Honeywell

MAINTENANCE MANUAL

BENDIX/KING®

KG 102A

DIRECTIONAL GYRO

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REVISION 7 MARCH, 2002

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REVISION HISTORY

KG 102A Maintenance Manual

Part Number: 006-15623-XXXX

For each revision, add, delete, or replace pages as indicated.

REVISION No. 7, March 2002

ITEM	ACTION
All pages	Full Reprint, new manual

Revision 7 creates a new stand-alone manual for the KG 102A which was extracted from revision 6 of the KCS 55/55A maintenance manual, (P/N 006-05111-0006). Any revisions to the KG 102A, beginning with revision 7, will not be a part of the KCS 55/55A manual.

THIS PAGE IS RESERVED

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SECTION IV
THEORY OF OPERATION

4.1 GENERAL

The KG 102A gyro forms the heart of the KCS 55A compass system in that it supplies the basic heading reference. In addition, it converts the aircraft power whether +14 or +28 VDC to the various voltage levels required by the other system units as well as for the gyro itself. It converts the flux valve slaving error to the proper digital format to be summed with the digital gyro signal that operates the stepper motor compass card drive in the KI 525A. It accepts the auto and manual slaving commands from the KA 51A to control speed and direction of the slaving activity and finally, it monitors the gyro spin motor to verify normal operation and sends a logic signal to the KI 525A HDG flag to remove it from view when the heading signal is valid.

CAUTION:
THE FOLLOWING INFORMATION IS FOR S/N 3748 AND ABOVE EQUIPPED WITH HONEYWELL GYROS P/N 060-00016-0000. FOR KG 102A EQUIPPED WITH AN R.C. ALLEN GYRO, S/N 3748 AND BELOW, REFER TO THE KG 102 MANUAL, P/N 006-15622-0007.

4.2 POWER SUPPLY

System power for the KCS 55A compass is supplied by the KG 102A gyro, and is generated solely from the +14VDC or +28VDC aircraft power. From this source, the following internal supplies are generated: 26 VAC, 400Hz for the gyro spin motor and flux valve excitation; ±15 VDC regulated supply for the linear circuitry in the system; +15VDC unregulated voltage for the KI 525A stepper motor drive plus the system logic circuitry, the glideslope pointer and power flag current, and +5VDC regulated supply for the LED drive current in the KI 525A and slaving drive circuits.

Input power enters the KG 102A through pin e and is filtered by the LC network consisting of capacitors C201, C202 and inductor L201. Voltage regulator Q212,Q213 generates +6VDC power for 800Hz oscillator I201. This signal is required to demodulate the flux valve signal in the auto-slave input circuit to be described later, and also to drive the flip-flop consisting of transistors Q202, Q203, and associated parts. The flip-flop performs the function of a frequency divider, supplying 400Hz waveforms that are 180 degrees out of phase to transistors Q205 and Q207. Diode CR201 and capacitor C204 steer the 800Hz signal to Q202 shutting it off on the negative going transition of the 800Hz waveform. When Q202 stops conducting, current flows through resistors R204 and R205 to the base of Q203, causing it to start conducting. This removes the base drive to Q202 allowing the circuit to stabilize with Q202 off and Q203 on. When the next negative going transition of the 800Hz waveform appears, it is steered through capacitor C205 and diode CR202 to the base of Q203. This negative pulse deprives Q203 of base current causing it to shut off. Current begins to flow through resistors R208 and R207 to the base of Q202, turning that transistor on. In this way, a complete cycle of the flip-flop operation is achieved for every two cycles of the 800Hz input waveform resulting in a 400Hz drive signal to the inverter transformer drive transistors.

Transistors Q205 and Q207 switch alternate ends of inverter transformer T201 to ground at 400Hz in response to the flip-flop output signal. Switch S201 effectively changes the turns ratio of the transformer allowing operation on +14VDC or +28VDC. The secondary windings of T201 develop the four individual supplies for the system operation.

First, a separate winding is used to generate the 26VAC necessary to drive the gyro spin motor and to excite the flux valve drive circuitry. One side of this winding is connected to power ground.

Second, a center tapped winding is used to generate the ± 15VDC regulated supply for the linear circuitry in the system. A conventional full wave bridge rectifier is used to convert the 400Hz waveform to DC and capacitors C206 and C207 filter this voltage prior to entering the zener regulator circuit.

Positive current passes through resistor R213 to zener CR212 across which is developed the reference voltage of 16VDC. Approximately ONE volt is dropped across the base to emitter junctions of darlington connected transistors Q208 and Q209 resulting in +15VDC appearing across output filter capacitor C209. Negative current passes through resistor R214 to zener CR213 developing the reference voltage for transistors Q210 and Q211. The output from this darlington connected pair appears across capacitor C210 as -15VDC.

The third secondary winding is used to generate the +15VDC unregulated supply and the + 5VDC regulated supply. Here again, a conventional full wave bridge rectifier is used to convert the 400Hz waveform to DC, and capacitor C208 filters this voltage producing the unregulated +15VDC supply. From here, current flows to Q212 a voltage regulating I.C. where the reference 6.2VDC is developed. Approximately 1.2VDC is dropped across the base to emitter junctions of transistor Q213 resulting in +5VDC appearing across capacitor C211. Individual ground lines have been established for the various circuits including signal ground for the linear circuitry, digital ground for the logic, unregulated ground for the stepper motor and power flag, and power ground for the input +14VDC or +28VDC aircraft power and the 26VAC 400Hz supply.

4.3 HEADING DISPLAY DRIVE CIRCUIT

Heading information is obtained from the directional gyro mounted on the KG 102A chassis and is in the form of two output waveforms that are 90 degrees out of phase with each other as shown in Figure 4-1.

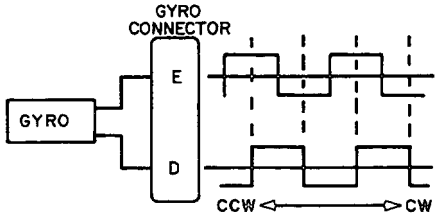


FIGURE 4-1 KG 102 GYRO OUTPUT WAVEFORMS

A signal transition occurs at pin D or E every quarter degree of heading change and is phased such that pin E leads pin D for CW rotation of the gyro (increasing heading). Since these signals are generated by op-amps in the gyro and are switching between ± 15 VDC, a limiting circuit is required to reduce the voltage to CMOS logic levels. Refer to the schematic diagram in Figure 4-2.

For units with digital filters, R301 and R302 current limit the amplifiers' signal so that it can be handled by CMOS logic gates (I302), see figure 4-16. The output of the digital filter is used as the limiter output. Refer to section 4.3.6 for additional information.

Resistors R101 and R102 along with diodes CR101 and CR102 limit the logic gate input voltage to +10VDC and ground.

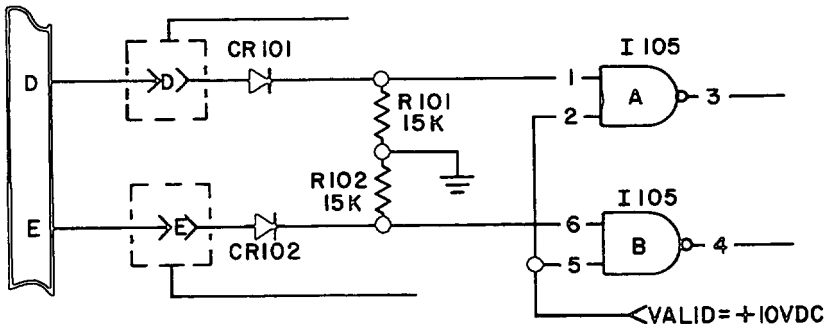


FIGURE 4-2 GYRO OUTPUT LIMITER AND VALID SWITCH

From this limiter circuit, the gyro signal passes through a HDG VALID switch which removes the gyro signal from the motor drive circuit during manual slave, fast auto slave and gyro motor spinup or failure periods. During valid operation, the signal passes through two sets of reversing switches used to introduce the slaving signal into the motor drive circuit, and from those to the motor switching transistors.

4.3.1 HEADING DISPLAY DRIVE DETAIL OPERATION

As explained above, the gyro signal is limited to CMOS logic levels by resistors R101 and R102, and diodes CR101 and CR102. A series resistor internal to the gyro on the D and E lines complete the voltage divider network. From this divider network, the signal passes through a HDG valid switch consisting of NAND gates I105A and B. Pins I105A-2 and I105B-5 are connected to the HDG valid signal which remains at a zero level voltage during manual slave, fast auto slave, gyro spinup, and gyro failure periods. This voltage forces the gate outputs to a logic high level preventing gyro signals from passing. During valid periods of operation, these gates are "opened" to permit the gyro signals to pass into the first of two reversing switches.

The first switch consists of four analog switches internal to I108 that serve to reverse the two gyro lines during auto and manual slave operation.

Figure 4-3 illustrates this switch.

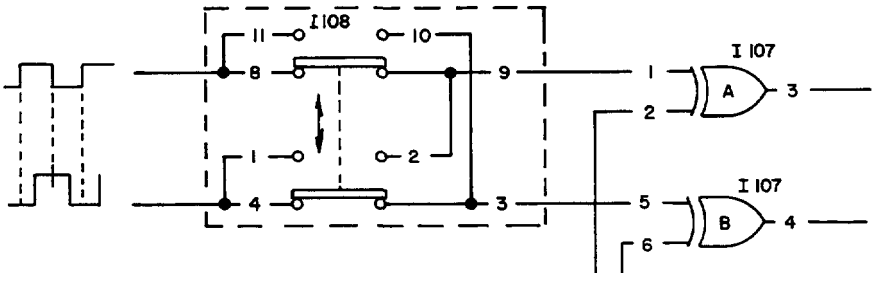


FIGURE 4-3 REVERSING SWITCHES I108 and I107

From the output of I108, the signals pass to inverting gates of I107A and B. These gates invert the signal polarity during slave operation. This polarity inversion is achieved with the use of EXCLUSIVE OR gates. A polarity control signal is connected to I107A pin 2 and I107B pin 6 such that when this signal is at a high logic level the gate inverts the input signal and when it is a low logic level the signal is unaffected. From here, the signal passes to the stepper motor output drive circuit consisting of inverters I104B and C, resistors R105, 6, 7, and 8; transistors Q101, 2, 3, and 4; and diodes CR3, 4, 5, and 6. The two inverters provide the 180 degree phase shift required on two of the stepper motor windings. See Figure 4-4.

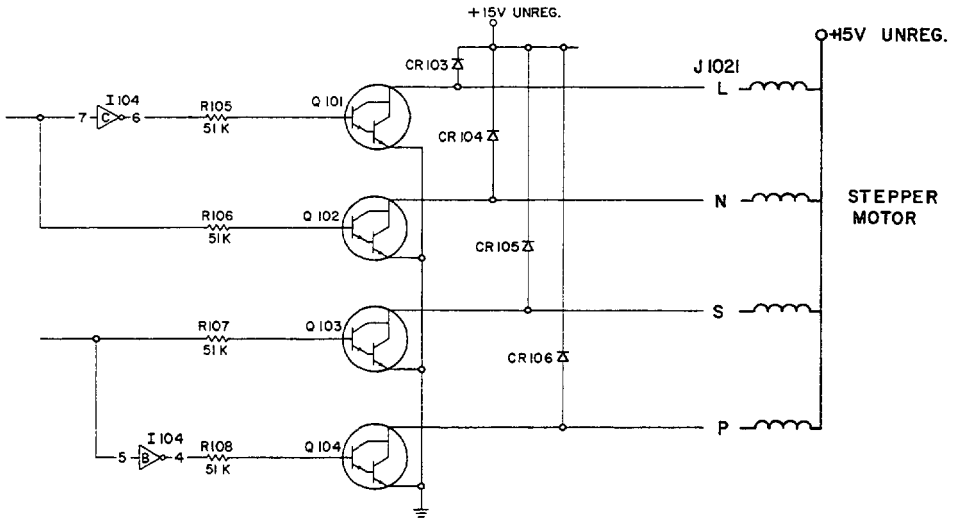


FIGURE 4-4 STEPPER MOTOR DRIVE CIRCUIT

4.3.2 AUTO-MANUAL SLAVING CIRCUITRY - DETAIL OPERATION

Automatic slaving in the KG 102A is achieved by demodulating the 800Hz flux valve signal to obtain a positive or negative direction control signal which is used to establish the output phase relationship of a two-phase state generator. This output then configures the two reversing switches in the stepper motor drive circuit to operate the motor in quarter degree steps until the slaving control transformer in the KI 525A has been aligned with the magnetic flux valve.

The flux valve signal is connected to J102 pin v where it enters a first order filter consisting of I101B and associated parts. This filter removes any high frequency noise that may be present on the signal and also increases the signal amplitude prior to being demodulated. Transistor Q105, FET's Q106 and Q107, along with related parts form the demodulator circuit. A reference 800HZ square wave from the KG 102A power supply is applied to the base of Q105 which supplies the switching signal to Q106 and Q107. During the half cycle when the 800Hz square wave is low, Q105 will be OFF resulting in +15VDC appearing at the collector through R110. This voltage will reverse bias the gate to drain junctions of Q106 and Q107, causing them to turn OFF. This prevents signal current from passing through R116 to pin 3 of I101A. When the 800Hz signal is high, Q105 turns ON, forcing Q106 and Q107 ON. This allows signal current to excite pin 3 of I101A and shorts the pin 2 signal current to ground through Q106.

Amplifier I101A filters the demodulated signal to provide a DC voltage to operate the slave meter connected to J102 pin k through R111. From the output of this filter, the slaving signal goes to a comparator circuit consisting of amplifiers I102A and B and associated resistors R125 through R131.

The purpose of this comparator is to determine the polarity of the flux valve signal, convert it to a logic signal to establish the direction of motor rotation, and to provide a second logic signal whenever the comparator output switches polarity, i.e. a zero-crossing detector. Amplifier I102A is biased slightly negative by voltage divider consisting of R128, R129 and R131 and the -15 volts supply. This results in switching taking place at approximately -0.61VDC as shown in Figure 4-5. There is no bias voltage on I102B, therefore, switching occurs at zero volts. Resistors R131 and R125 provide a small amount of positive feedback to prevent the amplifiers from oscillating during the switching operation.

As the input signal passes from negative to positive, I102A switches from +14.5V to -12.5 volts when the input reaches -0.61VDC. This reverse biases CR108, causing TP-2 to drop to zero volts. I102B remains at -12.5VDC as long as the input is negative holding CR109 in a reverse biased condition. When the input voltage goes positive, however, I102B switches to +14. 5VDC, forward biasing CR109 and forcing TP-2 to a logic high condition. Figure 4-6 shows the zero crossing signal along with the motor direction signal. The combined logic signals from TP-2 are reduced to 10 volt levels by divider network R132 and R133. In addition, the motor direction signal is modified in a similar fashion by diode CR110 and resistors R122 and R123.

From the junction of these two resistors, the motor direction signal is NOR'ed with the auto slave signal from the collector of Q108. This transistor is controlled by the auto slave switch in the panel mounted KI 51A through J102 pin c. When the auto slave switch is OFF, a high logic level on pin 6 of I110B prevents the slaving direction signal from passing. When the mode is engaged, however, the direction information is summed with the CW manual slave direction signal at I110A and then on to EXCLUSIVE-OR gate I107C. This gate controls the logic signal polarity to D-Flip-Flops I109A and B thus controlling the output transition sequence.

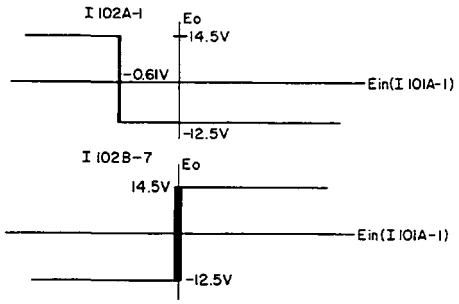


FIGURE 4-5 AUTO SLAVE COMPARATOR OPERATION

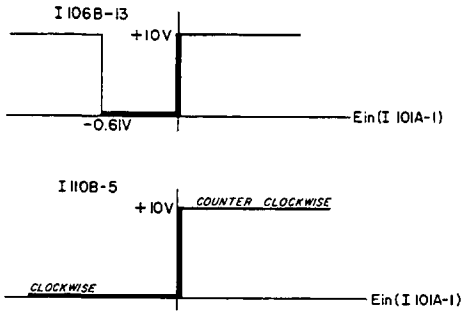


FIGURE 4-6 AUTO SLAVE ZERO CROSSING AND MOTOR DIRECTION SIGNAL

Whenever the auto or manual slave mode is engaged, clock pulses from oscillator I111 pass through I110C to gates I105C and D. With a logic high level at the output of EXCLUSIVE-OR gate I107C, indicating that the input logic levels are different, I105C will pass the clock pulse from I110C. Inverter I104F switches the polarity of the EXCLUSIVE-OR signal to a logic level low, turning OFF gate I105D. In this manner, Flip-Flop I109B will change state during the rising edge of the clock pulse signal on Pin I109B-11. As a result of the change in state of I109B, EXCLUSIVE-OR I107D will also change state as will the output of I107C. This forces I107C to a low state, disabling I105C and enabling I105D. When the next clock pulse arrives, Flip-Flop I109A will change states causing I105C to be enabled once again. From the waveforms, in Figure 4-7, it is clear how the Flip-Flops “take turns" producing the two-phase state signal necessary to operate the stepper motor.

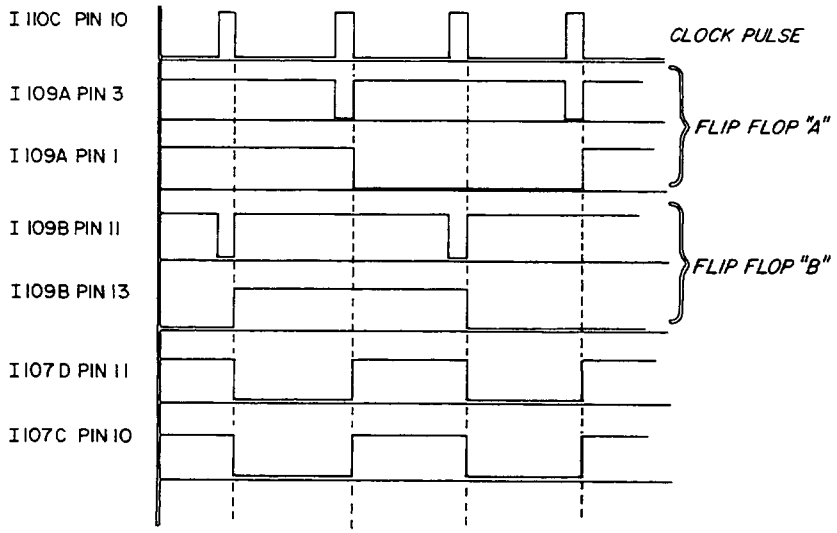


FIGURE 4-7 TWO-PHASE STATE GENERATOR - CW DRIVE

If a CCW direction is commanded at pin 8 of I107C, the sequence will be reversed with Flip-Flop A lagging Flip-Flop B by 90 deg. instead of leading by 90 deg, causing the motor to run in the opposite direction. The reversing switch, I108, switches the motor lines each time one of the Flip-Flops changes state and the EXCLUSIVE-OR's, I107A and B reverse the line polarity one at a time according to the state of the corresponding Flip-Flop to which they are connected. In this way the two phase slaving signal is introduced into the motor drive channel.

During these periods where the slaving modes are disengaged, operation of the D-Flip-Flops is inhibited by the removal of the clock signal. This is achieved by a control signal at pin 8 of I110C. When this pin is at a logic high level, the gate output is forced low preventing the clock signal at pin 9 of I110C from passing. This control signal is obtained by NOR'ing the auto-slave command at pin 13 of I110D with the combined manual slave command at pin 12 of I110D. When either of these signals is at a logic high level indicating engagement, pin 8 of I110C will switch to a logic low level allowing the clock signals to excite the Flip-Flops.

To prevent interaction between the auto and manual modes, gates I112A and D prevent manual slave operation when the auto-slave mode is engaged. It is also noticed that only the CW manual signal is OR'ed with the auto slave direction signal at I110A from I112A. This is sufficient because CCW operation corresponds to the logic statement: AUTO OR MANUAL SLAVE AND NOT AUTO CW OR MANUAL CW SLAVE, i.e. if any slaving is taking place and it is not CW slave, the system assumes a CCW direction command. Gate I110B serves to inhibit the auto slave direction signal when the auto slave mode is disengaged, thus preventing interference with the manual slave direction signal.

Normal slaving activity is divided into three basic modes: first of all, the manual mode, whereby the pilot positions the heading card by depressing the CW or CCW manual slave button on the KA 51A. This mode produces card rotation at the rate of 5 degrees per second as long as the button is depressed. Since the pilot has direct control of this operation, the higher speed is suitable. Secondly, the fast auto slave mode, whereby the KG 102A controls the direction based on the flux valve orientation, operates the card at 3 degrees per second; and lastly, the slow auto slave mode, which engages automatically when the fast auto slave mode produces a zero crossing pulse at I102A as described earlier. During slow slave operation, card rotation is slowed to one quarter of a degree every 4. 6 seconds. These rotation rates are controlled by clock oscillator I111 and associated timing components R135 through R138, CR111 and CR113, and capacitor C109 as shown in Figure 4-8.

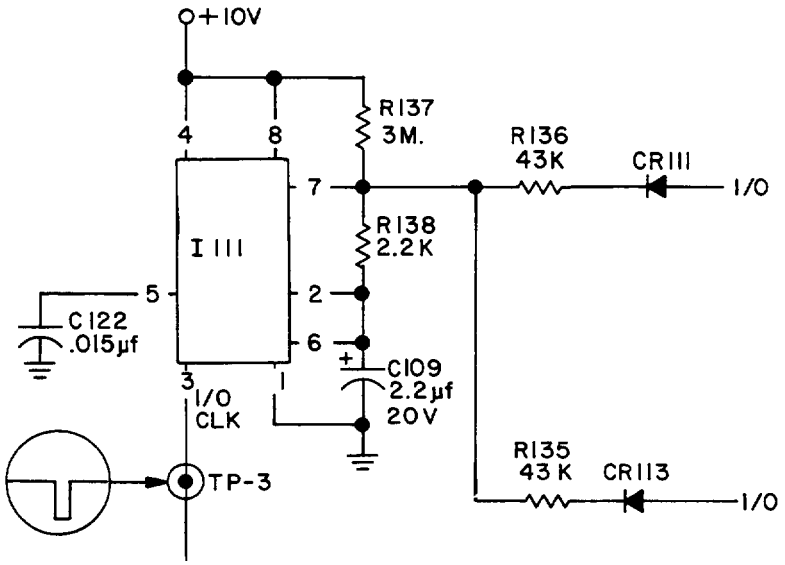


FIGURE 4-8 CLOCK CIRCUIT

During manual slave operation, the output of latch gate I106C is at a logic high level produced by a logic zero level from auto slave inverter I104E when auto slave is OFF. In addition, a logic high level is also present at slave transistor Q108. Both of these sources supply charging current through resistor diode combinations R136, CR111, and R135, CR113 respectively, to R138 through which current flows into timing capacitor C109. When the voltage across C109 reaches approximately +6.7 volts, pin 7 of I111 shorts to ground causing C109 to discharge through R138. When C109 voltage decreases to approximately 3.3 volts, the short is removed allowing C109 to charge up again. This sequence produces a pulse wave output at pin 3 of I111 which constitutes the system clock signal.

The frequency of this clock is directly proportional to the charging current through the two paths mentioned above, along with a third path through R137 from the 10 volts power supply. During fast auto slave, Q108 shorts to ground removing the charge path of CR113 and R135 resulting in a reduced clock frequency. When the zero crossing pulse occurs at pin 13 of I106D, the output at pin 11 goes high. This logic high, along with the logic high at pin 8 of I106C resulting from auto slave engagement at I104E, switches the output of I106C low which in turn holds I106D high thus completing the latch operation forcing I106C low until the auto slave mode is disengaged. This removes the second charge path of CR111 and R136 for C109 reducing the clock frequency to the slow slave value determined by R137, R138, and C109.

To conclude the discussion of the slaving system, a short description of three additional circuits is presented. Resistor R134 and capacitor C108 connected to pin 8 of latch gate I106C hold the zero crossing latch disabled for approximately one half second following engagement of the auto slave mode or the initial application of system power. It is the latter event which requires the use of this short delay. Since the auto slave button may be depressed prior to application, or recycling of power, the zero crossing latch must be disabled long enough to permit the demodulator to shift far enough away from zero volts to configure the comparator in its final position so the latch does not interpret the zero volts as a zero crossing and revert immediately to slow slave even though a large slaving error may be present. Diode CR114 performs a similar function, in that it prevents the system from switching into the slow slave mode until the gyro spin motor has reached operating speed.

Optionally a fourth circuit, Q401's collector also provides a similar function - as it prevents the system from falling into slow slave mode until the tumble detection circuitry- (Q401's base drive) indicates there are no excessive rates.

Last, the system is designed to energize and retract from view the KI 525A HDG flag during periods of free gyro operation when the spin motor is running at normal speed, and during periods of slow auto slave. Logic gate I106A computes the logic statement: AUTO SLAVE AND NOT ZERO CROSSING, i.e. auto fast slave. This signal is OR'ed with the output of I112B which computes the statement: MANUAL SLAVE ENGAGE. These two statements are OR'ed at gate I106B to provide a SLAVE INVALID signal to I103B. This gate computes the statement: GYRO MOTOR VALID AND NOT SLAVE INVALID, i.e., HDG valid which pulls the HDG flag from view. Any time the gyro spin motor is not at the proper operating speed, or manual slave is engaged, or fast auto slave is energized, the HDG flag will come into view. In addition to operating this flag, the signal also shuts off the gyro signal at gates I105A and B to prevent invalid heading information from being displayed on the KI 525A.

4.3.3 TUMBLE DETECT (for systems with this option)

The gyro pulses (ref 002-00385-0001) seen at I105B pin 4 (occurring at 1 cycle per degree) are feed to U402 (ref: 002-08582-0000) - the rate detection circuitry. U402 - decade counter, increments its output for each clock cycle seen from I105B. Once the count is incremented to the seventh count, the output from U402 is feed to base of Q401. Q401's collector, in turn pulls down I106C pin 8 - which initiates the fast slave mode of the operation. Once a reset pulse occurs on U402 pin 15, U402's outputs return to the zero state and the sequence starts fresh.

Note that the reset pulse is controlled by a 16 kHz oscillator built around binary counter - U401 and its associated components: R402, R403 and C402. The frequency of U401 oscillation is controlled by C402 and R402 with R403 providing isolation to the clock input pin. The output of U401- approximate 4 Hz square wave, feeds U402's reset pin through C401 and is referenced to ground through R401. This reset pulse clears U402's count approximately every 0.25 seconds -reverting all of its outputs to the zero state. Consequently if we allow seven counts in 1/4 second - this means the gyro is actually moving at 7*4 = 28 degrees / second.

4.3.4 GYRO MOTOR ROTATION DETECTOR (SN < 3748)

Figure 4-9 shows the schematic for the gyro motor, the output waveforms corresponding to the start and run periods, and the spin motor detector circuit. An indication of the motor speed is obtained from segments B and D in Figure 4-9B. During the start up period, L2 represents a lower reactance than it does during the normal running period and, as such, develops a smaller voltage during start up. As seen in Figure 4-9B the voltage during the running segments B and D continue to increase in magnitude throughout the period, whereas the start up waveform begins to increase then returns toward zero volts.

A voltage level detection scheme was implemented which uses this increased voltage to determine proper operation. If the voltage drops to low for to long - the associated logic circuitry will indicate an invalid gyro.

Segment D of Pin K, the positive going portion (fig.4-9B) during the negative phase of 400Hz excitation, is the only segment used to make the determination of motor speed. In this way, the measurement is used from each cycle of the 400 Hz excitation - providing a continuous monitor of spin motor RPM via motor efficiency. The filtered motor voltage (k) corresponding to the negative 1/2 cycle of 400 Hz excitation the motor response is filtered by a simple RC network - R164, R165, and C124. R164 a potentiometer is used during alignment to ensure proper duty cycle of TP5. This diode isolated filtered signal is summed with the 26vac 400 Hz signal via isolation Diode CR124 to load resistance R166. The 26vac 400 Hz goes though Zener Diode CR116 and potentiometer R159 to the load resistance of R166. Note only Segment D of the motor filtered response goes positive during this phase of summation, consequently its amplitude determines when the summation point will go positive. R159 is used to adjust the magnitude of the positive excursion during the alignment process while Diode CR116 provides a 15v drop in voltage to ensure R159's adjustable range.

The summed signal is then feed through base resister R160 and clamping Diode CR123 to Q117. Q117 inverts this signal and performs a level shift function to +10 logic, for use by I112C as GYRO VALID. To ensure that only one segment or quadrant is used to determine motor spin - 26vac 400 Hz is feed through current limiting resister R153 and clamping diode CR117 to the base of Q118. Q118 inverts the base drive pulling the base voltage of Q117 to ground during the positive phase of the 400 Hz excitation - and allowing it to remain open during the negative phase.

The none active output of TP5, at +10vdc through R155 represents logic ONE signal at pin 9 of NOR gate I112C. The output of this gate is ZERO, which allows capacitor C114 to completely discharge through resisters R151 and R150. With logic ZERO at the input to inverter I103C, logic ONE is applied to input of gates I103B and I103D. This produces a logic ZERO at the output of those gates which representing a GYRO INVALID.

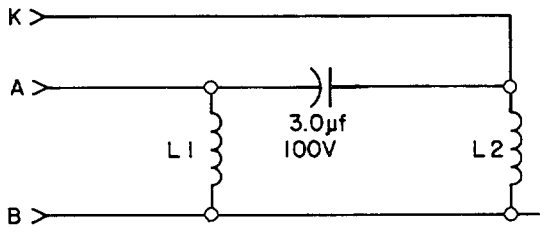


FIGURE 4-9A GYRO MOTOR SCHEMATIC

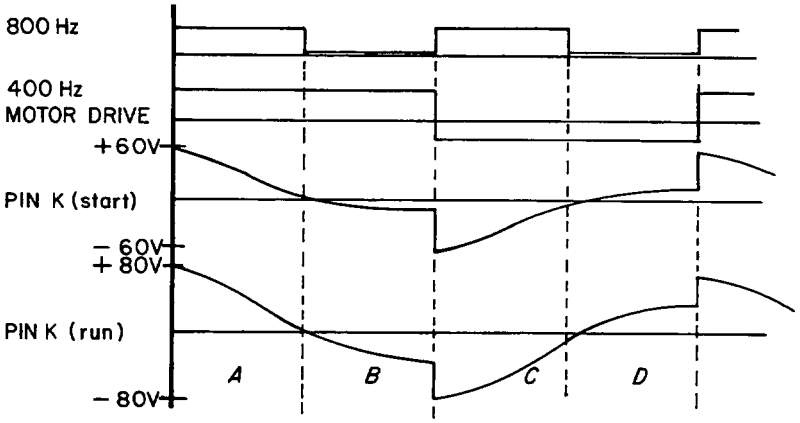


FIGURE 4-9B GYRO MOTOR AND WAVEFORMS

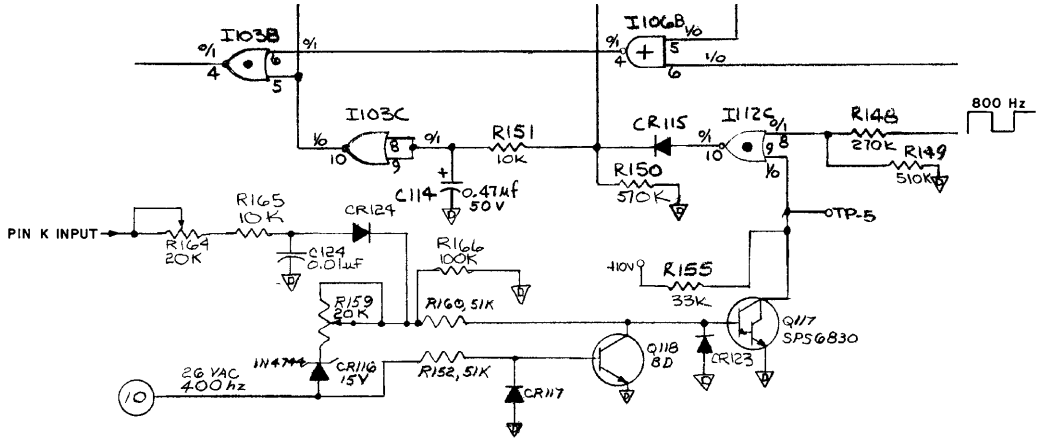


FIGURE 4-9C SPIN MOTOR DETECTOR CIRCUIT

As the gyro motor begins spinning, the waveforms at the cathode of CR124 and TP-5 begin to change as shown in Figure 4-10 and 4-11 below:

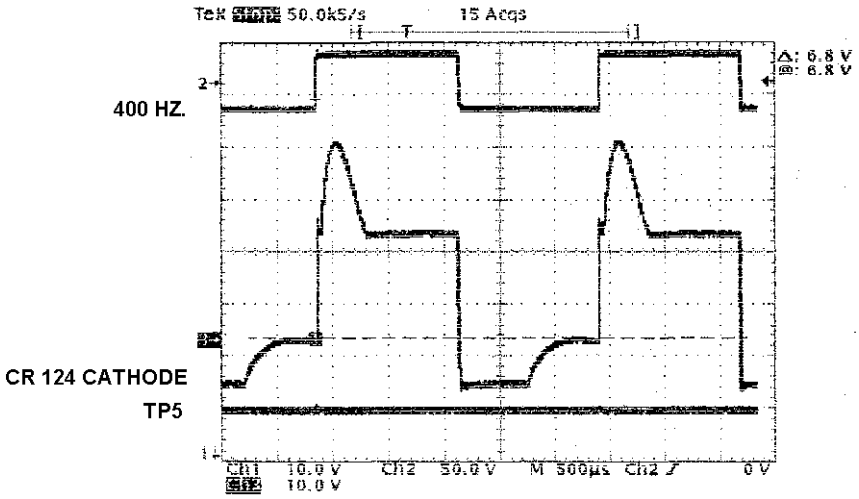


FIGURE 4-10 ROTATION DETECTOR START WAVEFORM

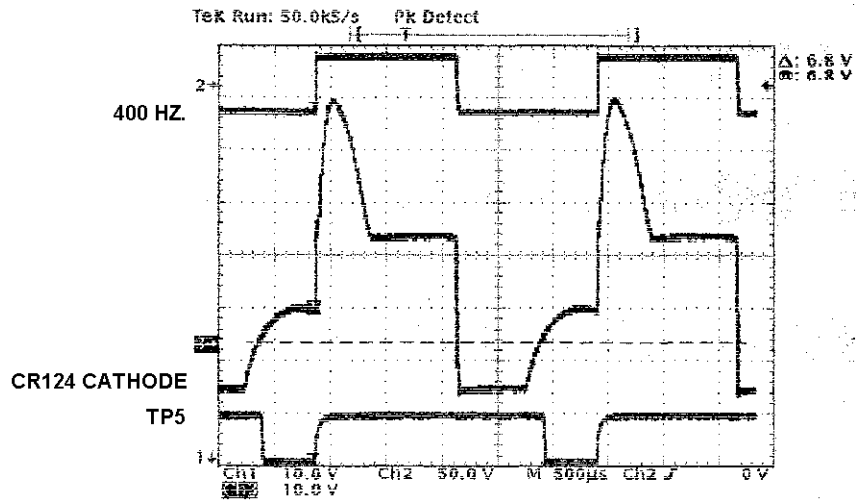


FIGURE 4-11 ROTATION DETECTOR RUN WAVEFORM

As seen in the above diagram, the waveform at TP5 continues to dip toward zero volts as the motor speed increases. The large pulse just to the right of the shifting waveform results from the negative transition of the 26V, 400Hz square wave supplying power to the motor. This pulse is removed at logic gate I112C by AND'ing the reference 800Hz square wave with the waveform at TP5. Since the 400Hz motor drive waveform is derived from the 800Hz reference oscillator, the two waveforms are synchronous resulting in the time relationship shown in Figure 4-12. As the variable portion of the waveform at TP5 drops below 5VDC, the output of gate I112C begins to pulse from zero to +10VDC during the time the input is less than 5VDC and the 800Hz signal at pin 8 is zero. This sequence is also shown in Figure 4-12.

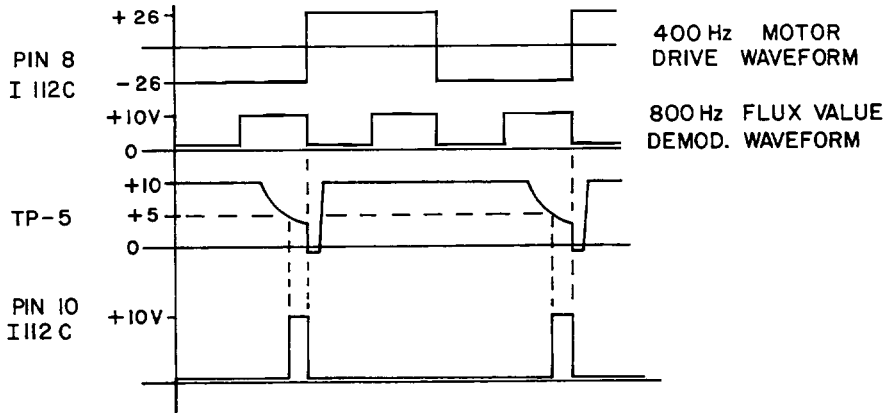


FIGURE 4-12 ROTATION DETECTOR TIMING DIAGRAM (Start-Up)

These pulses pass through CR115 and R151 to capacitor C114 which begins to charge to 10 VDC. At the end of each pulse, C114 slowly discharges through R151 and R150. Since the charge time is much shorter than the discharge time, the voltage on C114 soon reaches +5VDC causing gate I103C to switch from +10 VDC to ZERO volts. With a logic zero at pin 6 of I103B, indicating the absence of manual slave and fast auto slave, plus a logic ZERO at pin 5 of I103B from the spin motor circuit, the output of this gate will switch to a logic ONE. This turns on transistors Q113 and Q115 providing a ground for the KI 525A HDG flag pulling it out of view, indicating a valid compass system. Gate I103A inverts the signal to a logic ZERO turning off transistors Q114 and Q116. This removes the autopilot disconnect ground path allowing the autopilot to be engaged.

In addition to providing a ground for the HDG flag and removing a ground path for the autopilot disconnect system, the output of I103B also allows gates I105A and I105B to pass the gyro output signals to the KI 525A stepper motor.

In order to prevent the valid signal at pin 10 of I103C from oscillating during the transition from invalid to valid, a positive feedback loop is provided. This loop consists of gate I103D and components C119, R156 and diodes CR120 and CR122. When I103C initially switches to a logic ZERO, the output of I103D switches to a logic ONE. This voltage starts to charge capacitor C119 through resistors R156, R150 and diode CR120. The positive voltage developed across R150 during this charging period, holds the input of I103C high which maintains a steady low voltage at the output.

Several seconds after the initial valid signal appears at pin 10 of I112C, the motor RPM increases to a point where the positive feedback through C119 is no longer needed to prevent oscillation of the output signal at pin 4 of I103B. Figure 4-13 shows the spin motor circuit waveforms after the run up period is complete. The square wave signal at pin 10 of I112C is sufficient to keep C114 charged, maintaining a VALID compass signal.

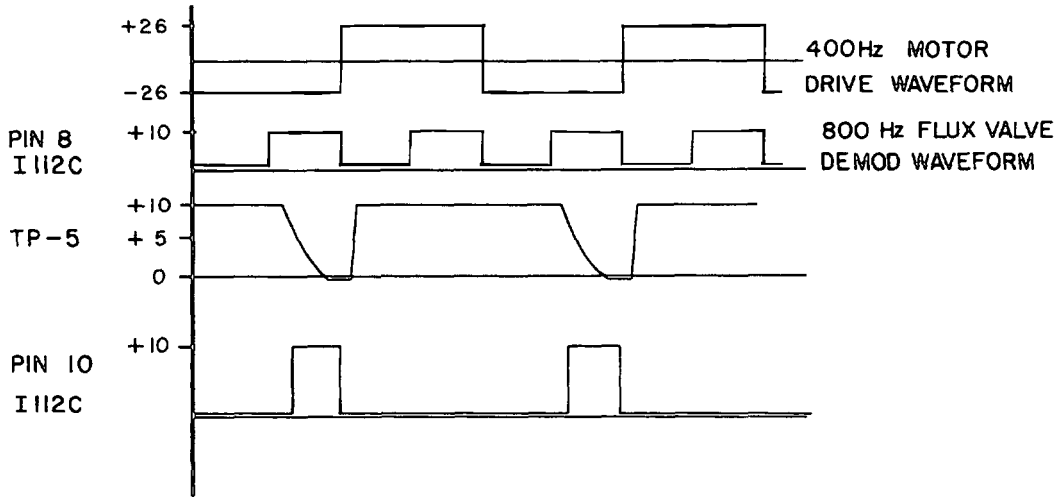


FIGURE 4-13 SPIN MOTOR RUNNING WAVEFORMS

4.3.5 FLUX VALVE DRIVE CIRCUIT

Figure 4-14 shows the flux valve drive circuit along with the associated waveforms.

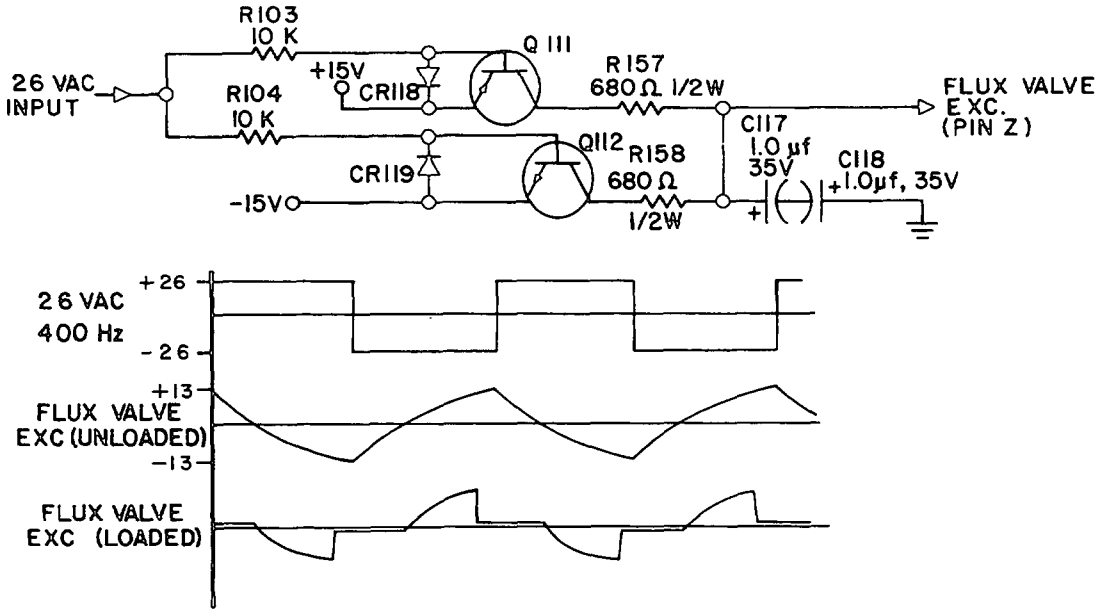


FIGURE 4-14 FLUX VALVE DRIVE CIRCUIT AND WAVEFORMS

During the positive portion of the input square wave, current flows through R103 and CR118 reverse biasing the Q111 base to emitter junction, shutting Q111 off. Q112 is turned ON by base current from the input 26VAC through R104 and the base-emitter junction of Q112. With the transistor turned on, capacitors C117 and C118 begin charging to -15VDC through R158. This charging continues until the capacitor voltage reaches approximately -13VDC when the input 26VAC signal switches from +26 volts to -26 volts. This causes Q112 to shut off and Q111 to turn ON, charging C117 and C118 to +13 volts as shown in the unloaded flux valve waveform in Figure 4-14. From the capacitors, the signal is connected to pin Z and then to the KMT 112 flux valve. With the flux valve connected, the output waveform is altered as shown in Figure 4-14 due to the saturation characteristics of the flux valve.

These characteristics are described in the KMT 112 manual, P/N 006-15624-00XX (where XX represents the latest revision).

4.3.6 DIGITAL FILTER

Exclusive or Gate I302 and Flip Flop I301 form the digital filter circuit. Gates I302A and D serve to shape the input signals by increasing the switching speed of those signals prior to exciting Flip Flops I301 A and B. A mechanical analogy will be used to describe the basic operation of the filter, Figure 4-15.

