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MAINTENANCE MANUAL

BENDIX/KING®

KLN 94

GPS NAVIGATION SYSTEM

MANUAL NUMBER 006-15599-0000
REVISION 0 SEPTEMBER, 2000

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MAINTENANCE MANUAL

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KLN 94

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SECTION IV
THEORY OF OPERATION

4.1 GENERAL INFORMATION

4.1.1 GENERAL DESCRIPTION

The KLN 94 is a panel-mounted, long range, GPS based airborne navigation system with a database. The KLN 94 provides VFR, IFR enroute, terminal and non-precision approach functions. The KLN 94 is certified to TSO C129a.

The primary purpose of the KLN 94 is to provide the pilot with present position information and to display guidance information with respect to a user defined flight plan. Flight plan information is entered by the user via various knobs and buttons located on the front panel.

The KLN 94 can use its present position information to determine crosstrack error, distance-to-waypoint, ground speed, track angle, time-to-waypoint, bearing-to-waypoint, and advisory VNAV guidance. The KLN 94 also has instrument approach capabilities.

The KLN 94 can also output some of this information for use by other devices. The internal database of the KLN94 contains information concerning airports, VORs, NDBs, intersections, SID/STARs, and outer markers located throughout the world. Waypoints are stored in the database by their ICAO identifiers. The ICAO identifiers are taken directly from Jeppesen-Sanderson or government aeronautical charts. This data allows the pilot to create flight plans with minimum effort. The KLN 94 can also store non-precision approaches. This allows the pilot to select an approach as a whole, rather than entering the approach waypoint by waypoint.

Information in the database is updated on a perpetual basis. The KLN 94 is designed so that the user may easily remove the old database and install a current database. The database is housed in a data card which plugs into the front of the KLN 94. The database can also be updated by loading the information with a personal computer via RS-232 serial interface.

For more information on the availability and cost of updating the database of the KLN 94, refer to the KLN 94 Pilot's Guide, P/N 006-18207-0000.

A color liquid crystal display (LCD) is used to display the navigation information. Connections to the unit are made through one 37 pin and one 25 pin D-sub connector and one BNC coaxial connector all located at the rear of the unit. Also, a phone jack is located on the front panel.

4.1.2 BASIC CONSTRUCTION

The KLN 94 contains several circuit boards and assemblies which are listed in Table 4-1, along with reference series and connector information.

ASSEMBLY	PART NUMBER	REFERENCE SERIES	CONNECTORS
GPS XPRESS BOARD	200-08825-0000	500	J501, J502
BUTTON BOARD	200-09641-0001	1000	J1007, J1017
BUS I/O BOARD	200-09642-0001	3000	J945, J3005
SUPPRESSOR BOARD	200-09665-0001	4000	J4005
MAIN BOARD	200-09638-0001	5000	J941, J942, J5001, J5003, J5004, J5005, J5006, J5007, J5009, J5100, J5101, J5102
POWER BOARD	200-09639-0001	6000	J943, J6005, J6008
SWITCH BOARD	200-09640-0001	7000	J7001, J7005, J7008, J7011

TABLE 4-1 ASSEMBLY DESIGNATIONS

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4.2 BLOCK DIAGRAM THEORY

Figure 4-1 is a block diagram showing the basic signal flow through a KLN 94 GPS RNAV.

4.2.1 POWER BOARD

The Power Board block diagram is shown in Figure 4-2.

The power supply uses a flyback converter circuit to transform the aircraft power bus voltage (11-33 volts) into the required voltages for the KLN 94's internal circuitry. The power supply incorporates over voltage and short circuit protection to minimize the possibility of damage occurring in the power supply or other circuitry.

4.2.2 FRONT PANEL ASSEMBLY

The Front Panel block diagram is depicted by Figure 4-3.

The Front Panel Assembly acts as the unit's pilot interface. It includes the liquid crystal display (LCD) with backlighting, control switches, and pushbuttons. Specific boards included within are the Button Board and the Switch Board.

4.2.3 GPS XPRESS RECEIVER

CAUTION

DO NOT ATTEMPT TO ALIGN OR REPAIR THE GPS PXPRESS RECEIVER BOARD (P/N 200–08825–0000). THIS BOARD IS NOT A FIELD SERVICEABLE ASSEMBLY

4.2.4 MAIN BOARD

The Main Board block diagram is depicted by Figures 4-4, 4-5, and 4-6.

The Main Board includes both microprocessors and input/output circuitries. The Bus I/O Board and Suppressor Boards interface directly with the Main Board.

4.2.5 UNIT INTERCONNECTION

The Unit Interconnection diagram is depicted by Figure 4-7.

This diagram shows the relationships between the various board connectors within the KLN 94.

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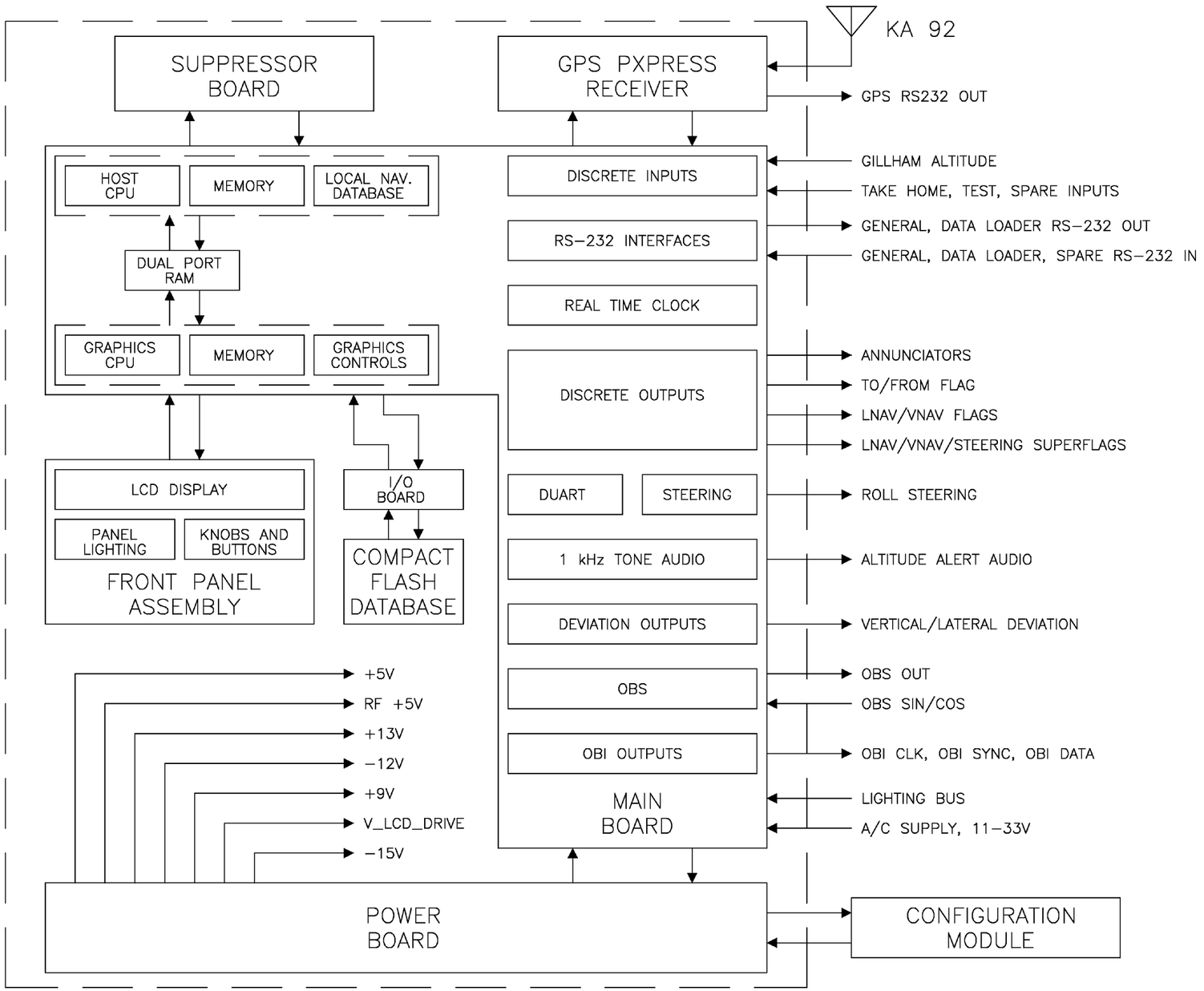


FIGURE 4-1
KLN 94 UNIT BLOCK DIAGRAM

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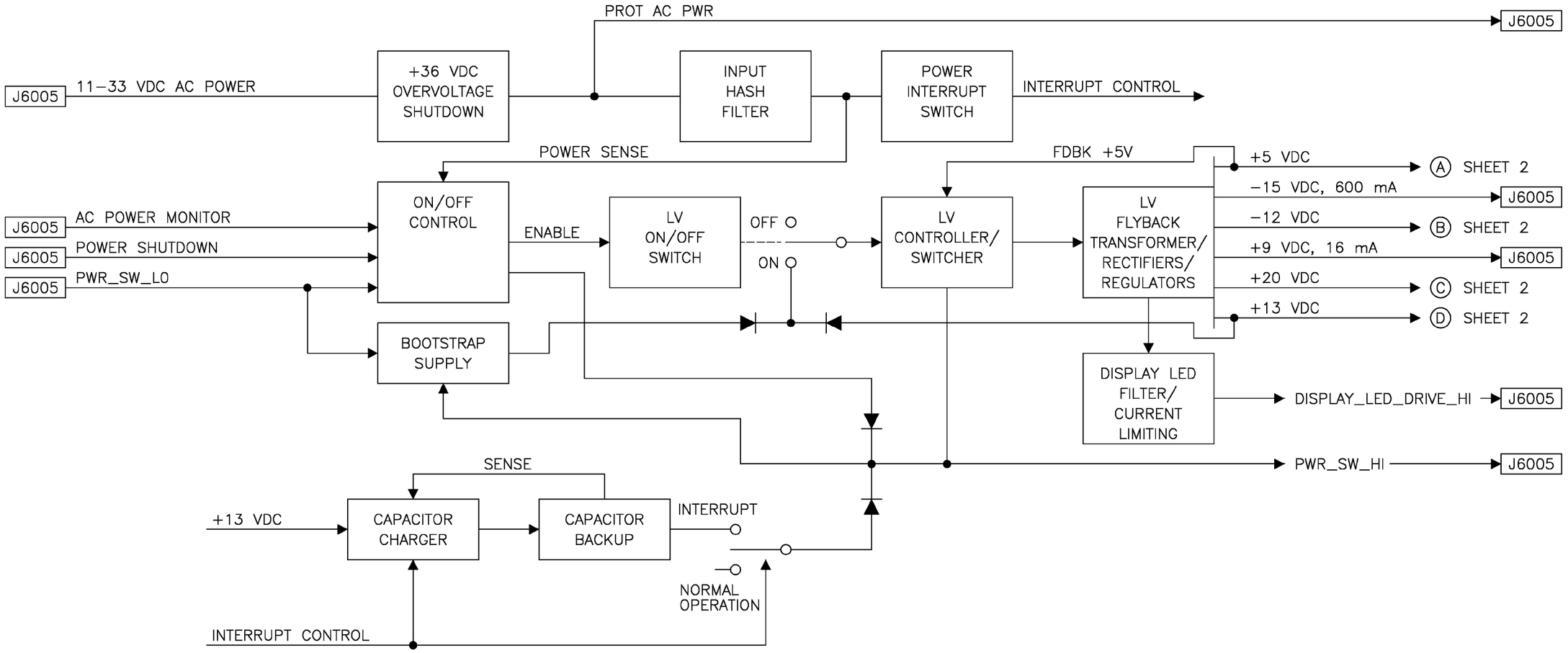


FIGURE 4-2
KLN 94 POWER SUPPLY BLOCK DIAGRAM (Sheet 1 of 2)

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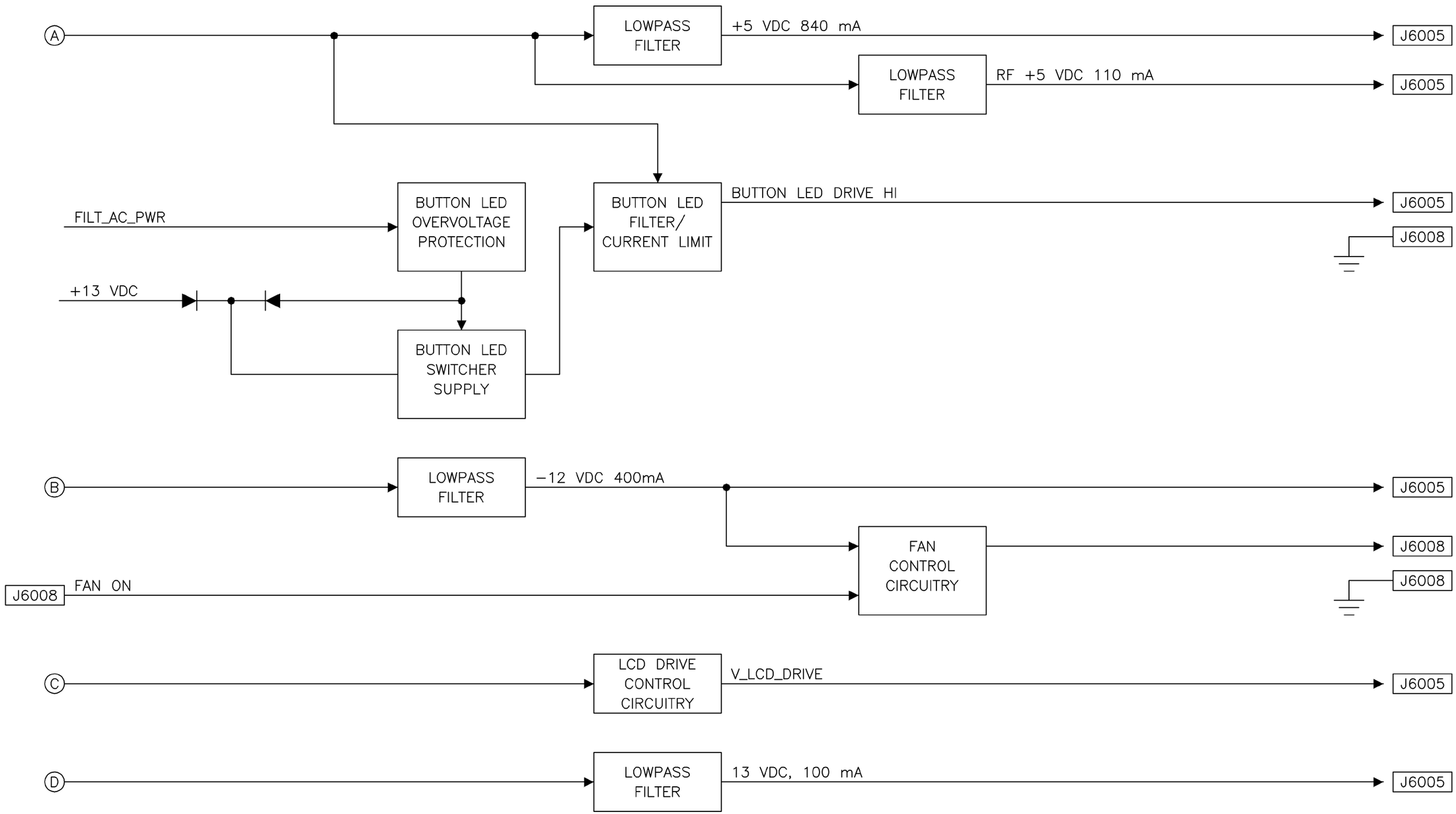


FIGURE 4-2
KLN 94 POWER SUPPLY BLOCK DIAGRAM (Sheet 2 of 2)

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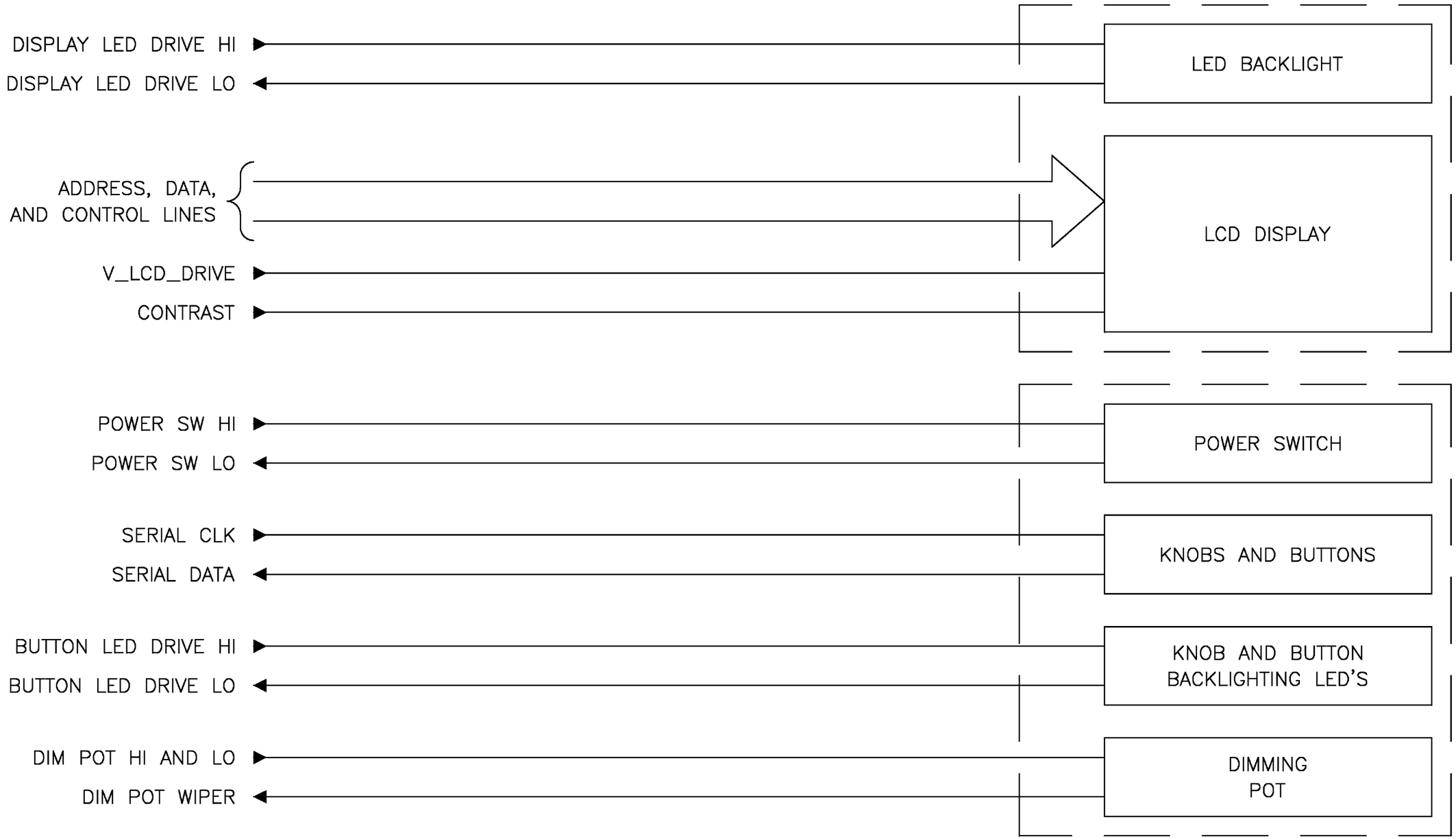


FIGURE 4-3
KLN 94 FRONT PANEL BLOCK DIAGRAM

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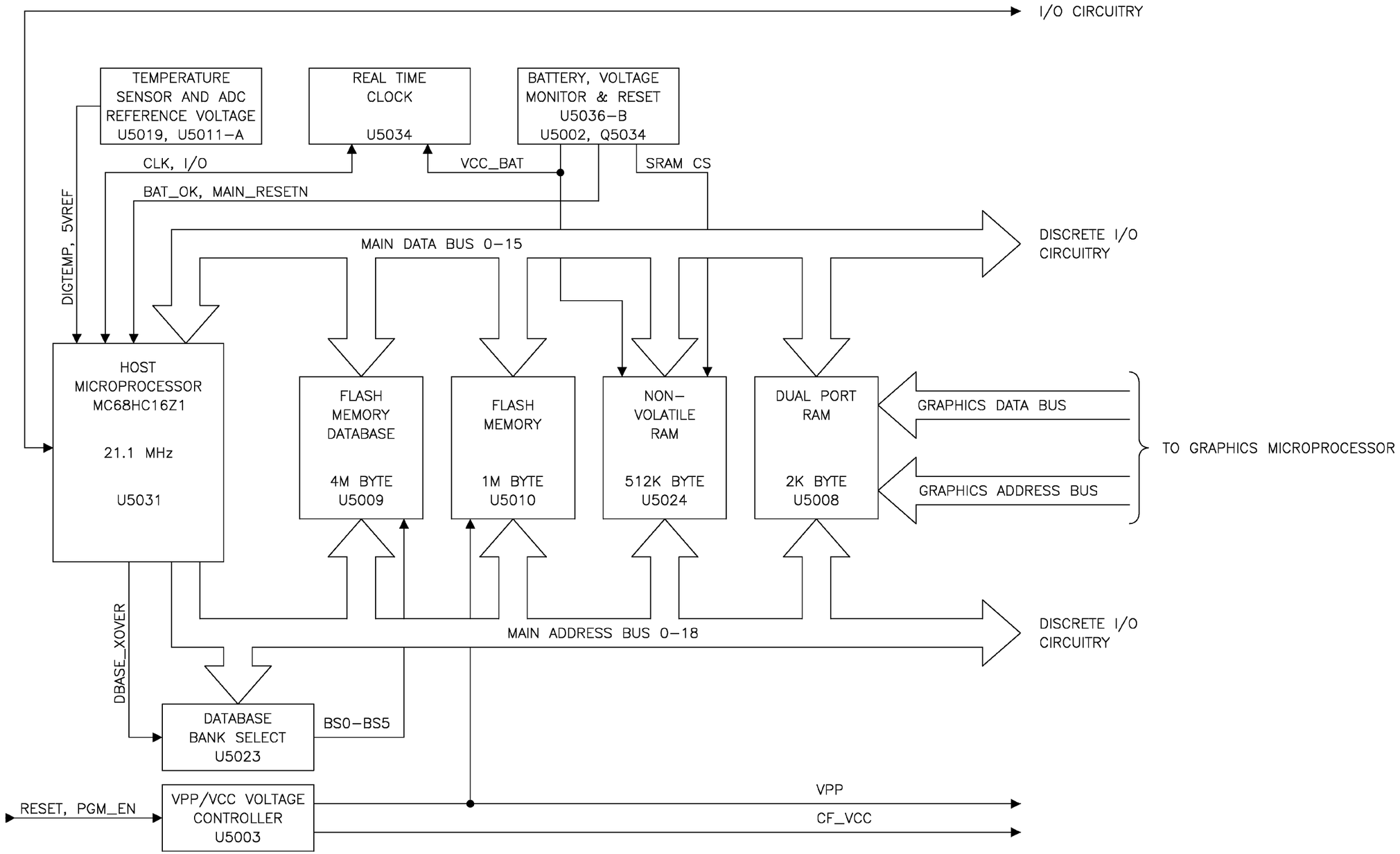


FIGURE 4-4
KLN 94 HOST MICROPROCESSOR BLOCK DIAGRAM

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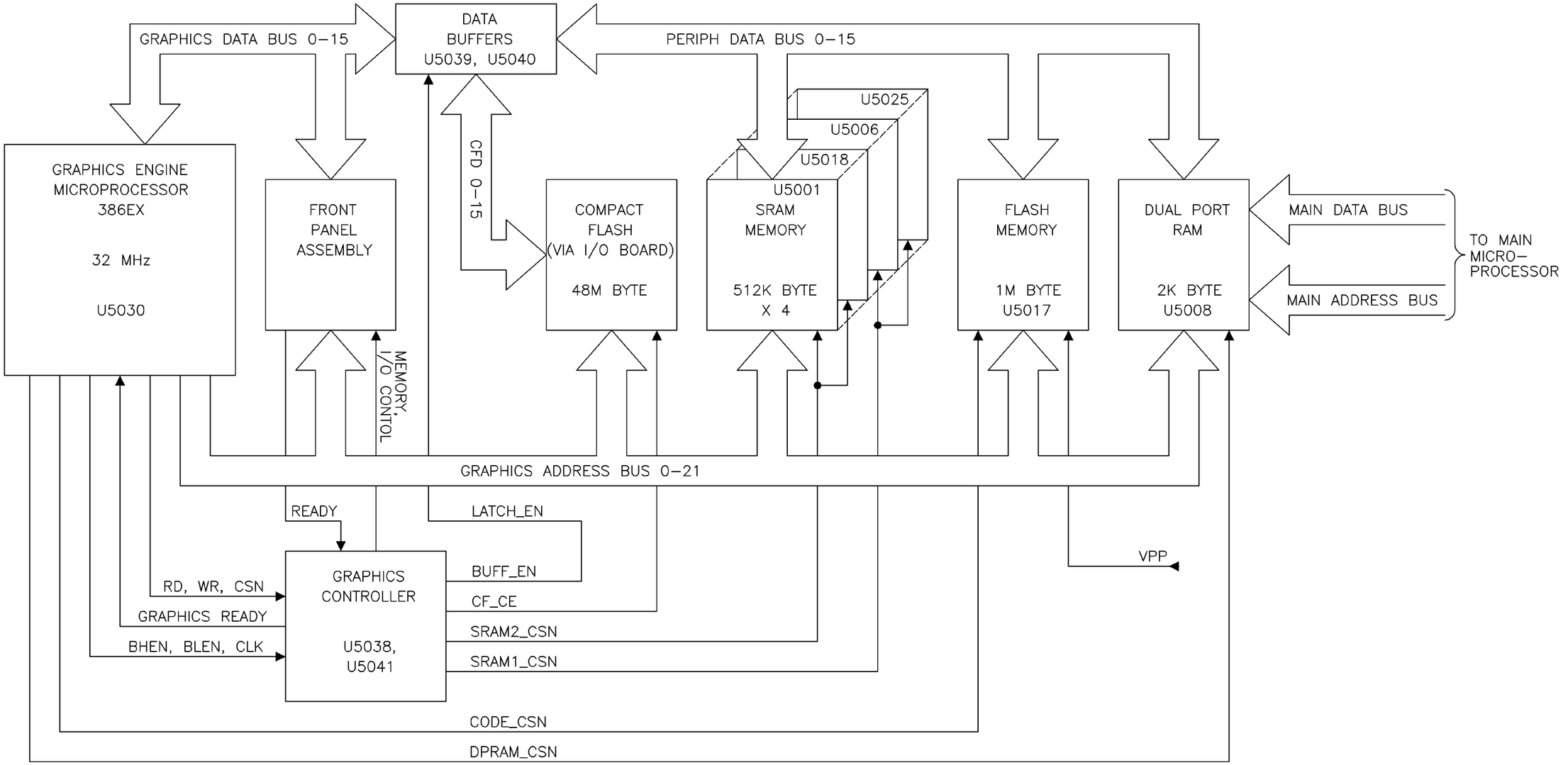


FIGURE 4-5
KLN 94 GRAPHICS MICROPROCESSOR BLOCK DIAGRAM

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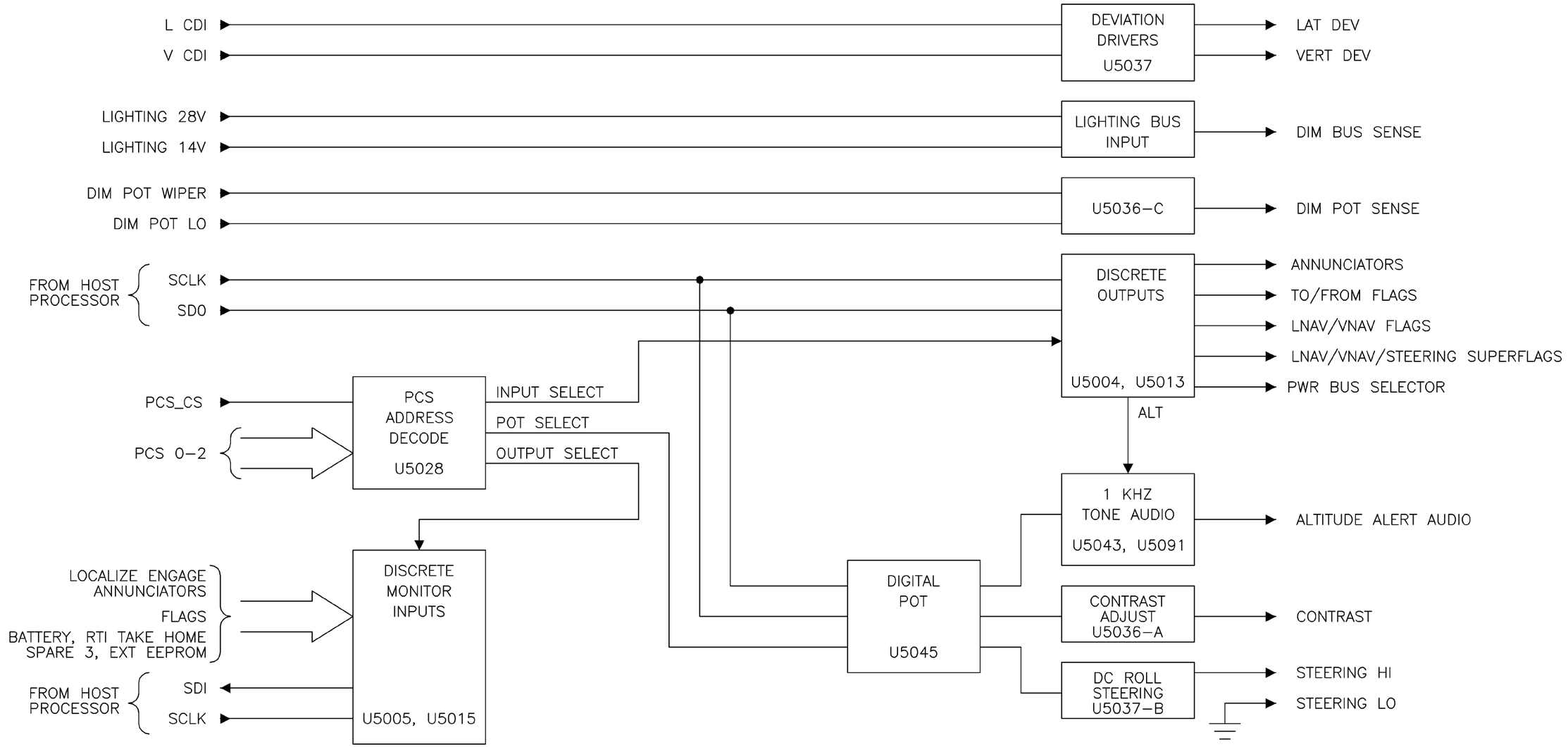


FIGURE 4-6
KLN 94 I/O BLOCK DIAGRAM (Sheet 1 of 2)

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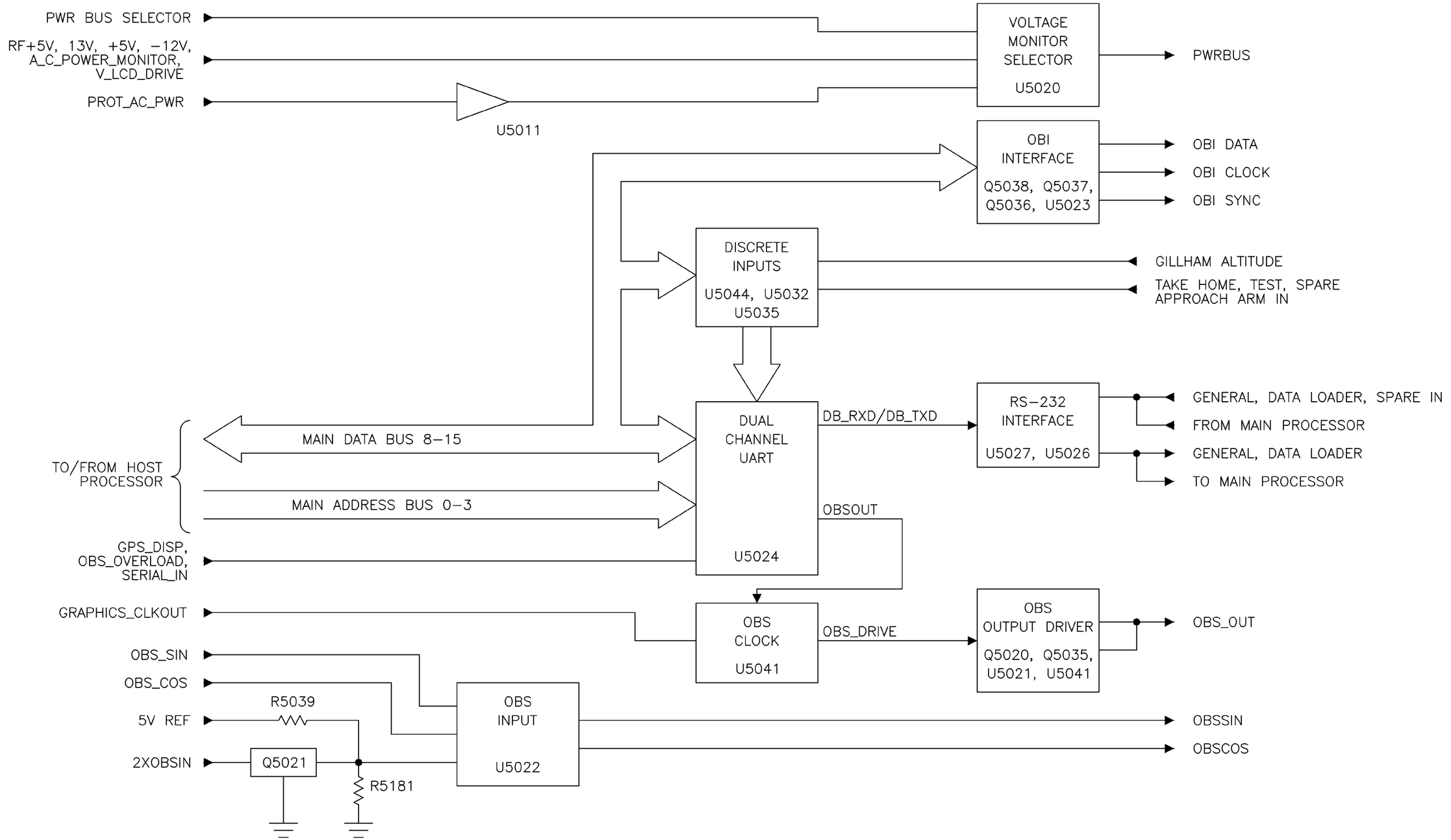


FIGURE 4-6
KLN 94 I/O BLOCK DIAGRAM (Sheet 2 of 2)

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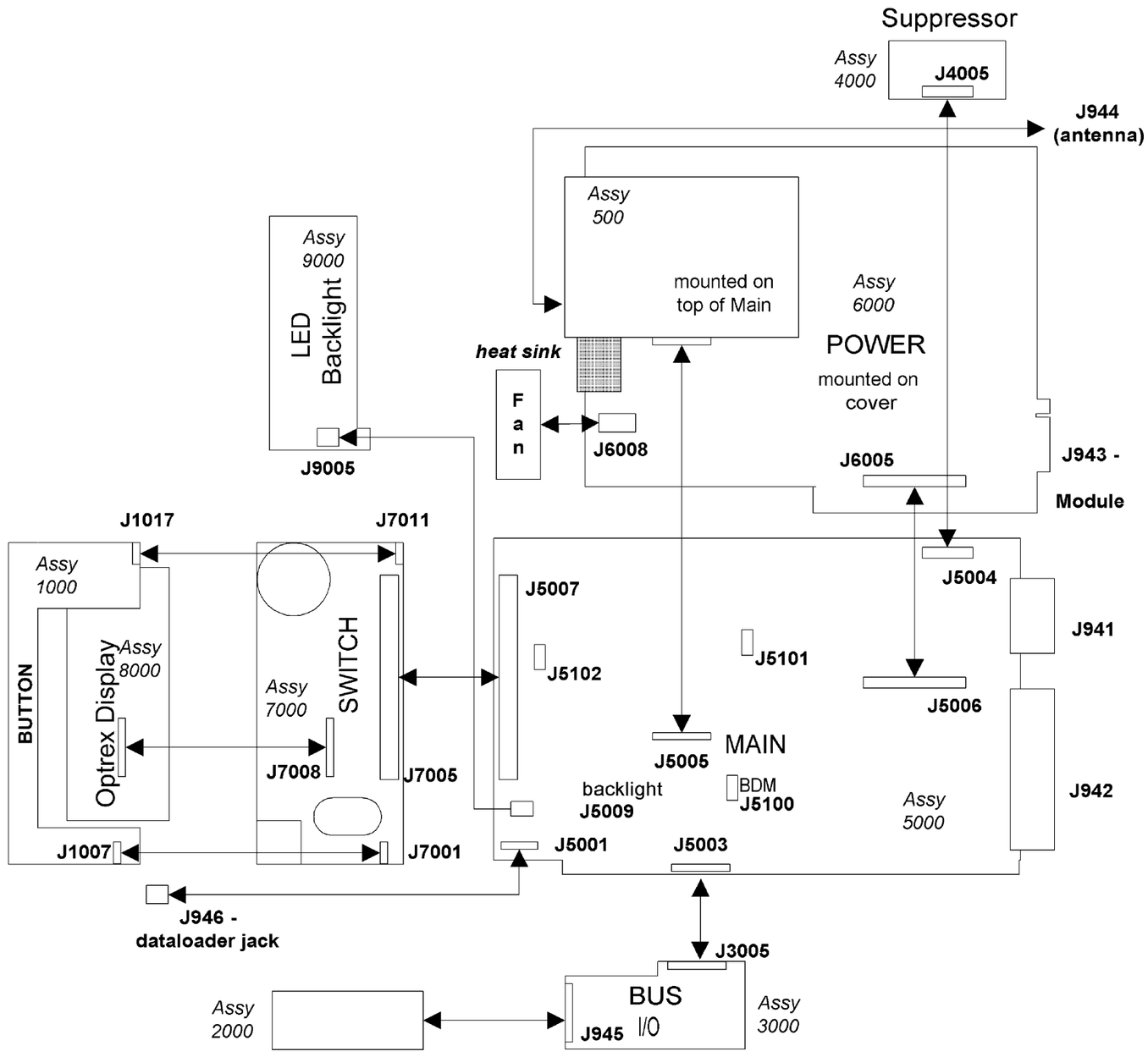


FIGURE 4-7
KLN 94 UNIT INTERCONNECTION DIAGRAM

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4.3 DETAILED CIRCUIT THEORY

4.3.1 POWER BOARD

4.3.1.1 General

Refer to Figure 4-2 and Power Board section of the Illustrated Parts List as an aid for the following discussion. The KLN 94 power supply produces the +5.0V, +9V, -12V, +13V, -15V, and +20V (V_LCD_DRIVE) DC voltages. The power supply configuration enables the KLN 94 to operate on any input voltage from +9.0VDC (a minimum of +10.0VDC for start-up) to +33VDC with no modification or rewiring. Also, the unit power consumption is virtually independent of the input voltage.

Current flowing through the primary windings of the power transformer T6001 is alternately switched, on then off, by Q6016. When the primary current is turned on, energy is stored in the transformer's magnetic field. When the primary current is turned off, the current flowing in the secondary windings dissipates the stored energy. Five taps on the secondary winding of T6001 are then rectified and filtered to produce the voltages necessary for operation of the KLN 94. The KLN 94 Power Board provides the required DC supply voltages for all circuitry within the unit.

4.3.1.2 Power Supply Circuitry

4.3.1.2.1 Power Input

Power input to the KLN 94 (11-33_VDC_A_C_POWER) is supplied to pin 19 of J942 on the MAIN Board. On the MAIN Board, the input power is RF bypassed by a 1000pF and a 1uF capacitor. The unit is protected from overvoltage damage by an 85V transorb. The input power then passes through a filter consisting of a 2.5 turn coil, a .01uF and a 1uF capacitor through a 15uH inductor, and a .1uF capacitor. Then power is passed to the Power Board via pins 30, 31 and 32 of J5006. On the Power Board, input power is supplied to the +33VDC Overvoltage Shutdown circuit.

4.3.1.2.2 Overvoltage Shutdown Circuit

This circuit senses the input voltage and turns on Q6014 if the input voltage rises above a nominal voltage of +36VDC. At input voltages less than this, the voltage is low enough to keep zener diode CR6014 out of conduction.

In the normal condition, no current flows through R6045 keeping the base-emitter junction of Q6014 at 0V. This will keep Q6014 turned off allowing the gate-source voltage of Q6015 to be negative (the gate-source voltage of Q6015 is clamped at a maximum of -9.1V by CR3015) and Q6015 is turned on for normal operation.

If the input voltage increases to a level above the sum of the zener voltage of CR6014 and the forward drop of CR6013, current flows through R6045. This establishes a negative base-emitter voltage that turns on Q6014 which clamps the gate-source voltage of Q6015 at -0.2V turning it off. When Q6015 is off, input power is disconnected. All of the components connected to the output of this circuit are thus protected from any voltage exceeding +36VDC.

The Overvoltage Shutdown circuit output to the superflags and annunciators, (PROT_AC_PWR), is routed back to the Main Board through a filter consisting of L6002, C6029, and C6056 while the input power for all power supply circuitry is routed to the Input Hash Filter.

4.3.1.2.3 Input Hash Filter

The Input Hash Filter is a pi filter consisting of L6003, C6015, C6016, C6022, and C6026. The filter reduces ripple on the input power line and protects the power supply circuitry from any externally induced ripple voltage. The hash filter output is routed to the input power steering diode CR6016. CR6016 couples either the Input Hash Filter circuit output or the Backup Capacitor circuit output to the Low-Voltage (LV) Flyback Transformer (XFMR_HI) and to the front panel On/Off switch (PWR_SW_HI).

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4.3.1.2.4 ON/OFF Control

The On/Off Control circuit monitors the signal from the front panel On/Off switch (PWR_SW_LO), the avionics power bus (AIRCRAFT_POWER_MONITOR), and the microprocessor-controlled shutdown line (POWER_SHUTDOWNn). If these inputs allow the unit to turn on, the On/Off Control circuit outputs an active-low ENABLEn signal. When the ENABLEn signal is low, the LV On/Off Switch circuit allows the LVPS to start up. Q6028 and Q6030 bring the ENABLEn line to the low state when both are on. Q6028 is turned on when the front panel On/Off switch is pushed in to the ON position, connecting PWR_SW_LO to PWR_SW_HI. While in normal operation, Q6030 is held on by the presence of +5V through R6096 and CR6038.

However, during initial startup, Q6030 can only be turned on by the presence of at least +6VDC on the AIRCRAFT_POWER_MONITOR line, or by C6058 being charged through R6080 and CR6037 while Q6028 is off (front panel On/Off switch pulled out to the off position). Under this condition, Q6030 is held on by C6058 long enough for the LVPS to start once Q6028 turns on (front panel On/Off switch pushed in to the ON position). The circuit operates this way to allow the unit to restart (if the KLN 94 is connected to an external emergency battery supply) by cycling the On/Off switch after the avionics power bus drops out and the unit has been shut down due to a POWER_SHUTDOWNn being asserted.

A POWER_SHUTDOWNn can be asserted by the KLN 94 Host microprocessor when the KLN 94 is connected to an external emergency battery supply and the AIRCRAFT_POWER_MONITOR line indicates a loss of avionics bus power. This is done to conserve battery supply life. A low level on the POWER_SHUTDOWN line causes R6079 to conduct base current from Q6023, turning it on. This causes C6057 to rapidly charge through R6098, turning on Q6029. When Q6029 turns on, it pulls the gate of Q6030 low through R6095, turning off Q6030. As the LVPS shuts down and +5V falls to 0V, C6057 slowly discharges through R6099 keeping Q6029 on long enough for the unit to remain shut off.

4.3.1.3 LVPS Circuitry

4.3.1.3.1 LV Controller/Switcher

The Low-Voltage Power Supply (LVPS) generates the required unit DC power outputs. This power supply is a Flyback topology using a dedicated current-mode control pulse width modulator (PWM) integrated circuit (IC) (U6002). The LV Controller/Switcher circuit is made up of this IC and U6003-B which provides undervoltage shutdown. Power supply voltage to the control circuitry is provided through CR6028 from the +13V output when the LVPS is running or through CR6029 from the Bootstrap Power Supply during startup.

This voltage is switched by the LV On/Off Switch (Q6018-A) and is applied to U6002 and U6003 only if the ENABLE line from the On/Off Control circuit is low. The PWM IC generates an internal reference voltage which is accessible at pin 14 (5V_LVPS_REF). The PWM IC operates at 128 kHz as set by R6055 and C6033, and the output at pin 10 drives Q6016 (an N-channel switching FET) through R6050. During the time that Q6016 is turned on, current is sourced from C6024, C6025, and C6020 on the XFMR_HI line through the primary windings of the LV Flyback Transformer (T6001) and returned to ground through current sense resistors R6048 and R6049. These resistors generate a current sense voltage that is filtered by R6051 and C6041 and provided to U6002 for current-mode regulation.

When Q6016 is turned off, the energy stored in T6001 as magnetic flux causes current to flow in the secondary windings. This is known as Flyback. Parasitic elements in the transformer also cause a Flyback voltage spike to occur in the primary of T6001. A snubber network consisting of C6021, R6047, and CR6019 capture this energy and return it to power input capacitors C6024, C6025, and C6020. Ferrite inductor L6005 reduces unwanted RF emissions.

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Soft start and shutdown control is provided by CR6025 which serves to hold the COMP output (Pin 1) of U6002 low to delay startup or initiate shutdown. Undervoltage shutdown is generated by U6003-B pulling pin 1 (COMP) of U6002 to ground. This occurs when V_IN falls below 7.2V. If this happens, R6067 provides hysteresis to prevent restart until INT_AC_PWR has returned to at least +9.0V.

4.3.1.3.2 Bootstrap Power Supply

The Bootstrap Power Supply provides DC power to the LV Controller/Switcher PWM IC (U6002) and to the comparator IC (U6003) until +13V can ramp up and supply the power. This supply goes into operation when the front panel On/Off switch is pushed in to the on position and PWR_SW_LO is connected to PWR_SW_HI. This causes CR6033 to conduct and clamp at +6.2VDC and Q6025 to turn on. As Q6025 turns on, the collector current is sourced through R6086, providing a negative base-emitter voltage for Q6026. This turns on Q6026, applying XFMR_HI to the anode of CR6029 and on to the LV On/Off Switch. As the XFMR_HI voltage increases, CR6035 goes into conduction applying emitter feedback to Q6025 through R6083. This feedback tends to turn off Q6025 that in turn tends to turn off Q6026. In this way, the Bootstrap Power Supply regulates the output voltage applied to the anode of CR6029. The Bootstrap Power Supply output voltage varies from +9 to +12VDC as XFMR_HI varies from +11 to +33VDC.

4.3.1.3.3 LV ON/OFF Switch

The LV On/Off Switch consists of Q6018A, R6063, and R6065. This switch controls the power supply voltage to the LVPS PWM IC (U6002) and the comparator IC (U6003). When the ENABLEn line goes low, the Q6018-A gate-source voltage becomes negative and Q6018-A is turned on, applying power to U6002 and U6003. This allows the LVPS to start up. When the ENABLEn line goes high, Q6018-A turns off and the LVPS shuts off immediately.

4.3.1.3.4 LV Flyback Transformer

The LV Flyback Transformer has an isolated primary winding and a tapped secondary winding with taps for +13V, –12V, +20V, -15V, and +5V referenced to grounded center taps.

4.3.1.3.5 Lowpass Filters

A Lowpass Filter (L6004 and C6046) reduces output ripple on the +13V output of the LVPS. A second Lowpass Filter (L6006 and C6018) reduces output ripple on the DISPLAY_LED_DRIVE_HI output of the LVPS. A third Lowpass Filter (L6007, C6038, and C6036) reduces output ripple on the -12V output of the LVPS. A fourth Lowpass Filter (L6009, C6030, and C6063) reduces output ripple on the +5V output of the LVPS. A sixth Lowpass Filter (L6008 and C6045) reduces output ripple on the RF+5 output of the LVPS.

4.3.1.3.6 Power Interrupt Circuitry

The power interrupt circuitry allows the KLN 94 to operate without interruption for at least one second without 11-33_VDC_A_C_POWER. During this one-second interval, the PROT_AC_PWR output is not backed up, so the superflags will not operate during a power interruption.

4.3.1.3.7 Capacitor Backup

The one-second backup power supply is made up of five 10 Farad, 2.5VDC double layer capacitors in series (C6001, C6006, C6011, C6014, and C6017). Resistors (R6003, R6011, R6027, R6034, and R6041) equalize charging voltage distribution and bleed off capacitor charge during unit storage. The Capacitor Backup circuit supplies +8 to +11.0VDC at ~2A-peak current for at least one second for temperatures down to -20 degrees C. CR6006 helps to prevent over charging.

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4.3.1.3.8 Power Interrupt Switch

The Power Interrupt Switch provides the control logic and power switches to turn on the Capacitor Backup circuit during power interrupt. U6003-A senses the output voltage from the Input Hash Filter and compares it to a reference voltage that is generated by U6002 pin 14 (5V_LVPS_REF).

R6060 provides about 0.7V of hysteresis. Since U6003-A is powered by the Bootstrap Power Supply, the output is low at unit power-up. Under this condition, the output remains low until V_IN drops to about +10.1VDC. At this voltage, the output of U6003-A goes high and cannot return low until the input voltage returns to about +10.8VDC. When the output of U6003-A goes high, CR6009 and CR6026 stop conducting. This causes Q6021 to turn on, sinking current from the Capacitor Backup circuit through R6033 and R6040. The resulting negative gate-source voltage on Q6012 turns it on, connecting the Capacitor Backup circuit to the input power steering diode CR6016. CR6016 couples the Backup Power Supply circuit output to the Low-Voltage (LV) Fly-back Transformer (XFMR_HI) and to the front panel On/Off switch (PWR_SW_HI). This also shuts down the Capacitor Charger circuit through CR6009.

4.3.1.3.9 Capacitor Charger

When FDBK_13V is present, this circuit charges the Capacitor Backup circuit through R6014, R6015, Q6018-B, and CR6007. The Capacitor Backup circuit is sufficiently charged at +10.5VDC to sustain a one-second interrupt. The Capacitor Charger circuit will take approximately 3 minutes to recharge the Capacitor Backup circuit to +10.5VDC after a power interruption and approximately 6 minutes to charge up to this voltage on initial power-up.

4.3.1.3.10 Button Backlighting Supply Circuitry

The Button Backlighting Supply generates the required unit DC power for the front panel nomenclature and buttons. This power supply is a simple switcher using a dedicated current-mode control pulse width modulator (PWM) integrated circuit (IC) (U6001).

Power supply voltage to the Button Backlighting control circuitry is provided through CR6005 from the +13V output when the LVPS is running. Power is provided through Q6001 from the FILT_AC_PWR filter whenever the unit is shut down. Voltage FDBK_13V is applied to U6001 through CR6005 only if the ENABLEn line from the On/Off Control circuit is low.

The PWM IC generates an internal reference voltage that is accessible at pin 14. The PWM IC operates at 128 kHz as set by R6010 and C6010. Output pin 10 drives Q6008 (an N-channel switching FET) through R6008 and R6022. During the time that Q6008 is turned off, current is sourced to C6007 which is fed back to U6001 to maintain a constant voltage (approximately 12.5VDC). R6023 and R6025 divide the fed back sense voltage for U6001 to maintain a 2.5-volt reference at pin 3 of U6001.

Charging current for L6001 is delivered through Q6002 during those portions of the PWM cycle when Q6006 is turned on. Resistor dividers R6002 and R6006 work with CR6004 to make sure Q6002 is properly turned on and that Q6002's gate-source voltage limit is not exceeded. When Q6008 is turned off, the energy stored in L6001 as magnetic flux causes current to flow in CR6010 to C6007. Q6006 shuts off the incoming current during those portions of the PWM cycle when L6001 is delivering its stored energy. During this time, CR6002 conducts and provides a ground for the negative-going end of L6001.

The button backlighting requires two different current levels, one for normal operation, and one for the situation where the unit's aircraft power is on but the unit is turned off. Q6009-B is the pass transistor providing these current levels. Resistors R6038 and R6039 apply gate-source voltage to Q6009-B to turn it on.

During normal operation, current flows from CR6010 through Q6009-A and current limit resistors R6028 and R6030, as well as current limit resistor R6029. This current then flows through Q6009-B and on to the front panel via J6005-15.

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If too much current flows, R6037 will begin to turn on Q6011 which then cuts back gate drive to Q6009-B, thereby limiting the current.

When the unit is turned off, the +5V power applied to the gate of Q6010 will be so low that Q6010 will be off. This causes R6036 and R6035 to set the gate-source voltage of Q6009-A at such a small magnitude that R6028 and R6030 no longer provide current. Only R6029 provides current which is just enough to provide dimly lit buttons. CR6011, C6013, and R6032 make up a timing network to make sure on/off transitions are handled smoothly, eliminating flashes of light.

Resistor R6031 provides a load to make measurements easier during troubleshooting. Bypass capacitors C6012 and C6052 reduce noise. R6020 is a current sense resistor that generates a current sense voltage that is filtered by R6026 and C6009 and provided to U6001 for current-mode regulation.

4.3.1.3.11 Display Backlighting Supply

The LEDs of the display assembly's backlighting must be supplied with a stable current source to regulate brightness and heat generation. Q6022 is the pass transistor providing this current source. Resistors R6088 and R6089 apply gate-source voltage to Q6022 to turn it on.

During the portion of the PWM cycle when the LEDs are conducting, current flows from L6006 through current limit resistors R6093, R6092, R6091, and R6090. This current then flows through Q6022 and on to the front panel via J6005-6. If too much current flows, R6087 will begin to turn on Q6027, which then cuts back gate drive to Q6022, thereby limiting the current.

Resistor R6069 provides a load to make measurements easier during troubleshooting. Bypass capacitors C6043 and C6048 reduce noise.

4.3.1.3.12 +9V and -15V Voltage Regulators

Two regulators provide Zener diode controlled voltages. In the +9V regulator, the base voltage (and therefore the emitter voltage) of Q6013 is limited by the voltage rating of CR6012. Resistor R6042 provides base drive current as well as Zener current. Bypass capacitor C6044 reduces high frequency noise. In the -15 regulator, the base voltage (and therefore the emitter voltage) of Q6024 is limited by the voltage rating of CR6030. Resistor R6081 provides base drive current as well as Zener current. Bypass capacitor C6049 reduces high frequency noise.

4.3.1.3.13 LCD Bias Supply and Timing Control

The supply for the display assembly's LCD bias voltage is derived from the voltage supplied by rectifier CR6023. First, the voltage is regulated. Then, a timing control makes sure that the LCD bias is applied to the display only when +5V is present. This prevents damage to the LCD display.

The voltage present on CR6023's cathode is applied to the nominal +20.5V regulator consisting of Q6019, R6056, CR6022, and CR6021. This regulator is very similar to that used in the +9V regulator described elsewhere.

Under normal conditions, the reset controller's output pin, U6004-1, applies base drive to Q6017, causing it to be turned on fully. This causes resistors R6058 and R6059 to apply base drive to pass transistor Q6020. In this condition, Q6020 is fully on, and the V_LCD_DRIVE signal on Q6020's collector is essentially the same as the voltage present on regulator Q6019's output. Bypass capacitors C6050 reduces noise.

