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Bendix/King
KLX 135/135A Communication Transceiver/GPS Receiver
Maintenance Manual

*** End of Index ***

MFG.

INTRO

AlliedSignal

ELECTRONIC AND AVIONICS SYSTEMS

INSTALLATION MANUAL

BENDIX/KING®

KLX 135/135A

COMMUNICATIONS TRANSCEIVER/GPS RECEIVER

MANUAL NUMBER 006-10500-0003
REVISION 3, AUGUST, 1995

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REVISION HISTORY AND INSTRUCTIONS

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Add, delete, or replace pages as indicated below and retain all tabs and dividers. Insert this page immediately behind the title page as a record of revisions. This revision level of this manual consists of the following individual publications:

PAGE	ACTION
Title Page	Remove and Replace
Revision History	Insert Behind Title Page
Installation Manual	Remove and Replace

SECTION I
GENERAL INFORMATION

SECTION II
INSTALLATION

SECTION III
OPERATION

LIST OF ILLUSTRATIONS

01

SECTION I

GENERAL INFORMATION

1.1 INTRODUCTION

This manual contains information relative to the physical, mechanical, and electrical characteristics of the Bendix/King Crown Series KLX 135/135A VHF Communication Transceiver/GPS Receiver. Installation and operating procedures are also included. Information relative to the maintenance, alignment, and procurement of the replacement parts may be found in the KLX 135/135A Maintenance/Overhaul Manual, P/N 006–15500–XXXX.

1.2 EQUIPMENT DESCRIPTION

The KLX 135/135A, is a 13.75 volt panel mounted, Communication Transceiver/GPS Receiver designed to provide the following functions:

A. TSO'd two–way VHF voice communication within the frequency range of 118.000 MHz to 136.975 MHz (760 channels) in 25 kHz selectivity. Two communication frequencies (active and standby) can be entered via concentric knobs and button on the left hand side of the front panel and displayed in the upper left corner of the display. The active and standby frequencies may be exchanged from either the front panel or using a remote transfer. A way to transfer the communication frequencies from the database (QuickTune TM) is also provided.

It has a 5 watt transmitter with a feature to prevent transmitter operation if the microphone is stuck. Audio amplification of the receiver output, as well as outputs from auxiliary devices is provided via the built–in audio amplifier.

B. A Non–TSO'd GPS based, long range airborne navigation system with a data base. The primary purpose of the GPS navigation portion of the KLX 135/135A is to provide the pilot with present position information and to display guidance information with respect to a flight plan defined by the pilot. Flight plan information is entered by the pilot via the concentric knobs and button on the right hand side of the front panel.

The unit can use its present position information to determine crosstrack error, distance–to–waypoint, ground speed, track angle, time– to–waypoint and bearing to waypoint. Some of this data is output to external devices. The internal data base of the KLX 135/135A contains information concerning airports, VORs and NDBs. (The KLX 135A also displays information about SUA's airport runways and frequency location information, nearest FSS and ARTCC names and frequencies). Waypoints are stored in the data base by their ICAO identifiers. The ICAO identifiers are in most cases taken directly from Jeppessen Sanderson or government aeronautical charts.

The information stored in the data base eventually becomes out of date. Therefore, to provide a means of updating the information, the data base is designed to be updatable by use of a personal computer, usually a laptop, via 3 1/2" 1.44M diskettes.

C. An alphanumeric liquid crystal display (LCD) is used to display frequencies and navigation information including a course deviation display. Connections to the unit are made through one 44 pin and one 30 pin Molex printed circuit board edge connector and two BNC coaxial connectors at the rear of the unit.

D. The KLX 135 is available under P/N 069–01029–0201. The KLX 135A, P/N 069–01029–0703, is identical to the KLX 135 except that it has an improved alphanumeric liquid crystal display (LCD), uses a different type of data base, and has a moving map display.

1.3 TECHNICAL CHARACTERISTICS

KLX 135/135A GENERAL SPECIFICATIONS

TSO Compliance:	See Appendix E
Physical Dimensions:	
Height:	2.052 in. 52.12 mm.
Width:	6.352 in. 161.345 mm.
Length:	10.380 in. 263.65 mm.
Weight:	4.35 lbs. 1.98 kg w/o mounting rack 5.02 lbs. 2.28 kg with mounting rack and connectors.
Applicable Documents: (continued)	
COMM Transmitter:	TSO-C37d, 100 NM, 25 kHz RTCA DO-160C RTCA DO-186, Class 4
COMM Receiver:	TSO-C38d RTCA DO-160C RTCA DO-186, Class C and D
Mounting:	Panel
Temperature:	A1D1 –20 °C to +55 °C
Altitude Range:	A1D1 50,000 ft.
Cooling:	Forced-air cooling not required, but recommended. (See Section 2.3.2)

KLX 135/135A GENERAL SPECIFICATIONS

Vibration:	Categories N, B, and M (Helicopter and Fixed–wing)
Shock:	Panel mount, no shock mounting required.
Power Consumption:	
Receive:	
+13.75 V dc	1.3 A (max) audio squelched 1.4 A (max) audio @ 100 mW into 500 Ω 3 A (max) audio @ 8 W into 4 Ω
Transmit:	
+13.75 V dc	6.3 A maximum
Lighting Bus:	
+13.75 V dc	0.4 A maximum
+27.50 V dc	0.2 A maximum
Frequency Specification:	
COMM	118.000 MHz to 136.975 MHz in 25 kHz increments.

COMM TRANSMITTER

Emission:	6K 00A3E
Occupied Bandwidth:	25 kHz
FCC Identifier (KLX 135 and KLX 135A):	ASY KLX135
Power Output:	5 W minimum
Frequency Tolerance:	Within 0.001% of assigned channel frequency
Modulation:	70% modulation capability with 98% limiting. Less than 15% distortion at 70% modulation.
Sidetone Output:	Adjustable up to 100 mW into 500 Ω headphones
Microphone:	Standard carbon or dynamic mike containing transistorized pre-amp. (Must provide 100 mV RMS into 100 Ω load.)
Harmonic Content:	Greater than 55 dB down from carrier
High Temperature Protection:	If the transmitter and modulator circuits become hot enough to potentially damage any components in the transceiver, a protection circuit will automatically reduce the transmitter power consumption and output power.
Duty Cycle:	10% (0.5 minute on, 4.5 minutes off) max

COMM RECEIVER

Receiver Sensitivity:	Two (2) µV (hard) or less for 6 dB (S+N)/N with 1 kHz tone modulated 30%.
Receiver Selectivity:	Six (6) dB bandwidth at not less than 18.0 kHz with no less than 8.1 kHz on each side. Sixty (60) dB bandwidth shall be 39.2 kHz with no more than 20.0 kHz on each side.
Audio Output:	100 mW into 500 Ω minimum with a 1 kHz tone modulated 30%.
Audio Response:	Less than 6 dB variation from 350 Hz to 2500 Hz.
AGC Characteristics:	From 5 µV to 20,000 µV audio output will not vary more than 3 dB.
Squelch:	Automatic squelch (internally adjustable carrier to noise setting) with manual disable.
Spurious Response and Cross Modulation Products:	At least 80 dB down
Intercom Input:	When the mic is connected to the intercom input, both the receiver and mic audio appears at the audio output. 100 mV RMS of mic audio into 500 Ω is required for 100 mW output.

AUDIO AMP

500 Ω Output:	100 mW minimum
4 Ω Output:	8 W minimum
Input:	Three 500 Ω Auxiliary Inputs one MIC Intercom Input
Audio Response:	Less than 6 dB variation from 350 Hz to 2500 Hz.

GPS RECEIVER

SIGNAL INPUTS:

TAKE HOME:	OPEN = Normal Operation GND = Take Home Mode
DATA LOADER IN:	The Data Loader RS232 input is designed to communicate with an IBM compatible personal computer
Gray Code Inputs (Gillham) (A1,A2,A4,B1,B2,B4,C1,C2,C4,D4)	Gray Code Altitude Signals (0V. to 28V.)

SIGNAL OUTPUTS:

RS-232 OUT:	The RS232 output is designed to interface with certain ARTEX ELTs and certain Moving Map displays
WPT ALERT: (Waypoint Alert)	OPEN = Inactive LOW = Active (Output can sink up to 250mA)
MSG: (Message)	OPEN = Inactive LOW = Active (Output can sink up to 250mA)
SPARE ANNUNCIATOR	RESERVED
CDI Output:	(Voltage at pin P relative to voltage at pin N of P1) Enroute: 30 mV per nautical mile Output capable of driving up to five 1KΩ loads in parallel Output drive range: ±300 mV (±150 mV full scale)
Nav Flag Output:	Flag Pulled out of view: 260 to 900 mV Flag in view: ≤ 50 mV Output capable of driving up to five 1KΩ loads in parallel

GPS RECEIVER	
To/From Flag Output:	To Indication: +40 to +300 mV on Pin S with respect to Pin R From Indication: –40 to –300 mV on Pin S with respect to Pin R Output capable of driving up to five 200Ω loads in parallel
DATA LOADER OUT	The Data Loader RS232 output is designed to communicate with an IBM compatible personal computer

KA 91 ANTENNA	
TSO Compliance:	See Appendix E
Physical Dimensions:	
Width:	2.90 in (7.37 cm)
Height:	0.75 in (1.91 cm)
Length:	4.70 in (11.94 cm)
Weight:	0.6 lbs (0.27 kg)
Airspeed Rating:	600 Kts TAS
Output Impedance:	50 Ohms (nominal)
DC Voltage:	5 Volts ±0.5 volts
DC Current:	50 mA maximum

KA 92 ANTENNA	
TSO Compliance:	See Appendix E
Physical Dimensions:	
Width:	2.70 in (6.86 cm)
Height:	0.70 in (1.78 cm)
Length:	4.30 in (10.92 cm)
Weight:	4.8 ozs (0.14 kg)
Airspeed Rating:	600 Kts TAS
Output Impedance:	50 Ohms (nominal)
DC Voltage:	5 Volts ±0.5 volts
DC Current:	50 mA maximum

KA 198 COMM FILTER (P/N 071–01565–0000)	
Center Notch Frequency:	1575.42 MHz
Attenuation at 1575.42 MHz ±1.5 MHz:	35 dB min.
Insertion loss from 118.00 to 137.00 Mhz:	.3 dB Max.
Impedance loss from 118.00 to 137.00 MHz:	50 ohms
VSWR from 118.00 to 137.00 MHz:	1.5 :1

NOTE

The conditions and tests performed on this article are minimum performance standards. It is the responsibility of those desiring to install this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within these performance standards. The article may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by the Administrator.

1.4 CONFIGURATIONS AVAILABLE

1.4.1 KLX 135 COMMUNICATIONS TRANSCEIVER/GPS RECEIVER

The KLX 135 is available in only one version. The part number for the unit is 069–01029–0201. The KLX 135 can be ordered with either a North American Data Base or an International Data Base. When ordering a unit with a North American data base, order part number 070–01029–0000. When ordering a unit with an International data base, order part number 070–01029–0001

1.4.2 KLX 135A COMMUNICATIONS TRANSCEIVER/GPS RECEIVER

The KLX 135A is available in only one version. The part number for the unit is 069–01029–0703. The KLX 135A can be ordered with either an Americas Data Base, a Pacific International Data Base or an Atlantic International Data Base. When ordering a unit with an Americas data base, order part number 070–01029–0012. When ordering a unit with an Pacific International data base, order part number 070–01029–0011. When ordering a unit with an Atlantic International data base, order part number 070–01029–0010.

1.4.2 GPS ANTENNA

There are two antennas available for the KLX 135/135A. The KA 91 antenna is a TSO'ed antenna and is available by ordering P/N 071–01545–0200. The KA 92 is a TSO'ed antenna and is available by ordering P/N 071–01553–0200.

1.5 UNITS AND ACCESSORIES SUPPLIED

1.5.1 KLX 135/135A INSTALL KIT

The KLX 135/135A COMM/GPS Transceiver installation kit P/N 050-02217-0000 contains the following parts:

PART NUMBER	DESCRIPTION	UM	00	VENDOR NAME & PART #
050-02217-0000	KLX 135 INSTALL KIT		X	
030-00101-0002	PANEL MOUNT PLUG	EA	2	
030-01094-0064	CONN W/POLARIZER	EA	1	
030-01094-0087	CONN W/POLARIZER KEY	EA	1	
030-01107-0031	CONN TERM 31T	EA	1	
030-01107-0045	TERMINAL, CONNECTOR	EA	1	
033-00230-0000	DATA BASE CONNECTOR	EA	1	
057-05621-0000	LABEL	EA	1	
057-05628-0000	LABEL	EA	1	
073-00627-0002	CONN MTL PLATE W/F	EA	1	
089-02353-0001	NUT CLP 6-32	EA	6	
089-05903-0008	SCR PHP 4-40 X 1/2	EA	4	
089-05907-0004	SCR PHP 6-32 X 1/4	EA	3	
089-06012-0004	SCR PHP 6-32 X 1/4	EA	6	
090-00019-0007	RING RTNR .438	EA	2	
155-05676-0000	INSTALL DWG KLX 135	EA	REF	

1.5.2 KA 91 ANTENNA INSTALLATION KIT

The KA 91 Installation Kit (P/N 050-03195-0000), including its contents, is shown below.

P/N	DESCRIPTION	UM	-0000	VENDOR NAME & PART #
050-03195-0000	KA91 INSTALL		X	
030-00134-0000	CONN COAX	EA	1	TED MFG 5-10-30
047-10130-0002	BACKPLATE, ANTENNA	EA	1	
089-06908-0012	SCREW, AIRCRAFT	EA	4	
187-01807-0000	KA 91 GASKET	EA	1	

1.5.3 KA 92 ANTENNA INSTALLATION KIT

The KA 92 Installation Kit (P/N 050-03318-0000), including its contents, is shown below.

P/N	DESCRIPTION	UM	-0000	VENDOR NAME & PART #
050-03318-0000	KA92 INSTALL		X	
030-00134-0001	CONN COAX	EA	1	TED MFG 5-10-30
047-10735-0002	BACKPLATE, ANTENNA	EA	1	
089-05909-0012	SCREW, AIRCRAFT	EA	4	
187-01831-0000	KA 92 GASKET	EA	1	

1.6 ACCESSORIES REQUIRED, BUT NOT SUPPLIED

The following parts are recommended for a typical installation of the KLX 135/135A unit.

A. Broad band 50 Ω vertically polarized Communications antenna with coaxial cable.

B. Headphones: 500 Ω nominal impedance.

C. Microphone: Low impedance carbon or dynamic with transistorized pre-amp.

1.7 OPTIONAL ACCESSORIES

1.7.1 PC INTERFACE KIT

To load the database from a personal computer via diskette, order interface kit P/N 050-03213-0000. The database may be loaded directly from the PC to the KLX 135/135A installed in the aircraft. Refer to Figure 2-1 in this manual and the KLX 135 Pilot's Guide (P/N 006-08751-0000) or the KLX 135A Pilot's Guide (P/N 006–08789–0000) for details.

1.7.2 Annunciators and Switch/Annunciators (Refer to Fig. 2–17 through 2–19)

(Refer to I.B. 363 for additional information pertaining to switch/annunciators for GPS systems) The devices shown below are Eaton 582/584 series switch/annunciators and are representative of those used in our original certification. They were chosen because of their excellent sunlight readable characteristics and meet or exceed the requirements of Advisory Circular 20–138. These are high quality devices and we encourage their use. However, there are other comparable devices on the market that may be substituted at the installer/customers choice.

These switch/annunciators are available through AlliedSignal Service Stock or direct from our supplier, LCOMP Inc. It is advantageous to order direct from LCOMP, if possible, in order to avoid additional price mark–ups. On international orders, it may be necessary to order through AlliedSignal because LCOMP, at the time of this publication, is not prepared to handle international orders. LCOMP's address and telephone number are listed as follows:

LCOMP	Telephone
6455 E.Commerce Ave.	(816) 241–0111
Suite 120	(800) 821–2915
Kansas City, Mo. 64120–2159	(816) 241–7373 Fax

A. NAV/GPS Switch/Annunciator

Installations where the outputs from KLX 135/135A and an existing navigation system are switched between a common indicator or HSI may require some type of annunciation. A NAV/GPS switch/annunciator is available that provides both the annunciation and a switch contact to energize the switching relay(s) required for the switching of the outputs. This Switch/Annunciator is available in 5 V, 14 V, or 28 V versions as shown below.

LIGHTING	ALLIEDSIGNAL P/N	ALLIEDSIGNAL P/N
28V	031–00763–0711	031–00785–0711
5V	031–00763–0713	031–00785–0713
14V	031–00763–0712	031–00785–0712
	(Eaton Series 584)	(Eaton Series 582)

B. WPT/MSG Remote Annunciators

The KLX 135/135A contains two outputs: 1) Waypoint Alert (WPT) and 2) Message (MSG). Annunciation of these outputs is optional since the KLX 135/135A has an internal means of indicating to the pilot when waypoint alerting is occuring and when there is a message to be viewed. However, a remote annunciator unit is available to annunciate these outputs and is offered in either 5 V, 14 V, or 28 V versions as shown below. The original design of this unit contained the (WPT) and (MSG) plus two additional fields (–/–) as it was expected that additional annunciation might be needed in the future. It has now been determined that additional annunciation will not be needed. Therefore, a new design is being offered that contains only the

(WPT) and (MSG) fields which allows improved readability. Both options are listed below.

FOUR FIELD ANNUNCIATORS (WPT/MSG/——/——)

LIGHTING	ALLIEDSIGNAL P/N
28 VOLT	031–00763–0718
14 VOLT	031–00763–0719
5 VOLT	031–00763–0720

NOTE

(WPT) AND (MSG) WILL BE IN AMBER COLOR AND THE DASHES IN GREEN. THESE ANNUNCIATORS WILL BE DEADFACE AND READABLE ONLY WHEN LIT. DASHES WILL ONLY BE LIT DURING AN ANNUNCIATOR TEST AS A FUNCTION OF THE AIRCRAFT INSTALLATION.

TWO FIELD ANNUNCIATORS (WPT/MSG)

LIGHTING	ALLIEDSIGNAL P/N	ALLIEDSIGNAL P/N
28 VOLT	031–00763–0505	031–00785–0505
14 VOLT	031–00763–0506	031–00785–0506
5 VOLT	031–00763–0762	031–00785–0762
	(Eaton Series 584)	(Eaton Series 582)

NOTE

(WPT) AND (MSG) WILL BE IN AMBER COLOR. THESE ANNUNCIATORS WILL BE DEADFACE AND READABLE ONLY WHEN LIT.

C. NAV/GPS Switching

Installations in which the outputs from a KLX 135/135A and an existing navigation system are being switched onto a common indicator will require some remote relay switching that is controlled by the NAV/GPS switch/annunciator. The following relay part number or equivalent may be used to perform the necessary switching function. This is a four pole double throw relay and may be paralleled for more contacts if necessary.

P/N: 032–00150–0000 4PDT
Vendor: Potter Brumfield #KHS–17D36–24

1.8 LICENSE REQUIREMENTS

The transmitter, as installed in the aircraft, requires an Aircraft Radio Station License. This license is obtained by filing the FCC Form 404. While awaiting the receipt of the station license, a copy of FCC Form 404 is kept in the aircraft.

This equipment has been type accepted by the FCC and entered on the type accepted equipment list, as Bendix/King KLX 135/135A and must be identified as Bendix/King KLX 135/135A on your Form 404, Aircraft Radio Station License application.

CAUTION

THE VHF TRANSMITTER IN THIS EQUIPMENT IS GUARANTEED TO MEET FEDERAL COMMUNICATIONS COMMISSION ACCEPTANCE OVER THE OPERATING TEMPERATURE RANGE ONLY WHEN A ALLIEDSIGNAL CRYSTAL IS USED IN THE STABILIZED MASTER OSCILLATOR. USE OF OTHER THAN A BENDIX/KING CRYSTAL IS CONSIDERED AN UNAUTHORIZED MODIFICATION, AND WILL VOID THE WARRANTY

02

SECTION II

INSTALLATION

2.1 GENERAL INFORMATION

This section contains suggestions and factors to consider before installing the KLX 135/135A Communication Transceiver/GPS Receiver. Close adherence to these suggestions will assure a more satisfactory performance from the equipment.

The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those desiring to install this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within TSO standards. The article may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by the Administrator.

2.2 UNPACKING AND INSPECTING EQUIPMENT

Exercise extreme caution when unpacking the unit. 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. When all equipment is removed, place in the shipping container, all packing materials for use in unit storage or reshipment.

2.3 EQUIPMENT INSTALLATION

2.3.1 GENERAL

The following paragraphs contain information pertaining to the initial installation of the KLX 135/135A Communication Transceiver/GPS Receiver, including instructions concerning the location and mounting of the antenna.

The equipment should be installed in the aircraft in a manner consistent with acceptable workmanship and engineering practices and in accordance with the instructions set forth in this publication. To ensure that the system has been properly and safely installed in the aircraft, the installer should make a thorough visual inspection and conduct an overall operational check of the system on the ground prior to flight.

CAUTION

AFTER INSTALLATION OF THE CABLING AND BEFORE INSTALLATION OF THE EQUIPMENT, A CHECK SHOULD BE MADE WITH THE AIRCRAFT PRIMARY POWER SUPPLIED TO THE MOUNTING CONNECTOR TO ENSURE THAT POWER IS APPLIED ONLY TO THE PINS SPECIFIED IN THE INTERWIRING DIAGRAM, FIGURE 2-1.

The KLX 135/135A system installation will conform to standards designated by the customer, installing agency and existing conditions as to the unit location and type of installation. However, the following suggestions should be considered before installing your KLX 135/135A system.

2.3.2 AVIONICS COOLING REQUIREMENTS FOR PANEL MOUNTED EQUIPMENT

The greatest single contributor to increased reliability of all modern day avionics is to limit the maximum operating temperature of the individual units whether panel or remote mounted. While modern day individual circuit designs consume much less electrical energy, the watts per cubic inch dissipated within avionics units remains much the same because of high density packaging techniques utilized. Consequently, the importance of providing avionics stack cooling is essential to the life span of the equipment.

While each individual unit may not require forced air cooling, the combined heat load of several units operating in a typical avionics stack will significantly degrade the reliability of the avionics if provisions for stack cooling are not incorporated in the initial installation. Recommendations on stack cooling are contained in Bendix/King Installation Bulletin #55. Failure to provide stack cooling will certainly lead to increased avionics maintenance costs and may void the warranty.

2.3.3 KLX 135/135A INTERWIRING AND CABLE HARNESS FABRICATION

A. General

The KLX 135/135A Communication Transceiver/GPS Receiver receives primary power from the aircraft power source. Power connections, voltage requirements and circuit breaker requirements are shown on the interconnect diagram (Figure 2-1).

The length of the wires to parallel pins should be approximately the same length, so that the best distribution of current can be effected. AlliedSignal General Aviation Avionics recommends that all wires, including spares as shown on the interconnect diagram be included in the fabrication of the wiring harness. However, if full wiring is not desired, the installer should ensure that the minimum wiring requirements for the features and functions to be used be incorporated.

When cables are installed in the aircraft, they must be supported firmly enough to prevent movement and should be carefully protected against chaffing. Additional protection should also be provided in any location where the cable may be subjected to abuse.

In wire bundles, the cabling should not be tied tightly together as this tends to increase the possibility of noise pickup and similar interference. When routing cables through the aircraft the cables should cross high level rf lines at right angles.

The following guidelines are recommended:

(1) The installing facility will supply and fabricate all external cables. (See Figures 2-1 through 2-5). The required connectors are supplied as part of the installation kit (P/N 050-02217-00XX).

(2) The KLX 135/135A and the associated wiring harness must be kept a minimum of three feet from the transceiver antenna coax and the termination connector of the antenna to prevent rf interference from the antenna.

(3) Do not route the transceiver antenna coax near ADF sense or loop antenna cables.

B. Primary Power and Circuit Breaker Requirements and Wiring

The KLX 135/135A transceiver/receiver receives primary power from an aircraft by aircraft power circuit breakers. The KLX 135/135A is designed to operate receiving with a +14 V dc supply. Power connections, and circuit breaker requirements are shown on the interconnection diagram Figure 2-1.

C. Audio Installation Description

The audio system within the KLX 135/135A provides maximum flexibility for use in a variety of audio/intercom configurations. The KLX 135/135A provides audio amplification for its VHF communication transceiver for both headphones and the cockpit speaker. In addition up to three external sources of audio may be amplified and sent to the headphones and speaker. With proper external switching, the KLX 135/135A can provide the microphone bias voltage and amplification necessary for the implementation of a push to talk or a hot mic intercom. The KLX 135/135A provides access to signals not commonly found on communication transceivers to allow full featured installation with audio switching panels and audio isolation/amplifier panels.

Three auxiliary audio inputs AUX #1 AUDIO IN (P4001-M), AUX #2 AUDIO IN (P4001-12) and AUX #3 AUDIO IN (P4001-11) are typically used to amplify audio from VOR/LOC, Marker Beacon, ADF, DME, Radio Altimeter Decision Height Alerters and other avionics audio sources. Any signal capable of driving a 500 ohm, or lower, load that is adjustable to less than 7 volts is acceptable. All three inputs share a common low, that is connected to ground inside the KLX 135/135A.

Should you have more than three audio sources it is sometimes possible to successfully connect more than one source to a single pin. The sources will in addition to driving the KLX 135/135A input load be driving the other source outputs as loads. Normally this does not damage the source units but can cause lower signal levels resulting in less audio from these sources sharing the input pin. In addition turning off one of the sources may stop audio from all the sources sharing that input pin.

COMM AUDIO/SIDETONE IN (P4001-E) and INTERCOM MIC IN (P4001-D) are inputs to the same amplifier used for the auxiliary audio inputs. The COMM AUDIO/SIDETONE IN is reserved for the COMM AUDIO/SIDETONE OUT and has 2.3 times the gain of the aux audio inputs. The INTERCOM MIC IN provides a MIC bias voltage output and should only be connected to aircraft microphones. Connection to other devices may result in damage to both the KLX 135/135A and the other device.

Connecting two microphones to the COMM MIC IN or INTERCOM MIC IN at the same time may result in weak or distorted audio. Variations in microphones, even with identical manufacturers part numbers, can produce this problem when both are connected at the same time. Microphone isolation relays are recommended so that only one microphone is connected at one time.

If intercom audio is placed on the speaker, it may cause undesirable audio feedback. To prevent this condition, it is common to interrupt the connection between AUDIO SUM OUT and 4 OHM AUDIO IN HI when the intercom is keyed. When the intercom is keyed this relay also prevents audio from any source from being heard on the speaker. All audio sources remain on the headphones when the intercom is keyed.

All five inputs described above are combined and amplified and output on the 500 OHM AUDIO OUT HI (P4001-13) and AUDIO SUM OUT HI (P4001-R). Both pins have identical signals but are at different voltage levels. The 500 OHM AUDIO OUT will drive headphones directly. The AUDIO SUM OUT is provided so that it may be input to the KLX 135/135A's internal 4 ohm speaker amplifier. No signals, other than the five inputs, are output from the amplifier. No other signals are automatically added to the output, thus allowing the installer complete flexibility.

4 OHM AUDIO IN HI (P4001-5) is the input to the speaker amplifier. Only the signal applied to this input will be output on 4 OHM AUDIO OUT HI (P4001-P) output. The output will drive speakers of greater than 4 ohm impedance, but since higher impedance speakers may expect higher voltages they may not be as loud as 4 ohm speakers. The speaker amplifier is muted (output is disabled) when the COMM transmitter is active (MIC KEY input is low).

When a separate audio panel is used, neither the 500 ohm or 4 ohm audio amplifiers in the KLX 135/135A are connected. The KLX 135/135A audio amplifiers do not need external loads applied to either their inputs or outputs when they are not used.

2.3.4 EQUIPMENT LOCATION

Care should be exercised to avoid mounting components near equipment operating with high pulse current or high power outputs such as radar and satellite communications equipment. In general, the equipment should be installed in a location convenient for operation, inspection, and maintenance, and in an area free from excessive vibration, heat, and noise generating sources.

All mechanical installation drawings, connector assembly diagrams, interwiring diagrams, and connector pin assignment tables referenced in this section are located at the end of this section of the manual. Determine the mounting location for system components following the guidelines below.

Prior to installing any equipment, make a continuity check of all wires and cables associated with the system. Then apply power and check for proper voltages at system connectors, and then remove power before completing the installation.

A. KLX 135/135A Communication Transceiver/GPS Receiver Locations

NOTE

- Care must be taken in selecting the optimum location for the KLX 135/135A.

- The LCD, Liquid Crystal Display, has viewing angle limitations. (See Figures 2–6 and 2–7) The installation of the KLX 135/135A must not exceed these viewing angles. The viewing angle should be checked with both the pilot's and the copilot's seats in the full forward position.

- In some potential mounting locations, glare and reflection from the display may cause the display to be nearly unreadable. Therefore, careful considerations of these effects should be made before choosing the final mounting location. Refer to Figures 2-6 and 2–7.

The panel-mounted KLX 135/135A can be installed in any convenient location on the panel that is free from excessive heat and vibration and which provides reasonable access for inspection and maintenance.

To allow for inspection or repair of the wiring of the connector assembly itself, sufficient lead length should be left so that when the mounting hardware for the rear connectors and antenna coaxial cable is removed the assembly may be pulled forward several inches. Also, a bend should be made in the harness (at the rear connectors) to allow water droplets that might form on the harness due to condensation, to drip off at the bend and not collect in the connection.

The length of cables from the KLX 135/135A connector to other system units is not critical because unit interfaces are designed with high impedance inputs, low impedance outputs, and low noise susceptibility characteristics.

Forced air cooling is recommended but is not a requirement. Outline drawing Figure 2-5 shows KLX 135/135A Communication Transceiver/GPS Receiver dimensions.

B. COMM Antenna

The antenna should be well removed from any projections, the engine(s), and propeller(s). It should also be well removed from landing gear doors, access doors, or other openings which will break the ground plane for the antenna. The ground plane surface directly beneath the COMM antenna should be a flat plane over as large an area (18 inches square, minimum) as possible.

A Conventional 50 Ω vertically polarized COMM antenna is required with the KLX 135/135A. Vertically bent whip communication antennas are not recommended. Wideband COMM antennas provide efficient operation over the COMM band. Antennas should be installed according to the manufacturer's recommendations.

A back-up plate should be used for added strength on thin-skinned aircraft.

To prevent rf interference, the antenna must be physically mounted a minimum distance of three feet from the KLX 135/135A and the wiring harness.

The antenna should be mounted a minimum of six feet away from the DME antenna and four feet from the ADF sense antenna.

Where practical, plan the antenna location to keep cable lengths as short as possible and avoid sharp bends in the cable to minimize the VSWR.

Avoid running other cables or wires near the antenna cable.

On pressurized aircraft, the antenna should be sealed using RTV No. 3145 (P/N 016-01082-0000) or equivalent around the connector and mounting hardware.

All antenna mounts should be sealed around the base from the outside for moisture protection using RTV or equivalent.

Mount the antenna in as clean an environment as possible, away from exhaust gases and oils. The antenna should be kept clean. If left dirty (oil covered), the range of the transceiver/receiver may be affected.

The antenna connectors on the KLX 135/135A are identified on the rear die casting.

C. GPS Antenna

1) The KA 91 and KA 92 GPS active antennas, P/N 071–01545–0200 and 071–01553–0200 respectively, are the designated antennas for the KLX 135/135A.

2) The antenna should be mounted on top of the fuselage near the cockpit. Avoid mounting the antenna near any projections, the propeller, and the T–tail of the aircraft, where shadows could occur. It is recommended that there be a separation of at least 3 ft between the GPS antenna and any VHF Comm antenna on the aircraft. Antenna baseplate must be level within ± 5° in both axes when the aircraft is in level flight. If the antenna is tilted more than ± 5° or is mounted close to other objects that shadow it, loss of some of the satellites will occur and system performance may be degraded. Antenna cable and connector information, including vendor information, is listed below. Refer to figure 2–14 (TNC) and figure 2–15 (BMA) for cable/connector assembly instructions for the 0 to 40 feet category using RG 400/U or RG 142B/U. Refer to figure 2–16 (for both TNC and BMA) for the 0 to 80 feet and 0 to 100 feet categories.

NOTE

The nominal gain figure for the KA 91/92 is 26.5 dB and the noise figure is 2.3 dB. With 0.050 ice on radome, gain will not decrease by more than 2.0 dB when viewing a satellite from 30° above the horizon to zenith, as compared to a no ice condition.

CABLE LENGTH	CABLE PART NUMBER	BMA CONNECTOR	TNC CONNECTOR	MAXIMUM ALLOWABLE LOSS (dB)
0 to 40 ft.	P/N: 024-00002-0000 VPN: RG142B/U	P/N: 030-00101-0002 VPN: TED Mfg. 9-30-10	P/N: 030-00134-0000 VPN: TED Mfg. 5-10-30	8.0
0 to 80 ft.	P/N: 024-00072-0000 VPN: ECS 311601	P/N: 030-00452-0000 VPN: TED Mfg. 9-30-26	P/N: 030-00108-0002 VPN: TED Mfg. 5-10-307	8.0
0 to 100 ft.	P/N: 024-00071-0000 VPN: ECS 311201	P/N: 030-00452-0001 VPN: TED Mfg. 9-30-25	P/N: 030-00108-0003 VPN: TED Mfg. 5-10-306	8.0
100 to 165 ft.	Contact TED, ECS or PIC for complete cable/connector assembly.			

TED Manufacturing Corp.
11415 Johnson Drive
Shawnee, Kansas 66203
Tel: (913) 631-6211

Electronic Cable
11227 W. Forest Home Avenue
Franklin, Wisconsin 53132
Tel: (800) ECS-WIRE
or (414) 529-5500

Specialists (ECSPIC Wire and Cable
N63 W 22619 Main Street
P.O. Box 330
Sussex, Wisconsin 53089
Tel: (800) 742-3191
or (414) 246-0500

2.3.5 KLX 135/135A INSTALLATION

The transceiver/receiver should be mounted using the dimensions specified in the outline and mounting drawing, Figure 2-5. The transceiver/receiver should be wired according to the interconnect diagram, Figure 2-1.

A. Cable Harness and Connector Assembly

The KLX 135/135A uses a special connector that mates directly with the printed circuit board inside the unit (see Figure 2-5). Assemble the connector using the procedure described in paragraph 2.3.6.

B. Coax Connector

Refer to Figure 2-5 for the details for mounting the right angle coaxial BNC connector to the coax cable. Install the connector into the mounting rack.

C. Mounting Rack

(1) Rear connector wiring must be completed before permanently fastening the transceiver/receiver to the panel.

(2) Remove the area specified on the outline and mounting drawing (see Figure 2-5) for front and rear dimensions. Care must be taken to avoid damage to the adjacent equipment and cables.

(3) Secure the rack to the panel. The mounting rack must be secured in the rear by attaching it to a structural member of the airframe.

D. Comm Antenna

For antenna outline drawing, installation procedures, and mounting dimensions, refer to the manufacture's instructions. In lieu of specific instructions, the following general guidelines may be used.

(1) Peel backing off the antenna template and apply the template to the aircraft at the desired mounting location.

(2) Drill or cut the proper size holes for mounting the antenna, then remove the template.

(3) Using the antenna as a stencil, draw a line around the base of the antenna where it comes into contact with the aircraft. Then carefully scrape off the paint within the stenciled area. Lightly sand the bare metal with fine sandpaper to insure the removal of all paint and protective coatings.

(4) Sand the inside area of the aircraft where the backing plate will be located to remove chromate or other protective finish.

(5) Apply Alumiprep No.33, or equivalent, following the manufacture's directions to cleanse the metal of any residue.

(6) Apply Alodine no. 1001, or equivalent, following the directions on the container.

(7) Align the backing plate with the holes drilled in step (2). Fasten the backing plate securely in place, if required for reinforcement.

(8) Mount the antenna using the fasteners called out or those included with the antenna.

(9) Coaxial cable RG400/U, or equivalent, is normally used.

(10) Inspect coaxial cable connector for proper contact, then fasten the connector securely to the antenna.

E. KA 91/92 GPS Antenna

To maintain good performance from the antenna system, do not wax or paint the antenna.

(1) Using the correct template for the antenna chosen, mark the mounting holes on the aircraft fuselage.

(2) Drill and/or punch the required holes.

(3) Use a piece of fine sandpaper or emery cloth to sand the area on the fuselage skin on which the doubler plate for the antenna is to be mounted and on the aircraft skin under where the antenna will be mounted.

(4) Apply Alumiprep No. 33, P/N 016-01127-0000, to both the inside and outside areas of the fuselage and to the back of the doubler plate. Follow the directions on the container to cleanse the metal of any left over residue.

(5) Apply Alodine, P/N 016-01128-0000, to both locations following the directions on the container. This is used to ensure good bonding of the antenna and to prevent oxidation.

(6) Refer to Figure 2-8 for the P/N 155-05999-0000 installation drawing and mount the antenna as shown. First rivet the doubler plate in place. It is important that the doubler plate make a good electrical bond with the inside of the aircraft skin and that the antenna itself be well bonded to the aircraft.

(7) When installing the KA 91/92 antenna do not exceed 50 inch–lbs of torque on the antenna mounting screws.

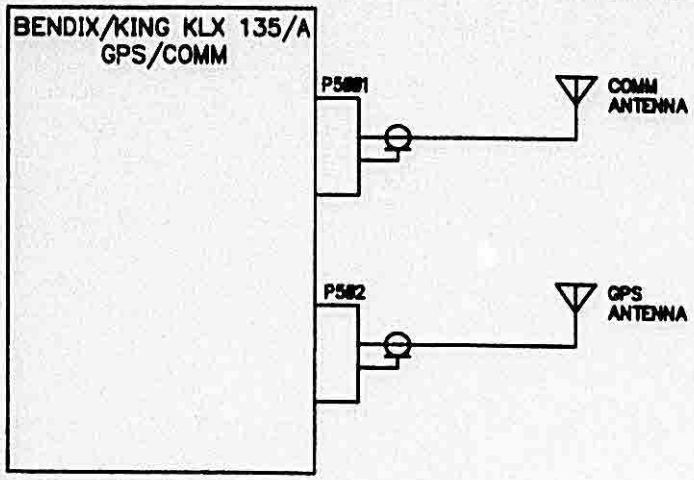
F. KLX 135/135A Unit

(1) Looking at the top of the unit, make sure the front lobe of the hold down device is in a vertical position.

(2) Slide the unit into the mounting rack until the front lobe touches the mounting rack.

(3) Insert a 3/32" Allen wrench through the hole in the front panel to engage the locking screw. Turn clockwise until the rear lobe engages the mounting rack. Continue turning until the unit is secure in the mounting rack. Do not overtighten.

(4) For removal, turn the locking screw counterclockwise using a 3/32" Allen wrench until the unit disengages from the mounting rack.



NOTES:

1. ALL WIRES ARE 24 AWG UNLESS OTHERWISE NOTED.
2. ⏚ CONNECT THE SHIELD/PIN TO AIRCRAFT CHASSIS WITH AS SHORT A CONDUCTOR AS PRACTICAL.
3. AIRCRAFT POWER WIRING SHOULD BE TWO 18 AWG WIRES TO THE CIRCUIT BREAKER. AIRCRAFT GROUND SHOULD BE TWO 18 AWG WIRES TO GROUND.
4. THE KLX135/A HAS TWO TYPES OF LIGHTING. THE NORMAL PANEL LIGHTING ILLUMINATES THE CONTROL NOMENCLATURE ON THE PANEL, AND BACK LIGHTING ILLUMINATES THE LIQUID CRYSTAL DISPLAY.
   14 VOLT LIGHTING BUS. CONNECT (P1A) TO THE 14 VOLT LIGHTING BUS AND CONNECT (P1-B AND P1-L) TO GROUND. THIS APPLIES A LIGHTING VOLTAGE TO THE PANEL. THE VOLTAGE IS MONITORED BY THE UNIT, AND IT PROVIDES DISPLAY BACK LIGHTING PROPORTIONAL TO THE LIGHTING VOLTAGE. WHEN THE LIGHTING VOLTAGE IS TURNED OFF (< 2 V) FOR DAYTIME OPERATION, THE UNIT PROVIDES FULL BRILLIANCE FOR THE DISPLAY BACK LIGHTING.
   28 VOLT LIGHTING BUS. THE OPERATION IS SIMILAR, BUT THE 28 VOLT LIGHTING BUS IS CONNECTED TO (P1-B). PIN (P1-L) IS CONNECTED TO GROUND AND (P1-A) IS NOT CONNECTED.
5. ANNUNCIATOR DIMMING MAY BE BY PHOTOCELL OR DAY/NIGHT SWITCH. DO NOT USE PANEL LIGHTING RHEOSTAT DIMMING BUS.
   SINCE THE "GPS APR" AND "GPS ORS" LEGENDS ARE DAYLIGHT VISIBLE WHITE IN AMBIENT LIGHT, IT IS NOT NECESSARY TO LIGHT THEIR LAMPS DURING DAYLIGHT OPERATION. THESE LAMPS MAY BE LIT DURING DAYLIGHT, MAY BE ILLUMINATED FROM THE PHOTOCELL OR DAY/NIGHT SWITCH, OR MAY BE DRIVEN ONLY FROM THE NIGHT POSITION OF THE DAY/NIGHT SWITCH. NOT ILLUMINATING THE LAMPS WITH THE HIGHER VOLTAGES USED DURING DAY OPERATION, HOWEVER, WILL GREATLY REDUCE THE TOUCH TEMPERATURE TO THE PILOT'S FINGERS.
6. PART OF [illegible] INTERFACE KIT.
7. INTERCOM OPERATION:
   A) THE MIC AUDIO MUST BE SWITCHED FROM P4881-3 COMM MIC IN KI TO P4881-D INTERCOM MIC IN AND P1-2 MIC KEY MUST BE OPENED TO PREVENT COMM TRANSMISSION.
   B) CONNECTING TWO MICROPHONES TO THE COMM MIC IN OR INTERCOM MIC IN AT THE SAME TIME MAY RESULT IN WEAK OR DISTORTED AUDIO. VARIATIONS IN MICROPHONES, EVEN WITH IDENTICAL MANUFACTURERS PART NUMBERS, CAN PRODUCE THIS PROBLEM. WHEN BOTH ARE CONNECTED AT THE SAME TIME. MIC ISOLATION RELAYS ARE RECOMMENDED SO THAT ONLY ONE MIC IS HOT AT ONE TIME.
8. TERMINATE AUDIO SHIELD AT ONE END ONLY, PREFERABLY AT THE AUDIO PANEL IF ONE IS USED.
9. CONNECT TX/RX INTERLOCK TO MIC KEY OF ANOTHER VHF TRANSCEIVER IF ANY ARE USED.
10. 32 KHZ SAWTOOTH WAVE, V P-P = 1.6 V (FACTORY USE ONLY).
11. FOR REMOTE FREQUENCY TRANSFER, A MOMENTARY GROUND AT P1-1 WILL TRANSFER THE USE AND STBY COMM FREQUENCY.
12. ISOLATION DIODES ARE LOCATED INSIDE THE KLX 135. SOME RECEIVERS OF THE ALTITUDE ENCODER DO NOT HAVE INTERNAL ISOLATION DIODES TO PREVENT THE UNIT FROM PULLING THE ENCODER LINES TO GROUND WHEN THE UNIT IS OFF. SOME TRANSPONDERS AND OTHER DEVICES DO NOT HAVE THE INTERNAL DIODES. THESE UNITS REQUIRE A DIODE TO BE ADDED TO THE INSTALLATION HARNESS FOR EVERY ENCODER LINE. THE DIODES ARE INSERTED AT THE CONNECTION TO THE UNIT THAT DOES NOT HAVE INTERNAL DIODES. THE ANODE IS ON THE RECEIVING UNITS SIDE AND THE CATHODE IS ON THE ENCODER SIDE. A 1N4997, OUR PART NUMBER [illegible], MEETS MSP A/D LIGHTNING REQUIREMENTS. A SET OF DIODES IS REQUIRED FOR EACH UNIT WITHOUT INTERNAL DIODES.
13. ENCODED ALTITUDE INPUTS ARE NEEDED FOR OPTIMUM SYSTEM PERFORMANCE, HOWEVER, THE SYSTEM WILL FUNCTION WITHOUT THESE INPUTS.

FIGURE 2-1 KLX 135/135A (+14 V DC) INTERCONNECT DIAGRAM
(Dwg No 155-05678-0000 R-2)
(Sheet 1 of 5)

BENDIX/KING

KLX 135/135A
COMMUNICATION TRANSCEIVER/
GPS RECEIVER

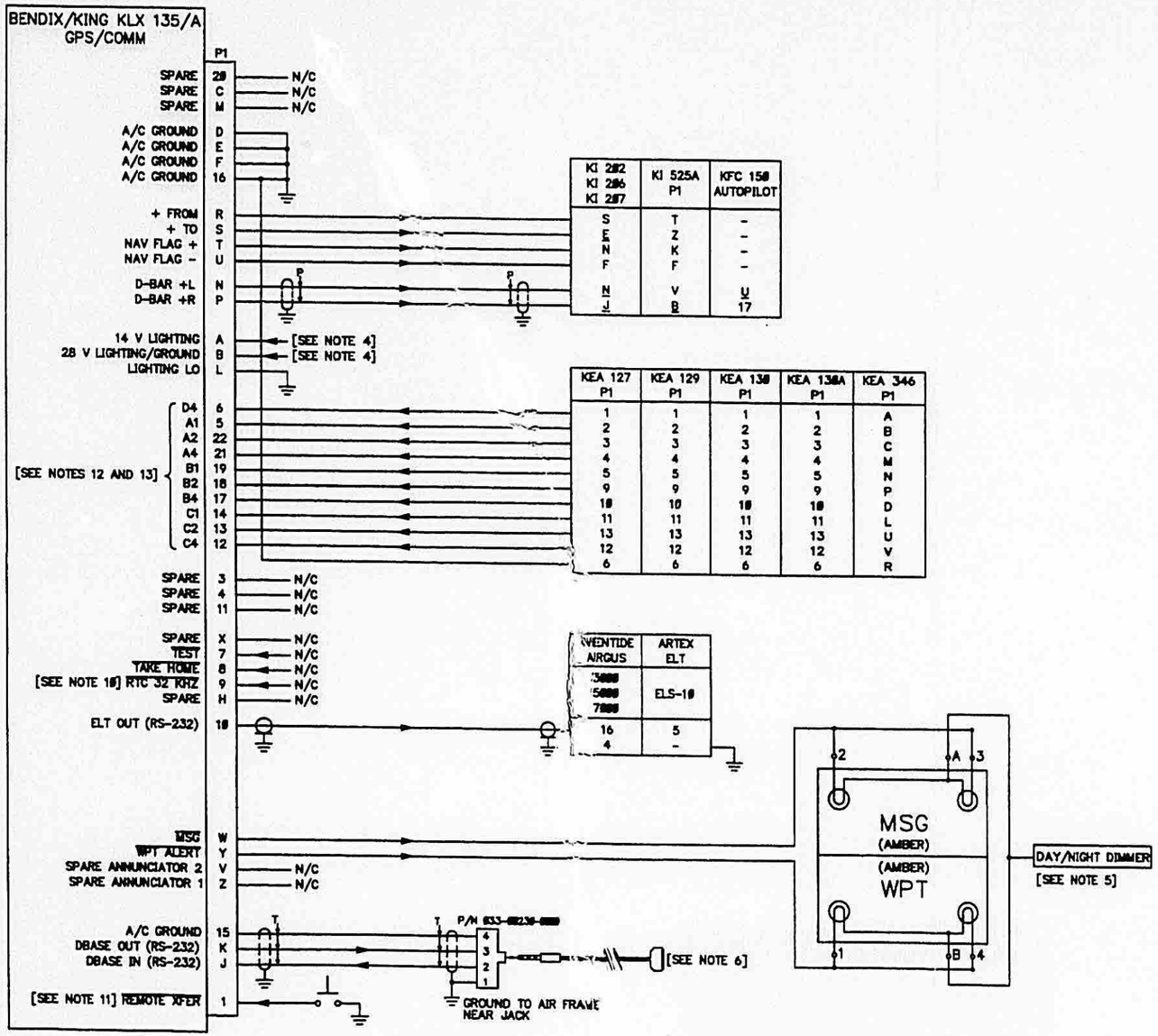


FIGURE 2-1 KLX 135/135A (+14 V DC) INTERCONNECT DIAGRAM
(DWG NO 155-05678-0000 R-2)
(SHEET 2 OF 5)

BENDIX/KING

KLX 135/135A
COMMUNICATION TRANSCEIVER/
GPS RECEIVER

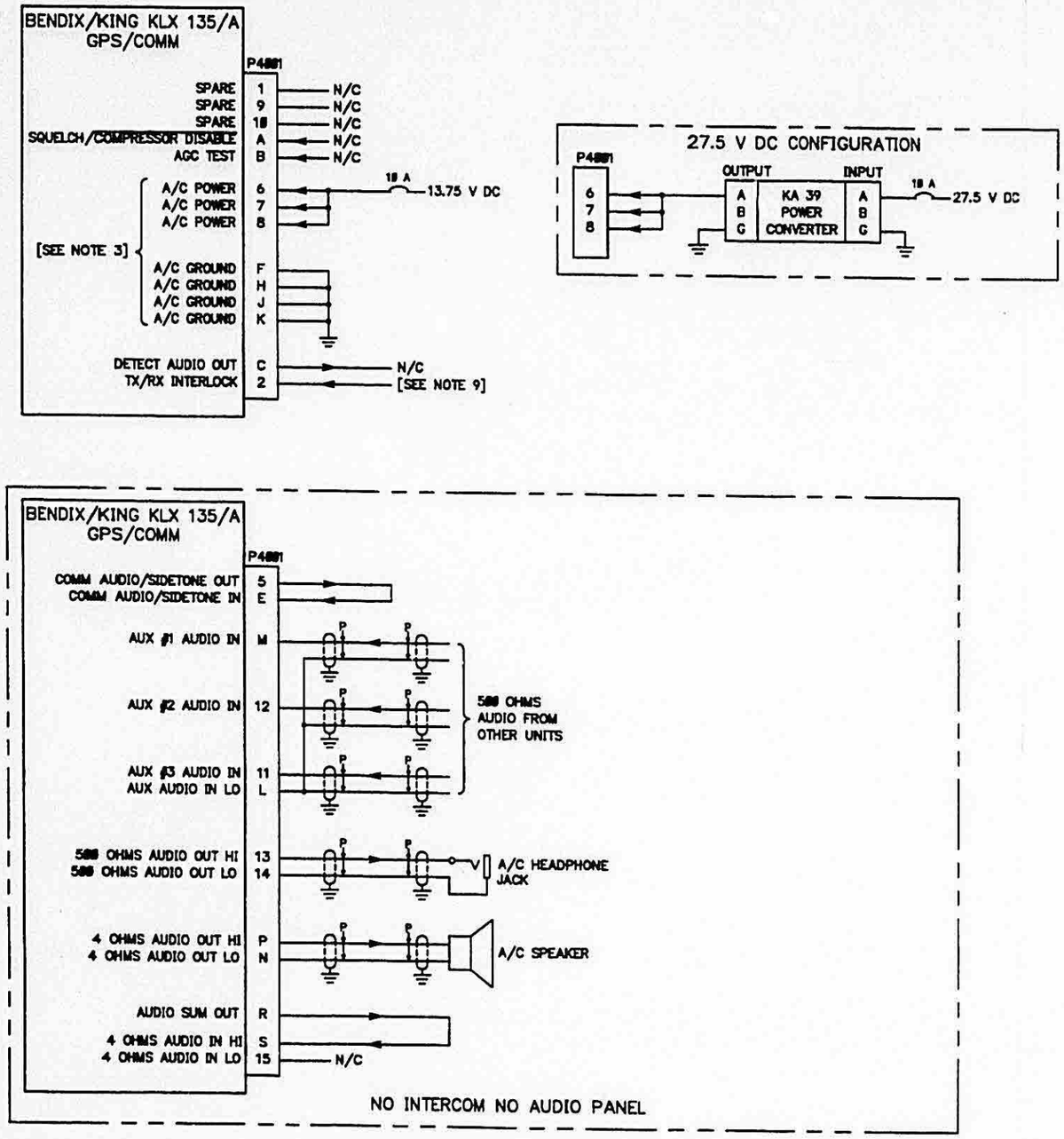


FIGURE 2-1 KLX 135/135A (+14 V DC) INTERCONNECT DIAGRAM
(DWG NO 155-05678-0000 R-2)
(SHEET 3 OF 5)

BENDiX/KING

KLX 135/135A
COMMUNICATION TRANSCEIVER/
GPS RECEIVER

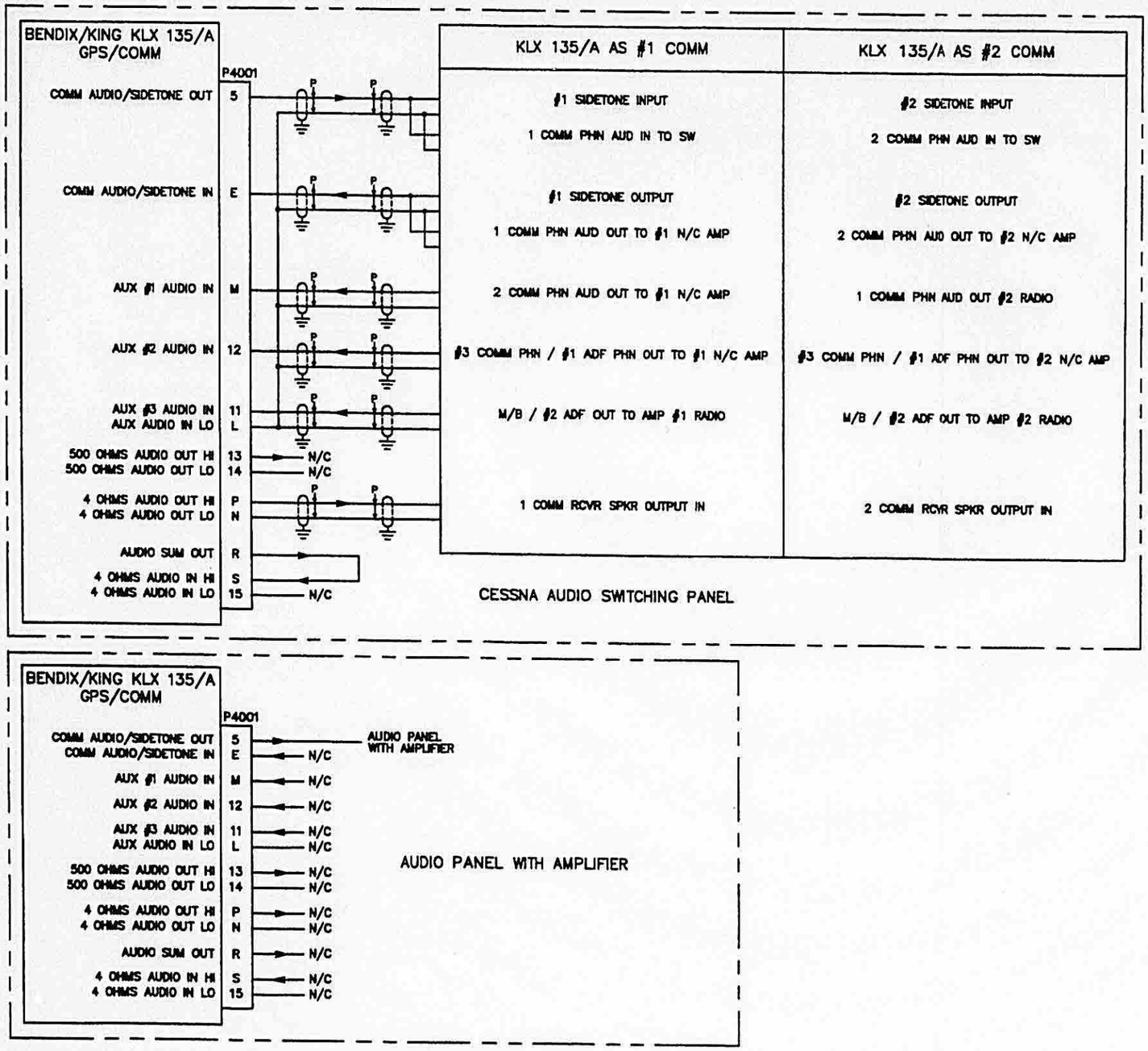
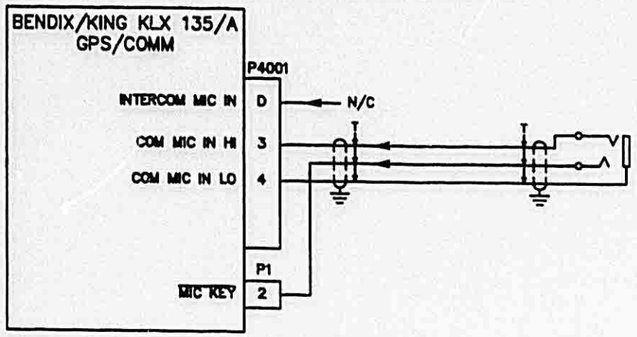


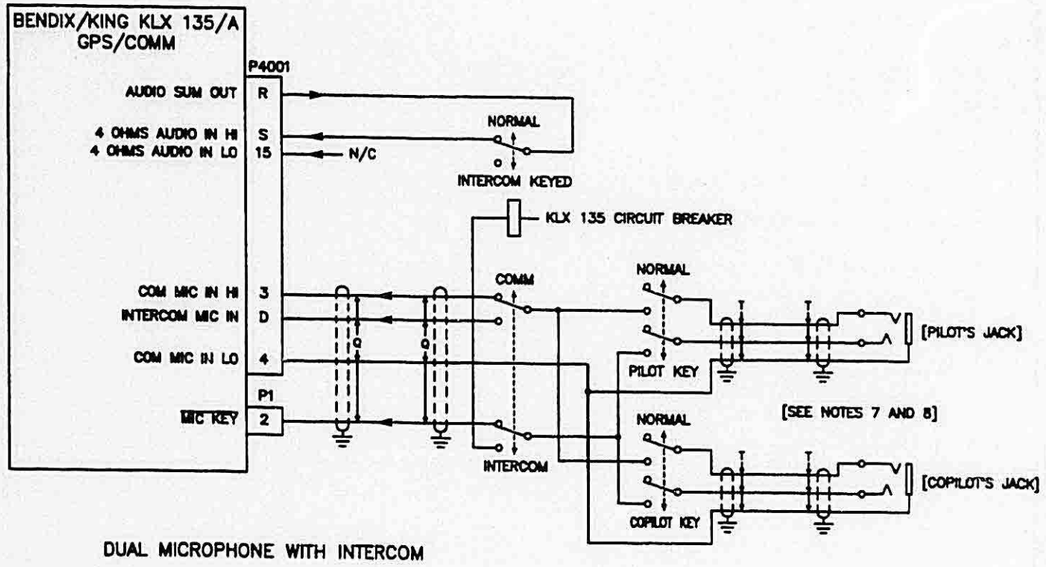
FIGURE 2-1 KLX 135/135A (+14 V DC) INTERCONNECT DIAGRAM
(DWG NO 155-05678-0000 R-2)
(SHEET 4 OF 5)

BENDIX/KING

KLX 135/135A
COMMUNICATION TRANSCEIVER/
GPS RECEIVER



SINGLE MICROPHONE WITH NO INTERCOM



DUAL MICROPHONE WITH INTERCOM

FIGURE 2-1 KLX 135/135A (+14 V DC) INTERCONNECT DIAGRAM
(DWG NO 155-05678-0000 R-2)
(SHEET 5 OF 5)

Main Connector - P 1

Pin Number		Description
1	.....→	$\overline{\text{REMOTE XFER}}$
2	.....→	$\overline{\text{MIC KEY}}$
3	.....	SPARE
4	.....	SPARE
5	.....→	A1
6	.....→	D4
7	.....→	$\overline{\text{TEST}}$
8	.....→	$\overline{\text{TAKE HOME}}$
9	.....→	$\overline{\text{RTC 32 KHZ}}$
10	.....	ELT OUT (RS-232)
11	.....	SPARE
12	.....→	C4
13	.....→	C2
14	.....→	C1
15	.....	A/C GROUND
16	.....	A/C GROUND
17	.....→	B4
18	.....→	B2
19	.....→	B1
20	.....	SPARE
21	.....→	A4
22	.....→	A2

← Output Input →

FIGURE 2-2 KLX 135/135A CONNECTOR PIN DIAGRAM
(Sheet 1 of 3)

Main Connector - P 1

Pin Number			Description
A		→	14 V LIGHTING
B		→	28 V LIGHTING/GROUND
C			SPARE
D			A/C GROUND
E			A/C GROUND
F			A/C GROUND
H			SPARE
J		→	DBASE IN (RS-232)
K	←		DBASE OUT (RS-232)
L			LIGHTING LO
M			SPARE
N	←		D-BAR +L
P	←		D-BAR +R
R	←		+ FROM
S	←		+ TO
T	←		NAV FLAG +
U	←		NAV FLAG -
V	←		SPARE ANNUNCIATOR 2
W	←		$\overline{\text{MSG}}$
X			SPARE
Y	←		$\overline{\text{WPT ALERT}}$
Z	←		SPARE ANNUNCIATOR 1

← Output Input →

FIGURE 2-2 KLX 135/135A CONNECTOR PIN DIAGRAM
(Sheet 2 of 3)

Connector - P 4001

Pin Number			Description
1		.....	SPARE
2		.....→	TX/RX INTERLOCK
3		.....→	COM MIC IN HI
4		.....→	COM MIC IN LO
5	←	.....	COMM AUDIO/SIDETONE OUT
6		.....→	A/C POWER
7		.....→	A/C POWER
8		.....→	A/C POWER
9		.....	SPARE
10		.....	SPARE
11		.....→	AUX #3 AUDIO IN
12		.....→	AUX #2 AUDIO IN
13	←	.....	500 OHM AUDIO OUT HI
14		.....	500 OHM AUDIO OUT LO
15		.....	4 OHM AUDIO IN LO
A		.....→	SQUELCH/COMPRESSOR DISABLE
B		.....→	AGC TEST
C	←	.....	DETECT AUDIO OUT
D		.....→	INTERCOM MIC IN
E		.....→	COMM AUDIO/SIDETONE IN
F		.....	A/C GROUND
H		.....	A/C GROUND
J		.....	A/C GROUND
K		.....	A/C GROUND
L		.....	AUX AUDIO IN LO
M		..... →	AUX #1 AUDIO IN
N		.....	4 OHM AUDIO OUT LO
P	←	.....	4 OHM AUDIO OUT HI
R	←	.....	AUDIO SUM OUT
S		..... →	4 OHM AUDIO IN HI

← Output Input→

FIGURE 2-2 KLX 135/135A CONNECTOR PIN DIAGRAM
(Sheet 3 of 3)

2.3.6 MOLEX CONNECTOR ASSEMBLY PROCEDURE

The installer has two options of fabricating the wiring harness for the KLX 135/135A. The option includes soldering the connectors or crimping the connectors onto the wires. Refer to instructions in Figure 2-3.

A. Solderless Contact Terminal Assembly using Pliers

(1) Strip each wire 5/32 inches for contact terminal (P/N 030-01107-0024). The last two digits of the contact terminal part number indicates the number of terminals furnished.

(2) Tin the exposed conductor.

(3) Using needle nosed pliers, fold over each conductor tab, in turn, onto the exposed conductor. when both tabs have been folded, firmly press the tabs against the conductor.

B. Solderless Contact Terminal Assembly using Molex Crimper (Figure 2-3)

(1) Strip each wire 5/32" for contact terminal (KPN 030-01107-00XX). (The last two digits of the contact terminal part number indicates the number of terminals required).

(2) Open the Molex hand crimper HTR-6115 with the engraved side toward the operator. Place the conductor tab section of a contact terminal on Anvil B with the contact portion facing away from the operator. Close the crimper slightly until the contact tabs touch the female jaw.

(3) Insert the stripped conductor until the insulation is even with the side of the crimper facing the operator. Crimp the conductor tabs by squeezing the handles together until the jaws are fully closed or a sufficient crimp is obtained.

(4) Move the lead to Anvil A. Place the insulating tab section on Anvil A. Crimp again until the jaws are fully closed or a sufficient crimp is obtained.

C. Contact Insertion into Molex Connector Housing

(1) After the contact terminals have been installed on the wiring harness, the contact terminals can be inserted into the proper location in the connector housing (P/N 030-01094-00XX). The terminal cannot be inserted upside down. Be sure to push the terminal all the way in, until a click can be felt or heard.

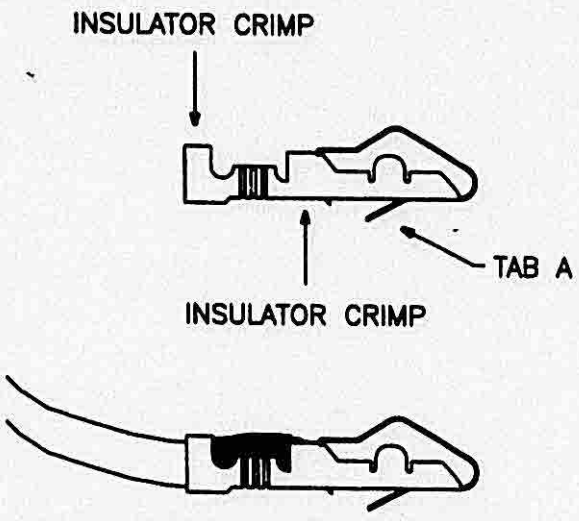
(2) The self locking feature can be tested by gently pulling on the wire.

D. Extraction of Contact from Molex Connector

(1) Slip the flat narrow blade of a Molex contact ejector tool, HT-1884 (BENDIX/KING P/N 047-05099-0001), under the contact on the mating side of the connector. By turning the connector upside down one can see the blade slide to the stop.

(2) When the ejector is positioned against the stop the locking key of the contact is raised, allowing the contact to be removed by pulling moderately on the lead.

(3) Neither the contact or position is damaged by removing a contact; however, the contact should be checked visually before reinstalling in connector, to be certain that retaining tab "A" extends as shown (see Figure 2-3 below) for retention in connector.



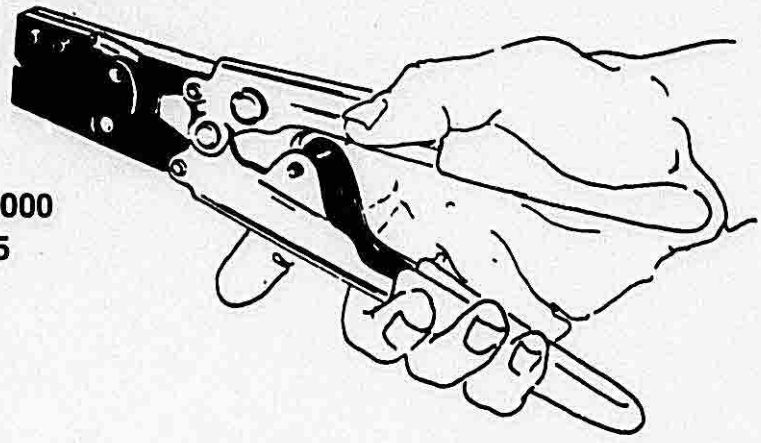
SOLDERLESS CONTACT TERMINAL
P/N 030-01107-0030

HAND EJECTOR
P/N 047-05099-0001
MOLEX P/N HT-1884

FIGURE 2-3 CRIMPING TOOLS AND CONNECTORS
(Sheet 1 of 3)

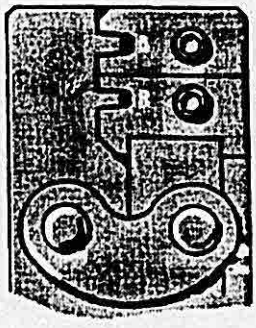
Holding the hand crimpers as shown, release the crimper's ratchet pawl and open by squeezing tightly on the handles, and then releasing pressure.

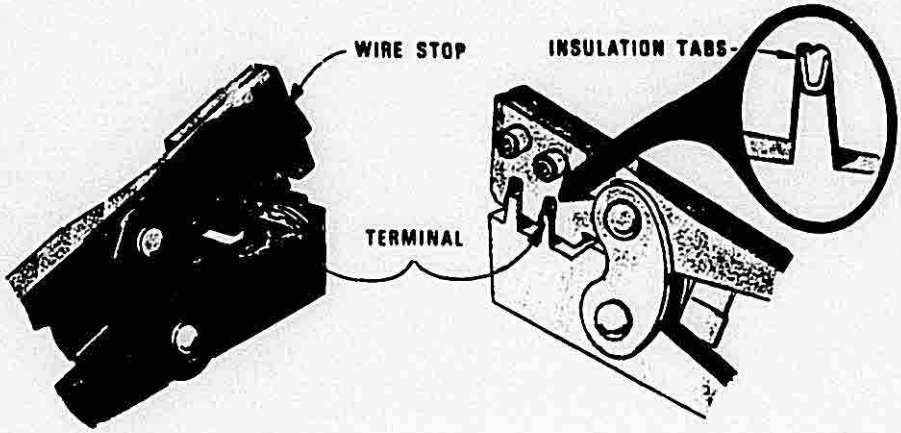
HAND CRIMPER
P/N 071-06041-0000
MOLEX P/N 6115



Close crimpers until ratchet begins to engage. Then insert terminal into jaws from the back side. (See the following; Figure 2-3 Sheet 2 below). For 24 to 30AWG wire, it will be necessary to start the crimp in jaw A and then complete in jaw B.

JAW	TERMINAL	WIRE SIZE	INSULATION RANGE
A	030-01107-0030	18 to 24AWG	.110 TO .055
B	030-01107-0030	24 to 30AWG	.055 to .030

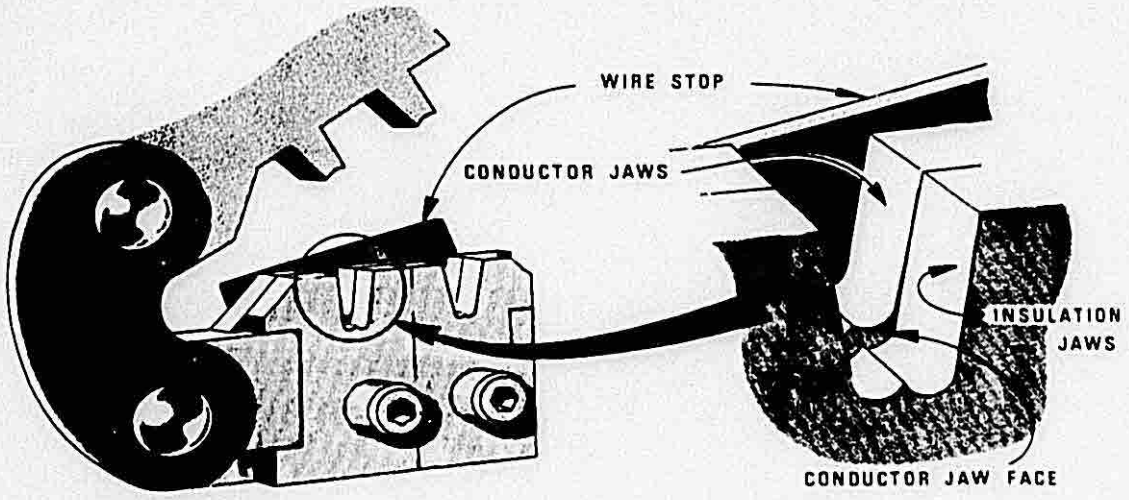




Terminal is in the correct position when insulation tabs are flush with outside face of crimp jaws.

FIGURE 2-3 CRIMPING TOOLS AND CONNECTORS
(Sheet 2)

Once the terminal is in the correct position, close the jaws gently until the terminal is held loosely in place. Push the wire stop down so that it rests snugly behind the contact portion of the terminal. Strip off 1/8 inch of the wire insulation and insert the wire through the insulation tabs into the conductor tabs until the insulation hits the conductor jaw face or until the conductor touches the wire stop.



Squeeze the handles until the crimp jaws close and the ratchet releases.
Straighten the terminal if necessary, then release the plier grips and remove the crimped terminal.

CRIMPING PRESSURE ADJUSTMENT

If too much or too little pressure is needed to release the crimper's ratchet pawl at the end of the crimp stroke, the ratchet can be easily adjusted. A spanner wrench provided with the tool can be used to loosen the lock nut, and rotate the keyed stud clockwise for increased pressure and counter-clockwise for decreased pressure. Once the desired pressure has been set, the lock nut must be tightened again. Newer models may have a screwdriver adjustment.

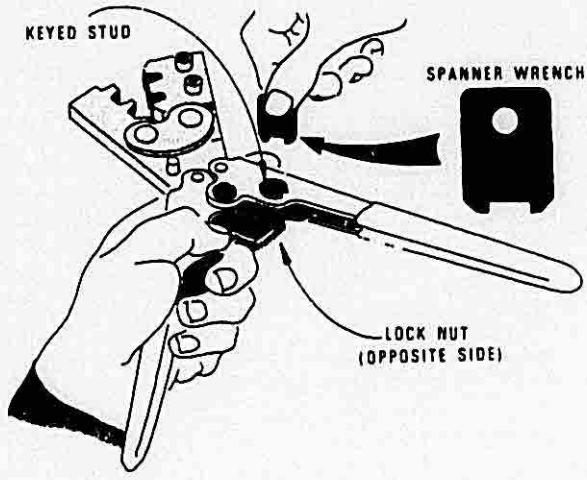


FIGURE 2-3 CRIMPING TOOLS AND CONNECTORS
(Sheet 3)

2.4 POST INSTALLATION TEST PROCEDURE

2.4.1 TRANSCEIVER/RECEIVER SYSTEM CHECKOUT

The post-installation test is used to apply power and functionally checkout the system. Successful completion of the post-installation test verifies the proper operation of the KLX 135/135A Communication Transceiver/GPS Receiver System.

Figure 2-4 is a visual inspection/check procedure that should be performed after system installation as part of a system checkout. A post-installation test per paragraph 2.4.1 B. should be performed. In addition, the procedure should be used as a periodic maintenance inspection check.

EQUIPMENT	INSPECTION/CHECK PROCEDURE
KLX 135/135A Transceiver/Receiver	A. Inspect external surface for damage. B. Check that the unit is securely installed and that retaining mechanism is securely tightened. C. Ensure that all connections in the transceiver/receiver are properly mounted and secure.
Antennas	A. Inspect external surfaces for damage. B. Check that antenna is properly mounted and mounting screws are tight. C. Ensure that antenna coaxial cable connectors are properly mated and secure.

FIGURE 2-4 INSPECTION/CHECK PROCEDURE

A. Inspection

Perform the following inspection on the overall system:

(1) Check that cables do not interfere with aircraft controls or other equipment.

(2) Check cabling for proper routing and check security of tie-down points. Inspect and adjust cable runs to ensure that cables are not strained, kinked, or severely twisted and are not exposed to rough or sharp surfaces.

B. Post-Installation Test/Operation

(1) General

Installation of the transceiver/receiver system requires three stages of testing to ensure the proper operation of the transceiver/receiver. Initially, prior to the installation of the transceiver/receiver and antenna, a system interwiring check should be performed. This check verifies that the aircraft and all transceiver/receiver interconnections are correct, before power is applied. After

the units are installed a visual inspection of the equipment and connections is made.

(2) System Interwiring Check

To check the aircraft and transceiver/receiver system interconnections proceed as follows:

(a) Check that all cables and interwiring are installed in accordance with the Interwiring and Cable Harness Fabrication instructions (paragraph 2.3.3).

(b) Using the interconnect diagram (see Figure 2-1), check wiring for proper destination, opens, and shorts.

(c) Check rf cables for VSWR.

(3) Visual Inspection

In conjunction with system installation, perform the inspection/check procedure (Figure 2-4 in this section).

(4) Post-Installation Test

The Post-Installation Test verifies the proper operation of the KLX 135/135A Transceiver/Receiver System. This procedure is used after the system units have been installed and thereafter as an operational check. This procedure is comprised of a pretest setup, a pre-flight turn on and a visual inspection. The following tests and check are performed on the ground.

(a) Pretest Setup

1) Check KLX 135/135A system source power as follows:

a Confirm that aircraft power is operational.

b Confirm that the aircraft panel background lighting power source is operational by adjusting the cockpit dimmer switch for proper cockpit panel illumination.

2) Operate appropriate aircraft circuit breakers and switches to apply power to the system as follows:

a Apply aircraft power to transceiver/receiver.

b Apply primary power inputs to all systems that interface with the transceiver/receiver(s) per the system configuration.

3) Verify that all KLX 135/135A circuit breakers are closed.

4) Allow one minute for warmup.

(b) Pre-Flight Turn On Test

1) Rotate the COMM Volume (VOL) knob clockwise from the OFF position.

2) The Turn-On page will be displayed for a few seconds. During this time, the KLX 135/135A performs an internal test. The operational revision status (ORS) level number in the upper right corner of the display should match the ORS level indicated on the first page of the Pilot's Guide.

   When the internal test is complete, the Turn-On page will automatically be replaced by the Self Test page.

3) Verify that the data displayed on the Self Test page is the same that is being displayed on the equipment (if any) in the aircraft which is interfaced to the KLX 135/135A. If the KLX 135/135A is not connected to any other equipment in the aircraft, you may skip to step 5.

   If the KLX 135/135A is interfaced with a NAV indicator such as an HSI or a course deviation indicator (CDI), the deviation bar (D-bar) should be indicating a half scale deviation to the right. The TO/FROM indicator should be showing FROM.

4) If the KLX 135/135A has passed the internal self test, the bottom left side of the Self Test page will display **Self-test Pass** and all external annunciators will be illuminated. If **Self-test Fail** is displayed, recycle power to the KLX 135/135A. If the Self Test page still displays **Self-test Fail,** the KLX 135/135A requires repair and should not be used for navigation.

5) When you are ready to approve the Self-test page, press the {ENT} button while the **Ok?** is flashing. If it is not flashing, press the {CRSR} button.

6) The next page displayed will be the Initialization page. Verify that the date displayed in the top left corner of the Initialization page is correct. The KLX 135/135A has an internal battery powered calendar/clock, so the date and time normally don't require setting. The battery has a life of approximately 3 years. In addition, the KLX 135/135A's system date and time are automatically updated when at least one satellite is being received. However, if for some reason the date or time are incorrect it is necessary to enter the correct date or time so that the KLX 135/135A can reach the navigation mode. The date must be correct and the time must be correct within ten minutes so that the KLX 135/135A will start looking for the correct satellites.

If the date is incorrect, rotate the right outer knob counterclockwise until the cursor is over the entire date field. Rotate the right inner knob until the correct day of the month is displayed. Then, move the cursor to the month field by rotating the outer knob one click clockwise and change the month as necessary. Use the same methods to select the correct year. When the date is correct, press {ENT}.

7) Verify that the time displayed in the upper right corner of the Initialization page is correct to within ten minutes of the actual time. However, you are responsible for assuring the desired time zone is selected on the KLX 135/135A. If it is necessary to reset the time, position the cursor over the time zone field and select the desired time zone. The following are the time zones which the KLX 135/135A is capable of displaying:

UTC	Coordinated Universal Time (Zulu)
GST	Greenland Standard Time (UTC - 3)
GDT	Greenland Daylight Time (UTC - 2)
ATS	Atlantic Standard Time (UTC - 4)
ATD	Atlantic Daylight Time (UTC - 3)
EST	Eastern Standard Time (UTC - 5)
EDT	Eastern Daylight Time (UTC - 4)
CST	Central Standard Time (UTC - 6)
CDT	Central Daylight Time (UTC - 5)
MST	Mountain Standard Time (UTC - 7)
MDT	Mountain Daylight Time (UTC - 6)
PST	Pacific Standard Time (UTC - 8)
PDT	Pacific Daylight Time (UTC - 7)
AKS	Alaska Standard Time (UTC - 9)
AKD	Alaska Daylight Time (UTC - 8)
HAS	Hawaii Standard Time (UTC - 10)
HAD	Hawaii Daylight Time (UTC - 9)
SST	Samoa Standard Time (UTC - 11)
SDT	Samoa Daylight Time (UTC - 10)
LCL	User Defined Timer (UTC ± 00–12)

Once you have selected the desired time zone, position the cursor over the entire time field and select the correct hour with the right inner knob. Since 24 hour time is used, be sure to add 12 if the time is after 1:00 P.M. (2:30 P.M. becomes 1430). Now move the cursor to the tens of minutes position and select the desired value, and repeat this process for the last digit of the time field. When the correct time has been entered, press {ENT} to start the clock running.

8) To aid the GPS receiver in acquiring your position, it is good that it have a reasonable idea of where you are. Check to see if the displayed initial position is where you are actually located. This latitude/longitude is the last known position before the power was shut down the last time. Unless the unit has been moved since its last use, this position should be correct. On the right side of the screen will be the identifier of the nearest airport in the data base, with a radial and distance from that airport. If you need to change the initial position to--let's say-- John F. Kennedy International (KJFK), move the cursor to the WPT: field and use the right inner knob to select a K as the first character of the identifier. Move the cursor to the next character and select a J and an F. The K should be filled in by the data base. When you press {ENT}, the latitude and longitude fields will change to those of KJFK. If necessary, the latitude and longitude may be entered manually.

9) When all information on the Initialization page is correct, move the cursor to **Ok?** and press {ENT} to move on.

10) The VFR page warning page will now be displayed. Press {ENT} to approve this page.

GPS For VFR use only
Acknowledge ?

11) The Data Base page will now be displayed with the cursor over **Acknowledge?**. Line 1 on the KLX 135 indicates whether a North American or International data base is being used. Line 1 on the KLX 135A indicates whether an Americas, Pacific International or Atlantic International data base is being used. If the data base is current, line 3 will show the date when the data base expires. If, on the other hand, the data base is out of date, line 3 shows the date that it expired. The KLX 135/135A will still function with an out of date data base; however, you must exercise extreme caution and always verify that the data base information is correct before using information from an out-of-date data base. Press {ENT} to acknowledge the information on the Data Base page.

CAUTION

The accuracy of the data base information is assured only if the data base is current. Operators using an out-of-date data base do so entirely at their own risk.

A waypoint page for the waypoint which was active when the KLX 135/135A was last turned off will be displayed on the screen. If the

last active waypoint was an airport, the APT 4 page showing the airport's communications frequencies will be displayed.

12) Verify that the COMM FREQ window displays the frequencies stored in the non-volatile memory. Further checkout of the communications transceiver should be done in flight testing. As an added precaution before the flight test the antenna VSWR should be checked with an in-line type wattmeter. The wattmeter should be inserted in the coaxial transmission line between the transceiver and the antenna. Any problem with the antenna installation will most likely be seen as a high reflected power. A VSWR of 3:1 will result in a 25% loss of power.

13) Check the NAV 2 page to see your present position. Use the right outer knob to select the NAV page type and then the right inner knob, if necessary, to select the NAV 2 page. It is quite likely that the present position will be dashed at first. It takes the KLX 135/135A several minutes to acquire the GPS satellites and to make its initial calculation of your position. When the KLX 135/135A reaches a NAV ready status and is able to navigate, the NAV 2 page will display your present position relative to the nearest VOR. Verify that the present position shown on the NAV 2 page is correct.

NOTE

In order to reach a Nav ready status, the aircraft must be away from obstructions blocking the GPS antenna's view of required satellites. If the KLX 135/135A fails to reach the NAV ready status within five minutes refer to the pilot's guide section 4.6 "Initialization and Time to First Fix".

14) The following paragraphs define additional checkout procedures for all possible Input/Output signals that can be connected to the KLX 135/135A. It should be clearly determined which of the signals are intended to be used in any given installation and then only the paragraphs pertaining to those signals should be performed.

a. Perform all steps defined in Paragraph 2.4.1 B(4)(b) steps 1) through 13) and leave the system energized with a valid GPS signal being received.

b. Cycle the power on the KLX 135/135A which will cause the self test page to be displayed. Verify that the CDI needle, after it has settled, is indicating half scale right deflection. Verify that the TO/FROM flag is indicating FROM. Verify that the nav flag is pulled from view.

c. With gray code altitude being supplied by a compatible encoding altimeter, verify that the proper altitude is indicated on the Self Test or Set 8 pages (provided no other altitude sources are active and that proper baro setting has been entered).

Verify that there is no interference between the KLX 135/135A, transponder, and any other loads on the encoding altimeter output. Remove power from each of the loads on the encoder to verify that the remaining equipment still performs properly. If interference exists, one or more of the units are not diode isolated and isolation diodes will need to be added to the aircraft wiring.

d. The following test must be conducted within five minutes after the hour with ELT transmissions limited to 3 (Three) sweeps. A sweep occurs each time there is a voice transmission. Verify that the present position is displayed on the KLX 135/135A Nav 2 page. Activate the Comm Receiver and tune it to 121.5 MHz. Switch The ELT cockpit toggle switch to TEST. The ELT light should flash and the "sweeping" sound of the ELT should be heard on the Comm Receiver. Within 1 (one) minute, a voice transmission should be heard which contains the present position displayed on the KLX 135/135A Nav 2 page. Switch the toggle switch to AUTO and push the reset button until it stops flashing.

e. If the KLX 135/135A is interfaced to a moving map display, verify operation by moving the aircraft out to an open location to acquire a satellite position. Enter some active flightplan or waypoint to develop a presentation on the map. Some moving maps require 2 kts of ground speed to display as the sense track angle is used instead of the heading. The KLX 135/135A does not output track angles when the groundspeed is below 2 kts.

f. Recycle the power on the KLX 135/135A which will cause the Self Test Page to be displayed. Verify that all external annunciators are energized. Cycle the KLX 135/135A display past all initialization pages. Verify all external annunciators are extinguished. If the message light comes on, view the Message Page to verify that there is a message. If any other annunciator remains lighted, review the status of the KLX 135/135A to determine if the lighted annunciator is justified.

NOTE

Annunciators should be checked one at a time in order to verify that the correct one lights.

g. The data base cartridge may be updated using a 3.5" disk and a laptop computer. The laptop computer must be IBM compatible, have an open COM 1 or COM 2 serial port, and have a 3.5" high density diskette drive.

Connect an IBM compatible laptop via PC loader kit P/N 050–03213–0000 (ref. figure 2–18). Set the KLX 135/135A to the Set 0 page. Put the #1 diskette into the PC. Cycle the power of the PC and follow the menu driven instructions.

NOTE

The KLX 135/135A database may be updated using a PC with the KLX 135/135A mounted in an aircraft (ref. figure 2–18).

(c) Comm Interference Tests

1) Energize the unit by rotating the power control switch to the "on" position.

2) Manipulate the controls as necessary to display the Set 1 Page on the screen.

On the Set 1 Page, enter the airport name or the present position (latitude and longitude) for the installation location accurate to within 60 nautical miles. Display the Set 2 Page. Verify that the date and time are correct to within 10 minutes and update if necessary.

3) At this point the aircraft will have to be moved to a location known to have reasonable GPS signal coverage. This implies an outside location away from tall structures that could mask low elevation satellites.

4) Select OTH 1 page. The State shown on the display should change to Acquire (ACQ) and after a period of not more than 5 minutes, (typically two minutes depending on the satellite coverage), the unit should display Latitude and Longitude values on the Nav 2 Page that are correct for the installation location. If the State shown is Search the Sky (SRCH), (Search the Sky mode will only be displayed on the KLX 135. The KLX 135A displays **ACQ** in the mode) the unit will take up to 15 minutes to calculate a position.

5) Select the OTH 2 page, verify that no asterisks appear next to any satellite with an elevation greater than 25°. Select 121.15 MHz on COMM 1. Transmit on COMM 1 for a period of 20 seconds and verify that no asterisks appear indicating satellites with an elevation of greater than 25°. Repeat for the following frequencies 121.175, 121.20, 131.250, 131.275 and 131.30 MHz. Repeat the above procedure for all VHF COMM's on board the aircraft.

If any of the above tests do not pass (any asterisks appear on satellites with greater than 25° during the above tests), it will be necessary to identify the source of the interference. There are two common sources of interference:

a. The 12th and 13th harmonics of the above mentioned frequencies can be radiated from the VHF COMM at a level strong enough to be a problem to the GPS but still be well low enough to meet TSO requirements for the VHF COMM. If the interference is from the radiating VHF COMM, an optional KA 198 notch filter (P/N 071–01565–0000 or TED Mfg 4–70–54) will need to be installed. The recommended location for the inline filter should be as close to the VHF RT as practical.

NOTE

The conditions and tests performed on this article are minimum performance standards. It is the responsibility of those desiring to install this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within these performance standards. The article may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by the Administrator.

b. The other possibility is re–radiation from an ELT. The radiated RF from the VHF COMM can excite the output tank circuit of the ELT and cause it to oscillate and radiate RF strong enough to interfere with the GPS. If disconnecting the ELT antenna eliminates the GPS interference, the manufacturer of the ELT should be contacted for a recommended solution.

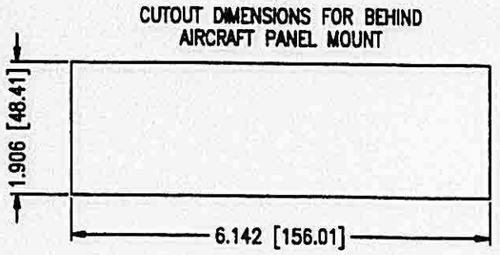
(d) Conformity Inspection

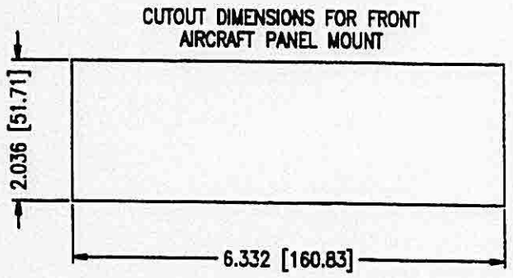
Visually inspect the installed equipment to determine the use of acceptable workmanship and engineering practices. Verify that all mechanical and electrical connections have been made properly.

2.4.2 FLIGHT TEST OF VHF TRANSCEIVER

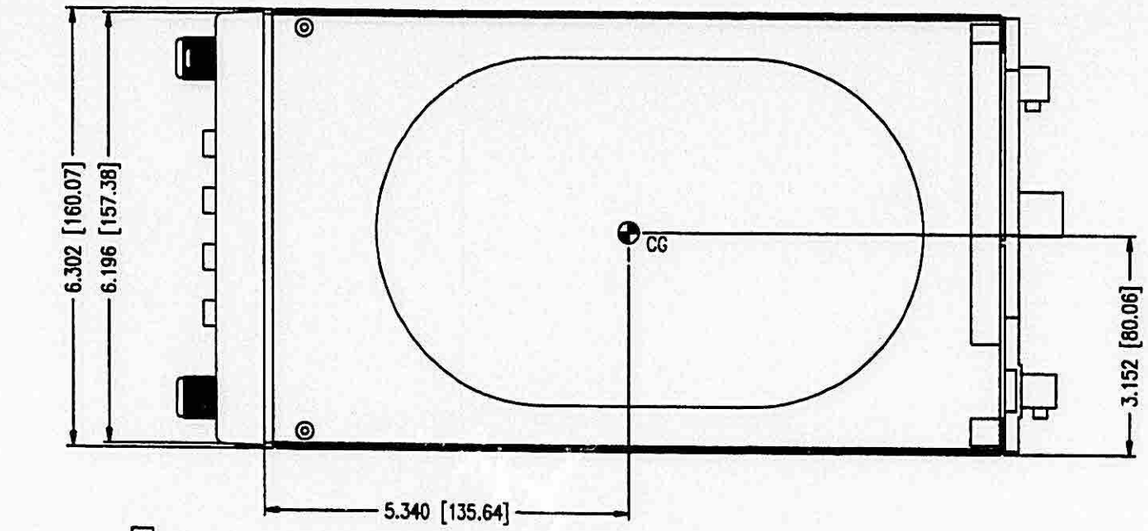
An operational performance flight test is recommended after the installation is completed to insure satisfactory performance of the equipment in it's normal environment. To check the communications transceiver, maintain an appropriate altitude and contact a ground station facility at a range of at least 50 nautical miles. Then contact a ground station close in. Pull the volume control out to defeat the automatic squelch feature 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 end of the VHF comm band.

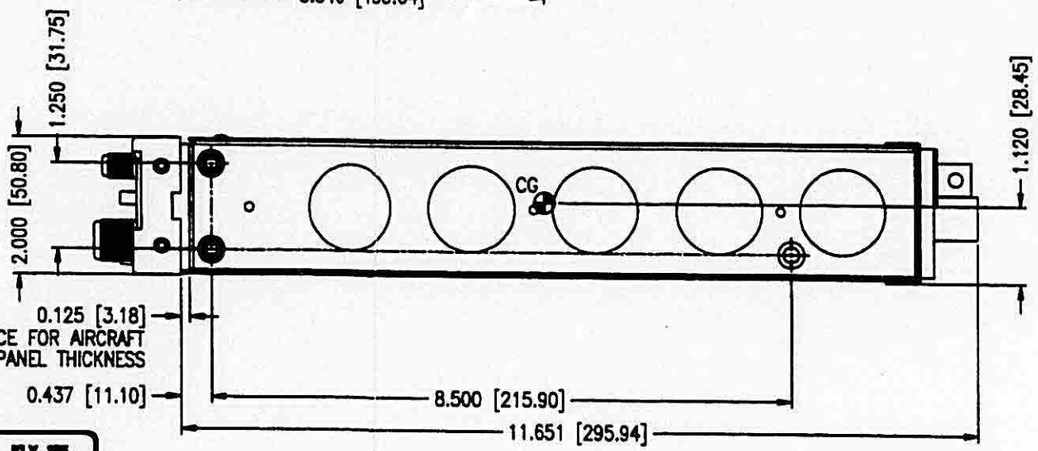
BENDIX/KING
KLX 135/135A
COMMUNICATION TRANSCEIVER/
GPS RECEIVER





NOTES:
1. ALL DIMENSIONS IN INCHES [ ] ARE IN MM.
2. WEIGHT: 4.35lbs (1.98kg) WITHOUT MTG. RACK AND CONNECTORS.
   5.02lbs (2.28kg) WITH MTG. RACK AND CONNECTORS.
3. INSTALLATION KIT IS KPN 050-02217-0000.
4. THIS RACK IS PART OF 069-01029-9900 FINAL ASSEMBLY BOM.
5. WHEN INSTALLING TWO OR MORE PANEL MOUNTED UNITS IN A STACK. THE MOUNTING TRAYS SHALL BE 0.050 INCHES (1.27mm) APART, MINIMUM.





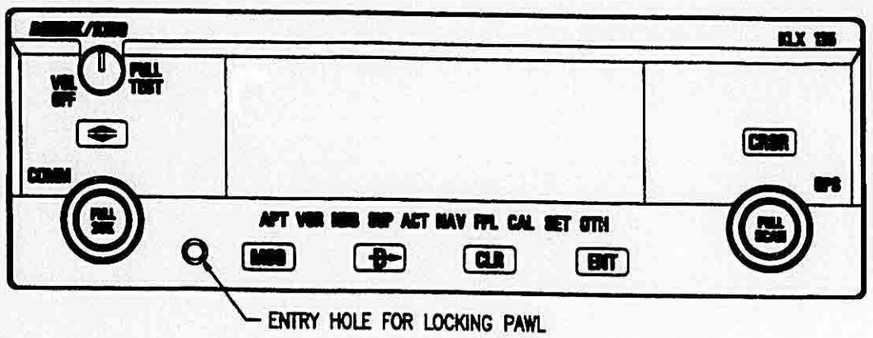


FIGURE 2-5 KLX 135/135A OUTLINE AND MOUNTING DRAWING
(DWG NO 155-05676-0000 R-3)
(SHEET 1 OF 2)

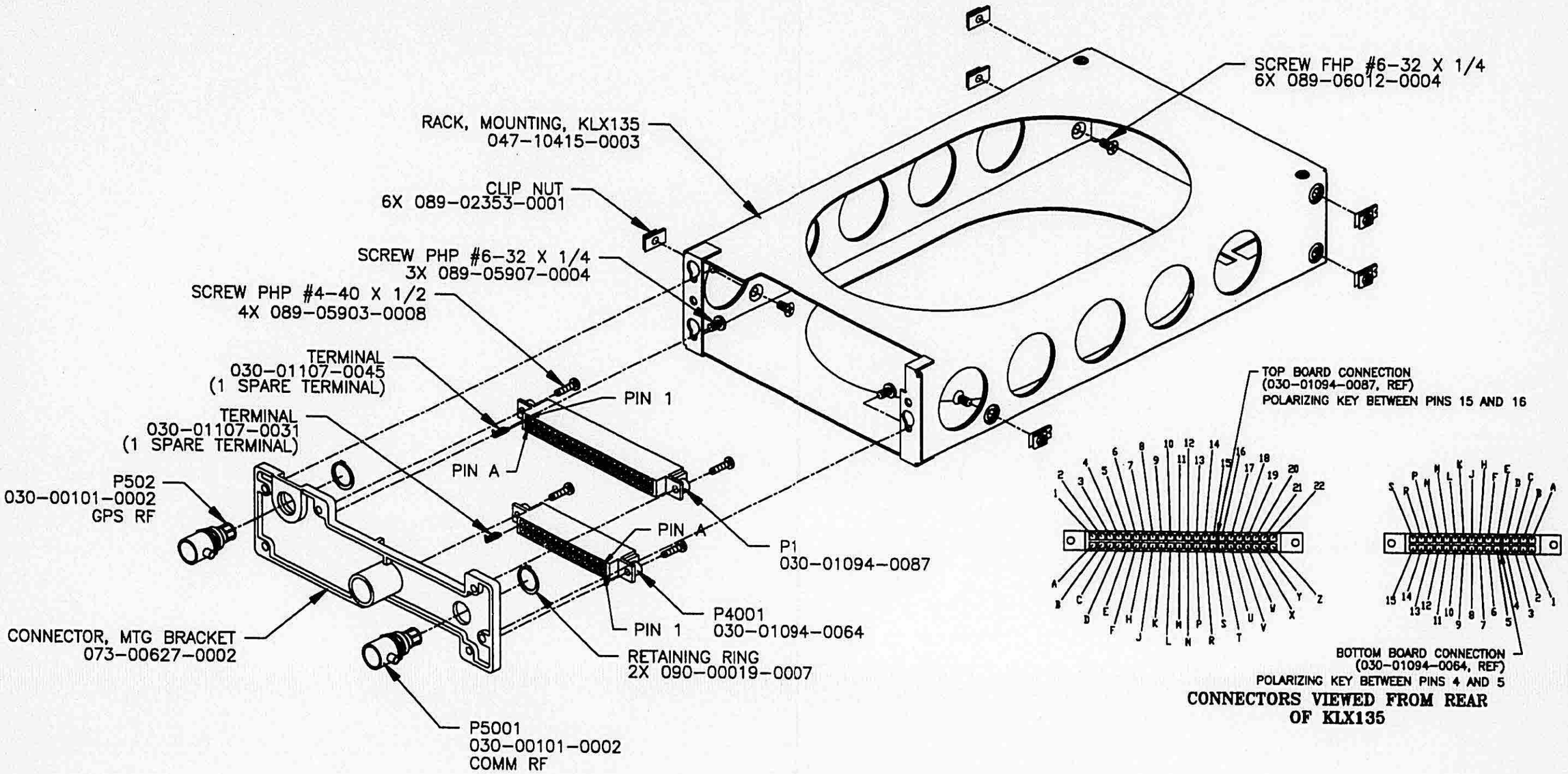
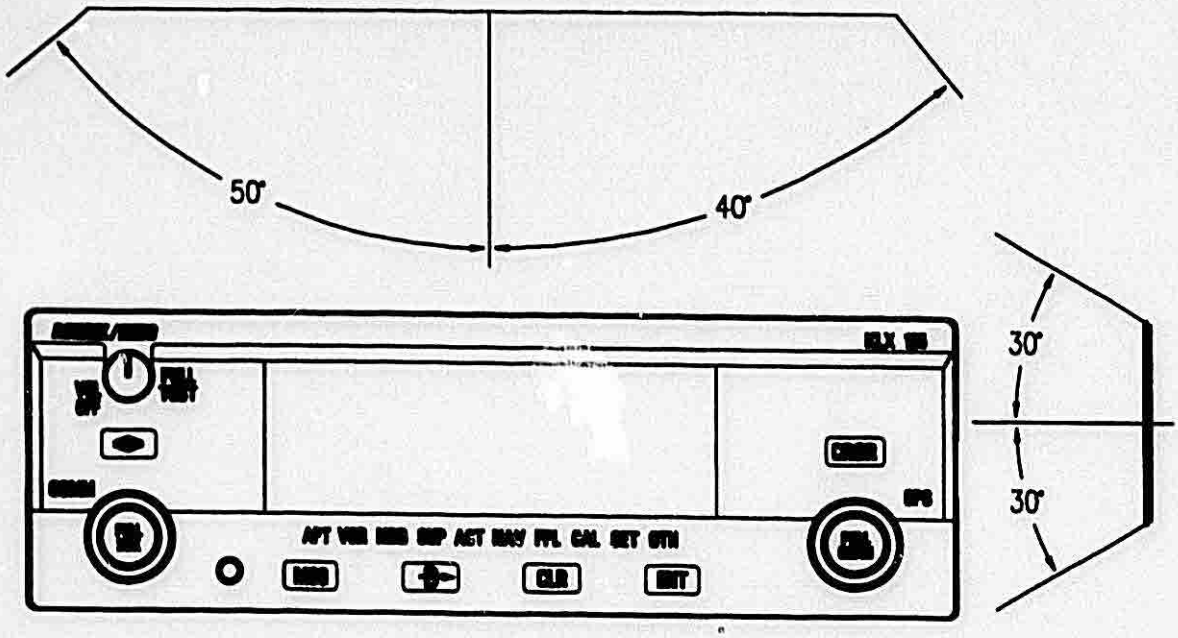


FIGURE 2-5 KLX 135/135A OUTLINE AND MOUNTING DRAWING
(DWG NO 155-05676-0000 R-3)
(SHEET 2)



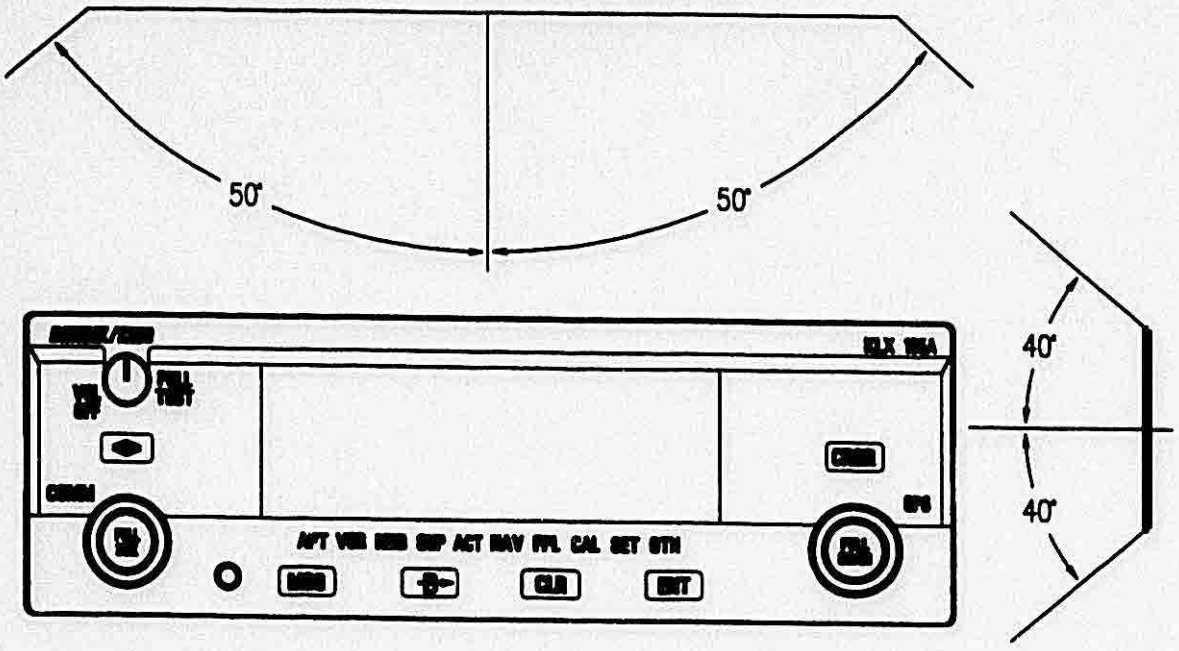
NOTE

Care should be taken in selecting the optimum location for the KLX 135. Consideration should also be given to proximity of other units, anything, such as knobs etc. that will block the viewing angle of the display.

The LCD, Liquid Crystal Display, has viewing angle limitations. The display is readable at angles up to 50 degrees directly to the left, 40 degrees directly to the right, and 30 degrees directly up and down. The installation of the KLX 135 must not exceed these viewing angles. The viewing angle should be checked with both the pilot's and the copilot's seats in the full forward position.

In some potential mounting locations, glare and reflection from the display may cause the display to be unreadable. Therefore, careful consideration of these effects should be made before choosing the final mounting location.

FIGURE 2-6 KLX 135 VIEWING ANGLE
(FOR VIEWING ANGLE ON KLX 135A REFER TO FIGURE 2–7 ON PAGE 2–44)



NOTE

Care should be taken in selecting the optimum location for the KLX 135A. Consideration should also be given to proximity of other units, anything, such as knobs etc. that will block the viewing angle of the display.

The LCD, Liquid Crystal Display, has viewing angle limitations. The display is readable at angles up to 50 degrees directly to the left, 50 degrees to the right, and 40 degrees directly up and down. The installation of the KLX 135A must not exceed these viewing angles. The viewing angle should be checked with both the pilot's and the copilot's seats in the full forward position.

In some potential mounting locations, glare and reflection from the display may cause the display to be unreadable. Therefore, careful consideration of these effects should be made before choosing the final mounting location.

FIGURE 2-7 KLX 135A VIEWING ANGLE

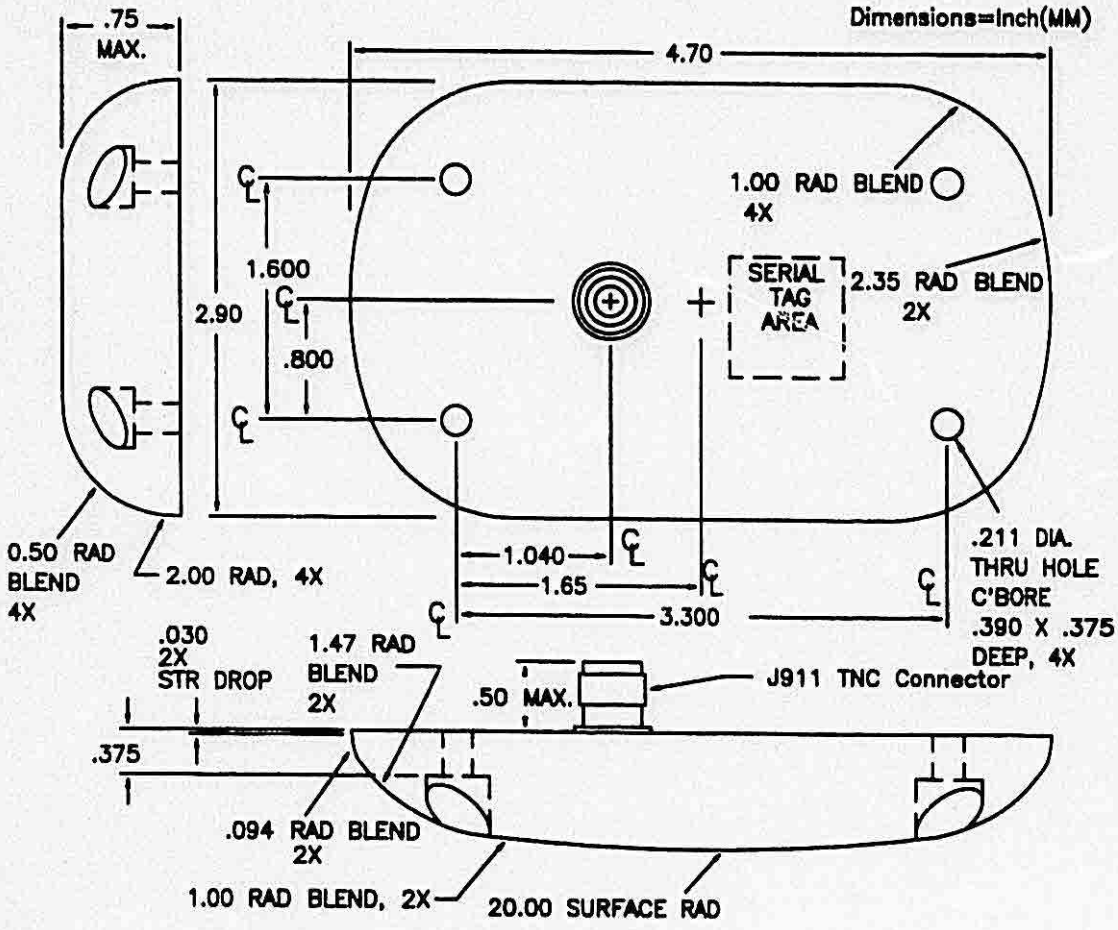
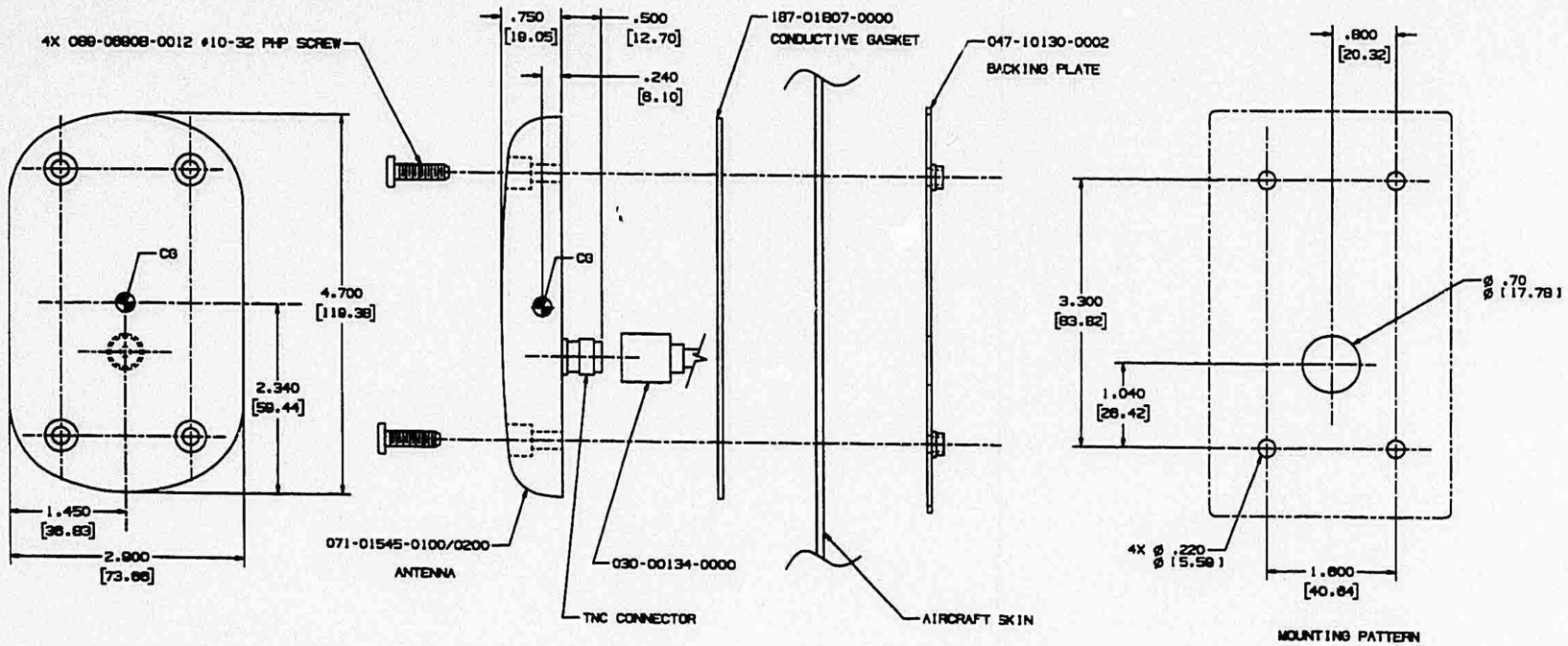


FIGURE 2-8 KA 91 OUTLINE DRAWING
(Dwg. No. 071-01545-0200 Rev 4)

BENDIX/KING

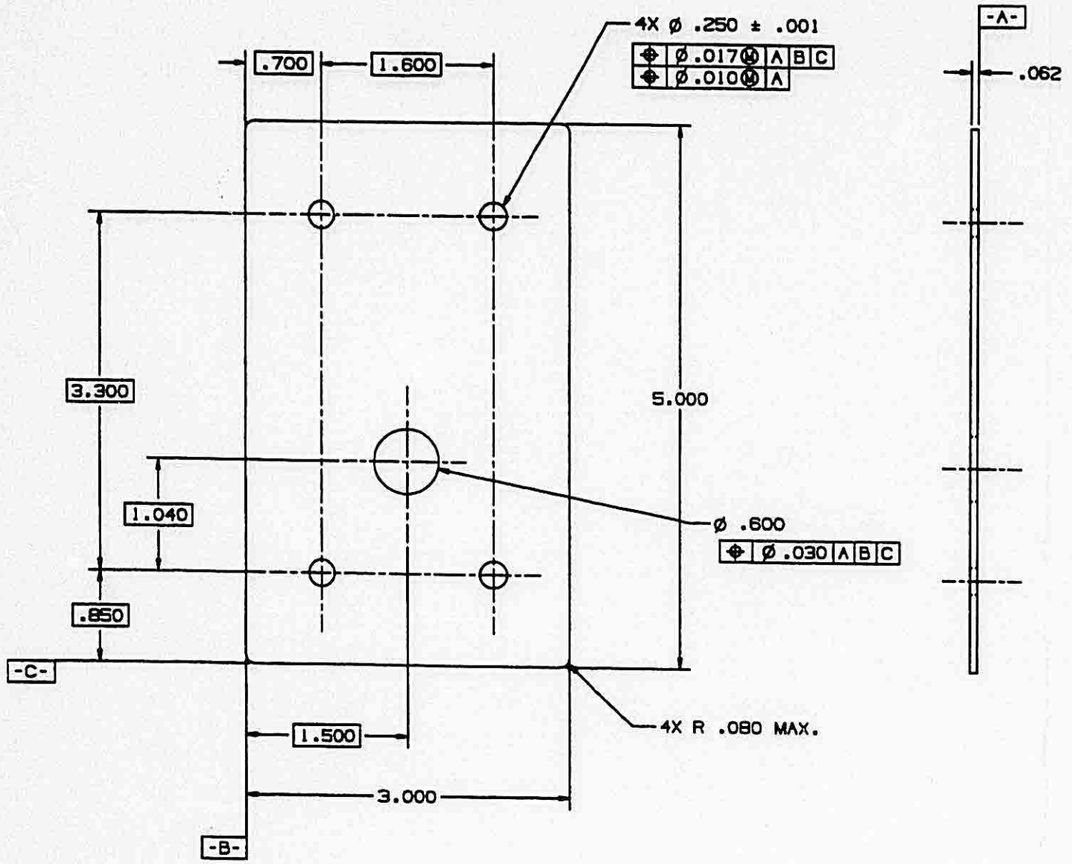
KLX 135/135A
COMMUNICATION TRANSCEIVER/
GPS RECEIVER

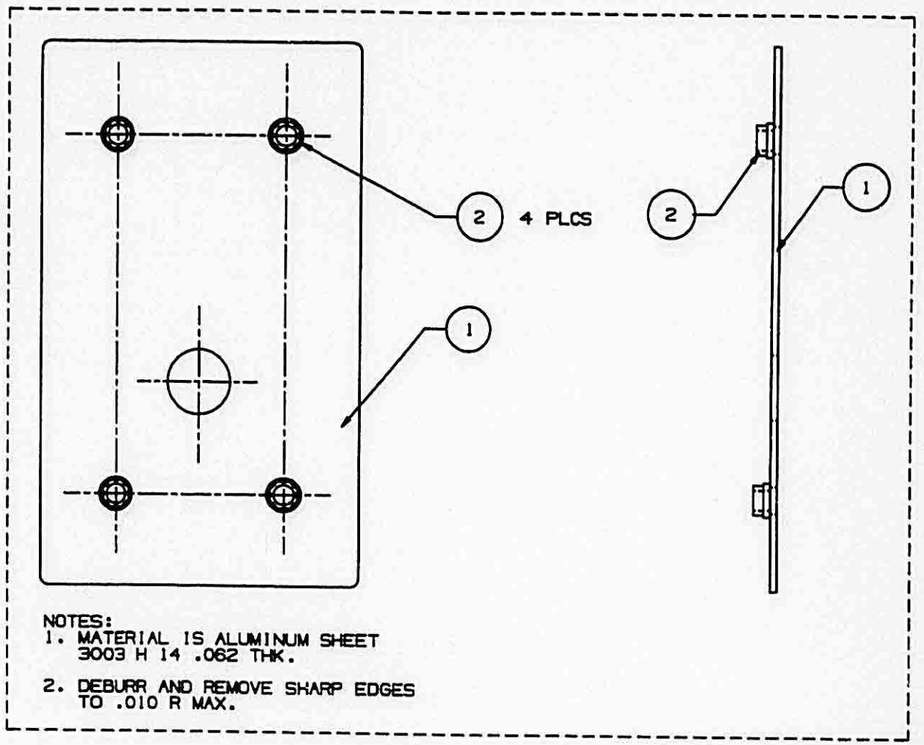


NOTES:

1. REMOVE PAINT IN AREA OF ANTENNA INSTALLATION.
2. DIMENSIONS IN INCHES [MILLIMETERS]
3. FOR BEST PERFORMANCE, BOND BETWEEN AIRCRAFT AND ANTENNA TO BE 10 MILLIOHMS RESISTANCE OR LESS.
4. UNIT WEIGHT .5 LBS [.227 KG.]
5. APPLY WHITE RTV SEALANT AROUND BASE OF INSTALLED ANTENNA. KPN 018-01129-0000 OR EQUIVALENT.
6. ANTENNA SHOULD BE MOUNTED ±2° WITH AIRCRAFT AT LEVEL FLIGHT ATTITUDE.
7. DO NOT PAINT ANTENNA
8. AIRSPEED RATING 600 KTS MAX TAS.

