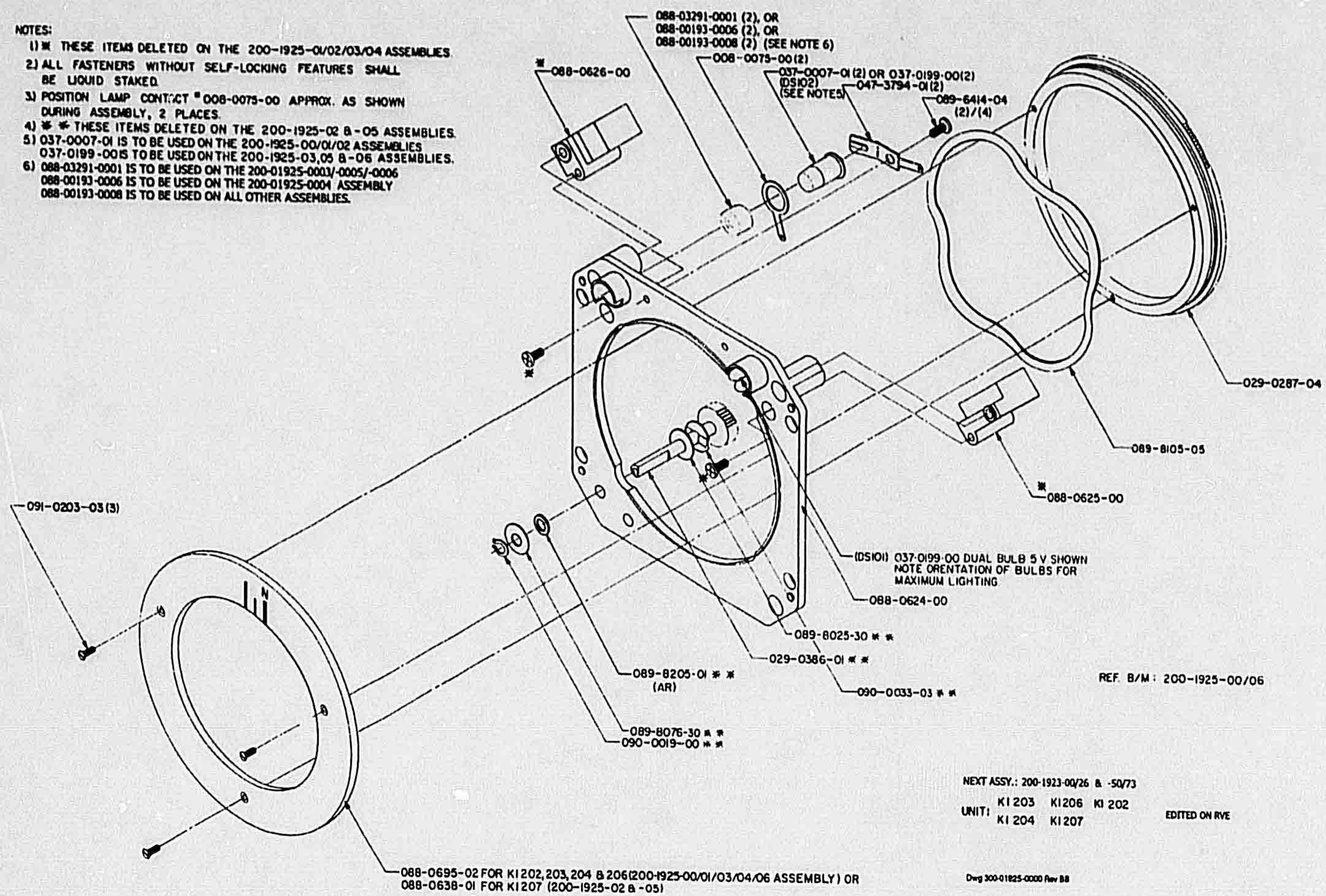

FIGURE 6-4 Gear Plate Assembly
(Dwg No 300-01925-0000, Rev BB)

BOM 6: Meter Assembly

200-01926-0000 3 METER ASSY REV 8
200-01926-0001 5 METER ASSY REV 9

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000	-0001
–	088-00629-0002		REAR GEAR PLT	EA	1	1
–	089-06022-0004		SCR SHC 2-56X1/4	EA	-	2
–	089-06022-0005		SCR SHC 2-56X5/16	EA	4	4
–	089-06022-0006		SCR SHC 2-56X3/8	EA	1	1
–	089-06414-0004		SCR PHP 2-28X1/4	EA	4	4
–	089-08023-0030		WSHR FLT STD #2	EA	2	4
–	091-00282-0000		SHIM	EA	1	2
–	091-00282-0001		SHIM .010	EA	2	2
–	091-00282-0002		SHIM .020	EA	2	2
–	091-00282-0003		SHIM .030	EA	2	2
–	200-01927-0000		FLAG ASSY	EA	1	-
–	200-01927-0001		FLAG ASSY	EA	-	1
M104	023-00129-0000		METER VOR HGA VIB	EA	1	1
M105	023-00120-0000		IND GSI VOR/LOC	EA	-	1

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NOTES:

1) * THESE ITEMS DELETED ON THE 200-1926-00 ASSEMBLY.
2) ** THE 200-1926-00 ASSEMBLY USES THE 200-1927-00.
3) ALL FASTENERS WITHOUT SELF-LOCICNG FEATURES SHALL BE LIQUID STAKED.
4) EXTREME CARE SHOULD BE EXERCISED WHEN HANDLING THE 023-0129-00, 023-0120-00, 200-1927-00/01 AND 200-1926-00/01 ITEMS.
5) POSITION M105 (GS) WITH ℄ OF WAND .033 INCHES ABOVE ℄ OF HORIZONTAL MARKS ON WARNING FLAG HOUSING.
6.) THIS OPTIONAL USE OF DIFFERENT LENGTHS OF SCREWS IS LEFT TO MFG AND IS BASED ON THEIR USE OF VARIOUS THICKNESSES OF SHIMS NEEDED TO MOUNT THE TWO METER MOVEMENTS.
7) UNITS USING THE 023-0129-00 MOVEMENT SHOULD HAVE SERIAL NUMBER 3000+.

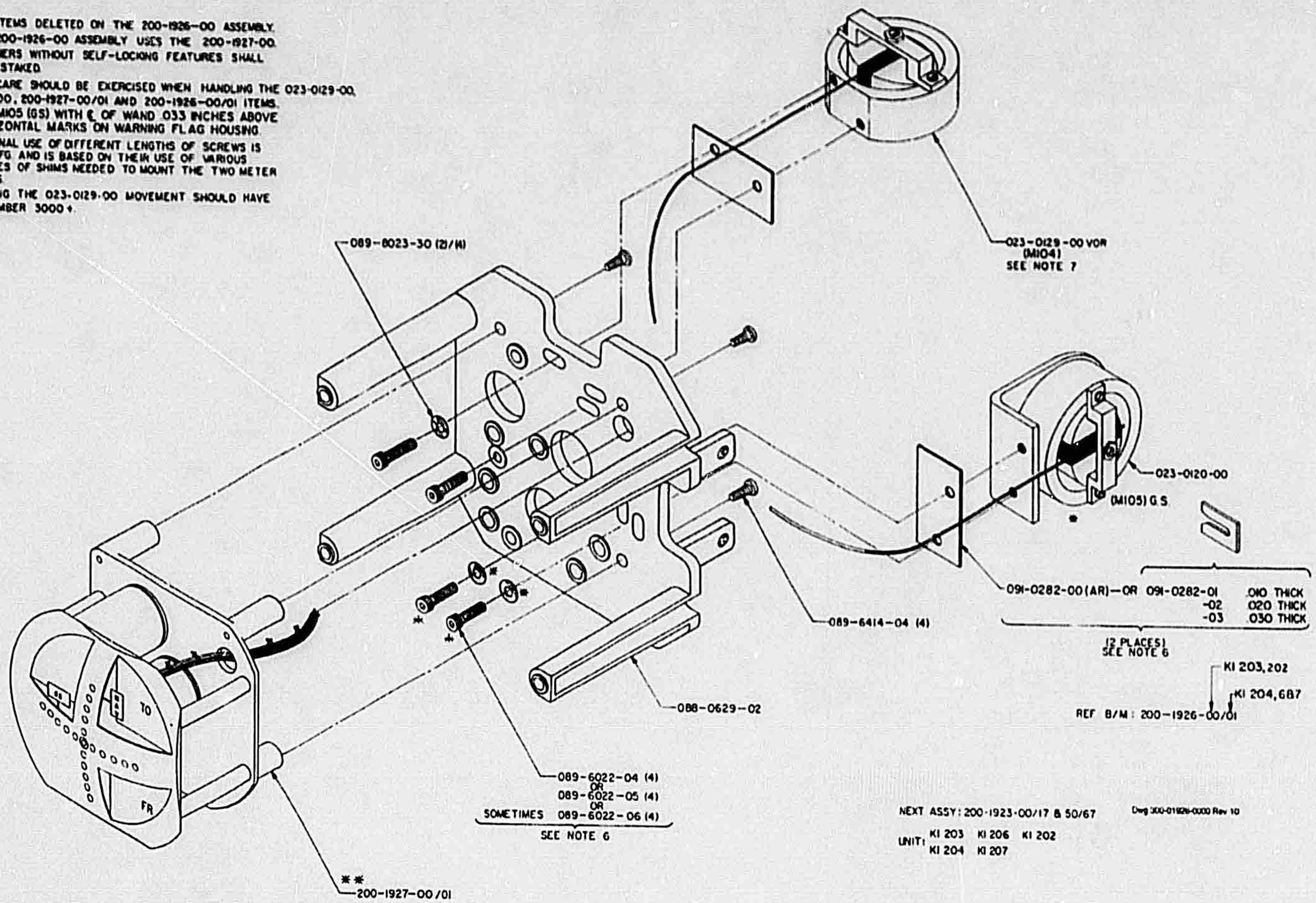

FIGURE 6-5 Meter Assembly
(Dwg No 300-01926-0000, Rev 10)

BOM 7: Flag Assembly

200-01927-0000 FLAG ASSY REV 6
200-01927-0001 FLAG ASSY REV 6

SYMBOL	PART_NUMBER	FIND_NO	DESCRIPTION	UM	-0000	-0001
–	088-00627-0002		WARN HOUSING	EA	1	-
–	088-00627-0003		WARN HOUSING	EA	-	1
–	088-00628-0000		METER MTG PLT	EA	1	1
–	089-05898-0003		SCR PHP 2-64X3/16	EA	4	6
–	089-06292-0004		SCR PHP 2-56X1/4	EA	4	4
–	091-00279-0000		METER SPACER	AR	0	0
M101	023-00023-0001		FLAG TO/FROM	EA	1	1
M102	023-00121-0000		FLAG WARN VOR/LOC	EA	1	1
M103	023-00122-0000		FLAG WARN GS	EA	-	1

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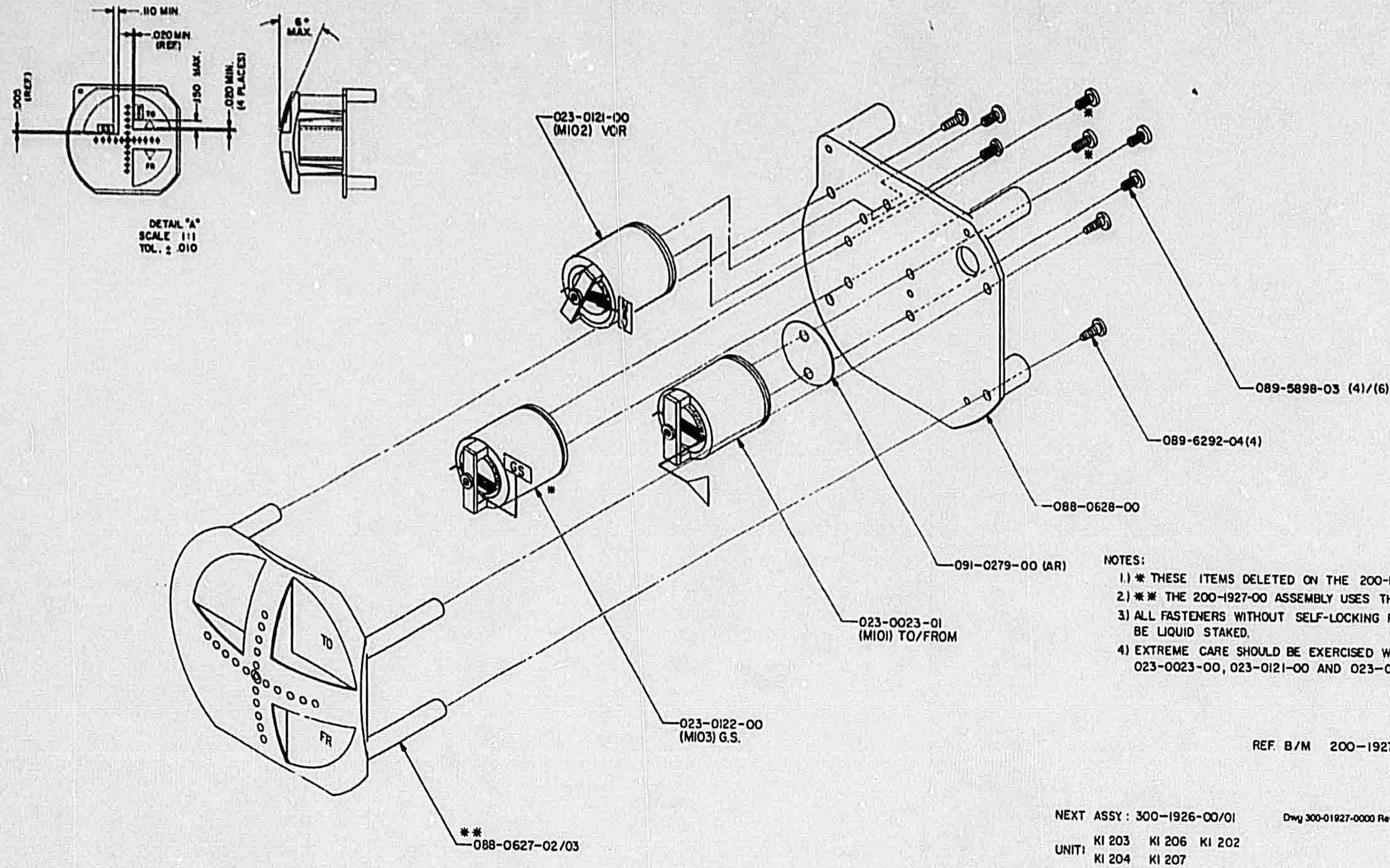


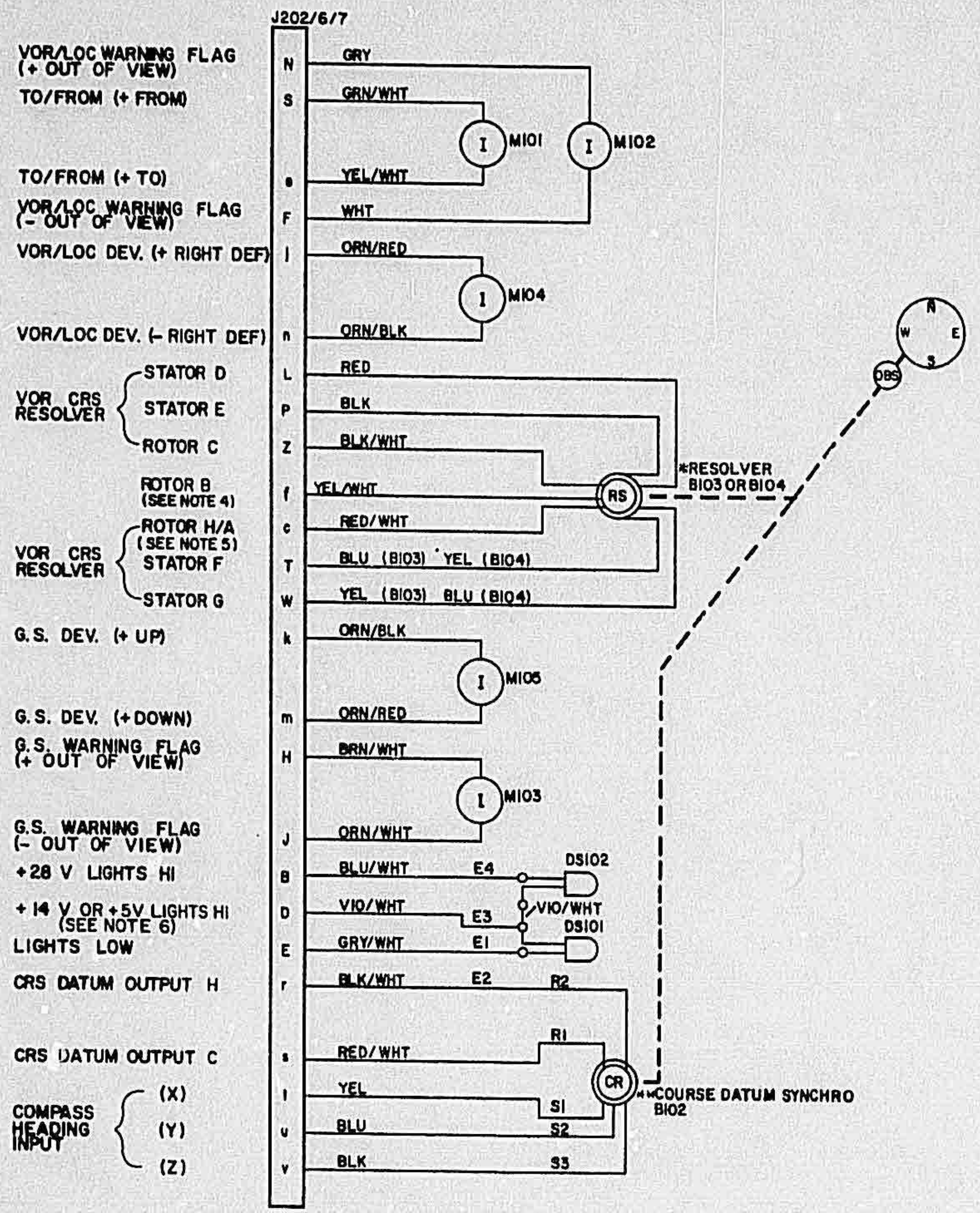
NOTES:
1.) * THESE ITEMS DELETED ON THE 200-1927-00 ASSEMBLY.
2.) ** THE 200-1927-00 ASSEMBLY USES THE 088-0627-02.
3.) ALL FASTENERS WITHOUT SELF-LOCKING FEATURES SHALL BE LIQUID STAKED.
4.) EXTREME CARE SHOULD BE EXERCISED WHEN HANDLING THE 023-0023-00, 023-0121-00 AND 023-0122-00 ITEMS.

REF. B/M 200-1927-00/01

NEXT ASSY: 300-1926-00/01 Dwg 300-01927-0000 Rev 7

UNIT: KI 203 KI 206 KI 202
KI 204 KI 207

FIGURE 6-6 Flag Assembly (Dwg No 300-01927-0000, Rev 7)



NOTES:

1. THE KI 202 & 206 CONTAIN A VOR COURSE RESOLVER (*) AND AN OPTIONAL COURSE DATUM SYNCHRO(**), THE KI 207 DOES NOT CONTAIN EITHER.
2. THE COURSE DATUM SYNCHRO(**) IS ON KI 206 UNIT NO. 066-03034-0005/0010/0013/0014 AND KI 202 UNIT NO. 066-03034-0008/0009.
3. THE KI 202 DOES NOT USE M105 AND M103.
4. ROTOR B IS USED ONLY WITH OPTIONAL 400Hz RESOLVER B104.
5. LINE IS CALLED ROTOR H IF 30Hz RESOLVER IS USED. LINE IS CALLED ROTOR A IF 400Hz RESOLVER IS USED.
6. FOR +14V OR +5V LIGHTING, PIN B MUST BE JUMPERED TO PIN E. +5V LIGHTING IS USED ONLY ON THE FOLLOWING FLAVORS:
   KI206 0013, -0014 & -0024
   KI207 -0017 & -0025
7. OBS RESOLVER WIRED, AS SHOWN ON SHT. 2 OF THIS DRAWING, TO CONNECT TO EXISTING AIRCRAFT WIRING OF NON-BENDIX/KING VOR RECEIVER.

Dwg 002-00360-0002 Rev AA Sht 1

FIGURE 6-7 Internal Wiring Schematic KI 202, KI 206, KI 207 (Sht 1 of 2) (Dwg No 002-00360-0002, Rev AA, Sht 1)

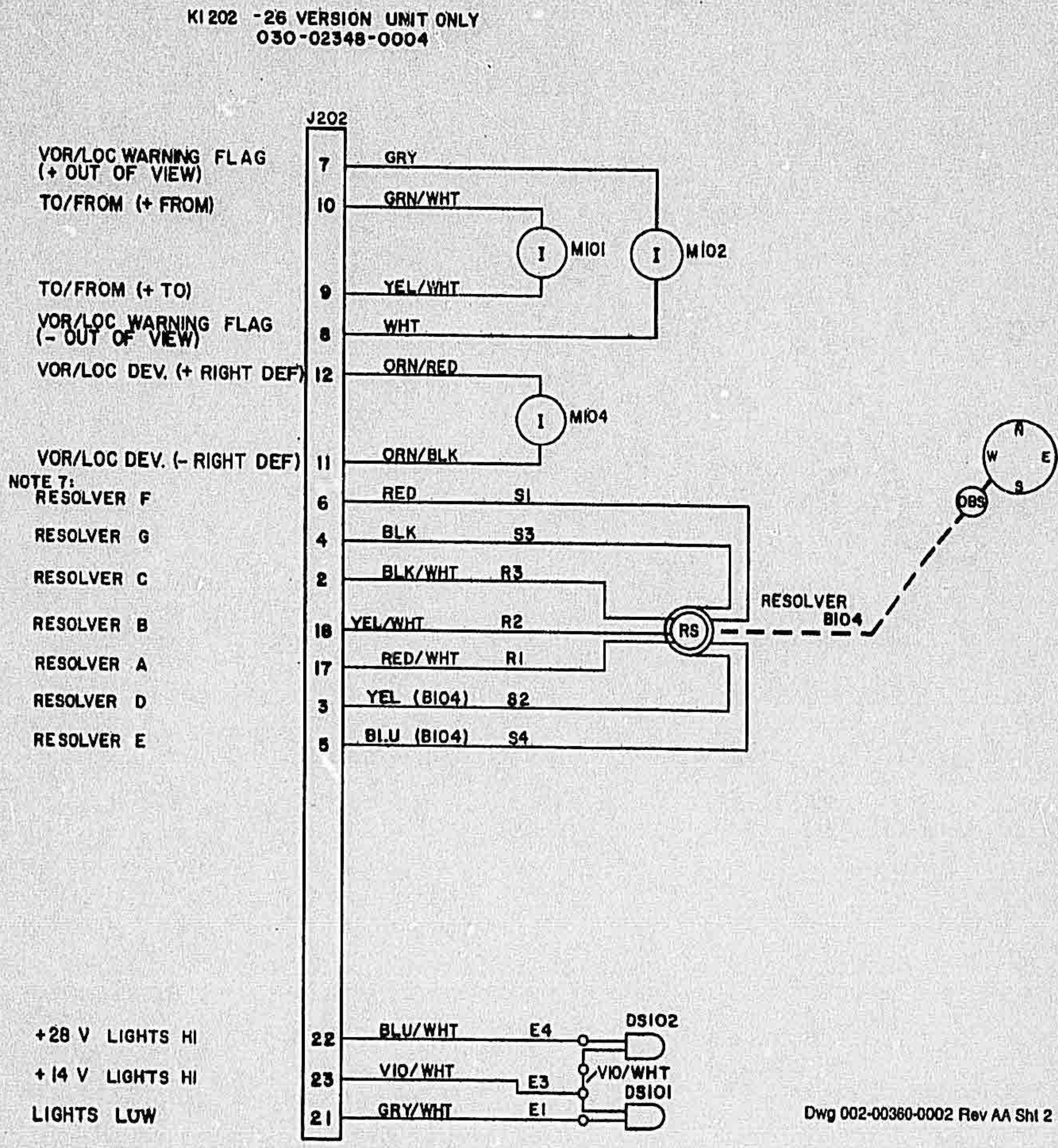


**FIGURE 6-7 Internal Wiring Schematic KI 202, KI 206, KI 207 (Sht 2 of 2)
(Dwg No 002-00360-0002, Rev AA, Sht 2)**

KI 208/209

Maintenance Manual

Honeywell

MAINTENANCE MANUAL

BENDIX/KING®

KI 208, KI 209

NAVIGATION INDICATORS

MANUAL NUMBER 006-05140-0005
Revision 5, August 2002

WARNING

PRIOR TO EXPORT OF THIS DOCUMENT, REVIEW FOR EXPORT LICENSE REQUIREMENT IS NEEDED.

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04

SECTION IV
THEORY OF OPERATION

4.1 GENERAL

The KI 208 and KI 209 contain the same VOR/LOC converter. However, the KI 209 Indicator also contains additional meters to provide glideslope information.

4.1.1 Principles of VOR System

4.1.1.1 General

The basic function of VOR is to provide a means to determine an aircraft's position with reference to a VOR ground station and also to follow a certain path toward or away from the station. This is accomplished by indicating when the aircraft is on a selected VOR station radial or by determining which radial the aircraft is on. A means to differentiate between radials and identify them is necessary. For this purpose, advantage is taken of the fact that the phase difference between two signals can be accurately determined. The phase difference between two signals which are generated by the VOR station is varied as the direction relative to the station changes so that a particular radial is represented by a particular phase difference. Refer to Figure 4-1. One non-directional reference signal is generated with a phase that at any instant is the same in all directions. A second signal is generated with a phase that at any instant is different in different directions. The phase of the variable phase signal is the same as the phase of the reference signal only at the 0° radial (north). As the angle measured from the 0° radial increases, the phase of the variable phase signal lags the phase of the reference signal by the number of degrees of the angle from 0°. The reference and variable phase signals, which are 30 Hz voltages, are carried by RF to make radio transmission and reception possible. The VOR receiving equipment must separate the 30 Hz reference and variable phase signals from the RF carrier and compare the phase of the two signals. The phase difference is indicated on a course indicator or RMI.

4.1.1.2 VOR Generation (Conventional Non-Doppler VOR System)

Refer to ICAO Annex 10 for a full description of conventional and doppler VOR systems.

The VOR electromagnetic field is composed of radiation from two ground based antennas radiating at the same carrier frequency. The first is a non-directional antenna radiating an amplitude modulated carrier. The frequency of the modulating signal varies from 9,480 Hz to 10,440 Hz back to 9,480 Hz 30 times per second. That is, a 9,960 Hz sub-carrier amplitude modulates the RF carrier and is frequency modulated by 30 Hz.

The second antenna is a horizontal dipole which rotates at the rate of 30 revolutions per second. The dipole produces a figure 8 field pattern. The RF voltages within the two lobes are 180° out of phase with each other. The RF within one of the lobes is exactly in phase with the RF radiated from the non-directional field and the RF in the other lobe is 180° out of phase with the non-directional field. The rotating figure 8 pattern reinforces the non-directional pattern on the in phase side and subtracts from the non-directional pattern on the out of phase side. See Figure 4-1. This results in a cardioid field pattern which rotates at the rate of 30 revolutions per second, the rate at which the dipole antenna rotates.

The signal at an aircraft within radio range of the VOR station is an RF carrier with amplitude varying at the rate of 30 Hz because of rotation of the cardioid pattern. The carrier is also amplitude modulated at the station by the 9,960 Hz signal which is, in turn, frequency modulated on a sub-carrier so that it may be separated from the 30 Hz variable phase signal.

4.1.2 PRINCIPLES OF LOCALIZER SYSTEM

The localizer facility provides a visual display of the aircraft's position relative to a straight approach line to the runway. The ground based localizer antenna system generates two patterns. Refer to Figure 4-2. One pattern is directed toward the right side of the runway, the second to the left. The two patterns have the same carrier frequency but different audio modulating signals. The pattern to the left of the runway (in normal approach) is 90 Hz amplitude modulated while the pattern to the right is 150 Hz amplitude modulated.

The ratio of 90 Hz to 150 Hz audio, after demodulation, is dependent only upon the position of the aircraft within the patterns. The patterns are adjusted so they are of equal strength on a vertical plane extending out from the runway centerline. When the aircraft is on this plane, the 90 Hz and 150 Hz voltages will be equal.

A new type of instrument landing system antenna is being deployed by the FAA. While previous ILS antennas provided a clearance signal throughout 360 degrees, the new antennas provide more accurate course guidance only within a narrow area of reception. The new antennas have no usable signal radiating beyond 35 degrees from the on-course indication. Pilots should be cautioned against relying on localizer signals to provide guidance outside the 35 degree sector of the localizer or beyond any extremities shown in Figure 4-3. Extended coverage of this area can be recognized by a flight procedure being predicated on the use of localizer guidance beyond the normal service volume shown in Figure 4-3. (For further information, refer to FAA Air Carrier Operations Bulletin No. 75-9, 8-4-75.)

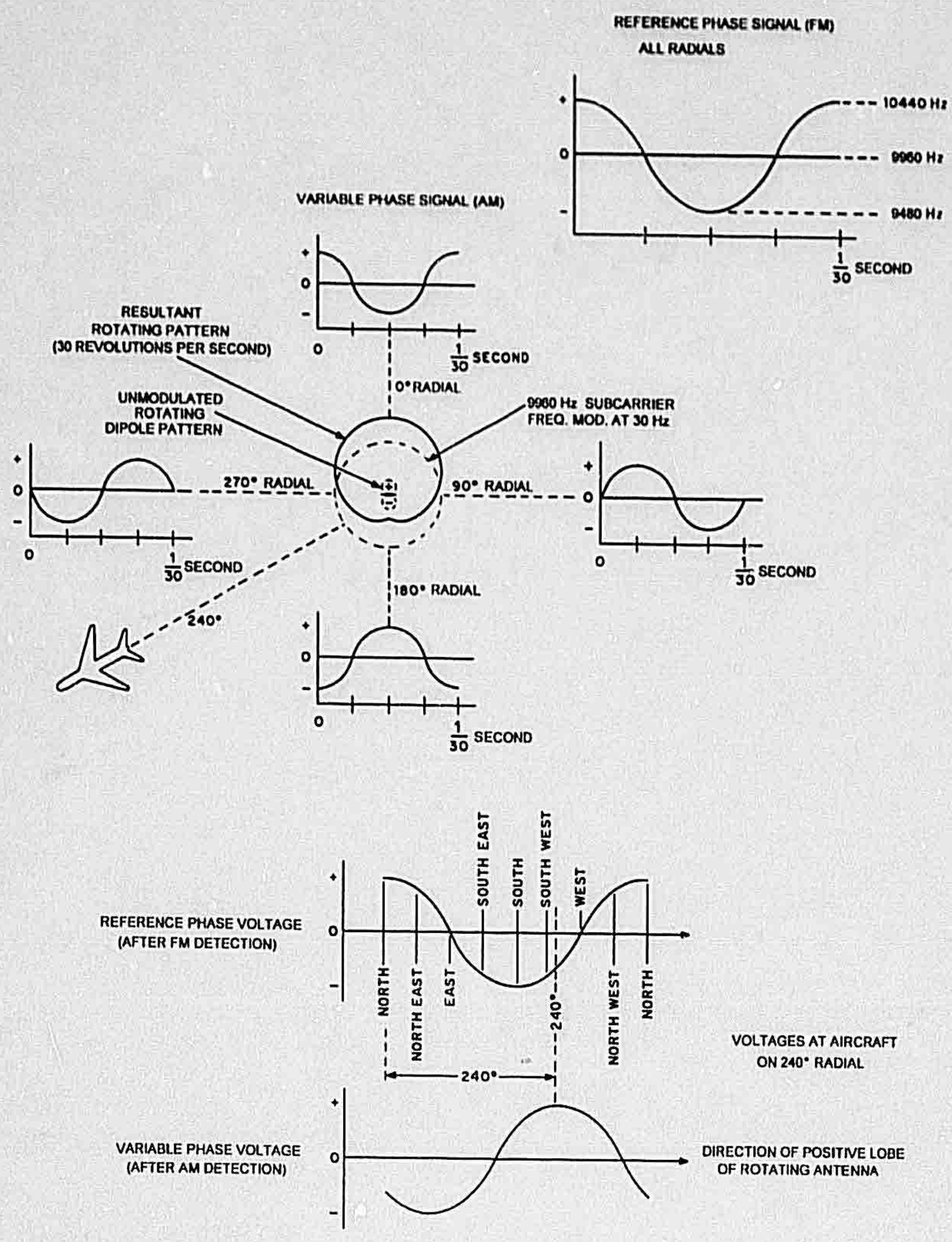


FIGURE 4-1 VOR Signal Generation (Conventional Non-Doppler VOR System)

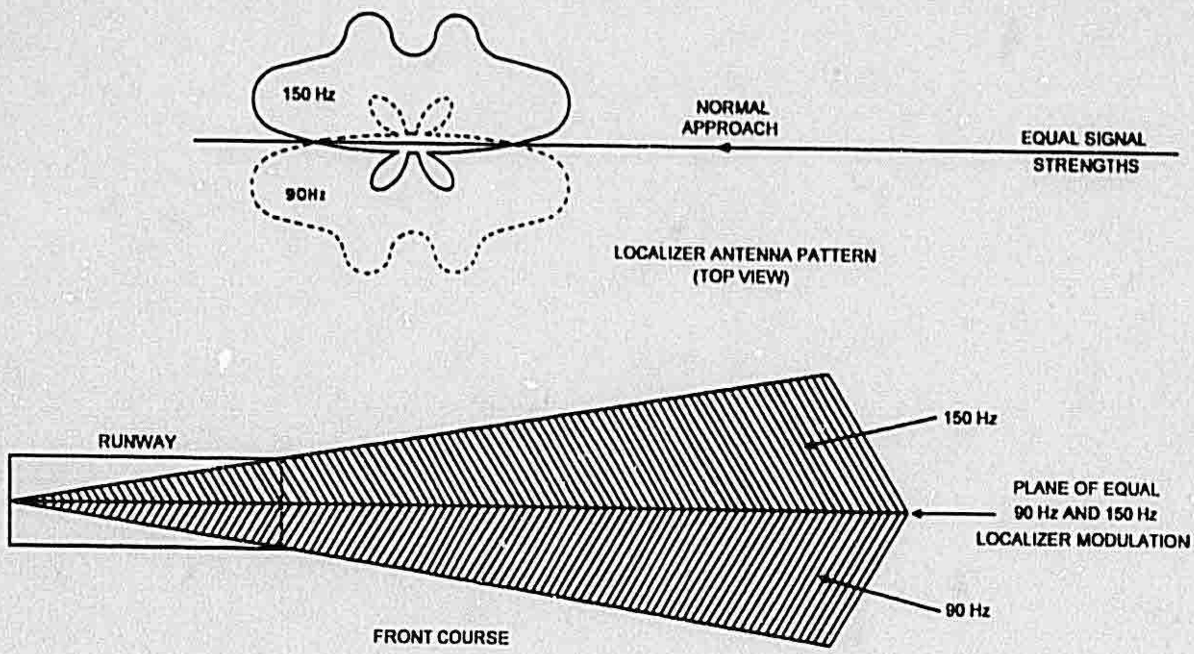


FIGURE 4-2 Localizer Signal Generation

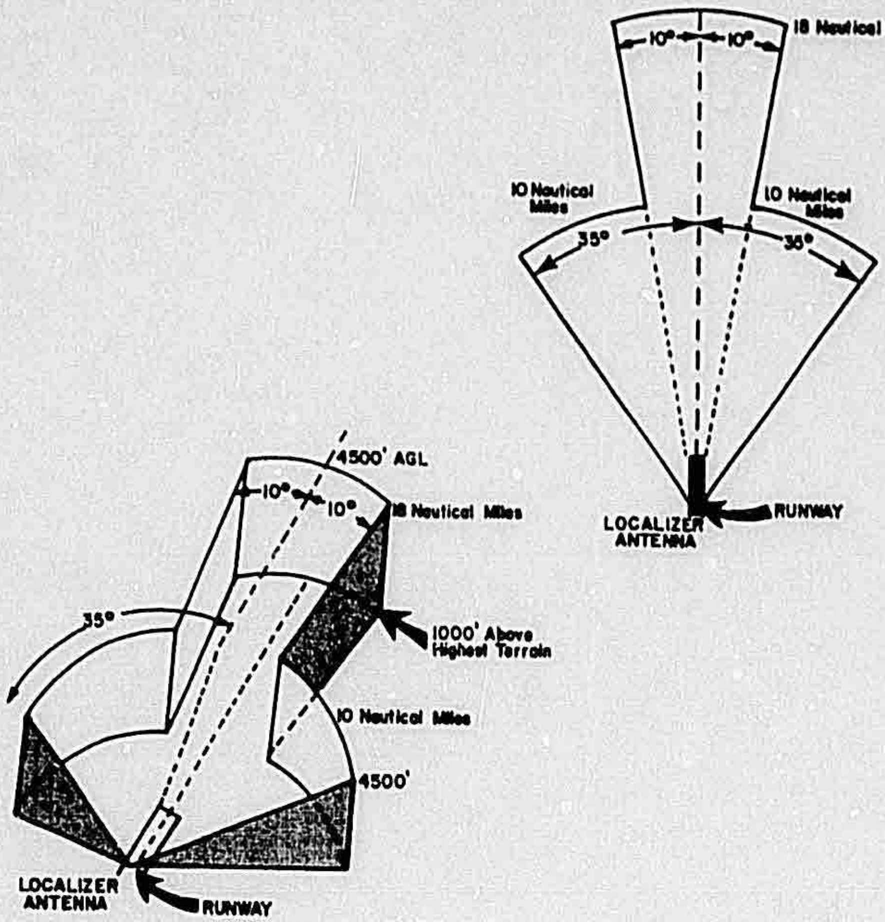


FIGURE 4-3 Localizer Coverage

4.1.3 PRINCIPLES OF GLIDESLOPE SYSTEM

The glideslope signal is radiated by a directional antenna array located near the approach end of the runway. The signal consists of two intersecting lobes of RF energy. The upper lobe contains 90 Hz modulation and the lower lobe contains 150 Hz modulation. The equal tone amplitude intersection of these two lobes forms the glide path. A typical glide angle is 2.5 degrees. If the aircraft is on the glide path, equal amplitudes of both tones will be received and the deviation bar will be centered. If the aircraft is above the glide path, 90 Hz modulation predominates and the visual display is displaced downward. If below the glide path, 150 Hz predominates and the display is displaced upward.

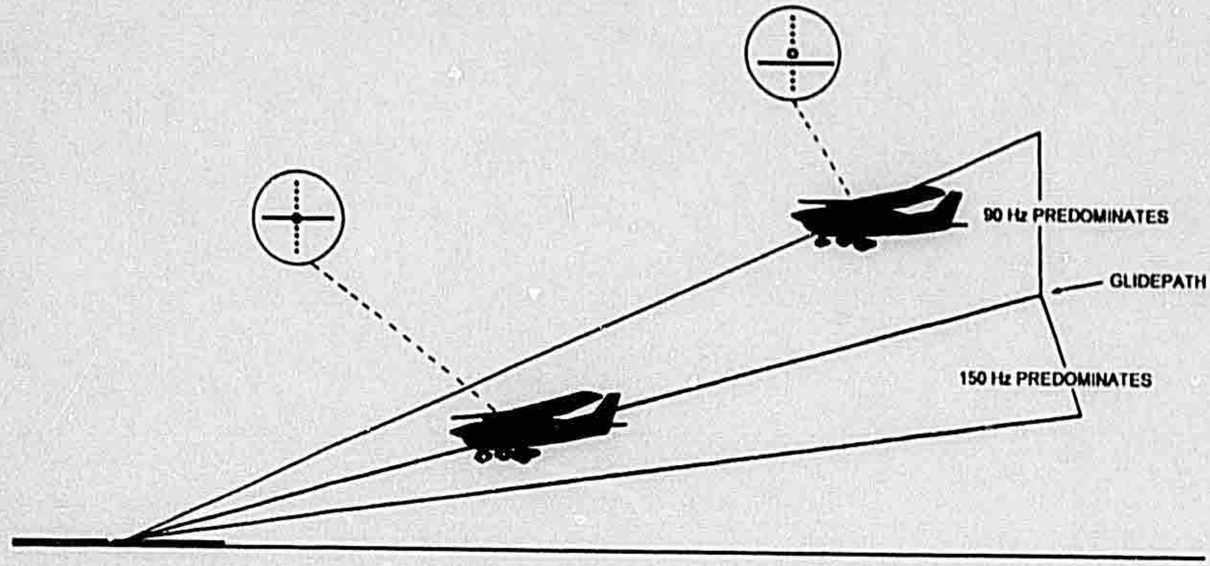


FIGURE 4-4 Glide Path

4.2 THEORY OF OPERATION

The KI 208, KI 209 final assembly contains the mechanical assemblies, converter #1 board, and converter #2 board.

TABLE 4-1 Subassemblies KI 208, KI 209

SUBASSEMBLY	COMPONENT SERIES
Final Assembly	100-199
Converter #1 Board	200-299
Converter #2 Board	300-399

4.2.1 VOR OPERATION KI 208, KI 209

4.2.1.1 Input Buffer

Transistor Q201, capacitors C201, C213 and associated resistors R201, R202, R203 on Converter #1 board comprise the input buffer stage for the indicator. This stage is set up as an emitter follower to provide high input resistance and low output resistance. High input impedance is necessary to prevent loading of the NAV receiver. The low output impedance allows the output signal (wiper of R203) to be varied, without significantly changing the impedance at TP202. If this impedance changed greatly, the center frequency of the two active filters would be affected. R203 is adjusted to obtain proper VOR course width.

4.2.1.2 VOR Limiter/Discriminator

The VOR composite signal is coupled to the limiter stage by C202. The limiter, which consists of Q202, CR201, and R204, effectively removes any amplitude modulation on the composite signal. This stage supplies clean 9960 Hz FM of sufficient amplitude to drive the phase locked loop (PLL) discriminator I201. The limiter output couples to the PLL via C203.

Without an FM signal into pin 14 of the PLL, the voltage controlled oscillator (VCO) within I201 will not be changing frequency. If no signal is applied, the VCO center frequency on either pins 3 or 4 should be equal to 9960 Hz. This frequency is established by R205, R206, R207, and C204. When FM is applied, the VCO is forced to sweep the FM deviation, i.e., ±480 Hz for VOR. The output of the phase detector then samples the difference in phase of the input FM signal and the internal VCO. After this difference signal is filtered by R208 and C205 a 30 Hz reference signal is produced. This 30 Hz signal is accessible at TP203. Pin 5 of I201 performs an enable/disable function. It must be less than 0.5 volt to enable the PLL in VOR. Pin 5 will be a logic high (approximately 9 V) when in LOC.

4.2.1.3 30 Hz Bandpass Filters

By following the signal flow lines it can be seen that the input to the 30 Hz reference filter in the VOR mode is through R209 since Q204 is off. The gain of the reference filter from TP203 to TP204 is equal to 1/2 R235 divided by R209, or 2.11. The center frequency (phase) is predominately set by the value of R232 and R233. The active components in the VOR mode for the reference filter are R209, R232, R233, R235, capacitors C208 and C209, and I202A.

The above statements for gain and phase on the reference 30 Hz also hold for the 30 Hz variable filter. On the 30 Hz variable filter, the gain from TP202 to TP205 is equal to 1/2 R223 divided by R220, or 5. The fixed center frequency of the filter is predominately set by R221. The active components in the 30 Hz variable filter in the VOR mode are R220, R221, R223, capacitors C206 and C207, and I202B. The phase shift of the variable channel is matched by adjusting R233 in the reference channel to exactly balance the two phase shifts.

Bias voltage (4.16 V) is supplied to the non-inverting terminals of the op amps via R222 and R234. The values of 430 k and 270 k were chosen to keep the output offsets a minimum in LOC mode.

Transistors Q204 through Q207 are used to reconfigure the 30 Hz filters to either 90 Hz or 150 Hz filters when the LOC enable line goes low, (TP201 goes high). In VOR operation all of these transistors are cut off, therefore, R213, R216, R218, R219, and R231 do not affect the VOR operation of the filters.

4.2.1.4 SIN-COS Pot Interface

In VOR the output of I202A drives a unity gain inverter stage I202C and one branch of the SIN-COS pot. The inverter, composed of I202C and R236 and R238 drives the opposite branch of the pot shown in Figure 4-5.

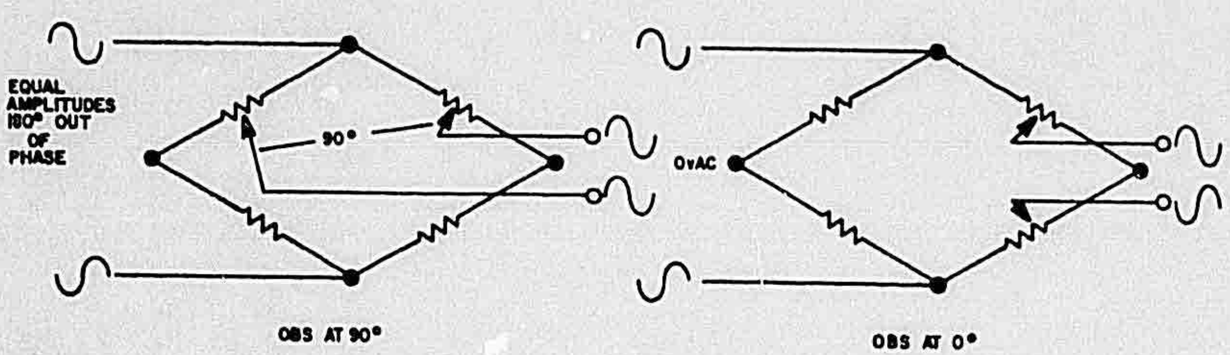


FIGURE 4-5 SIN/COS Pot Interface

With the pot set as shown in Figure 4-5 (OBS at 90°) the signals at the wipers will be 0.707 the amplitude of the top signal. These wipers are connected to high impedance emitter followers Q208 and Q209 to prevent loading of the pot. Their outputs then drive an RC network comprised of C210 and R241and R242. The resistance of R241 is adjusted so the total resistance of R241 plus R242 is equal to the reactance of C210 at 30 Hz. Since at the 90° position (Figure 4-5) the signals applied to the RC network are equal in amplitude and in phase there is no resultant phase shift in the output signal at TP206. When the OBS is rotated to 0° as shown in Figure 4-5, then the signal on the wipers are equal in amplitude but 180° out of phase. Applying two signals 180° out of phase to the RC network produces an output signal which is shifted 90°. The examples shown above were for only two discrete positions, but the phase shift is continuously variable as the wipers rotate 360° in position.

As was mentioned, R241 is adjusted so that the total resistance equaled the reactance of C210 at 30 Hz. In actual practice this is accomplished by placing the OBS and VOR generator to 0°, and adjusting R241 a 90° phase shift as noted by a null on the indicator needle.

4.2.1.5 Squaring Amplifier

The output from the SIN-COS interface circuit drives I202D via C211. The op amp is configured as an open loop amplifier, thus is quickly driven between saturation and cutoff. An offset threshold voltage 275 mV higher than the voltage on the non-inverting terminal is used to reject noise. This noise threshold keeps the needle steady when the NAV receiver is tuned off channel. The threshold for the op amp is produced by the voltage divider action of R244 and R245. Resistors R247 and R248 supply the bias for the inverting input. When the indicator is in LOC mode Q211 becomes saturated, taking the inverting input low. The inverting input going low causes the op amps output (TP301) to go high. This then causes the chopper switches I301C and D to be closed (shorted) when in LOC.

4.2.1.6 VOR Phase Detection and Output Drive

The 30 Hz variable sine wave is coupled to the chopper phase detector I301C by C303 and R311. The chopper acts as a switch which is controlled by the reference 30 Hz square wave. If the two 30 Hz signals are 90° out of phase there will not be any resultant dc voltage produced. If the signals are in phase, however, a maximum dc voltage is produced. This is shown in Figure 4-6.

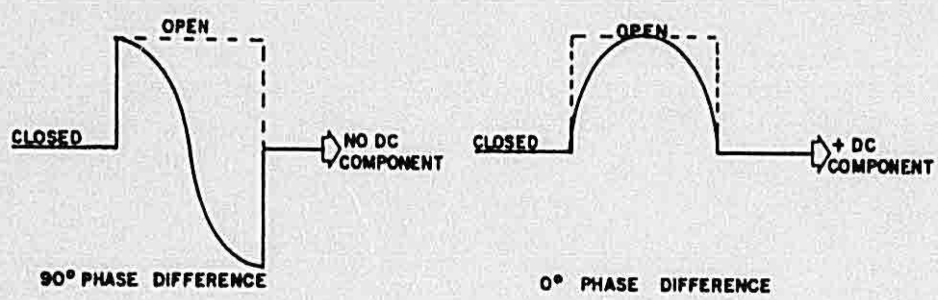


FIGURE 4-6 VOR Phase Detection

As the signals vary from the 90° nulled position, a resultant dc voltage is produced whose polarity indicates the direction of variation. The resultant half waves are filtered by R312 and C306 to produce a 3 second needle speed in VOR. Since the output is dc coupled to the meter, any excessive leakage in capacitors C303 or C306 will be observed as a variation from the nulled position. Nulling the meter by changing the VOR phase shift via R233 only compounds this problem since when the OBS is rotated 180° the needle will now be twice as far from center. If the capacitors are leaky it can sometimes be noticed as a change in needle position when the unit is powered up with no input signal. Output offset voltages that exceed the LM324's specs can also cause this problem.

Since I301A is open in VOR, R313 does not have any effect on VOR needle deflection. Also with I301A being open, the output op amp I320B is configured as a voltage follower. It should be noted that this type of output is a voltage drive amplifier as opposed to a more typical current drive output.

R315, CR303, CR304 are output protection components. R315 limits the output current that I302B can deliver. CR303 and CR304 limit the output voltages to less than 0.65 volts to protect the meter package.

4.2.1.7 VOR Flag

The 30 Hz variable sine wave from I202B is coupled to a 90° fixed phase shift stage composed of R305, R306, C301 and I302D. The 90° phase shift can be observed by checking TP204 to TP303. This signal then feeds another chopper phase detector as described in the previous paragraph. The flag drive is smoothed by R308 and C304. The same comments on leaky capacitors apply to this output stage. If the TO-FROM changeover is greatly different from 90° off course, or is biased toward either a TO or FROM with no composite input, leaky capacitors or excessive offset voltage should be investigated.

As with the needle drive circuit, I302A is configured as a voltage follower in VOR mode. This is true since I301B is open. R309 and CR301, CR302 are circuit protection components as described previously.

4.2.2 LOCALIZER OPERATION KI 208, KI 209

4.2.2.1 Input Buffer

The input stage performs the same function in LOC as it did in VOR. R203 should not be adjusted for LOC deflection, since its function is solely VOR course width. LOC deflection is controlled by R313. Both the 90 Hz and 150 Hz LOC modulation tones pass through the wiper of R203 enroute to the bandpass filters.

4.2.2.2 VOR/LOC Switching

When J2081 pin 4 is grounded (LOC mode) CR207 becomes forward biased and causes a voltage divider action between R215 and R210. This causes Q203's base to become negative with respect to its emitter and enough base current flows to saturate the transistor. TP201 then goes to 9 volts. When that occurs Q204, Q205, Q206, Q207 and Q211 are driven into saturation. The PLL is dis-enabled, by the action of I201 pin 5 going high in LOC. The VOR squaring amplifier output is also driven high by this action, which in turn, causes the two VOR choppers to be shorted. Finally, LOC Enable closes I301A and B to allow the LOC signals to be passed to the output stages.

4.2.2.3 90 Hz and 150 Hz Bandpass Filters

The saturation of transistors Q205 and Q206 place an additional resistor (R216 or R219) in parallel with the frequency determining resistor (R232 or R221) of each of the two bandpass filters. This paralleling of resistors causes the center frequency of the filter to be changed to either 150 Hz or 90 Hz. Saturation of Q207 causes the feedback resistance of the 150 Hz filter to be changed to the parallel combination of R231 and R235. This change is necessary to keep the Q of the two filters the same. If Q207 were not in the circuit, the 90 Hz filter would have a Q of 12 and the 150 Hz filter a Q of 20. Since Q207 is in the circuit, both filters have a Q of 12.

Since Q204 is saturated, the LOC signal input to the 150 Hz filter is through R213. The input to the 90 Hz filter is through R220. The phase of the two filters are matched much the same as in VOR. The phase matching is necessary to achieve proper temperature tracking of the filters. In this case, the input (TP202) to output (TP204) phase of the 150 Hz filter is recorded and then the input (TP202) to output (TP205) phase of the 90 Hz filter is adjusted with R218 to match the recorded data. Both filters have a gain of 5 in LOC.

4.2.2.4 LOC Deflection and FLag Summation

The resistor-diode network of CR203, CR204, R226 through R228 performs the LOC deflection summation. Since CR203 and CR204 are installed opposite, equal 90 Hz and 150 Hz signals will cancel at the center of R227. This is symbolically shown in Figure 4-7.

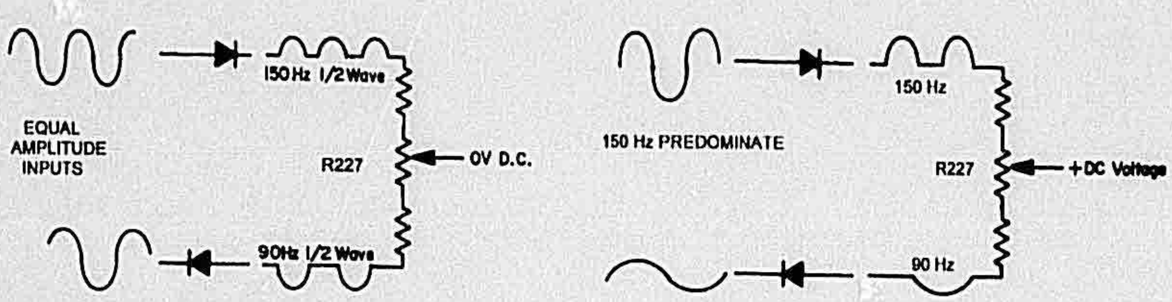


FIGURE 4-7 Localizer Deflection Summation

Ignoring the fact that the 90 and 150 Hz tones are riding on a 4.16 volt dc level, if the 150 Hz tone is greater, a positive dc voltage is produced. If the 90 Hz tone is greater, a negative dc voltage is produced. This bipolar signal then drives R313 and the output op amp I302B through the closed I301A switch.

As mentioned, the above discussion ignored the fact that the two tones were riding on a 4.16 Vdc level. This is a valid analytical statement, however, since the non-inverting terminal of I302B is also at this 4.16 Vdc potential. If the 90 Hz tone predominates then the output of R227 will be negative with respect to this 4.16 Vdc level.

R227 is used to balance or center the needle when equal 90 and 150 Hz tones are present. R313 is used to control the amount of LOC deflection. This should be set to produce 4 dots deflection for a 4 db tone ratio.

The LOC flag summation network is composed of CR202, CR205, R224, and R225. Since CR202 and CR205 are installed in the same direction, their output amplitudes sum directly to produce a TO indication. If one tone is absent then the output dc is 1/2 its normal value. This causes a 1/2 flag condition.

4.2.2.5 LOC Output Stages

In LOC I302B is configured as an inverting amplifier stage. R314 and C307 provide the filtering to produce the 0.6 second needle speed in LOC. Bias for the non-inverting terminal is produced by connecting R312 to the 4.16 volt line through the shorted I301C switch.

The same statements are true for the LOC flag output stage. R310 and C305 provide the filtering and R308 provides the bias through shorted I301D switch.

4.2.3 VOLTAGE REGULATOR

The voltage regulator portion consists of I303, Q101, C308 through C313, R317 through R321, and CR305, CR306. This regulator was chosen due to its low input to output voltage, as well as excellent regulation. This regulator should be capable of holding 9.2 V output with an input as low as 10 volts. R321 is the voltage adjustment control. C308 reduces the noise on the reference voltage of the IC regulator. C309 is the high frequency compensation for the IC, and C311 reduces the high frequency response of the pass transistor Q101. C312 and C313 are used to keep a low source impedance at high frequencies. R317 establishes the short circuit protection limits for the IC. (Q101 is only protected by limiting the base current. This will <u>not</u> usually allow its collector to be shorted without destroying the transistor.) R318 is a bias resistor for CR305 and CR306. These diodes are used to keep the differential amplifier inside the IC operating in its linear region. R319, R320, R321 establish the voltage applied to the input of the regulator. CR307 and C310 are transient protection for the regulator.

Associated circuitry involves R301, R302, R303 and I302C. The R301-R302 voltage divider drives I302C. The op amp is configured as a voltage follower to produce a very low source impedance for the 4.16 reference voltage. R303 will prevent blowing the input stage of the IC under shorted circuit conditions.

4.2.4 GLIDESLOPE OPERATION (KI 209 Only)

Only the KI 209 contains the glideslope meter packages. The applicable glideslope receiver that is used to drive the meters should be consulted for theory of operation.

05

SECTION V
MAINTENANCE

5.1 GENERAL

This section contains test equipment requirements, test procedures, alignment procedures, overhaul and repair procedures, and troubleshooting procedures.

5.2 TEST EQUIPMENT

The following test equipment, or equivalent, is required to properly align and test the KI 208, KI 209 indicators. All test equipment must be properly calibrated before attempting alignment.

All tests are conducted with the KI 208, KI 209 indicator connected to a KX 155, KX 155A series navigation receiver (200 uV RF input level), or directly to a VOR/LOC generator such as the Collins 479S-3 or Tel-Instrument T-20A.

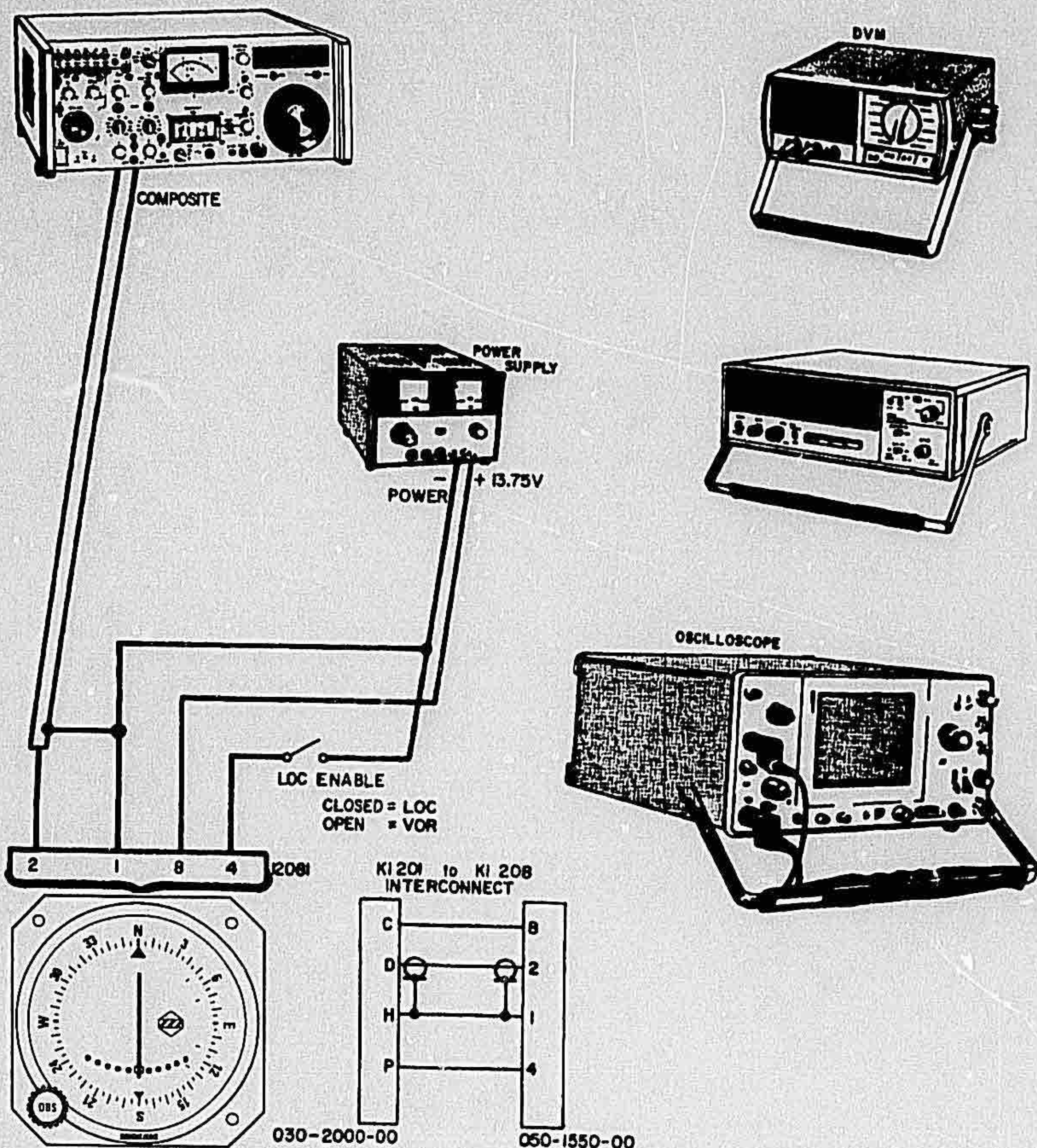
TABLE 5-1 Required Test Equipment (Modulator)

TYPE	CHARACTERISTICS	REPRESENTATIVE MODELS
Power Supply		Heath Model IP-20 or equivalent.
Digital Multimeter		Fairchild 7050 multimeter or equivalent.
Frequency Counter		CMC 616A or equivalent.
Oscilloscope	Dual trace	Tektronix Model 453 or equivalent.
VOR/LOC Generator		Collins 479S-3 or equivalent.
KI 208, KI 209 Bench Interconnect		See Figure 5-1.

The following pieces of equipment are optional. They are used to align the KI 208, KI 209 indicators with the mating NAV receiver. The only exception to this is the phase meter, which makes LOC alignment easier.

TABLE 5-2 Optional Test Equipment (Nav Receiver)

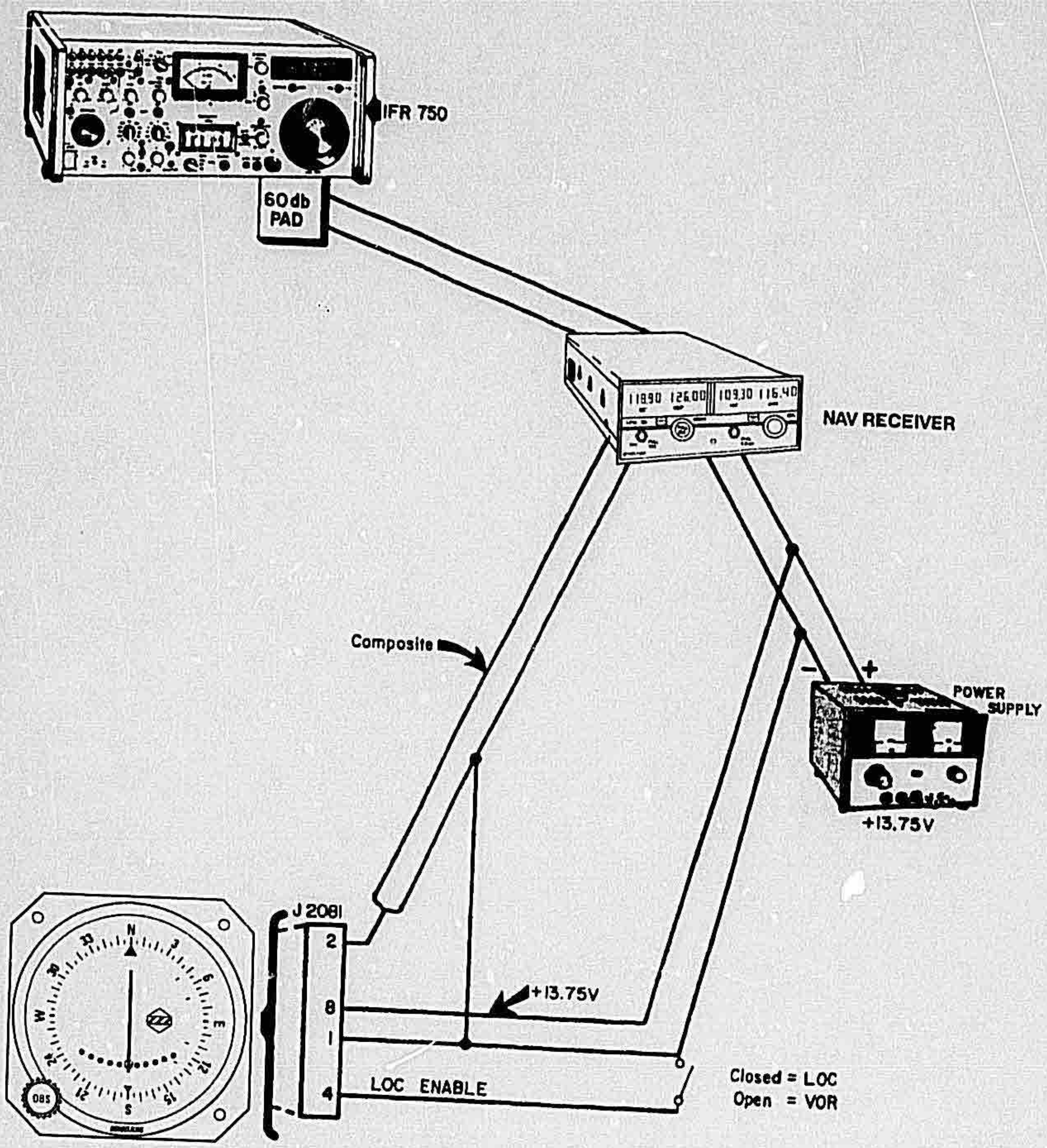
TYPE	CHARACTERISTICS	REPRESENTATIVE MODELS
NAV Receiver		KX 155, KX 155A Series Receiver.
VHF Signal Generator		Boonton Model 211A or equivalent.
Digital Phase Meter		Dranetz 305 with PA-3001 plug in.
KX 155, KX 155A, KI 208 Bench Interconnect		See Figure 5-2.



note: 1. The top board of the KI 208/209 is hinged for easier access to the test points of both boards. See 6.3.4.1 for instructions.
2. An interconnect harness using KI 201 KPN 030-2000-00 and P2081 KPN 050-1550-00 may be used with existing bench test sets.
3. A 2½ inch long adjustment tool KPN 088-0706-00 is required to adjust VOR & LOC centering.

KI 208/209 BENCH TEST SET (MODULATOR)

FIGURE 5-1 KI 208, KI 209 Bench Test Set (Modulator)



NOTE 1. The top board of the KI 208/209 is hinged for easier access to the test points. See 6.3.4.1 for instructions.
2. A 2½ inch long adjustment tool KPN 088-0706-00 is required to adjust VOR & LOC centering.

KI 208/209 BENCH TEST SET (NAV RECEIVER)

FIGURE 5-2 KI 208, KI 209 Bench Test Set (Nav Receiver)

5.3 TEST PROCEDURE

The KI 208, KI 209 Overall Performance tests can be completed without any disassembly of the unit. Set up test equipment according to section 5.2.

The following specifications establish the Minimum Performance Standards for the KI 208 and KI 209 Indicators. All indicators must meet the specifications preceded by an asterisk (*).

5.3.1 MINIMUM PERFORMANCE UNDER STANDARD CONDITIONS

5.3.1.1 VOR

5.3.1.1.1 FLAG: With a VOR test signal of 0.5 Vrms applied, there shall be no warning flag showing up to 60° off the bearing set on the OBS. When either the reference or the variable modulation is removed from the VOR test signal the alarm flag shall appear.

5.3.1.1.2 COURSE ACCURACY: ±2° maximum with 0.5 Vrms signal. Measured on the 12 radials specified.

5.3.1.1.3 COURSE WIDTH: 20° ±4° with 0.5 Vrms signal input.

5.3.1.1.4 TO-FROM: The To-From changeover (centered flag condition) shall be 90° ±10° from an On course heading.

5.3.1.1.5 POLARITY: With the generator and unit set for 0° "FROM" heading, rotating the bearing on the generator +10° shall cause the needle to deflect to the left.

5.3.1.1.6 AUTOPILOT DRIVE: With the conditions of paragraph 2.1.5, readjust if necessary the bearing on the VOR generator so as to produce 5 dots left deflection. J2031 pin 10 should be positive with respect to pin 11 and 150 mV ±30 mV should be recorded.

5.3.1.1.7 REFERENCE VOLTAGE: J2081 pin 10 should be at +4.15 ±0.15V with respect to ground.

5.3.1.2 LOCALIZER

5.3.1.2.1 FLAG: With a 0.3 Vrms LOC test signal applied, there shall be a full "TO" indication with no warning flag showing. When both the 90 Hz or the 150 Hz tone are removed from the LOC test signal, the alarm flag shall appear.

5.3.1.2.2 CENTERING ACCURACY: Needle shall be centered within ±1/2 dot, with a 0.3 Vrms input and a 0 db tone ratio.

5.3.1.2.3 DEFLECTION CHARACTERISTIC: With 0.35 Vrms input and a 4 db tone ratio, the needle shall deflect to the third dot ±1/2 dot.

5.3.1.2.4 POLARITY: With the tone ratio set in the 90 Hz side the needle shall deflect to the right and when set in the 150 Hz side the needle shall deflect to the left.

5.3.1.3 GLIDESLOPE METERS (KI 209 ONLY)

5.3.1.3.1 INPUT IMPEDANCE: 1 k ±5% ohm, both flag and needle.

5.3.1.3.2 POLARITY: A +100 mVdc voltage on J101 pin 3 with pin 6 being the return shall produce an upward movement of the GS needle. Conversely, a -100 mVdc on J2081 pin 3 with pin 6 common shall produce a downward movement of the GS needle.