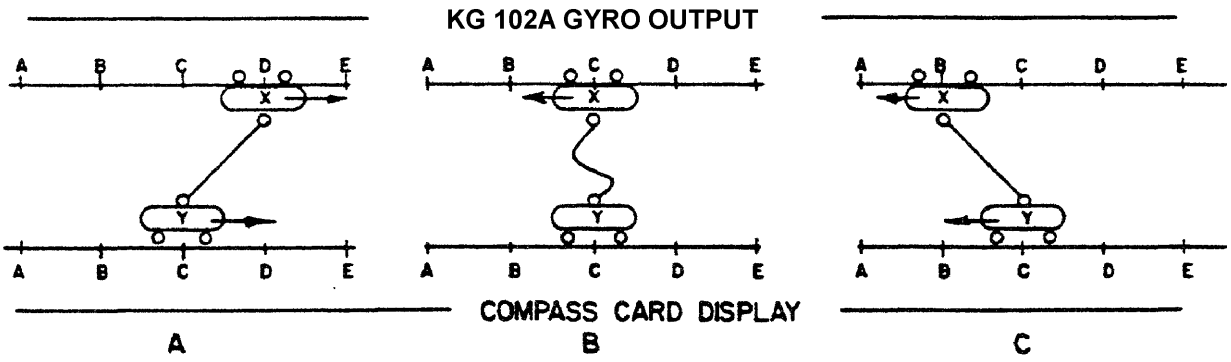


FIGURE 4-15 COMPASS CARD DISPLAY

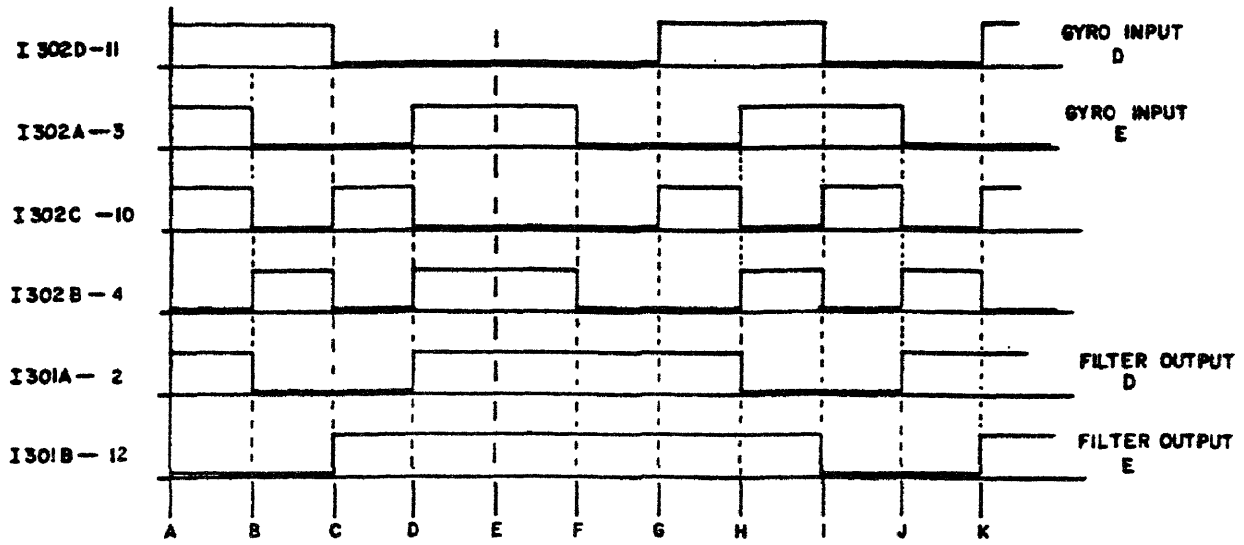
The KG 102A gyro output signal is represented by the car labeled "X" above. This car moves along the upper rail in one-quarter degree increments represented by the letter designations A, B, C, etc. The car labeled "Y" is pulled along the lower rail by a cable connected to Car "X". As seen in Figure 4-15, "Y" trails behind "X" by a quarter degree increment. When "X" reverses direction, Figure 4-15 part B, the cable goes slack until it reaches position B, Figure 4-15 part C, This causing no motion of Car Y. In this manner, oscillatory motion of Car "X" that does not exceed one half degree will produce no motion of Car "Y". This feature is the primary objective of the filter circuit; that is to prevent the compass card in the indicator from responding to vibration induced output from the KG 102A gyro.

Figure 4-16 shows the schematic and the time relationship between the waveforms at various points in the filter circuit.

Starting at period A with voltage levels as shown, three output transitions from the KG 102A gyro will be shown along with the resulting filter output waveforms that drive the Compass Card. Exclusive OR Gates I302B and C provide the clocking signals to Flip Flops I301 A and B. These Flip Flops transfer the data at the "D" inputs to the "Q" outputs on the positive going transition of the clock signal.

At period B, shaping Gate I302A switches from a logic 1 to a logic 0. This, together with the logic 1 at the Q output of I301B pin 13 (opposite of Q output of I301B pin 12) produces a logic 1 at pin 4 of Gate I302B. Since this represents a positive going transition at the clock input of Flip Flop I301A, the logic 1 signal at the "D" input will be transferred to the Q output pin 1. The Q output, pin 2 will switch to a logic 0 as shown in Figure 4-16. As a result of this transition, exclusive OR Gate I302C switches to a logic 0 in preparation for the input transition C which will cause it to switch back to a logic 1, providing the positive going clock transitions for Flip Flop I301B. When input transition C does occur, the logic 0 at I302A is transferred to I301B pin 13. The Q output pin 12 switches to a logic 1 at the same time as shown in Figure 4-16. At input transition D, input Gate I302A switches to a logic 1, causing output I301A pin 2 to also switch high. It is clear that each input transition produces an output on the opposite channel. In a sense, the output is always one step behind the input as was described in the mechanical analogy Figure 4-15. At this point, we will reverse the direction of the gyro rotation and observe the similarity between the compass display and the analogy used above.

At period F in Figure 4-16, the output of Gate I302A switches to a logic 0. Since this gate also contributed the previous transition (Period D) we know a direction reversal has occurred because the two inputs alternate during periods of constant direction activity. This transition cause the output of Exclusive or I302B to transition to a logic 0. Since this represents a negative going clock signal to Flip Flop I301A, it does not change state. This is similar to the situation depicted in the analogy Figure 4-15, Condition B. At period G, input Gate I302D switches to a logic 1 causing the clock signal at I302C to transition to a logic 1 also. This will cause the logic 0 at the input to Flip Flop I301B to be transferred to the output, but the output (I301B pin 13) is already a logic 0 (opposite of Q output I301B pin 12) so no change of state occurs. We have now reached the condition depicted in the analogy Figure 4-15, part C. All of the "slack" has been taken up and any addition transitions in the same direction will produce corresponding motion of the compass card. This happens at Period H where the input transition at I302A causes a positive going clock signal at the output of I302B, transferring he logic 1 at the input of Flip Flop I301A to the Q output. This also results in the logic 0 transition at the Q output of I301A.



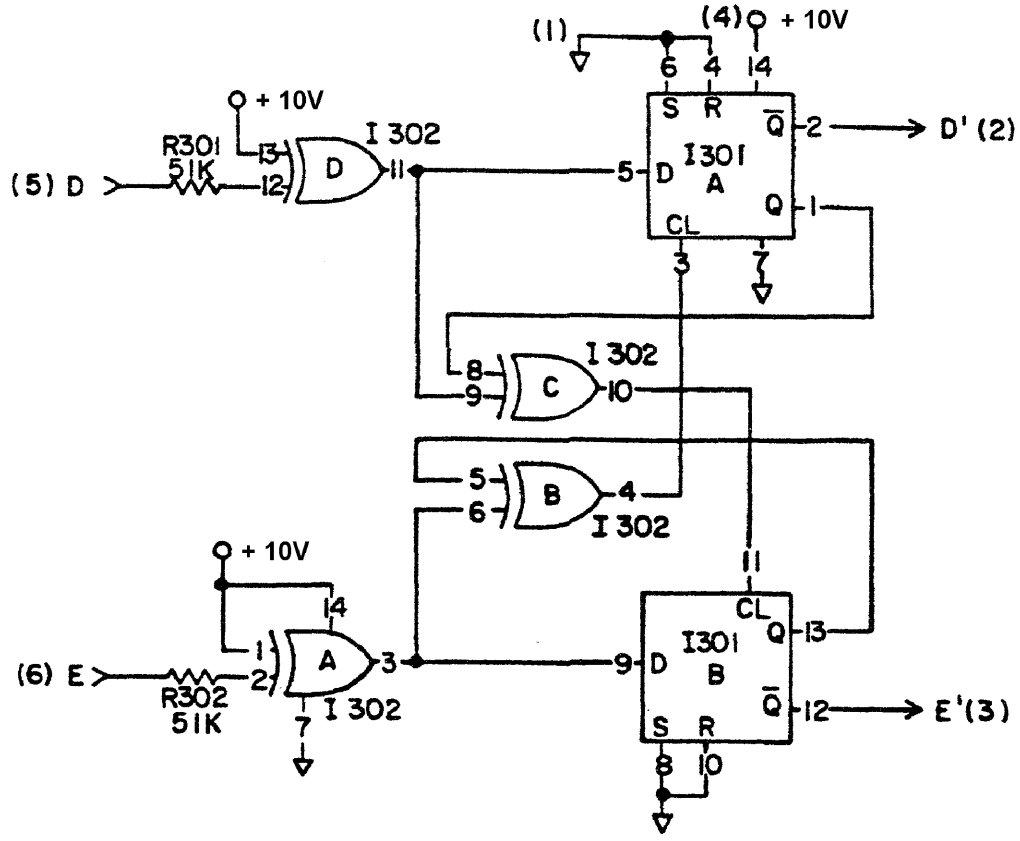


FIGURE 4-16 KG 102A DIGITAL FILTER

SECTION V
MAINTENANCE

5.1 GENERAL INFORMATION

This section discusses the testing, overhaul, and troubleshooting procedures for the KG102A directional gyro.

5.2 TEST AND ALIGNMENT

5.2.1 GENERAL REQUIREMENTS

Unless otherwise specified, all tests shall be conducted with the gyro in its normal operating position and at ambient room temperature (25 +/-5 deg. C) and humidity not to exceed 80%.

5.2.1.1 ELECTRICAL

Output Signals

a) Two phase state signal to KI 525A stepper motor
b) Slave meter drive signal
c) 26 vac 400 hz
d) 400 hz flux valve excitation
e) +/-15vdc for KI 525A
f) +5vdc for KI 525A
g) +15vdc unregulated for KI 525A
h) KC 295, KI 525A Valid
i) Autopilot disconnect VALID
*j) Gyro output wave forms
*k) Slave amp output
*l) 800 hz Ref.

* for test purposes only

Input Signals

a) 800 hz flux valve signal
b) Auto-manual slave signal 0/+5
c) CW Manual slave signal 0/+5
d) CCW Manual slave signal 0/+5
e) +14/+28vdc power input

5.2.1.2 MECHANICAL

Gyro photocell output accuracy D to E waveforms 90 deg. +/- 40 deg.

5.2.1.3 POWER INPUT

a) +14vdc- 3.0 amp
b) +28 vdc - 1.5 amp

5.2.2 TEST EQUIPMENT

a) KTS 152 Test Set
b) DC voltmeter Similar to Fluke Model 8000A
c) AC voltmeter Similar to Ballantine Laboratories Inc., Model 300-G.
d) Oscilloscope Similar to Tektronix, Model 516

5.2.3 CALIBRATION PROCEDURE

5.2.3.1 Place the switches on the KTS-152 test set to the following position:

a)	Flux Valve Simulator	X-ON
		Y-OFF
		Z-OFF
b)	KA-51A Slave Switch	OUT
c)	UNIT POWER	
	115VAC	OFF
	14/28 vdc	OFF
	26 VAC	OFF
	KG-102A 14-28v	+14v
d)	KSG 105 HDG CX	CX-1
e)	GYRO-GYRO SIM	GYRO
f)	GYRO SIMULATOR	
	ON-OFF	OFF
	CCW-CW	CW
	VAR/30 deg/s	VAR
FREE Run/l Rev.		FREE RUN
g)	INPUT POWER	
	14/28vdc	OFF
	115VAC	OFF

5.2.3.2

Connect 115VAC 400 hz and +14vdc to the appropriate jacks on the rear of the panel. Place the 14-28v switch on the KG 102A to the 14v position and remove the cover from the unit.

5.2.3.3

Switch the 115VAC and 14/28vdc Input power ON. Switch the 14/28vdc UNIT power ON. Adjust the 14vdc source for +14.0 vdc at pin e on the KG102A Connector.

5.2.3.4

Monitor the waveform between Pin p and t on the unit connector with a frequency counter or a scope and adjust R202 on the power supply board for 400+5hz. Measure the voltage at TP-6 on the logic board. It shall be 10.0 +/-1vdc.

5.2.3.5

Allow the gyro motor to reach full speed. Connect the scope probe to TP-5 and to the cathode (band side) of CR124. Adjust R164 for maximum negative pulse at TP-5. Adjust R159 to achieve +1.5 to +6.9 volts PK coinciding with TP-5's negative pulse width.

On some units equipped with RC Allen gyros, a neg. pulse duration of less than 0.4ms will be required to obtain a motor spin-up period in excess of 10 seconds as measured in step 5.2.4.a) below. Under no condition should this pulse duration be adjusted to less than 0.3ms.

5.2.4 FINAL TEST PROCEDURE

This portion of the test procedure shall be performed with the unit cover in place and the gyro Mounted to the base assembly.

5.2.4.1

Connect the unit to the tester and set the panel switches as listed in 5.2.3.1 above. Place the unit 14/28v switch in the l4v position. Switch the 14v-28v power switch ON and record the time for the HDG-VALID and the AP VALID LED's to illuminate. The Compass Card shall not rotate during this start-up period.

a)	Pin Z to t(-)(Fig. 5-1)	14 +/-1.5 Vpk (scope)
b)	Pin 2 to t(-)	26 +5.6/-3vac
		400 +/-30hz (scope)
c)	Pin X to Y(-)(Fig. 5-2)	5 +/-0.5V pk - pk
		800 +/-60hz (scope)
d)	Pin F to D(-)	+15 +/-2vdc: 0.2vrms Max.
e)	Pin H to Y (-)	+15 +/-1.5vdc: 0.1 vrms Max.
f)	Pin K to Y(-)	-15 +/-1.5vdc: 0.1 vrms Max.
g)	Pin T to V(-)	+5.4 +/-0.5vdc: 0.05vrms Max.
h)	Pin a to D(-)	+1.0 +/-0.6vdc
i)	Pin f to V(-) (Rotate gyro for Pos. Output)	+11.5 +/-2vdc (all except -02)
	(Rotate gyro for Neg. Output)	-13.5 +/-2vdc (all except -02)
	Pin f to V(-) (Rotate gyro for Pos. Output)	+15 +/-2vdc (-02 unit only)
	(Rotate gyro for Logic Low)	+ 0.06 +/-0.06vdc (-02 unit only)
j)	Pin s to V(-) (Rotate gyro for Pos. Output)	+11.5 +/-1vdc (all except -02)
	(Rotate gyro for Neg. Output)	-13.5 +/-2vdc (all except -02)
	Pin s to V(-) (Rotate gyro for Pos. Output)	+15 +/-2vdc (-02 unit only)
	(Rotate gyro for Logic Low)	+ 0.06 +/-0.06vdc (-02 unit only)
k)	Pin P to D(-) (Rotate gyro for high Output)	+15 +/-2vdc
	Pin S to D(-)	0.75+0.4vdc
	Pin P to D(-) (Rotate gyro for low Output)	0.75+0.4vdc
	Pin S to D(-)	+15 +/-2vdc
l)	Pin L to D(-) (Rotate gyro for high Output)	+15 +/-2vdc
	Pin N to D(-)	0.75 +/-0.4vdc
	Pin L to D(-) (Rotate gyro for low Output)	0.75 +/-0.4vdc
	Pin N to D(-)	+15 +/-2vdc
m)	Pin d to D(-)	+11 +/-2vdc

5.2.4.2

Operate the CW manual slave button to position "W" on the Compass card under the lubber line. The card shall rotate at 5 +/-1 deg/sec in a CW direction and the slave needle shall deflect to the right at least two meter divisions.

5.2.4.3

Switch the slave switch on and observe CCW card rotation at 3 +/-0.5 deg/sec. The HDG VALID and AP VALID LED's shall be OFF. The voltage between Pins d to b(-) shall-be +1.0 +/-0.6vdc. while the card is rotating.

5.2.4.4

When the compass card reaches "N" the fast slave rotation shall stop, and the HDG VALID and AP VALID LED's shall be ON. The voltage between pins a to b(-) shall be +1.0 +/-0.6vdc.

5.2.4.5

Operate the CW and CCW manual slave buttons. They shall produce no motion of the HDG card.

5.2.4.6

Place the flux Valve simulator switches to the following positions:

X ----- OFF
Y ----- ON
Z ----- OFF

Observe CCW card steps of 1/4 degree increments every 4.6 +/-1 sec. This motion can also be observed by watching the diamond shaped 1 deg. LED display. Each LED represents 1/4 degree of Card rotation. Occasionally an additional step will occur, but this is due to gyro drift and is normal if the gyro has passed the drift tests in section 5.4.5

5.2.4.7

Switch the slave switch OFF. Depress the CCW slave switch and insure CCW card rotation at 5 +/-1 deg/sec and the HDG VALID and AP VALID LED's shall be OFF. Position the compass card at "E" and the-flux valve switches to the following positions:

X ----- ON
Y ----- OFF
Z ----- OFF

5.2.4.8

Depress the slave switch. The compass card shall rotate CW at 3.0 +/-0.5deg/sec and stop within 5 degrees of "N" .

5.2.4.9

Position the flux valve switches as follows:

X ----- OFF
Y ----- OFF
Z ----- ON

Observe CW card steps of 1/4 degree increments every 4.6 +/-1 sec. The slave needle shall deflect to the left at least two meter divisions.

5.2.4.10

Rotate the unit in a CW direction as viewed from the top at a rate less than 30 deg/sec and observe CCW rotation of the compass card.

5.2.4.11

As the unit is being rotated CW, place the slave switch ON. The compass card shall reverse direction and rotate CW at 3.0 +/-0.5 deg/sec independent of the unit rotation, and stop at 240 +/-5 degrees.

5.2.4.11.1 (KG 102A -02 version only)

With unit continuing to rotate CW at 30 degrees/second, the unit will fall into slow slave mode (3.0 +/-1 degree/minute) as the unit reaches 240 +/-5 degrees (zero cross-over as described in section 5.2.4.11). Within one and one-half (1 1/2) seconds of slow slave transition, the unit will revert to fast slave mode. The compass card will rotate in a CW direction until the unit display once again crosses the 240 +/-5 degree, i.e. zero cross-over point, dropping back to slow slave mode. This will continue until the gyro's rate of rotation drops below the tumble detection threshold (approximately 28 degrees/second). Rotation of the unit at 15 degrees/second will not cycle through the fast slave mode of operation.

Slave Mode	Speed	Induced By:
Auto Slave	5 +/-1 Degree/Second	Pitot Induced - button or toggle switch
Fast Slave	3 +/-1 Degree/Second	Power-up, non-slaved to slave transition, slaved mode tumble detection
Slow Slave	3.40 +/-0.74 Degree/Minute 1/4 Degree/4.6 +/-1.0 Second	Slaved mode with absence of Auto and Fast slave modes

5.2.4.12

Switch the slave switch OFF and the CW slave switch ON while simultaneously rotating the KG 102A in a CW direction. The card shall rotate in a CW direction at 5.0 +/-1 deg/sec independent of the unit rotation. Switch the CW slave switch OFF.

5.2.4.13

Switch the CCW slave switch ON while simultaneously rotating the KG 102A in a CCW direction. The card shall rotate in a CCW direction at 5.0 +/-1 deg/sec independent of the unit rotation. Switch the CCW slave switch OFF.

5.2.4.14

Switch the UNIT and INPUT 14/28VDC power switches OFF. Place the KG102A 14-28v switch to 28v and the 14/28v switch on the unit to 28v. Connect 28vdc to the appropriate pins at the rear of the tester. Place the INPUT and UNIT 14/28vdc power switches ON.

a)	Pin Z to t(-) (Fig. 5-1)	14 +/-1.5Vpk (scope)
b)	Pin p to t(-)	26 +5.6/-3vac
		400 +/-30hz (scope)
c)	Pin X to Y(-) (Fig.5-2)	5 +/-0.5V pk-pk
		800 +/-60hz (scope)
d)	Pin F to D(-)	+15 +/-2vdc
e)	Pin H to Y(-)	+15 +/-1.5vdc
f)	Pin K to Y(-)	-15 +/-1.5vdc
g)	Pin T to V(-)	+5.4 +/-0.5vdc
h)	Pin a to D(-)	+1.0 +/-0.6vdc

5.2.4.15

Operate the CW slave and then the CCW slave and check for CW and then CCW card rotation respectively.

5.2.4.16

Operate the slave switch and observe high speed slaving. When the slave needle reaches zero, the system shall revert to low speed slaving.

5.2.4.17

Switch the UNIT and INPUT Power switches OFF and remove the unit.

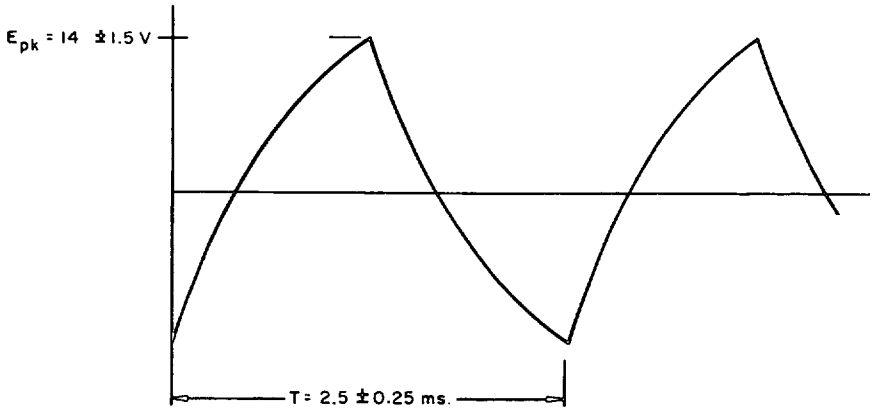


FIGURE 5-1 FLUX VALVE DRIVE WAVEFORM

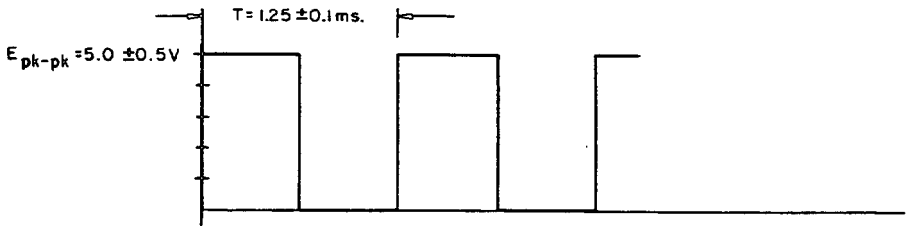


FIGURE 5-2 800 Hz. Reference Waveform

TEST DATA SHEETS

5.2.4.1

Compass Card Stationary	_____	OK
a) HDG VALID, AP VALID	_____	35 +/-25 sec
b) Pin Z to t (-)	_____	14 +/-1.5Vpk
c) Pin p to t(-)	_____	26 +5.6/-3vac
	_____	400 +/-30 hz
d) Pin X to Y (-)	_____	5 +/-0.5V pk-pk
	_____	800 +/-60hz
e) Pin F to D(-)	_____	+15 +/-2vdc
	_____	0.2vrms Max
f) Pin H to Y(-)	_____	+15 +/-1.5vdc
	_____	0.1 vrms Max.
g) Pin K to Y	_____	-15 +/-1.5vdc
	_____	-0.1 vrms Max
h) Pin T to V(-)	_____	0.05 vrms Max
	_____	0.05 vrms Max
i) Pin a to D(-)	_____	+1.0 +/-0.6vdc
j) Pin f to V (-) (all except -02)		
(Gyro for Pos)	_____	+11.5 +/-2vdc
(Gyro for Neg)	_____	-13.5 +/-2vdc
Pin f to V (-) (-02 unit only)		
(Gyro for Pos)	_____	+15 +/-2vdc
(Gyro for Logic Low)	_____	+ 0.06 +/-0.06vdc
k) Pin s to V(-) (all except -02)		
(Gyro for Pos)	_____	+11.5 +/-2vdc
(Gyro for Neg)	_____	-13.5 +/-2vdc
Pin s to V(-) (-02 unit only)		
(Gyro for Pos)	_____	+15 +/-2vdc
(Gyro for Logic Low)	_____	+ 0.06 +/-0.06vdc
l) Pin P to D(-)		
(Gyro for high)	_____	+15 +/-2vdc
Pin S to D(-)	_____	0.75 +/-0.4vdc
Pin P to D(-)		
(Gyro for low)	_____	0.75 +/-0.4vdc
Pin S to D(-)	_____	+15 +/-2vdc
m) Pin L to D(-)		
(Gyro for high)	_____	+15 +/-2vdc
Pin N to D(-)	_____	0.75 +/-0.4vdc

5.2.4.2

Pin L to D(-)

(Gyro for low) _____ 0.75 +/-0.4vdc

Pin N to D(-) _____ +15 +/-2vdc

n) Pin d to D(-) _____ +11.0 +/-2vdc

CW Manual _____ CW Direction

_____ 5 +/-1 deg/sec

Slave Meter _____ -2 div. Min.

5.2.4.3

Slave ON _____ CCW DIRECTION

_____ 3 +/-0.5 deg/sec

HDG VALID-AP VALID _____ OFF

Pin d to b(-) _____ +1.0 +/-6vdc

5.2.4.4

Card at N _____ Slow slave

HDG VALID-AP VALID _____ ON

Pins a to b (-) _____ +1.0 +/-0.6vdc

5.2.4.5

Manual slave _____ No Motion

5.2.4.6

Flux Valve Y ON _____ CCW Motion

_____ 4.6 +/-1 sec/step

5.2.4.7

Slave OFF.

Manual Slave _____ CCW Motion

_____ 5 +/-1 deg/sec

HDG VALID AP VALID _____ OFF

Card at E _____ X ON

5.2.4.8

Slave ON _____ CW Motion

_____ 3.0 +/-.5 deg/sec

_____ 360 +/-5 deg.

5.2.4.9

Z ON _____ CW Motion

_____ 4.6 +/-1 sec/step

Slave Needle _____ 2 div. Min.

5.2.4.10

Unit CW _____ CCW Card Motion

5.2.4.11

Slave ON during rotation _____ CW Card Motion

_____ 3.0 +/-0.5 deg/sec

_____ 240 +/- 5 deg stop

5.2.4.11.1

> 30 degrees/second	_____	Tumble Detect Operation
< 15 degrees/second	_____	No Tumble Detect Operation

5.2.4.12

Slave OFF - CW Manual	_____	CW Card rotation
UNIT Rotate CW	_____	5.0 +/-1 deg/sec
CW Manual OFF		

5.2.4.13

CCW Manual ON	_____	CCW Card rotation
Unit Rotate CCW	_____	-5.0 +/-1 deg/ sec
CCW Manual OFF		

5.2.4.14 Power OFF - Switch to 28 vdc

a) Pin Z to t(-)	_____	14 +/-1.5Vpk
b) Pin p to f(-)	_____	26 +5.6/-3 vac
	_____	400+30hz
c) Pin X to Y(-)	_____	5 +/-0.5Vpk-pk
	_____	800 +/-60 hz
d) Pin F to D(-)	_____	+15 +/-2vdc
e) Pin H to Y (-)	_____	15 +/-1.5vdc
f) Pin K to Y (-)	_____	-15 +/-1.5vdc
g) Pin T to V (-)	_____	+5.4 +/-0.5vdc
h) Pin a to D (-)	_____	+1.0 +/-0.6vdc

5.2.4.15

Manual slave	_____	CW
	_____	CCW

5.2.4.16

Slave Switch ON	_____	Fast slave
	_____	Slow slave

Tested by _____ Date_____

Inspected by _____ Date_____

5.3 GENERAL OVERHAUL

5.3.1 VISUAL INSPECTION

This section contains instructions and information to assist in determining, by visual inspection, the condition of the units major assemblies 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 traces.

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 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

Inspect 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 the 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 the 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 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. WEAR A SUITABLE MASK, GOGGLES, GLOVES, AND AN APRON WHEN NECESSARY. CHANGE CLOTHING UPON WHICH SOLVENTS HAVE BEEN SPILLED.

WARNING:
OBSERVE ALL FIRE PRECAUTIONS FOR FLAMMABLE MATERIALS. USE FLAMMABLE MATERIALS IN A HOOD PROVIDED WITH SPARK-PROOF ELECTRICAL EQUIPMENT AND AN EXHAUST FAN WITH SPARKPROOF BLADES.

B. Recommended Cleaning Agents

Table 5-1 lists the recommended cleaning agents to be used during overhaul of the unit.

NOTE:
EQUIVALENT SUBSTITUTES MAY BE USED FOR LISTED CLEANING AGENTS.

TYPE	USED TO CLEAN
Denatured Alcohol	Various, exterior and interior
DuPont Vertrel SMT	Various, interior
PolaClear Cleaner (Polaroid Corp.) or Texwipe TX129 (Texwipe Co.)	CRT display filter, LCD displays, and general purpose lens/glass cleaner.
KimWipes lint-free tissue (Kimberly Clark Corp.)	Various
Cloth, lint-free cotton	Various
Brush, flat with fiber bristles	Various
Brush, round with fiber bristles	Various
Dishwashing liquid (mild)	Nylon, Rubber Grommets

TABLE 5-1 RECOMMENDED CLEANING AGENTS

C. Recommended Cleaning Procedures

CAUTION:
DO NOT ALLOW SOLVENT TO RUN INTO SLEEVES OR CONDUIT THAT COVERS WIRES CONNECTED TO INSERT TERMINALS.

1. Exterior
   (a) Wipe dust cover and front panel with a lint-free cloth dampened with denatured alcohol.
   (b) For cleaning connectors, use the following procedure.
      (1) Wipe dust and dirt from bodies, shells, and cable clamps using a lint-free cloth moistened with denatured alcohol.
      (2) Wipe parts dry with a clean, dry lint-free cloth.
      (3) Remove dirt and lubricant from connector inserts, insulation, and terminals using a small soft bristled brush moistened with denatured alcohol.
      (4) Dry the inserts with an air jet.
   (c) Remove cover(s).
   (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

   The following solvents are no longer recommended for benchtop or rework cleaning of printed circuit boards, modules, or sub-assemblies.

FREON TF, IMC	TRICHLOROETHANE
CARBON TETRACHLORIDE	DETERGENT (ALL™ AND EQUIVALENTS)
CHLOROFORM	METHYLENE CHLORIDE
TRICHLOROETHYLENE	GENESOLV 2004/2010
PROPYL ALCOHOL	METHYL ALCOHOL
ETHYL ALCOHOL	BUTYL ALCOHOL
XYLENE	PRELETE (CFC-113)

TABLE 5-2 UNSAFE CLEANING AGENTS

CAUTION:
DO NOT USE SOLVENT TO CLEAN PARTS COMPOSED OF OR CONTAINING NYLON OR RUBBER GROMMETS. CLEAN THESE ITEMS WITH MILD LIQUID DISHWASHING DETERGENT AND WATER. USE DETERGENT FOR THIS PURPOSE ONLY.

CAUTION:
DUPONT VERTREL SMT DOES HAVE GENERAL MATERIAL COMPATIBILITY PROBLEMS WITH POLYCARBONATE, POLYSTYRENE, AND RUBBER. IT IS RECOMMENDED THAT THESE MATERIALS BE CLEANED WITH DENATURED ALCOHOL.

CAUTION:
DO NOT ALLOW EXCESS CLEANING SOLVENT TO ACCUMULATE IN ANY OF THE ADJUSTMENT SCREW CREVICES AND THEREBY SOFTEN OR DISSOLVE THE ADJUSTMENT SCREW EPOXY SEALANT.

CAUTION:
AVOID AIR-BLASTING SMALL TUNING COILS AND OTHER DELICATE PARTS BY HOLDING THE AIR NOZZLE TOO CLOSE. USE BRUSHES CAREFULLY ON DELICATE PARTS.

CAUTION:
IMPROPER CLEANING CAN RESULT IN SURFACE LEAKAGE AND CONDUCTIVE PARTICULATES, SUCH AS SOLDER BALLS OR METALLIC CHIPS, WHICH CAN CAUSE ELECTRICAL SHORTS. SEVERE IONIC CONTAMINATION FROM HANDLING AND FROM ENVIRONMENTAL CONDITIONS CAN RESULT IN HIGH RESISTANCE OR OPEN CIRCUITS.

CAUTION:
ULTRASONIC CLEANING CAN DAMAGE CERTAIN PARTS AND SHOULD GENERALLY BE AVOIDED.

NOTE:

Solvents may be physically applied in several ways including agitation, spraying, brushing, and vapor degreasing. The cleaning solvents and methods used shall have no deleterious effect on the parts, connections, and materials being used. If sensitive components are being used, spray is recommended. Uniformity of solvent spray flow should be maximized and wait-time between soldering and cleaning should be minimized.

NOTE:

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

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:

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

(2) 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 air stream (25 to 28 psi) is recommended to remove any excess solvent.

(3) Remove flux residue, metallic chips, and/or solder balls with an approved solvent.

(c) Wired chassic devices containing terminal boards, resistor and capacitor assemblies, rf coils, switches, sockets, inductors, transformers, and other wired parts should be cleaned as follows:

NOTE:

When necessary to disturb the dress of wires and cables, note the positions before disturbing and restore them to proper dress after cleaning.

(1) Blow dust from surfaces, holes, and recesses using an air jet.

(2) Finish cleaning chassis by wiping finished surfaces with a lint-free cloth moistened with solvent.

(3) Dry with a clean, dry, lint-free cloth.

(4) When thoroughly clean, touch-up any minor damage to the finish.

(5) Protect the chassis from dust, moisture, and damage pending inspection.

(d) Ceramic and plastic parts should be cleaned as follows:

(1) Blow dust from surfaces, holes, and recesses using an air jet.

(2) Finish cleaning chassis by wiping finished surfaces with a lint-free cloth moistened with solvents.

(3) Dry with a clean, dry, lint-free cloth.

5.3.3 REPAIR

A. General

This section contains information required to perform limited repairs on the 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 Precautions

1. Ensure that all ESDS and MOS handling precautions are followed.
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 60Hz and 400Hz 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.

C. 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 1MΩ 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 feasibly 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 workstation.
10. Keep common plastics out of the work area.

D. 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 200KΩ 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 any accumulated static charge. 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 the back side do not contact any material other than the 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 the 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 the device carrier, make certain conductive portion of carrier is brought in contact with well grounded table top.

E. 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 a 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.

F. 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 lead from each hole.

3. Melt solder in each hole, and using a desoldering 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 traces exist.

G. 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 10MΩ.
5. Reconnect leads to transistor and solder in place.

H. 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 the 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 strikes. If spraying, hold nozzle 10-15 inches from work surface.
5. Cure time is ten minutes at room temperature.

I. 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 unit. The manufacturer's part (type) number is for the un-programmed device, and cannot be used. The Honeywell 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 ensure correct mounting and mating of each connector.

B. Crystal

The use of any crystal, other than a Honeywell 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 the applicable reference for removal and replacement instructions.

E. Wiring/Coaxial Cable

When repairing a wire that has broken from its terminal, remove all old solder, and pieces of wire from the terminal, re-strip the wire to the necessary length, and resolder the wire to the terminal. Replace a damaged wire or coaxial cable with one of the same type, size and length.

5.4 DISASSEMBLY/ASSEMBLY PROCEDURES

The following instructions included the procedures that are necessary to remove and disassemble the subassemblies of the KG 102A.

It is assumed that the unit has been tested in accordance with the test procedures provided in paragraph 5.2 to locate the source of the malfunction. The unit should be disassembled only to the station where the malfunction can be corrected by repair, cleaning, or adjustment. Do not disassemble any parts or wiring unnecessarily as repeated tear downs can be detrimental to the life of the unit.

The KG 102A is comprised of three major subassemblies and a final assembly. The final assembly contains the necessary hardware and components required to bring the subassemblies together into a functional unit. This Section 5.4 covers disassembly of two of the three subassemblies. The third subassembly, the directional gyro, is covered in detail in Section 5.5.3.

Disassembly instructions are provided to separate the subassemblies from the basic unit, however, detailed breakdown of the components on each subassembly has not been included as this can be accomplished by referring to the subassembly drawings (Section VI). Reassembly can be accomplished by reversing the disassembly procedures.

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 MULTIPLE PIN CONNECTORS, TO ENSURE THAT THE CONNECTORS ARE NOT DAMAGED BY MISALIGNMENT OF THE PINS.

CAUTION

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

5.4.1 ELECTRONICS ASSEMBLY REMOVAL

A. Remove four screws and then remove the bottom cover.

B. Remove the three screws holding the gyro subassembly, slide the gyro subassembly away from the unit and disconnect the 9-pin connector.

C. Remove the two screws (089-05907-0006) in the center of the top of the unit and remove the electronics subassembly.

D. When in this state of disassembly, the components of both the power supply P. C. board subassembly and the logic P. C. board subassembly are readily accessible.

5.5 GYRO OVERHAUL (P/N 060-00016-0000)

5.5.1 INSPECTION

In general, all parts should be examined for defects and discrepancies which would impair the function of the part.

A. Examine machined surfaces, diameters, shoulders and threads which mate with another part for nicks, burns, flashing, the unnecessary residue of epoxy or adhesive, scratches and excessive wear.

B. Minor scratches and nicks noted, as in preceding step, may be smoothed with India stone, crocus cloth, or red rouge.

C. Slip rings must be examined critically under strong light and with magnification. Look for scratches, burn pits, epoxy splatters, discoloration, etc. Removal of slight scratches and discoloration are possible by lighting polishing with red rouge mixed in light oil. A piece of pith wood makes a convenient polishing tool. Slip rings must have a bright, smooth continuous finish around 360 degrees of each ring. (Pitted rings should be rejected because they will probably soon fail in the brush contact area and will cause excessive friction and additional burning). Thoroughly clean slip rings after polishing.

D. Ball bearings are difficult to evaluate and mechanically inspect without rather complicated electronic and mechanical fixturing. Consequently, much depends upon the judgement and experience of overhaul personnel with regard to the acceptance or rejection of a used bearing.

Experience gained in the testing of the gyro will tell much about bearing performance. Ball bearings, when axially loaded to nominal values, should feel "smooth" when rotated. There should be no detectable snagging of balls in the races, and no ball and retainer wrap-up which is indicated by momentary increases in the friction. Roughness, snagging and wrap-up as well as inner-outer race misalignment are all detrimental in gimbal operation because of the very small rotational rates that are typical of gimbal movement.

E. Spin axis bearing faults are more evident during operation because of the high rotational velocity. A gyro motor assembly may be bench mounted and spin performance observed, felt and heard as power is applied or during run-down. Preload conditions can be felt with power off by holding motor shaft between thumb and forefinger while rotating or spinning the rotor.

F. Encoder disc should be bonded firmly for full 360 degrees of contact with the spacer beneath it. The Fiberglas spacer, must, in turn, be firmly bonded for 360 degrees to the outer gimbal shoulder. Any separation between outer gimbal and Fiberglas spacer may be repaired with application of Hysol (part number 005-02002-0061) providing that perpendicularity of the encoder disc to the outer gimbal axis is held within 0.003 inch total indicator reading. Use a pointed applicator to apply Hysol to the fissure where parts have separated. Cure the adhesive at room ambient temperature and humidity.

G. If encoder disc perpendicularity limit (0.003 inch TIR) is exceeded, no attempt should be made to reseat the disc to meet the requirement. Replace entire gimbal assembly (25) if perpendicularity is out of limit.

H. Carefully examine, with optical magnification, the reticle pattern on the encoder disc. Theoretically the LED light falls midway, radially speaking, in the reticle pattern. Allowing for radial stack-up of all tolerances involved, discrepancies in the window pattern can not be tolerated except at extreme inner and outer ends of the windows. Scratches and/or transparencies in the black opaqued section, and irregularity of the edges of the windows will produce erroneous signals if they appear in the critical pattern band. Transparent (or even translucent) spots in the opaque web will cause a random spurious signal which would be unacceptable. A random opaque material in a window area will disrupt the trigger increment (as, for example, a small spatter of solder) such that it will not occur at the precise edge of a window.

I. Rotate gimbal disc assembly and observe the inner or outer ends of the windows for runout. Runout shall not exceed 0. 002 inch total indicator reading.

J. Examine circuit board assembly for signs of burned (overheated) components and poor solder joints.

5.5.2 GYRO CLEANING

5.5.2.1 Cleaning of Parts

Parts cleaning procedures given in the manual are primarily applicable to repair and reassembly at overhaul facilities. New parts from supply sources should be handled with same procedures as used parts to ensure that parts are properly cleaned, have all protective coatings removed, and are ready for installation.

5.5.2.2 SPECIAL TOOLS FOR CLEANING AND INSPECTION.

Refer to the approved cleaners in section 5.3.2.B. The following list comprises material and devices useful in the cleaning and inspection of parts of the gyro not listed in 5.3.2.B.

1) Approved cleaning material are as follows:
   a Red Rouge, Polishing (very fine grit)
   b. Machine Oil (low viscosity)
2) Equipment and tools are as follows:
   a. Artist's Brushes (assorted sizes) or equivalent.
   b. Clean Cotton Swabs
   c. Vacuum Source
   d. Compressed Air Source (filtered)
   e. Dental Picks and Chisels, or equivalent
   f. Electric Oven
   g. India Stones, or Polishing Paper (Rouge)
   h. Pipe Cleaners
   i. Eye Loupe, or Microscope

5.5.2.3 CLEANING

All individual fabricated metal parts except ball bearings, may be cleaned by submersion, by brushing or by spraying with DuPont Vertrel SMT. Remove excess solvent after cleaning by blowing with clean, dry compressed air or vacuum dry the parts. Other parts require specific handling as follows:

1) Assemblies which can not be submerged in a solvent because of adhesive joint or ball bearings can generally be brush cleaned with DuPont Vertrel SMT. Rapid dry with compressed air or with vacuum.
2) Molded plastic parts may be cleaned with DuPont Vertrel SMT. Rapid drying is required following cleaning.
3) Gold plated brushes and slip rings should be gently cleaned by applying DuPont Vertrel SMT with an artist's brush or a cotton swab. Rapid removal of excess solvent is necessary to prevent possible attack on adjacent molded components.
4) Switch assemblies usually require only dry brushing with a vacuum source. If necessary, brush application of DuPont Vertrel SMT followed by rapid drying may be used.
5) Circuit board assembly may be cleaned by brushing with DuPont Vertrel SMT. Rapid drying should follow cleaning.
6) Denatured alcohol may be used to clean soldering flux from around terminals, but care must be exercised that the alcohol does not remove artwork on circuit board.
7) Bearing retainer and bearing bores must have all old epoxy removed. Clean with DuPont Vertrel SMT.

CAUTION:
Do not allow solvents in lubricated area.

8) All bearing surfaces which are to receive an application of epoxy during assembly should be cleaned with DuPont Vertrel SMT just prior to epoxy application.
9) Use care when cleaning ball bearings that solvent does not get past the shields and into the bearing lubrication pockets or ball tracks.

Solvents should be applied in small quantities with an artist's brush, cotton swab or pipe cleaner. (Brush, swab or pipe cleaner should, itself, be thoroughly cleaned in solvent before using on the bearings).

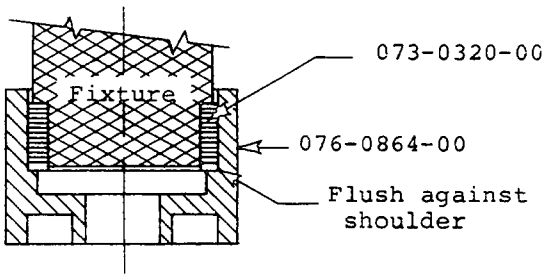
10) The emulsion on the encoder disc attached to the outer gimbal is practically impervious to all of the suggested cleaning solvents. Care must be used to ensure that the glass or emulsion is not scratched. Do not attempt removal of very thin coats of translucent or transparent materials from the reticle pattern area. Such materials, unless they could cause mechanical interference, are of no consequence outside the reticle pattern area.

5.5.3 GYRO ASSEMBLY (Reference Figure 5-3)

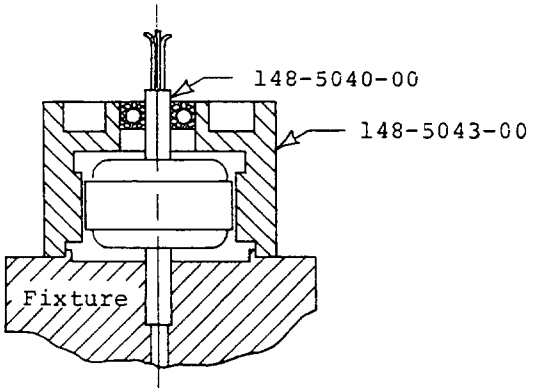
NOTE:
FOR THIS PARTICULAR GYRO, ALL WARRANTY REPAIRS MUST BE PERFORMED BY THE FACTORY.

THIS PAGE IS RESERVED

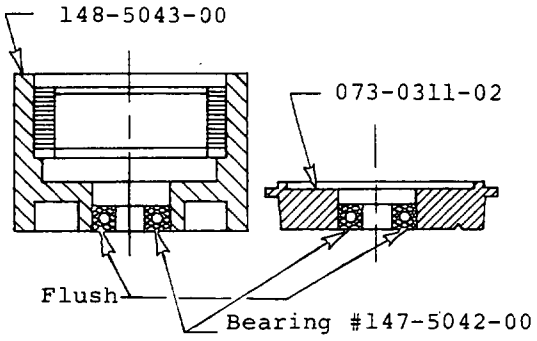
SPIN MOTOR ASSEMBLY



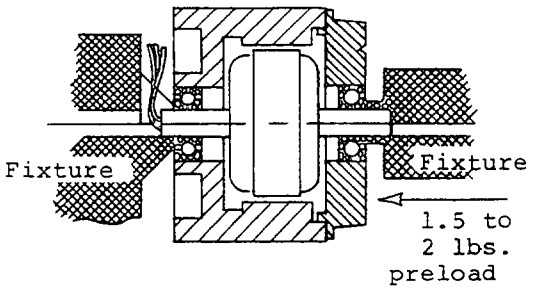
1. Press rotor lamination ass'y into rotor. Stake in place with loctite adhesive #016-1007-03.



3. Make sure shaft & Inner bearing race surfaces are clean & free of grease & oil. Apply thin film of adhesive #016-1088-00 to stator shaft (lead end), fixture locate stator to rotor and cure for 2 hours at 140 deg. (F).



2. Make sure mating surfaces are clean and free of grease & oil. Apply thin film of adhesive #016-1088-00 to outer bearing race. Mount flush & square in rotor and impeller as shown. Cure for 2 hours at 140 deg. (F) Caution: Do not contaminate bearings with adhesive.