FIGURE 2-9 KA 91 INSTALLATION DRAWING
(DWG. NO. 155-05999-0000 REV 3)





ALTERNATE VIEW

FIGURE 2-10 KA 91 BACKPLATE DRAWING
(DWG. NO. 047–10130–0000/0002 REV 2)

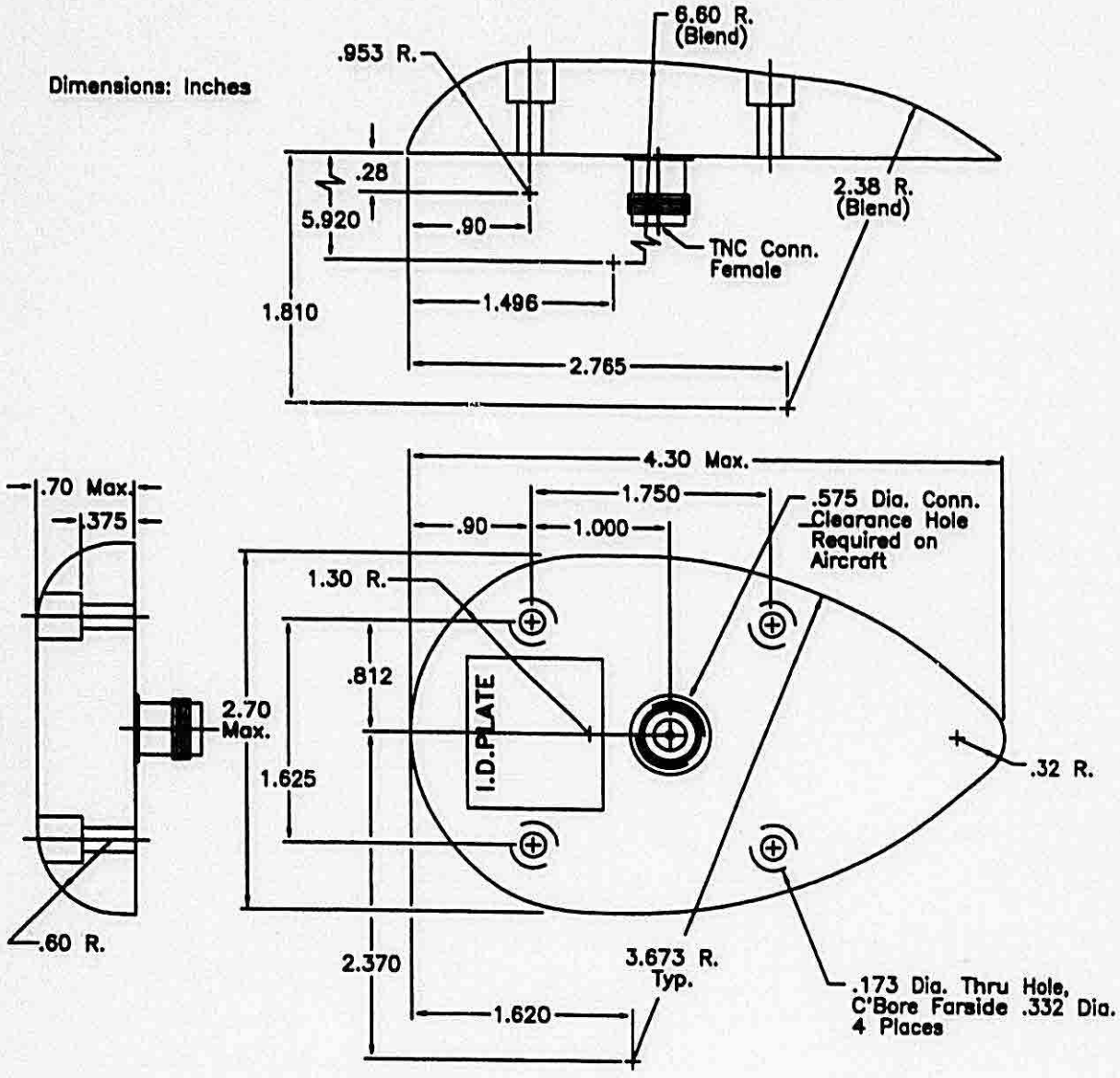
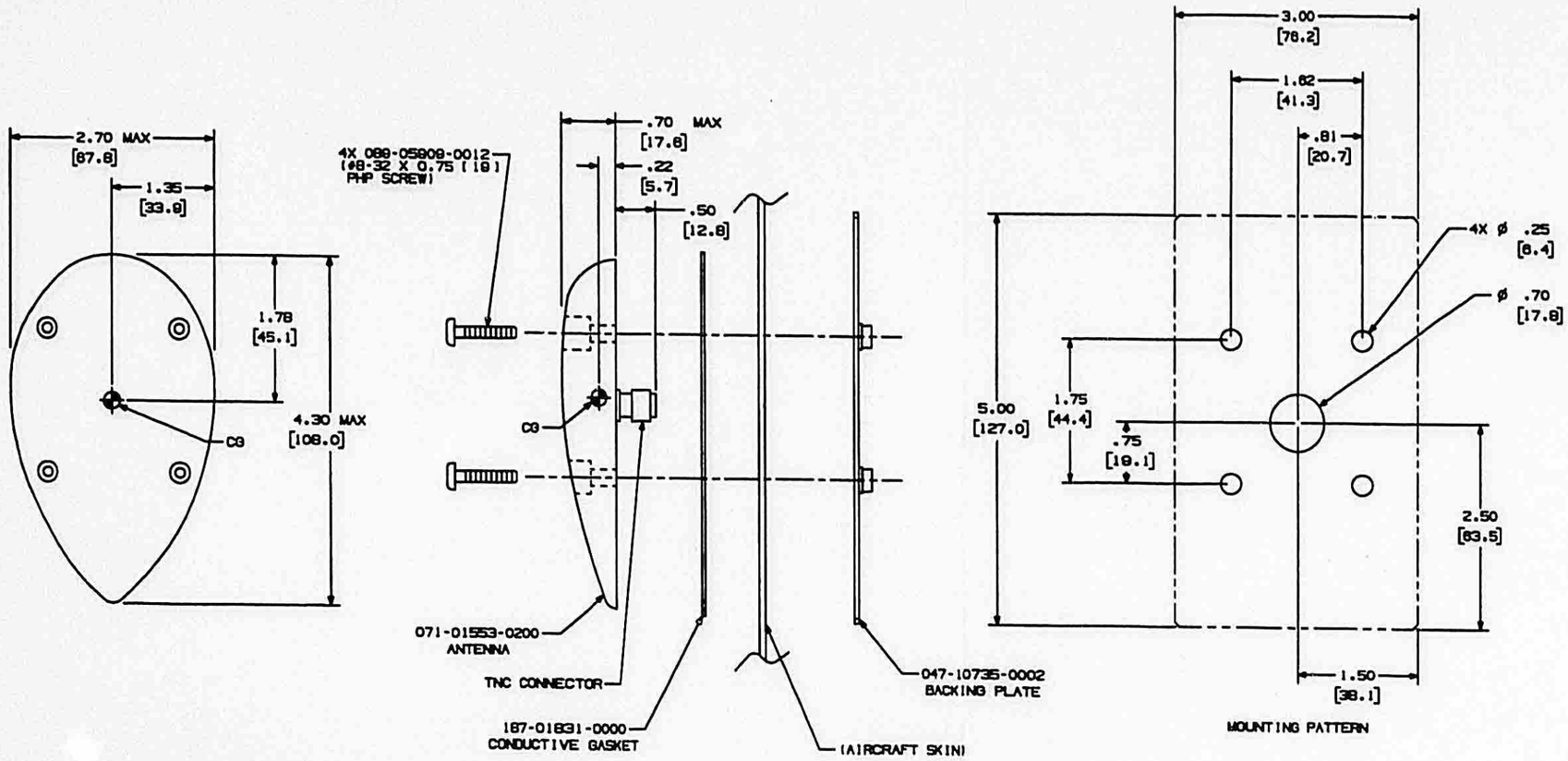
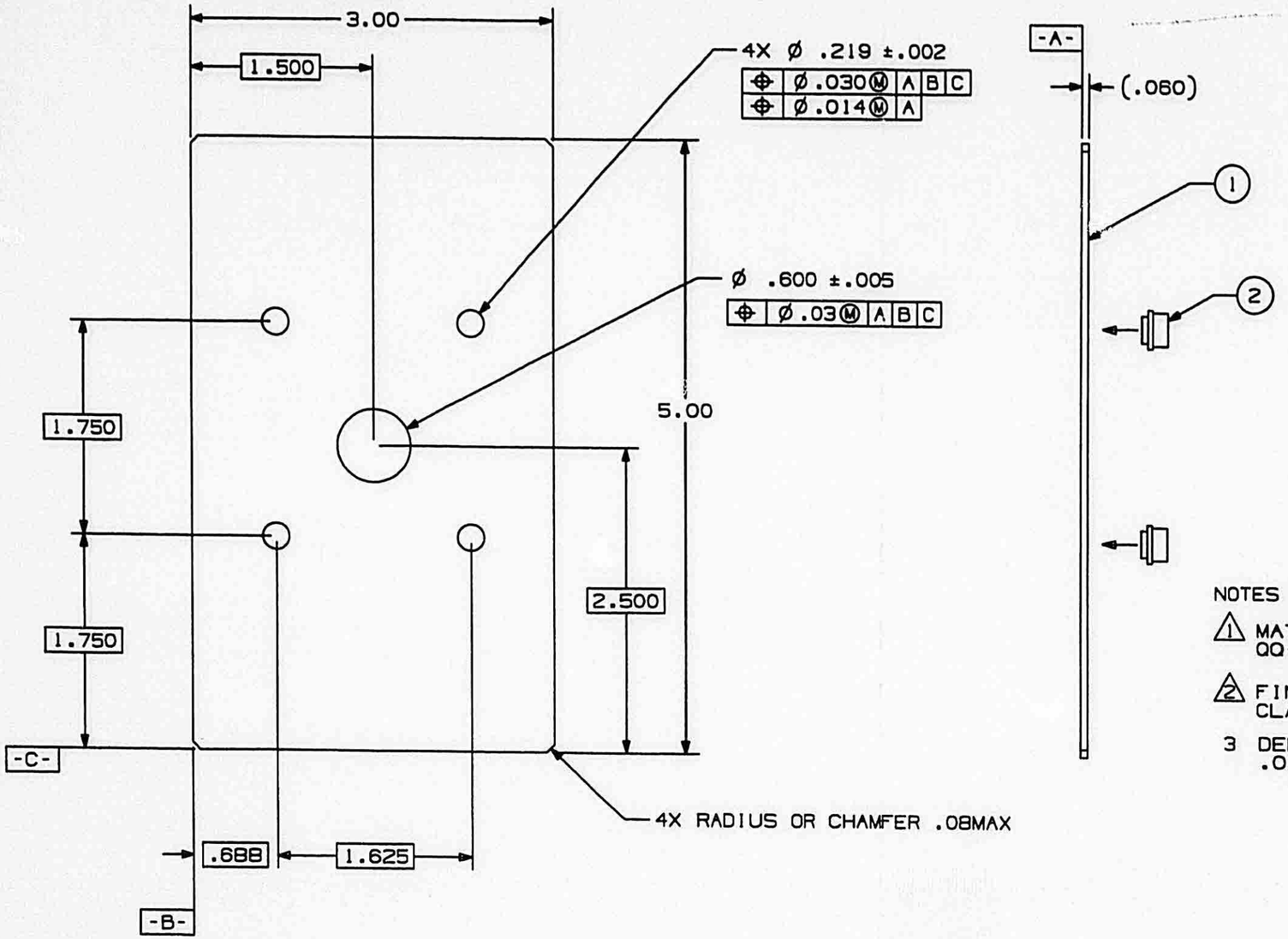


FIGURE 2-11 KA 92 OUTLINE DRAWING
(Dwg. No. 071-01553-0200 Rev 1)



NOTES UNLESS OTHERWISE SPECIFIED:
1. REMOVE PAINT IN AREA OF ANTENNA INSTALLATION.
2. DIMENSION IN INCHES [MILLIMETERS]
3. FOR BEST PERFORMANCE, BOND BETWEEN AIRCRAFT AND ANTENNA TO BE 10 MILLIOHMS RESISTANCE OR LESS.
4. UNIT WEIGHT IS .27 LBS (.12 KG)
5. APPLY WHITE RTV SEALANT AROUND BASE OF INSTALLED ANTENNA. (KPN 016-01129-0000 OR EQUIVALENT)
6. ANTENNA SHOULD BE MOUNTED LEVEL ±3° WITH AIRCRAFT AT LEVEL FLIGHT ATTITUDE.
7. DO NOT PAINT ANTENNA
8. AIRSPEED RATING 600KTS MAX TAS.

FIGURE 2-12 KA 92 INSTALLATION DRAWING
(DWG. NO. 155-06019-0000 REV 0)



NOTES UNLESS OTHERWISE SPECIFIED:

1. MATERIAL IS ALUMINUM 3003 H14 QQ-A-250/2, .063 STOCK THICK
2. FINISH IS GOLD IRIDITE MIL-C-5541 CLASS 1A
3. DEBURR AND REMOVE SHARP EDGES .01R MAX

FIGURE 2-13 KA 92 BACKPLATE DRAWING
(DWG. NO. 047-10735–0000/0002 REV 0)

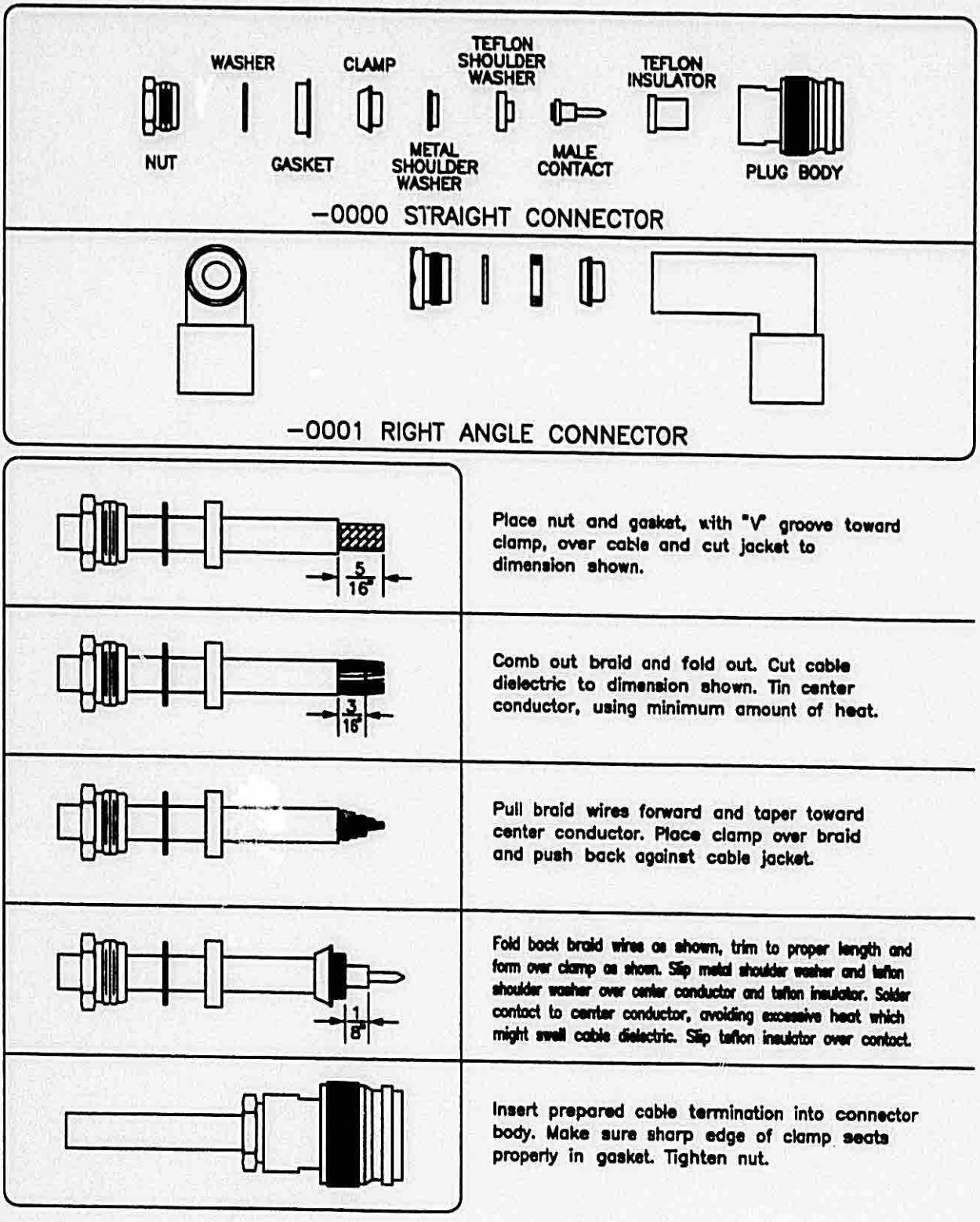
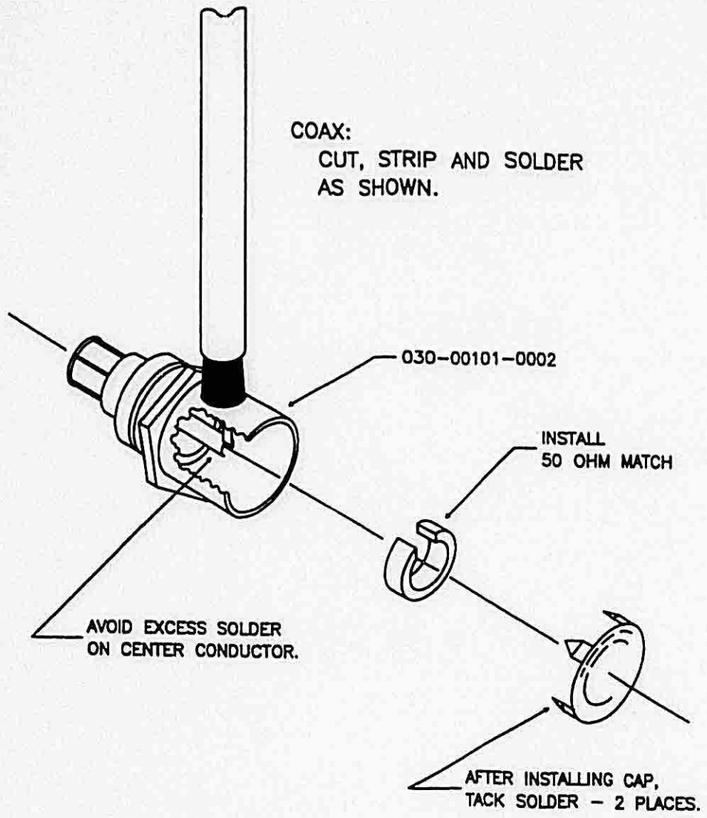
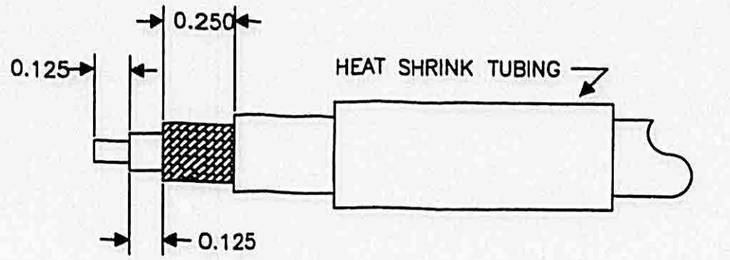


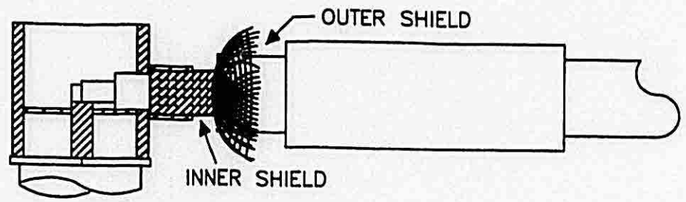
FIGURE 2-14 KA 91 TNC COAX/CONNECTOR ASSEMBLY (RG142B/U 0 to 40 ft.)
(Dwg. No. 030-00134-0000 Rev 3)

BENDIX/KING
KLX 135/135A
COMMUNICATION TRANSCEIVER/
GPS RECEIVER

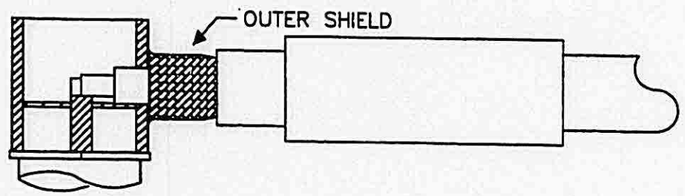




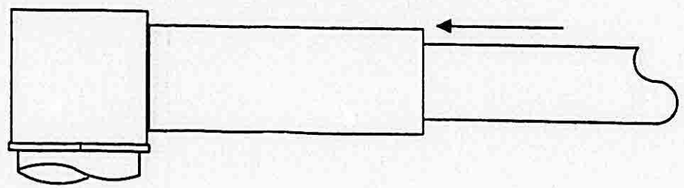
1. STRIP RG–142B/U (P/N 024–00002–0000) AND PLACE 1" HEAT SHRINK TUBING (P/N 150–00025–0010) OVER COAX.



2. SOLDER CENTER CONTACT AND SOLDER INNER SHIELD INSIDE. SEE NOTE 1.



3. SOLDER OUTER SHIELD OUTSIDE. SEE NOTE 1.

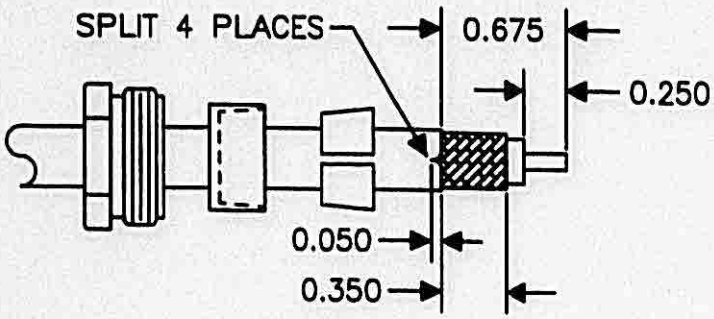


4. SLIDE HEAT SHRINK TUBING FORWARD (FLUSH WITH CONNECTOR) AND ADD HEAT TO SHRINK THE TUBING.

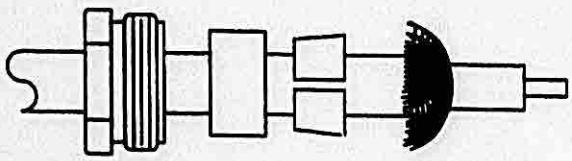
NOTES:

1. WHEN SOLDERING, AVOID APPLYING EXCESS HEAT TO CONNECTOR BODY, HEAT SINK SPRING CONTACTS, AND CENTER CONDUCTOR INSULATOR.

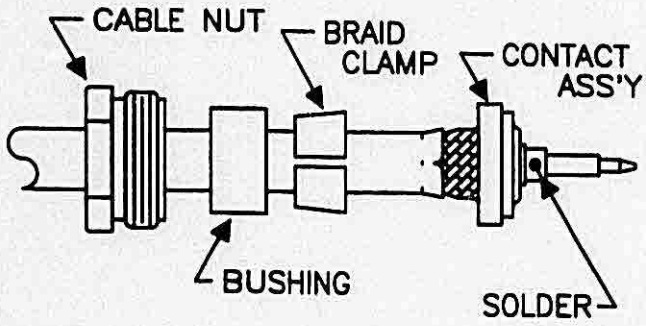
FIGURE 2-15 KA 91 BMA COAX/CONNECTOR ASSEMBLY (RG142 B/U 0 TO 40 FT.)
(DWG. NO. 030-00101-0002 REV 9)



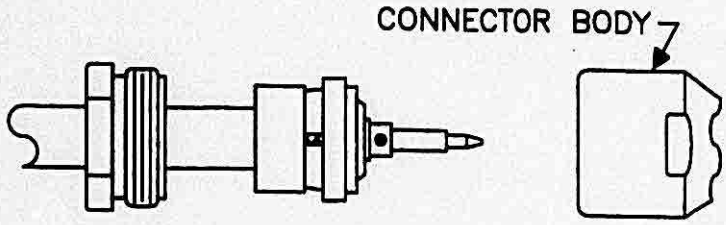
1. Place cable nut, bushing and braid clamp over outer jacket. Trim cable jacket, braid and dielectric to dimensions shown. Split outer jacket in 4 places (approx. 90° apart) to dimension. Lightly tin center conductor.



2. Fold back braid, foil and inner shield to expose dielectric.



3. Slide contact assembly (pin or socket) between inner dielectric and foil shield. Make certain contact assembly is pushed on cable to flare outer jacket and center conductor is visible through inspection hole. Smooth shields back over contact assembly and solder center contact as shown.

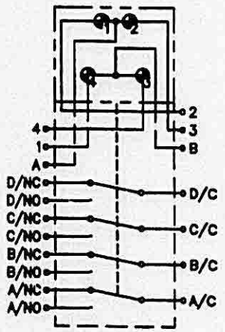


4. Push braid clamp and bushing forward over shield as far as possible. Slide cable nut over bushing and insert finished assembly into connector body. Tighten cable nut completely to seal cable assembly.

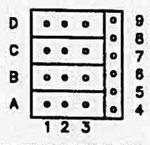
FIGURE 2-16 KA 91 TNC/ BMA COAX/CONNECTOR ASSEMBLY (0 to 80 ft./0 to 100 ft.)
(For Cable P/N's 024-00071-0000 Rev. 0 / 024-00072-0000 Rev. 0)

INSTALLATION AND REMOVAL TOOLS (AVAILABLE FROM LCOMP)

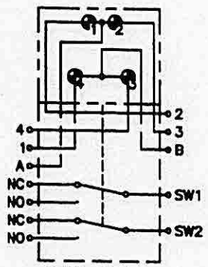
TYPE	EATON PART NUMBER
CONNECTOR PIN CRIMP TOOL	58T-103
CONNECTOR PIN REMOVAL TOOL	58T-104
CONNECTOR PIN REMOVAL TOOL TIP	58T-105-2



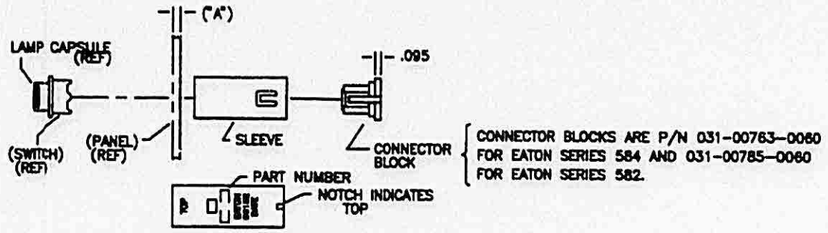
LAMP CIRCUIT
& SWITCH CIRCUIT
(031-00783-X000)



TERM CONFIGURATION
SWITCH
(031-00783-X000)

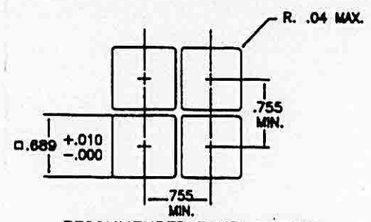


LAMP CIRCUIT
& SWITCH CIRCUIT
(031-00785-X000)



MOUNTING SLEEVES		
PANEL THICKNESS DIMENSION "A"	ALLIEDSIGNAL PART NUMBER	VENDOR PART NUMBER
.052" TO .072"	031-00763-0029	4686-29
.083" TO .103"	031-00763-0030	4686-30
.115" TO .135"	031-00763-0031	4686-31
USE THE ABOVE WITH EATON SERIES 584		
.052" TO .072"	031-00785-0029	4686-29
.083" TO .103"	031-00785-0030	4686-30
.115" TO .135"	031-00785-0031	4686-31
USE THE ABOVE WITH EATON SERIES 582		

THREE SLEEVES AND A CONNECTOR BLOCK ARE PROVIDED WITH EACH ANNUNCIATOR/SWITCH ASSEMBLY TO ACCOMMODATE A FULL RANGE OF PANEL THICKNESSES.



RECOMMENDED PANEL CUTOUT

NOTES:

1. MOMENTARY SWITCH TRAVEL IS SUCH THAT THE CAPSULE IS FLUSH WITH, OR RECESSED INTO, THE BEZEL OF THE SWITCH BODY WHEN FULLY ACTUATED.
2. ALTERNATE ACTION SWITCH TRAVEL AND RETAINED POSITION ARE SUCH THAT THE CAPSULE IS FLUSH WITH, OR RECESSED INTO, THE BEZEL OF THE SWITCH BODY WHEN ACTUATED.
3. COMPLETE ANNUNCIATORS/SWITCHES ARE AVAILABLE FROM LCOMP. PARTS FOR CONVERSION OR REPAIR ARE ALSO AVAILABLE.

LCOMP
6455 E. COMMERCE AVE.
SUITE 120
KANSAS CITY, MO 64120-2159

TELEPHONE:
(816) 241-0111
(800) 821-2915
(816) 241-7373 (FAX)

FIGURE 2-17 CUTLER-HAMMER SWITCH/ANNUNCIATOR UNIT INSTALLATION DWG

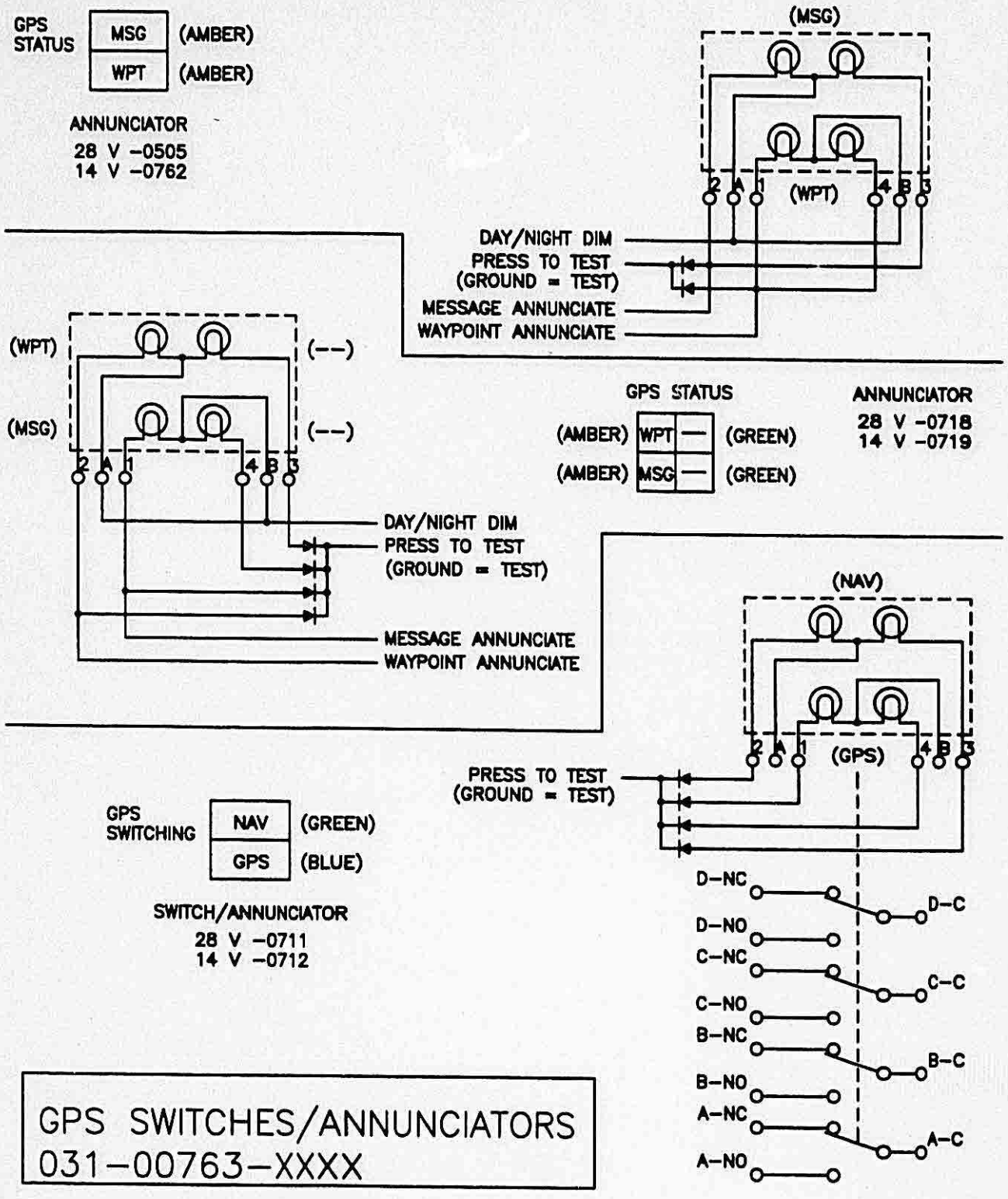
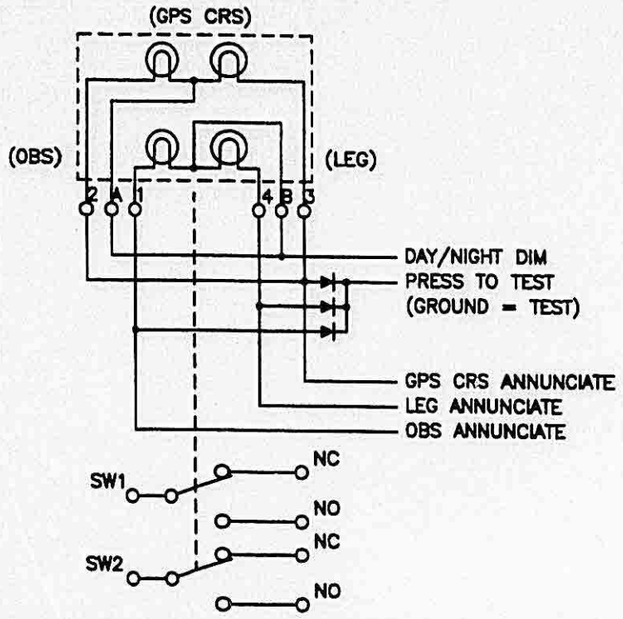


FIGURE 2-18 CUTLER-HAMMER SWITCH/ANNUNCIATOR INTERNAL SCHEMATIC

BENDIX/KING
KLX 135/135A
COMMUNICATION TRANSCEIVER/
GPS RECEIVER



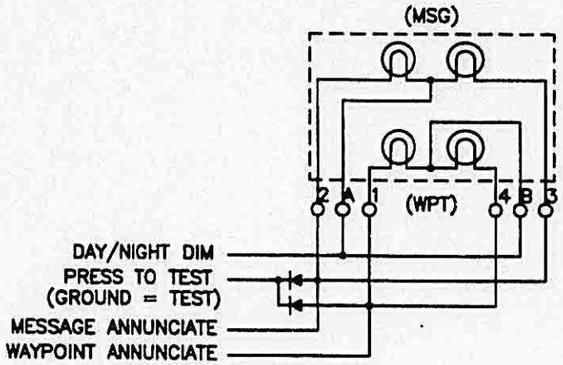
GPS STATUS

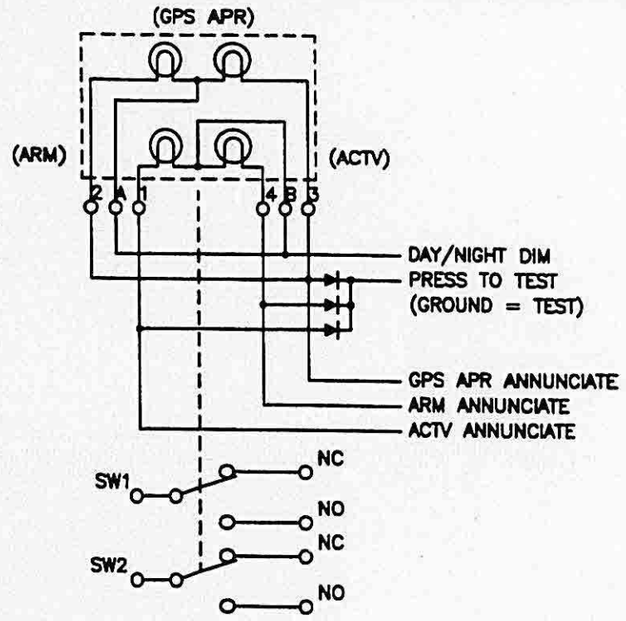
(VISIBLE WHITE) | GPS CRS |
(AMBER) | OBS | LEG | (GREEN)

ANNUNCIATOR
28 V –0763
14 V –0764

GPS STATUS | MSG | (AMBER)
WPT | (AMBER)

ANNUNCIATOR
28 V –0505
14 V –0762





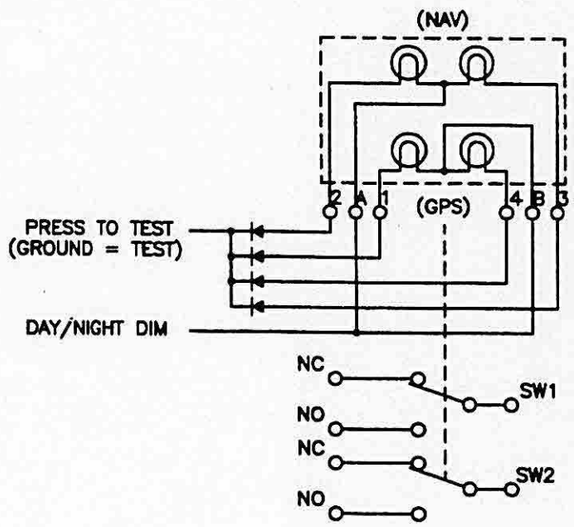
GPS STATUS

(VISIBLE WHITE) | GPS APR |
(WHITE) | ARM | ACTV | (GREEN)

ANNUNCIATOR
28 V –0766
14 V –0767

GPS SWITCHING | NAV | (GREEN)
GPS | (BLUE)

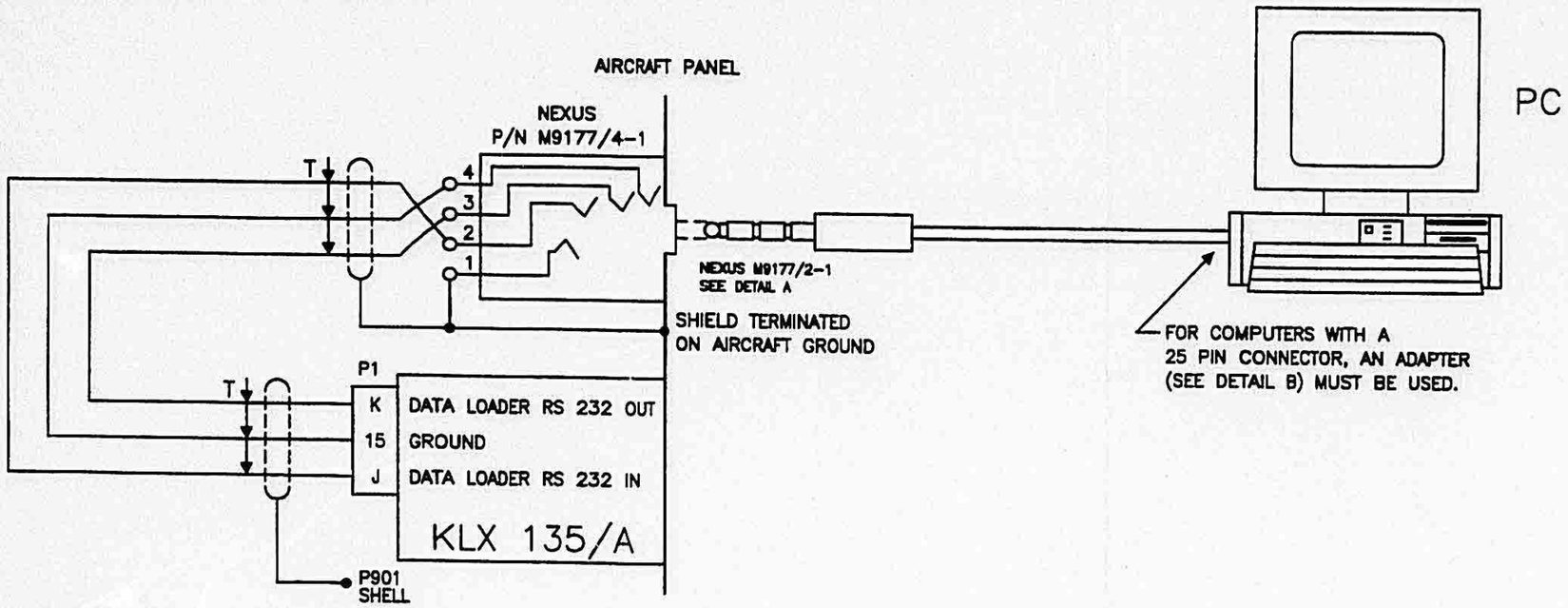
SWITCH/ANNUNCIATOR
28 V –0711
14 V –0712

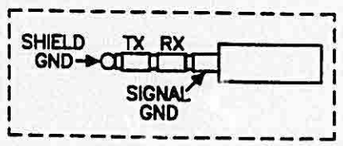


GPS SWITCHES/ANNUNCIATORS
031–00785–XXXX

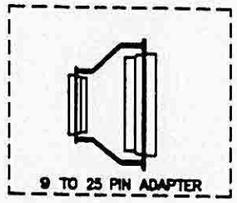
FIGURE 2-19 CUTLER–HAMMER SWITCH/ANNUNCIATOR UNIT SCHEMATIC

BENDIX/KING
KLN 35A
GPS RECEIVER

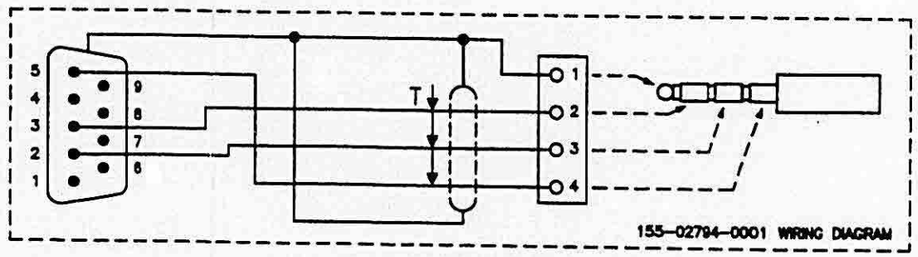




DETAIL A



DETAIL B



DETAIL C

FIGURE 2-20 KLX 135/135A DATALOADER/PC INTERFACE DRAWING

03

SECTION III

OPERATION

3.1 GENERAL

For an explanation of the operating controls of the KLX 135 GPS/COMM refer to the KLX 135 pilots guide P/N 006-08751-0000 or the aircraft's flight manual supplement. For an explanation of the operating controls of the KLX 135A GPS/COMM refer to the KLX 135A pilots guide P/N 006-08789-0000 or the aircraft's flight manual supplement.

APPENDIX

APPENDIX A

RS–232 FORMAT DEFINITIONS

1.0 GENERAL RS232 OUT

Functional Description

Byte format

Electrical per EIA RS232C
9600 baud, 8 bits, 1 start bit, 1 stop bit, no parity
MARK is a logical 1 (one) and SPACE is a logical 0 (zero)
START bit begins as MARK, goes to SPACE

The order of transmission within each data byte shall be:

START bit
Data bit 0 (lsb)
Data bit 1
Data bit 2
Data bit 3
Data bit 4
Data bit 5
Data bit 6
Data bit 7 (msb)
STOP bit

Data Protocol

Data shall be sent in blocks having the following format:

<STX><id><dddd><it><id><dddd><it>...<id><dddd><it><ETX>

<STX>	ASCII start of text character
<id>	item designator
<dddd>	item data
<it>	item terminator: <CR>
<CR>	ASCII carriage return character
<ETX>	ASCII end of text character
<STX>	ASCII start of text character
<id>	item designator
<dddd>	item data
<it>	item terminator: <CR>
<CR>	ASCII carriage return character
<ETX>	ASCII end of text character

Any data which is invalid or exceeds the data format will be filled with dashes.

RS 232 Output Data Item Definitions

Item Designator	Data Format	Data Field Width	Description
A	s dd mmhh	9	present latitude: dash if position flag is set. s–sign: N for north, S for south dd–degrees mm–minutes
B	s ddd mmhh	10	present longitude; dash if position flag is set. s=sign: E for east, W for west ddd=degrees mm=minutes hh=hundreds of minutes
C	ddd	3	magnetic track, degrees; dash if GS<2 kts or position flag is set.
D	ddd	3	groundspeed, knots; dash if position flag is set.
E	ddddd	5	10x distance to active waypoint, nm; dash if nav flag is set.
G	sdddd	5	crosstrack error; dash if nav flag is set. s=sign: R for aircraft position right of course, L for aircraft position left of course dddd=100 x crosstrack error, nm.
I (upper case IN-DIA)	dddd	4	10x magnetic desired track, degrees (use selected course in OBS mode); dash if nav flag is set.
K	ddddd	5	active waypoint identifier
L	dddd	4	10 x magnetic bearing to active waypoint, degrees (use radial from active waypoint 180 in OBS mode); dash if position flag is set.
Q	sddd	4	magnetic variation; dash if position flag set. s=sign; E for east, W for west
T	——A———	9	warnings; 4th character is "A" if estimated position error exceeds 3.8 nm, otherwise "_"
l (lower case LIMA)	dddddd	6	10 x distance to destination, nm; dash if nav flag is set.
u	free format	17	for development testing only

Item Designator	Data Format	Data Field Width	Description
w	ddsiiiiiiiiLLLLmm		flight plan waypoint data; this item is sent for each waypoint in the active flight plan dd=waypoint number (01 – 20) s=sequence number bits: 76543210 xlannnnn x=unused, l=1 if last waypoint, a=1 if active wpt nnnnn=sequential number (same as waypoint number, 01 – 20), unsigned binary iiiii=identifier (ASCII characters); a value of 7F hex in first byte indicates unknown ident, remaining bytes should be ignored. lll=waypoint latitude; packed, unsigned binary values: 76543210 76543210 76543210 sddddddd xxmmmmmm xhhhhhh s=sign; 0 for north, 1 for south ddddddd=degrees x=unused mmmmmm=minutes hhhhhhh=hundreds of minutes A value of 7f hex in the first byte indicates that latitude and longitude are unknown, and remaining bytes should be ignored. LLLL=waypoint longitude; packed, unsigned binary values; 76543210 76543210 76543210 sxxxxxxxx ddddddd xxmmmmmm 76543210 xhhhhhhh s=sign: 0=east 1=west, x=unused, d=degrees, m=minutes, h=hundredth mm=magnetic variation at waypoint 76543210 76543210 nnnnnnnn nnnnnnnn nnnnnnnnnnnnnnnn=Magnetic variation at waypoint Two's complement binary in sixteenths of degrees, Easterly variation is positive. a value of 7FH in byte 14 indicates that magnetic variation is not presently available and bytes 14 and 15 should be ignored

1. Active flight plan data in DIRECT–TO mode or OBS–TO–LEG mode,

   A. if the "direct–to" waypoint is in the active flight plan, the "direct–from" waypoint, the "direct–to" waypoint and those waypoints, if any, coming after the "direct–to" waypoint in the active flight plan should be transmitted, the sequence and waypoint numbers should start from "1".

   B. If the "direct–to" waypoint is not in the active flight plan, only the "direct–from" waypoint and the "direct–to" waypoint should be transmitted. The sequence and waypoint numbers, in this case, should start from "1".

   C. Identifier field of the "direct–from" waypoint shall always be blanked.

2. Active flight plan data in OBS mode,

   A. No flight plan data shall be transmitted.

   Performance

   All RS232 data shall be transmitted at least once every 2 sec.

APPENDIX E

DO–160C ENVIORMENTAL QUALIFICATION FORMS

RTCA/DO-160C

ENVIRONMENTAL QUALIFICATION FORM

NOMENCLATURE:	KLX135 Communication Transceiver/GPS Receiver
PART NUMBER:	069-01029-0201
TSO NUMBER:	C37d 100NM 25KHz DO-186 Class 4 C38d DO-186 Class C and D
MANUFACTURER'S SPECIFICATION:	See Specification Control Dwg. 069-01029-0201
MANUFACTURER:	ALLIEDSIGNAL INC.
ADDRESS:	400 N. ROGERS OLATHE, KS 66062 USA

CONDITIONS	PARA	CONDUCTED TESTS
TEMPERATURE AND ALTITUDE	4.0	CATEGORY A1 AND D1
TEMPERATURE VARIATION	5.0	CATEGORY B
HUMIDITY	6.0	CATEGORY B
OPER SHOCK/CRASH SAFETY	7.0	OPER SHOCK TEST AND CRASH SAFETY
VIBRATION	8.0	CATEGORIES N, B, AND M
EXPLOSION	9.0	CATEGORY X (NOT TESTED)
WATERPROOFNESS	10.0	CATEGORY X (NOT TESTED)
FLUIDS SUSCEPTIBILITY	11.0	CATEGORY X (NOT TESTED)
SAND AND DUST	12.0	CATEGORY X (NOT TESTED)
FUNGUS	13.0	CATEGORY X (NOT TESTED)
SALT SPRAY	14.0	CATEGORY X (NOT TESTED)
MAGNETIC EFFECT	15.0	CLASS Z
POWER INPUT	16.0	CATEGORY B
VOLTAGE SPIKE CONDUCTED	17.0	CATEGORY A & B
AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY	18.0	CATEGORIES B & Z
INDUCED SIGNAL SUSCEPTIBILITY	19.0	CATEGORY A
RADIO FREQUENCY SUSCEPTIBILITY	20.0	CATEGORY U
RADIO FREQUENCY EMISSION	21.0	CATEGORY A
LIGHTNING INDUCED TRANSIENT SUSCEPTIBILITY	22.0	CATEGORY Z1 XX
LIGHNING DIRECT EFFECTS	23.0	CATEGORY X (NOT TESTED)
ICING	24.0	CATEGORY X (NOT TESTED)

RTCA DO-160

ENVIRONMENTAL QUALIFICATION FORM

REVISION HISTORY

REVISION	CHANGE ORDER NO.	DATE
0	Original Issue	02/94
1	99985	03/94
2	100005	03/94

RTCA/DO-160C
ENVIRONMENTAL QUALIFICATION FORM

NOMENCLATURE:	KLX135A Communication Transceiver / GPS Receiver
PART NUMBER:	069-01029-0703
TSO NUMBER:	C37d 100NM 25KHz DO-186 Class 4 C38d DO-186 Class C and D
MANUFACTURER'S SPECIFICATION:	Minimum Performance Specification 004-00516-4000
MANUFACTURER:	AlliedSignal Avionics, Inc.
ADDRESS:	400 N. Rogers Rd. Olathe, KS 66062 USA

CONDITIONS	SECTION	CONDUCTED TESTS
TEMPERATURE AND ALTITUDE	4.0	CATEGORY A1 and D1
TEMPERATURE VARIATION	5.0	CATEGORY B
HUMIDITY	6.0	CATEGORY B
OPERATIONAL SHOCK/CRASH SAFETY	7.0	OPERATIONAL SHOCK TEST AND CRASH SAFETY
VIBRATION	8.0	CATEGORIES B, M, and N Note: No changes in critical frequencies observed during testing. Axis Vertical: 188.5, 263.1, 934.7, 1000 Longitudinal: 83.77, 171.6, 281.3, 730, 925 Horizontal: 313.0, 357.6, 526.7, 785.9
EXPLOSION	9.0	CATEGORY X (NOT TESTED)
WATERPROOFNESS	10.0	CATEGORY X (NOT TESTED)
FLUIDS SUSCEPTIBILITY	11.0	CATEGORY X (NOT TESTED)
SAND AND DUST	12.0	CATEGORY X (NOT TESTED)
FUNGUS	13.0	CATEGORY X (NOT TESTED)
SALT SPRAY	14.0	CATEGORY X (NOT TESTED)
MAGNETIC EFFECT	15.0	CATEGORY Z
POWER INPUT	16.0	CATEGORY B
VOLTAGE SPIKE CONDUCTED	17.0	CATEGORIES A and B
AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY	18.0	CATEGORIES B and Z
INDUCED SIGNAL SUSCEPTIBILITY	19.0	CATEGORY A
RADIO FREQUENCY SUSCEPTIBILITY	20.0	CATEGORY U
RADIO FREQUENCY EMISSION	21.0	CATEGORY A
LIGHTNING INDUCED TRANSIENT SUSCEPTIBILITY	22.0	CATEGORY Z1 XX
LIGHTNING DIRECT EFFECTS	23.0	CATEGORY X (NOT TESTED)
ICING	24.0	CATEGORY X (NOT TESTED)

KRC AUTHORIZED PRINT

RTCA/DO-160C
ENVIRONMENTAL QUALIFICATION FORM

REVISION HISTORY

REVISION	CHANGE ORDER NO.	DATE
0	Original Issue	June 1995
1	103403	July 1995
2	103463	July 14, 1995
3	103541	July 24, 1995

RTCA/DO-160C

ENVIRONMENTAL QUALIFICATION FORM

NOMENCLATURE:	KA 91 GPS ANTENNA
PART NUMBER:	071-01545-0100/0200
TSO NUMBER:	NOT AVAILABLE for 0100, C129 for 0200
MANUFACTURER'S SPECIFICATION:	See Specification Control Dwg. 071-01545-0100
MANUFACTURER:	KING RADIO CORPORATION
ADDRESS:	400 N. ROGERS OLATHE, KS 66062 USA

CONDITIONS	PARA	CONDUCTED TESTS
TEMPERATURE AND ALTITUDE	4.0	CATEGORY A2 and F2
TEMPERATURE VARIATION	5.0	CATEGORY A
HUMIDITY	6.0	CATEGORY C
SHOCK	7.0	PER SHOCK TEST
VIBRATION	8.0	CATEGORIES C,L,M, and Y
EXPLOSION	9.0	CATEGORY X (NOT TESTED)
WATERPROOFNESS	10.0	CATEGORY R
FLUIDS SUSCEPTIBILITY	11.0	CATEGORY F
SAND AND DUST	12.0	CATEGORY X (NOT TESTED)
FUNGUS	13.0	CATEGORY X (NOT TESTED)
SALT SPRAY	14.0	CATEGORY S
MAGNETIC EFFECT	15.0	CLASS A
POWER INPUT	16.0	CATEGORY X (NOT TESTED)
VOLTAGE SPIKE CONDUCTED	17.0	CATEGORY A & B
AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY	18.0	CATEGORY B & Z
INDUCED SIGNAL SUSCEPTIBILITY	19.0	CATEGORY A
RADIO FREQUENCY SUSCEPTIBILITY	20.0	CATEGORY U *
RADIO FREQUENCY EMISSION	21.0	CATEGORY A
LIGHTNING INDUCED TRANSIENT SUSCEPTIBILITY	22.0	CATEGORY L
LIGHTNING DIRECT EFFECTS	23.0	CATEGORY 1B
ICING	24.0	CATEGORY C

* Additional HIRF testing conducted, see test report 707-00615-0000

RTCA DO-160

ENVIRONMENTAL QUALIFICATION FORM

REVISION HISTORY

REVISION	CHANGE ORDER NO.	DATE
1	ECO 98584	July 1993

RTCA/DO-160C

ENVIRONMENTAL QUALIFICATION FORM

NOMENCLATURE:	KA 92 ANTENNA
PART NUMBER:	071-01553-0200
TSO NUMBER:	C129
MANUFACTURER'S SPECIFICATION:	See Specification Control Dwg. 071-01553-0200
MANUFACTURER:	ALLIEDSIGNAL GENERAL AVIATION AVIONCS
ADDRESS:	400 N. ROGERS ROAD OLATHE, KS 66062 USA

CONDITIONS	PARA	CONDUCTED TESTS
TEMPERATURE AND ALTITUDE	4.0	Category A2 and F2
TEMPERATURE VARIATION	5.0	Category A
HUMIDITY	6.0	Category C
SHOCK	7.0	Operational Shock Test
VIBRATION	8.0	Categories C, L, M and Y
EXPLOSION	9.0	Category X (NOT TESTED)
WATERPROOFNESS	10.0	Category R
FLUIDS SUSCEPTIBILITY	11.0	Category F
SAND AND DUST	12.0	Category X (Not Tested)
FUNGUS	13.0	Category X (Not Tested)
SALT SPRAY	14.0	Category S
MAGNETIC EFFECT	15.0	Class Z
POWER INPUT	16.0	Category A and B
VOLTAGE SPIKE CONDUCTED	17.0	Category A and B
AUDIO FREQUENCY CONDUCTED SUSCEPTIBILITY	18.0	Category A, B and Z
INDUCED SIGNAL SUSCEPTIBILITY	19.0	Category A
RADIO FREQUENCY SUSCEPTIBILITY	20.0 Change 3	Category R
RADIO FREQUENCY EMISSION	21.0 Change 3	Category A
LIGHTING INDUCED TRANSIENT SUSCEPTIBILITY	22.0 Change 2	Category XXE3
LIGHTING DIRECT EFFECTS	23.0 Change 1	Category 1B
ICING	24.0	Category C

RTCA/DO-160C

ENVIROMENTAL QUALIFICATION FORM

REVISION HISTORY

REV NUMBER	ECO NUMBER	DATE
0	ORIGINAL ISSUE	DECEMBER 1994
1	102111	JANUARY 1995

REMARKS

-Fluids Susceptability

Fluids Used:

Ethylene Glycol
Isopropyl Alcohol
Denatured Alcohol
1,1,1 Trichloroethane
Jet A Fuel
Aviation Fuel
Skydrol, Type IV
Dichlorvos (DDVP)
Pyrethrum - Based Inseticide
AEA Type 1
AEA Type 2

Swelling of KA 92 observed when exposed to Dichlorvos (DDVP).

KLX 135/135A

STC APPENDIX

United States of America

Department of Transportation — Federal Aviation Administration

Supplemental Type Certificate

Number SA00247WI-D

This certificate, issued to AlliedSignal Avionics Inc.
400 N. Rogers Road
Olathe, KS 66062

certifies that the change in the type design for the following product with the limitations and conditions therefor as specified hereon meets the airworthiness requirements of Part 3 of the Civil Air Regulations, and additional requirements as specified in TCDS 2A3.

Original Product — Type Certificate Number: 2A3
Make: Mooney
Model: M20C, Serial Numbers 680001 and above.

Description of Type Design Change:

Installation of the Bendix/King KLX 135 and KLX 135A GPS/COMM (Global Positioning System Navigation Receiver with VHF Communications Transceiver).
REQUIRED DATA: Master Drawing List 155-08148-0001, Rev. 0, dated 8-1-95.
Later FAA approved revisions to the above listed data are incorporated without further revision to this Supplemental Type Certificate.

Limitations and Conditions:

1. This approval should not be extended to other specific airplanes of this model on which other previously approved modifications are incorporated, unless it is determined that the interrelationship between this change and any of those other previously approved modifications will introduce no adverse effect upon the airworthiness of that airplane.

(Limitations and Conditions continued on Continuation Sheet)

This certificate and the supporting data which is the basis for approval shall remain in effect until surrendered, suspended, revoked, or a termination date is otherwise established by the Administrator of the Federal Aviation Administration.

Date of application: 8-4-95
Date of issuance: 8-9-95

Date issued:
Date amended:

By direction of the Administrator

Chris Durkin (Signature)
DAS Coordinator, DAS4CE
(Title)

Any alteration of this certificate is punishable by a fine of not exceeding $1,000, or imprisonment not exceeding 3 years, or both.

This certificate may be transferred in accordance with FAR 21.47.

FAA Form 8110-2 (10-68)

United States of America
Department of Transportation—Federal Aviation Administration

Supplemental Type Certificate

(Continuation Sheet)

Number SA00247WI-D

Limitations and Conditions (continued):

2. The GPS portion of the KLX 135 and KLX 135A is limited to use under Visual Flight Rules operations only. A placard stating this limitation is required to be affixed to the instrument panel.

MFG.

INTRO

AlliedSignal

ELECTRONIC AND AVIONICS SYSTEMS

MAINTENANCE MANUAL

BENDIX/KING®

KLX 135/135A

COMM TRANSCEIVER/ GPS RECEIVER

MANUAL NUMBER 006-15500-0002
REVISION 2 FEBRUARY, 1996

WARNING

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RECORD OF REVISIONS

MFG REV NO	DESCRIPTION	ISSUE DATE	ATP REV DATE	INSERTED BY
2	SEE HIGHLIGHTS	2/96	11/2/2000	ATP/MB

RECORD OF TEMPORARY REVISIONS

TEMP REV NO	DESCRIPTION	ISSUE DATE	ATP REV DATE	INSERTED BY	DATE REMOVED	REV INCORP	REMOVED BY

REVISION HISTORY AND INSTRUCTIONS

MANUAL	KLX 135/135A
REVISION	2, FEB,1996
PART NUMBER	006-15500-0002

Add, delete, or replace pages as indicated below and retain all tabs and dividers. Insert this page immediately behind the title page as a record of revisions. This revision level of this manual consists of the following individual publications:

PAGE	ACTION
Title Page	Remove and Replace
Revision History	Insert Behind Title Page
Section IV	Remove and Replace
Section V	Remove and Replace
Section VI	Remove and Replace
Software Appendix	Insert After Section VI

SECTION IV
THEORY OF OPERATION

SECTION V
MAINTENANCE

SECTION VI
ILLUSTRATED PARTS LIST

SECTION VI (Cont'd)
ILLUSTRATED PARTS LIST

LIST OF ILLUSTRATIONS

LIST OF ILLUSTRATIONS (Cont'd)

LIST OF TABLES

04

SECTION IV
THEORY OF OPERATION

LIST OF ILLUSTRATIONS

SECTION IV

THEORY OF OPERATION

4.1 GENERAL

4.1.1 GENERAL DESCRIPTION

The KLX 135/135A is a panel-mounted combination VHF communication transceiver and GPS navigation receiver. The KLX 135/135A is available in one version : 14 VAC supply with 14/28 V panel lighting and 6 MBit database memory (P/N 069-01029-0201). The KLX 135A is available in one version : 14 VAC supply with 14/28 V panel lighting and 8 MBit database memory (P/N 069-01029-0703). The KLX 135/135A provides the functions listed below:

- Seven hundred and sixty COMM channels for voice communication within the frequency range of 118.000 MHz to 136.975 MHz in 25 kHz selectivity.
- GPS based, long range airborne navigation system with a data base.
- A Liquid Crystal Display presents frequency and navigational information such as present position, course deviation, bearing to waypoint, TO/FROM and FLAG status.

A basic KLX 135/135A system consists of a panel mounted KLX 135/135A, a KA 91 or KA 92 GPS antenna, a 50Ω communication antenna, headphones and microphone. Additional system components may be added to the KLX 135/135A which increase its features and capabilities. Some of these optional components include an external Course Deviation Indicator (CDI) and external annunciators.

The GPS portion of KLX 135/135A provides the pilot with aircraft's present position and guidance information. The present position information is processed by the KLX 135/135A to determine crosstrack error, distance-to-waypoint, ground speed, track angle, time-to-waypoint and bearing-to-waypoint.

An internal data base provides the KLX 135/135A with information concerning airport, VORs, NDBs and Magnetic Variation Coefficients throughout the world. Waypoints are stored in the data base by their ICAO identifiers. The ICAO identifiers are in most cases taken directly from Jeppessen Sandersen or government aeronautical charts. This data allows the pilot to create flight plans with minimum effort. The data base can be updated by use of a personal computer, usually a laptop, via RS232 serial interface.

4.1.2 BASIC CONSTRUCTION

The KLX 135/135A contains several PC boards and assemblies which are listed in Figure 4-1 along with reference series and connector information.

ASSEMBLY BOARD	PART NUMBER	REFERENCE SERIES	CONNECTORS
DIGITAL BOARD	200-08755-0000	0000	J1, J2, J3, J5, J6
DATABASE BOARD	200-08773-0000	100	P101, P102
GPS RECEIVER BD	200-08691-0000	500	J501
POWER SUPPLY BD	200-08412-0000	1000	P1001
AUDIO BOARD	200-08768-0000	3000	P3001
COMM RECEIVER BD	200-08410-0000	4000	J4001, J4002, J4003, J4004, J4005, J4006, J4007
TRANSMITTER BD*	200-08413-0000	5000	- - -
FRONT PANEL (MAIN) BOARD**	200-08757-0000	6000	J6001, J6002, P6003
FRONT PANEL (AUX) BOARD**	200-08414-0000	7000	P7001, P7002, P7003

* Part of COMM Transmitter Assembly P/N 200-03297-0000

** Part of Front Panel Assembly P/N 200-03298-0000

FIGURE 4-1 ASSEMBLY DESIGNATIONS

4.2 BLOCK DIAGRAM THEORY

Figure 4-2 is a block diagram showing the basic signal flow through a KLX 135/135A GPS/COMM.

4.2.1 SWITCH MODE POWER SUPPLY (SMPS)

Refer to Figure 4-3 for the following discussion.

The SMPS uses a flyback converter circuit to transform the aircraft power bus voltage (11-33 volts) into the required voltages for the KLX 135/135A's internal circuitry. The power supply incorporates over voltage and short circuit protection to minimize the possibility of damage occurring in the power supply or other circuitry, resulting from abnormal circuit behavior within the KLX 135/135A. The power supply is also protected by a fuse on the COMM Receiver Board. The communication transmitter and the 8 Watts audio power amplifier of KLX 135/135A are powered directly from the aircraft's supply.

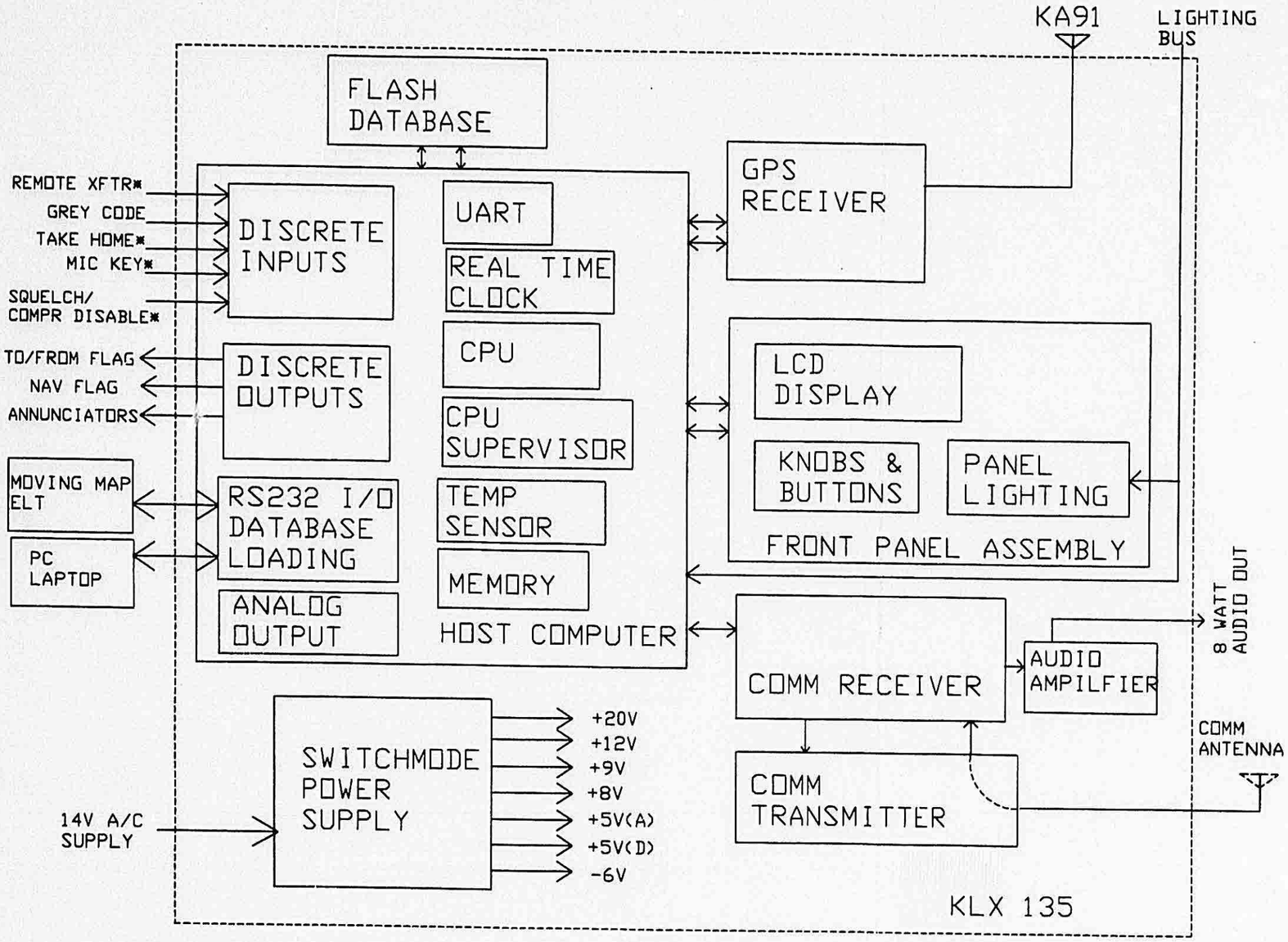


FIGURE 4-2 KLX 135/135A BLOCK DIAGRAM

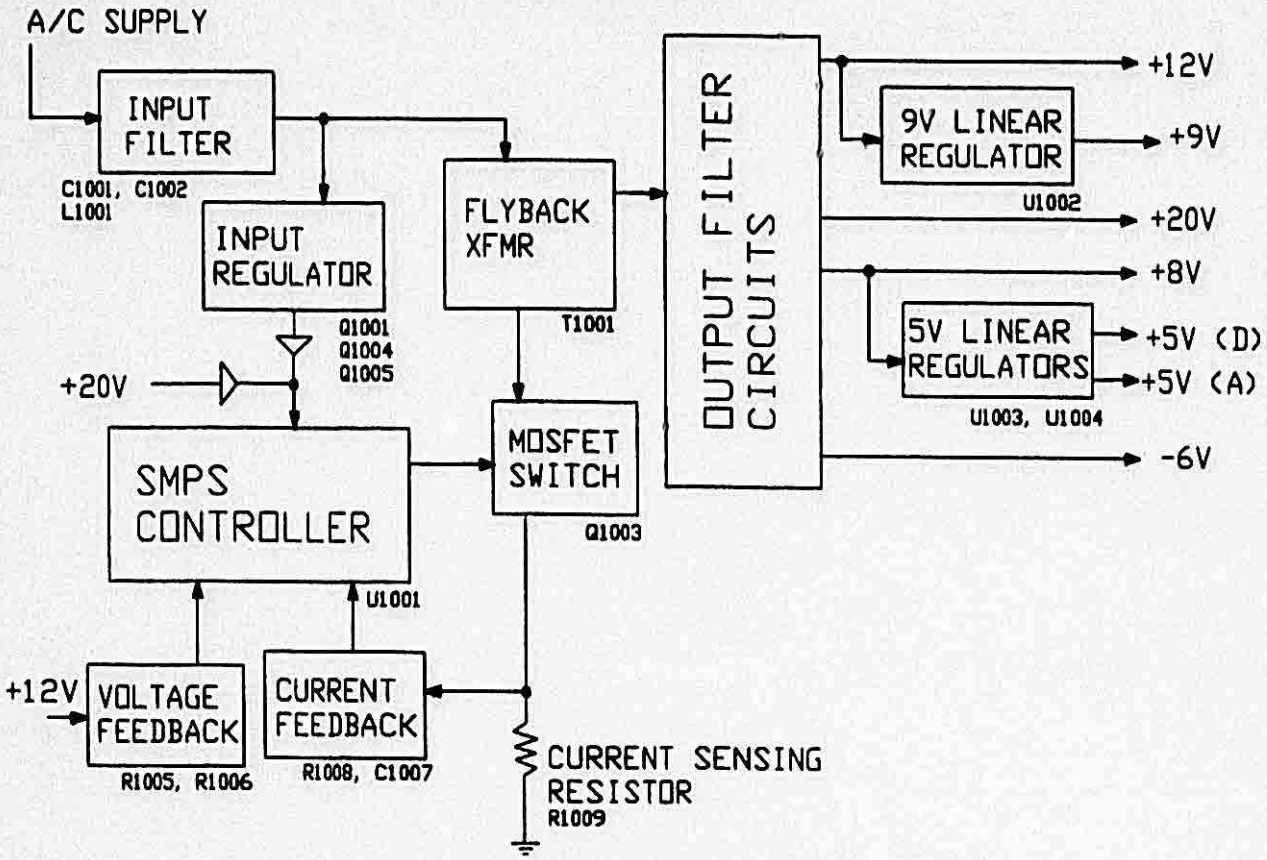


FIGURE 4-3 POWER SUPPLY BLOCK DIAGRAM

4.2.2 FRONT PANEL BOARDS (MAIN & AUXILIARY)

Refer to Figure 4-4 for the following discussion.

The FRONT PANEL BOARDS together houses the KLX 135/135A's pilot interface. The boards contain the circuitry to support the LCD display and backlighting, both sets of INC/DEC knobs (outer and inner), six buttons (COMM frequency transfer, CURSOR, CLR, ENT, D->, MSG) and the ON/OFF BRT knob. There are ten panel light bulbs on the MAIN board. The light bulbs are powered and controlled by the aircraft's lighting bus.

4.2.3 GPS RECEIVER BOARD

CAUTION

DO NOT ATTEMPT TO ALIGN OR REPAIR THE GPS RECEIVER BOARD P/N (200-08691-0000). THIS BOARD IS NOT A FIELD SERVICEABLE ASSEMBLY

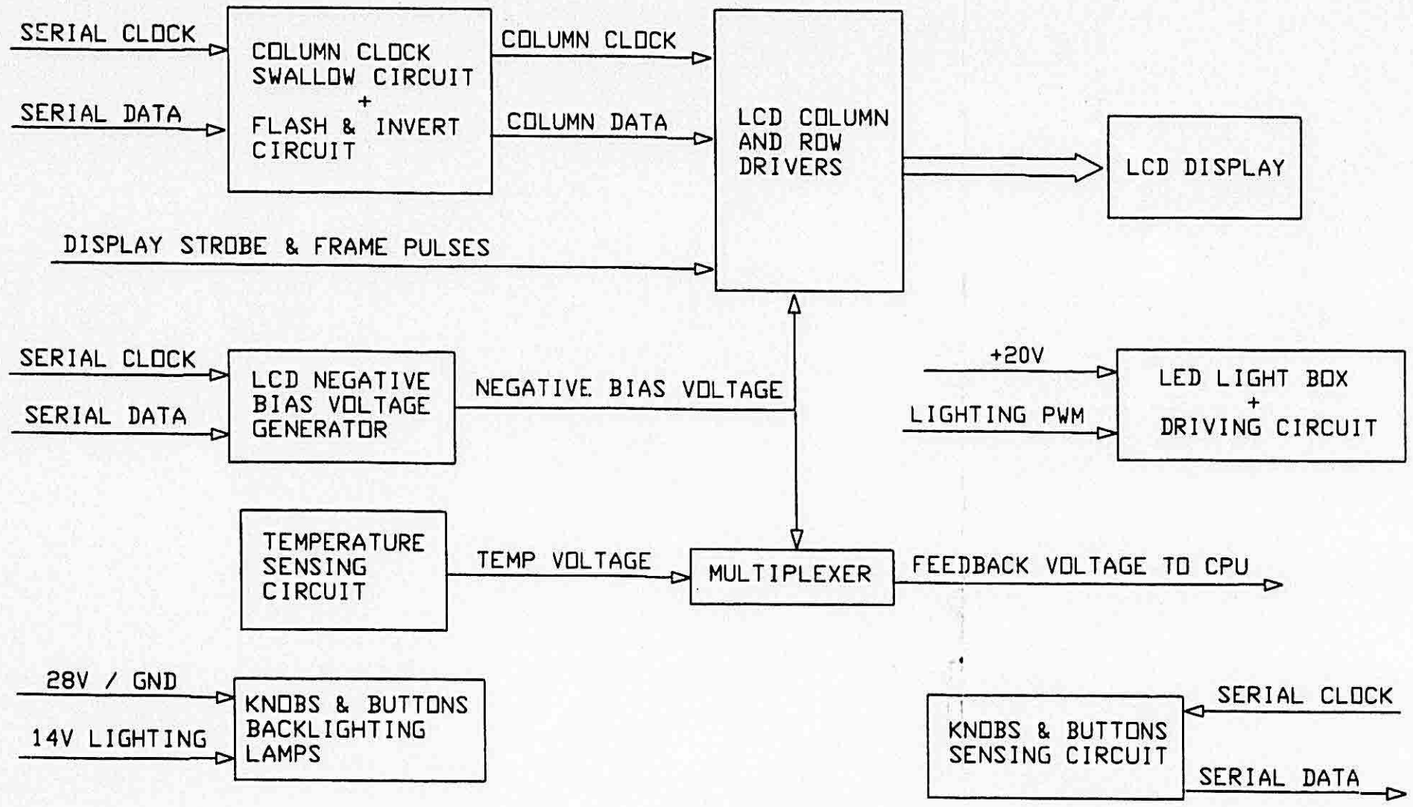


FIGURE 4-4 FRONT PANEL BLOCK DIAGRAM

The GPS RECEIVER BOARD, operating in conjunction with the KA 91 OR KA 92 antenna provides the host computer (on the DIGITAL BOARD) with position, velocity, and time information through the RS232 interface module. The host computer provides control information to the GPS RECEIVER through the RS232 interface module.

4.2.4 COMM RECEIVER BOARD

Refer to Figure 4-5A, B and C. This board contains the communication receiver as well as the modulator circuitry.

The received communication RF signal is filtered and amplified before it arrives at the mixer. At the mixer, it is mixed with the local oscillator frequency from the synthesizer to arrive at the 11.4 MHz intermediate frequency (IF). A crystal filter removes the noise from the IF before it is amplified by the IF amplifier and then demodulated. Automatic gain control voltage is fed to the first and second IF amplifiers and the RF amplifier to achieve a greater dynamic range. The squelch gate opens to let the detected signal pass through provided the signal is clean (noise squelch detector) or strong (carrier squelch detector). It then proceeds through the lowpass filter which has a passband from 350 Hz to 2.5 kHz to arrive at the audio compressor which maintains the audio volume at a level set by the volume adjust.

In the transmit mode, the mic audio is allowed to pass through the transmit switch, amplified and range compressed before it is applied to the transmitter power amplifiers by series modulating the supply to those amplifiers. A small amount of mic audio is also fed to the receiver's audio amplifier for sidetone.

The stabilized master oscillator (SMO) generates the RF drive for the transmitter as well as the local oscillator for the receiver. The SMO synthesizes frequencies that are referenced to a 25 kHz signal derived from the 3.975 MHz crystal oscillator.

4.2.5 TRANSMITTER BOARD

Refer to Figure 4-6 for the following discussion.

The T/R switch Q5004 turns off the transmitter in the receiver mode. In the transmitter mode, the RF signal is allowed to pass through the T/R switch to the pre-driver amplifier. The RF signal is then further amplified by the driver amplifier and the final amplifier to a level of about 5 Watts. A elliptic lowpass is placed between the final amplifier and the antenna to attenuate the harmonics of the transmitter signal. Modulation to the RF signal is applied by series modulating the supply to the driver and final amplifier. The other portion of the T/R switch CR5001 and CR5002 are reverse biased to protect the receiver

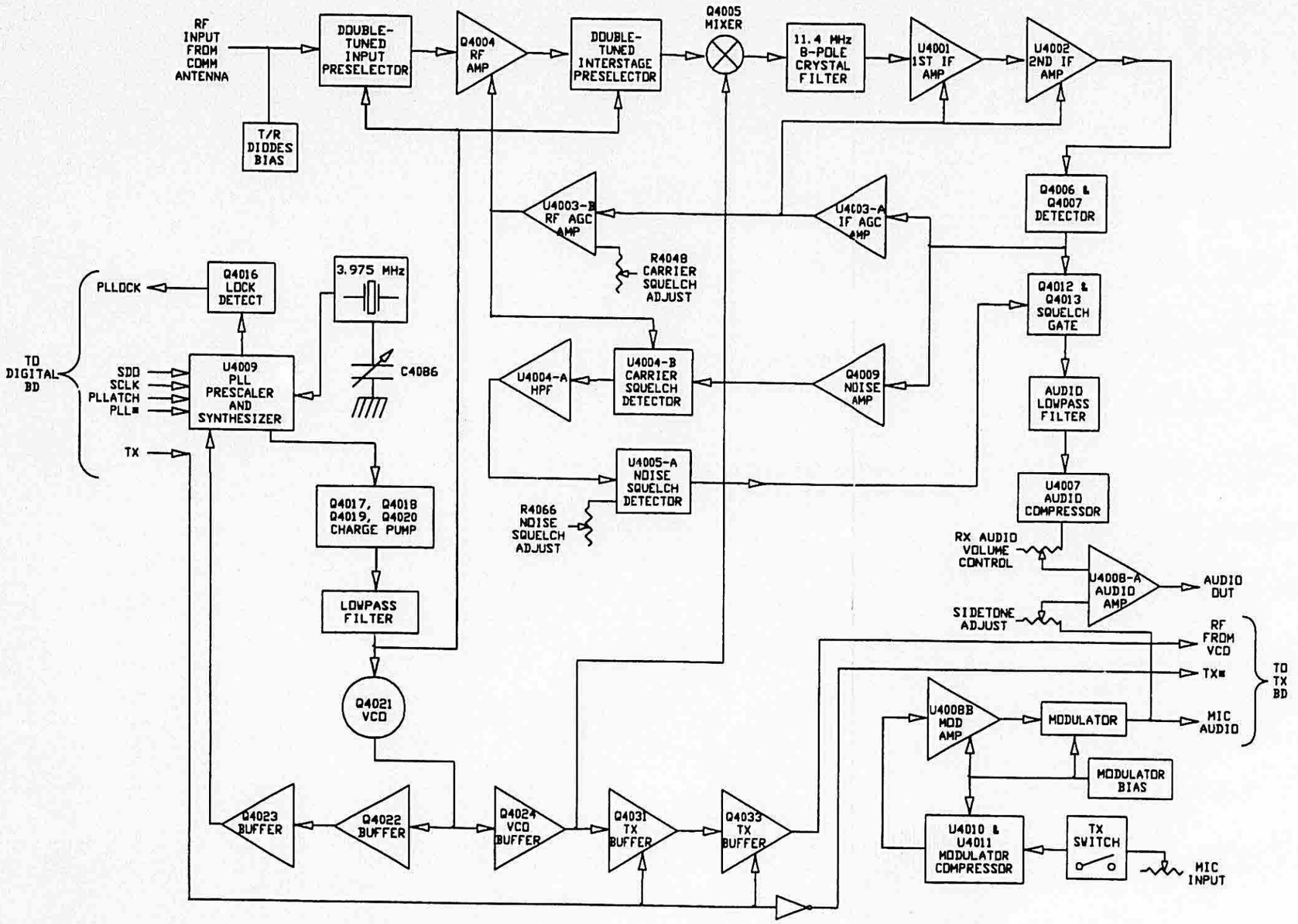


FIGURE 4-5A COMMUNICATION RECEIVER BLOCK DIAGRAM

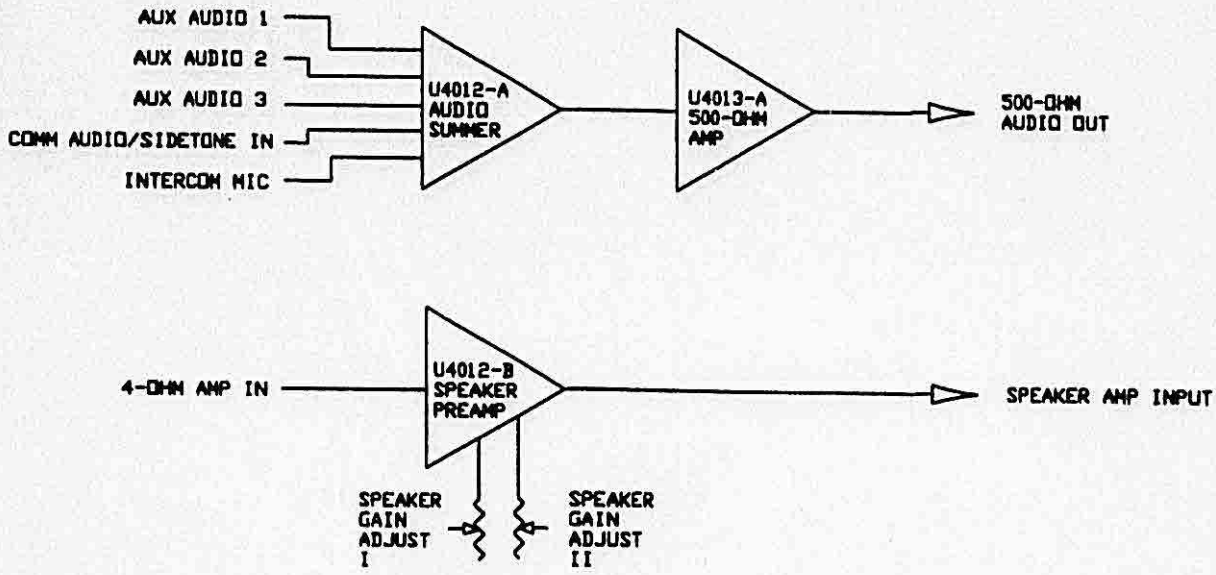


FIGURE 4-5B AUDIO BLOCK DIAGRAM

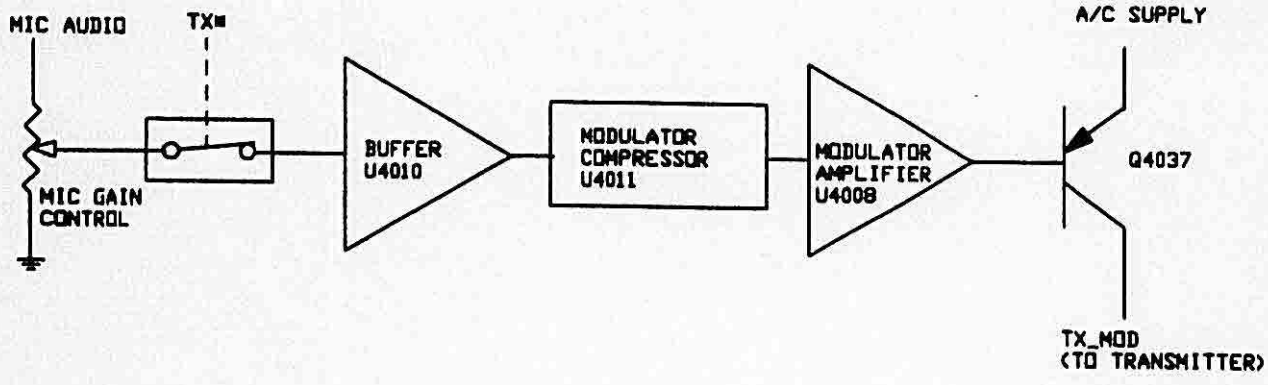


FIGURE 4-5C MODULATOR BLOCK DIAGRAM

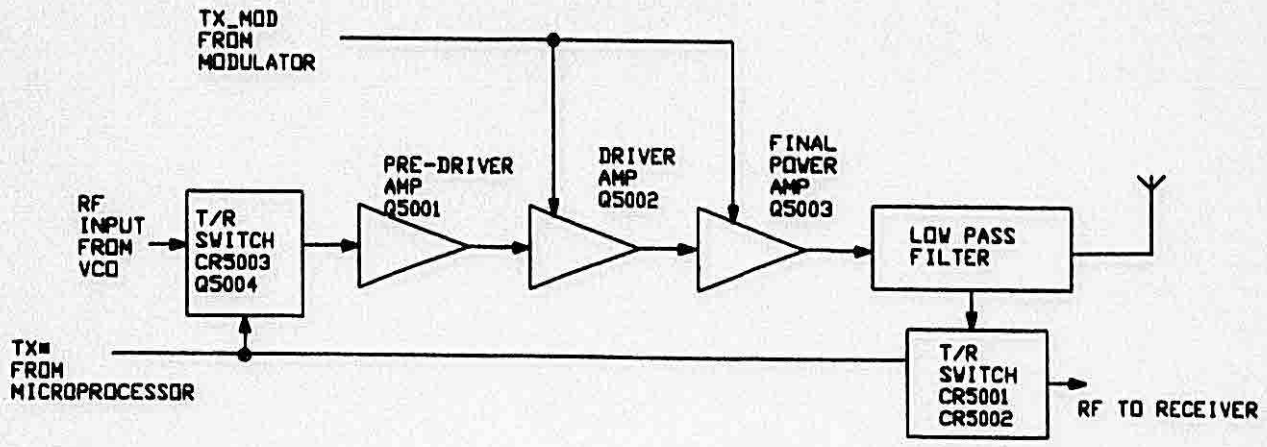


FIGURE 4-6 COMMUNICATION TRANSMITTER BLOCK DIAGRAM

4.2.6 AUDIO BOARD

The AUDIO BOARD houses the 8 Watts Integrated Circuit audio amplifier. It also has a comparator to monitor the aircraft's supply and warn the host computer when the voltage drops below 10 V.

4.2.7 DIGITAL BOARD

Refer to Figure 4-7 for the following discussion.

The DIGITAL BOARD integrates a variety of functions onto a signal board. The KLX 135/135A has three microprocessors, two reside on the GPS RECEIVER BOARD and the other, the host computer, resides on the DIGITAL BOARD. The host computer controls all RNAV functions associated with the KLX 135/135A. In addition, it controls RS-232 communications, CDI activity, data base communications, RTC (real time clock) activity, LCD display, front panel knobs operation and channeling of communication frequency.

4.2.8 DATABASE BOARD

The DATABASE BOARD houses 6 Mbits of FLASH memory. Its function is to store and provide access to data regarding airports, VOR's and NDB's. The data contained in the data base can be periodically updated via erasure and re-programming of the FLASH memory.

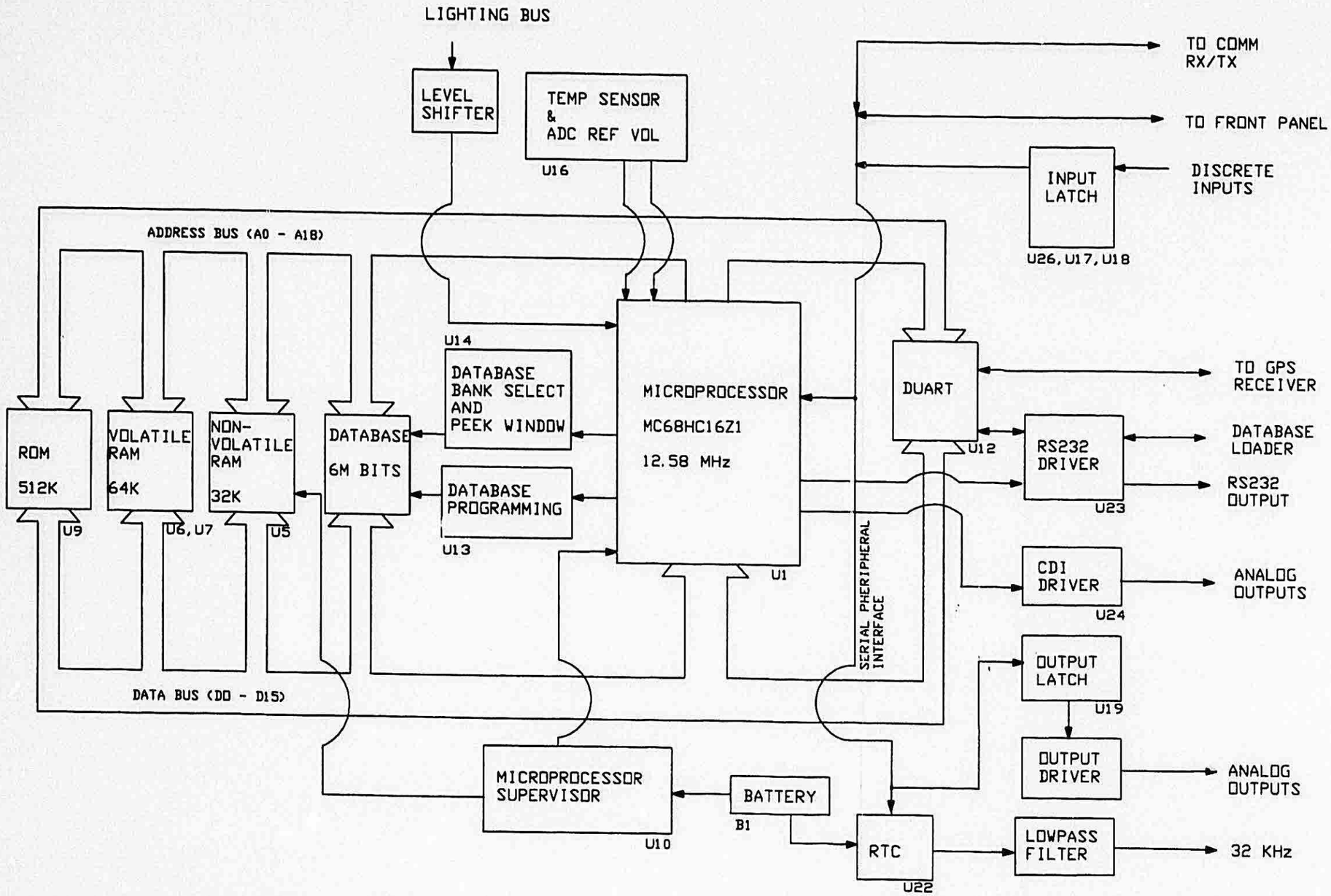


FIGURE 4-7 HOST COMPUTER BLOCK DIAGRAM

4.3 DETAILED CIRCUIT THEORY

4.3.1 POWER SUPPLY

The KLX 135/135A power supply is a dc to dc converter delivering 15 Watts of power to meet the needs of the GPS/COMM except the transmitter and the 8 Watts audio amplifier which are power directly from the 14 VAC supply. The supply generates +12 V, +9 V, +8 V, +5 V(A), +5V(D) and -6 VDC. The typical efficiency is close to 75 %. The design is based on a discontinuous inductor current mode flyback configuration. Input voltage to the converter can range from 10 VDC to 33 VDC.

Input power is filtered (C1001, L1002, C1002 and C1020) and routed to the input regulator (Q1001, Q1004, Q1005 and their associated resistors and zener diode) which provides a voltage of about 12 VDC to turn on the current mode controller, U1001. The controller in turn switches on and off the current through the primary of the flyback transformer, T1001 through the MOSFET switch, Q1003. When the current in the transformer primary is switched off, the energy stored in there is transferred to the secondary where it charges various capacitors through diodes to arrive at the various output voltages.

The +12 V output voltage is feedback to the controller and compared with its internal voltage reference. This, together with the current feedback implemented using resistor R1009 determine the ON duty cycle of the MOSFET switch. The output voltages are regulated by this double feedback loop.

Resistor R1007 and capacitor C1006 set the frequency of operation of the controller to about 87 kHz.

The 20 VDC output voltage, once it is up, will take over the supply of current to the controller from the input regulator. CR1009 converts the 20 VDC to about 15 VDC suitable for use by the controller.

+8 V, +12 V and +20 VDC are hard wired OR together and tied to pin 1 of the controller through R1019. Any short occurs at these outputs will bring down the voltage at pin 1 of the controller and shutting itself OFF.

4.3.2 FRONT PANEL PILOT INTERFACE

The Front Panel consists of Front Panel Main Board (with designator from 6000) and Front Panel Aux Board (with designator from 7000).

The LCD on Front Panel Main Board has 126 by 38 pixels. It is divided into 2 half-screen and operates on 1/19 duty factor with 1/5 biasing. U6001 to U6006 and U7011 provide column driving signals while U7001 provides row driving signals.

U7002 and U7004A form a simple D-to-A converter to generate negative biasing voltage for the LCD. This voltage is feedback to CPU via U7004B and U7003C. Thermistor sensor RT6001 on Main Board provides temperature information for the CPU to adjust LCD biasing voltage according to temperature.

Column information on LCD display is sent to Front Panel module from CPU via serial data line, SDO. The data is synchronized by serial clock, SCLK and is enabled by DISPO. The data come in a packet size of 8 bit. However, as a normal character is represented in 9 by 6 matrix, a 'Column Clock Swallow' Circuit is used to eliminate extra 2 bits for a character by consuming the last 2 clocks. The clock masking pattern is shifted serially out from U7005 and is enable by bit 5 of U7002. The result is COLCLK.

This serial data for column display is further processed by the 'Flash & Invert' circuit, consists of U7008C, U7009A&B, U7012C&D, to display characters in inverse and flashing mode when needed. The attribute of a character is stored in bit 6 and 7 of a data packet. U7006 is used to capture this information and its clock is gated by output of U7005. Bit 6 of U7002 enables U7006 when attribute is on. Character flashing rate is determined by the signal 'BLINK'. The processed serial data, COLDATAI, is input into U6001 and shifted serially to all column drivers.

After shifting 2 row of column data, U7010B is activated by LCDLP to generate COLLP for latching data into the column driver while U7010A supplies frame pulses.

LCDLP is also used to shift row information into the row driver, U7001. Row data is shifted from left to right, i.e. from Y21 to Y39 and keep circulating once U7001 is initialized. The data is latched at the falling edge of LCDLP via inverter U7012B. Every row output from U7001 will drive 2 rows at a time.

The LCD display is back lighted by a LED light box. Q7002 is used as a constant current driver for the light box. Its current value is determined by R4250 and R4251 on the COMM Receiver Board. Its duty cycle is pulse-width- modulated by LTGPWM from the CPU which varies with aircraft lighting bus voltage.

There are 8 photo-interrupters on the Front panel Main Board, U7006 to U6014, to detect rotation of left and right knobs. The Front Panel Main Board also houses 6 push buttons and 2 ON/OFF switches. The status of the above mentioned are serially polled by the CPU via U6015 and U6016.

10 bulbs on the Front Panel Main Board (DS1 to DS10) are used to back light the nomenclature and push buttons. They are arranged in 2 branches of 5. The branches are connected in series for 28V lighting and parallel for 14V lighting.

4.3.3 GPS RECEIVER

CAUTION

DO NOT ATTEMPT TO ALIGN OR REPAIR THE GPS RECEIVER BOARD P/N (200-08691-0000). THIS BOARD IS NOT A FIELD SERVICEABLE ASSEMBLY

The GPS RECEIVER BOARD, operating in conjunction with the KA 91 or KA 92 antenna provides the host computer (on the DIGITAL BOARD) with position, velocity, and time information through the RS232 interface module. The host computer provides control information to the GPS RECEIVER through the RS232 interface module.

4.3.4 COMM RECEIVER

The communication receiver operates in the 118 MHz to 136.975 MHz band.

4.3.4.1 Antenna Input Circuit

Since a common antenna is used for the communication receiver and transmitter, a means of isolating the two must be in place to offer the necessary protection. This isolation is provided by CR5001 and CR5002 (T/R diodes) on the transmitter board and CR4001, CR4002, Q4003, Q4002 and Q4001 and their associated circuits on the communication receiver board.

In the transmit mode, Q4003, Q4002 and Q4001 are turned off, providing no bias to CR5001 and CR5002. The RF signal to be transmitted will flow from the transmitter straight to the antenna. The presence of CR5001 and CR5002, now not biased, protects the receiver from the high RF power in the transmit mode.

In the receive mode and when interlock is not active, Q4003 conducts and turns on Q4001. Q4002 is also turned on. Hence the effective collector load seen by Q4001 is 1.1 KΩ (R4002). This allows a forward bias current of about 6.3 mA to flow to CR5001 and CR5002; DC voltage at emitter of Q4002 is about 1.4 V. This permits RF signal received by the communication antenna to flow to the receiver circuit. Q4001 and Q4003 are operating in the saturation region so as to maintain a constant bias to the T/R diodes.

When a transmitter in the same aircraft is transmitting, the TX/RCV_INTERLOCK (J4001 pin 2) line will be pulled low (active). Q4003 just turns on to turn on Q4001. Q4002 is turned off, increasing the collector load of Q4001 to 402 KΩ (R4001). This large load keeps Q4001 in the saturation region, thus supplying a fairly constant bias current of about 20 μA at a voltage of about 0.7 V.

C4003 steps up the impedance to match the first pole of the preselector.

4.3.4.2 Double-Tuned Input Preselector

This comprises two parallel resonant circuits (C4004, CR4003A, L4001, C4005 and CR4003B, C4006, L4003, C4007) inductively coupled via L4002. The matched varactor diodes allow the passband of the preselector to be moved across all the communication channels. A certain passband is selected when the lowpass loop filter in the synthesizer circuit applies an appropriate voltage to the varactor diodes. The desired RF signal with frequencies falling within the preselector passband is then ac-coupled to the RF amplifier.

4.3.4.3 RF Amplifier

Q4004 and the associated parts constitute the RF amplifier. To keep the system noise figure as low as possible, a low noise and high gain transistor is chosen. This dual-gate transistor Q4004 has a noise figure of about 1 dB and power gain of 25 dB. The RF signal coupled from the preselector is fed to gate 1 of Q4004 while a dc voltage applied to gate 2 varies the amount of gain or attenuation of the amplifier. A dynamic range of 40 dB is available.

4.3.4.4 Double-Tuned Interstage Selector

The double-tuned interstage selector (C4017, L4005, CR4003C, C4018 and CR4003D, C4019, L4007, C4020) is similar to the preselector in terms of construction. This filter is essential at the

output of the RF amplifier to filter off any undesired frequencies generated by the RF amplifier, passing only the desired signal to the mixer. As in the preselector, the matched varactor diodes allow the passband of the interstage selector to be tuned to the selected communication channel.

The input preselector and the interstage selector combined results in a high image rejection.

4.3.4.5 Mixer

Q4005, T4001 and the associated parts form the mixer. The RF signal is coupled to gate 1 of the MOSFET, Q4005, while the local oscillator (LO) signal is coupled to gate 2. The mixing results in an intermediate frequency of 11.4 MHz to which T4001 is tuned. T4001 also matches the output impedance of the mixer to the input impedance of the crystal filter, FL4001.

4.3.4.6 Crystal Filter, FL4001

The 8-pole 11.4 MHz crystal filter provides the desired selectivity. The input and output of the filter are matched to 4.1 KΩ by T4001 and T4002 respectively.

4.3.4.7 IF Amplifier

The IF amplifier (U4001, U4002 and associated circuit) consists of two stages, each with about 45 dB of gain. Automatic gain control (AGC) capability of U4001 and U4002 also makes possible for a dynamic range of 60 dB. This AGC takes the form of current control via Pin 5 of each amplifier IC. Resistors R4029 and R4032 convert the IF AGC voltage from U4003A to AGC current. Resistors R4031 and R4034 across the output of U4001 and U4002 respectively ensure the stability of the amplifiers. T4003 and T4004 are tuned to 11.4 MHz. At the same time, these IF transformers match the output impedance of the amplifier to the input impedance of the following stage.

4.3.4.8 Detector

The amplitude modulation detector centers around Q4006 and Q4007 where Q4006 is diode-connected to bias Q4007 near cutoff. This form of bias provides bias stability and temperature compensation. The output from the collector of Q4007 is the demodulated baseband signal. This signal is fed to the audio amplifier strip, to the squelch circuit as well as to DETECTED_AUDIO_OUT for external use.

4.3.4.9 IF AGC Circuit

The IF AGC circuit works to increase the gain of the IF amplifier when the signal level is low and decrease the gain when the signal level is high. This it does by comparing the average level of the detector output with a reference level and setting the AGC voltage accordingly. The average level as derived by U4003A will be inversely proportional to the amplitude of the detector output. When the signal level is low, the average level will be higher than the reference level and a low AGC voltage will result to increase the gain of U4001 and U4002. A high signal level will result in a high AGC voltage and hence reduce the gain of U4001 and U4002.

4.3.4.10 RF AGC Circuit

U4003B generates the RF AGC for the RF amplifier Q4004. The RF AGC stays at maximum voltage to maintain maximum gain of the RF amplifier until the RF signal level reaches about

12.5 µV. The threshold of change is set by R4048. When the IF AGC voltage exceeds the reference voltage set by R4048, indicating that the received signal level is high, the RF AGC voltage decreases, thereby reducing the gain of the RF amplifier.

In the transmit mode, the reference voltage at Pin 5 of U4003B is lowered, causing the RF AGC voltage to go to zero. This ensures maximum attenuation on the RF amplifier when the transceiver is transmitting.

4.3.4.11 Noise and Carrier Squelch Circuit

The purpose of the squelch circuit is to keep the speaker and headphones quiet in the absence of a signal at the receiver input.

Q4012, Q4013 and associated parts make up the squelch gate. The demodulated (audio) signal from the detector is applied to the base of Q4012. The unit is squelched (i.e. audio is shut off) when the base of Q4013 goes to the supply voltage and its emitter follows. This causes Q4012 to become reverse-biased, thereby attenuating the demodulated signal by 70 dB. No audio will be heard.

The opening or closing of the squelch gate is controlled by the noise and carrier squelch circuit which produces the SQ_GATE_ENABLE signal at the cathode of CR4006. The noise squelch circuit closes the gate when weak and noisy signal is detected. On the other hand, the carrier squelch circuit opens the gate when the detected carrier is strong regardless of whether the detected signal is quiet or noisy. The carrier squelch circuit over-rides the noise squelch circuit to prevent receiver muting in areas where offset carrier VHF communication is in operation.

Q4009, U4004A, U4005A and their associated circuits constitute the noise squelch circuit.

When a weak, and hence noisy, signal is present, Q4009 amplifies the noise from the collector of the detector and limits its amplitude. The output of Q4009 is coupled to an active highpass filter U4004A (with cutoff frequency of about 7.3 kHz). Comparator U4005A then compares the output of the filter with a reference level set by the Noise Squelch Adjust R4065. When the filter output exceeds this reference level, C4049 will be charged up. U4005B is configured as a non-inverting comparator with hysteresis. When the voltage across C4049 exceeds the upper hysteresis limit, the output of U4005B will swing towards 9V and the unit is squelched.

When a signal is received, the noise output from the detector decreases and less noise is being fed into the highpass filter U4004A. C4049 is charged to a lower voltage and the unit is unsquelched.

U4004B and associated parts form the carrier squelch circuit. In the case when the signal may be quiet or noisy but the RF carrier is strong, a low RF AGC voltage is generated by U4003B as described earlier in 4.3.3.10. This, being lower than the reference set by R4058 and R4059, will result in a high voltage at the output of the comparator U4004B. This turns on Q4010 and grounds the input to the highpass filter. This eventually produces a low voltage at SQ_GATE_ENABLE. Q4013 is thus turned off and the squelch gate opens to allow the audio signal to pass through.

The squelch gate can be forced open by pulling the 'PULL TEST' knob on the front panel. This causes Q4011 to turn on, hence bringing down the SQ_GATE_ENABLE voltage, regardless of the state of the noise or carrier squelch.

When either the noise squelch or carrier squelch is open, the comparator circuit of U4006A will produce a low voltage for the signal RXACT. The microprocessor on the digital board reacts to this by displaying an 'R' on the LCD.

In the transmit mode, CR4005 is forward-biased and lowers the reference voltage to U4005B, thereby turning on Q4013 and the unit is squelched.

4.3.4.12 Audio Lowpass Filter

Inductor L4013 and its associated capacitors form a lowpass elliptical filter. The filter transfer characteristics is at least 20 dB down at 4 kHz with a notch at least 25 dB down at 4.5 kHz. The filter does roll off below 350 Hz since the signal is ac-coupled in and out of the filter. The low frequency roll off reduces 60 Hz hum.

4.3.4.13 Audio Compressor

The output from the filter is coupled through C4059 to the input of the compressor amplifier U4007B. The amplifier output is fed to a volume control and to U4007A. When the output of U4007B exceeds the attack level as set by R4093, R4092 and R4091, the output of U4007A goes low and C4062 will discharge through CR4010 and the output of U4007A. This lowers the gate-to-source voltage on Q4014, which also reduces its drain-to-source resistance. As Q4014 is turned on, the amplitude at C4059 and hence the output of the compressor amplifier, are reduced. Above the attack level, this negative feedback loop maintains a relatively constant output level regardless of any modulation level.

If the compressor is disabled, that is, if SQ_TEST/COMPRESSOR_DISABLE is low, the loop is opened at CR4010.

4.3.4.14 Audio Amplifier

The audio signal is routed through the volume control to the audio amplifier U4008A (bandwidth from 300 Hz to 5 kHz). The signal is amplified by approximately 30 dB and capacitively coupled through C4072 to the auto- transformer T4005. The voltage and impedance are stepped up to provide a minimum of 100 mW of audio power into a 500Ω load such as headphones or an audio panel.

4.3.5 COMM PHASE LOCKED LOOP

The vital function of the phase-locked loop is to generate the necessary local oscillator signal at the correct frequency, whether in receive or transmit mode. The essential constituents of this circuit are the synthesizer integrated circuit U4009 and the voltage-controlled oscillator (VCO), with the other constituents completing the phase-locked loop.

4.3.5.1 Voltage-Controlled Oscillator (VCO)

Q4021 and its associated parts form a modified Hartley oscillator. The varactor CR4003E is part of a matched set of five varactors, four of which are used in the input preselector and interstage

selector so that these will track the VCO. C4091 determines the range of the tuning voltage; the smaller the capacitor, the larger the tuning range must be to maintain the same frequency range. C4092 and R4130 provide bias stability. The tuning range is from 118 MHz at 2.5V (at TP4009) to 148.375 MHz at 7.3 V.

The VCO has a dedicated 5V regulator, U4015. This is to keep the oscillator output as clean as possible.

4.3.5.2 Synthesizer

Internally, the CX7925B (U4009) synthesizer chip comprises an oscillator (reference) to which an external crystal is connected, a 14-bit programmable divider for this oscillator, prescalers and a 16-bit programmable divider for the incoming signal, a phase comparator and timing control circuit.

Programming of the internal dividers is done serially via the three control inputs : PLLATCH at Pin 3, gated SCLK at Pin 2 and SDO at Pin 4. Twenty bits of data at a time are required to set the frequency division number of each divider.

A reference frequency of 25 kHz is used internally. Since the reference frequency set by Y4001 is 3.975 MHz, the frequency division number to be entered into the 14-bit reference divider is 159. The incoming signal at Pin 11 is divided down by the prescalers and the 16-bit dividers to a frequency which is to be compared with the reference frequency of 25 kHz by the phase detector. If the reference frequency is the lower of the two, the phase detector will pulse up (3V). If the reference frequency is the higher of the two, the phase detector will pulse down (1V). The phase detector output becomes high impedance when the two frequencies are equal, in which case the loop is "locked". When this happens, the lock detect pin at Pin 8 pulses down. Q4016, R4117 and C4079 integrate the lock detect pulses to send the PLLLOCK signal to the microprocessor. The clock (SCLK), data (SDO) and strobe (PLLATCH) lines are driven by the microprocessor on the digital board.

As the SCLK from the microprocessor drives other circuits as well, the SCLK is OR-ed with the PLL signal to prevent inadvertent triggering of U4009. The data fed on SDO into pin 4 (DIN) of U4009 can be routed out from pin 9 (BO) back to the microprocessor via SDI for checking.

4.3.5.3 Voltage Translator

Since the tuning voltage that the VCO requires is 2.5 V to 7.3 V but the synthesizer outputs 1 V and 3 V pulses, some form of voltage translation is required between the two.

Voltage translation of 5 V pulses to 9 V pulses is accomplished by Q4017, Q4018, Q4019, Q4020 and the associated resistors. The output of the phase detector is fed to the emitters of Q4017 and Q4018. The bases of Q4017 and Q4018 are biased at about 2.2 V so that when the phase detector is tri-stated, Q4017 and Q4018 will be off. If the phase detector pulses low, Q4017 will turn on, causing Q4019 to turn on and a 9 V pulse to appear at the output of the voltage translator. If the phase detector pulses high, Q4018 will turn on, causing Q4020 to turn on and pull the output to ground.

4.3.5.4 Lowpass Filter

The lowpass filter determines the dynamic performance of the phase-locked loop. At the same time, it removes any noise and high frequency components from the output of the voltage translator, thereby obtaining an average (DC) voltage to bias the varactor diode in the voltage-controlled oscillator.

The lowpass RC filter formed by R4126, C4088, R4127, C4089, R4128, R4129 and C4090 has a cutoff frequency at about 30 Hz. About 40 dB of attenuation at 25 kHz is also achieved.

4.3.5.5 VCO Buffer

Q4024 and its associated parts form the VCO buffer. The VCO buffer provides isolation from the transmit buffers and the mixer as well as amplifying the signal before it is applied to the mixer.

4.3.5.6 Digital Buffer

Q4022, Q4023 and their associated parts form the digital buffers. The VCO output is very lightly coupled to the digital buffers through C4095 so that noise from the prescaler will not enter the VCO. The signal is coupled to the prescaler through C4099 at about 500 mV.

4.3.5.7 Transmit Buffers

The transmit buffers contain two stages of amplification. The RF signal is coupled through C4131 to Q4031 and amplified. C4138 couples the collector of Q4031 to Q4033. Q4033 amplifies the signal to approximately 24 dBm. The signal is coupled through CR4013 and C4181 to create the transmit drive. The drive level is adjusted for different transmitters by the resistor R4201. Q4032 and Q4034 are turned off in the receive mode to ensure that Q4031 and Q4033 are turned off. Q4035 is also turned off in the receive mode to prevent CR4013 from being turned on. In the receive mode, the local oscillator signal through the transmit buffers is attenuated by 50 dB.