5.3.1.3.3 FLAG: A 250 mVdc voltage on J2081 pin 9 with pin 12 the return shall remove the GS warning form view.

5.3.1.4 EXTERNAL LOADING

5.3.1.4.1 VOR-LOC: With one ARINC Autopilot load (1 k ohm) connected across the deflection meter through J2081 pins 10 and 11, all the requirements of parts 2.1 and 2.2 shall be met.

5.3.2 TEST DATA KI 208, KI 209

I. VOR

A. FLAG ____________ (OK) ____________ (OK) ____________ (OK)
Composite On 30 Hz Var. Off 9960 Hz Off

B. COURSE ACCURACY (±2° MAX ERROR)

	TO	FROM		TO	FROM
0°	_____	_____	180°	_____	_____
30°	_____	_____	210°	_____	_____
60°	_____	_____	240°	_____	_____
90°	_____	_____	270°	_____	_____
120°	_____	_____	300°	_____	_____
150°	_____	_____	330°	_____	_____

C. COURSE WIDTH (20° ±4°) ____________________
DATA

D. TO-FROM CHANGEOVER (90° ±10°) ____________________
DATA

E. POLARITY (Incr. Genr. Angle = Lf. Defl.) __________ (OK)

F. AUTOPILOT DRIVE (5 dots LF. Deflection = 150 mV ±30 mV) __________ (OK)

G. REFERENCE VOLTAGE (4.15 V ±0.15 V) ____________
DATA

II. LOC

A. FLAG ____________ (OK) ____________ (OK)
Composite On Composite Off

B. CENTERING (with ±1/2 dot) ____________ (OK)

C. DEFLECTION for 4db = 3 dots ±1/2 dot _________ Right 90 Hz (OK)

D. POLARITY (90 Hz = Right Deflection) __________ Left 150 Hz (OK)

III. VOR with Varying Voltage

A. FLAG

10.5V	33V		10.5V	33V		10.5V	33V	
______	______	(OK)	______	______	(OK)	______	______	(OK)
Composite On			30 Hz Var. Off			9960 Hz Off		

B. COURSE ACCURACY (±2° MAX ERROR)

90° TO	FROM
______33V	______33V
______10.5V	______10.5V

C. COURSE WIDTH (20° ±4°) __________ 10.5V Data __________ 33V Data

D. TO-FROM CHANGEOVER (90° ±10°)__________ 10.5V Data __________ 33V Data

IV. LOC with Varying Voltage

A. FLAG

10.5V	33V	
______	______	(OK)
Composite On		

B. CENTERING (±1/2 Dot) __________ (OK 10.5V)__________ (OK 33V)

C. DEFLECTION (4db = 3 dots ±1/2 Dot)

10.5V______Right 90Hz______33V

10.5V______Left 150Hz______33V

5.4 ALIGNMENT PROCEDURE

The following is an alignment procedure for aligning the VOR/LOC portion of the KI 208 and KI 209 indicators. Successful completion of this alignment procedure will enable the unit to meet its Minimum Performance Specification.

In order to carry out the alignment procedures of the individual assemblies, only the dust covers need be removed.

Prior to starting the alignment one of the two possible bench interconnects should be chosen. If Figure 5-1 is chosen assure that the modulator levels are set correctly. The following alignment will only call out "VOR" or "LOC" test signals. The full title "standard VOR modulator test signal" or "standard VOR test signal" will depend on which bench interconnect is chosen; i.e. Figure 5-1 or Figure 5-2, respectively. Millivolt levels within parenthesis in the alignment are measured from pin 11 to pin 10 on the rear connector.

The alignment assumes that the Azimuth Dial Card and SIN-COS pot R101 has been properly set. If this is not true, or if in doubt, paragraph 5.4.1 has a method for quickly setting the card.

5.4.1 SIN-COS POT/AZIMUTH CARD CALIBRATION

The calibration of a KI 208 or KI 209 Azimuth card and SIN-COS pot can be done quickly by using the test circuit shown in Figure 5-3.

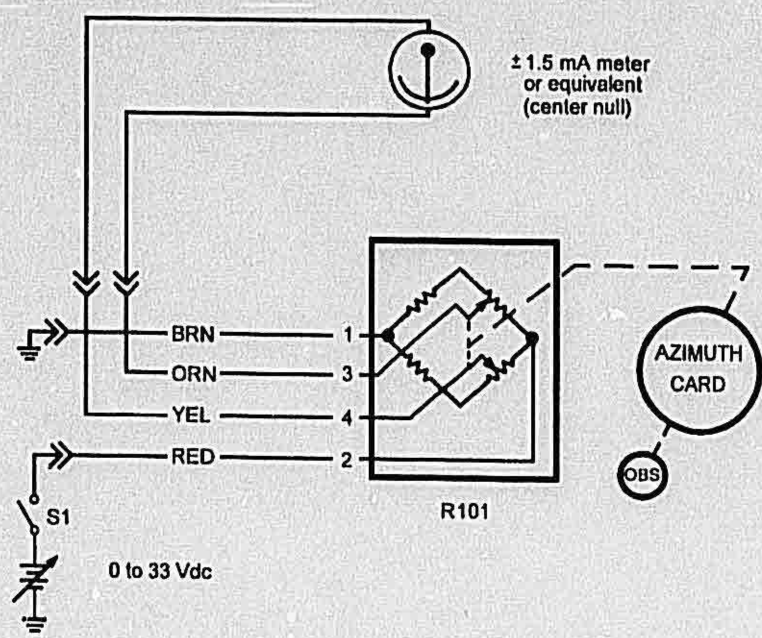
5.4.1.1 First check the resistance between pins 1 (Brn) and 2 (Red) of R101. A reading of 6.5 k ±975 ohms should be obtained.

5.4.1.2 Rotate the OBS knob until a balanced resistance reading of approximately 2.1 k ohm is obtained between pins 1 and 3 (Orn) and pins 1 and 4 (Yel) of R101.

5.4.1.3 After obtaining the balanced resistance (2.3 k) between 1-3 and 1-4, loosen the allen screw on the SIN-COS pot's gear so the pot's shaft does not turn when the OBS knob is rotated. Once that has been done, rotate the azimuth card until 90° is under the top vertical tick mark. Retighten the gear on the shaft.

5.4.1.4 The final alignment of an azimuth card is done using the test circuit shown in Figure 5-3. Connect the power supply and jumpers as shown in Figure 5-3. Close S1 and slowly increase the voltage while turning the OBS to null the meter. 33 volts can be safely applied with the meter nulled. This voltage allows sufficient sensitivity to balance out small errors. While 50 volts can be applied while the meter is nulled **do not** allow this voltage to remain on when the OBS is rotated between 270° and 90°, or whenever the meter is pegged.

5.4.1.5 With the meter nulled (close to 90° bearing) loosen the allen screw on the SIN-COS pot's gear so the pot's shaft does not turn. Rotate OBS to exactly 90° and tighten the gear on the shaft.



CAUTION

1. Do not increase voltage beyond 15 V until the OBS is rotated to null the indicator.
2. Open S1 prior to checking the reciprocal heading.

AZIMUTH CARD CALIBRATION

FIGURE 5-3 Azimuth Card Calibration

5.4.1.6 Open S1 and then rotate the azimuth card to 270°. Close S1 and check for nulled condition. If any error is present, first rotate the OBS to halve the error, and then loosen the large gear so it does not turn the SIN-COS pot. Turn the OBS to exactly 270°. Tighten the card on the shaft.

5.4.1.7 Open S1, rotate azimuth card to 90°. Close S1 and check that the error does exceed that noted at 270°. Repeat step 6 if necessary and **align for minimum centering error** at 90° and 270°. The error shall not exceed 1° at either position.

5.4.1.8 To assure that the pot is not set 180° out of position check the resistances between pins 1 and 3 and between pins 1 and 4 with the OBS set to 90°. The resistances should be balanced and approximately equal to 2.3 k.

Rotate the OBS to 270° and the resistances between pins 2 and 3 and between pins 2 and 4 should be balanced and approximately equal to 2.1 k.

5.4.2 INITIAL CHECK

5.4.2.1 Prior to turning on the unit assure that no shorts exist on the 9.2 volt output (TP308). Resistance between TP308 and ground should be greater than 100 ohms.

5.4.2.2 Preset all variable resistors to the center of their range unless the unit has been previously aligned.

5.4.3 REGULATOR ADJUSTMENTS

5.4.3.1 Apply input power of (13.75 Vdc) to unit. Current drain should be less than 250 mA with dial light on.

5.4.3.2 Monitor TP308 with a digital voltmeter and adjust R321 on bottom board for 9.2 ±0.1 Vdc.

5.4.4 PHASE LOCKED LOOP ADJUSTMENTS

5.4.4.1 With no composite signal applied (remove modulation from VHF generator or short out composite input) check that pin 14 of I201 on the top board does not change logic status.

5.4.4.2 Monitor either pin 3 or 4 of I201 with a frequency counter and adjust R207 to obtain 9960 ±10 Hz.

5.4.5 VOR ALIGNMENT

5.4.5.1 With no composite signal applied, note the position of the needle. It should be centered within 1/2 needle's width.

5.4.5.2 Apply a VOR Test Signal with both the VOR generator and the unit's OBS set to 90° (FROM indication).

5.4.5.3 Adjust R233 on the top board (accessible from the left front) to place the needle in the same position as noted in step 1.

5.4.5.4 Rotate the VOR generator to 270°. If necessary slightly readjust R233 until the needle is midway between this reading and the position set in the previous step. If a greater than 2 degree readjustment is required, this will usually signify a bad output stage or incorrectly set azimuth card.

5.4.5.5 Shift the VOR generator to 280° and adjust R203 on the top board to produce 5 dots (150 mV) right deflection. Rotate the generator to 260° and check that 5 dots (150 mV) left deflection is recorded. If necessary readjust R203 to balance any error between the two deflections. Example, if 5 dots right deflection is recorded, but only 4 1/2 dots left deflection, then R203 should be readjust to produce 5 1/4 dots right deflection and 4 3/4 dots left deflection.

5.4.5.6 Repeat 3 and 4 and align for minimum centering error at 90° TO and FROM. The majority of units will be capable of being nulled to less than 0.5° (6.8 mV) difference. If the error cannot be reduced to less than 1° (13.5 mV), then troubleshoot the VOR converter.

5.4.5.7 Change the VOR generator to 0° and set the unit's OBS to 0° (FROM indication). Adjust R241 to center the needle.

5.4.5.8 Rotate the VOR generator to 180° (TO indication) and readjust R241 to halve any error that is present.

5.4.5.9 Repeat 7 and 8 to balance or equalize any error at the two headings. **Align for minimum error.** Troubleshoot VOR converter if the error cannot be reduced to less than 1.5° total difference in the readings (less than 20.4 mV).

5.4.5.10 Set the 479T to 80° (the needle should deflect 5 dots to the right) and lower the composite input signal so that the needle deflects only 2 1/2 dots.

5.4.5.11 Adjust R323 so that the RED/WHT striped flag is in view in the top 1/3 of the window.

5.4.5.12 Return the composite input to 0.5 Vrms.

5.4.6 LOCALIZER CONVERTER ALIGNMENT

5.4.6.1 To match bandpass of the two LOC filters in the unit, first configure the LOC generator to produce 150 Hz only.

5.4.6.2 Measure and record the phase shift from TP202 to TP204. Either the phase meter or oscilloscope can be used for this measurement. If a scope is used, it is recommended that the variable time base control be used to expand 1/2 the wave to occupy the entire scope display as shown in Figure 5-4. Use AC coupling and adjust the two channels vertical position controls so their grounds are coincident and are at the center of the display. Check that the phase shifts of the two scope channels are equivalent by placing both probes on one 150 Hz signal.

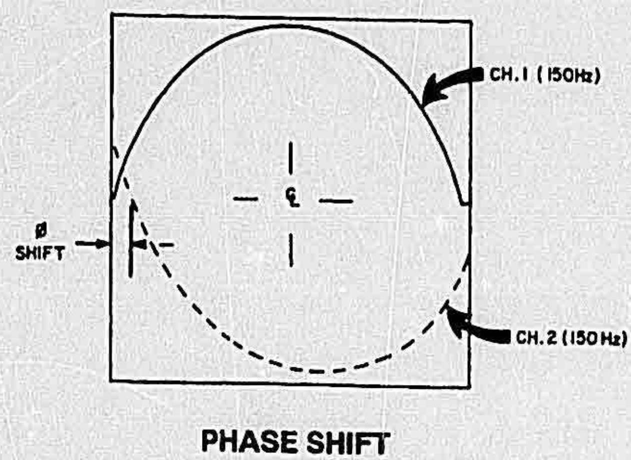


FIGURE 5-4 Localizer Phase Shift

5.4.6.3 Reconfigure the LOC generator to produce only 90 Hz. Monitor the phase shift between TP202 and TP205. If using the scope method, readjust the variable time base to reduce the 1/2 waveform to full horizontal display as shown above. Adjust R218 on the top board to match the phase shift recorded in 2.

CAUTION
DO NOT SWITCH REFERENCE WAVEFORMS BETWEEN THE TWO MEASUREMENTS. THAT IS, IF TP202 WAS THE #1 INPUT TO THE PHASE METER (OR SCOPE) IN STEP 2, DO NOT CHANGE IT TO THE #2 INPUT WHEN PERFORMING STEP 3.

5.4.6.4 Once the phase shifts are matched, the two active filters are equivalent. Any drift due to temperature will affect both of them equally and will not produce an offset condition that could have occurred if they were not matched.

5.4.6.5 Set the LOC generator to produce equal 90 and 150 Hz tones. Refer to LOC test signals for amplitudes.

5.4.6.6 Adjust R227 (accessible from the top right of unit) to center the needle.

5.4.6.7 Set the Tone Localizer switch of the LOC generator to 4 db (0.093 ddm) on each side and adjust R313 on bottom board for 3 dots (90.0 mV) deflection.

5.4.6.8 Return the generator to 0 db and switch the generator between CAL 90 to CAL 150 while observing the flag. Leave the generator at the setting that has the least amount of flag in view.

5.4.6.9 Adjust R310 so that the flag is in view in the bottom 1/3 of the window.

5.4.6.10 This completes the alignment of the KI 208, KI 209.

5.5 OVERHAUL

Maintenance information contained in this section includes inspection procedures, cleaning, semiconductor replacement, and troubleshooting procedures.

5.5.1 VISUAL INSPECTION

The following visual inspection procedures should be performed during the course of maintenance operations.

5.5.1.1 Inspect all wiring for frayed, loose, or burned wires.

5.5.1.2 Check cable connections, making sure the plugs are free from corrosion and are properly soldered.

5.5.1.3 Check all components for evidence of overheating, breakage, vibration, corrosion, or loose connections.

5.5.2 CLEANING

5.5.2.1 Using a clean lint-free cloth, lightly moistened with an approved cleaning solvent remove the foreign matter from the equipment case and unit front panels. Wipe dry using a clean, dry lint-free cloth.

5.5.2.2 Using a hand controlled dry air jet (not more than 15 psi), blow the dust from inaccessible areas. Care should be taken to prevent damage by the air blast.

5.5.2.3 Clean electrical contacts with a burnishing tool or cloth lightly moistened with an approved contact cleaner.

5.5.2.4 Clean the receptacles and plugs with a hand controlled dry jet (not more than 25 psi) and a clean lint-free cloth lightly moistened with an approved cleaning solvent. Wipe dry with a clean, dry, lint-free cloth.

5.5.3 DISASSEMBLY PROCEDURES

The following instructions include procedures that are necessary to remove and disassemble the subassemblies of the KI 208, KI 209. Before disassembly, verify that the power is removed and disassemble only to the extent necessary to effect test, alignment and repair. Tag or in some means, identify all disconnected wires.

The KI 208, KI 209 Overall Performance tests can be completed without any disassembly of the unit. In order to carry out the alignment procedures of the individual subassemblies, only the dust covers need be removed.

The support framework of the KI 208, KI 209 consists of the mounting chassis, rear plate and printed circuit board (PC) carriers.

The KI 208, KI 209 Converter #1 Board is secured to the top printed circuit board carrier. A ribbon cable connects between the converter #1 board and the converter #2 board. Also, four wires connect to the Sine/Cosine variable resistor, and two wires connect to the rear connector J2081, J2091.

The KI 208, KI 209 Converter #2 Board is secured to the bottom printed circuit board carrier. The ribbon cable, as mentioned above, connects to the converter #1 board. Also six wires connect to the meter package and light, and six wires connect to the rear connector J2081, J2091.

The KI 209 has four additional wires from the meter package that connect to the rear connector J2091.

The meter assembly and Sine/Cosine variable resistor of the KI 208, KI 209 are attached to the front gear plate and mounting chassis respectively. The meter assembly and Sine/Cosine variable resistor removal is facilitated by separating the mounting chassis from the bezel and removing the respective wires from the printed circuit boards. The KI 209 has four wires of the meter assembly connected to connector J2091.

The following procedures describe how the Indicator can be disassembled so that alignment or troubleshooting can be performed on a given subassembly. They also describe how that subassembly can be removed from the Indicator in the event it is replaced by a new module. This assumes the dust covers have been separated from the unit after removing the eight screw which hold them in place.

5.5.3.1 KI 208, KI 209 Converter #1 Board

5.5.3.1.1 Unscrew and remove the two screws on the left side (as viewed from the front of the unit) used to mount the top printed circuit board carrier to the mounting chassis and rear plate respectively. Also unscrew approximately a quarter turn the remaining two mounting screws.

5.5.3.1.2 Rotate the printed circuit board carrier approximately 90° R and retighten the two screws used for hinging.

At this point, the component side of the Converter #1 Board is exposed and the Converter #2 Board component side is exposed to facilitate the major amount of troubleshooting required.

5.5.3.1.3 Unscrew and remove the two screws used as the hinge.

5.5.3.1.4 Unscrew and remove the four board mounting screws.

5.5.3.1.5 Desolder each wire and tag it for identification.

5.5.3.2 KI 208, KI 209 Converter #2 Board

5.5.3.2.1 Unscrew and remove the screw used to mount transistor Q101 to the rear plate.

5.5.3.2.2 Unscrew and remove the four screws used to mount the bottom printed circuit board carrier to the mounting chassis and rear plate respectively.

5.5.3.2.3 Rotate the printed circuit board and carrier until the component side of the board is accessible.

5.5.3.2.4 Unscrew and remove the four board mounting screws.

5.5.3.2.5 Desolder each wire and tag it for identification.

5.5.3.3 KI 208, KI 209 Sine/Cosine Variable Resistor

5.5.3.3.1 Unscrew and remove the four screws used to mount the mounting chassis to the front gear plate and bezel.

5.5.3.3.2 Rotate bezel, gear plate, and meter assembly over the top of the unit to expose the Sine/Cosine variable resistor gear.

5.5.3.3.3 Unscrew about two turns of the capscrew on the gear clamp.

5.5.3.3.4 Remove gear from the Sine/Cosine variable resistor shaft.

5.5.3.3.5 Unscrew and remove the three screws used to mount the Sine/Cosine variable resistor to the mounting chassis.

5.5.3.3.6 Desolder each wire and tag it for identification.

5.5.3.4 KI 208 Meter Assembly Package

5.5.3.4.1 Unscrew and remove the four screws used to mount the mounting chassis to the front gear plate and bezel.

5.5.3.4.2 Rotate bezel, gear plate, and meter assembly over the top of unit to expose the mounting screws.

5.5.3.4.3 Unscrew and remove the three mounting screws.

5.5.3.4.4 Desolder each meter assembly wire from the Converter #2 Board and tag it for identification.

5.5.3.5 KI 209 Meter Assembly Package

5.5.3.5.1 Unscrew and remove the four screws used to mount the mounting chassis to the front gear plate and bezel.

5.5.3.5.2 Rotate bezel, gear plate, and meter assembly over the top of the unit to expose the mounting screws.

5.5.3.5.3 Unscrew and remove the three mounting screws.

5.5.3.5.4 Desolder each meter assembly wire from the rear connector J2091 and Converter #2 Board and tag it for identification.

5.5.3.6 KI 208, KI 209 Rear Connector J2081, J2091

5.5.3.6.1 Unscrew and remove the two screws used to secure the RF shield to the rear plate.

5.5.3.6.2 Desolder each wire from the feedthru capacitors and tag it for identification.

5.5.3.6.3 Depress the mounting clip on each side of J2081, J2091 and remove from rear plate.

5.5.4 KI 208, KI 209 ASSEMBLY PROCEDURES

5.5.4.1 KI 208 Rear Connector J2081

5.5.4.1.1 Install rear connector subassembly J2081 in the rear plate until the mounting clips snap into place on the outside of the unit.

5.5.4.1.2 Position the RF shield over the connector with Pin #1 protruding through the small hole in the shield and all other pins protruding through the feedthru capacitors.

5.5.4.1.3 Secure the RF shield assembly to the rear plate with the mounting hardware previously removed.

5.5.4.1.4 Install the wires into the feedthru capacitors and solder in place.

5.5.4.2 KI 209 Rear Connector J2091

5.5.4.2.1 Install rear connector subassembly J2081 in the rear plate until the mounting clips snap into place on the outside of the unit.

5.5.4.2.2 Position the RF shield assembly over the connector with Pin #1 protruding through the small hole in the shield and all other pins protruding through the feedthru capacitors.

5.5.4.2.3 Secure the RF shield assembly to the rear plate with the mounting hardware previously removed.

5.5.4.2.4 Install the wires into the feedthru capacitors and solder in place.

5.5.4.3 KI 208, KI 209 SUBASSEMBLIES

In general, the assembly procedures for each of the subassemblies are the reverse of the disassembly procedures.

5.5.5 SEMICONDUCTOR REPLACEMENT

It is recommended that semiconductors not be tested or replaced until satisfactory performance is observed.

5.5.5.1 Semiconductor Maintenance

Due to wide utilization of semiconductors in this electronic equipment, somewhat different techniques are necessary in maintenance procedures. In solid state circuits the impedance and resistances encountered are of much lower values than those encountered in vacuum-tube circuits. Therefore, a few ohms discrepancy can greatly affect the performance of the equipment. Also, coupling and filter capacitors are of larger values and usually are of the tantalum type. Hence, when measuring resistances, an instrument accurate in the high ranges must be employed. Capacitor polarity must be observed when measuring resistance.

5.5.5.2 Semiconductor Test Equipment

Damage to semiconductors by test equipment is usually the result of accidently applying too much current or voltage to the elements. Common causes of damage from test equipment are discussed in the following paragraphs.

5.5.5.2.1 Transformerless Power Supplies

Test equipment with transformerless power supplies is one source of high current. However, this type of test equipment can be used by employing an isolation transformer in the AC line.

5.5.5.2.2 Line Filter

It is still possible to damage semiconductors from line current, even though the test equipment has a power transformer in the power supply, if the test equipment is provided with a line filter. This filter may function as a voltage divider and apply half voltage to the semiconductor. To eliminate this condition, connect a ground wire from the chassis of the equipment under test before making any other connections.

5.5.5.2.3 Low Sensitivity Multimeters

Another cause of semiconductor damage is a multimeter that requires excessive current to provide adequate indications. Multimeters with sensitivities of less than 20,000 ohms-per-volt should not be used on semiconductors. A multimeter with low sensitivity will draw too much current through many types of small semiconductors, causing damage. When in doubt as to the amount of current supplied by a multimeter, check the multimeter circuits on all scales with an external, low-resistance multimeter connected in series with the multimeter leads. If more than on milliampere is drawn on any range, this range cannot be safely used on small semiconductors.

5.5.5.2.4 Power Supply

When using a battery-type power supply, always use fresh batteries of the proper value. Make certain that the polarity of the power supply is correct for the equipment under test. Do not use power supplies having poor voltage regulation.

5.5.5.3 Semiconductor Voltage and Resistance Measurements

When measuring voltage or resistance in circuits containing semiconductor devices, remember that these components are polarity and voltage conscious. Since the values of capacitors used in semiconductor circuits are usually large (especially in audio, servo, or power circuits) time is required to charge these capacitors when an ohmmeter is connected to a circuit in which they appear. Thus, any reading obtained is subjected to error if sufficient time is not allowed for the capacitor to fully charge. When in doubt it may be best in some cases to isolate the components in question and measure them individually.

5.5.5.4 Testing of Transistors

A transistor check should be used to properly evaluate transistors. If a transistor tester is not available, a good multimeter may be used. Make sure that the multimeter meets the requirements outlined in preceding paragraphs. Always check the value of bias resistors in series with the various transistor elements. A transistor is very sensitive to improper bias voltage, therefore a short or open in the bias resistance may damage the transistor. For this reason, do not troubleshoot by shorting the various points in the circuit to ground and listening for clicks.

CAUTION

IF A TRANSISTOR IS FOUND TO BE DEFECTIVE, MAKE CERTAIN THAT THE CIRCUIT IS IN GOOD OPERATING ORDER BEFORE INSTALLING A REPLACEMENT TRANSISTOR. IF A SHORT CIRCUIT EXISTS IN THE CIRCUIT, PUTTING IN ANOTHER TRANSISTOR WILL MOST LIKELY RESULT IN BURNING OUT THE NEW COMPONENT. DO NOT DEPEND UPON FUSES TO PROTECT TRANSISTORS.

5.5.5.4.1 PNP Transistor

To check a PNP transistor, connect the positive lead of the multimeter to the base of the transistor and the negative lead to the emitter. Generally, a resistance of 50,000 ohms or more should be obtained. Reconnect the multimeter with the negative lead to the base. With the positive lead connected to the emitter, a resistance value of 500 ohms or less should be obtained. When the positive lead is connected to the collector a value of 500 ohms or less should be likewise obtained.

5.5.5.4.2 NPN Transistor

Similar tests made on an NPN transistor should produce the following results: With the negative lead of the multimeter connected to the base of the transistor the value of resistance between the base and the collector should be high. With the positive lead of the multimeter connected to the base, the value of resistance between the base and the collector should be low. If these results are not obtained, the transistor is probably defective and should be replaced.

5.5.5.5 Replacing Semiconductors

Never remove or replace a plug-in semiconductor with the supply voltage turned on. Transients thus produced may damage the semiconductor or others remaining in the circuit. If a semiconductor is to be evaluated in an external test circuit, be sure that no more voltage is applied to the semiconductor than normally is used in the circuit from which it came.

Use only a low heat soldering iron when installing or removing soldered-in parts. Use care in the handling of printed circuit boards. When removing a part from a printed circuit board, first unbend the crimped leads. Use only the necessary amount of heat to unsolder the part. Clear excess solder form mounting eyelets, making sure that mounting holes are clear before installing new parts. When removing a transformer or other part having a multiple number of leads, straighten (unbend) all leads first and then heat leads one at a time, working around the part, until the part can be gently "rocked out."

When installing or removing a soldered-in semiconductor grasp the lead to which heat is applied between the solder joint and the semiconductor with long-nose pliers. This will dissipate some of the heat that would otherwise conduct into the semiconductor from the soldering iron. Make certain that all wires soldered to semiconductor terminals have first been properly tinned so that the necessary connection can be made quickly. Excessive heat will permanently damage a semiconductor.

When soldering is required to remove a component from a semiconductor socket, remove the semiconductor to prevent damage to the semiconductor.

In some cases, power transistors are mounted on heat sinks that are designed to dissipate heat away from them. In some power circuits, the transistor must also be insulated from them. In some power circuits, the transistor must also be insulated from ground. Often, this insulating is accomplished by means of insulating washers made of fiber and mica. When replacing transistors mounted in this manner, be sure that the insulating washers are replaced in proper order. Before installing the mica washers treat them with a film of silicone grease. This treatment helps in the transfer of heat. After the transistor is mounted, and before making any connections, check from the case of the transistor to ground with a multimeter to see that the insulation is effective.

5.6 TROUBLESHOOTING

Various customer complaints can be resolved by using troubleshooting chart. When a circuit failure is suspected the troubleshooting flow chart should be used to quickly isolate the problem area. Once the decision blocks have isolated the area, the theory of operation for that area should be reviewed. After reviewing how the particular circuit works, then the detailed troubleshooting procedures can be used in conjunction with the photographs to isolate the defective component.

5.6.1 FAILURE INDICATIONS

TABLE 5-3 Failure Indications KI 208, KI 209

INDICATION	PROBABLE CAUSE
1. VOR inaccurate	1. R233 not balanced on TO-FROM. 2. R241 not adjusted properly at 0°. 3. Leaky capacitors in output stage. 4. Ring clamp on SIN-COS pot has slipped. 5. Bad op amp (high offset voltage).
2. VOR insensitive	1. VOR signal from Nav receiver less than 0.5 Vrms at 200 uV RF level input, or is distorted. 2. Phase locked loop center frequency not 9960 ±25 Hz. 3. Op amp gains not correct.
3. VOR accurate at long range, but inaccurate close to station.	1. Nav receivers output greater than 0.6 Vrms at 200 uV RF level input. 2. R203 set incorrectly. 3. Nav receivers AGC is poor, which allows its output to increase until I202B is overdriven.
4. VOR needle unstable (oscillates side to side).	1. Prop modulation. 2. VOR scalloping. 3. Output stage filtering is bad.
5. Not enough L-R VOR deflection.	1. VOR signal from Nav receiver less than 0.5 Vrms. 2. R203 set incorrectly.
6. Needle wiggles when audio level of Nav receiver is high.	1. Insufficient size wire on Nav receivers power line. 2. Very low voltage to receiver and indicator. 3. Bad regulator in the KI 208, KI 209.
7. Needle kicks when transmitter is keyed.	1. Indicator not grounded per installation drawing (Remember the #16 wire and shielded composite?). 2. Transmitter coax paralleled with indicator cabling.

TABLE 5-3 Failure Indications KI 208, KI 209

INDICATION	PROBABLE CAUSE
8. LOC centering incorrect.	1. R227 set incorrectly. 2. R218 set incorrectly. 3. Q205 or Q206 not switching.
9. Not enough L-R LOC deflection	1. LOC signal from Nav receiver less than 0.35 Vrms. 2. R313 set incorrectly.
10. LOC inaccurate over the transmitter.	1. LOC signal from Nav receiver greater than 0.5 Vrms at 200 uV RF level input. 2. R203 set incorrectly. 3. Nav receivers AGC is poor, which causes I202A and B to be overdriven with the strong input signal.

NOTE: The KI 208, KI 209 has the greatest capability for handling variations of input amplitude of any of the new generation indicators, but can be overdriven if the amplitude of the signal increases approximately 5db over the amplitude at which the indicator was aligned.

5.6.2 TROUBLESHOOTING GUIDELINES

5.6.2.1 TROUBLESHOOTING REGULATOR

This circuit consists of a high gain amplifier (I303) and pass transistor Q101. A circuit jumper has been installed so the regulator can be isolated from the rest of the circuitry. If the 9.2 V line has been shorted, Q101 will usually be blown with no damage to I303. The reference voltage for the regulator (approx. 1.6 V) should be checked on pin 5 to assure that it is present. The input voltage on pin 6 should be very close to the voltage measured on pin 5. Pin 7 must be more positive than pin 6, if it is not check CR305 and CR306. If CR307 has been overheated it will usually fail in a shorted condition.

5.6.2.2 TROUBLESHOOTING VOR-LOC SWITCHING

When J2081 pin 4 goes low Q203 must saturate. When this happens the collector should go to approximately 9V. If that does not happen, and if the base goes low, Q203 is bad. All transistors connected to Q203's collector; i.e. Q204, Q205, Q206, Q207 and Q211 should saturate when it goes high. Q203's collector also controls the enable/disable of I201and I301A and B.

5.6.2.3 TROUBLESHOOTING PLL AND LIMITER

With no signal into the phase locked loop, the internal voltage controlled oscillator (VCO) should be free running at 9960 ±10 Hz. This frequency can be measured at pin 4 and adjusted by R207. To check the internal phase detector, check for a square wave at pin 2. Remember to check pin 5.

The limiter should provide FM square waves of 1 volt amplitude. The voltage at the base of Q202 should be clamped at 0.6 volt by Q202's base to emitter junction.

5.6.2.4 TROUBLESHOOTING 30 HZ VARIABLE FILTER

Check that Q204, Q205, Q206, Q207 are shut off. Gain from TP203 to TP204 should equal 2.1. Q of filter should = 4. Check that bias is at 4.16 volts at non-inverting terminal of I202A.

5.6.2.5 TROUBLESHOOTING 30 HZ REFERENCE FILTER

Check that Q206 is shut off. Gain from TP202 to TP205 should equal 5. Q of filter should = 4. Check that bias is at 4.16 volts at non-inverting terminal of I202B.

5.6.2.6 TROUBLESHOOTING SIN-COS POT INTERFACE

The 30 Hz signals on brown and red leads must be equal in amplitude and 180° out of phase. When OBS is at 90°, the signal on orange and yellow leads must be equal in amplitude (0.707 amplitude of brown and red) and in phase. Signal at TP206 should stay approximately the same amplitude and appear to shift continuously as the OBS is rotated. If Q208 or Q209 are shorted then there will be a greater amplitude change at TP206 as the OBS is rotated.

5.6.2.7 TROUBLESHOOTING SQUARING AMPLIFIER

Check that approximately a 275 mV threshold exits between the DC voltage on pin 13 to pin 12 of I202D. If it does not exist, check that Q211 is off.

5.6.2.8 TROUBLESHOOTING VOR OUTPUT STAGE

Check that I301A and B are open, so signals at input of I301 CMOS switch do not pass to the inverting terminal of either I302A and B. The output stage itself can be checked by monitoring the output test points for differential voltages up to ±0.65 V as the OBS is rotated from 90° off course to -90° off course.

5.6.2.9 TROUBLESHOOTING FLAG PHASE SHIFTER

Check for a 90 ±10° phase shift between TP205 and TP303. Input to output amplitude change equals slightly less than one third; i.e. gain = 0.35. Check for 4.16 V bias at non-inverting terminal of I302D.

5.6.2.10 TROUBLESHOOTING LOC BANDPASS FILTERS

Check that Q204, Q205, Q206 and Q207 are saturated. The gains should be 5 for both the 150 Hz and 90 Hz filters and the Qs should also be equal to 12. The phase shifts (180°) should be equal for the two filters by adjusting R218. This phase shift adjustment was set at the factory and should not be readjusted unless there is a significant difference between the two filters. Check for bias at non-inverting terminal.

5.6.2.11 TROUBLESHOOTING LOC OUTPUT STAGES

Check that I301C and D are closed when in LOC mode. This enables an input bias voltage to be applied to the non-inverting input of the output op amps. Also check that I301A and B are shorted to enable transmission of LO C DC voltage to the output stages. Check that the feedback resistors (R314 or R310) are of correct value.

5.6.3 TROUBLESHOOTING FLOW CHART

Consult Figure 5-5 Troubleshooting Flow Chart KI 208, KI 209 for fault isolation.

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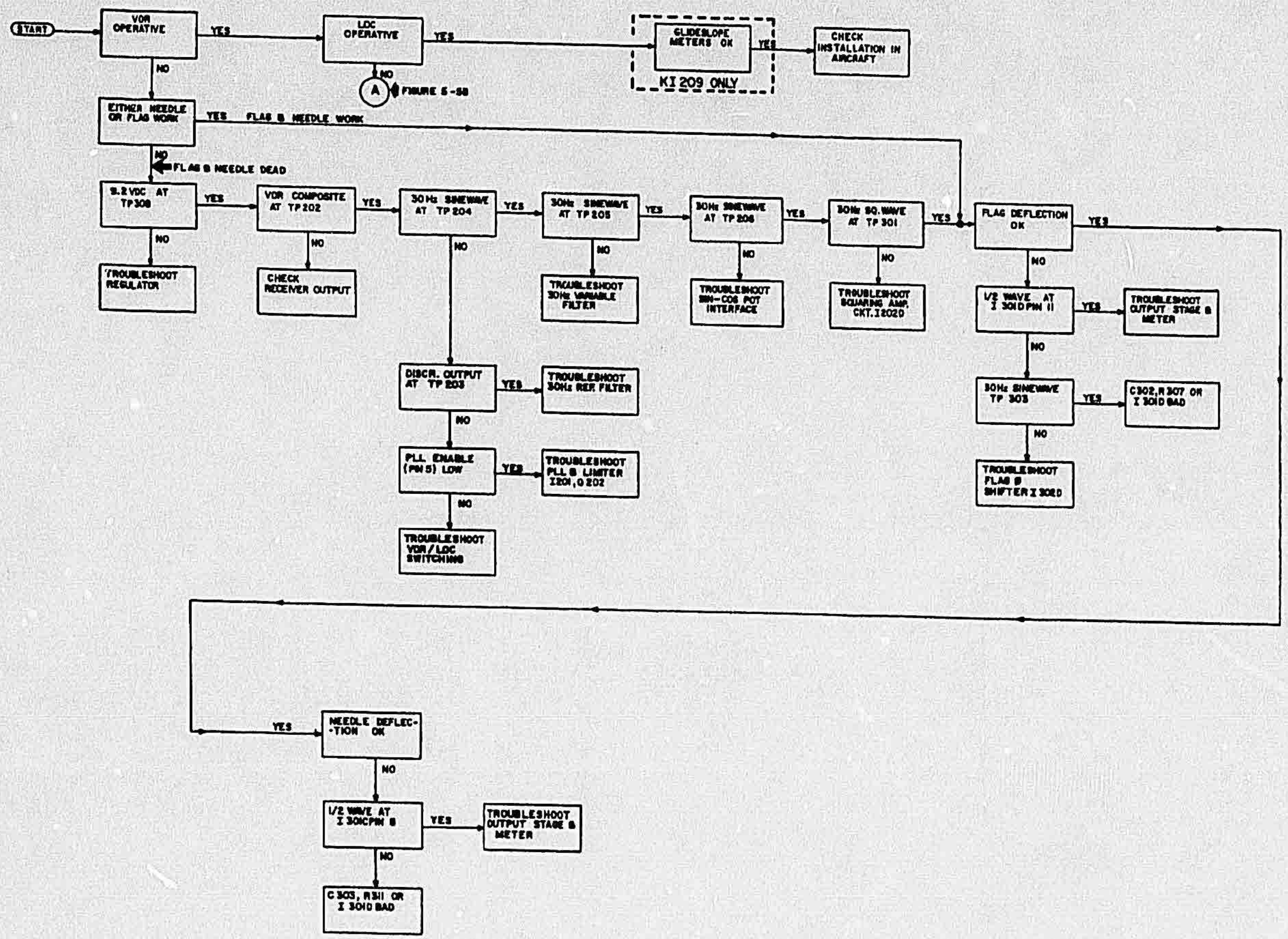

FIGURE 5-5 Troubleshooting Flow Chart KI 208, KI 209 (Sheet 1 of 2)

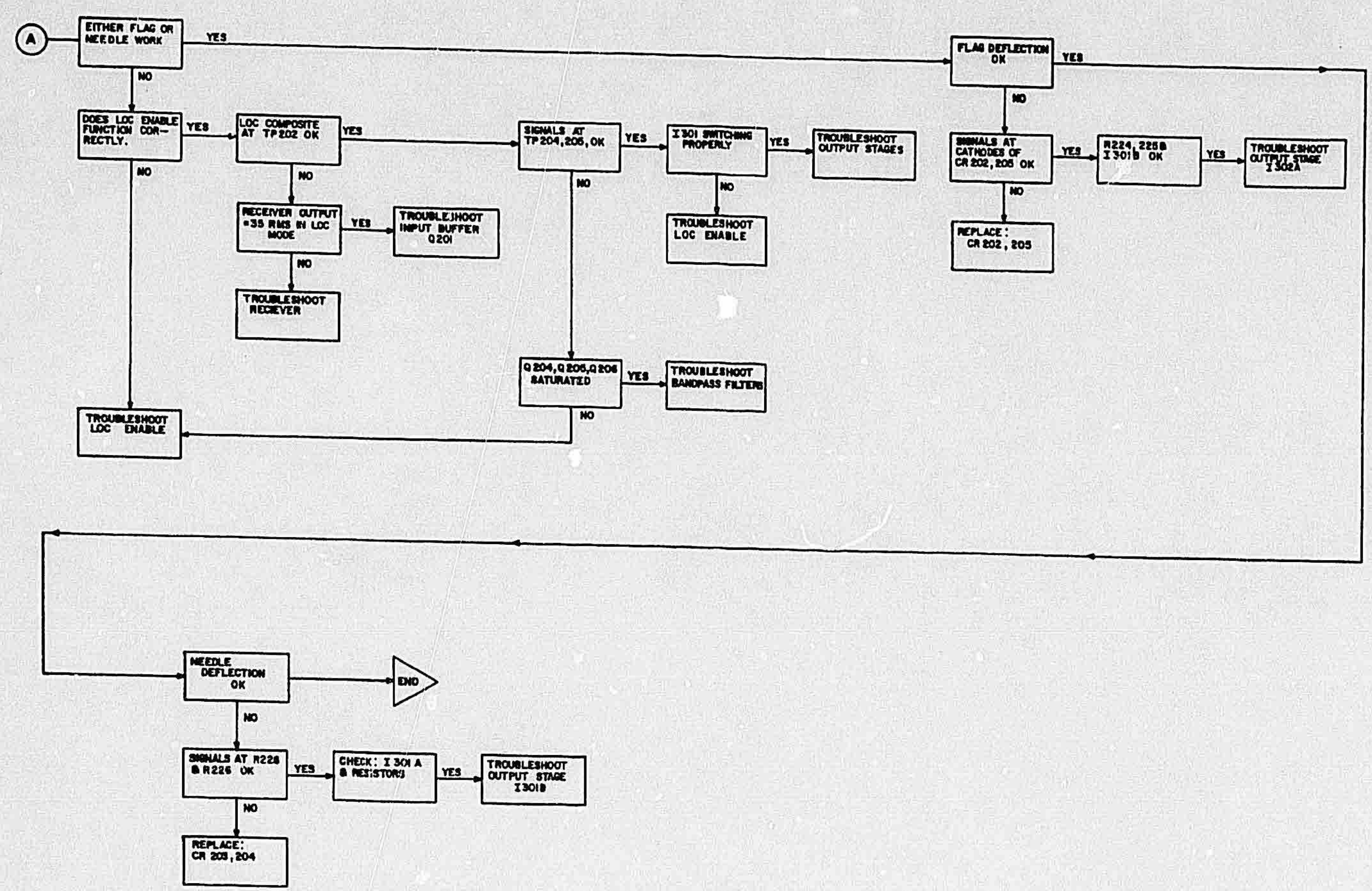

FIGURE 5-5 Troubleshooting Flow Chart KI 208, KI 209 (Sheet 2 of 2)

06

SECTION VI
ILLUSTRATED PARTS LIST

6.1 INTRODUCTION

The Illustrated Parts List (IPL) contains parts lists of assemblies and discrete components required for the unit. The IPL provides the proper identification and part number of each replacement part. The IPL starts with the top assembly and continues in sequence with the sub-assembly parts lists. Mechanical parts are grouped separately from electrical parts on each sub-assembly parts list. Each parts list is followed by the assembly drawing for that assembly. Parts lists may also be called "bills of material" or "BOM." Parts identified in this IPL meet design specifications for this equipment and are recommended replacement parts. Warranty information concerning replacement parts is contained in Service Memo #1, P/N 600-08001-00XX.

6.2 BILL OF MATERIAL DESCRIPTION

This section describes the various items that may appear on parts lists. Refer to figure 6-0 for the parts list format.

6.2.1 PARTS LIST (ASSEMBLY) NUMBER

Each parts list is labeled with the assembly part number at the top of the list. The assembly number is followed by the assembly description and the revision level of the parts list.

6.2.2 SYMBOL COLUMN

The symbol column contains the reference designators of electrical components on the assembly. Some mechanical parts and assembly supplies may be assigned the ITM designator. Reference documents may be assigned the REF designator. The reference designator contains a letter abbreviation to indicate the type of component, and the sequence number assigned to that part (C101, Q101, etc.). Common reference designator abbreviations are listed in table 6-1.

Table 6-1: Reference Designator Abbreviations

B	Motor, Synchro
C	Capacitor
CF	Capacitor Filter
CJ	Circuit Jumper
CQ	Capacitor
CR	Diode
D	Diode
DS	Lamp
E	Terminal, Connect Point
F	Fuse

Table 6-1: Reference Designator Abbreviations

FB	Ferrite Bead
FL	Filter
FT	Feedthru
I	Integrated Circuit
ITM	Item (Non-electrical)
J	Jack, Fixed Connector
K	Relay
L	Inductor
M	Meter, Transistor
MX	Mixer
P	Plug, Removable Connector
Q	Transistor
R	Resistor
REF	Reference Document
RP	Resistor Network
RT	Thermistor
RV	Varistor
S	Switch
SK	Socket
SW	Switch
T	Transformer
TJ	Terminal Jack
TP	Test Point
U	Integrated Circuit, Circuit Assembly, Component Network (Resistor, Capacitor, Inductor, Transistor, Diode)
V	Photocell, Vacuum Tube, Varistor
WG	Waveguide
Y	Crystal

6.2.3 PART NUMBER COLUMN

The part number column contains the Honeywell part number for each part. Special purpose part number series may appear in the parts list and are described below.

6.2.3.1 U401 122-XXXXX-9999 PLACE HOLDER

Circuit U401 is a programmed device with a -9999 place holder. Its true part number is contained on the next higher 125- P/N or 126- P/N software configuration. Refer to Section 6.3, Software Documentation, in this introduction, for a description of the software documentation system.

6.2.3.2 U402 999-09999-0090 REF SFTWARE SET

Circuit U402 is a programmed device. Its true part number is contained on the next higher 125- P/N or 126- P/N software configuration. Refer to Section 6.3, Software Documentation, in this introduction, for a description of the software documentation system.

6.2.3.3 CR401 999-09999-0096 RESERVED

Reference designator CR401 has been reserved for future use. The assembly does not currently include a CR401.

6.2.3.4 CR401 999-09999-0097 SEE NEXT ASSEMBLY

Diode CR401 is a part of the electrical circuit, but due to assembly or testing requirements, is actually assigned to the next assembly.

6.2.3.5 CR401 999-09999-0098 NOT USED

Reference designator CR401 is available for future assignment. The assembly does not currently include a CR401.

6.2.3.6 CR401 999-09999-0099 DO NOT USE

Reference designator CR401 has been previously used on this assembly and later deleted. It may not be reassigned on this assembly.

6.2.4 FIND_NO COLUMN

This column lists the find (item) number of a part. Find numbers of mechanical parts may appear on the assembly drawing. Find numbers of electrical parts do not appear on the assembly drawing. Find numbers are not assigned to every part and missing information in this column is not an error.

6.2.5 DESCRIPTION COLUMN

This column describes each part in the assembly. Common abbreviations in the description column are listed in table 6-2.

Table 6-2: Description Abbreviations

A	Ampere
ADC	Analog to Digital Converter
ADJ	Adjustable
AL, ALUM	Aluminum

Table 6-2: Description Abbreviations

AMP	Ampere, Amplifier
ANT	Antenna
ASSY	Assembly
BD	Board
BI	Two
BIFLR	Bifilar
BLK	Black
BLU	Blue
BOM	Bill of Material (= Parts List)
BRN	Brown
CA	Cable
CC	Carbon Composite
CF	Carbon Film
CH	Chip, Choke
CAP	Capacitor
CER, CR	Ceramic
CKT	Circuit
CNTCT	Contact
CONN	Connector
CVR	Cover
DAC	Digital to Analog Converter
DBL	Double
DC	Disc Ceramic
DIO	Diode
DPDT	Double Pole Double Throw
DPST	Double Pole Single Throw
DUAL, DUO	Two
DWG	Drawing
EL	Electrolytic
EW	Eighth Watt

Table 6-2: Description Abbreviations

FC	Fixed Composition
FERR	Ferrite
FET	Field Effect Transistor
FHP	Flat Head Phillips
FLTR	Filter
FREQ	Frequency
FT	Feedthru
GHZ	Gigahertz
GND	Ground
GRN	Green
GRY	Gray
HDR	Header
HDW	Hardware
HEX	Six
HF	High Frequency
HV	High Voltage
HW	Half Watt
H/W	Hardware
IC	Integrated Circuit
ID, IDT	Identification
IF	Intermediate Frequency
IND	Inductor
INTER	Interconnect
INTL	Internal
I/O	In/Out
ITM	Item
KHZ	Kilohertz
LCK, LK	Lock
LED	Light Emitting Diode
LSI	Large Scale Integrated Circuit

Table 6-2: Description Abbreviations

MA	Milliamp
MC	Monolithic Ceramic
MF	Microfarad
MH	Millihenry
MHZ	Megahertz
MOD	Modification
MOS	Metal Oxide Semiconductor
MPS	Minimum Performance Specification
MY	Mylar
NF	Nanofarad
NPN	Negative-Positive-Negative transistor type
OCTAL	Eight
OP AMP	Operational Amplifier
ORG, ORN	Orange
OSC	Oscillator
PA	Power Amplifier
PC	Polycarbonate, Printed Circuit
PCB, PCBD	Printed Circuit Board
PENTA	Five
PF	Precision Film, Picofarad
PHP	Pan Head Phillips
PKG	Package
P/L	Parts List
PLD	Programmable Logic Device
PLL	Phase-Locked Loop
PLT	Plate
P/N	Part Number
PNP	Positive-Negative-Positive transistor type
POS	Positive, Position
PP	Paper

Table 6-2: Description Abbreviations

PRGA	Programmable Gate Array
PROM	Programmable Read Only Memory
PS	Polystyrene, Power Supply
PWR	Power
QUAD	Four
QW	Quarter Watt
RAM	Random Access Memory
RCVR	Receiver
RECPT	Receptacle
REF	Reference
REG	Regulator
RES	Resistor
RF	Radio Frequency
ROM	Read Only Memory
RX	Receive, Receiver
S	Silicon
SCH	Schematic
SCR	Screw
SFTWR	Software
SM	Silver Mica, Surface Mount
SMD	Surface Mount Device
SMT	Surface Mount Technology
S/N	Serial Number
SO, SOT	Small Outline
SPDT	Single Pole Double Throw
SPST	Single Pole Single Throw
SRAM	Synchronous Random Access Memory
STDF	Standoff
SW	Switch
S/W	Software

Table 6-2: Description Abbreviations

SYN	Synthesizer
SYNC	Synchronizer
SYS	System
TCXO	Temperature Controlled Crystal Oscillator
TERM	Terminal
TN	Tantalum
TP	Test Point
TRI	Three
TRML	Terminal
TRNSB	Transorber
TST PT	Test Point
TURR	Turret
TW	Tenth Watt
TX	Transmit, Transmitter
U	Integrated Circuit
UA	Microamp
UF	Microfarad
UH	Microhenry
UHF	Ultra High Frequency
UP	Microprocessor
V	Volt
VA, VAR	Variable
VCO	Voltage Controlled Oscillator
VIO	Violet
VHF	Very High Frequency
VLT	Voltage
W	Watt
W/	With, Width
WHT	White
WW	Wire Wound

Table 6-2: Description Abbreviations

WX	Weather
XFMR	Transformer
XMIT	Transmit, Transmitter
XSTR	Transistor
XTAL	Crystal
YEL	Yellow
Z	Zener

6.2.6 ASSEMBLY (A) COLUMN

An "A" in this column indicates that the part is a sub-assembly. Each sub-assembly has a separate parts lists following the parent assembly. If the sub-assembly is a "COMMON BOM" with a -9900, -0099, or -9999 suffix, the parts for that common assembly are included in the parent assembly parts list as a separate column.

6.2.7 UNIT OF MEASURE (UM) COLUMN

This column indicates the unit of measure for each part. Common abbreviations found in this column are listed in table 6-3.

Table 6-3: Unit of Measure Abbreviations

AR	As Required
EA	Each
FT	Foot
IN	Inch
RF	Reference Only

6.2.8 VERSION AND QUANTITY COLUMN

Individual versions of an assembly are identified by the last four digits of the P/N. The quantity of parts for individual versions are listed in separate version columns -0000 through -9999. The parts indicated in -0099, -9900, or -9999 version columns are common to all versions of the assembly and constitute the "COMMON BOM." Versions may also be called "flavors" in parts lists. The terms are interchangeable.

6.3 SOFTWARE DOCUMENTATION

Not Applicable.

Figure 6-0, while closely related to a specific product, does not represent an exact configuration in use by that product. The example has been modified to clarify certain points.

Assy: 066-04020-0203 SG464 HSI W/O WX

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	016-01006-0004	3	GLYPTAL 7526 BL	AR	1.00	
	016-01131-0000	1	CNTCT CMT BND 1055	AR	1.00	
	047-02579-0002	2	HANDLE ASSEMBLY	EA	1.00	
	" "	"	" " " "	"	"	
	047-09392-0001	0	SPACER RT W/FIN	EA	1.00	
	057-02203-0002	3	FLAVOR STCKR	EA	1.00	
	057-02203-0003	3	FLAVOR STCKR	EA	1.00	
	057-05286-0000	0	SERIAL TAG SG 464	EA	1.00	
	075-05082-0002	0	GUIDE PLATE TOP	EA	1.00	
	" "	"	" " " "	"	"	
	090-00277-0000	1	HOLD DOWN BRACKET	EA	1.00	
	155-02536-0001	1	CABLE ASSY	EA	1.00	
	200-07703-0000	2	DPX CONN BD ASSY	EA	1.00	
	200-07704-0000	8	LV PS BD ASSY	EA	1.00	
	206-00118-0301	0	EFS40/50 HSI SET	EA	1.00	<--- A

Assy: 206-00118-0301 EFS40/50 HSI SET

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	057-05287-0301	0	SW MOD TAG	EA	1.00	
	205-00564-0002	0	EFIS 40/50 I/O PBS	EA	1.00	
	205-00565-0004	0	E40/50 HSI P/D PBS	EA	1.00	<--- B

Assy: 205-00565-0004 E40/50 HSI P/D PBS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	057-02241-0016	1	IDENT LABEL	EA	1.00	
	057-05252-0565	1	IDT 205-00565-0000	EA	1.00	
	125-00602-0004	0	EFIS 40/50 NAV SDS	EA	1.00	<--- C1
	125-00603-0002	0	EFIS40/50 DSPL SDS	EA	1.00	<--- C2
	126-00019-0000	1	EFS40/50 CLIPPER	EA	1.00	<--- C3
	200-07706-0000	1	PRCSR/DSPL BD ASSY	EA	1.00	

Figure 6-0 Sample Parts List
(Sheet 1 of 4)

Assy: 200-07706-0000 PRCSR/DSPL BD ASSY

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	009-07706-0000	0	PC BD PRCSR/DSPL	EA	1.00	
	" "	"	" " " "	"	"	
	150-00004-0010	3	TUBING TFLN 22AWG	IN	2.00	
	200-04969-0000	0	EXT BD PRCSR/ADI A	RF	0.00	
	126-00005-0000	1	EFS40/50 INT LOGIC	EA	1.00	<--- D1
	126-00006-0000	1	EFS40/50 VIDEO MUX	EA	1.00	<--- D2
	126-00017-0000	1	EFS40/50 SM SET	EA	1.00	<--- D3
	126-00018-0000	1	EFS40/50 SINE SET	EA	1.00	<--- D4
C 5001	111-02104-0042	26	CAP MC100KPF50V20%	EA	1.00	
	" "	"	" " " "	"	"	
I 5005	122-30001-9999	0	EFS40/50 VIDEO MUX	RF	0.00	<--- D5
I 5008	122-30002-9999	0	EFS40/50 INT LOGIC	RF	0.00	<--- D6
	" "	"	" " " "	"	"	
I 5036	122-30003-9999	0	EFS40/50 SM HIGH	RF	0.00	<--- D7
I 5037	122-30004-9999	0	EFS40/50 SM LOW	RF	0.00	<--- D8
I 5038	122-30005-9999	0	EFS40/50 SINE HIGH	RF	0.00	<--- D9
I 5039	122-30006-9999	0	EFS40/50 SINE LOW	RF	0.00	<--- D10
	" "	"	" " " "	"	"	
I 5075	122-00958-9999	0	EFS40/50 CLIPPER	RF	0.00	<--- D11
	" "	"	" " " "	"	"	
I 5138	122-00918-9999	0	EFS40/50 HSI NAV-E	RF	0.00	<--- D12
I 5139	122-00919-9999	0	EFS40/50 HSI NAV-O	RF	0.00	<--- D13
	" "	"	" " " "	"	"	
I 5158	122-00920-9999	0	EFS40/50 HSI DSP-E	RF	0.00	<--- D14
I 5159	122-00921-9999	0	EFS40/50 HSI DSP-O	RF	0.00	<--- D15

Assy: 126-00005-0000 EFS40/50 INT LOGIC

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-30002-0000	0	EFS40/50 INT LOGIC	EA	1.00	

Assy: 122-30002-0000 EFS40/50 INT LOGIC

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	120-02376-0000	1	EPLD EP320 (OTP)	EA	1.00	

Assy: 125-00602-0004 EFIS 40/50 NAV SDS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-00918-0004	0	EFS40/50 HSI NAV-E	EA	1.00	
	122-00919-0004	0	EFS40/50 HSI NAV-O	EA	1.00	

Assy: 125-00603-0002 EFIS40/50 DSPL SDS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-00920-0002	0	EFS40/50 HSI DSP-E	EA	1.00	
	122-00921-0002	0	EFS40/50 HSI DSP-O	EA	1.00	

Figure 6-0 Sample Parts List
(Sheet 2 of 4)

BOM NUMBER

ASSEMBLY VERSION

200-08366-0000 MST67 IOP/DLP R: 2 MST0067A

200-08366-0000 MST67 IOP/DLP R: 2 MST0067A

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	0000	9900
	009-08366-0000	PC BD IOP/DLP	A	EA	1.00	1.00
	016-01040-0000	COATING TYPE AR		AR	1.00	1.00
	033-00114-0021	SOCKET IC DIP 28C	A	EA	3.00	3.00
	047-09680-0001	KEYING BRACKET	A	EA	3.00	3.00
	090-00087-0000	CLIP CRYSTAL		EA	1.00	1.00
	092-05003-0015	EYELET .049		EA	2.00	2.00
	126-00030-0000	MST67A ASIC SFTWR	A	EA	1.00	1.00
C 9001	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
C 9002	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
C 9003	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
CR 9001	007-06180-0000	DIO SW MMBD6050		EA	1.00	1.00
CR 9002	007-08092-0000	QUAD SD DIODE		EA	1.00	1.00
CR 9003	007-08092-0000	QUAD SD DIODE		EA	1.00	1.00
DS 9001	007-06408-0000	COM CATH 7 SEG LED		EA	1.00	1.00
J 9002	030-02174-0000	PIN CONT		EA	50.00	1.00
P 9003	155-02688-0003	RIBBON CABLE ASSY	A	EA	1.00	1.00
Q 9003	007-00065-0001	XSTR 2N3906 (SOT)		EA	1.00	1.00
Q 9006	007-00383-0004	SOT-23 2N2222A XST		EA	1.00	1.00
Q 9011	007-00530-0000	XSTR NPN MMBT3903	A	EA	1.00	1.00
R 9001	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9002	015-00207-0020	OCTAL SO RESISTOR		EA	1.00	1.00
R 9003	130-05472-0023	RES CHIP 4.7KEW5%		EA	1.00	1.00
R 9004	130-05471-0023	RES CHIP 470EW5%		EA	1.00	1.00
R 9005	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9006	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9007	130-05000-0025	RES CHIP 0 EW CJ		EA	1.00	1.00
TP 9001	008-00096-0001	TERMINAL TEST PNT		EA	1.00	1.00
TP 9002	008-00096-0001	TERMINAL TEST PNT		EA	1.00	1.00
U 9001	120-02208-0004	UPRGSSR 10MHZ16B.T	A	EA	1.00	1.00
U 9002	120-06129-0009	6264-15 8K X 8 RAM		EA	1.00	1.00
U 9003	120-06129-0009	6264-15 8K X 8 RAM		EA	1.00	1.00
U 9004	122-01195-9999	*MST67 PRGMD ODD	A	RF	X.	
U 9005	122-01194-9999	*MST67 PRGMD EVEN	A	RF	X.	
U 9006	124-00574-0003	IC 74HCT574		EA	1.00	1.00
U 9007	123-00138-0003	74HC138 SO PKG		EA	1.00	1.00
Y 9001	044-00009-0019	XTAL 14.75MHZ		EA	1.00	1.00
Y 9002	044-00293-0000	20 MHZ OSC		EA	1.00	1.00

PROGRAMMABLE DEVICE SET

UNIT OF MEASURE

REFERENCE DESIGNATOR

QUANTITY

PART NUMBER

DESCRIPTION

Figure 6-0 Sample Parts List
(Sheet 3 of 4)

BOM NUMBER/DESCRIPTION/REVISION

DESCRIPTION

ASSEMBLY VERSION

UNIT OF MEASURE

REFEERENCE DESIGNATOR

QUANTITY

PART NUMBER

FIND NUMBER

200-09229-0000 GP BOARD, FPD500 REV 4

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C2001	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
C2002	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
C2003	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
R2038	139-03241-0000		RES CH 3.24K EW 1%	EA	1.00
R2039	139-02430-0000		RES CH 243 EW 1%	EA	1.00
R2040	139-00750-0000		RES CH 75.0 EW 1%	EA	1.00
TP2001	008-00309-0000		TEST POINT SURF MN	EA	1.00
TP2002	008-00309-0000		TEST POINT SURF MN	EA	1.00
U2005	12051354-0001		PP-IC,UPD482234G5-	EA	1.00
U2006	12051354-0001		PP-IC,UPD482234G5-	EA	1.00
U2021	12061010-0001		SI-IC,MEMORY CNTLR	EA	1.00
U2022	12061014-0001		SI-IC,DSP.CONTROLL	EA	1.00
Y2001	04416054-0015		XTAL OSC,36.000MHZ	EA	1.00
Y2002	04416054-0014		XTAL OSC,20.000MHZ	EA	1.00
	002-09229-0000		GP BOARD	RF	0.00
	009-09229-0000	1	GP BOARD	EA	1.00
	01243055-0001	2	INSULATOR,THERMAL	EA	3.00
	01250068-0001	3	SPACER, HEADER	EA	6.00
	016-01040-0000		COATING TYPE AR	AR	1.00
	016-01442-0000	4	E-6000 CLEAR SEALA	AR	1.00
	192-09229-0000		GP BOARD	RF	0.00
	300-09229-0000		GP BOARD, FPD500	RF	0.00
	34050-0084	6	SPACER,THD'D	EA	2.00
	46086-0007	5	SCREW,CAPTIVE,4-40	EA	3.00

Figure 6-0 Sample Parts List
(Sheet 4 of 4)

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6.4 ILLUSTRATED PARTS LIST

BOM 1: KI 208, KI 209 Navigation Indicator

066-3056-00	KI 208 INDICATOR	REV BC
066-3056-01	KI 209 INDICATOR	REV BC
066-3056-02	KI 208 INDICATOR W/ AR LENS	REV AC
066-3056-03	KI 209 INDICATOR W/ AR LENS	REV AC
066-3056-99	KI 208, KI 209 COMMON BOM	REV AE

SYMBOL	PART_NUMBER	DESCRIPTION	UM	KI208 -00	KI209 -01	KI208 -02	KI209 -03	COM -99
–	012-01021-0006	TAPE ELEC 3/8 WD	AR	-	-	-	-	1
–	016-01015-0000	IND ADH 3M 4475	AR	-	-	-	-	1
–	016-01068-0000	ANTI STATIC CRM	AR	-	-	-	-	1
–	016-01082-0000	DC RTV 3145	AR	-	-	-	-	1
–	025-00003-0002	WIRE 22 RED	IN	-	-	-	-	7.2
–	025-00018-0000	WIRE 26 BLK	IN	-	-	-	-	3.6
–	025-00018-0003	WIRE 26 BK/OR	IN	-	-	-	-	7.2
–	025-00018-0011	WIRE 26 BRN	IN	-	-	-	-	7.2
–	025-00018-0011	WIRE 26 BRN	IN	-	-	-	-	3.6
–	025-00018-0014	WIRE 26 BN/YL	IN	-	-	-	-	3.6
–	025-00018-0019	WIRE 26 BN/WH	IN	-	-	-	-	7.2
–	025-00018-0022	WIRE 26 RED	IN	-	-	-	-	7.2
–	025-00018-0022	WIRE 26 RED	IN	-	-	-	-	3.6
–	025-00018-0023	WIRE 26 RD/OR	IN	-	-	-	-	7.2
–	025-00018-0024	WIRE 26 RD/YL	IN	-	-	-	-	3.6
–	025-00018-0033	WIRE 26 ORG	IN	-	-	-	-	7.2
–	025-00018-0033	WIRE 26 ORG	IN	-	-	-	-	3.6
–	025-00018-0039	WIRE 26 OR/WH	IN	-	-	-	-	7.2
–	025-00018-0044	WIRE 26 YEL	IN	-	-	-	-	7.2
–	025-00018-0044	WIRE 26 YEL	IN	-	-	-	-	3.6
–	025-00018-0055	WIRE 26 GRN	IN	-	-	-	-	7.2
–	025-00018-0055	WIRE 26 GRN	IN	-	-	-	-	3.6
–	025-00018-0059	WIRE 26 GN/WH	IN	-	-	-	-	7.2
–	025-00018-0066	WIRE 26 BLU	IN	-	-	-	-	3.6
–	025-00018-0077	WIRE 26 VIO	IN	-	-	-	-	3.6
–	025-00018-0088	WIRE 26 GRY	IN	-	-	-	-	8.4
–	025-00018-0088	WIRE 26 GRY	IN	-	-	-	-	3.6
–	025-00018-0089	WIRE 26 GY/WH	IN	-	-	-	-	8.4
–	025-00018-0099	WIRE 26 WHT	IN	-	-	-	-	3.6
–	029-00022-0000	GEAR CLMP	EA	-	-	-	-	1
–	029-00287-0001	GEAR RING 64P	EA	-	-	-	-	1
–	029-00288-0000	GEAR IDLR 24T/64DP	EA	-	-	-	-	1
–	029-00289-0000	GEAR DRVR 24T	EA	-	-	-	-	1
–	029-00290-0000	GEAR SPUR 165T	EA	-	-	-	-	1
–	030-01099-0000	PIN CONTACT	EA	-	4	-	4	8
–	030-02227-0015	CONNECTOR	EA	-	4	-	4	8
–	035-01361-0006	PROTECTIVE CVR	EA	-	-	-	-	1
–	047-04090-0004	SHLD RF ASSY	EA	1	-	1	-	-
–	047-04090-0005	SHLD RF ASSY	EA	-	1	-	1	-
–	047-04091-0001	CVR DUST	EA	-	-	-	-	2
–	047-04151-0001	STRAP GROUND W/F	EA	-	-	-	-	2
–	047-04152-0001	REAR PLATE W/F	EA	-	-	-	-	1
–	057-01199-0002	MOD TAG	EA	-	-	-	-	1
–	057-01831-0000	CAUTION TAG	EA	-	-	-	-	1
–	057-02203-0000	FLAVOR STCKR	EA	1	-	-	-	-
–	057-02203-0001	FLAVOR STCKR	EA	-	1	-	-	-

SYMBOL	PART_NUMBER	DESCRIPTION	UM	KI208 -00	KI209 -01	KI208 -02	KI209 -03	COM -99
_	057-02203-0002	FLAVOR STCKR	EA	-	-	1	-	-
_	057-02203-0003	FLAVOR STCKR	EA	-	-	-	1	-
_	057-02337-0000	PRTCTV CVR DECAL	EA	-	-	-	-	1
_	057-03511-0001	DECAL, CAUTION	EA	-	-	-	-	1
_	057-05701-0001	DECAL, WARNING PLASTIC	EA	-	-	-	-	1
_	057-05967-0002	S/N TAG, KI 209	EA	-	1	-	1	-
_	057-05968-0002	S/N TAG, KI 208	EA	1	-	1	-	-
_	066-03056-0099	COMMON BOM	EA	1	1	1	1	-
_	076-00727-0000	POST IDLER	EA	-	-	-	-	1
_	088-00193-0004	FLTR LMP LGT BLU	EA	-	-	-	-	1
_	088-00480-0002	BEZEL	EA	-	-	-	-	1
_	088-00481-0002	FRONT MTG PLATE	EA	-	-	-	-	1
_	088-00695-0005	AZ DIAL CRD W/P&HS	EA	-	-	-	-	1
_	088-00697-0001	KNOB W/F - OBS	EA	-	-	-	-	1
_	088-00698-0000	CARRIER PC BRD	EA	-	-	-	-	2
_	088-00699-0000	COVER CONN BCK	EA	-	-	-	-	1
_	088-00700-0000	CHASSIS MNTG	EA	-	-	-	-	1
_	088-00701-0000	WEDGE LIG	EA	1	1	-	-	-
_	088-00701-0001	WEDGE LIGHTING	EA	-	-	1	1	-
_	089-02076-0030	NUT FLAT 4-40	EA	-	-	-	-	6
_	089-02322-0000	NUT SPD PUSH-ON	EA	-	-	-	-	1
_	089-02357-0000	NUT TORQUE 4-40	EA	-	-	-	-	3
_	089-05436-0012	SCR, MACH, 4-40, PH 82	EA	-	-	-	-	3
_	089-05878-0006	SCR PHP 4-40 X 3/8	EA	-	-	-	-	5
_	089-05903-0004	SCR PHP 4-40X1/4	EA	-	-	-	-	2
_	089-06022-0006	SCR SHC 2-56X3/8	EA	-	-	-	-	1
_	089-06167-0012	SCR FHP 6-32X3/4	EA	-	-	-	-	3
_	089-06218-0006	SCR SET 4-40X3/32	EA	-	-	-	-	2
_	089-06293-0003	SCR PHP 3-48X3/16	EA	-	-	-	-	4
_	089-06414-0004	SCR PHP 2-28X1/4	EA	-	-	-	-	11
_	089-06414-0005	SCR PHP 2-28X5/16	EA	-	-	-	-	8
_	089-06484-0004	SCR FHP 2-28X1/4	EA	-	-	-	-	4
_	089-08003-0034	WSHR SPLT LK #4	EA	-	-	-	-	5
_	089-08018-0037	WSHR INTL LK #10	EA	-	-	-	-	1
_	089-08023-0030	WSHR FLT STD #2	EA	3	-	3	-	-
_	089-08024-0030	WSHR FLT STD #3	EA	-	-	-	-	3
_	089-08074-0030	WSHR FLT STD .106	EA	-	-	-	-	3
_	089-08105-0004	WSHR SPR 2.500	EA	-	-	-	-	1
_	090-00038-0000	SPRING WSHR .240	EA	-	-	-	-	1
_	090-00160-0000	SCKT LAMP INSUL	EA	-	-	-	-	1
_	090-00517-0001	PROTECTIVE CAP	EA	-	-	-	-	1
_	091-00033-0004	WASHER FLAT .228	EA	-	-	-	-	3
_	091-00109-0000	CABLE TIE	EA	-	-	-	-	2
_	091-00156-0000	BUSHING	EA	-	-	-	-	1
_	091-00203-0003	SCR FHS 0-80X.187	EA	-	-	-	-	3
_	091-00286-0002	INSUL XSTR .687	EA	-	-	-	-	1
_	150-00020-0010	TUBING SHRINK 18G	IN	-	-	-	-	7.2
_	187-01060-0001	GSKT LGT WEDGE	EA	-	-	-	-	1
_	200-05848-0001	KI 208/209 CONVERTER #	EA	-	-	-	-	1
_	200-05849-0010	KI208/209 CONVERTER #2	EA	-	-	-	-	1
DS101	037-00007-0016	LMP 336 T1-3/4 14	EA	-	-	-	-	1
DS102	037-00032-0009	LMP 646E T1-1/4 14	EA	-	-	-	-	1
J2081	030-02227-0001	CONN SMS12R-1	EA	-	-	-	-	1
L102	013-00006-0000	FERR BEAD	EA	-	-	-	-	1
L103	013-00006-0000	FERR BEAD	EA	-	1	-	1	-
L104	013-00006-0000	FERR BEAD	EA	-	-	-	-	1