During power up, the reset controller's output pin, U6004-1, stays low for a short period of time after a valid +5V supply level is detected. While it is low, Q6017 doesn't conduct which causes Q6020 to also be turned off. Resistor R6057 keeps the level of the LCD Bias Supply at 0V while the +5V supply voltage rises to normal levels. When the time period is complete, the timing control assumes normal operation as described above.

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At power down, the reset controller's output pin, U6004-1, goes low immediately after a dip in the +5V supply is detected. When it goes low, Q6017 stops conducting which causes Q6020 to stop conducting. Resistor R6057 bleeds down the level of the LCD Bias Supply at least as quickly as the +5V supply voltage falls.

4.3.1.3.14 Fan Control

Level shifter transistors Q6005 and Q6008-A permit the standard 5V logic of the Host microprocessor to control the internal blower fan using the -12V supply. Resistors R6071, R6007, and R6005 supply the needed bias currents. Transistor Q6007 is driven via base drive resistor R6018 in the event that current sense resistor R6019 detects overcurrent conditions during fan turn on. When Q6007 turns on, the gate source drive across Q6008-A is reduced, thereby limiting fan current. C6042 reduces noise.

4.3.2 FRONT PANEL MODULE ASSEMBLY

The Front Panel Module Assembly consists of Front Panel Assembly, Switch Board Asembly, and a Display Assembly which houses a Backlight Board and a Controller Board. Refer to Figure 4-3 and applicable sections of the Illustrated Parts List as an aid for the following discussion.

4.3.2.1 FRONT PANEL ASSEMBLY

The Front Panel Assembly consist of a Button Board, a light block, and a switch membrane.

4.3.2.1.1 BUTTON BOARD

Nine pushbutton and 3 dome switches are routed through J1017 and J1007 to the Switch Board. When any button is depressed, the signal is pulled to a ground (low) state. Button backlighting for the KLN 94 is provided by 18 amber colored LEDs which are powered by PWM signal from the Main Board based on the 28V/14V lighting bus levels. This feature only requires one version of the unit to accommodate both lighting schemes.

4.3.2.1.2 SWITCH BOARD

Power switch U7005, when pushed to the "ON" position, pulls connector pin P7005-67 to the same potential as connector pin P7005-66. This enables the power supply. The Variable Resistor within U7005 controls the voltage of the wiper when turned. This voltage is fed to the Host microprocessor to vary the pulse width modulation of the Backlight LEDs which varies the intensity of the LCD Display.

The twelve switch signals from the Button Board, the Scan switch, as well as switches U7001 through U7004 (photo interrupters used for the increment/decrement knob functions) are converted to a 24 bit serial data stream by U7007 and U7008. This serial data is fed to the CPU Card to be polled by the Host microprocessor.

4.3.2.1.3 COLOR LCD DISPLAY ASSEMBLY

CAUTION

DO NOT ATTEMPT TO REPAIR THE COLOR LCD DISPLAY (P/N 043-05012-0001). THIS BOARD IS NOT A FIELD SERVICEABLE ASSEMBLY

This assembly contains a color LCD display, display drivers, a display controller chip, and an LED Backlight Board. The Backlight Board contains 147 (21 banks of 7) LEDs. These are pulse width modulated by the Main Board with an approximate 21VDC signal. The display assembly is communicated with through the Switch Board by the Main Board's graphics microprocessor.

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4.3.3 GPS XPRESS RECEIVER

CAUTION
DO NOT ATTEMPT TO ALIGN OR REPAIR THE GPS PXPRESS RECEIVER BOARD (P/N 200–08825–0001). THIS BOARD IS NOT A FIELD SERVICEABLE ASSEMBLY

The GPS Receiver Board, operating in conjunction with the KA 92 antenna provides the Host microprocessor (on the Main board) with position, velocity, and time information through the RS-232 interface module. The Host microprocessor provides control information to the GPS Receiver through the RS-232 interface module.

4.3.4 MAIN BOARD

4.3.4.1 General

Refer to Figures 4-1(overall block diagram), 4-4 (Host microprocessor diagram), 4-5 (Graphics microprocessor diagram), and 4-6 (input/output diagram) and applicable sections of the Illustrated Parts List as an aid for the following discussion. The Main Board has two microprocessors: the Host and the Graphics. The Host microprocessor controls all I/O functions of the rear panel connectors as well as the internal communication to the GPS engine and the local NAV Database with all calculation for flight. It also handles the front panel button and knob interface. The Graphics microprocessor controls the Display module and formats all data to the display as well as all interfacing to the Compact Flash data card. The two microporcessors communicate to each other via a 2 kiloByte Dual Port Static Ram.

4.3.4.2 Main Board Circuitry

4.3.4.2.1 Real Time Clock

The real time clock circuit consists of Y5002 and U5034. It is configured in the battery backup mode which means it has power applied at all times regardless if the unit is powered on or not. Communication with the real time clock and the Host microprocessor is accomplished through a serial peripheral interface consisting of SCLK and a discrete I/O pin of the Host microprocessor.

4.3.4.2.2 Host Microprocessor

The Host microprocessor, U5031, a Motorola MC68HC16Z1, is a high-speed 16 bit microcontroller which incorporates the following: a 16 bit central processing unit (CPU), system integration module (SIM), an 8/10-bit analog-to-digital converter (ADC) depicted on table 4-2, a queued serial module (QSM), general purpose timer (GPT), and a 1024-byte standby RAM (SRAM), interconnected by the inter-module bus (IMB). The system clock is software programmed to 20.972MHz. A 32.768kHz crystal, part of the reference oscillator, is connected across pin 78 and pin 80.

An internal phase-locked loop (PLL) circuit synthesizes the clock signal from the reference oscillator. Design hardware and software configuration supports changes in clock rate during operation. Because the Host microprocessor is a fully static design, register and memory contents are not affected by clock rate changes.

4.3.4.2.3 Host Reset Circuit

The Host microprocessor releases the reset line MAIN_HW_RESETn (pin 94 of U5031) only when the system clock is established and when the external reset line has been released by the external reset circuit. When locked, the system clock at pin 87 of U5031 should be 8.38MHz immediately after reset. When powered up, the reset line will only be released when +5V supply is stable.

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SYSTEM ANALOG CHANNELS	ANALOG SIGNALS	DESCRIPTIONS
ADA0	DIM_POT_SENSE	Monitors the setting of the Switch Board U7005 pot setting.
ADA1	DIGTEMP	Measures unit temperature.
ADA2	DIM_BUS_SENSE	Monitors the setting of the aircraft's lighting bus.
ADA3	DISPLAY_TEMP	Measure of the Backlight LED's temperature.
ADA4	PWRBUS	Samples unit bus voltage selected by U5020.
ADA5	OBSSIN	Monitors SIN ouput of OBS resolver.
ADA6	OBSCOS	Monitors COS ouput of OBS resolver.
ADA7	BAT_MEAS	Measures battery level.

TABLE 4-2 ADC Channels

The Host microprocessor can monitor up to 7 interrupts of which only 4 are used. The following table shows the descriptions of the interrupts monitored.

SYSTEM INTERRUPTS	INTERRUPT SIGNALS	DESCRIPTIONS
IRQ1	DPRAM_INTLn	U5008 interrupt for Dual Port Ram operation.
IRQ2	DBTX_INTn	DUART database loader transmit ready.
IRQ3	GLUINTn	DUART GPS transmit ready/receive interrupt.
IRQ4	DBRX_INTn	DUART database loader receive ready.
IRQ5	NC	Pulled High.
IRQ6	NC	Pulled Low.
PF7	POWER_SHUTDOWNn	Port pin F7 is used as an output to shutdown the unit via S/W, rather than as an interrupt.

TABLE 4-3 System Interrupts

Upon the release of MAIN_HW_RESETn, the Host microprocessor starts addressing code space data from the programmed flash part (U5010) starting with all address lines low as the first address. The memory map of the Host microprocessor is depicted in the following table.

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uP Chip Select	Designation	Size	Space	Data Size, bits
CSBOOT*	ROM_CSn	512K	00000-7FFFF	16
FC1_CS4*	XROM_CSn	256K	80000-BFFFF	16
BG_CS1*	DB_CSn	64K	C0000-CFFFF	8
BGACK_CS2*	DBXOVER_CSn	2K	D0000-D07FF	8
FC2_CS5*	SRAM1_CSn	62K	D0800-DFFFF	8
A20_CS7*	SRAM2_CSn	112K	E0000-FBFFF	8
A22_CS9*	PERI_CSn	16K	FC000-FFFFF	8
A19_CS6*	DPRAM_CSn	2K	FC000-FC7FF	8
BR_CS0*	DUARTn	2K	FC800-FC80F FC810 FC811-FCFFF	8
A23_CS10*	DISCRETE_CSn	2K	FD000 FD001 FD002-FD7FF	8
FC0_CS3*	Not used	2K	FD800-FDFFF	8
A21_CS8*	Not used	8K	FE000-FFFFF	8

TABLE 4-4 Host Processor Address Map

4.3.4.2.4 Host Flash Memories

The 8Mbit (512k x 16) flash memory (U5010) has a 16 kbyte boot block. This Boot Block is to ensure that the Boot Software is blocked from any accidental write cycles. For read operations, MAIN_8M_BOOT_CSn is low, MAIN_RDn is low, and MAIN_WRn is high because of decoding logic of U5029 and U5041.

During program and erasure, a BDM adapter is connected to J5100. A VPP of +5VDC will be supplied to the Flash VPP when HW_PGM_EN is pulled high by the U5029 PLD. Aternatively, both the Enter and Cursor keys can be depressed and Program code can be loaded via the Data Loader RS-232 interface. Memory contents of U5010 can then be altered.

4.3.4.2.5 Host Non-Volatile Memory

The Host side of MAIN Board contains one 512kbyte (512k x 8) of non-volatile RAM. The non-volatile RAM U5024 retains its data by applying the battery voltage (VCC_BAT) connected to pin 32 through U5002 pin 2. This will also hold MAIN_SRAM_CSn high to avoid any spurious chip selects in the power down cycle when the unit is turned off. When powered on, +5V will provide the required supply voltage to the RAM through U5002. MAIN_SRAM_CS_INn at pin 13 of U5002 controls MAIN_SRAM_CSn.

4.3.4.2.6 Database Interface

The maximum capacity of the Database Flash Memory Chip (U5009) is 4MBytes and is divided into banks of 64kbyte. To select each of the banks, 6 bank select lines BS(5:0) are decoded with U5023 using DISCRETE_CS2n, MAIN_DATA_BUS(15:0) and MAIN_WRn.

The MAIN_DB_CSn is used to enable each 64K bank. To support bank crossover, another chip select line, DBXOVER_CSn (CS2*), is used to address the 2K memory segment following a given bank. A 6-bit adder in the U5023 PLD implements the crossover. Note that the adding occurs without any extra programming since the microprocessor's CS2* chip select will automatically activate once the 64kbyte address is exceeded.

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4.3.4.2.7 Graphics Microprocessor

The Graphics microprocessor handles two main functions within the KLN 94. The first function is the interface to the LCD display. The majority of the data shown on the display is generated from the Host Microprocessor and passed to the Graphics microprocessor via the Dual Port SRAM (U5008). The Graphics microprocessor formats this data and presents it to the Graphics Controller chip within the LCD display module.

The second function is the interface to/from the Compact Flash Memory Card. This card holds all of the NAV Database, as well as, the Terrain Database. When required, the NAV Database is passed to the Host microprocessor for updating via the Dual Port Ram (U5008). The Terrain Database stays local to the Compact Flash Memory Card and is accessed as needed by the Graphics microprocessor when displaying the "Moving Map" screen.

The Graphics microprocessor (U5030) is an Intel 80386EX. The system clock is 32MHz and can be monitored on U5030 pin 112. A 64MHz crystal clock (Y5001) is the reference clock.

The Graphics microprocessor can be placed into the reset state by either of two conditions. The Graphics microprocessor receives a reset, high true, from the signal line GRAPHICS_RESET into pin 119. This signal is an output of U5029 pin 14. Two conditions can cause this reset.

1) The reset controller chip (U5002) detects that VCC has fallen below or has not risen to an acceptable limit. It then asserts the MAIN_RESETn signal that is decoded in U5029 and asserts GRAPHICS_RESET.

2) Duart (U5042), which is controlled by the Host microprocessor, can force an assertion of the DISPLAY_RST signal (pin 14) which is decoded in U5029 and asserts GRAPHICS_RESET.

Upon the release of Graphics Reset, the Graphics microprocessor starts addressing code space data from the programmed flash part (U5017) starting with all address lines high as the first address. The memory map of the Graphics Microprocessor is depicted in the following table.

uP Chip Select	Designation	Size	Space	Data Size, bits	Wait State	Ready Source
CS0#	SRAM_CS1n	1024K	0000000-00FFFFF	16	2	External
CS5#	SRAM_CS2n	1024K	0100000-01FFFFF	16	2	External
CS1#	MEMCSn	128K	0800000-081FFFF	16	Ready Controlled	External
CS2#	IOCSn	2K	0840000-08407FF	8	1	Internal
CS3#	DPRAM_CSn	2K	0850000-08507FF	8	9 Max	External
CS4#	CF_CSn	2K	0860000-08607FF	16	10 Max	External
UCS#	CODE_CSn	1024K	3F00000-3FFFFFF	16	3	External

TABLE 4-5 Graphics Microprocessor Address Map

All R/W accesses of the Graphics microprocessor are terminated by the GRAPHICS_READYn signal. Ready signals are generated external to the Graphics microprocessor by U5038 when accessing local Ram, Flash, and Compact Flash Database memory devices and by U5041 when addressing with MEMCSn to the LCD display module. GRAPHICS_READYn is generated internally in the 386EX when accessing IOCSn of the LCD.

The Graphics microprocessor can monitor up to 5 interrupts of which only 4 are used. The following table is the descriptions of the interrupts monitored.

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PIN	LABEL	DESCRIPTION
NMI	G_WDTOUT	Goes high when internal watchdog times out.
INT0	CF_READY	Goes high when the Compact Flash card is ready for the next data transfer.
INT1	CF_PRESENT	Goes high when the Compact Flash card is inserted into the socket.
INT2	GRAPHICS_INT	Goes high when the dual port RAM asserts an interrupt
INT3	Not Used	

TABLE 4-6 Graphics Microprocessor Interrupts

The Graphics microprocessor has port addressable I/O pins that can be used to monitor discrete lines going to the microprocessor and also control discrete lines going from the microprocessor. These lines are shown in the following table along with their description.

LABEL	PIN	I/O	DESCRIPTION
VIDEO_RESET	P1.0_DCD0*	O	1 = video controller chip is placed in reset 0 = normal operation
CF_REGn	P1.1_RTS0*	O	1 = Compact Flash common memory plane is enabled 0 = Compact Flash attribute memory plane is enabled
CF_RESET	P1.2_DTR0*	O	1 = Compact Flash card is placed in reset 0 = normal operation
VPP	P1.3_DSR0*	I	1 = Vpp has been enabled by the hardware, so code Flash memory may be programmed 0 = normal operation
TMCP_ENABLEn	P1.7_HLDA	I	1 = normal operation 0 = TMCP interface is active

TABLE 4-7 Graphics Microprocessor Discrete I/O

4.3.4.2.8 VPP and Compact Flash VCC

Normal operation for the Flash memory devices occurs when the VPP signal of U5003 pin 13 is GND. This output is controlled by GRAPHICS_RESET and HW_PGM_EN signals. When both the GRAPHICS_RESET signal and HW_PGM_EN are low, then VPP is grounded and normal read accesses are done on the Flash memory devices. When HW_PGM_EN is high and GRAPHICS_RESET is low, then the FLASH memory devices can be written to and programmed.

The Compact Flash VCC (CF_VCC) signal line on pins 16, 14 and 2 supplies the 5 volt power to the Compact Flash Card and protects the line from over-current transients which may occur if the card is removed or replaced while the unit is on.

4.3.4.2.9 Graphics Flash Memories

The 8Mbit (512k x 16) flash memory (U5017) has a 16kbyte boot block. The boot block is a special address memory location within the flash device. It has specific addressing/encoding requirements which ensure that the boot block is locked for all normal programming and read operations. For read operations, GRAPHICS_CODE_CSn is low, PERIPH_RDn is low, and PERIPH_WRn is held high due to the decoding logic of U5038.

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During program and erasing of the flash memory devices, a VPP of +5VDC will be supplied to the VPP signal line by U5003 pin 13 when HW_PGM_EN is pulled high by the U5029 decode logic device. This is done one of two ways, either when a programming adapter is connected to the J5102 JTAG port connector or by pressing the CURSOR and ENT keys simultaneously on the front panel at the time power is applied to the unit. The memory contents of U5017 can then be altered if GRAPHICS_CODE_CSn is low, PERIPH_RDn is high, and PERIPH_WRn is held low.

4.3.4.2.10 Graphics Volatile Memory

The Graphics microprocessor utilizes four 512kbyte (512k x 8) SRAM devices. One of these volatile SRAMs (U5001, U5006, U5018, or U5025) can be read or written to by the microprocessor when either GRAPHICS_SRAM1_LOn, GRAPHICS_SRAM1_HIn, GRAPHICS_SRAM2_LOn, or GRAPHICS_SRAM2_HIn is held low while the other three are high. PERIPH_RDn is held low on a read command and PERIPH_WRn is held low on a write command. These signals are decoded in U5038 programmable decode logic device.

4.3.4.2.11 Compact Flash Database Interface

The Compact Flash Database Card is manufactured by an external supplier and programmed with both the NAV and Terrain Databases. The data passed to/from the Compact Flash Database card through the I/O Board is controlled by U5039 and U5040 as data buffers and latches as well as U5038 as the controller for these buffers and latches. To read from the Compact Flash Database card, the microprocessor asserts GRAPHICS_CF_CSn low, GRAPHICS_RDn low, GRAPHICS_WRn high, and GRAPHICS_ADSn low which are then decoded within U5038. The decoder generates CF_CE_Hn, CF_CE_Ln, PERIPH_CF_BUF_En, PERIPH_RDn, and PERIPH_WRn signals to select the area of the Compact Flash Card that is needed to be read.

4.3.4.2.12 Electronically Programmable Logic Devices.

4.3.4.2.12.1 General

Programmable logic provides various support circuits needed by the unit. This logic circuitry primarily supports the interfacing requirements of the Host and Graphics microprocessors. Six individual EPLDs hold the needed circuitry.

The EPLDs use input logic having voltage requirements similar to industry standard TTL logic. Output drive voltage is similar to TTL logic also.

4.3.4.2.12.2 Graphics EPLD Interface

GRAPH1, GRAPH2, and GRAPH3 use the GRAPHICS_CLKIN 64MHz clock signal from Y6001 for high speed synchronization of signals. GRAPH3 also uses the 32 MHz GRAPHICS_CLKOUT signal from the Graphics Microprocessor.

The Graphics logic is spread across three EPLDs identified as GRAPH1 (U5040), GRAPH2 (U5039), and GRAPH3 (U5038) on the schematic. Refer to other sections of this document for a discussion of specific functions assigned to the Graphics EPLDs. The following paragraphs give an overview of the functions.

4.3.4.2.12.2.1 Buffering and multiplexing of the Graphics microprocessor data bus, PERIPH bus, and CF_BUS.

This function is needed because the disable times for the SRAM, CODE, DPRAM, and CF devices are longer than the 386EX's timing spec. Without the buffers, bus contention could occur when a write cycle follows a read to one of these devices.

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4.3.4.2.12.2.2 Generation of control signals for buffering and multiplexing of the 386EX data bus, PERIPH_BUS, and CF_BUS.

This avoids PERIPH bus contention with a possible previous PERIPH read operation.

4.3.4.2.12.2.3 Generation of customized RDn and WRn signals for PERIPH_BUS and CF_BUS accesses.

These customized PERIPH_RDn and PERIPH_WRn signals are generated because the CompactFlash card requires address and chip select hold times of 20ns following RDn or WRn deactivation. Also, the read data from the CompactFlash card must be latched since the 386EX will not read the data until the end of the cycle.

4.3.4.2.12.2.4 Wait state and GRAPHICS_READYn generation for PERIPH_BUS and CF_BUS accesses.

The EPLD state machine generates and outputs GRAPHICS_READYn to the 386EX in order to control the length of a PERIPH or CF bus cycle. Besides controlling the length of the bus cycle, the state machine also provides the control signals for the generation of GRAPHICS_BUF_ENn, PERIPH_CF_Buf_ENn, PERIPH_RDn, PERIPH_WRn, and LATCH_EN.

4.3.4.2.12.2.5 Generation of high and low byte chip selects for 386EX SRAM and CF access.

This function generates the high and low byte chips selects for SRAM and CF from the GRAPHICS_BHEn, GRAPHICS_BLEn, GRAPHICS_SRAM1_CSn, GRAPHICS_SRAM2_CSn, and GRAPHICS_CF_CSn signals from the 386EX.

Inversions of the DPRAM interrupt signal to the 386EX.

The DPRAM interrupt output is active low. The EPLD simply inverts this signal since the 386EX requires positive edge triggered interrupts.

4.3.4.2.12.2.6 JTAG Mode timing adjustment.

The JTAG mode for the ’386 microprocessor has bus cycles far slower than normal operation, so the state machine must be disabled to prevent time-outs. In JTAG mode, the state machine normally controlling critical bus timing is disabled. Instead, PERIPH_WRn and PERIPH_CF_BUF_ENn will follow GRAPHICS_WRn. GRAPHICS_BUF_ENn and PERIPH_RDn will follow GRAPHICS_RDn. A JTAG programming/debugging program hosted on a notebook PC must cause GRAPHICS_CF_CSn, GRAPHICS_CODE_CSn, and GRAPHICS_SRAM1_CSn to all go low all at the same to enter JTAG mode. Exiting JTAG mode is done by either bringing MAIN_RESETn low, or by bringing GRAPHICS_CODE_CSn, GRAPHICS_SRAM1_CSn, and GRAPHICS_DPRAM_CSn low at the same time.

4.3.4.2.12.2.7 REGn Modification.

It was found that the Sandisk Compact Flash cards do not utilize the variable bus timing of the common memory mode. SanDisk only uses fixed bus timing similar to the attribute mode. In particular, the CF card does not implement WAITn signaling. Fixed wait states must be used. Therefore, REGn has been internally tied low in the EPLD logic to cause the state machine to use fixed bus timing similar to the attribute mode during CF accesses.

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4.3.4.2.12.3 Main EPLD Functionality

The Main logic is spread across three EPLDs identified as MAIN1 (U5029), MAIN2 (U5041), and MAIN3 (U5023) on the schematic. Refer to other sections of this document for discussion of specific functions assigned to the MAIN EPLDs. The following paragraphs give an overview of the functions.

4.3.4.2.12.4 Main 1 EPLD Controller

The MAIN1 EPLD controller holds a variety of functions supporting the Host microprocessor.

4.3.4.2.12.4.1 Decoding for the DUART Chip.

Duart Chip enable/Discrete Chip select 3 by decoding the MAIN_DUART_CSn signal from the microprocessor along with MAIN_ADDRESS_BUS4. When both signals are low DUART_CEn is asserted low and when only MAIN_DUART_CSn is low DISCRETE_CS3n is asserted low.

4.3.4.2.12.4.2 Decoding for the NAV Database Chip.

Database Decoder logic decodes the MAIN_DBXOVER_CS and MAIN_DB_CSn chip selects along with MAIN_WRn signal from the microprocessor. If either MAIN_DB_CSn or MAIN_DBXOVER_CSn is asserted low then DBASE_LOCAL_CSn is asserted low. In this condition, with MAIN_WRn high, a read access is done to the local Database chip. If MAIN_WRn is low, data is written to the local Database chip.

4.3.4.2.12.4.3 Lower and upper chip enable decoding of the Flash memory.

This is accomplished by asserting MAIN_ROM_CSn or MAIN_XROM_CSn. With the assertion of either of these signals low will assert MAIN_8M_BOOT_CSn. When MAIN_XROM_CSn is high and MAIN_ROM_CSn is low, the MAIN_8M_ADDRESS_A19 signal line for the flash is asserted low. This is the lower Flash addressing mode.

4.3.4.2.12.4.4 Decoding for the Static RAM Chip.

Both MAIN_SRAM1_CSn and MAIN_SRAM2_CSn are decoded to assert MAIN_SRAM_CS_INn low. This addressing space is shared with the Database and PERIPH chip selects as well. If either of the Database or the PERIPH chip selects are asserted the MAIN_SRAM_CS_INn signal is held high regardless of the status of MAIN_SRAM1_CSn or MAIN_SRAM2_CSn.

4.3.4.2.12.4.5 Enabling of the HW_PGM_EN and / or WPn signals.

Decode logic handles the HW_PGM_EN and WPn signals to enable the write capabilities for the Flash chips. If either the BDM or the JTAG connectors are connected and RESETn is not asserted low, then WPn and HW_PGM_EN will be high. When both the CURSOR and the ENTER keys are depressed simultaneously on the front panel when power is applied to the unit, only HW_PGM_EN will be asserted high and WPn will remain low. This is intended for unit application code programming only. WPn must be driven high when programming the Boot portion of the Flash memory devices.

4.3.4.2.12.4.6 Creation of the DISCRETE_CS1n and DISCRETE_CS2n signals.

A 3-to-8 decoder monitors the MAIN_ADDRESS_BUS lines 1 through 3, as well as, MAIN_DISCRETE_CSn from the microprocessor to generate the DISCRETE_CS1n and DISCRETE_CS2n signals. The DISCRETE_CS1n signal will be asserted low when all three MAIN_ADDRESS_BUS signals are low and MAIN_DISCRETE_CSn is low.

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The DISCRETE_CS2n signal will be asserted low when the MAIN_DISCRETE_CSn is low, the MAIN_ADDRESS_BUS1 is high, and the other two MAIN_ADDRESS_BUS signals are low.

4.3.4.2.12.5 Main 2 EPLD Controller

The MAIN2 EPLD controller holds the Display Video decoding, Audio Tone/Clock Generator, and some discrete line decoding.

4.3.4.2.12.5.1 Creating of Display Video Controller Control Signals.

All the logic for the specific timing requirements for the Video Controller chip in the display assembly is included here. The logic within this function monitors all read and write accesses to the display assembly. It also decodes the VIDEO_READY from the display assembly, and signals the Graphics microprocessor when to terminate a write or read cycle by asserting GRAPHICS_READYn signal line low.

4.3.4.2.12.5.2 Clock Generation.

A divider divides the 32 MHz clock out of the Graphics microprocessor down for the Audio Tone (1 kHz.) and the PCLK (Approximately 695 kHz.). PCLK is a signal required by the main microprocessor for OBS sine and cosine read synchronization.

4.3.4.2.12.5.3 Read/Write Separator.

This separator is an exclusive-or function to separate the single line R_Wn from the Main Microprocessor into individual RDn and WRn signals needed by various chips.

4.3.4.2.12.5.4 Decoding of Discrete Read Chip selects.

The two Discrete Read Chip selects, DISCRETE_CS1_RDn and DISCRETE_CS2_RDn, are asserted only when the RDn signal is asserted along with the DISCRETE_CSn signal.

4.3.4.2.12.5.5 Buffer for DBASE_VPP_EN.

The DBASE_VPP_EN is buffered from the DBASE_PROG_MODE signal to enable the Local Database Flash VPP line when programming this Flash device.

4.3.4.2.12.5.6 OBS_DRIVE Output.

The OBS DRIVE output is the 450 Hz signal generated by the DUART, but gated by the OBS_SELECT signal.

4.3.4.2.12.5.7 CompactFlash Presence Logic.

The CF_PRESENT signal is generated from the two Card Detect lines of the Compact Flash Card. If both CD1n and CD2n are asserted low by having the Compact Flash Card installed the CF_PRESENT will be asserted high.

4.3.4.2.12.6 Main 3 EPLD Controller

The MAIN3 EPLD controller holds discrete output latches and the adder and latches for the bank selects.

4.3.4.2.12.6.1 Discrete Output Latches.

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Three 8 bit latches are connected to the microprocessor data bus. An independent DISCRETE_CSn signal for each latch is controlled by the WRn signal. If WRn is low and the appropriate DISCRETE_CSn signal is low, the data from the DATA_BUS will be latched to the appropriate output pin.

4.3.4.2.12.6.2 Bank Select Generation.

Bank selects signals (BS[5..0]) are latched and used with the the Six-Bit Adder. The Bank Select/ Six Bit Adder handles the appropriate decoding for the NAV Database extended block read feature. This feature is enabled when the DBXOVER_CSn signal is asserted low.

4.3.4.2.13 Dual Port Sram

The Dual Port Sram (U5008) is a 2kByte dual addressable static ram device for inter-microprocessor communications. The Host microprocessor and the Graphics microprocessor communicate through this device. This allows information, such as display data, to be passed between the Host and the Graphics microprocessors. Also, database information may be passed from the Compact Flash Card, through the Graphics microprocessor, to the Host microprocessor.

4.3.4.2.14 Voltage Monitor Circuit

U5020 is an analog multiplexer. Various voltages are scaled and level shifted before entering U5020. These levels can be monitored on a TEST page of the KLN 94. The internal ADC of the Host microprocessor samples the PWRBUS signal which is an output of U5020. PBUS #0, PBUS #1, and PBUS #2, are outputs of U5004 which accomplishes channel selection.

4.3.4.2.15 +5v Precision Reference/Temperature Transducer

A +5VDC reference (5VREF) is provided by U5019 to U5031 pin 72 for the Host microprocessor's analog-to-digital (ADC) module. This signal is also used as a reference level for the front panel backlight intensity level, the OBS sine and cosine filters, and for all annunciator detect comparators. A V_TRIP comparator (U5037) uses 5VREF to provide a current sense trip voltage of -.085 VDC to the annunciator drivers for external short circuit detection. The reference IC (U5019) provides the unit temperature at pin 3. The voltage at this pin (approximately 2.1mV/K) is scaled by U5011 before being applied to the Host microprocessor ADC where it is read as actual temperature.

4.3.4.2.16 OBS Circuits

4.3.4.2.16.1 OBS Output

The 450Hz signal required to excite the resolver is generated by DUART U5042. The square wave is converted to a sine wave by a fourth order lowpass filter comprised of U5021-A, U5021-B, and related components. The signal is then level shifted and amplified by the output driver stage consisting of U5021-C, Q5020, Q5035, and related components.

U5021-D and related components form an over-current detector for the output circuit by comparing the collector voltage of Q5020 with the driving signal. OBS OVERLOADn will be active when output current is more than 70mA.

4.3.4.2.16.2 OBS Inputs

The sine and cosine outputs of the OBS resolver are read back via OBS SIN and OBS COS. Both input circuits function identically so only operation of the OBS SIN will be described. The input signal is level shifted and scaled to within +5V by R5062, R5040, R5182, C5069, CR5011 and U5022-C. It is then filtered by a second order low pass filter consisting of R5183, R5049, C5055, C5056 and U5022-A.

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CR5015 removes its negative cycle before the internal ADC of the Host microprocessor samples it. Q5021 and R5180 are used to select the bias of the input signal. The bias is currently set to 0V.

4.3.4.2.17 Dimming Pot control

The DIM_POT_SENSE circuitry consist of a 5VREF signal at one input to the pot. The wiper voltage is monitored by a non-inverting voltage follower op-amp (U5036) and is passed on to the Host microprocessor to control backlight intensity.

4.3.4.2.18 Lateral and Vertical Deviation Flags

The LATERAL_DEV_FLAG+ signal goes to its nominal 0.7V state when the Lateral Superflag is in the active high state. The signal goes to its nominal 0V state when the Lateral Superflag is in its low state. Resistors R5010 and R5148 work with clamp diode CR5004 to create the proper voltage levels. The VERTICAL_DEV_FLAG+ output works similarly with the signal's output states corresponding to those of the Vertical Superflag. Resistor R5015 works with clamp diode CR5021 to create the proper voltage levels.

4.3.4.2.19 Superflag Outputs

The LATERAL_SUPERFLAG output circuit consists mainly of two control lines from U5004, two diodes (CR5005 and CR5008), an NPN transistor (Q5019), a protection diode (CR5007), and a drive FET (Q5012) which is turned on when the LATERAL_DEV_FLAG+ is on. To turn on the LATERAL_DEV_FLAG+, a high is written to either pin 3 or 4 of U5004 which enables Q5019 to drive Q5012. R5004 provides a load for Q5012 when the LATERAL_SUPERFLAG is not loaded. CR5007 limits the maximum gate voltage of Q5012 to approximately 6.2VDC. R5161 provides a feedback output status for the Host microprocessor via U5005. EMI and lightning protection for the line is provided by the suppressor card and C5129. Operation of the VERTICAL_SUPERFLAG circuit is functionally identical to the LATERAL_SUPERFLAG except that only one control signal is required. This is pin 2 of U5004. STEERING_SUPERFLAG is identical to VERTICAL_SUPERFLAG but is driven by U5013-7.

4.3.4.2.20 +From Outputs

The +FROM flag circuit consists of U5036-D and two control lines from U5004. When the TO_EN signal line is greater than the FROM_EN line, the +FROM output will be at a negative potential indicating a "TO" direction. When the FROM_EN is greater than the TO_EN signal line, the +FROM output will be at a positive potential indicating a "FROM" direction. Either of these signals when driven high will activate the Lateral Superflag circuitry. When both the TO_EN and the FROM_EN signals are low, the LATERAL_DEV_FLAG+ will be low. This effectively puts the +FROM signal at the same voltage level as the +TO output of the KLN 94. EMI protection for this line is provided by C5207.

4.3.4.2.21 Deviation Outputs

Two deviation outputs are available on the KLN 94: Lateral Deviation and Vertical Deviation. The operation of each output is functionally identical. U5037-C acts as a filter and level shifter to convert the L_CDI PWM signal to levels acceptable for use with a lateral deviation meter movement..

4.3.4.2.22 Annunciator Outputs

Discrete output data is sent from the Host microprocessor via the serial peripheral bus and latched into U5013. This device is a serial to parallel shift register.

The KLN 94 provides eight annunciator outputs. Since all are functionally identical, only the WAYPOINT ANNUNCIATEn line will be described.

When pin 15 of U5013 is high, Q5013-B will be turned on. This will sink current from an external load. Q5026, R5152, R5017, and R5018 form a current fold-back circuit.

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This limits the sinking current of Q5013-B to approximately 350mA. When pin 15 of U5013 is low, Q5013-B will be turned off.

4.3.4.2.23 DUART and RS-232 Interface

DUART U5042 provides two asynchronous receiver-transmitters. It is used for serial communication between the Host microprocessor and the GPS PXpress Card Receiver. It is also used for communication between the Host microprocessor and the data loader RS-232. The communication baud rate is derived from a 3.6864MHz clock oscillator (Y5004). DBTX_INTn interrupts the Host microprocessor when U5042 is ready to transmit data to the data loader RS-232. When receiving data from the data loader RS-232, DBRX_INTn interrupts the Host microprocessor.

In addition, U5042 is used to read external discrete input signals. U5044 is a discrete input level converter. U5044 is always enabled and has internal protection for lightning. GLUINTn will interrupt the Host microprocessor if there is a level transition in either one of the pins from IP0 through IP3, if data is received from the GPS PXpress Receiver Card, or if U5042 is ready to transmit data to the GPS PXpress Receiver Card.

U5027 and U5026 are level translators that convert RS-232 data from a 5V level to an EIA-232 standard level and vice-versa. Capacitors on the input and output lines are used for EMI suppression.

4.3.4.2.24 GPS Displayed Discrete input.

The GPS_DISPLAYED input pin is EMI suppressed by C5212; level shifted by CR5020, R5129, R5128, and R5127; and passed on to U5042 to be monitored by the Host microprocessor.

4.3.4.2.25 Serial Peripheral Interface

The front panel knobs and buttons, real time clock, discrete inputs, and discrete outputs are interfaced to the Host microprocessor via a serial peripheral interface. U5028 is the serial bus address decoder. The chip select truth table is shown below.

ADDRESS				DESCRIPTION
PCS_CS	PCS 2	PCS 1	PCS 0	
1	0	0	0	Chip select for discrete inputs.
1	0	0	1	Chip select for discrete outputs.
1	0	1	0	Spare
1	0	1	1	Chip Select for Digital Pot.
1	1	0	0	Spare
1	1	0	1	Chip Select for Front Panel Switches.
1	1	1	0	Spare
1	1	1	1	Spare

TABLE 4-8 PERIPHERAL CHIP SELECTS

4.3.4.2.26 Altitude Audio Alert Driver

U5041 divides the 32MHz clock down to a 1kHz square wave oscillator. Q5023 buffers the AUDIO_TONE signal. Digital Pot U5045-C controls the amplitude of the signal applied to buffer U5043-A. The signal is then a/c coupled, scaled, and partially filtered by buffer U5043-B and associated components.

4.3.4.2.27 Lighting Bus Monitor.

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U5043-C and U5043-D are connected to the external lighting bus signals LIGHTING_28V_LO and LIGHTING_14V. The inverting summing amplifier U5043-D uses R5201, R5122, and R5107 to scale the voltage. U5043-C filters and inverts the DC voltage level so the Host microprocessor can use this voltage to control the intensity of the button and nomenclature backlighting LEDs.

4.3.4.2.28 DC Roll Steering Control.

The Host microprocessor controls digital pot U5045-A at a voltage level between +5Vdc and ground. This level is scaled, level shifted, and filtered by U5037-B, C5161, C5171, R5114, R5115, R5113, and R5116. Series resistors R5126 and R5125 eliminate unwanted oscillation and increase RF immunity. Capacitor C5179 reduces noise.

4.3.4.2.29 Contrast Control

When DISPLAY_RST is low, the Host microprocessor controls digital pot U5045-D at a voltage level between +5Vdc and ground. R5123 and C5173 filter the signal. It is then buffered and driven to the display module as CONTRAST adjust by voltage follower U5036-A.

4.3.4.2.30 Hardware Reset Circuit

When the KLN 94 is powered up, the MAIN_RESET signal lines will only be released when the +5V supply is stable. After U5002 senses a stable +5V, the MAIN_SRAM_CS_INn is passed through to MAIN_SRAM_CSn signal along with applying +5V to VCC_BAT. The battery voltage at pin 1 of U5002 will be present at pins 2 and 12 only when +5V at pin 3 is below 4.75 Vdc. The PFO output of U5002 will indicate to the Host microprocessor the status of the battery. Q5034 inverts the MAIN_RESET signal along with making an open collector signal which allows other devices to drive the MAIN_HW_RESETn signal line.

4.3.4.2.31 Battery Measurement

The voltage of the internal battery at E3 is routed through the voltage follower U5036-B, to be measured by the ADC module of the Host microprocessor U5031.

4.3.4.2.32 Button LED Drive Lo Switch

The active low drive signal for the front panel button backlighting is controlled by transistors Q5002-A and Q5002-B depending on whether the unit is in the normal operational mode or is turned off.

In the normal operational mode, reset clamp transistor Q5009 is open. This permits the Host microprocessor's PWM drive signal, BUTTON_LED_PWM, to be buffered by drive transistors Q5001 and Q5006. Resistors R5142, R5134, R5137, and R5005 dampen high current noise transients. The buffered PWM signal drives the gate of Q5002-A, which causes the button backlighting LEDs to turn on during that portion of the PWM cycle when Q5002-A is active. Note that since +5V is active, clamp transistor Q5010 is kept on via R5143, thus preventing Q5002-B to interfere with the PWM-based control of Q5002-A.

When the unit is turned off, the aircraft bus voltage applied via the PROT_AC_PWR line drive the gate of Q5002-B via resistor divider R5008 and R5144. Since the +5V supply is off, clamp transistor Q5010 shall be kept off, permitting Q5002-B to stay on. This causes the button backlighting LEDs to be on.

The timing circuit consisting of R5143, CR5002, and C5005 prevents unwanted bursts of light during transitions of the unit between the normal operation and off states.

4.3.4.2.33 Display Backlighting LED Drive Lo Switch

The active low drive signal for the LED backlight within the LCD display is controlled by transistors Q5004-A and 5004-B which are paralleled for lower on resistance.

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Level shifter transistors Q5008 and Q5011 permit the standard 5V logic of the Host microprocessor to connect the drive transistors to the -12V supply rail during the active low state. Resistors R5136, R5140, R5006, R5141, R5145, R5147 and R5146 supply the needed bias currents. Clamp transistor Q5005 is turned on by the GRAPHICS_RESET signal to prevent bursts of light during that period of start-up when the microprocessor is not initialized.

Driver transistors Q5003 and Q5007 buffer PWM drive signal DISPLAY_LED_PWM. Resistors R5009, R5135, R5138, and R5139 dampen high current noise transients. The buffered PWM signal drives the gates of Q5004 which causes the display backlighting LEDs to turn on during that portion of the PWM cycle when Q5004 is active.

4.3.4.2.34 Discrete Inputs

U5015 and U5005 are parallel-to-serial shift registers which are daisy chained together. Discrete Main Board signals and flags are sent to the Host microprocessor via a serial peripheral bus. They are read in using SCLK while the DISCRETE_IN_SELECTn is signal held low.

4.3.4.2.35 Gillham Altitude Inputs

The KLN 94 has the capacity for ten Gillham Altitude Inputs, as well as, other discrete inputs. As these circuits are functionally identical, only the operation of the Gillham Input D4 will be discussed. U5035 translates the input voltage to a digital logic level which is applied to the Main microprocessor data bus when DISCRETE_CS2_RDn is asserted low. C5232 is used for EMI protection.

4.3.4.2.36 Configuration Module

The Configuration Module contains an EEPROM which stores some of the system configuration information for the KLN 94. The Module is housed in the mounting rack for the KLN 94 and contains a 256-bit EEPROM (U7001) which is communicated to in a serial manner. Signals EXT_EEPROM, EXT_EEPRM_CS, Serial_OUT_OBI_DATAn, Serial_IN and Serial_CLK run through the J5006 connector to the Power Board to J943.

4.3.4.2.37 OBI Serial Bus Driver

The OBI_DATA, OBI_CLOCK, and OBI_SYNC signals are created using the latched outputs of U5023. As all three are identical, only the OBI_DATA circuit will be described here. Driver FET Q5038 is driven via R5046. When the gate of Q5038 is driven high, the drain pin will be pulled near 0V. Current limit resistor R5053 and clamp diode CR5014 provide lightning protection. When a high voltage pulse appears on Q5038's drain, CR5014 clamps the gate-source voltage. This causes Q5038 to momentarily shut off, preventing damage.

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SECTION V
MAINTENANCE

5.1 INTRODUCTION

This section contains the test, alignment, troubleshooting and disassembly/assembly procedures for the KLN 94. Before maintenance is attempted, it is advisable to have a thorough understanding of the Theory of Operation.

5.2 TEST AND ALIGNMENT

The final test procedure of section 5.2.4 shall be followed to determine if the KLN 94 is operating properly. If it is not, the troubleshooting procedure of section 5.4 and/or the alignment procedure of section 5.2.3 should be followed to bring the unit up to the Minimum Performance Specifications. Refer to Figure 5-1 for a suggested test set up.

5.2.1 TEST EQUIPMENT REQUIRED

The following equipment, or equivalent, is required to properly align and test the KLN 94. All test equipment should be calibrated before alignment is attempted.

A. Power Supply
   Sorensen SRL 40-6 or equivalent
B. Voltmeter
   Fluke 800A or equivalent
C. Frequency Counter
   HP5335A or equivalent
D. Computer
   IBM compatible 80286 or above
E. Oscilloscope
   Tektronix 465 or equivalent
F. Test Harness (Customer Fabricated. See Figure 5-1)
   PC Interface Kit P/N 050-03612-0000
   KLN 94 Installation Kit P/N 050-03321-0000
G. KA 91/KA 92 GPS antenna or equivalent
H. GPS Simulator
   Welnavigate GS-100 or equivalent
I. KTS 143 Test Fixture, KI 229 or equivalent
J. OBS Resolver Test Set (See Service Memo 105)
   P/N 050-01571-0001

5.2.2 STANDARD GPS TEST SIGNAL DESCRIPTION

A standard GPS test signal is described as the “off-air” reception of more than two satellite signals, which produce an “Sg” of greater than 4, and “Hlt” of “GD”.

5.2.3 ALIGNMENT PROCEDURE

The alignment procedure is written for a KLN 94 that is either newly constructed or recently overhauled. If partial alignment is desired, use only the initial control settings that apply to the section being aligned.

Alignment of the KLN 94 must be performed with all system circuit boards in place, or with suitable loads in place.

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5.2.3.1 KLN 94 Software Updates

Either the Windows®-based GPS Database Loader program or the DOS-based SWLDR94.EXE may be used to update the software in the KLN 94.

5.2.3.1.1 System Requirements

The DOS-based SWLDR94.EXE program requires a fully IBM-compatible computer running DOS Version 3.3 (or higher). Microsoft Windows® 3.1 users must exit from Windows® to DOS mode in order to run the SWLDR94.EXE program.

The Windows®-based GPS Database Loader requires a fully IBM-compatible computer (i486DX-33 MHz or faster) with 8 MB of RAM minimum and a VGA or super VGA video (display and card). Operating system must be Microsoft Windows® 95/98/2000 or Windows® NT Version 3.51/4.0. The mouse or a compatible pointing device must be supported by Microsoft Windows®.

Additional requirements for both the Windows®-based GPS Database Loader program and the DOS-based SWLDR94.EXE include the following:

(1) A hard disk with at least 5 MB available.

(2) A functioning RS-232 serial communications port (COM1:, COM2:, COM3:, or COM4:) must be available. The RS-232 serial COM port must be capable of communicating using 9600 baud, 8 data bits, 1 stop bit, odd parity, and Flow control: None. For best performance, the COM port should be able to communicate at 115.2K baud (industry standard).

(3) A PC interface cable which connects the KLN 94's data loader jack to the personal computer. This cable can be obtained by ordering the PC Data Loader Kit for the KLN 94 (part number 050-03612-0000). Order per the following:
Honeywell Navigation Services
Tel: (800) 247-0230 (U.S.)
Tel: (913) 712-3145 (International)
FAX: (913) 712-3904.
Email: nav.database@honeywell.com
Web site: www.gpsdatabase.com

(4) A power supply source for the GPS unit. This source may be the aircraft or an external supply (if the KLN 94 is removed from the aircraft). For an external supply, Honeywell recommends the following:
Commander 2000-K Desktop Control Station: Lone Star Aviation Corporation
804 North Great S. W. Pkwy, Arlington, TX 76011
Phone: (817) 548-7768
FAX: (817) 633-6208
(Contact Lone Star and ask for a brochure)

The LoneStar Commander 2000-K Desktop Control Station includes a 12 volt power supply, cooling fan connection, RS-232 connector, and an external OBS LEG switch. It is Compatible with the KLN 90/A/B, KLN 89/B, KLN 94, KLX 135A, and KLN 35A.

5.2.3.1.2 Running the GPS Database Loader from the CD

To run the GPS Database Loader from the CD, select "Run" from the Windows® "Start" menu and then enter the following:

x:\LOADER\GpsLoadr.exe (where ‘x’ is the CD ROM drive letter).

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5.2.3.1.3 Installing the Windows®-based GPS Database Loader

To install the GPS Database Loader from CD ROM, perform the following steps:

(1) Start the computer and boot to Microsoft Windows® 95 / 98 / 2000 (or higher) or Windows® NT Version 3.51 / 4.0 (or higher).

(2) Insert the KLN 94 Application Software CD-ROM (P/N 222-30469-00xx) into the computer's CD ROM drive.

(3) Select Run from the Windows® Start menu.

(4) Enter x:\SETUP11 (where 'x' is the CD ROM drive letter) and press the 'OK' button. The SETUP11.EXE program will extract, uncompress, and install the software.

(5) Click on the 'Setup' button, and then follow the instructions as presented on-screen to install the GPS Database Loader.

(6) Once the GPS Database Loader is installed onto the computer, start the GPS Database Loader program by selecting: Start -> Programs -> GPS Database Loader.

(7) Once the program is running, press "F1" or select "Help Topics" from the "Help" menu for assistance in running the program.

To download and install the GPS Database Loader from the World Wide Web, perform the following steps:

(1) Start the computer and boot to Microsoft Windows® 95 / 98 / 2000 (or higher) or Windows® NT Version 3.51 / 4.0 (or higher).

(2) Start the web browser (Netscape Navigator, Internet Explorer, etc).

(3) Go to the www.gpsdatabase.com web site.

(4) From the "Download" tab choose "Windows® utility".

(5) Click on the "Click here" link and save the SETUP11.EXE.exe file to the hard disk. Note the disk drive location where the file was saved. (i.e. c:\temp).

(6) Select 'Run' from the Windows® Start menu.

(7) Enter the path, as noted in step (5), plus the SETUP11.EXE filename or use the 'BROWSE' option to search for the SETUP11.EXE file location. Once it is entered, click 'OK'. The SETUP11.EXE program will extract, uncompress, and install the software.

(8) Click on the 'Setup' button, and then follow the instructions as presented on-screen to install the GPS Database Loader.

(9) Once the GPS Database Loader is installed onto the computer, start the GPS Database Loader program by selecting: Start -> Programs -> GPS Database Loader.

(10) Once the program is running, press "F1" or select "Help Topics" from the "Help" menu for assistance in running the program.

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Note:
To uninstall the GPS Database Loader from CD ROM, perform the following steps:

(1) Select: Start --> Settings --> Control Panel.

(2) Double-click on Add/Remove Programs.

(3) Select GPS Database Loader.

(4) Click the "add/remove" button.

(5) Click 'yes' to confirm.

After installation, store the Honeywell KLN 94 Application Software CD-ROM in a safe place. It will only be needed if re-installation is required.

5.2.3.1.4 Updating the Software in a KLN 94 GPS

To use the Windows®-based GPS Database Loader program to update the software in the KLN 94, perform the following steps:

(1) Connect the KLN 94 to a COM Port on the personal computer using the PC Data Loader Cable for the KLN 94 (part number 050-03612-0000).

(2) If the PC has more than one COM port, it may be necessary to select "Options Preferences" from the menu and select the COM Port to which the PC Data Loader Cable for the KLN 94 is attached.

(3) From the "Update" menu, select "Software" -> "KLN 94".

(4) When the "Select KLN 94 Software Image File" window appears, use the "Look in" drop-down box to select the drive and directory where the KLN 94 software file (usually called Kln94ap.bin) is located.

These KLN 94 software files may be found in the \LOADER directory on the KLN 94 Applications Software CD.

(5) Select the Kln94ap.bin file and press the OK button.

Note:
In all cases, the software update must be performed while the KLN 94 unit is stationary. Do not attempt to update the KLN 94 software while in actual flight).

Note:
Whenever uploading KLN 94 software, always initiate the update on the PC side first. The PC will continuously attempt to communicate with the KLN 94 until it completes the update or until the update is canceled. The KLN 94, on the other hand, limits the amount of time that it attempts to communicate with the PC.

(6) Press the "Start" button. The GPS Database Loader will verify the integrity of the KLN 94 software files.

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(7) When prompted, place the KLN 94 in Program Mode. This can be accomplished by pressing and holding the "ENT" and "CRSR" buttons while powering on the KLN 94.

(8) The KLN 94 should display "Please Program". When communication between the PC and the KLN 94 is established, the KLN 94 should display a "Loading...." message that alternates from green to white.

(9) Once communication has been established, it will take approximately 6 minutes to update the software in the KLN 94. When the software update is complete, the KLN 94 will start automatically. To confirm that the desired software version has actually been loaded, display the AUX 14 page on the KLN 94.

5.2.3.1.5 Starting and Using the DOS-based SWLDR94.EXE program

The DOS-based KLN 94 Software Loader (SWLDR94.EXE) may be used to update the software in the KLN 94 by performing the following steps:

(1) Ensure that the system is in the DOS mode. Microsoft Windows® 3.1 users must exit from Windows® to the DOS prompt to run the SWLDR94.EXE program.

Note:
The SWLDR94 software should not be run in a DOS window under the Windows® operating system. To run SWLDR94 on a computer running Windows® 95 or 98, restart the computer in the MS-DOS mode. To run the DOS-based SWLDR94.EXE on a Windows® NT machine, reboot the computer using a DOS system diskette.

(2) Connect the KLN 94 to a COM Port on the PC using the PC Data Loader Cable for the KLN 94 (part number 050-03612-0000)

(3) Copy the \94SW directory from the KLN 94 Applications Software CD to the computer's hard disk.

(4) Change the current directory to the \94SW directory.

(5) Type SWLDR94 at the DOS prompt.

(6) Press ENTER when the checksum verification is done to return to the menu.

(7) The SWLDR94 software is initially configured to use the COM Port 1. To use a different COM port, select option C ("Choose a different COM Port") from the menu and select a different COM port.

(8) Choose option 1 ("Upload Software into a KLN 94") from the menu on the PC to update the software in the KLN 94.

(9) Place the KLN 94 into Program Mode by pressing and holding the "ENT" and "CRSR" buttons while powering on the KLN 94. The KLN 94 should display "Please Program".

(10) When communication between the PC and the KLN 94 is established, the KLN 94 should display a "Loading...." message that alternates from green to white.

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Note:
If communication is not established between the GPS unit and the PC, check is the cable connection. If it is secure, try a different COM port (option C on the PC menu).

(11) Once communication has been established, it will take approximately 6 minutes to update the software in the KLN 94. When the software update is complete, the KLN 94 will start automatically. To confirm that the desired software version has actually been loaded, display the AUX 14 page on the KLN 94.

5.2.3.2 Unit Alignment

This alignment is to be performed with the KLN 94 operating in the TEST MODE. The TEST MODE function of the KLN 94 can be utilized by grounding P942-1, (S9) before power on. While the unit is in the TEST MODE, perform the following:

A. Switch the unit off.

B. Set the RS-232 loopback control switch (S1) to the general position.

C. Set Test (S9) to closed and Takehome (S10) to open.

D. Turn the unit power on.

E. Press the ENT button, on the unit, once.

F. Check that the message GEN 232 P is displayed.

When the above is accomplished, perform the following:

A. Advance to the “TST 6" page and check for the following page to appear.

TST 6	DEV CAL LATERAL Press MSG to activate

B. Press the “MSG” button to activate alignment of the Lateral Deviation Circuit.

C. Turn the right outer knob, of the KLN 94 front panel, to get 0 ± 2.0mV between LATERAL DEV +L (P942-11) and LATERAL DEV +R (P942-12), on the digital voltmeter.

NOTE:
OUTER KNOB IS TURNED CLOCKWISE FOR INCREMENT AND COUNTER CLOCKWISE FOR DECREMENT.

D. Press the “ENT” button, to store the calibration offset in the unit’s non-volatile RAM.

When calibration of the Lateral Deviation Circuit is accomplished, perform the following:

A. Press the “CLR” button, and check that the following page appears.

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TST 6	DEV CAL VERTICAL Press MSG to activate

B. Press the “MSG” button to activate alignment of the Vertical Deviation Circuit.

C. Turn the right outer knob, of the KLN 94 front panel, to get 0 ± 2.0mV between VERTICAL DEV +UP (P942-13) and VERTICAL DEV +DOWN (P942-14), on the digital voltmeter.

D. Press the “ENT” button, to store the calibration offset in the unit’s non-volatile RAM.

When calibration of the Vertical Deviation Circuit is accomplished, perform the following:

A. Advance to the TST 11 page.

TST 11	DISPLAY CONTRAST ADJ. 128

B. Check of Default Setting
Adjust the dimming knob for full brightness. Depress the CRSR button to activate the alignment of contrast. Turn the right inner knob of the KLN 94 front panel (clockwise for increment and counterclockwise for decrement) until the highlighted contrast value reads “128 DEFAULT”. If it is not possible to read the display at this setting, follow the instructions in part D of this procedure.