4.3.6 MODULATOR

4.3.6.1 Microphone Input Circuit

The microphone is connected to Pin 3 of the rear panel connector J4001. Mic bias is supplied by R4144 and R4145. The audio signal from the microphone passes through C4107 to the Mic Gain Control R4146. In the transmit mode, Q4025 is turned on to pass the audio signal to the modulator compressor.

4.3.6.2 Modulator Compressor

The modulator compressor consists mainly of potential dividers (R4151, R4152 in parallel with Q4028, and R4157, R4158 in parallel with Q4026 and Q4027), amplifiers (U4010A and U4011A and their associated components), buffer (U4010) and comparator (U4011B and its associated components).

The audio signal is coupled through C4110 to the modulator compressor, the output of which is fed to the modulator amplifier through C4117.

The output of comparator U4011B will go low and begin to discharge C4126 for the duration when the peaks of the modulating voltage (TX_MOD) go below the level set by R4172 at the inverting input of U4011B. Discharging C4126 lowers the gate-to-source voltage on Q4026, Q4027 and Q4028, resulting in a lower drain-to-source resistance of these JFETs. This in turn lowers the amplitude of the audio signal at the inputs of amplifiers U4010A and U4011A. Hence, a constant amplitude, above the level determined by R4172, is maintained at the output of the modulator compressor through this close loop effect. The bias network of R171 and R172 is run off the Mod_Bias_voltage so that when the mod bias rises, the modulation will decrease, thus preventing distortion.

4.3.6.3 Modulator Amplifier

The output of the compressor amplifier is coupled to the modulator amplifier through C4117. The output is coupled to the modulator through C4123 and T4006.

4.3.6.4 Modulator Bias

The modulator bias (mod bias) regulates the supply voltage to just below half the supply voltage. The regulating transistor Q4036 is operated in the active region. R4207 is adjusted to obtain the necessary modulation bias for the required output power. CR4014 provides over-voltage protection. RT4001, R4208 and R4209 set the power reduction due to a thermal overload. When RT4001 becomes hot, the resistance goes up, reducing the voltage across R4209. This causes CR4015 to turn on and thus lowers the bias on Q4038.

4.3.6.5 Modulator

The audio signal is applied to the primary of T4006 which has a turns ratio of 4 to 1. This steps up the voltage swing on the modulator transistor Q4037 enough to make a 0 V-to-12 V swing to the final driver on the transmitter board. This output is also fed back to the modulator compressor. A certain portion is also fed to the audio amplifier to produce the sidetone. The mod bias is fed to the secondary of T4006, providing the bias to Q4037, with R4203 being the current limit resistor.

4.3.7 AUDIO AMPLIFIER

The audio inputs from AUX_1_AUDIO_IN (J4001 pin M), AUX_2_AUDIO_IN (J4001 pin 12), AUX_3_AUDIO_IN (J4001 pin 11), COMM_AUDIO/SIDETONE_IN (J4001 pin E), and INTERCOM_MIC_IN (J4001 pin D) are summed at U4012A. U4013A, the audio amplifier, then amplifies the summer output before coupling it via C4177 to the auto-transformer T4008. The signal is stepped up to provide a minimum of 100 mW of audio power into a 500Ω load.

The potentiometer R4221 allows for gain adjustment of the INTERCOM_MIC_IN signal up to 360 V/V.

A fraction of the output from U4012A is fed to the edge connector J4001 pin R as AUDIO_SUM_OUT. The input, 4_OHM_AMP_IN (J4001 pin S), to U4012B may be taken from the 500_OHM_AUDIO_OUT (J4001 pin 13) or the AUDIO_SUM_OUT or from the audio output of another unit in the installation. The output of U4012B is fed to the 8 W audio amplifier on the Audio

Board. The two potentiometer, R4237 and R4238, permit adjustment of the total audio gain to suit the strength of the audio source. The 8 W audio amplifier, U3001 is disabled during COMM transmit through TX. Transformer T3001 converts the differential audio output to single ended output suitable for use in aircraft installation.

4.3.8 TRANSMITTER

4.3.8.1 RF Amplifier Q5001

The RF carrier signal from the transmit buffers is fed to the pre-driver amplifier on the transmitter board through a 50Ω coaxial cable. The drive level is about 15 dBm. In the receive mode, Q5004 is turned on to bypass the carrier signal to ground and remove the bias from pin diode CR5003 so as to isolate the base of Q5001 from C5010. In the transmit mode, Q5004 is off and base current is supplied through R5001 and CR5003 to operate Q5001 as a class A amplifier. Transformer T5001 is broadband tuned and steps the collector impedance down to the input impedance of the driver.

4.3.8.2 Driver Q5002

The carrier signal from Q5001 is fed through C5012 and C5037 to the driver, Q5002. The driver is operated as a class C amplifier and the collector is modulated through T5002. The collector is broadband tuned and is coupled to the final power amplifier by T5002.

4.3.8.3 Final Power Amplifier Q5003

Capacitors C5015, C5016 and C5040 form the input matching network for the final power amplifier, Q5003. Q5003 is operated class C and is modulated at the collector. The low collector output impedance is stepped up to approximately 50Ω by transformer T5003.

4.3.8.4 Lowpass Filter

A three-section elliptic lowpass filter is placed between the final amplifier and the antenna to attenuate all harmonics which may be generated in the transmitter. In the transmit mode, the T/R diodes CR5001 and CR5002 are reverse-biased to protect the receiver.

4.3.9 MICROPROCESSOR CONTROL

The heart of the host computer board is the U1, Motorola MC68HC16Z1 high-speed 16-bit modular micro controller unit. A built in phase-locked loop circuit synthesizer allows various setting of system clock speed. The state of the MODCLK pin during reset will determine the system clock source from the clock synthesizer or external system clock input. In KLX 135/135A, the MODCLK pin is configured as high during reset and system clock is synthesized to 12.58 MHz through reference crystal frequency of 32.768 kHz. C5 comprises part of the loop filter of the synthesizer; Y3, C135, C136, R149 and R150 provide this reference frequency.

4.3.9.1 Memory

U9 and U15 are the 2x256 Kbytes of system non-volatile ROM in 16-bit word format. The program memory is configured for output-enable controlled mode with maximum access time of 50 ns. The

system volatile read and write memory is comprise of U6 and U7 for 64 Kbytes of 16-bit wide format and again configured as output-enable mode through Q2 digital transistor, R8 and R33 with maximum access time of 80 ns. U5 is the 32 Kbytes of non-volatile 8-bit wide byte format and configured as output-enable mode using Q1 digital transistor, R7 and R117 with maximum access time of 80 ns. When power is turned off, chip-select of U5 will be pulled high invoking data retention mode. U8 provides the necessary gating of read and write control signal for these chips. In addition, there is a 1 Kbytes of internal volatile RAM residing in U1. U4 is the provision for 32 Kbytes of non-volatile RAM expansion. Figure 4-8 is a table of the KLX 135/135A memory map.

START ADDRESS	PAGE NUMBER	SIZE (BYTES)	USE	DESCRIPTION
00000 H	0	512K	Program Space 512K Bytes Word Access	Contains program code, exception vectors, and constant.
10000 H	1			
20000 H	2			
30000 H	3			
40000 H	4			
50000 H	5			
60000 H	6			
70000 H	7			
80000 H	8	256K	Database Memory 256K Bytes Byte Access Only	Contain re-programmable non-volatile devices that will hold navigation information. Currently, this area is a window into a maximum of 8 banks of 256K-bytes. The hardware has provisions to expand the bank limit to 16.
90000 H	9			
A0000 H	10			
B0000 H	11			
C0000 H	12	64K	Bank Peek Window	A 2K-byte window at the boundary of page 11 and 12 to allow automatic bank crossover for records that straddle between bank boundary.
D0000 H	13	64K	Nonvolatile RAM	A maximum of 64K bytes which contents are guaranteed to survive across power cycles. Current configuration has 32K bytes of BYTE accessed non-volatile RAM.

Figure 4-8 KLX 135/135A Memory Map
(Sheet 1 of 2)

START ADDRESS	PAGE NUMBER	SIZE (BYTES)	USE	DESCRIPTION
E0000 H	14	64K	Volatile RAM	A maximum of 64K byts which contents will not be retained across power cycles. Current configuration has 64K bytes of byte/word accessed RAM.
E0400 H	15	64K	Volatile RAM	Contains: Intermodule Bus Peripherals, 1K-byte internal fast static RAM and DUART. The internal RAM shall be mapped right above the volatile RAM. This memory area will be used as stack memory, which will overflow to use the volatile memory for complex application.
F0000			Peripherals	

FIGURE 4-8 KLX 135/135A MEMORY MAP
(Sheet 2 of 2)

4.3.9.2 Database Sub-system

KLX 135/135A database sub-system comprises of 200-08773-0000 circuit assembly which is mounted to the digital board's connectors J5 and J6. The database sub- system provides a maximum of 6 Mbits of flash memory configure in 3 banks of 256 Kbytes of byte wide format. U102 up to U107 are the 1 Mbits flash memory each. U101 is the chip-select decoder for these chips. Programming and erasing of the flash memory is performed with the help of digital board's U13, a precision 12 V regulator; as slight over-voltage(>12.6 V) will cause permanent damage and slight under-voltage (<11.4 V) will result in incomplete programming. R101 and R102 on the database sub-system along with two internal feedback resistors of U13 set this output voltage. U13 is shut-down by a pull-up resistor, R25 when programming is disabled.

Provision has been catered for 5 V flash memory parts with the exclusion of circuit jumper, R107. In addition, with circuit jumpers R112, R114 and excluding R113, the same PCB foot-print can be utilized for 2 Mbits parts at U102, U104 and U106 for a maximum of 6 Mbits of memory size. Due to the current unstable supply of flash memory in the industry, provision has also been made in the software to be able to handle different flash memory parts and port size. This is make known to the software through configuration resistors R103 to R106 and R108 to R111, which are read by U1 through U18 on the digital board. U14 on the digital board is a 4-bit binary adders for the implementation of database bank peek window for records that straddle between the banks boundary. U3 gates the control signal for this to be possible. Figure 4-9 and 4-10 are tables of the KLX 135/135A database bank setup and configuration.

BANK NUMBER	COMPONENTS	CHIP SELECT SIGNALS		
		FA18	FA17	A17
0	U102	0	0	0
	U103	0	0	1
1	U104	0	1	0
	U105	0	1	1
2	U106	1	0	0
	U107	1	0	1

FIGURE 4-9 1 MBIT FLASH DATABASE BANK

M4	M3	M2	M1	CONFIGURATION TYPE
0	0	0	0	1 Mbits flash in byte format
0	0	0	1	1 Mbits flash in word format
0	0	1	0	2 Mbits flash in byte format
0	0	1	1	2 Mbits flash in word format
0	1	0	0	4 Mbits flash in byte format
0	1	0	1	4 Mbits flash in word format
0	1	1	0	8 Mbits flash in byte format
0	1	1	1	8 Mbits flash in word format

FIGURE 4-10 DATABASE CONFIGURATION

4.3.9.3 Serial Interface

U12, is a DUART utilized for serial communications between the digital board and the GPS RECEIVER BOARD and external world through channel A and B respectively. The communication baud rate is derived from a 3.6864 MHz crystal Y2, C31 and C32. The micro controller, U1 is interrupted when data is received from the GPS RECEIVER BOARD or that channel A transmitter is ready to receive data to be transmitted to the GPS RECEIVER BOARD through the logic low assertion of INTRN. TxDB is level shifted by U23 to become RS232 OUT after going through C86, EMI filter and protected by transient suppressor CR22. RxDB is derived from RS232 IN after EMI filtered by C85 and protected by transient suppressor CR5. U1 is interrupted by the logic low assertion of OP5, OP7 when RxDB received data from external or when the DUART is ready to receive data from U1 to be transmitted to the external. U12 is also used to detect battery on status, remote transfer activation, COMM RECEIVER BOARD PLLLOCK status and database bank selection error. It also provides LCD display flashing signal and reset the GPS RECEIVER BOARD through Q5. U12 registers base address is assigned to F4000H.

In addition to the DUART, U1 has also a serial communication interface where RS 232 signals, ELT_OUT and ELT_IN are generated. These signals are level shifted by U23 and EMI filtered by C133 and C134 before going out to the external. Transient suppressor, CR46 and CR47 are used to protect these lines from electrical transient.

4.3.9.4 Micro Controller Supervisor

U10 is the +5 V power supply monitoring chip, providing orderly switch over to battery supply when power abnormalities occurs. It provides a power up reset interval of 200 ms using C29 and R34. U10 will ensure that non-volatile RAMs on both digital board, U5 and GPS RECEIVER BOARD being powered from the power supply when is available; otherwise supply will come from the battery, B1. The battery weak threshold is set to 3.0 V by R19 and R20 and will interrupt the micro controller when occurs. In addition, the exact battery level is measured by the micro controller's ADC through U11.

4.3.9.5 Real-time Clock

U22 is the real-time clock which derive its clock from the 32.768 kHz crystal Y1, R5, R6, C4 and variable capacitor C3. U22 is configured for battery- backup mode and this is ensured by CR2. VSYS must be at least 0.7 V greater than VBAT at power up to be in this mode. The CLOCKOUT signal is routed to J1 pin 9 for precise alignment of the oscillation circuits through C3. CR21 is the transient suppressor, C65 and R83 form a low pass filter for this signal before going out to external. Communication with the micro controller is through the serial peripheral interface. This is enabled by Q3, R143, R144 and R145.

4.3.9.6 Unit Temperature Sensor

U16 acts as a temperature sensor for sensing enclosed temperature. The temperature related voltage is fed to the micro controller ADC after amplification by an approximate gain factor of 4.65 by U11. R27 and R28 set this gain factor. In addition, it also provides a precision +5 V reference voltage to U1 ADC module.

4.3.9.7 Analog Outputs

U1 OC5 output is used to derive the analog CDI driver. This signal is duty cycle varied from 50% (no deviation) proportional to the deviation desired. This output is integrated and level shifted by U24 to produce a DC output centered at 2.5 V. This DC level is proportional to the duty cycle of the OC5 output.

When valid NAV signal is available, the TO/FROM FLAG outputs will always be at opposite logic level. These signal are derived from U19 and U25. The micro controller will drive these signal through U19 using the serial peripheral interface. The NAV FLAG and annunciators outputs are also driven from U19. NON STD CDI IN/OUT annunciator will function as input when it is strapped to low. This is input to the micro controller through U18. NON STD CDI IN/OUT, INTEGRITY 1 and INTEGRITY 2 annunciators are not used in KLX 135/135A U18 is also used for detection of front panel and COMM BOARD presence using CR7 and R37; CR6 and R38 are used for detection of COMM BOARD synthesizer option.

4.3.9.8 Discrete Inputs

Gillham Altitude code, INPUT 101, INPUT 102, TEST and TAKE-HOME inputs are read by the micro controller with the help of U26, U17 and U18. As these interface inputs are identical, input A1

will be described. CR17 is the diode isolator and R49, R61, R73 ensure correct logic input for U18. R49, R61, R73 and C74 also form a low pass filter for this input. C61 functions as protection for EMI emission. The same interface setup is utilized for MIC KEY and external REMOTE TRANSFER inputs but are driven directly to the micro controller. INPUT 101 and INPUT 102 are not used by the system.

4.3.9.9 Serial Peripheral Interface

The front panel LCD display, knobs and buttons and COMM BOARD receiver synthesizer are interfaced to the micro controller using the serial peripheral interface running at 1 MHz baud rate. SP3 signal is used to enable the reading of the front panel knobs and buttons registers while LCDLP is the latch pulse for the front panel LCD display data. PLL_LATCH signal is used to latch the COMM synthesizer data. Micro controller, U1 also monitor the +20 V bus, front panel temperature, LCD biasing level and COMM BOARD receiver active, RXACT status.

The front panel lighting bus is measured by U1 ADC using R97, R98 and the LCD display backlighting is compensated accordingly through OC2 of U1. U1 will enable the TRANSMITTER BOARD to transmit if MIC KEY is asserted. An interlocking circuitry formed by Q7, R30 and R31 will ensure that the transmitter is not activated unintentionally. Finally a PWRFAIL signal for aircraft input power failure detection will interrupt U1 for necessary action. Figure 4-11 is a table of the U1 serial peripheral interface setup.

PCS 3	PCS 2	PCS 1	PERIPHERAL CHIP SELECT	DESCRIPTIONS
0	0	0	SP0	U26, U17, and U18 chips access for discrete inputs
0	0	1	SP1	U19 chip select for TO/FROM, NAV flags and annunciators
0	1	0	SP2	Chip select for LCD bias setting, selection of LCD bias or front panel temperature measurement and front panel display control
0	1	1	RTC	Real-time clock ship select
1	0	0		Unused
1	0	1	DISP0	Front panel display registers chip select
1	1	0	PLL	COMM synthesizer chip enable
1	1	1	EECS	Spare

FIGURE 4-11 PERIPHERAL CHIP SELECT

4.3.9.10 System Interrupts and ADC Channels

Figure 4-12 is a table showing system interrupts. Figure 4-13 is a table showing ADC channels.

SYSTEM INTERRUPTS	INTERRUPT SIGNALS	DESCRIPTIONS
IRQ1	RXFER	Remote COMM frequency transfer detection
IRQ2	BATBWN	Battery weak detection
IRQ3	DBTX_INT	DUART channel B transmit ready (database loader)
IRQ4	GLUINT	DUART channel A receive interrupt and transmit ready (GPS Receiver)
IRQ5	DBRX_INT	DUART channel B receive interrupt (database loader)
IRQ6		Spare
IRQ7	PWRFAIL	Aircraft power input filure detection

FIGURE 4-12 SYSTEM INTERRUPTS

SYSTEM ANALOG CHANNELS	ANALOG SIGNALS	DESCRIPTIONS
ADA0	FPMEAS	Measures front panel LCD display biasing or temperature
ADA1	DIGTEMP	Measures unit temperature
ADA2	DIMSEL	Unused
ADA3	LTGMEAS	Measures 14 V or 28 V lighting bus
ADA4	S20VBUS	Measures internal 20 V bus
ADA5	RXACT	Detect COMM receiver active status
ADA6	PWRFAIL	Unused
ADA7	BATMEAS	Measures battery level

FIGURE 4-13 ADC CHANNELS

05

SECTION V
MAINTENANCE

LIST OF ILLUSTRATIONS

LIST OF TABLES

SECTION V

MAINTENANCE

5.1 INTRODUCTION

This section contains the test, alignment, troubleshooting and disassembly/assembly procedures for the KLX 135/135A GPS Receiver/COMM Transceiver. Before maintenance is attempted, it is advisable to have thorough understanding of the Theory of Operation.

5.2 TEST AND ALIGNMENT

The final test procedure of section 5.2.3 shall be followed to determine if the KLX 135/135A is operating properly. If it is not, the troubleshooting procedure of section 5.3 and/or the alignment procedure of section 5.2.4 should be followed to bring the unit up to the Minimum Performance Specifications. Refer to Figure 5-1 for a suggested test set up.

5.2.1 TEST EQUIPMENT REQUIRED

The following equipment, or equivalent, is required to properly align and test the KLX 135/135A. All test equipment should be calibrated before alignment is attempted.

A. Power Supply

Sorensen SRL 40-6 or equivalent

B. RF Signal Generator

HP8640B or equivalent

C. RF 6-dB pad

Minicircuits Model NAT-6 or equivalent

D. Audio Signal Generator

HP200CD or equivalent

E. Digital Voltmeter

HP34401A or equivalent

F. RF Wattmeter

Bird Model 611 or equivalent

G. Frequency Counter

HP5335A or equivalent

H. Audio Wattmeter

Eico Model 261 or equivalent

I. Oscilloscope

Tektronix Model 465 or equivalent

J. Test Harness

Customer Fabricated (See Figure 5-1)

K. Linear Detector

Customer fabricated (See Figure 5-2)

L. Microphone Test Circuit

Customer Fabricated (See Figure 5-3)

M. 40-dB Attenuator

Customer Fabricated (See Figure 5-4)

N. GPS Simulator

Welnavigate GS-100 or equivalent

O. KA 91 or KA 92 GPS antenna or equivalent

P. Lightmeter

International Light IL1700 with SPD025Y pen probe or equivalent

Q. Tuning tools

Murata PPTZ-0022 or equivalent

5.2.2 STANDARD TEST SIGNAL DESCRIPTION

A. "Hard" microvolts indicates the use of a 6-dB pad between the signal generator and the COMM receiver. Unless other specified, all signal level are specified in hard microvolts.

B. A standard COMM test signal is a RF carrier that is amplitude-modulated 30% with a 1 kHz audio tone.

C. A standard modulator test signal is a 0.4 Vrms, 1 kHz tone at the open circuit terminals of the resistive matching network shown in Figure 5- 3.

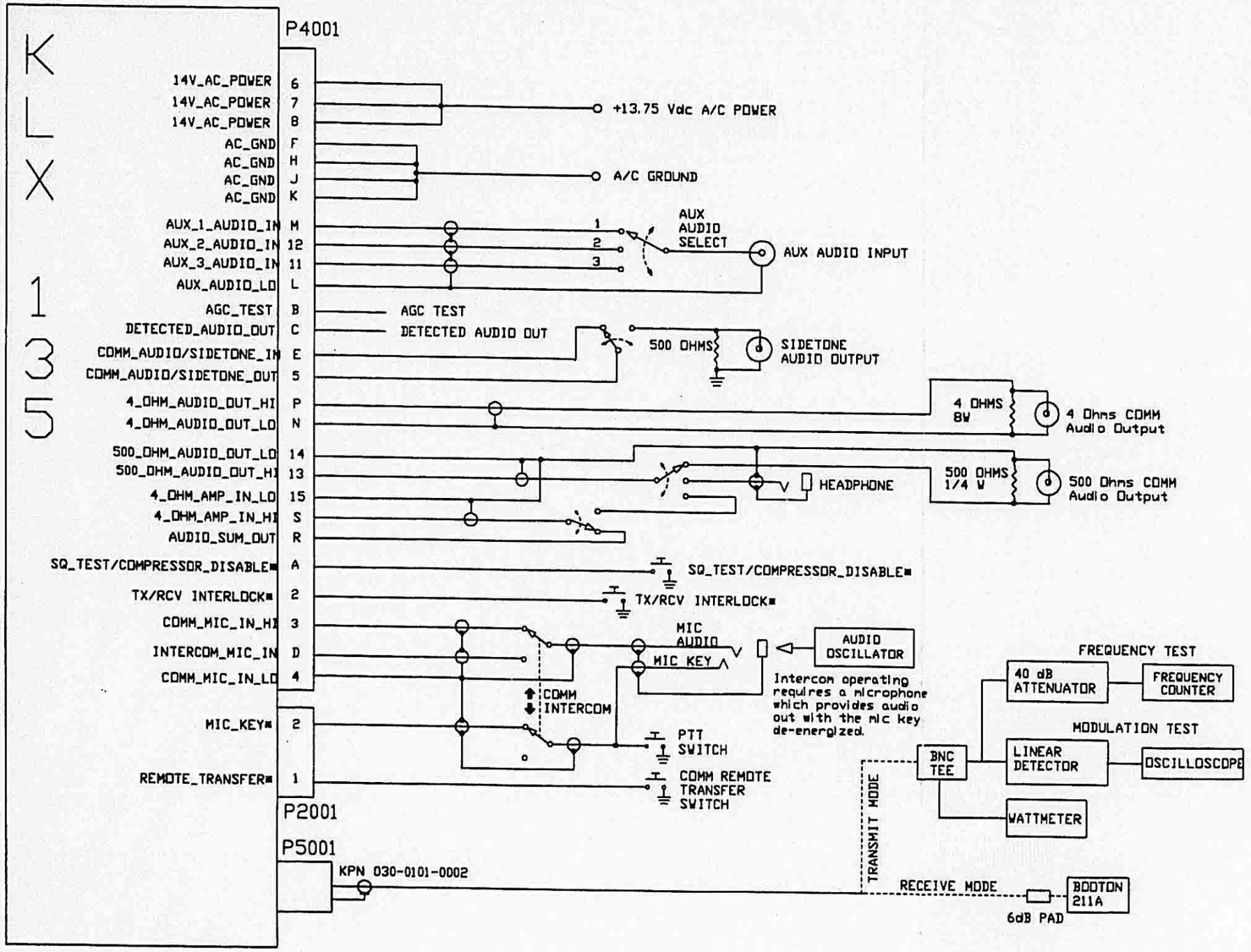
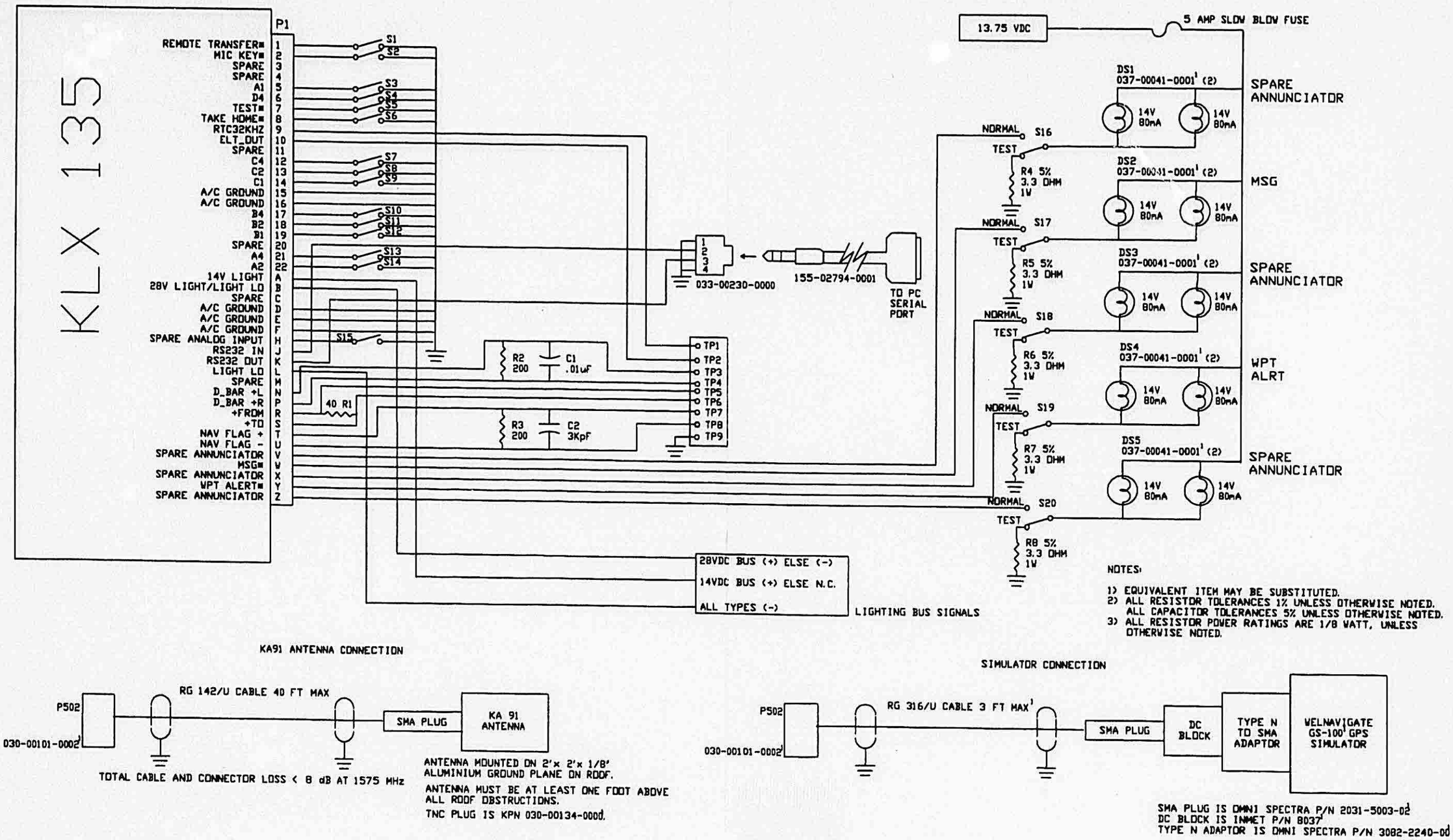


FIGURE 5-1 BENCH TEST SETUP
(SHEET 1 OF 2)



NOTES:

1) EQUIVALENT ITEM MAY BE SUBSTITUTED.
2) ALL RESISTOR TOLERANCES 1% UNLESS OTHERWISE NOTED.
   ALL CAPACITOR TOLERANCES 5% UNLESS OTHERWISE NOTED.
3) ALL RESISTOR POWER RATINGS ARE 1/8 WATT, UNLESS OTHERWISE NOTED.

KA91 ANTENNA CONNECTION

ANTENNA MOUNTED ON 2'x 2'x 1/8" ALUMINIUM GROUND PLANE ON ROOF.
ANTENNA MUST BE AT LEAST ONE FOOT ABOVE ALL ROOF OBSTRUCTIONS.
TNC PLUG IS KPN 030-00134-0000.

SIMULATOR CONNECTION

SMA PLUG IS OMNI SPECTRA P/N 2031-5003-02
DC BLOCK IS INMET P/N 8037
TYPE N ADAPTOR IS OMNI SPECTRA P/N 3082-2240-00

FIGURE 5-1 BENCH TEST SETUP
(SHEET 2 OF 2)

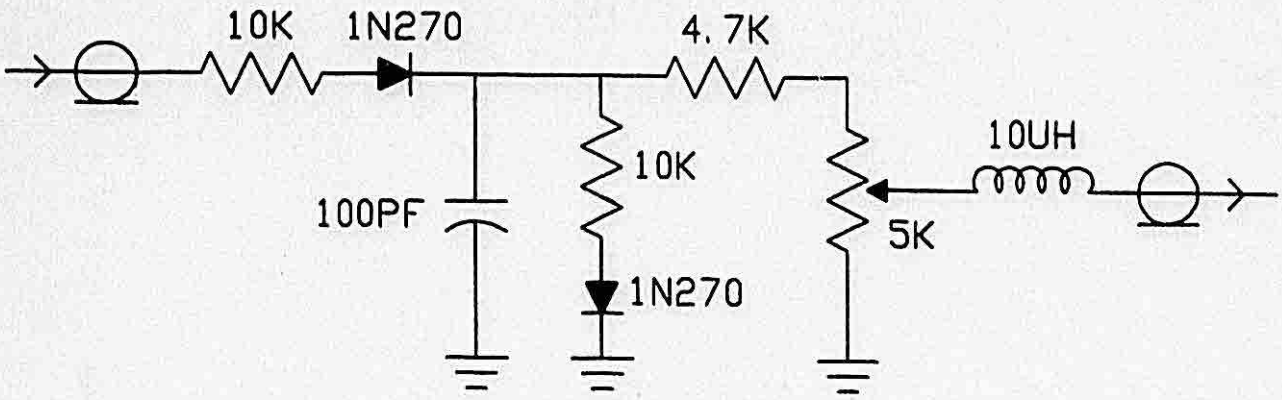


FIGURE 5-2 LINEAR DETECTOR CIRCUIT

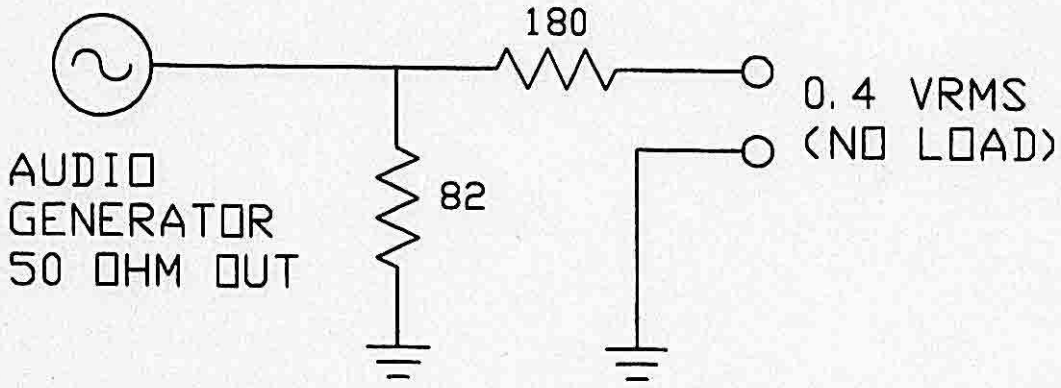


FIGURE 5-3 MIC TEST CIRCUIT

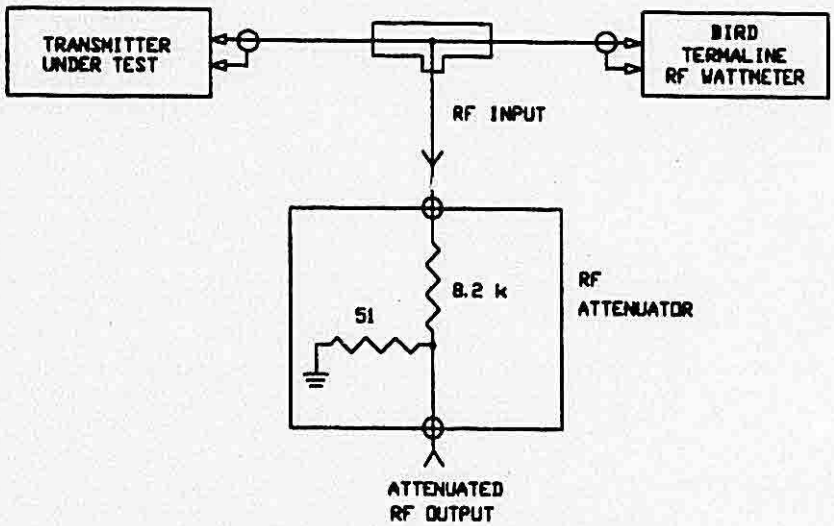


FIGURE 5-4 40 dB ATTENUATOR

5.2.3 FINAL TEST PROCEDURE

If an in-service unit tests within the acceptable limits given in this test procedure, no further testing is required and the unit shall be considered suitable for installation in an aircraft.

FINAL TEST DATA SHEET

P/N 069-01029-_____ S/N _____

5.2.3.1 Initial Turn On

A. Input Current: _____ amps.
(with current on) (1.3 amps max. @ 13.75 VDC)
(LCD backlighting full bright)

B. Turn On Page: _____ OK

C. Test Mode Warning Page: _____ OK

Test mode is activated by grounding pin J1-7 before power is turned on.

D. Self-test Pass: _____ YES

E. VFR Warning Page: _____ OK

F. Data Base Page: _____ OK

G. No failure messages: _____ OK

5.2.3.2 Panel Lighting

A. Lighting Bus Current: _____ mA
(286 mA DC max. @ 28 V)

_____ mA
(572 mA DC max. @ 14 V)

B. Button/Knob Lighting: _____ OK

C. Light Leakage: _____ OK

5.2.3.3 Control Functions

A. Display: _____ OK

Check all pixels are working in TST 2 page (activated by grounding J1 pin 7, TEST* before power ON)

B. COMM Transfer Button: _____ OK

Active and Standby frequencies shall toggle when this button is pressed. Press and hold the button for more than 2 seconds shall put the unit into active frequency entry mode.

C. COMM Frequency Control (left hand knobs):

	Increment Roll-over Charactreristics	Decrement Roll-over Characteristics	
COMM MHz	136.xxx to 118.xxx	118.xxx to 136.xxx	_____ OK
COMM kHz (50 kHz)	xxx.950 to xxx.000	xxx.000 to xxx.950	_____ OK
COMM kHz (25 kHz)	xxx.975 to xxx.000	xxx.000 to xxx.975	_____ OK

D. Memory: _____ OK

When the unit is turned "OFF" and then back "ON" that the last active and standby frequencies entered are displayed.

E. GPS Page Control (right hand knobs):

1. Right Outer Knob: _____ OK

From the NAV page, the display shall step through NAV, FPL, CAL, SET, OTH, APT, VOR, NDB, SUP, ACT and back to NAV page when the right outer knob is rotated clockwise. The display shall step through ACT, SUP, NDB, VOR, APT, OTH, SET, CAL, FPL and back to NAV page when the knob is rotated anti-clockwise.

2. Right Inner Knob: _____ OK

From NAV 2 page, the display shall steps through NAV 3, NAV 4, NAV 1 and back to NAV 2 page when the right inner knob is rotated clockwise. The display shall step through NAV 1, NAV 4, NAV 3 and back to NAV 2 page when the knob is rotated anti-clockwise.

3. Right Inner Knob (Pull Scan): _____ OK

Advance to APT 1 page. Pull right inner knob out and turn clockwise. The airport identifier shall change in ascending order.

F. CRSR Button: _____ OK

From NAV 2 page, the display shall show 'CRSR' in place of 'NAV 2' when the button is pressed. Press the button again and the display shall revert back to 'NAV 2'.

G. CLR Button: _____ OK

From VOR 2 page, turn ON the CRSR and move it to the cyclic field (the one preceded by a carat >). The 'Bearing To' shall change to 'Radial FR' when the CLR button is pressed. Press the button again and the display shall revert back to 'bearing to'.

H. Direct-To (D→) Button: _____ OK

The Direct-To page shall appear when the button is pressed.

I. ENT Button: _____ OK

During power up, this button is used to approve the Turn On Page, Initialization Page, the VFR page and the Data Base Page.

J. MSG Button: _____ OK

The message page shall appear when this button is pressed.

5.2.3.4 Discrete Inputs

A. TAKE HOME* : _____ OK

Grounding this input, J1 pin 8 shall put unit into Take Home mode.

B. TEST* : _____ OK

Grounding this input, J1 pin 7 shall put unit into Test mode.

C. MIC KEY*: _____ OK

Grounding this input, J1 pin 2 shall cause the COMM transmitter to transmit.

D. REMOTE TRANSFER*: _____ OK

Grounding this input, J1 pin 1 for less than 2 seconds shall toggle the COMM active and standby frequencies. Grounding this pin for more than 2 seconds shall put unit into active frequency entry mode.

E. Gray Code Altitude Inputs:

1. ALT Reading: _____ ft. (24300 ft)

Apply the following data to the Gray code inputs:

D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
0	1	0	1	0	1	0	1	0	0

(0 = OPEN, 1 = GROUND)

2. ALT Reading: _____ ft. (49900 ft)

Apply the following data to the Gray code inputs:

D4	A1	A2	A4	B1	B2	B4	C1	C2	C4
1	0	1	0	1	0	1	0	1	1

(0 = OPEN, 1 = GROUND)

5.2.3.5 Discrete Outputs

With the cursor disabled during the display of the self test page in Test mode, the Nav flag, MSG* and WPT ALERT* annunciators shall toggle between the high and low state each time the CLR button is pressed. In addition, the TO/FROM flag shall also toggle each time the D→ button is pressed.

A. NAV Flag (High): _____ (+260 mV to +900 mV)

NAV Flag (Low): _____ (NMT 50 mV)

B. TO/FROM Flag (TO): _____ (+40 mV to +390 mV)

TO/FROM Flag (FR): _____ (-40 mV to -390 mV)

C. MSG*: _____ OK

D. WPT ALERT*: _____ OK

5.2.3.6 CDI Left, Right and Center Deviation

With the cursor disabled during the display of the self test page in Test mode, the CDI output shall toggle between Left and right each time the CLR button is pressed. Go to TST 7 page and pressed the CRSR button to center the CDI.

A. CDI (Left): _____ (-60 mV to -90 mV)

B. CDI (Right): _____ (+60 mV to +90 mV)

C. CDI (center): _____ (NMT 4 mV)

5.2.3.7 GPS Receiver

A. Gain and Noise Figure Test

Put unit in TST 4 page. Set GPS simulator to the following conditions:

Satellite ID:	11
Code switch:	ON
Data switch:	ON
Doppler switch:	OFF
Doppler frequency:	N/A
Attenuation:	-112 dBm ± 2 dBm
Time:	22:25 (hard coded in GS-100)
Date:	2/20/87 (hard coded in GS-100)

KLX 135/135A acquires the correct satellite within: _____ minutes

(MAX 2 minutes)

SNR: _____ (MIN 35 dB)

B. Satellite Acquisition Test

Connect the KLX 135/135A to the roof mounted KA 91 or KA 92 antenna and cycle power. Set the date and time (SET 2 page) to current date and time ± 10 minutes. Set the unit's initial position (SET 1 page) to within 30 miles of the correct position of the roof-mounted KA 91 or KA 92.

KLX 135/135A acquires the correct position within 1 nm radius from exact antenna position within: _____ minutes (MAX 30 minutes).

State in OTH 1 page is NAV or NAV D: _____ OK

C. Non Volatile Memory Test

Cycle power after having a valid position. State in OTH 1 page goes from INIT to ACQ instead of SRCH and arrive at NAV or NAV D state within 5 minutes: _____ OK

5.2.3.8 Communication Receiver

A. Receiver sensitivity:

Apply a 2 µV standard COMM test signal (i.e. amplitude-modulated 30% with 1 kHz audio tone) to the unit. Disable the compressor by grounding J4001 pin A. Monitor the receiver audio while switching modulation on/off.

(S+N)/N:

118.000 MHZ _____ NLT 6 dB
126.550 MHZ _____ NLT 6 dB
136.975 MHZ _____ NLT 6 dB

B. Receiver quieting:

Apply a 100 µV standard COMM test signal to the unit. Disable the compressor by grounding J4001 pin A. Monitor receiver audio while switching the modulation on/off.

(S+N)/N:

_____ NLT 25 dB

C. AGC Characteristics:

With the unit set to 126.550 MHz, monitor the receiver output while varying the amplitude of the standard COMM test signal from 5 µV to 20,000 µV.

Variation in audio output:

_____ NMT 3 dB

D. Selectivity :

With the AGC voltage due to a 3 µV standard signal as reference, measure and record the frequencies which produce the AGC reference voltage at 6 dB and 60 dB above 3 µV.

<u>6-dB bandwidth</u>
126.550 MHz:

Above _____ NLT 126.5581 MHz
Below _____ NMT 126.5419 MHz

<u>60-dB bandwidth</u>
126.550 MHz:

Above _____ NMT 126.5696 MHz
Below _____ NLT 126.5304 MHz

E. Volume Gain Control:

Apply a 100 µV standard COMM test signal into the unit. Disable the squelch control by pulling out the volume knob and monitor the audio output.

Minimum:
Maximum:

_____ NMT 22 mVrms across 500Ω
_____ NLT 7.07 Vrms across 500Ω

F. Audio Distortion:

Apply a 100 μV 85% modulated signal between 350 Hz and 2500 Hz. (This is an optional test that requires a distortion analyzer.)

350 Hz: _____ NMT 15%
1000 Hz: _____ NMT 15%
2500 Hz: _____ NMT 15%

G. Audio Response:

Apply a 100 μV standard COMM test signal into the unit. Disable the compressor by grounding J4001 pin A and observe the receiver audio output.

350 Hz: _____ NMT 6 dB down from Reference
1000 Hz: _____ 0 dB (Reference)
2500 Hz: _____ NMT 6 dB down from Reference
4000 Hz: _____ MT 18 dB down from Reference

H. Compressor:

Enable the compressor. Apply a modulated 100 μV signal into the unit. Vary the modulation from 20% to 85% and observe the receiver audio output.

Variation in audio output: _____ NMT ± 3 dB

I. Squelch:

Note -- Squelch adjustments must be performed in the sequence described below.

1. Carrier/Noise Squelch set to open between 1 and 5 μV on any channel and to close at NMT 6 dB below the squelch opening level.

   Carrier/Noise Squelch: _____ OK

2. On any channel, with 8 kHz 85% modulated signal into the unit, the Carrier Squelch opens between 6 and 24 μV and closes within 6 dB of the opening level.

   Carrier Squelch: _____ OK

5.2.3.9 COMM Transmitter

A. Power Out:

Connect a wattmeter to the COMM antenna output and record the following unmodulated power.

<u>13.75 Vdc input</u>
118.000 MHz: _____ NLT 5W
126.550 MHz: _____ NLT 5W
136.975 MHz: _____ NLT 5W

11.00 Vdc input

118.000 MHz:	_____	NLT 2.5W
126.550 MHz:	_____	NLT 2.5W
136.975 MHz:	_____	NLT 2.5W

B. Frequency Stability:

Measurement to be made only if the unit has been in the "OFF" state for at least 2 hours.

_____ NMT ± 200 Hz

C. Modulation Capability:

Apply a standard modulator test signal into the microphone input. Measure the transmitter % modulation using the linear detector.

118.000 MHz:	_____	NLT 70%
126.550 MHz:	_____	NLT 70%
136.975 MHz:	_____	NLT 70%

D. Carrier Noise Level:

Modulate the carrier with 70% at 1000 Hz. Noise on the carrier with modulation removed shall be NLT 40 dB below the carrier level when modulated 70% with a standard modulating signal.

(C+N)/N:

118.000 MHz:	_____	NLT 40 dB
126.550 MHz:	_____	NLT 40 dB
136.975 MHz:	_____	NLT 40 dB

E. Demodulated Audio Distortion:

With a modulating signal varied from 350 to 2500 Hz at 0.4 Vrms into the microphone input, the total harmonic distortion of the demodulated audio from the transmitter shall be NMT 15%.

350 Hz:	_____	NMT 15%
1000 Hz:	_____	NMT 15%
2500 Hz:	_____	NMT 15%

F. Sidetone:

Apply a standard modulator test signal into the microphone input. vary R4105 over its full range and monitor the sidetone.

Minumum:	_____	NMT 0.5 mW
Maximum:	_____	NLT 100 mW

5.2.3.10 Audio Amplifier

A. Output Power:

With a standard COMM receiver input signal at 100 µV, the COMM audio output from the audio amplifier shall be NLT 8 W.

B. Quieting: _____ NLT 25 dB

With a standard COMM receiver input signal at 100 µV, the (S+N)/N ratio shall be NLT 25 dB with the COMM audio compressor disabled.

C. Frequency Response : Apply a 100 µV standard COMM test signal into the unit. Disable the compressor by grounding J4001 pin A and observe the receiver audio output.

350 Hz: _____ NMT 6 dB down from Reference
1000 Hz: _____ 0 dB (Reference)
2500 Hz: _____ NMT 6 dB down from Reference

D. Audio Distortion : Apply a 100 µV 85% modulated signal between 350 Hz and 2500 Hz. (This is an optional test that requires a distortion analyzer.)

350 Hz: _____ NMT 15%
1000 Hz: _____ NMT 15%
2500 Hz: _____ NMT 15%

5.2.4 ALIGNMENT PROCEDURE

CAUTION

DO NOT ATTEMPT TO ALIGN THE GPS RECEIVER BOARD.
THIS IS A FACTORY SERVICEABLE ITEM ONLY.

5.2.4.1 General Information

The alignment procedure is written for a KLX 135/135A that is either newly constructed or recently overhauled. If partial alignment is desired, use only the initial control settings that apply to the section being aligned.

Alignment of the KLX 135/135A must be performed with all system circuit boards in place, or with suitable dummy loads in place.

5.2.4.2 Initial Turn-on

Initial Control Settings :

S6008	Volume Control	Max CCW (off)
S6009	Pull Test (Squelch)	Pushed in
R4048	Carrier Squelch Adjust	Max CW
R4065	Noise Squelch Adjust	Mid-range
R4105	Sidetone Adjust	Mid-range
R4146	Mic Gain Control	Mid-range
R4172	Modulation Adjust	Max CW
R4207	Output Power Adjust	Mid-range
R4221	Intercom Gain Adjust	Mid-range
R4237	Speaker Gain Adjust 1	Mid-range
R4238	Speaker Gain Adjust 2	Mid-range
R4250	Backlighting Brightness	Mid-range

5.2.4.3 COMM VCO Adjust

Set COMM channel to 136.975 MHz and monitor collector of Q4024 with a frequency counter. Adjust C4086 to obtain frequency at 148.375 MHz ± 50 Hz. This should be done within 60 seconds of turn-on. Then adjust T4007 to obtain 7.3 VDC at TP4009.

5.2.4.4 Communication Transmitter Adjustment

A. Output Power Set

Adjust R4207 to obtain minimum rated power across the COMM band. Adjust C5018 (on Transmitter Bd) for minimum power variation across the COMM band. The output power must not be less than 5 W. Power variation should be less than 2 W.

B. Modulator Adjust

1. Select 118.000 MHz channel. Apply a 0.4 Vrms 1 kHz standard test signal to the microphone input (Figure 5-3) and then key the transmitter. Observe the

demodulated RF output from the linear detector (Figure 5-2) on an oscilloscope and adjust R4146 for 85% modulation.

2. Adjust R4172 for 70% modulation.

3. Check also at 128.500 MHz and 136.975 MHz channels. Re-adjust only if the modulation is lower than 70%.

C. Sidetone Adjust

Apply a 0.4 Vrms 1 kHz standard test signal to the microphone input and key the transmitter. Adjust R4105 for 4 mW (1.4 Vrms) of audio into a 500 _ load.

5.2.4.5 Communication Receiver Alignment

A. COMM RF-IF Alignment

1. Set COMM channel at 130.500 MHz. Connect the UUT COMM antenna to the RF signal generator through a 6 dB pad. Turn on the UUT with squelch and compressor disabled. Ensure that the Pull Test knob (S6009) is pushed in. Apply sufficient RF (about 5 µV) at 130.500 MHz for approximately 5 Vdc at TP4002 . Load and tune L4001, L4003, L4005 and L4007 using a 220Ω resistor from the top of each tank to ground in the following sequence:

Load L4003	Tune L4001
Load L4001	Tune L4003
Load L4007	Tune L4005
Load L4005	Tune L4007

2. Adjust T4001, T4002, T4003 and T4004 for maximum IF AGC voltage at TP4002. During the above adjustments, the RF signal should be reduced to keep the IF AGC voltage near 5.0 Vdc.

3. Set the RF level at 100 µV (hard). Frequency modulate the RF signal with 20 kHz deviation at 50 Hz rate. Observe TP4001 on an oscilloscope. Adjust T4002 to minimize the ripple.

B. Noise Squelch Adjustments

Ensure that the Pull Test knob is in the pushed-in position. Turn on the compressor. Check that R4048 is in the maximum clockwise position. Apply 2.0 µV (hard) of RF at 128.500 MHz and modulated 30% with a 1 kHz tone. Adjust R4065 until the receiver just breaks squelch, i.e. audio present.

C. Carrier Squelch Adjustments

Apply a 12.5 µV (hard), 130.500 MHz signal, amplitude modulated 85% at 8 kHz, and slowly adjust R4048 until the receiver just breaks squelch.

D. Climax Filter Adjustments

Apply a 100 µV (hard), 130.500 MHz signal, amplitude modulated 85% at 4.5 kHz. Disable the compressor/squelch. Monitor the audio output with an audio wattmeter. Adjust L4013 for minimum output (null).

5.2.4.6 Audio Amplifier Gain Adjustments

A. Speaker Gain Adjust

1. Apply a 100 µV (hard), 130.50 MHz signal, amplitude modulated 30% at 1 kHz. Set the volume potentiometer to obtain rated output (i.e. 100 mW or 7.07 Vrms) at the loaded 500_OHM_AUDIO_OUT output.

2. Connect the 500_OHM_AUDIO_OUT to the 4_OHM_IN_HI (J4001 pin 5). Set R4238 to maximum clockwise position (0 OHM). Adjust R4237 to obtain rated audio output (8W or 5.65 Vrms) at the 4_OHM_AUDIO_OUT_HI (J4001 pin 8).

3. Finally, feed the AUDIO_SUM_OUT (J4001 pin R) to 4_OHM_AMP_IN_HI (J4001 pin S). Set R4237 to 0Ω. Then adjust R4238 to obtain rated output (8 W or 5.65 Vrms) at the 4_OHM_AUDIO_OUT_HI (J4001 pin P).

B. Intercom Mic Gain Adjust

1. Turn volume knob counterclockwise maximum.

2. Apply a 19 mVrms 1 kHz signal to the INTERCOM_MIC_IN (J4001 pin D). Adjust R4221 to obtain the rated output (i.e. 100 mW or 7.07 Vrms) at the 500_OHM_AUDIO_OUT.

3. Finally, apply a 0.4 Vrms 1 kHz signal to the INTERCOM_MIC_IN. Adjust R4221 to obtain the rated output (i.e. 100 mW or 7.07 Vrms) at the 500_OHM_AUDIO_OUT.

5.2.4.7 LCD Backlighting

Turn on unit and change the display to page "FPL 0". Put the pen probe of the lightmeter directly in front of the anti-glare lens at the area where no segment is turned ON. Turn OFF lighting bus. Adjust R4250 until the lightmeter reads 20 ft-lambert ± 1 ft-lambert. Turn lighting bus voltage to maximum. Observe the lightmeter reading. It should be 5 ft-lambert ± 2 ft- lambert. This should be done within first 5 minutes after the unit is turned ON.

5.2.4.8 Digital Board Alignment

A. Real-time Clock

1. Immediately after the installation of battery, B1 onto the Digital Board, check that test point E2 potential is greater than 3 V with respect to digital ground with the

unit turn OFF. If this is not the case, then momentarily short test point E2 to digital ground and check again. The voltage at test point E2 should be greater than 3 V.

2. With the unit in TEST mode (by grounding P1-7, TEST* before power ON), connect a frequency counter to P1-9 (RTC32 kHz output) of the Digital Board and turn ON the unit. Adjust C3 on the Digital Board with the tuning tool to read 32.768 kHz +/- 0.5 Hz. Turn OFF the unit and check that the RTC32 kHz output fade away. Otherwise, Momentarily short E2 test point to digital ground while the unit is OFF. Repeat this alignment to obtain the desired frequency and see that the oscillation fade away when the unit is turn OFF.

B. D-Bar Output

With the unit in Test mode (by grounding P1-7, TEST* before power ON), advance to TST 7 page and depress the CRSR button to activate D-Bar output alignment. Turn the right outer knob of the KLX 135/135A front panel (clockwise for increment and counterclockwise for decrement) to get 0 mV +/- 4 mV at P1-P (DBAR +R) with respect to P1-N (DBAR +L) on the Digital Board. Once the voltage falls within the limits, depress ENT button to confirm.

5.3 OVERHAUL

5.3.1 VISUAL INSPECTION

This section contains instructions and information to assist in determining, by visual inspection, the condition of the KLX 135's major and subassemblies. These inspection procedures will assist in finding defects resulting from wear, physical damage, deterioration, or other causes. To aid inspection, detailed procedures are arranged in alphabetical order.

A. Capacitors, Fixed

Inspect capacitors for case damage, body damage, and cracked, broken, or charred insulation. Check for loose, broken, or corroded terminal studs, lugs, or leads. Inspect for loose, broken, or improperly soldered connections. On chip caps be especially alert for hairline cracks in the body and broken terminations.

B. Capacitors, Variable

Inspect trimmers for chipped and cracked bodies, damaged dielectrics and damaged contacts.

C. Chassis

Inspect the chassis for loose or missing mounting hardware, deformation, dents, damaged fasteners, or damaged connectors. In addition, check for corrosion or damage to the finish that should be repaired.

D. Circuit Boards

Inspect for loose, broken, or corroded terminal connections; insufficient solder or improper bonding; fungus, mold, or other deposits; and damage such as cracks, burns, or charred track.

E. Connectors

Inspect the connector bodies for broken parts, check the insulation for cracks, and check the contacts for damage, misalignment, corrosion, or bad plating. Check for broken, loose, or poorly soldered connections to the terminals of the connectors. Inspect connector hoods and cable clamps for crimped wires.

F. Covers and Shields

Inspect covers and shields for punctures, deep dents, and badly worn surfaces. Also, check for damaged fastener devices, corrosion and damage to finish.

G. Flex Circuits

Inspects flex circuits for punctures, and badly worn surfaces. Check for broken traces, especially near the solder contact points.

H. Front Panel

Check that name, serial, and any plates or stickers are secure and hardware is tight. Check that the handle is functional, securely fastened, and handle casting is not damaged or bent.

I. Fuse

Inspect for blown fuse and check for loose solder joints.

J. Insulators

Inspect insulators for evidence of damage, such as broken or chipped edges, burned areas, and presence of foreign matter.

K. Jacks

Inspect all jacks for corrosion, rust, deformations, loose or broken parts, cracked insulation, bad contacts, or other irregularities.

L. Potentiometers

Inspect all potentiometers for evidence of damage or loose terminals, cracked insulation or other irregularities.

M. Resistors, Fixed

Inspect the fixed resistors for cracked, broken, blistered, or charred bodies and loose, broken, or improperly soldered connections. On chip resistors be especially alert for hairline cracks in the body and broken terminations.

N. RF Coils

Inspect all RF coils for broken leads, loose mountings, and loose, improperly soldered, or broken terminal connections. Check for crushed, scratched, cut or charred windings. Inspect the windings, leads, terminals and connections for corrosion or physical damage. Check for physical damage to forms and tuning slug adjustment screws.

O. Terminal Connections soldered

(1) Inspect for cold-soldered or resin joints. These joints present a porous or dull, rough appearance. Check for strength of bond using the points of a tool.

(2) Examine the terminals for excess solder, protrusions from the joint, pieces adhering to adjacent insulation, and particles lodged between joints, conductors, or other components.

(3) Inspect for insufficient solder and unsoldered strands of wire protruding from conductor at the terminal. Check for insulation that is stripped back too far from the terminal.

(4) Inspect for corrosion at the terminal.

P. Transformers

(1) Inspect for signs of excessive heating, physical damage to case, cracked or broken insulation, and other abnormal conditions.

(2) Inspect for corroded, poorly soldered, or loose connecting leads or terminals.

Q. Wiring/Coaxial Cable

Inspect wiring in chassis for breaks in insulation, conductor breaks, cut or broken lacing and improper dress in relation to adjacent wiring or chassis.

5.3.2 CLEANING

A. General

This section contains information to aid in the cleaning of the component parts and subassemblies of the KLX 135 unit.

WARNING

GOGGLES ARE TO BE WORN WHEN USING PRESSURIZED AIR TO BLOW DUST AND DIRT FROM EQUIPMENT. ALL PERSONNEL SHOULD BE WARNED AWAY FROM THE IMMEDIATE AREA.

WARNING

OPERATIONS INVOLVING THE USE OF A CLEANING SOLVENT SHOULD BE PERFORMED UNDER A VENTILATED HOOD. AVOID BREATHING SOLVENT VAPOR AND FUMES; AVOID CONTINUOUS CONTACT WITH THE SOLVENT.

B. Recommended Cleaning Agents

Table 5-1 lists the recommended cleaning agents to be used during overhaul of the KLX 135/135A.

NOTE

Equivalent substitutes may be used for listing cleaning agents.

TYPE	USED TO CLEAN
Denatured Alcohol	Exterior Surfaces
Isopropyl Alcohol	Interior Surfaces

TABLE 5-1 RECOMMENDED CLEANING AGENTS

C. Recommended Cleaning Procedures

1. Exterior

(a) Wipe dust cover and front panel with a lint-free cloth dampened with denatured alcohol.

(b) Use a clean camel-hair brush saturated with denatured alcohol to remove any foreign matter from the rear connector.

(c) Remove side covers.

(d) If necessary, open any blocked ventilation holes by first saturating the debris clogging the apertures with denatured alcohol and then blowing the loosened material out with an air stream.

2. Interior

CAUTION

ALUMINUM ELECTROLYTIC CAPACITORS CAN BE DAMAGED BY HALOGENATED HYDROCARBON SOLVENTS. BENDIX/KING RECOMMENDS "ISOPROPYL ALCOHOL" AS A SAFE CLEANING SOLVENT FOR PRINTED CIRCUIT BOARDS CONTAINING ALUMINUM ELECTROLYTIC CAPACITORS. OTHER SOLVENTS WHICH MAY BE USED ARE AS FOLLOWS:

SAFE SOLVENTS

XYLENE	METHYL ALCOHOL
ETHYL ALCOHOL	PROPYYL ALCOHOL
BUTYL ALCOHOL	CALGONITE (DETERGENT)

PRINTED CIRCUIT BOARDS CONTAINING ALUMINUM ELECTROLYTIC CAPACITORS SHALL NOT BE CLEANED WITH THE FOLLOWING SOLVENTS:

FREON TF, IMC	TRICHLOROETHANE
CARBON TETRACHLORIDE	ALL™ (DETERGENT)
CHLOROFORM	METHYLENE CHLORIDE
TRICHLOROETHYLENE	

Remove each module subassembly. Then remove any foreign matter from the casting.

(a) Casting covers and shields should be cleaned as follows:

1 Remove surface grease with a lint-free cloth.

2 Blow dust from surfaces, holes, and recesses using an air stream.

3 If necessary use a solvent, and scrub until clean, working over all surfaces and into all holes and recesses with a suitable non-metallic brush.

4 Position the part to dry so the solvent is not trapped in holes or recesses. Use an air stream to blow out any trapped solvent.

5 When thoroughly clean, touch up any minor damage to the finish.

(b) Assemblies containing resistors, capacitors, rf coils, inductors, transformers, and other wired parts should be cleaned as follows:

CAUTION

AVOID AIR-BLASTING SMALL TUNING COILS AND OTHER DELICATE PARTS.

(c) Remove dust and dirt from all surfaces, including all parts and wiring, using soft-bristled brushes in conjunction with air stream.

CAUTION

SOLVENT SHOULD NOT BE USED TO CLEAN COMPONENTS, COUPLERS, BUSHINGS OF NYLON, OR RUBBER GROMMETS. CLEAN THESE ITEMS USING A WASHING BATH OF LIQUID DETERGENT AND WATER.

EXCESS CLEANING SOLVENT MUST NOT BE PERMITTED TO ACCUMULATE IN ANY OF THE ADJUSTMENT SCREW CREVICES AND THUS SOFTEN OR DISSOLVE THE ADJUSTMENT SCREW OR ITS SEALANT.

(d) Any dirt that cannot be removed in this way should be removed with a brush (not synthetic) saturated with an approved solvent such as mentioned above. Use of a clean, dry, compressed air stream (25 to 28 psi) is recommended to remove any excess solvent.

5.3.3 REPAIR

A. General

This section contains information required to perform limited repairs on the KLX 135 Unit. The repair or replacement of damaged parts in airborne electronic equipment usually involves standard service techniques. In most cases, examination of drawings and equipment reveals several approaches to perform a repair. However, certain repairs demand following an exact repair sequence to ensure proper operation of the equipment. After correcting a malfunction in any section of the unit, it is recommended that a repetition of the functional test of the unit be performed.

B. Repair

Repair Precautions

1. Refer to paragraph C., 3. for special ESDS and MOS handling precautions.
2. Perform repairs and replace components with power disconnected from equipment.
3. Use a conductive table top for repairs and connect table to ground conductors of 60 Hz and 400 Hz power lines.
4. Replace connectors, coaxial cables, shield conductors, and twisted pairs ONLY with identical items.
5. Reference "component side" of a printed circuit board in this manual means the side on which components are located; "solder side" refers to the other side. The standard references are as follows: nearside is the component side; farside is the solder side; on surface mount boards with components on both sides the nearside is the side that has the J#### and P#### connector numbers.
6. When repairing circuits, carefully observe lead dress and component orientation. Keep leads as short as possible and observe correct repair techniques.
7. There are certain soldering considerations with surface mount components. The soldering iron tip should not touch the ceramic component body. The iron should be applied only to the termination-solder filet.

8. Observe cable routing throughout instrument assembly, prior to disassembly, to enable a proper reinstallation of cabling during reassembly procedures.

CAUTION

THIS EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. EQUIPMENT MODULES AND ESDS DEVICES MUST BE HANDLED IN ACCORDANCE WITH SPECIAL ESDS HANDLING PROCEDURES.

B. Electrostatic Sensitive Devices (ESDS) Protection

1. Always discharge static before handling devices by touching something that is grounded.
2. Use a wrist strap grounded through a 1 MΩ resistor.
3. Do not slide anything on the bench. Pick it up and set it down instead.
4. Keep all parts in protective cartons until ready to insert into the board.
5. Never touch the device leads or the circuit paths during assembly.
6. Use a grounded tip, low wattage soldering station.
7. Keep the humidity in the work environment as high as feasible possible.
8. Use grounded mats on the work station unless table tops are made of approved antistatic material.
9. Do not use synthetic carpet on the floor of the shop. If a shop is carpeted, ensure that a grounded mat is placed at each work station.
10. Keep common plastics out of the work area.

C. MOS Device Protection

MOS (Metal Oxide Semiconductor) devices are used in this equipment. While the attributes of MOS type devices are many, characteristics make them susceptible to damage by electrostatic or high voltage charges. Therefore, special precautions must be taken during repair procedures to prevent damaging the device. The following precautions are recommended for MOS circuits, and are especially important in low humidity or dry conditions.

1. Store and transport all MOS devices in conductive material so that all exposed leads are shorted together. Do not insert MOS devices into conventional plastic "snow" or plastic trays used for storing and transporting standard semiconductor devices.

2. Ground working surfaces on workbench to protect the MOS devices.

3. Wear cotton gloves or a conductive wrist strap in series with a 200 KΩ resistor connected to ground.

4. Do not wear nylon clothing while handling MOS devices.

5. Do not insert or remove MOS devices with power applied. Check all power supplies to be used for testing MOS devices and be sure that there are no voltage transients present.

6. When straightening MOS leads, provide ground straps for the apparatus for the device.

7. Ground the soldering iron when soldering a device.

8. When possible, handle all MOS devices by package or case, and not by leads. Prior to touching the device, touch an electrical ground to displace the static charge that you may have accumulated. The package and substrate may be electrically common. If so, an electrical discharge to the case would cause the same damage as touching the leads.

9. Clamping or holding fixtures used during repair should be grounded, as should the circuit board during repair.

10. Devices should be inserted into the printed circuit boards such that leads on back side do not contact any material other than printed circuit board (in particular, do not use any plastic foam as a backing).

11. Devices should be soldered as soon as possible after assembly. All soldering irons must be grounded.

12. Boards should not be handled in area around devices, but rather by board edges.

13. Assembled boards must not be placed in conventional home-type plastic bags. Paper bags or antistatic bags should be used.

14. Before removing devices from conductive portion of device carrier, make certain conductive portion of carrier is brought in contact with well grounded table top.

D. PC Board, Two-Lead Component Removal (Resistors, Capacitors, Diodes, etc.)

1. Heat one lead from component side of board until solder flows and lift one lead from board; repeat for other lead and remove component (note orientation).

2. Melt solder in each hole and using desoldering tool remove solder from each hole.

3. Dress and form leads of replacement component; insert leads into correct holes.

4. Insert replacement component observing correct orientation.

E. PC Board, Multi-Lead Component Removal (IC's etc.)

1. Remove component by clipping each lead along both sides. Clip off leads as close to component as possible. Discard component.

2. Heat hole from solder side and remove clipped hole from each hole.

3. Melt solder in each hole and using a desoldering suction tool remove solder from each hole.

4. Insert replacement component observing correct orientation.

5. Solder component in place from farside of board. Avoid solder runs. No solder is required on contacts where no tracks exists.

F. Replacement of Power Transistors

1. Unsolder leads and remove attaching hardware. Remove transistor and hard-coat insulator.

2. Apply Thermal Joint Compound Type 120 (Wakefield Engineering, Inc.) to the mounting surface of the replacement transistor.

3. Reinstall the transistor insulator and the power transistor using hardware removed in step (1).

4. After installing the replacement transistor, but before making any electrical connections, measure the resistance between the case of the transistor and the chassis to ensure that the insulation is effective. The resistance measured should be greater than 10 MΩ.

5. Reconnect leads to transistor and solder in place.

G. Replacement of Printed Circuit Board Protective Coating

WARNING

CONFORMAL COATING CONTAINS TOXIC VAPORS! USE ONLY WITH ADEQUATE VENTILATION!

1. Clean repaired area of printed circuit board per instructions in Cleaning section of this manual.

2. Apply Conformal Coating Humiseal #1B-31 HYSOL PC20-35M-01 (Humiseal Division, Columbia Chase Corp., 24-60 Brooklyn Queens Expressway West, Woodside, N.Y., 11377) P/N 016-01040-0000.

3. Shake container well before using.

4. Spray or brush surfaces with smooth, even strokes: if spraying hold the nozzle 10-15 inches from work surface.

5. Cure time is ten minutes at room temperature.

H. Programmable Read Only Memory (PROM) Replacement

The read only memory packages are specially programmed devices to provide specific logic outputs required for operation in the transponder unit. The manufacture's part (type) number is for the un-programmed device and cannot be used. The BENDIX/KING part number must be used to obtain the correctly programmed device. Refer to the "Illustrated Parts List"(IPL).

5.3.3.1 REPLACEMENT OF COMPONENTS

This section describes the procedure along with any special techniques for replacing damaged or defective components.

A. Connectors

When replacing a connector, refer to the appropriate PC board assembly drawing and follow the notes to insure correct mounting and mating of each connector.

B. Crystal

The use of any other than a Bendix/King crystal is considered an unauthorized modification.

C. Diodes

Diodes used are silicon and germanium. Use long nose pliers as a heat sink under normal soldering conditions. NOTE the diode polarity before removal.

D. Integrated Circuits

Refer to appendix A for removal and replacement instructions.

E. Wiring/Coaxial Cable

When repairing a wire that has broken from it's terminal, remove all old solder and pieces of wire from the terminal, restrip the wire to the necessary length and resolder the wire to the terminal. Replace a damaged wire or coax with one of the same type, size and length.

5.3.4 DISASSEMBLY

5.3.4.1 General

This section contains information for disassembly of the KLX 135/135A Communications transceiver/GPS receiver. Disassembly procedures are to be accomplished only when repair, or as

described in the modification service bulletin. This section contains the recommended procedures for removal of all subassemblies. Refer to the Illustrated Parts List (IPL) for aid in disassembly. Part numbers are used in the **IPL** drawings to identify specific parts. Complete disassembly should never be undertaken. Provisions have been made in the design of the unit to make complete disassembly unnecessary except to replace a damage mechanical part that cannot be reached otherwise.

WARNING

REMOVE ALL POWER FROM THE UNIT BEFORE DISASSEMBLY OF ANY MODULE. BESIDES BEING DANGEROUS TO LIFE, VOLTAGE TRANSIENTS CAN CAUSE CONSIDERABLE DAMAGE TO THE EQUIPMENT.

CAUTION

EXERCISE EXTREME CARE WHEN DISCONNECTING AND RECONNECTING THE MULTIPLE PIN CONNECTORS TO ENSURE THAT THE CONNECTORS ARE NOT DAMAGE BY MISALIGNMENT OF THE PINS.

5.3.4.2 Recommended Disassembly Procedures

NOTE

View unit from front for determining left and right sides. Tag, or by some means, identify all disconnected wires or coaxial cables.

A. Top Assembly Removal

1. Remove one fastener (089-06008-0003) securing Top Assembly to Rear Plate (047-10202-0001).
2. Remove three fasteners (089-06008-0003) securing Top Assembly to Right Side Rail (047-10201-0002).
3. Remove three fasteners (089-06008-0003) securing Top Assembly to Transmitter Casting Assembly (200-03297-0000).
4. Lift Top Assembly and swing to left side of unit.
5. Locate and disengage Ribbon Cable (155-02294-0021) from J2 on the Digital Board Assembly (200-08775-0000).

CAUTION

THIS EQUIPMENT CONTAINS ELECTROSTATIC DISCHARGE SENSITIVE (ESDS) DEVICES. EQUIPMENT MODULES AND ESDS DEVICES MUST BE HANDLED IN ACCORDANCE WITH SPECIAL ESDS HANDLING PROCEDURES.

B. Digital Board Removal

1. Perform steps outlined in step A.
2. Remove four fasteners (089-06008-0003) securing Digital Board Chassis (047-10417-0001) to Standoffs (076-01535-0001 & 076-01535-0003).
3. Remove five fasteners (089-06008-0003) securing GPS Receiver Chassis (047-06896-0001) to Standoffs (076-01535-0001 & 076-01535-0005).
4. Unplugged Ribbon Cable (155-02293-0015) from GPS Receiver Board Assembly (200-08691-0000).

C. GPS Board Removal

1. Perform steps outlined in step A.
2. Remove four fasteners (089-06008-0003) securing Digital Board Chassis (047-10417-0001) to Standoffs (076-01535-0001 & 076-01535-0003).
3. Remove two fasteners (089-06004-0003) securing Recpt Coax Mtg (030-00412-0000) to Top Frame (047-10204-0003).
4. Remove five fasteners (089-06008-0003) securing GPS Receiver Chassis (047-06896-0001) to Standoffs (076-01535-0001 & 076-01535-0005).
5. Unplugged Ribbon Cable (155-02293-0015) from GPS Receiver Board Assembly (200-08691-0000).

D. Bottom Cover Removal

1. Turn the unit over so that the Bottom Cover (047-10203-0004) is facing up.
2. Remove three fasteners (089-06008-0006) securing Bottom Cover to Power Supply Assembly (200-08412-0000) and Comm Rcvr Board Assembly (200-08410-0000).
3. Remove one fastener (089-06008-0004) securing Bottom Cover to Transmitter Casting Assembly (200-03297-0000).
4. Remove one fastener (089-06008-0002) securing Bottom Cover to Rear Plate (047-10202-0001).
5. Remove three fasteners (089-06008-0003) securing Bottom Cover to Right Side Rail (047-10201-0002).
6. Remove three fasteners (089-06008-0003) securing Bottom Cover to Transmitter Casting Assembly (200-03297-0000).

E. Front Panel Assembly Removal

1. Perform steps outlined in step A.

2. Locate and disengage connector P3 (Refer to drawing number 300-08757-0000).

3. Remove two fasteners (089-06342-0004) securing Front Panel Assembly (200-03298-0000) to Right Side Rail (047-10201-0002).

4. Remove two fasteners (089-06342-0004) securing Front Panel Assembly to Transmitter Casting Assembly (200-03297-0000).

5. Slide Front Panel Assembly toward the front of the unit to disengage from J4003.

F. Front Panel-Aux Board Assembly Removal

1. Perform steps outlined in steps A and E.

2. Remove four fasteners (089-05899-0008) securing Front Panel-Aux Board Assembly (200-08414-0000) to Bezel (088-01383-0002).

3. Locate and disengage Front Panel-Aux Board Assembly from J6001 and J6002.

G. Front Panel-Main Board Assembly Removal

1. Perform steps outlined in steps A, E and F.

2. Loosen two set screws (089-06200-0003) in Volume Knob (073-00626-0002).

3. Remove Volume Knob from the assembly.

4. Rotate PULL SCAN and PULL 25K knobs to expose set screws (089-06200-0003) in Spool Switches (076-01537-0001) and loosen set screws.

5. Remove PULL SCAN and PULL 25K knobs from the assembly.

6. Remove two big knobs (088-01392-0001) from the assembly.

7. Remove two fasteners (089-05899-0003) securing Front Panel-Main Board Assembly to Bezel (088-01383-0002).

H. Front Panel Main Board Removal

1. Perform steps outlined steps A, E, F and G.

2. Remove four fasteners (089-05899-0008) securing Switch Brackets (047-10416-0001) to Back Housings (073-00924-0001).

3. Twist the legs on the LCD Casing (047-06894-0001) and remove it from the Front Panel Main Board.

4. Remove Hex Nut (089-02106-0011) securing Pot/Dual Switch (133-00398-0002) to Front Panel Main Board.

I. Rear Plate Removal

1. Perform steps outlined in steps A and D.
2. Remove two fasteners (089-06008-0003) securing Rear Plate (047-10202-0001) to Right Side Rail (047-10201-0002).
3. Remove two fasteners (089-06008-0003) securing Rear Plate to Transmitter Casting Assembly (200-03297-0000).
4. Remove one fastener (089-05903-0004) securing Comm/Rx Board Assembly to Rear Plate.
5. Remove one fastener (089-05903-0004) securing Audio Board Assembly to Rear Plate.

J. Transmitter Casting Assembly Removal

1. Perform steps outlined in steps E and I.
2. Unsolder wire from the following terminations:

   E5012 and E5013 on Transmitter Casting Assembly (200-03297-0000), E4001 and E4002 on Comm/Rx Board Assembly (200-08410-0000), E4014 and E4015 on Comm/Rx Board Assembly.
3. Remove one fastener (089-05903-0004) securing Q36 to Transmitter Casting Assembly.
4. Remove three fasteners (089-05903-0004) securing Comm/Rx Board Assembly to Transmitter Casting Assembly.

K. Transmitter Board Removal

1. Perform steps outlined in step J.
2. Remove Transmitter Cover (047-10200-0001) from Transmitter Casting (073-00625-0003).
3. Unsolder wire from the following terminations:

   E5005, E5007, E5011 and E5019.
4. Remove three fasteners (089-05903-0003) securing Q2 and Q3 to Transmitter Casting.
5. Remove six fasteners (089-05903-0004) securing Transmitter Board (200-08413-0000) to Transmitter Casting.

L. Power Supply Assembly Removal

1. Perform steps outlined in steps A and D.

2. Remove one fastener (089-05903-0004) securing Power Supply Assembly (200-08412-0000) to Comm/Rx Board Assembly (200-08410-0000).

3. Remove two fasteners (089-06008-0003) securing Power Supply Assembly to Right Side Rail (047-10201-0002).

4. Push the Power Supply Assembly downward so that it is disengage from J4004 (030-03006-0007).

M. Power Supply Board Removal

1. Perform steps outlined in step L.

2. Remove Power Supply Cover (047-10199-0001) from the assembly.

3. Remove two fasteners (089-05903-0004) securing Power Supply Board (200-08412-0000) to Power Supply Chassis (047-10198-0001).

4. Remove four fasteners (089-06008-0004) securing Q3, U2, U3 and U4 to Power Supply Heatsink (047-10207-0001).

N. Audio Board Assembly Removal

1. Perform steps outlined in steps A and D.

2. Remove one fastener (089-05903-0004) securing Audio Board Assembly (200-08768-0000) to Comm/Rx Board Assembly (200-08410-0000).

3. Remove one fastener (089-05903-0004) securing Audio Board Assembly to Rear Plate (047-10202-0001).

4. Remove two fasteners (089-06008-0003) securing Audio Board Assembly to Right Side Rail (047-10201-0002).

5. Push the Audio Board Assembly downward so that it is disengage from J4005 (030-03006-0008).

O. Audio Board Removal

1. Perform steps outlined in step N.

2. Remove two fasteners (089-06008-0004) securing U1 to Audio Heatsink (047-10206-0001).

3. Remove two fasteners (089-05903-0004) securing Audio Heatsink to Audio Board.

5.3.5 ASSEMBLY

Assembly should be performed in the reverse order.

5.4 TROUBLESHOOTING

CAUTION

DO NOT ATTEMPT TO TROUBLESHOOT THE GPS RECEIVER BOARD. THIS IS A FACTORY SERVICEABLE ITEM ONLY.

This troubleshooting section is intended as a guide for the technician in isolating a malfunction in the KLX 135/135A. Before troubleshooting the radio, a thorough understanding of the Theory of Operation should be accomplished. The technique of fault finding through elimination should be used as a basis in locating the trouble area.

Before any troubleshooting procedures are applied, perform a bench check to determine if the unit is the source of the problem. If it is, determine in which assembly (Power Supply, COMM Receiver, COMM transmitter, Front Panel or Digital Control) the problem lies. Once you have determine the problem section, consult the troubleshooting flow charts, schematics and the waveforms of Figure 5-10 to 5-12 for information pertaining to voltages and waveforms. The KLX 135/135A Self-test during power up can aid in troubleshooting a failure. If the unit displays "FAIL", approve the Turn On, Initialization, VFR and Data Base pages and then select the MESSAGE page to identify failure.

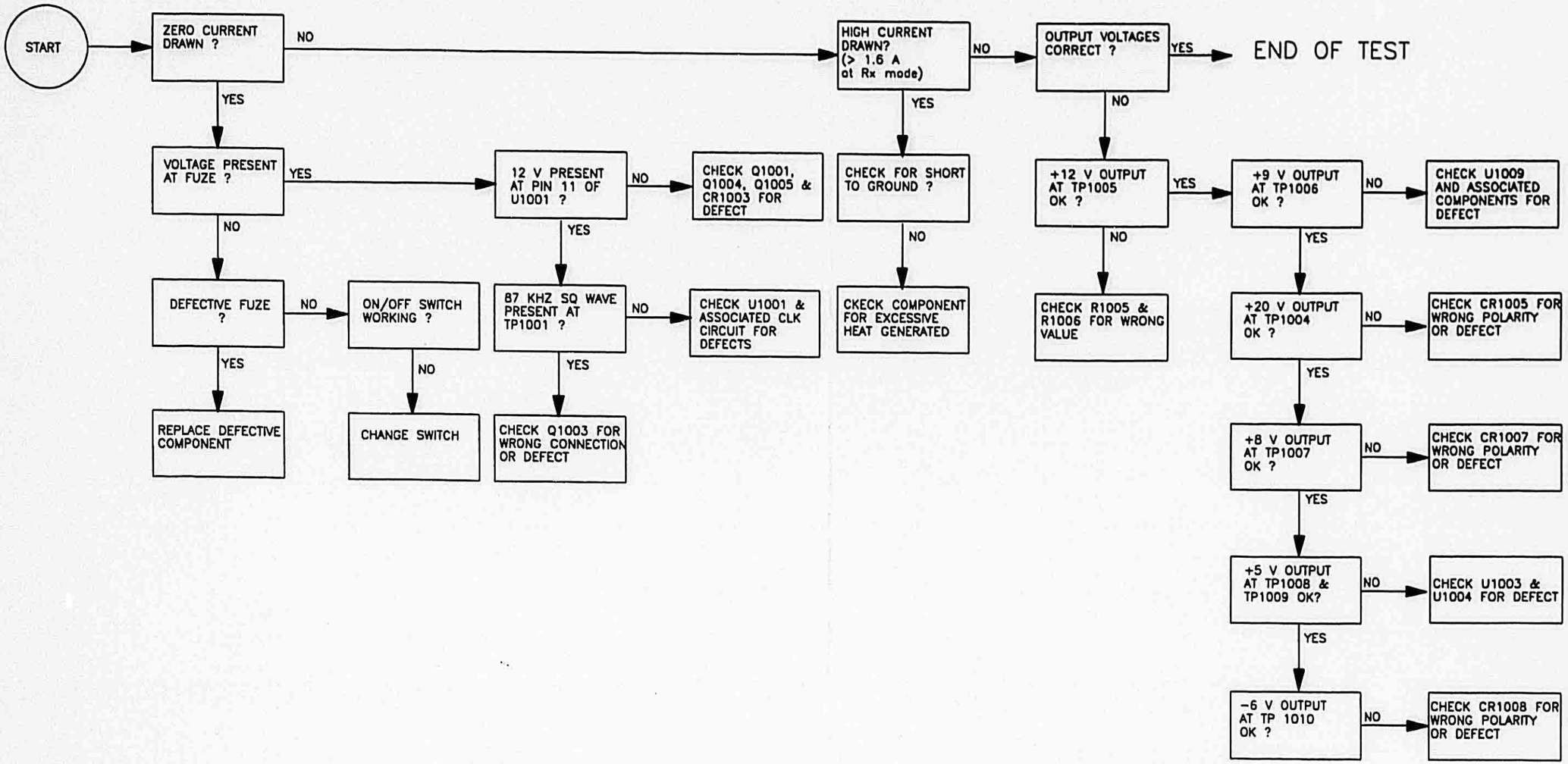


FIGURE 5-5 POWER SUPPLY TROUBLESHOOTING FLOWCHART

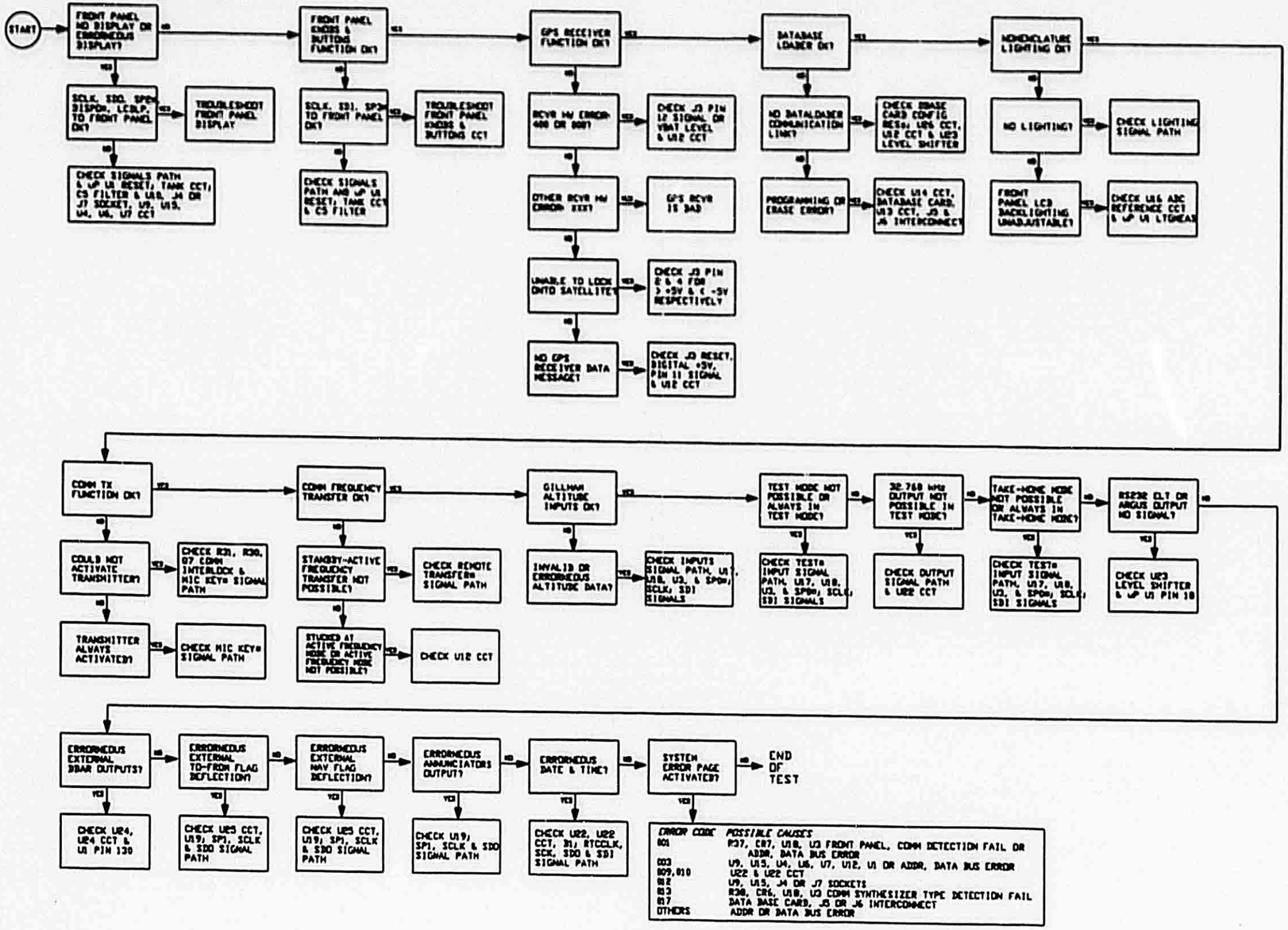


FIGURE 5-6 DIGITAL CONTROL TROUBLESHOOTING FLOWCHART

BENDIX/KING

KLX 135/135A
COMMUNICATIONS TRANSCEIVER/
GPS RECEIVER

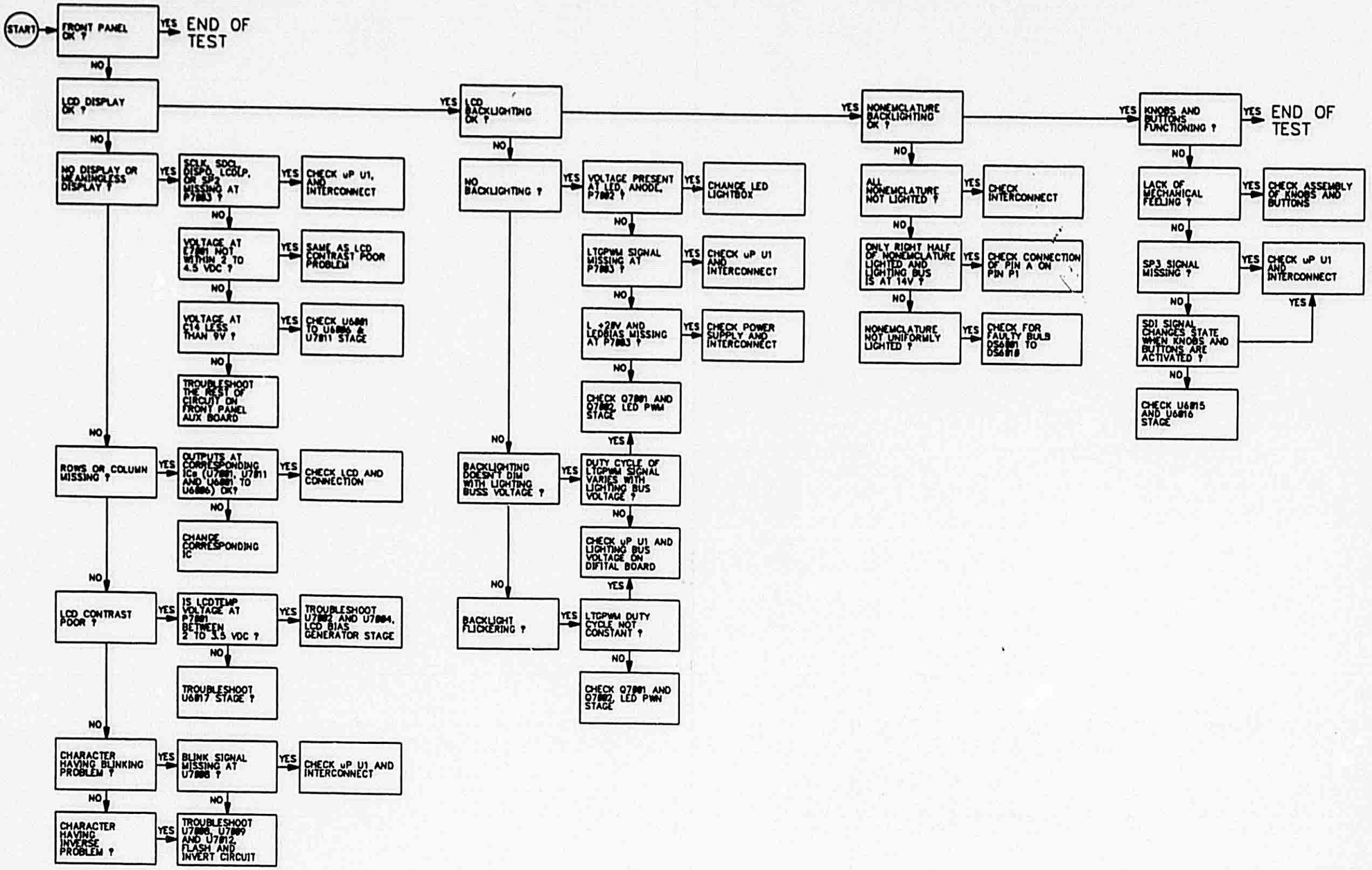


FIGURE 5-7 FRONT PANEL DISPLAY/CONTROL TROUBLESHOOTING FLOWCHART

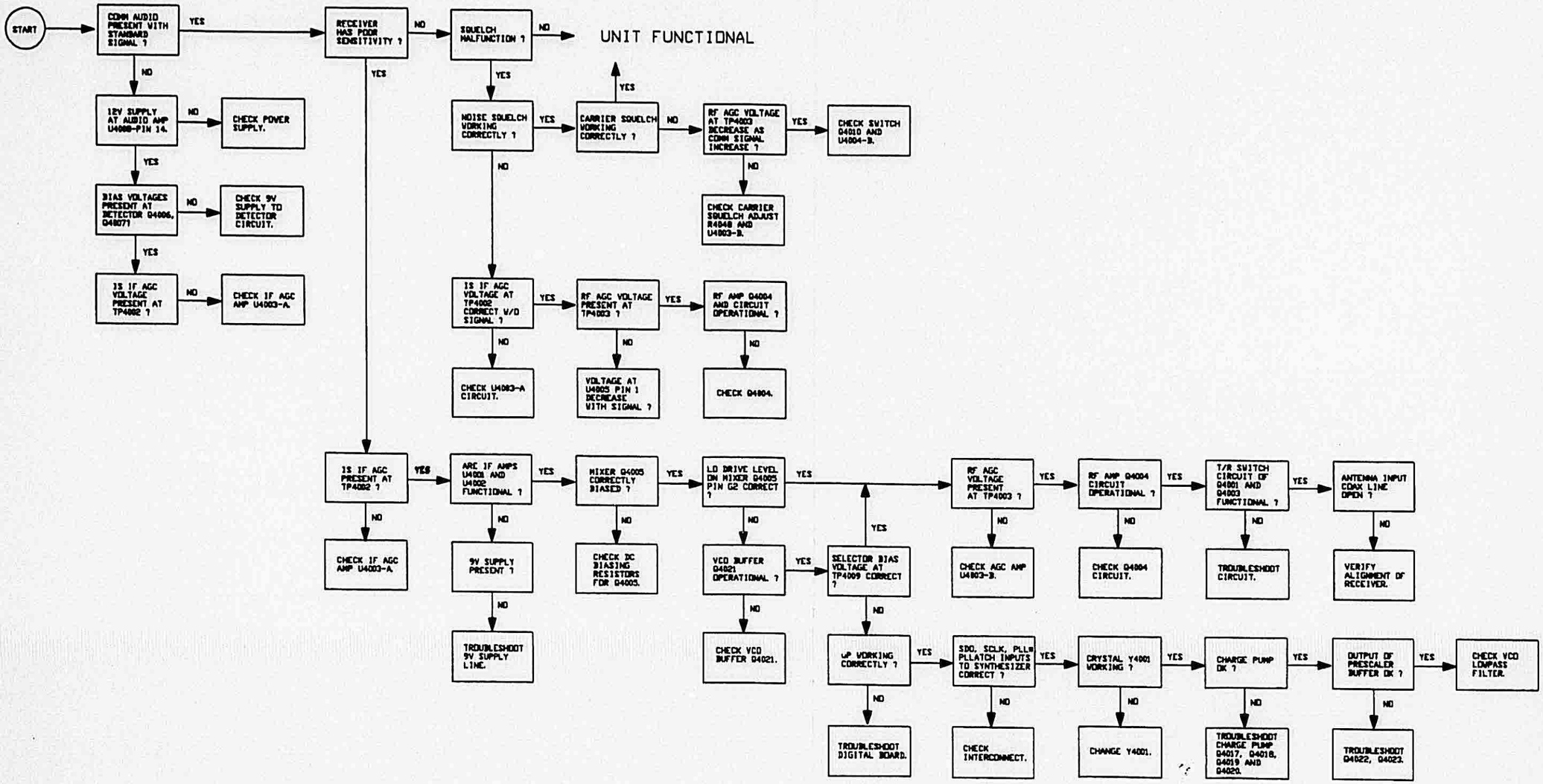


FIGURE 5-8 COMM RECEIVER TROUBLESHOOTING FLOWCHART

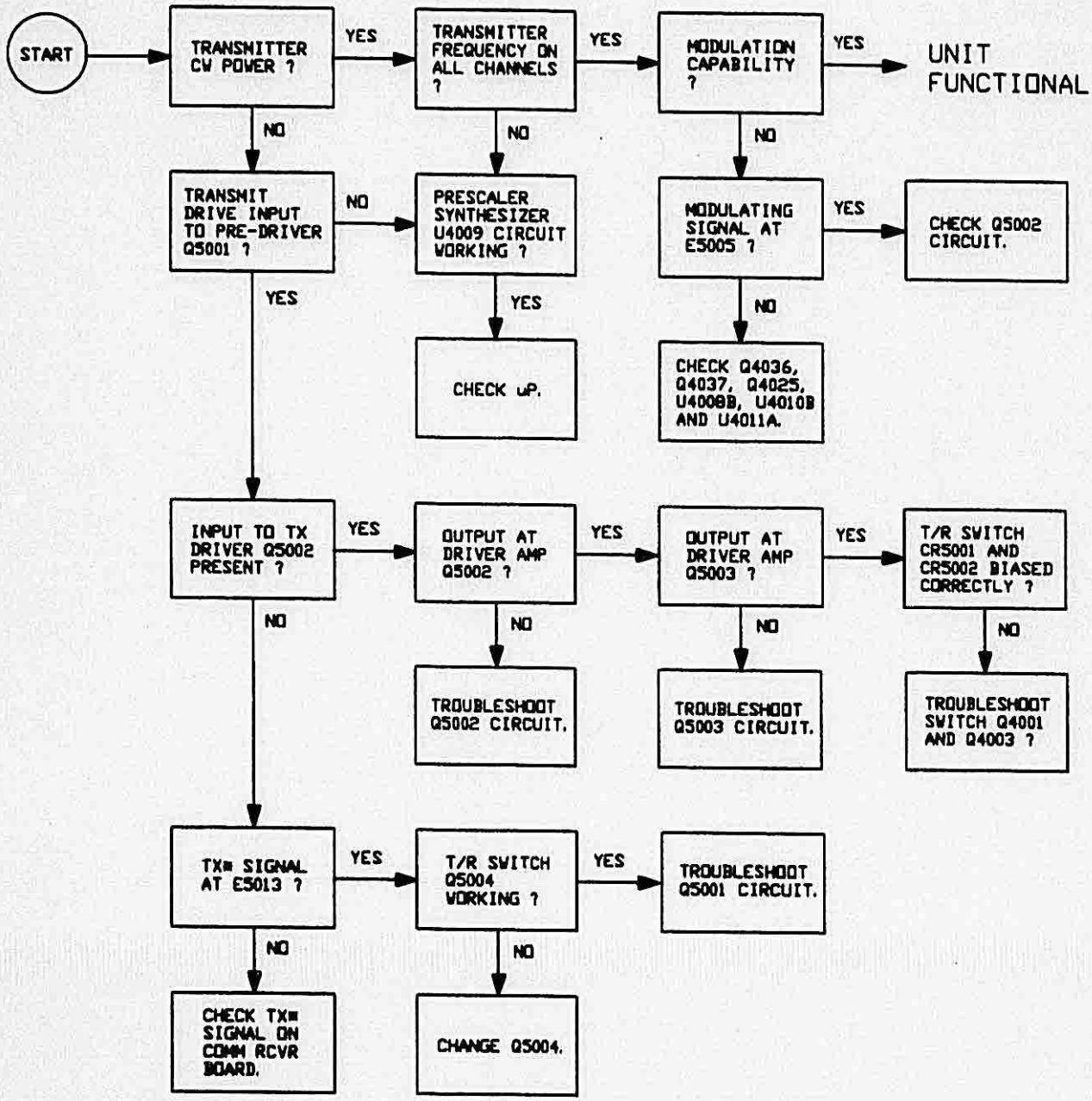
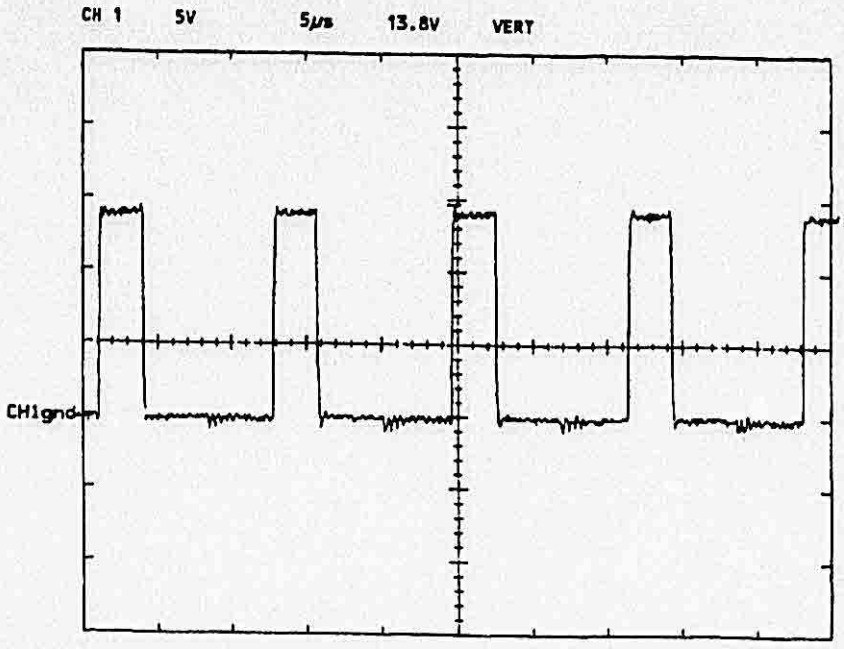
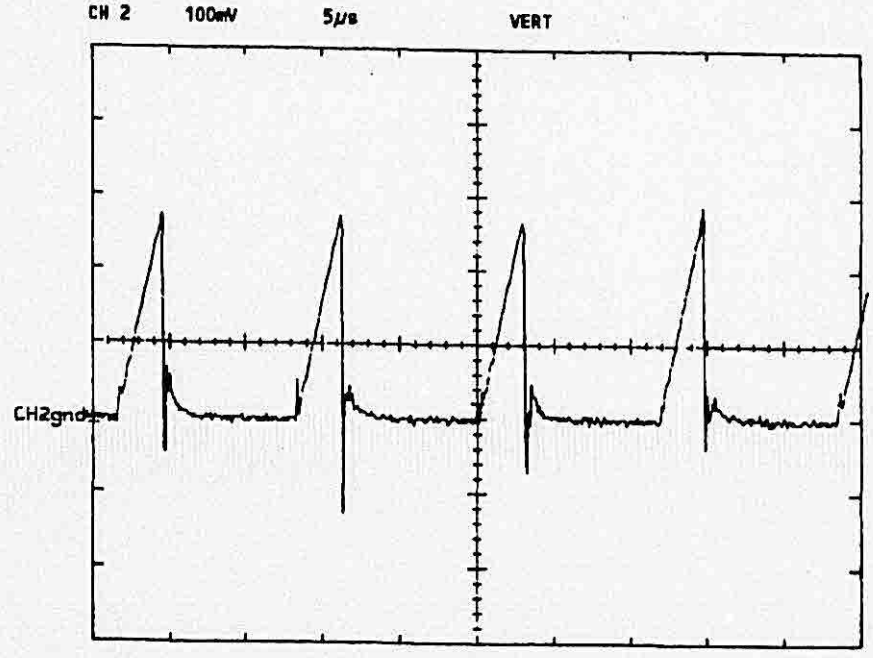


FIGURE 5-9 COMM TRANSMITTER TROUBLESHOOTING FLOWCHART

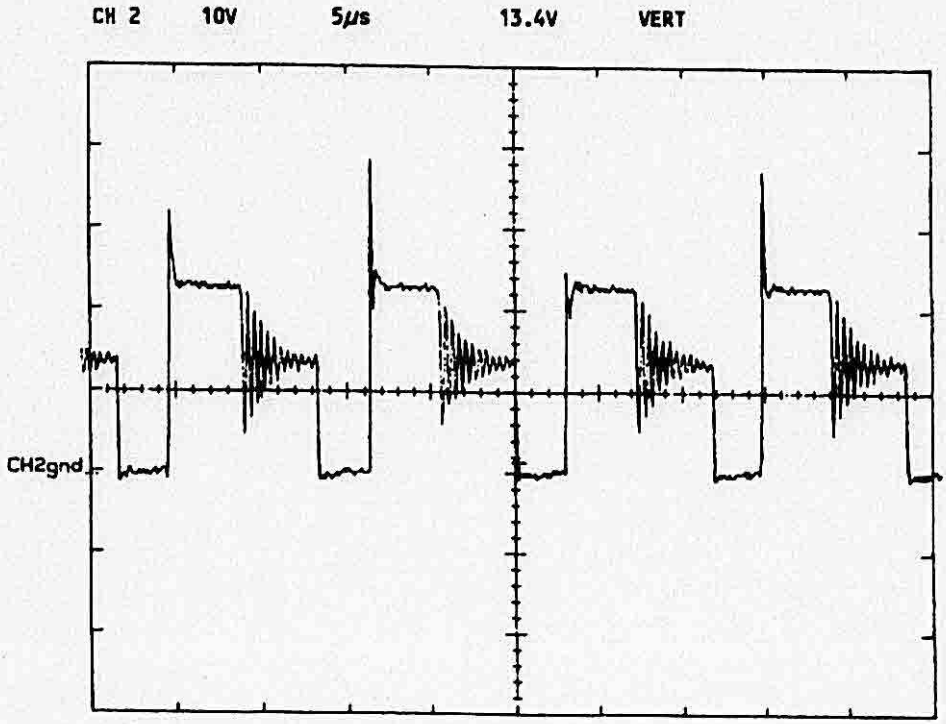


TP1001



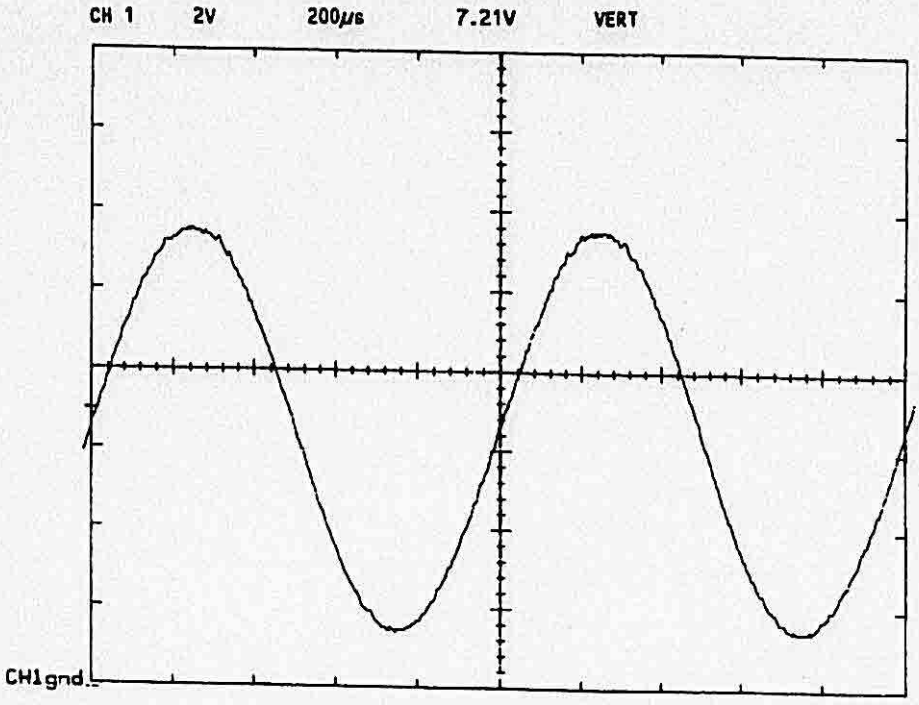
TP1002

FIGURE 5-10 POWER SUPPLY BOARD VOLTAGE WAVEFORM
(Sheet 1 of 2)

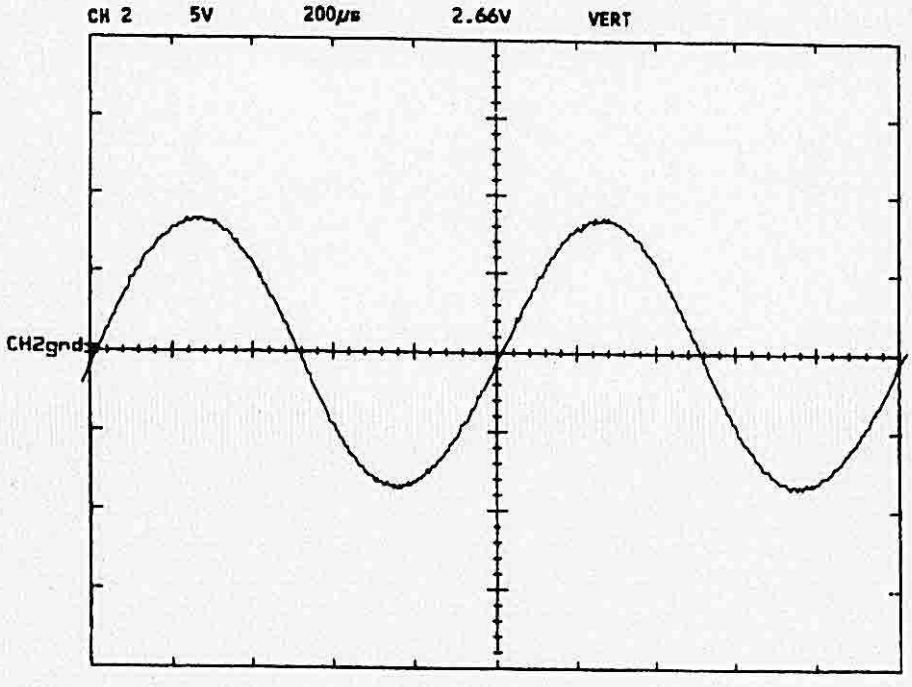


TP1003

FIGURE 5-10 POWER SUPPLY BOARD VOLTAGE WAVEFORM
(Sheet 2 of 2)

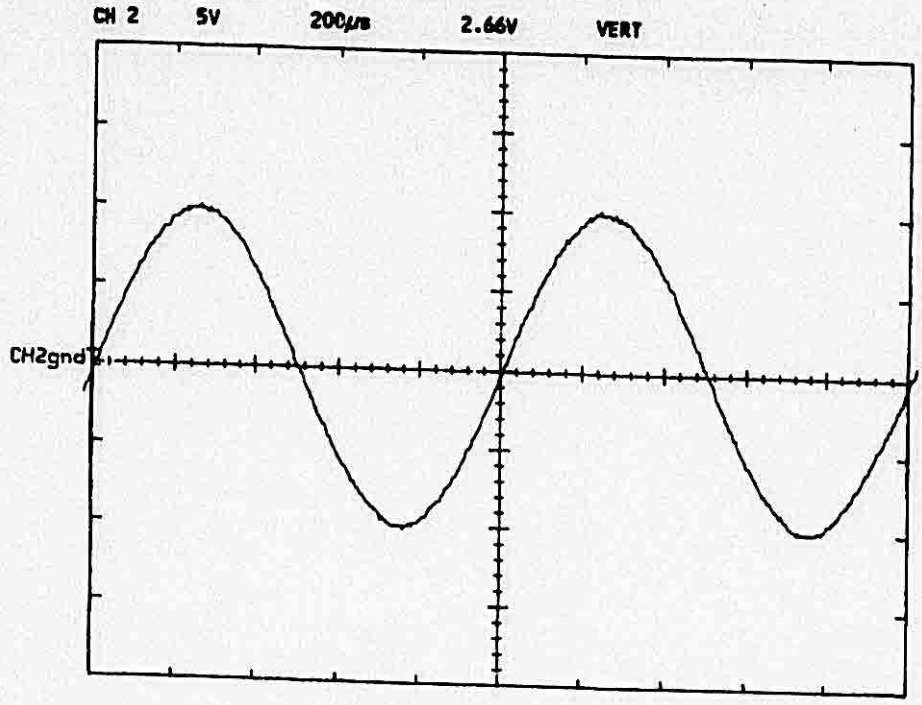


TX_MOD SIGNAL

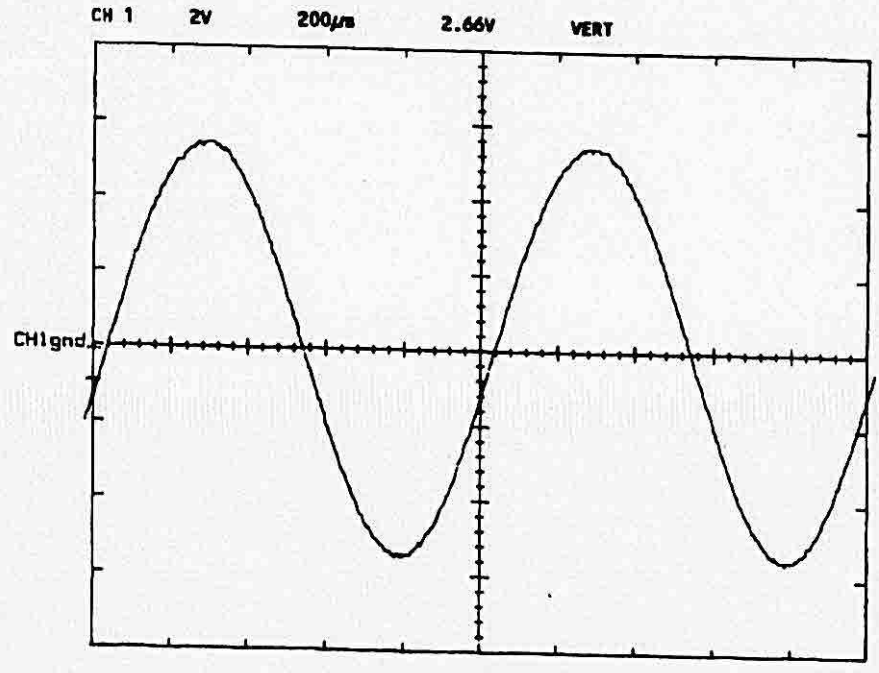


4 OHM AUDIO OUT
J4001 PIN P

FIGURE 5-11 COMM RECEIVER BOARD VOLTAGE WAVEFORM
(Sheet 1 of 7)

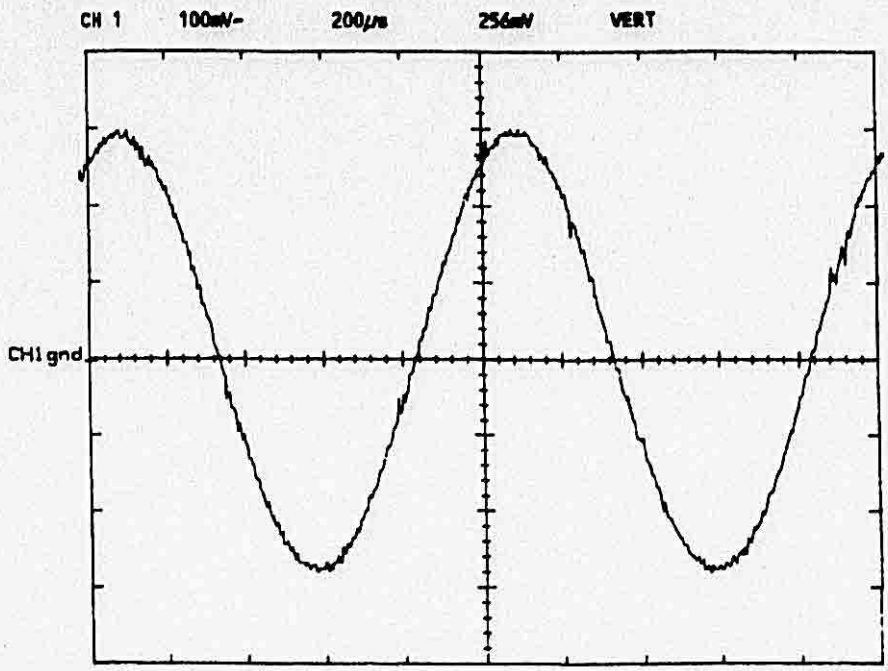


500 OHM AUDIO OUT
J4001 PIN 13

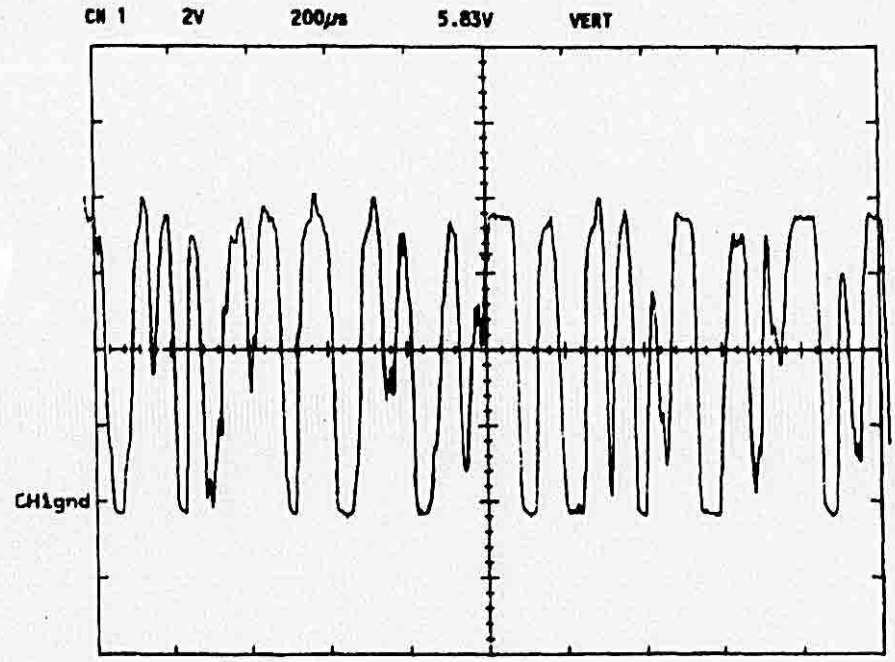


COMM_AUDIO/SIDETONE IN
J4001 PIN E

FIGURE 5-11 COMM RECEIVER BOARD VOLTAGE WAVEFORM
(Sheet 2 of 7)