SYMBOL	PART_NUMBER	DESCRIPTION	UM	KI208 -00	KI209 -01	KI208 -02	KI209 -03	COM -99
L105	013-00006-0000	FERR BEAD	EA	-	-	-	-	1
L106	013-00006-0000	FERR BEAD	EA	-	1	-	1	-
L107	013-00006-0000	FERR BEAD	EA	-	-	-	-	1
L108	013-00006-0000	FERR BEAD	EA	-	-	-	-	1
L109	013-00006-0000	FERR BEAD	EA	-	1	-	1	-
L110	013-00006-0000	FERR BEAD	EA	-	-	-	-	1
L111	013-00006-0000	FERR BEAD	EA	-	-	-	-	1
L112	013-00006-0000	FERR BEAD	EA	-	1	-	1	-
M101	023-00098-0001	METER ASSEMBLY	EA	1	-	1	-	-
M101	023-00125-0001	METER ASSEMBLY	EA		-1	-	1	-
Q101	007-00930-0000	XSTR S PNPMJE15029	EA	-	-	-	-	1
R101	133-00111-0000	RES VA 100M .5W	EA	-	-	-	-	1

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066-03056-0000 Rev. 28 INDICATOR ASSEMBLY
066-03056-0001 Rev. 28 INDICATOR ASSEMBLY
066-03056-0002 Rev. 2 INDICATOR ASSEMBLY
066-03056-0003 Rev. 2 INDICATOR ASSEMBLY
066-03056-0099 Rev. 12 COMMON BOARD

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY				
				-0000	-0001	-0002	-0003	-0099
	012-01021-0006	TAPE ELEC 3/8 WD	[AR]					1
	016-01015-0000	IND ADH 3M 4475	[AR]					1
	016-01068-0000	ANTI STATIC CRM	[AR]					1
	016-01082-0000	DC RTV 3145	[AR]					1
	025-00003-0002	WIRE 22 RED	[IN]					7.2
	025-00018-0003	WIRE 26 BK/OR	[IN]					7.2
	025-00018-0011	WIRE 26 BRN	[IN]					7.2
	025-00018-0019	WIRE 26 BN/WH	[IN]					7.2
	025-00018-0022	WIRE 26 RED	[IN]					7.2
	025-00018-0023	WIRE 26 RD/OR	[IN]					7.2
	025-00018-0033	WIRE 26 ORG	[IN]					7.2
	025-00018-0039	WIRE 26 OR/WH	[IN]					7.2
	025-00018-0044	WIRE 26 YEL	[IN]					7.2
	025-00018-0055	WIRE 26 GRN	[IN]					7.2
	025-00018-0059	WIRE 26 GN/WH	[IN]					7.2
	025-00018-0088	WIRE 26 GRY	[IN]					8.4
	025-00018-0089	WIRE 26 GY/WH	[IN]					8.4
	025-00025-0012	CA RBN 28G 12C	[IN]					3.6
	029-00022-0000	GEAR CLMP	[EA]					1
	029-00287-0001	GEAR RING 64P	[EA]					1
	029-00288-0000	GEAR IDLR 24T/64DP	[EA]					1
	029-00289-0000	GEAR DRVR 24T	[EA]					1
	029-00290-0000	GEAR SPUR 165T	[EA]					1
	030-01099-0000	PIN CONTACT	[EA]		4		4	8
	030-02227-0015	CONNECTOR	[EA]		4		4	8
	035-01361-0006	PROTECTIVE CVR	[EA]					1
	047-04090-0004	SHLD RF ASSY	[EA]	1		1		
	047-04090-0005	SHLD RF ASSY	[EA]		1		1	
	047-04091-0001	CVR DUST	[EA]					2
	047-04151-0001	STRAP GROUND W/F	[EA]					2
	047-04152-0001	REAR PLATE W/F	[EA]					1
	057-01199-0002	MOD TAG	[EA]					1

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SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000	-0001	-0002	-0003	-0099
	057-01831-0000	CAUTION TAG	[EA]					1
	057-01879-0002	SERIAL TAG KI208	[EA]	1		1		
	057-01880-0002	SERIAL TAG KI209	[EA]		1		1	
	057-02203-0000	FLAVOR STCKR	[EA]	1				
	057-02203-0001	FLAVOR STCKR	[EA]		1			
	057-02203-0002	FLAVOR STCKR	[EA]			1		
	057-02203-0003	FLAVOR STCKR	[EA]				1	
	057-03511-0001	DECAL_ CAUTION	[EA]					1
	066-03056-0099	COMMON BOM	[EA]	1	1	1	1	
	076-00727-0000	POST IDLER	[EA]					1
	088-00193-0004	FLTR LMP LGT BLU	[EA]					1
	088-00480-0002	BEZEL	[EA]					1
	088-00481-0002	FRONT MTG PLATE	[EA]					1
	088-00695-0005	AZ DIAL CRD W/P&HS	[EA]					1
	088-00697-0001	KNOB W/F - OBS	[EA]					1
	088-00698-0000	CARRIER PC BRD	[EA]					2
	088-00699-0000	COVER CONN BCK	[EA]					1
	088-00700-0000	CHASSIS MNTG	[EA]					1
	088-00701-0000	WEDGE LIG	[EA]	1	1			
	088-00701-0001	WEDGE LIGHTING	[EA]			1	1	
	089-02076-0030	NUT FLAT 4-40	[EA]					6
	089-02322-0000	NUT SPD PUSH-ON	[EA]					1
	089-02357-0000	NUT TORQUE 4-40	[EA]					3
	089-05436-0012	SCR FHP 4-40X3/4	[EA]					3
	089-05878-0006	SCR PHP 4-40X3/8	[EA]					5
	089-05903-0004	SCR PHP 4-40X1/4	[EA]					2
	089-06022-0006	SCR SHC 2-56X3/8	[EA]					1
	089-06167-0012	SCR FHP 6-32X3/4	[EA]					3
	089-06218-0006	SCR SET 4-40X3/32	[EA]					2
	089-06293-0003	SCR PHP 3-48X3/16	[EA]					4
	089-06414-0004	SCR PHP 2-28X1/4	[EA]					11
	089-06414-0005	SCR PHP 2-28X5/16	[EA]					8
	089-06484-0004	SCR FHP 2-28X1/4	[EA]					4
	089-08003-0034	WSHR SPLT LK #4	[EA]					5
	089-08018-0037	WSHR INTL LK #10	[EA]					1
	089-08023-0030	WSHR FLT STD #2	[EA]	3		3		
	089-08024-0030	WSHR FLT STD #3	[EA]					3
	089-08074-0030	WSHR FLT STD .106	[EA]					3

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SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000	-0001	-0002	-0003	-0099
	089-08105-0004	WSHR SPR 2.500	[EA]					1
	090-00038-0000	SPRING WSHR .240	[EA]					1
	090-00160-0000	SCKT LAMP INSUL	[EA]					1
	091-00033-0004	WASHER FLAT .228	[EA]					3
	091-00109-0000	CABLE TIE .234	[AR]					0
	091-00156-0000	BUSHING	[EA]					1
	091-00203-0003	SCR FHS 0-80X.187	[EA]					3
	091-00286-0002	INSUL XSTR .687	[EA]					1
	150-00020-0010	TUBING SHRINK 18G	[IN]					7.2
	187-01060-0001	GSKT LGT WEDGE	[EA]					1
	200-05848-0000	CONVERTER BD #1	[EA]					1
	200-05849-0000	CONVERTER BD #2	[EA]					1
DS 101	037-00007-0016	LMP 336 T1-3/4 14	[EA]					1
DS 102	037-00032-0009	LMP 646E T1-1/4 14	[EA]					1
J 2081	030-02227-0001	CONN SMS12R-1	[EA]					1
L 102	013-00006-0000	FERR BEAD	[EA]					1
L 103	013-00006-0000	FERR BEAD	[EA]		1		1	
L 104	013-00006-0000	FERR BEAD	[EA]					1
L 105	013-00006-0000	FERR BEAD	[EA]					1
L 106	013-00006-0000	FERR BEAD	[EA]		1		1	
L 107	013-00006-0000	FERR BEAD	[EA]					1
L 108	013-00006-0000	FERR BEAD	[EA]					1
L 109	013-00006-0000	FERR BEAD	[EA]		1		1	
L 110	013-00006-0000	FERR BEAD	[EA]					1
L 111	013-00006-0000	FERR BEAD	[EA]					1
L 112	013-00006-0000	FERR BEAD	[EA]		1		1	
M 101	023-00125-0000	MTR ASSY	[EA]		1		1	
M 101	023-00098-0000	MTR FLAG	[EA]	1		1		
Q 101	007-00930-0000	XSTR S PNPMJE15029	[EA]					1
R 101	133-00111-0000	RES VA 100M .5W	[EA]					1

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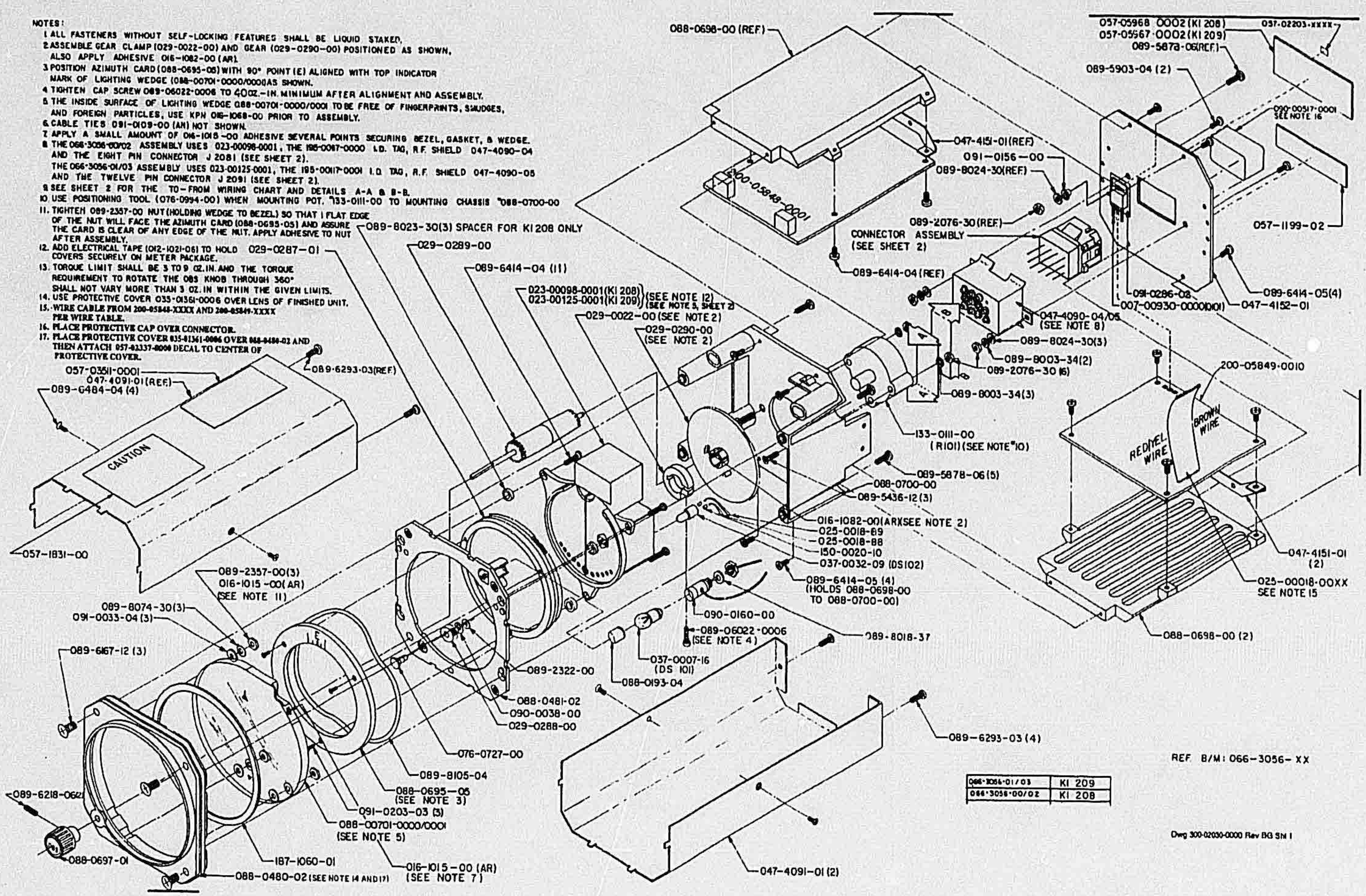
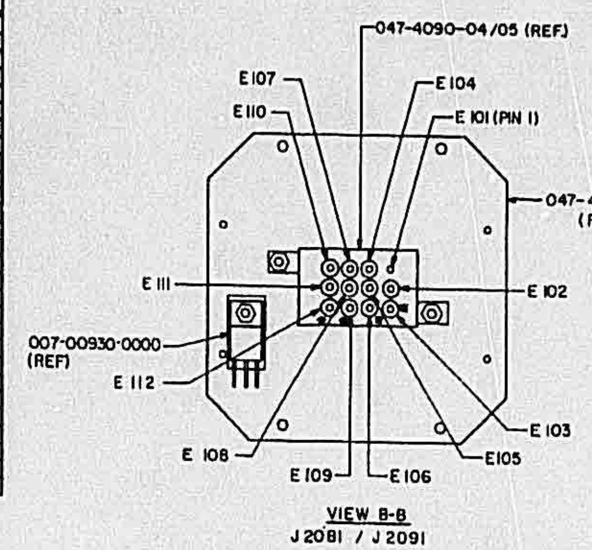
NOTES:
1. ALL FASTENERS WITHOUT SELF-LOCKING FEATURES SHALL BE LIQUID STAKED.
2. ASSEMBLE GEAR CLAMP (029-0022-00) AND GEAR (029-0290-00) POSITIONED AS SHOWN, ALSO APPLY ADHESIVE 016-1082-00 (AR).
3. POSITION AZIMUTH CARD (088-0695-05) WITH 90° POINT (E) ALIGNED WITH TOP INDICATOR MARK OF LIGHTING WEDGE (088-00701-0000/0001) AS SHOWN.
4. TIGHTEN CAP SCREW 089-06022-0006 TO 4 OZ.-IN. MINIMUM AFTER ALIGNMENT AND ASSEMBLY.
5. THE INSIDE SURFACE OF LIGHTING WEDGE 088-00701-0000/0001 TO BE FREE OF FINGERPRINTS, SMUDGES, AND FOREIGN PARTICLES, USE KPN 016-1068-00 PRIOR TO ASSEMBLY.
6. CABLE TIES 091-0109-00 (AR) NOT SHOWN.
7. APPLY A SMALL AMOUNT OF 016-1015-00 ADHESIVE SEVERAL POINTS SECURING BEZEL, GASKET, & WEDGE.
8. THE 066-3056-00/02 ASSEMBLY USES 023-00098-0001, THE 195-0087-0000 I.D. TAG, R.F. SHIELD 047-4090-04 AND THE EIGHT PIN CONNECTOR J 2081 (SEE SHEET 2).
THE 066-3056-01/03 ASSEMBLY USES 023-00125-0001, THE 195-00117-0001 I.D. TAG, R.F. SHIELD 047-4090-05 AND THE TWELVE PIN CONNECTOR J 2091 (SEE SHEET 2).
9. SEE SHEET 2 FOR THE TO-FROM WIRING CHART AND DETAILS A-A & B-B.
10. USE POSITIONING TOOL (076-0994-00) WHEN MOUNTING POT. 133-0111-00 TO MOUNTING CHASSIS 088-0700-00
11. TIGHTEN 089-2357-00 NUT (HOLDING WEDGE TO BEZEL) SO THAT 1 FLAT EDGE OF THE NUT WILL FACE THE AZIMUTH CARD (088-0695-05) AND ASSURE THE CARD IS CLEAR OF ANY EDGE OF THE NUT. APPLY ADHESIVE TO NUT AFTER ASSEMBLY.
12. ADD ELECTRICAL TAPE (012-1021-06) TO HOLD COVERS SECURELY ON METER PACKAGE.
13. TORQUE LIMIT SHALL BE 3 TO 9 OZ.IN. AND THE TORQUE REQUIREMENT TO ROTATE THE OBS KNOB THROUGH 360° SHALL NOT VARY MORE THAN 3 OZ.IN WITHIN THE GIVEN LIMITS.
14. USE PROTECTIVE COVER 035-01361-0006 OVER LENS OF FINISHED UNIT.
15. WIRE CABLE FROM 200-05848-XXXX AND 200-05849-XXXX PER WIRE TABLE.
16. PLACE PROTECTIVE CAP OVER CONNECTOR.
17. PLACE PROTECTIVE COVER 035-01361-0006 OVER 088-0480-02 AND THEN ATTACH 057-02337-0000 DECAL TO CENTER OF PROTECTIVE COVER.

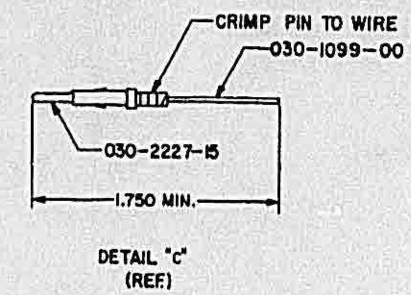


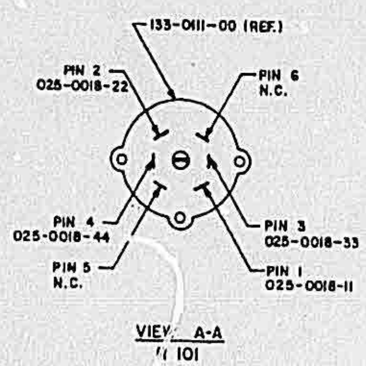
066-3056-01/03	KI 209
066-3056-00/02	KI 208

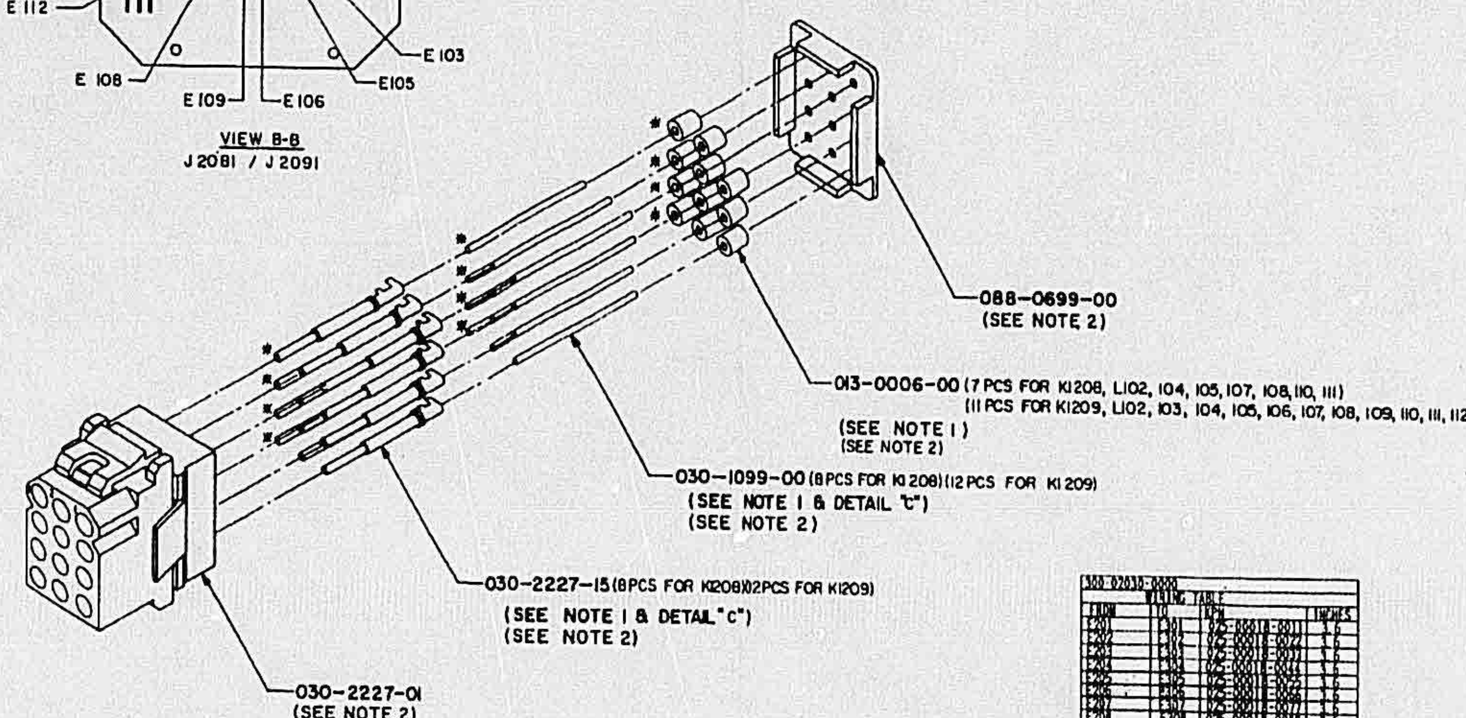
FIGURE 6-1 Final Assembly KI 208, KI 209 (Sheet 1 of 2)
(Dwg No 300-02030-0000, Rev BG, Sht 1)

WIRING INFORMATION					
FROM	TO	PART NO.	DESCRIPTION	LENGTH	REMARKS
E 102	E 213	025-0018-55	#26 GRN	7.2"	COMPOSITE INPUT
#M103	E 103	COMPONENT WIRE	RED / YEL.	1.2"	+ UP DEFLECTION
E 104	E 214	025-0018-59	#26 GRN / WHT	7.2"	ILS ENG INPUT
E 105	E 319	025-0018-39	#26 ORN / WHT	7.2"	+28V LIGHTS HIGH
#M103	E 106	COMPONENT WIRE	BLK / YELLOW	1.2"	+ DOWN DEFLECTION
E107	E 320	025-0018-19	#26 BRN/WHT	7.2"	+ 14V LIGHTS HIGH
E 108	E 324	025-0003-02	#22 RED	7.2"	AIRCRAFT POWER INPUT
#M104	E 109	COMPONENT WIRE	YEL / RED	1.2"	+ GLIDE SLOPE FLAG
E 110	E 322	025-0018-03	#26 BLK/ORN	7.2"	+ LEFT DEFLECTION
E 111	E 321	025-0018-23	#26 RED/ORN	7.2"	+ RIGHT DEFLECTION
#M104	E 112	COMPONENT WIRE	YEL / BLK	1.2"	− GLIDE SLOPE FLAG
E 317	DS 101	NOTE 4	WHITE	8.4"	LIGHT HIGH
E 313	DS 101	NOTE 4	BLACK	8.4"	LIGHT LOW
E 316	M102	NOTE 3	WHT / RED	8.4"	+ TO
E 318	M102	NOTE 3	WHT / BLK	8.4"	+ FROM
E 314	M 101	NOTE 3	BLK / WHT	8.4"	+ LEFT DEFLECTION
E 315	M 101	NOTE 3	RED / WHT	8.4"	+ RIGHT DEFLECTION
R101-1	E216	025-0018-11	#26 BRN	7.2"	SIN / COS POT HI
R101-2	E218	025-0018-22	#26 RED	7.2"	SIN / COS POT LOW
R101-3	E217	025-0018-33	#26 ORN	7.2"	SIN / COS POT SIN Θ
R101-4	E215	025-0018-44	#26 YEL	7.2"	SIN / COS POT COS Θ
E 101	CHASSIS	———	GROUND	———	SOLDER PIN TO R.F. SHIELD
DS102	E325	025-0018-88	#26 GRAY	8.4"	
DS102	E326	025-0018-89	#26 GRAY/WHT	8.4"	
CONN 1	CONN 2	025-0025-12	12 RIBBON CABLE	3.6	BETWEEN PC BOARDS









300-02030-0000			
WIRING TABLE			
FROM	TO	KPN	INCHES
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]
[illegible]	[illegible]	[illegible]	[illegible]

NOTES:
1. *THESE ITEMS ARE DELETED ON THE KI 208 (066-03056-0000) ASSEMBLY.
2. TO SIMPLIFY THE REPAIR OF DAMAGED CONNECTORS THE FOLLOWING COMPLETE CONNECTOR ASSEMBLIES CAN BE ORDERED:
   FOR THE KI 208 - 230-00208-0091
   FOR THE KI 209 - 230-00209-0091
3. COMPONENT WIRE IS PART OF ASSEMBLY NO. 023-00098-0001 (KI 208), & 023-00125-0001 (KI 209).
4. COMPONENT WIRE IS PART OF ASSEMBLY NO. 090-00160-0000.
5. M102 - M104 ARE PART OF M101 ASSEMBLY (023-00098-0001 OR 023-00125-0001).

Dwg 300-02030-0000 Rev BG Sht 2

FIGURE 6-1 Final Assembly KI 208, KI 209 (Sheet 2 of 2)
(Dwg No 300-02030-0000, Rev BG, Sht 2)

NOTES:

1. ALL FASTENERS WITHOUT SELF-LOCKING FEATURES SHALL BE LIQUID STAKED.
2. ASSEMBLE GEAR CLAMP (029-0022-00) AND GEAR (029-0290-00) POSITIONED AS SHOWN. ALSO APPLY ADHESIVE 016-1082-00 (AR).
3. POSITION AZIMUTH CARD (088-0695-05) WITH 90° POINT (E) ALIGNED WITH TOP INDICATOR MARK OF LIGHTING WEDGE (088-0701-00) AS SHOWN.
4. TIGHTEN CAP SCREW 089-5373-02 TO 26 OZ.-IN. ± 2 OZ.-IN. AFTER ALIGNMENT AND ASSEMBLY.
5. THE INSIDE SURFACE OF LIGHTING WEDGE 088-0701-00 TO BE FREE OF FINGERPRINTS, SMUDGES, AND FOREIGN PARTICLES, USE KPM 016-1086-00 PRIOR TO ASSEMBLY.
6. CABLE TIES 091-0109-00 (AR) NOT SHOWN.
7. APPLY A SMALL AMOUNT OF 016-1063-00 ADHESIVE SEVERAL POINTS SECURING BEZEL, GASKET, & WEDGE.
8. THE 066-3056-00 ASSEMBLY USES 023-0098-00, THE 057-1879-01 I.D. TAG, R.F. SHIELD 047-4090-04 AND THE EIGHT PIN CONNECTOR J 2081 (SEE SHEET 2).
   THE 066-3056-01 ASSEMBLY USES 023-0125-00, THE 057-1880-01 I.D. TAG, R.F. SHIELD 047-4090-05 AND THE TWELVE PIN CONNECTOR J 2091 (SEE SHEET 2).
9. SEE SHEET 2 FOR THE TO-FROM WIRING CHART AND DETAILS A-A & B-B.
10. USE POSITIONING TOOL (076-0894-00) WHEN MOUNTING POT. °133-0111-00 TO MOUNTING CHASSIS °088-0700-00
11. TORQUE LIMIT OF 089-2357-00 NUT (HOLDING WEDGE TO BEZEL) SHALL BE 6 OZ-IN. APPLY ADHESIVE TO NUT AFTER ASSEMBLY.
12. ADD MYLAR TAPE TO HOLD COVERS SECURELY ON METER PACKAGE.

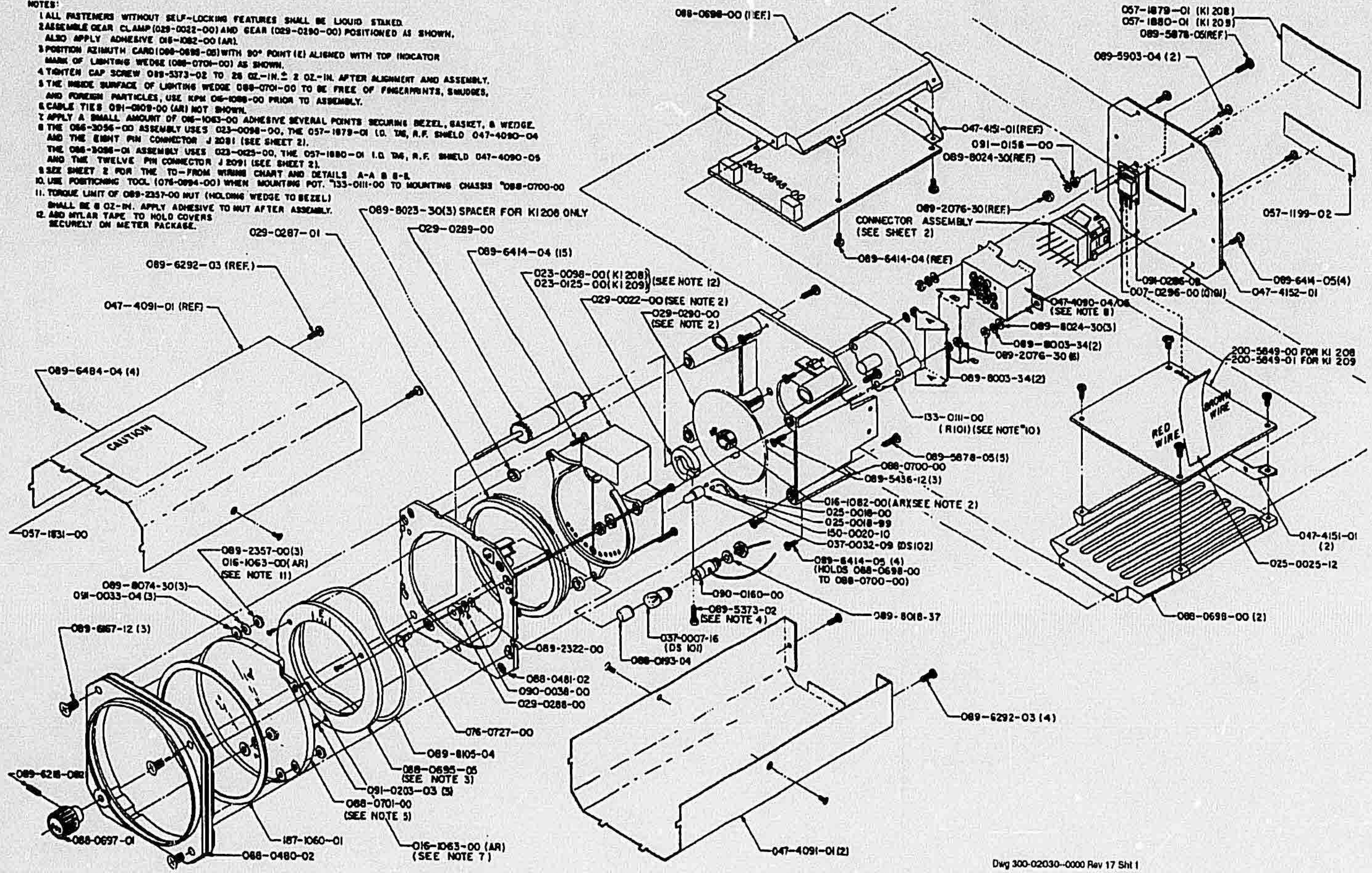
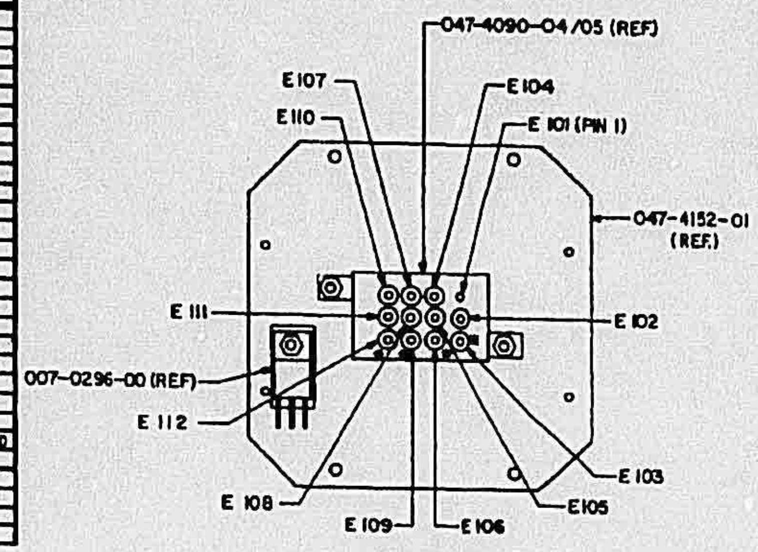
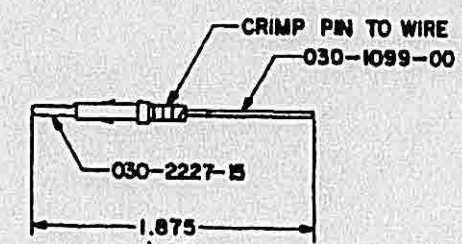


FIGURE 6-2 Final Assembly KI 208, KI 209 (Sheet 1 of 2)
(Dwg No 300-02030-0000, Rev 17 Sht 1)

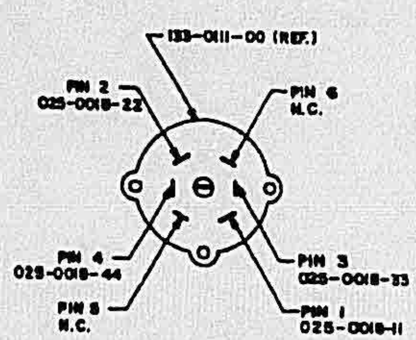
WIRING INFORMATION						
	FROM	TO	PART NO.	DESCRIPTION	LENGTH	REMARKS
	[illegible]	[illegible]	[illegible]	#26 ORN	.60	COMPOSITE INPUT
	[illegible]	E 105	[illegible]	RED / YEL.	1.0	+ UP DEFLECTION
	E 104	[illegible]	[illegible]	#26 ORN / WHT	.60	ILS ENG INPUT
	E 108	E 319	[illegible]	#26 ORN / WHT	.60	+28V LIGHTS HIGH
	[illegible]	E 106	[illegible]	BLK / YELLOW	1.0	+ DOWN DEFLECTION
	E 107	[illegible]	[illegible]	#26 BRN / WHT	.60	+14V LIGHTS HIGH
	[illegible]	[illegible]	[illegible]-0003-[illegible]	#22 RED	.60	AIRCRAFT POWER INPUT
	[illegible]	E 109	[illegible]	YEL / RED	1.0	+ GLIDE SLOPE FLAG
	E 110	[illegible]	[illegible]	#26 BLK / ORN	.60	+ LEFT DEFLECTION
	E 111	[illegible]	[illegible]	#26 RED / ORN	.60	+ RIGHT DEFLECTION
	[illegible]	E 112	[illegible]	YEL / BLK	1.0	− GLIDE SLOPE FLAG
	[illegible]	[illegible]	" "	WHITE	.70	LIGHT HIGH
	[illegible]	[illegible]	" "	BLACK	.70	LIGHT LOW
	[illegible]	M102	" "	WHT / RED	.70	+ TO
	[illegible]	M102	" "	WHT / BLK	.70	+ FROM
	[illegible]	M101	" "	BLK / WHT	.70	+ LEFT DEFLECTION
	[illegible]	M101	" "	RED / WHT	.70	+ RIGHT DEFLECTION
	R 101-1	[illegible]	025-0018-11	#26 BRN	.60	SIN / COS POT HI
	R 101-2	[illegible]	025-0018-22	#26 RED	.60	SIN / COS POT LOW
	R 101-3	E 317	025-0018-33	#26 ORN	.60	SIN / COS POT SIN ⊖
	R 101-4	[illegible]	025-0018-44	#26 YEL	.60	SIN / COS POT COS ⊖
	E 101	CHASSIS	——	GROUND	——	SOLDER PIN TO R.F. SHIELD
●	[illegible]	[illegible]	025-0018-99	#26 WHT	.70	
●	[illegible]	[illegible]	025-0018-00	#26 BLK	.70	



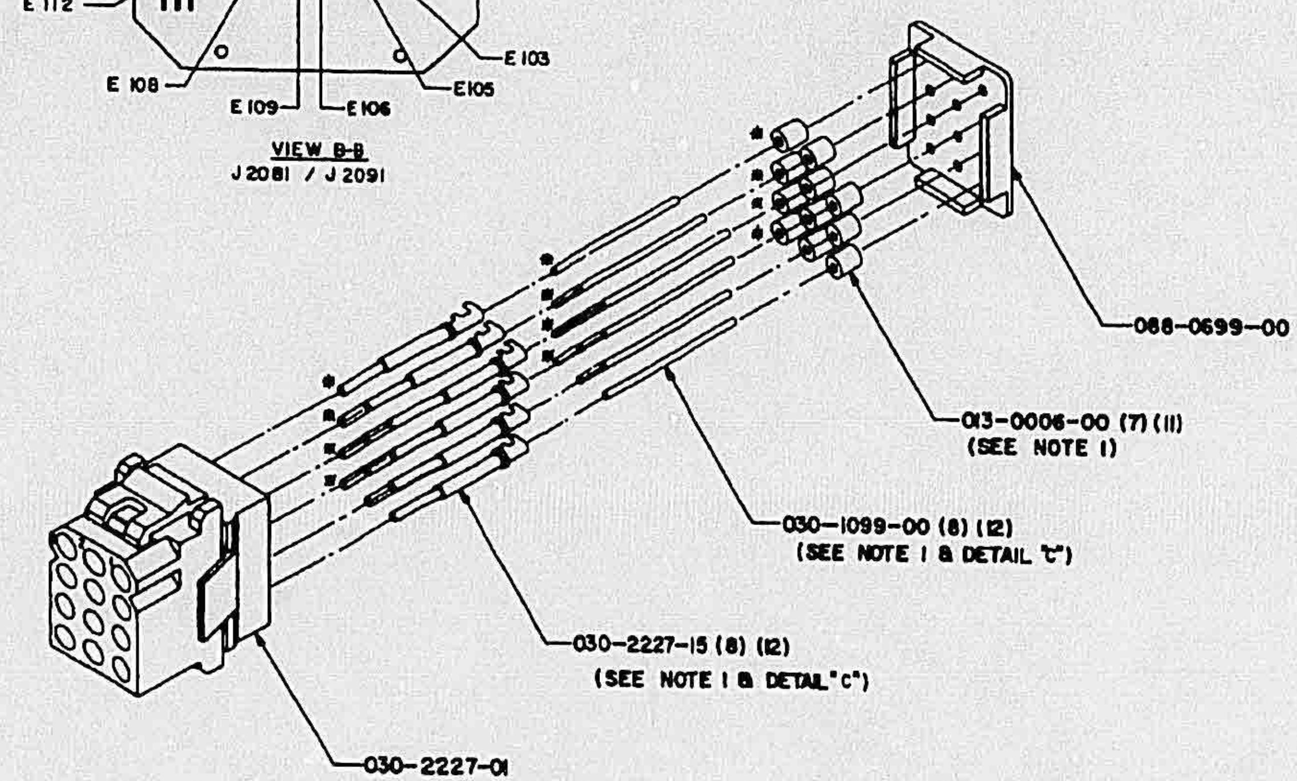
VIEW B-B
J 2081 / J 2091



DETAIL "C"
(REF)



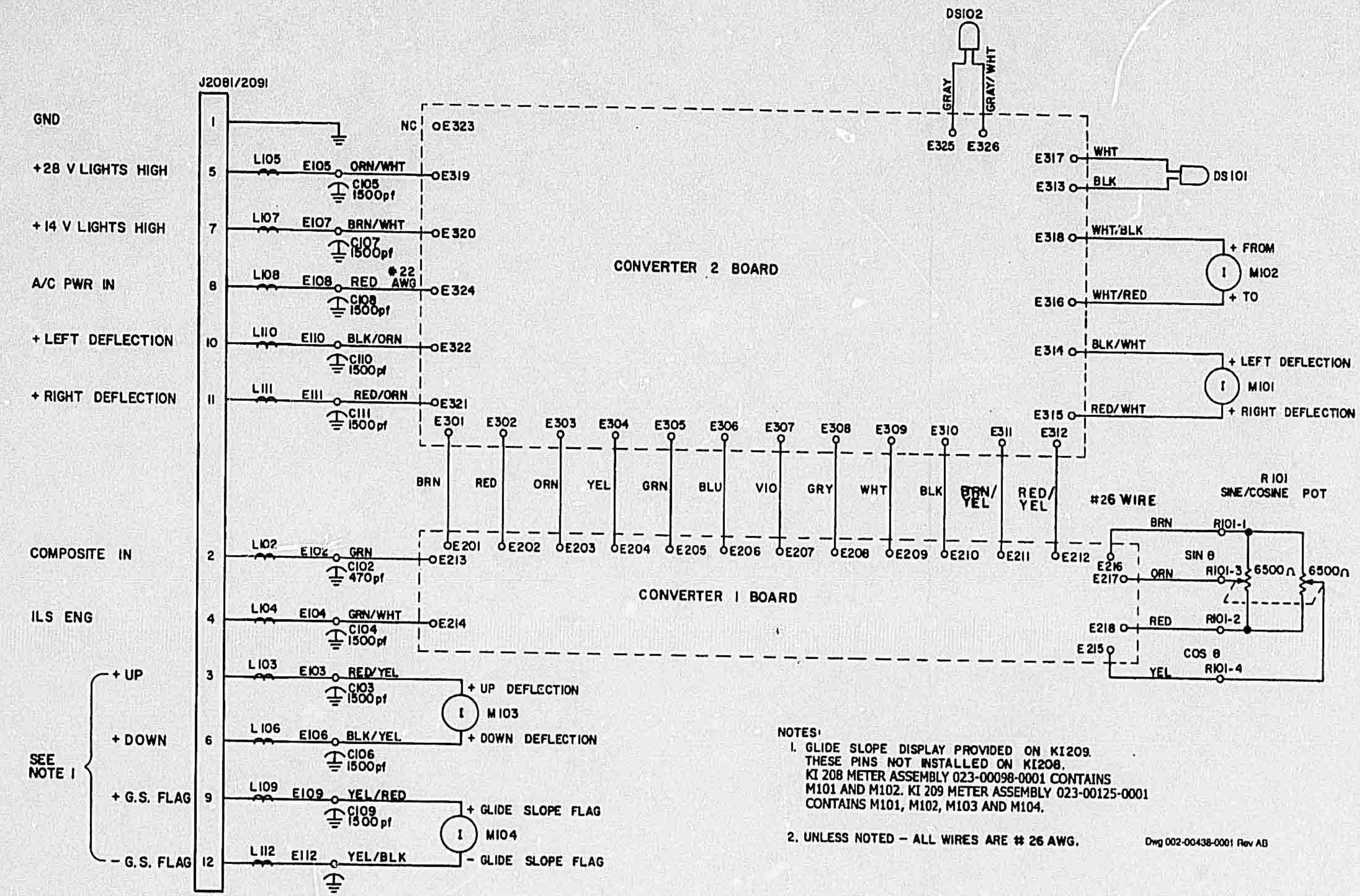
VIEW A-A
R 101



NOTES:
1. ● THESE ITEMS DELETED ON THE KI 208 (066-3056-00) ASSEMBLY.

Dwg 300-02030-0000 Rev 17 Sht 2

FIGURE 6-2 Final Assembly KI 208, KI 209 (Sheet 2 of 2)
(Dwg No 300-02030-0000, Rev 17, Sht 2)

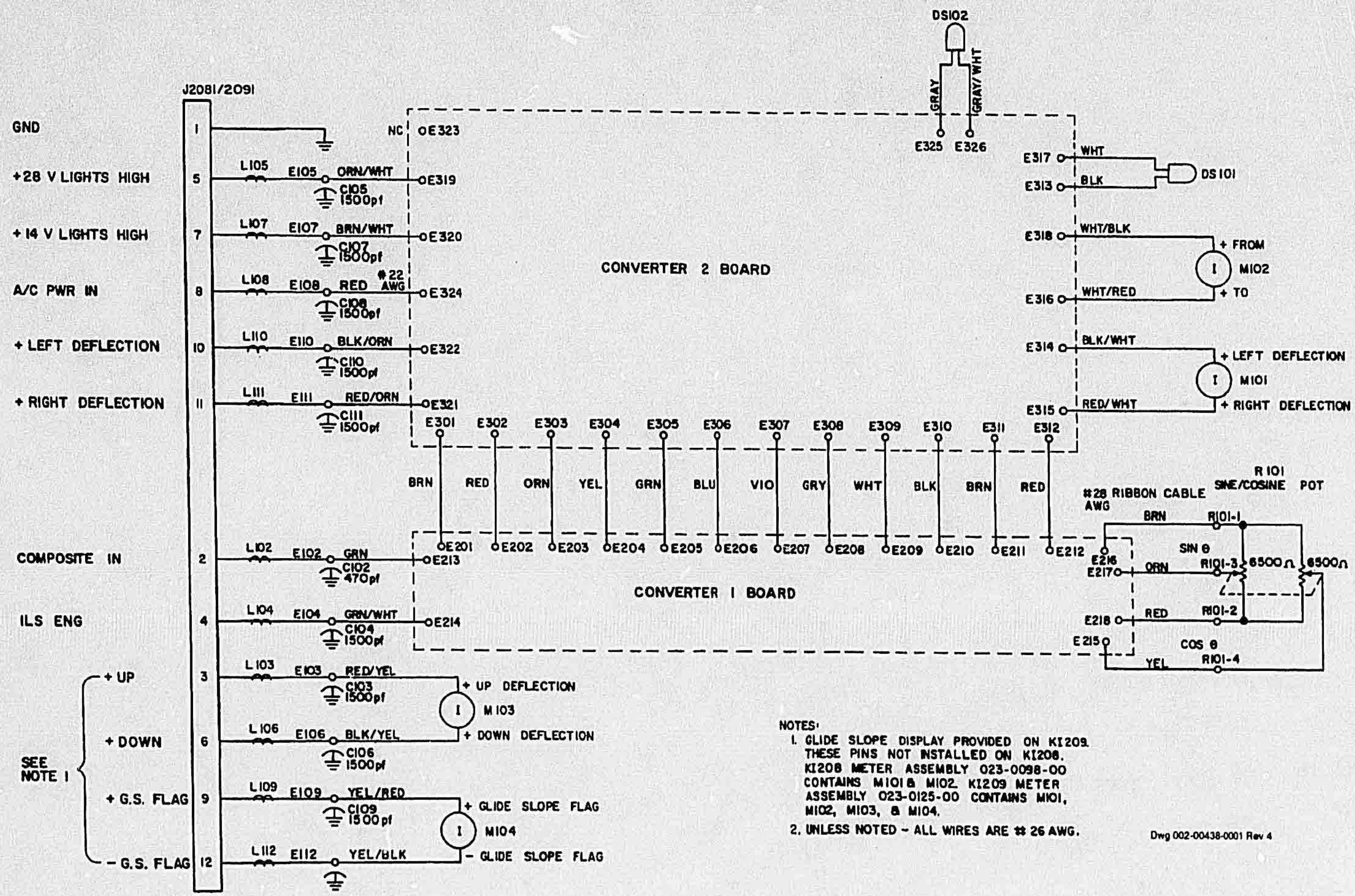


NOTES:
1. GLIDE SLOPE DISPLAY PROVIDED ON KI209. THESE PINS NOT INSTALLED ON KI208. KI 208 METER ASSEMBLY 023-00098-0001 CONTAINS M101 AND M102. KI 209 METER ASSEMBLY 023-00125-0001 CONTAINS M101, M102, M103 AND M104.

2. UNLESS NOTED – ALL WIRES ARE # 26 AWG.

Dwg 002-00438-0001 Rev AB

FIGURE 6-3 Internal Wiring KI 208, KI 209
(Dwg No 002-00438-0001, Rev AB)



NOTES:
1. GLIDE SLOPE DISPLAY PROVIDED ON KI209. THESE PINS NOT INSTALLED ON KI208. KI208 METER ASSEMBLY 023-0098-00 CONTAINS M101 & M102. KI209 METER ASSEMBLY 023-0125-00 CONTAINS M101, M102, M103, & M104.
2. UNLESS NOTED - ALL WIRES ARE # 26 AWG.

Dwg 002-00438-0001 Rev 4

FIGURE 6-4 Internal Wiring KI 208, KI 209
(Dwg No 002-00438-0001, Rev 4)

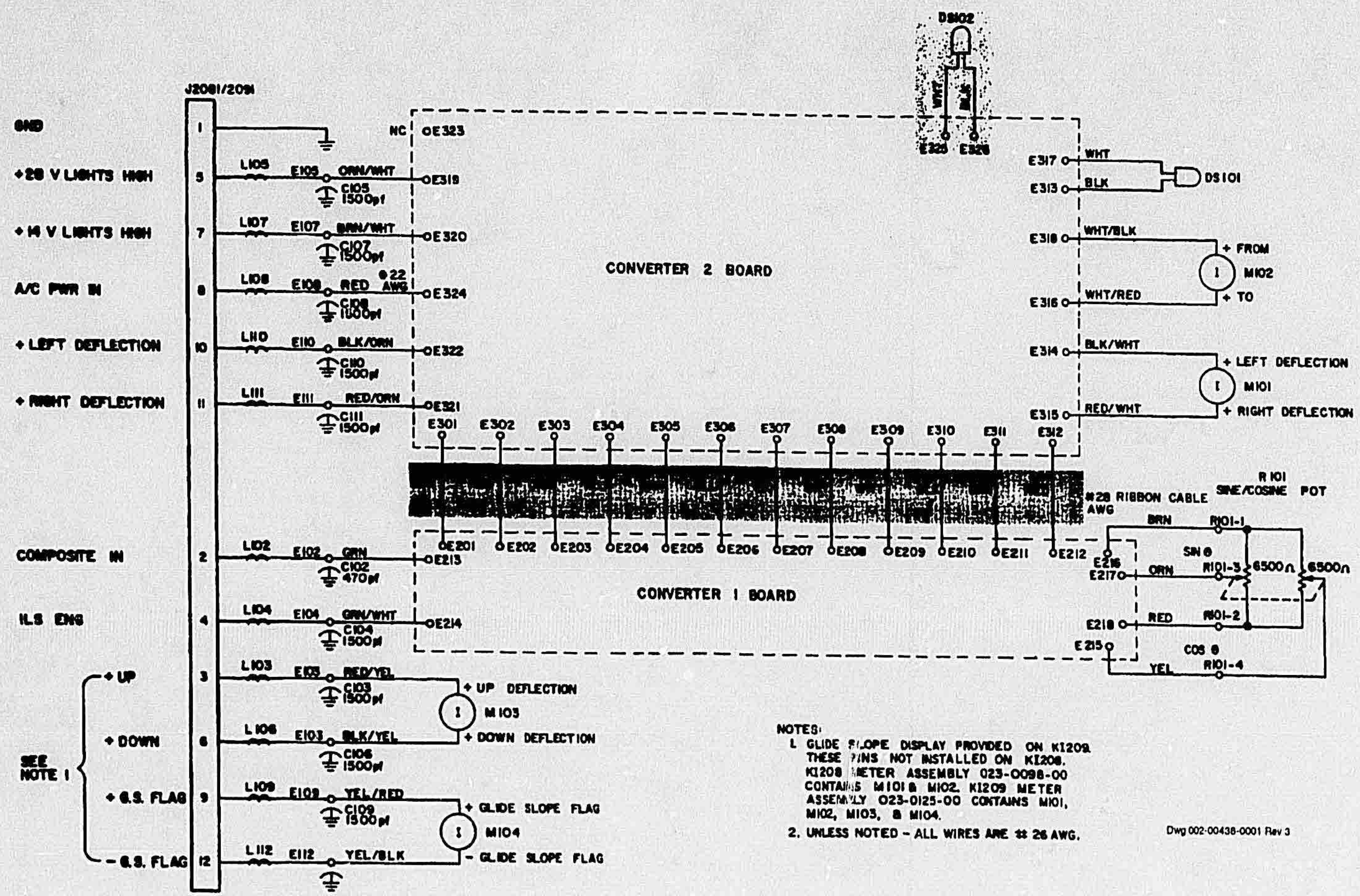
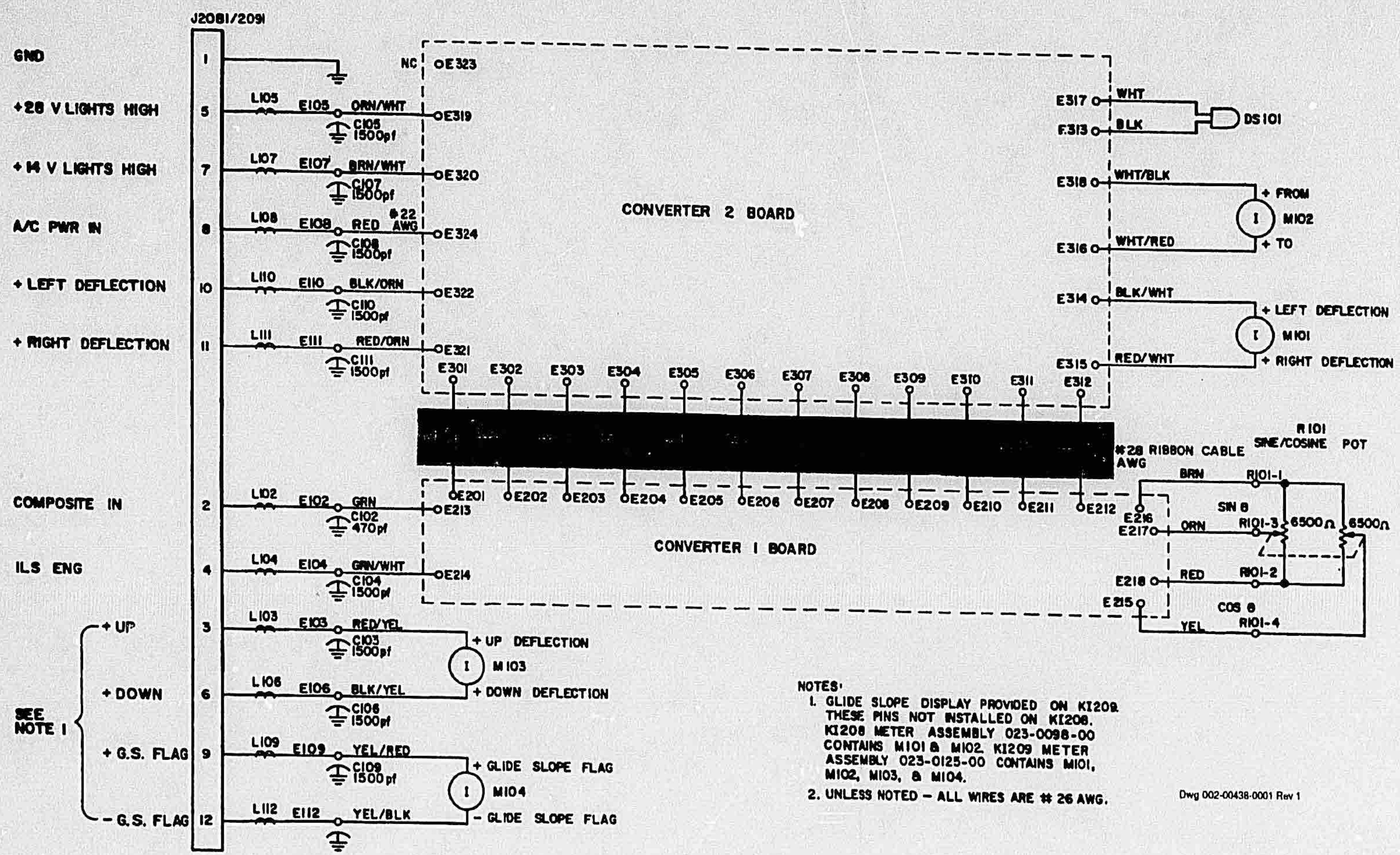


FIGURE 6-5 Internal Wiring KI 208, KI 209
(Dwg No 002-00438-0001, Rev 3)



NOTES:

1. GLIDE SLOPE DISPLAY PROVIDED ON KI209. THESE PINS NOT INSTALLED ON KI208. KI208 METER ASSEMBLY 023-0098-00 CONTAINS M101 & M102. KI209 METER ASSEMBLY 023-0125-00 CONTAINS M101, M102, M103, & M104.
2. UNLESS NOTED – ALL WIRES ARE # 26 AWG.

Dwg 002-00438-0001 Rev 1

FIGURE 6-6 Internal Wiring KI 208, KI 209
(Dwg No 002-00438-0001, Rev 1)

BOM 2: Converter #1 Board

200-05848-0000 CONVERTER #1 BD REV BA

SYMBOL	PART_NUMBER	DESCRIPTION	UM	-0000
–	009-05848-0000	PC BD #1 CONV	EA	1
–	016-01040-0000	COATING TYPE AR	AR	1
–	016-01071-0000	DC RTV 3140	AR	1
C201	096-01014-0000	CAP TN 40UF 10V	EA	1
C203	111-00001-0003	CAP CR .22UF 50V	EA	1
C204	104-00001-0018	CAP SM 2KPF 100V	EA	0.5
C204	111-00001-0085	CAPCR 3300PF 50V 5%	EA	0.5
C205	104-00001-0018	CAP SM 2KPF 100V	EA	1
C206	108-06005-0012	CAP TRKG SET/4 MATCHED	EA	1
C207	108-06005-0012	CAP TRKG SET/4 MATCHED	EA	1
C208	108-06005-0012	CAP TRKG SET/4 MATCHED	EA	1
C209	108-06005-0012	CAP TRKG SET/4 MATCHED	EA	1
C210	108-06005-0000	CAP MPC .10UF50V5%	EA	1
C211	096-01014-0000	CAP TN 40UF 10V	EA	1
C212	113-05471-0000	CAP DC 470PF 500V	EA	1
C213	113-03121-0000	CAP DC 120PF 500V	EA	1
C214	118-00015-0000	CAP DC 27PF 500V	EA	1
C215	113-03121-0000	CAP DC 120PF 500V	EA	1
C216	113-03121-0000	CAP DC 120PF 500V	EA	1
C217	113-03121-0000	CAP DC 120PF 500V	EA	1
C219	111-00001-0000	CAP CR .01UF 50V	EA	1
CR202	007-06016-0000	DIO S 1N4154	EA	1
CR203	007-06016-0000	DIO S 1N4154	EA	1
CR204	007-06016-0000	DIO S 1N4154	EA	1
CR205	007-06016-0000	DIO S 1N4154	EA	1
CR206	007-06016-0000	DIO S 1N4154	EA	1
CR207	007-06016-0000	DIO S 1N4154	EA	1
CR208	007-06016-0000	DIO S 1N4154	EA	1
CR209	007-06016-0000	DIO S 1N4154	EA	1
I201	120-06038-0012	SCREENED 02 GREEN	EA	0.5
I201	120-06038-0022	SCREENED 02 ORANGE	EA	0.5
I202	120-03052-0005	IC LM224N	EA	1
L201	019-02129-0024	COIL RF 27000MH10%	EA	1
Q201	007-00078-0000	XSTR S NPN 2N3415	EA	1
Q203	007-00238-0000	XSTR S PNP FPN4917	EA	1
Q204	007-00078-0000	XSTR S NPN 2N3415	EA	1
Q205	007-00078-0000	XSTR S NPN 2N3415	EA	1
Q206	007-00078-0000	XSTR S NPN 2N3415	EA	1
Q207	007-00078-0000	XSTR S NPN 2N3415	EA	1
Q208	007-00078-0000	XSTR S NPN 2N3415	EA	1
Q209	007-00078-0000	XSTR S NPN 2N3415	EA	1
Q210	007-00187-0000	XSTR S NPN 2N5089EA	1	
Q211	007-00383-0001	XSTR S NPN 2N2222A (TO	EA	1
R201	131-00104-0023	RES CF 100K QW 5%	EA	1
R202	131-00104-0023	RES CF 100K QW 5%	EA	1
R203	133-00113-0015	RES VA 2K 20% B	EA	1
R204	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R205	131-00154-0023	RES CF 150K QW 5%	EA	1
R206	136-06812-0072	RES PF 68.1K QW 1%	EA	1
R207	133-00096-0037	RES VA 200K HW 10%	EA	1
R208	131-00124-0023	RES CF 120K QW 5%	EA	1
R209	136-01003-0072	RES PF 100K QW 1%	EA	1
R210	131-00472-0023	RES CF 4.7K QW 5%	EA	1

SYMBOL	PART_NUMBER	DESCRIPTION	UM	-0000
R211	131-00122-0023	RES CF 1.2K QW 5%	EA	1
R212	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R213	136-02552-0072	RES PF 25.5K QW 1%	EA	1
R214	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R215	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R216	136-04640-0072	RES PF 464 QW 1%	EA	1
R217	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R218	133-00122-0000	RES VA 200 HW 20%	EA	1
R219	136-07320-0072	RES PF 732 QW 1%	EA	1
R220	136-04222-0072	RES PF 42.2K QW 1%	EA	1
R221	136-08061-0072	RES PF 8.06K QW 1%	EA	1
R222	131-00434-0023	RES CF 430K QW 5%	EA	1
R223	136-04223-0072	RES PF 422K QW 1%	EA	1
R224	131-00623-0023	RES CF 62K QW 5%	EA	1
R225	131-00623-0023	RES CF 62K QW 5%	EA	1
R226	131-00243-0023	RES CF 24K QW 5%	EA	1
R227	133-00122-0003	RES VA 50K HW 20%	EA	1
R228	131-00243-0023	RES CF 24K QW 5%	EA	1
R229	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R230	131-00153-0023	RES CF 15K QW 5%	EA	1
R231	136-06343-0072	RES PF 634K QW 1%	EA	1
R232	136-06191-0072	RES PF 6.19K QW 1%	EA	1
R233	133-00122-0001	RES VA 2K HW 20%	EA	1
R234	131-00274-0023	RES CF 270K QW 5%	EA	1
R235	136-04223-0072	RES PF 422K QW 1%	EA	1
R236	136-01333-0071	RES PF 133K QW .5%	EA	1
R237	131-00683-0023	RES CF 68K QW 5%	EA	1
R238	136-01333-0071	RES PF 133K QW .5%	EA	1
R239	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R240	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R241	133-00113-0019	RES VA 10K 20% B	EA	1
R242	136-04872-0072	RES PF 48.7K QW 1%	EA	1
R243	131-00562-0023	RES CF 5.6K QW 5%	EA	1
R244	136-04992-0072	RES PF 49.9K QW 1%	EA	1
R245	136-05362-0072	RES PF 53.6K QW 1%	EA	1
R247	131-00163-0023	RES CF 16K QW 5%	EA	1
R248	131-00912-0023	RES CF 9.1K QW 5%	EA	1
R250	131-00203-0023	RES CF 20K QW 5%	EA	1
R251	131-00511-0023	RES CF 510 QW 5%	EA	1
TP201	008-00096-0001	TERMINAL TEST PNT	EA	1
TP202	008-00096-0001	TERMINAL TEST PNT	EA	1
TP203	008-00096-0001	TERMINAL TEST PNT	EA	1
TP204	008-00096-0001	TERMINAL TEST PNT	EA	1
TP205	008-00096-0001	TERMINAL TEST PNT	EA	1
TP206	008-00096-0001	TERMINAL TEST PNT	EA	1
TP207	008-00096-0001	TERMINAL TEST PNT	EA	1

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

200-05848-0000 Rev. 28 Converter Bd #1

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000
	009-05848-0000	PC BD #1 CONV	[EA]	1
	016-01040-0000	COATING TYPE AR	[AR]	1
C 201	096-01014-0000	CAP TN 40UF 10V	[EA]	1
C 203	111-00001-0003	CAP CR .22UF 50V	[EA]	1
C 204	104-00001-0018	CAP SM 2KPF 100V	[EA]	1
C 205	104-00001-0018	CAP SM 2KPF 100V	[EA]	1
C 206	108-06005-0012	CAP TRKG SET/4 1%	[EA]	1
C 207	108-06005-0012	CAP TRKG SET/4 1%	[RF]	0
C 208	108-06005-0012	CAP TRKG SET/4 1%	[RF]	0
C 209	108-06005-0012	CAP TRKG SET/4 1%	[RF]	0
C 210	108-06005-0000	CAP MPC .10UF50V5%	[EA]	1
C 211	096-01014-0000	CAP TN 40UF 10V	[EA]	1
C 212	113-05471-0000	CAP DC 470PF 500V	[EA]	1
C 213	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 214	118-00015-0000	CAP DC 27PF 500V	[EA]	1
C 215	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 216	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 217	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 219	111-00001-0000	CAP CR .01UF 50V	[EA]	1
CR 202	007-06016-0000	DIO S 1N4154	[EA]	1
CR 203	007-06016-0000	DIO S 1N4154	[EA]	1
CR 204	007-06016-0000	DIO S 1N4154	[EA]	1
CR 205	007-06016-0000	DIO S 1N4154	[EA]	1
CR 206	007-06016-0000	DIO S 1N4154	[EA]	1
CR 207	007-06016-0000	DIO S 1N4154	[EA]	1
CR 208	007-06016-0000	DIO S 1N4154	[EA]	1
CR 209	007-06016-0000	DIO S 1N4154	[EA]	1
I 201	120-06038-0012	SCREENED 02 GREEN	[EA]	1
I 202	120-03052-0005	IC LM224N	[EA]	1
L 201	019-02129-0024	COIL RF 27MH 10%	[EA]	1
Q 201	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 203	007-00238-0000	XSTR S PNP FPN4917	[EA]	1
Q 204	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 205	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 206	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 207	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 208	007-00078-0000	XSTR S NPN 2N3415	[EA]	1

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000
Q 209	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 210	007-00187-0000	XSTR S NPN 2N5089	[EA]	1
Q 211	007-00383-0001	XSTR S NPN 2N2222A	[EA]	1
R 201	131-00104-0023	RES CF 100K QW 5%	[EA]	1
R 202	131-00104-0023	RES CF 100K QW 5%	[EA]	1
R 203	133-00113-0015	RES VA 2K 20% B	[EA]	1
R 204	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 205	131-00154-0023	RES CF 150K QW 5%	[EA]	1
R 206	136-06812-0072	RES PF 68.1K QW 1%	[EA]	1
R 207	133-00096-0037	RES VA 200K HW 10%	[EA]	1
R 208	131-00124-0023	RES CF 120K QW 5%	[EA]	1
R 209	136-01003-0072	RES PF 100K QW 1%	[EA]	1
R 210	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 211	131-00122-0023	RES CF 1.2K QW 5%	[EA]	1
R 212	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 213	136-02552-0072	RES PF 25.5K QW 1%	[EA]	1
R 214	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 215	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 216	136-04640-0072	RES PF 464 QW 1%	[EA]	1
R 217	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 218	133-00122-0000	RES VA 200 HW 20%	[EA]	1
R 219	136-07320-0072	RES PF 732 QW 1%	[EA]	1
R 220	136-04222-0072	RES PF 42.2K QW 1%	[EA]	1
R 221	136-08061-0072	RES PF 8.06K QW 1%	[EA]	1
R 222	131-00434-0023	RES CF 430K QW 5%	[EA]	1
R 223	136-04223-0072	RES PF 422K QW 1%	[EA]	1
R 224	131-00623-0023	RES CF 62K QW 5%	[EA]	1
R 225	131-00623-0023	RES CF 62K QW 5%	[EA]	1
R 226	131-00243-0023	RES CF 24K QW 5%	[EA]	1
R 227	133-00122-0003	RES VA 50K HW 20%	[EA]	1
R 228	131-00243-0023	RES CF 24K QW 5%	[EA]	1
R 229	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 230	131-00153-0023	RES CF 15K QW 5%	[EA]	1
R 231	136-06343-0072	RES PF 634K QW 1%	[EA]	1
R 232	136-06191-0072	RES PF 6.19K QW 1%	[EA]	1
R 233	133-00122-0001	RES VA 2K HW 20%	[EA]	1
R 234	131-00274-0023	RES CF 270K QW 5%	[EA]	1
R 235	136-04223-0072	RES PF 422K QW 1%	[EA]	1

