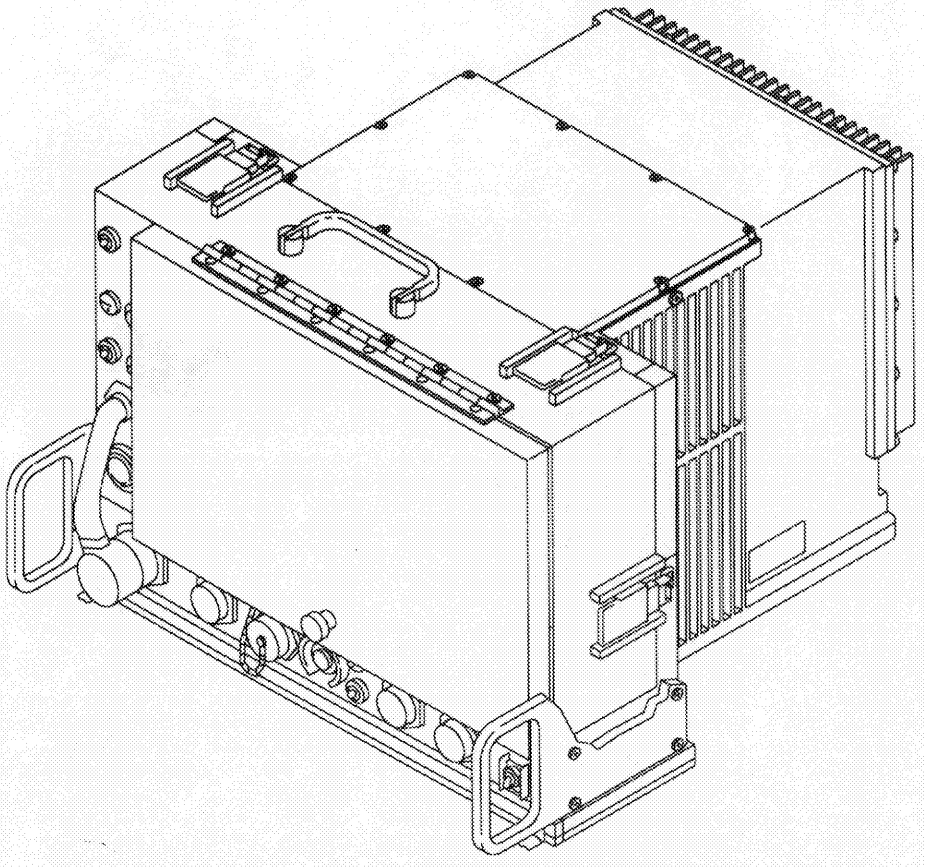
ARMY TM 11-5895-1322-24
NAVY EE119-ND-MMI-010/W110-MX10819
AIR FORCE TO 31R2-2GRC215-32

UNIT, INTERMEDIATE DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL



INPUT-OUTPUT UNIT MX-10819/GRC-215 (NSN 5895-01-207-0655)

DEPARTMENTS OF THE ARMY, THE NAVY, AND THE AIR FORCE

15 MAY 1989

5 SAFETY STEPS TO FOLLOW IF SOMEONE IS THE VICTIM OF ELECTRICAL SHOCK

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2. IF POSSIBLE, TURN OFF THE ELECTRICAL POWER

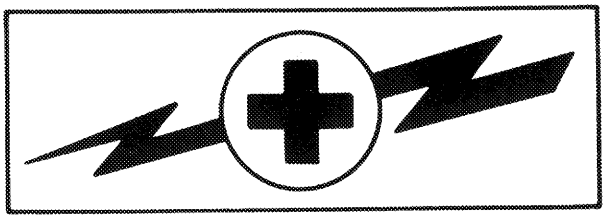
3. IF YOU CANNOT TURN OFF THE ELECTRICAL POWER, PULL, PUSH, OR LIFT THE PERSON TO SAFETY USING A DRY WOODEN POLE OR A DRY ROPE OR SOME OTHER INSULATING MATERIAL

4. SEND FOR HELP AS SOON AS POSSIBLE

5. AFTER THE INJURED PERSON IS FREE OF CONTACT WITH THE SOURCE OF ELECTRICAL SHOCK, MOVE THE PERSON A SHORT DISTANCE AWAY AND IMMEDIATELY START ARTIFICIAL RESUSCITATION

NOTE: DON'T WAIT UNTIL AN ACCIDENT HAPPENS! READ ABOUT ARTIFICIAL RESPIRATION IN FM21-11. AIR FORCE PERSONNEL REFER TO AFOSH 127-50 AND AFOSH 127-66, CHAPTER 10.

WARNING



HIGH VOLTAGE

is used in the operation of this equipment

DEATH ON CONTACT

may result if personnel fail to observe safety precautions

Never work on electronic equipment unless there is another person nearby who is familiar with the operation and hazards of the equipment and who is competent in administering first aid. When the technicians are aided by operators, they must be warned about dangerous areas.

Whenever possible, the power supply to the equipment must be shut off before beginning work on the equipment. Take particular care to ground every capacitor likely to hold a dangerous potential. When working inside the equipment, after the power has been turned off, always ground every part before touching it.

Be careful not to contact high-voltage connections or 120 volt ac input connections when installing or operating this equipment.

Whenever the nature of the operation permits, keep one hand away from the equipment to reduce the hazard of current flowing through the body.

WARNING: DO NOT BE MISLED BY THE TERM "LOW VOLTAGE". POTENTIALS AS LOW AS 50 VOLTS MAY CAUSE DEATH UNDER ADVERSE CONDITIONS.

For Artificial Respiration, refer to FM 21-11. Air Force personnel refer to AFOSH 127-50 and AFOSH 127-66, Chapter 10.

WARNING

HAZARDOUS VOLTAGE exists within the power supply during test. Under adverse conditions, DEATH ON CONTACT may result if personnel fail to observe safety precautions. Know all points where you may be exposed to high voltages.

WARNING

The Input-Output Unit MX-10819/GRC-215 weighs 58 pounds. Two persons are needed to remove or install this unit.

WARNING

Turn off all equipment power before using TRICHLORO-TRIFLUOROETHANE. Provide adequate ventilation while using TRICHLOROTRIFLUOROETHANE. Avoid prolonged breathing of the fumes and vapor. Do not use solvent near heat or open flames; the products decomposed are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, avoid prolonged contact with the skin. When needed, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

CAUTION

This equipment contains certain static-sensitive solid state devices which are subject to damage from electrostatic discharge. Effective control of electrostatic discharge is maintained only through continuous strict observance of the following maintenance procedures:

- Any maintenance requring disassembly of the equipment must be performed at an approved work station. The work station must include a grounded surface and grounded wrist strap in accordance with DOD-HDBK-263.

- All maintenance personnel must have completed training in the handling of static sensitive devices before working on this equipment. Maintenance personnel must wear the grounded wrist strap and be at an approved work station when performing maintenance.

- The static sensitive subassemblies or circuit cards must be stored in approved electrostatic free material when not installed in the equipment.

Technical Manual
No. 11-5895-1322-24
Technical Manual
No. EE119-ND-MMI-010/W110-MX10819
Technical Order
TO 31R2-2GRC215-32

DEPARTMENTS OF THE ARMY,
THE NAVY, AND THE AIR FORCE

Washington, DC, 15 May 1989

UNIT, INTERMEDIATE DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL INPUT-OUTPUT UNIT MX-10819/GRC-215 (NSN 5895-01-207-0655)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this manual. If you find any mistakes or if you know of a way to improve the procedures, please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or DA Form 2028-2 located in back of this manual direct to: Commander, US Army Communications - Electronics Command and Fort Monmouth, ATTN: AMSEL-LC-ME-MP, Fort Monmouth, New Jersey 07703-5000.

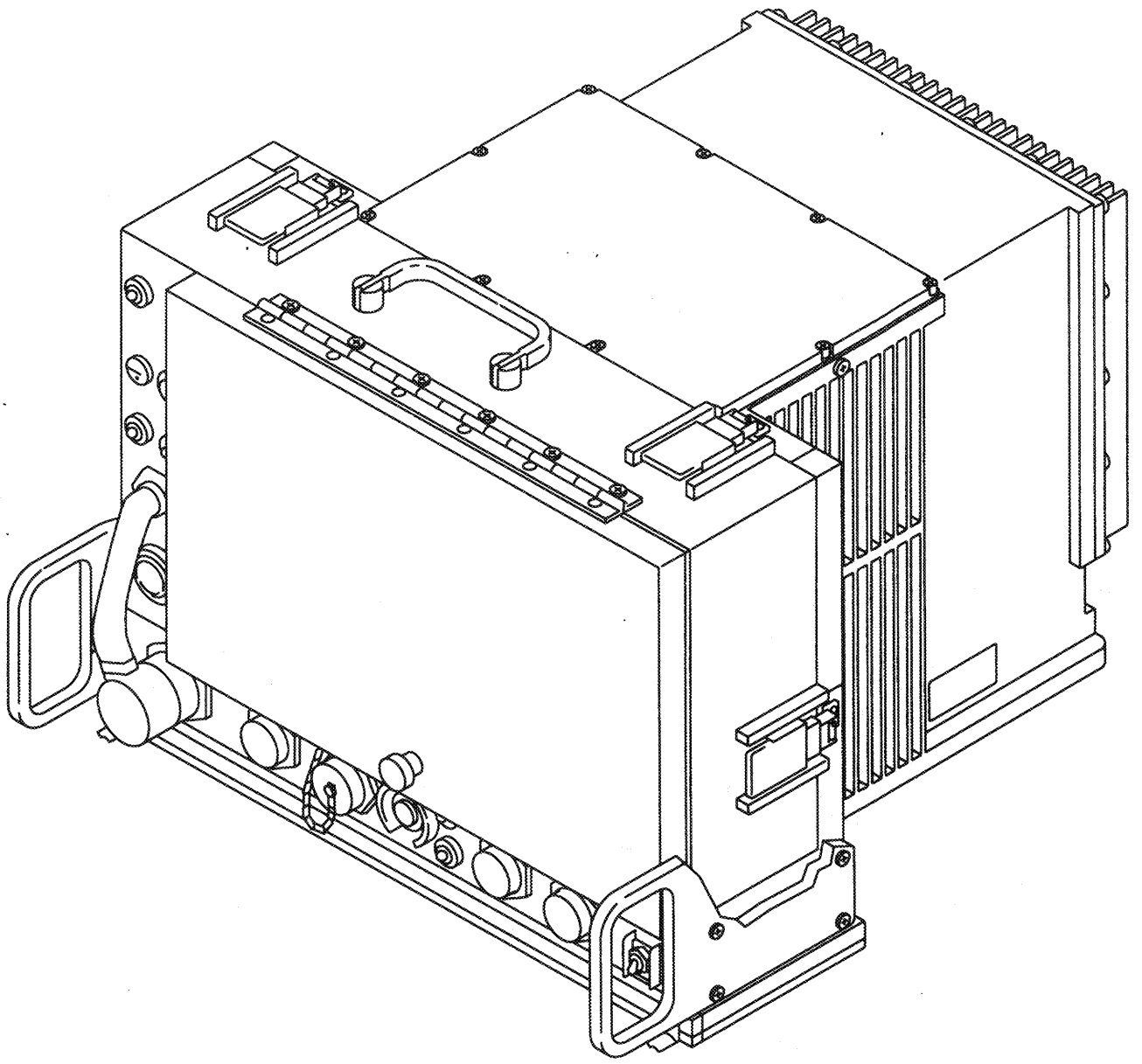
For Air Force, submit AFTO Form 22 (Technical Order System Publication Improvement Report and Reply) in accordance with paragraph 6-5, Section VI, TO 00-5-1. Forward direct to prime SM-ALC/MMEDT McClellan AFB, CA 95652-5609.

For Navy, mail comments to the Commander, Space and Naval Warfare Systems Command, ATTN: SPAWAR PWM-003-242 Washington, DC 20363-5100.

In either case, a reply will be furnished direct to you.

HOW TO USE THIS MANUAL

- The front cover index identifies frequently used Information. Each item is boxed and identified by topic and page number.
- The first page containing the informtion you are looking for has a black box on the edge of the page.
- Bend the manual in half and follow the index to the page with the black edge marker.
- Topics in the table of contents which are the same as topics on the front cover are also boxed.
- A complete alphabetical subject index is located in the back of the manual. Use the index to locate specific information.
- The glossary contains an explanation of technical terms and acronyms.



INPUT-OUTPUT UNIT MX-10819/GRC-215

CHAPTER 1
INTRODUCTION

Section I. GENERAL INFORMATION

1-1. SCOPE

a. Type of Manual. Unit, Intermediate Direct Support and General Support Maintenance Manual.

b. Equipment Name and Model. Input-Output Unit MX-10819/GRC-215.

c. Purpose of Equipment. Functions as the operator interface for input/output (I/O) of data to control and operate the Radio Set AN/GRC-215 (team terminal). Contains circuitry and logic to control the input-output and fault isolation through the use of the display/keypad assembly. The display/keyboard assembly is mounted with the controller assy or can be mounted separately in a position more accessible to the operator.

d. Maintenance Category Cross-reference. Army maintenance categories are referenced in this manual. Navy and Air Force personnel will contact their same-level maintenance group. Refer to the following cross-reference list.

Army	Navy	Air Force
Unit	Organizational	Organizational

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, as contained in Maintenance Management Update. Air Force personnel will use AFR 66-1 for maintenance reporting and TO 00-35D54 for unsatisfactory equipment reporting. Navy personnel will report maintenance performed by using the Maintenance Data Collection Subsystem (MDCS) IAW OPNAVINST 4790.2 Vol 3 and unsatisfactory material/conditions (UR submissions) IAW OPNAVINST 4790.2, Vol 2, chapter 17.

1-2. MAINTENANCE FORMS, RECORDS, AND REPORTS (Cont.)

b. Reporting of Item and Packaging Discrepancies. Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55/SECNAVINST 4355.18/AFR 400-54/MCO 4430.3J.

c. Transportation Discrepancy Report (TDR) (SF 361). Fill out and forward Transportation Discrepancy Report (TDR) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33C/AFR 75-18/MCO P4610.19D/DLAR 4500.15.

1-3. CONSOLIDATED INDEX OF PUBLICATIONS AND BLANK FORMS

a. Army. Refer to the latest issue of DA PAM 25-30 to determine whether there are new editions, changes or additional publications pertaining to the equipment.

b. Navy. Navy personnel refer to NAVSUP 2002.

c. Air Force. For technical publications, Air Force personnel refer to Numerical Index and Requirement Table (NI & RT). For non-technical publications refer to AFR 0-2. For forms, refer to AFR 0-9.

1-4. REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR)

a. Army. If your equipment needs improvement, let us know. Send us an EIR. You, the user, are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Product Quality Deficiency Report). Mail it to: Commander US Army Communications-Electronics Command and Fort Monmouth: ATTN: AMSEL-PA-MA-D, Fort Monmouth, New Jersey 07703-5000. We'll send you a reply.

b. Navy. Navy personnel are encouraged to submit EIR's through their local Beneficial Suggestion Program.

c. Air Force. Air Force personnel are encouraged to submit EIR's in accordance with AFR 900-4.

1-5. DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE

a. Army. Before placing equipment into administrative storage, insure that equipment is operational. If operational, put into storage using appropriate corrosion control techniques. When removing from storage, again perform operational tests and Unit PMCS(if available) to determine mission capability.

b. Navy. Refer to NAPSUP PUB 503.

c. Air Force. Refer to AFM 66-267 (storage) and AFR 67-31 (shipment).

1-6. PREPARATION FOR STORAGE OR SHIPMENT

a. Army. Before placing equipment into administrative storage, insure that equipment is operational. If operational, put into storage using appropriate corrosion control techniques. When removing from storage, again perform operational tests and Unit PMCS, (if available) to determine mission capability.

b. Navy. Refer to NAVSUP PUB 503.

c. Air Force. Refer to AFM 66-267 (storage) and AFR 67-31 (shipment).

1-7. OFFICIAL NOMENCLATURE, NAMES AND DESIGNATIONS

COMMON NAME	OFFICIAL NOMENCLATURE
I/O	Input-Output Unit MX-10819/GRC-215
Controller assembly	Controller Assembly, A1, P/N A3025853
Controller chassis	Chassis Assembly, A1A1, P/N A3023925
Trusted data controller	Data Controller Trusted CCA, A1A3, P/N A3028731
Untrusted data controller	Data Controller Untrusted CCA, A1A2, P/N A3028730
Black data controller	Data Controller, Black, A1A7, P/N A3028732
Data interface circuit card assembly (CCA)	Data Interface CCA, A1A5/A1A6, P/N A3023903
Power supply	Power Supply Assembly, A1PS1, P/N A3023920
Tempest heatsink assembly	Heatsink Assembly, Tempest, A1PS1A2, P/N A3024559
High voltage heatsink assembly	Heatsink Assembly, High Voltage, A1PS1A3, P/N A3024560
Output heatsink assembly	Heatsink Assembly, Output, A1PS1A4, P/N A3024561
Input heatsink assembly	Heatsink Assembly, Input DC to DC CCA, A1PS1A5, P/N A3024562
BITE CCA	BITE CCA, A1PS1A6, P/N A3024563
Motherboard	Motherboard CCA, A1PS1A7, P/N A3024807
Black output CCA	Black Output CCA, A1PS1A8, P/N A3024564
D/K assembly (D/K)	Display/Keyboard Assembly, A2, P/N A3023931
Display assembly	Display Assembly, A2A1, P/N A3023912
Display module chassis	Chassis Assembly, Display Module, A2A2, P/N A3023933

Section II. EQUIPMENT DESCRIPTION AND DATA

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES

a. Characteristics. The I/O consists of a controller assembly and a display/keypad (D/K) assembly. It provides:

(1) Operator interface:

- Display is an 80 column by 25 line alphanumeric character AC plasma display.
- Operator control and data entry made through 34 bezel switches (keypads) and 66 transparent screen overlay switches (touch points).
- Menu driven operator features for selecting operating modes, for parameter selections within each operating mode, for message handling and built-in-test (BIT) initiation.
- Audible and visual indicators for message receipt and equipment BIT failure.
- Automatic BIT when power is first applied and faults are sensed by the unit.

(2) Peripheral data interfaces

- TSEC/KG-84A (KG-84) interface provides signalling for receive and transmit data, timing and control (synchronous operation at 9600 baud with unbalanced signal levels).
- Optional printer port with asynchronous operation at 600 or 1200 baud (7 bit data format, one odd parity bit, one start bit, and one stop bit). Will interface with an AN/UGC-74 (UGC-74).
- RF control/status bus provides asynchronous interface with RF stack at 9600 baud (8 data bits, one odd parity bit, one start bit, and one stop bit).

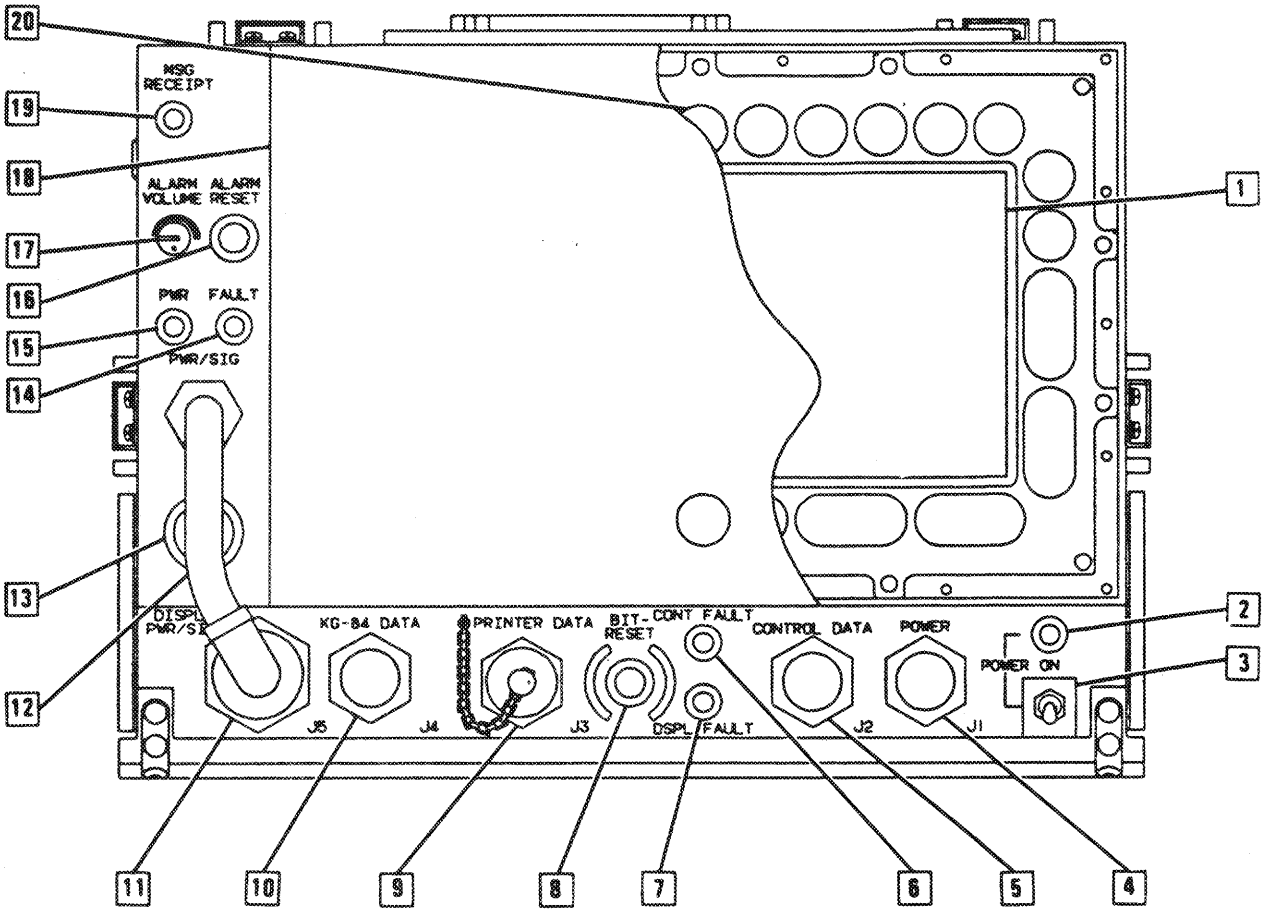
1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES AND FEATURES (Cont.)

b. Capabilities and Features.

- Provides the capability to transmit and receive Regency Net (RN) messages.
- Provides capability to manage, maintain, and control the operating modes of the team terminal.
- Cabling permits D/K assembly to be mounted in equipment rack or removed and remotely operated in a more convenient location.
- Fault indicators on the controller assembly aid operator in isolating failures between controller and D/K assemblies.
- Fault and power indicator provided for both local and remote operation of the D/K assembly.
- Controller and D/K assemblies power controlled by a single power switch on the controller assembly.
- Connection of peripheral equipment is accomplished from the front of the I/O controller chassis assembly.
- Operates from vehicle power or other dc sources with the correct voltage (+22 to +32 Vdc) and current applied.
- External signal input ports conform to RS-422 and MIL-STD-188-114A standards.
- Internal interface between controller and D/K assemblies conform to MIL-STD-118-114A.
- BIT provides constant monitoring of systems operational status (on-line BIT).

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

a) Front panel controls and indicators



MX-10819/GRC-215 FRONT VIEW 1-6

[1] Display - Supports prompting and menu display; shows incoming messages and supports compose/edit functions via 66 software-controlled touch sensitive switches on the viewing area.

[2] POWER ON Indicator (green) - Lights when power is applied to the controller assembly.

[3] POWER ON Switch - Applies power to the I/O Unit.

[4] POWER Connector J1 - Used for connecting input power from the TT PS via the power junction unit.

[5] CONTROL DATA Connector J2 - Interfaces with the system control/status bus via the control junction unit.

[6] CONT FAULT Indicator (red) - Indicates when there is a fault in the controller assembly.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont.)

[7] DSPL FAULT Indicator (red) - Indicates when there is a fault in the D/K assembly.

NOTE

Operating parameters will need to be re-entered after pressing the BIT-RESET pushbutton switch.

[8] BIT-RESET Pushbutton Switch - Initiates a reset of the I/O Unit similar to power on reset and performs off-line BIT of the I/O Unit (normally BIT should be performed by pressing the BIT bezel key). Operating parameters will need to be re-entered after pressing the BIT-RESET pushbutton switch.

[9] PRINTER DATA Connector J3 - Interfaces with printer (if optional printer is utilized).

[10] KG-84 DATA Connector J4 - Signal interface for receive and transmit data timing and control.

[11] DISPLAY PWR/SIG Connector J5 - Interfaces controller assembly with D/K assembly (whether D/K assembly is mounted to the controller assembly or remoted).

[12] PWR/SIG Cable - Power and signal interconnect cable from the D/K assembly.

[13] Audible Alarm - The audible alarm indicates a message received or BIT fault.

[14] FAULT Indicator (red) - Lights to indicate any fault detected in the Team Terminal.

[15] PWR Indicator (green) - Lights when power is applied to the D/K assembly (especially useful when the D/K assembly is remoted).

[16] ALARM RESET Pushbutton Switch - Depressing this switch causes the audible alarm to be reset after it has been activated.

[17] ALARM VOLUME Control - Adjusts the volume of the audible alarm from maximum to minimum.

[18] Display Cover - Provides protection for the display.

[19] MSG RECEIPT Indicator (yellow) - Lights to indicate when a message has been received by the I/O Unit.

[20] Bezel Keys - Used to control entry into major I/O functions, support editing operations, and provide general utility functions.

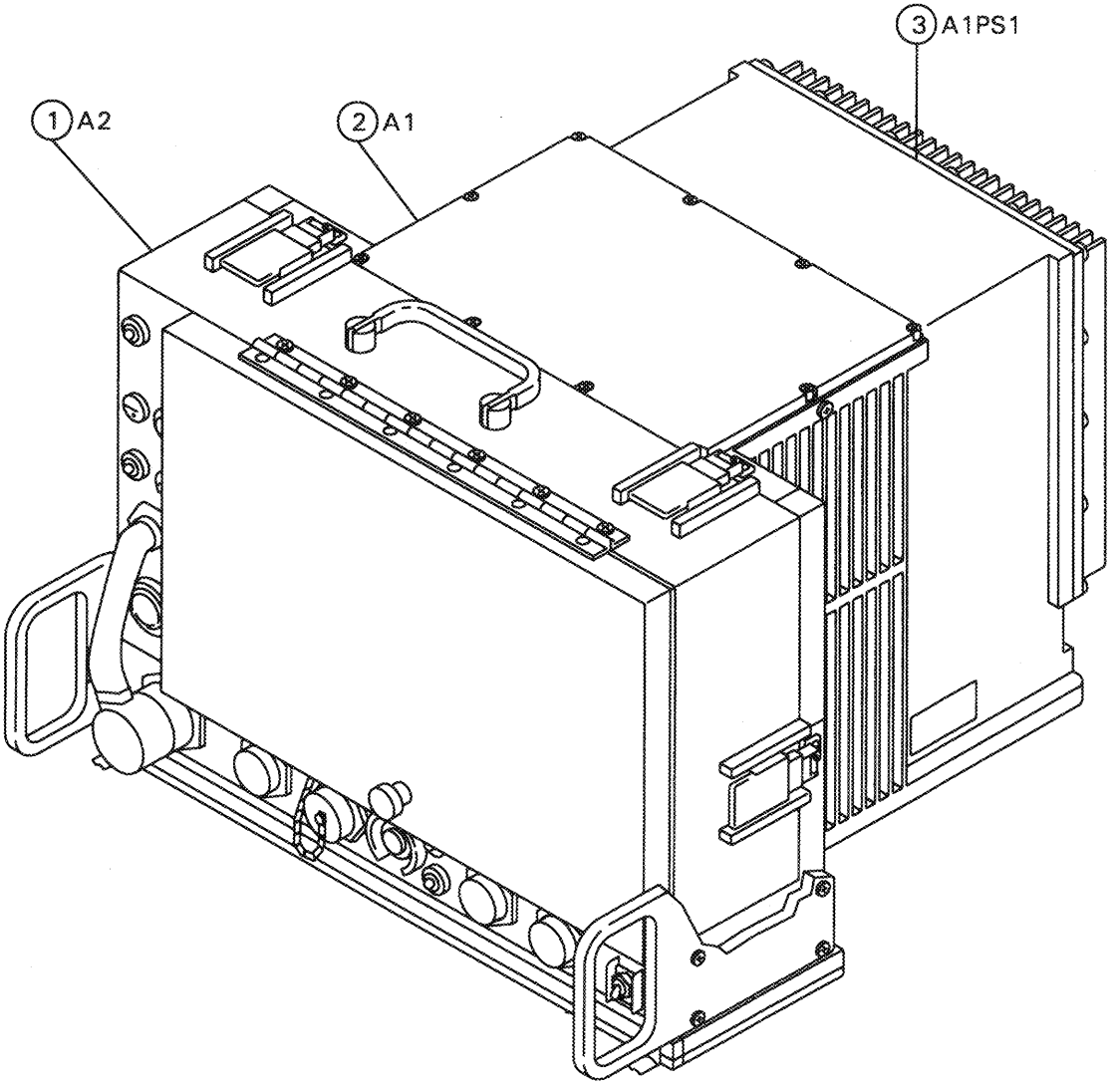
1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont.)

b) The I/O consists of controller assembly (A1) with power supply (A1PS1) and the D/K assembly (A2).

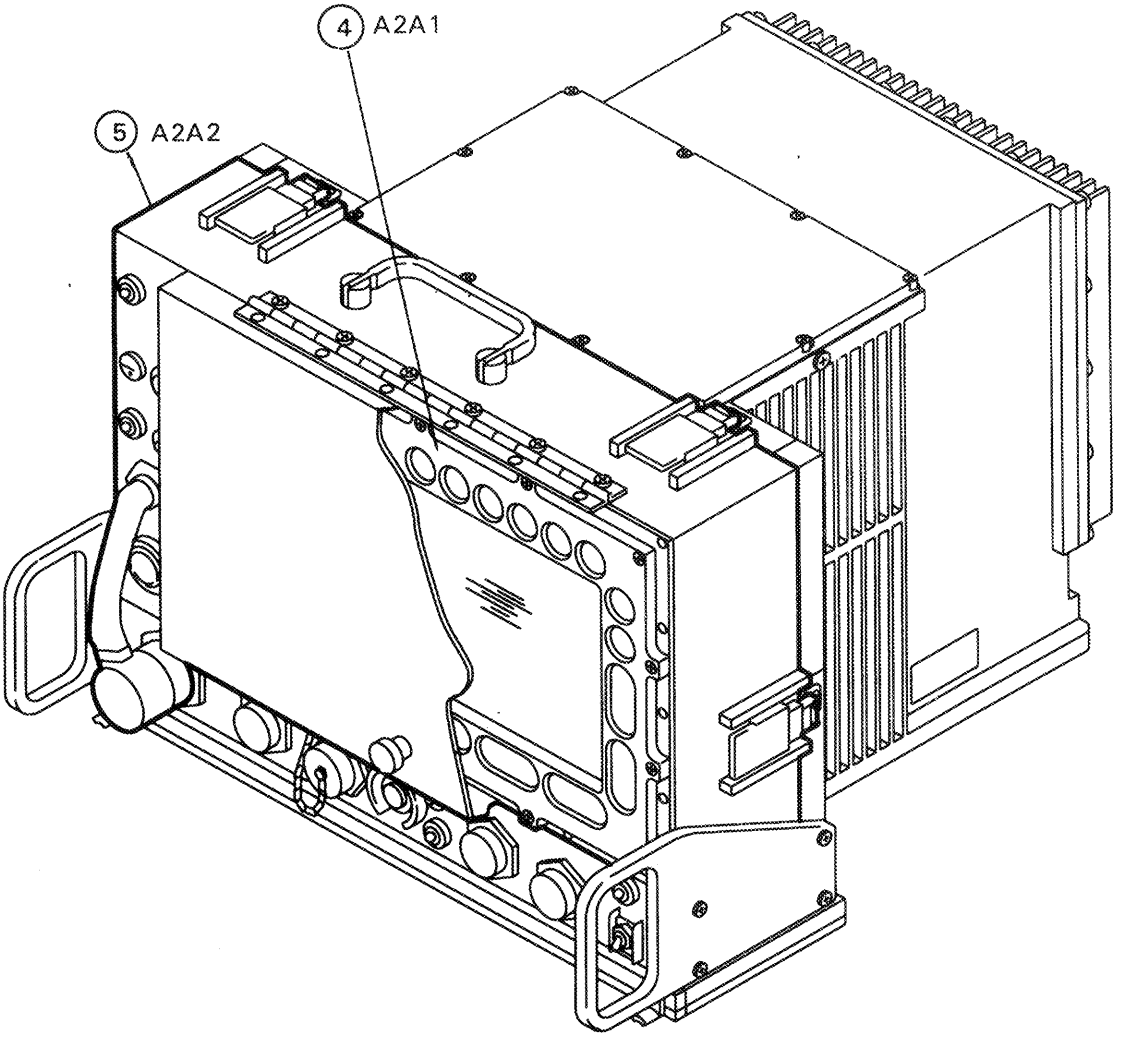
① Display/Keypad Assembly A2. The D/K consists of a display module chassis assembly and the display assembly.

② Controller Assembly A1. The controller assembly consists of a chassis, untrusted data controller circuit card assembly (CCA), a trusted data controller CCA and its associated data interface CCA, a black data controller CCA and its associated data interface CCA. The controller assembly houses the power supply also.

③ Power Supply A1PS1. The power supply provides all operating voltages required by the I/O. It provides separate red and black operating voltages with independent fault monitoring circuits.



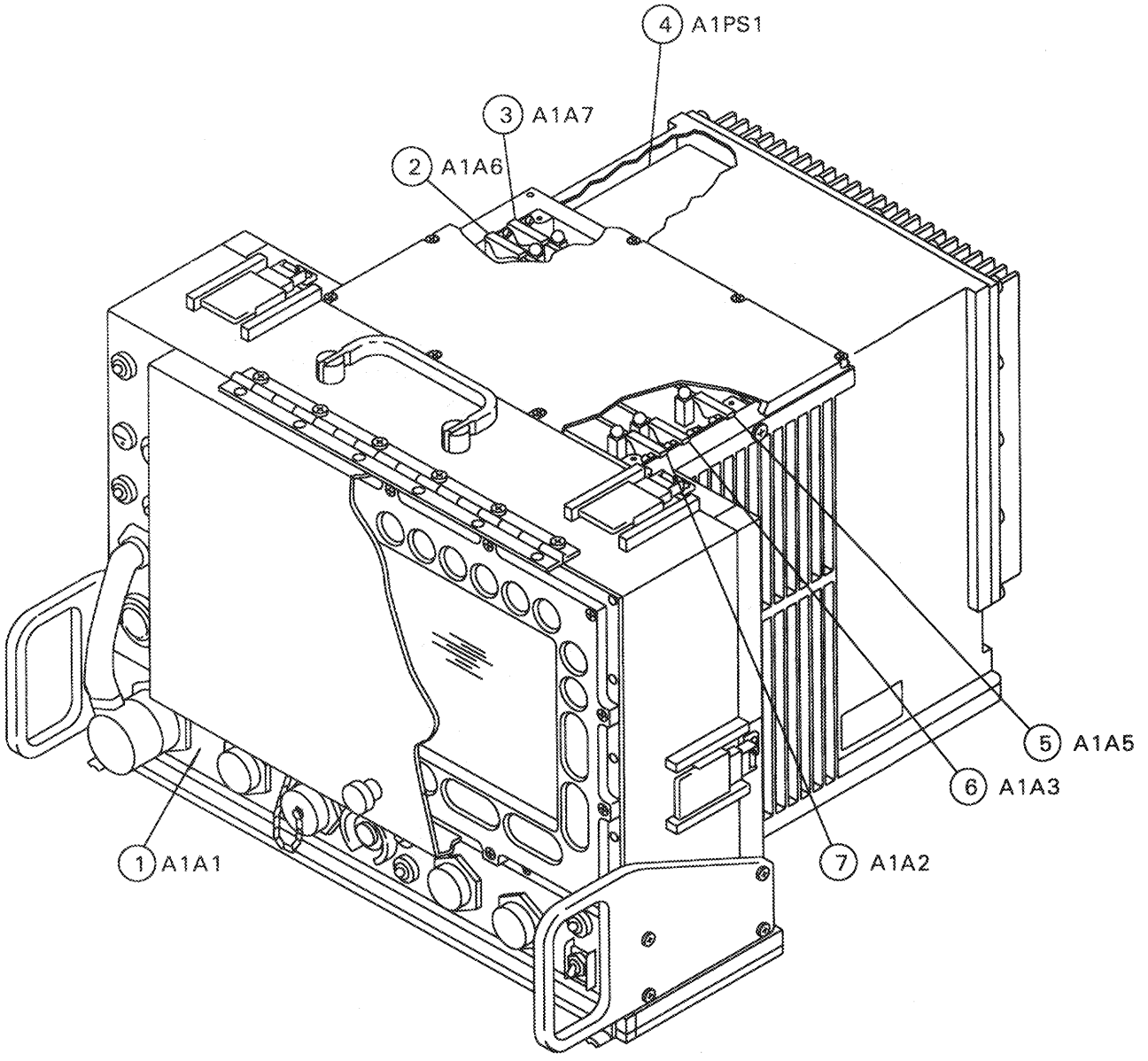
1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont.)



(4) Display Assembly A2A1. The display assembly includes 6 CCAs, bezel switches, touch points, and cables. The display assembly has 34 bezel switches and a plasma display panel with 66 touch points for entering operating instructions and data. An electroluminescent panel provides backlighting for the 34 bezel switches.

(5) Display Module Chassis Assembly A2A2. The assembly houses the surge protection CCA, internal cabling, and provides mounting of the display assembly. An audible alarm, visual indicators for power, fault and message receipt, an ALARM VOLUME control and an ALARM RESET switch are mounted on the front panel.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont.)



1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont.)

(1) Controller Chassis Assembly A1A1. The controller chassis assembly provides front panel connections for input power, control/status bus, a KG-84 transmission security (TRANSEC) device and an optional printer. An indicator lamp is lit when power is connected and the switch is closed. The chassis assembly houses the CCAs and provides mechanical mounting for the D/K assembly and I/O unit power supply. Access is provided by top and bottom covers that are secured with self-retaining hardware.

(2) Black Data Interface CCA A1A6. Contains multiprotocol serial controllers (MPSCs) to provide input and output ports for interface between the data controller and team terminal RF stack equipment. No message data is handled by this CCA.

(3) Data Controller CCA A1A7. Microprocessor based CCA, used as a data controller for data (black) to and from the team terminal RF stack. Used with data interface CCA A1A6.

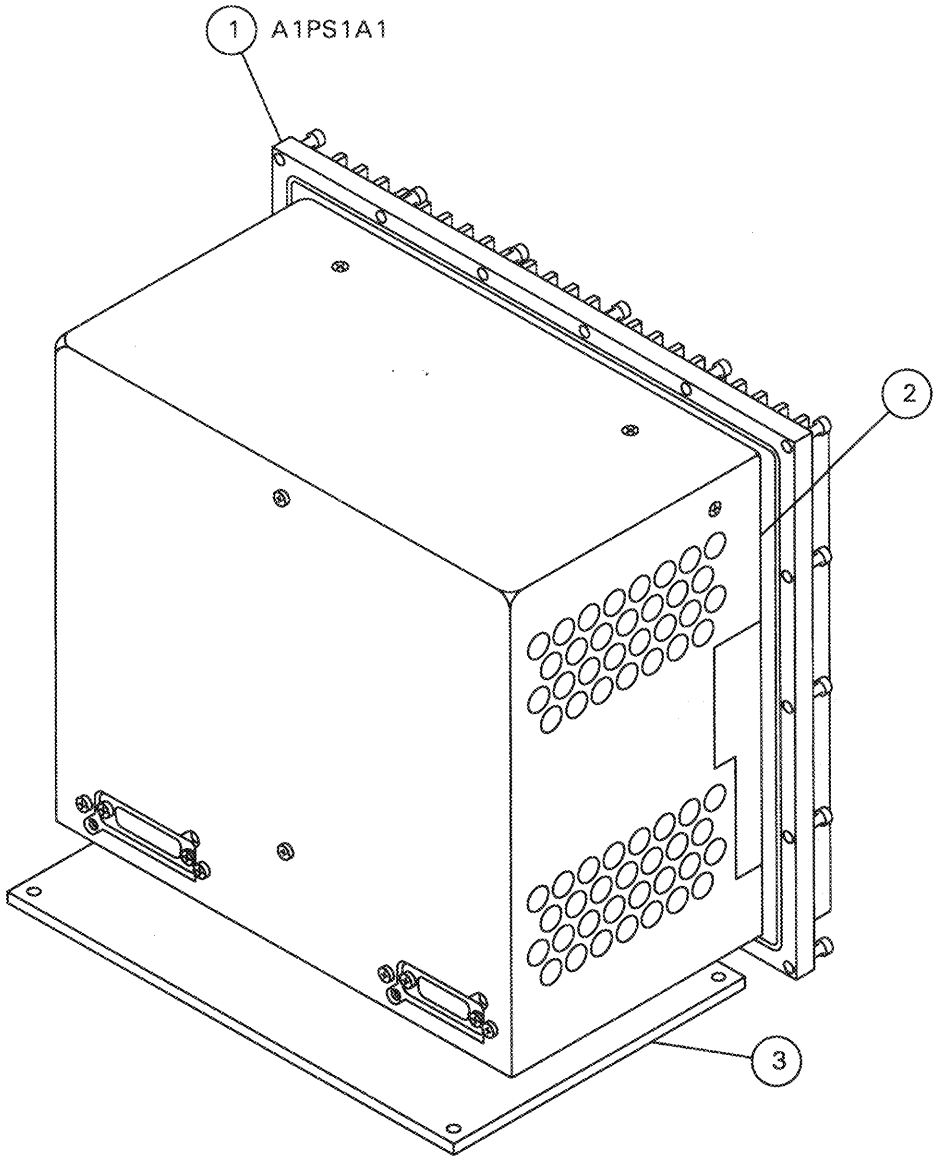
(4) Power Supply A1PS1. Provides all operating and display voltages for the I/O. Contains four heatsink assemblies with CCAs and 2 separate CCAs. Provides a separate red and black power source.