C. Final Adjustment
With the contrast value highlighted, turn the right inner knob clockwise until the highlighted contrast value is near the high end of the range, but the text is still readable. Next, lower the contrast value while observing the color of the white text. As the contrast value is decreased, a transition point must be reached where the white text loses its yellowish tint and becomes bluish-white. When that point is reached, turn the knob back clockwise so that the contrast value is 15 units greater than at the transition point, thereby causing a slight yellowish tint to return to the white text. This indicates the point of best contrast.
The contrast value must now read within the range of 20 to 235. If it is outside this range, follow the instructions in Paragraph D. of this procedure. If within this range, depress the ENT button to store the calibration offset in the unit’s non-volatile ram. Then, depress CRSR to end the contrast alignment process.

D. Adjustment of the LCD Color Display’s Variable Resistor

NOTE:
Do not make this adjustment unless indicated by instructions in part B or C of this procedure.

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Disassemble the KLN 94 to allow a small Philips-head screwdriver to access the contrast adjustment Variable Resistor. This Variable Resistor is labeled “VR1”, and is located near the bottom center on the printed circuit card of the 043-05012-01 LCD Color Display. Easy access will require either the removal of the KLN 94’s top cover, or an extender for the J5007 and J5009 Main Board connectors. It is not necessary to extend J5001.
Next, plug the unit’s connectors back together and re-apply power to the KLN 94. Go to the TST 11 page and set the contrast value to 128 as outlined in Paragraph B. Rotate VR1 until the point of best contrast is obtained (as defined in Paragraph C). Re-assemble the KLN 94 and repeat the contrast alignment as outlined in Paragraph A.

5.2.4 FINAL TEST PROCEDURE

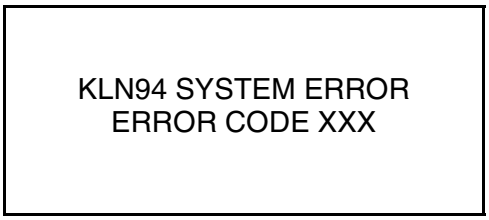
If an in-service unit tests within the acceptable limits given in this test procedure, no further testing is required and the unit shall be considered suitable for installation in an aircraft.

5.2.4.1 SYSTEM ERROR

A. Set the TEST switch (S9) to open.

B. Turn the unit power on.

C. Check to verify that the following page is not displayed.



D. If no failure is indicated, continue testing.

5.2.4.2 UNIT SOFTWARE VERSION

A. Press the ENT button four times.

B. Turn the right knobs until the Aux 14 page is visible.

C. This page will display the revision of software in the unit.

D. Record software data on the Final Data Sheet.

5.2.4.3 UNIT INITIALIZATION

A. Turn right outer knob to set page 1.

B. Press the CRSR button.

C. Set the initial position to a location near to the user’s present position, i.e. KIXD, OJC.

D. Press ENT three times to validate the choice.

E. Turn the right inner knob to the SET 2 page.

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F. Set the date and time to the present date and GMT.

5.2.4.4 UNIT CURRENT DRAIN TEST

A. Attach a DC Ammeter to the unit.

B. Turn the unit power on (with no superflags set), fan on, LCD and button backlighting at full bright, and aircraft power set to 27.5V dc.

C. Verify that the unit current drains is not more than 785 mA.

D. If no failure is indicated, check “OK” on the Final Data Sheet.

E. Turn the unit power off.

F. Attach a DC ammeter to the 14V lighting bus.

G. Turn the unit power on.

H. Verify the 14V lighting current drain is less than 1mA and that the Button lighting is on.

I. If no failure is indicated, check “OK” on the Final Data Sheet.

J. Turn the unit power off.

K. Attach a DC ammeter to the 28V lighting bus.

L. Turn the unit power on.

M. Verify the 28V lighting current drain is less than 1mA and that the Button lighting is on.

N. If no failure is indicated, check “OK” on the Final Data Sheet.

5.2.4.5 DISCRETE OUTPUT TESTS

A. Turn the unit power off.

B. Set the test switch S9 to closed.

C. Turn the unit power on.

D. Press the ENT button and then press the CRSR button on the unit.

E. Place all annunciator switches (S4, S5, S6, S7, S33, S34, S35, S36, S37, S38) to the normal position.

F. Place the annunciator select control (S3) to the annunciate position.

G. Place the unit select control (S39) to the KLN 94 position.

H. Press the ALT button on the unit. The annunciators should toggle between the high and low states each time the ALT button is pressed. If all annunciators illuminate, proceed to the next step.

I. Place the annunciator select control (S3) to the spare position.

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J. Press the ALT button on the unit. The annunciators should toggle between the high and low states each time the ALT button is pressed.

K. If no failure is indicated, check “OK” on the Final Data Sheet.

L. Press the button labeled DIR (DIRECT TO) on the unit.

M. Check for a DC voltage between (-100mV and -900mV) or (100mV and 900mV) on the TO/FROM FLAG output (THTP13, THTP14).

N. If no failure is indicated, check “OK” on the Final Data Sheet.

5.2.4.6 DEVIATION OUTPUT TESTS

A. Set the deviation select switch (S17) to the lateral position.

B. Connect a DC voltmeter to the deviation output (THTP10, THTP11).

C. Press the MSG button several times. Each time the MSG button is pressed, the output voltage on the voltmeter should toggle between 75mV, 0mV, and -75mV.

D. Set (S17) to the vertical position and repeat step C.

E. If no failure is indicated, check “OK” on the Final Data Sheet.

5.2.4.7 SERIAL OBI OUTPUT

A. Connect a DC voltmeter to the OBI Data output (THTP5).

B. Check for a DC voltage of 9.0VDC ±1.35VDC for a high reading, and less than 1.0VDC for a low.

C. Press the ALT button on the unit to toggle between a high and low.

D. If no failure is indicated, check “OK” on the Final Data Sheet.

5.2.4.8 OBS TEST

A. Connect a frequency counter to the OBS OUT output (THTP12).

B. Check for a reading of 450Hz ±4Hz.

C. Connect an oscilloscope to the OBS OUT output (THTP12).

D. Check for an AC reading of 11 ±1Vp-p.

E. Adjust the Bomar bearing knob.

F. Verify the reading of the OBS from the unit is the same as the Bomar bearing.

NOTE:
If OBS reading is not the same, calibrate per the procedure in the KLN 94 installation manual.

G. If no failures are indicated, check “OK” on the Final Data Sheet.

5.2.4.9 DISCRETE INPUT TEST

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NOTE:
Baro must be set to 29.92".

A. Set the Gillham Altitude switches according to the table below. Verify that the altitude is the same as indicated in the table.

SWITCH	S19	S20	S21	S22	S23	S24	S25	S26	S27	S18	GILLHAM ALTITUDE
INPUT	A1	A2	A4	B1	B2	B4	C1	C2	C4	D4	
SWITCH SETTING	L	O	L	O	L	O	L	O	O	O	24,300 Ft. ±10 Ft.
SWITCH SETTING	O	L	O	L	O	L	O	L	L	L	49,900 Ft. ±10 Ft.

B, Press the CRSR button on the KLN 94.

C. Turn the right outer knob until the cursor is over the word "OK".

D. Press the ENT button.

E. Turn the right inner knob until the unit shows the following display.

```
GPSDSP-L        SP1-0          SP3-0
SPARE0 -L       SP2-0          APRCHARM-0
                               TAKEHOME-0
                               RTI TAKEHOME-0



TST 7
```

F. Set the following switches to the settings listed in the table below.

SWITCH		SETTING
S28	GPS DISPLAYED	GROUND
S11	SPARE IN 1	LOW
S12	SPARE IN 2	LOW
S13	SPARE IN 3	LOW
S15	SPARE IN 0	OBS
S16	APPROACH ARM IN	LOW
S10	TAKE HOME	LOW

G. Verify the unit displays the following page.

```
GPSDSP-L        SP1-L          SP3-L
SPARE0-L        SP2-L          APRCHARM-L
                               TAKEHOME-L
                               RTI TAKEHOME-0



TST 7
```


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H. If no failures are indicated, check “OK” on the Final Data Sheet.

5.2.4.10 ANNUNCIATOR OUTPUT TESTS

A. Using the Right inner knob bring up test page 9 (TST 9).

B. Press CRSR. Using right inner and outer knob, toggle the annunciators at the unit. Check for a corresponding indication at the test harness.

DESCRIPTION	INDICATOR	SWITCH SETTING
MESSAGE:	DS2	S3 set to SPARE
WAYPOINT	DS1	S3 set to Annunciate
APPR ARM	DS3	S3 set to SPARE
APPR ACT:	DS4	S3 set to Annunciate
FCS LOC ENG	DS8	
VERT FLAG	THTP 6-7	VERTICAL
LAT FLAG	THTP 6-7	LATERAL
FAN ENABLE		
STEERING SUPERFLAG	DS9	

C. When LATERAL DEV FLAG+ is set to ‘ON’ (invalid), TO/FROM shall be less than + 5 mV. (THTP13, THTP14)

D. The internal fan will turn on when commanded.

E. Current shall increase by (50 +/- 30) mA when the fan is on.

NOTE:
Sounds produced by a proper working fan normally do not indicate improper performance or mechanical interference.

F. Press CRSR and then turn the Right inner knob to Next page 9. Page 9 will be displayed in three separate screens.

G. Press CRSR and toggle the outputs at the unit. Check for a corresponding indication at the test harness.

DESCRIPTION	INDICATOR	SWITCH SETTING
SPARE ANN 1	DS1	S3 set to SPARE
SPARE ANN 2	DS2	S3 set to SPARE

H. If no failure is indicated, check “OK” on the Final Data Sheet.

5.2.4.11 SUPERFLAG OUTPUTS / Lateral and Vertical Flags

A. Set switches S34, S35 , S38 to the normal position.

B. Set S39 is set to the KLN94 position.

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NOTE:
All Checks for this test will be across test points THTP6 and THTP7 (TST 9).

C. Set S2 to Vertical, toggle the VERT FLAG to ON (on the Tst 9 page), and check for a DC voltage of not more than 50mV. The corresponding superflag will be OFF.

D. Toggle the VERT FLAG OFF (on the Tst 9 page) and check for a DC voltage between 350mV and 900mV. The corresponding superflag will be ON.

E. If no failure is indicated, check “OK” on the Final Data Sheet.

F. Set S2 to Lateral, toggle the LAT FLAG to ON (on the Tst 9 page), and check for a DC voltage of not more than 50mV. The corresponding superflag will be OFF.

G. Toggle the LAT FLAG OFF (on the Tst 9 page) and check for a DC voltage between 350mV and 900mV. The corresponding superflag will be ON.

H. If no failure is indicated, check “OK” on the Final Data Sheet.

I. Toggle the STEERING SUPPERFLAG to ON (on the Tst 9 page). The indicator will be OFF. Toggle the STEERING SUPERFLAG to OFF (on the Tst 9 page). The indicator will be ON.

J. If no failure is indicated, check “OK” on the Final Data Sheet.

5.2.4.12 INTERNAL VOLTAGE TEST

A. Turn the right inner knob of the unit to display the TST 3 page.

B. Check for the display shown below.

	V-LCD-DRIVE	20.4V
	P/S 13V	14.6V
	P/S 12V	-11.5V
TST +3		

C. Verify the V-LCD-DRIVE reading is between 18.8V and 21.2V.

D. If no failures are indicated, record the voltage reading on the Final Data Sheet.

E. Verify the 13V reading is between 12.8V and 16.7V.

F. If no failures are indicated, record the voltage reading on the Final Data Sheet.

G. Verify the -12V reading is between -10.6V and -12.7V.

H. If no failures are indicated, record the voltage reading on the Final Data Sheet.

I. Turn the right inner knob on the unit to display the following page.

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	N/V BATTERY	3.7V
	P/S 5V	5.0V
	P/S RF 5V	5.1V
TST +3		

J. Verify the NV BATTERY reading is not less than 3.3VDC.

K. If no failures are indicated, record the voltage reading on the Final Data Sheet.

L. Verify the DIGITAL 5V reading is between +4.75VDC and 5.25VDC.

M. If no failures are indicated, record the voltage reading on the Final Data Sheet.

N. Verify the RF 5V reading is between +4.75VDC and 5.25VDC.

O. If no failures are indicated, record the voltage on the Final Data Sheet.

5.2.4.13 ANALOG INPUT TEST

A. Turn the right inner knob to the next display, which appears below.

AC Power Monitor	13.7V
FILTER AC Power	13.7V
Unit Temp	44.7°C
TST +3	

B. Verify the reading for the AC POWER MONITOR is between +10.7 and +33.7VDC.

C. Verify the reading for the PROT AC POWER is between +10.5 and +33.5VDC.

D. If no failures are indicated, record the voltage on the Final Data Sheet.

5.2.4.14 UNIT TEMPERATURE SENSOR TEST

A. Check the display listed above. Verify the unit temperature is not more than ambient +35°C.

B. If no failures are indicated, record the temperature reading on the Final Data Sheet.

5.2.4.15 DISPLAY PERFORMANCE TEST

A. Turn the right inner knob of the unit to display the following page.

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DISPLAY TEST PATTERNS Use CLR button to sequence patterns TST 2

B. To check button lighting, set the lighting to 14V.

C. Then, set the lighting to 28V.

D. Assess the display for missing pixels.

E. Check display dimming. Display will be fully dimmed with dimming knob completely counter-clockwise and fully bright with the knob completely clockwise.

K. If no failures are indicated, check “OK” on the Final Data Sheet.

5.2.4.16 UNIT BUILT-IN SELF TEST

A. Turn the right inner knob until the page below is displayed.

ADC-P	LOC-P	ALT-P	S1-P
STR-P	AARM-P	APR-P	S2-P
	LNAV-P	MSG-P	
	VNAV-P	WPT-P	
TST 8			

B. Check the display to verify all variables show “P”.

C. If no failures are detected, check “OK” on the Final Data Sheet.

5.2.4.17 AUDIO OUTPUT AND DC ROLL STEERING TEST

A. Close S14.

B. Turn the right inner knob on the unit to display the following page.

TST 5	ALTITUDE ALERT AUDIO OFF DC ROLL STEERING CENTER

C. Press the CLR button on the unit and note the display change. Before pressing CLR, check Audio off: (THTP15, THTP16), output $\leq$ 100mV p-p; DC Roll Steering center (THTP17, GND), output = 0 $\pm$ .135 VDC.

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TST 5	ALTITUDE ALERT AUDIO ON HALF VOLUME DC ROLL STEERING POSITIVE

D. Connect a frequency counter to the ALT ALERT AUDIO output (THTP15, THTP16).

E. Check for a reading of 1000Hz ±100Hz.

F. If no failure is indicated, record the frequency reading on the Final Data Sheet.

G. Connect an oscilloscope to the ALT ALERT AUDIO output (THTP15, THTP16).

H. Verify the amplitude of the signal is between 4.2Vp-p and 6.8Vp-p. Connect scope to DC Roll Steering (THTP17, GND), output = +2.69 ± .135 VDC.

I. If no failure is indicated, record the reading on the Final Data Sheet.

J. Press the CLR button.

K. Verify amplitude of the Alt. Alert Audio signal is between 8.4Vp-p and 12.4Vp-p at (THTP15, THTP16). Verify that DC Roll Steering (THTP17, GND) for negative is -2.69 ± .135 VDC.

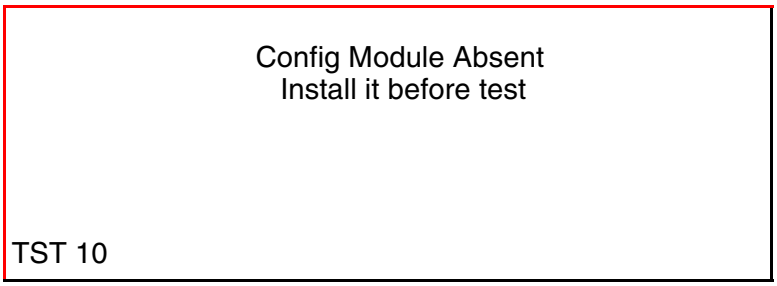
L. If no failure is indicated, record the reading on the Final Data Sheet.

5.2.4.18 CONFIGURATION MODULE TEST

A. Turn the right inner knob on the unit until the TST 10 page is displayed as below.

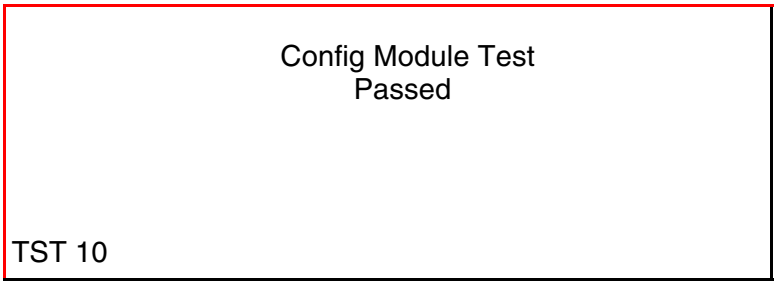


B. If the configuration module is not present, then the following message will be displayed.

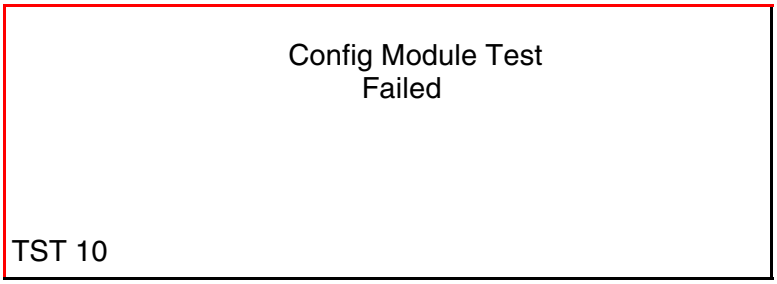


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C. Press the NRST button on the unit. If the test is passed, the following message will be displayed.



D. If the test fails, the following message will be displayed.



E. If no failure is indicated, check “OK” on the Final Data Sheet.

5.2.4.19 REAL TIME CLOCK TEST

A. Turn the unit OFF.

B. Set the TEST switch (S9) to the open position.

C. Turn the left knob of the unit to the ON position.

D. Press the ENT button four times.

E. Turn the right outer knob of the unit until the bottom left side of the page displays the word SET.

F. Turn the right inner knob until the bottom left side of the page displays the word SET2.

G. The page should now show the correct GMT time and date.

H. If no failure is indicated, check “OK” on the Final Data Sheet.

5.2.4.20 GPS RECEIVER SATELLITE ACQUISITION TEST

A. Connect the antenna cable to the antenna connector on the rear of the unit.

B. Turn the right outer knob of the unit until the bottom left side of the display shows the AUX page.

C. Turn the right inner knob to display the following page.

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__1_nm	SV	HIT	Sg	El	Hz
	11	GD	4	26	0

M>LEG					
AUX +2					

D. Two or more satellites should be acquired, an Sg of more than 4, and a HIT of GD will be displayed after 5 minutes of run time.

E. Turn the right inner knob to the AUX +1 page. It should display the present state of the GPS receiver as NAV D and an estimated position error of not more than 0.124nm.

F. If no failure is indicated, check “OK” on the Final Data Sheet.

5.2.4.21 HARDWARE FAILURE TEST

A. Press the MSG button on the unit.

B. Verify that no messages regarding hardware failures are displayed on the page.

C. If no failure is indicated, check “OK” on the Final Data Sheet.

5.2.4.22 POST TEST PROCEDURE

A. If the application software is updated, verify the SW REVISION by viewing the top line of the AUX 14 page. SW REVISION 0X0X will be displayed, where 0X0X is the last four digits of the of the KLN 94 Application Software 206-number.

A marking should be made in the Aircraft Log Book to indicate that the KLN 94 Application Software has been updated.

The recommended wording in the log book is as follows:
“KLN 94 APPLICATION SOFTWARE IS AT SW REVISION 0X0X ON (current date).

B. Turn the unit power to OFF.

C. Disconnect the test harness and antenna cable.

D. Sign and date the Final Test Data Sheet.

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FINAL TEST DATA SHEET

5.2.4.2	UNIT SOFTWARE VERSION		
	Graphics Code <Enter part number here _____>	_____	OK
	HOST Code <Enter part number here _____>	_____	OK
5.2.4.3	CLOCK SETTING	_____	OK
5.2.4.4	UNIT CURRENT DRAIN TESTS		
	Unit Current Drain 785mA	_____	mA
	14V Light Bus Current Drain <1mA	_____	OK
	28V Light Bus Current Drain <1mA	_____	OK
5.2.4.5	DISCRETE OUTPUT TESTS		
	Annunciators	_____	OK
	TO/FROM Flag	_____	OK
5.2.4.6	DEVIATION OUTPUT TEST (P942-11,12,13,14)	_____	OK
5.2.4.7	SERIAL OBI OUTPUT TEST	_____	OK
5.2.4.8	OBS TEST	_____	OK
5.2.4.9	DISCRETE INPUT TEST	_____	OK
5.2.4.10	ANNUNCIATOR OUTPUT TEST	_____	OK
5.2.4.11	SUPERFLAG OUTPUTS/LATERAL/VERTICAL FLAG TEST		
	Lateral Deviation Flag	_____	OK
	Vertical Deviation Flag	_____	OK
	Annunciator	_____	OK
5.2.4.12	INTERNAL VOLTAGE TEST		
	V-LCD-DRIVE (V_LCD_DRIVE) 18.8V to 21.2V	_____	VDC
	+13V 12.8V to 16.7V	_____	VDC
	-12V -10.6V to -12.7V	_____	VDC
	NV BATTERY Voltage >3.3V	_____	VDC
	DIGTAL 5V +4.75V to +5.25V	_____	VDC
	RF 5V +4.75V to +5.25V	_____	VDC
5.2.4.13	ANALOG INPUT TEST		
	A_C_POWER_MONITOR +10.7 to +33.7V	_____	VDC
	PROT_AC_PWR +10.5 to +33.5V	_____	VDC
5.2.4.14	UNIT TEMPERATURE SENSOR TEST		
	Temperature <T ambient +35°C	_____	°C
5.2.4.15	DISPLAY PERFORMANCE TEST	_____	OK

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5.2.4.16	UNIT BUILT-IN SELF TEST	_____	OK
5.2.4.17	AUDIO OUTPUT AND DC ROLL STEERING TEST		
	Audio Output Frequency 1000Hz ±100Hz	_____	Hz
	Audio Output At Full Volume 8.4Vp-p to 12.4Vp-p	_____	Vp-p
	Audio Output At Half Volume 4.2Vp-p to 6.8Vp-p	_____	Vp-p
	Audio Output Off ≤100mVp-p	_____	Vp-p
	DC Roll Steering (positive) +2.69 ±.135 VDC	_____	VDC
	DC Roll Steering (center) 0 ±.135 VDC	_____	VDC
	DC Roll Steering (negative) -2.69 ±.135 VDC	_____	VDC
5.2.4.18	CONFIGURATION MODULE TEST	_____	OK
5.2.4.19	REAL TIME CLOCK TEST	_____	OK
5.2.4.20	GPS RECEIVER SATELLITE ACQUISITION TEST	_____	OK
5.2.4.21	HARDWARE FAILURE TEST	_____	OK
5.2.4.22	POST TEST PROCEDURES COMPLETE	_____	OK
TESTED BY	_____DATE	_____	

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5.3 OVERHAUL

5.3.1 VISUAL INSPECTION

This section contains instructions and information to assist in determining, by visual inspection, the condition of the KLN 94's major assemblies and subassemblies. These inspection procedures will assist in finding defects resulting from wear, physical damage, deterioration, or other causes. To aid inspection, detailed procedures are arranged in alphabetical order.

A. Capacitors, Fixed

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

B. Capacitors, Variable

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

C. Chassis

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

D. Circuit Boards

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

E. Connectors

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

F. Covers and Shields

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

G. Flex Circuits

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

H. Front Panel

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

I. Fuse

Inspect for blown fuse and check for loose solder joints.

J. Insulators

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

K. Jacks

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

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L. Potentiometers

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

M. Resistors, Fixed

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

N. RF Coils

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

O. Terminal Connections Soldered

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

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

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

(4) Inspect for corrosion at the terminal.

P. Transformers

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

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

Q. Wiring/Coaxial Cable

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

5.3.2 CLEANING

A. General

This section contains information to aid in the cleaning of the component parts and subassemblies of the KLN 94.

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

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WARNING:
OPERATIONS INVOLVING THE USE OF A CLEANING SOLVENT SHOULD BE PERFORMED UNDER A VENTILATED HOOD. AVOID BREATHING SOLVENT VAPOR AND FUMES; AVOID CONTINUOUS CONTACT WITH THE SOLVENT. WEAR A SUITABLE MASK, GOGGLES, GLOVES, AND AN APRON WHEN NECESSARY. CHANGE CLOTHING UPON WHICH SOLVENTS HAVE BEEN SPILLED.

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

B. Recommended Cleaning Agents

Table 5-1 lists the recommended cleaning agents to be used during overhaul of the KLN 94.

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

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

TABLE 5-1 RECOMMENDED CLEANING AGENTS

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C. Recommended Cleaning Procedures

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

1. Exterior
   (a) Wipe dust cover and front panel with a lint-free cloth dampened with denatured alcohol.
   (b) For cleaning connectors, use the following procedure.
      (1) Wipe dust and dirt from bodies, shells, and cable clamps using a lint-free cloth moistened with denatured alcohol.
      (2) Wipe parts dry with a clean, dry lint-free cloth.
      (3) Remove dirt and lubricant from connector inserts, insulation, and terminals using a small soft bristled brush moistened with denatured alcohol.
      (4) Dry the inserts with an air jet.
   (c) Remove cover(s).
   (d) If necessary, open any blocked ventilation holes by first saturating the debris clogging the aperatures with denatured alcohol and then blowing the loosened material out with an air stream.
2. Interior

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

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

TABLE 5-2 UNSAFE CLEANING AGENTS

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

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

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

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

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

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

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NOTE:

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

NOTE:

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

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

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

(1) Remove surface grease with a lint-free cloth.

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

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

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

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

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

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

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

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

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

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NOTE:

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

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

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

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

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

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

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

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

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

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

5.3.3 REPAIR

A. General

This section contains information required to perform limited repairs on the KLN 94 unit. The repair or replacement of damaged parts in airborne electronic equipment usually involves standard service techniques. In most cases, examination of drawings and equipment reveals several approaches to perform a repair. However, certain repairs demand following an exact repair sequence to ensure proper operation of the equipment. After correcting a malfunction in any section of the unit, it is recommended that a repetition of the functional test of the unit be performed.

B. Repair Precautions

1. Ensure that all ESDS and MOS handling precautions are followed.
2. Perform repairs and replace components with power disconnected from equipment.
3. Use a conductive table top for repairs and connect table to ground conductors of 60Hz and 400Hz power lines.
4. Replace connectors, coaxial cables, shield conductors, and twisted pairs only with identical items.
5. Reference “component side” of a printed circuit board in this manual means the side on which components are located; “solder side” refers to the other side. The standard references are as follows: nearside is the component side; farside is the solder side; on surface mount boards with components on both sides, the nearside is the side that has the J#### and P#### connector numbers.

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6. When repairing circuits, carefully observe lead dress and component orientation. Keep leads as short as possible and observe correct repair techniques.
7. There are certain soldering considerations with surface mount components. The soldering iron tip should not touch the ceramic component body. The iron should be applied only to the termination-solder filet.
8. Observe cable routing throughout instrument assembly, prior to disassembly, to enable a proper reinstallation of cabling during reassembly procedures.

CAUTION

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

C. Electrostatic Sensitive Devices (ESDS) Protection

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

D. MOS Device Protection

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

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1. Store and transport all MOS devices in conductive material so that all exposed leads are shorted together. Do not insert MOS devices into conventional plastic “snow” or plastic trays used for storing and transporting standard semiconductor devices.
2. Ground working surfaces on workbench to protect the MOS devices.
3. Wear cotton gloves or a conductive wrist strap in series with a 200KΩ resistor connected to ground.
4. Do not wear nylon clothing while handling MOS devices.
5. Do not insert or remove MOS devices with power applied. Check all power supplies to be used for testing MOS devices. and be sure that there are no voltage transients present.
6. When straightening MOS leads, provide ground straps for the apparatus for the device.
7. Ground the soldering iron when soldering a device.
8. When possible, handle all MOS devices by package or case, and not by leads. Prior to touching the device, touch an electrical ground to displace any accumulated static charge. The package and substrate may be electrically common. If so, an electrical discharge to the case would cause the same damage as touching the leads.
9. Clamping or holding fixtures used during repair should be grounded, as should the circuit board, during repair.
10. Devices should be inserted into the printed circuit boards such that leads on the back side do not contact any material other than the printed circuit board (in particular, do not use any plastic foam as a backing).
11. Devices should be soldered as soon as possible after assembly. All soldering irons must be grounded.
12. Boards should not be handled in the area around devices, but rather by board edges.
13. Assembled boards must not be placed in conventional, home-type, plastic bags. Paper bags or antistatic bags should be used.
14. Before removing devices from conductive portion of the device carrier, make certain conductive portion of carrier is brought in contact with well grounded table top.

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

1. Heat one lead from component side of board until solder flows, and lift one lead from board; repeat for other lead and remove component (note orientation).
2. Melt solder in each hole, and using a desoldering tool, remove solder from each hole.
3. Dress and form leads of replacement component; insert leads into correct holes.

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4. Insert replacement component observing correct orientation.

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

1. Remove component by clipping each lead along both sides. Clip off leads as close to component as possible. Discard component.
2. Heat hole from solder side and remove clipped lead from each hole.
3. Melt solder in each hole, and using a desoldering tool, remove solder from each hole.
4. Insert replacement component observing correct orientation.
5. Solder component in place from farside of board. Avoid solder runs. No solder is required on contacts where no traces exist.

G. Replacement of Power Transistors

1. Unsolder leads and remove attaching hardware. Remove transistor and hard-coat insulator.
2. Apply Thermal Joint Compound Type 120 (Wakefield Engineering, Inc.) to the mounting surface of the replacement transistor.
3. Reinstall the transistor insulator and the power transistor using hardware removed in step (1).
4. After installing the replacement transistor, but before making any electrical connections, measure the resistance between the case of the transistor and the chassis, to ensure that the insulation is effective. The resistance measured should be greater than 10MΩ.
5. Reconnect leads to transistor and solder in place.

H. Replacement of Printed Circuit Board Protective Coating

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

1. Clean repaired area of printed circuit board per instructions in the Cleaning section of this manual.
2. Apply Conformal Coating, Humiseal #1B-31 HYSOL PC20-35M-01 (Humiseal Division, Columbia Chase Corp., 24-60 Brooklyn Queens Expressway West, Woodside, N.Y., 11377) P/N 016-01040-0000.
3. Shake container well before using.

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4. Spray or brush surfaces with smooth, even strikes. If spraying, hold nozzle 10-15 inches from work surface.
5. Cure time is ten minutes at room temperature.

I. Programmable Read Only Memory (PROM) Replacement

The read only memory packages are specially programmed devices to provide specific logic outputs required for operation in the KLN 94 unit. The manufacturer's part (type) number is for the un-programmed device, and cannot be used. The Honeywell part number must be used to obtain the correctly programmed device. Refer to the "Illustrated Parts List" (IPL).

5.3.3.1 REPLACEMENT OF COMPONENTS

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

A. Connectors

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

B. Crystal

The use of any crystal, other than a Honeywell crystal, is considered an unauthorized modification.

C. Diodes

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

D. Integrated Circuits

Refer to Appendix A for removal and replacement instructions.

E. Wiring/Coaxial Cable

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

5.3.4 DISASSEMBLY

5.3.4.1 General

This section contains information for disassembly of the KLN 94. Disassembly procedures are to be accomplished only when repairing the unit, or as described in the modification service bulletin. This section contains the recommended procedures for removal of all subassemblies. Refer to the Illustrated Parts List (IPL) for aid in disassembly. Part numbers are used in the IPL drawings to identify specific parts. Complete disassembly should never be undertaken. Provisions have been made in the design of the unit to make complete disassembly unnecessary, except to replace a damaged mechanical part that cannot otherwise be reached.

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WARNING

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

CAUTION

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

5.3.4.2 Recommended Disassembly Procedures

NOTE

View unit from front, with display to the top, for determining left and right sides, top and bottom. Tag, or by some means identify, all disconnected wires or coaxial cables. Refer to unit and board level assembly drawings as additional aids in assembly/disassembly procedures.

A. Bottom Cover Removal

CAUTION

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

1. Turn unit over so the Bottom Cover (047-12425-0006) is facing up.
2. Remove nine fasteners (089-06008-0003) securing the Bottom Cover to the Top Cover (047-12426-0006).
3. Remove two fasteners (089-06008-0004) securing the Bottom Cover to the Front Panel assembly (200-09673-0001).
4. Lift Bottom Cover assembly off, and swing to left side of unit.
5. Locate and disengage ribbon cable (155-02937-0001) from P5006 on the Main Board Assembly (200-09638-0001).
6. The Bottom Cover is now free.

B. Power Board Removal

1. Perform steps outlined in step A.

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2. Remove two fasteners (089-06008-0004) securing Power Board heatsink to Bottom Cover assembly.

3. Remove eight fasteners (089-05878-0004) securing Power Board assembly to Bottom Cover (047-12425-0006) assembly.

4. Sever black and red fan wiring.

5. Lift Cap Board Assembly (200-09639-0001) up, and off, of Bottom Cover assembly.

C. Front Panel Assembly Removal

1. Perform steps outlined in step A.

2. Rotate unit so Top Cover (047-12426-0006) assembly is up.

3. Remove two fasteners (089-06008-0004) securing Front Panel Assembly (200-09673-0001) to Top Cover (047-12425-0006).

4. Remove connectors attached to Main Board connectors J5001 and J5009.

5. Remove Front Panel Assembly by carefully separating Switch Board connector (J7005) from Main Board connector (J5007).

D. Switch Board Assembly Removal

1. Perform steps outlined in steps A and C.

2. Remove three fasteners (089-05874-0004) securing the Switch Board Assembly (200-09715-0001) to the Front Panel Assembly (200-09673-0001).

3. Remove set screw (089-06200-0003) from Left Knob (073-00991-0005) and remove Left Knob.

4. Remove set screw (089-06200-0003) from Right Knob Switch Spool (076-01537-0001) and remove Right Inner Knob and Shaft (088-03229-0012) and Right Knob (088-03172-0002).

5. Separate Switch Board Assembly from Front Panel Assembly by carefully pulling apart the assemblies from connectors J7001 and J7011 and their mating connectors on the Button Board (J1007, J1017) and J7008 from the Display.

E. LCD Module Removal

1. Perform steps outlined in steps A, C, and D.

2. Remove two screws (089-05874-0008) attaching the LCD Module (043-05012-0001) to the Bezel.

3. Remove one screw (089-05874-0004) attaching the LCD Module to the Bezel.

4. The LCD Module is now loose and may be removed. This assembly is not field servicable. No other disassembly should be attempted.

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F. Buttons and Backlight Assembly/Button Board Removal

1. Perform steps outlined in steps A, C, D, and E.

2. Remove five hex screws/washers (089-06491-0003/089-08001-0034).

3 The Buttons and Backlight Assembly (300-09748-0001) is now separate from the Bezel and can be removed. The Button Board (200-09641-0001) is a part of this assembly and can be separated from the Light Bar (088-03408-0001) and the Keypad (088-03409-0001).

G. Bus I/O Board Removal

1. Perform steps outlined in step A.

2. Remove two fasteners (089-05878-0005) securing Board Support Brackets (047-12427-0002) to the Main Board (200-09638-0001).

3. Lift Bus I/O Board (200-09642-0001) up to disengage assembly from J5003 on the Main Board.

4. If required, remove two fasteners (089-05874-0004) securing Board Support Brackets to Bus I/O Card.

H. Suppressor Board Removal

1. Perform steps outlined in step A.

2. Remove two fasteners (089-06004-0003) securing the Suppressor Board (200-09665-0001) to left rear of Top Cover (047-12426-0006).

3. Lift Suppressor Board up to disengage assembly from J5004 on the Main Board (200-09638-0001).

I. GPS Xpress Receiver Removal

1. Perform steps outlined in step A.

2. Remove Xpress Cover (047-10752-0000) from the GPS Xpress Receiver Assembly (205-00891-0002).

3. Remove RF Cable Assembly (155-02811-0004) connector from J502 of the GPS Xpress Receiver Assembly.

4. Remove four fasteners (089-05874-0008) securing GPS Xpress Receiver to spacers (076-00322-0009).

5. Remove Xpress Flex Cable (155-02846-0001) from J5005 on the Main Board (200-09638-0001).

6. If required, Remove Xpress Flex Cable (155-02846-0001) from J501 on the GPS Xpress Receiver Assembly.

7. The GPS Xpress Receiver Assembly is now loose and may be removed. It is not a field serviceable assembly.

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J. RF Cable Assembly Removal

1. Perform steps outlined in step A.
2. Remove Xpress Cover (047-10752-0000) from GPS Xpress Receiver (205-00891-0002).
3. Remove RF Cable Assembly (155-02811-0004) connector from J502 of the GPS Xpress Receiver Assembly.
4. Remove two fasteners (089-06004-0003) securing RF Cable Assembly (155-02811-0004) connector to rear of the Top Cover (047-12426-0006).
5. Cable assembly is now loose and can now be removed.

K. Main Board Removal

1. Perform steps outlined in steps A, C, G, H, and I.
2. Remove five screws (089-05878-0004) securing Main Board (200-09638-0001) to Top Cover (047-12426-0006).
3. Remove four fasteners (089-06008-0004) securing Main Board connectors J941 and J942 to the rear of the Top Cover.
4. Remove 4 hex spacers (076-00322-0009) that mount the GPS Xpress board to the main board.
5. Lift Main Board assembly up and remove from Top Cover.

5.3.5 ASSEMBLY

Assembly should be performed in the reverse order of the disassembly procedures.

5.4 TROUBLESHOOTING

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

This troubleshooting section is intended as a guide for the technician in isolating a malfunction of the KLN 94. Before troubleshooting the unit, a thorough understanding of the Theory of Operation should be accomplished. The technique of fault finding through elimination should be used as a basis in locating the trouble area.

Before any troubleshooting procedures are applied, perform a bench check to determine if the unit is the source of the problem. If it is, determine in which assembly the problem lies. Once the problem section has been determined , consult the troubleshooting flowchart and schematics for information pertaining to repair.

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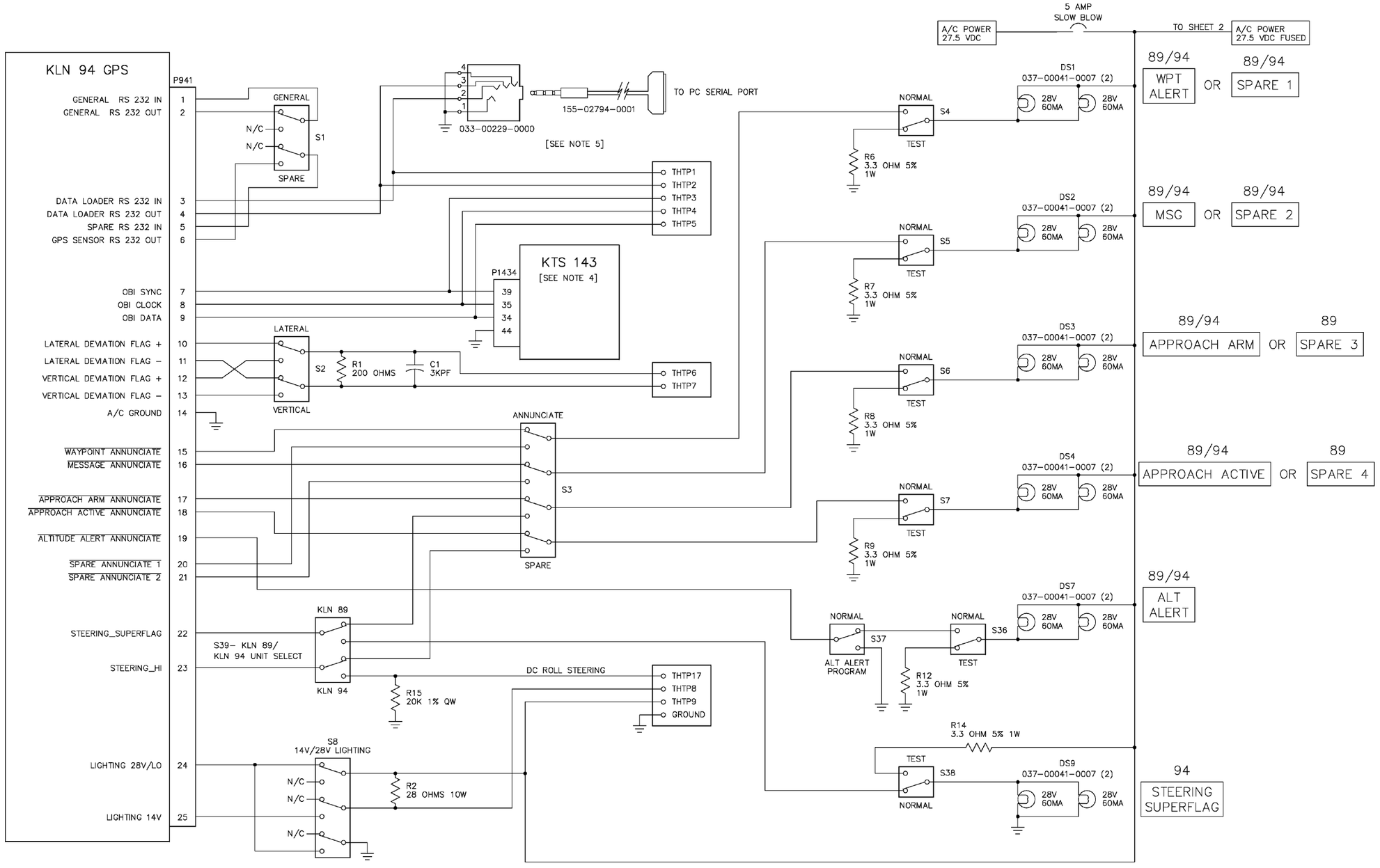


FIGURE 5-1
KLN 89/89B/94 TEST HARNESS (Sheet 1 of 3)

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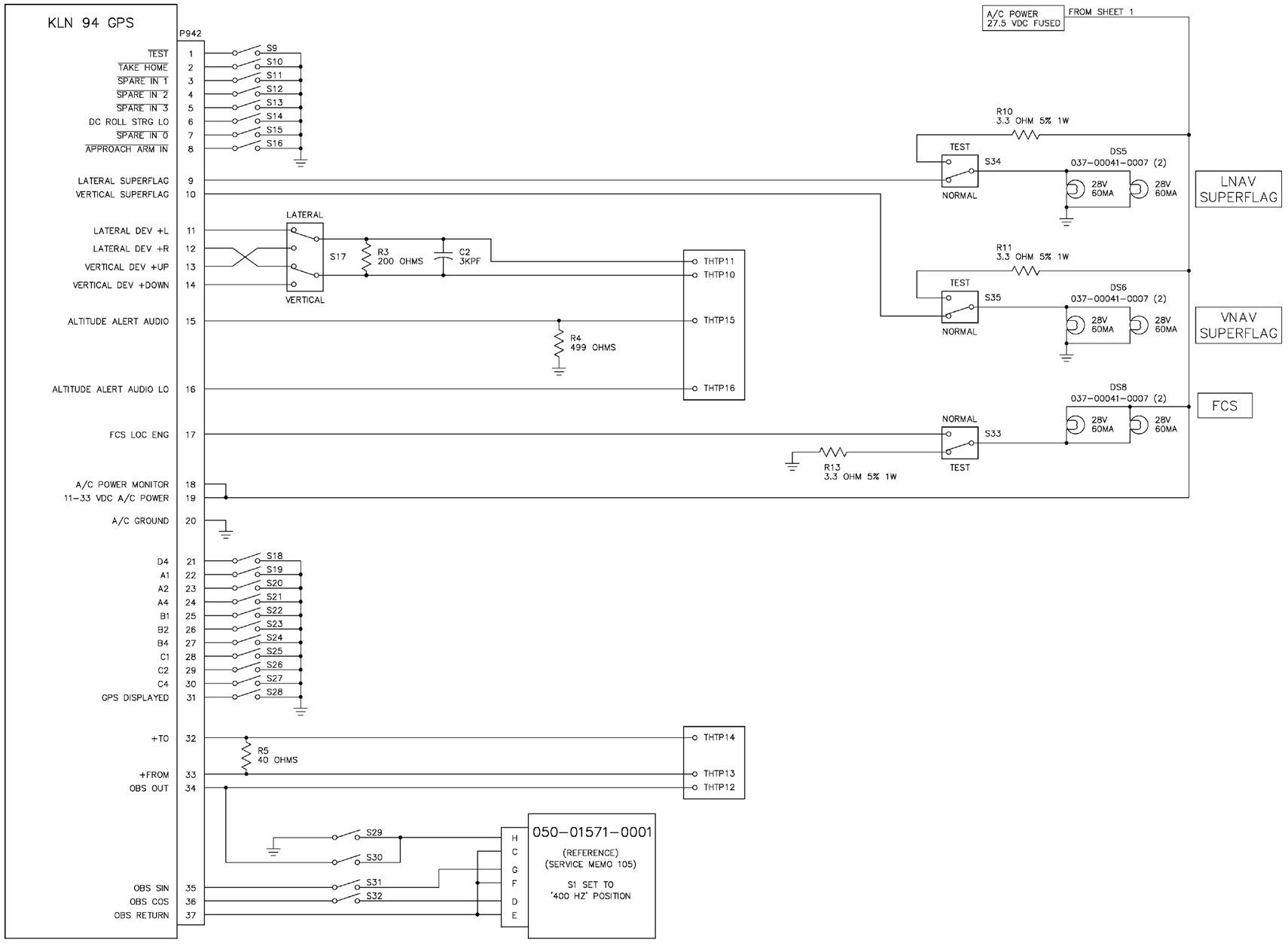
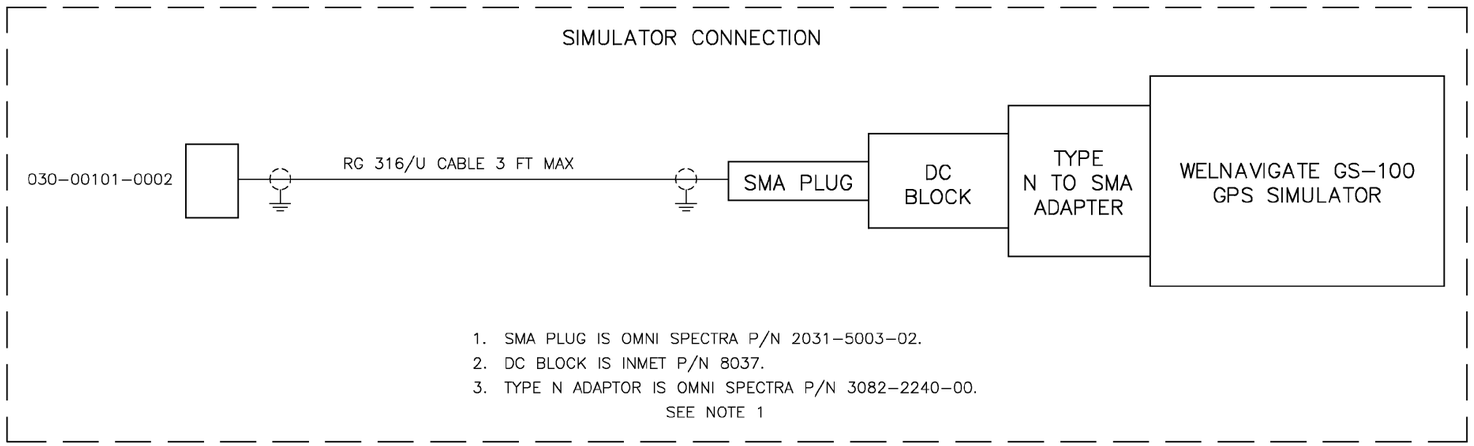
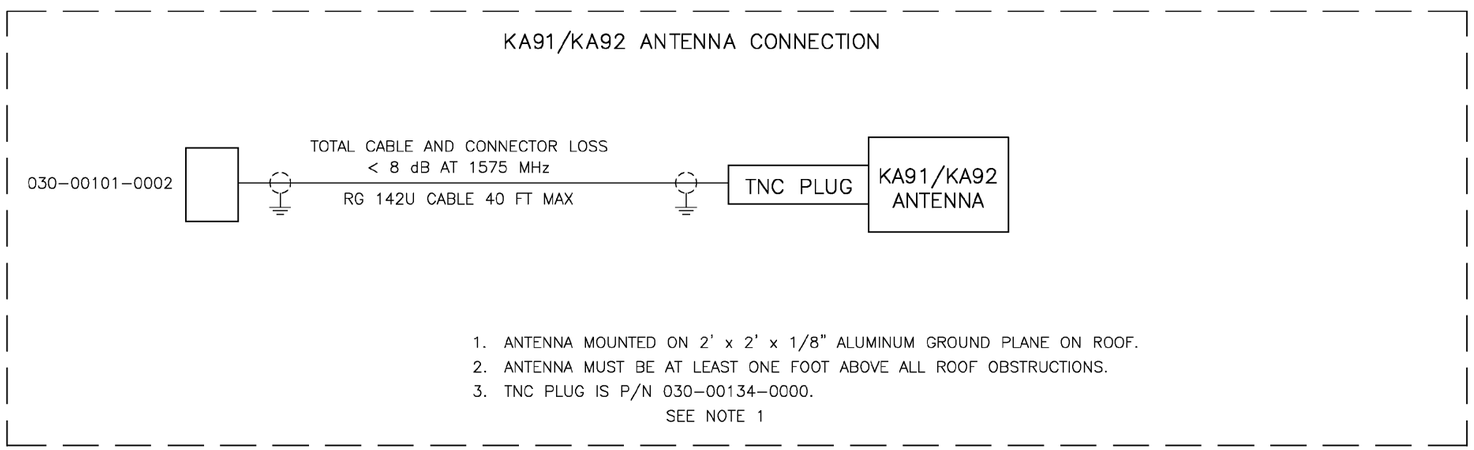


FIGURE 5-1
KLN 89/89B/94 TEST HARNESS (Sheet 2 of 3)

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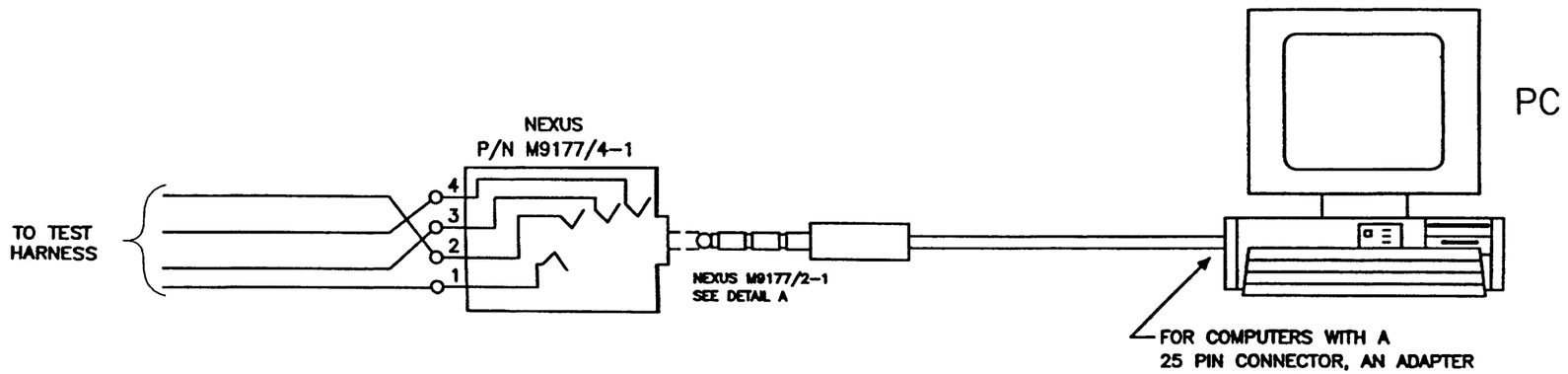


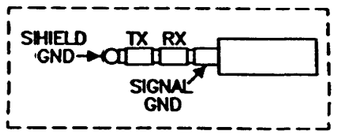
NOTES:

1. EQUIVALENT ITEM MAY BE SUBSTITUTED.
2. ALL RESISTOR TOLERANCES ARE 1% UNLESS OTHERWISE NOTED.
   ALL CAPACITOR TOLERANCES ARE 5% UNLESS OTHERWISE NOTED.
3. ALL RESISTOR POWER RATINGS ARE 1/8 WATT UNLESS OTHERWISE NOTED.
4. KI 229 MAY ALSO BE USED TO VERIFY PROPER OPERATION OF OBI OUTPUTS.
5. PART OF 050-03213-0000.