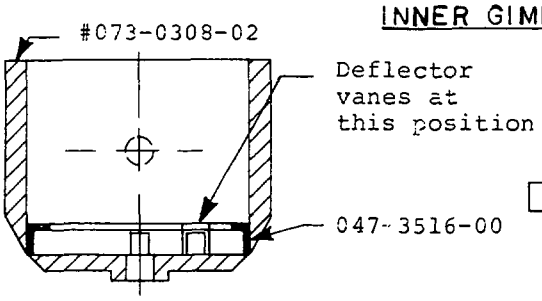
4. With mating surfaces clean & free of grease & oil, apply thin film of adhesive #016-1088-00 to shaft of stator & face of impeller. Seat impeller firmly in rotor. Place in preload fixture, spin once to seat bearings & cure for 2 hours at 140 deg. (F).

5. Run motor for 24 hours at 8,000 to 12,000 R.P.M.

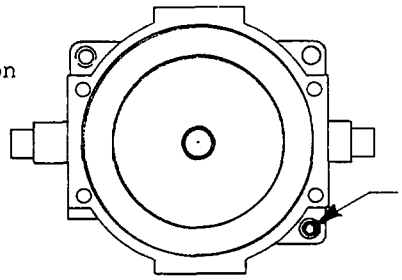
6. Balance motor to within 30 micro-oz-in. on Schenck Trebel RGO-T Gyrobalance Machine and run for 96 hours (minimum) on run-in fixture at full speed. Recheck balance.

FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 1 of 12)

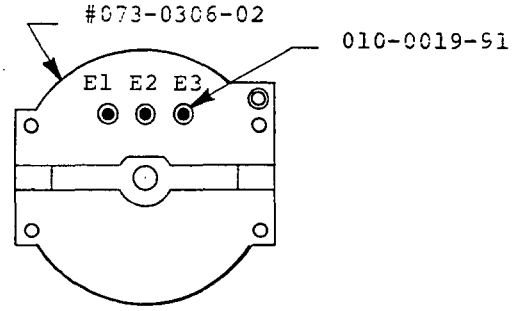
INNER GIMBAL ASSEMBLY



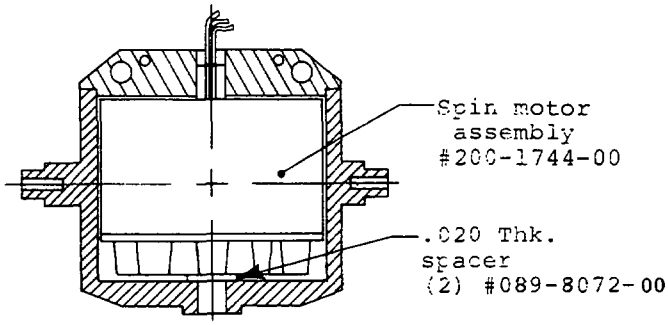
1. Locate as shown and cement air deflector in rotor housing body with adhesive #016-1083-00. Cure 2 hours at 140 deg. (F).



2. Install one set screw in bottom side boss with wrench opening toward body open end. Approximately center in boss.

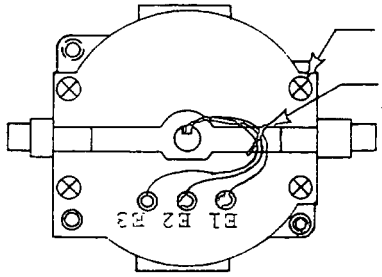


3. Install three terminals at points E1, E2 & E3 in rotor housing end plate.

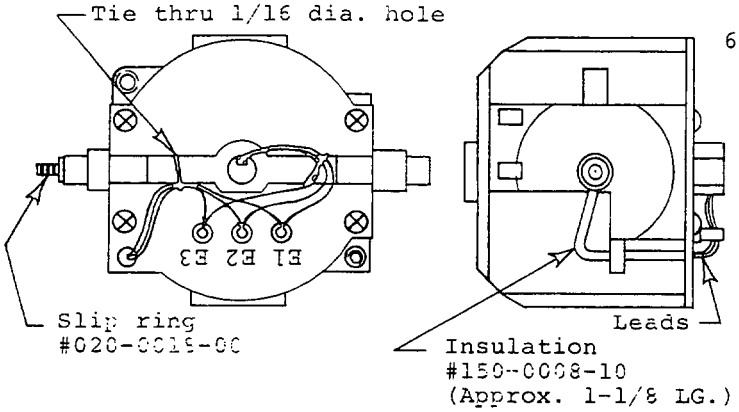


4. Place .020 thk. spacer on vane end of spin motor and, with thin film of cement on shaft, place in rotor housing as shown, vanes down. Apply thin film of cement to opposite end of shaft and, making sure that motor leads are in keyway and clear, install rotor housing end plate to body with four screws. (5) Leave assembly with motor weight on spacer while cement is curing. Use adhesive #016-1083-00 & cure for 2 hours at 140 deg. (F).

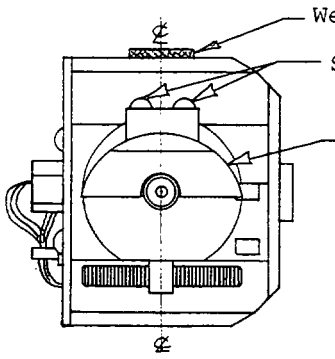
FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 2 of 12)



5. After shaft cement has cured, dress motor leads and solder to terminals as follows: yellow lead to E1, green lead to E2, violet lead to E3.



6. Install slip ring in housing & cement in place with adhesive #016-1088-00 cured for 2 hours at 140 deg. (F). Slip tubular insulation over leads, thread thru side boss and cap and cement in place as shown with adhesive #016-1082-00. Dress leads to correct length, strip ends and solder to terminals as follows: yellow to E1, green to E2 and orange to E3.



7. Install cam on motor housing. Glyp. screws with #016-1008-04.

8. Attach weight (0.1 to 0.2 gram) to top of gimbal and static balance, using balance screws (089-7022-00 & 089-7022-02) as necessary with gimbal installed in special balance fixture. Use #016-1008-04 on balance screws, Remove weight after balancing is complete.

NOTE: Make sure weight is evenly distributed at centerline.

FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 3 of 12)

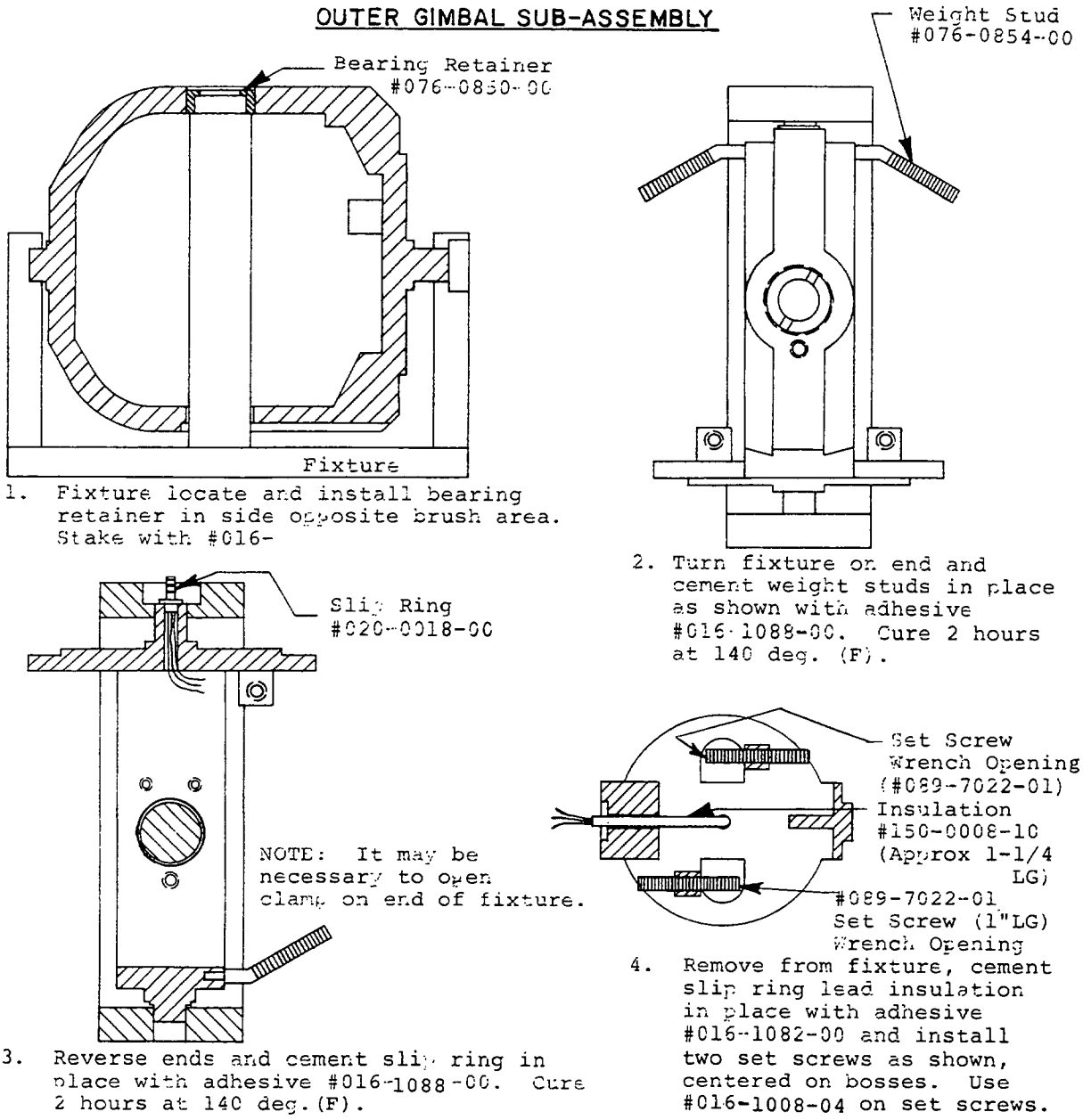
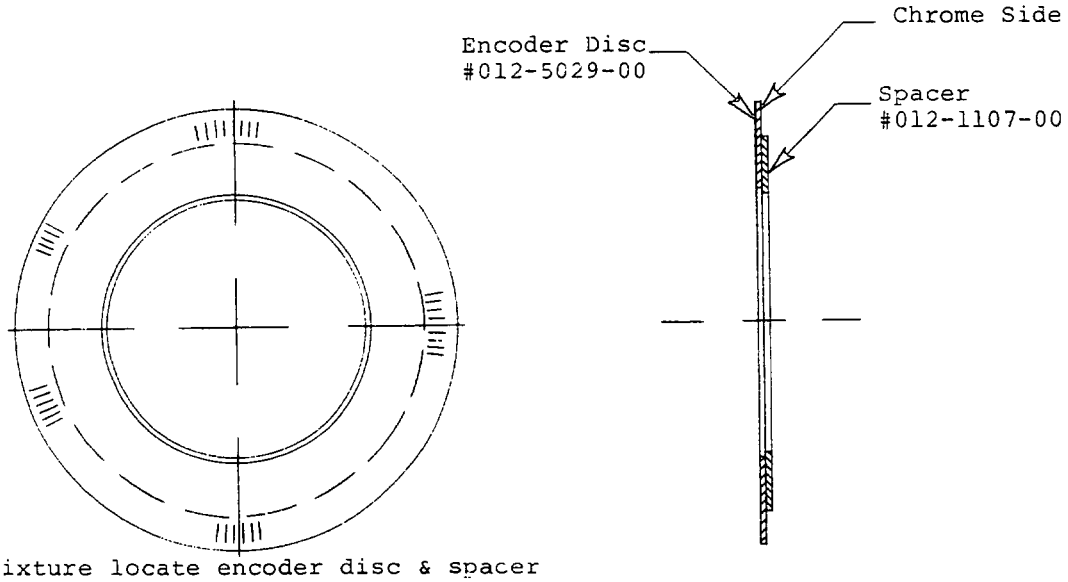


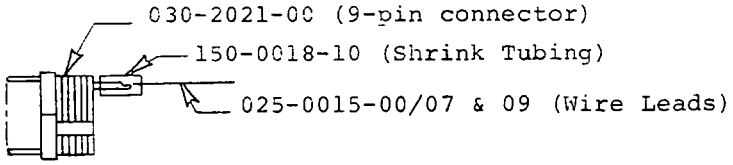
FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 4 of 12)

ENCODER DISC ASSEMBLY



1. Fixture locate encoder disc & spacer and cement together as shown with adhesive #016-1088-00. Cure at 140 deg.(F) for 2 hours.

CONNECTOR ASSEMBLY

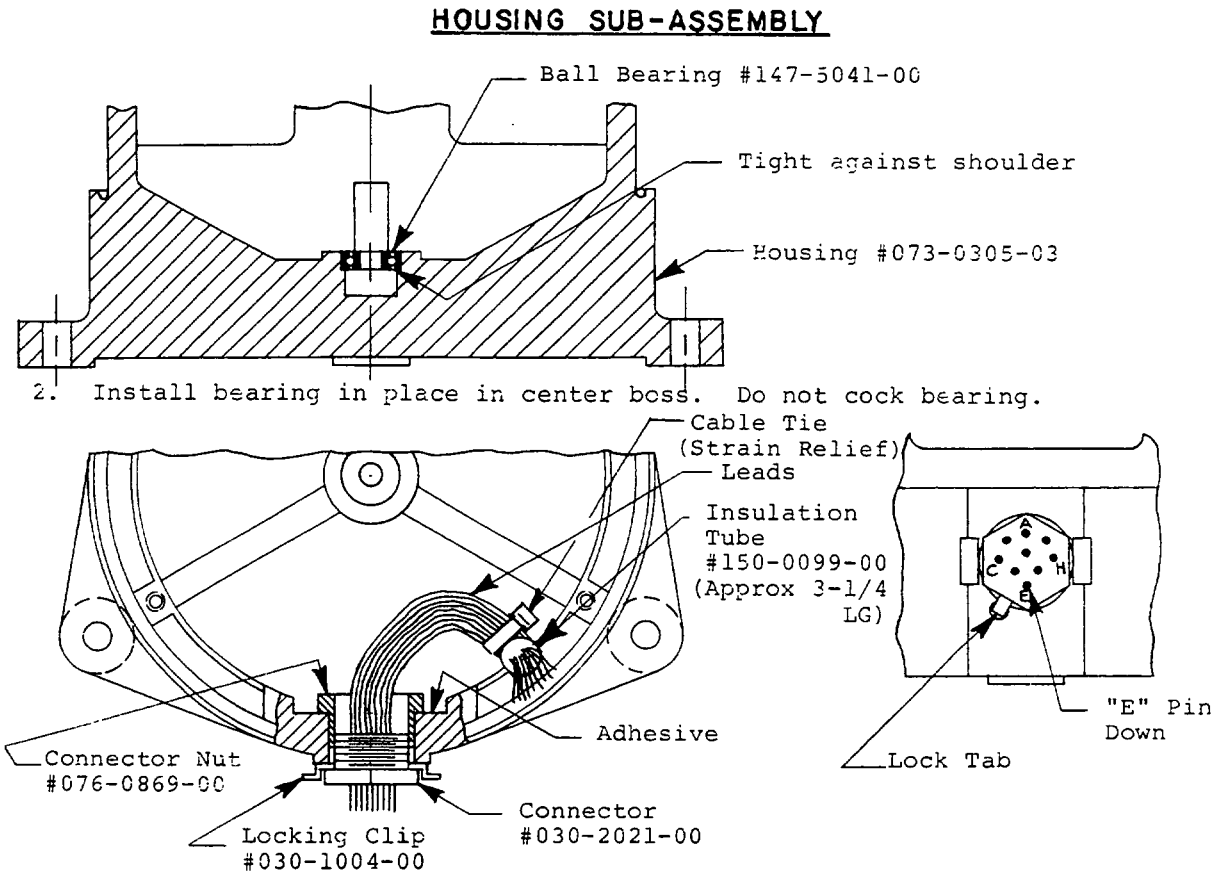


1. Solder leads to lugs on back of connector as follows:

Pin A:	Yellow	Pin D:	Blue	Pin H:	Black
Pin B:	Green	Pin E:	Red	Pin J:	Brown
Pin C:	White	Pin F:	Orange	Pin K:	Purple

2. Install shrink tubing over connector lugs (each approximately 3/8" long).

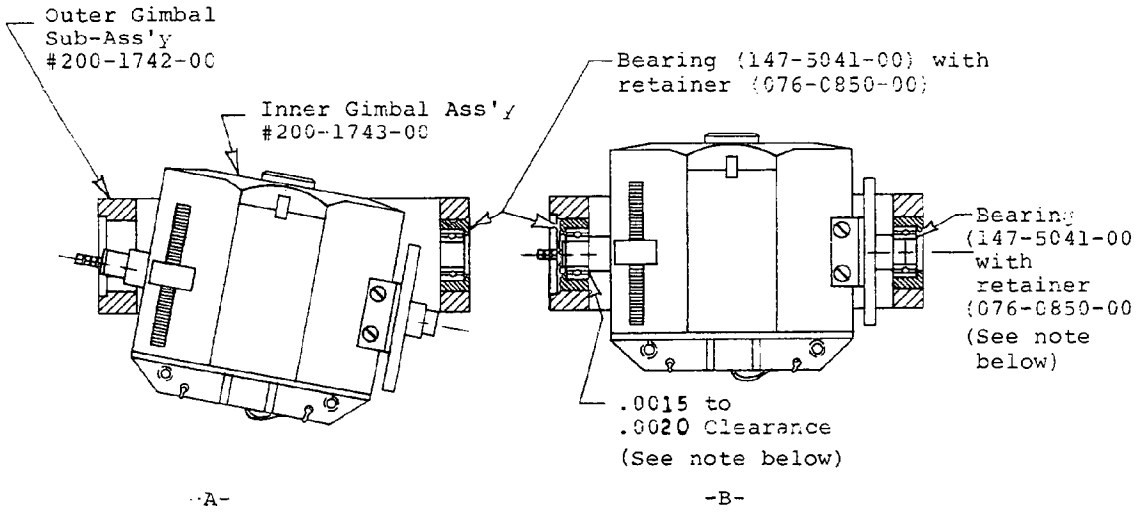
FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 5 of 12)



1. Install connector, locking clip and connector nut as shown. Be sure locking clip tab remains in correct location and connector pin "E" is down. Apply adhesive around edge of connector nut. Dress leads thru insulation tube and cement tube in place on housing. Tube end should protrude above top edge of housing approximately 1/8 inch. Use adhesive #016-1082-00.

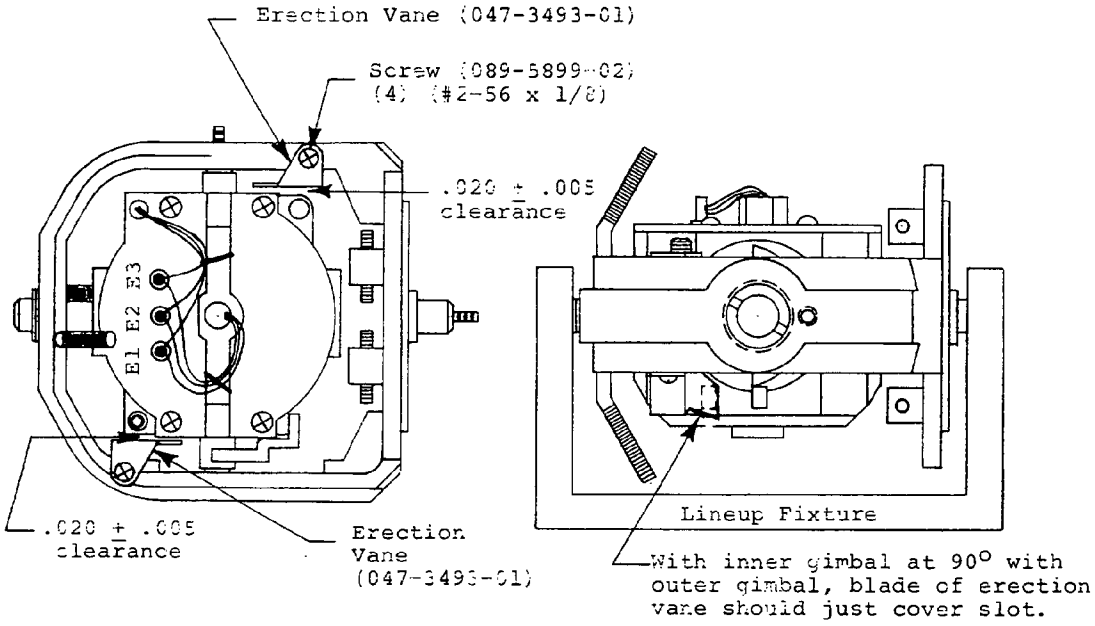
FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 6 of 12)

OUTER GIMBAL ASSEMBLY



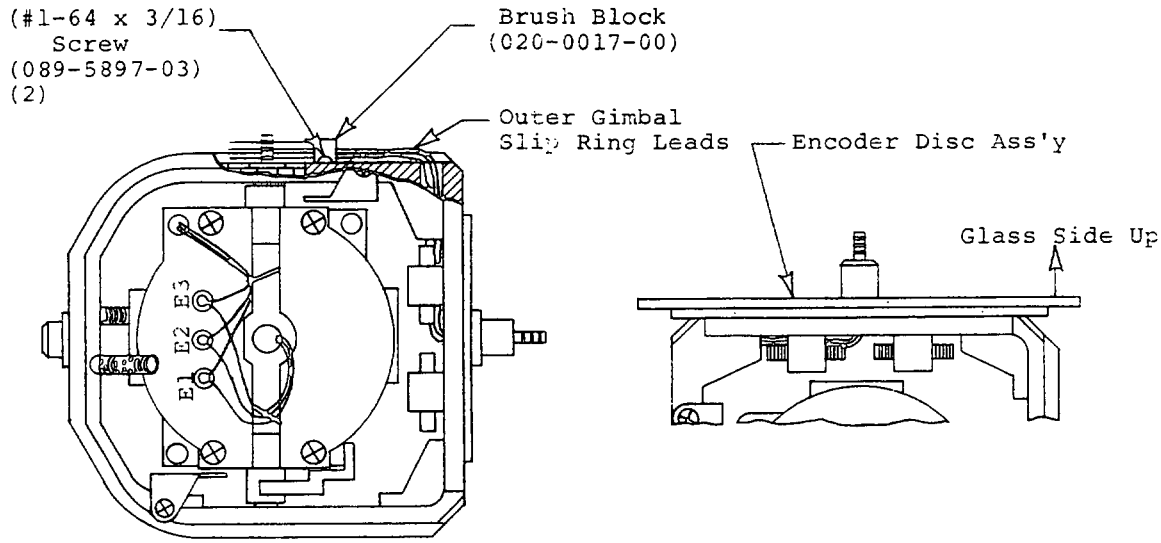
1. Install inner gimbal ass'y in outer gimbal as shown. Using special spanner wrench No. P-1707, install retainer with bearing on brush/slip ring side maintaining end clearance as shown. Stake retainer with #016-1008-04. Use extreme care to not break slip ring.

NOTE: All end-play adjustment to be done with retainer on brush side only. Do not move opposite retainer after locating with fixture at outer gimbal sub-assembly.



2. Attach two erection vanes as shown in -A- (do not tighten screws). Glyp screws with #016-1008-04. Place gimbal assembly in lineup fixture, line up erection vanes and tighten screws maintaining .020 ± .005 clearance between flat of vane and finished surface of inner gimbal.

FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 7 of 12)



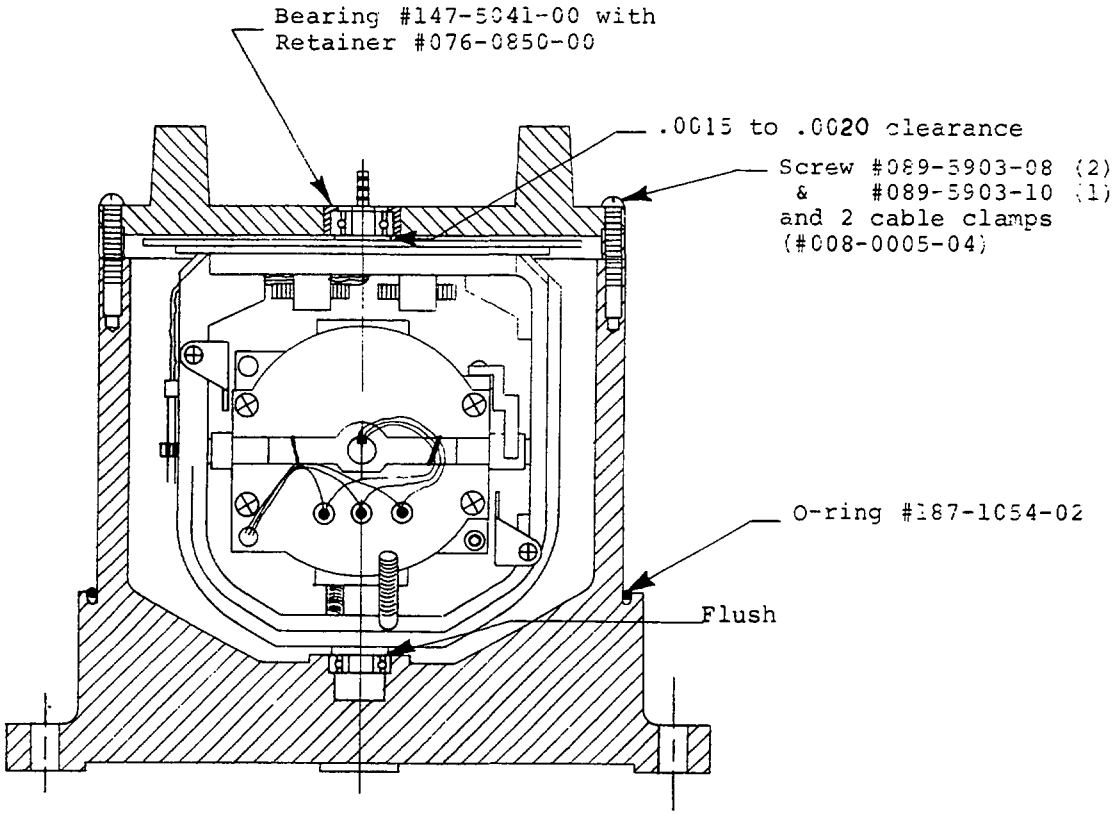
3. Install brush block in place on outer gimbal using shims (047-3518-00/01) as necessary to line up brushes to slip rings. Glyp. screws with #016-1008-04. Dress outer gimbal slip ring leads and solder to brush block as follows: yellow to innermost terminal, green to middle terminal & orange to outer terminal.

4. Cement encoder disc assy in place with #016-1068-00 cured at 140 deg.(F) for 2 hours. Keep flat, clean & unscratched.

5. With fixture, static balance outer gimbal using special nuts #089-2005-11 and screws #076-0849-00/01/02 as necessary. Glyp with #016-1008-04.

FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 8 of 12)

FINAL ASSEMBLY



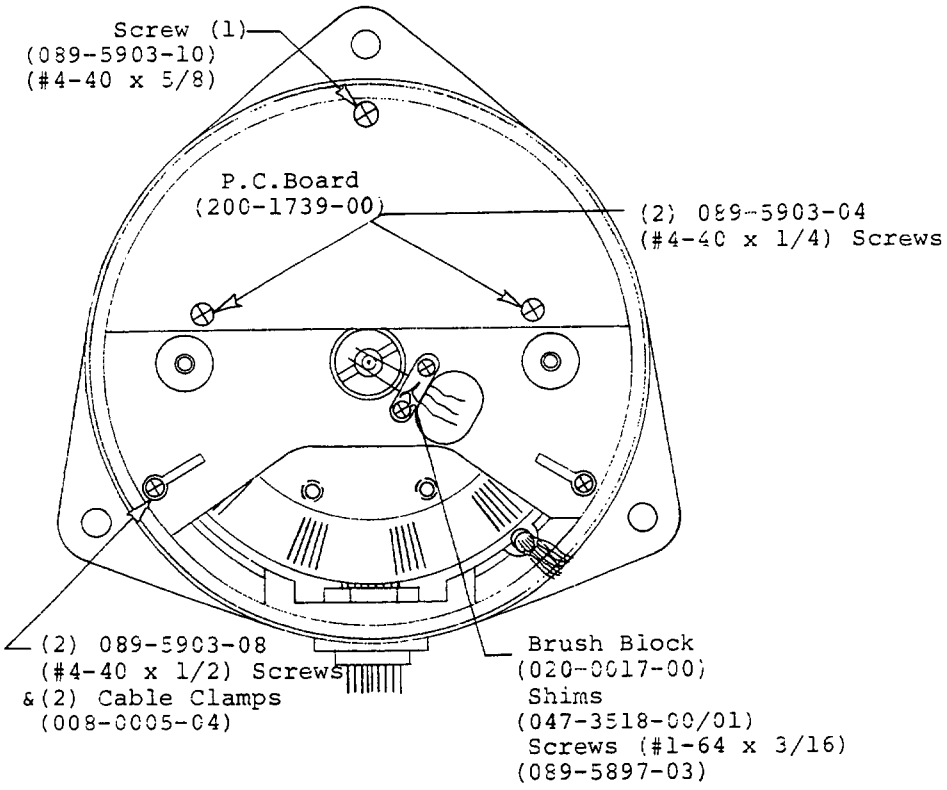
1. Carefully insert gimbal assy into housing engaging lower trunion with bottom bearing making sure trunion shoulder is flush against inner race.

2. Install housing cap on housing.

3. Install upper bearing over upper gimbal trunion and in housing cap. Carefully screw retainer in place and tighten until clearance of .0015 to .0020 is obtained. Stake retainer with #016-1008-04.

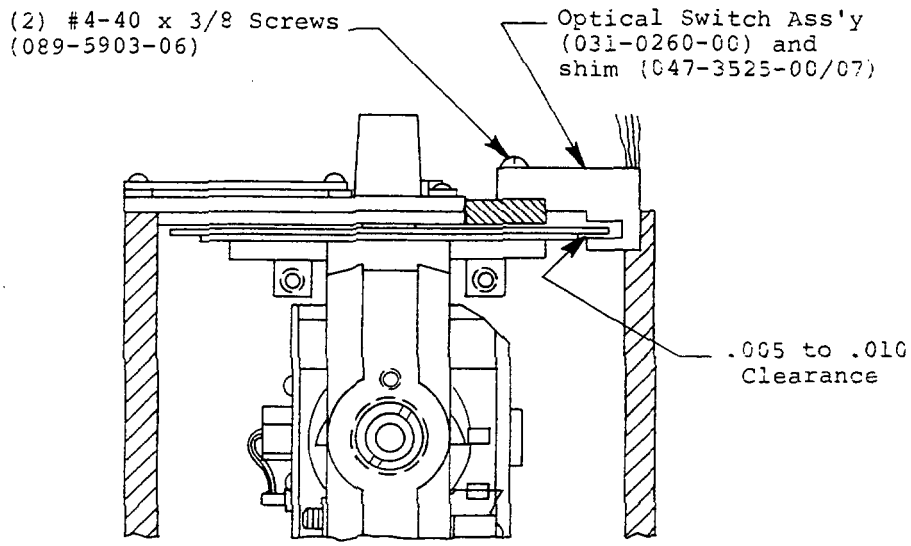
4. Install O-ring.

FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 9 of 12)



5. Install brush block in place on housing cap using shims as necessary to line up brushes to slip rings. Strip one end of three leads & solder to brush block lugs as follows: yellow to innermost lug, green to middle lug, orange to outer lug.

FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 10 of 12)

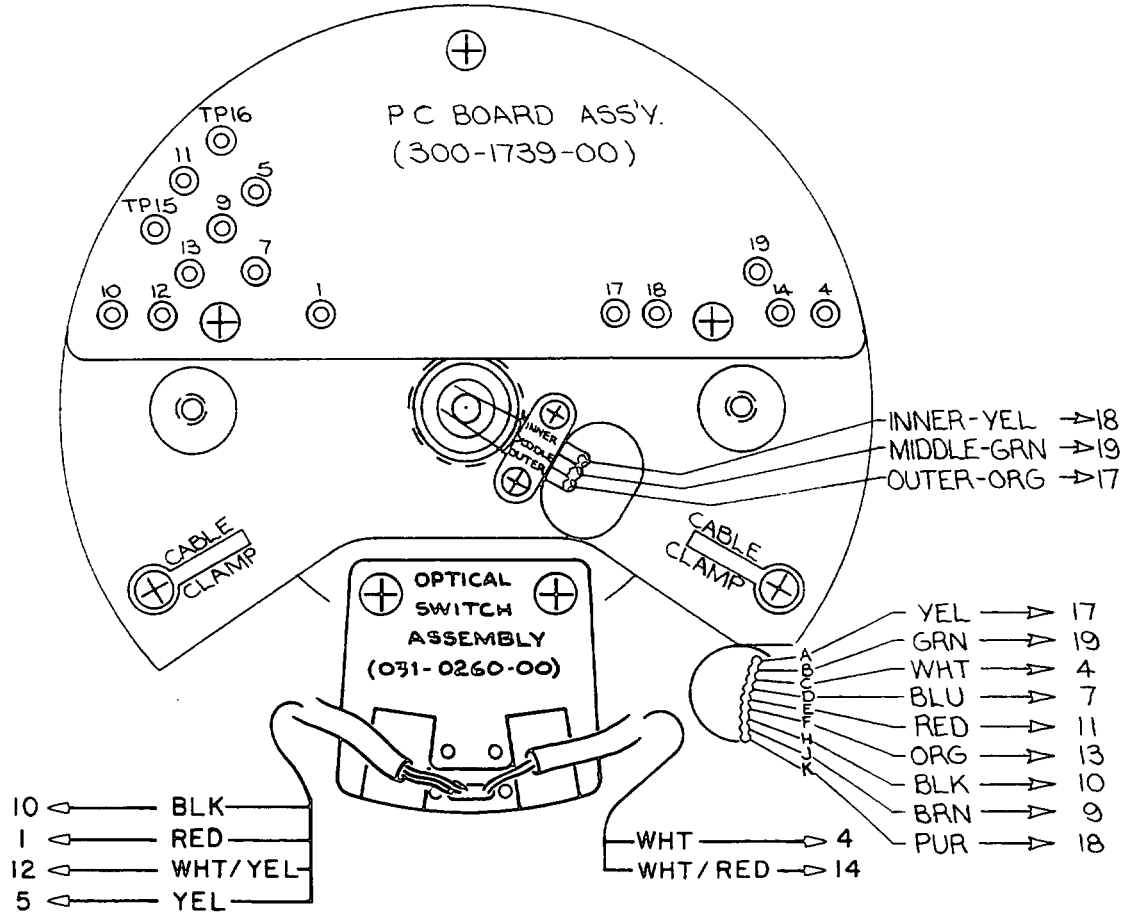


6. Install optical switch ass'y in place using shims as necessary to position vertically to obtain .005 to .010 clearance as shown. Extreme care must be taken to prevent scratching, cracking or breaking encoder disc. Glyp screws with #016-1008-04.

7. Wrap (2) turns of mylar insulation tape around each of (2) bosses on cap.

8. Attach P.C. Board ass'y with (3) screws as shown. Glyp screws with #016-1008-04.

FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 11 of 12)



(1) 2" lgth. insul. tubing (150-0062-10)

(1) 2" lgth. insul. tubing (150-0008-10)

9. Dress out leads and solder to P.C. Board terminals as shown
10. Finish dress and tie leads to two upright posts. Wrap cable clamps around wire bundles (two places).
11. Connect to test set-up, calibrate and align
12. Attach cover and test
13. Seal

FIGURE 5-3 GYRO ASSEMBLY PROCEDURES
(Sheet 12 of 12)

5.6 DESCRIPTION AND ALIGNMENT PROCEDURE

The Directional Gyro, KPN 060-00016-0000, is the directional sensing unit for the KG 102A Directional Gyro.

5.6.1 POWER REQUIREMENTS, OUTPUT SIGNALS AND TEST EQUIPMENT

Power Requirements

115VAC 400 hz

+14vdc@3.0 Amps

5.6.2 OUTPUT SIGNALS

Pins D and E: Digital Heading Information Outputs

Pin K: Spin Motor Rotation Detection Signal

5.6.3 TEST EQUIPMENT REQUIRED

KTS-152 Test Set

Oscilloscope similar to Tektronix 516

Multimeter Similar to FLUKE 8000A

Turntable: Ideal Aerosmith Inc. No. 1224 or equivalent

5.6.4 ALIGNMENT AND CALIBRATION

Set the KTS-152 front panel switches to the positions listed below.

INPUT POWER	14/28vdc	- OFF
	115 VAC	- OFF
UNIT POWER	115 VAC	- OFF
	14/28VDC	- OFF
	26 VAC	- OFF
	14v-28v	- 14v
	KA-51 SLAVE Switch	- OUT
	GYRO-GYRO SIM	- GYRO

Connect the KG102A base assembly and the gyro to the tester cable as shown in Fig. 5-7 . Connect 115VAC and +14VDC to the appropriate jacks at the rear of the unit.

5.6.4.1

Switch the 14/28 VDC and 115VAC INPUT POWER Switches ON. Switch the 14/28 VDC UNIT POWER switch ON and adjust the +14v supply for +14.0 vdc at Pin e of the KG102A Connector. Allow two minutes for the gyro to reach operating speed.

5.6.4.2

Connect scope probes to test points E5 and E12 on the gyro P.C. board (see 300-01739-0000), and rotate the turntable at 30+/-5 deg/sec.

5.6.4.3

Adjust R102 for 4.0+/-0.1 Vpk-pk at E5, and R109 for 4.0+/-0.1 Peak-to-peak at E12. There shall be no waveform clipping following this adjustment. Use extreme CAution while making these "IN MOTION" adjustments.

5.6.4.4

Connect the scope probes to gyro Connector pins D and E and operate the turntable at 30+/-5 deg/sec.

5.6.4.5

Adjust R104 for a symmetrical square wave at pin D, and R111 for a symmetrical square wave at pin E. Figure 5-4 depicts this waveform. Use extreme caution while making these "IN MOTION" adjustments.

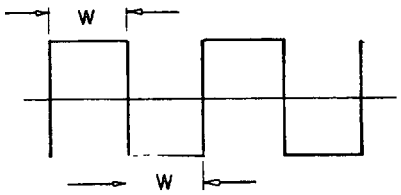


FIGURE 5-4
Gyro Symmetrical Waveform

5.6.4.6

Stop the turn table and exert a gentle force on the outer gimbal assembly, as shown in Fig. 5-5A below, until the inner gimbal assembly has precessed to the position shown in Fig. 5-5B below. The time required for the gyro to return to full erection shall not exceed three minutes.

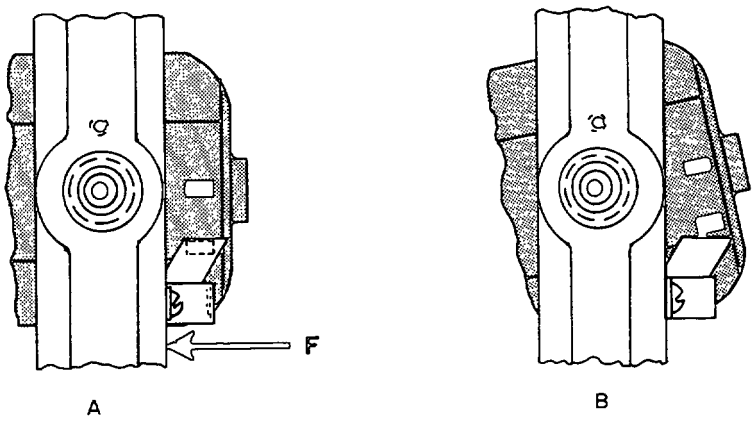


FIGURE 5-5
Gimbal Assembly

5.6.4.7

Measure the rotor speed with a stroboscopic light. It shall be greater than 16.200 rpm. Turn OFF the Unit and INPUT POWER. Install the unit Cover.

5.6.5 GYRO TEST PROCEDURE

Connect the unit and set the tester panel switches as described in 5.6.4 above.

5.6.5.1

Switch the 115vac and 14/28 vdc INPUT POWER Switches On along with the 14/28vdc UNIT Power Switch. Monitor the gyro current test port with an AC meter and record the difference between the start and run gyro current levels. This difference should be approximately 30Ma (30mv on voltmeter) on Honeywell gyros and approximately 40ma on R.C. Allen units. The absolute current value is a function of the voltmeter used since the motor drive supply is a square wave instead of a sine wave. Generally, the absolute current values will range between 400 and 500 ma. The units should reach full operating speed in less than 3 minutes.

5.6.5.2

Observe the following waveforms at gyro Pin K (figure 5-6A, 5-6B).

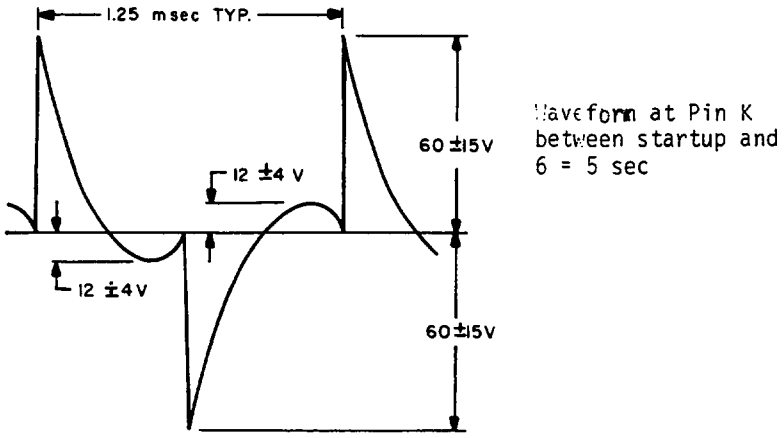


FIGURE 5-6A Gyro Waveform

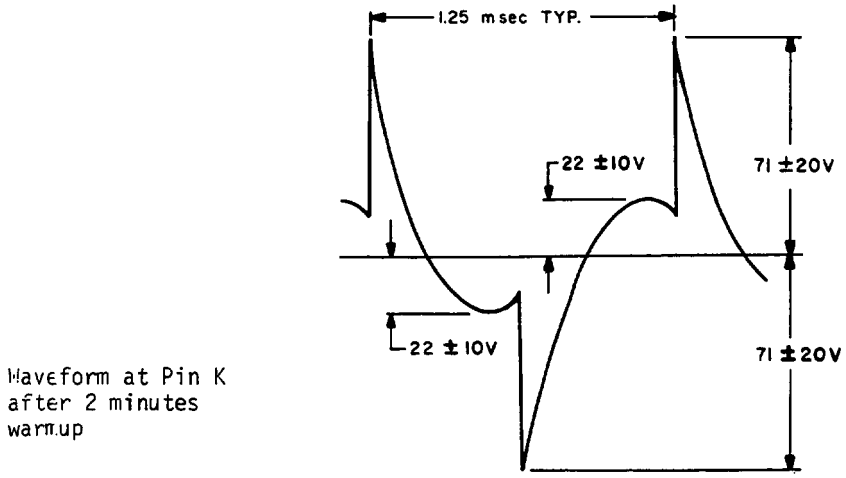


FIGURE 5-6B Gyro Waveform

5.6.5.3

Measure the DC voltage at Pins D and E.

Pin D +11.5 +/-2.0vdc or -13.5 +/- 2.0vdc

Pin E +11.5 +/-2.0vdc or -13.5 +/- 2.0vdc

5.6.5.4

Carefully rotate the gyro until the D and E voltages are opposite to that measured in the previous step.

Pin D -13.5 +/-2.0vdc or +11.5 +/-2.0vdc

Pin E -13.5 +/-2.0vdc or +11.5 +/-2.0vdc

5.6.5.5

With the turntable set at 0 deg., allow the gyro to rotate 5 rev at 1800 deg/min in a CW direction, stopping at zero. Verify 5.6.5.6 thru 5.6.5.10.

5.6.5.6

The waveform analysis fail light shall not come on indicating a minimum of 5.00 ms separation between a transition on line D and one on line E or between two transitions on the same line.

5.6.5.7

The rise times and fall times between the 10% and 90% points of the waveforms of pin D and pin E shall be less than 500 usec.

5.6.5.8

The compass card rotation shall be CCW when the turntable is rotated CW, and CW when table is rotated CCW.

5.6.5.9

The heading error shall be less than two degrees after five revolutions.

5.6.5.10

Allow the gyro to rotate in CW direction for one rev at 225 deg/min. The fail light shall not come on.

5.6.5.11

Repeat 5.6.5.5 thru 5.6.5.10 for CCW rotation.

