



ELECTRONIC AND AVIONICS SYSTEMS

MAINTENANCE MANUAL

BENDIX/KING[®]
KNS 81

*DIGITAL AREA NAVIGATION
SYSTEM*

MANUAL NUMBER 006-05185-0002
REVISION 2, JUNE 1985

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REVISION HISTORY AND INSTRUCTIONS

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Add, replace, or delete pages as indicated below. Insert this page immediately behind the Title Page as a record of revisions.

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Section IV	Replace

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KING RADIO MAINTENANCE MANUAL HISTORY AND REVISION INSTRUCTIONS

MANUAL KNS 81
REVISION 1, December, 1981
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Where R&R appears in the action column, remove the page now in the maintenance manual and replace it with the enclosed page; otherwise, ADD or DESTROY pages as listed. Retain these instructions in the front of the maintenance manual as a Record of Revisions.

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SECTION IV THEORY OF OPERATION

4.1 INTRODUCTION

The KNS 81 is a computerized area navigation unit capable of calculating and displaying course data to a programmed waypoint. The KNS 81 requires an external DME for distance information. The unit can be operated as a VOR, an RNAV, or an ILS (Glideslope optional). It can also be operated as a TACAN if it is a -3X flavor and used in conjunction with a TACAN receiver. It is possible to store up to nine waypoints (-0X, -18 flavors) or 10 waypoints (-1X, 2X & -3X except -18 flavors) in the KNS 81. Waypoint data is retained during power off conditions.

4.1.1 BASIC VOR PRINCIPLES

4.1.1.1 General

The basic function of VHF Omnidirection Range (VOR) is to provide a means to determine an aircraft's position with reference to a VOR ground station and also to follow a certain path toward or away from the station. This is accomplished by indicating when the aircraft is on a selected VOR station radial or by determining which radial the aircraft is on. A means to differentiate between radials and identify them is necessary. For this purpose, advantage is taken of the fact that the phase difference between two signals can be accurately determined. The phase difference between two signals which are generated by the VOR station is varied as the direction relative to the station changes so that a particular radial is represented by a particular phase difference. Refer to Figure 4-1. One non-directional reference signal is generated with a phase that at any instant is the same in all directions. A second signal is generated with a phase that at any instant is different in different directions. The phase of the variable phase signal is the same as the phase of the reference signal only at the 0° radial (North). As the angle measured from the 0° radial increases, the phase of the variable phase signal lags the phase of the reference signal by the number of degrees of the angle from 0° . The reference and variable phase signals, which are 30Hz voltages, are carried by RF to make radio transmission and reception possible. The VOR receiving equipment must separate the 30Hz reference and variable phase signals from the RF carrier and compare the phase of the two signals. The phase difference is indicated on a course indicator or RMI.

4.1.1.2 VOR Generation

The VOR electromagnetic field is composed of the radiation from two ground based antennas radiating at the same carrier frequency. The first is a non-directional antenna radiating an amplitude modulated carrier. The frequency of the modulating signal varies from 9480Hz to 10,440Hz back to 9480Hz 30 times per second. That is, a 9960Hz subcarrier amplitude modulates the RF carrier and is frequency modulated by 30Hz.

The second antenna is a horizontal dipole which rotates at the rate of 30 revolutions per second. The dipole produces a figure 8 field pattern. The RF voltages within the two lobes are 180° out of phase with each other. The RF within one of the lobes is exactly in phase with the RF radiated from the non-directional field. The rotating figure 8 pattern reinforces the non-directional pattern on the side (see Figure 4-1). This results in a cardioid field pattern which rotates at the rate of 30 revolutions per second, the rate at which the dipole antenna rotates.

The signal at an aircraft within radio range of the VOR station is an RF carrier with amplitude varying at the rate of 30Hz because of the rotation of the cardioid pattern. The carrier is also amplitude modulated at the station by the 9960Hz signal which is, in turn, frequency modulated by the 30Hz reference signal so that it may be separated from the 30Hz variable phase signal.

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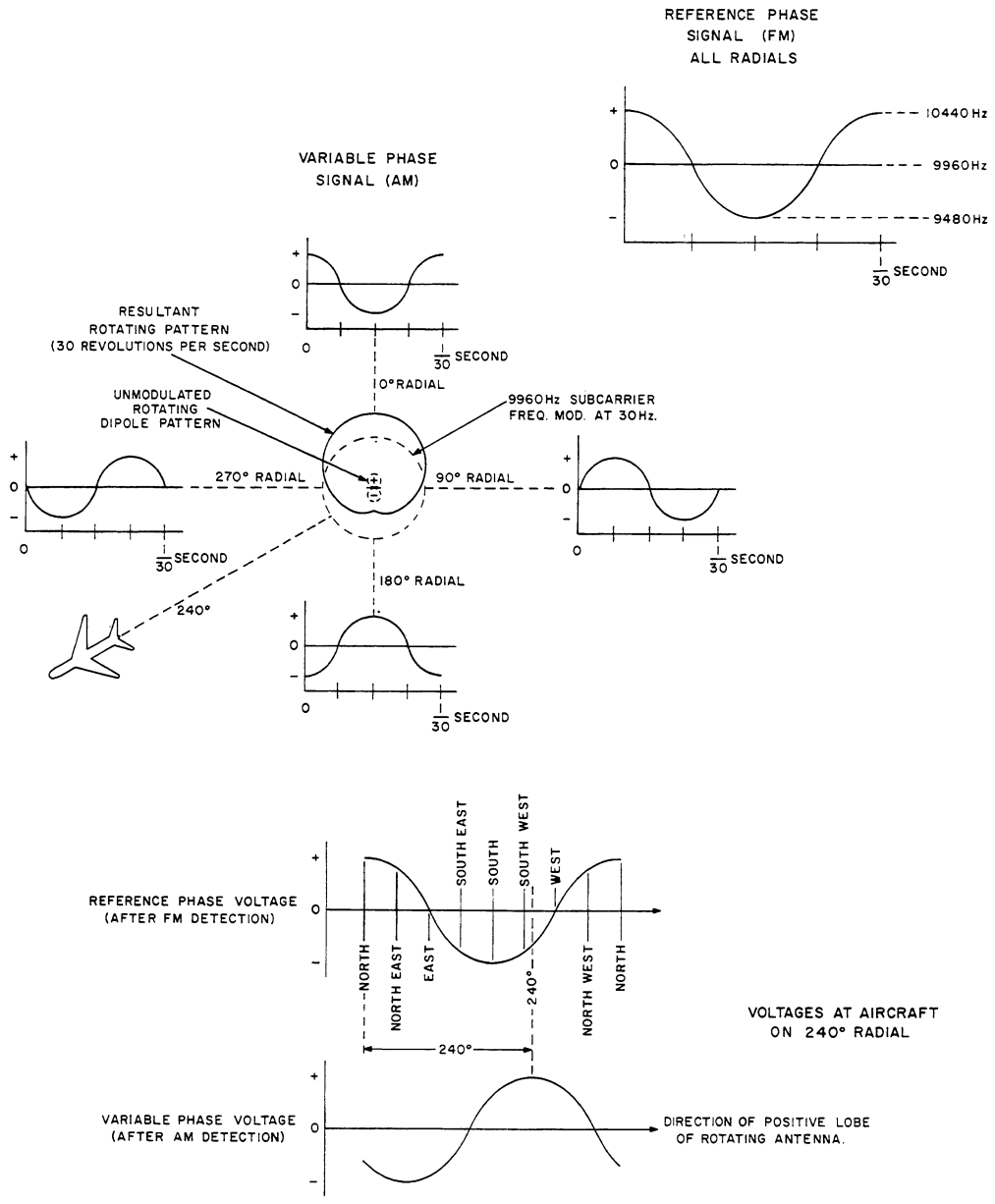


FIGURE 4-1 VOR SIGNAL GENERATION
(Dwg. No. 696-0714-00, R-0)

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4.1.2 BASIC AREA NAVIGATION PRINCIPLES

When the KNS 81 is in RNAV mode, the navigation computer must solve navigation problems. A typical problem is shown in Figure 4-2.

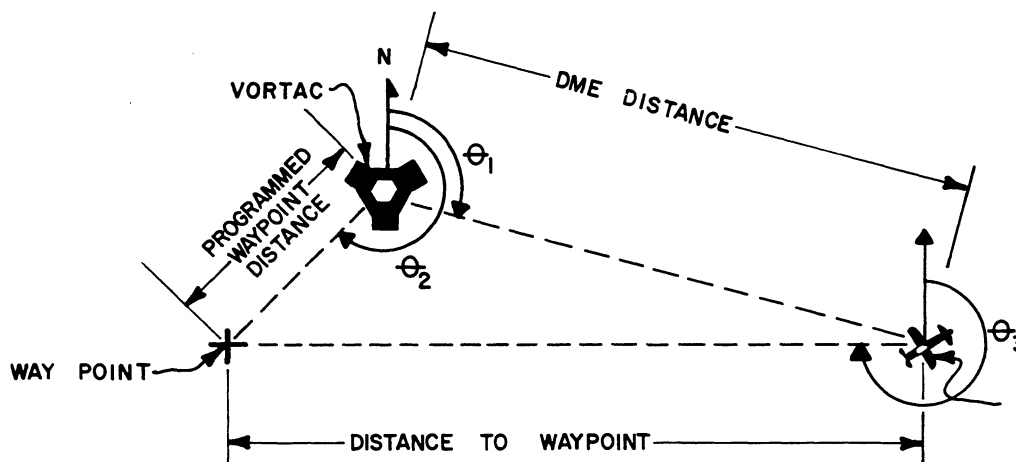


FIGURE 4-2 TYPICAL AREA NAVIGATION PROBLEM

θ_1 (pronounced Theta one) represents the angle from the VORTAC to the aircraft, the received radial. θ_2 represents the angle that the waypoint is from the VORTAC. Two sides and the included angle are known enabling the triangle to be solved. Trigonometry is used to find the unknown distance to waypoint and θ_3 . The computer then compares θ_3 to the selected course angle obtained from the OBS. The distance deviation from the selected course is calculated from the distance to waypoint and the angular deviation from selected course.

Course deviation is computed by solving another triangle formed by the distance to the waypoint, θ_3 and the OBS angle selected by the pilot. The solution is made for course distance deviation rather than course bearing deviation as in conventional VOR converters. Refer to Figure 4-3.

Course distance deviation is commonly called constant course width. It is advantageous because it presents the pilot and autopilot with position error in constant terms which are easier to interpret. The large deviation errors common to VOR converters at station passage are also eliminated by the constant course width feature.

The TO/FROM indication is derived by comparing the phase difference between θ_3 and the OBS angle. If this difference is $\pm 90^\circ$ or less, a TO indication is given. Likewise, if the difference is greater than $\pm 90^\circ$, a FROM indication is given.

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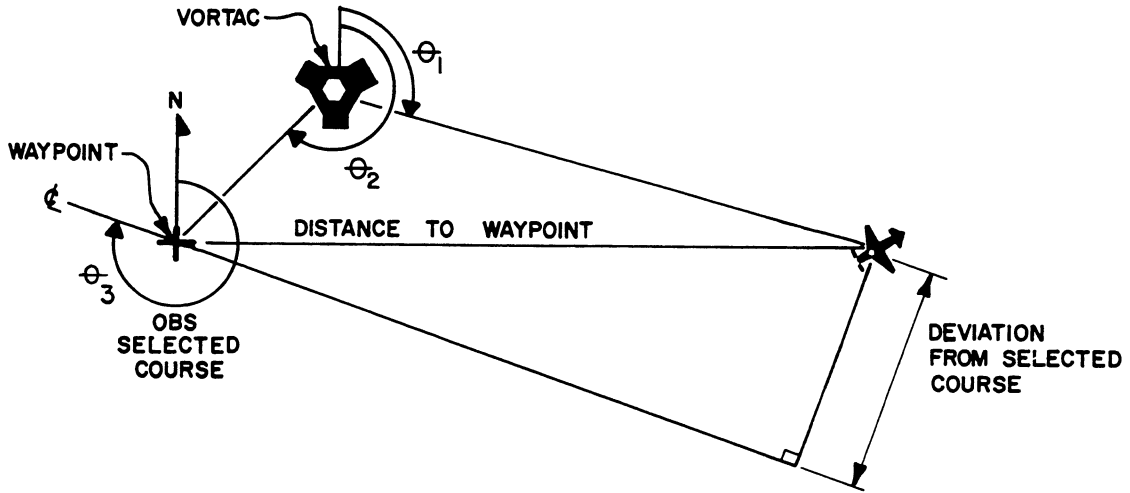


FIGURE 4-3 DEVIATION FROM SELECTED COURSE

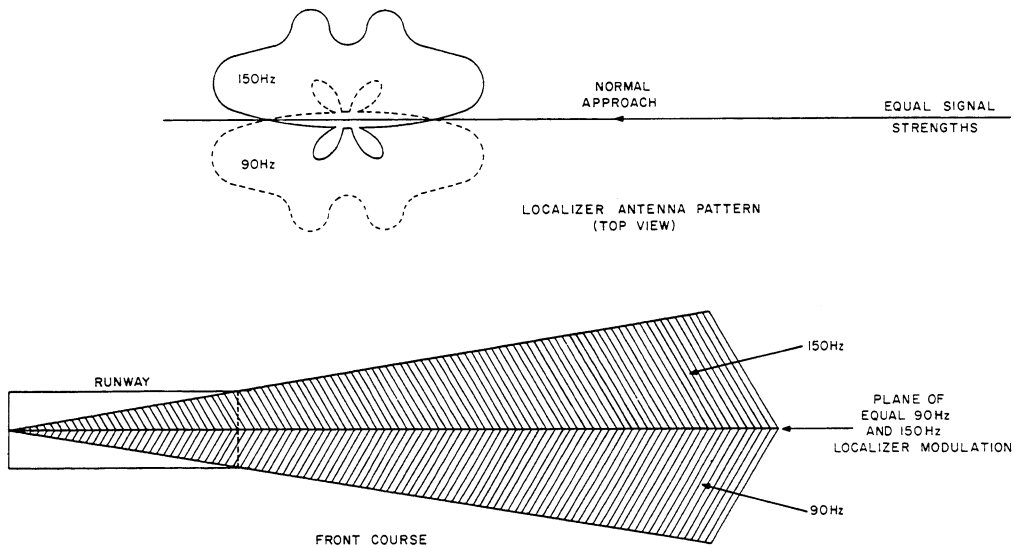


FIGURE 4-4 LOCALIZER SIGNAL GENERATION
(Dwg. No. 696-0705-00, R-0)

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4.1.3 BASIC LOCALIZER PRINCIPLES

The localizer facility provides a visual display of the aircraft's position relative to a straight approach line to the runway. The ground based localizer antenna system generates two patterns. Refer to Figure 4-4. One pattern is directed toward the right side of the runway, the second to the left. The two patterns have the same carrier frequency but different audio modulating signals. The pattern to the left of the runway (in normal approach) is 90Hz amplitude modulated which the pattern to the right is 150Hz amplitude modulated. The ratio of 90Hz and 150Hz audio, after demodulation, is dependent only upon the position of the aircraft within the patterns. The patterns are adjusted so they are of equal strength on a vertical plane extending out from the runway centerline. When the aircraft is on this plane, the 90Hz and 150Hz voltages will be equal.

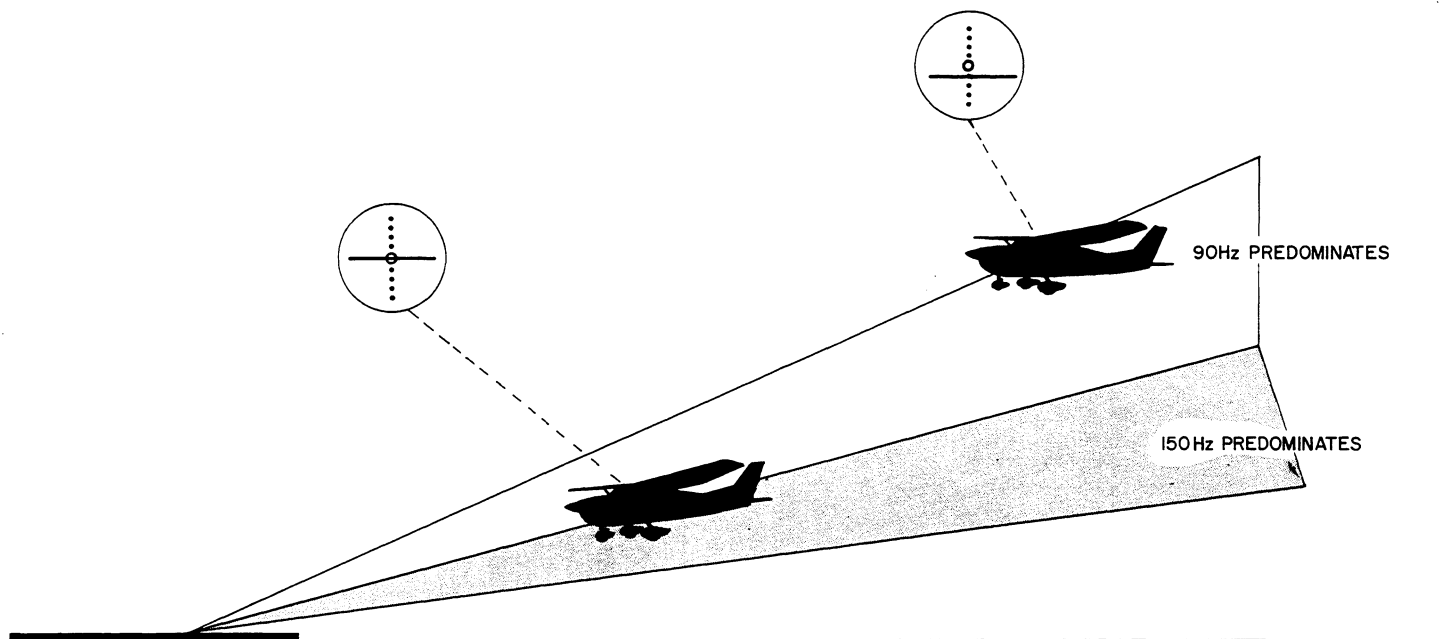


FIGURE 4-5 GLIDESLOPE PATH
(Dwg. No. 696-1539-00, R-0)

4.1.4 BASIC GLIDESLOPE PRINCIPLES

The glideslope signal is radiated by a directional antenna array located near the approach end of the runway. The signal consists of two intersecting lobes of RF energy. The upper lobe contains 90Hz modulation and the lower lobe contains 150Hz modulation. The equal tone amplitude intersection of these two lobes form the glide path. A typical glide angle is 2.5 degrees. If the aircraft is on the glide path, equal amplitudes of both tones will be received and the deviation bar will be centered. If the aircraft is above the glide path, 90Hz modulation predominates and the visual display is displaced downward. If below the glide path, 150Hz predominates and the display is displaced upward. Refer to Figure 4-5.

There are 40 glideslope frequencies in use today with a channel separation of 150KHz and each of these is paired with a localizer frequency as shown in Table 4-1.

4.2 SIMPLIFIED CIRCUIT THEORY

Figure 4-6 shows the simplified block diagram of the KNS 81. The individual blocks are discussed briefly in this section. For a more detailed discussion, see Section 4.3, Detailed Circuit Theory.

4.2.1 POWER SUPPLY (SIMPLIFIED)

The power supply in the KNS 81 employs a ringing choke regulator to produce the following DC voltages: +192.0V, +13.5V, +5.0V and -26.0V. The ringing choke regulator enables the KNS 81 to run on any voltage from 11 to 33VDC with no modification or rewiring. Also, power consumption of the KNS 81 (15 watts maximum) is virtually independent of input voltage.

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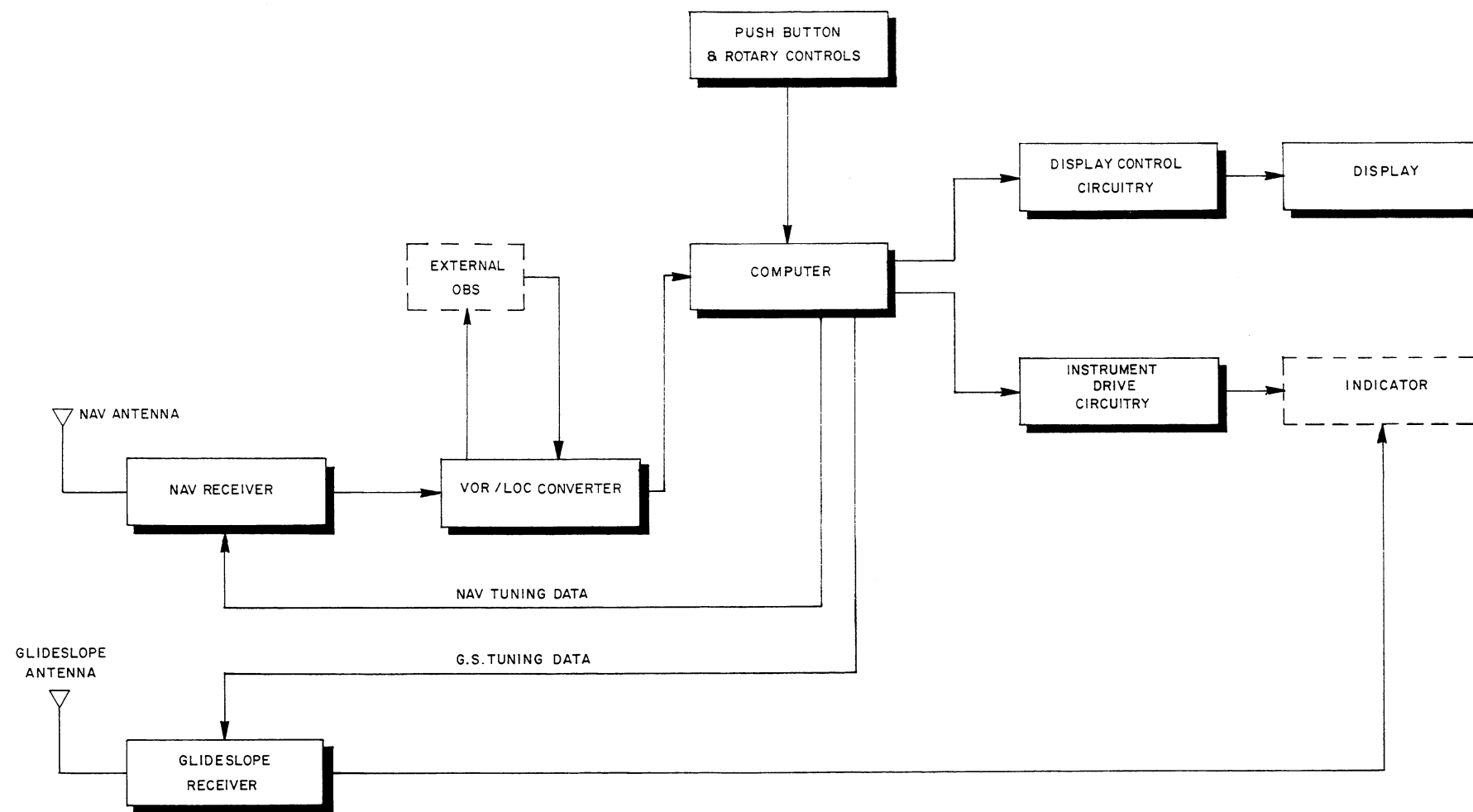


FIGURE 4-6 KNS 81 SIMPLIFIED BLOCK DIAGRAM
 (Dwg. No. 696-5250-00, R-0)

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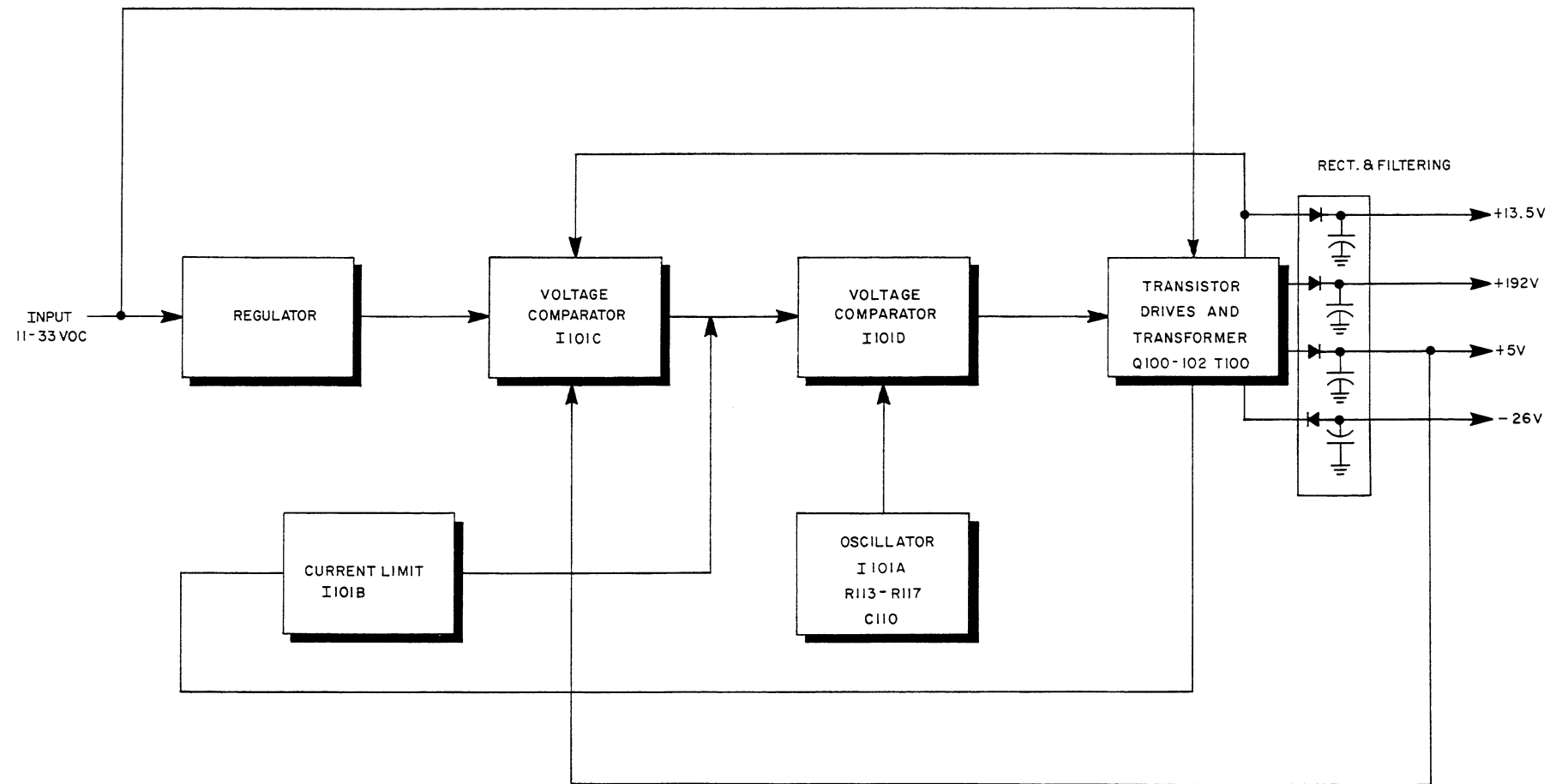


FIGURE 4-7 KNS 81 POWER SUPPLY BLOCK DIAGRAM
 (Dwg. No. 696-5251-00, R-0)

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4.2.2 NAVIGATION RECEIVER SIMPLIFIED CIRCUITRY

4.2.2.1 Receiver

The navigation receiver board block diagram is shown in Figure 4-8 of this section. The receiver is a single conversion superhetrodyne design with a monolithic crystal IF filter. The receiver generates VOR or localizer composite for the converter section. Audio is separated from the composite and amplified.

4.2.2.2 RF Section

The RF section of the receiver has two poles of selectivity both before and after the RF amplifier. The RF stages and VCO are varactor controlled from the synthesizer tuning line.

4.2.2.3 Synthesizer

The synthesizer uses a universal synthesizer to generate a frequency 11.1MHz below the received frequency. The synthesizer receives its tuning information digitally from the microprocessor and its reference frequency of 12.8MHz from a crystal oscillator.

4.2.2.4 IF Section and Audio Section

The RF signal from the preselector and the local oscillator frequency are mixed in a dual gate DMOS FET. The 11.1MHz mixer output is selected with a crystal filter and amplified by two AGC controlled IF amplifiers. The detected output contains VOR/LOC composite and audio. The audio between 350Hz and 2.5KHz is amplified in the audio section to produce 50mW into a 500 ohm load. The 1020Hz ident tone is suppressed when the ident filter is switched into the circuit. VOR/LOC composite is buffered and sent to the converter.

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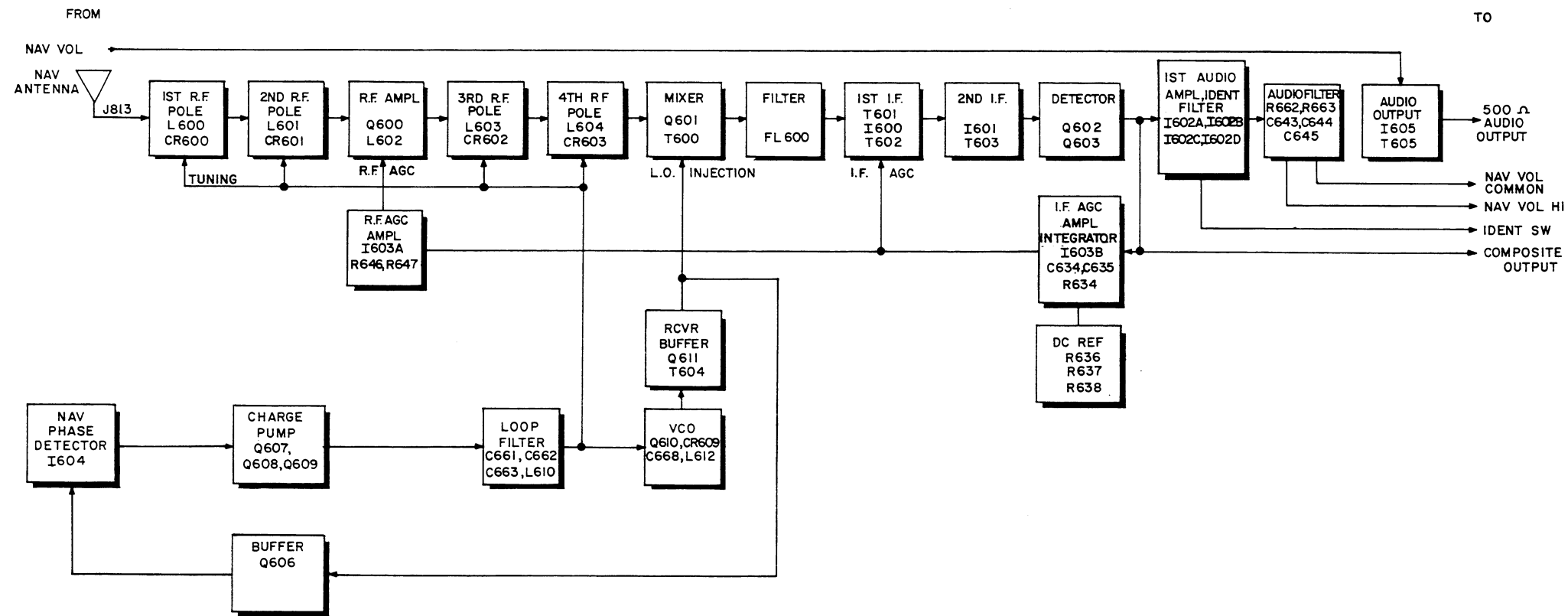


FIGURE 4-8 NAV RECEIVER BOARD BLOCK DIAGRAM
(Dwg. No. 696-5252-00, R-1)

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4.2.3 CONVERTER SIMPLIFIED CIRCUIT THEORY

The navigation receiver used in the KNS 81 receives the radio frequency energy transmitted by a VOR or LOC ground station. This radio frequency energy is demodulated and the modulation information is sent to the converter. The VOR/LOC composite signal from the navigation receiver consists of the 9960Hz frequency modulated reference phase signal and the 30Hz variable phase signal if a VOR frequency is selected. The VOR/LOC composite signal will consist of 90Hz and 150Hz if a LOC frequency is selected. Refer to Figure 4-9 for a block diagram of the converter. The TACAN signal which can be used by the KNS 81 is actually a synthesized VOR composite produced by the TACAN receiver. It contains equivalent signals and levels to those produced by the Navigation receiver.

4.2.3.1 VOR Operation

If a VOR frequency is selected by the navigation receiver, the KNS 81 separates the variable phase 30Hz signal from the 9960Hz frequency modulated reference by passing the buffered VOR composite through a 30Hz bandpass filter, I302A and associated components. This variable phase filter removes all the reference phase modulation from the variable phase signal.

The buffered VOR composite is also fed to the FM discriminator, I304, which recovers the 30Hz reference phase signal from the frequency modulated 9960Hz signal.

The filtered 30Hz reference phase signal from I305B is fed to the rotor winding of an OBS resolver.

By turning the OBS knob, the pilot turns the azimuth card and the rotor of the resolver. Output of the stator windings of the resolver is amplitude dependent upon the mechanical position of the resolver rotor. By connecting both stator windings to an R-C network, R337, R338 and C316, an output voltage that is constant amplitude but phase dependent upon the position of the resolver rotor is derived. This constant amplitude variable phase signal is amplified by a low pass amplifier, I307A and then again by a PLL 30Hz bandpass filter, I308. The output of the reference and variable bandpass filters are squared by I303 and I306. The variable signal is additionally filtered by PLL I329. The variable and OBS square waves' phase are compared to the reference square waves' phase (I313) which results in a pulse whose width corresponds to a specific angle. These pulses are sent to the computer where the D-bar and TO/FROM information is calculated. This information is then buffered and sent to the indicator.

4.2.3.2 Localizer Operation

When an ILS frequency is selected, circuits within the converter are switched to the configuration required for localizer operation. LOC composite from the input buffer passes to the bandpass filters. The center frequencies of filters have been changed to 90Hz and 150Hz by switching in additional components. The FM discriminator is bypassed through an FET switch.

Steering information in localizer mode is obtained by comparing the output levels of the two bandpass filters. The difference in amplitude of the two filters is obtained by a localizer detector circuit which essentially subtracts the level of 90Hz from the 150Hz. This process is accomplished by rectifying the positive half of the 150Hz sine wave and the negative half of the 90Hz sine wave and filtering out the resultant DC component. This DC component is used to control the D-bar driver.

Localizer flag indication is obtained by summing the levels from the bandpass filters. If the summed voltage from the bandpass filters falls below a usable level, the output voltage of the flag amplifier will not be great enough to pull the warning flag from view.

TACAN Operation

(-3X flavors) The change from VOR/LOC to TACAN is automatic when one of the three TACAN modes is selected. I300 and I301 comprise a switching circuit which selects whether the Navigation receiver or the TACAN receiver is the input to the converter. The switching circuit is controlled by the microprocessor. After receiver selection is completed the converter operation is identical for VOR and TACAN.

(-0X and -1X flavors) By means of an external switch the switching circuit (I300 and I301) could be controlled manually. With the advent of the TACAN version however, this capability is not used.

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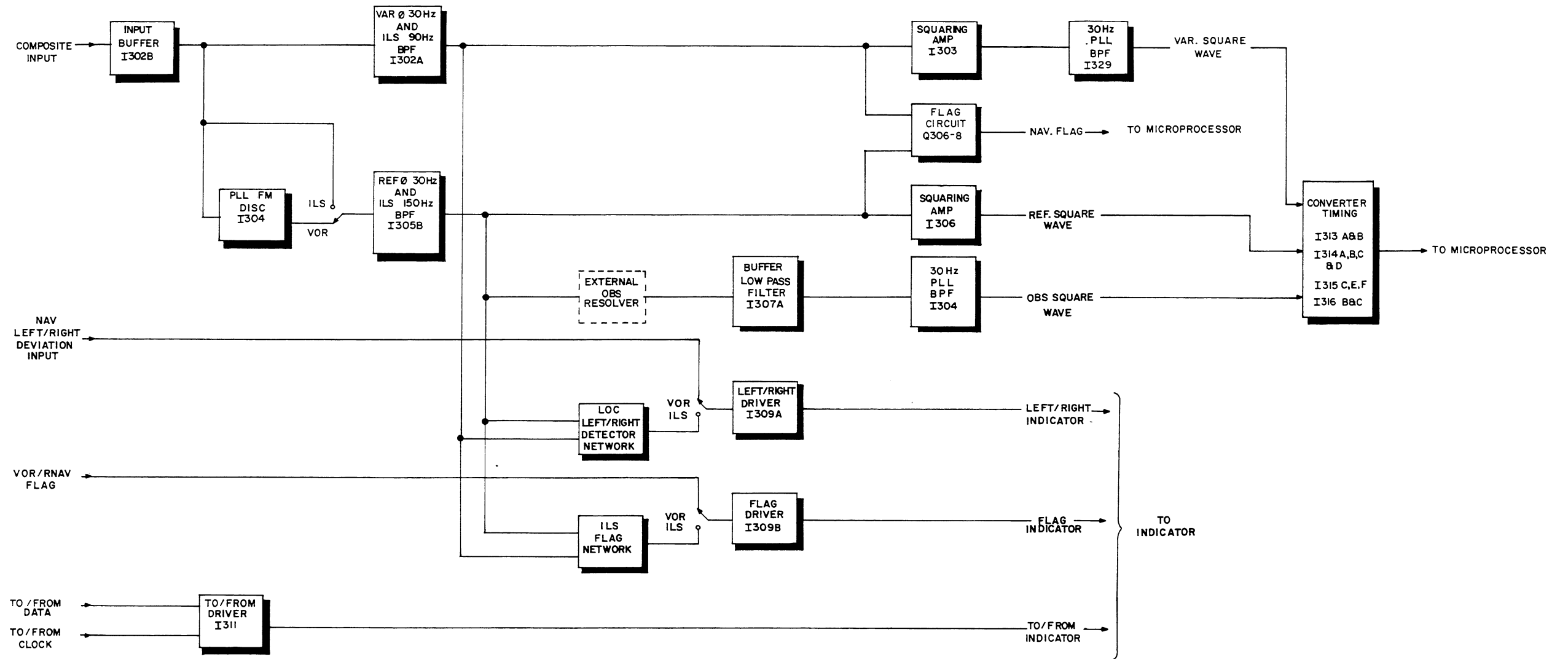


FIGURE 4-9 VOR/LOC CONVERTER BLOCK DIAGRAM
(Dwg. No. 696-5253-00, R-1)

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4.2.4 DISPLAY SIMPLIFIED CIRCUIT THEORY

4.2.4.1 Data Timing

The display used on the KNS 81 is time multiplexed. Only one of eight sections of the display is lit at any one instance. The section being lit is changed about every millisecond. The 125Hz display rate is fast enough to produce a steady image to the eye. The block diagram in Figure 4-10 shows how the data is moved to the correct position for displaying.

4.2.4.2 Display Circuit

The display of the KNS 81 is operated primarily by the PIA Johnson counters, I317 and I319 in both the anode and cathode driver sections and are controlled by the microprocessor via the PIA interface. One of the Johnson counters, I317, operates the anode driver I318 such that each anode is switched on in the proper sequence. Information is given to the cathode drivers in two forms. First, data from the microprocessor via the PIA interface is fed to the cathode drivers I322 and I327. These cathode drivers send the data to the display digits. The PIA controls the multiplexing of the data so that the correct data is displayed at the correct place on the display. Secondly, the PIA in conjunction with a Johnson counter, I319, controls the message sent to the display and also controls the current programming circuitry for the message cathodes of the display. The message data is sent directly to the cathode drivers, I321 and I323, which sends the message to the message words on the display. The Johnson counter is also interfaced with the message lines from the PIA to current programming circuitry. This circuitry controls the amount of current to be sent to each individual cathode so as to maintain a constant current flow through the entire display. This keeps all digits and message words at a uniform brightness.

4.2.4.3 Dimming Circuit

Automatic dimming is controlled with a photocell and a light dimming circuit. Dimming is accomplished by varying the duty cycle of the current programming circuitry of the cathode drivers.

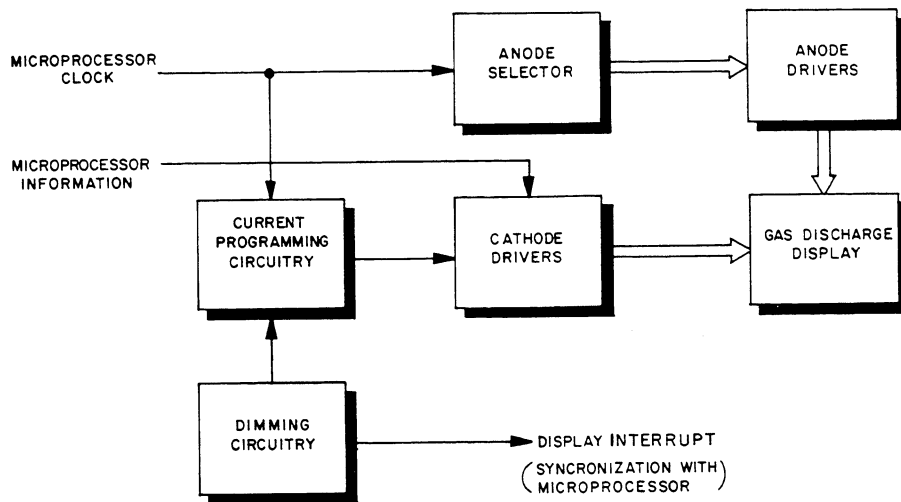


FIGURE 4-10 DISPLAY BLOCK DIAGRAM

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4.2.5 GLIDESLOPE SIMPLIFIED CIRCUIT THEORY

4.2.5.1 Receiver

The glideslope signals in the range of 329.15MHz to 335.00MHz are coupled from the antenna to the first RF amplifier. The desired signal is amplified in this tuned RF amplifier and coupled to the second tuned RF amplifier. The signal again receives amplification. The combination of the two RF amplifiers provide the necessary preselection before passing onto the active mixer. The signal from the universal synthesizer is then mixed with the incoming signal producing the intermediate frequency of 33.3KHz. The signal is now passed into the first IF amplifier where the signal strength is increased. The signal is then passed through a three section low pass elliptic filter which removes the unwanted frequencies from the IF signal. The IF signal is then directed through two more IF amplifiers before being applied to the detector. The detector removes the 150Hz and 90Hz modulation from the IF signal. There are two signal paths, one goes to the AGC circuitry and the other to the deviation converter.

4.2.5.2 Deviation Converter

The composite 150Hz and 90Hz signal is now applied to the course width amplifier which has a gain less than one. From here the composite signal is filtered to 90Hz and 150Hz components by the use of two active filters.

The two separated signals are passed through their own individual peak detectors and are then summed and fed through a deviation-bar driver. The DC voltage from the D-bar driver is proportional to the amount of voltage created by the presence of various amounts of 150Hz and 90Hz signals.

The outputs of the 90Hz and 150Hz active filters are also passed into two more peak detectors. There is a separate peak detector for each frequency. The outputs of the two peak detectors are summed and fed into the flag driver. Again the DC voltage output of the driver is used to drive a visual indicator which provides a warning indication when the signal strength is too weak, or when one or both of the two modulation components is absent.

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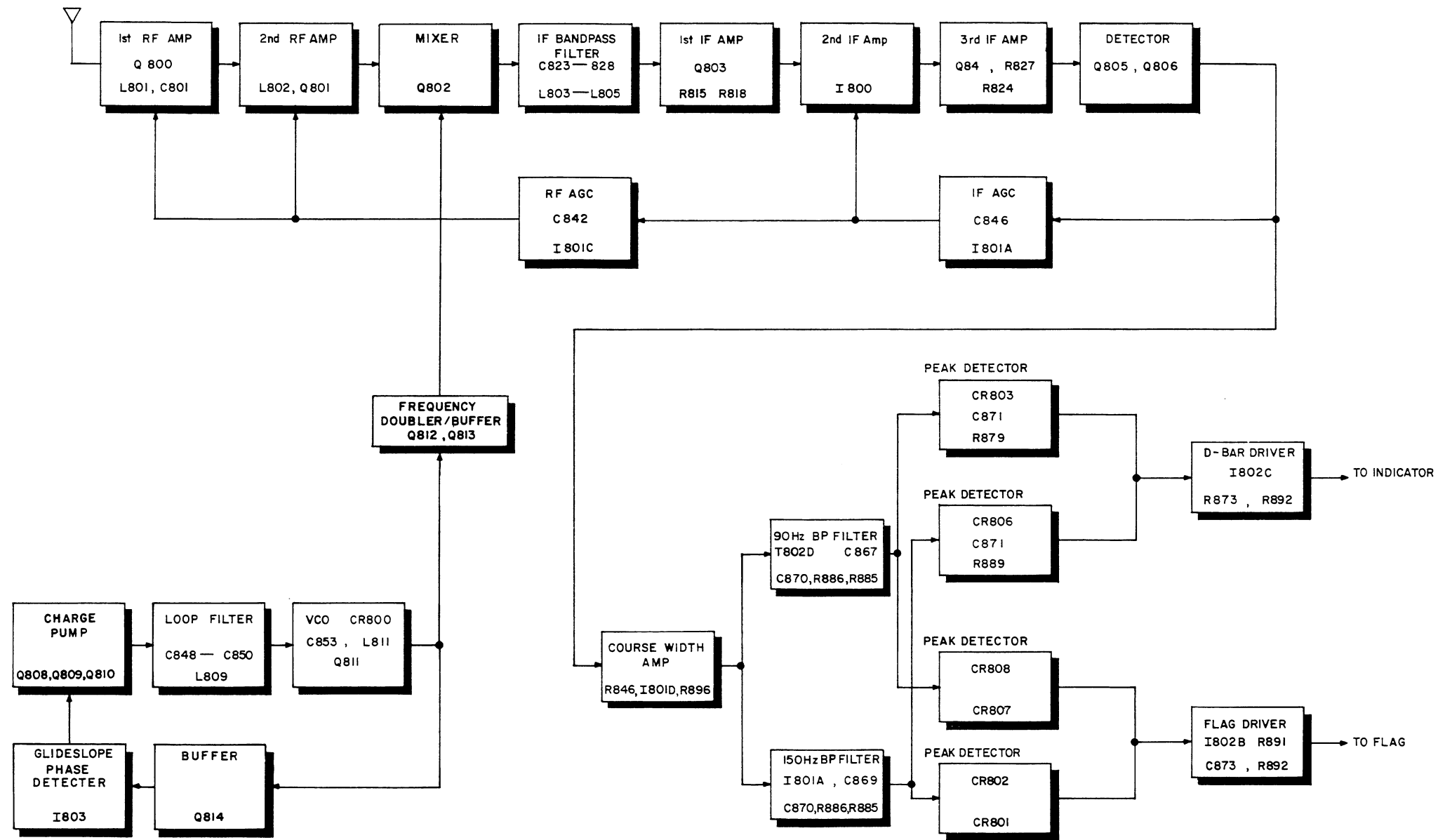


FIGURE 4-11 GLIDESLOPE BLOCK DIAGRAM
(Dwg. No. 696-5254-00, R-1)

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4.2.6 MICROPROCESSOR SIMPLIFIED CIRCUIT THEORY

The microprocessor system processes and distributes data to various parts of the KNS 81. Some of its various functions are:

- A. Receive front panel switch information
- B. Send data to be displayed
- C. Tune receivers
- D. Calculate the aircraft's position from DME and converter information
- E. Provide indicator drive (TO/FROM, flags, D-bar deviation drive, and mode indication)

The microprocessor system block diagram, Figure 4-12, shows that a few basic parts make up most of the system. These include the microprocessor (MPU), permanent memory (ROM), temporary memory (RAM), and input/output buffers (PIA).

The microprocessor receives instructions from the permanent memory called the read only memory or ROM. Examples of instructions include storing and retrieving data into RAM, outputting data to the PIA's, and performing calculations upon sets of data already inside the processor.

The PIA's or peripheral interface adapters are input/output interfaces to the outside systems. The PIA's can receive information from the processor, latch it, and output it continuously; or they can receive information from external systems and send it to the processor.

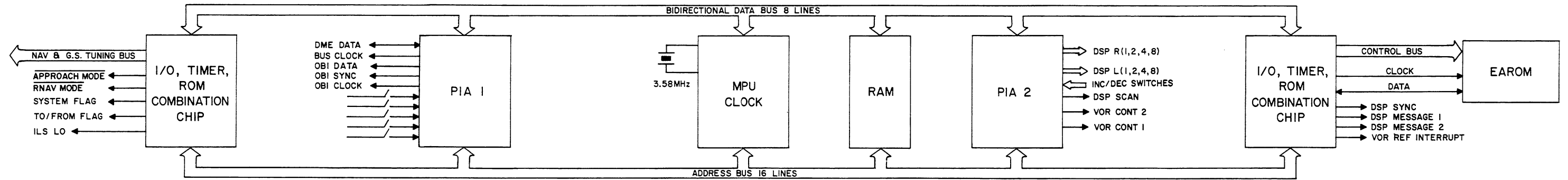
Information transfer throughout the computer system is synchronized by 895KHz supplied by the MPU.

Via one of the PIA's, waypoint information is stored and retrieved from a non-volatile memory (EAROM).

A DME Interface circuit takes information from the DME and passes it to the microprocessor. The calculated distance is then relayed from the microprocessor back through the interface circuit to the DME.

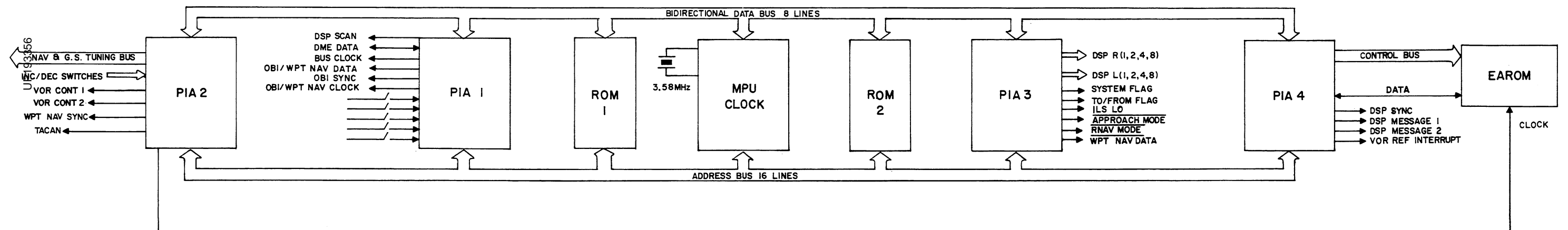
To insure proper operation of the microprocessor two reset circuits are employed. The first detects a lost program condition and the second checks for an unacceptably low voltage level. Should either condition occur the microprocessor will be periodically reset until the problem is resolved.

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(-0X & -18)

FIGURE 4-12a COMPUTER SYSTEM BLOCK DIAGRAM
(Dwg. No. 696-5255-00, R-1)



(-1X, -2X, -3X except -18)

FIGURE 4-12b COMPUTER SYSTEM BLOCK DIAGRAM
(Dwg. No. 696-5255-10/30, R-0)

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4.3 DETAILED CIRCUIT THEORY

4.3.1 GENERAL INFORMATION

This section provides a detailed description of the circuit operation. Timing diagrams, circuit schematics, and individual components are referred to extensively as an aid in understanding the theory.

The following numbering sequence is used in the KNS 81:

<u>BOARDS</u>	<u>COMPONENT DESIGNATORS</u>
Power Supply Board	100 - 199
Switch Board	200 - 299
Converter/Display Board	300 - 499
Computer Board	500 - 599
NAV Receiver Board	600 - 799
Glideslope Board	800 - 899

4.3.2 POWER SUPPLY

4.3.2.1 Ringing Choke Regulator

DC current flowing through the primary windings of the power transformer, T100, is alternately switched on and off by Q102. When the primary current is on, energy is stored in the transformer's magnetic field. When the primary current is off, the energy is dissipated by current flowing in the secondary winding. Four taps on the secondary windings are then rectified and filtered to produce the various DC voltages required by the KNS 81.

Voltage regulation is achieved by varying the duty cycle of the switching signal that drives Q102. The base frequency of the power supply is 20KHz. By controlling the amount of time Q102 is turned on, the amount of energy to be transferred to the secondary of the transformer is controlled. The +5.0V output of the power supply is divided down by R100, R125 and R101 and compared to the +5.0V reference output of I100. The DC output of the comparator, I101C, is then used to control the duty cycle of I101D, a comparator which compares the DC level to a triangle wave produced by I101A, R113 through R117 and C110. The output of I101D is a square wave which is coupled through emitter followers Q100 and Q101 and then used to drive Q102. The voltage regulation compensates for changes in input voltage or power supply load. R125 is adjusted to obtain +5.0V at TP518.

CR101 senses the voltage of the +13.5 volt line. If the line exceeds +15.1 volts, the voltage at pin 8 of I101C will increase causing the comparator to regulate the supply to the correct voltage. I101B is a current limiter and a soft start to limit power supplied to the transformer. Voltage is sensed at R124 which is compared with the voltage which appears at pin 7 of I101B.

4.3.3 NAV RECEIVER DETAILED CIRCUIT THEORY

4.3.3.1 RF Preselector

The RF signal input (108.00MHz to 117.95MHz) is coupled into the first filter pole (C601, CR600 and L600) by L615. This pole is varactor tuned by CR600. The signal is then coupled into the second filter pole (C606, CR601 and L601) by C603. This pole is varactor tuned by CR601. The RF signal is then capacitively coupled into G_1 of the RF amplifier Q600, a dual gate DMOS FET.

R603 and R605 bias G_1 of Q600. The RF AGC is applied to G_2 of Q600. The voltage at G_2 will be approximately 7VDC (full RF gain) from no signal to 2uV (hard) input. At 2uV input the RF AGC will attack and the AGC voltage will decrease thereby reducing the RF amplifier gain according to the level of the input signal. At high RF input levels, the G_2 voltage maybe as low as 0VDC.

The amplified RF signal is coupled into the third filter pole (C614, CR602 and L603) by C613. This pole is varactor tuned by CR602. The signal is then coupled into the fourth filter pole (C618, CR603 and L604) by C616. This pole is varactor tuned by CR603. The RF signal is then coupled into the mixer (Q601) by C619.

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4.3.3.2 Mixer

The filtered and amplified RF signal is applied to G_1 of Q601. The buffered VCO (local oscillator) signal is coupled into G_2 by C621. G_1 and G_2 of Q601 are biased by R614 and R618. The RF signal is mixed with the local oscillator signal to produce the 11.1MHz IF frequency.

4.3.3.3 IF

T600 impedance matches the 11.1MHz mixer output into the monolithic crystal filter, FL600. FL600 determines the receiver bandwidth and rejects unwanted frequencies of the mixer output. T601 impedance matches the FL600 output into the differential input of the first IF amplifier, I600. T602 impedance matches the output of I600 into the differential input of the second IF amplifier I601. I600 and I601 are AGC'd to provide the correct IF gain.

4.3.3.4 Detector

The 11.1MHz IF signal is fed into the active detector by T603. Q602 and R626 develop the base bias for Q603. With the collector shorted to the base, Q602 is functioning as a diode which has the same thermal characteristics as Q603. On positive swings, Q603 will conduct and on negative swings, Q603 will cut off less, thus providing detection. R627 and C632 remove the IF signal frequency leaving the composite and audio signals to be processed by the convertor and audio sections.

4.3.3.5 IF AGC Amplifier

The DC component of the composite signal is sent through a buffer (I603C) to the AGC amplifier, I603B. The IF AGC circuit takes the instantaneous DC component of the composite signal and integrates it to produce the IF AGC. The integrator is I603B and uses C634 and C635 as the feedback path. A low voltage from the integrator will demand near maximum gain from I600 and I601. A higher voltage from the integrator will produce a lower gain from I600 and I601.

4.3.3.6 RF AGC Amplifier

The signal from the integrating amplifier, I603B, is sent to an inverting amplifier (I603A and associated components). The amplifier has two inputs, the variable or IF AGC voltage from the integrator and the reference or RF AGC set. The RF AGC is adjusted so the amplifier attacks at 2uV (hard) RF input. At low signal inputs, the RF AGC output voltage applied to G_2 of Q600 will be high and the gain of Q600 will be at or near maximum. At higher level input signals, the RF AGC voltage will be lower and the gain of Q600 will be lower.

4.3.3.7 Audio Pre-Amp and Ident Filtering

The composite signal from Q603 is buffered by I602A and associated components. I603D and R633 are used to adjust the composite output level. The signal is then filtered by a noise limit circuit (CR606, R658-R661, C640 and C641) and an elliptical high-pass filter network (I602B and associated circuitry). The elliptical high-pass filter has a 3dB break point at 300Hz. I602B's output is coupled by C639 to give the volume control the AUDIO OUT signal.

I602C and D, along with their associated circuitry form the ident filter. This filter is active whenever the ident line is shorted to the volume control AUDIO OUT line. The ident filter is a gyrator type of circuit and is active at 1020Hz.

4.3.3.8 Audio Amplifier

The audio signal which comes from I602B is passed through the volume control and then to the audio amplifier. R699 and C679 along with R698 and C680, filter the audio signal before it is amplified by I605. The output of I605 is used to drive a center tap transformer which impedance matches to a speaker.

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4.3.3.9 NAV Synthesizer

The local oscillator signal is developed and frequency controlled by a phase locked loop (PLL). The heart of the PLL is the VCO (Q610 and associated components). The VCO is a Colpitts design with L612, CR609 and C668-C670 being the major frequency determining components. The VCO is capable of changing from 96.9MHz to 106.85MHz (11.1MHz below the RF signal) by varying the DC voltage or varactor CR609. The output of the VCO is capacitively coupled to the buffer stage (Q611 and associated components). The buffer eliminates frequency pulling of the VCO by the load. The buffer supplies the VCO frequency to the mixer (Q601 and associated components) and to the synthesizer buffer (Q606 and associated components). The synthesizer buffer provides additional isolation between the universal synthesizer (I604) and the VCO. The output of the synthesizer buffer drives the prescaler input of the universal synthesizer. The synthesizer receives a 12.8MHz reference frequency input derived from Y600, Q604, Q605 and associated circuitry. The synthesizer divides the 12.8MHz reference by 256 to obtain a 50KHz reference. The prescaler input is also divided by an integer, referred to as N_T , to obtain 50KHz. N_T is determined by the serial channeling data on pin 7 of the synthesizer. The synthesizer then phase/frequency compares the reference and prescaler inputs. If the frequency of the prescaler is low with respect to the reference, the synthesizer produces "up" pulses on pin 3. If the frequency of the prescaler is high with respect to the reference, the synthesizer produces "down" pulses on pin 2. The "up" and "down" pulses are fed to the charge pump (Q607, Q608, Q609 and associated components). The duty cycle of the "up" or "down" pulses determine the length of time that Q607-Q609 are turned on or off. The length of time that Q607-Q609 are turned on or off determines the average charge on C664. The voltage on C664, in turn tunes CR609, thus determining the VCO frequency. Hence, the loop is completed. C661-C663 and L610 filter the 50KHz reference from the control voltage. C665, C666, R685, R684, R687 and L611, all provide additional filtering and isolation of the DC control voltage. This control voltage also tunes the preselector via varactors CR600-CR603.

4.3.4 CONVERTER DETAILED CIRCUIT THEORY

4.3.4.1 Input Buffer

The VOR/LDC composite is capacitively coupled through C341 and C340 through I300D to I302, the input buffer. Resistors R301, R302 and variable resistor R303 control the gain of the amplifier. The non-inverting input of the amplifier is tied to V_{ref} through R305, giving an output signal with an average DC level of V_{ref} . Since the amplitude of the 30Hz FM component is determined by the deviation in frequency and not the amplitude of the 9960Hz subcarrier, the gain adjustment can be used to balance the VAR and REF sine wave signals.

4.3.4.2 Bandpass Filter and Squaring Amp Detailed Circuit Theory

The bandpass filters utilized in the KNS 81 are of the multiple feedback type. Figure 4-13 shows a typical multiple feedback bandpass filter.

In VOR operation, Q1 is turned off and looks like a high impedance which effectively removes R2 from the circuit. Center frequency of the circuit is dependent upon the parallel combination of R1 and R3 along with R4, C1 and C2. Center frequency is set to 30Hz by varying R3. Output of the filters is capacitively coupled to the squaring amps which function as comparators referenced to 4.8V. As the input sine wave swings through its midpoint, the output changes state. Positive feedback through C329 and C332 eliminates multiple triggering.

In localizer operation, Q1 will be saturated and R2 will be in parallel with R3 to change the frequency of the filter. In the 150Hz BPF, a resistor is switched in parallel to R4 to obtain equal Q's in both filters. The microprocessor ignores the output from the squaring amplifiers in the localizer mode.

30Hz Variable Phase-Locked Loop Filter

I329 and associated circuitry form a phase-locked loop (PLL) bandpass filter. The VCO output of the PLL filter (Pin 4) is a square wave whose phase is the same as the input. The output is fed into a phase comparator (Pin 3) that compares the input and output. Any phase difference changes the pulse width on Pin 13. R441, R443, C380 and C361 form a low-pass filter which averages the voltage from Pin 13. On units with Mod 8 installed or KNS 81 units KPN, 066-4010-60 and above, the low pass filter is replaced by an active low pass filter consisting of I1001, R1001-R1004, C1001 and C1002. The active low pass filter provides a more stable average DC voltage representing the phase shift of the 30Hz variable. This provides better filtering for rotor modulation. This changes the control voltage to the VCO (Pin 9). R440, R441, R442 and C359 determine the natural frequency of the PLL.

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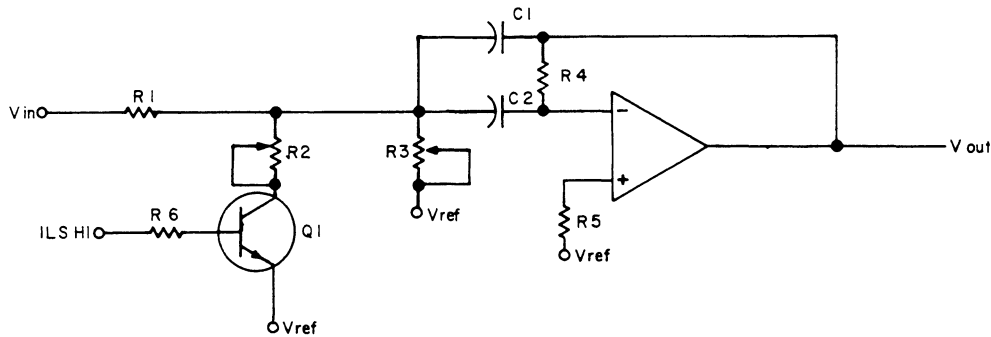


FIGURE 4-13 BANDPASS FILTER

4.3.4.3 FM Discriminator

The REF 30Hz FM modulation on the 9960 subcarrier is detected with a PLL. The PLL consists of a phase comparator, low pass filter, VCO, and source follower amplifier. R320 and C311 form the low pass filter for the input VCO voltage. R317, R319, variable resistor R318 and C310 are timing components that determine the natural frequency of the VCO. The phase comparator and VCO are located in I304. The 9960Hz signal from the input buffer I302B is passed through a series resonant circuit consisting of L304 and C306. The signal is limited by Q301 and CR301 and applied to pin 14 where it is phase compared to output signal of the VCO. The phase comparator output is a square wave whose average value is related to the difference in phase between the two signals which in turn is related to the difference between the input frequency and the natural frequency of the VCO. Since the signal into I304 is varying at a 30Hz rate, the average value of the phase comparator output will vary at a 30Hz rate. The source follower amplifier within I304 buffers the low pass, filtered phase comparator output. The buffered output is applied to the REF 30Hz BPF to remove noise.

4.3.4.4 30Hz Resolver and Low Pass Filter Detailed Circuit Theory

Selected course information is obtained through the use of an external OBS resolver. The resolver is a transformer with two secondary windings (stators) physically displaced 90° from each other. The amount of signal transferred from the primary coil (rotor) to each of the stators depends upon the pilot's selected setting of the rotor position. When the rotor is located so as to give maximum coupling into one stator winding, the other winding has minimum coupling. The phase shift network consisting of C316, R337 and R338 causes one signal to be phase shifted 45° leading and the other signal to be shifted 45° lagging. The vector addition of these signals results in a constant amplitude 30Hz signal with a shift in phase that depends on the OBS setting.

The low pass amplifier I307A amplifies the signal and reduces high frequency noise. Gain of the amplifier is determined by R339 and R340. The low pass filter causes about 6° of lagging phase shift.

4.3.4.5 OBS 30Hz PLL Filter

I308, I307B and their associated components form a phase-locked loop (PLL) bandpass filter. The VCO output of the PLL filter (pin 3) is a square wave whose phase differs 90° from the input. If for some reason the phase difference is not exactly 90°, the squarewave output of the phase comparator (pin 2 of I308) will have an average value which differs from the average value at pin 3. I307B will integrate this difference and change the control voltage of the VCO (pin 9). The frequency of the VCO will change slightly until the VCO output is 90° out of phase with the input. Noise is reduced since the integrator will not respond rapidly to the input voltage.

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I307B and associated components form the integrating amplifier. I308 is a phase comparator and voltage controlled oscillator (VCO). R347, R348, variable resistor R349 and C320 determine the range of frequencies that the VCO will lock on. The resistance divider consisting of R341, R342 and R343 determine the reference voltage for the integrator. Variable resistor R342 is used to make minor adjustments in phase shift.

4.3.4.6 Converter Timing

The aircraft's angular position is perceived as a phase difference between Reference and Variable square waves and Reference and OBS square waves. The microprocessor, however, interprets the length of a pulse as being an angle. This circuitry, therefore, converts the phase difference into a pulse of specific length and sends it to the microprocessor upon request.

I313B is a flip-flop set by the reference square wave and reset by the variable square wave with the resulting output pulse being equal in length to the phase difference. C337 and R399 form a differentiator which changes the variable square wave to a spike to ensure the proper length of the output. I313A is the flip-flop which compares the reference square wave to the OBS square wave with C339 and R400 forming the differentiator for the OBS square wave. The reference square wave is then sent to the microprocessor as an interrupt. Using VOR control 1 and 2, the microprocessor can ask to measure one of the three pulses. If VOR control 2 is low, AND gate I314D will be disabled and I314C enabled allowing only the reference/variable pulse to pass through OR gate I316C. A high on VOR control 2 will do the opposite and allow only the reference/OBS pulse to pass. VOR control 1 controls the final output to the microprocessor. A low on VOR control 1 disables AND gate I314A and enables I314B which will allow only the reference square wave to pass through OR gate I316B to the microprocessor. A high on VOR control 1 allows only the pulse selected by VOR control 2 to pass through the OR gate to the microprocessor.

4.3.4.7 Localizer Deviation Detector Detailed Circuit Theory

In the LOC mode, the difference in signal levels between 90Hz and 150Hz signals is accomplished by subtracting the level of the 90Hz signal from the 150Hz signal. CR311, R372, and variable resistor R370 rectify the top half of the 150Hz waveform to about the "virtual ground" (4.6V) at pin 2 of I309A. Likewise, CR312, R373, and variable resistor R370 rectify the bottom half of 90Hz waveform. The two signals are then summed and filtered by the D-bar driver.

4.3.4.8 D-Bar Driver Detailed Circuit Theory

D-bar current drive for both LOC and VOR is provided by I309A. Input selection is provided by FET switches I310A, C, and D. Gain is determined by feedback resistors R364 and the input resistors. Gain for ILS is adjustable with variable resistor R370. Centering in VOR mode is adjustable with the balance network R365, R367 and variable resistor R366. Capacitors C325 and C326 provide filtering. R363 limits the amount of current the OP AMP can provide to approximately 4ma.

4.3.4.9 Flag Detector and Flag Driver Circuit Theory

The output levels of both bandpass filters are monitored and compared to a reference voltage. Diode CR315 along with C333 peak detect the variable phase bandpass filter output. As long as the voltage at the base of Q306 is greater than the reference voltage on the emitter, the transistor will not conduct. Similarly, Q307 will not conduct if the reference signal level is adequate. If either Q306 or Q307 turn on because of a low level signal, Q308 will turn on. The voltage at J301 pin 9 will then be low, signaling the microprocessor that variable or reference information may be invalid. The microprocessor will send a high signal back on the system flag line. Q303 will turn on causing FET switch I310B to open. The potential on pin 6 of I309B will drop to a level equal to V_{ref} since pin 6 is tied to V_{ref} through R351 and the deviation meter windings. Since pin 5 is at a higher potential than pin 6, the output of I309B will be high (9V) and CR304 will be reverse biased. Diodes CR305 and CR306 will also be reverse biased, since the potential of "ILS HI" is zero. When signal levels are adequate, FET switch I310B will close and the 9 volt line will be the signal applied to the flag amplifier. Gain of the amplifier is determined by the ratio of R351 to R355 and the setting of variable resistor R354.

In the localizer mode, R358 and R359 forward bias CR305, CR306, CR307, and CR308 allowing the signal levels of the 90Hz and 150Hz BPF to control the flag driver. FET switch I310B is in the off state so flag action is analog in nature. Variable resistor R354 is used to set the "flag" level.

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4.3.4.10 ILS Energizer Driver Detailed Circuit Theory

When an ILS frequency is selected by the KNS 81, the ILS line goes to a low logic state. Q304 and Q305 saturate leaving TP310, the "ILS HI" bus, at a logic high. The "ILS LO" bus is at a logic low. These signals are used to operate the various FET and transistor switches within the converter. ILS LO is used as a ground for the glideslope and as an annunciator for indicators or switches external to the KNS 81.

4.3.4.11 9 Volt Regulator Detailed Circuit Theory

Voltage regulation for the converter 9 volt circuitry is provided by I521 (located on the computer board). The four terminal device regulates the 13.5 volts from the power supply down to 9 volts which is filtered by C512. The output level is controlled by R548 and R549.

4.3.5 DISPLAY DETAILED CIRCUIT THEORY

4.3.5.1 Display Timing and Storage

Timing for recirculating new data is provided by a multiplex timer I325. The timer is a 555 operating in an astable mode. R417, R418 and C350 determine the interrupt period. The following things happen when the 555 goes low:

- a. I326, the one-shot that controls the pulse width in the light dimming circuit is reset causing the display to be blanked. (The one-shot will have already been low if the display is operating under dim light conditions). The display is blanked to avoid flickering in the displays as data is shifted serially through the latches.
- b. The anode selection Johnson counter (I317) is incremented one count by the microprocessor. The next set of cathode data will be displayed on the anode selected by the Johnson counter. There are eight possible states of the Johnson counters and eight anodes to display.
- c. The microprocessor (which has been interrupted by I325 going low) outputs the display message in the form of a digital word to the cathode drivers I322, I323 and I327.

After eight periods, all eight anode lines will have been turned on. This completes one multiplex cycle. Approximately 110 of these cycles are completed every second.

4.3.5.2 High Voltage Driver Detailed Circuit Theory

The gas discharge displays need approximately 130 volts between the anode and cathodes to ionize the gas. If a given character is to be lit, the anode above the character is pulled to the +185 volts and the cathode is pulled from 75 volts towards ground until the display "fires". Since the cathode drivers are current sources, the voltage on the cathodes vary depending on the tube characteristics and the current output level. Current levels are "programmed" through pin 1 of drivers I321, I322, I323 and I327. In addition, I321 and I323 are also "current programmed" by a gating network which is operated by the PIA.

4.3.5.3 Dimming Circuitry

The photocell activated dimming circuit adjusts the brightness of the display to compensate for changes in ambient light level. Dimming is accomplished by varying both the duty cycle and current level of the programming current.

Pulse width variation is obtained from a variable duty cycle one-shot I326 which is triggered from the multiplex timer I325. The one-shot's time constant varies 80 μ s to 110 μ s.

I324B is wired as a constant current source whose output current is used to charge C353, the timing capacitor for the one-shot. The time constant of the one-shot is determined by the magnitude of the current from the current source which, in turn, is controlled by the photocell V300. In darkness, the output current from I324B is at its maximum value of about .75mA, giving the one-shot a time constant of about 80 μ s. As the ambient light level increases, the duty cycle of I326 increases. The maximum time constant is limited by the duty cycle of the multiplex timer, I325. When the output of I325 goes low, it forces the one-shot to reset. Variable resistor R416 controls the minimum time constant of I326 and is used to adjust the minimum display brightness.

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The output of I326 is filtered by R422 and R423 to produce a DC voltage proportional to the duty cycle of the square wave. This DC voltage controls the magnitude of the current from I324A, a constant current source. This current is used as the programming current for the cathode drivers, I321, I322, I323 and I327. Since the drive requirements of a display character differ according to its size, different values of series resistors are used in series with the programming input of the four cathode drivers.

The programming current to the display drivers has a duty cycle that is determined by one-shot I326. Diode CR346 shunts current source I324A to ground when the one-shot is low. By changing both the duty cycle and the level of programming current, approximately 30 to 1 dimming ratios are obtained.

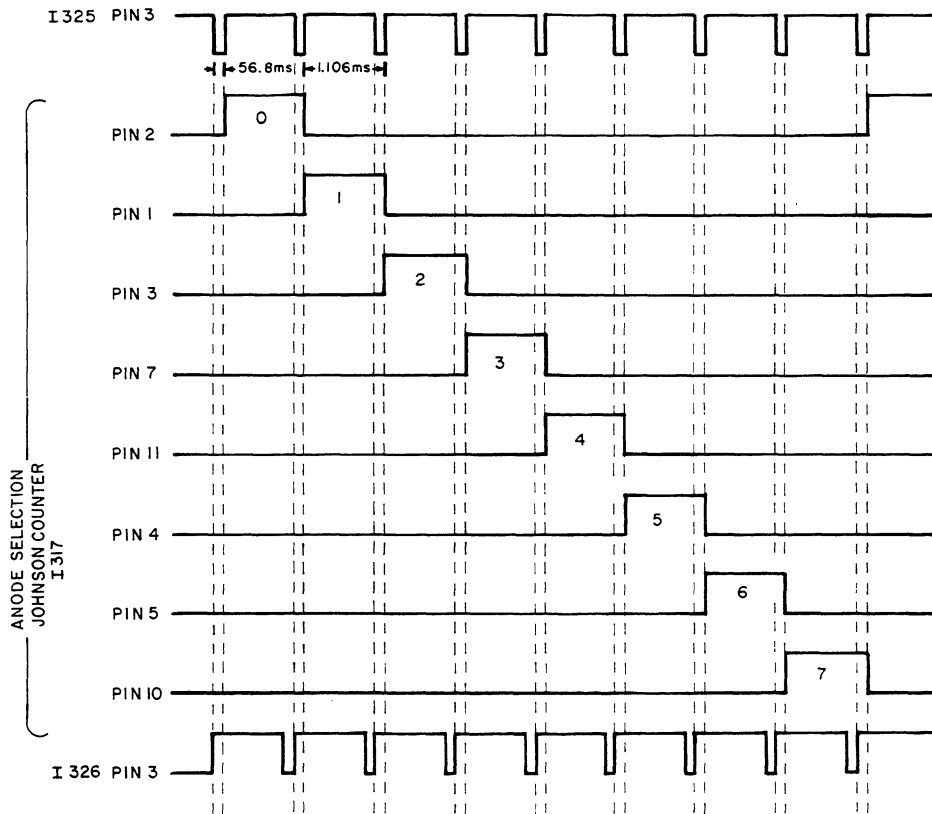


FIGURE 4-14 DISPLAY TIMING DIAGRAM

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4.3.6 GLIDESLOPE RECEIVER DETAILED CIRCUIT THEORY

4.3.6.1 Preselector

The first stage of the preselector is formed by Q800 and its associated components. Gate 1 of Q800 is tuned by L800 and variable capacitor C801. L801 and C805 provide the tuning for the drain of Q800. The second preselector stage is formed by Q801 and its associated components. Q801's drain is tuned using L802 and C810. Both the first and the second stages are tuned to resonate at approximately 332MHz. The gain of Q800 is 10dB and Q801 has about the same amount giving a total gain of 20dB before reaching the mixer stage. Q800 and Q801 are both dual gate, N channel, enhancement mode, field effect transistors. Since these are enhancement mode devices, their gates must be positive biased for proper operation. The tuning of these stages provides the necessary preselection of the RF signal.

4.3.6.2 Mixer

Capacitor C813 couples the preselector output to the mixer stage (Q802). Q802 is also a dual gate FET with the preselector output applied to Gate 1 and the buffered VCO (local oscillator) signal applied to Gate 2. Gate 1 and Gate 2 are biased by R808 and R811. Q802 mixes the local oscillator signal and the preselector RF signal to produce an IF frequency of 33.33KHz.

4.3.6.3 IF Amplifier and Elliptic IF Filter

The first IF amplifier is formed by Q803 and its associated circuitry and has a gain of 37dB. The output of Q803 is then passed into the elliptic IF filter. This filter consists of a three section low pass filter with three tuned circuits to provide three distinct notches in the frequency response. The elliptic filter has a 6dB break point at approximately 60KHz and 60dB of rejection at 79.5KHz. C830 couples the signal from the elliptic filter to the second IF amplifier, I800. The gain of I800 is controlled by AGC action on pin 5. C835 then couples the output of the second IF amplifier to the third IF amplifier, Q804 and its circuitry. R824 and R825 provide the biasing for Q804. The output of Q804 is coupled to the detector stage through C837.

4.3.6.4 Detector

Q805 and R829 develop the base bias for Q806. The collector of Q805 is shorted to the base so that it will function as a diode with the same thermal characteristics as Q806. On positive swings, Q806 will conduct and on negative swings Q806 will cut off, thus providing detection. R830 and C838 will filter out the IF frequency from the composite audio.

4.3.6.5 IF AGC Amplifier

The DC component of the composite signal is sent to the IF AGC amplifier, I801A. I801A is connected as an integrator which uses C846 as feedback. This circuit produces the automatic gain control (AGC) for the IF stage, I800.

4.3.6.6 RF AGC Amplifier

The output of I801A also drives the RF AGC amplifier I801C. I801C provides additional AGC action for high level RF input signals. R836 sets the RF AGC amplifier to attack at the correct RF input level. Gate 2 of Q800 and Q801 control the preselector gain and are driven by the output of I801C.

4.3.6.7 Course Width Amplifier

I801D is the course width amplifier which uses R846 and R843 to control its gain. R846 is adjusted to provide the correct course width indication by changing the gain of I801D.