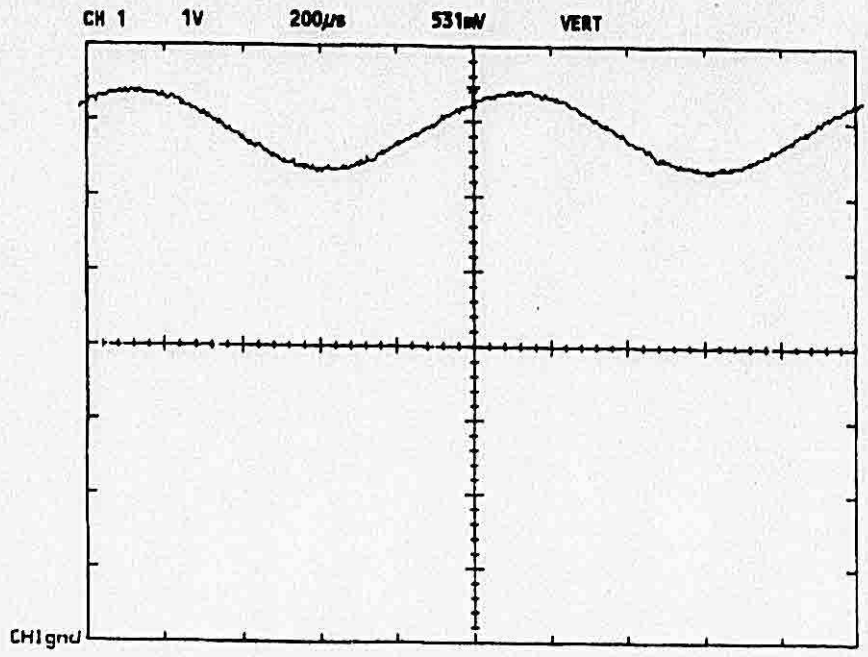


OUTPUT OF AUDIO SUMMER
TP4015

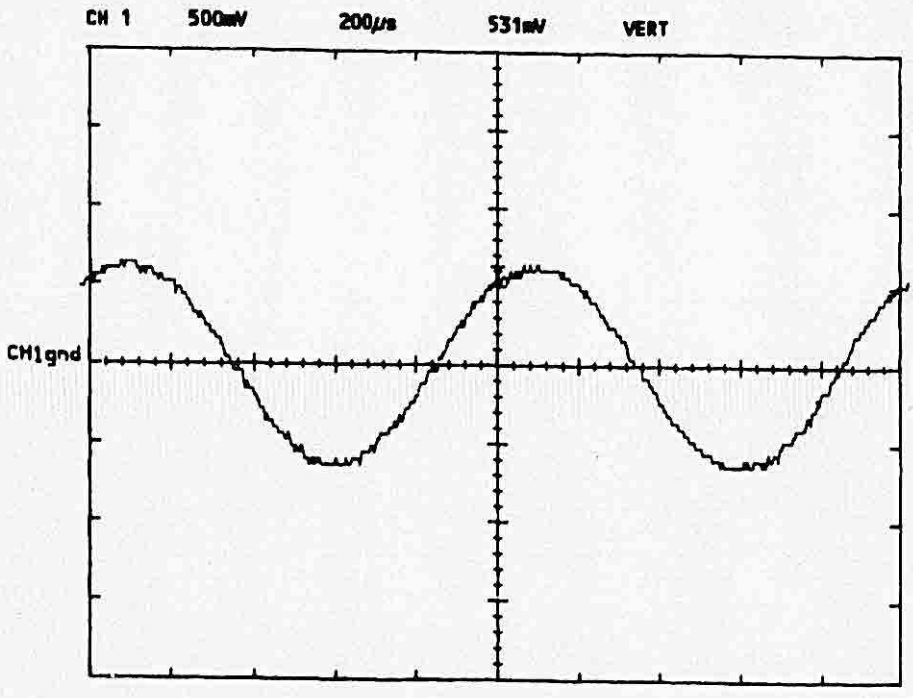


TP4004
(NO INPUT SIGNAL)

FIGURE 5-11 COMM RECEIVER BOARD VOLTAGE WAVEFORM
(Sheet 3 of 7)

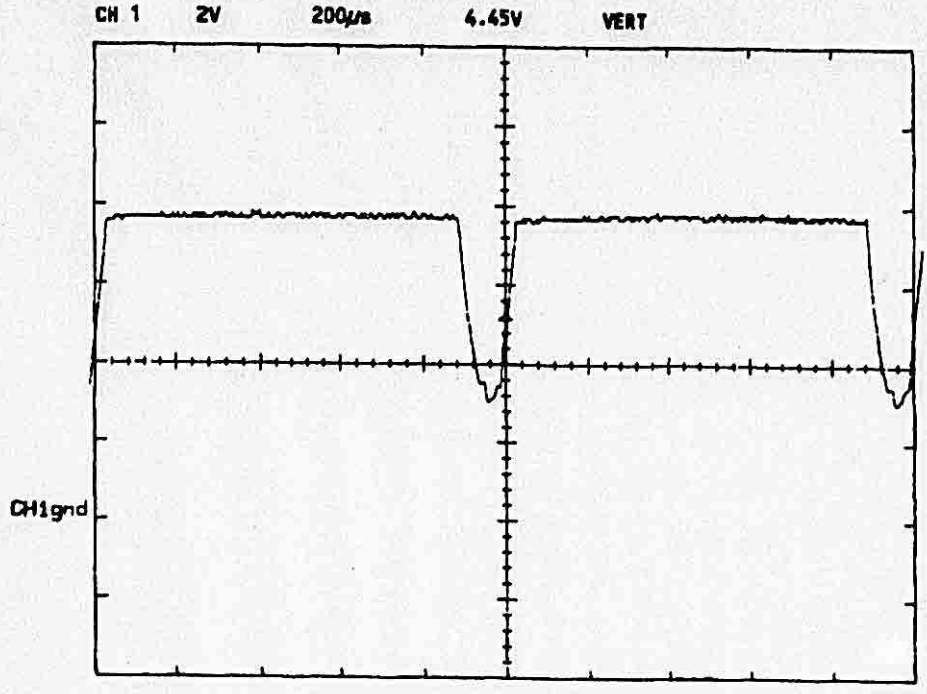


DETECTOR OUTPUT
TP4001

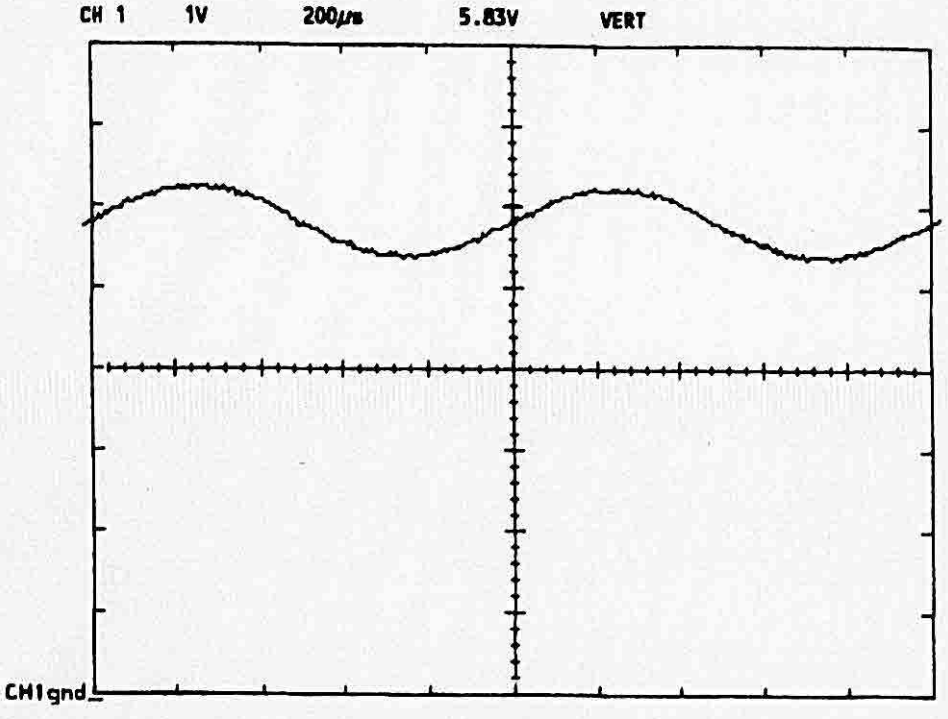


TP4007

FIGURE 5-11 COMM RECEIVER BOARD VOLTAGE WAVEFORM
(Sheet 4 of 7)

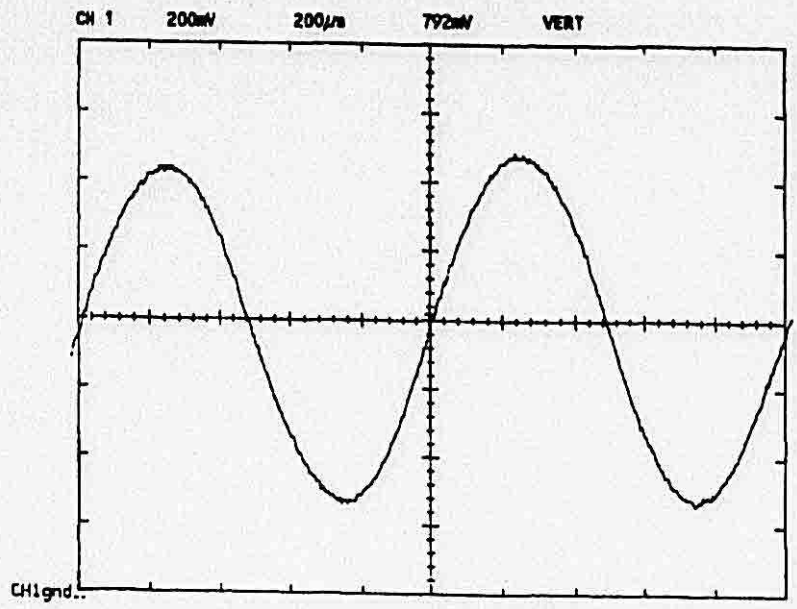


U4011 PIN 7

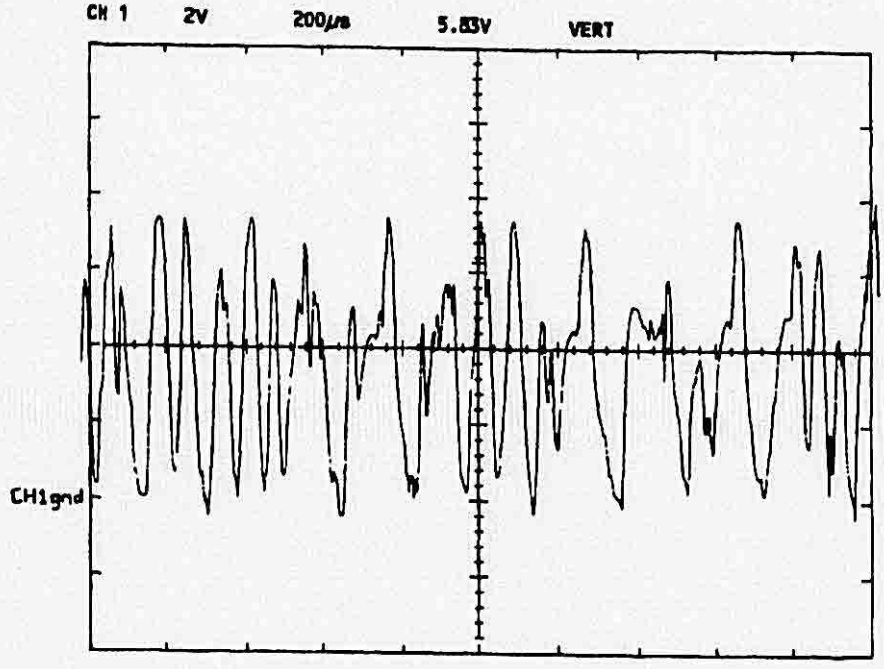


TP4006

FIGURE 5-11 COMM RECEIVER BOARD VOLTAGE WAVEFORM
(Sheet 5 of 7)

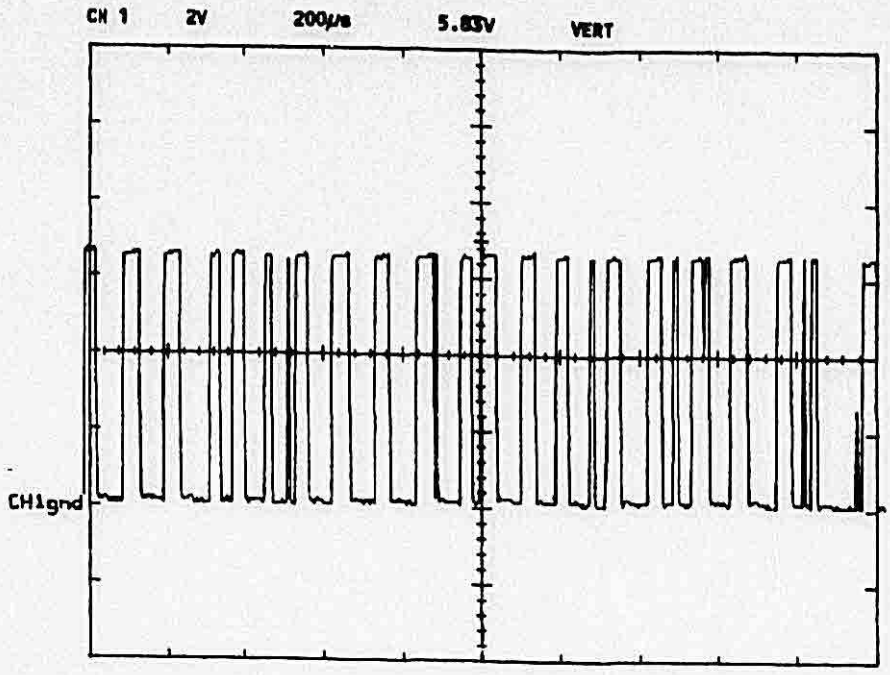


TP4010
(TX WITH STD MOD)

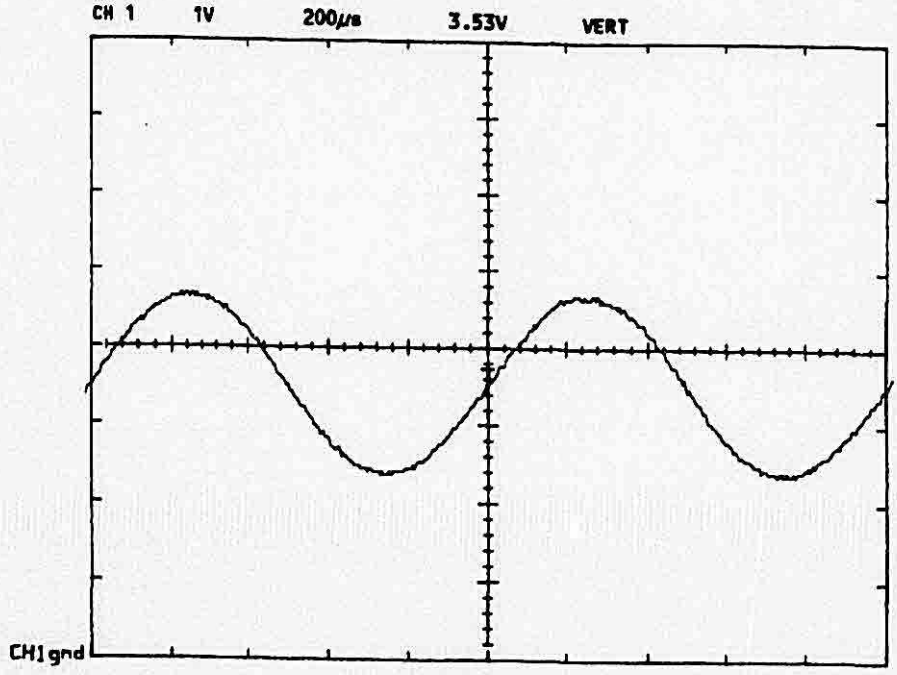


U4004 PIN 1
(NO INPUT SIGNAL)

FIGURE 5-11 COMM RECEIVER BOARD VOLTAGE WAVEFORM
(Sheet 6 of 7)

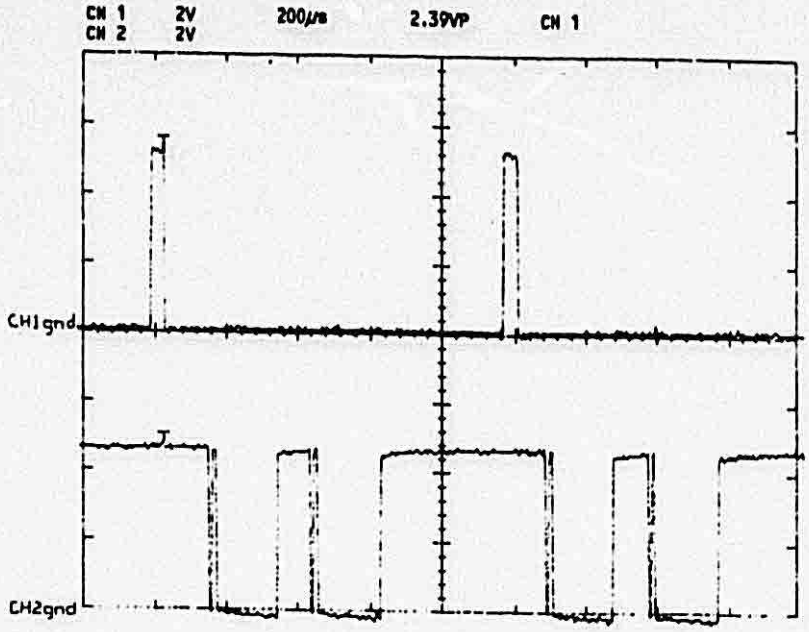


U4005 PIN 1
(NO INPUT SIGNAL)

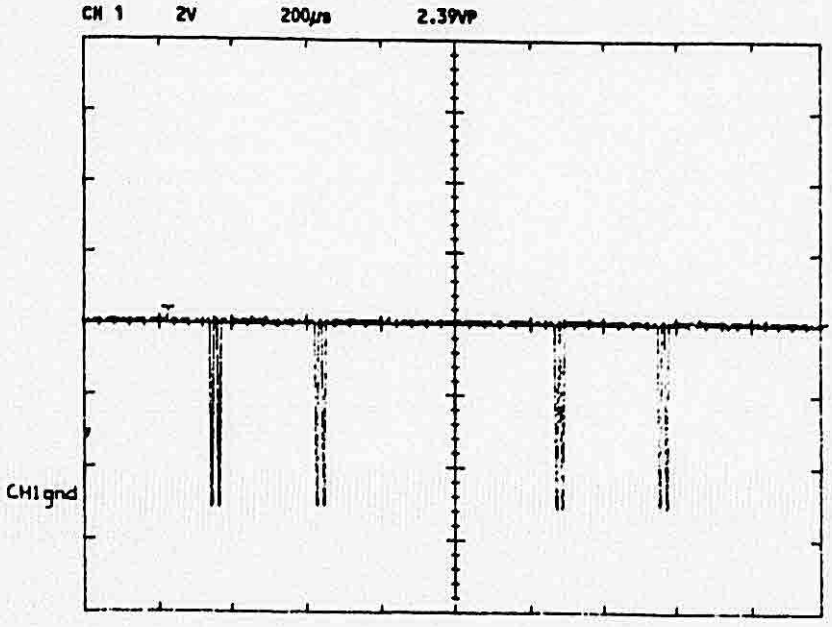


U4007 PIN 7
(COMPRESSOR ON)

FIGURE 5-11 COMM RECEIVER BOARD VOLTAGE WAVEFORM
(Sheet 7 of 7)

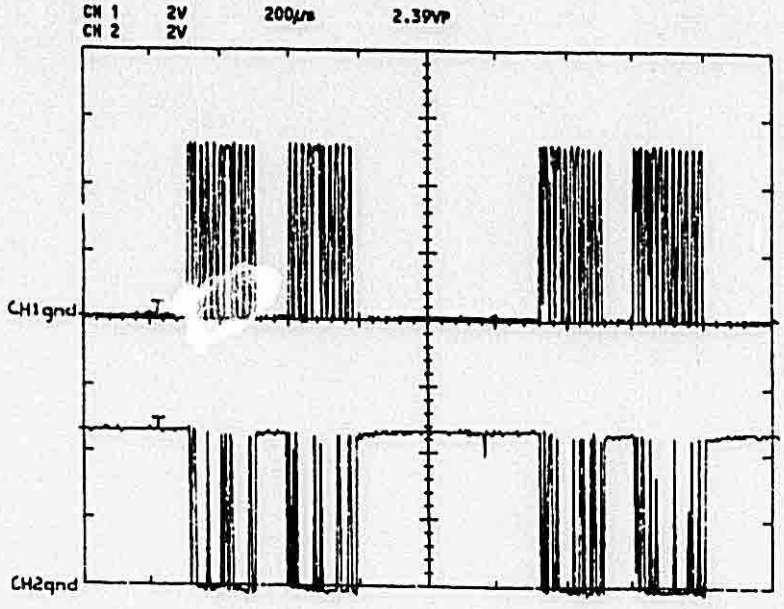


TOP: LCDLP
BOT: DISPO*

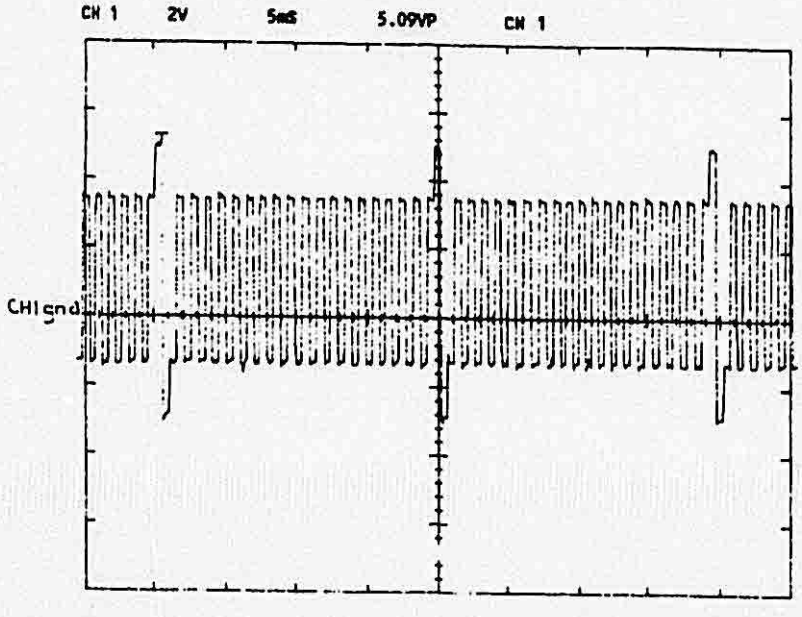


SP2*

FIGURE 5-12 FRONT PANEL MAIN/AUX BOARDS VOLTAGE WAVEFORM
(Sheet 1 of 5)

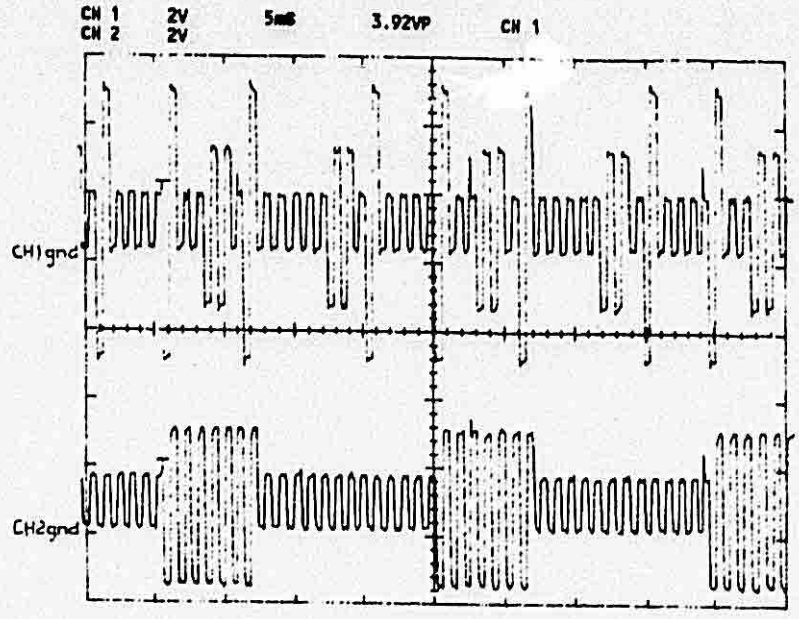


SCLK
(SYNC WITH LCDLP)

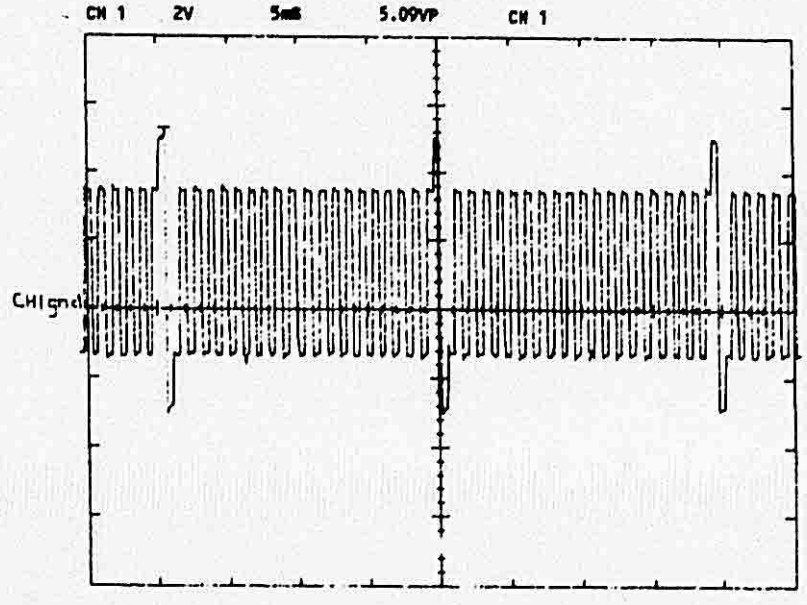


TYPICAL LCD ROW DRIVING SIGNAL

FIGURE 5-12 FRONT PANEL MAIN/AUX BOARDS VOLTAGE WAVEFORM
(Sheet 2 of 5)

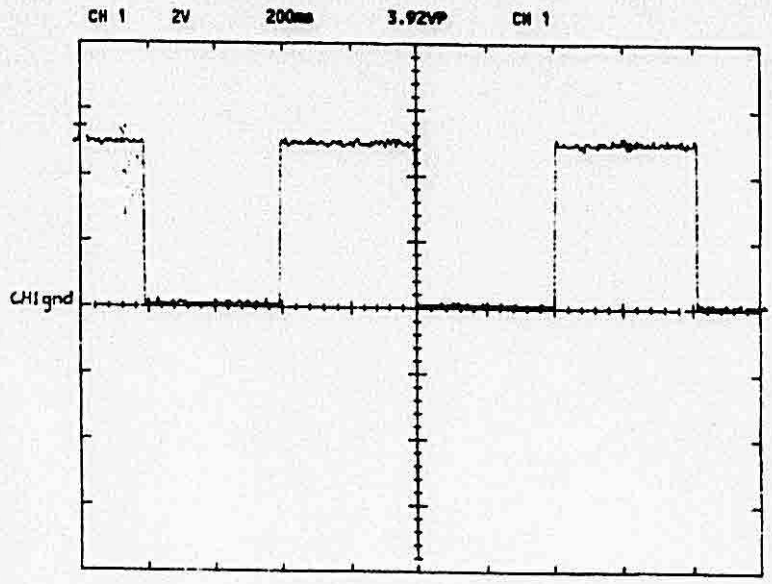


TOP: TYPICAL LCD COLUMN DRIVING SIGNAL
BOT: TYPICAL LCD COLUMN DRIVING SIGNAL

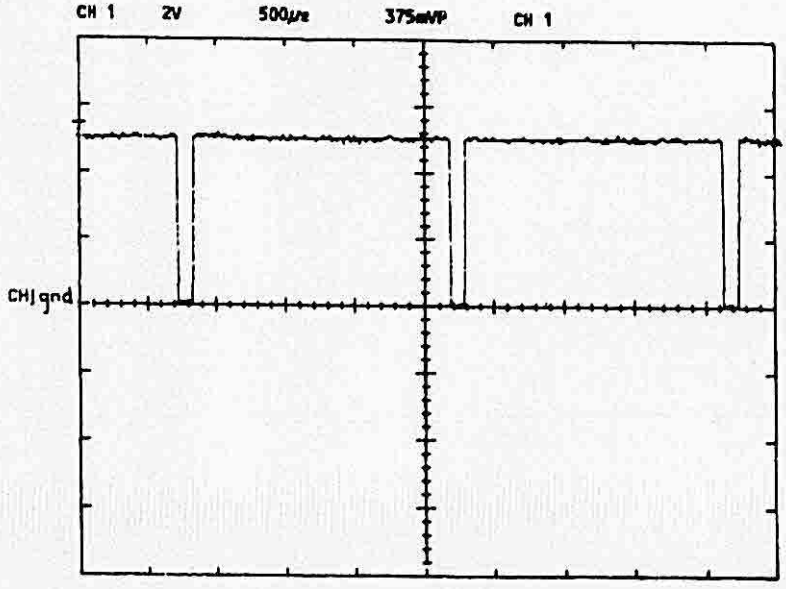


LTGPWM WITH 95% DUTY CYCLE

FIGURE 5-12 FRONT PANEL MAIN/AUX BOARDS VOLTAGE WAVEFORM
(Sheet 3 of 5)

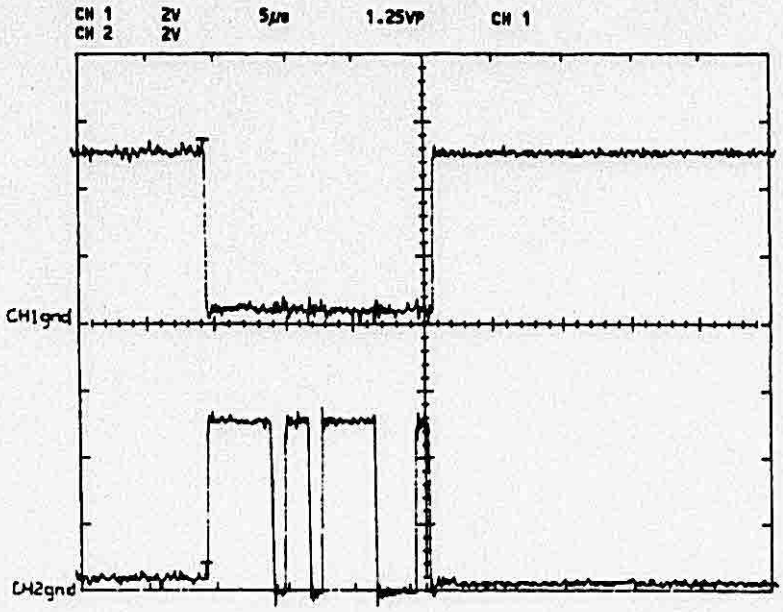


BLINK



SP3*

FIGURE 5-12 FRONT PANEL MAIN/AUX BOARDS VOLTAGE WAVEFORM
(Sheet 4 of 5)



TOP: SP3*

BOT: TYPICAL SDI

FIGURE 5-12 FRONT PANEL MAIN/AUX BOARDS VOLTAGE WAVEFORM
(Sheet 5 of 5)

06

SECTION VI
ILLUSTRATED PARTS LIST

ILLUSTRATED PARTS LISTS

LIST OF ILLUSTRATIONS

SECTION VI

ILLUSTRATED PARTS LIST

6.1 INTRODUCTION

The Illustrated Parts List (IPL) is a complete list of assemblies and parts required for the KLX 135/135A. 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 Bendix/King Part Number meet design specifications for this equipment and are the recommended replacement parts. Warranty information concerning King replacement parts is contained in Service Memo #1, KPN 600-08001-00XX.

6.2 PARTS LIST DESCRIPTION

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 Bendix/King 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. 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 Bendix/King 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 SEE APPENDIX S

I401 is a programmed memory device. Refer to Section 8, 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	PC	Polycarbonate
ASSY	Assembly	PF	Precision Film
BIFLR	Bifilar	PP	Paper
BOM	Bill of Material	PS	Polystrene
CC	Carbon Composite	QW	Quarter Watt

CF	Carbon Film
CH	Choke
CAP	Capacitor
CR	Ceramic
DC	Disc Ceramic
DIO	Diode
EL	Electrolytic
EW	Eighth Watt
FC	Fixed Composition
FERR	Ferrite
FLTR	Filter
FT	Feedthru
HV	High Voltage
HW	Half Watt
I	Integrated Circuit
MC	Monolithic
MY	Mylar
RES	Resistor
S	Silicon
SCR	Screw
SM	Silver Mica
STDF	Standoff
SW	Switch
TERM	Terminal
TN	Tantalum
TST PT	Test Point
TW	Tenth Watt
U	Integrated Circuit
VA	Variable
WW	Wire Wound
XFMR	Transformer
XSTR	Transistor Ceramic
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-9900 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
FT	Foot
AR	As Required
RF	For Reference Only
IN	Inch

G. Quantity and Version Columns

Individual versions of an assembly are identified by the last four digits of the P/N. Part quantities for each version will be indicated under headings numbered 0000 through 9900 as required. The parts indicated in the 9900 Column are common to all other versions of the assembly and are considered the Common Bill of Material for the assembly.

H. Software Documentation

Software is defined as the programs, routines, codes and other written information integrated with a device to form a functional entity (i.e., ROM's or other electronically programmed devices) used in the configuration of the complete unit.

Hardware is defined as physical or emulated equipment used in data processing.

Firmware is defined as a non-software programmable device that contains programs and data, whose functional dynamics may vary, and does not contain machine instruction images.

The hardware, working in conjunction with the software and firmware, defines a particular version of unit.

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. Refer to Appendix S to determine the correct P/N for ordering the correct programmed device. You will need to know the part number of and the software revision level of the unit. Appendix S contains block diagrams for documented software/hardware configurations. The unit designator and part numbers are listed in the top box. One level down from that is a box for the 206-type system software BOM number and boxes for the BOM numbers for all other hardware assemblies that do not contain any software. The next level are boxes containing 205-type BOM's for assemblies which use software under the system software box. Below these top BOM boxes are two boxes. One box shows the hardware BOM number and the other contains a list of circuit designators and part numbers of individual integrated circuits used on the circuit board. The hardware/software configuration diagrams in Appendix S provide a method to coordinate hardware with software versions and revision levels.

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 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 tag that appears on the unit. In the example shown on page 7, 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.

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 revision level of the unit. The software identification tag is illustrated below.

(b) The 205- hardware/software board assemblies which 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 is contained on a label part number of 057-05252-XXXX and the last two digits is specified by 057-05335-00YY.

2) For 9-digit 205-WWWW-ZZ board labels the first 7 digits is contained on a label part number of 057-050WW-00WW and the last two digits is 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 BENDIX/KING 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 to 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 are 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 in the 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	VERSION STCKR	EA	1.00	
	057-02203-0003	3	VERSION 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

Figure 6-1 TYPICAL BILL OF MATERIALS

```
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

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
         .
    .
    .
```

FIGURE 6-1 TYPICAL BILL OF MATERIALS (Cont'd)

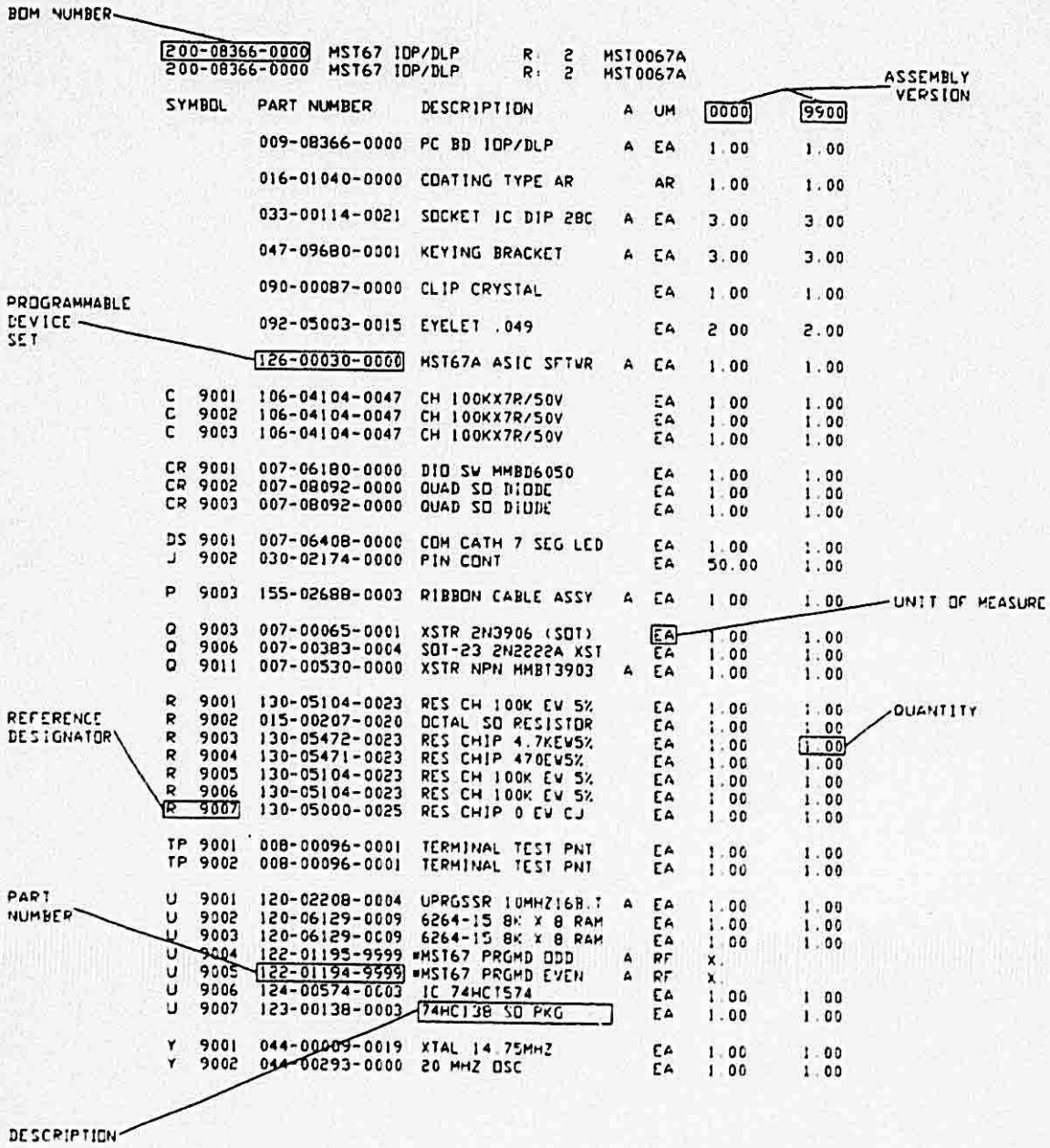
Assy: 126-00005-0000		EFS40/50 INT LOGIC			
Symbol Part Number	Rev	Description	UM	Quantity	BxItm
122-30002-0000	0	EFS40/50 INT LOGIC	EA	1.00	

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 6-1 TYPICAL BILL OF MATERIALS (Cont'd)



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	UPROSSR 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 74HC1574		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 6-1 TYPICAL BILL OF MATERIAL (Cont'd)

6.3 KLX 135/135A FINAL ASSEMBLY

KLX135 GPS COMM 069-01029-0201
KLX135A GPS COMM 069-01029-0703
KLX135/A GPS COMM 069-01029-9900

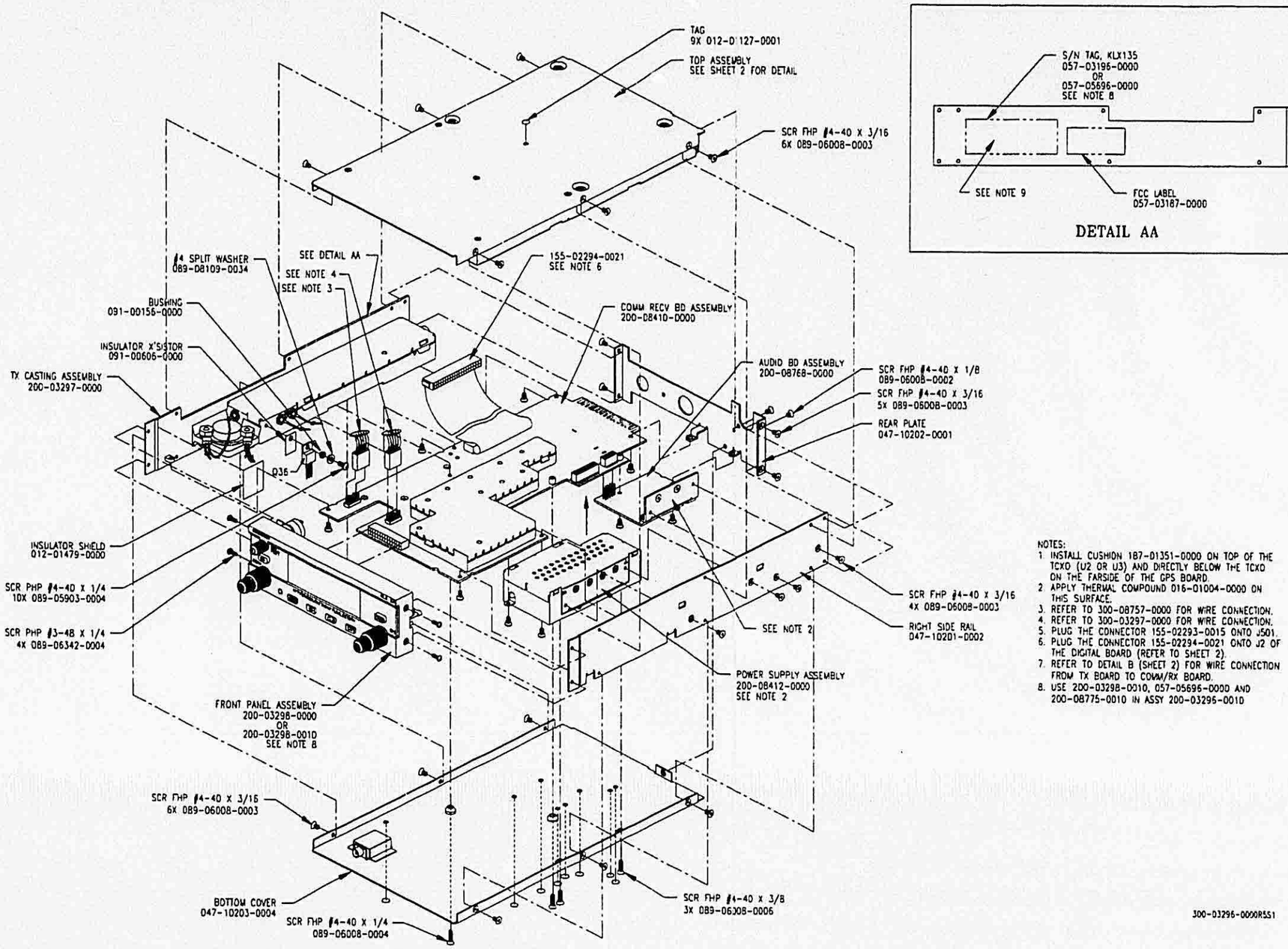
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0201	-0703	-9900
...	000-00506-0103			RF	X	.	.
...	000-00506-0302	.		RF	.	X	.
...	009-08961-0001	FLEX CABLE EXPRESS		EA	.	.	1
...	012-01127-0001	TAG COVER		EA	.	.	9
...	012-01479-0000	INSUL SHIELD		EA	.	.	2
...	047-10201-0002	RIGHT SIDE RAIL		EA	.	.	1
...	047-10202-0001	REAR PLATE		EA	.	.	1
...	047-10203-0004	BOTTOM COVER		EA	.	.	1
...	047-10415-0003	RACK MOUNTING		EA	.	.	1
...	047-10417-0001	DIGITAL BD CHASSIS		EA	.	.	1
...	047-10752-0000	COVER, XPRESS		EA	.	.	1
...	047-10756-0003	KLX135A TOP FRAME		EA	.	.	1
...	057-03186-0201	FLAVOR TAG		EA	1	.	.
...	057-03186-0703	FLAVOR TAG		EA	.	1	.
...	057-03187-0000	FCC LABEL		EA	.	.	1
...	057-03196-0000	S/N TAG KLX135 14V		EA	1	.	.
...	057-05696-0000	S/N TAG KLX135A 14		EA	.	1	.
...	069-01029-9900	COMMON BILL 14V		EA	1	1	.
...	073-00630-0001	XPRESS HOUSING		EA	.	.	1
...	076-01535-0001	STANDOFF		EA	.	.	2
...	076-01535-0003	STANDOFF		EA	.	.	2
...	089-05899-0007	SCR PHP 2-56X7/16		EA	.	.	4
...	089-05903-0004	SCR PHP 4-40X1/4		EA	.	.	10
...	089-06004-0003	SCR FHP 2-56X3/16		EA	.	.	2
...	089-06008-0002	SCR FHP 4-40X1/8		EA	.	.	1

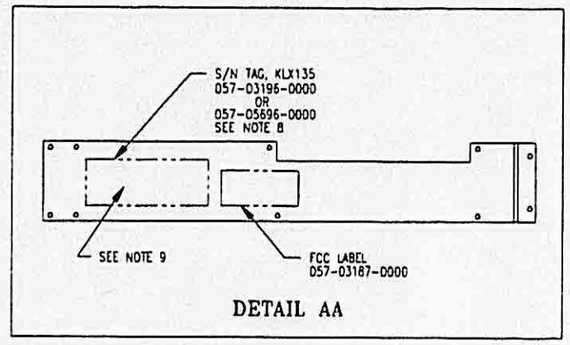
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0201	-0703	-9900
...	089-06008-0003	SCR FHP 4-40X3/16		EA	.	.	25
...	089-06008-0004	SCR FHP 4-40X1/4		EA	.	.	1
...	089-06008-0006	SCR FHP 4-40X3/8		EA	.	.	3
...	089-06342-0004	SCR PHP 3-48X1/4		EA	.	.	4
...	089-08109-0034	WSHR SPLT LK #4		EA	.	.	3
...	091-00156-0000	BUSHING		EA	.	.	1
...	091-00606-0000	INSULATOR XSTR		EA	.	.	1
...	155-02811-0003	RF CABLE ASSY	A	EA	.	.	1
...	200-03297-0000	KLX135 TX MOD 14V	A	EA	1	1	.
...	200-03298-0000	KLX135 FNT PNL MOD	A	EA	1	.	.
...	200-03298-0010	KLX135A FNT PNL MOD	A	EA	.	1	.
...	200-08410-0000	COMM RCVR BD 14V	A	EA	1	1	.
...	200-08412-0000	KLX135 P/S BOARD	A	EA	1	1	.
...	200-08768-0000	KLX135 AUDIO BD 14	A	EA	.	1	.
...	206-00322-0103	KLX135 SW SYSTEM		EA	1	.	.
...	206-00322-0302	KLX135A SW SYSTEM		EA	.	1	.
Q 4036	007-00525-0000	XSTR PWR MJE15028		EA	.	.	1
REF 1	300-03296-0000	KLX135 FINAL ASSY		RF	.	.	X

6.4 KLX 135/135A SYSTEM SOFTWARE

206-00322-0101 KLX135 SYSTEM SW
206-00322-0102 KLX135 SYSTEM SW
206-00322-0103 KLX135 SYSTEM SW
206-00322-0301 KLX135A SYSTEM SW

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0101	-0102	-0103	-0301
	057-05287-0101	SW MOD TAG		EA	1	.	.	.
	057-05287-0102	UNIT SFTWR V0102		EA	.	1	.	.
	057-05287-0103	UNIT SFTWR V0103		EA	.	.	1	.
	057-05287-0301	SW MOD TAG		EA	.	.	.	1
	057-05287-0302	SW MOD TAG		EA	1	.	.	.
	057-05796-0000	S/N TAG		EA	.	1	.	1
	205-00816-0000	KLX135 BA 1M CARD		EA	1	.	.	.
	205-00816-0001	KLX135 BA IM CARD		EA	.	1	1	.
	205-00816-0300	KLX135A DIG BD PROG		EA	.	.	.	1
	205-00834-0002	XPRESS PROG'D		EA	1	.	1	.
	205-08691-0000	GPS ASIC/MMIC RCVR		EA	1	.	.	.
	205-08691-0001	GPS ASIC/MMIC RCVR		EA	.	1	.	1
	716-00169-0000	KLX135 CONFIG INDX		EA	1	.	.	.
	716-00169-0001	KLX135 CONFIG INDX		RF	.	X	.	.
	716-00169-0002	KLX135 CONFIG INDX		RF	.	.	X	.
	716-00169-0301	KLX135A CONFIG INDEX		RF	.	.	.	X
	716-00169-0302	KLX135A CONFIG INDX		RF	X	.	.	.



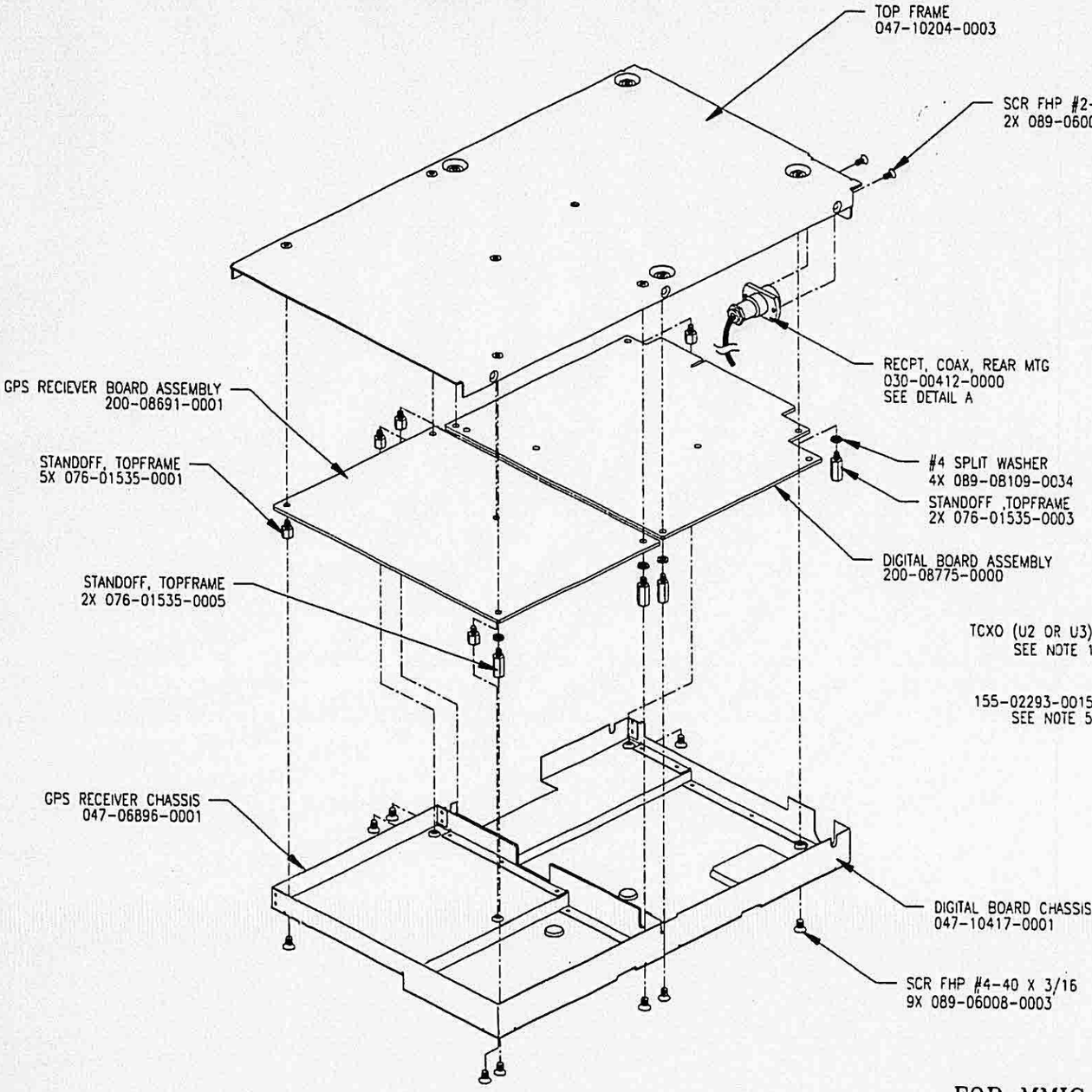


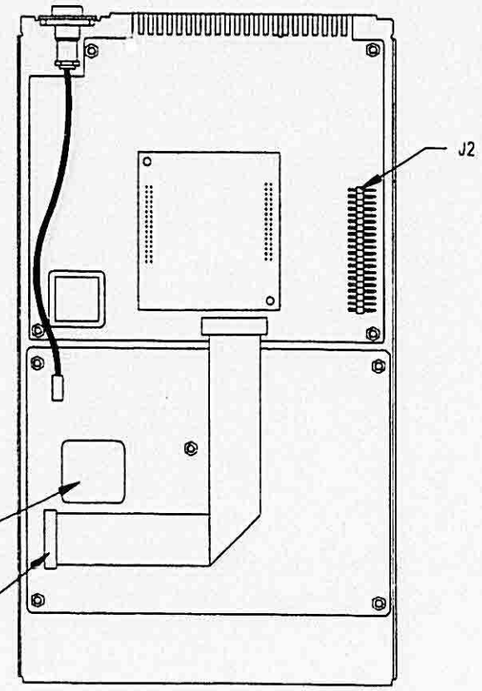
DETAIL AA

NOTES:
1. INSTALL CUSHION 187-01351-0000 ON TOP OF THE TCXO (U2 OR U3) AND DIRECTLY BELOW THE TCXO ON THE FARSIDE OF THE GPS BOARD.
2. APPLY THERMAL COMPOUND 016-01004-0000 ON THIS SURFACE.
3. REFER TO 300-08757-0000 FOR WIRE CONNECTION.
4. REFER TO 300-03297-0000 FOR WIRE CONNECTION.
5. PLUG THE CONNECTOR 155-02293-0015 ONTO J501.
6. PLUG THE CONNECTOR 155-02294-0021 ONTO J2 OF THE DIGITAL BOARD (REFER TO SHEET 2).
7. REFER TO DETAIL B (SHEET 2) FOR WIRE CONNECTION FROM TX BOARD TO COMM/RX BOARD.
8. USE 200-03298-0010, 057-05696-0000 AND 200-08775-0010 IN ASSY 200-03295-0010

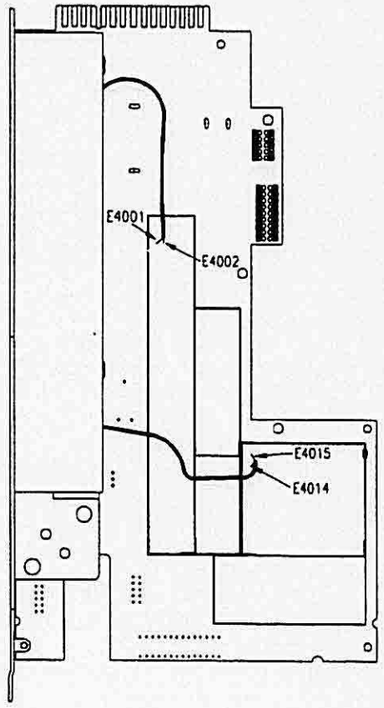
300-03296-0000R5S1

FIGURE 6-2 KLX 135/A FINAL ASSEMBLY
Dwg. No. 300-03296-0000/-0010, R5
(Sheet 1 of 3)





DETAIL A



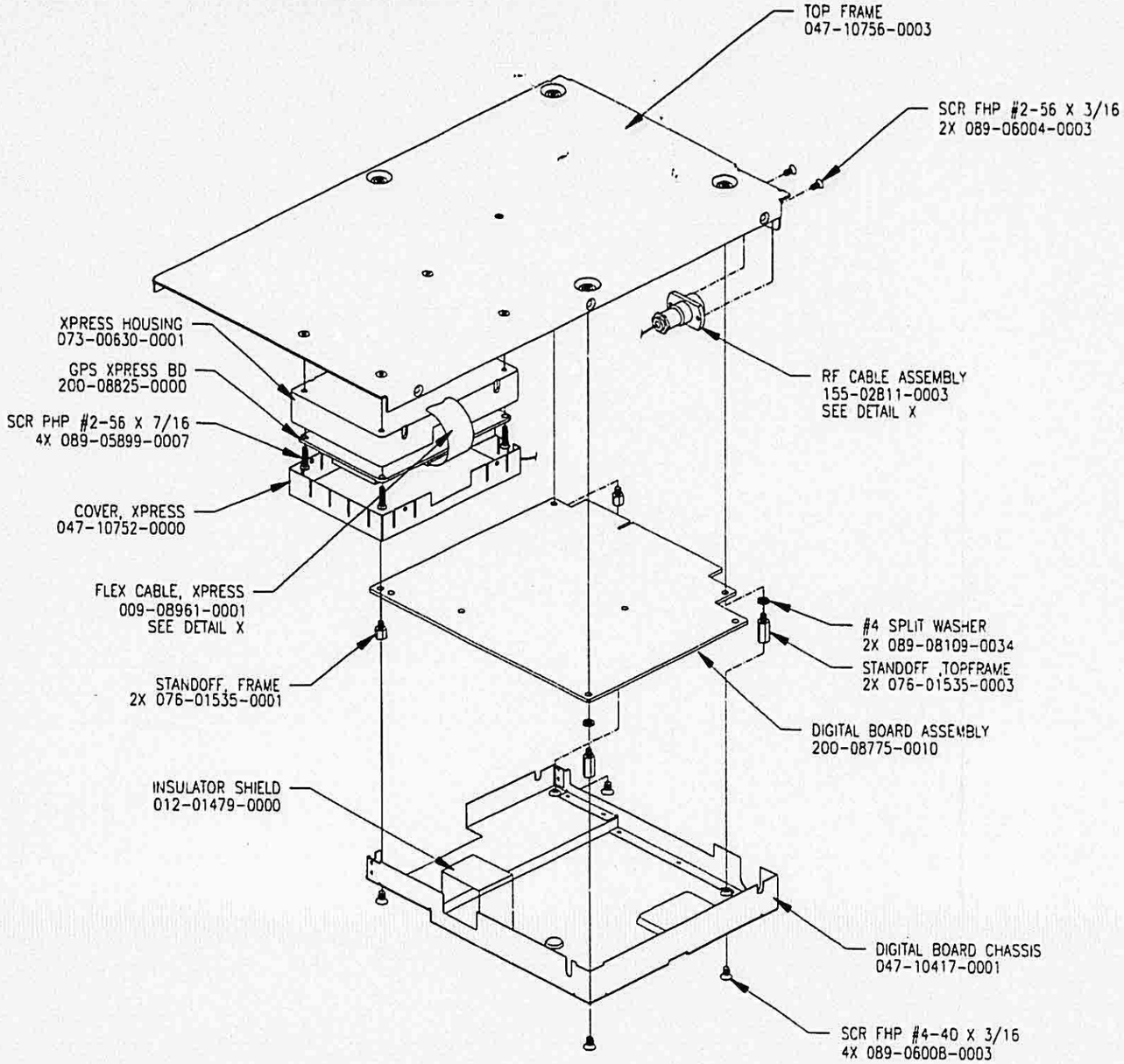
DETAIL B

300-03296-0000R5S2

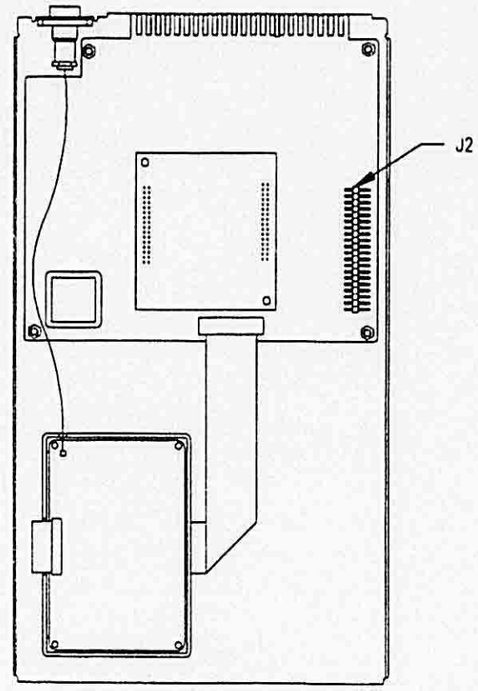
FOR MMIC BOARD ONLY

FIGURE 6-2 KLX 135/A FINAL ASSEMBLY
Dwg. No. 300-03296-0000/-0010, R5
(Sheet 2 of 3)

BENDIX/KING
KLX 135/135A
COMMUNICATIONS TRANSCEIVER/
GPS RECEIVER



FOR XPRESS BOARD ONLY



DETAIL X

FIGURE 6-2 KLX 135/A FINAL ASSEMBLY
Dwg. No. 300-03296-0000/-0010, R5
(Sheet 3 of 3)

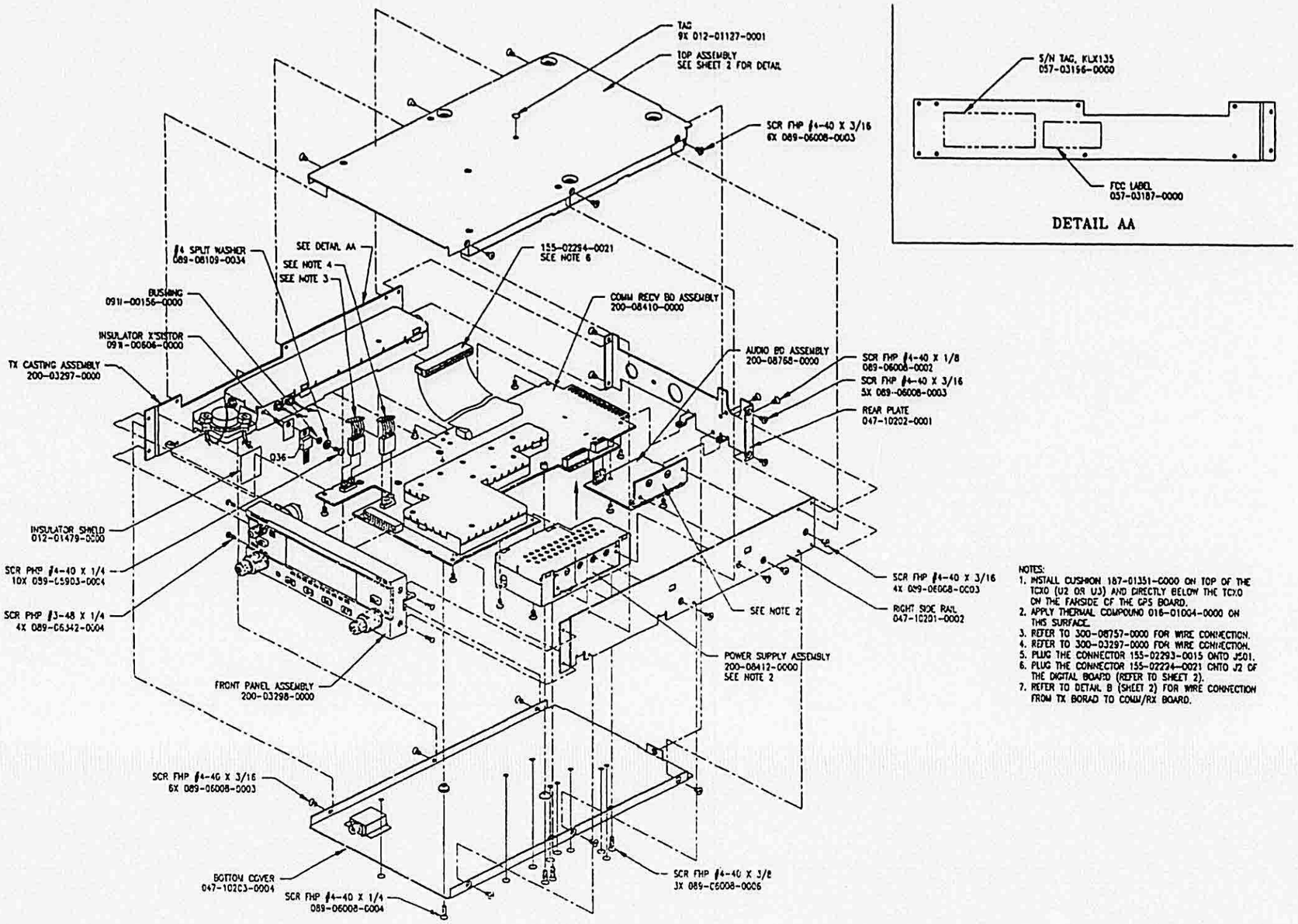
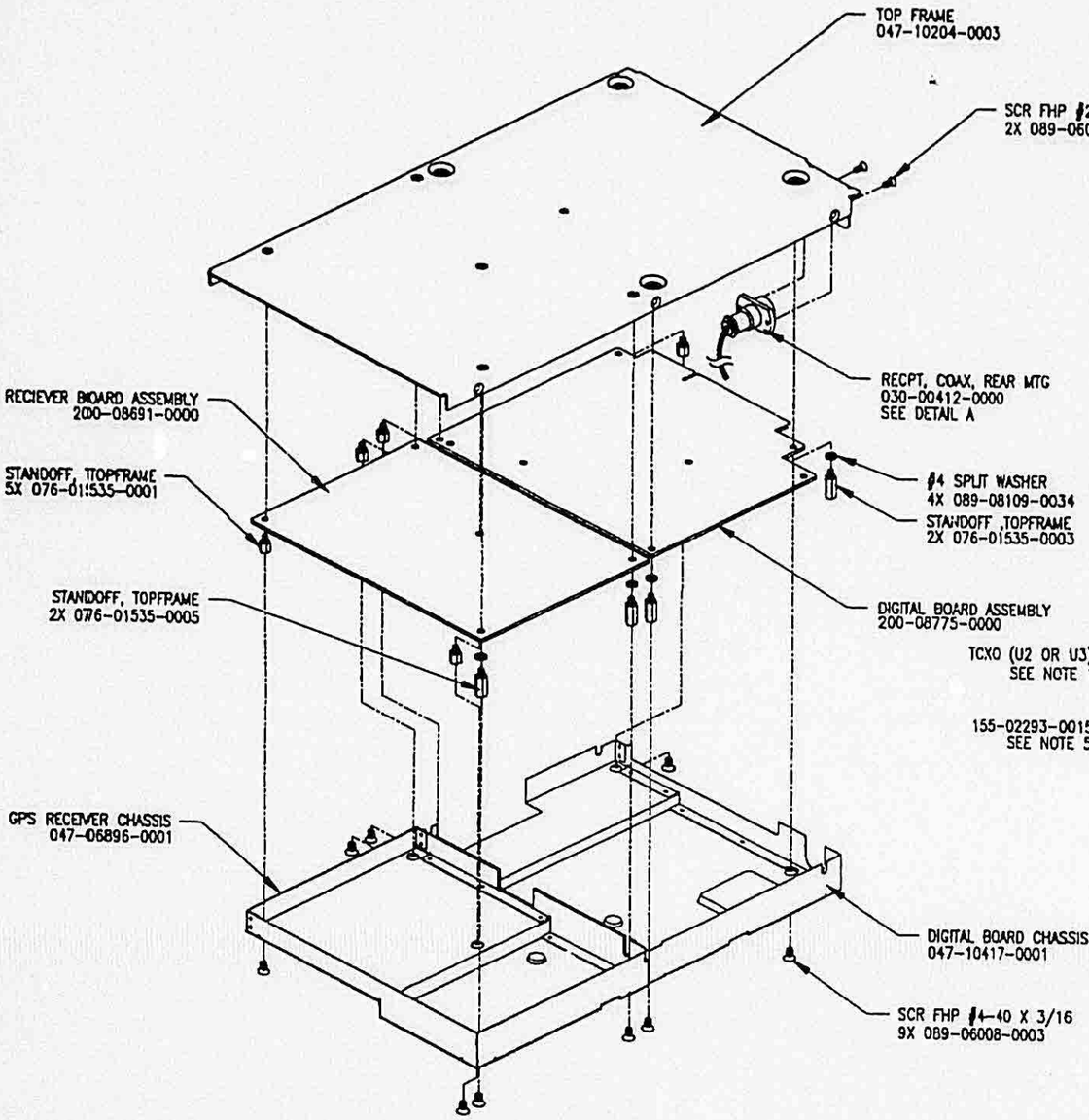
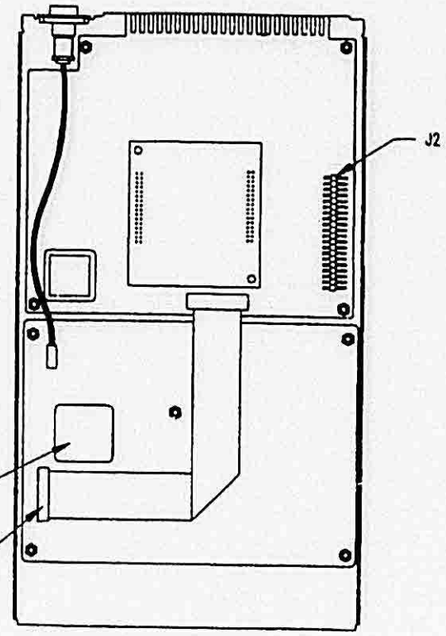
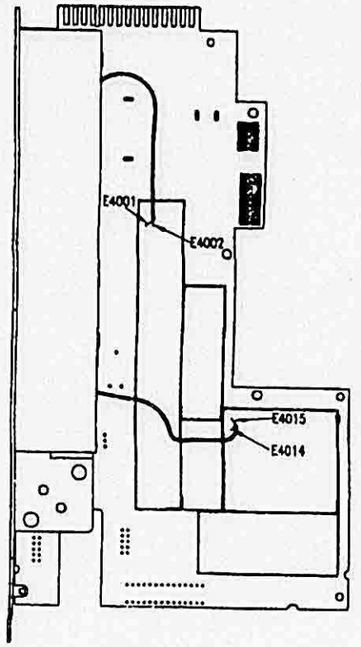


FIGURE 6-3 KLX 135 FINAL ASSEMBLY
Dwg. No. 300-03296-0000, R2
(Sheet 1 of 2)





DETAIL A



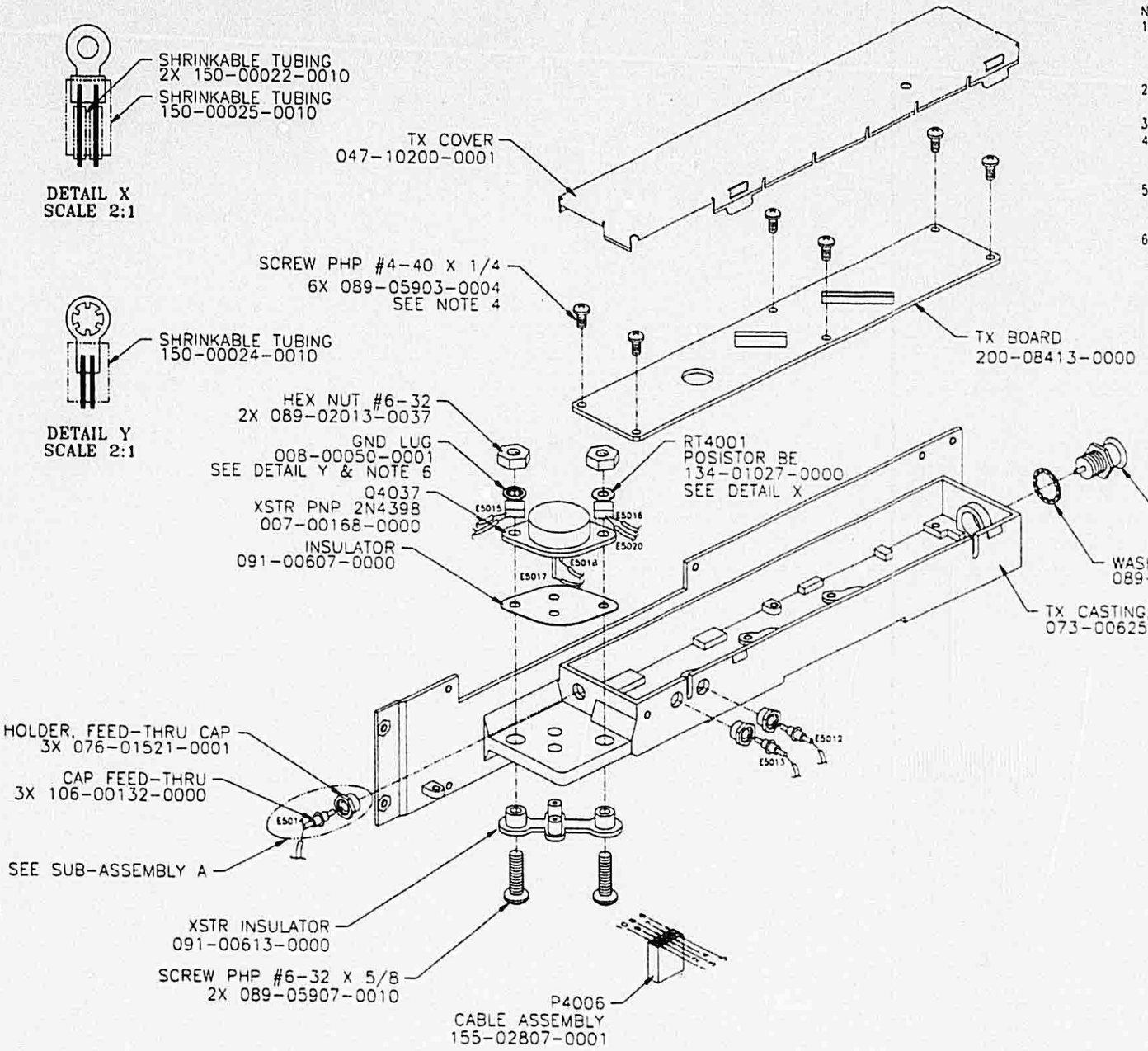
DETAIL B

FIGURE 6-3 KLX 135 FINAL ASSEMBLY
Dwg. No. 300-03296-0000, R2
(Sheet 2 of 2)

6.5 COMM TX MOD 14V

	200-03297-0000	COMM TX MOD 14V	R2		
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
...	008-00050-0001	GND LUG		EA	1
...	016-01004-0000	COMPOUND THRML JNT		ML	0
...	025-00005-0002	WIRE 18 RED		IN	9.291
...	025-00024-0001	WIRE 22 BRN		IN	0.787
...	025-00024-0003	WIRE 22 ORN		IN	1.575
...	026-00004-0000	WIRE COP TIN 20G		IN	0.787
...	026-00013-0001	CA COAX RG178BU		IN	18.898
...	026-00028-0000	WIRE CU20AWG TIN		IN	0.079
...	030-00152-0000	CONN BNC HEX		EA	1
...	047-10200-0001	TX COVER		EA	1
...	073-00625-0003	TX CASTING KLX135		EA	1
...	076-01521-0001	HOLDER, FEED THRU		EA	3
...	089-02013-0037	NUT FLAT 6-32		EA	2
...	089-05903-0003	SCR PHP 4-40X3/16		EA	3
...	089-05903-0004	SCR PHP 4-40X1/4		EA	6
...	089-05907-0010	SCR PHP 6-32X5/8		EA	2
...	089-08016-0037	WSHR INTL LK #6		EA	1
...	089-08033-0030	WSHR INTL LK .391		EA	1
...	090-00133-0001	HEATSINK .323 LG		EA	1
...	091-00028-0000	SCR BHS 4-40X.187		EA	1
...	091-00155-0000	WASHER MICA		EA	1
...	091-00607-0000	INSULATOR XSTR		EA	1
...	091-00613-0000	XSTR INSULTOR		EA	1
...	106-00132-0000	CAP FD-THRU 1500PF		EA	3

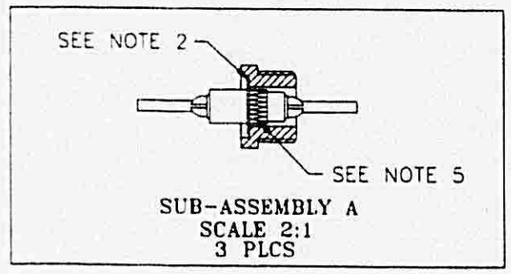
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
...	150-00022-0010	TUBING SHNK 14AWG		IN	1.181
...	150-00024-0010	TUBING SHRINK 10G		IN	0.591
...	150-00025-0010	TUBING SHRINK 8G		IN	0.591
...	150-00103-0000			EA	4
...	200-08413-0000	KLX135 TX BD 14V	A	EA	1
P 4006	155-02807-0001	CABLE ASSY		EA	1
Q 4037	007-00168-0000	XSTR PNP 2N4398		EA	1
REF 1	300-03297-0000	KLX135 COMM TX MOD		RF	X
RT 4001	134-01027-0000	POSISTOR BE		EA	1



NOTES:
1. APPLY THERMAL COMPOUND, 016-01004-0000 TO BACK SIDE OF TRANSISTORS Q5002 AND Q5003. ALSO APPLY THERMAL COMPOUND ON BOTH SIDES OF MICA 091-00155-0000 WHICH IS USED AT Q5001 TRANSISTOR.
2. SOLDER FEED-THRU CAP 106-00132-0000 ALL AROUND ON HOLDER 076-01521-0001.
3. ALL DIMENSIONS IN INCHES.
4. DO NOT APPLY ANY THREAD LOCKER ON THESE SCREWS AS IT WILL CREATE A THIN FLIM OF INSULATING BARRIER.
5. ENSURE THAT THE "JAGGED-TOOTH" HALF OF FEED-THRU CAP 106-00132-0000 IS ASSEMBLED INSIDE THE HOLDER 076-01521-0001 AS SHOWN IN SUB-ASSEMBLY A.
6. TURN THE GND LUG COUNTER CLOCKWISE TO BE AS CLOSE TO Q4037 AS POSSIBLE BEFORE TIGHTENING THE HEX NUT.

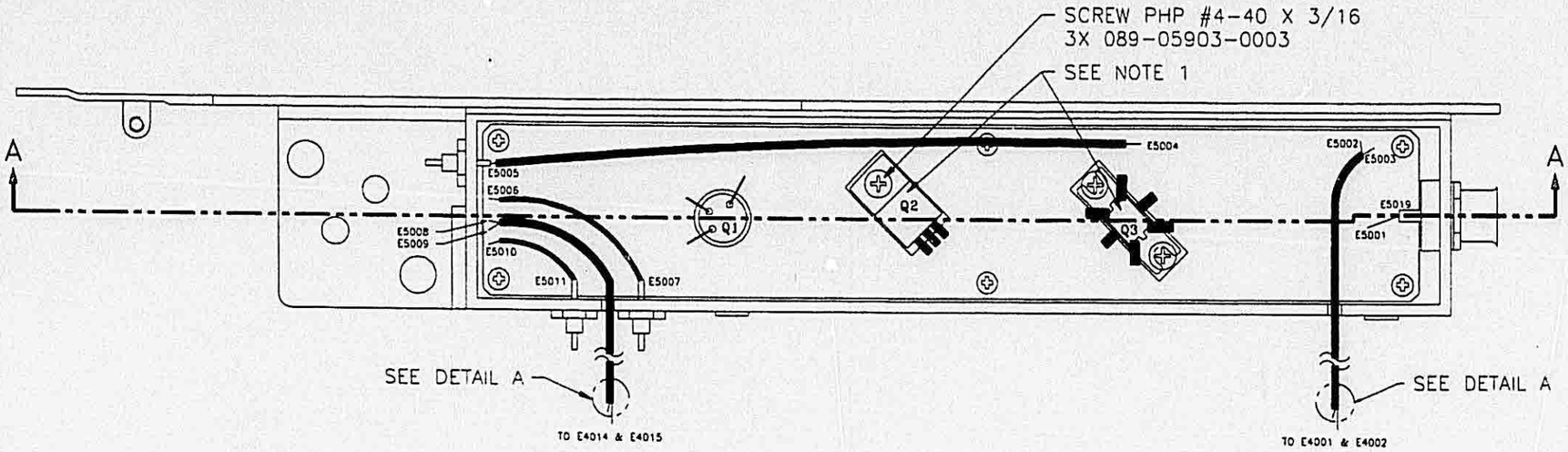
WIRE CHART

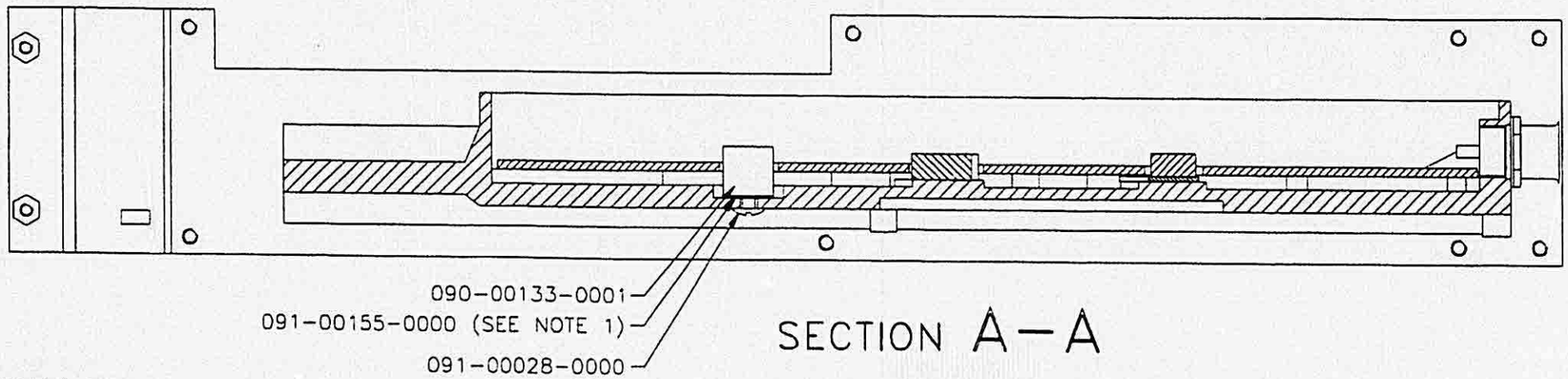
FROM	TO P4006 PIN NO	COLOR	KPN	LENGTH ±0.1 (inch)
E5015	1	WHITE/RED	025-00024-0032	3.00
	E5014	RED	025-00005-0002	3.80
E5016	2	WHITE/BLUE	025-00024-0036	3.00
E5020	3	BLUE	025-00024-0006	3.00
E5017	4	RED	025-00024-0002	3.00
	5	RED	025-00024-0002	3.00
E5013	6	BROWN	025-00024-0001	3.00
---	8	---	NO CONNECTION	---
PLUGGED	7	---	---	---
E5012	9	ORANGE	025-00024-0003	3.00
E5018	10	BLACK	025-00024-0000	3.00



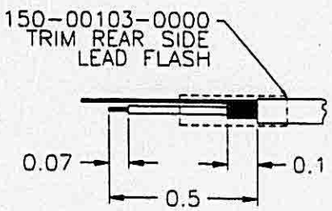
SUB-ASSEMBLY A
SCALE 2:1
3 PLCS

FIGURE 6-4 COMM TX MODULE
Dwg. No. 300-03297-0000, R2
(Sheet 1 of 2)





SECTION A–A



DETAIL A
SCALE 2:1

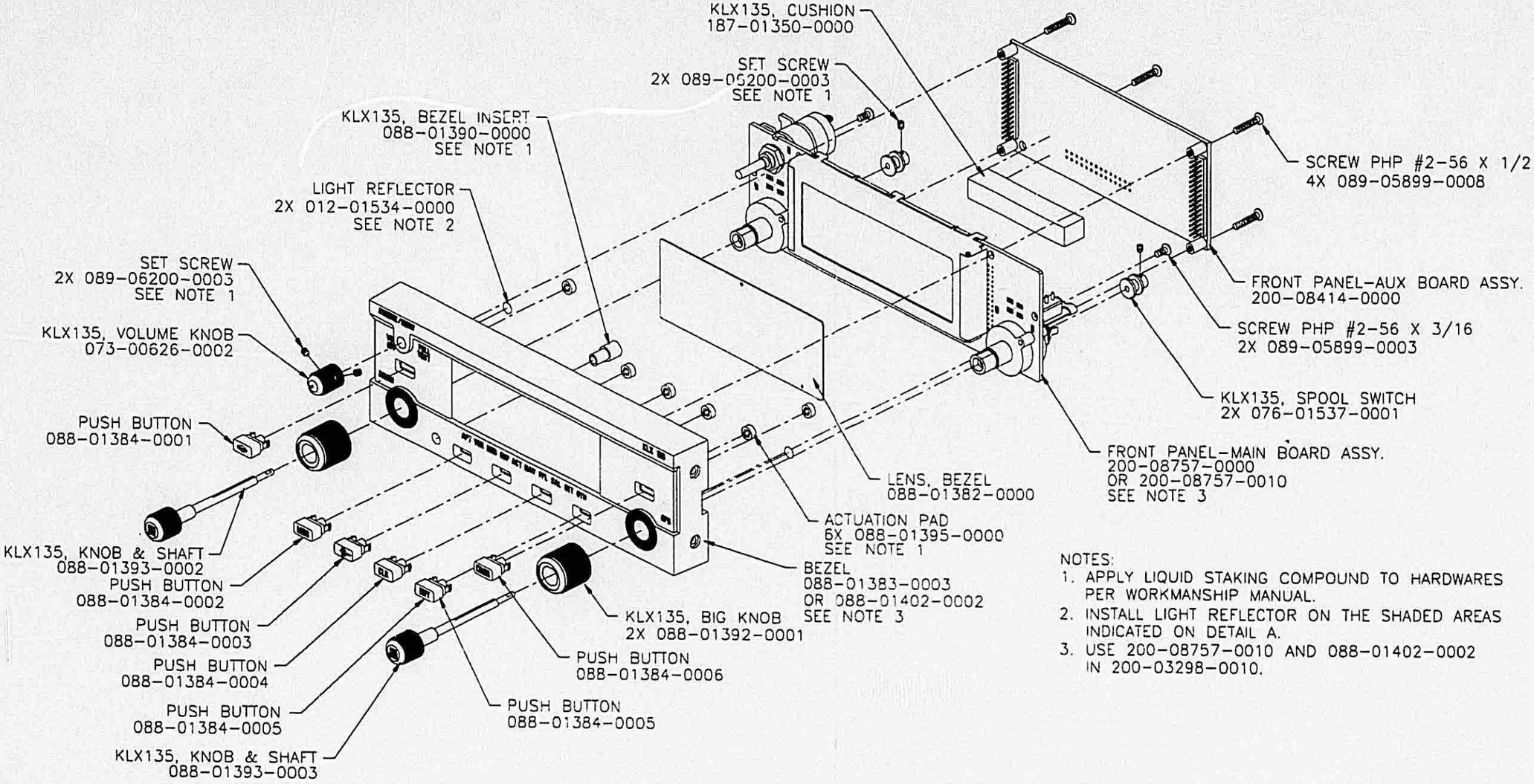
WIRING CHART				
FROM	TO	PART NUMBER	DESCRIPTION	LENGTH
E5008	E4014	026-00013-0001	CABLE COAXIAL RG178 B/U	7.00"
E5009	E4015			
E5010	E5011	025-00024-0001	22 AWG BROWN	1.00"
E5006	E5007	025-00024-0003	22 AWG ORANGE	1.75"
E5004	E5005	025-00005-0002	18 AWG RED	5.50"
E5002	E4001	026-00013-0001	CABLE COAXIAL RG178 B/U	6.0"
E5003	E4002			
E5001	E5019	026-00004-0000	20 AWG WIRE COP TIN	0.3"

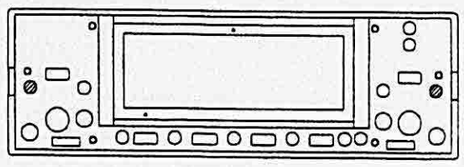
FIGURE 6-4 COMM TX MODULE
Dwg. No. 300-03297-0000, R2
(Sheet 2 of 2)

6.6 FRONT PANEL MOD

200-03298-0000	KLX135 FRT PANEL MODULE	R2
200-03298-0010	KLX135A FRT PANEL MOD	RO

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0010
...	012-01534-0000	LIGHT REFLECTOR		EA	2	2
...	073-00826-0002	VOL KNOB KLX135		EA	1	1
...	076-01537-0001	SPOOL SWITCH W/F	A	EA	2	2
...	088-01382-0000	LENS, BEZEL		EA	1	1
...	088-01383-0003	BEZEL KLX135 W/F W		EA	1	.
...	088-01384-0001	PUSHBUTTON (XFER)	A	EA	1	1
...	088-01384-0002	PUSHBUTTON (MSG)	A	EA	1	1
...	088-01384-0003	PUSHBUTTON (D->)	A	EA	1	1
...	088-01384-0004	PUSHBUTTON (CLR)	A	EA	1	1
...	088-01384-0005	PUSHBUTTON (ENT)	A	EA	1	1
...	088-01384-0006	PUSHBUTTON (CRSR)	A	EA	1	1
...	088-01390-0000	BEZEL INSERT		EA	1	1
...	088-01392-0001	KLX135,BIG KNOB	A	EA	2	2
...	088-01393-0002	KNOB & SHAFT (25K)	A	EA	1	1
...	088-01393-0003	KNOB & SHAFT (SCAN	A	EA	1	1
...	088-01395-0000	ACTUATION PAD		EA	6	6
...	088-01402-0002	BEZEL KLX135A		EA	.	1
...	089-05899-0003	SCR PHP 2-56X3/16		EA	2	2
...	089-05899-0008	SCR PHP 2-56X1/2		EA	4	4
...	089-06200-0003	SCR SET 2-56X3/32		EA	4	4
...	187-01350-0000	KLX135, CUSHION		EA	1	1
...	200-08414-0000	FP AUX BD KLX135	A	EA	1	1
...	200-08757-0000	FP MAIN BD KLX135	A	EA	1	.
...	200-08757-0010	KLX135A FP MAIN BD	A	EA	.	1
REF 1	300-03298-0000	KLX135 FNT PNL MOD		RF	X	.

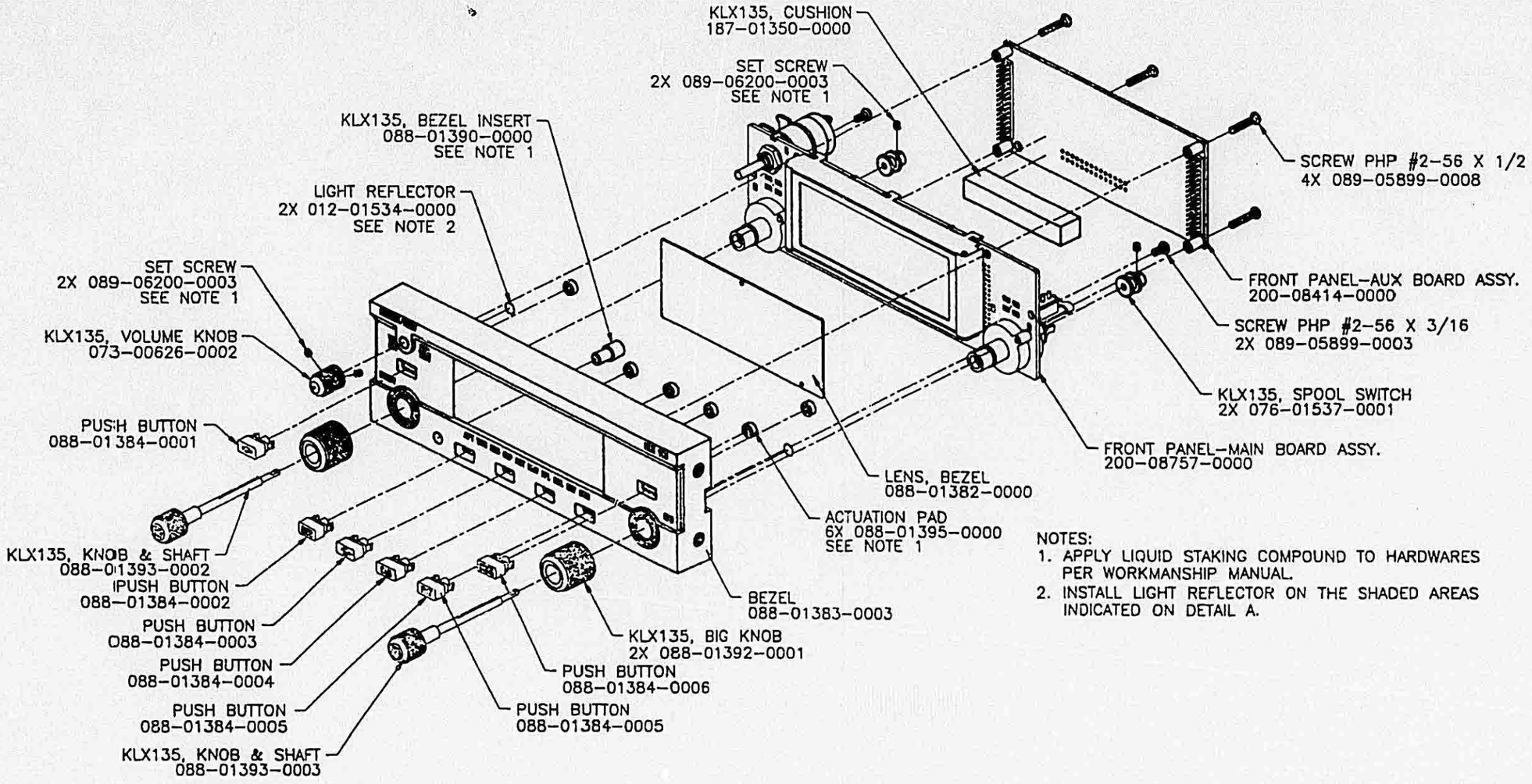


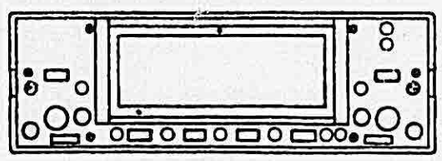


DETAIL A

NOTES:
1. APPLY LIQUID STAKING COMPOUND TO HARDWARES PER WORKMANSHIP MANUAL.
2. INSTALL LIGHT REFLECTOR ON THE SHADED AREAS INDICATED ON DETAIL A.
3. USE 200-08757-0010 AND 088-01402-0002 IN 200-03298-0010.

FIGURE 6-5 FRONT PANEL MODULE
Dwg. No. 300-03298-0000/-0010, R2





DETAIL A

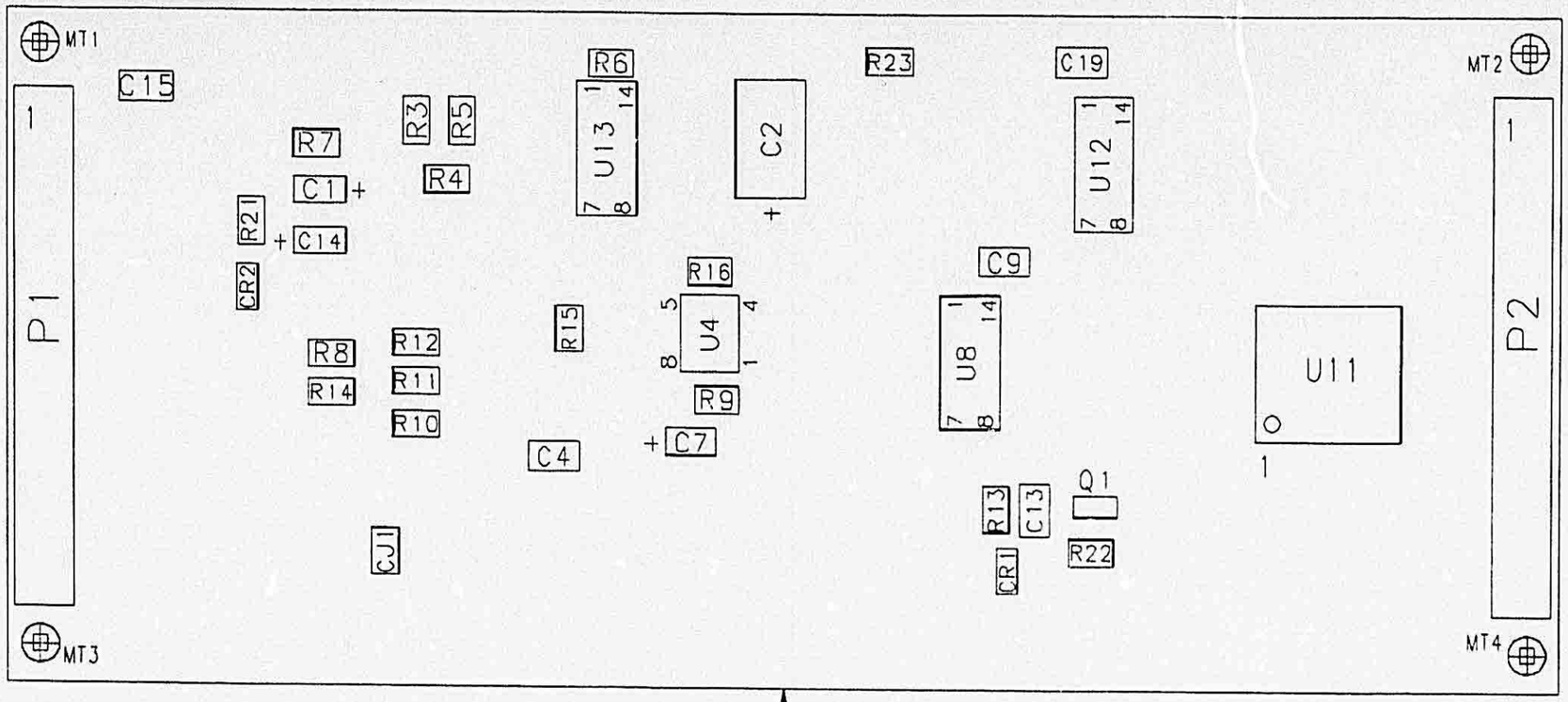
NOTES:
1. APPLY LIQUID STAKING COMPOUND TO HARDWARES PER WORKMANSHIP MANUAL.
2. INSTALL LIGHT REFLECTOR ON THE SHADED AREAS INDICATED ON DETAIL A.

FIGURE 6-6 FRONT PANEL MODULE
Dwg. No. 300-03298-0000, R2

6.7	200-08414-0000	FRONT PANEL AUX BD	R0		
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
...	009-08414-0000	FRT PANEL (AUX BD)		EA	1
...	016-01040-0000	COATING TYPE AR		AR	1
...	076-01530-0001	STANDOFF W/F	A	EA	1
C 7001	096-01186-0062	CAP 1.0UF 16V 20%		EA	1
C 7002	096-01186-0036	CAP 10UF 35V 10%		EA	1
C 7003	106-04104-0047	CH 100KX7R/50V		EA	1
C 7004	106-04104-0047	CH 100KX7R/50V		EA	1
C 7005	106-04104-0047	CH 100KX7R/50V		EA	1
C 7006	106-04104-0047	CH 100KX7R/50V		EA	1
C 7007	096-01186-0062	CAP 1.0UF 16V 20%		EA	1
C 7008	106-04104-0047	CH 100KX7R/50V		EA	1
C 7009	106-04104-0047	CH 100KX7R/50V		EA	1
C 7010	106-04104-0047	CH 100KX7R/50V		EA	1
C 7013	106-04120-0026	CAPCH 12PFNPO/100V		EA	1
C 7014	096-01186-0062	CAP 1.0UF 16V 20%		EA	1
C 7015	106-04104-0047	CH 100KX7R/50V		EA	1
C 7016	106-04103-0057	CAP CH 10KX7R/100V		EA	1
C 7017	106-04104-0047	CH 100KX7R/50V		EA	1
C 7018	106-04104-0047	CH 100KX7R/50V		EA	1
C 7019	106-04104-0047	CH 100KX7R/50V		EA	1
CJ 7001	130-05000-0025	RES CHIP 0 EW CJ		EA	1
CR 7001	007-06223-0000	DIO DA204K		EA	1
CR 7002	007-05117-0011	DIO Z 9.1V SOT		EA	1
P 7001	030-03195-0016	CONN MALE 32 PIN		EA	1
P 7002	030-03195-0016	CONN MALE 32 PIN		EA	1
P 7003	030-03139-0014	STRGHT DBL ROW HDR		EA	1
Q 7001	007-00903-0000	2N7002 MOSFET		EA	1
Q 7002	007-00985-0000	TRANS/STOR PWR PNP		EA	1
Q 7003	007-00903-0000	2N7002 MOSFET		EA	1

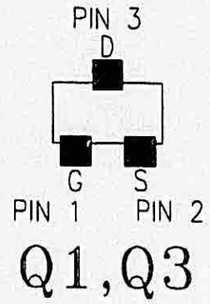
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
R 7001	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 7002	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 7003	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 7004	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 7005	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 7006	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 7007	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 7008	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 7009	139-02493-0000	RES CH 249K EW 1%		EA	1
R 7010	139-01243-0000	RES CH 124K EW 1%		EA	1
R 7011	139-06192-0000	RES CH 61.9K EW 1%		EA	1
R 7012	139-03092-0000	RES CH 30.9K EW 1%		EA	1
R 7013	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 7014	139-03322-0000	RES CH 33.2K EW 1%		EA	1
R 7015	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 7016	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 7017	139-08251-0000	RES CH8.25 KEW 1%		EA	1
R 7018	139-07502-0000	RES CHIP 75KEW1%		EA	1
R 7019	139-03322-0000	RES CH 33.2K EW 1%		EA	1
R 7020	130-05022-0033	RES CHIP 2.2QW 5%		EA	1
R 7021	139-02001-0000	RES CHIP 2K EW 1%		EA	1
R 7022	139-08251-0000	RES CH8.25 KEW 1%		EA	1
R 7023	~~139-04752~~-0000	RES CH 47.5K EW 1%		EA	1
REF 1	300-08414-0000			RF	X
REF 2	002-08414-0000			RF	X
U 7001	120-02491-0000	LCD DVR LC7930		EA	1
U 7002	123-00595-0003	IC 74HC595 SO		EA	1
U 7003	123-04066-0003	IC ANA/DIG SW		EA	1
U 7004	120-03498-0000	TL062 DUAL OPAMP		EA	1
U 7005	123-00589-0003	IC 74HC589 (SO)		EA	1
U 7006	123-00164-0003	IC 74HC164 SO PKG		EA	1
U 7007	123-00032-0003	74HC32D SO PKG		EA	1
U 7008	123-00008-0003	74HC08 SO PKG		EA	1
U 7009	123-00086-0003	IC 74HC86 SO PKG		EA	1
U 7010	123-04538-0003	74HC4538 (SO)		EA	1
U 7011	120-02492-0000	LCD DVR SED1181		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
U 7012	123-00002-0003	IC 74HC02 SO PKG		EA	1
U 7013	120-03196-0000	IC LM2902D		EA	1

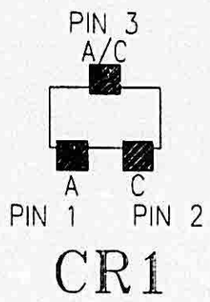


009-08414-0000
(NEARSIDE VIEW)

NOTE: ADD 7000 TO ALL REFERENCE DESIGNATIONS
ie: C1 = C7001
ALL ASSEMBLY NOTES ARE FOUND IN SHEET 3 OF 3.

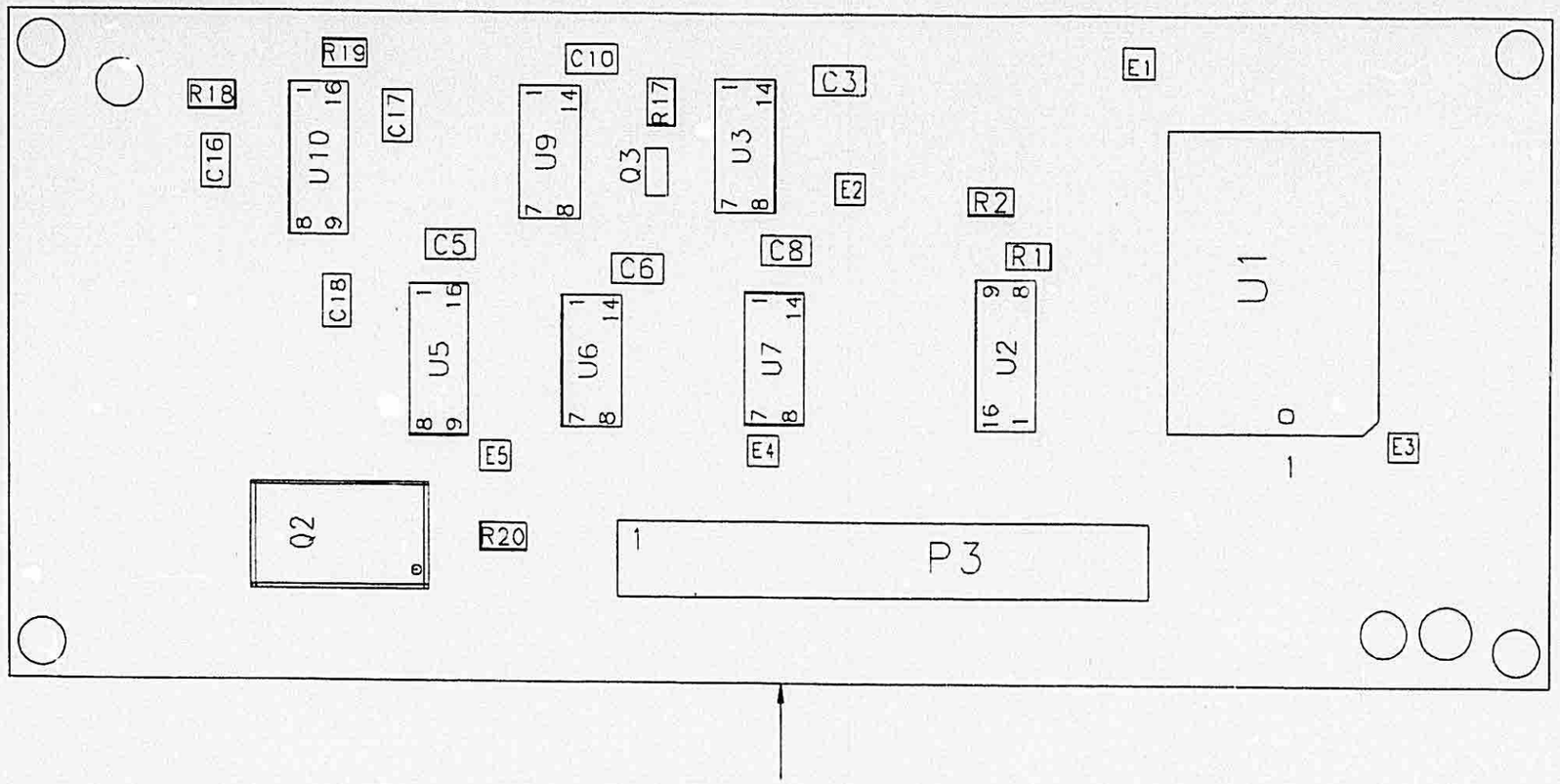


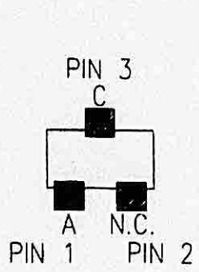
Q1,Q3



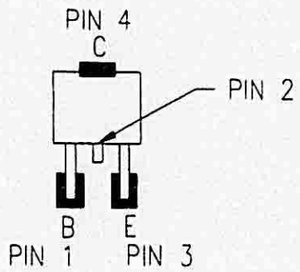
CR1

FIGURE 6-7 FRONT PANEL AUX BOARD
Dwg. No. 300-08414-0000, R0
(Sheet 1 of 3)



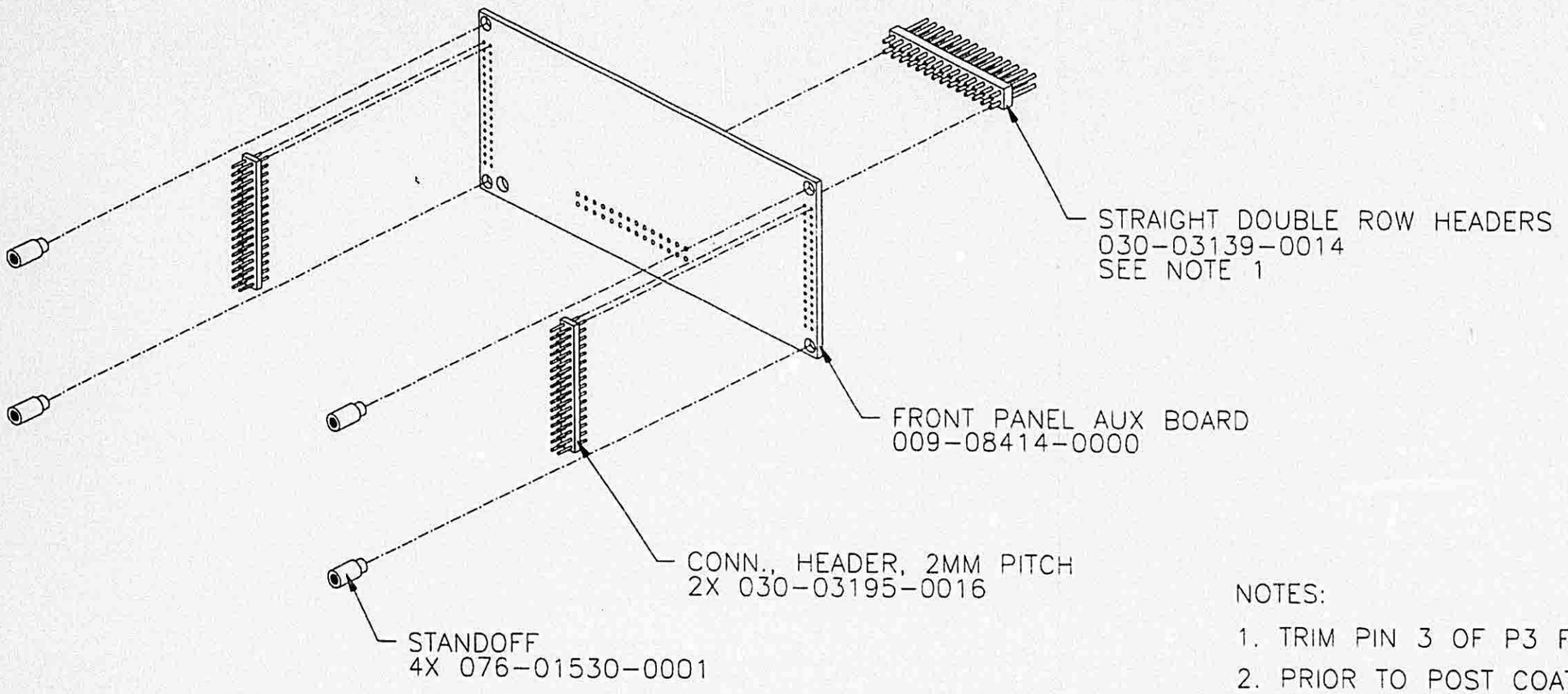


CR2



Q2

FIGURE 6-7 FRONT PANEL AUX BOARD
Dwg. No. 300-08414-0000, R0
(Sheet 2 of 3)



NOTES:

1. TRIM PIN 3 OF P3 FOR KEYING PURPOSE.
2. PRIOR TO POST COATING BOTH SIDES OF PC BOARD WITH KPN 016-01040-0000, MASK OFF THE FOLLOWING:
   P1 THRU P3, E1 THRU E5
   AND ALL MOUNTING AREAS.