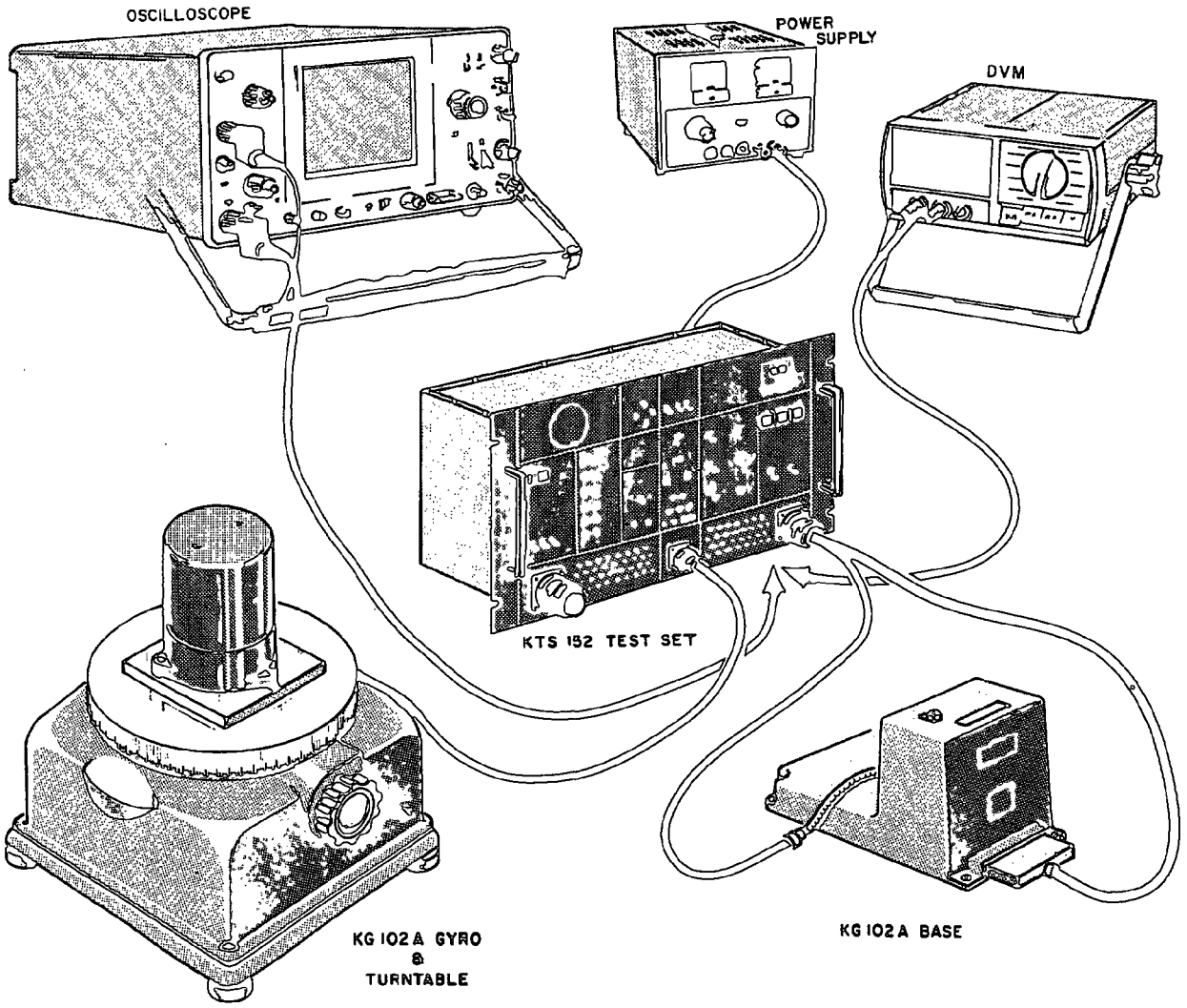


FIGURE 5-7 TEST EQUIPMENT SETUP

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TEST DATA SHEETS

5.6.5	Gyro Test Procedure		
5.6.5.1	Starting Current		
	Start-Run difference	_____	30 +/-10ma (Honeywell)
		_____	40 +/-10ma (RCA)
	Spin up time	_____	3 Min Max
5.6.5.2	Starting waveform	_____	OK
	Running waveform	_____	OK
5.6.5.3	Pin D +11.5 +/-2.0vdc or -13.5 +/-2.0vdc	_____	OK
	Pin E +11.5 +/-2.0vdc or -13.5 +/-2.0vdc	_____	OK
5.6.5.4	Pin D -13.5 +/-2.0vdc or +11.5 +/-2.0vdc	_____	OK
	Pin E -13.5 +/-2.0vdc or +11.5 +/-2.0vdc	_____	OK

CW Rotation

5.6.5.6	Minimum 5.00 msec transition time	_____	OK
5.6.5.7	Rise times less than 500 usec	_____	OK
5.6.5.8	Compass card rotation CCW	_____	OK
5.6.5.9	Heading error less than 2 deg.	_____	OK
5.6.5.10	V table = 225 deg. /min, minimum 5.00 usec transition time	_____	OK

CCW Rotation

5.6.5.6	Minimum 5.00 msec transition time	_____	OK
5.6.5.7	Rise times less than 500 usec	_____	OK
5.6.5.8	Compass card rotation CCW	_____	OK
5.6.5.9	Heading error less than 2 deg.	_____	OK
5.6.5.10	V table = 225 deg. /min, minimum 5.00 usec transition time	_____	OK

Tested by _____ Date_____

Inspected by _____ Date_____

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ILLUSTRATED PARTS LIST

6.1 General

The Illustrated Parts List (IPL) is a complete list of assemblies and parts required for the unit. The IPL also provides for the proper identification of replacement parts. Individual parts lists 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 parts list is followed by a component location drawing.

Parts identified in this IPL by Honeywell part number meet design specifications for this equipment and are the recommended replacement parts. Warranty information concerning Honeywell replacement parts is contained in Service Memo #1, P/N 600-08001-00XX.

Some part numbers may not be currently available. Consult the current Honeywell catalog or contact a Honeywell representative for equipment availability.

6.2 Revision Service

The manual will be revised as necessary to reflect current information.

6.3 List of Abbreviations

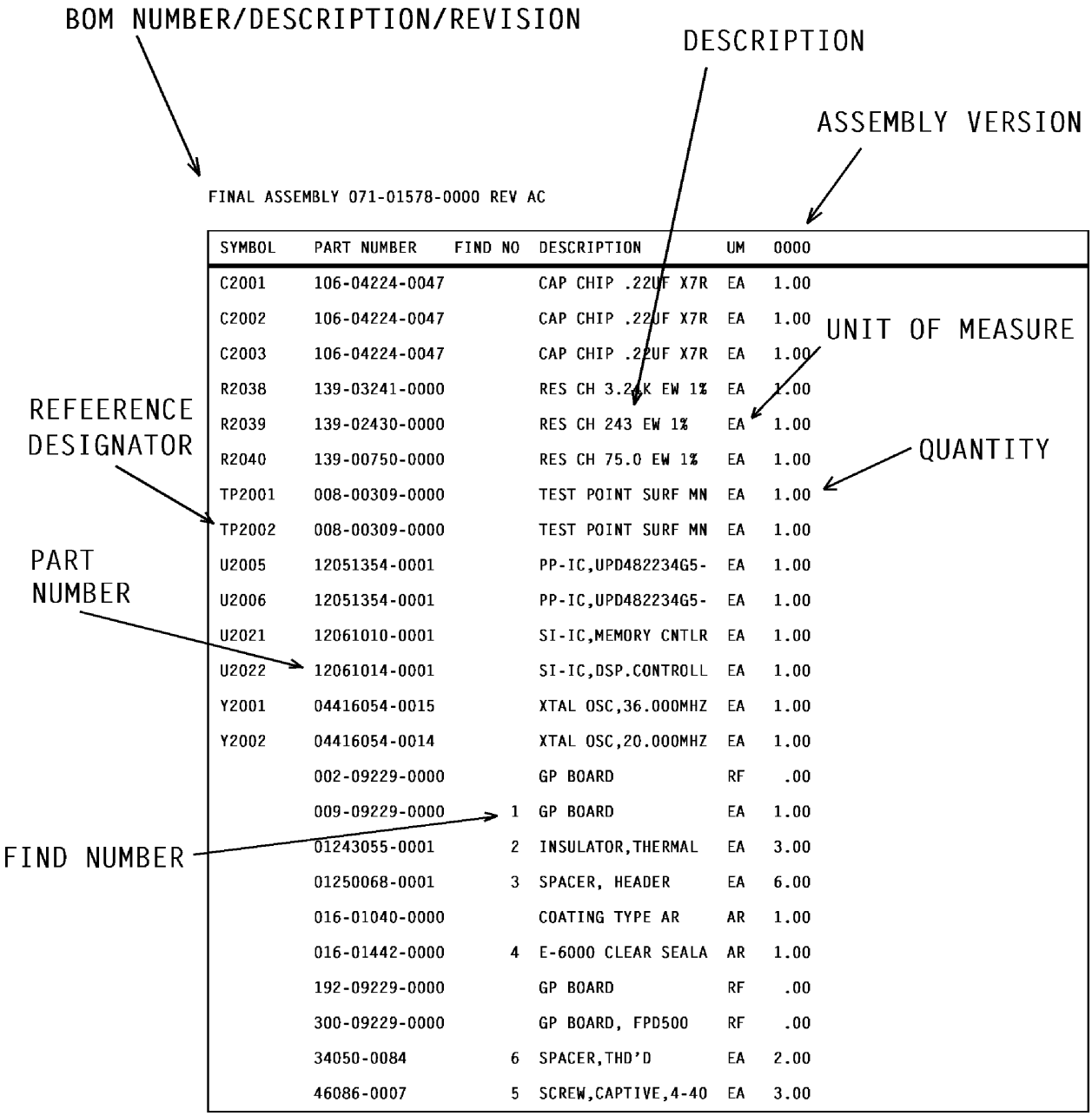
Abbreviation	Name
B	Motor or Synchro
C	Capacitor
CJ	Circuit Jumper
CR	Diode
DS	Lamp
E	Voltage or Signal Connect Point
F	Fuse
FL	Filter
FT	Feedthru
I	Integrated Circuit
J	Jack or Fixed Connector
L	Inductor
M	Meter
P	Plug

Table 1
Abbreviations

Abbreviation	Name
Q	Transistor
R	Resistor
RT	Thermistor
S	Switch
T	Transformer
TP	Test Point
U	Component Network, Integrated Circuit, Circuit Assembly
V	Photocell/Vacuum Tube
W	Waveguide
Y	Crystal

Table 1 (Continued)
Abbreviations

6.4 Sample Parts List



FINAL ASSEMBLY 071-01578-0000 REV AC

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C2001	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
C2002	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
C2003	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
R2038	139-03241-0000		RES CH 3.24K EW 1%	EA	1.00
R2039	139-02430-0000		RES CH 243 EW 1%	EA	1.00
R2040	139-00750-0000		RES CH 75.0 EW 1%	EA	1.00
TP2001	008-00309-0000		TEST POINT SURF MN	EA	1.00
TP2002	008-00309-0000		TEST POINT SURF MN	EA	1.00
U2005	12051354-0001		PP-IC,UPD482234G5-	EA	1.00
U2006	12051354-0001		PP-IC,UPD482234G5-	EA	1.00
U2021	12061010-0001		SI-IC,MEMORY CNTLR	EA	1.00
U2022	12061014-0001		SI-IC,DSP.CONTROLL	EA	1.00
Y2001	04416054-0015		XTAL OSC,36.000MHZ	EA	1.00
Y2002	04416054-0014		XTAL OSC,20.000MHZ	EA	1.00
	002-09229-0000		GP BOARD	RF	.00
	009-09229-0000	1	GP BOARD	EA	1.00
	01243055-0001	2	INSULATOR,THERMAL	EA	3.00
	01250068-0001	3	SPACER, HEADER	EA	6.00
	016-01040-0000		COATING TYPE AR	AR	1.00
	016-01442-0000	4	E-6000 CLEAR SEALA	AR	1.00
	192-09229-0000		GP BOARD	RF	.00
	300-09229-0000		GP BOARD, FPD500	RF	.00
	34050-0084	6	SPACER,THD'D	EA	2.00
	46086-0007	5	SCREW,CAPTIVE,4-40	EA	3.00

The above is only a sample. The actual format and style may vary slightly. A 'Find Number' column, when shown, references selected items on the BOM's accompanying Assembly Drawing. This information does not apply to every BOM. Therefore, a lack of information in this column, or a lack of this column, should not be interpreted as an omission.

Figure 6-1
Sample Parts List

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6.5 KG 102A FINAL ASSEMBLY

060-00015-0000 Rev. AB
060-00015-0001 Rev. AB
060-00015-0002 Rev. A

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000	0001	0002
REF1	300-01695-0000		FINAL ASSY KG102A	RF	.00	.	.
REF1	300-01695-0001		FINAL ASSEMBLY, KG	RF	.	.00	.
REF100	000-00146-0000		FLOW CHART KG 102A	RF	.00	.00	.00
REF2	002-00385-0001		ELECTRICAL SCHEMAT	RF	.	.	.00
REF2	002-00385-0002		SCH KG102A POWER S	RF	.	.	.00
REF3	300-01695-0001		FINAL ASSEMBLY, KG	RF	.	.	.00
REF4	004-00197-0000		PERFORMANCE SPECIF	RF	.	.	.00
	016-01004-0000		COMPOUND THRML JNT	AR	.00	.00	.00
	016-01008-0004		GLYPTAL 7526 BL	AR	.00	.00	.00
	047-02831-0001		COVER SWITCH W/F	EA	1.00	1.00	1.00
	047-02839-0001		COVER, W/FINISH	EA	1.00	1.00	.
	057-01575-0000		WARNING TAG	EA	1.00	1.00	1.00
	057-01648-0001		S/N TAG, KG 102A	EA	1.00	1.00	1.00
	057-01820-0000		NAMEPLATE	EA	1.00	1.00	1.00
	057-02203-0000		FLAVOR STCKR	EA	1.00	.	.
	057-02203-0001		FLAVOR STCKR	EA	.	1.00	.
	057-02203-0002		FLAVOR STCKR	EA	.	.	1.00
	057-03511-0001		DECAL, CAUTION	EA	1.00	1.00	1.00
	060-00016-0000		FINAL ASSY	EA	1.00	1.00	1.00
	073-00219-0003		CASTING	EA	1.00	1.00	1.00
	088-00578-0002		CONN COVER 2.312	EA	1.00	1.00	1.00
	089-05899-0003		SCR PHP 2-56X3/16	EA	4.00	4.00	4.00
	089-05899-0005		SCR PHP 2-56X5/16	EA	2.00	2.00	2.00
	089-05899-0012		SCR PHP 2-56X3/4	EA	2.00	2.00	2.00
	089-05907-0006		SCR PHP 6-32X3/8	EA	2.00	2.00	2.00
	089-05909-0008		SCR PHP 8-32X1/2	EA	3.00	.	.
	089-05909-0009		SCR PHP 8-32X9/16	EA	.	3.00	3.00
	089-08017-0037		WSHR INTL LK #8	EA	.	3.00	3.00
	089-08158-0011		WSHR FLT #8	EA	3.00	3.00	3.00
	150-00030-0010		TBG SHRNK 3/8&7/16	IN	.	1.00	1.00
	200-01693-0000		ELECTRONICS ASSY	EA	1.00	1.00	.
	200-01693-0001		ELECTRONIC ASSEMBL	EA	.	.	1.00
	200-05058-0000		GYRO FILTER ASSY	EA	.	1.00	1.00
	200-05073-0002		MTG PLATE ASSY	EA	.	.	1.00

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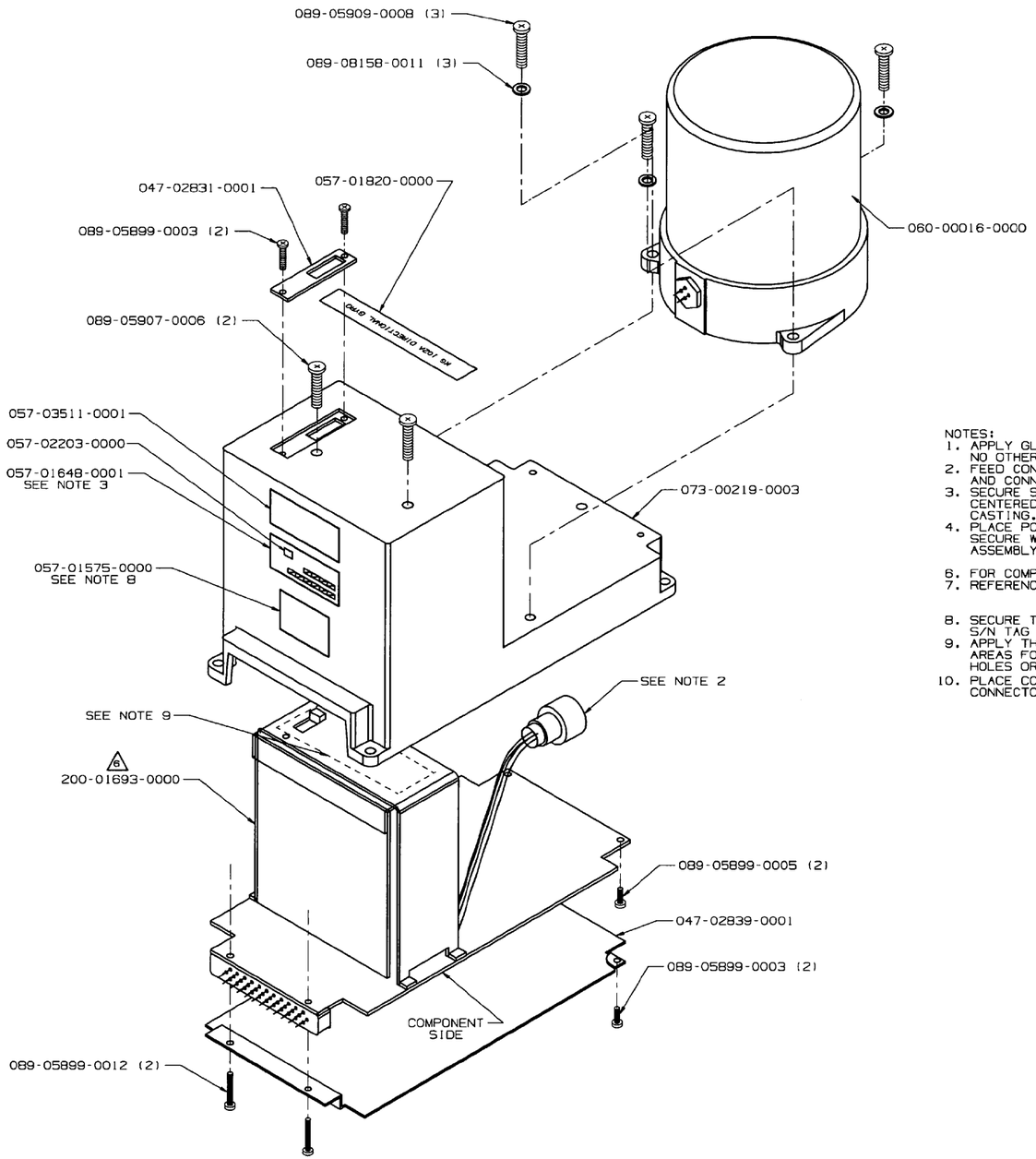
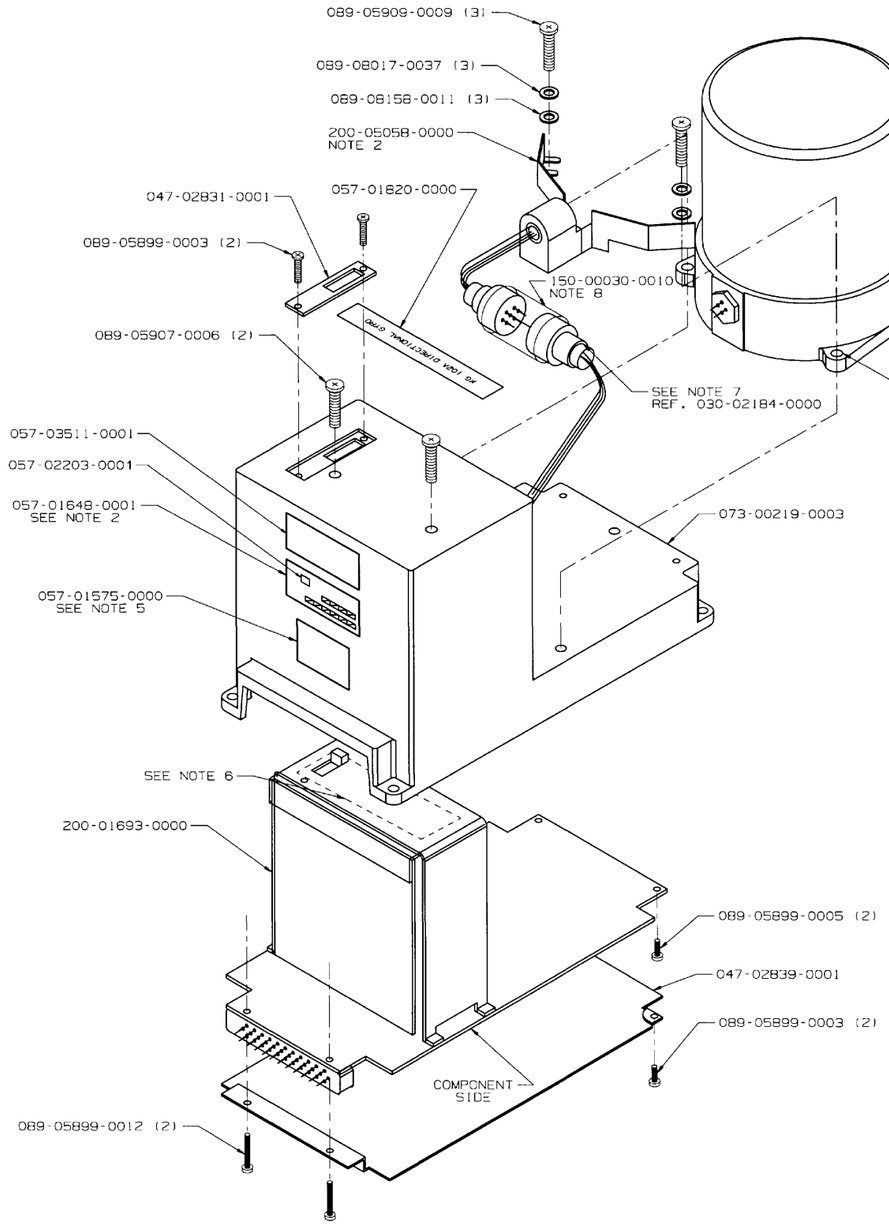


NOTES:
1. APPLY GLYPTAL (016-01008-0004) TO ALL SCREWS WITH NO OTHER LOCKING MEANS PROVIDED.
2. FEED CONNECTOR THROUGH HOLE PROVIDED IN CASTING AND CONNECT TO GYRO KPN 060-00016-0000.
3. SECURE S/N TAG (057-01648-0001) SUCH THAT IT IS CENTERED ON CASTING AND 1.0 INCH ABOVE FLANGE ON CASTING.
4. PLACE POWER SUPPLY SWITCH TO 14VDC POSITION AND SECURE WITH SWITCH COVER (047-02831-0001) AFTER ASSEMBLY ONTO BASE CASTING.

6. FOR COMPLETE ITEM DESCRIPTION SEE B/M 060-00015-0000.
7. REFERENCE: MPS 004-00197-0000
   SCHEMATIC 002-00385-0000/0002
   FLOW CHART 000-00146-0000
8. SECURE TAG 057-01575-0000 SUCH THAT IT IS CENTERED ON S/N TAG & BETWEEN S/N TAG AND CASTING FLANGE.
9. APPLY THERMAL COMPOUND (016-01004-0000) TO INDICATED AREAS FOR HEAT TRANSFER. AVOID AREAS AROUND SCREW HOLES OR AREAS VISIBLE FROM OUTSIDE OF UNITS.
10. PLACE CONNECTOR COVER, 088-00578-0002, OVER UNIT CONNECTOR PRIOR TO UNIT SHIPMENT.

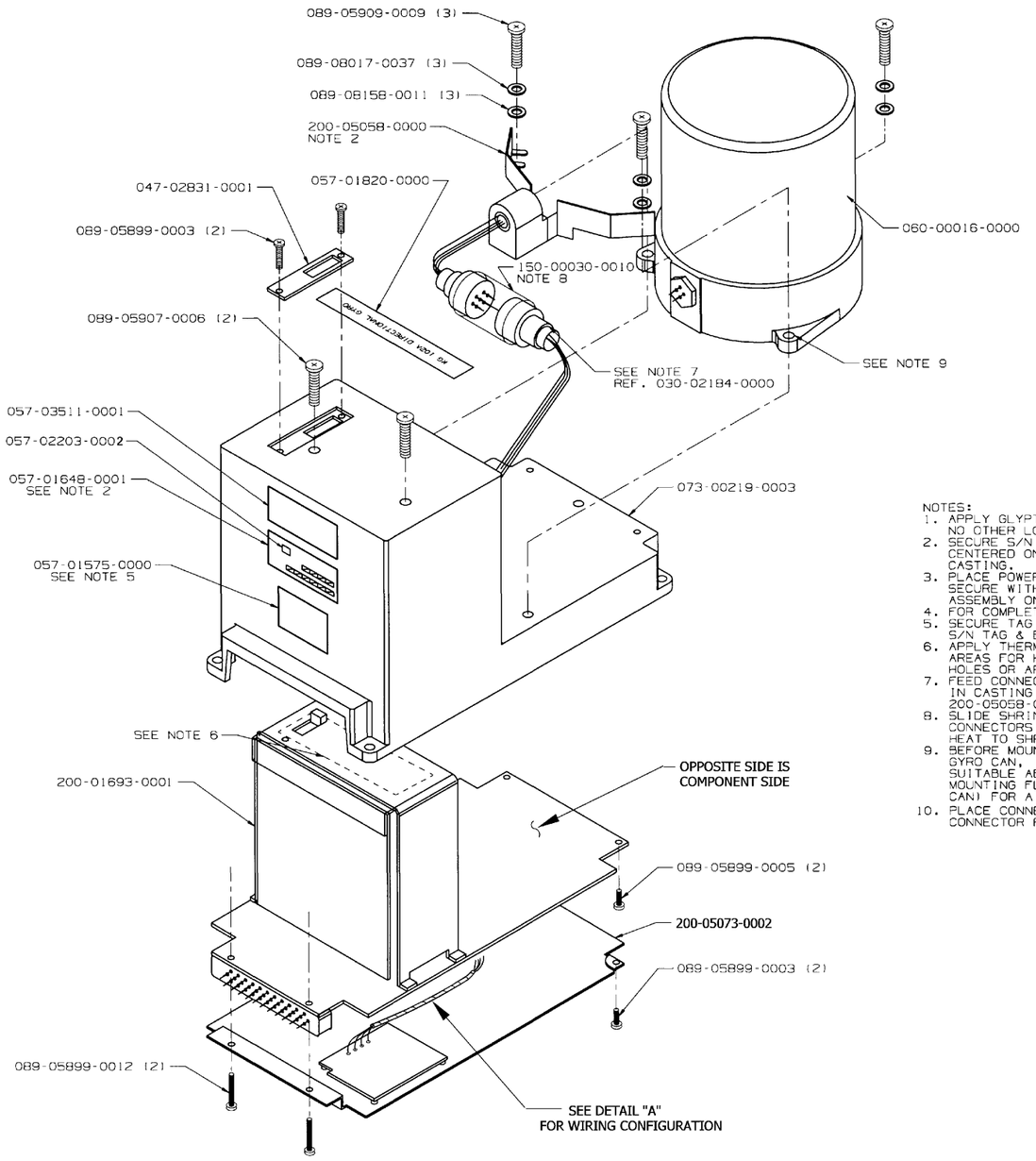
FIGURE 6-2 KG 102A ASSEMBLY DRAWING
(Dwg. 300-01695-0000 Rev. AA)



NOTES:
1. APPLY GLYPTAL (016-01008-0004) TO ALL SCREWS WITH NO OTHER LOCKING MEANS PROVIDED.
2. SECURE S/N TAG (057-01648-0001) SUCH THAT IT IS CENTERED ON CASTING AND 1.0 INCH ABOVE FLANGE ON CASTING.
3. PLACE POWER SUPPLY SWITCH TO 14VDC POSITION AND SECURE WITH SWITCH COVER (047-02831-0001) AFTER ASSEMBLY ONTO BASE CASTING.
4. FOR COMPLETE ITEM DESCRIPTION SEE B/M 060-00015-0001.
5. SECURE TAG 057-01575-0000 SUCH THAT IT IS CENTERED ON S/N TAG & BETWEEN S/N TAG AND CASTING FLANGE.
6. APPLY THERMAL COMPOUND (016-01004-0000) TO INDICATED AREAS FOR HEAT TRANSFER. AVOID AREAS AROUND SCREW HOLES OR AREAS VISIBLE FROM OUTSIDE OF UNITS.
7. FEED CONNECTOR (030-02184-0000) THROUGH HOLE PROVIDED IN CASTING AND PLUG INTO FILTER ASSYEMBLY KPN 200-05058-0000. & LOCK THE CONNECTOR.
8. SLIDE SHRINKABLE TUBING, (150-00030-0010) OVER THE CONNECTORS SO THAT IT COVERS ALL METAL PARTS. APPLY HEAT TO SHRINK TUBING.
9. BEFORE MOUNTING CONNECTOR BRACKET (200-05058-0000) TO GYRO CAN, (080-00016-0000) USE AN EMERY CLOTH, OR OTHER SUITABLE ABRASIVE TO CLEAN TOP OF THE TWO (2) MOUNTING FLANGES (NEAREST THE CONNECTOR ON THE GYRO CAN) FOR A GOOD GROUND PLANE CONNECTION.
10. PLACE CONNECTOR COVER, 088-00578-0002, OVER UNIT CONNECTOR PRIOR TO UNIT SHIPMENT.

SHT 1 REF. B/M 060-00015-0001 ONLY

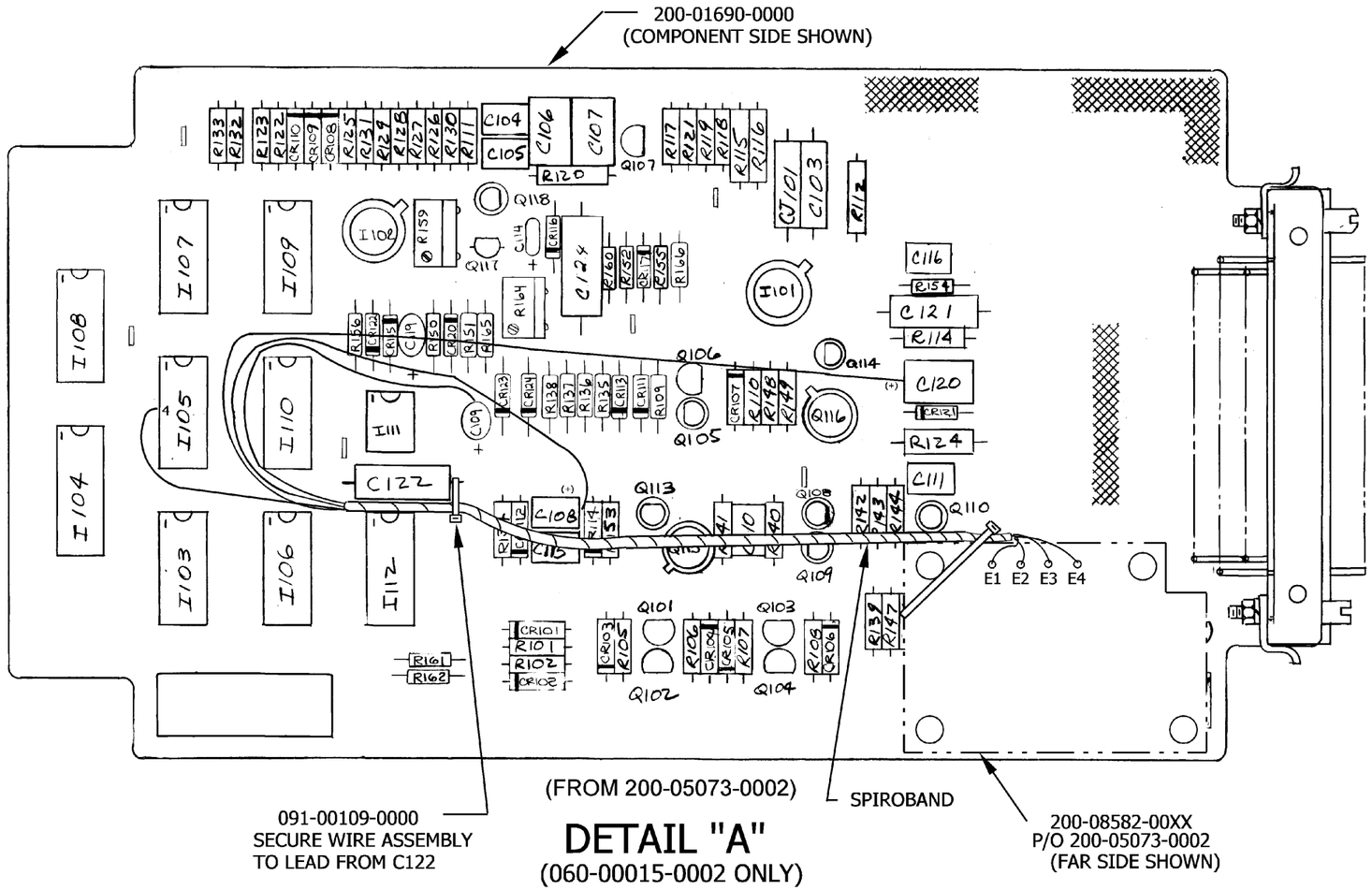
FIGURE 6-3 KG 102A ASSEMBLY DRAWING
(Dwg. 300-01695-0001 Rev. AD, Sheet 1 of 3)



NOTES:
1. APPLY GLYPTAL (016-01008-0004) TO ALL SCREWS WITH NO OTHER LOCKING MEANS PROVIDED.
2. SECURE S/N TAG (057-01648-0001) SUCH THAT IT IS CENTERED ON CASTING AND 1.0 INCH ABOVE FLANGE ON CASTING.
3. PLACE POWER SUPPLY SWITCH TO 14VDC POSITION AND SECURE WITH SWITCH COVER (047-02831-0001) AFTER ASSEMBLY ONTO BASE CASTING.
4. FOR COMPLETE ITEM DESCRIPTION SEE B/M 060-00015-0002.
5. SECURE TAG 057-01575-0000 SUCH THAT IT IS CENTERED ON S/N TAG & BETWEEN S/N TAG AND CASTING FLANGE.
6. APPLY THERMAL COMPOUND (016-01004-0000) TO INDICATED AREAS FOR HEAT TRANSFER. AVOID AREAS AROUND SCREW HOLES OR AREAS VISIBLE FROM OUTSIDE OF UNITS.
7. FEED CONNECTOR (030-02184-0000) THROUGH HOLE PROVIDED IN CASTING AND PLUG INTO FILTER ASSYEMBLY KPN 200-05058-0000. & LOCK THE CONNECTOR.
8. SLIDE SHRINKABLE TUBING, (150-00030-0010) OVER THE CONNECTORS SO THAT IT COVERS ALL METAL PARTS. APPLY HEAT TO SHRINK TUBING.
9. BEFORE MOUNTING CONNECTOR BRACKET (200-05058-0000) TO GYRO CAN, (060-00016-0000) USE AN EMERY CLOTH, OR OTHER SUITABLE ABRASIVE TO CLEAN TOP OF THE TWO (2) MOUNTING FLANGES (NEAREST THE CONNECTOR ON THE GYRO CAN) FOR A GOOD GROUND PLANE CONNECTION.
10. PLACE CONNECTOR COVER, 088-00578-0002, OVER UNIT CONNECTOR PRIOR TO UNIT SHIPMENT.

SHT 2 REF. B/M 060-00015-0002 ONLY

FIGURE 6-3 KG 102A ASSEMBLY DRAWING
(Dwg. 300-01695-0001 Rev. AD, Sheet 2 of 3)



WIRING CHART	
FROM 200-05073-0002	TO 200-01690-0000
E1 (BROWN)	C108 +
E2 (BLACK)	C109 -
E3 (GREEN)	I105 PIN 4
E4 (RED)	C120 +

PROCEDURE FOR CONNECTION OF WIRES LEADING FROM 200-05073-0002 TO 200-01690-0000:

1. CABLE TIE THE SPIROBAND TO THE COMPONENT LEAD AS SHOWN SO THE WIRE ASSY FOLD EASILY INTO THE UNIT WHEN THE COVER IS INSTALLED.

2. ROUTE THE WIRES TO THEIR DESTINATION COMPONENT PER THE WIRING CHART AND TRIM, STRIP, AND SOLDER THEM IN PLACE.

FIGURE 6-3 KG 102A ASSEMBLY DRAWING
(Dwg. 300-01695-0001 Rev. AD, Sheet 3 of 3)

6.6 KG 102A GYRO ASSEMBLY

060-00016-0000 Rev. BC

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
REF1	300-01738-0000		REMOTE DIGITAL DI	RF	.00
REF100	000-00153-0000		FLOW CHT KSG0105	RF	.00
REF2	004-00238-0000		MPS KG 102A	RF	.00
REF3	001-00247-0000		ALIGNMENT PROC	RF	.00
	008-00005-0005		TND COP LUG	EA	2.00
	012-01006-0001		LACING CORD 20DR	IN	60.00
	016-01008-0004		GLYPTAL 7526 BL	AR	.00
	016-01176-0000		CONTACT OIL	AR	1.00
	020-00017-0000		BRUSH BLCK ASSY	EA	1.00
	031-00260-0000		OPTICAL SW ASSY (O	EA	1.00
	047-03494-0002		COVER MACH W/F	EA	1.00
	047-03518-0000		BRSH BLK SHIM .005	AR	.00
	047-03518-0001		BRSH BLK SHIM .010	AR	.00
	047-03525-0000		SHIM OPTCL SW .001	AR	.00
	047-03525-0001		SHIM OPTCL SW .002	AR	.00
	047-03525-0002		SHIM OPTCL SW .005	AR	.00
	047-03525-0003		SHIM OPTCL SW .010	AR	.00
	047-03525-0004		SHIM OPTCL SW .015	AR	.00
	047-03525-0005		SHIM OPTCL SW .020	AR	.00
	047-03525-0006		SHIM OPTCL SW .025	AR	.00
	047-03525-0007		SHIM OPTCL SW .030	AR	.00
	057-01575-0000		WARNING TAG	EA	1.00
	057-01803-0001		S/N TAG, KG 102A &	EA	1.00
	057-02322-0000		WARNING TAG BASE	EA	1.00
	057-02834-0000		ESD TAG	EA	1.00
	057-03231-0004		BDX-26147-0004	EA	1.00
	073-00307-0002		HOUSING CAP W/F	EA	1.00
	076-00850-0000		BEARING RETAINER	EA	1.00
	076-01258-0001		LOCKNUT BRG W/F	EA	1.00
	089-05519-0004		SCR FLHP 2-56X1/4	EA	2.00
	089-05903-0004		SCR PHP 4-40X1/4	EA	2.00
	089-05903-0006		SCR PHP 4-40X3/8	EA	2.00
	089-05903-0008		SCR PHP 4-40X1/2	EA	2.00
	089-05903-0010		SCR PHP 4-40X5/8	EA	1.00
	089-06273-0002		SCR SEAL 4-40X5/16	EA	2.00
	147-05174-0000		RADIAL BALL BRG	EA	2.00
	150-00020-0010		TUBING SHRINK 18G	IN	1.00
	150-00026-0010		TUBING SHRINK 6&4G	IN	1.60
	150-00062-0010		TUBING TFL 10G NAT	IN	4.80
	187-01054-0002		O-RING 3 1/4 ID	EA	1.00
	200-01739-0000		PC BD ASSY	EA	1.00
	200-01740-0000		GIMBAL ASSY	EA	1.00
	200-01741-0000		FRAME ASSY	EA	1.00

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NOTES :

1. APPLY LUBRICANT 016-01176-0000 TO CONTACT AREAS OF INNER AND OUTER GIMBAL SLIP RINGS.
2. UNLESS OTHERWISE SPECIFIED, USE GLYPTAL (016-01008-0004) TO SECURE FASTENERS. USE GLYPTAL TO SECURE POTENTIOMETER ADJUSTS.
3. SECURE WIRES WITH LACING CORD, 012-01006-0001.
4. INSTALL SHRINK TUBING, 150-00020-0010 OVER RED, BROWN, BLACK, BLUE AND ORANGE WIRES. POSITION THE SHRINK TUBING SO THAT IT IS APPROXIMATELY CENTERED ON THE HOUSING CAP (073-00307-0002).

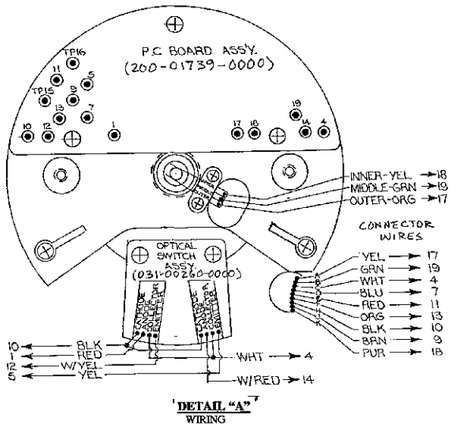

FIGURE 6-4 KG 102A REMOTE DIGITAL DIRECTION GYRO DRAWING
(Dwg. 300-01738-0000 Rev. AD)

NOTES:
1. REFER TO 001-0242-00 FOR ASSEMBLY PROCEDURE.
2. SECURE ALL SCREWS WITH KPN 016-1008-04.
3. SECURE BEARING RETAINER WITH KPN 016-1007-09.

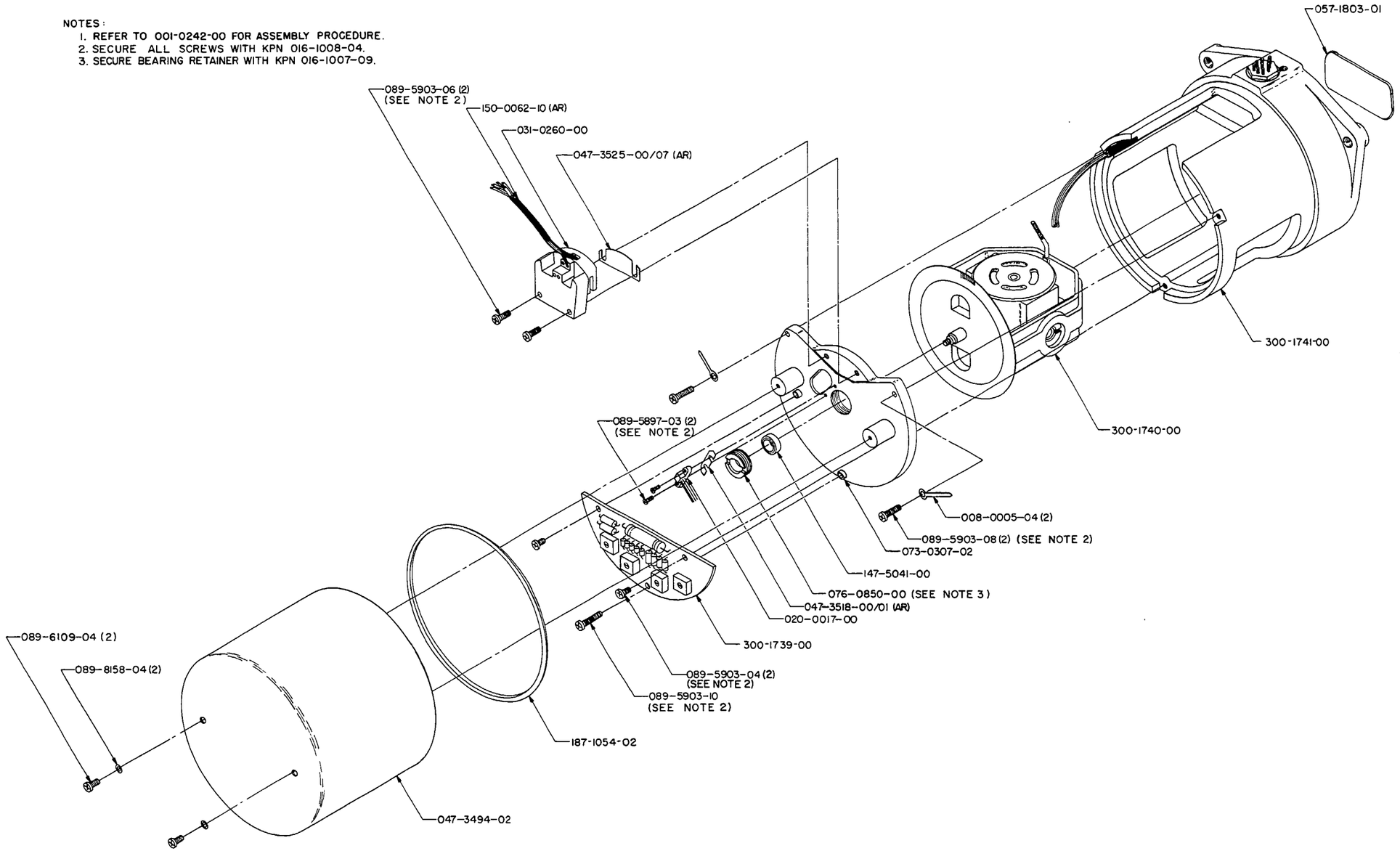

FIGURE 6-4A KG 102A REMOTE DIGITAL DIRECTION GYRO DRAWING
(Dwg. 300-01738-0000 Rev. 2)

6.7 KG 102A GYRO P.C. BOARD

200-01739-0000 Rev. AA

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C101	105-00046-0004		CAP MY 3UF 100V10%	EA	1.00
C102	105-00018-0039		CAP MY.0047UF 200V	EA	1.00
C103	105-00018-0039		CAP MY.0047UF 200V	EA	1.00
E101	008-00038-0001		TERM BIFUR .084L	EA	1.00
E104	008-00038-0001		TERM BIFUR .084L	EA	1.00
E105	008-00038-0001		TERM BIFUR .084L	EA	1.00
E107	008-00038-0001		TERM BIFUR .084L	EA	1.00
E109	008-00038-0001		TERM BIFUR .084L	EA	1.00
E110	008-00038-0001		TERM BIFUR .084L	EA	1.00
E111	008-00038-0001		TERM BIFUR .084L	EA	1.00
E112	008-00038-0001		TERM BIFUR .084L	EA	1.00
E113	008-00038-0001		TERM BIFUR .084L	EA	1.00
E114	008-00038-0001		TERM BIFUR .084L	EA	1.00
E117	008-00038-0001		TERM BIFUR .084L	EA	1.00
E118	008-00038-0001		TERM BIFUR .084L	EA	1.00
E119	008-00038-0001		TERM BIFUR .084L	EA	1.00
I101	120-03022-0005		IC LM1558H/883 CAN	EA	1.00
R101	131-00510-0023		RES CF 51 QW 5%	EA	1.00
R102	133-00086-0014		RES VA 1K 10%	EA	1.00
R103	131-00623-0023		RES CF 62K QW 5%	EA	1.00
R104	133-00116-0001		RES VA 250K HW 10%	EA	1.00
R105	136-03012-0072		RES PF 30.1K QW 1%	EA	1.00
R106	131-00106-0023		RES CF 10M QW 5%	EA	1.00
R107	131-00272-0023		RES CF 2.7K QW 5%	EA	1.00
R108	131-00510-0023		RES CF 51 QW 5%	EA	1.00
R109	133-00086-0014		RES VA 1K 10%	EA	1.00
R110	131-00623-0023		RES CF 62K QW 5%	EA	1.00
R111	133-00116-0001		RES VA 250K HW 10%	EA	1.00
R112	136-03012-0072		RES PF 30.1K QW 1%	EA	1.00
R113	131-00106-0023		RES CF 10M QW 5%	EA	1.00
R114	131-00272-0023		RES CF 2.7K QW 5%	EA	1.00
RT101	134-01012-0001		THMS 1K 10%	EA	1.00
RT102	134-01012-0001		THMS 1K 10%	EA	1.00
TP115	008-00038-0001		TERM BIFUR .084L	EA	1.00
TP116	008-00038-0001		TERM BIFUR .084L	EA	1.00
	002-00445-0000		SCH GYRO KSG100 DI	RF	.00
	009-05698-0000		PC BD GYRO	EA	1.00
	192-01739-0000		KG 102A GYRO PC BD	RF	.00
	300-01739-0000		GYRO BOARD	RF	.00

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NOTES:
1. LOCATE APPROXIMATELY AS SHOWN.