4.3.6.8 Glideslope Synthesizer

The local oscillator signal is developed and frequency controlled by a phase locked loop (PLL). The heart of the PLL is the VCO (Q811 and associated components). The VCO is a Colpitts design with L811, CR800, C853, C857 and C858 being the major frequency determining components. The VCO is capable of changing from 164.559MHz to 167.489MHz (RF frequency minus 33.33KHz divided by two) by varying the DC voltage on varactor CR800. The output of the VCO is coupled to the receiver buffer (Q813 and associated components) and the synthesizer buffer (Q814 and associated components). These buffers eliminate frequency pulling of the VCO by the load. The input to the receiver buffer is tuned to the second harmonic of the VCO by series resonant C859 and L808. The output of the receiver buffer is tuned to the second harmonic of the VCO by parallel resonant L806 and the internal capacitance of Q813. This tuning provides frequency doubling in the buffer so that the resultant frequency fed to the mixer is 33.33KHz

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below the selected RF frequency. Q812 and associated components provide bias for Q813. The synthesizer buffer provides isolation between the universal synthesizer (I803) and the VCO. The output of the synthesizer buffer drives the prescaler input of the universal synthesizer. The synthesizer receives a 12.8MHz reference input signal from I604 in the NAV receiver. The synthesizer divides the 12.8MHz reference by 1536 to obtain an 8.333KHz reference. The prescaler input is also divided by an integer, referred to as N_T to obtain 8.333KHz. N_T is determined by the serial channeling data on pin 7 of the synthesizer. The synthesizer then phase/frequency compares the divided reference and prescaler inputs. If the frequency of the prescaler is low with respect to the reference, the synthesizer produces "up" pulses on pin 3. If the frequency of the prescaler is high with respect to the reference, the synthesizer produces "down" pulses on pin 2. The "up" and "down" pulses are fed to the charge pump (Q808, Q809, Q810 and associated components). The duty cycle of the "up" or "down" pulses determine the length of time that Q808-Q810 are turned on or off. The length of time that Q808-Q810 are turned on or off determines the average charge on C851. The voltage on C851, in turn tunes CR800, thus determining the VCO frequency. Hence, the loop is completed. C848-C850 and L809 filter the 8.333KHz from the control voltage. L810 provides isolation between the control voltage and the VCO. R838, R839 and C814 provide dither of the VCO. Q815 and associated components turn off I803 when channels other than ILS are selected.

4.3.6.9 90Hz Bandpass Filter

The output of the course width amplifier is applied to R872 and R874. These two resistors determine how much of the detected signal goes to the 90Hz filter or the 150Hz filter. I802D is configured as the 90Hz bandpass filter which uses its associated circuitry to control its gain and to determine the filter's bandwidth.

4.3.6.10 150Hz Bandpass Filter

I802A and its associated components form the 150Hz bandpass filter, which is the same type as the 90Hz filter. The gain and the bandwidth of I802A is controlled by its associated circuitry.

4.3.6.11 Deviation Bar Detectors

CR803 rectifies the 90Hz filter output and passes only the positive portion of the sine wave. This rectified signal charges C871 in the positive direction. The output of the 150Hz bandpass filter is rectified by CR806, which passes only the negative portion of the sine wave. This signal drains the charge from C871, so that the remaining charge on C871 will indicate the difference between the two signals. Noise damping is provided by R879 and R889 and C871.

4.3.6.12 Deviation Bar Driver

I802C is used to drive the deviation indicator (D-bar). The gain of the amplifier is set by R881 and R883, and indicator damping is provided by R883 and C872. I802C is a voltage source, thereby allowing the addition of more than one indicator load without changing the indicators position. CR804, CR805 and R884 provide current limiting to protect the deviation indicators.

4.3.6.13 Flag Peak Detectors

The output of the 90Hz bandpass filter is also rectified by CR802 to provide detection for the flag driver. CR808 rectifies the output of the 150Hz filter. CR801 and CR807 are used to compensate for variations in the voltage across the rectifiers over temperature changes.

4.3.6.14 Flag Driver

I802B and its associated circuitry is used to drive the flag indicator. This driver provides a voltage source so that several flags may be used simultaneously. A summing of the detected 90Hz and 150Hz voltages appears at the input of I802B. Indicator damping is provided by C873 and R891. CR809 and CR810 will limit I802B's output so that it will only drive positive with an amplitude of not greater than 600 millivolts.

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LOC FREQUENCY MHz	GLIDESLOPE FREQUENCY MHz
108.10	334.70
108.15	334.55
108.30	334.10
108.35	333.95
108.50	329.90
108.55	329.75
108.70	330.50
108.75	330.35
108.90	329.30
108.95	329.15
109.10	331.40
109.15	331.25
109.30	332.00
109.35	331.85
109.50	332.60
109.55	332.45
109.70	333.20
109.75	333.05
109.90	333.80
109.95	333.65
110.10	334.40
110.15	334.25
110.30	335.00
110.35	334.85
110.50	329.60
110.55	329.45
110.70	330.20
110.75	330.05
110.90	330.80
110.95	330.65
111.10	331.70
111.15	331.55
111.30	332.30
111.35	332.15
111.50	332.90
111.55	332.75
111.70	333.50
111.75	333.35
111.90	331.10
111.95	330.95

SHARED LOC/GS FREQUENCIES
TABLE 4-1

4.3.7 COMPUTER DETAILED CIRCUIT THEORY

4.3.7.1 Microprocessor Detailed Circuit Theory

The control lines of the microprocessor are described in this section. Timing in the processor is directed from an internal clock. This internal oscillator is controlled by crystal Y500. The valid memory address (VMA) output indicates to peripheral devices that there is a valid address on the address bus. The Reset input is used to restart the MPU from a power down condition or if the OBI clock stops or also if the Vcc voltage goes below 4.5 volts. The system clock is supplied by the enable pin (E). This output is equivalent to the phase 2 clock of the MC6800 MPU. The read/write (R/W) output signals the peripherals whether the MPU is in a read (high) or write (low) state. The Halt, MR, RE and BA control functions are not used and their control pins are tied to either Vcc or ground, the BA pin is left open.

Non-maskable interrupt (NMI) and interrupt request (IRQ) are hardware interrupt lines which cause the MPU to stop normal sequential program execution and jump to a special section of the program. These interrupt lines are sampled when the clock (E) is high and will start the interrupt routine on a low clock following the completion of an instruction which it was currently working on.

The microprocessor uses the 16 address lines in conjunction with the valid memory address (VMA) to select memory locations in the system. Information is transferred either to or from the processor on the bi-directional data bus depending on the state of the read/write line.

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4.3.7.2 Reset Starter Detailed Circuit Theory

For the purpose of condensing the theory of operation and still covering all flavors of the unit, sometimes it will be necessary to show two component designations for a part that serves a common function. When a designation is shown as R537/R540, the R537 applies to the -00 flavor of the computer schematic and assembly drawing and the R540 applies to the -10 flavor of the computer schematic and assembly drawing. When only one component designation is shown it applies to both -00 and -10 assemblies. Refer to the maintenance structure, Table 4-2, to determine what board assembly part numbers and used in different flavors of KNS 81.

When power is first applied to the KNS 81, the microprocessor must be reset to start the initialization program. The power-on clear function is accomplished through C513, R537/R540 and R540/R541. When power is turned on, the capacitor (C513) holds the reset line low. The capacitor charges through R537/R540 and R540/R541 slowly letting the reset line go high. During the charging time, the power to the MPU and the memory is stabilizing so the MPU will operate properly when the reset line goes high.

Comparators I514A/I509A and B/B form a lost program detector. I514B/I509B detects any low pulses on the OBI clock line while I514A/I509A monitors the voltage of a slowly charging capacitor C514/C512. The switching threshold of comparator I514B/I509B is referenced from a resistor divider composed of R546/R532 and R547/R533. The reference for comparator I514A/I509A is supplied by the resistor divider of R543/R537 and R544/R538. Whenever there is a high level on pin 5 of I514B/I509A, the output of the comparator is high impedance state, which allows C514/C512 to charge through R537/R536 and R539/R540. A low pulse on pin 5 of I514B/I509B causes its output to go low and drain some of the charge from C514/C512, thus preventing it from charging up to I514A's/I509A's reference voltage. If there are no low pulses occurring at pin 5 of I514B/I509B, the capacitor C514/C512 will be allowed to charge up to I514A's/I509A's reference level. Once this level is exceeded by C514/C512, the output of I514A/I509A goes low causing the reset line to go low and reset the MPU. When the OBI clock is running normally, there should be enough low pulses occurring to keep C514/C512 from charging to the reference voltage.

I514C/I509C and D/D are the comparators which form a low voltage reset circuit. I514D/I509D monitors the +5 volt line, while I514C/I509C monitors the charge on capacitor C508/C525. This capacitor is used to filter out short pulses which may occur but will not affect the operation of the MPU. The reference voltage for I514D/I509D is supplied by the zener diode I520/I519 and resistor divider R532/R574 and R533/R575. If the 5 volt line ever drops below this reference level, the output of I514D/I509D goes low and begins drawing the charge from C508/C525. When the voltage on the capacitor gets below the reference of I514C/I509C, supplied by resistor divider R530/R572 and R531/R573, the output of I514C/I509C goes low pulling the reset line low and resetting the MPU and associated peripherals. During normal operation, C508/C525 should be charged greater than the reference voltage.

4.3.7.3 Computer Memory Detailed Circuit Theory

For the purpose of condensing the theory of operation and still covering all flavors of the unit, sometimes it will be necessary to show two component designations for a part that serves a common function. When a designation is shown as R537/R540, the R537 applies to the -00 flavor of the computer schematic and assembly drawing and the R540 applies to the -10 flavor of the computer schematic and assembly drawing. When only one component designation is shown it applies to both -00 and -10 assemblies. Refer to the maintenance structure, Table 4-2, to determine what board assembly part numbers and used in different flavors of KNS 81.

I501, I508, I512 and I519/I501, I512, I514, I515 and I521 form the memory for the computer. The MPU itself has 128 bytes of RAM built into it. An individual location is accessed by applying the correct address to the address (A) lines and also having the correct chip select line enabled. Data is returned through the data bus (DB0-DB7). The address lines to the memory are valid when the VMA signal from the microprocessor is high. Data is sent or received depending on the state of the read/write line. Figure 4-15 and Figure 4-16 show timing relationships between various signals.

4.3.7.4 Peripheral Interface Adapter (PIA)

The peripheral interface adapter provides the means of interfacing the microprocessor to external circuitry. The functional configuration of the PIA is determined during system initialization which occurs immediately after the reset. Each of the peripheral data lines is programmed as either an output or an input at this time. Information is sent to or read from the PIA on the data lines, DB0-DB7, when the correct address is applied to the chip selects. Data is transferred to the PIA if the read/write line is low and read from the PIA if the read/write line is high. The enable pin is tied to the enable pin of the MPU so that data transfer takes place when the clock is high. Data written into the PIA is latched at the PIA output ports. No microprocessor updating of the PIA is needed except when the data is to be changed. Figure 4-17 lists the functions of the PIA's.

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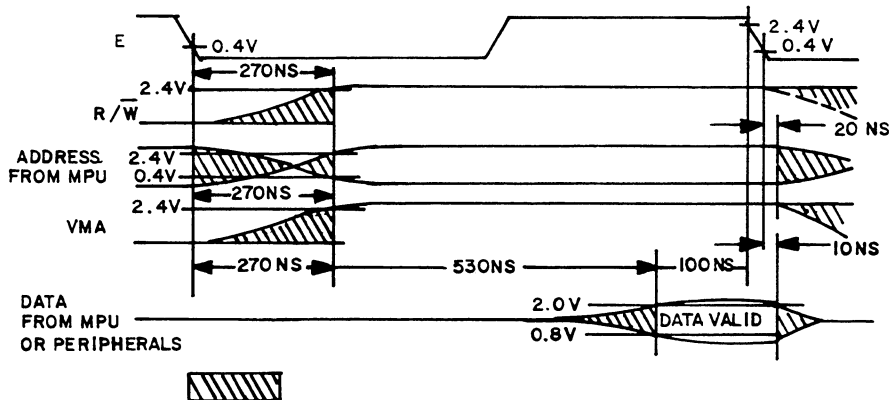


FIGURE 4-15 READ DATA FROM MEMORY OR PERIPHERALS

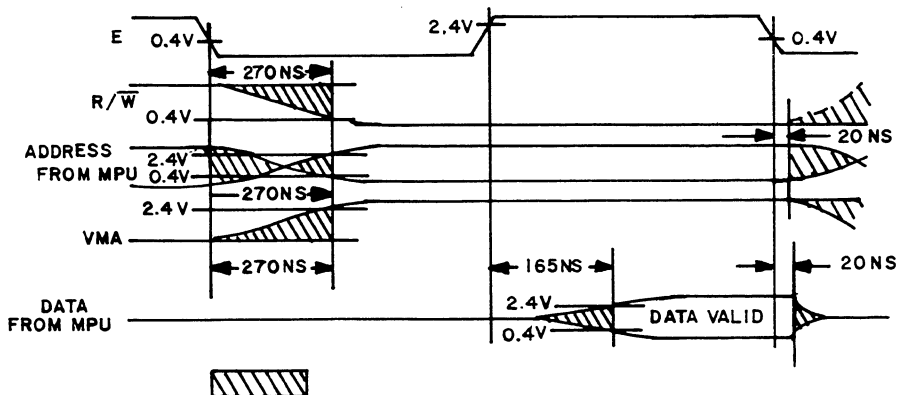


FIGURE 4-16 WRITE DATA IN MEMORY OR PERIPHERALS

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FOR -OX &-18 FLAVORS

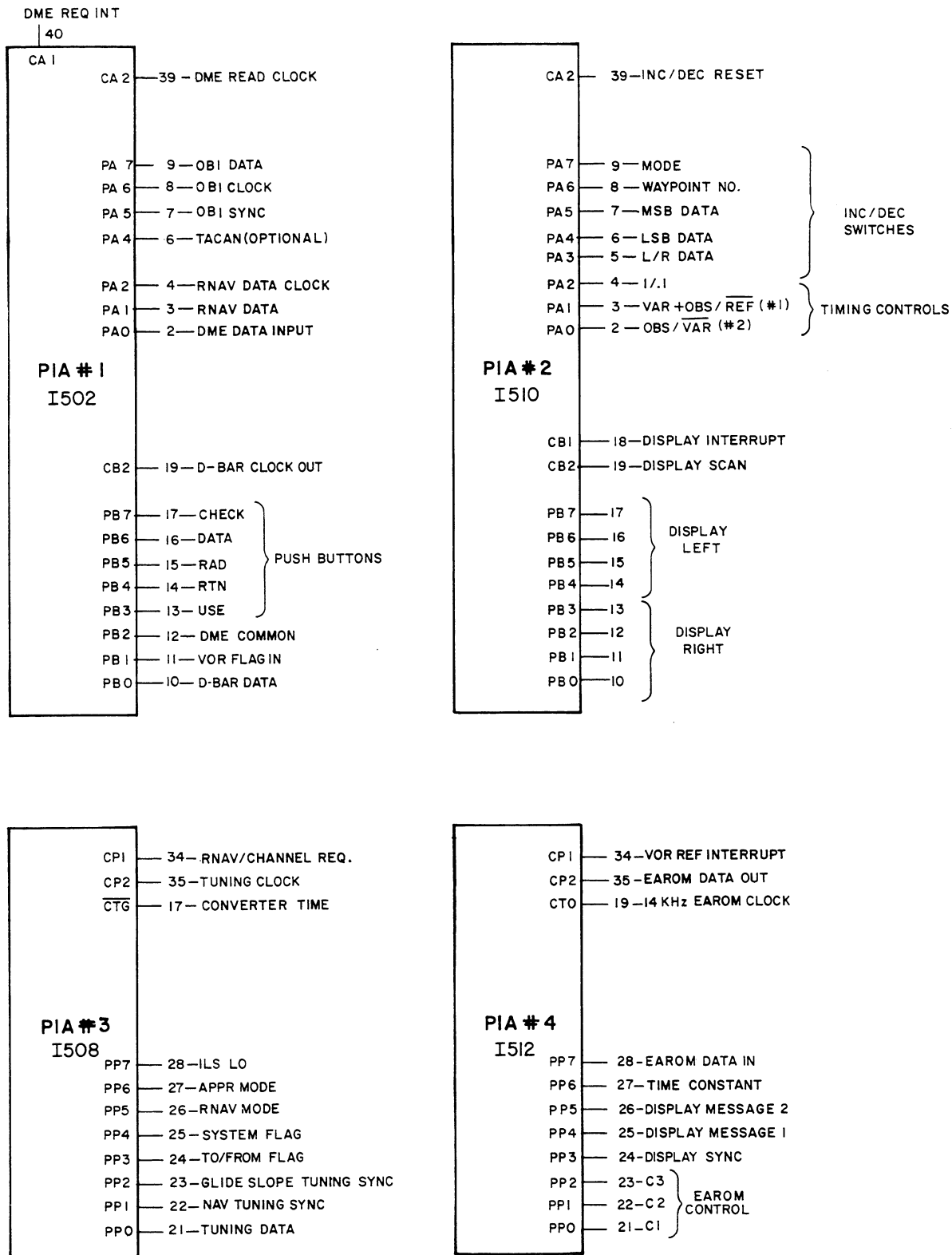


FIGURE 4-17a PIA INTERFACES
(Dwg. No. 696-5256-00, R-1)

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- 1X - 2X - 3X EXCEPT - 18 FLAVORS

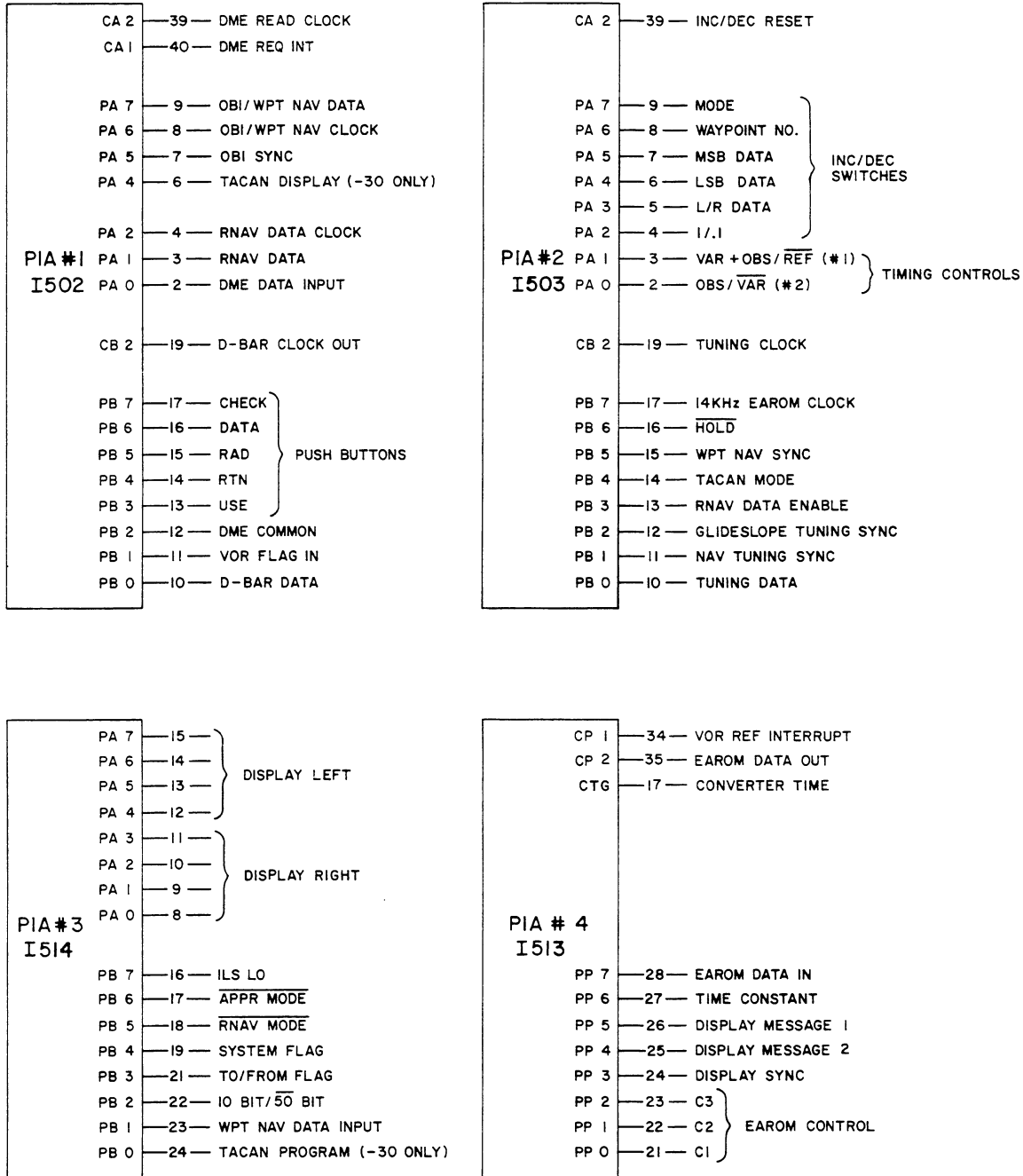


FIGURE 4-17b PIA INTERFACES
(Dwg. No. 696-5256-10/30, R-0)

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4.3.7.5 D-bar Digital to Analog Converter

For the purpose of condensing the theory of operation and still covering all flavors of the unit, sometimes it will be necessary to show two component designations for a part that serves a common function. When a designation is shown as R537/R540, the R537 applies to the -00 flavor of the computer schematic and assembly drawing and the R540 applies to the -10 flavor of the computer schematic and assembly drawing. When only one component designation is shown it applies to both -00 and -10 assemblies. Refer to the maintenance structure, Table 4-2, to determine what board assembly part numbers and used in different flavors of KNS 81.

Left/right information for the D-bar is converted from a digital word to a DC voltage signal with shift register I522/I516 and resistance ladder network U500/U501. Data is clocked into the shift register serially. Data from the shift register output Q2 produces twice the effect that data from Q1 produces and data from Q3 produces twice as much effect as Q2 and so on. The digital word containing all ones represents maximum left deflection and all zeroes represent maximum right deflection.

4.3.7.6 Increment/Decrement Switch Circuit Theory

(-0X & -18 flavors)

Rotation of the knobs is detected by flip-flops I515, I516 and I517. There are four lines coming from each switch assembly: LL, S TO GIVE A LOGIC HIGH AT PIN 1 (Q1) to indicate the large knob on the right side was moved. A high at pin 13 (Q2) of I516 would indicate the small knob on the right side was moved. I517 is wired the same as I516 so when a high occurs on pin 1 (Q1) it indicates the large knob on the left side was turned. A high on pin 13 (Q2) of I517 would indicate that the small knob on the left side was turned. The microprocessor senses the outputs of the flip flops so that it knows which knob was turned and in which direction it was turned. The microprocessor can now update the display. The microprocessor will reset I516 and I517 after it has read the information from them.

(-1X, -2X, -3X except -18 flavors)

Rotation of the knobs is detected by flip-flop I507 and latches I508. There are four lines coming from each switch assembly: LL, P₁L, P₂L and RL are from the left switches while LR, P₁R, P₂R and RR are from the right switches. I507 will indicate the direction of any knob rotation. I508 will indicate which knob was rotated. I507 is wired such that a clockwise rotation (increment) yields a logic high from the flip-flop and a counter-clockwise rotation (decrement) yields a logic low from the flip-flop. It should be noted that while the pulse from the switch is a positive leading edge on the -00 computer boards and a negative leading edge on the -10 computer boards it makes no difference to the flip-flops since timing is not critical. To determine which knob was rotated, latches (I508) are used instead of flip-flop as on the -00 computer boards.

Again different logic states are produced by the -00 computer board switches and the -10 computer board switches. I508 is wired so a logic high from Pin 4 indicates the large right knob, Pin 7 indicates the small right knob, and Pins 9 and 13 indicate the mode and waypoint knobs respectively. By sensing these outputs the microprocessor knows which knob was turned and in which direction and updates the display accordingly. The microprocessor then resets the flip-flop and latches after reading their information.

4.3.7.7 EAROM Detailed Circuit Theory

For the purpose of condensing the theory of operation and still covering all flavors of the unit, sometimes it will be necessary to show two component designations for a part that serves a common function. When a designation is shown as R537/R540, the R537 applies to the -00 flavor of the computer schematic and assembly drawing and the R540 applies to the -10 flavor of the computer schematic and assembly drawing. When only one component designation is shown it applies to both -00 and -10 assemblies. Refer to the maintenance structure, Table 4-2, to determine what board assembly part numbers and used in different flavors of KNS 81.

The electrically alterable read only memory (I519)/(I521) is used to store waypoint information during the power off condition. The EAROM receives its data and address information through the serial I/O line (pin 12). The three control pins (C1, C2, C3) are used to select the mode of operation for the EAROM. By applying a certain code of ones and zeros, the standby, accept address, read, write, data out, accept data, or erase modes can be selected. When the microprocessor does a write operation to the EAROM, it will output the correct control code to PIA 4 (I512)/(I513). The PIA will then send the code to I518A/I520A, B/B and D/D for a five volt to nine volt level shift. The microprocessor will also output one bit of data and one clock pulse at the same time as the control code. The data is sent through PIA 4 to I518F/I520F, a buffer, and then shifted into the EAROM's address shift register. Once the address is

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shifted into the EAROM, the data to be stored at the location can be sent out along with the "write" control code. The transistor, Q506/Q510 and resistors R525/R577, R526/R578 and R527/R579 form a pull up circuit for the data input line. When data is to be sent out of the EAROM, control line C2 will be a low. This low is sensed by I518C/520C and will cause Q506/Q510 to turn on and pull the data input line to nine volts. I518/I520 outputs are all open collector type so no damage to the buffers occurs by the level shifting. The capacitors on the control lines (C524/C528, C525/C529, C526/C530) filter out short spike pulses which may occur on these lines. Figure 4-18 shows some of the timing relationships between various signals.

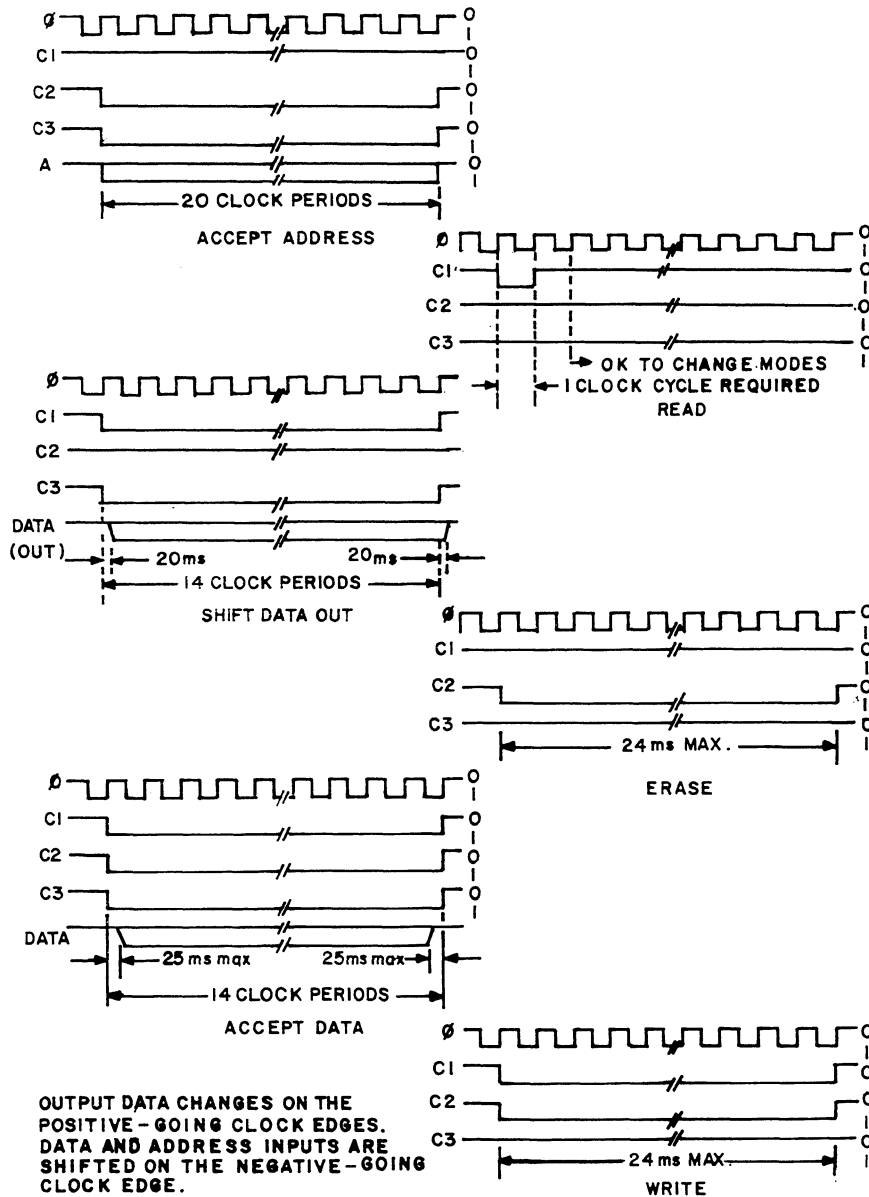


FIGURE 4-18 EAROM TIMING INPUTS

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4.3.7.8 DME Interface Detailed Circuit Theory

(-0X & -18 Flavors)

The DME interface is provided so the microprocessor can communicate with an external DME. Data is transferred to and from the microprocessor through a bi-directional serial data bus. When the DME is sending data, it will cause the DME data request line to go high. This signal is inverted through I504 and fed into the reset pins of I511. CR512 is used for protection against over-voltage. The low signal on the reset pins causes all of the Q outputs of I511 to go to a logic low allowing the DME bus clock to go through I505A and B and clock I506 and I507. The DME data request line being high allows I511 to count the number of clock pulses at pin 2. When Q1 (pin 12) of I511 goes high, the 20 bits of data from the DME should now be shifted into I507 and I506. The microprocessor will be interrupted by this high level on PIA 1 (I502) pin 40. The microprocessor will now send out a clock signal on PIA 1 pin 39 to clock out the data contained in I506 and I507. The data will go to the microprocessor through PIA 1 pin 2. After 32 milliseconds, the DME data request line will go low again resetting I511. The computer uses the DME data to compute RNAV or VOR parallel problems.

After the DME request line goes low, the RNAV/Channel request line goes to a high level to interrupt the MPU. The interrupt will cause the microprocessor to send out a 50 bit word if the unit is in the RNAV mode or if the RAD button is pushed. In all other modes, the MPU will send a 10 bit word to the DME. The DME COMMON line will be a logic low if the KNS 81 is to be used to remote tune the DME. This line is monitored by the MPU so that it will know if it is required to send out tuning data or not. The decoding gates of I505, I524, I504 and I503 control Q500 and the state of the 10 bit/50 bit line. If the DME COMMON line is low, and if the RAD button is not pushed, the output (pin 11) of I505 will be a high. If the KNS 81 is in the RNAV mode, there will be a high level at the collector of Q503 which is applied to pin 8 of I524C. The output of I524C will then go to a logic high and cause transistor Q500 to turn on, which will drive the 10 bit/50 bit line to be low. This tells the DME to expect a 50 bit word on the data bus. If the KNS 81 is not in the RNAV mode, the output of I524C would be a low. The transistor (Q500) would not turn on so the 10 bit/50 bit line would remain at a high level, telling the DME to expect a 10 bit word on the data bus. If the RAD button is pushed, it will cause the same effect as in the RNAV mode by causing the output of the NAND gate (I505D) to go low.

When the MPU outputs the data for the DME, it will send data to PIA 1 (I502) along with a clock signal. These signals go out of PIA 1 pins 3 and 4 to two NAND gates (I525A and B). If the RNAV/Channel request line is high, I524A's output will be high also. Now the bus clock and DME data out will be allowed through the NAND gates. The DME data out will go from I525A pin 3 through R559 and to the base of Q507 which turns the transistor on or off depending upon the level of the data being sent. The bus clock will do the same to transistor Q508. The DME data out can be seen at TP509 and the bus clock can be seen at TP510. Figure 4-19 shows some of the timing relationships of some of the signals. Figure 4-20 shows the functions of the 50 bit word.

(-1X/-2X/-3X except -18 Flavors)

The DME interface is provided so the microprocessor can communicate with an external DME. Clock and data are transferred to and from the microprocessor through bi-directional serial buses. DME request, clock bus, and data buses are level shifted from +9V to +5V by I518 B, F, and D respectively. When the DME is sending data DME request goes high enabling NAND gate I505D and allowing clock data to pass. CA2 of PIA1 is high allowing clock data to pass a second NAND gate (I505C) to the shift register I504. When DME request transistors low CA1 of PIA1 is also pulled low interrupting the microprocessor which outputs clock pulses through CA2 of PIA1. Because the output of NAND gate I505D is high due to DME request being low, NAND gate I505C is enabled and CA2 will clock the needed data from the shift register into PIA1. Concurrent to DME request going low clock and data information to the DME is output by PIA1. Q501 is constantly held high, enabling NAND gates I500A and B. Clock and data is level shifted from +5V to +9V by Q500 and Q502 and output to the DME. Q501's purpose is to prevent the microprocessor from talking on the bus during power up by keeping NAND gates I500 A and B disabled until the microprocessor power up initialization is complete. Completion is indicated by PB3 of PIA2.

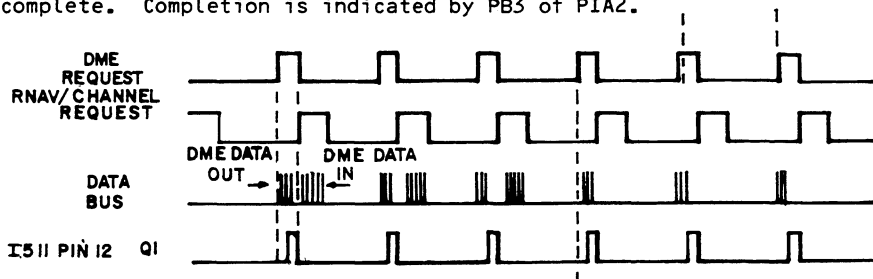


FIGURE 4-19 DME DATA TRANSFER TIMING DIAGRAM

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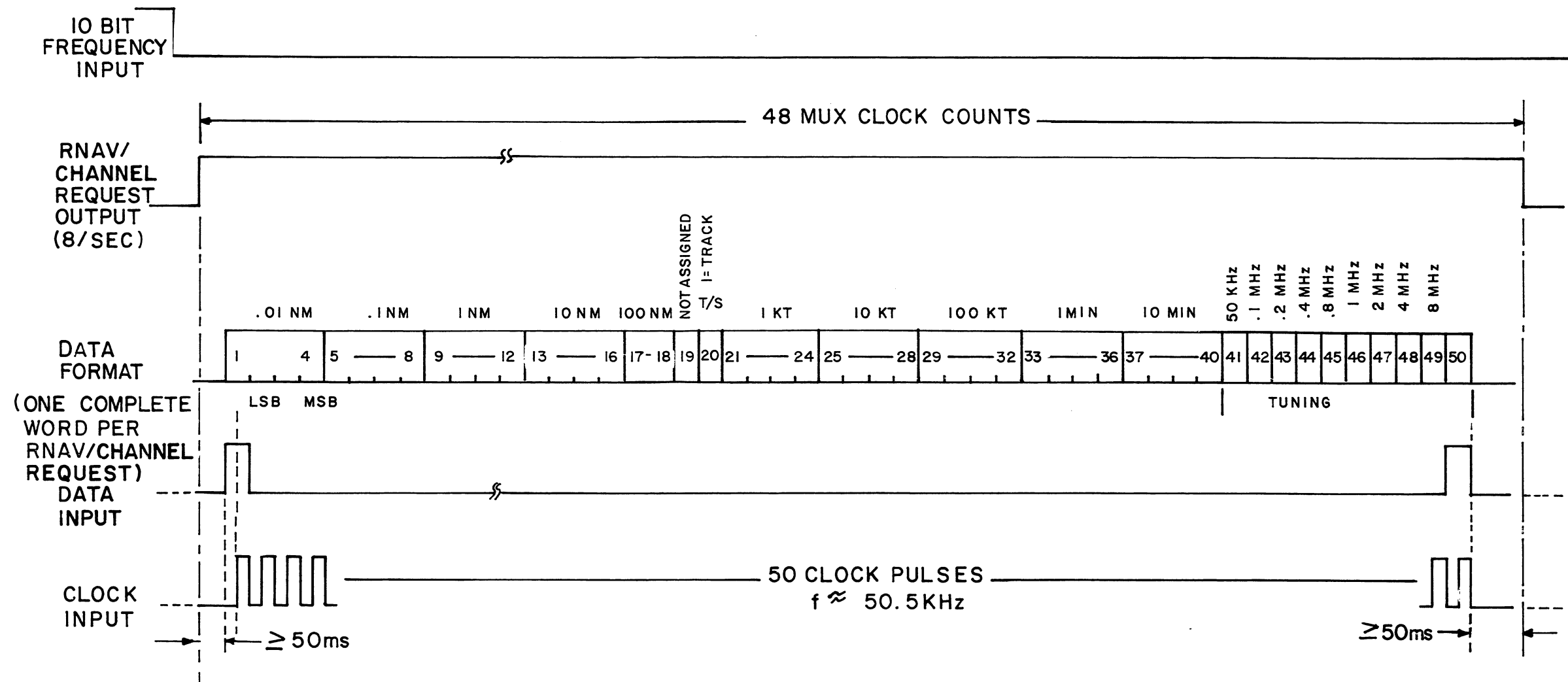


FIGURE 4-20 50 BIT WORD DATA FORMAT
(Dwg. No. 696-5258-00, R-1)

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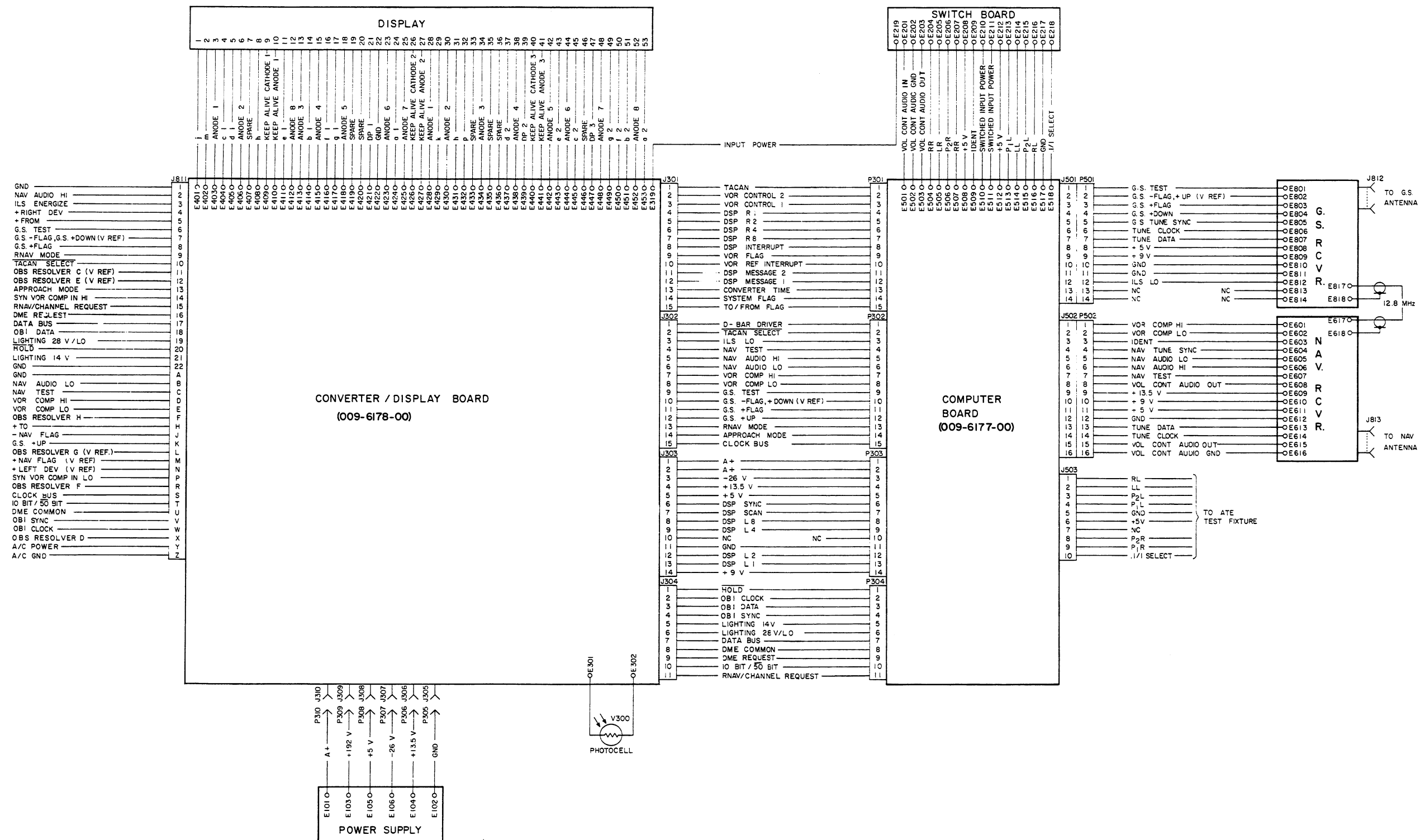


FIGURE 4-21 KNS 81 INTERNAL INTERCONNECT -01/-18 FLAVORS
(Dwg. No. 002-0532-00, R-4)
(Sheet 1 of 2)

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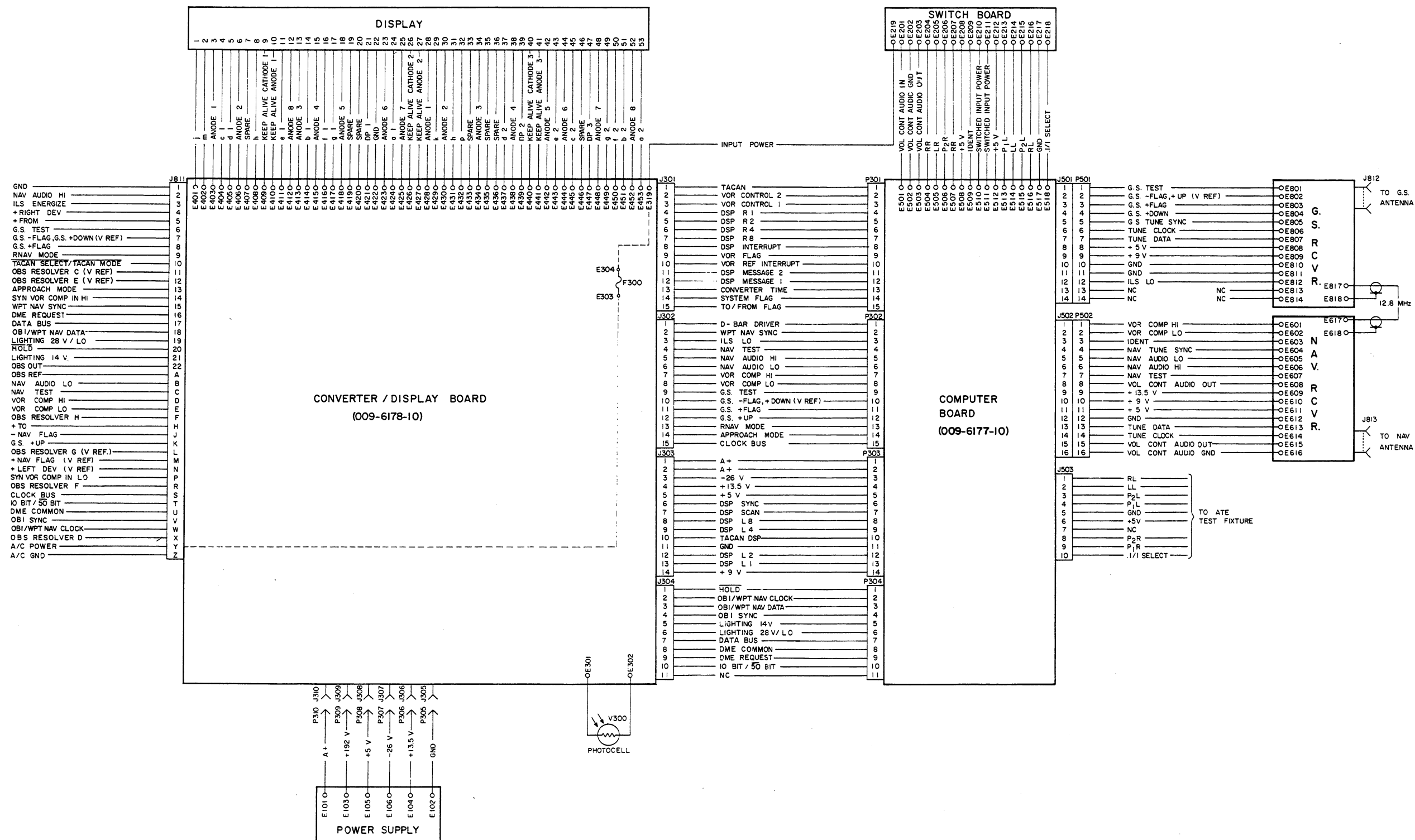


FIGURE 4-21 KNS 81 INTERNAL INTERCONNECT -1X/-2X/-3X EXCEPT -18 FLAVORS
(Dwg. No. 002-0532-00, R-4)
(Sheet 2 of 2)

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KNS 81 VERSION	PART NUMBER	CONVERTER / DISPLAY BD		COMPUTER BD.		NAV	GLIDESLOPE	POWER	SWITCH
						RECEIVER	RECEIVER	SUPPLY	BOARD
		002-6178-00	002-6178-10	002-6177-00	002-6177-10	002-6175-00	002-6176-00	002-6197-00	002-6183-00
		300-6178-00	300-6178-10	300-6177-00	300-6177-10	300-6175-00	300-6176-00	300-6197-00	300-6183-00
VOR -0X FAMILY -18	066-4010-00	X		X		X	X	X	X
	-01	X		X		X		X	X
	-02	X		X		X	X	X	X
	-03	X		X		X		X	X
	-04	X		X		X	X	X	X
	-18	X		X		X	X	X	X
VOR -1X FAMILY -2X EXCEPT -18	-10		X		X	X	X	X	X
	-11		X		X	X	X	X	X
	-14		X		X	X		X	X
	-15		X		X	X		X	X
	-20		X		X	X	X	X	X
TACAN -3X FAMILY	-30		X		X	X	X	X	X
	-31		X		X	X	X	X	X
	-34		X		X	X		X	X
	-35		X		X	X		X	X
	-38		X		X	X	X	X	X

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TABLE 4-2 KNS 81 MAINTENANCE STRUCTURE
(Dwg. No. 696-5268-00, R-0)

The KNS 81 is divided into three versions or families: -0X/-1X/-2X and -3X. All versions use the same NAV Receiver, Glideslope Receiver (optional), Power Supply and Switch Board. The flavor differences are created in the Converter/Display Board and the Computer Board. The -1X/-2X/-3X except -18 families use the same Converter/Display Board and Computer Board and are identical except for small flavor differences. For this reason the -1X/-2X/-3X families are referred to as -1X/-2X/-3X. The -0X family however uses a functionally similar but electrically different Computer Board and Converter/Display Board. The following Table should help clarify which schematic and assembly to use with each flavor of KNS 81.

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SECTION V MAINTENANCE

5.1 GENERAL INFORMATION

This section contains test, alignment, inspection, cleaning, repair, and troubleshooting procedures for the KNS 81. Included are detailed assembly/disassembly instructions and troubleshooting flowcharts. Schematic diagrams are illustrated in Section 6.0.

Information concerning semiconductor test equipment, semiconductor and integrated circuit maintenance, and specific integrated circuits used in the KNS 81 may be found in Appendix A at the end of this manual. It is suggested that Appendix A be consulted before attempting to service the KNS 81.

5.2 TEST AND ALIGNMENT

5.2.1 GENERAL INFORMATION

The test procedures of Section 5.2.4 may be followed to determine if the KNS 81 is operating properly. If it is not, the alignment procedures are given to bring the KNS 81 up to minimum performance standards.

5.2.2 TEST EQUIPMENT REQUIRED

The following test equipment or equivalent is needed to align and troubleshoot the KNS 81.

- A. Power Supply - 13-28V at 3 amps
- B. Oscilloscope - Tektronix 465
- C. Digital Voltmeter - Fluke 8600A
- D. VOR RF Generator - HP 8640B
- E. VOR/ILS Modulator - TIC-T20A
- F. Attenuators - 6dB pad, 50 ohm
- G. RF VTVM - HP 3400A
- H. Audio VTVM - Ballentine 310A/B
- I. Frequency Counter - Eldorado 1615C
- J. Precision Track Selector - 479V-3
- K. Audio Oscillator - Hewlett Packard 200CD
- L. DME Test Set - IFR ATC - 1200Y3 or equivalent
- N. KNS 81 Test Panel

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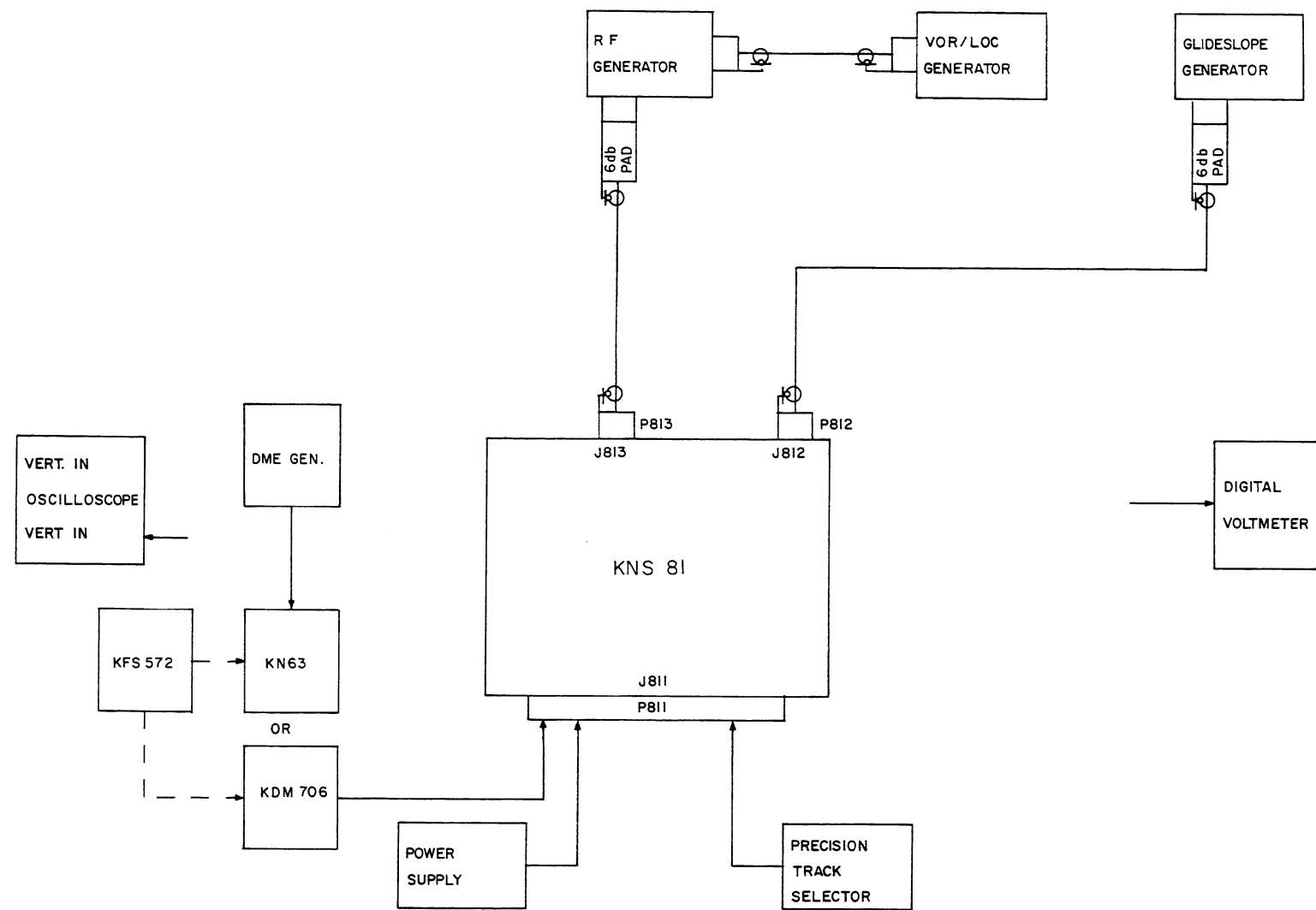


FIGURE 5-1 EQUIPMENT SETUP
 (Dwg. No. 696-5259-00, R-0)

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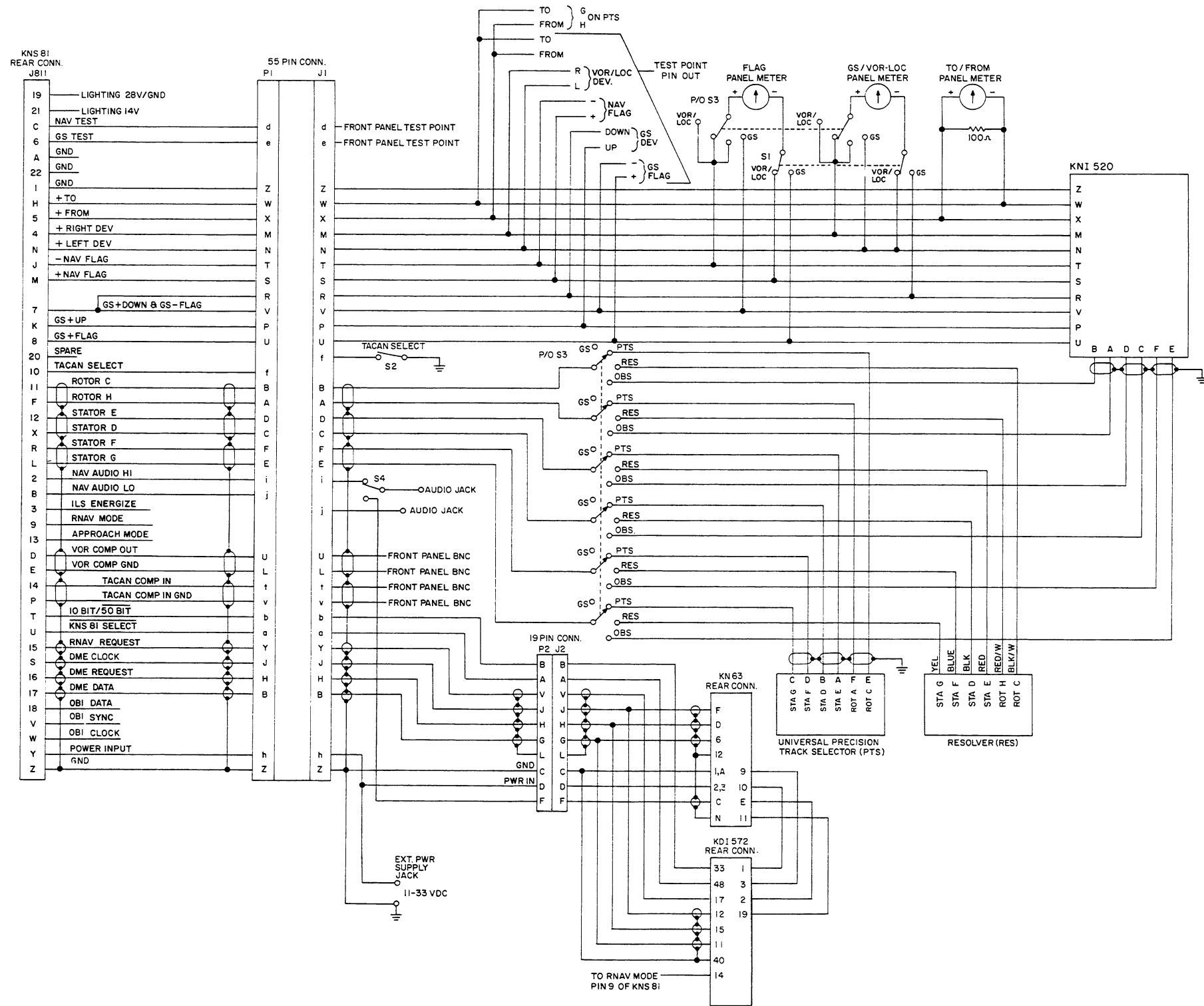


FIGURE 5-2 TEST PANEL SCHEMATIC
(Dwg. No. 002-0533-00, R-0)

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5.2.3 ALIGNMENT PROCEDURES

The following procedures describe how to align the KNS 81 once the test procedures have been completed to prove alignment is necessary. A sequential order has been followed for complete alignment. Refer to the schematics and assembly drawings for location of components, test points, and adjustments. The numbering sequence is as follows:

<u>SCHEMATICS</u>	<u>COMPONENT OF TEST POINT DESIGNATORS</u>
Power Supply Board	100 - 199
Switch Board	200 - 299
Converter/Display Board	300 - 499
Computer Board	500 - 599
NAV Receiver Board	600 - 799
Glideslope Board	800 - 899

Unless otherwise stated, alignment should be performed with standard test signals and input conditions as defined in Section 5.2.3.1.

5.2.3.1 Standard Test Signal Description

a. Standard VOR Test Signal

An RF carrier, amplitude modulated simultaneously at $30 \pm 1\%$ by a 9960Hz subcarrier which, in turn is frequency modulated at a deviation ratio of $\frac{1}{16}$ by a $30 \pm .1\%$ "Reference Phase Signal" and at $30 \pm 1\%$ by a $30\text{Hz} \pm .1\%$ "Variable Phase Signal" which can be varied in phase with respect to the reference phase signal.

b. Standard Audio Test Signal

An RF carrier amplitude modulated 30% at 1000Hz.

c. Standard Localizer Test Signal

An RF carrier modulated simultaneously with $90\text{Hz} \pm .3\%$ and $150\text{Hz} \pm .3\%$ signal so that the sum of their separate modulation percentages equals $40 \pm 2\%$.

d. Standard Localizer Centering Signal

A standard localizer test signal in which the difference in depth of modulation is less than .002 (.1dB).

e. Standard Localizer Deviation Signal

A standard localizer test signal in which the difference in depth of modulation of the 90Hz and 150Hz signal is $.093 \pm .002$ ($4 \pm .1\text{dB}$).

f. Standard Glideslope Test Signal

A 700uV RF carrier amplitude modulated simultaneously with 90Hz and 150Hz of such levels that when each signal is applied independently, the carrier is modulated $40 \pm 2\%$.

g. Standard Glideslope Centering Signal

A standard glideslope test signal in which the difference in depth of modulation is less than .002.

h. Standard Glideslope Deviation Signal

A standard glideslope test signal in which the difference in depth of modulation of the 90Hz and 150Hz signals is $.091 \pm .002$.

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5.2.3.2 Alignment Conditions

Unless otherwise stated, alignment should be performed with standard test signals as defined in Part II and with the following set of input conditions.

- a. Input Voltage to Power Supply: 13.75V
- b. NAV Channel: 113.00MHz
- c. NAV Signal RF Level: 100uV
- d. KNS 81 Connected To Compatible DME (KN 63 or KDM 706) or TACAN REC. (KTU 709)

5.2.3.3 Power Supply Alignment

- a. Apply 13.75VDC to the power input line of the KNS 81.
- b. Monitor TP518 with a DVM. TP518 is located on the computer board.
- c. The reading at TP518 should be 5.0VDC \pm .05VDC. If the voltage needs adjusting, proceed as follows.
- d. Remove the power supply cover.
- e. Adjust R125 for a 5V .05VDC reading at TP518.

5.2.3.4 NAV Receiver and Synthesizer Alignment

a. Reference Oscillator and VCO Alignment

- (1) Remove the NAV receiver cover.
- (2) Tune the KNS 81 to 113.00MHz.
- (3) Set the signal generator to 113.00MHz at 100uV output.
- (4) Monitor TP602 with a frequency counter.
- (5) Adjust C648 for 101.9MHz \pm 100Hz.
- (6) Monitor TP606 with a DVM.
- (7) Adjust L612 for 4.5 \pm 0.1VDC.
- (8) Set the signal generator to a standard modulated signal at 113.05MHz at 1000uV.
- (9) Monitor TP604 with a DVM.
- (10) Temporarily attach a 510K ohm resistor to either side of R684 to ground. See Figure 5-4 for tool. Note: The resistor should be clipped in position.
- (11) Adjust L610 for a minimum voltage.
- (12) Remove the 510K resistor.

b. Preselection and IF Alignment

- (1) Apply a standard audio modulated RF signal at 113.00MHz with a level of 1000uV to the antenna input.
- (2) Tune the KNS 81 to 113.00MHz.
- (3) Monitor TP603 with a DVM.

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- (4) Tune the following for peak voltages. Use the swamping tool as depicted in Figure 5-3 to perform the following adjustments.
- (a) Swamp L600 by placing the swamping tool across CR600 to ground. See Figure 5-3 for proper placement of tool.
 - (b) Tune L601.
 - (c) Swamp L601 by placing the swamping tool across CR601 to ground. See Figure 5-3 for proper placement of tool.
 - (d) Tune L600.
 - (e) Swamp L603 by placing the swamping tool across CR602 to ground. See Figure 5-3 for proper placement of tool.
 - (f) Tune L604.
 - (g) Swamp L604 by placing the swamping tool across CR603 to ground. See Figure 5-3 for proper placement of tool.
 - (h) Tune L603.
 - (i) With the tool removed, tune the following.
 - (j) Tune T600.
 - (k) Tune T601.
 - (l) Tune T602.
 - (m) Tune T603.
- (5) Decrease the signal generator level to 10uv and repeat step 4, items a through m.
- c. RF AGC Alignment
- (1) Set the signal generator level to 2uv.
 - (2) Monitor TP604 with a DVM.
 - (3) Adjust R649 for maximum voltage.
 - (4) Readjust to .1V less than maximum voltage.
- d. Ident Filter Alignment
- (1) Apply a 113.00MHz signal of 1000uv modulated 30% by a 1020Hz tone.
 - (2) Set the Ident On/Off switch to the IN position.
 - (3) Monitor the audio out line with a VTVM.
 - (4) Adjust R640 for a minimum RMS voltage.
- e. Composite Out
- (1) Use the 30Hz variable modulation only.
 - (2) Monitor TP605 with a VTVM.
 - (3) Adjust R633 for .35VRMS.

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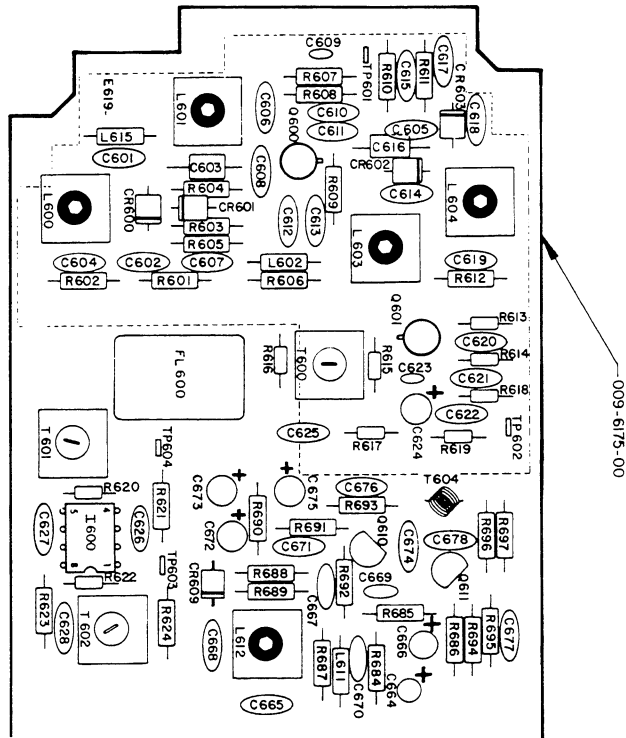


FIGURE 5-3 NAV RECEIVER FRONT END

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5.2.3.5 Converter/Display Board

The D-bar and flag outputs are expressed in mV rather than uA since the drivers are voltage and not current sources.

- a. Remove the top cover to the converter board.
- b. Set the signal generator to 114.90MHz.
- c. Apply a standard VOR test signal at 1000uV.
- d. Set the KNS 81 to 114.90MHz.
- e. Set the KNS 81 to the VOR mode.
- f. Present a DME signal to the DME input of the KNS 81. Simulated DME signal can be provided from a KTS 143 Digital Test Set.
- g. Perform the following adjustments:
 - (1) Peak the 30Hz variable filter output at TP302 by adjusting R312. TP302 should be monitored with an oscilloscope.
 - (2) Remove modulation from the RF generator.
 - (3) Monitor TP304 with a scope probe.
 - (4) Adjust R318 for a frequency of 9960 ± 30 Hz at TP304.
 - (5) Replace the modulation.
 - (6) Monitor TP306 with a scope probe.
 - (7) Adjust R409 for a 4.80V p-p $\pm .1$ V signal.
 - (8) Adjust R331 to peak the 30Hz reference filter at TP306.
 - (9) Monitor both TP302 and TP306 with a scope probe.
 - (10) Adjust R303 so that the amplitudes of the signals at TP302 and TP306 are equal to within 0.2V peak to peak. If the amplitude of the signal at TP306 is less than 4.5 volts peak to peak, adjust R303 for 4.5 volts at TP302.
 - (11) Set the variable PLL VCO voltage at TP314 to $4.6 \pm .2$ V by adjusting R442. Signal at TP303 must be $30 \text{Hz} \pm .3$ Hz for this adjustment.
 - (12) With generator set at zero degrees T₀, align the two square waves rising edges at TP303 and TP307 to within $.1^\circ$ by adjusting R312.
 - (13) With a standard VOR signal on channel and the KNS 81 in the RNAV mode, remove the DME RF signal. The KNS 81 should then be in a flagged condition.
 - (14) Zero the D-bar to within 1mV with R366.
 - (15) Replace the DME RF signal. The KNS 81 should now be in a non-flagged condition.
 - (16) Set the KNS 81 to the VOR mode.
 - (17) Monitor TP312 with a scope probe.
 - (18) Adjust R349 to set the VCO voltage of the 30Hz PLL to $4.6 \pm .2$ volts. The 30Hz signal input must be accurate to within $.3$ Hz for this adjustment.
 - (19) Monitor TP303 and TP307 with scope probes.
 - (20) Set the NAV signal generator to 0 degrees "T₀".

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- (21) Adjust R331 to align the two square waves to within $\pm 10\mu s$.
- (22) Set the NAV signal generator to 90 degrees "T0".
- (23) Set the precision track selector to 90 degrees.
- (24) Monitor the D-bar output at L309 and L311 with a DVM. L309 is monitored relative to L311 with the DVM.
- (25) Allow a two (2) minute settling time before any adjustments are made.

NOTE

Grounding of pin 7 of J503 on the computer board will reduce this time to 15 seconds.

- (26) Adjust R342 for $0 \pm 2mV$ between L309 and L311.
 - (27) Set the NAV signal generator to 0 degrees "T0" and the precision track selector to 0 degrees.
 - (28) Again allow for the settling time.
 - (29) Adjust R338 for $0 \pm 2mV$.
 - (30) Repeat steps 21 through 26 until the required null voltage exists at both 0 and 90 degrees with no further adjustments.
 - (31) Apply a standard localizer test signal at 1000uV.
 - (32) Set the signal generator to 110.10MHz.
 - (33) Set the KNS 81 to 110.10MHz.
 - (34) Monitor TP302 with a scope probe.
 - (35) Peak the 90Hz bandpass filter with R308.
 - (36) Monitor TP306 with a scope probe.
 - (37) Peak the 150Hz bandpass filter with R326.
 - (38) Monitor the D-bar outputs at L309 and L311 with a DVM. L309 relative to L311.
 - (39) Adjust R329 to zero the D-bar to within 1mV.
 - (40) Set the NAV generator tone ratio to .093dBm (4dB).
 - (41) Monitor the D-bar outputs L309 and L311.
 - (42) Adjust R370 for $90 \pm 2mV$ of the D-bar deflection.
 - (43) By alternately removing the 90Hz and 150Hz tones, find which one gives the larger flag voltage.
 - (44) Adjust R354 to $125 \pm 5mV$.
- h. Place opaque tape over the photocell.
- (1) Monitor TP311 with a scope probe.
 - (2) Adjust R416 for a pulse width of 110us.
 - (3) Monitor TP313 with a DVM.
 - (4) Adjust R434 for $185 \pm 1VDC$.

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5.2.3.6 Glideslope Board Alignment Procedure

a. Dither

- (1) Disconnect R898 for glideslope alignment.

b. VCO

Under this section you will find two different alignment procedures for the VCO. Alignment 1 requires the use of a spectrum analyzer. Alignment 2 is an acceptable alternate, but not as accurate as Alignment 1.

Alignment 1 (preferred method)

- (1) Tune the KNS 81 to 109.30MHz and the signal generator to 332.00MHz using a standard glideslope signal.
- (2) Connect a frequency counter to E817 and verify that the incoming frequency is 12.8MHz + 15Hz. NOTE: If the frequency is not 12.8MHz + 15Hz, repeat steps a of the NAV Receiver Alignment and then step 2 of this section.
- (3) Screw L809 core partially out of the can (approximately 3 threads).
- (4) Temporarily attach a 510K ohm resistor from TP806 to ground.
- (5) Connect a spectrum analyzer to TP807.
- (6) Tune the analyzer to 332MHz and observe 8.333KHz sidebands.
- (7) Adjust L809 for minimum sideband.
- (8) Remove the 510K ohm resistor.
- (9) Monitor TP806 with a DVM.
- (10) Adjust L811 for 4.5 + 0.1VDC.

Alignment 2 (acceptable alternate)

- (1) Tune the KNS 81 to 109.30MHz and the signal generator to 332.00MHz using a standard glideslope signal.
- (2) Connect a frequency counter to E817 and verify that the incoming frequency is 12.8MHz + 15Hz. NOTE: If the frequency is not 12.8MHz + 15Hz, repeat step a of the NAV Receiver Alignment and then step 2 of this section.
- (3) Screw L809 core partially out of the can (approximately 3 threads).
- (4) Temporarily attach a 510K ohm resistor from TP806 to ground.
- (5) Tune the signal generator to 331.966MHz at 70uv.
- (6) Connect a DVM to TP802.
- (7) Vary the signal generator frequency slightly until the DVM indication is dipped.
- (8) Adjust L809 for minimum voltage.
- (9) Remove the 510K resistor.
- (10) Monitor TP806 with a DVM.
- (11) Adjust L811 for 4.5 + 0.1VDC.

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c. Preselector Adjustment

- (1) Tune KNS 81 to 109.3 and a standard glideslope signal of 332.00MHz.
- (2) Monitor TP804 with a DVM (DCV). Tune the receiver to an indicated frequency of 109.3MHz. Set the signal generator to 332.0MHz at 1000uv with a standard glideslope signal. Adjust C801, L801 and L802 for a minimum DC voltage at TP804.

d. Elliptic Low Pass Filter Alignment

- (1) Remove the RF input.
- (2) Adjust a sine wave signal generator for 162KHz as measured with a frequency counter. Connect the signal generator to TP801.
- (3) Connect a DVM to TP802.
- (4) Observe the no signal voltage at TP802. Adjust the signal generator signal level for .1V above the no signal voltage at TP802.
- (5) Adjust L803 for minimum voltage at TP802.
- (6) Set the signal generator for 83.6KHz as measured with a frequency counter.
- (7) Repeat step 4.
- (8) Adjust L804 for minimum voltage at TP802.
- (9) Set the signal generator for 97.7KHz as measured with a frequency counter.
- (10) Repeat step 4.
- (11) Adjust L805 for minimum voltage at TP802.
- (12) Repeat all of step d for accuracy.

e. RF AGC Attack Adjust

- (1) Monitor TP804 (RF AGC) with a DVM (DCV).
- (2) Set the signal generator output to 30uv.
- (3) Adjust R836 until the voltage on TP804 just begins to drop (.3V drop maximum).

f. Centering Adjust

- (1) Set the signal generator for a standard glideslope centering signal (.000ddm).
- (2) Adjust R873 for $0 \pm 1\text{mv}$ deflection.

g. Course Width Adjust

- (1) Set the signal generator for a standard glideslope deviation signal (.091ddm).
- (2) Adjust R846 for a deflection of $78 \pm 2\text{mv}$. Check both up and down.
- (3) Repeat Steps 6 and 7 as necessary.

h. Reconnect R898.

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5.2.4 TEST PROCEDURES

5.2.4.1 Conditions for Testing

All specifications pertain to the following set of input and environmental conditions unless otherwise noted.

- a. Ambient room temperature and humidity
- b. Supply Voltage: 13.75 ± .1VDC
- c. Currents stated are currents which would flow through a single standard load unless otherwise stated. The output should be able to produce this current for any number of loads which the KNS 81 was designed for. Standard loads and the number of loads allowed on the outputs are listed below:

Course Deviation Loads: 0 to 5, 1K Loads
 VOR/LOC/RNAV Flag Loads: 0 to 5, 1K Loads
 TO/FROM Loads: 0 to 3, 200 Ohm Loads
 Glideslope Deviation: 0 to 3, 1K Loads
 Glideslope Flag Loads: 0 to 3, 1K Loads

- d. All RF signal voltages in this document are expressed in hard microvolts.
- e. All tests are to be performed with the cover on.
- f. Tests marked with an asterisk are to be performed at the option of quality Control.

5.2.4.2 VOR Tests

5.2.4.2.1 Standard Test Signals

a. Standard VOR Test Signal

An RF carrier (114.90MHz) amplitude modulated simultaneously:

- (1) 30 ± 1% by a 9960Hz subcarrier which is in turn frequency modulated at a deviation ratio of 16 ± 1 by a 30 ± 1Hz "reference phase signal" and
- (2) 30 ± 1% by a 30 ± 1Hz "variable phase signal" which can be varied in phase with respect to the reference phase signal.

b. Standard Audio Test Signal

An RF carrier amplitude modulated 30% at 1000Hz.

c. Standard TACAN test signal

A synthesized VOR Composite

5.2.4.2.2 VOR Test Procedures

Using the test setup of Figure 5-1, the conditions of 5.2.4.1, and the signals of 5.2.4.2.1, check the following parameters:

a. RF Sensitivity

<u>S + N/N @ 2.0uV = -101dBm (6dB min.)</u>	<u>Solid Flag (325 ± 75, -50mV)</u>
Freq. 108.00 _____	_____
(MHz) 114.90 _____	_____
117.95 _____	_____
Quieting	
112.50MHz _____	<u>(20dB min. at -67dBm) 100uV</u>

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Selectivity 112.50MHz

6dB Upper Freq. _____ MHz (> 112.5174MHz) +17.4KHz
 Lower Freq. _____ MHz (< 112.4826MHz) -17.4KHz

6dB Bandwidth _____ MHz (> 34.8KHz)

Selectivity 112.542MHz _____ dB (80dB min.)
 112.458MHz _____ dB (80dB min.)

- b. Course Accuracy - With a 100uV RF signal, bearing error as measured by the D-bar deviation current shall not exceed +0.6° for any radial.

Course Accuracy Standard VOR Test Signal on 114.90MHz (100uV)

TACAN Test Signal on 70X (TACAN Version only)

RADIAL (degrees)	BEARING VOR	BEARING TACAN	BEARING ERROR (+0.6° or +9mV) (RMI + .4°)		RADIAL (degrees)	BEARING VOR	BEARING TACAN	BEARING ERROR (+0.6° or +9mV) (RMI + .4°)	
			VOR	TACAN				VOR	TACAN
* 0°	TO _____ FROM _____	_____	_____	_____	* 240°	TO _____ FROM _____	_____	_____	_____
30°	TO _____ FROM _____	_____	_____	_____	270°	TO _____ FROM _____	_____	_____	_____
60°	TO _____ FROM _____	_____	_____	_____	* 300°	TO _____ FROM _____	_____	_____	_____
* 90°	TO _____ FROM _____	_____	_____	_____	* 330°	TO _____ FROM _____	_____	_____	_____
180°	TO _____ FROM _____	_____	_____	_____					

- c. Deflection Sensitivity - With an RF signal of 100uV, the D-bar deviation current shall be 150 ± 10uA when the phase difference between the two components of a standard VOR test signal differs 10° from the selected course.

Deflection Sensitivity
 RF Signal 100uV D-Bar Current +10° _____ (114.90MHz)
 -67dBm -10° _____ (150 ± 10uA)
 (150 ± 10uA)

- d. Deflection Response - When the difference in phase between the two components of an on course 100uV standard test signal is changed abruptly, the deflection current should reach 70% of its ultimate value within 3.2 ± .3 seconds.

- e. Deflection Linearity - The deflection current shall be within 5uA of being proportional to the difference in phase between the two components of the standard VOR test signal. This requirement shall be met at all deflection currents between +150uA.

Deflection Linearity (114.90MHz)
 Deflection is monotonic between -10° and +10° _____ ()

- f. Flag Sensitivity - The unit shall not be flagged with an RF input of 2uV or greater.

- g. T0/FROM Flag - The T0/FROM flag current shall be 200uA to 800uA for both the T0 and FROM status.

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- h. Audio Sensitivity - On any channel, the (S + N)/N ratio as measured at the audio output shall be at least 6dB for an RF input of 2uV or greater.
- i. AGC - The audio output produced by a standard audio test signal shall not vary more than 3dB when the RF signal level is changed from 5 to 20,000uV.
AGC 12.50MHz _____ dB (3dB Max.)
- j. Birdies - The equivalent carrier level as measured on the IF AGC line shall be less than 0.5uV on all channels.
Spurious Responses 112.50MHz - Image at 112.903MHz
_____ dB (60dB Min.)
- k. NAV Audio Output - A 20uV standard audio test signal shall produce at least 50mw (5.0VRMS) into 500 ohms. The volume control shall be capable of reducing the audio to under 5uw (0.05VRMS).
NAV Audio Output _____ VRMS (5.0VRMS Min.) (112.50MHz)
Minimum NAV Audio Output _____ VRMS (.05VRMS Max.)
Volume Control Fully CCW
- l. Audio Muting (TACAN Version only)
Audio Output _____ mVRMS (71mVRMS Max.)
- m. Audio Frequency Response - With a 100uV RF signal amplitude modulated 30%, the audio output shall not change more than 6dB when the frequency of modulation is varied from 350Hz to 2500Hz.
Audio Frequency Response - 1. KHz Ref. _____ dB.
350Hz _____ dB. (6dB Max.)
2500Hz _____ dB. (6dB Max.)
- n. Voice/Ident - With a 100uV RF input modulated 30% with 1020Hz, the voice/ident filter shall attenuate the audio at least 15dB.
Voice/Ident _____ dB (15dB Min.) (112.50MHz)
Audio Distortion _____ % (15% Max.) (112.50MHz)
Cross Modulation - Change in centering error with 30uV desired signal, 10,000uV undesired. _____ uV.
- o. VOR Flag Characteristics (114.90MHz)
(1) No RF signal present _____ (0 + 1mV)
(2) Standard VOR signal with 30Hz modulation absent _____ (0 + 1mV)
(3) Standard VOR signal with 9960Hz modulation absent _____ (0 + 1mV)
(4) Standard VOR test signal _____ (325 + 75, -50mV)
- p. TACAN (TACAN version only)
TACAN channel 70X (with no RF applied to antenna)
NAV Flag _____ mV (325 + 75 - 50mV)
D-Bar _____ mV (0 + 9mV)
- q. VOR Composite Output Level - 0.5 + 0.1VRMS.

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5.2.4.3 Localizer Tests

5.2.4.3.1 Standard Test Signals

- a. Standard Localizer Test Signal - An RF carrier (110.10MHz) modulated simultaneously with 90Hz \pm .3% and 150Hz \pm .3% signals so that the sum of their separate modulation percentages equals 40 \pm 2%.
- b. Standard Localizer Centering Signal - A standard localizer test signal in which the difference in depth of modulation is less than .002 (.1dB).
- c. Standard Localizer Deviation Signal - A standard localizer test signal in which the difference in depth of modulation of the 90Hz and 150Hz signal is .093 \pm .002 (4 \pm .1dB).

5.2.4.3.2 Test Procedures

Using the test setup of Figure 5-1, the conditions of 5.2.4.1, and the signals of 5.2.4.3.1, check the following parameters:

- a. Sensitivity - With a standard localizer test signal, the flag sensitivity shall be no greater than 2uV for 1/2 flag (190uA flag current).