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000
R 236	136-01333-0071	RES PF 133K QW .5%	[EA]	1
R 237	131-00683-0023	RES CF 68K QW 5%	[EA]	1
R 238	136-01333-0071	RES PF 133K QW .5%	[EA]	1
R 239	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 240	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 241	133-00113-0019	RES VA 10K 20% B	[EA]	1
R 242	136-04872-0072	RES PF 48.7K QW 1%	[EA]	1
R 243	131-00562-0023	RES CF 5.6K QW 5%	[EA]	1
R 244	136-04992-0072	RES PF 49.9K QW 1%	[EA]	1
R 245	136-05362-0072	RES PF 53.6K QW 1%	[EA]	1
R 247	131-00163-0023	RES CF 16K QW 5%	[EA]	1
R 248	131-00912-0023	RES CF 9.1K QW 5%	[EA]	1
R 250	131-00203-0023	RES CF 20K QW 5%	[EA]	1
R 251	131-00511-0023	RES CF 510 QW 5%	[EA]	1
TP 201	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 202	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 203	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 204	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 205	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 206	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 207	008-00096-0001	TERMINAL TEST PNT	[EA]	1

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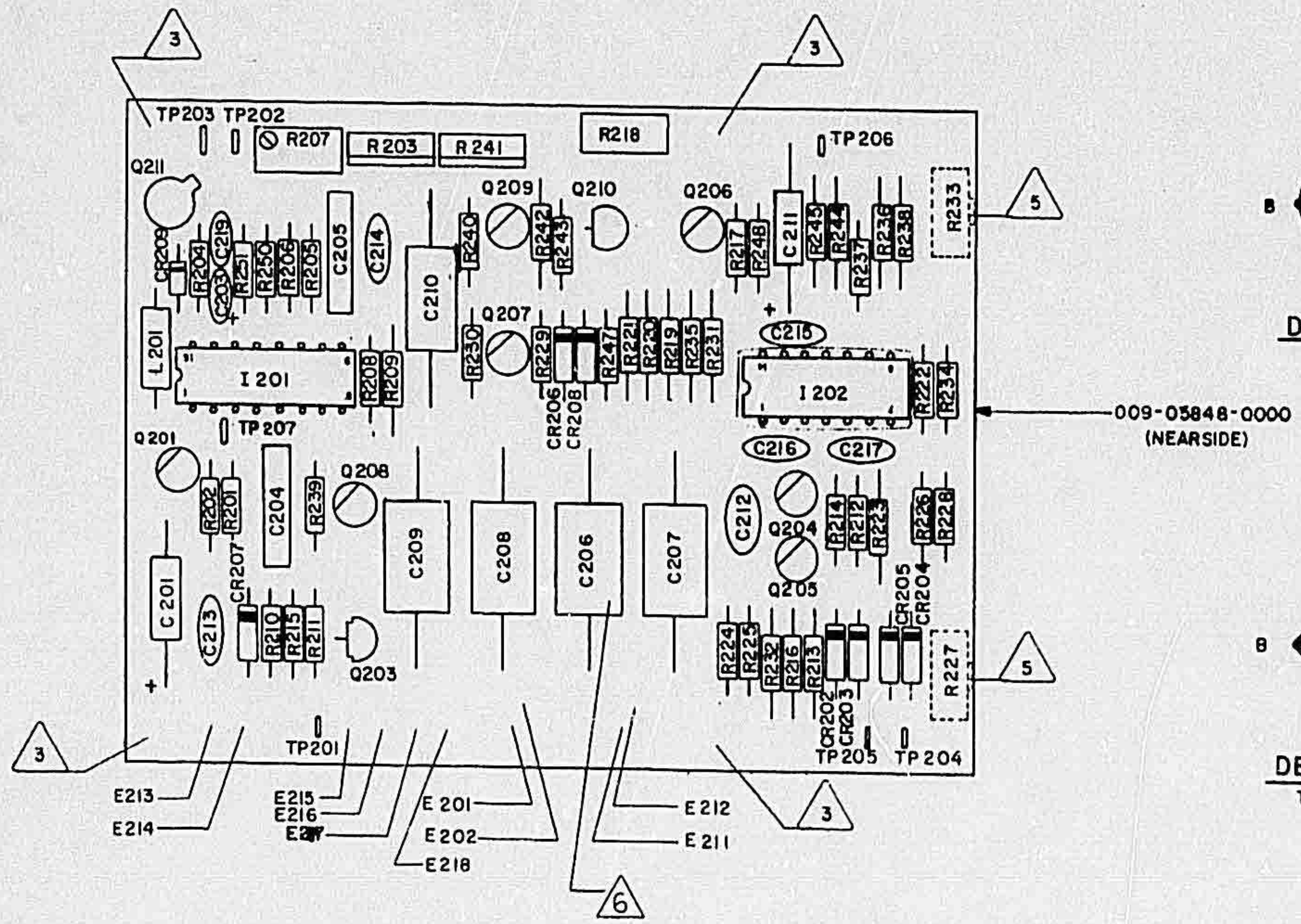
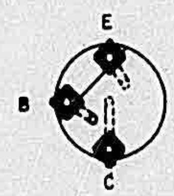
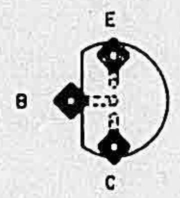


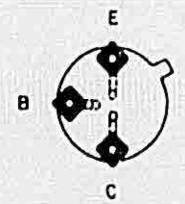
009-05848-0000 (NEARSIDE)



DETAIL "A" 1
TOP VIEW



DETAIL "B" 2
TOP VIEW



DETAIL "C" 4
TOP VIEW

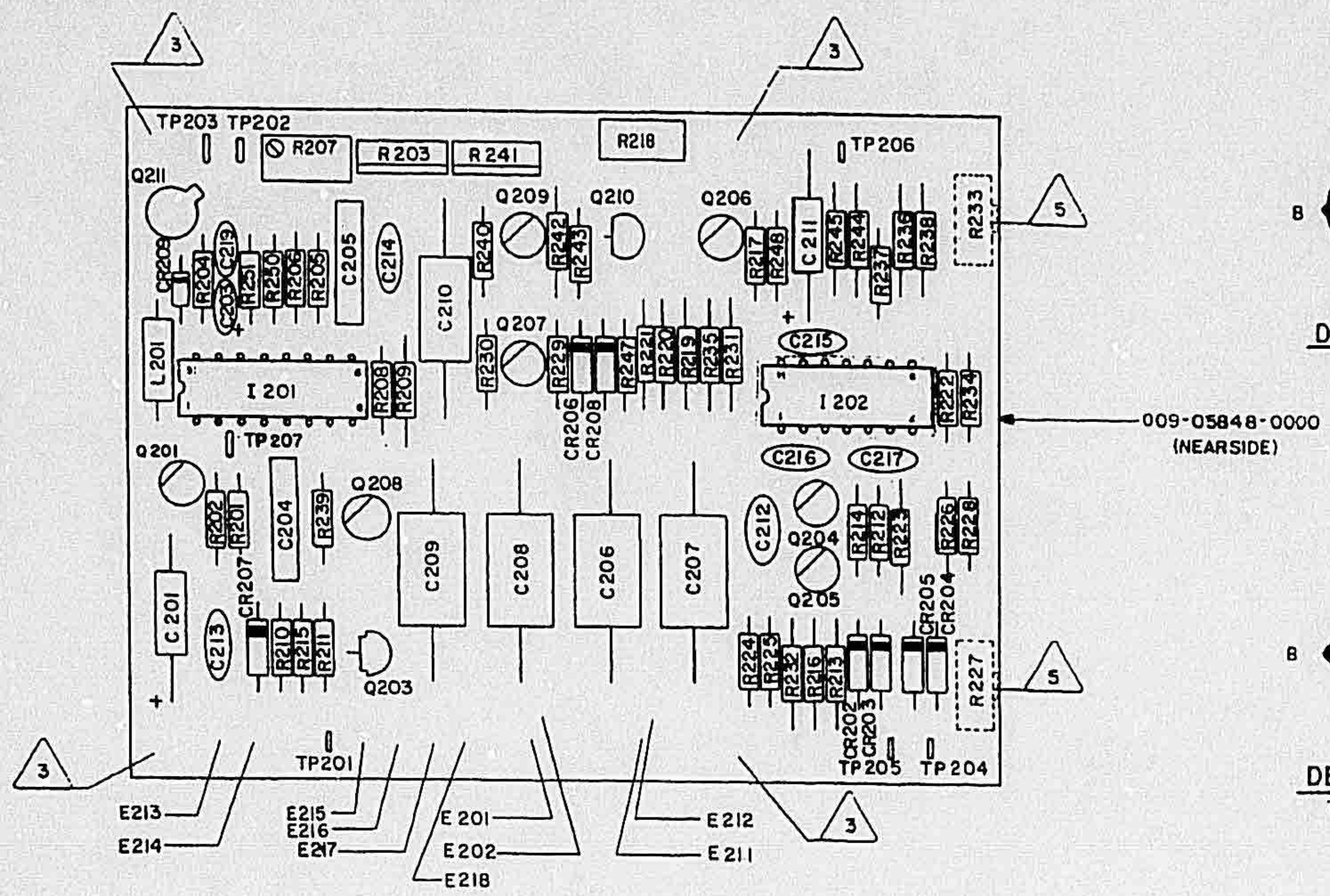
NOTES:

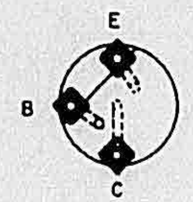
1. TRANSISTORS Q201, Q204, Q205, Q206, Q207, Q208, & Q209, SEE DETAIL "A".
2. TRANSISTORS Q203, & Q210, SEE DETAIL "B".
3. MASK OFF TEST POINTS (7), ALL PADS WITH "E" NO'S (18), R203, R207, R218, R223, R227, R241, & FOUR MOUNTING AREAS, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH UNDILUTED CLEAR URETHANE COATING (P/N 016-1040-00).
4. TRANSISTOR Q211, SEE DETAIL "C".
5. POTS R227 AND R233 MOUNT ON FAR SIDE. ADJUSTOR TO FACE AWAY FROM P.C. BOARD.
6. SECURE C206, C207, C208 AND C209 TO BD FIRMLY WITH RTV (016-01071-0000)

REF: B/M 200-05848-0000

Dwg 300-05848-0000 Rev AA

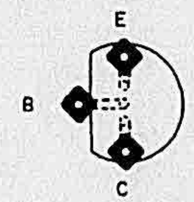
FIGURE 6-7 Converter #1 Board Assembly
(Dwg No 300-05848-0000, Rev AA)





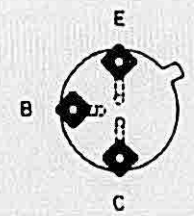
DETAIL "A" 1

TOP VIEW



DETAIL "B" 2

TOP VIEW



DETAIL "C" 4

TOP VIEW

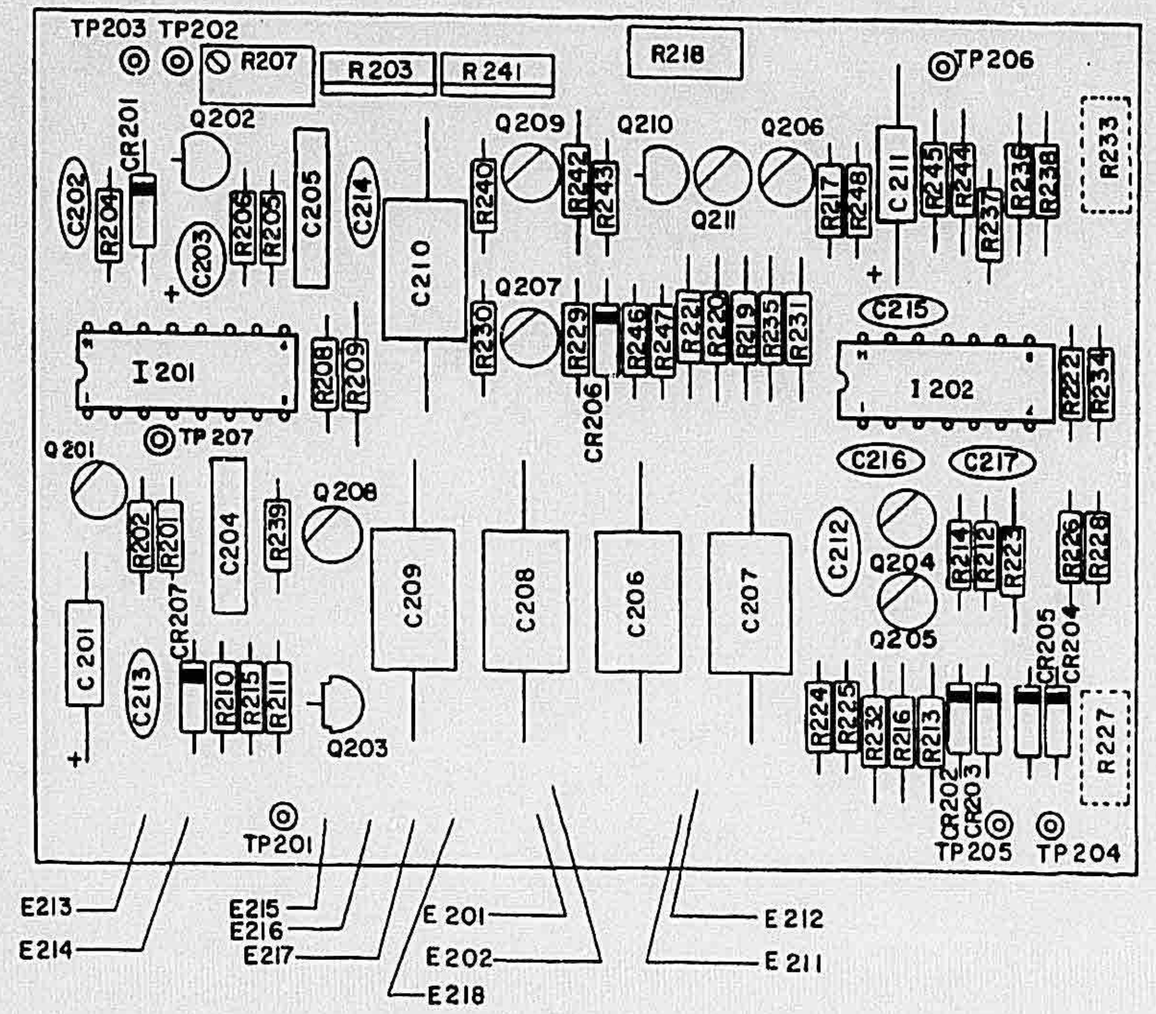
NOTES:

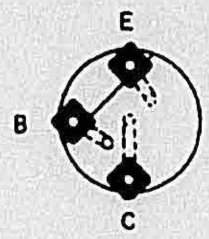
1. TRANSISTORS Q201, Q204, Q205, Q206, Q207, Q208, & Q209, SEE DETAIL "A".
2. TRANSISTORS Q203, & Q210, SEE DETAIL "B".
3. MASK OFF TEST POINTS (7), ALL PADS WITH "E" NO'S (18), R203, R207, R218, R223, R227, R241, & FOUR MOUNTING AREAS, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).
4. TRANSISTOR Q211, SEE DETAIL "C".
5. POTS R227 AND R233 MOUNT ON FAR SIDE. ADJUSTOR TO FACE AWAY FROM P.C. BOARD.

REF B/M 200-05848-XXXX

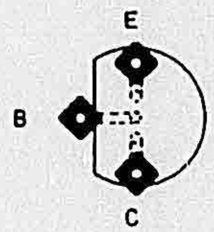
Dwg 300-05848-0000 Rev 12

FIGURE 6-8 Converter #1 Board Assembly
(Dwg No 300-05848-0000, Rev 12)





DETAIL "A"
TOP VIEW



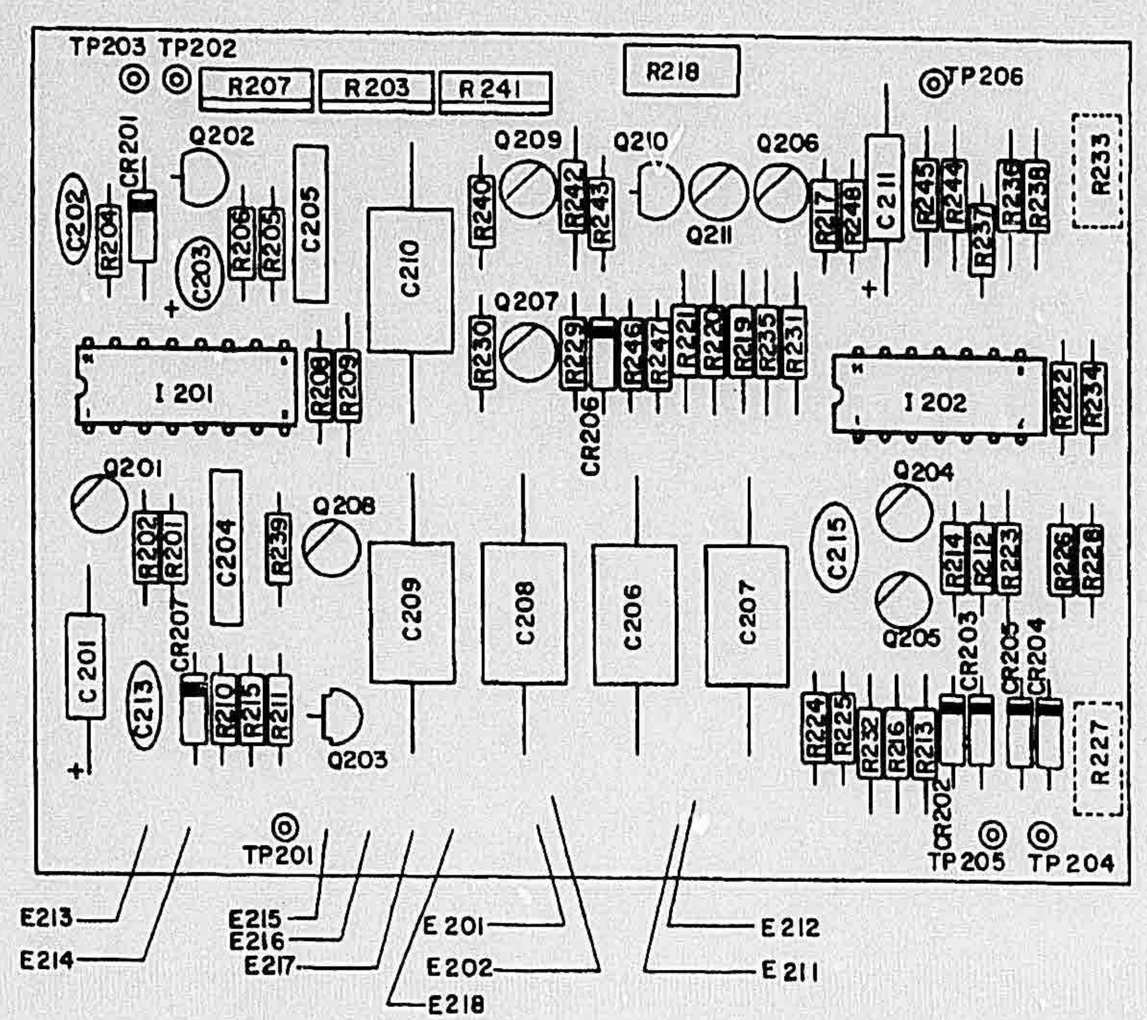
DETAIL "B"
TOP VIEW

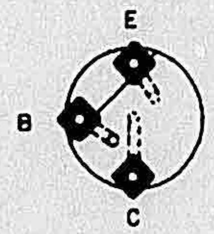
NOTES:

1. TRANSISTORS Q201, Q204, Q205, Q206, Q207, Q208, Q209, & Q211, SEE DETAIL "A".
2. TRANSISTORS Q202, Q203, & Q210, SEE DETAIL "B".
3. MASK OFF TEST POINTS (6), ALL PADS WITH "E" NO'S (18), R203, R207, R218, R223, R227, R241, & FOUR MOUNTING AREAS, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).

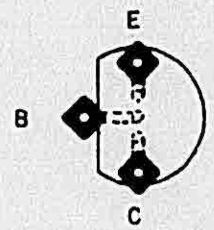
Dwg 300-05848-0000 Rev 4

FIGURE 6-9 Converter #1 Board Assembly
(Dwg No 300-05848-0000, Rev 4)





DETAIL "A"
TOP VIEW



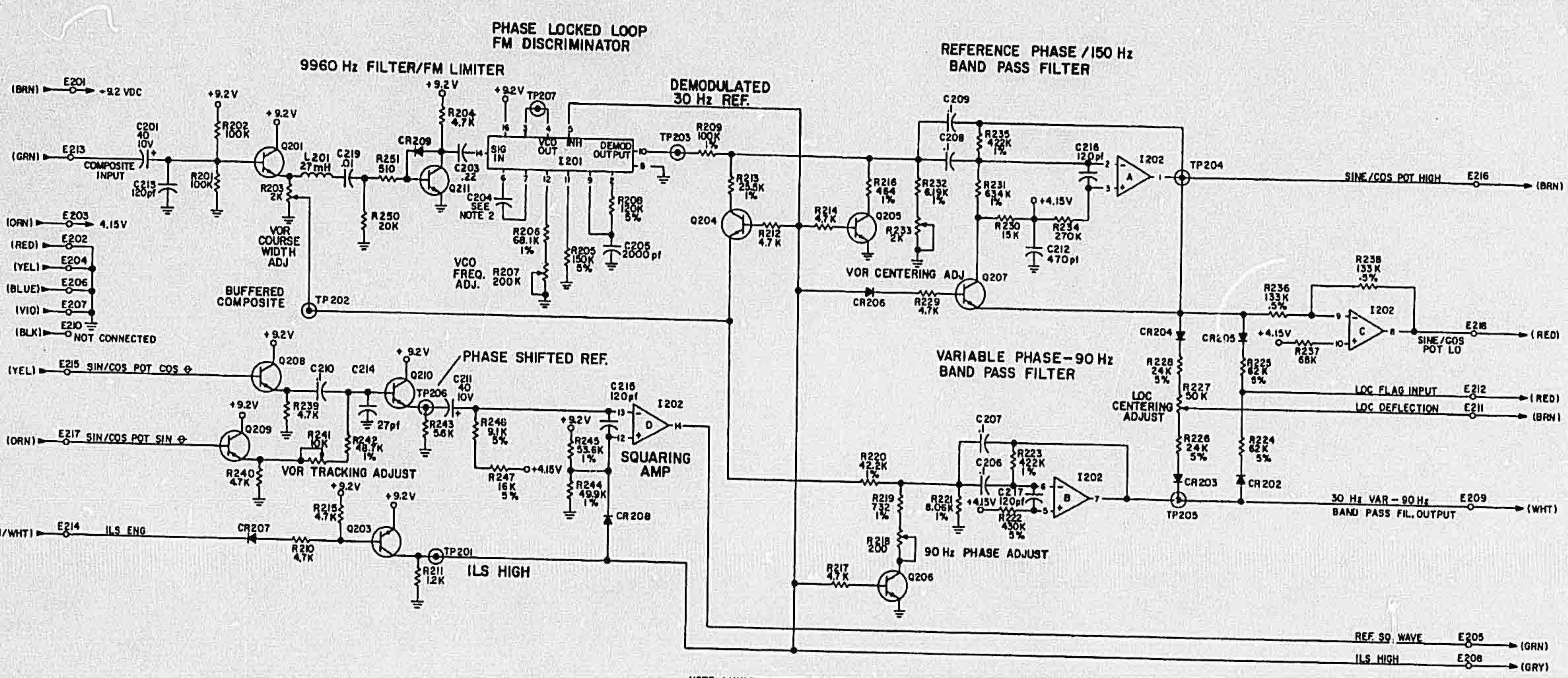
DETAIL "B"
TOP VIEW

NOTES:

1. TRANSISTORS Q201, Q204, Q205, Q206, Q207, Q208, Q209, & Q211, SEE DETAIL "A".
2. TRANSISTORS Q202, Q203, & Q210, SEE DETAIL "B".
3. MASK OFF TEST POINTS (6), ALL PADS WITH "E" NO'S (18), R203, R207, R218, R223, R227, R241, & FOUR MOUNTING AREAS, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).

Dwg 300-05848-0000

FIGURE 6-10 Converter #1 Board Assembly
(Dwg No 300-05848-0000)



NOTE: 1. UNLESS NOTED: ALL RESISTANCE VALUES ARE IN OHMS, QW, 10%.
ALL CAPACITANCE VALUES ARE IN MICROFARADS (µf).

2. I 201 120-06038-0012 MARKED WITH GREEN DOT TO BE USED WITH C204 104-00001-0018 (2000pF) OR I201 120-06038-0022 MARKED WITH ORANGE DOT TO BE USED WITH C204 111-00001-0085 (3300pF).

Dwg 002-00438-0002 Rev 15

FIGURE 6-11 Converter #1 Board Schematic
(Dwg No 002-00438-0002, Rev 15)

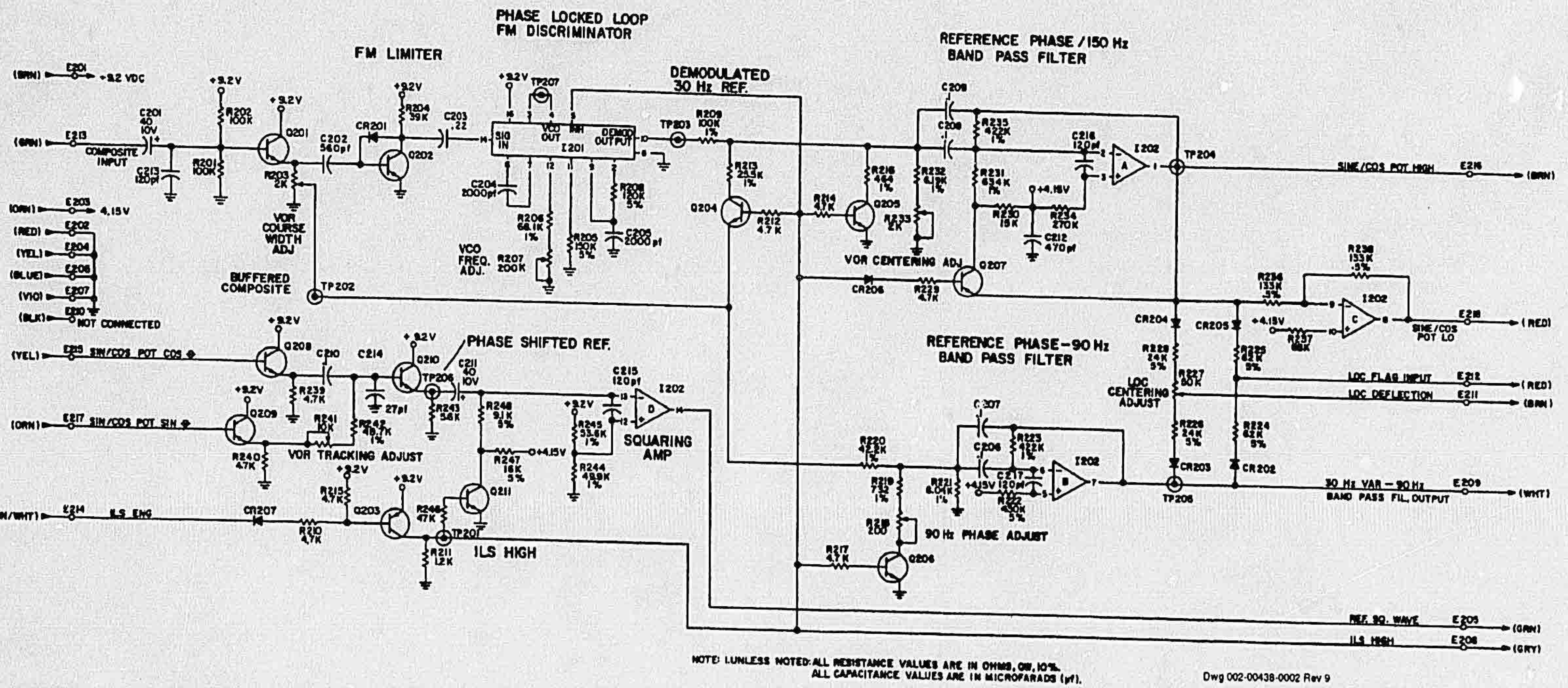


FIGURE 6-12 Converter #1 Board Schematic
(Dwg No 002-00438-0002, Rev 9)

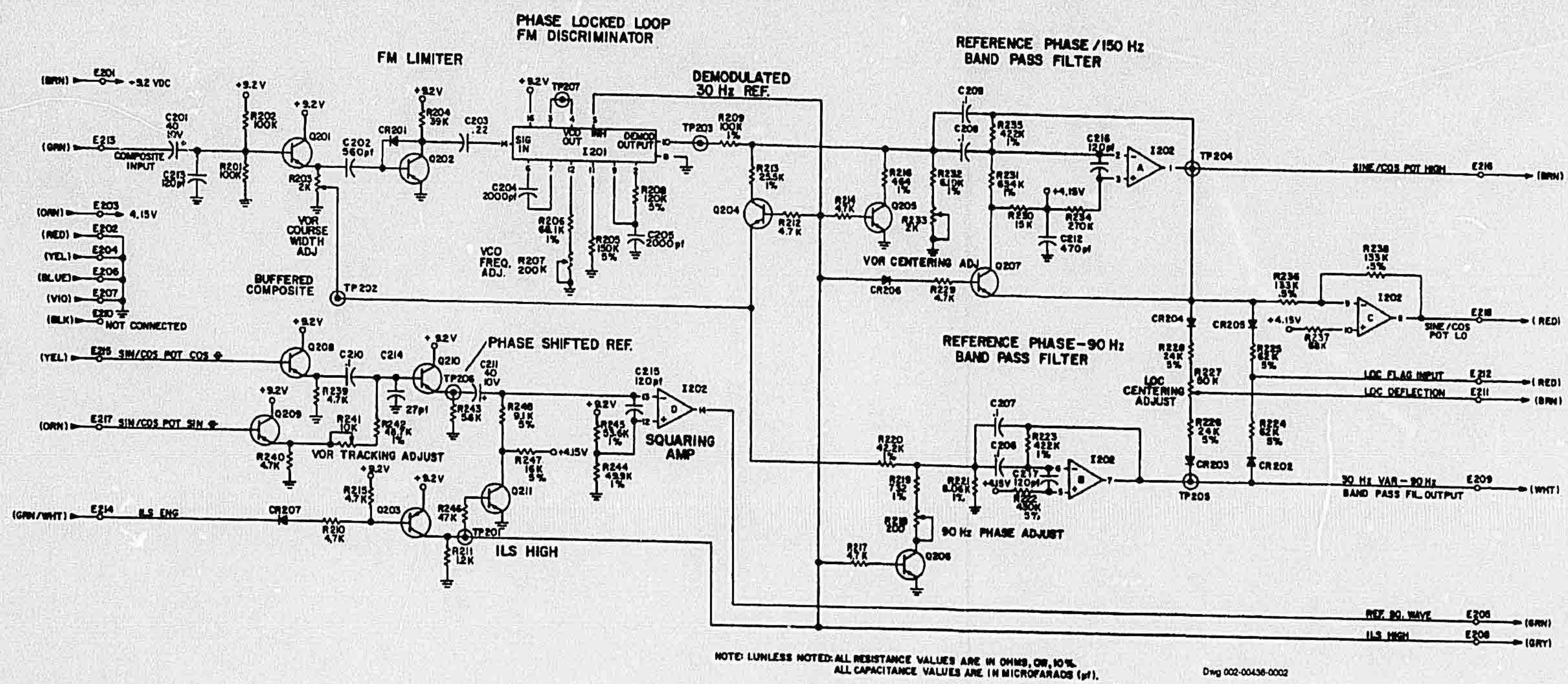


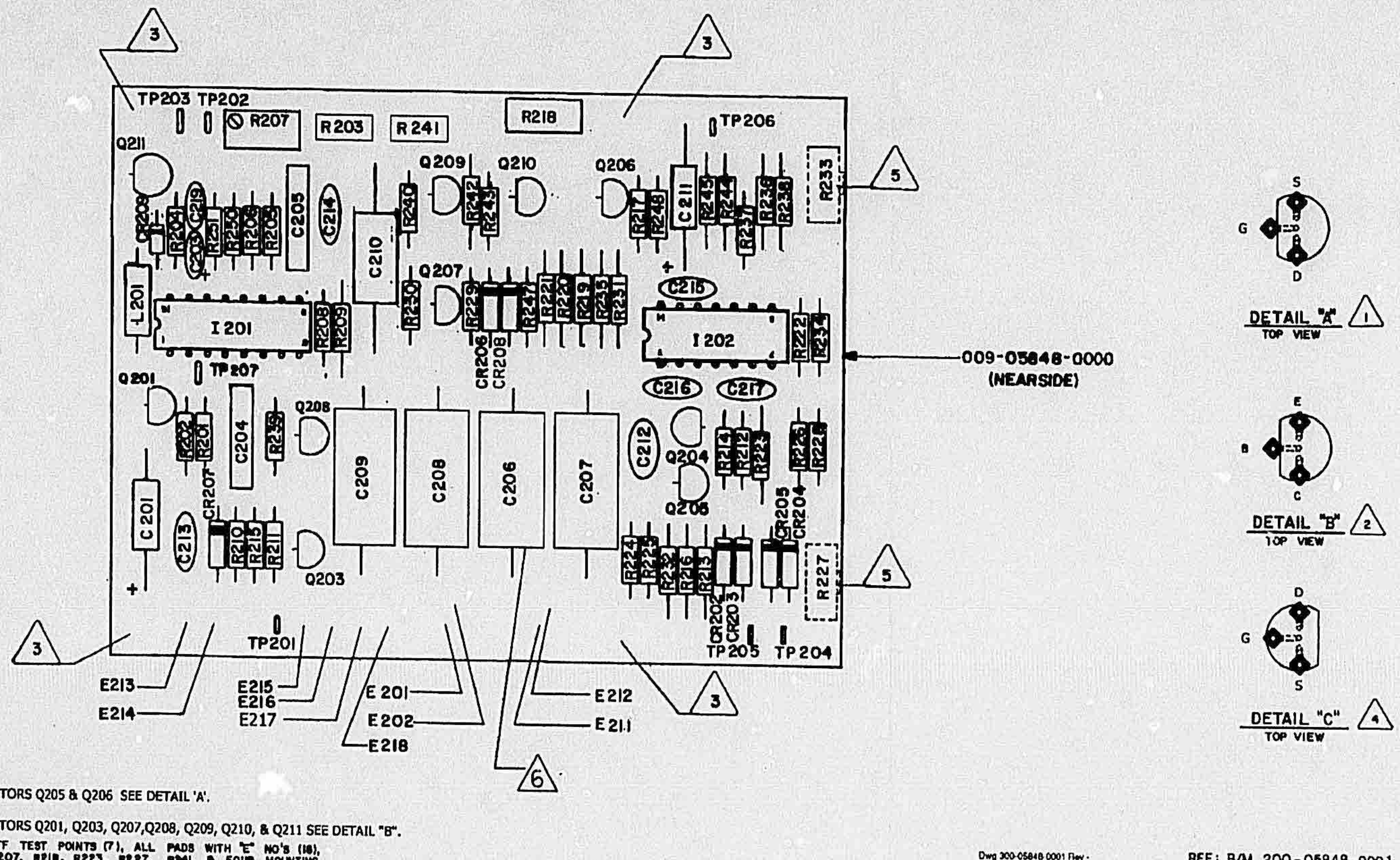
FIGURE 6-13 Converter #1 Board Schematic
(Dwg No 002-00438-0002)

BOM 3: Converter #1 Board

200-05848-0001 CONVERTER #1 BD REV -

SYMBOL	PART_NUMBER	DESCRIPTION	UM	-0001
–	009-05848-0000	PC BD #1 CONV	EA	1
–	016-01040-0000	COATING TYPE AR	AR	1
–	016-01071-0000	DC RTV 3140	AR	1
C201	096-01014-0000	CAP TN 40UF 10V	EA	1
C203	111-00001-0003	CAP CR .22UF 50V	EA	1
C204	104-00001-0018	CAP SM 2KPF 100V	EA	0.5
C204	111-00001-0085	CAPCR 3300PF 50V 5%	EA	0.5
C205	104-00001-0018	CAP SM 2KPF 100V	EA	1
C206	108-05090-0001	CAP MPC .47UF 30V 1%	EA	1
C207	108-05090-0001	CAP MPC .47UF 30V 1%	EA	1
C208	108-05090-0001	CAP MPC .47UF 30V 1%	EA	1
C209	108-05090-0001	CAP MPC .47UF 30V 1%	EA	1
C210	108-06005-0000	CAP MPC .10UF50V5%	EA	1
C211	096-01014-0000	CAP TN 40UF 10V	EA	1
C212	113-05471-0000	CAP DC 470PF 500V	EA	1
C213	113-03121-0000	CAP DC 120PF 500V	EA	1
C214	118-00015-0000	CAP DC 27PF 500V	EA	1
C215	113-03121-0000	CAP DC 120PF 500V	EA	1
C216	113-03121-0000	CAP DC 120PF 500V	EA	1
C217	113-03121-0000	CAP DC 120PF 500V	EA	1
C219	111-00001-0000	CAP CR .01UF 50V	EA	1
CR202	007-06016-0000	DIO S 1N4154	EA	1
CR203	007-06016-0000	DIO S 1N4154	EA	1
CR204	007-06016-0000	DIO S 1N4154	EA	1
CR205	007-06016-0000	DIO S 1N4154	EA	1
CR206	007-06016-0000	DIO S 1N4154	EA	1
CR207	007-06016-0000	DIO S 1N4154	EA	1
CR208	007-06016-0000	DIO S 1N4154	EA	1
CR209	007-06016-0000	DIO S 1N4154	EA	1
I201	120-06038-0012	SCREENED 02 GREEN	EA	0.5
I201	120-06038-0022	SCREENED 02 ORANGE	EA	0.5
I202	120-03052-0005	IC LM224N	EA	1
L201	019-02129-0024	COIL RF 27000MH 10%	EA	1
Q201	007-00187-0000	XSTR S NPN 2N5089	EA	1
Q203	007-00065-0000	XSTR S PNP 2N3906	EA	1
Q204	106-0073-000	2N7000 POWER MOSFET	EA	1
Q205	106-0073-000	2N7000 POWER MOSFET	EA	1
Q206	106-0073-000	2N7000 POWER MOSFET	EA	1
Q207	007-00179-0000	XSTR S NPN 2N3904	EA	1
Q208	007-00179-0000	XSTR S NPN 2N3904	EA	1
Q209	007-00179-0000	XSTR S NPN 2N3904	EA	1
Q210	007-00187-0000	XSTR S NPN 2N5089	EA	1
Q211	007-00179-0000	XSTR S NPN 2N3904	EA	1
R201	131-00683-0023	RES CF 68K QW 5%	EA	1
R202	131-00683-0023	RES CF 68K QW 5%	EA	1
R203	133-00110-0004	RES VA 1K HW	EA	1
R204	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R205	131-00154-0023	RES CF 150K QW 5%	EA	1
R206	136-06812-0072	RES PF 68.1K QW 1%	EA	1
R207	133-00096-0037	RES VA 200K HW 10%	EA	1
R208	131-00124-0023	RES CF 120K QW 5%	EA	1
R209	136-02152-0072	RES PF 21.5K QW 1%	EA	1
R210	131-00472-0023	RES CF 4.7K QW 5%	EA	1

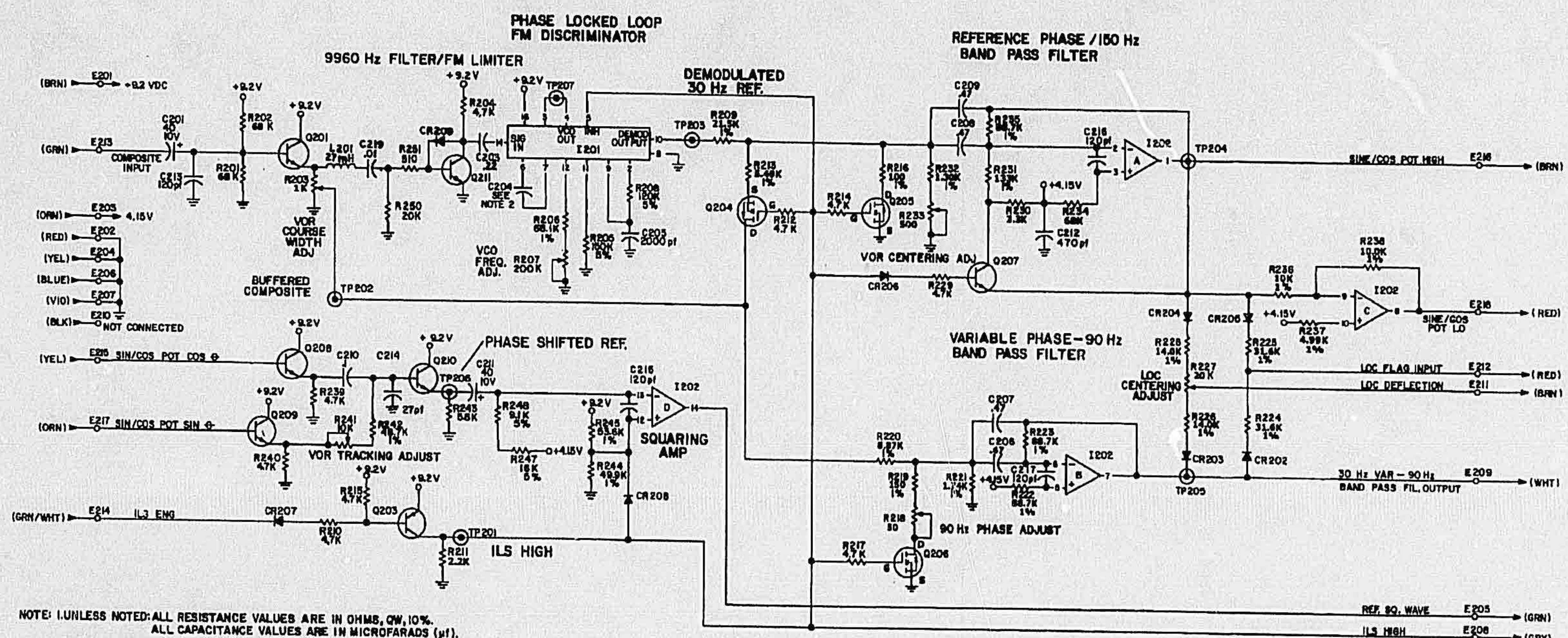
SYMBOL	PART_NUMBER	DESCRIPTION	UM	-0001
R211	131-00222-0023	RES CF 2.2K QW 5%	EA	1
R212	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R213	136-05491-0072	RES PF 5.49K QW 1%	EA	1
R214	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R215	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R216	136-01000-0072	RES PF 100 QW 1%	EA	1
R217	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R218	133-00110-0031	RES VA 50 HW	EA	1
R219	136-01500-0072	RES PF 150 QW 1%	EA	1
R220	136-08871-0072	RES PF 8.87K QW 1%	EA	1
R221	136-01741-0072	RES PF 1.74K QW 1%	EA	1
R222	136-08872-0072	RES PF 88.7K QW 1%	EA	1
R223	136-08872-0072	RES PF 88.7K QW 1%	EA	1
R224	136-03162-0072	RES PF 31.6K QW 1%	EA	1
R225	136-03162-0072	RES PF 31.6K QW 1%	EA	1
R226	136-01402-0072	RES PF 14K QW 1%	EA	1
R227	133-00122-0008	RES VA 20K HW 20%	EA	1
R228	136-01402-0072	RES PF 14K QW 1%	EA	1
R229	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R230	131-00332-0023	RES CF 3.3K QW 5%	EA	1
R231	136-01333-0072	RES PF 133K QW 1%	EA	1
R232	136-01301-0072	RES PF 1.3K QW 1%	EA	1
R233	133-00122-0006	RES VA 500 HW 20%	EA	1
R234	131-00683-0023	RES CF 68K QW 5%	EA	1
R235	136-08872-0072	RES PF 88.7K QW 1%	EA	1
R236	136-01002-0072	RES PF 10K QW 1%	EA	1
R237	136-04991-0072	RES PF 4.99K QW 1%	EA	1
R238	136-01002-0072	RES PF 10K QW 1%	EA	1
R239	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R240	131-00472-0023	RES CF 4.7K QW 5%	EA	1
R241	133-00110-0007	RES VA 10K HW	EA	1
R242	136-04872-0072	RES PF 48.7K QW 1%	EA	1
R243	131-00562-0023	RES CF 5.6K QW 5%	EA	1
R244	136-04992-0072	RES PF 49.9K QW 1%	EA	1
R245	136-05362-0072	RES PF 53.6K QW 1%	EA	1
R247	131-00163-0023	RES CF 16K QW 5%	EA	1
R248	131-00912-0023	RES CF 9.1K QW 5%	EA	1
R250	131-00203-0023	RES CF 20K QW 5%	EA	1
R251	131-00511-0023	RES CF 510 QW 5%	EA	1
TP201	008-00096-0001	TERMINAL TEST PNT	EA	1
TP202	008-00096-0001	TERMINAL TEST PNT	EA	1
TP203	008-00096-0001	TERMINAL TEST PNT	EA	1
TP204	008-00096-0001	TERMINAL TEST PNT	EA	1
TP205	008-00096-0001	TERMINAL TEST PNT	EA	1
TP206	008-00096-0001	TERMINAL TEST PNT	EA	1
TP207	008-00096-0001	TERMINAL TEST PNT	EA	1



NOTES:

1. TRANSISTORS Q205 & Q206 SEE DETAIL 'A'.
2. TRANSISTORS Q201, Q203, Q207,Q208, Q209, Q210, & Q211 SEE DETAIL "B".
3. MASK OFF TEST POINTS (7), ALL PADS WITH "E" NO'S (18), R203, R207, R218, R223, R227, R241, & FOUR MOUNTING AREAS, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).
4. TRANSISTOR Q204 SEE DETAIL "C".
5. POTS R227 AND R233 MOUNT ON FAR SIDE. ADJUSTOR TO FACE AWAY FROM P.C. BOARD.
6. SECURE C206,C207,C208 AND C209 TO BD FIRMLY WITH RTV (016-01071-0000)

FIGURE 6-14 Converter #1 Board Assembly
(Dwg No 300-05848-0001, Rev -)



NOTE: 1. UNLESS NOTED: ALL RESISTANCE VALUES ARE IN OHMS, 1/4W, 10%.
ALL CAPACITANCE VALUES ARE IN MICROFARADS (µf).

2. I 201 120-06038-0012 MARKED WITH GREEN DOT TO BE USED WITH C204 104-00001-0018 (2000pF) OR I201 120-06038-0022 MARKED WITH ORANGE DOT TO BE USED WITH C204 111-00001-0085 (3300pF).

Dwg 002-05848-0001 Rev A

FIGURE 6-15 Converter #1 Board Schematic
(Dwg No 002-05848-0001, Rev A)

BOM 4: Converter #2 Board

200-05849-0000 CONVERTER #2 BD REV BA

SYMBOL	PART_NUMBER	DESCRIPTION	UM	-0000
_	009-05849-0000	PC BD #2 CONV	EA	1
_	016-01040-0000	COATING TYPE AR	AR	1
C301	105-00032-0053	CAP MY .15UF5%200V	EA	1
C302	096-01030-0021	CAP TN 12UF20%10V	EA	1
C303	096-01014-0000	CAP TN 40UF 10V	EA	1
C304	096-01030-0011	CAP TN 4.7UF20%20V	EA	1
C305	096-01030-0011	CAP TN 4.7UF20%20V	EA	1
C306	096-01082-0054	CAP TN 15UF 20V	EA	1
C307	096-01030-0034	CAP TN 4.7UF5%20V	EA	1
C308	097-00068-0002	CAP AL 47UF 6.3V	EA	1
C309	109-00007-0000	CAP DC .01UF 25V	EA	1
C310	097-00056-0065	CAP AL 47UF 63V	EA	1
C311	113-05221-0001	CAP DC 220PF 500V	EA	1
C312	096-01030-0011	CAP TN 4.7UF20%20V	EA	1
C313	113-05471-0000	CAP DC 470PF 500V	EA	1
C314	096-01030-0005	CAP TN 10UF 10%20V	EA	1
C315	113-03121-0000	CAP DC 120PF 500V	EA	1
C316	113-03121-0000	CAP DC 120PF 500V	EA	1
C317	113-03121-0000	CAP DC 120PF 500V	EA	1
CJ301	026-00018-0000	WIRE CKTJMPR 22AWG	IN	1
CR301	007-06016-0000	DIO S 1N4154	EA	1
CR302	007-06016-0000	DIO S 1N4154	EA	1
CR303	007-06016-0000	DIO S 1N4154	EA	1
CR304	007-06016-0000	DIO S 1N4154	EA	1
CR305	007-06016-0000	DIO S 1N4154	EA	1
CR306	007-06016-0000	DIO S 1N4154	EA	1
CR307	007-05032-0066	DIO Z 1N5365B	EA	1
I301	120-06083-0001	IC SCL4066BC	EA	1
I302	120-03052-0005	IC LM224N	EA	1
I303	120-03060-0000	IC CA3085AE	EA	1
R301	136-01001-0072	RES PF 1K QW 1%	EA	1
R302	136-01211-0072	RES PF 1.21K QW 1%	EA	1
R303	131-00102-0023	RES CF 1K QW 5%	EA	1
R304	131-00913-0023	RES CF 91K QW 5%	EA	1
R305	131-00753-0023	RES CF 75K QW 5%	EA	1
R306	131-00105-0023	RES CF 1M QW 5%	EA	1
R307	131-00103-0023	RES CF 10K QW 5%	EA	1
R308	131-00333-0023	RES CF 33K QW 5%	EA	1
R309	131-00102-0023	RES CF 1K QW 5%	EA	1
R310	133-00113-0025	RES VA 100K 20% B	EA	1
R311	131-00103-0023	RES CF 10K QW 5%	EA	1
R312	131-00104-0023	RES CF 100K QW 5%	EA	1
R313	133-00113-0027	RES VA 200K 20% B	EA	1
R314	131-00104-0023	RES CF 100K QW 5%	EA	1
R315	131-00102-0023	RES CF 1K QW 5%	EA	1
R316	131-00103-0023	RES CF 10K QW 5%	EA	1
R317	131-00220-0023	RES CF 22 QW 5%	EA	1
R318	131-00103-0023	RES CF 10K QW 5%	EA	1
R319	131-00162-0023	RES CF 1.6K QW 5%	EA	1
R320	131-00271-0023	RES CF 270 QW 5%	EA	1
R321	133-00113-0009	RES VA 200 20% B	EA	1
R322	131-00103-0023	RES CF 10K QW 5%	EA	1
R323	133-00113-0027	RES VA 200K 20% B	EA	1

SYMBOL	PART_NUMBER	DESCRIPTION	UM	-0000
TP301	008-00096-0001	TERMINAL TEST PNT	EA	1
TP302	008-00096-0001	TERMINAL TEST PNT	EA	1
TP303	008-00096-0001	TERMINAL TEST PNT	EA	1
TP304	008-00096-0001	TERMINAL TEST PNT	EA	1
TP305	008-00096-0001	TERMINAL TEST PNT	EA	1
TP306	008-00096-0001	TERMINAL TEST PNT	EA	1
TP307	008-00096-0001	TERMINAL TEST PNT	EA	1
TP308	008-00096-0001	TERMINAL TEST PNT	EA	1

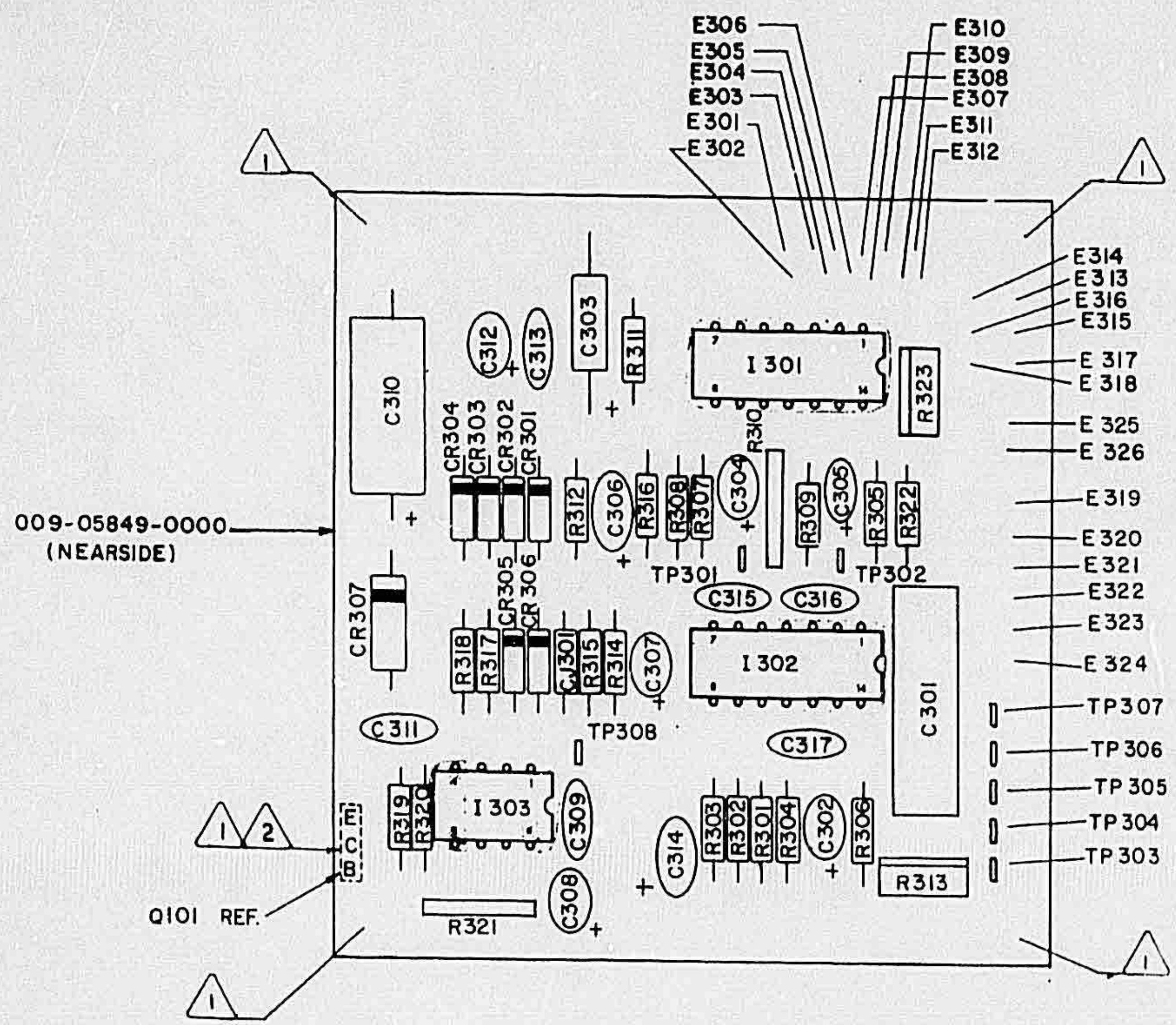
THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

200-05849-0000 Rev. 21 Converter Bd #2

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000
	009-05849-0000	PC BD #2 CONV	[EA]	1
	016-01040-0000	COATING TYPE AR	[AR]	1
C 301	105-00032-0053	CAP MY .15UF5%200V	[EA]	1
C 302	096-01030-0021	CAP TN 12UF20%10V	[EA]	1
C 303	096-01014-0000	CAP TN 40UF 10V	[EA]	1
C 304	096-01030-0011	CAP TN 4.7UF20%20V	[EA]	1
C 305	096-01030-0011	CAP TN 4.7UF20%20V	[EA]	1
C 306	096-01082-0054	CAP TN 15UF 20V	[EA]	1
C 307	096-01030-0034	CAP TN 4.7UF5%20V	[EA]	1
C 308	097-00068-0002	CAP AL 47UF 6.3V	[EA]	1
C 309	109-00007-0000	CAP DC .01UF 25V	[EA]	1
C 310	097-00056-0065	CAP AL 47UF 63V	[EA]	1
C 311	113-05221-0001	CAP DC 220PF 500V	[EA]	1
C 312	096-01030-0011	CAP TN 4.7UF20%20V	[EA]	1
C 313	113-05471-0000	CAP DC 470PF 500V	[EA]	1
C 314	096-01030-0005	CAP TN 10UF 10%20V	[EA]	1
C 315	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 316	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 317	113-03121-0000	CAP DC 120PF 500V	[EA]	1
CJ 301	026-00018-0000	WIRE CKTJMPR 22AWG	[EA]	1
CR 301	007-06016-0000	DIO S 1N4154	[EA]	1
CR 302	007-06016-0000	DIO S 1N4154	[EA]	1
CR 303	007-06016-0000	DIO S 1N4154	[EA]	1
CR 304	007-06016-0000	DIO S 1N4154	[EA]	1
CR 305	007-06016-0000	DIO S 1N4154	[EA]	1
CR 306	007-06016-0000	DIO S 1N4154	[EA]	1
CR 307	007-05032-0066	DIO Z 1N5365B	[EA]	1
I 301	120-06083-0001	IC SCL4066BC	[EA]	1
I 302	120-03052-0005	IC LM224N	[EA]	1
I 303	120-03060-0000	IC CA3085AE	[EA]	1
R 301	136-01001-0072	RES PF 1K QW 1%	[EA]	1
R 302	136-01211-0072	RES PF 1.21K QW 1%	[EA]	1
R 303	131-00102-0023	RES CF 1K QW 5%	[EA]	1
R 304	131-00913-0023	RES CF 91K QW 5%	[EA]	1
R 305	131-00753-0023	RES CF 75K QW 5%	[EA]	1
R 306	131-00105-0023	RES CF 1M QW 5%	[EA]	1
R 307	131-00103-0023	RES CF 10K QW 5%	[EA]	1
R 308	131-00333-0023	RES CF 33K QW 5%	[EA]	1

THIS PAGE CONTAINS OLD REVISION BOMS, FOR REFERENCE ONLY.

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000
R 309	131-00102-0023	RES CF 1K QW 5%	[EA]	1
R 310	133-00113-0025	RES VA 100K 20% B	[EA]	1
R 311	131-00103-0023	RES CF 10K QW 5%	[EA]	1
R 312	131-00104-0023	RES CF 100K QW 5%	[EA]	1
R 313	133-00113-0027	RES VA 200K 20% B	[EA]	1
R 314	131-00104-0023	RES CF 100K QW 5%	[EA]	1
R 315	131-00102-0023	RES CF 1K QW 5%	[EA]	1
R 316	131-00103-0023	RES CF 10K QW 5%	[EA]	1
R 317	131-00220-0023	RES CF 22 QW 5%	[EA]	1
R 318	131-00103-0023	RES CF 10K QW 5%	[EA]	1
R 319	131-00162-0023	RES CF 1.6K QW 5%	[EA]	1
R 320	131-00271-0023	RES CF 270 QW 5%	[EA]	1
R 321	133-00113-0009	RES VA 200 20% B	[EA]	1
R 322	131-00103-0023	RES CF 10K QW 5%	[EA]	1
R 323	133-00113-0027	RES VA 200K 20% B	[EA]	1
TP 301	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 302	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 303	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 304	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 305	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 306	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 307	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 308	008-00096-0001	TERMINAL TEST PNT	[EA]	1



REF.: B/M 200-05849-0000

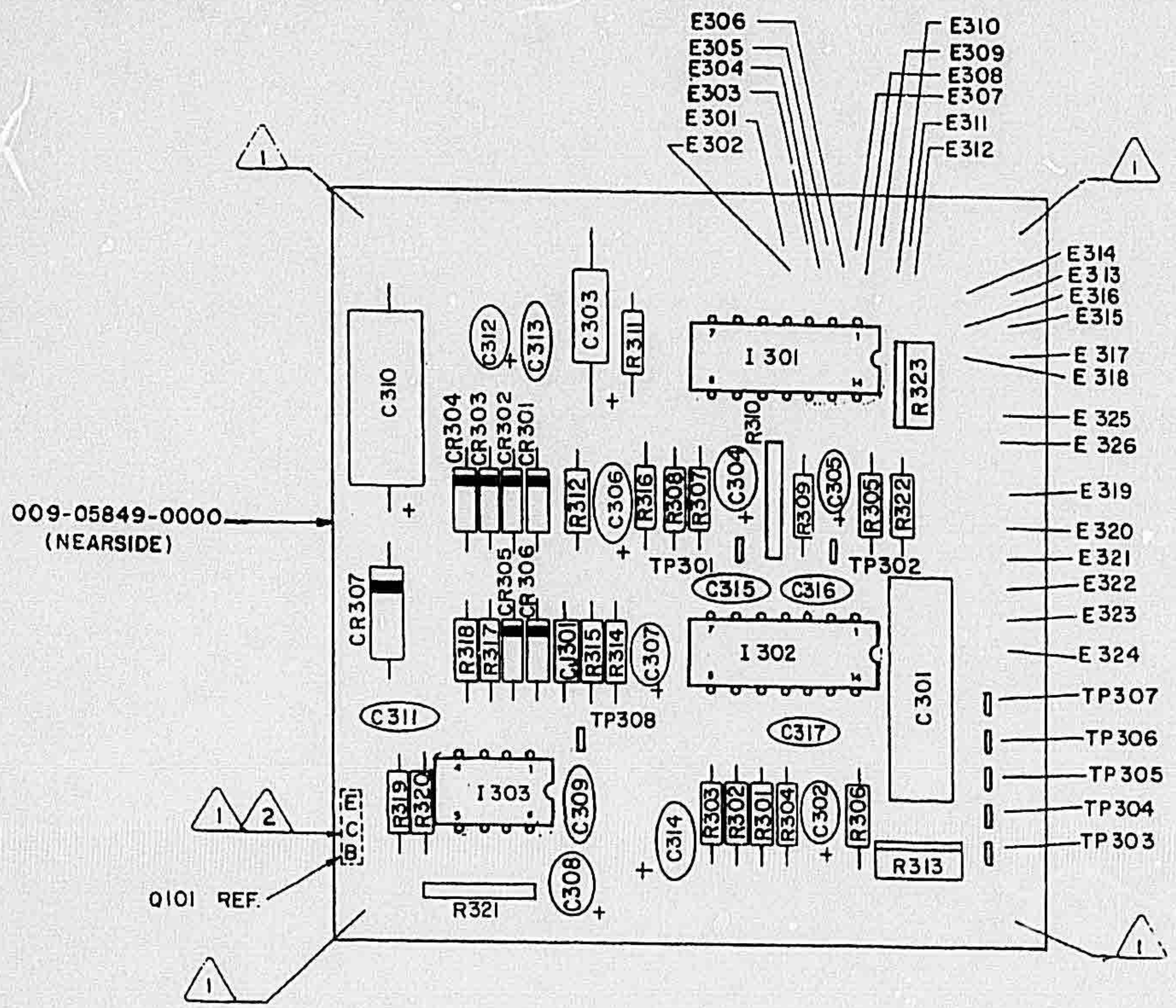
Dwg 300-05849-0000 Rev AA

NOTES:

1. MASK OFF TEST POINTS (8), ALL PADS WITH "E" NO'S (26), R310, R323, R321, R313, PADS IN DASHED AREA, & FOUR MOUNTING AREAS, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH UNDILUTED CLEAR URETHANE POSTCOATING 016-01040-0000.

2. Q101 IS ON FINAL ASSEMBLY.

FIGURE 6-16 Converter #2 Board Assembly
(Dwg No 300-05849-0000, Rev AA)



REF.: B/M 200-5849-XX

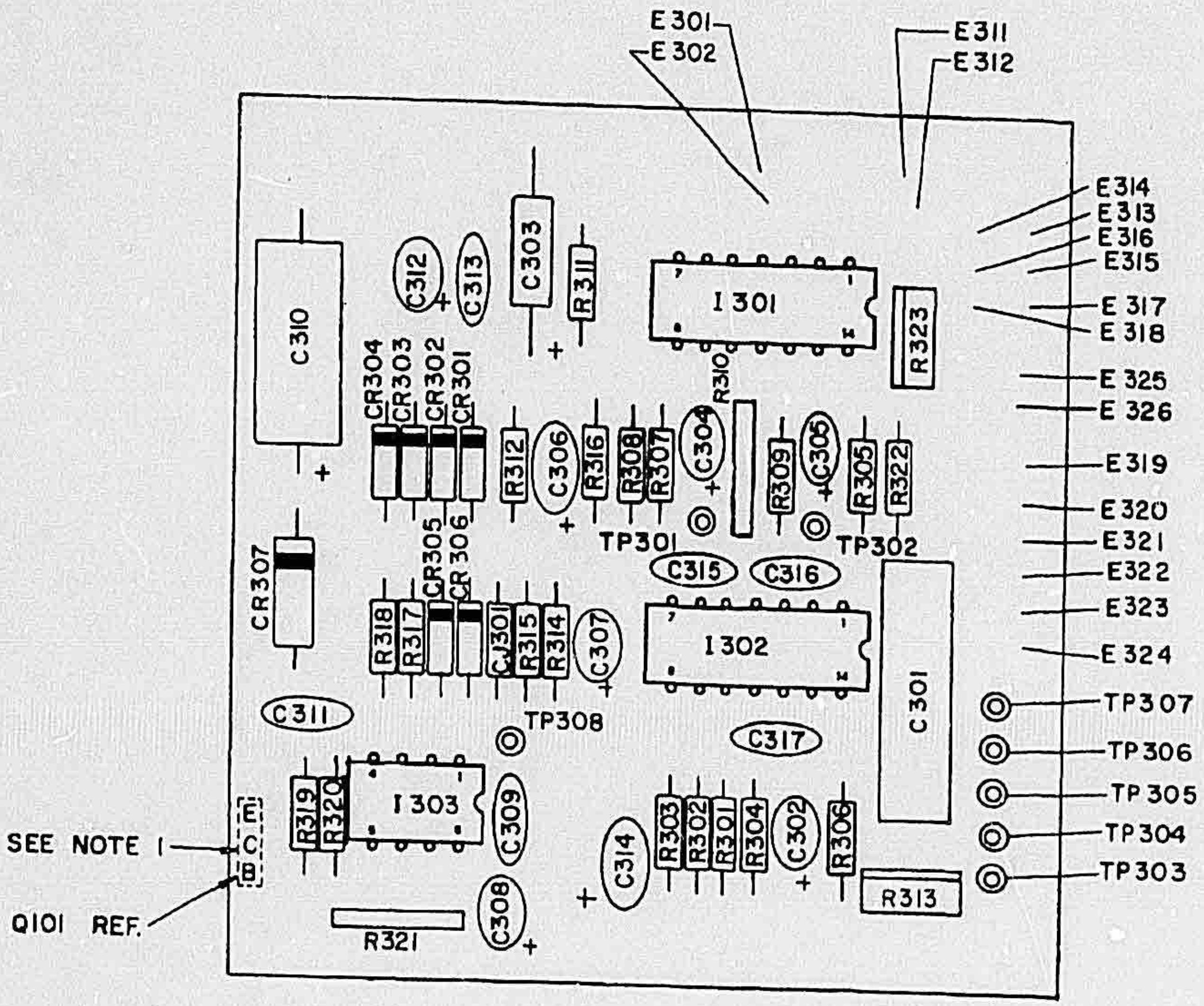
Dwg 300-05849-0000 Rev 10

NOTES:

1. MASK OFF TEST POINTS (8), ALL PADS WITH "E" NO'S (26), R310, R323, R321, R313, PADS IN DASHED AREA, & FOUR MOUNTING AREAS, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH (P/N 016-1040-00).

2. Q101 IS ON FINAL ASSEMBLY.

FIGURE 6-17 Converter #2 Board Assembly
(Dwg No 300-05849-0000, Rev 10)

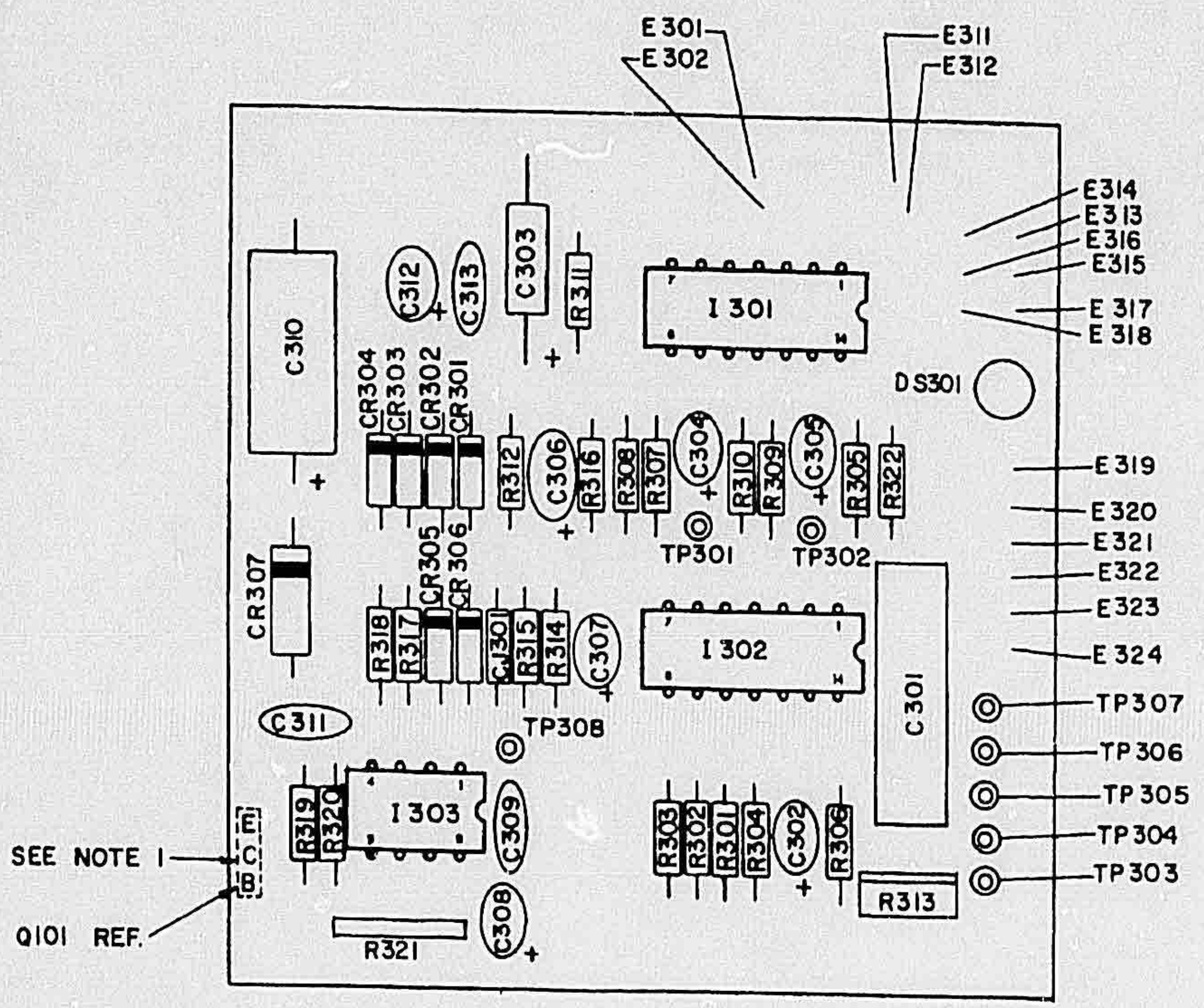


NOTES:

1. MASK OFF TEST POINTS (8), ALL PADS WITH "E" NO'S (24), R321, R313, DS301, PADS IN DASHED AREA, & FOUR MOUNTING AREAS, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).