FIGURE 6-7 FRONT PANEL AUX BOARD
Dwg. No. 300-08414-0000, R0
(Sheet 3 of 3)

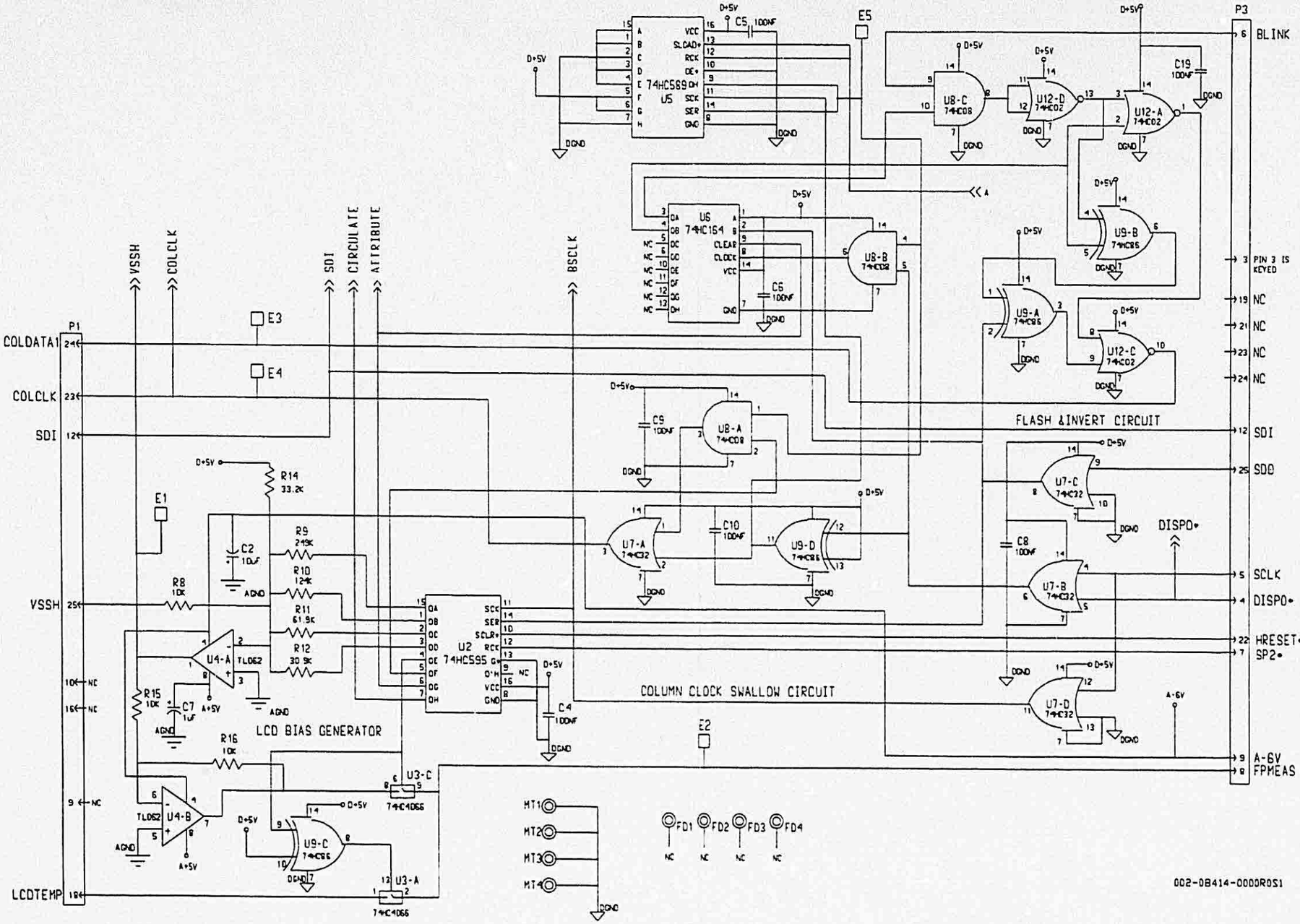


FIGURE 6-8 FRONT PANEL AUX BOARD SCHEMATIC
Dwg. No. 002-08414-0000, R0
(Sheet 1 of 2)

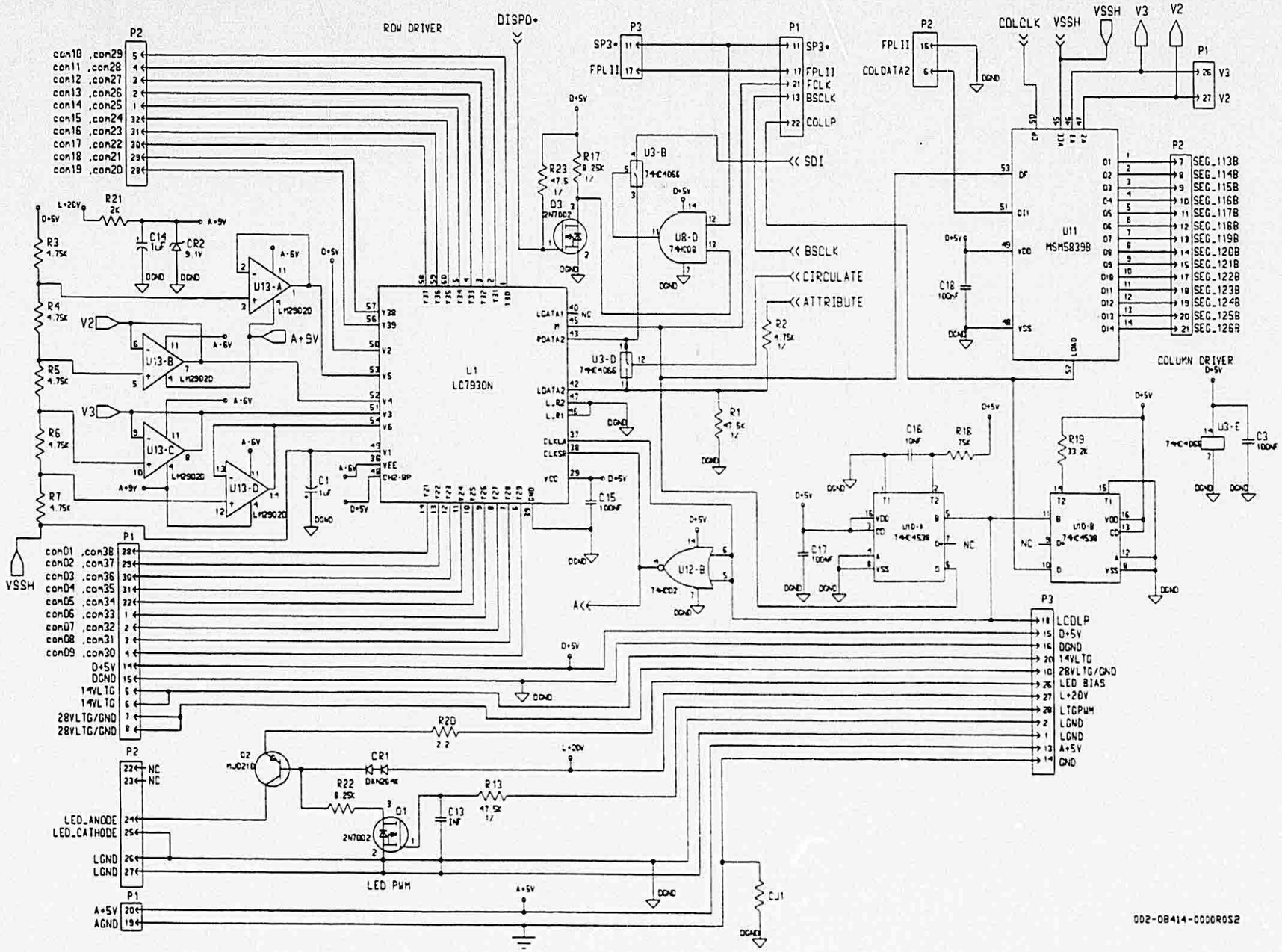


FIGURE 6-8 FRONT PANEL AUX BOARD SCHEMATIC
Dwg. No. 002-08414-0000, R0
(Sheet 2 of 2)

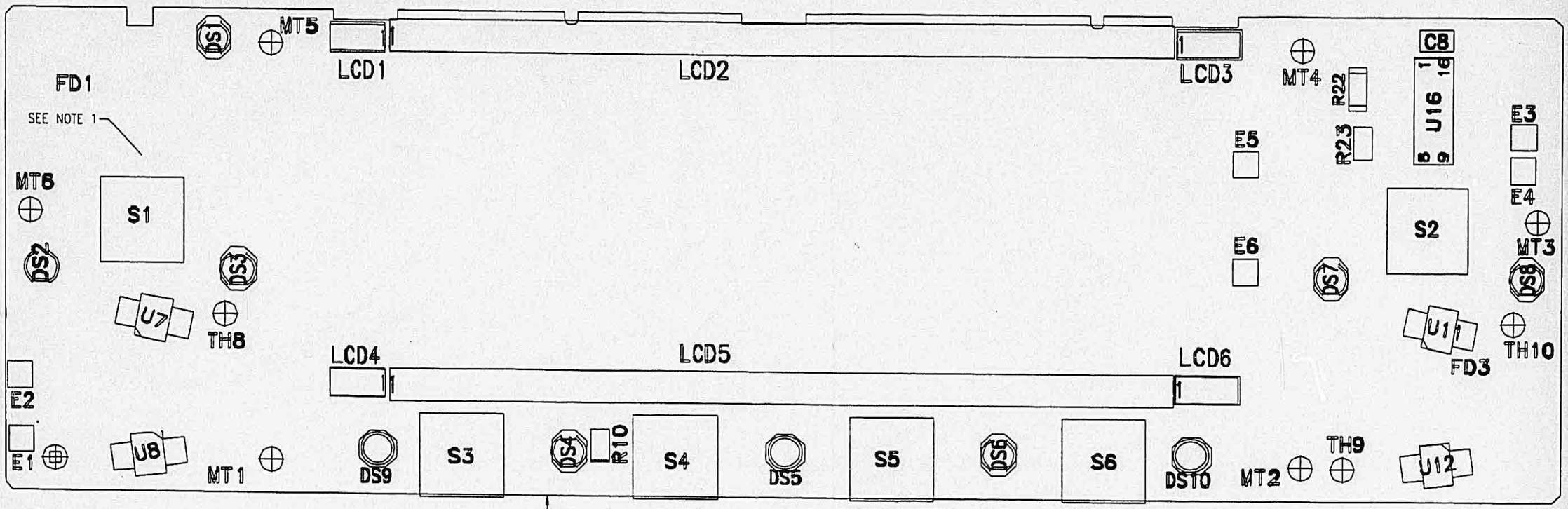
6.8	200-08757-0000	KLX135 FP MAIN BD	R5			
	200-08757-0010	KLX135A FP MAIN BD	R2			
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0010
...	007-07001-0001	LED LIGHT BOX		EA	1	1
...	009-08757-0000	FRONT PANEL BOARD		EA	1	1
...	012-01002-0001	TAPE .500W		IN	2.717	2.717
...	016-01040-0000	COATING TYPE AR		AR	1	0
...	025-00018-0044	WIRE 26 YEL		IN	0.08	3.15
...	025-00018-0077	WIRE 26 VIO		IN	0.08	3.15
...	030-03234-0001	ZEBRA STRIP CONN		EA	1	.
...	030-03286-0001	ZEBRA STRIP CONN		EA	.	2
...	043-00083-0000	LCD KLN35		EA	1	1
...	047-06894-0003	LCD CASING		EA	1	1
...	047-10416-0001	SW BRKT KLX135		EA	2	2
...	073-00550-0002	SHAFT W/F		EA	2	2
...	073-00923-0002	HOUSING FRNT W/F		EA	2	2
...	073-00924-0001	HOUSING BACK MACH		EA	2	2
...	088-00769-0000	SLEEVE LOCKING		EA	2	2
...	088-03029-0001	INC/DEC REFLECTOR		EA	4	4
...	088-03030-0000	INC/DEC RTR BROWN		EA	2	2
...	088-03030-0001	INC/DEC RTR WHITE		EA	2	2
...	089-02106-0011	NUT FLAT 1/4-32		EA	1	1
...	089-05899-0008	SCR PHP 2-56X1/2		EA	4	4
...	089-08309-0000	WASHER INSULATING		EA	1	1
...	090-00019-0005	RING RTNR .188		EA	4	4
...	091-00109-0000	CABLE TIE .234		EA	1	1
...	091-00196-0000	STANDOFF BEAD		EA	9	9

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0010
...	091-00580-0000	WASHER INSULATING		EA	4	4
...	150-00003-0010	TUBING TFLN 24AWG		IN	0.394	0.394
...	150-00020-0010	TUBING SHRINK 18G		AR	0.01	0.394
...	150-00049-0010	TUBING SHRINK WHT		IN	1.181	1.181
C 6001	106-04104-0047	CH 100KX7R/50V		EA	1	1
C 6002	106-04104-0047	CH 100KX7R/50V		EA	1	1
C 6003	106-04104-0047	CH 100KX7R/50V		EA	1	1
C 6004	106-04104-0047	CH 100KX7R/50V		EA	1	1
C 6005	106-04104-0047	CH 100KX7R/50V		EA	1	1
C 6006	106-04104-0047	CH 100KX7R/50V		EA	1	1
C 6007	106-04104-0047	CH 100KX7R/50V		EA	1	1
C 6008	106-04104-0047	CH 100KX7R/50V		EA	1	1
C 6009	106-04104-0047	CH 100KX7R/50V		EA	1	1
C 6010	096-01186-0062	CAP 1.0UF 16V 20%		EA	1	1
C 6011	106-04104-0047	CH 100KX7R/50V		EA	1	1
DS 6001	037-00012-0014	LAMP INC T-1 14V		EA	1	1
DS 6002	037-00012-0014	LAMP INC T-1 14V		EA	1	1
DS 6003	037-00012-0014	LAMP INC T-1 14V		EA	1	1
DS 6004	037-00012-0014	LAMP INC T-1 14V		EA	1	1
DS 6005	037-00012-0014	LAMP INC T-1 14V		EA	1	1
DS 6006	037-00012-0014	LAMP INC T-1 14V		EA	1	1
DS 6007	037-00012-0014	LAMP INC T-1 14V		EA	1	1
DS 6008	037-00012-0014	LAMP INC T-1 14V		EA	1	1
DS 6009	037-00012-0014	LAMP INC T-1 14V		EA	1	1
DS 6010	037-00012-0014	LAMP INC T-1 14V		EA	1	1
J 6001	030-03196-0016	CONN FEMALE 32 PIN		EA	1	1
J 6002	030-03196-0016	CONN FEMALE 32 PIN		EA	1	1
P 6003	155-02807-0000	CABLE ASSY		EA	1	1
Q 6001	007-00903-0000	2N7002 MOSFET		EA	1	1
R 6001	139-04992-0000	RES CH 49.9K EW 1%		EA	1	1
R 6002	139-08250-0000	RES CH 825 EW 1%		EA	1	1

R 6003	139-08250-0000	RES CH 825 EW 1%	EA	1	1
R 6004	139-08250-0000	RES CH 825 EW 1%	EA	1	1
R 6005	139-08250-0000	RES CH 825 EW 1%	EA	1	1
R 6006	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6007	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6008	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6009	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6010	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6011	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6012	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6013	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6014	139-08250-0000	RES CH 825 EW 1%	EA	1	1
R 6015	139-08250-0000	RES CH 825 EW 1%	EA	1	1
R 6016	139-08250-0000	RES CH 825 EW 1%	EA	1	1
R 6017	139-08250-0000	RES CH 825 EW 1%	EA	1	1
R 6018	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6019	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6020	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6021	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6022	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6023	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6024	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6025	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
R 6026	139-04751-0000	RES CH 4.75K EW 1%	EA	1	1
R 6027	139-01003-0000	RES CHIP 100KEW1%	EA	1	1
REF 1	300-08757-0000	KLX135 FP MAIN BD	RF	X	.
REF 2	002-08757-0000	KLX135 FP MAIN BD	RF	X	.
RT 6001	134-01044-0005	THRMSTR SURFCE MT	EA	1	1
S 6001	031-00781-0000	SWITCH SMT TACTILE	EA	1	1
S 6002	031-00781-0000	SWITCH SMT TACTILE	EA	1	1
S 6003	031-00781-0000	SWITCH SMT TACTILE	EA	1	1
S 6004	031-00781-0000	SWITCH SMT TACTILE	EA	1	1
S 6005	031-00781-0000	SWITCH SMT TACTILE	EA	1	1
S 6006	031-00781-0000	SWITCH SMT TACTILE	EA	1	1
S 6007	031-00372-0001	SWITCH SLIDE SPDT	EA	1	1
S 6008	031-00372-0001	SWITCH SLIDE SPDT	EA	1	1
S 6009	133-00398-0002	POT DUAL SW DTAPER	EA	1	1

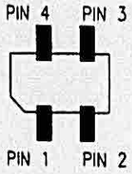
U 6001	120-02492-0000	LCD DVR SED1181	EA	1	1
U 6002	120-02492-0000	LCD DVR SED1181	EA	1	1
U 6003	120-02492-0000	LCD DVR SED1181	EA	1	1
U 6004	120-02492-0000	LCD DVR SED1181	EA	1	1
U 6005	120-02492-0000	LCD DVR SED1181	EA	1	1
U 6006	120-02492-0000	LCD DVR SED1181	EA	1	1
U 6007	007-08094-0000	PHOTO INTERUPTER	EA	1	1
U 6008	007-08094-0000	PHOTO INTERUPTER	EA	1	1
U 6009	007-08094-0000	PHOTO INTERUPTER	EA	1	1
U 6010	007-08094-0000	PHOTO INTERUPTER	EA	1	1
U 6011	007-08094-0000	PHOTO INTERUPTER	EA	1	1
U 6012	007-08094-0000	PHOTO INTERUPTER	EA	1	1
U 6013	007-08094-0000	PHOTO INTERUPTER	EA	1	1
U 6014	007-08094-0000	PHOTO INTERUPTER	EA	1	1
U 6015	123-00589-0003	IC 74HC589 (SO)	EA	1	1
U 6016	123-00589-0003	IC 74HC589 (SO)	EA	1	1
U 6017	120-03053-0011	LM258 SO-8 OP AMP	EA	1	1

BENDIX/KING
KLX 135/135A
COMMUNICATIONS TRANSCEIVER/
GPS RECEIVER



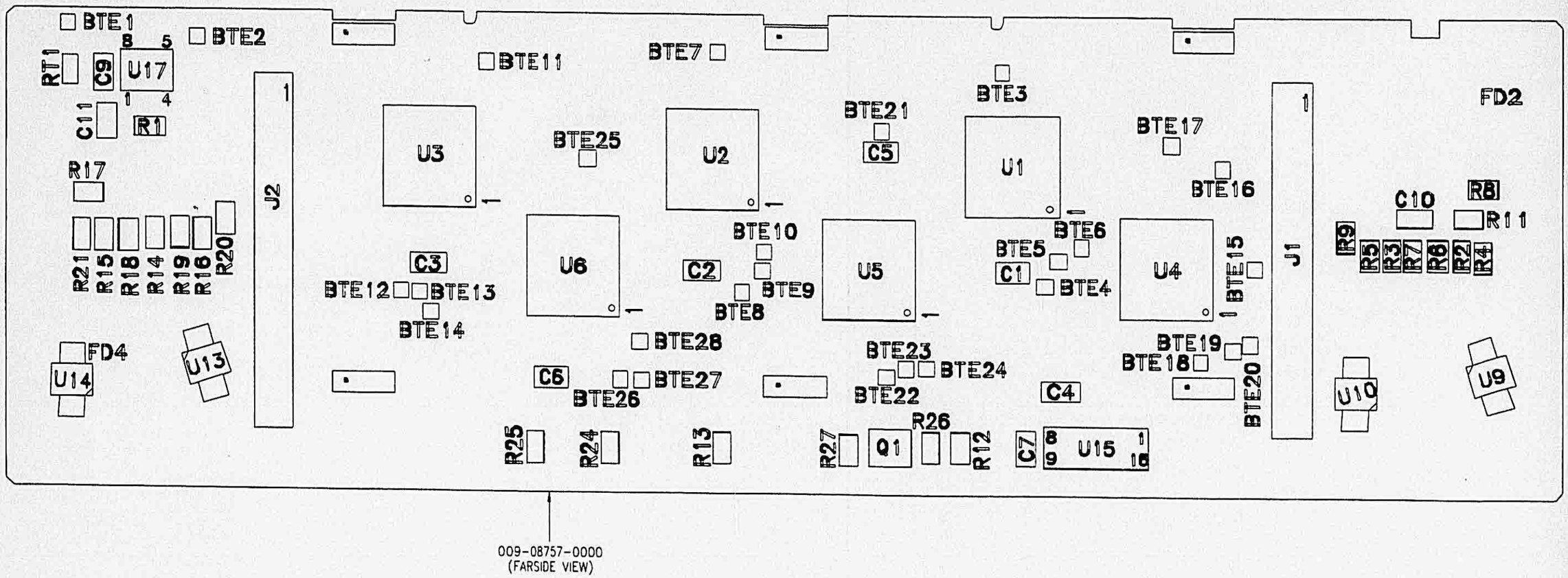
009-08757-0000
(NEARSIDE VIEW)

NOTES:
1. LEADS SHOULD BE BENT AS SHOWN IN SHEET 3.
2. ADD 6000 TO ALL REFERENCE DESIGNATORS
   ie: C1 = C6001
3. ALL WIRE CHARTS AND ASSEMBLY NOTES ARE FOUND IN SHEET 3 OF 3.
4.



U7 THRU U14

FIGURE 6-9 FRONT PANEL MAIN BOARD
Dwg. No. 300-08757-0000/-0010, R7
(Sheet 1 of 3)



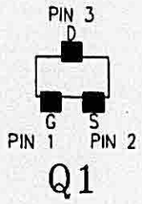
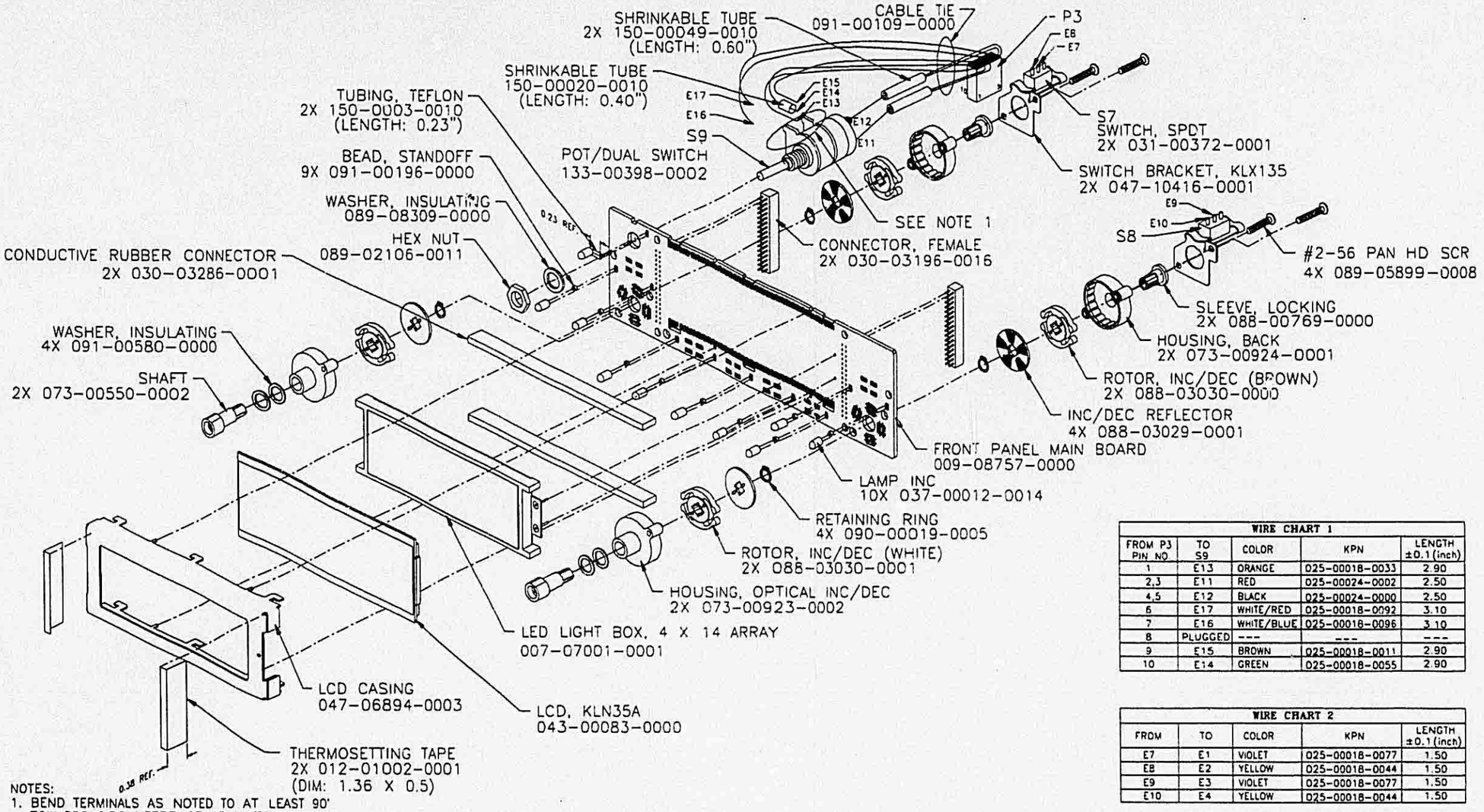


FIGURE 6-9 FRONT PANEL MAIN BOARD
Dwg. No. 300-08757-0000/-0010, R7
(Sheet 2 of 3)



NOTES:
1. BEND TERMINALS AS NOTED TO AT LEAST 90° TOWARDS CIRCUMFERENCE OF SWITCH.
2. APPLY HIGH VACUUM GREASE (016-01013-0000) ON HOUSINGS (073-00923-0002 AND 073-00924-0001).
3. PRIOR TO POST COATING FAR SIDE OF PC BOARD WITH KPN 016-01040-0000, MASK OFF THE FOLLOWING: J1, J2, E1 THRU E6, DS1 THRU DS4, DS6 THRU DS8, U7 THRU U14, AND ALL MOUNTING AREAS (EXCLUDING THE 6 RECTANGULAR PADS FOR LCD BRACKET). FOR NEARSIDE OF PC BOARD, POST COAT THE AREA AROUND THE FOLLOWING COMPONENTS: U16, C8, R22, R23, R10, J1 AND J2.
4. BEND CONTACTS E11 AND E12 APPROXIMATELY 90° DOWNWARD AFTER SOLDERING AND SHRINKABLE TUBING INSERTED.

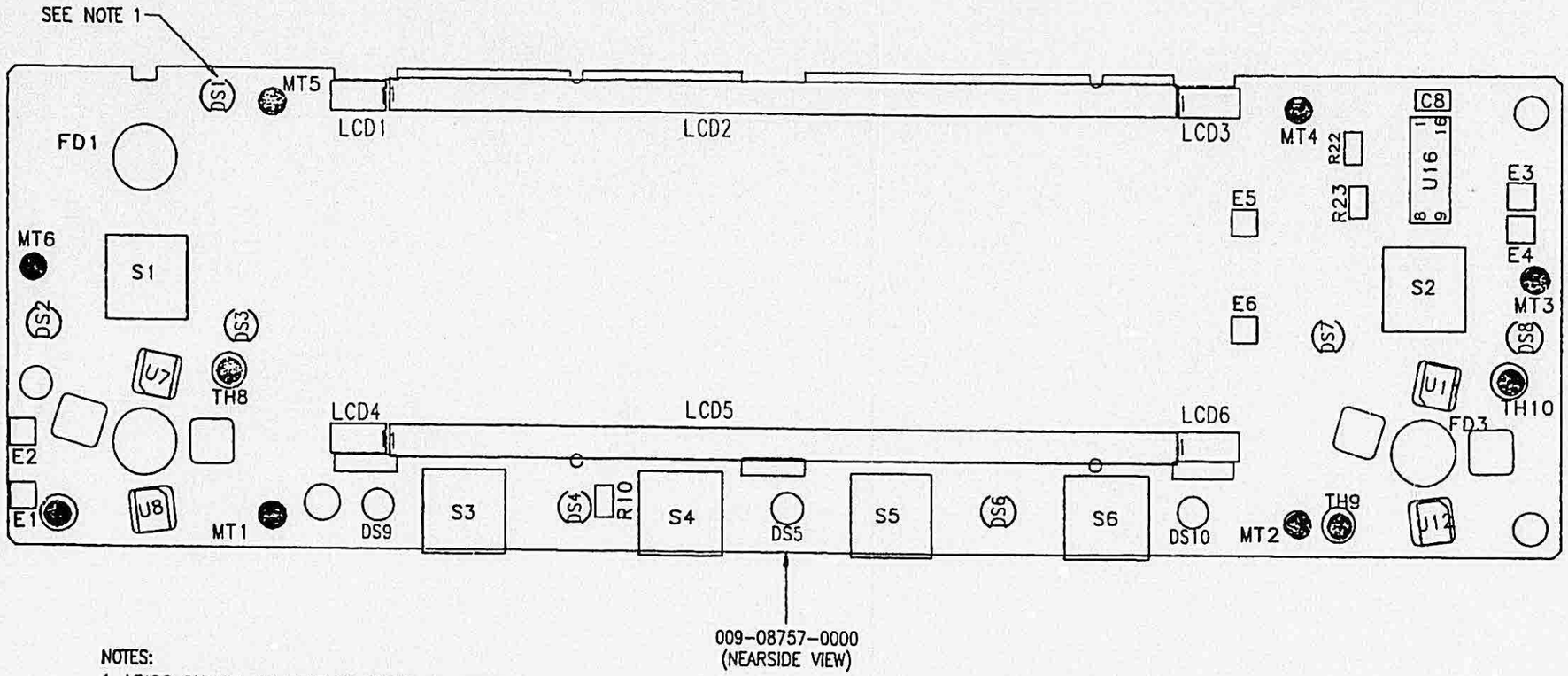
WIRE CHART 1

FROM P3 PIN NO	TO S9	COLOR	KPN	LENGTH ±0.1 (inch)
1	E13	ORANGE	025-00018-0033	2.90
2,3	E11	RED	025-00024-0002	2.50
4,5	E12	BLACK	025-00024-0000	2.50
6	E17	WHITE/RED	025-00018-0092	3.10
7	E16	WHITE/BLUE	025-00018-0096	3.10
8	PLUGGED	---	---	---
9	E15	BROWN	025-00018-0011	2.90
10	E14	GREEN	025-00018-0055	2.90

WIRE CHART 2

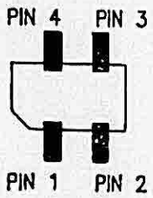
FROM	TO	COLOR	KPN	LENGTH ±0.1 (inch)
E7	E1	VIOLET	025-00018-0077	1.50
E8	E2	YELLOW	025-00018-0044	1.50
E9	E3	VIOLET	025-00018-0077	1.50
E10	E4	YELLOW	025-00018-0044	1.50

FIGURE 6-9 FRONT PANEL MAIN BOARD
Dwg. No. 300-08757-0000/-0010, R7
(Sheet 3 of 3)



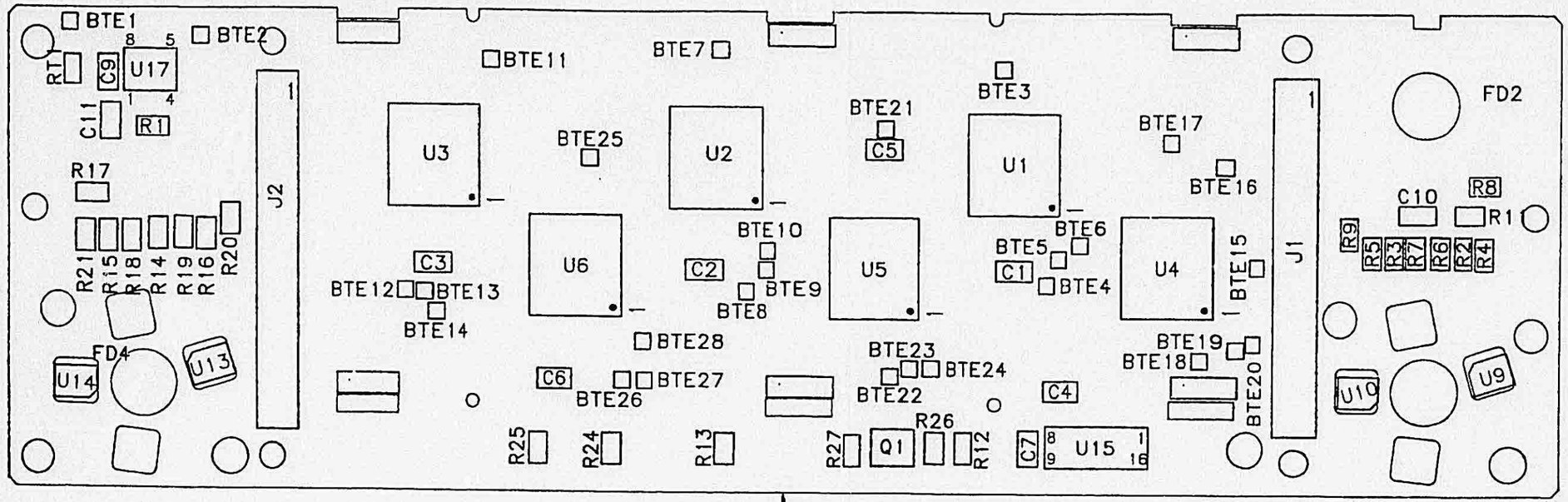
NOTES:

1. LEADS SHOULD BE BENT AS SHOWN IN SHEET 3.
2. ADD 6000 TO ALL REFERENCE DESIGNATORS
   ie: C1 = C6001
3. ALL WIRE CHARTS AND ASSEMBLY NOTES ARE FOUND IN SHEET 3 OF 3.
4.



U7 THRU U14

FIGURE 6-10 FRONT PANEL MAIN BOARD
Dwg. No. 300-08757-0000, R3
(Sheet 1 of 3)



009-08757-0000
(FARSIDE VIEW)

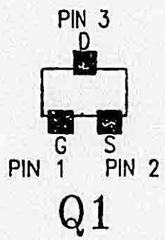
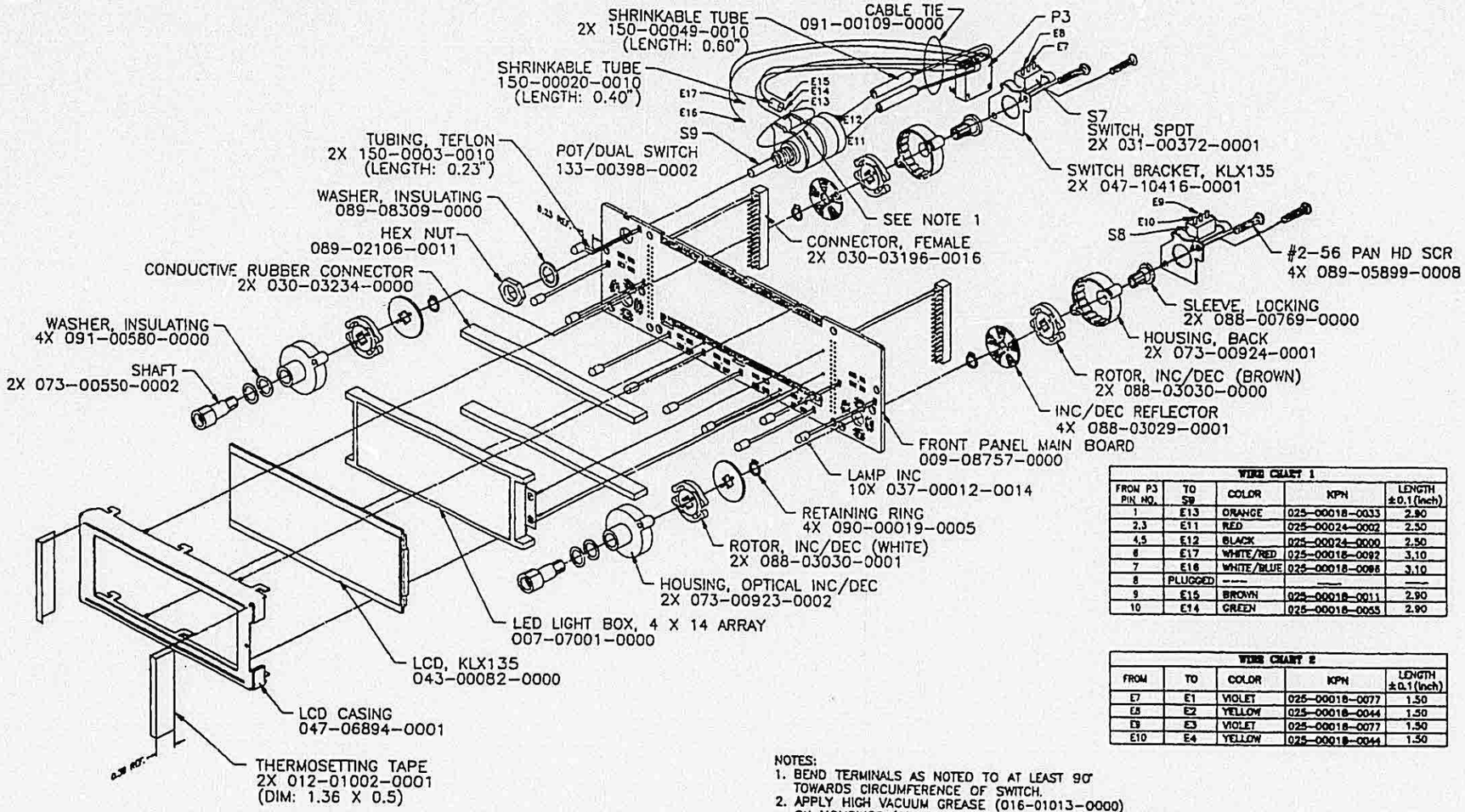


FIGURE 6-10 FRONT PANEL MAIN BOARD
Dwg. No. 300-08757-0000, R3
(Sheet 2 of 3)



WIRE CHART 1

FROM P3 PIN NO.	TO S9	COLOR	KPN	LENGTH ±0.1(inch)
1	E13	ORANGE	025-00018-0033	2.90
2,3	E11	RED	025-00024-0002	2.50
4,5	E12	BLACK	025-00024-0000	2.50
6	E17	WHITE/RED	025-00018-0092	3.10
7	E16	WHITE/BLUE	025-00018-0098	3.10
8	PLUGGED	----	----	----
9	E15	BROWN	025-00018-0011	2.90
10	E14	GREEN	025-00018-0055	2.90

WIRE CHART 2

FROM	TO	COLOR	KPN	LENGTH ±0.1(inch)
E7	E1	VIOLET	025-00018-0077	1.50
E8	E2	YELLOW	025-00018-0044	1.50
E9	E3	VIOLET	025-00018-0077	1.50
E10	E4	YELLOW	025-00018-0044	1.50

NOTES:
1. BEND TERMINALS AS NOTED TO AT LEAST 90° TOWARDS CIRCUMFERENCE OF SWITCH.
2. APPLY HIGH VACUUM GREASE (016-01013-0000) ON HOUSINGS (073-00923-0002 AND 073-00924-0001).
3. PRIOR TO POST COATING FAR SIDE OF PC BOARD WITH KPN 016-01040-0000, MASK OFF THE FOLLOWING: J1, J2, E1 THRU E6, DS1 THRU DS4, DS6 THRU DS8, U7 THRU U14, AND ALL MOUNTING AREAS (EXCLUDING THE 6 RECTANGULAR PADS FOR LCD BRACKET). FOR NEARSIDE OF PC BOARD, POST COAT THE AREA AROUND THE FOLLOWING COMPONENTS: U16, C8, R22, R23, R10, J1 AND J2.
4. BEND CONTACTS E11 AND E12 APPROXIMATELY 90° DOWNWARD AFTER SOLDERING AND SHRINKABLE TUBING INSERTED.

FIGURE 6-10 FRONT PANEL MAIN BOARD
Dwg. No. 300-08757-0000, R3
(Sheet 3 of 3)

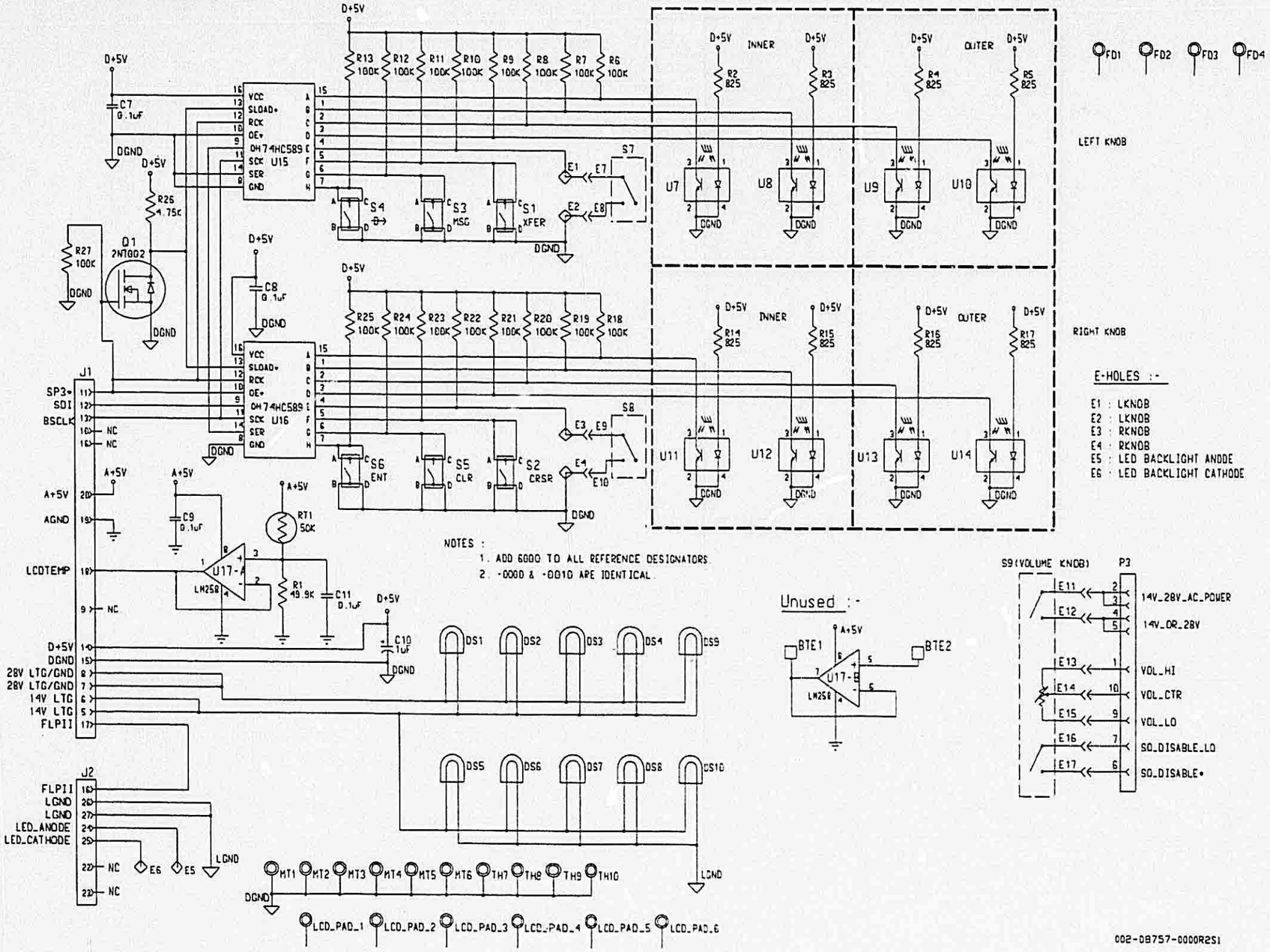


FIGURE 6-11 FRONT PANEL MAIN BOARD SCHEMATIC
Dwg. No. 002-08757-0000/-0010, R2
(Sheet 1 of 2)

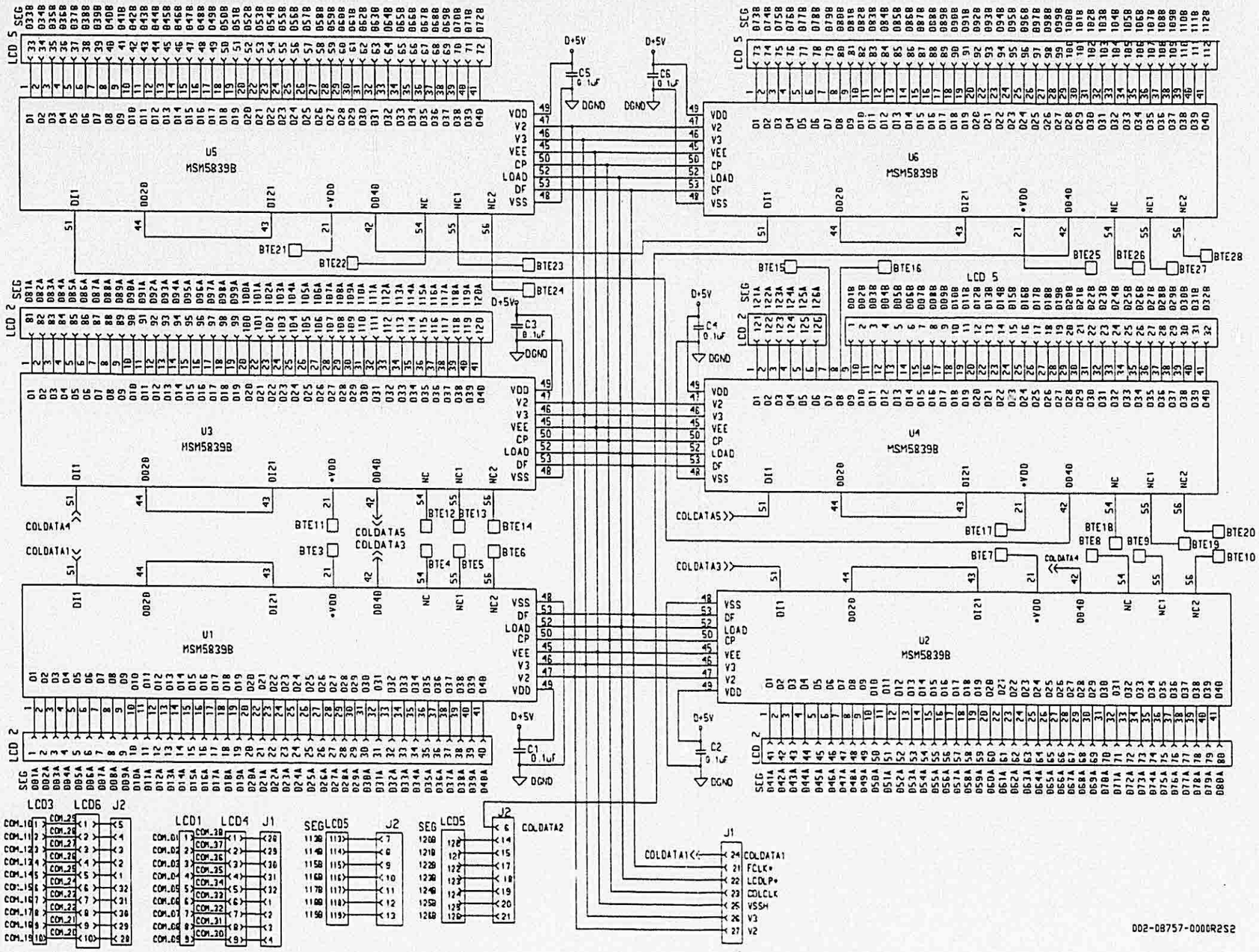


FIGURE 6-11 FRONT PANEL MAIN BOARD SCHEMATIC
Dwg. No. 002-08757-0000/-0010, R2
(Sheet 2 of 2)

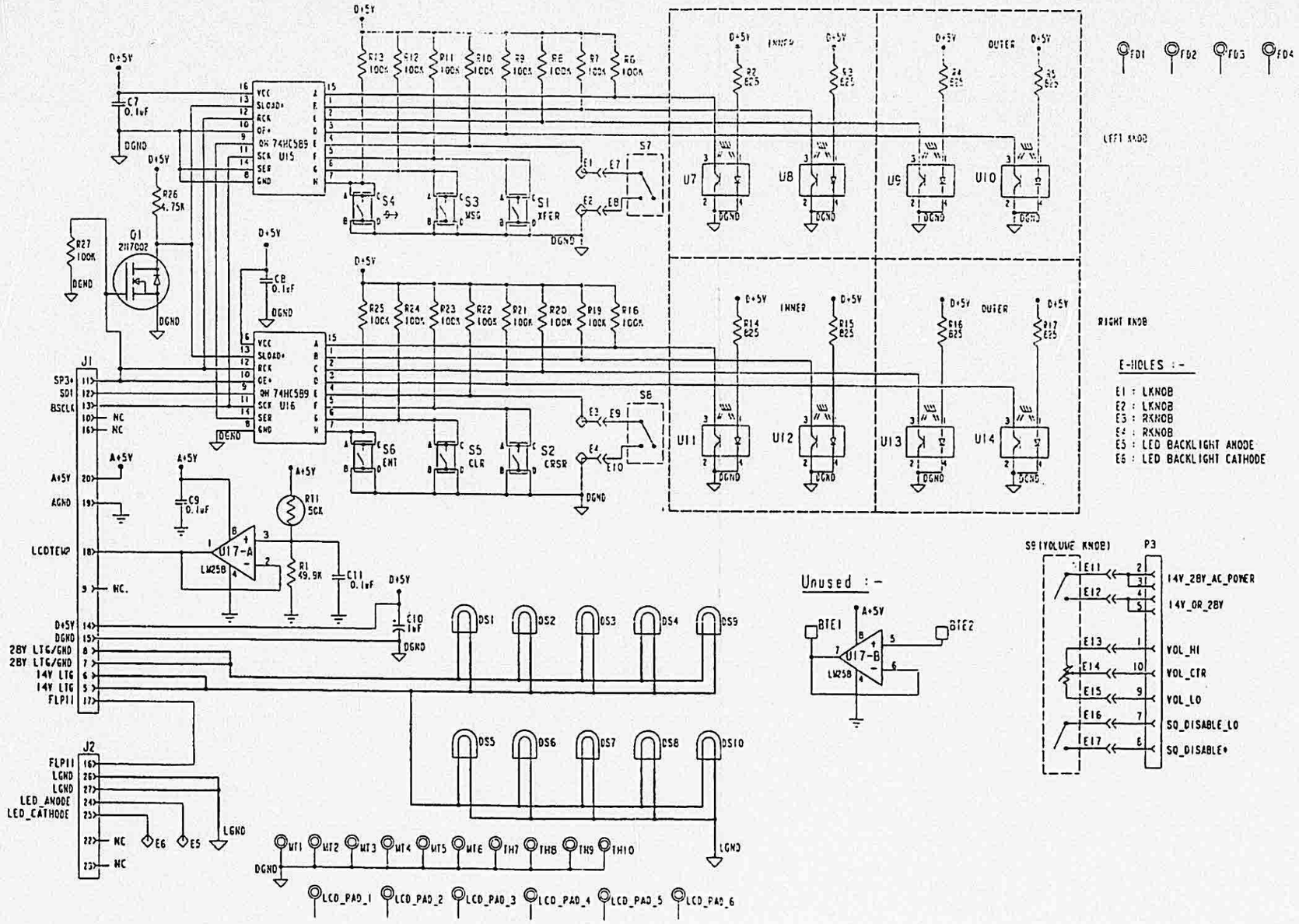


FIGURE 6-12 FRONT PANEL MAIN BOARD SCHEMATIC
Dwg. No. 002-08757-0000, R1
(Sheet 1 of 2)

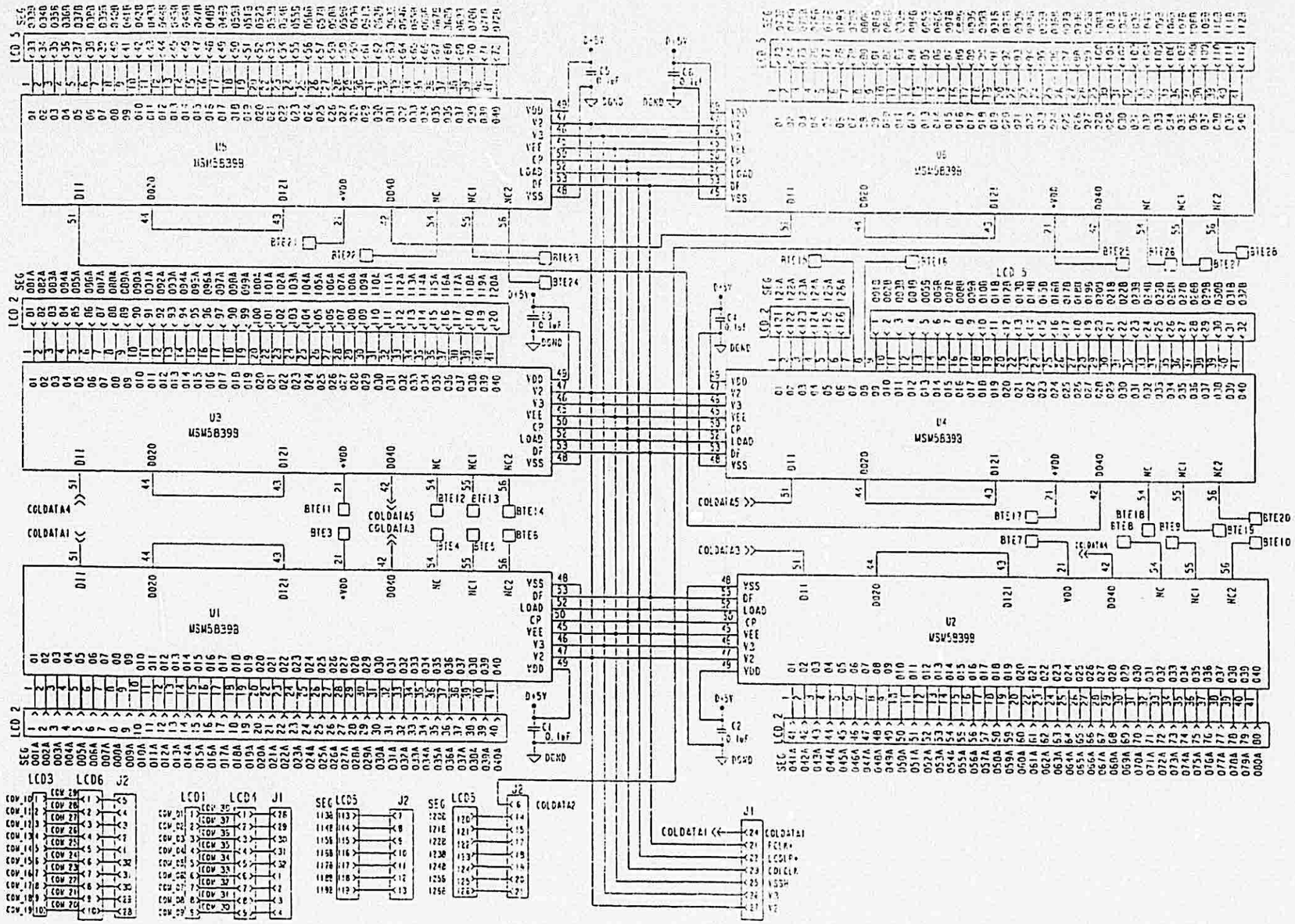


FIGURE 6-12 FRONT PANEL MAIN BOARD SCHEMATIC
Dwg. No. 002-08757-0000, R1
(Sheet 2 of 2)

6.9	200-08410-0000	COMM RECEIVER BD	R11		
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
...	008-00038-0001	TERM BIFUR .084L		EA	2
...	009-08410-0000	KX135 COMM RX BD		EA	1
...	012-01174-0000	INSULATOR		EA	5
...	012-01361-0002	TAPE LACING		IN	39.37
...	013-00006-0001	FERR BEAD		EA	2
...	016-01040-0000	COATING TYPE AR		AR	0
...	016-01082-0000	DC RTV 3145		AR	1
...	025-00005-0002	WIRE 18 RED		IN	11.024
...	025-00005-0012	WIRE 18 RD/WH		IN	11.024
...	025-00018-0022	WIRE 26 RED		IN	2.362
...	025-05012-0000	WIRE 2C SHD WHTBLK		IN	7.087
...	026-00013-0001	CA COAX RG178BU		IN	4.724
...	026-00032-0008	WIRE CU28AWG 750OG		IN	0.394
...	030-01058-0000	CONN PLUG		EA	2
...	047-10409-0001	COMM RCVR CVR W/F	A	EA	1
...	047-10410-0001	COMM/RX FNC RF/IF	A	EA	1
...	047-10411-0001	RX VCO FENCE W/F	A	EA	1
...	047-10412-0001	COMM/RX SHLD RF/IF	A	EA	1
...	047-10413-0001	COMM/RX SHLD VCO	A	EA	1
...	076-01527-0001	NAV SPACER ROLLVER		EA	3
...	090-00307-0000	HEAT SINK FOR TO-5		EA	1
...	091-00025-0000	WSHR XSTR INSUL		EA	1
...	150-00072-0004	SLDR SLEEVE .62		EA	2
...	150-00103-0000	SLDR SLEEVE		EA	2

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
...	155-02294-0021	CABLE ASSY	A	EA	1
C 4001	106-04473-0047	CAP CH 47K X7R/50V		EA	1
C 4002	106-04104-0047	CH 100KX7R/50V		EA	1
C 4003	106-05479-0020	CH 4.7PF NPO/100V		EA	1
C 4004	106-05479-0020	CH 4.7PF NPO/100V		EA	1
C 4005	106-04101-0026	CH 100PF NPO/100V		EA	1
C 4006	106-04151-0026	CH 150PF NPO/100V		EA	1
C 4007	106-05020-0020	CH 2PF NPO 100V		EA	1
C 4008	106-04221-0026	CAP CH220PFNPO/100		EA	1
C 4009	106-04473-0047	CAP CH 47K X7R/50V		EA	1
C 4010	106-04682-0057	CAPCH6800PFX7R/100		EA	1
C 4011	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4012	106-04473-0047	CAP CH 47K X7R/50V		EA	1
C 4013	106-04104-0047	CH 100KX7R/50V		EA	1
C 4014	106-05689-0020	CH 6.8PF NPO/100V		EA	1
C 4015	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4016	106-04331-0026	CAPCH330PFNPO/100V		EA	1
C 4017	106-05030-0020	CH 3.0PF NPO/100V		EA	1
C 4018	106-04471-0026	CH 470PF NPO/100V		EA	1
C 4019	106-04471-0026	CH 470PF NPO/100V		EA	1
C 4020	106-05060-0020	CH 6PF NPO 100V		EA	1
C 4021	106-04330-0026	CH 33PF NPO/100V		EA	1
C 4022	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4023	106-04473-0047	CAP CH 47K X7R/50V		EA	1
C 4024	096-01186-0036	CAP 10UF 35V 10%		EA	1
C 4025	106-04473-0047	CAP CH 47K X7R/50V		EA	1
C 4026	106-00001-0003	CAP FC 1.5PF5%500V		EA	1
C 4027	106-00001-0003	CAP FC 1.5PF5%500V		EA	1
C 4028	106-00001-0003	CAP FC 1.5PF5%500V		EA	1
C 4029	106-04473-0047	CAP CH 47K X7R/50V		EA	1
C 4030	096-01186-0036	CAP 10UF 35V 10%		EA	1
C 4031	106-04473-0047	CAP CH 47K X7R/50V		EA	1
C 4032	096-01186-0036	CAP 10UF 35V 10%		EA	1
C 4033	106-04473-0047	CAP CH 47K X7R/50V		EA	1
C 4034	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4035	106-04821-0016	CAP CH820PFNPO/50V		EA	1
C 4036	106-04392-0057	CAPCH3900PFX7R/100		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
C 4037	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4038	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4039	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4040	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4041	106-04151-0026	CH 150PF NPO/100V		EA	1
C 4042	106-04104-0047	CH 100KX7R/50V		EA	1
C 4043	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4044	106-04104-0047	CH 100KX7R/50V		EA	1
C 4045	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4046	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4047	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4048	106-04154-0078	CAP CH 150KZ5U/50V		EA	1
C 4049	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4050	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4051	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4052	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4053	106-04221-0026	CAP CH220PFNPO/100		EA	1
C 4054	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4055	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4056	096-01186-0026	CAP .22UF 35V 10%		EA	1
C 4057	096-01186-0026	CAP .22UF 35V 10%		EA	1
C 4058	096-01186-0026	CAP .22UF 35V 10%		EA	1
C 4059	106-04104-0047	CH 100KX7R/50V		EA	1
C 4060	106-04391-0026	CH 390PF NPO/100V		EA	1
C 4061	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4062	096-01186-0034	CAP 4.7UF 35V 10%		EA	1
C 4063	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4064	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4065	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4066	096-01186-0028	CAP .47UF 35V 10%		EA	1
C 4067	106-04104-0047	CH 100KX7R/50V		EA	1
C 4068	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4069	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4070	106-04821-0016	CAP CH820PFNPO/50V		EA	1
C 4071	106-04104-0047	CH 100KX7R/50V		EA	1
C 4072	097-00109-0006	CAP EL 100UF 16V		EA	1
C 4073	106-04104-0047	CH 100KX7R/50V		EA	1
C 4074	106-04121-0026	CAPCH120PFNPO/100V		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
C 4075	106-04151-0026	CH 150PF NPO/100V		EA	1
C 4076	106-04151-0026	CH 150PF NPO/100V		EA	1
C 4077	106-04151-0026	CH 150PF NPO/100V		EA	1
C 4078	106-04151-0026	CH 150PF NPO/100V		EA	1
C 4079	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4080	106-04103-0057	CAP CH 10KX7R/100V		EA	1
C 4081	106-04103-0057	CAP CH 10KX7R/100V		EA	1
C 4082	106-04103-0057	CAP CH 10KX7R/100V		EA	1
C 4083	106-04472-0046	CAP CH4.7K X7R/50V		EA	1
C 4084	106-04470-0026	CAPCH 47PFNPO/100V		EA	1
C 4085	106-04470-0026	CAPCH 47PFNPO/100V		EA	1
C 4086	102-00085-0000	CAP VAR SURF MTG		EA	1
C 4087	097-00109-0006	CAP EL 100UF 16V		EA	1
C 4088	106-04683-0046	CAP CH 68KX7R 50V		EA	1
C 4089	096-01186-0027	CAP .33UF 35V 10%		EA	1
C 4090	096-01082-0040	CAP TN 3.3UF 35V		EA	1
C 4091	106-04820-0026	CAP CH82PFNPO/100V		EA	1
C 4092	106-04390-0026	CH 39PF NPO/100V		EA	1
C 4093	096-01186-0015	CAP 33UF 16V 10%		EA	1
C 4094	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4095	106-05020-0020	CH 2PF NPO 100V		EA	1
C 4096	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4097	106-04220-0026	CH 22PF NPO/100V		EA	1
C 4098	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4099	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4100	106-04150-0026	CH 15PF NPO/100V		EA	1
C 4101	097-00109-0007	CAP EL 100UF 25V		EA	1
C 4102	106-04104-0047	CH 100KX7R/50V		EA	1
C 4103	106-04221-0026	CAP CH220PFNPO/100		EA	1
C 4104	999-09999-0098	NOT USED		RF	X
C 4105	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4106	097-00109-0006	CAP EL 100UF 16V		EA	1
C 4107	096-01186-0032	CAP 2.2UF 35V 10%		EA	1
C 4108	106-04154-0078	CAP CH 150KZ5U/50V		EA	1
C 4109	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4110	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4111	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4112	096-01186-0014	CAP 10.0UF 16V 10%		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
C 4113	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4114	096-01186-0028	CAP .47UF 35V 10%		EA	1
C 4115	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4116	106-04221-0026	CAP CH220PFNPO/100		EA	1
C 4117	106-04104-0047	CH 100KX7R/50V		EA	1
C 4118	106-04104-0047	CH 100KX7R/50V		EA	1
C 4119	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4120	097-00109-0007	CAP EL 100UF 25V		EA	1
C 4121	106-04222-0057	CAPCH2200PFX7R/100		EA	1
C 4122	106-04104-0047	CH 100KX7R/50V		EA	1
C 4123	097-00109-0006	CAP EL 100UF 16V		EA	1
C 4124	106-04103-0057	CAP CH 10KX7R/100V		EA	1
C 4125	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4126	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4127	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4128	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4129	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4130	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4131	106-04100-0026	CAPCH 10PFNPO/100VV		EA	1
C 4132	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4133	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4134	106-04470-0026	CAPCH 47PFNPO/100V		EA	1
C 4135	106-04270-0026	CH 27PF NPO/100V		EA	1
C 4136	097-00109-0007	CAP EL 100UF 25V		EA	1
C 4137	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4138	106-04470-0026	CAPCH 47PFNPO/100V		EA	1
C 4139	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4140	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4141	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4142	106-04270-0026	CH 27PF NPO/100V		EA	1
C 4143	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4144	097-00109-0007	CAP EL 100UF 25V		EA	1
C 4145	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4146	106-04104-0047	CH 100KX7R/50V		EA	1
C 4147	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4148	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4149	106-04331-0026	CAPCH330PFNPO/100V		EA	1
C 4150	106-04104-0047	CH 100KX7R/50V		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
C 4151	106-04104-0047	CH 100KX7R/50V		EA	1
C 4152	106-04101-0026	CH 100PF NPO/100V		EA	1
C 4153	097-00104-0036	CAP AL 47UF 25V		EA	1
C 4154	097-00104-0036	CAP AL 47UF 25V		EA	1
C 4155	097-00104-0036	CAP AL 47UF 25V		EA	1
C 4156	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4157	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4158	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4159	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4160	097-00109-0006	CAP EL 100UF 16V		EA	1
C 4161	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4162	096-01186-0018	CAP 6.8UF 20V 10%		EA	1
C 4163	096-01186-0018	CAP 6.8UF 20V 10%		EA	1
C 4164	096-01186-0015	CAP 33UF 16V 10%		EA	1
C 4165	106-04103-0046	CAP CH 10K X7R/50V		EA	1
C 4166	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4167	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 4168	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4169	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 4170	106-04683-0046	CAP CH 68KX7R 50V		EA	1
C 4171	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4172	097-00149-0000	CAP AL 2200UF 25V		EA	1
C 4173	097-00109-0006	CAP EL 100UF 16V		EA	1
C 4174	097-00109-0006	CAP EL 100UF 16V		EA	1
C 4175	097-00109-0009	CAP EL 470UF 16V		EA	1
C 4176	097-00109-0006	CAP EL 100UF 16V		EA	1
C 4177	097-00109-0006	CAP EL 100UF 16V		EA	1
C 4178	106-04104-0047	CH 100KX7R/50V		EA	1
C 4179	106-04104-0047	CH 100KX7R/50V		EA	1
C 4180	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4181	106-04101-0026	CH 100PF NPO/100V		EA	1
C 4182	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4183	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4184	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4185	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4186	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4187	096-01186-0015	CAP 33UF 16V 10%		EA	1
C 4188	096-01186-0017	CAP 2.2UF 20V 10%		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
C 4189	096-01186-0012	CAP 1.0UF 16V 10%		EA	1
C 4190	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4191	106-04121-0026	CAPCH120PFNPO/100V		EA	1
C 4192	106-04104-0047	CH 100KX7R/50V		EA	1
C 4193	106-04104-0047	CH 100KX7R/50V		EA	1
C 4194	106-04104-0047	CH 100KX7R/50V		EA	1
C 4195	096-01186-0027	CAP .33UF 35V 10%		EA	1
C 4196	106-04104-0047	CH 100KX7R/50V		EA	1
C 4197	096-01186-0036	CAP 10UF 35V 10%		EA	1
C 4199	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 4200	096-01082-0007	CAP TN 68UF 20V		EA	1
C 4201	096-01082-0007	CAP TN 68UF 20V		EA	1
C 4202	106-04473-0047	CAP CH 47K X7R/50V		EA	1
C 4203	999-09999-0098	NOT USED		RF	X
C 4204	999-09999-0098	NOT USED		RF	X
C 4205	111-00001-0034	CAP CR 1500PF 50V		EA	1
CR 4002	007-06181-0000	DIO DUAL MMBD2835		EA	1
CR 4003	007-04020-0002	DIO V SMV1163M5		EA	1
CR 4004	007-06223-0000	DIO DA204K		EA	1
CR 4005	007-06222-0000	DIO DAN202K		EA	1
CR 4006	007-06222-0000	DIO DAN202K		EA	1
CR 4007	007-06222-0000	DIO DAN202K		EA	1
CR 4008	007-06222-0000	DIO DAN202K		EA	1
CR 4009	007-05117-0007	DIO Z 6.2V SOT		EA	1
CR 4010	007-06222-0000	DIO DAN202K		EA	1
CR 4011	007-06222-0000	DIO DAN202K		EA	1
CR 4012	007-06223-0000	DIO DA204K		EA	1
CR 4013	007-06228-0000	RF SWITCHING DIODE		EA	1
CR 4014	007-05117-0017	DIO Z 16V SOT		EA	1
CR 4015	007-06181-0000	DIO DUAL MMBD2835		EA	1
CR 4016	007-05237-0001	XSIENT SUP 18V		EA	1
F 4001	036-00057-0015	FUSE 275 125V 7A		EA	1
FL 4001	017-00069-0000	FLTR XTAL 8P		EA	1
J 4002	030-02453-0005	CONNECTOR 10P		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
J 4003	030-02170-0014	CONN CARD 28C		EA	1
J 4004	030-03006-0007	CONN RECP DUAL		EA	1
J 4005	030-03006-0008	CONN RECPT 2-ROW		EA	1
J 4006	030-02453-0005	CONNECTOR 10P		EA	1
L 4001	019-02312-0060	IDCTR V 2.5T		EA	1
L 4002	019-02084-0022	CH 1.2UH 5%		EA	1
L 4003	019-02312-0060	IDCTR V 2.5T		EA	1
L 4004	019-02084-0027	CH 1.8UH 10%		EA	1
L 4005	019-02312-0060	IDCTR V 2.5T		EA	1
L 4006	019-02084-0034	CH 3.9UH 5%		EA	1
L 4007	019-02312-0060	IDCTR V 2.5T		EA	1
L 4008	019-02084-0021	CH 1UH 10%		EA	1
L 4009	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4010	019-02660-0032	IND SM 2200 10%		EA	1
L 4011	019-02660-0032	IND SM 2200 10%		EA	1
L 4012	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4013	019-08078-0000	COIL TUN 20MH		EA	1
L 4014	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4015	019-02084-0027	CH 1.8UH 10%		EA	1
L 4016	019-02099-0000	CHOKE .047UH 10%		EA	1
L 4017	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4018	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4019	019-02099-0003	CH .047UH 5%		EA	1
L 4020	019-02084-0000	CH .15UH 5%		EA	1
L 4021	019-02084-0021	CH 1UH 10%		EA	1
L 4022	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4023	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4024	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4025	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4026	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4027	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4029	019-02209-0000	CHOKE FILTER		EA	1
L 4030	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4031	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4032	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4033	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4034	013-00028-0001	FERR BEAD W/LEAD		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
L 4035	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4036	013-00028-0001	FERR BEAD W/LEAD		EA	1
L 4037	019-02084-0037	CH 4.7UH 10%		EA	1
Q 4001	007-00254-0001	XSTR S PNP SOT-23		EA	1
Q 4003	007-00813-0000	XSTR NPN S MMBTA14		EA	1
Q 4004	007-00957-0000	TSTR MOS FET BF996		EA	1
Q 4005	007-00957-0000	TSTR MOS FET BF996		EA	1
Q 4006	007-00195-0001	XSTR MPSH10		EA	1
Q 4007	007-00195-0001	XSTR MPSH10		EA	1
Q 4008	007-00187-0002	XSTR SOT-23 2N5089		EA	1
Q 4009	007-00187-0002	XSTR SOT-23 2N5089		EA	1
Q 4010	007-00187-0002	XSTR SOT-23 2N5089		EA	1
Q 4011	007-00179-0001	XSTR SOT23 2N3904		EA	1
Q 4012	007-00813-0000	XSTR NPN S MMBTA14		EA	1
Q 4013	007-00187-0002	XSTR SOT-23 2N5089		EA	1
Q 4014	007-00932-0000	JFET P-CHANNEL		EA	1
Q 4015	007-00187-0002	XSTR SOT-23 2N5089		EA	1
Q 4016	007-00179-0001	XSTR SOT23 2N3904		EA	1
Q 4017	007-00187-0002	XSTR SOT-23 2N5089		EA	1
Q 4018	007-00537-0000	XSTR PNP MMBT5087		EA	1
Q 4019	007-00537-0000	XSTR PNP MMBT5087		EA	1
Q 4020	007-00187-0002	XSTR SOT-23 2N5089		EA	1
Q 4021	007-00579-0000	XSTR 2SK241		EA	1
Q 4022	007-00195-0001	XSTR MPSH10		EA	1
Q 4023	007-00195-0001	XSTR MPSH10		EA	1
Q 4024	007-00195-0001	XSTR MPSH10		EA	1
Q 4025	007-00932-0000	JFET P-CHANNEL		EA	1
Q 4026	007-00932-0000	JFET P-CHANNEL		EA	1
Q 4027	007-00932-0000	JFET P-CHANNEL		EA	1
Q 4028	007-00932-0000	JFET P-CHANNEL		EA	1
Q 4029	007-00903-0000	2N7002 MOSFET		EA	1
Q 4030	007-00903-0000	2N7002 MOSFET		EA	1
Q 4031	007-00195-0001	XSTR MPSH10		EA	1
Q 4032	007-00195-0001	XSTR MPSH10		EA	1
Q 4033	007-00250-0000	XSTR 2N4427		EA	1
Q 4034	007-00383-0004	SOT-23 2N2222A XST		EA	1
Q 4035	007-00195-0001	XSTR MPSH10		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
Q 4038	007-00078-0001	XSTR S NPN 2N3417		EA	1
R 4001	139-01211-0000	RES CHIP1.21KEW1%		EA	1
R 4003	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4004	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4005	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4006	139-02671-0000	RES CH 2.67K EW 1%		EA	1
R 4007	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 4008	999-09999-0098	NOT USED		RF	X
R 4009	139-04750-0000	RES CH 475 EW 1%		EA	1
R 4010	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 4011	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 4012	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4013	139-04322-0000	RES CHIP 43.2KEW1%		EA	1
R 4014	139-05622-0000	RES CH 56.2K EW 1%		EA	1
R 4015	139-05622-0000	RES CH 56.2K EW 1%		EA	1
R 4016	999-09999-0098	NOT USED		EA	1
R 4017	139-01301-0000	RES CH 1.30K EW 1%		EA	1
R 4018	139-02000-0000	RES CH 200 EW 1%		EA	1
R 4019	139-00221-0000	RES CH 22.1 EW 1%		EA	1
R 4020	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 4021	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 4022	999-09999-0098	NOT USED		RF	X
R 4023	139-00499-0000	RES CH 49.9 EW 1%		EA	1
R 4024	139-05112-0000	RES CHIP 51.1K 1%		EA	1
R 4025	139-01820-0000	RES CH 182 EW 1%		EA	1
R 4026	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 4027	999-09999-0098	NOT USED		EA	1
R 4028	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 4029	139-01212-0000	RES CHIP 12.1K1%EW		EA	1
R 4030	139-00100-0000	RES CHIP 10 EW 1%		EA	1
R 4031	139-05621-0000	RES CHIP 5.62KEW1%		EA	1
R 4032	139-02212-0000	RES CHIP 22.1KEW1%		EA	1
R 4033	139-00100-0000	RES CHIP 10 EW 1%		EA	1
R 4034	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4035	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4036	139-01101-0000	RES CH 1.1K EW 1%		EA	1
R 4037	139-09090-0000	RES CHIP 909 EW 1%		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
R 4038	139-00562-0000	RES CH 56.2 EW 1%		EA	1
R 4039	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4040	139-02212-0000	RES CHIP 22.1KEW1%		EA	1
R 4041	139-03322-0000	RES CH 33.2K EW 1%		EA	1
R 4042	139-06812-0000	RES 68.1K EW 1%		EA	1
R 4043	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4044	139-03921-0000	RES CH 3.92K EW 1%		EA	1
R 4045	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4046	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 4047	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 4048	133-00351-0005	POTENTIOMETER 22K		EA	1
R 4049	139-03322-0000	RES CH 33.2K EW 1%		EA	1
R 4050	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4051	139-01103-0000	RES CHIP 110K EW1%		EA	1
R 4052	139-01102-0000	RES 11K EW 1%		EA	1
R 4053	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 4054	130-05301-0023	RES CHIP 300 EW 5%		EA	1
R 4055	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 4056	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 4057	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 4058	139-03922-0000	RES CH 39.2K EW 1%		EA	1
R 4059	139-03322-0000	RES CH 33.2K EW 1%		EA	1
R 4060	139-06193-0000	RES CH 619KEW 1%		EA	1
R 4061	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 4062	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4063	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 4064	139-03572-0000	RES CHIP 35.7KEW1%		EA	1
R 4065	133-00351-0004	POTENTIOMETER 10K		EA	1
R 4066	139-02672-0000	RES CHIP 26.7KEW1%		EA	1
R 4067	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4068	139-05111-0000	RES CHIP 5.11KEW1%		EA	1
R 4069	139-05111-0000	RES CHIP 5.11KEW1%		EA	1
R 4070	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4071	139-04753-0000	RES CH 475K EW 1%		EA	1
R 4072	139-07500-0000	RES CHIP 750 EW 1%		EA	1
R 4073	139-01542-0000	RES 15.4K EW 1%		EA	1
R 4074	139-02432-0000	RES CH 24.3K EW 1%		EA	1
R 4075	139-07500-0000	RES CHIP 750 EW 1%		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
R 4076	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 4077	139-01912-0000	RES CHIP 19.1KEW1%		EA	1
R 4078	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4079	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4080	139-07500-0000	RES CHIP 750 EW 1%		EA	1
R 4081	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4082	139-01102-0000	RES 11K EW 1%		EA	1
R 4083	139-02001-0000	RES CHIP 2K EW 1%		EA	1
R 4084	139-02673-0000	RES CH 267K EW 1%		EA	1
R 4085	139-02000-0000	RES CH 200 EW 1%		EA	1
R 4086	139-02371-0000	RES CH 2.37K EW 1%		EA	1
R 4087	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 4088	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 4089	139-01302-0000	RES CH 13K EW 1%		EA	1
R 4090	139-02003-0000	RES CHIP 200KEW1%		EA	1
R 4091	139-01102-0000	RES 11K EW 1%		EA	1
R 4092	139-02671-0000	RES CH 2.67K EW 1%		EA	1
R 4093	139-09091-0000	RES CH 9.09K EW 1%		EA	1
R 4094	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 4095	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 4096	139-02212-0000	RES CHIP 22.1KEW1%		EA	1
R 4097	139-04753-0000	RES CH 475K EW 1%		EA	1
R 4098	139-00750-0000	RES CH 75.0 EW 1%		EA	1
R 4099	139-04753-0000	RES CH 475K EW 1%		EA	1
R 4100	130-05301-0023	RES CHIP 300 EW 5%		EA	1
R 4101	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 4102	139-07500-0000	RES CHIP 750 EW 1%		EA	1
R 4103	139-06811-0000	RES CH 6.81K EW 1%		EA	1
R 4104	139-07501-0000	RES CHIP 7.5KEW1%		EA	1
R 4105	133-00351-0004	POTENTIOMETER 10K		EA	1
R 4106	139-01212-0000	RES CHIP 12.1K1%EW		EA	1
R 4107	139-01501-0000	RES CH 1.5K EW 1%		EA	1
R 4108	139-02432-0000	RES CH 24.3K EW 1%		EA	1
R 4109	139-02432-0000	RES CH 24.3K EW 1%		EA	1
R 4110	139-03922-0000	RES CH 39.2K EW 1%		EA	1
R 4111	130-05027-0033	RES CH 2.7 QW 5%		EA	1
R 4112	130-05101-0033	RES CH 100 QW 5%		EA	1
R 4113	139-01000-0000	RES CHIP 100 EW 1%		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
R 4114	139-01000-0000	RES CHIP 100 EW 1%		EA	1
R 4115	139-01000-0000	RES CHIP 100 EW 1%		EA	1
R 4116	999-09999-0098	NOT USED		RF	X
R 4117	139-02000-0000	RES CH 200 EW 1%		EA	1
R 4118	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4119	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4120	139-01000-0000	RES CHIP 100 EW 1%		EA	1
R 4121	139-03571-0000	RES CHIP 3.57KEW1%		EA	1
R 4122	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 4123	139-03321-0000	RES CHIP 3.32K EW		EA	1
R 4124	139-03321-0000	RES CHIP 3.32K EW		EA	1
R 4125	139-02210-0000	RES CH 221 EW 1%		EA	1
R 4126	139-02210-0000	RES CH 221 EW 1%		EA	1
R 4127	139-02210-0000	RES CH 221 EW 1%		EA	1
R 4128	139-06810-0000	RES CH 681 EW 1%		EA	1
R 4129	139-02210-0000	RES CH 221 EW 1%		EA	1
R 4130	139-02210-0000	RES CH 221 EW 1%		EA	1
R 4131	139-01000-0000	RES CHIP 100 EW 1%		EA	1
R 4132	139-01000-0000	RES CHIP 100 EW 1%		EA	1
R 4133	139-03322-0000	RES CH 33.2K EW 1%		EA	1
R 4134	139-08251-0000	RES CH8.25 KEW 1%		EA	1
R 4135	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 4136	139-03320-0000	RES CHIP 332 EW 1%		EA	1
R 4137	139-03322-0000	RES CH 33.2K EW 1%		EA	1
R 4138	139-08251-0000	RES CH8.25 KEW 1%		EA	1
R 4139	139-04750-0000	RES CH 475 EW 1%		EA	1
R 4140	139-03320-0000	RES CHIP 332 EW 1%		EA	1
R 4141	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 4142	139-08250-0000	RES CH 825 EW 1%		EA	1
R 4143	139-01000-0000	RES CHIP 100 EW 1%		EA	1
R 4144	139-01000-0000	RES CHIP 100 EW 1%		EA	1
R 4145	139-04750-0000	RES CH 475 EW 1%		EA	1
R 4146	133-00351-0004	POTENTIOMETER 10K		EA	1
R 4147	139-00150-0000	RES CH 15 EW 1%		EA	1
R 4148	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 4149	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 4150	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 4151	139-04751-0000	RES CH 4.75K EW 1%		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
R 4152	139-01004-0000	RES CHIP 1M EW 1%		EA	1
R 4153	139-02001-0000	RES CHIP 2K EW 1%		EA	1
R 4154	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4155	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4156	139-02432-0000	RES CH 24.3K EW 1%		EA	1
R 4157	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4158	139-01004-0000	RES CHIP 1M EW 1%		EA	1
R 4159	139-01502-0000	RES CHIP 15K EW 1%		EA	1
R 4160	139-01821-0000	RES CHIP 1.82KEW1%		EA	1
R 4161	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 4162	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 4163	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 4164	139-03011-0000	RES CH 3.01K EW 1%		EA	1
R 4165	139-02432-0000	RES CH 24.3K EW 1%		EA	1
R 4166	139-02432-0000	RES CH 24.3K EW 1%		EA	1
R 4167	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4168	130-05027-0033	RES CH 2.7 QW 5%		EA	1
R 4169	139-03011-0000	RES CH 3.01K EW 1%		EA	1
R 4170	139-03321-0000	RES CHIP 3.32K EW		EA	1
R 4171	139-01502-0000	RES CHIP 15K EW 1%		EA	1
R 4172	133-00351-0003	POTENTIOMETER 4.7K		EA	1
R 4173	139-02212-0000	RES CHIP 22.1KEW1%		EA	1
R 4174	139-04750-0000	RES CH 475 EW 1%		EA	1
R 4175	139-02003-0000	RES CHIP 200KEW1%		EA	1
R 4176	139-04753-0000	RES CH 475K EW 1%		EA	1
R 4177	139-04753-0000	RES CH 475K EW 1%		EA	1
R 4178	139-01913-0000	RES CHIP 191KEW1%		EA	1
R 4179	139-01004-0000	RES CHIP 1M EW 1%		EA	1
R 4180	139-05620-0000	RES CH 562 EW 1%		EA	1
R 4181	139-02373-0000	RES CH 237K EW 1%		EA	1
R 4182	139-01913-0000	RES CHIP 191KEW1%		EA	1
R 4183	139-01004-0000	RES CHIP 1M EW 1%		EA	1
R 4184	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4185	139-08250-0000	RES CH 825 EW 1%		EA	1
R 4186	139-01501-0000	RES CH 1.5K EW 1%		EA	1
R 4187	139-00100-0000	RES CHIP 10 EW 1%		EA	1
R 4188	139-01502-0000	RES CHIP 15K EW 1%		EA	1
R 4189	139-04752-0000	RES CH 47.5K EW 1%		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
R 4190	139-02210-0000	RES CH 221 EW 1%		EA	1
R 4191	139-05110-0000	RES CH 511 EW 1%		EA	1
R 4192	139-03921-0000	RES CH 3.92K EW 1%		EA	1
R 4193	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 4194	139-00100-0000	RES CHIP 10 EW 1%		EA	1
R 4195	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 4196	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 4197	139-05110-0000	RES CH 511 EW 1%		EA	1
R 4198	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4199	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4200	139-02001-0000	RES CHIP 2K EW 1%		EA	1
R 4201	139-00499-0000	RES CH 49.9 EW 1%		EA	1
R 4202	139-01000-0000	RES CHIP 100 EW 1%		EA	1
R 4203	139-02000-0000	RES CH 200 EW 1%		EA	1
R 4204	139-01500-0000	RES CH 150 EW 1%		EA	1
R 4205	139-09091-0000	RES CH 9.09K EW 1%		EA	1
R 4206	139-06191-0000	RES CH 6.19KEW 1%		EA	1
R 4207	133-00351-0004	POTENTIOMETER 10K		EA	1
R 4208	139-02212-0000	RES CHIP 22.1KEW1%		EA	1
R 4209	131-00182-0033	RES CF 1.8K HW 5%		EA	1
R 4210	139-04990-0000	RES CH 499 EW 1%		EA	1
R 4211	139-04322-0000	RES CHIP 43.2KEW1%		EA	1
R 4212	139-04990-0000	RES CH 499 EW 1%		EA	1
R 4213	139-04322-0000	RES CHIP 43.2KEW1%		EA	1
R 4214	139-04990-0000	RES CH 499 EW 1%		EA	1
R 4215	139-04322-0000	RES CHIP 43.2KEW1%		EA	1
R 4216	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 4217	139-06192-0000	RES CH 61.9K EW 1%		EA	1
R 4218	139-01300-0000	RES CH 130 EW 1%		EA	1
R 4219	139-03320-0000	RES CHIP 332 EW 1%		EA	1
R 4220	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 4221	133-00351-0003	POTENTIOMETER 4.7K		EA	1
R 4222	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4223	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4224	139-03321-0000	RES CHIP 3.32K EW		EA	1
R 4225	139-06810-0000	RES CH 681 EW 1%		EA	1
R 4226	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 4227	139-01003-0000	RES CHIP 100KEW1%		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
R 4228	139-04753-0000	RES CH 475K EW 1%		EA	1
R 4229	139-01821-0000	RES CHIP 1.82KEW1%		EA	1
R 4230	139-03920-0000	392 OHM 1/8W 1%		EA	1
R 4231	139-08250-0000	RES CH 825 EW 1%		EA	1
R 4232	130-05022-0023	RES CH 2.2		EA	1
R 4233	130-05101-0033	RES CH 100 QW 5%		EA	1
R 4234	132-00106-0039	RES WW 30 2.25W 5%		EA	1
R 4235	139-04990-0000	RES CH 499 EW 1%		EA	1
R 4236	139-06191-0000	RES CH 6.19KEW 1%		EA	1
R 4237	133-00351-0000	POTENTIOMETER 470		EA	1
R 4238	133-00351-0006	POTENTIOMETER 47K		EA	1
R 4239	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4240	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4241	139-07500-0000	RES CHIP 750 EW 1%		EA	1
R 4242	139-04750-0000	RES CH 475 EW 1%		EA	1
R 4243	139-02002-0000	RES CHIP 20.0KEW1%		EA	1
R 4244	130-05000-0025	RES CHIP 0 EW CJ		EA	1
R 4245	130-05000-0025	RES CHIP 0 EW CJ		EA	1
R 4246	130-05000-0025	RES CHIP 0 EW CJ		EA	1
R 4247	130-05000-0025	RES CHIP 0 EW CJ		EA	1
R 4248	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4249	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 4250	133-00560-0002	RES VA SMD 50 QW		EA	1
R 4251	130-05082-0023	RES CH 8.20 EW 5%		EA	1
R 4252	130-05000-0025	RES CHIP 0 EW CJ		EA	1
R 4253	130-05000-0025	RES CHIP 0 EW CJ		EA	1
R 4254	130-05000-0025	RES CHIP 0 EW CJ		EA	1
R 4255	130-05000-0025	RES CHIP 0 EW CJ		EA	1
R 4256	130-05000-0025	RES CHIP 0 EW CJ		EA	1
R 4257	130-05000-0025	RES CHIP 0 EW CJ		EA	1
R 4259	130-05000-0025	RES CHIP 0 EW CJ		EA	1
R 4260	999-09999-0098	NOT USED		RF	0
R 4261	999-09999-0096	NOT USED		EA	1
REF 1	300-08410-0000			RF	0
REF 2	002-08410-0000			RF	0
T 4001	019-08079-0000	XFMR IF		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
T 4002	019-08080-0000	XFMR IF 15PF		EA	1
T 4003	019-08102-0000	XFMR IF 27PF		EA	1
T 4004	019-08103-0000	XFMR IF		EA	1
T 4005	019-05083-0000	XFMR AUD		EA	1
T 4006	019-05084-0001	XFMR MOD 900T		EA	1
T 4007	019-02328-0081	3.5 TURN CT		EA	1
T 4008	019-05083-0000	XFMR AUD		EA	1
TP 4001	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4002	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4003	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4004	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4005	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4006	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4007	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4008	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4009	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4010	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4011	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4012	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4013	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4014	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 4015	008-00096-0001	TERMINAL TEST PNT		EA	1
U 4001	120-03020-0001	IC IF AMP SO		EA	1
U 4002	120-03020-0001	IC IF AMP SO		EA	1
U 4003	120-03195-0000	IC LM2904D		EA	1
U 4004	120-03195-0000	IC LM2904D		EA	1
U 4005	120-03127-0011	IC LM2903 SO PKG		EA	1
U 4006	120-03127-0011	IC LM2903 SO PKG		EA	1
U 4007	120-03195-0000	IC LM2904D		EA	1
U 4008	120-03190-0000	AUDIO AMP LM1877N		EA	1
U 4009	120-03317-0000	SYNTHESIZER CX7925		EA	1
U 4010	120-03195-0000	IC LM2904D		EA	1
U 4011	120-03195-0000	IC LM2904D		EA	1
U 4012	120-03174-0013	OP AMP BI FET SO		EA	1
U 4013	120-03491-0000	IC HEADPHONE AMP		EA	1
U 4014	123-00032-0003	74HC32D SO PKG		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
U 4015	120-03065-0026	IC MC78L05ABD		EA	1
Y 4001	044-00272-0001	3.975 MHZ .001%		EA	1

COMMUNICATIONS TRANSCEIVER/ GPS RECEIVER

NOTES:

1. PRIOR TO POST-COATING BOTH SIDES OF THE PRINTED CIRCUIT BOARD WITH KPN 016-01040-0000, MASK OFF THE FOLLOWING:
   a) GROUND STRIPS FOR FENCES;
   b) ALL MOUNTING AREAS;
   c) AREAS WHERE THE CASTING COMES IN CONTACT WITH THE BOARD SURFACE;
   d) ALL TEST POINTS;
   e) ALL E-HOLES;
   f) ALL POTENTIOMETERS, VARICAPS, CONNECTORS;
   g) FL4001A, B, C, D;
   h) L4001, L4003, L4005 AND L4007;
   i) T4001, T4002, T4003 AND T4004; AND
   j) Q4033.
2. INSTALL FERRITE BEAD (KPN 013-00006-0001) AT LOCATIONS E4016 AND E4018. SECURE BEAD TO BOARD WITH RTV (KPN 016-01071-0000) TO PREVENT MOVEMENT.
3. ON BOTH ENDS OF 025-05012-0000, SOLDER RED WIRE TO WIRE MESH OF 025-05012-0000 BEFORE INSTALLING SOLDER SLEEVE 150-00072-0004. SEE DETAIL A ON SHEET 3 OF 3.
4. TWIST THESE WIRES (SEE WIRE CHART) TOGETHER AT 1.5 TURNS PER INCH.
5. SECURE THE CABLES IN NOTES 2 AND 3 WITH A PIECE OF NYLON RIBBON (KPN 012-01361-0002) VIA THESE 2 HOLES.
6. L4001, L4003, L4005 AND L4007 MUST BE INSTALLED WITH TABS IN THE POSITIONS SHOWN.
7. FL4001A, B, C AND D MUST BE INSTALLED AS A SET IN ORDER SHOWN ON THE DRAWING. IF ONE CRYSTAL OF THE SET IS REPLACED, THEY MUST BE REPLACED.
   O = WHITE DOT
   ⊠ = RED DOT
   ● = BLACK DOT
8. CR4003A, B, C, D AND E ARE A MATCHED SET OF 5. IF ONE IS REPLACED, THEY MUST ALL BE REPLACED.
9. ALL FENCES AND ALL SHIELDS MUST BE LAID FLUSHED AGAINST AND CONTINUOUSLY SOLDERED TO PRINTED CIRCUIT BOARD.
10. J4003 PIN 3 IS TO BE KEYED (POLARIZING PLUG KPN 030-01058-0000).
    J4002 PIN 8 IS TO BE SNIPPED OFF.
    J4006 PIN 7 IS TO BE SNIPPED OFF.
11. APPLY THERMAL COMPOUND (KPN 016-01004-0000) ON TRANSISTOR Q4033 (KPN 007-00250-0000). THEN, INSTALL HEATSINK (KPN 090-00307-0000) ON THE TRANSISTOR.
12. INSTALL INSULATOR (KPN 012-01174-0000) BENEATH FL4001A, B, C AND D.
13.

WIRE CHART				LENGTH (M)
FROM	TO	DESCRIPTION	KPN	
E4003	E4005	DOUBLE-SHIELD COAX CABLE E4003-E4005: SIGNAL; E4004-E4006: GND	026-00013-0001	0.125
E4004	E4006			
E4007	E4010	WIRE 2C SHIELD WHT/BLK	025-05012-0000	0.175
E4008	E4011			
E4009	E4012	WIRE INSULATED 26 AWG RED	025-00018-0022	2X 0.035
E4016	E4017	18 AWG RED/WHT	025-00005-0012	0.245
E4018	E4019	18 AWG RED	025-00005-0002	0.245

14. THE RF/IF SHIELD(047-10412-0001) NEED TO BE INSTALLED FIRST BEFORE THE VCO SHIELD(047-10413-0001).
    NOTE THE DIRECTION OF BEND IN DETAIL X & Y.
15. INSTALL SOLDER SLEEVE ON BOTH ENDS OF 026-00013-0001 COAX CABLE. SEE DETAIL B ON SHEET 3 OF 3.

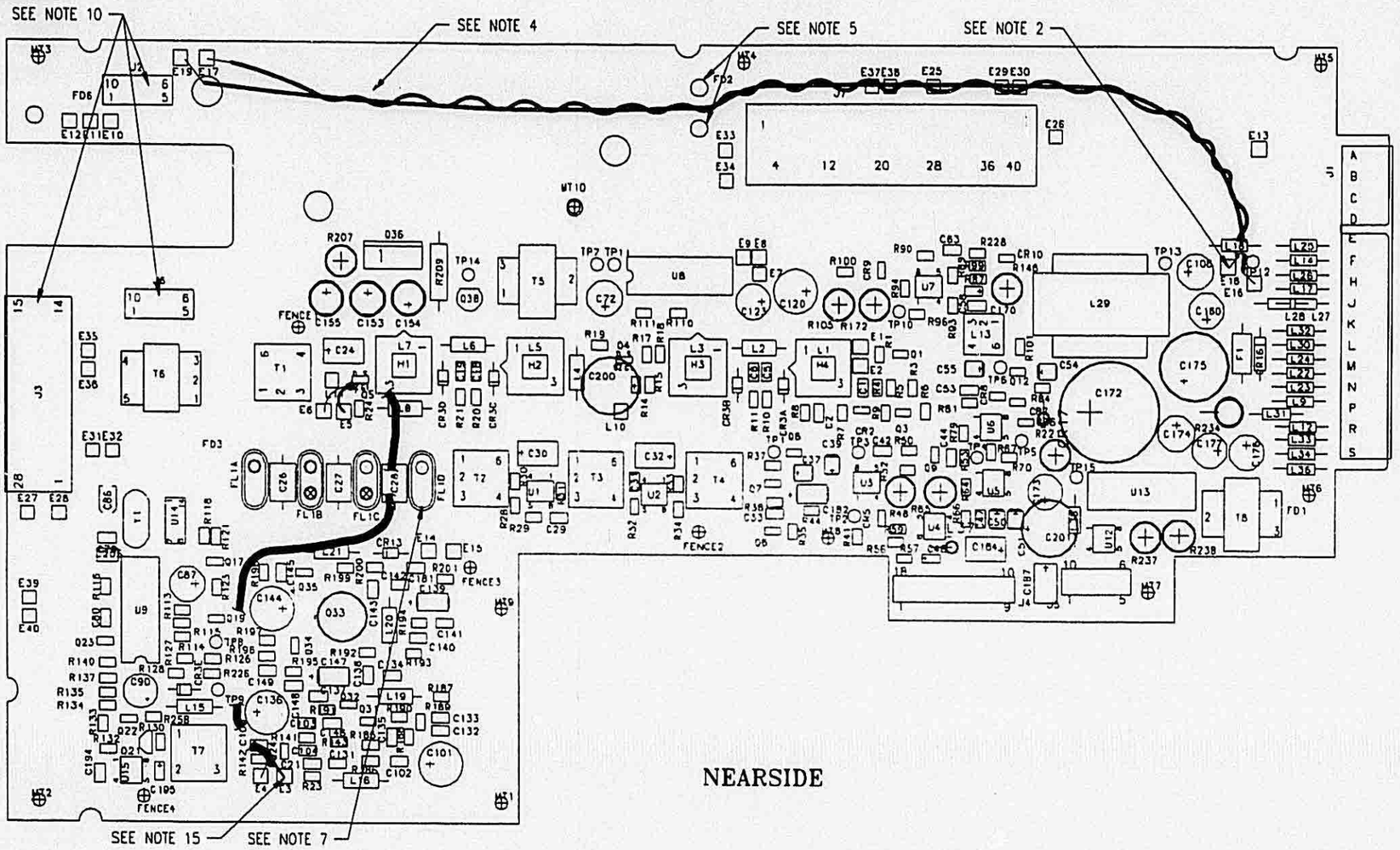
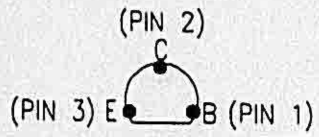
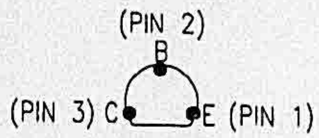


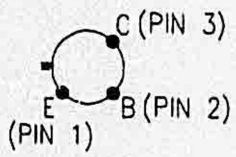
FIGURE 6-13 COMM RECEIVER BOARD
Dwg. No. 300-08410-0000, R5
(Sheet 1 of 3)



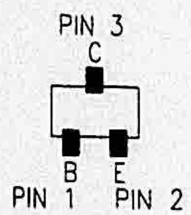
Q38



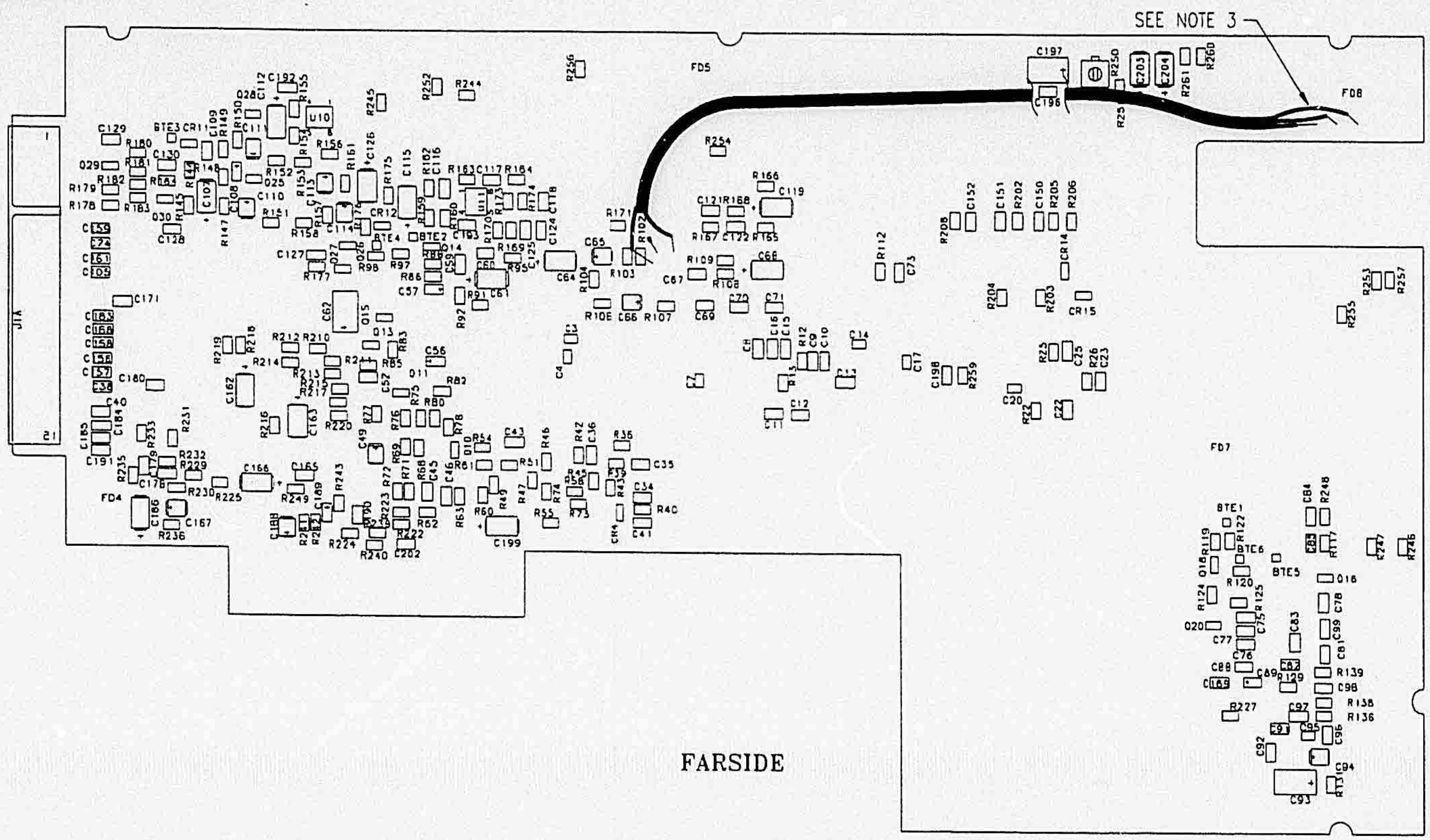
Q1,Q9,Q10,Q13
Q15,Q17,Q20

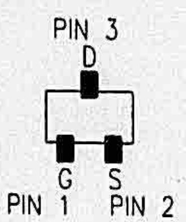


Q33

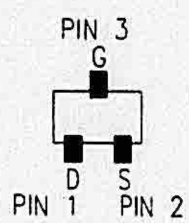


Q3
Q6 THRU Q8
Q11,Q12,Q16
Q18,Q19
Q22 THRU Q24
Q31,Q32,Q34,Q35

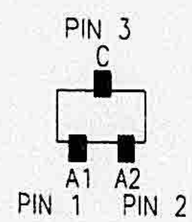




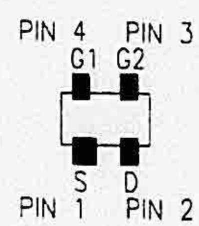
Q29,Q30



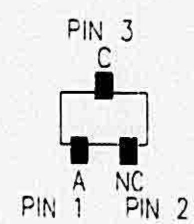
Q14
Q25 THRU Q28



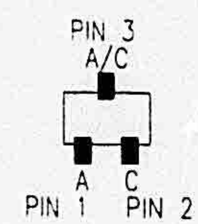
CR5 THRU CR8
CR10,CR11



Q4,Q5



CR9,CR14



CR4,CR12

FIGURE 6-13 COMM RECEIVER BOARD
Dwg. No. 300-08410-0000, R5
(Sheet 2 of 3)

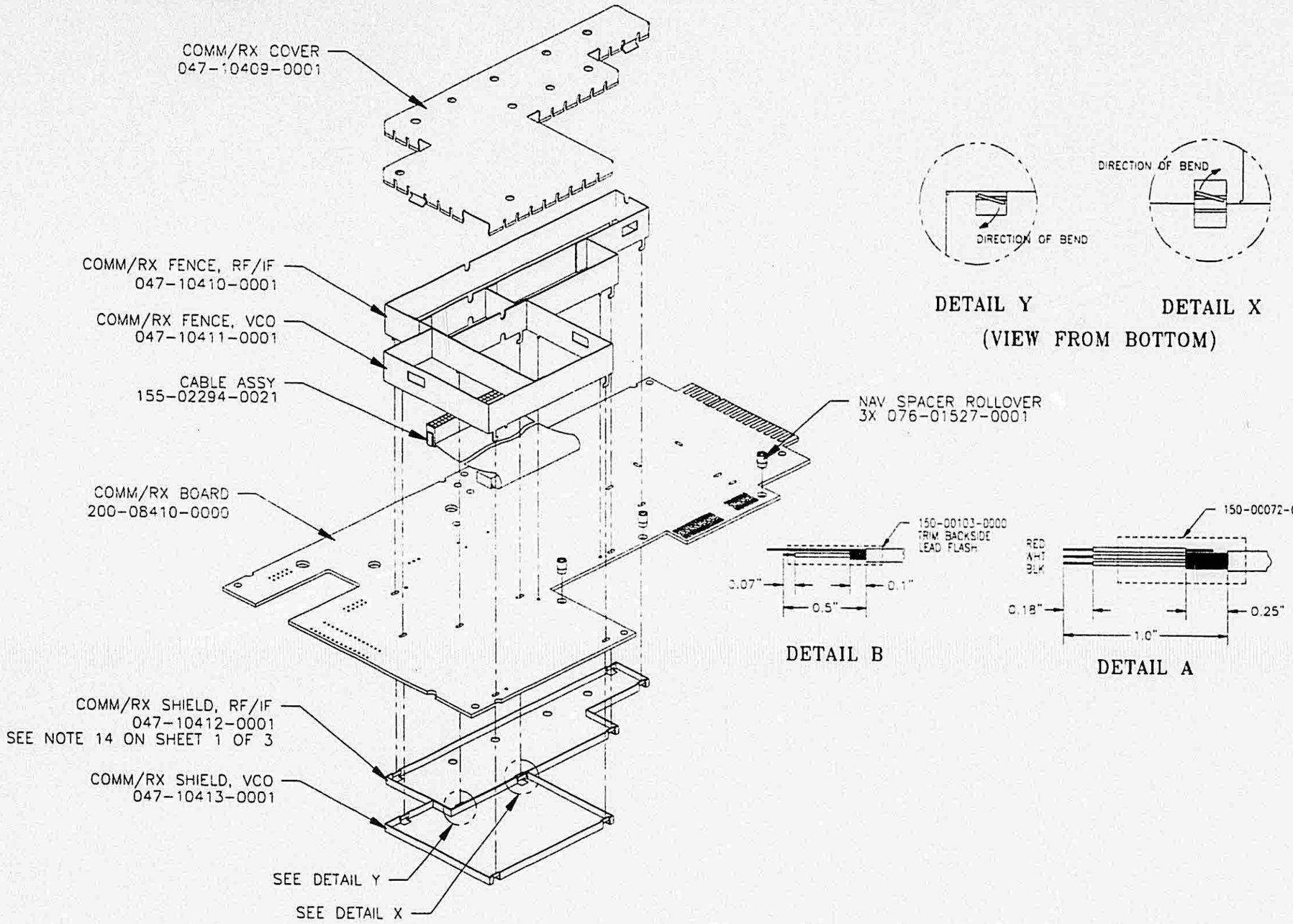


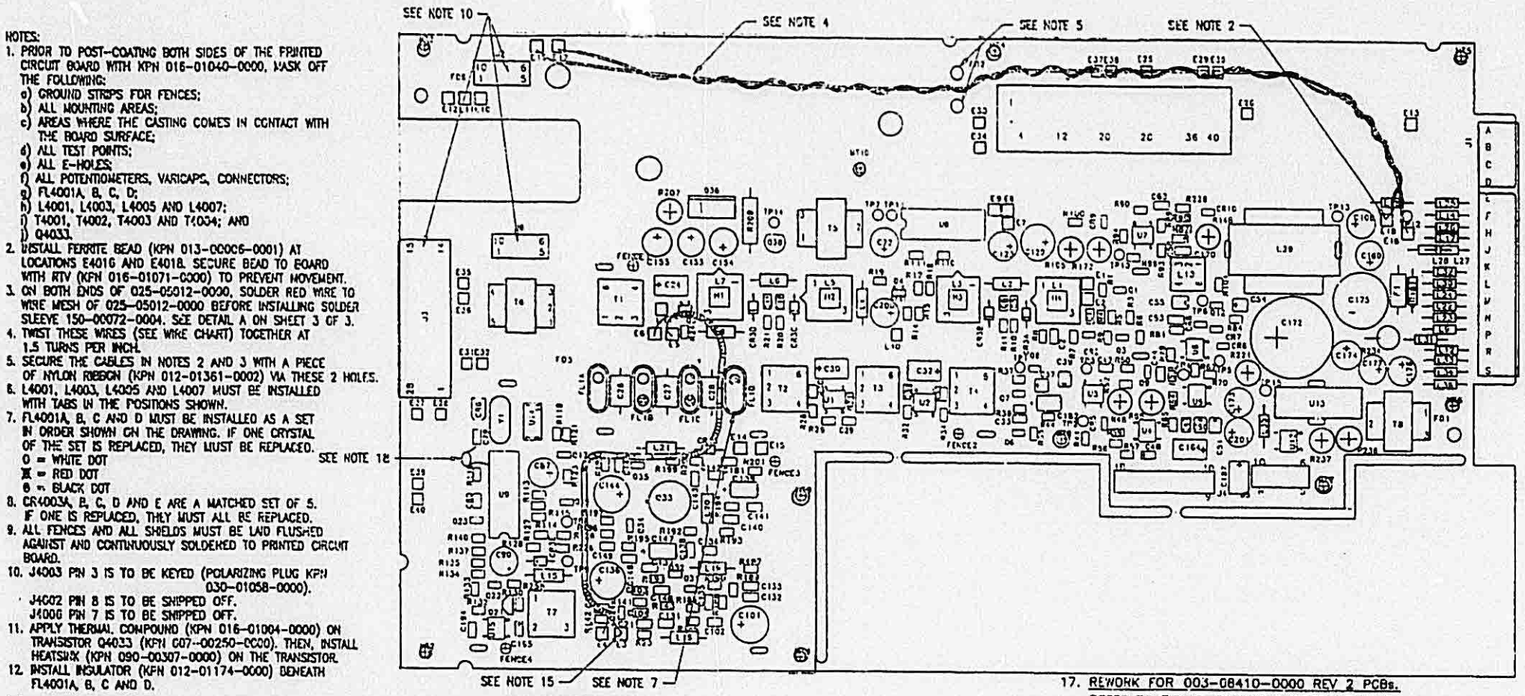
FIGURE 6-13 COMM RECEIVER BOARD
Dwg. No. 300-08410-0000, R5
(Sheet 3 of 3)

COMMUNICATIONS TRANSCEIVER/ GPS RECEIVER

NOTES:
1. PRIOR TO POST-COATING BOTH SIDES OF THE PRINTED CIRCUIT BOARD WITH KPN 016-01040-0000, MASK OFF THE FOLLOWING:
   a) GROUND STRIPS FOR FENCES;
   b) ALL MOUNTING AREAS;
   c) AREAS WHERE THE CASTING COMES IN CONTACT WITH THE BOARD SURFACE;
   d) ALL TEST POINTS;
   e) ALL E-HOLES;
   f) ALL POTENTIOMETERS, VARICAPS, CONNECTORS;
   g) FL4001A, B, C, D;
   h) L4001, L4003, L4005 AND L4007;
   i) T4001, T4002, T4003 AND T4004; AND
   j) Q4033.
2. INSTALL FERRITE BEAD (KPN 013-00006-0001) AT LOCATIONS E4016 AND E4018. SECURE BEAD TO BOARD WITH RTV (KPN 016-01071-0000) TO PREVENT MOVEMENT.
3. ON BOTH ENDS OF 025-05012-0000, SOLDER RED WIRE TO WIRE MESH OF 025-05012-0000 BEFORE INSTALLING SOLDER SLEEVE 150-00072-0004. SEE DETAIL A ON SHEET 3 OF 3.
4. TWIST THESE WIRES (SEE WIRE CHART) TOGETHER AT 1.5 TURNS PER INCH.
5. SECURE THE CABLES IN NOTES 2 AND 3 WITH A PIECE OF NYLON RIBBON (KPN 012-01361-0002) VIA THESE 2 HOLES.
6. L4001, L4003, L4005 AND L4007 MUST BE INSTALLED WITH TABS IN THE POSITIONS SHOWN.
7. FL4001A, B, C AND D MUST BE INSTALLED AS A SET IN ORDER SHOWN ON THE DRAWING. IF ONE CRYSTAL OF THE SET IS REPLACED, THEY MUST BE REPLACED.
   O = WHITE DOT
   ⊠ = RED DOT
   ⊗ = BLACK DOT
8. CR4003A, B, C, D AND E ARE A MATCHED SET OF 5. IF ONE IS REPLACED, THEY MUST ALL BE REPLACED.
9. ALL FENCES AND ALL SHIELDS MUST BE LAID FLUSHED AGAINST AND CONTINUOUSLY SOLDERED TO PRINTED CIRCUIT BOARD.
10. J4003 PIN 3 IS TO BE KEYED (POLARIZING PLUG KPN 030-01058-0000).
    J4002 PIN 8 IS TO BE SNIPPED OFF.
    J4006 PIN 7 IS TO BE SNIPPED OFF.
11. APPLY THERMAL COMPOUND (KPN 016-01004-0000) ON TRANSISTOR Q4033 (KPN 007-00250-0000). THEN, INSTALL HEATSINK (KPN 090-00307-0000) ON THE TRANSISTOR.
12. INSTALL INSULATOR (KPN 012-01174-0000) BENEATH FL4001A, B, C AND D.
13.

WIRE CHART				
FROM	TO	DESCRIPTION	KPN	LENGTH (M)
E4003	E4005	DOUBLE-SHIELD COAX CABLE E4003-E4005: SIGNAL; E4004-E4006: GND	026-00013-0001	0.125
E4004	E4006			
E4007	E4010	WIRE 20 SHIELD WHT/BLK	025-05012-0000	0.175
E4008	E4011			
E4009	E4012	WIRE INSULATED 26 AWG RED	025-00018-0022	2X 0.035
E4016	E4017	18 AWG RED/WHT	025-00005-0012	0.245
E4018	E4019	18 AWG RED	025-00005-0002	0.245

14. THE RF/IF SHIELD(047-10412-0001) NEED TO BE INSTALLED FIRST BEFORE THE VCO SHIELD(047-10413-0001).
    NOTE THE DIRECTION OF BEND IN DETAIL X & Y.
15. INSTALL SOLDER SLEEVE ON BOTH ENDS OF 026-00013-0001 COAX CABLE. SEE DETAIL B ON SHEET 3 OF 3.
16. REWORK FOR 003-08410-0000 REV 2 PCBs.
    REFER TO FIG. 1. CUT TRACE ATTACHED TO C199 ANODE. THEN, SOLDER AN INDUCTOR (019-02084-0037) BETWEEN POINT A AND C199 ANODE.



NEARSIDE

17. REWORK FOR 003-08410-0000 REV 2 PCBs.
    REFER TO FIG. 2. SOLDER A PIECE OF WIRE (KPN 026-00032-0008, 1cm) BETWEEN POINT X AND POINT Y (TERMINAL OF R13).
18. REWORK FOR 003-08410-0000 REV 2 PCBs.
    SOLDER A CAP. (KPN 111-00001-0034) BETWEEN U9-PIN8 AND C79 GND TERMINAL.