Flag Sensitivity (110.10MHz)

Flag current equals 190uA at _____ uV (2uV Max. = -101dBm)

- b. Centering - With a standard localizer centering RF signal applied at any level between 10uV to 20mV, the D-bar output current shall be 0 \pm 5uA.

D-Bar centering current (110.10MHz)

Centering current 10uV _____	(+5.uA)	20mV _____	(+5.uA)
-87dBm		-21dBm	

- c. Deflection - When the ddm of a standard localizer test signal is abruptly changed from zero to any value less than \pm 0.155ddm, the output current shall reach 63% of its ultimate value in 6 \pm .2 seconds.

Deflection Characteristics (110.10MHz)

	+ .093ddm		- .093ddm
-87dBm 10uV _____	uA	_____	uA (90 \pm 4.5uA)
-47dBm 1000uV _____	uA	_____	uA (90 \pm 4.5uA)
-27dBm 10,000uV _____	uA	_____	uA (90 \pm 4.5uA)

- d. Flag Signal - The flag current shall be less than 130uA if the RF signal is absent (130uA maximum), or if either or both of the 90Hz and 150Hz modulations is absent from an otherwise standard localizer.

Current Characteristics (110.10MHz)

No RF signal _____	uA (0 \pm 1uA)
-93dBm 5uV standard signal _____	uA (325 \pm 50uA)
90Hz absent _____	uA (130uA Max. at -67dBm)
150Hz absent _____	uA (130uA Max. at -57dBm)

5.2.4.4 Glideslope Tests

5.2.4.4.1 Standard Test Signals

- a. Standard Glideslope Test Signal - A 700uV RF carrier amplitude modulated simultaneously with 90Hz and 150Hz of such levels that when each signal is applied independently, the carrier is modulated 40 \pm 2%.
- b. Standard Glideslope Centering Signal - A standard glideslope test signal in which the difference in depth of modulation is less than .002.

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- c. Standard Glideslope Deviation Signal - A standard glideslope test signal in which the difference in depth of modulation of the 90Hz and 150Hz signals is $.091 \pm .002$.
- d. Sensitivity - With a standard glideslope deviation signal applied, the sensitivity shall be no greater than 16uV for at least 60% of standard deflection (47uA deflection current).

Sensitivity - 329.150MHz (108.95)	_____	uV (16uV Max. -83dBm)
332.000MHz (109.30)	_____	uV (16uV Max. -83dBm)
335.000MHz (110.30)	_____	uV (16uV Max. -83dBm)

- e. Centering - The deviation current shall be $0 \pm 10\mu A$ when the RF level of a standard glideslope centering signal is varied from 100uV to 10mV.

	-67dBm 100uV ($0 \pm 10\mu A$)	-27dBm 10,000uV ($0 \pm 10\mu A$)
329.150MHz (108.95)	_____ uA	_____ uA
332.000MHz (109.30)	_____ uA	_____ uA
335.000MHz (110.30)	_____ uA	_____ uA

- f. Selectivity - At a 20uV input signal level, monitor the G/S test output (IF AGC) and use as a reference. The 6dB bandwidth shall not be less than $\pm 25\text{KHz}$. The 40dB bandwidth shall not be greater than $\pm 125\text{KHz}$.

Upper 6dB Freq. _____	>332.025 (Min.)	Upper 40dB Freq. _____	<332.125 (Max.)
Lower 6dB Freq. _____	<331.975 (Max.)	Lower 40dB Freq. _____	>331.875 (Min.)

- g. Deflection - The deflection needle of an indicator properly connected to a glideslope receiver shall deflect up when 150Hz is predominant and down when 90Hz is predominant.

The deviation current shall be $78 \pm 12\mu A$ when the level of a standard glideslope deviation is varied from 100uV to 10mV.

	332MHz + .092ddm	-092ddm $\pm 5\%$
-67dBm 100uV	_____ mV	_____ mV (78 \pm 3.9mV)
-47dBm 1000uV	_____ mV	_____ mV (78 \pm 3.9mV)
-27dBm 10,000uV	_____ mV	_____ mV (78 \pm 3.9mV)

- h. Flag Signal - The flag current shall be less than 125uA if the RF signal is absent or if either or both of the 90Hz and 150Hz modulations is absent from an otherwise standard glideslope signal.

The flag current shall be $325 \pm 65\mu A$ when a standard glideslope test signal is applied at levels from 50uV to 10mV.

As the ddm is increased from 0.175 to 0.8, the deviation current shall not decrease.

Flag Current - RF signal absent	_____	uA ($0 \pm 125\mu A$)
-50dBm (700uV) 90Hz absent	_____	uA (125uA Max.)
-50dBm (700uV) 150Hz absent	_____	uA (125uA Max.)
-50dBm (700uA) standard signal	_____	uA ($325 \pm 65\mu A$)

5.2.4.5 Computer Tests

Using the test setup of Figure 5-1 and the conditions of 5.2.4.1, check the following parameters:

Groundspeed Characteristics:

- a. 90% of final value.

- (1) RNAV Mode: 200 seconds
- (2) Initialization short time constant: 47 seconds.

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b. Groundspeed Freezes - Groundspeed freezes occur during and 15 seconds after:

- (1) TO/FROM flag change
- (2) Window dashes (flagged distance to station)
- (3) USE button pushed
- (4) Changing the in use information
- (5) A 45° change in VOR angle in 36 seconds within 15NM of the DME/VOR station
- (6) VOR to RNAV mode change

c. Short Time Constant - The KNS 81 goes into a short time constant mode after the groundspeed becomes unfrozen under the following conditions:

Situation	Time In Short Time Constant Mode
1) Window Dashes	60 Seconds
2) A 45° change in VOR angle in 36 seconds.	165 Seconds

Groundspeed accuracy shall be with 2NM at 300NM.

d. VOR Angle Filter:

- (1) 2.4 seconds for 63% of full D-bar displacement

e. Selected Course Filters:

- (1) 0.8 seconds for 63% of full D-bar displacement
- (2) There is no computer filtering of selected course for 4 seconds after a 5.6° change is made in the selected course.

f. RNAV Accuracy - The cross track and along track error shall be less than 02.NM>

5.2.4.6 Display Tests

All segments of the display shall function under both bright and dim conditions. All segments shall appear to be the same brightness and each character should be solidly illuminated.

- a. VOR, PAR, RNV, APR _____ (OK)
 WPT, 1 Thru 9 _____ (OK)
 DATA, CHK, RAD, RTN, USE (Buttons) _____ (OK)
 FRQ, RAD, DST _____ (OK)
 All numbers in all positions _____ (OK)

b. Unit remembers frequency information when switched off _____ (OK)

c. ISL, RNAV, APR OUTPUTS

ON STATE	OFF STATE (High Z)
ILS .3V _____ (OK)	_____ (OK)
RNAV .3V _____ (OK)	_____ (OK)
APR .3V _____ (OK)	_____ (OK)

d. RNAV Accuracy

Set up the following RNAV problem:

- | | |
|----------------------------------|-----------------------------------|
| (1) Generator Setting: 0.0° FROM | (NAV 750 or equivalent) |
| (2) DME Distance: 25nm | (KNS 81 Test Panel or equivalent) |
| (3) Waypoint Radial: 270° | (KNS 81 Rad.) |
| (4) Waypoint Distance: 43.3nm | (KNA 81 Dst.) |
| (5) PTS: 240° | (KNS 89 Test Panel or equivalent) |

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Record Results

DME Distance to Station	_____	(50.0 ± .3NM.)
D-Bar Current in RNW	_____	(0 ± 18.mV)
D-Bar Current in RNW APR	_____	(0 ± 72.mV)
RMI Bearing	_____	(60.0 ± .2)

5.2.4.7 Data Backup Test

The KNS 81 shall "remember" all waypoint information codes and the displayed and used waypoint numbers when unit is turned off.

5.2.4.8 Power Consumption Test

Input current shall be not more than 1.3 amps at 11 volts and not more than 0.5 amps at 33 volts.

Input Current	VOR (114.9MHz)	ILS (110.3MHz)
11 volts	_____ amps (1.3A Max.)	_____ amps (1.3A Max.)
33 volts	_____ amps (.5A Max.)	_____ amps (.5A Max.)

5.2.4.9 Annunciator Output Test

The ILS, RNAV, and APR outputs shall have an output voltage less than 0.3V and sink up to 75ma in the active state. In the off state, the outputs are high impedance (>100K) and can be pulled to any voltage less than 33V.

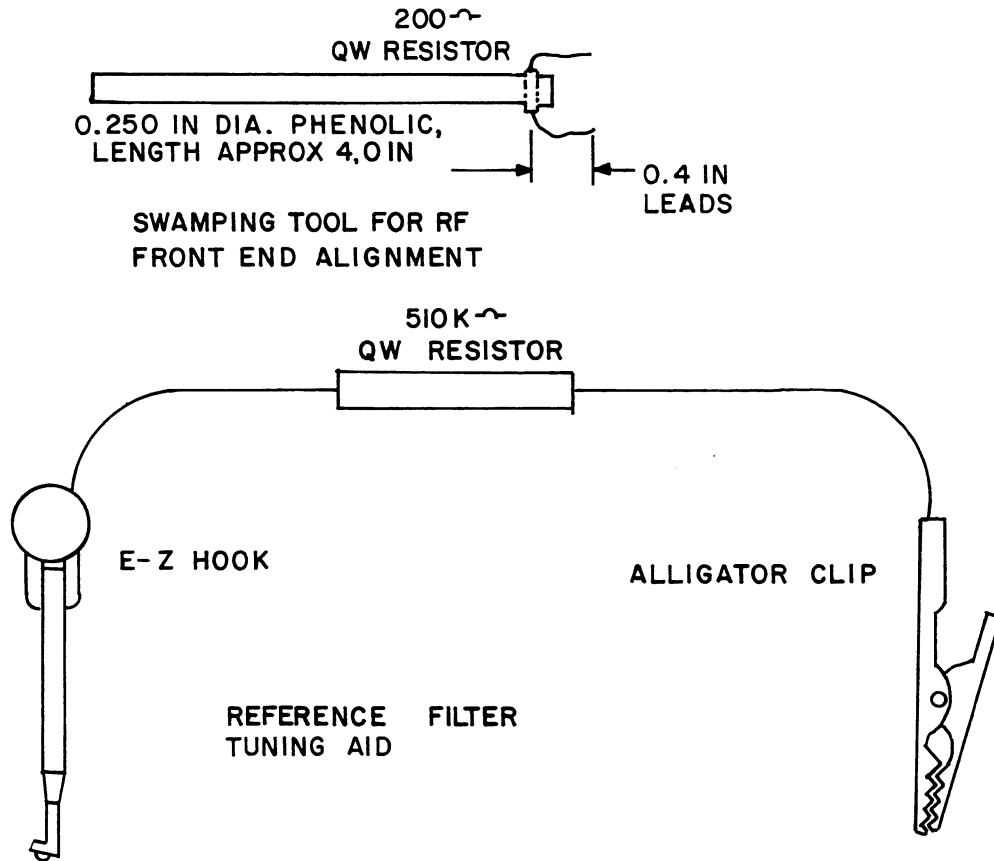


FIGURE 5-4 ALIGNMENT TOOLS

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5.3 OVERHAUL

5.3.1 GENERAL INFORMATION

Overhaul information contained in this section includes inspection procedures, cleaning, repairing and disassembly/assembly procedures for the KNS 81.

5.3.2 VISUAL INSPECTION

This section contains instructions to assist in determining, by inspection, the condition of the KNS 81 assemblies. Defects resulting from wear, physical damage, deterioration, or other causes can be found by these inspection procedures. 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.

B. Capacitors, Variable

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

C. Chassis

Inspect the chassis for deformation, dents, punctures, badly worn surfaces, damaged connectors, damaged fastener devices, component corrosion, and damage to the finish.

D. Connectors

Inspect connectors for broken parts, deformed shells or clamps, and other irregularities. Inspect for cracked or broken insulation and for contacts that are broken, deformed, or out of alignment. Also, check for corroded or damaged plating on contacts and for loose, improperly soldered, broken, or corroded terminal connections.

E. Covers and Shields

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

F. Insulators

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

G. Jacks

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

H. Potentiometers

Inspect all potentiometers for evidence of damage such as dents, cracked insulation or other irregularities.

I. Resistors, Fixed

Inspect the fixed resistors for cracked, broken, blistered, or charred bodies and loose, broken, or improperly soldered or corroded terminal connections.

J. 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.

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K. Transformers

1. Inspect for signs of excessive heating, physical damage to case, cracked or broken insulation, and other abnormal conditions.
2. Inspect for corroded, poorly soldered, or loose connecting wires.

L. Wiring

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

5.3.3 CLEANING

- A. Using a clean, lint-free cloth lightly moistened with a regular cleaning detergent, remove the foreign matter from the equipment case and unit front panels. Wipe dry using a clean, dry, lint-free cloth.
- B. Using a hand controlled dry air jet (not more than 15psi), blow the dust from inaccessible areas. Care should be taken to prevent damage by the air blast.
- C. Clean the receptacles and plugs with a hand controlled dry air jet (not more than 25psi), and a clean, lint-free cloth lightly moistened with an approved cleaning solvent. Wipe dry with a clean, dry, lint-free cloth.

5.3.3.1 Repair

This section describes the procedure, along with any special techniques for replacing damaged or defective components of the KNS 81.

A. Diodes

Diodes used in the KNS 81 are silicon and germanium. Use long nose pliers as a heatsink under normal soldering conditions. Note the diode polarity before removal.

B. Integrated Circuits

The large scale integrated circuits (LSI's) used in the KNS 81 are mounted in sockets for easy replacement. Use the insert/extract tool included in the LSI Insertion/Extraction Kit (KPN 050-1671-00) for removing or replacing the LSI's. Refer to the instructions included in the kit. Be careful to avoid breaking the IC package during removal and insertion. Carefully line up the pins of the IC with the holes in the socket when replacing it. Be sure pin 1 (marked with a dot on the case or slot in the pin) is oriented properly. The medium scale integrated circuits are soldered to the PC boards. Refer to the integrated circuit maintenance section in the Appendix for removal and replacement instructions. The LSI's and CMOS integrated circuits may be damaged by static electricity and should be kept in conductive packaging when not installed.

C. PC Boards

Use a low wattage soldering iron to avoid damaging the boards by excessive heat. A path that has opened up on the top or bottom of a board can be replaced with insulated hookup wire.

D. Transistors

Refer to semiconductor maintenance section in the Appendix for removal and replacement instructions.

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5.3.4 DISASSEMBLY/ASSEMBLY PROCEDURES

The KNS 81 assembly drawings are located in Figures 6-1, 6-2, 6-3 and 6-4. The unit is constructed so that it can be unfolded allowing access to most of the components. Connections between the glideslope (optional) and NAV receiver to the computer board are made by flexible ribbon cables. The connection between the glideslope and NAV receiver is made by a single coax cable. If access to only one section is needed, refer to the appropriate disassembly section. Assembly may be accomplished by following the steps in reverse order referring to the appropriate assembly drawings when necessary. (Figures 6-1, 6-2, 6-3 and 6-4.)

5.3.4.1 Converter/Display Board Access and Removal

The converter/display board is the top board of the unit. For access only for testing, remove the top cover plate. There are two screws on each side, two screws on the rear and one screw on top of the unit towards the center front. Removal of these seven screws will permit the top cover to be removed to expose the component side of converter/display board. For access to the bottom side of board for parts replacement, it is recommended to remove the computer board from the unit. Follow the instructions in the Computer Board Access and Removal section.

5.3.4.2 Computer Board Access and Removal

For access to the computer board, the unit must be unfolded. The arrow marked screws will allow the unit to be unfolded. For access to the bottom side of the computer board and/or converter/display board, follow the instructions below in the order given. For assembly, follow the instructions below in reverse order:

- a. Remove the top cover.
- b. Remove the faceplate by removing two screws on each side and one screw on the bottom of the faceplate. The faceplate will pull forward. Gently push up on the display on the bottom corners for removal. When replacing the display, insert the display at an angle into the connector pins. (Make sure contacts and connectors are aligned). Gently push back and down on the top corners of display.
- c. With the top cover removed, remove the screw on the converter/display panel located near the center rear of the board. This screw is between the row of ferrite beads.
- d. Remove the screw which holds down the power supply case tab in the center of the converter/display board.
- e. Remove the five arrow marked screws and unfold the unit. These screws are located two on each side and one on the rear.
- f. Disconnect the ribbon connectors from the computer board.
- g. Remove two screws, one on each corner of the switch board.
- h. Remove the five screws along the edge of the computer board which connect the computer board to the case.
- i. The computer board can now be gently lifted out and apart from the converter/display board. Care must be taken when disconnecting or connecting the interconnects between the computer board and converter/display board so as not to bend the connectors or damage the PC pads.

5.3.4.3 NAV Receiver Board/Glideslope Board Access and Removal

Remove the six arrow marked screws on the side, back, and bottom of the unit and unfold. Disconnect the ribbon connectors from the computer board. Removal of the top cover plates of the NAV receiver or the glideslope will permit access for testing. Removal of either board for parts replacement is done by removing the four screws from underneath the NAV receiver on the bottom of unit, or the five screws from the top side of the glideslope board.

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5.3.4.4 Power Supply Board Access and Removal

The unit does not have to be unfolded if only the power supply is to be tested. Remove the top cover plate of the unit. Two screws on each side, two screws in the rear, and one screw on the top of the unit towards the center front will remove the top cover plate. Remove the four corner screws of the power supply cover and lift. This will permit access for testing. To remove the power supply board from the unit, the entire case must be removed from the unit. Follow the instructions below in the order given. For assembly, follow the instructions below in reverse order.

- a. Remove the top cover of the unit.
- b. Remove the screw in the center of the converter/display board which holds down the power supply tab.
- c. Remove the two screws on the side of the unit which holds the power supply to the case.
- d. Unplug the wires from the converter/display board and the entire power supply case can be removed from the unit.
- e. Remove the cover.
- f. Remove the two screws on the heat sinks of the transistors on the side of the case. (When replacing the screws, make sure the transistor tabs are not shorted to the side of the case. Check for shorts with an ohm meter.)
- g. Unscrew the four standoffs, one in each corner, and the power supply board can be removed.

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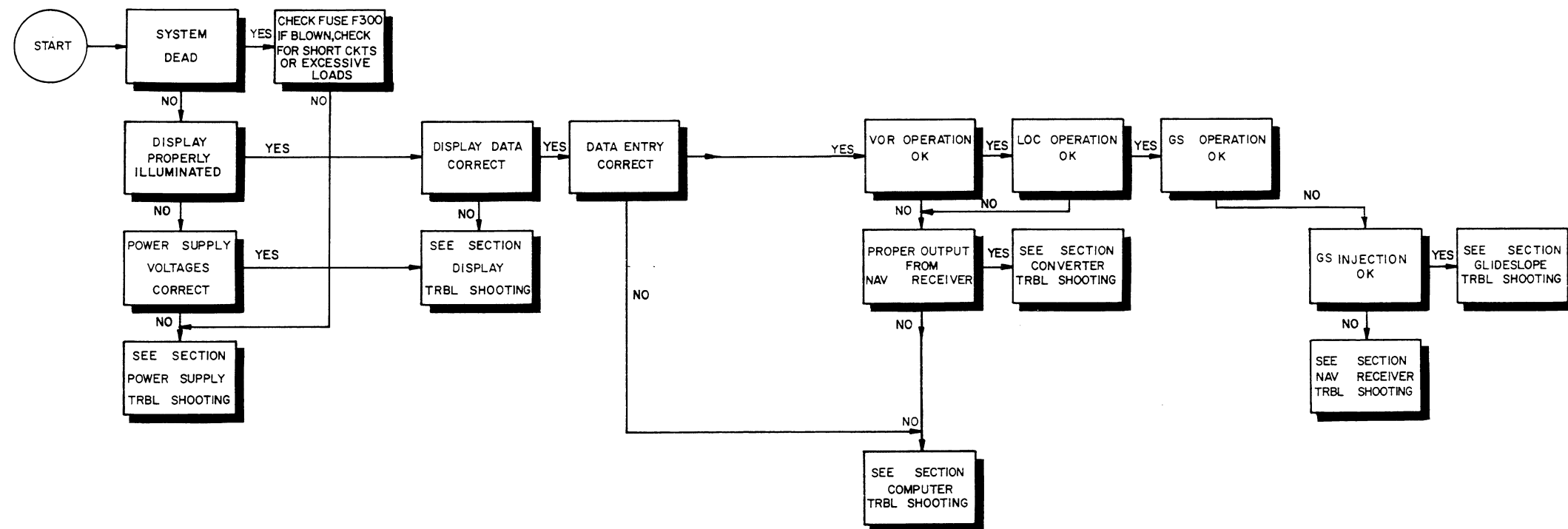


FIGURE 5-5 KNS 81 SYSTEM TROUBLESHOOTING FLOWCHART
(Dwg. No. 696-5260-00, R-0)

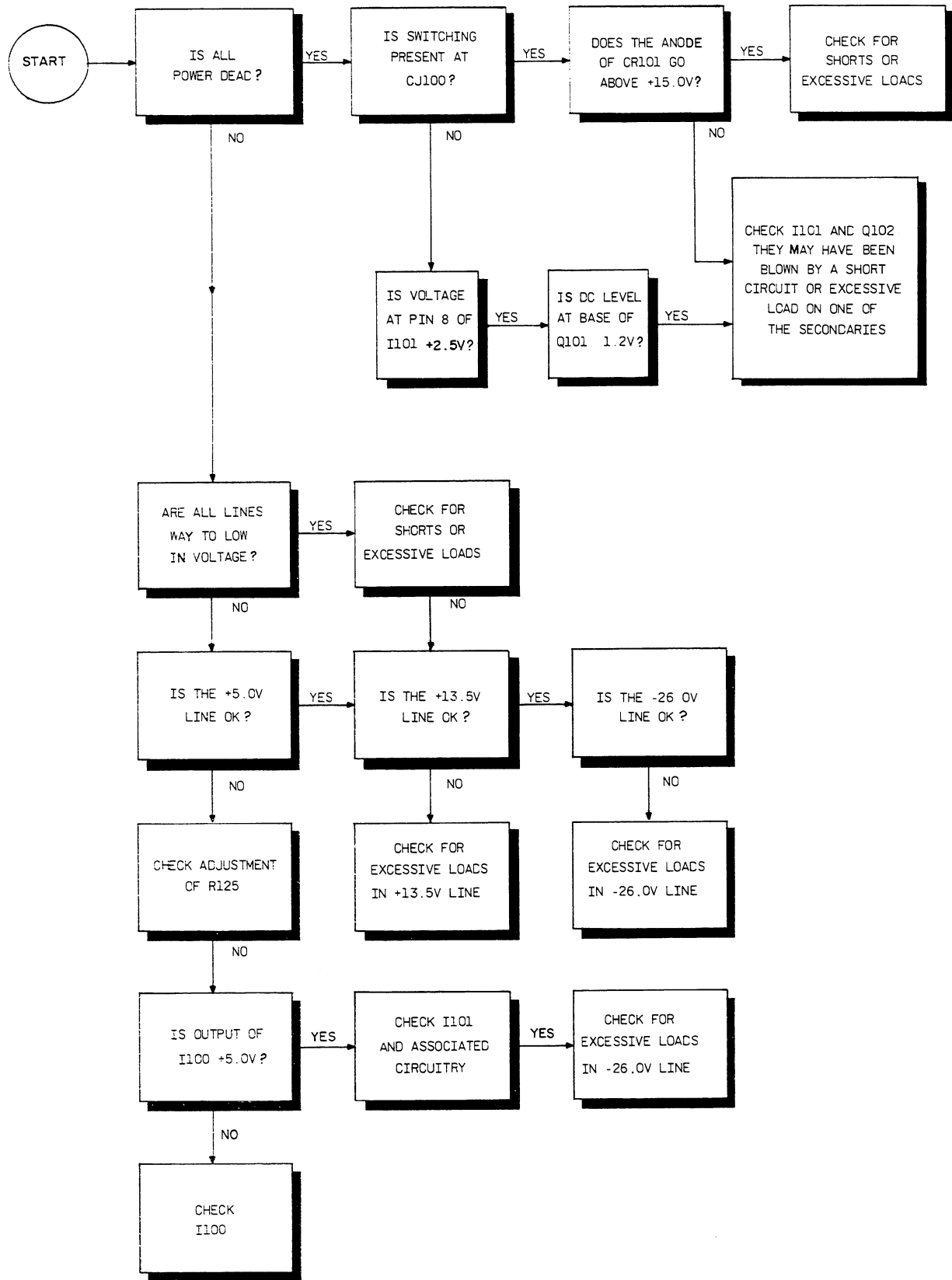
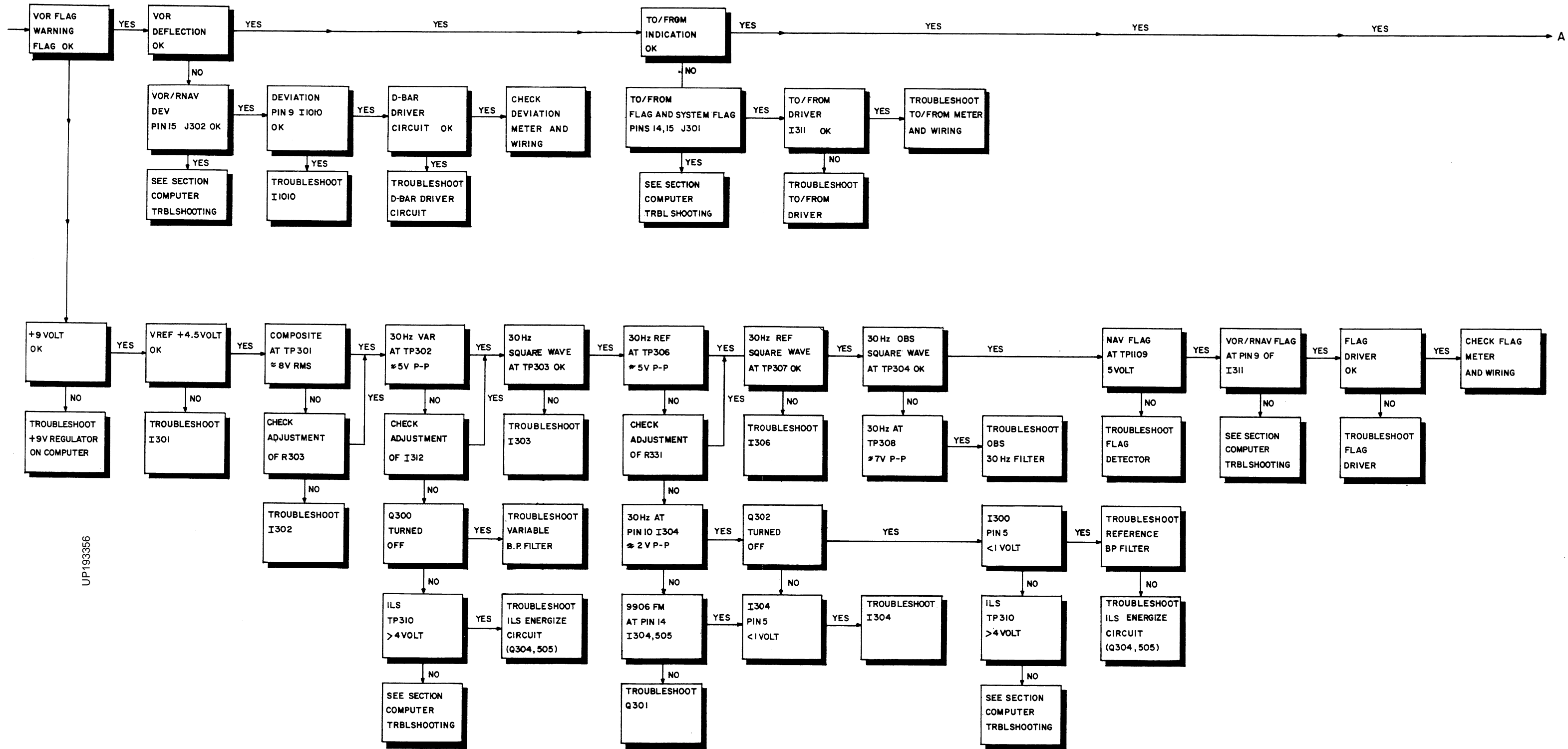


FIGURE 5-6 POWER SUPPLY TROUBLESHOOTING FLOWCHART
(Dwg. No. 696-5261-00, R-0)

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FIGURE 5-7 CONVERTER TROUBLESHOOTING FLOWCHART
(Dwg. No. 696-5262-00, R-2)
(Sheet 1 of 2)

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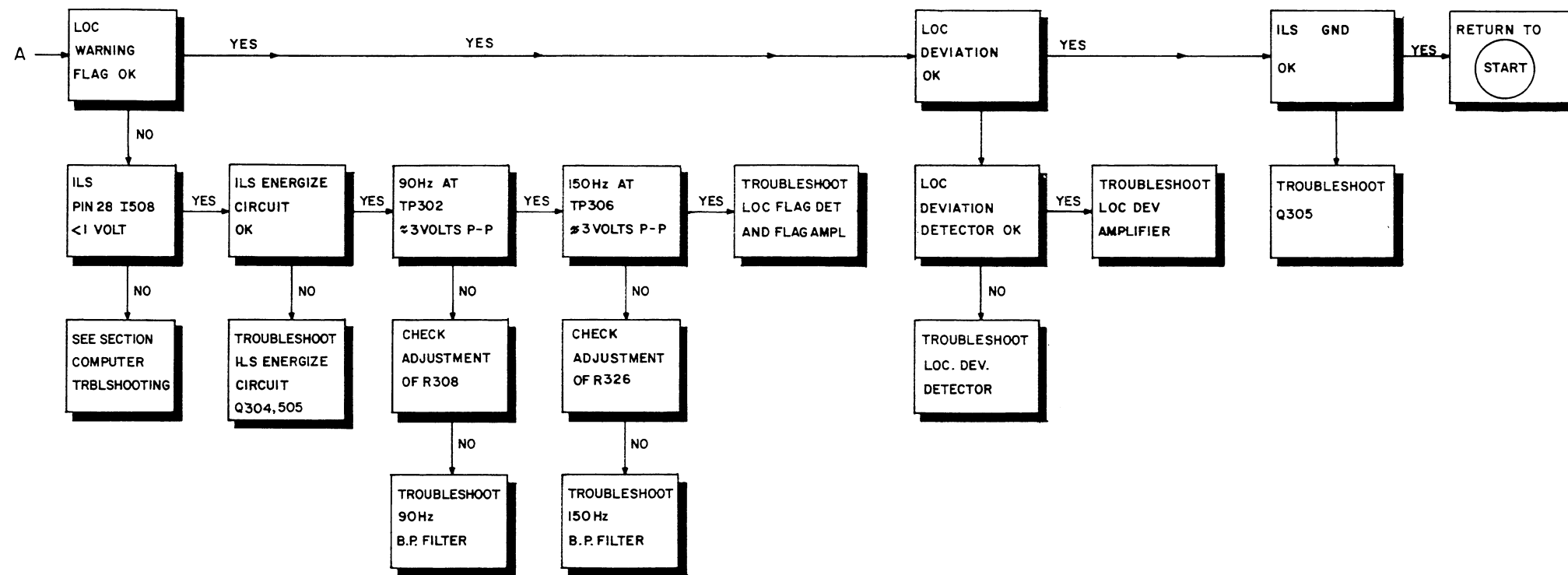


FIGURE 5-7 CONVERTER TROUBLESHOOTING FLOWCHART
(Dwg. No. 696-5262-00, R-2)
(Sheet 2 of 2)

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KNS 81
DIGITAL AREA NAVIGATION SYSTEM

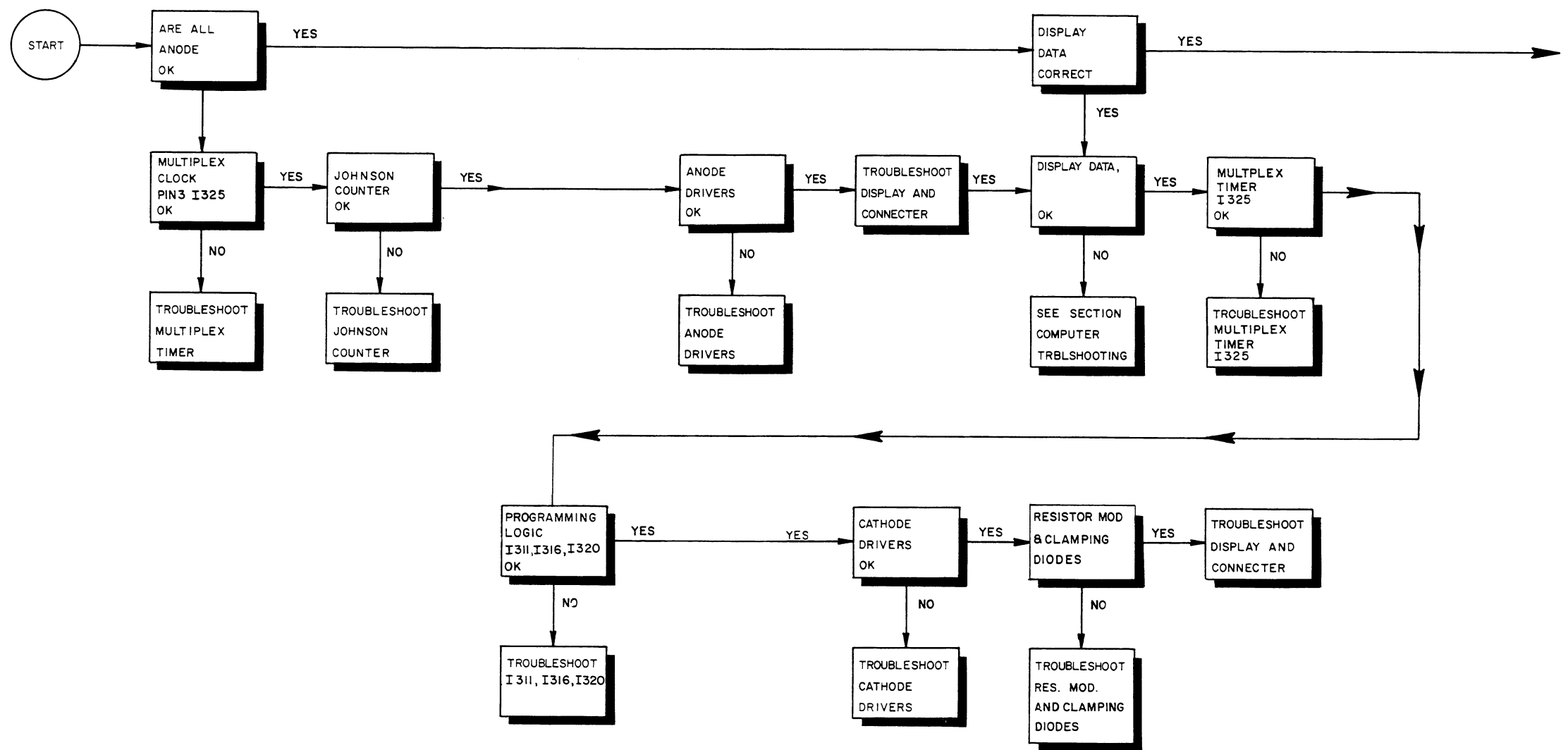


FIGURE 5-8 DISPLAY TROUBLESHOOTING FLOWCHART
(Dwg. No. 696-5263-00, R-0)
(Sheet 1 of 2)

KING
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DIGITAL AREA NAVIGATION SYSTEM

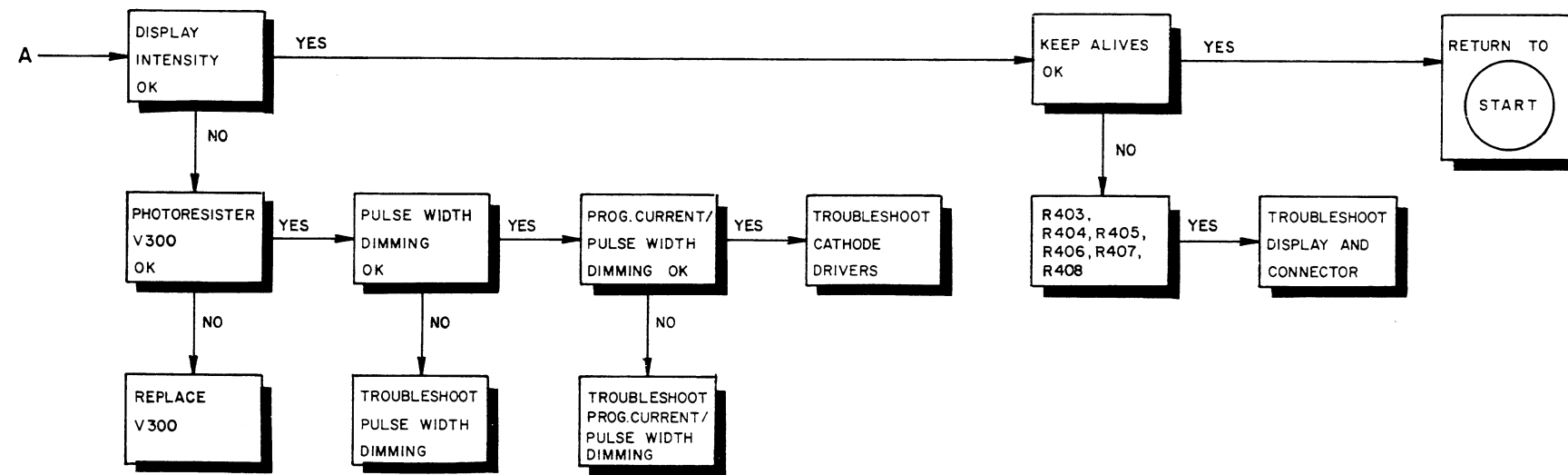


FIGURE 5-8 DISPLAY TROUBLESHOOTING FLOWCHART
(Dwg. No. 696-5263-00, R-0)
(Sheet 2 of 2)

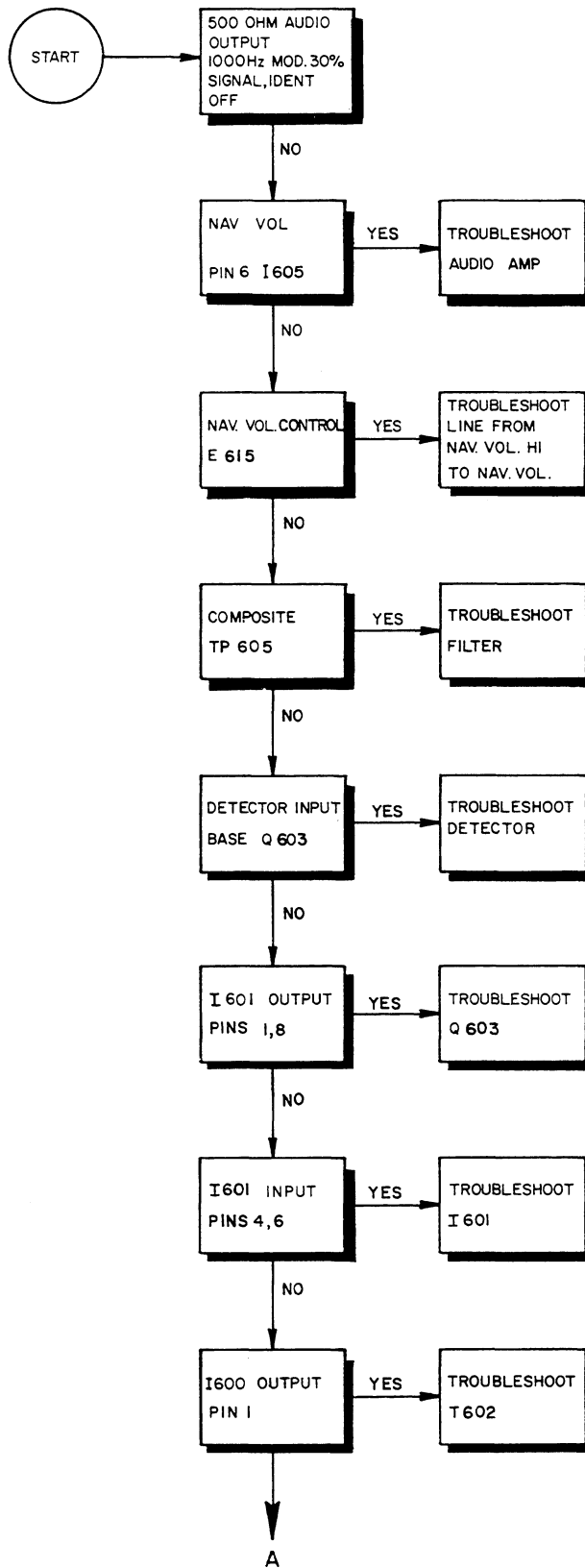


FIGURE 5-9 NAV RECEIVER TROUBLESHOOTING FLOWCHART
(Dwg. No. 696-5264-00, R-0)
(Sheet 1 of 2)

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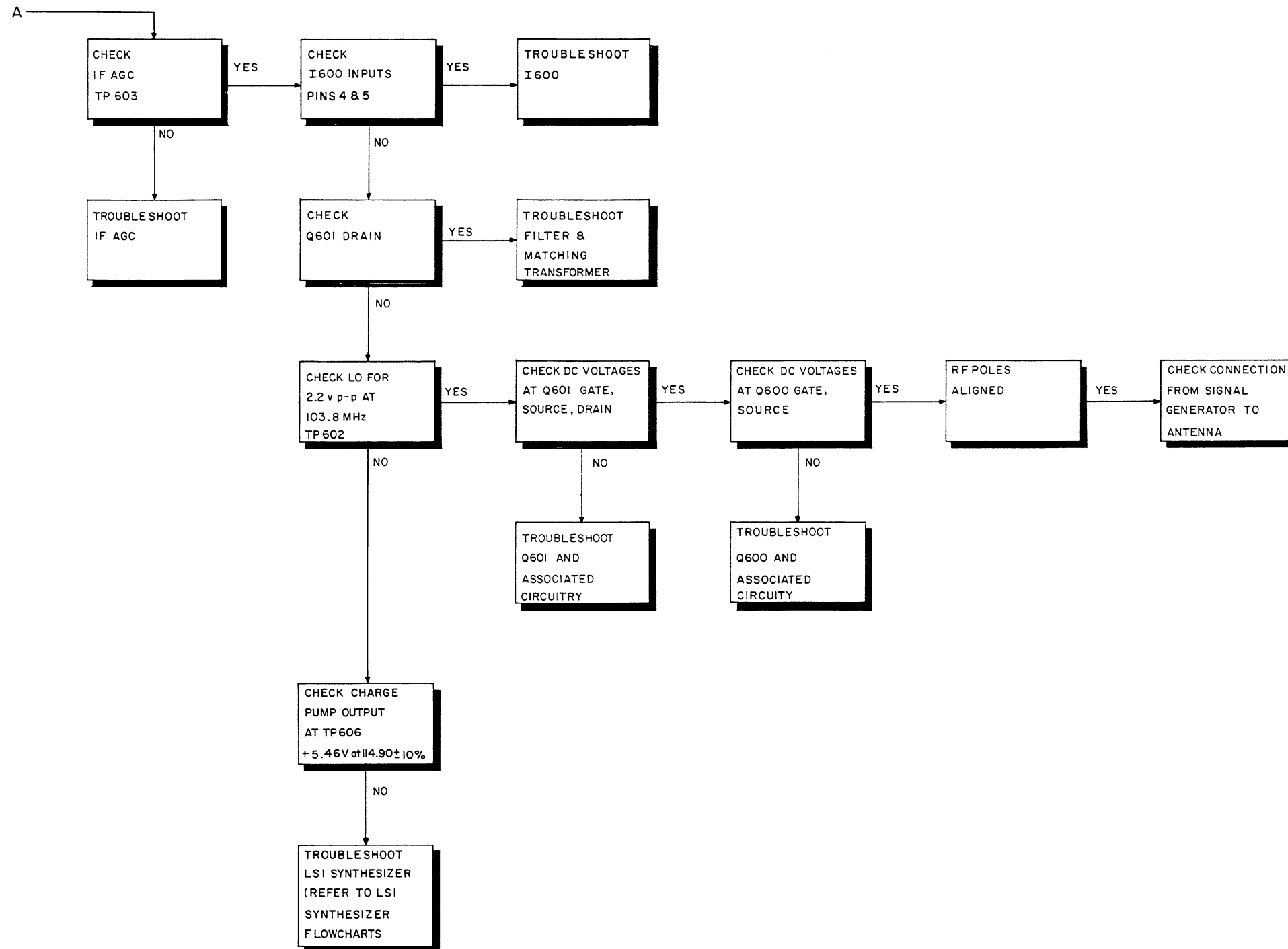


FIGURE 5-9 NAV RECEIVER TROUBLESHOOTING FLOWCHART
(Dwg. No. 696-5264-00, R-0)
(Sheet 2 of 2)

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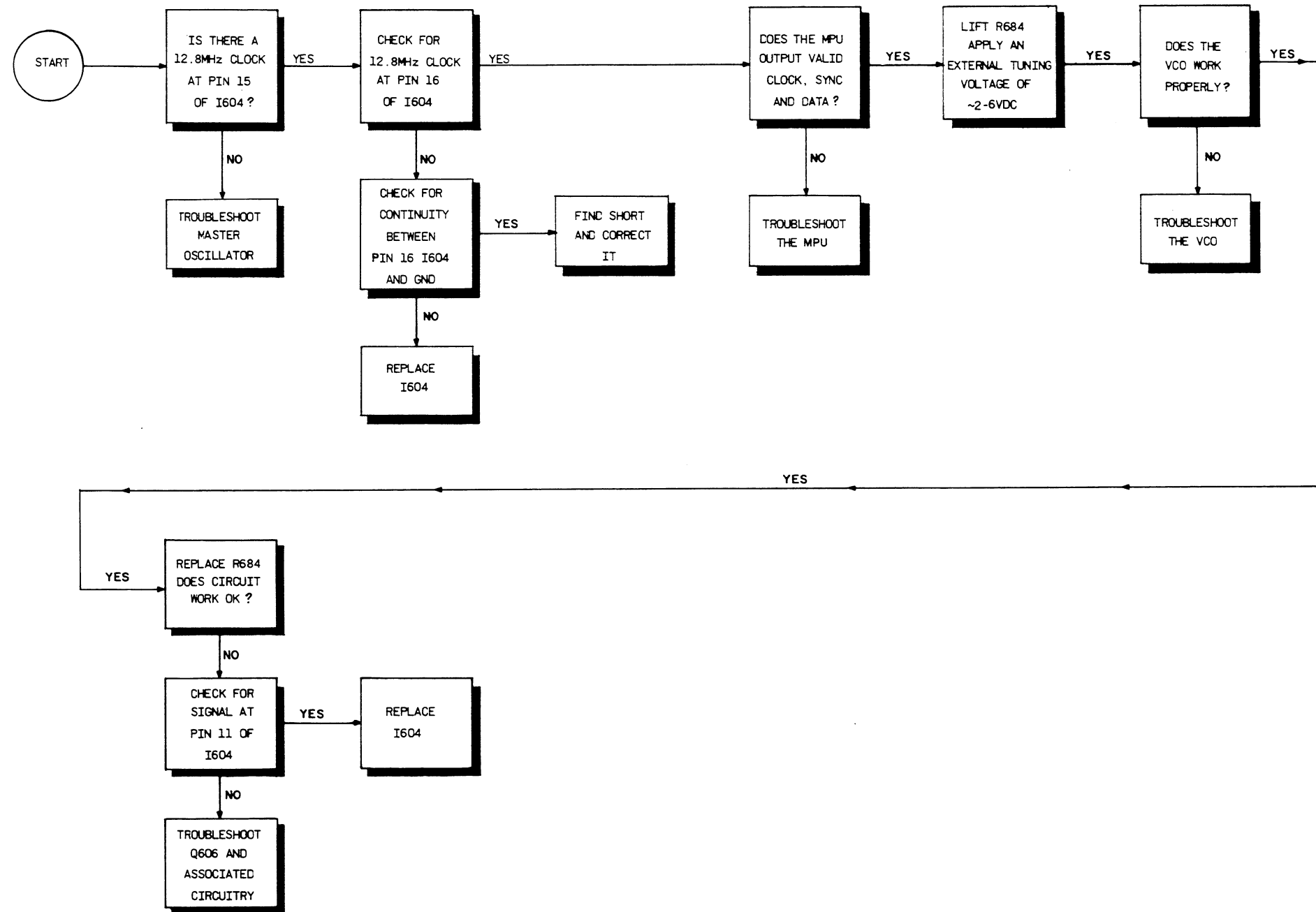
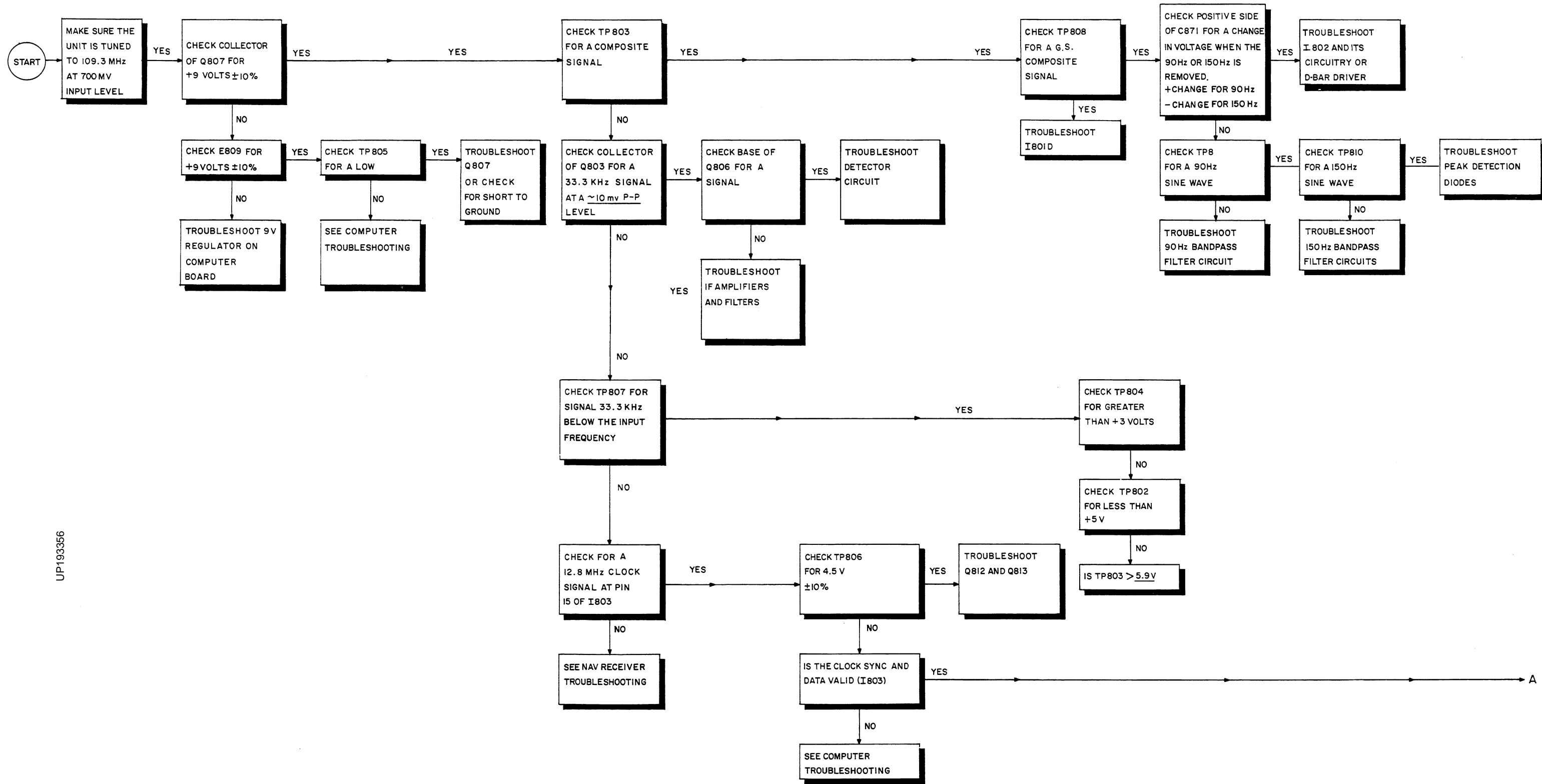


FIGURE 5-10 NAV SYNTHESIZER FLOWCHART
(Dwg. No. 696-5265-00, R-1)

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FIGURE 5-11 GLIDESLOPE TRCUBLESHOOTING FLOWCHART
(Dwg. No. 696-5266-00, R-0)
(Sheet 1 of 2)

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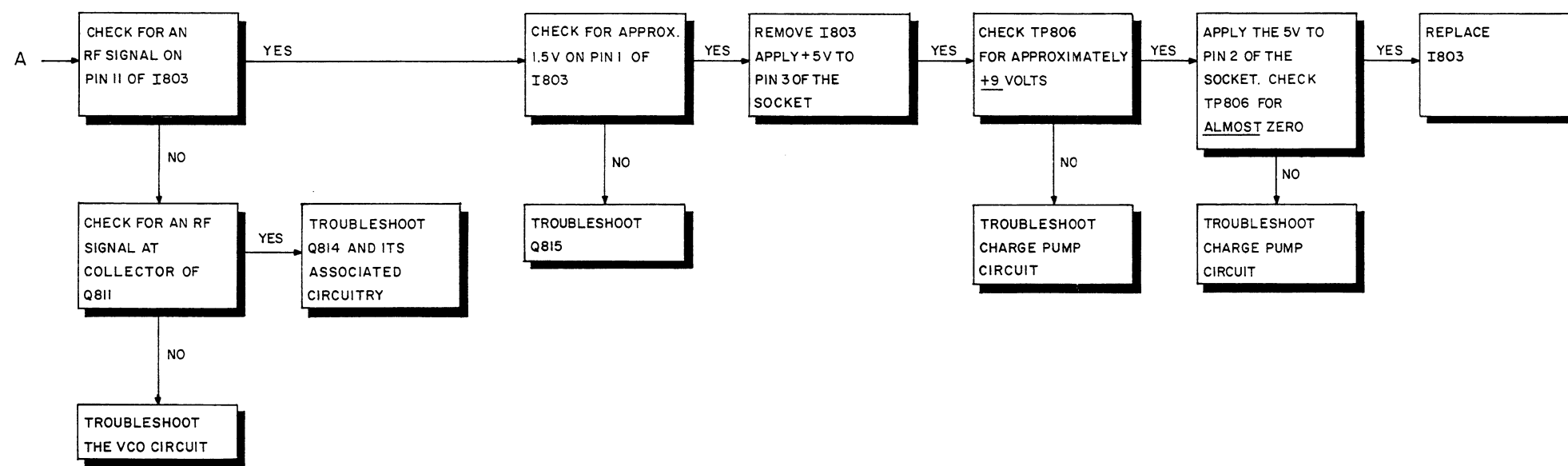


FIGURE 5-11 GLIDESLOPE TROUBLESHOOTING FLOWCHART
 (Dwg. No. 696-5266-00, R-0)
 (Sheet 2 of 2)

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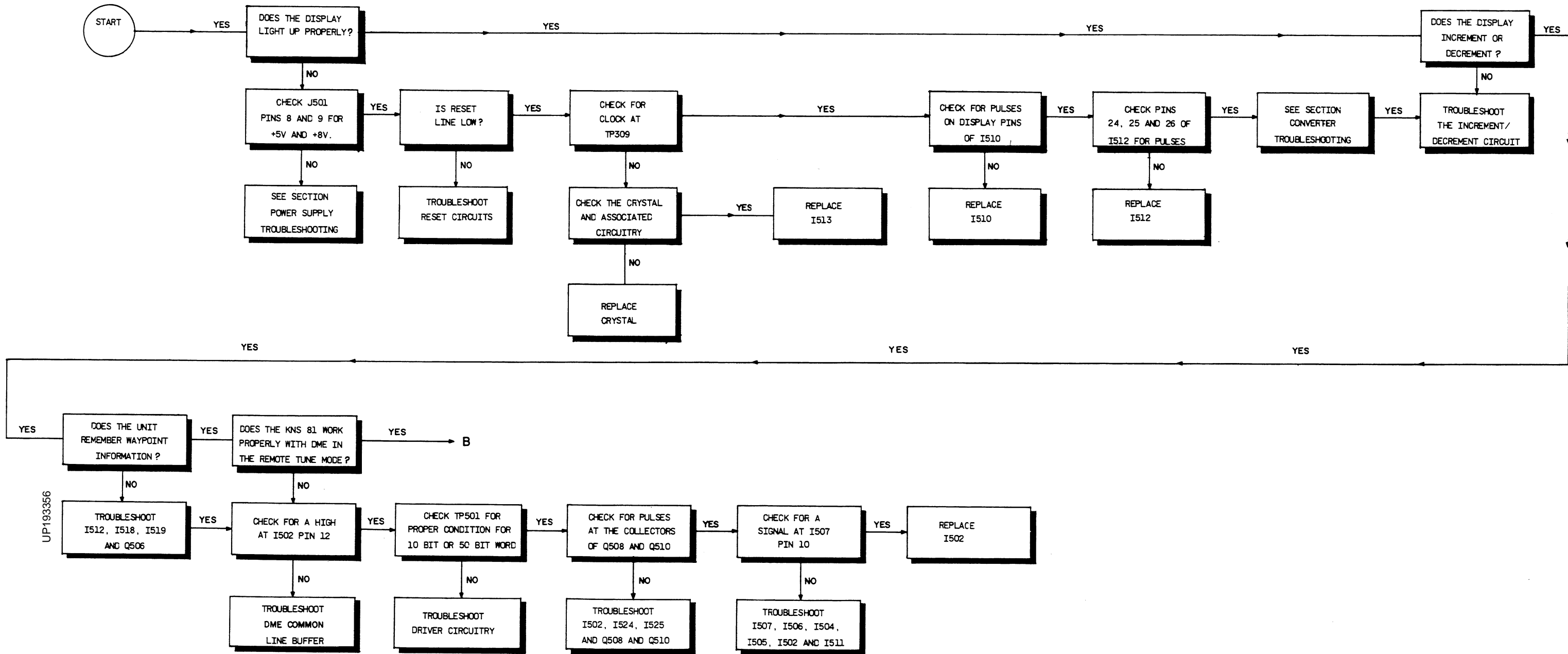
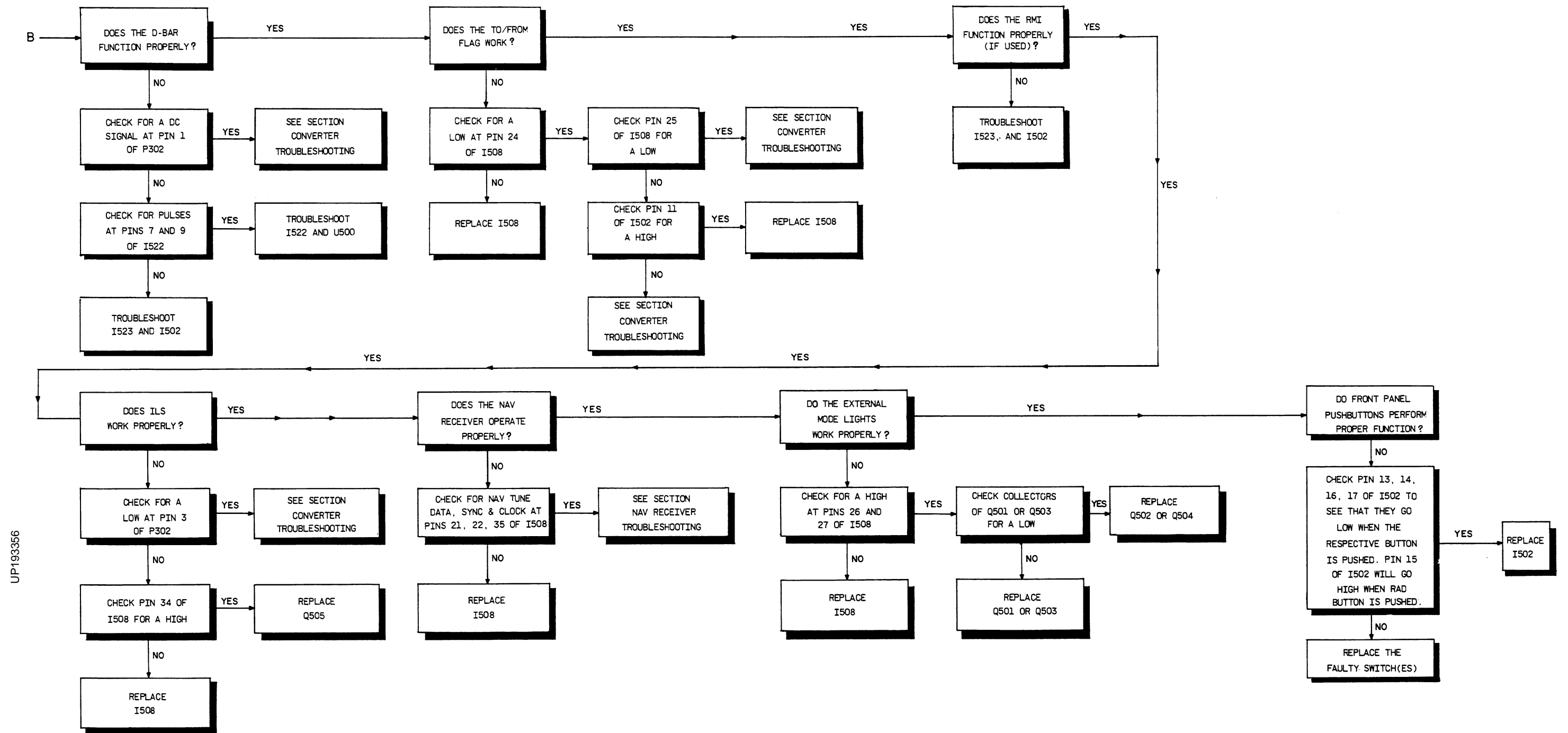


FIGURE 5-12 COMPUTER TROUBLESHOOTING FLOWCHART
(Dwg. No. 696-5267-00, R-1)
(Sheet 1 of 2)

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FIGURE 5-12 COMPUTER TROUBLESHOOTING FLOWCHART
(Dwg. No. 696-5267-00, R-1)
(Sheet 2 of 2)

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SECTION VI
ILLUSTRATED PARTS LIST

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ILLUSTRATED PARTS LIST

INTRODUCTION

This Illustrated Parts List (IPL) provides for the proper identification of replacement parts. Individual Bills of Material (BOM) within this IPL are arranged in numerical order by BOM number. Each BOM is followed by the Assembly Drawing and Schematic Diagram for that assembly.

Parts identified in this IPL by King Part Number meet design specifications for this equipment and are the recommended replacement parts. Warranty information concerning King replacement parts are contained in Service Memo #1, KPN 800-8001-XX.

BILL OF MATERIAL DESCRIPTION

This section describes the various items that appear on the Bills of Material. A sample BOM is included in this section as Figure 6-1.

1. BOM Number

The Bill of Material Number appears at the top of the BOM as a 9-digit number which is also the King Part Number for the assembly. The BOM Number is followed by the assembly description and the revision level of the BOM.

2. Symbol Column

This column contains the Reference Designators of the electrical components of the assembly. Mechanical parts are not assigned Reference Designators. The Reference Designator consists of a letter abbreviation which indicates the type of component followed by the number assigned to that part (C101, Q101, etc). Common Reference Designator abbreviations are listed below.

C	Capacitor	P	Plug
CJ	Circuit Jumper	R	Resistor
CR	Diode	S	Switch
DS	Lamp	T	Transformer
F	Fuse	TP	Test Point
FL	Filter	U	Resistor/Capacitor Network
I	Integrated Circuit	V	Photocell/Vacuum Tube
J	Jack	WG	Waveguide
L	Inductor	Y	Crystal
Q	Transistor		

3. Part Number Column

This column contains the King Part Number for each part. Special purpose 999-9999-XX series part numbers may appear in the BOM and are described below.

1. CR401 999-9999-96 RESERVED

The Reference Designator CR 401 has been reserved for future use; the assembly does not currently include a CR401.

2. CR401 999-9999-97 SEE NEXT ASSEMBLY

CR401 is a part of the electrical circuit but due to assembly or testing requirements is actually part of a different assembly.

3. CR401 999-9999-98 NOT USED

The Reference Designator CR401 is available for future assignment. The assembly does not currently include a CR 401.

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4. CR401 999-9999-99 DO NOT USE

The Reference Designator CR401 has been previously used for this assembly and later deleted. It may not be reassigned on this assembly.

4. Description Column

This column contains the description of each part in the assembly. Common abbreviations which may appear in this column are listed below.

AL	Aluminum	PC	Polycarbonate
BIFLR	Bifilar	PF	Precision Film
BOM	Bill of Material	PP	Paper
CC	Carbon Composite	PS	Polystyrene
CF	Carbon Film	QW	Quarter Watt
CH	Choke	RES	Resistor
CAP	Capacitor	S	Silicon
CR	Ceramic	SCR	Screw
DC	Disc Ceramic	SM	Silver Mica
DIO	Diode	STDF	Standoff
EL	Electrolytic	SW	Switch
FC	Fixed Composition	TERM	Terminal
FERR	Ferrite	TN	Tantalum
FLTR	Filter	TST PT	Test Point
FT	Feedthru	TW	Tenth Watt
HV	High Voltage	VA	Variable
HW	Half Watt	WW	Wire Wound
IC	Integrated Circuit	XFMR	Transformer
MC	Monolithic Ceramic	XSTR	Transistor
MY	Mylar	XTAL	Crystal

5. Assembly (A) Column

An "A" in this column indicates that the part indicated is an assembly. If the KPN and description reads "200-XXXX-99 COMMON BOM" the parts for that assembly are included in the same BOM. The parts breakdown for an assembly with any other KPN will be found in the BOM with the same number.

6. Unit of Measure (UM) Column

This column indicates the Unit of Measure for each part. Common abbreviations found in this column are listed below.

EA	Each
FT	Foot
AR	As Required

7. Quantity and Flavor Columns

Individual flavors of an assembly are identified by the last two digits of the KPN. Part quantities for each flavor will be indicated under headings numbered 00 through 99 as required. The parts indicated in the 99 Column are common to all other flavors of the assembly and are considered the Common Bill of Material for the assembly.

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BOM NUMBER		200-6178-00	Rev 29	CONV/DSPLY-00	KNS0081						
		200-6178-10	Rev 16	CONV/DSPLY-YDR	KNS0081						
		200-6178-11	Rev 17	CONV/DSP YDR/WMS	KNS0081						
		200-6178-30	Rev 17	CONV/DSPLY-TAC	KNS0081						
		200-6178-31	Rev 16	CONV/DSPLY-TAC/WMS	KNS0081						
						ASSEMBLY FLAVOR					
SYMBOL	PAR#	NUMBER	DESCRIPTION	A	UM	00	10	11	30	31	UNIT OF MEASURE
		009-6178-00	PC BD CONV/DISPLAY	EA		1.00					
		009-6178-10	PC BD CONV/DISPLAY	EA			1.00	1.00	1.00	1.00	
		016-1040-00	COATING TYPE AR	AR		0.00	0.00	0.00	0.00	0.00	
		047-5400-01	FENCE W/F	A EA		1.00	1.00	1.00	1.00	1.00	
		090-0296-00	FUSE CLIP	EA		2.00					
	C	300	096-1082-08 CAP 1M 100UF 15V	EA		1.00	1.00	1.00	1.00	1.00	QUANTITY
	C	301	096-1082-08 CAP 1M 100UF 15V	EA		1.00	1.00	1.00	1.00	1.00	
REFERENCE DESIGNATOR	C	302	108-6005-10 CAP TRKG SET/4 IDC	EA		1.00	1.00	1.00	1.00	1.00	
	C	303	999-9999-99 DO NOT USE	EA		0.00	0.00	0.00	0.00	0.00	
	C	304	096-1082-06 CAP 1M 47UF 15V	EA		1.00	1.00	1.00	1.00	1.00	
	C	305	111-0001-17 CAP CR 180PF 50V	EA		1.00	1.00	1.00	1.00	1.00	
	C	306	109-0007-00 CAP DC 011UF 25V	EA		1.00	1.00	1.00	1.00	1.00	
KING PART NUMBER	C	307	109-0007-00 CAP DC 011UF 25V	EA		1.00	1.00	1.00	1.00	1.00	
	C	308	109-0007-00 CAP DC 011UF 25V	EA		1.00	1.00	1.00	1.00	1.00	
	C	309	111-0001-13 CAP CR 1UF 50V	EA		1.00	1.00	1.00	1.00	1.00	
	C	310	108-6001-03 CAP PF 0020UF 50V	EA		1.00	1.00	1.00	1.00	1.00	
	C	311	114-5222-01 CAP DC 2200PF 500V	EA		1.00	1.00	1.00	1.00	1.00	
	C	312	999-9999-99 DO NOT USE	EA		0.00	0.00	0.00	0.00	0.00	
	C	313	999-9999-99 DO NOT USE	EA		0.00	0.00	0.00	0.00	0.00	
	C	314	109-0007-00 CAP DC 011UF 25V	EA		1.00	1.00	1.00	1.00	1.00	
	C	315	096-1082-06 CAP 1M 47UF 15V	EA		1.00	1.00	1.00	1.00	1.00	
	C	316	105-0031-69 CAP MY 1UF 80V	EA		1.00	1.00	1.00	1.00	1.00	
DESCRIPTION	C	317	111-0001-17 CAP CR 180PF 50V	EA		1.00	1.00	1.00	1.00	1.00	
	C	318	108-6001-02 CAP PF 001UF 50V	EA		1.00	1.00	1.00	1.00	1.00	
	C	319	096-1082-16 CAP 1M 2.2UF 20V	EA		1.00	1.00	1.00	1.00	1.00	
	C	320	108-6013-04 CAP PC 33UF 100V	EA		1.00	1.00	1.00	1.00	1.00	
	C	321	105-0031-52 CAP MY 068UF 80V	EA		1.00	1.00	1.00	1.00	1.00	

FIGURE 6-1
TYPICAL BILL OF MATERIAL

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066-4010-00 Rev. 9 NAV SYS 9WP KNS 81 KNS0081
 066-4010-01 Rev. 9 NAV SYS 9WP NOGS 1 KNS0081
 066-4010-02 Rev. 11 NAV SYS 9WPSPL LNS KNS0081
 066-4010-03 Rev. 10 NAV SYS 9WPNOGSLNS KNS0081
 066-4010-04 Rev. 2 NAV SYS 9WP GY KNS0081
 066-4010-10 Rev. 1 NAV SYS10WP KNS 81 KNS0081
 066-4010-11 Rev. 2 NAV SYS10WPSPL LNS KNS0081
 066-4010-12 Rev. 2 NAV SYS10WP KNS 81 KNS0081
 066-4010-13 Rev. 3 NAV SYS10WP KNS 81 KNS0081
 066-4010-14 Rev. 2 NAV SYS10WP NOGS KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	01	02	03	04	10	11	12	13	14
	037-0067-00	VOR DISPLAY	EA		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	057-2203-04	FLAVOR STCKR	EA		.	.	.	.	1.00	.	.	.	.	.
	057-2203-10	FLAVOR STCKR	EA		.	.	.	.	.	1.00	.	.	.	.
	057-2203-11	FLAVOR STCKR	EA		.	.	.	.	.	.	1.00	.	.	.
	057-2203-12	FLAVOR STCKR	EA		.	.	.	.	.	.	.	1.00	.	.
	057-2203-13	FLAVOR STCKR	EA		.	.	.	.	.	.	.	.	1.00	.
	057-2203-14	FLAVOR STCKR	EA		.	.	.	.	.	.	.	.	.	1.00
	057-2209-01	NAMETAG	EA		.	1.00	.	.	.	.	.	.	.	.
	057-2209-02	NAMETAG	EA		.	.	1.00	.	.	.	.	.	.	.
	057-2209-03	NAMETAG	EA		.	.	.	1.00	.	.	.	.	.	.
	057-2209-04	NAMETAG	EA		.	.	.	.	1.00	1.00	1.00	1.00	1.00	.
	057-2209-05	NAMETAG	EA		.	.	.	.	.	.	.	.	.	1.00
	066-4010-99	COMMON BOM	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	073-0397-02	FRONT PANEL-BLACK	A	EA	1.00	1.00	1.00	1.00	.	1.00	1.00	1.00	1.00	1.00
	073-0397-03	FRONT PANEL GRAY	EA		.	.	.	.	1.00	.	.	.	.	.
	088-0838-01	BTN & SHAFT USE	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-02	BTN & SHAFT RTN	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-03	BTN & SHAFT RAD	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-04	BTN & SHAFT CHK	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-05	BTN & SHAFT DATA	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0839-01	LENS PLRD W/BLK SS	EA		1.00	1.00	.	.	1.00	1.00	.	.	.	1.00
	088-0839-03	LENS PLRD W/BLK SS	EA		.	.	1.00	1.00	.	.	1.00	.	.	.
	088-1128-00	LENS/BSS & NOWEN	EA		.	.	.	.	.	.	.	1.00	.	.
	088-1128-01	LENS/BSS & NOWEN	EA		.	.	.	.	.	.	.	.	1.00	.
	089-6303-03	SCR FHP 3-48X3/16	EA		4.00	4.00	4.00	4.00	.	4.00	4.00	4.00	4.00	4.00
	089-6455-03	*SCR FHP 3-48X3/16	EA		.	.	.	.	4.00	.	.	.	.	.
	200-2474-00	NAV/RCVR W/GS	A	EA	1.00	.	1.00	.	1.00	1.00	1.00	1.00	1.00	.
	200-2474-01	NAV/RCVR W0/GS	A	EA	.	1.00	.	1.00	.	.	.	.	.	1.00
	200-2475-00	RNAV -00	A	EA	1.00	1.00	1.00	1.00	1.00
	200-2475-10	RNAV-VOR	A	EA	1.00	1.00	.	.	1.00
	200-2475-11	RNAV -VOR/WNB	A	EA	1.00	1.00	.

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066-4010-15 Rev. 1 NAV SYSIOWPNOGSLNS KNS0081
 066-4010-16 Rev. 3 NAV SYSIOWP NOGS KNS0081
 066-4010-17 Rev. 2 NAV SYSIOWPNOGSLNS KNS0081
 066-4010-18 Rev. 4 NAV SYSIOWPSPL LTG KNS0081
 066-4010-19 Rev. 3 NAV SYSIOWPSPL LTG KNS0081
 066-4010-20 Rev. 2 NAV SYSIOWP GY KNS0081
 066-4010-21 Rev. 3 NAV SYSIOWP GY KNS0081
 066-4010-30 Rev. 2 NAV SYS TAC KNS 81 KNS0081
 066-4010-31 Rev. 3 NAV SYS TAC SPL LN KNS0081
 066-4010-32 Rev. 2 NAV SYS TAC BUS KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	15	16	17	18	19	20	21	30	31	32
	037-0067-00	VOR DISPLAY	EA		1.00	1.00	1.00	1.00	1.00	1.00	1.00			
	037-0081-00	TACAN DISPLAY	EA									1.00	1.00	1.00
	057-2203-15	FLAVOR STCKR	EA		1.00									
	057-2203-16	FLAVOR STCKR	EA			1.00								
	057-2203-17	FLAVOR STCKR	EA				1.00							
	057-2203-18	FLAVOR STCKR	EA					1.00						
	057-2203-19	FLAVOR STCKR	EA						1.00					
	057-2203-20	FLAVOR STCKR	EA							1.00				
	057-2203-21	FLAVOR STCKR	EA								1.00			
	057-2203-30	FLAVOR STCKR	EA									1.00		
	057-2203-31	FLAVOR STCKR	EA										1.00	
	057-2203-32	FLAVOR STCKR	EA											1.00
	057-2209-04	NAMETAG	EA					1.00	1.00	1.00	1.00	1.00	1.00	1.00
	057-2209-05	NAMETAG	EA		1.00	1.00	1.00							
	066-4010-99	COMMON BOW	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	073-0397-02	FRONT PANEL-BLACK	A	EA	1.00	1.00	1.00	1.00	1.00			1.00	1.00	1.00
	073-0397-03	FRONT PANEL GRAY	EA							1.00	1.00			
	088-0838-01	BTN & SHAFT USE	A	EA	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00
	088-0838-02	BTN & SHAFT RTN	A	EA	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00
	088-0838-03	BTN & SHAFT RAD	A	EA	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00
	088-0838-04	BTN & SHAFT CHK	A	EA	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00
	088-0838-05	BTN & SHAFT DATA	A	EA	1.00	1.00	1.00			1.00	1.00	1.00	1.00	1.00
	088-0838-31	BUTTON & SHAFT USE	A	EA				1.00	1.00					
	088-0838-32	BUTTON & SHAFT RTN	A	EA				1.00	1.00					
	088-0838-33	BUTTON & SHAFT RAD	A	EA				1.00	1.00					
	088-0838-34	BUTTON & SHAFT CHK	A	EA				1.00	1.00					
	088-0838-35	BUTTON & SHFT DATA	A	EA				1.00	1.00					
	088-0839-01	LENS PLRD W/BLK SS	EA					1.00	1.00	1.00				
	088-0839-03	LENS PLRD W/BLK SS	EA		1.00									
	088-1128-00	LENS/BSS & NOWEN	EA			1.00					1.00			
	088-1128-01	LENS/BSS & NOWEN	EA				1.00							
	088-1128-02	LENS/BSS & NOWEN	EA									1.00		
	088-1128-03	LENS/BSS & NOWEN	EA										1.00	
	088-1128-04	LENS/BSS & NOWEN	EA											1.00
	089-6303-03	SCR FHP 3-48X3/16	EA		4.00	4.00	4.00	4.00	4.00			4.00	4.00	4.00
	089-6455-03	*SCR FHP 3-48X3/16	EA							4.00	4.00			
	187-1250-00	LAMP SHIELD	EA					1.00	1.00					
	200-2474-00	NAV/RCVR W/GS	A	EA				1.00	1.00	1.00	1.00	1.00	1.00	1.00
	200-2474-01	NAV/RCVR WO/GS	A	EA	1.00	1.00	1.00							
	200-2475-01	RNAV	A	EA				1.00						
	200-2475-02	RNAV	A	EA					1.00					
	200-2475-10	RNAV-VOR	A	EA	1.00					1.00				
	200-2475-11	RNAV -VOR/WNB	A	EA		1.00	1.00				1.00			
	200-2475-30	RNAV-TAC	A	EA								1.00	1.00	
	200-2475-31	RNAV-TAC/WNB	A	EA										1.00

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KNS 81
DIGITAL AREA NAVIGATION SYSTEM

066-4010-33 Rev. 3 NAV SYS TAC SPL LN KNS0081
 066-4010-34 Rev. 3 NAV SYS TAC NO GS KNS0081
 066-4010-35 Rev. 2 NAV SYS TACNOGS LN KNS0081
 066-4010-36 Rev. 3 NAV SYS TAC NO GS KNS0081
 066-4010-37 Rev. 2 NAV SYS TAC SPL LN KNS0081
 066-4010-38 Rev. 3 NAV SYS TAC BY KNS0081
 066-4010-39 Rev. 3 NAV SYS TAC GY BUS KNS0081
 066-4010-40 Rev. 2 NAV SYS TACRF1 SHD KNS0081
 066-4010-60 Rev. 1 RNAV W/60 OPTIONS KNC0081
 066-4010-61 Rev. 1 RNAV W/61 OPTIONS KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	33	34	35	36	37	38	39	40	60	61
	037-0067-00	VOR DISPLAY	EA	.	.	.	.	.	.	.	.	.	1.00	1.00
	037-0081-00	TACAN DISPLAY	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.	.
	057-2203-33	FLAVOR STCKR	EA	1.00	.	.	.	.	.	.	.	.	.	.
	057-2203-34	FLAVOR STCKR	EA	.	1.00	.	.	.	.	.	.	.	.	.
	057-2203-35	FLAVOR STCKR	EA	.	.	1.00	.	.	.	.	.	.	.	.
	057-2203-36	FLAVOR STCKR	EA	.	.	.	1.00	.	.	.	.	.	.	.
	057-2203-37	FLAVOR STCKR	EA	.	.	.	.	1.00	.	.	.	.	.	.
	057-2203-38	FLAVOR STCKR	EA	.	.	.	.	.	1.00	.	.	.	.	.
	057-2203-39	FLAVOR STCKR	EA	.	.	.	.	.	.	1.00	.	.	.	.
	057-2203-40	FLAVOR STCKR	EA	.	.	.	.	.	.	.	1.00	.	.	.
	057-2203-60	FLAVOR STCKR	EA	.	.	.	.	.	.	.	.	1.00	.	.
	057-2203-61	FLAVOR STCKR	EA	.	.	.	.	.	.	.	.	.	1.00	1.00
	057-2209-04	NAMETAG	EA	1.00	.	.	.	.	.	1.00	1.00	1.00	1.00	1.00
	057-2209-05	NAMETAG	EA	.	1.00	1.00	1.00	1.00	.	.	.	.	.	.
	066-4010-99	COMMON BOM	A EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	073-0397-02	FRONT PANEL-BLACK	A EA	1.00	1.00	1.00	1.00	1.00	.	.	1.00	1.00	1.00	1.00
	073-0397-03	FRONT PANEL GRAY	EA	.	.	.	.	.	1.00	1.00	.	.	.	.
	088-0838-01	BTN & SHAFT USE	A EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-02	BTN & SHAFT RTN	A EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-03	BTN & SHAFT RAD	A EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-04	BTN & SHAFT CHK	A EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-05	BTN & SHAFT DATA	A EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0839-01	LENS PLRD W/BLK SS	EA	.	.	.	.	.	.	.	.	.	1.00	.
	088-0839-03	LENS PLRD W/BLK SS	EA	.	.	.	.	.	.	.	.	.	.	1.00
	088-1128-02	LENS/BSS & NOMEN	EA	.	1.00	.	.	.	1.00	.	.	.	.	.
	088-1128-03	LENS/BSS & NOMEN	EA	.	.	1.00	.	.	.	.	.	.	.	.
	088-1128-04	LENS/BSS & NOMEN	EA	.	.	.	1.00	.	.	1.00	.	.	.	.
	088-1128-05	LENS/BSS & NOMEN	EA	1.00	.	.	.	1.00	.	.	.	.	.	.
	089-6303-03	SCR FHP 3-48X3/16	EA	4.00	4.00	4.00	4.00	4.00	.	.	4.00	4.00	4.00	4.00
	089-6455-03	*SCR FHP 3-48X3/16	EA	.	.	.	.	.	4.00	4.00	.	.	.	.
	200-2474-00	NAV/RCVR W/GS	A EA	1.00	.	.	.	.	1.00	1.00	1.00	1.00	1.00	1.00
	200-2474-01	NAV/RCVR WD/GS	A EA	.	1.00	1.00	1.00	1.00	.	.	.	.	.	.
	200-2475-30	RNAV-TAC	A EA	.	1.00	1.00	.	.	1.00	.	1.00	.	.	.
	200-2475-31	RNAV-TAC/WNB	A EA	1.00	.	.	1.00	1.00	.	1.00
	200-2475-60	RNAV-VOR/PLL	A EA	1.00	1.00	1.00
	200-3314-00	BEZEL ASSY	A EA	1.00	.	.	.