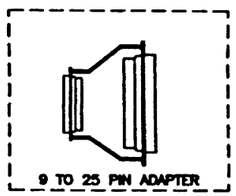
FIGURE 5-1
KLN 89/89B/94 TEST HARNESS (Sheet 3 of 3)

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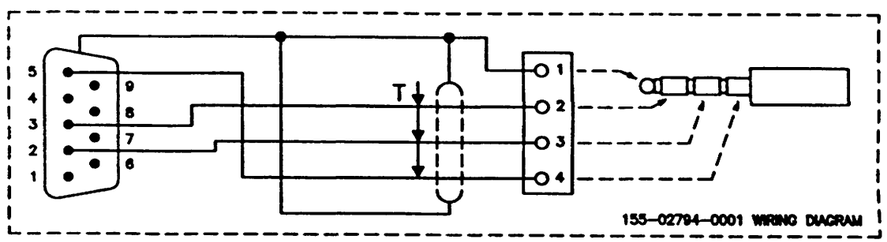




DETAIL A



DETAIL B



DETAIL C

FIGURE 5-2
PC INTERFACE DRAWING/SOFTWARE UPDATE TOOL KIT

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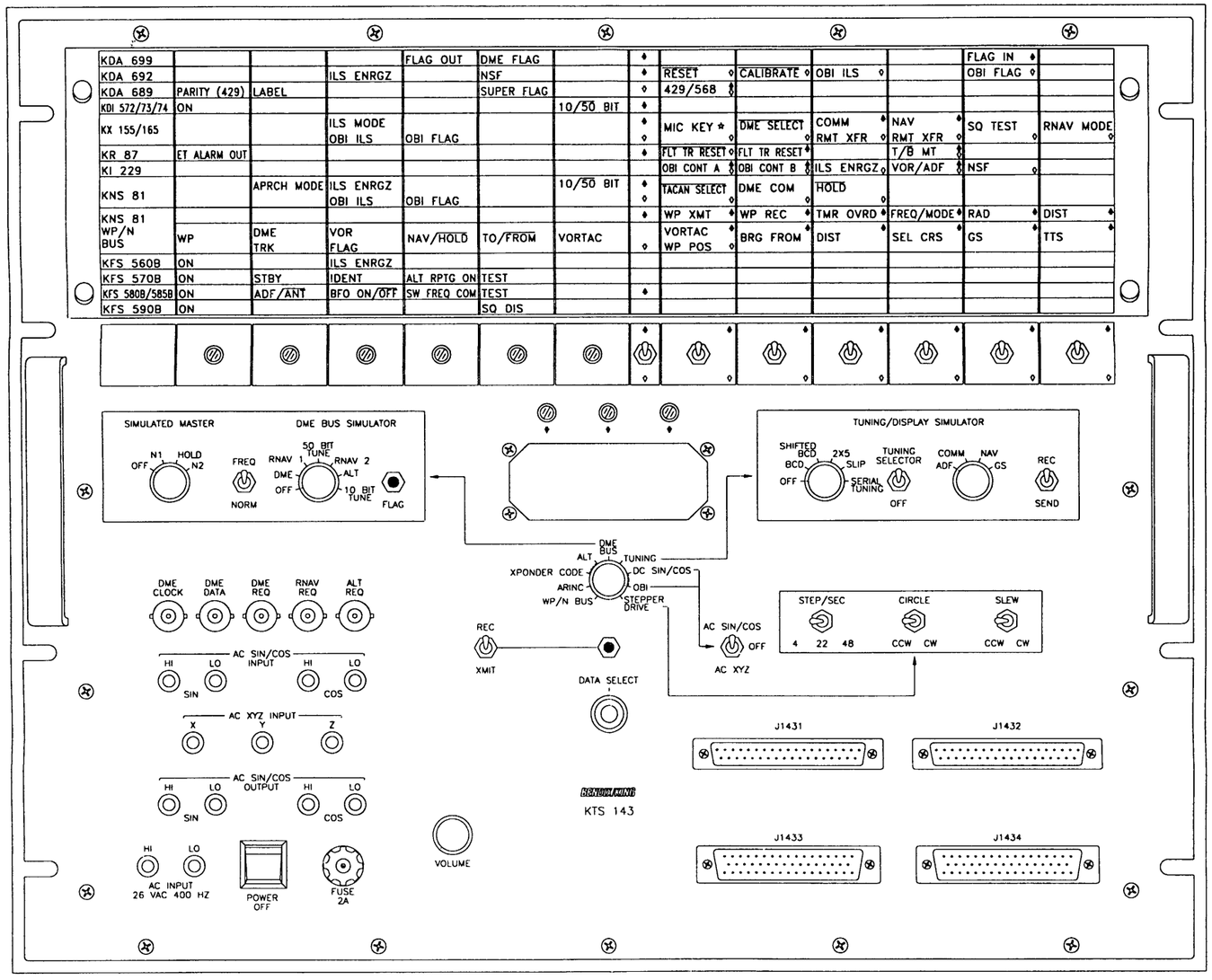


FIGURE 5-3
KTS 143 TEST FIXTURE

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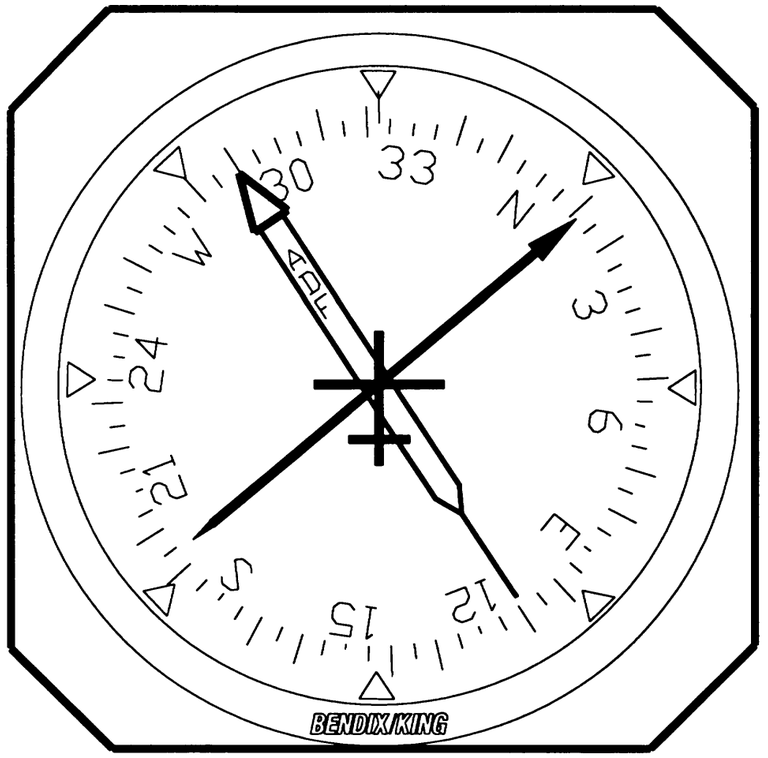


FIGURE 5-4
KI 229 RADIO MAGNETIC INDICATOR

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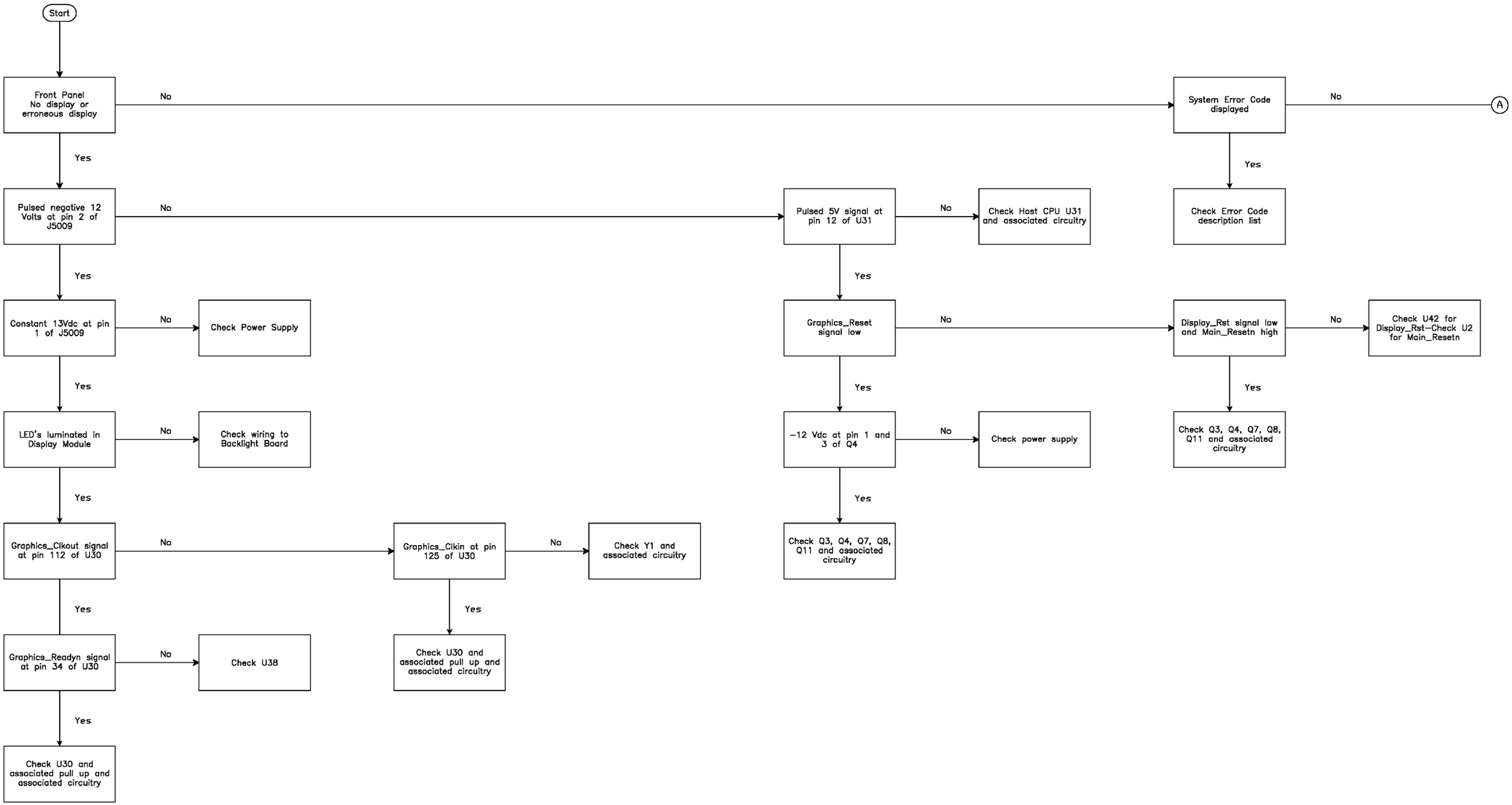


FIGURE 5-5
KLN 94 MAIN BOARD TROUBLESHOOTING FLOWCHART (Sheet 1 of 2)

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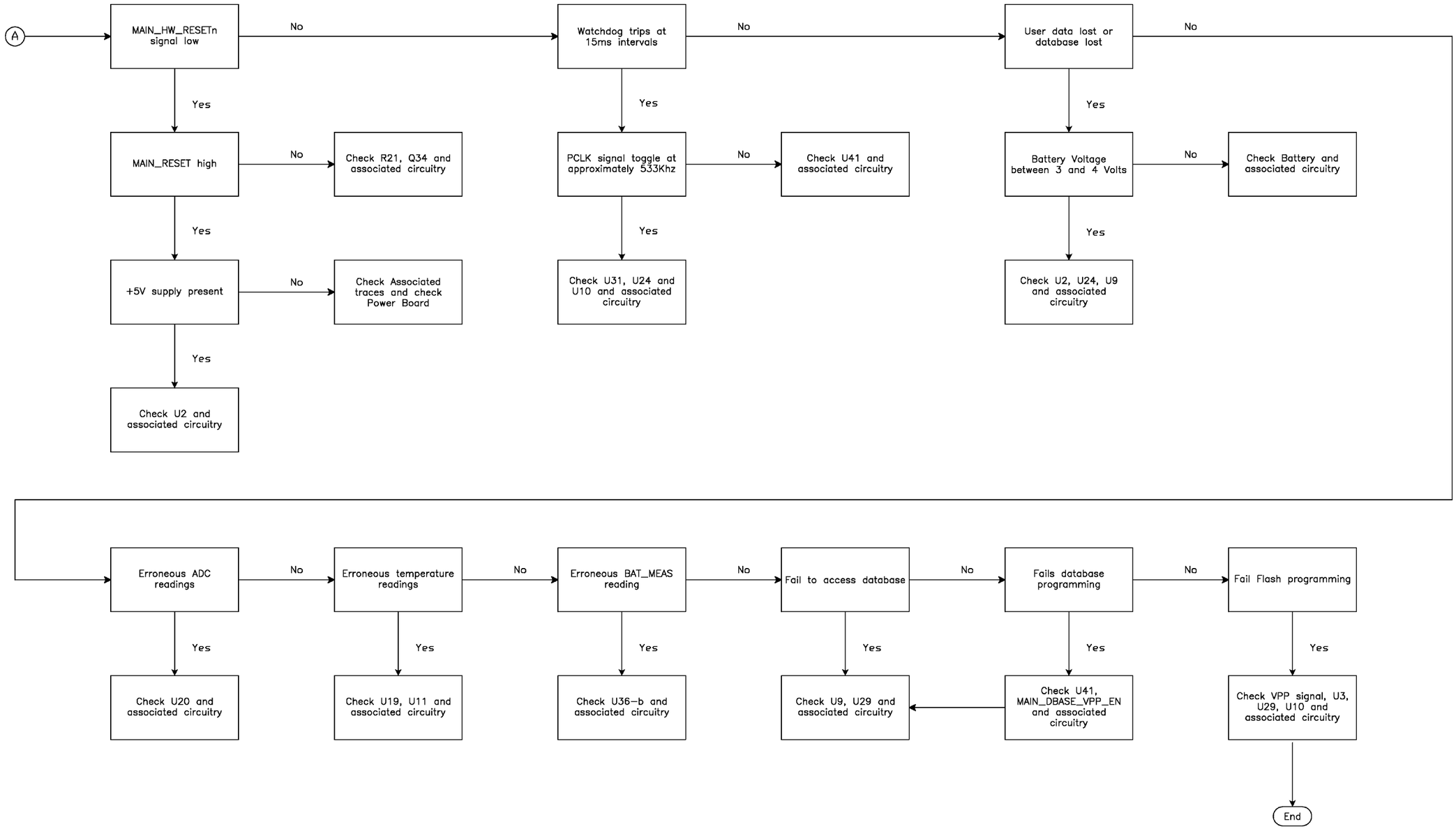


FIGURE 5-5
KLN 94 MAIN BOARD TROUBLESHOOTING FLOWCHART (Sheet 2 of 2)

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FIGURE 5-6
KLN 94 POWER BOARD TROUBLESHOOTING FLOWCHART (Sheet 1 of 2)

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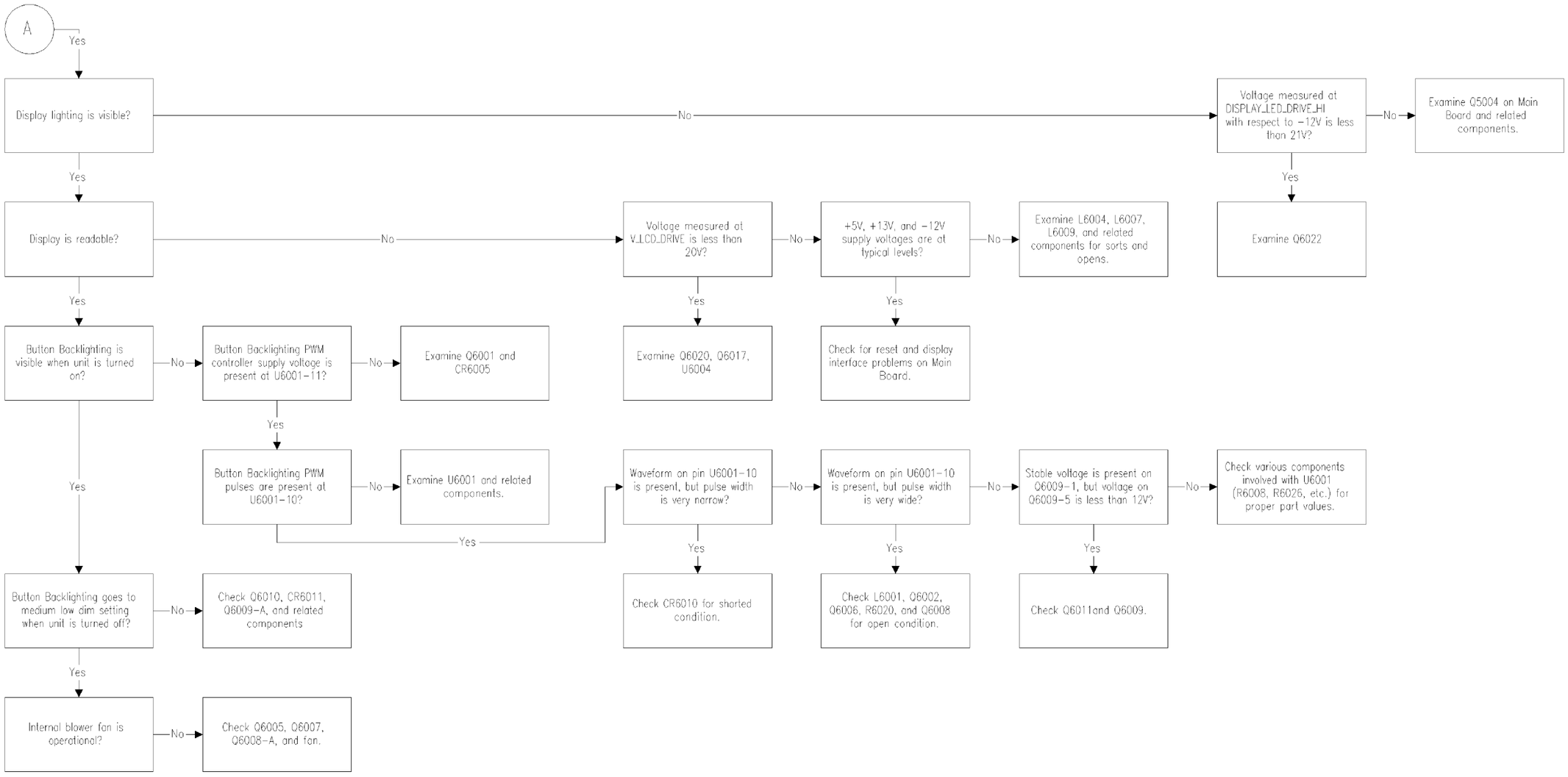


FIGURE 5-6
KLN 94 POWER BOARD TROUBLESHOOTING FLOWCHART (Sheet 2 of 2)

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ILLUSTRATED PARTS LIST

6.1 General

The Illustrated Parts List (IPL) is a complete list of assemblies and parts required for the unit. The IPL also provides for the proper identification of replacement parts. Individual parts lists within this IPL are arranged in numerical sequence starting with the top assembly and continuing with the sub-assemblies. All mechanical parts will be separated from the electrical parts used on the sub-assembly. Each parts list is followed by a component location drawing.

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

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

6.2 Revision Service

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

6.3 List of Abbreviations

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

Table 1
Abbreviations

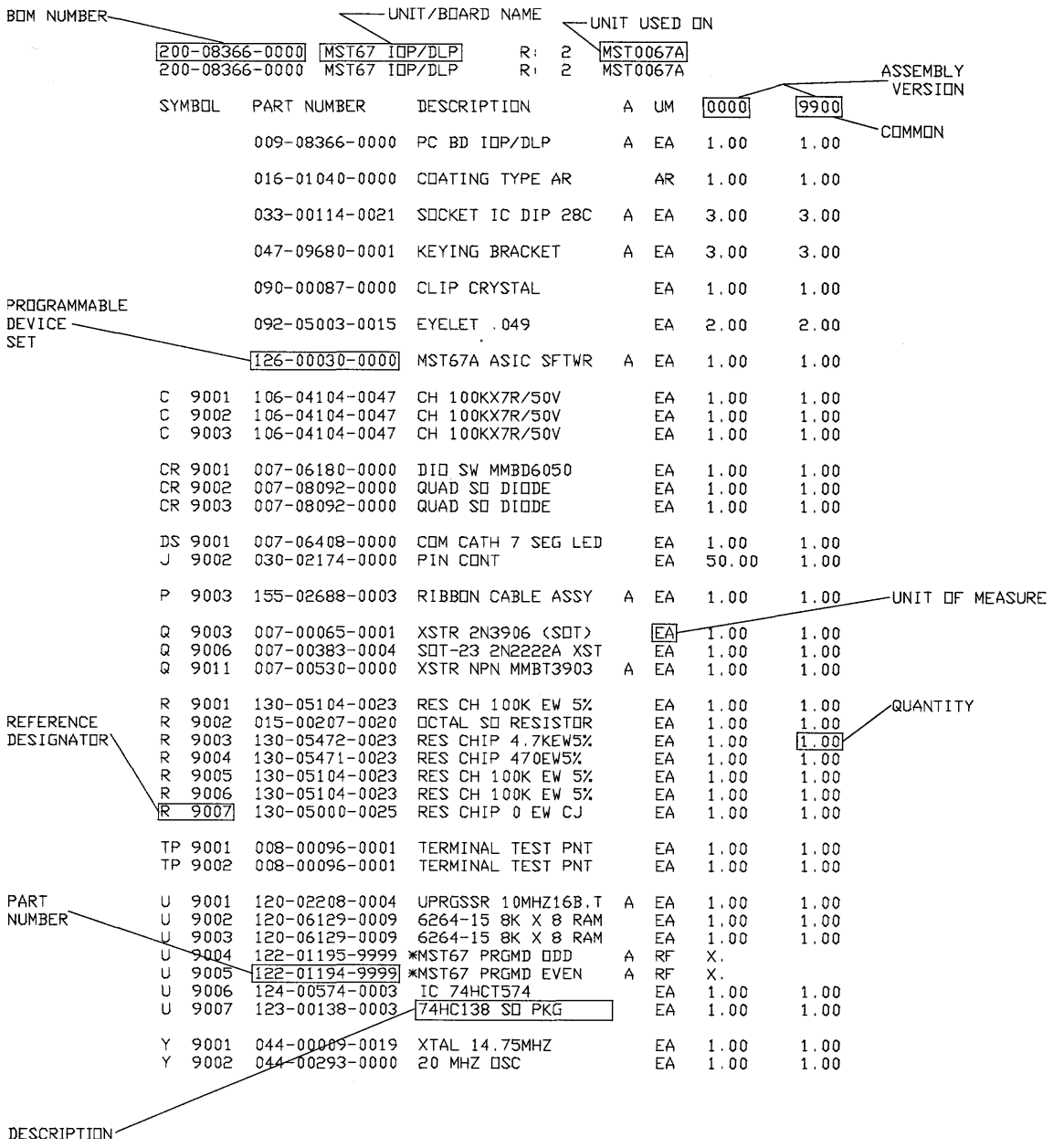
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Abbreviation	Name
Q	Transistor
R	Resistor
RT	Thermistor
S	Switch
T	Transformer
TP	Test Point
U	Component Network, Integrated Circuit, Circuit Assembly
V	Photocell/Vacuum Tube
W	Waveguide
Y	Crystal

Table 1 (Continued)
Abbreviations

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6.4 Sample Parts List



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

Figure 6-1
Sample Parts List

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6.5 KLN 94 FINAL ASSEMBLY AND SYSTEM SOFTWARE

069-01034-0101 KLN 94 FINAL ASSY. Rev. E

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0101
	000-01045-0101		KLN94 GPS PRODUCT	RF	.00
	004-02179-4000		KLN 94 MINIMUM PER	RF	.00
	015-00220-0003		BATTERY, LITHIUM,	EA	1.00
	030-03417-0001		CONN, HDR, RECPT,	EA	2.00
	030-03417-0002		CONN, HDR, RECPT,	EA	1.00
	035-01007-0000		CONN CVR NAS 813-8	EA	1.00
	035-02022-0001		PROTECTIVE COVER	EA	1.00
	047-10434-0003		RACK,MNTING KLN89	EA	1.00
	047-10752-0000		COVER, XPRESS	EA	1.00
	047-12425-0006		BOTTOM COVER, W/H'	EA	1.00
	047-12426-0006		TOP COVER, W/H'WAR	EA	1.00
	047-12427-0002		BD SUPPORT BRKT W/	EA	2.00
	057-02337-0000		PRTCTV CVR DECAL	EA	1.00
	057-03186-0101		FLAVOR TAG	EA	1.00
	057-03511-0001		DECAL, CAUTION	EA	1.00
	057-05943-0001		S/N TAG KLN94	EA	1.00
	057-06008-0001		AUXILARY SOFTWARE	EA	1.00
	073-00630-0001		XPRESS HOUSING	EA	1.00
	073-01024-0002		LOCKING PAWL COVER	EA	1.00
	073-05195-0002		LOCKING PAWL, W/FI	EA	1.00
	076-00322-0009		SPACER .375	EA	4.00
	076-03039-0002		SCREW LOCKING PAWL	EA	1.00
	089-05874-0004		SCR PHP 2-56X1/4	EA	2.00
	089-05874-0008		SCR PHP 2-56X1/2	EA	4.00
	089-05878-0004		SCR PHP 4-40X1/4	EA	13.00
	089-05878-0005		SCR PHP 4-40X5/16	EA	2.00
	089-05899-0009		SCR PHP 2-56X9/16	EA	2.00
	089-06004-0003		SCR FHP 2-56X3/16	EA	8.00
	089-06008-0003		SCR FHP 4-40X3/16	EA	9.00
	089-06008-0004		SCR FHP 4-40X1/4	EA	10.00
	089-08023-0030		WSHR FLT STD #2	EA	2.00
	089-08231-0000		WASHER FLAT	EA	1.00
	090-00265-0002		GROOVE PIN .046 X	EA	1.00
	090-00990-0005		PROTECTIVE CAP, SU	EA	1.00
	090-00990-0007		PROTECTIVE CAP, SU	EA	1.00
	090-00991-0003		CAP PLUG PROTECTIV	EA	1.00
	148-05193-0001		FAN, SUBMINIATURE,	EA	1.00
	150-00005-0010		TUBING TFLN 20AWG	IN	2.00
	155-02811-0004		RF CABLE ASSY	EA	1.00
	155-02846-0001		FLEX CABLE ASSY	EA	1.00
	155-02937-0001		CABLE ASSY, RIBBON	EA	1.00
	200-09639-0001		POWER BD	EA	1.00
	200-09642-0001		BUS I/O BOARD	EA	1.00
	200-09665-0001		SUPPRESSOR BOARD	EA	1.00
	200-09673-0001		FRONT PANEL	EA	1.00
	206-00410-0102		KLN94 BOOT SOFTWAR	EA	1.00
	206-00416-0101		KLN94 APP SW SYSTE	EA	1.00
	300-09714-0000		KLN 94 FINAL ASSY	RF	.00

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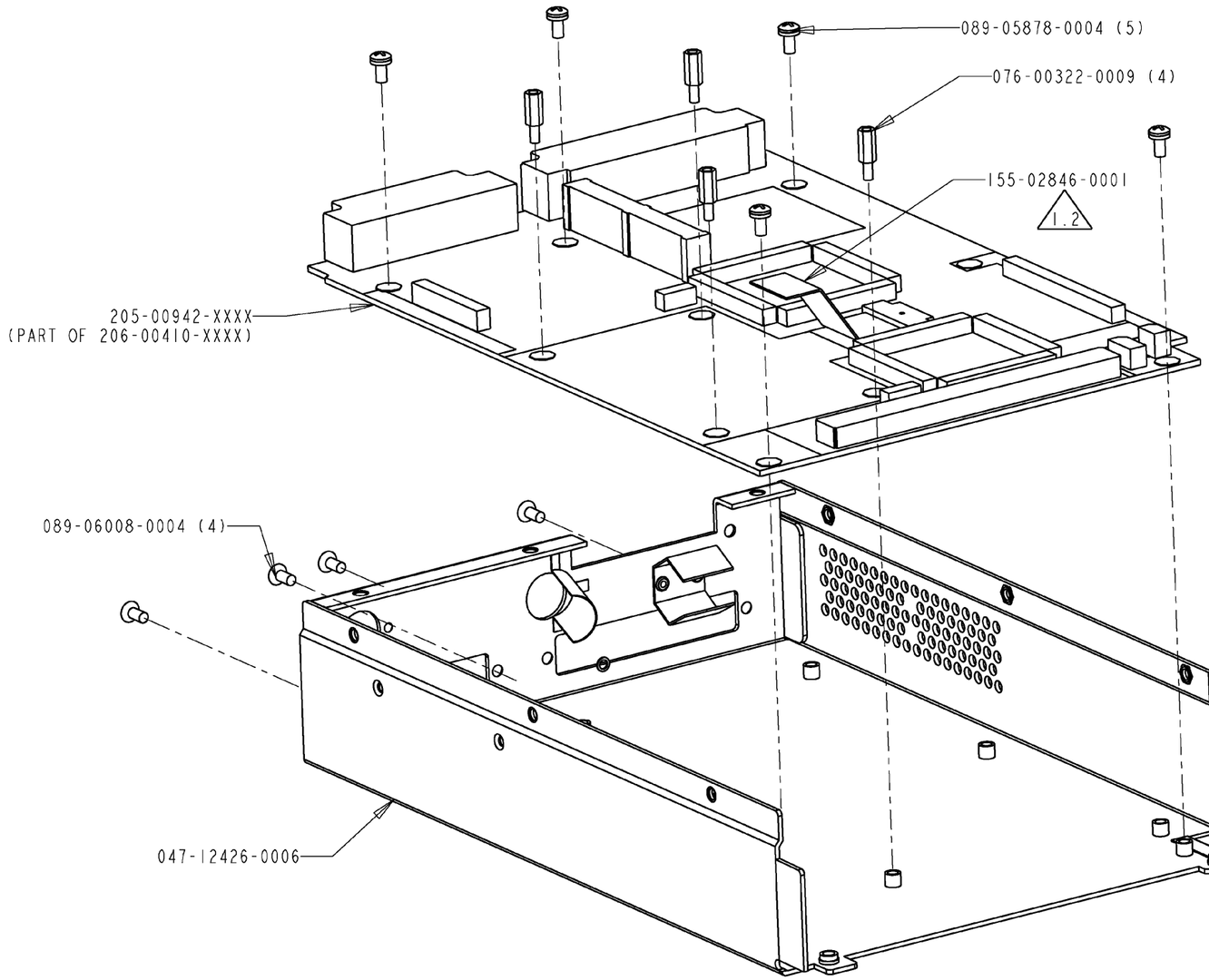
206-00410-0102 KLN 94 SYSTEM BOOT SOFTWARE Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0102
	057-05287-0102		UNIT SFTWR V0102	EA	1.00
	205-00891-0002		GPS PXPRESS - PROG	EA	1.00
	205-00942-0003		KLN94 MAIN BOARD H	EA	1.00
	222-30470-0001		KLN94 BOOT SW SYST	RF	.00

206-00416-0101 KLN 94 SYSTEM APP SOFTWARE Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0101
	125-01013-0001		KLN 94 HOST APPLIC	EA	1.00
	125-01014-0001		KLN 94 GRAPHICS EN	EA	1.00
	222-30469-0000		KLN94 APP SW SYSTE	RF	.00

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NOTES:
1.1 UNLESS OTHERWISE NOTED, ALL SCREWS TO BE TIGHTENED TO TORQUE SPEC 001-01100-0000. APPLY THREAD LOCKING COMPOUND PER 001-01080-0000.

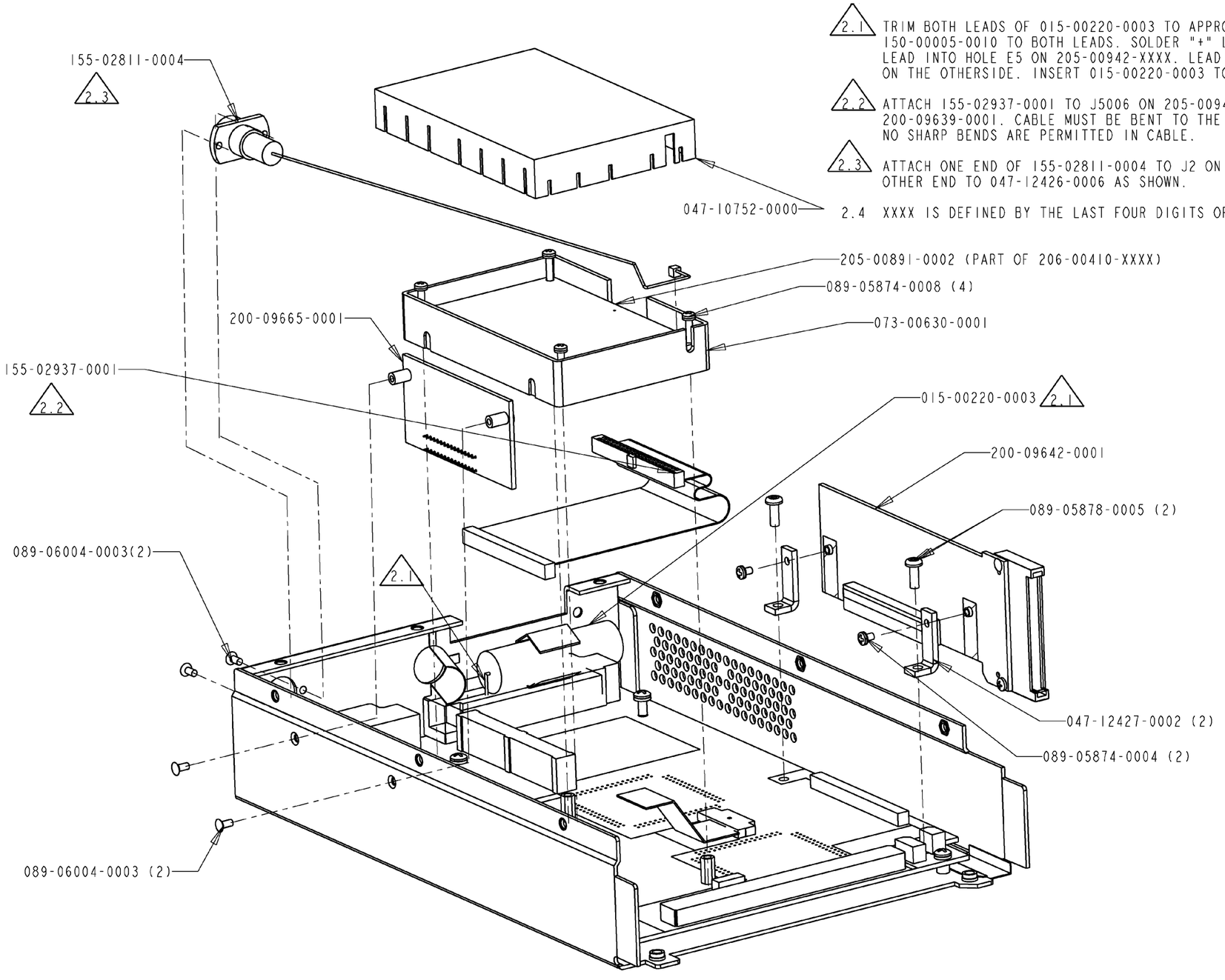
1.2 ATTACH 155-02846-0001 WITH CONTACTS AT BOTTOM POSITION TO J5005 ON 205-00942-XXXX AND J1 ON 205-00891-0002.

1.3 XXXX IS DEFINED BY THE LAST FOUR DIGITS OF BOM.

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 069-01034-0101

FIGURE 6-2
KLN 94 ASSEMBLY DRAWING (P/N 300-09714-0000 Rev. E, Sheet 1 of 4)

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2.1 TRIM BOTH LEADS OF 015-00220-0003 TO APPROXIMATELY 1.00" LONG. INSTALL 150-00005-0010 TO BOTH LEADS. SOLDER "+" LEAD INTO HOLE E3 AND OTHER LEAD INTO HOLE E5 ON 205-00942-XXXX. LEAD MUST NOT PROTRUDE MORE THAN .05" ON THE OTHERSIDE. INSERT 015-00220-0003 TO THE CLAMP ON 047-12426-0006.

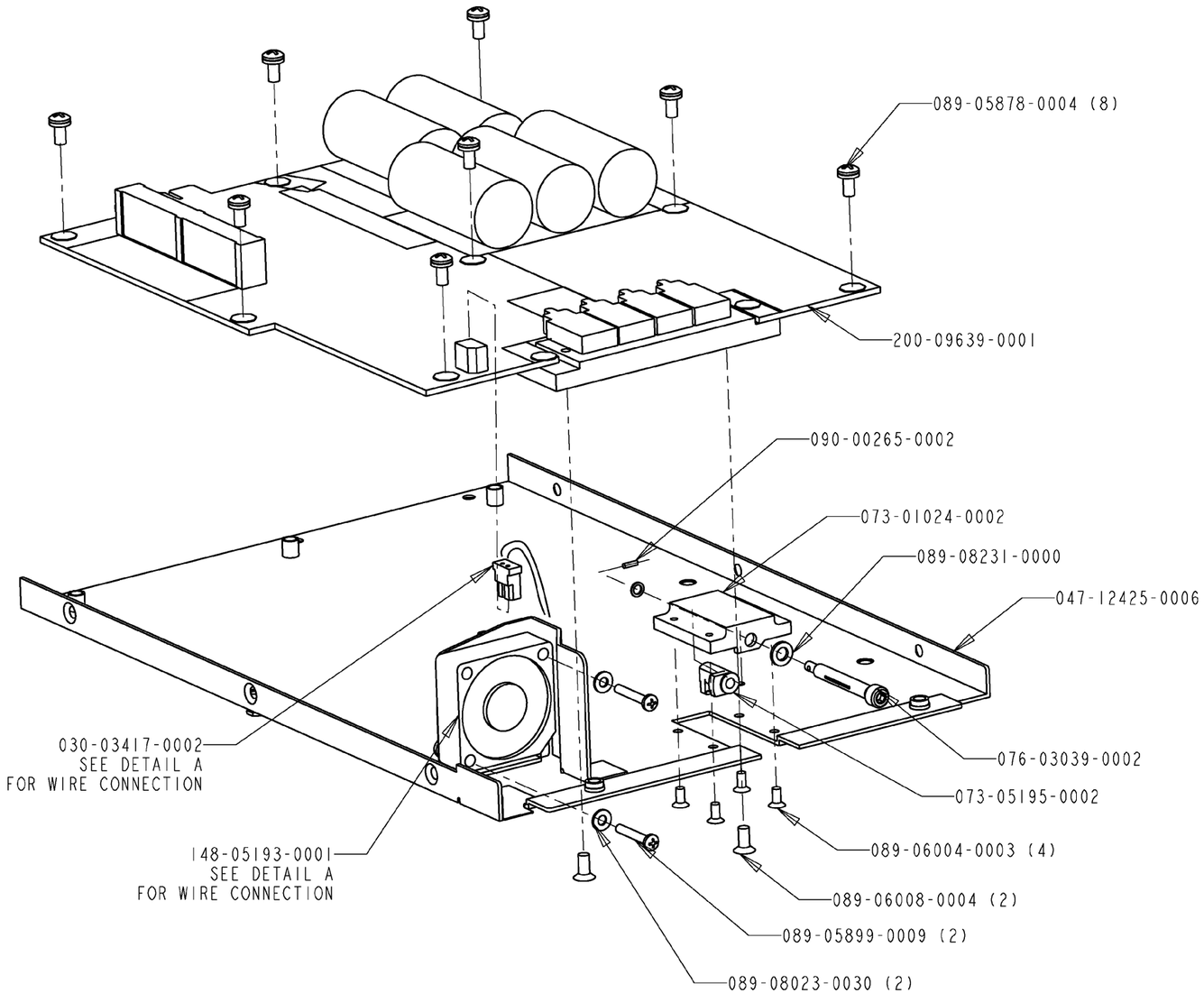
2.2 ATTACH 155-02937-0001 TO J5006 ON 205-00942-XXXX AND TO J6005 ON 200-09639-0001. CABLE MUST BE BENT TO THE SIDE AS SHOWN. NO SHARP BENDS ARE PERMITTED IN CABLE.

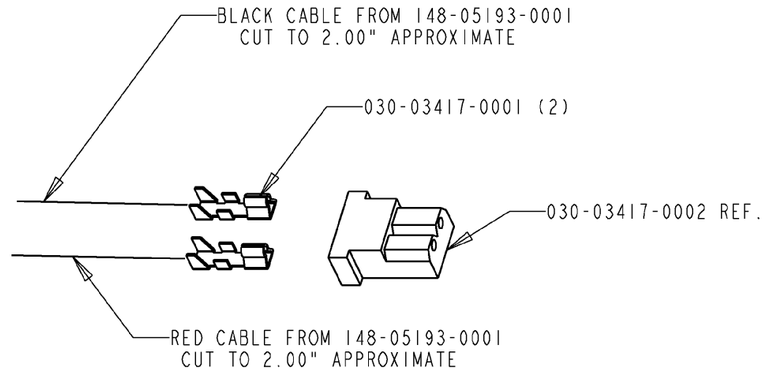
2.3 ATTACH ONE END OF 155-02811-0004 TO J2 ON 205-00891-0002 AND THE OTHER END TO 047-12426-0006 AS SHOWN.

2.4 XXXX IS DEFINED BY THE LAST FOUR DIGITS OF BOM.

FIGURE 6-2
KLN 94 ASSEMBLY DRAWING (P/N 300-09714-0000 Rev. E, Sheet 2 of 4)

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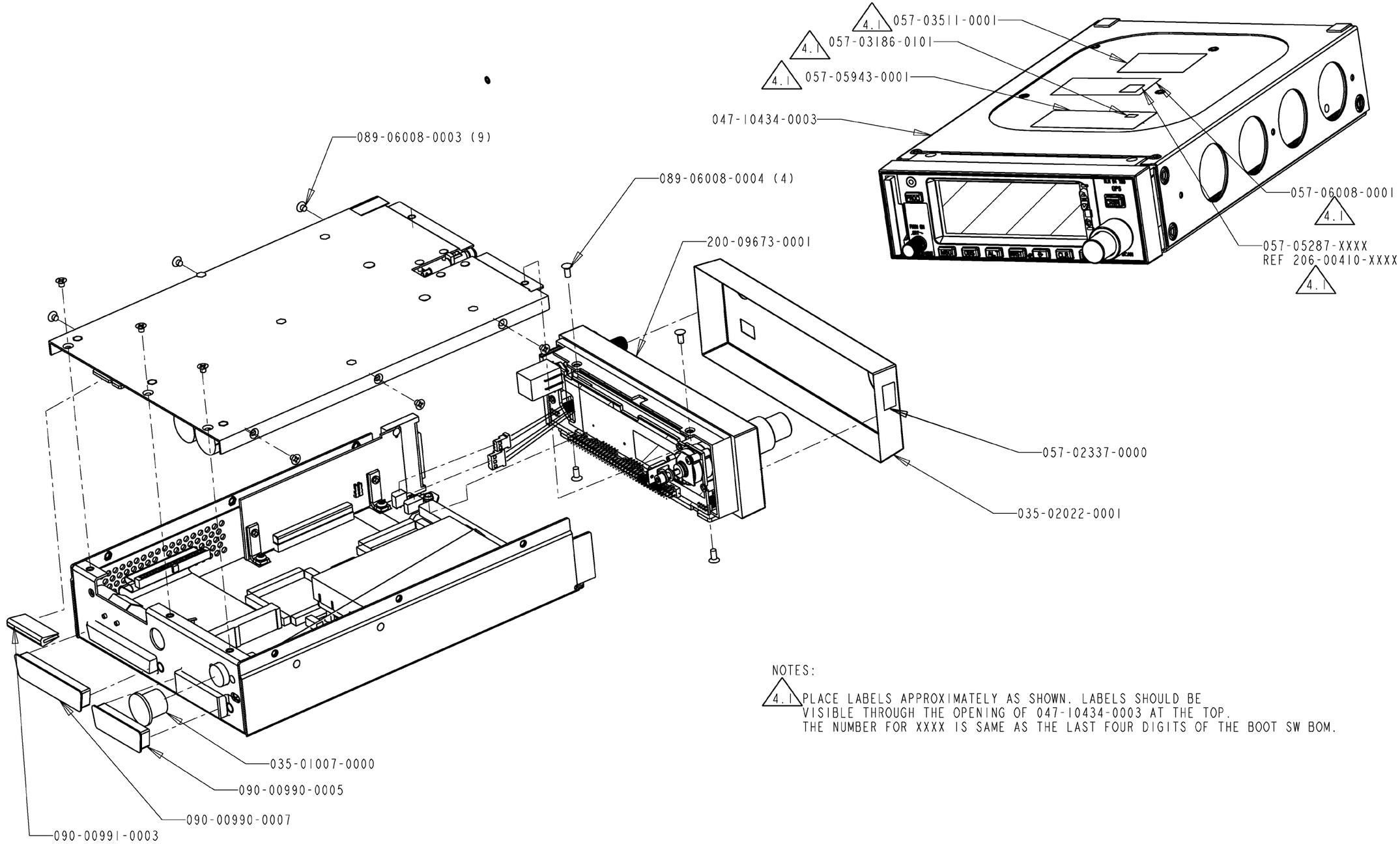




DETAIL A

FIGURE 6-2
KLN 94 ASSEMBLY DRAWING (P/N 300-09714-0000 Rev. E, Sheet 3 of 4)

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NOTES:

4.1 PLACE LABELS APPROXIMATELY AS SHOWN. LABELS SHOULD BE VISIBLE THROUGH THE OPENING OF 047-10434-0003 AT THE TOP. THE NUMBER FOR XXXX IS SAME AS THE LAST FOUR DIGITS OF THE BOOT SW BOM.

FIGURE 6-2
KLN 94 ASSEMBLY DRAWING (P/N 300-09714-0000 Rev. E, Sheet 4 of 4)

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6.6 200-09673-0001 KLN 94 FRONT PANEL ASSY. Rev. C

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
J946	030-03418-0001		CONN, AUDIO, JACK,	EA	1.00
P5001	030-03417-0003		CONN, HDR, RECPT,	EA	1.00
P5009	030-03417-0002		CONN, HDR, RECPT,	EA	1.00
P9005	030-03423-0002		CONN, HDR, RECPT,	EA	1.00
	016-01097-0000		CADCO DRY FILM LUB	AR	1.00
	025-00238-0000		WIRE 26 AWG W/BLK	IN	4.00
	025-00238-0002		WIRE 26 AWG W/RED	IN	4.00
	025-00238-0003		WIRE 26 AWG W/ORNG	IN	2.00
	030-03417-0001		CONN, HDR, RECPT,	EA	5.00
	030-03423-0001		CONN ACCESSORY, CO	EA	2.00
	043-05012-0001		LCD MODULE	EA	1.00
	057-05947-0001		DECAL, LEFT	EA	1.00
	057-05948-0001		DECAL, RIGHT	EA	1.00
	073-00991-0005		KNOB W/DECORATION	EA	1.00
	073-01027-0004		BEZEL, W / FINISH	EA	1.00
	076-03101-0002		SPOOL, W/FINISH	EA	1.00
	088-03172-0002		KNOB W/LGT BUSHING	EA	1.00
	088-03229-0012		KNOB INNER W/SHAFT	EA	1.00
	089-05874-0004		SCR PHP 2-56X1/4	EA	4.00
	089-05899-0008		SCR PHP 2-56X1/2	EA	2.00
	089-06200-0003		SCR SET 2-56X3/32	EA	2.00
	089-06491-0003		SCR SHC 2-56X3/16	EA	5.00
	089-08001-0034		WSHR SPLT LK #2	EA	5.00
	089-08023-0030		WSHR FLT STD #2	EA	3.00
	150-00017-0010		TUBING SHRINK 24G	IN	.90
	150-00020-0010		TUBING SHRINK 18G	IN	.45
	187-01981-0001		SEAL, DISPLAY	EA	1.00
	200-09715-0001		SWITCH BD MECHANIC	EA	1.00
	200-09748-0001		BUTTONS & BACKLIGH	EA	1.00
	300-09673-0000		FRONT PANEL ASSEMB	RF	.00

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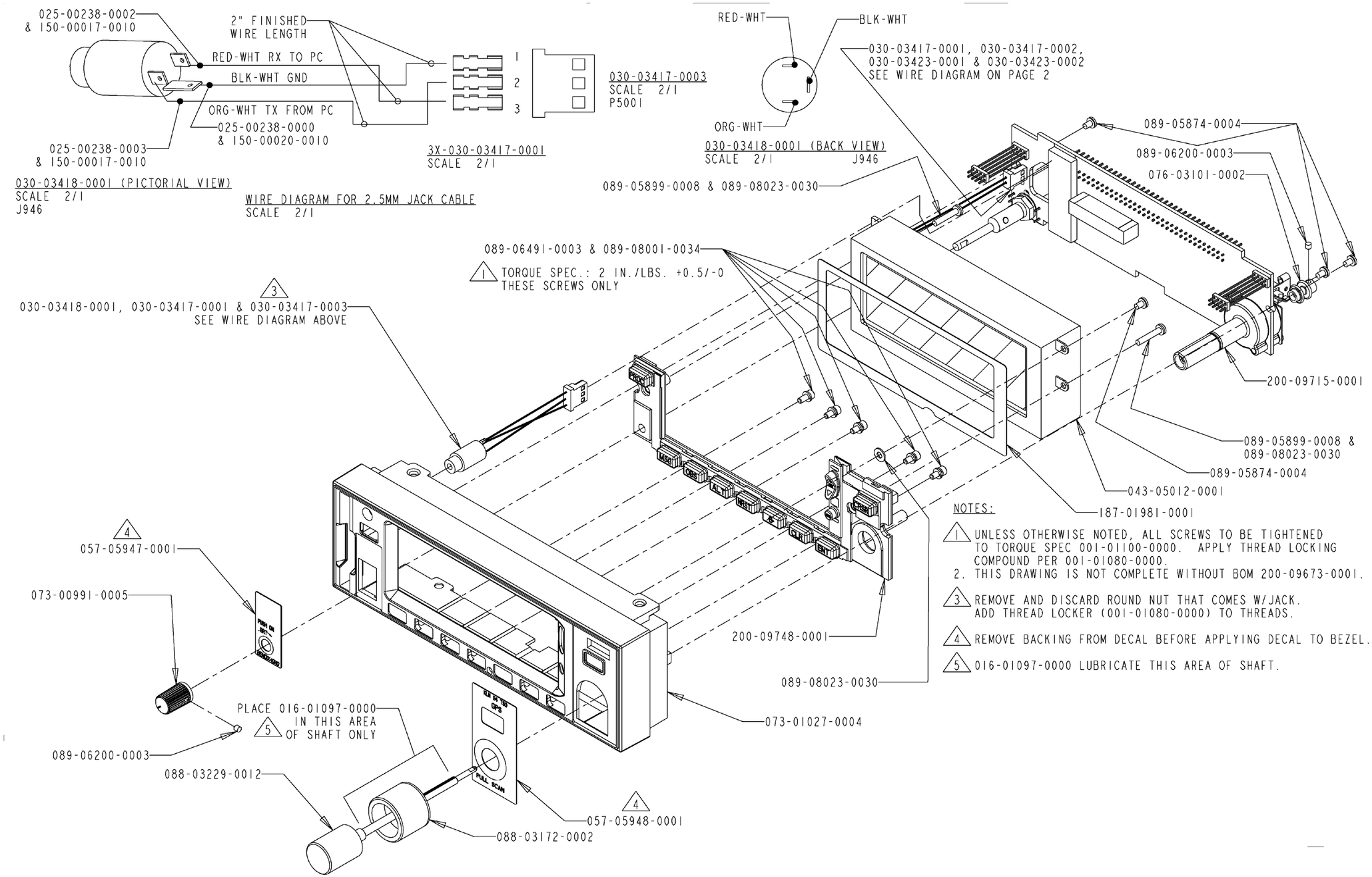


FIGURE 6-3
KLN 94 FRONT PANEL ASSEMBLY DRAWING (P/N 300-09673-0000 Rev. C, Sheet 1 of 2)

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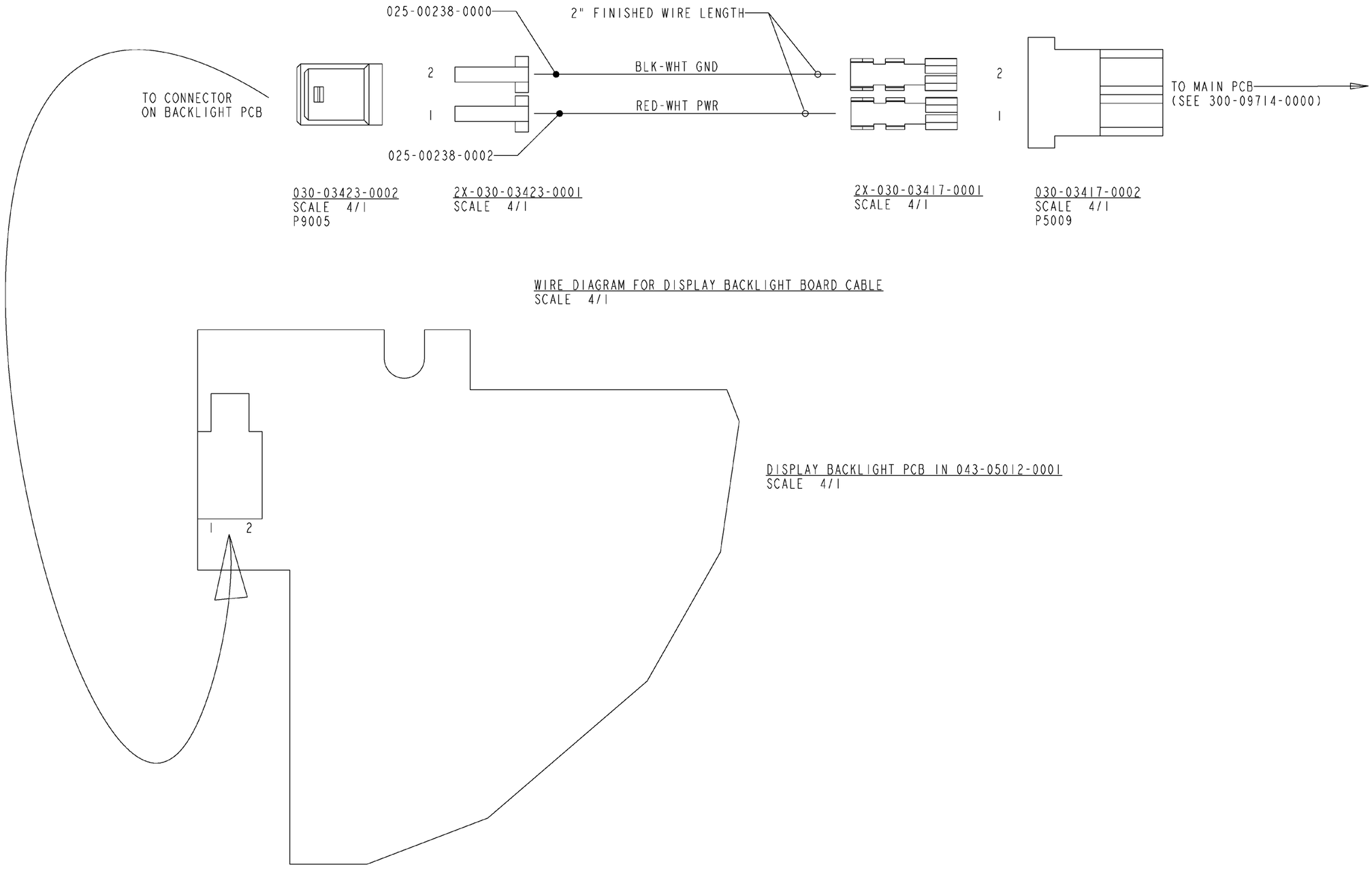


FIGURE 6-3
KLN 94 FRONT PANEL ASSEMBLY DRAWING (P/N 300-09673-0000 Rev. C, Sheet 2 of 2)

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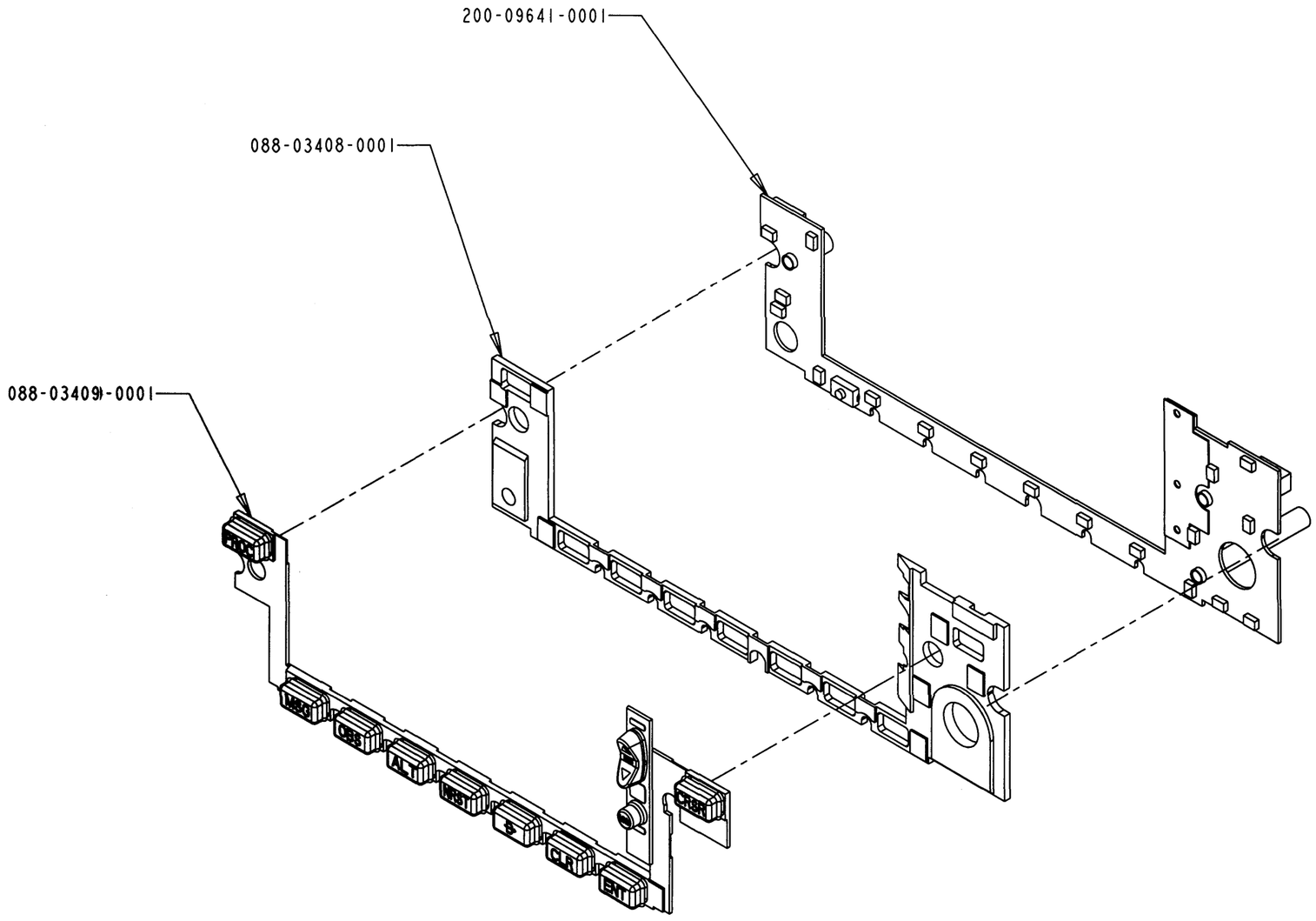
6.7 200-09748-0001 KLN 94 BUTTON/BACKLIGHT ASSY. Rev. -

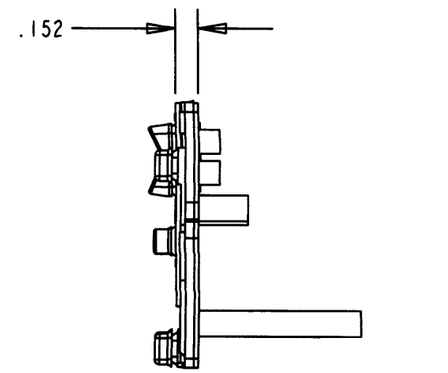
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
	088-03408-0001		LIGHT BAR ACTUATOR	EA	1.00
	088-03409-0001		SILICONE KEYPAD	EA	1.00
	200-09641-0001		BUTTON BOARD	EA	1.00
	300-09748-0000		BUTTONS & BACKLIGH	RF	.00

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RIGHT SIDE VIEW
SCALE 1/1

NOTE:

1. THIS DRAWING REFERENCES TO BOM 200-09748-0001.
2. PART I.D. NO. TO BE PLACED ON BACK OF THE PCB THAT IS ON BACK SIDE OF ENTIRE ASSEMBLY.
3. ALL PCB DATA REF. TO DOCUMENT 192-09641-0001.