(5) Data Interface CCA A1A5. Interfaces the trusted data controller CCA A1A3 to the external I/O devices. Operates under control of the trusted data controller.

(6) Data Controller, (Trusted) CCA A1A3. A microprocessor based CCA that controls all functions within the I/O assembly. Used with data interface CCA A1A5.

(7) Data Controller, (Untrusted) CCA A1A2. A microprocessor based CCA that contains screen menus and processes message composition/editing. All data in or out of the untrusted data controller is validated by the trusted data controller.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont.)

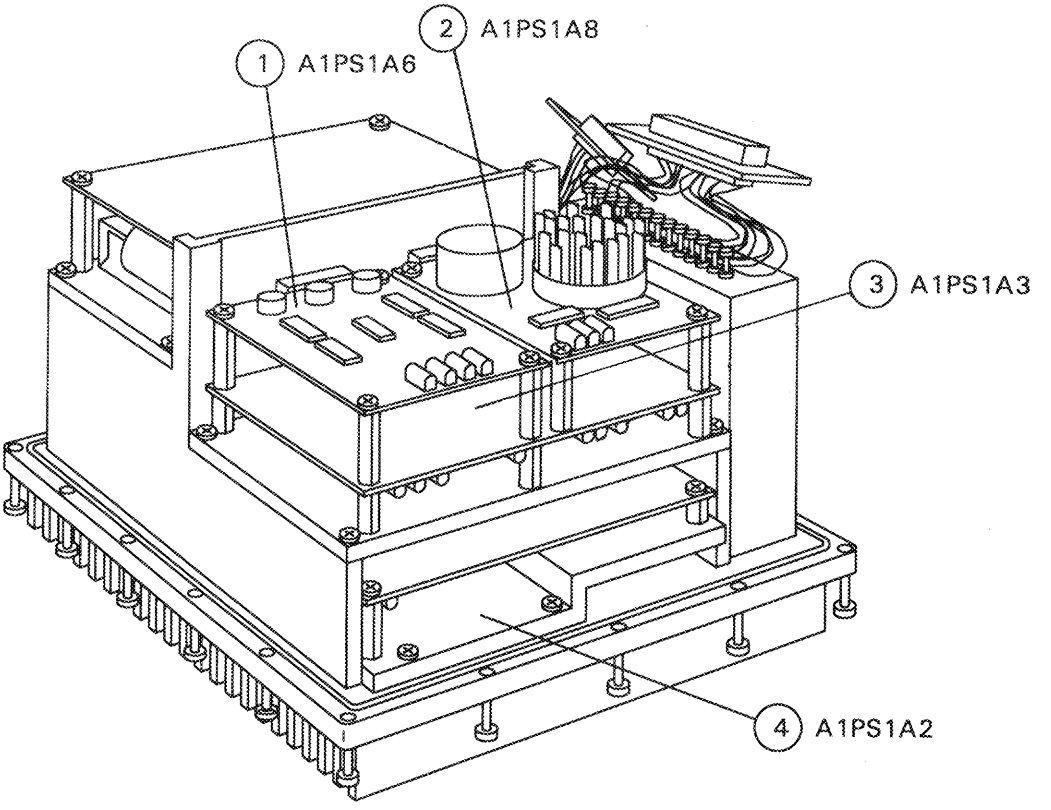


(1) Chassis Assembly A1PS1A1. Provides for the physical mounting of heatsink assemblies and provides finned area for cooling. Contains preformed gasketing for weatherproofing and electro magnetic interference (EMI) shielding.

(2) Cover Assembly. A vented cover that provides personnel protection and protection to components and heatsink assemblies.

(3) Access Cover Assembly. A lower plate assembly that is removed to provide access to filters, connectors and wiring. May be removed while the main cover remains in place.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont.)



POWER SUPPLY A1PS1
(COVERS REMOVED–LEFT SIDE VIEW

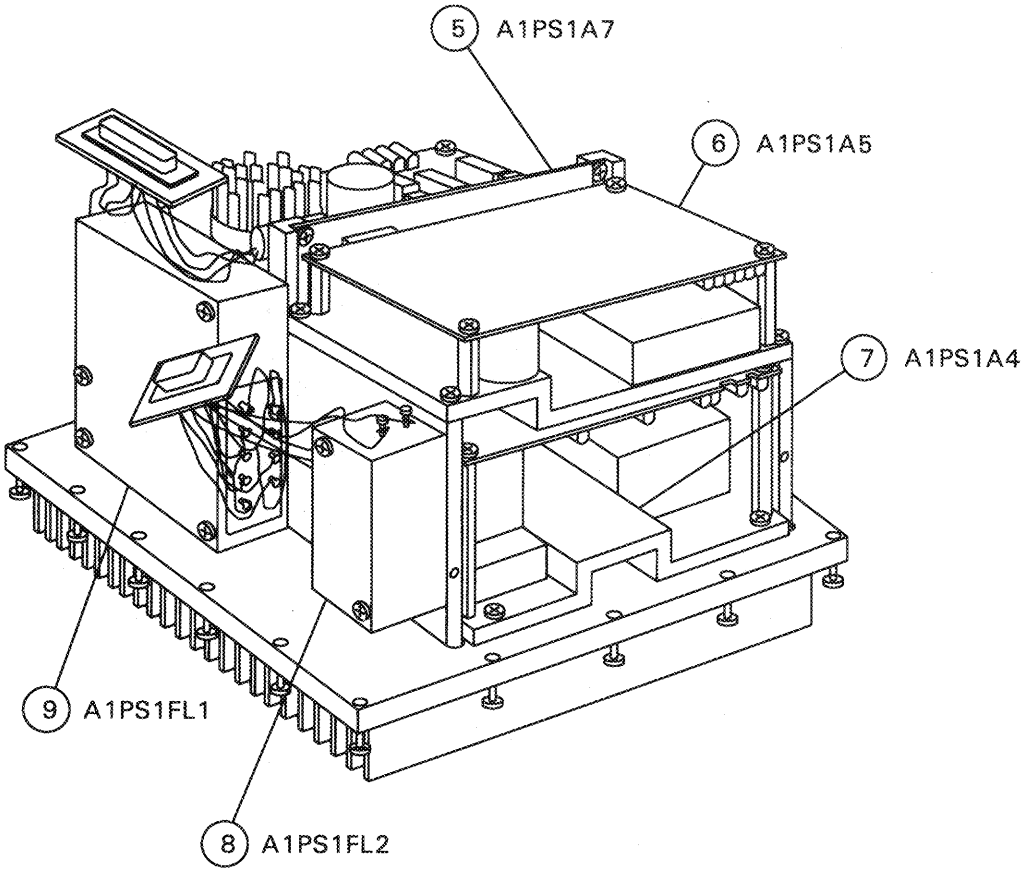
① BITE CCA A1PS1A6. Monitors and outputs fault data for under and overvoltage conditions. Provides shut-down signal in the event of +5 Vdc overvoltage (red) or +12 or -12 Vdc overcurrent conditions.

② Black Output CCA A1PS1A8. Receives +20 Vdc from the output heatsink assembly and provides +5 Vdc output. Used to provide voltage source separation between red and black data.

③ High Voltage Heatsink Assembly A1PS1A3. Provides three of the seven operating voltages for the D/K Assembly. Consists of a CCA and a heatsink.

④ Tempest Heatsink Assembly A1PS1A2. Provides the red +5 Vdc. Serves as a constant load for +12 and -12 Vdc. Consists of a CCA and a heatsink.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS (Cont.)



POWER SUPPLY A1PS1
(COVERS REMOVED RIGHT SIDE VIEW)

(5) Motherboard CCA A1PS1A7. Provides interconnection of all input and output voltages.

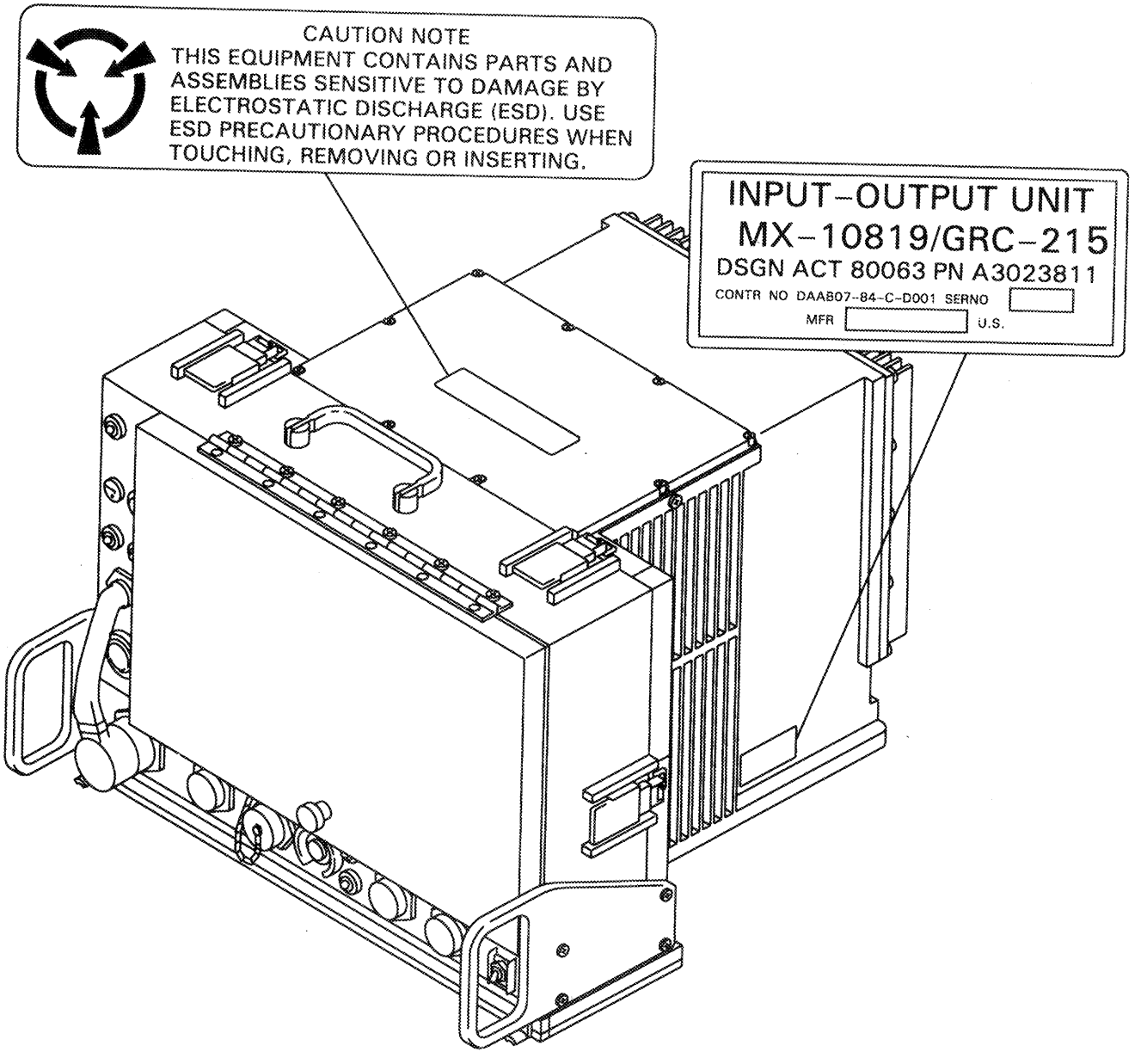
(6) Input Heatsink Assembly A1PS1A5. Conditions the input voltage and provides operating voltages for control circuitry. Con tains a voltage inverter circuit to provide drive to the high voltage heatsink assembly.

(7) Output Heatsink Assembly A1PS1A4. Rectifies voltages output from the input heatsink assembly and provides conditioned voltages to the high voltage and tempest heatsink assemblies.

(8) Output Filter A1PS1FL2. Provides filtering of black +5 Vdc.

(9) Output Filter A1PS1FL1. Provides filtering of all red output voltages.

1-10. IDENTIFICATION AND INSTRUCTION PLATES



1-11. EQUIPMENT DATA

a. Electrical Characteristics:

Input power, +22 to +32 Vdc, +28 Vdc nominal.

Power consumption, 84.9 watts nominal, 112.3 watts maximum.

b. Physical Characteristics:

Weight (total)..... 58 lb

Control interface assembly - 39 lb.

D/K assembly - 19 lb.

Height ..... 12.9 in.

Width ..... 17.1 in.

Depth ..... 19.56 in.

1-12. EQUIPMENT CONFIGURATION

The I/O may be operated in a local configuration with the D/K assembly mounted on the controller assembly, or it may be operated remotely. In remote operation, all functions are the same and the D/K assembly is extended by cable CX-13350/GRC-215, part number A3029111.

1-13. SAFETY, CARE, AND HANDLING

WARNING

The I/O weighs 58 pounds. Two persons are needed to remove or install this unit.

CAUTION

Prior to removing or installing a component or cable, ensure that power to the component has been turned off. Cables connected with voltage present may arc or short. This can produce damage to the connector.

Make all cable connections by hand. Do not use tools. When tools are used to make connections connectors may be over tightened and damage to the connector and pins may occur.

CAUTION

The I/O contains certain static-sensitive solid state devices which are subject to damage from electrostatic discharge. Effective control of electrostatic discharge is maintained only through continuous strict observance of the following maintenance procedures:

- Any maintenance action requiring disassembly of the equipment must be performed at an approved work station. The work station must include a grounded surface and grounded wrist strap in accordance with DOD-HDBK-263.
- All maintenance personnel must have completed training in the handling of static-sensitive devices before working on this equipment. Maintenance personnel must wear the grounded wrist strap and be at an approved work station when performing maintenance.
- The static-sensitive subassemblies or circuit cards must be stored in approved electrostatic free materials when not installed in the equipment.

Section III. PRINCIPLES OF OPERATION

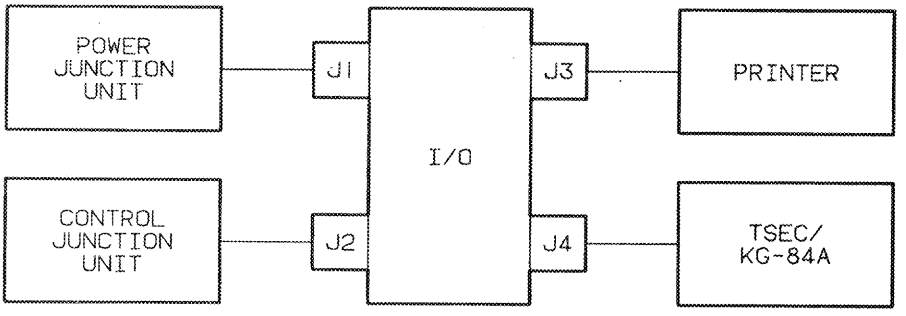
1-14. GENERAL

The I/O contains two main functional units with the following subassemblies.

- Controller assembly A1
  - Controller chassis
  - Four CCAs
  - Power supply
- D/K assembly A2
  - Display assembly
  - Display module chassis

The D/K assembly can be separated from the controller assembly and operated, by means of a remote cable connection, separate from the controller assembly. The controller assembly contains the power supply and the main electronic functions of the I/O. Also on the controller assembly are the connectors J1 through J4 for connection to other units in the RN team terminal. Connector J4 connects to the D/K assembly.

1-14. GENERAL (Cont.)



(1) J1, power input. Power input is a nominal +28 Vdc from the team terminal power supply through the power junction unit.

(2) J2, control/status bus interface. Receives data from the control junction unit. This data is to control the operational parameters of the team terminal such as; the mode, frequency, power levels, coding rates, net numbers, time of day transfer, and off-line BIT. No message traffic is sent on this interface.

(3) J3, print data interface. J3 interfaces to a printer. The print data consists of team terminal receive and transmit data messages and operator selected displayed text.

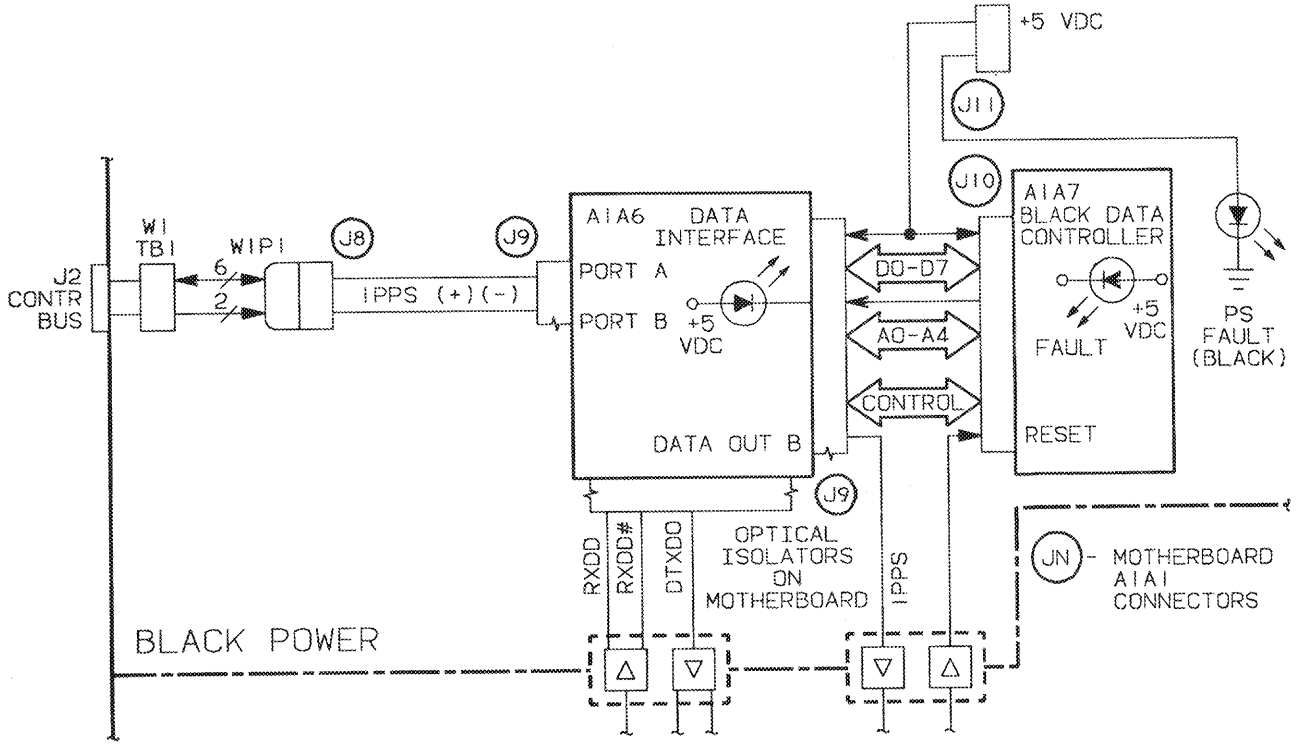
(4) J4, TSEC/KG-84A. This interface provides receive and transmit voice data from the TSEC/KG-84A. The TSEC/KG-84 can be by-passed when operating in the non-secure message mode. In this mode J4 is effectively connected to the RN modem.

1-15. FUNCTIONAL DESCRIPTION OF THE I/O

The I/O permits the team terminal I/O operator to transmit and receive RN messages and manage, maintain, and control the operating modes of the team terminal. The I/O consists of a controller assembly A1 and a D/K assembly A2. Both are powered by a common power supply mounted in the controller assembly. The D/K assembly may be physically mounted to the controller assembly, or remoted. Refer to figure FO-1, and FO-3, I/O functional block diagram, at the rear of this manual.

a. Control/status bus interface J2. The control/status bus allows the I/O black data controller CCA A1A7, through the data interface CCA A1A6, to control the operational parameters of the team terminal; such as the mode, frequency, power levels, coding rates, net numbers, time of day transfer, and off-line BIT. No message traffic is sent on this interface.

1-15. FUNCTIONAL DESCRIPTION OF THE I/O (Cont.)



(1) Data rate on this interface is asynchronous 9600 Baud. The data word is 11 bits consisting of 1 start bit, 1 stop bit; 1 odd parity bit, and 8 information bits.

- Data is transferred between the black data controller assembly CCA A1A7 and the data interface CCA A1A6 through the motherboard CCA A1A1. A multiprotocol serial controller (MPSC) transmits and receives control and status messages from connector A1A1J9. This connector is interconnected through motherboard connector A1A1J8 to A1A1W2W1P1. It is then connected through A1A1W2W1TB1/ A1A1W2J2 as CONTROL BUS (+) and (-), and status bus (+) and (-) signals.

- The 1 pulse-per-second (1PPS (+),(-)) signal from the control bus is interfaced through the B port.

(2) This interface conforms to RS-422 standards, balanced line, 0 to +5 Vdc transistor-to-transistor logic (TTL) logic levels.

(3) Data interchanged between the black data controller assembly A1A7 and assemblies found in the red data area are isolated through transistor drivers and optical couplers on the motherboard.

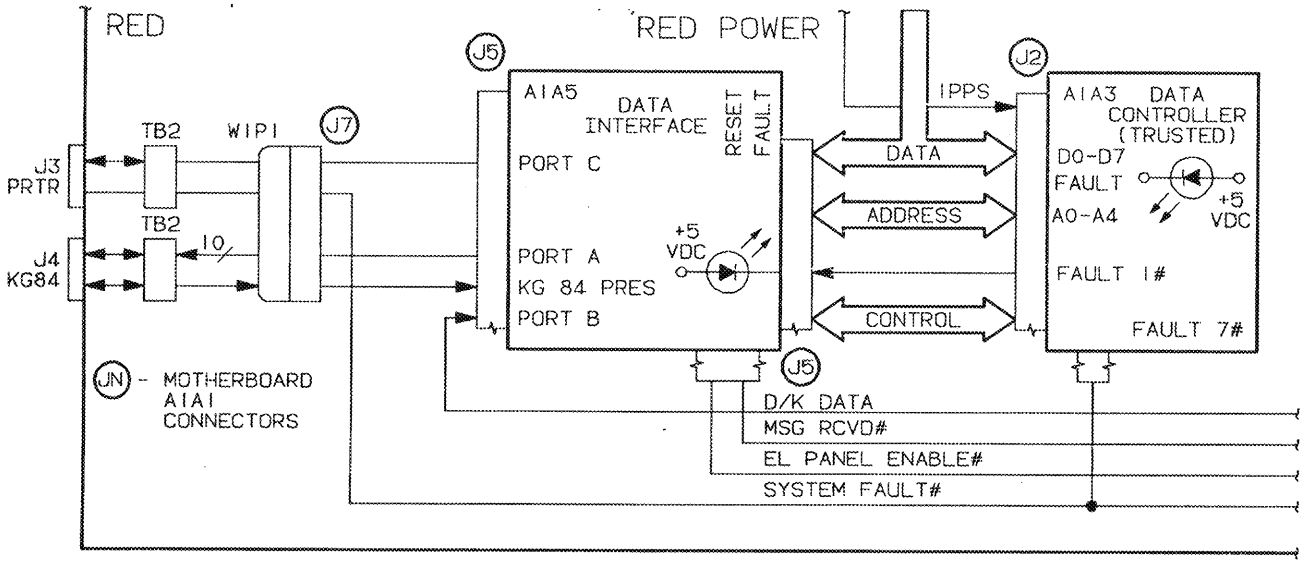
1-15. FUNCTIONAL DESCRIPTION OF THE I/O (Cont.)

b. TSEC/KG-84A (KG-84) data interface J4. This interface provides receive and transmit data, timing and control.

(1) The signal levels are MIL-STD-188-114 compatible for serial data interchange. Transmit and receive data clocks are provided by the KG-84.

(2) Data rate is 9600 Baud synchronous with 7 data bits, and 1 stop bit.

(3) Signal levels are 6 volt mark/space. Depending upon the polarity of connection, the mark may be either positive or negative.



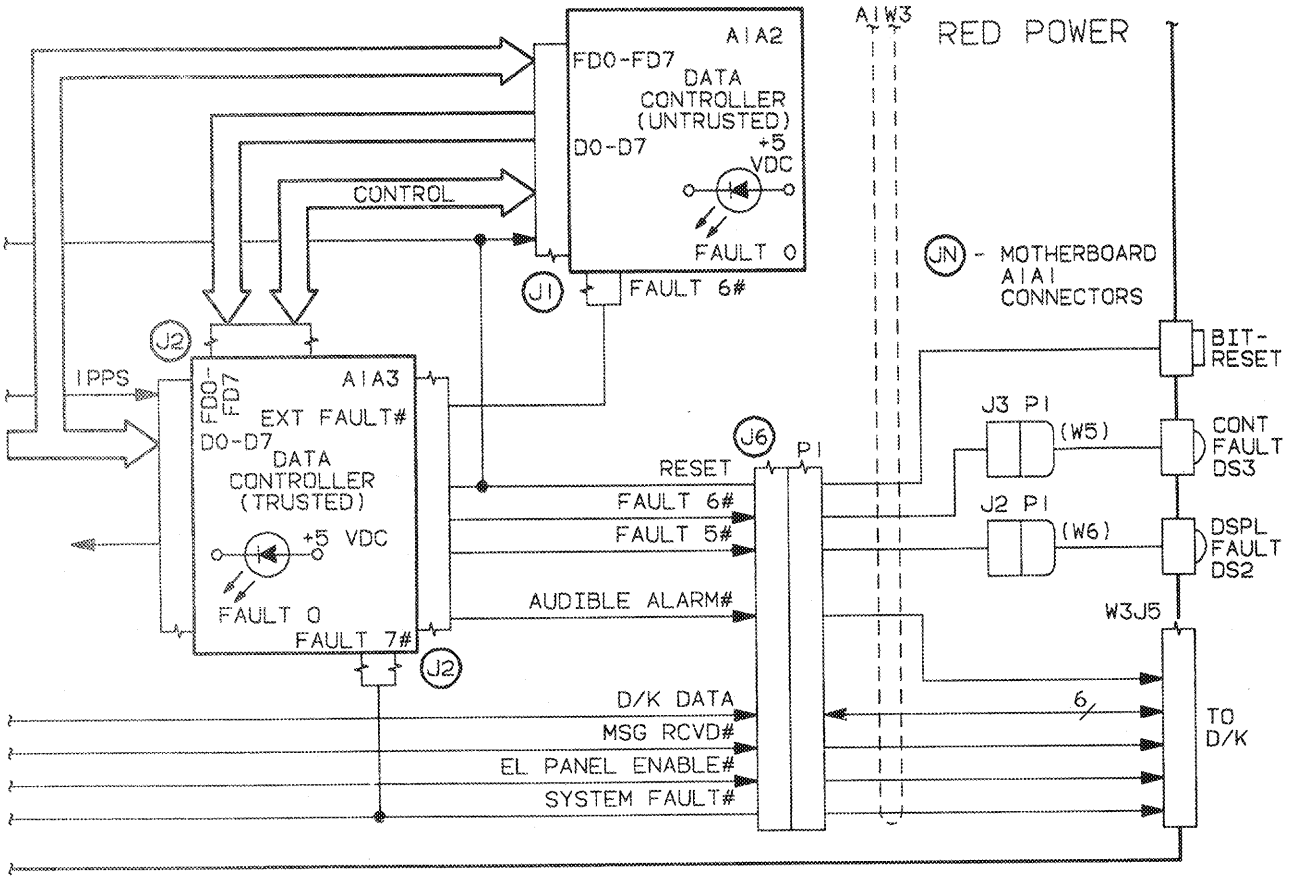
c. Print data interface J3. Print data consists of team terminal receive and transmit data messages and operator selected displayed text. A printer ready input signal is provided for terminal transfer control.

(1) The printer interface is MIL-STD-188-114A operating asynchronously at 600 or 1200 Baud with unbalanced signal levels.

(2) Signal levels are 6 volt mark/space. Depending upon the polarity of connection, the mark may be either positive or negative.

(3) Interfaces to AN/UGC-74 (UGC-74). UGC-74 check/UGC-74 present control lines determine if UGC-74 is present. If a UGC-74 is present the Baud rate is 600.

1-15. FUNCTIONAL DESCRIPTION OF THE I/O (Cont.)

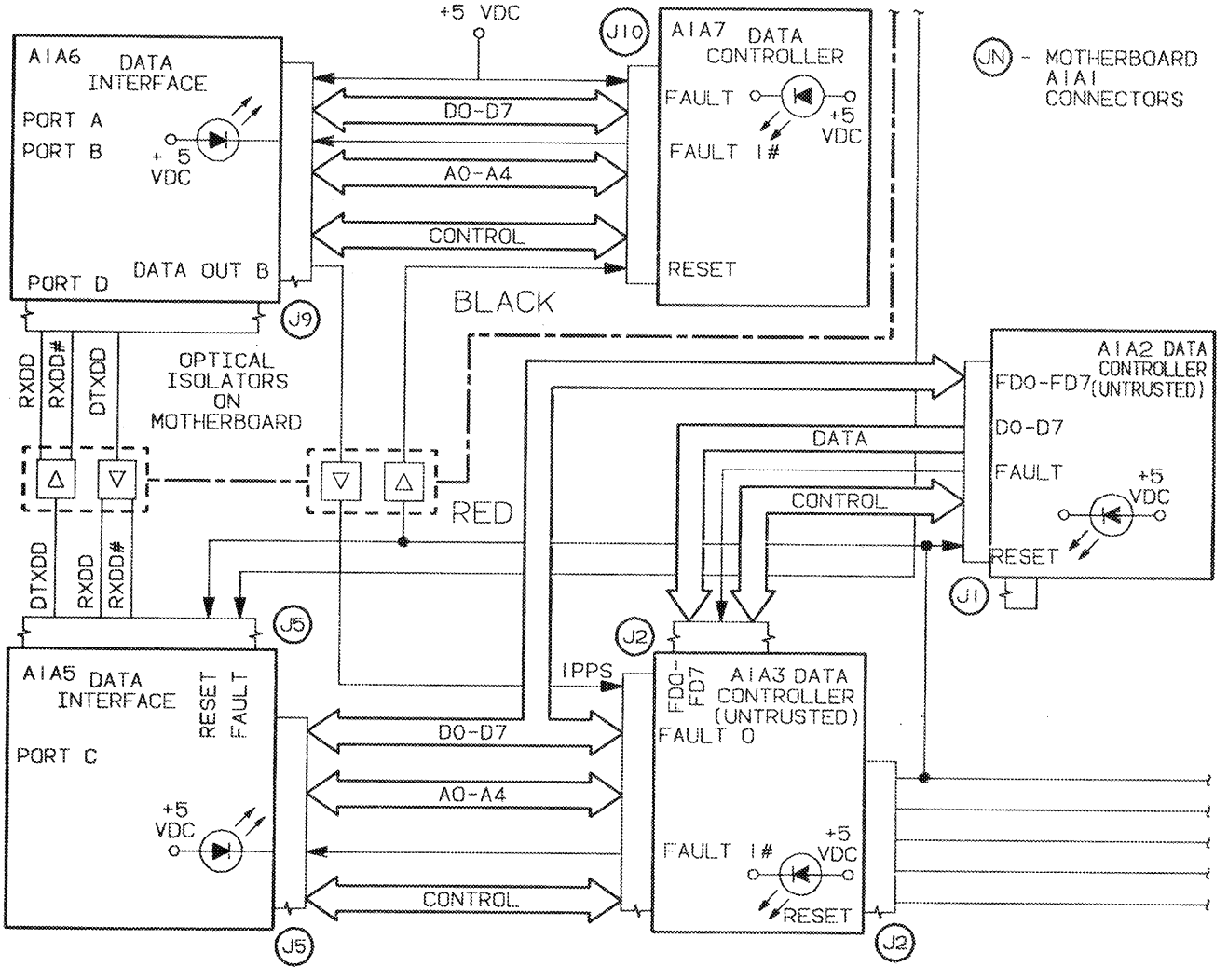


d. D/K Interface. The display interface is 19.2kBaud asynchronous data input through controller circuits within the display assembly. Each character consists of 1 start bit, 7 data bits, 1 odd parity bit and 1 stop bit.

(1) The information to the display interface is derived in the data controller assembly modules A1A2 and A1A3. From module A1A3, the control information is passed through the motherboard A1A1J2 and A1A1J6 connectors to the A1W3 cable assembly to W3J5 where it interfaces to the D/K. See also FO-2 and FO-3.

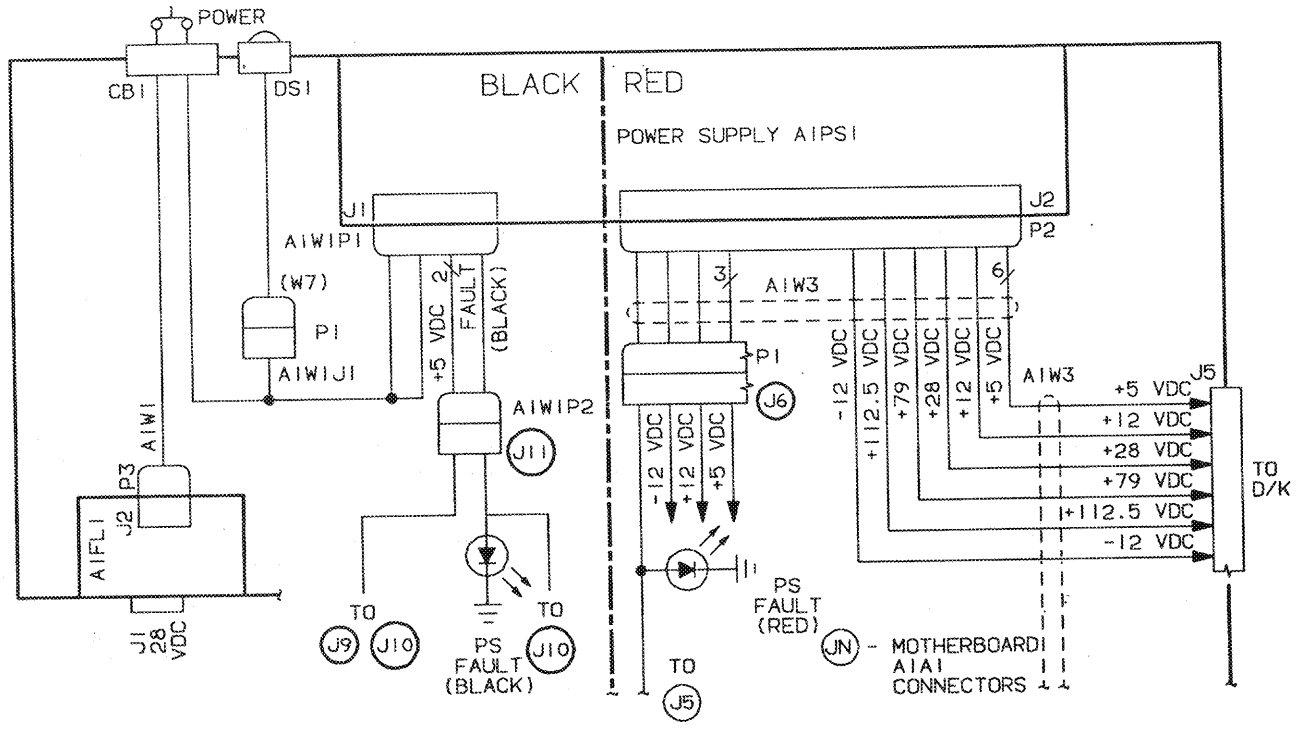
1-15. FUNCTIONAL DESCRIPTION OF THE I/O (Cont.)

e. Internal CCAs and buses. The I/O has two data controller CCAs (A3, A2) in a trusted-untrusted configuration and a black data controller (A7). There are two data interface CCAs (A5, A6). The data bus, address bus, and control bus signals are routed through motherboard connections.



1-15. FUNCTIONAL DESCRIPTION OF THE I/O (Cont.)

f. Power Input J1. The input power is nominally 28 Vdc with one ground return and safety ground connected to chassis to isolate from the power return line.



(1) A1J1 is an integral part of the input filter which mounts to the I/O as one assembly.

(2) The power supply (A1PS1) produces the following voltages:

- +5 Vdc (black)
- +5 Vdc (red)
- +12 Vdc
- -12 Vdc
- +28 Vdc
- +79 Vdc
- +112.5 Vdc

1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS

In addition to the block diagrams accompanying the description of each major assembly, refer to the schematic diagrams (figures FO-1 through FO-13) at the rear of this manual.

a. Controller assembly A1. The controller assembly is used for network management, message I/O, and radio equipment control. It has a printer port for an optional printer. The controller assembly consists of the chassis, motherboard, cables, indicator lights, input power filter, and the following major components.

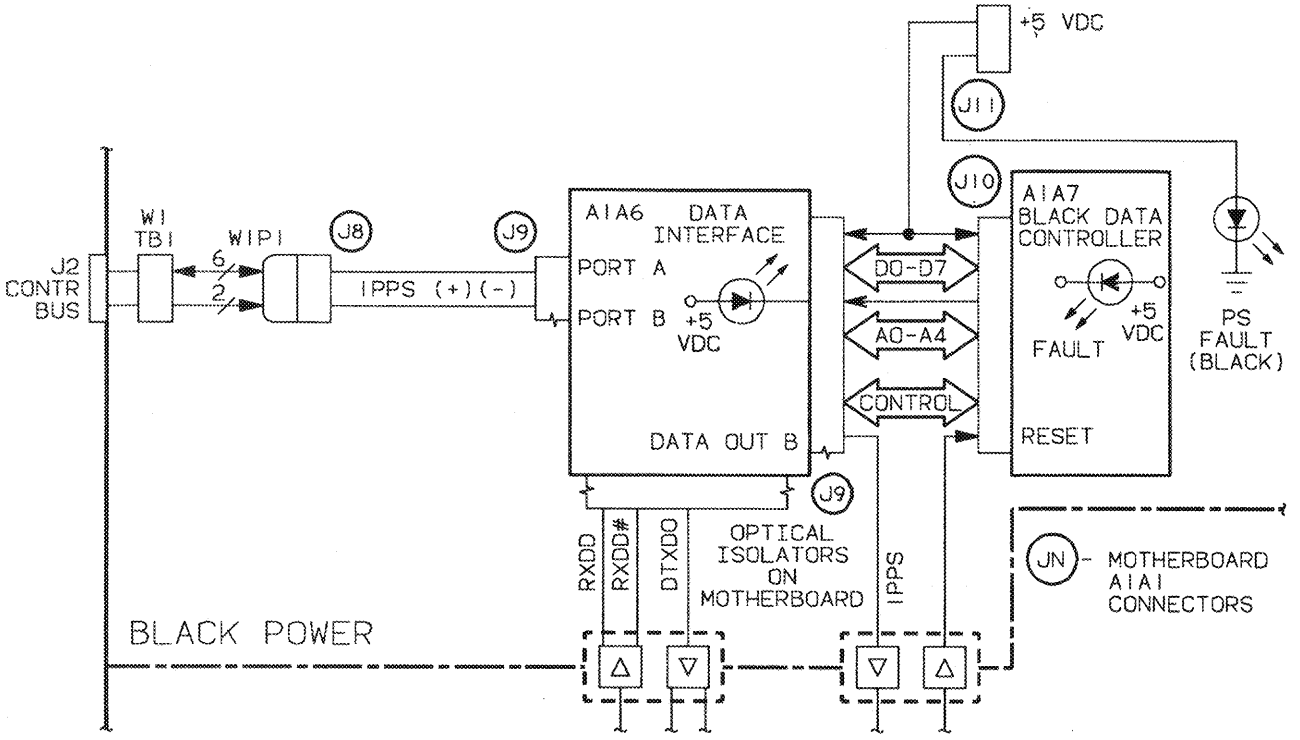
- Black data controller CCA A1A7
- Data interface CCAs A1A5, A1A6
- Trusted and untrusted data controller CCAs A1A3, A1A2, respectively
- Power supply A1PS1

(1) Black data controller A1A7. The black data controller is microprocessor based and operates through data interface CCA A1A6. There are two connectors on the data controller CCA. Connector A1A7P1 is used for interfacing to other connectors through the motherboard. Connector A1A7J1 is used for testing and board programming at higher levels of maintenance.