Dwg 300-05849-0000 Rev 5

FIGURE 6-18 Converter #2 Board Assembly
(Dwg No 300-05849-0000, Rev 5)



NOTES:

1. MASK OFF TEST POINTS (8), ALL PADS WITH "E" NO'S (24), R321, R313, DS301, PADS IN DASHED AREA, & FOUR MOUNTING AREAS, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).

Dwg 300-05849-0000

FIGURE 6-19 Converter #2 Board Assembly
(Dwg No 300-05849-0000)

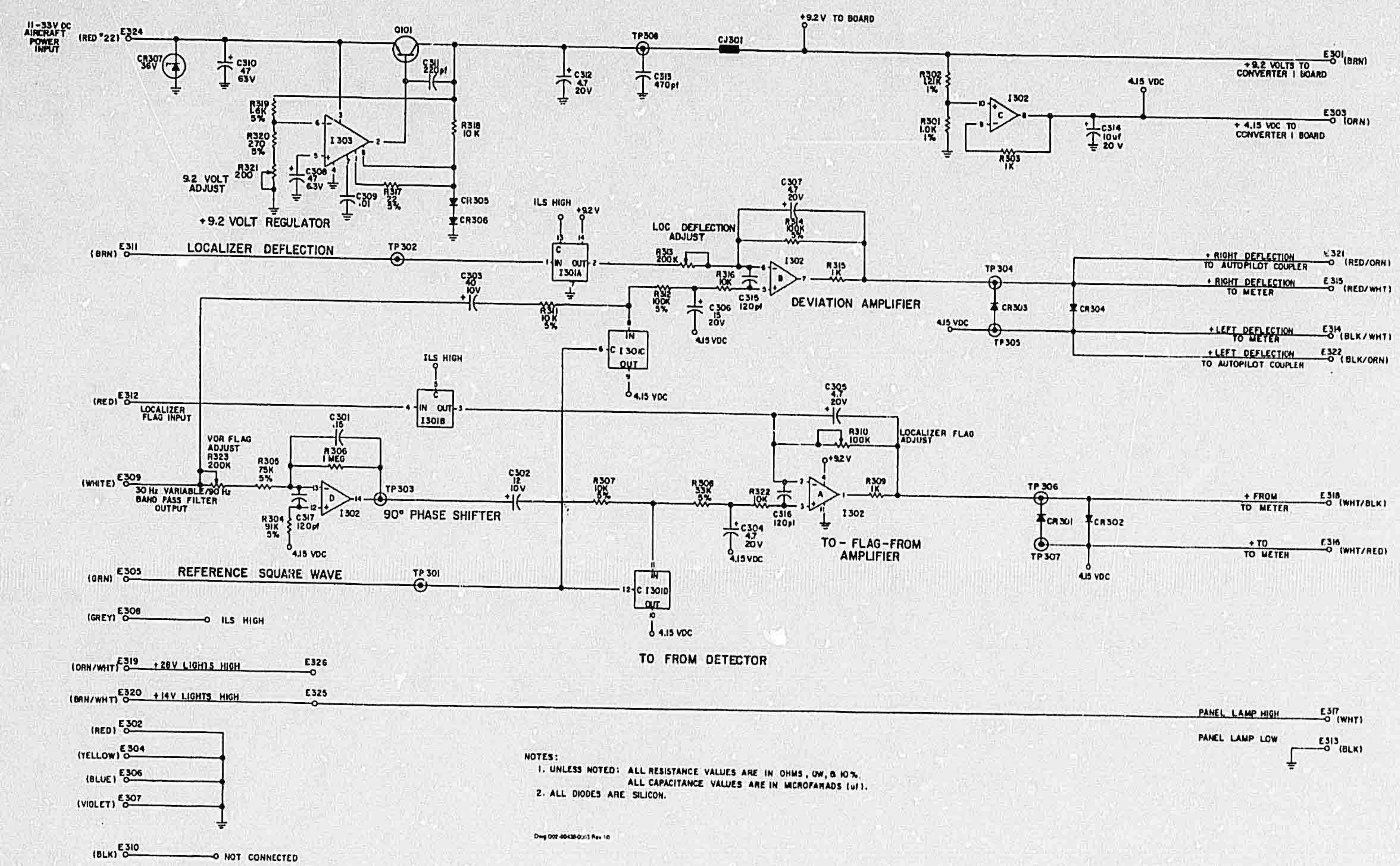
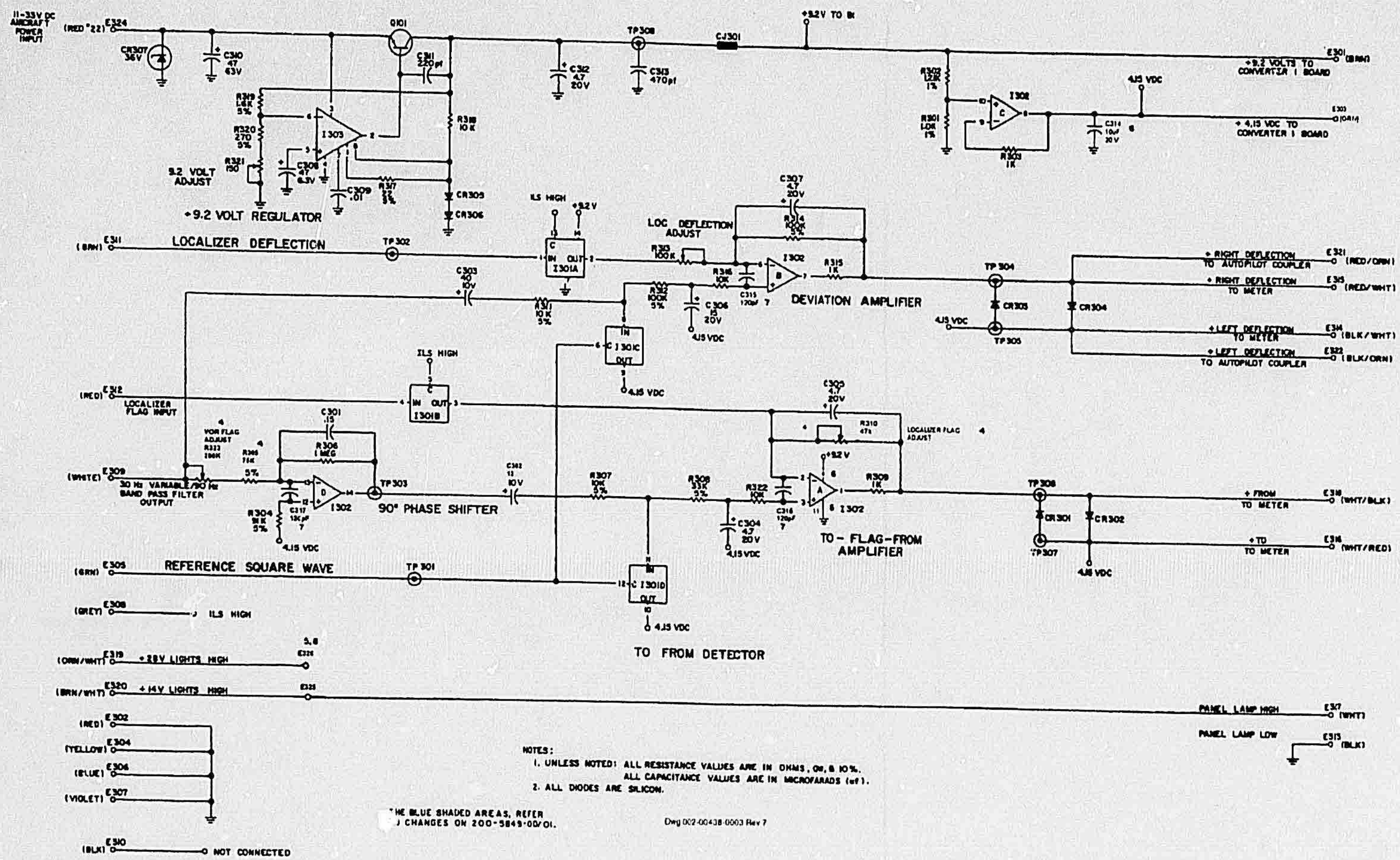


FIGURE 6-20 Converter #2 Board Schematic
(Dwg No 002-00438-0003, Rev 10)



NOTES:
1. UNLESS NOTED: ALL RESISTANCE VALUES ARE IN OHMS, 0W, & 10%.
ALL CAPACITANCE VALUES ARE IN MICROFARADS (uf).
2. ALL DIODES ARE SILICON.

THE BLUE SHADED AREAS, REFER TO CHANGES ON 200-5849-00/01.

Dwg 002-00438-0003 Rev 7

FIGURE 6-21 Converter #2 Board Schematic
(Dwg No 002-00438-0003, Rev 7)

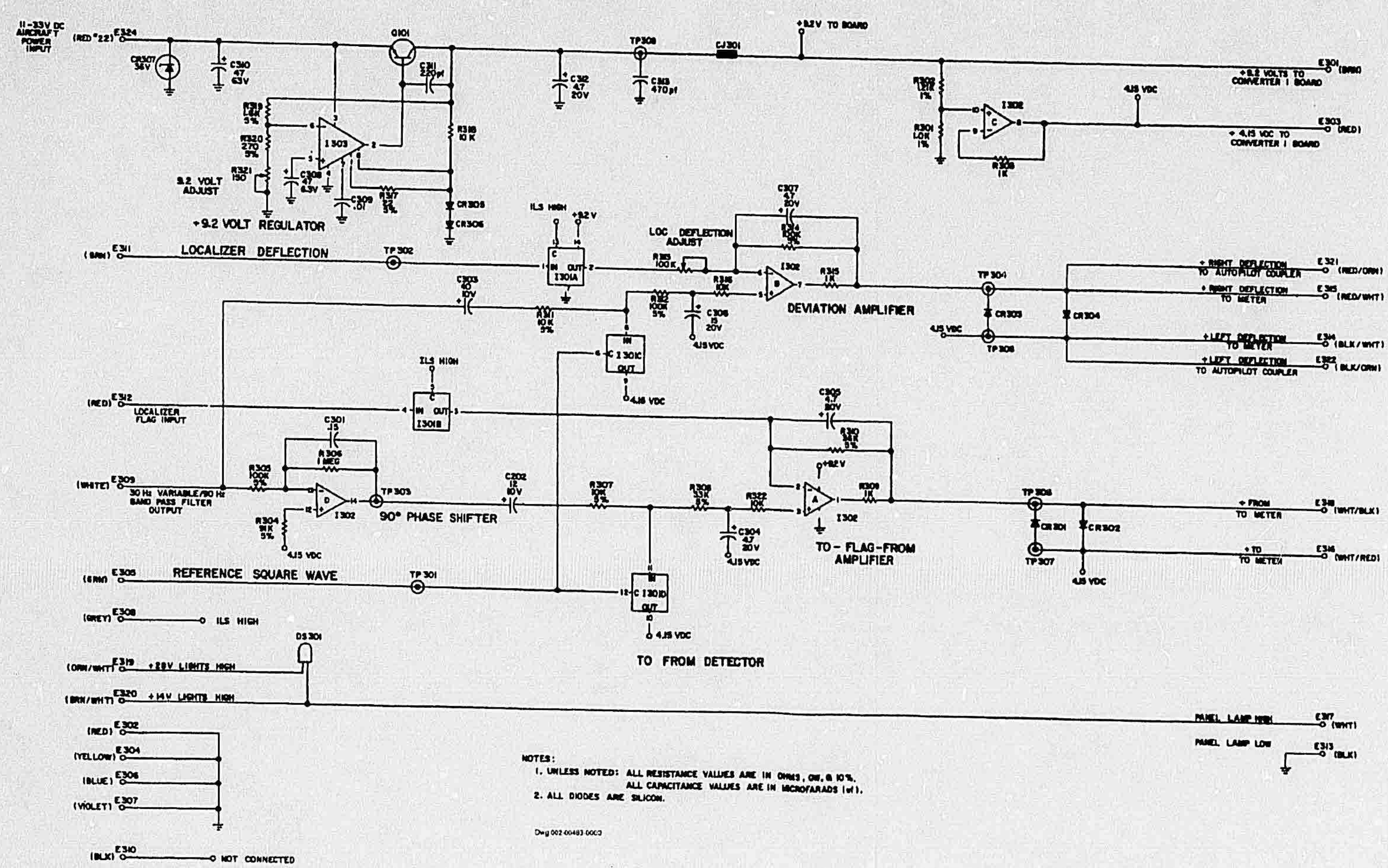


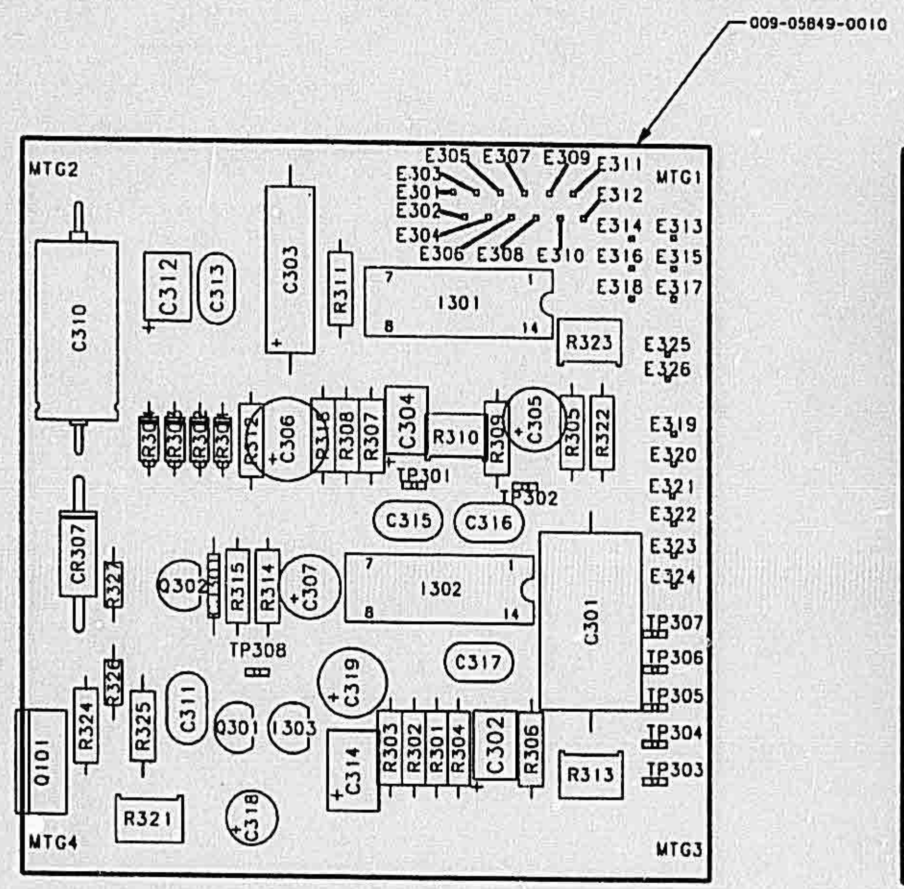
FIGURE 6-22 Converter #2 Board Schematic
(Dwg No 002-00438-0003)

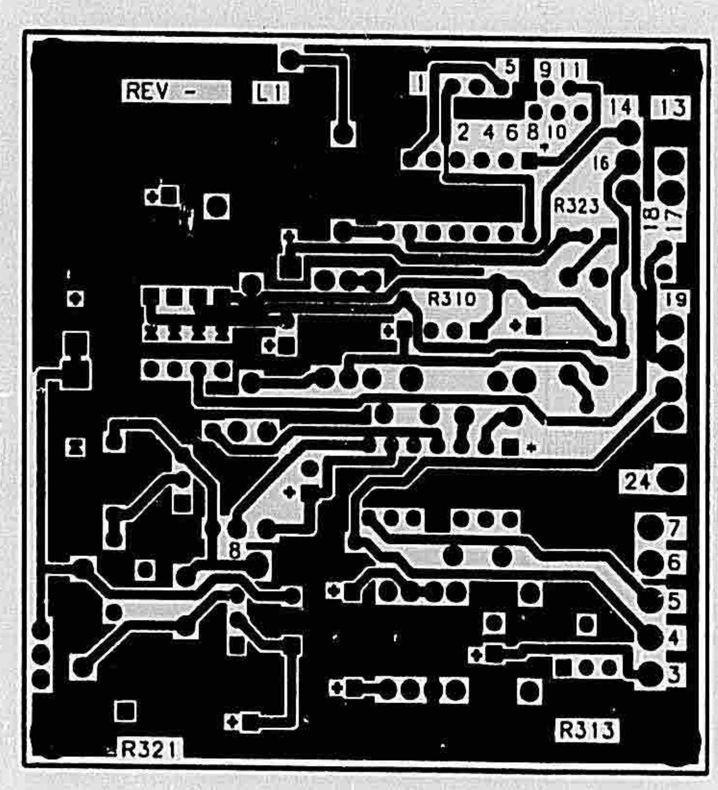
BOM 5: Converter #2 Board

200-05849-0010 CONVERTER #2 BD REV A

SYMBOL	PART_NUMBER	DESCRIPTION	UM	-0010
_	009-05849-0010	KI 208/209 CONVERTER #2	EA	1
_	016-01040-0000	COATING TYPE AR	AR	1
_	150-00003-0010	TUBING TFLN 24AWG	IN	0.7
C301	108-05020-0001	CAP PC 1UF 50V	EA	1
C302	096-01030-0021	CAP TN 12UF20%10V	EA	1
C303	096-01014-0000	CAP TN 40UF 10V	EA	1
C304	096-01030-0011	CAP TN 4.7UF20%20V	EA	1
C305	096-01082-0036	CAP TN 10UF 20V	EA	1
C306	096-01082-0042	CAP TN 33UF 15V	EA	1
C307	096-01082-0036	CAP TN 10UF 20V	EA	1
C310	097-00056-0065	CAP AL 47UF 63V	EA	1
C311	113-05221-0001	CAP DC 220PF 500V	EA	1
C312	096-01030-0011	CAP TN 4.7UF20%20V	EA	1
C313	113-05471-0000	CAP DC 470PF 500V	EA	1
C314	096-01030-0005	CAP TN 10UF 10%20V	EA	1
C315	113-03121-0000	CAP DC 120PF 500V	EA	1
C316	113-03121-0000	CAP DC 120PF 500V	EA	1
C317	113-03121-0000	CAP DC 120PF 500V	EA	1
C318	097-00214-0024	CAP AL 10UF 63V	EA	1
C319	097-00109-0006	CAP EL 100UF 16V	EA	1
CJ301	026-00018-0000	WIRE CKTJMPR 22AWG	EA	1
CR301	007-06016-0000	DIO S 1N4154	EA	1
CR302	007-06016-0000	DIO S 1N4154	EA	1
CR303	007-06016-0000	DIO S 1N4154	EA	1
CR304	007-06016-0000	DIO S 1N4154	EA	1
CR307	007-05032-0066	DIO Z 1N5365B	EA	1
I301	120-06083-0001	IC SCL4066BC	EA	1
I302	120-03052-0005	IC LM224N	EA	1
I303	120-03744-0001	REGULATOR, 5V, TO-92	EA	1
Q301	007-00243-0000	XSTR S NPN MPSA06	EA	1
Q302	007-00243-0000	XSTR S NPN MPSA06	EA	1
R301	136-01001-0072	RES PF 1K QW 1%	EA	1
R302	136-01211-0072	RES PF 1.21K QW 1%	EA	1
R303	131-00102-0023	RES CF 1K QW 5%	EA	1
R304	131-00273-0023	RES CF 27K QW 5%	EA	1
R305	136-01402-0072	RES PF 14K QW 1%	EA	1
R306	136-01503-0072	RES PF 150K QW 1%	EA	1
R307	131-00103-0023	RES CF 10K QW 5%	EA	1
R308	131-00333-0023	RES CF 33K QW 5%	EA	1
R309	131-00102-0023	RES CF 1K QW 5%	EA	1
R310	133-00110-0010	RES VA 50K HW	EA	1
R311	136-04991-0072	RES PF 4.99K QW 1%	EA	1
R312	136-04992-0072	RES PF 49.9K QW 1%	EA	1
R313	133-00110-0011	RES VA 100K HW	EA	1
R314	136-04992-0072	RES PF 49.9K QW 1%	EA	1
R315	131-00102-0023	RES CF 1K QW 5%	EA	1
R316	131-00103-0023	RES CF 10K QW 5%	EA	1
R321	133-00110-0002	RES VA 200 HW	EA	1
R322	131-00103-0023	RES CF 10K QW 5%	EA	1
R323	133-00110-0009	RES VA 25K HW	EA	1
R324	131-00104-0023	RES CF 100K QW 5%	EA	1
R325	131-00911-0023	RES CF 910 QW 5%	EA	1
R326	136-08250-0062	RES PF 825 EW 1%	EA	1

SYMBOL	PART_NUMBER	DESCRIPTION	UM	-0010
R327	136-07500-0062	RES PF 750 EW 1%	EA	1
TP301	008-00096-0001	TERMINAL TEST PNT	EA	1
TP302	008-00096-0001	TERMINAL TEST PNT	EA	1
TP303	008-00096-0001	TERMINAL TEST PNT	EA	1
TP304	008-00096-0001	TERMINAL TEST PNT	EA	1
TP305	008-00096-0001	TERMINAL TEST PNT	EA	1
TP306	008-00096-0001	TERMINAL TEST PNT	EA	1
TP307	008-00096-0001	TERMINAL TEST PNT	EA	1
TP308	008-00096-0001	TERMINAL TEST PNT	EA	1





NEARSIDE VIEW OF PC BOARD

NOTES:

1. PRIOR TO POST COATING BOTH SIDES OF P.C. BOARD WITH PN 016-01040-0000, MASK OFF ALL MOUNTING AREAS AND REFERENCE DESIGNATORS: E301-E326, MTG1-MTG4, R310 R313, R321, R323, TP301-TP308, Q101
2. Q101 IS ON FINAL ASSEMBLY.
3. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC. 001-01101-0000.
4. WHERE APPLICABLE, LIQUID STAKE ALL FASTENERS PER SPEC. 001-01080-0000.
5. MOUNT POTENTIOMETERS R310 AND R323 WITH TEFLON TUBING 150-00003-0010 INSERTED OVER LEADS TO BOARD. RAISE R310 AND R323 TO A HEIGHT OF .11 ABOVE THE BOARD.

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-05849-0010

Dwg 300-05849-0010 Rev A

FIGURE 6-23 Converter #2 Board Assembly
(Dwg No 300-05849-0010, Rev A)

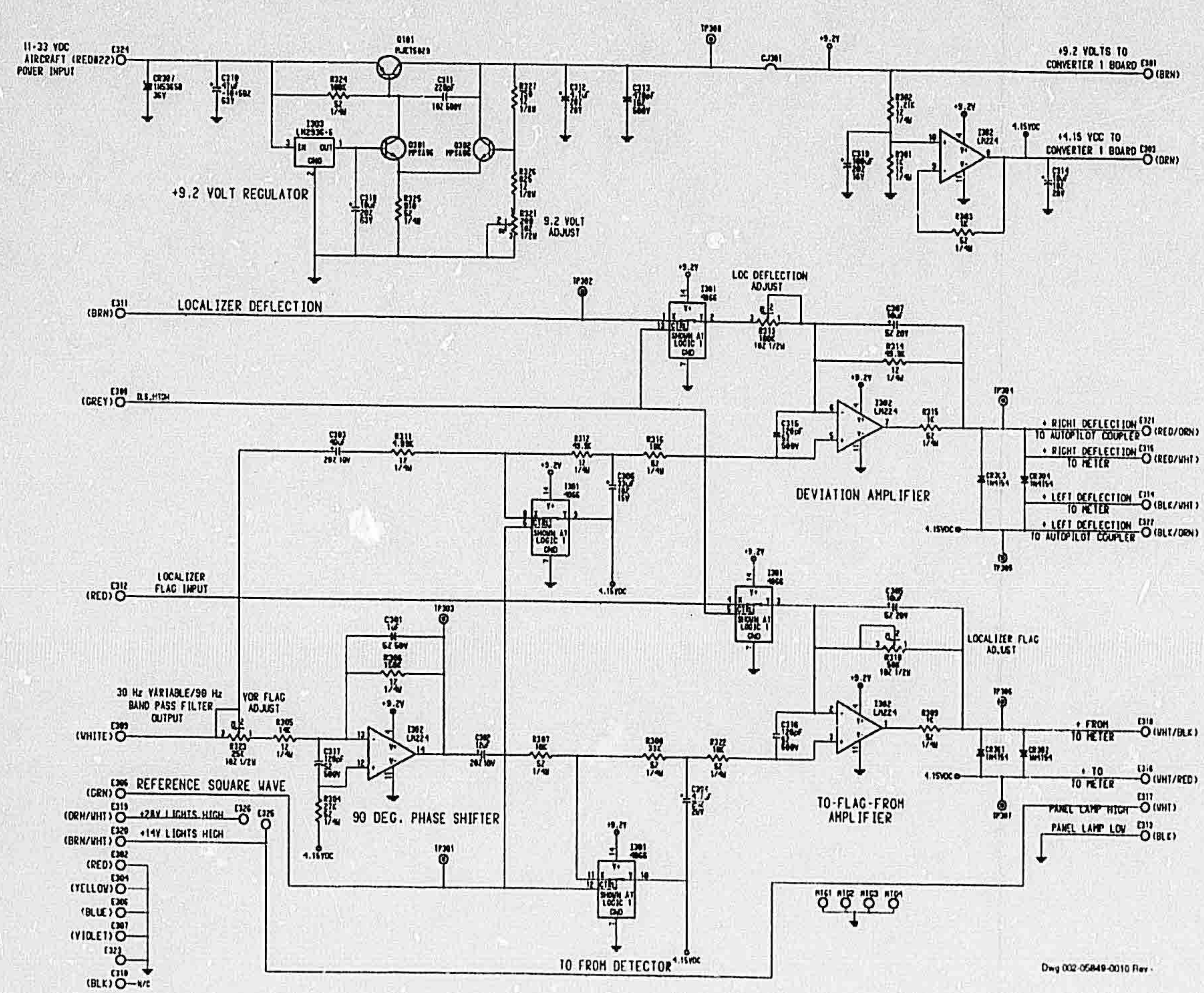


FIGURE 6-24 Converter #2 Board Schematic
(Dwg No 002-05849-0010, Rev -)

ATP INDEX

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Bendix/King
KI 208A/209A Navigation Indicators
Maintenance Manual

*** End of Index ***

MFG.

INTRO

AlliedSignal

ELECTRONIC AND AVIONICS SYSTEMS

INSTALLATION MANUAL

BENDIX/KING®

KI 208A/209A
NAVIGATION INDICATORS

MANUAL NUMBER 006-10543-0000
REVISION 0 OCTOBER, 1996

RECORD OF REVISIONS

MFG REV NO	DESCRIPTION	ISSUE DATE	ATP REV DATE	INSERTED BY
	INSTALLATION MANUAL	10/1996	11/2/00	ATP/MG

RECORD OF TEMPORARY REVISIONS

ATP

TEMP REV NO	DESCRIPTION	ISSUE DATE	ATP REV DATE	INSERTED BY	DATE REMOVED	REV INCORP	REMOVED BY

SECTION I
GENERAL INFORMATION

SECTION II
INSTALLATION

SECTION III
OPERATION

LIST OF FIGURES

01

SECTION I
GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical and electrical characteristics of the Bendix/King Silver Crown, KI 208A and KI 209A.

1.2 EQUIPMENT DESCRIPTION

The Bendix/King KI 208A NAV Indicator is designed to operate with VHF, Loran-C and GPS navigational equipment (such as the KX 155/A, KLN 88 and KLN 89) to provide OMNI (VOR), GPS, Loran-C or LOCALIZER (LOC) information. An external selector switch determines which navigation information, GPS/Loran-C or VOR/LOC, is displayed on the indicator. When NAV is selected for display, the VHF navigational receiver receives and detects the omni or localizer information. The KI 208A converts this information to DC signals which drive the LEFT-RIGHT needle and the TO-OFF-FROM flag of the visual indicator. When LNAV is selected for display, the KI 208A receives inputs from compatible GPS/Loran-C receivers or Flight Management Systems to provide a visual presentation to the pilot.

The KI 209A NAV Indicator performs the same functions as the KI 208A. In addition, it contains an UP-DOWN needle with an OFF warning flag. The external selector switch determines whether information from an external glideslope receiver or vertical navigation information from a GPS or FMS is displayed.

The lateral and vertical deviation and flag signals that are selected for display on the indicator are output from the indicator for use by a flight control system. No course datum information is supplied by the indicator.

The KI 208A/209A OBS circuit is zeroed at 45°, as opposed to ORZ/EZ indicators which are typically zeroed at 300°. Because of this, any LNAV interfaced to the KI 208A/209A OBS resolver must have at least 110° of calibration range on its OBS resolver.

Three spare double throw relay contacts are provided by both the KI 208A and KI 209A. These relays are switched by the external selector switch that selects the indicator's displayed sensor.

1.3 TECHNICAL CHARACTERISTICS

SPECIFICATION	KI 208A CHARACTERISTIC	
GENERAL		
TSO COMPLIANCE:	C40a, C36c Class C Cat 2 DO-138 Environmental Cat. DAPAAAXXXXXX	
SIZE:	See Figure 2-2	
WEIGHT:	1.0 lbs (.45Kg) Nominal	
POWER REQUIREMENTS:	14VDC	28VDC
Indicator	50mA	50mA
Lighting	160mA	80mA

SPECIFICATION	KI 208A (Cont'd)	CHARACTERISTIC
RELAY CHARACTERISTICS:		
Total Energize Current	200mA Max.	100mA Max.
Resistive Load Current	1.0A Max.	1.0A Max.
Inductive Load Current	0.2A Max.	0.2A Max.
Incandescent Lamp Load Current	0.1A Max.	0.1A Max.
NAV AND LNAV ANNUNCIATE:		
Incandescent Lamp Load Current	0.1A Max.	0.1A Max.
	VOR/LOC	
INPUT IMPEDANCE:	50K ohms, Nominal	
NOMINAL COMPOSITE INPUT LEVEL:	LOC: 0.33VRMS ±10% VOR: 0.50VRMS ±10% ARINC phased	
LOCALIZER SENSITIVITY:	4dB tone ratio will give 3 dot scale deflection	
OMNI ACCURACY:	±2° Max Error, ±1° Typical	
OMNI SENSITIVITY:	±10° off course gives full scale deflection	
EXTERNAL LOAD:	ARINC Autopilot Deviation (Two 1K loads)	
	LNAV LATERAL DEVIATION	
INPUT IMPEDANCE:	1K ohms ±5%	
DEFLECTION SENSITIVITY:	150µA ±5% for full scale deflection	
	LNAV LATERAL FLAG	
INPUT IMPEDANCE:	1K ohms ±5% minimum	
DEFLECTION SENSITIVITY:	125µA for flag to leave stop 260µA maximum for fully concealed flag	
	LNAV OBS	
Electrical Zero:	45°	
OBS Excitation Voltage:	2.0 - 7.2 V P-P, RMS or Square	
Input Impedance:	> 10K ohms	
Output Load Capability:	> 30K ohms	
	FLIGHT CONTROL SYSTEM OUTPUTS	
Lateral Deviation Load Capability:	NAV Mode	LNAV Mode
	Two 1K ohm loads	Direct Relay Connection to LNAV

SPECIFICATION	KI 208A (Cont'd)	CHARACTERISTIC
Lateral Flag Load Capability:	NAV Mode	LNAV Mode
	Five 1K ohm loads	Direct Relay Connection to LNAV
FCS LOC Engage Load Capability:	NAV Mode	LNAV Mode
	Direct Relay Connection to VOR/LOC Receiver	Direct Relay Connection to LNAV

SPECIFICATION	KI 209A CHARACTERISTIC	
GENERAL		
TSO COMPLIANCE:	C40a, C36c Class C Cat 2 C34c Class D Cat 2 DO-138 Environmental Cat. DAPAAAXXXXXX	
SIZE:	See Figure 2-2	
WEIGHT:	1.2 lbs (.54Kg) Nominal	
POWER REQUIREMENTS:	14VDC	28VDC
Indicator	50mA	50mA
Lighting	160mA	80mA
RELAY CHARACTERISTICS:		
Total Energize Current	200mA Max.	100mA Max.
Resistive Load Current	1.0A Max.	1.0A Max.
Inductive Load Current	0.2A Max.	0.2A Max.
Incandescent Lamp Load Current	0.1A Max.	0.1A Max.
NAV AND LNAV ANNUNCIATE:		
Incandescent Lamp Load Current	0.1A Max.	0.1A Max.
VOR/LOC		
INPUT IMPEDANCE:	50K ohms, Nominal	
NOMINAL COMPOSITE INPUT LEVEL:	LOC: 0.33VRMS ±10% VOR: 0.50VRMS ±10% ARINC phased	
LOCALIZER SENSITIVITY:	4dB tone ratio will give 3 dot scale deflection	
OMNI ACCURACY:	±2° Max Error, ±1° Typical	
OMNI SENSITIVITY:	±10° off course gives full scale deflection	
EXTERNAL LOAD:	ARINC Autopilot Deviation (Two 1K loads)	

SPECIFICATION	KI 209A (Cont'd)	CHARACTERISTIC
	LNAV LATERAL AND VERTICAL DEVIATION	
INPUT IMPEDANCE		1K ohms ±5%
DEFLECTION SENSITIVITY:		150µA ±5% for full scale deflection
	LNAV LATERAL AND VERTICAL FLAG	
INPUT IMPEDANCE:		1K ohms ±5% minimum
DEFLECTION SENSITIVITY:		125µA for flag to leave stop 260µA maximum for fully concealed flag
	LNAV OBS	
Electrical Zero:		45°
OBS Excitation Voltage:		2.0 - 7.2 V P-P, RMS or Square
Input Impedance:		> 10K ohms
Output Load Capability:		> 30K ohms
	FLIGHT CONTROL SYSTEM OUTPUTS	
Lateral Deviation Load Capability:	NAV Mode	LNAV Mode
	Two 1K ohm loads	Direct Relay Connection to LNAV
Lateral Flag Load Capability:	NAV Mode	LNAV Mode
	Five 1K ohm loads	Direct Relay Connection to LNAV
Vertical Deviation Load Capability:	NAV Mode	LNAV Mode
	Direct Relay Connection to Glideslope Receiver	Direct Relay Connection to LNAV
Vertical Flag Load Capability:	NAV Mode	LNAV Mode
	Direct Relay Connection to Glideslope Receiver	Direct Relay Connection to LNAV
FCS LOC Engage Load Capability:	NAV Mode	LNAV Mode
	Direct Relay Connection to VOR/LOC Receiver	Direct Relay Connection to LNAV
	GLIDESLOPE DEVIATION METER	
INPUT IMPEDANCE:		1K ohms ±5%
DEFLECTION SENSITIVITY:		150µA ±5% for full scale deflection

SPECIFICATION	KI 209A (Cont'd)	CHARACTERISTIC
	GLIDESLOPE FLAG	
INPUT IMPEDANCE:		1K ohms ±5% minimum
DEFLECTION SENSITIVITY:		125μA for flag to leave stop 260μA maximum for fully concealed flag

1.4 UNITS AND ACCESSORIES SUPPLIED

A. KI 208A NAV Indicator

066-3056-10

B. KI 209A NAV Indicator

066-3056-11

C. Bendix/King Equipment Installation Kit (050-01550-0001) which includes mating connectors, mounting hardware, etc., is as follows:

PART NUMBER	DESCRIPTION	VENDOR P/N	QUANTITY
030-01176-0000	Connector		1
030-02351-0004	Conn. Hood		1
030-02227-0023	Pin Female		50

1.5 ACCESSORIES REQUIRED, BUT NOT SUPPLIED

A. Antenna
B. Interconnecting Cables
C. Receiver
D. Switch/Annunciator (NAV/GPS)

	Eaton Series 582	Eaton Series 584
28 Volt	031-00785-0711	031-00763-0711
14 Volt	031-00785-0712	031-00763-0712
5 Volt	031-00785-0713	031-00763-0713

E. Mooring Plate P/N 073-00044-0001
F. Adapter Plate P/N 073-00045-0000 (Front mounting only)
G. Punch P/N 071-06038-0000 or
H. Filing Template P/N 071-06039-0000
I. Crimp Tool P/N 005-02012-0021
J. Positioner P/N 005-02012-0023
K. Insertion/Extraction Tool P/N 005-02012-0025

1.6 LICENSE REQUIREMENTS

None.

1.7 REQUIREMENTS FOR TSO'D VOR/ILS/GLIDESLOPE SYSTEM

Units used in conjunction with the KI 208A/209A must meet the specifications listed below to comprise a completely TSO'd navigation system.

1.7.1 NAVIGATION RECEIVER REQUIREMENTS FOR USE WITH KI 208A/209A:

A. The Navigation Receiver shall be authorized to the standards of TSO C40a/b/c or TSO C36c/d/e.

B. VOR phase error shall not exceed 1.5°.

C. Variation in VOR composite output to not exceed ±3dB from .500VRMS as the RF input level of a Standard VOR Test Signal to the receiver is varied from 10µv to 10,000µv.

D. Variation in the LOC composite output shall not exceed ±2dB from .333VRMS as the RF input level of a Standard Localizer Centering Signal is varied from 50µv to 10,000µv.

E. A control line (ILS Energize) must be provided as a low impedance to ground when an ILS frequency is selected.

1.7.2 GLIDESLOPE RECEIVER/CONVERTER REQUIREMENTS FOR USE WITH KI 209A:

A. The Glideslope Receiver/Converter shall be authorized to the standards of TSO C34c/d/e.

B. Centering current to be 0 ±7µA into a 1000 ohm load with a 95% probability under all combinations of the service conditions listed in RTCA Paper DO-132, Minimum Performance Standards - Airborne ILS Glideslope Receiving Equipment paragraph 2.1 sub-paragraph b, Centering Accuracy.

C. Deviation current with a 700µv Standard Glideslope Deviation Signal (.091 ± .001ddm tone ratio) applied to the receiver input shall be 78µA ±10% into a 1000 ohm load. Deviation current shall not change more than 15% as the RF input level of a Standard Glideslope Deviation Signal is varied from 100 to 10,000µv. Deviation Current shall be proportional within 5% to the difference in depth of modulation of the 90Hz and 150Hz tones.

D. Warning signal output shall be a DC current less than 125µA into a 1000 ohm load for a warning flag to be fully visible. Warning signal for a fully concealed warning flag shall be a DC current of 260µA minimum into a 1000 ohm load.

02

SECTION II
INSTALLATION

2.1 GENERAL

This section contains suggestions and factors to consider before installing the KI 208A/209A Indicator. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme care when unpacking each unit. Make a visual inspection of each unit for evidence of damage incurred during shipment. If a claim for damage is to be made, save the shipping container to substantiate the claim. When all equipment is removed, place in the shipping container all packing materials for use in unit storage or reshipment. The KI 208A/209A installation will conform to standards designated by the customer, installing agency and existing conditions as to unit location and type of installation.

NOTE

This equipment has plastic lenses. Use extreme caution when cleaning.

2.3 KI 208A/209A INSTALLATION

2.3.1 INSTALLATION PROCEDURE

A. Carefully select the KI 208A/209A panel location for unobstructed vision, minimum parallax and adequate clearance for the instrument case and installation of cables and connectors.

B. Refer to Figure 2-2 for the KI 208A and KI 209A mounting dimensions.

C. A standard 3 1/8" instrument hole is required. Use Hole Punch (P/N 071-06038-0000) or Filing Template (P/N 071-06039-0000).

D. Secure the KI 208A/209A firmly in place using the mounting screws supplied. If the mounting screws supplied are not used, #6-32 screws that do not extend more than .625 (1.59cm) into the unit may be used.

E. The installing agency will supply and fabricate the external cable. The plugs required are supplied by AlliedSignal.

F. The KI 208A/209A will drive two external deflection indicator loads of 1000 ohms or greater impedance.

G. An omni phase adjust potentiometer, R233, is accessible from the front of the indicator by removing the upper left mounting screw. The 2 1/2 inch long adjustment tool (P/N 088-00706-0000) is required to adjust the omni phase adjust potentiometer. This is for final calibration of the omni system after installation in the aircraft. The range of the error potentiometer is approximately ±25°. It should be noted that this potentiometer does not affect localizer centering. The localizer centering potentiometer R227 is accessible from the front of the indicator by removing the upper right mounting screw. Again the 2 1/2 inch long adjustment tool is required.

2.3.2 CABLING

A. The length and routing of the external cables must be carefully studied and planned prior to the installation. Avoid sharp bends and placing cables too near the aircraft control cables.

B. Fabricate the external cables in accordance with the installation drawing that fulfills the system requirement.

C. Avoid running the interconnect harness between the KI 208A and navigation receiver too close to any transmitter antenna coax cable.

D. Considerable savings of installation time can be realized by using the crimping tool shown in Figure 2-1.

2.3.3 PIN DESCRIPTIONS

A. NAV 11-33 VDC A/C POWER and LNAV 11-33 VDC A/C POWER (Pins 40 and 41)

The KI 208A/209A will accept from 11 VDC to 33 VDC input power. Two separate pins are available so the KI 208A/209A is always powered by the displayed navigation data source. Pin 41 may be connected to the circuit breaker or switched power output of a NAV receiver or NAV/COM. If the switched power output is used, the KI 208A/209A draws current only when the power switch on the NAV or NAV/COM is ON (if NAV is selected on the NAV/LNAV switch). This is particularly helpful in aircraft where there is no avionics master switch. Generally, LNAV units are not equipped with switched power outputs, so pin 40 should be connected to the LNAV circuit breaker.

B. A/C GROUND (Pin 34)

This pin is tied to aircraft ground. Wiring harness shields are not to be terminated on this pin. Refer to Figure 2-3.

C. LIGHTING 14 V and LIGHTING 28 V / LO (Pins 4 and 5)

Used for the panel lighting. Refer to Figure 2-3 for the correct method of connecting these pins to the aircraft dimmer bus.

D. VOR/LOC COMPOSITE (Pin 6)

VOR/LOC composite input from a NAV receiver. Nominal level: 500 mV VOR (ARINC phased), 350 mV LOC. Levels are as measured by an RMS-calibrated, peak detecting voltmeter.

E. NAV VERTICAL +UP IN, NAV VERTICAL +DOWN IN, NAV VERTICAL +FLAG IN, and NAV VERTICAL -FLAG IN (Pins 29, 28, 25 and 24)(KI 209A only)

Meter-level vertical deviation and flag inputs from a NAV (glideslope) receiver.

F. LNAV LATERAL DEV +LEFT IN, LNAV LATERAL DEV +RIGHT IN, LNAV +TO IN, LNAV +FROM IN, LNAV LATERAL +FLAG IN and LNAV LATERAL -FLAG IN (Pins 20, 21, 43, 42, 48 and 3)

Meter-level lateral deviation, TO/FROM, and flag inputs from an LNAV receiver.

G. LNAV VERTICAL +UP IN, LNAV VERTICAL +DOWN IN, LNAV VERTICAL +FLAG IN and LNAV VERTICAL -FLAG IN (Pins 27, 26, 23 and 22)(KI 209A only)

Meter-level vertical deviation and flag inputs from an LNAV receiver.

H. LNAV OBS EXCITATION IN, LNAV OBS SIN OUT, LNAV OBS COS OUT, and OBS RETURN (Pins 2, 15, 14, and 50)

These pins form the OBS resolver interface. LNAV OBS EXCITATION IN is a typically 400-450 Hz excitation/reference signal. LNAV OBS SIN OUT and LNAV OBS COS OUT indicate the position of the OBS selection card on the KI 208A/209A. OBS RETURN is the low-side reference for all three signals. The KI 208A/209A OBS circuit is zeroed at 45°, as opposed to ORZ/EZ indicators which are typically zeroed at 300°. Because of this, any LNAV interfaced to the KI 208A/209A must have at least 110° of calibration range on its OBS resolver.

I. LATERAL DEV +LEFT OUT, LATERAL DEV +RIGHT OUT, LATERAL +FLAG OUT and LATERAL -FLAG OUT (Pins 17, 16, 11 and 12)

Meter-level lateral deviation and flag outputs, typically to a flight control system. When LNAV is displayed on the KI 208A/209A, these signals are simply the LNAV deviation and flags switched through relay contacts. When NAV is displayed, these signals are the outputs of the VOR/LOC converter.

J. VERTICAL +UP OUT, VERTICAL +DOWN OUT, VERTICAL +FLAG OUT, and VERTICAL -FLAG OUT (Pins 44, 45, 46, and 47)(KI 209A only)

Meter-level vertical deviation and flag outputs, typically to a flight control system. These signals are simply the NAV or LNAV deviation and flags switched through relay contacts, depending on which source is displayed on the KI 209A.

K. RELAY 14 V POWER A and RELAY 14 V POWER B (Pins 35 and 37)

These pins are connected to the LNAV circuit breaker and provide the power for the KI 208A/209A's internal relays. Should a failure of LNAV power occur, the KI 208A/209A will automatically revert to displaying NAV data. These pins are connected differently, depending on the aircraft power voltage. The two banks are wired in series for 28 volt power, and in parallel for 14 volt power. Refer to Figure 2-3 for the proper connection to 14 volt and 28 volt power. The current draw is 58.5 mA when A/C POWER is 27.5 VDC, and 117 mA when A/C POWER is 14.75 VDC. Suppression diodes are contained within the KI 208A/209A.

L. RELAY $\overline{\text{ENGAGE}}$ A and RELAY $\overline{\text{ENGAGE}}$ B (Pins 36 and 1)

These pins sense the position of the NAV/GPS switch. They are the low side of the relays, which complete the relay coil power circuit. In 28 volt aircraft, pin 36 is jumpered to pin 37, and pin 1 is connected to a NAV/GPS switch contact. In 14 volt aircraft, both pin 36 and pin 1 are connected to a NAV/GPS switch contact. Refer to Figure 2-3 for the proper connections in each case.

M. $\overline{\text{LNAV}}$ ANNUNCIATE and $\overline{\text{NAV}}$ ANNUNCIATE (Pins 7 and 8)

Navigation source annunciator outputs. This output is tied to a remote annunciator lamp. When the line is pulled low the annunciator lamp will illuminate. The $\overline{\text{NAV}}$ ANNUNCIATE output will be active when the KI 208A/209A is in the NAV (VOR/LOC/GS) mode, and the $\overline{\text{LNAV}}$ ANNUNCIATE output will be active when the KI 208A/209A is in the LNAV (i.e. FMS, LORAN, or GPS) mode. The relay contacts that drive these outputs are rated at 100 mA maximum for an incandescent lamp load.

N. LNAV FCS LOC ENGAGE IN and NAV LOC ENGAGE IN (Pins 9 and 10)

NAV receivers and some LNAV receivers have localizer engage outputs which are connected to flight control systems so that their gain will be higher when tracking a localizer on the final approach course of a GPS approach. When a NAV receiver is the navigation source, NAV LOC ENGAGE IN is also used by the VOR/LOC converter to process the input composite signal as a localizer signal rather than a VOR signal. The KI 208A/209A accepts these discretes as inputs.

O. FCS LOC ENGAGE OUT (Pin 13)

The KI 208A/209A switches the appropriate localizer engage discrete (LNAV FCS LOC ENGAGE IN or NAV LOC ENGAGE IN) to a flight control system (FCS), based on the status of the external NAV/GPS switch. This ensures that the FCS only responds to the navigation source which is currently displayed on the KI 208A/209A. The FCS LOC ENGAGE logic from the LNAV should not drive the localizer energize input on an RMI or HSI as this could park the RMI pointer or remove the TO/FROM indicator when the LNAV is in Approach Active mode.

P. Spare relay contacts (Pins 18, 19, 30, 31, 32, 33, 38, 39, and 49)

There are three sets of spare relay contacts with three pins each (COMMON, NORMALLY CLOSED, and NORMALLY OPEN). When NAV is selected, COMMON is connected to NORMALLY CLOSED. When LNAV is selected, COMMON is connected to NORMALLY OPEN.

2.4 POST INSTALLATION CHECKOUT

An operational performance flight test is recommended after installation to insure satisfactory performance of the equipment in its normal environment.

To check the VOR/ILS System, select a VOR frequency within a forty nautical mile range. Listen to the VOR audio and insure that no electrical interference such as magneto noise is present. Check the tone identifier filter operation. Fly inbound or outbound on a selected VOR radial and check for proper LEFT-RIGHT and TO-FROM indications. Check the VOR accuracy.

NOTE

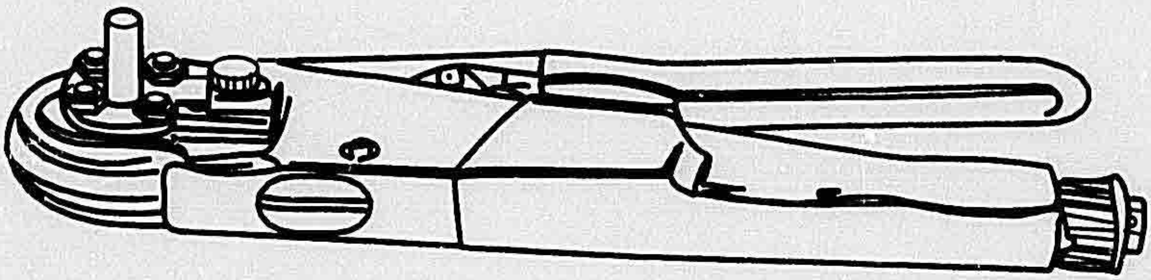
VOR ground station scalloping may occur under weak signal conditions.

To check accuracy when installed with a GPS or Loran-C receiver, simply compare with the digital display on the receiver.

Flight test the ILS operation by flying a simulated ILS approach. Check localizer LEFT-RIGHT deflection and, if applicable, glideslope deflection. Check the localizer accuracy in relation to the ILS runway. Check the glideslope accuracy in relation to the published ILS approach altitude.

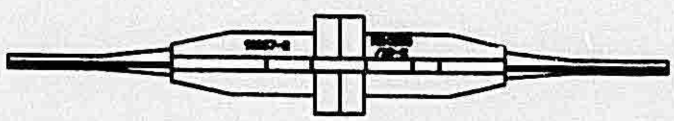
Check the operation of the OBS interface by selecting a course on the KI 208A/209A and verify it is displayed correctly on the LNAV. A calibration procedure must typically be performed on the LNAV for the selected course to be displayed correctly. Consult the installation literature for the interfaced LNAV.

If a flight control system is installed in the aircraft, verify that proper tracking occurs for both the NAV and LNAV display modes of the indicator.



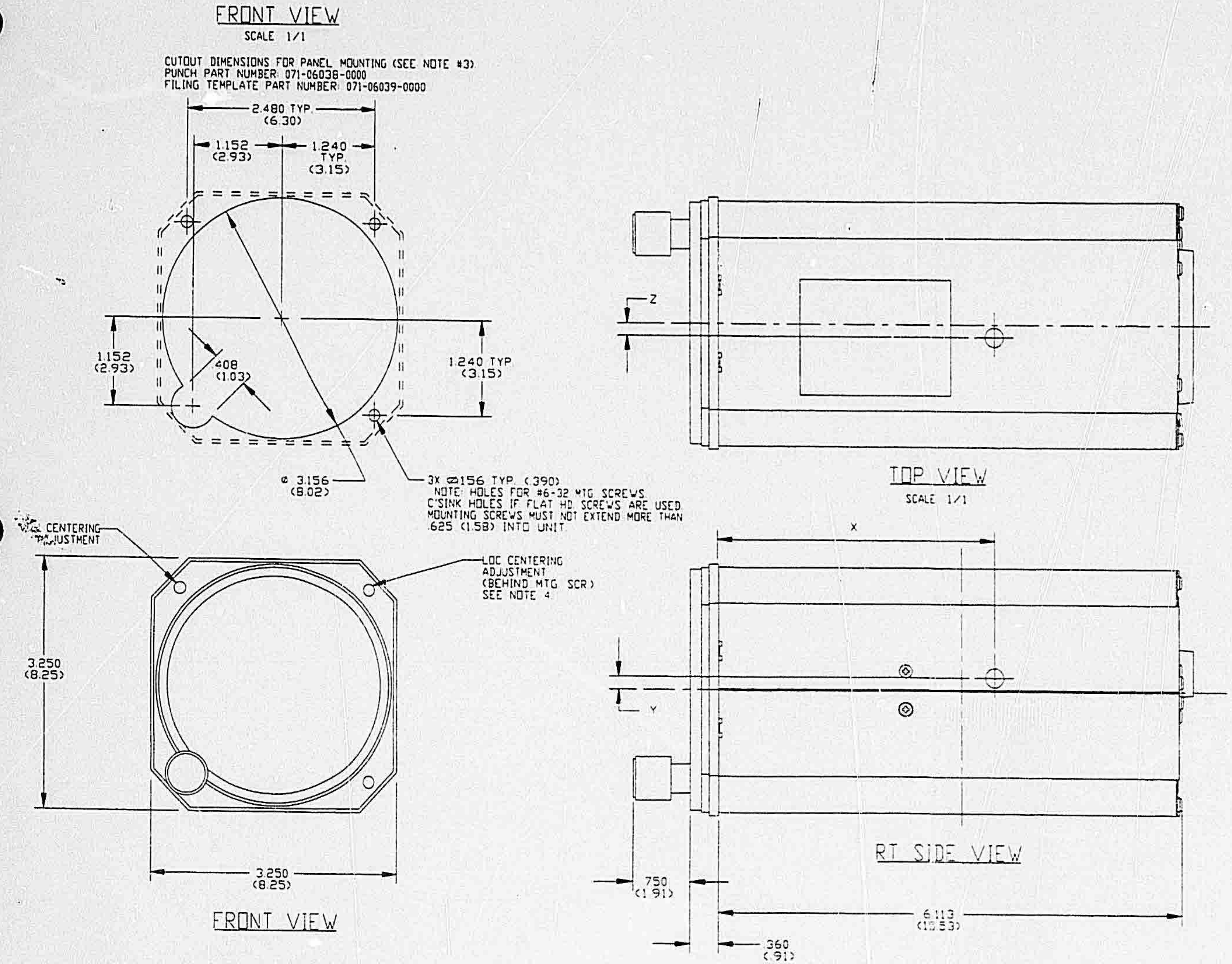
CRIMPING TOOL P/N: 005-02012-0021
BUCHANAN P/N 612118
POSITRONIC P/N: 9508

POSITIONER P/N: 005-02012-0023
BUCHANAN P/N 612513
POSITRONIC P/N: 9502-7



INSERTION/EXTRACTION TOOL P/N: 005-02012-0025
AMP P/N 91067-2
MIL SPEC P/N: M24308/18-12

FIGURE 2-1 KI 208A/209A CONNECTOR TOOLS



NOTES:

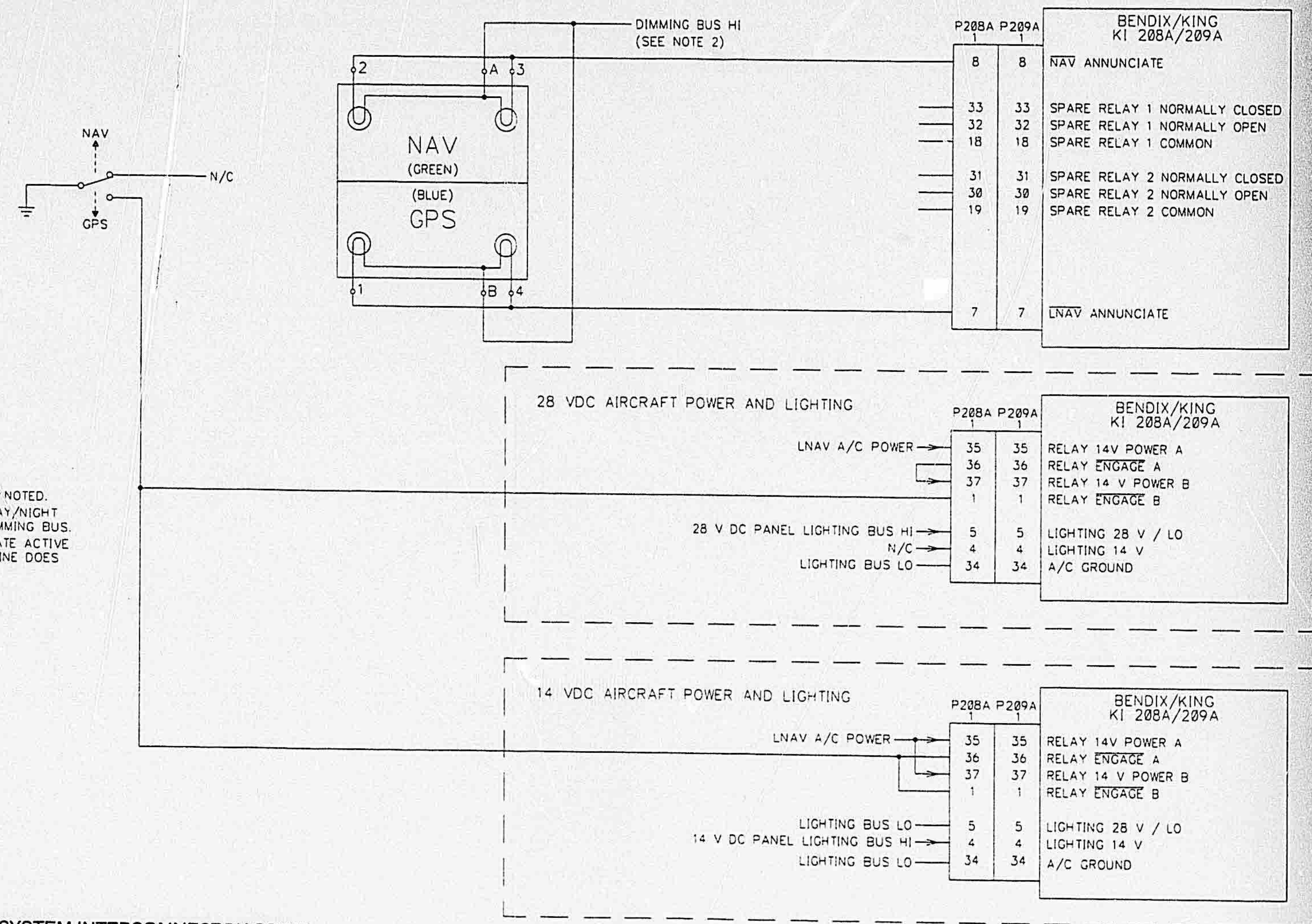
1. DIMENSIONS: IN(CM)
2. NOMINAL WEIGHT:
   KI 208 A: 1.0 LBS/.45 KG
   KI 209 A: 1.2 LBS/.54 KG
3. THIS UNIT MAY BE FRONT OR REAR MOUNTED IN A STANDARD 3" A.T.I. OPENING. TO REAR MOUNT UNIT USE A STANDARD MOORING PLATE P/N 073-00044-0001. TO FRONT MOUNT UNIT USE A STANDARD BLACK ADAPTOR PLATE P/N 073-00045-0000 WITH A STANDARD MOORING PLATE P/N 073-00044-0001.
4. ADJUSTMENTS CAN ONLY BE MADE BY USING SPECIAL TUNING TOOL P/N 088-00706-0000.

C.G. DIMENSION TABLE

AXIS	KI 208 A	KI 209 A
X	2.875 (7.303)	2.850 (7.239)
Y	.100 (.254)	.000 (.000)
Z	.060 (.152)	.000 (.000)

FIGURE 2-2 KI 208A/209A OUTLINE AND MOUNTING DIAGRAM

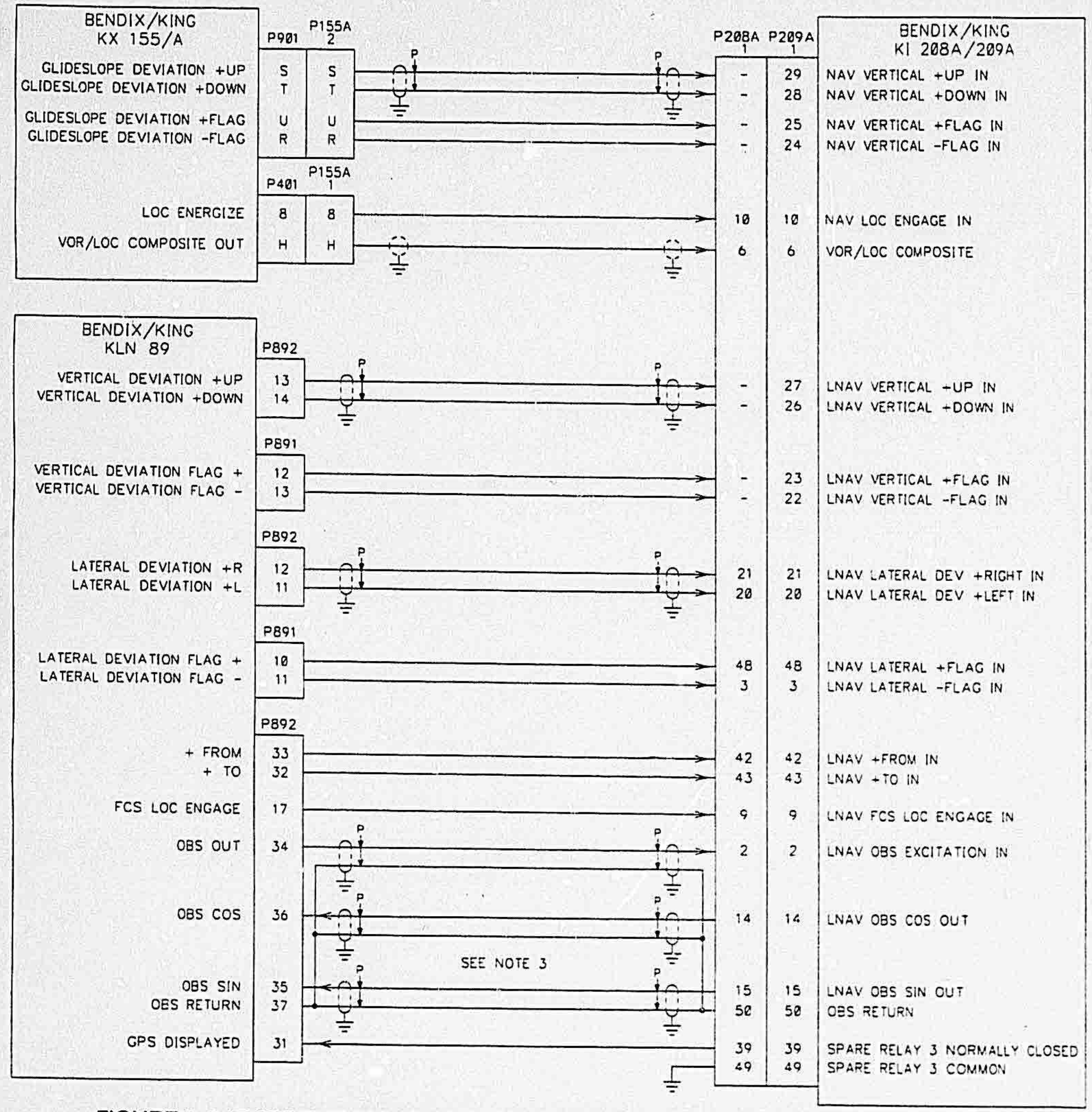
(Dwg. No. 155-06038-0000, R-2)



NOTES:

1. ALL WIRES ARE 24 AWG MINIMUM UNLESS OTHERWISE NOTED.
2. ANNUNCIATOR DIMMING MAY BE BY PHOTOCELL OR DAY/NIGHT SWITCH. DO NOT USE PANEL LIGHTING RHEOSTAT DIMMING BUS.
3. OVERLINED PIN NAMES, SUCH $\overline{\text{NAV}}$, GENERALLY INDICATE ACTIVE LOW SIGNALS, ALTHOUGH THE ABSENCE OF AN OVERLINE DOES NOT NECESSARILY INDICATE AN ACTIVE HIGH SIGNAL.

FIGURE 2-3 TYPICAL KI 208A/209A SYSTEM INTERCONNECT DIAGRAM
(Dwg. No. 155-01650-0000, R-0)
(Sheet 1 of 3)

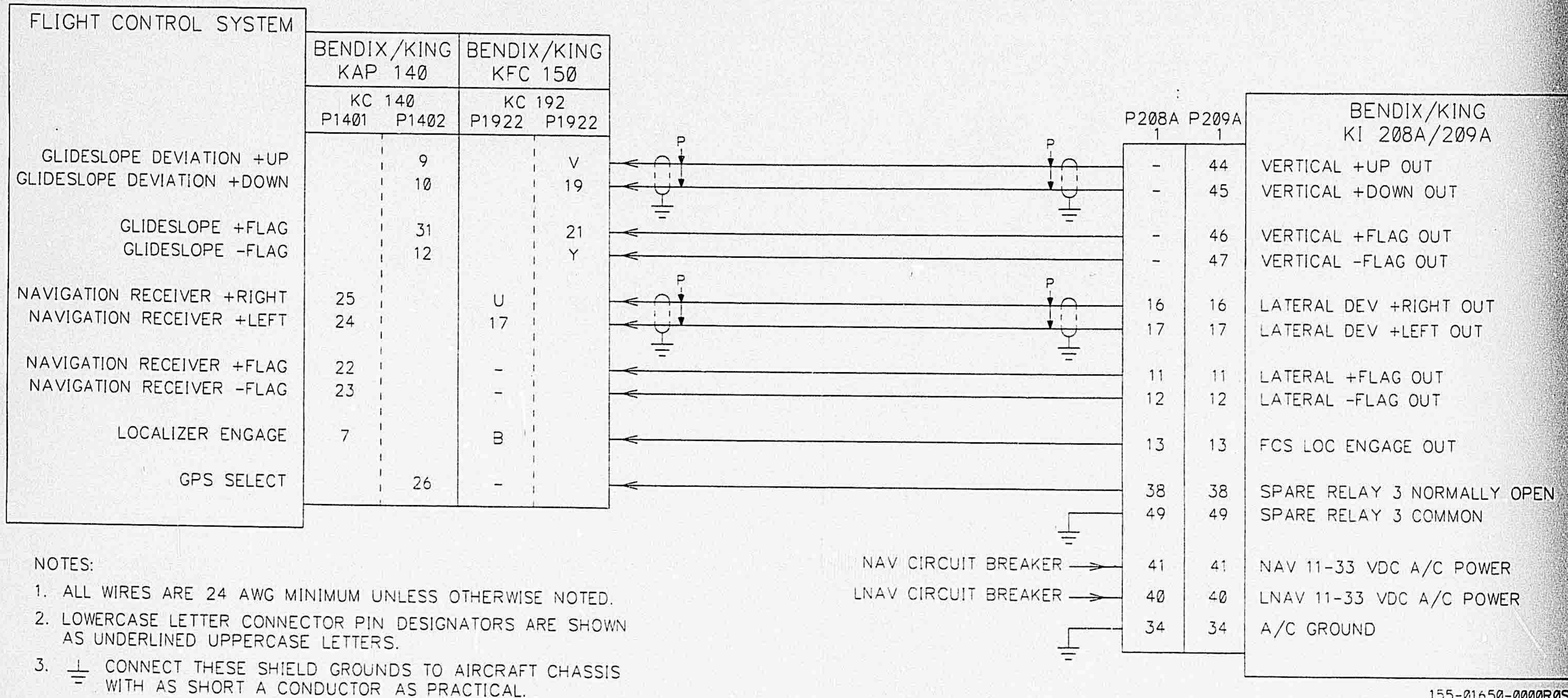


NOTES:

1. ALL WIRES ARE 24 AWG MINIMUM UNLESS OTHERWISE NOTED.
2. LOWERCASE LETTER CONNECTOR PIN DESIGNATORS ARE SHOWN AS UNDERLINED UPPERCASE LETTERS.
3. THE KI 208A/209A OBS CIRCUIT IS ZEROED AT 45°, AS OPPOSED TO ORZ/EZ INDICATORS WHICH ARE TYPICALLY ZEROED AT 300°. BECAUSE OF THIS, ANY LNAV INTERFACED TO THE KI 208A/209A MUST HAVE AT LEAST 110° OF CALIBRATION ON ITS OBS RESOLVER.
4. CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

155-01650-0000R0S2

FIGURE 2-3 TYPICAL KI 208A/209A SYSTEM INTERCONNECT DIAGRAM
(Dwg. No. 155-01650-0000, R-0)
(Sheet 2 of 3)



NOTES:

1. ALL WIRES ARE 24 AWG MINIMUM UNLESS OTHERWISE NOTED.
2. LOWERCASE LETTER CONNECTOR PIN DESIGNATORS ARE SHOWN AS UNDERLINED UPPERCASE LETTERS.
3. ⏚ CONNECT THESE SHIELD GROUNDS TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.