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KNS 81
DIGITAL AREA NAVIGATION SYSTEM

066-4010-62 Rev. 1 RNAV W/62 OPTIONS KNS0081
 066-4010-63 Rev. 1 RNAV W/63 OPTIONS KNS0081
 066-4010-64 Rev. 1 RNAV W/64 OPTIONS KNS0081
 066-4010-65 Rev. 1 RNAV W/65 OPTIONS KNS0081
 066-4010-66 Rev. 1 RNAV W/66 OPTIONS KNS0081
 066-4010-67 Rev. 1 RNAV W/67 OPTIONS KNS0081
 066-4010-69 Rev. 1 RNAV W/69 OPTIONS KNS0081
 066-4010-70 Rev. 1 RNAV W/70 OPTIONS KNS0081
 066-4010-71 Rev. 1 RNAV W/71 OPTIONS KNS0081
 066-4010-80 Rev. 1 RNAV W/80 OPTIONS KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	62	63	64	65	66	67	69	70	71	80
	037-0067-00	VDR DISPLAY	EA		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.
	037-0081-00	TACAN DISPLAY	EA		.	.	.	.	.	.	.	.	.	1.00
	057-2203-62	FLAVOR STCKR	EA		1.00	.	.	.	.	.	.	.	.	.
	057-2203-63	FLAVOR STCKR	EA		.	1.00	.	.	.	.	.	.	.	.
	057-2203-64	FLAVOR STCKR	EA		.	.	1.00	.	.	.	.	.	.	.
	057-2203-65	FLAVOR STCKR	EA		.	.	.	1.00	.	.	.	.	.	.
	057-2203-66	FLAVOR STCKR	EA		.	.	.	.	1.00	.	.	.	.	.
	057-2203-67	FLAVOR STCKR	EA		.	.	.	.	.	1.00	.	.	.	.
	057-2203-69	FLAVOR STCKR	EA		.	.	.	.	.	.	1.00	.	.	.
	057-2203-70	FLAVOR STCKR	EA		.	.	.	.	.	.	.	1.00	.	.
	057-2203-71	FLAVOR STCKR	EA		.	.	.	.	.	.	.	.	1.00	.
	057-2203-80	FLAVOR STICKER	EA		.	.	.	.	.	.	.	.	.	1.00
	057-2209-04	NAMETAG	EA		1.00	1.00	.	.	.	.	1.00	1.00	1.00	1.00
	057-2209-05	NAMETAG	EA		.	.	1.00	1.00	1.00	1.00	.	.	.	.
	066-4010-99	COMMON BOM	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	073-0397-02	FRONT PANEL-BLACK	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.	.	1.00
	073-0397-03	FRONT PANEL GRAY	EA		.	.	.	.	.	.	.	1.00	1.00	.
	088-0838-01	BTN & SHAFT USE	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	.	1.00	1.00	1.00
	088-0838-02	BTN & SHAFT RTN	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	.	1.00	1.00	1.00
	088-0838-03	BTN & SHAFT RAD	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	.	1.00	1.00	1.00
	088-0838-04	BTN & SHAFT CHK	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	.	1.00	1.00	1.00
	088-0838-05	BTN & SHAFT DATA	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	.	1.00	1.00	1.00
	088-0838-31	BUTTON & SHAFT USE	A	EA	.	.	.	.	.	.	1.00	.	.	.
	088-0838-32	BUTTON & SHAFT RTN	A	EA	.	.	.	.	.	.	1.00	.	.	.
	088-0838-33	BUTTON & SHAFT RAD	A	EA	.	.	.	.	.	.	1.00	.	.	.
	088-0838-34	BUTTON & SHAFT CHK	A	EA	.	.	.	.	.	.	1.00	.	.	.
	088-0838-35	BUTTON & SHFT DATA	A	EA	.	.	.	.	.	.	1.00	.	.	.
	088-0839-01	LENS PLRD W/BLK SS	EA		.	.	1.00	.	.	.	1.00	1.00	.	.
	088-0839-03	LENS PLRD W/BLK SS	EA		.	.	.	1.00	.	.	.	.	.	.
	088-1128-00	LENS/BSS & NOWEN	EA		1.00	.	.	.	1.00	.	.	.	1.00	.
	088-1128-01	LENS/BSS & NOWEN	EA		.	1.00	.	.	.	1.00	.	.	.	.
	088-1128-02	LENS/BSS & NOWEN	EA		.	.	.	.	.	.	.	.	.	1.00
	089-6303-03	SCR FHP 3-48X3/16	EA		4.00	4.00	4.00	4.00	4.00	4.00	4.00	.	.	4.00
	089-6455-03	*SCR FHP 3-48X3/16	EA		.	.	.	.	.	.	.	4.00	4.00	.
	187-1250-00	LAMP SHIELD	EA		.	.	.	.	.	.	1.00	.	.	.
	200-2474-00	NAV/RCVR W/GS	A	EA	1.00	1.00	.	.	.	.	1.00	1.00	1.00	1.00
	200-2474-01	NAV/RCVR W0/GS	A	EA	.	.	1.00	1.00	1.00	1.00	.	.	.	.
	200-2475-60	RNAV-VOR/PLL	A	EA	.	.	1.00	1.00	.	.	1.00	1.00	.	.
	200-2475-61	RNAV-VOR/WNB/PLL	A	EA	1.00	1.00	.	.	1.00	1.00	.	.	1.00	.
	200-2475-80	RNAV-TAC/PLL	A	EA	1.00

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066-4010-81 Rev. 1 RNAV W/81 OPTIONS KNS0081
 066-4010-82 Rev. 1 RNAV W/82 OPTIONS KNS0081
 066-4010-83 Rev. 1 RNAV W/83 OPTIONS KNS0081
 066-4010-84 Rev. 1 RNAV W/84 OPTIONS KNS0081
 066-4010-85 Rev. 1 RNAV W/85 OPTIONS KNS0081
 066-4010-86 Rev. 1 RNAV W/86 OPTIONS KNS0081
 066-4010-87 Rev. 1 RNAV W/87 OPTIONS KNS0081
 066-4010-88 Rev. 1 RNAV W/88 OPTIONS KNS0081
 066-4010-89 Rev. 1 RNAV W/89 OPTIONS KNS0081
 066-4010-90 Rev. 2 RNAV W/90 OPTIONS KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	81	82	83	84	85	86	87	88	89	90
	037-0081-00	TACAN DISPLAY	EA		1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	057-2203-81	FLAVOR STCKR	EA		1.00	.	.	.	.	.	.	.	.	.
	057-2203-82	FLAVOR STCKR	EA		.	1.00	.	.	.	.	.	.	.	.
	057-2203-83	FLAVOR STCKR	EA		.	.	1.00	.	.	.	.	.	.	.
	057-2203-84	FLAVOR STCKR	EA		.	.	.	1.00	.	.	.	.	.	.
	057-2203-85	FLAVOR STCKR	EA		.	.	.	.	1.00	.	.	.	.	.
	057-2203-86	FLAVOR STCKR	EA		.	.	.	.	.	1.00	.	.	.	.
	057-2203-87	FLAVOR STCKR	EA		.	.	.	.	.	.	1.00	.	.	.
	057-2203-88	FLAVOR STCKR	EA		.	.	.	.	.	.	.	1.00	.	.
	057-2203-89	FLAVOR STCKR	EA		.	.	.	.	.	.	.	.	1.00	.
	057-2203-90	FLAVOR STCKR	EA		.	.	.	.	.	.	.	.	.	1.00
	057-2209-04	NAMETAG	EA		1.00	1.00	1.00	.	.	.	.	1.00	1.00	1.00
	057-2209-05	NAMETAG	EA		.	.	.	1.00	1.00	1.00	1.00	.	.	.
	066-4010-99	COMMON BOW	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	073-0397-02	FRONT PANEL-BLACK	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	.	.	1.00
	073-0397-03	FRONT PANEL GRAY	EA		.	.	.	.	.	.	.	1.00	1.00	.
	088-0838-01	BTN & SHAFT USE	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-02	BTN & SHAFT RTN	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-03	BTN & SHAFT RAD	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-04	BTN & SHAFT CHK	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-0838-05	BTN & SHAFT DATA	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	088-1128-02	LENS/BSS & NOWNEN	EA		.	.	.	1.00	.	.	.	1.00	.	.
	088-1128-03	LENS/BSS & NOWNEN	EA		1.00	.	.	.	1.00	.	.	.	.	.
	088-1128-04	LENS/BSS & NOWNEN	EA		.	1.00	.	.	.	1.00	.	.	1.00	.
	088-1128-05	LENS/BSS & NOWNEN	EA		.	.	1.00	.	.	.	1.00	.	.	.
	089-6303-03	SCR FHP 3-48X3/16	EA		4.00	4.00	4.00	4.00	4.00	4.00	4.00	.	.	4.00
	089-6455-03	*SCR FHP 3-48X3/16	EA		.	.	.	.	.	.	.	4.00	4.00	.
	200-2474-00	NAV/RCVR W/GS	A	EA	1.00	1.00	1.00	.	.	.	.	1.00	1.00	1.00
	200-2474-01	NAV/RCVR WO/GS	A	EA	.	.	.	1.00	1.00	1.00	1.00	.	.	.
	200-2475-80	RNAV-TAC/PLL	A	EA	1.00	.	.	1.00	1.00	.	.	1.00	.	1.00
	200-2475-81	RNAV-TAC/WNB/PLL	A	EA	.	1.00	1.00	.	.	1.00	1.00	.	1.00	.
	200-3314-00	BEZEL ASSY	A	EA	1.00

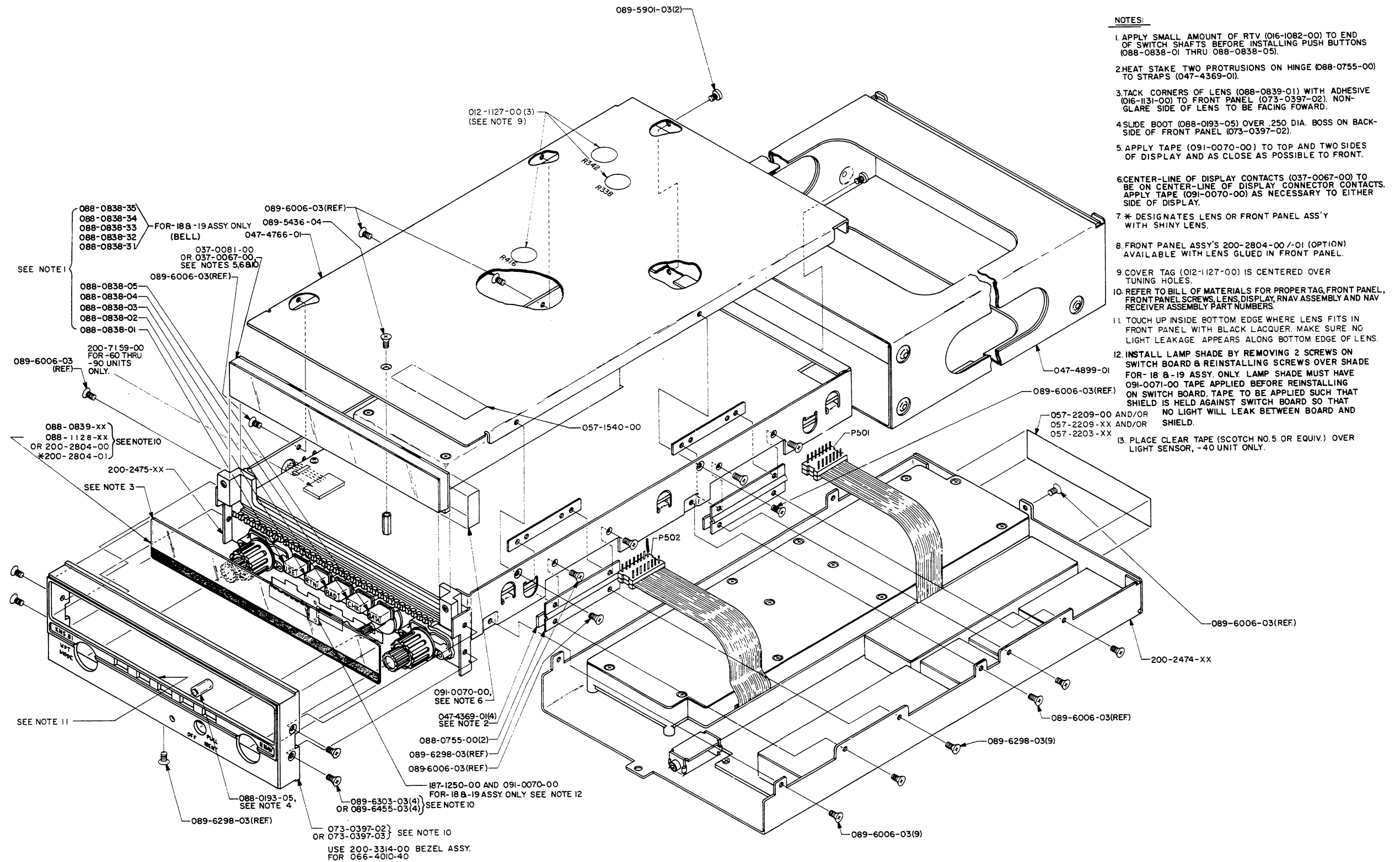
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KNS 81
DIGITAL AREA NAVIGATION SYSTEM

066-4010-99 Rev. 1 COMMON BOM KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	99
	012-1127-00	TAG COVER		EA	3.00
	016-1082-00	DC RTV 3145		AR	0.00
	016-1131-00	CNTCT CMT BND 1055		AR	0.00
	035-1361-17	PROTECTIVE COVER		EA	1.00
	047-4369-01	STRAP HINGE W/F		EA	4.00
	047-4766-01	CVR	A	EA	1.00
	047-4899-01	TRAY MTG	A	EA	1.00
	057-1540-00	WARNING HV TAG		EA	1.00
	057-2209-00	NAMETAG		EA	1.00
	088-0193-05	FLTR LWP BLK		EA	1.00
	088-0755-00	FLEX HINGE		EA	2.00
	089-5436-04	SCR FHP 4-40X1/4		EA	1.00
	089-5901-03	SCR PHP 3-48X3/16		EA	2.00
	089-6006-03	SCR FHP 3-48X3/16		EA	9.00
	089-6298-03	SCR FHPH 3-48X3/16		EA	9.00
	091-0070-00	CREPE PAPER TAPE		AR	0.00

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KNS 81
DIGITAL AREA NAVIGATION SYSTEM



NOTES:

1. APPLY SMALL AMOUNT OF RTV (016-1082-00) TO END OF SWITCH SHAFTS BEFORE INSTALLING PUSH BUTTONS (088-0838-01 THRU 088-0838-05).
2. HEAT STAKE TWO PROTRUSIONS ON HINGE (088-0755-00) TO STRAPS (047-4369-01).
3. TACK CORNERS OF LENS (088-0839-01) WITH ADHESIVE (016-1131-00) TO FRONT PANEL (073-0397-02). NON-GLARE SIDE OF LENS TO BE FACING FORWARD.
4. SLIDE BOOT (088-0193-05) OVER .250 DIA. BOSS ON BACK-SIDE OF FRONT PANEL (073-0397-02).
5. APPLY TAPE (091-0070-00) TO TOP AND TWO SIDES OF DISPLAY AND AS CLOSE AS POSSIBLE TO FRONT.
6. CENTER-LINE OF DISPLAY CONTACTS (037-0067-00) TO BE ON CENTER-LINE OF DISPLAY CONNECTOR CONTACTS. APPLY TAPE (091-0070-00) AS NECESSARY TO EITHER SIDE OF DISPLAY.
7. * DESIGNATES LENS OR FRONT PANEL ASSY WITH SHINY LENS.
8. FRONT PANEL ASSY'S 200-2804-00 /-01 (OPTION) AVAILABLE WITH LENS GLUED IN FRONT PANEL.
9. COVER TAG (012-1127-00) IS CENTERED OVER TUNING HOLES.
10. REFER TO BILL OF MATERIALS FOR PROPER TAG, FRONT PANEL, FRONT PANEL SCREWS, LENS, DISPLAY, RNAV ASSEMBLY AND NAV RECEIVER ASSEMBLY PART NUMBERS.
11. TOUCH UP INSIDE BOTTOM EDGE WHERE LENS FITS IN FRONT PANEL WITH BLACK LACQUER. MAKE SURE NO LIGHT LEAKAGE APPEARS ALONG BOTTOM EDGE OF LENS.
12. INSTALL LAMP SHADE BY REMOVING 2 SCREWS ON SWITCH BOARD & REINSTALLING SCREWS OVER SHADE FOR-18 & -19 ASSY ONLY. LAMP SHADE MUST HAVE 091-0071-00 TAPE APPLIED BEFORE REINSTALLING ON SWITCH BOARD. TAPE TO BE APPLIED SUCH THAT SHIELD IS HELD AGAINST SWITCH BOARD SO THAT NO LIGHT WILL LEAK BETWEEN BOARD AND SHIELD.
13. PLACE CLEAR TAPE (SCOTCH NO.5 OR EQUIV.) OVER LIGHT SENSOR, -40 UNIT ONLY.

FIGURE 6-2 FINAL ASSEMBLY
(Dwg. No. 300-2476-00, Rev. 16)

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200-2475-00	Rev. 10	RNAV -00	KNS0081
200-2475-01	Rev. 1	RNAV	KNS0081
200-2475-02	Rev. 1	RNAV	KNS0081
200-2475-10	Rev. 1	RNAV-VOR	KNS0081
200-2475-11	Rev. 1	RNAV-VOR/WNB	KNS0081
200-2475-30	Rev. 1	RNAV-TAC	KNS0081
200-2475-31	Rev. 1	RNAV-TAC/WNB	KNS0081
200-2475-60	Rev. 1	RNAV-VOR/PLL	KNS0081
200-2475-61	Rev. 1	RNAV-VOR/WNB/PLL	KNS0081
200-2475-80	Rev. 1	RNAV-TAC/PLL	KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	01	02	10	11	30	31	60	61	80
	008-0048-03	SLDRLS RECPTL		EA	.	6.00	6.00	.	.	.	.	.	.	.
	012-1021-10	TAPE ELEC 5/8		AR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	012-1166-00	INSUL SHLD		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	025-0018-55	WIRE 26 GRN		IN	3.00	3.00	2.10	2.10	2.10	2.10	2.10	2.10	2.10	2.10
	025-0029-00	WIRE 24 BLK		IN	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10	5.10
	025-0029-02	WIRE 24 RED		IN	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00	18.00
	025-0029-03	WIRE 24 DRN		IN	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80	4.80
	025-0029-04	WIRE 24 YEL		IN	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10	4.10
	025-0029-06	WIRE 24 BLU		IN	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40	4.40
	025-0029-07	WIRE 24 VID		IN	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90	3.90
	030-2320-00	CONN DSPLY 55C		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	030-2336-00	CONN R/ANG		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	030-2336-01	CONN R/ANG		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	030-2336-02	CONN R/ANG		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	047-4765-03	CHAS TOP	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	047-4775-01	BRACKET SWITCH W/F		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	047-4919-02	BTW SHELL	A	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	047-4921-02	COVER P/S W/F		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	047-5399-00	FINGER STOCK 4.45		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	076-0672-00	SPACER		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	076-1086-00	SPACER HEX .700		EA	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00
	089-2005-37	NUT HEX #2-56		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	089-2007-37	NUT HEX 3-48		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	089-2136-00	NUT HEX ESNA 2-56		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	089-5432-05	SCR FHP 2-56X5/16		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	089-5878-05	SCR PHP 4-40X5/16		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	089-5901-04	SCR PHP 3-48X1/4		EA	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00	8.00
	089-5901-06	SCR PHP 3-48X3/8		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	089-5903-04	SCR PHP 4-40X1/4		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	089-6008-04	SCR FHP 4-40X1/4		EA	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00	6.00
	089-6292-03	SCR PHP 2-56X3/16		EA	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	089-6292-07	SCR PHP 2-56X7/16		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	089-8013-37	WSHR INTL LK #3		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	089-8109-34	WSHR SPLT LK #4		EA	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00	5.00
	091-0015-00	RUBBER GRWT 3/16		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	091-0059-00	SCR FH 2-56X3/8		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	091-0109-00	CABLE TIE .234		EA	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	091-0187-00	SHOULDER WASHER		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	091-0187-01	WASHER SHOULDER		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	091-0188-00	CLIP COMPONENT		EA	.	.	3.00	3.00	3.00	3.00	3.00	3.00	3.00	3.00
	091-0286-00	INSUL XSTR .437		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	091-0286-02	INSUL XSTR .687		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	091-0307-03	SPCR INSUL .075		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	150-0003-10	TUBING TFLN 24AWG		AR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	150-0020-10	TUBING SHRINK 18G		AR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	150-0049-10	TUBING SHRINK WHT		AR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	187-1179-00	CUSHION POWER SPLY		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

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	200-6177-00	COMPUTER BD-00	A EA	1.00
	200-6177-01	COMPUTER BD-00	A EA	.	1.00
	200-6177-02	COMPUTER BD-VOR	A EA	.	.	1.00
	200-6177-10	COMPUTER BD-VOR	A EA	.	.	.	1.00	1.00	.	.	.	.
	200-6177-30	COMPUTER BD-TAC	A EA	.	.	.	.	.	1.00	1.00	.	.
	200-6177-60	COMPUTER BD-VOR	A EA	.	.	.	.	.	.	.	1.00	1.00
	200-6177-80	COMPUTER BD-TAC	A EA	.	.	.	.	.	.	.	.	1.00
	200-6178-00	CONV/DSPLY-00	A EA	1.00	1.00	.	.	.	.	.	.	.
	200-6178-10	CONV/DSPLY-VOR	A EA	.	.	1.00	1.00	.	.	.	.	.
	200-6178-11	CONV/DSP-VOR/WNB	A EA	.	.	.	.	1.00	.	.	.	.
	200-6178-30	CONV/DSPLY-TAC	A EA	.	.	.	.	.	1.00	.	.	.
	200-6178-31	CONV/DSPLY-TAC/WNB	A EA	.	.	.	.	.	.	1.00	.	.
	200-6178-60	COMM/DSPLY-VOR/PLL	A EA	.	.	.	.	.	.	.	1.00	.
	200-6178-61	COMM/DSPLY-VOR/WNB	A EA	.	.	.	.	.	.	.	.	1.00
	200-6178-80	COMM/DSPLY-TAC/PLL	A EA	.	.	.	.	.	.	.	.	1.00
	200-6183-00	SWITCH BOARD	A EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	200-6197-00	POWER SUPPLY BD	A EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
V 300	134-5005-02	PHOTODETECTOR	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00

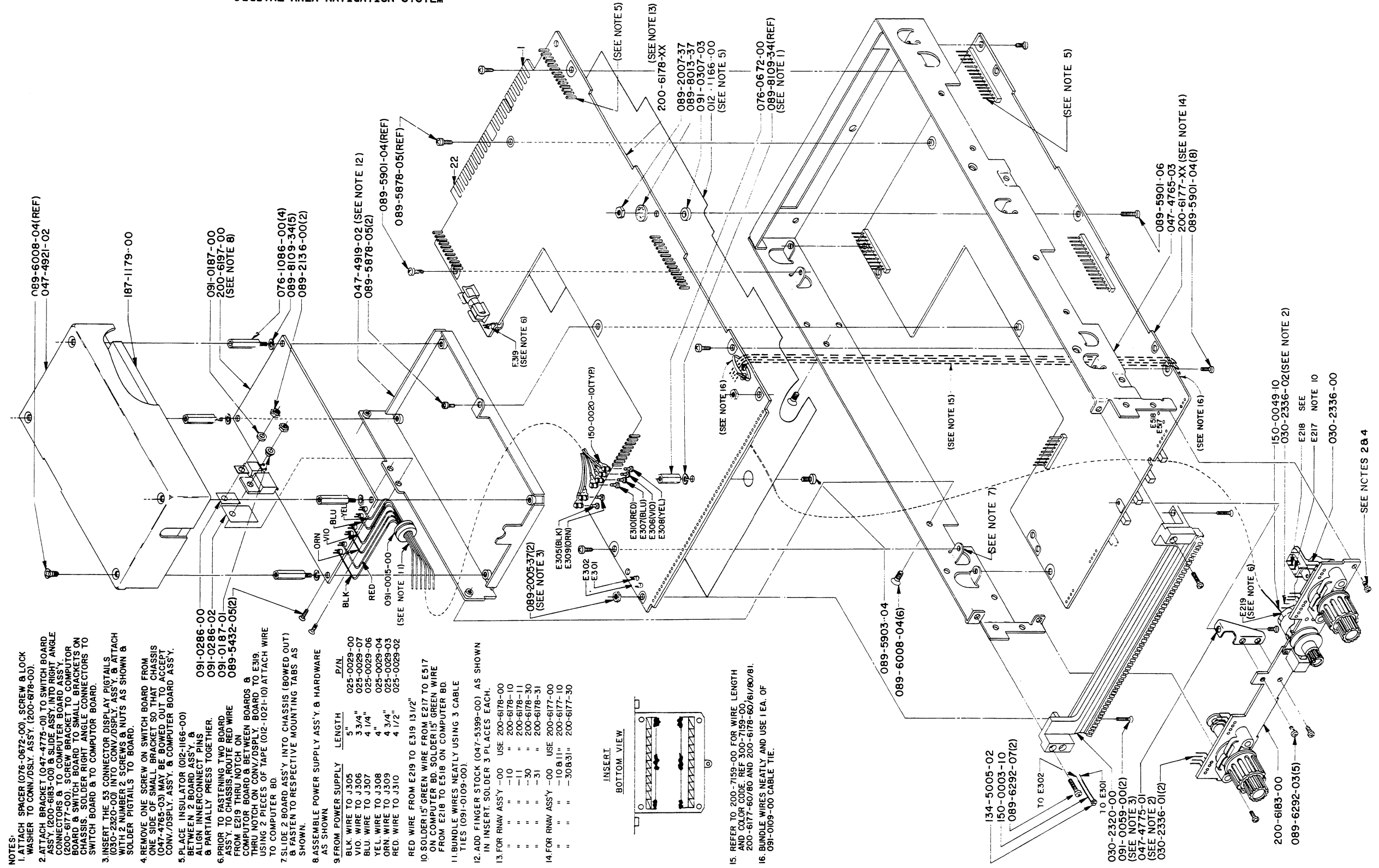
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DIGITAL AREA NAVIGATION SYSTEM

200-2475-81 Rev. 1 RNAV-TAC/WNB/PLL KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	81
	012-1021-10	TAPE ELEC 5/8		AR	0.00
	012-1166-00	INSUL SHLD		EA	1.00
	025-0018-55	WIRE 26 GRN		IN	2.10
	025-0029-00	WIRE 24 BLK		IN	5.10
	025-0029-02	WIRE 24 RED		IN	18.00
	025-0029-03	WIRE 24 DRN		IN	4.80
	025-0029-04	WIRE 24 YEL		IN	4.10
	025-0029-06	WIRE 24 BLU		IN	4.40
	025-0029-07	WIRE 24 VID		IN	3.90
	030-2320-00	CONN DSPLY 55C		EA	1.00
	030-2336-00	CONN R/ANG		EA	1.00
	030-2336-01	CONN R/ANG		EA	2.00
	030-2336-02	CONN R/ANG		EA	1.00
	047-4765-03	CHAS TOP	A	EA	1.00
	047-4775-01	BRACKET SWITCH W/F		EA	1.00
	047-4919-02	BTM SHELL	A	EA	1.00
	047-4921-02	COVER P/S W/F	A	EA	1.00
	047-5399-00	FINGER STOCK 4.45		EA	2.00
	076-0672-00	SPACER		EA	1.00
	076-1086-00	SPACER HEX .700		EA	4.00
	089-2005-37	NUT HEX #2-56		EA	2.00
	089-2007-37	NUT HEX 3-48		EA	1.00
	089-2136-00	NUT HEX ESNA 2-56		EA	2.00
	089-5432-05	SCR FHP 2-56X5/16		EA	2.00
	089-5878-05	SCR PHP 4-40X5/16		EA	2.00
	089-5901-04	SCR PHP 3-48X1/4		EA	8.00
	089-5901-06	SCR PHP 3-48X3/8		EA	1.00
	089-5903-04	SCR PHP 4-40X1/4		EA	1.00
	089-6008-04	SCR FHP 4-40X1/4		EA	6.00
	089-6292-03	SCR PHP 2-56X3/16		EA	5.00
	089-6292-07	SCR PHP 2-56X7/16		EA	2.00
	089-8013-37	WSHR INTL LK #3		EA	1.00
	089-8109-34	WSHR SPLT LK #4		EA	5.00
	091-0015-00	RUBBER GRWT 3/16		EA	1.00
	091-0059-00	SCR FH 2-56X3/8		EA	2.00
	091-0109-00	CABLE TIE .234		EA	3.00
	091-0187-00	SHOULDER WASHER		EA	1.00
	091-0187-01	WASHER SHOULDER		EA	1.00
	091-0188-00	CLIP COMPONENT		EA	3.00
	091-0286-00	INSUL XSTR .437		EA	1.00
	091-0286-02	INSUL XSTR .687		EA	1.00
	091-0307-03	SPCR INSUL .075		EA	1.00
	150-0003-10	TUBING TFLN 24AWG		AR	0.00
	150-0020-10	TUBING SHRINK 18G		AR	0.00
	150-0049-10	TUBING SHRINK WHT		AR	0.00
	187-1179-00	CUSHION POWER SPLY		EA	1.00
	200-6177-80	COMPUTER BD-TAC	A	EA	1.00
	200-6178-81	CONN/DSPLY-TAC/WNB	A	EA	1.00
	200-6183-00	SWITCH BOARD	A	EA	1.00
	200-6197-00	POWER SUPPLY BD	A	EA	1.00
Y 300	134-5005-02	PHOTODETECTOR		EA	1.00

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- NOTES:
1. ATTACH SPACER (076-0672-00), SCREW & LOCK WASHER TO CONN./DSL. ASSY. (200-6178-00).
 2. ATTACH BRACKET (047-4775-01) TO SWITCH BOARD ASSY. (200-6183-00) & SLIDE ASSY. INTO RIGHT ANGLE CONNECTORS & TO COMPUTER BOARD ASSY. (200-6177-00). SCREW BRACKET TO COMPUTER BOARD & SWITCH BOARD TO SMALL BRACKETS ON CHASSIS. SOLDER RIGHT ANGLE CONNECTORS TO SWITCH BOARD & TO COMPUTER BOARD.
 3. INSERT THE 53 CONNECTOR DISPLAY PIGTAILS (030-2320-00) INTO CONN./DSL. ASSY. & ATTACH SOLDER PIGTAILS TO BOARD.
 4. REMOVE ONE SCREW ON SWITCH BOARD FROM ONE SIDE OF SMALL BRACKET SO THAT CHASSIS (047-4765-03) MAY BE BOWED OUT TO ACCEPT CONN./DSL. ASSY. & COMPUTER BOARD ASSY.
 5. PLACE INSULATOR (012-1166-00) BETWEEN 2 BOARD ASSYS. & ALIGN INNER CONNECT PINS & PARTIALLY PRESS TOGETHER.
 6. PRIOR TO FASTENING TWO BOARD ASSY. FROM E219 THRU NOTCH ON COMPUTER BOARD & BETWEEN BOARDS & THRU NOTCH ON CONN./DSL. BOARD TO E319, USING 2 PIECES OF TAPE (012-1021-10) ATTACH WIRE TO COMPUTER BD.
 7. SLIDE 2 BOARD ASSY INTO CHASSIS (BOWED OUT) & FASTEN TO RESPECTIVE MOUNTING TABS AS SHOWN.
 8. ASSEMBLE POWER SUPPLY ASSY. & HARDWARE AS SHOWN.
 9. FROM POWER SUPPLY LENGTH P/N
 BLK WIRE TO J305 5" 025-0029-00
 VIO WIRE TO J306 3 3/4" 025-0029-07
 BLU WIRE TO J307 4 1/4" 025-0029-06
 YEL WIRE TO J308 4" 025-0029-04
 ORN WIRE TO J309 4 3/4" 025-0029-03
 RED WIRE TO J310 4 1/2" 025-0029-02
 10. SOLDER BLU GREEN WIRE FROM E217 TO E517 ON COMPUTER BD. SOLDER YEL GREEN WIRE FROM E218 TO E518 ON COMPUTER BD.
 11. BUNDLE WIRES NEATLY USING 3 CABLE TIES (091-0109-00).
 12. ADD FINGER STOCK (047-5399-00) AS SHOWN IN INSERT. SOLDER 3 PLACES EACH.
 13. FOR RNVA ASSY -00 USE 200-6178-00
 " " -10 " 200-6178-10
 " " -11 " 200-6178-11
 " " -30 " 200-6178-30
 " " -31 " 200-6178-31
 14. FOR RNVA ASSY -00 USE 200-6177-00
 " " -10 & 11" 200-6177-10
 " " -30 & 31" 200-6177-30

15. REFER TO 200-7159-00 FOR WIRE LENGTH AND COLOR CODE. REF 300-7159-00, 200-6177-60/80 AND 200-6178-60/61/80/81.
16. BUNDLE WIRES NEATLY AND USE 1 EA. OF 091-0109-00 CABLE TIE.

FIGURE 6-3 RNVA ASSEMBLY
(Dwg. No. 300-2475-00, Rev. 8)

SEE NOTES 2 & 4

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DIGITAL AREA NAVIGATION SYSTEM

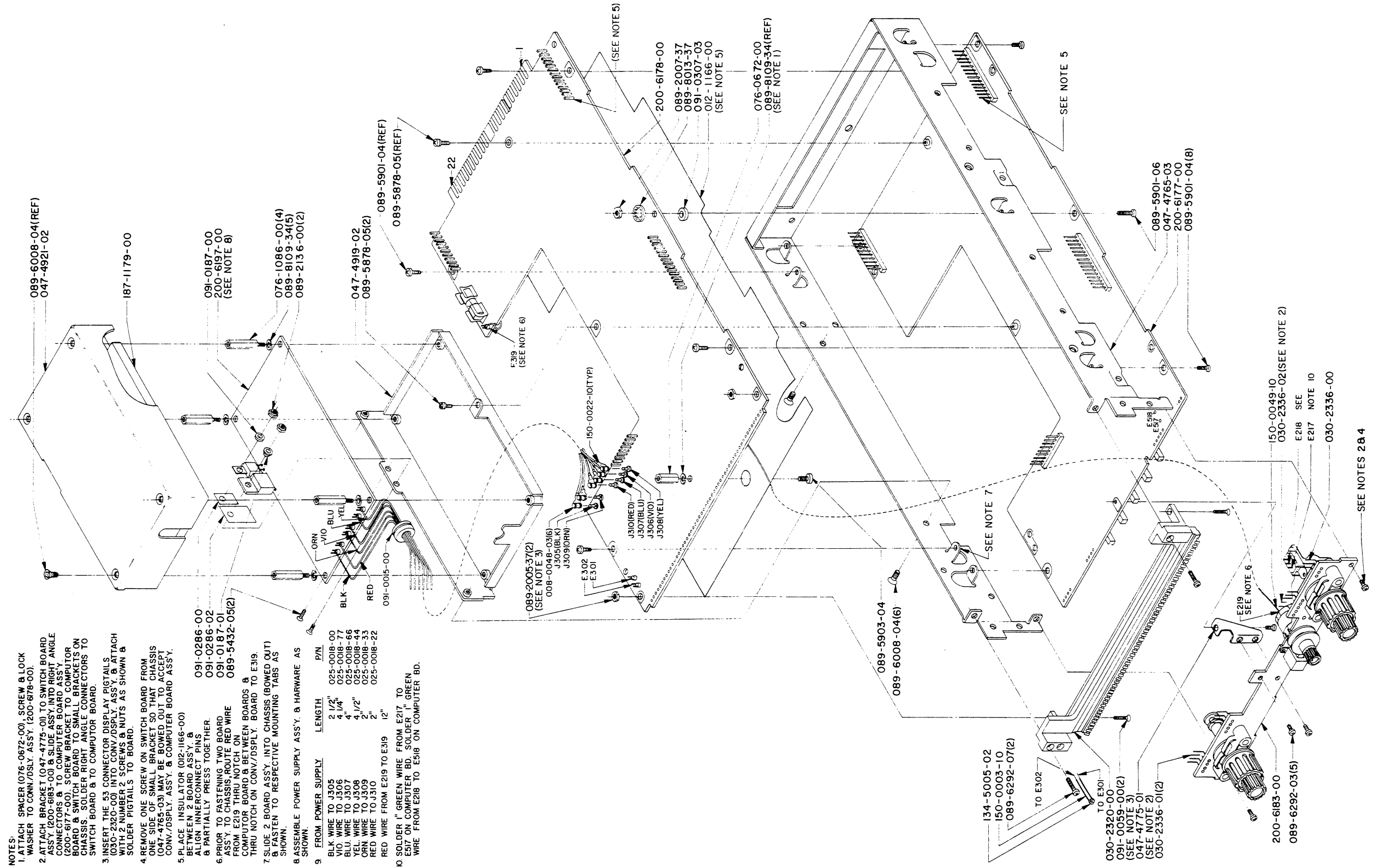


FIGURE 6-3 RNVA ASSEMBLY
(Dwg. No. 300-2475-00, Rev. 0)

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200-2474-00 Rev. 9 NAV/RCVR W/GS KNS0081
 200-2474-01 Rev. 9 NAV/RCVR WO/GS KNS0081
 200-2474-99 Rev. 1 COMMON BOM KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	01	99
	012-1005-05	TAPE WYLAR 1 W	AR	.	.	.	0.00
	026-0003-00	WIRE COP TIN 22G	IN	.	.	.	3.00
	026-0011-00	CA COAX 316U	IN	7.20	.	.	.
	047-4371-01	SPREADER HD W/F	EA	.	.	.	1.00
	047-4873-02	CHSS BTM	A EA	.	.	.	1.00
	047-4898-01	CVR NAV RCVR	A EA	.	.	.	1.00
	047-5325-01	COVER RF 1 W/F	A EA	1.00	.	.	.
	047-5326-01	COVER RF 2 W/F	A EA	1.00	.	.	.
	047-5327-01	COVER MIXER W/F	A EA	1.00	.	.	.
	047-5328-01	COVER IF W/F	A EA	1.00	.	.	.
	047-5329-01	COVER SYN W/F	A EA	1.00	.	.	.
	073-0379-02	HOLD DOWN 80	EA	.	.	.	1.00
	073-0410-01	NAV RCVR CSTG	A EA	.	.	.	1.00
	089-5436-05	SCR FHP 4-40X5/16	EA	.	.	.	4.00
	089-5874-04	SCR PHP 2-56X1/4	EA	.	.	.	13.00
	089-5878-03	SCR PHP 4-40X3/16	EA	5.00	.	.	.
	089-6004-03	SCR FHP 2-56X3/16	EA	.	.	.	13.00
	089-6298-03	SCR FHPH 3-48X3/16	EA	1.00	.	.	.
	089-6561-00	RETAINING SCREW	EA	.	.	.	1.00
	089-8231-00	WASHER FLAT	EA	.	.	.	1.00
	090-0265-00	GROOVE PIN TYPE 5	EA	.	.	.	1.00
	091-0331-15	GRWT SLD SNCS-1	IN	0.80	.	.	.
	150-0049-10	TUBING SHRINK WHT	EA	1.00	.	.	.
	200-2474-99	COMMON BOM	A EA	1.00	1.00	.	.
	200-6175-00	NAV RECEIVER	A EA	.	.	.	1.00
	200-6176-00	GS RECEIVER BD	A EA	1.00	.	.	.
J 813	030-0146-01	RECPT PNL MT	EA	.	.	.	1.00

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DIGITAL AREA NAVIGATION SYSTEM

NOTES:

1. ASS'Y OF HOLD DOWN UNIT AS FOLLOWS:
 - A. SLIDE IN SPREADER (047-4371-01) IN NOTCHES OF CHASSIS.
 - B. INSERT SCREW (089-6561-00) THRU CHASSIS & SPREADER & THREAD INTO HOLD DOWN (073-0379-02).
 - C. PLACE WASHER OVER SCREW AS SHOWN & PRESS IN PIN (090-0265-00).
 - D. BEND TABS OF SPREADER INTO GROOVES ON TABS OF MAIN CHASSIS.

2. -00 ASS'Y INCLUDES GLIDESLOPE WITH 012-1005-05 NECESSARY HARDWARE. (SEE NOTE 6)
- 01 ASS'Y IS WITHOUT GLIDESLOPE & ITEMS DESIGNATED WITH "*" ARE NOT USED.

3. SOLDER ONE END OF COAX TO E617 & E618. BRAIDED SHIELD GOING TO E618. PUT SHRINK TUBING (150-0049-10) OVER COAX WHERE IT PASSES THROUGH HOLE IN FENCE ON GLIDESLOPE BOARD. SOLDER OTHER END OF COAX TO E817 & E818, BRAIDED SHIELD GOING TO E818. COAX SHOULD BE APPROX. 7 1/4" LONG.

4. ALL SCREWS WITHOUT SELF-LOCKING FEATURE SHALL BE LIQUID STAKED.

5. USE 026-0003-00 BUS WIRE 089-5874-04 (13) TO CONNECT J813 TO E619.

6. APPLY MYLAR TAPE (012-1005-05) AS SHOWN. TRIM TO CONTOUR.

7. INSERT GROMMET STRIP (091-0331-15), APPROX. 3/4" LONG, TO FINGERS ON COVER WHERE CABLE EXITS. BEND FINGERS ON COVER TO HOLD GROMMET STRIP.

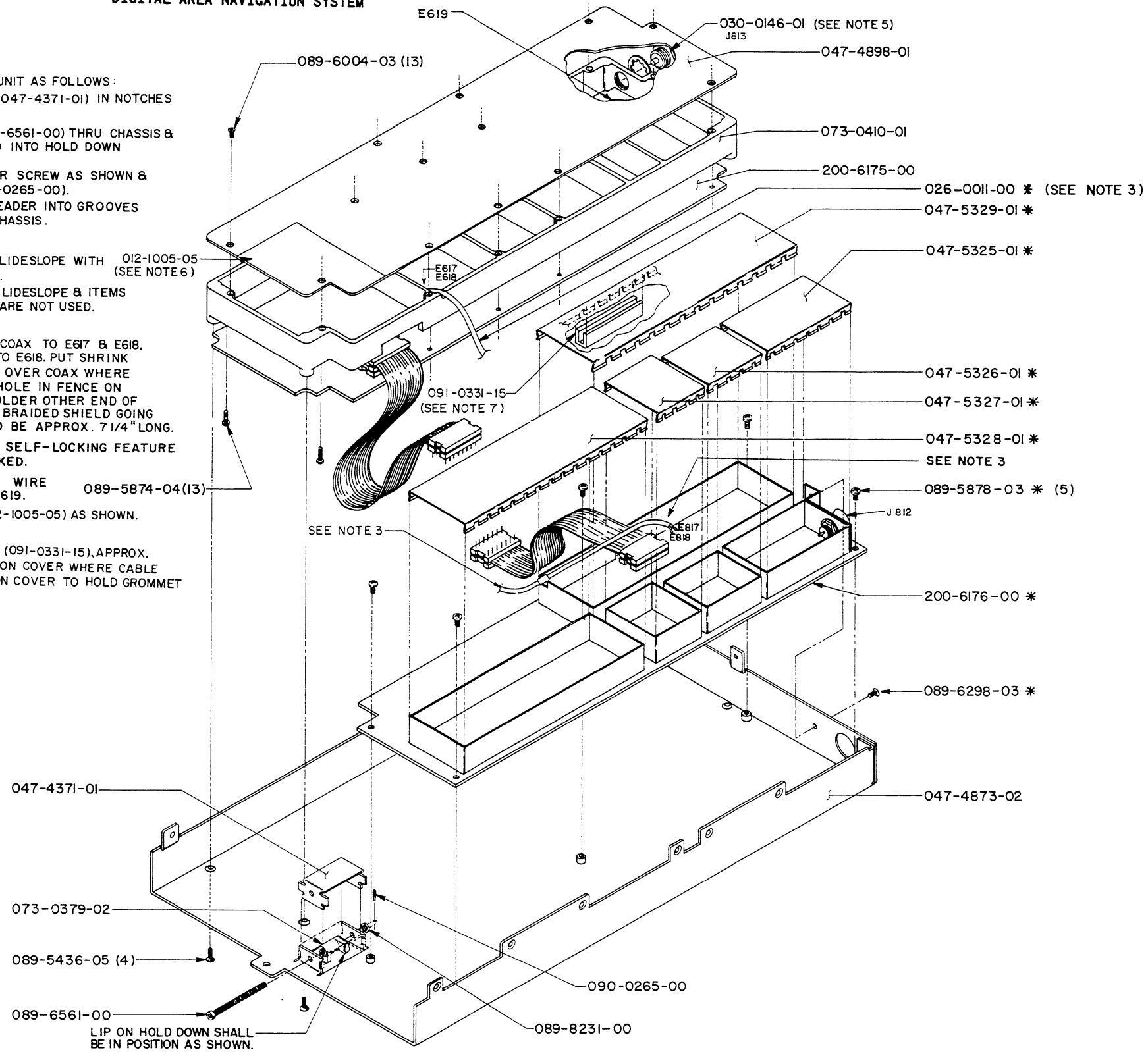


FIGURE 6-4 NAV RECEIVER BOARD ASSEMBLY
(Dwg. No. 300-2474-00, Rev. 8)

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DIGITAL AREA NAVIGATION SYSTEM

200-6197-00 Rev. 7 POWER SUPPLY BD KNS0081

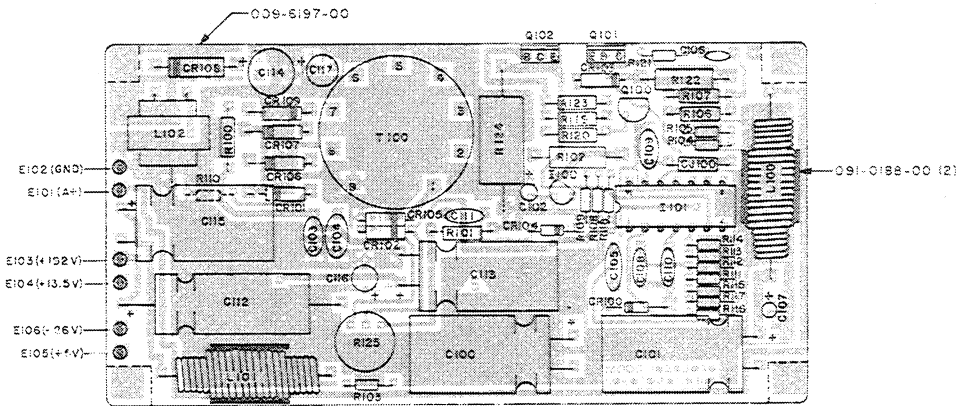
SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
	009-6197-00	PC BD PWR SPLY		EA	1.00
	016-1040-00	COATING TYPE AR		AR	0.00
	091-0188-00	CLIP COMPONENT		EA	2.00
C	100 097-1111-10	CAP EL 110UF 50V C		EA	1.00
C	101 097-1111-10	CAP EL 110UF 50V C		EA	1.00
C	102 096-1082-02	CAP TN 1UF 35V		EA	1.00
C	103 113-5102-00	CAP DC .001UF 500V		EA	1.00
C	104 114-7104-00	CAP DC .1UF 16V		EA	1.00
C	105 114-7104-00	CAP DC .1UF 16V		EA	1.00
C	106 111-0001-13	CAP CR .1UF 50V		EA	1.00
C	107 096-1082-47	CAP TN 1UF 20V		EA	1.00
C	108 113-5102-00	CAP DC .001UF 500V		EA	1.00
C	109 113-5471-00	CAP DC 470PF 500V		EA	1.00
C	110 113-5102-00	CAP DC .001UF 500V		EA	1.00
C	111 114-5222-01	CAP DC 2200PF 500V		EA	1.00
C	112 097-0071-01	CAP AL 4.7UF 350V		EA	1.00
C	113 097-0078-27	CAP AL 100UF 50V		EA	1.00
C	114 097-0078-12	CAP AL 22UF 25V		EA	1.00
C	115 097-0078-10	CAP AL 330UF 16V		EA	1.00
C	116 096-1082-25	CAP TN 150UF 10V		EA	1.00
C	117 097-0068-22	CAP AL 4.7UF 50V		EA	1.00
CJ	100 026-0018-00	WIRE CKTJMPR 22AWG		EA	1.00
CR	100 007-5011-24	DIO Z 33V 1W 5%		EA	1.00
CR	101 007-5011-02	DIO Z 12V 1W 5%		EA	1.00
CR	102 007-6016-00	DIO S 1N4154		EA	1.00
CR	103 007-6114-00	DIO MPD400		EA	1.00
CR	104 007-6016-00	DIO S 1N4154		EA	1.00
CR	105 007-6105-00	DIO HV FDH444		EA	1.00
CR	106 007-6091-04	DIO WR818		EA	1.00
CR	107 007-6091-03	DIO WR814		EA	1.00
CR	108 007-6113-00	DIO WR850		EA	1.00
CR	109 007-6091-03	DIO WR814		EA	1.00
E	101 008-0038-01	TERM BIFUR .084L		EA	1.00
E	102 008-0038-01	TERM BIFUR .084L		EA	1.00
E	103 008-0038-01	TERM BIFUR .084L		EA	1.00
E	104 008-0038-01	TERM BIFUR .084L		EA	1.00
E	105 008-0038-01	TERM BIFUR .084L		EA	1.00
E	106 008-0038-01	TERM BIFUR .084L		EA	1.00
I	100 120-3094-32	IC LM340LAZ-5.0		EA	1.00
I	101 120-3048-00	IC LM339N		EA	1.00
L	100 019-2102-04	CHOKE 90UH		EA	1.00
L	101 019-2102-02	CHOKE 50UH		EA	1.00
L	102 019-2279-01	CHOKE 500UH		EA	1.00
Q	100 007-0078-01	XSTR S NPN 2N3417		EA	1.00
Q	101 007-0244-00	XSTR S MPSU05-3		EA	1.00
Q	102 007-0230-07	XSTR S NPN X44H384		EA	1.00
R	100 131-0682-23	RES CF 6.8K QW 5%		EA	1.00
R	101 131-0512-23	RES CF 5.1K QW 5%		EA	1.00
R	102 131-0511-33	RES CF 510 HW 5%		EA	1.00
R	103 131-0433-13	RES CF 43K EW 5%		EA	1.00
R	104 131-0152-13	RES CF 1.5K EW 5%		EA	1.00

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R	105	131-0183-13	RES CF 18K EW 5%	EA	1.00
R	106	131-0103-23	RES CF 10K QW 5%	EA	1.00
R	107	131-0103-23	RES CF 10K QW 5%	EA	1.00
R	108	131-0393-13	RES CF 39K EW 5%	EA	1.00
R	109	131-0242-13	RES CF 2.4K EW 5%	EA	1.00
R	110	131-0103-13	RES CF 10K EW 5%	EA	1.00
R	111	131-0202-13	RES CF 2K EW 5%	EA	1.00
R	112	131-0393-13	RES CF 39K EW 5%	EA	1.00
R	113	131-0104-13	RES CF 100K EW 5%	EA	1.00
R	114	131-0104-13	RES CF 100K EW 5%	EA	1.00
R	115	131-0562-13	RES CF 5.6K EW 5%	EA	1.00
R	116	131-0333-13	RES CF 33K EW 5%	EA	1.00
R	117	131-0104-13	RES CF 100K EW 5%	EA	1.00
R	118	131-0302-13	RES CF 3K EW 5%	EA	1.00
R	119	131-0301-23	RES CF 300 QW 5%	EA	1.00
R	120	131-0391-23	RES CF 390 QW 5%	EA	1.00
R	121	131-0471-13	RES CF 470 EW 5%	EA	1.00
R	122	130-0015-33	RES FC 1.5 HW 5%	EA	1.00
R	123	131-0100-23	RES CF 10 QW 5%	EA	1.00
R	124	132-5046-00	RES WW .05 2W 5%	EA	1.00
R	125	133-0113-14	RES VA 2K 20% A	EA	1.00
T	100	019-7091-00	XFMR PWR	EA	1.00

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NOTES:

1. PRIOR TO POST COATING BOTH SIDES OF ASS'Y WITH CLEAR URETHANE COATING (016-1040-00) MASK OFF THE FOLLOWING:
ALL MOUNTING AREAS, "E" NUMBERS, Q101, Q102
2. HEAT STAKE TABS ON FAR SIDE OF BOARD.

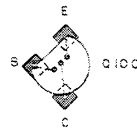
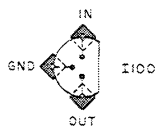


FIGURE 6-5 POWER SUPPLY BOARD ASSEMBLY
(Dwg. No. 800-6197-00, Rev. 2)

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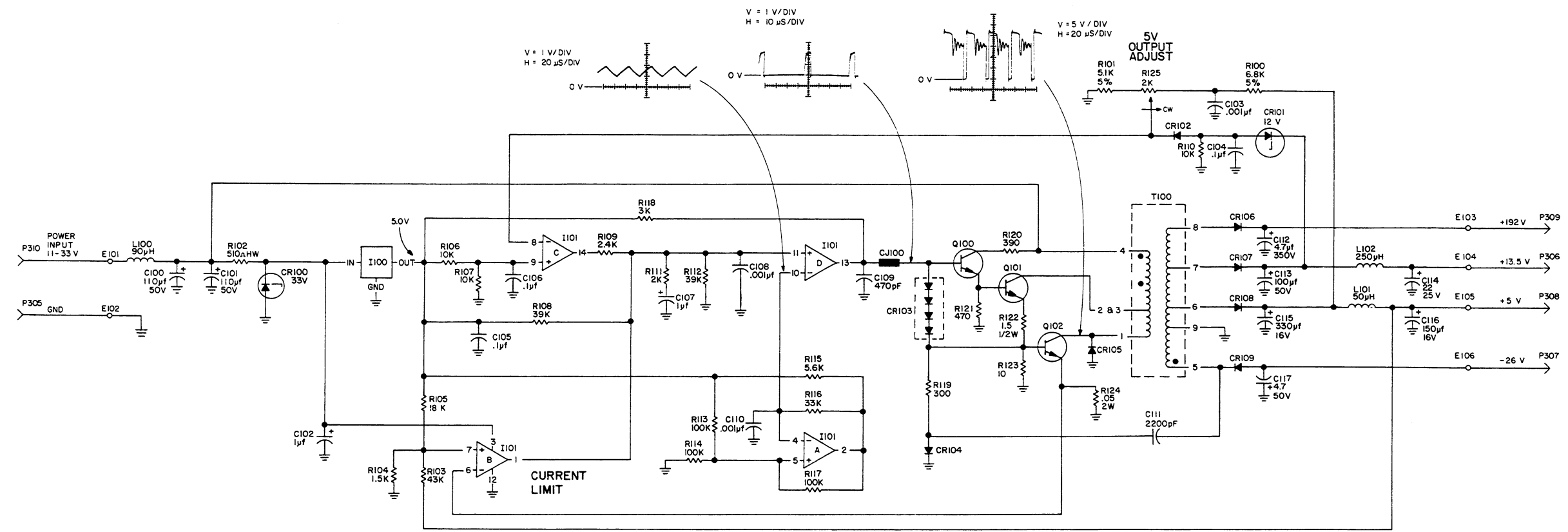


FIGURE 6-6 POWER SUPPLY BOARD SCHEMATIC
(Dwg. No. 002-6197-00, Rev. 2)

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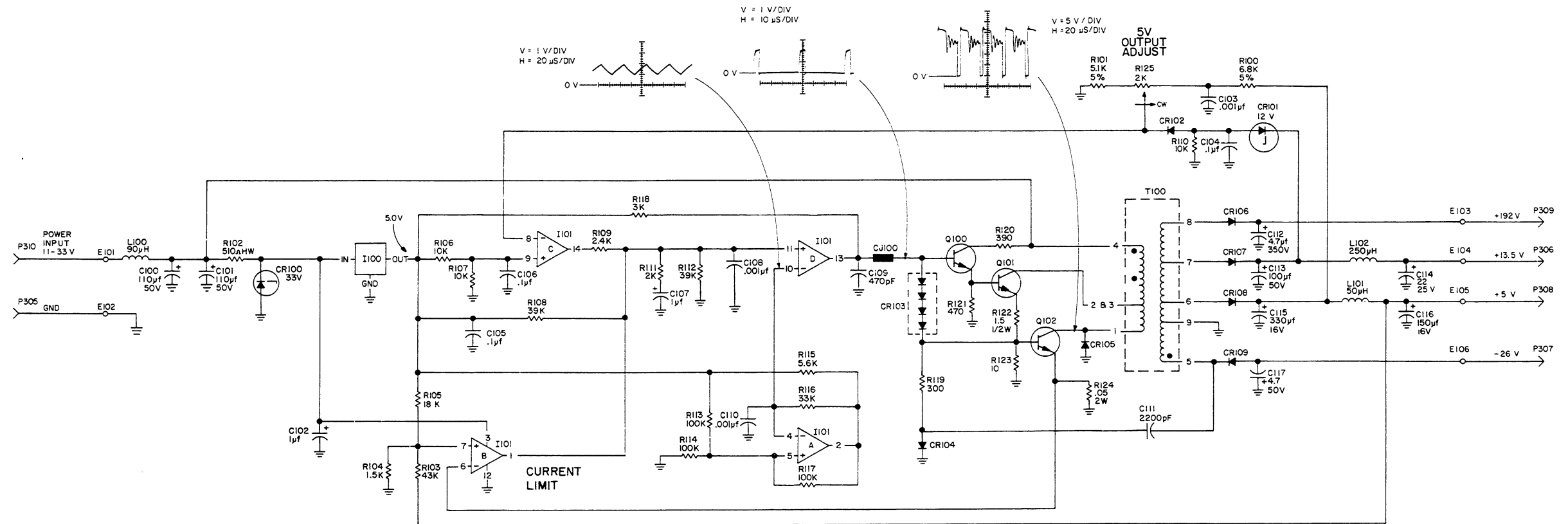
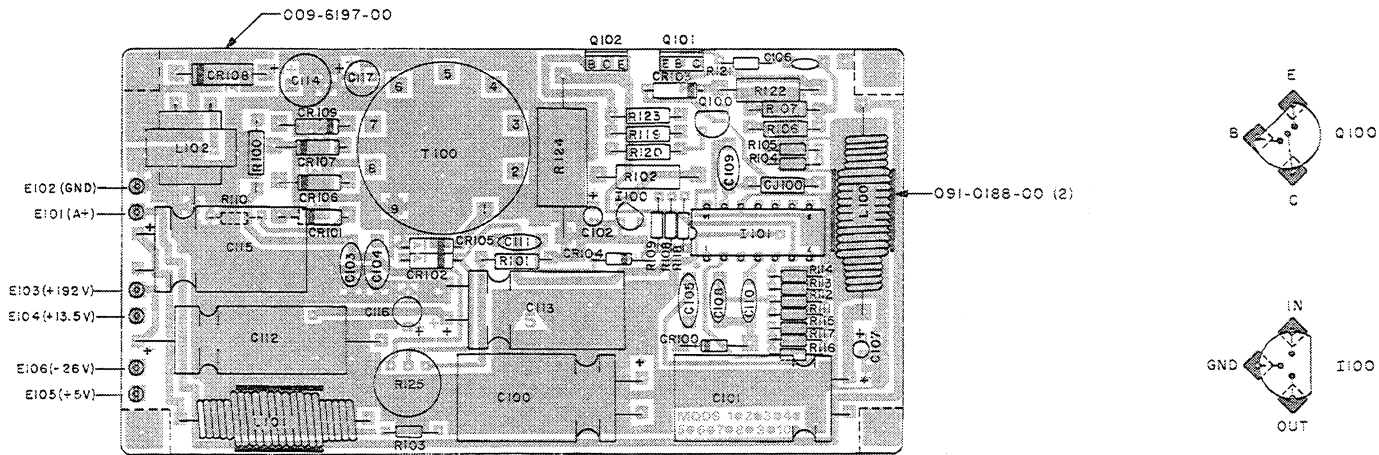


FIGURE 6-6 POWER SUPPLY BOARD SCHEMATIC
(Dwg. No. 002-6197-00, Rev. 1)

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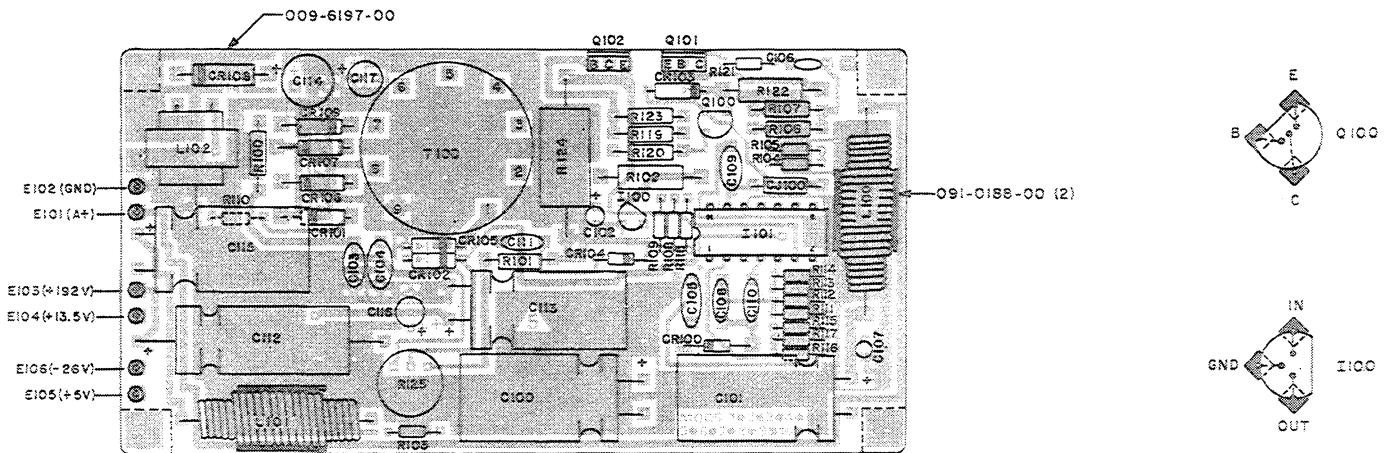
NOTES:

1. PRIOR TO POST COATING BOTH SIDES OF ASS'Y WITH CLEAR URETHANE COATING (016-1040-00) MASK OFF THE FOLLOWING:
ALL MOUNTING AREAS, "E" NUMBERS, Q101, Q102
2. HEAT STAKE TABS ON FAR SIDE OF BOARD.

FIGURE 6-4 POWER SUPPLY BOARD ASSEMBLY
(Dwg. No. 300-6197-00, R-2)

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NOTES:

1. PRIOR TO POST COATING BOTH SIDES OF ASS'Y WITH CLEAR URETHANE COATING (015-1040-00) MASK OFF THE FOLLOWING: ALL MOUNTING AREAS, "E" NUMBERS, Q101, Q102
2. HEAT STAKE TABS ON FAR SIDE OF BOARD.

FIGURE 6-4 POWER SUPPLY BOARD ASSEMBLY
(Dwg. No. 300-6197-00, R-1)

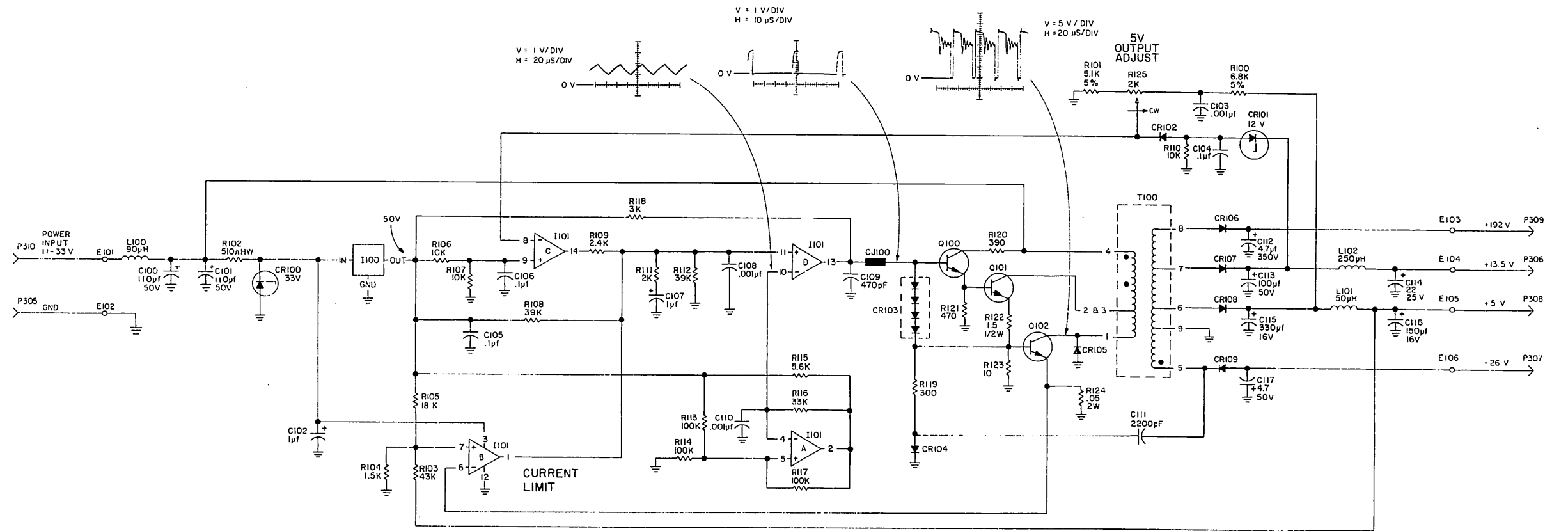
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200-6183-00 Rev. 7 SWITCH BOARD KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
	009-6183-00	PC BD SWITCH		EA	1.00
	016-1097-00	DRY FILM LUB 61		AR	0.00
	016-1122-00	EPOXY DEVCON 14250		AR	0.00
	025-0018-00	WIRE 26 BLK		IN	0.80
	025-0018-29	WIRE 26 RD/WH		IN	1.20
	025-0018-99	WIRE 26 WHT		IN	0.80
	047-4632-01	BRACKET SWITCH W/F	A	EA	1.00
	047-5018-00	SPRING SW 8 POS		EA	2.00
	088-0720-00	SPOOL SWITCH		EA	2.00
	088-0765-00	HOUSING SWITCH		EA	2.00
	088-0765-01	HOUSING SWITCH		EA	2.00
	088-0767-01	KNOB	A	EA	2.00
	088-0769-00	SLEEVE LOCKING		EA	2.00
	088-0803-00	HOLDER SWITCH		EA	1.00
	088-0866-01	KNOB	A	EA	1.00
	088-0871-00	SPACER		EA	1.00
	088-1057-01	KNOB AND SHAFT W/F	A	EA	2.00
	089-6292-03	SCR PHP 2-56X3/16		EA	2.00
	089-6292-07	SCR PHP 2-56X7/16		EA	4.00
	089-8093-30	WSHR FLT STD .094		AR	0.00
	090-0019-05	RING RTNR .188		EA	4.00
	090-0036-04	RING RTNR .051		EA	2.00
	091-0016-05	EXT FIBRE WASHER		EA	1.00
	092-5015-05	EYELET .059		EA	2.00
REF 1	300-6183-00	SWITCH BD ASSY	RF	X.	
S	201	088-0766-01	DETENT WHEEL 53/80	EA	1.00
S	202	088-0766-01	DETENT WHEEL 53/80	EA	1.00
S	203	088-0766-01	DETENT WHEEL 53/80	EA	1.00
S	204	088-0766-01	DETENT WHEEL 53/80	EA	1.00
S	205	031-0353-01	SWITCH & POT	EA	1.00
S	206	031-0343-03	SWITCH	EA	1.00
S	207	031-0372-01	SW SPDT	EA	1.00

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FIGURE 6-5 POWER SUPPLY BOARD SCHEMATIC
(Dwg. No. 002-6197-00, R-2)

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DIGITAL AREA NAVIGATION SYSTEM

NOTES:

1. ASSEMBLE 8 POSITION INC/DEC SWITCH AS SHOWN.
2. ATTACH SWITCH AND POT (031-0353-01) TO P.C. BOARD BY BENDING TABS INWARD AND SOLDERING TO BOARD. SHOULDER OF TWO TABS SHALL BE FLUSH ON BACK SIDE OF P.C. BOARD. PRIOR TO SOLDERING, FIXTURE AS NECESSARY, TO MEET THE DIMENSIONS SHOWN BETWEEN CENTER LINE OF POT SHAFT AND CENTER LINE OF .615 DIAMETER OF LARGE KNOB WITHIN $\pm .010$.
3. SOLDER WIRES TO TWO TERMINALS ON SLIDE SWITCH (S206) NEAREST TO P.C. BOARD.
4. SLIDE SWITCH BUTTON TO FIT BETWEEN TWO CIRCULAR SKIRTS OF KNOB (088-0866-01).
5. SPRAY DETENTS WITH DRY LUBRICANT (016-1097-00) BEFORE ASSEMBLY. OVERSPRAY PERMISSIBLE.
6. AFTER ASSEMBLY, APPLY A SMALL AMOUNT OF EPOXY (016-1122-00) TO THE RETAINING RING (090-0036-04) TO SECURE IT TO THE SHAFT (088-0768-02).
7. ATTACH SWITCH TO BRACKET AS SHOWN BY SWAGING RIVETS ON BRACKET SURFACE.
8. SOLDER RED/WHT WIRE FROM E221 (BACKSIDE OF P.C. BD.) TO E220.

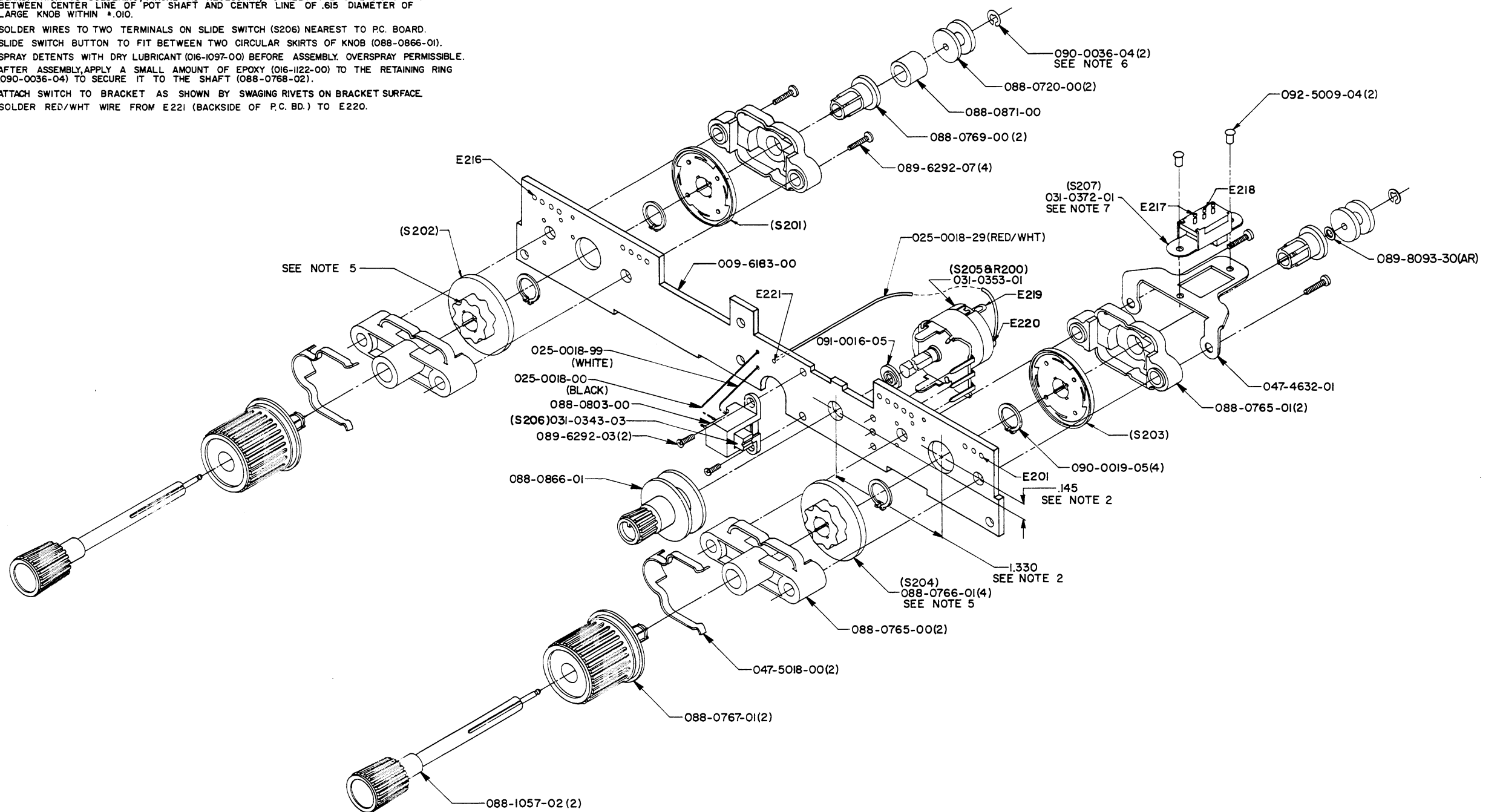


FIGURE 6-7 SWITCH BOARD ASSEMBLY
(Dwg. No. 300-6183-00, Rev. 5)

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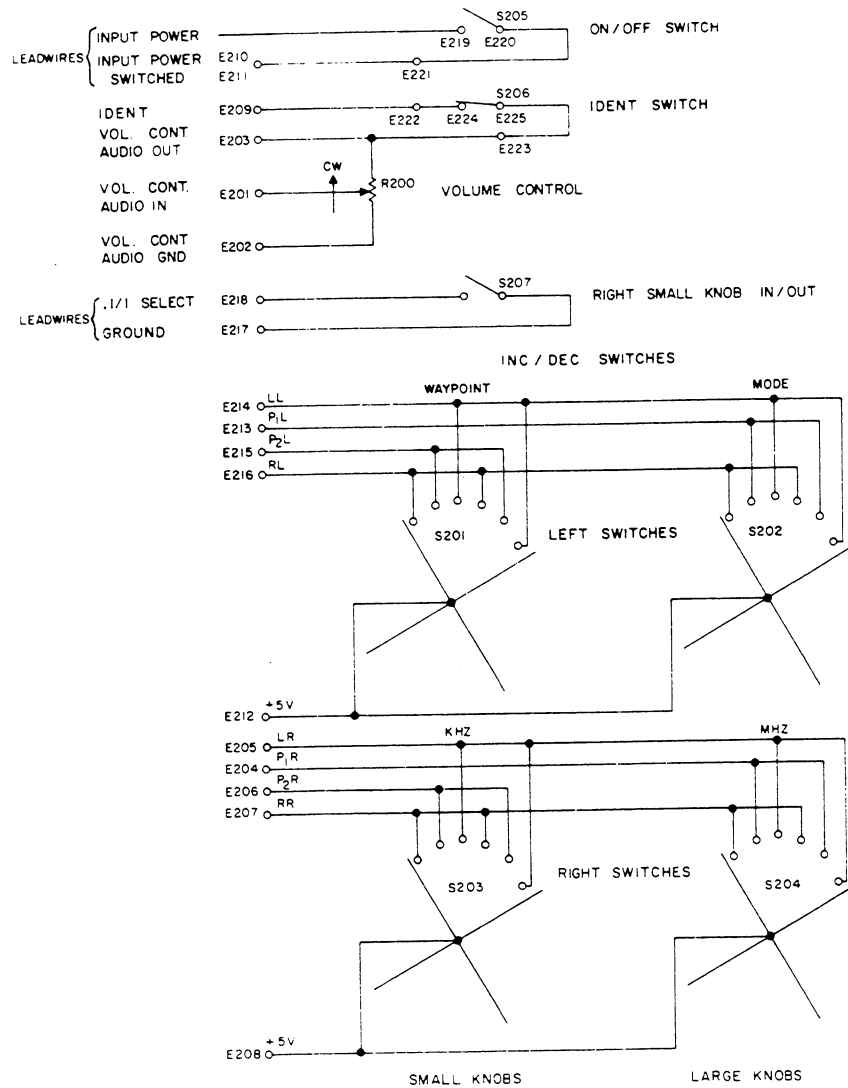


FIGURE 6-8 SWITCH BOARD SCHEMATIC
(Dwg. No. 002-6183-00, Rev. 2)

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KNS 81
DIGITAL AREA NAVIGATION SYSTEM

NOTES:

1. ASSEMBLE 8 POSITION INC/DEC SWITCH AS SHOWN.
2. ATTACH SWITCH AND POT (031-0353-01) TO P.C. BOARD BY BENDING TABS INWARD AND SOLDERING TO BOARD. SHOULDER OF TWO TABS SHALL BE FLUSH ON BACK SIDE OF P.C. BOARD PRIOR TO SOLDERING. FIXTURE AS NECESSARY TO MEET THE DIMENSIONS SHOWN BETWEEN CENTER LINE OF POT SHAFT AND CENTER LINE OF .615 DIAMETER OF LARGE KNOB WITHIN $\pm .010$.
3. SOLDER WIRES TO TWO TERMINALS ON SLIDE SWITCH (S206) NEAREST TO P.C. BOARD.
4. SLIDE SWITCH BUTTON TO FIT BETWEEN TWO CIRCULAR SKIRTS OF KNOB (088-0866-01).
5. SPRAY DETENTS WITH DRY LUBRICANT (016-1097-00) BEFORE ASSEMBLY. OVERSPRAY PERMISSIBLE.
6. AFTER ASSEMBLY, APPLY A SMALL AMOUNT OF EPOXY (016-1122-00) TO THE RETAINING RING (090-0036-04) TO SECURE IT TO THE SHAFT (088-0768-02).
7. ATTACH SWITCH TO BRACKET AS SHOWN BY SWAGING OVER EYELETS.
8. SOLDER RED/WHT WIRE FROM E221 (BACKSIDE OF P.C. BD.) TO E220.