(a) Data lines. The bidirectional data lines D0 - D7 (A1A7P1-29 - D7, A1A7P1-36 - D0) are interfaced through a data transceiver for all off-board read and write operations. The off-board data lines interface only to data interface CCA A1A6 through motherboard connector A1A7J9 to A1A7J10. The direction of data flow (transmit or receive) is deter mined by the state of the DT/R# line. DT/R# is high (logic 1) for transmit (write) operations and low (logic 0) for receive (read) operations. This and other control lines are interfaced to the data interface CCA A1A6.

(b) Address lines. Address lines A0 through A4 are used for addressing components of the data interface CCA A1A6. For off-board operation, the address lines are through trans parent latches on black data controller CCA A1A7. A0 and A1 are used to operate control lines that are through a data latch, and address lines A2, A3, and A4 are routed to an address decoder to operate components on data interface CCA A1A6. The microprocessor outputs an address latch enable (ALE) signal at A1A7P1-40. This ALE signal is looped back at A1A7P1-43. Though interconnected to the data interface CCA data latch (A1A6J9-14), the ALE is not required for off-board operation. On board, it is active when ALE is low (logic 0).

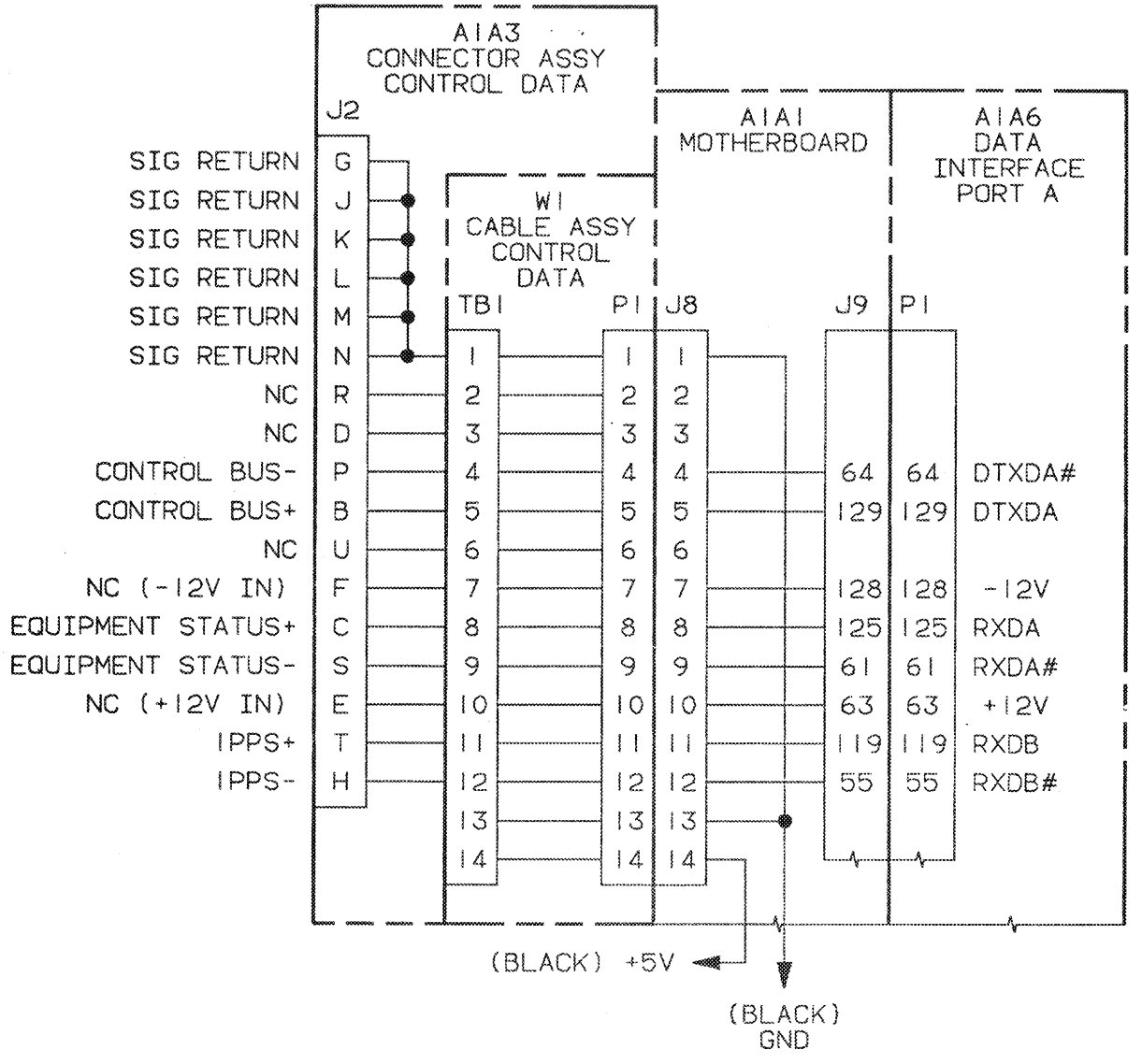
1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)



(2) Data interface CCA A1A5/A6. Data interface CCA A1A5 operates under the control of the trusted data controller. Data interface CCA A1A6 is operated by the black data controller CCA A1A7. There are four independent MIL-STD-188C serial ports. Ports A and D are also RS-422 compatible. The ports are controlled by two MPSC devices. Data interchanged between the black data section and the red data section is isolated by driver transistors and optical couplers found on the motherboard A1A1.

1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

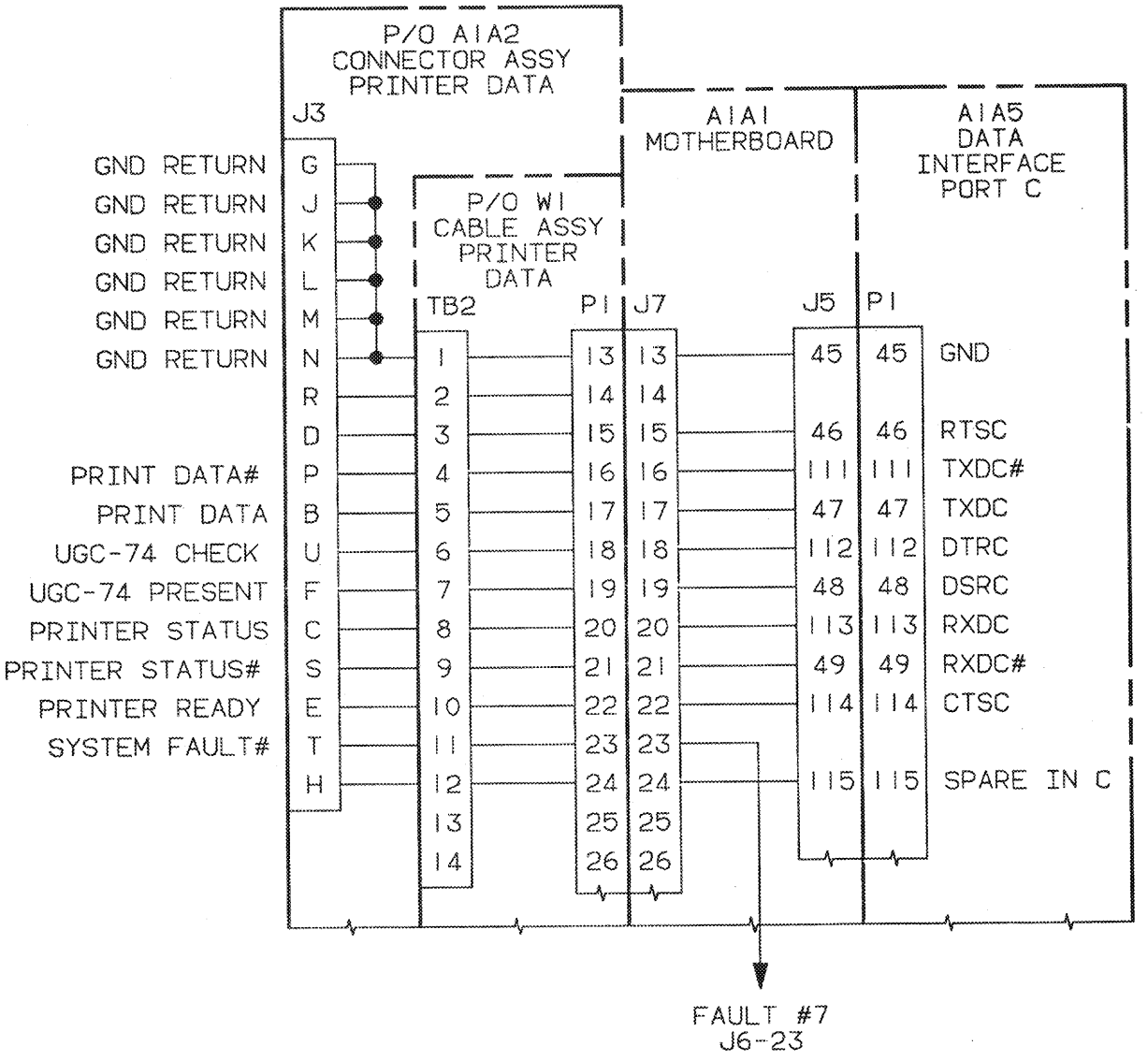
(3) Data interface CCA A1A6. The data interface CCA A1A6 is dedicated to the black data controller A1A7. Inputs to this data interface are from the RF control/status bus at A1J2. Though all lines are connected for data, only four lines are active. Control messages are transmitted from DTXDA and DTXDA#. Status messages are returned via RXDA and RXDA# lines. All operating voltages to this assembly are provided by the black output of A1PS1.



1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

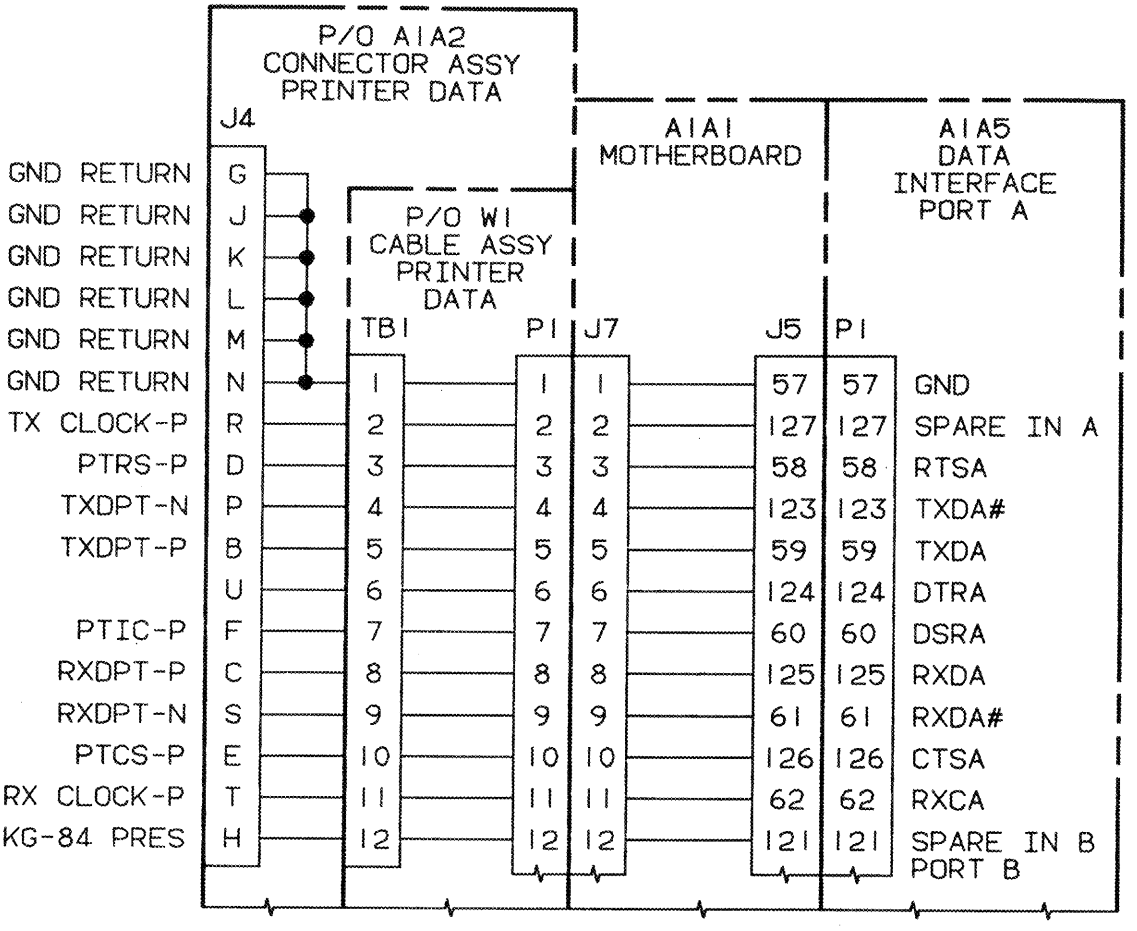
(4) Data interface CCA A1A5. The data interface CCA A1A5 is interfaced to the optional printer input at A1J3 and KG-84 input at J4. This CCA provides the interface for RN messages and control information.

- The optional printer is connected to port C of A1A6. Printer ready is indicated by the state of the CTSC line.



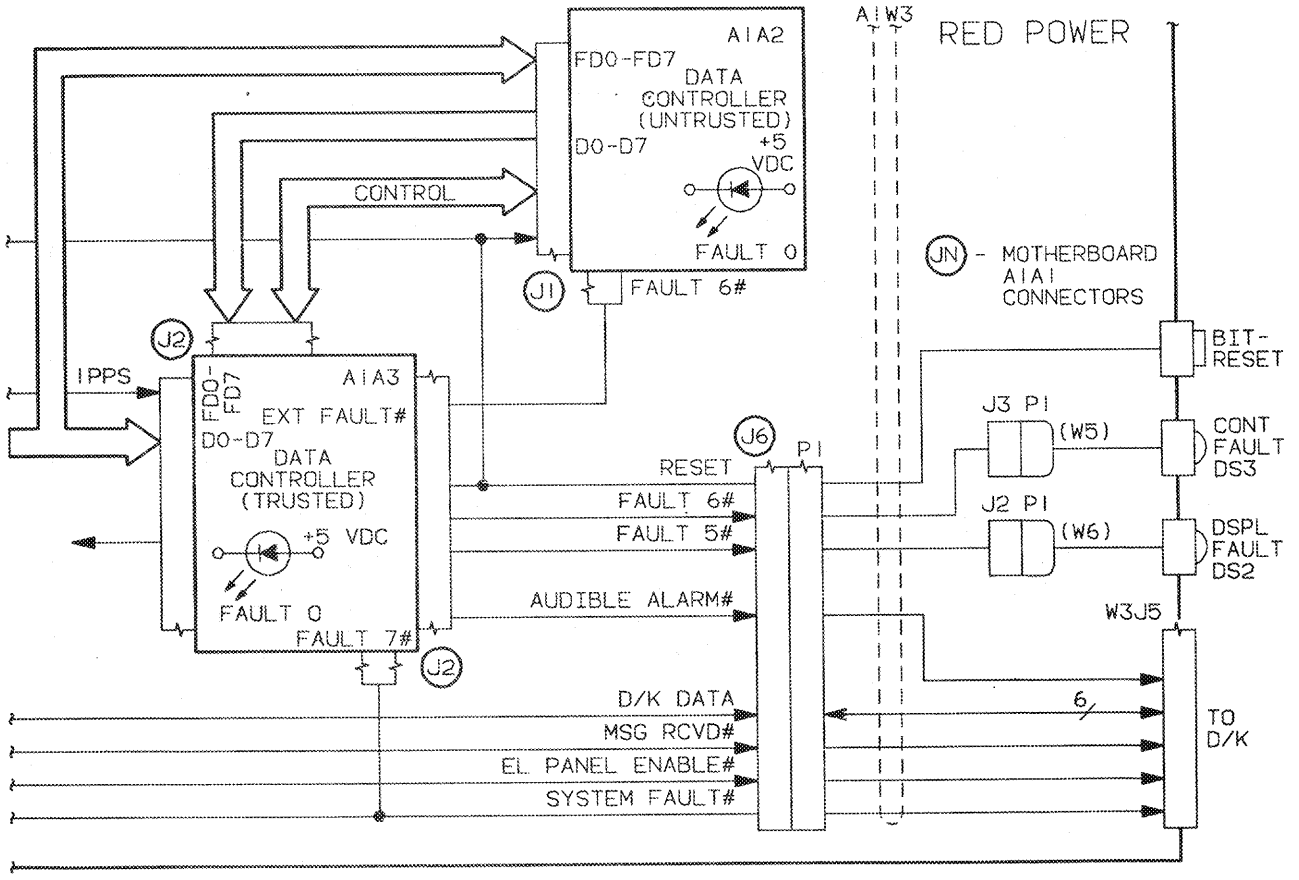
1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

- The KG-84 is connected to port A of A1A5 while the presence of a KG-84 is signalled by a logic 1 (>+6 Vdc) at the spare input line of port B.



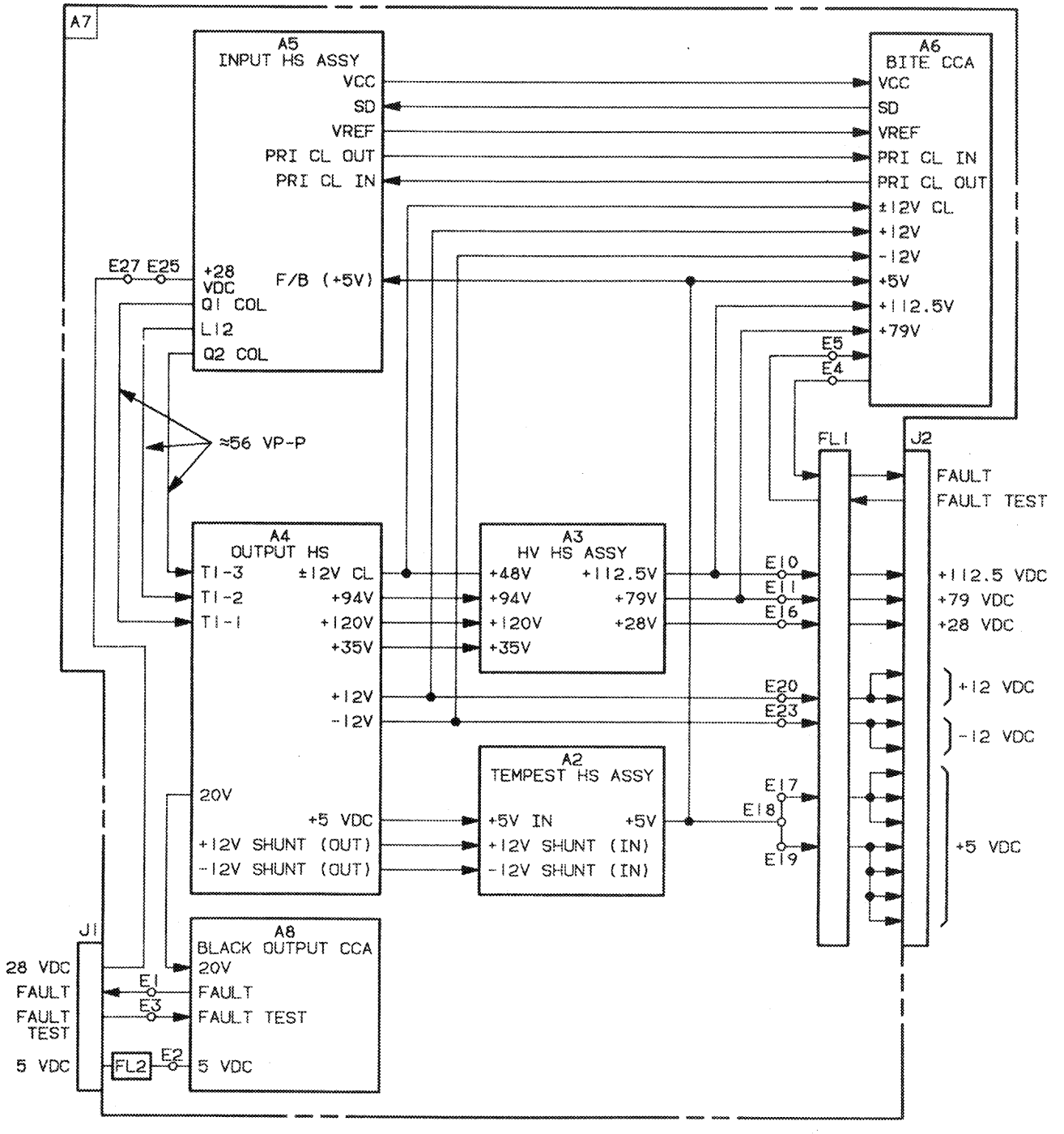
1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

(5) Trusted and untrusted data controller CCAs A1A3/A1A2. The data controllers are microprocessor based. The 8 bit data bus is controlled by the trusted data controller A1A3. Data is valid on the data bus when WR# or RD# is pulsed low while the ALE is held low. The direction of the data flow is controlled by the DT/R# line, output of the microprocessor. Interrupt prioritization is provided by a programmable interrupt controller, a device that can accept up to eight interrupts and determine which has the highest priority. The untrusted data controller A1A2 contains the memory circuits for all displays and processes information for updating the screen. All data input or output from the untrusted data controller A1A2 is validated by the trusted data controller A1A3.



1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

(6) Power Supply A1PS1. Refer to the power supply block diagram and schematics at the rear of this manual (FO-6 through FO-13). The power supply consists of the following major assemblies (in reference designation order):



1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

NOTE

During the following description of the A1PS1 circuits, reference designations are abbreviated to refer only to power supply circuits. The prefix reference designation of the Controller Assembly (A1) is omitted for brevity. For example A1PS1A5A1 will appear as PS1A5A1.

- Chassis assembly (PS1A1)
- Tempest heatsink assembly (PS1A2) with CCA (PS1A2A1)
- High voltage heatsink assembly (PS1A3) with CCA (PS1A3A1)
- Output heatsink assembly (PS1A4) with output CCA (PS1A4A1)
- Input dc to dc heatsink assembly (PS1A5) with CCA (PS1A5A1)
- BITE CCA (PS1A6)
- Motherboard assembly (PS1A7)
- Black output CCA (PS1A8)
- Red output filter (PS1FL1)
- Black output filter (PS1FL2)

Source voltage from +22 to +32 Vdc is input at PS1J1 and thru the power supply mMotherboard PS1A7. It is routed to the input heatsink assembly. The input heatsink assembly drives a power transformer on the output heatsink assembly.

The output heatsink assembly provides the voltages for the tempest heatsink assembly, a high voltage heatsink assembly, and the black output CCA.

The tempest heatsink assembly provides the red +5 Vdc. It contains regulators that are a constant current load for the +12 and -12 Vdc from the output heatsink assembly.

The high voltage and tempest heatsink assemblies outputs are through PS1FL1 to connector PS1J2. The output of the black output CCA assembly is through PS1FL2 to PS1J1.

BITE CCA assembly PS1A6 provides fault monitoring and BIT of red voltage sources. Fault monitoring and BIT of the +5 black power source is contained in components of the black output CCA assembly.

1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

(a) Chassis Assembly PS1A1. The chassis assembly PS1A1 provides mounting and housing for the power supply heatsink and CCAs. The mating surface that meets the I/O chassis has a preformed gasket for water tightness and to reduce electromagnetic interference (EMI). The rear of the chassis assembly is finned to provide heat dissipation. A cover provides protection to components. This cover and a bottom plate are removed to provide access to the housed components and filters.

(b) Input heatsink assembly PS1A5. The input heatsink assembly PS1A5 contains CCA PS1A5A1, chassis mounted components PS1A5CR1, PS1A5VR1, PS1A5L1, PS1A5Q1 and PS1A5Q2, and a chassis that serves as a heatsink.

- Refer to figures FO-6 and FO-7. The +28 Vdc input at PS1J1 (FO-6) (pins 4 and 11) is connected to motherboard PS1A7 terminals E25 and E27. These terminals are jumpered and route the input to connector PS1A5J1 pins 32 through 36. The PS1A5A1 run interconnects with PS1A5A1E12 which is then wired to the PS1A5L1-1 and CR1 cathode junction.

- Refer to figure FO-8. PS1A5CR1 provides reverse polarity protection. Inductor PS1A5L1 provides additional input voltage filtering. Zener diode PS1A5VR1 protects the power supply against voltage transients. Capacitors PS1A5C1 and PS1A5C2 are filter capacitors.

- The dc input is switched through the primary windings of PS1A5A1T1 by a dc inverter circuit formed by PS1A5A1Q1 and PS1A5A1Q2 circuitry. When power is applied either PS1A5A1Q1 or PS1A5A2Q2 will begin to conduct through the primary of PS1A5A1T1 until the core of the transformer approaches saturation. Near saturation, current begins to reverse flow. This change in polarity causes current to reverse in the base circuit of the conducting stage and causes it to shutoff. At the same time, current in the base of the nonconducting transistor increases and causes it to conduct. This induced voltage in the winding of PS1A5A1T1 is then of the opposite polarity. The resistor - capacitor networks, (PS1A5A1R4/C3 and PS1A5A1R7/C6) in the base circuits of these transistors provide paths for rapid base bias changes.

- Voltage from the secondary winding of PS1A5A1T1 is rectified by diodes PS1A5A1CR11 through PS1A5A1CR14, and filtered by capacitor PS1A5A1C9. The voltage from this portion of the power supply provides operating voltage (VCC) for circuits within power supply PS1. Silicon control rectifier (SCR) PS1A5A1Q5 and diode

1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (cont.)

PS1A5A1CR15 form a protective circuit called a crowbar circuit. This circuit will sense any high electromagnetic pulse (EMP) that may be input through the source and will discharge capacitor A5A1C9 causing the power supply to turn off. This removes the operating voltage and prevents damage to other components.

- Integrated circuit (IC) PS1A5A1U1 is a pulse width modulator (PWM). It provides square wave drive signals to MOSFETs PS1A5A1Q3 and PS1A5A1Q4. Zener diodes PS1A5A1VR1 and PS1A5A1VR2 regulate the amplitude of the drive to the MOSFET gates. PS1A5A1CR17 and PS1A5A1CR18 are steering diodes that produce rapid turn-on, turn-off of the MOSFETs.

- As the MOSFETs alternately conduct, current is switched through the primary winding of transformer PS1A5A1T2. This changes the base biasing of the chassis mounted power transistors, PS1A5Q1 and PS1A5Q2. PS1A5Q1 and PS1A5Q2 and associated components form a half bridge inverter that drives the PS1A4T1 primary windings on the output heatsink assembly. The push- pull action of this circuit produces approximately 56 Vac at Q1 COL, L1-2 and Q2 COL outputs.

- The voltage from the secondary of PS1A5A1T2 is also in series to PS1A5A1T3. As load is increased, this load is reflected across the secondary of PS1A5A1T3. The voltage within PS1A5A1T3 is rectified by PS1A5A1CR21 through CR24. This rectified voltage is directly related to the amount of current within the primary windings of PS1A5A1T2.

- This rectified voltage is connected to the inverting input (-) of comparator PS1A5A1U2B. Feedback voltage from the +5 Vdc output of the tempest heatsink assembly Feedback voltage (FB (5V)) at PS1A5A1P1-21 is input to the non-inverting input of this comparator. The voltage at the (+) positive input of this comparator is determined by the amplitude of the feedback voltage through voltage divider PS1A5A1R26 and R28. The amplitude of the voltage at the negative input to the comparator is determined by the amount of current flow in the secondary of PS1A5A1T3 and voltage divider network PS1A5A1R30 and R31. The output from this comparator is the primary current limit signal (PRI CL OUT). This is routed from the input heatsink assembly by the PS1 motherboard PS1A7 to BITE CCA PS1A6U5D (refer to figure FO-12). PS1A6U5D is a voltage comparator that is referenced to a precision 2.5 Vdc.

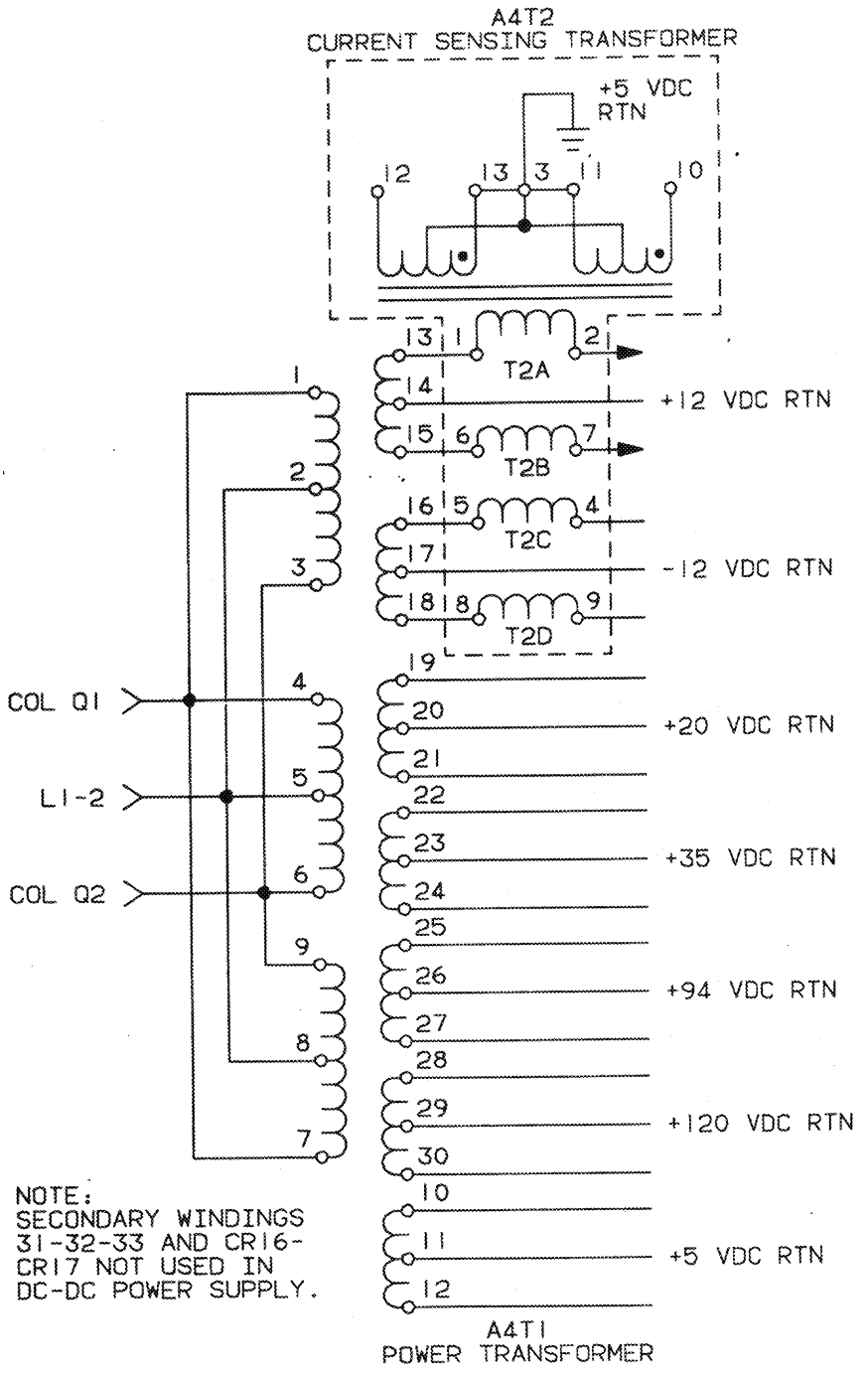
1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

- High current flow through the primary of transformer PS1A5A1T3 produces a voltage level at the negative input of PS1A5A1U2B that is greater than that at the positive input. This causes the output to go to a logic low. The output (PRI CL OUT) of PS1A5A1U2B is routed to BITE CCA comparator PS1A6A1U5D which buffers the signal output. The output of PS1A6A1U5D (PRI CL IN signal) is returned to the input heatsink assembly PS1A5 and applied to the positive input of operational amplifier PS1A5A1U2A. When the output of PS1A5A1U2B is low, the output of PS1A5A1U2A is also low. This low input to circuits within the PWM will cause it to fold back. Therefore, the output of the power supply will oscillate off and on until the condition causing over -current is removed.

- The output of PS1A5A1U2A is routed to an error amplifier within PWM PS1A5A1U1. The drive signal output of PS1A5A1U1 is controlled by the output of PS1A5A1U2A. Feedback voltage from the +5 Vdc output of PS1 is monitored at the negative input of PS1A5A1U2A. Reference voltage (V REF) is applied to the positive input of PS1A5A1U2A. When the FB voltage varies above or below the V REF signal, the output of PS1A5A1U2A is also varied. This variation of drive signal causes the width of the pulses from the PWM PS1A5A1U1 to increase or decrease. Capacitors PS1A5A1C11/C12 and C14, with resistors PS1A5A1R18/R20, and R25 form a compensation circuit to stabilize the switching action of the power supply. Variable resistor PS1A5A1R24 provides adjustment of the PWM drive signal.

(c) Output Heatsink Assembly PS1A4. The output heatsink assembly PS1A4 consists of CCA PS1A4A1, chassis mounted components rectifier PS1A4CR1, reactor PS1A4L1, power transformer PS1A4T1, dual current sense transformer PS1A4T2, voltage regulators PS1A4U1 and PS1A4U2 and a chassis which functions as a heatsink. Output voltages of PS1A4 are unregulated dc voltages of +120, +94, +35, +20, +5 and regulated dc voltages of +12 and -12.

1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)



1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

- Transformer PS1A4T1 has three primary input windings that operate in parallel and eight secondary output windings. The primary input windings of PS1A4T1 are 1-2-3, 4-5-6, and 7-8-9. Windings 1, 4, and 7 are connected to the collector of PS1A5Q1. Windings 2, 5, and 8 are connected to PS1A5L1 pin 2 (28 Vdc). Windings 3, 6 and 9 are connected to the collector of PS1A5Q2. As PS1A5Q1 and PS1A5Q2 alternately conduct, a switched current develops approximately 56 volts in each of the primary windings.

- Transformer PS1A4T1A (pins 28, 29 and 30) provides an ac voltage that is rectified by diodes PS1A4A1CR1, PS1A4A1CR2, PS1A4A1CR18 and PS1A4A1CR19 to produce +120 Vdc. The +120 Vdc is filtered by PS1A4L1A and PS1A4A1C1. PS1A4A1R1 is a bleeder resistor.

- Transformer PS1A4T1A (pins 25, 26 and 27) provides an ac voltage that is rectified by diodes PS1A4A1CR3, PS1A4A1CR4, PS1A4A1CR20 and PS1A4A1CR21 to produce +94 Vdc. The +94 Vdc is filtered by PS1A4L1B and PS1A4A1C2. PS1A4A1R5 is a bleeder resistor.

- Transformer PS1A4T1B (pins 22, 23 and 24) provides an ac voltage that is rectified by diodes PS1A4A1CR12 and PS1A4A1CR13 to produce +35 Vdc. This +35 Vdc is filtered by PS1A4L1F and PS1A4A1C14. PS1A4A1R10 is a bleeder resistor.

- Transformer PS1A4T1B (pins 19, 20 and 21) provides an ac voltage, that is rectified by diodes PS1A4A1CR14 and PS1A4A1CR15 to produce +20 Vdc. Filtering is provided by reactor PS1A4L1G and capacitor PS1A4A1C15. Resistor PS1A4A1R11 is a bleeder resistor.

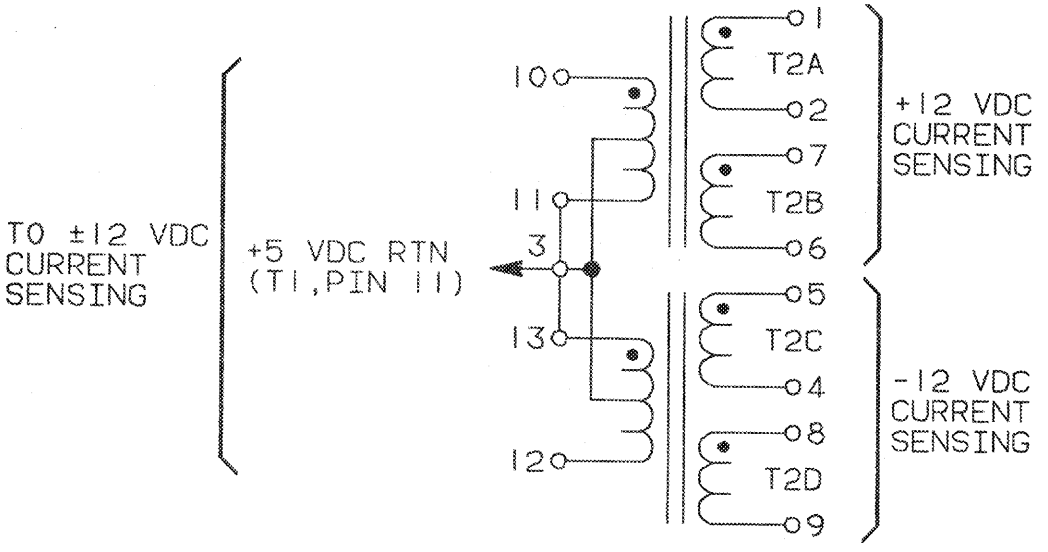
- Transformer PS1A4T1A (pins 10, 11 and 12) provides an ac voltage that is rectified by diodes PS1A4C41A and PS1A4CR1B to produce +5 Vdc. Filtering is provided by PS1A4L1D, and PS1A4A1C8 through PS1A4A1C11, PS1A4A1C16 and PS1A4A1C17. PS1A4A1R3 is a bleeder resistor.

- Transformer PS1A4T1A (pins 13, 14 and 15) provides an ac voltage that is routed through current sense transformer windings PS1A4T2A and PS1A4T2B. Diodes PS1A4A1CR7 and PS1A4A1CR8 rectify this voltage to produce +12 Vdc. The +12 Vdc is filtered by PS1A4L1C and PS1A4A1C4. This unregulated voltage (+12 V SHUNT OUT) is routed from PS1A4L1C to a regulator on the tempest heatsink assembly PS1A2 which provides a constant load.

1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

- The unregulated output from PS1A4L1C is also routed to voltage regulator PS1A4U1 to produce a regulated +12 Vdc output. Transformer PS1A4T1B (pins 16, 17 and 18) provide output voltage -17 Vdc used to produce the -12 Vdc. This voltage is routed through the current sense windings of PS1A4T2C and PS1A4T2D. Diodes PS1A4A1CR10 and PS1A4A1CR11 form a full wave rectifier. Reactor PS1A4L1E and capacitor PS1A4A1C12 form a filter. Unregulated voltage (-12V SHUNT OUT) from PS1A4L1E is routed to a shunt regulator on the tempest heatsink assembly which provides a constant load. The unregulated output voltage from PS1A4L1E is also routed to PS1A41U2, which regulates the -12 Vdc output.

- PS1A4T2 is a current sensing transformer that has windings in series with current flow in the secondary of PS1A4T1. Current flow within windings PS1A4T2A (1-2), PS1A4T2B (6-7), PS1A4T2C (4-5) and PS1A4T2D (8-9) form a primary that produces voltage in secondary windings PS1A4T2E (10-11) and PS1A4T2F (12-13). This voltage is rectified by diodes PS1A4A1CR5, PS1A4A1CR6, PS1A4A1CR22 and PS1A4A1CR23, filtered by capacitor PS1A4A1C22 and routed through a voltage divider formed by PS1A4A1R16 and PS1A4A1R17. Output voltage from the voltage divider is routed to the BITE CCA assembly PS1A6 (+12V and -12V CL) that has circuitry to monitor over-current conditions.