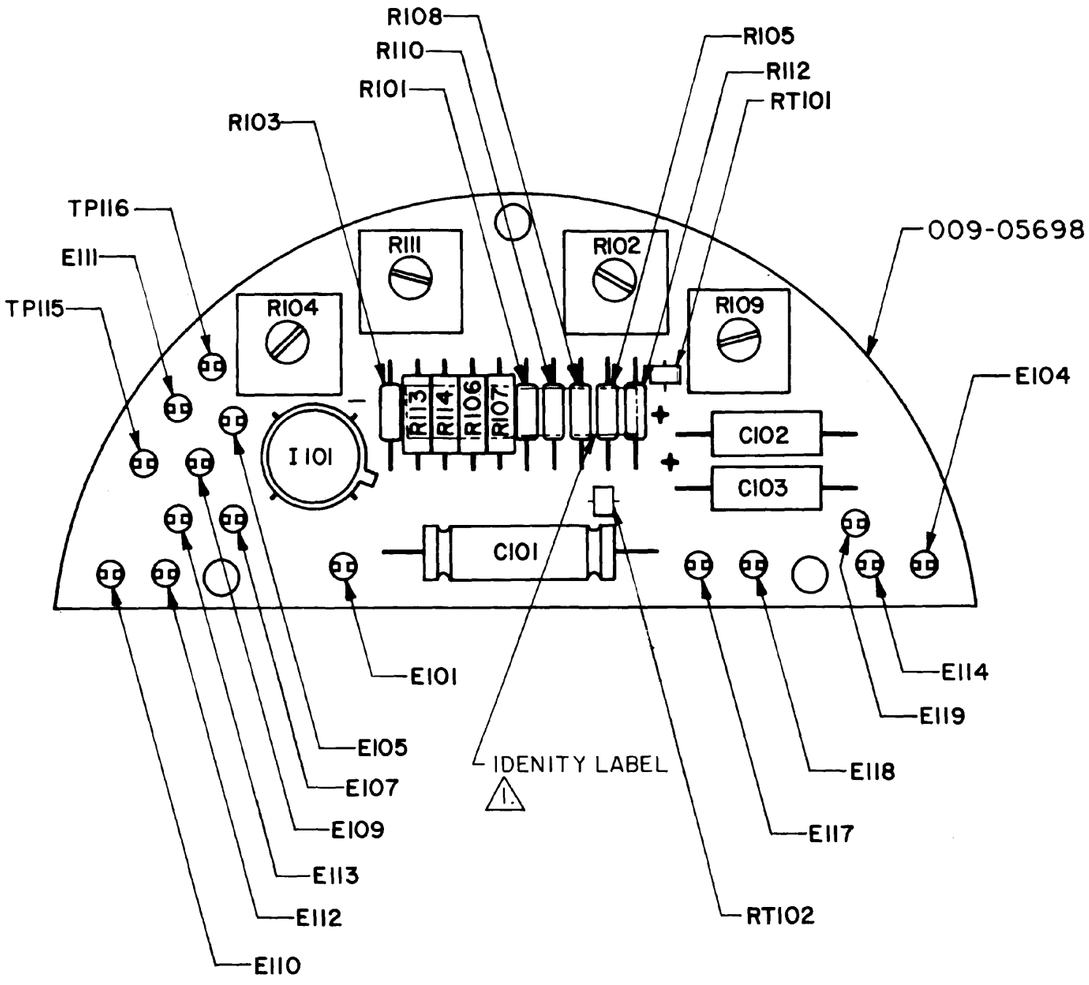


FIGURE 6-5 KG 102A GYRO BOARD DRAWING
(Dwg. 300-01739-0000 Rev. AA)

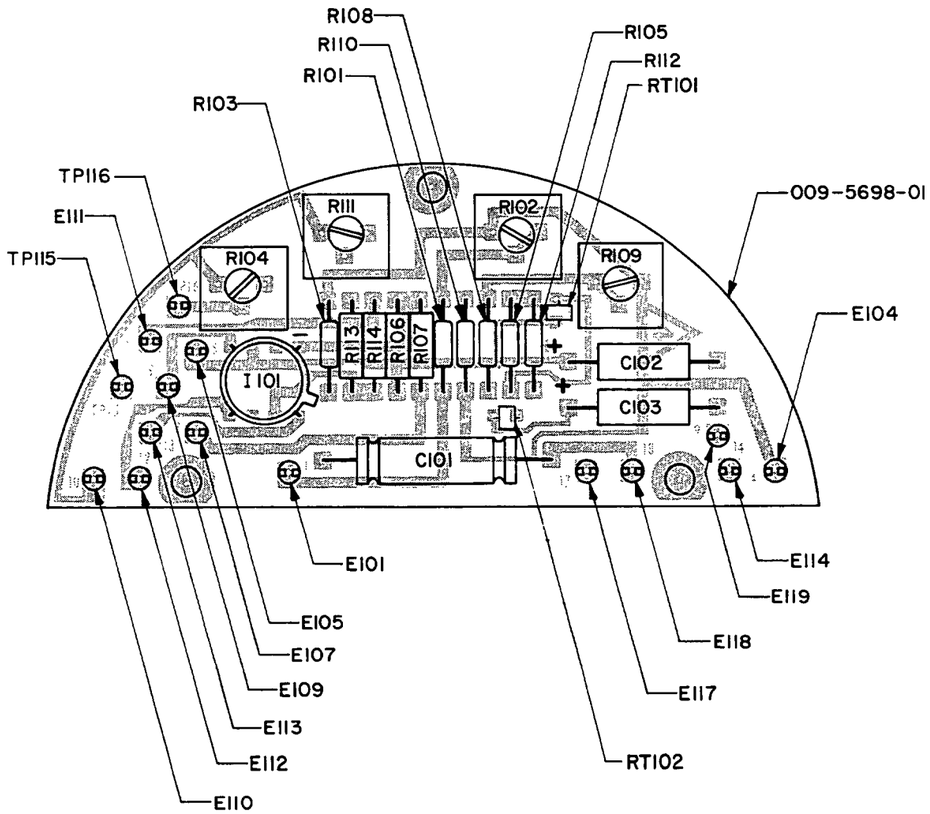
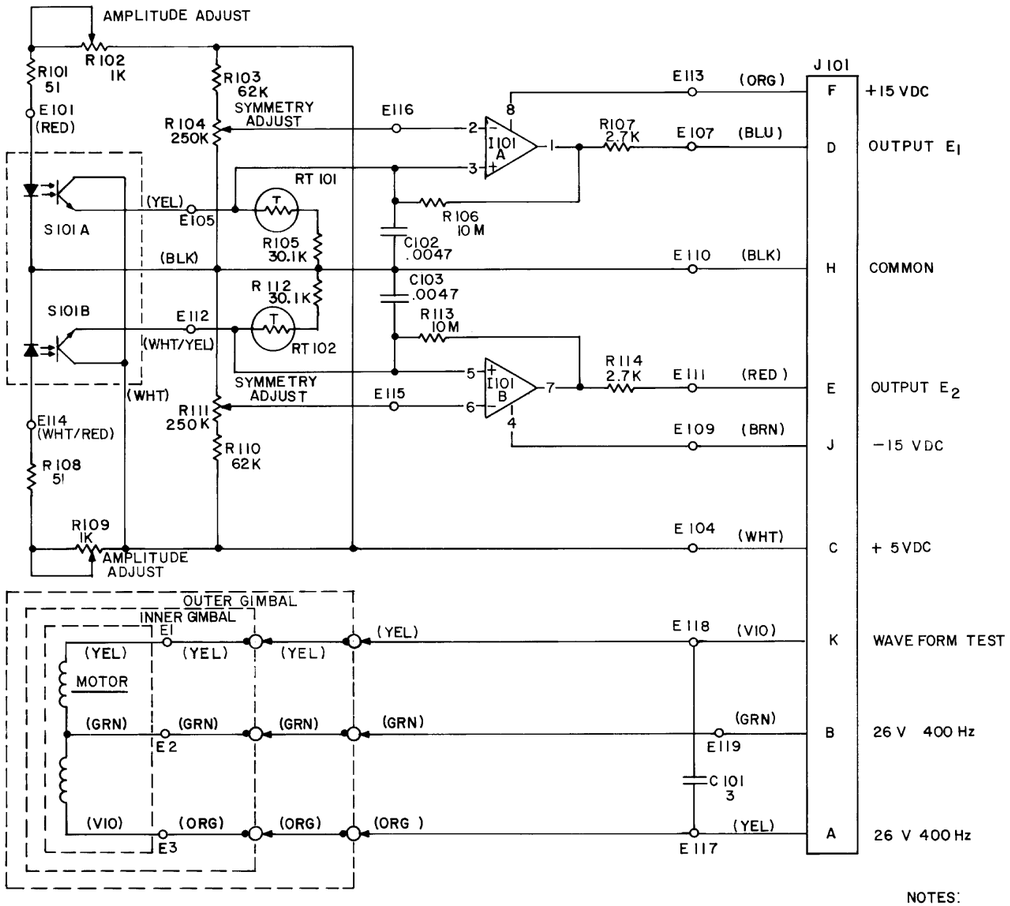


FIGURE 6-5A KG 102A GYRO BOARD DRAWING
(Dwg. 300-01739-0000 Rev. 2)



NOTES:
1. ALL RESISTORS ARE IN OHMS UNLESS OTHERWISE SPECIFIED.
2. ALL CAPACITORS ARE IN MICROFARADS UNLESS OTHERWISE SPECIFIED.

FIGURE 6-6 KG 102A GYRO BOARD SCHEMATIC
(Dwg. 002-00445-0000 Rev. 6)

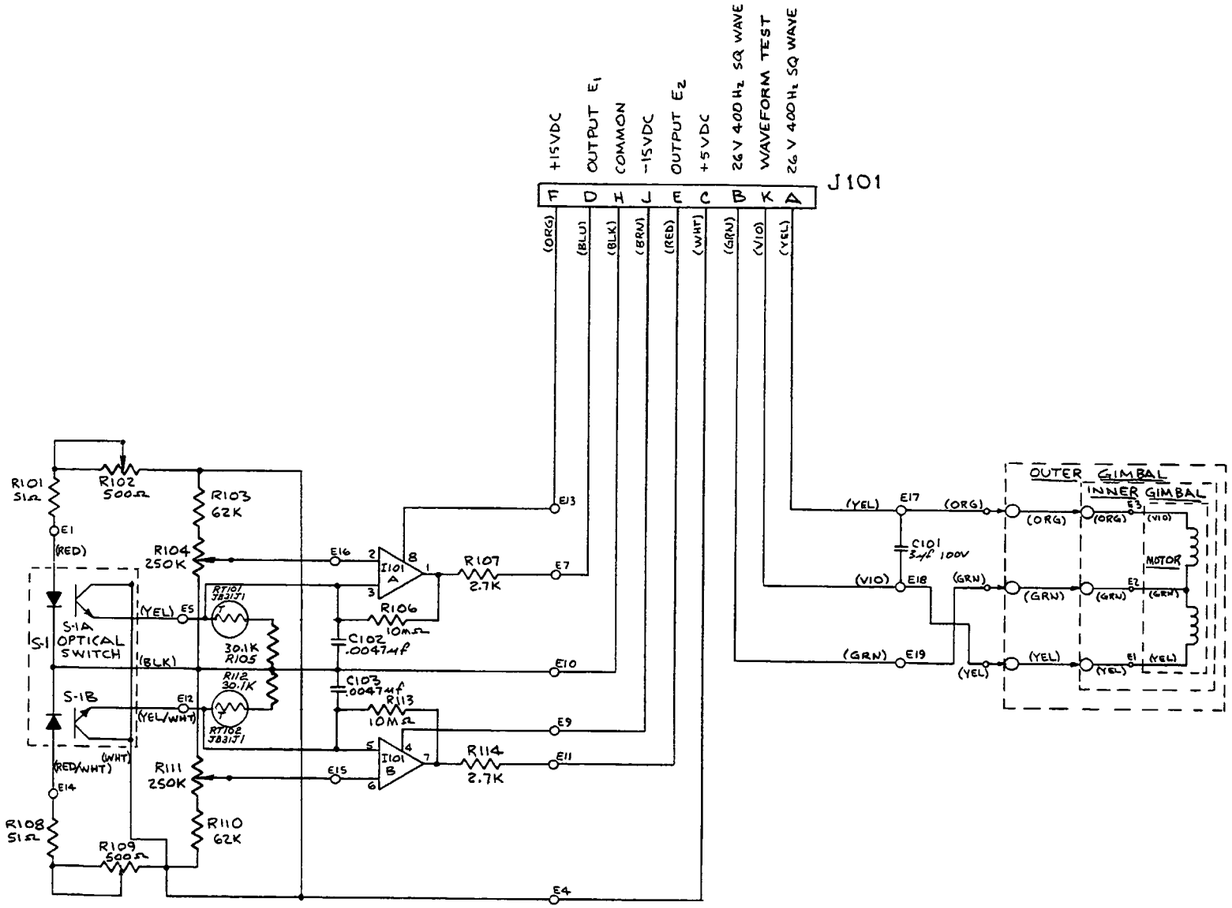


FIGURE 6-6A KG 102A GYRO BOARD SCHEMATIC
(Dwg. 002-00445-0000 Rev. 1)

6.8 KG 102A GIMBAL ASSY.

200-01740-0000 Rev. AB

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
REF1	300-01740-0000		GIMBAL ASSY	RF	.00
	012-01107-0000		SPCR ENC DISC	EA	2.00
	016-01007-0009		LOCTITE 242	AR	1.00
	016-01008-0004		GLYPTAL 7526 BL	AR	1.00
	020-00017-0000		BRUSH BLCK ASSY	EA	1.00
	047-03493-0001		VANE ERECTION W/F	EA	2.00
	047-03518-0000		BRSH BLK SHIM .005	AR	.00
	047-03518-0001		BRSH BLK SHIM .010	AR	.00
	047-10451-0000		ENCODER DISK	EA	1.00
	076-00850-0000		BEARING RETAINER	EA	2.00
	076-01258-0001		LOCKNUT BRG W/F	EA	2.00
	089-02005-0011		NUT FLAT 2-56	AR	.00
	089-05519-0003		SCR FLHP 2-56X3/16	EA	2.00
	089-05927-0003		SCR BHP 4-40X3/16	AR	.00
	089-06004-0003		SCR FHP 2-56X3/16	EA	8.00
	089-06491-0003		SCR SHC 2-56X3/16	EA	4.00
	089-07022-0000		SCR SET 6-32X1/2	AR	.00
	089-07022-0001		SCR SET 6-32X1	AR	.00
	089-07022-0002		SCR SET 6-32X3/4	AR	.00
	089-08107-0034		WSHR SPLT LK #2	EA	4.00
	089-08238-0004		WASHER .015 THK	AR	1.00
	089-08238-0008		WASHER .031 THCK	AR	.00
	147-05174-0000		RADIAL BALL BRG	EA	2.00
	200-01742-0000		GIMBAL SUB-ASSY	EA	1.00
	200-02899-0000		INNER GIMBAL ASSY	EA	1.00

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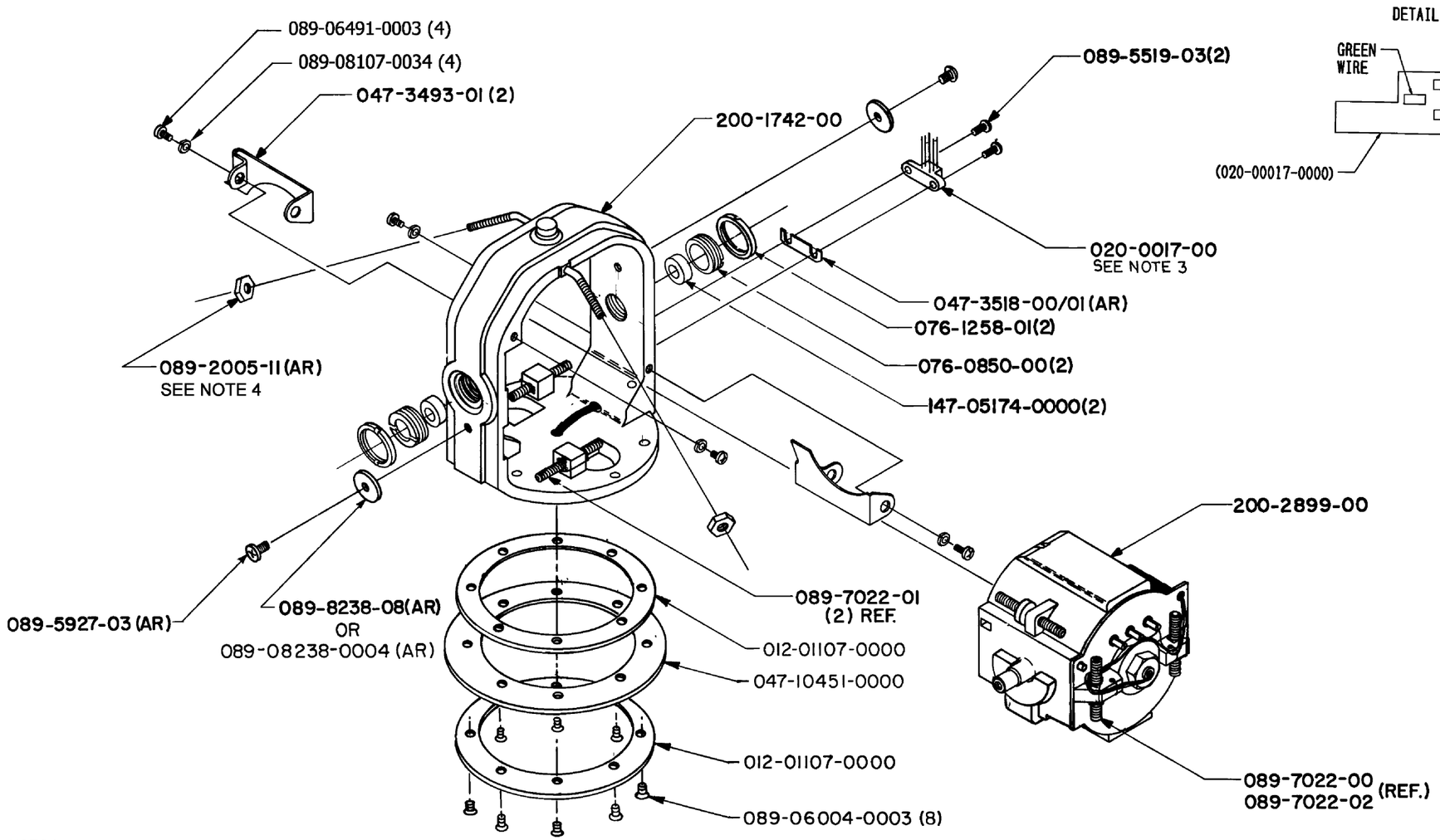
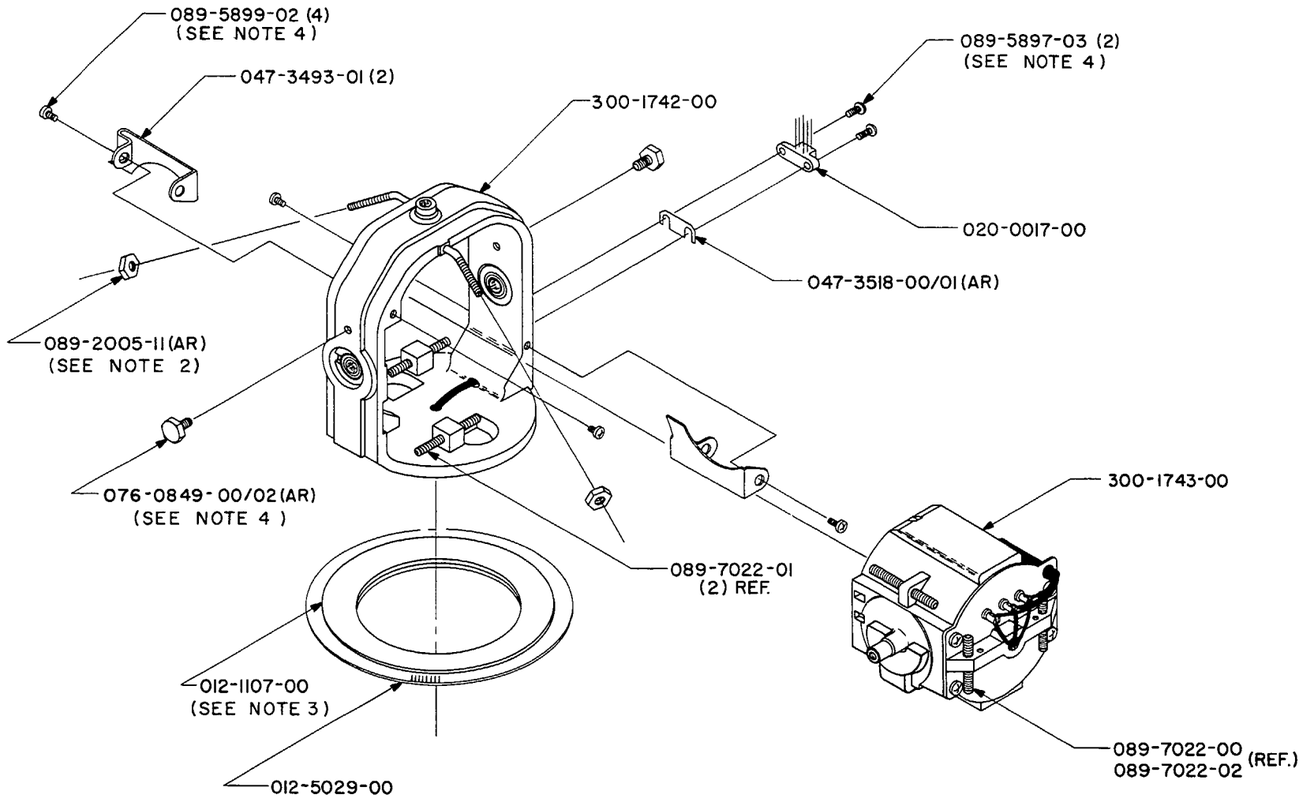


REF. B/M 200-1740-00

NOTE:

1. WHEN P/N 200-1740-00 IS BEING SUPPLIED TO SERVICE PARTS, PACKAGE PER PACKING INSTRUCTIONS P/N 035-1444-00.
2. UNLESS OTHERWISE SPECIFIED, SECURE THREADED FASTENERS, RETAINING RINGS, AND LOCK NUTS WITH GLYPTAL (016-01008-0004).
3. SOLDER SLIP RING WIRES TO BRUSH BLOCK TERMINALS AS SHOWN IN DETAIL "A".
4. SECURE BALANCE NUTS (089-02005-0011) WITH 016-01007-0009.

FIGURE 6-7 KG 102A GIMBAL ASSEMBLY DRAWING
(Dwg. 300-01740-0000 Rev. AC)



NOTES:

1. REFER TO 001-0242-00 FOR ASSEMBLY PROCEDURE.
2. SECURE ALL BALANCE SCREWS & NUTS WITH 016-1007-09.
3. SECURE ENCODER DISC WITH 016-1088-00.
4. SECURE ALL HOLDING SCREWS WITH 016-1008-04.

FIGURE 6-7A KG 102A GIMBAL ASSEMBLY DRAWING
(Dwg. 300-01740-0000 Rev. 2)

6.9 KG 102A GIMBAL SUB-ASSY.

200-01742-0000 Rev. AA

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
REF1	300-01742-0000		OUTER GIMBAL SUB-A	RF	.00
	016-01007-0009		LOCTITE 242	AR	.00
	016-01082-0000		DC RTV 3145	AR	.00
	016-01375-0000		NYEBAR TYPE K	AR	1.00
	016-01605-0001		EPOXY, HYSOL EA946	AR	1.00
	020-00018-0000		SLIP RING ASSY	EA	1.00
	073-00304-0005		OUTER GIMBAL W/F	EA	1.00
	076-00854-0000		STUD	EA	2.00
	089-07022-0000		SCR SET 6-32X1/2	AR	.00
	089-07022-0001		SCR SET 6-32X1	AR	.00
	089-07022-0002		SCR SET 6-32X3/4	AR	.00
	150-00007-0010		TUBING TFLN 16AWG	IN	2.50

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NOTES :

1. APPLY NYEBAR O16-O1375-OOOO TO THE TIP AND ALL AROUND THE BASE OF THE SLIP RING O20-OOO18-OOOO. EXTREME CARE MUST BE TAKEN TO PREVENT O16-O1375-OOOO FROM COMING IN CONTACT WITH THE GOLD RINGS.

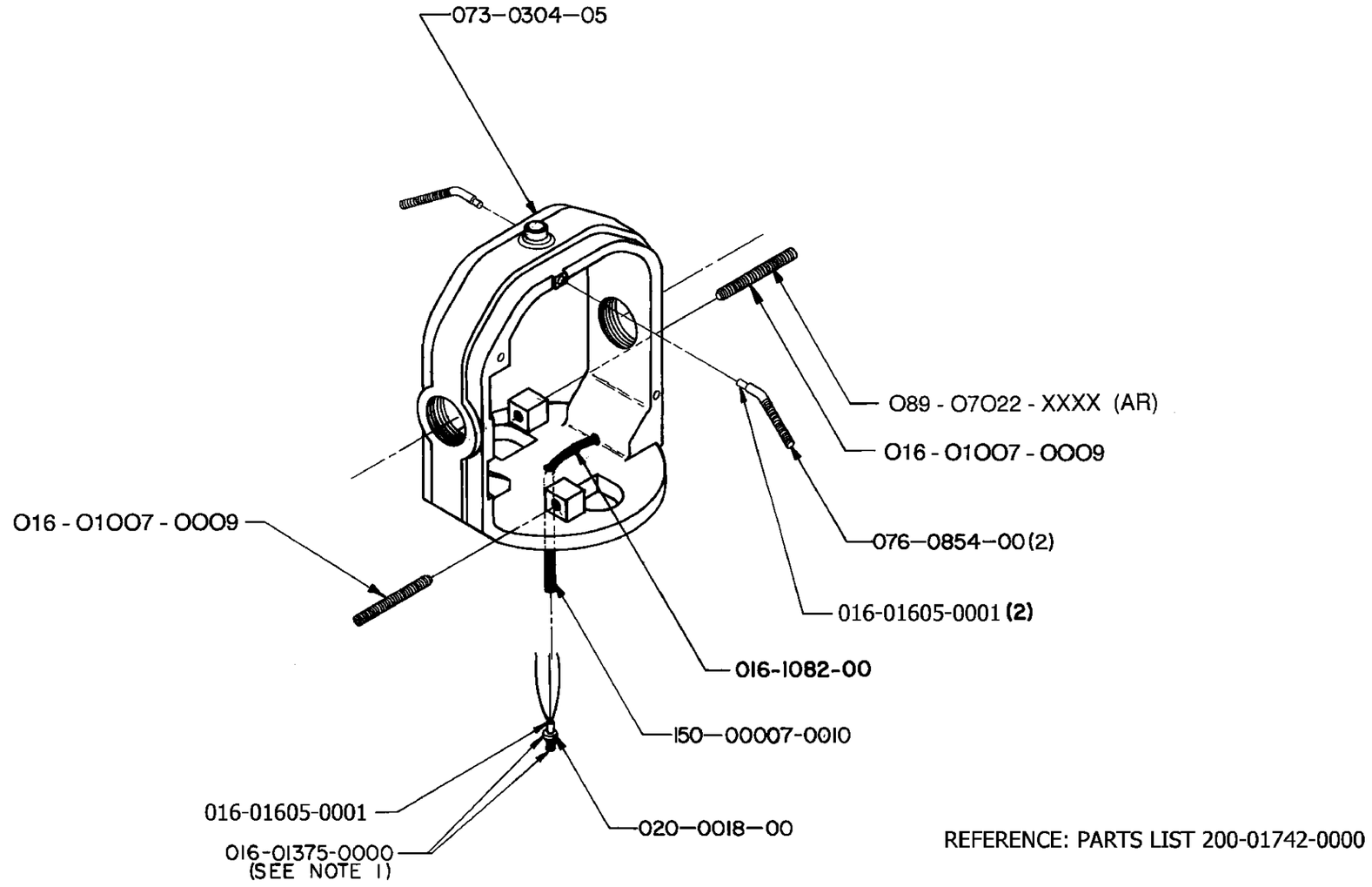
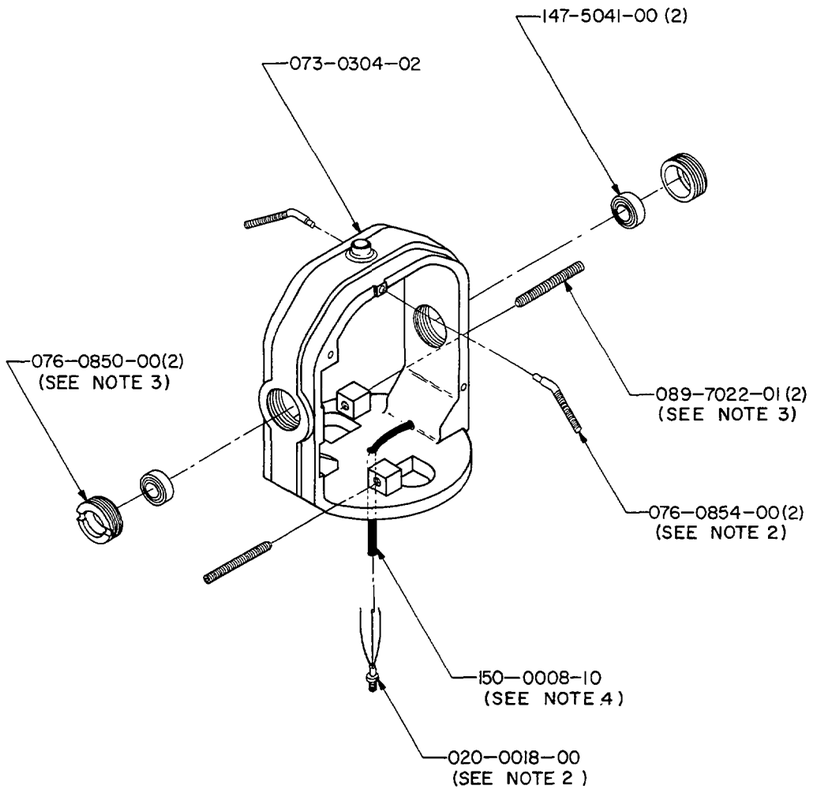


FIGURE 6-8 KG 102A GIMBAL SUB-ASSEMBLY DRAWING
(Dwg. 300-01742-0000 Rev. AA)



NOTES:
1. REFER TO 001-0242-00 FOR ASSEMBLY PROCEDURE.
2. SECURE BALANCE STUDS & SLIP RING WITH KPN 016-1088-00.
3. SECURE ALL BALANCE SCREWS & BEARING RETAINERS WITH KPN 016-1007-09.
4. SECURE INSULATION WITH KPN 016-1082-00.

FIGURE 6-8A KG 102A GIMBAL SUB-ASSEMBLY DRAWING
(Dwg. 300-01742-0000 Rev. 2)

6.10 KG 102A INNER GIMBAL ASSY.

200-02899-0000 Rev. AD

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
REF1	300-02899-0000		INNER GIMBAL ASSY	RF	.00
REF2	035-02131-01		INNER GIMBAL PACKI	RF	.00
	010-00019-0091		TERM STDF WHT	EA	3.00
	012-01006-0001		LACING CORD 20DR	IN	20.40
	016-01007-0009		LOCTITE 242	AR	.00
	016-01008-0004		GLYPTAL 7526 BL	AR	.00
	016-01082-0000		DC RTV 3145	AR	.00
	016-01375-0000		NYEBAR TYPE K	AR	1.00
	016-01605-0001		EPOXY, HYSOL EA946	AR	1.00
	020-00018-0000		SLIP RING ASSY	EA	1.00
	073-00508-0002		INNER GIMBAL W/F	EA	1.00
	073-00509-0002		GMBL END PLT W/F	EA	1.00
	088-00547-0000		CAM	EA	1.00
	089-02351-0000		NUT SPEC 8-36	EA	1.00
	089-05899-0004		SCR PHP 2-56X1/4	EA	2.00
	089-07022-0000		SCR SET 6-32X1/2	AR	.00
	089-07022-0001		SCR SET 6-32X1	AR	.00
	089-07022-0002		SCR SET 6-32X3/4	AR	.00
	090-00052-0002		PIN ROL .066X.250	EA	1.00
	150-00007-0010		TUBING TFLN 16AWG	IN	2.40
	200-02900-0000		SPIN MOTOR ASSY	EA	1.00

200-01743-0000 Rev. 13

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
	010-00019-0091		TERM STDF WHT	EA	3.00
	012-01006-0001		LACING CORD 20DR	IN	20.40
	016-01007-0009		LOCTITE 242	AR	.00
	016-01008-0004		GLYPTAL 7526 BL	AR	.00
	016-01082-0000		DC RTV 3145	AR	.00
	016-01088-0000		EPOXY HYSOL 907	AR	.00
	020-00018-0000		SLIP RING ASSY	EA	2.00
	047-03516-0000		DEFLECTOR AIR	EA	1.00
	073-00306-0002		END PLATE	EA	1.00
	073-00308-0002		INNER GIMBAL	EA	1.00
	088-00547-0000		CAM	EA	1.00
	089-05899-0003		SCR PHP 2-56X3/16	EA	6.00
	089-05899-0004		SCR PHP 2-56X1/4	EA	2.00
	089-07022-0000		SCR SET 6-32X1/2	AR	.00
	089-07022-0001		SCR SET 6-32X1	AR	.00
	089-07022-0002		SCR SET 6-32X3/4	AR	.00
	089-08023-0030		WSHR FLT STD #2	AR	.00
	089-08206-0000		WSHR FLT STD .191	EA	1.00
	150-00007-0010		TUBING TFLN 16AWG	IN	2.50
	200-01744-0000		SPIN MTR ASSY	EA	1.00

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NOTES :

1. APPLY NYEBAR 016-01375-0000 TO THE TIP AND ALL AROUND THE BASE OF THE SLIP RING 020-00018-0000. EXTREME CARE MUST BE TAKEN TO PREVENT 016-01375-0000 FROM COMING IN CONTACT WITH THE GOLD RINGS.
2. LOCTITE 242 (016-01007-0009) MUST BE APPLIED TO BALANCE SCREWS AFTER ADJUSTMENTS TO GIMBAL BALANCE ARE MADE DURING ALGINMENT AND TEST. APPLY 016-01007-0009 TO THE BALANCE SCREWS WHERE THEY ENTER AND EXIT THE CASTING.
3. SOLDER SLIP RING WIRES AND MOTOR WIRES TO TERMINALS PER TABLE I.

TABLE I

TERMINAL	SLIP RING WIRE	MOTOR WIRE
E1	YELLOW	YELLOW
E2	GREEN	GREEN
E3	ORANGE	VIOLET

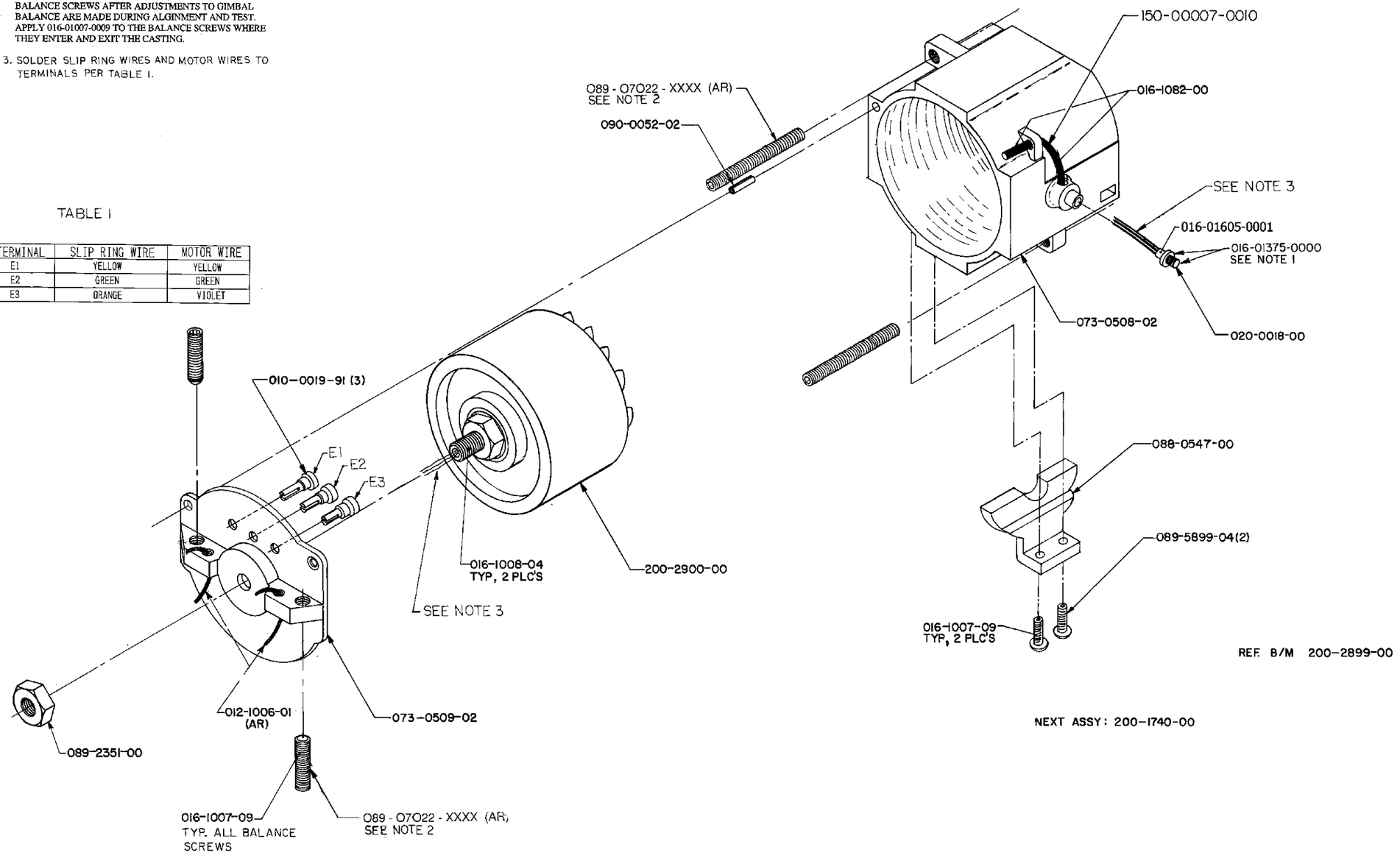


FIGURE 6-9 KG 102A INNER GIMBAL ASSEMBLY DRAWING
(Dwg. 300-02899-0000 Rev. AD)

NOTES:

1. REFER TO 001-0242-00 FOR ASSEMBLY PROCEDURE.
2. SECURE ALL BALANCING SCREWS WITH KPN 016-1007-09.
3. SECURE MOTOR SHAFT, DEFLECTOR RING & SLIP RING WITH KPN 016-1088-00.
4. SECURE INSULATION WITH KPN 016-1082-00.
5. SECURE ALL HOLDING SCREWS WITH KPN 016-1008-04.
6. SCREWS (089-5899-03) AND WASHERS (089-8023-30) TO BE ADDED IF REQUIRED FOR BALANCING.
7. USE 012-1006-01 LACE CORD TIES AS REQUIRED.

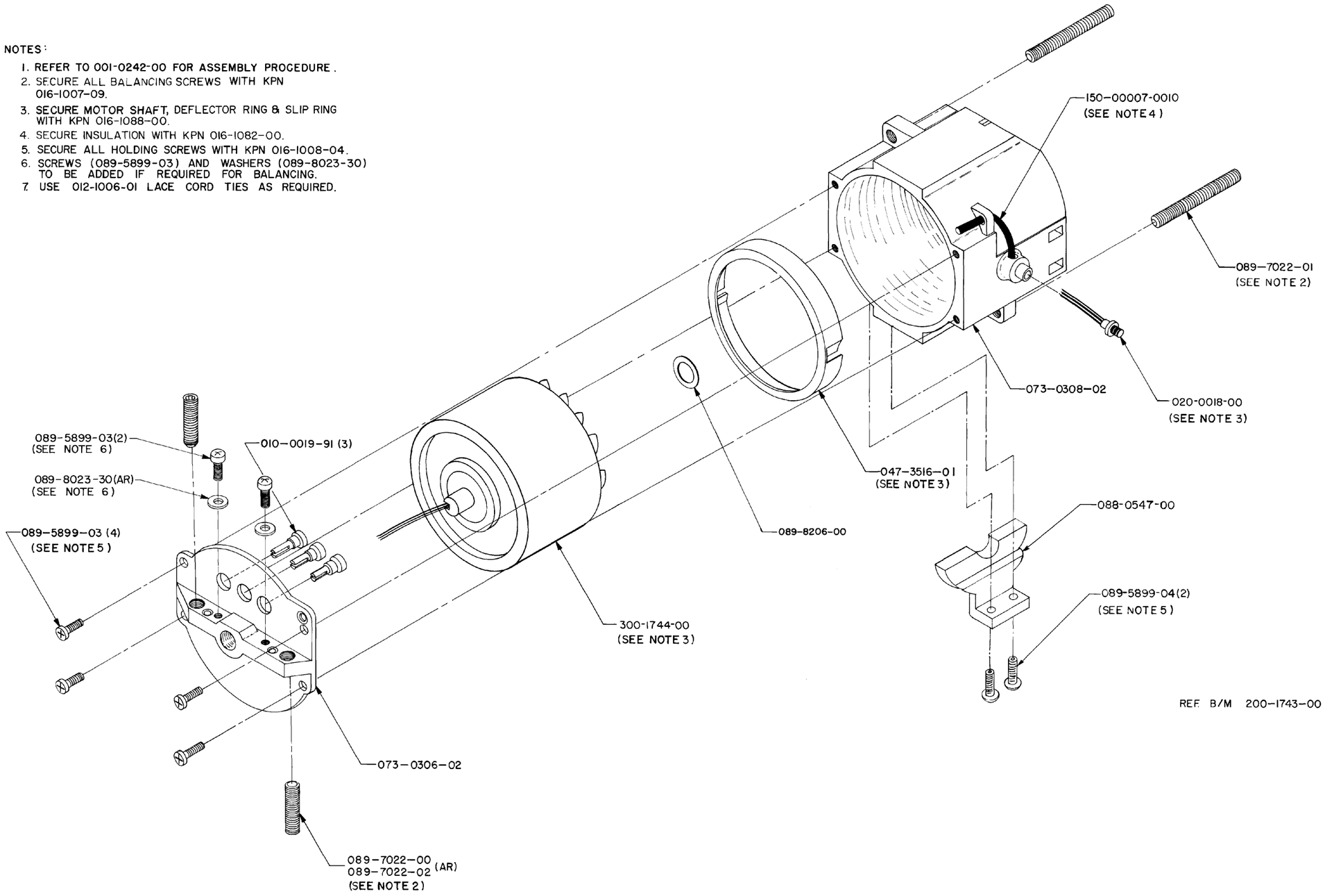
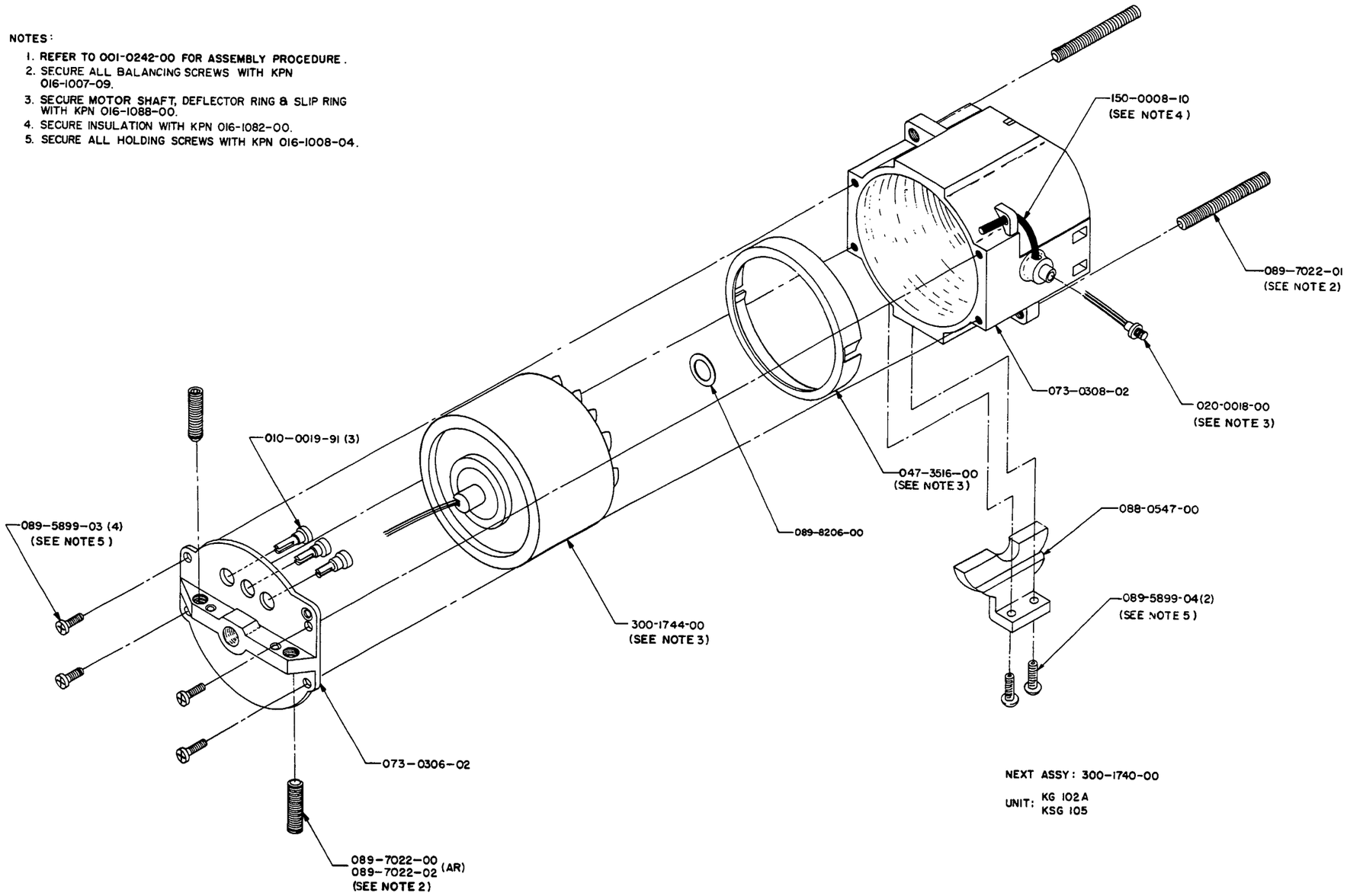


FIGURE 6-9A KG 102A INNER GIMBAL ASSEMBLY DRAWING (Dwg. 300-01743-0000 Rev. 8)

NOTES:

1. REFER TO 001-0242-00 FOR ASSEMBLY PROCEDURE.
2. SECURE ALL BALANCING SCREWS WITH KPN 016-1007-09.
3. SECURE MOTOR SHAFT, DEFLECTOR RING & SLIP RING WITH KPN 016-1088-00.
4. SECURE INSULATION WITH KPN 016-1082-00.
5. SECURE ALL HOLDING SCREWS WITH KPN 016-1008-04.