FIGURE 6-4
KLN 94 FRONT PANEL BUTTONS/BACKLIGHT DRAWING (P/N 300-09748-0000 Rev. -)

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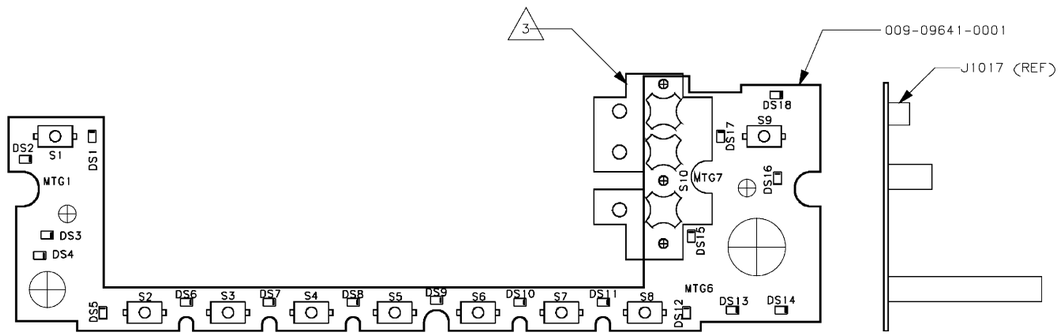
6.8 200-09641-0001 KLN 94 BUTTON BOARD Rev. -

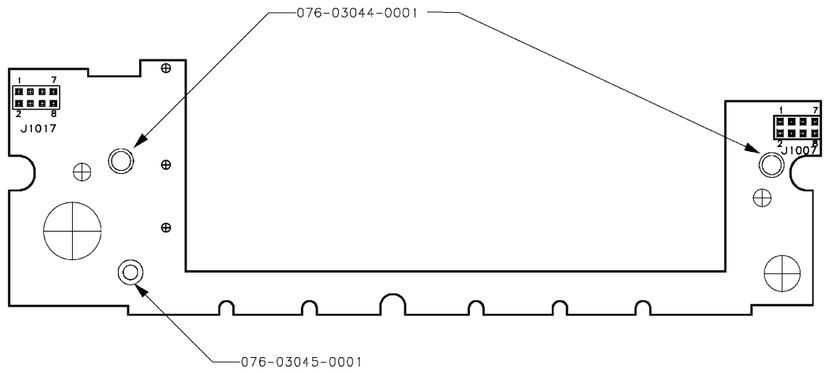
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
DS1001	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1002	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1003	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1004	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1005	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1006	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1007	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1008	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1009	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1010	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1011	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1012	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1013	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1014	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1015	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1016	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1017	007-06580-0001		DIODE, LED, AMBER	EA	1.00
DS1018	007-06580-0001		DIODE, LED, AMBER	EA	1.00
J1007	030-03378-2204		CONN, HDR, RECPT,	EA	1.00
J1017	030-03378-2204		CONN, HDR, RECPT,	EA	1.00
S1001	031-00800-0001		SWITCH, TACTILE	EA	1.00
S1002	031-00800-0001		SWITCH, TACTILE	EA	1.00
S1003	031-00800-0001		SWITCH, TACTILE	EA	1.00
S1004	031-00800-0001		SWITCH, TACTILE	EA	1.00
S1005	031-00800-0001		SWITCH, TACTILE	EA	1.00
S1006	031-00800-0001		SWITCH, TACTILE	EA	1.00
S1007	031-00800-0001		SWITCH, TACTILE	EA	1.00
S1008	031-00800-0001		SWITCH, TACTILE	EA	1.00
S1009	031-00800-0001		SWITCH, TACTILE	EA	1.00
S1010	031-00806-0001		SWITCH, SNAP DOME	EA	1.00
	002-09641-0000		KLN 94 BUTTON BOA	RF	.00
	004-02179-1000		BUTTON BOARD MPS	RF	.00
	009-09641-0001		PCB, BUTTON BOARD	EA	1.00
	076-03044-0001		PCB STANDOFF FOR .	EA	2.00
	076-03045-0001		THREADED STANDOFF	EA	1.00
	192-09641-0001		KLN 94 BUTTON BD	RF	.00
	300-09641-0000		KLN 94 BUTTON BOA	RF	.00

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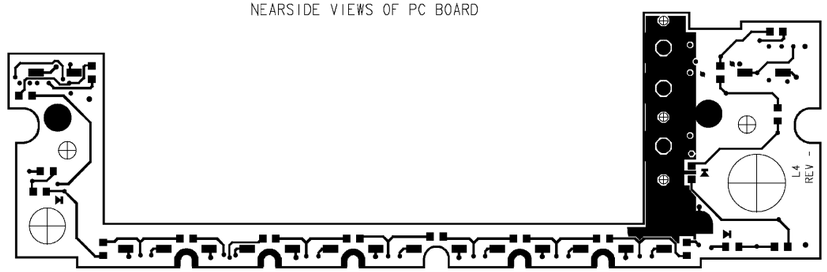
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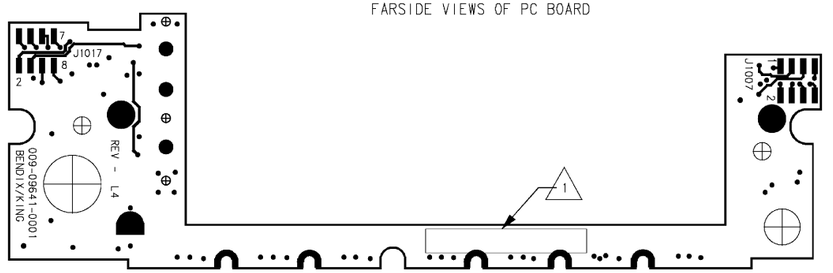




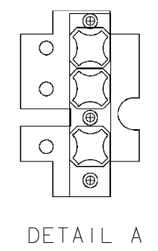
NEARSIDE VIEWS OF PC BOARD



FARSIDE VIEWS OF PC BOARD







NOTES:

1. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC. 001-01101-0000. INK STAMPING IS PREFERRED METHOD.
2. ADD 1000 TO ALL REFERENCE DESIGNATORS EXCEPT J1007 AND J1017 WHEN REFERRING TO PARTS LIST.
3. TO INSTALL 031-00806-0001 SNAP DOME ARRAY, REMOVE ALL CONTAMINATION FROM PCB AREA WHERE TAPE WILL ATTACH.

   REMOVE BACKING FRAOM ARRAY. PLACE ARRAY ON NEARSIDE, MAKING SURE TO ALIGN THE 3 HOLES IN THE TAPE WITH THE THREE PCB ALIGNMENT HOLES. SOME TAPE WILL OVERHANG OFF THE PCB. PRESS TAPE AGAINST PCB TO REMOVE ANY TRAPPED AIR. FOLD OVERHANGING TABS OF TAPE AROUND

   FOLD OVERHANGING TABS OF TAPE AROUND SO THAT IT ADHERES TO THE FARSIDE. AIR RELIEF HOLES IN FARSIDE OF TAPE MUST ALIGN WITH AIR RELIEF VIAS.

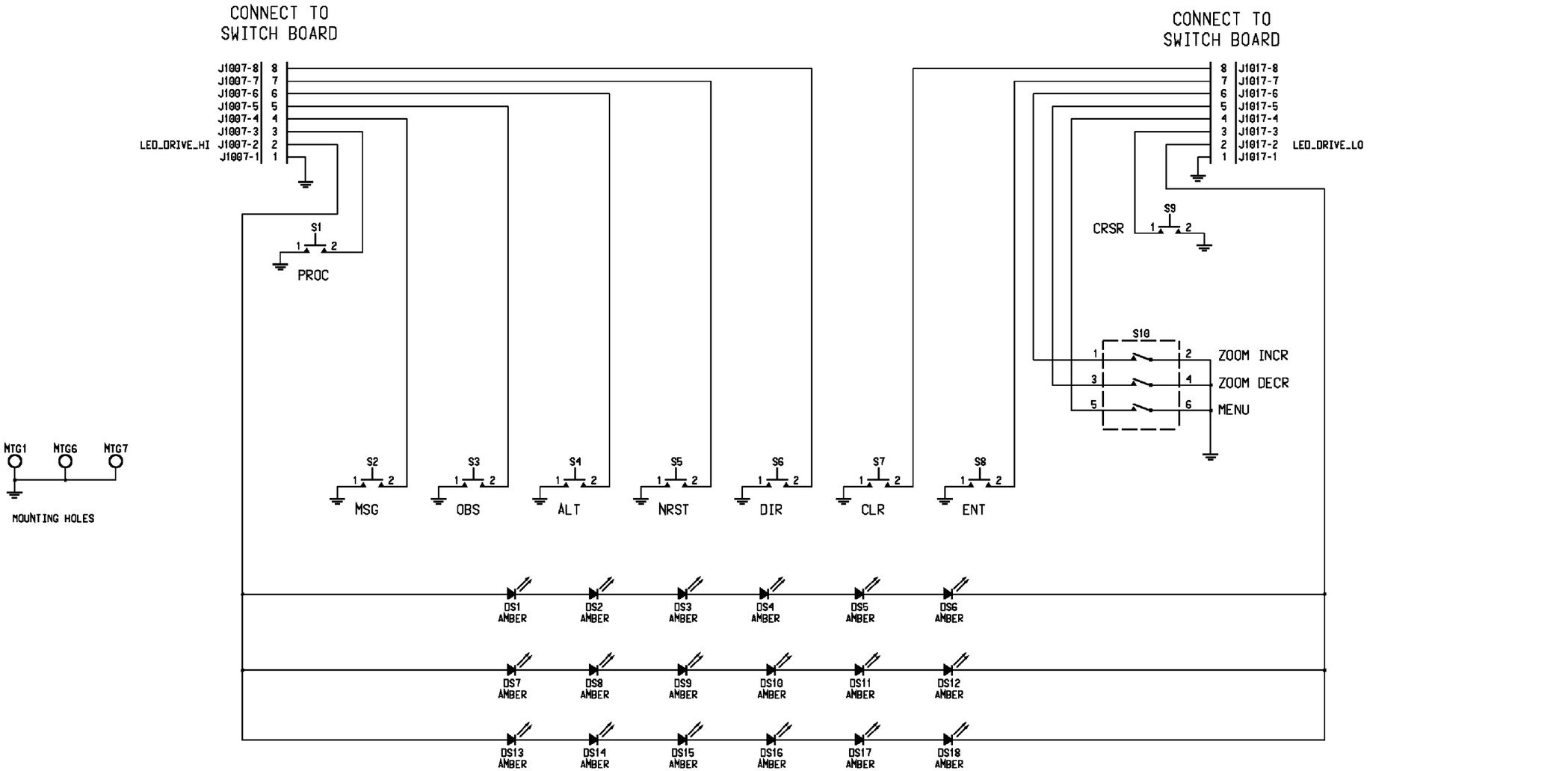
   PRESS FARSIDE TAPE AGAINST FARSIDE PCB TO REMOVE ANY TRAPPED AIR.

   SNAP DOMES MUST BE CENTERED ON PAD. SEE DETAIL A.

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-09641-0001

FIGURE 6-5
KLN 94 BUTTON BOARD DRAWING (P/N 300-09641-0000 Rev. A)

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NOTE: ADD 1000 TO ALL REFERENCE DESIGNATORS, EXCEPT J1007 AND J1017 WHEN REFERRING TO PARTS LIST.

FIGURE 6-6
KLN 94 BUTTON BOARD SCHEMATIC (P/N 002-09641-0000 Rev. -)

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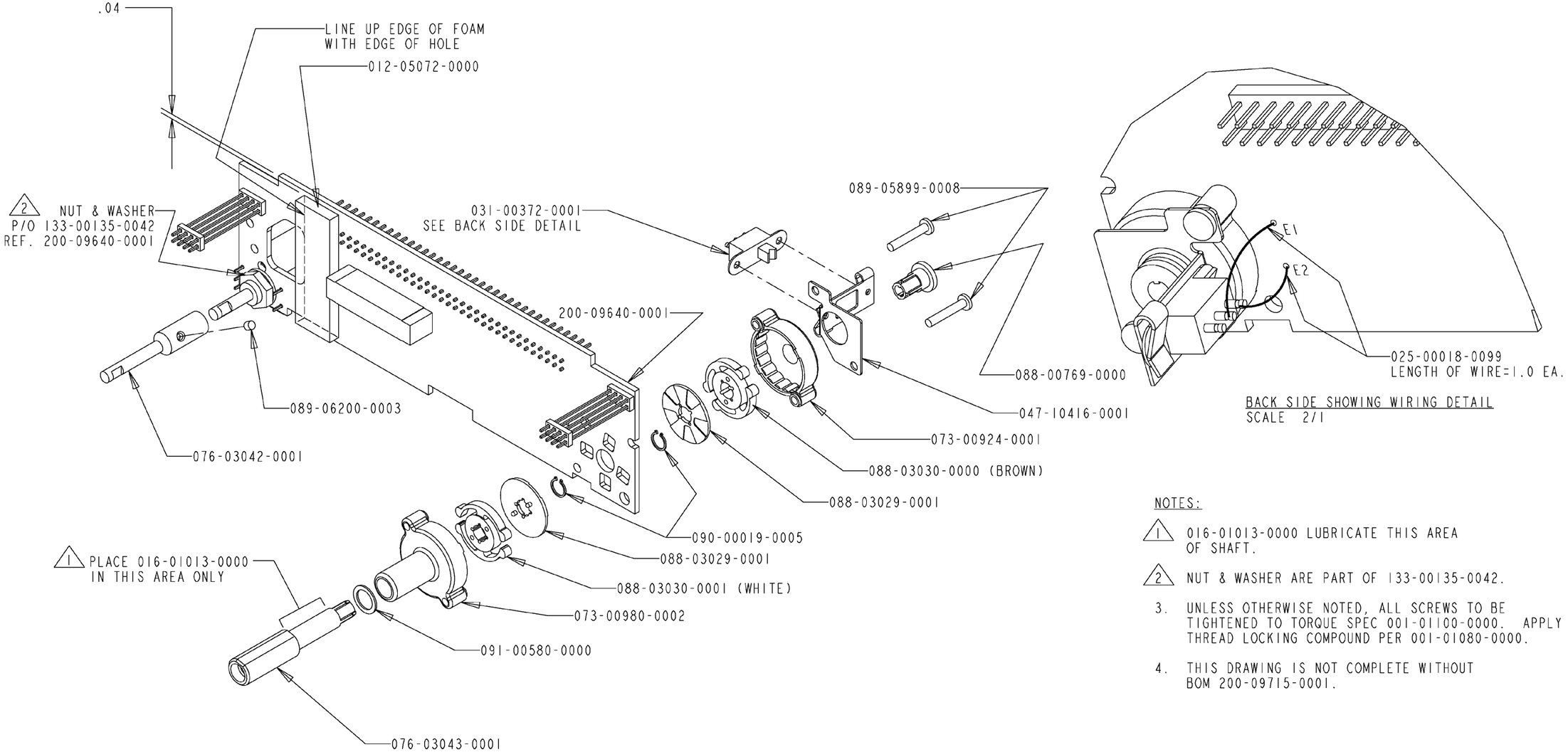
6.9 200-09715-0001 KLN 94 SWITCH BOARD ASSY. Rev. B

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
	012-05072-0000		FOAM TAPE	IN	1.50
	016-01013-0000		VAC GREASE DC 976	AR	1.00
	025-00018-0099		WIRE 26 WHT	IN	2.00
	031-00372-0001		SWITCH SLIDE SPDT	EA	1.00
	047-10416-0001		SW BRKT KLX135	EA	1.00
	073-00924-0001		HOUSING BACK MACH	EA	1.00
	073-00980-0002		HUSING OPT INC/DEC	EA	1.00
	076-03042-0001		SWITCH SHAFT EXTEN	EA	1.00
	076-03043-0001		SHAFT, OUTER	EA	1.00
	088-00769-0000		SLEEVE LOCKING	EA	1.00
	088-03029-0001		INC/DEC REFLECTOR	EA	2.00
	088-03030-0000		INC/DEC RTR BROWN	EA	1.00
	088-03030-0001		INC/DEC RTR WHITE	EA	1.00
	089-05899-0008		SCR PHP 2-56X1/2	EA	2.00
	089-06200-0003		SCR SET 2-56X3/32	EA	1.00
	090-00019-0005		RING RTNR .188	EA	2.00
	091-00580-0000		WASHER INSULATING	EA	1.00
	200-09640-0001		SWITCH BOARD	EA	1.00
	300-09715-0000		SWITCH BOARD ASSE	RF	.00

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NOTES:

1. 016-01013-0000 LUBRICATE THIS AREA OF SHAFT.
2. NUT & WASHER ARE PART OF 133-00135-0042.
3. UNLESS OTHERWISE NOTED, ALL SCREWS TO BE TIGHTENED TO TORQUE SPEC 001-01100-0000. APPLY THREAD LOCKING COMPOUND PER 001-01080-0000.
4. THIS DRAWING IS NOT COMPLETE WITHOUT BOM 200-09715-0001.

FIGURE 6-7
KLN 94 FRONT MECHANICAL SWITCH ASSEMBLY DRAWING (P/N 300-09715-0000 Rev. B)

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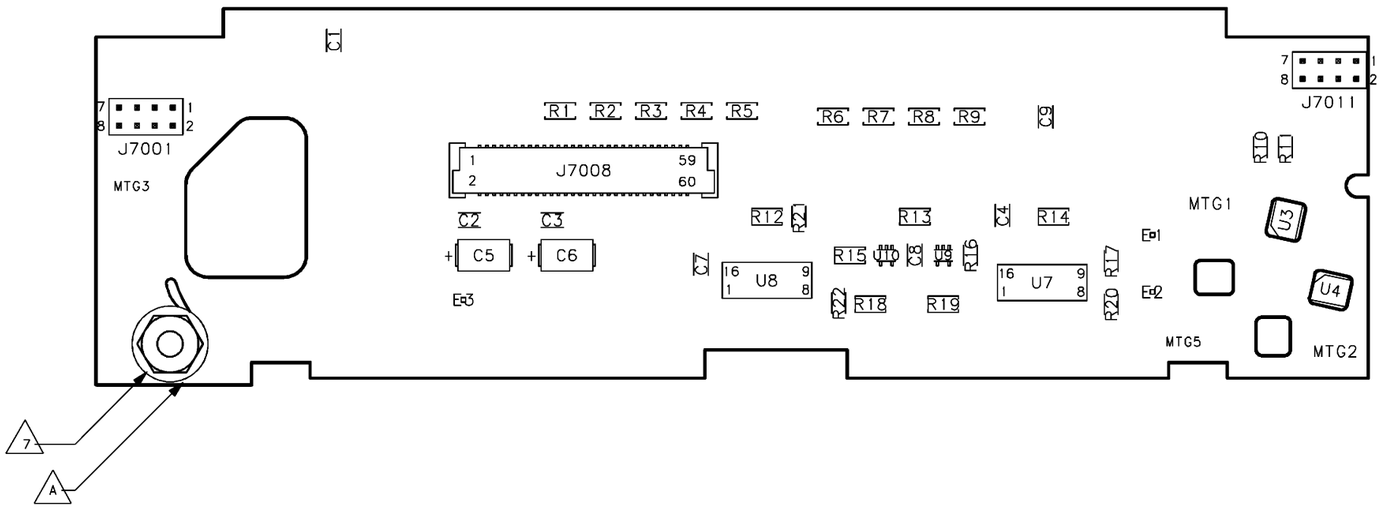
6.10 200-09640-0001 KLN 94 SWITCH BOARD Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
C7001	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C7002	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C7003	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C7004	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C7005	096-01186-0043		CAP 1.0UF 50V 10%	EA	1.00
C7006	096-01186-0043		CAP 1.0UF 50V 10%	EA	1.00
C7007	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C7008	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C7009	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
J7001	030-03407-0001		CONN, HDR, PLUG, D	EA	1.00
J7005	030-02453-0000		CONNECTOR 72P	EA	1.00
J7008	030-03381-0802		CONN, PLUG, BD TO	EA	1.00
J7011	030-03407-0001		CONN, HDR, PLUG, D	EA	1.00
R7001	015-00309-2430		RES ARRAYS 243 OHM	EA	1.00
R7002	015-00309-2430		RES ARRAYS 243 OHM	EA	1.00
R7003	015-00309-2430		RES ARRAYS 243 OHM	EA	1.00
R7004	015-00309-2430		RES ARRAYS 243 OHM	EA	1.00
R7005	015-00309-2430		RES ARRAYS 243 OHM	EA	1.00
R7006	015-00309-2430		RES ARRAYS 243 OHM	EA	1.00
R7007	015-00309-2430		RES ARRAYS 243 OHM	EA	1.00
R7008	015-00309-2430		RES ARRAYS 243 OHM	EA	1.00
R7009	015-00309-2430		RES ARRAYS 243 OHM	EA	1.00
R7010	139-08250-0010		RES CH 825 .1W 1%	EA	1.00
R7011	139-08250-0010		RES CH 825 .1W 1%	EA	1.00
R7012	015-00309-1003		RES ARRAYS 100K OH	EA	1.00
R7013	015-00309-1003		RES ARRAYS 100K OH	EA	1.00
R7014	015-00309-1003		RES ARRAYS 100K OH	EA	1.00
R7015	015-00309-2430		RES ARRAYS 243 OHM	EA	1.00
R7016	139-08250-0010		RES CH 825 .1W 1%	EA	1.00
R7017	139-08250-0010		RES CH 825 .1W 1%	EA	1.00
R7018	015-00309-1003		RES ARRAYS 100K OH	EA	1.00
R7019	015-00309-1003		RES ARRAYS 100K OH	EA	1.00
R7020	139-08250-0010		RES CH 825 .1W 1%	EA	1.00
R7021	139-08250-0010		RES CH 825 .1W 1%	EA	1.00
R7022	139-08250-0010		RES CH 825 .1W 1%	EA	1.00
U7001	007-08094-0001		PHOTO INTERUPTER	EA	1.00
U7002	007-08094-0001		PHOTO INTERUPTER	EA	1.00
U7003	007-08094-0001		PHOTO INTERUPTER	EA	1.00
U7004	007-08094-0001		PHOTO INTERUPTER	EA	1.00
U7005	133-00135-0042		POT 100K P/P SW	EA	1.00
U7007	123-00165-0003		74HC165D SHIFT REG	EA	1.00
U7008	123-00165-0003		74HC165D SHIFT REG	EA	1.00
U7009	120-02716-0006		BUFFER, TRI-STATE	EA	1.00
U7010	120-02716-0006		BUFFER, TRI-STATE	EA	1.00
	002-09640-0000		SWITCH BOARD	RF	.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
	009-09640-0001		PCB, SWITCH BOARD	EA	1.00
	150-00004-0010		TUBING TFLN 22AWG	IN	1.00
	192-09640-0001		KLN 94 SWITCH BD	RF	.00
	300-09640-0000		KLN 94 SWITCH BOA	RF	.00

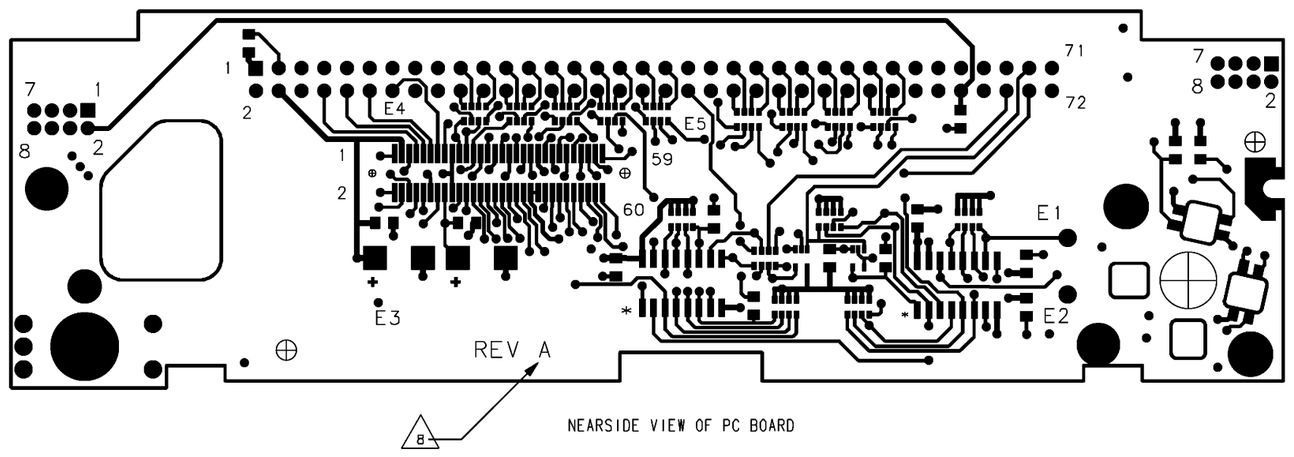
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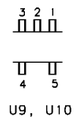


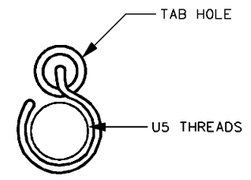
NOTES:
1. POST COATING NOT REQUIRED.
2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC. 001-01101-0000.
3. ADD 7000 TO ALL REFERENCE DESIGNATORS, EXCEPT J7001, J7005, J7008, AND J7011 WHEN REFERRING TO PARTS LIST.
4. WHERE APPLICABLE, LIQUID STAKE ALL FASTENERS PER SPEC. 001-01080-0000.
5. HAND INSTALL U1 THRU U4 SO THAT BODY IS RECEDED IN PCB CUTOUT. PARTS SHOULD ALSO BE CENTERED IN CUTOUT AND PLANAR +/- 3 DEGREES TO PCB. MAXIMUM SOLDERING TEMPERATURE FOR U1 THRU U8 IS 500 DEGREES FAHRENHEIT WITH A MAXIMUM DWELL TIME PER LEAD OF 5 SECONDS. ALLOW A MINIMUM OF 5 SECONDS FOR PART TO COOL AFTER SOLDERING EACH LEAD.
6. BEFORE SOLDERING U5 INTO PCB, PLACE NYLON SLEEVING, PN 150-00004-0010, OVER LEADS 1, 2, AND 3 TO PREVENT SHORTING TO BODY.
7. NUT AND WASHER ARE PART OF 133-00135-0042.
8. PC BOARD ARTWORK IS IDENTICAL FOR BOARDS LABELED "REV -" AND "REV A". EITHER MAY BE USED IN THIS ASEMBLY.

REWORK NOTES:

A. BEFORE ATTACHING NUT AND WASHER, WRAP A LENGTH OF #20 BUS WIRE, 026-00028-0000, 7/8THS OF THE WAY AROUND THE THREADS OF U5 AS SHOWN IN DETAIL A. THE OTHER END OF THE WIRE MUST BE SOLDERED INTO THE TAB HOLE OF U5. NOTE THAT U5'S TAB IS MADE OF A NON-SOLDERABLE ALLOY, SO IT IS NOT NECESSARY TO MAKE A COMPLETE SOLDER FILLET AROUND U5'S TAB.





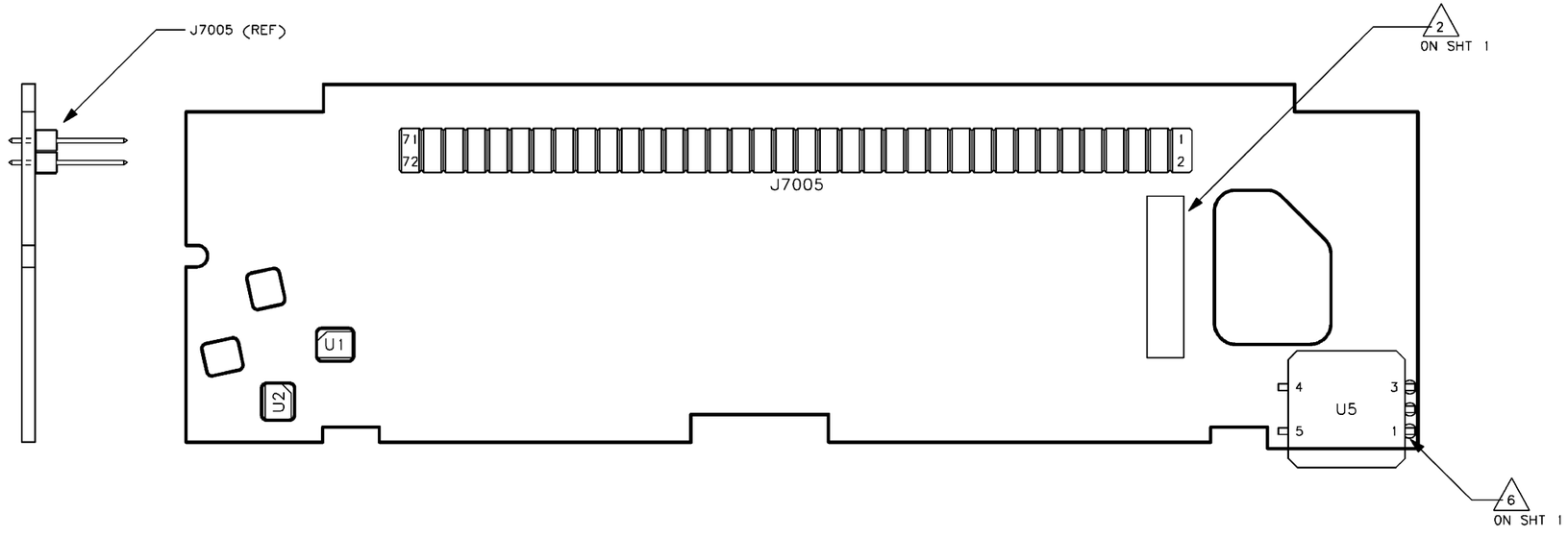


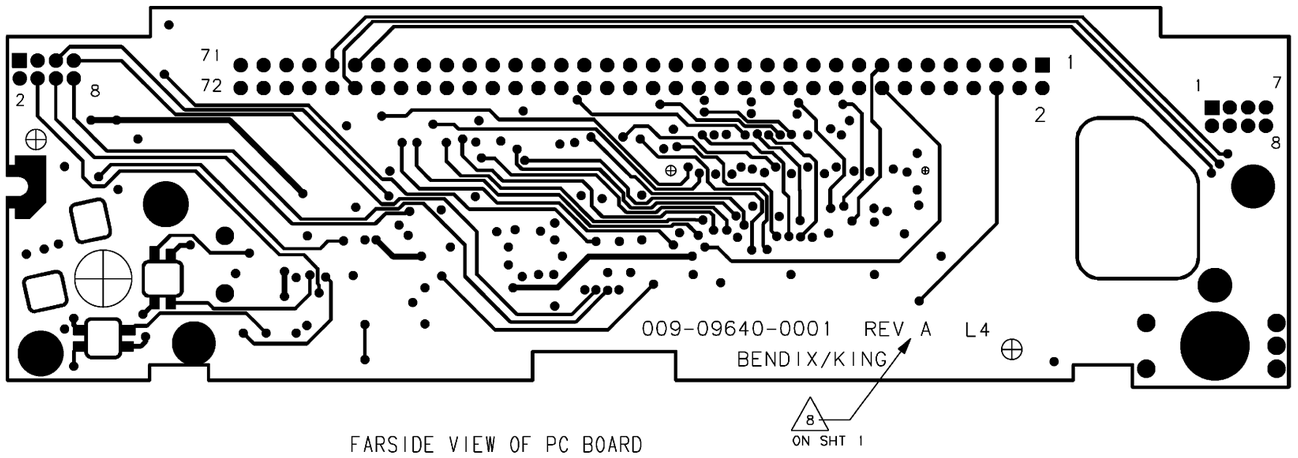
DETAIL "A"

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-09640-0001

FIGURE 6-8
KLN 94 SWITCH BOARD DRAWING (P/N 300-09640-0000 Rev. C, Sheet 1 of 2)

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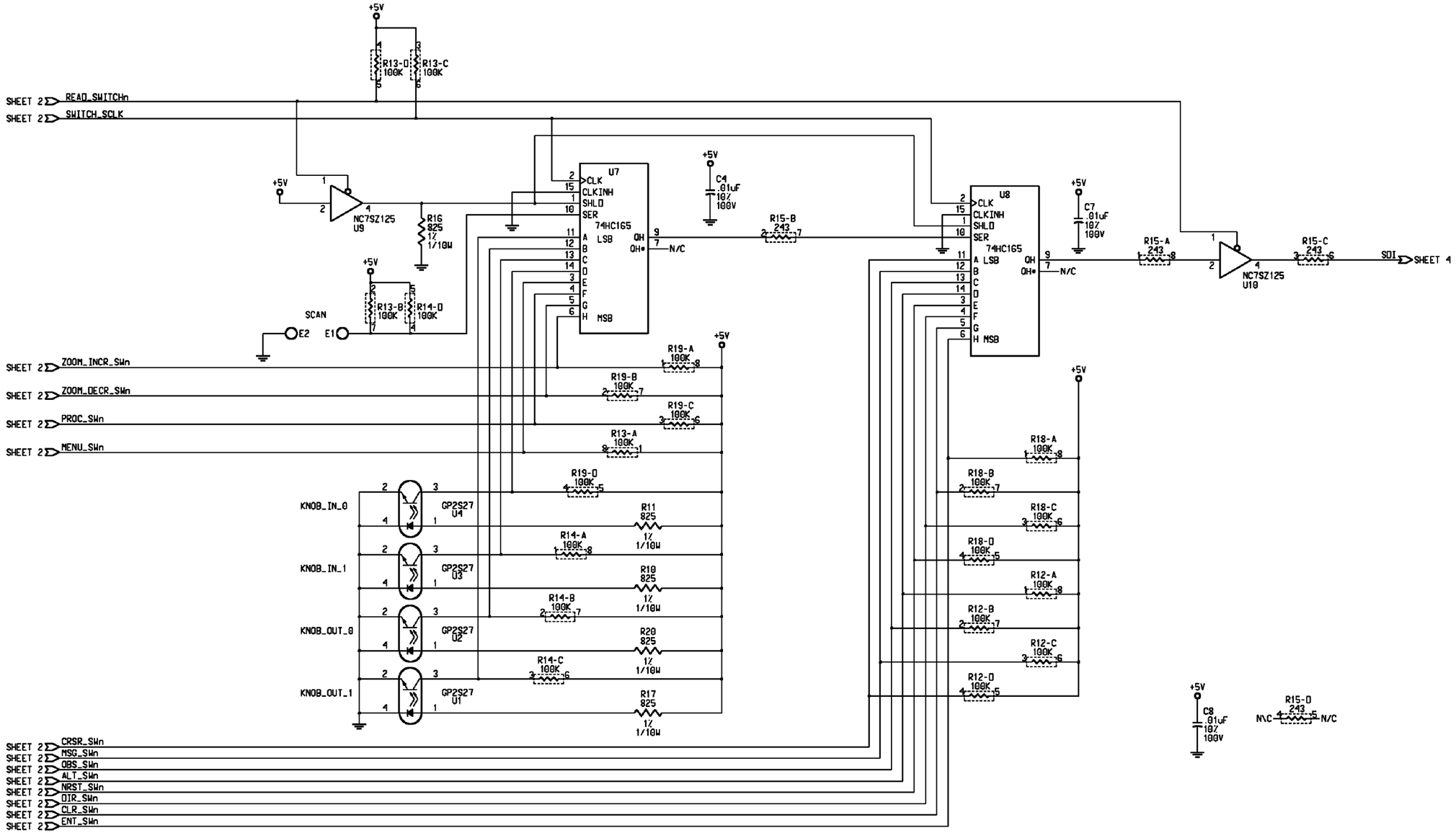




THIS DRAWING IS NOT COMPLETE WITHOUT
PARTS LIST 200-09640-0001

FIGURE 6-8
KLN 94 SWITCH BOARD DRAWING (P/N 300-09640-0000 Rev. C, Sheet 2 of 2)

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NOTE: ADD 7000 TO ALL REFERENCE DESIGNATORS, EXCEPT J7001, J7005, J7008, AND J7011 WHEN REFERRING TO PARTS LIST.

FIGURE 6-9
KLN 94 SWITCH BOARD SCHEMATIC (P/N 002-09640-0000 Rev. A, Sheet 1 of 2)

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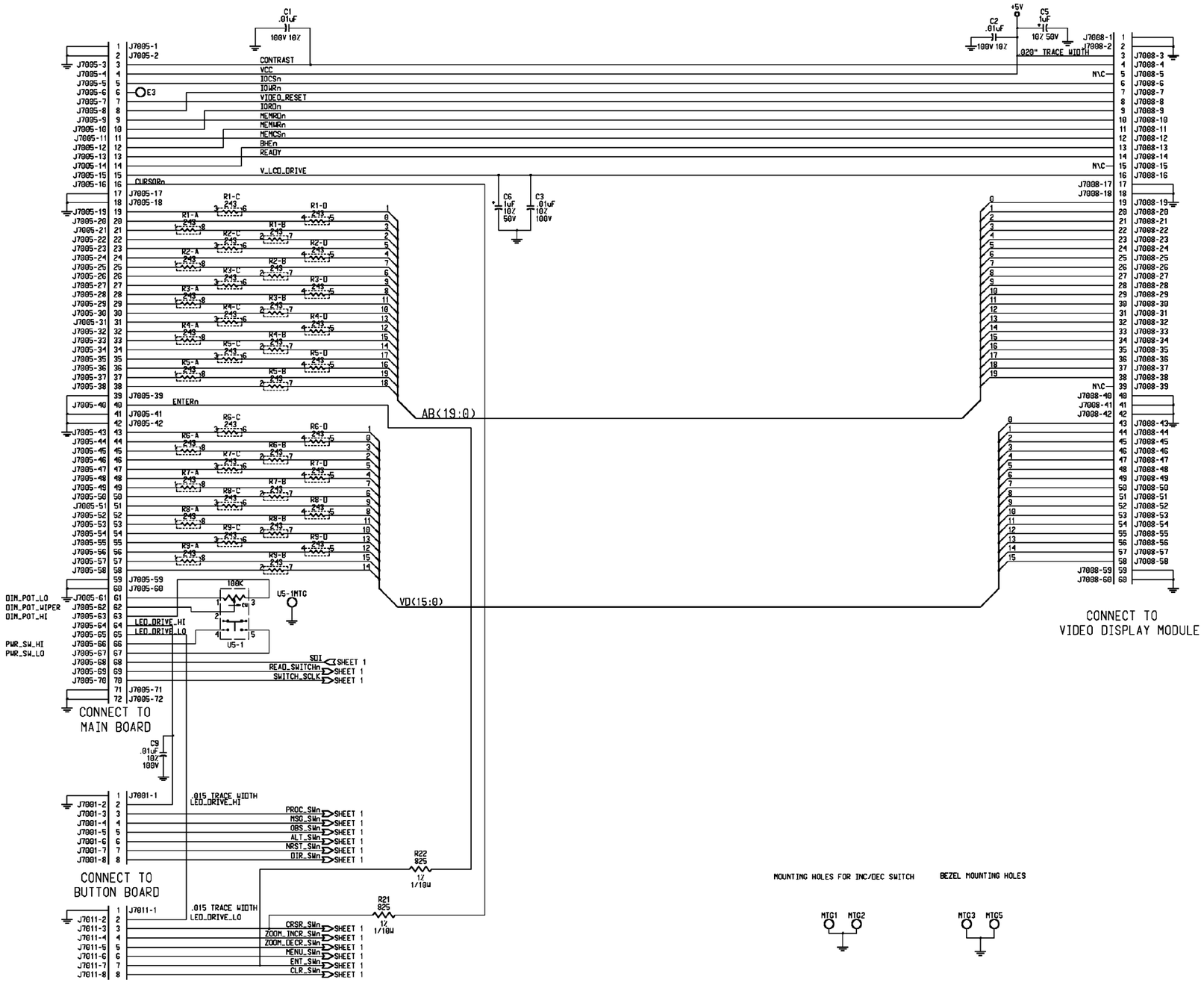


FIGURE 6-9
KLN 94 SWITCH BOARD SCHEMATIC (P/N 002-09640-0000 Rev. A, Sheet 2 of 2)

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6.11 205-00891-0002 KLN 94 GPS XPRESS PROGRAMMED BOARD Rev. B

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0002
REF100	300-08825-0000		GPS XPRESS ASSY	RF	.00
	057-05252-0891		IDT 205-00891-0000	EA	1.00
	057-05335-0002		DECAL 205 DASH 02	EA	1.00
	125-00937-0002		P-XPRESS PROGRAM D	EA	1.00
	193-00891-0002		PXPRESS ASSY	RF	.00
	200-08825-0000		GPS XPRESS	EA	1.00

125-00937-0002 KLN 94 P-XPRESS PROGRAMMED DEVICE SET Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0002
REF1	300-08825-0000		GPS XPRESS ASSY	RF	.00
U504	122-01621-0002		P-XPRESS PROGRAM D	EA	1.00

122-01621-0002 KLN 94 P-XPRESS PROGRAMMED DEVICE Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0002
	120-02372-0020		64KX16 EPROM120OTP	EA	1.00

200-08825-0000 GPS XPRESS BOARD Rev. AA

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C501	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C502	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C503	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C504	096-01186-0015		CAP 33UF 16V 10%	EA	1.00
C505	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C506	096-01186-0027		CAP .33UF 35V 10%	EA	1.00
C507	106-05102-0016		CAP CH 1K NPO/50V	EA	1.00
C508	106-05102-0016		CAP CH 1K NPO/50V	EA	1.00
C510	106-05102-0016		CAP CH 1K NPO/50V	EA	1.00
C511	106-05102-0016		CAP CH 1K NPO/50V	EA	1.00
C513	096-01186-0064		CAP 10UF 16V 20%	EA	1.00
C514	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C515	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C516	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C517	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C518	096-01186-0064		CAP 10UF 16V 20%	EA	1.00
C519	106-05102-0016		CAP CH 1K NPO/50V	EA	1.00
C520	106-05102-0016		CAP CH 1K NPO/50V	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
C522	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C523	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C524	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C525	106-05102-0016		CAP CH 1K NPO/50V	EA	1.00
C526	106-05030-0020		CH 3.0PF NPO/100V	EA	1.00
C527	106-05030-0020		CH 3.0PF NPO/100V	EA	1.00
C528	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C530	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C531	106-05102-0016		CAP CH 1K NPO/50V	EA	1.00
C532	096-01186-0064		CAP 10UF 16V 20%	EA	1.00
C533	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C534	106-05360-0016		CAP CH 36PFNPO/50V	EA	1.00
C535	106-05360-0016		CAP CH 36PFNPO/50V	EA	1.00
C536	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C537	096-01186-0064		CAP 10UF 16V 20%	EA	1.00
C538	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C539	106-05270-0026		CAP CH27PFNPO/100V	EA	1.00
C540	106-05270-0026		CAP CH27PFNPO/100V	EA	1.00
C541	106-05010-0020		CAP CH 1PFNPO/100V	EA	1.00
C542	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C543	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C544	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C545	106-05102-0016		CAP CH 1K NPO/50V	EA	1.00
C546	106-05102-0016		CAP CH 1K NPO/50V	EA	1.00
C547	106-05102-0016		CAP CH 1K NPO/50V	EA	1.00
C548	106-05030-0020		CH 3.0PF NPO/100V	EA	1.00
C549	106-05030-0020		CH 3.0PF NPO/100V	EA	1.00
C550	106-05030-0020		CH 3.0PF NPO/100V	EA	1.00
C551	106-05030-0020		CH 3.0PF NPO/100V	EA	1.00
C552	106-05104-0037		CAP CH 100KX7R/25V	EA	1.00
C553	106-05020-0020		CH 2PF NPO 100V	EA	1.00
C554	999-09999-0098		PLACE HOLDER	RF	.00
C555	096-01186-0064		CAP 10UF 16V 20%	EA	1.00
CJ501	130-05000-0025		RES CHIP 0 EW CJ	EA	1.00
CJ502	130-05000-0025		RES CHIP 0 EW CJ	EA	1.00
CJ503	999-09999-0098		PLACE HOLDER	RF	.00
CJ504	999-09999-0098		PLACE HOLDER	RF	.00
CJ505	130-05000-0025		RES CHIP 0 EW CJ	EA	1.00
CJ506	130-05000-0025		RES CHIP 0 EW CJ	EA	1.00
CJ507	130-05000-0025		RES CHIP 0 EW CJ	EA	1.00
CR501	007-06398-0000		DIO DUAL SCHOTTKY	EA	1.00
CR502	007-05241-0007		TRNSRB 1500W 7V	EA	1.00
FL501	017-00260-0000		DIELCT BNDPS FILTE	EA	1.00
FL502	017-00259-0001		GPS XPRESS FILTER	EA	1.00
J501	030-03250-0000		ELCO 16PIN SMTCONN	EA	1.00
J502	030-00444-0000		CONN SMT MINI COAX	EA	1.00
L503	019-02730-0011		IND SM 33UH 5%	EA	1.00
L504	019-02730-0011		IND SM 33UH 5%	EA	1.00
L505	019-02660-0015		IND SM 150 10%	EA	1.00
L506	019-02660-0015		IND SM 150 10%	EA	1.00
L507	019-02660-0017		IND SM 220 10%	EA	1.00

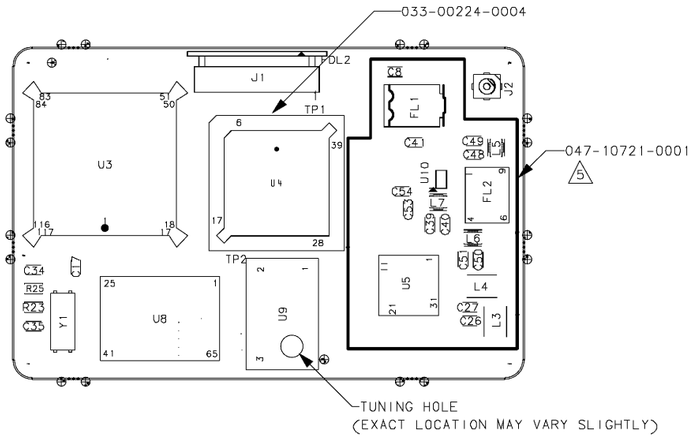
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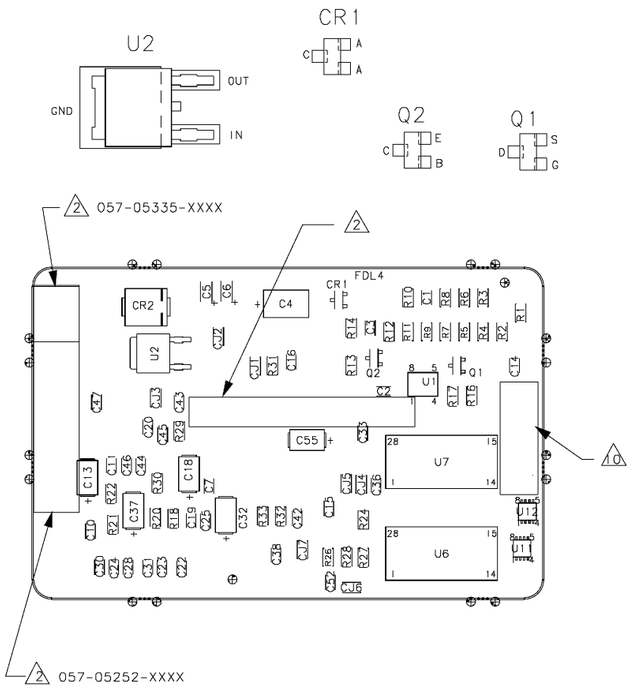
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
Q501	007-00903-0000		2N7002 MOSFET	EA	1.00
Q502	007-00933-0000		MMBT2369	EA	1.00
R501	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R502	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R503	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R504	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R505	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R506	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R507	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R508	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R509	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R510	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R511	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R512	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R513	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R514	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R516	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R517	139-01002-0000		RES CHIP 10K EW 1%	EA	1.00
R518	999-09999-0098		PLACE HOLDER	RF	.00
R520	999-09999-0098		PLACE HOLDER	RF	.00
R521	999-09999-0098		PLACE HOLDER	RF	.00
R522	999-09999-0098		PLACE HOLDER	RF	.00
R523	139-06194-0000		RES CH 6.19M EW 1%	EA	1.00
R524	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R525	139-01503-0000		RES CHIP 150KEW1%	EA	1.00
R526	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R527	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R528	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R529	139-05110-0000		RES CH 511 EW 1%	EA	1.00
R530	139-05110-0000		RES CH 511 EW 1%	EA	1.00
R531	139-04751-0000		RES CH 4.75K EW 1%	EA	1.00
R532	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
R533	139-01001-0000		RES CHIP 1K EW 1%	EA	1.00
SK501	033-00224-0004		SKT PLCC SM 44 PIN	EA	1.00
U501	120-02161-0001		EEPROM SERIAL 2KX8	EA	1.00
U502	120-03026-0080		78M05 DPAK VLT REG	EA	1.00
U503	120-02511-0000		MC68331 UP 16MHZ	EA	1.00
U504	999-09999-0090		REF SFTWARE SET	RF	.00
U505	120-08206-0000		GPS XPRESS MMIC	EA	1.00
U506	120-02363-0008		32K X 8 STATIC RAM	EA	1.00
U507	120-02363-0008		32K X 8 STATIC RAM	EA	1.00
U508	120-08207-0000		GPS XPRESS ASIC	EA	1.00
U509	044-00332-0000		GPS XPRESS TCXO 10	EA	1.00
U510	120-03590-0000		IC UPC2726	EA	1.00
U511	123-00074-0013		TC7W74FU SO PKG	EA	1.00
U512	123-00002-0013		TC7W02FU SO PKG	EA	1.00
Y501	044-00307-0000		32.768KHZ CRYS OSC	EA	1.00
	002-08825-0000		SCH GPS XPRESS	RF	.00
	009-08825-0000		PC BD GPS XPRESS	EA	1.00
	016-01040-0000		COATING TYPE AR	AR	1.00

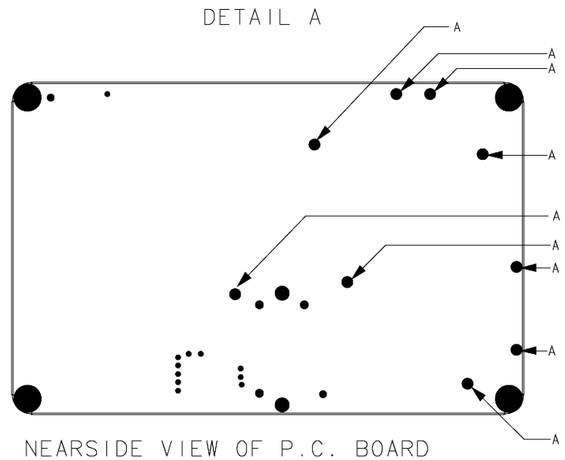
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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0000
	047-10721-0001		GPS XPRESS SHIELD	EA	1.00
	193-00891-0001		P XPRESS ASSEMBLY	RF	.00
	193-00891-0002		PXPRESS ASSY	RF	.00
	300-08825-0000		GPS XPRESS ASSY	RF	.00

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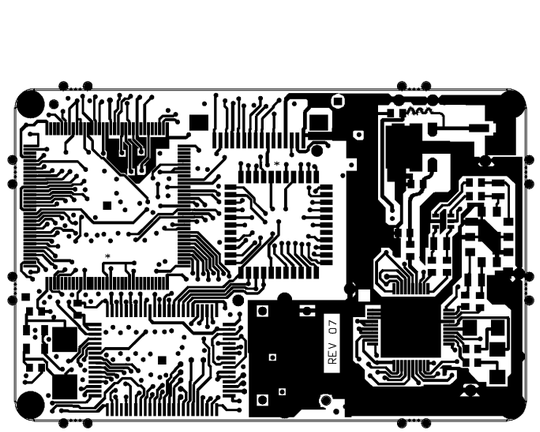




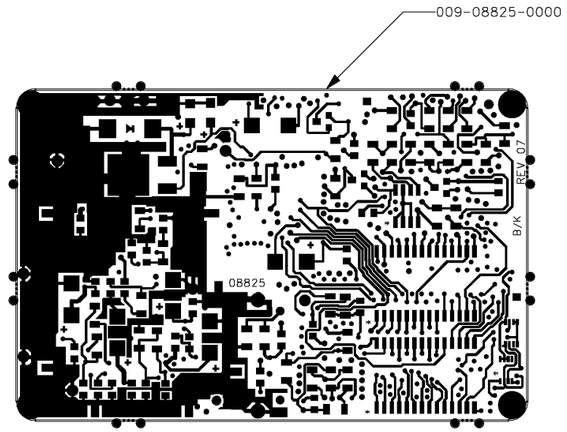
NOTES:

1. PRIOR TO POST COATING BOTH SIDES OF P.C. BOARD WITH KPN 016-01040-0000, MASK OFF THE FOLLOWING; ALL MOUNTING AREAS, ALL THROUGH HOLES LABLED 'A' IN DETAIL A, U9 TUNING HOLE, J1, J2 AND U4 SOCKET. RF SHIELD (047-10721-0001) TO BE INSTALLED TO BOARD AND LABELS AFTER POSTCOAT.
2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH KING SPEC. 001-01101-0000. REFER TO BOM 205-00891-0001 OR 205-00834-0002 FOR LABELING.
3. NOT ALL PARTS INSTALLED, REFER TO 200-08825-XXXX
4. 200-08825-XXXX ADDS 500 TO ALL REFERENCE DESIGNATORS.
5. RF SHIELD (047-10721-0001) TO BE SOLDERED ONLY AT PLATED THRU HOLES AT THE TABS. DO NOT SEAM SOLDER.
6. U9 TCXO TO BE HAND SOLDERED TO THE BOARD. DO NOT EXPOSE PART TO REFLOW TEMPERATURES, AND DO NOT EXPOSE INTERNAL COMPONENTS OF TCXO TO CLEANING SOLUTIONS.
7. U5 IS TEMPERATURE SENSITIVE, AND CANNOT BE EXPOSED TO OVER 200 DEGREES C FOR OVER 5 MINUTES, OR EXPOSED TO OVER 230 DEGREES C FOR OVER 1 MINUTE. COMPONENT BODY OF U5 TO BE SOLDERED TO GROUND PLANE ON BOARD DURING REFLOW SOLDERING. THERE MUST BE EVIDENCE OF SOLDER FROM THE COMPONENT BODY TO THE GROUND PLANE ON THE BOARD, BUT A COMPLETE FILLET IS NOT REQUIRED. RECYCLE U5 MATRIX TRAYS WITH THE COMPONENT SUPPLIER.
8. COMPONENT BODY OF FL2 FILTER TO BE SOLDERED TO GROUND PLANE ON BOARD DURING REFLOW SOLDERING WITH A MINIMUM OF .006" THICKNESS SOLDER PASTE (APPLICATION OF APPROX. .003" SOLDER).
9. MAXIMUM LEAD PROTRUSION FOR U9 TCXO IS .07" AND RF SHIELD (047-10721-0001) IS .09".
10. MANUFACTURING BAR CODE LABEL (OPTIONAL) MAY BE APPLIED TO FAR SIDE OF BOARD NEAR U7, COVERING VIA HOLES AND SILKSCREEN (ORIENTATION OPTIONAL).