FIGURE 2-3 TYPICAL KI 208A/209A SYSTEM INTERCONNECT DIAGRAM
(Dwg. No. 155-01650-0000, R-0)
(Sheet 3 of 3)

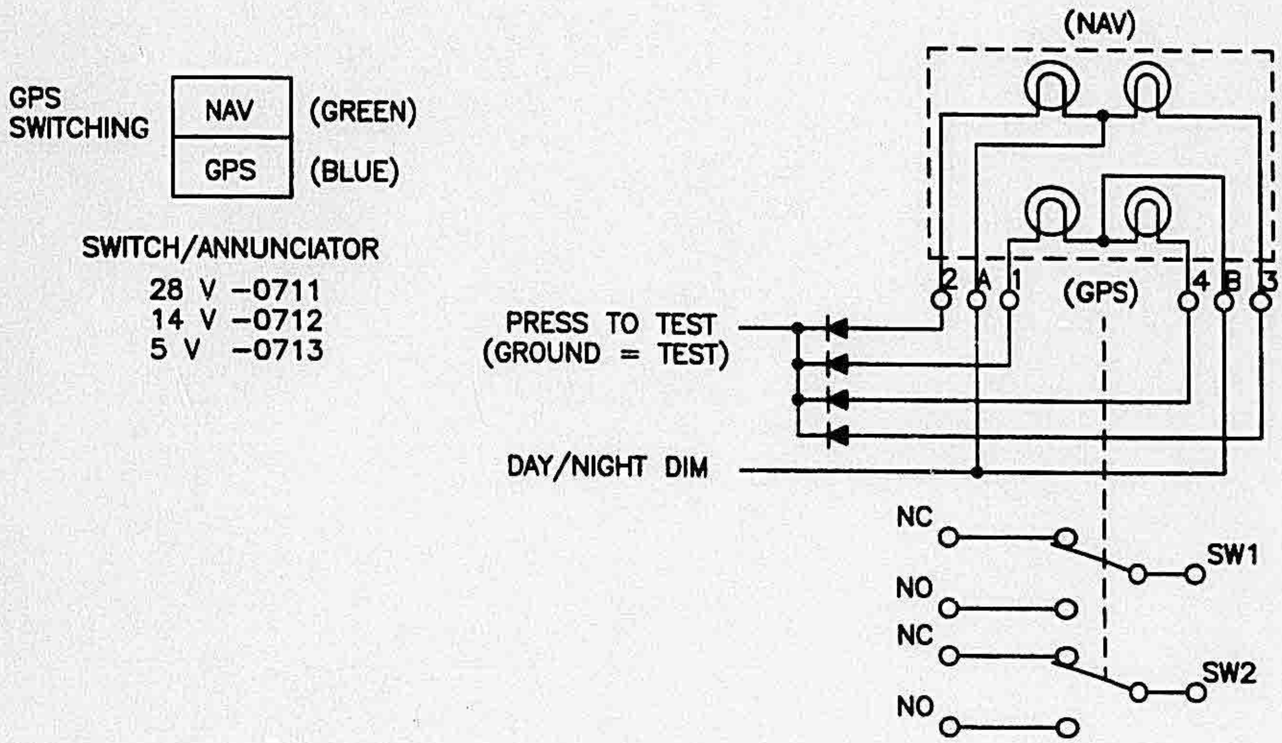
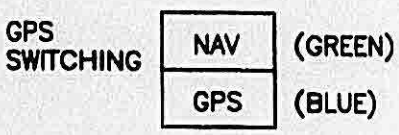


FIGURE 2-4 INTERNAL SWITCH SCHEMATIC (031-00785-XXXX)



SWITCH/ANNUNCIATOR
28 V -0711
14 V -0712
5 V -0713

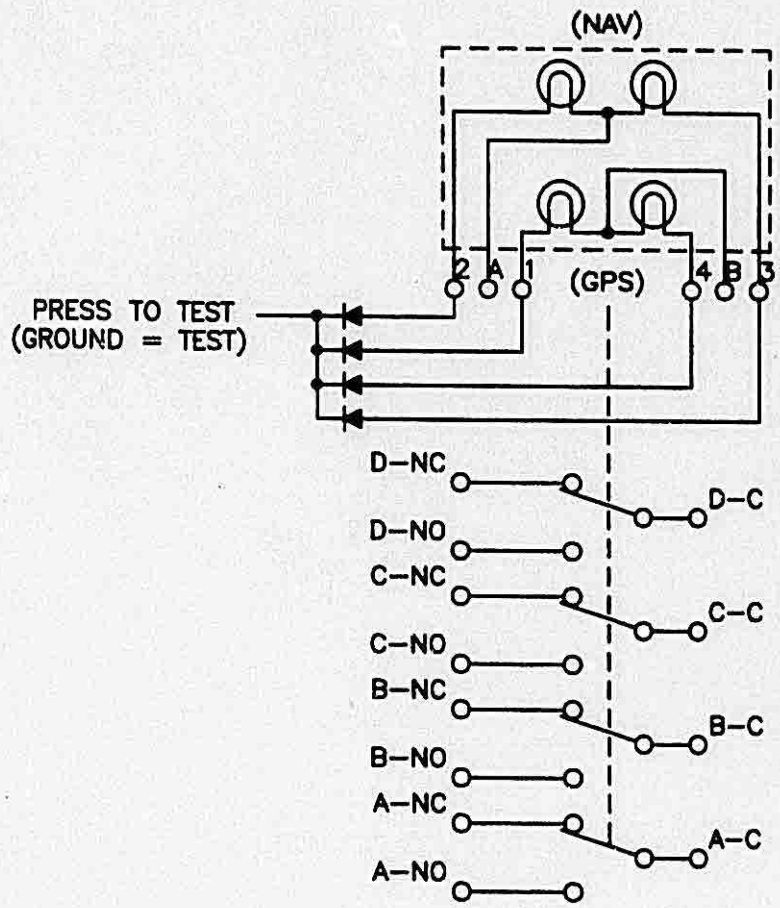


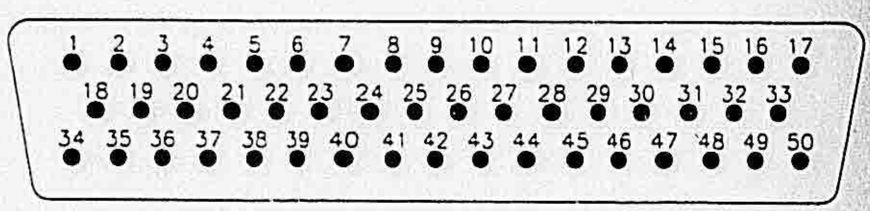
FIGURE 2-5 INTERNAL SWITCH SCHEMATIC (031-00763-XXXX)

P208A		DESCRIPTION
1	←	RELAY ENGAGE B
2	←	LNAV OBS EXCITATION IN
3	←	LNAV LATERAL –FLAG IN
4	←	14 VOLT LIGHTING
5	←	28 VOLT/LO LIGHTING
6	←	VOR/LOC COMPOSITE
7	→	LNAV ANNUNCIATE
8	→	NAV ANNUNCIATE
9	←	LNAV FCS LOC ENGAGE IN
10	←	NAV LOC ENGAGE IN
11	→	LATERAL +FLAG OUT
12	→	LATERAL –FLAG OUT
13	→	FCS LOC ENGAGE OUT
14	→	LNAV OBS COS OUT
15	→	LNAV OBS SIN OUT
16	→	LATERAL DEVIATION +RIGHT OUT
17	→	LATERAL DEVIATION +LEFT OUT
18		SPARE RELAY 1 COMMON
19		SPARE RELAY 2 COMMON
20	←	LNAV LATERAL DEVIATION +LEFT IN
21	←	LNAV LATERAL DEVIATION +RIGHT IN
22		NO CONNECTION
23		NO CONNECTION
24		NO CONNECTION
25		NO CONNECTION

← INPUT OUTPUT →

P208A		DESCRIPTION
26		NO CONNECTION
27		NO CONNECTION
28		NO CONNECTION
29		NO CONNECTION
30		SPARE RELAY 2 NORMALLY OPEN
31		SPARE RELAY 2 NORMALLY CLOSED
32		SPARE RELAY 1 NORMALLY OPEN
33		SPARE RELAY 1 NORMALLY CLOSED
34		AIRCRAFT GROUND
35	←	LNAV RELAY 14 VOLT POWER A
36	←	RELAY ENGAGE A
37	←	LNAV RELAY 14 VOLT POWER B
38		SPARE RELAY 3 NORMALLY OPEN
39		SPARE RELAY 3 NORMALLY CLOSED
40	←	LNAV 11–33 VDC AIRCRAFT POWER
41	←	NAV 11–33 VDC AIRCRAFT POWER
42	←	LNAV +FROM IN
43	←	LNAV +TO IN
44		NO CONNECTION
45		NO CONNECTION
46		NO CONNECTION
47		NO CONNECTION
48	←	LNAV LATERAL +FLAG IN
49		SPARE RELAY 3 COMMON
50		OBS RETURN

← INPUT OUTPUT →



CABLE END VIEW

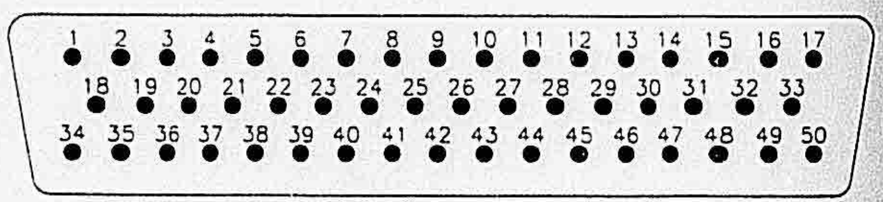
FIGURE 2–6 KI 208A PINOUT LIST

P209A			DESCRIPTION
1	←	----------------	RELAY ENGAGE B
2	←	----------------	LNAV OBS EXCITATION IN
3	←	----------------	LNAV LATERAL -FLAG IN
4	←	----------------	14 VOLT LIGHTING
5	←	----------------	28 VOLT/LO LIGHTING
6	←	----------------	VOR/LOC COMPOSITE
7		---------------- →	LNAV ANNUNCIATE
8		---------------- →	NAV ANNUNCIATE
9	←	----------------	LNAV FCS LOC ENGAGE IN
10	←	----------------	NAV LOC ENGAGE IN
11		---------------- →	LATERAL +FLAG OUT
12		---------------- →	LATERAL -FLAG OUT
13		---------------- →	FCS LOC ENGAGE OUT
14		---------------- →	LNAV OBS COS OUT
15		---------------- →	LNAV OBS SIN OUT
16		---------------- →	LATERAL DEVIATION +RIGHT OUT
17		---------------- →	LATERAL DEVIATION +LEFT OUT
18		----------------	SPARE RELAY 1 COMMON
19		----------------	SPARE RELAY 2 COMMON
20	←	----------------	LNAV LATERAL DEVIATION +LEFT IN
21	←	----------------	LNAV LATERAL DEVIATION +RIGHT IN
22	←	----------------	LNAV VERTICAL -FLAG IN
23	←	----------------	LNAV VERTICAL +FLAG IN
24	←	----------------	NAV VERTICAL -FLAG IN
25	←	----------------	NAV VERTICAL +FLAG IN

← INPUT OUTPUT →

P209A			DESCRIPTION
26	←	----------------	LNAV VERTICAL +DOWN IN
27	←	----------------	LNAV VERTICAL +UP IN
28	←	----------------	NAV VERTICAL +DOWN IN
29	←	----------------	NAV VERTICAL +UP IN
30		----------------	SPARE RELAY 2 NORMALLY OPEN
31		----------------	SPARE RELAY 2 NORMALLY CLOSED
32		----------------	SPARE RELAY 1 NORMALLY OPEN
33		----------------	SPARE RELAY 1 NORMALLY CLOSED
34		----------------	AIRCRAFT GROUND
35	←	----------------	LNAV RELAY 14 VOLT POWER A
36	←	----------------	RELAY ENGAGE A
37	←	----------------	LNAV RELAY 14 VOLT POWER B
38		----------------	SPARE RELAY 3 NORMALLY OPEN
39		----------------	SPARE RELAY 3 NORMALLY CLOSED
40	←	----------------	LNAV 11-33 VDC AIRCRAFT POWER
41	←	----------------	NAV 11-33 VDC AIRCRAFT POWER
42	←	----------------	LNAV +FROM IN
43	←	----------------	LNAV +TO IN
44		---------------- →	VERTICAL +UP OUT
45		---------------- →	VERTICAL +DOWN OUT
46		---------------- →	VERTICAL +FLAG OUT
47		---------------- →	VERTICAL -FLAG OUT
48	←	----------------	LNAV LATERAL +FLAG IN
49		----------------	SPARE RELAY 3 COMMON
50		----------------	OBS RETURN

← INPUT OUTPUT →



CABLE END VIEW

FIGURE 2-7 KI 209A PINOUT LIST

03

SECTION III
OPERATION

3.1 GENERAL

All controls required to operate the KI 208A/209A are located on the unit's front panel and on the front panel of the related navigation receivers. A panel mounted switch is needed to select NAV or LNAV to be displayed on the KI 208A/209A.

3.1.1 KI 208A/209A VOR OPERATION

Select the desired VOR station frequency with the NAV frequency controls. The NAV receiver volume control can then be adjusted to positively identify the station or listen to FSS reports.

To intercept a selected VOR radial (from the station) and fly outbound, turn the OBS control to set the desired radial under the top indicator index. Maneuver the aircraft to fly the selected radial magnetic heading plus a 45° intercept angle which will provide a sufficient intercept angle. The intercept angle should be reduced as the deviation needle approaches an on course condition (center) to prevent excessive course bracketing.

To determine the bearing and fly "to" a selected VOR station, turn the OBS control until the "To–From" flag resembles a white arrow pointing up and the deviation needle is centered. Read the "To" bearing under the top indicator index and maneuver the aircraft to approximately fly the magnetic course "To" the station. If the deviation needle moves to the right, the aircraft course must be adjusted 5 or 10 degrees to the right. Similarly, if the deviation needle goes to the left, the aircraft course must be adjusted to the left. Maintaining a centered deviation needle will provide automatic course compensation for wind drift.

3.1.2 KI 208A/209A LNAV OPERATION

If the KI 208A/209A OBS lines are connected to the LNAV the course to the active waypoint is selected using the OBS knob on the KI 208A/209A. When the LNAV is in LEG mode, course selection is automatically done by the LNAV. To intercept an LNAV course, maneuver the aircraft to fly a course heading which establishes a 45° intercept angle to the LNAV course. The intercept angle should be reduced as the deviation needle approaches an on course condition (center) to prevent excessive course bracketing. The deviation scale depends on the present LNAV mode. Crosstrack deviation is linear during LNAV operation rather than angular as in VOR operation.

The KI 209A is GPS precision approach ready. It is capable of displaying the vertical guidance information when these GPS approaches become operational.

3.1.3 KI 208A/209A LOCALIZER OPERATION

Localizer circuits are automatically energized when an ILS frequency is selected on the KX 155/A. By adjusting the NAV volume level, the localizer station can be identified and in some cases, ATIS information received. The localizer flag should disappear from view into the "To" condition indicating the signal is reliable.

Maneuver the aircraft to fly on course centered needle. While flying a front course approach or outbound on the back course approach, magnetic heading corrections are made toward the needle deflection. Similarly, while flying the back course approach or outbound on the front course approach, corrections are made away from the needle deflection.

The localizer course width is narrow compared to VOR course width and requires much smaller course corrections to center the deviation needle. When intercepting the localizer course, the aircraft turn into the localizer course should be started when the needle moves off the meter stop.

A helpful quick reference reminder of the localizer course is to set the course on the Omni bearing readout.

3.1.4 KI 209A GLIDESLOPE OPERATION

The glideslope (horizontal) needle provides the pilot with vertical steering information during ILS approaches. The glideslope circuitry may be energized independently or when the associated localizer frequency is selected on the navigation receiver. Observe that the glideslope warning flag is concealed. The glideslope needle deflects toward the direction the pilot must fly to remain on the glideslope path. If the glideslope needle deflects upward, the aircraft is below the glideslope and must climb to center the needle. If the needle deflects downward, the aircraft is above the glide path and must descend to remain on the glide path. When the needle is centered the aircraft is on the glide path.

3.2 KI 208A/209A INDICATOR CONTROL FUNCTIONS

3.2.1 OMNI BEARING SELECTOR (OBS)

The OMNI Bearing Selector knob rotates the azimuth card on which the desired course is selected. The reciprocal course is identified under the bottom course indice.

3.2.2 VOR/LOC/LNAV DEVIATION INDICATOR

The VOR/LOC/LNAV needle deflection indicates the amount of deviation from the selected VOR/LNAV course or localizer path. The indicated deviation is toward the proper flight path in normal operation. Crosstrack deviation is linear during LNAV operation, not angular as in VOR operation.

The VOR/LOC/LNAV warning flag is fully visible when the VOR, LNAV or LOC signal is unreliable. The VOR/LNAV TO/FROM flag indicates the direction "To" or "From" the VOR station or LNAV waypoint.

3.2.3 GLIDESLOPE DEVIATION INDICATOR (KI 209A ONLY)

The glideslope deviation needle deflection indicates the amount of deviation from the glide path. The deflection is toward the direction of flight required to maintain the proper descent path. The glideslope warning flag is visible when the glideslope signal is unreliable or the receiver has malfunctioned.

When GPS precision approaches become operational, the glideslope deviation needle and flag may be used for the vertical guidance portion of these approaches.

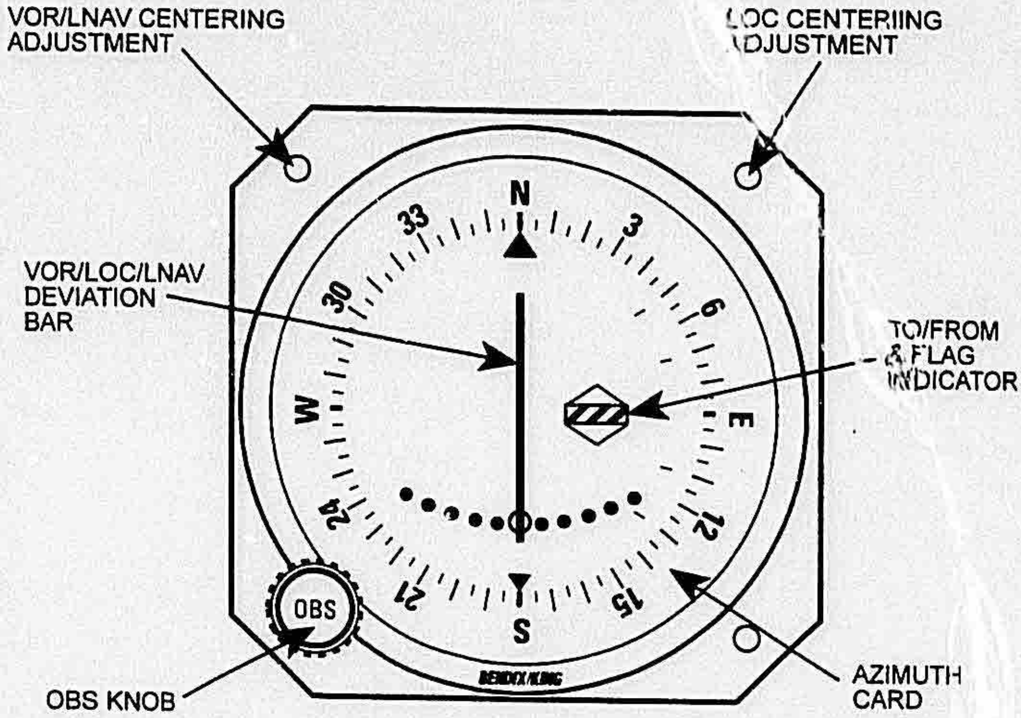


FIGURE 3-1 KI 208A CONTROL FUNCTIONS

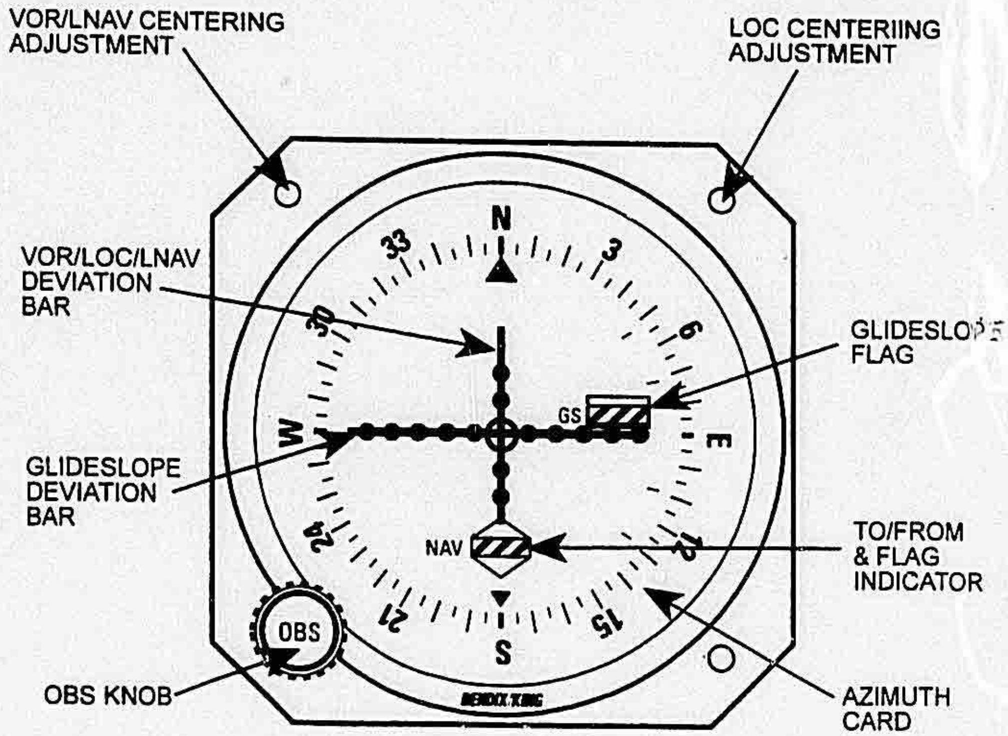


FIGURE 3-2 KI 209A CONTROL FUNCTIONS

MFG.

INTRO

AlliedSignal

ELECTRONIC AND AVIONICS SYSTEMS

MAINTENANCE MANUAL

BENDIX/KING®

KI 208A/209A

NAVIGATION INDICATORS

MANUAL NUMBER 006-15543-0000

REVISION 0, DECEMBER, 1996

RECORD OF REVISIONS

ATP

MFG REV NO	DESCRIPTION	ISSUE DATE	ATP REV DATE	INSERTED BY
	MAINTENANCE MANUAL	10/1996	11/2/00	ATP/MG

RECORD OF TEMPORARY REVISIONS

TEMP REV NO	DESCRIPTION	ISSUE DATE	ATP REV DATE	INSERTED BY	DATE REMOVED	REV INCORP	REMOVED BY

SECTION IV
THEORY OF OPERATION

SECTION V
MAINTENANCE

SECTION VI
ILLUSTRATED PARTS LIST

LIST OF ILLUSTRATIONS

04

SECTION IV
THEORY OF OPERATION

4.1 GENERAL

The KI 208A and KI 209A Indicators contain the same VOR/LOC converter. However, the KI 209A Indicator contains additional meters to provide glideslope information.

4.2 PRINCIPLES OF VOR SYSTEM

4.2.1 GENERAL

The basic function of VOR is to provide a means to determine an aircraft's position with reference to a VOR ground station and also to follow a certain path toward or away from the station. This is accomplished by indicating when the aircraft is on a selected VOR station radial or by determining which radial the aircraft is on. A means to differentiate between radials and identify them is necessary. For this purpose, advantage is taken of the fact that the phase difference between two signals can be accurately determined. The phase difference between two signals which are generated by the VOR station is varied as the direction relative to the station changes so that a particular radial is represented by a particular phase difference. Refer to **Figure 4-3**. One non-directional reference signal is generated with a phase that at any instant is different in all directions. A second signal is generated with a phase that at any instant is the same in different directions. The phase of the variable phase signal is the same as the phase of the reference signal only at the 0 ±radial (North). As the angle measured from the 0° radial increases, the phase of the variable phase signal lags the phase of the reference signal by the number of degrees of the angle from 0°. The reference and variable phase signals, which are 30Hz voltages, are carried by rf to make radio transmission and reception possible. The VOR receiving equipment must separate the 30Hz reference and variable phase signals from the rf carrier and compare the phase of the two signals. The phase difference is indicated on a course indicator or RMI.

4.2.2 VOR GENERATION

The VOR electromagnetic field is composed of the radiation from two ground based antennas radiating at the same carrier frequency. The first is a non-directional antenna radiating an amplitude modulated carrier. The frequency of the modulating signal varies from 9,480Hz to 10,440Hz back to 9,480Hz 30 times per second. That is, a 9,960Hz subcarrier amplitude modulates the rf carrier and is frequency modulated by 30Hz.

The second antenna is a horizontal dipole which rotates at the rate of 30 revolutions per second. The dipole produces a figure 8 field pattern. The rf voltages within the two lobes are 180° out of phase with each other. The rf within one of the lobes is exactly in phase with the rf radiated from the non-directional antenna and the rf within the other lobe is 180° out of phase with the non-directional field. The rotating figure 8 pattern reinforces the non-directional pattern on the in phase side of the dipole and subtracts from the non-directional pattern on the out of phase side. See **Figure 4-3** This results in a cardioid field pattern which rotates at the rate of 30 revolutions per second, the rate at which the dipole antenna rotates.

The signal at an aircraft within radio range of the VOR station is an rf carrier with amplitude varying at the rate of 30Hz because of the rotation of the cardioid pattern. The carrier is also amplitude modulated at the station by the 9,960Hz signal which is, in turn, frequency modulated on a sub-carrier so that it may be separated from the 30Hz variable phase signal.

4.3 PRINCIPLES OF LOCALIZER SYSTEM

The localizer facility provides a visual display of the aircraft's position relative to a straight approach line to the runway. The ground based localizer antenna system generates two patterns. Refer to **Figure 4-1**. One pattern is directed toward the right side of the runway, the second to the left. The two patterns have the same carrier frequency but different audio modulating signals. The pattern to the left of the runway (in normal approach) is 90Hz amplitude modulated while the pattern to the right is 150Hz amplitude modulated.

The ration of 90Hz to 150Hz audio, after demodulation, is dependent only upon the position of the aircraft within the patterns. The patterns are adjusted so they are of equal strength on a vertical plane extending out from the runway centerline. When the aircraft is on this plane. the 90Hz and 150Hz voltages will be equal.

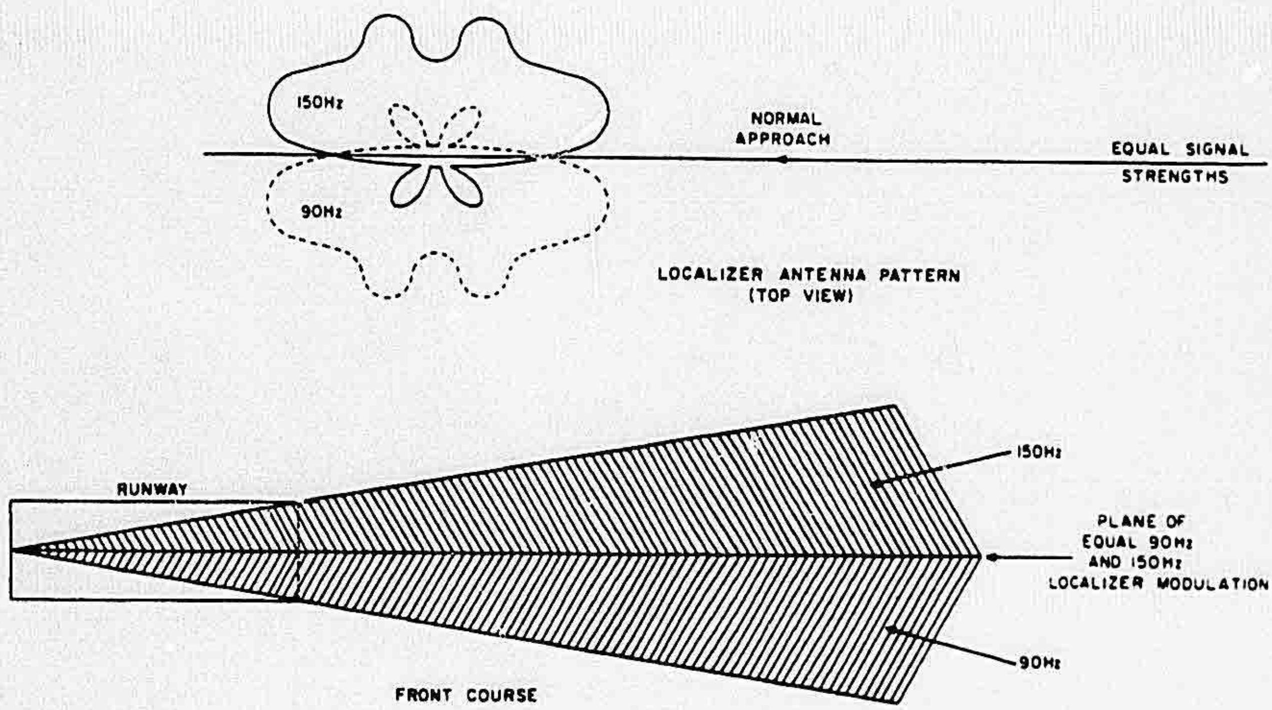


FIGURE 4-1 LOCALIZER SIGNAL GENERATION

A new type of instrument landings systems antenna is being deployed by the FAA. While previous ILS antennas provided a clearance signal throughout 360 degrees, the new antennas provide more accurate course guidance only within a narrow area of reception. The new antennas have no **usable** signal radiating beyond 35 degrees from the on-course indication. Pilots should be cautioned against relying on localizer signals to provide guidance outside the 35 degree sector of the localizer or beyond any extremities shown below. Extended coverage of this area can be recognized by an flight procedure being predicated on the use of localizer guidance beyond the normal service volume shown below:

(For further information, refer to FAA AIR CARRIER OPERATIONS BULLETIN, No. 75-9 8-4-75)

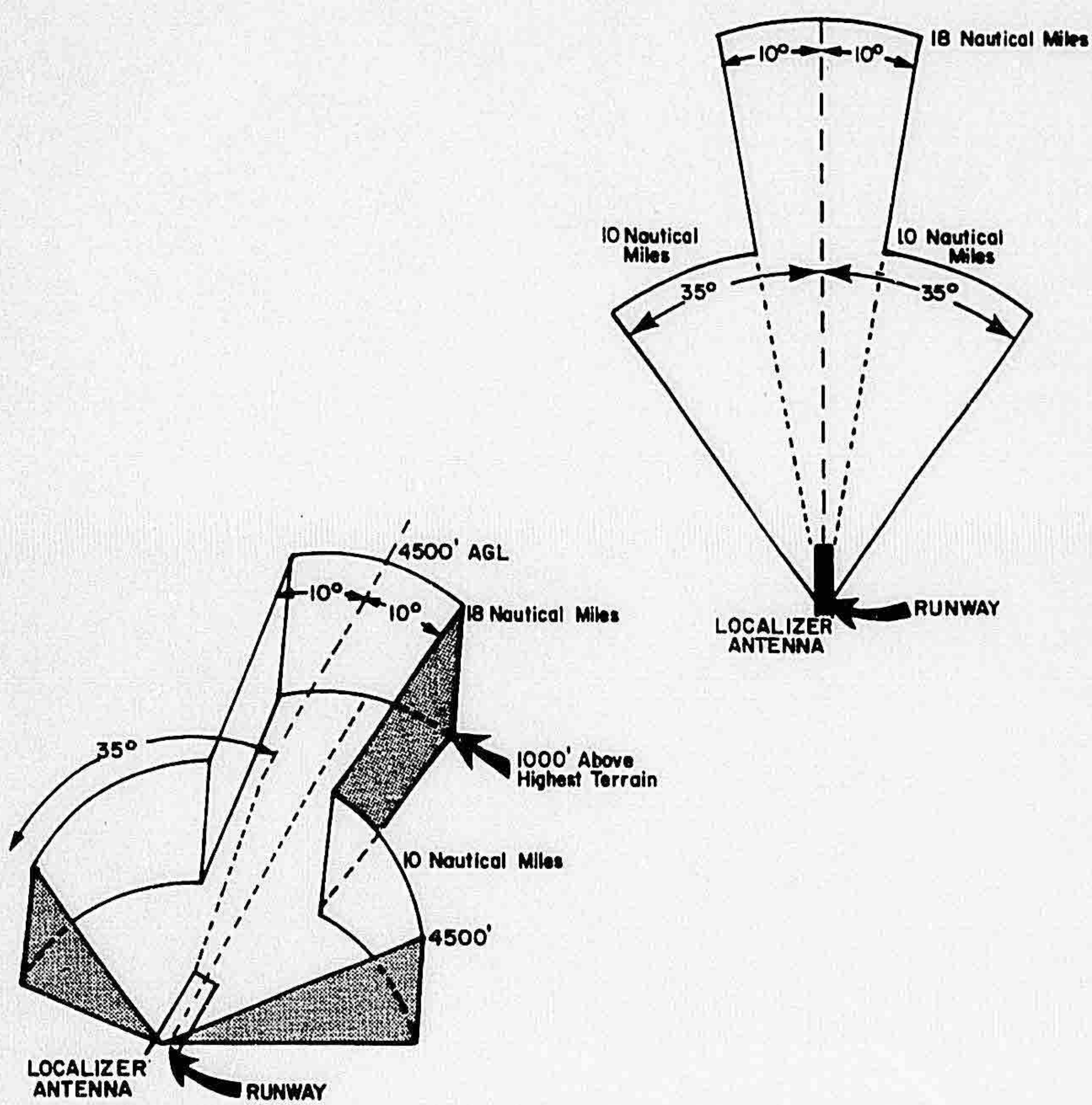


FIGURE 4-2 LOC COVERAGE

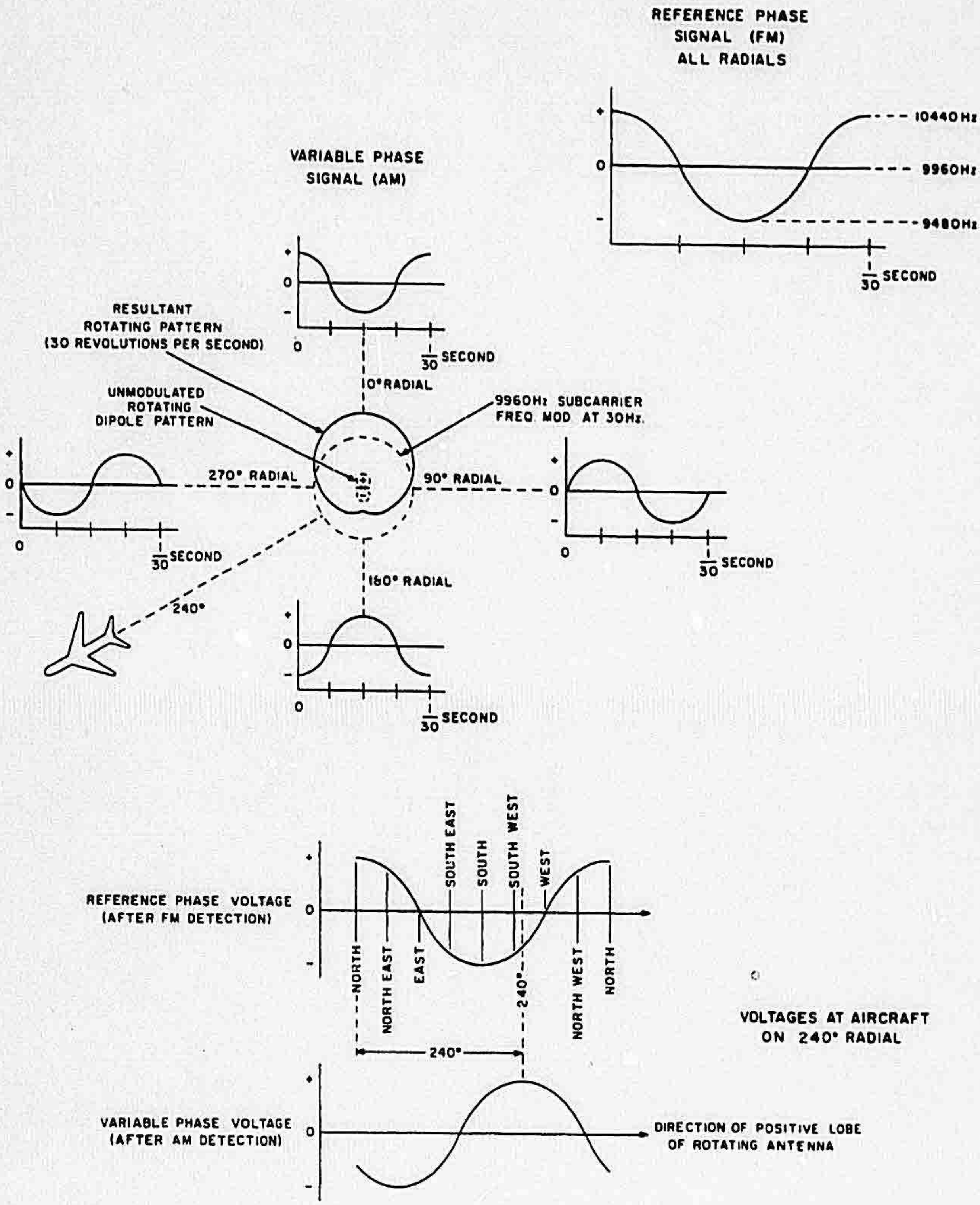


FIGURE 4-3 VOR SIGNAL GENERATION

4.4 PRINCIPLES OF GLIDESLOPE SYSTEM

The glideslope signal is radiated by a directional antenna array located near the approach end of the runway. The signal consists of two intersecting lobes of RF energy. The upper lobe contains 90Hz modulation and the lower lobe contains 150Hz modulation. The equal tone amplitude intersection of these two lobes forms the glide path. A typical glide angle is 2.5 degrees. If the aircraft is on the glide path, equal amplitudes of both tones will be received and the deviation bar will be centered. If the aircraft is above the glide path, 90Hz modulation predominates and the visual display is displaced downward. If below the glide path, 150Hz predominates and the display is displaced upward.

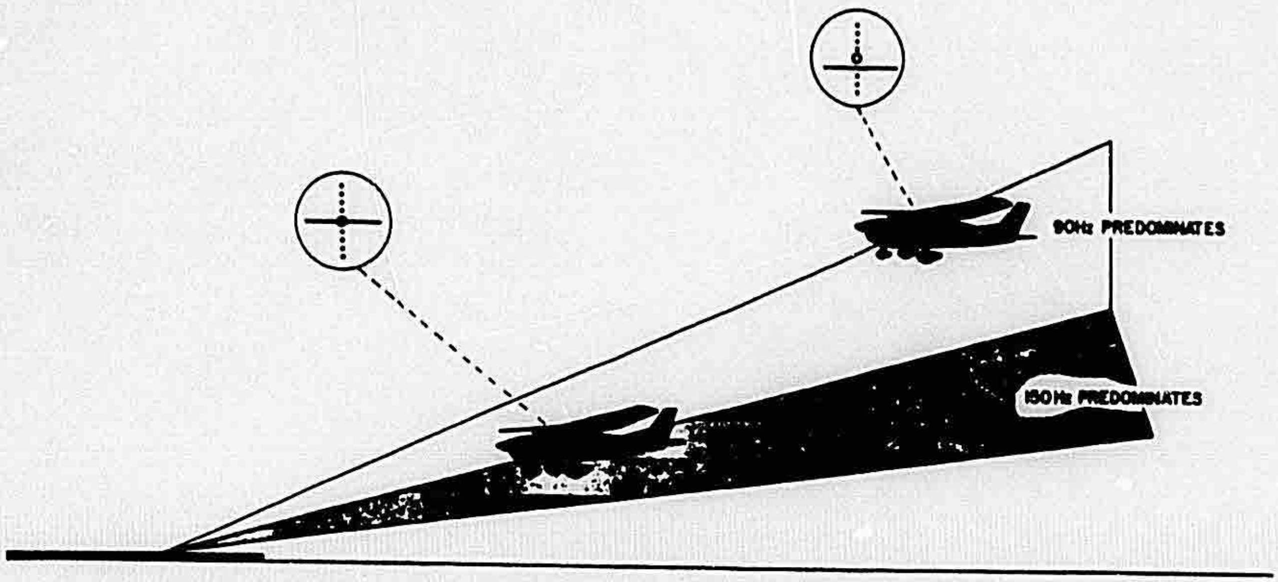


FIGURE 4-4 GLIDE PATH

4.5 KI 208A/209A VOR OPERATION

4.5.1 INPUT BUFFER

Transistor Q201, capacitors C201, C213 and associated resistors R201, 202, 203 on Converter Board 1, comprise the input buffer stage for the indicator. This stage is set up as an emitter follower to provide high input resistance and low output resistance. High input impedance is necessary to prevent loading of the NAV receiver. The low output impedance allows the output signal (wiper of R203) to be varied, without significantly changing the impedance at TP202. If this impedance changed greatly, the center frequency of the two active filters would be effected. R203 is adjusted to obtain proper VOR course width.

4.5.2 VOR LIMITER/DISCRIMINATOR

The VOR composite signal is coupled to the limiter stage by C202. The limiter, which consists of Q202, CR201 and R204, effectively removes any amplitude modulation on the composite signal.

This stage supplies "clean" 9960Hz FM of significant amplitude to drive the phase locked loop PLL discriminator I201. The limiter output couples to the PLL via C203.

Without an FM signal into Pin 14 of the PLL, the voltage controlled oscillator (VCO) within I201 will not be changing frequency. If no signal is applied, the VCO frequency on either Pins 3 or 4 should be equal to 9960Hz. This frequency is established by R205, 206, 207 and C204. When FM is applied the VCO is forced to sweep the FM deviation, i.e., ±480Hz for VOR. The output of the phase detector then samples the difference in phase of the input FM signal and the internal VCO. After this difference signal is filtered by R208 and C205 a 30Hz reference signal is produced. This 30Hz signal is accessible at TP203. Pin 5 of I201 performs an enable/disable function. It must be less than .5 volt to enable the PLL in VOR. Pin 5 will be a logic high (approximately 9V) when in LOC.

4.5.3 30HZ BANDPASS FILTERS

By following the signal flow lines it can be seen that the input to the 30Hz reference filter in the VOR mode is through R209 since Q204 is off. The gain of the reference filter from TP203 to TP204 is equal to 1/2 (R235 divided by R209) or 2.11. The center frequency (phase) is predominately set by the value of R232 and R233. The "active" components in the VOR mode for the reference filter are R209, R232, R233, R235, capacitors C208 and C209, and I202A.

The above statements for gain and phase on the reference 30Hz filter also hold for the 30Hz variable filter. On the 30Hz variable filter, the gain from TP202 to TP205 is equal to 1/2 (R223 divided by R220) or 5. The fixed center frequency of the filter is predominately set by R221. The "active" components in the 30Hz variable filter in the VOR mode are R220, R221, R223, capacitors C206 and C207 and I202B. The phase shift of the variable channel is matched by adjusting R233 in the reference channel to exactly balance the two phase shifts.

Bias voltage (4.16V) is supplied to the non-inverting terminals of the op amps via R222 and R234. The values of 430K and 270K were chosen to keep the output offsets a minimum in LOC mode.

Transistors Q204 through Q207 are used to reconfigure the 30Hz filters to either 90Hz or 150Hz filters when the LOC enable line goes low. (TP201 goes high). In VOR operation all of these transistors are cut off; therefore, R213, R216, R218, R219 and R231 do not effect the VOR operation of the filters.

4.5.4 SIN-COS POT INTERFACE

In VOR, the output of I202A drives a unity gain inverter stage I202C and one branch of the Sin-Cos pot. The inverter, composed of I202C and R236 and R238 drives the opposite branch of the pot as shown below.

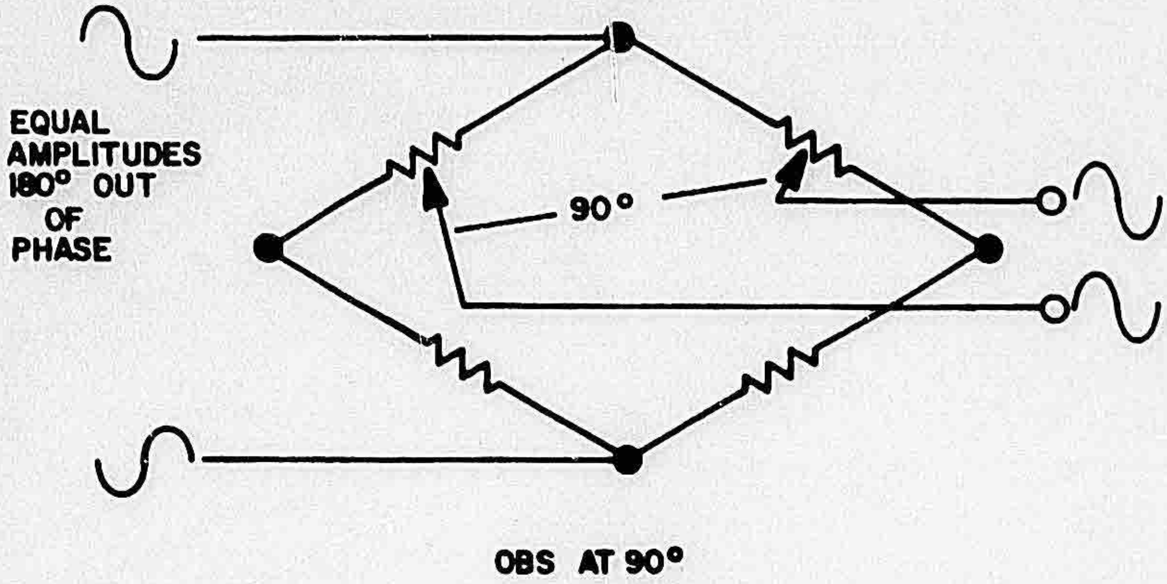


FIGURE 4-5 OBS AT 90°

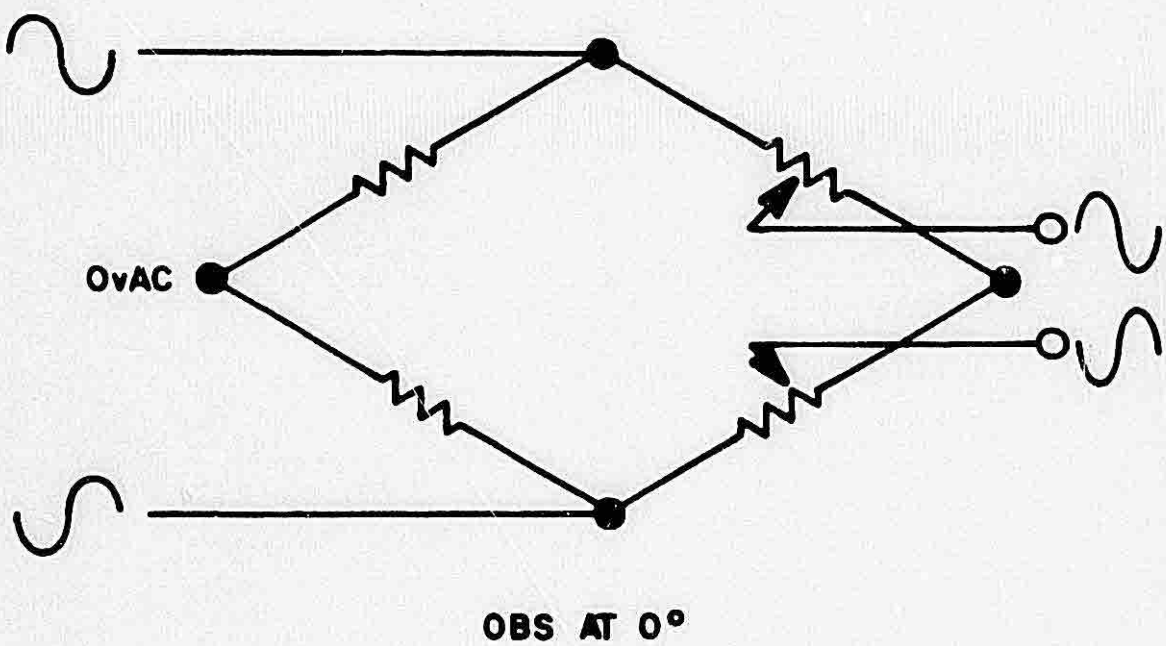


FIGURE 4-6 OBS AT 0°

With the pot set as shown in **Figure 4-5** (OBS at 90°) the signals at the wipers will be .707 the amplitude of the top signal. These wipers are connected to high impedance emitter followers Q208 and Q209 to prevent loading of the pot. Their outputs then drive an RC network comprised of C210 and R241 and 242. The resistance of R241 is adjusted so the total resistance of R241 plus R242 is equal to the reactance of C210 at 30Hz. Since at the 90° position (**Figure 4-5**) the signals applied to the RC network are equal in amplitude and in phase there is no resultant phase shift in the output signal at TP206. When the OBS is rotated to 0° as shown in **Figure 4-6**, then the signal on the wipers are equal in amplitude but 180° out of phase. Applying two signals 180° out of phase to the RC network produces an output signal which is shifted 90°. The examples shown above were for only two discrete positions but the phase shift is continuously variable as the wipers rotate 360° in position.

As was mentioned R241 is adjusted so that the total resistance equaled the reactance of C210 at 30Hz. In actual practice this is accomplished by placing the OBS and VOR generator to 0° and adjusting R241 for a 90° phase shift as noted by a null on the indicator meter.

4.5.5 SQUARING AMPLIFIER

The output from the Sin-Cos Interface Circuit drives I202D via C211. The op amp is configured as an open loop amplifier thus is quickly driven between saturation and cutoff. An offset threshold voltage 275mv higher than the voltage on the non-inverting terminal is used to reject noise. This noise threshold keeps the needle steady when the NAV receiver is tuned off channel. The threshold for the op amp is produced by the voltage divider action of R244 and R245. Resistors R247 and R248 supply the bias for the inverting input. When the indicator is in LOC mode Q211 becomes saturated taking the inverting input low. The inverting input going low causes the op amps output (TP301) to go high. This then causes the chopper switches I301C and D to be closed (shorted) when in LOC.

4.5.6 VOR PHASE DETECTION AND OUTPUT DRIVE

The 30Hz variable sine wave is coupled to the chopper phase detector I301C by C303 and R311. The chopper acts as a switch which is controlled by the reference 30Hz square wave. If the two 30Hz signals are 90° out of phase there will not be any resultant dc voltage produced. If the signal are in phase, however, a maximum dc voltage is produced. This is shown below (**Figure 4-7**):

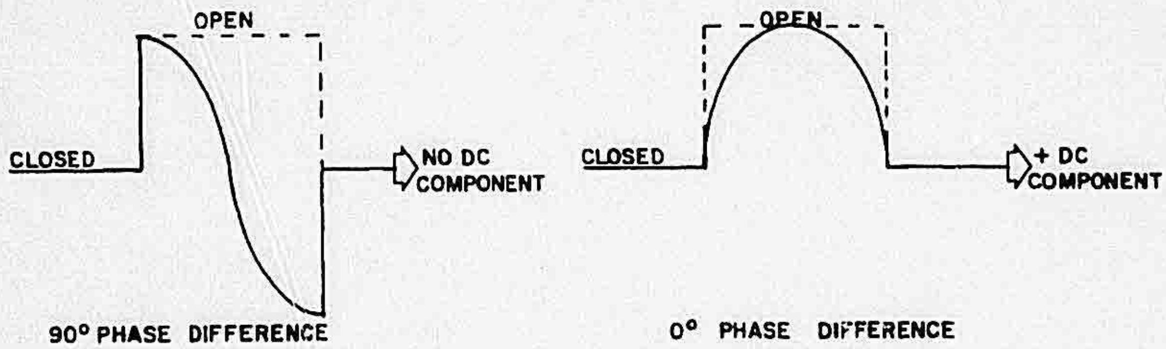


FIGURE 4-7 PHASE DIFFERENCE

As the signals vary from the 90° nulled position, a resultant dc voltage is produced whose polarity indicates the direction of variation. The resultant half waves are filtered by R312 and C306 to produce a 3 second needle speed in VOR. Since the output is dc coupled to the meter any excessive leakage in capacitors C303 or C306 will be observed as a variation from the nulled position. Nulling the meter by changing the VOR phase shift via R233 only compounds this problem since when the OBS is rotated 180° the needle will now be twice as far from center. If the capacitors are leaky it can sometimes be noticed as a change in needle position when the unit is powered up with no input signal. Output offset voltages that exceed the LM324's spec. can also cause this problem.

Since I301A is "open" in VOR, R313 does not have any effect on VOR needle deflection. Also with I301A being open, the output op amp I302B is configured as a voltage follower. It should be noted that this type of output is a voltage drive amplifier as opposed to a more typical current drive output.

R315, CR303, CR304 are output protection components. R315 limits the output current that I302B can deliver. CR303 and CR304 limit the output voltages to less than .65 volts to protect the meter package.

4.5.7 VOR FLAG

The 30Hz variable sinewave from I202B is coupled to a 90° fixed phase shift stage composed of R305, R306, C301 and I302D. The 90° phase shift can be observed by checking TP204 to TP303. This signal then feeds another chopper phase detector as described in the previous paragraph. The flag drive is smoothed by R308 and C304. The same comments on leaky capacitors apply to this output stage. If the TO-FROM changeover is greatly different from 90° off course, or is biased toward either a TO or FROM with no composite input, leaky capacitors or excessive output offset voltage should be investigated.

As with the needle drive circuit, I302A is configured as a voltage follower in VOR mode. This is true since I301B is open. R309 and CR301, CR302 are circuit protection components as described previously.

4.6 KI 208A/209A LOC OPERATION

4.6.1 INPUT BUFFER

The input stage performs the same function in LOC as it did in VOR. R203 should not be adjusted for LOC deflection since its function is solely VOR course width. LOC deflection is controlled by R313. Both the 90Hz and 150Hz LOC modulation tones pass through the wiper of R203 enroute to the bandpass filters.

4.6.2 VOR/LOC SWITCHING

When J2081 Pin 4 is grounded (LOC Mode) CR207 becomes forward biased and causes a voltage divider action between R215 and R210. This causes Q203's base to become negative with respect to its emitter and enough base current flows to saturate the transistor. TP201 then goes to 9 volts. When that occurs Q204, Q205, Q206, Q207 and Q211 are driven into sautration. The PLL is disenabled by the action of I201 Pin 5 going high in LOC. The VOR squaring amplifier output is also driven high by this action, which in turn, causes the two VOR choppers to be shorted. Finally, LOC Enable closes I301A and B to allow the LOC signals to be passed to the output stages.

4.6.3 90 AND 150HZ BANDPASS FILTERS

The saturation of transistors Q205 and Q206 place an additional resistor (R216 or R219) in parallel with the frequency determining resistor (R232 or R221) of each of the two bandpass filters. This paralleling of resistors causes the center frequency of the filter to be changed to either 150Hz or 90Hz. Saturation of Q207 causes the feedback resistance of the 150Hz filter to be changed to the parallel combination of R231 and R235. This change is necessary to keep the Q of the two filters the same. If Q207 were not in the circuit the 90Hz filter would have a Q of 12 and the 150Hz filter a Q of 20. Since Q207 is in the circuit both filters have a Q of 12.

Since Q204 is saturated, the LOC signal input to the 150Hz filter is through R213. The input to the 90Hz filter is through R220. The phase of the two filters are matched much the same as in VOR. The phase matching is necessary to achieve proper temperature tracking of the filters. In this case, the input (TP202) to output (TP204) phase of the 150Hz filter is recorded and then the input (TP202) to output (TP205) phase of the 90Hz filter is adjusted with R218 to match the recorded data. Both filters have a gain of 5 in LOC.

4.6.4 LOC DEFLECTION AND FLAG SUMMATION

The resistor-diode network of CR203, CR204, R226 through R228 performs the LOC deflection summation. Since CR203 and CR204 are installed opposite, equal 90Hz and 150Hz signals will cancel at the center of R227. This is symbolically shown below (**Figure 4-8**):

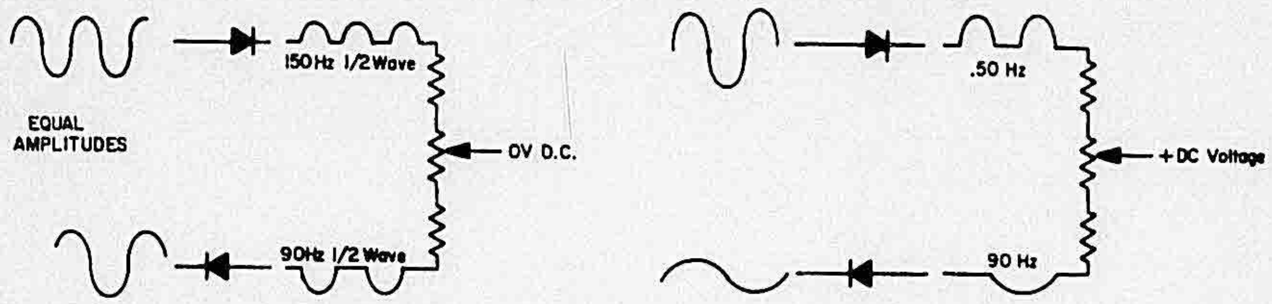


FIGURE 4-8 LOC DEFLECTION SUMMATION

Ignoring the fact that the 90 and 150Hz tones are riding on a 4.16 volt dc level, if the 150Hz tone is greater, a positive dc voltage is produced. If the 90Hz tone is greater a negative dc voltage is produced. This bipolar signal then drives R313 and the output op amp I302B through the closed I301A switch.

As mentioned, the above discussion ignored the fact that the two tones were riding on a 4.16VDC level. This is a valid analytical statement however, since the non-inverting terminal of I302B is also at this 4.16VDC potential. If the 90Hz tone predominates then the output of R227 will be negative with respect to this 4.16 volt level.

R227 is used to balance or center the needle when equal 90 and 150Hz tones are present. R313 is used to control the amount of LOC deflection. This should be set to produce 4 dots deflection for a 4db tone ratio.

The LOC flag summation network is composed of CR202, CR205, R224 and R225. Since CR202 and CR205 are installed in the same direction, their output amplitudes sum directly to produce a TO indication. If one tone is absent then the output dc is 1/2 its normal value. This causes a 1/2 flag condition.

4.6.5 LOC OUTPUT STAGES

In LOC I302B is configured as an inverting amplifier stage. R314 and C307 provide the filtering to produce the 0.6 second needle speed in LOC. Bias for the non-inverting terminal is produced by connecting R312 to the 4.16 volt line through the shorted I301C switch.

The same statements are true for the LOC flag output stage. R310 and C305 provide the filtering and R308 provides the bias through shorted I301D switch.

4.7 VOLTAGE REGULATOR

The Voltage Regulator portion consists of I303, Q101, C308 through C313, R317 through R321 and CR305, CR306. This regulator was chosen due to its low input to output voltage, as well as excellent regulation. This regulator should be capable of holding 9.2 output with an input as low as 10 volts. R321 is the voltage adjustment control. C308 reduces the noise on the reference voltage of the IC regulator.

C309 is the high frequency compensation for the IC and C311 reduces the high frequency response of the pass transistor Q101. C312 and C313 are used to keep a low source impedance at high frequencies. R317 establishes the short circuit protection limits for the IC. (Q101 is only protected by limiting the base current. This will **not** usually allow its collector to be shorted without destroying the transistor). R318 is a bias resistor for CR305 and 306. These diodes are used to keep the differential amplifier inside the IC operating in its linear region. R319, R320, R321 establish the voltage applied to the input of the regulator. CR307 and C310 are transient protection for the regulator.

Associated circuitry involves R301, R302, R303 and I302C. The R301-302 voltage divider drives I302C. The op amp is configured as a voltage follower to produce a very low source impedance for the 4.16 reference voltage. R303 will prevent blowing the input stage of the IC under short circuited conditions.

4.8 GLIDESLOPE OPERATION [KI 209A ONLY]

The KI 209A only contains the glideslope meter packages. The applicable glideslope receiver that is used to drive the meters should be consulted for theory of operation.

4.9 COMP/RELAY BOARD

The performance of the KI208A and KI209A retain the NAV features of the KI208 and KI209 respectively. By incorporating assembly 200-09091-0000, the units are able to switch between the conventional NAV operation and LNAV operation. This permits access to the 'D-Bar' and 'FLAG' movements and, on the KI209A, vertical 'D-Bar' and vertical 'FLAG' movements. In addition, the OBS is available for LNAV use.

Performance in NAV mode is the same as for the KI208 & KI209.

The following 10 relays switch these signals:

RELAY	INPUT FUNCTIONS	OUTPUT FUNCTIONS
K401	SPARE 1 NC / SPARE 1 NO	SPARE 1 COMMON
	SPARE 2 NC / SPARE 2 NO	SPARE 2 COMMON
K402	NAV VERT +UP IN / LNAV VERT +UP IN	VERT +UP METER OUT
	NAV VERT +DOWN IN / LNAV VERT +DOWN IN	VERT +DOWN METER OUT
K403	NAV VERT +FLAG IN / LNAV VERT +FLAG IN	VERT +FLAG OUT
	NAV VERT -FLAG IN / LNAV VERT -FLAG IN	VERT -FLAG OUT
K404	NAV A/C POWER / LNAV A/C POWER	UNIT POWER OUT
	SPARE 3 NC / SPARE 3 NO	SPARE 3 COMMON

RELAY	INPUT FUNCTIONS	OUTPUT FUNCTIONS
K405	NAV LOC ENGAGE IN / LNAV FCS LOC ENGAGE IN NAV ANNUNCIATE / LNAV ANNUNCIATE	LOC ENGAGE OUT GROUND
K406	NAV +TO IN / LNAV +TO IN NAV +FROM IN / LNAV +FROM IN	+TO METER OUT +FROM METER OUT
K407	NAV FLAG OUT / LNAV +FLAG OUT GROUND / LNAV -FLAG OUT	LATERAL +FLAG OUT LATERAL -FLAG OUT
K408	NAV LATERAL DEV +RIGHT IN / LNAV LATERAL DEV +RIGHT IN NAV LATERAL DEV +LEFT IN / LNAV LATERAL DEV +LEFT IN	LAT. DEV. +RIGHT MTR OUT LAT. DEV. +LEFT MTR OUT
K409	NAV HI IN / LNAV OBS EXCITE IN NAV LO IN / LNAV OBS	OBS SIN/COS POT HI OUT OBS SIN/COS POT LO OUT
K410	NAV OBS COS OUT / LNAV OBS COS OUT NAV OBS SIN OUT / LNAV OBS SIN OUT	NAV OBS COS OUT NAV OBS SIN OUT

I401A and I401B provide amplified LNAV OBS COS & SIN outputs.

I401C AND I401D amplify the OBS drive signal.

I402A and I402B are or'd together so either polarity will give a non-polarized NAV FLAG output at the emitter of Q401.

05

SECTION V
MAINTENANCE

5.1 GENERAL INFORMATION

5.1.1 SEMICONDUCTOR REPLACEMENT

It is recommended that semiconductors not be tested or replaced until unsatisfactory performance is observed.

5.1.2 SEMICONDUCTOR MAINTENANCE

5.1.2.1 GENERAL

Due to the wide utilization of semiconductors in this electronic equipment, somewhat different techniques are necessary in maintenance procedures. In solid state circuits the impedance and resistances encountered are of much lower values than those encountered in vacuum-tube circuits. Therefore, a few ohms discrepancy can greatly affect the performance of the equipment. Also, coupling and filter capacitors are of larger values and usually are of the tantalum type. Hence, when measuring resistances, an instrument accurate in the high ranges must be employed. Capacitor polarity must be observed when measuring resistance.

5.1.2.2 SEMICONDUCTOR TEST EQUIPMENT

Damage to semiconductors by test equipment is usually the result of accidentally applying too much current or voltage to the elements. Common causes of damage from test equipment are discussed in the following paragraphs.

5.1.2.2.1 TRANSFORMERLESS POWER SUPPLIES

Test equipment with transformerless power supplies is one source of high current. However, this type of test equipment can be used by employing an isolation transformer in the AC power line.

5.1.2.2.2 LINE FILTER

It is still possible to damage semiconductors from line current, even though the test equipment has a power transformer in the power supply, if the test equipment is provided with a line filter. This filter may function as a voltage divider and apply half voltage to the semiconductor. To eliminate this condition, connect a ground wire from the chassis of the equipment under test before making any other connections.

5.1.2.2.3 LOW-SENSITIVITY MULTIMETERS

Another cause of semiconductor damage is a multimeter that requires excessive current to provide adequate indiations. Multimeters with sensitivities of less than 20,000 ohms-per-volt should not be used on semiconductors. A multimeter with low sensitivity will draw too much current through many types of small semiconductors, causing damage. When in doubt as to the amount of current supplied by a multimeter, check the multimeter circuits on all scales with an external, low-resistance multimeter connected in series with the multimeter leads. If more than one milliampere is drawn by the multimeter on any range, this range cannot be safely used on small semiconductors.

5.1.2.2.4 POWER SUPPLY

When using a battery-type power supply, always use fresh batteries of the proper value. Make certain that the polarity of the power supply is correct for the equipment under test. Do not use power supplies having poor voltage regulation.

5.1.2.3 SEMICONDUCTOR VOLTAGE AND RESISTANCE MEASUREMENTS

When measuring voltage or resistances in circuits containing semiconductor devices, remember that these components are polarity and voltage conscious. Since the values of capacitors used in semiconductor circuits are usually large (especially in audio, servo, or power circuits) time is required to charge these capacitors when an ohmeter is connected to a circuit in which they appear. Thus, any reading obtained is subjected to error if sufficient time is not allowed for the capacitor to fully charge. When in doubt it may be best in some cases to isolate the components in question and measure them individually.

5.1.2.4 TESTING OF TRANSISTORS

A transistor check should be used to properly evaluate transistors. If a transistor tester is not available, a good multimeter may be used. Make sure that the multimeter meets the requirements outlined in preceeding paragraph 5.1.2.3. Always check the value of the bias resistors in series with the various transistor elements. A transistor is very sensitive to improper bias voltage therefore a short or open circuit in the bias resistance may damage the transistor. For this reason, do not troubleshoot by shorting the various points in the circuit to ground and listening for clicks.

CAUTION

IF A TRANSISTOR IS FOUND TO BE DEFECTIVE, MAKE CERTAIN THAT THE CIRCUIT IS IN GOOD OPERATING ORDER BEFORE INSTALLING A REPLACEMENT TRANSISTOR. IF A SHORT CIRCUIT EXISTS IN THE CIRCUIT, PUTTING IN ANOTHER TRANSISTOR WILL MOST LIKELY RESULT IN BURNING OUT THE NEW COMPONENT. DO NOT DEPEND UPON FUSES TO PROTECT TRANSISTORS.

5.1.2.4.2 PNP TRANSISTOR

To check a PNP transistor, connect the positive lead of the multimeter to the base of the transistor and the negative lead to the emitter. Generally, a resistance reading of 50,000 ohms or more should be obtained. Reconnect the multimeter with the negative lead to the base. With the positive lead connected to the emitter, a resistance value of 500 ohms or less should be obtained. When the positive lead is connected to the collector a value of 500 ohms or less should be likewise obtained.

5.1.2.4.3 NPN TRANSISTOR

Similar tests made on an NPN transistor should produce the following results: With the negative lead of the multimeter connected to the base of the transistor the value of resistance between the base and the collector should be high. With the positive lead of the multimeter connected to the base, the value of resistance between the base and the collector should be low. If these results are not obtained, the transistor is probably defective and should be replaced.

5.1.2.5 REPLACING SEMICONDUCTORS

Never remove or replace a plug-in semiconductor with the supply voltage turned on. Transients thus produced may damage the semiconductor or others remaining in the circuit. If a semiconductor is to be evaluated in an external test circuit, be sure that no more voltage is applied to the semiconductor than normally is used in the circuit from which it came.

Use only a low heat soldering iron when installing or removing soldered-in parts. Use care in the handling of printed circuit boards. When removing a part from a printed circuit board, first unbend the crimped leads. Use only the necessary amount of heat to unsolder the part. Clear excess solder from mounting eyelets, making sure that mounting holes are clear before installing new parts. When removing a transformer or other part having a multiple number of leads, straighten (unbend) all leads first and then heat leads one at a time, working around the part, until the part can be gently "rocked out".

When installing or removing a soldered-in semiconductor grasp the lead to which heat is applied between the solder joint and the semiconductor with long-nosed pliers. This will dissipate some of the heat that would otherwise conduct into the semiconductor from the soldering iron. Make certain that all wires soldered to semiconductor terminals have first been properly tinned so that the necessary connection can be made quickly. Excessive heat will permanently damage a semiconductor.

When soldering is required to remove a component from a semiconductor socket, remove the semiconductor to prevent damage to the semiconductor.

In some cases, power transistors are mounted on heat sinks that are designed to dissipate heat away from them. In some power circuits, the transistor must also be insulated from them. In some power circuits, the transistor must also be insulated from ground. Often, this insulating is accomplished by means of insulating washers made of fiber and mica. When replacing transistors mounted in this manner, be sure that the insulating washers are replaced in proper order. Before installing the mica washers treat them with a film of silicone grease. This treatment helps in the transfer of heat. After the transistor is mounted, and before making any connections, check from the case of the transistor to ground with a multimeter to see that the insulation is effective.

5.2 TEST ALIGNMENT

5.2.1 GENERAL INFORMATION

The following is an alignment procedure for aligning the VOR/LOC portion of the KI 208A and KI 209A indicators. Successful completion of this alignment procedure will enable the unit to meet its Minimum Performance Specification. All tests are conducted with the KI 208A/209A indicator connected to a KX 155/A series navigation receiver (200uV RF input level) or directly to a VOR/LOC generator such as the Collins 479S-3 or Tel-Instrument T-20A. The alignment assumes that the Azimuth Dial Card and the Sin-Cos pot R101 has been properly set. If this is not true, or if in doubt, Paragraph 5.2.3. has a method for quickly setting the card.