NEXT ASSY: 300-1740-00

UNIT: KG 102A
KSG 105

FIGURE 6-9B KG 102A INNER GIMBAL ASSEMBLY DRAWING
(Dwg. 300-01743-0000 Rev. 3)

6.11 KG 102A SPIN MOTOR ASSY.

200-02900-0000 Rev. AB

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
REF1	300-02900-0000		SPIN MOTOR ASSY	RF	.00
	016-01007-0005		LOCTITE 222	AR	.00
	016-01007-0007		LOCTITE 47-56 PMR	AR	.00
	016-01007-0010		LOCTITE 609	AR	.00
	016-01135-0000		ADHESIVE ANAEROBIC	AR	1.00
	035-01966-0000		ROTOR PACKING INST	RF	.00
	073-00510-0002		IMPELLER W/F	EA	1.00
	073-00511-0002		RTR SQ CAGE W/F	EA	1.00
	076-01257-0001		WHEEL INERTIA W/F	EA	1.00
	089-02351-0000		NUT SPEC 8-36	EA	2.00
	089-05895-0002		SCR PHP 0-80X1/8	EA	3.00
	147-05173-0000		ANG CONT BALL BRG	EA	2.00
	148-05062-0000		STATOR SPIN MOTOR	EA	1.00

200-01744-0000 Rev. 4

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
	016-01088-0000		EPOXY HYSOL 907	AR	.00
	073-00311-0002		IMPELLER	EA	1.00
	147-05042-0001			EA	2.00
	148-05040-0000		STATOR ASSY	EA	1.00
	148-05043-0000		ROTOR ASSY	EA	1.00

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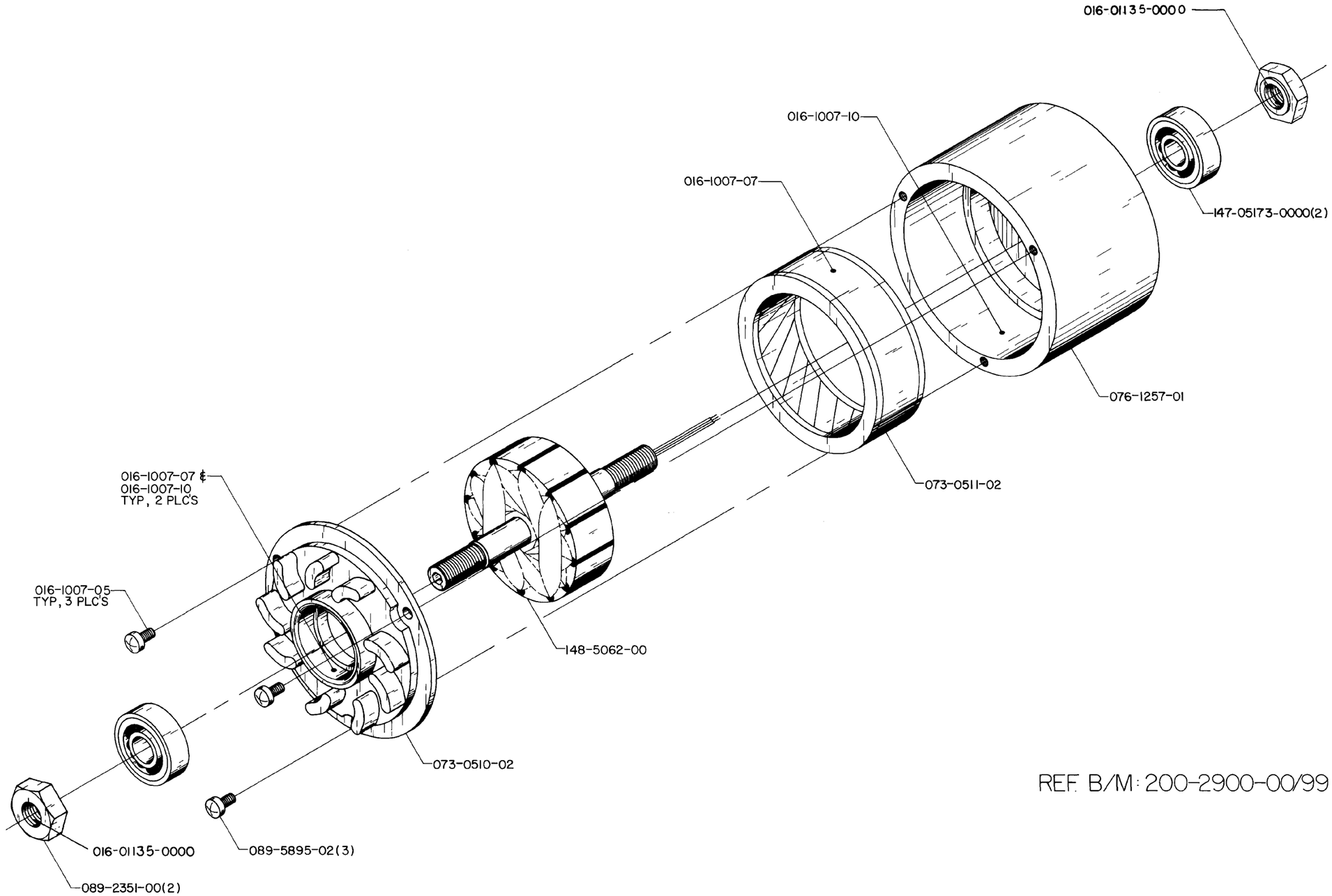
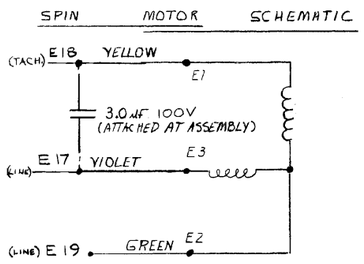
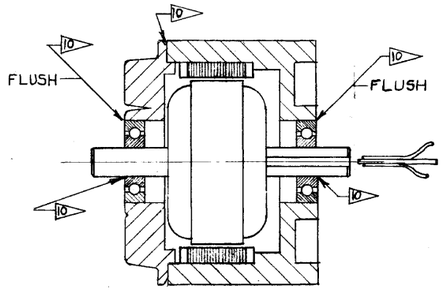


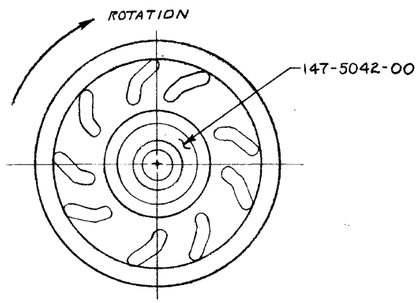
REF. B/M: 200-2900-00/99

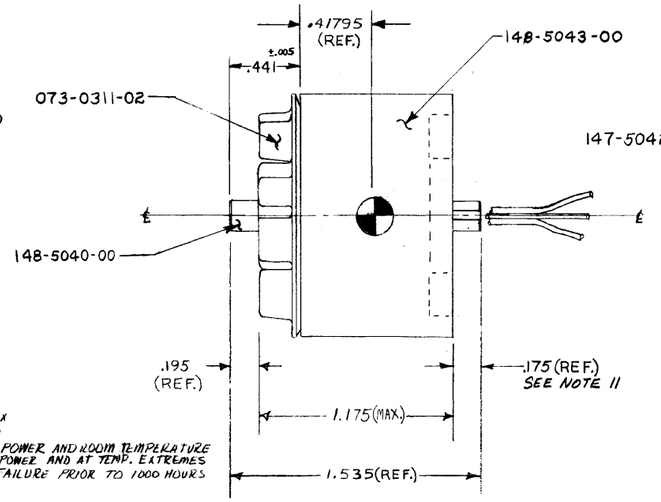
FIGURE 6-10 KG 102A SPIN MOTOR ASSEMBLY DRAWING
(Dwg. 300-02900-0000 Rev. AA)

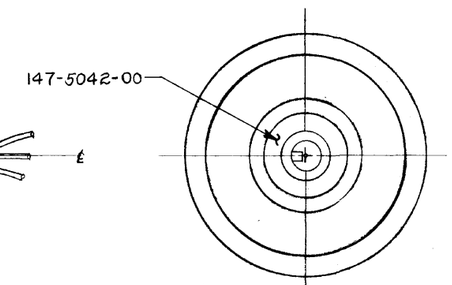




SECTION THRU ℄ OF MOTOR







NOTES

1. POWER SUPPLIED: 26 VAC, 400 HZ SQUARE WAVE
   VOLTAGE VARIATION: 21V TO 30V PEAK TO PEAK
   FREQUENCY VARIATION: 360 HZ MIN TO 490 HZ MAX
2. PERFORMANCE REQUIREMENTS: SPEED: 16,200 RPM MINIMUM
   RUN-UP: 2 MINUTES MAX AT 80% POWER AND ROOM TEMPERATURE
   5 MINUTES MAX AT 80% POWER AND AT TEMP. EXTREMES
   LIFE: WARRANTED AGAINST FAILURE PRIOR TO 1000 HOURS MINIMUM
3. STATOR DATA: 12 SLOT LAMINATED STACK
   WINDING RESISTANCE: E1 TO E2 SHOULD BE 29.0 TO 34.0 OHMS
   E3 TO E2 SHOULD BE 31.0 TO 36.0 OHMS
   E1 TO E3 SHOULD BE 60.0 TO 70.0 OHMS
4. ASSEMBLY OF MOTOR TO BE PER KMS ASSEMBLY SPECIFICATION 001-0242-00.
5. ROTOR DATA: IMPELLER END CAP TO BE SUPPLIED BY KING RADIO PER KING P/N 073-0311-02
   MATERIAL TO BE ALUMINUM (DENSITY .098 #/IN³)
   ROTOR HOUSING MATERIAL TO BE FREE CUTTING BRASS (DENSITY .305 #/IN³)
   ROTOR WEIGHT CALCULATED TO BE .2793# COMPLETE WITH LAMINATION STACK AND BEARINGS.
   MASS MOMENT OF INERTIA CALCULATED TO BE 52.1339X10⁻⁷ #SEC² FT
   MOMENTUM CALCULATED TO BE .928 #SEC
   APPROXIMATE STARTING TORQUE (BEARING FRICTION NEGLECTED) CALCULATED TO BE .015 IN-OZ. 2 MIN. RUN-UP
   RADIUS OF GYRATION CALCULATED TO BE .306 INCH .010 IN-OZ. 3 MIN. RUN-UP
6. MOTOR BEARINGS TO BE PRELOADED 1.5 TO 2.0 LBS. (STATIC)
7. TOTAL MOTOR WEIGHT TO BE .349# (158.9 GRAMS) ± 1%
8. MOTOR TO BE DYNAMICALLY BALANCED WITHIN 30 M-OZ.-IN. (SCHENCK TREBEL RGO-T GYROBALANCER)
9. ENVIROMENTAL REQUIREMENTS PER KING SPECIFICATION 060-0010-00101
10. ASSY. SHALL BE SECURED WITH ADHESIVE KPN 016-1088-00.

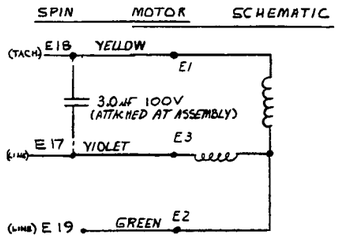
NOTES CONT.

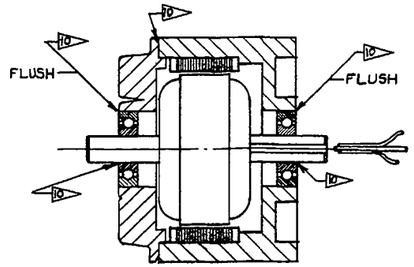
11. .164 HAS BEEN FOUND TO BALANCE THE ASSEMBLY. THIS DIMENSION MAY BE CHANGED AS REQUIRED TO ALLOW OPTIMUM BALANCING. CARE MUST BE TAKEN NOT TO PERMIT THE STARTER TO CONTACT ANY PARTS EXCEPT THE BEARINGS.

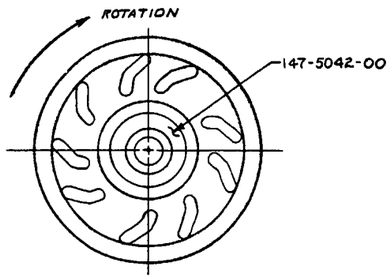
B/M 200-1744-00

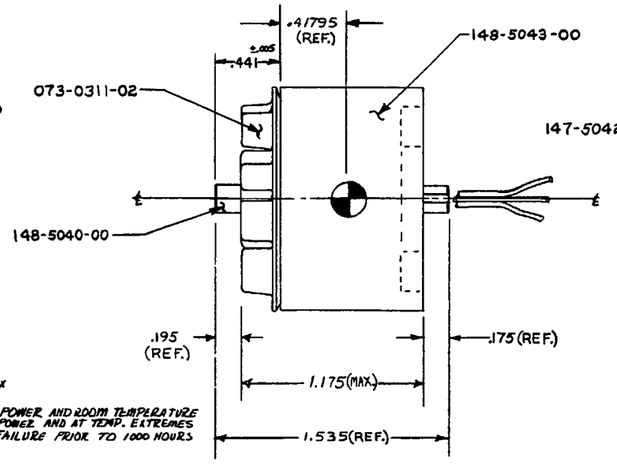
UNIT: KG 102A & KSG 105

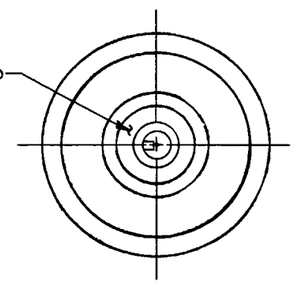
FIGURE 6-10A KG 102A SPIN MOTOR ASSEMBLY DRAWING
(Dwg. 300-01744-0000 Rev. 1)











NOTES

1. POWER SUPPLIED: 26 VAC, 400 HZ SQUARE WAVE
   VOLTAGE VARIATION: 41V TO 60V PEAK TO PEAK
   FREQUENCY VARIATION: 360 HZ MIN TO 440 HZ MAX
2. PERFORMANCE REQUIREMENTS: SPEED: 16,200 RPM MINIMUM
   RUN-UP: 2 MINUTES MAX AT 80% POWER AND ROOM TEMPERATURE
   5 MINUTES MAX AT 80% POWER AND AT TEMP. EXTREMES
   LIFE: WARRANTED AGAINST FAILURE PRIOR TO 1000 HOURS MINIMUM
3. STATOR DATA: 12 SLOT LAMINATED STACK
   WINDING RESISTANCE: E1 TO E2 SHOULD BE 29.0 TO 34.0 OHMS
   E3 TO E2 SHOULD BE 31.0 TO 36.0 OHMS
   E1 TO E3 SHOULD BE 60.0 TO 70.0 OHMS
4. ASSEMBLY OF MOTOR TO BE PER KING ASSEMBLY SPECIFICATION 001-0242-00.
5. ROTOR DATA: IMPELLER END CAP TO BE SUPPLIED BY KING RADIO PER KING P/N 073-0311-02
   MATERIAL TO BE ALUMINUM (DENSITY .098 #/IN³)
   ROTOR HOUSING MATERIAL TO BE FREE CUTTING BRASS (DENSITY .305 #/IN³)
   ROTOR WEIGHT CALCULATED TO BE .2793# COMPLETE WITH LAMINATION STACK AND BEARINGS.
   MASS MOMENT OF INERTIA CALCULATED TO BE 57.13391×10⁻⁷ # SEC² FT
   MOMENTUM CALCULATED TO BE 5928 # SEC
   APPROXIMATE STARTING TORQUE (BEARING FRICTION NEGLECTED) CALCULATED TO BE .015 #OZ. 2MIN. RUN-UP
   .010 IN-OZ. 3MIN. RUN-UP
   RADIUS OF GYRATION CALCULATED TO BE .306 INCH
6. MOTOR BEARINGS TO BE PRELOADED 1.5 TO 2.0 LBS. (STATIC)
7. TOTAL MOTOR WEIGHT TO BE .349# (158.9 GRAMS) ± 1%
8. MOTOR TO BE DYNAMICALLY BALANCED WITHIN 30 M-OZ.-IN. (SCHENCK TREBEL RGO-T GYROBALANCER)
9. ENVIROMENTAL REQUIREMENTS PER KING SPECIFICATION 060-0010-00101
10 ASSY. SHALL BE SECURED WITH ADHESIVE KPN 016-1088-00.

FIGURE 6-10B KG 102A SPIN MOTOR ASSEMBLY DRAWING
(Dwg. 300-01744-0000 Rev. 0)

6.12 KG 102A FRAME ASSY.

200-01741-0000 Rev. AC

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
REF1	300-01741-0000		FRAME ASSY	RF	.00
	016-01082-0000		DC RTV 3145	AR	1.00
	025-00018-0000		WIRE 26 BLK	IN	10.90
	025-00018-0011		WIRE 26 BRN	IN	11.50
	025-00018-0022		WIRE 26 RED	IN	11.90
	025-00018-0033		WIRE 26 ORG	IN	11.20
	025-00018-0044		WIRE 26 YEL	IN	8.60
	025-00018-0055		WIRE 26 GRN	IN	9.30
	025-00018-0066		WIRE 26 BLU	IN	11.30
	025-00018-0077		WIRE 26 VIO	IN	8.80
	025-00018-0099		WIRE 26 WHT	IN	9.30
	030-01004-0000		CLIP LOCKING	EA	1.00
	030-02021-0000		CONN 9 PIN PLUG	EA	1.00
	073-00305-0002		CASTING HOUSING	EA	1.00
	076-00869-0001		CONN NUT .340 W/F	EA	1.00
	091-00109-0000		CABLE TIE	EA	1.00
	150-00018-0010		TUBING SHRINK WHT	IN	4.50
	150-00042-0010		SHRINK TUBING .187	IN	3.60
	2089043-0703		CAP,CONDUCTIVE	EA	1.00

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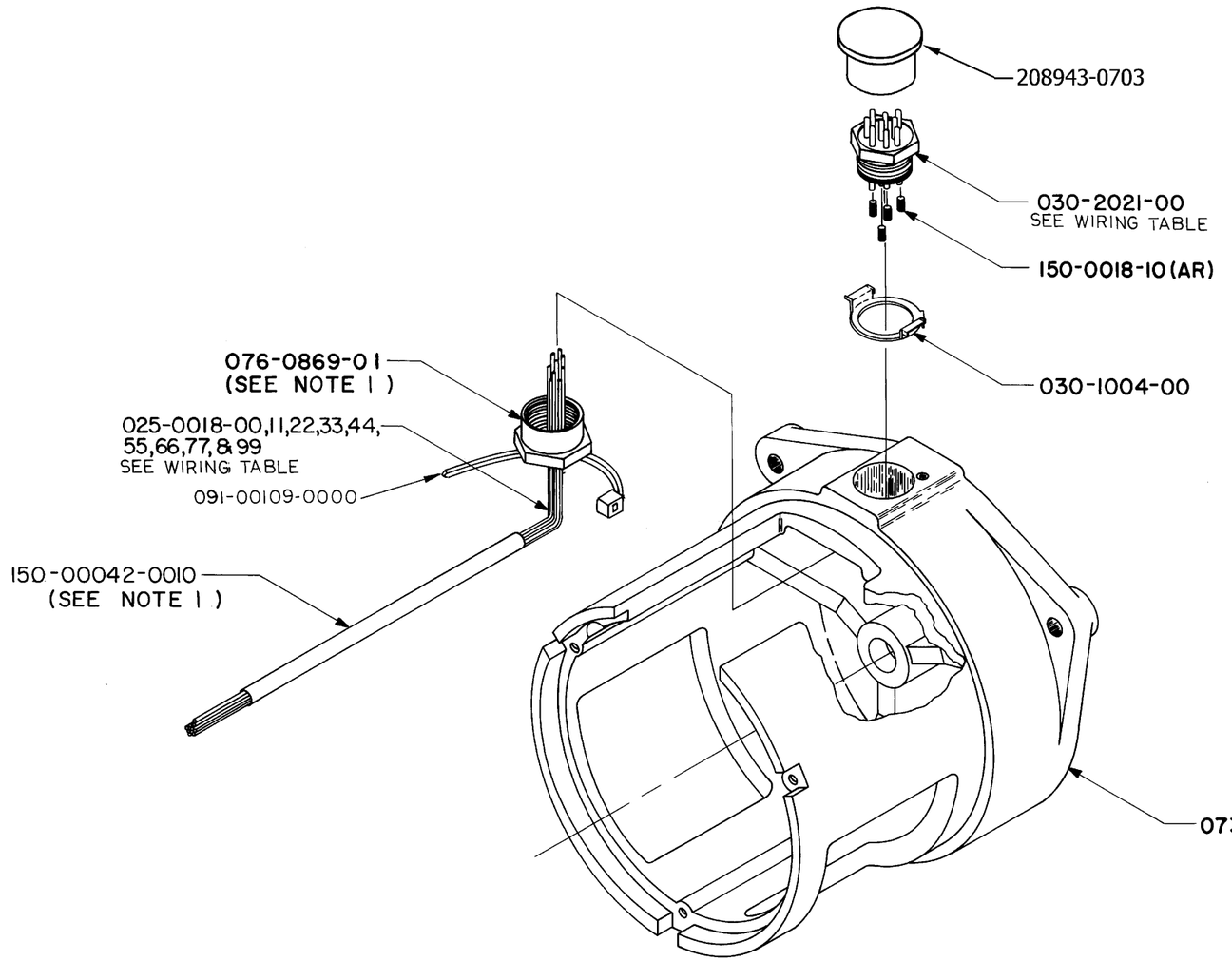


WIRING TABLE

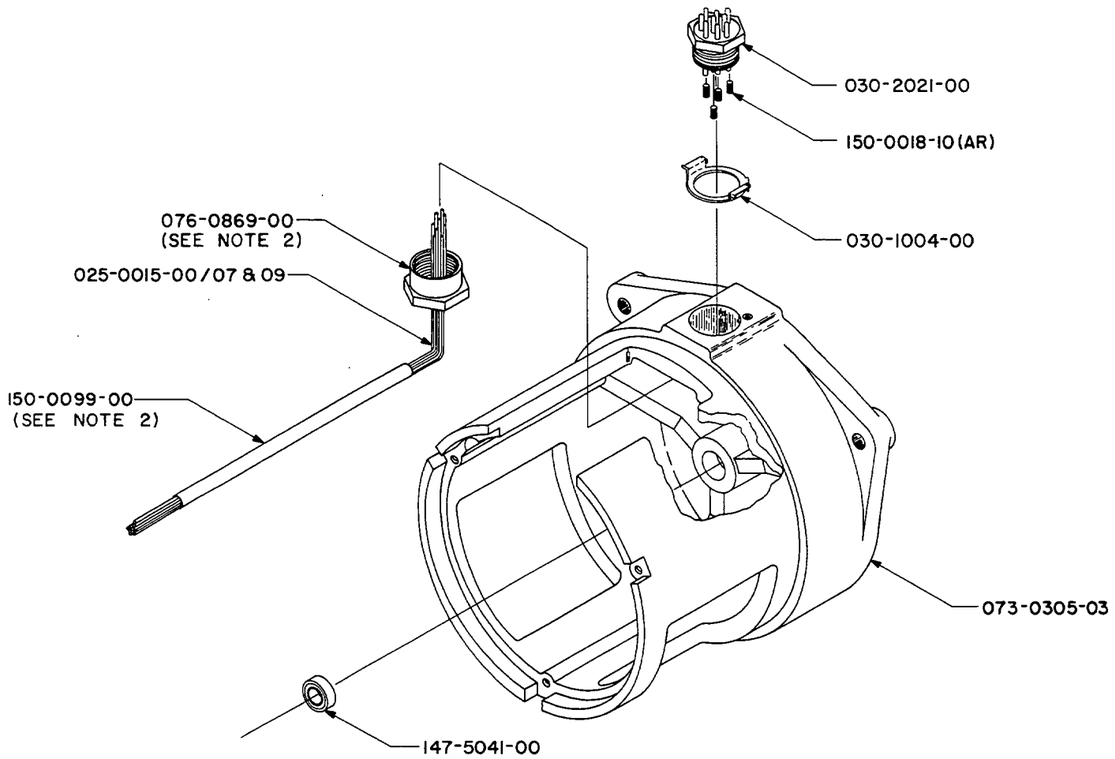
PIN #	WIRE	COLOR
A	025-00018-0044	YELLOW
B	025-00018-0055	GREEN
C	025-00018-0099	WHITE
D	025-00018-0066	BLUE
E	025-00018-0022	RED
F	025-00018-0033	ORANGE
H	025-00018-0000	BLACK
J	025-00018-0011	BROWN
K	025-00018-0077	VOILET

REF. B/M 200-1741-00

NOTES:

1. SECURE IN PLACE WITH 016-1082-00.

FIGURE 6-11 KG 102A FRAME DRAWING
(Dwg. 300-01741-0000 Rev. AB)



NOTES:
1. REFER TO 001-0242-00 FOR ASSEMBLY PROCEDURE
2. SECURE IN PLACE WITH 016-1082-00.

FIGURE 6-11A KG 102A FRAME DRAWING
(Dwg. 300-01741-0000 Rev. 0)

6.13 KG 102A ELECTRONICS ASSY.

200-01693-0000 Rev. AB
200-01693-0001 Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000	0001
Q205	007-00219-0001		XSTR S NPN TIP121	EA	1.00	.
Q207	007-00219-0001		XSTR S NPN TIP121	EA	1.00	.
Q209	007-00276-0002		XSTR MJE181	EA	1.00	.
Q211	007-00276-0003		XSTR MJE171	EA	1.00	.
Q213	007-00276-0000		XSTR MJE180	EA	1.00	.
REF1	300-01693-0000		KG 102A ELECTRONI	RF	.00	.00
REF2	002-00385-0002		SCH KG102A POWER S	RF	.00	.00
T201	019-07048-0000		XFMR INV OUT	EA	1.00	.
	016-01008-0004		GLYPTAL 7526 BL	AR	.00	.
	016-01100-0000		RTV DC 3145	AR	.00	.
	025-00003-0001		WIRE 22 BRN	IN	3.60	.
	025-00003-0013		WIRE 22 OR/WH	IN	7.20	.
	025-00003-0014		WIRE 22 YL/WH	IN	3.60	.
	025-00018-0011		WIRE 26 BRN	IN	.	5.00
	025-00018-0026		WIRE 26 RD/BU	IN	.	5.00
	025-00018-0030		WIRE 26 OR/BK	IN	2.40	.
	025-00018-0033		WIRE 26 ORG	IN	.	5.00
	025-00018-0040		WIRE 26 YL/BK	IN	2.40	.
	025-00018-0096		WIRE 26 WH/BU	IN	.	5.00
	031-00219-0000		SWITCH DPDT LOCKIN	EA	1.00	.
	047-02830-0002		CHASS POWER SUPPLY	EA	1.00	.
	089-02009-0037		NUT FLAT 4-40	EA	4.00	.
	089-02185-0022		NUT LOCK 2-56	EA	2.00	.
	089-05460-0004		SCR, TPG, TC, 2-32	EA	4.00	.
	089-05899-0007		SCR PHP 2-56X7/16	EA	2.00	.
	089-05903-0004		SCR PHP 4-40X1/4	EA	1.00	2.00
	089-05903-0007		SCR PHP 4-40X7/16	EA	3.00	.
	089-06008-0004		SCR FHP 4-40X1/4	EA	2.00	.
	089-06014-0006		SCR FHP 8-32X3/8	EA	2.00	.
	089-08025-0030		WSHR FLT STD #4	EA	3.00	.
	091-00109-0000		CABLE TIE	EA	11.00	2.00
	091-00181-0002		INSULATING BUSHING	EA	2.00	.
	091-00286-0000		INSUL XSTR .437	EA	3.00	.
	091-00286-0020		INSUL XSTR .855	EA	2.00	.
	150-00048-0010		SHRINK TUBING WHT	IN	3.60	.
	187-01029-0000		SEAL-CHANNEL	IN	1.20	.
	200-01689-0000		PWR SPLY BD ASSY	EA	1.00	.
	200-01690-0000		LOGIC BD ASSY	EA	1.00	.
	200-01693-0000		ELECTRONICS ASSY	EA	.	1.00
	200-01696-0000		CABLE ASSY	EA	1.00	.
	200-06571-0000		DIGITAL FILTER	EA	.	1.00

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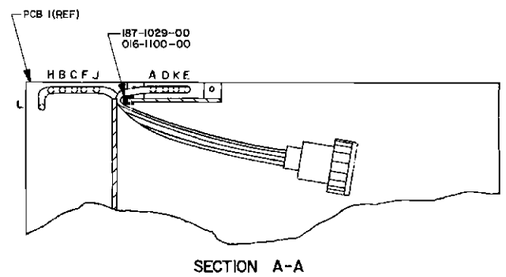
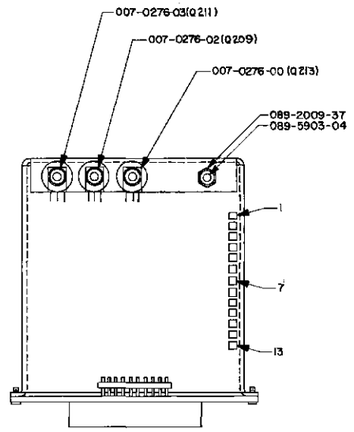
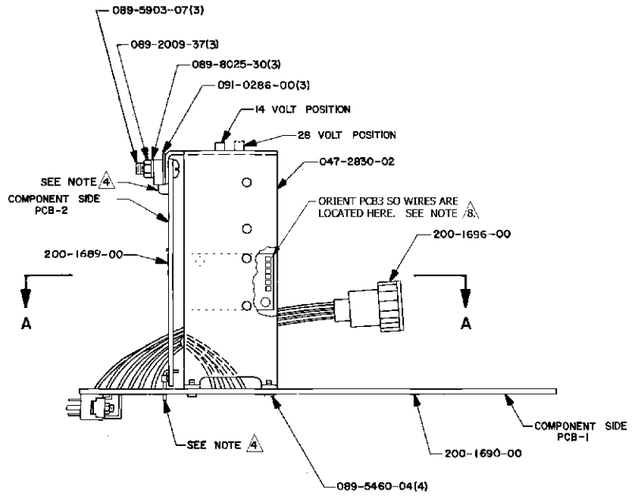
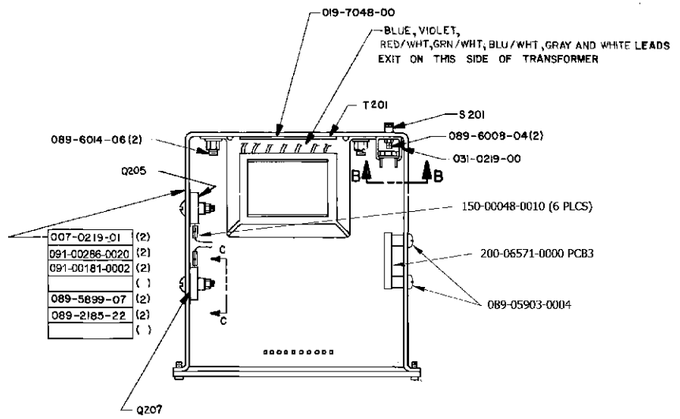
USED ON 200-01693-XXXX	WIRES FROM CONNECTOR ASSY 200-01696-0000 FROM		TO	COLOR
ALL	CONNECTOR	PIN B	PCB 1-B	GRAY/WHITE
"	"	" A	" -A	GRAY
"	"	" F	" F	ORANGE
"	"	" J	" J	GREEN
WIRE FROM SHIELD	SHIELD		" L	BLACK/BROWN
-0000 SEE NOTE 7	CONNECTOR	PIN E	" E	WHITE
-0000 SEE NOTE 7	"	" D	" D	RED
ALL	"	" H	" H	BROWN
"	"	" C	" C	YELLOW
"	"	" K	" K	VIOLET/WHITE
-0001	"	" D	PCB3-5	RED
-0001	"	" E	PCB3-6	WHITE



WIRE NO.	GAGE	COLOR	WIRE P/N	FROM	TO
1 *	22			T101 - GRAY	PCB 2-12
2 *	22			" - WHT	" -13
3 *	26			" - RED/WHT	" -2
4 *	26			" - BLUE/WHT	" -3
5 *	22			" - BLUE	" -9
6 *	22			" - VIOLET	" -8
7 *	20			" - YELLOW	S201 -6
8 *	20			" - BROWN	S201 -2
9 *	20			" - RED	PCB 2-7
10 *	20			" - ORANGE	S201 -1
11 *	22			" - GREEN	S201 -5
12 *	26			" - GRN/WHT	PCB 2-10
13	26	ORN/BLK	025-0018-30	PCB 2-4	Q205-B
14					
15	22	YEL/WHT	025-0003-14	S201-4	" -C
16	26	YEL/BLK	025-0018-40	PCB 2-6	Q 207-B
17					
18	22	ORN/WHT	025-0003-13	S201-3	" -C
19	22	BROWN	025-0003-01	Q 207-E	Q205-E
20	22	BROWN	025-0003-01	"	PCB 2-11
21(#)	26	RED/BLUE	025-00018-0026	PCB3-2	PCB1-D
22(#)	26	WHITE/BLUE	025-00018-0096	PCB3-3	PCB1-E
23(#)	26	ORANGE	025-00018-0033	PCB3-1	PCB1-F
24(#)	26	BROWN	025-00018-0011	PCB3-1	PCB1-H

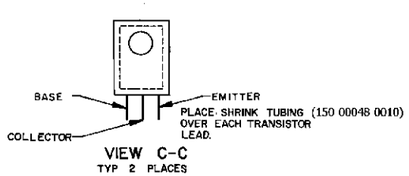


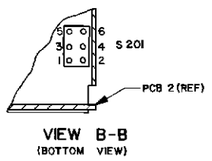




NOTE:

1. PREFORM TRANSISTOR LEADS AND MOUNT SUCH THAT THE LEADS ARE INSERTED INTO THE HOLES PROVIDED IN THE P.C. BOARD (200-1689-00)
2. HAND SOLDER CONNECTOR PINS AFTER ASSEMBLY OF POWER SUPPLY CHASSIS (047-2830-02) TO LOGIC P. C. BOARD(200-1690-00).
3. WIRES MARKED * ARE PART OF TRANSFORMER T101.
4. APPLY GLYPTAL(016-1008-04) TO FASTENERS WHERE NO OTHER LOCKING MEANS IS PROVIDED.
5. ALL WIRE TIES WILL BE SECURED WITH 091-0109-00 TYRAPS.
6. WIRES MARKED WITH (#) USED ONLY ON 200-01693-0001 ASSEMBLY.
7. WIRES MAYBE TRIMMED TO PROPER LENGTH FOR ROUTING AND TERMINATION.
8. DRESS WIRES FROM PCB3 USING CABLE TIES (091-00109-0000 QTY 2).



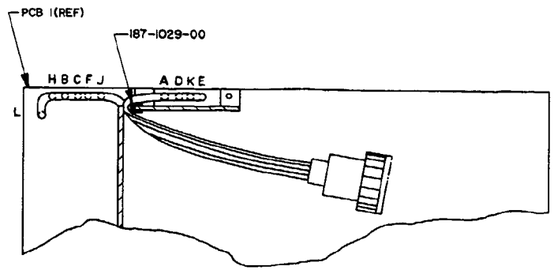


REF B/M 200-01693-0000
REF B/M 200-01693-0001

FIGURE 6-12 KG 102A ELECTRONICS ASSEMBLY DRAWING (Dwg. 300-01693-0000 Rev. AD)

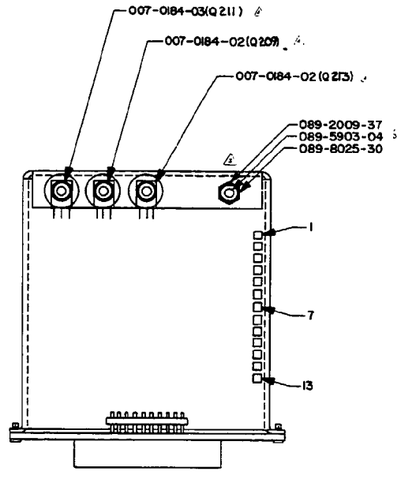
WIRES FROM CONNECTOR ASSY (200-0595-00)

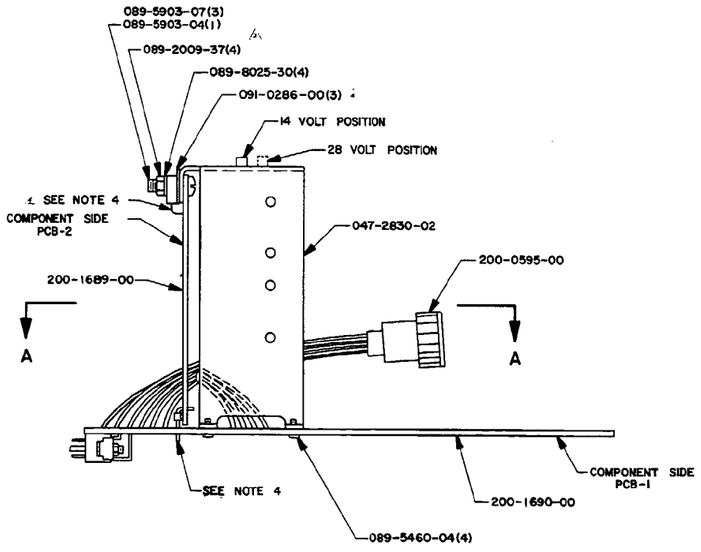
	FROM	TO	COLOR
	CONNECTOR PIN B	PCB 1-B	GRAY/WHITE
	" " A	" -A	GRAY
	" " F	" F	ORANGE
	" " J	" J	GREEN
WIRE FROM SHIELD	SHIELD	" L	BLACK/BROWN
WIRES FROM SHIELDED PAIR	CONNECTOR PIN E	" E	BLACK
	" " D	" D	RED
	" " H	" H	BROWN
	" " C	" C	YELLOW
	" " K	" K	VIOLET/WHITE

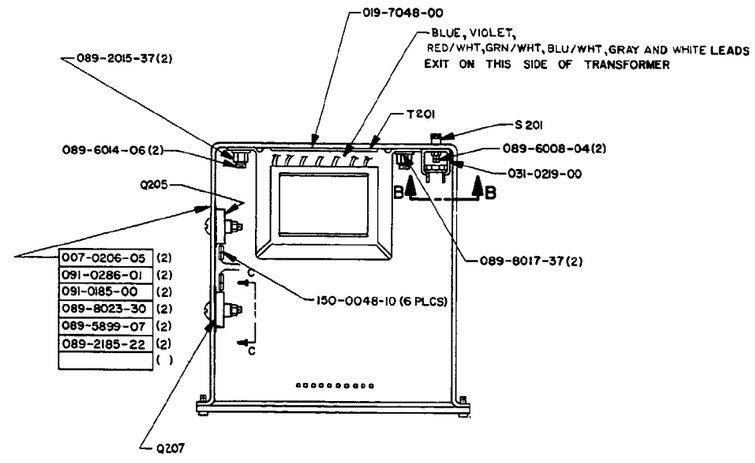


SECTION A-A

WIRE NO.	GAGE	COLOR	WIRE P/N	FROM	TO
1 *	22	——	——	T101 - GRAY	PCB 2-12
2 *	22	——	——	" - WHT	" -13
3 *	26	——	——	" - RED/WHT	" -2
4 *	26	——	——	" - BLUE/WHT	" -3
5 *	22	——	——	" - BLUE	" -9
6 *	22	——	——	" - VIOLET	" -8
7 *	20	——	——	" - YELLOW	S201 -6
8 *	20	——	——	" - BROWN	S201 -2
9 *	20	——	——	" - RED	PCB 2-7
10 *	20	——	——	" -ORANGE	S201 -1
11 *	22	——	——	" -GREEN	S201 -5
12 *	26	——	——	" -GRN/WHT	PCB 2-10
13	26	ORN/BLK	025-0018-30	PCB 2-4	Q205-B
14					
15	22	YEL/WHT	025-0003-14	S201-4	" -C
16	26	YEL/BLK	025-0018-40	PCB 2-6	Q 207-B
17					
18	22	ORN/WHT	025-0003-13	S201-3	" -C
19	22	BROWN	025-0003-01	Q 207-E	Q205-E
20	22	BROWN	025-0003-01	"	PCB 2-11

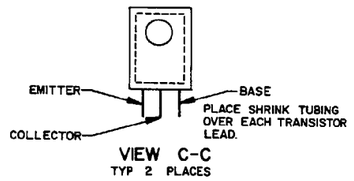




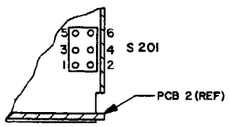


NOTE:

1. PREFORM TRANSISTOR LEADS AND MOUNT SUCH THAT THE LEADS ARE INSERTED INTO THE HOLES PROVIDED IN THE P.C. BOARD (200-1689-00)
2. HAND SOLDER CONNECTOR PINS AFTER ASSEMBLY OF POWER SUPPLY CHASSIS (047-2830-02) TO LOGIC P. C. BOARD(200-1690-00).
3. WIRES MARKED * ARE PART OF TRANSFORMER T101.
4. APPLY GLYPTAL(016-1008-04) TO FASTENERS WHERE NO OTHER LOCKING MEANS IS PROVIDED.
5. ALL WIRE TIES WILL BE SECURED WITH 091-0109-00 TYRAPS.