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-08825-0000



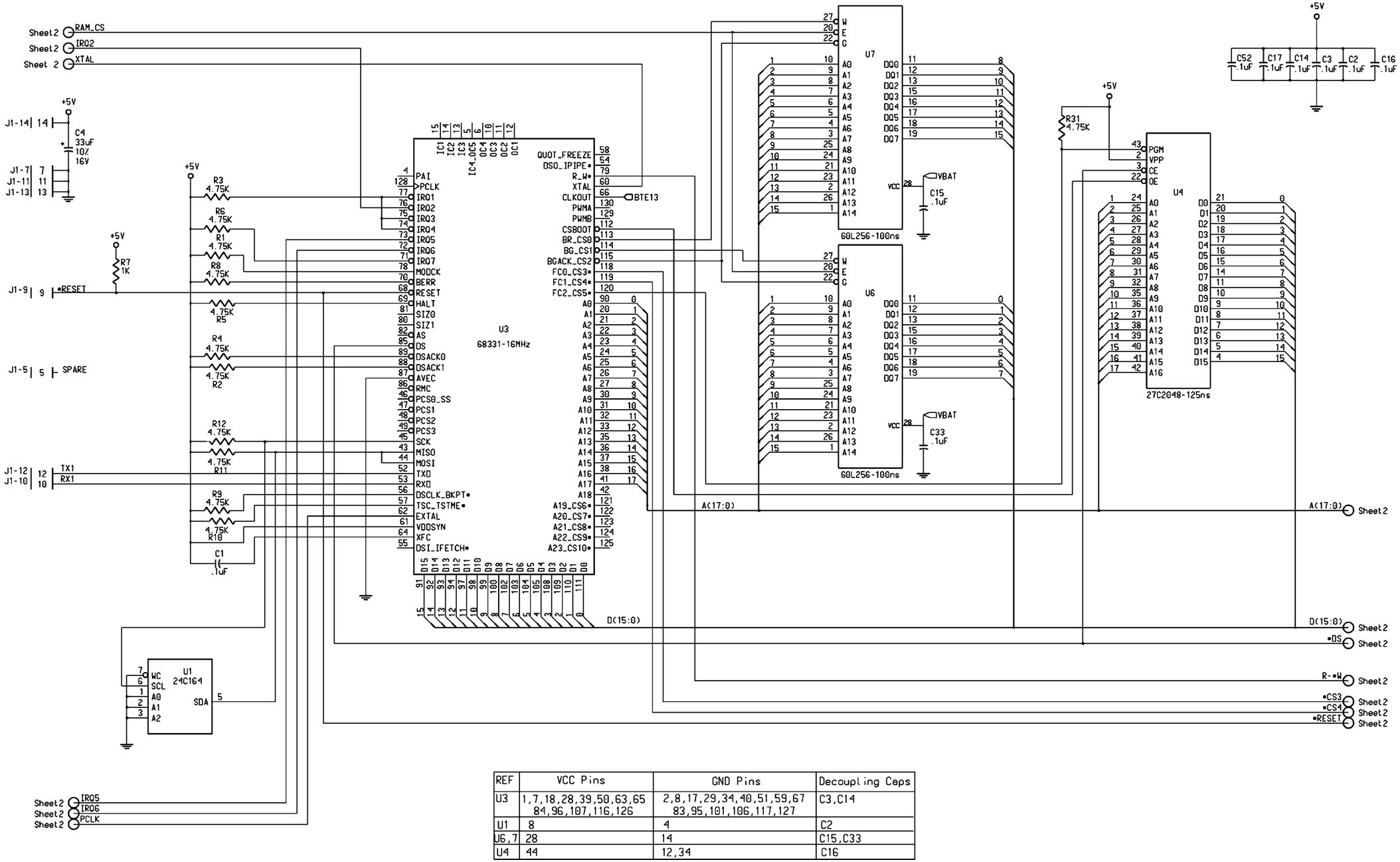
NEARSIDE VIEW OF P.C. BOARD



FARSIDE VIEW OF P.C. BOARD

FIGURE 6-10
KLN 94 GPS XPRESS BOARD ASSEMBLY DRAWING (P/N 300-08825-0000 Rev. AA)

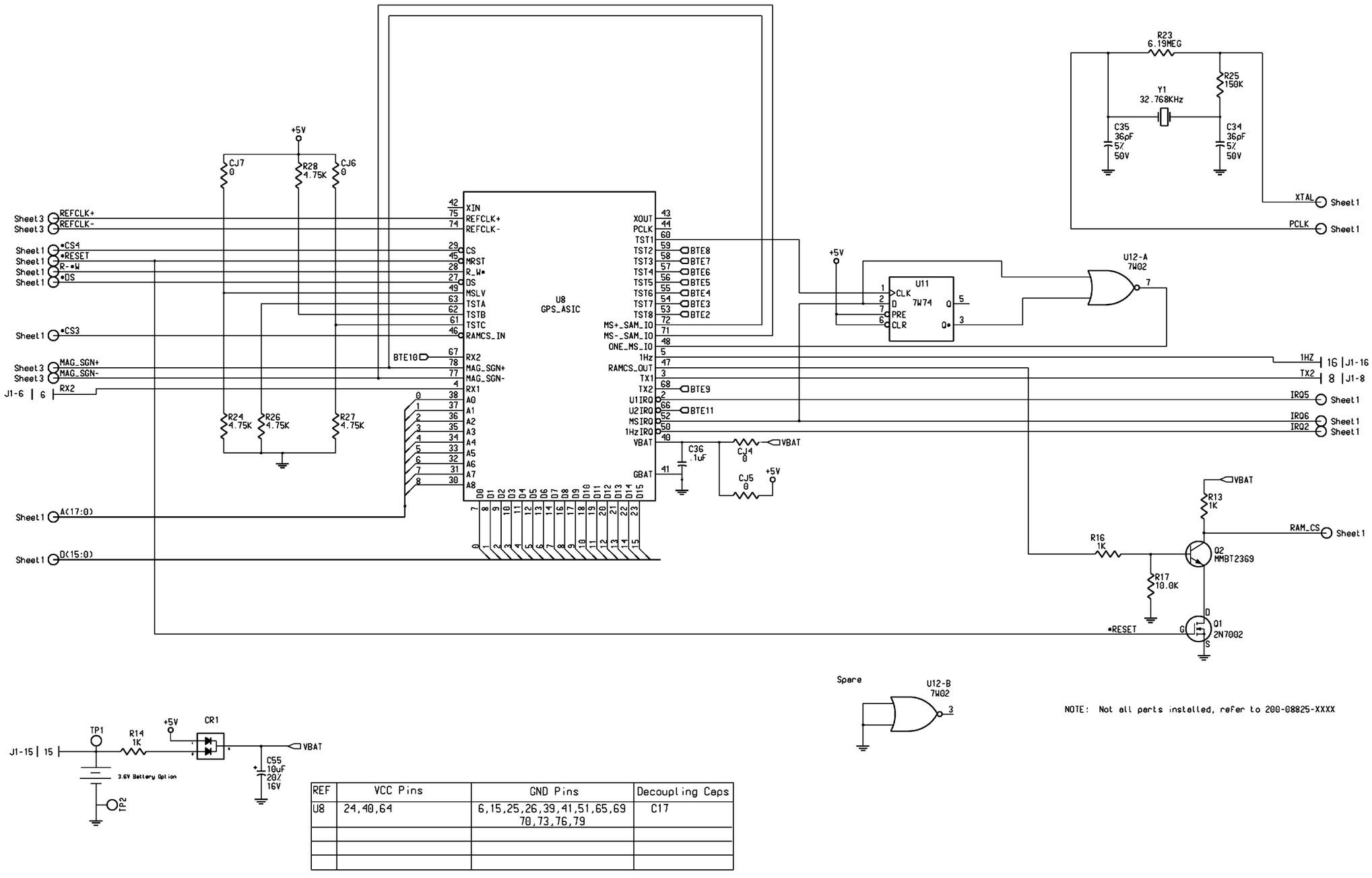
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REF	VCC Pins	GND Pins	Decoupling Caps
U3	1,7,18,28,39,50,63,65 84,96,107,116,126	2,8,17,29,34,40,51,59,67 83,95,101,106,117,127	C3,C14
U1	8	4	C2
U6,7	28	14	C15,C33
U4	44	12,34	C16

FIGURE 6-11
KLN 94 GPS XPRESS BOARD SCHEMATIC (P/N 002-08825-0000 Rev. 4, Sheet 1 of 3)

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NOTE: Not all parts installed, refer to 200-08825-XXXX

REF	VCC Pins	GND Pins	Decoupling Caps
U8	24,40,64	6,15,25,26,39,41,51,65,69 70,73,76,79	C17

FIGURE 6-11
KLN 94 GPS XPRESS BOARD SCHEMATIC (P/N 002-08825-0000 Rev. 4, Sheet 2 of 3)

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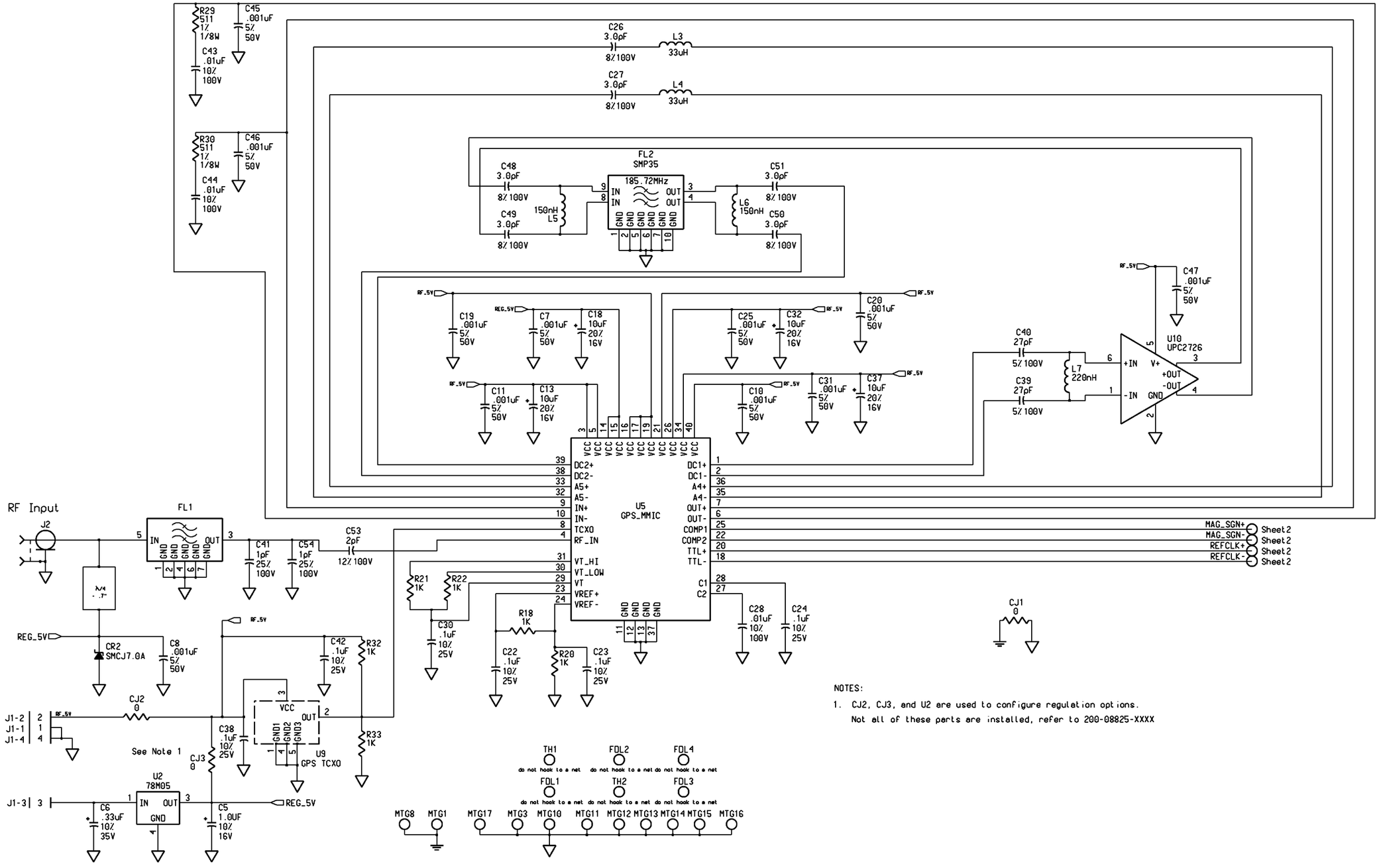


FIGURE 6-11
KLN 94 GPS XPRESS BOARD SCHEMATIC (P/N 002-08825-0000 Rev. 4, Sheet 3 of 3)

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6.12 205-00942-0003 KLN 94 PROGRAMMED MAIN BOARD Rev. -

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0003
REF100	300-09638-0000		KLN 94 MAIN BOA	RF	.00
	057-05252-0942		KLN 94 SOFTWARE LA	EA	1.00
	057-05335-0003		DECAL 205 DASH 03	EA	1.00
	125-01011-0001		KLN 94 HOST BOOT S	EA	1.00
	125-01012-0002		KLN94 GRAPHICS ENG	EA	1.00
	126-50000-0000		KLN94 COMBINED EPL	EA	1.00
	193-00942-0003		KLN94 MAIN BOARD H	RF	.00
	200-09638-0001		MAIN BOARD	EA	1.00

200-09638-0001 KLN 94 MAIN BOARD Rev. G

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
C5001	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5002	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5003	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5004	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5005	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C5006	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C5007	106-05200-0016		CAPCH 20PF NPO 50V	EA	1.00
C5008	096-01186-0019		CAP 22UF 20V 10%	EA	1.00
C5009	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5010	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5011	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5012	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5013	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5014	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5015	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5016	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5017	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5018	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5019	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5020	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5021	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5022	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5023	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5024	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5025	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5026	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5027	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5028	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5029	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5030	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5031	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5032	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5033	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5034	106-04470-0026		CAPCH 47PFNPO/100V	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
C5035	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5036	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5037	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5038	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5039	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5040	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
C5041	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5042	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5043	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5044	106-04182-0016		CAPCH1800PFNPO/50V	EA	1.00
C5045	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5046	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5047	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5048	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5049	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5050	106-04222-0014		CAP CH 2200PF 2% 5	EA	1.00
C5051	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5052	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5053	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5054	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5055	106-04182-0016		CAPCH1800PFNPO/50V	EA	1.00
C5056	106-04561-0016		CAP CH560PFNPO/50V	EA	1.00
C5057	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5058	106-04561-0016		CAP CH560PFNPO/50V	EA	1.00
C5059	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5060	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5061	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5062	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5063	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
C5064	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5065	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
C5066	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5067	096-01186-0010		CAP 15UF 10V 10%	EA	1.00
C5068	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5069	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5070	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5071	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5072	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5073	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5074	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5075	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5076	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5077	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5078	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5079	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5080	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5081	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5082	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5083	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5084	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5085	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
C5086	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5087	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5088	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5089	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5090	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5091	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5092	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5093	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5094	111-03105-0005		CAP CR 1UF 50V 10%	EA	1.00
C5095	111-03105-0005		CAP CR 1UF 50V 10%	EA	1.00
C5096	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5097	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5098	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5099	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5100	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5101	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5102	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5103	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5104	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5105	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5106	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5107	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
C5108	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5109	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5110	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5111	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5112	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5113	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5114	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5115	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5116	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5117	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5118	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
C5120	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5121	096-01186-0014		CAP 10.0UF 16V 10%	EA	1.00
C5122	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5123	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5124	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5125	096-01186-0010		CAP 15UF 10V 10%	EA	1.00
C5126	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C5127	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5128	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5129	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5130	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5131	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5132	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5133	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5134	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5135	106-04224-0047		CAP CHIP .22UF X7R	EA	1.00
C5136	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5137	096-01186-0013		CAP CH 3.3UF 16V	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
C5138	096-01186-0010		CAP 15UF 10V 10%	EA	1.00
C5139	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
C5140	096-01186-0010		CAP 15UF 10V 10%	EA	1.00
C5142	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5144	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5145	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5146	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5147	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5148	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5149	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5150	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5151	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5152	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5153	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5154	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5155	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5156	106-05101-0026		CAPCH100PFNPO/100V	EA	1.00
C5157	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5158	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5159	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5160	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5161	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C5162	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5163	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5164	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5165	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5166	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5167	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5168	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5169	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5170	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C5171	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C5172	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5173	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C5174	106-05103-1047		CAP CH 10KX7R/50V	EA	1.00
C5175	106-05390-1026		CAP CH 39PFNPO/100	EA	1.00
C5176	106-04131-0026		CAP CH 130PF NPO	EA	1.00
C5177	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5178	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5179	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5180	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5181	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5182	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5183	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5184	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5185	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5186	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5187	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5188	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5189	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5190	106-04104-0047		CH 100KX7R/50V	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
C5191	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5192	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5193	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5194	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5195	106-04221-0026		CAP CH220PFNPO/100	EA	1.00
C5196	096-01186-0017		CAP 2.2UF 20V 10%	EA	1.00
C5197	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5198	106-04221-0026		CAP CH220PFNPO/100	EA	1.00
C5199	096-01186-0017		CAP 2.2UF 20V 10%	EA	1.00
C5200	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5201	106-04221-0026		CAP CH220PFNPO/100	EA	1.00
C5202	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5203	096-01186-0017		CAP 2.2UF 20V 10%	EA	1.00
C5204	096-01186-0017		CAP 2.2UF 20V 10%	EA	1.00
C5205	096-01186-0017		CAP 2.2UF 20V 10%	EA	1.00
C5206	096-01186-0017		CAP 2.2UF 20V 10%	EA	1.00
C5207	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5208	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5209	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C5210	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5211	106-04103-0047		CH 10K X7R/50V	EA	1.00
C5212	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5213	106-04221-0026		CAP CH220PFNPO/100	EA	1.00
C5214	096-01186-0017		CAP 2.2UF 20V 10%	EA	1.00
C5215	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C5216	096-01186-0017		CAP 2.2UF 20V 10%	EA	1.00
C5217	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5218	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5219	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5220	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5221	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5222	106-04470-0026		CAPCH 47PFNPO/100V	EA	1.00
C5223	106-04470-0026		CAPCH 47PFNPO/100V	EA	1.00
C5224	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5225	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5226	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5227	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5228	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5229	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5230	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5231	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5232	106-05102-0026		CAP CH 1K NPO/100V	EA	1.00
C5233	106-04104-0047		CH 100KX7R/50V	EA	1.00
C5234	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
CR5001	007-05117-0004		DIO Z 4.7V SOT	EA	1.00
CR5002	007-06223-0001		DIODE	EA	1.00
CR5003	007-05117-0004		DIO Z 4.7V SOT	EA	1.00
CR5004	007-06223-0000		DIO DA204K	EA	1.00
CR5005	007-06223-0000		DIO DA204K	EA	1.00
CR5006	007-05117-0007		DIO Z 6.2V SOT	EA	1.00
CR5007	007-05117-0007		DIO Z 6.2V SOT	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
CR5008	007-06223-0000		DIO DA204K	EA	1.00
CR5009	007-06223-0000		DIO DA204K	EA	1.00
CR5010	007-06223-0000		DIO DA204K	EA	1.00
CR5011	007-06223-0000		DIO DA204K	EA	1.00
CR5012	007-06223-0000		DIO DA204K	EA	1.00
CR5013	007-06223-0000		DIO DA204K	EA	1.00
CR5014	007-06223-0000		DIO DA204K	EA	1.00
CR5015	007-06223-0000		DIO DA204K	EA	1.00
CR5016	007-06223-0000		DIO DA204K	EA	1.00
CR5017	007-06223-0000		DIO DA204K	EA	1.00
CR5018	007-05241-0008		TRANSORB 1500W 85V	EA	1.00
CR5019	007-06223-0000		DIO DA204K	EA	1.00
CR5020	007-06223-0000		DIO DA204K	EA	1.00
CR5021	007-06223-0000		DIO DA204K	EA	1.00
CR5022	007-05117-0004		DIO Z 4.7V SOT	EA	1.00
CR5023	007-05117-0007		DIO Z 6.2V SOT	EA	1.00
J5001	030-03386-0003		CONN, HDR, MALE, S	EA	1.00
J5003	030-03196-0025		CONN FEMALE 50 PIN	EA	1.00
J5004	030-03388-0001		CONN, HDR, MALE, D	EA	1.00
J5005	030-00462-0016		SMT ZIF FLEX CONN	EA	1.00
J5006	030-03408-0009		CONN, HDR, PLG, EJ	EA	1.00
J5007	030-03264-0036		SKT STRIP 72P	EA	1.00
J5009	030-03386-0002		CONN, HDR, MALE, S	EA	1.00
J5100	030-03305-0005		HEADER, 2MM 2X	EA	1.00
J5101	030-03305-0005		HEADER, 2MM 2X	EA	1.00
J5102	030-03305-0005		HEADER, 2MM 2X	EA	1.00
J941	030-03424-0003		CONN, D-SUB, PLG,	EA	1.00
J942	030-03424-0004		CONN, D-SUB, PLG,	EA	1.00
L5001	019-02369-0001		IND 15UH	EA	1.00
L5002	019-02332-0000		CHOKE PARASITIC	EA	1.00
L5003	019-02660-0035		IND SM 3900 10%	EA	1.00
L5004	019-02660-0035		IND SM 3900 10%	EA	1.00
Q5001	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5002	007-01023-0000		MOSFET DUAL SO-8	EA	1.00
Q5003	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5004	007-01023-0000		MOSFET DUAL SO-8	EA	1.00
Q5005	007-00903-0000		2N7002 MOSFET	EA	1.00
Q5006	007-00466-0000		XSTR S PNP MMBTA56	EA	1.00
Q5007	007-00466-0000		XSTR S PNP MMBTA56	EA	1.00
Q5008	007-00942-0000		XSTR P-CH MOSFET	EA	1.00
Q5009	007-00903-0000		2N7002 MOSFET	EA	1.00
Q5010	007-00903-0000		2N7002 MOSFET	EA	1.00
Q5011	007-00903-0000		2N7002 MOSFET	EA	1.00
Q5012	007-01025-0000		MOSFET DUAL SO-8	EA	1.00
Q5013	007-01023-0000		MOSFET DUAL SO-8	EA	1.00
Q5014	007-01023-0000		MOSFET DUAL SO-8	EA	1.00
Q5015	007-01025-0000		MOSFET DUAL SO-8	EA	1.00
Q5016	007-01023-0000		MOSFET DUAL SO-8	EA	1.00
Q5017	007-01023-0000		MOSFET DUAL SO-8	EA	1.00
Q5018	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5019	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
Q5020	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5021	007-00903-0000		2N7002 MOSFET	EA	1.00
Q5022	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5023	007-00466-0000		XSTR S PNP MMBTA56	EA	1.00
Q5024	007-00903-0000		2N7002 MOSFET	EA	1.00
Q5025	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5026	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5027	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5028	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5029	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5030	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5031	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5032	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5033	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5034	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q5035	007-00466-0000		XSTR S PNP MMBTA56	EA	1.00
Q5036	007-00903-0000		2N7002 MOSFET	EA	1.00
Q5037	007-00903-0000		2N7002 MOSFET	EA	1.00
Q5038	007-00903-0000		2N7002 MOSFET	EA	1.00
R5001	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R5002	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5003	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5004	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5005	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5006	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R5007	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5008	139-02002-0010		RES CH 20K TW 1%	EA	1.00
R5009	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R5010	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5011	015-00309-2001		RES ARRAYS 2K OHM	EA	1.00
R5012	139-01004-0010		RES CH 1M TW 1%	EA	1.00
R5013	139-01623-0010		RES CH 162000 .1W	EA	1.00
R5014	015-00309-2001		RES ARRAYS 2K OHM	EA	1.00
R5015	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5016	015-00309-4992		RES ARRAYS 49.9K O	EA	1.00
R5017	015-00309-4991		RES ARRAYS 4.99K O	EA	1.00
R5018	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5019	015-00309-4991		RES ARRAYS 4.99K O	EA	1.00
R5020	015-00309-4992		RES ARRAYS 49.9K O	EA	1.00
R5021	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5022	015-00309-4991		RES ARRAYS 4.99K O	EA	1.00
R5023	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5024	015-00309-4991		RES ARRAYS 4.99K O	EA	1.00
R5025	015-00309-1001		RES ARRAYS 1K OHM	EA	1.00
R5026	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5027	015-00309-2001		RES ARRAYS 2K OHM	EA	1.00
R5028	139-03011-0010		RES CH 3.01K .1W 1	EA	1.00
R5029	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R5030	139-01102-0010		RES CH 11K .1W 1%	EA	1.00
R5031	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R5032	139-00000-0014		CKT JUMPER 0805	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
R5033	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5034	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R5035	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R5036	139-08062-0010		RES CH 80.6K TW 1%	EA	1.00
R5037	139-02433-0010		RES CH 243K TW 1%	EA	1.00
R5038	139-03922-0010		RES CH 39.2K TW 1%	EA	1.00
R5039	139-01002-0003		RES CH 10.0KEW.1%	EA	1.00
R5040	139-04752-0010		RES CH 47.5K TW 1%	EA	1.00
R5041	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5042	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5043	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5044	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R5045	139-02433-0010		RES CH 243K TW 1%	EA	1.00
R5046	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5047	139-08062-0010		RES CH 80.6K TW 1%	EA	1.00
R5048	139-01822-0010		RES CH 18.2K TW 1	EA	1.00
R5049	139-02433-0010		RES CH 243K TW 1%	EA	1.00
R5050	139-02433-0010		RES CH 243K TW 1%	EA	1.00
R5051	139-00200-0020		RES CH 20 QW 1%	EA	1.00
R5052	139-00200-0020		RES CH 20 QW 1%	EA	1.00
R5053	139-00200-0020		RES CH 20 QW 1%	EA	1.00
R5054	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5055	015-00309-1001		RES ARRAYS 1K OHM	EA	1.00
R5056	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5057	015-00309-2001		RES ARRAYS 2K OHM	EA	1.00
R5058	139-02002-0010		RES CH 20K TW 1%	EA	1.00
R5059	139-02871-0010		RES CH 2.87K TW 1%	EA	1.00
R5060	139-00825-0040		RES CH 82.5 1W 1%	EA	1.00
R5061	139-04752-0010		RES CH 47.5K TW 1%	EA	1.00
R5062	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R5063	015-00309-1001		RES ARRAYS 1K OHM	EA	1.00
R5064	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5065	015-00309-2001		RES ARRAYS 2K OHM	EA	1.00
R5066	015-00309-2001		RES ARRAYS 2K OHM	EA	1.00
R5067	015-00309-1003		RES ARRAYS 100K OH	EA	1.00
R5068	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5069	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R5070	015-00309-2001		RES ARRAYS 2K OHM	EA	1.00
R5071	015-00309-1001		RES ARRAYS 1K OHM	EA	1.00
R5072	015-00309-1001		RES ARRAYS 1K OHM	EA	1.00
R5073	015-00309-1001		RES ARRAYS 1K OHM	EA	1.00
R5074	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R5075	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5076	139-04752-0010		RES CH 47.5K TW 1%	EA	1.00
R5077	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R5078	015-00309-2001		RES ARRAYS 2K OHM	EA	1.00
R5079	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R5080	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R5081	015-00309-1003		RES ARRAYS 100K OH	EA	1.00
R5082	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R5083	139-01472-0010		RES CH 14.7K .1W 1	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
R5084	139-01472-0010		RES CH 14.7K .1W 1	EA	1.00
R5085	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R5086	139-01472-0010		RES CH 14.7K .1W 1	EA	1.00
R5087	139-01472-0010		RES CH 14.7K .1W 1	EA	1.00
R5088	139-01472-0010		RES CH 14.7K .1W 1	EA	1.00
R5089	139-01472-0010		RES CH 14.7K .1W 1	EA	1.00
R5091	139-01472-0010		RES CH 14.7K .1W 1	EA	1.00
R5092	139-01472-0010		RES CH 14.7K .1W 1	EA	1.00
R5093	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R5094	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5095	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5096	015-00309-2001		RES ARRAYS 2K OHM	EA	1.00
R5097	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5098	015-00309-1001		RES ARRAYS 1K OHM	EA	1.00
R5099	139-04991-0010		RES CH 4.99K TW 1%	EA	1.00
R5100	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5101	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5102	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5103	015-00309-1002		RES ARRAYS 10K OHM	EA	1.00
R5104	015-00309-4992		RES ARRAYS 49.9K O	EA	1.00
R5105	139-00000-0014		CKT JUMPER 0805	EA	1.00
R5106	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5107	139-01542-0010		CHIP RES 15.4K OHM	EA	1.00
R5108	139-01542-0010		CHIP RES 15.4K OHM	EA	1.00
R5109	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R5110	139-01303-0010		RES CH 130K TW 1%	EA	1.00
R5111	139-02211-0010		RES CH 2.21K TW 1%	EA	1.00
R5112	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5113	015-00309-2002		RES ARRAYS 20K OHM	EA	1.00
R5114	139-02052-0010		RES CH 20.5K .1W 1	EA	1.00
R5115	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R5116	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R5117	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R5118	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R5119	015-00309-1001		RES ARRAYS 1K OHM	EA	1.00
R5120	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5121	015-00309-2001		RES ARRAYS 2K OHM	EA	1.00
R5122	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R5123	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R5124	139-04750-0020		RES CH 475 QW 1%	EA	1.00
R5125	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R5126	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R5127	139-04752-0010		RES CH 47.5K TW 1%	EA	1.00
R5128	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R5129	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R5130	139-02003-0010		RES CH 200K .1W 1%	EA	1.00
R5131	139-02153-0010		CHIP RES 215K OHMS	EA	1.00
R5132	139-01004-0010		RES CH 1M TW 1%	EA	1.00
R5133	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R5134	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R5135	139-01000-0010		RES CH 100 .1W 1%	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
R5136	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R5137	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R5138	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R5139	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5140	139-00000-0014		CKT JUMPER 0805	EA	1.00
R5141	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R5142	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R5143	139-02003-0010		RES CH 200K .1W 1%	EA	1.00
R5144	139-02002-0010		RES CH 20K TW 1%	EA	1.00
R5145	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R5146	139-03011-0010		RES CH 3.01K .1W 1	EA	1.00
R5147	139-06810-0010		RES CH 681 .1W 1%	EA	1.00
R5148	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R5149	130-09006-2181		RES CH 1.8 HW 5%	EA	1.00
R5150	130-09006-2181		RES CH 1.8 HW 5%	EA	1.00
R5151	130-09006-2101		RES CH 1.0 HW 5%	EA	1.00
R5152	130-09006-2101		RES CH 1.0 HW 5%	EA	1.00
R5153	130-09006-2101		RES CH 1.0 HW 5%	EA	1.00
R5154	130-09006-2101		RES CH 1.0 HW 5%	EA	1.00
R5155	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5156	130-09006-2181		RES CH 1.8 HW 5%	EA	1.00
R5157	130-09006-2101		RES CH 1.0 HW 5%	EA	1.00
R5158	130-09006-2101		RES CH 1.0 HW 5%	EA	1.00
R5159	130-09006-2101		RES CH 1.0 HW 5%	EA	1.00
R5160	130-09006-2101		RES CH 1.0 HW 5%	EA	1.00
R5161	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5162	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5163	139-02211-0010		RES CH 2.21K TW 1%	EA	1.00
R5164	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R5165	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5166	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5167	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R5168	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R5169	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R5170	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R5171	139-04752-0010		RES CH 47.5K TW 1%	EA	1.00
R5172	139-02002-0010		RES CH 20K TW 1%	EA	1.00
R5173	139-04752-0010		RES CH 47.5K TW 1%	EA	1.00
R5174	139-04752-0010		RES CH 47.5K TW 1%	EA	1.00
R5175	139-04752-0010		RES CH 47.5K TW 1%	EA	1.00
R5176	139-00100-0010		RES CH 10 OHMS 1%	EA	1.00
R5177	139-02002-0010		RES CH 20K TW 1%	EA	1.00
R5178	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R5179	139-04752-0010		RES CH 47.5K TW 1%	EA	1.00
R5180	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R5181	139-01002-0003		RES CH 10.0KEW.1%	EA	1.00
R5182	139-03922-0010		RES CH 39.2K TW 1%	EA	1.00
R5183	139-02433-0010		RES CH 243K TW 1%	EA	1.00
R5184	139-04752-0010		RES CH 47.5K TW 1%	EA	1.00
R5185	139-00825-0040		RES CH 82.5 1W 1%	EA	1.00
R5186	139-01822-0010		RES CH 18.2K TW 1	EA	1.00

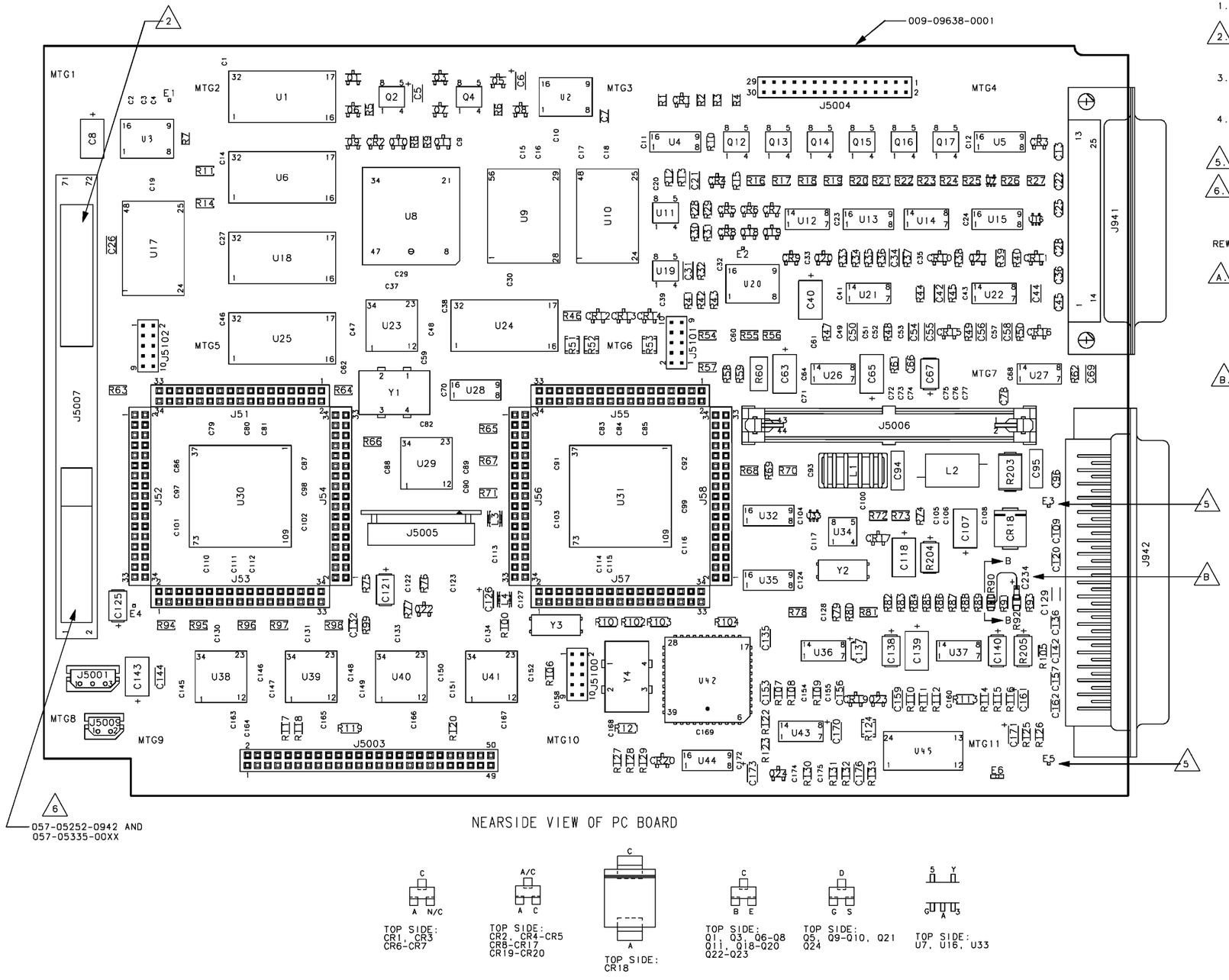
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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
R5187	139-08062-0010		RES CH 80.6K TW 1%	EA	1.00
R5188	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R5189	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R5190	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5191	139-00000-0014		CKT JUMPER 0805	EA	1.00
R5192	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5193	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5194	139-00221-0000		RES CH 22.1 EW 1%	EA	1.00
R5195	139-00221-0000		RES CH 22.1 EW 1%	EA	1.00
R5196	139-04993-0000		RES CHIP 499K EW1%	EA	1.00
R5197	139-01005-0010		RES CH 10MEG .1W 1	EA	1.00
R5198	139-01004-0010		RES CH 1M TW 1%	EA	1.00
R5199	139-00000-0014		CKT JUMPER 0805	EA	1.00
R5200	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R5201	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R5202	139-01822-0010		RES CH 18.2K TW 1	EA	1.00
R5203	130-09008-0010		RES CH 0.01 1 W, 1	EA	1.00
R5204	139-04320-0030		RES CH 432 HW 1%	EA	1.00
R5205	139-04320-0030		RES CH 432 HW 1%	EA	1.00
R5206	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R5207	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
U5001	120-02763-0001		SRAM, 512K X 8 BIT	EA	1.00
U5002	120-02468-0001		UPROC SPVSRMAX691A	EA	1.00
U5003	120-03715-0001		SWITCHING MATRIX,	EA	1.00
U5004	123-00595-0003		IC 74HC595 SO	EA	1.00
U5005	123-00165-0003		74HC165D SHIFT REG	EA	1.00
U5006	120-02763-0001		SRAM, 512K X 8 BIT	EA	1.00
U5007	120-02716-0006		BUFFER, TRI-STATE	EA	1.00
U5008	120-02717-0001		SRAM, DUAL PORT 2K	EA	1.00
U5009	120-02719-0001		MEMORY, FLASH, 1 M	EA	1.00
U5010	120-02535-0030		8 MBIT BOOT BLOCK	EA	1.00
U5011	120-03602-0000		LM6482 RR OP AMP	EA	1.00
U5012	120-03163-0001		LM2901 SO-14 COMP	EA	1.00
U5013	123-00595-0003		IC 74HC595 SO	EA	1.00
U5014	120-03163-0001		LM2901 SO-14 COMP	EA	1.00
U5015	123-00165-0003		74HC165D SHIFT REG	EA	1.00
U5016	120-02716-0006		BUFFER, TRI-STATE	EA	1.00
U5017	120-02688-0001		MEMORY, FLASH	EA	1.00
U5018	120-02763-0001		SRAM, 512K X 8 BIT	EA	1.00
U5019	120-03400-0001		REF-02 PREC V REG	EA	1.00
U5020	123-04051-0003		74HC4051 SO PKG	EA	1.00
U5021	120-03174-0014		OP AMP BI FET SO	EA	1.00
U5022	120-03174-0014		OP AMP BI FET SO	EA	1.00
U5023	120-02503-0020		EPLD 7032 W/ISP	EA	1.00
U5024	120-02763-0001		SRAM, 512K X 8 BIT	EA	1.00
U5025	120-02763-0001		SRAM, 512K X 8 BIT	EA	1.00
U5026	120-00477-0003		IC 14C88 LINE DRVR	EA	1.00
U5027	120-00478-0004		IC MC14C89 LINE RC	EA	1.00
U5028	123-00138-0003		74HC138 SO PKG	EA	1.00
U5029	120-02503-0020		EPLD 7032 W/ISP	EA	1.00
U5030	120-02675-0001		386 MICROPROCESSO	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
U5031	120-02502-0012		PROC 68C16 144PQFP	EA	1.00
U5032	120-08231-0001		DISCRETE INPUT CIR	EA	1.00
U5033	120-02716-0006		BUFFER, TRI-STATE	EA	1.00
U5034	120-02546-0010		CLOCK, SERIAL TIME	EA	1.00
U5035	120-08231-0001		DISCRETE INPUT CIR	EA	1.00
U5036	120-03174-0014		OP AMP BI FET SO	EA	1.00
U5037	120-03552-0000		QUAD OP AMP	EA	1.00
U5038	120-02503-0020		EPLD 7032 W/ISP	EA	1.00
U5039	120-02503-0020		EPLD 7032 W/ISP	EA	1.00
U5040	120-02503-0020		EPLD 7032 W/ISP	EA	1.00
U5041	120-02503-0020		EPLD 7032 W/ISP	EA	1.00
U5042	120-02373-0000		DUAL CHANNEL UART	EA	1.00
U5043	120-03552-0000		QUAD OP AMP	EA	1.00
U5044	120-08231-0001		DISCRETE INPUT CIR	EA	1.00
U5045	133-00569-0000		DIGITAL POT 10K	EA	1.00
Y5001	044-00309-0002		64.000MHZ OSC	EA	1.00
Y5002	044-00307-0000		32.768KHZ CRYS OSC	EA	1.00
Y5003	044-00307-0000		32.768KHZ CRYS OSC	EA	1.00
Y5004	044-00349-0007		3.6864 MHZ SMT OSC	EA	1.00
	002-09638-0000		KLN 94 MAIN BOAR	RF	.00
	009-09638-0001		PCB, MAIN BOARD	EA	1.00
	016-01144-0000		TAK PAK ADV 122-92	AR	1.00
	016-01144-0001		ACCELERATOR 11525	AR	1.00
	026-00032-0008		WIRE, CU, 28AWG, S	AR	1.00
	300-09638-0000		KLN 94 MAIN BOA	RF	.00

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NOTES:

1. POST COATING NOT REQUIRED.

2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC. 001-01101-0000.

3. ADD 5000 TO ALL REFERENCE DESIGNATORS, EXCEPT CONNECTORS WHEN REFERRING TO THE PARTS LIST.

4. WHERE APPLICABLE, LIQUID STAKE ALL FASTENERS PER SPEC. 001-01080-0000.

5. MASK OFF HOLES E3 AND E5 PRIOR TO WAVE SOLDERING.

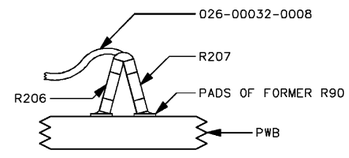
6. TO BE INSTALLED AT NEXT ASSEMBLY LEVEL. 'XX' MUST BE SAME AS LAST TWO DIGITS OF 205-00942-00XX HW/SW SET.

REWORK NOTES:

A. REFER TO SHEET 3. ATTACH C233 TO PAD OF C209. ATTACH R202 TO PAD OF C211. ATTACH MAG WIRE (026-00032-0008) FROM R202 TO C233. FASTEN R202, C233, AND MAG WIRE TO PWB WITH ADHESIVE (016-01144-0000 AND 016-01144-0001). DO NOT BLOCK TEST PADS. JUMPER WIRE ROUTING IS SHOWN FOR REFERENCE ONLY.

B. REMOVE MAG WIRES ATTACHED TO R82 OR R93, IF PRESENT. ATTACH C234 TO PWB USING ADHESIVE (016-01144-0000 AND 016-01144-0001) AND SOLDER NON '+' END TO R92 AS SHOWN. SOLDER THE ENDS OF R206 AND R207 TO PADS SO THAT THEIR OTHER ENDS TOUCH AS SHOWN IN DETAIL B. ATTACH MAG WIRE (026-00032-0008) FROM THE POINT R206 CONTACTS R207 TO THE '+' END OF C234. FASTEN THE MAG WIRE TO THE PWB USING THE SAME ADHESIVE. IGNORE THE '+' MARKINGS FOR R204 AND R205. JUMPER WIRE ROUTING IS SHOWN FOR REFERENCE ONLY.

DETAIL B:

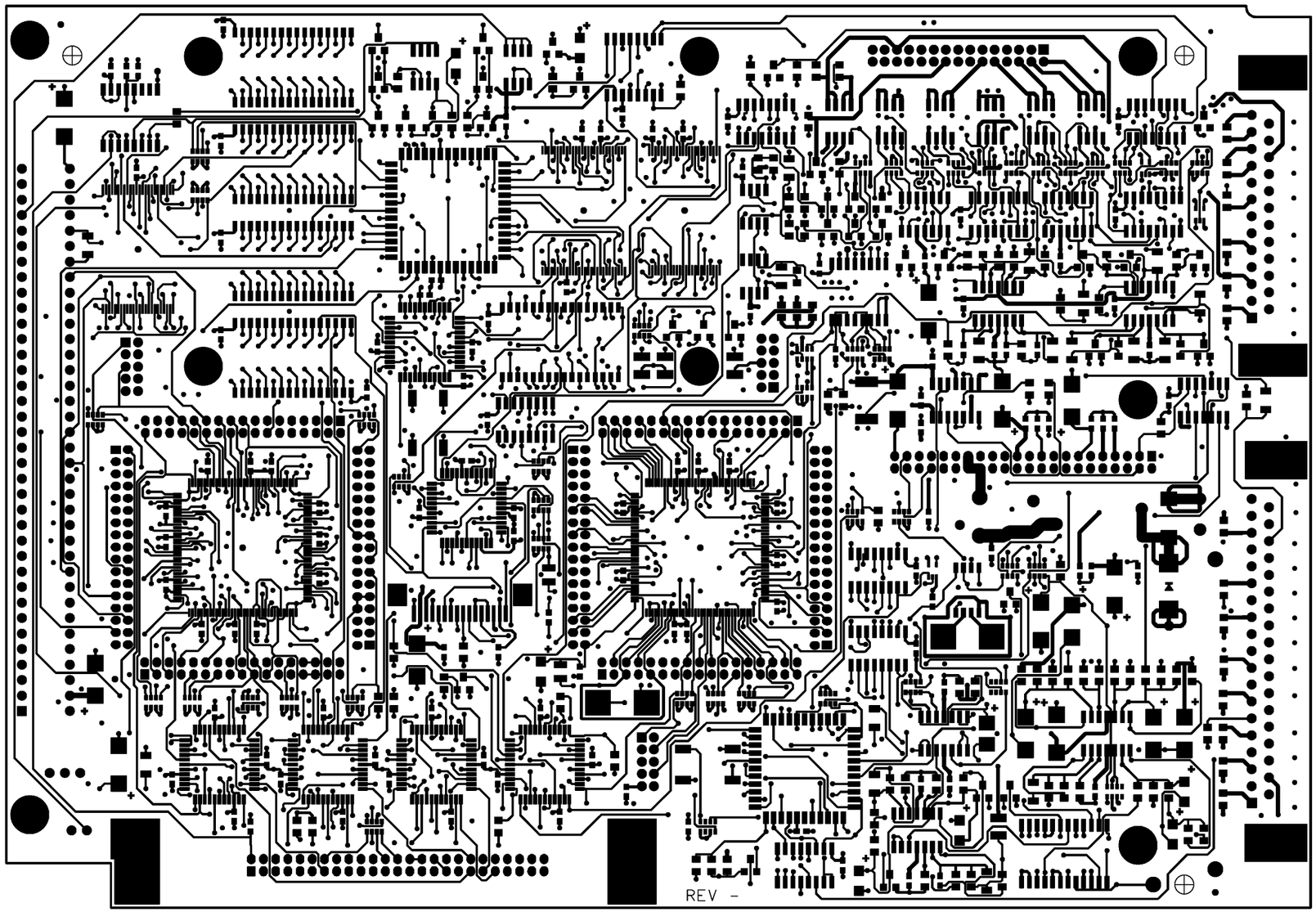


THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-09638-0001

NEARSIDE VIEW OF PC BOARD

FIGURE 6-12
KLN 94 MAIN BOARD ASSEMBLY DRAWING (P/N 300-09638-0000 Rev. F, Sheet 1 of 4)

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NEARSIDE VIEW OF PC BOARD

FIGURE 6-12
KLN 94 MAIN BOARD ASSEMBLY DRAWING (P/N 300-09638-0000 Rev. F, Sheet 2 of 4)

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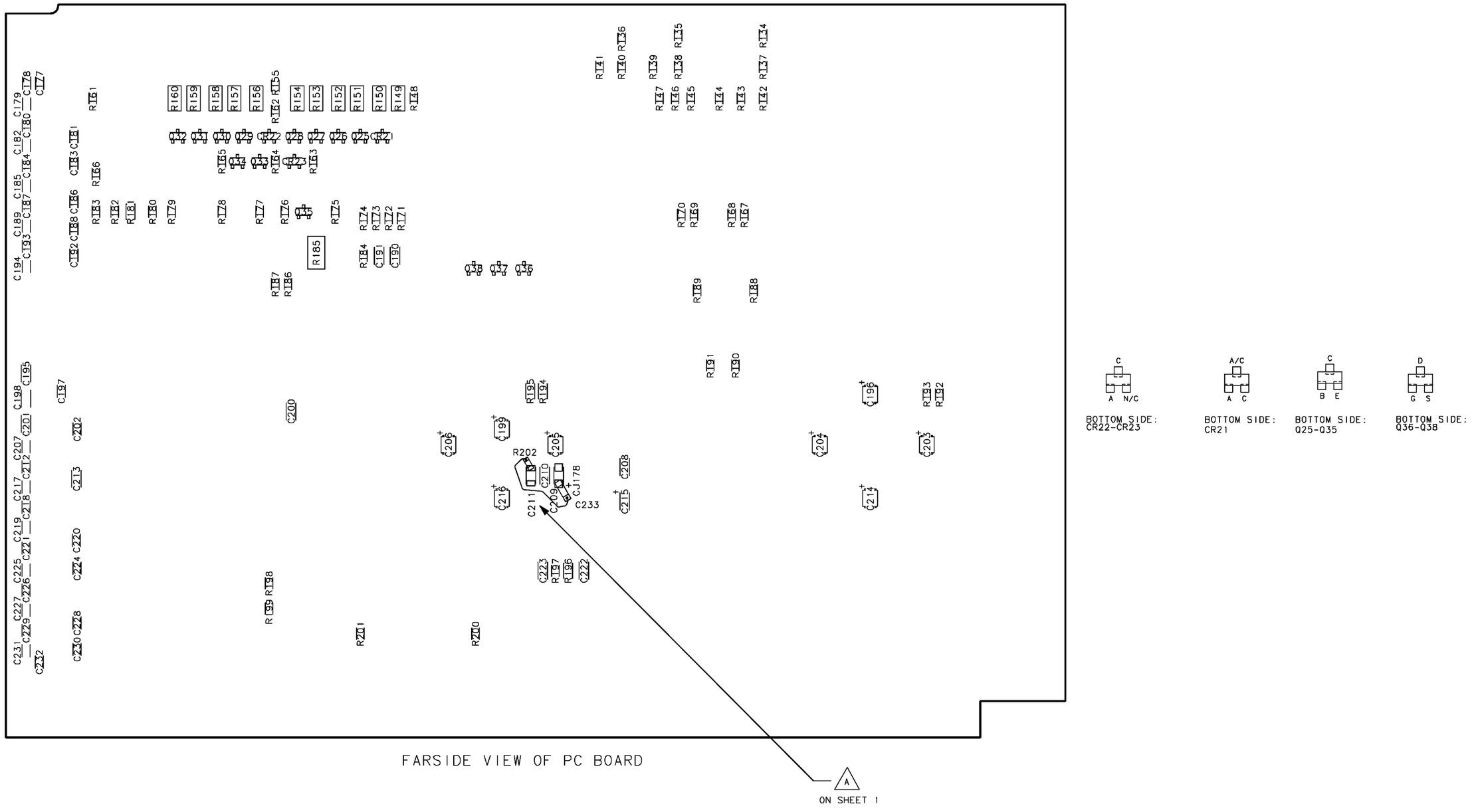
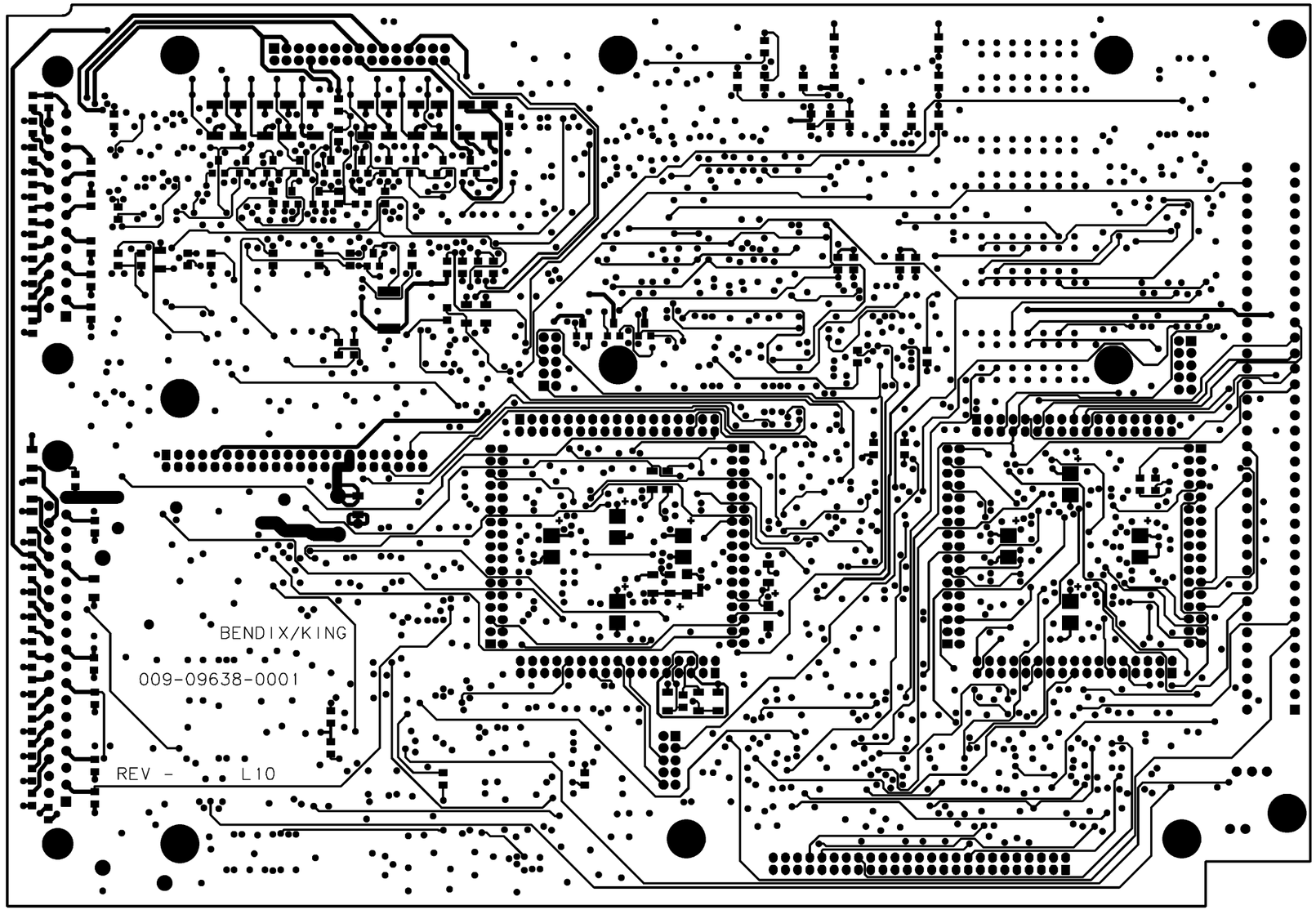