1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

(d) Tempest Heatsink Assembly PS1A2. The tempest heatsink assembly PS1A2 consists of a CCA PS1A2A1, transistors PS1A2Q1 and PS1A2Q2, voltage regulators PS1A2U1 and PS1A2U2, resistors PS1A2R1 through PS1A2R4, and a chassis which functions as a heatsink. The tempest heatsink assembly provides constant load for +12 and -12 Vdc outputs of the power supply.

- PS1A2R1 is in series with the +5 Vdc output. Current flowing through resistor PS1A2R1 develops a voltage potential that will vary as the current through the resistor varies. PS1A2Q1, PS1A2Q2, PS1A2A1Q1, and PS1A2A1Q2 function as contant current loads. As current flow through PS1A2R1 varies, the voltage potential developed across PS1A2R1 also varies. This is sensed by these current regulators which will shunt current to or from the load, maintaining a constant current level. PS1A2A1R1 provides the current level threshold adjustment for the +5 Vdc output.

- Current regulators PS1A2U1 and PS1A2U2 across the unregulated +12 Vdc and -12 Vdc outputs provide shunt current regulation for the +12 Vdc and -12 Vdc supplies. PS1A2U1 is a constant load for the +12 Vdc and PS1A2U2 is a constant load for the -12 Vdc. As current in the +12 Vdc or -12 Vdc circuits vary the shunting action of the current regulator varies and maintains a constant current load.

(e) High voltage heatsink assembly PS1A3. The high voltage heatsink assembly PS1A3 consists of CCA PS1A3A1, transistors PS1A3Q1 and PS1A3Q2, voltage regulators PS1A3U1, PS1A3U2 and PS1A3U4, and a chassis which functions as a heatsink.

- The high voltage heatsink assembly PS1A3 has inputs of +120 Vdc, +94 Vdc and +35 Vdc. It provides regulated voltage outputs of +112.5 Vdc, +79 Vdc and +28 Vdc.

- PS1A3Q1 and PS1A3A1Q1 are in a Darlington pair configuration to provide a high input impedance. PS1A3U1 provides voltage regulation for the +112.5 Vdc output. Variable resistor PS1A3A1R4 provides adjustment of the +112.5 Vdc output. PS1A3A1CR13 is a reference diode and, with Zener diode PS1A3A1VR1, regulates current and voltage inputs to the base of PS1A3A1Q1. A dynamic adjustment is developed across A3A1R1. A3A1Q2 provides current limiting. During excessive current loading. A3A1Q2 is turned on by the loading across A3A1R5/R6/R50/R51. This causes the ADJ input of A3U1 to be at ground and the regulator shuts off.

1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

- The PWM contains a precision +5.0 Vdc reference regulator. This reference voltage is connected through PS1A8R11 to the positive (+) input (pin 1) of a voltage comparator internal to the PWM. The output voltage is monitored through PS1A8R19/R20 at the negative (-) input (pin 2). Variations in the output voltage cause the comparator to produce an error voltage. This results in commands from the PWM in the form of increased or decreased pulse widths. By increasing and decreasing the pulse width, the conduction period of the switching transistor within PS1A8U1 is made to vary. This results in varying the voltage through PS1A8L1. Capacitors PS1A8C6/C7/C8 will then charge or discharge to maintain a constant output voltage.

- Under and overvoltage sensing is accomplished by the power supply supervisor circuit. A sample of the output voltage is returned through voltage divider network PS1A8R2/R3/R4 to comparator circuits contained in PS1A8U2. Under normal conditions, approximately 2.8 Vdc is present at the undervoltage and 2.2 Vdc is present at the overvoltage sensing inputs. Fault testing is initiated during power up and when selected by the operator. During system BIT the controller assembly inputs a low through PS1A1P1-11. This produces the same fault alarm indication as an undervoltage fault.

- A second overvoltage sensing circuit is developed by using the current limit detection circuit of the power supply supervisor. An internal 2.5 Vdc reference voltage of the power supply supervisor is connected to the current limiting normal input pin 11 (CL NI INP). A sample (approximately 2.3 Vdc) of the output voltage is sent to the current limiting inverted input pin 10 (CL INV INP). This permits two thresholds of overvoltage protection. The lowest threshold provides a fault signal only, while exceeding the higher threshold will result in a shutdown of the +5 Vdc black output voltage source.

- During an undervoltage condition (approximately 4.65 Vdc) and system BIT testing, the state at PS1A8U2 pin 9 goes to a low. This low at the base of PS1A8Q1 shuts this transistor off. When off, the input voltage through PS1A8R15 is regulated to a TTL logic one (approximately 5.1 Vdc) that is sent from the Black Output CCA Assembly PS1A8 via the Motherboard to connector PS1J1. This TTL signal enters the controller motherboard A1A1A1J11 and lights fault indicator LED DS2.

1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

- During an overvoltage condition the voltage through PS1A8R1/R5 voltage divider network increases from the normal 2.3 Vdc until it exceeds the 2.5 Vdc reference voltage at PS1A8U2 pin 11. This causes a comparator within this power supply supervisor IC to output a logic low (CL OUT) through pin 13. This shuts PS1A8Q1 off and produces a fault signal in the same manner as that generated by undervoltage.

- If an overvoltage condition reaches the second threshold, (approximately 5.76 Vdc), the state at PS1A8U2 pin 4 (OV IND) will change to a low. This low is connected to PS1A8U2 pin 2 through PS1A8CR1. Internal to the power supply supervisor, a self-holding SCR trigger signal is generated and is output at pin 1. This is routed through PS1A8R27 to the base of PS1A8Q3, which causes it to conduct. When this transistor conducts, ground is present at pin 8 of PWM PS1A8U3, and the PWM shuts down and drive is removed from the regulator PS1A8U1. While PS1A8U1 is shut off, no voltage is present at VOUT (pin 1). Since the SCR trigger is self-holding, to reset the black output CCA assembly PS1A8 power must be turned off and then on when the overvoltage condition no longer exists.

- Current sensing is accomplished by the voltage drop across resistors PS1A8R17/18. This voltage is compared at pins 6 and 7 of PS1A8U3. If current increases to a level between 2.5 and 3.7 amperes, a comparator within the PWM generates an internal shutdown signal. This has the same effect as the previously desribed externally generated shutdown produced by an overvoltage condition.

(h) Motherboard PS1A7. The motherboard PS1A7 consists of a printed wiring board, connectors PS1A7J1 through PS1A7J6 and terminal studs E1 through E29. The motherboard PS1A7 provides interconnection between all PS1 heatsinks and CCAs. Input voltage to the Motherboard is connected at terminal E27 and jumpered to E25. Output dc voltages from the motherboard PS1A7 are through terminals to PS1FL1 and PS1FL2.

(i) Filters PS1FL1 and PS1FL2. Filter PS1FL1 is a multisection filter and provides filtering of the red dc voltage interconnected through the motherboard PS1A7 to connector PS1J2. Filter PS1FL2 filters the black 5 Vdc that is interconnected to PS1J1.

1-16. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

b. Display/keypad assembly A1A2 (D/K). The D/K is the operator interface device. Menus are displayed in response to operational sequences such as message receipt, internal fault sensing, or mode/function selection. Operation and selection of the displayed menus is controlled through the keypad switches and the display touch points. Through operation of the touch point and keypads, the operator can change operating parameters of the interfaced high frequency (HF) equipment, view and process messages, perform fault detection and perform other RN communication functions. The D/K assembly has two functional subgroups; the display module chassis A2A2 and the display assembly A2A1. Major CCAs of the D/K assembly are as follows:

- Surge protection CCA (A2A2A1)
- Driver CCA (A2A1A1)
- Driver CCA (A2A1A2)
- Driver CCA (A2A1A3)
- Driver CCA (A2A1A4)
- Programmed controller CCA (A2A1A5)
- Display control (A2A1A6)

CHAPTER 2
UNIT MAINTENANCE

Section I. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

2-1. COMMON TOOLS AND EQUIPMENT

a. Army. For authorized common tools and equipment refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

b. Navy. Navy personnel refer to applicable Tables of Allowance (TA).

c. Air Force. Air Force personnel refer to applicable Tables of Allowance (TA).

2-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Special tools, TMDE, and support equipment and their purposes are listed in the Maintenance Allocation Chart (MAC), Appendix B.

2-3. REPAIR PARTS

Repair parts used during unit maintenance are listed and illustrated in the repair parts and special tools lists contained in TM 11- 5895-1322-24P, (Navy) EE119-ND-PLD-010/W110-MX10819, (Air Force) TO 31R2-2GRC215-34.

Section II. SERVICE UPON RECEIPT

2-4. UNPACKING

There are no special procedures for unpacking the I/O. However, avoid damaging containers during unpacking and report reuseable empty containers through established supply channels, if applicable. When possible, reuse containers to pack unserviceable I/O assemblies for return to higher maintenance levels.

2-5. CHECKING UNPACKED EQUIPMENT

a. Inspect the equipment for damage incurred during shipment. Report shipping damage on SF-364, Report of Discrepancy (ROD).

b. Check the equipment against the packing slip to see if the shipment is complete. Report all discrepancies in accordance with the instructions of DA Pam 738-750.

c. Check to see whether your equipment has had any Modification Work Orders (MWO) applied.

2-6. PRELIMINARY SERVICING OF EQUIPMENT

No alinements are required prior to installation. Perform the following checks upon receiving a new I/O or prior to installing a repaired item. The Team Terminal I/O is installed in accordance with the instructions contained in TM 11-5895-1220-12, (Navy) EE160-RG-OMI-010/W110-GRC215, (Air Force) TO 31R2-2GRC215-1.

a. Check all front panel connectors.

- Connectors will be securely mounted to the chassis.
- Connector pins will not be bent or broken.

b. Check all indicator lamp covers.

- Lamp Covers will be secure.
- Lamp Covers will not be cracked.
- Lamp covers will turn for normal and blackout operation.

c. Check the ALARM VOLUME control and adjusting knob.

- Control and adjusting knob will be securely mounted.
- ALARM VOLUME control knob will turn through the adjustment range with detent indicated at each end of adjustment.

d. Check the reset switches.

- Switches will be securely mounted to the chassis.
- Switches will operate evenly and do not bind or remain in when pressed.

2-6. PRELIMINARY SERVICING OF EQUIPMENT (Cont.)

e. Check the POWER switch.

- The POWER switch and switch guard will be securely mounted to the chassis.
- The switch will operate in the ON and OFF position. Note that the switch locks when set to the ON position.

f. Check the D/K interface cable.

- The insulation will not be cracked or frayed.
- The cable fitting at the display module chassis will fit flush with the chassis and firmly around the cable.
- Cable connector pins will not be bent or broken.
- The collar of the cable connector will turn freely and will secure the cable connector to the controller chassis connector J5.

g. Check the general mechanical condition of the the I/O chassis.

- Mounting and carrying handles will be secure.
- Hinged cover will be secure and can be raised.
- Hinged cover will remain in place when closed.
- Latches are in place and can secure the D/K to the controller chassis.
- Mounting hardware will be in place and securely fixed to the controller chassis.
- The audible alarm speaker will not be loose, cracked, or missing.

h. Check the bezel switches.

- Bezel switches have no visible damage.

Section III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-7. INTRODUCTION

Unit preventive maintenance procedures help maintain the equipment in a serviceable condition. They include items to be checked and procedures for checking them. The checks and services described in the PMCS table outline inspections that are to be made at specific monthly (M) and quarterly (Q) intervals.

a. Routine Checks. The following items are not listed in the PMCS table. Defects that can be found by these checks are routine and should be reported and corrected when found.

- Checking for frayed cables.
- Tightening loose screws or nuts.
- Cleaning and dusting.
- Checking for broken or dented equipment rack.

a. Explanation of Columns.

(1) Item number column. This column is used as a source of item numbers for the TM Number Column on DA Form 2404, Equipment Inspection and Maintenance Worksheet, in recording results of PMCS.

(2) Interval column. This column specifies the frequency of the check, M for Monthly checks, and Q for Quarterly checks.

(3) Item to be inspected column. This column lists the item to which the procedure is to be applied.

(4) Procedures column. This column describes the procedure that is to be followed to perform the check.

c. Instructions for Reporting and Correcting Deficiencies. If your equipment does not perform as required, refer to the troubleshooting procedures within this chapter. Report any malfunctions or failures on DA Form 2404, or refer to DA Pam 738-750.

NOTE

If your equipment must be in operation all the time, only do items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

2-8. UNIT PMCS TABLE

PREVENTIVE MAINTENANCE CHECKS AND SERVICES

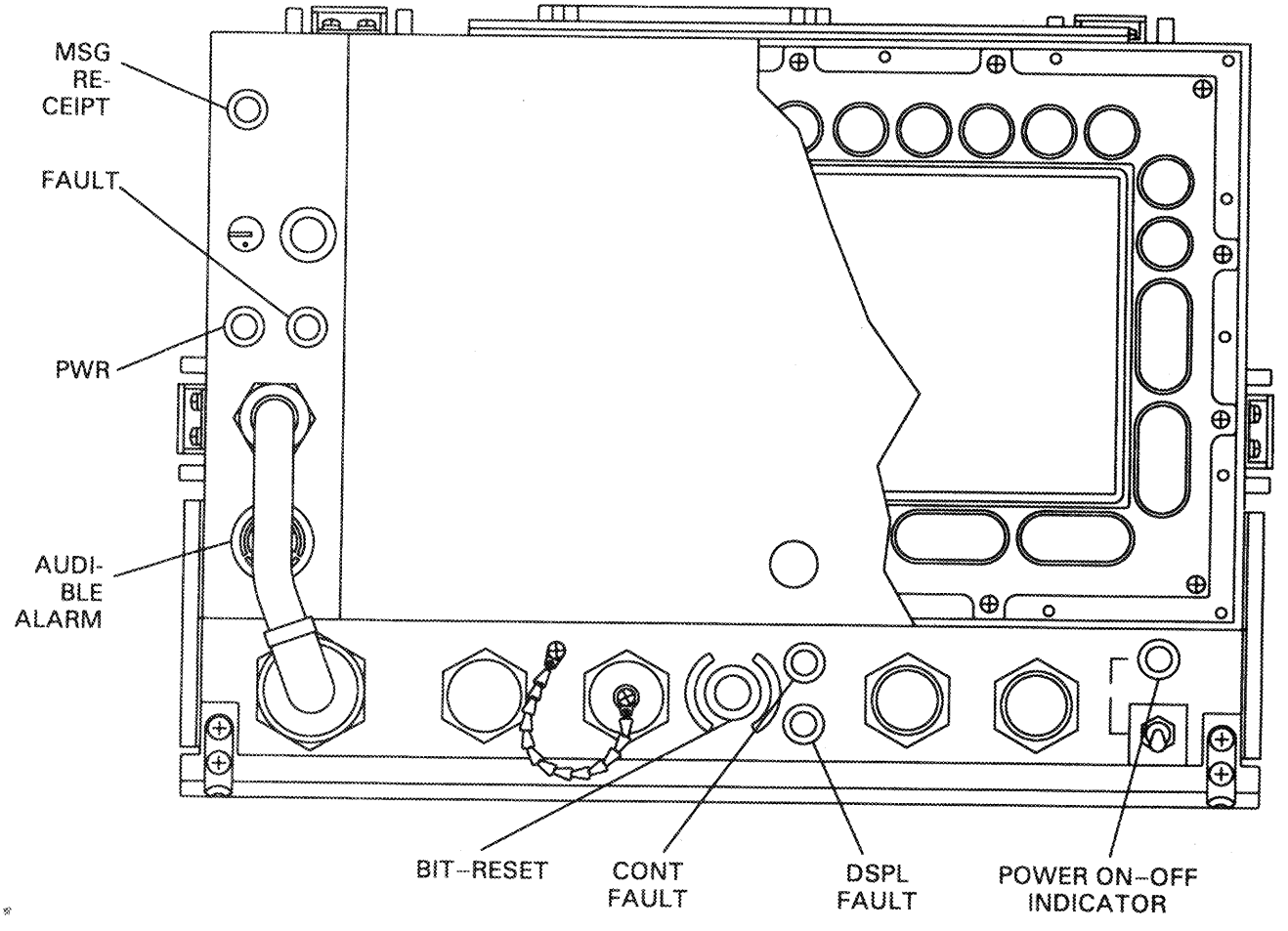
Item No.	Interval M	Interval Q	Item To Be Inspected	Procedures
1	●		End item equipment.	Inspect for completeness.
2	●		Communications equipment performance.	Initiate terminal off-line BIT. If BIT fails, refer to troubleshooting procedures in Section IV, Chapter 2.

Section IV. UNIT TROUBLESHOOTING

2-9. INTRODUCTION

a. Unit level troubleshooting for the I/O is done as part of Radio Set AN/GRC-215 and is simplified by both on-line and off-line BIT and fault detection capabilities.

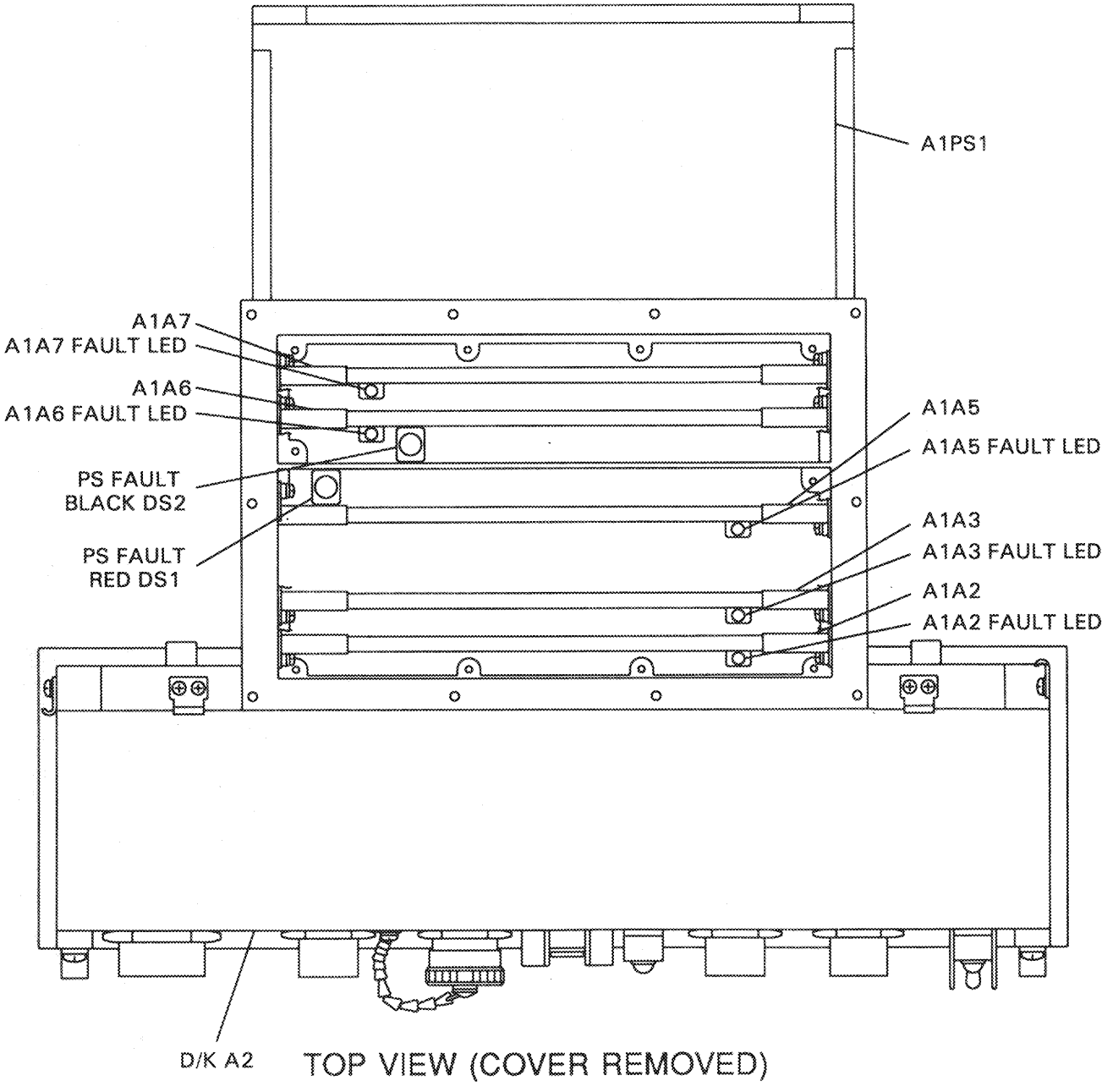
- I/O off-line BIT is automatically run upon power up or it can be initiated by pressing the BIT-RESET switch.
- The front panel indicator lamps on the controller and D/K assemblies light to show faults of primary assemblies (controller or D/K assemblies).
- Individual CCAs have light emitting diodes (LEDs) to indicate failure of that CCA. Power supply failures are indicated by LEDs on the motherboard.



2-9. INTRODUCTION (Cont.)

b. The BIT can fault isolate to the following assemblies that are removed and replaced at the unit maintenance level.

- Power Supply A1PS1 (both red and black power sources).
- Controller CCAs A1A2, A1A3, A1A5, A1A6, A1A7
- Display/keypad A2



TOP VIEW (COVER REMOVED)

2-9. INTRODUCTION (Cont.)

c. Some defects and corrective measures are routine and will be corrected at the unit maintenance level.

- Checking and replacing failed indicator lamps.

CAUTION

When a circuit breaker cannot be reset or immediately trips when reset, this may indicate a short circuit or defective component. Do not force circuit breakers to remain on. More extensive damage can occur.

- Checking and resetting the POWER circuit breaker.
- Tighten, repair and replace handles, knobs and latch assemblies.

2-10. TROUBLESHOOTING PROCEDURES

The fault lamps on the D/K assembly and the controller assembly will indicate if the failure is within the D/K or the controller assembly. These fault lamps are; Fault and DSPL fault lamps.

a. Refer to paragraph 2-15 for procedures to replace the D/K.

b. If a controller assembly failure is indicated, remove the top cover (para. 2-14) to observe the fault LED's. Replace the CCA (para. 2-16) or the power supply assembly (para. 2-17) as appropriate. Each of the plug-in CCAs has a LED located at the top edge of the CCA to indicate a failure. Power supply failures are indicated by LEDs DS1 (red power) and DS2 (black power) on the motherboard located at the bottom of the controller.

NOTE

Depending on installation, observation of DS1 and DS2 may require use of a mirror device.

c. In the event that the unit is totally inoperative (other units of the team terminal are operating properly and input power to the team terminal can be assumed good), replace the Power Supply. If replacement of the Power Supply and/or the I/O fails to correct the problem, contact the appropriate maintenance level as indicated in the MAC, page B-1.

Section V. Unit Maintenance

2-11. GENERAL

This section contains maintenance procedures which are the responsibility of Unit Maintenance as authorized by the Maintenance Allocation Chart (MAC); refer to Appendix B. Unit Maintenance is also authorized to replace front panel bulbs, lens cover, handles, knobs, front and top cover, top cover gaskets, cushion and latch assemblies.

2-12. OPERATIONAL CHECK

Operational checks are performed by BIT after all maintenance actions. Bit is automatically initiated each time the unit is powered up and status is monitored continuously during operation. During operation, BIT may be initiated by the operator. To check or verify operational condition, initiate off-line BIT by pressing the BIT bezel switch on the controller assembly.

2-13. INSPECTION OF INSTALLED ITEMS

Inspect all assemblies and parts mounted on the I/O to determine if it is damaged or incomplete to the extent that it should be replaced or repaired.

2-14. REPLACEMENT OF TOP COVER

Disassembly and assembly of the I/O at unit level is limited to the removal of top cover to gain access to the CCAs. This is accomplished by loosening 10 screws on the top of the controller assembly. When assembling the I/O unit, these screws are tightened using a torque wrench. Torque to 10 to 12 inch/pounds according to the pattern below [1] thru [10] .

INITIAL SETUP

Tools	Equipment Condition
Tool Kit, TK-101/G Screwdriver, Set, Torque, (1-30 in./lb. range)	BIT completed.

REMOVE

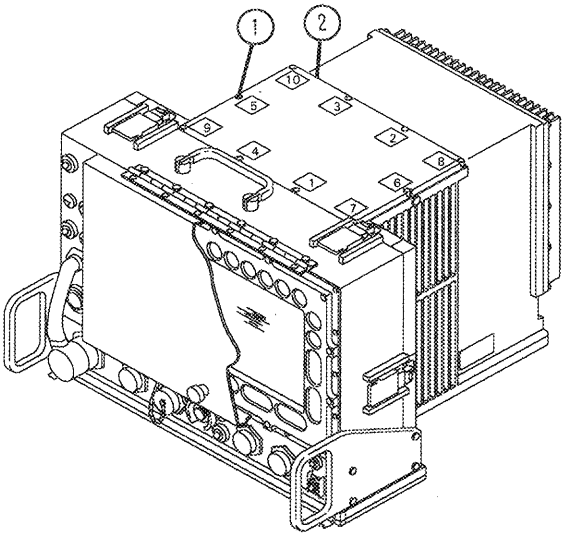
STEP 1. Loosen 10 captive screws (1) .

STEP 2. Lift cover (2) .

REPLACE

STEP 1. Position cover (2) .

STEP 2. Tighten 10 captive screws (1) to 10 to 12 in./lbs. in sequence indicated by [ ] .



NOTE

In some installations it may be necessary to remove the MX-10819/GRC-215 from its rack when replacing cover. Refer to TM 11-5895-1220-12 for removal.

2-15. REPLACEMENT OF THE D/K ASSEMBLY

INITIAL SETUP

Equipment Condition	Material/Parts
BIT completed Power removed	D/K Assembly, A2, P/N A3023931

REMOVE D/K ASSEMBLY

STEP 1. Disconnect PWR/SIG cable W1P1 (1) from DISPLAY PWR/SIG connector J5.

STEP 2. Release four latches (2) to free the D/K assembly (3) from controller assembly (4).

STEP 3. Remove the D/K assembly.

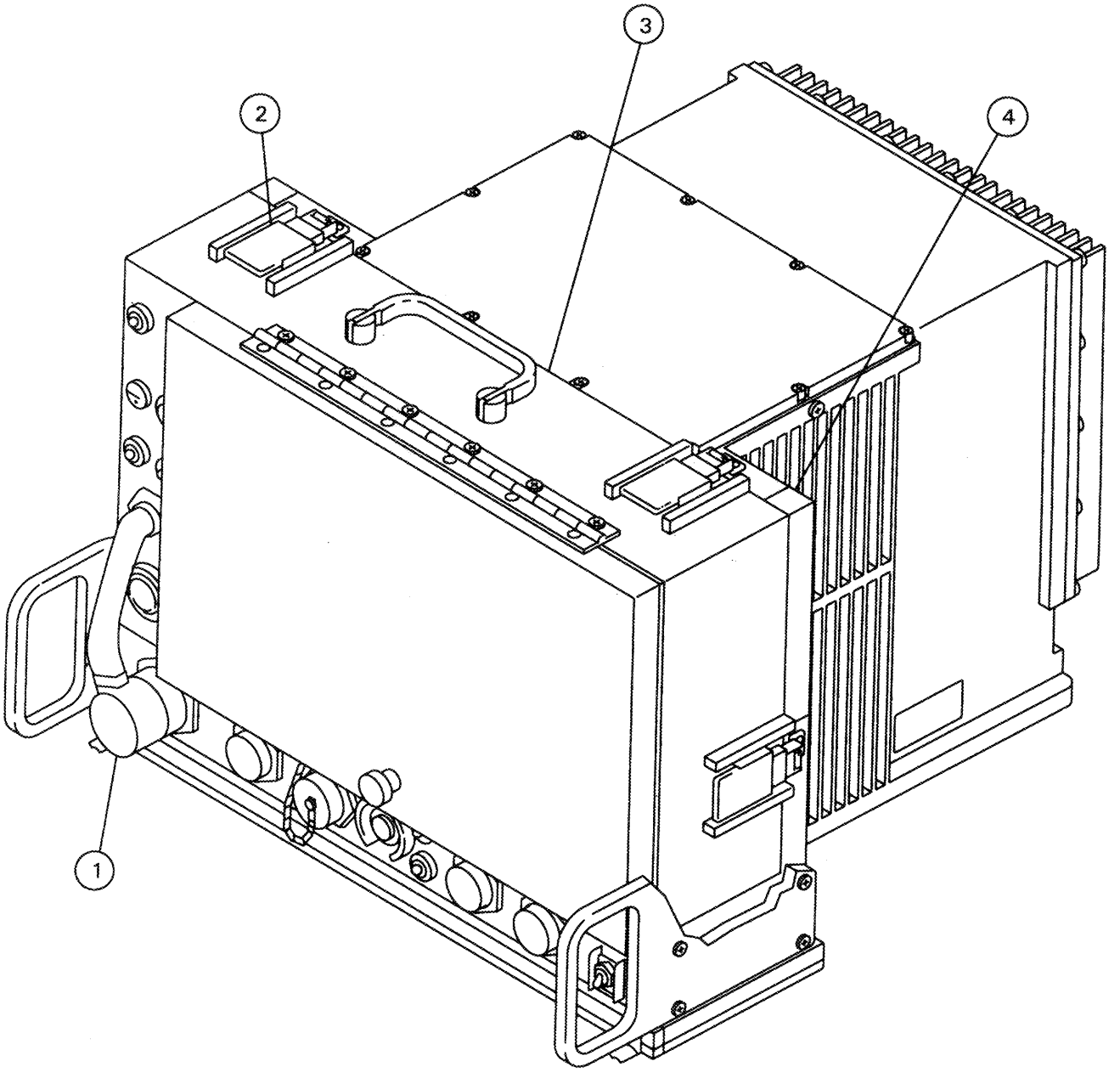
REPLACE D/K ASSEMBLY

STEP 1. Position the D/K assembly (3) onto the controller assembly (4).

STEP 2. Fasten four latches (2) to secure the D/K assembly to controller assembly.

STEP 3. Connect PWR/SIG cable W1P1 (1) to DISPLAY PWR/SIG connector J5.

2-15. REPLACEMENT OF THE D/K ASSEMBLY (Cont.)



2-16. REPLACEMENT OF CONTROLLER ASSEMBLY PLUG-IN CCAs

NOTE

In some installations, it may be necessary to remove the MX-10819/GRC-215 from rack prior to performing this procedure (See TM 11-5895-1220-12).

CCAs A1A2, A1A3, A1A5, A1A6, and A1A7 are plug-in CCAs that are accessed after removing the top cover (para. 2-14). All CCAs are removed and replaced in the same manner. After replacement of a CCA, BIT should be performed. If BIT is successful, the top cover is replaced in accordance with paragraph 2-14.

CAUTION

All controller assembly plug-in CCAs contain components that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.

INITIAL SETUP

Tools

Tool Kit, TK-101/G
Static Control Service Kit

Equipment Conditon

Power OFF
Top cover removed (para. 2-14).

Material/Parts

Anti-static protective bag
CCA as appropriate (A1A2 through A1A7)

REMOVE

STEP 1. Grasp circuit card extractors (1) and lift until the CCA (2) is free from the motherboard connector.

STEP 2. Carefully pull the CCA from the chassis (3).

STEP 3. Place the removed CCA in an anti-static bag.

REPLACE CCA

STEP 1. Remove the CCA from the anti-static bag.

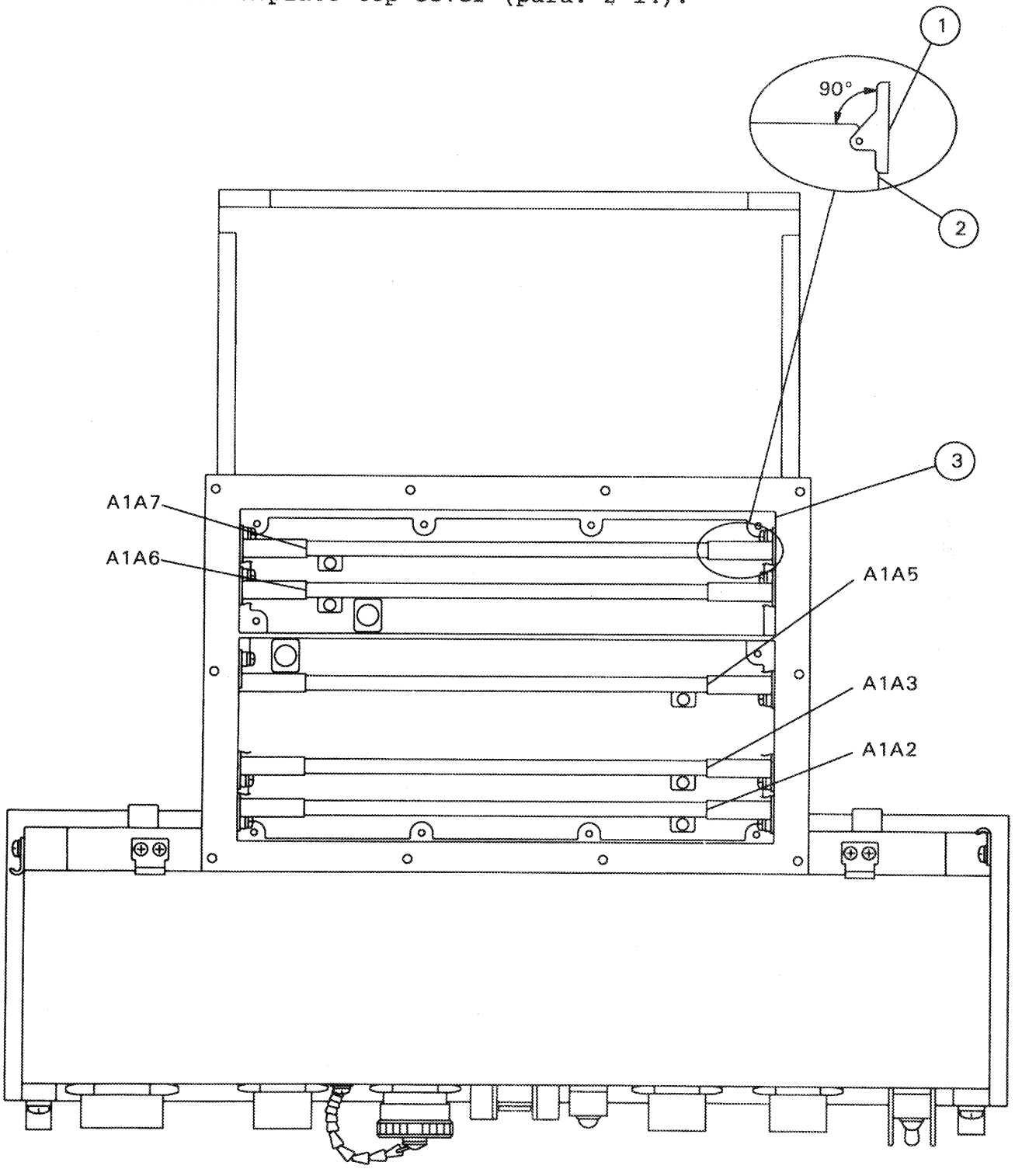
STEP 2. Aline CCA (2) with card guides.

STEP 3. Push down into cardcage (3) until seated in the mother-board connector.

2-16. REPLACEMENT OF CONTROLLER ASSEMBLY PLUG-IN CCAs (Cont.)

REPLACE CCA (Cont.)

STEP 4. Ensure that no faults are indicated at the end of power-up BIT. Replace top cover (para. 2-14).



2-17. REPLACEMENT OF POWER SUPPLY ASSEMBLY

INITIAL SETUP

Tools	Equipment Condition
Tool Kit, TK-101/G	BIT completed
Static Control Service Kit	Power removed
Screwdriver Set, Torque (1-30 in. lb)	

Material/Parts

Power Supply Assembly, A1PS1,
P/N A3023920

REMOVE POWER SUPPLY ASSEMBLY

STEP 1. Loosen 18 captive screws (1) securing the power supply (2) to the rear of controller assembly (3).

STEP 2. Pull power supply (2) from controller assembly (3).

REPLACE POWER SUPPLY ASSEMBLY

STEP 1. Insert power supply (2) in rear of controller assembly (3).

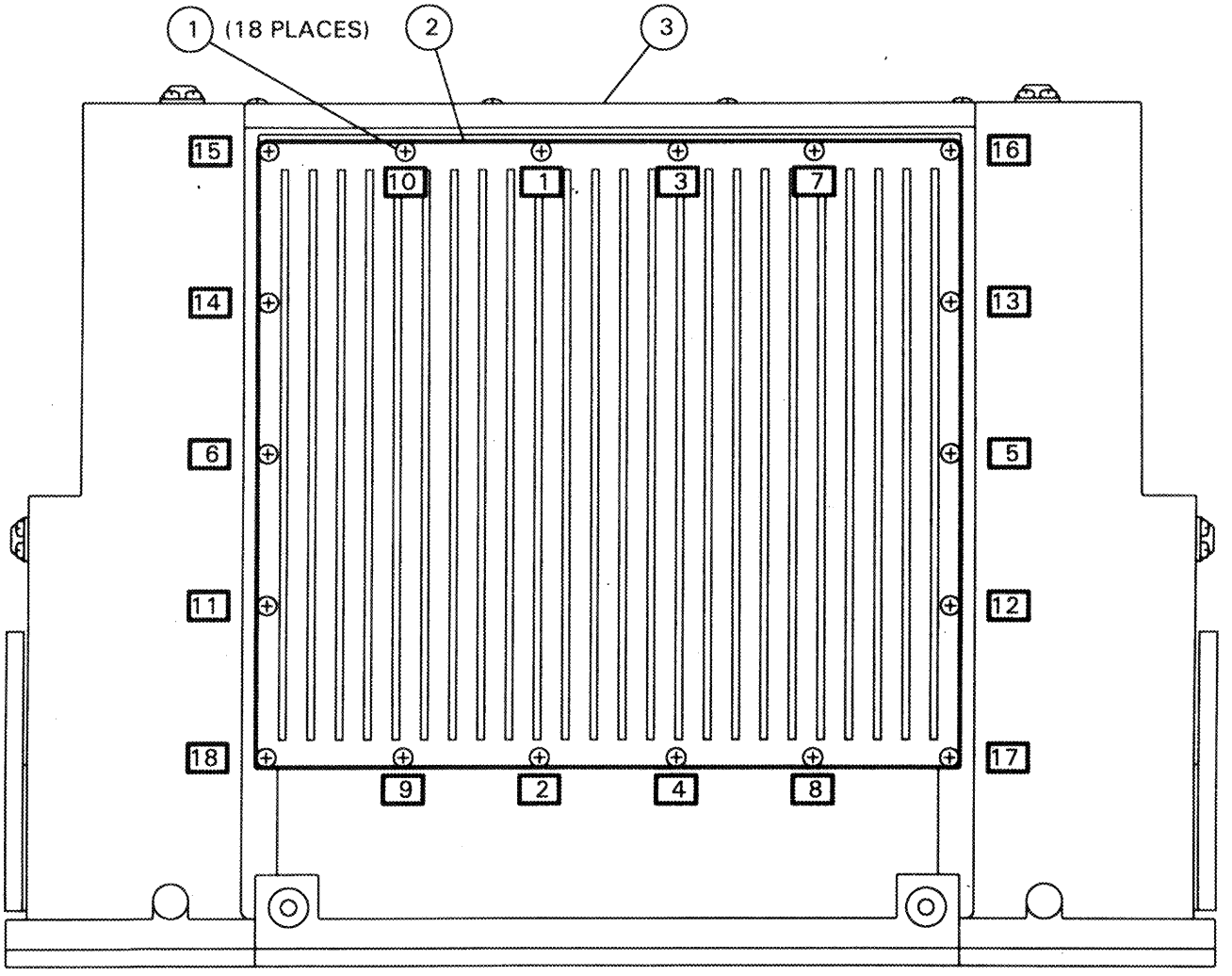
STEP 2. Tighten 18 captive screws (1) to secure power supply to controller assembly. Tighten each screw to 10-12 inch/pounds according to tightening sequence shown.

STEP 3. Ensure that no faults are indicated at the end of power-up BIT.

2-17. REPLACEMENT OF POWER SUPPLY ASSEMBLY (Cont.)

NOTE

WHEN REPLACING POWER SUPPLY
TORQUE SCREWS TO 10-12 INCH POUNDS
IN THE SEQUENCE INDICATED BY ☐ .



I/O REAR VIEW

2-18. CLEANING

WARNING

Turn off all equipment power before using TRICHLORO-TRIFLUOROETHANE. Provide adequate ventilation while using TRICHLOROTRIFLUOROETHANE. Avoid prolonged breathing of fumes and vapor. Do not use solvent near heat or open flames; the products decomposed are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, avoid prolonged contact with the skin. When needed, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

Use a dry, clean, lint free cloth or brush to remove dust or dirt. If needed, moisten the cloth or brush with TRICHLOROTRIFLUOROETHANE. After cleaning, wipe dry with a clean cloth.