VIEW C-C
TYP 2 PLACES



VIEW B-B
(BOTTOM VIEW)

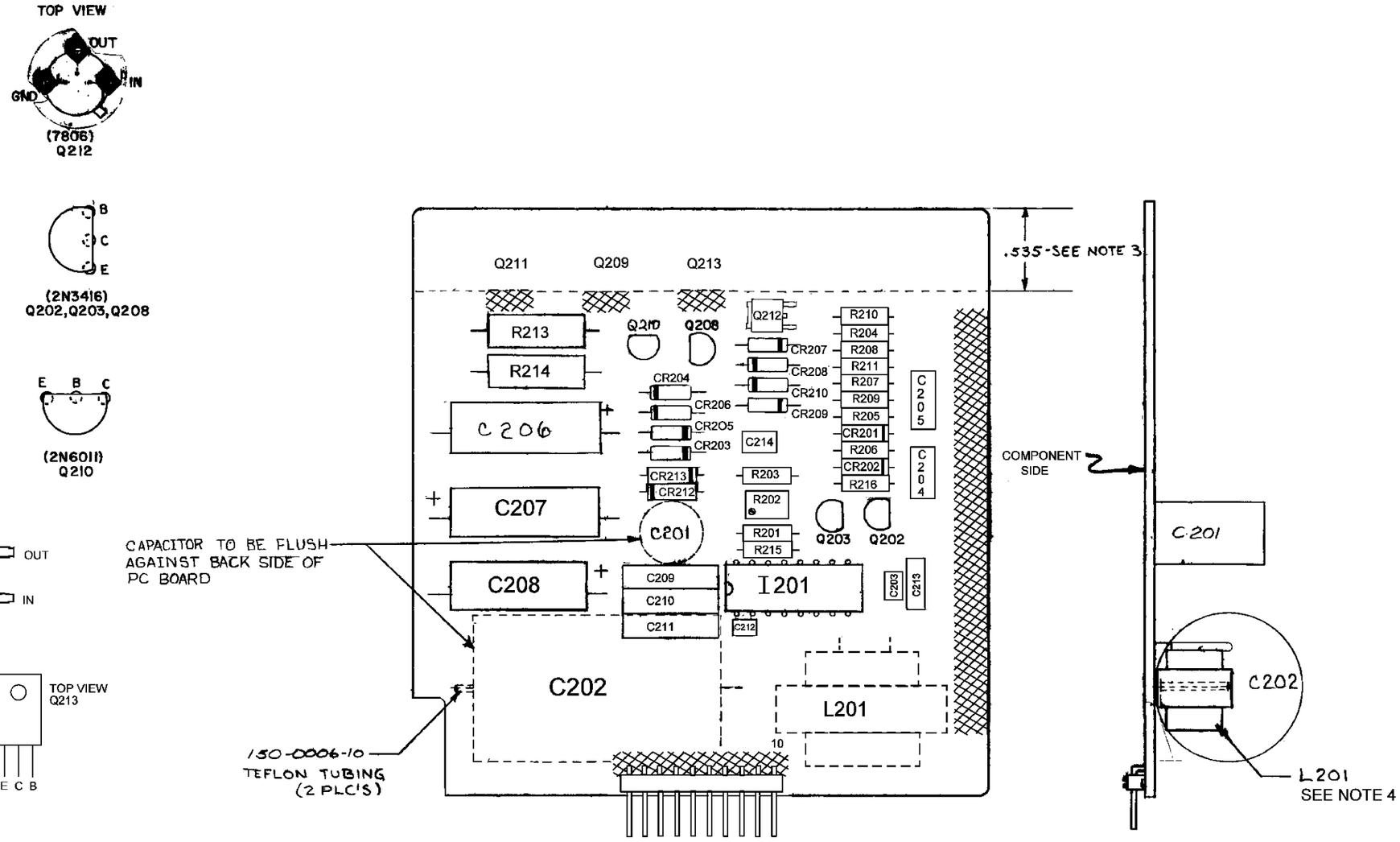
FIGURE 6-12A KG 102A ELECTRONICS ASSEMBLY DRAWING
(Dwg. 300-01693-0000 Rev. 6)

6.14 KG 102A POWER SUPPLY BOARD ASSY.

200-01689-0000 Rev. AD

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C201	097-00068-0026		CAP AL 47UF 50V	EA	1.00
C202	097-00065-0000		CAP AL 500UF 50V	EA	1.00
C203	111-00001-0000		CAP CR .01UF 50V	EA	1.00
C204	113-06103-0000		CAP DC .01UF 50V	EA	1.00
C205	113-06103-0000		CAP DC .01UF 50V	EA	1.00
C206	097-00070-0003		CAP AL 100UF 50V	EA	1.00
C207	097-00070-0003		CAP AL 100UF 50V	EA	1.00
C208	097-00066-0000		CAP AL 150UF 25V	EA	1.00
C209	116-06104-0000		CAP DC .1UF 25V	EA	1.00
C210	116-06104-0000		CAP DC .1UF 25V	EA	1.00
C211	116-06104-0000		CAP DC .1UF 25V	EA	1.00
C212	111-00001-0000		CAP CR .01UF 50V	EA	1.00
C213	111-00010-0001		CAP CR 0.1UF NPO 5	EA	1.00
C214	111-00001-0034		CAP CR 1500PF 50V	EA	1.00
CR201	007-06029-0000		DIO S 1N457A	EA	1.00
CR202	007-06029-0000		DIO S 1N457A	EA	1.00
CR203	007-06025-0000		DIO S 1N4003	EA	1.00
CR204	007-06025-0000		DIO S 1N4003	EA	1.00
CR205	007-06025-0000		DIO S 1N4003	EA	1.00
CR206	007-06025-0000		DIO S 1N4003	EA	1.00
CR207	007-06025-0000		DIO S 1N4003	EA	1.00
CR208	007-06025-0000		DIO S 1N4003	EA	1.00
CR209	007-06025-0000		DIO S 1N4003	EA	1.00
CR210	007-06025-0000		DIO S 1N4003	EA	1.00
CR212	007-05011-0003		DIO Z 16V 1W 5%	EA	1.00
CR213	007-05011-0003		DIO Z 16V 1W 5%	EA	1.00
I201	120-03495-0000		IC SG1524BJ	EA	1.00
L201	019-02152-0001		CH .350MH	EA	1.00
Q202	007-00026-0003		XSTR S NPN 2N3416	EA	1.00
Q203	007-00026-0003		XSTR S NPN 2N3416	EA	1.00
Q208	007-00026-0003		XSTR S NPN 2N3416	EA	1.00
Q210	007-00210-0000		XSTR S X39E1798	EA	1.00
Q212	120-03026-0081		78M06 DPAK VLT REG	EA	1.00
R201	136-05111-0072		RES PF 5.11K QW 1%	EA	1.00
R202	133-00100-0039		RES VA 10K QW 10%	EA	1.00
R203	131-00102-0023		RES CF 1K QW 5%	EA	1.00
R204	131-00202-0023		RES CF 2K QW 5%	EA	1.00
R205	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R206	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R207	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R208	131-00202-0023		RES CF 2K QW 5%	EA	1.00
R209	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R210	131-00202-0023		RES CF 2K QW 5%	EA	1.00
R211	131-00202-0023		RES CF 2K QW 5%	EA	1.00
R213	135-00391-0082		RES MF 390 1W 5%	EA	1.00
R214	135-00391-0082		RES MF 390 1W 5%	EA	1.00

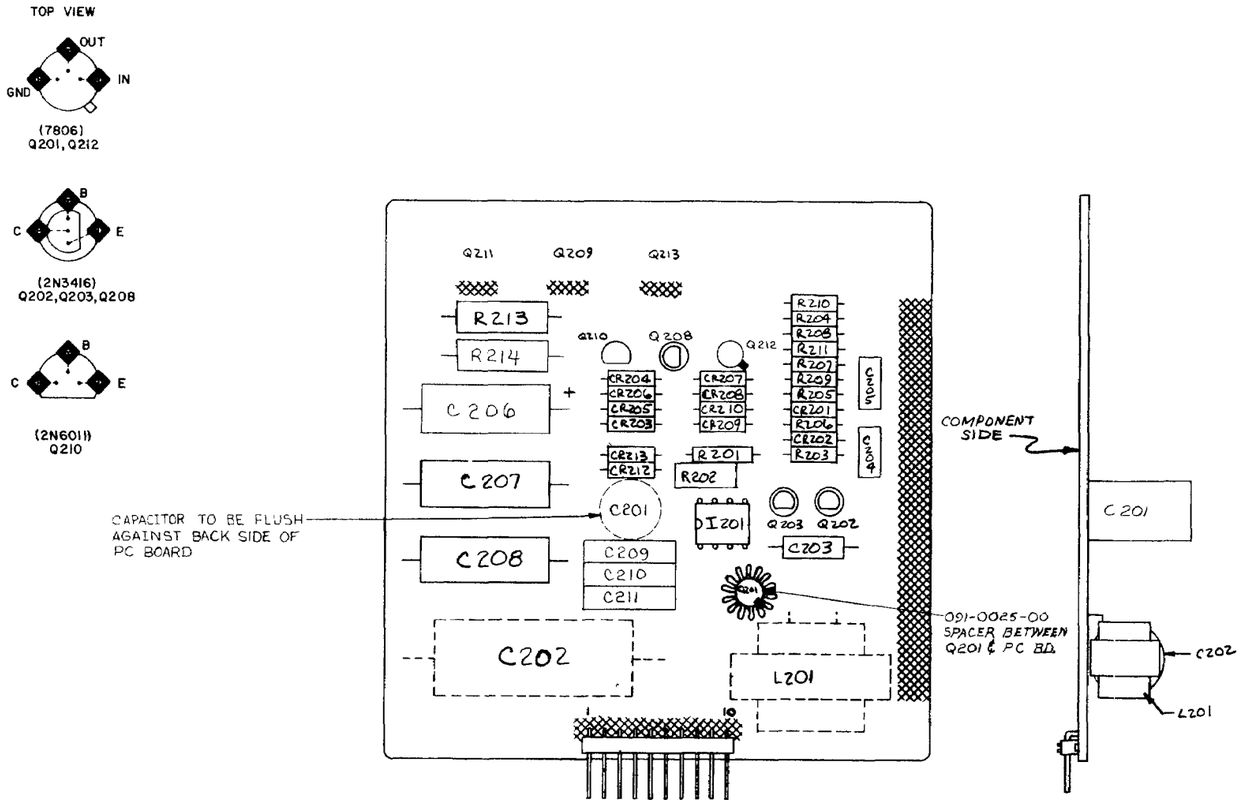
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
R215	131-00102-0023		RES CF 1K QW 5%	EA	1.00
R216	131-00512-0023		RES CF 5.1K QW 5%	EA	1.00
	002-00385-0002		SCH KG102A POWER S	RF	.00
	009-05658-0000		PC BD PWR SUPPLY	EA	1.00
	016-01040-0000		COATING TYPE AR	AR	.00
	030-02185-0001		RGT ANG HDR 10P	EA	1.00
	150-00006-0010		TUBING TFLN 18AWG	IN	3.60
	192-01689-0000		KG 102A POWER SUPP	RF	.00
	300-01689-0000		POWER SUPPLY P.C.	RF	.00



NOTES:

1) FOR COMPLETE ITEM DESCRIPTION SEE B/M 200-1689-00.
2) AFTER ASSEMBLY APPLY URETHANE SEAL COAT, 016-1040-00, TO ALL SURFACES EXCEPT THE CONTACT PINS OF 030-2185-01 AND THE CROSS-HATCHED AREAS. THE CROSS-HATCHING PERTAINS TO BOTH SIDES OF BOARD.
3) DO NOT RUN PATHS (NEAR SIDE ONLY) OR PLACE COMPONENTS IN THIS AREA.
4) TRIM LEADS OF L201 TO 1.1 ± .1". INSERT L201 MOUNTING TABS INTO THE BOARD, BEND INWARD AND SOLDER IN PLACE.

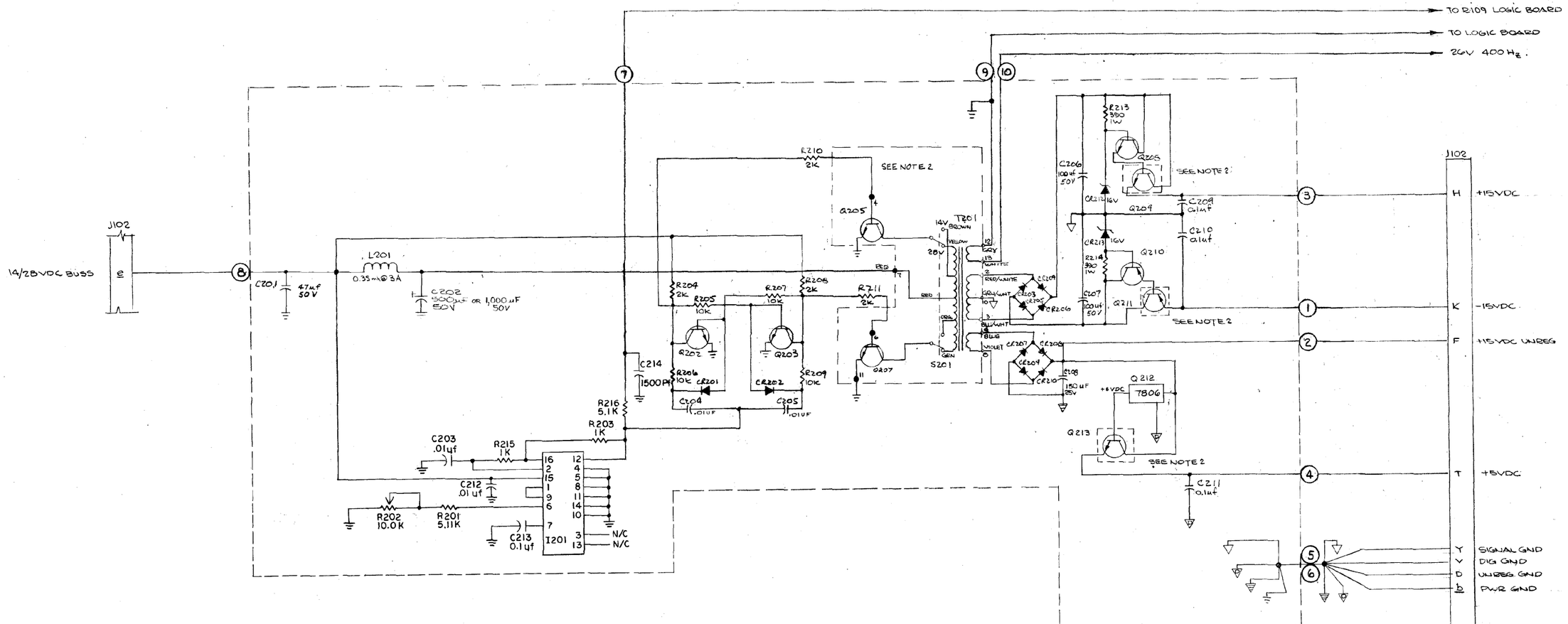
FIGURE 6-13 KG 102A POWER SUPPLY DRAWING
(Dwg. 300-01689-0000 Rev. BD)



NOTES:

1) FOR COMPLETE ITEM DESCRIPTION SEE B/M 200-1689-00.
2) AFTER ASSEMBLY APPLY URETHANE SEAL COAT, 016-1040-00, TO ALL SURFACES EXCEPT THE CONTACT PINS OF 030-2185-01, TRANSISTOR Q201, AND THE CROSS-HATCHED AREAS. THE CROSS-HATCHING PERTAINS TO BOTH SIDES OF BOARD.
3) ADD HEAT SINK 090-0077-00 AFTER APPLYING SEAL COAT PER NOTE 2

FIGURE 6-13A KG 102A POWER SUPPLY DRAWING
(Dwg. 300-01689-0000 Rev. 8)

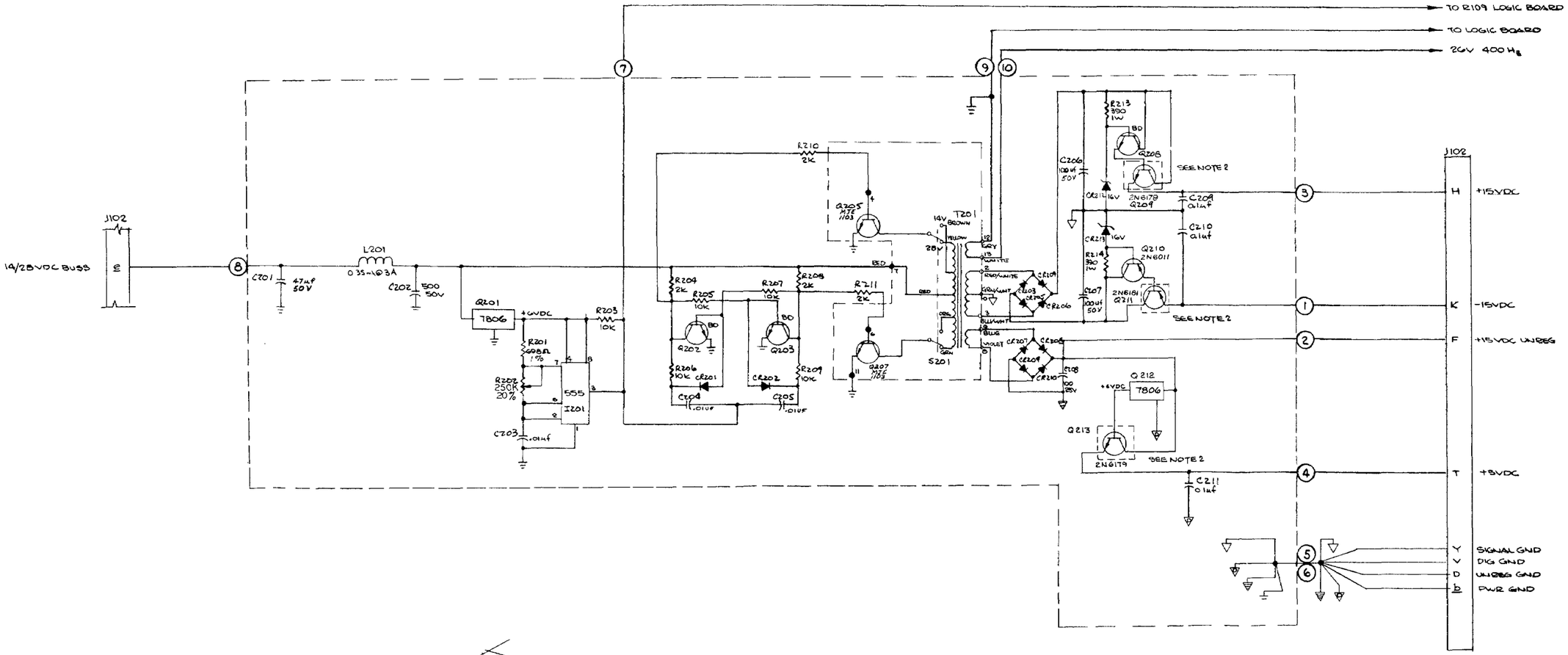


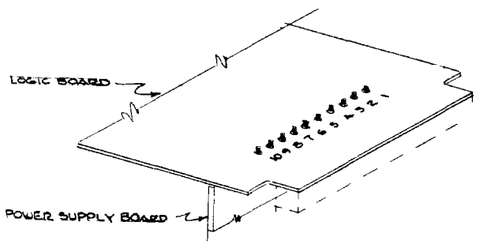
DETAIL SHOWING BOARD CONNECTION

NOTES

1-UNLESS NOTED ALL RESISTANCE VALUE IN OHMS, ¼W, 5 %
&ALL CAPACITANCE VALUES ARE IN MICROFARADS
2-COMPONENTS INSIDE DASHED LINES ARE CHASSIS MOUNTED
3- LAST COMPONENT NUMBERS USED ARE C214, CR213, I201, L201, Q212, R216, S201 AND T201.

FIGURE 6-14 KG 102A POWER SUPPLY SCHEMATIC
(Dwg. 002-00385-0002 Rev. 14)





DETAIL SHOWING BOARD CONNECTION

NOTES

1- UNLESS NOTED ALL RESISTANCE VALUE IN OHMS, ¼ W, 5 %
&ALL CAPACITANCE VALUES ARE IN MICROFARADS
2- COMPONENTS INSIDE DASHED LINES ARE CHASSIS MOUNTED
3- LAST COMPONENT NUMBERS USED ARE C211, CR213, IZ01, L201, Q213, R214, S201 AND T201.

FIGURE 6-14A KG 102A POWER SUPPLY SCHEMATIC
(Dwg. 002-00385-0002 Rev. 7)

6.15 KG 102A LOGIC BOARD ASSY.

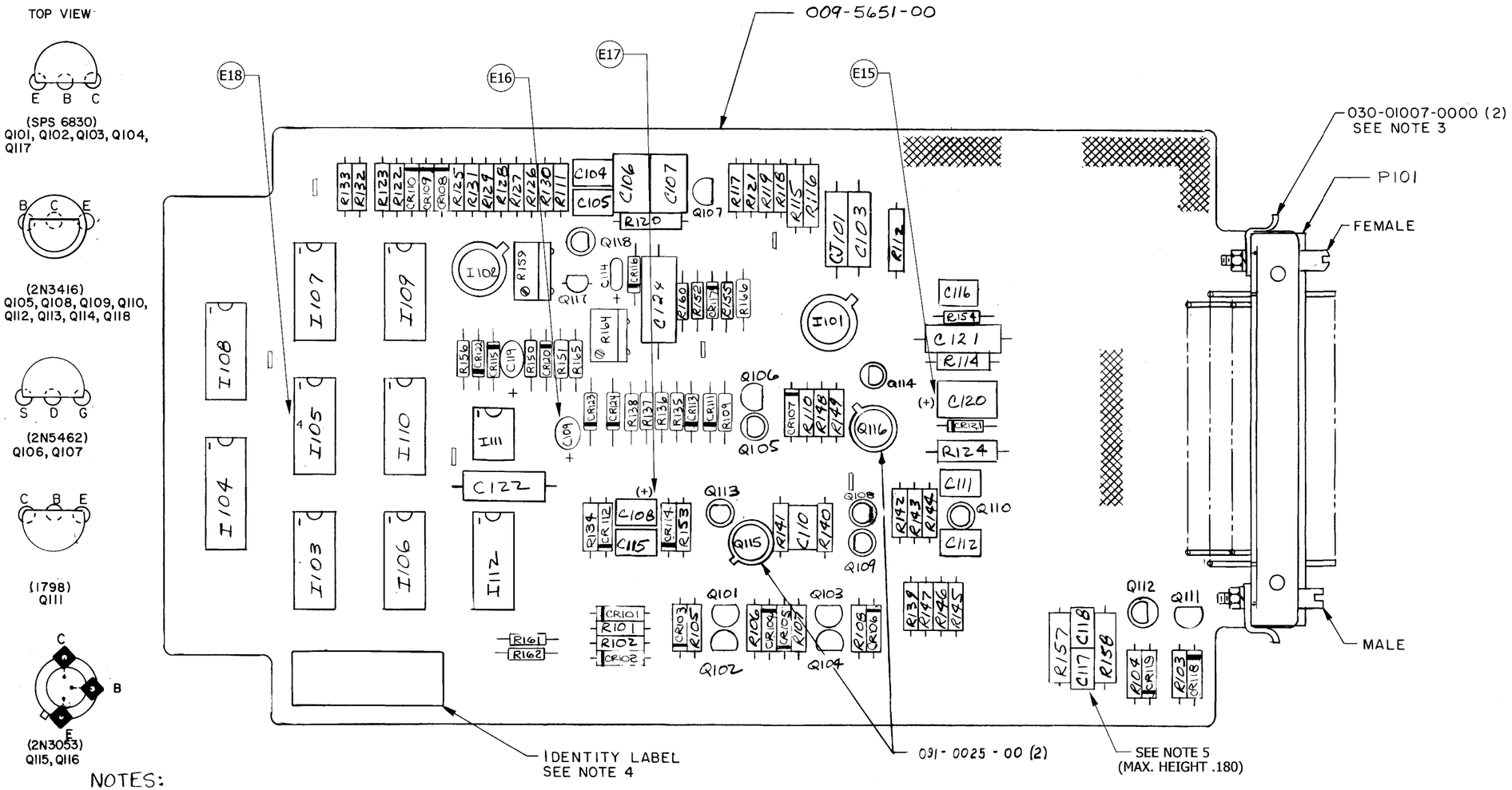
200-01690-0000 Rev. AB

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C103	108-05012-0001		CAP PC .0012UF100V	EA	1.00
C104	096-01030-0002		CAP TN 1UF 20% 35V	EA	1.00
C105	096-01030-0002		CAP TN 1UF 20% 35V	EA	1.00
C106	096-01030-0005		CAP TN 10UF 10%20V	EA	1.00
C107	096-01030-0005		CAP TN 10UF 10%20V	EA	1.00
C108	096-01030-0002		CAP TN 1UF 20% 35V	EA	1.00
C109	096-01030-0015		CAP TN 2.2U 5%15V	EA	1.00
C110	096-01030-0002		CAP TN 1UF 20% 35V	EA	1.00
C111	096-01030-0002		CAP TN 1UF 20% 35V	EA	1.00
C112	096-01030-0002		CAP TN 1UF 20% 35V	EA	1.00
C114	096-01030-0033		CAP TN .47UF20%50V	EA	1.00
C115	096-01030-0002		CAP TN 1UF 20% 35V	EA	1.00
C116	096-01030-0002		CAP TN 1UF 20% 35V	EA	1.00
C117	096-01030-0002		CAP TN 1UF 20% 35V	EA	1.00
C118	096-01030-0002		CAP TN 1UF 20% 35V	EA	1.00
C119	096-01030-0007		CAP TN 68UF 20%20V	EA	1.00
C120	096-01030-0010		CAP TN 10UF20%35V	EA	1.00
C121	105-00031-0021		CAP MY .0047UF 80V	EA	1.00
C122	105-00031-0039		CAP MY .015UF 80V	EA	1.00
C124	105-00031-0032		CAP MY .01UF 80V	EA	1.00
CJ101	026-00018-0002		WIRE CKTJMPR 22AWG	EA	1.00
CR101	007-06029-0000		DIO S 1N457A	EA	1.00
CR102	007-06029-0000		DIO S 1N457A	EA	1.00
CR103	007-06029-0000		DIO S 1N457A	EA	1.00
CR104	007-06029-0000		DIO S 1N457A	EA	1.00
CR105	007-06029-0000		DIO S 1N457A	EA	1.00
CR106	007-06029-0000		DIO S 1N457A	EA	1.00
CR107	007-06029-0000		DIO S 1N457A	EA	1.00
CR108	007-06029-0000		DIO S 1N457A	EA	1.00
CR109	007-06029-0000		DIO S 1N457A	EA	1.00
CR110	007-06029-0000		DIO S 1N457A	EA	1.00
CR111	007-06029-0000		DIO S 1N457A	EA	1.00
CR112	007-06029-0000		DIO S 1N457A	EA	1.00
CR113	007-06029-0000		DIO S 1N457A	EA	1.00
CR114	007-06029-0000		DIO S 1N457A	EA	1.00
CR115	007-06029-0000		DIO S 1N457A	EA	1.00
CR116	007-05011-0018		DIO Z 15V 1W 5%	EA	1.00
CR117	007-06029-0000		DIO S 1N457A	EA	1.00
CR118	007-06029-0000		DIO S 1N457A	EA	1.00
CR119	007-06029-0000		DIO S 1N457A	EA	1.00
CR120	007-06029-0000		DIO S 1N457A	EA	1.00
CR121	007-05011-0001		DIO Z 10V 1W 5%	EA	1.00
CR122	007-06029-0000		DIO S 1N457A	EA	1.00
CR123	007-06029-0000		DIO S 1N457A	EA	1.00
CR124	007-06029-0000		DIO S 1N457A	EA	1.00
I101	120-03022-0001		DUAL OP AMP, CAN,	EA	1.00

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
I102	120-03022-0001		DUAL OP AMP, CAN,	EA	1.00
I103	120-06002-0001		IC SLC4001ABC+	EA	1.00
I104	120-06025-0001		IC SCL4049ABC+	EA	1.00
I105	120-06007-0001		IC SCL4011BC	EA	1.00
I106	120-06007-0001		IC SCL4011BC	EA	1.00
I107	120-06019-0001		IC SCL4030BC	EA	1.00
I108	120-06012-0001		IC SCL4016ABC+	EA	1.00
I109	120-06009-0001		IC MC14013BALDS	EA	1.00
I110	120-06002-0001		IC SLC4001ABC+	EA	1.00
I111	120-03040-0000		IC SE555CN	EA	1.00
I112	120-06002-0001		IC SLC4001ABC+	EA	1.00
P101	030-02220-0000		CONN 37 PIN	EA	1.00
PCB0	009-05651-0000		LOGIC C MOSE 102	EA	1.00
Q101	007-00246-0001		XSTR S NPN MPS5308	EA	1.00
Q102	007-00246-0001		XSTR S NPN MPS5308	EA	1.00
Q103	007-00246-0001		XSTR S NPN MPS5308	EA	1.00
Q104	007-00246-0001		XSTR S NPN MPS5308	EA	1.00
Q105	007-00026-0003		XSTR S NPN 2N3416	EA	1.00
Q106	007-00143-0002		XSTR FET 2N5462	EA	1.00
Q107	007-00143-0002		XSTR FET 2N5462	EA	1.00
Q108	007-00026-0003		XSTR S NPN 2N3416	EA	1.00
Q109	007-00026-0003		XSTR S NPN 2N3416	EA	1.00
Q110	007-00026-0003		XSTR S NPN 2N3416	EA	1.00
Q111	007-00210-0000		XSTR S X39E1798	EA	1.00
Q112	007-00026-0003		XSTR S NPN 2N3416	EA	1.00
Q113	007-00026-0003		XSTR S NPN 2N3416	EA	1.00
Q114	007-00026-0003		XSTR S NPN 2N3416	EA	1.00
Q115	007-00038-0000		XSTR S NPN 2N3053	EA	1.00
Q116	007-00038-0000		XSTR S NPN 2N3053	EA	1.00
Q117	007-00246-0001		XSTR S NPN MPS5308	EA	1.00
Q118	007-00026-0003		XSTR S NPN 2N3416	EA	1.00
R101	131-00153-0023		RES CF 15K QW 5%	EA	1.00
R102	131-00153-0023		RES CF 15K QW 5%	EA	1.00
R103	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R104	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R105	131-00513-0023		RES CF 51K QW 5%	EA	1.00
R106	131-00513-0023		RES CF 51K QW 5%	EA	1.00
R107	131-00513-0023		RES CF 51K QW 5%	EA	1.00
R108	131-00513-0023		RES CF 51K QW 5%	EA	1.00
R109	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R110	131-00153-0023		RES CF 15K QW 5%	EA	1.00
R111	131-00153-0023		RES CF 15K QW 5%	EA	1.00
R112	136-01072-0072		RES PF 10.7K QW 1%	EA	1.00
R114	136-01072-0072		RES PF 10.7K QW 1%	EA	1.00
R115	136-04223-0072		RES PF 422K QW 1%	EA	1.00
R116	136-02052-0072		RES PF 20.5K QW 1%	EA	1.00
R117	131-00205-0023		RES CF 2M QW 5%	EA	1.00
R118	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R119	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R120	136-01912-0072		RES PF 19.1K QW 1%	EA	1.00
R121	131-00754-0023		RES CF 750K QW 5%	EA	1.00
R122	131-00273-0023		RES CF 27K QW 5%	EA	1.00

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
R123	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R124	131-00221-0033		RES CF 220 HW 5%	EA	1.00
R125	131-00205-0023		RES CF 2M QW 5%	EA	1.00
R126	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R127	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R128	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R129	131-00274-0023		RES CF 270K QW 5%	EA	1.00
R130	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R131	131-00205-0023		RES CF 2M QW 5%	EA	1.00
R132	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R133	131-00273-0023		RES CF 27K QW 5%	EA	1.00
R134	131-00274-0023		RES CF 270K QW 5%	EA	1.00
R135	131-00433-0023		RES CF 43K QW 5%	EA	1.00
R136	131-00433-0023		RES CF 43K QW 5%	EA	1.00
R137	131-00305-0023		RES CF 3M QW 5%	EA	1.00
R138	131-00222-0023		RES CF 2.2K QW 5%	EA	1.00
R139	131-00153-0023		RES CF 15K QW 5%	EA	1.00
R140	131-00222-0023		RES CF 2.2K QW 5%	EA	1.00
R141	131-00153-0023		RES CF 15K QW 5%	EA	1.00
R142	131-00153-0023		RES CF 15K QW 5%	EA	1.00
R143	131-00222-0023		RES CF 2.2K QW 5%	EA	1.00
R144	131-00153-0023		RES CF 15K QW 5%	EA	1.00
R145	131-00153-0023		RES CF 15K QW 5%	EA	1.00
R146	131-00222-0023		RES CF 2.2K QW 5%	EA	1.00
R147	131-00153-0023		RES CF 15K QW 5%	EA	1.00
R148	131-00274-0023		RES CF 270K QW 5%	EA	1.00
R149	131-00514-0023		RES CF 510K QW 5%	EA	1.00
R150	131-00514-0023		RES CF 510K QW 5%	EA	1.00
R151	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R152	131-00513-0023		RES CF 51K QW 5%	EA	1.00
R153	131-00513-0023		RES CF 51K QW 5%	EA	1.00
R154	131-00513-0023		RES CF 51K QW 5%	EA	1.00
R155	131-00333-0023		RES CF 33K QW 5%	EA	1.00
R156	131-00274-0023		RES CF 270K QW 5%	EA	1.00
R157	131-00681-0033		RES CF 680 HW 5%	EA	1.00
R158	131-00681-0033		RES CF 680 HW 5%	EA	1.00
R159	133-00096-0033		RES VA 20K HW 10%	EA	1.00
R160	131-00513-0023		RES CF 51K QW 5%	EA	1.00
R161	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R162	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R164	133-00096-0033		RES VA 20K HW 10%	EA	1.00
R165	131-00103-0023		RES CF 10K QW 5%	EA	1.00
R166	131-00104-0023		RES CF 100K QW 5%	EA	1.00
REF	192-01690-0000		KG 102A LOGIC BOAR	RF	.00
REF2	002-00385-0001		ELECTRICAL SCHEMAT	RF	.00
REF3	300-01690-0000		LOGIC PC BD ASSY	RF	.00
TP101	008-00096-0001		TERMINAL TEST PNT	EA	1.00
TP102	008-00096-0001		TERMINAL TEST PNT	EA	1.00
TP103	008-00096-0001		TERMINAL TEST PNT	EA	1.00
TP104	008-00096-0001		TERMINAL TEST PNT	EA	1.00
TP105	008-00096-0001		TERMINAL TEST PNT	EA	1.00
TP106	008-00096-0001		TERMINAL TEST PNT	EA	1.00

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
	016-01040-0000		COATING TYPE AR	AR	1.00
	016-01082-0000		DC RTV 3145	AR	1.00
	030-01007-0000		TAB LOCKING	EA	2.00
	091-00025-0000		WSHR XSTR INSUL	EA	2.00
	150-00004-0010		TUBING TFLN 22AWG	IN	1.00



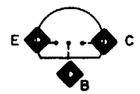
NOTES:

1. AFTER ASSEMBLY APPLY URETHANE SEAL COAT, 016-1040-00, TO ALL SURFACES OF THE BOARAD EXCEPT THE CROSS-HATCHED AREAS, TEST PINS, R159 ADJ. SCREW, R164 ADJ. SCREW AND P101.
THE CROSS-HATCHING PERTAINS TO BOTH SIDES OF BOARD.
2. FOR COMPLETE ITEM DESCRIPTION SEE B/M 200-1690-00.
3. REMOVE FASTENERS FROM P101. INSTALL 030-01007-0000, ONE EACH SIDE. REINSTALL FASTENERS WHEN ASSEMBLY IS COMPLETE.
4. PRINTED CURCUIT CARD MUST BE IDENTIFIED PER 001-01101-0000. LOCATE APPROXIMATELY AS SHOWN.
5. PREFORM C117 LEADS SUCH THAT MAXIMUM HEIGHT (C117 BODY) FROM THE PCB ASSEMBLY IS .180 INCHES. (BODY OF CAPACITOR BENT OVER R157). USE TEFLON TUBING 150-00004-0010 FOR LEAD INSULATION. SECURE C117 WITH RTV (016-01082-0000).

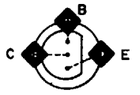
REF. B/M: 200-01690-0000

FIGURE 6-15 KG 102A LOGIC BOARD ASSEMBLY DRAWING
(Dwg. 300-01690-0000 Rev. AC)

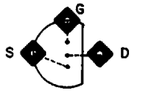
TOP VIEW



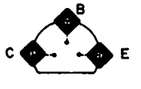
(SPS 6830)
Q101, Q102, Q103, Q104, Q117



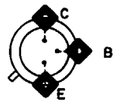
(2N3416)
Q105, Q108, Q109, Q110, Q112, Q113, Q114, Q118



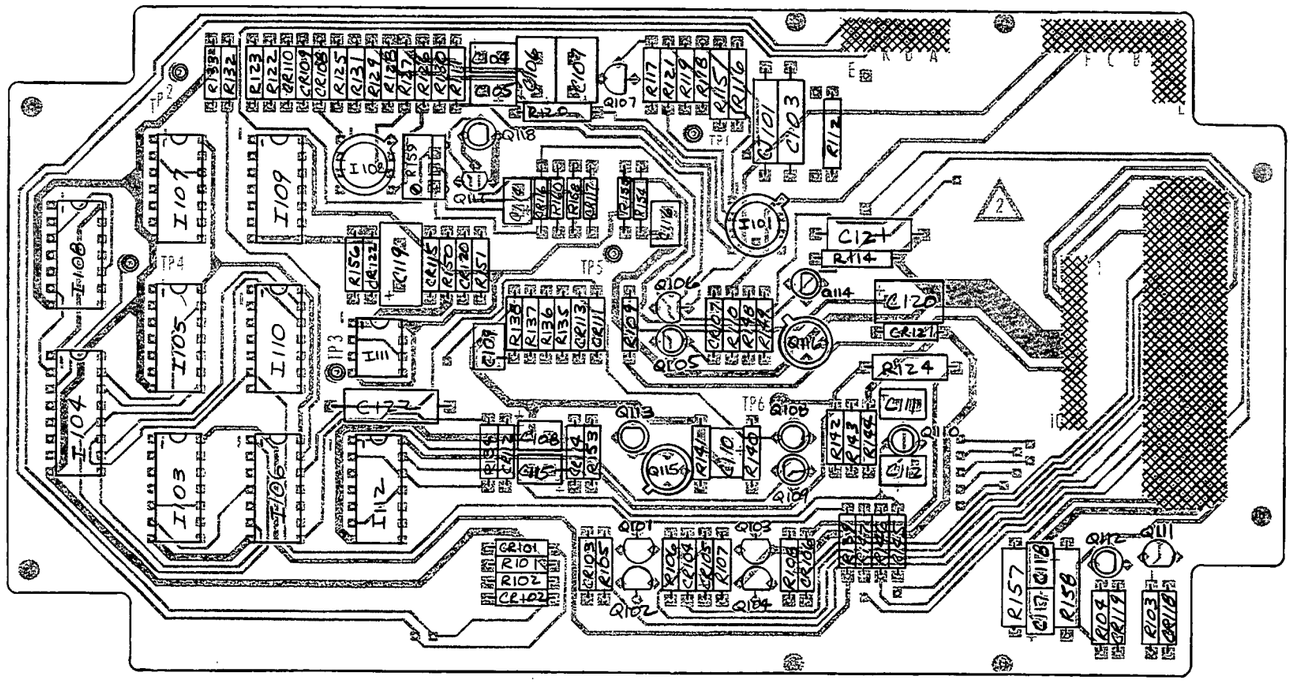
(2N5462)
Q106, Q107



(2N6011)
Q111



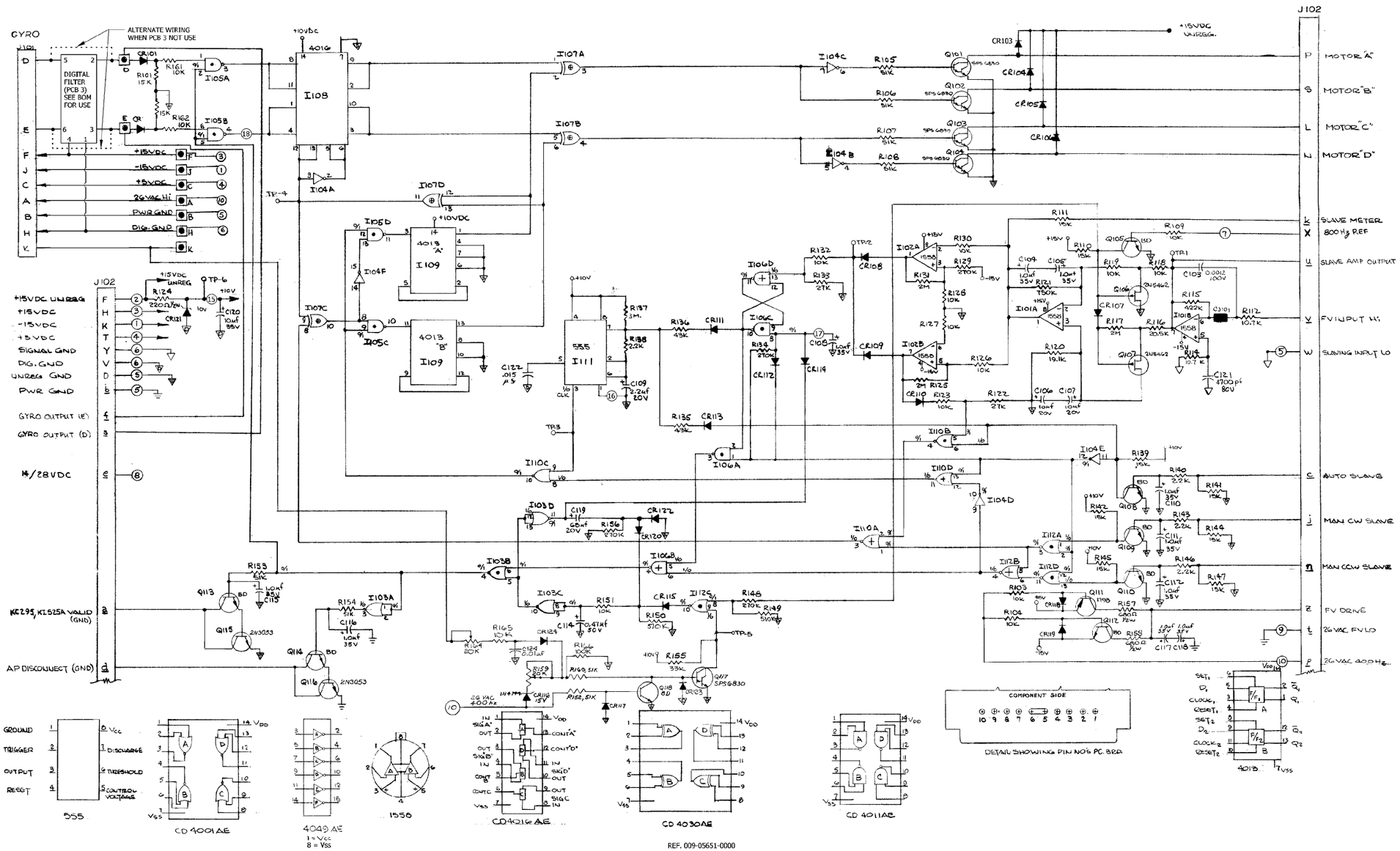
(2N3053)
Q115, Q116



NOTES:

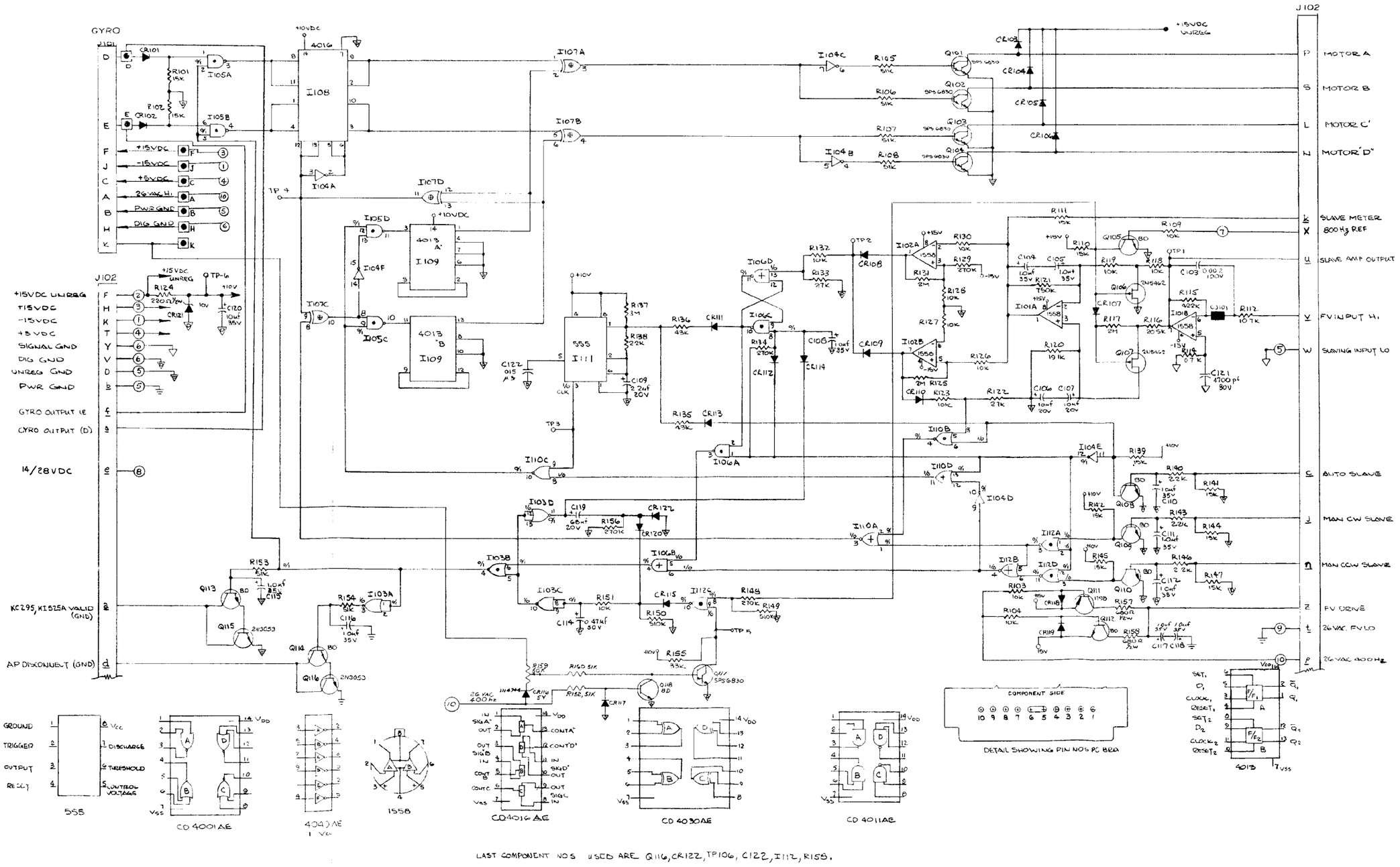
1. AFTER ASSEMBLY APPLY URETHANE SEAL COAT, 016-1040-00, TO ALL SURFACES OF THE BOARD EXCEPT THE CROSS-HATCHED AREAS. THE CROSS-HATCHING PERTAINS TO BOTH SIDES OF BOARD.
2. FOR COMPLETE ITEM DESCRIPTION SEE B/M 200-1690-00.

FIGURE 6-15A KG 102A LOGIC BOARD ASSEMBLY DRAWING
(Dwg. 300-01690-0000 Rev. 3)



LAST COMPONENT NO.'S. USED ARE Q116, CR122, TP106, C123, I112, R158.

FIGURE 6-16 KG 102A LOGIC BOARD SCHEMATIC
(Dwg. 002-00385-0001 Rev. AB)



LAST COMPONENT NOS USED ARE Q116, CR122, TP106, C122, I112, R159.