FIGURE 6-12
KLN 94 MAIN BOARD ASSEMBLY DRAWING (P/N 300-09638-0000 Rev. F, Sheet 3 of 4)

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FARSIDE VIEW OF PC BOARD

FIGURE 6-12
KLN 94 MAIN BOARD ASSEMBLY DRAWING (P/N 300-09638-0000 Rev. F, Sheet 4 of 4)

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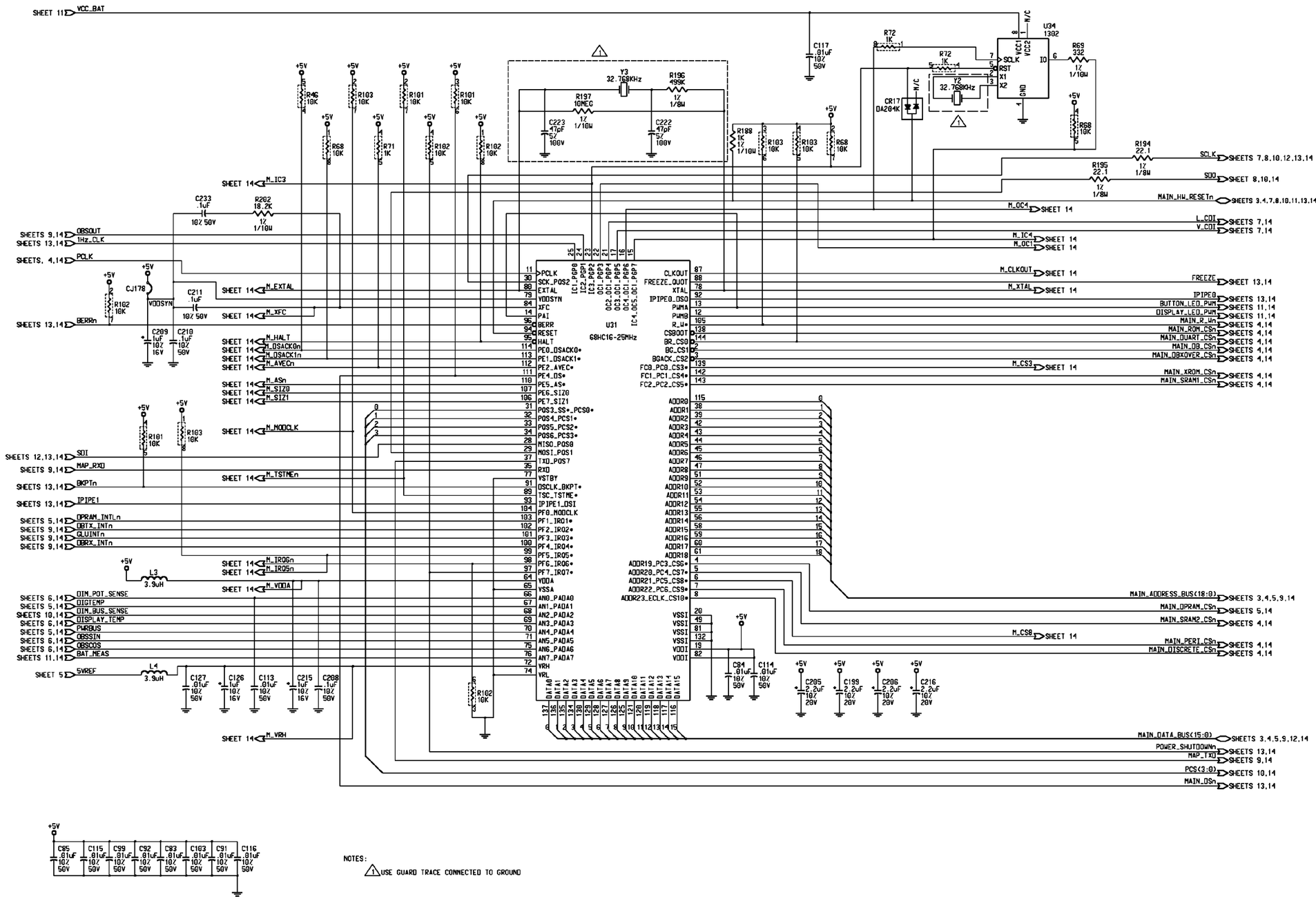


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 1 of 14)

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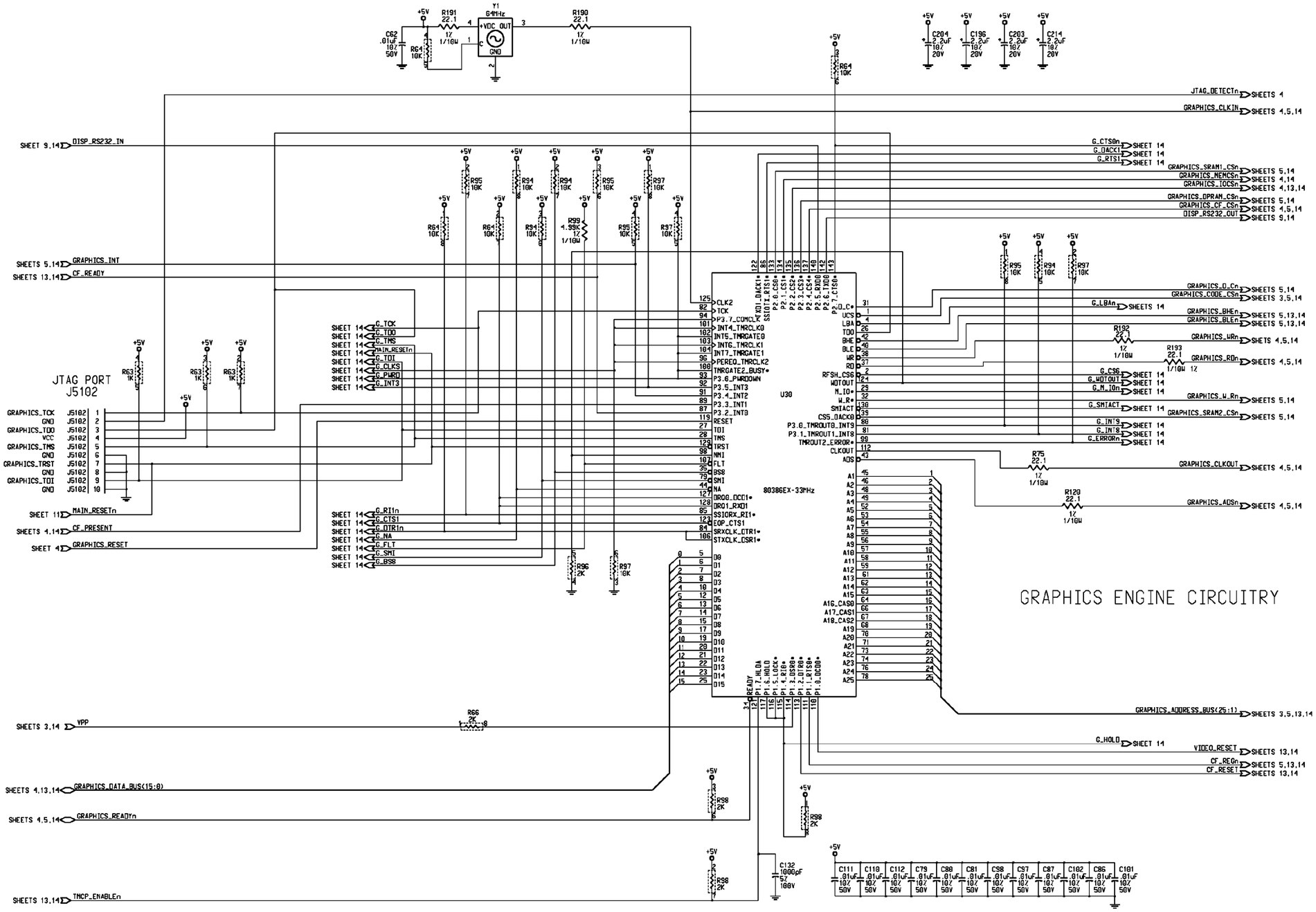


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 2 of 14)

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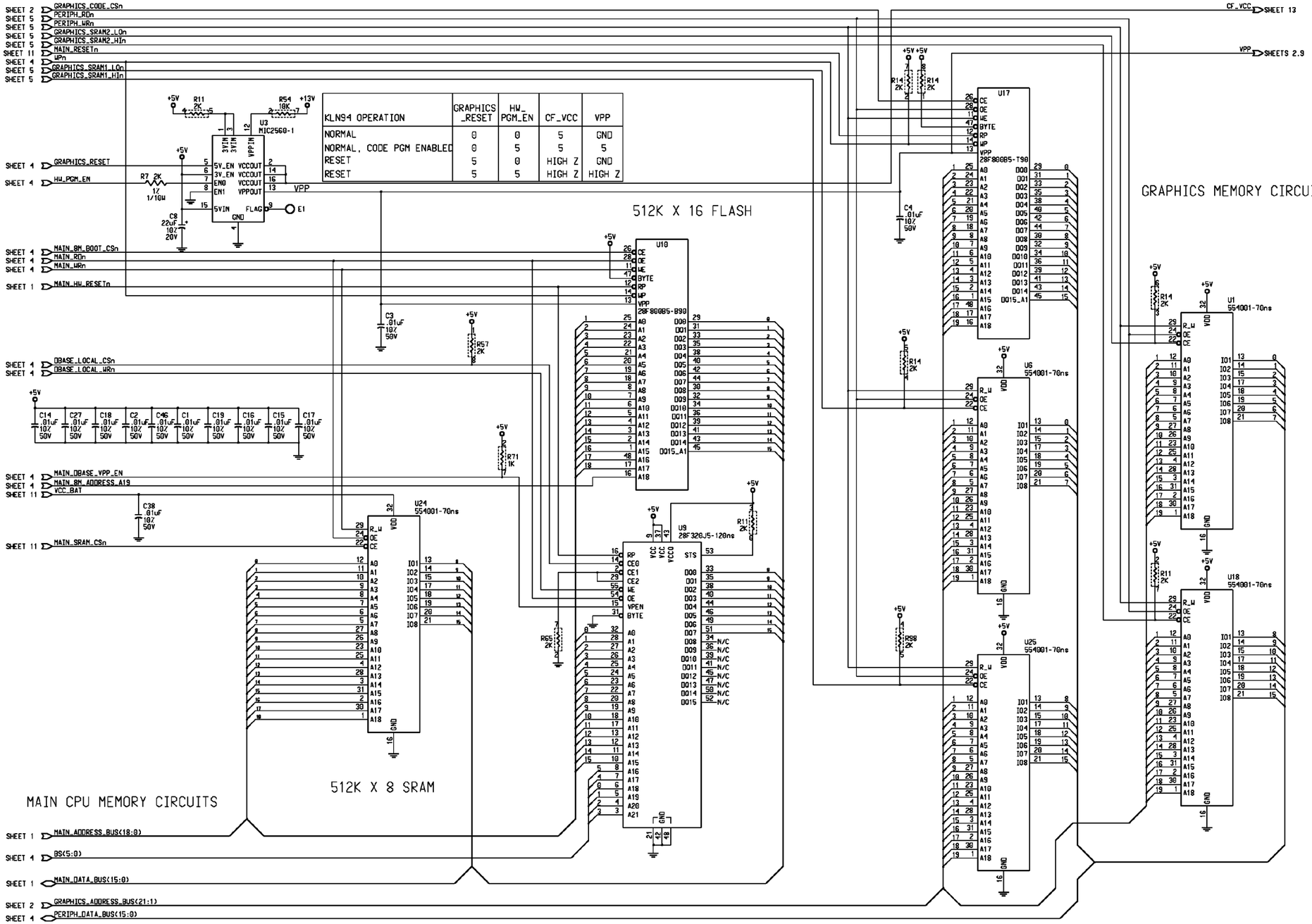


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 3 of 14

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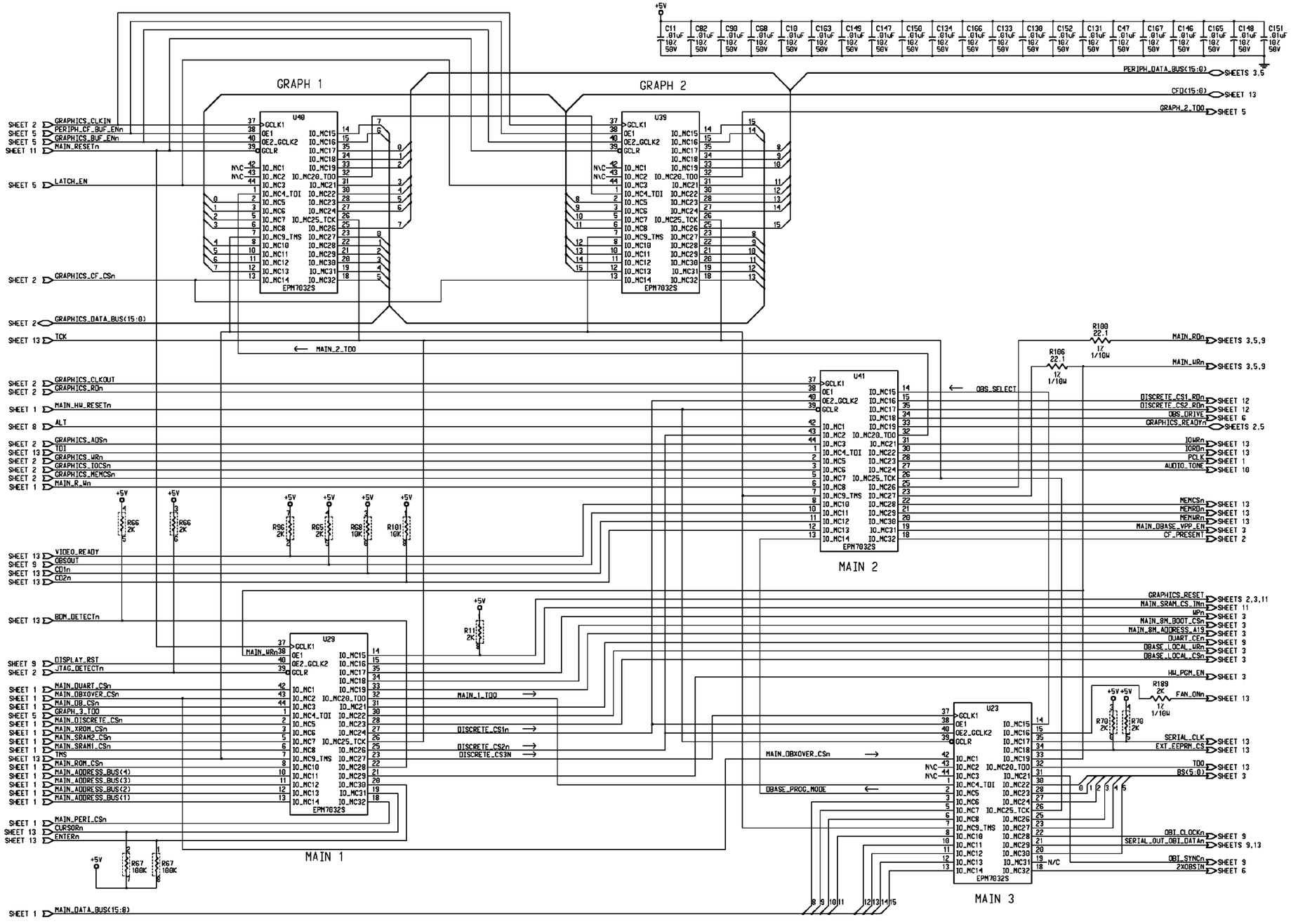


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 4 of 14)

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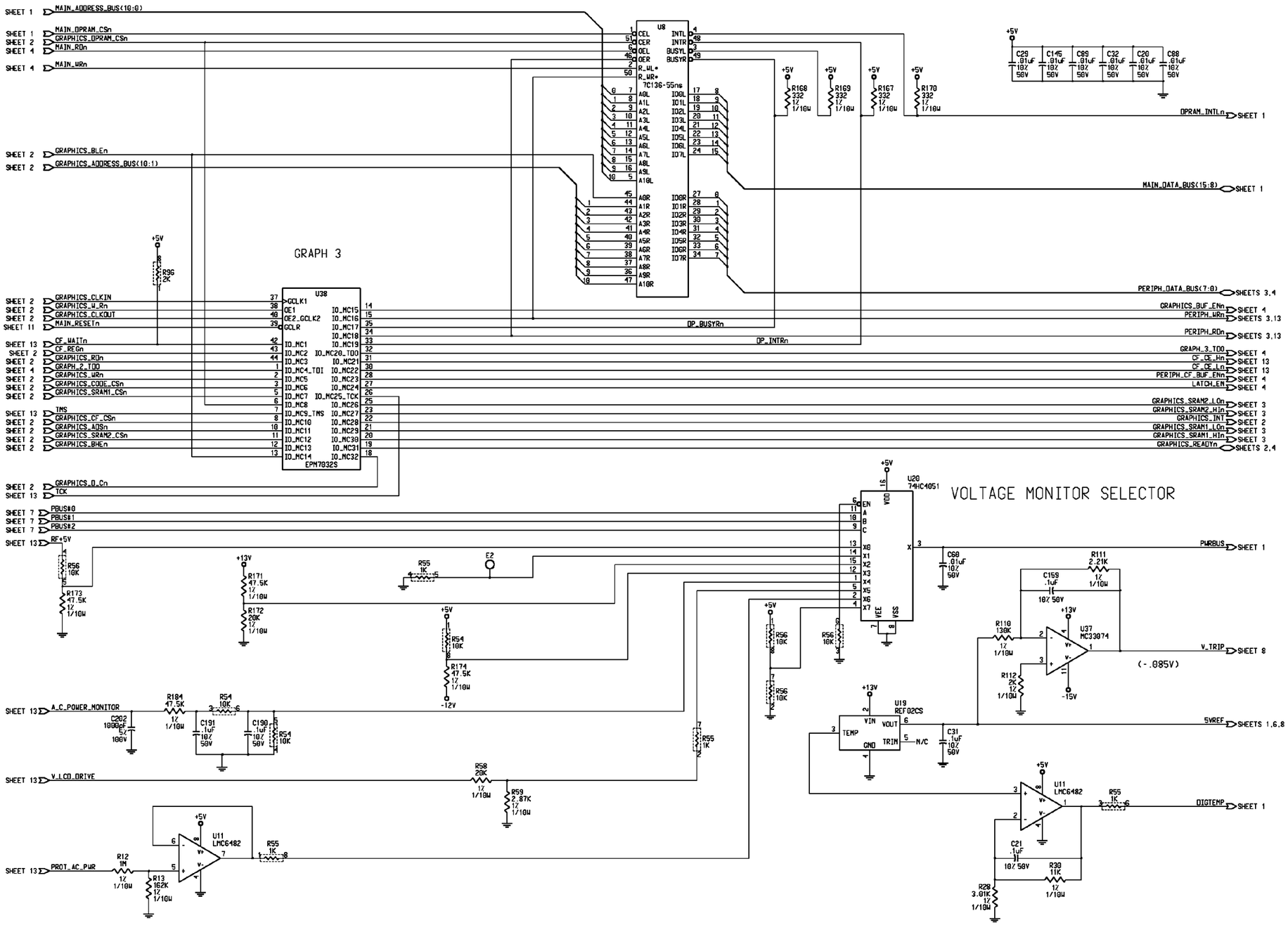


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 5 of 14)

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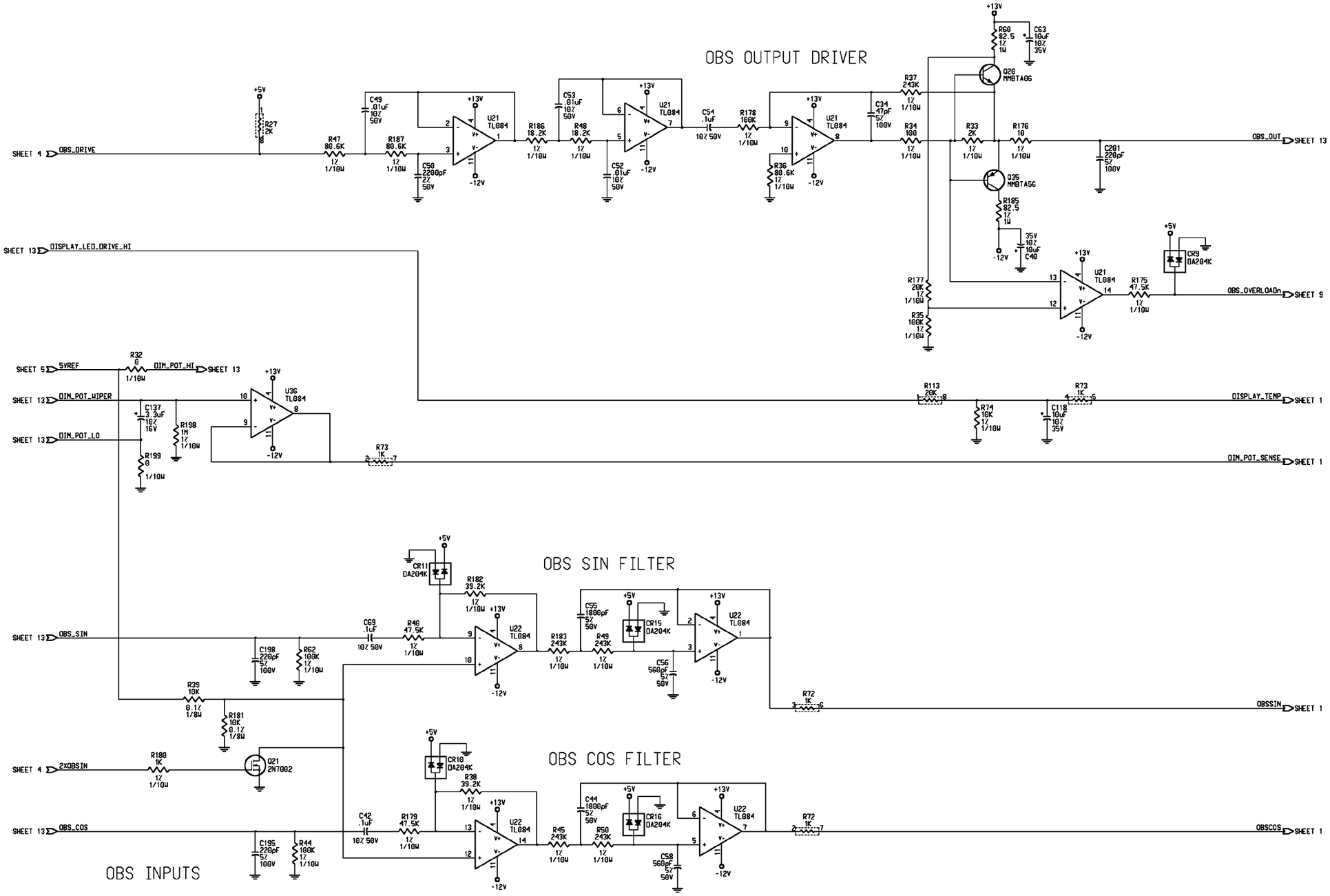


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 6 of 14)

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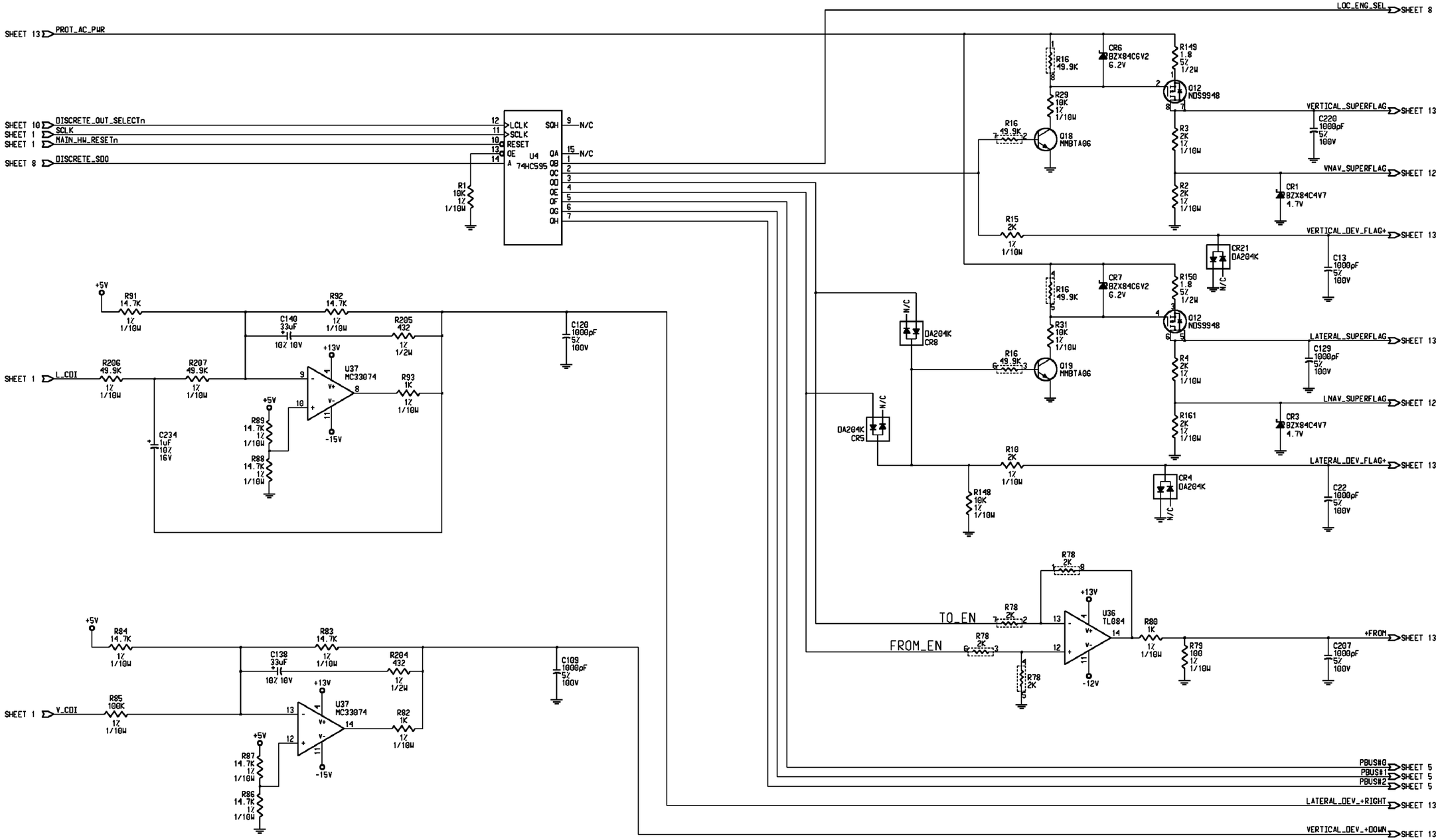


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 7 of 14)

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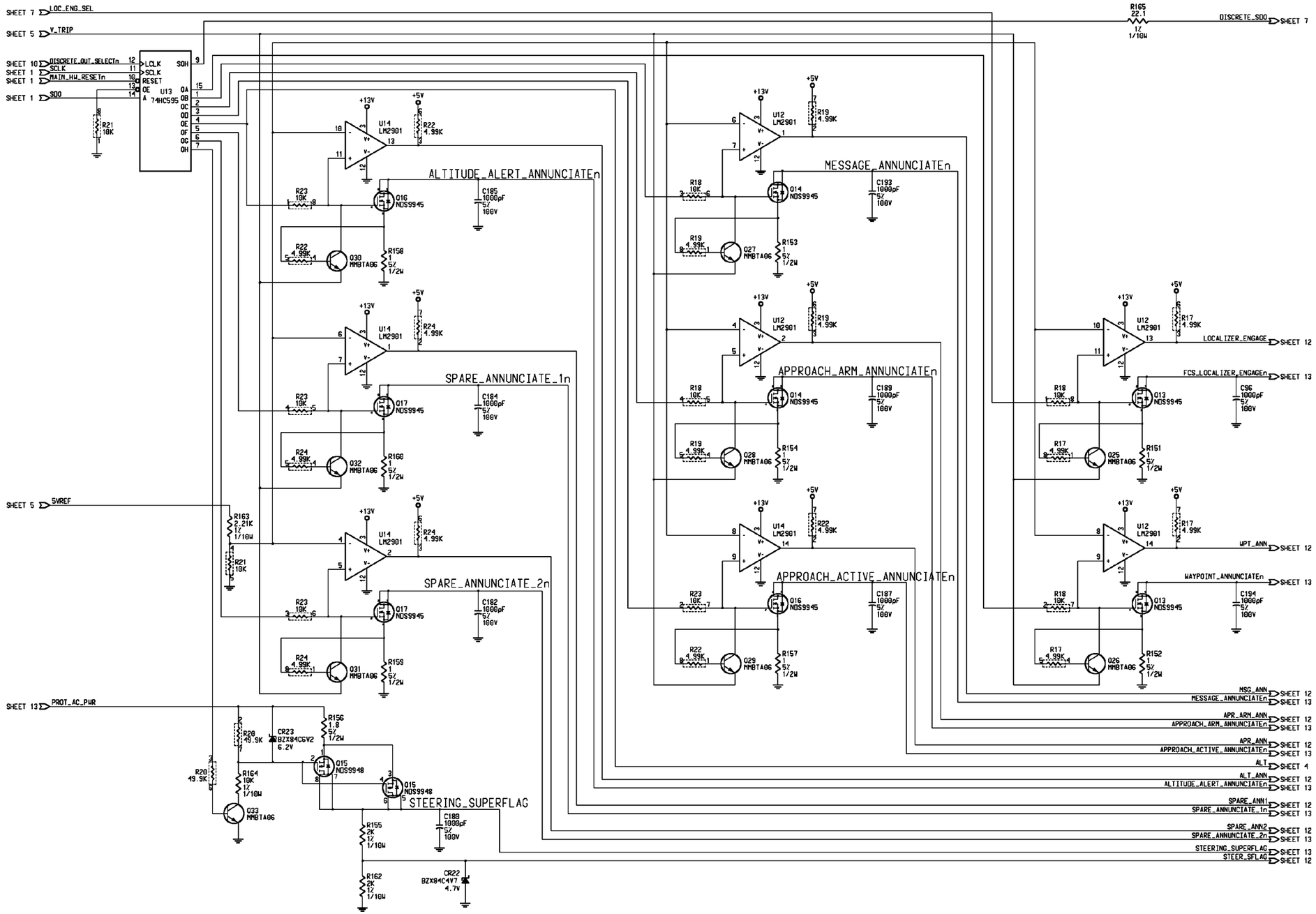


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 8 of 14)

Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

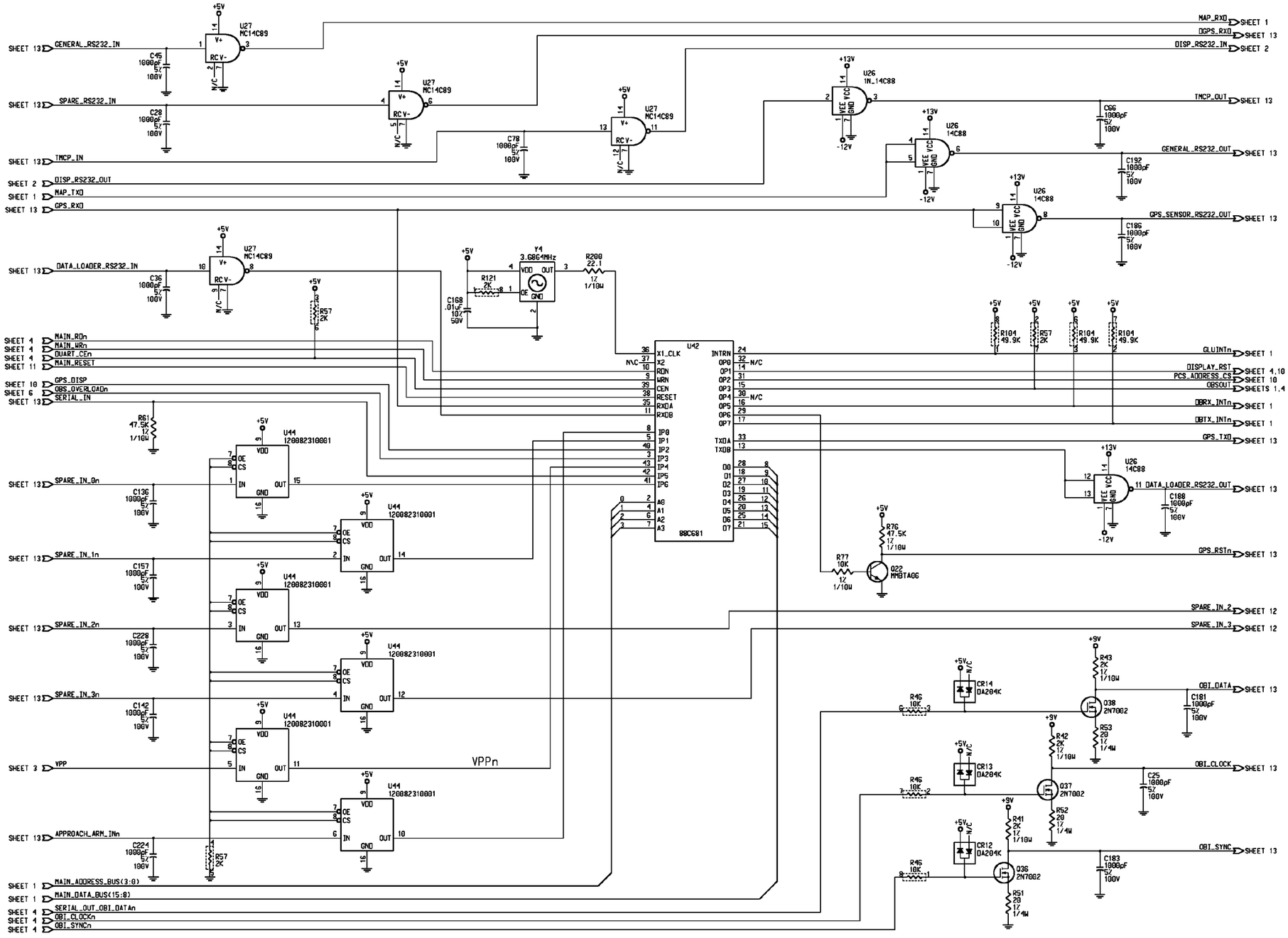


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 9 of 14)

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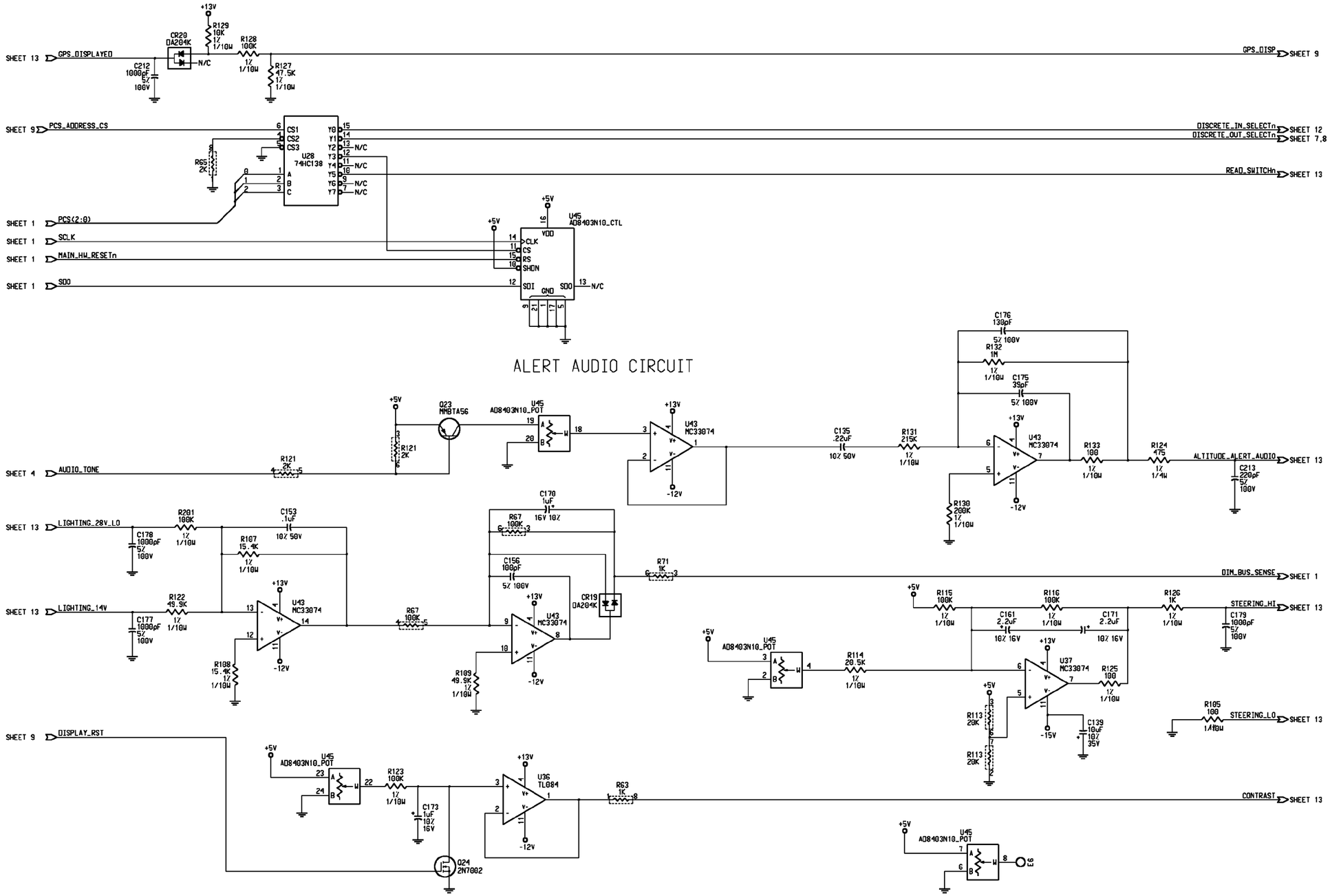


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 10 of 14)

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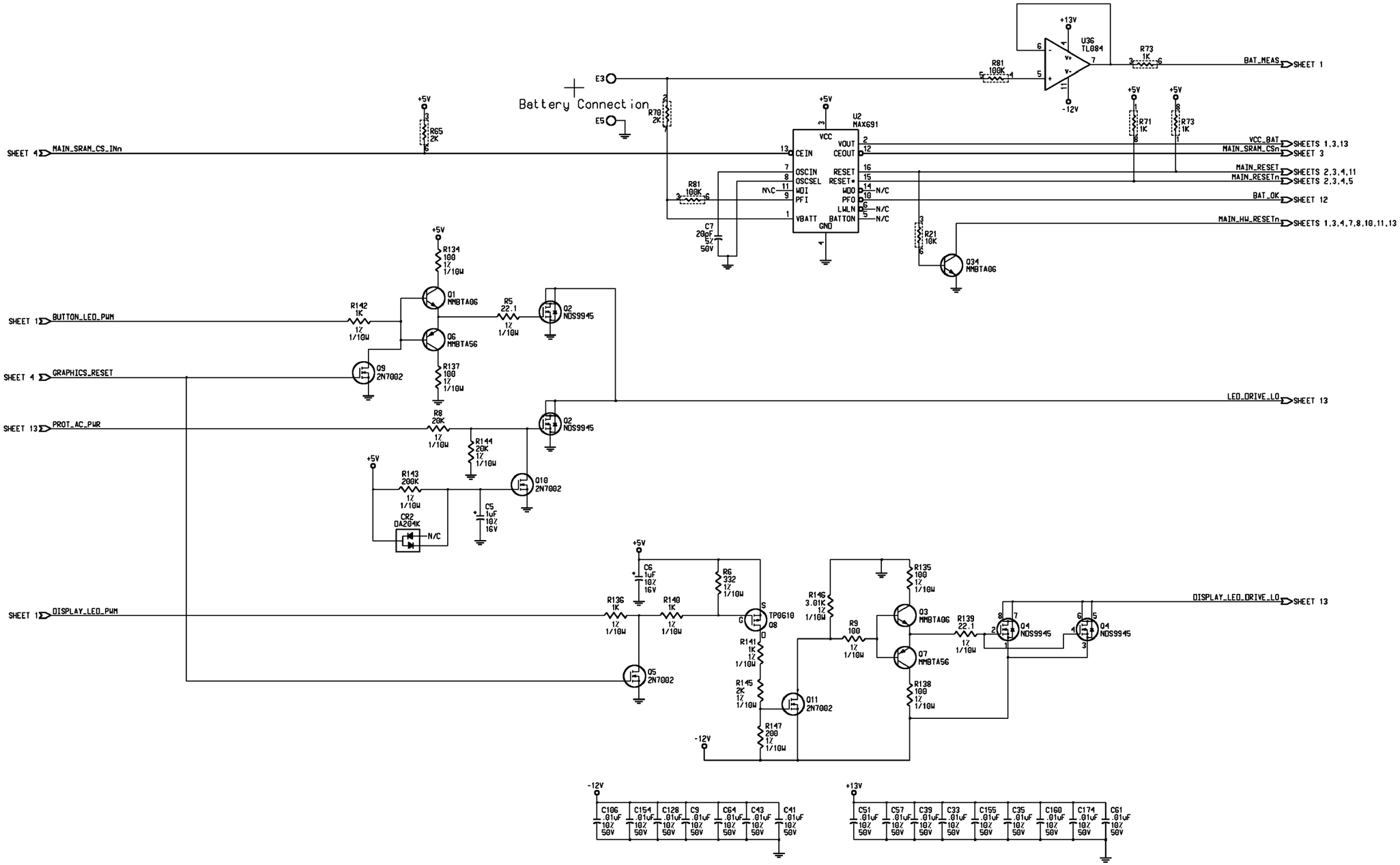


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 11 of 14)

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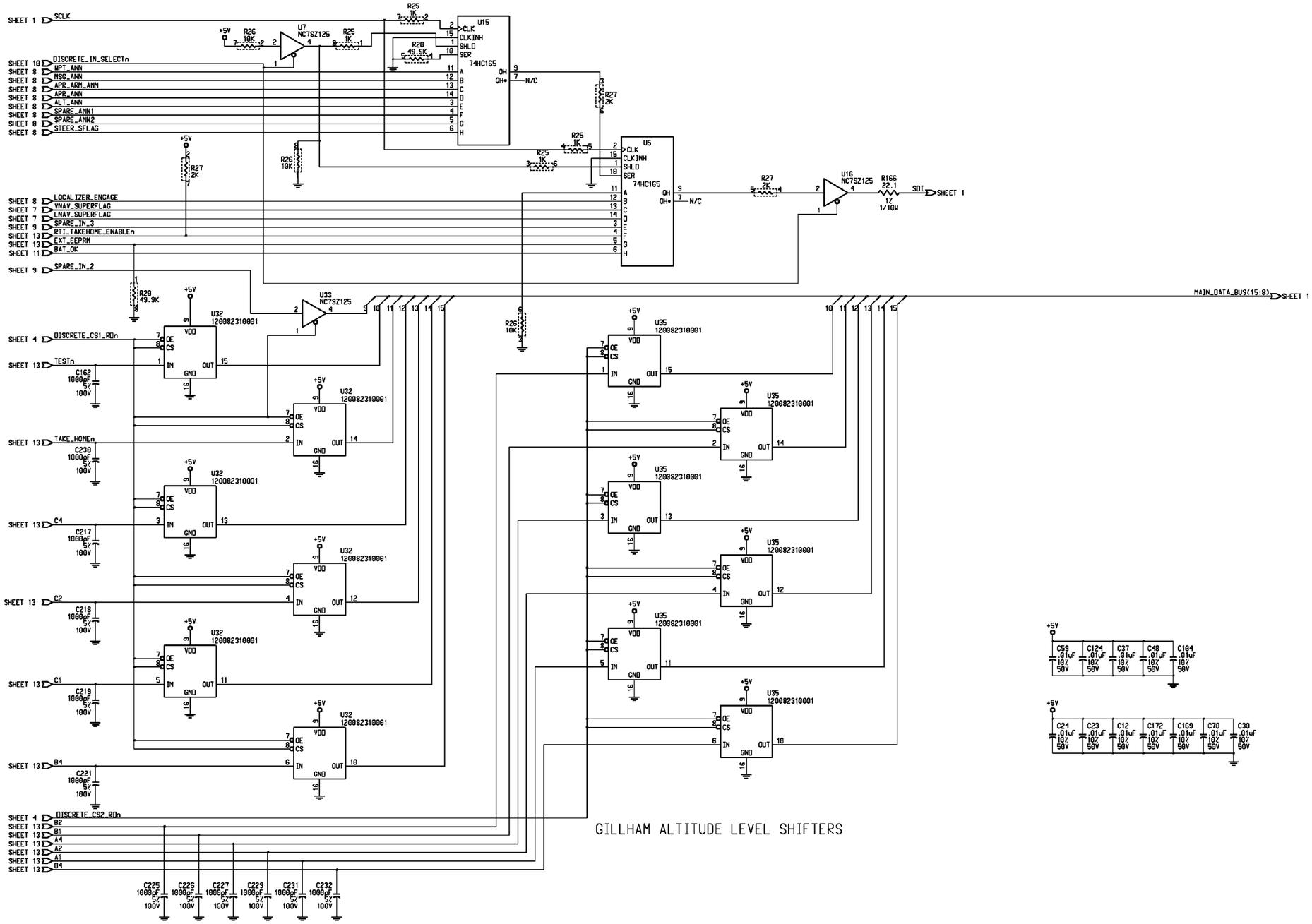


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 12 of 14)

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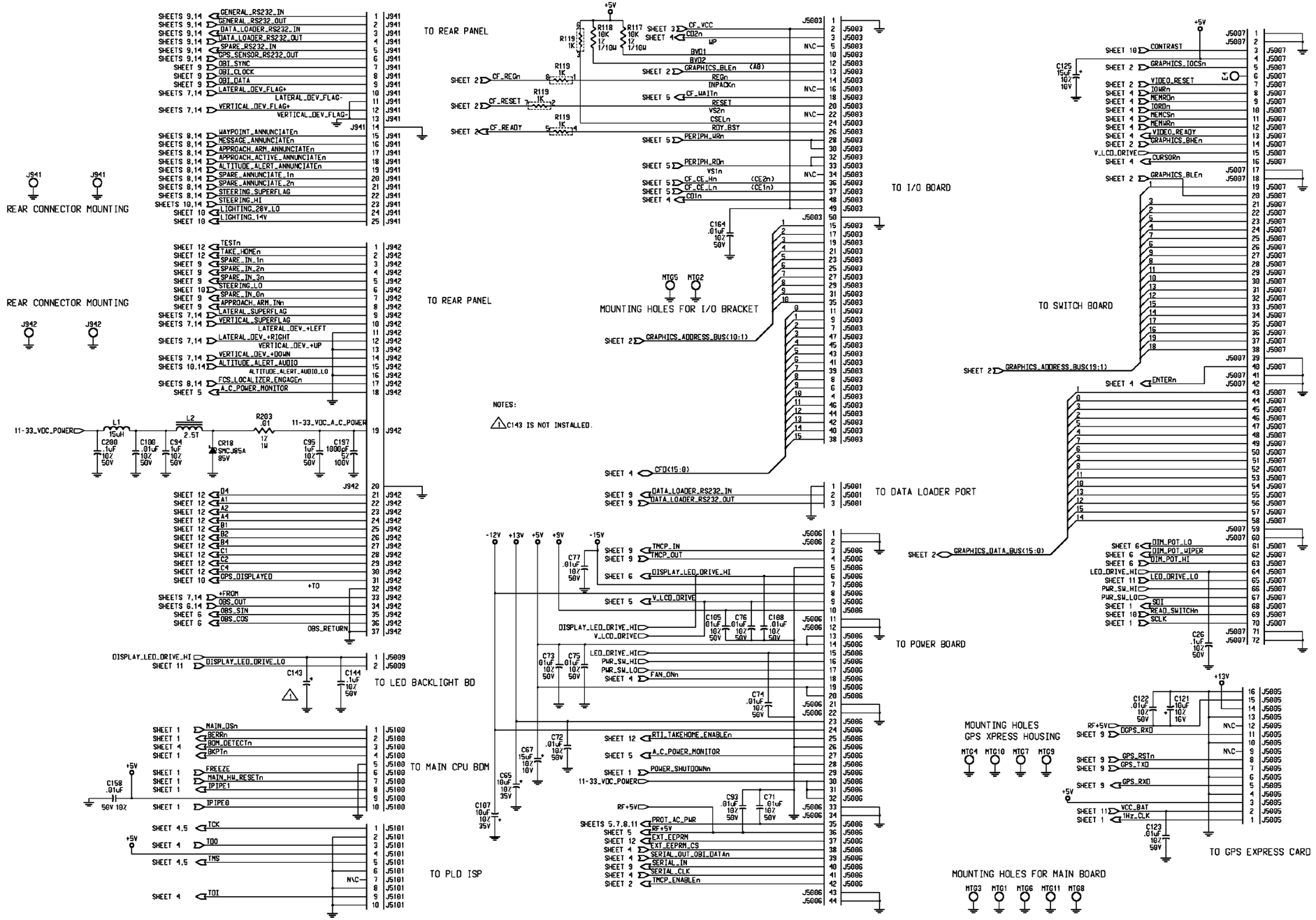


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 13 of 14

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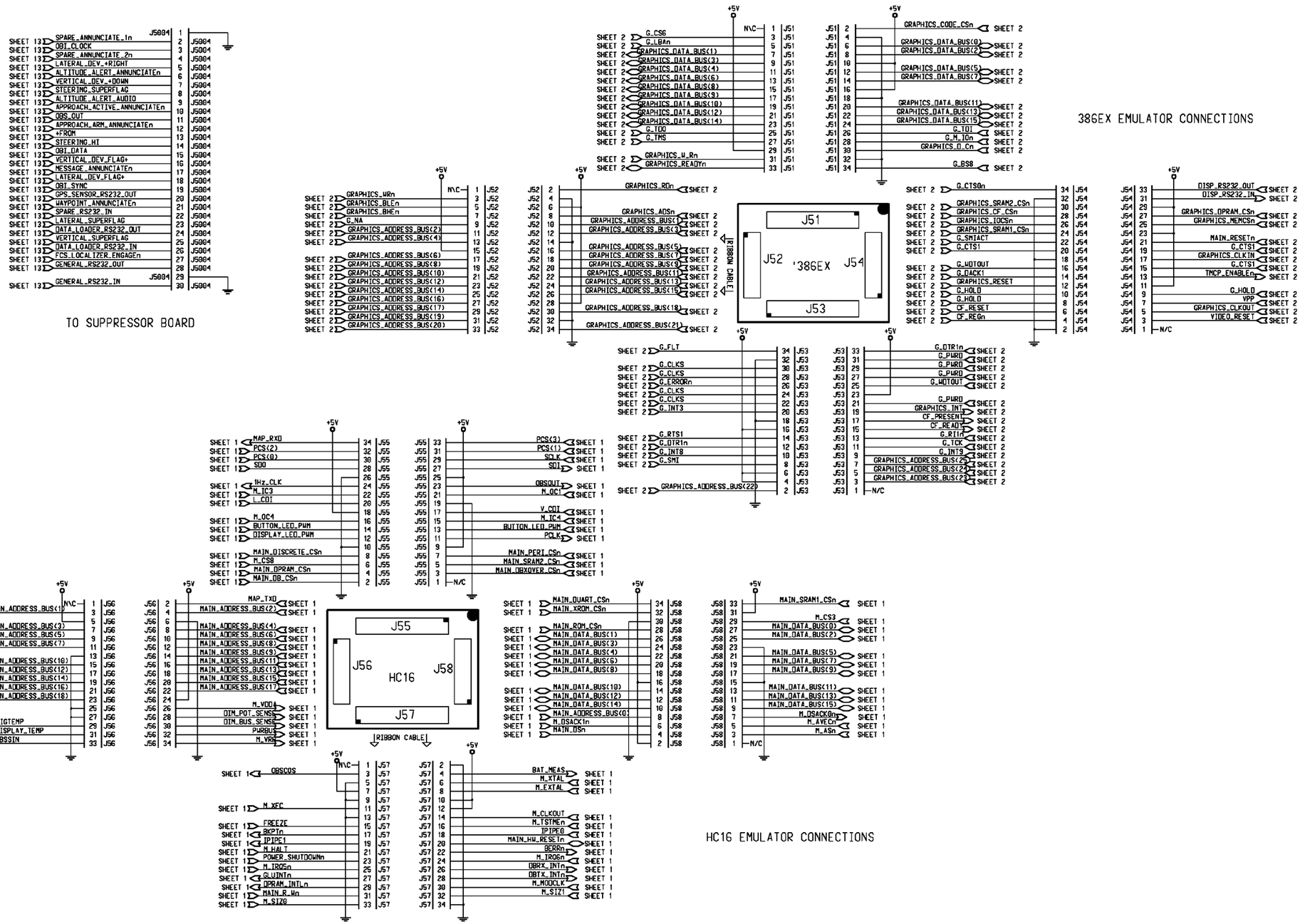


FIGURE 6-13
KLN 94 MAIN BOARD SCHEMATIC (P/N 002-09638-0000 Rev. F, Sheet 14 of 14)

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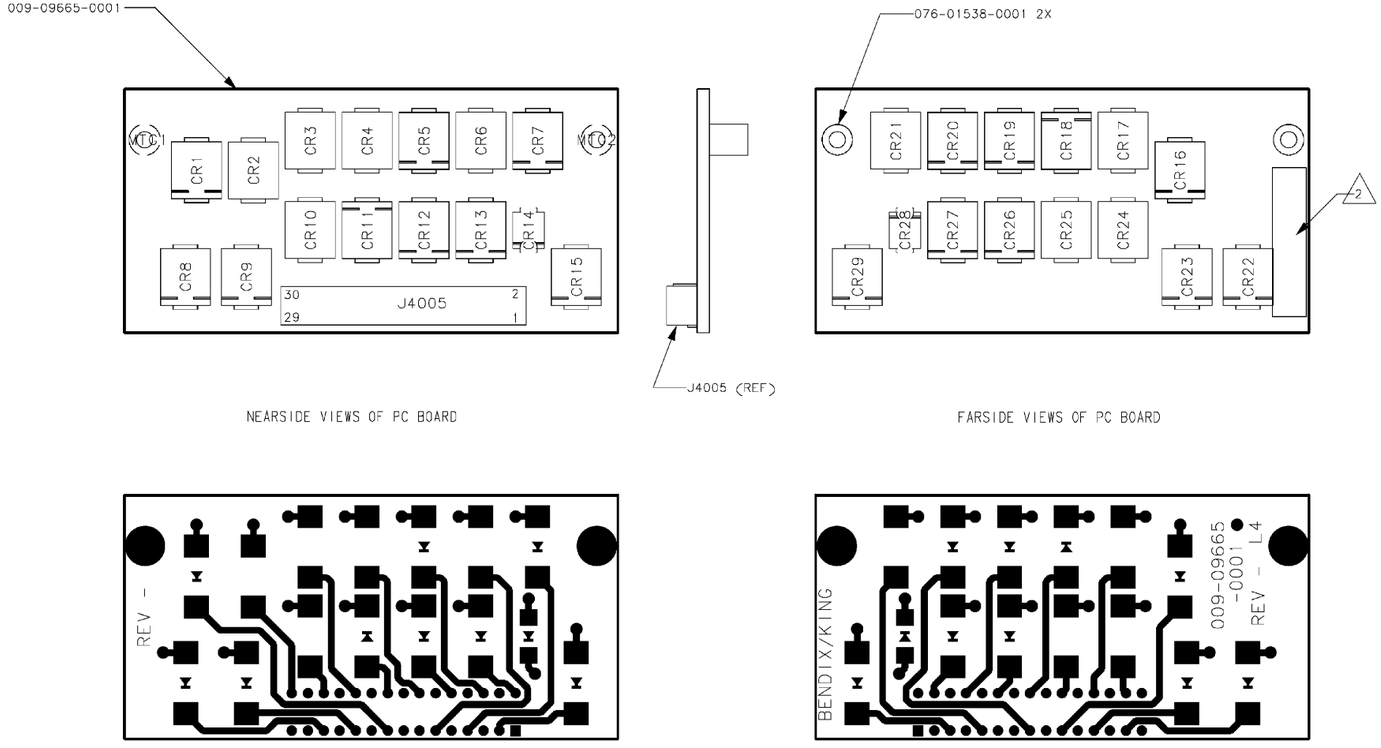
6.13 200-09665-0001 KLN 94 SUPPRESSOR BOARD Rev. -

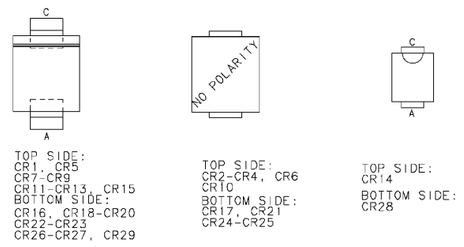
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
CR4001	007-05241-0002		TRNSRB 150W 40V	EA	1.00
CR4002	007-05241-0205		TRNSRB 1500W 24V	EA	1.00
CR4003	007-05241-0205		TRNSRB 1500W 24V	EA	1.00
CR4004	007-05241-0203		TRNSRB 1500W 15V	EA	1.00
CR4005	007-05241-0002		TRNSRB 150W 40V	EA	1.00
CR4006	007-05241-0203		TRNSRB 1500W 15V	EA	1.00
CR4007	007-05241-0003		TRNSRB 1500W 15V	EA	1.00
CR4008	007-05241-0002		TRNSRB 150W 40V	EA	1.00
CR4009	007-05241-0002		TRNSRB 150W 40V	EA	1.00
CR4010	007-05241-0205		TRNSRB 1500W 24V	EA	1.00
CR4011	007-05241-0003		TRNSRB 1500W 15V	EA	1.00
CR4012	007-05241-0002		TRNSRB 150W 40V	EA	1.00
CR4013	007-05241-0002		TRNSRB 150W 40V	EA	1.00
CR4014	007-06444-0002		DIO 1A 150V SMD	EA	1.00
CR4015	007-05241-0003		TRNSRB 1500W 15V	EA	1.00
CR4016	007-05241-0003		TRNSRB 1500W 15V	EA	1.00
CR4017	007-05241-0203		TRNSRB 1500W 15V	EA	1.00
CR4018	007-05241-0003		TRNSRB 1500W 15V	EA	1.00
CR4019	007-05241-0002		TRNSRB 150W 40V	EA	1.00
CR4020	007-05241-0003		TRNSRB 1500W 15V	EA	1.00
CR4021	007-05241-0203		TRNSRB 1500W 15V	EA	1.00
CR4022	007-05241-0002		TRNSRB 150W 40V	EA	1.00
CR4023	007-05241-0002		TRNSRB 150W 40V	EA	1.00
CR4024	007-05241-0203		TRNSRB 1500W 15V	EA	1.00
CR4025	007-05241-0203		TRNSRB 1500W 15V	EA	1.00
CR4026	007-05241-0002		TRNSRB 150W 40V	EA	1.00
CR4027	007-05241-0002		TRNSRB 150W 40V	EA	1.00
CR4028	007-06444-0002		DIO 1A 150V SMD	EA	1.00
CR4029	007-05241-0003		TRNSRB 1500W 15V	EA	1.00
J4005	030-03373-1415		CONNECTOR, HEADER,	EA	1.00
	002-09665-0000		SUPPRESSOR BOARD	RF	.00
	009-09665-0001		PCB, SUPPRESSOR BO	EA	1.00
	076-01538-0001		SPCR DIGITAL BD	EA	2.00
	192-09665-0001		KLN 94 SUPPRESSOR	RF	.00
	300-09665-0000		SUPPRESSOR BOARD	RF	.00

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NOTES:

1. POST COATING NOT REQUIRED.
2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC. 001-01101-0000.
3. ADD 4000 TO ALL REFERENCE DESIGNATORS, EXCEPT J4005 WHEN REFERRING TO PARTS LIST.
4. WHERE APPLICABLE, LIQUID STAKE ALL FASTENERS PER SPEC. 001-01080-0000.