FIG. 2 (F/S)

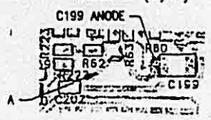
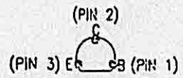
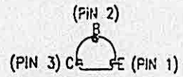


FIG. 1 (F/S)

FIGURE 6-14 COMM RECEIVER BOARD
Dwg. No. 300-08410-0000, R3
(Sheet 1 of 3)



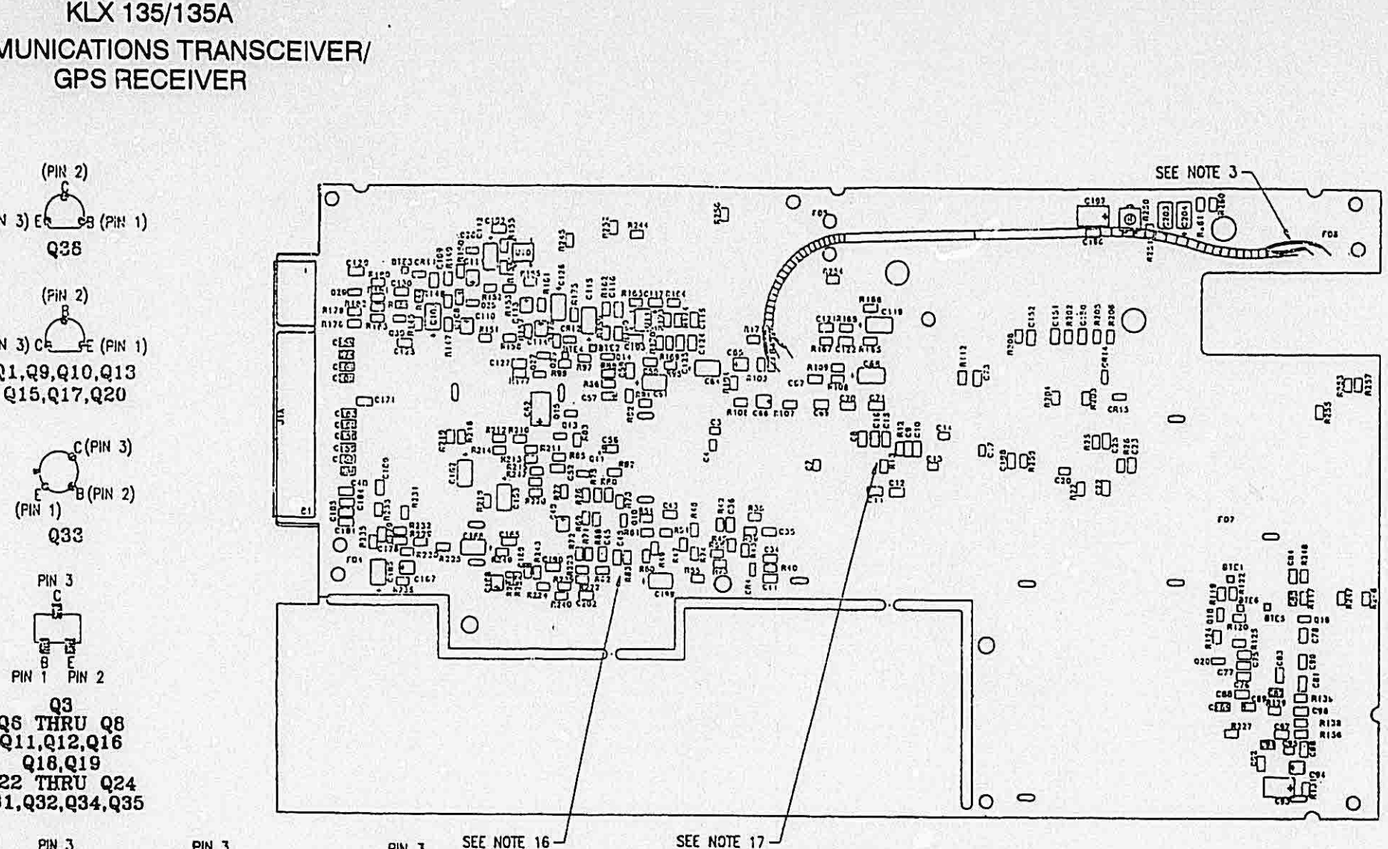
Q38



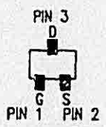
Q1,Q9,Q10,Q13
Q15,Q17,Q20

Q33

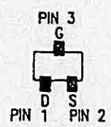
Q3
Q6 THRU Q8
Q11,Q12,Q16
Q18,Q19
Q22 THRU Q24
Q31,Q32,Q34,Q35



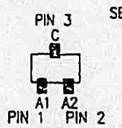
FARSIDE



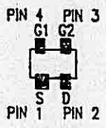
Q29,Q30



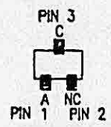
Q14
Q25 THRU Q28



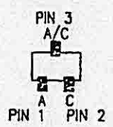
CR5 THRU CR8
CR10,CR11



Q4,Q5



CR9,CR14



CR4,CR12

FIGURE 6-14 COMM RECEIVER BOARD
Dwg. No. 300-08410-0000, R3
(Sheet 2 of 3)

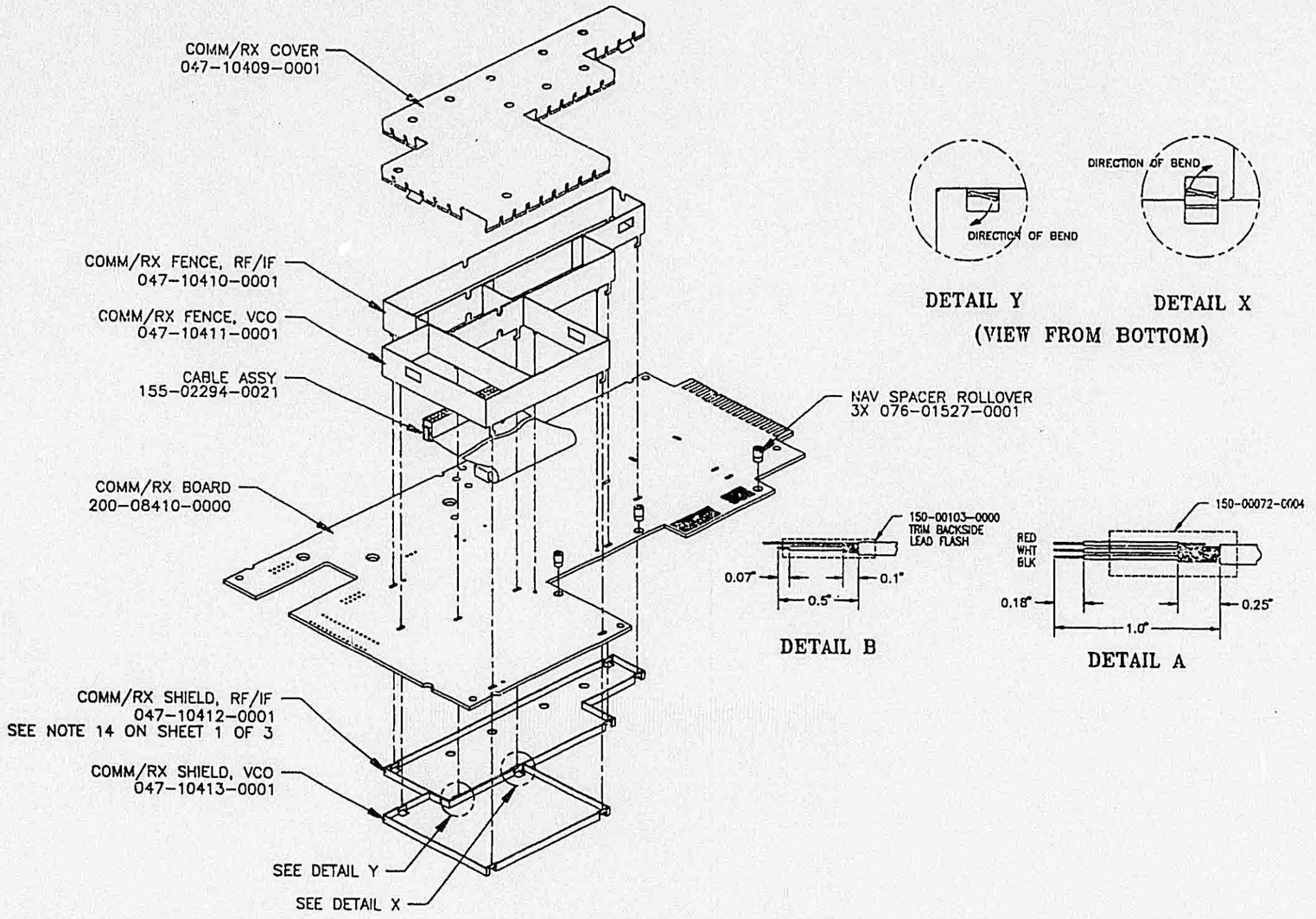


FIGURE 6-14 COMM RECEIVER BOARD
Dwg. No. 300-08410-0000, R3
(Sheet 3 of 3)

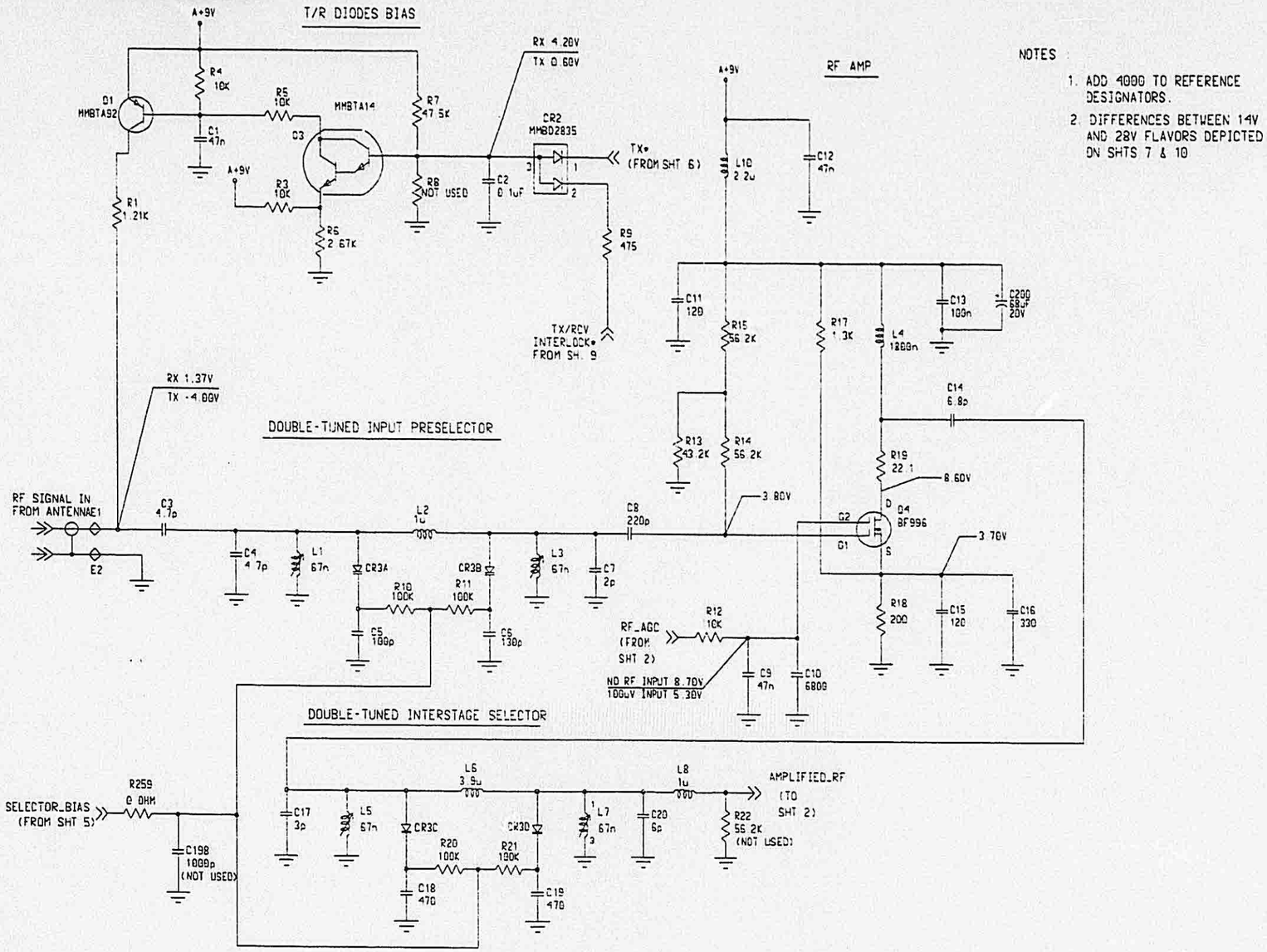


FIGURE 6-15 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R7
(Sheet 1 of 10)

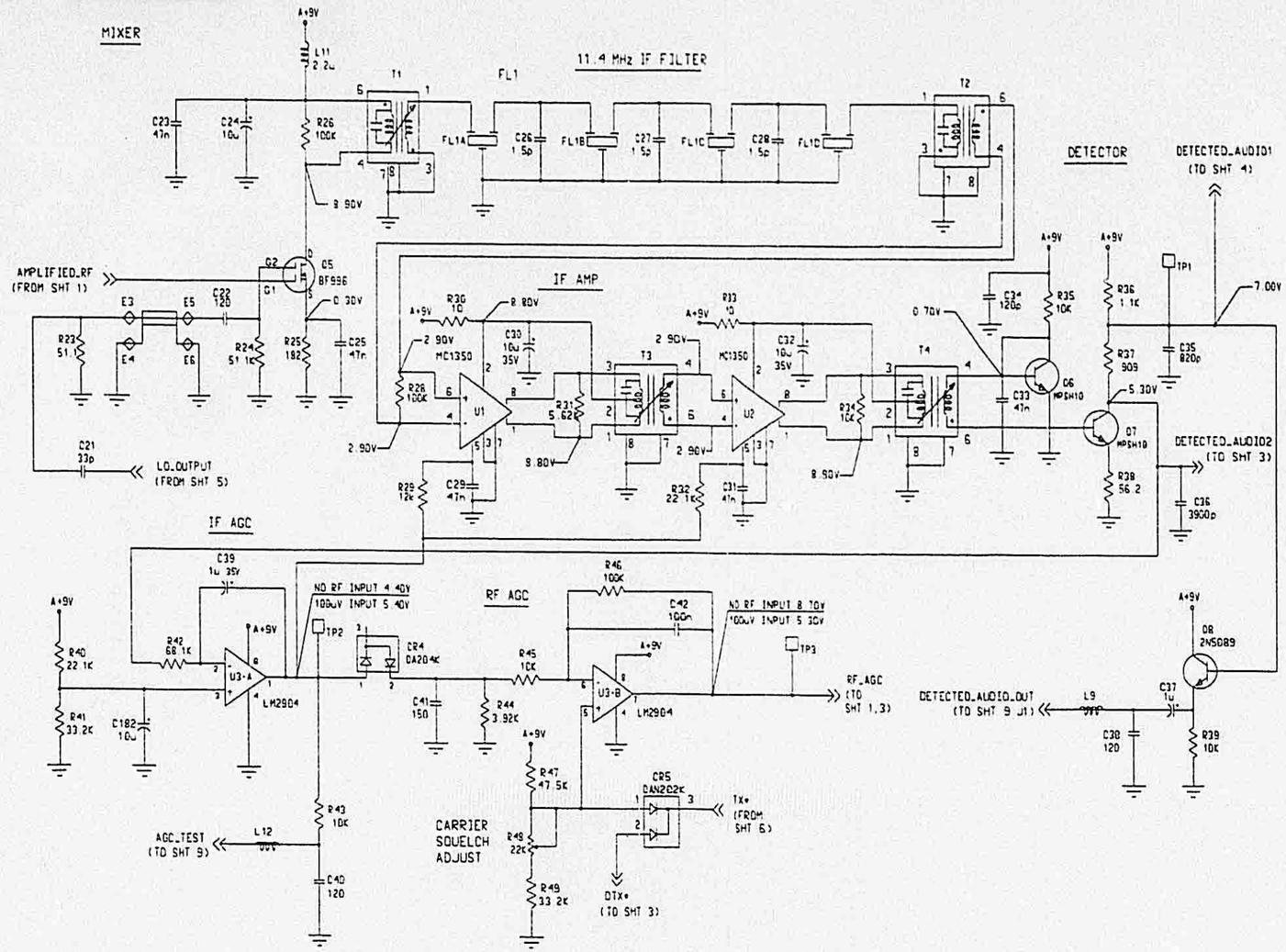


FIGURE 6-15 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R7
(Sheet 2 of 10)

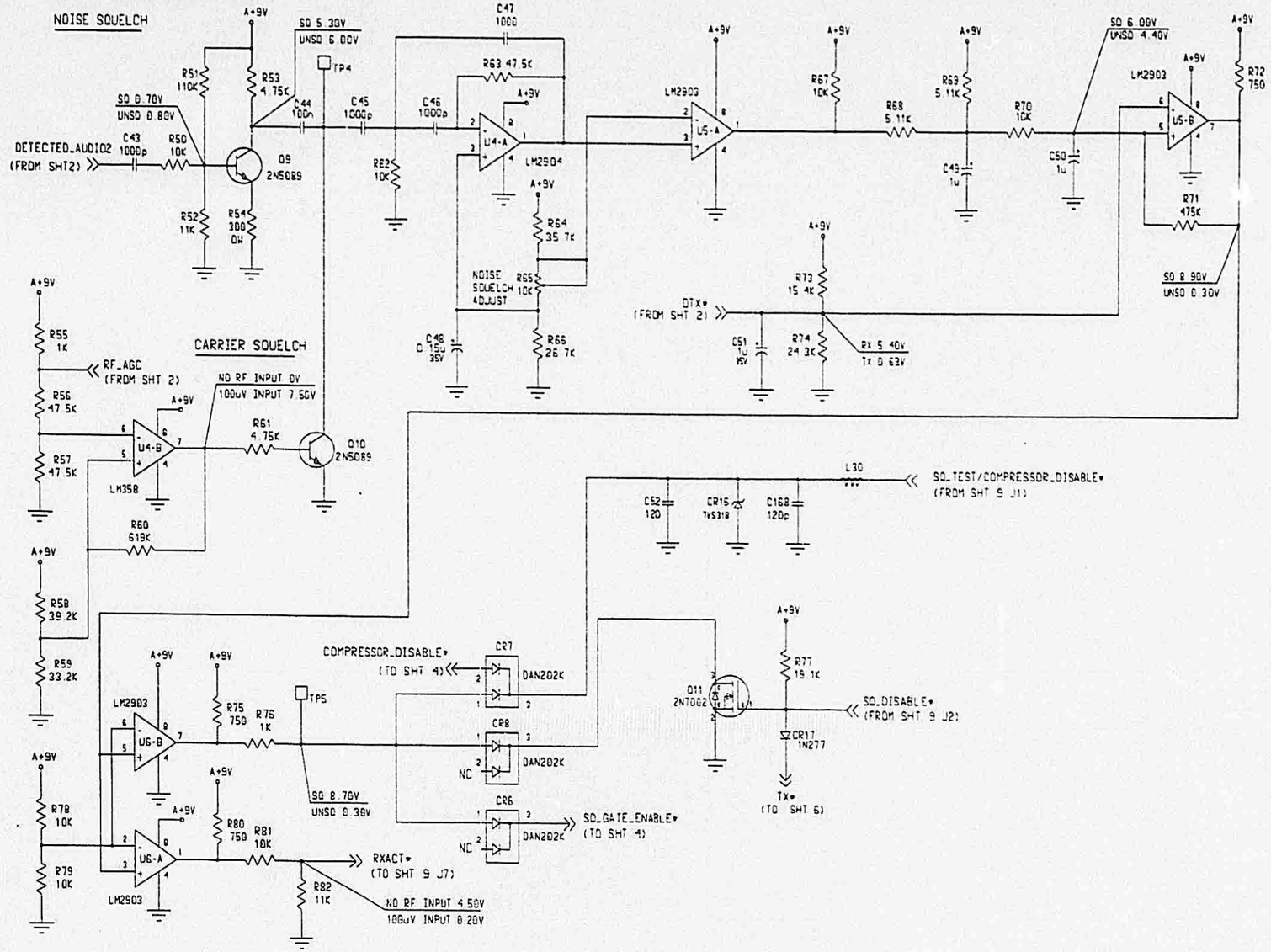


FIGURE 6-15 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R7
(Sheet 3 of 10)

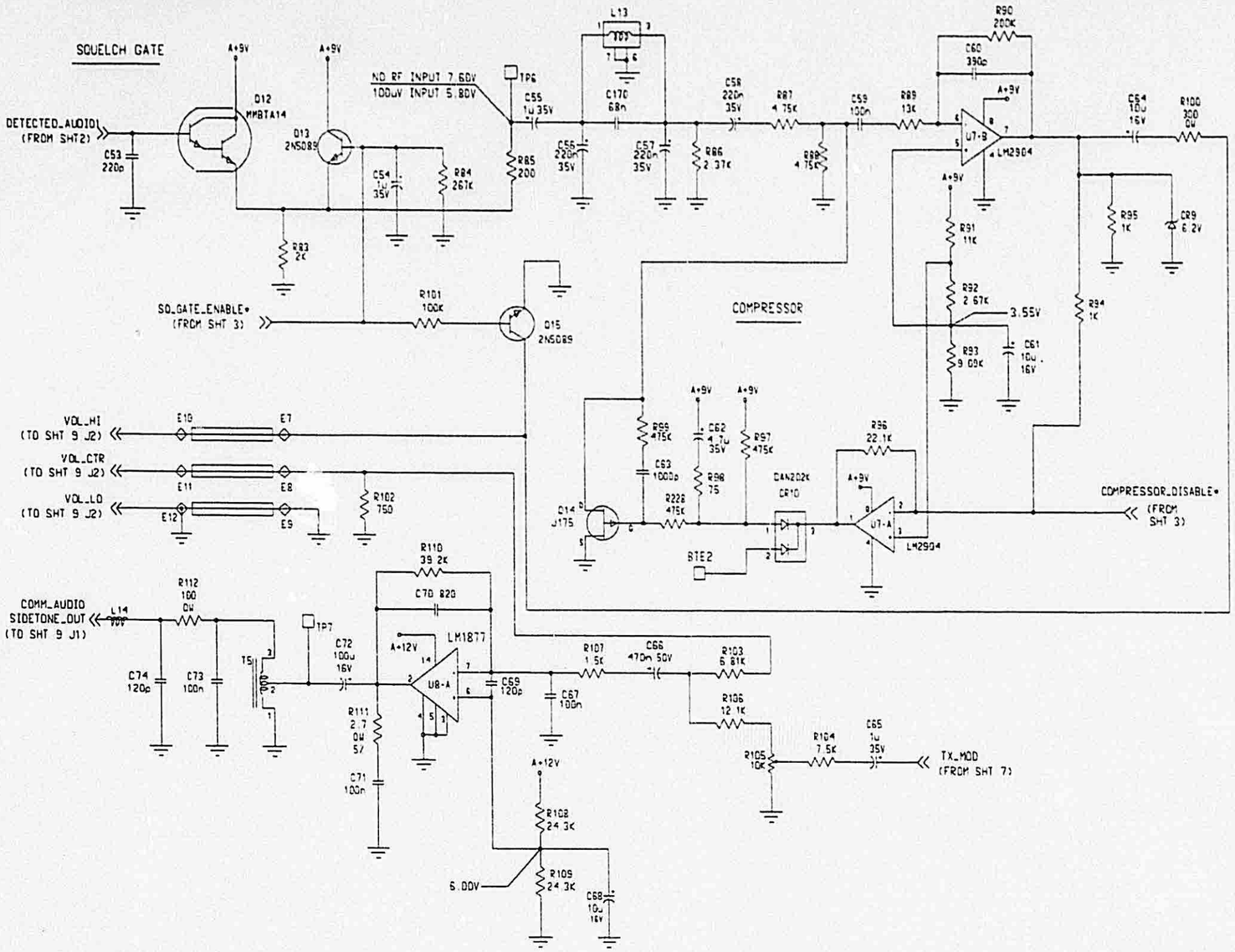


FIGURE 6-15 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R7
(Sheet 4 of 10)

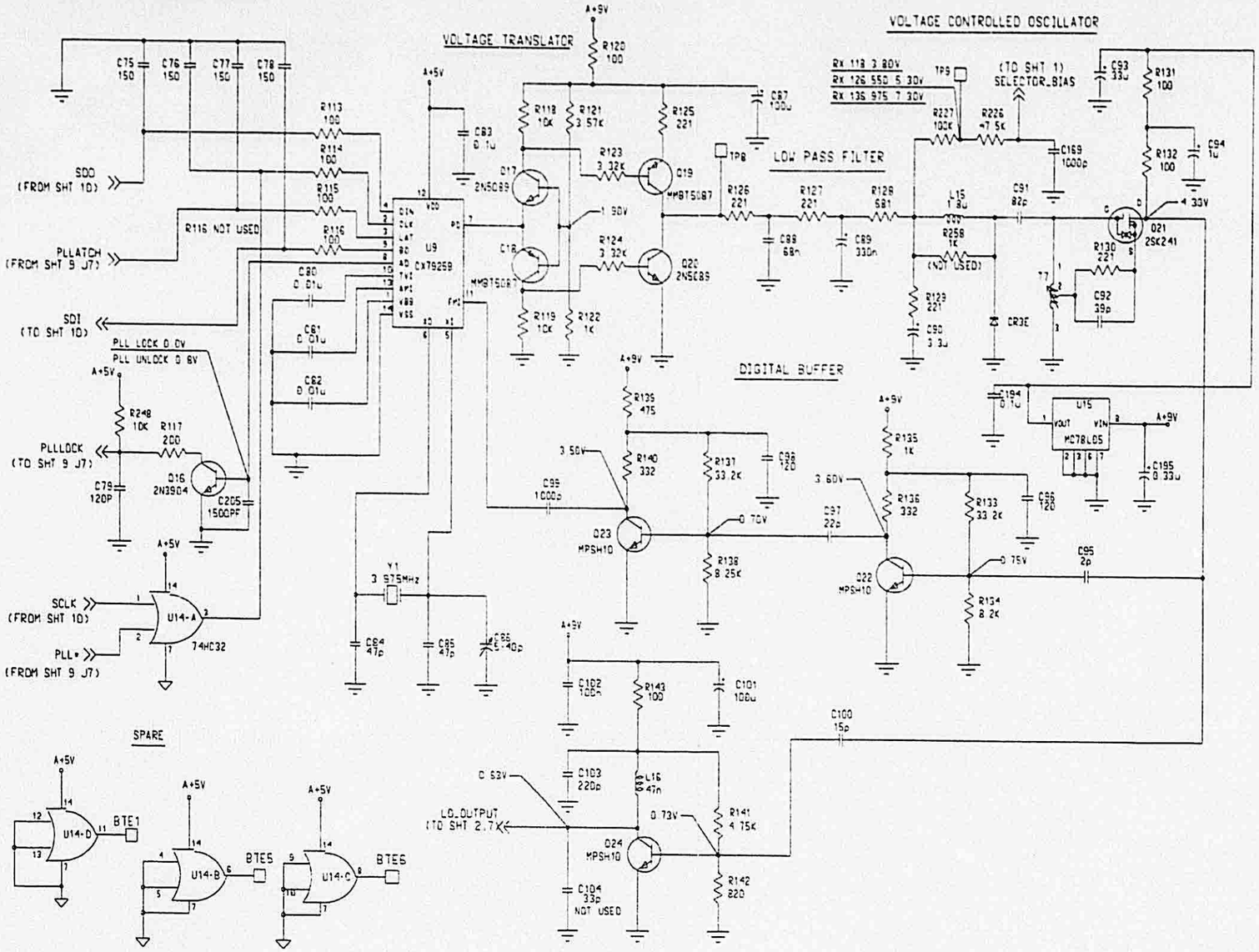


FIGURE 6-15 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R7
(Sheet 5 of 10)

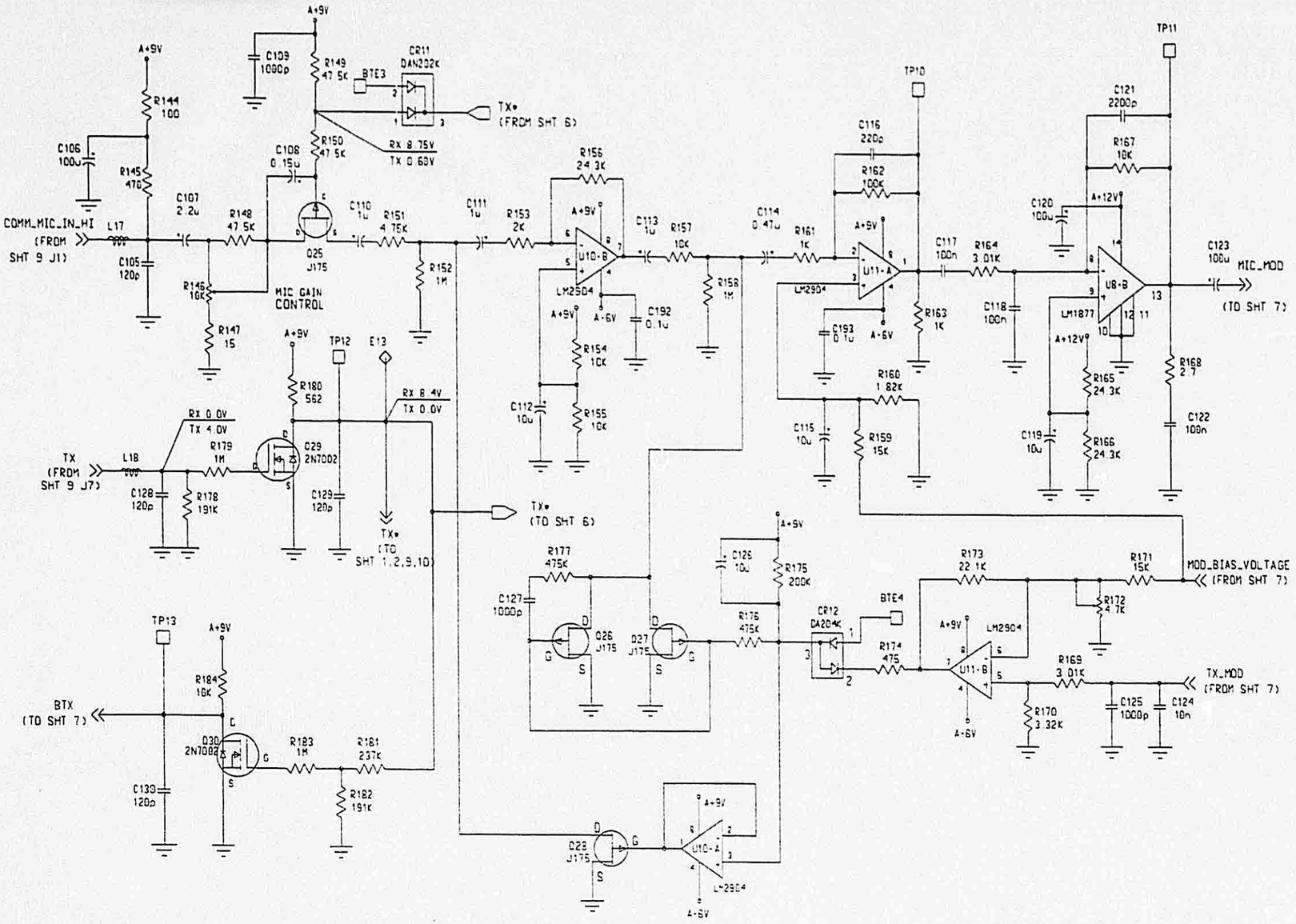
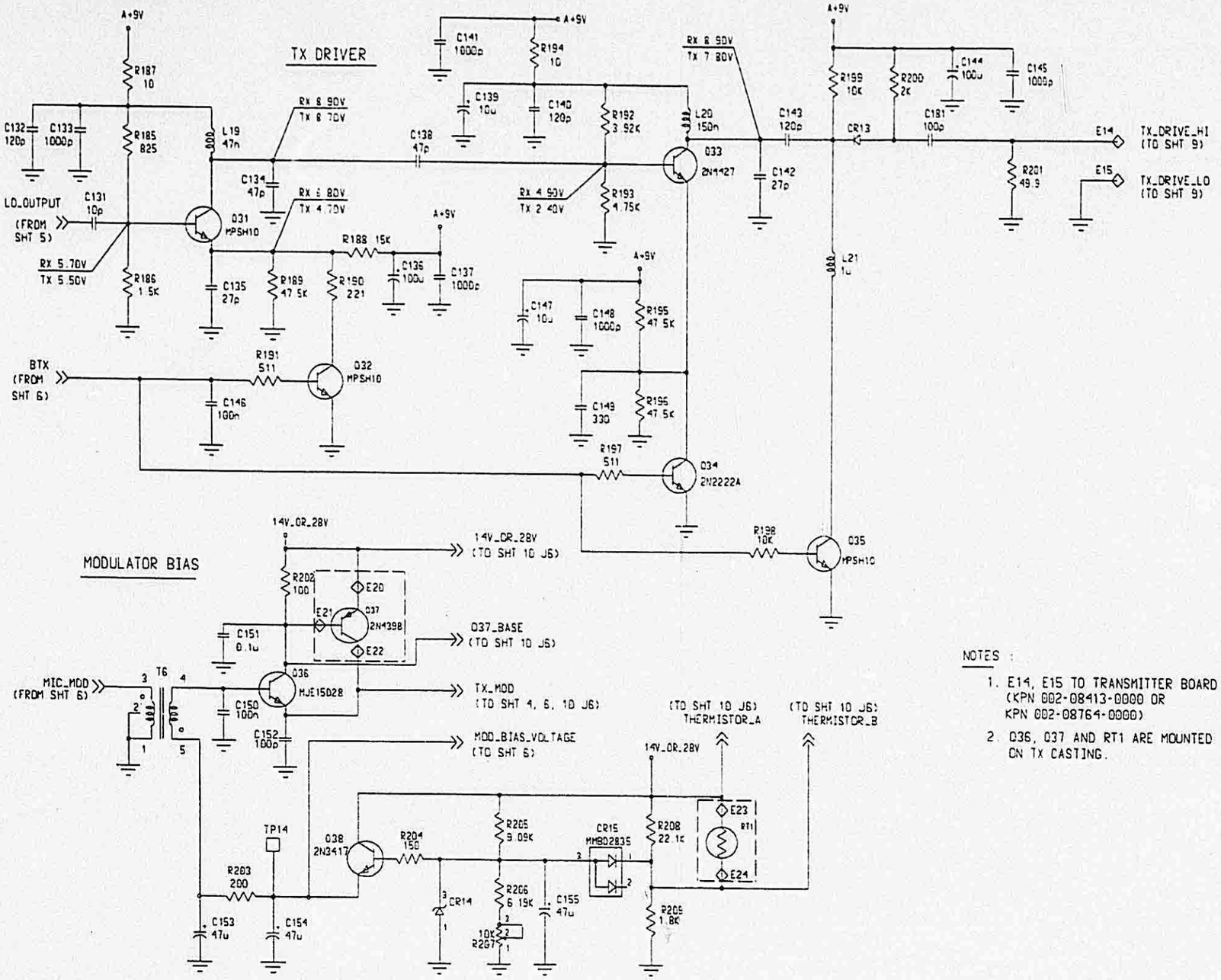


FIGURE 6-15 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R7
(Sheet 6 of 10)



NOTES :

1. E14, E15 TO TRANSMITTER BOARD (KPN 002-08413-0000 OR KPN 002-08764-0000)
2. Q36, Q37 AND RT1 ARE MOUNTED ON TX CASTING.

FIGURE 6-15 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R7
(SHEET 7 OF 10)

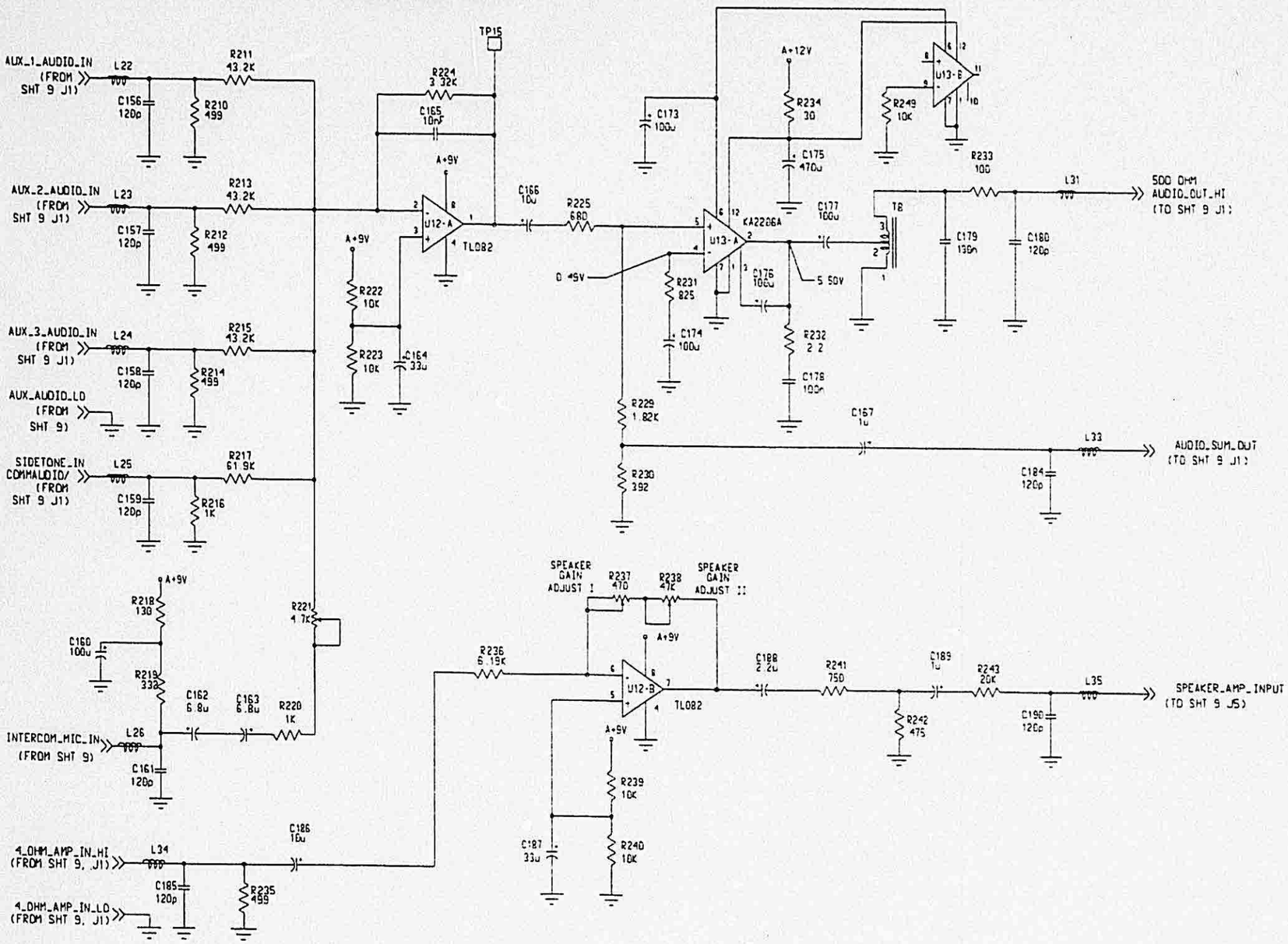


FIGURE 6-15 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R7
(Sheet 8 of 10)

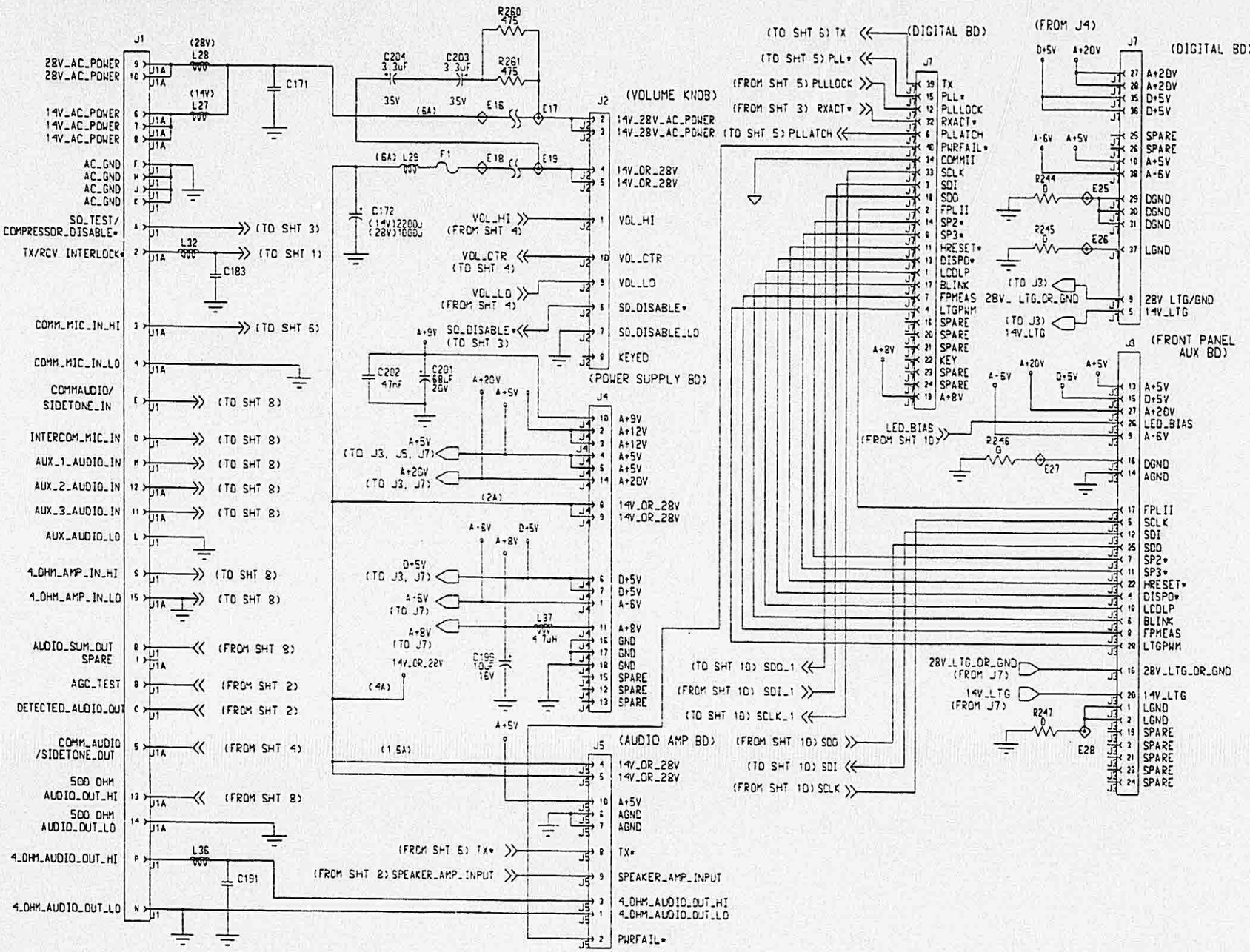


FIGURE 6-15 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R7
(Sheet 9 of 10)

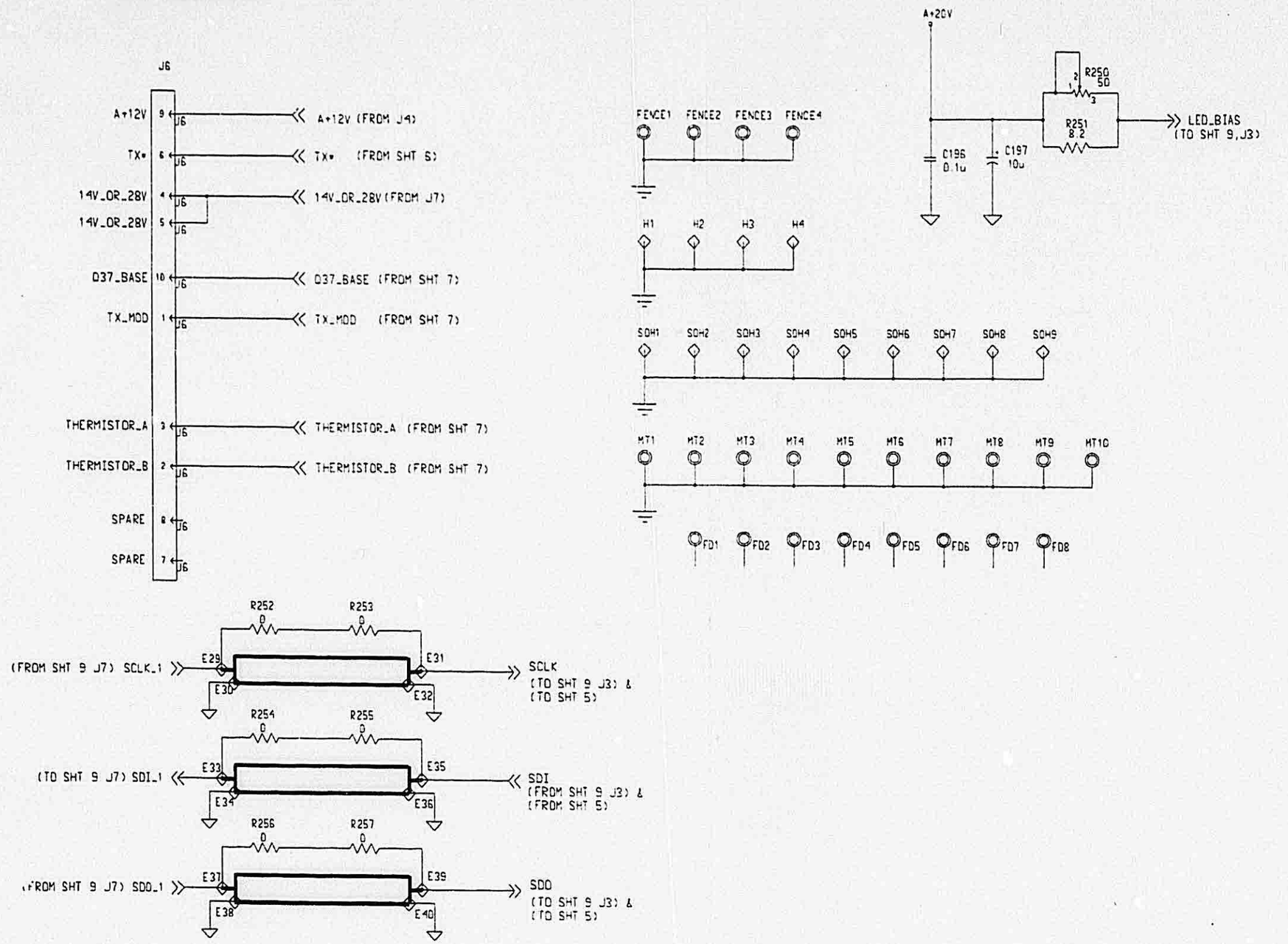


FIGURE 6-15 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R7
(Sheet 10 of 10)

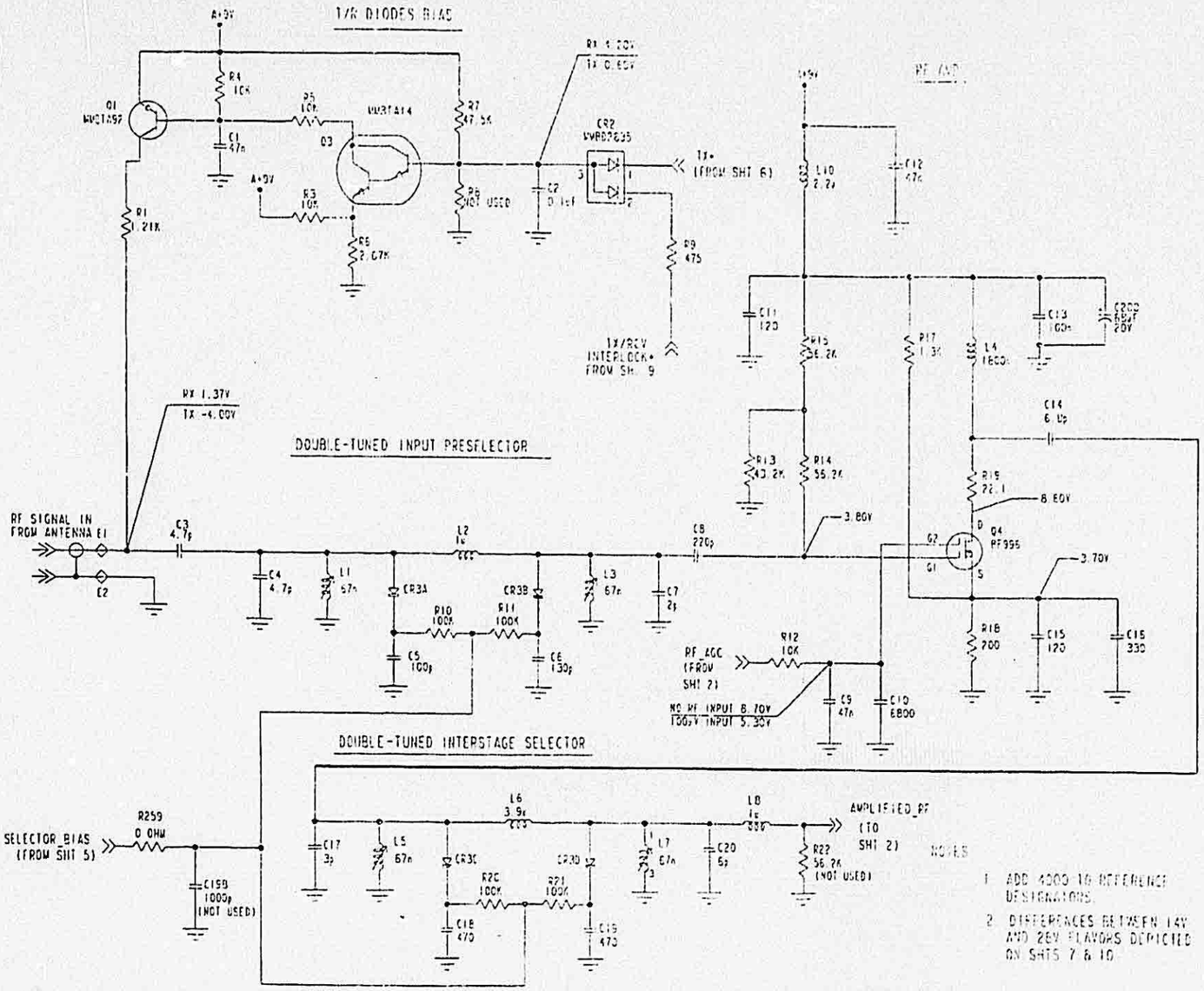


FIGURE 6-16 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R4
(Sheet 1 of 10)

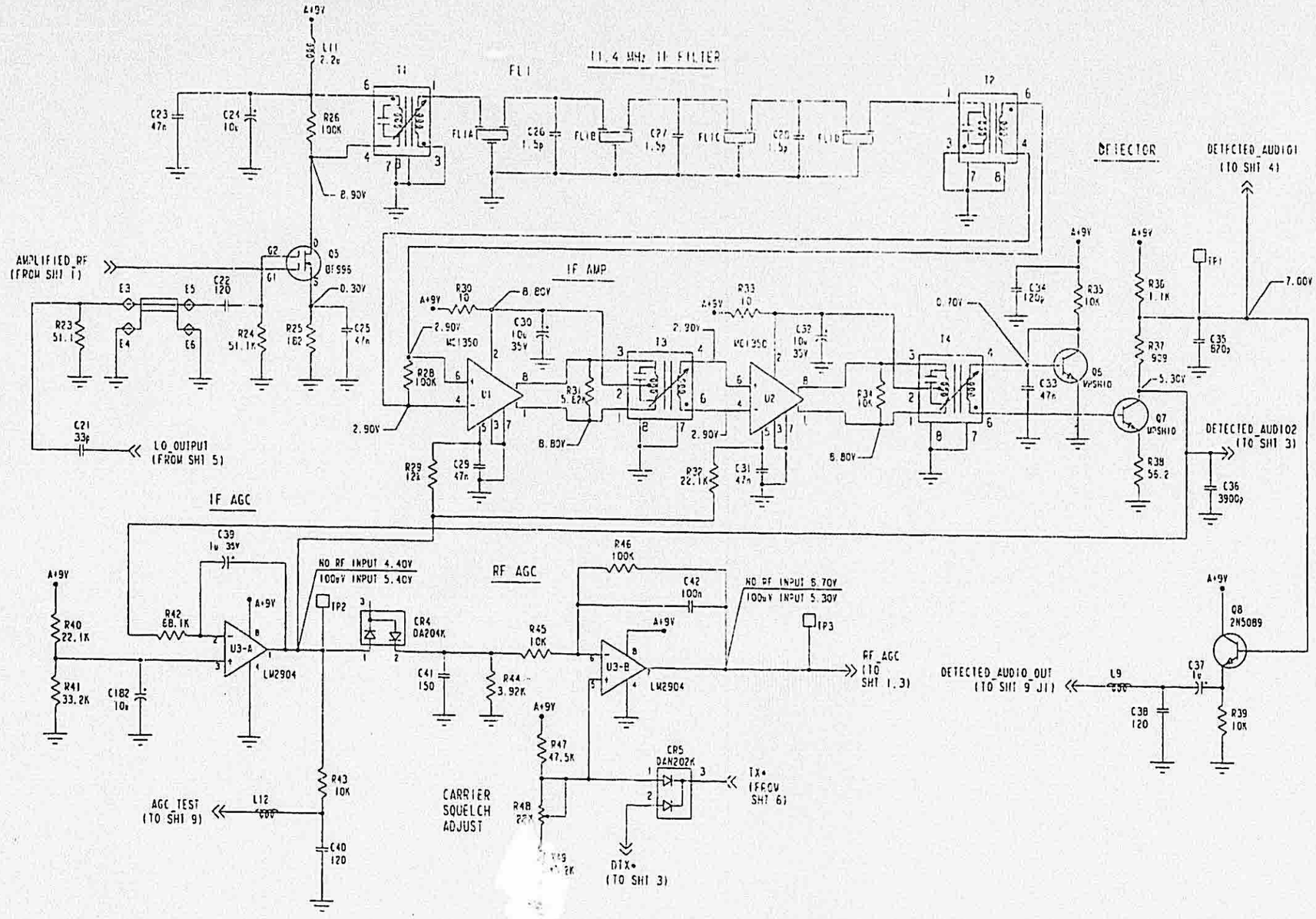


FIGURE 6-16 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R4
(Sheet 2 of 10)

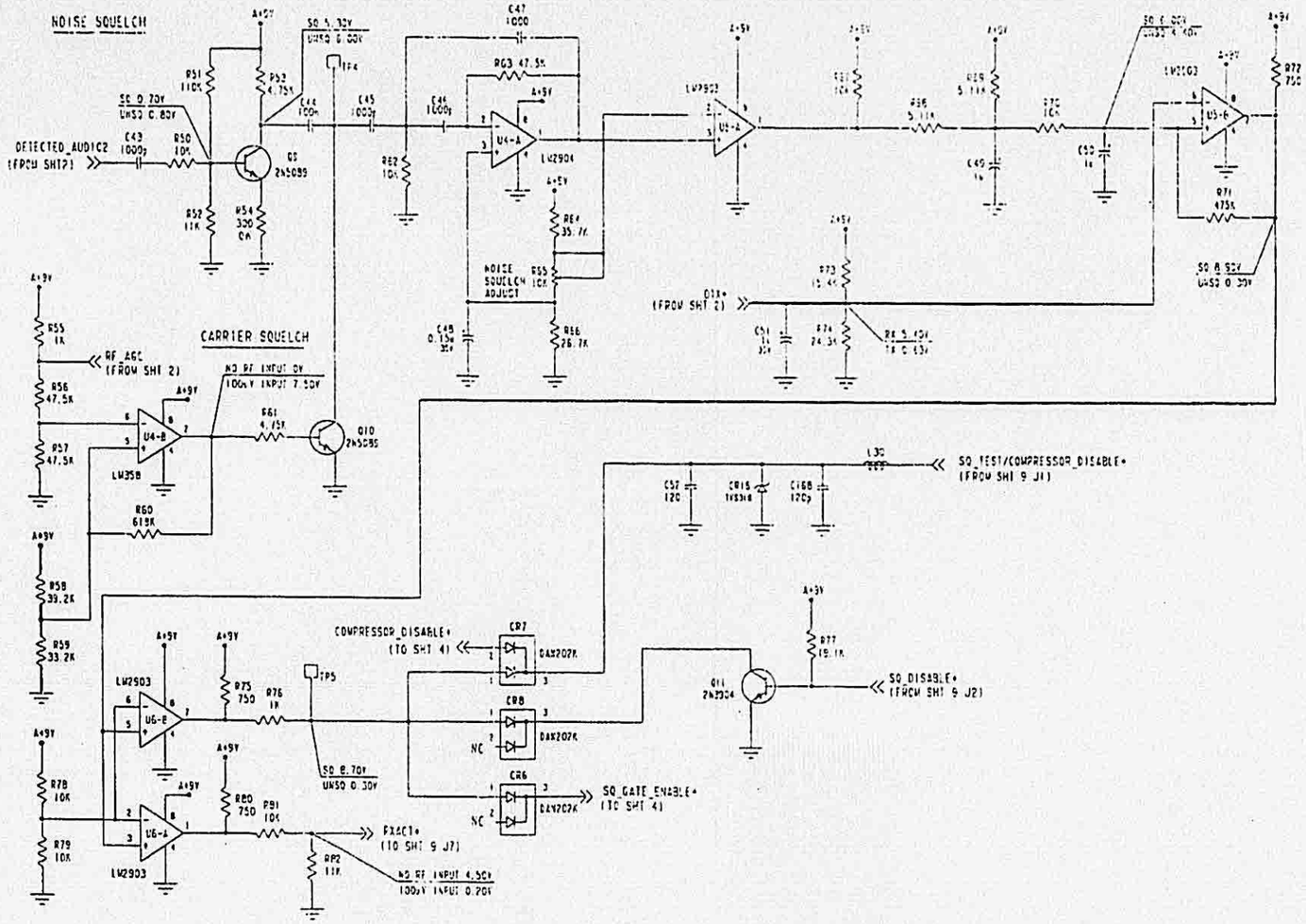


FIGURE 6-16 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R4
(Sheet 3 of 10)

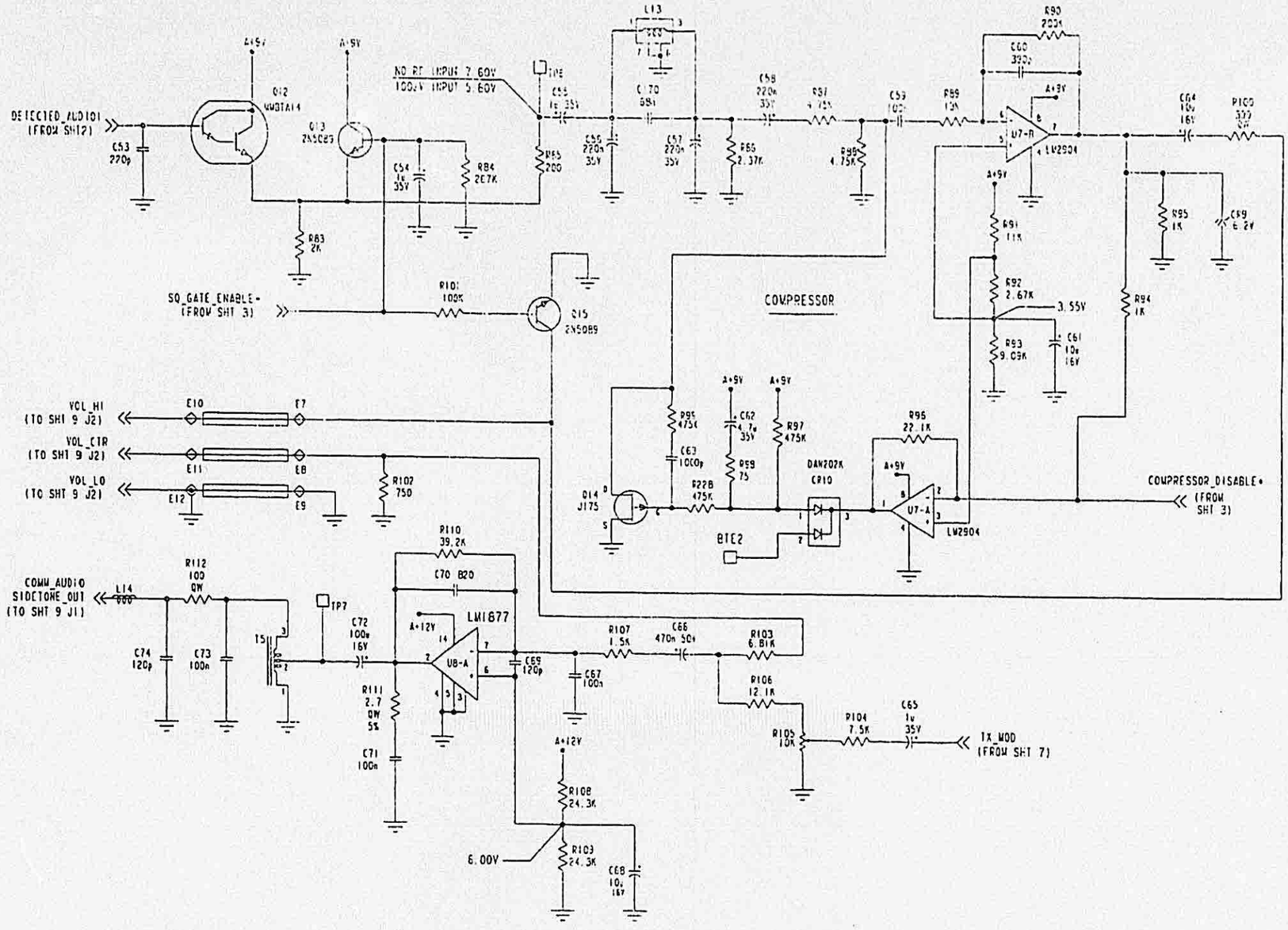


FIGURE 6-16 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R4
(Sheet 4 of 10)

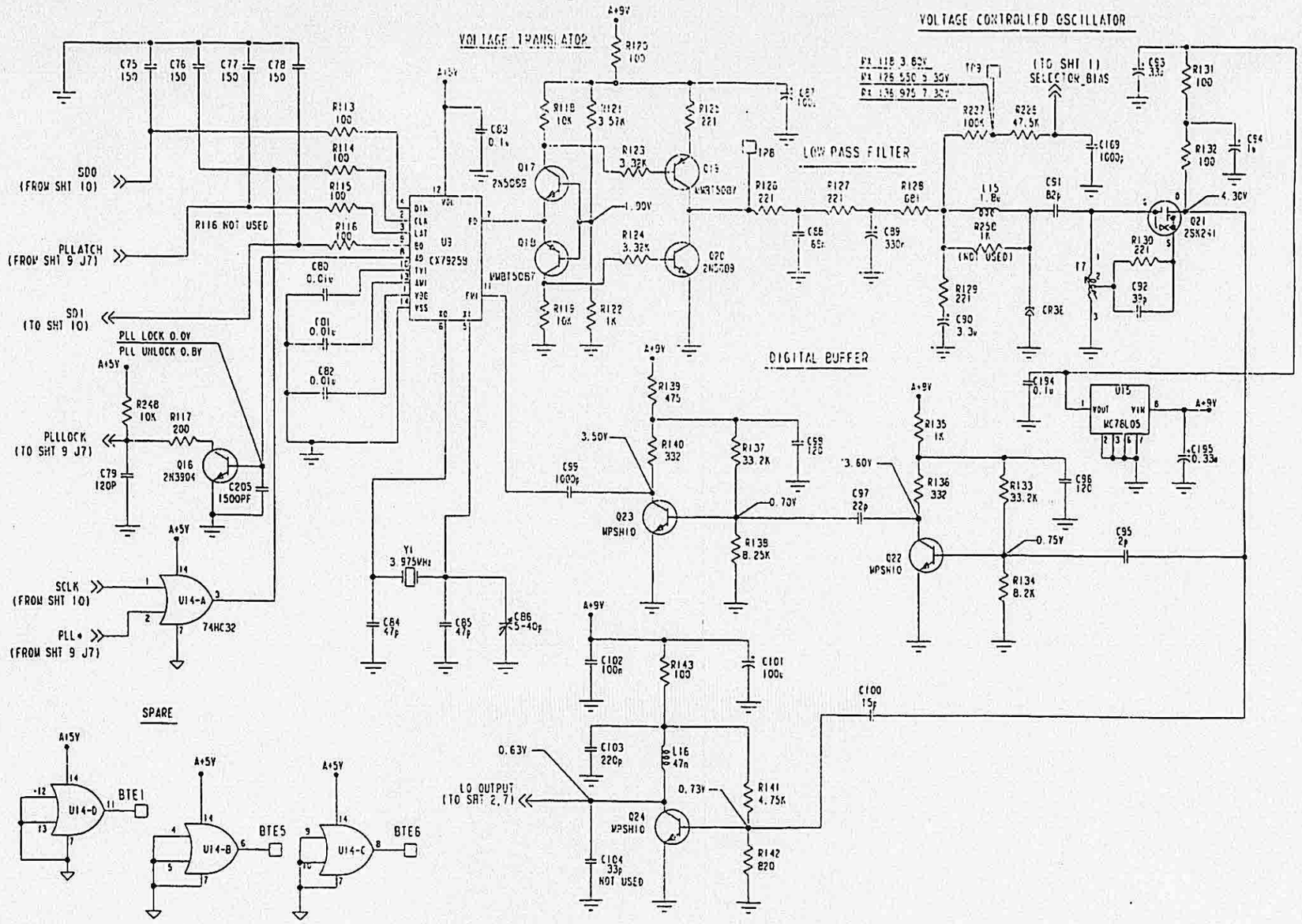


FIGURE 6-16 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R4
(Sheet 5 of 10)

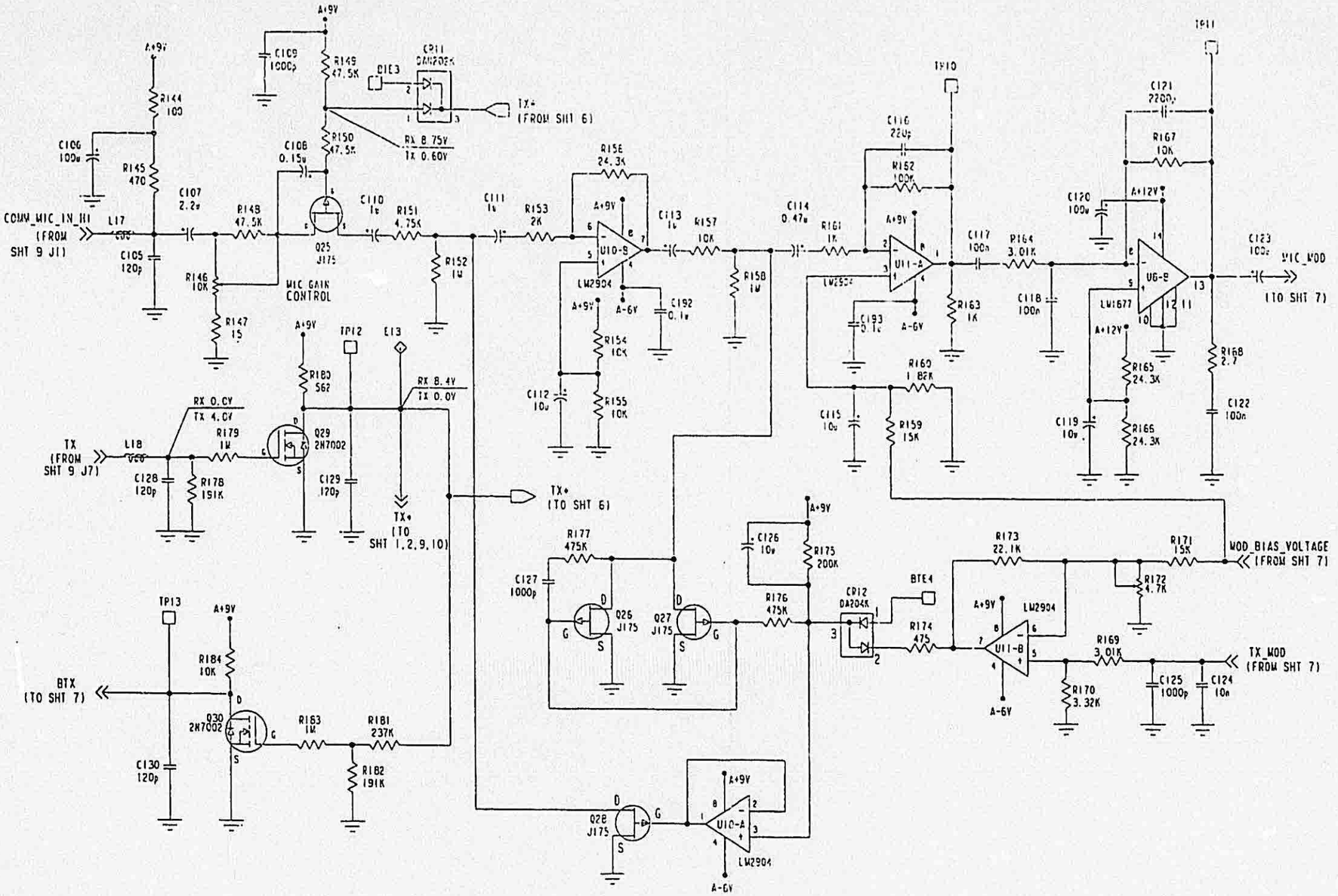
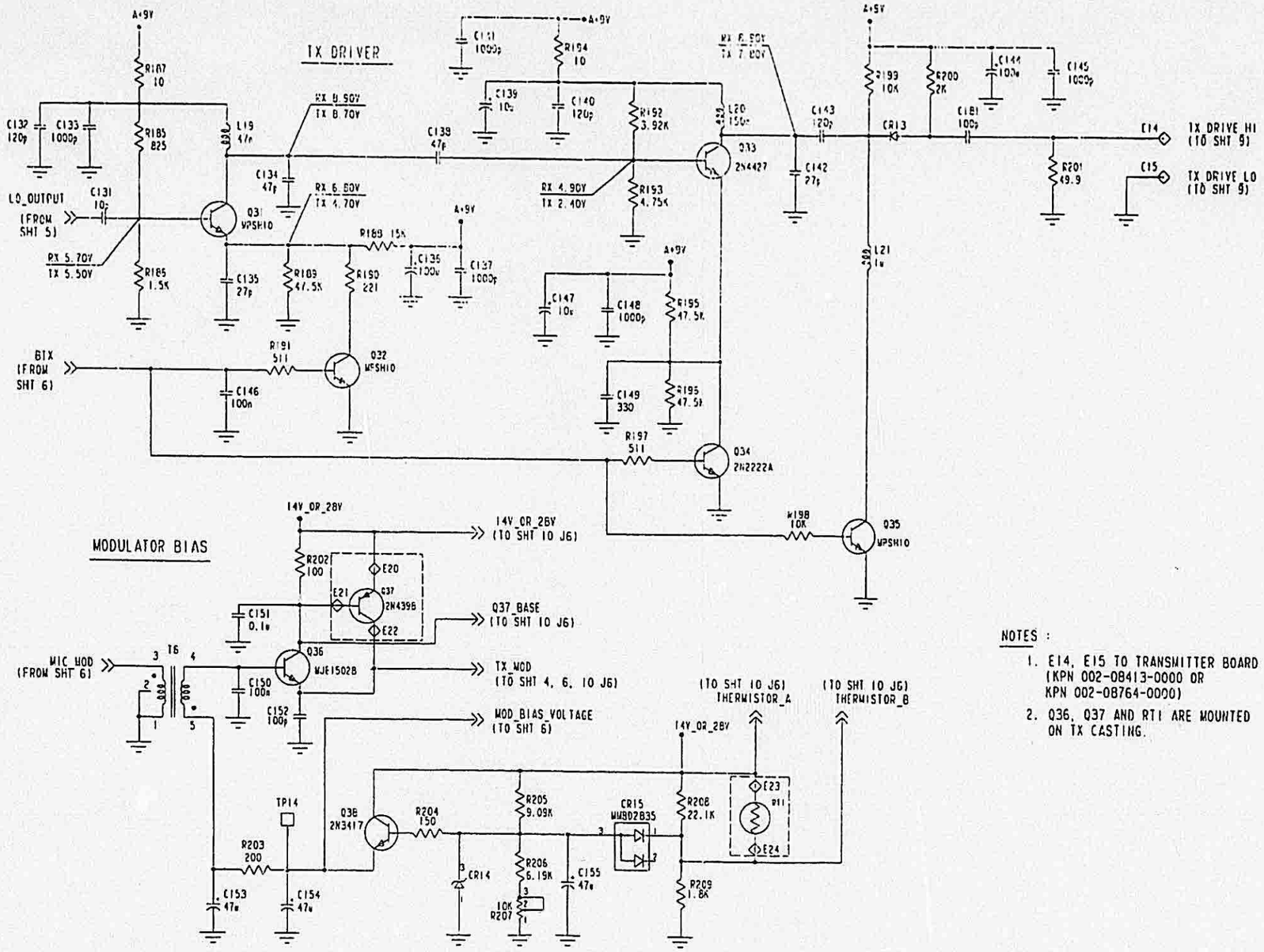


FIGURE 6-16 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R4
(Sheet 6 of 10)



NOTES :

1. E14, E15 TO TRANSMITTER BOARD (KPN 002-08413-0000 OR KPN 002-08764-0000)
2. Q36, Q37 AND RT1 ARE MOUNTED ON TX CASTING.

FIGURE 6-16 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R4
(Sheet 7 of 10)

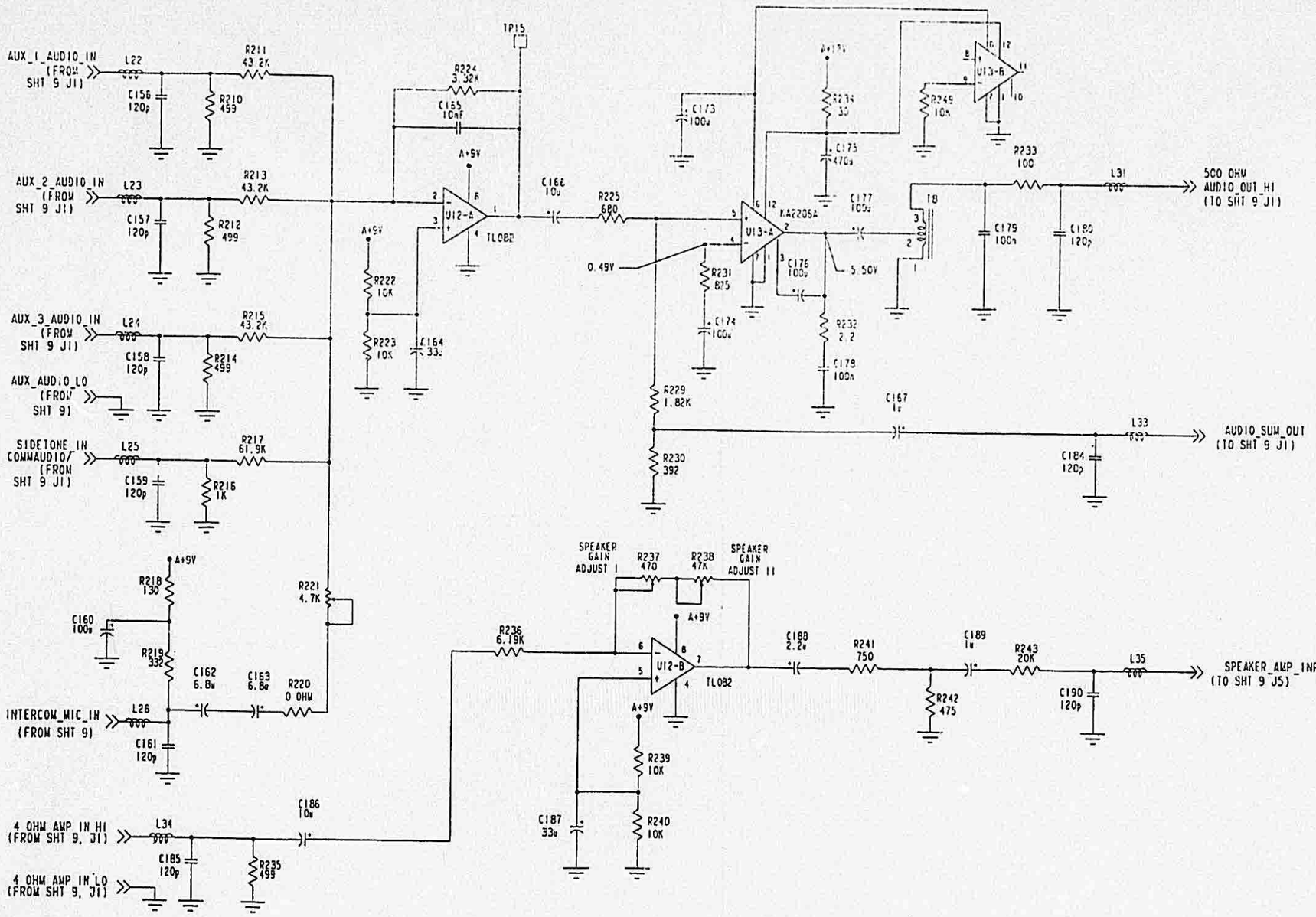


FIGURE 6-16 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R4
(Sheet 8 of 10)

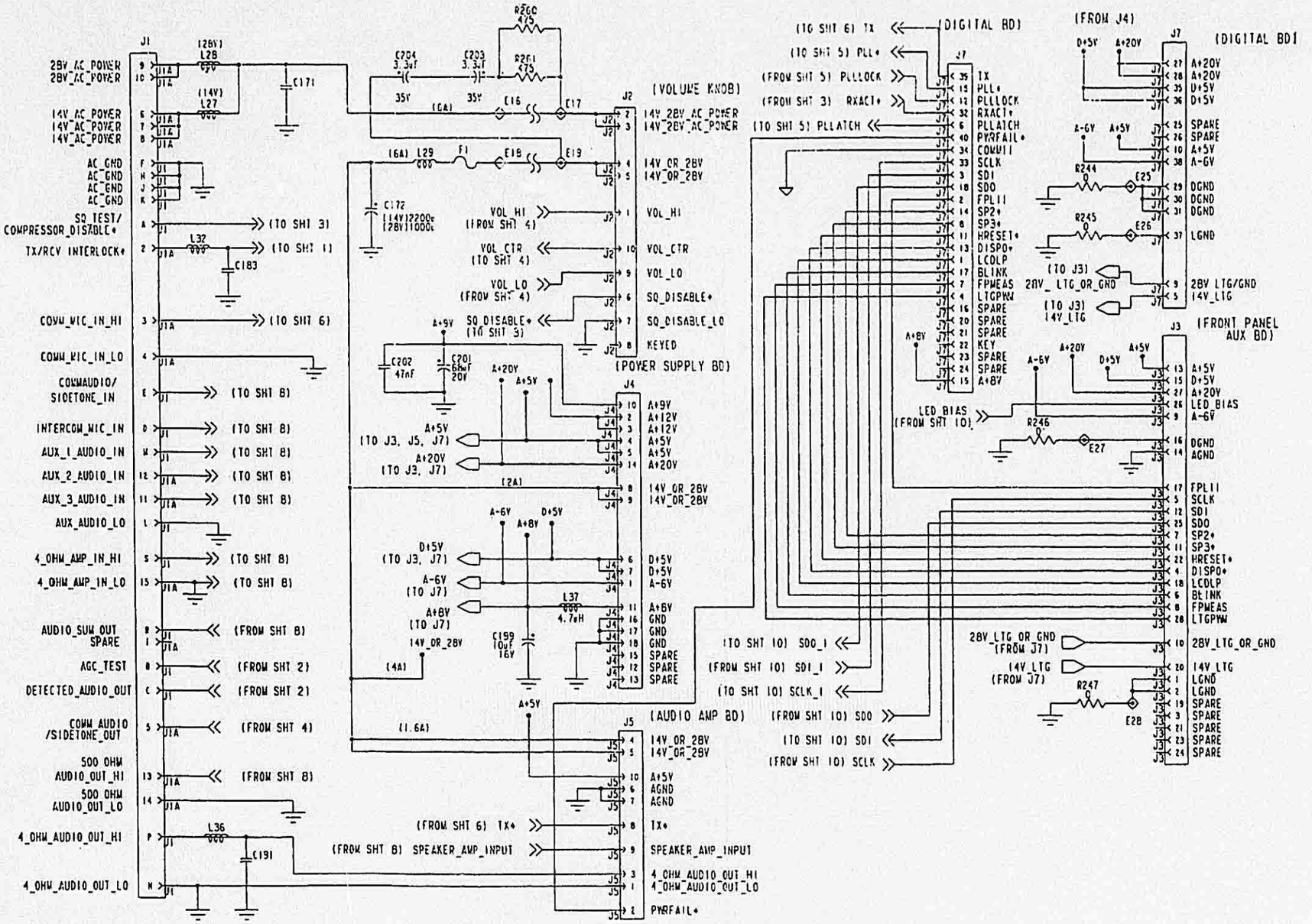


FIGURE 6-16 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R4
(Sheet 9 of 10)

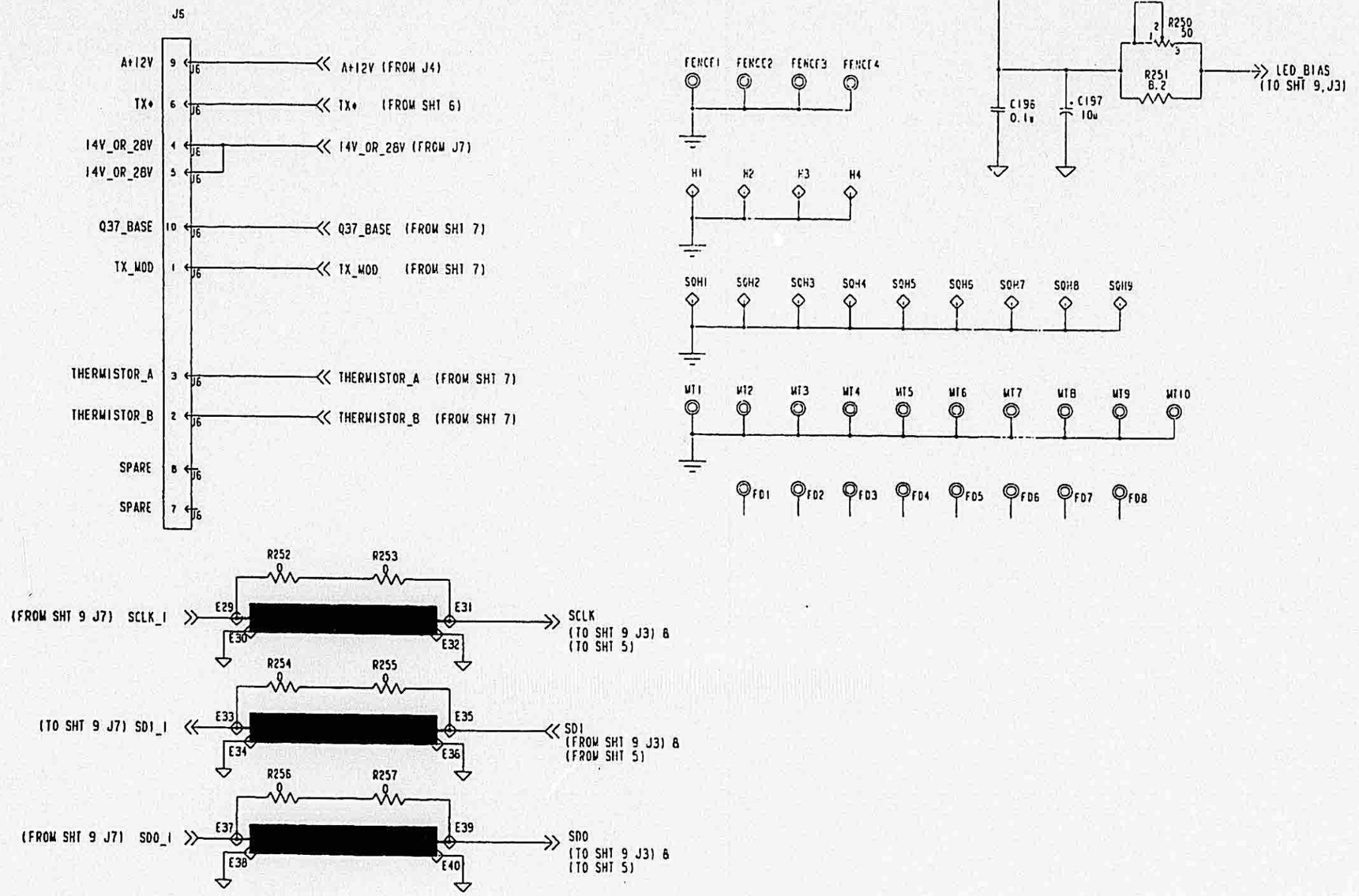


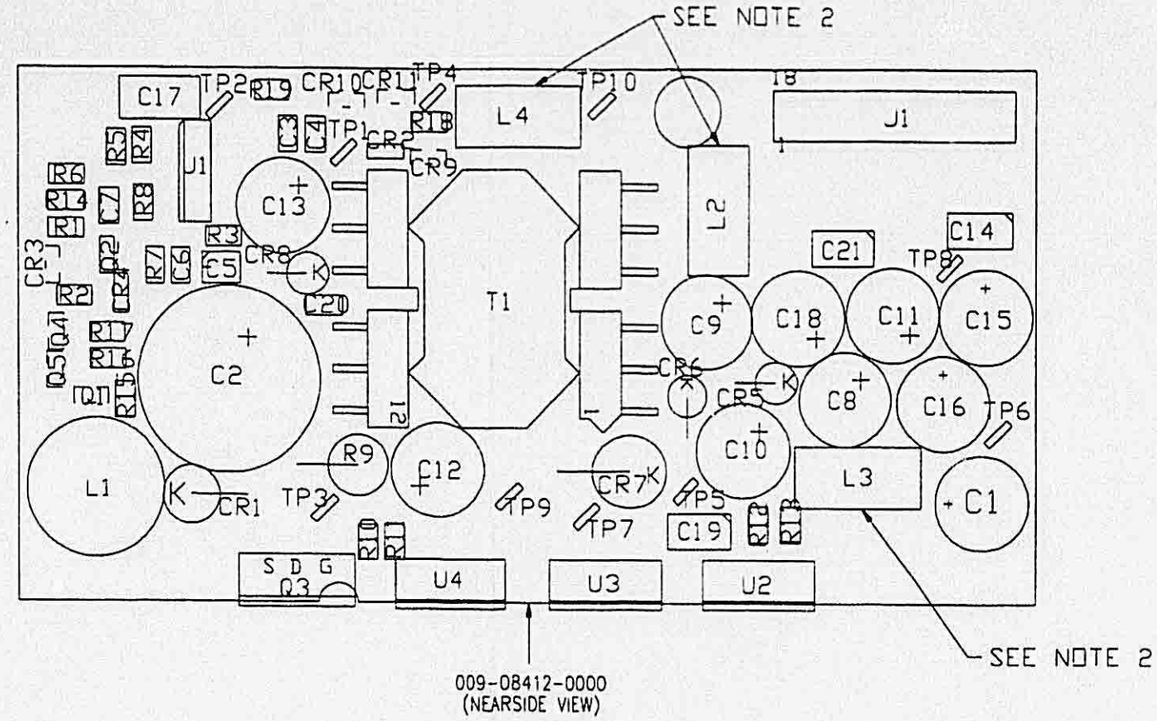
FIGURE 6-16 COMM RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08410-0000, R4
(Sheet 10 of 10)

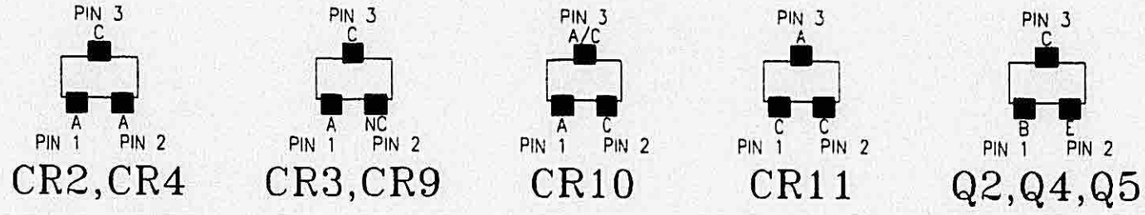
6.10	200-08412-0000	POWER SUPPLY BOARD	R1		
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
...	009-08412-0000	KL135 P/S BOARD		EA	1
...	012-01479-0000	INSUL SHIELD		EA	1
...	016-01040-0000	COATING TYPE AR		AR	1
...	016-01071-0000	DC RTV 3140		ML	1
...	047-10198-0002	PWR SUPPLY CHASSIS	A	EA	1
...	047-10199-0001	PWR SUPPLY COVER	A	EA	1
...	047-10207-0001	HEATSINK P/S W/F	A	EA	1
...	076-01527-0001	NAV SPACER ROLLVER		EA	2
...	089-02076-0030	NUT FLAT 4-40		EA	4
...	089-05903-0004	SCR PHP 4-40X1/4		EA	2
...	089-06008-0004	SCR FHP 4-40X1/4		EA	4
...	091-00156-0000	BUSHING		EA	2
...	091-00606-0000	INSULATOR XSTR		EA	4
C 1001	097-00104-0038	CAP AL 47UF 50V		EA	1
C 1002	097-00207-0002	CAP AL 560UF 50V		EA	1
C 1003	106-04104-0047	CH 100KX7R/50V		EA	1
C 1004	106-04104-0047	CH 100KX7R/50V		EA	1
C 1005	096-01186-0030	CAP 1UF 35V 10%		EA	1
C 1006	106-04681-0016	CAP CH560PFNPO/50V		EA	1
C 1007	106-04821-0047	CAP CH820PFX7R/50V		EA	1
C 1008	097-00207-0007	CAP AL 330UF 25V		EA	1
C 1009	097-00207-0001	CAP AL 220UF 25V		EA	1
C 1010	097-00207-0007	CAP AL 330UF 25V		EA	1
C 1011	097-00207-0007	CAP AL 330UF 25V		EA	1
C 1012	097-00207-0007	CAP AL 330UF 25V		EA	1
C 1013	097-00207-0001	CAP AL 220UF 25V		EA	1
C 1014	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 1015	096-01082-0037	CAP TN 68UF 10V		EA	1
C 1016	096-01082-0037	CAP TN 68UF 10V		EA	1

BENDIX/KING
KLX 135/135A
COMMUNICATIONS TRANSCEIVER/
GPS RECEIVER

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
C 1017	111-00001-0007	CAP CR .022UF 50V		EA	1
C 1018	097-00207-0001	CAP AL 220UF 25V		EA	1
C 1019	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
C 1020	106-04104-0047	CH 100KX7R/50V		EA	1
C 1021	096-01186-0014	CAP 10.0UF 16V 10%		EA	1
CR 1001	007-05039-0002	DIO Z 40.2V		EA	1
CR 1002	007-06227-0000	SOT23 DIO MMBD6100		EA	1
CR 1003	007-05117-0005	DIO Z 5.1V SOT		EA	1
CR 1004	007-06227-0000	SOT23 DIO MMBD6100		EA	1
CR 1005	007-06141-0000	DIO MUR110		EA	1
CR 1005	007-06141-0001	DIO UF RECOV 200V		EA	1
CR 1006	007-06141-0000	DIO MUR110		EA	1
CR 1007	007-06175-0001	DIO RECT		EA	1
CR 1008	007-06141-0000	DIO MUR110		EA	1
CR 1009	007-05117-0005	DIO Z 5.1V SOT		EA	1
CR 1010	007-06223-0000	DIO DA204K		EA	1
CR 1011	007-06181-0000	DIO DUAL MMBD2835		EA	1
L 1001	019-02687-0001	PWR FILTER CHOKES		EA	1
L 1002	019-02696-0000	INDUCTOR 51UH		EA	1
L 1003	019-02696-0000	INDUCTOR 51UH		EA	1
L 1004	019-02696-0000	INDUCTOR 51UH		EA	1
P 1001	030-02174-0001	PIN CONT		EA	1
Q 1001	007-00466-0000	XSTR S PNP MMBTA56		EA	1
Q 1002	007-00542-0000	XSTR PNP MMBTA64		EA	1
Q 1003	007-00886-0000	XSTR MOSFET IRF540		EA	1
Q 1004	007-00467-0000	XSTR S NPN MMBTA06		EA	1
Q 1005	007-00467-0000	XSTR S NPN MMBTA06		EA	1
R 1001	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 1002	139-03922-0000	RES CH 39.2K EW 1%		EA	1
R 1003	139-01212-0000	RES CHIP 12.1K1%EW		EA	1
R 1004	139-02002-0000	RES CHIP 20.0KEW1%		EA	1
R 1005	139-01502-0000	RES CHIP 15K EW 1%		EA	1
R 1006	139-03921-0000	RES CH 3.92K EW 1%		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
R 1007	139-03402-0000	RES CH 34K EW 1%		EA	1
R 1008	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 1009	132-00205-0000	RES WW .03 3W 3%		EA	1
R 1010	139-00100-0000	RES CHIP 10 EW 1%		EA	1
R 1011	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 1012	139-03010-0000	RES CHIP 301 EW 1%		EA	1
R 1013	139-01821-0000	RES CHIP 1.82KEW1%		EA	1
R 1014	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 1015	139-04750-0000	RES CH 475 EW 1%		EA	1
R 1016	139-01302-0000	RES CH 13K EW 1%		EA	1
R 1017	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 1018	139-00100-0000	RES CHIP 10 EW 1%		EA	1
R 1019	139-00100-0000	RES CHIP 10 EW 1%		EA	1
REF 1	300-08412-0000			RF	X
REF 2	002-08412-0000			RF	X
T 1001	019-07267-0000	FLYBACK XFMR		EA	1
TP 1001	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 1002	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 1003	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 1004	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 1005	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 1006	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 1007	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 1008	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 1009	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 1010	008-00096-0001	TERMINAL TEST PNT		EA	1
U 1001	120-03430-0000	IC 2843		EA	1
U 1002	120-03126-0006	IC LM317BT		EA	1
U 1003	120-03026-0000	IC MC7805CT		EA	1
U 1004	120-03026-0000	IC MC7805CT		EA	1

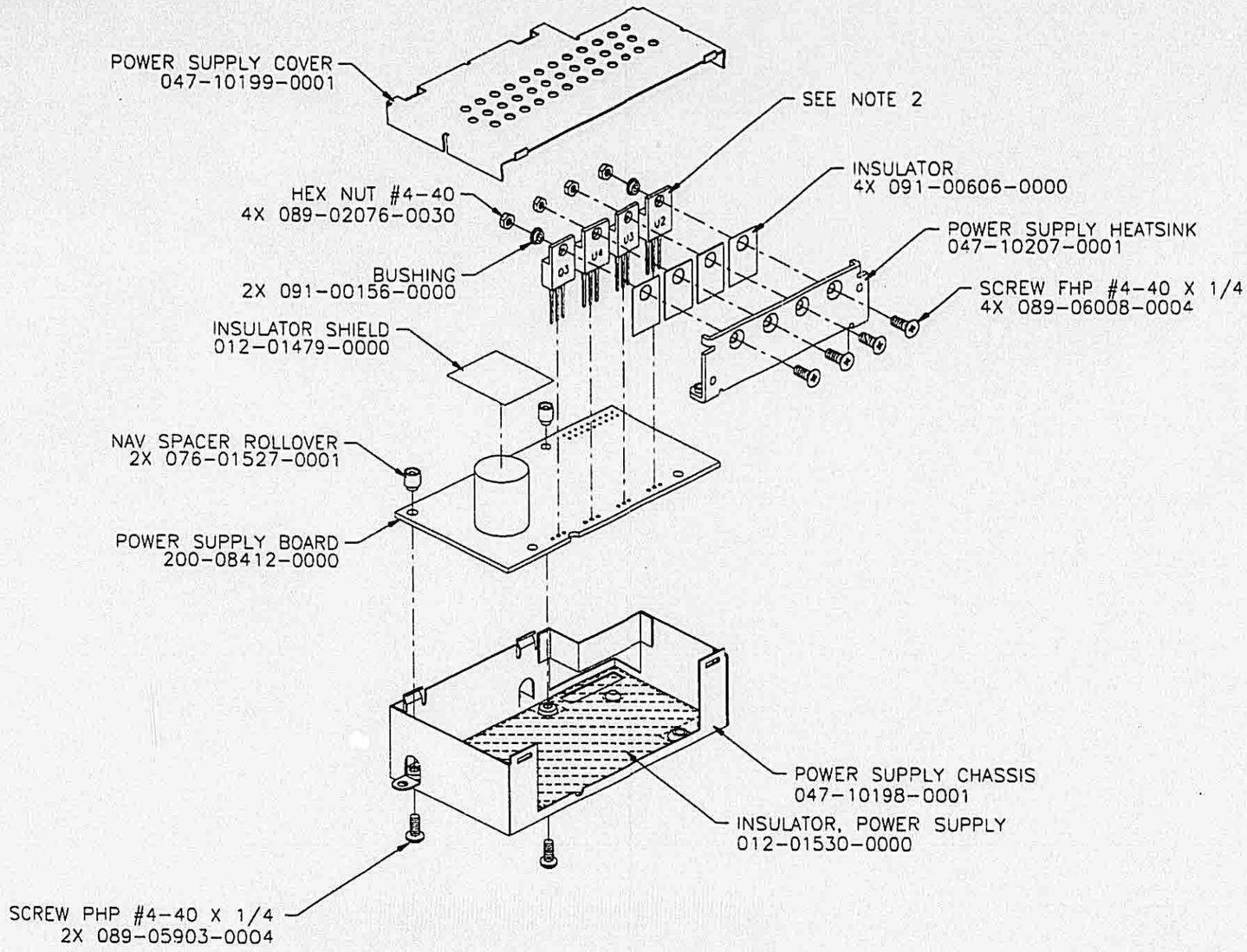




NOTES:

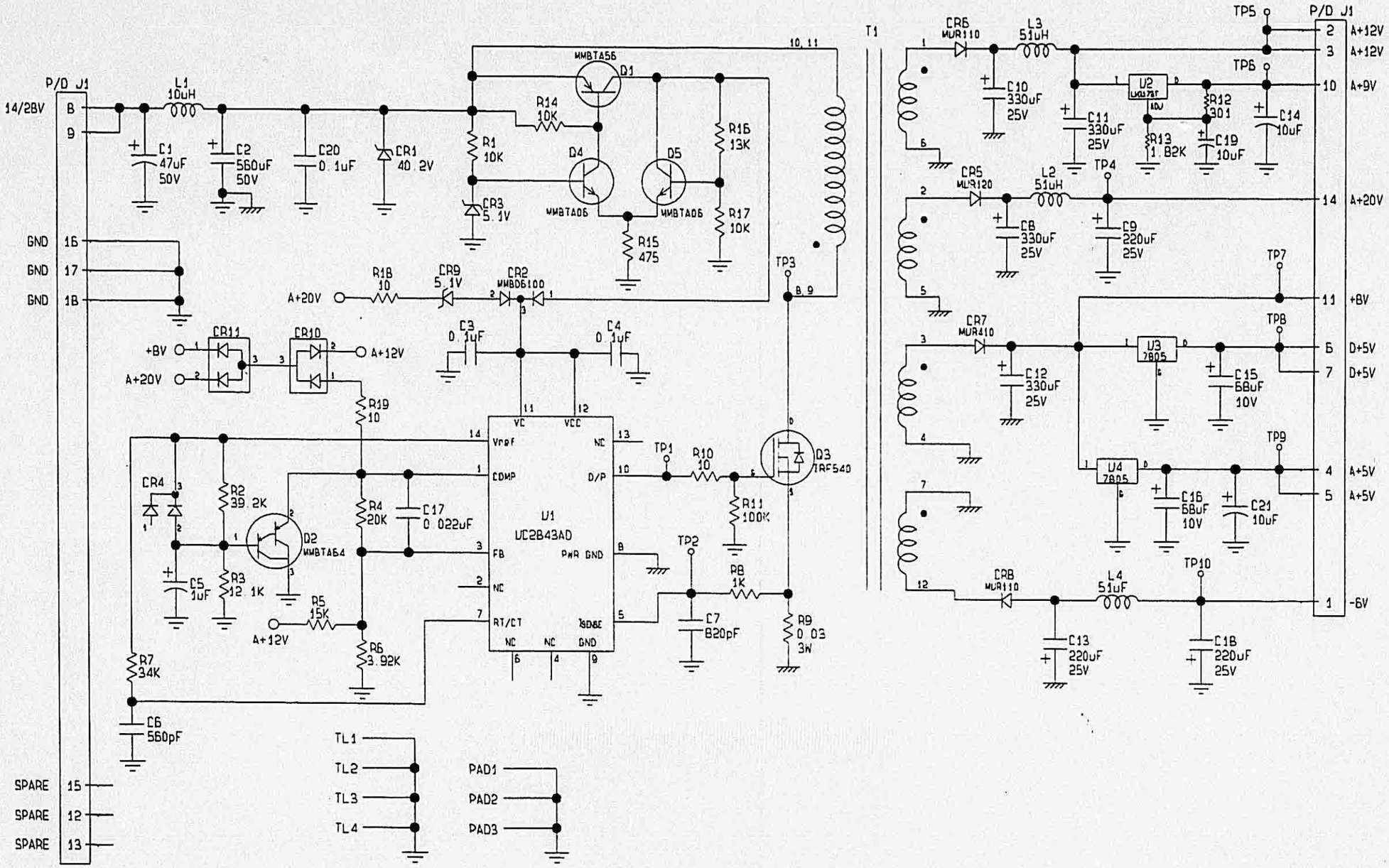
1. ADD 1000 TO ALL REFERENCE DESIGNATIONS ie: C1 = C1001
2. APPLY RTV (KPN 016-01071-0000) TO SECURE INDUCTOR ONTO BOARD.
3. PRIOR TO COATING BOTH SIDES OF P.C. BOARD WITH KPN 016-01040-0000, MASK OFF ALL THE TEST POINTS & MOUNTING AREAS WHERE THE CHASSIS COME IN CONTACT WITH BOARD SURFACE.

FIGURE 6-17 POWER SUPPLY BOARD
Dwg. No. 300-08412-0000, R2
(Sheet 1 of 2)



NOTES:
1. APPLY LIQUID STACKING COMPOUND TO HARDWARES PER WORKMANSHIP MANUAL.
2. TRIM AWAY EXCESS LENGTH AFTER PARTS (Q3,U2,U3,U4) HAS BEEN SOLDERED TO BOARD.

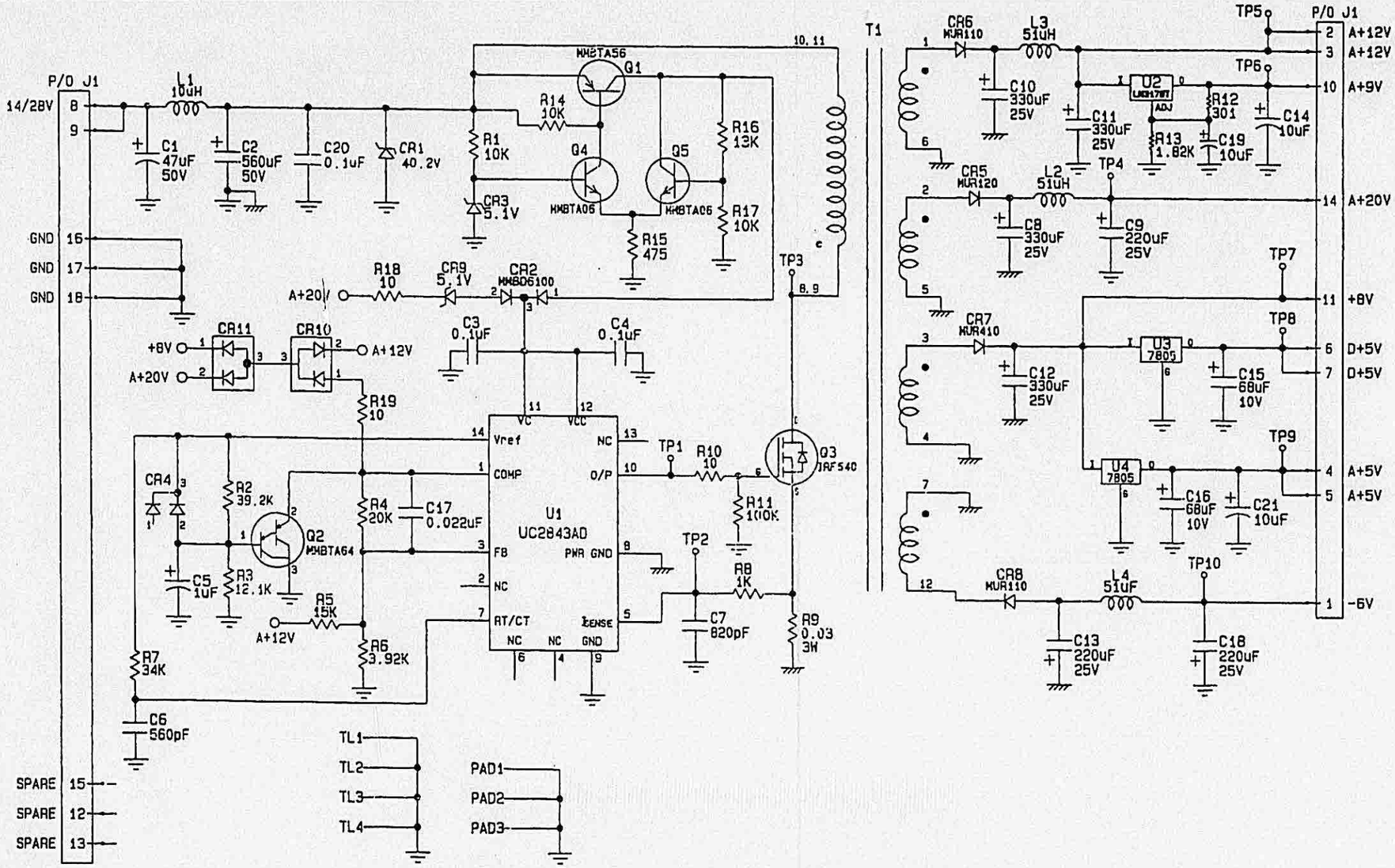
FIGURE 6-17 POWER SUPPLY BOARD
Dwg. No. 300-08412-0000, R2
(Sheet 2 of 2)



NOTE: ADD 1000 TO ALL REFERENCE DESIGNATOR

002-08412-0000R0S1

FIGURE 6-18 POWER SUPPLY BOARD SCHEMATIC
Dwg. No. 002-08412-0000, R1



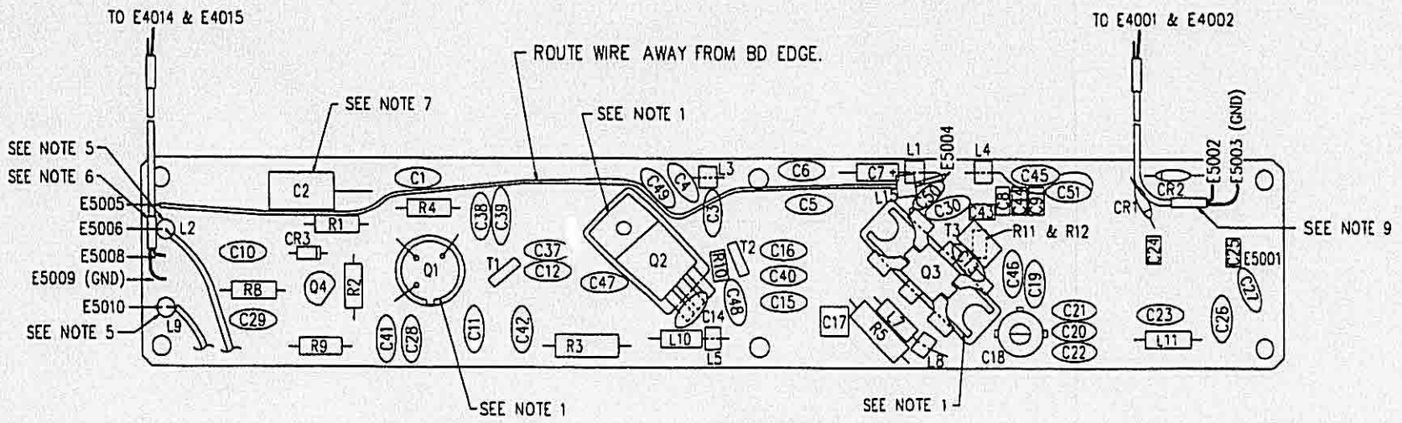
NOTE: ADD 1000 TO ALL REFERENCE DESIGNATOR

FIGURE 6-19 POWER SUPPLY BOARD SCHEMATIC
Dwg. No. 002-08412-0000, R0

6.11	200-08413-0000	COMM TX BOARD	R2		
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
...	009-08413-0000	KLX135 TX BD 14V		EA	1
...	016-01071-0000	DC RTV 3140		AR	1
C 5001	113-05102-0000	CAP DC .001UF 500V		EA	1
C 5002	097-00104-0036	CAP AL 47UF 25V		EA	1
C 5003	113-05331-0000	CAP DC 330PF 500V		EA	1
C 5004	113-03121-0000	CAP DC 120PF 500V		EA	1
C 5005	113-05102-0000	CAP DC .001UF 500V		EA	1
C 5006	111-00001-0001	CAP CR .1UF 50V		EA	1
C 5006	113-05102-0000	CAP DC .001UF 500V		EA	1
C 5007	096-06105-0052	CAP TN 1.0UF50V20%		EA	1
C 5008	106-04331-0026	CAPCH330PFNPO/100V		EA	1
C 5009	106-04331-0026	CAPCH330PFNPO/100V		EA	1
C 5010	113-03151-0000	CAP DC 150PF 500V		EA	1
C 5011	104-00001-0015	CAP SM 10PF 100V		EA	1
C 5012	104-00001-0009	CAP SM 47PF 100V		EA	1
C 5013	104-00001-0031	CAP SM 27PF 500V		EA	1
C 5014	104-00001-0000	CAP SM 100PF 100V		EA	1
C 5015	104-00001-0014	CAP SM 33PF 100V		EA	1
C 5016	104-00001-0008	CAP SM 75PF 100V		EA	1
C 5017	100-00003-0001	300PF 500V 5% CP		EA	1
C 5018	102-00024-0009	CAP VA 7-35PF 160V		EA	1
C 5019	104-00001-0030	CAP SM 18PF 500V		EA	1
C 5020	104-00001-0033	CAP SM 15PF 500V		EA	1
C 5021	104-00001-0030	CAP SM 18PF 500V		EA	1
C 5022	104-00001-0063	CAP SM 12PF 100V		EA	1
C 5023	104-00001-0041	CAP SM 22PF 500V		EA	1
C 5024	106-00074-0036	CAP PF 9.1 500VDC		EA	1
C 5025	106-00074-0033	CAP PF 6.8 500VDC		EA	1
C 5026	104-00001-0041	CAP SM 22PF 500V		EA	1
C 5027	104-00001-0063	CAP SM 12PF 100V		EA	1
C 5028	113-03121-0000	CAP DC 120PF 500V		EA	1
C 5029	113-05331-0000	CAP DC 330PF 500V		EA	1
C 5030	113-05102-0000	CAP DC .001UF 500V		EA	1
C 5031	999-09999-0098	NOT USED		RF	X

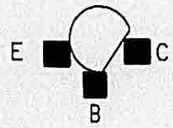
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
C 5032	999-09999-0098	NOT USED		RF	X
C 5033	999-09999-0098	NOT USED		RF	X
C 5034	999-09999-0098	NOT USED		RF	X
C 5036	999-09999-0098	NOT USED		RF	X
C 5037	104-00001-0045	CAP SM 43PF 100V		EA	1
C 5038	113-03121-0000	CAP DC 120PF 500V		EA	1
C 5039	113-05331-0000	CAP DC 330PF 500V		EA	1
C 5040	104-00001-0031	CAP SM 27PF 500V		EA	1
C 5041	111-00001-0021	CAP CR .0068UF 100		EA	1
C 5042	104-00001-0002	CAP SM 91PF 100V		EA	1
C 5043	106-04331-0026	CAPCH330PFNPO/100V		EA	1
C 5044	106-04331-0026	CAPCH330PFNPO/100V		EA	1
C 5045	113-05102-0000	CAP DC .001UF 500V		EA	1
C 5046	113-05331-0000	CAP DC 330PF 500V		EA	1
C 5047	104-00001-0002	CAP SM 91PF 100V		EA	1
C 5048	104-00001-0009	CAP SM 47PF 100V		EA	1
C 5049	113-03121-0000	CAP DC 120PF 500V		EA	1
C 5050	111-00001-0001	CAP CR .1UF 50V		EA	1
C 5051	111-00001-0001	CAP CR .1UF 50V		EA	1
CR 5001	007-06099-0000	DIO UM9401		EA	1
CR 5002	007-06099-0000	DIO UM9401		EA	1
CR 5003	007-06228-0000	RF SWITCHING DIODE		EA	1
L 5001	013-00006-0001	FERR BEAD		EA	1
L 5002	013-00006-0001	FERR BEAD		EA	1
L 5003	013-00006-0001	FERR BEAD		EA	1
L 5004	013-00006-0001	FERR BEAD		EA	1
L 5005	013-00006-0001	FERR BEAD		EA	1
L 5006	999-09999-0098	NOT USED		RF	X
L 5007	019-02084-0005	CH .22UH 10%		EA	1
L 5008	013-00006-0001	FERR BEAD		EA	1
L 5009	013-00006-0001	FERR BEAD		EA	1
L 5010	019-02084-0001	CH .15UH 10%		EA	1
L 5011	019-02084-0029	CH 2.2UH 10%		EA	1
L 5012	999-09999-0098	NOT USED		RF	X
L 5013	999-09999-0098	NOT USED		RF	X
L 5014	999-09999-0098	NOT USED		RF	X

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
L 5015	013-00006-0001	FERR BEAD		EA	1
Q 5001	007-00250-0000	XSTR 2N4427		EA	1
Q 5002	007-00483-0000	XSTR RF SD1574-1		EA	1
Q 5003	007-00500-0000	XSTR RF 2SC1946A		EA	1
Q 5004	007-00195-0000	XSTR S MPSH10		EA	1
R 5001	131-00182-0023	RES CF 1.8K QW 5%		EA	1
R 5002	131-00471-0023	RES CF 470 QW 5%		EA	1
R 5003	131-00300-0033	RES CF 30 HW 5%		EA	1
R 5004	131-00100-0023	RES CF 10 QW 5%		EA	1
R 5005	131-00100-0033	RES CF 10 HW 5%		EA	1
R 5006	999-09999-0098	NOT USED		RF	X
R 5007	999-09999-0098	NOT USED		RF	X
R 5008	131-00103-0023	RES CF 10K QW 5%		EA	1
R 5009	131-00100-0023	RES CF 10 QW 5%		EA	1
R 5010	139-00511-0000	RES CH 51.1 EW 1%		EA	1
R 5011	130-05101-0043	RES CHIP 100 HW		EA	1
R 5012	130-05101-0043	RES CHIP 100 HW		EA	1
REF 1	300-08413-0000			RF	X
REF 2	002-08413-0000			RF	X
T 5001	019-03026-0002	XFMR TW BIFLR		EA	1
T 5002	019-03026-0003	XFMR TWISTED BIFLR		EA	1
T 5003	019-03124-0001	XFMR BIFILAR RF 4T		EA	1

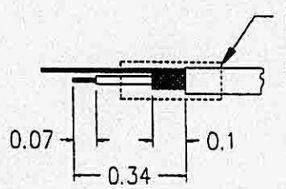


NOTES :

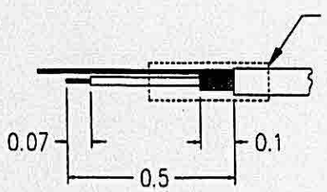
1. Q1, Q2 AND Q3 ARE TO BE INSTALLED AFTER THEY ARE MOUNTED IN THE CASTINGS.
2. KEEP WINDINGS OF T3 AS CLOSE AS POSSIBLE TO EACH OTHER AND KEEP LEAD LENGTHS AS SHORT AS POSSIBLE.
3. ALL LEAD LENGTHS MUST BE AS SHORT AS POSSIBLE. SOLDER JOINTS ON ALL CAPACITOR LEADS SHOULD EXTEND ALL THE WAY TO THE BODY OF THE CAPACITOR WHERE POSSIBLE.
4. ENTIRE ASSEMBLY MUST BE ESPECIALLY CLEAN AND FREE OF FLUX DEPOSITS.
5. SECURE BEAD TO BOARD WITH RTV (016-01071-0000).
6. INSTALL SOLDER SLEEVE 150-00103-0000 IN THIS LOCATION. SEE DETAIL A.
7. C2 SHOULD LAY FLAT ON BOARD TO AVOID INTERFERENCE WITH COVER. SEE DETAIL B.
8. ADD 5000 TO ALL REFERENCE DESIGNATORS, EXCEPT "E" NUMBERS. I.E. C35 = C5035
9. INSTALL SOLDER SLEEVE 150-00103-0000 IN THIS LOCATION. SEE DETAIL C.