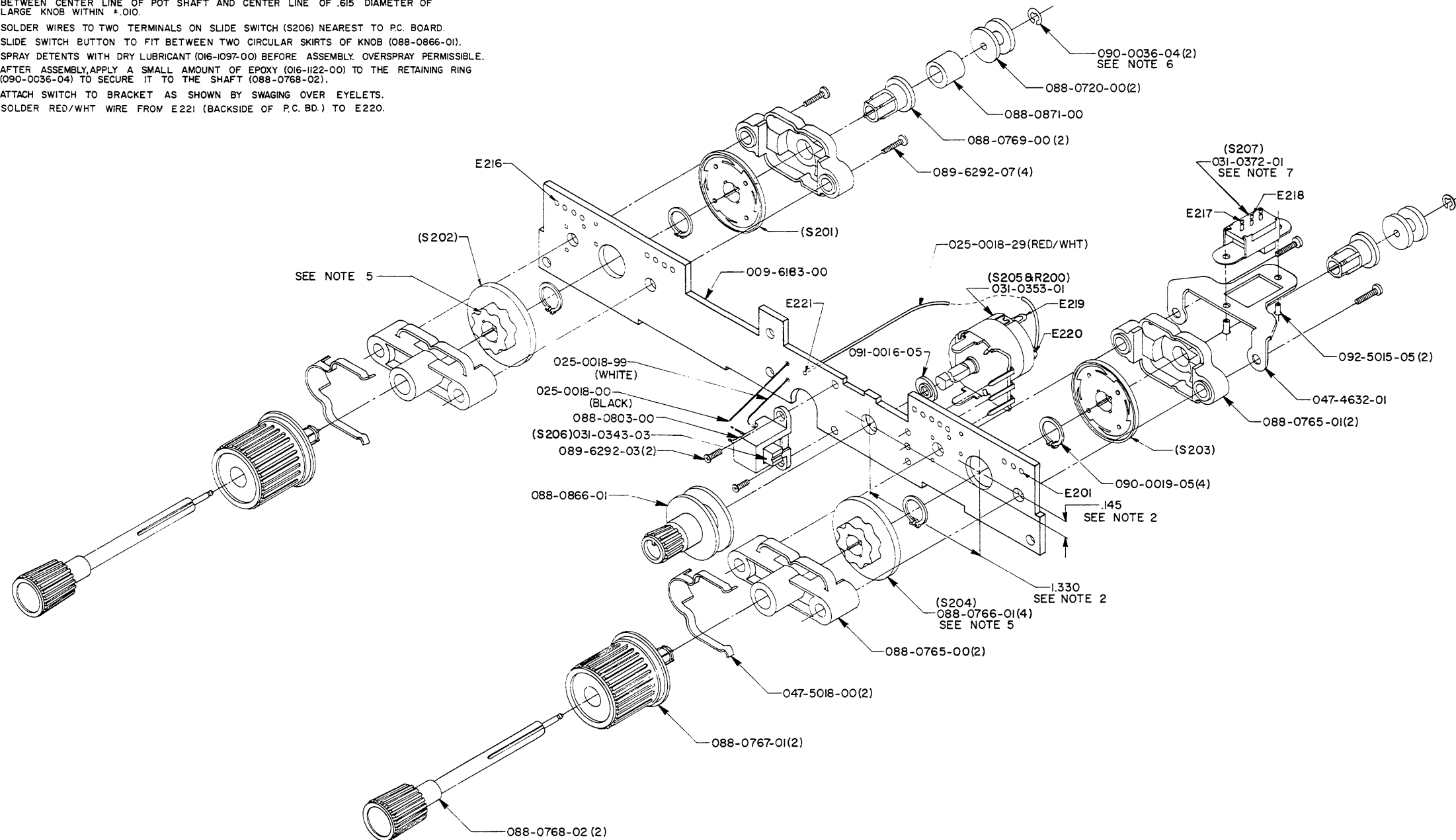


FIGURE 6-6 SWITCH BOARD ASSEMBLY
(Dwg. No. 300-6183-00, R-2)

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DIGITAL AREA NAVIGATION SYSTEM

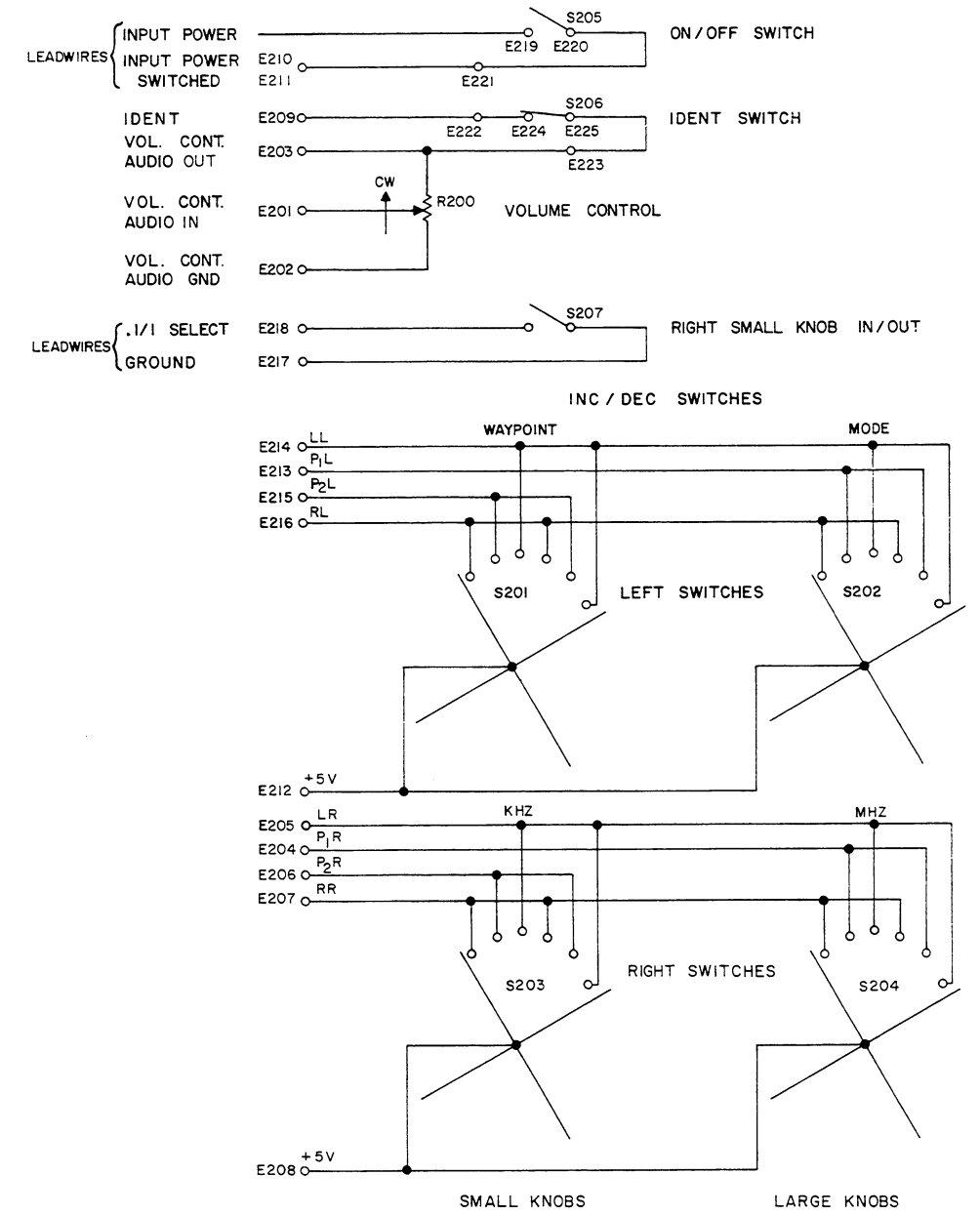
200-6178-00 Rev. 29 CONV/DSPLY-00 KNS0081
 200-6178-10 Rev. 16 CONV/DSPLY-VOR KNS0081
 200-6178-11 Rev. 17 CONV/DSP-VOR/WNB KNS0081
 200-6178-30 Rev. 17 CONV/DSPLY-TAC KNS0081
 200-6178-31 Rev. 16 CONV/DSPLY-TAC/WNB KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	10	11	30	31
	009-6178-00	PC BD CONV/DISPLAY	EA		1.00				
	009-6178-10	PC BD CONV/DISPLAY	EA			1.00	1.00	1.00	1.00
	016-1040-00	COATING TYPE AR	AR		0.00	0.00	0.00	0.00	0.00
	047-5400-01	FENCE W/F	A	EA	1.00	1.00	1.00	1.00	1.00
	090-0296-00	FUSE CLIP	EA		2.00				
C	300 096-1082-08	CAP TN 100UF 15V	EA		1.00	1.00	1.00	1.00	1.00
C	301 096-1082-08	CAP TN 100UF 15V	EA		1.00	1.00	1.00	1.00	1.00
C	302 108-6005-10	CAP TRKG SET/4 IDC	EA		1.00	1.00	1.00	1.00	1.00
C	303 999-9999-99	DO NOT USE	EA		0.00	0.00	0.00	0.00	0.00
C	304 096-1082-06	CAP TN 47UF 15V	EA		1.00	1.00	1.00	1.00	1.00
C	305 111-0001-17	CAP CR 180PF 50V	EA		1.00	1.00	1.00	1.00	1.00
C	306 109-0007-00	CAP DC .01UF 25V	EA		1.00	1.00	1.00	1.00	1.00
C	307 109-0007-00	CAP DC .01UF 25V	EA		1.00	1.00	1.00	1.00	1.00
C	308 109-0007-00	CAP DC .01UF 25V	EA		1.00	1.00	1.00	1.00	1.00
C	309 111-0001-13	CAP CR .1UF 50V	EA		1.00	1.00	1.00	1.00	1.00
C	310 108-6001-03	CAP PF .002UF 50V	EA		1.00	1.00	1.00	1.00	1.00
C	311 114-5222-01	CAP DC 2200PF 500V	EA		1.00	1.00	1.00	1.00	1.00
C	312 999-9999-99	DO NOT USE	EA		0.00	0.00	0.00	0.00	0.00
C	313 999-9999-99	DO NOT USE	EA		0.00	0.00	0.00	0.00	0.00
C	314 109-0007-00	CAP DC .01UF 25V	EA		1.00	1.00	1.00	1.00	1.00
C	315 096-1082-06	CAP TN 47UF 15V	EA		1.00	1.00	1.00	1.00	1.00
C	316 105-0031-69	CAP NY .1UF 80V	EA		1.00	1.00	1.00	1.00	1.00
C	317 111-0001-17	CAP CR 180PF 50V	EA		1.00	1.00	1.00	1.00	1.00
C	318 108-6001-02	CAP PF .001UF 50V	EA		1.00	1.00	1.00	1.00	1.00
C	319 096-1082-16	CAP TN 2.2UF 20V	EA		1.00	1.00	1.00	1.00	1.00
C	320 108-5013-04	CAP PC .33UF 100V	EA		1.00	1.00	1.00	1.00	1.00
C	321 105-0031-62	CAP NY .068UF 80V	EA		1.00	1.00	1.00	1.00	1.00
C	322 096-1082-11	CAP TN 4.7UF 20V	EA		1.00	1.00	1.00	1.00	1.00
C	323 096-1082-11	CAP TN 4.7UF 20V	EA		1.00	1.00	1.00	1.00	1.00
C	324 096-1082-11	CAP TN 4.7UF 20V	EA		1.00	1.00	1.00	1.00	1.00
C	325 096-1082-11	CAP TN 4.7UF 20V	EA		1.00	1.00	1.00	1.00	1.00
C	326 096-1082-11	CAP TN 4.7UF 20V	EA		1.00	1.00	1.00	1.00	1.00
C	327 113-3270-00	CAP DC 27PF 500V	EA		1.00	1.00	1.00	1.00	1.00
C	328 113-3180-00	CAP DC 18PF 500V	EA		1.00	1.00	1.00	1.00	1.00
C	329 109-0007-00	CAP DC .01UF 25V	EA		1.00	1.00	1.00	1.00	1.00
C	330 113-3270-00	CAP DC 27PF 500V	EA		1.00	1.00	1.00	1.00	1.00
C	331 113-3180-00	CAP DC 18PF 500V	EA		1.00	1.00	1.00	1.00	1.00
C	332 109-0007-00	CAP DC .01UF 25V	EA		1.00	1.00	1.00	1.00	1.00
C	333 096-1082-11	CAP TN 4.7UF 20V	EA		1.00	1.00	1.00	1.00	1.00
C	334 096-1082-11	CAP TN 4.7UF 20V	EA		1.00	1.00	1.00	1.00	1.00
C	335 096-1082-06	CAP TN 47UF 15V	EA		1.00	1.00	1.00	1.00	1.00
C	336 096-1082-06	CAP TN 47UF 15V	EA		1.00	1.00	1.00	1.00	1.00
C	337 113-5102-00	CAP DC .001UF 500V	EA		1.00	1.00	1.00	1.00	1.00
C	338 109-0007-00	CAP DC .01UF 25V	EA		1.00	1.00	1.00	1.00	1.00
C	339 113-5102-00	CAP DC .001UF 500V	EA		1.00	1.00	1.00	1.00	1.00
C	340 096-1082-08	CAP TN 100UF 15V	EA		1.00	1.00	1.00	1.00	1.00
C	341 096-1082-08	CAP TN 100UF 15V	EA		1.00	1.00	1.00	1.00	1.00
C	342 113-5681-00	CAP DC 680PF 500V	EA		1.00	1.00	1.00	1.00	1.00
C	343 113-5681-00	CAP DC 680PF 500V	EA		1.00	1.00	1.00	1.00	1.00
C	344 096-1082-09	CAP TN 15UF 20V	EA		1.00	1.00	1.00	1.00	1.00
C	345 096-1030-17	CAP TN 6.8UF10%15V	EA		1.00	1.00	1.00	1.00	1.00
C	346 111-0001-63	CAP CR .022UF 200V	EA		1.00	1.00	1.00	1.00	1.00
C	347 111-0001-17	CAP CR 180PF 50V	EA		1.00				
C	348 114-7472-00	CAP DC 4700PF 500V	EA		1.00	1.00	1.00	1.00	1.00
C	349 111-0001-13	CAP CR .1UF 50V	EA		1.00	1.00	1.00	1.00	1.00
C	350 108-5022-02	CAP PC .01UF 100V	EA		1.00	1.00	1.00	1.00	1.00
C	351 096-1082-05	CAP TN 10UF 20V	EA		1.00	1.00	1.00	1.00	1.00

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C	352	109-0007-00	CAP DC .01UF 25V	EA	1.00	1.00	1.00	1.00	1.00
C	353	111-0001-00	CAP CR .01UF 50V	EA	1.00	1.00	1.00	1.00	1.00
C	354	096-1082-05	CAP TN 10UF 20V	EA	1.00	1.00	1.00	1.00	1.00
C	355	096-1005-00	CAP TN 1.0UF 35V	EA	1.00	1.00	1.00	1.00	1.00
C	356	113-3270-00	CAP DC 27PF 500V	EA	1.00	1.00	1.00	1.00	1.00
C	357	109-0007-00	CAP DC .01UF 25V	EA	1.00	1.00	1.00	1.00	1.00
C	358	096-1082-16	CAP TN 2.2UF 20V	EA	1.00	1.00	1.00	1.00	1.00
C	359	108-5013-04	CAP PC .33UF 100V	EA	1.00	1.00	1.00	1.00	1.00
C	360	111-0001-06	CAP CR .47UF 50V	EA	1.00	1.00	1.00	1.00	1.00
C	361	114-7472-00	CAP DC 4700PF 500V	EA	1.00	1.00	1.00	1.00	1.00
C	362	113-3121-00	CAP DC 120PF 500V	EA	1.00	1.00	1.00	1.00	1.00
C	363	113-3121-00	CAP DC 120PF 500V	EA	1.00	1.00	1.00	1.00	1.00
C	364	113-3121-00	CAP DC 120PF 500V	EA	1.00	1.00	1.00	1.00	1.00
C	365	113-3121-00	CAP DC 120PF 500V	EA	1.00	1.00	1.00	1.00	1.00
C	366	111-0001-38	CAP CR 1KPF 50V	EA	1.00	1.00	1.00	1.00	1.00
C	367	111-0001-38	CAP CR 1KPF 50V	EA	1.00	1.00	1.00	1.00	1.00
C	368	999-9999-98	NOT USED	EA	0.00	0.00	0.00	0.00	0.00
C	369	111-0001-17	CAP CR 180PF 50V	EA	1.00	1.00	1.00	1.00	1.00
CJ	300	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	1.00	1.00	.	.
CJ	301	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	1.00	.	1.00	.
CJ	302	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	1.00	.	1.00	.
CJ	303	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	1.00	1.00	.	.
CJ	304	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	1.00	1.00	.	.
CJ	305	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	.	1.00	1.00
CJ	306	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	.	1.00	1.00
CJ	307	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	.	1.00	1.00
CJ	308	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	.	1.00	1.00
CJ	309	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	.	1.00	1.00
CJ	310	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	1.00	.	1.00
CJ	311	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	1.00	.	1.00
CJ	312	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	1.00	.	1.00
CR	300	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	301	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	302	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	303	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	304	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	305	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	306	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	307	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	1.00	1.00	1.00
CR	308	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	1.00	1.00	1.00
CR	309	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	310	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	311	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	312	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	313	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	314	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	315	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	316	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	317	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	318	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR	319	007-5044-05	DIO Z 1N5523B	EA	1.00	1.00	1.00	1.00	1.00
CR	320	007-5011-36	DIO Z 100V 1W 5%	EA	1.00	1.00	1.00	1.00	1.00
CR	321	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	322	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	323	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	324	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	325	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	326	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	327	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	328	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	329	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	330	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	331	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	332	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	333	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR	334	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00

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FIGURE 6-7 SWITCH BOARD SCHEMATIC
(Dwg. No. 002-6183-00, R-2)

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CR 335	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 336	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 337	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 338	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 339	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 340	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 341	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 342	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 343	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 344	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 345	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 346	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR 347	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
CR 348	007-5046-06	DIO Z 1N5259A	EA	1.00	1.00	1.00	1.00	1.00
CR 349	007-6106-00	DIO 1N4156	EA	1.00	1.00	1.00	1.00	1.00
CR 350	007-5011-33	DIO Z 75V 1W 5%	EA	1.00	1.00	1.00	1.00	1.00
CR 351	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	1.00	1.00	1.00
CR 352	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	1.00	1.00	1.00
CR 353	007-5046-06	DIO Z 1N5259A	EA	1.00	1.00	1.00	1.00	1.00
CR 354	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 355	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 356	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00	1.00
CR 357	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00
E 301	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00	1.00
E 302	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00	1.00
E 303	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00	1.00
E 304	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00	1.00
E 305	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00	1.00
E 306	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00	1.00
E 307	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00	1.00
E 308	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00	1.00
E 309	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00	1.00
E 310	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00	1.00
E 319	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00	1.00
F 300	036-0057-08	FUSE 275 125V 3A	EA	1.00	1.00	1.00	1.00	1.00
F 300	036-0058-02	FUSE AGA 32V 2A	EA	1.00	1.00	1.00	1.00	1.00
I 300	120-6012-01	IC SCL4016ABC-	EA	1.00	1.00	1.00	1.00	1.00
I 301	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00	1.00
I 302	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00	1.00
I 303	120-3001-04	IC MC1709CP1	EA	1.00	1.00	1.00	1.00	1.00
I 304	120-6038-02	IC CMOS SCL4046BC	EA	1.00	1.00	1.00	1.00	1.00
I 305	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00	1.00
I 306	120-3001-04	IC MC1709CP1	EA	1.00	1.00	1.00	1.00	1.00
I 307	120-3084-01	IC TL082CP	EA	1.00	1.00	1.00	1.00	1.00
I 308	120-6038-02	IC CMOS SCL4046BC	EA	1.00	1.00	1.00	1.00	1.00
I 309	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00	1.00
I 310	120-6012-01	IC SCL4016ABC-	EA	1.00	1.00	1.00	1.00	1.00
I 311	120-6002-01	IC SCL4001ABC-	EA	1.00	1.00	1.00	1.00	1.00
I 312	120-6026-01	IC MC14050BALDS	EA	1.00	1.00	1.00	1.00	1.00
I 313	120-6009-01	IC MC14013BALDS	EA	1.00	1.00	1.00	1.00	1.00
I 314	120-6047-01	IC SCL4081BC	EA	1.00	1.00	1.00	1.00	1.00
I 315	120-6025-01	IC SCL4049ABC-	EA	1.00	1.00	1.00	1.00	1.00
I 316	120-6064-01	IC SCL4071BC	EA	1.00	1.00	1.00	1.00	1.00
I 317	120-6045-03	IC F4022DMOR	EA	1.00	1.00	1.00	1.00	1.00
I 318	120-0161-00	HIGH VOLT DSPLY DR	AR	0.00	0.00	0.00	0.00	0.00
I 318	120-3083-00	IC DI-512	AR	0.00	0.00	0.00	0.00	0.00
I 319	120-6045-03	IC F4022DMOR	EA	1.00	1.00	1.00	1.00	1.00
I 320	120-6047-01	IC SCL4081BC	EA	1.00	1.00	1.00	1.00	1.00
I 321	120-0091-00	IC DS8889N+	EA	1.00	1.00	1.00	1.00	1.00
I 322	120-0163-00	IC DS8884AN	EA	1.00	1.00	1.00	1.00	1.00
I 323	120-0091-00	IC DS8889N+	EA	1.00	1.00	1.00	1.00	1.00
I 324	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00	1.00
I 325	120-3040-00	IC SA555P	EA	1.00	1.00	1.00	1.00	1.00
I 326	120-3040-00	IC SA555P	EA	1.00	1.00	1.00	1.00	1.00
I 327	120-0163-00	IC DS8884AN	EA	1.00	1.00	1.00	1.00	1.00
I 328	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00	1.00
I 329	120-6038-02	IC CMOS SCL4046BC	EA	1.00	1.00	1.00	1.00	1.00
I 330	120-0053-00	IC SN7407N	EA	1.00	1.00	1.00	1.00	1.00

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J	301	030-1117-00	RECEPTACLE	EA	15.00	15.00	15.00	15.00	15.00
J	302	030-1117-00	RECEPTACLE	EA	15.00	15.00	15.00	15.00	15.00
J	303	030-1117-00	RECEPTACLE	EA	14.00	14.00	14.00	14.00	14.00
J	304	030-1117-00	RECEPTACLE	EA	11.00	11.00	11.00	11.00	11.00
L	300	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	301	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	302	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	303	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	304	019-2129-24	COIL RF 27MH 10%	EA	1.00	1.00	1.00	1.00	1.00
L	305	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	306	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	307	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	308	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	309	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	310	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	311	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	312	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	313	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	314	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	315	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	316	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	317	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	318	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	319	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	320	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	321	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	322	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	323	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	324	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	325	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	326	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	327	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	328	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	329	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	330	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	331	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	332	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	333	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	334	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	335	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	336	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	337	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
L	338	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00	1.00
Q	300	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	1.00	1.00	1.00
Q	301	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	1.00	1.00	1.00
Q	302	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	1.00	1.00	1.00
Q	303	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	1.00	1.00	1.00
Q	304	007-0065-00	XSTR S PNP 2N3906	EA	1.00	1.00	1.00	1.00	1.00
Q	305	007-0211-02	XSTR X X3805559	EA	1.00	1.00	1.00	1.00	1.00
Q	306	007-0065-00	XSTR S PNP 2N3906	EA	1.00	1.00	1.00	1.00	1.00
Q	307	007-0065-00	XSTR S PNP 2N3906	EA	1.00	1.00	1.00	1.00	1.00
Q	308	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	1.00	1.00	1.00
Q	309	007-0257-00	XSTR S NPN WPSA42	EA	1.00	1.00	1.00	1.00	1.00
Q	310	007-0257-00	XSTR S NPN WPSA42	EA	1.00	1.00	1.00	1.00	1.00
Q	311	007-0211-02	XSTR X X3805559	EA	1.00	1.00	1.00	1.00	1.00
R	300	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	301	131-0513-13	RES CF 51K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	302	131-0223-13	RES CF 22K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	303	133-0113-24	RES VA 100K 20% A	EA	1.00	1.00	1.00	1.00	1.00
R	304	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	305	131-0303-13	RES CF 30K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	306	136-8252-72	RES PF 82.5K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	307	136-5900-72	RES PF 590 QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	308	133-0113-08	RES VA 200 20% A	EA	1.00	1.00	1.00	1.00	1.00

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R	309	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	310	136-5363-72	RES PF 536K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	311	136-5111-72	RES PF 5.11K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	312	133-0096-54	RES VA 1K HW 10%	EA	1.00	1.00	1.00	1.00	1.00
R	313	131-0564-23	RES CF 560K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	314	131-0102-13	RES CF 1K EW 5%	EA					
R	314	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	315	131-0273-23	RES CF 27K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	316	131-0393-23	RES CF 39K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	317	136-1503-72	RES PF 150K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	318	133-0096-62	RES VA 200K HW 10%	EA	1.00	1.00	1.00	1.00	1.00
R	319	136-5112-72	RES PF 51.1K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	320	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	321	131-0101-23	RES CF 100 QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	322	131-0223-23	RES CF 22K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	323	131-0103-23	RES CF 10K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	324	136-4422-72	RES PF 44.2K QW 1%	EA		1.00	1.00	1.00	1.00
R	324	136-6652-72	RES PF 66.5K QW 1%	EA	1.00				
R	325	136-3240-72	RES PF 324 QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	326	133-0113-06	RES VA 100 20% A	EA	1.00	1.00	1.00	1.00	1.00
R	327	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	328	136-4422-72	RES PF 44.2K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	329	133-0113-18	RES VA 10K 20% A	EA	1.00	1.00	1.00	1.00	1.00
R	330	136-5111-72	RES PF 5.11K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	331	133-0096-54	RES VA 1K HW 10%	EA	1.00	1.00	1.00	1.00	1.00
R	332	131-0564-13	RES CF 560K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	333	136-5363-72	RES PF 536K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	334	136-8063-72	RES PF 806K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	335	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	336	131-0202-23	RES CF 2K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	337	136-4992-72	RES PF 49.9K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	338	133-0113-16	RES VA 5K 20% A	EA	1.00	1.00	1.00	1.00	1.00
R	339	131-0912-13	RES CF 9.1K EW 5%	EA		1.00	1.00	1.00	1.00
R	339	131-0912-23	RES CF 9.1K QW 5%	EA	1.00				
R	340	136-5363-72	RES PF 536K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	341	136-3402-72	RES PF 34K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	342	133-0113-14	RES VA 2K 20% A	EA	1.00	1.00	1.00	1.00	1.00
R	343	136-3402-72	RES PF 34K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	344	131-0754-13	RES CF 750K EW 5%	EA		1.00	1.00	1.00	1.00
R	344	131-0754-23	RES CF 750K QW 5%	EA	1.00				
R	345	131-0824-13	RES CF 820K EW 5%	EA		1.00	1.00	1.00	1.00
R	345	131-0824-23	RES CF 820K QW 5%	EA	1.00				
R	346	131-0754-13	RES CF 750K EW 5%	EA		1.00	1.00	1.00	1.00
R	346	131-0754-23	RES CF 750K QW 5%	EA	1.00				
R	347	136-8063-72	RES PF 806K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	348	136-1653-72	RES PF 165K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	349	133-0096-62	RES VA 200K HW 10%	EA	1.00	1.00	1.00	1.00	1.00
R	350	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	351	136-3572-72	RES PF 35.7K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	352	131-0164-23	RES CF 160K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	353	131-0512-23	RES CF 5.1K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	354	133-0113-16	RES VA 5K 20% A	EA	1.00	1.00	1.00	1.00	1.00
R	355	136-2803-72	RES PF 280K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	356	136-6042-72	RES PF 60.4K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	357	136-6042-72	RES PF 60.4K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	358	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	359	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	360	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	361	131-0223-13	RES CF 22K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	362	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	363	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	364	136-2053-72	RES PF 205K QW 1%	EA		1.00	1.00	1.00	1.00
R	364	136-2103-72	RES PF 210K QW 1%	EA	1.00				
R	365	136-1543-72	RES PF 154K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	366	133-0113-20	RES VA 20K 20% A	EA	1.00	1.00	1.00	1.00	1.00
R	367	136-1543-72	RES PF 154K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	368	131-0104-23	RES CF 100K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	369	136-2103-72	RES PF 210K QW 1%	EA	1.00	1.00	1.00	1.00	1.00

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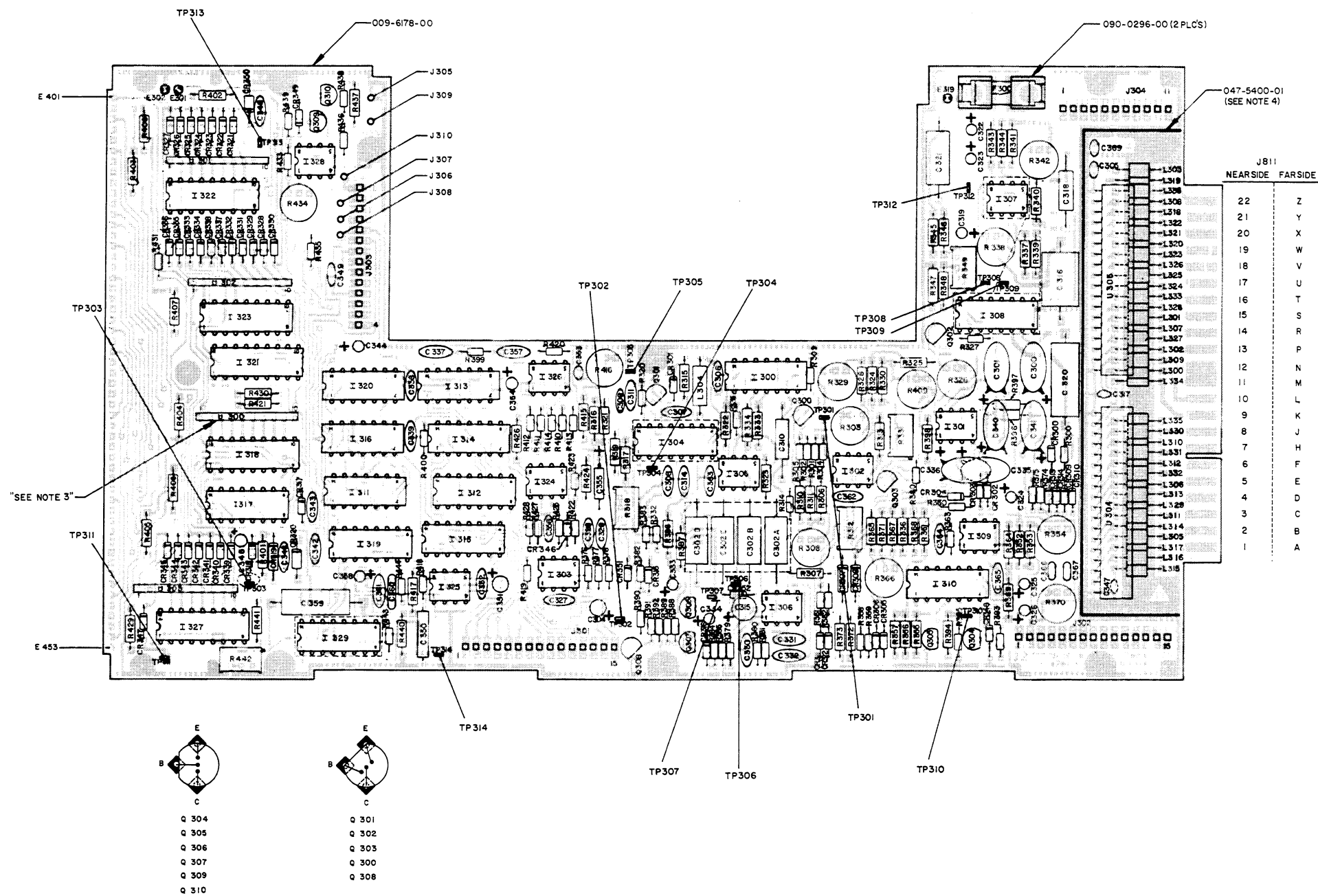
R 370	133-0113-26	RES VA 200K 20% A	EA	1.00	1.00	1.00	1.00	1.00
R 371	136-7151-72	RES PF 7.15K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R 372	136-2743-72	RES PF 274K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R 373	136-2743-72	RES PF 274K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R 374	131-0302-13	RES CF 3K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 375	131-0302-13	RES CF 3K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 376	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 377	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 378	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 379	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 380	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 381	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 382	131-0222-13	RES CF 2.2K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 383	131-0105-13	RES CF 1W EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 384	131-0222-13	RES CF 2.2K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 385	131-0105-13	RES CF 1W EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 386	136-1821-72	RES PF 1.82K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R 387	136-2671-72	RES PF 2.67K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R 387	136-5621-72	RES PF 5.62K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R 388	131-0304-13	RES CF 300K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 389	131-0304-13	RES CF 300K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 390	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 391	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 392	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 393	131-0562-13	RES CF 5.6K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 394	131-0122-23	RES CF 1.2K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 395	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 396	136-1002-72	RES PF 10K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R 397	136-1002-72	RES PF 10K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R 398	131-0512-23	RES CF 5.1K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 399	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 400	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 401	131-0563-23	RES CF 5.6K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 402	131-0823-23	RES CF 82K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 403	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 404	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 405	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 406	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 407	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 408	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 409	133-0113-20	RES VA 20K 20% A	EA	1.00	1.00	1.00	1.00	1.00
R 409	133-0113-22	RES VA 50K 20% A	EA	1.00	1.00	1.00	1.00	1.00
R 410	131-0394-13	RES CF 390K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 411	131-0394-13	RES CF 390K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 412	131-0823-13	RES CF 82K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 413	131-0123-13	RES CF 12K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 414	131-0823-13	RES CF 82K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 415	131-0182-23	RES CF 1.8K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 416	133-0113-12	RES VA 1K 20% A	EA	1.00	1.00	1.00	1.00	1.00
R 417	136-1433-72	RES PF 143K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R 418	131-0822-13	RES CF 8.2K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 419	131-0101-13	RES CF 100 EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 420	131-0101-13	RES CF 100 EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 421	131-0182-23	RES CF 1.8K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 422	131-0273-13	RES CF 27K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 423	131-0913-13	RES CF 91K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 424	131-0274-23	RES CF 270K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 425	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 426	131-0274-23	RES CF 270K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 427	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 428	131-0112-13	RES CF 1.1K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 429	131-0302-23	RES CF 3K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 430	131-0182-23	RES CF 1.8K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R 431	131-0302-13	RES CF 3K EW 5%	EA	1.00	1.00	1.00	1.00	1.00

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R	433	131-0474-13	RES CF 470K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	434	133-0113-14	RES VA 2K 20% A	EA	1.00	1.00	1.00	1.00	1.00
R	435	131-0123-13	RES CF 12K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	436	131-0123-13	RES CF 12K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	437	131-0104-23	RES CF 100K QW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	438	131-0123-13	RES CF 12K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	439	131-0240-13	RES CF 24 EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	440	136-8063-72	RES PF 806K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	441	136-1653-72	RES PF 165K QW 1%	EA	1.00	1.00	1.00	1.00	1.00
R	442	133-0096-62	RES VA 200K HW 10%	EA	1.00	1.00	1.00	1.00	1.00
R	443	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	444	131-0514-13	RES CF 510K EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	445	131-0222-13	RES CF 2.2K EW 5%	EA	.	1.00	1.00	1.00	1.00
R	446	131-0102-23	RES CF 1K QW 5%	EA	.	1.00	1.00	1.00	1.00
R	447	131-0102-23	RES CF 1K QW 5%	EA	.	1.00	1.00	1.00	1.00
R	448	131-0105-13	RES CF 1W EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	449	131-0105-13	RES CF 1W EW 5%	EA	1.00	1.00	1.00	1.00	1.00
R	450	131-0512-13	RES CF 5.1K EW 5%	EA	.	.	.	.	.
REF	1	300-6178-00	CONV/DISPLAY ASSY	RF	X.	.	.	.	.
TP	301	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	302	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	303	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	304	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	305	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	306	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	307	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	308	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	309	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	310	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	311	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	312	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	313	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
TP	314	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00
U	300	015-0041-01	RES MOD 220K150V2%	AR	0.00	0.00	0.00	0.00	0.00
U	301	015-0041-02	RES MOD 1W150V5%	EA	1.00	1.00	1.00	1.00	1.00
U	302	015-0041-02	RES MOD 1W150V5%	EA	1.00	1.00	1.00	1.00	1.00
U	303	015-0041-02	RES MOD 1W150V5%	EA	1.00	1.00	1.00	1.00	1.00
U	304	015-0049-00	NTWK CAP 220PF 20%	EA	1.00	.	.	.	.
U	304	015-0064-13	8P CAP 220PF 10%	EA	.	1.00	1.00	1.00	1.00
U	305	015-0049-00	NTWK CAP 220PF 20%	EA	1.00	.	.	.	.
U	305	015-0064-13	8P CAP 220PF 10%	EA	.	1.00	1.00	1.00	1.00
U	306	015-0064-13	8P CAP 220PF 10%	EA	.	1.00	1.00	1.00	1.00
U	307	015-0064-13	8P CAP 220PF 10%	EA	.	1.00	1.00	1.00	1.00
U	308	015-0064-13	8P CAP 220PF 10%	EA	.	1.00	1.00	1.00	1.00

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NOTES:

1. PRIOR TO POST COATING WITH CLEAR URETHANE (KPN 016-1040-00) MASK OFF THE FOLLOWING AREAS: ALL MOUNTING SURFACES, ALL TEST POINTS, ALL "E" NUMBERS, J 301-J 310, I.C. SOCKETS, CONNECTOR FINGERS, FUSE CLIPS AND ALL POTS.
2. NO COMPONENT HEIGHT TO EXCEED .425 MAXIMUM.
3. USE U 300 WHEN KPN 120-3083-00 IS USED FOR I 318.
4. FENCE 047-5400-01 IS TO BE SOLDERED ON ALL 3 SIDES.
5. C 302 A-D IS A MATCHED SET OF 4 IF ONE MUST BE REPLACED, ALL MUST BE REPLACED.
6. AREAS WITHIN DOTTED LINES TO BE HEAVILY POST COATED.

FIGURE 6-9 CONVERTER/DISPLAY BOARD ASSEMBLY
(Dwg. No. 300-6178-00, Rev. 14)

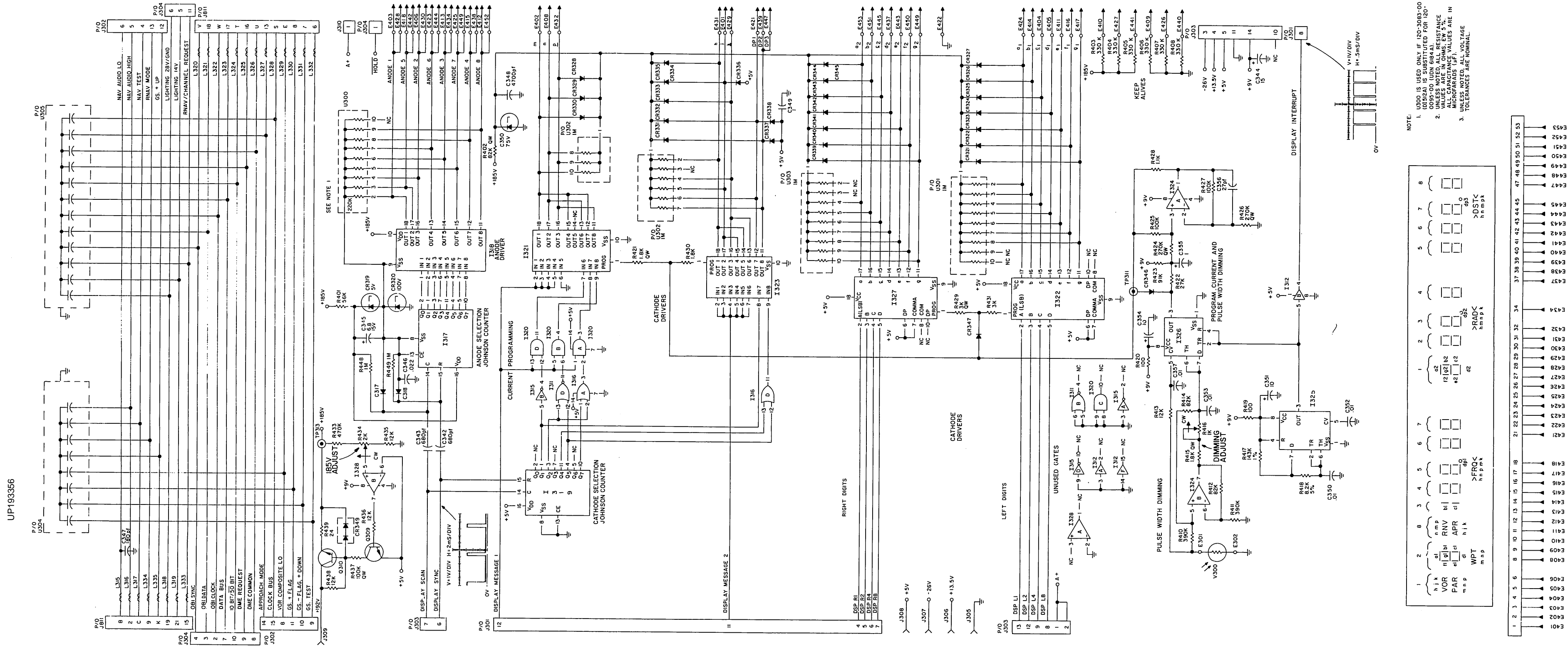
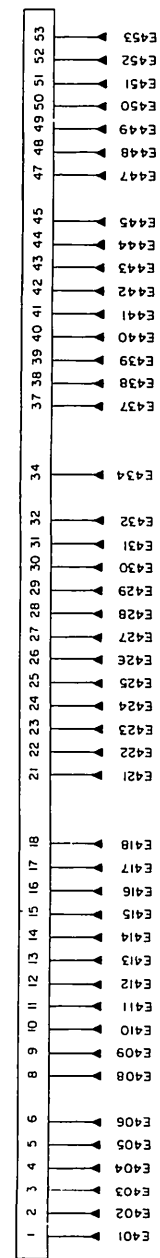
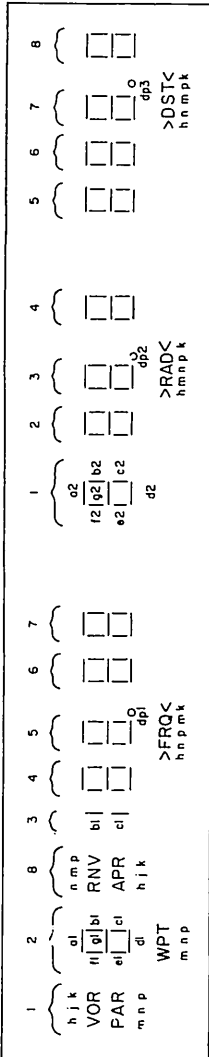


FIGURE 6-10 CONVERTER/DISPLAY BOARD SCHEMATIC
(Orig. No. 002-6178-00, Rev. 14)
(Sheet 1 of 2)

NOTE:
1. U300 IS USED ONLY IF 120-3083-00 (01322A) IS SUBSTITUTED FOR 120-3083-00.
2. UNLESS NOTED, ALL RESISTANCE VALUES ARE IN OHMS, RESISTANCE VALUES IN MICROGRAMS, ALL VOLTAGE TOLERANCES ARE NOMINAL.



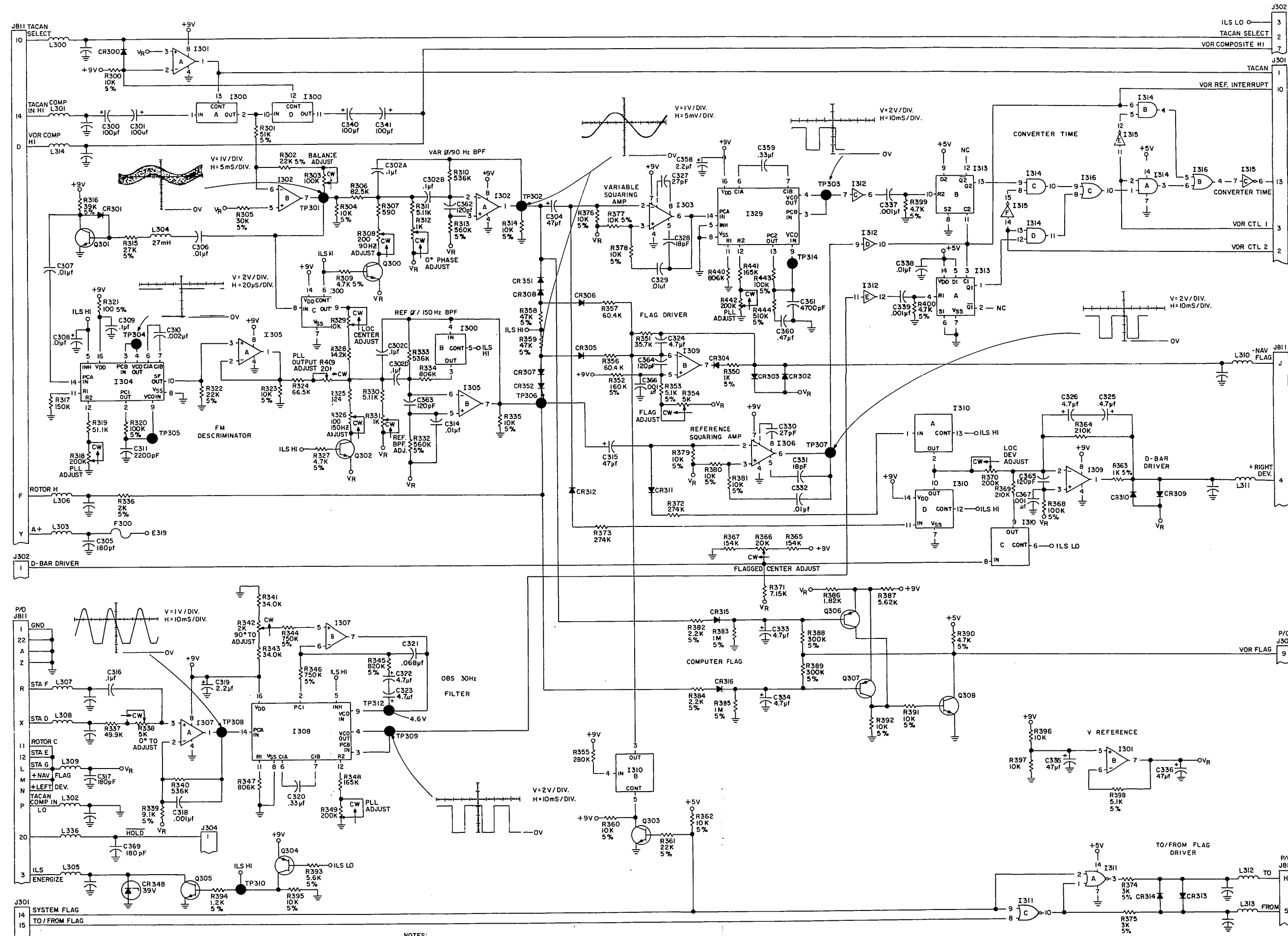
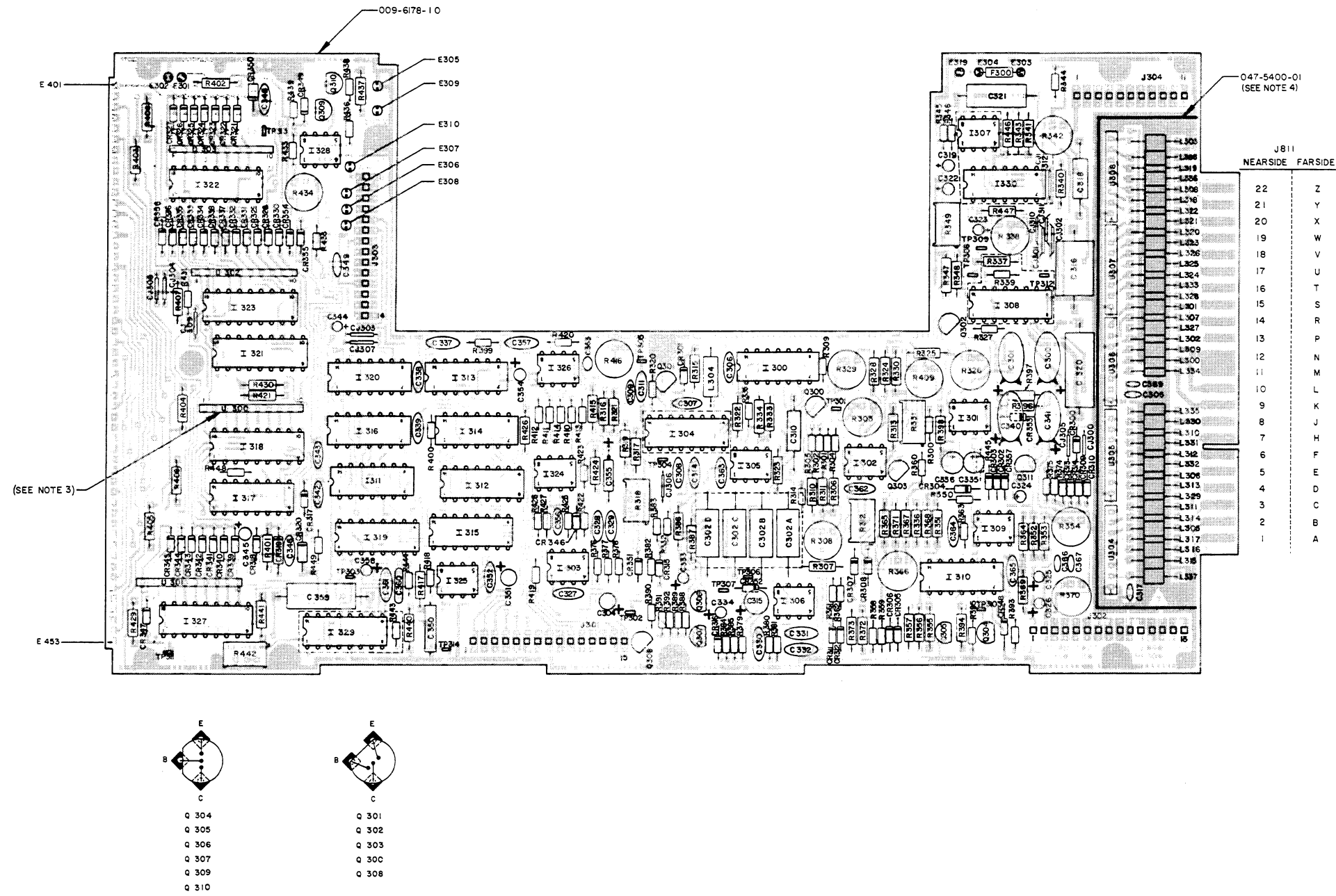


FIGURE 6-10 CONVERTER/DISPLAY BOARD SCHEMATIC
(Dwg. No. 002-6178-00, Rev. 14)
(Sheet 2 of 2)

NOTES:
1. UNLESS NOTED ALL RESISTANCE VALUES ARE IN OHMS, 1%.
2. ALL UNMARKED CAPACITORS ARE PART OF U304 OR U305.

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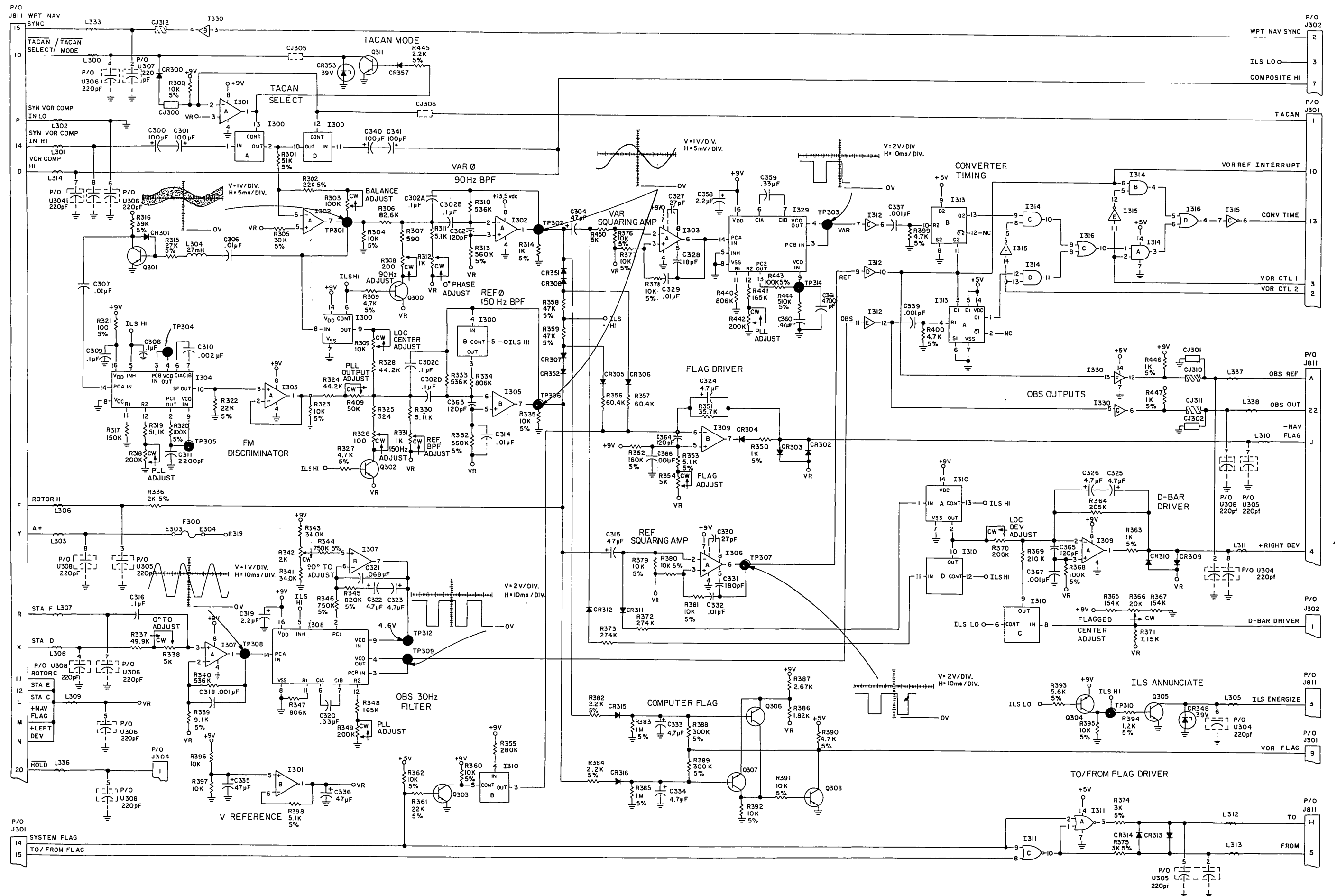
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NOTES:

1. PRIOR TO POST COATING WITH CLEAR URETHANE (KPN 016-1040-00) MASK OFF THE FOLLOWING AREAS: ALL MOUNTING SURFACES, ALL TEST POINTS, ALL "E" NUMBERS, J 301-J 310, I. C. SOCKETS, CONNECTOR FINGERS, FUSE CLIPS AND ALL POTS.
2. NO COMPONENT HEIGHT TO EXCEED .425 MAXIMUM.
3. USE U 300 WHEN KPN 020-3083-00 IS USED FOR I 318.
4. FENCE 047-5400-01 IS TO BE SOLDERED ON ALL 3 SIDES.
5. VOR VERSION - INSTALL CJ300, CJ303, AND CJ304 (-10 THRU -17 AND -19 THRU -21 FLAVORS).
TACAN VERSION - INSTALL CJ305 AND CJ306 (-30 THRU -39 FLAVORS)
6. WITHOUT WAYPOINT NAVIGATION BUS (WNB) OPTION - INSTALL CJ301 AND CJ302 (-10, -11, -14, -15, -19, -20, -30, -31, -34, -35, AND -38 FLAVORS).
WITH WAYPOINT NAVIGATION BUS (WNB) OPTION - INSTALL CJ310, CJ311, AND CJ312 (-12, -13, -16, -17, -21, -32, -33, -36, -37, AND -39 FLAVORS).
7. C302 A-D IS A MATCHED SET OF 4. IF ONE MUST BE REPLACED, ALL MUST BE REPLACED.
8. AREAS WITHIN DOTTED LINES ARE TO BE HEAVILY POST COATED.

FIGURE 6-11 -10 VERSION CONVERTER/DISPLAY BOARD ASSEMBLY
(Dwg. No. 300-6178-10, Rev. 11)



NOTES:
1. UNLESS OTHERWISE NOTED, ALL RESISTANCE VALUES ARE IN OHMS, 1%.
2. C330, 301, 302 ARE USED FOR VOR VERSION. C330 & 306 ARE USED FOR TACAN VERSION. C330, 311, 312 ARE USED FOR THE WAYPOINT NAVIGATION BUS OPTION.
3. V REFERENCE = 4.5VDC

UNUSED GATES

VAR SQUARING AMP

FLAG DRIVER

REF SQUARING AMP

COMPUTER FLAG

ILS ANNUNCIATE

D-BAR DRIVER

TO/FROM FLAG DRIVER

FIGURE 6-12 -10 VERSION CONVERTER/DISPLAY BOARD SCHEMATIC
(Orig. No. 002-6178-10, Rev. 12)
(Sheet 1 of 2)

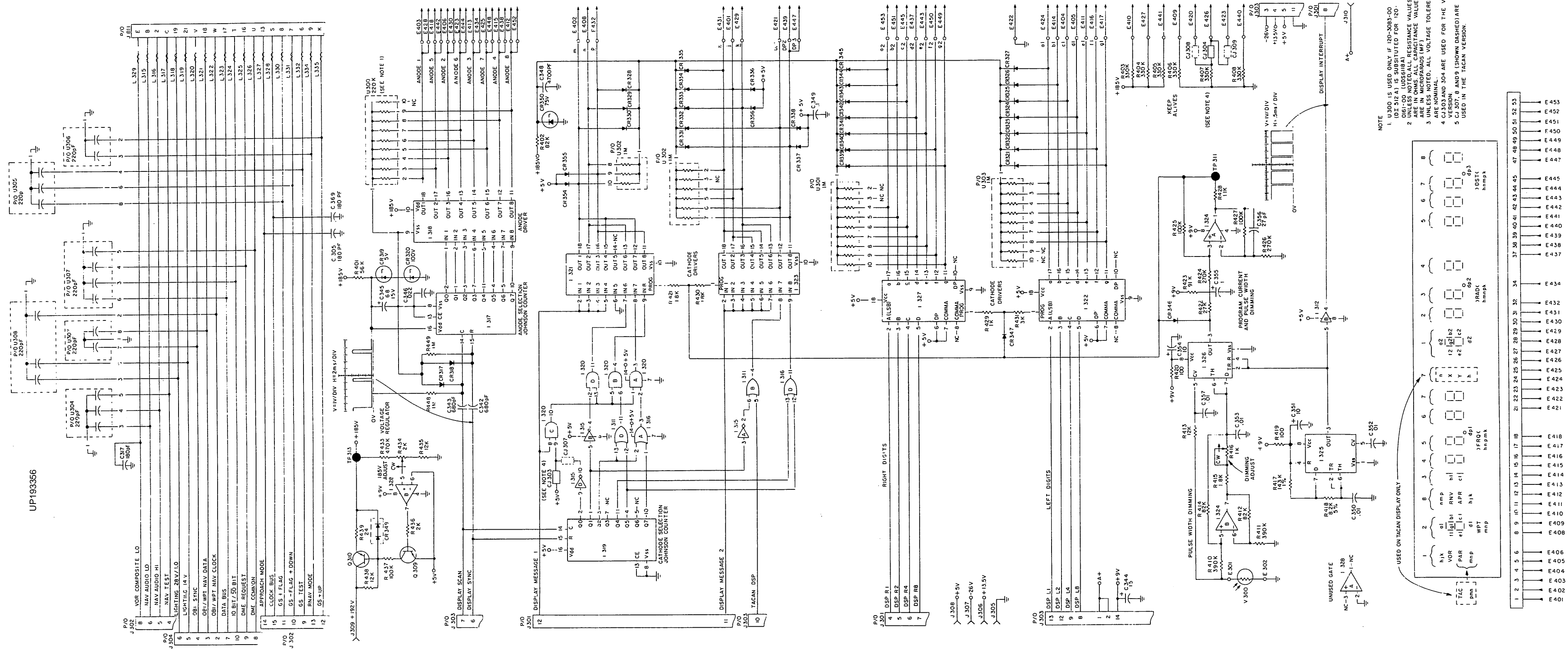
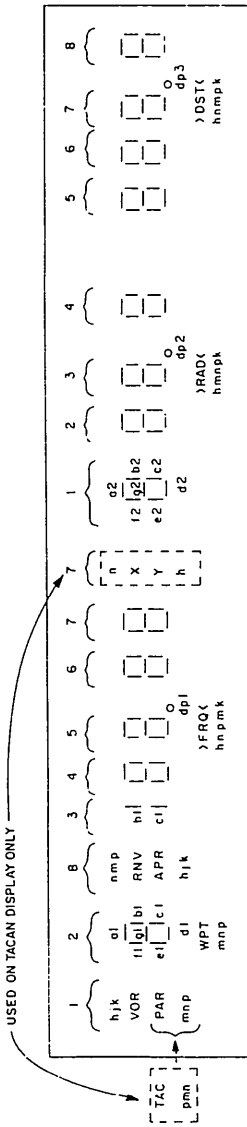


FIGURE 6-12 -10 VERSION CONVERTER/DISPLAY BOARD SCHEMATIC
(Dwg. No. 002-6178-10, Rev. 12)
(Sheet 2 of 2)

- NOTE
1. U300 IS USED ONLY IF 120-3083-00 (ID 1312 A) IS SUBSTITUTED FOR 120-3083-00 (ID 1312 B). ALL RESISTANCE VALUES ARE IN OHMS. ALL CAPACITANCE VALUES ARE IN MICROFARADS (MF) UNLESS NOTED. ALL VOLTAGE TOLERANCES ARE NOMINAL.
 2. U300 AND 304 ARE USED FOR THE VOR DISPLAY.
 3. U303 AND 304 ARE USED FOR THE TACAN DISPLAY.
 4. C303 AND 304 ARE USED FOR THE VOR DISPLAY.
 5. C1307, 8 AND 9 (SHOWN DASHED) ARE USED IN THE TACAN VERSION.



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200-6178-60 Rev. 1 CDMW/DSPPLY-VOR/PLL KNS0081
 200-6178-61 Rev. 1 CDMW/DSPPLY-VOR/WNB KNS0081
 200-6178-80 Rev. 1 CDMW/DSPPLY-TAC/PLL KNS0081
 200-6178-81 Rev. 1 CDMW/DSPPLY-TAC/WNB KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	60	61	80	81
	009-6178-10	PC BD CONV/DISPLAY	EA		1.00	1.00	1.00	1.00
	016-1040-00	COATING TYPE AR	AR		0.00	0.00	0.00	0.00
	047-5400-01	FENCE W/F	A	EA	1.00	1.00	1.00	1.00
C	300	096-1082-08	CAP TN	EA	1.00	1.00	1.00	1.00
C	301	096-1082-08	CAP TN	EA	1.00	1.00	1.00	1.00
C	302	108-6005-10	CAP TRKG SET/4 IDC	EA	1.00	1.00	1.00	1.00
C	303	999-9999-99	DO NOT USE	EA	0.00	0.00	0.00	0.00
C	304	096-1082-06	CAP TN	EA	1.00	1.00	1.00	1.00
C	305	111-0001-17	CAP CR	EA	1.00	1.00	1.00	1.00
C	306	109-0007-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	307	109-0007-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	308	109-0007-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	309	111-0001-13	CAP CR	EA	1.00	1.00	1.00	1.00
C	310	108-6001-03	CAP PF	EA	1.00	1.00	1.00	1.00
C	311	114-5222-01	CAP DC	EA	1.00	1.00	1.00	1.00
C	312	999-9999-99	DO NOT USE	EA	0.00	0.00	0.00	0.00
C	313	999-9999-99	DO NOT USE	EA	0.00	0.00	0.00	0.00
C	314	109-0007-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	315	096-1082-06	CAP TN	EA	1.00	1.00	1.00	1.00
C	316	105-0031-69	CAP MY	EA	1.00	1.00	1.00	1.00
C	317	111-0001-17	CAP CR	EA	1.00	1.00	1.00	1.00
C	318	108-6001-02	CAP PF	EA	1.00	1.00	1.00	1.00
C	319	096-1082-16	CAP TN	EA	1.00	1.00	1.00	1.00
C	320	108-5013-04	CAP PC	EA	1.00	1.00	1.00	1.00
C	321	105-0031-62	CAP MY	EA	1.00	1.00	1.00	1.00
C	322	096-1082-11	CAP TN	EA	1.00	1.00	1.00	1.00
C	323	096-1082-11	CAP TN	EA	1.00	1.00	1.00	1.00
C	324	096-1082-11	CAP TN	EA	1.00	1.00	1.00	1.00
C	325	096-1082-11	CAP TN	EA	1.00	1.00	1.00	1.00
C	326	096-1082-11	CAP TN	EA	1.00	1.00	1.00	1.00
C	327	113-3270-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	328	113-3180-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	329	109-0007-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	330	113-3270-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	331	113-3180-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	332	109-0007-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	333	096-1082-11	CAP TN	EA	1.00	1.00	1.00	1.00
C	334	096-1082-11	CAP TN	EA	1.00	1.00	1.00	1.00
C	335	096-1082-06	CAP TN	EA	1.00	1.00	1.00	1.00
C	336	096-1082-06	CAP TN	EA	1.00	1.00	1.00	1.00
C	337	113-5102-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	338	109-0007-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	339	113-5102-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	340	096-1082-08	CAP TN	EA	1.00	1.00	1.00	1.00
C	341	096-1082-08	CAP TN	EA	1.00	1.00	1.00	1.00
C	342	113-5681-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	343	113-5681-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	344	096-1082-09	CAP TN	EA	1.00	1.00	1.00	1.00
C	345	096-1030-17	CAP TN	EA	1.00	1.00	1.00	1.00
C	346	111-0001-63	CAP CR	EA	1.00	1.00	1.00	1.00
C	347	111-0001-17	CAP CR	EA	-	-	-	-
C	348	114-7472-00	CAP DC	EA	1.00	1.00	1.00	1.00
C	349	111-0001-13	CAP CR	EA	1.00	1.00	1.00	1.00
C	350	108-5022-02	CAP PC	EA	1.00	1.00	1.00	1.00
C	351	096-1082-05	CAP TN	EA	1.00	1.00	1.00	1.00
C	352	109-0007-00	CAP DC	EA	1.00	1.00	1.00	1.00

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C	353	111-0001-00	CAP CR .01UF 50V	EA	1.00	1.00	1.00	1.00
C	354	096-1082-05	CAP TN 10UF 20V	EA	1.00	1.00	1.00	1.00
C	355	096-1005-00	CAP TN 1.0UF 35V	EA	1.00	1.00	1.00	1.00
C	356	113-3270-00	CAP DC 27PF 500V	EA	1.00	1.00	1.00	1.00
C	357	109-0007-00	CAP DC .01UF 25V	EA	1.00	1.00	1.00	1.00
C	358	096-1082-16	CAP TN 2.2UF 20V	EA	1.00	1.00	1.00	1.00
C	359	108-5013-04	CAP PC .33UF 100V	EA	1.00	1.00	1.00	1.00
C	360	111-0001-06	CAP CR .47UF 50V	EA	.	.	.	.
C	361	114-7472-00	CAP DC 4700PF 500V	EA	.	.	.	.
C	362	113-3121-00	CAP DC 120PF 500V	EA	1.00	1.00	1.00	1.00
C	363	113-3121-00	CAP DC 120PF 500V	EA	1.00	1.00	1.00	1.00
C	364	113-3121-00	CAP DC 120PF 500V	EA	1.00	1.00	1.00	1.00
C	365	113-3121-00	CAP DC 120PF 500V	EA	1.00	1.00	1.00	1.00
C	366	111-0001-36	CAP CR 1KPF 50V	EA	1.00	1.00	1.00	1.00
C	367	111-0001-36	CAP CR 1KPF 50V	EA	1.00	1.00	1.00	1.00
C	368	999-9999-98	NOT USED	EA	0.00	0.00	0.00	0.00
C	369	111-0001-17	CAP CR 180PF 50V	EA	1.00	1.00	1.00	1.00
CJ	300	026-0018-01	WIRE CKTJWPR 24AWG	EA	1.00	1.00	.	.
CJ	301	026-0018-01	WIRE CKTJWPR 24AWG	EA	1.00	.	1.00	.
CJ	302	026-0018-01	WIRE CKTJWPR 24AWG	EA	1.00	.	1.00	.
CJ	303	026-0018-01	WIRE CKTJWPR 24AWG	EA	1.00	1.00	.	.
CJ	304	026-0018-01	WIRE CKTJWPR 24AWG	EA	1.00	1.00	.	.
CJ	305	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	1.00	1.00
CJ	306	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	1.00	1.00
CJ	307	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	1.00	1.00
CJ	308	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	1.00	1.00
CJ	309	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	.	1.00	1.00
CJ	310	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	1.00	.	1.00
CJ	311	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	1.00	.	1.00
CJ	312	026-0018-01	WIRE CKTJWPR 24AWG	EA	.	1.00	.	1.00
CR	300	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	301	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	302	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	303	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	304	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	305	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	306	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	307	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	1.00	1.00
CR	308	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	1.00	1.00
CR	309	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	310	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	311	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	312	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	313	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	314	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	315	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	316	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	317	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	318	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	319	007-5044-05	DIO Z 1N5523B	EA	1.00	1.00	1.00	1.00
CR	320	007-5011-36	DIO Z 100V 1W 5%	EA	1.00	1.00	1.00	1.00
CR	321	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	322	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	323	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	324	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	325	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	326	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	327	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	328	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	329	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	330	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	331	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	332	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	333	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	334	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	335	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00

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CR	336	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	337	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	338	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	339	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	340	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	341	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	342	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	343	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	344	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	345	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	346	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	347	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
CR	348	007-5046-06	DIO Z 1N5259A	EA	1.00	1.00	1.00	1.00
CR	349	007-6106-00	DIO 1N4156	EA	1.00	1.00	1.00	1.00
CR	350	007-5011-33	DIO Z 75V 1W 5%	EA	1.00	1.00	1.00	1.00
CR	351	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	1.00	1.00
CR	352	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	1.00	1.00
CR	353	007-5046-06	DIO Z 1N5259A	EA	1.00	1.00	1.00	1.00
CR	354	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	355	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	356	007-6105-00	DIO HV FDH444	EA	1.00	1.00	1.00	1.00
CR	357	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00
E	301	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00
E	302	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00
E	303	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00
E	304	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00
E	305	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00
E	306	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00
E	307	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00
E	308	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00
E	309	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00
E	310	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00
E	319	008-0038-01	TERM BIFUR .084L	EA	1.00	1.00	1.00	1.00
F	300	036-0057-08	FUSE 275 125V 3A	EA	1.00	1.00	1.00	1.00
F	300	036-0058-02	FUSE AGA 32V 2A	EA	.	.	.	.
I	300	120-6012-01	IC SCL4016ABC-	EA	1.00	1.00	1.00	1.00
I	301	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00
I	302	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00
I	303	120-3001-04	IC MC1709CP1	EA	1.00	1.00	1.00	1.00
I	304	120-6038-02	IC CMOS SCL4046BC	EA	1.00	1.00	1.00	1.00
I	305	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00
I	306	120-3001-04	IC MC1709CP1	EA	1.00	1.00	1.00	1.00
I	307	120-3084-01	IC TL082CP	EA	1.00	1.00	1.00	1.00
I	308	120-6038-02	IC CMOS SCL4046BC	EA	1.00	1.00	1.00	1.00
I	309	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00
I	310	120-6012-01	IC SCL4016ABC-	EA	1.00	1.00	1.00	1.00
I	311	120-6002-01	IC SCL4001ABC-	EA	1.00	1.00	1.00	1.00
I	312	120-6026-01	IC MC14050BALDS	EA	1.00	1.00	1.00	1.00
I	313	120-6009-01	IC MC14013BALDS	EA	1.00	1.00	1.00	1.00
I	314	120-6047-01	IC SCL4081BC	EA	1.00	1.00	1.00	1.00
I	315	120-6025-01	IC SCL4049ABC-	EA	1.00	1.00	1.00	1.00
I	316	120-6064-01	IC SCL4071BC	EA	1.00	1.00	1.00	1.00
I	317	120-6045-03	IC F4022DMOR	EA	1.00	1.00	1.00	1.00
I	318	120-0161-00	HIGH VOLT DSPLY DR	AR	0.00	0.00	0.00	0.00
I	318	120-3083-00	IC DI-512	AR	0.00	0.00	0.00	0.00
I	319	120-6045-03	IC F4022DMOR	EA	1.00	1.00	1.00	1.00
I	320	120-6047-01	IC SCL4081BC	EA	1.00	1.00	1.00	1.00
I	321	120-0091-00	IC DS8889N-	EA	1.00	1.00	1.00	1.00
I	322	120-0163-00	IC DS8884AN	EA	1.00	1.00	1.00	1.00
I	323	120-0091-00	IC DS8889N-	EA	1.00	1.00	1.00	1.00
I	324	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00
I	325	120-3040-00	IC SA555P	EA	1.00	1.00	1.00	1.00
I	326	120-3040-00	IC SA555P	EA	1.00	1.00	1.00	1.00
I	327	120-0163-00	IC DS8884AN	EA	1.00	1.00	1.00	1.00
I	328	120-3053-00	IC LM358N	EA	1.00	1.00	1.00	1.00
I	329	120-6038-02	IC CMOS SCL4046BC	EA	1.00	1.00	1.00	1.00
I	330	120-0053-00	IC SN7407N	EA	1.00	1.00	1.00	1.00

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J	301	030-1117-00	RECEPTACLE	EA	15.00	15.00	15.00	15.00
J	302	030-1117-00	RECEPTACLE	EA	15.00	15.00	15.00	15.00
J	303	030-1117-00	RECEPTACLE	EA	14.00	14.00	14.00	14.00
J	304	030-1117-00	RECEPTACLE	EA	11.00	11.00	11.00	11.00
L	300	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	301	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	302	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	303	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	304	019-2129-24	COIL RF 27MH 10%	EA	1.00	1.00	1.00	1.00
L	305	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	306	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	307	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	308	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	309	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	310	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	311	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	312	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	313	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	314	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	315	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	316	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	317	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	318	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	319	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	320	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	321	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	322	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	323	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	324	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	325	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	326	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	327	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	328	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	329	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	330	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	331	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	332	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	333	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	334	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	335	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	336	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	337	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
L	338	013-0028-00	FERR BEAD W/LEAD	EA	1.00	1.00	1.00	1.00
Q	300	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	1.00	1.00
Q	301	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	1.00	1.00
Q	302	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	1.00	1.00
Q	303	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	1.00	1.00
Q	304	007-0065-00	XSTR S PNP 2N3906	EA	1.00	1.00	1.00	1.00
Q	305	007-0211-02	XSTR X X38D5559	EA	1.00	1.00	1.00	1.00
Q	306	007-0065-00	XSTR S PNP 2N3906	EA	1.00	1.00	1.00	1.00
Q	307	007-0065-00	XSTR S PNP 2N3906	EA	1.00	1.00	1.00	1.00
Q	308	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	1.00	1.00
Q	309	007-0257-00	XSTR S NPN WPSA42	EA	1.00	1.00	1.00	1.00
Q	310	007-0257-00	XSTR S NPN WPSA42	EA	1.00	1.00	1.00	1.00
Q	311	007-0211-02	XSTR X X38D5559	EA	1.00	1.00	1.00	1.00
R	300	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R	301	131-0513-13	RES CF 51K EW 5%	EA	1.00	1.00	1.00	1.00
R	302	131-0223-13	RES CF 22K EW 5%	EA	1.00	1.00	1.00	1.00
R	303	133-0113-24	RES VA 100K 20% A	EA	1.00	1.00	1.00	1.00
R	304	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R	305	131-0303-13	RES CF 30K EW 5%	EA	1.00	1.00	1.00	1.00
R	306	136-8252-72	RES PF 82.5K QW 1%	EA	1.00	1.00	1.00	1.00
R	307	136-5900-72	RES PF 590 QW 1%	EA	1.00	1.00	1.00	1.00
R	308	133-0113-08	RES VA 200 20% A	EA	1.00	1.00	1.00	1.00