FIGURE 6-16A KG 102A LOGIC BOARD SCHEMATIC (S/N 3748 & ABOVE)
(Dwg. 002-00385-0001 Rev. 2)

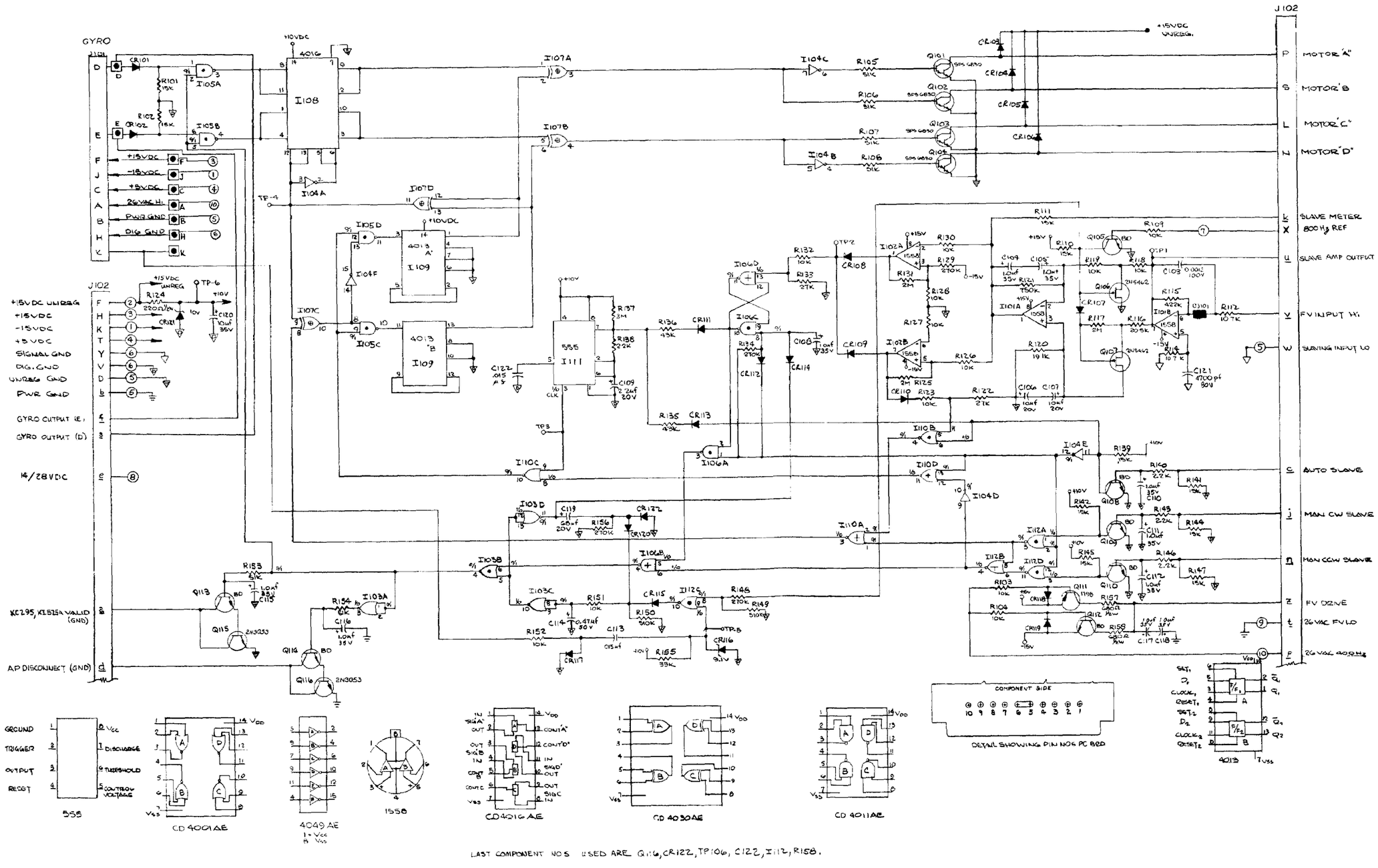


FIGURE 6-16B KG 102A LOGIC BOARD SCHEMATIC (S/N 3748 & BELOW)
(Dwg. 002-00385-0001 Rev. 1)

6.16 KG 102A CABLE ASSY.

200-01696-0000 Rev. AC

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
REF1	300-01696-0000		CABLE ASSY KSG 10	RF	.00
	025-00018-0001		WIRE 26 BK/BN	IN	3.25
	025-00018-0011		WIRE 26 BRN	IN	6.50
	025-00018-0033		WIRE 26 ORG	IN	6.50
	025-00018-0044		WIRE 26 YEL	IN	6.50
	025-00018-0055		WIRE 26 GRN	IN	6.50
	025-00018-0079		WIRE 26 VI/WH	IN	6.50
	025-00018-0088		WIRE 26 GRY	IN	6.50
	025-00018-0089		WIRE 26 GY/WH	IN	6.50
	025-05005-0022		WIRE 24G RED	IN	8.50
	025-05005-0099		WIRE 24G WHT	IN	8.50
	030-02184-0000		CONN 9 PIN FEM	EA	1.00
	091-00109-0000		CABLE TIE	EA	2.00
	150-00018-0010		TUBING SHRINK WHT	IN	4.50
	150-00024-0010		TUBING SHRINK 10G	IN	.50
	150-00098-0017		INSUL TUBING 5D	IN	4.50

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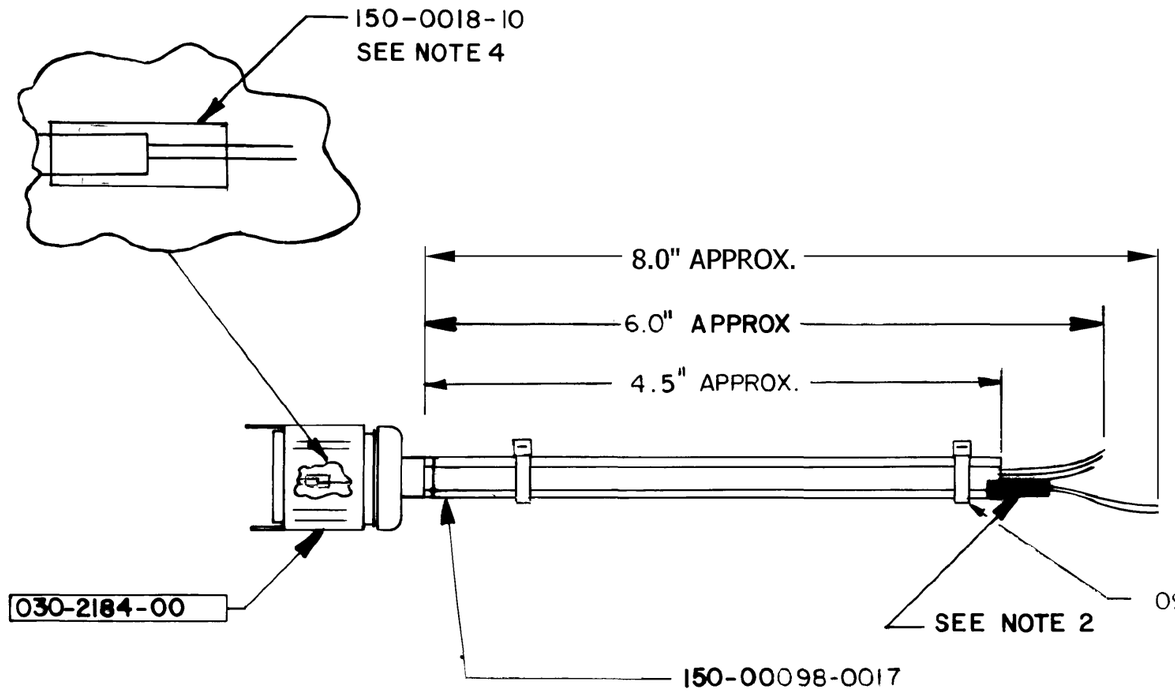

WIRE NO.	PIN	GAUGE	COLOR	WIRE PART NUMBER
1	C	26	YELLOW	025-0018-44
2	H	26	BROWN	025-0018-11
3	D	24	RED	025-05005-0022
4	E	24	WHITE	025-05005-0099
5		26	BLK/BRN	025-0018-01
6	J	26	GREEN	025-0018-55
7	F	26	ORANGE	025-0018-33
8	A	26	GRAY	025-0018-88
9	B	26	GRAY/WHT	025-0018-89
10	K	26	VIO/WHT	025-0018-79

SEE NOTE 2

NOTES:

1. FOR COMPLETE ITEM DESCRIPTION SEE B/M 200-01696-0000.
2. SOLDER SHIELD OF WIRE NO. 3 TO SHIELD OF WIRE NO. 4. SOLDER WIRE NO.5 TO SHIELDS. PLACE ½" OF HEAT SHRINKABLE TUBING (150-00024-0010) OVER ALL THREE WIRES AND SHIELDS.
3. COVER WIRES WITH SLEEVING (150-00098-0017).
4. PLACE ½" OF HEAT SHRINK TUBING (150-0018-10) OVER INDIVIDUAL CONNECTIONS (9 PLC'S).

FIGURE 6-17 KG 102A CABLE ASSEMBLY DRAWING (Dwg. 300-01696-0000 Rev. AC)

6.17 KG 102A DIGITAL FILTER ASSY.

200-06571-0000 Rev. AA

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C301	111-00001-0041		CAP CR 270PF 50V	EA	1.00
C302	111-00001-0041		CAP CR 270PF 50V	EA	1.00
I301	120-06009-0001		IC MC14013BALDS	EA	1.00
I302	120-06019-0001		IC SCL4030BC	EA	1.00
R301	131-00513-0023		RES CF 51K QW 5%	EA	1.00
R302	131-00513-0023		RES CF 51K QW 5%	EA	1.00
	002-06571-0000		SCH DIGITAL FLTR K	RF	.00
	009-06571-0000		PC BD DGTL FLTR	EA	1.00
	016-01040-0000		COATING TYPE AR	AR	1.00
	076-00787-0000		SPACER	EA	2.00
	192-06571-0000		KSG 105 DIGITAL FI	RF	.00
	300-06571-0000		DIGITAL FILTER	RF	.00

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NOTES:

1. AFTER MASKING CONNECTION PADS 1 THRU 6, APPLY CLEAR URETHANE SEAL COAT (016-1040-00) TO BOTH SIDES OF BOARD.

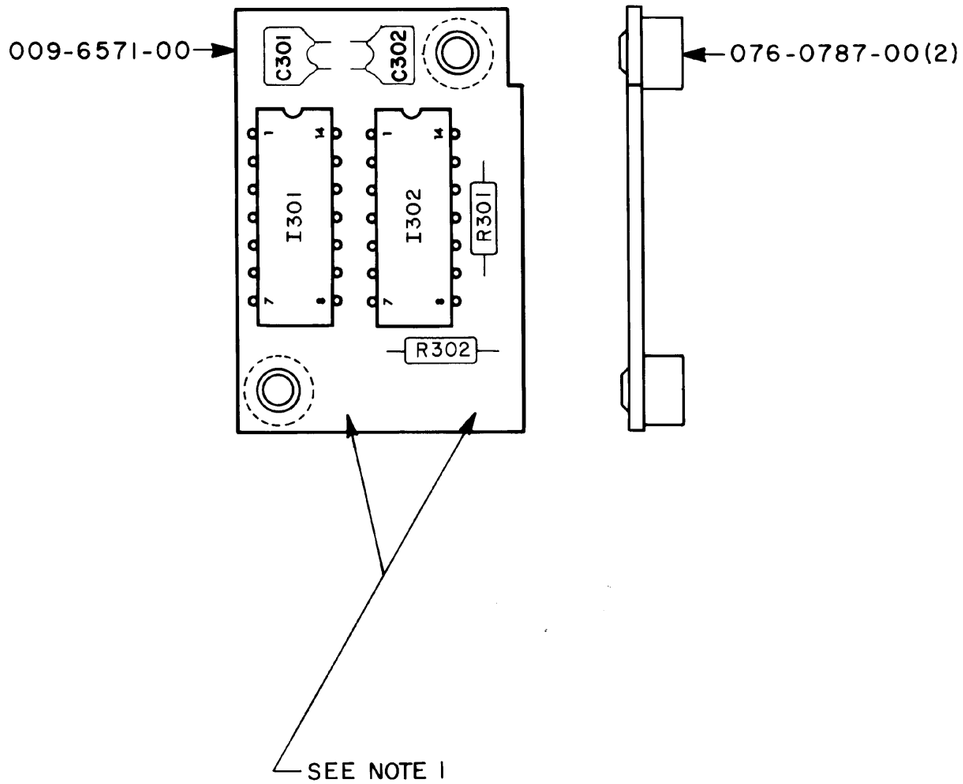

FIGURE 6-18 KG 102A DIGITAL FILTER ASSEMBLY DRAWING (Dwg. 300-06571-0000 Rev. 4)

	+Vs
KSG105	+12V
KG102	+10V

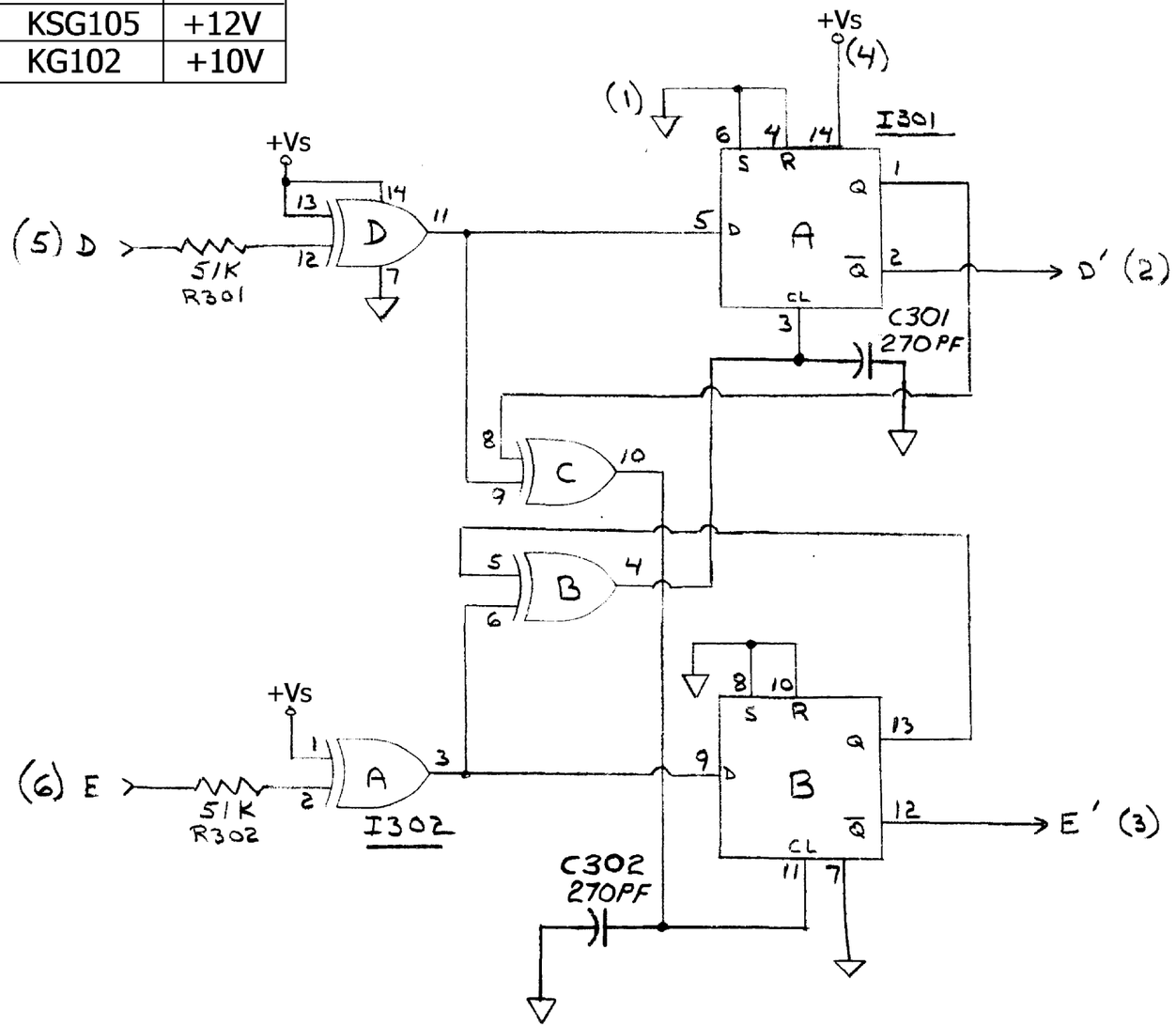

FIGURE 6-19 KG 102A DIGITAL FILTER SCHEMATIC
(Dwg. 002-06571-0000 Rev. AA

6.18 KG 102A GYRO FILTER ASSY.

200-05058-0000 Rev. AA

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
REF	300-05058-0000		GYRO FILTER FINAL	RF	.00
	016-01008-0004		GLYPTAL 7526 BL	AR	1.00
	025-00018-0011		WIRE 26 BRN	IN	3.00
	025-00018-0022		WIRE 26 RED	IN	3.00
	025-00018-0033		WIRE 26 ORG	IN	3.00
	025-00018-0044		WIRE 26 YEL	IN	3.00
	025-00018-0055		WIRE 26 GRN	IN	3.00
	025-00018-0066		WIRE 26 BLU	IN	3.00
	025-00018-0077		WIRE 26 VIO	IN	3.00
	025-00018-0088		WIRE 26 GRY	IN	3.00
	025-00018-0099		WIRE 26 WHT	IN	3.00
	030-01004-0000		CLIP LOCKING	EA	1.00
	030-02021-0000		CONN 9 PIN PLUG	EA	1.00
	030-02184-0000		CONN 9 PIN FEM	EA	1.00
	047-09598-0001		COVER W/ FINISH	EA	1.00
	047-09599-0001		FILTER BRACKET	EA	1.00
	076-02218-0001		FILTER MTG BLOCK	EA	1.00
	089-02087-0011		NUT FLAT 1/2-20	EA	1.00
	089-05899-0004		SCR PHP 2-56X1/4	EA	5.00
	091-00015-0000		RUBBER GRMT 3/16	EA	1.00
	091-00109-0000		CABLE TIE	EA	3.00
	150-00018-0010		TUBING SHRINK WHT	IN	6.00
	200-08379-0000		FILTER BD	EA	1.00

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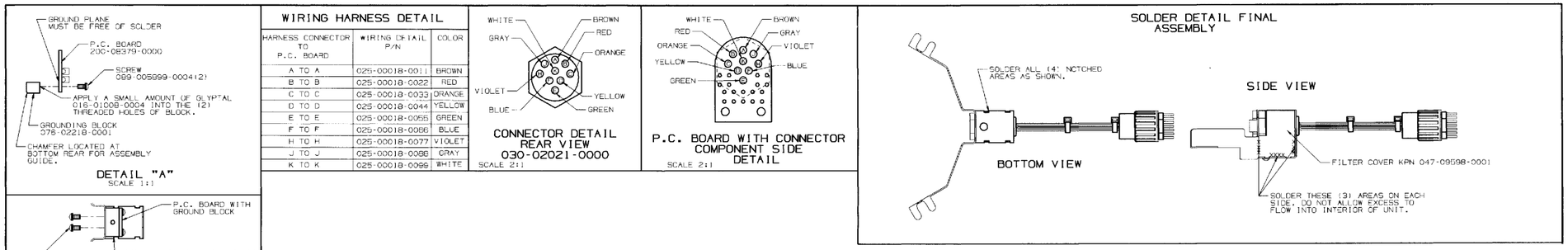
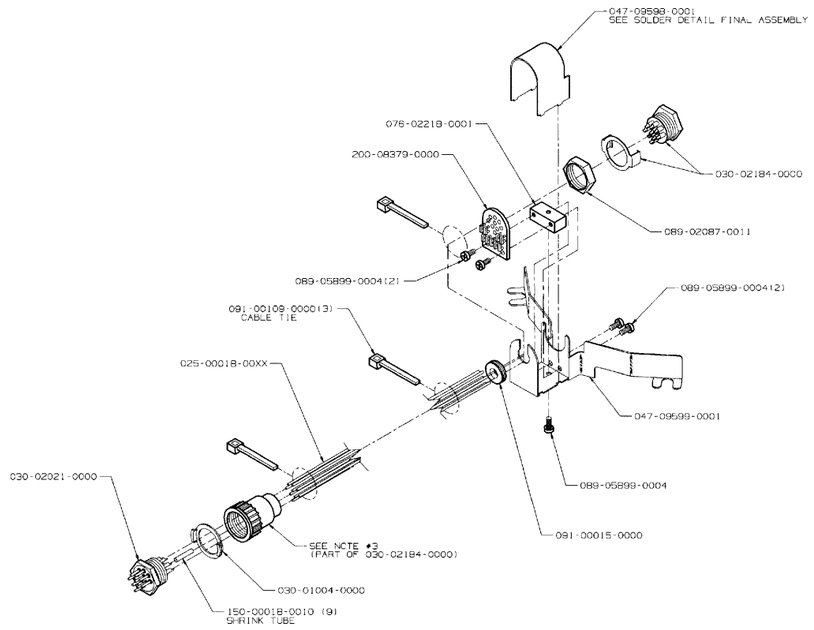


WIRING HARNESS DETAIL

HARNESS CONNECTOR TO P.C. BOARD	WIRING DETAIL P/N	COLOR
A TO A	025-00018-0011	BROWN
B TO B	025-00018-0022	RED
C TO C	025-00018-0033	ORANGE
D TO D	025-00018-0044	YELLOW
E TO E	025-00018-0055	GREEN
F TO F	025-00018-0066	BLUE
H TO H	025-00018-0077	VIOLET
J TO J	025-00018-0088	GRAY
K TO K	025-00018-0099	WHITE



NOTES:

1. MOUNT P.C. BOARD 200-08379-0000 TO GROUNDING BLOCK KPN 076-02218-0001 USING (2) #2-56 SCREWS KPN 089-05899-0004. APPLY SMALL AMOUNT OF GLYPTAL KPN 016-01008-0004 INTO THE (2) THREADED HOLES OF THE GROUNDING BLOCK SEE DETAIL "A". (CAUTION) DO NOT ALLOW GLYPTAL TO SPREAD TO SURFACE BETWEEN GROUNDING BLOCK AND P.C. BOARD.

2. USING (3) #2-56 SCREWS KPN 089-05899-0004 MOUNT P.C. BOARD WITH BLOCK INTO FILTER BRACKET KPN 047-09599-0001. SEE DETAIL "B". DO NOT USE GLYPTAL AT THIS TIME. SCREWS WILL BE REMOVED IN LATER STEPS. USING THE NOTCHES AS SHOWN IN DETAIL "B" CENTER MOUNTING BLOCK THEN TIGHTEN.

3. DETAIL "C" SHOWS CONNECTOR KPN 030-02184-0000 MOUNTING INTO FILTER BRACKET. THIS CONNECTOR HAS A SPECIAL 9 PIN INSERTION ARRANGEMENT. THE PIN ARRANGEMENT IS POSITIONED SO THAT THE FILTER BRACKET WITH P.C. BOARD MOUNTED IS USED AS A FIXTURE. THE CONNECTOR HOOD, PART OF 030-02184-0000 IS USED ON CONNECTOR KPN 030-02021-0000. SEE PARTS ILLUSTRATION. WHEN PIN ARRANGEMENT HAS BEEN ALIGNED SLOWLY TIGHTEN CONNECTOR NUT. THE CONNECTOR PINS SHOULD PROTRUDE THRU P.C. BOARD.

4. DETAIL "D" SHOWS P.C. BOARD AND CONNECTOR IN CORRECT POSITION. USING CONNECTOR DETAIL SOLDER PINS A, B, C, J & H. FINAL SOLDER WORK WILL BE COMPLETED AFTER PARTS ARE REMOVED AS SHOWN IN DETAIL "E". REMOVING THESE PARTS WILL ALLOW BETTER ACCESS FOR FINAL SOLDER OF PINS AND WIRES. REMOVE (3) #2-56 SCREWS HOLDING GROUNDING BLOCK FIRST. NEXT LOOSEN CONNECTOR NUT AND LIFT CONNECTOR AND P.C. BOARD OUT OF BRACKET.

5. HARNESS SHOULD NOW BE ASSEMBLED. PARTS ILLUSTRATION SHOWS CORRECT POSITION OF ALL PARTS. 091-00015-0000 SHOULD BE POSITIONED OVER WIRES BEFORE FINAL SOLDER TO P.C. BOARD. SEE DETAIL "E".

6. AFTER ALL SOLDER WORK IS COMPLETED UNIT IS NOW READY FOR FINAL ASSEMBLY. SEE DETAIL "F". SLIDE CONNECTOR AND P.C. BOARD ASSEMBLY INTO PLACE AND TIGHTEN CONNECTOR NUT. APPLY SMALL AMOUNT OF GLYPTAL UNDER HEADS OF (3) #2-56 SCREWS USED FOR MOUNTING GROUNDING BLOCK AND TIGHTEN. CABLE TIES SHOULD BE POSITIONED AS SHOWN THEN DRAWN TIGHT.

7. POSITION COVER KPN 047-09598-0001 AS SHOWN IN SOLDER DETAIL FINAL ASSEMBLY. WHEN COVER IS IN POSITION SOLDER 3 PLACES ON BOTH SIDES. DO NOT ALLOW EXCESS SOLDER TO FLOW INTO INTERIOR OF UNIT.

8. AFTER ASSEMBLY IS COMPLETED, EACH CONNECTOR PIN SHALL MEASURE 330 ±70 pF WITH RESPECT TO THE FILTER BRACKET. CONNECTOR -TO- CONNECTOR WIRING SHALL BE CHECKED FOR ACCURACY.

DRAWING NOT COMPLETE WITHOUT PARTS LIST: 200-05058-0000

FIGURE 6-20 KG 102A RFI FILTER ASSEMBLY DRAWING (Dwg. 300-05058-0000 Rev. AA)

6.19 KG 102A FILTER BOARD

200-08379-0000 Rev. AA

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C101	111-00001-0015		CAP CR 330PF 50V	EA	1.00
C102	111-00001-0015		CAP CR 330PF 50V	EA	1.00
C103	111-00001-0015		CAP CR 330PF 50V	EA	1.00
C104	111-00001-0015		CAP CR 330PF 50V	EA	1.00
C105	111-00001-0015		CAP CR 330PF 50V	EA	1.00
C106	111-00001-0015		CAP CR 330PF 50V	EA	1.00
C107	111-00001-0015		CAP CR 330PF 50V	EA	1.00
C108	111-00001-0015		CAP CR 330PF 50V	EA	1.00
C109	111-00001-0015		CAP CR 330PF 50V	EA	1.00
REF	002-08379-0000		FILTER BOARD KG	RF	.00
REF	300-08379-0000		FILTER BD ASSY	RF	.00
	009-08379-0000		PC FILTER BD	EA	1.00

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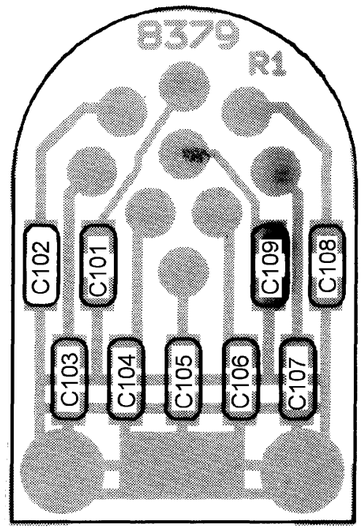
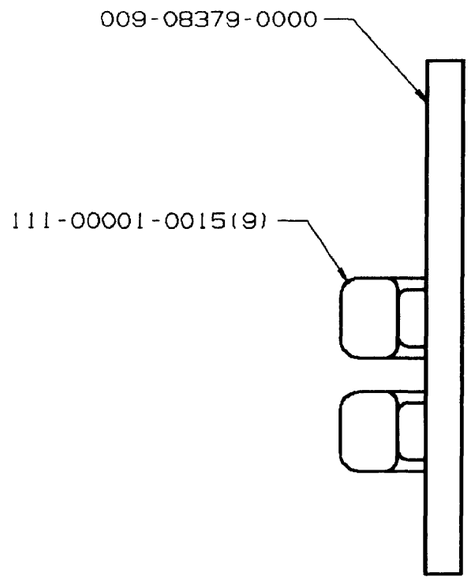
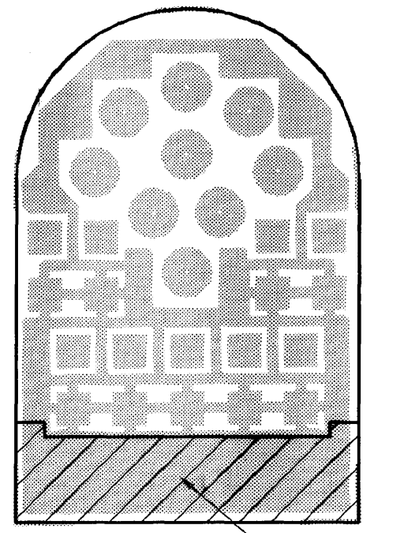


NEAR SIDE





FAR SIDE

NO SOLDER ON GROUND PLANE SURFACE

NOTES:

1. COMPONENT LEADS ON BACKSIDE OF BOARD TO BE TRIMMED TO .040 MAX.
2. DO NOT POST COAT THIS BOARD.
3. ALL COMPONENTS ARE MOUNTED ON THE NEAR SIDE OF BOARD.
4. PRINTED CIRCUIT CARD MUST BE IDENTIFIED PER 001-01101-0000.

REFERENCE BILL OF MATERIALS 200-08379-0000.

FIGURE 6-21 KG 102A FILTER BOARD ASSEMBLY DRAWING (Dwg. 300-08379-0000 Rev. AA)

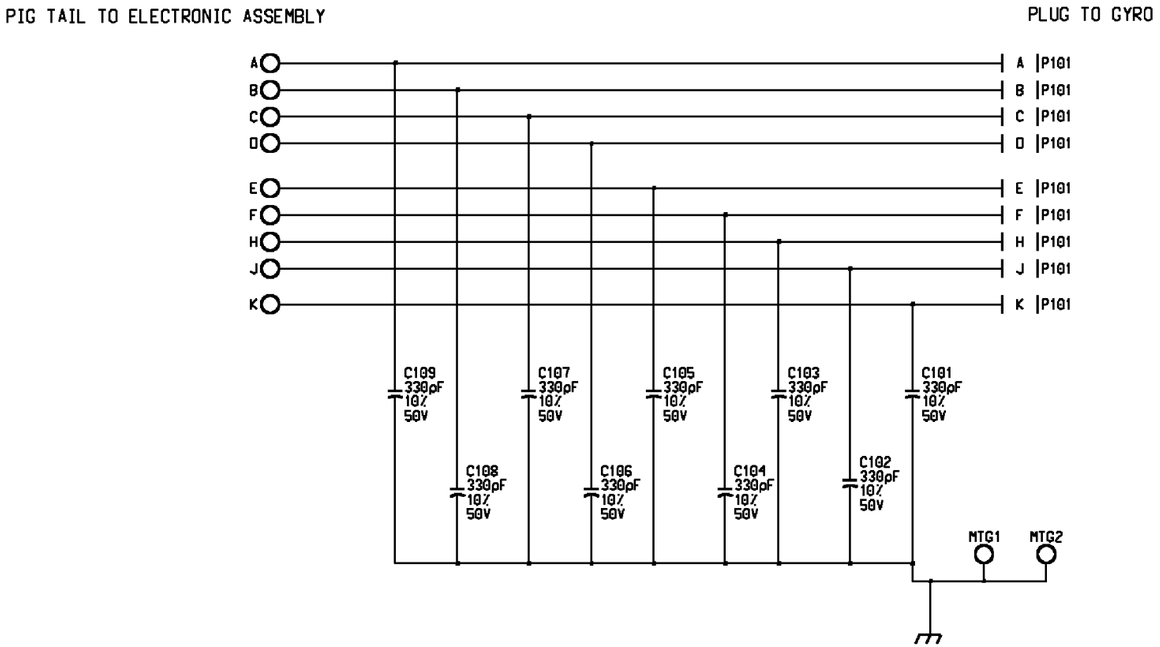


FIGURE 6-22 KG 102A FILTER BOARD SCHEMATIC
(Dwg. 002-08379-0000 Rev. -)

6.20 KG 102A MOUNTING PLATE ASSY.

200-05073-0002 Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0002
REF1	300-05073-0001		PC BOARD MOUNTING	RF	.00
	025-00018-0000		WIRE 26 BLK	IN	11.00
	025-00018-0011		WIRE 26 BRN	IN	11.00
	025-00018-0022		WIRE 26 RED	IN	11.00
	025-00018-0055		WIRE 26 GRN	IN	11.00
	047-02839-0004		COVER PLATE	EA	1.00
	089-02140-0000		NUT LOCK 4-40	EA	4.00
	091-00109-0000		CABLE TIE	EA	2.00
	150-00060-0000		SPIROBAND	IN	4.00
	200-08582-0001		TUMBLE DETECTION	EA	1.00

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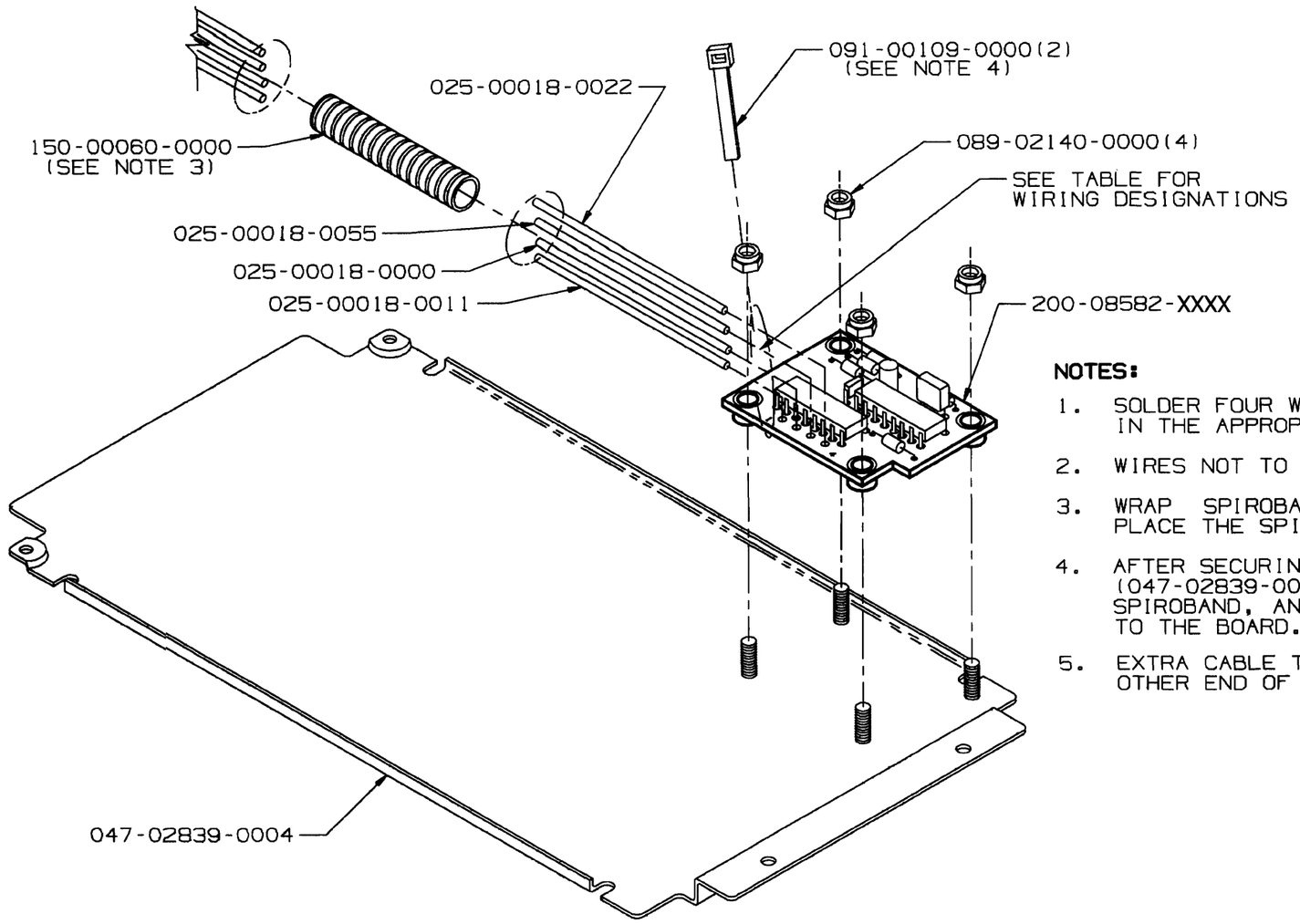

WIRING TABLE

WIRE COLOR	P/N	P.C. BOARD
RED	025-00018-0022	E4
GREEN	025-00018-0055	E3
BLACK	025-00018-0000	E2
BROWN	025-00018-0011	E1

NOTES:

1. SOLDER FOUR WIRES TO THE TUMBLE DETECT BOARD (200-08582-XXXX) IN THE APPROPRIATE PLC'S. (SEE WIRING TABLE AND ILLUSTRATION).
2. WIRES NOT TO EXCEED PAST .040 FROM THE BACK OF THE BOARD.
3. WRAP SPIROBAND AROUND THE **FOUR** WIRES (150-00060-0000). PLACE THE SPIROBAND AS CLOSE TO THE BOARD AS POSSIBLE.
4. AFTER SECURING THE BOARD (200-08582-XXXX) TO THE COVER PLATE (047-02839-0004), WRAP THE CABLE TIE AROUND THE **FOUR** WIRES, SPIROBAND, AND THE EDGE OF THE PC BOARD TO SECURE THE WIRES TO THE BOARD.
5. EXTRA CABLE TIE (091-00109-0000) WILL BE USED TO SECURE THE OTHER END OF THE WIRES IN THE NEXT ASSEMBLY.

THIS DRAWING IS NOT COMPLETE WITHOUT
PARTS LIST 200-05073-0001, 200-05073-0002

FIGURE 6-23 KG 102A P.C. BOARD MOUNTING ASSEMBLY DRAWING
(Dwg. 300-05073-0001 Rev. AB)

6.21 KG 102A TUMBLE DETECTION

200-08582-0001 Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
C401	111-02102-0010		CAP MC 1KPF 50V 5%	EA	1.00
C402	111-02102-0010		CAP MC 1KPF 50V 5%	EA	1.00
C403	111-00001-0012		CAP CR .047UF 50V	EA	1.00
Q401	007-00246-0001		XSTR S NPN MPS5308	EA	1.00
R401	131-00104-0013		RES CF 100K EW 5%	EA	1.00
R402	136-02432-0062		RES PF 24.3K EW 1%	EA	1.00
R403	131-00104-0013		RES CF 100K EW 5%	EA	1.00
R404	131-00183-0013		RES CF 18K EW 5%	EA	1.00
R405	131-00220-0013		RES CF 22 EW 5%	EA	1.00
REF1	002-08582-0000		SCH DIGITAL TUMBLE	RF	.00
REF2	300-08582-0000		DIGITAL TUMBLE DET	RF	.00
U401	120-06055-0000		MC14060BCP	EA	1.00
U402	120-06027-0000		IC CD4017AF	EA	1.00
	009-08582-0000		PCBD DGTL TMBL DET	EA	1.00
	016-01040-0000		COATING TYPE AR	AR	1.00
	016-01082-0000		DC RTV 3145	AR	1.00
	076-00338-0002		SPACER .100	EA	4.00

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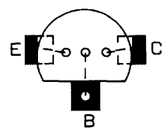
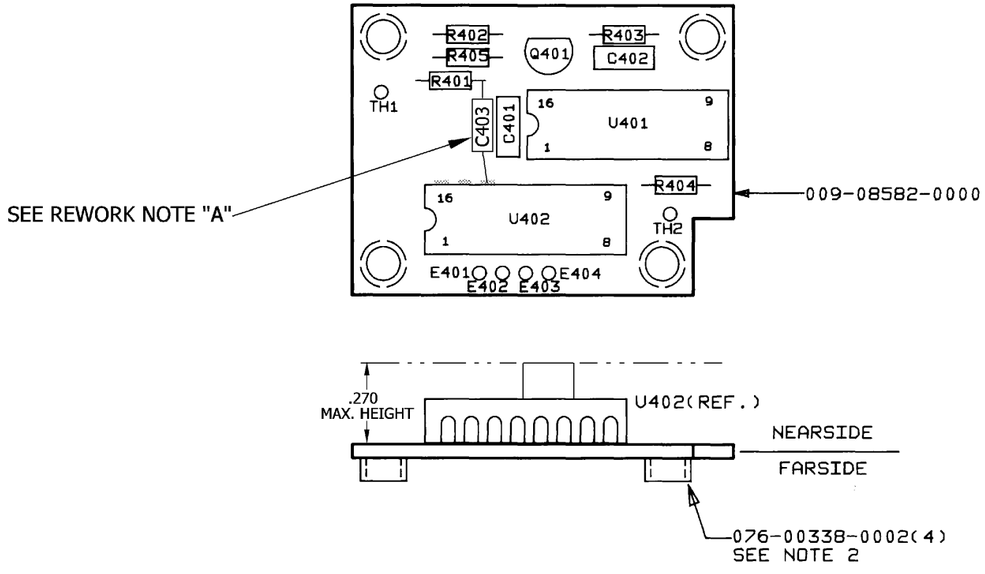


Q401

DETAIL (TOP VIEW)
SCALE 4:1



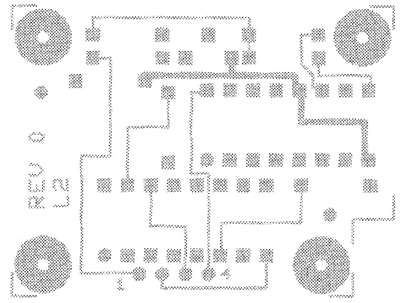
NOTES:

1. PRIOR TO POST COATING BOTH SIDES OF P.C. BOARD WITH KPN 016-01040-0000, MASK OFF THE FOLLOWING; ALL MOUNTING AREAS, ALL "E" NUMBERS.

2. AFTER SPACERS ARE PRESSED INTO BOARD AS SHOWN, SOLDER SPACERS TO BOARD.

REWORK NOTES: (200-08582-0001 ONLY)

A. INSTALL C403 FROM U402-14 (E403 NODE) TO R401 (GROUND). SECURE WITH RTV 016-01082-0000.



REF. B/M: 200-08582-0000
200-08582-0001

FIGURE 6-24 KG 102A DIGITAL TUMBLE DETECTION BOARD ASSEMBLY DRAWING (Dwg. 300-08582-0000 Rev. AA)

Table 1 (KG102/KG105 Variances)		
Item:	KG105	KG102
R402	26.7K	24.3K
C403	---	.043uF
V_S	12VDC	10VDC

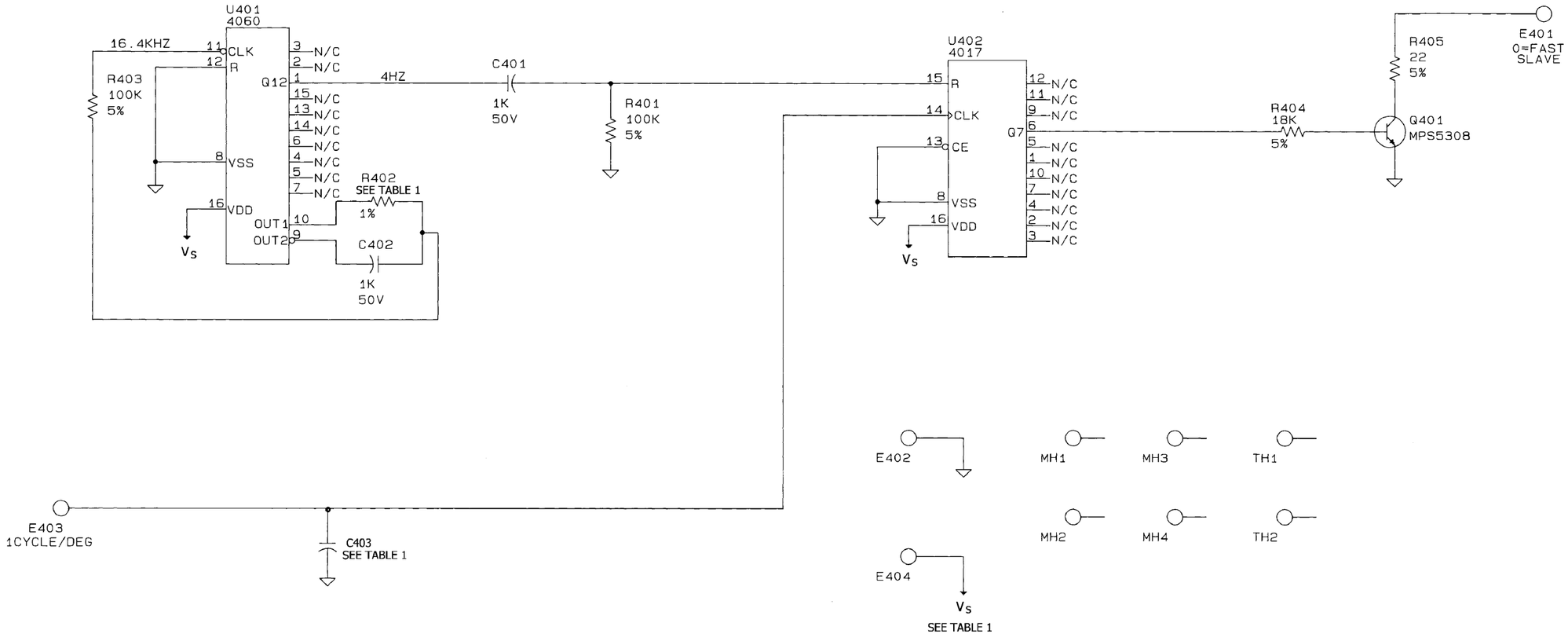


FIGURE 6-25 KG 102A DIGITAL TUMBLE DETECTION BOARD SCHEMATIC
(Dwg. 002-08582-0000 Rev. AA)