Section VI. PREPARATION FOR STORAGE OR SHIPMENT

2-19. GENERAL

a. Army. Refer to paragraph 1-6a for administrative storage.

b. Navy. Refer to NAVSUP PUB 503.

c. Air Force. Refer to AFM-257 (storage) and AFR 67-31 (shipment).

2-20. MARKING

The marking on the exterior of the container will provide ESD warnings as prescribed in MIL-STD-129H.

CHAPTER 3
INTERMEDIATE DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

NOTE

Intermediate Direct Support Maintenance is not allocated for the I/O.

Subject | Page

Section I. REPAIR PARTS, SPECIAL TOOLS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT (TMDE); AND SUPPORT EQUIPMENT

3-1. COMMON TOOLS AND EQUIPMENT

a. Army. For authorized common tools and test equipment, refer to the Modified Table of Organization and Equipment (MTOE) applicable to your unit.

b. Navy. Refer to applicable Tables of Allowance (TA).

c. Air Force. Refer to applicable Tables of Allowance (TA).

3-2. SPECIAL TOOLS, TMDE, AND SUPPORT EQUIPMENT

Special tools, TMDE, and support equipment and their purposes are identified in the Maintenance Allocation Chart, Appendix B.

3-3. REPAIR PARTS

Repair parts used during intermediate general support maintenance are listed and illustrated in TM 11-5895-1322-24P, (Navy) EE119-ND-PLD-010/W110-MX10819, (Air Force) TO 31R2-2GRC215-34.

Section II. INTERMEDIATE GENERAL SUPPORT TROUBLESHOOTING

3-4. GENERAL

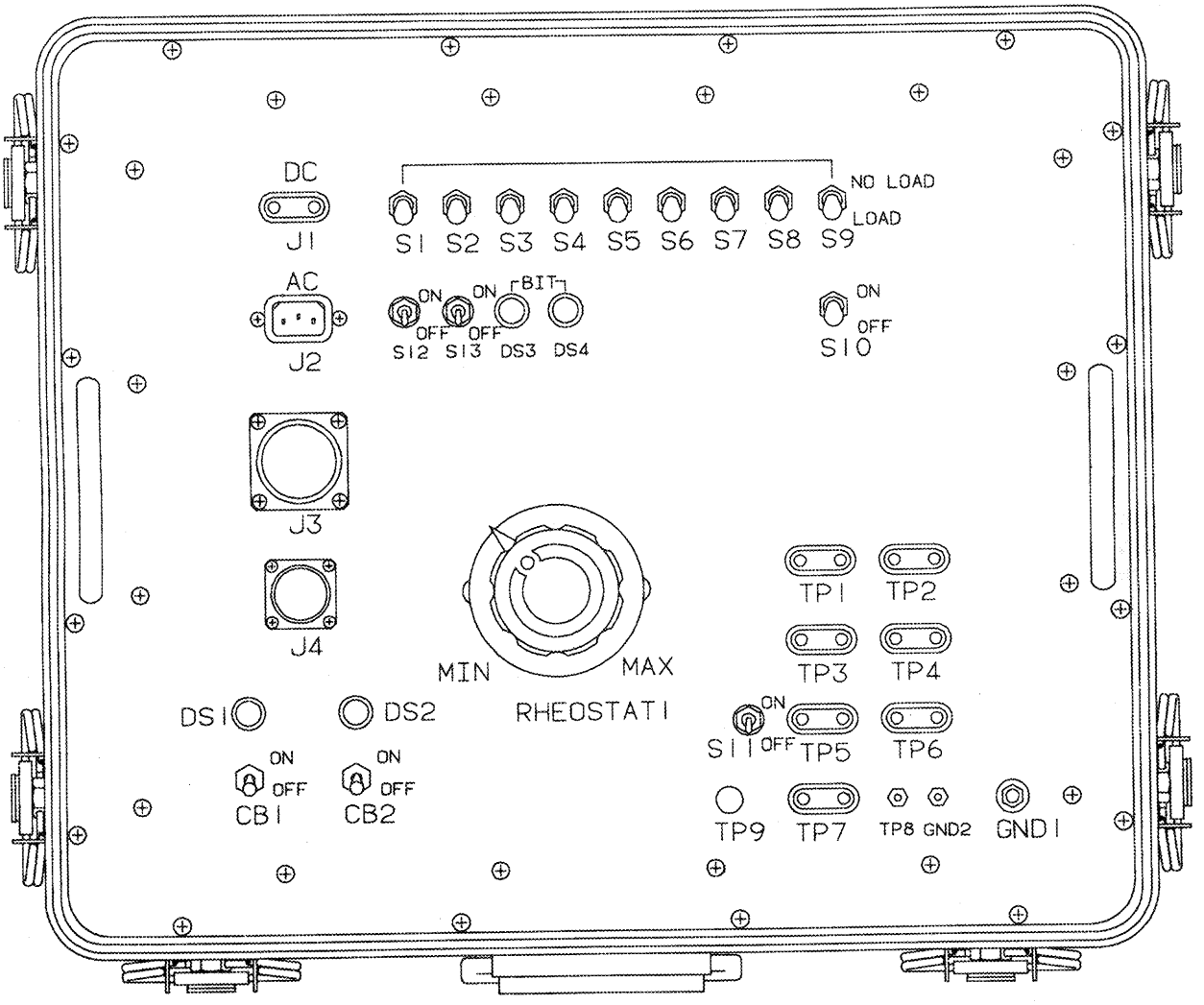
a. Other then verifying a defective I/O in the Radio Set AN/GRC-215, intermediate general support is limited to maintenance of the I/O power supply assembly A1PS1 using Test Set, Power Supply TS-4243/G. Upon receiving an I/O power supply assembly, perform an operational check to verify the power supply is not functional. Should the failure require disassembly, or removal of a major component, refer to Section III.

General support repairs the defective power supply removed at unit level. Defects and corrective measures for items listed below are not in the troubleshooting chart. Defects and failures of these items should be corrected when noted.

- Replacing/repairing handles.
- Replacing damaged access cover and cover assembly.
- Replacing preformed EMI cover gaskets and mounting hardware.

b. Test Set Power Supply TS-4243/G. This test set, shown on page 3-3, provides the necessary loads, interface and test points to test several Regency Net power supply subassemblies including A1PS1, P/N A3023920. It includes an assortment of cables including W1, W3 and W7. For complete operating and maintenance instructions see TM 11-6625-3218-14&P.

3-4. GENERAL (Cont.)



TEST SET, POWER SUPPLY TS-4243/G
(Commonly referred to as Test Fixture)

3-5. POWER SUPPLY OPERATIONAL CHECK

The power supply operational check is performed to determine the condition and/or any failure symptoms. It is also performed after maintenance to verify repair actions to the power supply. If power supply fails the operational check refer to the Symptom Index, para 3-8. To perform the I/O operational check see para. 2-12.

INITIAL SETUP

Test Equipment

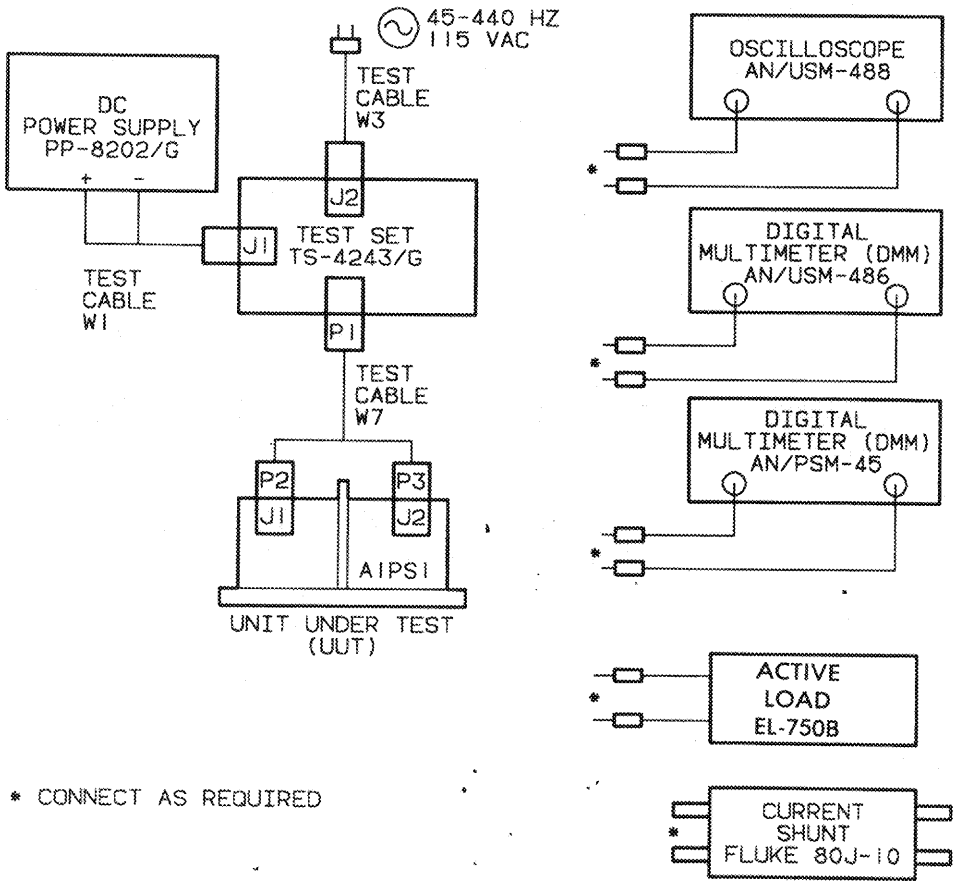
DC Power Supply, PP-8202/G
Oscilloscope, AN/USM-488
Power Supply Test Set, TS-4243/G
Digital Multimeter AN/PSM-45
Digital Multimeter AN/USM-486
Current Shunt, Fluke 80J-10
Active Load, EL 750B

Tools

Tool Kit TK-17

Equipment Condition

Power supply removed from controller assembly (para 2-17).
Test equipment and power supply connected as shown.
Test fixture switches set as follows:
CB1 and CB-2 OFF,
S1 through S9 NO LOAD,
and S10 through S13 OFF.
PP-8202/G power ON and output adjusted to 28 Vdc.



3-5. POWER SUPPLY OPERATIONAL CHECK (Cont.)

STEP 1. Set test set CB1 and CB2 to ON and verify:

- DS1 and DS2 are lit.
- BIT indicators are not lit.
- Blower is operating.

STEP 2. Connect common lead of DMM to GND2 of test fixture and verify following voltages on test fixture test points.

TEST POINT	VOLTAGE
TP1	+4.75 to +5.25 Vdc
TP2	+4.75 to +5.25 Vdc
TP3	+106.87 to +118.13 Vdc
TP4	+11.4 to +12.6 Vdc
TP5	+75.05 to +82.95 Vdc
TP6	-11.4 to -12.6 Vdc
TP7	+26.6 to +29.4 Vdc

STEP 3. Set CB1 to OFF, set S3 to LOAD, and set CB1 to ON. Verify voltages as follows:

TEST POINT	VOLTAGE
TP1	+4.75 to +5.25 Vdc
TP2	+4.75 to +5.25 Vdc
TP3	+106.87 to +118.13 Vdc
TP4	+11.4 to +12.6 Vdc
TP5	+75.05 to +82.95 Vdc
TP6	-11.4 to -12.6 Vdc
TP7	+26.6 to +29.4 Vdc

STEP 4. With an oscilloscope, verify that the ripple components of each of the output voltages are not greater than values as follows:

NOTE

When measuring ripple voltage, ignore spikes of less than 2 microseconds.

TEST POINT	MAXIMUM RIPPLE
TP1	0.20 V peak-to-peak
TP2	0.20 V peak-to-peak
TP3	0.50 V peak-to-peak
TP4	0.50 V peak-to-peak
TP5	0.50 V peak-to-peak
TP6	0.50 V peak-to-peak
TP7	0.50 V peak-to-peak

STEP 5. Set CB1 to OFF and remove shorting bar from TP1 red and black test jacks and install current shunt.

3-5. POWER SUPPLY OPERATIONAL CHECK (Cont.)

CAUTION

Make sure that 80J-10 current shunt is in place in TP1.

STEP 6. Connect DMM to red and black test jacks of TP1. Set DMM to measure 200 millivolts DC.

STEP 7. Set CB1 to ON.

NOTE

Current shunt contains a 0.01 ohm resistor.

STEP 8. Verify 58 - 62 millivolts DC at TP1.

STEP 9. Set CB1 to OFF. Disconnect DMM. Remove current shunt 80J-10. Pre-set electronic load controls as follows:

PWR:	OFF
MODE:	R
DYNAMIC LOADING:	OFF
LOAD switch:	OFF
DYNAMIC CURRENT knob:	Fully CCW
STATIC CURRENT knob:	Fully CCW
VOLTS knob:	5
METER CURRENT RANGE:	50A

Connect electronic load positive lead to TP1 (red). Connect negative lead to test set GND1.

STEP 10. In step 11, as load increases to between 14 and 20 amperes, observe that:

a. UUT should shut down (all voltages fall to 0 Vdc).

b. BIT lamp should light.

STEP 11. Set electronic load PWR to ON and LOAD switch to ON. Set CB1 to ON. Slowly adjust electronic load STATIC CURRENT adjustment towards, but do not exceed, 20 amperes of current load.

STEP 12. Set CB1 to OFF and S3 to NO LOAD. Disconnect electronic load from test set. Set electronic load LOAD switch to OFF, and STATIC CURRENT knob fully CCW.

STEP 13. Insert shorting bar in TP1 and remove shorting bar from TP2.

3-5. POWER SUPPLY OPERATIONAL CHECK (Cont.)

STEP 14. Connect electronic load positive lead to TP2 (red), and the electronic load negative lead to GND1.

STEP 15. Set METER CURRENT RANGE on electronic load to "10A".

STEP 16. Set CB1 to ON.

STEP 17. Set LOAD switch on electronic load to ON.

STEP 18. Verify as load increases in step 19 that between 2.5 and 3.7 amperes:

a. The +5 Vdc (black output) shuts down.

b. BIT lamp should light.

STEP 19. Slowly adjust electronic load STATIC CURRENT adjustment towards, but do not exceed, 3.7 amperes of current load.

STEP 20. Set CB1 to OFF and disconnect DMM and electronic load. Set electronic load STATIC CURRENT knob fully CCW and LOAD switch to OFF.

STEP 21. Insert shorting bar in TP2 and remove shorting bar from TP3.

STEP 22. Connect DMM positive lead to TP3 (red) and negative test lead to TP3 (black). Set DMM to read 2000 milliamperes full scale. Connect another DMM between TP3 (red) and GND2. Set second DMM to 200 Vdc range.

STEP 23. Set S10 to 2. Set CB1 to ON.

STEP 24. In step 25, as load increases to between 180 and 350 milliamperes, observe that:

a. The voltage should fall between +94.9 and +84.5 volts.

b. BIT lamp should light.

STEP 25. Slowly adjust RHEOSTAT 1 clockwise, but do not exceed 350 milliamperes of current (indicated on DMM 1).

STEP 26. Set CB1 to OFF. Set S10 to OFF. Set RHEOSTAT 1 to MIN. Disconnect DMMs. Remove shorting bar from TP4 red and black jacks and replace shorting bar in TP3.

3-5. POWER SUPPLY OPERATIONAL CHECK (Cont.)

STEP 27. Install current shunt 80J-10 in TP4. Connect DMM to red and black test jacks of TP4. Set the DMM to measure 200 millivolts full scale.

STEP 28. Set the LOAD switch S3 to the LOAD position.

STEP 29. Set CB1 to ON. Verify 7.88 to 8.72 millivolts at TP4.

STEP 30. Set CB1 to OFF. Set S3 to the NO LOAD position. Remove current shunt 80J-10 from TP4. Connect positive lead of electronic load to TP4 (red). Connect negative lead of electronic load to mA of DMM. Connect negative of DMM to test set GND2. Set DMM to measure 2000 milliamperes full scale. Set electronic load METER CURRENT RANGE to 10A, STATIC CURRENT knob fully CCW, LOAD switch to ON.

NOTE

For ease in performing this test, set the electronic load VOLTS knob to 47.

STEP 31. Connect another DMM from TP4 red to GND2. Set to measure 20 Vdc full scale.

STEP 32. In step 33, as load increases to 1600 milliamperes,

a. The UUT should shut down (all voltages drop to zero).

b. BIT lamp DS4 should light.

STEP 33. Set CB1 to ON and slowly adjust electronic load STATIC CURRENT adjustment toward, but do not exceed, 1600 milliamperes of current load.

STEP 34. Set CB1 to OFF and disconnect DMM and electronic load. Set electronic load STATIC CURRENT knob fully CCW and LOAD switch to OFF.

STEP 35. Insert shorting bar in TP4 and remove shorting bar from TP5.

STEP 36. Connect DMM to red and black jacks of TP5. Set DMM to measure current, 2000 milliamperes full scale.

STEP 37. Set S3 to LOAD and set CB1 to ON.

STEP 38. Verify 200 to 220 milliamperes of current at TP5.

STEP 39. Set CB1 to OFF. Set S3 to NO LOAD. Set S10 to 1.

3-5. POWER SUPPLY OPERATIONAL CHECK (Cont.)

STEP 40. Connect another DMM positive from TP5 red and DMM negative to GND2. Set to measure 200 Vdc full scale.

STEP 41. In step 42, as load increases to between 290 and 420 milliamperes of current, observe that:

a. +79 Vdc decreases below limits. (75.05 to 82.5 Vdc)

b. The BIT lamp lights when voltage is between 57.5 and 64.9 Vdc.

STEP 42. Set CB1 to ON. Slowly adjust RHEOSTAT 1 clockwise, but do not exceed 420 milliamperes of current load.

STEP 43. Set CB1 to OFF and disconnect DMMs. Turn S10 to OFF, set RHEOSTAT 1 to MIN.

STEP 44. Insert shorting bar in TP5 and remove shorting bar from TP6.

STEP 45. Connect DMM to red and black test jacks of TP6. Set to measure 2000 milliamperes full scale.

STEP 46. Set S3 to LOAD and set CB1 to ON.

STEP 47. Verify -390 to -430 milliamperes at TP6.

STEP 48. Set CB1 to OFF. Set S3 to NO LOAD. Disconnect DMM. Connect electronic load negative lead to TP6 (red). Connect electronic load positive lead to DMM negative. Connect DMM mA to GND2. Set DMM to measure 2000 milliamperes full scale. Connect another DMM positive to TP6 (red) and DMM negative to GND1. Set to measure 200 Vdc full scale.

STEP 49. In step 50, as load increases to between 500 and 1100 milliamperes of current, observe that:

a. UUT should shut down (all voltages fall to 0 Vdc).

b. BIT lamp should light.

STEP 50. Set electronic load LOAD switch to ON. Set CB1 to ON. Slowly adjust electronic load STATIC CURRENT adjustment towards, but do not exceed, 1100 milliamperes of current.

STEP 51. Set CB1 to OFF. Set electronic load LOAD switch to OFF. Set STATIC CURRENT knob fully CCW. Disconnect DMMs and electronic load.

3-5. POWER SUPPLY OPERATIONAL CHECK (Cont.)

STEP 52. Insert shorting bar in TP6 and remove shorting bar from TP7.

STEP 53. Connect DMM to red and black jacks of test set TP7. Set to measure 2000 milliamperes of current full scale.

STEP 54. Set S3 to ON and set CB1 to ON.

STEP 55. Verify 350 to 450 milliamperes at TP7.

STEP 56. Set CB1 to OFF, and S3 to NO LOAD. Disconnect DMM. Connect electronic load positive lead to TP7 (red). Connect electronic load negative lead to DMM positive. Connect DMM negative lead to GND2. Set DMM to measure 2000 milliamperes full scale.

STEP 57. Connect another DMM to TP7 (red) and GND2. Set to measure 200 Vdc full scale.

STEP 58. In step 59, as load increases to between 450 and 900 milliamperes, the current will stabilize (reach a peak value) and/or even decrease slightly while still increasing the STATIC CURRENT control. When the current stabilizes or drops the 28 Vdc should have dropped to or below 26.6 Vdc.

STEP 59. Set CB1 to ON and slowly adjust electronic load STATIC CURRENT knob towards, but do not exceed, 900 milliamperes of current load.

STEP 60. Set CB1 and CB2 to OFF. Disconnect DMM and electronic load.

STEP 61. Insert shorting bar in TP7. Disconnect all test equipment.

END OF TEST

3-6. PRELIMINARY TROUBLESHOOTING PROCEDURES FOR POWER SUPPLY

Troubleshooting procedures contained in the troubleshooting flow charts are intended as an aid to technicians working at the intermediate general support maintenance level. In view of the complexity of the equipment, these flow charts cannot cover all possible failures and faults which may occur. Flow charts serve as a guide to logical step-by-step troubleshooting. Wiring diagrams of the I/O power supply (A1PS1) are contained in the rear of this manual. These should be referred to for location of connections and test points used during troubleshooting. Test point locations are illustrated in FO-14. Preliminary troubleshooting procedures for the power supply are provided below.

a. This procedure prepares the power supply for troubleshooting and repair. During some checks, heatsink assemblies A1PS1A2, A1PS1A3, A1PS1A4, A1PS1A5 and their associated CCAs are removed from the power supply to gain access to the various components. They are then reconnected to the power supply using cables (components of the power supply test set). When possible, do not remove the CCA. Use test points and component connections found on the foil side of the CCA. Instructions for removing and replacing heatsink assemblies are contained in Section III of this chapter.

The procedures to configure heatsink assemblies A1PS1A2, A1PS1A3, A1PS1A4, and A1PS1A5 are identical and are described as follows:

NOTE

The CCA of A1PS1A4 cannot be completely extended. However, the wires of the assembly provide sufficient rigidity so that the CCA can be set at about 90 degrees from the heatsink.

INITIAL SETUP

Tools	Equipment Condition
Tool Kit TK-17 Workstation, Static	Power removed. Cover removed (paragraph 3-18). Heatsink assemblies removed and extended when required. BITE CCA A1PS1A6 and black output CCA A1PS1A8 removed from high voltage heatsink assembly and installed in A1PS1A7J3 and A1PS1A7J4.

3-6. PRELIMINARY TROUBLESHOOTING PROCEDURES FOR POWER SUPPLY (Cont.)

CAUTION

The input heatsink assembly A1PS1A5A1 contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.

NOTE

Example shown is the output heatsink assembly A1PS1A4.

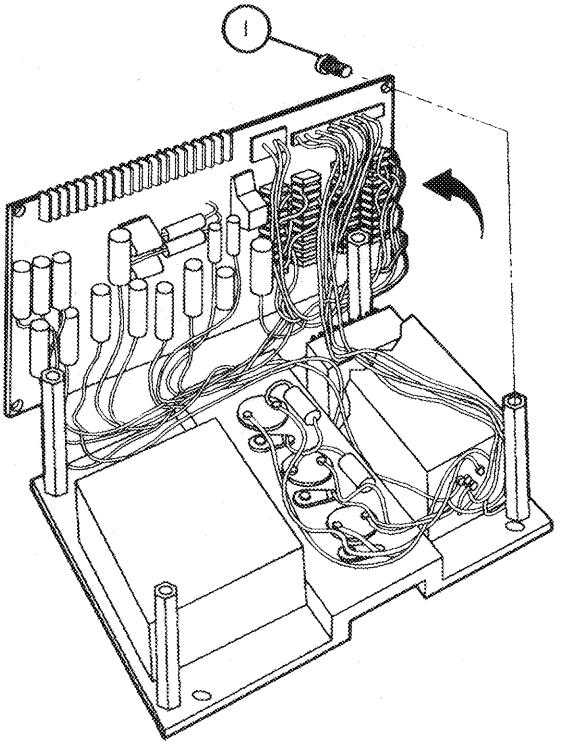
NOTE

This procedure is used only when necessary to gain access to a component. In most procedures, points can be probed from the foil side of the CCA. (Refer to FO-14.)

STEP 1. Remove the screws (1) at each side of the CCA.

STEP 2. Raise the CCA and rotate until wires are extended.

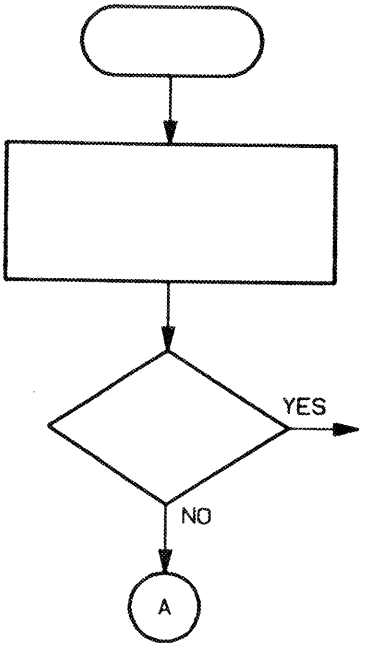
STEP 3. Position CCA beside the heatsink.



3-7. FLOW CHARTS AND HOW TO USE THEM

The flow charts make troubleshooting easier and give maintenance personnel a clear path to follow.

To use the flow chart, begin at START and follow the path indicated by the arrow. Perform the task given in the symbol block and then follow the arrow to the next block. At the decision symbol, be sure to follow the correct path indicated by YES or NO.

SYMBOL	MEANING
	START AND FINISH SYMBOL INDICATES STARTING AND FINISHING POINTS. TASK SYMBOL INDICATES WHAT TO DO AND WHERE TO DO IT. DECISION SYMBOL (YES OR NO) INDICATES THAT A DECISION MUST BE MADE. THE DIRECTION TO GO FROM THE DECISION SYMBOL DEPENDS ON THE DECISION MADE. CONTINUATION SYMBOL INDICATES THAT THE PATH CONTINUES TO OR COMES FROM ANOTHER FLOW CHART.

3-8. SYMPTOM INDEX

3-9. UNIT IS COMPLETELY INOPERATIVE

INITIAL SETUP

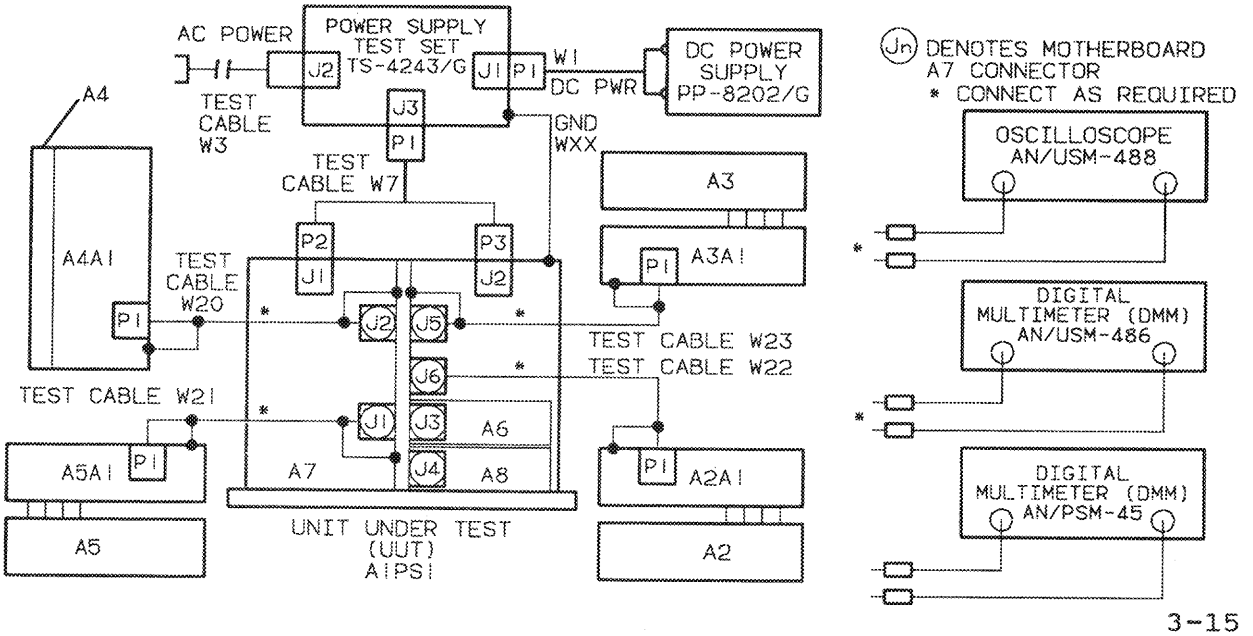
Test Equipment	Equipment Condition
DC Power Supply, PP-8202/G Oscilloscope, AN/USM-488 Power Supply Test Set, TS-4243/G Digital Multimeter, AN/PSM-45 Digital Multimeter, AN/USM-486	Supply removed from A1, (para 2-17). Heatsinks extended when required, (para 3-6). Test setup.
Tools	**Material/Parts**
Tool Kit, TK-105/G Workstation, Static Maintenance Kit PCB MX-10897/G Repair Kit, PCB MK-772/u	As indicated

WARNING

HAZARDOUS VOLTAGES exist within the power supply assembly during test. Under adverse conditions, DEATH ON CONTACT may result if personnel fail to observe safety precautions. Know all points where you may be exposed to high voltages.

CAUTION

The input heatsink assembly A1PS1A5A1 contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.



3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)

NOTE

A heatsink mounting screw may be removed and used to secure ground cable.

The initial diagnostic flow diagram is to lead the technician in a localized approach to troubleshooting of a completely inoperative PS1 assembly. Most failures produce a distinct, observable symptom. One, or all, of the symptoms may be present during a specific failure.

The following subparagraphs are titled to describe a particular type of failure. The squared letter after the paragraph title refers to a corresponding letter in the the flow chart that provides trouble-shooting for that type of failure.

a. Input Short.- AA .

(1) Test set CB2 repeatedly trips or will not set to ON.
(2) High current shown on test setup power supply.
(3) Input voltage, though set at correct range, drops severely when test set CB2 is closed.
(4) Test set DS2 does not light, or lights faintly.
(5) Test set lamps DS3 and DS4 do not light briefly.

b. Input Open.- BB .

(1) Test setup power supply shows low or no current.
(2) DS2 lights.
(3) DS3 and DS4 will not light briefly.
(4) No VCC present (A5A1J2).

c. VCC Failure (no voltage A5A1J2).- CC .

(1) DS2 lit.
(2) DS3 and DS4 will not light briefly.
(3) Low or no current shown on test setup power supply.

d. Shutdown.- DD . Only three stages are monitored to produce a shutdown signal; +5 Vdc over/overvoltage (exceeds +5.6 Vdc), +12 and -12 Vdc current limiting. (The power supply can be reset if this is a transient condition.)

(1) Lower than normal current indicated by test setup power supply
(2) VCC lower than normal.
(3) Fault lamp DS3 lit.

3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)

Normally, the +5 Vdc cannot be set by A5A1R24 so that it can produce overvoltage. Regulation is accomplished by a reference to the precision regulator in the PWM (A5A1U1). Also, a fault state is monitored by referencing the voltage to a precision regulator within the power supply supervision (A6U1).

Failures that could cause overvoltage to be sensed are transients generated in the filtering network, loss of rectification (SCR A6Q1), and failures of reference/regulating and monitoring voltages (A6U1 and A5A1U1).

The combined current of +12 and -12 Vdc is monitored. The primary winding of transformer A4T2 is electrically in series with the secondary circuit of power transformer A4T1. Voltage induced in the secondary of A4T2 is rectified and routed to the BITE CCA (A6). Failures that could cause an overload are shorted outputs, regulator failures, rectifier failures, failures within the shunt (TEMPEST heatsink assembly A2), and failure of monitoring circuits on A4A1 and A6. Additionally, if the protective SCRs (A6Q2/A6Q3) fail, overcurrent is produced should an SCR short the +12 or -12 Vdc to ground.

e. Primary Current Overload.- EE .

(1) UUT produces audible sounds of a laboring transformer.
(2) Fault lamp DS2 lights dimly or flickers rapidly. (An exception to this would be when +20 volt drive to the black output is shorted.)
(3) VCC present, but higher than normal.

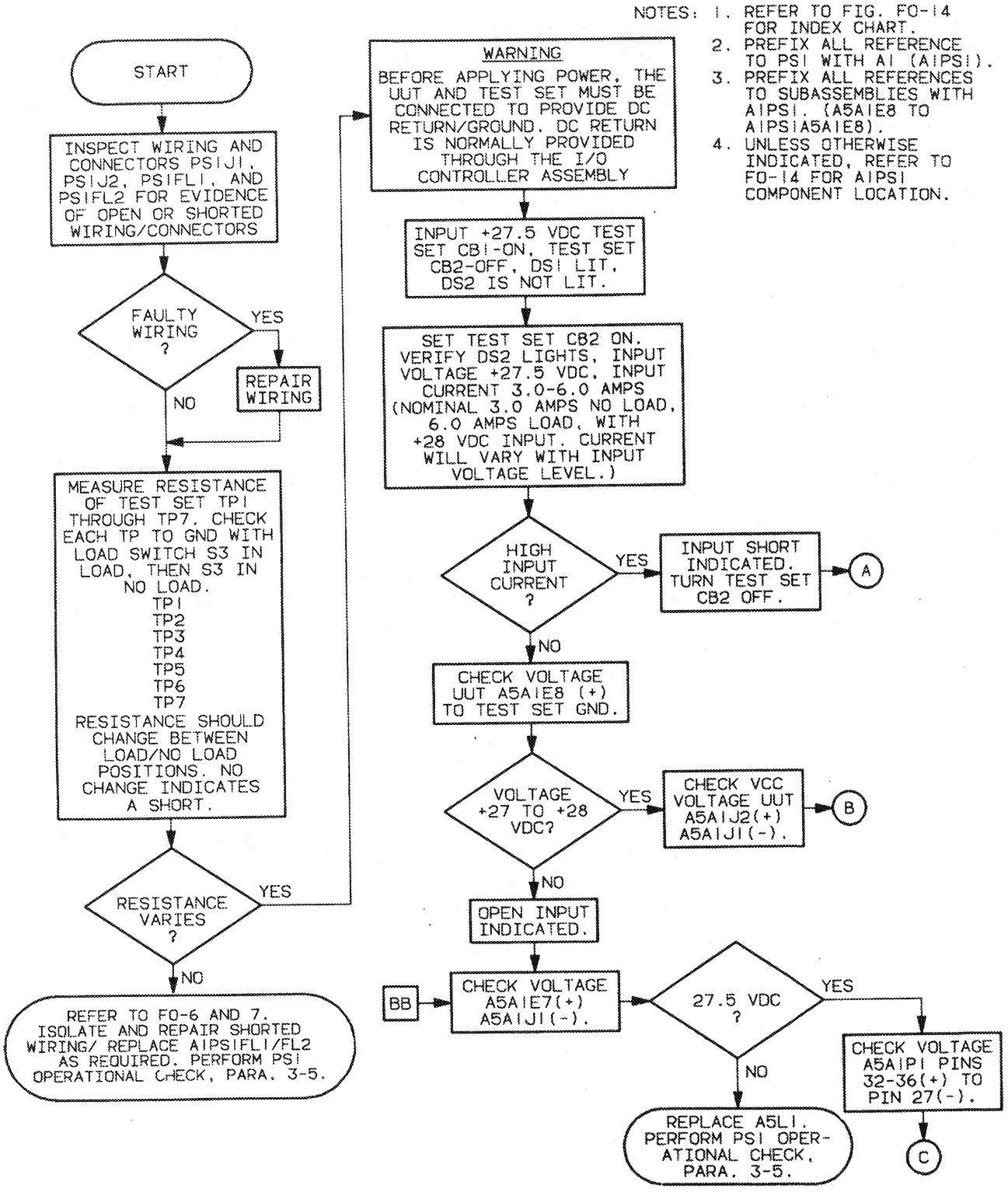
NOTE

A short of the high voltage outputs normally will not produce a primary current overload (protected by current limiting transistors). A short on the +12 or -12 Vdc will normally not produce primary current overload (protected by shutdown signal). A short of +5 Vdc will normally cause a very rapid and bright blinking of test set DS3.

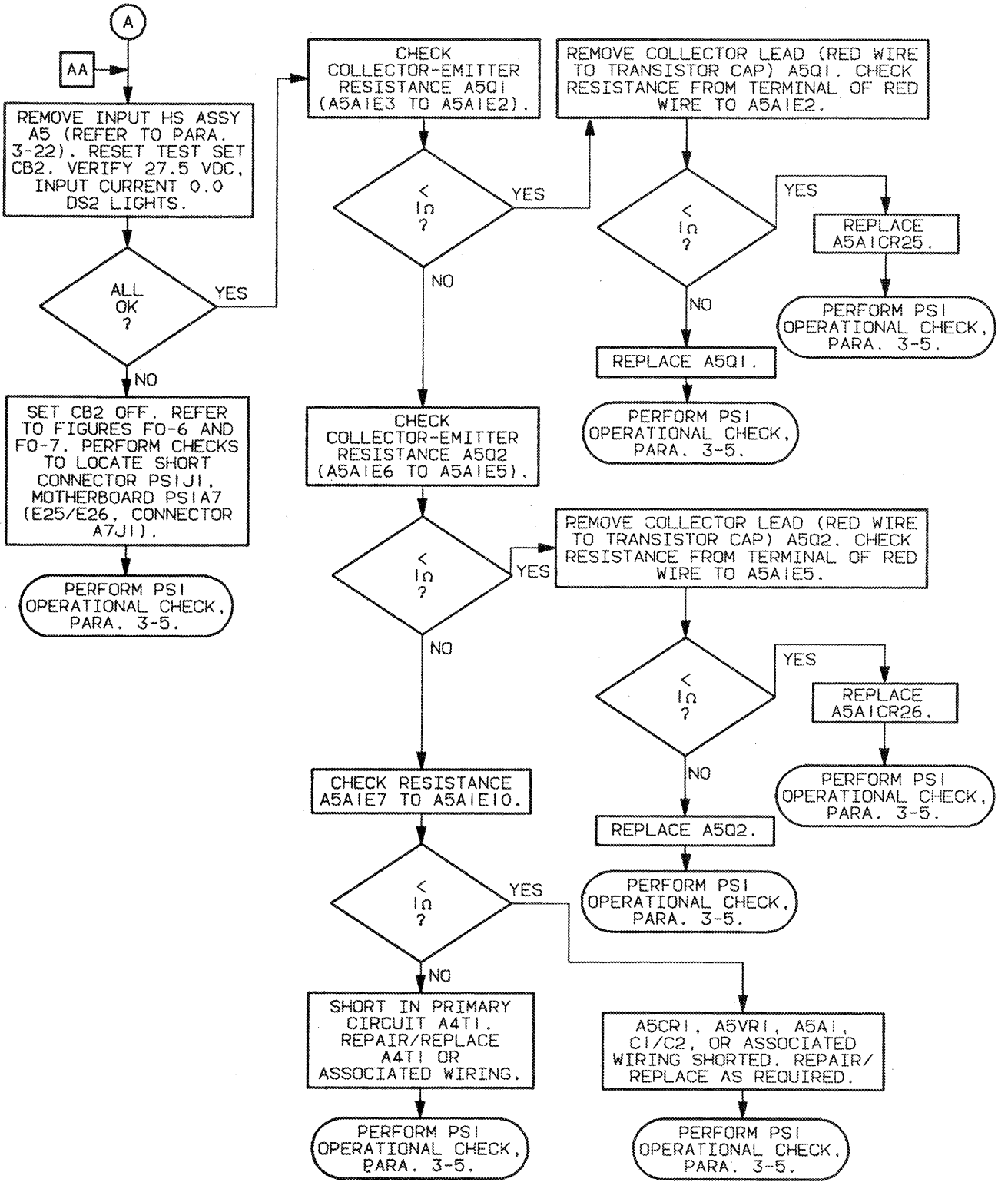
f. Loss of Inverter (Drive to A4T1).- FF .

(1) Lower than normal VCC.
(2) Low or no input current shown on test setup power supply.
(3) DS3 lit.