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R 309	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	1.00	1.00
R 310	136-5363-72	RES PF 536K QW 1%	EA	1.00	1.00	1.00	1.00
R 311	136-5111-72	RES PF 5.11K QW 1%	EA	1.00	1.00	1.00	1.00
R 312	133-0096-54	RES VA 1K HW 10%	EA	1.00	1.00	1.00	1.00
R 313	131-0564-23	RES CF 560K QW 5%	EA	1.00	1.00	1.00	1.00
R 314	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	1.00	1.00
R 314	131-0103-13	RES CF 10K EW 5%	EA	.	.	.	.
R 315	131-0273-23	RES CF 27K QW 5%	EA	1.00	1.00	1.00	1.00
R 316	131-0393-23	RES CF 39K QW 5%	EA	1.00	1.00	1.00	1.00
R 317	136-1503-72	RES PF 150K QW 1%	EA	1.00	1.00	1.00	1.00
R 318	133-0096-62	RES VA 200K HW 10%	EA	1.00	1.00	1.00	1.00
R 319	136-5112-72	RES PF 51.1K QW 1%	EA	1.00	1.00	1.00	1.00
R 320	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00	1.00	1.00
R 321	131-0101-23	RES CF 100 QW 5%	EA	1.00	1.00	1.00	1.00
R 322	131-0223-23	RES CF 22K QW 5%	EA	1.00	1.00	1.00	1.00
R 323	131-0103-23	RES CF 10K QW 5%	EA	1.00	1.00	1.00	1.00
R 324	136-4422-72	RES PF 44.2K QW 1%	EA	1.00	1.00	1.00	1.00
R 324	136-6652-72	RES PF 66.5K QW 1%	EA	.	.	.	.
R 325	136-3240-72	RES PF 324 QW 1%	EA	1.00	1.00	1.00	1.00
R 326	133-0113-06	RES VA 100 20% A	EA	1.00	1.00	1.00	1.00
R 327	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	1.00	1.00
R 328	136-4422-72	RES PF 44.2K QW 1%	EA	1.00	1.00	1.00	1.00
R 329	133-0113-18	RES VA 10K 20% A	EA	1.00	1.00	1.00	1.00
R 330	136-5111-72	RES PF 5.11K QW 1%	EA	1.00	1.00	1.00	1.00
R 331	133-0096-54	RES VA 1K HW 10%	EA	1.00	1.00	1.00	1.00
R 332	131-0564-13	RES CF 560K EW 5%	EA	1.00	1.00	1.00	1.00
R 333	136-5363-72	RES PF 536K QW 1%	EA	1.00	1.00	1.00	1.00
R 334	136-8063-72	RES PF 806K QW 1%	EA	1.00	1.00	1.00	1.00
R 335	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 336	131-0202-23	RES CF 2K QW 5%	EA	1.00	1.00	1.00	1.00
R 337	136-4992-72	RES PF 49.9K QW 1%	EA	1.00	1.00	1.00	1.00
R 338	133-0113-16	RES VA 5K 20% A	EA	1.00	1.00	1.00	1.00
R 339	131-0912-13	RES CF 9.1K EW 5%	EA	1.00	1.00	1.00	1.00
R 339	131-0912-23	RES CF 9.1K QW 5%	EA	.	.	.	.
R 340	136-5363-72	RES PF 536K QW 1%	EA	1.00	1.00	1.00	1.00
R 341	136-3402-72	RES PF 34K QW 1%	EA	1.00	1.00	1.00	1.00
R 342	133-0113-14	RES VA 2K 20% A	EA	1.00	1.00	1.00	1.00
R 343	136-3402-72	RES PF 34K QW 1%	EA	1.00	1.00	1.00	1.00
R 344	131-0754-13	RES CF 750K EW 5%	EA	1.00	1.00	1.00	1.00
R 344	131-0754-23	RES CF 750K QW 5%	EA	.	.	.	.
R 345	131-0824-13	RES CF 820K EW 5%	EA	1.00	1.00	1.00	1.00
R 345	131-0824-23	RES CF 820K QW 5%	EA	.	.	.	.
R 346	131-0754-13	RES CF 750K EW 5%	EA	1.00	1.00	1.00	1.00
R 346	131-0754-23	RES CF 750K QW 5%	EA	.	.	.	.
R 347	136-8063-72	RES PF 806K QW 1%	EA	1.00	1.00	1.00	1.00
R 348	136-1653-72	RES PF 165K QW 1%	EA	1.00	1.00	1.00	1.00
R 349	133-0096-62	RES VA 200K HW 10%	EA	1.00	1.00	1.00	1.00
R 350	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	1.00	1.00
R 351	136-3572-72	RES PF 35.7K QW 1%	EA	1.00	1.00	1.00	1.00
R 352	131-0164-23	RES CF 160K QW 5%	EA	1.00	1.00	1.00	1.00
R 353	131-0512-23	RES CF 5.1K QW 5%	EA	1.00	1.00	1.00	1.00
R 354	133-0113-16	RES VA 5K 20% A	EA	1.00	1.00	1.00	1.00
R 355	136-2803-72	RES PF 280K QW 1%	EA	1.00	1.00	1.00	1.00
R 356	136-6042-72	RES PF 60.4K QW 1%	EA	1.00	1.00	1.00	1.00
R 357	136-6042-72	RES PF 60.4K QW 1%	EA	1.00	1.00	1.00	1.00
R 358	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	1.00	1.00
R 359	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	1.00	1.00
R 360	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 361	131-0223-13	RES CF 22K EW 5%	EA	1.00	1.00	1.00	1.00
R 362	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 363	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	1.00	1.00
R 364	136-2053-72	RES PF 205K QW 1%	EA	1.00	1.00	1.00	1.00
R 364	136-2103-72	RES PF 210K QW 1%	EA	.	.	.	.
R 365	136-1543-72	RES PF 154K QW 1%	EA	1.00	1.00	1.00	1.00
R 366	133-0113-20	RES VA 20K 20% A	EA	1.00	1.00	1.00	1.00
R 367	136-1543-72	RES PF 154K QW 1%	EA	1.00	1.00	1.00	1.00
R 368	131-0104-23	RES CF 100K QW 5%	EA	1.00	1.00	1.00	1.00
R 369	136-2103-72	RES PF 210K QW 1%	EA	1.00	1.00	1.00	1.00
R 370	133-0113-26	RES VA 200K 20% A	EA	1.00	1.00	1.00	1.00

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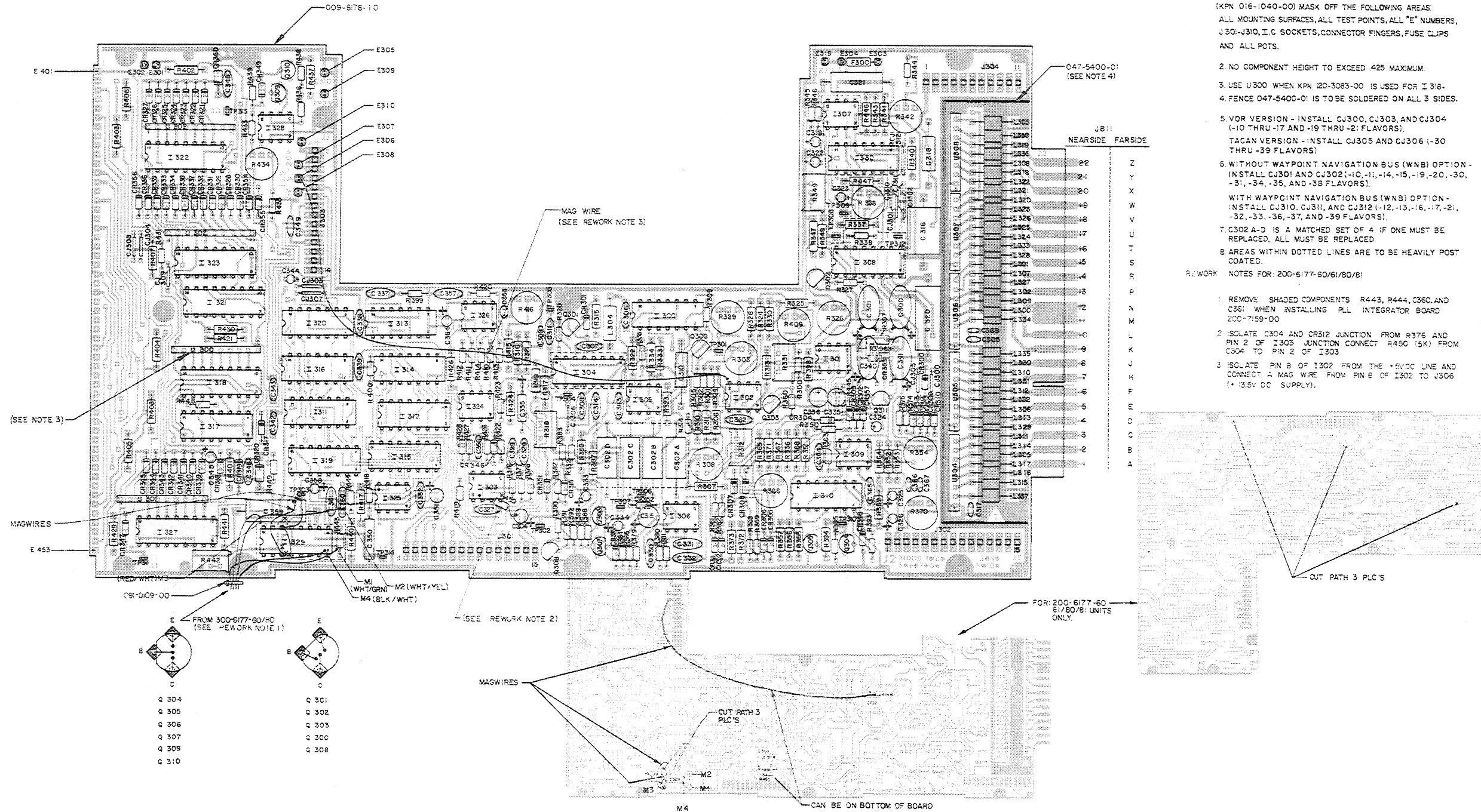
R 371	136-7151-72	RES PF 7.15K QW 1%	EA	1.00	1.00	1.00	1.00
R 372	136-2743-72	RES PF 274K QW 1%	EA	1.00	1.00	1.00	1.00
R 373	136-2743-72	RES PF 274K QW 1%	EA	1.00	1.00	1.00	1.00
R 374	131-0302-13	RES CF 3K EW 5%	EA	1.00	1.00	1.00	1.00
R 375	131-0302-13	RES CF 3K EW 5%	EA	1.00	1.00	1.00	1.00
R 376	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 377	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 378	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 379	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 380	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 381	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 382	131-0222-13	RES CF 2.2K EW 5%	EA	1.00	1.00	1.00	1.00
R 383	131-0105-13	RES CF 1W EW 5%	EA	1.00	1.00	1.00	1.00
R 384	131-0222-13	RES CF 2.2K EW 5%	EA	1.00	1.00	1.00	1.00
R 385	131-0105-13	RES CF 1W EW 5%	EA	1.00	1.00	1.00	1.00
R 386	136-1821-72	RES PF 1.82K QW 1%	EA	1.00	1.00	1.00	1.00
R 387	136-2671-72	RES PF 2.67K QW 1%	EA	1.00	1.00	1.00	1.00
R 387	136-5621-72	RES PF 5.62K QW 1%	EA	.	.	.	.
R 388	131-0304-13	RES CF 300K EW 5%	EA	1.00	1.00	1.00	1.00
R 389	131-0304-13	RES CF 300K EW 5%	EA	1.00	1.00	1.00	1.00
R 390	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	1.00	1.00
R 391	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 392	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 393	131-0562-13	RES CF 5.6K EW 5%	EA	1.00	1.00	1.00	1.00
R 394	131-0122-23	RES CF 1.2K QW 5%	EA	1.00	1.00	1.00	1.00
R 395	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00
R 396	136-1002-72	RES PF 10K QW 1%	EA	1.00	1.00	1.00	1.00
R 397	136-1002-72	RES PF 10K QW 1%	EA	1.00	1.00	1.00	1.00
R 398	131-0512-23	RES CF 5.1K QW 5%	EA	1.00	1.00	1.00	1.00
R 399	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	1.00	1.00
R 400	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	1.00	1.00
R 401	131-0563-23	RES CF 56K QW 5%	EA	1.00	1.00	1.00	1.00
R 402	131-0823-23	RES CF 82K QW 5%	EA	1.00	1.00	1.00	1.00
R 403	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00
R 404	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00
R 405	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00
R 406	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00
R 407	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00
R 408	131-0334-23	RES CF 330K QW 5%	EA	1.00	1.00	1.00	1.00
R 409	133-0113-20	RES VA 20K 20% A	EA	.	.	.	.
R 409	133-0113-22	RES VA 50K 20% A	EA	1.00	1.00	1.00	1.00
R 410	131-0394-13	RES CF 390K EW 5%	EA	1.00	1.00	1.00	1.00
R 411	131-0394-13	RES CF 390K EW 5%	EA	1.00	1.00	1.00	1.00
R 412	131-0823-13	RES CF 82K EW 5%	EA	1.00	1.00	1.00	1.00
R 413	131-0123-13	RES CF 12K EW 5%	EA	1.00	1.00	1.00	1.00
R 414	131-0823-13	RES CF 82K EW 5%	EA	1.00	1.00	1.00	1.00
R 415	131-0182-23	RES CF 1.8K QW 5%	EA	1.00	1.00	1.00	1.00
R 416	133-0113-12	RES VA 1K 20% A	EA	1.00	1.00	1.00	1.00
R 417	136-1433-72	RES PF 143K QW 1%	EA	1.00	1.00	1.00	1.00
R 418	131-0822-13	RES CF 8.2K EW 5%	EA	1.00	1.00	1.00	1.00
R 419	131-0101-13	RES CF 100 EW 5%	EA	1.00	1.00	1.00	1.00
R 420	131-0101-13	RES CF 100 EW 5%	EA	1.00	1.00	1.00	1.00
R 421	131-0182-23	RES CF 1.8K QW 5%	EA	1.00	1.00	1.00	1.00
R 422	131-0273-13	RES CF 27K EW 5%	EA	1.00	1.00	1.00	1.00
R 423	131-0913-13	RES CF 91K EW 5%	EA	1.00	1.00	1.00	1.00
R 424	131-0274-23	RES CF 270K QW 5%	EA	1.00	1.00	1.00	1.00
R 425	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00	1.00	1.00
R 426	131-0274-23	RES CF 270K QW 5%	EA	1.00	1.00	1.00	1.00
R 427	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00	1.00	1.00
R 428	131-0112-13	RES CF 1.1K EW 5%	EA	1.00	1.00	1.00	1.00
R 429	131-0302-23	RES CF 3K QW 5%	EA	1.00	1.00	1.00	1.00
R 430	131-0182-23	RES CF 1.8K QW 5%	EA	1.00	1.00	1.00	1.00
R 431	131-0302-13	RES CF 3K EW 5%	EA	1.00	1.00	1.00	1.00
R 433	131-0474-13	RES CF 470K EW 5%	EA	1.00	1.00	1.00	1.00
R 434	133-0113-14	RES VA 2K 20% A	EA	1.00	1.00	1.00	1.00
R 435	131-0123-13	RES CF 12K EW 5%	EA	1.00	1.00	1.00	1.00
R 436	131-0123-13	RES CF 12K EW 5%	EA	1.00	1.00	1.00	1.00

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R	437	131-0104-23	RES CF 100K QW 5%	EA	1.00	1.00	1.00	1.00
R	438	131-0123-13	RES CF 12K EW 5%	EA	1.00	1.00	1.00	1.00
R	439	131-0240-13	RES CF 24 EW 5%	EA	1.00	1.00	1.00	1.00
R	440	136-8063-72	RES PF 806K QW 1%	EA	1.00	1.00	1.00	1.00
R	441	136-1653-72	RES PF 165K QW 1%	EA	1.00	1.00	1.00	1.00
R	442	133-0096-62	RES VA 200K HW 10%	EA	1.00	1.00	1.00	1.00
R	443	131-0104-13	RES CF 100K EW 5%	EA	.	.	1.00	1.00
R	444	131-0514-13	RES CF 510K EW 5%	EA	.	.	1.00	1.00
R	445	131-0222-13	RES CF 2.2K EW 5%	EA	.	1.00	1.00	1.00
R	446	131-0102-23	RES CF 1K QW 5%	EA	1.00	1.00	1.00	1.00
R	447	131-0102-23	RES CF 1K QW 5%	EA	1.00	1.00	1.00	1.00
R	448	131-0105-13	RES CF 1W EW 5%	EA	1.00	1.00	1.00	1.00
R	449	131-0105-13	RES CF 1W EW 5%	EA	1.00	1.00	1.00	1.00
R	450	131-0512-13	RES CF 5.1K EW 5%	EA	1.00	1.00	1.00	1.00
REF	1	300-6178-00	CONV/DISPLAY ASSY	RF	.	.	.	.
TP	301	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	302	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	303	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	304	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	305	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	306	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	307	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	308	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	309	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	310	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	311	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	312	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	313	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
TP	314	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00
U	300	015-0041-01	RES MOD 220K150V2%	AR	0.00	0.00	0.00	0.00
U	301	015-0041-02	RES MOD 1W150V5%	EA	1.00	1.00	1.00	1.00
U	302	015-0041-02	RES MOD 1W150V5%	EA	1.00	1.00	1.00	1.00
U	303	015-0041-02	RES MOD 1W150V5%	EA	1.00	1.00	1.00	1.00
U	304	015-0049-00	NTWK CAP 220PF 20%	EA	.	.	.	.
U	304	015-0064-13	8P CAP 220PF 10%	EA	1.00	1.00	1.00	1.00
U	305	015-0049-00	NTWK CAP 220PF 20%	EA	.	.	.	.
U	305	015-0064-13	8P CAP 220PF 10%	EA	1.00	1.00	1.00	1.00
U	306	015-0064-13	8P CAP 220PF 10%	EA	1.00	1.00	1.00	1.00
U	307	015-0064-13	8P CAP 220PF 10%	EA	1.00	1.00	1.00	1.00
U	308	015-0064-13	8P CAP 220PF 10%	EA	1.00	1.00	1.00	1.00

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NOTES:

1. PRIOR TO POST COATING WITH CLEAR URETHANE (KPN 016-1040-00) MASK OFF THE FOLLOWING AREAS: ALL MOUNTING SURFACES, ALL TEST POINTS, ALL "E" NUMBERS, J301-J310, I.C. SOCKETS, CONNECTOR FINGERS, FUSE CLIPS AND ALL POTS.

2. NO COMPONENT HEIGHT TO EXCEED .425 MAXIMUM.

3. USE U300 WHEN KPN 120-3083-00 IS USED FOR I 318.

4. FENCE 047-5400-01 IS TO BE SOLDERED ON ALL 3 SIDES.

5. VOR VERSION - INSTALL CJ300, CJ303, AND CJ304 (-10 THRU -17 AND -19 THRU -21 FLAVORS).
TAGAN VERSION - INSTALL CJ305 AND CJ306 (-30 THRU -39 FLAVORS)

6. WITHOUT WAYPOINT NAVIGATION BUS (WNB) OPTION - INSTALL CJ301 AND CJ302 (-10, -11, -14, -15, -19, -20, -30, -31, -34, -35, AND -38 FLAVORS).

WITH WAYPOINT NAVIGATION BUS (WNB) OPTION - INSTALL CJ310, CJ311, AND CJ312 (-12, -13, -16, -17, -21, -32, -33, -36, -37, AND -39 FLAVORS).

7. C302 A-D IS A MATCHED SET OF 4 IF ONE MUST BE REPLACED, ALL MUST BE REPLACED.

8. AREAS WITHIN DOTTED LINES ARE TO BE HEAVILY POST COATED.

REWORK NOTES FOR: 200-6177-60/61/80/81

1. REMOVE SHADED COMPONENTS R443, R444, C360, AND C361 WHEN INSTALLING PLL INTEGRATOR BOARD 200-7159-00

2. ISOLATE C304 AND CR512 JUNCTION FROM R376 AND PIN 2 OF I303 JUNCTION. CONNECT R450 (5K) FROM C304 TO PIN 2 OF I303

3. ISOLATE PIN 8 OF I302 FROM THE +5VDC LINE AND CONNECT A MAG WIRE FROM PIN 8 OF I302 TO J508 (+13.5V DC SUPPLY).

FIGURE 6-13 -60 VERSION CONVERTER/DISPLAY BOARD ASSEMBLY
(Dwg. No. 300-6178-60, Rev. 3)

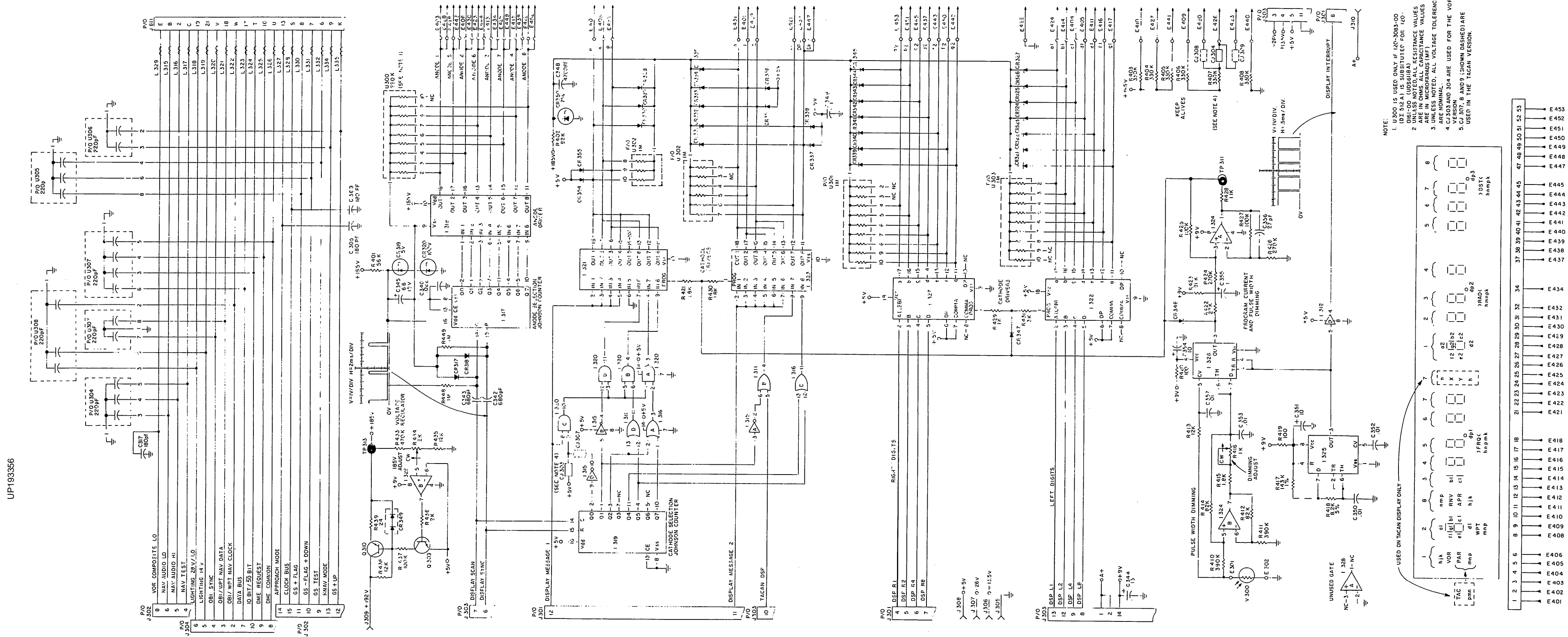
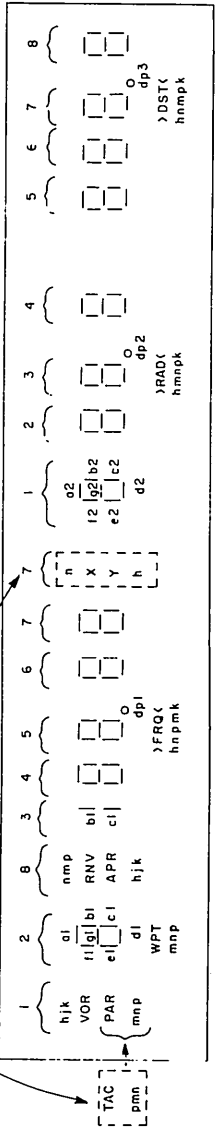
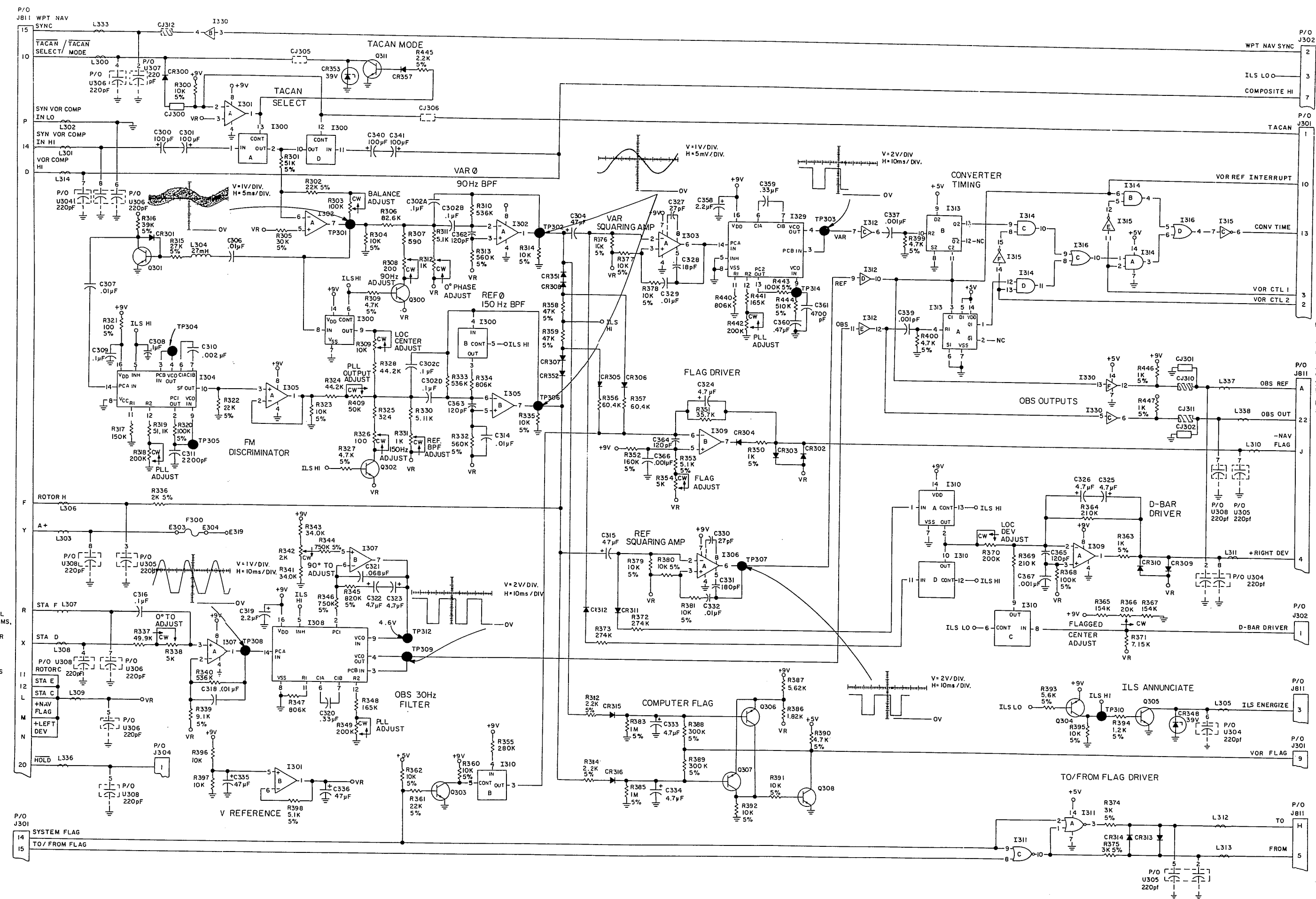


FIGURE 6-14 -60 VERSION CONVERTER/DISPLAY BOARD SCHEMATIC
(Dwg. No. 002-6178-60, Rev. 2)
(Sheet 1 of 2)

- NOTE:
1. U300 IS USED ONLY IF 120-3093-00 (D2 512 A) IS SUBSTITUTED FOR 120-3093-00.
 2. UNLESS NOTED, ALL RESISTANCE VALUES ARE IN OHMS. ALL CAPACITANCE VALUES ARE IN MICROFARADS (MF).
 3. UNLESS NOTED, ALL VOLTAGE TOLERANCES ARE NOMINAL.
 4. VERSION 1 AND 2.
 5. CJ 307, B AND 9 (SHOWN DASHED) ARE USED IN THE TACAN VERSION.



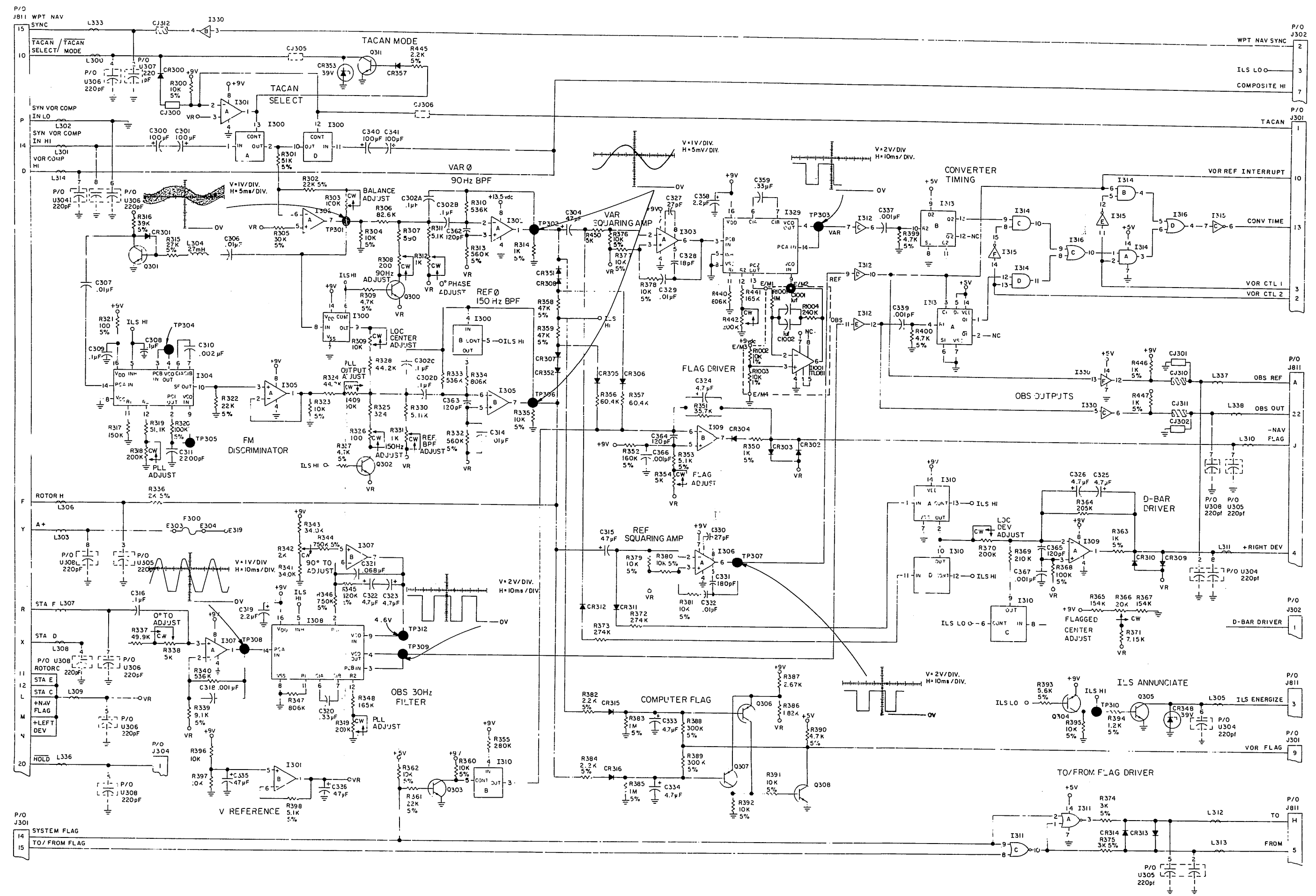
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NOTES:
1. UNLESS OTHERWISE NOTED, ALL RESISTANCE VALUES ARE IN OHMS, 1%.
2. C300, 301, 302 ARE USED FOR VOR VERSION. C305 & 306 ARE USED FOR TACAN VERSION. C310, 311, 312 ARE USED FOR THE WAYPOINT NAVIGATION BUS OPTION.
3. V REFERENCE = +4.5 VDC

UNUSED GATES:
I312 2-NC
I312 8-NC
I312 10-NC
I312 15-NC

FIGURE 6-11 CONVERTER/DISPLAY BOARD SCHEMATIC
(Dwg. No. 002-6178-10, R-7)
(Sheet 1 of 2)



NOTES:
1. UNLESS OTHERWISE NOTED, ALL RESISTANCE VALUES ARE IN OHMS, 1%
2. C3300, 301, 302 ARE USED FOR VOR VERSION. C3305 & 306 ARE USED FOR TACAN VERSION. C3310, 311, 312 ARE USED FOR THE WAYPOINT NAVIGATION BUS OPTION

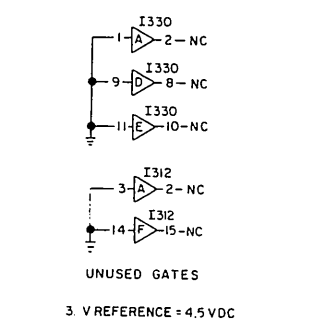
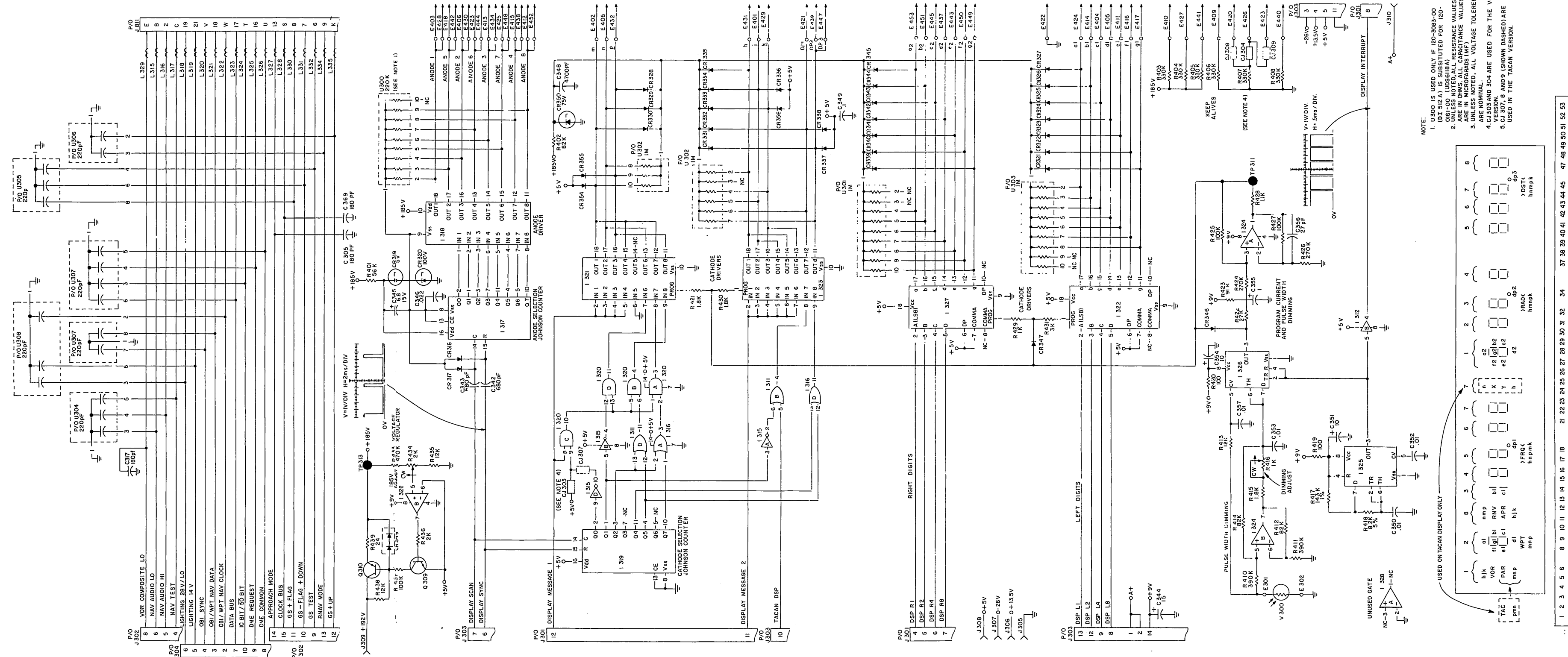


FIGURE 6-14 -60 VERSION CONVERTER/DISPLAY BOARD SCHEMATIC
(Dwg. No. 002-6178-60, Rev. 2)
(Sheet 2 of 2)

UP193356

FIGURE 6-11 CONVERTER/DISPLAY BOARD SCHEMATIC
(Dwg. No. 002-6178-10, R-7)
(Sheet 2 of 2)



KING
KNS 81
DIGITAL AREA NAVIGATION SYSTEM

200-6177-00 Rev. 25 COMPUTER BD-00 KNS0081
 200-6177-01 Rev. 1 COMPUTER BD-00 KNS0081
 200-6177-02 Rev. 2 COMPUTER BD-VOR KNS0081
 200-6177-10 Rev. 14 COMPUTER BD-VOR KNS0081
 200-6177-30 Rev. 14 COMPUTER BD-TAC KNS0081
 200-6177-60 Rev. 2 COMPUTER BD-VOR KNS0081
 200-6177-80 Rev. 2 COMPUTER BD-TAC KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00	01	02	10	30	60	80
	009-6177-00	PC BD COMP		EA	1.00	1.00					
	009-6177-10	PC BD COMPUTER		EA			1.00	1.00	1.00	1.00	1.00
	016-1040-00	COATING TYPE AR		AR	0.00	0.00	0.00	0.00	0.00	0.00	0.00
	088-0870-00	SPCR SW		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	089-2140-00	NUT HEX ESMA 4-40		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	089-5903-04	SCR PHP 4-40X1/4		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	090-0085-01	STAND-OFF .187		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	090-0087-00	CLIP CRYSTAL		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	091-0188-00	CLIP COMPONENT		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
	092-5010-03	EYELET .059		EA	2.00	2.00	2.00	2.00	2.00	2.00	2.00
	200-7159-00	PLL INTEGRATOR BD	A	EA						1.00	1.00
C	500 111-0001-13	CAP CR .1UF 50V		EA			1.00	1.00	1.00	1.00	1.00
C	500 113-5821-00	CAP DC 820PF 500V		EA	1.00	1.00					
C	501 096-1082-13	CAP TN .33UF 20V		EA			1.00	1.00	1.00	1.00	1.00
C	501 111-0001-03	CAP CR .22UF 50V		EA	1.00	1.00					
C	502 111-0001-03	CAP CR .22UF 50V		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C	503 111-0001-03	CAP CR .22UF 50V		EA	1.00	1.00					
C	503 111-0001-13	CAP CR .1UF 50V		EA			1.00	1.00	1.00	1.00	1.00
C	504 111-0001-03	CAP CR .22UF 50V		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C	505 111-0001-03	CAP CR .22UF 50V		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C	506 111-0001-13	CAP CR .1UF 50V		EA			1.00	1.00	1.00	1.00	1.00
C	506 113-3270-00	CAP DC 27PF 500V		EA	1.00	1.00					
C	507 111-0001-03	CAP CR .22UF 50V		EA			1.00	1.00	1.00	1.00	1.00
C	507 113-3270-00	CAP DC 27PF 500V		EA	1.00	1.00					
C	508 111-0001-03	CAP CR .22UF 50V		EA			1.00	1.00	1.00	1.00	1.00
C	508 111-0001-13	CAP CR .1UF 50V		EA	1.00	1.00					
C	509 109-0007-00	CAP DC .01UF 25V		EA	1.00	1.00					
C	509 113-5821-00	CAP DC 820PF 500V		EA			1.00	1.00	1.00	1.00	1.00
C	510 109-0007-00	CAP DC .01UF 25V		EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C	511 111-0001-00	CAP CR .01UF 50V		EA			1.00	1.00	1.00	1.00	1.00
C	511 111-0001-13	CAP CR .1UF 50V		EA	1.00	1.00					
C	512 096-1082-05	CAP TN 10UF 20V		EA			1.00	1.00	1.00	1.00	1.00
C	512 111-0001-13	CAP CR .1UF 50V		EA	1.00	1.00					
C	513 096-1030-38	CAP TN 100UF10%15V		EA	1.00	1.00					
C	513 096-1030-46	CAP TN 39UF10%10V		EA			1.00	1.00	1.00	1.00	1.00
C	514 096-1082-05	CAP TN 10UF 20V		EA	1.00	1.00					
C	514 113-3270-00	CAP DC 27PF 500V		EA			1.00	1.00	1.00	1.00	1.00
C	515 111-0001-00	CAP CR .01UF 50V		EA	1.00	1.00					
C	515 113-3270-00	CAP DC 27PF 500V		EA			1.00	1.00	1.00	1.00	1.00
C	516 111-0001-03	CAP CR .22UF 50V		EA			1.00	1.00	1.00	1.00	1.00
C	516 111-0001-13	CAP CR .1UF 50V		EA	1.00	1.00					
C	517 111-0001-03	CAP CR .22UF 50V		EA			1.00	1.00	1.00	1.00	1.00
C	517 111-0001-06	CAP CR .47UF 50V		EA	1.00	1.00					
C	518 111-0001-03	CAP CR .22UF 50V		EA			1.00	1.00	1.00	1.00	1.00
C	518 111-0001-13	CAP CR .1UF 50V		EA	1.00	1.00					
C	519 097-0066-01	CAP AL 68UF 50V		EA			1.00	1.00	1.00	1.00	1.00
C	519 111-0001-03	CAP CR .22UF 50V		EA	1.00	1.00					
C	520 111-0001-03	CAP CR .22UF 50V		EA			1.00	1.00	1.00	1.00	1.00
C	520 111-0001-13	CAP CR .1UF 50V		EA	1.00	1.00					
C	521 096-1082-05	CAP TN 10UF 20V		EA			1.00	1.00	1.00	1.00	1.00

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C	521	109-0007-00	CAP DC .01UF 25V	EA	1.00	1.00
C	522	109-0007-00	CAP DC .01UF 25V	EA	1.00	1.00
C	522	111-0001-13	CAP CR .1UF 50V	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
C	523	097-0066-01	CAP AL 68UF 50V	EA	1.00	1.00	.	.	.	.	.	.
C	523	111-0001-13	CAP CR .1UF 50V	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
C	524	111-0001-70	CAP CR 820PF 50V	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
C	524	113-5821-00	CAP DC 820PF 500V	EA	1.00	1.00	.	.	.	.	.	.
C	525	111-0001-13	CAP CR .1UF 50V	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
C	525	113-5821-00	CAP DC 820PF 500V	EA	1.00	1.00	.	.	.	.	.	.
C	526	109-0007-00	CAP DC .01UF 25V	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
C	526	113-5821-00	CAP DC 820PF 500V	EA	1.00	1.00	.	.	.	.	.	.
C	527	109-0007-00	CAP DC .01UF 25V	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
C	527	113-5821-00	CAP DC 820PF 500V	EA	1.00	1.00	.	.	.	.	.	.
C	528	113-5821-00	CAP DC 820PF 500V	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C	529	113-5821-00	CAP DC 820PF 500V	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C	530	113-5821-00	CAP DC 820PF 500V	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
C	531	113-5821-00	CAP DC 820PF 500V	EA	1.00	1.00	.	.	.	.	.	.
C	532	113-5821-00	CAP DC 820PF 500V	EA	1.00	1.00	.	.	.	.	.	.
C	533	113-5821-00	CAP DC 820PF 500V	EA	1.00	1.00	.	.	.	.	.	.
CJ	500	026-0018-01	WIRE CKTJMPR 24AWG	EA	.	.	.	.	1.00	.	.	1.00
CR	500	007-5046-06	DIO Z 1N5259A	EA	1.00	1.00	.	.	.	.	.	.
CR	500	007-6033-00	DIO G 1N270	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
CR	501	007-6033-00	DIO G 1N270	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
CR	501	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	.	.	.	.	.	.
CR	502	007-6016-00	DIO S 1N4154	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
CR	503	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CR	504	007-6016-00	DIO S 1N4154	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
CR	504	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	.	.	.	.	.	.
CR	505	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CR	506	007-6016-00	DIO S 1N4154	EA	1.00	1.00	.	.	.	.	.	.
CR	506	007-6085-00	DIO HC 1N5711	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
CR	507	007-6016-00	DIO S 1N4154	EA	1.00	1.00	.	.	.	.	.	.
CR	507	007-6085-00	DIO HC 1N5711	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
CR	508	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CR	509	007-6016-00	DIO S 1N4154	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
CR	509	007-6033-00	DIO G 1N270	EA	1.00	1.00	.	.	.	.	.	.
CR	510	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CR	511	007-6016-00	DIO S 1N4154	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
CR	511	007-6033-00	DIO G 1N270	EA	1.00	1.00	.	.	.	.	.	.
CR	512	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CR	513	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CR	514	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CR	515	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CR	516	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CR	517	007-5046-06	DIO Z 1N5259A	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
CR	517	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	.	.	.	.	.	.
CR	518	007-6016-00	DIO S 1N4154	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
CR	519	007-6085-00	DIO HC 1N5711	EA	1.00	1.00	.	.	.	.	.	.
CR	520	007-6085-00	DIO HC 1N5711	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
DS	500	037-0012-10	LAMP WIN T-1 14V	EA	1.00	.	.	1.00	1.00	1.00	1.00	1.00
DS	500	037-0032-08	LWP 4030 T1-1/4 14	EA	.	1.00	1.00	.	.	.	.	.
DS	501	037-0012-10	LAMP WIN T-1 14V	EA	1.00	.	.	1.00	1.00	1.00	1.00	1.00
DS	501	037-0032-08	LWP 4030 T1-1/4 14	EA	.	1.00	1.00	.	.	.	.	.
DS	502	037-0012-10	LAMP WIN T-1 14V	EA	1.00	.	.	1.00	1.00	1.00	1.00	1.00
DS	502	037-0032-08	LWP 4030 T1-1/4 14	EA	.	1.00	1.00	.	.	.	.	.
DS	503	037-0012-10	LAMP WIN T-1 14V	EA	1.00	.	.	1.00	1.00	1.00	1.00	1.00
DS	503	037-0032-08	LWP 4030 T1-1/4 14	EA	.	1.00	1.00	.	.	.	.	.
I	500	120-0082-00	IC SN74LS10N	EA	1.00	1.00	.	.	.	.	.	.
I	500	120-0117-00	IC SN74LS26N	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	501	120-2022-00	IC WCM6810P	EA	1.00	1.00	.	.	.	.	.	.
I	501	122-0152-00	D000 ROM	A EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	502	120-2042-00	IC MC6821P	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
I	503	120-2075-00	IC SYEP6522	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	503	120-6026-01	IC MC14050BALDS	EA	1.00	1.00

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I	504	120-6025-01	IC SCL4049ABC-	EA	1.00	1.00
I	504	120-6059-01	IC CD4031BCJ-	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	505	120-6007-01	IC SCL4011BC	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
I	506	120-0053-00	IC SN7407N	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	506	120-6004-01	IC SCL4006ABC	EA	1.00	1.00	.	.	.	.	.	.
I	507	120-0085-00	IC SN74LS76N	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	507	120-6011-01	IC SCL4015ABC-	EA	1.00	1.00	.	.	.	.	.	.
I	508	120-0158-00	IC SN74279N	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	508	120-2045-01	IC MC6846P	EA	1.00	1.00	.	.	.	.	.	.
I	509	120-0109-00	IC SN74LS08N	EA	1.00	1.00	.	.	.	.	.	.
I	509	120-3048-00	IC LM339N	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	510	120-0079-00	IC SN74LS00N	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	510	120-2042-00	IC MC6821P	EA	1.00	1.00	.	.	.	.	.	.
I	511	120-0076-00	IC SN74LS138N	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	511	120-6029-01	IC MC14518AL	EA	1.00	1.00	.	.	.	.	.	.
I	512	120-2041-00	IC MC6802CP	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	512	120-2046-00	IC SC80809P	EA	1.00	1.00	.	.	.	.	.	.
I	513	120-2041-00	IC MC6802CP	EA	1.00	1.00	.	.	.	.	.	.
I	513	120-2085-00	IC SC80824P	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	514	120-2074-00	IC SYEP6532	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	514	120-3048-00	IC LM339N	EA	1.00	1.00	.	.	.	.	.	.
I	515	120-2083-00	IC RDM BIT 2048X8	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	515	120-6009-01	IC MC14013BALDS	EA	1.00	1.00	.	.	.	.	.	.
I	516	120-6009-01	IC MC14013BALDS	EA	1.00	1.00	.	.	.	.	.	.
I	516	120-6011-01	IC SCL4015ABC-	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	517	120-3066-01	IC UA78G	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	517	120-6009-01	IC MC14013BALDS	EA	1.00	1.00	.	.	.	.	.	.
I	518	120-6026-01	IC MC14050BALDS	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	518	120-6058-00	IC MM74C906J-	EA	1.00	1.00	.	.	.	.	.	.
I	519	120-2028-01	IC ER1400	EA	1.00	1.00	.	.	.	.	.	.
I	519	120-3109-00	IC LM329BZ	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	520	120-3109-00	IC LM329BZ	EA	1.00	1.00	.	.	.	.	.	.
I	520	120-6058-00	IC MM74C906J-	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	521	120-2028-01	IC ER1400	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
I	521	120-3066-01	IC UA78G	EA	1.00	1.00	.	.	.	.	.	.
I	522	120-6011-01	IC SCL4015ABC-	EA	1.00	1.00	.	.	.	.	.	.
I	523	120-0053-00	IC SN7407N	EA	1.00	1.00	.	.	.	.	.	.
I	524	120-6064-01	IC SCL4071BC	EA	1.00	1.00	.	.	.	.	.	.
I	525	120-0117-00	IC SN74LS26N	EA	1.00	1.00	.	.	.	.	.	.
J	501	033-0053-01	IC SOCKET 14P	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
J	502	033-0053-02	IC SOCKET 16P	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
J	503	030-2170-05	CONN CARD 10C	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
L	500	019-2102-04	CHOKE 90UH	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P	301	030-2322-15	HEADER 15P	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P	302	030-2322-15	HEADER 15P	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P	303	030-2322-14	HEADER 14P	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
P	304	030-2322-11	HEADER 11P	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
Q	500	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	.	.	.	.	.	.
Q	500	007-0174-00	XSTR S PNP 2N5086	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
Q	501	007-0065-00	XSTR S PNP 2N3906	EA	1.00	1.00	.	.	.	.	.	.
Q	501	007-0078-00	XSTR S NPN 2N3415	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
Q	502	007-0174-00	XSTR S PNP 2N5086	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
Q	502	007-0211-02	XSTR X X3805559	EA	1.00	1.00	.	.	.	.	.	.
Q	503	007-0065-00	XSTR S PNP 2N3906	EA	1.00	1.00	.	.	.	.	.	.
Q	503	007-0078-00	XSTR S NPN 2N3415	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
Q	504	007-0078-00	XSTR S NPN 2N3415	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
Q	504	007-0211-02	XSTR X X3805559	EA	1.00	1.00	.	.	.	.	.	.
Q	505	007-0065-00	XSTR S PNP 2N3906	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
Q	505	007-0078-00	XSTR S NPN 2N3415	EA	1.00	1.00	.	.	.	.	.	.
Q	506	007-0065-00	XSTR S PNP 2N3906	EA	1.00	1.00	.	.	.	.	.	.
Q	506	007-0211-02	XSTR X X3805559	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
Q	507	007-0065-00	XSTR S PNP 2N3906	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
Q	507	007-0174-00	XSTR S PNP 2N5086	EA	1.00	1.00	.	.	.	.	.	.
Q	508	007-0174-00	XSTR S PNP 2N5086	EA	1.00	1.00	.	.	.	.	.	.
Q	508	007-0211-02	XSTR X X3805559	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
Q	509	007-0078-00	XSTR S NPN 2N3415	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
Q	510	007-0065-00	XSTR S PNP 2N3906	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
Q	511	007-0078-00	XSTR S NPN 2N3415	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00

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R 500	131-0101-13	RES CF 100 EW 5%	EA	1.00	1.00
R 500	131-0220-13	RES CF 22 EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 501	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 501	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 502	131-0152-13	RES CF 1.5K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 502	131-0333-13	RES CF 33K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 503	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 503	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 504	131-0363-13	RES CF 36K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 504	131-0393-13	RES CF 39K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 505	131-0122-13	RES CF 1.2K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 505	131-0511-13	RES CF 510 EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 506	131-0223-13	RES CF 22K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 506	131-0562-13	RES CF 5.6K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 507	131-0152-13	RES CF 1.5K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 507	131-0223-13	RES CF 22K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 508	131-0153-13	RES CF 15K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 508	131-0220-13	RES CF 22 EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 509	131-0122-13	RES CF 1.2K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 509	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 510	131-0333-13	RES CF 33K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 510	131-0562-13	RES CF 5.6K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 511	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 511	131-0152-13	RES CF 1.5K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 512	131-0153-13	RES CF 15K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 512	131-0363-13	RES CF 36K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 513	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 513	131-0513-13	RES CF 51K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 514	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 514	131-0224-13	RES CF 220K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 515	131-0363-13	RES CF 36K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 515	131-0682-13	RES CF 6.8K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 516	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 516	131-0513-13	RES CF 51K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 517	131-0224-13	RES CF 220K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 517	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 518	131-0363-13	RES CF 36K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 518	131-0392-13	RES CF 3.9K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 519	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 519	131-0513-13	RES CF 51K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 520	131-0202-13	RES CF 2K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 520	131-0392-13	RES CF 3.9K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 521	131-0202-13	RES CF 2K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 521	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 522	131-0202-13	RES CF 2K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 522	131-0392-13	RES CF 3.9K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 523	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 523	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 524	131-0102-13	RES CF 1K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 524	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 525	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R 526	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 526	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 527	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 527	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 528	131-0101-13	RES CF 100 EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 528	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 529	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 529	131-0824-13	RES CF 820K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 530	131-0332-13	RES CF 3.3K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 530	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 531	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.	.
R 531	131-0154-13	RES CF 150K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 532	131-0334-13	RES CF 330K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 532	136-3742-72	RES PF 37.4K QW 1%	EA	1.00	1.00	.	.	.	.	.	.
R 533	131-0334-13	RES CF 330K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00	1.00
R 533	136-2002-72	RES PF 20K QW 1%	EA	1.00	1.00

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R 534	131-0101-13	RES CF 100 EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 534	131-0151-13	RES CF 150 EW 5%	EA	1.00	1.00
R 535	131-0393-13	RES CF 39K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 535	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 536	131-0274-13	RES CF 270K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 536	131-0472-13	RES CF 4.7K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 537	131-0104-13	RES CF 100K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 537	131-0332-13	RES CF 3.3K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 538	131-0104-13	RES CF 100K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 538	131-0393-13	RES CF 39K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 539	131-0104-13	RES CF 100K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 539	131-0274-13	RES CF 270K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 540	131-0101-13	RES CF 100 EW 5%	EA	1.00	1.00	.	.	.	.	.
R 540	131-0822-13	RES CF 8.2K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 541	131-0101-13	RES CF 100 EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 541	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 542	131-0101-13	RES CF 100 EW 5%	EA	1.00	1.00	.	.	.	.	.
R 542	131-0472-13	RES CF 4.7K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 543	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 543	131-0472-13	RES CF 4.7K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 544	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 544	131-0392-13	RES CF 3.9K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 545	131-0154-13	RES CF 150K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 545	131-0392-13	RES CF 3.9K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 546	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 546	131-0334-13	RES CF 330K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 547	131-0102-13	RES CF 1K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 547	131-0334-13	RES CF 330K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 548	131-0682-13	RES CF 6.8K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 548	136-4021-72	RES PF 4.02K QW 1%	EA	1.00	1.00	.	.	.	.	.
R 549	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 549	136-4991-72	RES PF 4.99K QW 1%	EA	1.00	1.00	.	.	.	.	.
R 550	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 550	131-0392-13	RES CF 3.9K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 551	131-0392-13	RES CF 3.9K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 551	131-0562-13	RES CF 5.6K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 552	131-0122-13	RES CF 1.2K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 552	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 553	131-0152-13	RES CF 1.5K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 553	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 554	131-0153-13	RES CF 15K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 554	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 555	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 555	131-0562-13	RES CF 5.6K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 556	131-0122-13	RES CF 1.2K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 556	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 557	131-0152-13	RES CF 1.5K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 557	134-0275-13	RES CC 2.7M EW 5%	EA	1.00	1.00	.	.	.	.	.
R 558	131-0153-13	RES CF 15K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 559	131-0224-13	RES CF 220K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 559	131-0333-13	RES CF 33K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 560	131-0363-13	RES CF 36K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 560	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 561	131-0220-13	RES CF 22 EW 5%	EA	1.00	1.00	.	.	.	.	.
R 561	131-0513-13	RES CF 51K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 562	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 562	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 563	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 564	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 564	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 565	131-0153-13	RES CF 15K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 566	131-0101-13	RES CF 100 EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 567	131-0333-13	RES CF 33K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 567	136-4021-72	RES PF 4.02K QW 1%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 568	131-0473-13	RES CF 47K EW 5%	EA	1.00	1.00	.	.	.	.	.
R 568	136-4991-72	RES PF 4.99K QW 1%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 569	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R 569	131-0220-13	RES CF 22 EW 5%	EA	1.00	1.00
R 570	131-0101-13	RES CF 100 EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00

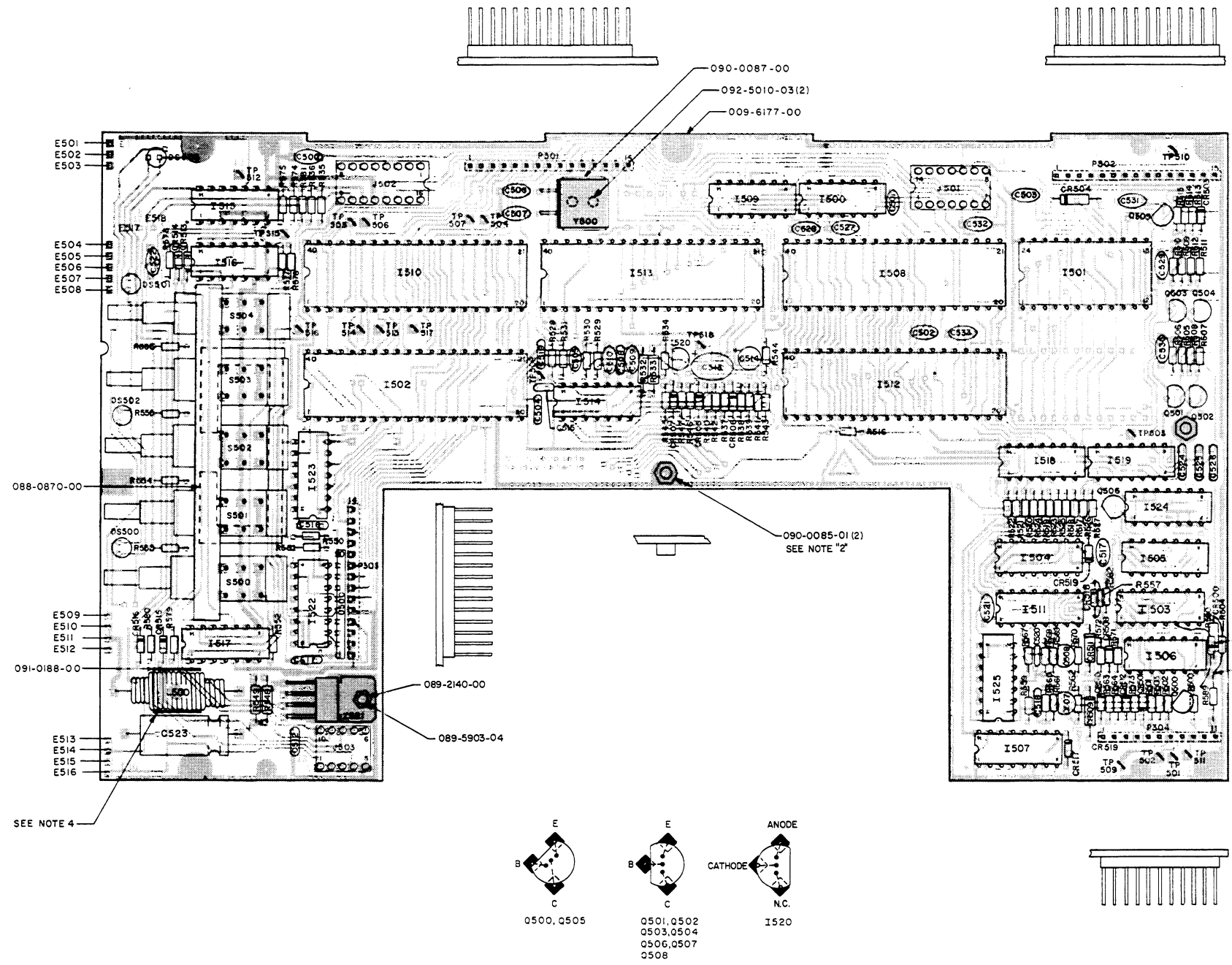
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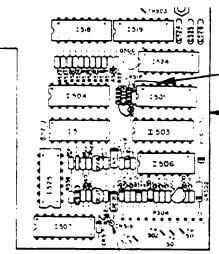
R	570	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00
R	571	131-0104-13	RES CF 100K EW 5%	EA	1.00	1.00
R	571	131-0824-13	RES CF 820K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	572	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.
R	572	131-0332-13	RES CF 3.3K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	573	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
R	574	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	.	.	.	.	.
R	574	136-3742-72	RES PF 37.4K QW 1%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	575	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	.	.	.	.	.
R	575	136-2002-72	RES PF 20K QW 1%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	576	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	.	.	.	.	.
R	576	131-0151-13	RES CF 150 EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	577	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	.	.	.	.	.
R	577	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	578	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	.	.	.	.	.
R	578	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	579	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	.	.	.	.	.
R	579	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	580	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	.	.	.	.	.
R	580	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	581	131-0103-13	RES CF 10K EW 5%	EA	1.00	1.00	.	.	.	.	.
R	581	131-0392-13	RES CF 3.9K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	582	131-0102-13	RES CF 1K EW 5%	EA	1.00	1.00	.	.	.	.	.
R	582	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	583	131-0392-13	RES CF 3.9K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	584	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	585	131-0392-13	RES CF 3.9K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	586	131-0473-13	RES CF 47K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	587	131-0103-13	RES CF 10K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	588	131-0272-13	RES CF 2.7K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	589	131-0102-13	RES CF 1K EW 5%	EA	.	.	1.00	1.00	1.00	1.00	1.00
R	589	131-0223-13	RES CF 22K EW 5%	EA	1.00	1.00	.	.	.	.	.
R	590	131-0224-13	RES CF 220K EW 5%	EA	1.00	1.00	.	.	.	.	.
REF	1	300-6177-00	COMPUTER BD ASSY	RF	X.	X.	.	.	.	.	.
S	500	031-0383-00	SW ASSY 5	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	501	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	502	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	503	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	504	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	505	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	506	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	507	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	508	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	509	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	510	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	511	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	512	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	513	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	514	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	515	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	516	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	517	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	518	008-0096-01	TERMINAL TEST PNT	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00
TP	519	008-0096-01	TERMINAL TEST PNT	EA	.	.	1.00	1.00	1.00	1.00	1.00
U	500	015-0039-06	RES MOD 1K150V2%	EA	.	.	1.00	1.00	1.00	1.00	1.00
U	500	015-0060-00	RES NTWK H9-3931	EA	1.00	1.00	.	.	.	.	.
U	501	015-0060-00	RES NTWK H9-3931	EA	.	.	1.00	1.00	1.00	1.00	1.00
Y	500	044-0106-00	XTAL 3579.545KHZ	EA	1.00	1.00	1.00	1.00	1.00	1.00	1.00

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- NOTES:
1. PRIOR TO POST COATING WITH CLEAR URETHANE (KPN 016-1040-00), MASK OFF THE FOLLOWING AREAS: ALL MOUNTING AREAS, TEST POINTS, PADS FOR "E" NUMBERS, I.C. SOCKETS, J501, J502, J503, S500-S504, P301-P304, DS500-DS503
 2. PRESS 090-0085-01 FLUSH TO BOARD.
 3. MAXIMUM HEIGHT OF COMPONENTS NOT TO EXCEED .430 EXCEPT DS500 THRU DS503.
 4. HEAT STAKE TAB ON FAR SIDE OF BOARD.
- REWORK NOTES:
- A. DRILL HOLE USING BIT ".51, INSTALL EYELET(092-1515-05) AND TERMINAL. REMOVE TEFLON BEFORE INSTALLING.
 - B. CHANGE CR502 TO R589 22K (131-0223-13) REMOVE R504, CHANGE R504 TO 36K (131-0363-13) AND COVER LEADS WITH TEFLON TUBING. REINSTALL AS SHOWN.
 - C. ADD R590 FROM EMPTY PAD WHERE R504 USE TO BE TO PIN 6 OF I503 AND COVER WITH TUBING.



SEE NOTE A
REWORK DETAIL FOR REVISIONS 6/6, 7/7, AND 8/8 ARTWORKS.

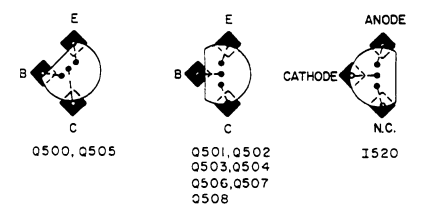


FIGURE 6-15 COMPUTER BOARD ASSEMBLY
(Dwg. No. 300-6177-00, Rev. 13)

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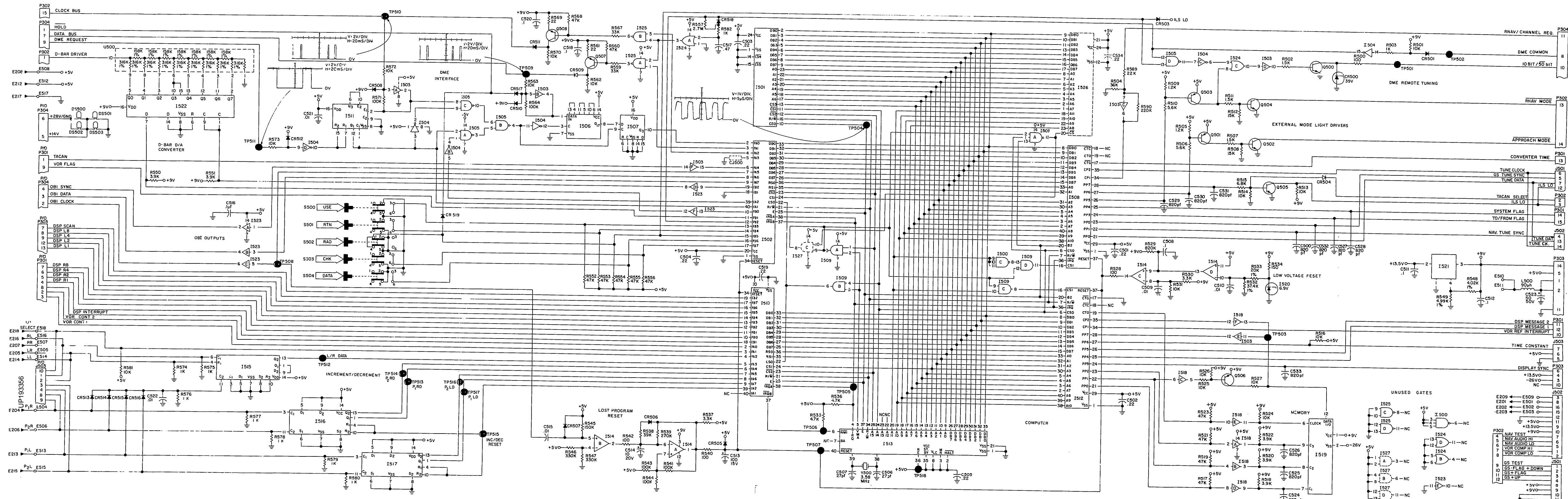
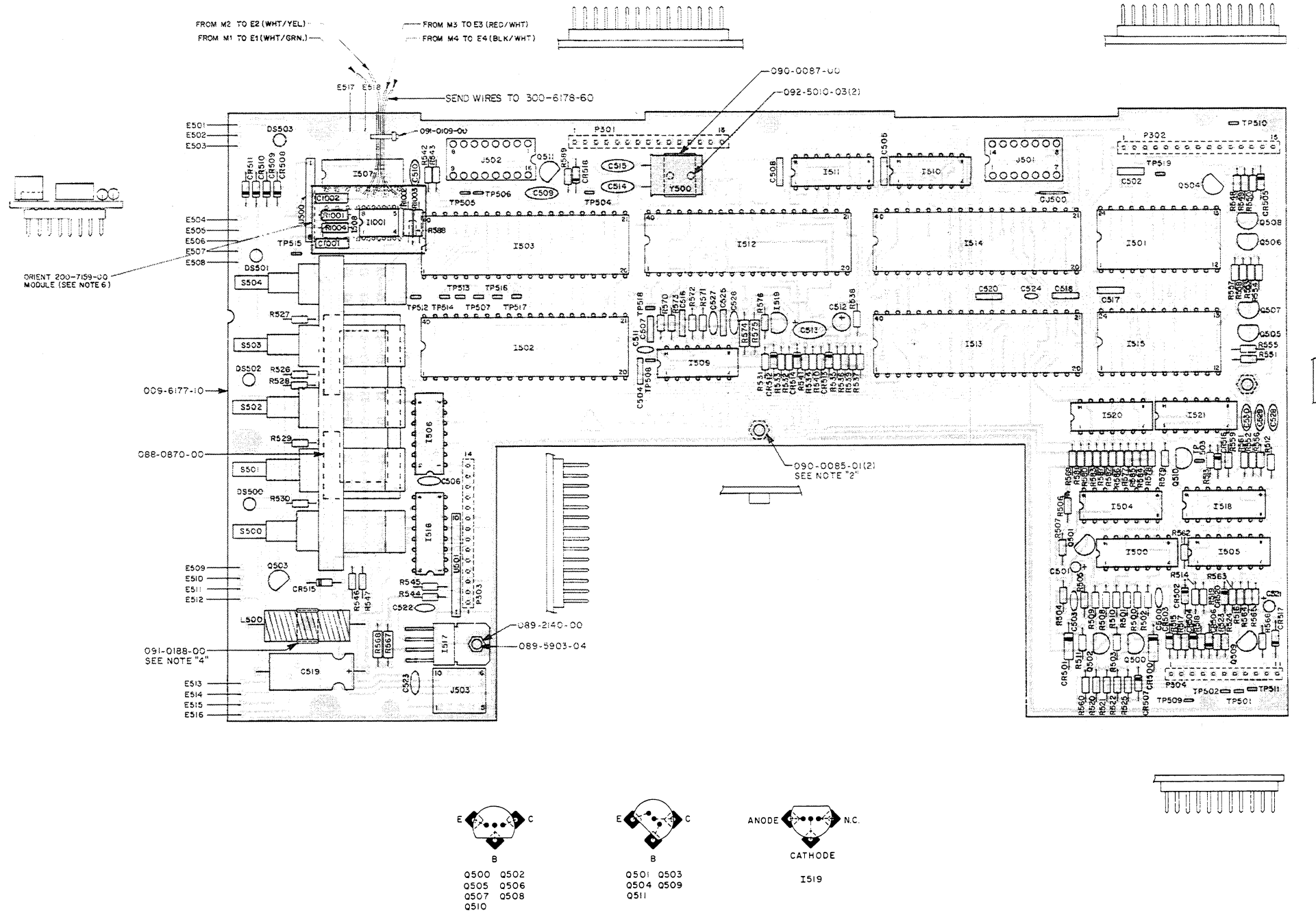


FIGURE 6-16 COMPUTER BOARD SCHEMATIC
(Dwg. No. 002-6177-00, Rev. 11)

NOTE:
I 526, I527, AND C534 ARE PROVIDED FOR
BUT ARE NOT INSTALLED. THEY ARE FOR
FUTURE PROGRAM EXPANSION, IF REQUIRED.

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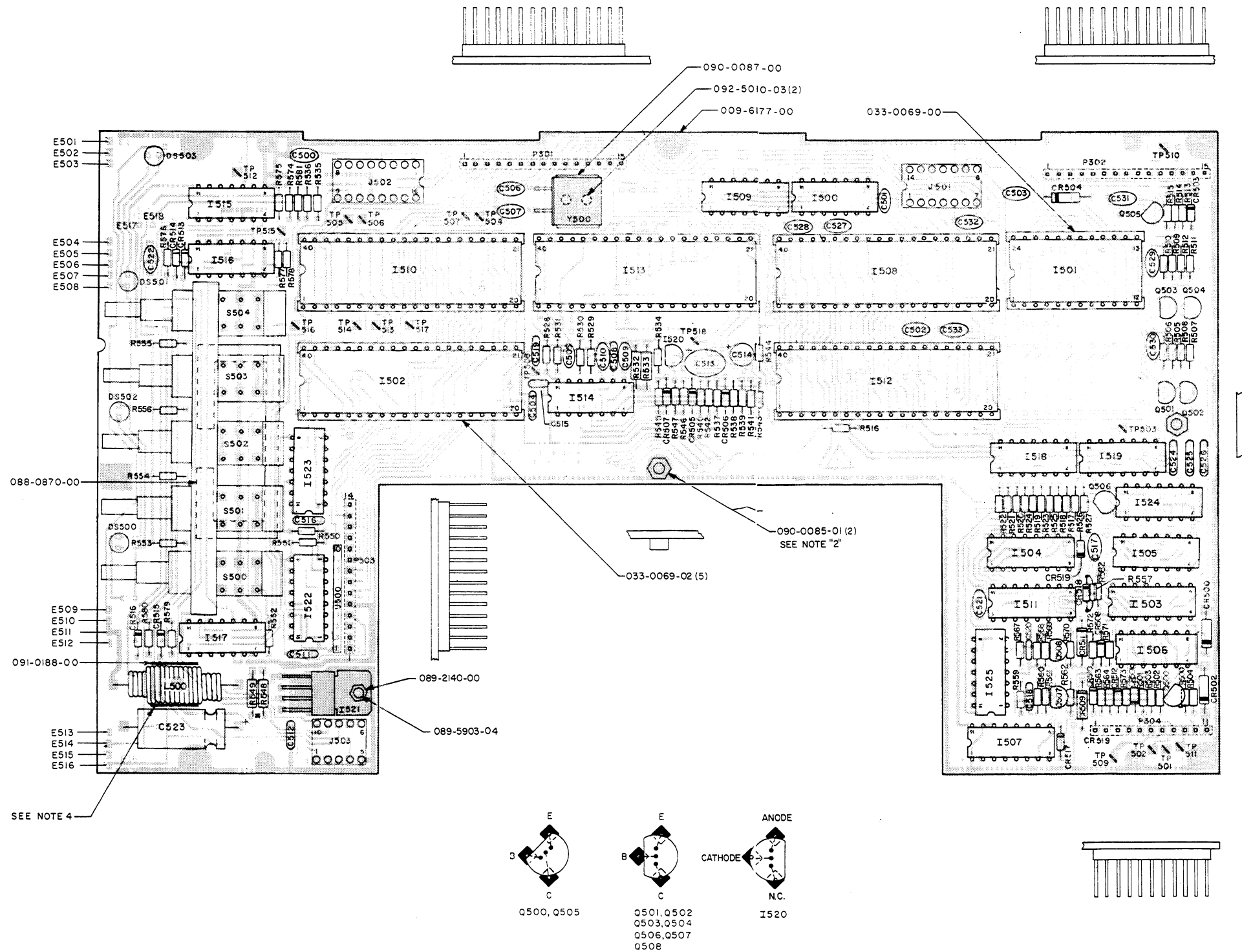


- NOTES:
1. PRIOR TO POST COATING BOTH SIDES OF PC BOARD WITH CLEAR URETHANE (016-1040-00), MASK OFF THE FOLLOWING: ALL MOUNTING AREAS, ALL TEST POINTS, ALL SOCKETS, DS500 THRU DS503, SS00 THRU SS04, P301 THRU P304, J501 THRU J503, ALL "E" NUMBERS
 2. PRESS 090-0085-01 FLUSH TO BOARD.
 3. MAXIMUM HEIGHT OF COMPONENTS NOT TO EXCEED .430 EXCEPT DS500 THRU DS503.
 4. HEAT STAKE TAB ON FAR SIDE OF BOARD.
 5. CJ500 IS USED ONLY WITH TACAN VERSION BOARD (I-30).
 6. FOR -60 & -80 UNITS ONLY:
APPLY RTV (016-1082-00) TO TOP OF I508. PLACE THE PLL INTEGRATOR BOARD OVER I-508 & PRESS THE CABLE TOWARD THE OUTSIDE EDGE OF THE PC BOARD. BUNDLE WIRES TOGETHER NEATLY & SECURE TOGETHER WITH A CABLE TIE (091-0109-00).

FIGURE 6-17 -10 VERSION COMPUTER BOARD ASSEMBLY
(Dwg. No. 300-6177-10, Rev. 8)

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NOTES:

1. PRIOR TO POST COATING WITH CLEAR URETHANE (KPN 016-1040-00), MASK OFF THE FOLLOWING AREAS: ALL MOUNTING AREAS, TEST POINTS, PADS FOR "E" NUMBERS, I.C. SOCKETS, J501, J502, J503, S500-S504, P301-P304, DS500-DS503
2. PRESS 090-0085-01 FLUSH TO BOARD.
3. MAXIMUM HEIGHT OF COMPONENTS NOT TO EXCEED .430 EXCEPT DS500 THRU DS503.
4. HEAT STAKE TAB ON FAR SIDE OF BOARD.

REWORK NOTES:

- A. DRILL HOLE USING BIT ".51", INSTALL EYELET(092-1515-05) AND TERMINAL. REMOVE TEFLON BEFORE INSTALLING.

FIGURE 6-12 COMPUTER BOARD ASSEMBLY
(Dwg. No. 300-6177-00, R-8)

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NOTE:

1. ALL CAPACITANCE IS IN MICROFARADS.
2. ALL RESISTANCE IS IN OHMS, 5%.
3. CJ501 & C2502 ARE NOT USED BUT PROVIDED FOR FUTURE PROGRAM EXPANSION, IF REQUIRED.
4. CJ500 IS USED FOR TACAN VERSION.