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-09665-0001

FIGURE 6-14
KLN 94 SUPPRESSOR BOARD ASSEMBLY DRAWING (P/N 300-09665-0000 Rev. -)

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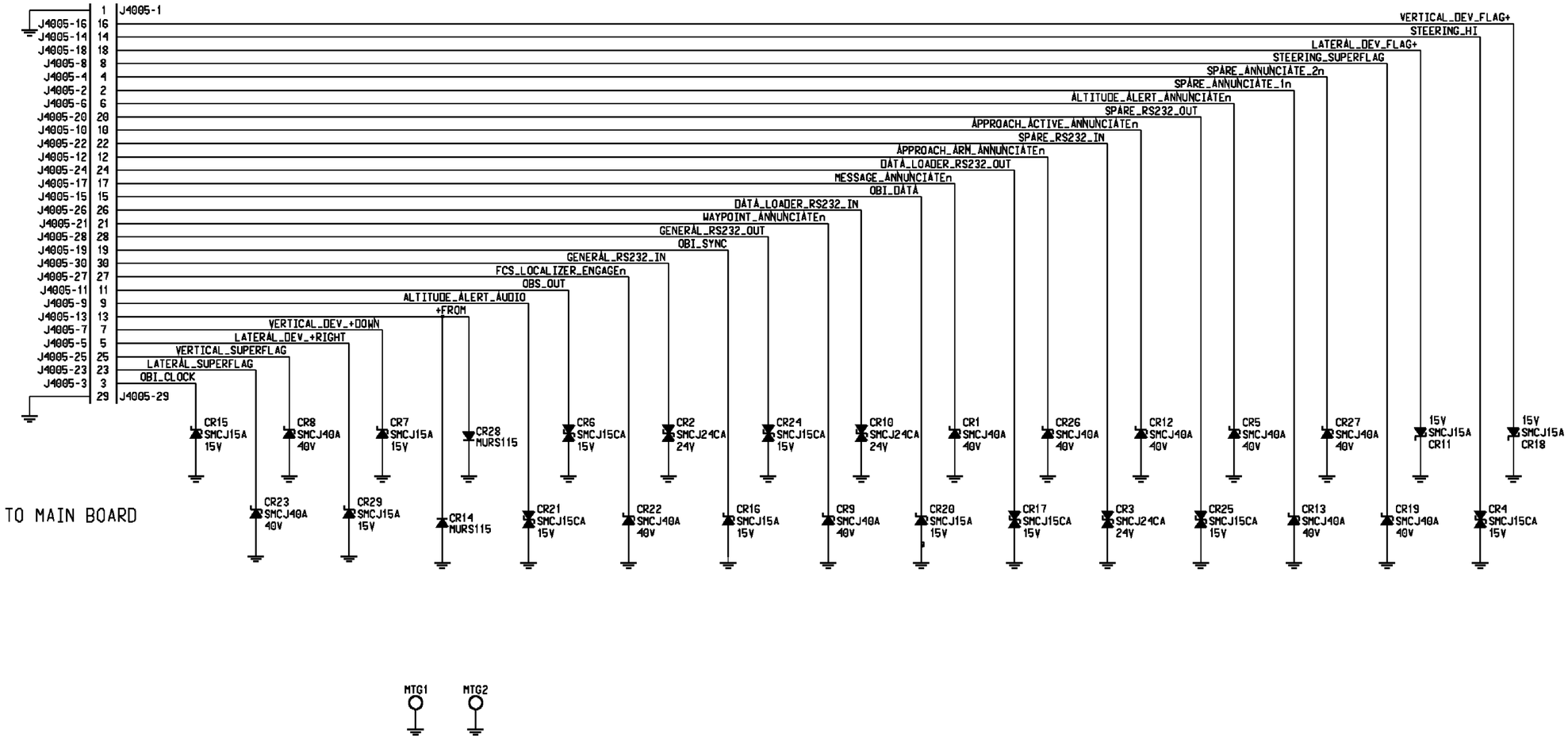


FIGURE 6-15
KLN 94 SUPPRESSOR BOARD SCHEMATIC (P/N 002-09665-0000 Rev. -)

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6.14 200-09642-0001 KLN 94 BUS I/O BOARD Rev. A

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
C3001	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C3002	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C3003	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C3004	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
J3005	030-03171-0025		CONN HDR RTANG 50P	EA	1.00
J945	030-03406-0001		CONN, HDR, PLG, SM	EA	1.00
	002-09642-0000		BUS I/O BOARD	RF	.00
	009-09642-0001		PCB, BUS I/O BOARD	EA	1.00
	076-01539-0000		SPACER CPU CARD	EA	2.00
	089-02144-0030		NUT FLAT 2-56	EA	2.00
	089-05899-0004		SCR PHP 2-56X1/4	EA	1.00
	089-06004-0004		SCR FHP 2-56X1/4	EA	1.00
	192-09642-0001		KLN 94 BUS I/O BD	RF	.00
	300-09642-0000		KLN 94 BUS I/O B	RF	.00

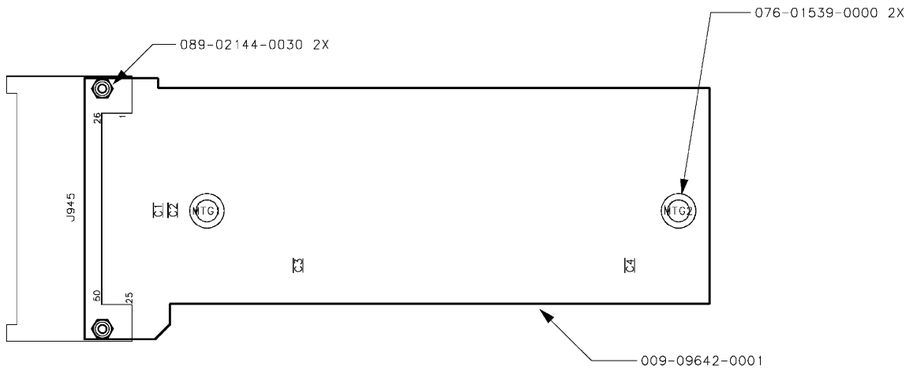
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

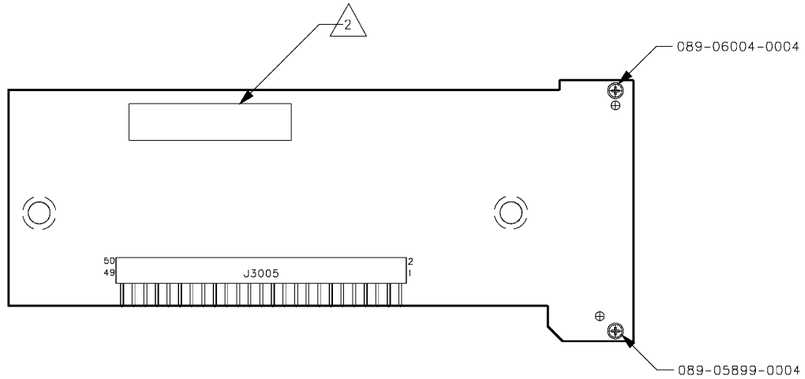
THIS PAGE IS RESERVED

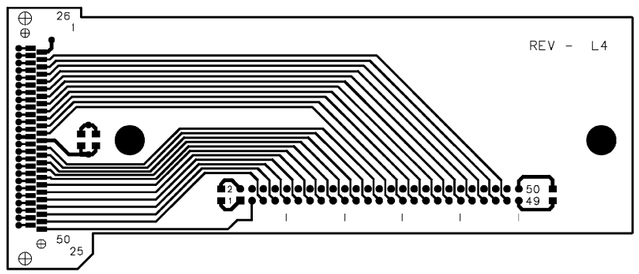
Artisan Technology Group - Quality Instrumentation ... Guaranteed | (888) 88-SOURCE | www.artisantg.com

NOTES:

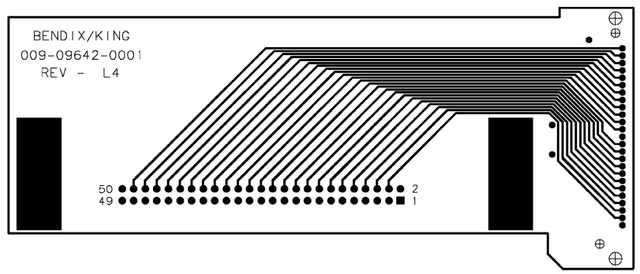
1. POST COATING NOT REQUIRED.
2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC. 001-01101-0000.
3. ADD 3000 TO ALL REFERENCE DESIGNATORS, EXCEPT J3005 AND J945 WHEN REFERRING TO PARTS LIST.
4. WHERE APPLICABLE, LIQUID STAKE ALL FASTENERS PER SPEC. 001-01080-0000.
5. UNLESS OTHERWISE NOTED, ALL SCREWS TO BE TIGHTENED TO TORQUE SPEC. 001-01100-0000.







NEARSIDE VIEW OF PC BOARD

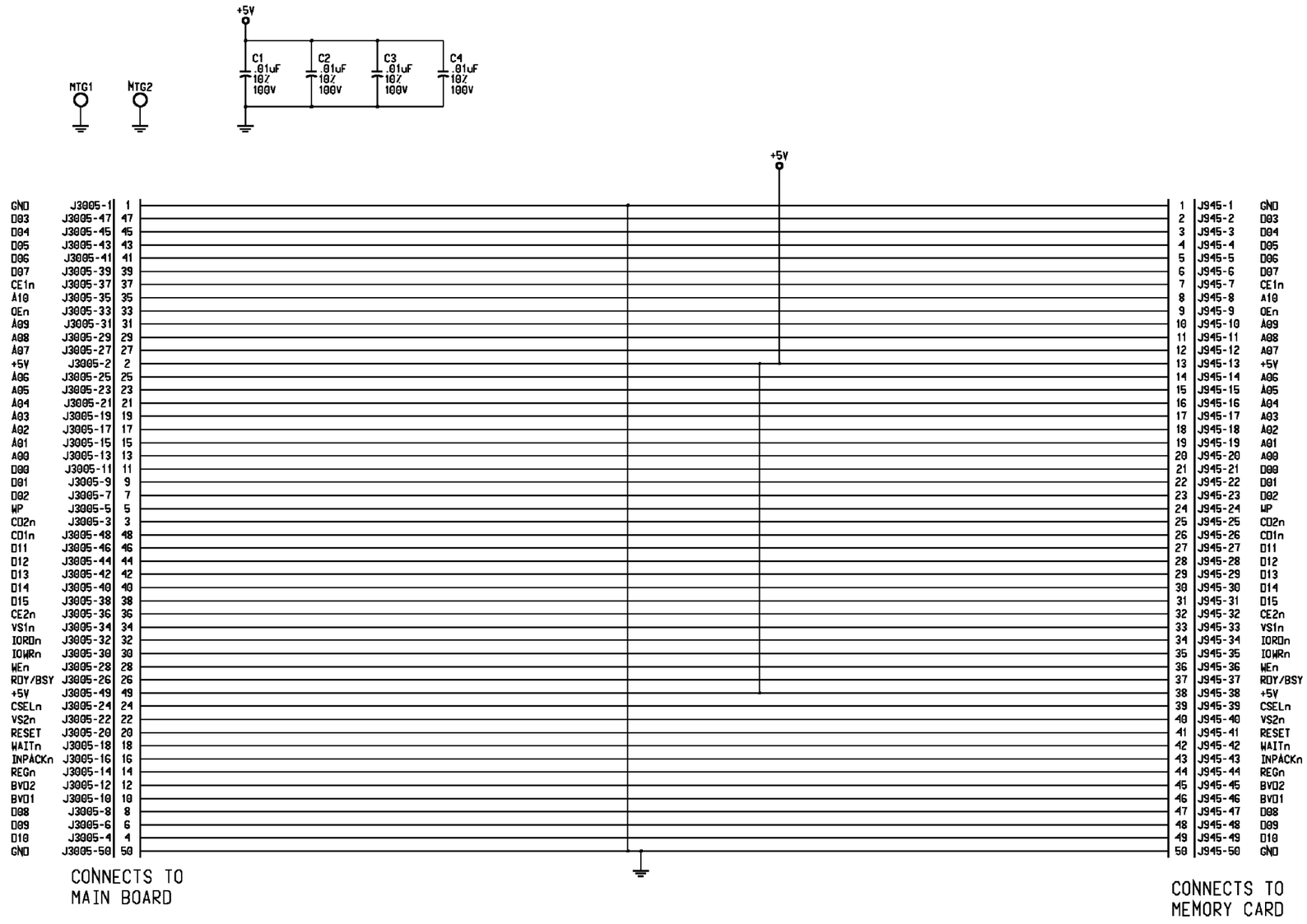


FARSIDE VIEW OF PC BOARD

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-09642-0001

FIGURE 6-16
KLN 94 BUS I/O BOARD ASSEMBLY DRAWING (P/N 300-09642-0000 Rev. B)

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NOTE: ADD 3000 TO ALL REFERENCE DESIGNATORS, EXCEPT J3005 AND J945 WHEN REFERRING TO PARTS LIST.

FIGURE 6-17
KLN 94 BUS I/O BOARD SCHEMATIC (P/N 002-09642-0000 Rev. -)

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6.15 200-09639-0001 KLN 94 POWER BOARD Rev. B

SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
C6001	097-00225-0008		CAP, HIGH CAPACITY	EA	1.00
C6002	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
C6003	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6004	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6005	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6006	097-00225-0008		CAP, HIGH CAPACITY	EA	1.00
C6007	096-01186-0049		CAP 10UF 50V 10%	EA	1.00
C6008	106-05101-1026		CAP CH 100PFNPO/10	EA	1.00
C6009	106-04471-0026		CH 470PF NPO/100V	EA	1.00
C6010	106-04102-0026		CH 1KPF NPO/100V	EA	1.00
C6011	097-00225-0008		CAP, HIGH CAPACITY	EA	1.00
C6013	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C6014	097-00225-0008		CAP, HIGH CAPACITY	EA	1.00
C6015	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C6016	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C6017	097-00225-0008		CAP, HIGH CAPACITY	EA	1.00
C6018	097-00214-0002		CAP AL 220UF 25V	EA	1.00
C6019	097-00214-0001		CAP AL 820UF 25V	EA	1.00
C6020	106-00129-0000		CAP CH 1UF X7R/50V	EA	1.00
C6021	106-04102-0026		CH 1KPF NPO/100V	EA	1.00
C6022	097-00214-0021		CAP AL 150UF 63V	EA	1.00
C6023	097-00214-0002		CAP AL 220UF 25V	EA	1.00
C6024	097-00214-0006		CAP AL 680UF 50V	EA	1.00
C6025	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6026	097-00214-0021		CAP AL 150UF 63V	EA	1.00
C6027	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
C6028	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6029	097-00214-0021		CAP AL 150UF 63V	EA	1.00
C6030	097-00214-0013		CAP AL 2200UF 25V	EA	1.00
C6031	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C6032	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6033	106-04102-0026		CH 1KPF NPO/100V	EA	1.00
C6034	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6035	096-01186-0011		CAP 47UF 10V 10%	EA	1.00
C6036	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
C6037	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C6038	097-00214-0013		CAP AL 2200UF 25V	EA	1.00
C6039	097-00217-0013		CAP EL 220UF 10V	EA	1.00
C6040	106-05101-1026		CAP CH 100PFNPO/10	EA	1.00
C6041	106-04471-0026		CH 470PF NPO/100V	EA	1.00
C6042	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C6043	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6044	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C6045	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C6046	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
C6047	096-01186-0049		CAP 10UF 50V 10%	EA	1.00
C6049	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6050	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C6051	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
C6052	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6053	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6054	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C6055	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6056	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C6057	096-01186-0012		CAP 1.0UF 16V 10%	EA	1.00
C6058	096-01186-0027		CAP .33UF 35V 10%	EA	1.00
C6059	096-01186-0049		CAP 10UF 50V 10%	EA	1.00
C6060	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
C6061	106-05103-0057		CAP CH 10KX7R/100V	EA	1.00
C6062	106-04104-0047		CH 100KX7R/50V	EA	1.00
C6063	096-01186-0036		CAP 10UF 35V 10%	EA	1.00
CR6001	007-05117-0022		DIO Z 27V SOT	EA	1.00
CR6002	007-06444-0002		DIO 1A 150V SMD	EA	1.00
CR6003	007-05117-0012		DIO Z 10V SOT	EA	1.00
CR6004	007-05117-0017		DIO Z 16V SOT	EA	1.00
CR6005	007-06227-0000		SOT23 DIO MMBD6100	EA	1.00
CR6006	007-05245-0013		DIO Z 11V SMD	EA	1.00
CR6007	007-06223-0000		DIO DA204K	EA	1.00
CR6008	007-06227-0000		SOT23 DIO MMBD6100	EA	1.00
CR6009	007-06227-0000		SOT23 DIO MMBD6100	EA	1.00
CR6010	007-06444-0002		DIO 1A 150V SMD	EA	1.00
CR6011	007-06223-0000		DIO DA204K	EA	1.00
CR6012	007-05117-0012		DIO Z 10V SOT	EA	1.00
CR6013	007-06223-0000		DIO DA204K	EA	1.00
CR6014	007-05117-0024		DIO Z 33V SOT	EA	1.00
CR6015	007-05117-0011		DIO Z 9.1V SOT	EA	1.00
CR6016	007-06131-0000		DIO CT RECTIFIER	EA	1.00
CR6017	007-05241-0011		DIODE 1500W 51V	EA	1.00
CR6018	007-06437-0003		DIO 3A 200V SMD	EA	1.00
CR6019	007-06444-0002		DIO 1A 150V SMD	EA	1.00
CR6020	007-06223-0000		DIO DA204K	EA	1.00
CR6021	007-06223-0000		DIO DA204K	EA	1.00
CR6022	007-05117-0019		DIO Z 20V SOT	EA	1.00
CR6023	007-06444-0002		DIO 1A 150V SMD	EA	1.00
CR6024	007-06444-0002		DIO 1A 150V SMD	EA	1.00
CR6025	007-06223-0000		DIO DA204K	EA	1.00
CR6026	007-06227-0000		SOT23 DIO MMBD6100	EA	1.00
CR6027	007-06223-0000		DIO DA204K	EA	1.00
CR6028	007-06444-0002		DIO 1A 150V SMD	EA	1.00
CR6029	007-06448-0000		DIO SCHTKY 1A 30V	EA	1.00
CR6030	007-05117-0017		DIO Z 16V SOT	EA	1.00
CR6031	007-06444-0002		DIO 1A 150V SMD	EA	1.00
CR6032	007-06402-0001		SCHOTTKY 60V 3A	EA	1.00
CR6033	007-05117-0007		DIO Z 6.2V SOT	EA	1.00
CR6034	007-06223-0000		DIO DA204K	EA	1.00
CR6035	007-05117-0007		DIO Z 6.2V SOT	EA	1.00
CR6036	007-05117-0017		DIO Z 16V SOT	EA	1.00
CR6037	007-06227-0000		SOT23 DIO MMBD6100	EA	1.00
CR6038	007-06227-0000		SOT23 DIO MMBD6100	EA	1.00
J6005	030-03408-0009		CONN, HDR, PLG, EJ	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
J6008	030-03386-0002		CONN, HDR, MALE, S	EA	1.00
L6001	019-02753-1680		COIL 68UH 1.26A	EA	1.00
L6002	019-02753-1680		COIL 68UH 1.26A	EA	1.00
L6003	019-02369-0001		IND 15UH	EA	1.00
L6004	019-02753-1220		COIL 22UH 2.2A	EA	1.00
L6005	013-00172-0001		FERR BEAD SRFC MT	EA	1.00
L6006	019-02753-1220		COIL 22UH 2.2A	EA	1.00
L6007	019-02753-1220		COIL 22UH 2.2A	EA	1.00
L6008	019-02753-1220		COIL 22UH 2.2A	EA	1.00
L6009	019-02753-1680		COIL 68UH 1.26A	EA	1.00
Q6001	007-00913-0000		BST40 TRANSISTOR	EA	1.00
Q6002	007-01025-0000		MOSFET DUAL SO-8	EA	1.00
Q6003	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q6004	007-00466-0000		XSTR S PNP MMBTA56	EA	1.00
Q6005	007-00466-0000		XSTR S PNP MMBTA56	EA	1.00
Q6006	007-00903-0000		2N7002 MOSFET	EA	1.00
Q6007	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q6008	007-01023-0000		MOSFET DUAL SO-8	EA	1.00
Q6009	007-01025-0000		MOSFET DUAL SO-8	EA	1.00
Q6010	007-00903-0000		2N7002 MOSFET	EA	1.00
Q6011	007-00466-0000		XSTR S PNP MMBTA56	EA	1.00
Q6012	007-00937-0000		XSTR P-CHAN HEXFET	EA	1.00
Q6013	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q6014	007-00466-0000		XSTR S PNP MMBTA56	EA	1.00
Q6015	007-00937-0000		XSTR P-CHAN HEXFET	EA	1.00
Q6016	007-00886-0000		XSTR MOSFET IRF540	EA	1.00
Q6017	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q6018	007-01025-0000		MOSFET DUAL SO-8	EA	1.00
Q6019	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q6020	007-00466-0000		XSTR S PNP MMBTA56	EA	1.00
Q6021	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q6022	007-01025-0000		MOSFET DUAL SO-8	EA	1.00
Q6023	007-00466-0000		XSTR S PNP MMBTA56	EA	1.00
Q6024	007-00914-0000		BST16 TRANSISTOR	EA	1.00
Q6025	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q6026	007-00914-0000		BST16 TRANSISTOR	EA	1.00
Q6027	007-00466-0000		XSTR S PNP MMBTA56	EA	1.00
Q6028	007-00467-0000		XSTR S NPN MMBTA06	EA	1.00
Q6029	007-00903-0000		2N7002 MOSFET	EA	1.00
Q6030	007-00903-0000		2N7002 MOSFET	EA	1.00
R6001	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R6002	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6003	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6004	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6005	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R6006	139-02000-0010		RES CH 200 OHMS 1%	EA	1.00
R6007	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6008	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6009	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6010	139-01272-0010		RES CH 12.7K TW 1%	EA	1.00
R6011	139-03320-0010		RES CH 332 .1W 1%	EA	1.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
R6012	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6013	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6014	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R6015	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R6016	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R6017	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6018	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6019	130-09006-1221		RES CH 2.2 QW 5%	EA	1.00
R6020	130-09006-1221		RES CH 2.2 QW 5%	EA	1.00
R6021	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6022	139-02000-0010		RES CH 200 OHMS 1%	EA	1.00
R6023	139-01272-0010		RES CH 12.7K TW 1%	EA	1.00
R6024	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R6025	139-03091-0010		RES CH 3.09K TW 1%	EA	1.00
R6026	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R6027	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6028	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R6029	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6030	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6031	139-02002-0010		RES CH 20K TW 1%	EA	1.00
R6032	139-02003-0010		RES CH 200K .1W 1%	EA	1.00
R6033	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R6034	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6035	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R6036	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6037	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6038	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R6039	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6040	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6041	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6042	139-01001-0010		RES CH 1000 .1W 1%	EA	1.00
R6043	139-01002-0020		RES CH 10000 QW 1%	EA	1.00
R6044	139-01002-0020		RES CH 10000 QW 1%	EA	1.00
R6045	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R6046	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R6047	139-03010-0020		RES CH 301 QW 1%	EA	1.00
R6048	130-09006-0102		RES CH 0.1 QW 10%	EA	1.00
R6049	130-09006-0102		RES CH 0.1 QW 10%	EA	1.00
R6050	139-00221-0010		RES CH 22.1 TW 1%	EA	1.00
R6051	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R6052	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R6053	139-03320-0010		RES CH 332 .1W 1%	EA	1.00
R6054	139-03011-0010		RES CH 3.01K .1W 1	EA	1.00
R6055	139-01272-0010		RES CH 12.7K TW 1%	EA	1.00
R6056	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R6057	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6058	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6059	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6060	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R6061	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6062	139-01002-0010		RES CH 10K TW 1%	EA	1.00

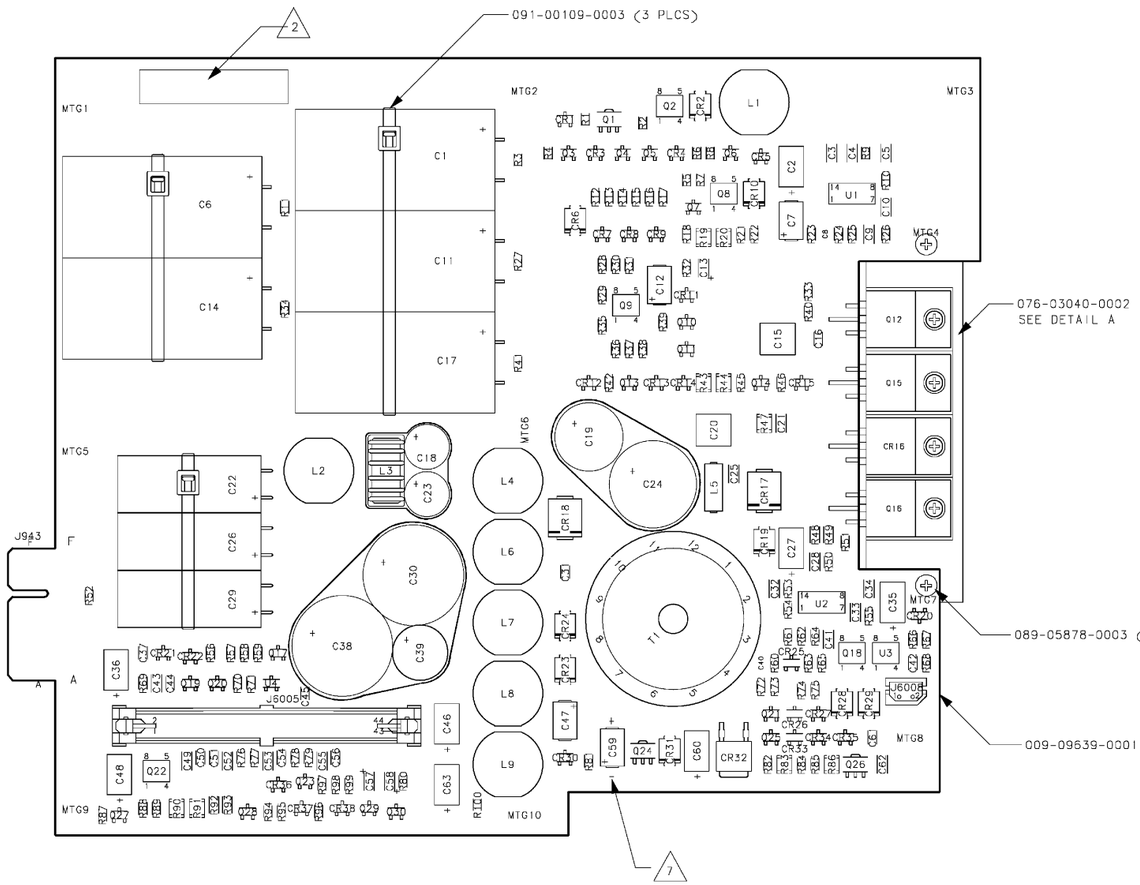
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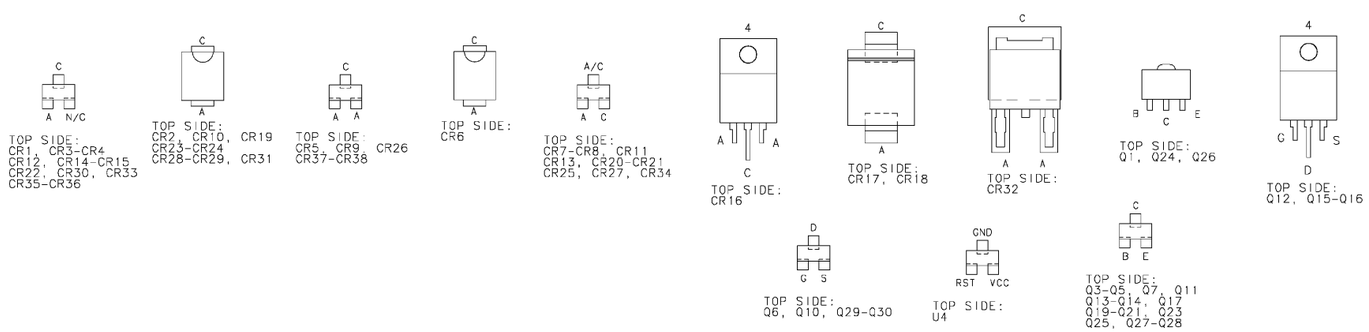
SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
R6063	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R6064	139-01502-0010		RES CH 15 K .1W 1%	EA	1.00
R6065	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R6066	139-01372-0010		RES SM 13.7K 1/10W	EA	1.00
R6067	139-02002-0010		RES CH 20K TW 1%	EA	1.00
R6068	139-04751-0010		RES CH 4.75K .1W 1	EA	1.00
R6069	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6070	139-00100-0010		RES CH 10 OHMS 1%	EA	1.00
R6071	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R6072	139-03091-0010		RES CH 3.09K TW 1%	EA	1.00
R6073	139-01003-0010		RES CH 100K TW 1%	EA	1.00
R6074	139-01152-0010		RES CH 11.5K TW 1%	EA	1.00
R6075	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6076	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R6077	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R6078	139-01623-0010		RES CH 162000 .1W	EA	1.00
R6079	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6080	139-01623-0010		RES CH 162000 .1W	EA	1.00
R6081	139-02001-0010		RES CH 2.00K TW 1%	EA	1.00
R6082	139-04751-0010		RES CH 4.75K .1W 1	EA	1.00
R6083	139-01001-0020		RES CH 1000 QW 1%	EA	1.00
R6084	139-01372-0010		RES SM 13.7K 1/10W	EA	1.00
R6085	139-01372-0010		RES SM 13.7K 1/10W	EA	1.00
R6086	139-01002-0020		RES CH 10000 QW 1%	EA	1.00
R6087	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6088	139-04992-0010		RES SM 49.9K 1/10W	EA	1.00
R6089	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6090	130-09006-1221		RES CH 2.2 QW 5%	EA	1.00
R6091	130-09006-1221		RES CH 2.2 QW 5%	EA	1.00
R6092	130-09006-0102		RES CH 0.1 QW 10%	EA	1.00
R6093	130-09006-0102		RES CH 0.1 QW 10%	EA	1.00
R6094	139-01623-0010		RES CH 162000 .1W	EA	1.00
R6095	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R6096	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6097	139-01002-0010		RES CH 10K TW 1%	EA	1.00
R6098	139-01000-0010		RES CH 100 .1W 1%	EA	1.00
R6099	139-01004-0010		RES CH 1M TW 1%	EA	1.00
R6100	139-01002-0010		RES CH 10K TW 1%	EA	1.00
T6001	019-07285-0001		TRANSFORMER, FLYBA	EA	1.00
U6001	120-03430-0000		IC 2843	EA	1.00
U6002	120-03430-0000		IC 2843	EA	1.00
U6003	120-03127-0011		IC LM2903 SO PKG	EA	1.00
U6004	120-03693-0001		POWER MONITOR	EA	1.00
	002-09639-0000		KLN 94 POWER BO	RF	.00
	009-09639-0001		PCB, POWER BOARD	EA	1.00
	076-03040-0002		HEATSINK, W/FINISH	EA	1.00
	089-05878-0003		SCR PHP 4-40X3/16	EA	2.00
	089-05903-0003		SCR PHP 4-40X3/16	EA	4.00
	091-00109-0003		CABLE TIE	EA	3.00
	091-00156-0000		BUSHING	EA	4.00
	091-00614-0000		TRANS INSULTRW/ADH	EA	4.00

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SYMBOL	PART NUMBER	FIND NO	DESCRIPTION	UM	0001
	150-00032-0010		TBG SHRNK 1/2&5/8	IN	.60
	150-00034-0010		TBG SHRNK 3/4&7/8	IN	1.60
	192-09639-0001		KLN 94 POWER BD	RF	.00
	300-09639-0000		KLN 94 POWER BOAR	RF	.00

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NOTES:

1. POST COATING NOT REQUIRED.

2. PRINTED CIRCUIT ASSEMBLY IDENTIFICATION MUST BE IN ACCORDANCE WITH SPEC. 001-01101-0000.

3. WHERE APPLICABLE, LIQUID STAKE ALL FASTENERS PER SPEC. 001-01080-0000.

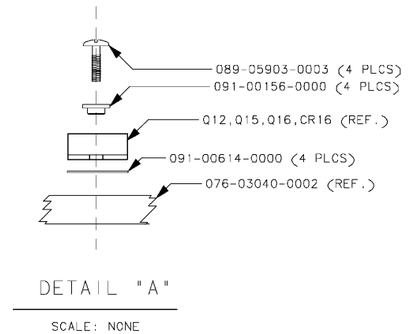
4. UNLESS OTHERWISE NOTED, ALL SCREWS TO BE TIGHTENED TO TORQUE SPEC. 001-01100-0000.

5. ADD 6000 TO ALL REFERENCE DESIGNATORS, EXCEPT J6005 AND J6008 WHEN REFERRING TO PARTS LIST.

6. PLACE HEAT SHRINKABLE TUBING AROUND LARGE COMPONENT GROUPS:

ITEMS	PART NUMBER
L3 / C18 / C23	150-00032-0010
C19 / C24	150-00034-0010
C30 / C38 / C39	150-00034-0010

7. C59 MUST BE INSTALLED WITH NEGATIVE POLARITY END CLOSEST TO THE EDGE OF PWB.



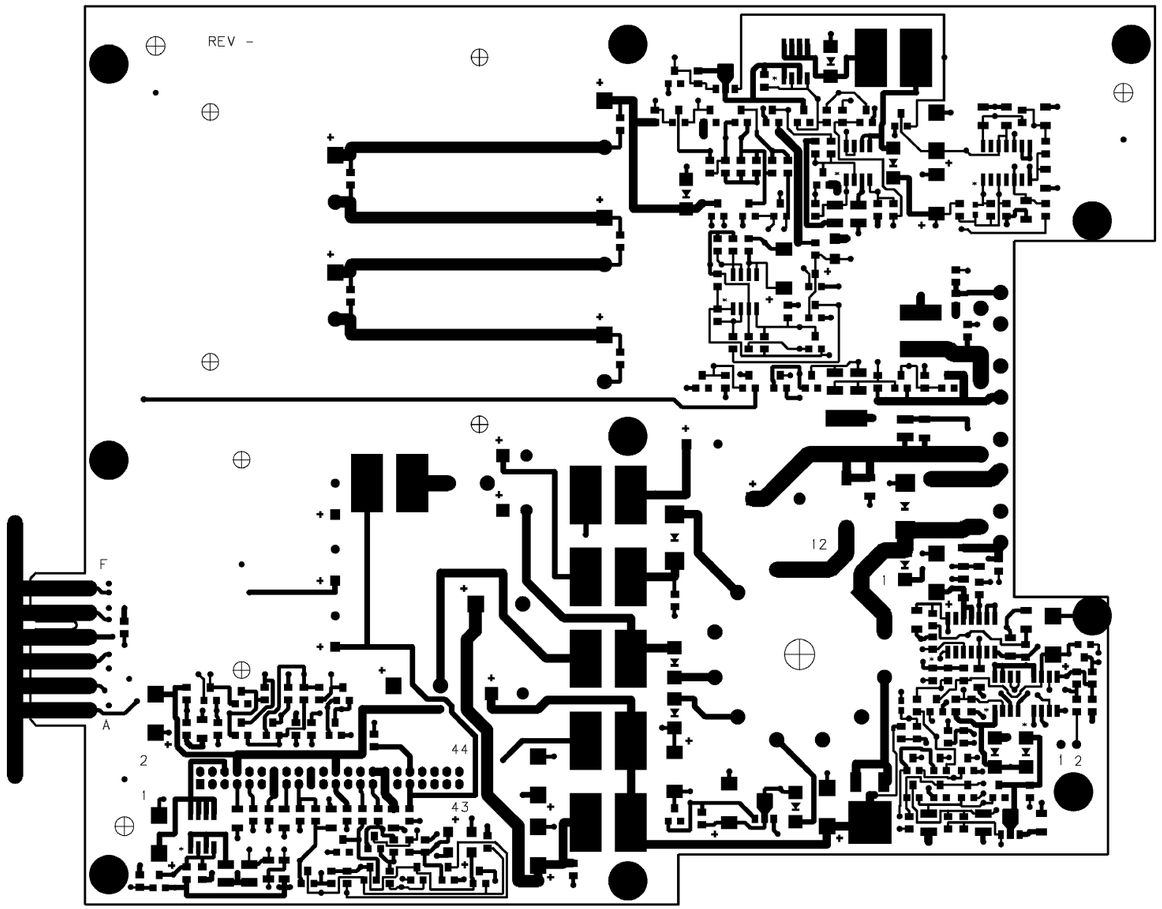
DETAIL "A"

SCALE: NONE

THIS DRAWING IS NOT COMPLETE WITHOUT PARTS LIST 200-09639-0001

FIGURE 6-18
KLN 94 POWER BOARD ASSEMBLY DRAWING (P/N 300-09639-0000 Rev. C, Sheet 1 of 2)

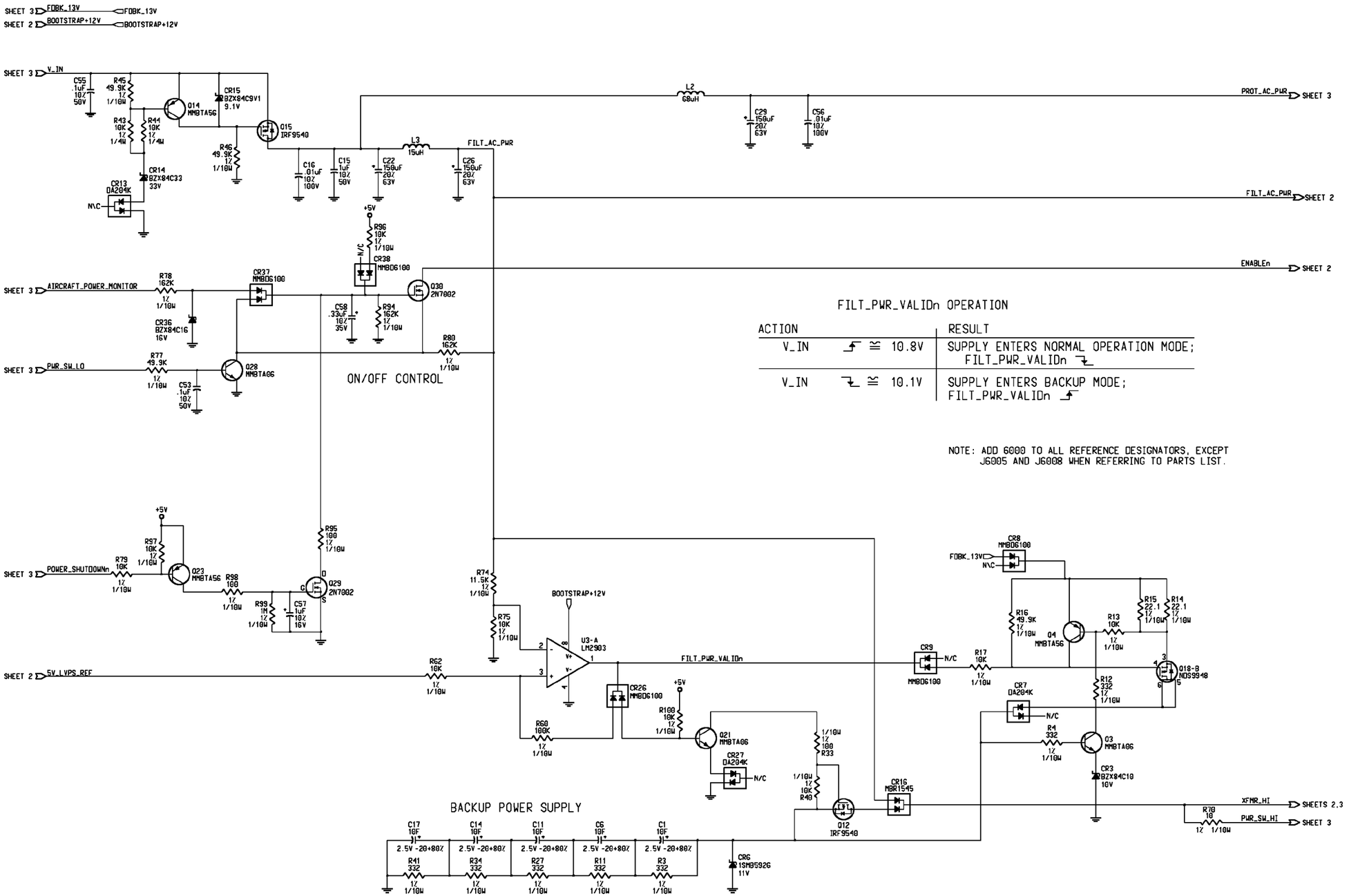
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NEARSIDE VIEW OF PC BOARD

FIGURE 6-18
KLN 94 POWER BOARD ASSEMBLY DRAWING (P/N 300-09639-0000 Rev. C, Sheet 2 of 2)

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FILT_PWR_VALIDn OPERATION

ACTION			RESULT
V_IN	↓ ≅	10.8V	SUPPLY ENTERS NORMAL OPERATION MODE; FILT_PWR_VALIDn ↓
V_IN	↓ ≅	10.1V	SUPPLY ENTERS BACKUP MODE; FILT_PWR_VALIDn ↑

NOTE: ADD 6000 TO ALL REFERENCE DESIGNATORS, EXCEPT J6005 AND J6008 WHEN REFERRING TO PARTS LIST.

FIGURE 6-19
KLN 94 POWER BOARD SCHEMATIC (P/N 002-09639-0000 Rev. B, Sheet 1 of 3)

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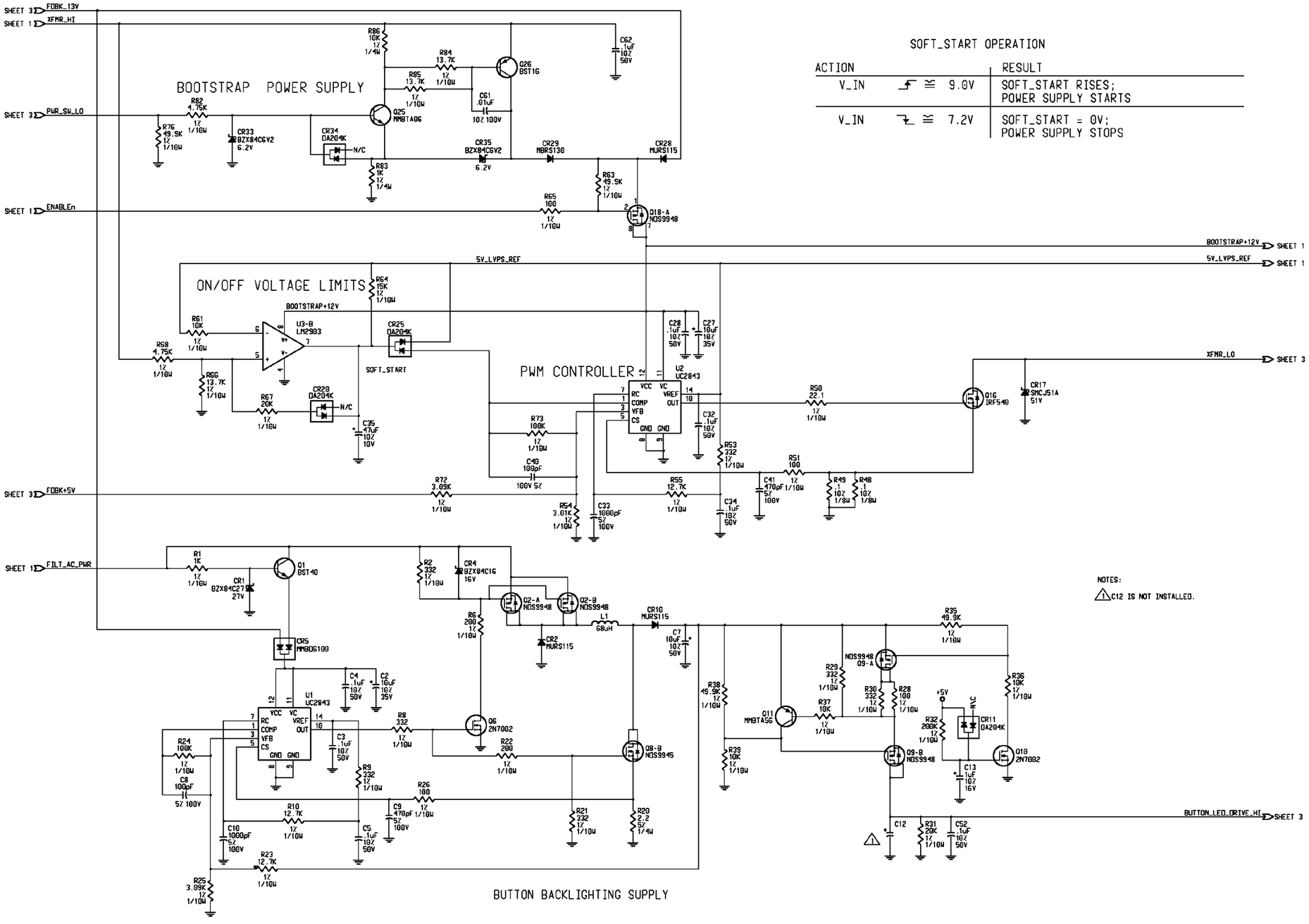


FIGURE 6-19
KLN 94 POWER BOARD SCHEMATIC (P/N 002-09639-0000 Rev. B, Sheet 2 of 3)

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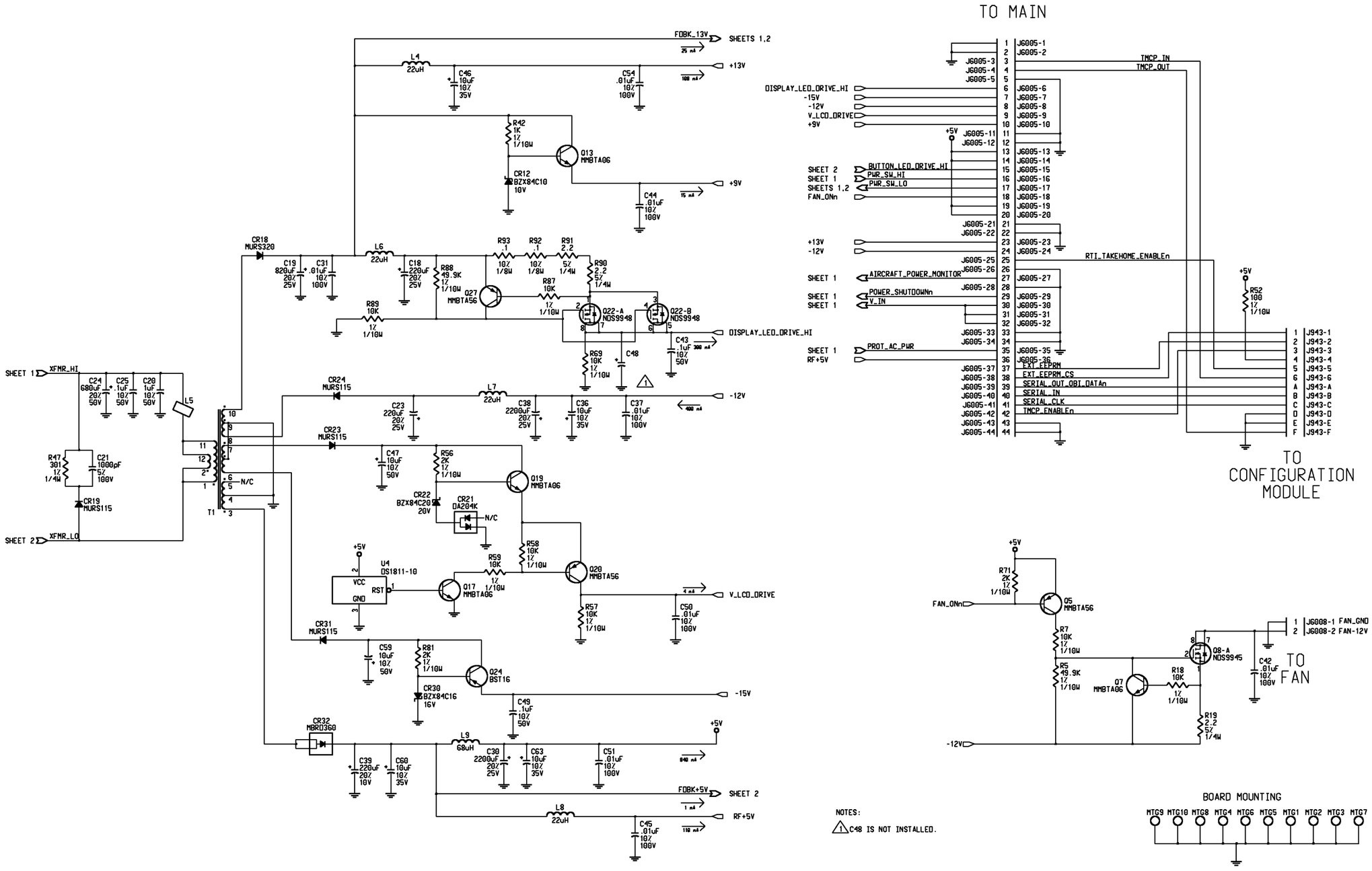


FIGURE 6-19
KLN 94 POWER BOARD SCHEMATIC (P/N 002-09639-0000 Rev. B, Sheet 3 of 3)

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