5.2.2 TEST EQUIPMENT

The following test equipment, or equivalent, is required to properly align and test the KI 208A/209A indicators. All test equipment must be properly calibrated before attempting alignment.

A. Power Supply: Heath Model IP-20 or equivalent

B. Digital Multimeter: Fairchild 7050 multimeter or equivalent

C. Frequency Counter: CMC 616A or equivalent

D. Oscilloscope (Dual Trace): Tektronix Model 453 or equivalent

E. VOR/LOC Generator: Collins 479S-3 or equivalent

F. KI 208A/209A Bench Interconnect: See Figure 5-1.

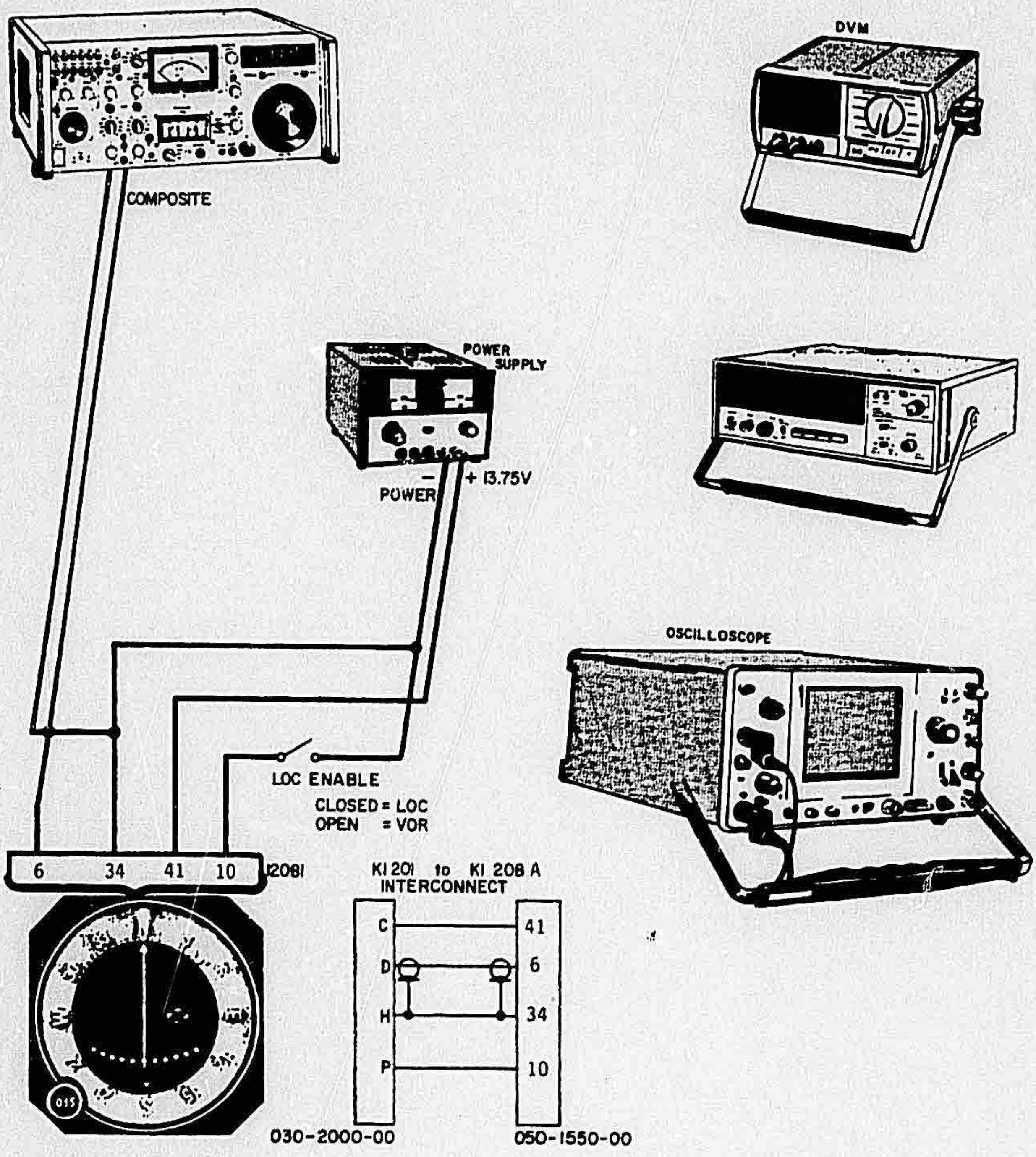
The following pieces of equipment are optional. They are used to align the KI 208A/209A indicators with the mating NAV receiver. The only exception to this is the phase meter, which makes LOC alignment easier.

1. NAV Receiver: KX 155/A Series Receiver

2. VHF Signal Generator: Boonton Model 211A or equivalent

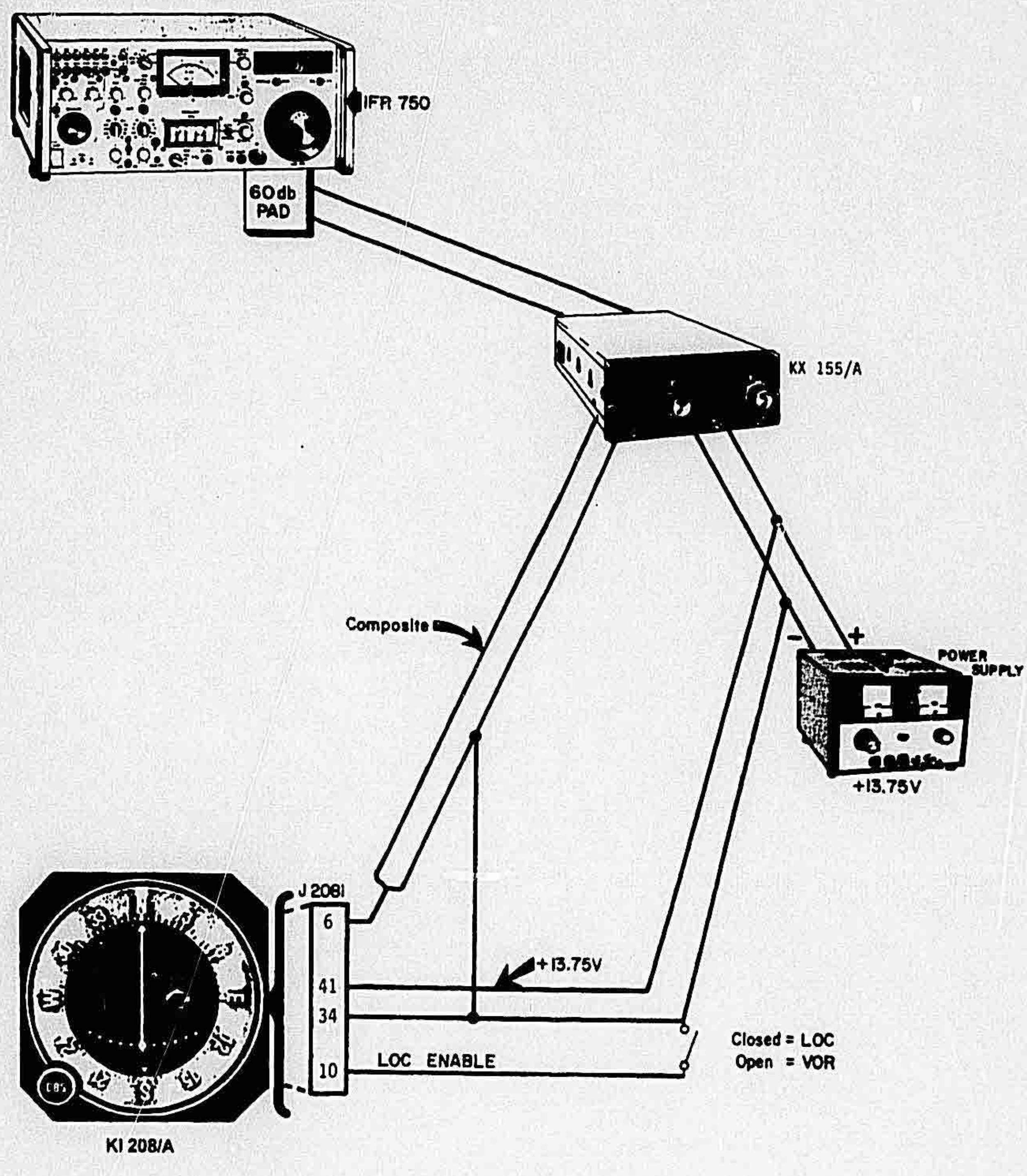
3. Digital Phase Meter: Dranetz 305 with PA-3001 plug-in

4. KX 155/A, KI 208A Bench Interconnect: See Figure 5-2.



note: 1. The top board of the KI 208A/209A is hinged for easier access to the test points of both boards. See 6.3.4.1 for instructions.
2. An interconnect harness using KI 201 KPN 030-2000-00 and P2081 KPN 050-1550-01 may be used with existing bench test sets.
3. A 2½ inch long adjustment tool KPN 088-0706-00 is required to adjust VOR & LOC centering.

FIGURE 5-1 KI 208A/209A BENCH TEST SET (MODULATOR)



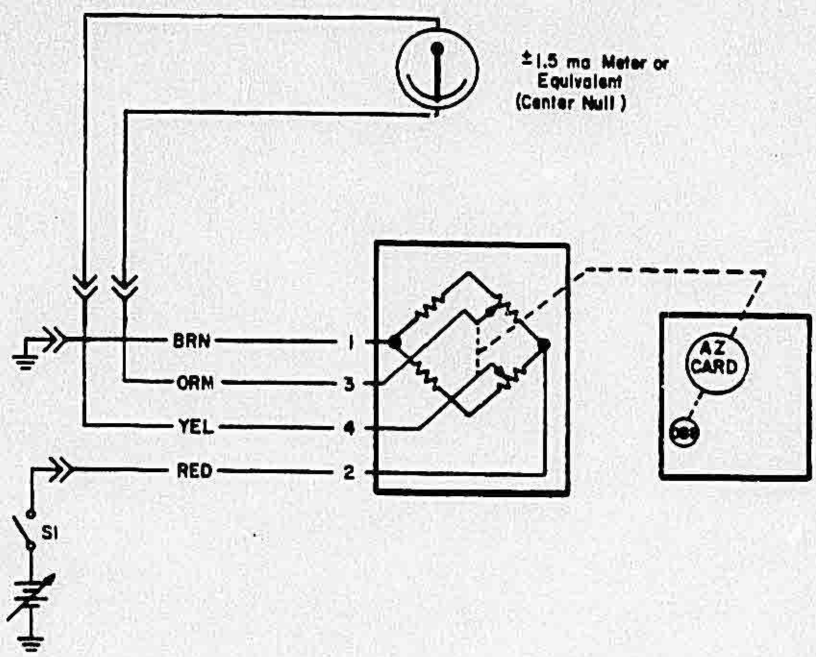
NOTE
1. The top board of the KI 208A/209A is hinged for easier access to the test points. See 6.3.4.1 for instructions.
2. A 2½ inch long adjustment tool KPN 088-0706-00 is required to adjust VOR & LOC centering.

FIGURE 5-2 KI 208A/209A BENCH TEST SET (NAV RECEIVER)

5.2.3 SIN-COS POT/AZIMUTH CARD CALIBRATION

The KI 208A/209A Overall Performance tests can be completed without any disassembly of the unit. In order to carry out the alignment procedures of the individual subassemblies, only the dust covers need be removed.

The calibration of a KI 208A or 209A Azimuth card and sin-cos pot can be done quickly by using the test circuit shown in Figure 5-3.



CAUTION

1. Do not increase voltage beyond 15V until the OBS is rotated so as to null the indicator.

2. Open S1 prior to checking the reciprocal heading.

FIGURE 5-3 AZIMUTH CARD CALIBRATION

Alignment

1. First check the resistance between pins 1 (Brn) and 2 (Red) of R101. A reading of 6.5K ohm ±975 ohms should be obtained.

2. Rotate the OBS knob until a balanced resistance reading of approximately 2.1K ohm is obtained between pins 1 and 3 (Orn) and pins 1 and 4 (Yel) of R101.

3. After obtaining the balanced resistance (2.3K) between 1-3 and 1-4, loosen the allen screw on the sin-cos pot's gear so the pot's shaft does not turn when the OBS knob is rotated. Once that has been done, rotate the Azimuth card until 90° is under the top vertical tick mark. Retighten the gear on the shaft.

4. The final alignment of an azimuth card is done using the test circuit shown in Figure 5-3. Connect the power supply and jumpers as shown in Figure 5-3. Close S1 and slowly increase the voltage while turning the OBS to null the meter. 33 volts can safely be applied with the meter nulled. This voltage allows sufficient sensitivity to balance out small errors. While 50 volts can be applied while the meter is nulled **do not** allow this voltage to remain on when the OBS is rotated between 270° and 90°, or whenever the meter is pegged.

5. With the meter nulled (close to 90° bearing) loosen the allen screw on the sin-cos pot's gear so the pot's shaft does not turn. Rotate OBS to exactly 90° and tighten the gear on the shaft.

6. Open S1 and then rotate the azimuth card to 270°. Close S1 and check for nulled condition. If any error is present, first rotate the OBS to halve the error, and then loosen the large gear so it does not turn the sin-cos pot. Turn the OBS to exactly 270°. Tighten the card on the shaft.

7. Open S1, rotate azimuth card to 90°. Close S1 and check that the error does not exceed that noted at 270°. Repeat step 6 if necessary and **align for minimum centering error** at 90° and 270°. The error shall not exceed 1° at either position.

8. To assure that the pot is not set 180° out of position check the resistances between pins 1 and 3 and between pins 1 and 4 with the OBS set to 90°. The resistances should be balanced and approximately equal to 2.3K.

   Rotate the OBS to 270° and the resistances between pins 2 and 3 and between pins 2 and 4 should be balanced and approximately equal to 2.1K.

5.2.4 VOR/LOC ALIGNMENT PROCEDURE

5.2.4.1 GENERAL

5.2.4.1.1 Standard VOR Test Signal

A signal consisting of two equal amplitude components:

1. A 9960 Hz signal frequency modulated at a 30 Hz rate with a deviation ratio of 16 by a reference phase signal. Set this tone to .39 V RMS.

2. A 30 Hz signal "variable phase signal" which can be varied in phase with respect to the reference phase signal. Set this tone to .39 V RMS.

5.2.4.1.2 Standard Localizer Test Signals

A signal consisting of two components, 90 Hz and 150 Hz combined as described in RTCA Paper 208-53/DO-52 "Calibration Procedures for Signal Generators Used in the Testing of VOR and ILS Receivers". The amplitude ratio of the 90/150 Hz tones (tone ratio) must be adjustable. Unless specified, the level of the Localizer Test Signal with equal amplitude components of 90 Hz and 150 Hz (0.00 DDM) shall be .27 V RMS for each tone with the other tone removed.

Prior to starting the alignment one of the two possible bench interconnects should be chosen. If Figure 5-1 is chosen assure that the modulator levels are set correctly. The following alignment will only call out "VOR or LOC" test signals. The full title "standard VOR modulator test signal" or "standard VOR test signal" will depend on which bench interconnect is chosen; i.e., figure 5-1 or Figure 5-2, respectively. Millivolt levels within parenthesis in the alignment are measured from pin 11 to pin 10 on the rear connector. The test setup of figure 5-1 and 5-2 does not test LNAV capability and there is no alignment for LNAV.

5.2.4.2 INITIAL CHECK

A. Prior to turning on the unit assure that no shorts exist on the 9.2 volt output (TP308). Resistance between TP308 and ground should be greater than 100 ohms.

B. Preset all variable resistors to the center of their range unless the unit has been previously aligned.

5.2.4.3 REGULATOR ADJUSTMENTS

A. Apply input power (13.75VDC) to unit. Current drain should be less than 250mA with dial light on.

B. Monitor TP308 with a digital voltmeter and adjust R321 on bottom board for 9.2VDC ±0.1VDC.

5.2.4.4 PHASE LOCKED LOOP ADJUSTMENTS

A. With no composite signal applied (remove modulation from VHF generator or short out composite input) check that pin 14 of I201 on the top board does not change logic status.

B. Monitor either pin 3 or 4 of I201 with a frequency counter and adjust R207 to obtain 9960 ±10Hz.

5.2.4.5 VOR ALIGNMENT

A. With no composite signal applied, note the position of the needle. It should be centered within 1/2 needle's width.

B. Apply a VOR Test Signal with both the VOR generator and the unit's OBS set to 90° (FROM indication).

C. Adjust R233 on the top board (accessible from the left front) to place the needle in the same position as noted in Step A.

D. Rotate the VOR generator to 270°. If necessary slightly readjust R233 until the needle is midway between this reading and the position set in the previous step. If a greater than 2 degree readjustment is required, this will usually signify a bad output stage or incorrectly set azimuth card.

E. Shift the VOR generator to 280° and adjust R203 on the top board to produce 5 dots (150mV) right deflection. Rotate the generator to 260° and check that 5 dots (150mV left deflection is recorded. If necessary readjust R203 to balance any error between the two deflections. Example, if 5 dots right deflection is recorded, but only 4 1/2 dots left deflection, then R203 should be readjust to produce 5 1/4 dots right deflection and 4- 3/4 dots left deflection.

F. Repeat C and D and align for minimum centering error at both 90° TO and FROM. The majority of units will be capable of being nulled to less than 0.5° (6.8mV) difference. If the error cannot be reduced to less than 1° (13.5mV) difference, then troubleshoot the VOR converter.

G. Change the VOR generator to 0° and set the unit's OBS to 0° (FROM indication). Adjust R241 to center the needle.

H. Rotate the VOR generator to 180° (TO indication) and readjust R241 to halve any error that is present.

I. Repeat G and H to balance or equalize any error at the two headings. **Align for minimum error**. Troubleshoot VOR converter if the error cannot be reduced to less than 1.5° total difference in the readings (less than 20.4mV)

J. Set the 479T to 80° (the needle should deflect 5 dots to the right) and lower the composite input signal so that the needle deflects only 2-1/2 dots.

K. Adjust R323 so that the RED/WHITE striped flag is in view only in the top 1/3 of the window.

L. Return the composite input to 0.5VRMS.

5.2.4.6 LOC ALIGNMENT

A. To match the bandpass of the two LOC filters in the unit, first configure the LOC generator to produce 150Hz only.

B. Measure and record the phase shift from TP202 and TP204. Either the phase meter or oscilloscope can be used for this measurement. If a scope is used, it is recommended that the variable time base control be used to expand 1/2 the wave to occupy the entire scope display as shown in Figure 5-4. Use AC coupling and adjust the two channels vertical position controls so their grounds are coincident and are at the center of the display. Check that the phase shifts of the two scope channels are equivalent by placing both probes on one 150Hz signal.

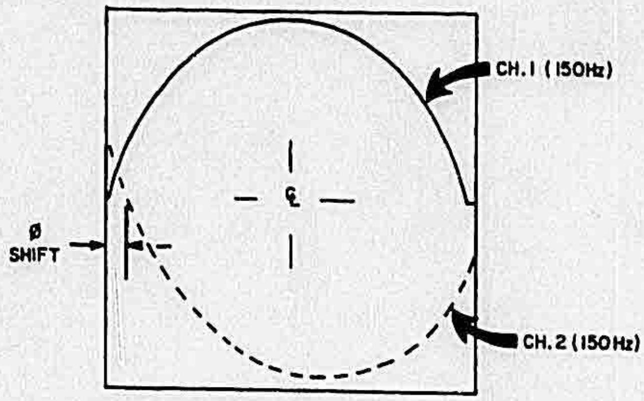


FIGURE 5-4 PHASE SHIFT

C. Reconfigure the LOC generator to produce only 90Hz. Monitor the phase shift between TP202 and TP205. If using the scope method, readjust the variable time base to reduce the 1/2 waveform to full horizontal display as shown above. Adjust R128 on the top board to match the phase shift recorded in B.

CAUTION

DO NOT SWITCH REFERENCE WAVEFORMS BETWEEN THE TWO MEASUREMENTS. THAT IS, IF TP202 WAS THE #1 INPUT TO THE PHASE METER (OR SCOPE) IN STEP B, DO NOT CHANGE IT TO THE #2 INPUT WHEN PERFORMING STEP C.

D. Once the phase shifts are matched, the two active filters are equivalent. Any drift due to temperature will affect both of them equally and will not produce an offset condition that could have occurred if they were not matched.

E. Set the LOC generator to produce equal 90 and 150Hz tones. Refer to LOC test signals for amplitudes.

F. Adjust R227 (accessible from the top right of unit) to center the needle.

G. Set the Tone Localizer switch of the LOC generator to 4db (.093ddm) on each side and adjust R313 on bottom board for 3 dots (90.0mv) deflection.

H. Return the generator to 0db and switch the generator between CAL 90 and CAL 150 while observing the flag. Leave the generator at the setting that has the least amount of flag in view.

I. Adjust R310 so that the flag is in view in the bottom 1/3 of the window.

J. This completes the alignment of the KI 208A/209A.

5.2.5 MINIMUM PERFORMANCE SPECIFICATIONS

5.2.5.1 PURPOSE

The following specifications establish the Minimum Performance Standards for the KI 208A and KI 209A Indicators. All indicators must meet the specifications proceeded by an asterisk (*).

5.2.5.2 MINIMUM PERFORMANCE UNDER STANDARD CONDITIONS

A. <u>VOR</u>

FLAG: With a VOR test signal of 0.5V RMS applied, there shall be no warning flag showing up to 60° off the bearing set on the OBS. When either the reference or the variable modulation is removed from the VOR test signal the alarm flag shall appear.

COURSE ACCURACY: ±2° maximum with .5VRMS signal. Measured on the 12 radials specified.

COURSE WIDTH: 20° +4° with .5V RMS signal input.

TO-FROM: The To-From changeover (centered flag condition) shall be 90° ±10° from an On course heading.

POLARITY: With the generator and unit set for 0° "FROM" heading, rotating the bearing on the generator +10° shall cause the needle to deflect to the left.

AUTOPILOT DRIVE: With the conditions of paragraph 2.1.5, readjust if necessary the bearing on the VOR generator so as to produce 5 dots left deflection. J2031 Pin 10 should be positive with respect to pin 11 and 150mV ±30mV should be recorded.

REFERENCE VOLTAGE: J2081 pin 10 should be at +4.15V ±0.15V with respect to ground.

B. <u>LOCALIZER</u>

FLAG: With a 0.3V RMS LOC test signal applied, there shall be a full "TO" indication with no warning flag showing. When both the 90Hz or the 150Hz tone are removed from the LOC test signal, the alarm flag shall appear.

CENTERING ACCURACY: Needle shall be centered within ±1/2 dot, with a 0.3V RMS input and an Odb tone ratio.

DEFLECTION CHARACTERISTIC: With 0.35V RMS input and a 4db tone ratio, the needle shall deflect to the third dot ±1/2 dot.

POLARITY: With the tone ratio set in the 90 Hz side the needle shall deflect to the right and when set in the 150Hz side the needle shall deflect to the left.

C. GLIDESLOPE METERS (KI 209A ONLY)

INPUT IMPEDANCE: 1K ohm ±5%, both flag and needle.

POLARITY: A +100mV DC voltage on J101 pin 3 with pin 6 being the return shall produce an upward movement of the GS needle. Conversely, a −100mV DC on J2081 pin 3 with pin 6 common shall produce a downward movement of the GS needle.

FLAG: A 250mV DC voltage on J2081 pin 9 with pin 12 the return shall remove the GS warning from view.

D. EXTERNAL LOADING

VOR-LOC: With one ARINC Autopilot load (1K ohm) connected across the deflection meter through J2081 pins 10 and 11, all the requirements of parts 2.1 and 2.2 shall be met.

5.2.6 KI 208A/209A TEST DATA SHEET

I. VOR

A. FLAG ______________(OK) ______________(OK) ______________(OK)
Composite On 30Hz Var. Off 9960Hz Off

B. LATERAL FLAG ON ______________(OK) ______________(OK) ______________(OK)
Composite On 30Hz Var. Off 9960Hz Off

C. COURSE ACCURACY (±2° MAX ERROR)

	TO	FROM		TO	FROM
0°	______	______	180°	______	______
30°	______	______	210°	______	______
60°	______	______	240°	______	______
90°	______	______	270°	______	______
120°	______	______	300°	______	______
150°	______	______	330°	______	______

D. COURSE WIDTH (20° ±4°) ______________
DATA

E. TO FROM CHANGEOVER (90° ±10°) ______________
DATA

F. POLARITY (Incr. Genr. Angel = Lf. Defl.) ______________(OK)

G. AUTOPILOT DRIVE (5 dots LF. Deflection =150mV ±30Mv)
______________(OK)

H. REFERENCE VOLTAGE (4.15V ±.15V) ______________
DATA

II. LOC

A. FLAG ______________(OK) ______________(OK)
Composite On Composite Off

B. CENTERING (with ±1/2 Dot) ______________(OK)

C. DEFLECTION for 4db = 3 dots ±1/2 Dot ______________Right 90Hz (OK)

D. POLARITY (90Hz = Right Deflection) ____________ Left 150Hz (OK)

III. VOR with Varying Voltage

A. FLAG

10.5V ________ 33V ________ (OK) Composite On

10.5V ________ 33V ________ (OK) 30Hz Var. Off

10.5V ________ 33V ________ (OK) 9960Hz Off

B. COURSE ACCURACY (±2° Max. Error) 90°

TO ________ 33v FROM ________ 33V

TO ________ 10.5V FROM ________ 10.5V

C. COURSE WIDTH (20° ±4°) ________ 10.5V Data ________ 33V Data

D. TO-FROM CHANGEOVER (90° ±10°) ________ 10.5V Data ________ 33V Data

IV. LOC with Varying Voltage

A. FLAG

10.5V ________ 33V ________ (OK)
Composite On

B. CENTERING (±1/2 Dot) ________ (OK 10.5V) ________ (OK 33V)

C. DEFLECTION (4db = 3 dots ±1/2 Dot) 10.5V ________ Right 90Hz ________ 33V
10.5V ________ Left 105Hz ________ 33V

V. LNAV

A. LATERAL DEVIATION
Centered ________ (0 mV)
Left 5 Marks ________ (-150 mV)
Right 5 Marks ________ (+150 mV)

B. TO/FROM FLAG
Flag ________ (±15 mV)
To ________ (-130 mV)
From ________ (+130 mV)

C. VERTICAL DEVIATION (KI 209A)
Centered __________(0 mV)
Up 2 Marks __________(+150 mV)
Down 2 Marks __________(–150 mV)

D. VERTICAL FLAG (KI 209A)
Flag __________(129 mV)
No Flag __________(260 mV)

E. OBS
0° __________(<± 2°)
90° __________(<± 2°)
180° __________(<± 2°)
270° __________(<± 2°)

F. SPARE RELAYS

Spare Relay 1	NO__________	NC__________
Spare Relay 2	NO__________	NC__________
Spare Relay 3	NO__________	NC__________

5.3 OVERHAUL

5.3.1 GENERAL

Maintenance information contained in this section includes inspection procedures, cleaning, semiconductor replacement, and troubleshooting procedures.

5.3.2 VISUAL INSPECTION

The following visual inspection procedures should be performed during the course of maintenance operations.

a. Inspect all wiring for frayed, loose, or burned wires.

b. Check cable connections. making sure the plugs are free from corrosion and are properly soldered.

c. Check all components for evidence of overheating, breakage, vibration, corrosion, or loose connections.

5.3.3 CLEANING

a. Using a clean lint-free cloth, lightly moistened with an approved cleaning solvent remove the foreign matter from the equipment case and unit front panels. Wipe dry using a clean, dry, lint-free cloth.

b. Using a hand controlled dry air jet (not more than 15 psi), blow the dust from inaccessible areas. Care should be taken to prevent damage by the air blast.

c. Clean electrical contacts with a burnishing tool or cloth lightly moistened with an approved contact cleaner.

d. Clean the receptacles and plugs with a hand controlled dry jet (not more than 25 psi) and a clean lint-free cloth lightly moistened with an approved cleaning solvent. Wipe dry with a clean, dry, lint-free cloth.

5.3.4 DISASSEMBLY PROCEDURES

The following instructions include procedures that are necessary to remove and disassemble the subassemblies of the KI 208A/209A. Before disassembly, verify that the power is removed and disassemble only to the extent necessary to effect test, alignment and repair. Tag or in some means, identify all disconnected wires.

5.3.4.1 KI 208A/209A DISASSEMBLY PROCEDURES

The KI 208A/209A Overall Performance tests can be completed without any disassembly of the unit. In order to carry out the alignment procedures of the individual subassemblies, only the dust covers need be removed.

The support framework of the KI 208A/209A consists of the mounting chassis, rear plate and printed circuit board (PC) Carriers.

The KI 208A/209A Converter #1 Board is secured to the top printed circuit board carrier. A ribbon cable connects between the converter #1 board and the converter #2 board. Also, four wires connect the Sine/Cosine variable resistor to the Relay Board.

The KI 208A/209A Converter #2 Board is secured to the bottom printed circuit board carrier. The ribbon cable, as mentioned above, connects to the converter #1 board. Also, six wires connect to the meter package and light, and six wires connect to the Relay Board.

The KI 209A has four additional wires from the meter package that connect to the Relay Board.

The meter assembly and Sine/Cosine variable resistor of the KI 208A/209A are attached to the front gear plate and mounting chassis respectively. The meter assembly and Sine/Cosine variable resistor removal is facilitated by separating the mounting chassis from the bezel and removing the respective wires from the printed circuit boards. The KI 209A has four wires of the meter assembly connected to the Relay Board.

The following procedures describe how the Indicator can be disassembled so that alignment or troubleshooting can be performed on a given subassembly. They also describe how that subassembly can be completely removed from the Indicator in the event it is replaced by a new module. This assumes the dust covers have been separated from the unit after removing the eight screws which hold them in place.

A. KI 208A/209A Converter #1 Board

1. Unscrew and remove the two screws on the left side (as viewed from the front of the unit) used to mount the top printed circuit board carrier to the mounting chassis and rear plate respectively. Also, unscrew approximately a quarter turn the remaining two mounting screws.

2. Rotate the printed circuit board and carrier approximately 90°R and retighten the two screws used for hinging.

   At this point, the component side of the Converter #1 Board is exposed and the Converter #2 Board component side is exposed to facilitate the major amount of troubleshooting required.

3. Unscrew and remove the two screws used as the hinge.

4. Unscrew and remove the four board mounting screws.

5. Desolder each wire and tag it for identification.

B. KI 208A/209A Converter #2 Board

1. Unscrew and remove the screw used to mount transistor Q101 to the rear plate.

2. Unscrew and remove the four screws used to mount the bottom printed circuit board carrier to the mounting chassis and rear plate respectively. Unscrew and remove two long screws and spacers that hold the Relay Board and Converter board #2 to the mounting chassis.

3. Rotate the printed circuit board and carrier until the component side of the board is accessible.

4. Unscrew and remove the two board mounting screws.

5. Desolder each wire and tag it for identification.

C. KI 208A/209A Sine/Cosine Variable Resistor

1. Unscrew and remove the four screws used to mount the mounting chassis to the front gear plate and bezel.

2. Rotate bezel, gear plate and meter assembly over the top of the unit to expose the Sine/Cosine variable resistor gear.

3. Unscrew about two turns of the capscrew on the gear clamp.

4. Remove gear from the Sine/Cosine variable resistor shaft.

5. Unscrew and remove the three screws used to mount the Sine/Cosine variable resistor body to the mounting chassis.

6. Desolder each wire and tag it for identification.

D. KI 208A Meter Assembly Package

1. Unscrew and remove the four screws used to mount the mounting chassis to the fron gear plate and bezel.

2. Rotate bezel, gear plate, and meter assembly over the top of the unit to expose the mounting screws.

3. Unscrew and remove the three mounting screws.

4. Desolder each meter assembly wire from the Converter #2 Board and tag it for identification.

E. KI 209A Meter Assembly Package

1. Unscrew and remove the four screws used to mount the mounting chassis to the front gear plate and bezel.

2. Rotate bezel, gear plate and meter assembly over the top of the unit to expose the mounting screws.

3. Unscrew and remove the three mounting screws.

4. Desolder each meter assembly wire from the Relay Board and Converter #2 Board and tag it for identification.

F. KI 208A/209A Relay Board

1. The rear connector, J2081/2091 is soldered to the Relay Board and held to the rear plate by two screws.

2. The Relay Board is completely exposed when the other boards are removed.

A. KI 208A/209A Subassemblies

1. In general, the assembly procedures for each of the subassemblies are the reverse of the disassembly procedures.

5.4 TROUBLESHOOTING

5.4.1 TROUBLESHOOTING THE KI 208A/209A

Various customer complaints can be resolved by using troubleshooting chart. When a circuit failure is suspected the troubleshooting flow chart should be used to quickly isolate the problem area. Once the decision blocks have isolated the area, the theory of operation for that area should be reviewed. After reviewing how the particular circuit works, then the detailed troubleshooting procedures can be used in conjunction with the photographs to isolate the defective component.

5.4.2 TROUBLESHOOTING FLOW CHART

INDICATION	PROBABLE CAUSE
1) VOR inaccurate	1) R233 not balanced on TO-FROM. 2) R241 not adjusted properly at 0°. 3) Leaky capacitors in output stage. 4) Ring clamp on sin/cos pot has slipped. 5) Bad op amp (high offset voltage).
2) VOR insensitive	1) VOR sig. from NAV receiver less than .5VRMS at 200uv RF level input, or is distorted. 2) Phase locked loop center frequency. not 9960Hz ±25Hz. 3) Op amp gains not correct.
3) VOR accurate at long range but inaccurate close to station	1) NAV receivers output greater than .6VRMS at 200uV RF level input. 2) R203 set incorrectly. 3) NAV receivers AGC is poor which allows its output to increase until I202B is overdriven.
4) VOR needle unstable oscillates side to side)	1) Prop modulation. 2) VOR scalloping. 3) Output stage filtering is bad.
5) Not enought L-R VOR deflection	1) VOR signal from NAV receiver less than .5VRMS. 2) R203 set incorrectly.
6) Needle wiggles when audio level of NAV receiver is high	1) Insufficient size wire on NAV receivers power lines. 2) Very low voltage to receiver and indicator. 3) Bad regulator in the KI 208A/209A.
7) Needle kicks when transmitter is keyed	1) Indicator not grounded per installation drawing (Remember the #16 wire and shielded composite?). 2) Transmitter coax paralleled with indicator cabling.
8) LOC centering incorrect	1) R227 set incorrectly. 2) R218 set incorrectly. 3) Q205 or Q206 not switching.
9) Not enough L-R LOC deflection	1) LOC signal from NAV receiver less than .35VRMS. 2) R313 set incorrectly.

10) LOC inaccurate over the transmitter	1) LOC signal from NAV receiver greater than.5VRMS at 200uV RF input. 2) R203 set incorrectly. 3) NAV receivers AGC is poor, which causes I202A and B to be overdriven with the strong input signal.
11) OBS error in LNAV	1) If VOR operation is okay, then the error is external.
12) No deviation in LNAV	1) check relay activation. 2) Check LNAV receiver/converter.
NOTE: The KI 208/209 has the greatest capability for handling variations of input amplitude of any of the new generation indicators but can beoverdriven if the amplitude of the signal increases approximately 5db over the amplitude at which the indicator was aligned.	

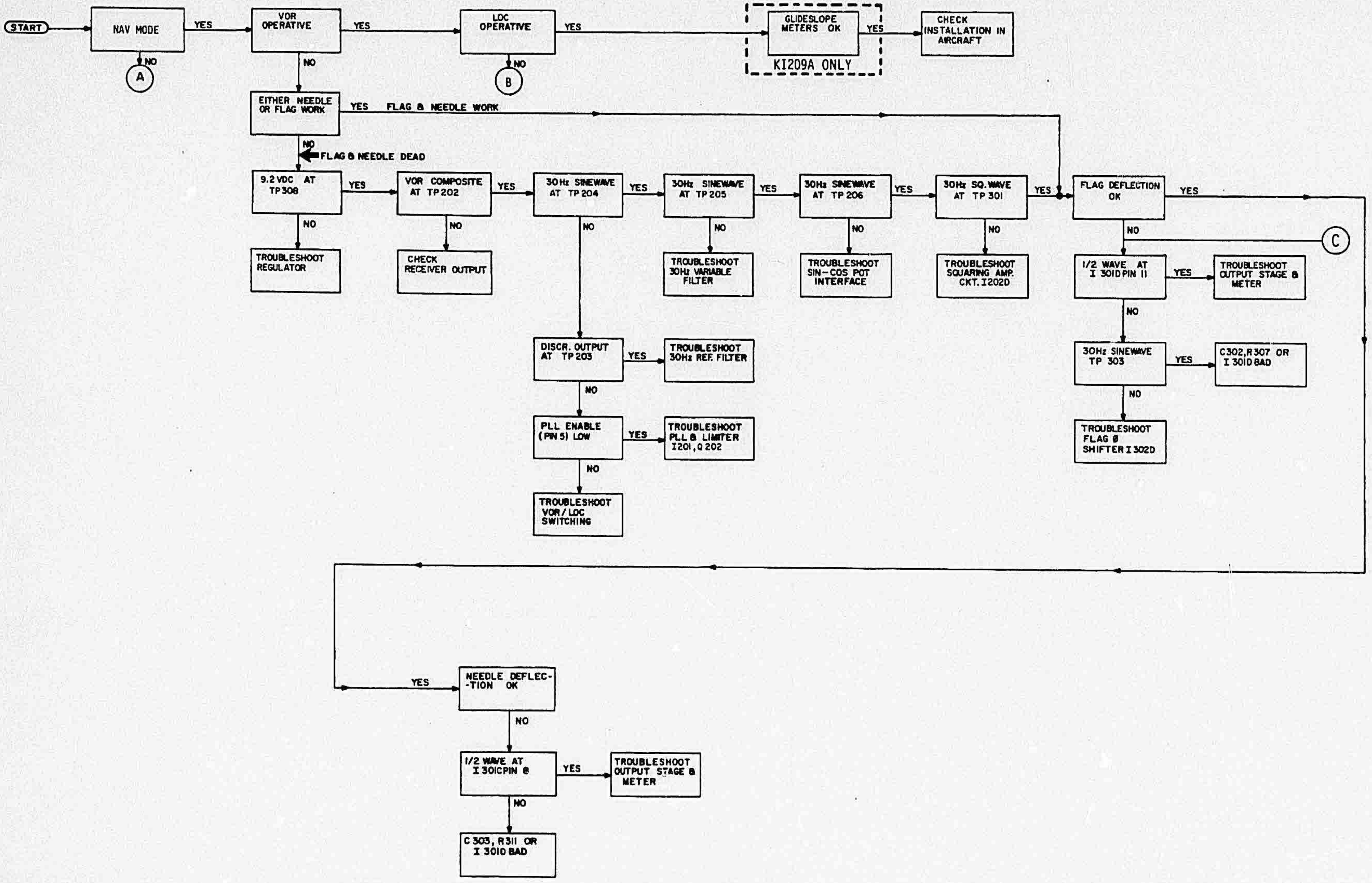


FIGURE 5-5A TROUBLESHOOTING FLOW CHART

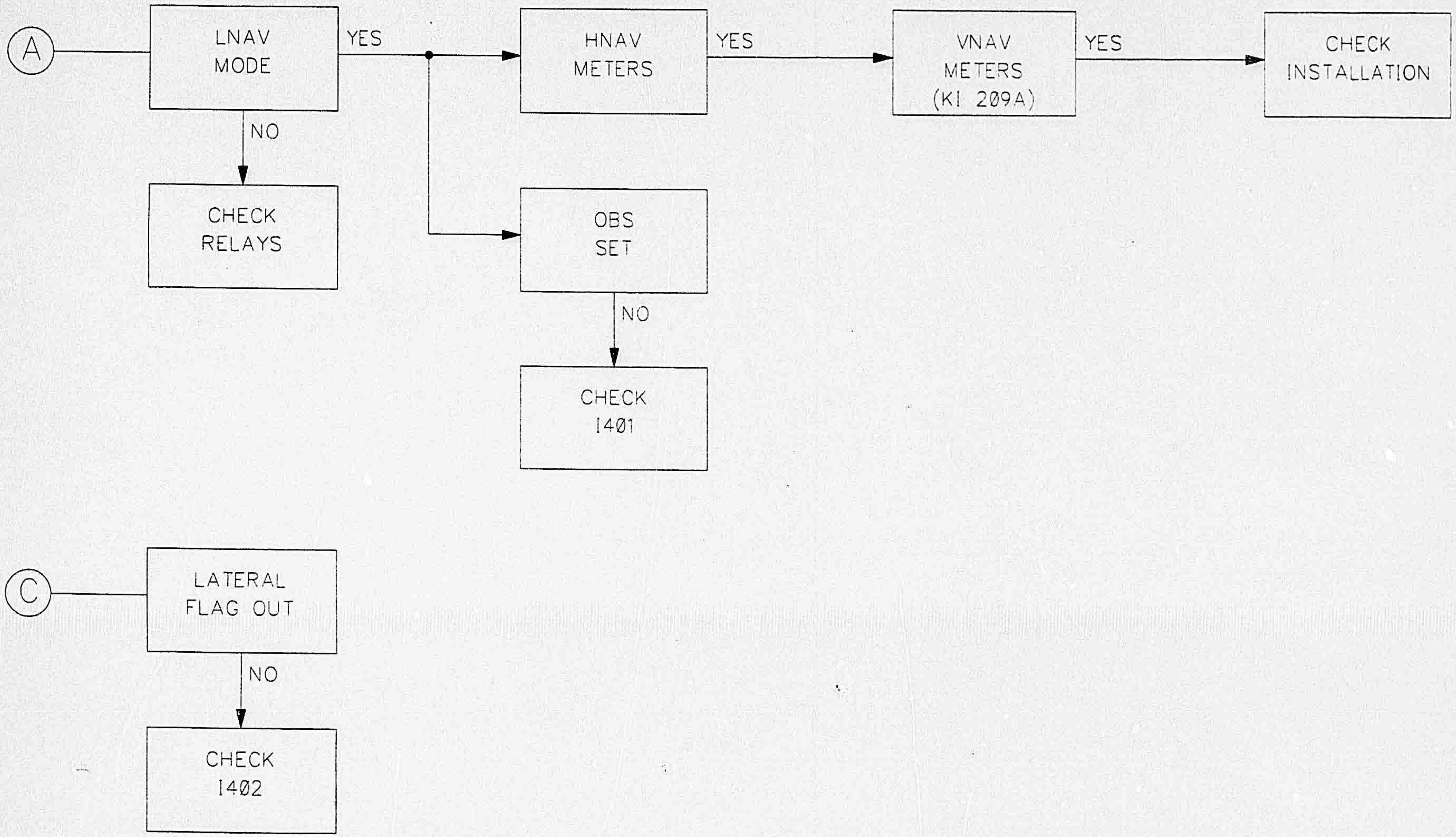


FIGURE 5-5B TROUBLESHOOTING FLOW CHART

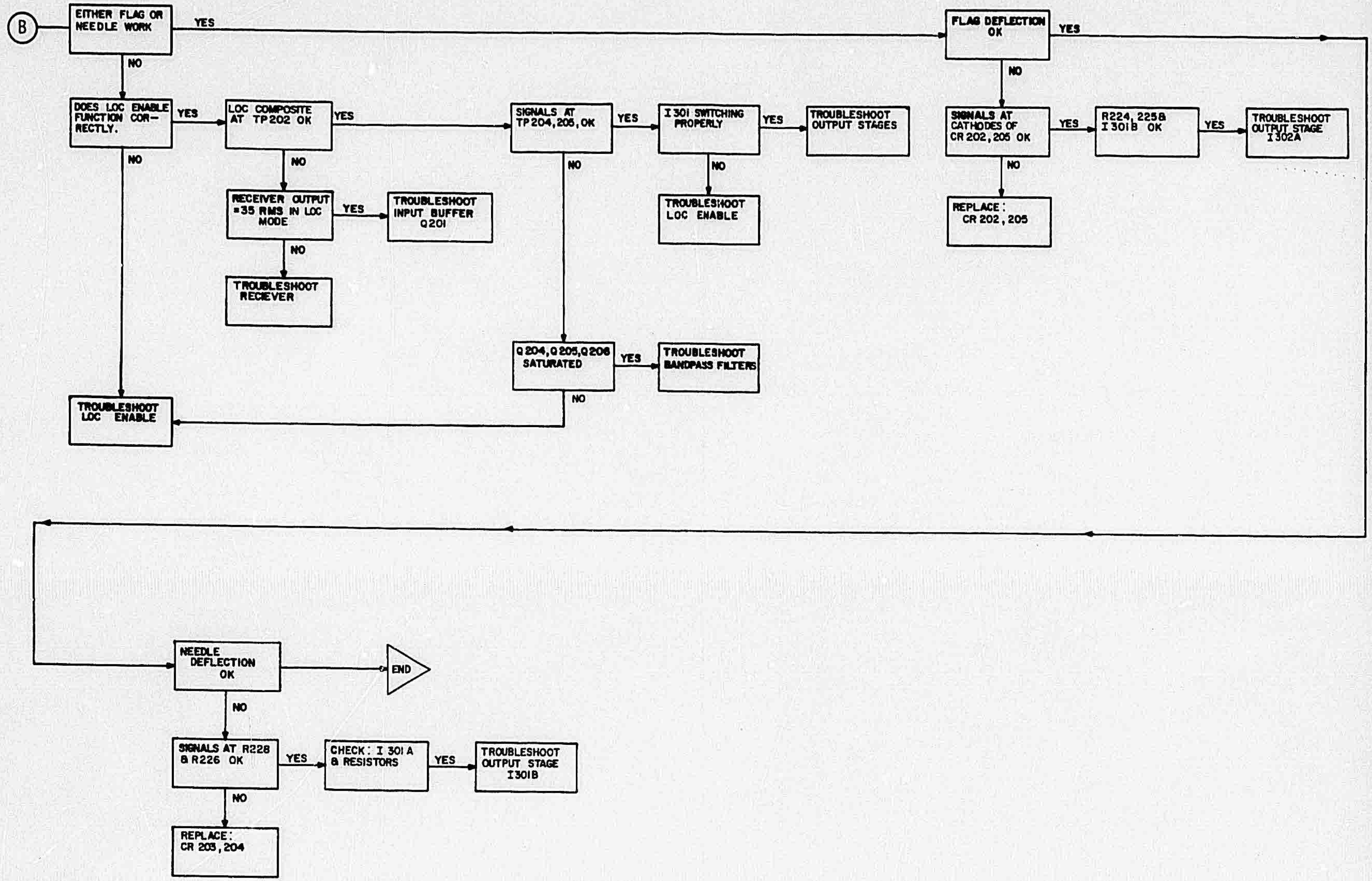


FIGURE 5-5C TROUBLESHOOTING FLOW CHART

Troubleshooting Regulator:

This circuit consists of a high gain amplifier (I303) and pass transistor Q101. A circuit jumper has been installed so the regulator can be isolated from the rest of the circuitry. If the 9.2V line has been shorted Q101 will usually be blown with no damage to I303. The reference voltage for the regulator (approx. 1.6V) should be checked on pin 5 to assure that is is present. The input voltage on pin 6 should be very close to the voltage measured on pin 5. Pin 7 must be more positive than pin 6, if it is not check CR305 and CR306. If CR307 has been overheated it will usually fail in a shorted condition.

Troubleshooting VOR-LOC Switching:

When J2081 pin 4 goes low Q203 must saturate. When this happens the collector should to to approimately 9V. If that does not happen and if the base goes low, Q203 is bad. All transistors connected to Q203's collector; i.e. Q204, Q205, Q206, Q207 and Q211 should saturate when it goes high. Q203's collector also controls enable/disable of I201 and I301A and B.

Troubleshooting PLL and Limiter:

With no signal into the phase locked loop, the internal voltage controlled oscillator (VCO) should be free running at 9960 ±10Hz. This frequency can be measured at pin 4 and adjusted by R207. To check the internal phase detector, check for a square wave at pin 2. Remember to check pin 5.

The limiter should provide FM Square waves of 1 volt amplitude. The voltage at the base of Q202 should be clamped at .6 volt by Q202's base to emitter junction.

Troubleshooting 30Hz Variable Filter:

Check that Q204, Q205, Q207 are shut off. Gain from TP203 to TP204 should equal 2.1. Q of filter should = 4. Check that bias is at 4.16 volts at non–inverting terminal of I202A.

Troubleshooting 30Hz Reference Filter:

Check that Q206 is shut off. Gain from TP202 to TP205 should equal 5. Q of filter should = 4. Check that bias is at 4.16 volts at non–inverting terminal of I202B.

Troubleshooting Sin-Cos Pot Interface:

The 30Hz signals on brown and red leads must be equal in amplitude and 180° out of phase. When OBS is at 90°, the signal on orange and yellow leads must be equal in amplitude (.707 amplitude of brown and red) and in phase. Signal at TP206 should stay approximately the same amplitude and appear to shift continuously as the OBS is rotated. If Q208 or Q209 are shorted then there will be a greater amplitude change at TP206 as the OBS is rotated.

Troubleshooting Squaring Amplifier:

Check that approximately a 275mV threshold exists between the DC voltage on pin 13 to pin 12 of I202D. If it does not exist, check that Q211 is off.

Troubleshooting Flag Phase Shifter:

Check for a 90° ±10° phase shift between TP205 and TP303. Input to output amplitude change equals slightly less than one–third; i.e., gain = 0.35. Check for 4.16V bias at non–inverting terminal of I302D.

Troubleshooting VOR Output Stage:

Check that I301A and B are open, so signals at input to the I301 CMOS switch do not pass to the inverting terminal of either I302A and B. The output stage itself can be checked by monitoring the output test points for differential voltages up to .±65 volt as the OBS is rotated from 90° off course to −90° off course.

Troubleshooting LOC Bandpass Filters:

Check that Q204, Q205, Q206 and Q207 are saturated. The gains should be 5 for both the 150Hz and 90Hz filters and the Q's should also be equal to 12. The phase shifts (180°) should be equal for the two filters by adjusting R218. This phase shift adjustment was set at the factory and should not be readjusted unless there is a significant difference between the two filters. Check for bias at non-inverting terminal.

Troubleshooting LOC Output Stages:

Check that I301C and D are closed when in LOC mode. This enables an input bias voltage to be applied to the non-inverting input of the output op amps. Also check that I301A and B are shorted to enable transmission of LOC DC voltage to the output stages. Check that the feedback resistors (R314 or R310) are of correct values.

06

SECTION VI

ILLUSTRATED PARTS LIST

6.1 INTRODUCTION

The Illustrated Parts List (IPL) is a complete list of assemblies and parts required for the unit. The IPL also provides for the proper identification of replacement parts. Individual Bills of Material (BOM) within this IPL are arranged in numerical sequence starting with the top assembly and continuing with the sub-assemblies. All mechanical parts will be separated from the electrical parts used on the sub-assembly. Each BOM is followed by the Assembly Drawing and Schematic Diagram for that assembly.

Parts identified in this IPL by AlliedSignal Part Number meet design specifications for this equipment and are the recommended replacement parts. Warranty information concerning AlliedSignal replacement parts is contained in Service Memo #1, P/N 600-08001-00XX.

This section describes the various items that appear on the Bills of Material. A sample BOM is included in this section as **Figure 6-1.**

A. BOM Number

The Bill of Material Number appears at the top of the BOM as a 12-digit number which is also the AlliedSignal Part Number for the assembly. The BOM Number is followed by the assembly description and the revision level of the BOM.

B. Symbol Column

This column contains the Reference Designators of the electrical components of the assembly. Mechanical parts are not assigned Reference Designators; however, they may be assigned item numbers to assist in locating the part on an assembly drawing. The Reference Designator consists of a letter abbreviation which indicates the type of component followed by the number assigned to that part (C101, Q101, etc). Common Reference Designator abbreviations are listed below.

B	Motor or Synchro	Q	Transistor
C	Capacitor	P	Plug
CJ	Circuit Jumper	R	Resistor
CR	Diode	RT	Thermistor
DS	Lamp	S	Switch
F	Fuse	T	Transformer
FL	Filter	TP	Test Point
I	Integrated Circuit	U	Resistor/Capacitor Network/Integrated Circuit
J	Jack	V	Photocell/Vacuum Tube
L	Inductor	WG	Waveguide
M	Meter	Y	Crystal

C. Part Number Column

This column contains the AlliedSignal Part Number for each part. Special purpose 999-09999-00XX series part numbers may appear in the BOM and are described below.

(1) CR401 999-09999-0096 RESERVED

The Reference Designator CR401 has been reserved for future use; the assembly does not currently include a CR401.

(2) CR401 999-09999-0097 SEE NEXT ASSEMBLY

CR401 is a part of the electrical circuit but due to assembly or testing requirements is actually part of a different assembly.

(3) CR401 999-09999-0098 NOT USED

The Reference Designator CR401 is available for future assignment. The assembly does not currently include a CR401.

(4) CR401 999-09999-0099 DO NOT USE

The Reference Designator CR401 has been previously used for this assembly and later deleted. It may not be reassigned on this assembly.

(5) I401 999-09999-0090 REF SFTWARE SET

I401 is a programmed memory device. Refer to Section H, Software Documentation in this introduction for a description of the software documentation system being used at the time of publication of this manual.

D. Description Column

This column contains the description of each part in the assembly. Common abbreviations which may appear in this column are listed below.

AL	Aluminum	MY	Mylar
ASSY	Assembly	PC	Polycarbonate
BIFLR	Bifilar	PF	Precision Film
BOM	Bill of Material	PP	Paper
CAP	Capacitor	PS	Polystrene
CC	Carbon Composite	QW	Quarter Watt
CF	Carbon Film	RES	Resistor
CH	Choke	S	Silicon
CR	Ceramic	SCR	Screw
CRT	Cathode Ray Tube	SM	Silver Mica
DC	Disc Ceramic	STDF	Standoff
DIO	Diode	SW	Switch
EL	Electrolytic	TERM	Terminal
EW	Eighth Watt	TN	Tantalum
FC	Fixed Composition	TST PT	Test Point
FERR	Ferrite	TW	Tenth Watt
FLTR	Filter	U	Integrated Circuit
FT	Feedthru	VA	Variable
HV	High Voltage	WW	Wire Wound
HVXFMR	High Voltage XFMR	XFMR	Transformer
HW	Half Watt	XSTR	Transistor Ceramic
MC	Monolithic	XTAL	Crystal

E. Assembly (A) Column

An "A" in this column indicates that the part indicated is an assembly. If the P/N and description reads "200-0XXXX-0099 COMMON BOM" or "200-XXXX-99 COMMON BOM" the parts for that assembly are included in the same BOM. The parts breakdown for an assembly with any other P/N will be found in the BOM with the same number.

F. Unit of Measure (UM) Column

This column indicates the Unit of Measure for each part. Common abbreviations found in this column are listed below.

EA	Each	RF	For Reference Only
FT	Foot	IN	Inch
AR	As Required		

G. Quantity and Flavor Columns

Individual flavors of an assembly are identified by the last four digits of the P/N. Part quantities for each flavor will be indicated under headings numbered 0000 through 9900 as required. The parts indicated in the 9900 Column are common to all other flavors of the assembly and are considered the Common Bill of Material for the assembly.

H. Software Documentation

The documentation of software involves the use of several unique types of part numbers. The following subsections list these part numbers with their description. In some cases, some specific versions of hardware must be used with specific versions of software. To determine the correct P/N for ordering the programmed device, you will need to know the part number of and the software revision level of the unit.

The last two digits of all software related P/N's, designated in the following text as -RN, indicate the revision number or level of the related software. This number is incremented with each revision of software. For example, -01 is revision 0, -02 is revision 1, and so on. When ordering specific integrated circuits or devices, the applicable 122-XXXXX-XXRN P/N is used. When ordering a circuit board which contains software, the applicable 205X-XXXX-XXRN P/N is used. Applicable assembly drawings and schematic diagrams will then follow in order.

(1) General Information

The part number of the unit, typically the 065-, 066- or 071-top assembly part number, contains a 206- item in its bill of materials. This 206- item is the configuration control mechanism for programmable electronic devices of the unit. Two different means exist to label the hardware/software configuration of the unit depending on the the part number of the unit:

(a) When the part number of the unit is a 9-digit part as represented on the TSO label, the last 2 digits of the 206-item are the digits of the Software Identification (SW ID) tag that appears on the unit.

(b) When the part number of the unit is a 12-digit part as represented on the TSO label, the last 4 digits of the 206- item are the digits of the Software Modification (SW MOD) tag that appears on the unit. In the example shown in figure 6-1, sheet 1 the 206- item is flagged with an "A" in the right hand margin.

(2) Definition of a Hardware/Software System

The 206- item represents the collection of all boards in the unit which contain electronic programmable devices (software). The hardware/software system (206-) bill of materials contains two categories of items:

(a) The part number of the unit label,i.e. the SOFT ID or SOFT MOD tag.

1) In the case of the 9-digit TSOed unit the unit label part number 057-03284-00XX where XX is the last two digits of the 206- number. The software identification tag is illustrated below.

KRC
00
SW ID

2) In the case of the 12-digit TSOed unit the unit label part number is 057-05287-YYYY where YYYY is the last four digits of the 206- number. This number is also referred to as the software mod level of the unit. The software mod tag is illustrated below.

SW MOD
01/01

(b) The 205- hardware/software board assemblies constitute all the hardware/software boards which this unit contains. In the example, the item marked "B" is the 205- hardware/software board used in the rest of the example.

(3) Definition of a Hardware/Software Board

The hardware/software board (205-) bill of materials contains four categories of items:

(a) The part numbers of the board label:

1) For 12-digit 205-0XXXX-00YY board labels, the first 10 digits are contained on a label part number of 057-05252-XXXX and the last two digits are specified by 057-05335-00YY.

2) For 9-digit 205-WWWW-ZZ board labels, the first 7 digits are contained on a label part number of 057-050WW-00WW and the last two digits are specified by 057-05252-00ZZ.

The 205-0XXXX-00YY and the 057-05252-00YY P/N is incremented whenever the revision number of any one or more of the 125-0XXXX-XXRN P/N's is incremented. This means that the -RN part of the P/N's for the 057-05252-XXRN and the 205-0XXXX-XXRN will be the same. A circuit board identification tag is illustrated below.

205-06616-	0000

(b) The software programmable device set assemblies (125-):

Each 125- programmable device set constitutes all the software for a unique microprocessor on the hardware board. The group of 125- programmable device sets constitutes all of the software for all of the microprocessors.

1) 125-0XXXX-XXRN AlliedSignal Part Numbers

The 125-0XXXX-XXRN P/N is a BOM which lists all the 122-0XXXX-XXRN programmed devices in a software set for a given circuit board. There may be only one 122-0XXXX-XXRN P/N listed or there may be several. Whenever the revision number (RN) of any one or more of the 122-0XXX-XXRN programmed devices is incremented in a new software release, the -XXRN part of the 125-0XXXX-RN P/N is also incremented. This 125-0XXXX-XXRN BOM also indentifies the "U" or "I" circuit designators used to identify the programmed devices on assembly drawings and schematic diagrams.

2) The 122-0XXXX-XXRN P/N is used to identify an individual integrated circuit or other device containing software.

(c) The non-software programmable device set assemblies (126-) which fulfill software requirements.

(d) The specification of the hardware board (200-).

In the example, the items marked "C" in the right margin are all the programmable device assemblies which fulfill the software requirements.

(4) Definition of a Hardware Board

The hardware board (200-) bill of materials contains two categories of items that relate to programmable devices:

(a) The non-software programmable device sets (126s) that fulfill hardware requirements. (Items D1 thru D4 in the example).

(b) The references to all of the programmable devices (122-) on the board. These references resolve device location on the board in that they use the SYMBOL field of the bill of materials to specify component location. These 122-numbers are of the form 122-3XXXX-9999 or 122-0YYYY-9999.

The 122- numbers of the form 122-3XXXX-9999 are used for non-software programmable devices (126-) that fulfill hardware requirements and therefore these programmable device sets appear on the hardware board (200-) bill of materials. (Items D5 thru D10 in the example).

The 122- numbers of the form 122-0YYYY-9999 are used for both software programmable devices (125-) (items D12 thru D15 in the example) and non-software programmable devices (126-) (item D11 inthe example) that fulfill software requirements.

These programmable device sets appear on the hardware/software board (205-) bill of materials.

The exact programmable device (the resolution of the -9999 in the above items) is specified by the respective software programmable device set (125-) or the non-software programmable device set (126-) bill of materials.

Using the SYMBOL field as specified above would discourage the use of the SYMBOL field for this purpose in the programmable device sets (125- and 126-) bill of materials. This would then permit the specification of the same programmable device sets in different boards, hence different component designators.

In the example, **Figure 6-1**:

- the items flagged D1 thru D4 in the right margin are non-software programmable device sets,

- the items flagged D5 thru D10 in the right margin are non-software programmable device designators that fulfill hardware requirements,

- the item flagged D11 in the right margin is a non-software programmable device designator that fulfills software requirements,

- the items flagged D12 thru D15 in the right margin are software programmable device designators that fulfill software requirements,

Figure 6-1, while closely related to a specific product, does not represent an exact configuration in use by that product. This example has been modified to clarify certain points.

Assy: 066-04020-0203 SG464 HSI W/O WX

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	016-01008-0004	3	GLYPTAL 7526 BL	AR	1.00	
	016-01131-0000	1	CNTCT CMT BND 1055	AR	1.00	
	047-02579-0002	2	HANDLE ASSEMBLY	EA	1.00	
	.					
	047-09392-0001	0	SPACER RT W/FIN	EA	1.00	
	057-02203-0002	3	FLAVOR STCKR	EA	1.00	
	057-02203-0003	3	FLAVOR STCKR	EA	1.00	
	057-05286-0000	0	SERIAL TAG SG 464	EA	1.00	
	075-05082-0002	0	GUIDE PLATE TOP	EA	1.00	
	.					
	090-00277-0000	1	HOLD DOWN BRACKET	EA	1.00	
	155-02536-0001	1	CABLE ASSY	EA	1.00	
	200-07703-0000	2	DPX CONN BD ASSY	EA	1.00	
	200-07704-0000	8	LV PS BD ASSY	EA	1.00	
	206-00118-0301	0	EFS40/50 HSI SET	EA	1.00	<--- A

Assy: 206-00118-0301 EFS40/50 HSI SET

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	057-05287-0301	0	SW MOD TAG	EA	1.00	
	205-00564-0002	0	EFIS 40/50 I/O PBS	EA	1.00	
	205-00565-0004	0	E40/50 HSI P/D PBS	EA	1.00	<--- B

Assy: 205-00565-0004 E40/50 HSI P/D PBS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	057-02241-0016	1	IDENT LABEL	EA	1.00	
	057-05252-0565	1	IDT 205-00565-0000	EA	1.00	
	125-00602-0004	0	EFIS 40/50 NAV SDS	EA	1.00	<--- C1
	125-00603-0002	0	EFIS40/50 DSPL SDS	EA	1.00	<--- C2
	126-00019-0000	1	EFS40/50 CLIPPER	EA	1.00	<--- C3
	200-07706-0000	1	PRCSR/DSPL BD ASSY	EA	1.00	

FIGURE 6-1 TYPICAL BILL OF MATERIAL
(Sheet 1 of 4)

Assy: 200-07706-0000 PRCSR/DSPL BD ASSY

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	009-07706-0000	0	PC BD PRCSR/DSPL	EA	1.00	
	.					
	.					
	.					
	150-00004-0010	3	TUBING TFLN 22AWG	IN	2.00	
	200-04969-0000	0	EXT BD PRCSR/ADI A	RF	0.00	
	126-00005-0000	1	EFS40/50 INT LOGIC	EA	1.00	<--- D1
	126-00006-0000	1	EFS40/50 VIDEO MUX	EA	1.00	<--- D2
	126-00017-0000	1	EFS40/50 SM SET	EA	1.00	<--- D3
	126-00018-0000	1	EFS40/50 SINE SET	EA	1.00	<--- D4
C 5001	111-02104-0042	26	CAP MC100KPF50V20%	EA	1.00	
	.					
	.					
	.					
I 5005	122-30001-9999	0	EFS40/50 VIDEO MUX	RF	0.00	<--- D5
I 5008	122-30002-9999	0	EFS40/50 INT LOGIC	RF	0.00	<--- D6
	.					
	.					
	.					
I 5036	122-30003-9999	0	EFS40/50 SM HIGH	RF	0.00	<--- D7
I 5037	122-30004-9999	0	EFS40/50 SM LOW	RF	0.00	<--- D8
I 5038	122-30005-9999	0	EFS40/50 SINE HIGH	RF	0.00	<--- D9
I 5039	122-30006-9999	0	EFS40/50 SINE LOW	RF	0.00	<--- D10
	.					
	.					
	.					
I 5075	122-00958-9999	0	EFS40/50 CLIPPER	RF	0.00	<--- D11
	.					
	.					
	.					
I 5138	122-00918-9999	0	EFS40/50 HSI NAV-E	RF	0.00	<--- D12
I 5139	122-00919-9999	0	EFS40/50 HSI NAV-O	RF	0.00	<--- D13
	.					
	.					
	.					
I 5158	122-00920-9999	0	EFS40/50 HSI DSP-E	RF	0.00	<--- D14
I 5159	122-00921-9999	0	EFS40/50 HSI DSP-O	RF	0.00	<--- D15
	.					
	.					
	.					

Assy: 126-00005-0000 EFS40/50 INT LOGIC

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-30002-0000	0	EFS40/50 INT LOGIC	EA	1.00	
	.					