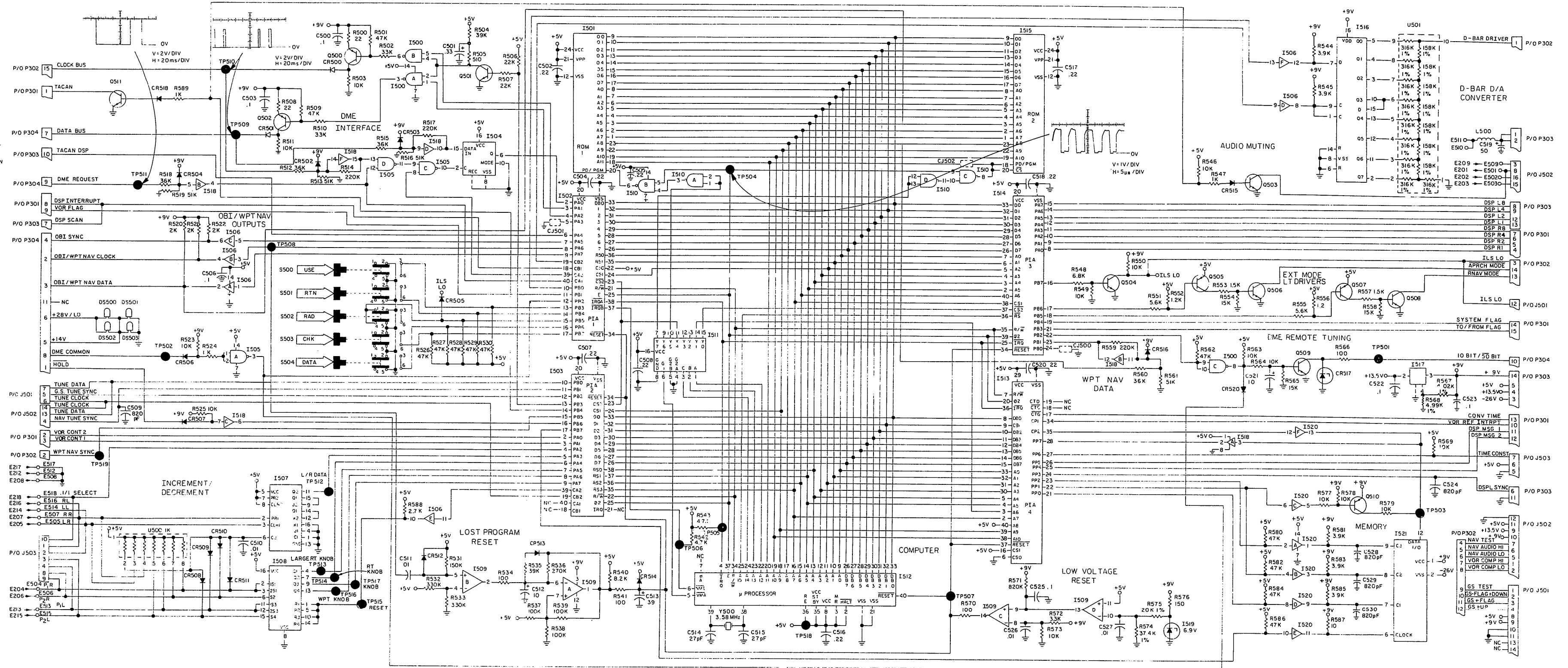
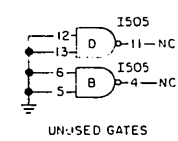


FIGURE 6-18 -10 VERSION COMPUTER BOARD SCHEMATIC
(Org. No. 002-6177-10, Rev. 5)

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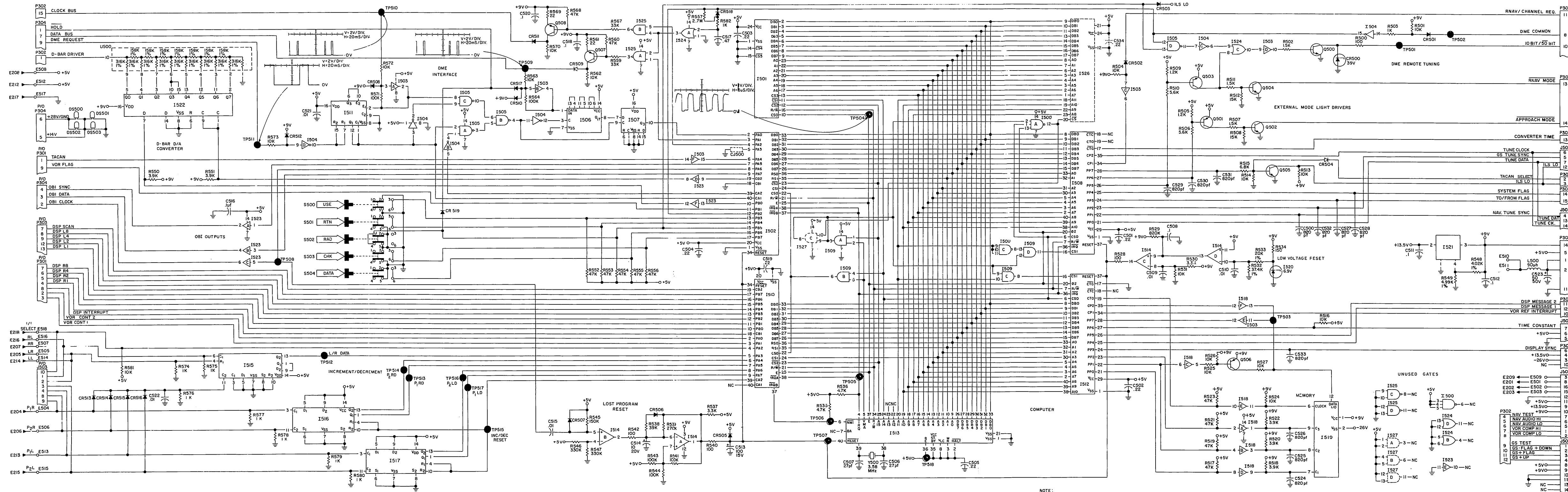


FIGURE 6-13 COMPUTER BOARD SCHEMATIC
(Dwg. No. 002-6177-00, R-9)

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200-6175-00 Rev. 27 NAV RECEIVER KNS0081

SYMBOL	PART NUMBER	DESCRIPTION	A	UW	00
	009-6175-00	PC BD NAV RCVR		EA	1.00
	012-1171-00	INSUL NAV/RCVR		EA	1.00
	012-1175-00	INSUL OSC SHLD		EA	1.00
	016-1040-00	COATING TYPE AR		AR	0.00
	047-5195-01	SHLD NAV REC	A	EA	1.00
	047-5274-01	SHLD OSC NAV/RCVR	A	EA	1.00
	047-5399-01	FINGER STOCK 1.80		EA	1.00
	155-2111-00	CA FLEX		EA	1.00
C	601 113-3100-00	CAP DC 10PF 500V		EA	1.00
C	602 113-3330-00	CAP DC 33PF 500V		EA	1.00
C	603 106-0001-31	CAP FC 1.1 5% 500V		EA	1.00
C	604 113-3330-00	CAP DC 33PF 500V		EA	1.00
C	605 113-5102-00	CAP DC .001UF 500V		EA	1.00
C	606 113-3027-00	CAP DC 2.7PF 500V		EA	1.00
C	607 113-5331-00	CAP DC 330PF 500V		EA	1.00
C	608 113-3820-00	CAP DC 82PF 500V		EA	1.00
C	609 111-0001-01	CAP CR .1UF 50V		EA	1.00
C	610 113-5331-00	CAP DC 330PF 500V		EA	1.00
C	611 113-3047-00	CAP DC 4.7PF 500V		EA	1.00
C	612 113-5151-01	CAP DC 150PF 500V		EA	1.00
C	613 113-3120-00	CAP DC 12PF 500V		EA	1.00
C	614 113-3033-01	CAP DC 3.3PF 500V		EA	1.00
C	615 113-3330-00	CAP DC 33PF 500V		EA	1.00
C	616 106-0001-12	CAP FC .75PF5%500V		EA	1.00
C	617 113-3330-00	CAP DC 33PF 500V		EA	1.00
C	618 113-3047-00	CAP DC 4.7PF 500V		EA	1.00
C	619 113-3120-00	CAP DC 12PF 500V		EA	1.00
C	620 113-5331-00	CAP DC 330PF 500V		EA	1.00
C	621 113-5151-01	CAP DC 150PF 500V		EA	1.00
C	622 113-5151-01	CAP DC 150PF 500V		EA	1.00
C	623 111-0001-00	CAP CR .01UF 50V		EA	1.00
C	624 096-1082-05	CAP TN 10UF 20V		EA	1.00
C	625 113-5151-01	CAP DC 150PF 500V		EA	1.00
C	626 109-0007-00	CAP DC .01UF 25V		EA	1.00
C	627 109-0007-03	CAP DC .05UF 25V		EA	1.00
C	628 109-0007-03	CAP DC .05UF 25V		EA	1.00
C	629 109-0007-03	CAP DC .05UF 25V		EA	1.00
C	630 109-0007-00	CAP DC .01UF 25V		EA	1.00
C	631 096-1082-02	CAP TN 1UF 35V		EA	1.00
C	632 113-5681-00	CAP DC 680PF 500V		EA	1.00
C	633 096-1082-16	CAP TN 2.2UF 20V		EA	1.00
C	634 096-1082-06	CAP TN 47UF 15V		EA	1.00
C	635 096-1082-06	CAP TN 47UF 15V		EA	1.00
C	636 111-0002-00	CAP CR .1UF 50V		EA	1.00
C	637 096-1082-05	CAP TN 10UF 20V		EA	1.00
C	638 111-0001-37	CAP CR .0047UF100V		EA	1.00
C	639 111-0001-07	CAP CR .022UF 50V		EA	1.00
C	640 111-0001-00	CAP CR .01UF 50V		EA	1.00
C	641 999-9999-99	DO NOT USE		EA	0.00
C	642 096-1082-02	CAP TN 1UF 35V		EA	1.00
C	643 111-0001-07	CAP CR .022UF 50V		EA	1.00
C	644 111-0001-38	CAP CR .0082UF 50V		EA	1.00
C	645 111-0001-00	CAP CR .01UF 50V		EA	1.00
C	646 114-5152-00	CAP DC 1500PF 500V		EA	1.00
C	647 113-3100-00	CAP DC 10PF 500V		EA	1.00
C	648 102-0024-09	CAP VA 7-35PF 160V		EA	1.00
C	649 111-0001-01	CAP CR .1UF 50V		EA	1.00
C	650 113-5221-01	CAP DC 220PF 500V		EA	1.00
C	651 113-5471-00	CAP DC 470PF 500V		EA	1.00
C	652 113-5151-01	CAP DC 150PF 500V		EA	1.00

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C	653	111-0001-01	CAP CR .1UF 50V	EA	1.00
C	654	111-0001-01	CAP CR .1UF 50V	EA	1.00
C	655	111-0001-01	CAP CR .1UF 50V	EA	1.00
C	656	113-5221-01	CAP DC 220PF 500V	EA	1.00
C	657	113-5121-01	CAP DC 120PF 1KV	EA	1.00
C	658	113-5121-01	CAP DC 120PF 1KV	EA	1.00
C	659	113-5331-00	CAP DC 330PF 500V	EA	1.00
C	660	111-0001-01	CAP CR .1UF 50V	EA	1.00
C	661	113-5471-00	CAP DC 470PF 500V	EA	1.00
C	662	111-0001-14	CAP CR .0027UF 50V	EA	1.00
C	663	111-0001-14	CAP CR .0027UF 50V	EA	1.00
C	664	096-1082-40	CAP TN 3.3UF 35V	EA	1.00
C	665	113-5331-00	CAP DC 330PF 500V	EA	1.00
C	666	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	667	113-5331-00	CAP DC 330PF 500V	EA	1.00
C	668	113-3120-00	CAP DC 12PF 500V	EA	1.00
C	669	104-0001-08	CAP SW 75PF 100V	EA	1.00
C	670	113-5121-01	CAP DC 120PF 1KV	EA	1.00
C	671	113-5471-00	CAP DC 470PF 500V	EA	1.00
C	672	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	673	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	674	113-5151-01	CAP DC 150PF 500V	EA	1.00
C	675	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	676	113-5331-00	CAP DC 330PF 500V	EA	1.00
C	677	113-5151-01	CAP DC 150PF 500V	EA	1.00
C	678	113-5101-00	CAP DC 100PF 500V	EA	1.00
C	679	111-0001-34	CAP CR 1500PF 50V	EA	1.00
C	680	111-0001-39	CAP CR 1KPF 100V	EA	1.00
C	681	096-1082-28	CAP TN 47UF 20V	EA	1.00
C	682	096-1082-33	CAP TN .47UF 50V	EA	1.00
C	683	096-1082-33	CAP TN .47UF 50V	EA	1.00
C	684	096-1030-08	CAP TN 100UF20%15V	EA	1.00
C	685	096-1030-08	CAP TN 100UF20%15V	EA	1.00
C	686	113-5331-00	CAP DC 330PF 500V	EA	1.00
C	687	106-0049-00	CAP CHIP 56PF 20%	EA	1.00
CR	600	007-4025-00	DIO V MV109	EA	1.00
CR	601	007-4025-00	DIO V MV109	EA	1.00
CR	602	007-4025-00	DIO V MV109	EA	1.00
CR	603	007-4025-00	DIO V MV109	EA	1.00
CR	604	007-6016-00	DIO S 1N4154	EA	1.00
CR	605	007-6016-00	DIO S 1N4154	EA	1.00
CR	606	999-9999-99	DO NOT USE	EA	1.00
CR	607	007-6106-00	DIO 1N4156	EA	1.00
CR	608	007-6106-00	DIO 1N4156	EA	1.00
CR	609	007-4025-00	DIO V MV109	EA	1.00
E	617	008-0038-01	TERM BIFUR .084L	EA	1.00
E	618	008-0038-01	TERM BIFUR .084L	EA	1.00
FL	600	017-0080-00	FLTR XTAL 11.1MHZ	EA	1.00
I	600	120-3020-00	IC MC1350P	EA	1.00
I	601	120-3020-00	IC MC1350P	EA	1.00
I	602	120-3052-00	IC LM324N	EA	1.00
I	603	120-3052-00	IC LM324N	EA	1.00
I	604	120-8025-00	IC C2392N	EA	1.00
I	605	120-3080-00	IC SL60827	EA	1.00
L	600	019-2313-11	IDCTR V 3.5T	EA	1.00
L	601	019-2313-61	IDCTR V 3.5T	EA	1.00
L	602	019-2084-29	CH 2.2UH 10%	EA	1.00
L	603	019-2313-61	IDCTR V 3.5T	EA	1.00
L	604	019-2313-61	IDCTR V 3.5T	EA	1.00
L	605	019-2084-63	CH 56UH 10%	EA	1.00
L	606	019-2084-31	CH 2.7UH 10%	EA	1.00
L	607	019-2084-31	CH 2.7UH 10%	EA	1.00
L	608	019-2084-05	CH .22UH 10%	EA	1.00

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L	609	019-2084-31	CH 2.7UH 10%	EA	1.00
L	610	019-8078-00	COIL TUN 20MH	EA	1.00
L	611	019-2084-49	CH 15UH 10%	EA	1.00
L	612	019-2314-61	IDCTR V 4.5T	EA	1.00
L	613	013-0006-03	FERR BEAD	EA	1.00
L	614	013-0006-03	FERR BEAD	EA	1.00
L	615	019-2084-12	CH .47UH 5%	EA	1.00
Q	600	007-0317-01	XSTR SD306DE	EA	1.00
Q	601	007-0452-01	XSTR 68716	EA	1.00
Q	602	007-0162-00	XSTR S NPN MPS6515	EA	1.00
Q	603	007-0162-00	XSTR S NPN MPS6515	EA	1.00
Q	604	007-0195-00	XSTR S NPSH10	EA	1.00
Q	605	007-0162-00	XSTR S NPN MPS6515	EA	1.00
Q	606	007-0195-00	XSTR S NPSH10	EA	1.00
Q	607	007-0078-00	XSTR S NPN 2N3415	EA	1.00
Q	608	007-0238-00	XSTR S PNP FPN4917	EA	1.00
Q	609	007-0078-00	XSTR S NPN 2N3415	EA	1.00
Q	610	007-0195-00	XSTR S NPSH10	EA	1.00
Q	611	007-0195-00	XSTR S NPSH10	EA	1.00
R	601	131-0563-23	RES CF 56K QW 5%	EA	1.00
R	602	131-0563-23	RES CF 56K QW 5%	EA	1.00
R	603	131-0433-23	RES CF 43K QW 5%	EA	1.00
R	604	131-0563-23	RES CF 56K QW 5%	EA	1.00
R	605	131-0563-23	RES CF 56K QW 5%	EA	1.00
R	606	131-0101-23	RES CF 100 QW 5%	EA	1.00
R	607	131-0113-23	RES CF 11K QW 5%	EA	1.00
R	608	131-0101-23	RES CF 100 QW 5%	EA	1.00
R	609	131-0220-13	RES CF 22 EW 5%	EA	1.00
R	610	131-0563-23	RES CF 56K QW 5%	EA	1.00
R	611	131-0563-23	RES CF 56K QW 5%	EA	1.00
R	612	131-0563-23	RES CF 56K QW 5%	EA	1.00
R	613	131-0563-13	RES CF 56K EW 5%	EA	1.00
R	614	131-0104-13	RES CF 100K EW 5%	EA	1.00
R	615	131-0104-13	RES CF 100K EW 5%	EA	1.00
R	616	131-0101-13	RES CF 100 EW 5%	EA	1.00
R	617	131-0101-13	RES CF 100 EW 5%	EA	1.00
R	618	131-0622-13	RES CF 6.2K EW 5%	EA	1.00
R	619	131-0510-13	RES CF 51 EW 5%	EA	1.00
R	620	131-0751-13	RES CF 750 EW 5%	EA	1.00
R	621	131-0243-23	RES CF 24K QW 5%	EA	1.00
R	622	131-0622-13	RES CF 6.2K EW 5%	EA	1.00
R	623	131-0101-23	RES CF 100 QW 5%	EA	1.00
R	624	131-0183-23	RES CF 18K QW 5%	EA	1.00
R	625	131-0133-23	RES CF 13K QW 5%	EA	1.00
R	626	131-0473-23	RES CF 47K QW 5%	EA	1.00
R	627	131-0103-23	RES CF 10K QW 5%	EA	1.00
R	628	131-0513-13	RES CF 51K EW 5%	EA	1.00
R	629	131-0201-23	RES CF 200 QW 5%	EA	1.00
R	630	131-0104-23	RES CF 100K QW 5%	EA	1.00
R	631	131-0753-23	RES CF 75K QW 5%	EA	1.00
R	632	131-0333-23	RES CF 33K QW 5%	EA	1.00
R	633	133-0113-16	RES YA 5K 20% A	EA	1.00
R	634	131-0244-13	RES CF 240K EW 5%	EA	1.00
R	635	131-0102-13	RES CF 1K EW 5%	EA	1.00
R	636	131-0224-13	RES CF 220K EW 5%	EA	1.00
R	637	131-0303-13	RES CF 30K EW 5%	EA	1.00
R	638	131-0273-13	RES CF 27K EW 5%	EA	1.00
R	639	131-0752-23	RES CF 7.5K QW 5%	EA	1.00
R	640	133-0113-16	RES YA 5K 20% A	EA	1.00
R	641	131-0472-23	RES CF 4.7K QW 5%	EA	1.00
R	642	131-0102-23	RES CF 1K QW 5%	EA	1.00
R	643	131-0752-23	RES CF 7.5K QW 5%	EA	1.00
R	644	131-0752-23	RES CF 7.5K QW 5%	EA	1.00
R	645	131-0102-23	RES CF 1K QW 5%	EA	1.00
R	646	131-0123-13	RES CF 12K EW 5%	EA	1.00
R	647	131-0104-13	RES CF 100K EW 5%	EA	1.00
R	648	131-0223-13	RES CF 22K EW 5%	EA	1.00

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R	649	133-0113-16	RES VA 5K 20% A	EA	1.00
R	650	131-0243-13	RES CF 24K EW 5%	EA	1.00
R	651	131-0303-23	RES CF 30K QW 5%	EA	1.00
R	652	131-0203-23	RES CF 20K QW 5%	EA	1.00
R	653	131-0153-23	RES CF 15K QW 5%	EA	1.00
R	654	131-0823-23	RES CF 82K QW 5%	EA	1.00
R	655	131-0912-23	RES CF 9.1K QW 5%	EA	1.00
R	656	131-0302-23	RES CF 3K QW 5%	EA	1.00
R	657	131-0113-23	RES CF 11K QW 5%	EA	1.00
R	658	999-9999-99	DO NOT USE	EA	0.00
R	659	136-3831-72	RES PF 3.83K QW 1%	EA	1.00
R	660	999-9999-99	DO NOT USE	EA	0.00
R	661	999-9999-99	DO NOT USE	EA	0.00
R	662	131-0114-23	RES CF 110K QW 5%	EA	1.00
R	663	131-0224-23	RES CF 220K QW 5%	EA	1.00
R	664	131-0183-23	RES CF 18K QW 5%	EA	1.00
R	665	131-0472-23	RES CF 4.7K QW 5%	EA	1.00
R	666	131-0472-23	RES CF 4.7K QW 5%	EA	1.00
R	667	131-0471-23	RES CF 470 QW 5%	EA	1.00
R	668	131-0471-23	RES CF 470 QW 5%	EA	1.00
R	669	132-0105-45	RES WW 47 1.5W 5%	EA	1.00
R	670	131-0241-23	RES CF 240 QW 5%	EA	1.00
R	671	131-0221-23	RES CF 220 QW 5%	EA	1.00
R	672	131-0682-23	RES CF 6.8K QW 5%	EA	1.00
R	673	131-0362-23	RES CF 3.6K QW 5%	EA	1.00
R	674	131-0471-23	RES CF 470 QW 5%	EA	1.00
R	675	131-0122-23	RES CF 1.2K QW 5%	EA	1.00
R	676	131-0822-23	RES CF 8.2K QW 5%	EA	1.00
R	677	131-0113-23	RES CF 11K QW 5%	EA	1.00
R	678	131-0912-23	RES CF 9.1K QW 5%	EA	1.00
R	679	131-0113-23	RES CF 11K QW 5%	EA	1.00
R	680	131-0103-23	RES CF 10K QW 5%	EA	1.00
R	681	131-0822-23	RES CF 8.2K QW 5%	EA	1.00
R	682	131-0200-13	RES CF 20 EW 5%	EA	1.00
R	683	131-0103-23	RES CF 10K QW 5%	EA	1.00
R	684	131-0102-23	RES CF 1K QW 5%	EA	1.00
R	685	131-0103-23	RES CF 10K QW 5%	EA	1.00
R	686	131-0821-23	RES CF 820 QW 5%	EA	1.00
R	687	131-0473-23	RES CF 47K QW 5%	EA	1.00
R	688	131-0822-23	RES CF 8.2K QW 5%	EA	1.00
R	689	131-0332-23	RES CF 3.3K QW 5%	EA	1.00
R	690	131-0101-23	RES CF 100 QW 5%	EA	1.00
R	691	131-0471-23	RES CF 470 QW 5%	EA	1.00
R	692	131-0221-23	RES CF 220 QW 5%	EA	1.00
R	693	131-0100-23	RES CF 10 QW 5%	EA	1.00
R	694	131-0472-23	RES CF 4.7K QW 5%	EA	1.00
R	695	131-0102-23	RES CF 1K QW 5%	EA	1.00
R	696	131-0750-23	RES CF 75 QW 5%	EA	1.00
R	697	131-0750-23	RES CF 75 QW 5%	EA	1.00
R	698	136-3832-72	RES PF 38.3K QW 1%	EA	1.00
R	699	136-2552-72	RES PF 25.5K QW 1%	EA	1.00
R	700	131-0027-23	RES CF 2.7 QW 5%	EA	1.00
R	701	131-0101-23	RES CF 100 QW 5%	EA	1.00
R	702	131-0911-23	RES CF 910 QW 5%	EA	1.00
R	703	131-0223-13	RES CF 22K EW 5%	EA	1.00
T	600	019-8080-01	XFMR IF 5.8PF	EA	1.00
T	601	019-8098-01	TRANSFORMER	EA	1.00
T	602	019-8102-00	XFMR IF 27PF	EA	1.00
T	603	019-8103-00	XFMR IF	EA	1.00
T	604	019-3082-00	XFMR BFLR RF 4T	EA	1.00
T	605	019-5083-00	XFMR AUD	EA	1.00
TP	601	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	602	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	603	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	604	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	605	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	606	008-0096-01	TERMINAL TEST PNT	EA	1.00
Y	800	044-0107-01	XTAL 12.8000MHZ	EA	1.00

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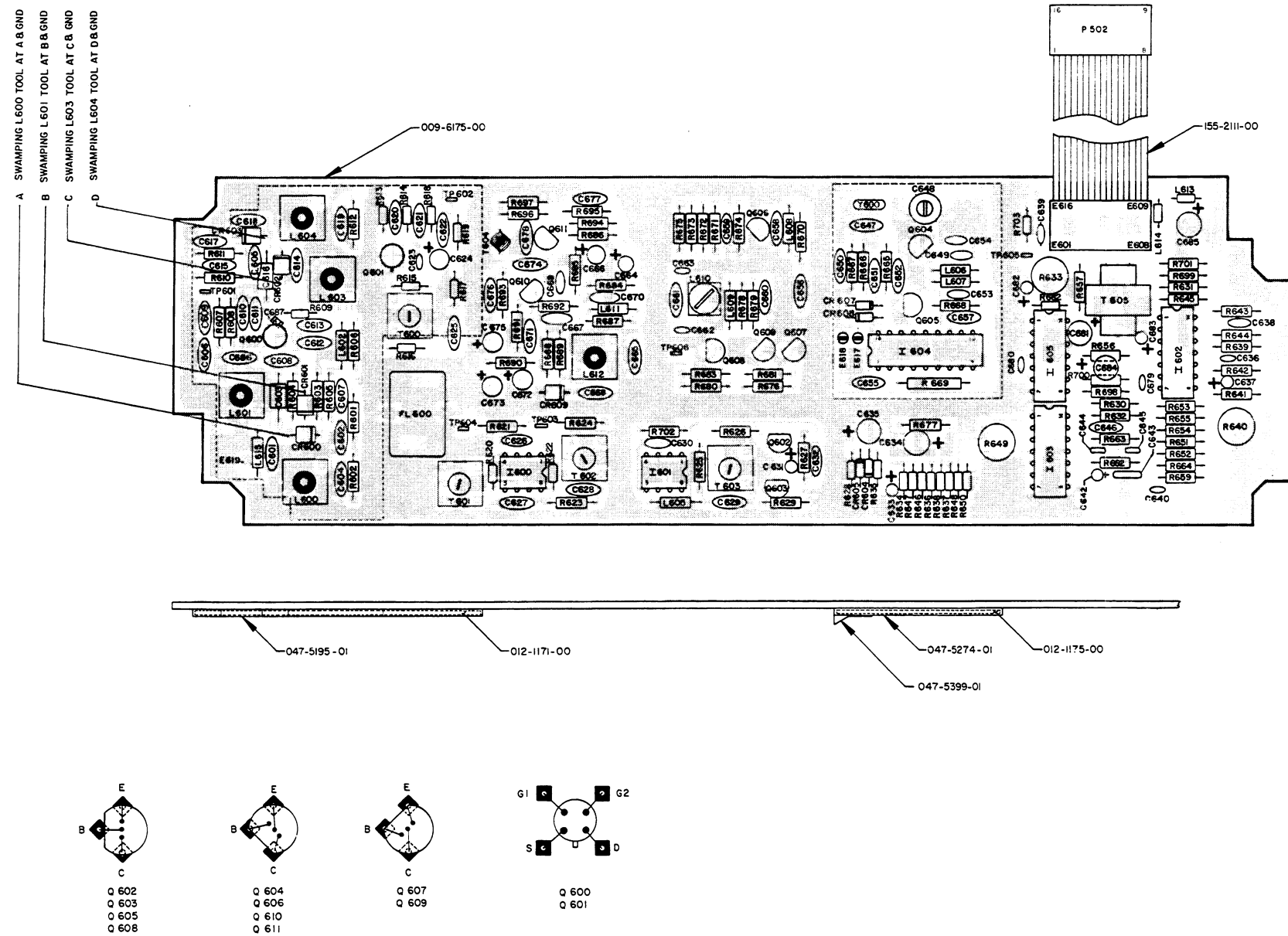


FIGURE 6-19 NAV RECEIVER BOARD ASSEMBLY
(Dwg. No. 300-6175-00, Rev. 12)

UP-193356

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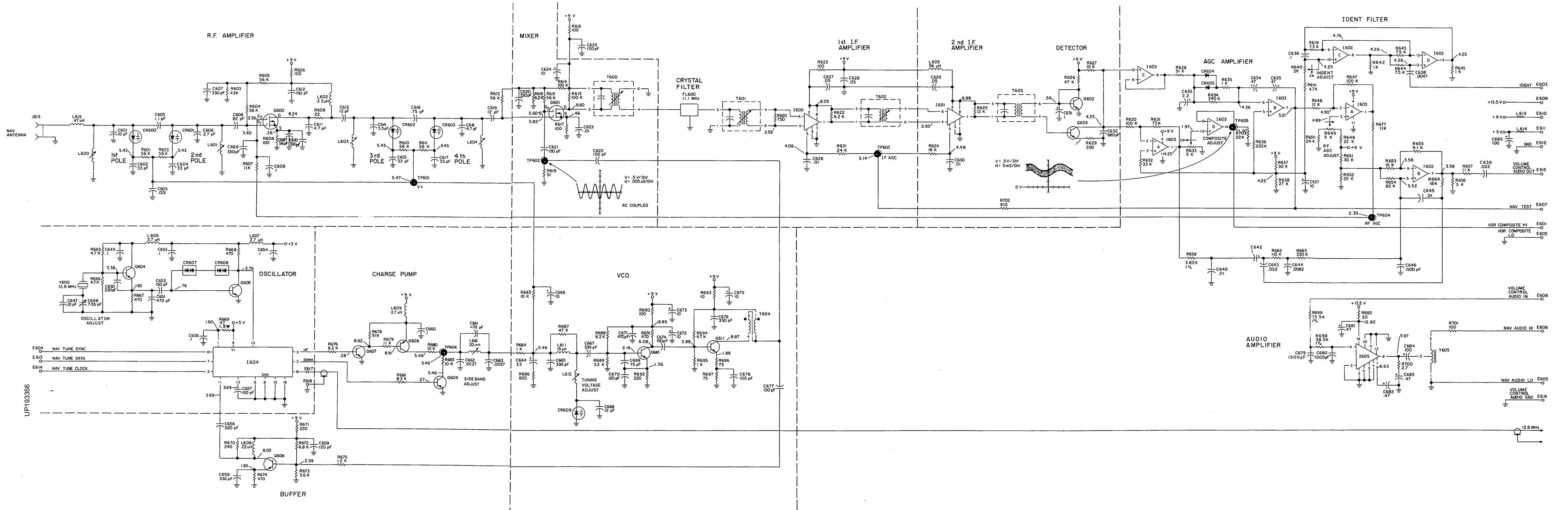


FIGURE 6-20 NAV RECEIVER BOARD SCHEMATIC
(Dwg. No. 002-6175-00, Rev. 12)

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200-6176-00 Rev. 18 GS RECEIVER BD KNSG081

SYMBOL	PART NUMBER	DESCRIPTION	A	UM	00
	009-6176-00	PC BD GS RCVR	EA		1.00
	012-1169-00	INSUL GLIDESLOPE	EA		1.00
	012-1169-02	INSUL GLIDESLOPE	EA		1.00
	012-1169-03	INSUL GLIDESLOPE	EA		1.00
	012-1169-04	INSUL GLIDESLOPE	EA		1.00
	016-1040-00	COATING TYPE AR	AR		0.00
	026-0003-00	WIRE COP TIN 22G	IN		3.00
	047-5320-01	FENCE RF 1	A	EA	1.00
	047-5321-01	FENCE RF 2 W/F	A	EA	1.00
	047-5322-01	FENCE MIXER W/F	A	EA	1.00
	047-5323-01	FENCE IF W/F	A	EA	1.00
	047-5324-01	FENCE SYN W/F	A	EA	1.00
	047-5335-01	SHIELD RF W/F	A	EA	1.00
	047-5337-01	SHIELD MIXER W/F	A	EA	1.00
	047-5338-01	SHIELD IF W/F	A	EA	1.00
	047-5339-01	SHIELD SYN W/F	A	EA	1.00
	047-5399-00	FINGER STOCK 4.45	EA		1.00
	155-2111-01	CA FLEX	EA		1.00
C	800	113-5331-00	CAP DC 330PF 500V	EA	1.00
C	801	102-0024-05	CAP YA3.5-13PF160V	EA	1.00
C	802	113-3680-00	CAP DC 68PF 500V	EA	1.00
C	803	113-3680-00	CAP DC 68PF 500V	EA	1.00
C	804	113-3680-00	CAP DC 68PF 500V	EA	1.00
C	805	113-3020-00	CAP DC 2PF 500V	EA	1.00
C	806	113-5033-00	CAP DC 3.3PF 500V	EA	1.00
C	807	113-3680-00	CAP DC 68PF 500V	EA	1.00
C	808	113-3121-00	CAP DC 120PF 500V	EA	1.00
C	809	113-3680-00	CAP DC 68PF 500V	EA	1.00
C	810	113-3039-00	CAP DC 3.9PF 500V	EA	1.00
C	811	113-3680-00	CAP DC 68PF 500V	EA	1.00
C	812	113-3121-00	CAP DC 120PF 500V	EA	1.00
C	813	113-3010-00	CAP DC 1PF 500V	EA	1.00
C	814	113-6103-00	CAP DC .01UF 50V	EA	1.00
C	815	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	816	113-3680-00	CAP DC 68PF 500V	EA	1.00
C	817	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	818	111-0001-01	CAP CR .1UF 50V	EA	1.00
C	819	111-0001-11	CAP CR .047UF 50V	EA	1.00
C	820	096-1082-28	CAP TN 47UF 20V	EA	1.00
C	821	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	822	096-1082-49	CAP TN 1UF 50V	EA	1.00
C	823	118-0035-00	CAP DC 1800PF 600V	EA	1.00
C	824	113-3151-00	CAP DC 150PF 500V	EA	1.00
C	825	114-5222-01	CAP DC 2200PF 500V	EA	1.00
C	826	113-5681-00	CAP DC 680PF 500V	EA	1.00
C	827	118-0036-00	CAP DC 2KPF 600V	EA	1.00
C	828	113-5471-00	CAP DC 470PF 500V	EA	1.00
C	829	114-5152-00	CAP DC 1500PF 500V	EA	1.00
C	830	111-0001-11	CAP CR .047UF 50V	EA	1.00
C	831	113-7503-00	CAP DC .05UF 12V	EA	1.00
C	832	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	833	114-5102-00	CAP DC 1KPF 500V	EA	1.00
C	834	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	835	111-0001-03	CAP CR .22UF 50V	EA	1.00
C	836	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	837	111-0001-07	CAP CR .022UF 50V	EA	1.00
C	838	111-0001-11	CAP CR .047UF 50V	EA	1.00
C	839	096-1082-28	CAP TN 47UF 20V	EA	1.00
C	840	096-1082-28	CAP TN 47UF 20V	EA	1.00

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C	841	113-5101-01	CAP DC 100PF 500V	EA	1.00
C	842	111-0001-01	CAP CR .1UF 50V	EA	1.00
C	843	113-3220-00	CAP DC 22PF 500V	EA	1.00
C	844	113-3121-00	CAP DC 120PF 500V	EA	1.00
C	845	111-0001-01	CAP CR .1UF 50V	EA	1.00
C	846	096-1082-45	CAP TN 2.2UF 35V	EA	1.00
C	847	113-3121-00	CAP DC 120PF 500V	EA	1.00
C	848	113-7503-00	CAP DC .05UF 12V	EA	1.00
C	849	114-7203-00	CAP DC .02UF 200V	EA	1.00
C	850	113-7503-00	CAP DC .05UF 12V	EA	1.00
C	851	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	852	113-3120-02	CAP DC 12PF 500V	EA	1.00
C	853	113-3150-00	CAP DC 15PF 500V	EA	1.00
C	854	113-3820-00	CAP DC 82PF 500V	EA	1.00
C	855	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	856	113-5221-01	CAP DC 220PF 500V	EA	1.00
C	857	113-3100-00	CAP DC 10PF 500V	EA	1.00
C	858	113-3100-00	CAP DC 10PF 500V	EA	1.00
C	859	113-3047-00	CAP DC 4.7PF 500V	EA	1.00
C	860	113-6103-00	CAP DC .01UF 50V	EA	1.00
C	861	113-3121-00	CAP DC 120PF 500V	EA	1.00
C	862	111-0001-01	CAP CR .1UF 50V	EA	1.00
C	863	113-3470-00	CAP DC 47PF 500V	EA	1.00
C	864	113-3330-00	CAP DC 33PF 500V	EA	1.00
C	865	113-5221-01	CAP DC 220PF 500V	EA	1.00
C	866	113-5221-01	CAP DC 220PF 500V	EA	1.00
C	867	108-6004-02	CAP PF .10UF 50V	EA	1.00
C	868	108-6004-02	CAP PF .10UF 50V	EA	1.00
C	869	108-6004-02	CAP PF .10UF 50V	EA	1.00
C	870	108-6004-02	CAP PF .10UF 50V	EA	1.00
C	871	096-1030-19	CAP TN 33UF20%20V	EA	1.00
C	872	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	873	096-1082-09	CAP TN 15UF 20V	EA	1.00
C	874	096-1082-02	CAP TN 1UF 35V	EA	1.00
C	875	096-1082-05	CAP TN 10UF 20V	EA	1.00
C	877	113-3680-00	CAP DC 68PF 500V	EA	1.00
C	878	113-3680-00	CAP DC 68PF 500V	EA	1.00
C	879	113-3121-00	CAP DC 120PF 500V	EA	1.00
C	880	113-3121-00	CAP DC 120PF 500V	EA	1.00
C	881	113-3121-00	CAP DC 120PF 500V	EA	1.00
C	882	113-3121-00	CAP DC 120PF 500V	EA	1.00
C	883	114-7104-00	CAP DC .1UF 16V	EA	1.00
C	884	111-0001-15	CAP CR 330PF 50V	EA	1.00
C	885	111-0001-36	CAP CR 1KPF 50V	EA	1.00
C	886	114-5102-00	CAP DC 1KPF 500V	EA	1.00
C	887	106-0049-00	CAP CHIP 56PF 20%	EA	1.00
C	888	111-0001-36	CAP CR 1KPF 50V	EA	1.00
C	889	106-0049-16	CAP CHIP 1KPF 5%	EA	1.00
C	890	106-0049-16	CAP CHIP 1KPF 5%	EA	1.00
C	891	106-0049-16	CAP CHIP 1KPF 5%	EA	1.00
C	892	106-0049-16	CAP CHIP 1KPF 5%	EA	1.00
CR	800	007-4025-00	DIO Y WV109	EA	1.00
CR	801	007-6033-00	DIO G 1N270	EA	1.00
CR	802	007-6016-00	DIO S 1N4154	EA	1.00
CR	803	007-6016-00	DIO S 1N4154	EA	1.00
CR	804	007-6016-00	DIO S 1N4154	EA	1.00
CR	805	007-6016-00	DIO S 1N4154	EA	1.00
CR	806	007-6016-00	DIO S 1N4154	EA	1.00
CR	807	007-6033-00	DIO G 1N270	EA	1.00
CR	808	007-6016-00	DIO S 1N4154	EA	1.00
CR	809	007-6016-00	DIO S 1N4154	EA	1.00
CR	810	007-6016-00	DIO S 1N4154	EA	1.00
E	817	008-0038-01	TERM BIFUR .084L	EA	1.00
E	818	008-0038-01	TERM BIFUR .084L	EA	1.00
I	800	120-3020-00	IC MC1350P	EA	1.00
I	801	120-3052-00	IC LM324N	EA	1.00
I	802	120-3052-00	IC LM324N	EA	1.00
I	803	120-8025-00	IC C2392N	EA	1.00

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J	812	030-0152-00	CONN BNC HEX	EA	1.00
L	801	019-2311-61	IDCTR V 1.5T	EA	1.00
L	802	019-2311-61	IDCTR V 1.5T	EA	1.00
L	803	019-2266-00	COIL ADJ 7MH	EA	1.00
L	804	019-2265-00	COIL ADJ 6MH	EA	1.00
L	805	019-2265-00	COIL ADJ 6MH	EA	1.00
L	806	019-2099-04	CHOKE .027UH 10%	EA	1.00
L	807	019-2084-13	CH .47UH 10%	EA	1.00
L	808	019-2099-00	CHOKE .047UH 10%	EA	1.00
L	809	019-8078-00	COIL TUN 20MH	EA	1.00
L	810	019-2084-21	CH 1UH 10%	EA	1.00
L	811	019-2311-41	IDCTR V 1.5T	EA	1.00
L	812	019-2099-00	CHOKE .047UH 10%	EA	1.00
L	813	019-2099-00	CHOKE .047UH 10%	EA	1.00
Q	800	007-0317-01	XSTR SD306DE	EA	1.00
Q	801	007-0317-01	XSTR SD306DE	EA	1.00
Q	802	007-0462-00	XSTR MOSFET BF960	EA	1.00
Q	803	007-0187-00	XSTR S NPN 2N5089	EA	1.00
Q	804	007-0179-00	XSTR S NPN 2N3904	EA	1.00
Q	805	007-0078-00	XSTR S NPN 2N3415	EA	1.00
Q	806	007-0078-00	XSTR S NPN 2N3415	EA	1.00
Q	807	007-0210-00	XSTR S X39E1798	EA	1.00
Q	808	007-0078-00	XSTR S NPN 2N3415	EA	1.00
Q	809	007-0238-00	XSTR S PNP FPN4917	EA	1.00
Q	810	007-0078-00	XSTR S NPN 2N3415	EA	1.00
Q	811	007-0195-00	XSTR S NPSH10	EA	1.00
Q	812	007-0195-00	XSTR S NPSH10	EA	1.00
Q	813	007-0195-00	XSTR S NPSH10	EA	1.00
Q	814	007-0195-00	XSTR S NPSH10	EA	1.00
Q	815	007-0210-00	XSTR S X39E1798	EA	1.00
R	800	131-0102-13	RES CF 1K EW 5%	EA	1.00
R	801	131-0101-13	RES CF 100 EW 5%	EA	1.00
R	802	131-0103-13	RES CF 10K EW 5%	EA	1.00
R	803	131-0103-13	RES CF 10K EW 5%	EA	1.00
R	804	131-0622-13	RES CF 6.2K EW 5%	EA	1.00
R	805	131-0103-13	RES CF 10K EW 5%	EA	1.00
R	806	131-0153-13	RES CF 15K EW 5%	EA	1.00
R	807	131-0101-13	RES CF 100 EW 5%	EA	1.00
R	809	131-0563-13	RES CF 56K EW 5%	EA	1.00
R	810	131-0563-13	RES CF 56K EW 5%	EA	1.00
R	812	131-0510-13	RES CF 51 EW 5%	EA	1.00
R	813	131-0471-13	RES CF 470 EW 5%	EA	1.00
R	814	131-0221-13	RES CF 220 EW 5%	EA	1.00
R	815	131-0563-23	RES CF 56K QW 5%	EA	1.00
R	816	131-0273-23	RES CF 27K QW 5%	EA	1.00
R	817	131-0101-23	RES CF 100 QW 5%	EA	1.00
R	818	131-0302-23	RES CF 3K QW 5%	EA	1.00
R	819	131-0202-23	RES CF 2K QW 5%	EA	1.00
R	820	131-0123-23	RES CF 12K QW 5%	EA	1.00
R	821	131-0101-23	RES CF 100 QW 5%	EA	1.00
R	822	131-0102-23	RES CF 1K QW 5%	EA	1.00
R	823	131-0752-23	RES CF 7.5K QW 5%	EA	1.00
R	824	131-0103-23	RES CF 10K QW 5%	EA	1.00
R	825	131-0162-23	RES CF 1.6K QW 5%	EA	1.00
R	826	131-0102-23	RES CF 1K QW 5%	EA	1.00
R	827	131-0471-23	RES CF 470 QW 5%	EA	1.00
R	828	131-0472-23	RES CF 4.7K QW 5%	EA	1.00
R	829	131-0473-23	RES CF 47K QW 5%	EA	1.00
R	830	131-0472-23	RES CF 4.7K QW 5%	EA	1.00
R	831	131-0201-23	RES CF 200 QW 5%	EA	1.00
R	832	131-0103-13	RES CF 10K EW 5%	EA	1.00
R	833	131-0102-13	RES CF 1K EW 5%	EA	1.00
R	834	131-0683-13	RES CF 68K EW 5%	EA	1.00
R	835	131-0683-23	RES CF 68K QW 5%	EA	1.00
R	836	133-0113-20	RES VA 20K 20% A	EA	1.00

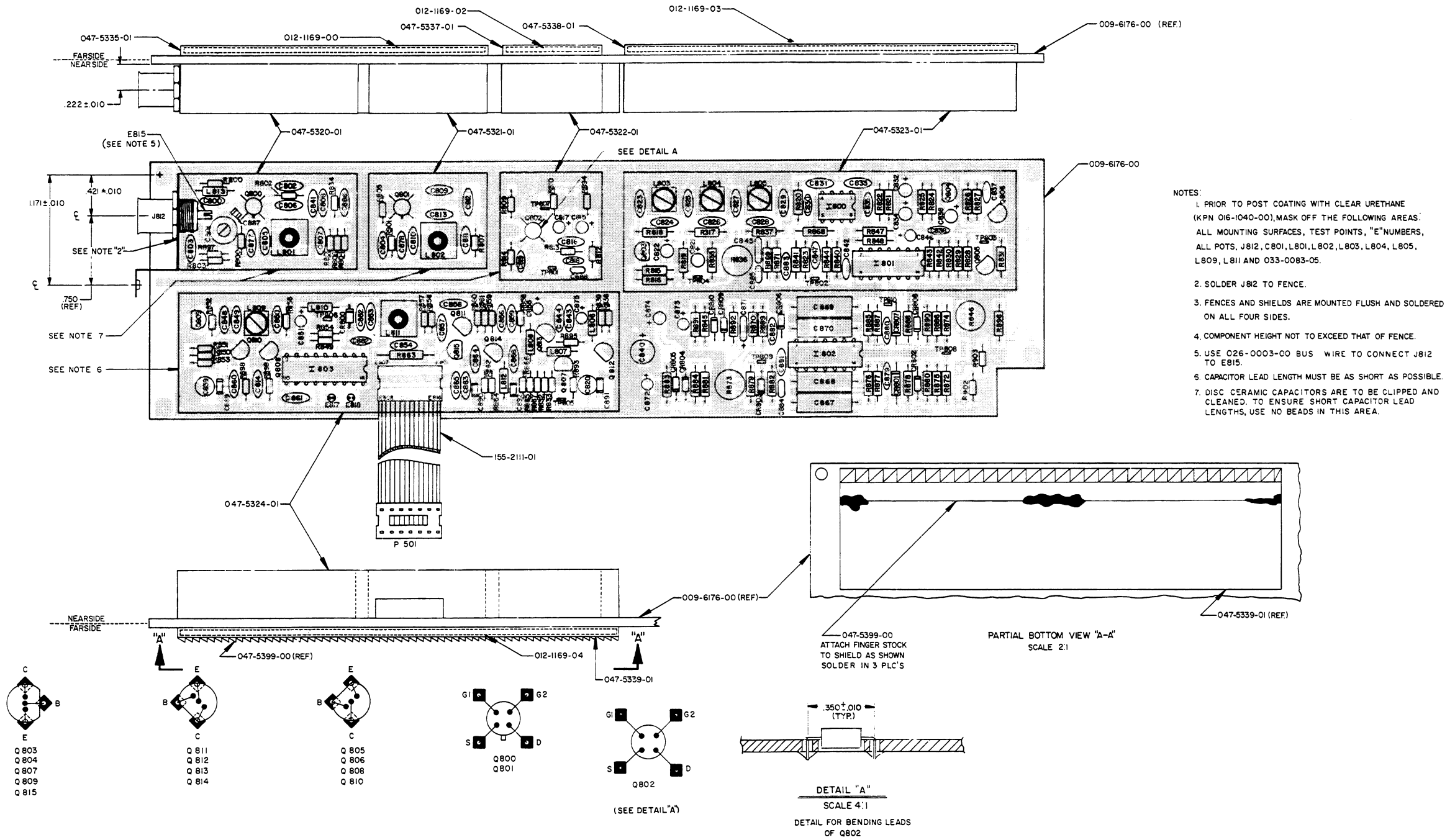
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R 837	131-0823-23	RES CF 82K QW 5%	EA 1.00
R 838	131-0101-13	RES CF 100 EW 5%	EA 1.00
R 839	131-0222-13	RES CF 2.2K EW 5%	EA 1.00
R 840	131-0224-23	RES CF 220K QW 5%	EA 1.00
R 841	131-0752-23	RES CF 7.5K QW 5%	EA 1.00
R 842	131-0104-23	RES CF 100K QW 5%	EA 1.00
R 843	131-0104-23	RES CF 100K QW 5%	EA 1.00
R 844	131-0103-23	RES CF 10K QW 5%	EA 1.00
R 845	131-0471-23	RES CF 470 QW 5%	EA 1.00
R 846	133-0113-18	RES VA 10K 20% A	EA 1.00
R 847	136-1821-72	RES PF 1.82K QW 1%	EA 1.00
R 848	136-3651-72	RES PF 3.65K QW 1%	EA 1.00
R 849	131-0102-13	RES CF 1K EW 5%	EA 1.00
R 850	131-0102-13	RES CF 1K EW 5%	EA 1.00
R 851	131-0101-13	RES CF 100 EW 5%	EA 1.00
R 852	131-0561-13	RES CF 560 EW 5%	EA 1.00
R 853	131-0561-13	RES CF 560 EW 5%	EA 1.00
R 854	131-0102-13	RES CF 1K EW 5%	EA 1.00
R 855	131-0681-13	RES CF 680 EW 5%	EA 1.00
R 856	131-0103-13	RES CF 10K EW 5%	EA 1.00
R 857	131-0822-13	RES CF 8.2K EW 5%	EA 1.00
R 858	131-0101-13	RES CF 100 EW 5%	EA 1.00
R 859	131-0470-13	RES CF 47 EW 5%	EA 1.00
R 860	131-0621-13	RES CF 620 EW 5%	EA 1.00
R 861	131-0470-13	RES CF 47 EW 5%	EA 1.00
R 862	131-0222-13	RES CF 2.2K EW 5%	EA 1.00
R 863	132-0105-41	RES WW 36 1.5W 5%	EA 1.00
R 864	131-0431-13	RES CF 430 EW 5%	EA 1.00
R 865	131-0101-13	RES CF 100 EW 5%	EA 1.00
R 866	131-0472-13	RES CF 4.7K EW 5%	EA 1.00
R 867	131-0821-13	RES CF 820 EW 5%	EA 1.00
R 868	136-3651-72	RES PF 3.65K QW 1%	EA 1.00
R 869	136-1100-72	RES PF 110 QW 1%	EA 1.00
R 870	136-3571-72	RES PF 3.57K QW 1%	EA 1.00
R 871	131-0101-23	RES CF 100 QW 5%	EA 1.00
R 872	136-5491-72	RES PF 5.49K QW 1%	EA 1.00
R 873	133-0113-12	RES VA 1K 20% A	EA 1.00
R 874	136-3321-72	RES PF 3.32K QW 1%	EA 1.00
R 875	136-2491-72	RES PF 2.49K QW 1%	EA 1.00
R 876	136-1823-72	RES PF 182K QW 1%	EA 1.00
R 877	131-0103-23	RES CF 10K QW 5%	EA 1.00
R 878	131-0203-23	RES CF 20K QW 5%	EA 1.00
R 879	136-1502-72	RES PF 15K QW 1%	EA 1.00
R 880	136-6812-72	RES PF 68.1K QW 1%	EA 1.00
R 881	136-7501-72	RES PF 7.5K QW 1%	EA 1.00
R 882	131-0103-23	RES CF 10K QW 5%	EA 1.00
R 883	136-1782-72	RES PF 17.8K QW 1%	EA 1.00
R 884	131-0102-23	RES CF 1K QW 5%	EA 1.00
R 885	136-1103-72	RES PF 110K QW 1%	EA 1.00
R 886	136-1471-72	RES PF 1.47K QW 1%	EA 1.00
R 887	131-0103-23	RES CF 10K QW 5%	EA 1.00
R 888	131-0203-23	RES CF 20K QW 5%	EA 1.00
R 889	136-1502-72	RES PF 15K QW 1%	EA 1.00
R 890	136-6812-72	RES PF 68.1K QW 1%	EA 1.00
R 891	136-4992-72	RES PF 49.9K QW 1%	EA 1.00
R 892	131-0511-23	RES CF 510 QW 5%	EA 1.00
R 893	131-0102-13	RES CF 1K EW 5%	EA 1.00
R 894	131-0510-13	RES CF 51 EW 5%	EA 1.00
R 895	131-0221-13	RES CF 220 EW 5%	EA 1.00
R 896	131-0512-23	RES CF 5.1K QW 5%	EA 1.00
R 897	131-0240-13	RES CF 24 EW 5%	EA 1.00
R 898	131-0474-13	RES CF 470K EW 5%	EA 1.00
R 899	131-0183-13	RES CF 18K EW 5%	EA 1.00
R 900	131-0680-13	RES CF 68 EW 5%	EA 1.00

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R	901	131-0680-13	RES CF 68 EW 5%	EA	1.00
R	902	131-0027-13	RES CF 2.7 EW 5%	EA	1.00
R	903	131-0027-13	RES CF 2.7 EW 5%	EA	1.00
REF	1	300-6176-00	GS RECEIVER ASSY	RF	X.
TP	801	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	802	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	803	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	804	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	805	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	806	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	807	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	808	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	809	008-0096-01	TERMINAL TEST PNT	EA	1.00
TP	810	008-0096-01	TERMINAL TEST PNT	EA	1.00

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- NOTES:
1. PRIOR TO POST COATING WITH CLEAR URETHANE (KPN 016-1040-00), MASK OFF THE FOLLOWING AREAS: ALL MOUNTING SURFACES, TEST POINTS, "E" NUMBERS, ALL POTS, J812, C801, L801, L802, L803, L804, L805, L809, L811 AND 033-0083-05.
 2. SOLDER J812 TO FENCE.
 3. FENCES AND SHIELDS ARE MOUNTED FLUSH AND SOLDERED ON ALL FOUR SIDES.
 4. COMPONENT HEIGHT NOT TO EXCEED THAT OF FENCE.
 5. USE 026-0003-00 BUS WIRE TO CONNECT J812 TO EB15.
 6. CAPACITOR LEAD LENGTH MUST BE AS SHORT AS POSSIBLE.
 7. DISC CERAMIC CAPACITORS ARE TO BE CLIPPED AND CLEANED TO ENSURE SHORT CAPACITOR LEAD LENGTHS, USE NO BEADS IN THIS AREA.

FIGURE 6-21 GLIDESLOPE BOARD ASSEMBLY
(Dwg. No. 300-6176-00, Rev. 16)

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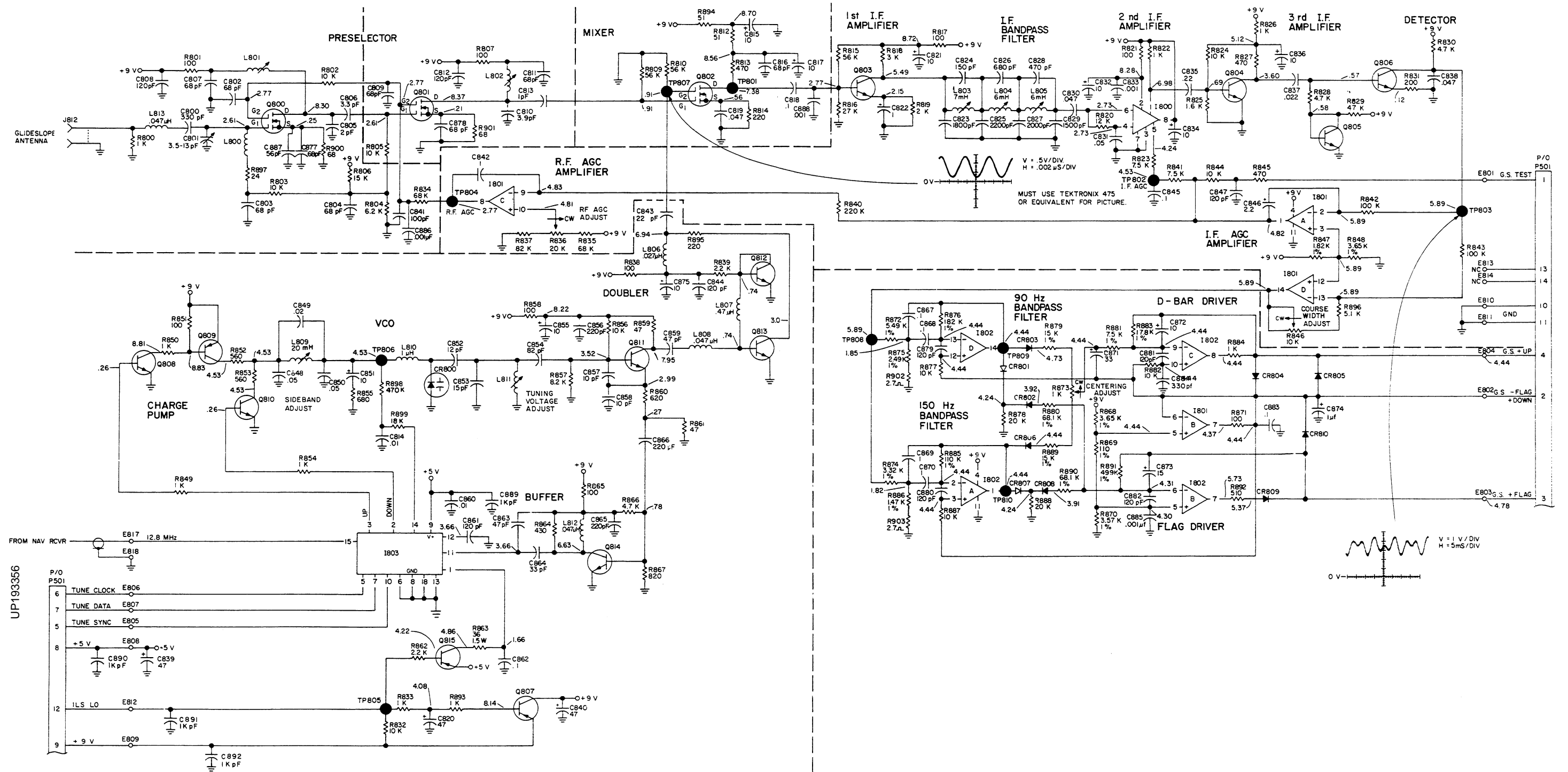


FIGURE 6-22 GLIDESLOPE BOARD SCHEMATIC
(Dwg. No. 002-6176-00, Rev. 8)

KING RADIO CORPORATION

PARTS LISTING

NAME: GLIDESLOPE RCVR

UNIT: KNS0081

ASSY NO: 200-6176-00

REV NO: 13

LAST ECO:

ECO DATE: 7/02/0

SYMBOL	PART NUMBER	DESCRIPTION	CODE	UM	-00
R817	131-0101-23	RES CF 100 QW 5%	EA		1
R818	131-0302-23	RES CF 3K QW 5%	EA		1
R819	131-0202-23	RES CF 2K QW 5%	EA		1
R820	131-0123-23	RES CF 12K QW 5%	EA		1
R821	131-0101-23	RES CF 100 QW 5%	EA		1
R822	131-0102-23	RES CF 1K QW 5%	EA		1
R823	131-0752-23	RES CF 7.5K QW 5%	EA		1
R824	131-0103-23	RES CF 10K QW 5%	EA		1
R825	131-0162-23	RES CF 1.6K QW 5%	EA		1
R826	131-0102-23	RES CF 1K QW 5%	EA		1
R827	131-0471-23	RES CF 470 QW 5%	EA		1
R828	131-0472-23	RES CF 4.7K QW 5%	EA		1
R829	131-0473-23	RES CF 47K QW 5%	EA		1
R830	131-0472-23	RES CF 4.7K QW 5%	EA		1
R831	131-0201-23	RES CF 200 QW 5%	EA		1
R832	131-0103-13	RES CF 10K EW 5%	EA		1
R833	131-0102-13	RES CF 1K EW 5%	EA		1
R834	131-0683-13	RES CF 68K EW 5%	EA		1
R835	131-0683-23	RES CF 68K QW 5%	EA		1
R836	133-0113-20	RES VA 20K 20% A	EA		1
R837	131-0823-23	RES CF 82K QW 5%	EA		1
R838	131-0101-13	RES CF 100 EW 5%	EA		1
R839	131-0222-13	RES CF 2.2K EW 5%	EA		1
R840	131-0224-23	RES CF 220K QW 5%	EA		1
R841	131-0752-23	RES CF 7.5K QW 5%	EA		1
R842	131-0104-23	RES CF 100K QW 5%	EA		1
R843	131-0104-23	RES CF 100K QW 5%	EA		1
R844	131-0103-23	RES CF 10K QW 5%	EA		1
R845	131-0471-23	RES CF 470 QW 5%	EA		1
R846	133-0113-18	RES VA 10K 20% A	EA		1
R847	136-1821-72	RES PF 1.82K EW 1%	EA		1
R848	136-3651-72	RES PF 3.65K EW 1%	EA		1
R849	131-0102-13	RES CF 1K EW 5%	EA		1
R850	131-0102-13	RES CF 1K EW 5%	EA		1
R851	131-0101-13	RES CF 100 EW 5%	EA		1
R852	131-0561-13	RES CF 560 EW 5%	EA		1
R853	131-0561-13	RES CF 560 EW 5%	EA		1
R854	131-0102-13	RES CF 1K EW 5%	EA		1
R855	131-0681-13	RES CF 680 EW 5%	EA		1
R856	131-0103-13	RES CF 10K EW 5%	EA		1
R857	131-0822-13	RES CF 8.2K EW 5%	EA		1
R858	131-0101-13	RES CF 100 EW 5%	EA		1
R859	131-0470-13	RES CF 47 EW 5%	EA		1
R860	131-0621-13	RES CF 620 EW 5%	EA		1
R861	131-0470-13	RES CF 47 EW 5%	EA		1
R862	131-0222-13	RES CF 2.2K EW 5%	EA		1
R863	132-0105-41	RES WW 36 1.5W 5%	EA		1
R864	131-0431-13	RES CF 430 EW 5%	EA		1
R865	131-0101-13	RES CF 100 EW 5%	EA		1
R866	131-0472-13	RES CF 4.7K EW 5%	EA		1

KING RADIO CORPORATION
PARTS LISTING

NAME: GLIDESLOPE RCVR

UNIT: KNS0081

ASSY NO: 200-6176-00

REV NO: 13
LAST ECO:
ECO DATE: 7/02/0

SYMBOL	PART NUMBER	DESCRIPTION	CODE	UM	-00
R867	131-0821-13	RES CF 820 EW 5%	EA		1
R868	136-3651-72	RES PF 3.65K EW 1%	EA		1
R869	136-1100-72	RES PF 110 EW 1%	EA		1
R870	136-3571-72	RES PF 3.57K EW 1%	EA		1
R871	131-0101-23	RES CF 100 QW 5%	EA		1
R872	136-5491-72	RES PF 5.49K EW 1%	EA		1
R873	133-0113-12	RES VA 1K 20% A	EA		1
R874	136-3321-72	RES PF 3.32K EW 1%	EA		1
R875	136-2491-72	RES PF 2.49K EW 1%	EA		1
R876	136-1823-72	RES PF 182K EW 1%	EA		1
R877	131-0103-23	RES CF 10K QW 5%	EA		1
R878	131-0203-23	RES CF 20K QW 5%	EA		1
R879	136-1502-72	RES PF 15K EW 1%	EA		1
R880	136-6812-72	RES PF 68.1K EW 1%	EA		1
R881	136-7501-72	RES PF 7.5K EW 1%	EA		1
R882	131-0103-23	RES CF 10K QW 5%	EA		1
R883	136-1782-72	RES PF 17.8K EW 1%	EA		1
R884	131-0102-23	RES CF 1K QW 5%	EA		1
R885	136-1103-72	RES PF 110K EW 1%	EA		1
R886	136-1471-72	RES PF 1.47K EW 1%	EA		1
R887	131-0103-23	RES CF 10K QW 5%	EA		1
R888	131-0203-23	RES CF 20K QW 5%	EA		1
R889	136-1502-72	RES PF 15K EW 1%	EA		1
R890	136-6812-72	RES PF 68.1K EW 1%	EA		1
R891	136-4992-72	RES PF 49.9K EW 1%	EA		1
R892	131-0511-23	RES CF 510 QW 5%	EA		1
R893	131-0102-13	RES CF 1K EW 5%	EA		1
R894	131-0510-13	RES CF 51 EW 5%	EA		1
R895	131-0221-13	RES CF 220 EW 5%	EA		1
R896	131-0512-23	RES CF 5.1K QW 5%	EA		1
R897	131-0240-13	RES CF 24 EW 5%	EA		1
R898	131-0474-13	RES CF 470K EW 5%	EA		1
R899	131-0183-13	RES CF 18K EW 5%	EA		1
R900	131-0680-13	RES CF 68 EW 5%	EA		1
R901	131-0680-13	RES CF 68 EW 5%	EA		1
R902	131-0027-13	RES CF 2.7 EW 5%	EA		1
R903	131-0027-13	RES CF 2.7 EW 5%	EA		1
TP801	008-0096-01	TERMINAL TEST PNT	EA		1
TP802	008-0096-01	TERMINAL TEST PNT	EA		1
TP803	008-0096-01	TERMINAL TEST PNT	EA		1
TP804	008-0096-01	TERMINAL TEST PNT	EA		1
TP805	008-0096-01	TERMINAL TEST PNT	EA		1
TP806	008-0096-01	TERMINAL TEST PNT	EA		1
TP807	008-0096-01	TERMINAL TEST PNT	EA		1
TP808	008-0096-01	TERMINAL TEST PNT	EA		1
TP809	008-0096-01	TERMINAL TEST PNT	EA		1
TP810	008-0096-01	TERMINAL TEST PNT	EA		1

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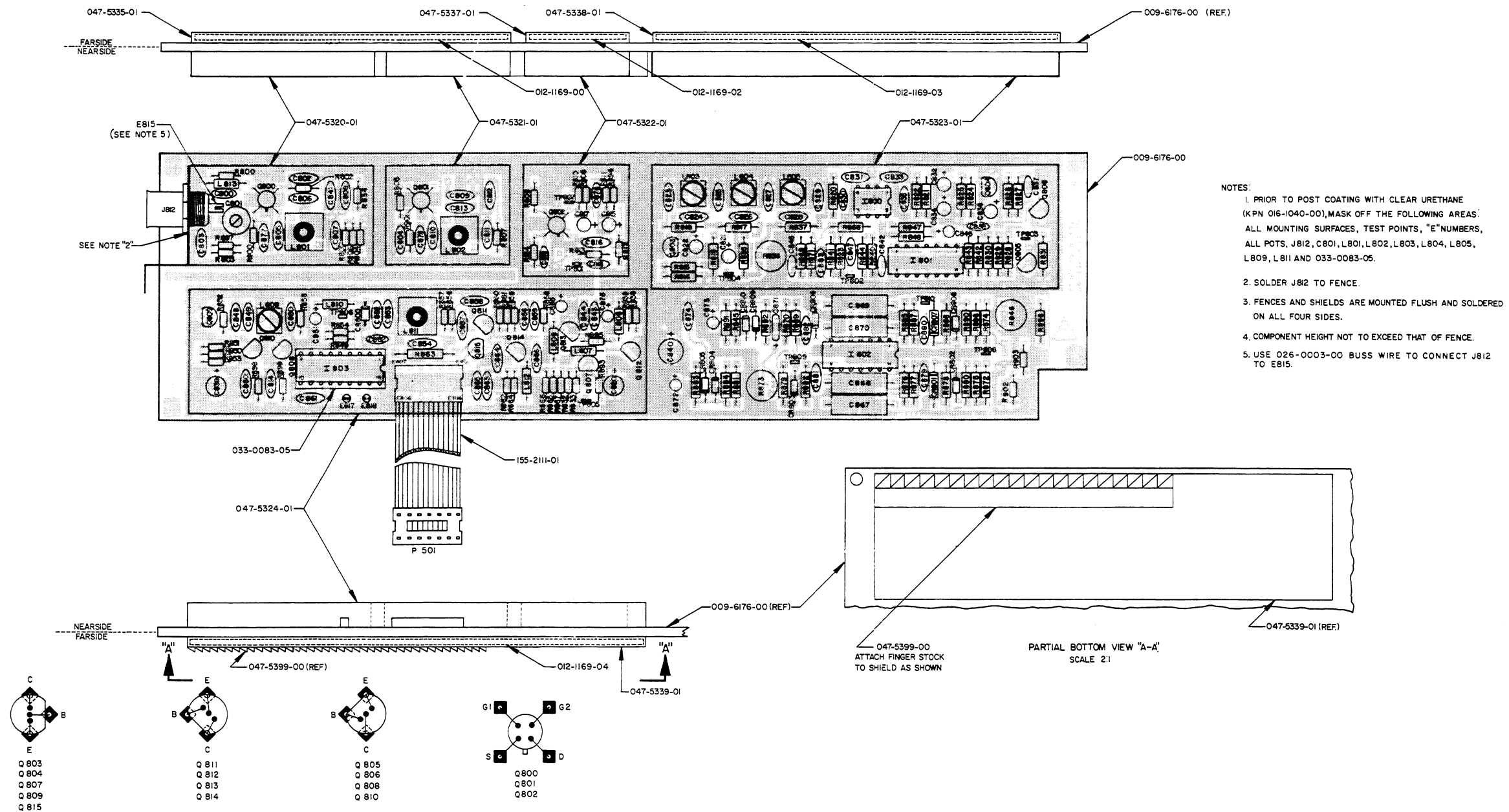
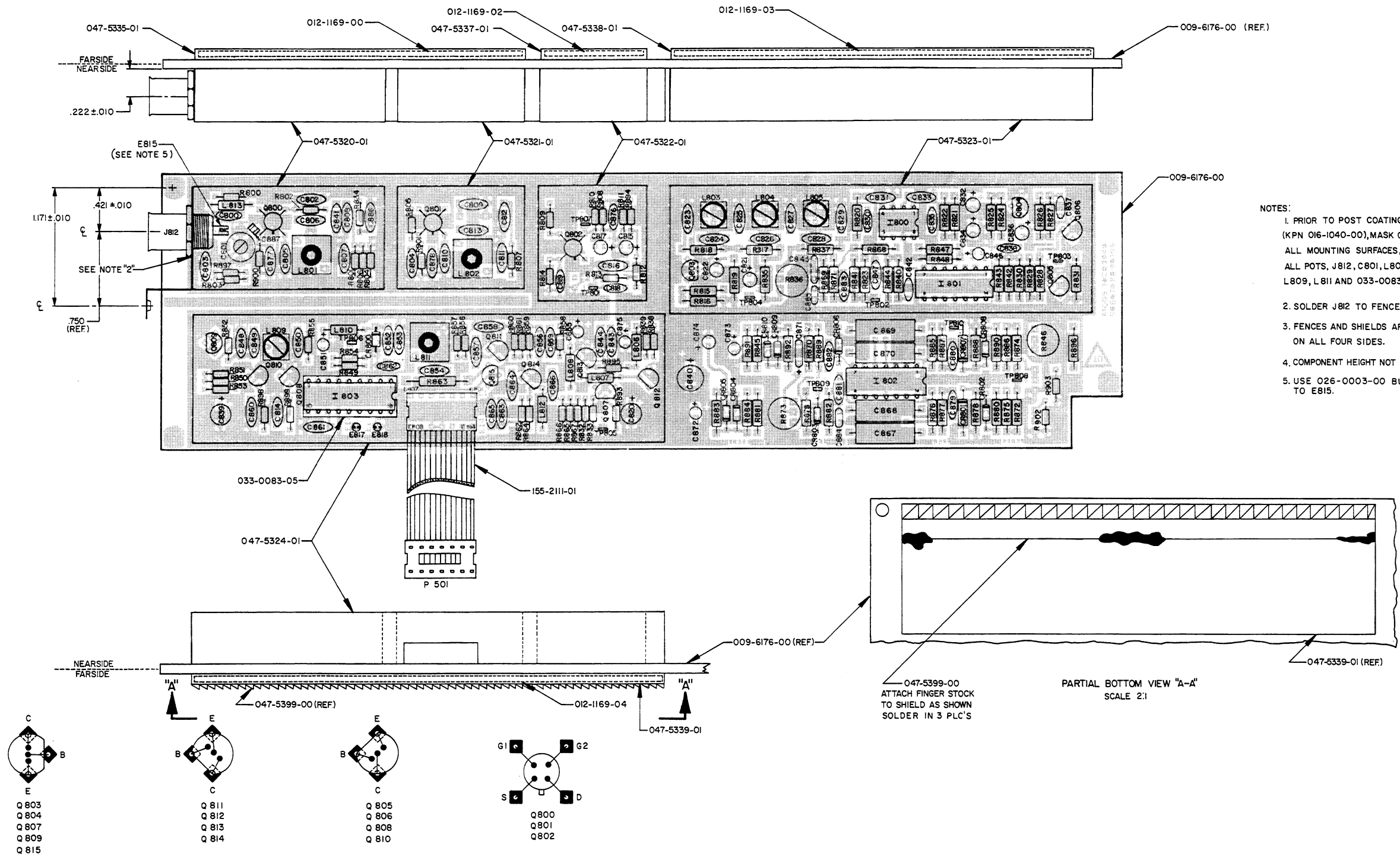
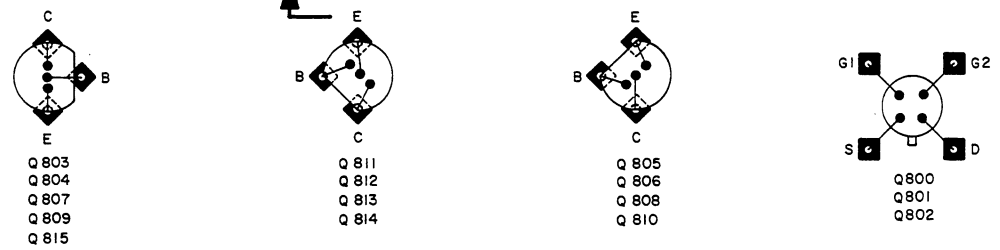


FIGURE 6-18 GLIDESLOPE ASSEMBLY
(Dwg. No. 300-6176-00, R-2)

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- NOTES:
1. PRIOR TO POST COATING WITH CLEAR URETHANE (KPN 016-1040-00), MASK OFF THE FOLLOWING AREAS: ALL MOUNTING SURFACES, TEST POINTS, "E" NUMBERS, ALL POTS, J812, C801, L801, L802, L803, L804, L805, L809, L811 AND 033-0083-05.
 2. SOLDER J812 TO FENCE.
 3. FENCES AND SHIELDS ARE MOUNTED FLUSH AND SOLDERED ON ALL FOUR SIDES.
 4. COMPONENT HEIGHT NOT TO EXCEED THAT OF FENCE.
 5. USE 026-0003-00 BUSS WIRE TO CONNECT J812 TO E815.



Q 803
Q 804
Q 807
Q 809
Q 815

Q 811
Q 812
Q 813
Q 814

Q 805
Q 806
Q 808
Q 810

Q 800
Q 801
Q 802

FIGURE 6-18 GLIDESLOPE ASSEMBLY
(Dwg. No. 300-6176-00, R-7)

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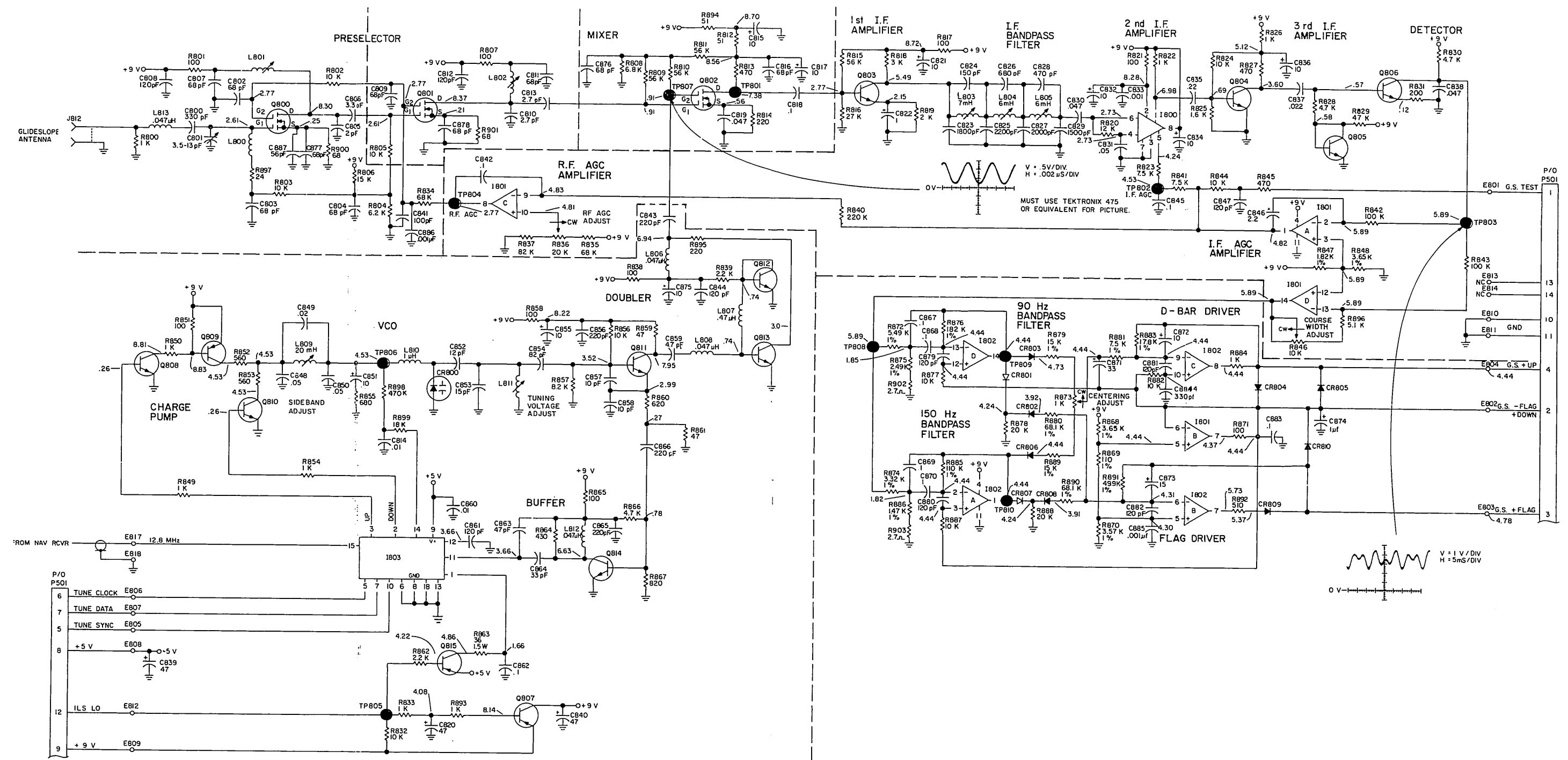


FIGURE 6-19 GLIDESLOPE RECEIVER SCHEMATIC
(Dwg. No. 002-6176-00, R-2)

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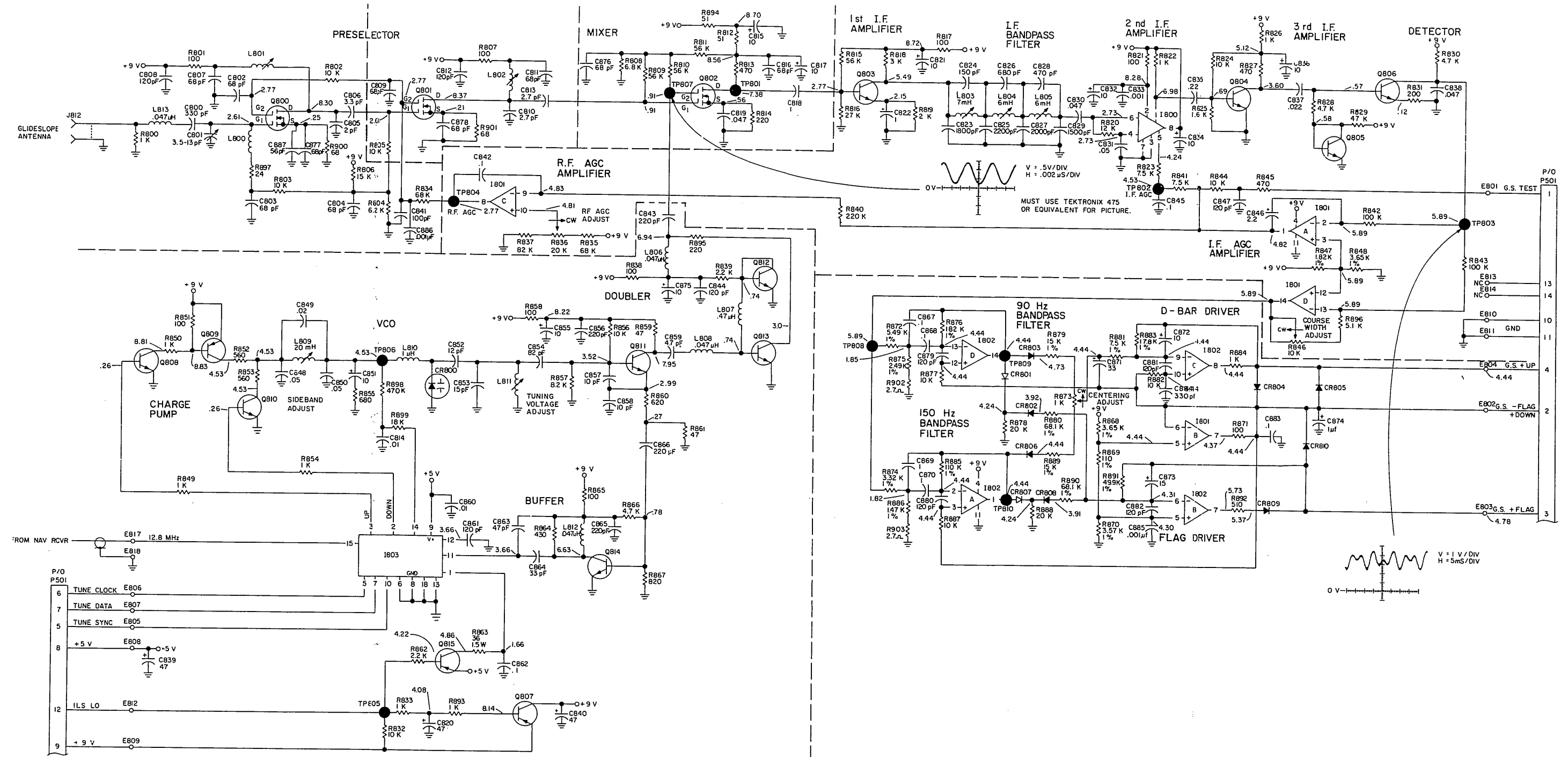


FIGURE 6-19 GLIDESLOPE RECEIVER SCHEMATIC
(Dwg. No. 002-6176-00, R-6)

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GLIDESLOPE RECEIVER SCH.