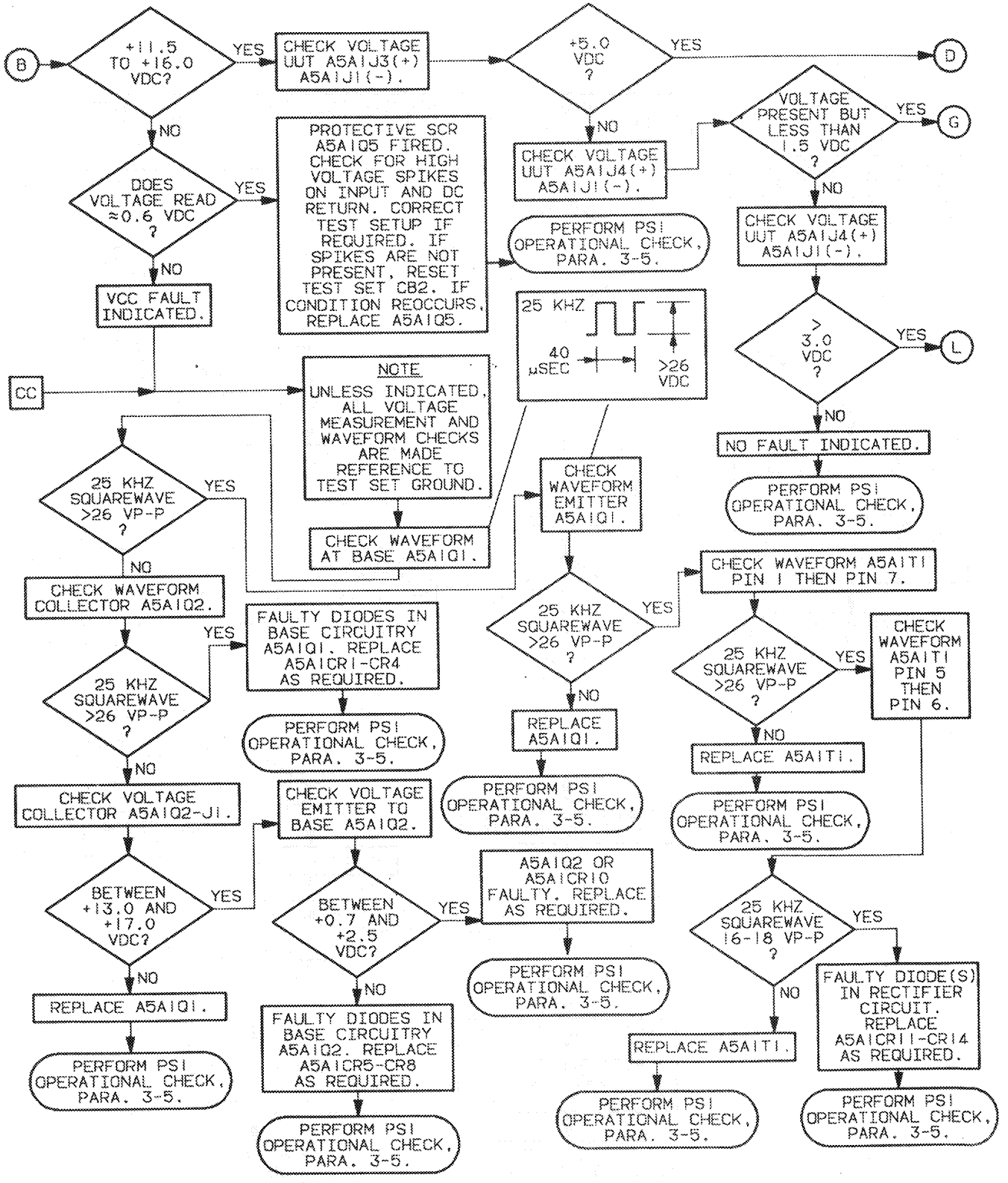
3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)



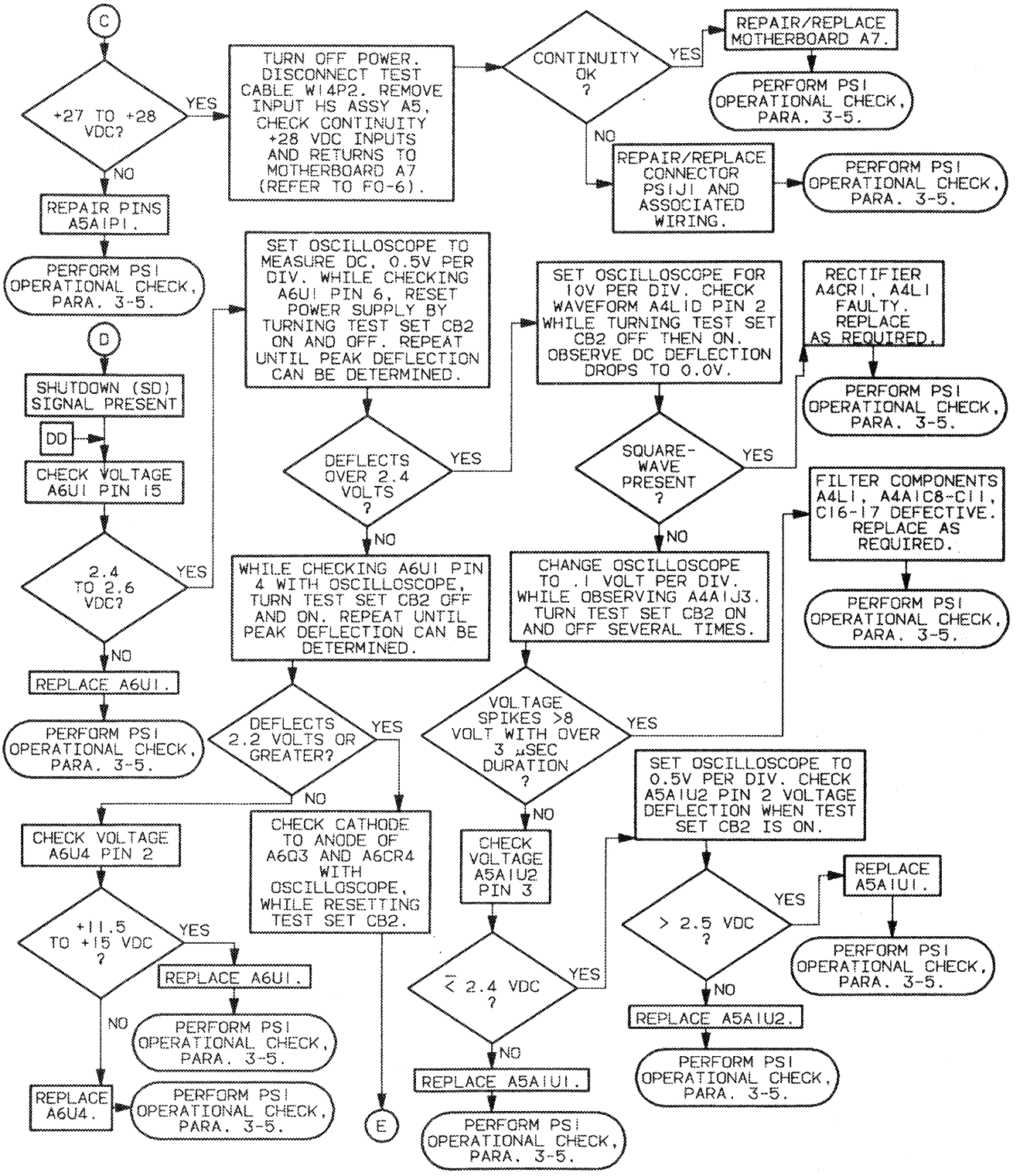
3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)



3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)



3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)



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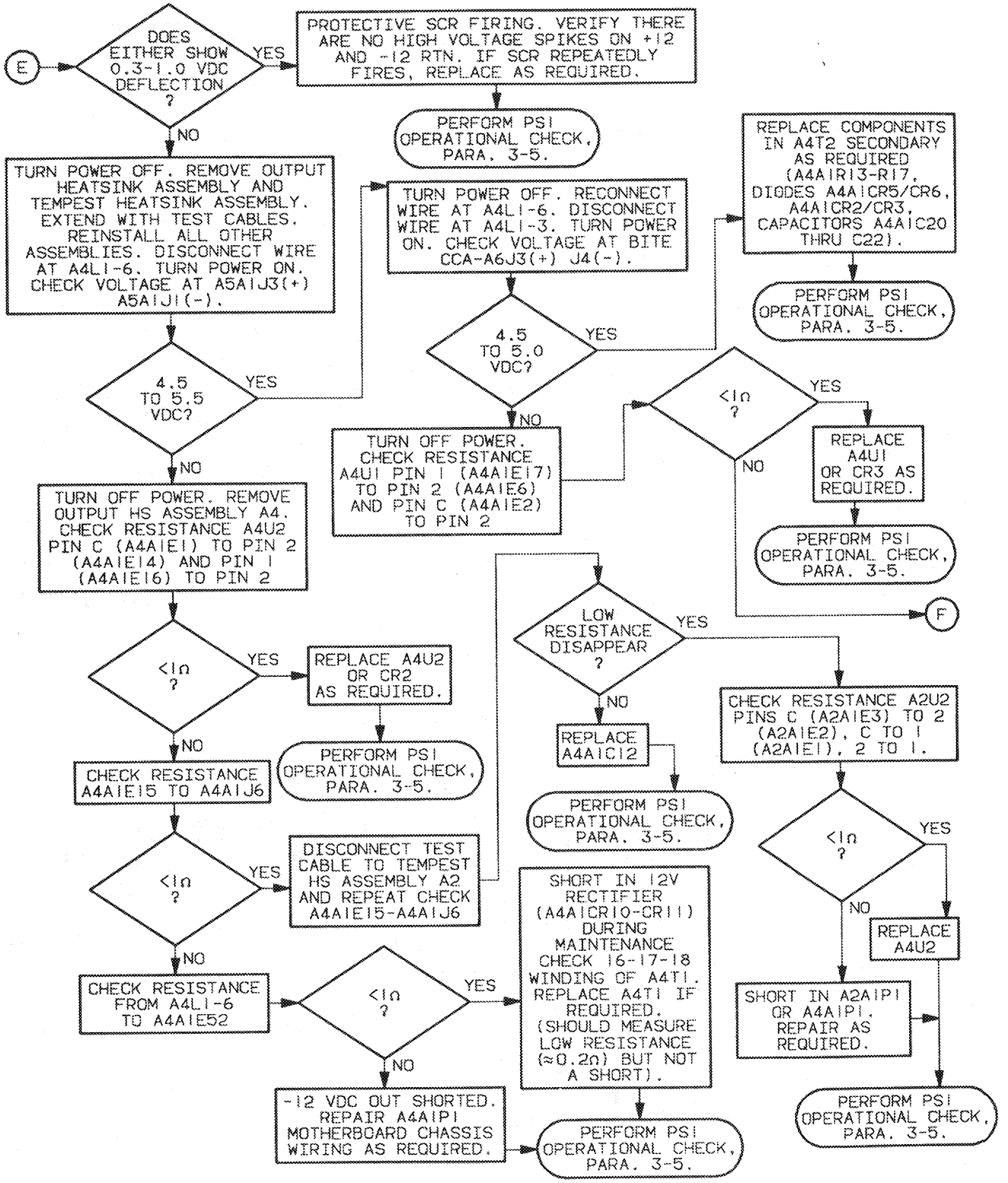
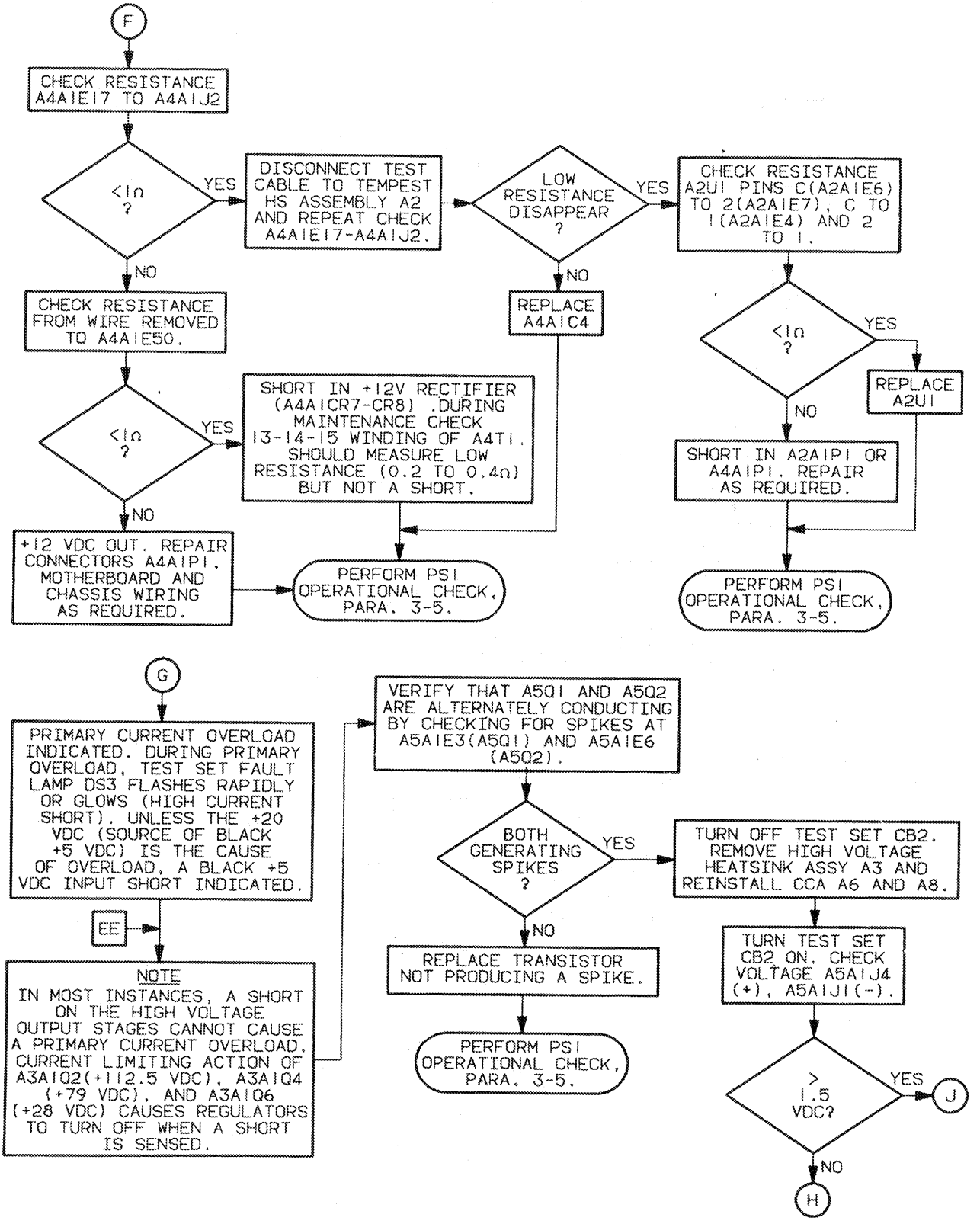
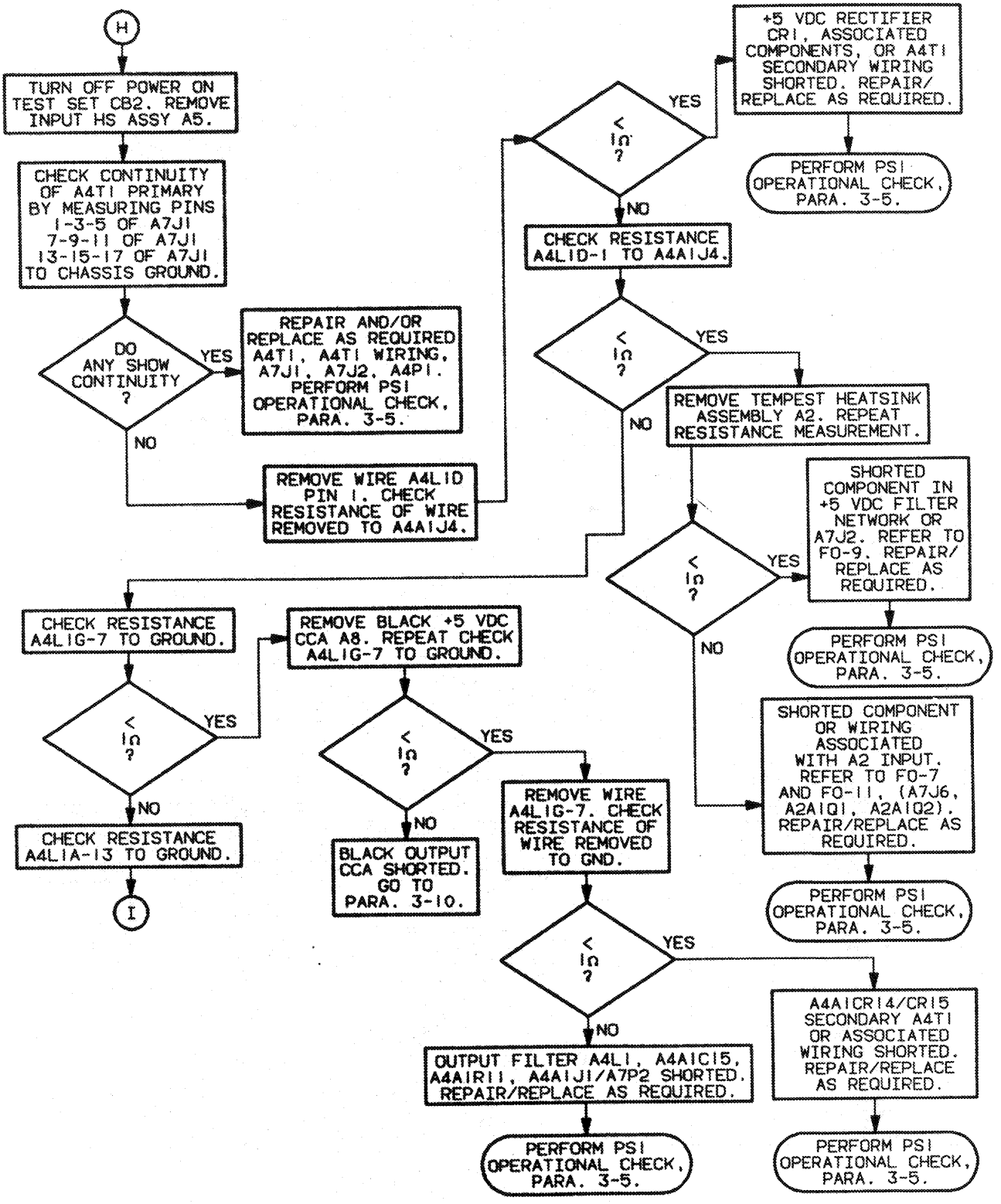


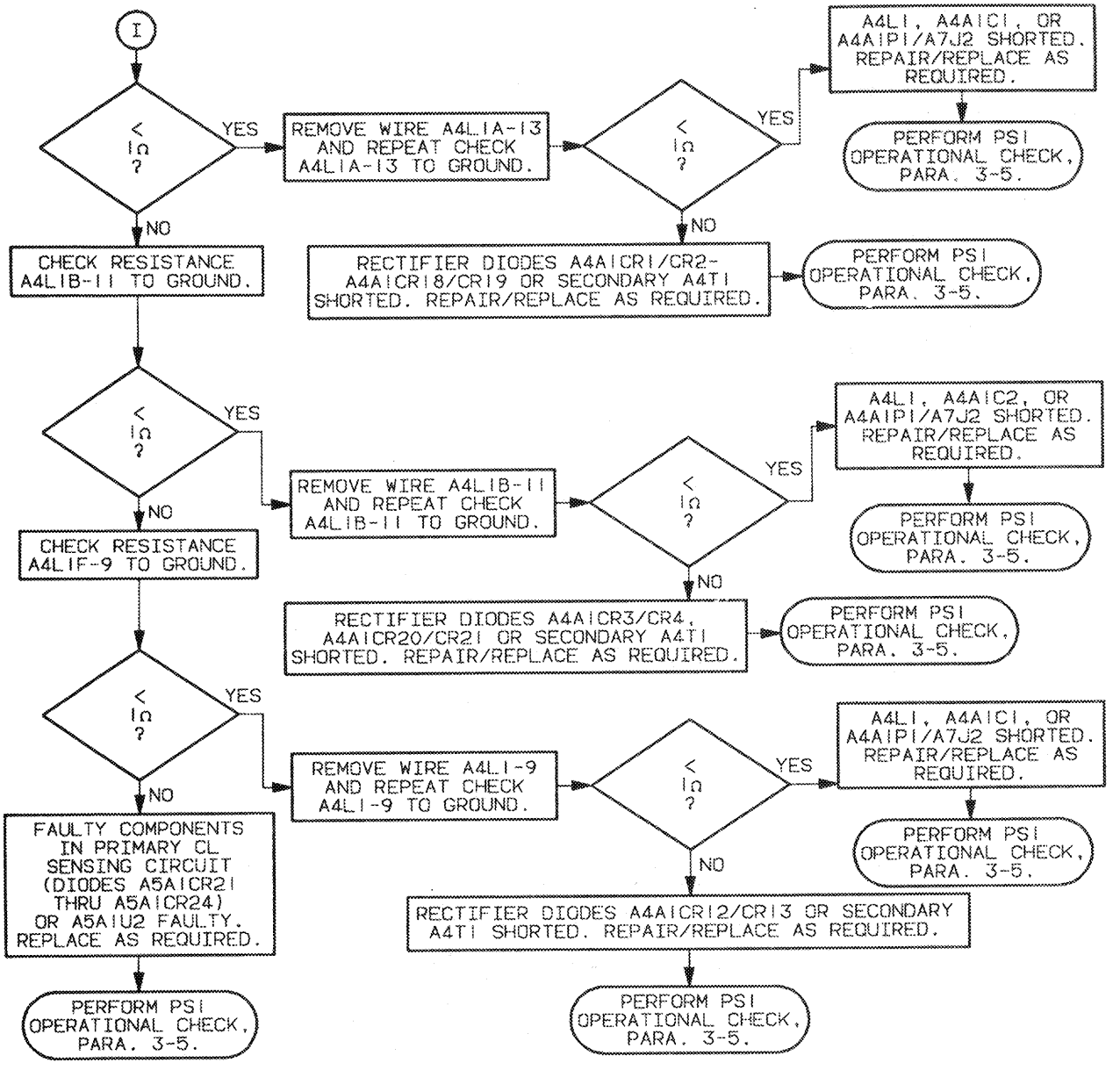
3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)



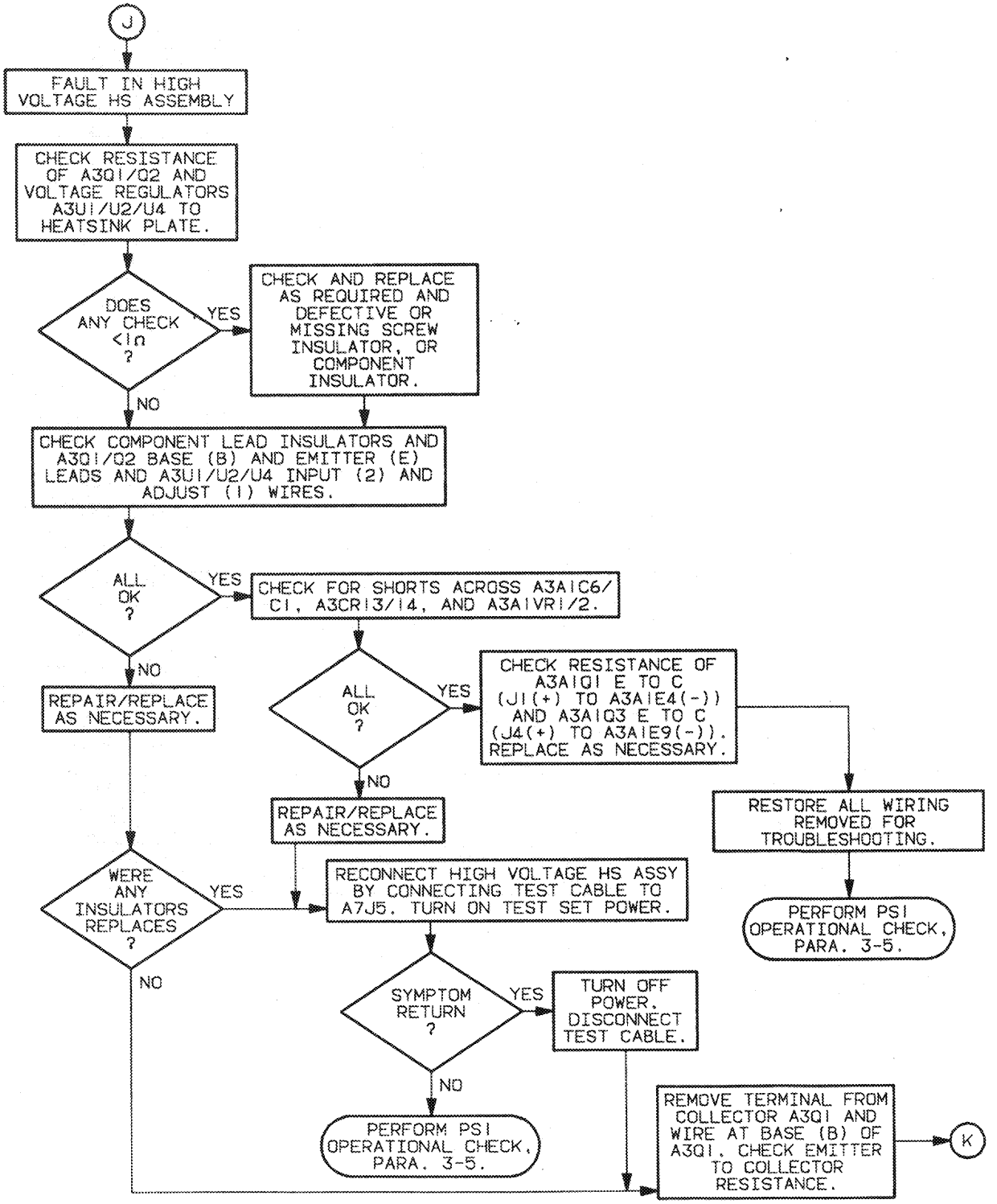
3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)



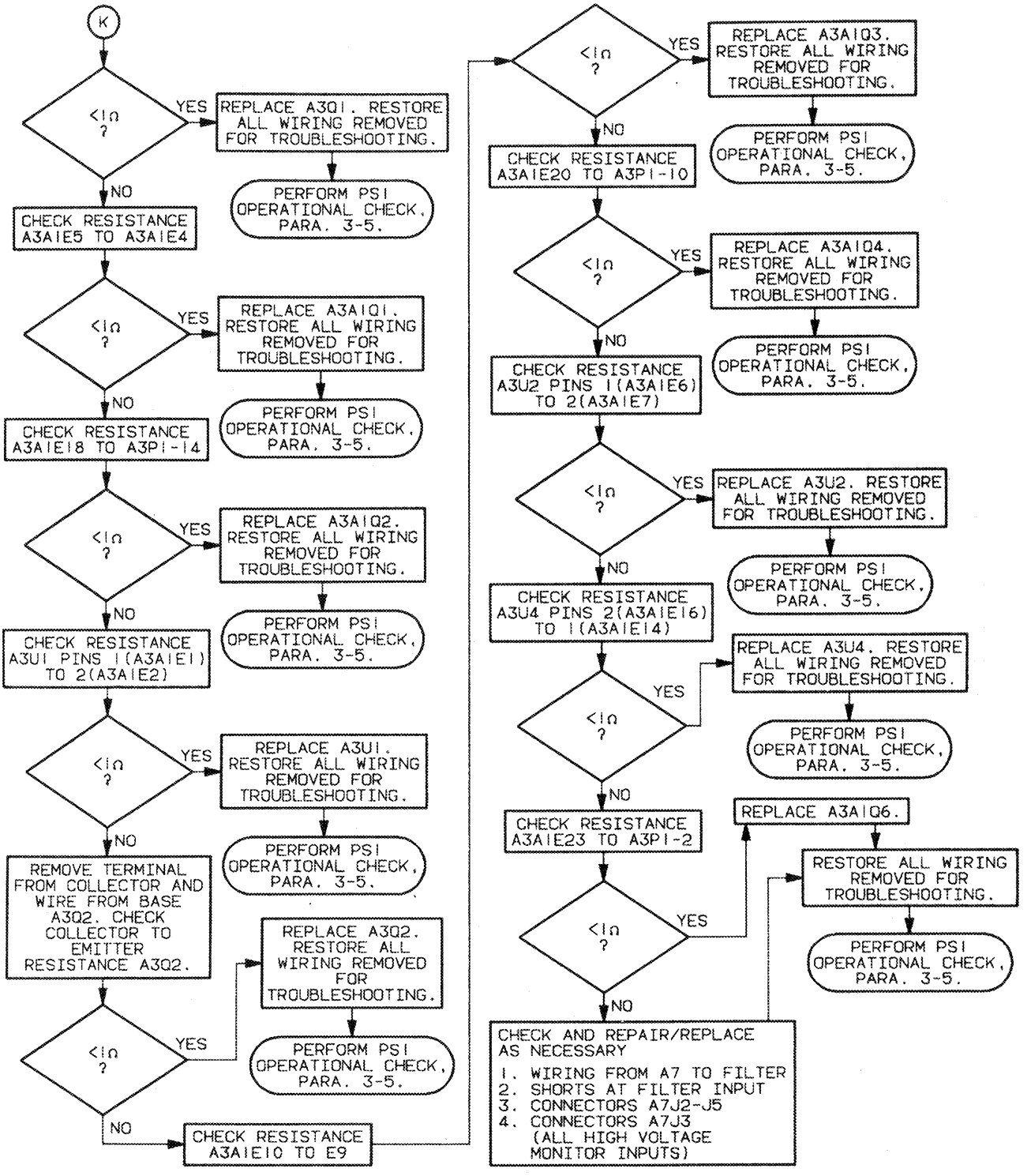
3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)



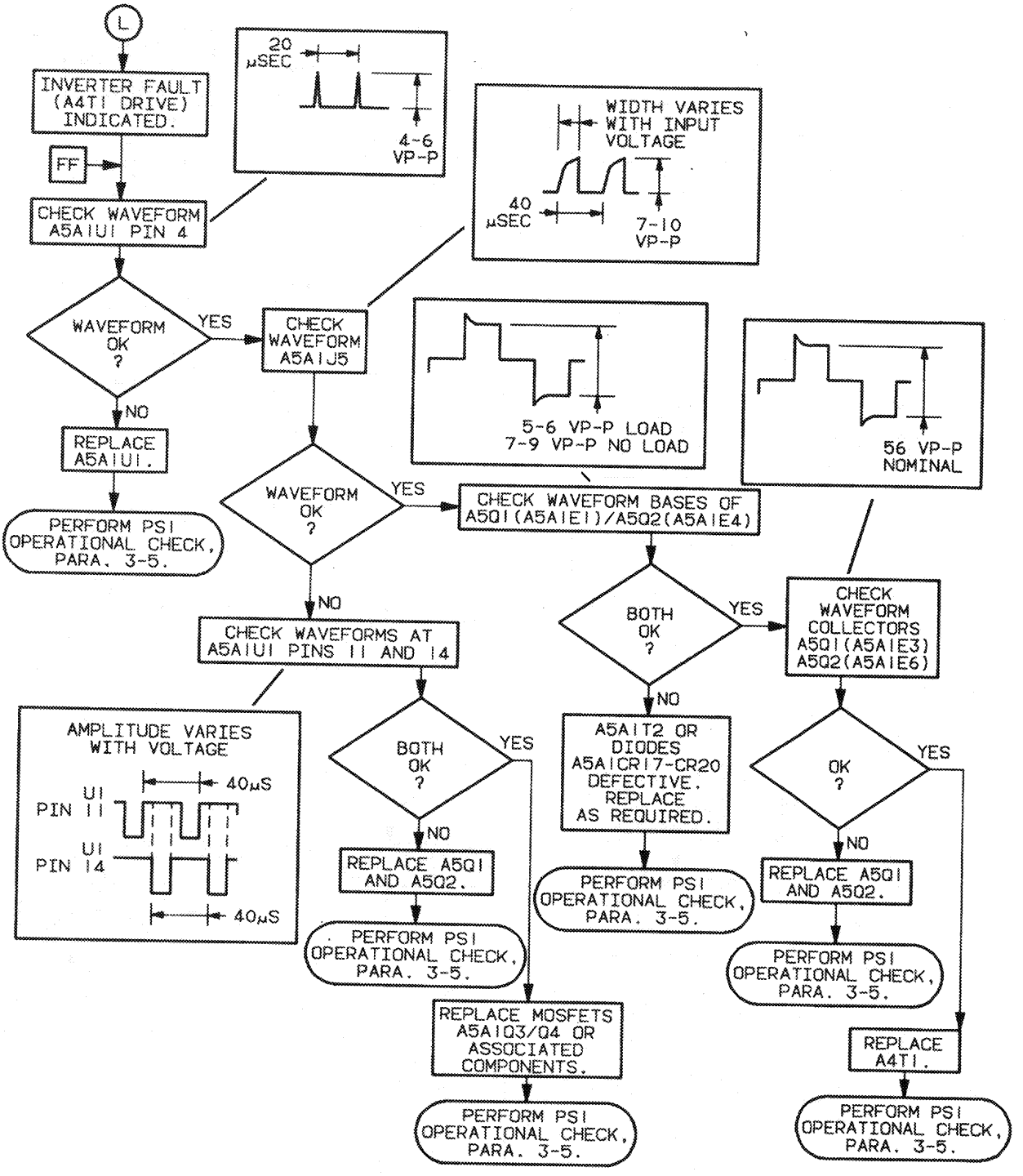
3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)



3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)



3-9. UNIT IS COMPLETELY INOPERATIVE (Cont.)



3-10. NO +5 VDC OUTPUT (BLACK) PS1A8

INITIAL SETUP

Test Equipment

DC Power Supply, PP-8202/G
Oscilloscope, AN/USM-488
Power Supply Test Set, TS-4243/G
Digital Multimeter, AN/USM-486

Tools

Tool Kit, TK-17
Workstation, Static
Maintenance Kit, PCB MX-10897/G
Repair Kit, PCB MK-772/U

Equipment Condition

Power supply removed from A1, (para 2-17).
Heatsink extended as required, para 3-6).
Test setup.

Material/Parts

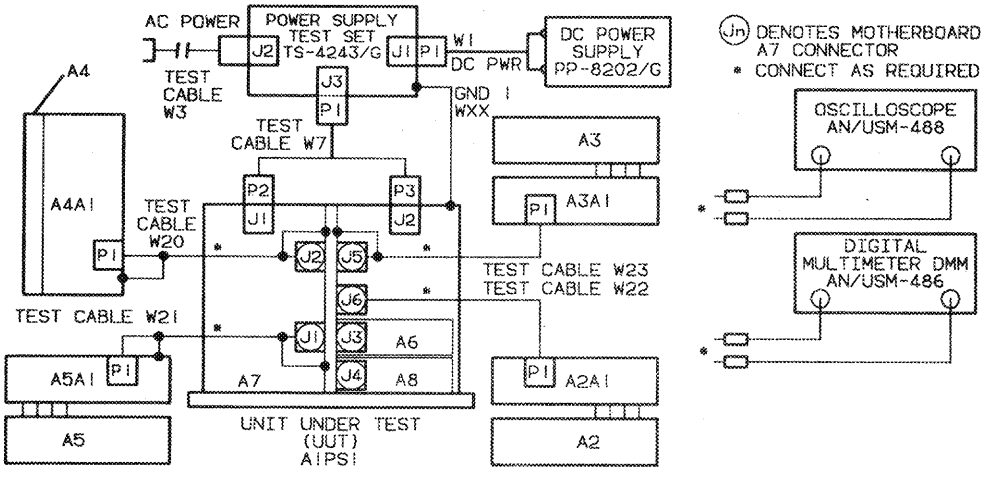
As indicated.

WARNING

HAZARDOUS VOLTAGES exist within the power supply assembly during test. Under adverse conditions, DEATH ON CONTACT may result if personnel fail to observe safety precautions. Know all points where you may be exposed to high voltages.

CAUTION

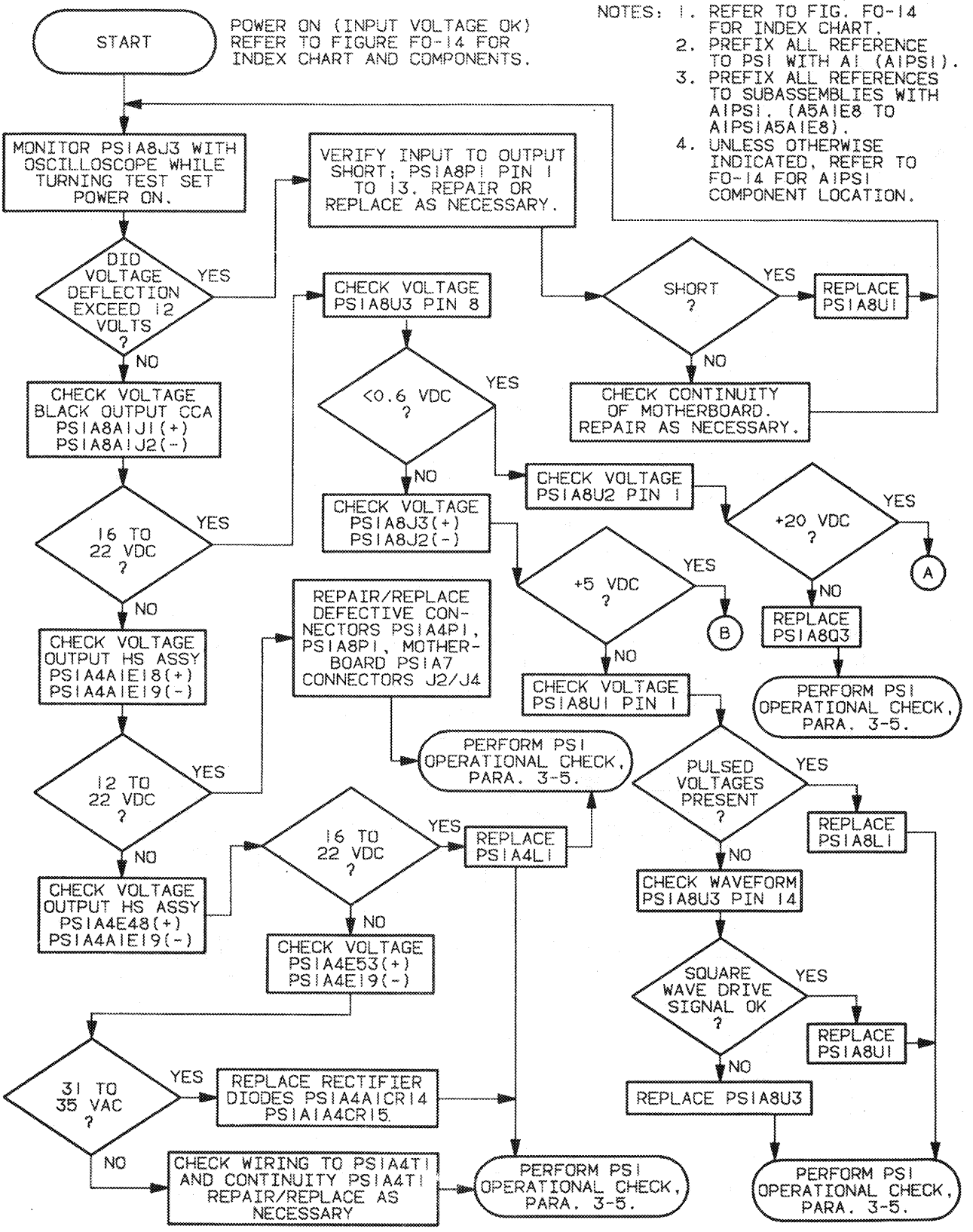
The input heatsink assembly PS1A5A1 contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.