Assy: 122-30002-0000 EFS40/50 INT LOGIC

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	120-02376-0000	1	EPLD EP320 (OTP)	EA	1.00	

FIGURE 6-1 TYPICAL BILL OF MATERIAL
(Sheet 2 of 4)

Assy: 125-00602-0004 EFIS 40/50 NAV SDS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-00918-0004	0	EFS40/50 HSI NAV-E	EA	1.00	
	122-00919-0004	0	EFS40/50 HSI NAV-O	EA	1.00	

Assy: 125-00603-0002 EFIS40/50 DSPL SDS

Symbol	Part Number	Rev	Description	UM	Quantity	BxItm
	122-00920-0002	0	EFS40/50 HSI DSP-E	EA	1.00	
	122-00921-0002	0	EFS40/50 HSI DSP-O	EA	1.00	

FIGURE 6-1 TYPICAL BILL OF MATERIAL
(Sheet 3 of 4)

BOM NUMBER
ASSEMBLY VERSION
PROGRAMMABLE DEVICE SET
UNIT OF MEASURE
REFERENCE DESIGNATOR
QUANTITY
PART NUMBER
DESCRIPTION

200-08366-0000 MST67 IDP/DLP R: 2 MST0067A
200-08366-0000 MST67 IDP/DLP R: 2 MST0067A

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	0000	9900
	009-08366-0000	PC BD IDP/DLP	A	EA	1.00	1.00
	016-01040-0000	COATING TYPE AR		AR	1.00	1.00
	033-00114-0021	SOCKET IC DIP 28C	A	EA	3.00	3.00
	047-09680-0001	KEYING BRACKET	A	EA	3.00	3.00
	090-00087-0000	CLIP CRYSTAL		EA	1.00	1.00
	092-05003-0015	EYELET .049		EA	2.00	2.00
	126-00030-0000	MST67A ASIC SFTWR	A	EA	1.00	1.00
C 9001	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
C 9002	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
C 9003	106-04104-0047	CH 100KX7R/50V		EA	1.00	1.00
CR 9001	007-06180-0000	DIO SW MMBD6050		EA	1.00	1.00
CR 9002	007-08092-0000	QUAD SO DIODE		EA	1.00	1.00
CR 9003	007-08092-0000	QUAD SO DIODE		EA	1.00	1.00
DS 9001	007-06408-0000	COM CATH 7 SEG LED		EA	1.00	1.00
J 9002	030-02174-0000	PIN CONT		EA	50.00	1.00
P 9003	155-02688-0003	RIBBON CABLE ASSY	A	EA	1.00	1.00
Q 9003	007-00065-0001	XSTR 2N3906 (SOT)		EA	1.00	1.00
Q 9006	007-00383-0004	SOT-23 2N2222A XST		EA	1.00	1.00
Q 9011	007-00530-0000	XSTR NPN MMBT3903	A	EA	1.00	1.00
R 9001	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9002	015-00207-0020	OCTAL SO RESISTOR		EA	1.00	1.00
R 9003	130-05472-0023	RES CHIP 4.7KEW5%		EA	1.00	1.00
R 9004	130-05471-0023	RES CHIP 470EW5%		EA	1.00	1.00
R 9005	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9006	130-05104-0023	RES CH 100K EW 5%		EA	1.00	1.00
R 9007	130-05000-0025	RES CHIP 0 EW CJ		EA	1.00	1.00
TP 9001	008-00096-0001	TERMINAL TEST PNT		EA	1.00	1.00
TP 9002	008-00096-0001	TERMINAL TEST PNT		EA	1.00	1.00
U 9001	120-02208-0004	UPRGSSR 10MHZ16B.T	A	EA	1.00	1.00
U 9002	120-06129-0009	6264-15 8K X 8 RAM		EA	1.00	1.00
U 9003	120-06129-0009	6264-15 8K X 8 RAM		EA	1.00	1.00
U 9004	122-01195-9999	■MST67 PRGMD ODD	A	RF	X.	
U 9005	122-01194-9999	■MST67 PRGMD EVEN	A	RF	X.	
U 9006	124-00574-0003	IC 74HCT574		EA	1.00	1.00
U 9007	123-00138-0003	74HC138 SO PKG		EA	1.00	1.00
Y 9001	044-00069-0019	XTAL 14.75MHZ		EA	1.00	1.00
Y 9002	044-00293-0000	20 MHZ OSC		EA	1.00	1.00

FIGURE 6-1 TYPICAL BILL OF MATERIAL
(Sheet 4 of 4)

6.2	066-03056-0010	Rev. 1	KI 208A INDICATOR ASSEMBLY			
	066-03056-0011	Rev. 1	KI 209A INDICATOR ASSEMBLY			
	066-03056-0098	Rev. 2	COMMON BOARD			

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0010	-0011	-0098
	012-01021-0006	TAPE ELEC 3/8 WD	[AR]			1
	016-01015-0000	IND ADH 3M 4475	[AR]			1
	016-01068-0000	ANTI STATIC CRM	[AR]			1
	016-01082-0000	DC RTV 3145	[AR]			1
	025-00003-0002	WIRE 22 RED	[IN]			4.5
	025-00018-0000	WIRE 26 BLK	[IN]			11.5
	025-00018-0003	WIRE 26 BK/OR	[IN]			
	025-00018-0009	WIRE 26 BK/WH	[IN]			4.5
	025-00018-0011	WIRE 26 BRN	[IN]			15
	025-00018-0019	WIRE 26 BN/WH	[IN]			4.5
	025-00018-0022	WIRE 26 RED	[IN]			9.5
	025-00018-0023	WIRE 26 RD/OR	[IN]			
	025-00018-0029	WIRE 26 RD/WH	[IN]			4.5
	025-00018-0033	WIRE 26 ORG	[IN]			9.5
	025-00018-0039	WIRE 26 OR/WH	[IN]			4.5
	025-00018-0044	WIRE 26 YEL	[IN]			9.5
	025-00018-0055	WIRE 26 GRN	[IN]			5
	025-00018-0059	WIRE 26 GN/WH	[IN]			9.5
	025-00018-0088	WIRE 26 GRY	[IN]			7
	025-00018-0089	WIRE 26 GY/WH	[IN]			7
	025-00018-0090	WIRE 26 WH/BK	[IN]			4.5
	025-00018-0092	WIRE 26 WH/RD	[IN]			4.5
	025-00018-0099	WIRE 26 WHT	[IN]			7
	025-00025-0012	CA RBN 28G 12C	[IN]			3.6
	029-00022-0000	GEAR CLMP	[EA]			1
	029-00287-0001	GEAR RING 64P	[EA]			1
	029-00288-0000	GEAR IDLR 24T/64DP	[EA]			1
	029-00289-0000	GEAR DRVR 24T	[EA]			1
	029-00290-0000	GEAR SPUR 165T	[EA]			1
	030-01099-0000	PIN CONTACT	[EA]			
	030-02227-0015	CONNECTOR	[EA]			
	035-01361-0006	PROTECTIVE CVR	[EA]			1
	047-04090-0004	SHLD RF ASSY	[EA]			
	047-04090-0005	SHLD RF ASSY	[EA]			

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0010	-0011	-0098
	047-04091-0001	CVR DUST	[EA]			2
	047-04151-0001	STRAP GROUND W/F	[EA]			2
	047-04152-0001	REAR PLATE W/F	[EA]			
	047-12117-0001	REAR PLATE	[EA]			1
	057-01199-0002	MOD TAG	[EA]			1
	057-01831-0000	CAUTION TAG	[EA]			1
	057-01879-0002	SERIAL TAG KI208	[EA]			
	057-01880-0002	SERIAL TAG KI209	[EA]			
	057-02203-0000	FLAVOR STCKR	[EA]			
	057-02203-0001	FLAVOR STCKR	[EA]			
	057-02203-0002	FLAVOR STCKR	[EA]			
	057-02203-0003	FLAVOR STCKR	[EA]			
	057-03511-0001	DECAL_ CAUTION	[EA]			1
	057-05839-0001	MADE IN SINGAPORE / KI 208A	[EA]	1		
	057-05840-0001	MADE IN SOFTWARE / KI 209A	[EA]		1	
	066-03056-0098	COMMON BOM	[EA]	1	1	
	076-00727-0000	POST IDLER	[EA]			1
	076-02958-0000	BOARD SPACER	[EA]			2
	088-00193-0004	FLTR LMP LGT BLU	[EA]			1
	088-00480-0002	BEZEL	[EA]			1
	088-00481-0002	FRONT MTG PLATE	[EA]			1
	088-00695-0005	AZ DIAL CRD W/PHS	[EA]			1
	088-00697-0001	KNOB W/F - OBS	[EA]			1
	088-00698-0000	CARRIER PC BRD	[EA]			2
	088-00699-0000	COVER CONN BCK	[EA]			
	088-00700-0000	CHASSIS MNTG	[EA]			1
	088-00701-0000	WEDGE LIG	[EA]			
	088-00701-0001	WEDGE LIGHTING	[EA]			1
	089-02076-0030	NUT FLAT 4-40	[EA]			4
	089-02322-0000	NUT SPD PUSH-ON	[EA]			1
	089-02357-0000	NUT TORQUE 4-40	[EA]			3
	089-05436-0012	SCR FHP 4-40X3/4	[EA]			3
	089-05878-0006	SCR PHP 4-40X3/8	[EA]			5
	089-05903-0004	SCR PHP 4-40X1/4	[EA]			4
	089-06022-0006	SCR SHC 2-56X3/8	[EA]			1
	089-06167-0012	SCR FHP 6-32X3/4	[EA]			3

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0010	-0011	-0098
	089-06218-0006	SCR SET 4-40X3/32	[EA]			2
	089-06292-0004	SCR PHP 2-56X1/4	[EA]			4
	089-06293-0003	SCR PHP 3-48X3/16	[EA]			
	089-06414-0004	SCR PHP 2-28X1/4	[EA]			9
	089-06414-0005	SCR PHP 2-28X5/16	[EA]			8
	089-06414-0020	SCREW_ PAN HEAD PLASTITE	[EA]			2
	089-06484-0004	SCR FHP 2-28X1/4	[EA]			4
	089-08003-0034	WSHR SPLT LK #4	[EA]			3
	089-08018-0037	WSHR INTL LK #10	[EA]			1
	089-08023-0030	WSHR FLT STD #2	[EA]	3		
	089-08024-0030	WSHR FLT STD #3	[EA]			1
	089-08074-0030	WSHR FLT STD .106	[EA]			3
	089-08105-0004	WSHR SPR 2.500	[EA]			1
	090-00038-0000	SPRING WSHR .240	[EA]			1
	090-00160-0000	SCKT LAMP INSUL	[EA]			1
	090-00990-0009	CONDUCTIVE DP COVER	[EA]			1
	091-00033-0004	WASHER FLAT .228	[EA]			3
	091-00109-0000	CABLE TIE .234	[AR]			1
	091-00156-0000	BUSHING	[EA]			1
	091-00203-0003	SCR FHS 0-80X.187	[EA]			3
	091-00286-0002	INSUL XSTR .687	[EA]			1
	150-00020-0010	TUBING SHRINK 18G	[IN]			7.2
	187-01060-0001	GSKT LGT WEDGE	[EA]			1
	200-05848-0000	CONVERTER BD #1	[EA]			1
	200-05849-0000	CONVERTER BD #2	[EA]			1
	200-09091-0000	COMP/RELAY BOARD	[EA]			1
DS 101	037-00007-0016	LMP 336 T1-3/4 14	[EA]			1
DS 102	037-00032-0009	LMP 646E T1-1/4 14	[EA]			1
J 2081	030-02227-0001	CONN SMS12R-1	[EA]			
L 102	013-00006-0000	FERR BEAD	[EA]			
L 103	013-00006-0000	FERR BEAD	[EA]			
L 104	013-00006-0000	FERR BEAD	[EA]			
L 105	013-00006-0000	FERR BEAD	[EA]			
L 106	013-00006-0000	FERR BEAD	[EA]			
L 107	013-00006-0000	FERR BEAD	[EA]			
L 108	013-00006-0000	FERR BEAD	[EA]			

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0010	-0011	-0098
L 109	013-00006-0000	FERR BEAD	[EA]			
L 110	013-00006-0000	FERR BEAD	[EA]			
L 111	013-00006-0000	FERR BEAD	[EA]			
L 112	013-00006-0000	FERR BEAD	[EA]			
M 101	023-00098-0000	MTR FLAG	[EA]	1		
M 101	023-00125-0000	MTR ASSY	[EA]		1	
M 101	023-00098-0000	MTR FLAG	[EA]			
Q 101	007-00930-0000	XSTR S PNPMJE15029	[EA]			1
R 101	133-00111-0000	RES VA 100M .5W	[EA]			1

WIRING INFORMATION

FROM	TO	DESCRIPTION	PART NUMBER	LENGTH	REMARKS
E401	E324	#22 AWG. RED	025-00003-0002	4.5 INCH	+9.25 VDC
E402	TP8(E301)	#26 GA. BRN	025-00018-0011	5.5 INCH	+9.25 VDC
E403	TP305	#26 AWG GRN/WHT	025-00018-0059	4.5 INCH	+14.5VDC
E404	E320	#26 AWG BRN/WHT	025-00018-0019	4.5 INCH	LIGHTING +14V
E405	E319	#26 AWG ORN/WHT	025-00018-0039	4.5 INCH	LIGHTING 28V
E428	E323	#26 AWG BLK	025-00018-0000	4.5 INCH	GROUND
E406	E316	#26 AWG WHT/RED	025-00018-0092	4.5 INCH	NAV +TO IN
E407	E318	#26 AWG WHT/BLK	025-00018-0090	4.5 INCH	NAV +FROM IN
E408	E315	#26 AWG RED/WHT	025-00018-0029	4.5 INCH	NAV LATERAL DEV +RIGHT
E409	E314	#26 AWG BLK/WHT	025-00018-0009	4.5 INCH	NAV LATERAL DEV +LEFT
E410	E213	#26 AWG GRN	025-00018-0055	5.0 INCH	VOR/LOC COMPOSITE
E411	E214	#26 AWG GRN/WHT	025-00018-0059	5.0 INCH	NAV/LOC ENAWGGE
E412	E215	#26 AWG YEL	025-00018-0044	5.0 INCH	NAV OBS COS (FROM R101)
E413	E217	#26 AWG ORN	025-00018-0033	5.0 INCH	NAV OBS SIN (FROM R101)
E414	E216	#26 AWG BRN	025-00018-0011	5.0 INCH	NAV OBS HIGH (TO R101)
E415	E218	#26 AWG RED	025-00018-0022	5.0 INCH	NAV OBS LO (TO R101)
E416	R101-1	#26 AWG BRN	025-00018-0011	4.5 INCH	OBS HIGH
E417	R101-3	#26 AWG ORN	025-00018-0033	4.5 INCH	OBS SIN
E418	R101-4	#26 AWG YEL	025-00018-0044	4.5 INCH	OBS COS
E419	R101-2	#26 AWG RED	025-00018-0022	4.5 INCH	OBS LO
E424	M101	#26 AWG RED/WHT	METER WIRE NOTE 1	--------	LATERAL DEV +RIGHT METER
E425	M101	#26 AWG BLK/WHT	METER WIRE NOTE 1	--------	LATERAL DEV +LEFT METER
E426	M102	#26 AWG WHT/RED	METER WIRE NOTE 1	--------	+TO METER
E427	M102	#26 AWG WHT/BLK	METER WIRE NOTE 1	--------	+FROM METER
E420	M103	#26 AWG RED/YEL	METER WIRE NOTE 1	--------	VERT +DOWN METER (KI209A)
E421	M103	#26 AWG BLK/YEL	METER WIRE NOTE 1	--------	VERT +UP METER (KI209A)
E422	M104	#26 AWG YEL/RED	METER WIRE NOTE 1	--------	VERT +FLAG METER (KI209A)
E423	M104	#26 AWG YEL/BLK	METER WIRE NOTE 1	--------	VERT -FLAG METER (KI209A)
E301	E201	BRN 28 AWG RIBBON	025-00025-0012	3.6 INCH	9.25VDC
E302	E202	RED 28 AWG RIBBON	025-00025-0012	3.6 INCH	GROUND
E303	E203	ORN 28 AWG RIBBON	025-00025-0012	3.6 INCH	4.15VD
E304	E204	YEL 28 AWG RIBBON	025-00025-0012	3.6 INCH	GROUND
E305	E205	GRN 28 AWG RIBBON	025-00025-0012	3.6 INCH	REF SQ WAVE
E306	E206	BLU 28 AWG RIBBON	025-00025-0012	3.6 INCH	GROUND
E307	E207	VIO 28 AWG RIBBON	025-00025-0012	3.6 INCH	GROUND
E308	E208	GRY 28 AWG RIBBON	025-00025-0012	3.6 INCH	ILS HIGH
E309	E209	WHT 28 AWG RIBBON	025-00025-0012	3.6 INCH	30HZ VAR
E310	E210	BLK 28 AWG RIBBON	025-00025-0012	3.6 INCH	LOC DEFLECT
E311	E211	BRN 28 AWG RIBBON	025-00025-0012	3.6 INCH	LOCK DEFLECT
E312	E212	RED 28 AWG RIBBON	025-00025-0012	3.6 INCH	LOC FLAG IN
DS102	E325	#26 AWG GRAY	025-00018-0088	7.0 INCH	LAMP
DS102	E326	#26 AWG GRAY/WHT	025-00018-0089	7.0 INCH	LAMP
DS101	E317	#26 AWG WHT NOTE 2	025-00018-0099	7.0 INCH	LAMP
DS101	E313	#26 AWG BLK NOTE 2	025-00018-0000	7.0 INCH	LAMP

NOTES

1. METER WIRE PART OF ASSEMBLY 023-00098-0000 (KI 208A), 023-00125-0000 (KI 209A).
2. PART OF 090-00160-0000.
3. M102 - M104 ARE PART OF M101 ASSEMBLY (023-00098-0000 OR 023-00125-0000)

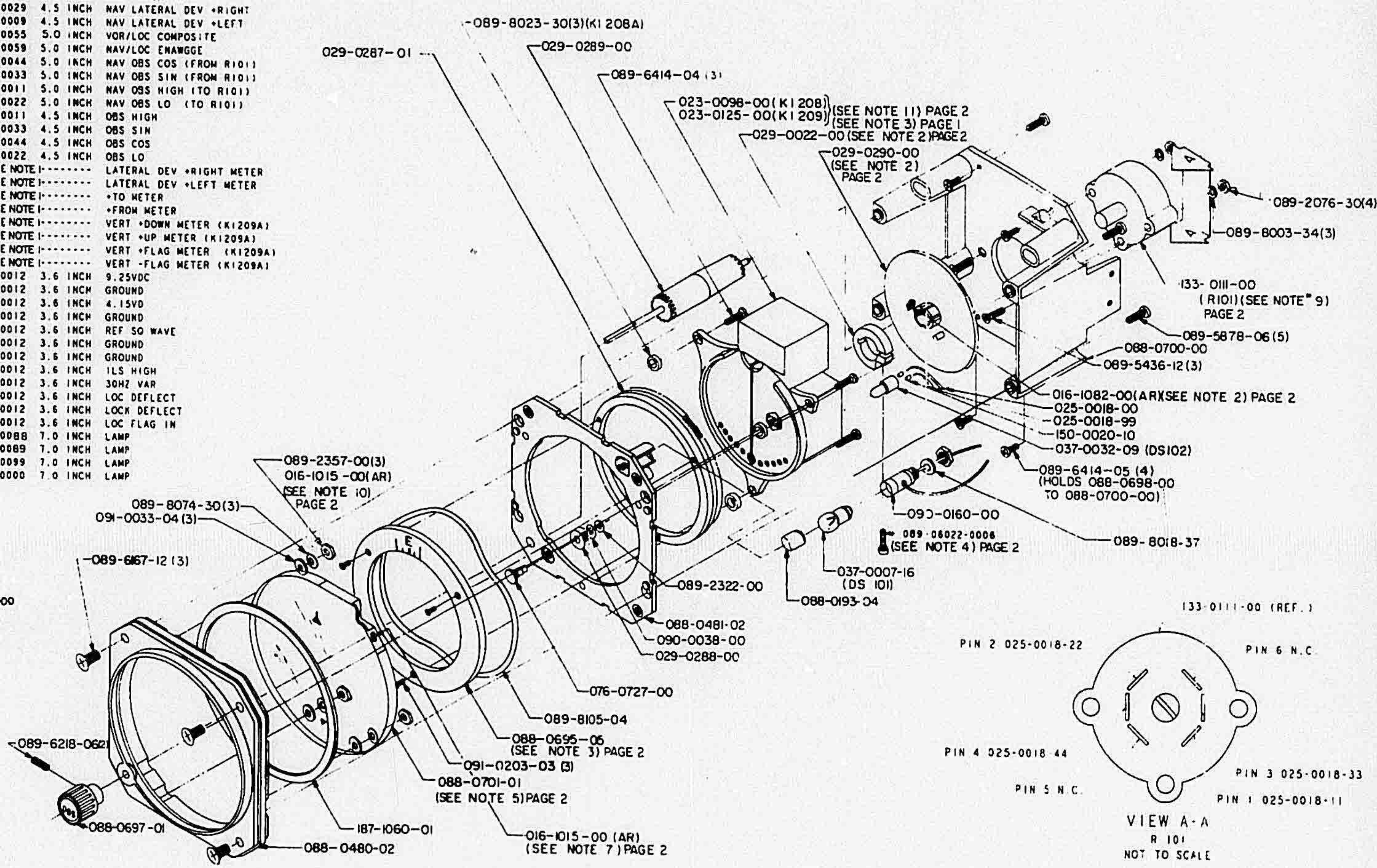
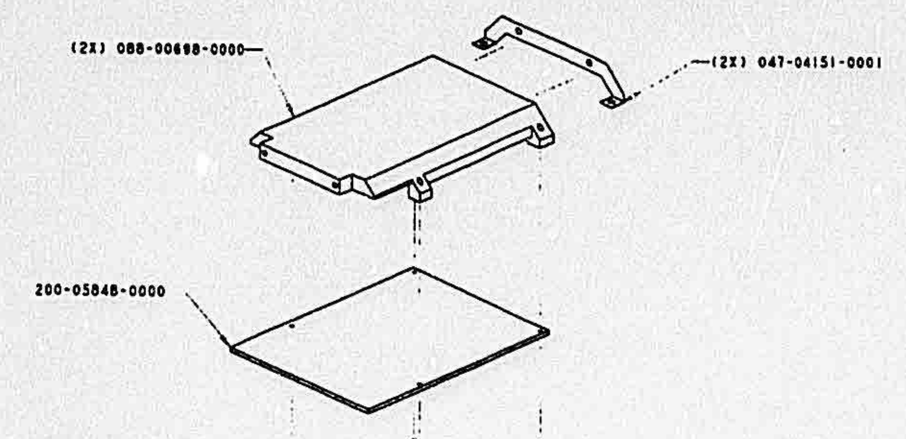


FIGURE 6-2 KI208A/209A FINAL ASSEMBLY
(Dwg. No. 300-02030-0010 R-4, Sheet 1 of 2)



NOTES: UNLESS OTHERWISE SPECIFIED.

1. ALL FASTENERS WITHOUT SELF-LOCKING FEATURES SHALL BE LIQUID STAKED.
2. ASSEMBLE GEAR CLAMP 029-00022-0000 AND GEAR 029-00290-0000 POSITIONED AS SHOWN. ALSO APPLY ADHESIVE 016-01082-0000 AS REQUIRED.
3. POSITION AZIMUTH CARD 088-00695-0005 WITH 90° POINT (E) ALIGNED WITH TOP INDICATOR MARK OF LIGHTING WEDGE 088-00701-0000 AS SHOWN.)
4. TIGHTEN CAP SCREW 089-08022-0006 26 OZ.-IN ± 2 OZ.-IN. AFTER ALIGNMENT AND ASSEMBLY.
5. THE INSIDE SURFACE OF LIGHTING WEDGE 088-00701-0001 TO BE FREE OF FINGERPRINTS, SMUDGES, AND FOREIGN PARTICLES. USE KPN 016-01068-0000 PRIOR TO ASSEMBLY
6. CABLE TIES 091-00109-0000 (AR) NOT SHOWN.
7. APPLY A SMALL AMOUNT OF 016-0105-0000 ADHESIVE SEVERAL POINTS SECURING BEZEL, GASKET, AND WEDGE.
8. SEE SHEET 2 FOR THE TO FROM WIRING CHART AND VIEW A.
9. USE POSITIONING TOOL 076-00994-0000 WHEN MOUNTING POT 133-00111-0000 TO MOUNTING CHASSIS 088-00700-0000.
10. TIGHTEN 089-02357-0000 NUT (HOLDING WEDGE TO BEZEL SO THAT ONE FLAT EDGE OF NUT WILL FACE AZIMUTH CARD 088-00695-0000 AND ASSURE THE CARD IS CLEAR OF ANY EDGE OF THE NUT APPLY ADHESIVE TO NUT AFTER ASSEMBLY.
11. ADD ELECTRICAL TAPE 012-01021-0006 TO HOLD COVERS SECURELY TO METER PACKAGE.
12. TORQUE LIMIT SHALL BE 3 TO 9 OZ.-IN. AND THE TORQUE REQUIREMENT TO ROTATE OBS KNOB THROUGH 360° SHALL NOT VARY MORE THAN 3 OZ.-IN. WITHIN THE GIVEN LIMITS.
13. COVER FACE OF UNIT WITH 035-01361-0006.

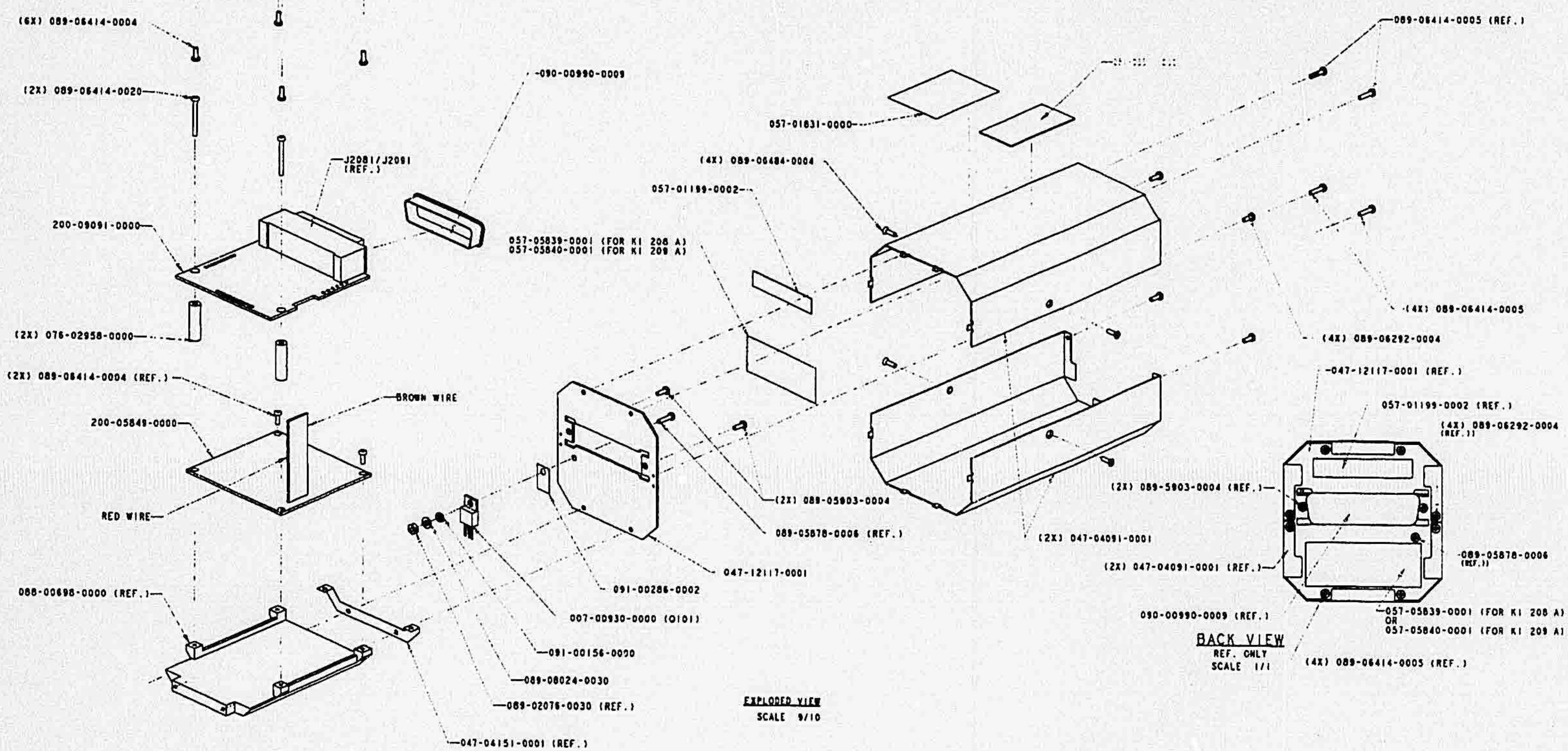


FIGURE 6-2 KI208A/209A FINAL ASSEMBLY
(Dwg. No. 300-02030-0010 R-4, Sheet 2 of 2)

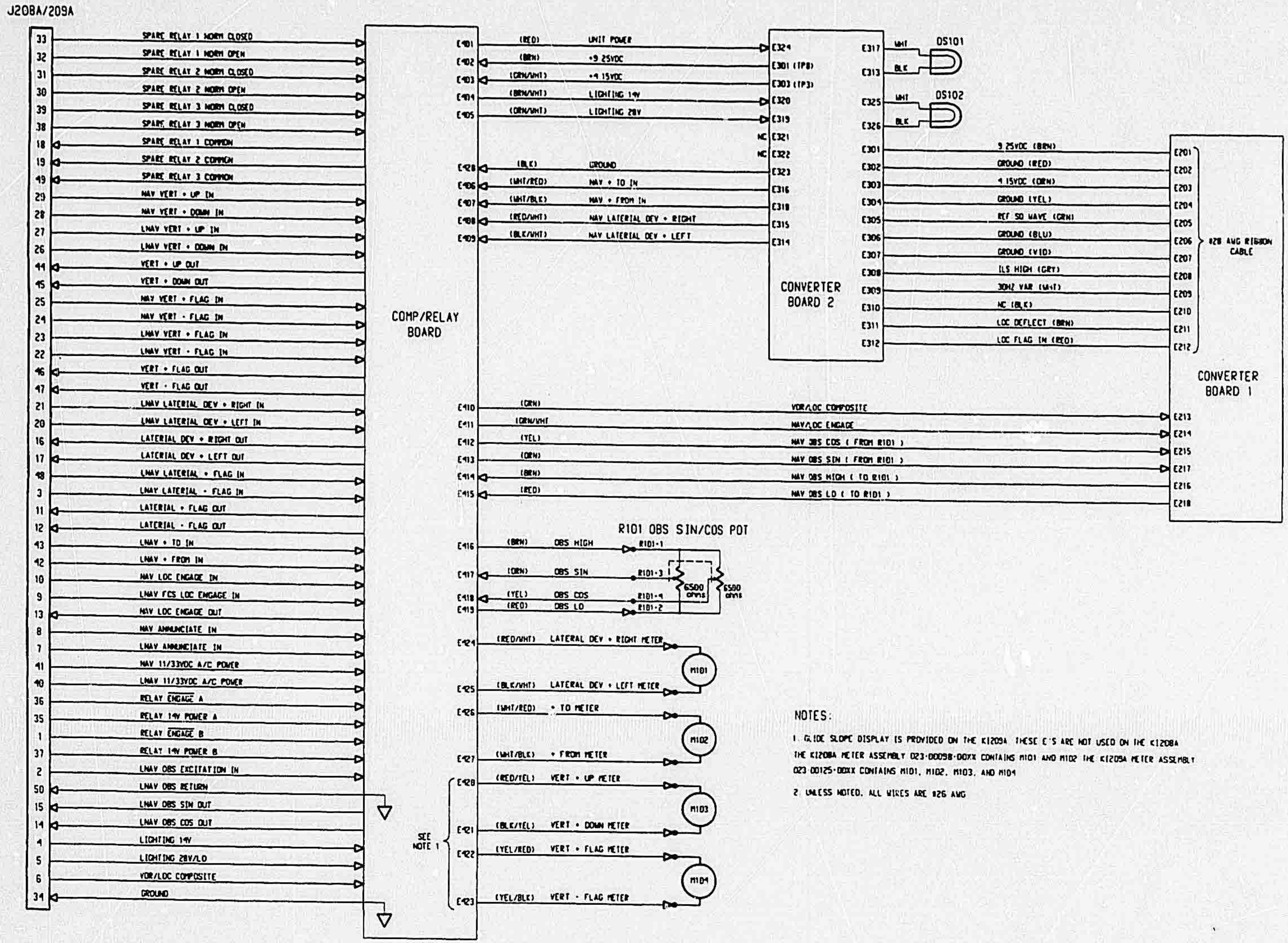


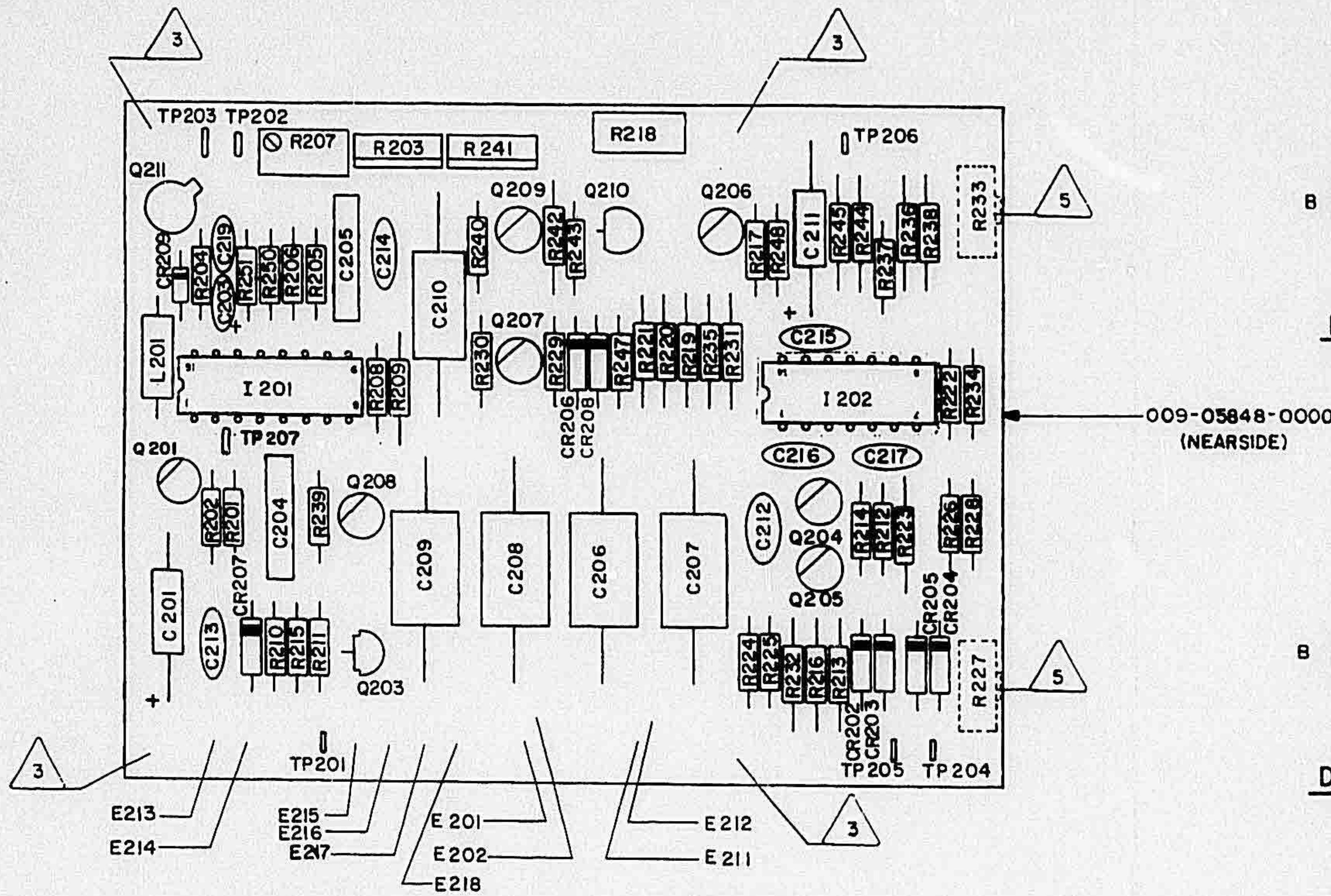
FIGURE 6-3 KI208A/209A INTERCONNECTION DIAGRAM
(Dwg. No. 002-00438-0004 R-0)

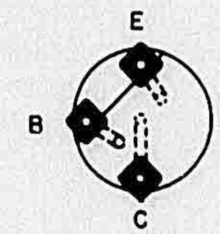
6.3 200-05848-0000 Rev. 28 Converter Bd #1

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY
				-0000
	009-05848-0000	PC BD #1 CONV	[EA]	1
	016-01040-0000	COATING TYPE AR	[AR]	1
C 201	096-01014-0000	CAP TN 40UF 10V	[EA]	1
C 203	111-00001-0003	CAP CR .22UF 50V	[EA]	1
C 204	104-00001-0018	CAP SM 2KPF 100V	[EA]	1
C 205	104-00001-0018	CAP SM 2KPF 100V	[EA]	1
C 206	108-06005-0012	CAP TRKG SET/4 1%	[EA]	1
C 207	108-06005-0012	CAP TRKG SET/4 1%	[RF]	0
C 208	108-06005-0012	CAP TRKG SET/4 1%	[RF]	0
C 209	108-06005-0012	CAP TRKG SET/4 1%	[RF]	0
C 210	108-06005-0000	CAP MPC .10UF50V5%	[EA]	1
C 211	096-01014-0000	CAP TN 40UF 10V	[EA]	1
C 212	113-05471-0000	CAP DC 470PF 500V	[EA]	1
C 213	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 214	118-00015-0000	CAP DC 27PF 500V	[EA]	1
C 215	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 216	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 217	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 219	111-00001-0000	CAP CR .01UF 50V	[EA]	1
CR 202	007-06016-0000	DIO S 1N4154	[EA]	1
CR 203	007-06016-0000	DIO S 1N4154	[EA]	1
CR 204	007-06016-0000	DIO S 1N4154	[EA]	1
CR 205	007-06016-0000	DIO S 1N4154	[EA]	1
CR 206	007-06016-0000	DIO S 1N4154	[EA]	1
CR 207	007-06016-0000	DIO S 1N4154	[EA]	1
CR 208	007-06016-0000	DIO S 1N4154	[EA]	1
CR 209	007-06016-0000	DIO S 1N4154	[EA]	1
I 201	120-06038-0012	SCREENED 02 GREEN	[EA]	1
I 202	120-03052-0005	IC LM224N	[EA]	1
L 201	019-02129-0024	COIL RF 27MH 10%	[EA]	1
Q 201	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 203	007-00238-0000	XSTR S PNP FPN4917	[EA]	1
Q 204	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 205	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 206	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 207	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 208	007-00078-0000	XSTR S NPN 2N3415	[EA]	1

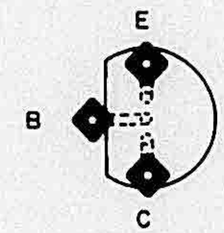
SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY
				-0000
Q 209	007-00078-0000	XSTR S NPN 2N3415	[EA]	1
Q 210	007-00187-0000	XSTR S NPN 2N5089	[EA]	1
Q 211	007-00383-0001	XSTR S NPN 2N2222A	[EA]	1
R 201	131-00104-0023	RES CF 100K QW 5%	[EA]	1
R 202	131-00104-0023	RES CF 100K QW 5%	[EA]	1
R 203	133-00113-0015	RES VA 2K 20% B	[EA]	1
R 204	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 205	131-00154-0023	RES CF 150K QW 5%	[EA]	1
R 206	136-06812-0072	RES PF 68.1K QW 1%	[EA]	1
R 207	133-00096-0037	RES VA 200K HW 10%	[EA]	1
R 208	131-00124-0023	RES CF 120K QW 5%	[EA]	1
R 209	136-01003-0072	RES PF 100K QW 1%	[EA]	1
R 210	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 211	131-00122-0023	RES CF 1.2K QW 5%	[EA]	1
R 212	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 213	136-02552-0072	RES PF 25.5K QW 1%	[EA]	1
R 214	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 215	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 216	136-04640-0072	RES PF 464 QW 1%	[EA]	1
R 217	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 218	133-00122-0000	RES VA 200 HW 20%	[EA]	1
R 219	136-07320-0072	RES PF 732 QW 1%	[EA]	1
R 220	136-04222-0072	RES PF 42.2K QW 1%	[EA]	1
R 221	136-08061-0072	RES PF 8.06K QW 1%	[EA]	1
R 222	131-00434-0023	RES CF 430K QW 5%	[EA]	1
R 223	136-04223-0072	RES PF 422K QW 1%	[EA]	1
R 224	131-00623-0023	RES CF 62K QW 5%	[EA]	1
R 225	131-00623-0023	RES CF 62K QW 5%	[EA]	1
R 226	131-00243-0023	RES CF 24K QW 5%	[EA]	1
R 227	133-00122-0003	RES VA 50K HW 20%	[EA]	1
R 228	131-00243-0023	RES CF 24K QW 5%	[EA]	1
R 229	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 230	131-00153-0023	RES CF 15K QW 5%	[EA]	1
R 231	136-06343-0072	RES PF 634K QW 1%	[EA]	1
R 232	136-06191-0072	RES PF 6.19K QW 1%	[EA]	1
R 233	133-00122-0001	RES VA 2K HW 20%	[EA]	1
R 234	131-00274-0023	RES CF 270K QW 5%	[EA]	1
R 235	136-04223-0072	RES PF 422K QW 1%	[EA]	1

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000
R 236	136-01333-0071	RES PF 133K QW .5%	[EA]	1
R 237	131-00683-0023	RES CF 68K QW 5%	[EA]	1
R 238	136-01333-0071	RES PF 133K QW .5%	[EA]	1
R 239	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 240	131-00472-0023	RES CF 4.7K QW 5%	[EA]	1
R 241	133-00113-0019	RES VA 10K 20% B	[EA]	1
R 242	136-04872-0072	RES PF 48.7K QW 1%	[EA]	1
R 243	131-00562-0023	RES CF 5.6K QW 5%	[EA]	1
R 244	136-04992-0072	RES PF 49.9K QW 1%	[EA]	1
R 245	136-05362-0072	RES PF 53.6K QW 1%	[EA]	1
R 247	131-00163-0023	RES CF 16K QW 5%	[EA]	1
R 248	131-00912-0023	RES CF 9.1K QW 5%	[EA]	1
R 250	131-00203-0023	RES CF 20K QW 5%	[EA]	1
R 251	131-00511-0023	RES CF 510 QW 5%	[EA]	1
TP 201	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 202	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 203	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 204	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 205	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 206	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 207	008-00096-0001	TERMINAL TEST PNT	[EA]	1

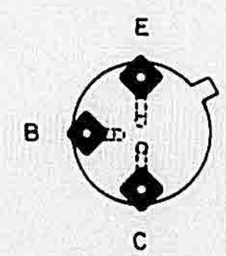




DETAIL "A" 1
TOP VIEW



DETAIL "B" 2
TOP VIEW



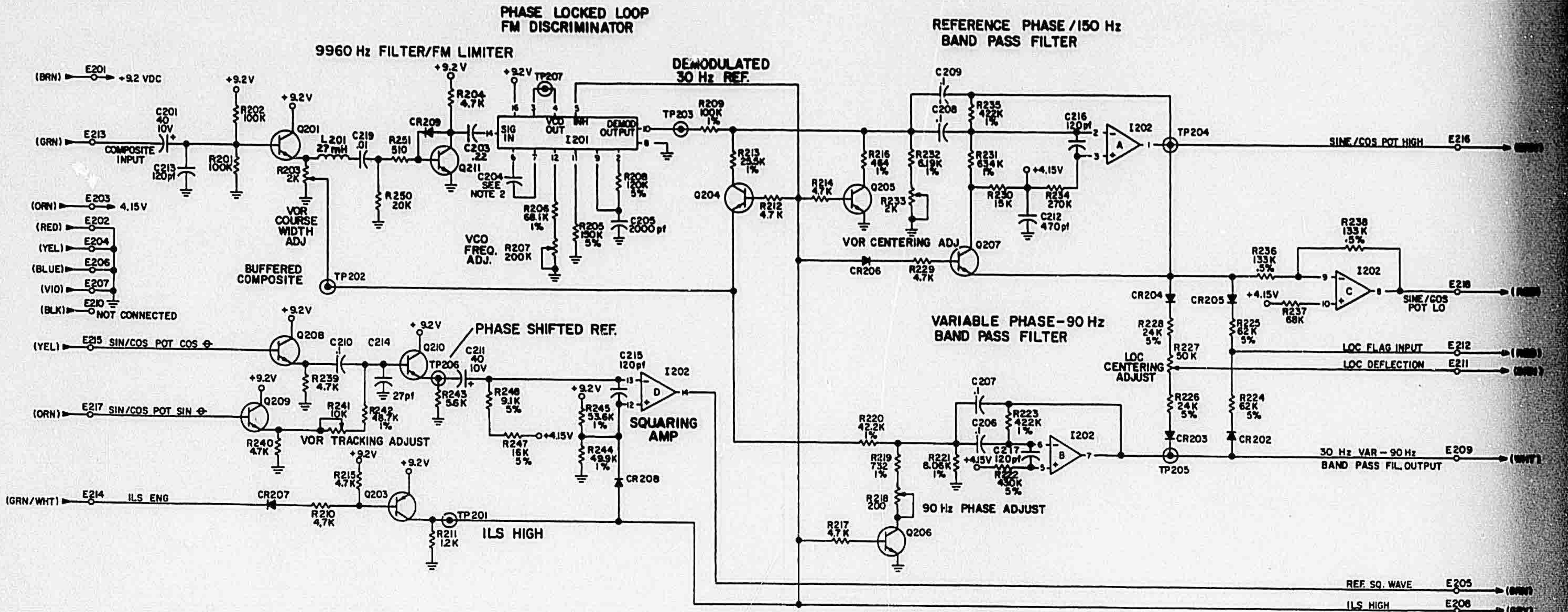
DETAIL "C" 4
TOP VIEW

NOTES:

1. TRANSISTORS Q201, Q204, Q205, Q206, Q207, Q208, & Q209, SEE DETAIL "A".
2. TRANSISTORS Q203, & Q210, SEE DETAIL "B".
3. MASK OFF TEST POINTS (7), ALL PADS WITH "E" NO'S (18), R203, R207, R218, R223, R227, R241, & FOUR MOUNTING AREAS, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH CLEAR URETHANE COATING (P/N 016-1040-00).
4. TRANSISTOR Q211, SEE DETAIL "C".
5. POTS R227 AND R233 MOUNT ON FAR SIDE. ADJUSTOR TO FACE AWAY FROM P.C. BOARD.

REF: B/M 200-05848-XXXX

FIGURE 6-4 KI208A/209A CONVERTER BOARD #1
(Dwg. No. 300-05848-0000 R-12)



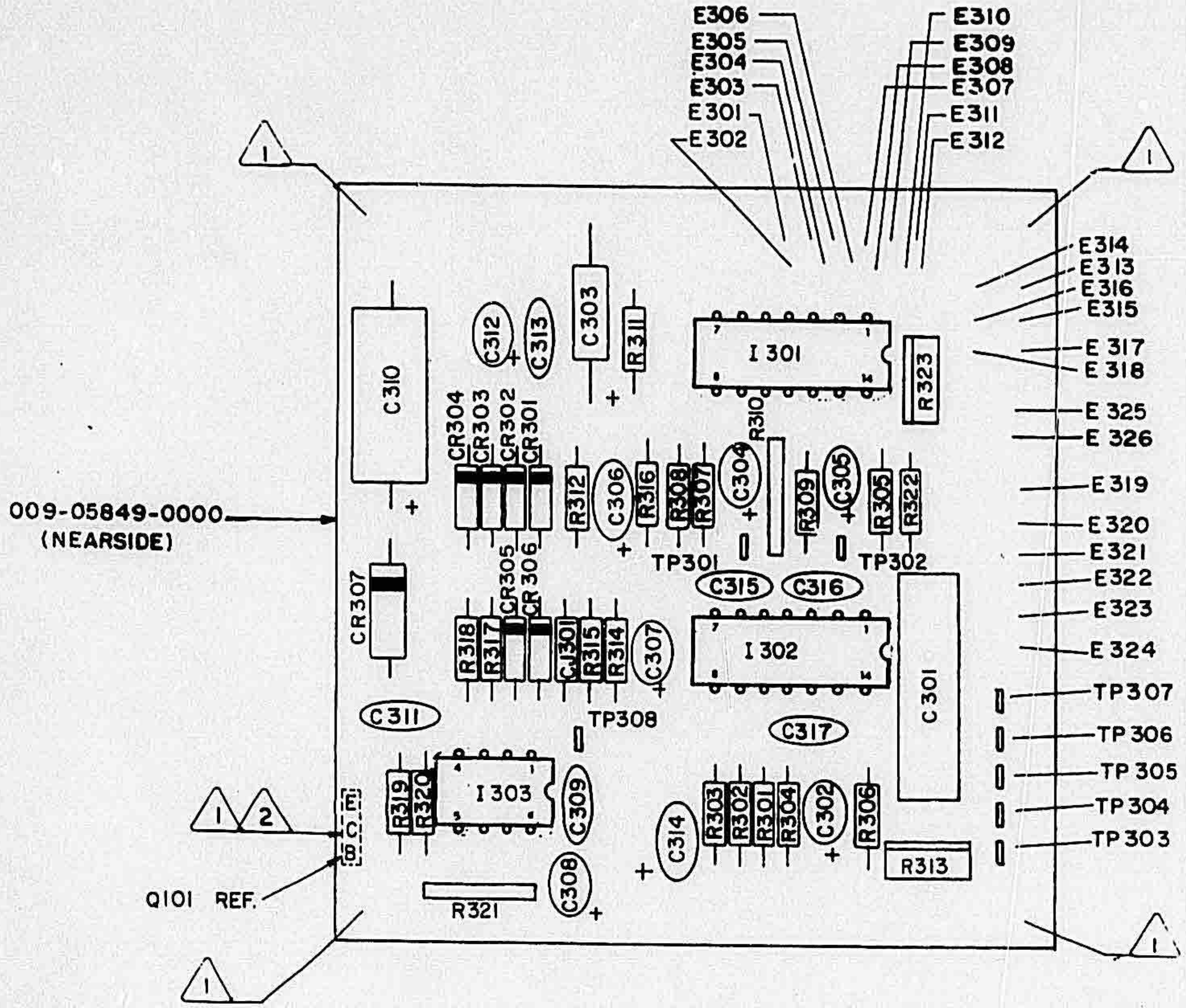
NOTE: 1. UNLESS NOTED: ALL RESISTANCE VALUES ARE IN OHMS, QW, 10%.
ALL CAPACITANCE VALUES ARE IN MICROFARADS (µf).
2. USE EITHER 2000pF OR 3300pF FOR C204. SEE 195-00099-0000.

FIGURE 6-5 KI208A/209A CONVERTER BOARD #1 SCHEMATIC
(Dwg. No. 002-00438-0002 R-14)

6.4 200-05849-0000 Rev. 21 Converter Bd #2

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000
	009-05849-0000	PC BD #2 CONV	[EA]	1
	016-01040-0000	COATING TYPE AR	[AR]	1
C 301	105-00032-0053	CAP MY .15UF5%200V	[EA]	1
C 302	096-01030-0021	CAP TN 12UF20%10V	[EA]	1
C 303	096-01014-0000	CAP TN 40UF 10V	[EA]	1
C 304	096-01030-0011	CAP TN 4.7UF20%20V	[EA]	1
C 305	096-01030-0011	CAP TN 4.7UF20%20V	[EA]	1
C 306	096-01082-0054	CAP TN 15UF 20V	[EA]	1
C 307	096-01030-0034	CAP TN 4.7UF5%20V	[EA]	1
C 308	097-00068-0002	CAP AL 47UF 6.3V	[EA]	1
C 309	109-00007-0000	CAP DC .01UF 25V	[EA]	1
C 310	097-00056-0065	CAP AL 47UF 63V	[EA]	1
C 311	113-05221-0001	CAP DC 220PF 500V	[EA]	1
C 312	096-01030-0011	CAP TN 4.7UF20%20V	[EA]	1
C 313	113-05471-0000	CAP DC 470PF 500V	[EA]	1
C 314	096-01030-0005	CAP TN 10UF 10%20V	[EA]	1
C 315	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 316	113-03121-0000	CAP DC 120PF 500V	[EA]	1
C 317	113-03121-0000	CAP DC 120PF 500V	[EA]	1
CJ 301	026-00018-0000	WIRE CKTJMPR 22AWG	[EA]	1
CR 301	007-06016-0000	DIO S 1N4154	[EA]	1
CR 302	007-06016-0000	DIO S 1N4154	[EA]	1
CR 303	007-06016-0000	DIO S 1N4154	[EA]	1
CR 304	007-06016-0000	DIO S 1N4154	[EA]	1
CR 305	007-06016-0000	DIO S 1N4154	[EA]	1
CR 306	007-06016-0000	DIO S 1N4154	[EA]	1
CR 307	007-05032-0066	DIO Z 1N5365B	[EA]	1
I 301	120-06083-0001	IC SCL4066BC	[EA]	1
I 302	120-03052-0005	IC LM224N	[EA]	1
I 303	120-03060-0000	IC CA3085AE	[EA]	1
R 301	136-01001-0072	RES PF 1K QW 1%	[EA]	1
R 302	136-01211-0072	RES PF 1.21K QW 1%	[EA]	1
R 303	131-00102-0023	RES CF 1K QW 5%	[EA]	1
R 304	131-00913-0023	RES CF 91K QW 5%	[EA]	1
R 305	131-00753-0023	RES CF 75K QW 5%	[EA]	1
R 306	131-00105-0023	RES CF 1M QW 5%	[EA]	1
R 307	131-00103-0023	RES CF 10K QW 5%	[EA]	1
R 308	131-00333-0023	RES CF 33K QW 5%	[EA]	1

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000
R 309	131-00102-0023	RES CF 1K QW 5%	[EA]	1
R 310	133-00113-0025	RES VA 100K 20% B	[EA]	1
R 311	131-00103-0023	RES CF 10K QW 5%	[EA]	1
R 312	131-00104-0023	RES CF 100K QW 5%	[EA]	1
R 313	133-00113-0027	RES VA 200K 20% B	[EA]	1
R 314	131-00104-0023	RES CF 100K QW 5%	[EA]	1
R 315	131-00102-0023	RES CF 1K QW 5%	[EA]	1
R 316	131-00103-0023	RES CF 10K QW 5%	[EA]	1
R 317	131-00220-0023	RES CF 22 QW 5%	[EA]	1
R 318	131-00103-0023	RES CF 10K QW 5%	[EA]	1
R 319	131-00162-0023	RES CF 1.6K QW 5%	[EA]	1
R 320	131-00271-0023	RES CF 270 QW 5%	[EA]	1
R 321	133-00113-0009	RES VA 200 20% B	[EA]	1
R 322	131-00103-0023	RES CF 10K QW 5%	[EA]	1
R 323	133-00113-0027	RES VA 200K 20% B	[EA]	1
TP 301	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 302	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 303	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 304	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 305	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 306	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 307	008-00096-0001	TERMINAL TEST PNT	[EA]	1
TP 308	008-00096-0001	TERMINAL TEST PNT	[EA]	1



NOTES:

1. MASK OFF TEST POINTS (8), ALL PADS WITH "E" NO'S (26), R310, R323, R321, R313, PADS IN DASHED AREA, & FOUR MOUNTING AREAS, THEN POST COAT BOTH SIDES OF ASSEMBLY WITH (P/N 016-1040-00).
2. Q101 IS ON FINAL ASSEMBLY.

REF.: B/M 200-5849-XX

FIGURE 6-6 KI208A/209A CONVERTER BOARD #2
(Dwg. No. 300-05849-0000 R-10)

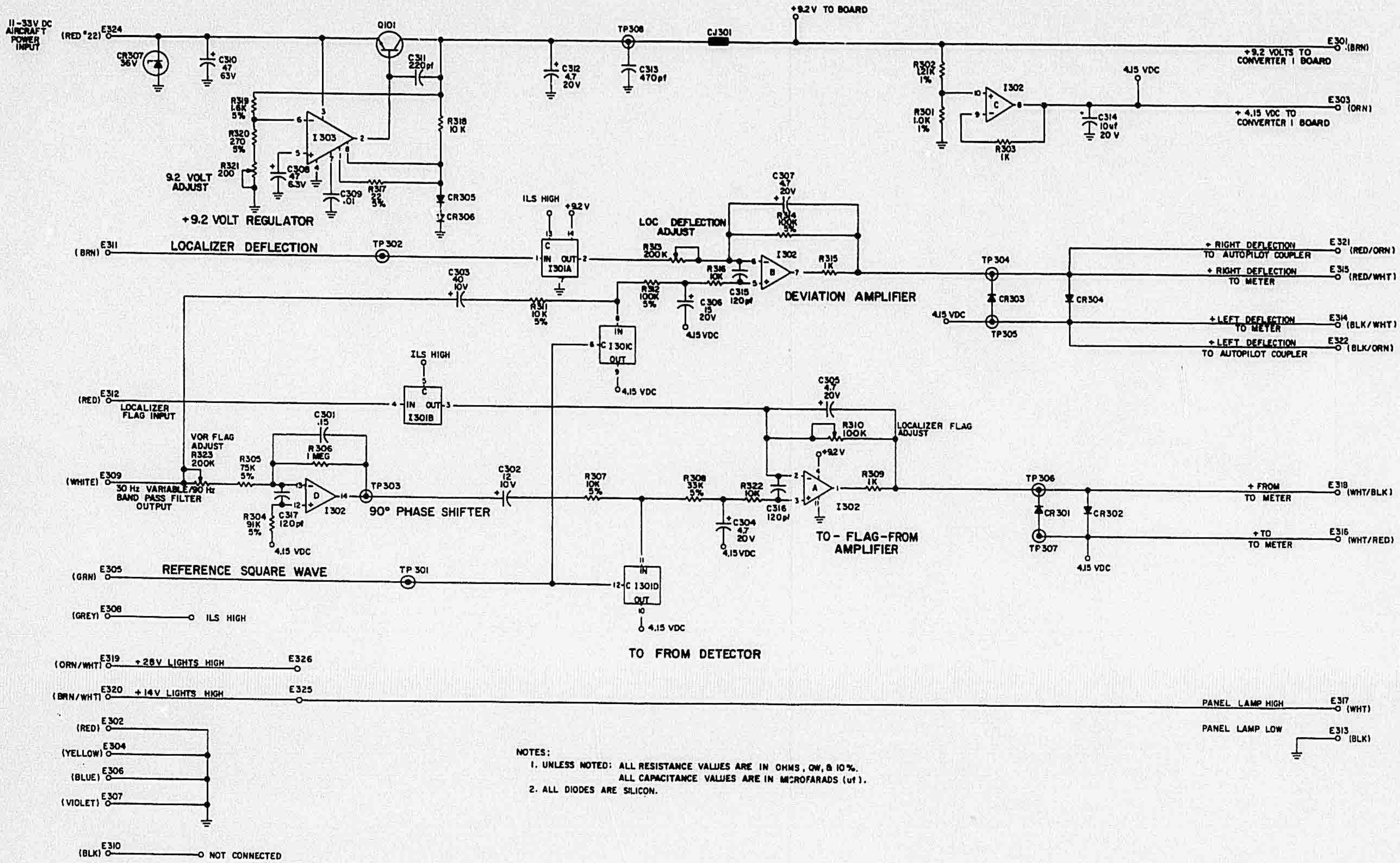


FIGURE 6-7 KI208A/209A CONVERTER BOARD #2 SCHEMATIC
(Dwg. No. 002-00438-0003 R-10)

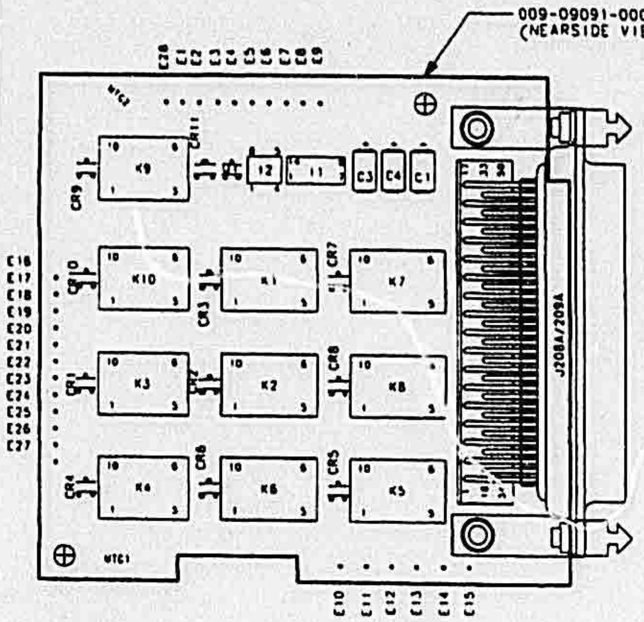
6.5 200-09091-0000 Rev. 0 Comp/Relay Bd.

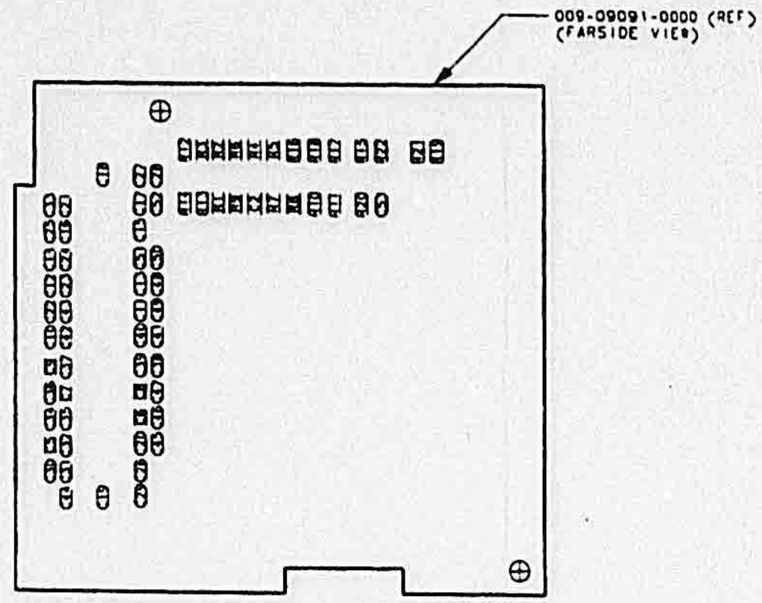
SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000
	009-09091-0000	COMP / RELAY BOARD	[EA]	1
C 401	096-01186-0014	CAP 10.0UF 16V 10%	[EA]	1
C 402	106-04104-0047	CH 100KX7R/50V	[EA]	1
C 403	096-01186-0014	CAP 10.0UF 16V 10%	[EA]	1
C 404	096-01186-0014	CAP 10.0UF 16V 10%	[EA]	1
C 405	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 406	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 407	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 408	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 409	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 410	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 411	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 412	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 413	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 414	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 415	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 416	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 417	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 418	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 419	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 420	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 421	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 422	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 423	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 424	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 425	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 426	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 427	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 428	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 429	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 430	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 431	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 432	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 433	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 434	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 435	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 436	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 437	106-05221-0026	CAP CH220PFNPO/100	[EA]	1

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000
C 438	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 439	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 440	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 441	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 442	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 443	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 444	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 445	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 446	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 447	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 448	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 449	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 450	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 451	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 452	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
C 453	106-05221-0026	CAP CH220PFNPO/100	[EA]	1
CR 401	007-06180-0000	DIO SW MMBD6050	[EA]	1
CR 402	007-06180-0000	DIO SW MMBD6050	[EA]	1
CR 403	007-06180-0000	DIO SW MMBD6050	[EA]	1
CR 404	007-06180-0000	DIO SW MMBD6050	[EA]	1
CR 405	007-06180-0000	DIO SW MMBD6050	[EA]	1
CR 406	007-06180-0000	DIO SW MMBD6050	[EA]	1
CR 407	007-06180-0000	DIO SW MMBD6050	[EA]	1
CR 408	007-06180-0000	DIO SW MMBD6050	[EA]	1
CR 409	007-06180-0000	DIO SW MMBD6050	[EA]	1
CR 410	007-06180-0000	DIO SW MMBD6050	[EA]	1
CR 411	007-06180-0000	DIO SW MMBD6050	[EA]	1
I 401	120-03196-0000	IC LM2902D	[EA]	1
I 402	120-03127-0011	IC LM2903 SO PKG	[EA]	1
J 608A	030-03322-0001	50P MALE D SUB W/ FERRITE	[EA]	1
K 401	032-00156-0001	RELAY 12VDC DPDT SMD	[EA]	1
K 402	032-00156-0001	RELAY 12VDC DPDT SMD	[EA]	1
K 403	032-00156-0001	RELAY 12VDC DPDT SMD	[EA]	1
K 404	032-00156-0001	RELAY 12VDC DPDT SMD	[EA]	1
K 405	032-00156-0001	RELAY 12VDC DPDT SMD	[EA]	1
K 406	032-00156-0001	RELAY 12VDC DPDT SMD	[EA]	1
K 407	032-00156-0001	RELAY 12VDC DPDT SMD	[EA]	1
K 408	032-00156-0001	RELAY 12VDC DPDT SMD	[EA]	1

SYMBOL	PART NUMBER	DESCRIPTION	[UM]	QUANTITY -0000
K 409	032-00156-0001	RELAY 12VDC DPDT SMD	[EA]	1
K 410	032-00156-0001	RELAY 12VDC DPDT SMD	[EA]	1
Q 401	007-00065-0001	XSTR 2N3906 (SOT)	[EA]	1
R 401	139-01002-0000	RES CHIP 10K EW 1%	[EA]	1
R 402	139-01002-0000	RES CHIP 10K EW 1%	[EA]	1
R 403	139-01002-0000	RES CHIP 10K EW 1%	[EA]	1
R 404	139-01003-0003	RES CH 100K EW .1%	[EA]	1
R 405	139-01003-0003	RES CH 100K EW .1%	[EA]	1
R 406	139-04992-0000	RES CH 49.9K EW 1%	[EA]	1
R 407	139-02002-0000	RES CHIP 20.0KEW1%	[EA]	1
R 408	139-02740-0000	RES CH 274 EW 1%	[EA]	1
R 409	139-01001-0003	RES CH 1K EW 1%	[EA]	1
R 410	139-01003-0003	RES CH 100K EW .1%	[EA]	1
R 411	139-02002-0000	RES CHIP 20.0KEW1%	[EA]	1
R 412	139-01003-0003	RES CH 100K EW .1%	[EA]	1
R 413	139-02740-0000	RES CH 274 EW 1%	[EA]	1
R 414	139-01001-0003	RES CH 1K EW 1%	[EA]	1
R 415	139-02212-0000	RES CHIP 22.1KEW1%	[EA]	1
R 416	139-06040-0000	RES CHIP 604 EW 1%	[EA]	1
R 417	139-06040-0000	RES CHIP 604 EW 1%	[EA]	1
R 418	139-04642-0000	RES CHIP 46.4KEW1%	[EA]	1
R 419	139-01002-0000	RES CHIP 10K EW 1%	[EA]	1
R 420	139-01002-0000	RES CHIP 10K EW 1%	[EA]	1
R 421	139-01001-0000	RES CHIP 1K EW 1%	[EA]	1
R 422	139-01501-0000	RES CH 1.5K EW 1%	[EA]	1

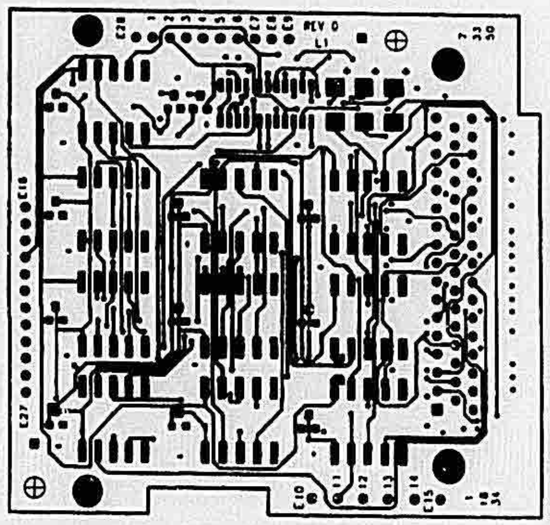
NOTE: ADD 400 TO ALL REFERENCE DESIGNATORS, EXCEPT J208A/209A



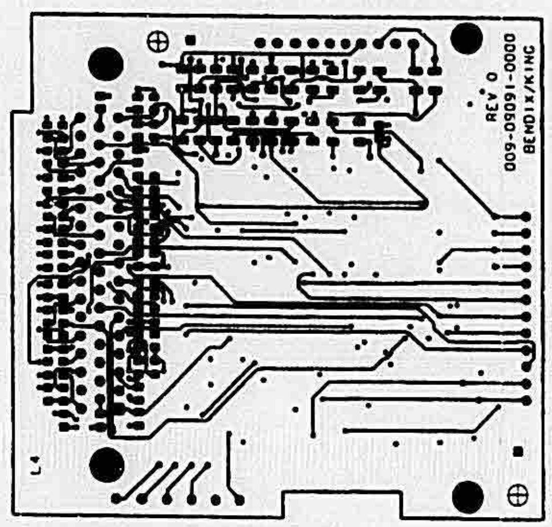


NOTES:

1. POST COATING NOT REQUIRED.
2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC 001-01101-0000
3. LIQUID STAKE ALL FASTENERS PER SPEC 001-01080-0000



NEARSIDE VIEW OF PC BOARD



FARSIDE VIEW OF PC BOARD

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-09091-0000

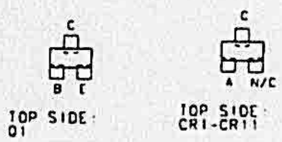


FIGURE 6-8 KI208A/209A COMP/RELAY BOARD
(Dwg. No. 300-09091-0000 R-0)

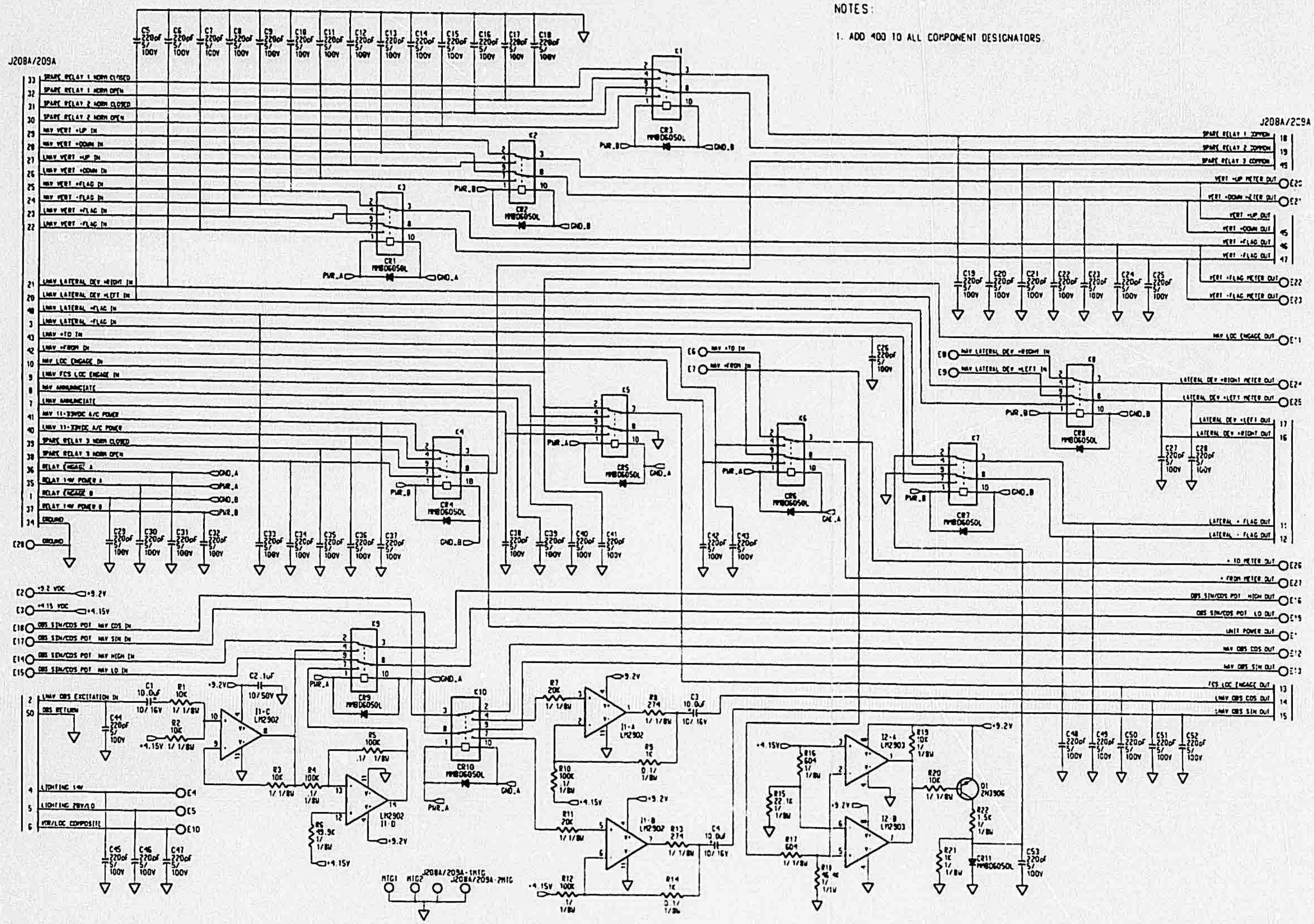


FIGURE 6-9 KI208A/209A COMP/RELAY BOARD SCHEMATIC (Dwg. No. 002-09091-0000 R-0)