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SEMICONDUCTOR AND INTEGRATED CIRCUIT DATA

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1.1 GENERAL

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

1.1.1 SEMICONDUCTOR TEST EQUIPMENT

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

A. Transformerless Power Supplies

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

B. Line Filter

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

C. Low-Sensitivity Multimeters

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

D. Power Supply

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

1.1.2 SEMICONDUCTOR VOLTAGE AND RESISTANCE MEASUREMENTS

When measuring voltage or resistance in circuits containing semiconductor devices, remember that these components are polarity and voltage conscious. Since the values of capacitors used in semiconductor circuits are usually large, time is required to charge these capacitors when they appear. Thus, any reading obtained is subject to error if sufficient time is not allowed for the capacitor to fully charge. When in doubt it may be best in some cases to isolate the components in question and measure them individually.

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1.1.3 TESTING OF TRANSISTORS

A transistor checker should be used to properly evaluate transistors. If a transistor tester is not available, a good multimeter may be used. Make sure that the multimeter meets the requirements outlined in the preceding paragraph.

A. PNP Transistor

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

B. NPN Transistor

Similar tests made on a NPN transistor should produce the following results:

With the negative lead of the multimeter connected to the base of the transistor the value of resistance between the base and the collector or emitter should be high. With the positive lead of the multimeter connected to the base, the value of resistance between the base and the collector or emitter should be low. If these results are not obtained, the transistor is probably defective and should be replaced.

CAUTION

IF A TRANSISTOR IS FOUND TO BE DEFECTIVE, MAKE CERTAIN THAT THE CIRCUIT IS IN GOOD OPERATING ORDER BEFORE INSTALLING A REPLACEMENT TRANSISTOR. IF A SHORT CIRCUIT EXISTS IN THE CIRCUIT, PUTTING IN ANOTHER TRANSISTOR WILL MOST LIKELY RESULT IN BURNING OUT THE NEW COMPONENT. DO NOT DEPEND UPON FUSES TO PROTECT TRANSISTORS.

- C. Always check the value of the bias resistors in series with the various elements. A transistor is very sensitive to improper bias voltage; therefore, a short or open circuit in the bias resistance may damage the transistor.

1.1.4 REPLACING SEMICONDUCTORS

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

- A. Use only a low heat soldering iron when installing or removing soldered-in semiconductors. Grasp the lead to which heat is applied between the solder joint and the semiconductor with long nosed pliers.

This will dissipate some of the heat that would otherwise be conducted into the semiconductor from the soldering iron. Make certain that all wires soldered to semiconductor terminals have first been properly tinned so that the necessary connection can be made quickly. Excessive heat will permanently damage a semiconductor.

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

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1.2 INTEGRATED CIRCUIT MAINTENANCE

1.2.1 GENERAL

A knowledge of integrated circuit fundamentals is as necessary in testing digital logic circuits involving IC's as a knowledge of rectification fundamentals is needed to test a power supply.

1.2.2 TERMINOLOGY

Several terms are used whenever logic circuits are discussed:

- A. A logic state is defined as a high or low level voltage applied to the input or seen at the output of a device. A high level voltage is called a logic "1". A low level voltage is called a logic "0". Logic threshold voltage of a device is the input voltage required at an input to change the output state.
- B. A truth table is a list of input logic states that will yield certain output logic states. A digital logic element should be thought of as a circuit element with its output level being either HI or LO as programmed by the levels present on its inputs.

A logic element may be tested by verifying that it is performing per the Truth Table of that logic element.

- C. Logic elements which have multiple inputs and a single output are known as gates. The OR gate produces a HI output when one or more of the inputs are HI. With all inputs LO, the output is LO. The AND gate produces a HI output only when all inputs are HI. When any input is LO the output is LO. A small circle at the output of a gate on the schematics indicates "negation", which means that the sense of the gate logic is reversed. An OR gate with negation is called a NOR gate and an AND gate with negation is called a NAND gate. A NOR gate produces a LO output when one or more of the inputs are HI and a NAND gate produces a LO output only when all inputs are HI.
- D. The Flip-Flop logic element is the basic data storage element of digital logic. It has two outputs that are always at opposite logic levels. That is, when one output is HI the other is LO. The Flip-Flop will remain in a particular state until that state is changed by an input signal.

The operation of these Flip-Flops is controlled by the signals on their inputs, and is best understood by a careful study of their Truth Tables. It should be kept in mind that a small circle on either the input or the output indicates negation. Also, a circle on a clock input indicates that a HI to LO transition causes the Flip-Flop to function.

- E. Besides the gates and Flip-Flops, two other commonly used logic elements are inverters and expanders. Inverters are merely switching transistors such that if a logic "1" is the input to a device, a logic "0" will be the output and vice-versa. An expander is a set of parallel switching transistors that depends upon another resistor to provide their supply voltage. Generally, these devices are used to expand the number of inputs available to a standard gate.

1.2.3 INTEGRATED CIRCUIT TEST EQUIPMENT

As with semiconductors, damage to integrated circuits by test equipment is usually the result of applying too much current or voltage to the elements. The same precautions as discussed in Paragraph 1.1.1 apply here.

1.2.4 VOLTAGE MEASUREMENTS

Precise voltage measurements are not needed in testing digital IC's other than to see that the voltage is a HI or a LO level. An oscilloscope is needed where the input levels are of short duration, either HI or LO. For instance, if a 10 microsecond pulse going from LO to HI was applied to one input of a NOR gate, while the other input stayed LO, the output would go LO for 10 microseconds and then return HI. This, of course, could not be seen without an oscilloscope.

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1.2.5 TESTING INTEGRATED CIRCUITS

The fully loaded guaranteed minimum high and maximum low for the digital logic output levels are:

TTL ($V_{CC} = +5V$)		ECL ($V_{CC} = +5.2V$)	
High	Low	High	Low
2.4	0.5	4.25	3.48

The minimum high and maximum low input levels which are guaranteed to be correctly interpreted are:

TTL ($V_{CC} = +5V$)		ECL ($V_{CC} = +5.2V$)	
High	Low	High	Low
2.0	0.8	4.06	3.75

When checking input and output levels of a logic element under question, it should be remembered that an input or output may not agree with its truth table not because it has malfunctioned but because some other component connected to the same point has shorted to ground or to the supply voltage (V_{CC}). This is not common when an output on one element is connected to an input of another. A majority of digital IC failures can be grouped into three categories:

- A. Input(s) or output shorted to ground pin of I.C.
- B. Input(s) or output shorted to V_{CC} pin of I.C.
- C. Open input(s) or output

An input or output to ground would be constant LO and an input or output shorted to V_{CC} would be constant HI.

Other failures common in digital IC's are:

- A. Ground pin open.
- B. V_{CC} pin open.
- C. Inputs shorted together.

An open ground pin would not allow a LO on the output. An open V_{CC} pin would not allow a HI on the output. (Remember to isolate the device from other components connected to it.). Two or more inputs shorted together can be checked by grounding one of the inputs under question. If the other input also goes to ground, they are probably shorted.

CAUTION

IF AN IC IS FOUND TO BE DEFECTIVE, VERIFY THAT PROPER
POWER SUPPLY VOLTAGES ARE PRESENT BEFORE INSTALLING A
REPLACEMENT IC.

1.2.6 REPLACING INTEGRATED CIRCUITS

If an IC is known to be defective, the easiest way to remove it is to cut off each of its pins, remove the case, and then unsolder the remaining pins from the printed circuit board one by one. This is preferable over removing the IC intact because attempts to remove the IC intact may result in damage to the printed circuit board.

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APPENDIX "A"

FIGURE 1. BUFFER

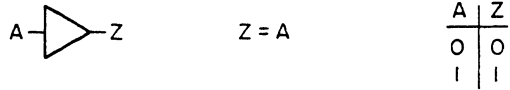


FIGURE 2. INVERTER

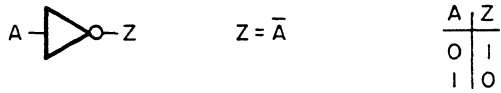


FIGURE 3. NOR GATE

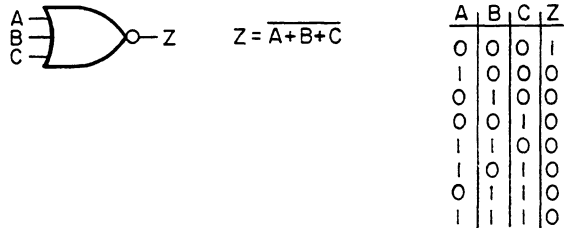


FIGURE 4. NAND GATE

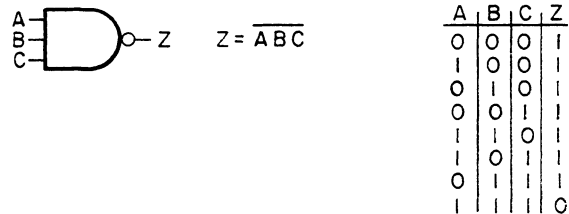


FIGURE 5. EXCLUSIVE OR GATE

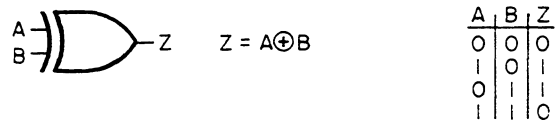
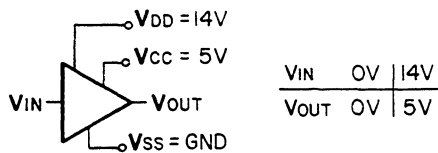
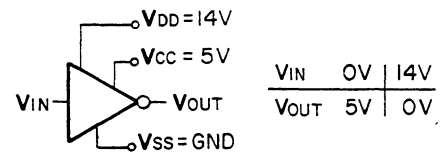


FIGURE 6. TTL TO CMOS VOLTAGE LEVEL TRANSLATORS

BUFFER

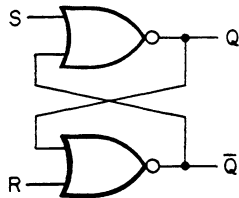


INVERTER



KING
KNS 81
APPENDIX "A"

FIGURE 7. NOR GATE FLIP-FLOP



S	R	Next Q	\bar{Q}
1	1	0	0
0	1	1	0
0	0	NC	NC
1	0	0	1

NC = NO CHANGE

FIGURE 8. MONOSTABLE MULTIVIBRATOR (ONE-SHOT)

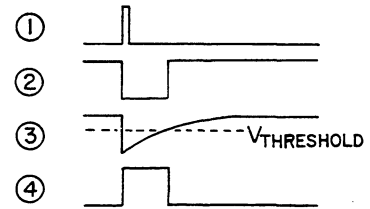
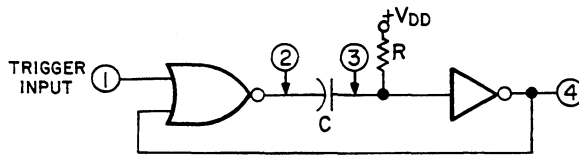
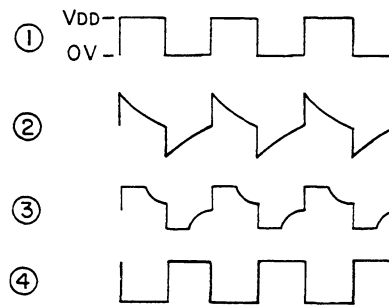
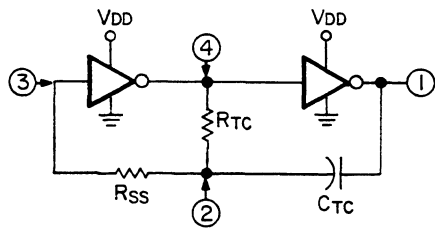
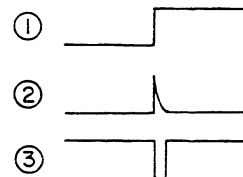
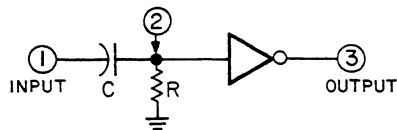


FIGURE 9. ASTABLE MULTIVIBRATOR (FREE-RUNNING)



FREQUENCY OF OPERATION IS DETERMINED BY R_{TC} AND C_{TC} .
A NOR OR NAND GATE MAY BE USED IN PLACE OF THE FIRST
INVERTER TO PERMIT GATING OF THE MULTIVIBRATOR.

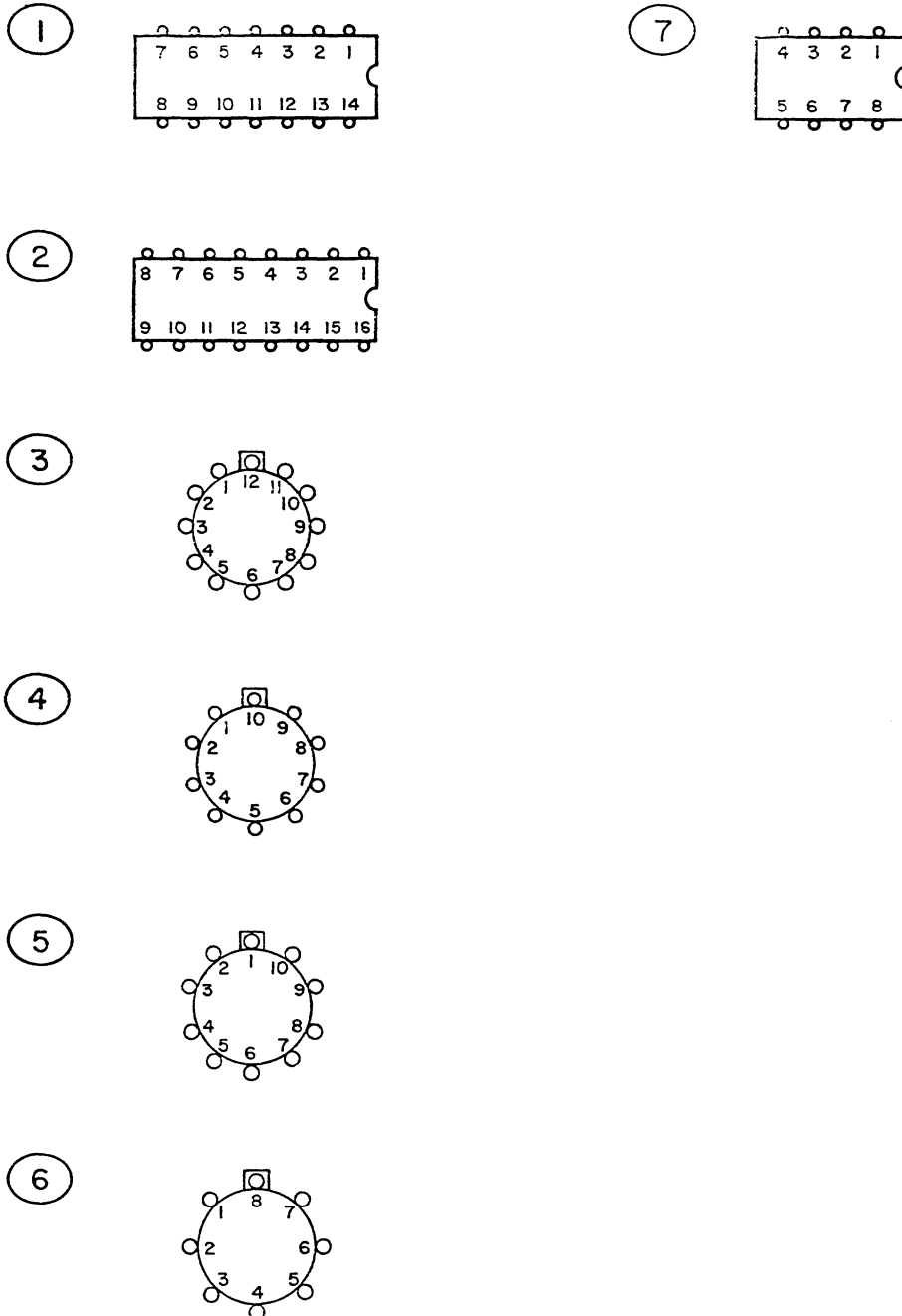
FIGURE 10. DIFFERENTIATOR



OFTEN USED TO CHANGE A STEP SIGNAL
TO A SHORT PULSE SIGNAL.

KING
KNS 81
APPENDIX "A"

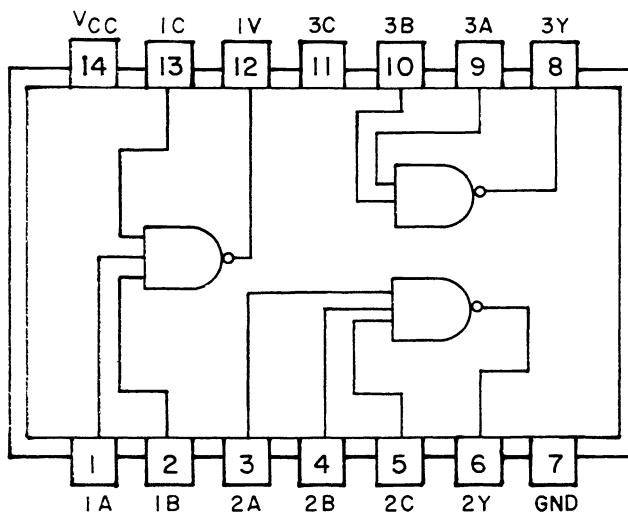
INTEGRATED CIRCUIT PIN LOCATION DIAGRAMS
(Viewed From TOP of IC)



KING

KNS 81
APPENDIX "A"

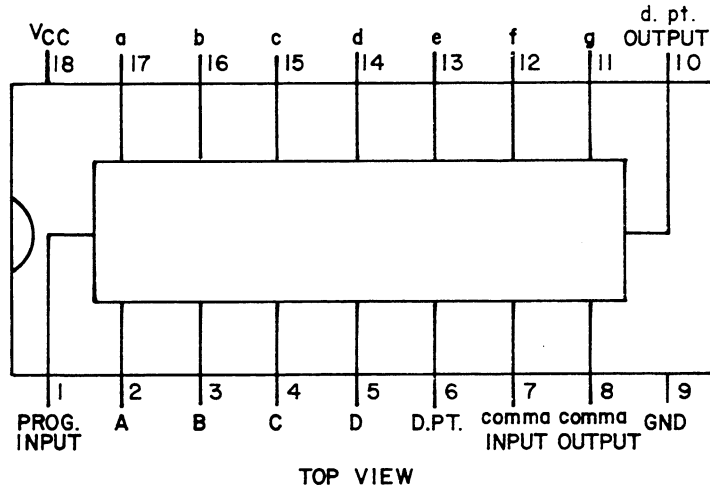
74LS10
120-0082-00
TRIPLE 3-INPUT NAND GATE



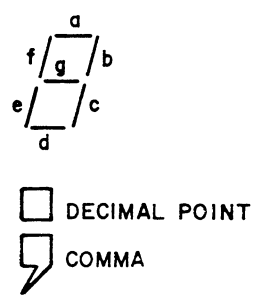
POSITIVE LOGIC $Y = \overline{ABC}$

KING
KNS 81
APPENDIX "A"

DS8884
120-0089-00



FUNCTION	D.P.T.	COMMA	D	C	B	A	a	b	c	d	e	f	g	DISPLAY
0	1	1	0	0	0	0	0	0	0	0	0	0	1	0
1	1	1	0	0	0	1	1	0	0	1	1	1	1	1
2	1	1	0	0	1	0	0	0	1	0	0	1	0	2
3	1	1	0	0	1	1	0	0	0	0	1	1	0	3
4	1	1	0	1	0	0	1	0	0	1	1	0	0	4
5	1	1	0	1	0	1	0	1	0	0	1	0	0	5
6	1	1	0	1	1	0	0	1	0	0	0	0	0	6
7	1	1	0	1	1	1	0	0	0	1	1	1	1	7
8	1	1	1	0	0	0	0	0	0	0	0	0	0	8
9	1	1	1	0	0	1	0	0	0	0	1	0	0	9
10	1	1	1	0	1	0	1	1	0	0	0	1	1	10
11	1	1	1	0	1	1	1	1	0	0	0	1	0	11
12	1	1	1	1	0	0	0	0	1	1	1	0	0	12
13	1	1	1	1	0	1	0	1	1	0	0	0	0	13
14	1	1	1	1	1	0	1	1	1	1	1	1	0	14
15	1	1	1	1	1	1	1	1	1	1	1	1	1	15
* D.P.T.	0	1	X	X	X	X	X	X	X	X	X	X	X	000
* Comma	0	0	X	X	X	X	X	X	X	X	X	X	X	900

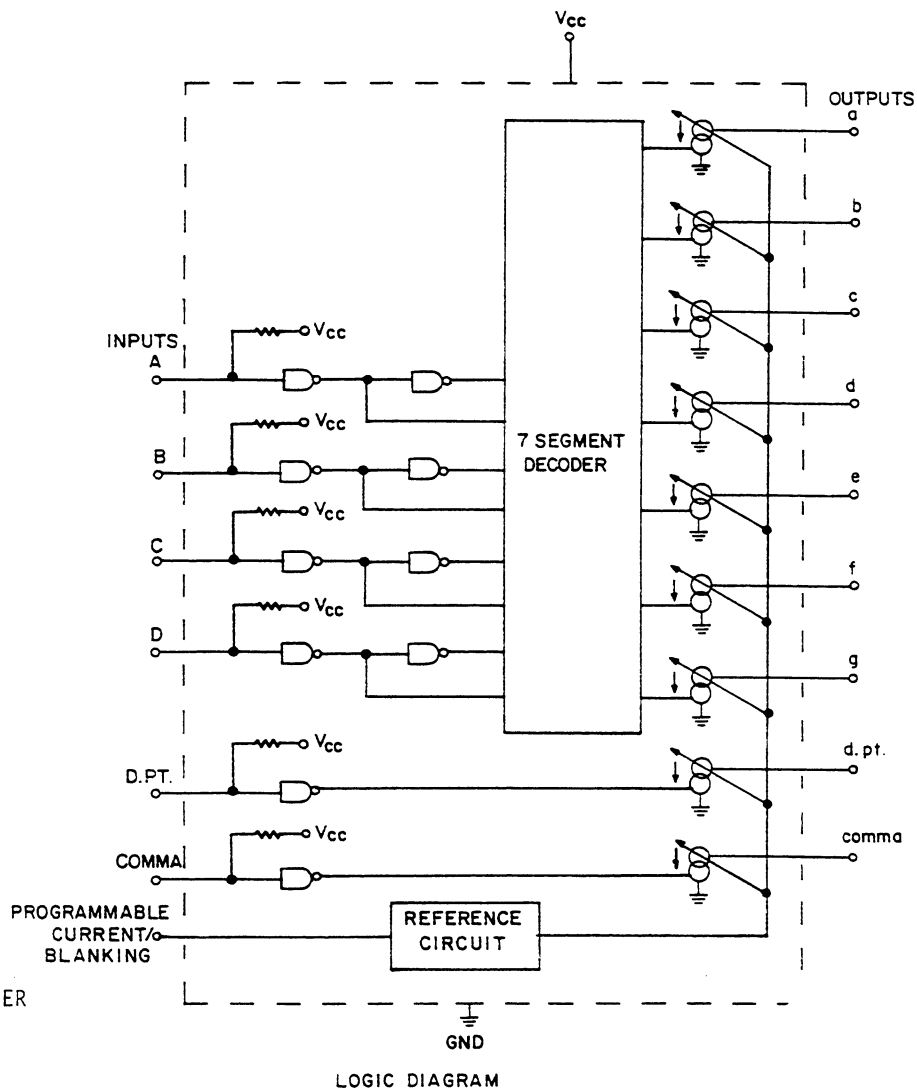


* DECIMAL POINT AND COMMA CAN BE DISPLAYED WITH OR WITHOUT ANY NUMERAL.

UP193356

DS8884

120-0089-00



HIGH VOLTAGE CATHODE DECODER/DRIVER
 GENERAL DESCRIPTION

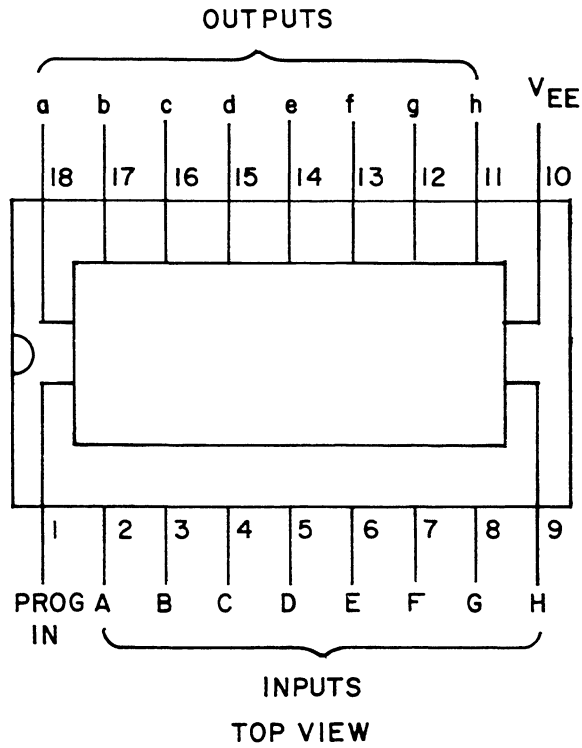
The DS8884A is designed to decode four lines of BCD input and drive seven-segment digits of gas-filled readout displays. Two separate inputs are provided for driving the decimal point and comma cathodes.

All outputs consists of switchable and programmable current sinks which provide constant current to the tube cathodes, even with high tube anode supply tolerance. Output currents may be varied over the 0.2 to 1.2ma range for multiplex operation. The output current is adjusted by connecting an external program resistor (R_p) from V_{cc} to the program input in accordance with the programming curve.

KING
KNS 81
APPENDIX "A"

DS8899
120-0091-00

DISPLAY DRIVERS

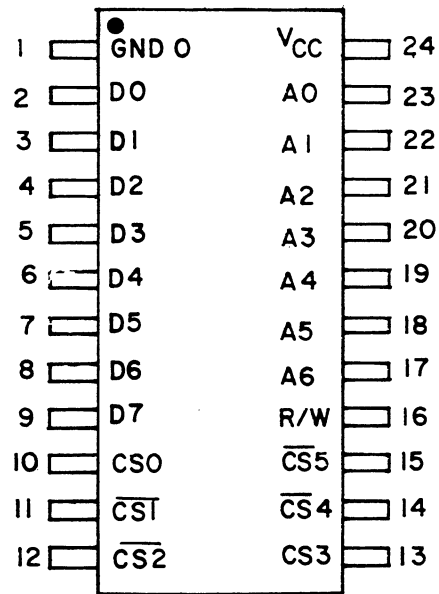


UP193356

KING
KNS 81
APPENDIX "A"

MCM6810
120-2022-01
RANDOM ACCESS MEMORY

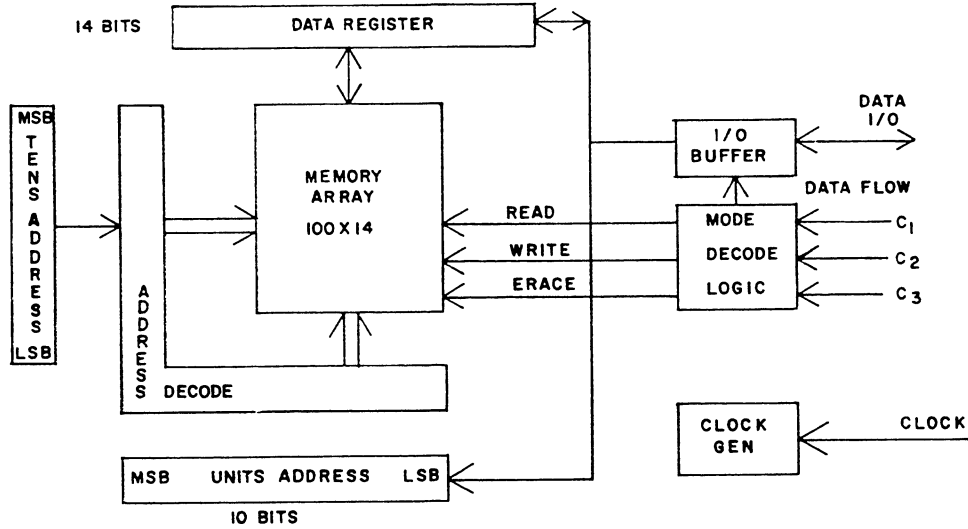
PIN ASSIGNMENT



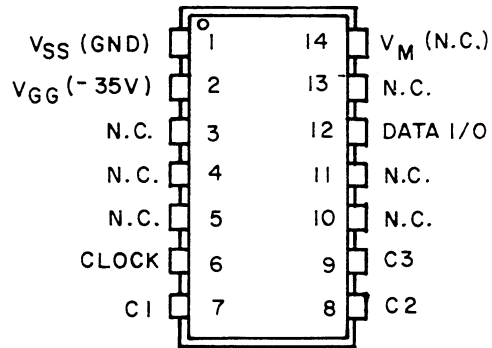
KING
 KNS 81
 APPENDIX "A"

ER1400/1400T

120-2028-00



TOP VIEW



1400 Bit Electrically Alterable Read Only Memory

DESCRIPTION

The ER1400 is a serial input/output 1400 bit electrically erasable and reprogrammable ROM, organized as 100 words of 14 bits each. Data and address are communicated in serial form via a one-pin bidirectional buss.

Addressing is by two consecutive one-of-ten codes.

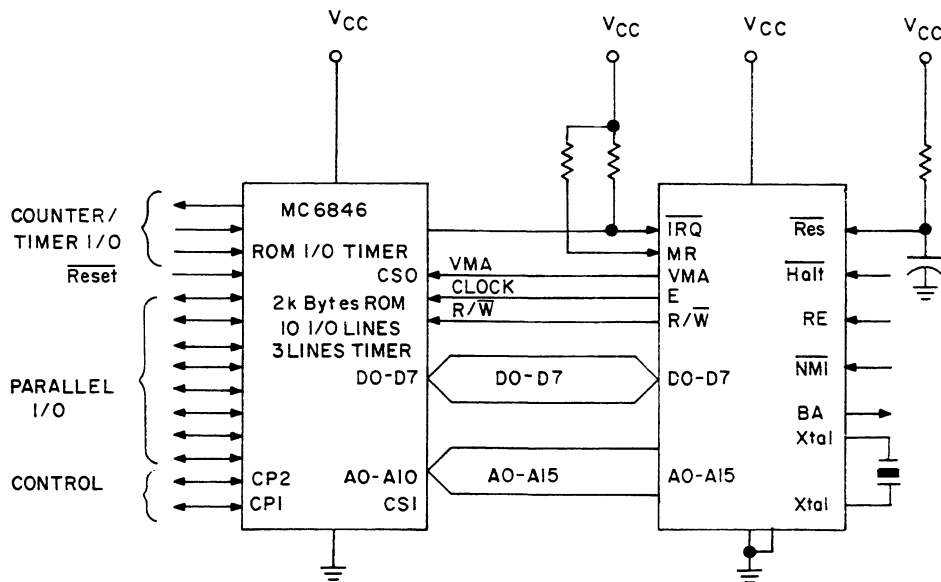
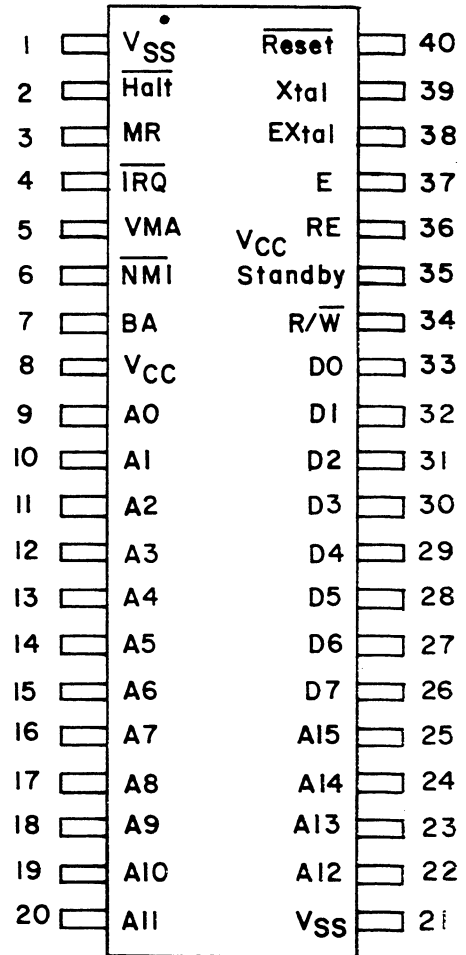
Mode selection is by a 3 bit code applied to C1, C2 and C3.

Data is stored by internal negative writing pulses that selectively tunnel charge into the oxide-nitride interface of the gate insulator of the 1400 MNOS memory transistors. When the writing voltage is removed the charge trapped at the interface is manifested as a negative shift in the threshold voltage of the selected memory transistors.

UP193356

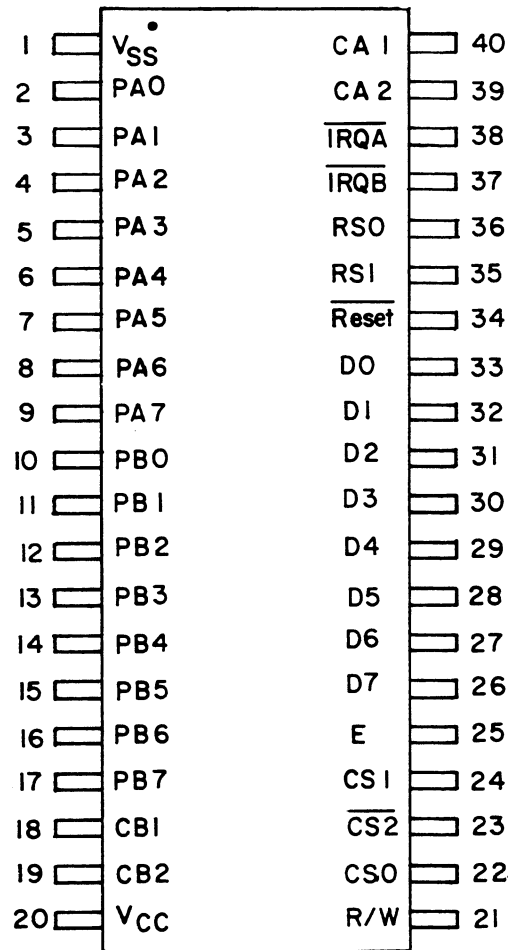
KING
 KNS 81
 APPENDIX "A"

MC6802CP
 120-2041-00
IC, MICROPROCESSOR W/CLOCK & RAM



KING
KNS 81
APPENDIX "A"

MC6821P
120-2042-01
IC, PIA

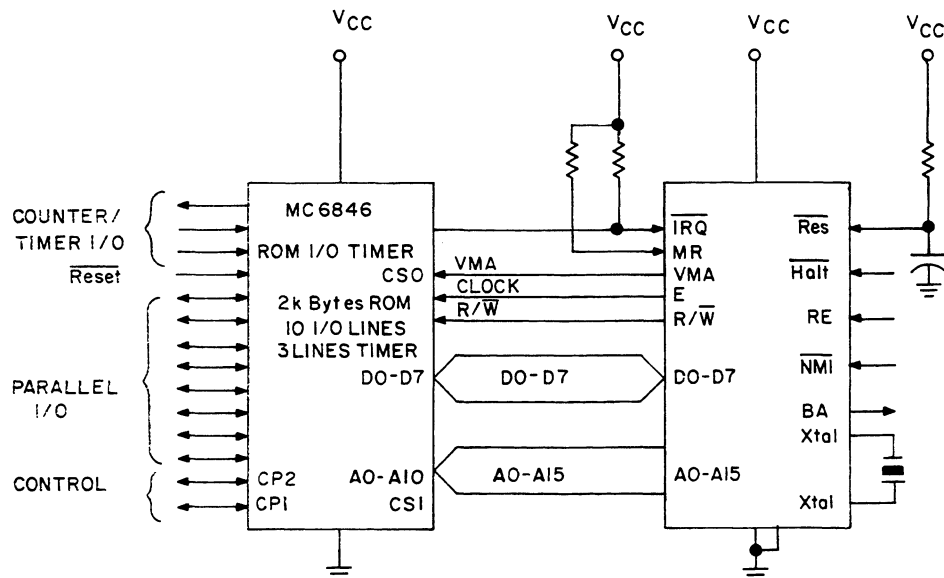
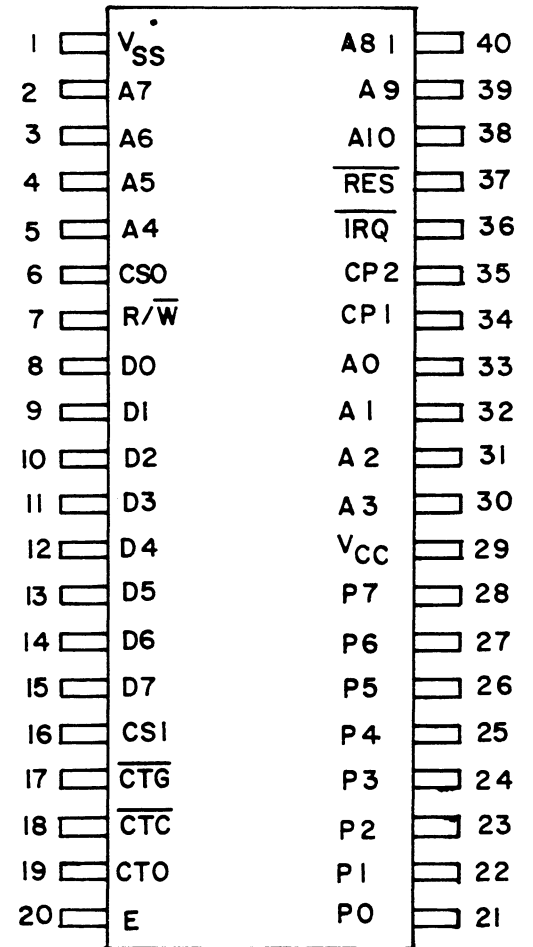


KING

KNS 81
APPENDIX "A"

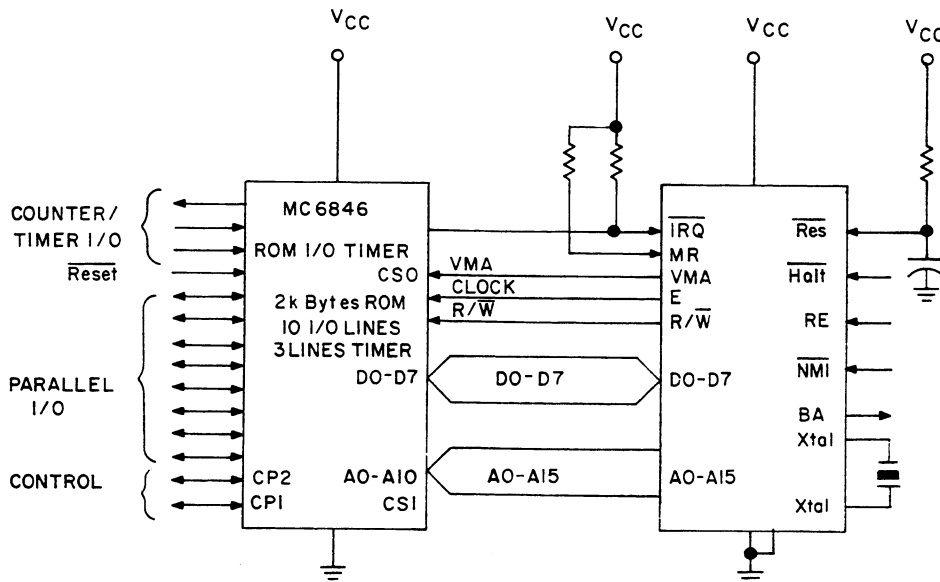
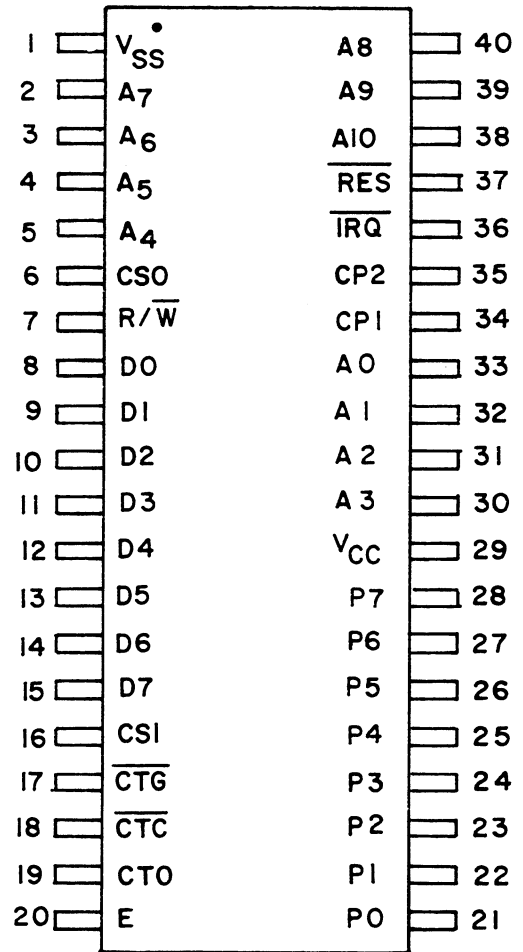
MC6846P
120-2045-00
IC, ROM I/O TIMER

ROM-I/O TIMER



KING
 KNS 81
 APPENDIX "A"

MC6846P
 120-2046-00
IC, ROM I/O TIMER



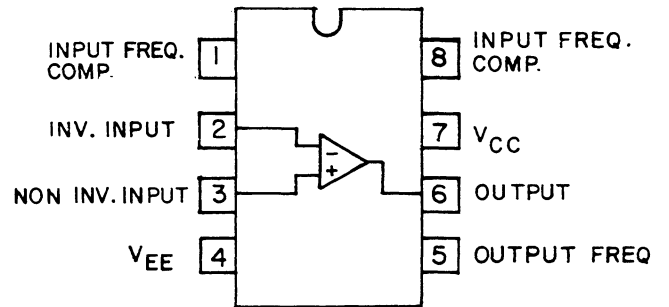
KING

KNS 81
APPENDIX "A"

MC 17C9CP
120-3001-00

IC, OP AMP

This device circuit is a high-performance operational amplifier with high-impedance differential inputs and a low-impedance output. Component matching, inherent with silicon monolithic circuit fabrication techniques, produces an amplifier with low drift and offset characteristics. Provisions are incorporated within the circuit whereby external components may be used to compensate the amplifier for stable operation under various feedback or load conditions. These amplifiers are particularly attractive for applications requiring transfer or generation of linear or non-linear functions.



MC1350P

120-3020-00

MONOLITHIC IF AMPLIFIER

...an integrated circuit featuring wide range AGC for use as an IF amplifier in radio and TV over the temperature range 0 to +75°C. The MC 1352 is similar in design but has a keyed-AGC amplifier as an integral part of the same chip.

Power Gain - 50dB typ. at 45MHz,
- 48dB typ. at 58MHz

AGC Range - 60dB min, DC to 45MHz

Nearly constant input and output admittance over the entire AGC range

γ_{21} Constant (-3.0dB) to 90MHz

Low Reverse Transfer Admittance - 1.0umho typ.

12-Volt Operation, Single-Polarity Power Supply

KING
KMS 81
APPENDIX "A"

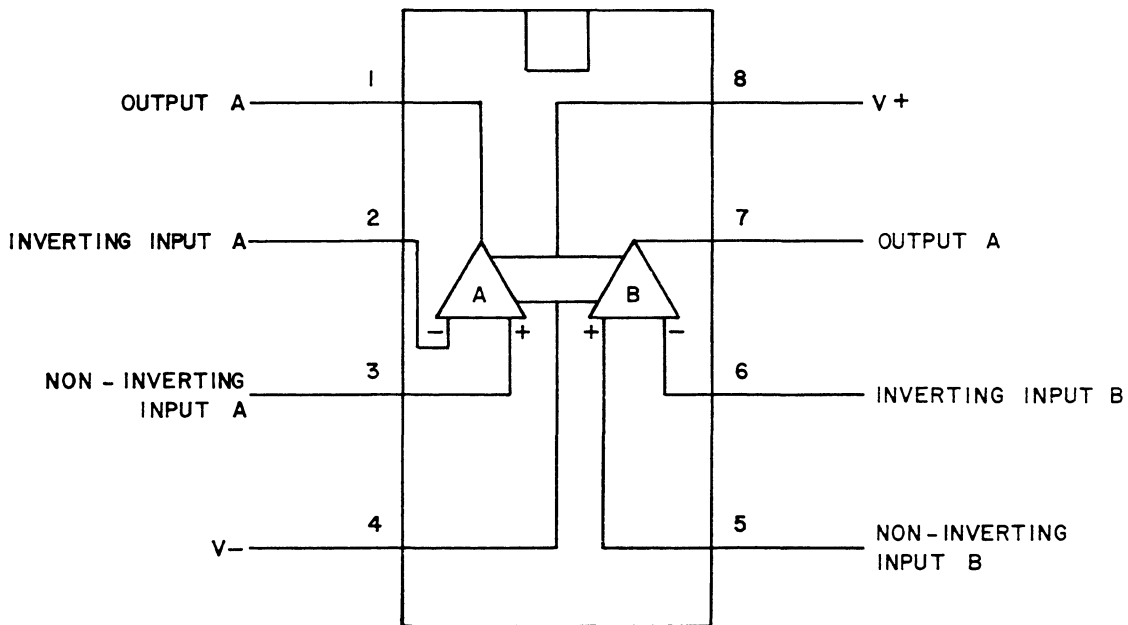
LM1458P
120-3022-00

GENERAL DESCRIPTION

The LM1558 and the LM1458 are general purpose dual operational amplifiers. The two amplifiers share a common bias network and power supply leads. Otherwise, their operation is completely independent. Features include:

- No frequency compensation required
- Short-circuit protection
- Wide common-mode and differential voltage ranges
- Low-power consumption
- 8-lead TO-5 and 8-lead mini DIP
- No latch up when input common mode range is exceeded

The LM1458 is identical to the LM1558 except that the LM1458 has its specifications guaranteed over the temperature range from 0°C to 70°C instead of -55°C to +125°C.



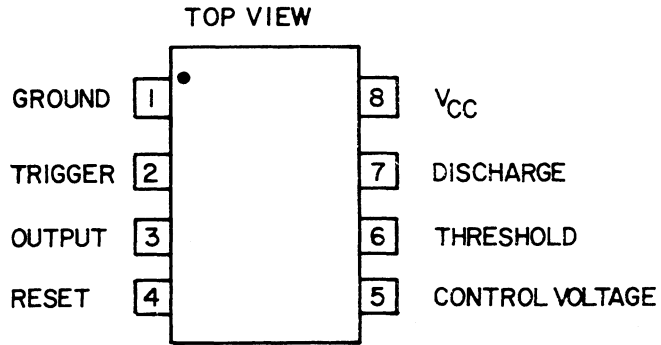
TOP VIEW

UP193356

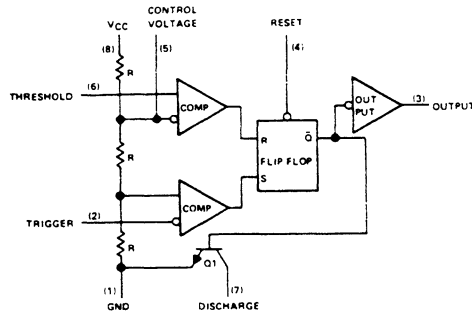
KING
 KNS 81
 APPENDIX "A"

NE/SE555

120-3040-00/01



functional block diagram



LINEAR INTEGRATED CIRCUITS

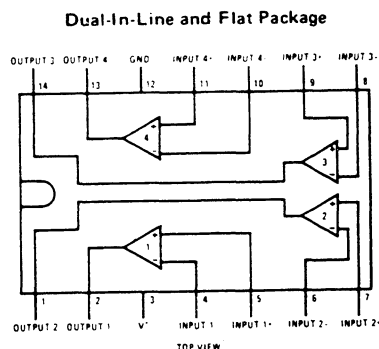
DESCRIPTION

The NE/SE 555 monolithic timing circuit is a highly stable controller capable of producing accurate time delays, or oscillation. Additional terminals are provided for triggering or resetting if desired. In the time delay mode of operation, the time is precisely controlled by one external resistor and capacitor. For a stable operation as an oscillator, the free running frequency and the duty cycle are both accurately controlled with two external resistors and one capacitor. The circuit may be triggered and reset on falling waveforms, and the output structure can source or sink up to 200ma or drive TTL circuits.

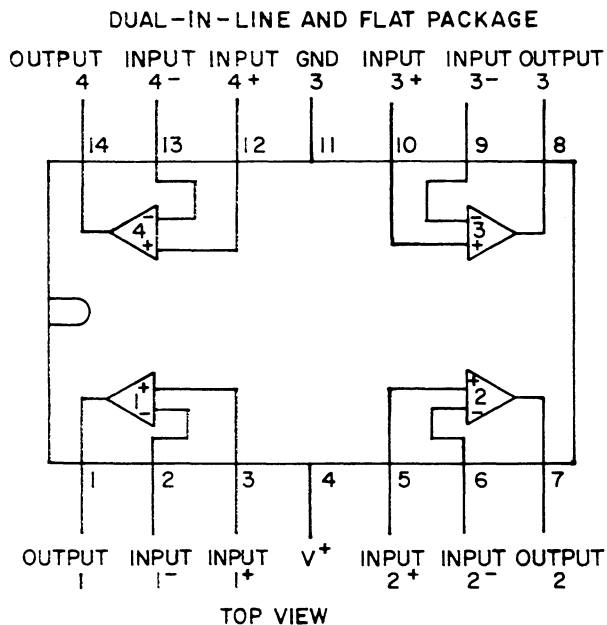
UP193356

LM339N
 120-3048-00

The LM339 consists of four independent voltage comparators which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage. These comparators also have a unique characteristic in that the input common-mode voltage range includes ground, even though operated from a single power supply voltage.



LM 324
 120-3052-00



GENERAL DESCRIPTION

This series consists of four independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

Application areas include transducer amplifiers, DC gain blocks and all the conventional op amp circuits which now can be more easily implemented in single power systems. For example, this series can be directly operated off of the standard +5VDC power supply voltage which is used in digital systems and will easily provide the required interface electronics without requiring the additional +15VDC power supplies.

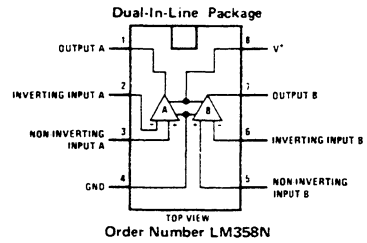
KING

KNS 81
APPENDIX "A"

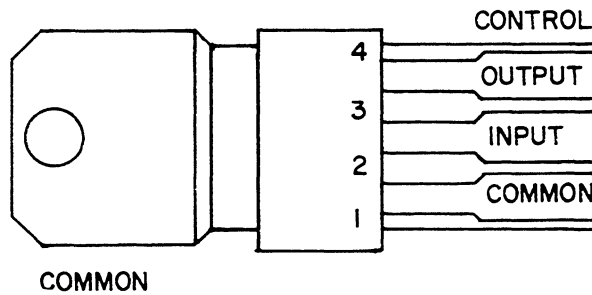
LM358N

120-3053-00

The LM358N consists of two independent, high gain, internally frequency compensated operational amplifiers which were designed specifically to operate from a single power supply over a wide range of voltages. Operation from split power supplies is also possible and the low power supply current drain is independent of the magnitude of the power supply voltage.

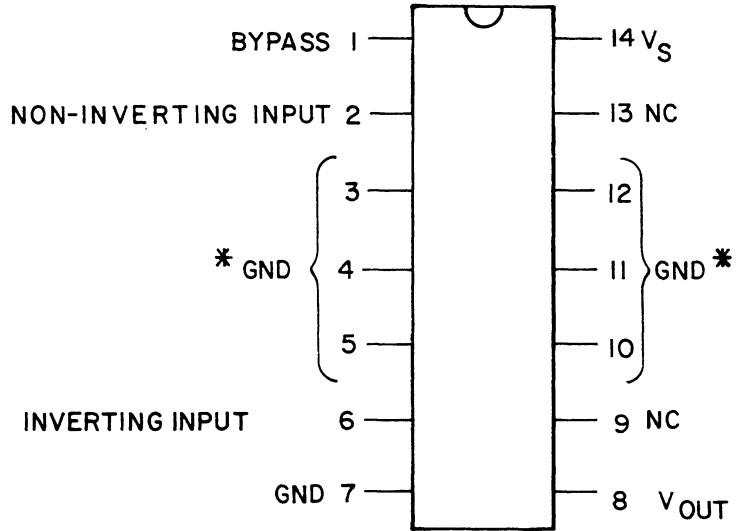
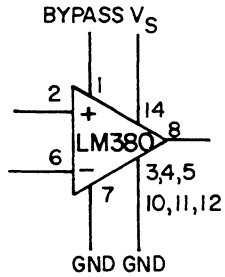


VA78GUIC
120-3066-01
I.C. VOLT. REG. 4- TERM ADJ.



KING
 KNS E1
 APPENDIX "A"

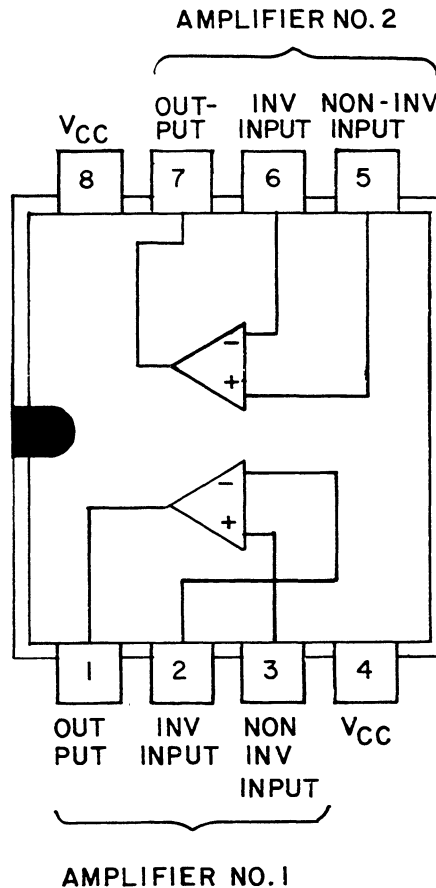
LM380N
 120-3080-00
IC, AUDIO POWER AMPLIFIER



*HEATSINK PINS

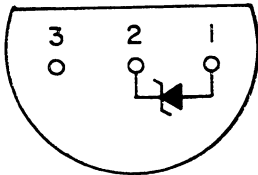
TOP VIEW

TL082
 120-3084-01
OP AMP BIFET



UP193356

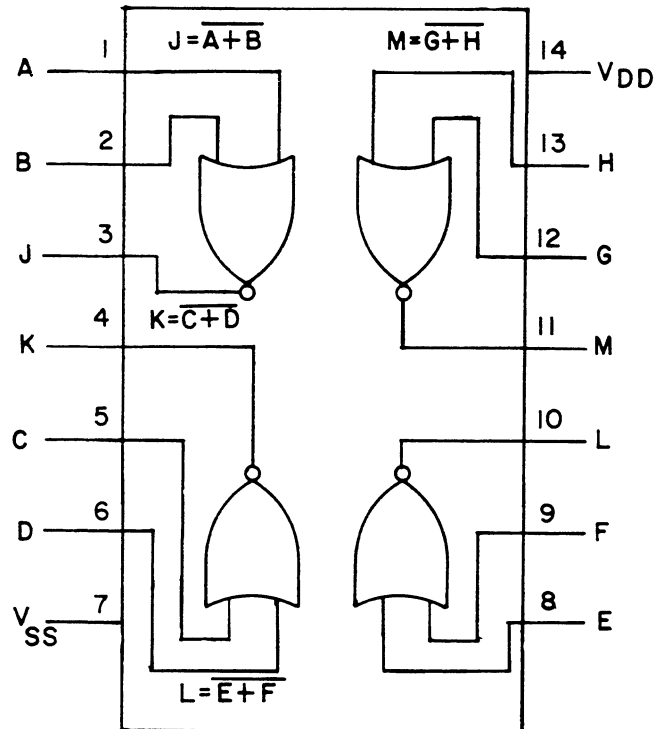
LM329
120-3109-00/01
I.C., PRECISION VOLTAGE REFERENCE



This series of three terminal positive regulators is available with several fixed output voltages making them useful in a wide range of applications. The regulators have $\pm 2\% V_{OUT}$ specification, 0.04%/V line regulation, and 0.01%/ma load regulation. When used as a zener diode/resistor combination replacement, the regulator usually results in an effective output impedance improvement of two orders of magnitude, and lower quiescent current. These regulators can provide local on card regulation, eliminating the distribution problems associated with single point regulation. The voltages available allow it to be used in logic systems, instrumentation, HI-FI, and other solid state electronic equipment. Although designed primarily as fixed voltage regulators, these devices can be used with external components to obtain adjustable voltages and currents.

With adequate heat sinking the regulator can deliver 100ma output current. Current limiting is included to limit the peak output current to a safe value. Safe area protection for the output transistor is provided to limit internal power dissipation. If internal power dissipation becomes too high for the heat sinking provided, the thermal shutdown circuit takes over, preventing the IC from overheating.

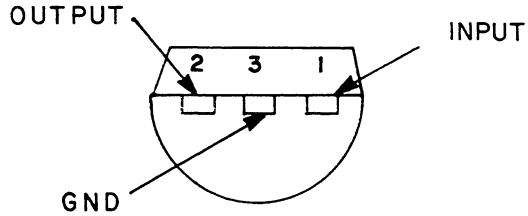
CD4001
120-6002-00/01
QUAD 2- INPUT NOR GATE



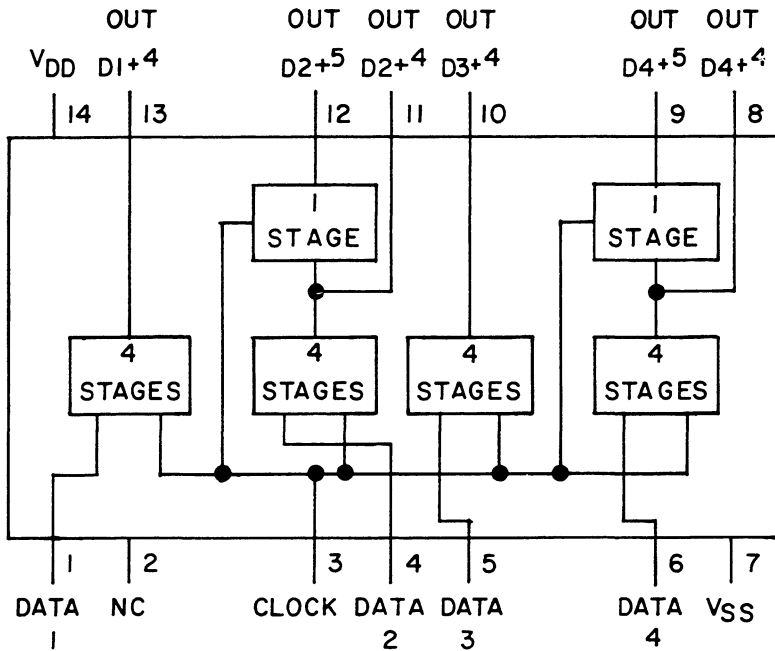
This device is a monolithic quadruple two-input NOR gate. N and P-channel enhancement mode transistors provide a symmetrical circuit with output swings essentially equal to the supply voltage. This results in high noise immunity over a wide supply voltage range. No DC power other than that caused by leakage current is consumed during static conditions. All inputs are protected against static discharge and latching conditions.

KING
 KNS 81
 APPENDIX "A"

LM340
 120-3094-32
 3-TERMINAL POSITIVE REGULATORS



CD4006
 120-6004-01
 18-STAGE SHIFT REGISTER



TRUTH TABLE

D	CL ^Δ	D + 1
0		0
1		1
X		NC

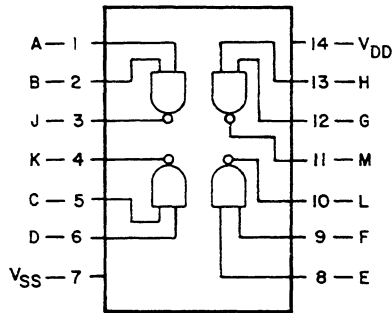
X= DON'T CARE
 Δ= LEVEL CHANGE
 NC= NO CHANGE

This device is an 18-stage static shift register which is comprised of four separate "shift register" sections, two sections of four stages and two sections of five stages. Each section has an independent data input. A common clock signal is used for all stages. Data is shifted to the next stage on the negative-going transition of the clock. Through appropriate connections of input and outputs, multiple register sections of 4, 5, 8, and 9 stages or single register sections of 10, 12, 13, 14, 16, 17, and 18 can be implemented by using one device. Longer shift register sections can be assembled by using more than one device.

UP193356

KING
KNS 81
APPENDIX "A"

SCL4011
120-6007-01



REF: PIN LOCATION DIAGRAM #1

$$J = \overline{A \cdot B}$$

$$K = \overline{C \cdot D}$$

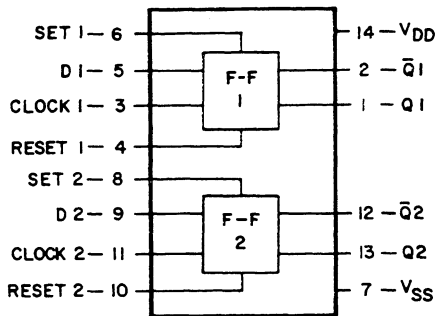
$$L = \overline{E \cdot F}$$

$$M = \overline{G \cdot H}$$

INPUTS		OUTPUT
0	0	1
1	0	1
0	1	1
1	1	0

SCL4013
120-6009-01

CD4013A types consist of two identical, independent data-type flip-flops. Each flip-flop has independent data, set, reset, and clock inputs and "Q" and "Q̄" outputs. These devices can be used for shift register applications, and, by connecting "Q̄" output to the data input, for counter and toggle applications. The logic level present at the "D" input is transferred to the Q output during the positive-going transition of the clock pulse. Setting or resetting is independent of the clock and is accomplished by a high level on the set or reset line, respectively.



REF: PIN LOCATION DIAGRAM #1

TRUTH TABLE




CL*	D	R	S	Q	Q̄
0	0	0	0	0	1
0	0	0	1	0	1
0	0	1	0	0	0
0	0	1	1	0	0
0	1	0	0	0	1
0	1	0	1	0	1
0	1	1	0	0	0
0	1	1	1	0	0
1	0	0	0	0	1
1	0	0	1	0	1
1	0	1	0	0	0
1	0	1	1	0	0
1	1	0	0	0	1
1	1	0	1	0	1
1	1	1	0	0	0
1	1	1	1	0	0

NC CHANGE

- * - INVALID CONDITION
- ** - FF1, FF2 TERMINAL ASSIGNMENTS
- Δ - LEVEL CHANGE
- Δ - DON'T CARE CASE

SCL4015
 120-6011-01
 DUAL 4 STAGE STATIC SHIFT REG.

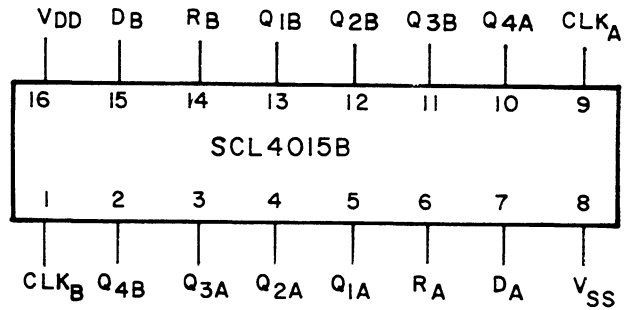
TRUTH TABLE

CLK*	D	R	Q ₁	Q _n
	0	0	0	Q _{n-1}
	1	0	1	Q _{n-1}
	X	0	Q ₁	Q _n
X	X	1	0	0

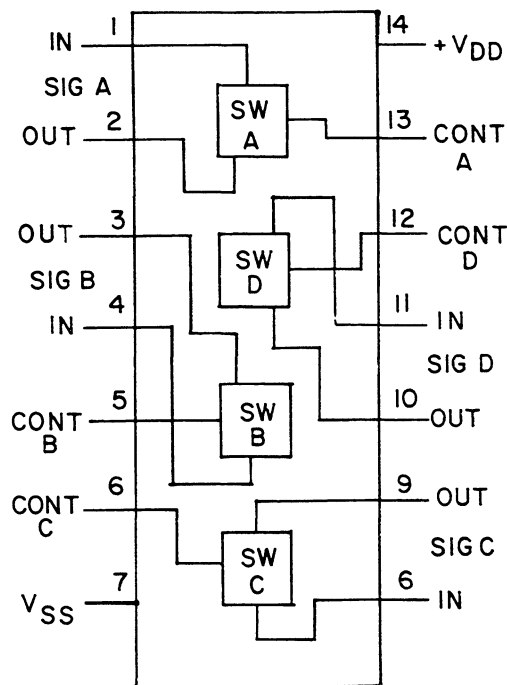
(NO CHANGE)

* = LEVEL CHANGE

X = DON'T CARE

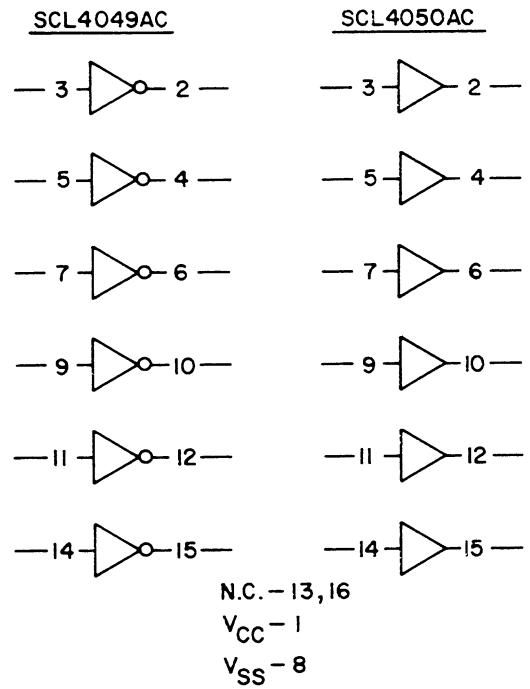


SCL4016
 120-6012-01
 QUAD BILATERAL SWITCH



KING
KNS 81
APPENDIX "A"

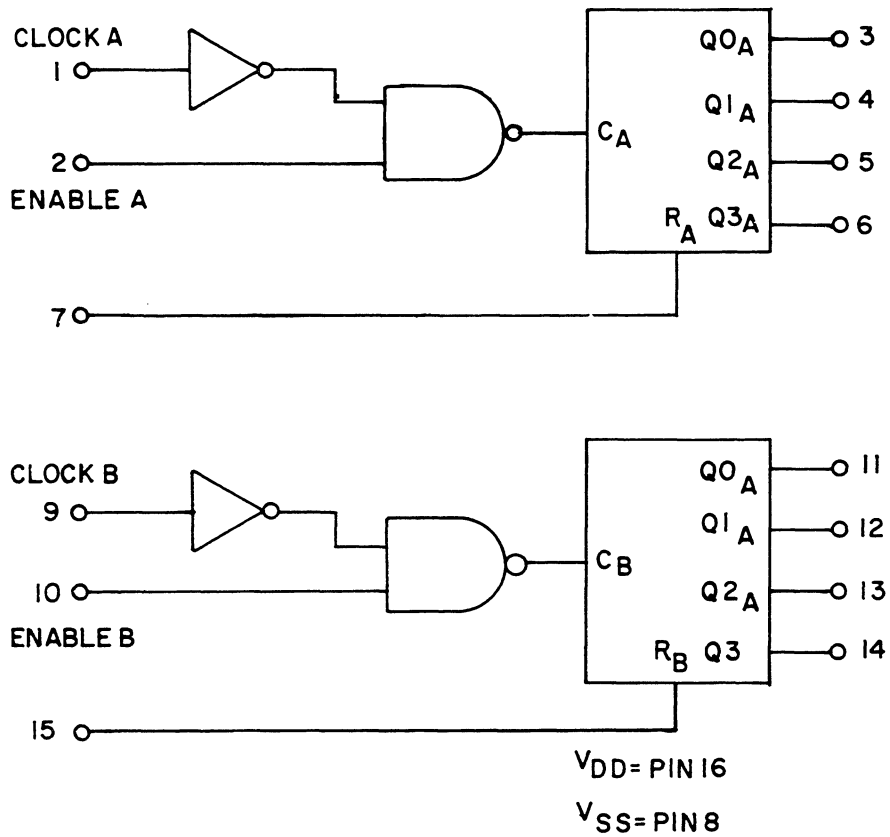
CD 4049 120-6025-01
CD 4050 120-6026-01



The CD4049 is an inverting hex buffer and the CD4050 is a non-inverting hex buffer. Both feature logic-level conversion using only one supply voltage (V_{CC}). The input-signal high level (V_{IH}) can exceed the V_{CC} supply voltage when these devices are used for logic-level conversions. These devices are intended for use as COS/MOS to DTL/TTL converters and can drive directly two DTL/TTL loads. ($V_{CC} = 5V$, $V_{OL} \leq 0.4V$, and $I_N \geq 3mA$.)

KING
KNS 81
APPENDIX "A"

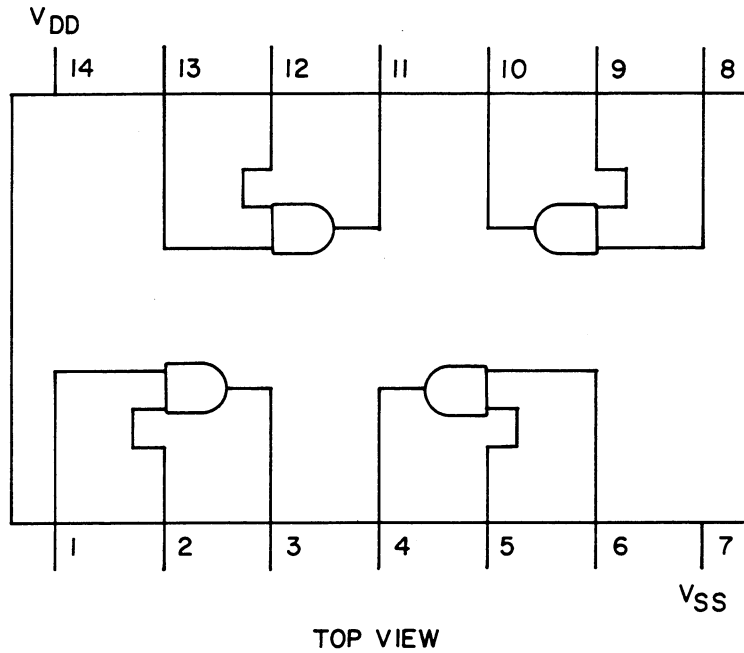
MC1451B
120-6029-00/01
DUAL BCD UP COUNTER



CLOCK	ENABLE	RESET	ACTION
	1	0	INCREMENT COUNTER
0		0	INCREMENT COUNTER
	X	0	NO CHANGE
X		0	NO CHANGE
	0	0	NO CHANGE
1		0	NO CHANGE
X	X	1	QC THRU Q3=0

KING
KNS 81
APPENDIX "A"

CD 4081 120-6047-01

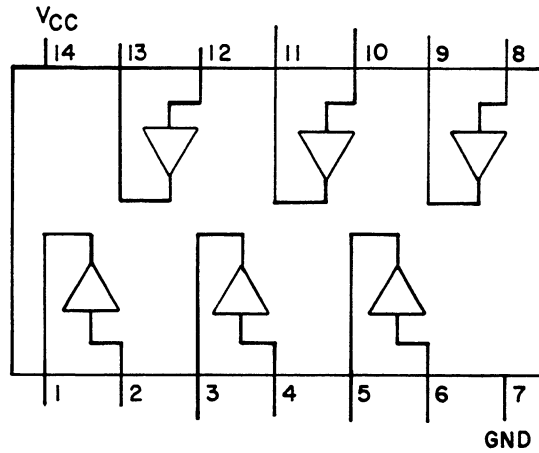


This quad gate is a monolithic complementary integrated circuit constructed with N and P-channel enhancement mode transistors. It has equal source and sink current capabilities and conform to standard B series output drive. The device also has buffered outputs which provide transfer characteristics by providing very high gain.

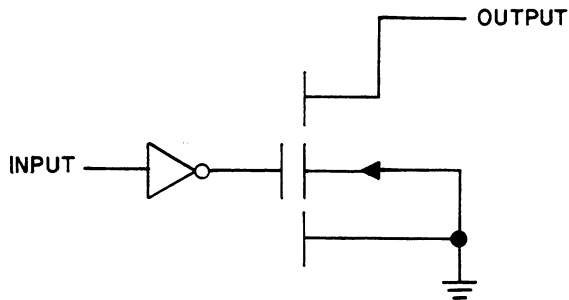
All inputs are protected against static discharge with diodes to V_{DD} and V_{SS} .

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 KNS 81
 APPENDIX "A"

74C906
 120-6058-00
IC, BUFFER, HEX OPEN DRAIN

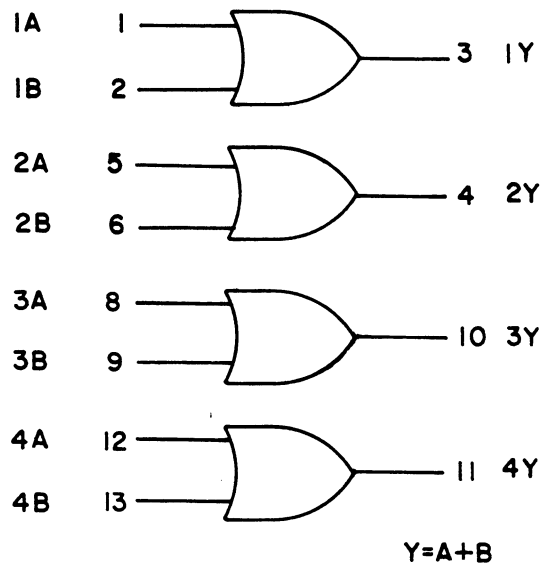


LOGIC DIAGRAM



SCL4071
 120-6064-01

INPUTS	OUTPUT
00...0	0
ALL OTHER COMBINATIONS	1

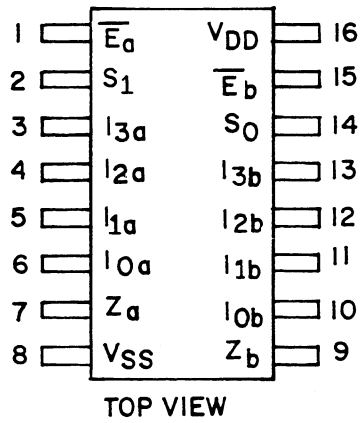


UP193356

KING

KNS 81
APPENDIX "A"

F34539
120-6068-00/G1
I.C., MULTIPLEXER, DUAL 4 INPUT



INPUTS			OUTPUT
S ₀	S ₁	\bar{E}	Z
X	X	H	L
L	L	L	I ₀
H	L	L	I ₁
L	H	L	I ₂
H	H	L	I ₃