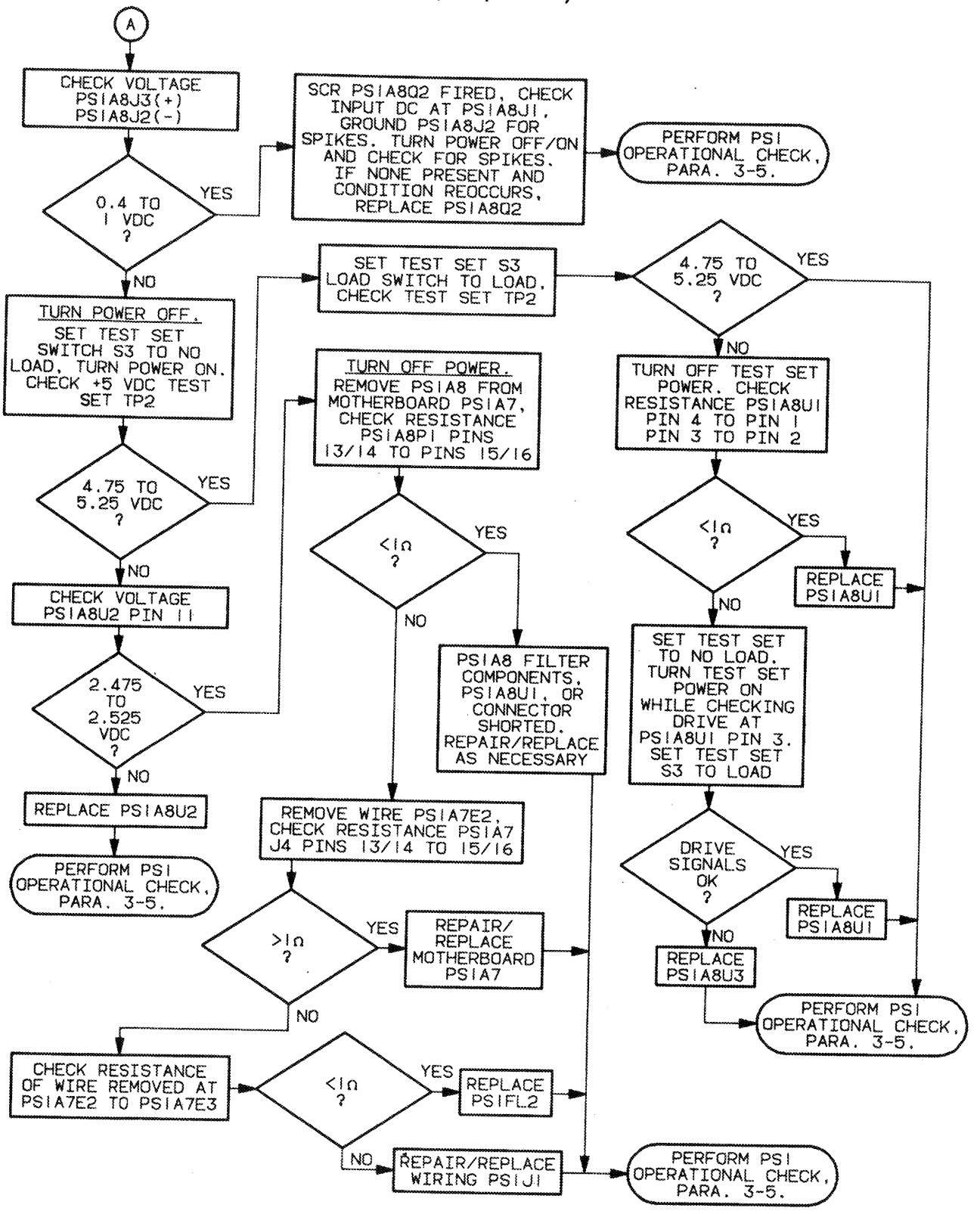
NOTE

A heatsink mounting screw may be removed and used to secure ground cable.

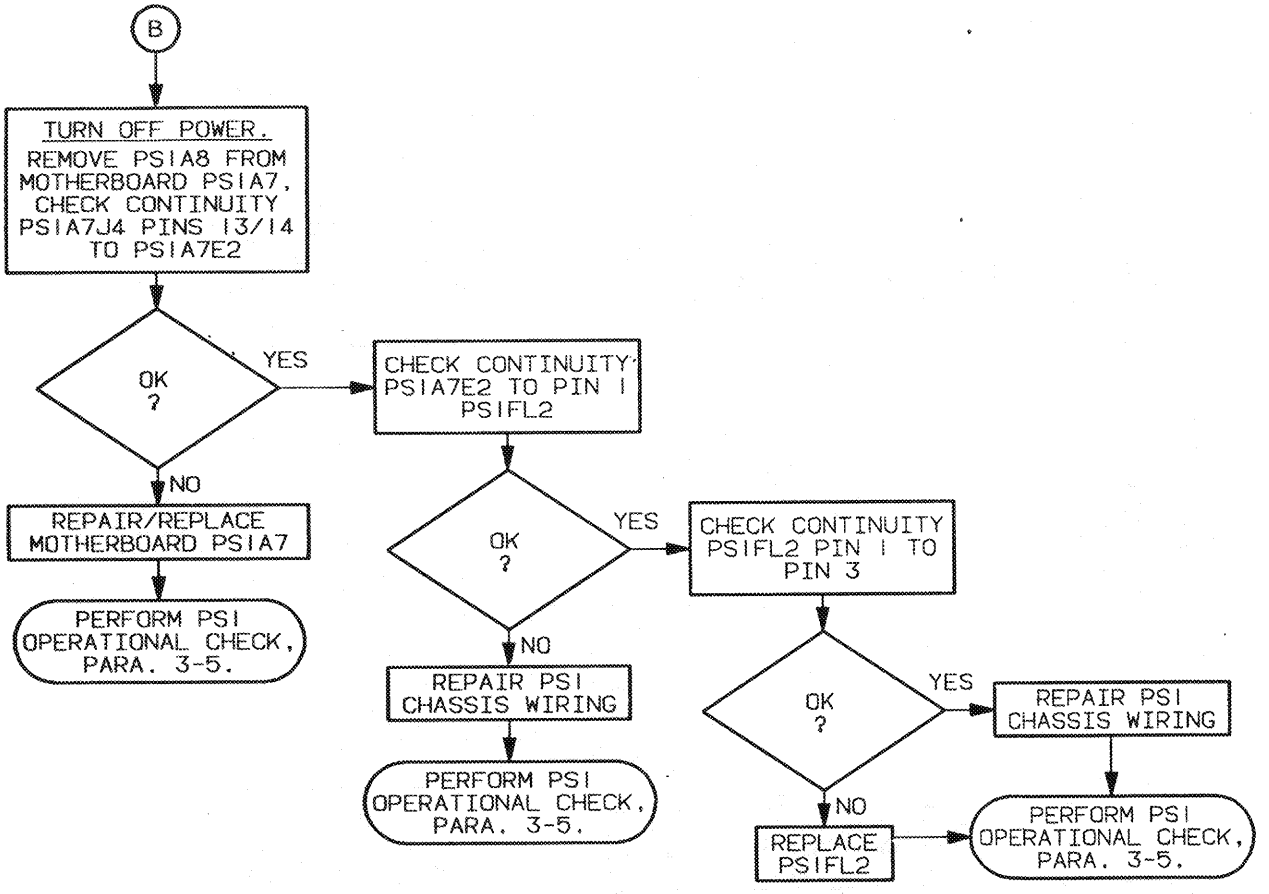
3-10. NO +5 VDC OUTPUT (BLACK) (Cont.)



3-10. NO +5 VDC OUTPUT (BLACK) (Cont.)



3-10. NO +5 VDC OUTPUT (BLACK) (Cont.)



3-11. NO +12 VDC OUTPUT

INITIAL SETUP

Test Equipment

DC Power Supply, PP-8202/G
Oscilloscope, AN/USM-488
Power Supply Test Set, TS-4243/G
Digital Multimeter, AN/USM-486

Tools

Tool Kit, TK-17
Workstation, Static
Maintenance Kit, PCB MX-10897/G
Repair Kit, PCB MK-772/U

Equipment Condition

Power supply removed from A1, (para 2-17).
Heatsink extended as required, para 3-6).
Test setup.

Material/Parts

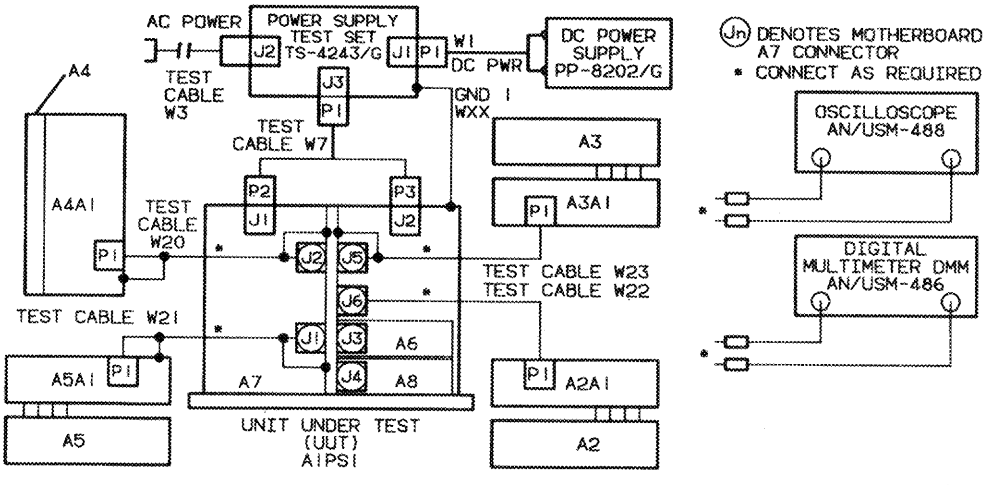
As indicated.

WARNING

HAZARDOUS VOLTAGES exist within the power supply assembly during test. Under adverse conditions, DEATH ON CONTACT may result if personnel fail to observe safety precautions. Know all points where you may be exposed to high voltages.

CAUTION

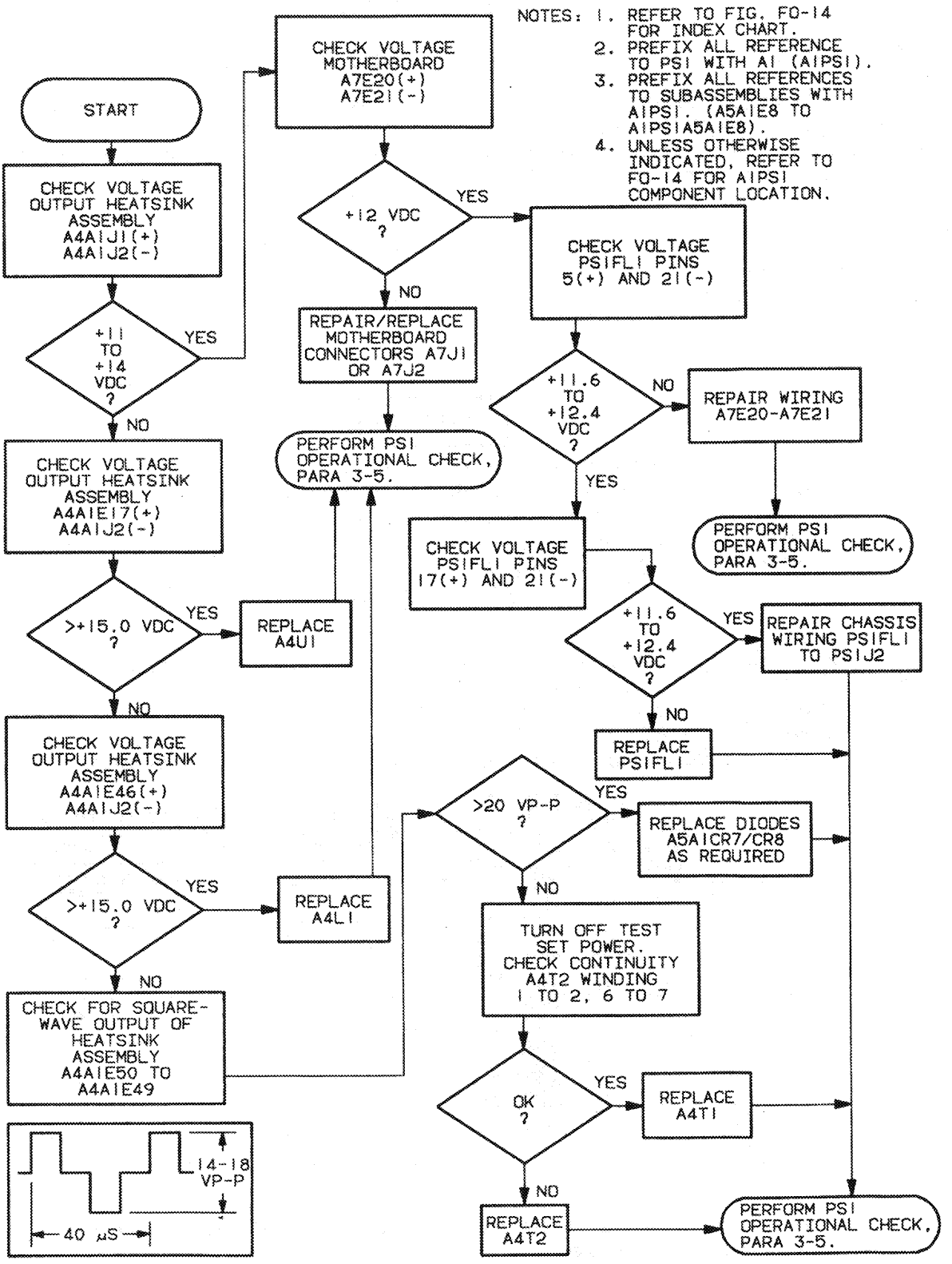
The input heatsink assembly PS1A5A1 contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.



NOTE

A heatsink mounting screw may be removed and used to secure ground cable.

3-11. NO +12 VDC OUTPUT (Cont.)



3-12. NO -12 VDC OUTPUT

INITIAL SETUP

Test Equipment

DC Power Supply, PP-8202/G
Oscilloscope, AN/USM-488
Power Supply Test Set, TS-4243/G
Digital Multimeter, AN/USM-486

Tools

Tool Kit, TK-17
Workstation, Static
Maintenance Kit, PCB MX-10897/G
Repair Kit, PCB MK-772/U

Equipment Condition

Power supply removed from A1, (para 2-17).
Heatsink extended as required, para 3-6).
Test setup.

Material/Parts

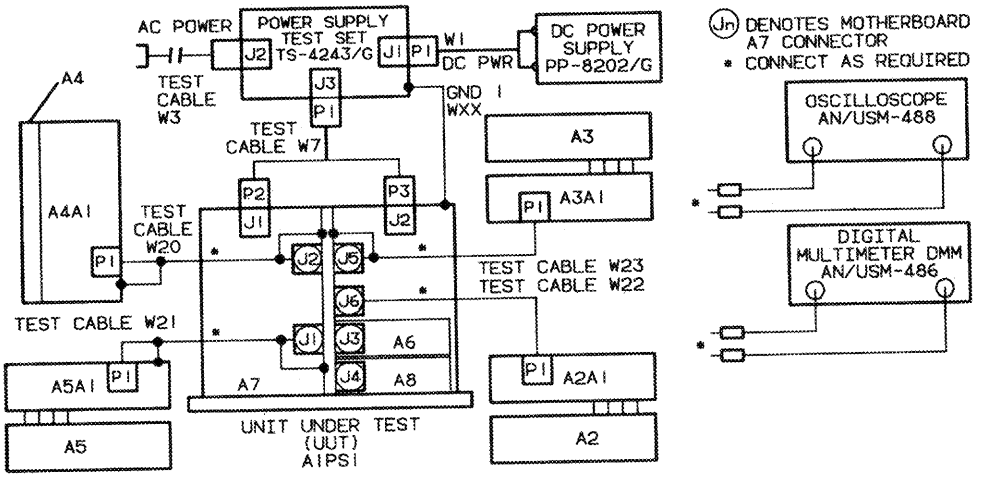
As indicated.

WARNING

HAZARDOUS VOLTAGES exist within the power supply assembly during test. Under adverse conditions, DEATH ON CONTACT may result if personnel fail to observe safety precautions. Know all points where you may be exposed to high voltages.

CAUTION

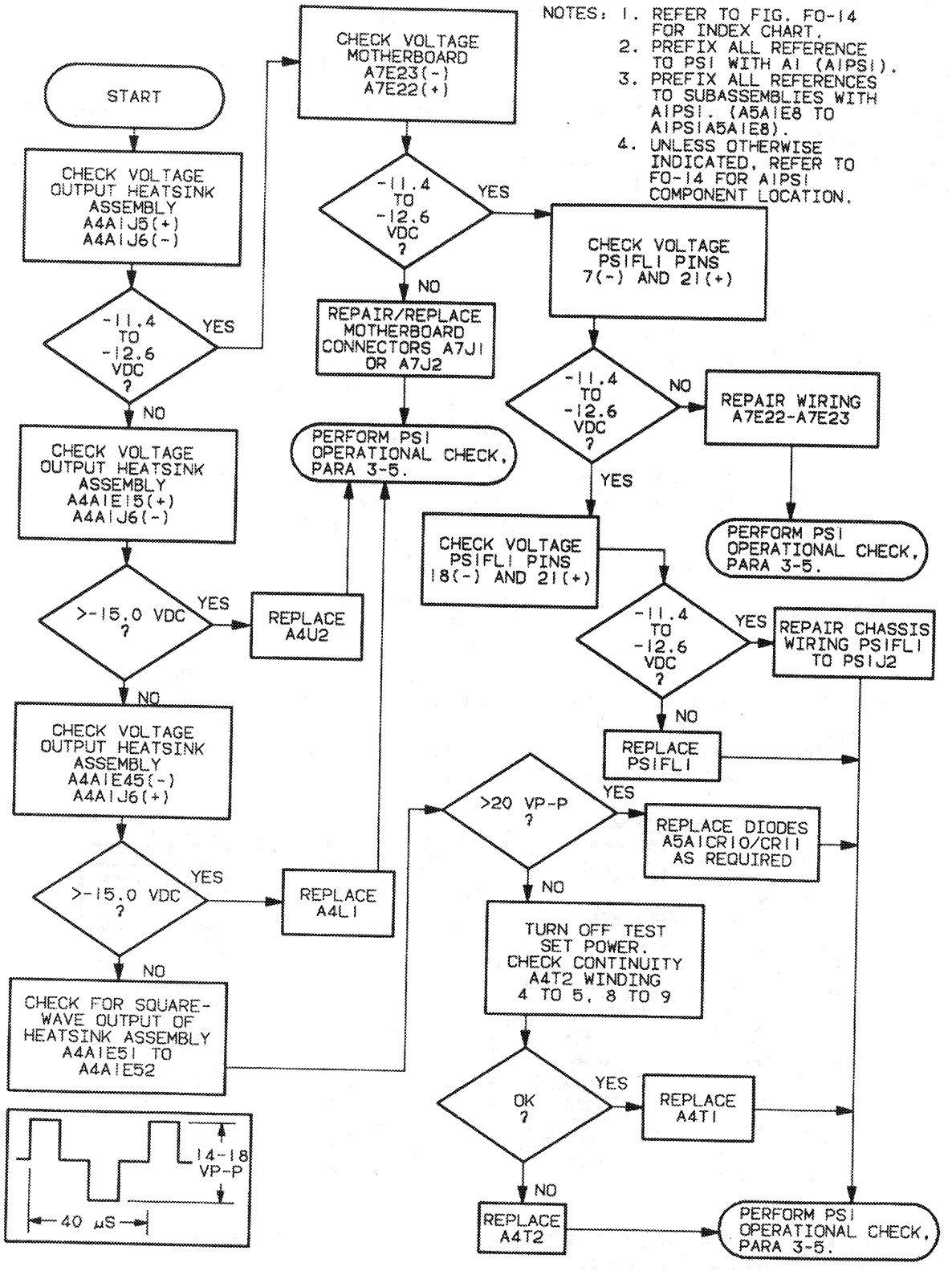
The input heatsink assembly PS1A5A1 contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.



NOTE

A heatsink mounting screw may be removed and used to secure ground cable.

3-12. NO -12 VDC OUTPUT (Cont.)



3-13. NO +112.5 VDC OUTPUT

INITIAL SETUP

Test Equipment

DC Power Supply, PP-8202/G
Oscilloscope, AN/USM-488
Power Supply Test Set, TS-4243/G
Digital Multimeter, AN/USM-486

Tools

Tool Kit, TK-17
Workstation, Static
Maintenance Kit, PCB MX-10897/G
Repair Kit, PCB MK-772/U

Equipment Condition

Power supply removed from A1, (para 2-17).
Heatsink extended as required, para 3-6).
Test setup.

Material/Parts

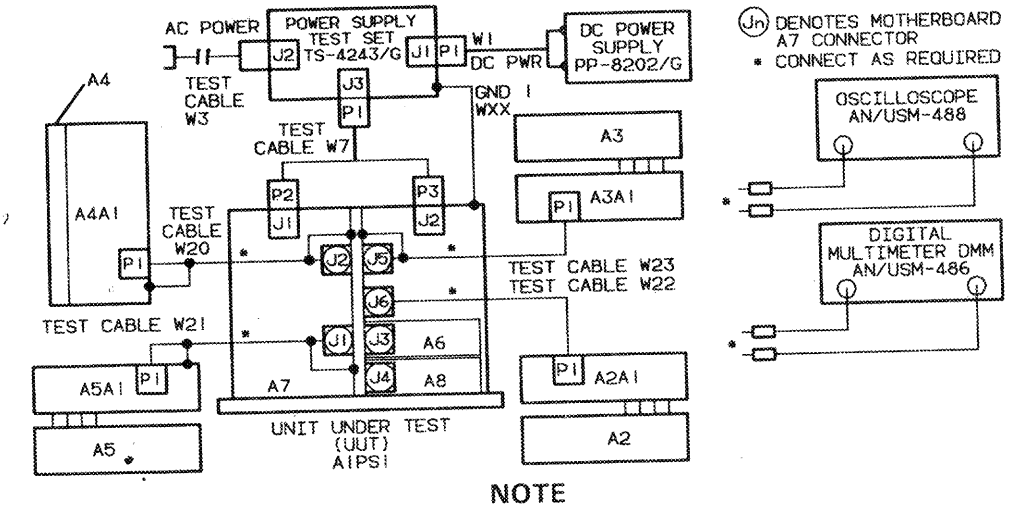
As indicated.

WARNING

HAZARDOUS VOLTAGES exist within the power supply assembly during test. Under adverse conditions, DEATH ON CONTACT may result if personnel fail to observe safety precautions. Know all points where you may be exposed to high voltages.

CAUTION

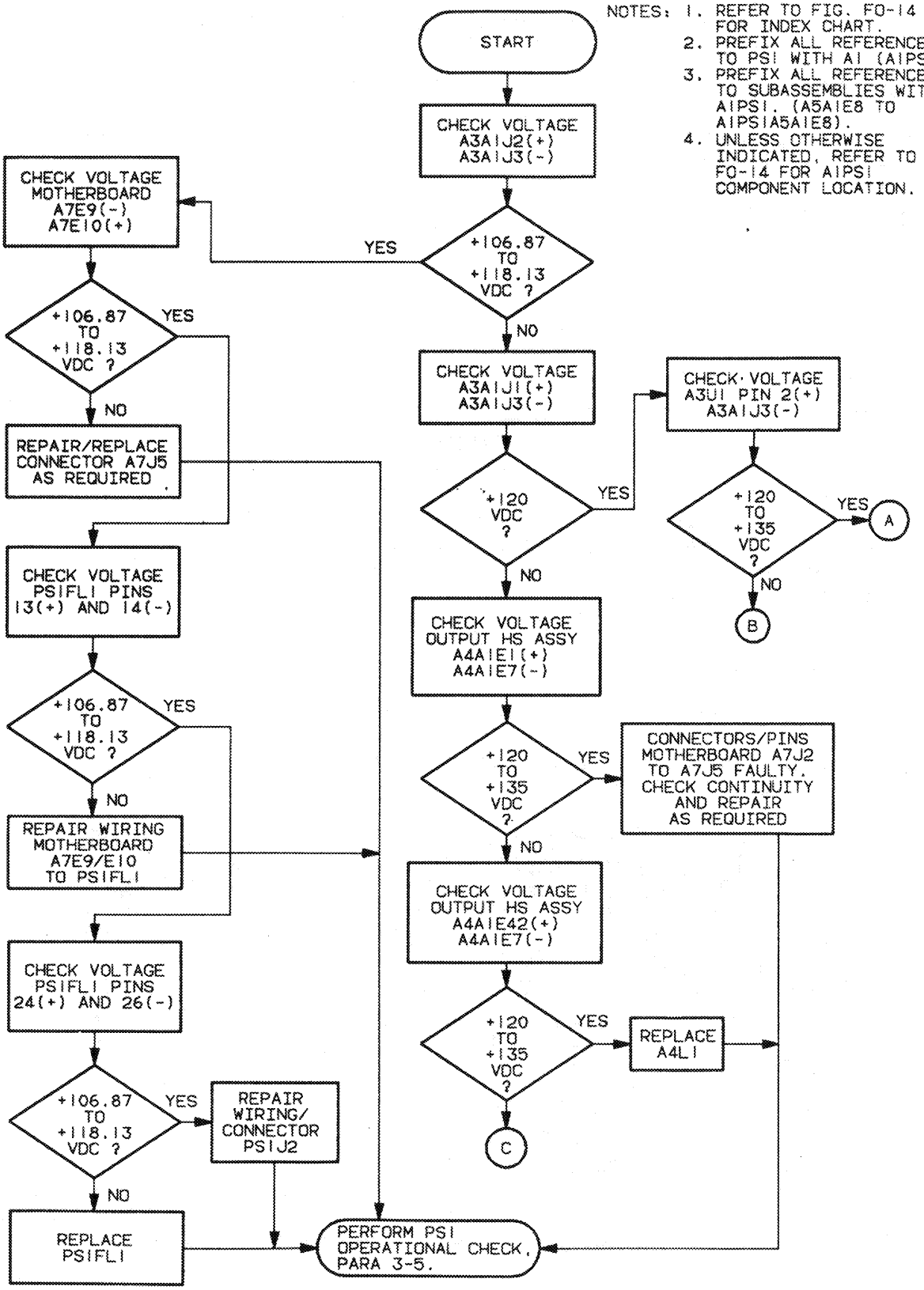
The input heatsink assembly PS1A5A1 contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.



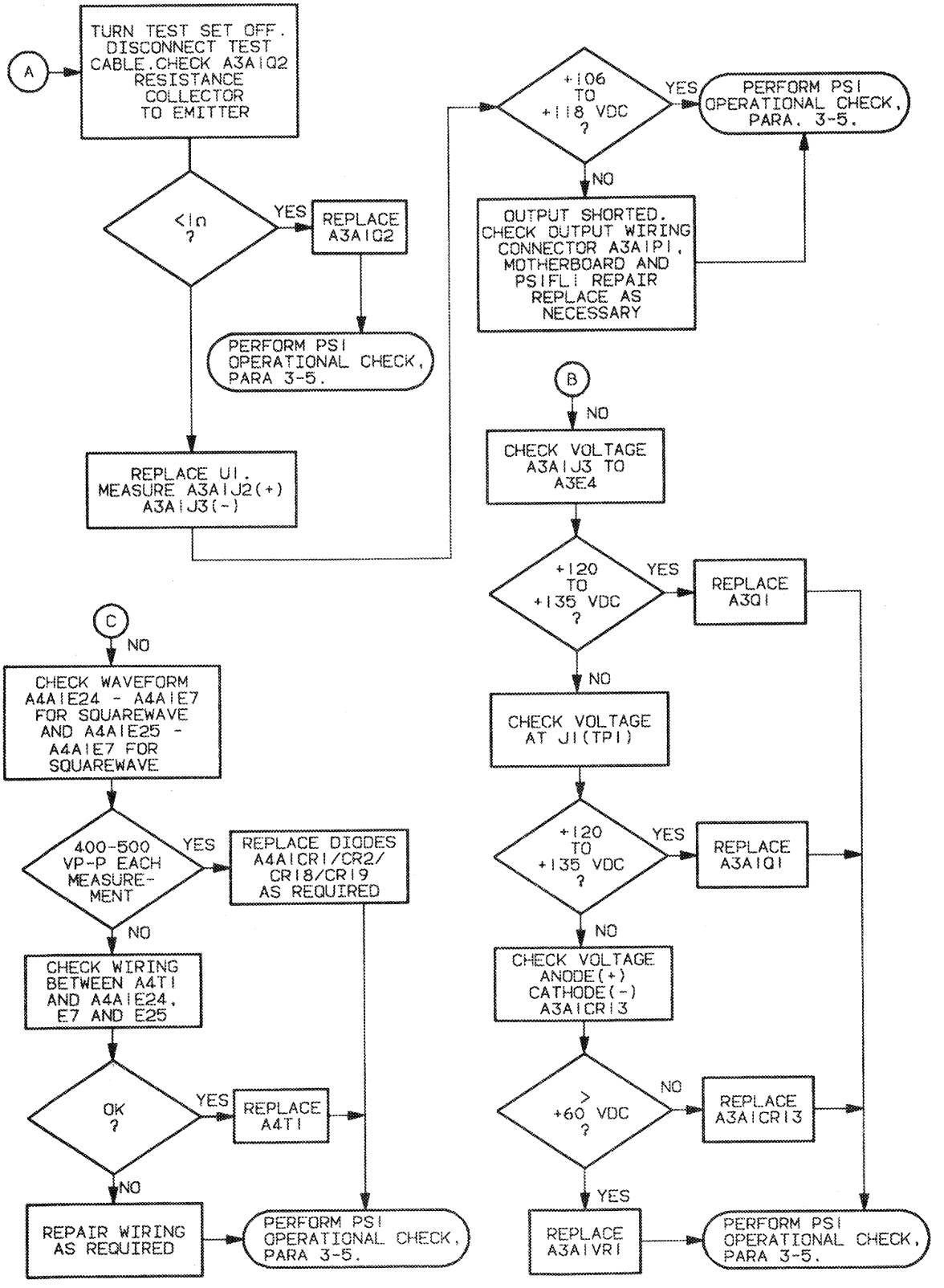
NOTE

A heatsink mounting screw may be removed and used to secure ground cable.

3-13. NO +112.5 VDC OUTPUT (Cont.)



3-13. NO +112.5 VDC OUTPUT (Cont.)



3-14. NO +79 VDC OUTPUT

INITIAL SETUP

Test Equipment

DC Power Supply, PP-8202/G
Oscilloscope, AN/USM-488
Power Supply Test Set, TS-4243/G
Digital Multimeter, AN/USM-486

Tools

Tool Kit, TK-17
Workstation, Static
Maintenance Kit, PCB MX-10897/G
Repair Kit, PCB MK-772/U

Equipment Condition

Power supply removed from A1, (para 2-17).
Heatsink extended as required, para 3-6).
Test setup.

Material/Parts

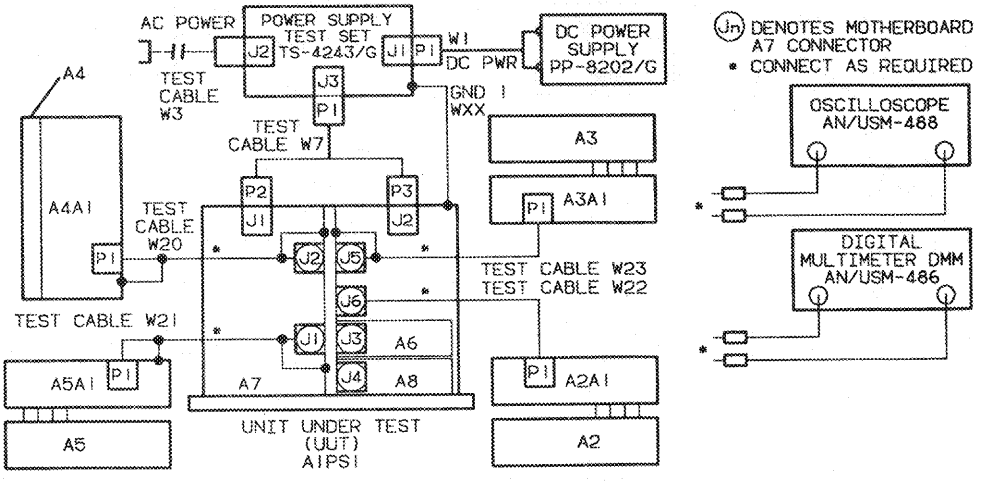
As indicated.

WARNING

HAZARDOUS VOLTAGES exist within the power supply assembly during test. Under adverse conditions, DEATH ON CONTACT may result if personnel fail to observe safety precautions. Know all points where you may be exposed to high voltages.

CAUTION

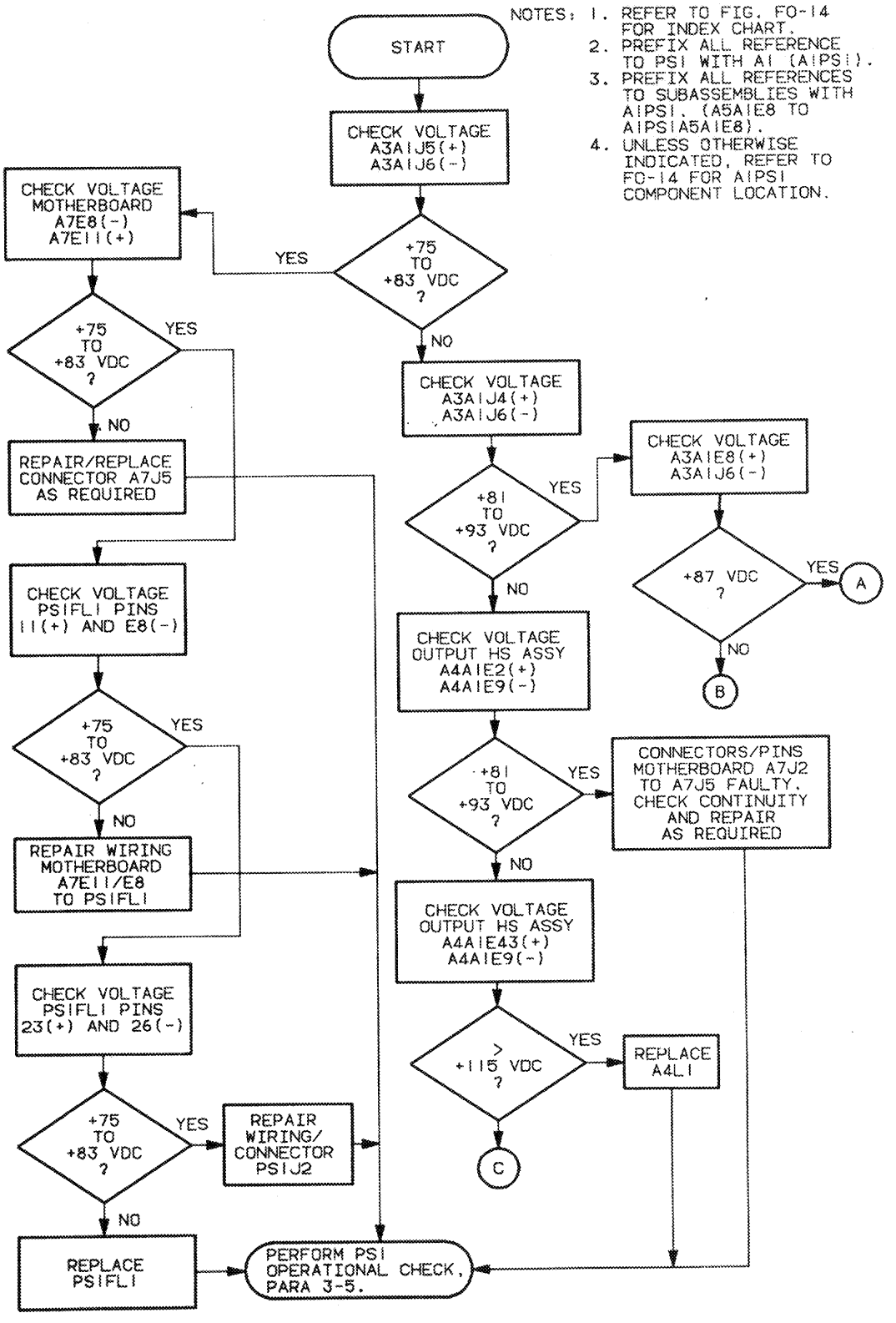
The input heatsink assembly PS1A5A1 contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.



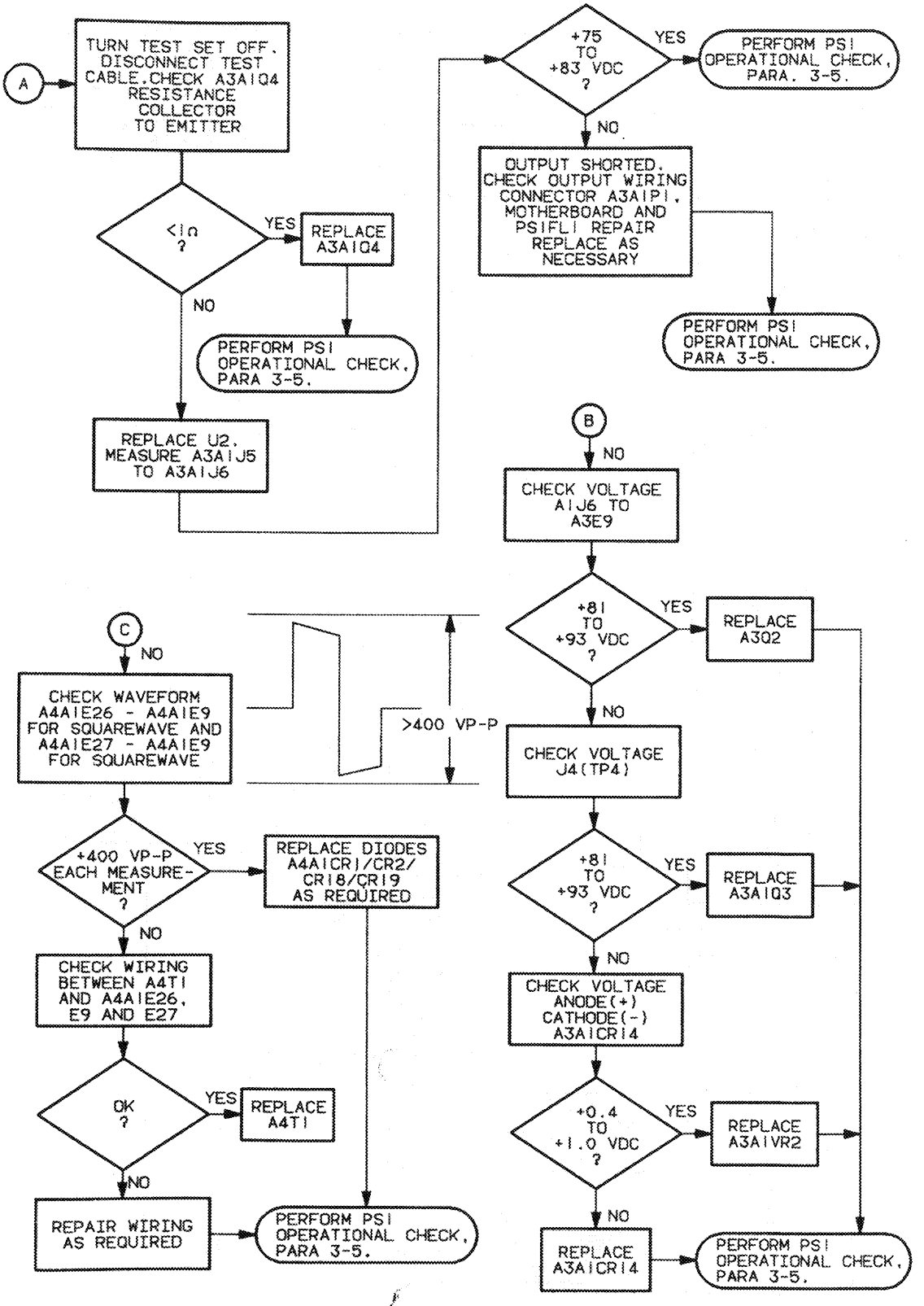
NOTE

A heatsink mounting screw may be removed and used to secure ground cable.

3-14. NO +79 VDC OUTPUT (Cont.)



3-14. NO +79 VDC OUTPUT (Cont.)



3-15. NO +28 VDC OUTPUT

INITIAL SETUP

Test Equipment

DC Power Supply, PP-8202/G
Oscilloscope, AN/USM-488
Power Supply Test Set, TS-4243/G
Digital Multimeter, AN/USM-486

Tools

Tool Kit, TK-17
Workstation, Static
Maintenance Kit, PCB MX-10897/G
Repair Kit, PCB MK-772/U

Equipment Condition

Power supply removed from A1, (para 2-17).
Heatsink extended as required, para 3-6).
Test setup.

Material/Parts

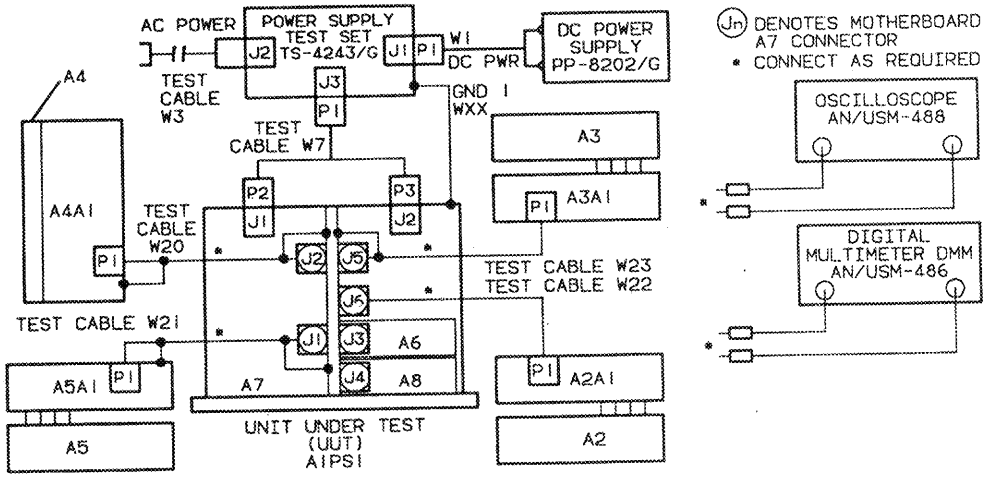
As indicated.