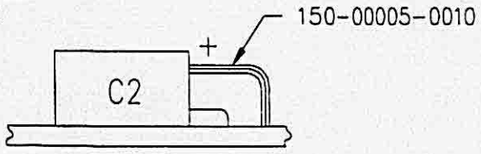
Q4



DETAIL C
SCALE 2:1

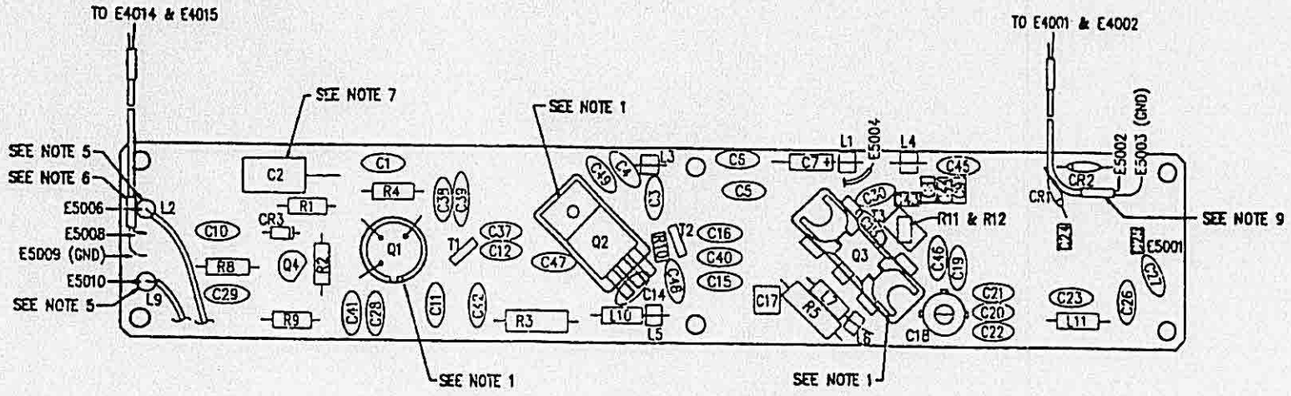


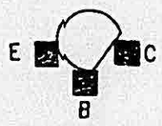
DETAIL A
SCALE 2:1



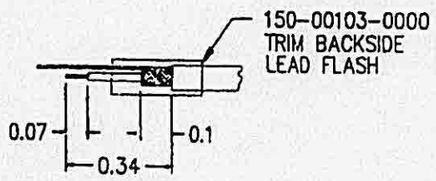
DETAIL B
SCALE 2:1

FIGURE 6-20 COMM TX BOARD
Dwg. No. 300-08413-0000, R4

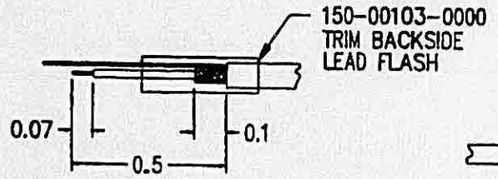




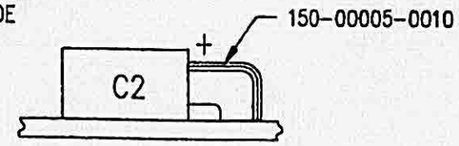
Q4



DETAIL C
SCALE 2:1



DETAIL A
SCALE 2:1

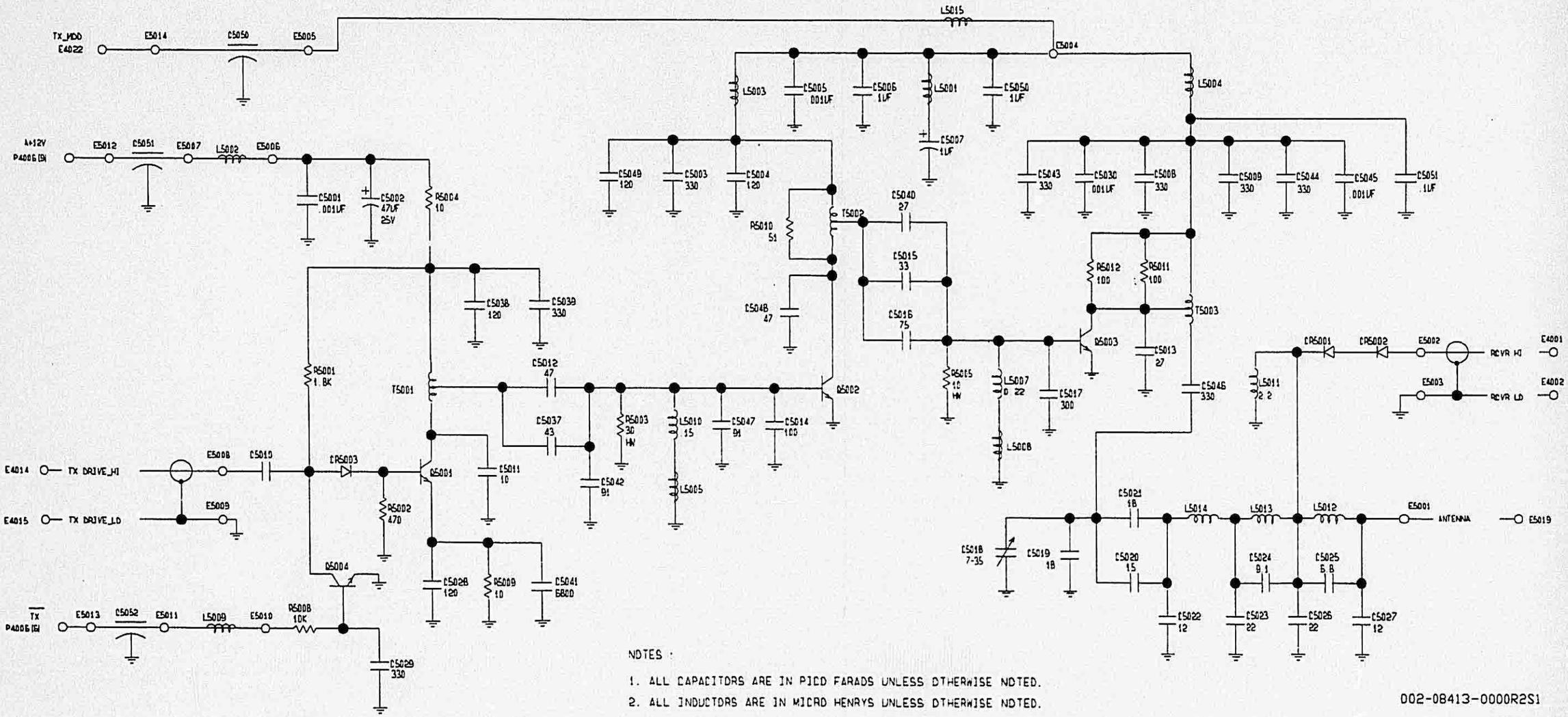


DETAIL B
SCALE 2:1

NOTES :

1. Q1, Q2 AND Q3 ARE TO BE INSTALLED AFTER THEY ARE MOUNTED IN THE CASTINGS.
2. KEEP WINDINGS OF T3 AS CLOSE AS POSSIBLE TO EACH OTHER AND KEEP LEAD LENGTHS AS SHORT AS POSSIBLE.
3. ALL LEAD LENGTHS MUST BE AS SHORT AS POSSIBLE. SOLDER JOINTS ON ALL CAPACITOR LEADS SHOULD EXTEND ALL THE WAY TO THE BODY OF THE CAPACITOR WHERE POSSIBLE.
4. ENTIRE ASSEMBLY MUST BE ESPECIALLY CLEAN AND FREE OF FLUX DEPOSITS.
5. SECURE BEAD TO BOARD WITH RTV (016-01071-0000).
6. INSTALL SOLDER SLEEVE 150-00103-0000 IN THIS LOCATION. SEE DETAIL A.
7. C2 SHOULD LAY FLAT ON BOARD TO AVOID INTERFERENCE WITH COVER. SEE DETAIL B.
8. ADD 5000 TO ALL REFERENCE DESIGNATORS, EXCEPT "E" NUMBERS. I.E. C35 = C5035
9. INSTALL SOLDER SLEEVE 150-00103-0000 IN THIS LOCATION. SEE DETAIL C.

FIGURE 6-21 COMM TX BOARD
Dwg. No. 300-08413-0000, R2



NOTES :

1. ALL CAPACITORS ARE IN PICO FARADS UNLESS OTHERWISE NOTED.
2. ALL INDUCTORS ARE IN MICRO HENRYS UNLESS OTHERWISE NOTED.

002-08413-0000R2S1

FIGURE 6-22 COMM TX BOARD SCHEMATIC
(Dwg. No. 002-08413-0000, R2)

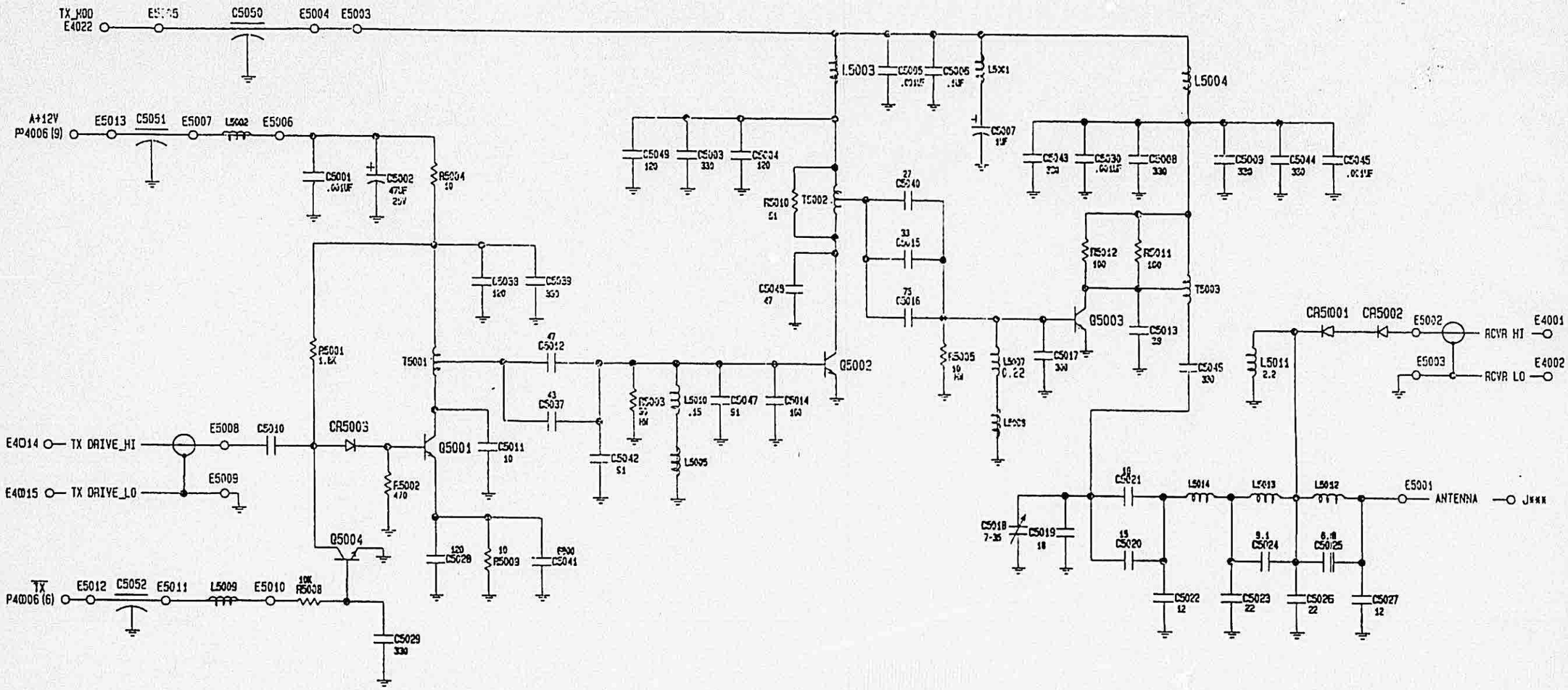


FIGURE 6-23 COMM TX BOARD SCHEMATIC
Dwg. No. 002-08413-0000, R0

6.12	205-08691-0000	GPS ASIC MMIC RCVR	R0			
	205-08691-0001	GPS ASIC MMIC RCVR	R0			

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0001
...	057-03193-0000	LABEL, S/W REV TAG		EA	1	.
...	057-03193-0001	LABEL, S/W REV TAG		EA	.	1
...	057-03194-8691	LABEL SFTW TAG		EA	1	1
...	125-00758-0002	GPS PVT PROG DEV S		EA	1	.
...	125-00758-0003	GPS PVT PROG DEV		EA	.	1
...	125-00759-0000	GPS RCVR BB PROG		EA	1	1
...	200-08691-0001	ASIC RCVR BD		EA	1	1

	125-00758-0002	GPS RCVR PVT PROG DEV	R0			
	125-00758-0003	GPS RCVR PVT PROG DEV	R0			

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0002	-0003
REF 1	300-08460-0000	ASSY DWG RCVR BD		RF	X	X
REF 1	300-08691-0000	ASIC REC BD ASSY		RF	X	X
I 523	122-01371-0002	GPS PVT PROG DEV	A	EA	1	.
I 523	122-01371-0003	GPS PVT PROG DEV	A	EA	.	1

	125-00759-0000	GPS RCVR PVT PROG DEV	R0			

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
REF 1	300-08460-0000	ASSY DWG RCVR BD		RF	X
REF 1	300-08691-0000	ASIC REC BD ASSY		RF	X
I 528	122-01366-0000	GPS RCVR BB PROG	A	EA	1

6.13	200-08691-0001	GPS ASIC RECEIVER BD	R3		
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0001
...	009-08691-0000	PC ASIC REC BD		EA	1
...	012-01548-0000	XSTR INSUL W/ADHSV		EA	1
...	016-01040-0000	COATING TYPE AR		AR	1
...	016-01412-0000	LOCTITE 425		AR	1
...	091-00107-0000	LEAD INSUL .145		EA	6
...	195-00142-0000	TCXO OPTIONS		EA	1
BPF 501	017-00249-0002	DIELCT BNDPS FIL		EA	1
BPF 502	017-00257-0000	BPF 7KLT		EA	1
C 501	096-01186-0024	CAP .1UF 35V 10%		EA	1
C 502	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 503	106-00129-0000	CAP CH 1UF X7R/50V		EA	1
C 504	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 505	999-09999-0098	NOT USED		RF	X
C 506	106-05221-0016	CAP CH220PFNPO/50V		EA	1
C 507	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 508	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 509	106-05221-0016	CAP CH220PFNPO/50V		EA	1
C 510	106-05221-0016	CAP CH220PFNPO/50V		EA	1
C 512	106-04104-0046	CAP CH.1UFX7R50V		EA	1
C 514	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 516	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 517	096-01186-0010	CAP 15UF 10V 10%		EA	1
C 518	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 520	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 521	096-01186-0010	CAP 15UF 10V 10%		EA	1
C 522	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 523	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 524	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 525	106-05103-0046	CAP CH 10K X7R/50V		EA	1

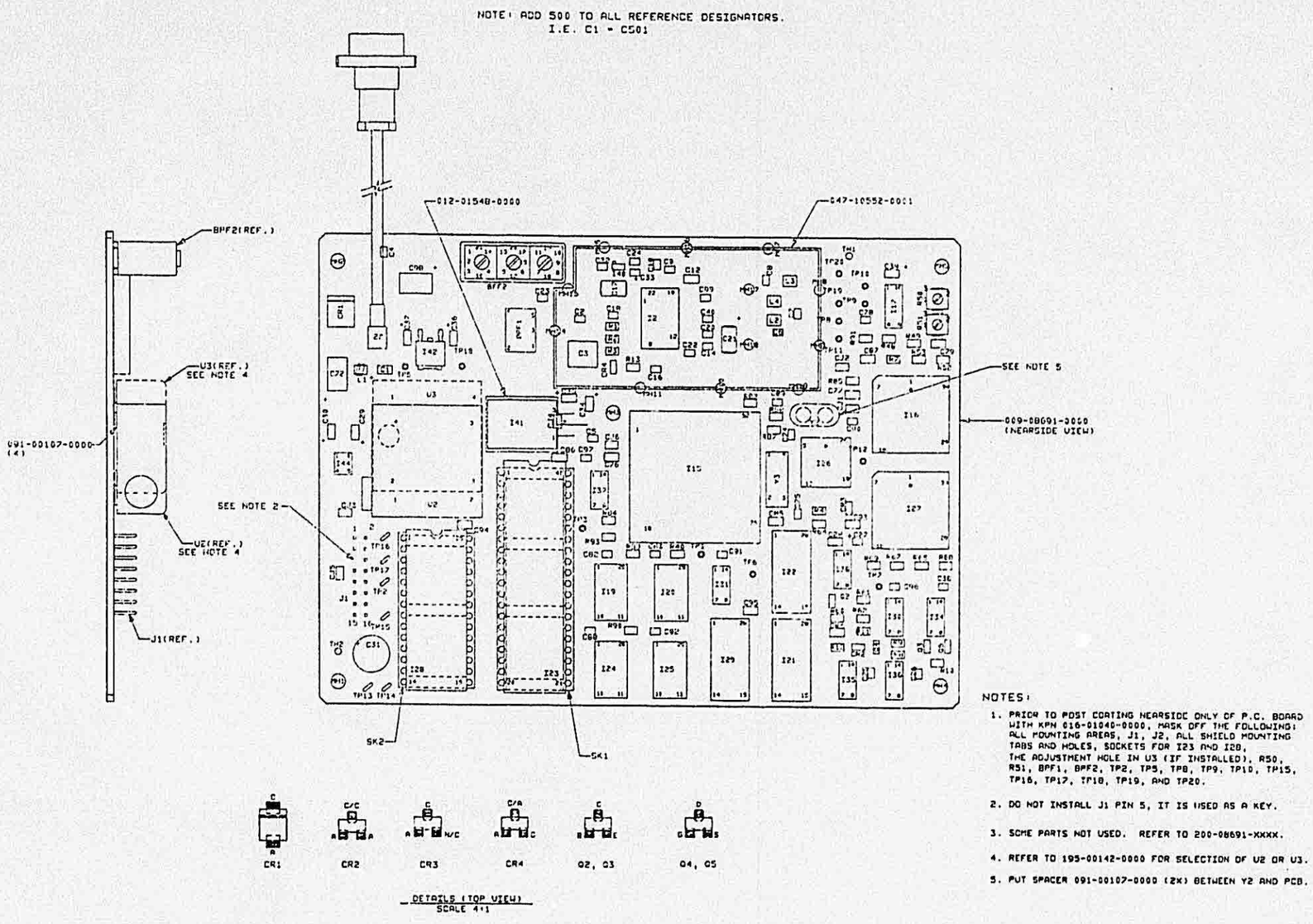
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0001
C 526	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 527	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 528	096-01186-0012	CAP 1.0UF 16V 10%		EA	1
C 529	096-01186-0027	CAP .33UF 35V 10%		EA	1
C 530	096-01186-0012	CAP 1.0UF 16V 10%		EA	1
C 531	097-00104-0050	CAP AL 220UF 10V		EA	1
C 532	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 533	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 534	096-01186-0012	CAP 1.0UF 16V 10%		EA	1
C 535	096-01186-0012	CAP 1.0UF 16V 10%		EA	1
C 536	096-01186-0027	CAP .33UF 35V 10%		EA	1
C 537	096-01186-0012	CAP 1.0UF 16V 10%		EA	1
C 538	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 539	096-01186-0012	CAP 1.0UF 16V 10%		EA	1
C 540	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 572	096-01186-0036	CAP 10UF 35V 10%		EA	1
C 574	106-05200-0016	CAPCH 20PF NPO 50V		EA	1
C 575	106-05330-0016	CAP CH 33PFNPO/50V		EA	1
C 576	106-04104-0046	CAP CH.1UFX7R50V		EA	1
C 577	106-04104-0046	CAP CH.1UFX7R50V		EA	1
C 578	106-05101-0016	CAP CH100PFNPO/50V		EA	1
C 579	106-04104-0046	CAP CH.1UFX7R50V		EA	1
C 582	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 583	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 584	106-04104-0046	CAP CH.1UFX7R50V		EA	1
C 585	106-04104-0046	CAP CH.1UFX7R50V		EA	1
C 586	106-04104-0046	CAP CH.1UFX7R50V		EA	1
C 587	106-04104-0046	CAP CH.1UFX7R50V		EA	1
C 588	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 589	106-05200-0016	CAPCH 20PF NPO 50V		EA	1
C 590	106-05200-0016	CAPCH 20PF NPO 50V		EA	1
C 591	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 592	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 593	106-04104-0046	CAP CH.1UFX7R50V		EA	1
C 594	106-04104-0046	CAP CH.1UFX7R50V		EA	1
C 595	106-04104-0046	CAP CH.1UFX7R50V		EA	1
C 596	106-05103-0046	CAP CH 10K X7R/50V		EA	1
C 597	106-05103-0046	CAP CH 10K X7R/50V		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0001
C 598	096-01186-0015	CAP 33UF 16V 10%		EA	1
C 599	106-05330-0016	CAP CH 33PFNPO/50V		EA	1
CJ 501	130-05000-0025	RES CHIP 0 EW CJ		EA	1
CJ 502	999-09999-0098	NOT USED		RF	X
CJ 503	999-09999-0098	NOT USED		RF	X
CJ 504	999-09999-0098	NOT USED		RF	X
CJ 505	130-05000-0025	RES CHIP 0 EW CJ		EA	1
CJ 506	130-05000-0025	RES CHIP 0 EW CJ		EA	1
CR 501	007-05241-0007	TRNSRB 1500W 7V		EA	1
CR 502	007-06227-0000	SOT23 DIO MMBD6100		EA	1
CR 503	007-06180-0000	DIO SW MMBD6050		EA	1
CR 504	999-09999-0098	NOT USED		RF	X
I 502	120-08203-0000	GPS RECEIVER MMIC		EA	1
I 515	120-02208-0004	80C186 10MHZ 16BIT		EA	1
I 516	120-08204-0000	ASIC GPS SYCH DET		EA	1
I 517	123-04046-0003	74HC4046A		EA	1
I 519	124-00573-0003	74HCT573 (SO)		EA	1
I 520	124-00573-0003	74HCT573 (SO)		EA	1
I 521	120-02363-0008	32Kx8 SRAM		EA	1
I 522	120-02363-0008	32Kx8 SRAM		EA	1
I 523	999-09999-0090	REF SFTWARE SET		RF	X
I 524	124-00541-0003	74HCT541 (SO)		EA	1
I 525	124-00245-0002	74HCT245D SO PKG		EA	1
I 526	120-02456-0000	82050 UART		EA	1
I 527	120-02431-0000	Z80 CPU/2K SRAM		EA	1
I 528	999-09999-0090	REF SFTWARE SET		RF	X
I 529	999-09999-0098	NOT USED		RF	X
I 530	124-00074-0003	IC 74HCT74 SO PKG		EA	1
I 531	999-09999-0098	NOT USED		RF	X
I 534	123-00125-0003	74HC125 SO PKG		EA	1
I 535	123-00125-0003	74HC125 SO PKG		EA	1
I 536	123-00125-0003	74HC125 SO PKG		EA	1
I 537	124-00000-0003	IC 74HCT00 SO PKG		EA	1
I 538	123-00005-0003	74HC05 (SO PKG)		EA	1
I 540	120-03559-0000	AMPLIFIER		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0001
I 541	120-03588-0000	LM299OT-5.0 REG		EA	1
I 542	120-03026-0080	DPAK VLT REG		EA	1
I 544	120-03065-0026	IC MC78L05ABD		EA	1
J 501	030-02453-0008	CONNECTOR 16P		EA	1
J 502	155-02743-0001	RF CABLE ASSY		EA	1
L 501	019-02660-0038	IND SM 6800 10%		EA	1
L 502	019-02723-0033	CHIP INDUCTOR		EA	1
L 503	019-02723-0043	CHIP INDUCTOR		EA	1
L 504	019-02723-0025	CHIP INDUCTOR		EA	1
Q 502	007-00933-0000	MMBT2369		EA	1
Q 503	007-00261-0003	XSTR 2N2907A (SOT)		EA	1
Q 504	007-00903-0000	2N7002 MOSFET		EA	1
Q 505	007-00903-0000	2N7002 MOSFET		EA	1
R 501	139-01501-0000	RES CH 1.5K EW 1%		EA	1
R 502	139-01501-0000	RES CH 1.5K EW 1%		EA	1
R 503	139-01501-0000	RES CH 1.5K EW 1%		EA	1
R 504	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 507	139-04990-0000	RES CH 499 EW 1%		EA	1
R 508	139-04752-0000	RES CH 47.5K EW 1%		EA	1
R 509	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 510	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 511	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 512	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 513	999-09999-0098	NOT USED		RF	X
R 540	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 548	139-05623-0000	RES CHIP 562K 1%EW		EA	1
R 549	139-02211-0000	RES CH 2.21K EW 1%		EA	1
R 550	133-00560-0012	RES VA SMD 100K QW		EA	1
R 551	133-00560-0010	RES VA SMD 20K QW		EA	1
R 552	139-04990-0000	RES CH 499 EW 1%		EA	1
R 553	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 559	139-04990-0000	RES CH 499 EW 1%		EA	1
R 560	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 561	139-01001-0000	RES CHIP 1K EW 1%		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0001
R 562	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 564	139-02211-0000	RES CH 2.21K EW 1%		EA	1
R 565	139-02211-0000	RES CH 2.21K EW 1%		EA	1
R 567	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 568	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 569	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 582	139-04990-0000	RES CH 499 EW 1%		EA	1
R 583	139-04990-0000	RES CH 499 EW 1%		EA	1
R 584	139-04990-0000	RES CH 499 EW 1%		EA	1
R 585	139-04990-0000	RES CH 499 EW 1%		EA	1
R 587	139-04990-0000	RES CH 499 EW 1%		EA	1
R 588	139-04990-0000	RES CH 499 EW 1%		EA	1
R 590	139-04990-0000	RES CH 499 EW 1%		EA	1
R 591	139-04990-0000	RES CH 499 EW 1%		EA	1
SK 501	033-00092-0017	IC DIP SCKT 40C		EA	1
SK 502	033-00092-0016	IC DIP SCK 28C		EA	1
TP 501	999-09999-0098	NOT USED		RF	X
TP 502	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 503	999-09999-0098	NOT USED		RF	X
TP 505	008-00079-0000	TERM TURRET		EA	1
TP 506	999-09999-0098	NOT USED		RF	X
TP 507	999-09999-0098	NOT USED		RF	X
TP 508	008-00079-0000	TERM TURRET		EA	1
TP 509	008-00079-0000	TERM TURRET		EA	1
TP 510	008-00079-0000	TERM TURRET		EA	1
TP 511	999-09999-0098	NOT USED		RF	X
TP 512	999-09999-0098	NOT USED		RF	X
TP 513	999-09999-0098	NOT USED		RF	X
TP 514	999-09999-0098	NOT USED		RF	X
TP 515	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 516	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 517	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 518	008-00079-0000	TERM TURRET		EA	1
TP 519	008-00079-0000	TERM TURRET		EA	1
TP 520	008-00079-0000	TERM TURRET		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0001
U 502	999-09999-0096	RESERVED		RF	X
U 503	999-09999-0096	RESERVED		RF	X
Y 502	044-00312-0000	XTAL 16.432MHZ		EA	1
Y 503	044-00327-0000	CRYSTAL SM 20 MHZ		EA	1



NOTES:

1. PRIOR TO POST COATING NEARSIDE ONLY OF P.C. BOARD WITH KPN 016-01040-0000, MASK OFF THE FOLLOWING: ALL MOUNTING AREAS, J1, J2, ALL SHIELD MOUNTING TABS AND HOLES, SOCKETS FOR I23 AND I28, THE ADJUSTMENT HOLE IN U3 (IF INSTALLED), R50, R51, BPF1, BPF2, TP2, TP5, TP8, TP9, TP10, TP15, TP16, TP17, TP18, TP19, AND TP20.
2. DO NOT INSTALL J1 PIN 5, IT IS USED AS A KEY.
3. SOME PARTS NOT USED. REFER TO 200-08691-XXXX.
4. REFER TO 195-00142-0000 FOR SELECTION OF U2 OR U3.
5. PUT SPACER 091-00107-0000 (2X) BETWEEN Y2 AND PCB.

FIGURE 6-24 ASIC GPS RECEIVER BOARD
Dwg. No. 300-08691-0000, R1

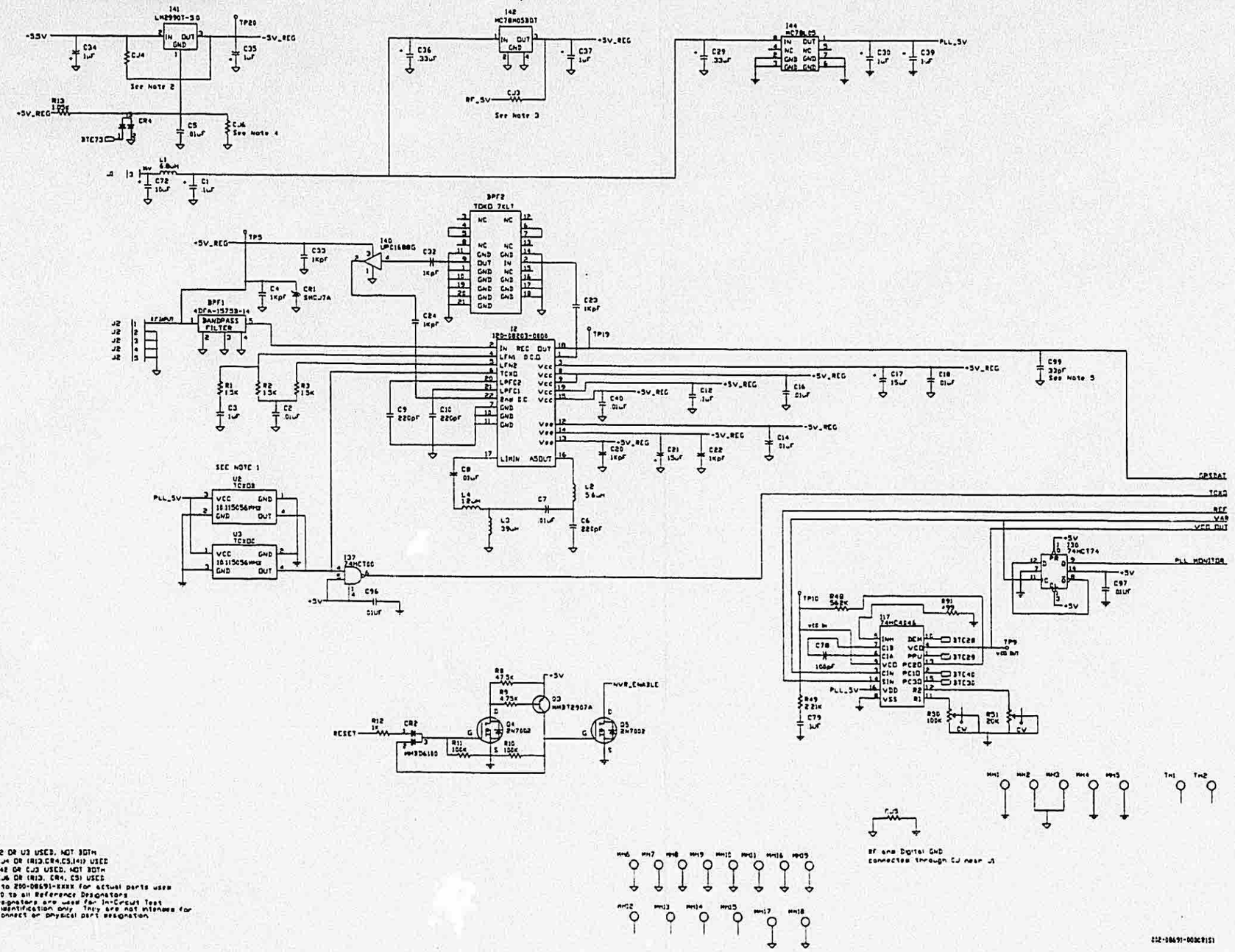


FIGURE 6-25 ASIC GPS RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08691-0000, R1
(Sheet 1 of 2)

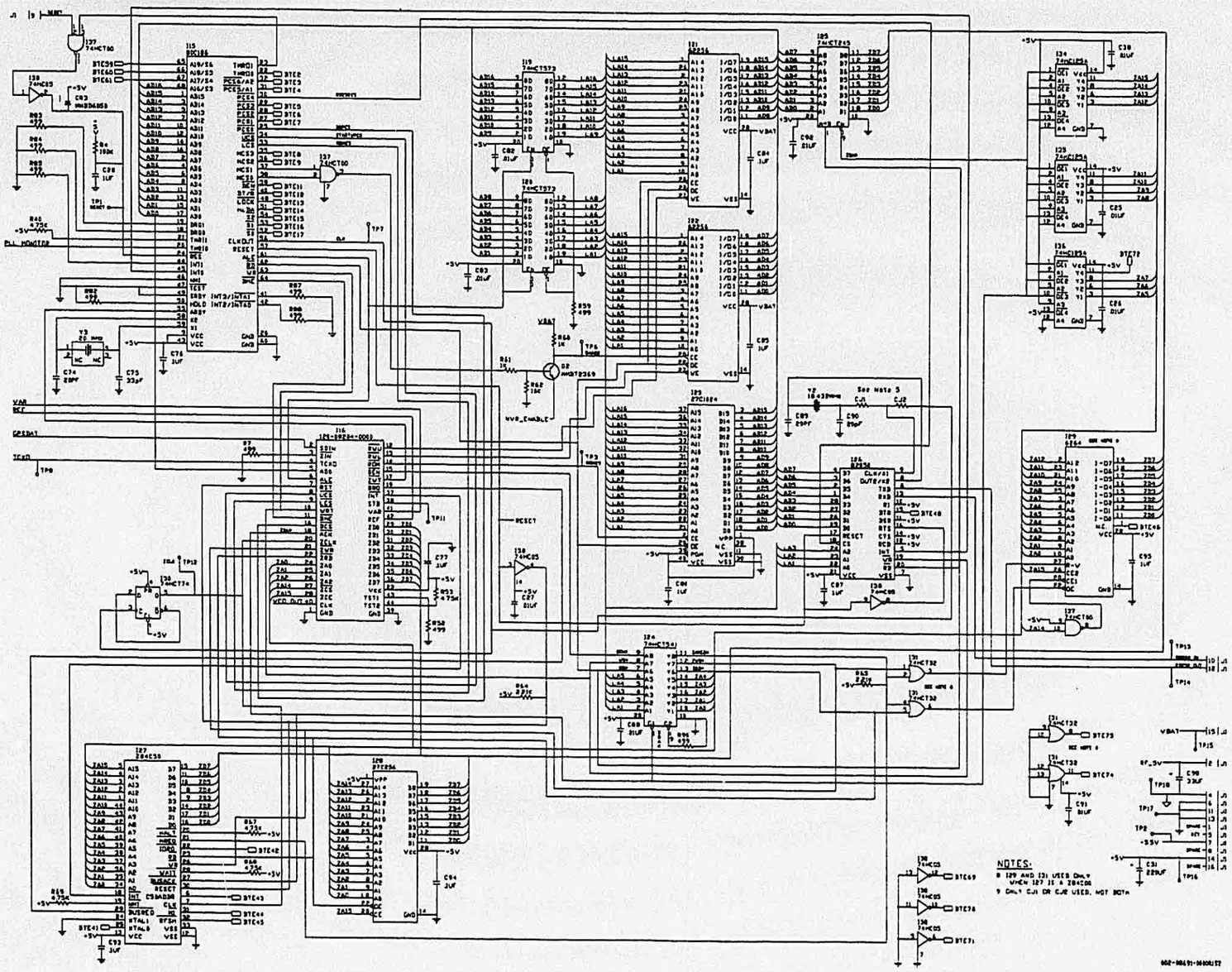


FIGURE 6-25 ASIC GPS RECEIVER BOARD SCHEMATIC
Dwg. No. 002-08691-0000, R1
(Sheet 2 of 2)

6.14	200-08768-0000	AUDIO BOARD	R0		
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
...	009-08768-0000	PCBD AUDIO BD		EA	1
...	016-01004-0000	COMPND THRML JNT		AR	1
...	016-01040-0000	COATING TYPE AR		AR	1
...	047-10206-0001	HEATSINK AUD W/F	A	EA	1
...	089-02076-0030	NUT FLAT 4-40		EA	2
...	089-05903-0004	SCR PHP 4-40X1/4		EA	2
...	089-06008-0004	SCR FHP 4-40X1/4		EA	2
C 3001	097-00104-0038	CAP AL 47UF 50V		EA	1
C 3002	097-00104-0038	CAP AL 47UF 50V		EA	1
C 3003	106-04104-0047	CH 100KX7R/50V		EA	1
C 3004	106-04104-0047	CH 100KX7R/50V		EA	1
C 3005	097-00104-0038	CAP AL 47UF 50V		EA	1
C 3006	097-00104-0038	CAP AL 47UF 50V		EA	1
C 3007	106-04103-0046	CAP CH 10K X7R/50V		EA	1
C 3008	106-04103-0046	CAP CH 10K X7R/50V		EA	1
C 3009	097-00214-0001	CAP AL 820UF 25V		EA	1
C 3010	097-00148-0025	CAL EL 1UF		EA	1
C 3011	106-04121-0016	CAP CH120PFNPO/50V		EA	1
C 3012	106-04102-0026	CH 1KPF NPO/100V		EA	1
C 3013	106-04182-0046	CAP CH 1800X7R 5%		EA	1
C 3014	096-01188-0030	CAP 1UF 35V 10%		EA	1
C 3015	097-00214-0001	CAP AL 820UF 25V		EA	1
C 3016	096-01186-0012	CAP 1.0UF 16V 10%		EA	1
C 3017	106-04333-0046	CAP CH 33K X7R/50V		EA	1
CR 3001	007-05117-0005	DIO Z 5.1V SOT		EA	1
P 3001	030-02174-0001	PIN CONT		EA	10
Q 3001	007-00179-0001	XSTR SOT23 2N3904		EA	1
Q 3002	007-00179-0001	XSTR SOT23 2N3904		EA	1

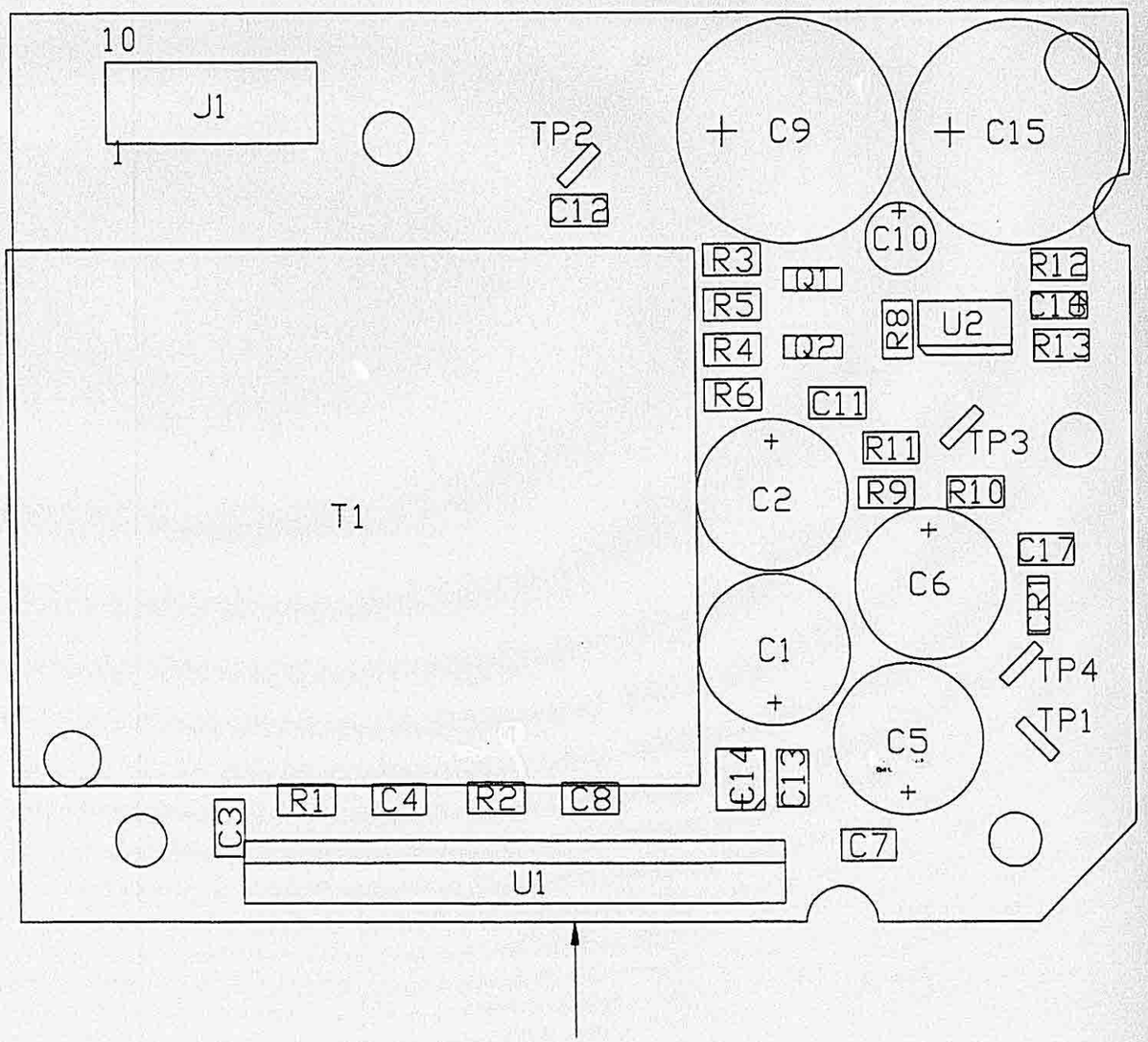
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
R 3001	130-05022-0023	RES CH 2.2		EA	1
R 3002	130-05022-0023	RES CH 2.2		EA	1
R 3003	139-01302-0000	RES CH 13K EW 1%		EA	1
R 3004	139-01302-0000	RES CH 13K EW 1%		EA	1
R 3005	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 3006	139-01003-0000	RES CHIP 100KEW1%		EA	1
R 3008	139-02001-0000	RES CHIP 2K EW 1%		EA	1
R 3009	139-01623-0000	RES CH 162K EW 1%		EA	1
R 3010	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 3011	139-01302-0000	RES CH 13K EW 1%		EA	1
R 3012	139-01302-0000	RES CH 13K EW 1%		EA	1
R 3013	139-01502-0000	RES CHIP 15K EW 1%		EA	1
REF 1	002-08768-0000			RF	1
REF 1	300-08768-0000			RF	X
REF 2	002-08768-0000			RF	X
REF 2	300-08768-0000			EA	1
T 3001	019-05203-0000	XFMR AUDIO OUTPUT		EA	1
TP 3001	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 3002	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 3003	008-00096-0001	TERMINAL TEST PNT		EA	1
TP 3004	008-00096-0001	TERMINAL TEST PNT		EA	1
U 3001	120-03493-0000	IC 14V POWER AMP		EA	1
U 3002	120-03127-0011	IC LM2903 SO PKG		EA	1

NOTES:

1. ADD 3000 TO ALL REFERENCE DESIGNATIONS
   ie: C1 = C3001
2. PRIOR TO COATING BOTH SIDES OF P.C. BOARD WITH KPN 016-01040-0000, MASK OFF ALL THE TEST POINTS & MOUNTING AREAS.

CR1

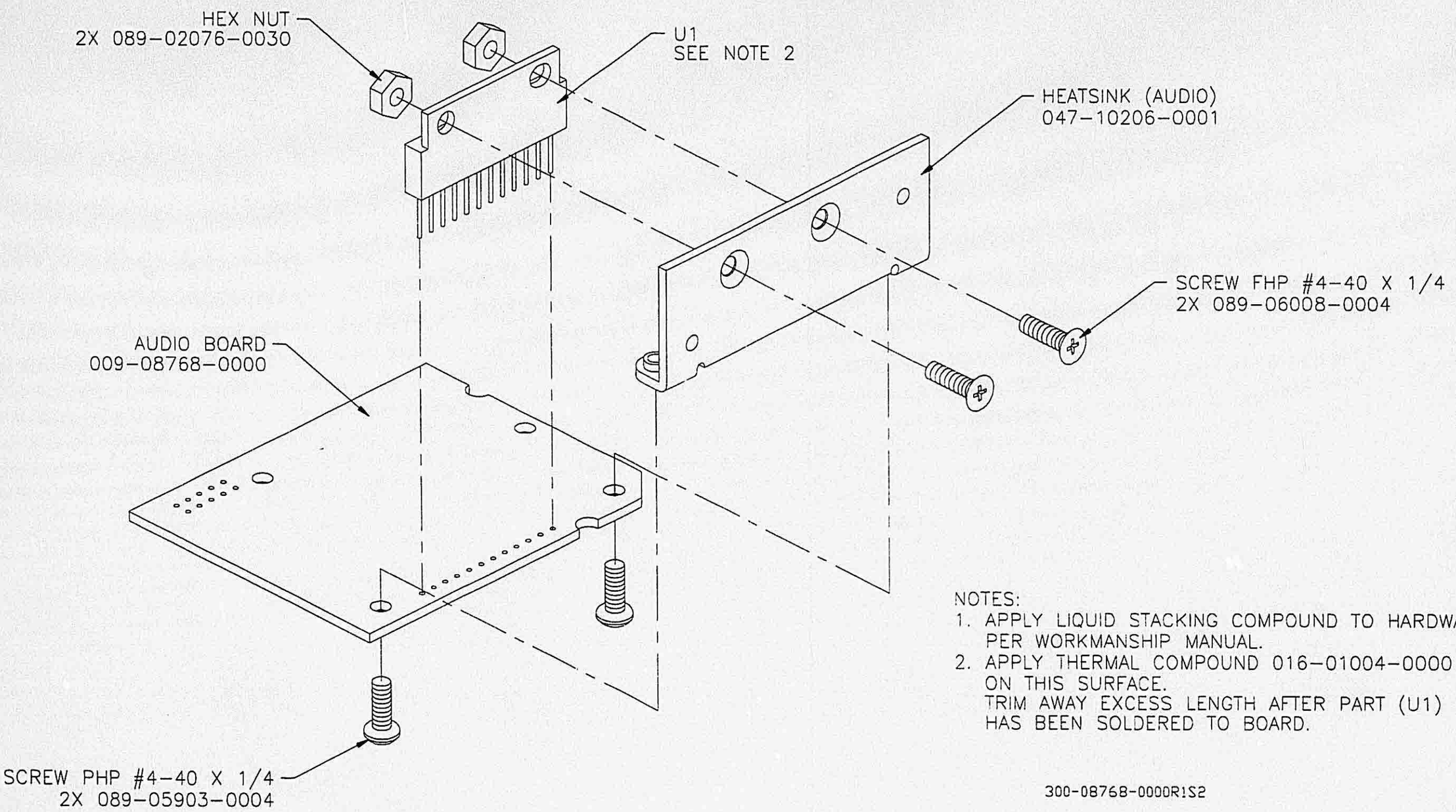
Q1,Q2



009-08768-0000
(NEARSIDE VIEW)

300-08768-0000R1S1

FIGURE 6-26 AUDIO BOARD
Dwg. No. 300-08768-0000, R1
(Sheet 1 of 2)



NOTES:
1. APPLY LIQUID STACKING COMPOUND TO HARDWARES PER WORKMANSHIP MANUAL.
2. APPLY THERMAL COMPOUND 016-01004-0000 ON THIS SURFACE.
   TRIM AWAY EXCESS LENGTH AFTER PART (U1) HAS BEEN SOLDERED TO BOARD.

300-08768-0000R1S2

FIGURE 6-26 AUDIO BOARD
Dwg. No. 300-08768-0000, R1
(Sheet 2 of 2)

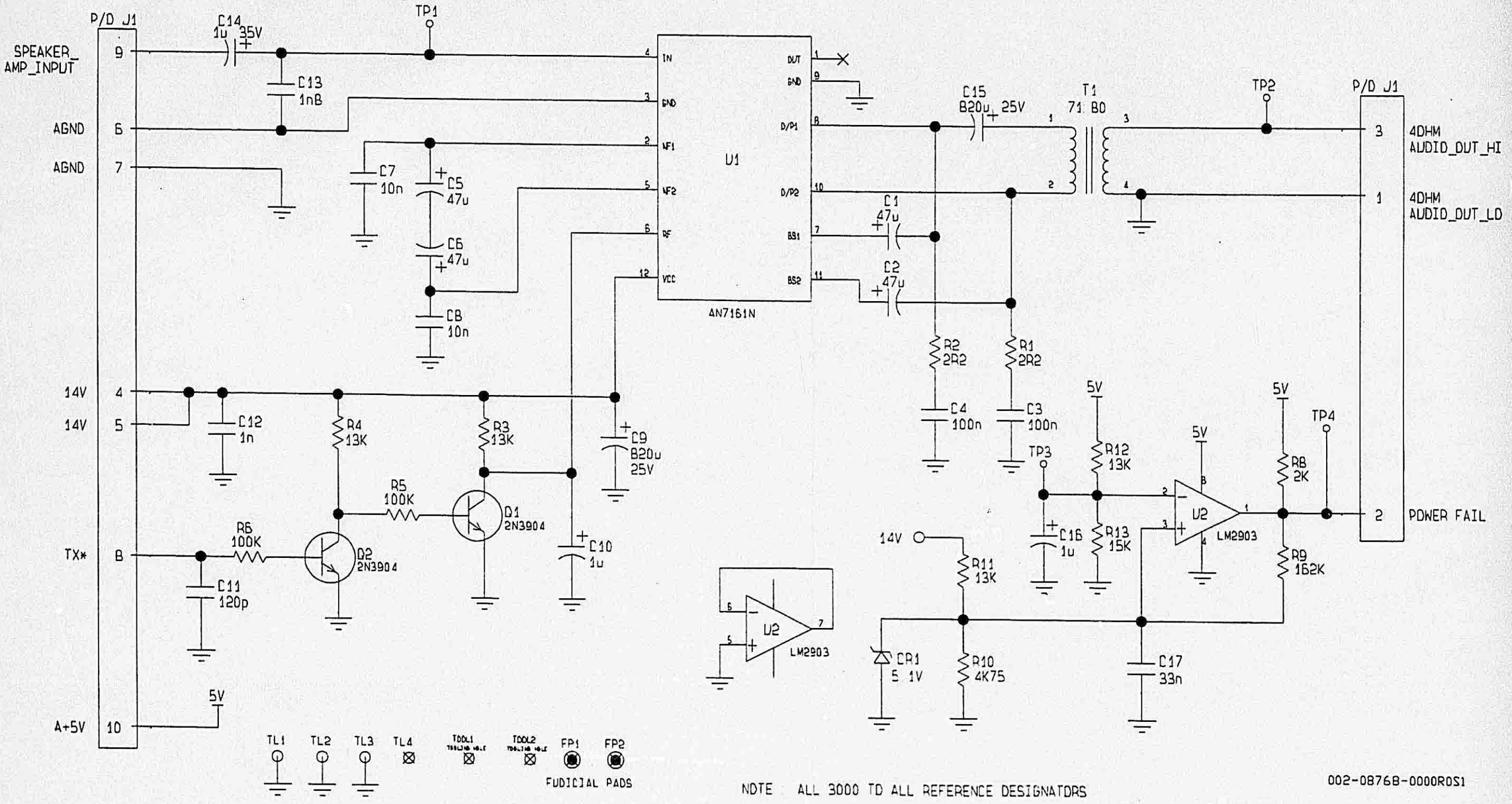
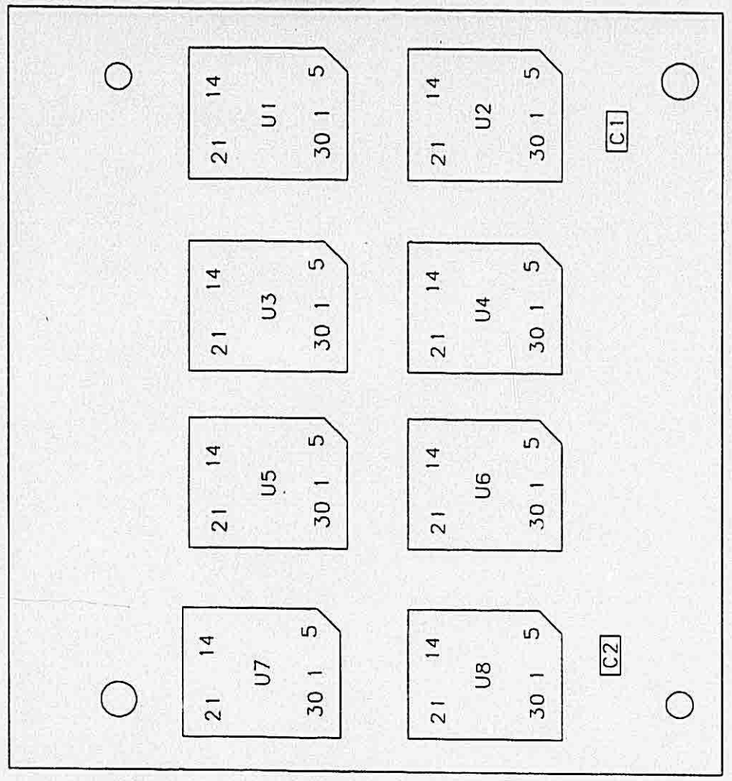


FIGURE 6-27 AUDIO BOARD SCHEMATIC
Dwg. No. 002-08768-0000, R0

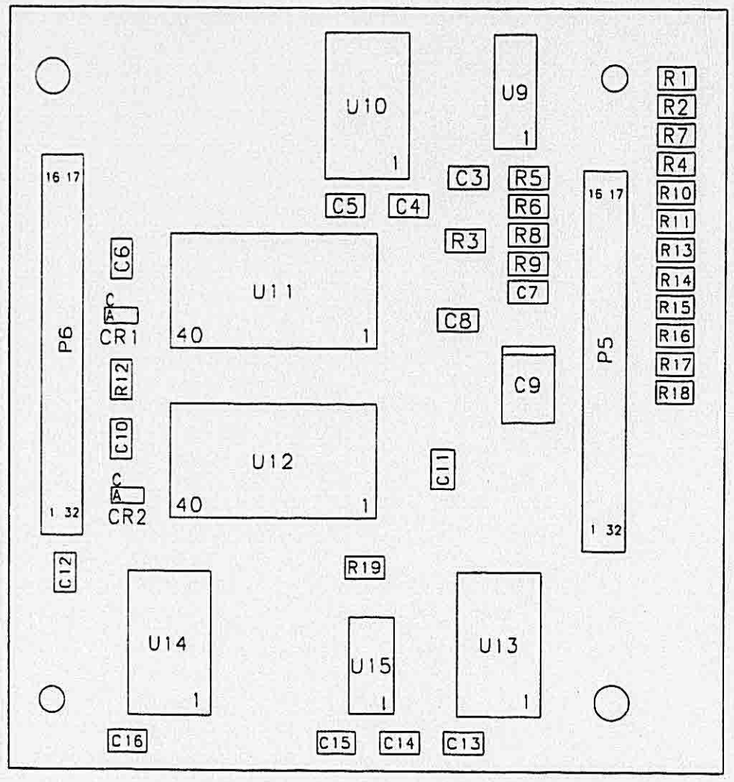
6.15	200-08773-0000	EPROM DBASE CARD	R0			
	200-08773-0010	EPROM DBASE CARD	R1			
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0010
...	009-08773-0000	PCBD DATA BASE		EA	1	.
...	009-08773-0010	KLX135B PCB DB CARD		EA	.	1
...	016-01040-0000	COATING TYPE AR		AR	0	1
...	195-00151-0000	KLX135 FLASH OPTNS		EA	1	.
C 101	106-04104-0046	CAP CH.1UFX7R50V		EA	1	1
C 102	106-04104-0046	CAP CH.1UFX7R50V		EA	1	1
C 103	106-04104-0046	CAP CH.1UFX7R50V		EA	1	1
C 104	106-04104-0046	CAP CH.1UFX7R50V		EA	1	1
C 105	106-04104-0046	CAP CH.1UFX7R50V		EA	1	1
C 106	106-04104-0046	CAP CH.1UFX7R50V		EA	1	1
C 107	106-04104-0046	CAP CH.1UFX7R50V		EA	1	1
C 108	106-04104-0046	CAP CH.1UFX7R50V		EA	1	1
C 109	096-01186-0036	CAP 10UF 35V 10%		EA	.	1
C 109	106-04104-0046	CAP CH.1UFX7R50V		EA	1	.
C 110	096-01186-0036	CAP 10UF 35V 10%		EA	1	.
C 110	106-04104-0046	CAP CH.1UFX7R50V		EA	.	1
C 111	106-04104-0046	CAP CH.1UFX7R50V		EA	.	1
C 112	106-04104-0046	CAP CH.1UFX7R50V		EA	.	1
C 113	106-04104-0046	CAP CH.1UFX7R50V		EA	.	1
C 114	106-04104-0046	CAP CH.1UFX7R50V		EA	.	1
C 115	106-04104-0046	CAP CH.1UFX7R50V		EA	.	1
C 116	106-04104-0046	CAP CH.1UFX7R50V		EA	.	1
CR 101	999-09999-0098	NOT USED		RF	.	X
CR 102	999-09999-0098	NOT USED		RF	.	1
P 101	030-03195-0016	CONN MALE 32 PIN		EA	1	.
P 102	030-03195-0016	CONN MALE 32 PIN		EA	1	.
P 105	030-03195-0016	CONN MALE 32 PIN		EA	.	1
P 106	030-03195-0016	CONN MALE 32 PIN		EA	.	1
R 101	139-02553-0000	RES CH 255K EW 1%		EA	1	.
R 101	999-09999-0098	NOT USED		RF	.	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0010
R 102	130-05000-0025	RES CHIP 0 EW CJ		EA	.	1
R 102	139-01102-0000	RES 11K EW 1%		EA	1	.
R 103	139-01102-0000	RES 11K EW 1%		EA	.	1
R 103	999-09999-0099	DO NOT USE		RF	X	.
R 104	130-05000-0025	RES CHIP 0 EW CJ		EA	.	1
R 104	999-09999-0099	DO NOT USE		RF	X	.
R 105	999-09999-0098	NOT USED		RF	.	1
R 105	999-09999-0099	DO NOT USE		RF	X	.
R 106	130-05000-0025	RES CHIP 0 EW CJ		EA	.	1
R 106	999-09999-0099	DO NOT USE		RF	X	.
R 107	999-09999-0096	RESERVED		RF	X	.
R 107	999-09999-0098	NOT USED		RF	.	1
R 108	130-05000-0025	RES CHIP 0 EW CJ		EA	1	.
R 108	139-02553-0000	RES CH 255K EW 1%		EA	.	1
R 109	130-05000-0025	RES CHIP 0 EW CJ		EA	1	1
R 110	130-05000-0025	RES CHIP 0 EW CJ		EA	1	1
R 111	130-05000-0025	RES CHIP 0 EW CJ		EA	1	.
R 111	999-09999-0098	NOT USED		RF	.	1
R 112	999-09999-0098	NOT USED		RF	.	1
R 112	999-09999-0099	DO NOT USE		RF	X	.
R 113	130-05000-0025	RES CHIP 0 EW CJ		EA	1	.
R 113	999-09999-0098	NOT USED		RF	.	1
R 114	130-05000-0025	RES CHIP 0 EW CJ		EA	.	1
R 114	999-09999-0099	DO NOT USE		RF	X	.
R 115	999-09999-0098	NOT USED		RF	.	1
R 116	130-05000-0025	RES CHIP 0 EW CJ		EA	.	1
R 117	999-09999-0098	NOT USED		RF	.	1
R 118	130-05000-0025	RES CHIP 0 EW CJ		EA	.	1
R 119	999-09999-0098	NOT USED		RF	.	1
REF 1	002-08773-0010	KLX135A EEPROM BD		EA	.	X
REF 2	300-08773-0010	KLX135A EEPROM BD		EA	.	X
U 101	120-02467-0012	IC FLASH IM 120NS		EA	.	1
U 101	123-00138-0003	74HC138 SO PKG		EA	1	.
U 102	120-02467-0012	IC FLASH IM 120NS		EA	.	1
U 102	999-09999-0096	RESERVED		RF	X	.
U 103	120-02467-0012	IC FLASH IM 120NS		EA	.	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0010
U 103	999-09999-0096	RESERVED		RF	X	.
U 104	120-02467-0012	IC FLASH IM 120NS		EA	.	1
U 104	999-09999-0096	RESERVED		RF	X	.
U 105	120-02467-0012	IC FLASH IM 120NS		EA	.	1
U 105	999-09999-0096	RESERVED		RF	X	.
U 106	120-02467-0012	IC FLASH IM 120NS		EA	.	1
U 106	999-09999-0096	RESERVED		RF	X	.
U 107	120-02467-0012	IC FLASH IM 120NS		EA	.	1
U 107	999-09999-0096	RESERVED		RF	X	.
U 108	120-02467-0012	IC FLASH IM 120NS		EA	.	1
U 109	123-00138-0003	74HC138 SO PKG		EA	.	1
U 110	123-00541-0003	IC MOS 74HC541		EA	.	1
U 111	999-09999-0098	NOT USED		RF	.	1
U 112	999-09999-0098	NOT USED		RF	.	1
U 113	123-00245-0003	IC 74HC245 SO PKG		EA	.	1
U 114	123-00541-0003	IC MOS 74HC541		EA	.	1
U 115	123-00086-1003	IC 74AC86 SOIC		EA	.	1



NEARSIDE

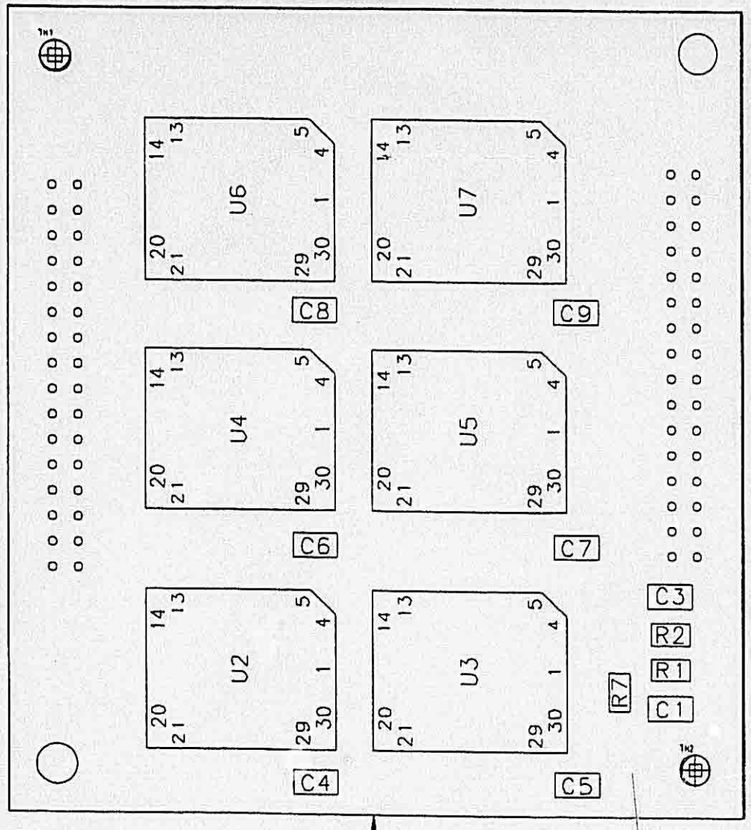


FARSIDE

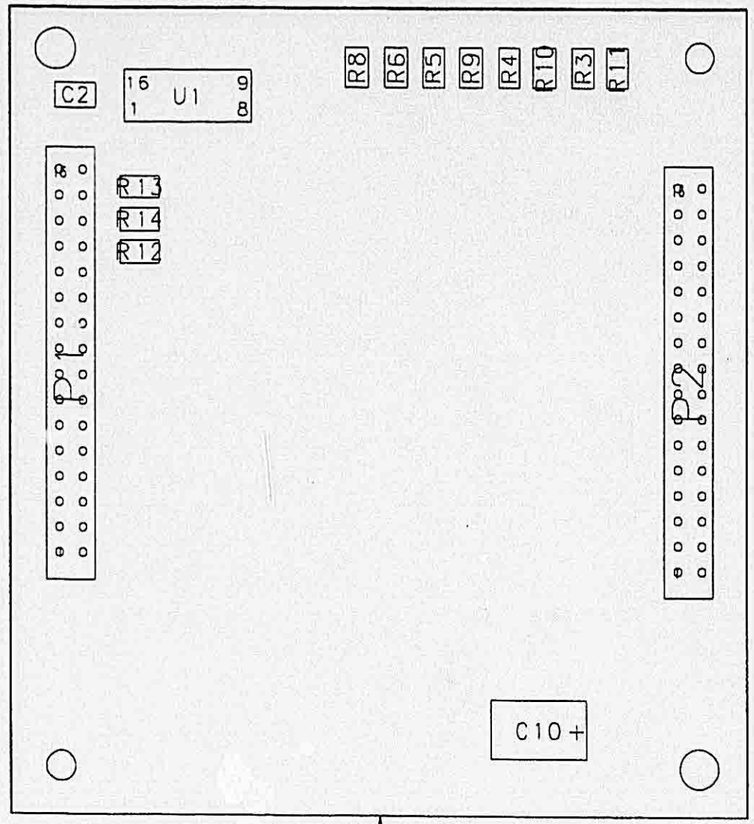
NOTES:

1. ADD 100 TO ALL REFERENCE DESIGNATIONS ie: C1 = C101.
2. PRIOR TO COATING BOTH SIDES OF P.C. BOARD WITH KPN 016-01040-0000, MASK OFF ALL THE MOUNTING AREAS.
3. THE FOLLOWING PARTS WILL NOT BE USED:
   CR101, CR102
   R101, R105, R107, R111, R112
   R113, R115, R117, R119
   U111, U112

FIGURE 6-28 DB (1MBIT) CARD
Dwg. No. 300-08773-0000/-0010, R0



009-08773-0000
(NEARSIDE VIEW)



009-08773-0000
(FARSIDE VIEW)

NOTES:

1. ADD 400 TO ALL REFERENCE DESIGNATIONS ie: C1 = C401.
2. PRIOR TO COATING BOTH SIDES OF P.C. BOARD WITH KPN 016-01040-0000, MASK OFF ALL THE MOUNTING AREAS.

FIGURE 6-29 DB (1MBIT) CARD
Dwg. No. 300-08773-0000, R0

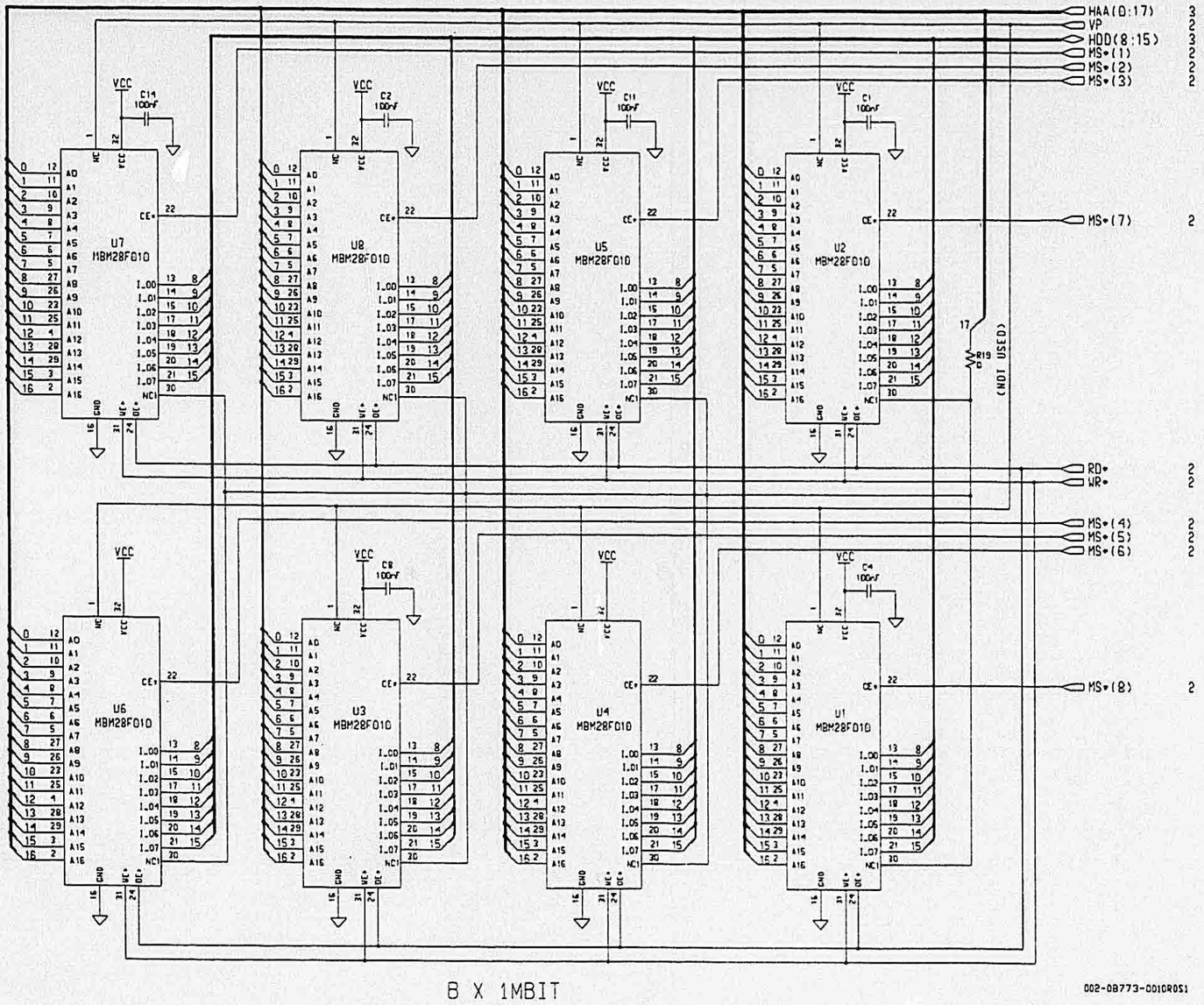


FIGURE 6-30 DB (1MBIT) CARD SCHEMATIC
Dwg. No. 002-08773-0010, R0
(Sheet 1 of 3)

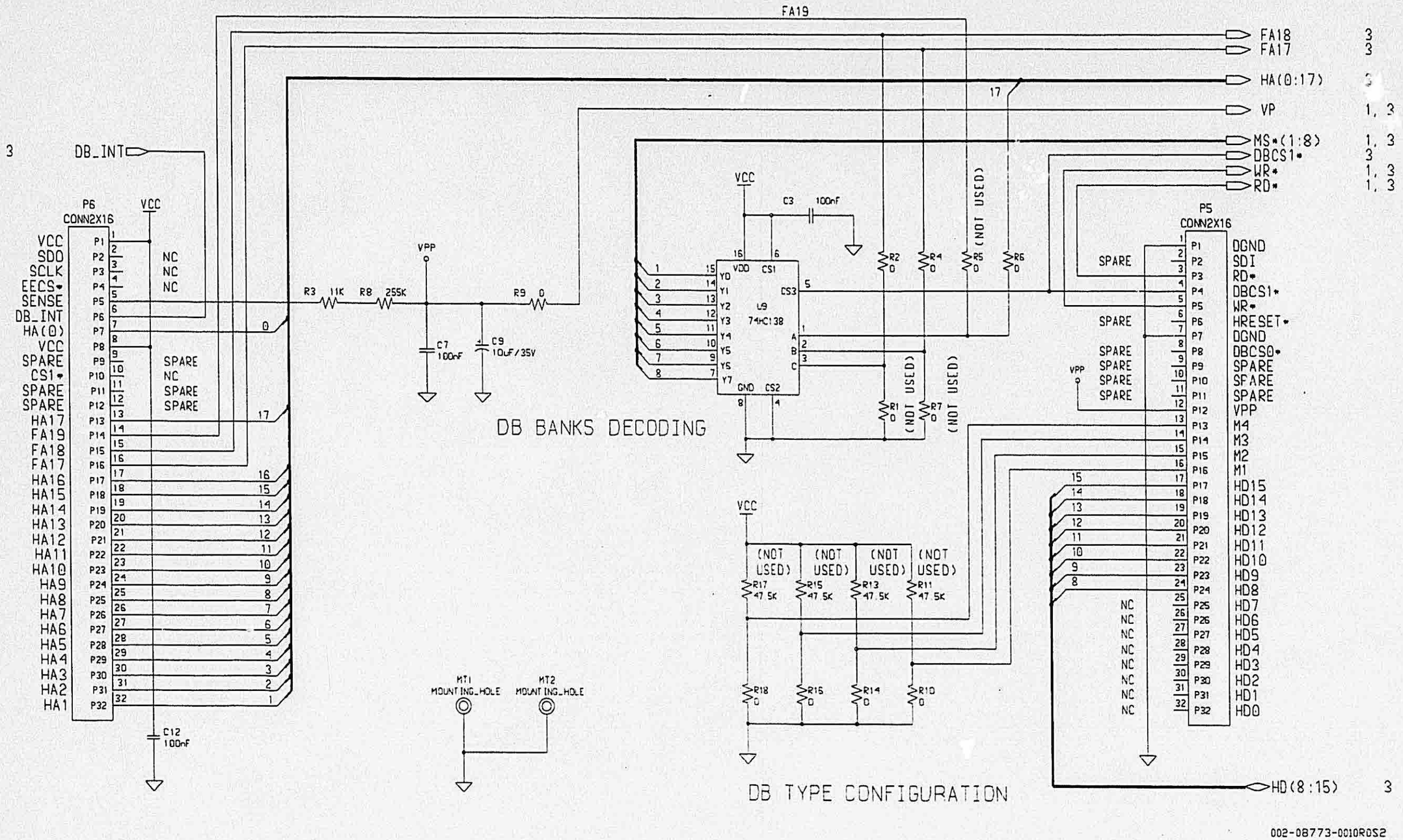
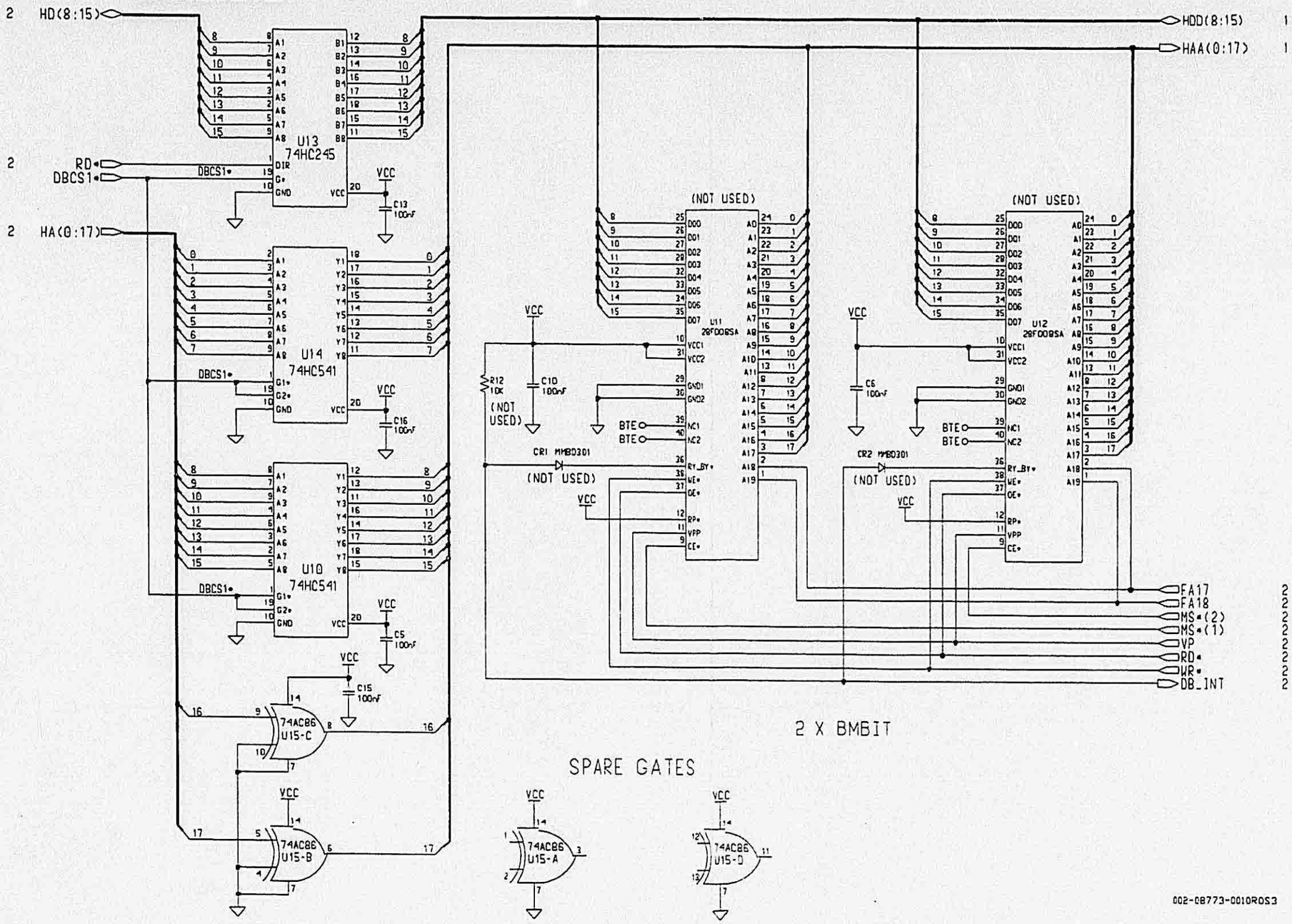


FIGURE 6-30 DB (1MBIT) CARD SCHEMATIC
Dwg. No. 002-08773-0010, R0
(Sheet 2 of 3)



002-08773-0010R0S3

FIGURE 6-30 DB (1MBIT) CARD SCHEMATIC
Dwg. No. 002-08773-0010, R0
(Sheet 3 of 3)

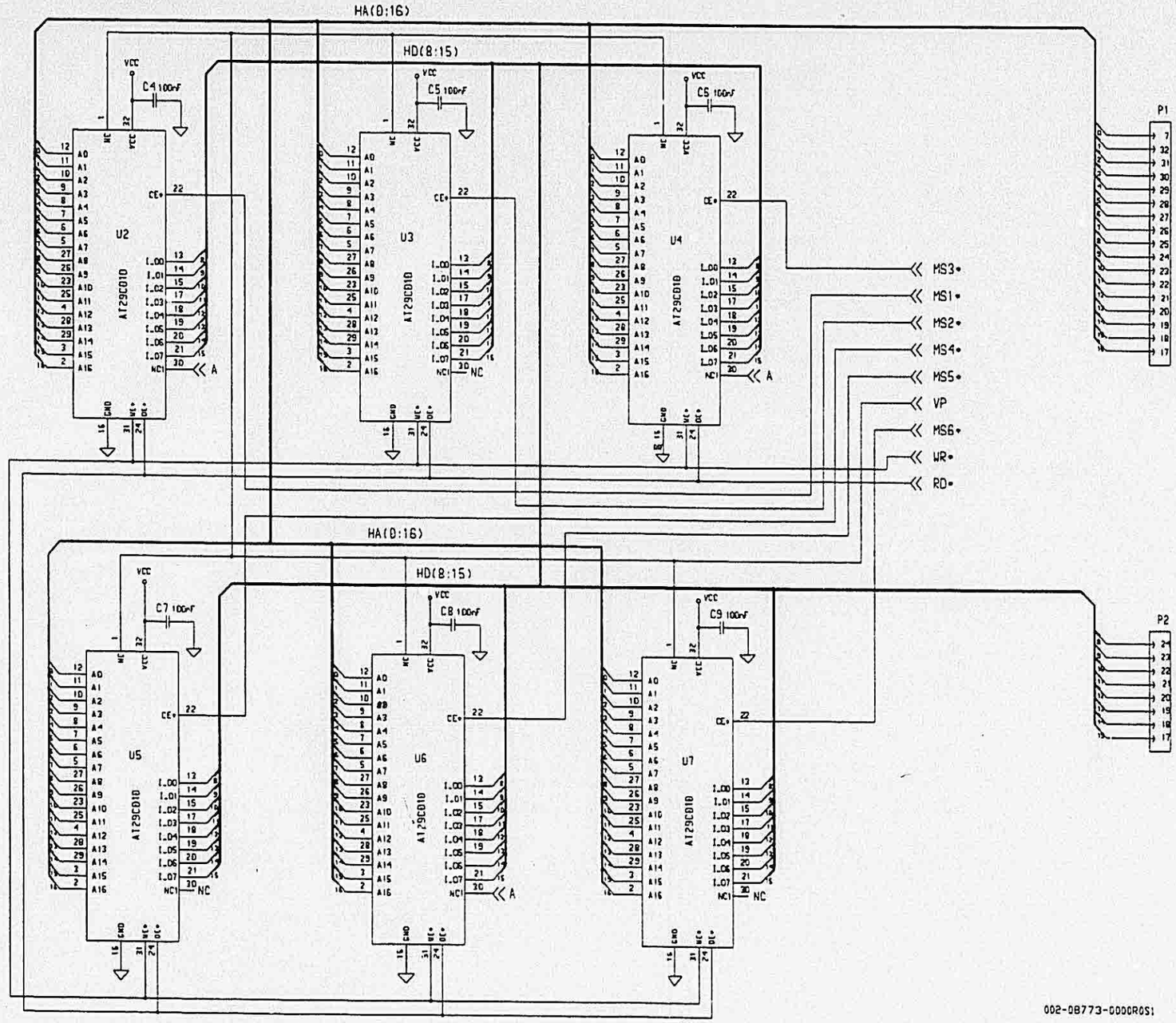
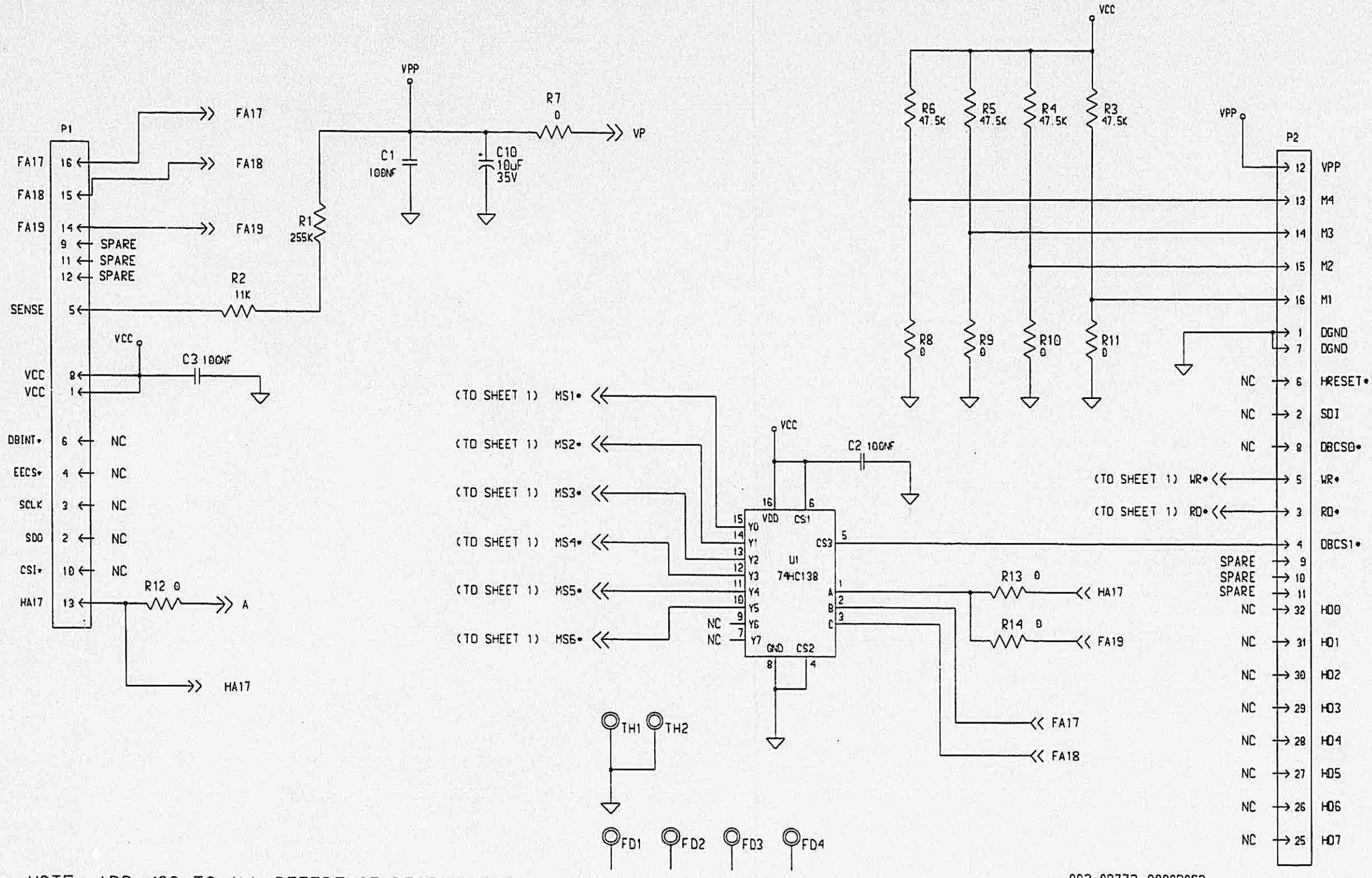


FIGURE 6-31 DB (1MBIT) CARD SCHEMATIC
Dwg. No. 002-08773-0000, R0
(Sheet 1 of 2)



NOTE: ADD 400 TO ALL REFERENCE DESIGNATORS

FIGURE 6-31 DB (1MBIT) CARD SCHEMATIC
Dwg. No. 002-08773-0000, R0
(Sheet 2 of 2)

6.16	205-00816-0000	KLX135 BA 1M CARD	R0			
	205-00816-0001	KLX135 BA IM CARD	R1			
	205-00816-0300	KLX135A DIG BD PROG	R1			

SYMBOL	PART NUMBER	DESCRIPTION	UM	-0000	-0001	-0300
...	057-03193-0000	LABEL, S/W REV TAG	EA	1	.	.
...	057-03193-0001	LABEL, S/W REV TAG	EA	.	1	.
...	057-03194-0816	LABEWL SFT TAG	EA	1	1	1
...	057-05697-0300	LABEL S/W REV TAG	EA	.	.	1
...	125-00831-0000	BASIC DB SFTWR	EA	1	.	.
...	125-00831-0001	KLX135 BASIC SW	EA	.	1	.
...	125-00831-0300	KLX135A DIG BD DEV	EA	.	.	1
...	200-08775-0000	DIG BD W/O DB BOM	EA	1	.	.
...	200-08775-0005	KLX135 DIG BD W/O DB	EA	.	1	.
...	200-08775-0015	KLX135A DIG BD W/O BD	EA	.	.	1

	125-00831-0000	BASIC DB SFTWR	R1			
	125-00831-0001	KLX135 BASIC SW	R0			
	125-00831-0300	KLX135A DIG BD DEV	R0			

SYMBOL	PART NUMBER	DESCRIPTION	UM	-0000	-0001	-0300
U 9	122-01530-0000	KLX135 PROG DEV BA	EA	1	.	.
U 9	122-01530-0001	KLX135 PROG DEV BA	EA	.	1	.
U 9	122-01530-0300	KLX135A PRGRM LOW	EA	.	.	1
U 15	122-01531-0000	KLX135 PROG BA HI	EA	1	.	.
U 15	122-01531-0001	KLX135 PROG DEV BA	EA	.	1	.
U 15	122-01531-0300	KLX135A PROG HIGH	EA	.	.	1
	722-01490-0000	KLX135 PROG DEV BA	EA	1	.	.

6.17	200-08775-0000	DIGITAL BD W/O DB	R2
	200-08775-0005	DIGITAL BD W/O DB	R0
	200-08775-0010	DIGITAL BD W/O DB	R2
	200-08775-0015	DIGITAL BD W/O DB	R0
	200-08775-9900	DIGITAL BD COMMON	R10

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
...	008-00038-0001	TERM BIFUR .084L		EA	.	.	.	.	4
...	016-01040-0000	COATING TYPE AR		AR	.	.	.	.	1
...	076-01538-0001	SPCR DIGITAL BD		EA	.	.	.	.	2
...	089-05899-0004	SCR PHP 2-56X1/4		EA	.	.	.	.	2
...	091-00107-0000	LEAD INSUL .145		EA	.	.	.	.	2
...	150-00003-0010	TUBING TFLN 24AWG		IN	.	.	.	.	0.003
...	200-08773-0000	EPROM DBASE CARD	A	EA	.	1	.	.	.
...	200-08773-0010	KLX135A EEPROM DB CARD	A	EA	.	.	.	1	.
...	200-08775-9900	DIGITAL BD COMMON	A	EA	.	1	.	1	.
...	200-08773-0000	EPROM DBASE CARD	A	EA	.	1	.	.	.
...	200-08773-0010	KLX135A EEPROM DB CARD	A	EA	.	.	.	1	.
B 1	015-00084-0000	BATTERY LITHIUM		EA	.	.	.	.	1
C 1	096-01186-0062	CAP 1.0UF 16V 20%		EA	.	.	.	.	1
C 2	096-01186-0062	CAP 1.0UF 16V 20%		EA	.	.	.	.	1
C 3	102-00085-0000	CAP VAR SURF MTG		EA	.	.	.	.	1
C 4	106-04560-0026	CAPCH 56PFNPO/100V		EA	.	.	.	.	1
C 5	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 6	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 7	096-01186-0062	CAP 1.0UF 16V 20%		EA	.	.	.	.	1
C 8	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 9	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 10	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 11	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 12	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 13	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
C 14	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 15	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 16	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 17	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 18	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 19	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 20	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 21	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 22	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 23	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 24	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 25	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 26	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 27	106-04102-0026	CH 1KPF NPO/100V		EA	.	.	.	.	1
C 28	096-01186-0011	CAP 47UF 10V 10%		EA	.	.	.	.	1
C 29	106-04470-0026	CAPCH 47PFNPO/100V		EA	.	.	.	.	1
C 30	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 31	106-04150-0026	CH 15PF NPO/100V		EA	.	.	.	.	1
C 32	106-04569-0020	CAP CH 5.6 NPO/100		EA	.	.	.	.	1
C 33	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 35	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 36	096-01186-0062	CAP 1.0UF 16V 20%		EA	.	.	.	.	1
C 37	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 38	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 39	096-01186-0011	CAP 47UF 10V 10%		EA	.	.	.	.	1
C 40	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 41	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 42	096-01186-0062	CAP 1.0UF 16V 20%		EA	.	.	.	.	1
C 43	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 44	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 45	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 46	096-01186-0014	CAP 10.0UF 16V 10%		EA	.	.	.	.	1
C 47	097-00213-0072	CAP AL ELECTROLYTI		EA	.	.	.	.	1
C 48	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 49	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 51	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 52	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 53	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
C 54	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 55	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 56	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 57	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 58	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 59	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 60	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 61	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 62	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 63	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 64	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 65	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 66	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 67	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 68	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 69	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 70	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 71	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 72	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 73	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 74	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 75	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 76	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 77	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 78	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 79	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 80	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 81	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 84	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 85	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 86	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 87	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 88	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 89	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 90	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 91	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 92	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 93	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
C 94	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 95	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 96	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 97	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 98	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 99	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 100	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 101	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 102	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 103	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 104	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 105	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 106	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 107	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 108	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 109	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 111	096-01186-0017	CAP 2.2UF 20V 10%		EA	.	.	.	.	1
C 112	096-01186-0017	CAP 2.2UF 20V 10%		EA	.	.	.	.	1
C 113	096-01186-0017	CAP 2.2UF 20V 10%		EA	.	.	.	.	1
C 114	096-01186-0011	CAP 47UF 10V 10%		EA	.	.	.	.	1
C 115	096-01186-0014	CAP 10.0UF 16V 10%		EA	.	.	.	.	1
C 116	096-01186-0014	CAP 10.0UF 16V 10%		EA	.	.	.	.	1
C 117	096-01186-0017	CAP 2.2UF 20V 10%		EA	.	.	.	.	1
C 118	096-01186-0017	CAP 2.2UF 20V 10%		EA	.	.	.	.	1
C 119	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 120	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 121	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 122	106-04104-0046	CAP CH.1UFX7R50V		EA	.	.	.	.	1
C 123	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 124	106-04103-0046	CAP CH 10K X7R/50V		EA	.	.	.	.	1
C 125	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 126	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 128	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 129	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 130	096-01186-0017	CAP 2.2UF 20V 10%		EA	.	.	.	.	1
C 131	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 132	106-04221-0026	CAP CH220PFNPO/100		EA	.	.	.	.	1
C 133	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
C 134	106-00131-0000	CAP FDTHU 220PF SM		EA	.	.	.	.	1
C 135	106-04470-0026	CAPCH 47PFNPO/100V		EA	.	.	.	.	1
C 136	106-04470-0026	CAPCH 47PFNPO/100V		EA	.	.	.	.	1
C 137	106-04100-0026	CAPCH 10PFNPO/100VV		EA	.	.	.	.	1
C 138	106-04100-0026	CAPCH 10PFNPO/100VV		EA	.	.	.	.	1
C 139	106-04100-0026	CAPCH 10PFNPO/100VV		EA	.	.	.	.	1
C 140	096-01186-0062	CAP 1.0UF 16V 20%		EA	.	.	.	.	1
C 141	113-05101-0001	CAP DC 100PF 500V		EA	.	.	.	.	1
CR 2	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 3	007-06177-0000	SMD DIO SI MMBD914		EA	.	.	.	.	1
CR 4	007-05241-0004	TRNSRB 1500W 17V		EA	.	.	.	.	1
CR 5	007-05241-0205	TRNSRB 1500W 24V		EA	.	.	.	.	1
CR 6	007-06180-0000	DIO SW MMBD6050		EA	.	.	.	.	1
CR 7	007-06180-0000	DIO SW MMBD6050		EA	.	.	.	.	1
CR 8	007-05241-0005	TRNSRB 1500W 24V		EA	.	.	.	.	1
CR 9	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 10	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 11	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 12	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 13	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 14	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 15	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 16	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 17	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 18	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 19	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 20	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 21	007-05241-0004	TRNSRB 1500W 17V		EA	.	.	.	.	1
CR 22	007-05241-0203	TRNSRB 1500W 15V		EA	.	.	.	.	1
CR 23	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 24	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 25	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 26	007-05241-0004	TRNSRB 1500W 17V		EA	.	.	.	.	1
CR 27	007-06177-0000	SMD DIO SI MMBD914		EA	.	.	.	.	1
CR 28	007-06177-0000	SMD DIO SI MMBD914		EA	.	.	.	.	1
CR 29	007-06177-0000	SMD DIO SI MMBD914		EA	.	.	.	.	1
CR 30	007-06223-0000	DIO DA204K		EA	.	.	.	.	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
CR 31	007-05241-0001	TRNSRB 1500W 33V		EA	.	.	.	.	1
CR 32	007-05241-0004	TRNSRB 1500W 17V		EA	.	.	.	.	1
CR 34	007-05241-0001	TRNSRB 1500W 33V		EA	.	.	.	.	1
CR 36	007-05241-0004	TRNSRB 1500W 17V		EA	.	.	.	.	1
CR 37	007-05241-0004	TRNSRB 1500W 17V		EA	.	.	.	.	1
CR 38	007-05241-0004	TRNSRB 1500W 17V		EA	.	.	.	.	1
CR 39	007-05241-0001	TRNSRB 1500W 33V		EA	.	.	.	.	1
CR 40	007-05241-0001	TRNSRB 1500W 33V		EA	.	.	.	.	1
CR 41	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 42	007-06223-0000	DIO DA204K		EA	.	.	.	.	1
CR 43	007-05241-0001	TRNSRB 1500W 33V		EA	.	.	.	.	1
CR 44	007-05241-0001	TRNSRB 1500W 33V		EA	.	.	.	.	1
CR 45	007-05241-0001	TRNSRB 1500W 33V		EA	.	.	.	.	1
CR 46	007-05241-0203	TRNSRB 1500W 15V		EA	.	.	.	.	1
CR 47	007-05241-0205	TRNSRB 1500W 24V		EA	.	.	.	.	1
F 1	036-00057-0009	FUSE 275 125V 4A		EA	.	.	.	.	1
F 2	036-00057-0009	FUSE 275 125V 4A		EA	.	.	.	.	1
J 2	030-03041-0020	HEADER RT DOUBLE		EA	.	.	.	.	1
J 3	030-02453-0008	CONNECTOR 16P		EA	.	1	.	1	.
J 3	155-02293-0015			EA	1	.	1	.	.
J 4	033-00224-0004	SKT PLCC SM 44 PIN		EA	.	.	.	.	1
J 5	030-03196-0016	CONN FEMALE 32 PIN		EA	.	.	.	.	1
J 6	030-03196-0016	CONN FEMALE 32 PIN		EA	.	.	.	.	1
J 7	033-00224-0004	SKT PLCC SM 44 PIN		EA	.	.	.	.	1
L 1	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 2	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 3	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 4	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 5	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 6	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 7	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 9	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 10	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 11	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 12	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
L 13	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 14	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 15	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 16	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
L 17	013-00028-0001	FERR BEAD W/LEAD		EA	.	.	.	.	1
Q 1	007-08064-0017	XSTR NPN 47K. 47K		EA	.	.	.	.	1
Q 2	007-08064-0017	XSTR NPN 47K. 47K		EA	.	.	.	.	1
Q 3	007-00466-0000	XSTR S PNP MMBTA56		EA	.	.	.	.	1
Q 7	007-00903-0000	2N7002 MOSFET		EA	.	.	.	.	1
Q 8	007-00956-0000	IRFR120 N-CHN XSTR		EA	.	.	.	.	1
Q 9	007-00956-0000	IRFR120 N-CHN XSTR		EA	.	.	.	.	1
Q 10	007-00956-0000	IRFR120 N-CHN XSTR		EA	.	.	.	.	1
Q 11	007-00956-0000	IRFR120 N-CHN XSTR		EA	.	.	.	.	1
Q 12	007-00956-0000	IRFR120 N-CHN XSTR		EA	.	.	.	.	1
R 1	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 2	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 3	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 4	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 5	139-03323-0000	RES CH 332K EW 1%		EA	.	.	.	.	1
R 6	131-00226-0023	RES CF 22M QW 5%		EA	.	.	.	.	1
R 7	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 8	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 9	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 11	139-01003-0000	RES CHIP 100KEW1%		EA	.	.	.	.	1
R 12	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 13	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 14	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 15	139-02002-0000	RES CHIP 20.0KEW1%		EA	.	.	.	.	1
R 16	139-02671-0000	RES CH 2.67K EW 1%		EA	.	.	.	.	1
R 17	139-01503-0000	RES CHIP 150KEW1%		EA	.	.	.	.	1
R 18	139-02210-0000	RES CH 221 EW 1%		EA	.	.	.	.	1
R 19	139-01002-0000	RES CHIP 10K EW 1%		EA	.	.	.	.	1
R 20	139-01302-0000	RES CH 13K EW 1%		EA	.	.	.	.	1
R 21	139-01004-0000	RES CHIP 1M EW 1%		EA	.	.	.	.	1
R 22	999-09999-0098	NOT USED		RF	.	.	.	.	X
R 25	139-01002-0000	RES CHIP 10K EW 1%		EA	.	.	.	.	1

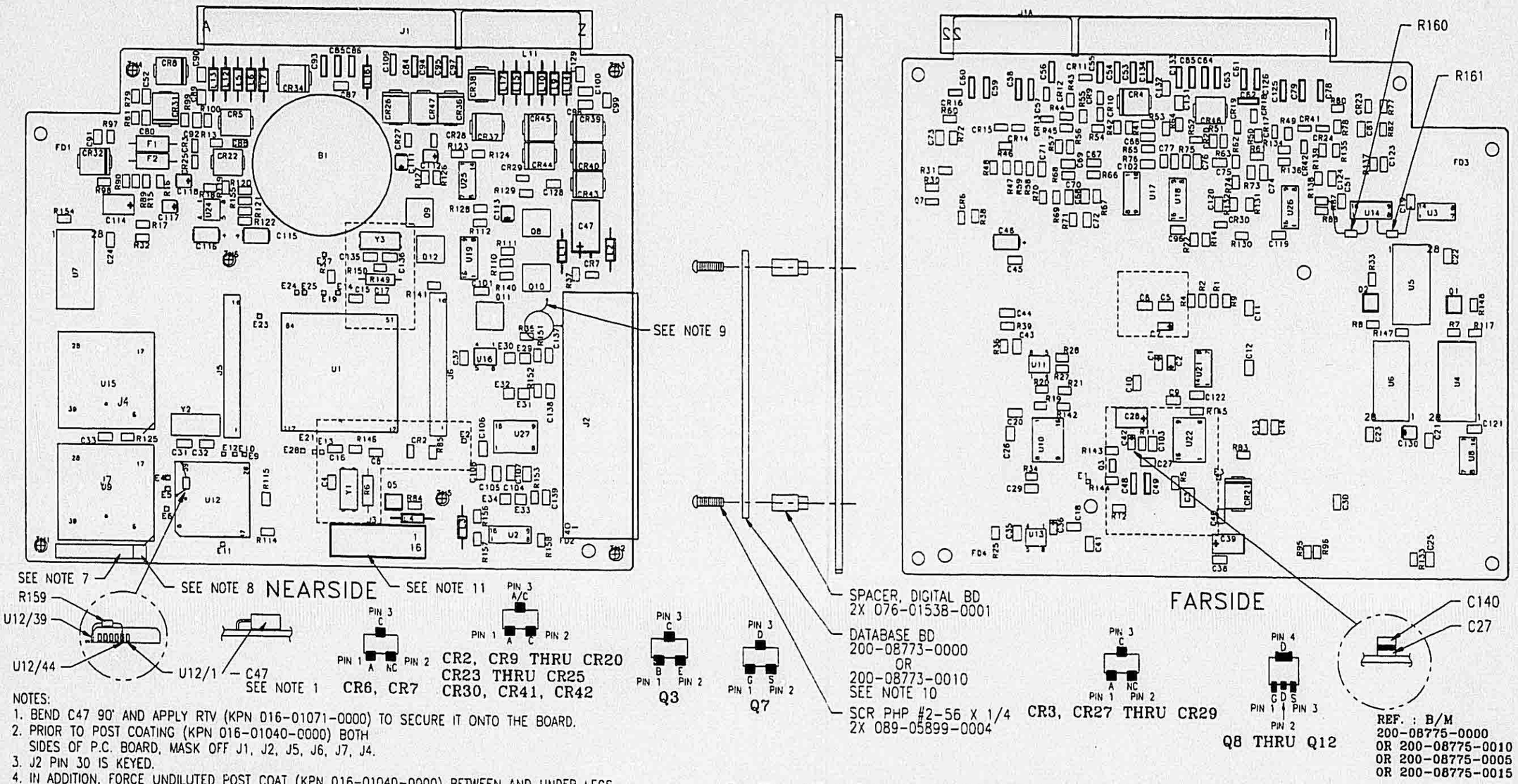
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
R 27	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 28	139-03011-0000	RES CH 3.01K EW 1%		EA	.	.	.	.	1
R 30	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 31	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 32	130-05000-0025	RES CHIP 0 EW CJ		EA	1	1	.	.	.
R 32	999-09999-0099	DO NOT USE		RF	.	.	1	X	.
R 33	130-05000-0025	RES CHIP 0 EW CJ		EA	.	.	.	.	1
R 34	130-05000-0025	RES CHIP 0 EW CJ		EA	.	.	.	.	1
R 35	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 36	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 37	139-01002-0000	RES CHIP 10K EW 1%		EA	.	.	.	.	1
R 38	139-01002-0000	RES CHIP 10K EW 1%		EA	.	.	.	.	1
R 39	139-01001-0000	RES CHIP 1K EW 1%		EA	.	.	.	.	1
R 41	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 42	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 43	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 44	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 45	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 46	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 47	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 48	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 49	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 50	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 51	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 52	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 53	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 54	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 55	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 56	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 57	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 58	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 59	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 60	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 61	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 62	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 63	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 64	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 65	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
R 66	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 67	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 68	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 69	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 70	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 71	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 72	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 73	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 74	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 75	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 76	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 77	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 78	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 79	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 80	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 81	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 82	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 83	139-01002-0000	RES CHIP 10K EW 1%		EA	.	.	.	.	1
R 84	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 85	139-01001-0000	RES CHIP 1K EW 1%		EA	.	.	.	.	1
R 87	999-09999-0098	NOT USED		RF	.	.	.	.	X
R 88	999-09999-0098	NOT USED		RF	.	.	.	.	X
R 89	999-09999-0098	NOT USED		RF	.	.	.	.	X
R 90	130-05000-0025	RES CHIP 0 EW CJ		EA	.	.	.	.	1
R 95	139-01001-0000	RES CHIP 1K EW 1%		EA	.	.	.	.	1
R 96	139-01001-0000	RES CHIP 1K EW 1%		EA	.	.	.	.	1
R 97	139-01002-0000	RES CHIP 10K EW 1%		EA	.	.	.	.	1
R 98	139-01802-0000	RES CH 18K 1%		EA	.	.	.	.	1
R 99	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 100	139-02742-0000	RES CHIP 27.4KEW1%		EA	.	.	.	.	1
R 110	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 111	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 112	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 114	139-01002-0000	RES CHIP 10K EW 1%		EA	.	.	.	.	1
R 115	139-01002-0000	RES CHIP 10K EW 1%		EA	.	.	.	.	1
R 117	130-05000-0025	RES CHIP 0 EW CJ		EA	.	.	.	.	1
R 119	139-01503-0000	RES CHIP 150KEW1%		EA	.	.	.	.	1
R 120	139-02210-0000	RES CH 221 EW 1%		EA	.	.	.	.	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
R 121	139-04992-0000	RES CH 49.9K EW 1%		EA	.	.	.	.	1
R 122	139-04992-0000	RES CH 49.9K EW 1%		EA	.	.	.	.	1
R 123	139-04220-0000	RES CHIP 4220MM 1%		EA	.	.	.	.	1
R 124	139-04220-0000	RES CHIP 4220MM 1%		EA	.	.	.	.	1
R 125	130-05000-0025	RES CHIP 0 EW CJ		EA	.	.	.	.	1
R 126	139-05623-0000	RES CHIP 562K 1%EW		EA	.	.	.	.	1
R 127	139-05623-0000	RES CHIP 562K 1%EW		EA	.	.	.	.	1
R 128	139-05623-0000	RES CHIP 562K 1%EW		EA	.	.	.	.	1
R 129	139-03011-0000	RES CH 3.01K EW 1%		EA	.	.	.	.	1
R 130	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 131	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 132	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 133	130-05000-0025	RES CHIP 0 EW CJ		EA	.	.	.	.	1
R 134	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 135	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 136	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 137	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 138	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 139	139-01102-0000	RES 11K EW 1%		EA	.	.	.	.	1
R 140	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 141	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 142	139-01001-0000	RES CHIP 1K EW 1%		EA	.	.	.	.	1
R 143	139-04750-0000	RES CH 475 EW 1%		EA	.	.	.	.	1
R 144	139-02001-0000	RES CHIP 2K EW 1%		EA	.	.	.	.	1
R 145	139-02212-0000	RES CHIP 22.1KEW1%		EA	.	.	.	.	1
R 146	139-01002-0000	RES CHIP 10K EW 1%		EA	.	.	.	.	1
R 147	999-09999-0099	DO NOT USE		RF	.	.	.	.	X
R 148	999-09999-0099	DO NOT USE		RF	.	.	.	.	X
R 149	131-00226-0023	RES CF 22M QW 5%		EA	.	.	.	.	1
R 150	139-04993-0000	RES CHIP 499K EW1%		EA	.	.	.	.	1
R 151	139-02210-0000	RES CH 221 EW 1%		EA	.	.	.	.	1
R 152	139-02210-0000	RES CH 221 EW 1%		EA	.	.	.	.	1
R 153	139-02210-0000	RES CH 221 EW 1%		EA	.	.	.	.	1
R 154	130-05000-0025	RES CHIP 0 EW CJ		EA	.	.	1	1	.
R 154	999-09999-0099	DO NOT USE		RF	1	X	.	.	.
R 155	139-02492-0000	RES CH 24.9K EW 1%		EA	.	.	.	.	1
R 156	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 157	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1

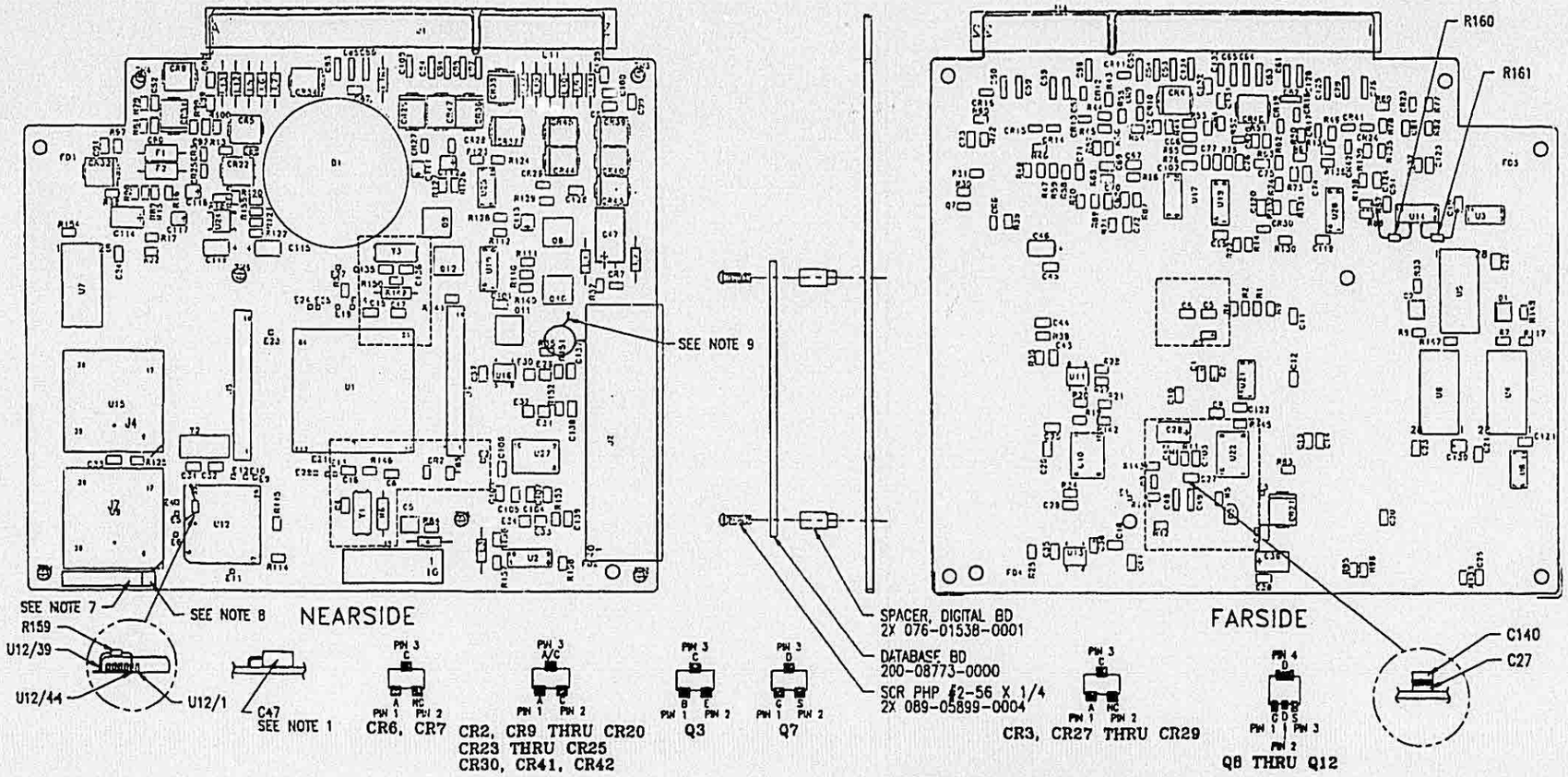
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
R 158	139-04752-0000	RES CH 47.5K EW 1%		EA	.	.	.	.	1
R 159	131-00103-0013	RES CF 10K EW 5%		EA	.	.	.	.	1
R 160	131-00103-0013	RES CF 10K EW 5%		EA	.	.	.	.	1
R 161	131-00103-0013	RES CF 10K EW 5%		EA	.	.	.	.	1
REF 1	300-08775-0000	ASSY DIG BD W/O DB		RF	.	.	.	.	X
REF 2	002-08775-0000	DIG BD W/O DB		RF	.	.	.	.	X
U 1	120-02502-0000			EA	.	.	.	.	1
U 2	123-00138-0003	74HC138 SO PKG		EA	.	.	.	.	1
U 3	123-00086-1003	IC 74AC86 SOIC		EA	.	.	.	.	1
U 4	120-02363-0008	32Kx8 SRAM		EA	.	.	1	1	.
U 4	999-09999-0098	NOT USED		RF	.	X	.	.	.
U 4	999-09999-0099	DO NOT USE		RF	X	.	.	.	.
U 5	120-02363-0008	32Kx8 SRAM		EA	.	.	.	.	1
U 6	120-02363-0008	32Kx8 SRAM		EA	.	.	.	.	1
U 7	120-02363-0008	32Kx8 SRAM		EA	.	.	.	.	1
U 8	123-00032-1003	74AC32 SO PKG		EA	.	.	.	.	1
U 9	999-09999-0090	REF SFTWARE SET		RF	.	.	.	.	X
U 10	120-02468-0000			EA	.	.	.	.	1
U 11	120-03498-0000	TL062 DUAL OPAMP		EA	.	.	.	.	1
U 12	120-02373-0000			EA	.	.	.	.	1
U 13	120-03274-0000	VOLT REG LM2951ACM		EA	.	.	.	.	1
U 14	124-00283-0003	IC 74HCT283 SO PKG		EA	.	.	.	.	1
U 15	999-09999-0090	REF SFTWARE SET		RF	.	.	.	.	X
U 16	120-03400-0001	REF-02 PREC V REG		EA	.	.	.	.	1
U 17	123-00589-0003	IC 74HC589 (SO)		EA	.	.	.	.	1
U 18	123-00589-0003	IC 74HC589 (SO)		EA	.	.	.	.	1
U 19	123-00595-0003	IC 74HC595 SO		EA	.	.	.	.	1
U 21	123-00008-1003	74AC08 SO PKG		EA	.	.	.	.	1
U 22	120-02505-0000			EA	.	.	.	.	1
U 23	120-03597-0000	MAX202EWE		EA	.	.	.	.	1
U 24	120-03195-0000	IC LM2904D		EA	.	.	.	.	1
U 25	120-03196-0000	IC LM2902D		EA	.	.	.	.	1
U 26	123-00589-0003	IC 74HC589 (SO)		EA	.	.	.	.	1
Y 1	044-00307-0000	32.768KHZ CRYS OSC		EA	.	.	.	.	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0005	-0010	-0015	-9900
Y 2	044-00285-0000	CRYSTAL 36864 MHZ		EA	.	.	.	.	1
Y 3	044-00307-0000	32.768KHZ CRYS OSC		EA	.	.	.	.	1



NOTES:
1. BEND C47 90° AND APPLY RTV (KPN 016-01071-0000) TO SECURE IT ONTO THE BOARD.
2. PRIOR TO POST COATING (KPN 016-01040-0000) BOTH SIDES OF P.C. BOARD, MASK OFF J1, J2, J5, J6, J7, J4.
3. J2 PIN 30 IS KEYED.
4. IN ADDITION, FORCE UNDILUTED POST COAT (KPN 016-01040-0000) BETWEEN AND UNDER LEGS OF U22, Y1, R6, Y3 AND R149. APPLY HEAVY COAT OF UNDILUTED POST COAT TO DASHED-IN AREAS SHOWN ON NEARSIDE AND FARSIDE OF P.C. BOARD.
5. ADD SPACERS (KPN 091-00107-0000) TO LEADS OF Y2.
6. SOLDER ONE END OF R160 TO U14 PIN 3 AND THE OTHER END TO Vcc PAD OF R87. SOLDER ONE END OF R161 TO U14 PIN 5 AND THE OTHER END TO Vcc PAD OF C19. SOLDER R159 BETWEEN U12 PIN 39 AND PIN 44. ADD SLEEVE (KPN 150-00003-0010) ON LONGER LEADS OF R160 AND R161.
7. INSTALL LABEL SOFTWARE TAG KPN 057-03194-0XXX AS CALLED OUT IN 205-00816-00XX BOMS ON POSITION INDICATED.
8. PLACE LABEL REVISION TAG KPN 057-03193-00XX OR 057-05697-XXXX AS CALLED OUT IN 205-00816-00XX BOMS ONTO SOFTWARE TAG 057-03194-0XXX.
9. SOLDER A 100pF CAPACITOR (KPN 113-05101-0001) BETWEEN J2-PIN22 WITH TUBING (KPN 150-00003-0010) AND Q10-PIN3 (GND).
10. USE 200-08773-0010 IN 200-08775-0010
11. J3 PIN 4 TO BE SNIPPED OFF IF GPS RECEIVER IS XPRESS CARD.(200-08825-0000)

FIGURE 6-32 DIGITAL BOARD W/O DB
Dwg. No. 300-08775-0000/-0010, R6



NOTES:
1. BEND C47 90° AND APPLY RTV (KPN 016-01071-0000) TO SECURE IT ONTO THE BOARD.
2. PRIOR TO POST COATING (KPN 016-01040-0000) BOTH SIDES OF P.C. BOARD, MASK OFF J1, J2, J5, J6, J7, J4.
3. J2 PIN 30 IS KEYED.
4. IN ADDITION, FORCE UNDILUTED POST COAT (KPN 016-01040-0000) BETWEEN AND UNDER LEGS OF U22, Y1, R6, Y3 AND R149. APPLY HEAVY COAT OF UNDILUTED POST COAT TO DASHED-IN AREAS SHOWN ON NEARSIDE AND FARSIDE OF P.C. BOARD.
5. ADD SPACERS (KPN 091-00107-0000) TO LEADS OF Y2.
6. SOLDER ONE END OF R160 TO U14 PIN 3 AND THE OTHER END TO Vcc PAD OF R87. SOLDER ONE END OF R161 TO U14 PIN 5 AND THE OTHER END TO Vcc PAD OF C19. SOLDER R159 BETWEEN U12 PIN 39 AND PIN 44. ADD SLEEVE (KPN 150-00003-0010) ON LONGER LEADS OF R160 AND R161.
7. INSTALL LABEL SOFTWARE TAG KPN 057-03194-0XXX AS CALLED OUT IN 205-00816-00XX BOMS ON POSITION INDICATED.
8. PLACE LABEL REVISION TAG KPN 057-03193-00XX AS CALLED OUT IN 205-00816-00XX BOMS ONTO SOFTWARE TAG 057-03194-0XXX.
9. SOLDER A 100pF CAPACITOR (KPN 113-05101-0001) BETWEEN J2-PIN22 AND Q10-PIN3 (GND).

FIGURE 6-33 DIGITAL BOARD W/O DB
Dwg. No. 300-08775-0000, R4

COMMUNICATIONS TRANSCEIVER/ GPS RECEIVER

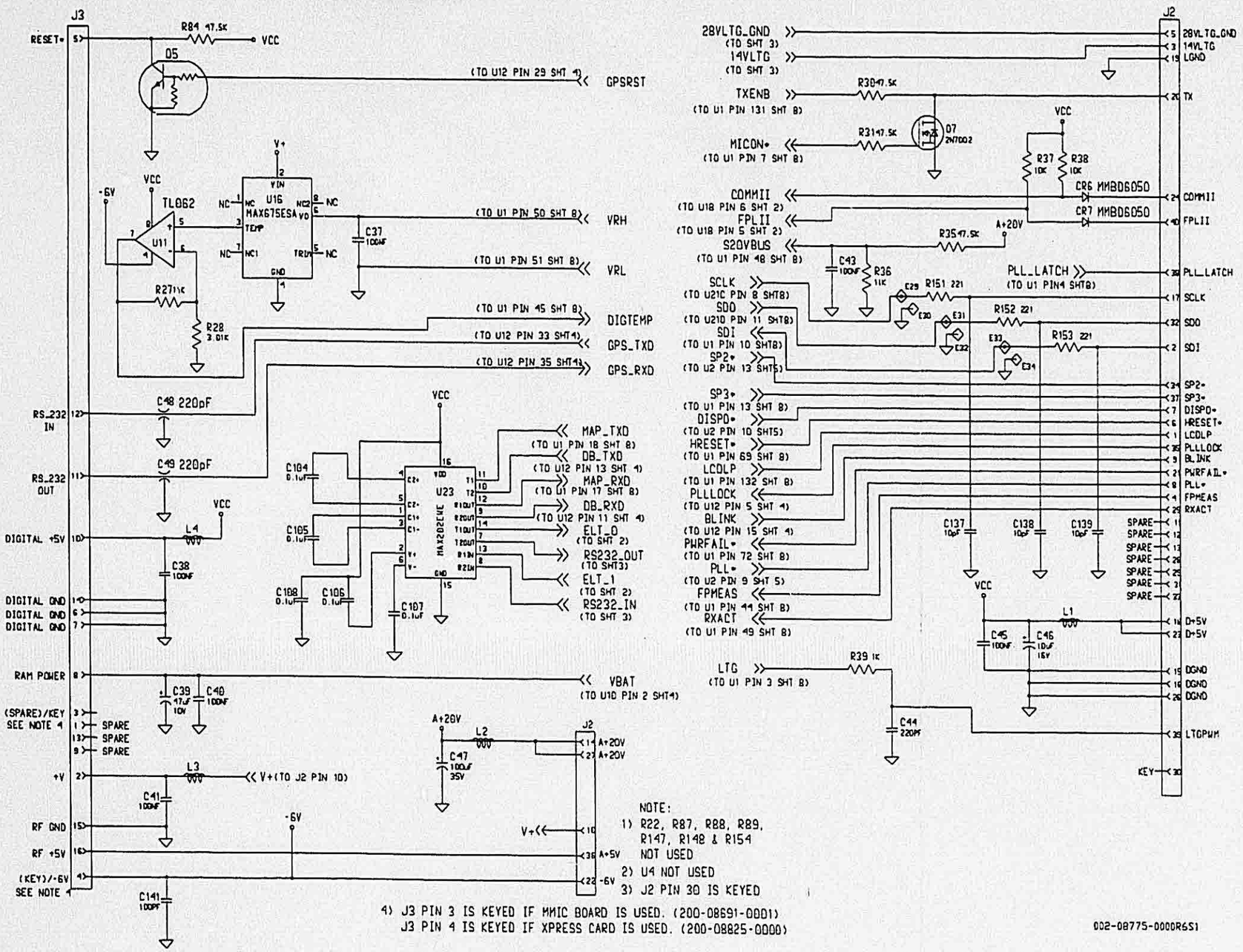


FIGURE 6-34 DIGITAL BOARD SCHEMATIC
Dwg. No. 002-08775-0000/-0010, R6
(Sheet 1 of 8)

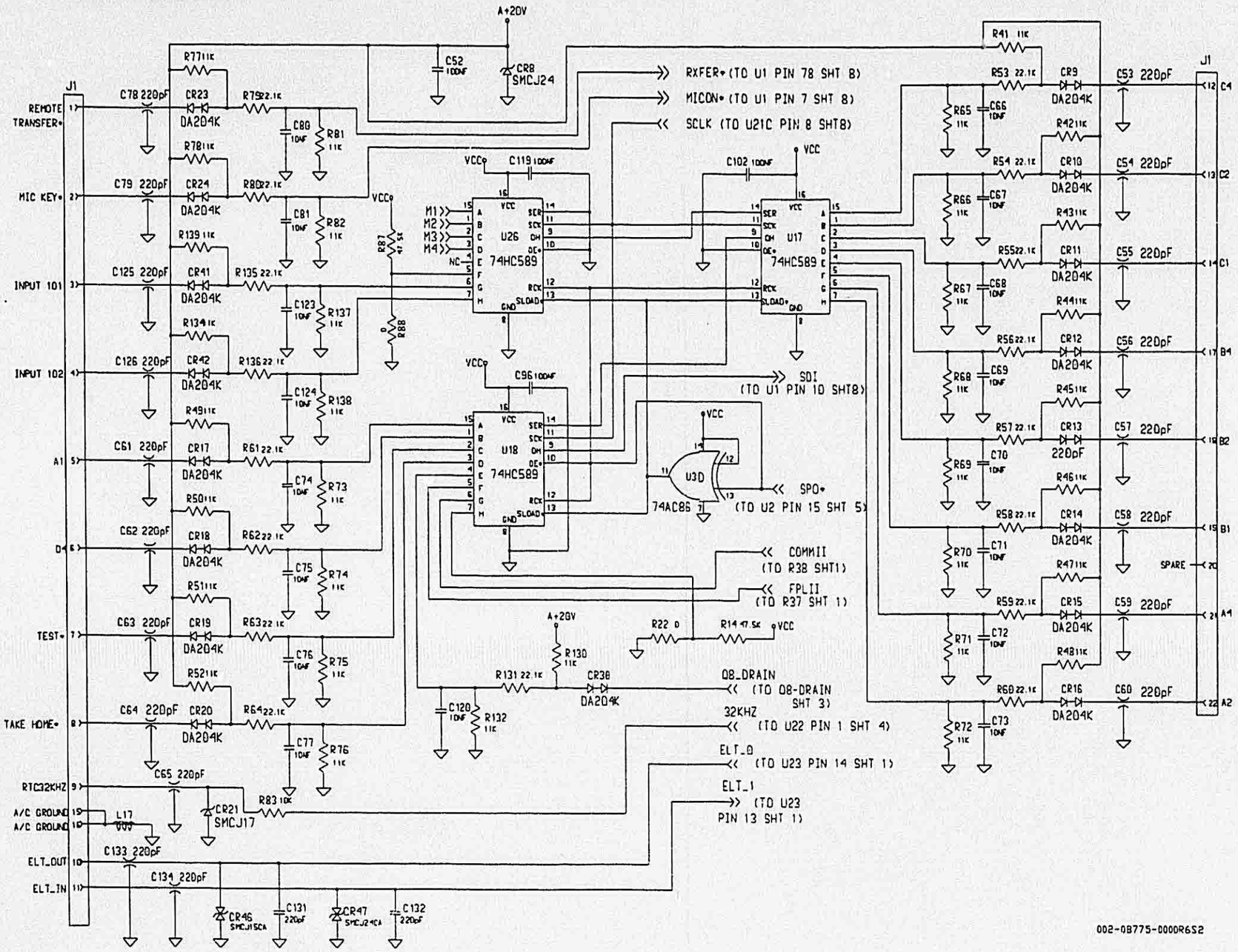


FIGURE 6-34 DIGITAL BOARD SCHEMATIC
Dwg. No. 002-08775-0000/-0010, R6
(Sheet 2 of 8)

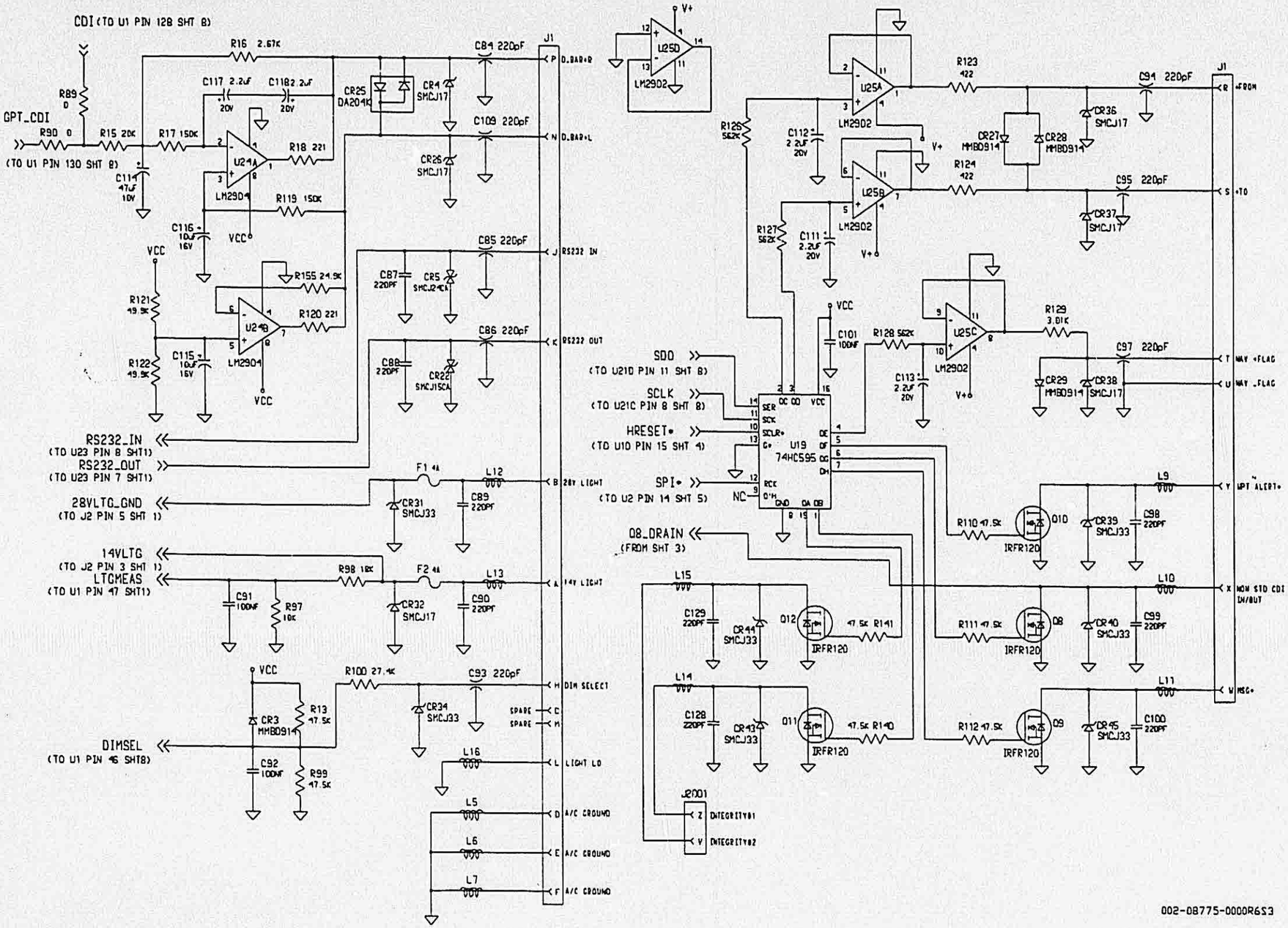


FIGURE 6-34 DIGITAL BOARD SCHEMATIC
Dwg. No. 002-08775-0000/-0010, R6
(Sheet 3 of 8)

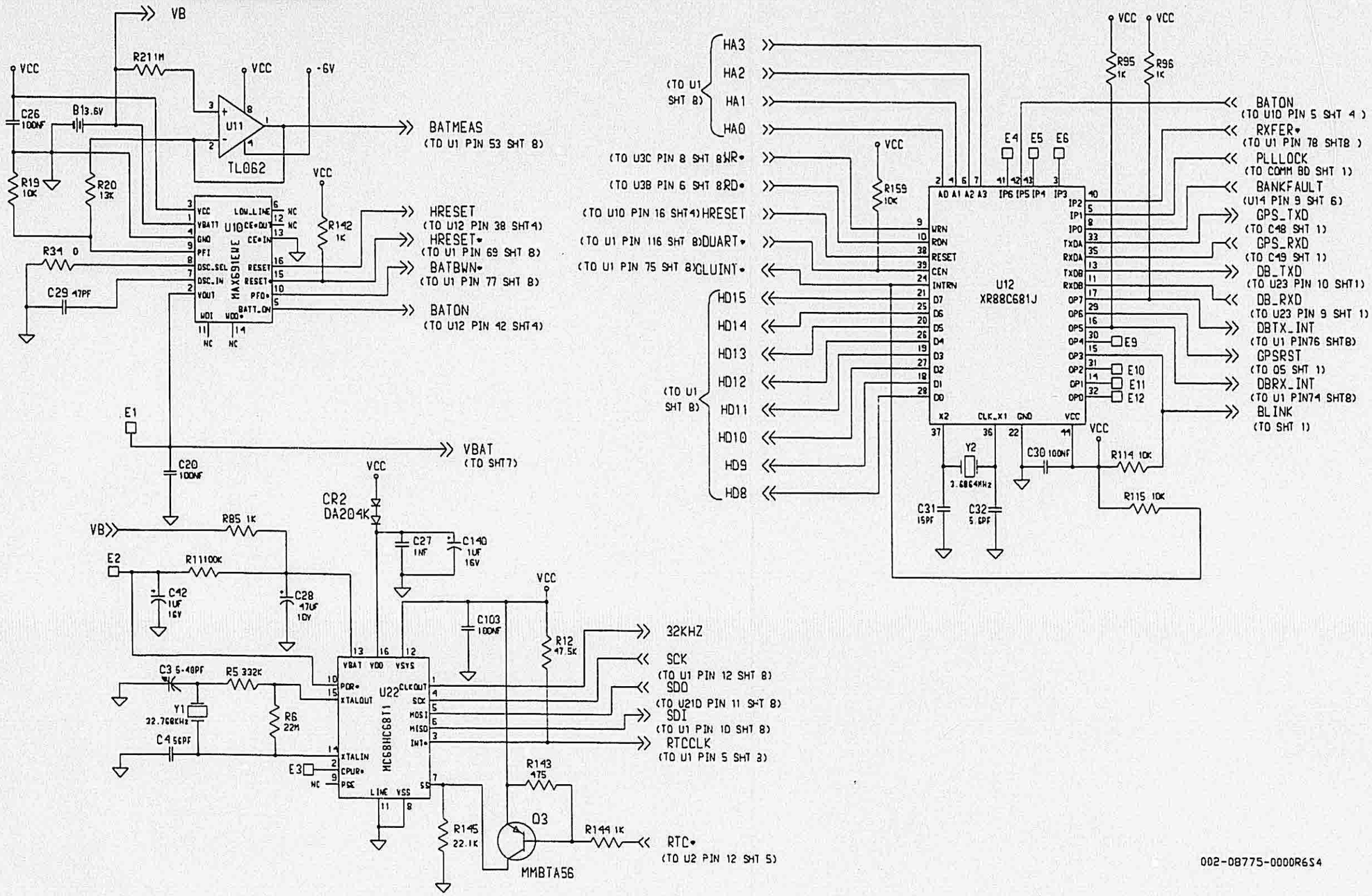


FIGURE 6-34 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000/-0010, R6
(Sheet 4 of 8)

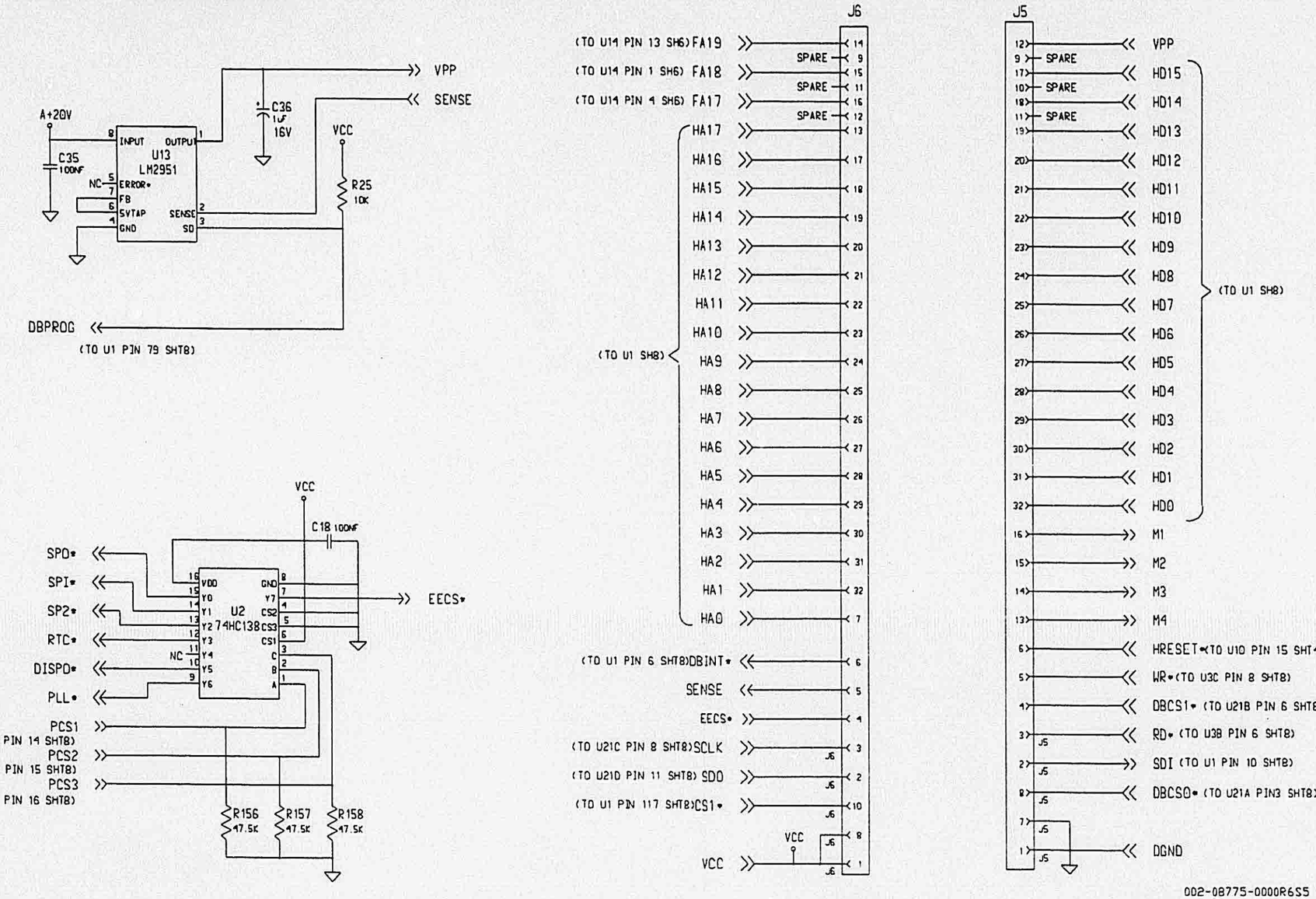


FIGURE 6-34 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000/-0010, R6
(Sheet 5 of 8)

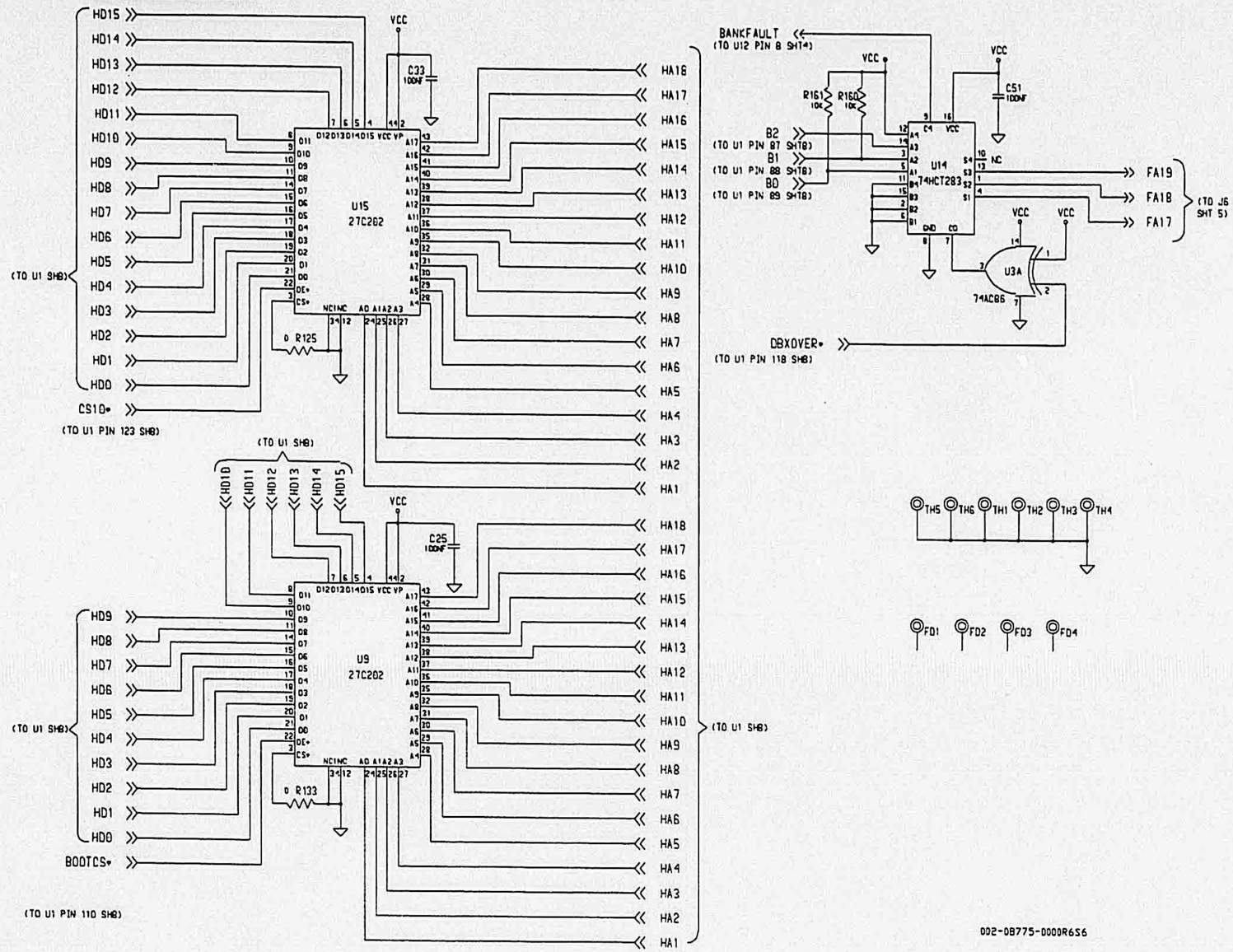


FIGURE 6-34 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000/-0010, R6
(Sheet 6 of 8)

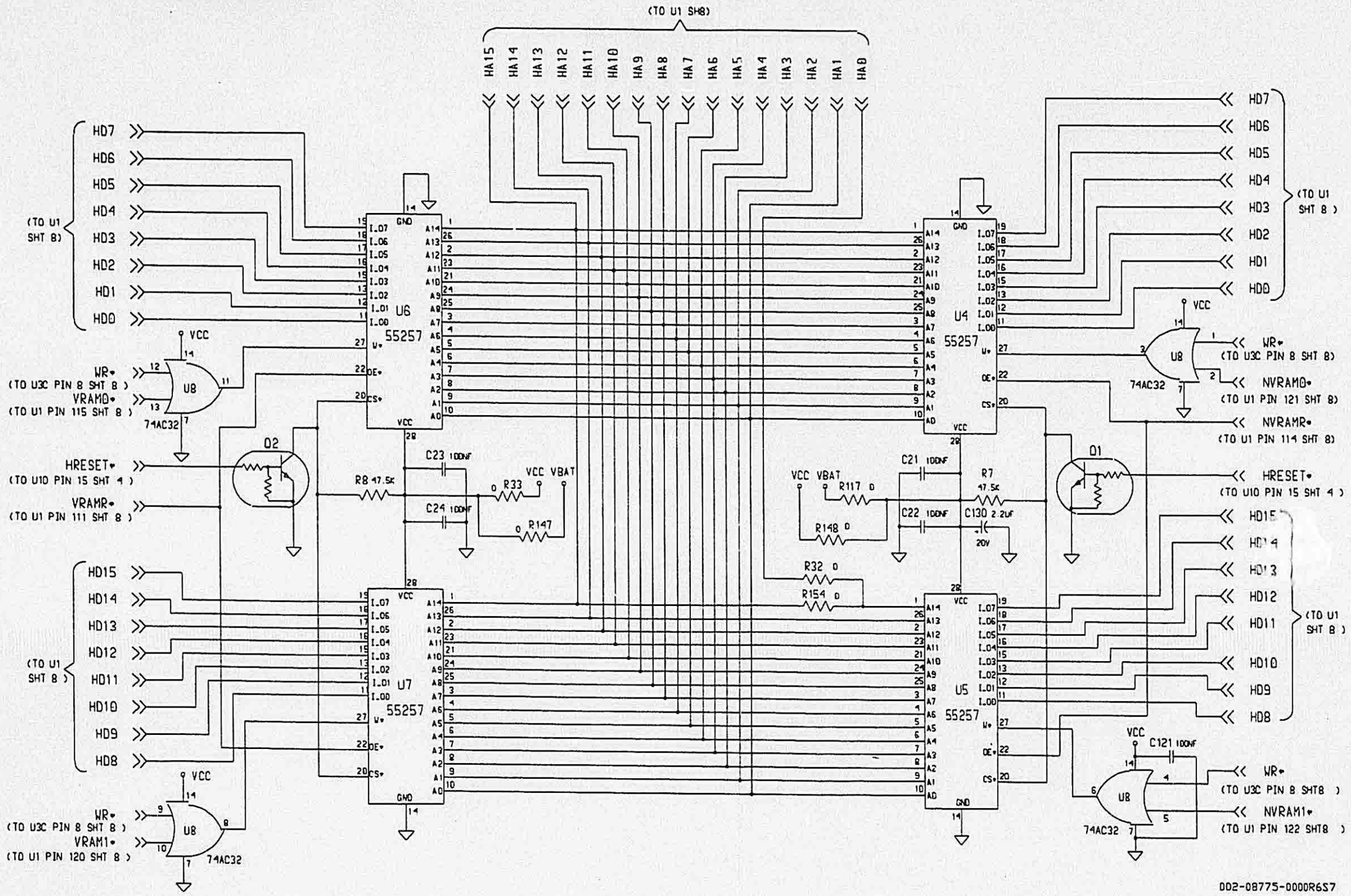


FIGURE 6-34 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000/-0010, R6
(Sheet 7 of 8)

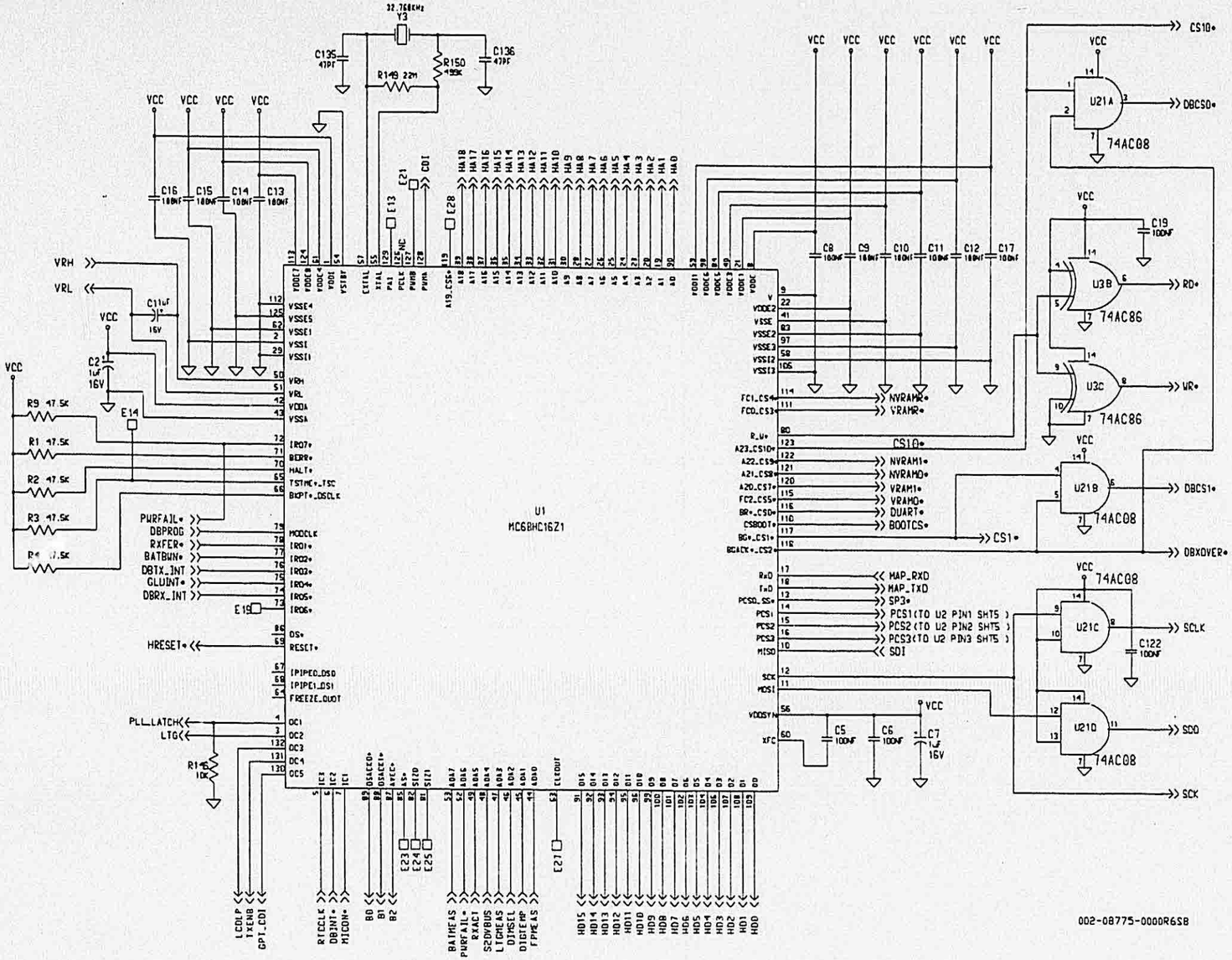


FIGURE 6-34 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000/-0010, R6
(Sheet 8 of 8)

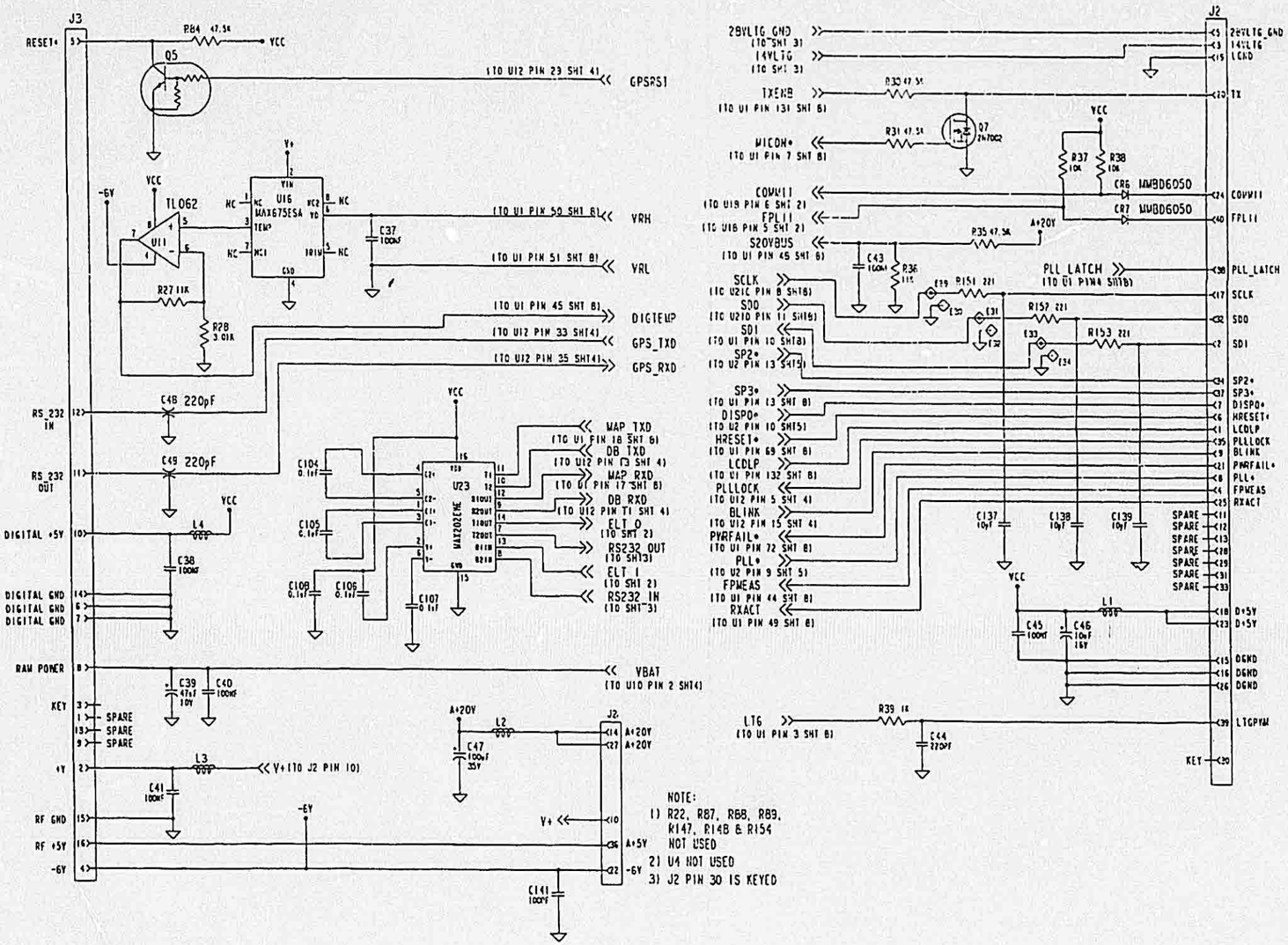


FIGURE 6-35 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000, R3
(Sheet 1 of 8)

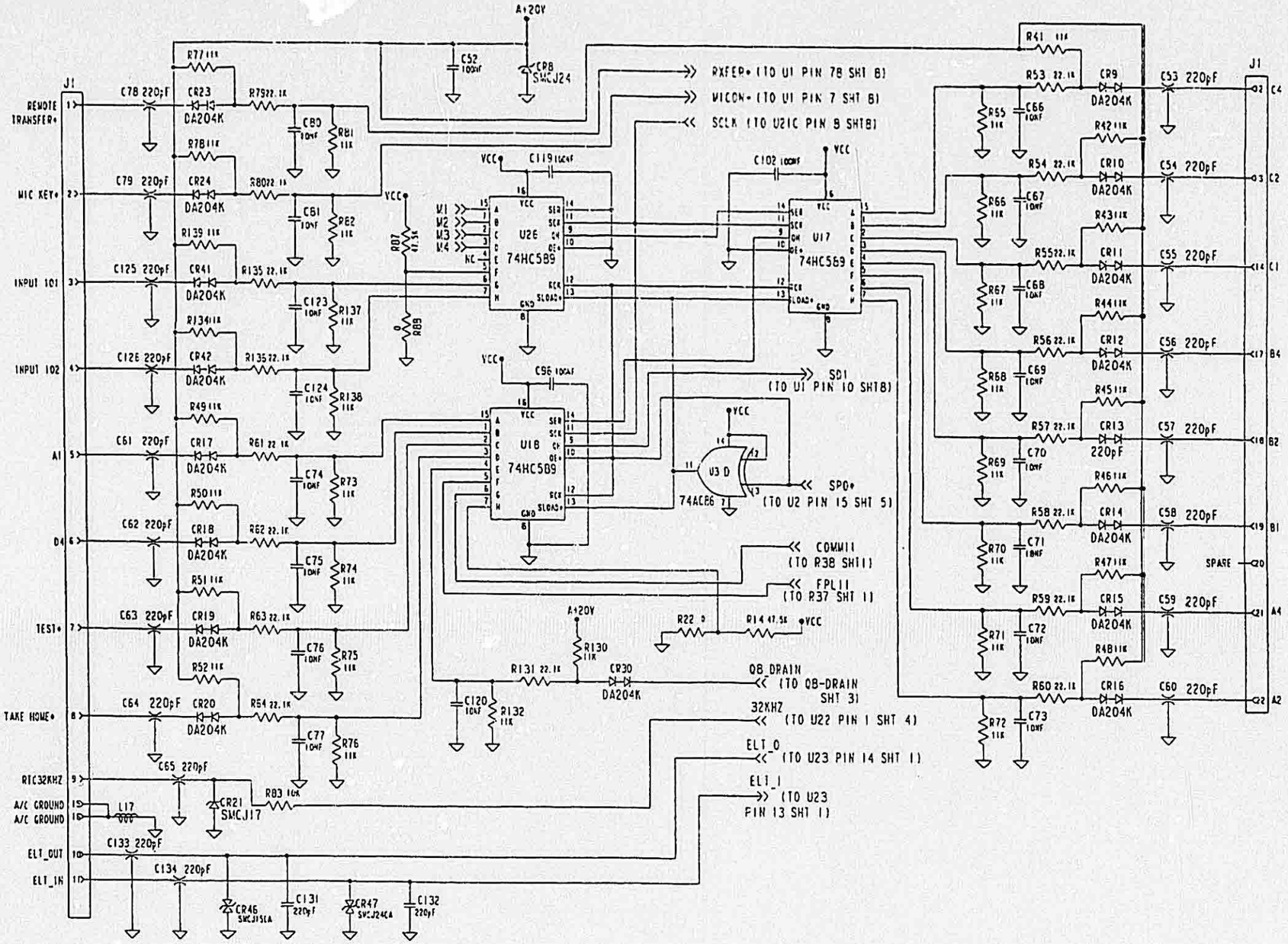


FIGURE 6-35 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000, R3
(Sheet 2 of 8)

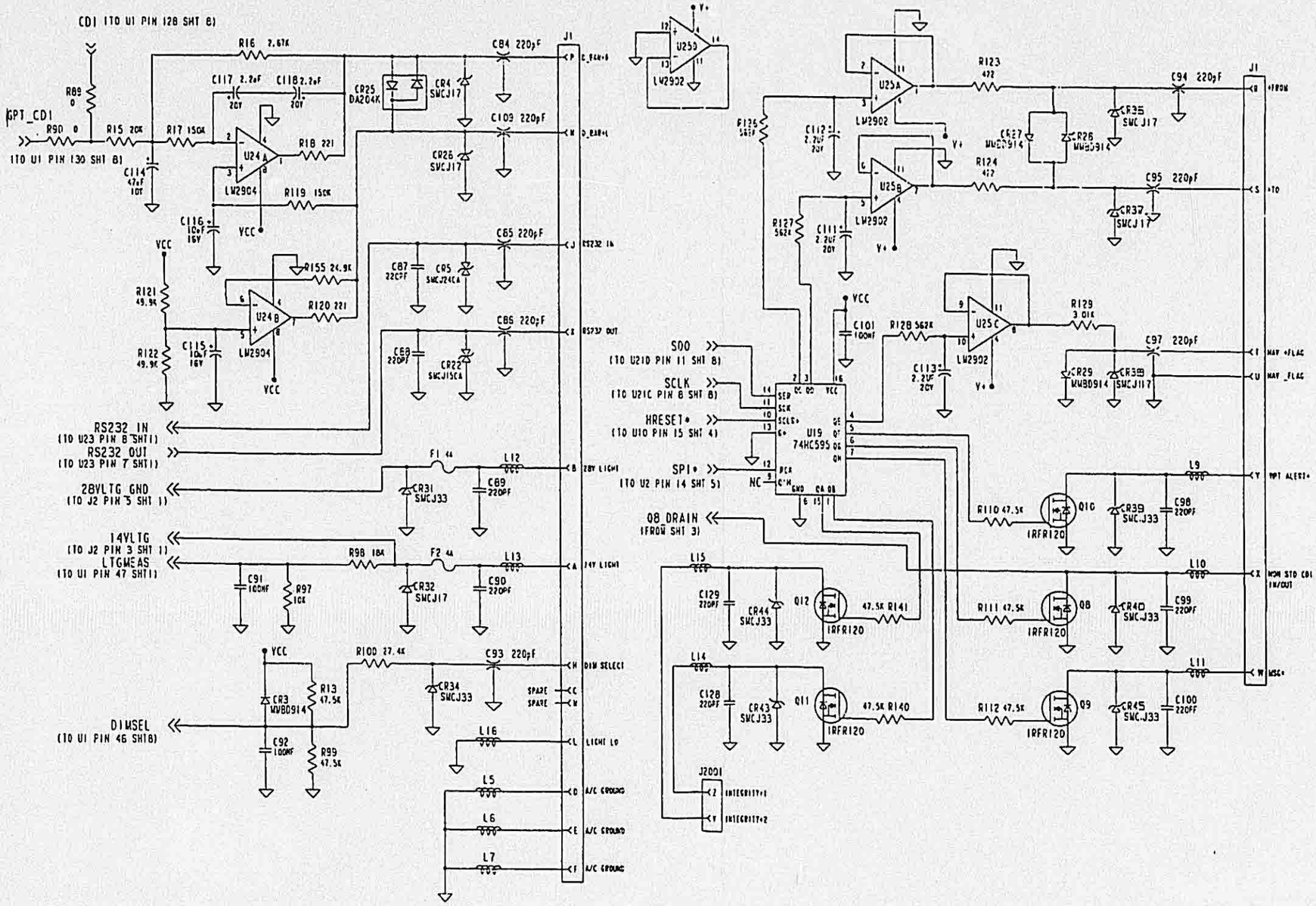


FIGURE 6-35 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000, R3
(Sheet 3 of 8)

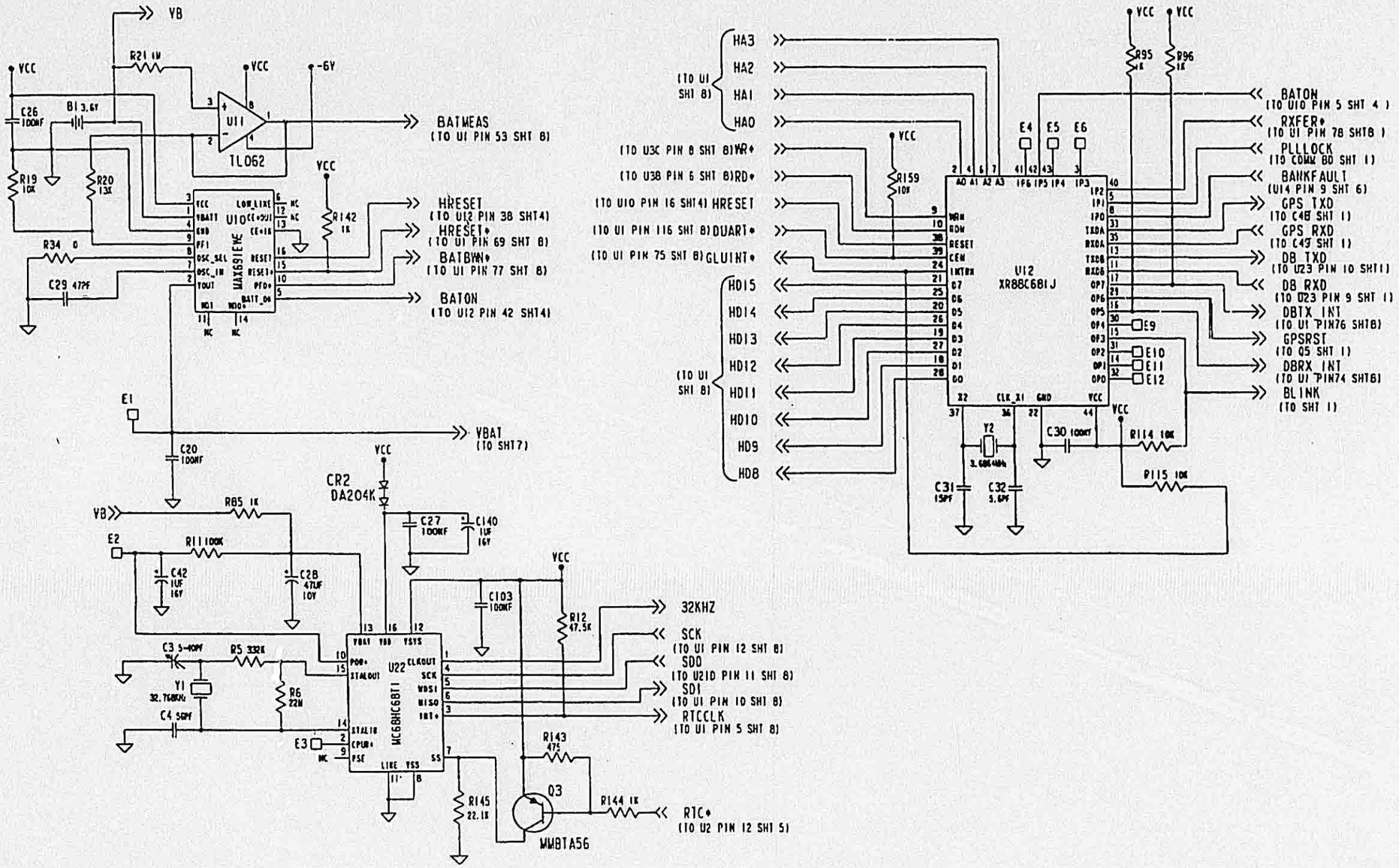


FIGURE 6-35 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000, R3
(Sheet 4 of 8)

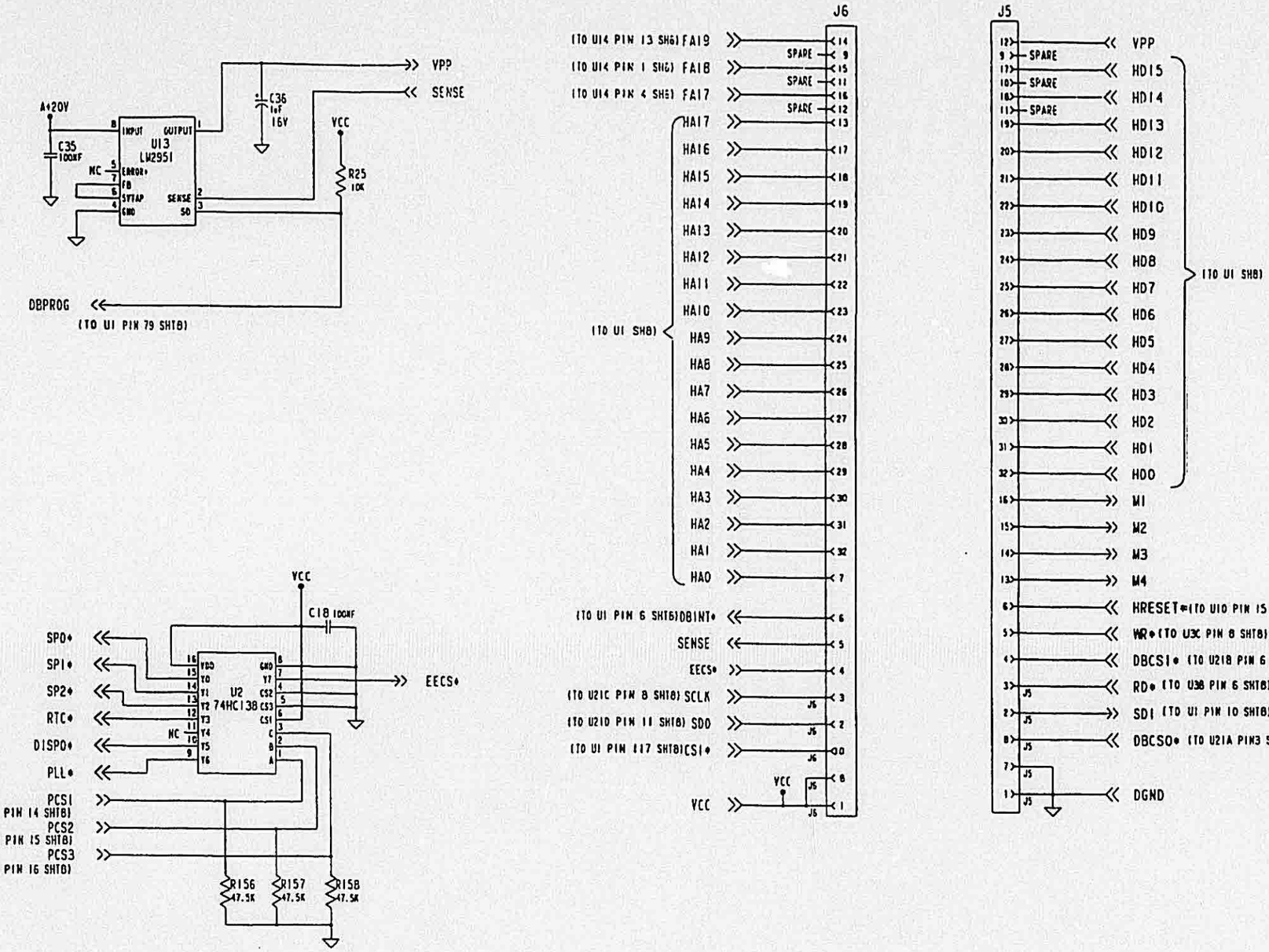


FIGURE 6-35 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000, R3
(Sheet 5 of 8)

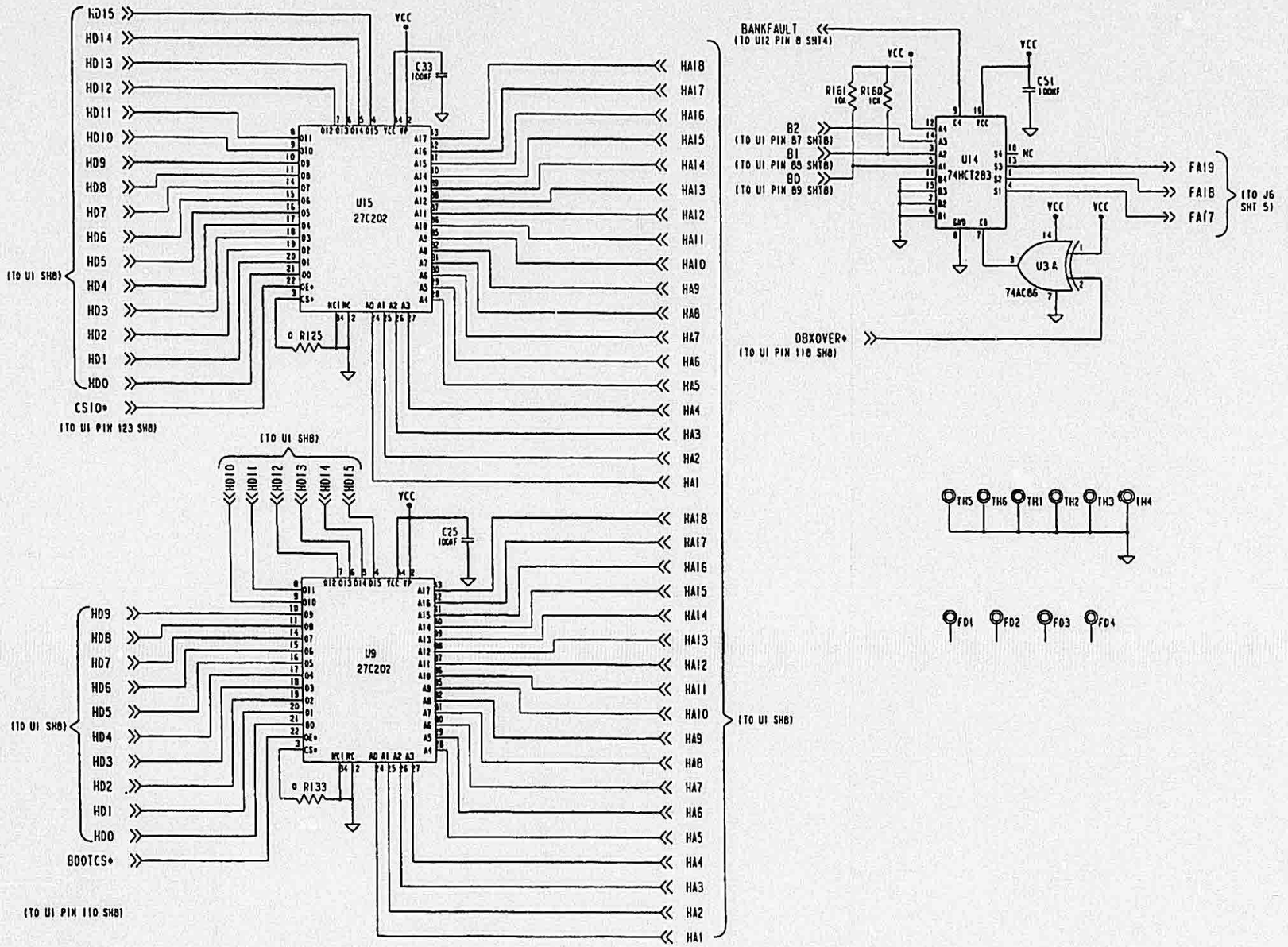


FIGURE 6-35 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000, R3
(Sheet 6 of 8)

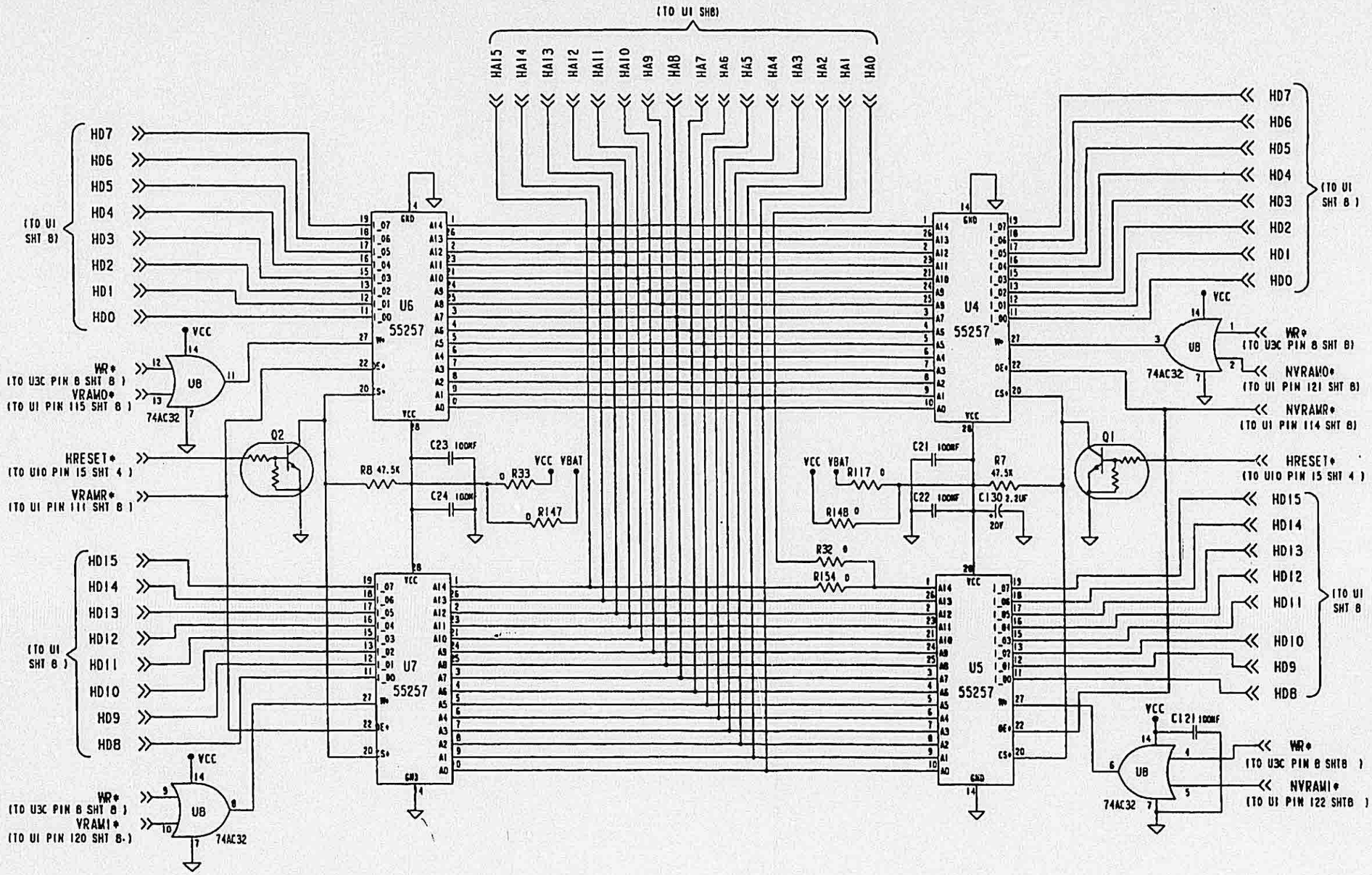


FIGURE 6-35 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000, R3
(Sheet 7 of 8)

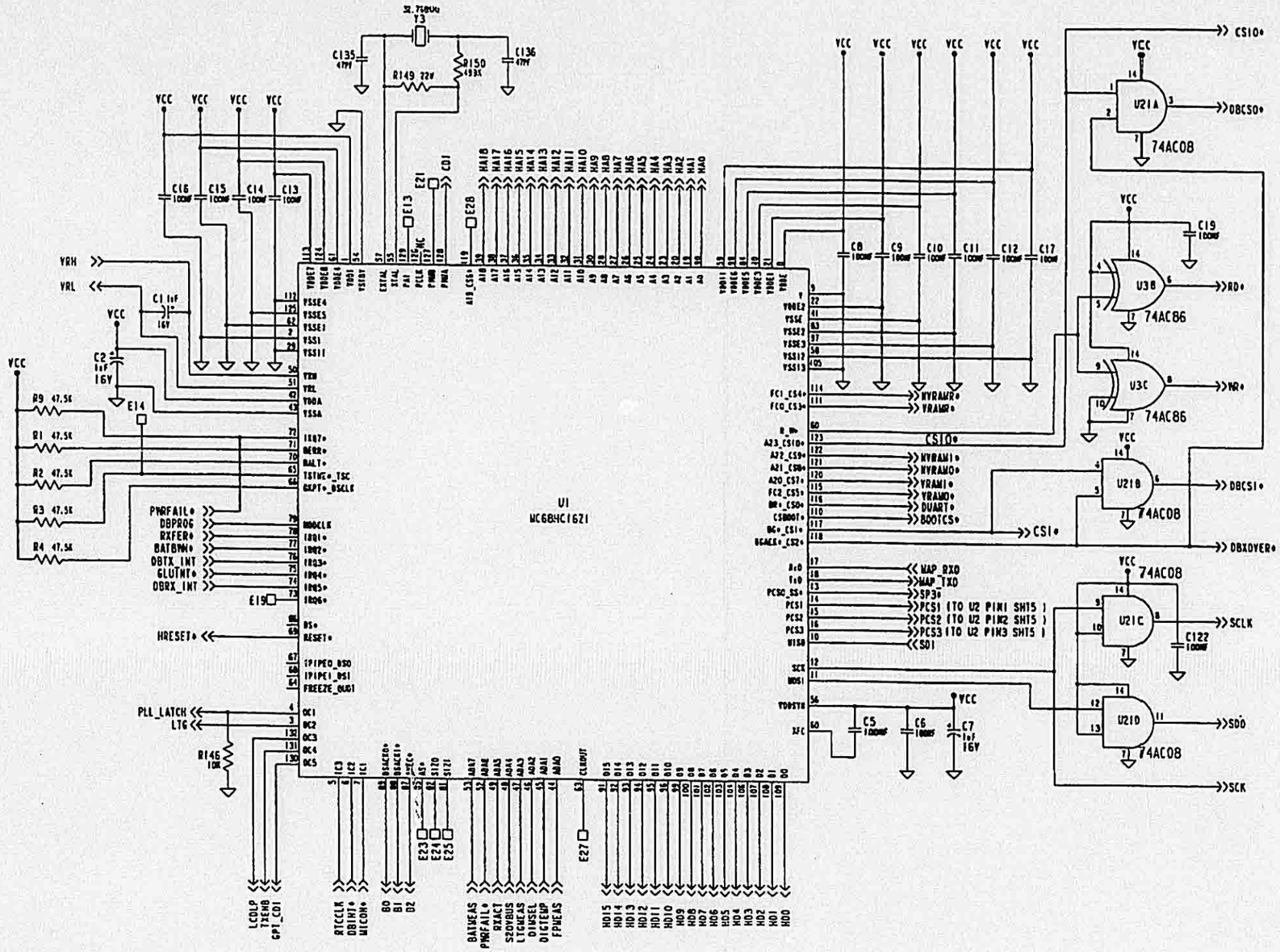


FIGURE 6-35 DIGITAL BOARD W/O DB SCHEMATIC
Dwg. No. 002-08775-0000, R3
(Sheet 8 of 8)

6.18	205-00834-0000	XPRESS PROG'D	R0
	205-00834-0001	XPRESS PROG'D	R0
	205-00834-0002	XPRESS PROG'D	R0

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0001	-0002
...	057-05252-0834	IDT 205-00834-0000		EA	1	1	1
...	057-05335-0000	DECAL 205 DASH 00		EA	1	.	.
...	057-05335-0001	DECAL 205 DASH 01		EA	.	1	.
...	057-05335-0002	DECAL 205 DASH 02		EA	.	.	1
...	125-00864-0000	XPRESS PROGRAM		EA	1	.	.
...	125-00864-0001	XPRESS PROGRAM		EA	.	1	.
...	125-00864-0002	XPRESS PROGRAM		EA	.	.	1
...	200-08825-0000	GPS XPRESS	A	EA	1	1	1
REF 100	300-08825-0000	GPS XPRESS ASSY		RF	1	X	X

	125-00864-0000	XPRESS PROG'D	R0
	125-00864-0001	XPRESS PROG'D	R0
	125-00864-0002	XPRESS PROG'D	R0

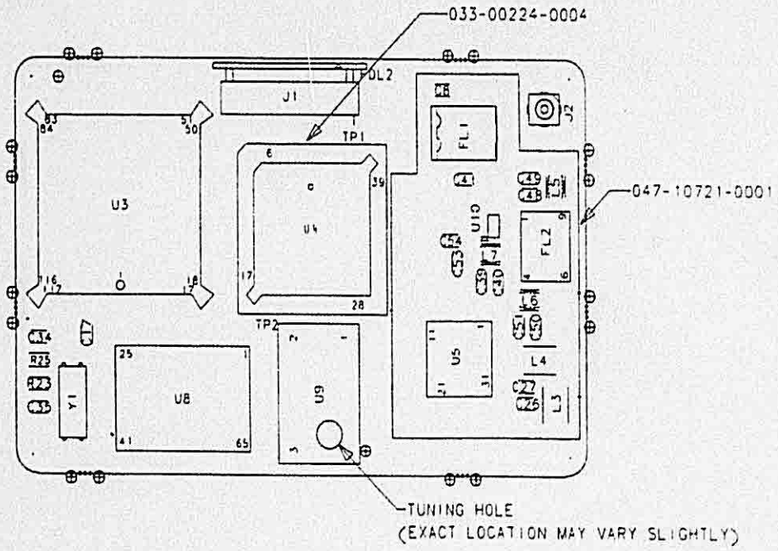
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000	-0001	-0002
U 504	122-01538-0000	XPRESS PROGRAM		EA	1	.	.
U 504	122-01538-0001	XPRESS PROGRAM		EA	.	1	.
U 504	122-01538-0002	XPRESS PROGRAM		EA	.	.	1
REF 1	300-08825-0000	GPS XPRESS ASSY		RF	X	X	X

6.19	200-08825-0000	GPS XPRESS ASSY	R4		
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
...	009-08825-0000	PC BD GPS XPRESS		EA	1
...	016-01040-0000	COATING TYPE AR		AR	1
...	047-10721-0001	GPS XPRESS SHIELD		EA	1
C 501	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 502	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 503	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 504	096-01186-0015	CAP 33UF 16V 10%		EA	1
C 505	096-01186-0012	CAP 1.0UF 16V 10%		EA	1
C 506	096-01186-0027	CAP .33UF 35V 10%		EA	1
C 507	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 508	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 510	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 511	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 513	096-01186-0064	CAP 10UF 16V 20%		EA	1
C 514	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 515	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 516	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 517	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 518	096-01186-0064	CAP 10UF 16V 20%		EA	1
C 519	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 520	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 522	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 523	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 524	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 525	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 526	106-05030-0020	CH 3.0PF NPO/100V		EA	1
C 527	106-05030-0020	CH 3.0PF NPO/100V		EA	1
C 528	106-05103-0057	CAP CH 10KX7R/100V		EA	1
C 530	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 531	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 532	096-01186-0064	CAP 10UF 16V 20%		EA	1
C 533	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 534	106-05360-0016	CAP CH 36PFNPO/50V		EA	1
C 535	106-05360-0016	CAP CH 36PFNPO/50V		EA	1
C 536	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 537	096-01186-0064	CAP 10UF 16V 20%		EA	1

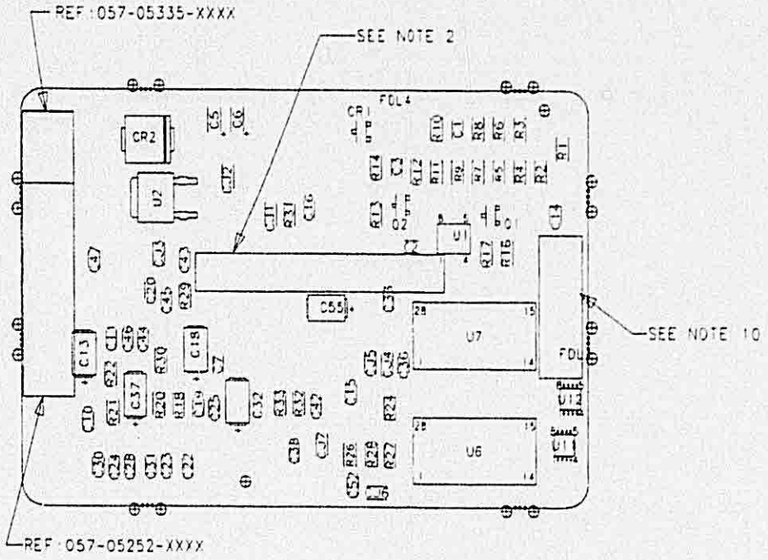
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
C 538	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 539	106-05270-0026	CAP CH27PFNPO/100V		EA	1
C 540	106-05270-0026	CAP CH27PFNPO/100V		EA	1
C 541	106-05010-0020	CAP CH 1PFNPO/100V		EA	1
C 542	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 543	106-05103-0057	CAP CH 10KX7R/100V		EA	1
C 544	106-05103-0057	CAP CH 10KX7R/100V		EA	1
C 545	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 546	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 547	106-05102-0016	CAP CH 1K NPO/50V		EA	1
C 548	106-05030-0020	CH 3.0PF NPO/100V		EA	1
C 549	106-05030-0020	CH 3.0PF NPO/100V		EA	1
C 550	106-05030-0020	CH 3.0PF NPO/100V		EA	1
C 551	106-05030-0020	CH 3.0PF NPO/100V		EA	1
C 552	106-05104-0037	CAP CH 100KX7R/25V		EA	1
C 553	106-05020-0020	CH 2PF NPO 100V		EA	1
C 554	999-09999-0098	NOT USED		RF	x
C 555	096-01186-0064	CAP 10UF 16V 20%		EA	1
CJ 501	130-05000-0025	RES CHIP 0 EW CJ		EA	1
CJ 502	130-05000-0025	RES CHIP 0 EW CJ		EA	1
CJ 503	999-09999-0098	NOT USED		RF	x
CJ 504	999-09999-0098	NOT USED		RF	x
CJ 505	130-05000-0025	RES CHIP 0 EW CJ		EA	1
CJ 506	130-05000-0025	RES CHIP 0 EW CJ		EA	1
CJ 507	130-05000-0025	RES CHIP 0 EW CJ		EA	1
CR 501	007-06398-0000	DIO DUAL SCHOTTKY		EA	1
CR 502	007-05241-0007	TRNSRB 1500W 7V		EA	1
FL 501	017-00260-0000	DIELCT BNDPS FILTE		EA	1
FL 502	017-00259-0001	GPS XPRESS FILTER		EA	1
J 501	030-03250-0000	ELCO 16PIN SMTCONN		EA	1
J 502	030-00444-0000	CONN SMT MINI COAX		EA	1
L 503	019-02730-0011	IND SM 33UH 5%		EA	1

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
L 504	019-02730-0011	IND SM 33UH 5%		EA	1
L 505	019-02660-0015	IND SM 150 10%		EA	1
L 506	019-02660-0015	IND SM 150 10%		EA	1
L 507	019-02660-0017	IND SM 220 10%		EA	1
Q 501	007-00903-0000	2N7002 MOSFET		EA	1
Q 502	007-00933-0000	MMBT2369		EA	1
R 501	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 502	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 503	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 504	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 505	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 506	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 507	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 508	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 509	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 510	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 511	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 512	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 513	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 514	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 516	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 517	139-01002-0000	RES CHIP 10K EW 1%		EA	1
R 518	999-09999-0098	NOT USED		RF	x
R 520	999-09999-0098	NOT USED		RF	x
R 521	999-09999-0098	NOT USED		RF	x
R 522	999-09999-0098	NOT USED		RF	x
R 523	139-06194-0000	RES CH 6.19M EW 1%		EA	1
R 524	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 525	139-01503-0000	RES CHIP 150KEW1%		EA	1
R 526	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 527	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 528	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 529	139-05110-0000	RES CH 511 EW 1%		EA	1
R 530	139-05110-0000	RES CH 511 EW 1%		EA	1
R 531	139-04751-0000	RES CH 4.75K EW 1%		EA	1
R 532	139-01001-0000	RES CHIP 1K EW 1%		EA	1
R 533	139-01001-0000	RES CHIP 1K EW 1%		EA	1

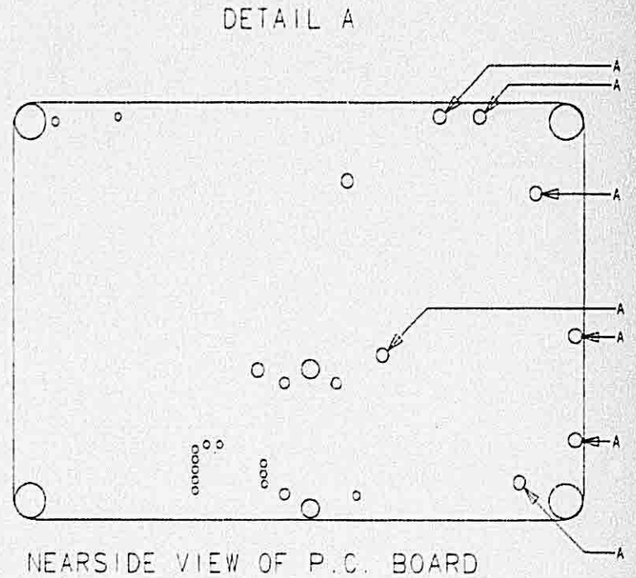
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	-0000
SK 501	033-00224-0004	SKT PLCC SM 44 PIN		EA	1
U 501	120-02161-0001	EEPROM SERIAL 2KX8		EA	1
U 502	120-03026-0080	78M05 DPAK VLT REG		EA	1
U 503	120-02511-0000	MC68331 UP 16MHZ		EA	1
U 504	999-09999-0090	REF SFTWARE SET		RF	x
U 505	120-08206-0000	GPS XPRESS MMIC		EA	1
U 506	120-02363-0008	32K X 8 STATIC RAM		EA	1
U 507	120-02363-0008	32K X 8 STATIC RAM		EA	1
U 508	120-08207-0000	GPS XPRESS ASIC		EA	1
U 509	044-00332-0000	GPS XPRESS TCXO		EA	1
U 510	120-03590-0000	IC UPC2726		EA	1
U 511	123-00074-0013	TC7W74FU SO PKG		EA	1
U 512	123-00002-0013	TC7W02FU SO PKG		EA	1
Y 501	044-00307-0000	32.768KHZ CRYS OSC		EA	1



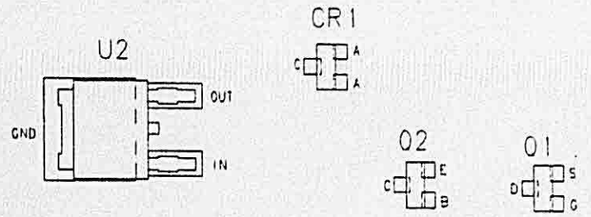
NEARSIDE VIEW OF P.C. BOARD



FARSIDE VIEW OF P.C. BOARD



NEARSIDE VIEW OF P.C. BOARD

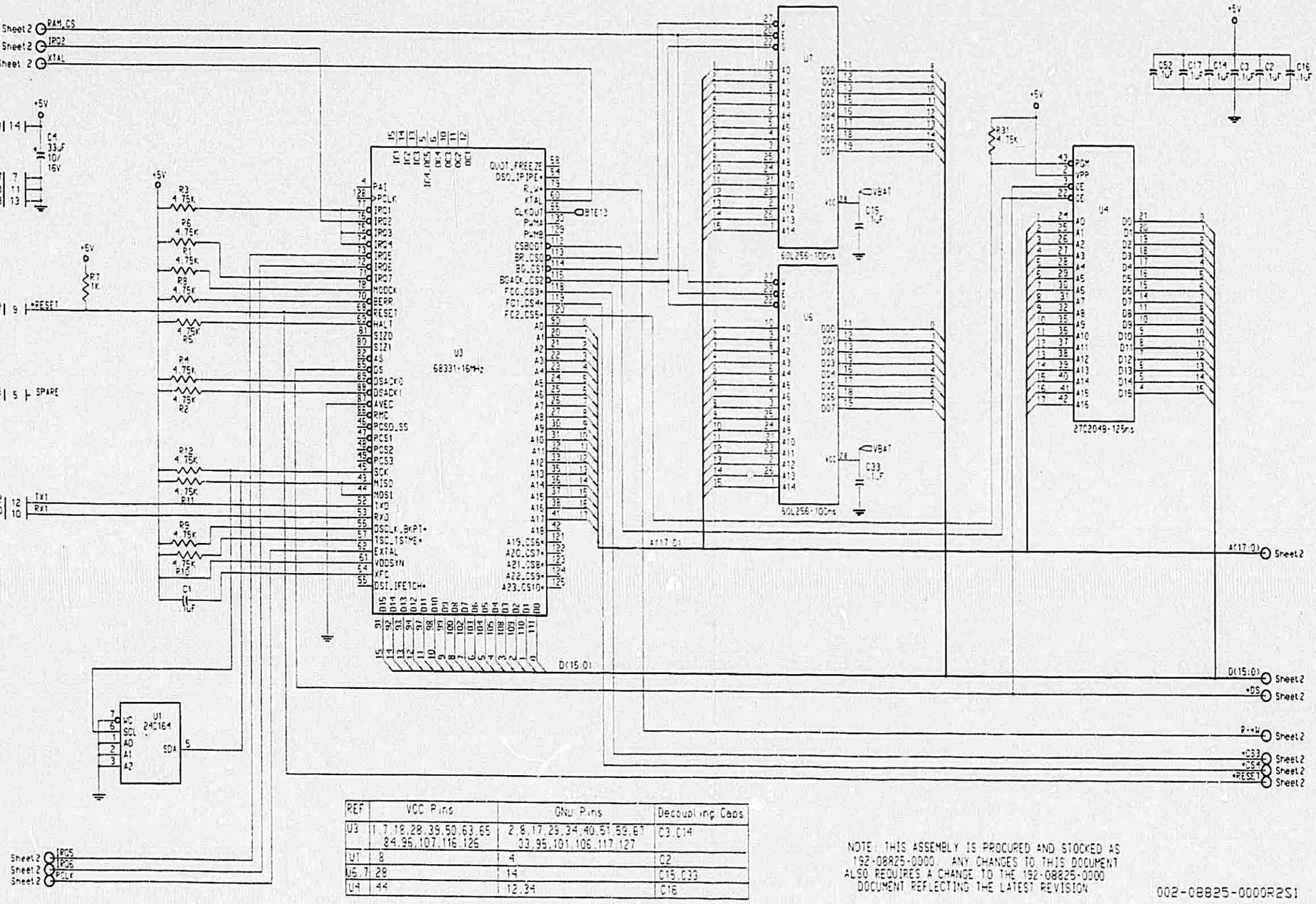


300-08825-0000R6S1

NOTES:

1. PRIOR TO POST COATING BOTH SIDES OF P.C. BOARD WITH KPN 016-01040-0000, MASK OFF THE FOLLOWING: ALL MOUNTING AREAS, ALL THROUGH HOLES LABLED 'A' IN DETAIL A, U9 TUNING HOLE, J1, J2 AND U4 SOCKET RF SHIELD (047-10721-0001) TO BE INSTALLED TO BOARD AND LABELS AFTER POSTCOAT.
2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH KING SPEC. 001-01101-0000.
3. NOT ALL PARTS INSTALLED. REFER TO 200-08825-XXXX
4. 200-08825-XXXX ADDS 500 TO ALL REFERENCE DESIGNATORS
5. RF SHIELD (047-10721-0001) TO BE SOLDERED ONLY AT PLATED THRU HOLES AT THE TABS. DO NOT SEAM SOLDER.
6. U9 TCXO TO BE HAND SOLDERED TO THE BOARD. DO NOT EXPOSE PART TO REFLOW TEMPERATURES AND DO NOT EXPOSE INTERNAL COMPONENTS OF TCXO TO CLEANING SOLUTIONS.
7. U5 IS TEMPERATURE SENSITIVE, AND CANNOT BE EXPOSED TO OVER 200 DEGREES C FOR OVER 5 MINUTES, OR EXPOSED TO OVER 230 DEGREES C FOR OVER 1 MINUTE. COMPONENT BODY OF U5 TO BE SOLDERED TO GROUND PLANE ON BOARD DURING REFLOW SOLDERING. RECYCLE U5 MATRIX TRAYS WITH THE COMPONENT SUPPLIER.
8. COMPONENT BODY OF FL2 FILTER TO BE SOLDERED TO GROUND PLANE ON BOARD DURING REFLOW SOLDERING WITH A MINIMUM OF .006' THICKNESS SOLDER PASTE (APPLICATION OF APPROX. .003' SOLDER)
9. MAXIMUM LEAD PROTRUSION FOR U9 TCXO IS .07' AND RF SHIELD (047-10721-0001) IS .09'
10. MANUFACTURING BAR CODE LABEL (OPTIONAL) MAY BE APPLIED TO FAR SIDE OF BOARD NEAR U7, COVERING VIA HOLES AND SILKSCREEN (ORIENTATION OPTIONAL).

FIGURE 6-36 GPS XPRESS BOARD
Dwg. No. 300-08825-0000, R6

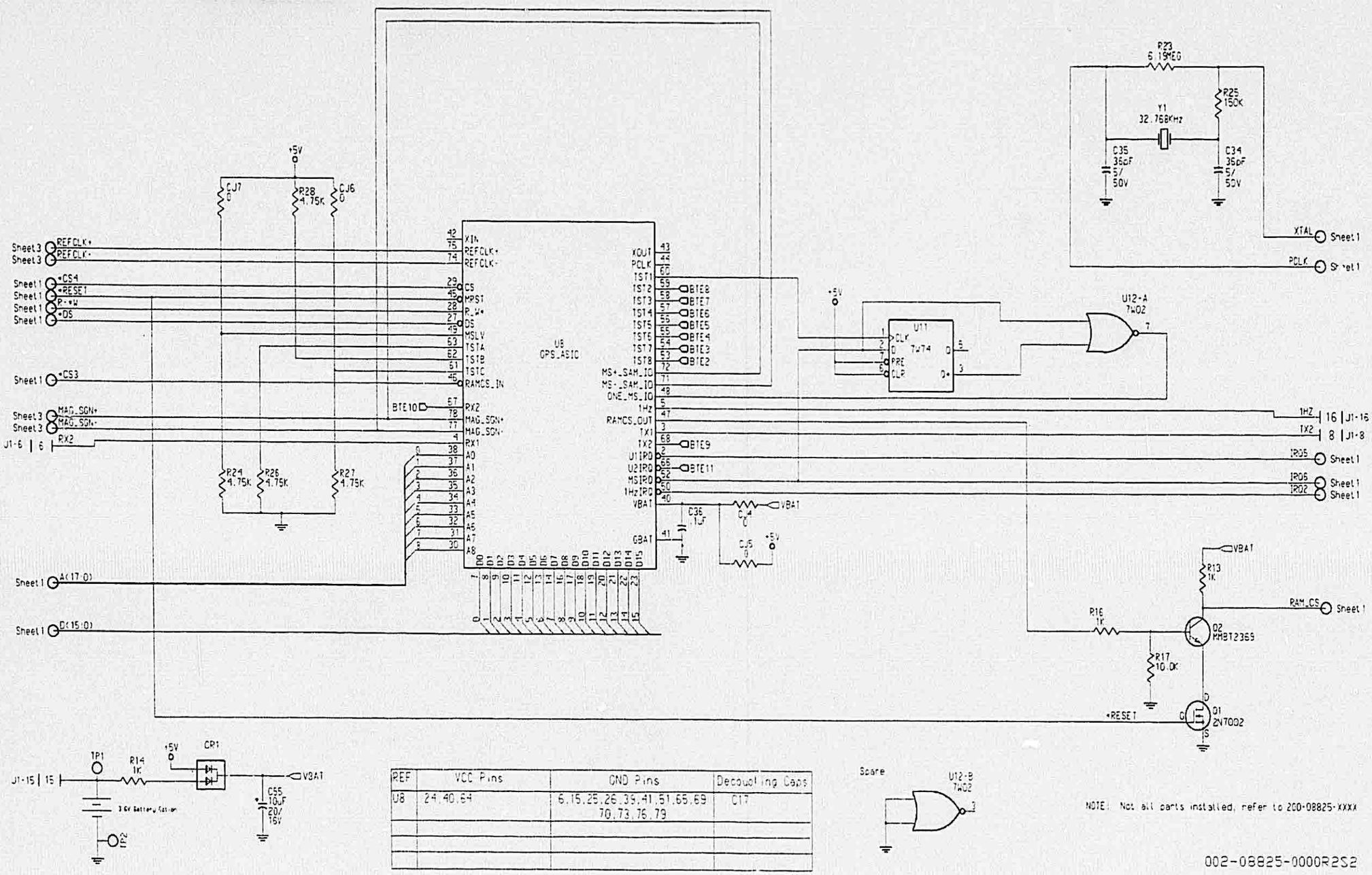


REF	VCC Pins	GND Pins	Decoupling Caps
U3	11,7,18,28,39,50,63,65 84,95,107,116,126	2,8,17,29,34,40,51,59,67 33,95,101,106,117,127	C3,C14
U1	8	4	C2
U6,7	28	14	C15,C33
U4	44	12,34	C16

NOTE: THIS ASSEMBLY IS PROCURED AND STOCKED AS 192-08825-0000. ANY CHANGES TO THIS DOCUMENT ALSO REQUIRES A CHANGE TO THE 192-08825-0000 DOCUMENT REFLECTING THE LATEST REVISION.

002-08825-0000R2S1

FIGURE 6-37 GPS XPRESS BOARD SCHEMATIC
Dwg. No. 002-08825-0000, R2
(Sheet 1 of 3)



REF	VCC Pins	GND Pins	Decoupling Caps
U8	24,40,64	6,15,25,26,39,41,51,65,69 70,73,76,79	C17

NOTE: Not all parts installed, refer to 200-08825-XXXX

002-08825-0000R2S2

FIGURE 6-37 GPS XPRESS BOARD SCHEMATIC
Dwg. No. 002-08825-0000, R2
(Sheet 2 of 3)

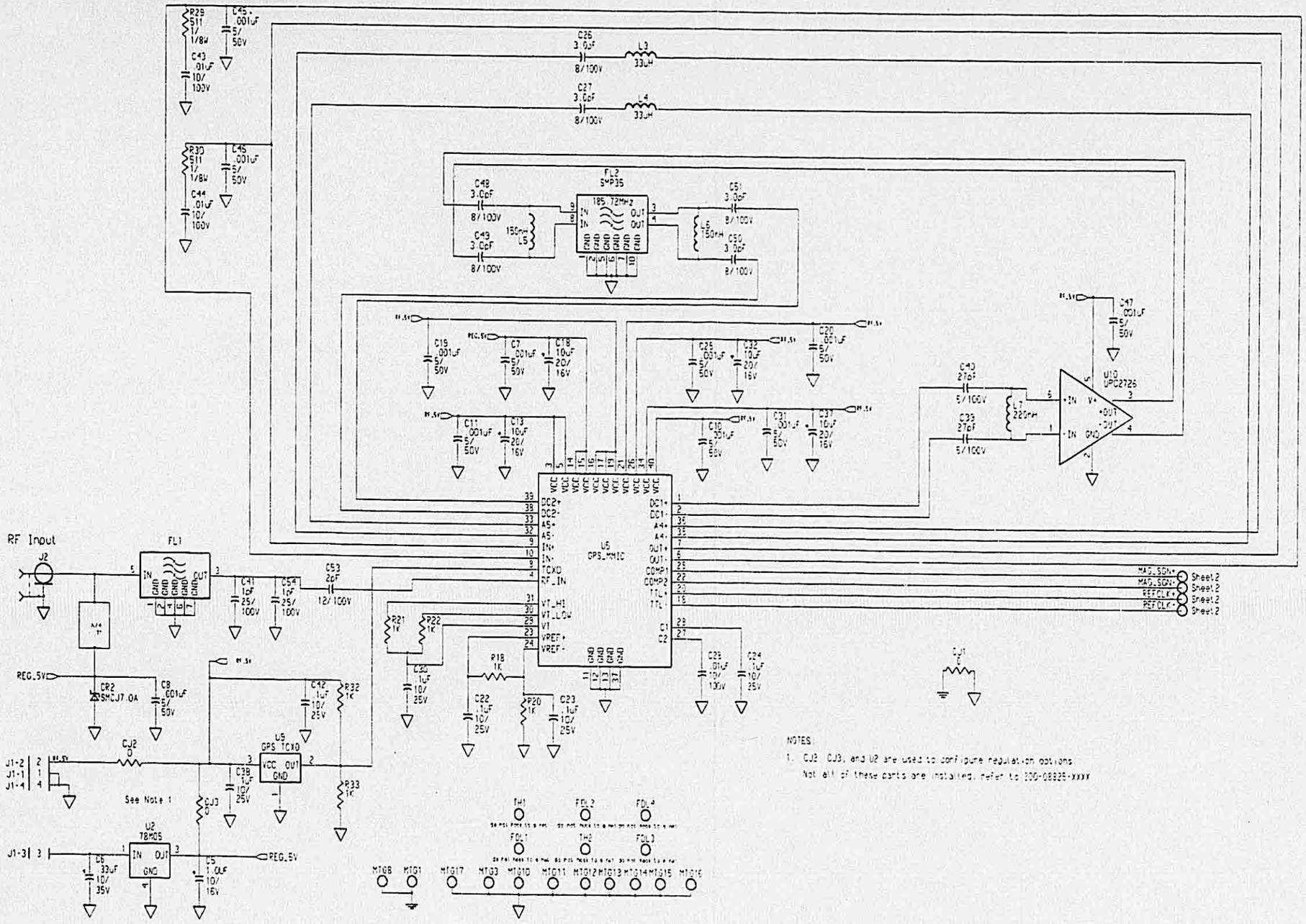


FIGURE 6-37 GPS XPRESS BOARD SCHEMATIC
Dwg. No. 002-08825-0000, R2
(Sheet 3 of 3)

APPENDIX

SOFTWARE APPENDIX

SOFTWARE APPENDIX

HARDWARE/SOFTWARE CONFIGURATIONS

INTRODUCTION

Hardware and software unit configuration options are presented in this Appendix. The appendix provides a means for identifying the compatibility between particular hardware and specific software configurations. Additionally, the hardware version and software revisions of a unit is are reflected by the appendix.

Hardware is defined as the circuit boards and assemblies used to configure the complete unit of a particular version. Software is defined as the ROM's or other programmed devices containing programs which are used in the particular version of the complete unit. Firmware is defined as programmed devices that provide a hardware function independent of the unit software programming. Because firmware is independent of the unit software programming it may be a sub-assembly of non- software hardware board assembly or a sub-assembly of a hardware/software set depending on the particular application.

A LIST OF SOFTWARE DIAGRAMS is presented, followed by the individual figures. Each figure illustrates only one specific combination of hardware and software. Each individual figure depicts restricted compatibility relationships.

Each drawing in this Appendix is assigned a figure number, commencing with Figure S-1 and progressing sequentially.

HARDWARE/SOFTWARE CONFIGURATION DIAGRAMS

A block diagram flow chart format is used to illustrated hardware/software configurations. Each block represents a single hardware/software assembly, hardware assembly or software set or firmware set. The block's title reflect's the assembly or set represented. Contained within the each block is the part number of the assembly or the set, or a listing of the components with part numbers that makes up the set.

The blocks of each diagram are arranged in levels to indicate assembly/sub-assembly relationship of the individual blocks. The blocks representing sub-assemblies are located beneath the block representing the assembly to which they belong. The solid horizontal and vertical lines between the blocks aid in tracing the assembly/sub-assembly relationships. Dashed lines are used to indicates that the enclosed or attached item is related but not part of assembly or software set being diagrammed.

A. Top BOM Level

The top most level of blocks on the hardware/software/firm diagram corresponds to the final assembly BOM of the unit. The part numbers located in the blocks on this level corresponds to the top Bill of Materials (BOM) numbers of the Illustrated Parts List (IPL).

The last four digits of the unit part number (XXX-XXXXX-HHSS) define the hardware/software version of the equipment (the first two digits defining the hardware version and the last two digits defining the software version).

B. System Hardware/Software Level

A block on the next tier represents a hardware circuit boards containing no software or a the system hardware/software set used in the particular versions of the units listed.

The first three digits of a part number is a part number designator that defines the type of part assigned to the part number. A 200 part number designator (200-XXXXX-XXXX) defines a part as a hardware assembly. A 206 part number designator (206-XXXXX-VVRR) defines a part as a system hardware/software set.

The last 4 digits of a part number with a 206 part number designator (206-XXXXX-VVRR) tracks the software version/revision level of the system hardware/software set. The first two digits correspond to the system software version as identified by the number on the software ID tag on the outside of the the unit. The last two digits correspond to the revision level of the software version. (Note: a part number with a 206 designator may not be ordered and are for reference only.)

C. Hardware/Software Set Level.

A block on the next tier corresponds to a hardware/software set. A part with a 205 part number designator (205-XXXXX-XXRR) is a hardware/software set that contains both hardware boards and associated software. The last two digits correspond to the revision level of the hardware/software set. (Note: a part number with a 205 part number designator may contain several hardware boards and several software sets as sub-assemblies.)

D. Software/Firmware Set Level.

A block on the next tier corresponds to a software set or firmware set. A part number with a 125 part number designator (125-XXXXX-00RR) defines a part as a software set only. A part number with a 126 part number designator (126-XXXXX-00RR) defines a part as a firmware set. (Note: a part number with a 125 or 126 part designator may not be ordered and is for reference only.)

E. Programmable Devices Level

A block on the next tier corresponds to a set of programmable devices that contain software programming or firmware. Also contained within a block on this tier is list of the components with associated parts numbers that make up a software set or firmware set. A part number with a 122 part number designator (122-XXXXX-00RR) defines a part as a programmable device. The last two digits of the part numbers track the software revision level of the set.

F. Drawing Titles

The drawing titles identify the unit by: nomenclature; unit version part number; and software ID tag.

LIST OF SOFTWARE DIAGRAMS

UNIT	P/N	SOFTWARE	SOFTWARE DIAGRAM	PAGE
KLX 135	069-01029-0201	SW ID #0101	FIGURE S-1	S-5
KLX 135	069-01029-0201	SW ID #0102	FIGURE S-2	S-7
KLX 135	069-01029-0201	SW ID #0103	FIGURE S-3	S-9
KLX 135A	069-01029-0703	SW ID #0301	FIGURE S-4	S-11
KLX 135A	069-01029-0703	SW ID #0302	FIGURE S-5	S-13

BENDIX/KING
KLX 135/135A
COMMUNICATIONS TRANSCEIVER/
GPS RECEIVER

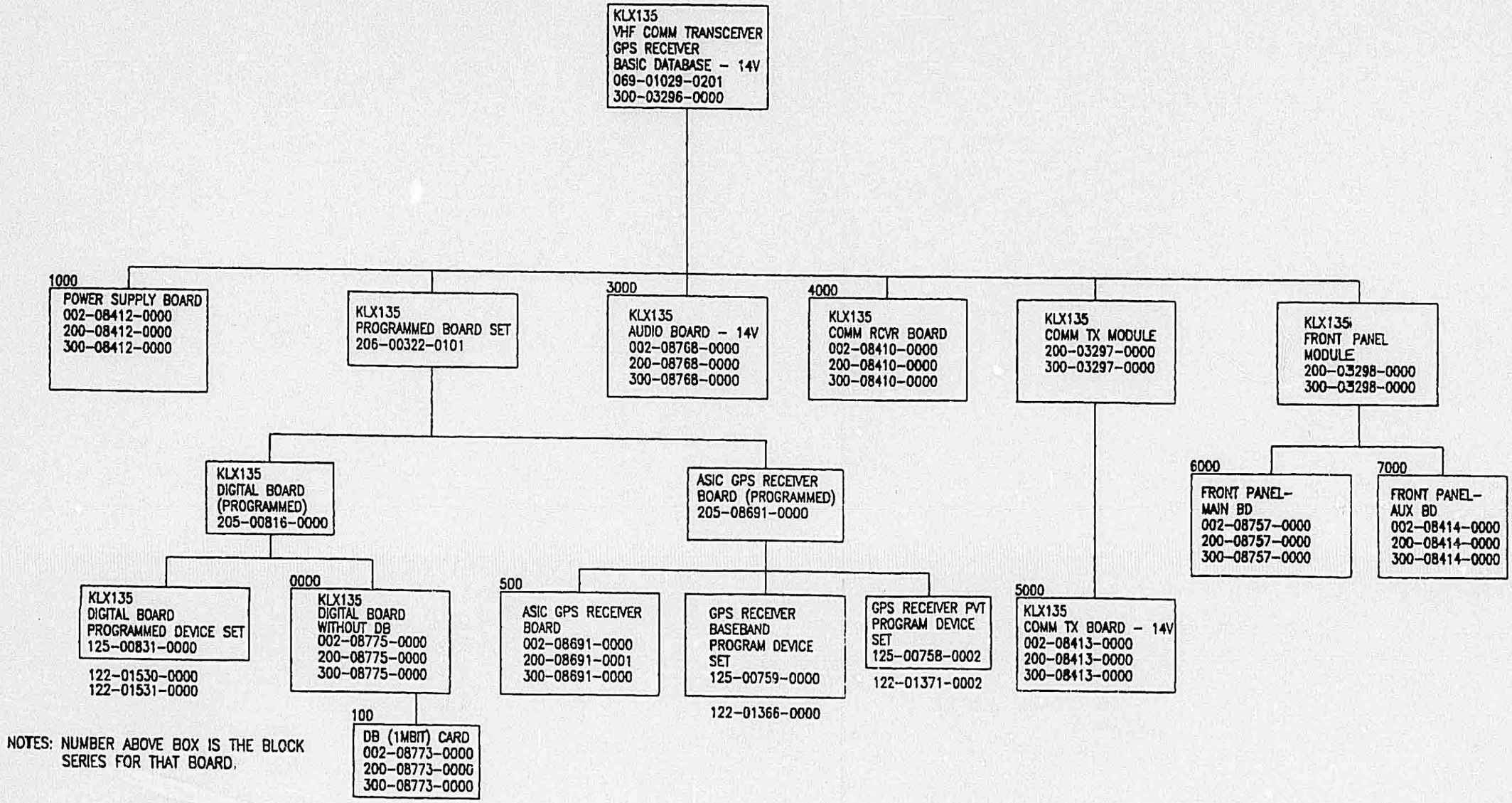


FIGURE S-1 KLX 135, P/N 069-01029-0201, SW ID 0101

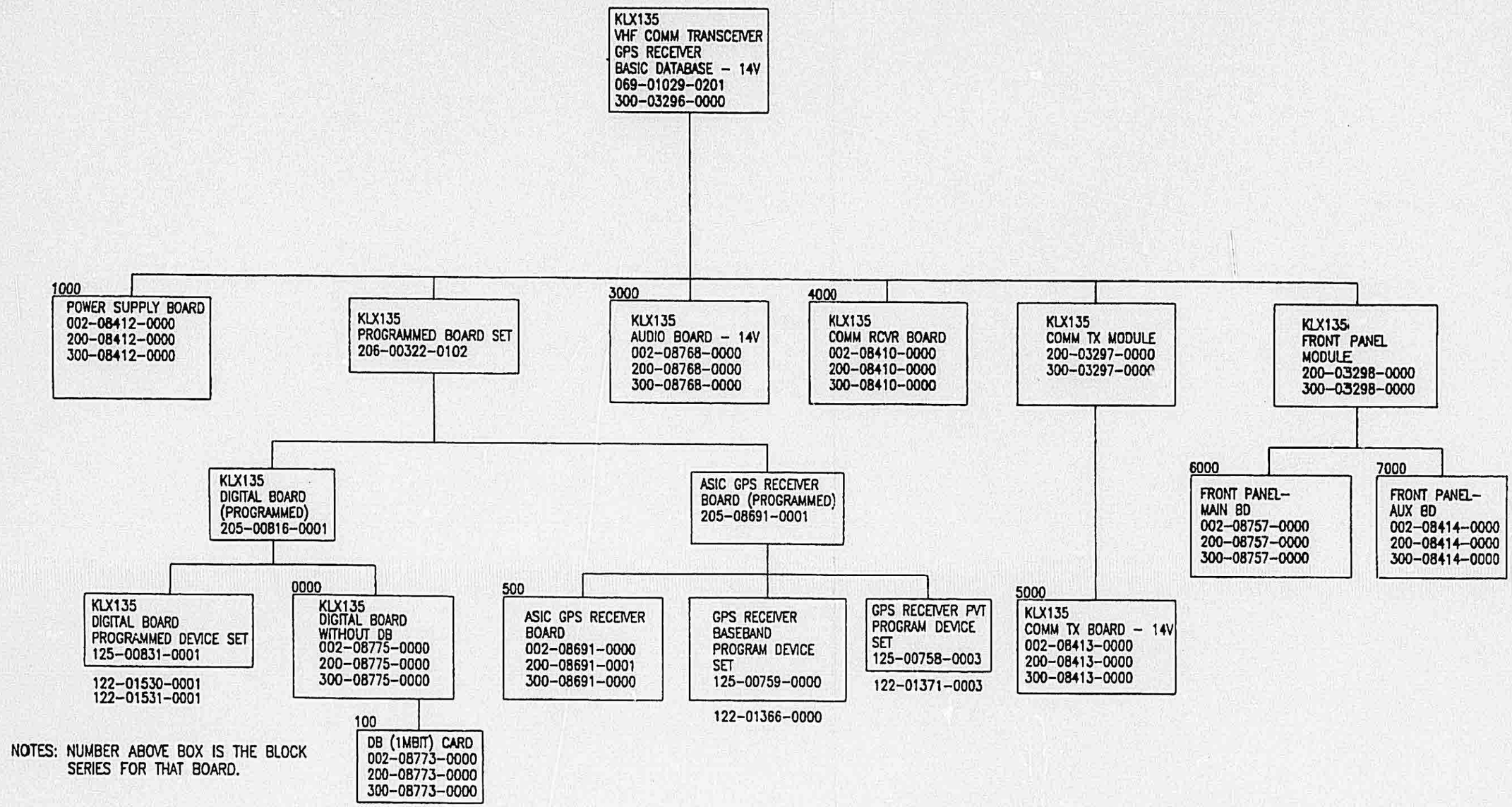
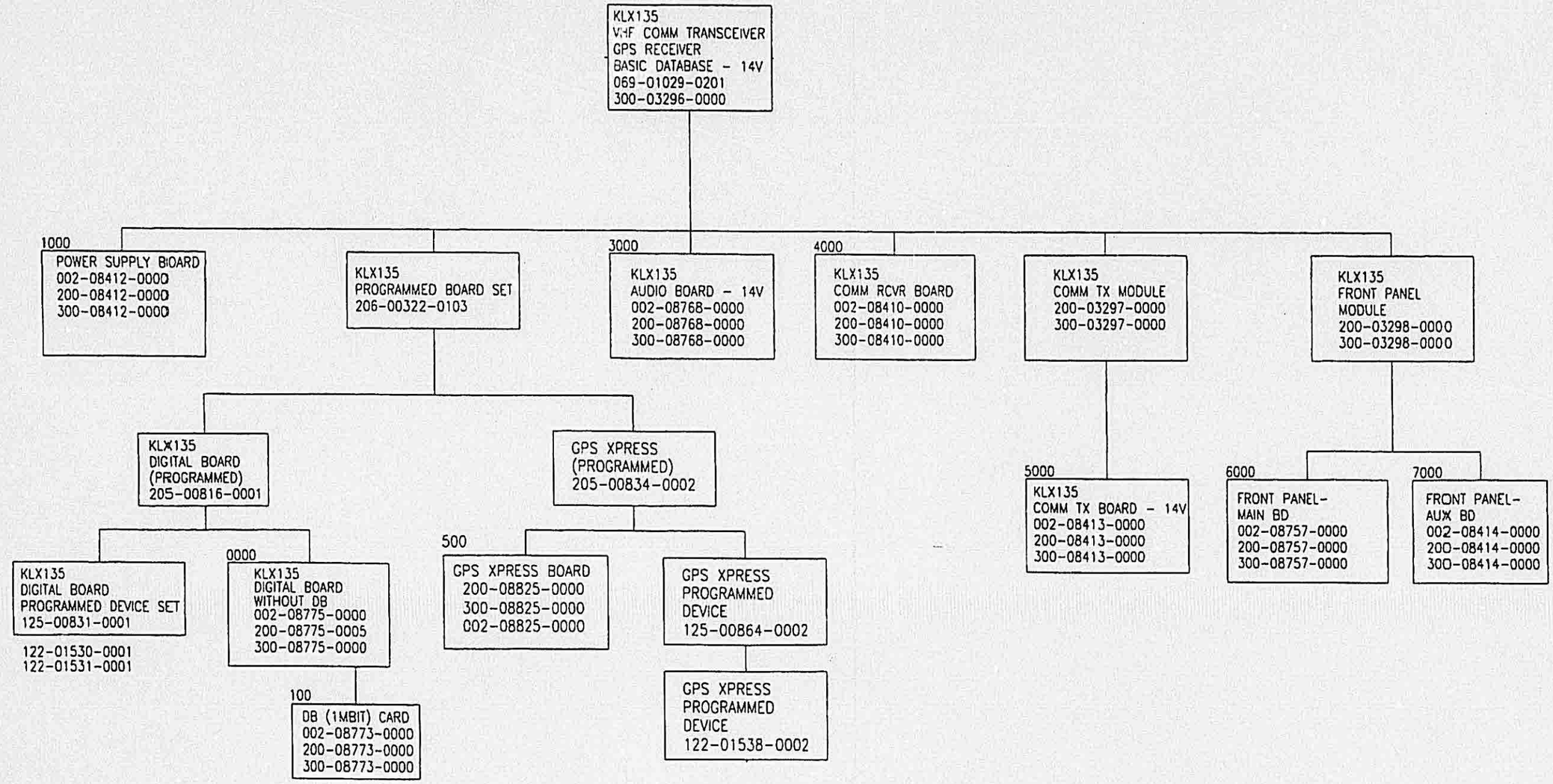


FIGURE S-2 KLX 135, P/N 069-01029-0201, SW ID 0102



NOTES: NUMBER ABOVE BOX IS THE BLOCK SERIES FOR THAT BOARD.

FIGURE S-3 KLX 135, P/N 069-01029-0201, SW ID 0103

BENDIX/KING

KLX 135/135A

COMMUNICATIONS TRANSCEIVER/
GPS RECEIVER

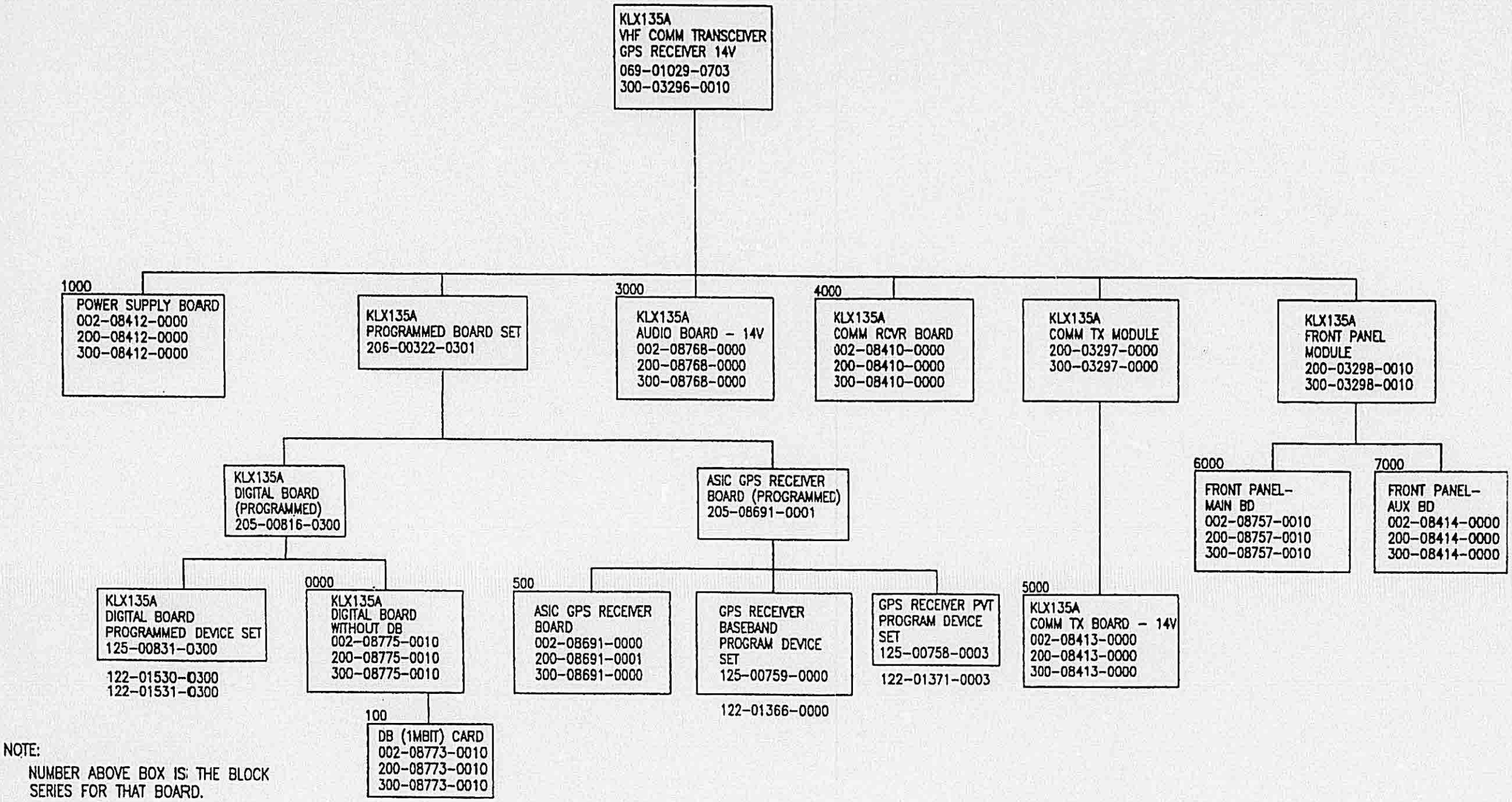
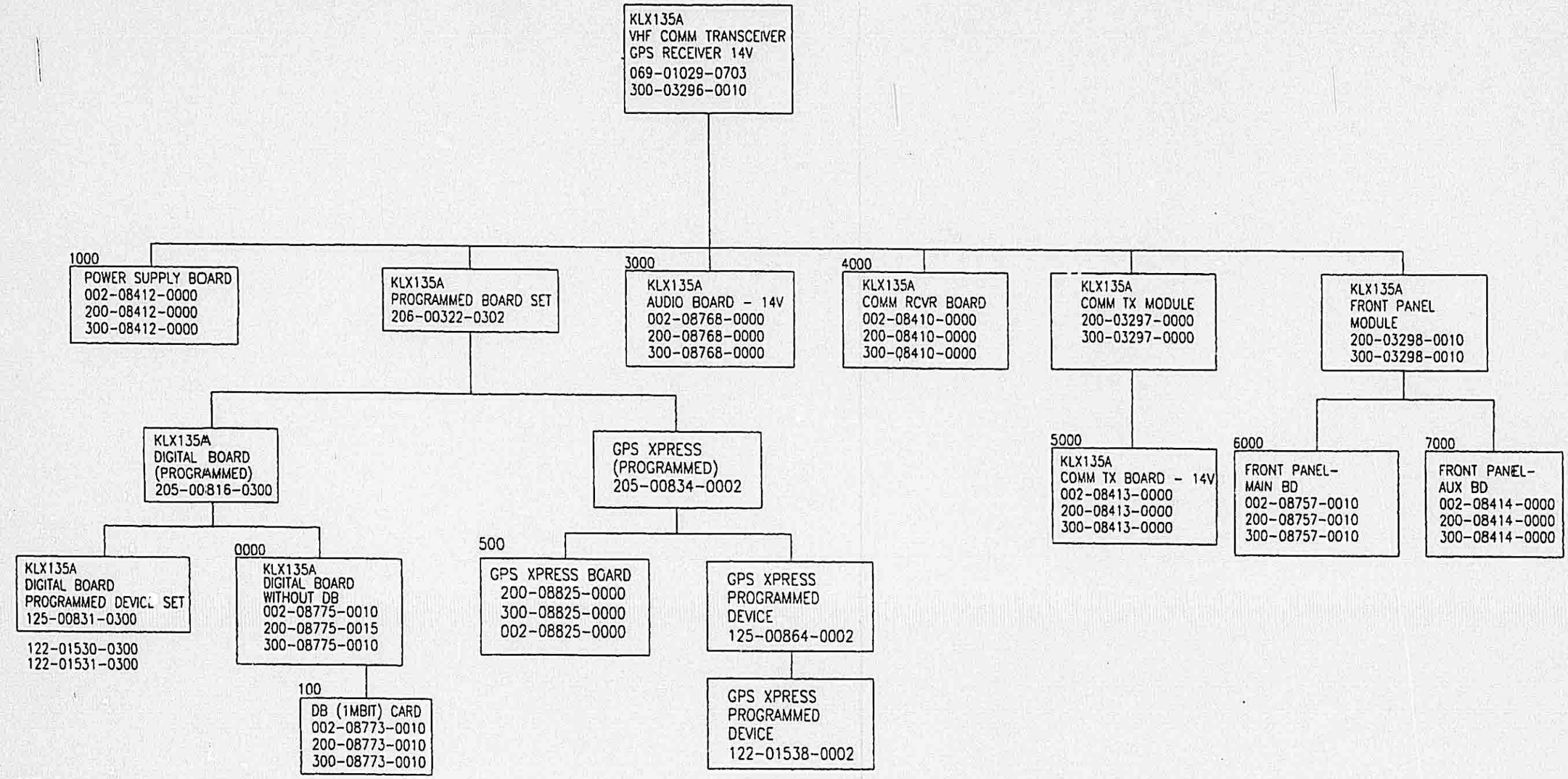


FIGURE S-4 KLX 135A, P/N 069-01029-0703, SW ID 0301

BENDIX/KING
KLX 135/135A
COMMUNICATIONS TRANSCEIVER/
GPS RECEIVER



NOTE:

NUMBER ABOVE BOX IS THE BLOCK SERIES FOR THAT BOARD.

FIGURE S-5 KLX 135A, P/N 069-01029-0703, SW ID 0302