WARNING

HAZARDOUS VOLTAGES exist within the power supply assembly during test. Under adverse conditions, DEATH ON CONTACT may result if personnel fail to observe safety precautions. Know all points where you may be exposed to high voltages.

CAUTION

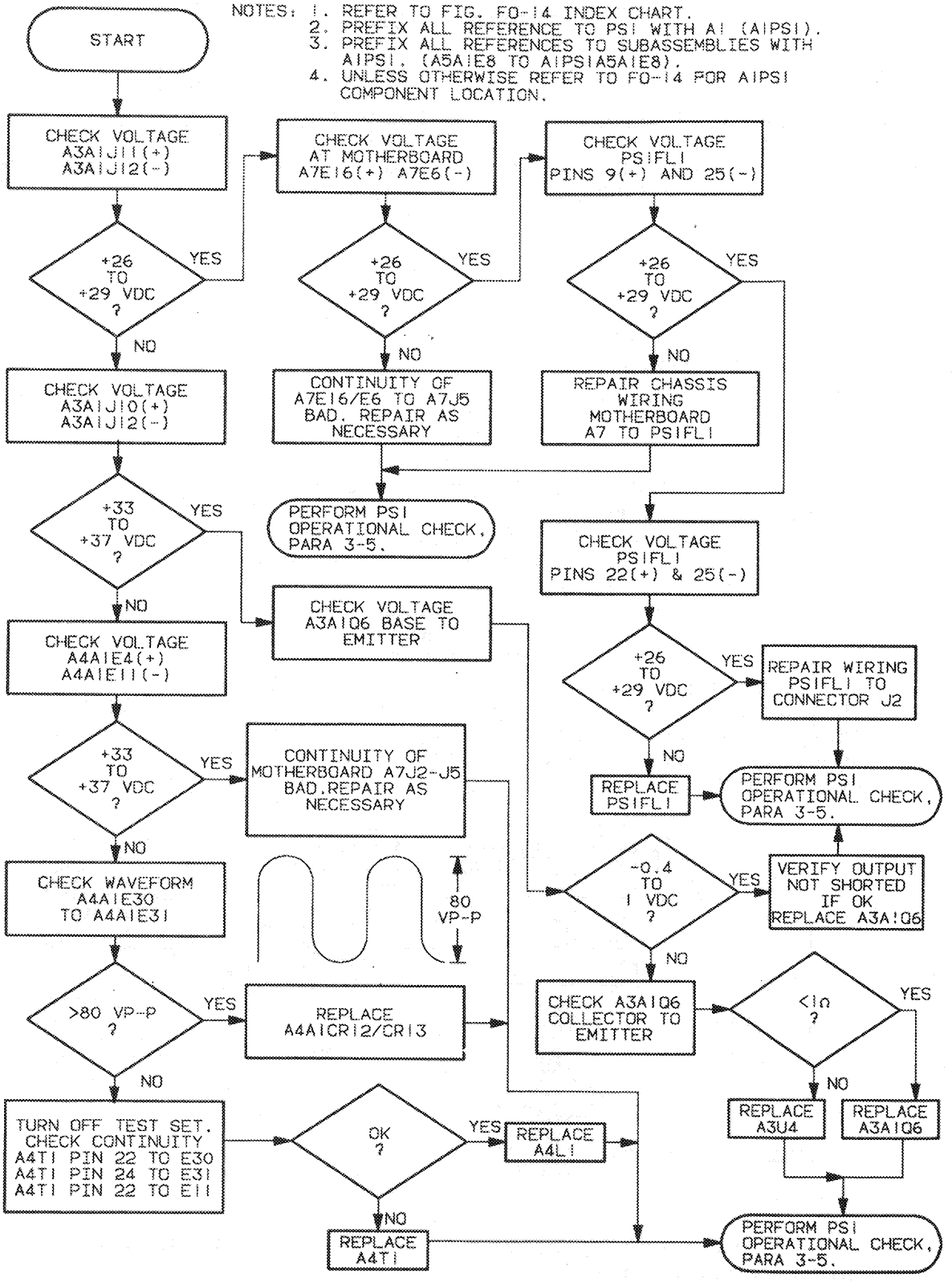
The input heatsink assembly PS1A5A1 contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.



NOTE

A heatsink mounting screw may be removed and used to secure ground cable.

3-15. NO +28 VDC OUTPUT (Cont.)



3-16. CONSTANT FAULT OUTPUT

INITIAL SETUP

Test Equipment

DC Power Supply, PP-8202/G
Oscilloscope, AN/USM-488
Power Supply Test Set, TS-4243/G
Digital Multimeter, AN/USM-486

Tools

Tool Kit, TK-17
Workstation, Static
Maintenance Kit, PCB MX-10897/G
Repair Kit, PCB MK-772/U

Equipment Condition

Power supply removed from A1, (para 2-17).
Heatsink extended as required, para 3-6).
Test setup.

Material/Parts

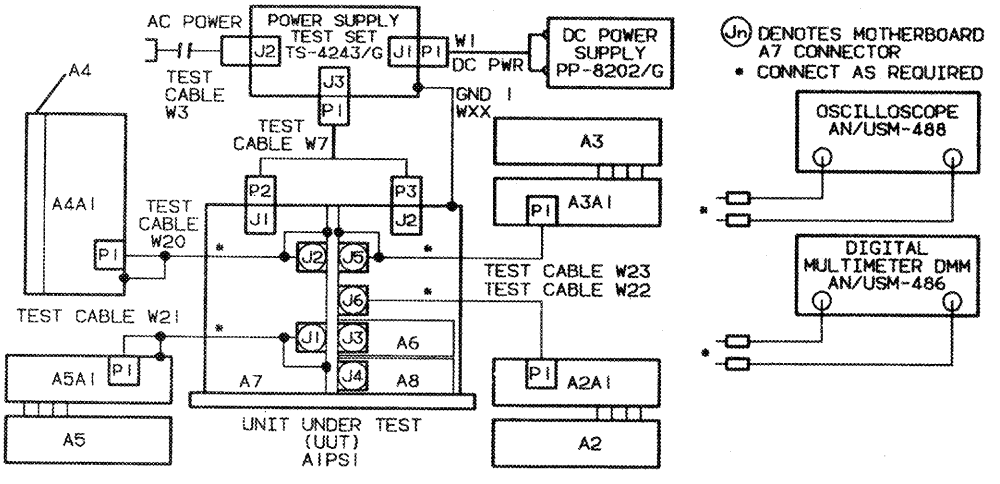
As indicated.

WARNING

HAZARDOUS VOLTAGES exist within the power supply assembly during test. Under adverse conditions, DEATH ON CONTACT may result if personnel fail to observe safety precautions. Know all points where you may be exposed to high voltages.

CAUTION

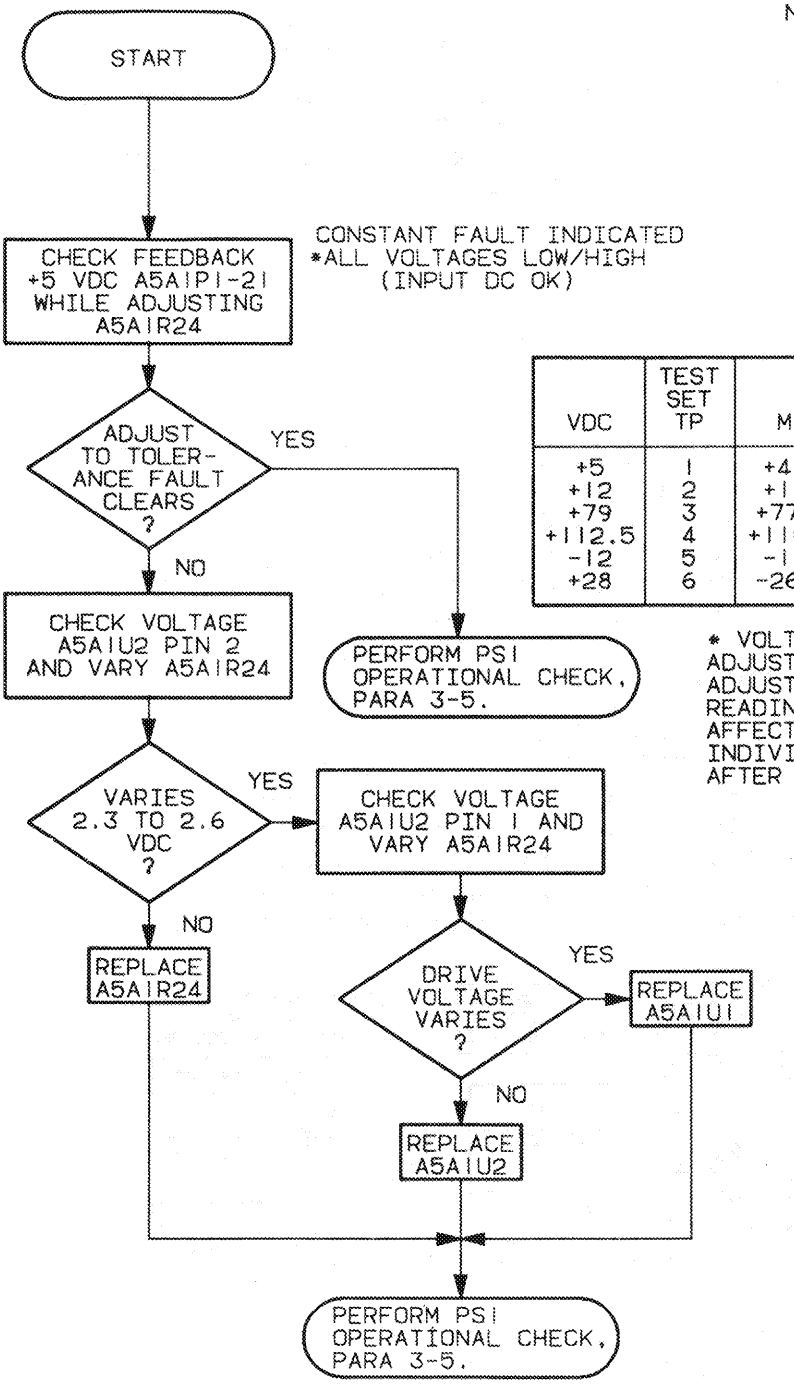
The input heatsink assembly PS1A5A1 contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.



NOTE

A heatsink mounting screw may be removed and used to secure ground cable.

3-16. CONSTANT FAULT OUTPUT (Cont.)



NOTES:
1. REFER TO FIG. FO-14 FOR INDEX CHART.
2. PREFIX ALL REFERENCE TO PSI WITH A1 (A1PS1).
3. PREFIX ALL REFERENCES TO SUBASSEMBLIES WITH A1PS1. (A5A1E8 TO A1PS1A5A1E8).
4. UNLESS OTHERWISE INDICATED, REFER TO FO-14 FOR A1PS1 COMPONENT LOCATION.

VDC	TEST SET TP	MIN	MAX	CURRENT		
				NORMAL	OVERLOAD	
+5	1	+4.75	+5.25	6.0	14-20	
+12	2	+11.4	+12.6	0.83	1.0-1.6	
+79	3	+77.42	+80.58	0.21	0.25-0.42	*
+112.5	4	+110.25	+114.75	0.12	0.18-0.35	*
-12	5	-11.4	-12.6	0.41	0.5-1.1	
+28	6	-26.61	+29.4	0.40	0.45-0.9	*

* VOLTAGES MARKED BY * HAVE INDIVIDUAL ADJUSTMENT ON A3A1. USE APPROPRIATE ADJUSTMENT TO CORRECT OUT OF TOLERANCE READING. ADUSTMENT OF A5A1R24 WILL AFFECT ALL VOLTAGES. CORRECTION OF INDIVIDUAL VOLTAGES MAY BE REQUIRED AFTER A5A1R24 HAS BEEN ADJUSTED.

Section III. INTERMEDIATE GENERAL SUPPORT MAINTENANCE

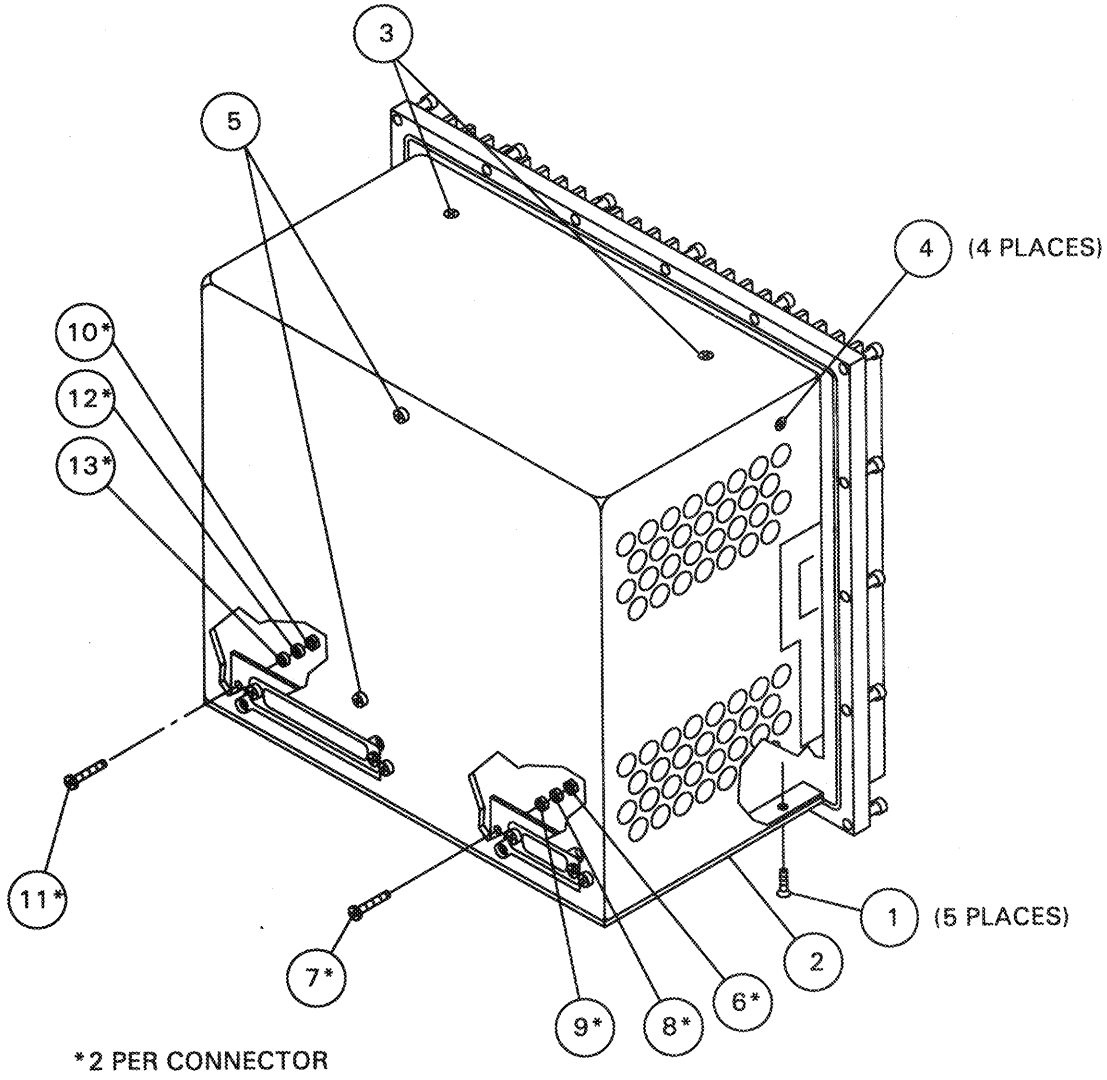
3-17. GENERAL

This section includes all maintenance procedures that are the responsibility of intermediate general support maintenance personnel as authorized by the MAC. The I/O power supply assembly PS1 is returned to intermediate general support for repair.

3-18. POWER SUPPLY (A1PS1) DISASSEMBLY AND ASSEMBLY

INITIAL SETUP

Tools	Equipment Condition
Tool Kit, TK-17	Power off. PS1 removed from K/D (para 2-17).



3-18. POWER SUPPLY (A1PS1) DISASSEMBLY AND ASSEMBLY (Cont.)

DISASSEMBLY - REMOVE ACCESS PLATE AND COVER ASSEMBLY

STEP 1. Place the power supply so that the main heatsink cooling fins rest on the work surface.

STEP 2. Remove 5 screws (1) and remove the access plate (2).

STEP 3. Remove the following screws from the cover.

- 2 screws (3) at the top,
- 4 screws (4) with lockwashers at the sides, and
- 2 screws (5) with lockwashers at the rear of the cover.

STEP 4. While holding the nut (6), remove the screw (7), and then the nut, lockwasher (8), and flatwasher (9) (2 places) that hold PS1J1 to the cover assembly.

STEP 5. While holding the nut (10), remove the screw (11), then the nut, lockwasher (12), and flatwasher (13) (2 places) that hold PS1J2 to the cover assembly.

ASSEMBLY - REPLACE ACCESS COVER AND COVER ASSEMBLY

STEP 1. Place the power supply so that the main heatsink cooling fins rest on the work surface.

STEP 2. Place PS1J1 through the cover slot, and secure it with screws (7), lockwashers (8), flatwashers (9), and hexagonal nuts 6 (2 places).

STEP 3. Place PS1J2 through the cover slot, and secure it with screws (11), lockwashers (12), flatwashers (13) and hexagonal nuts (10) (2 places).

STEP 4. Place the cover assembly on the power supply chassis and secure it with:

- 2 screws (3) at the top of the cover,
- 4 screws (4) with lockwashers at the sides, and
- 2 screws (5) with lockwashers at the rear of cover.

STEP 5. Place the access plate (2) on the chassis and secure it with 5 screws (1).

STEP 6. Perform operational check (para. 3-5).

3-19. REPLACEMENT OF BITE CCA (A1PS1A6)/BLACK OUTPUT CCA (A1PS1A8)

Removal instructions for the BITE CCA and the black output CCA PS1A8 are the same. It is not possible to install these CCAs in an incorrect position due to the location of the connectors.

CAUTION

The mounting post screws have locking and retaining sealant applied to the threads to prevent loosening or loss due to vibration. To prevent turning and breaking during removal, make sure the mounting post does not turn while removing the retaining screws.

INITIAL SETUP

Tools

Tool Kit, TK-17
Workstation, Static

Equipment Condition

Power supply removed from controller assembly (para 2-17).
Cover removed (para 3-18).

Material/Parts

Appropriate CCA
BITE CCA, PS1A6, P/N A3024563
Black output CCA, PS1A8, P/N A3024564
Locking and retaining sealant, P/N MIL-S-22473

CAUTION

The CCA assemblies contain devices that are sensitive to damage by electrostatic discharge. Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.

REMOVE BITE CCA/BLACK OUTPUT CCA

STEP 1. Remove 4 screws (1) along with flatwashers and lockwashers at corners of the CCA.

STEP 2. Pull the CCA forward until free of the motherboard connector (2).

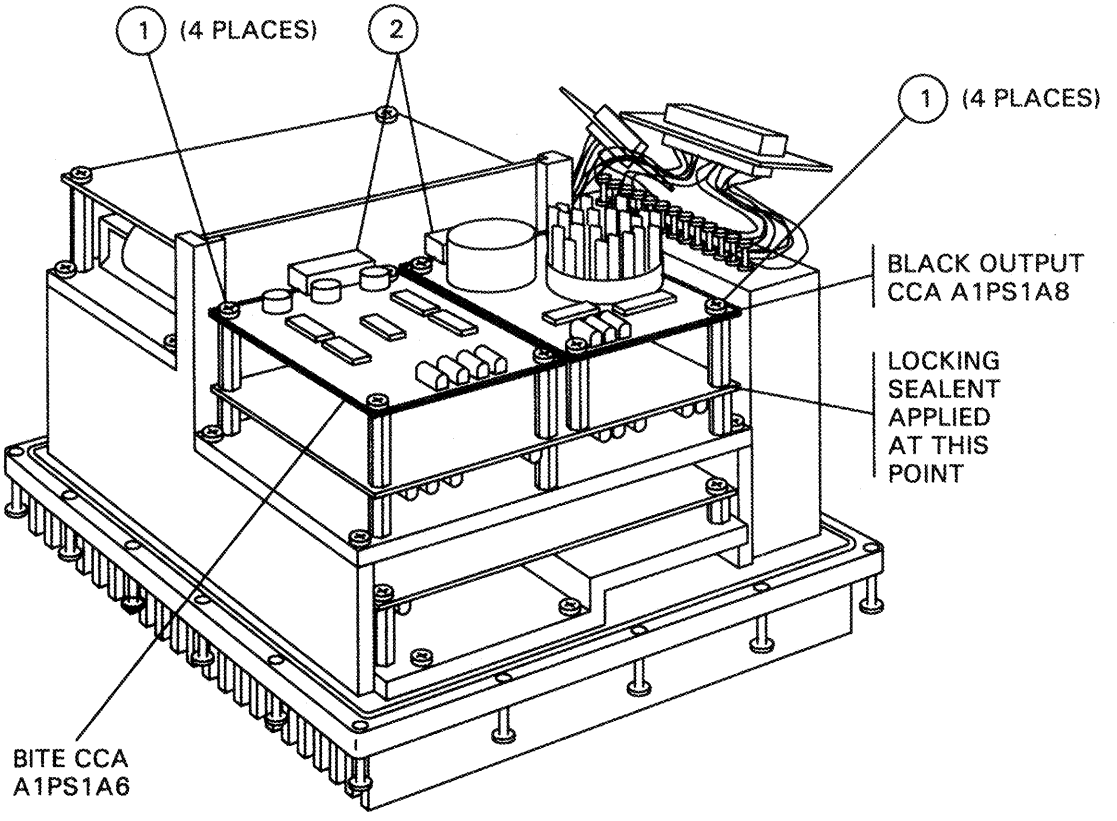
REPLACE BITE CCA/BLACK OUTPUT CCA

STEP 1. Position the board and push forward until the CCA connector is seated in the motherboard (2).

STEP 2. Secure the CCA corners with 4 screws (1), lockwashers and flatwashers.

STEP 3. Perform operational check (para. 3-5).

3-19. REPLACEMENT OF BITE CCA (A1PS1A6)/BLACK OUTPUT CCA (A1PS1A8) (Cont.)



3-20. REPLACEMENT OF HIGH VOLTAGE HEATSINK ASSEMBLY (A1PS1A3)

INITIAL SETUP

Tools

Tool Kit, TK-17
Workstation, Static

Material/Parts

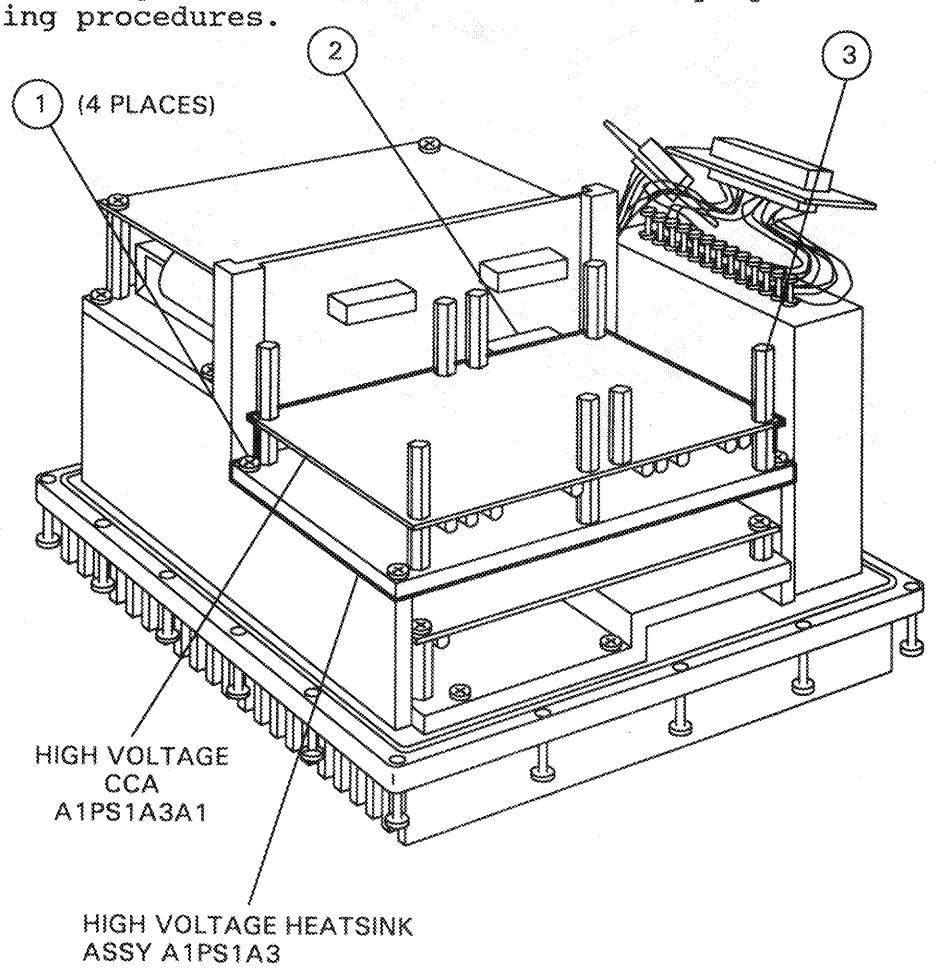
High Voltage Heatsink Assy,
A1PS1A3, P/N A3024560
Locking and retaining sealant, P/N MIL-S-22473

Equipment Condition

Power supply removed from controller assembly (para 2-17).
Cover removed (para 3-18).
BITE CCA/black output CCA removed (para 3-19).

CAUTION

This assembly contains devices that are sensitive to damage by ESD. Improper handling will result in component and assembly failure. Use extreme caution when handling. Refer to DOD-HDBK-263 for proper handling procedures.



3-20. REPLACEMENT OF HIGH VOLTAGE HEATSINK ASSEMBLY (A1PS1A3) (Cont.)

CAUTION

The mounting post screws have locking and retaining sealant applied to the threads to prevent loosening or loss due to vibration. To prevent turning and breaking during removal, make sure the mounting post does not turn while removing the retaining screws.

REMOVE HIGH VOLTAGE HEATSINK ASSEMBLY

NOTE

The BITE CCA and black output CCA may remain installed if the purpose of removal is to gain access to the tempest heatsink (skip STEP 1). If purpose of removal is to perform a maintenance and test setup, remove the BITE and black output CCA.

NOTE

The BITE and black output CCA mounting post may remain attached to the A3A1 CCA. These need be removed only when A3A1 CCA is replaced.

STEP 1. Remove 4 screws (1) along with lockwashers and flatwashers at each corner of the heatsink.

STEP 2. Move the board side-to-side to free the connector (2) and pull the high voltage heatsink assembly from the chassis.

REPLACE HIGH VOLTAGE HEATSINK ASSEMBLY

STEP 1. Position the high voltage heatsink assembly (with BITE and black output CCA mounting posts (3) installed) and push until A6A1P1 is firmly mated with motherboard connector (2).

STEP 2. Secure the high voltage heatsink at each corner to the upper and lower brackets with 4 screws (1), lockwashers, and flatwashers.

STEP 3. Replace CCAs removed in initial setup.

STEP 4. Perform PS operational check (para. 3-5).

3-21. REPLACEMENT OF TEMPEST HEATSINK ASSEMBLY (A1PS1A2)

INITIAL SETUP

Tools

Tool Kit, TK-17
Workstation, Static

Material/Parts

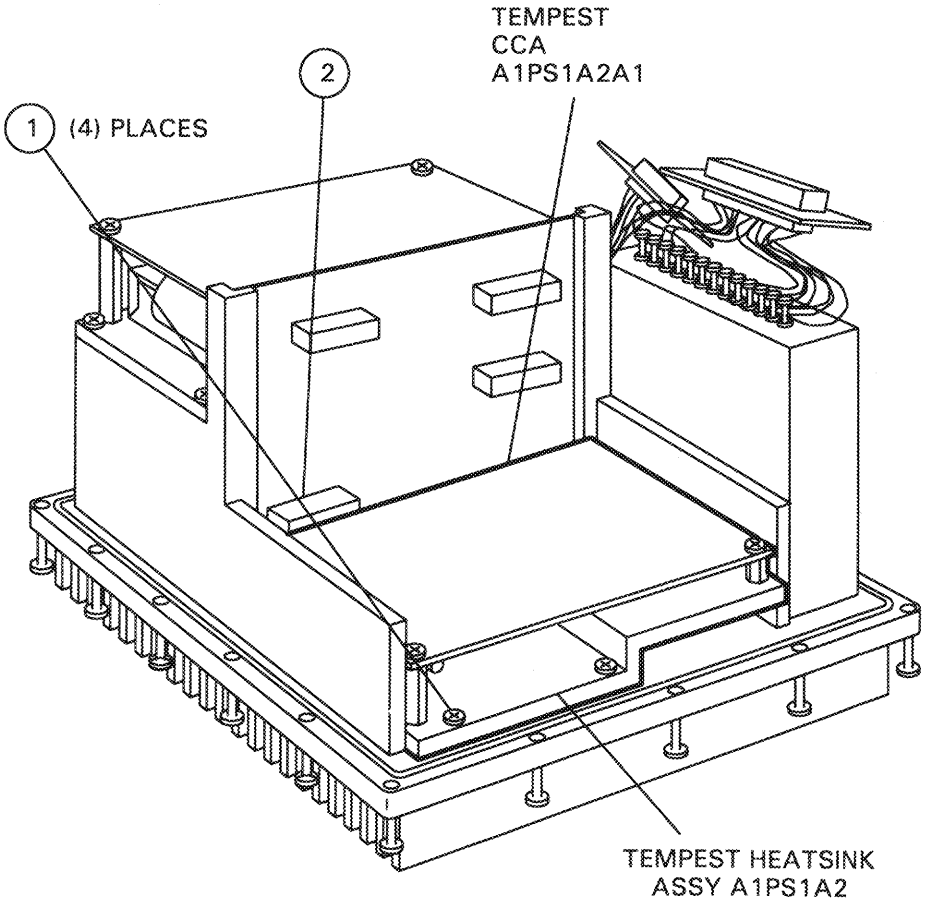
Tempest Heatsink Assy, A1PS1A2, P/N A3024559
Locking and retaining sealant, P/N MIL-S-22473

Equipment Condition

Power supply removed from controller assembly (para 2-17).
Cover removed (para 3-18).
High voltage heatsink removed, (para 3-20).
BITE CCA/black output CCA removed, (para 3-19).

CAUTION

This assembly contains devices that are sensitive to damage by ESD. Improper handling will result in component and assembly failure. Use extreme caution when handling. Refer to DOD-HDBK-263 for proper handling procedures.



3-21. REPLACEMENT OF TEMPEST HEATSINK ASSEMBLY (A1PS1A2) (Cont.)

CAUTION

The mounting post screws have locking and retaining sealant applied to the threads to prevent loosening or loss due to vibration. To prevent turning and breaking during removal, make sure the mounting post does not turn while removing the retaining screws.

NOTE

It is not necessary to remove the BITE CCA and the black output CCA from the high voltage heatsink assembly if the purpose of maintenance is to remove the tempest heatsink assembly. These CCAs may remain mounted to the high voltage heatsink assembly.

REMOVE TEMPEST HEATSINK ASSEMBLY

STEP 1. Remove the 4 screws (1), lockwashers, and flatwashers that hold tempest heatsink assembly to the main heatsink assembly.

STEP 2. Grasp the tempest heatsink assembly and move the assembly side-to-side to loosen the connector (2) from the motherboard and lift the tempest heatsink assembly from the main heatsink.

REPLACE TEMPEST HEATSINK ASSEMBLY

STEP 1. Position the tempest heatsink assembly and push until the connector (2) is firmly mated with the motherboard.

STEP 2. Secure the tempest heatsink assembly to the main heatsink with 4 screws (1), lockwashers, and flatwashers.

STEP 3. Replace module removed in initial setup.

STEP 4. Perform PS operational check (para. 3-5).

3-22. REPLACEMENT OF INPUT DC TO DC HEATSINK ASSEMBLY (A1PS1A5)

INITIAL SET UP

Tools

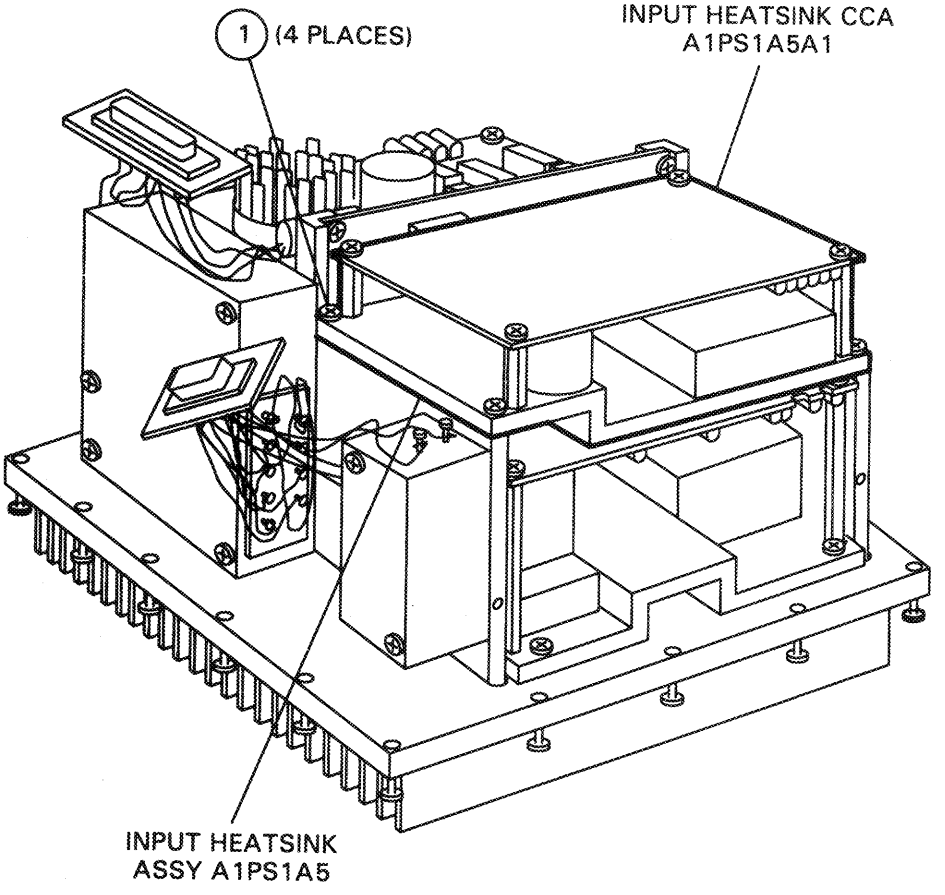
Tool Kit, TK-17
Workstation, Static

Material/Parts

Input DC-DC Heatsink Assembly, PS1A5, P/N A3024562
Locking and Retaining sealant, P/N MIL-S-22473

Equipment Condition

Power supply removed from controller assembly (para 2-17).
Cover removed (para 3-18).



3-22. REPLACEMENT OF INPUT DC TO DC HEATSINK ASSEMBLY (A1PS1A5) (Cont.)

CAUTION

The mounting post screws have locking and retaining sealant applied to the threads to prevent loosening or loss due to vibration. To prevent turning and breaking during removal, make sure the mounting post does not turn while removing the retaining screws.

CAUTION

The input heatsink assembly contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD- HDBK-263 for proper handling procedures.

REMOVE INPUT DC TO DC HEATSINK ASSEMBLY

STEP 1. From the corners of the assembly, remove four screws (1) with lockwashers and flatwashers.

STEP 2. Move the input heatsink assembly side-to-side to loosen it from the connector and lift it from the upper and lower brackets.

REPLACE INPUT DC TO DC HEATSINK ASSEMBLY

STEP 1. Place the input heatsink assembly on the upper and lower brackets and push in until a firm connection is made with the motherboard.

STEP 2. Secure the input heatsink assembly to the upper and lower brackets with four screws (1), lockwashers and flatwashers.

STEP 3. Perform PS operational check (para. 3-5).

3-23. REPLACEMENT OF OUTPUT HEATSINK ASSEMBLY (A1PS1A4)

INITIAL SETUP

Tools

Tool Kit, TK-17
Workstation, Static

Material/Parts

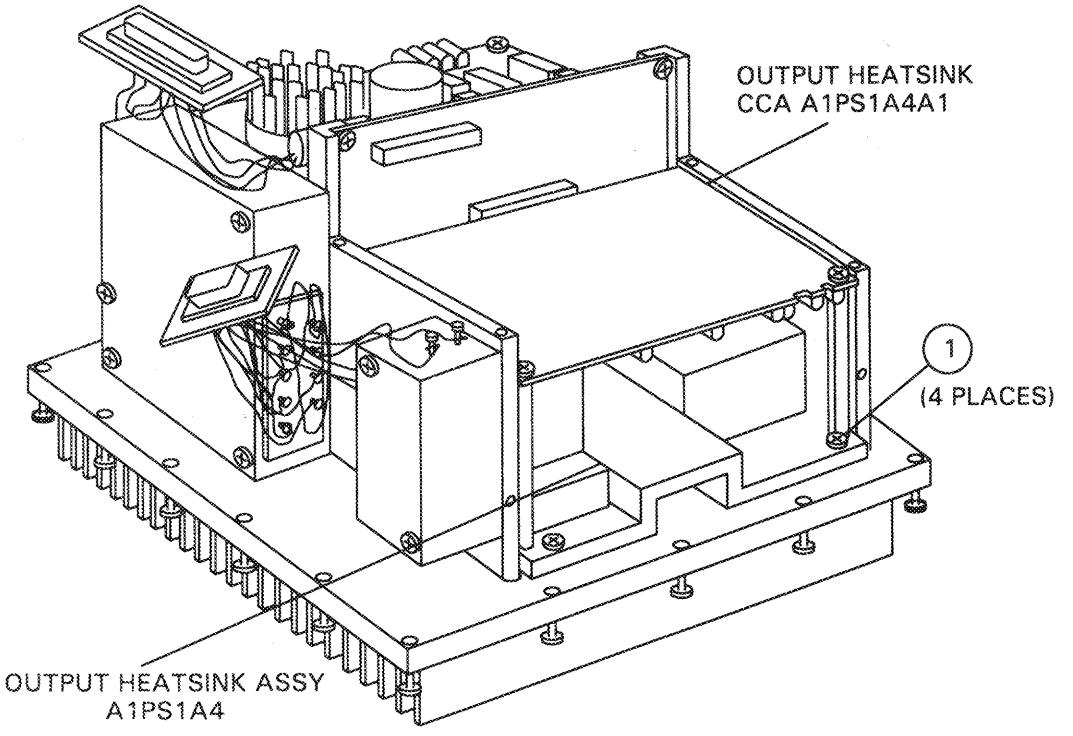
Output Heatsink Assembly, PS1A4,
P/N A3024561
Locking and retaining sealant,
P/N MIL-S-22473

Equipment Condition

Power supply removed from controller assembly (para 2-17).
Cover removed (para 3-18).
Input dc-dc heatsink assy removed (para 3-22).

CAUTION

This assembly contains devices that are sensitive to damage by ESD. Improper handling will result in component and assembly failure. Use extreme caution when handling. Refer to DOD-HDBK-263 for proper handling procedures.



3-23. REPLACEMENT OF OUTPUT HEATSINK ASSEMBLY (A1PS1A4) (Cont.)

REMOVE OUTPUT HEATSINK ASSEMBLY

STEP 1. Remove the 4 screws (1) with lockwashers and flatwashers that hold the output heatsink assembly to the main heatsink.

STEP 2. Move the output heatsink from side-to-side to loosen it from the connector and lift it from the chassis.

REPLACE OUTPUT HEATSINK ASSEMBLY

STEP 1. Place the output heatsink assembly between the upper and lower brackets and push until the connector is firmly seated.

STEP 2. Secure the output heatsink to the main heatsink with 4 screws (1), lockwashers, and flatwashers.

STEP 3. Replace modules removed in initial setup.

STEP 4. Perform PS operational check (para. 3-5).

3-24. REPLACEMENT OF MOTHERBOARD CCA (A1PS1A7)

INITIAL SETUP

Tools

Tool Kit, TK-17
Workstation, Static

Materials/Parts

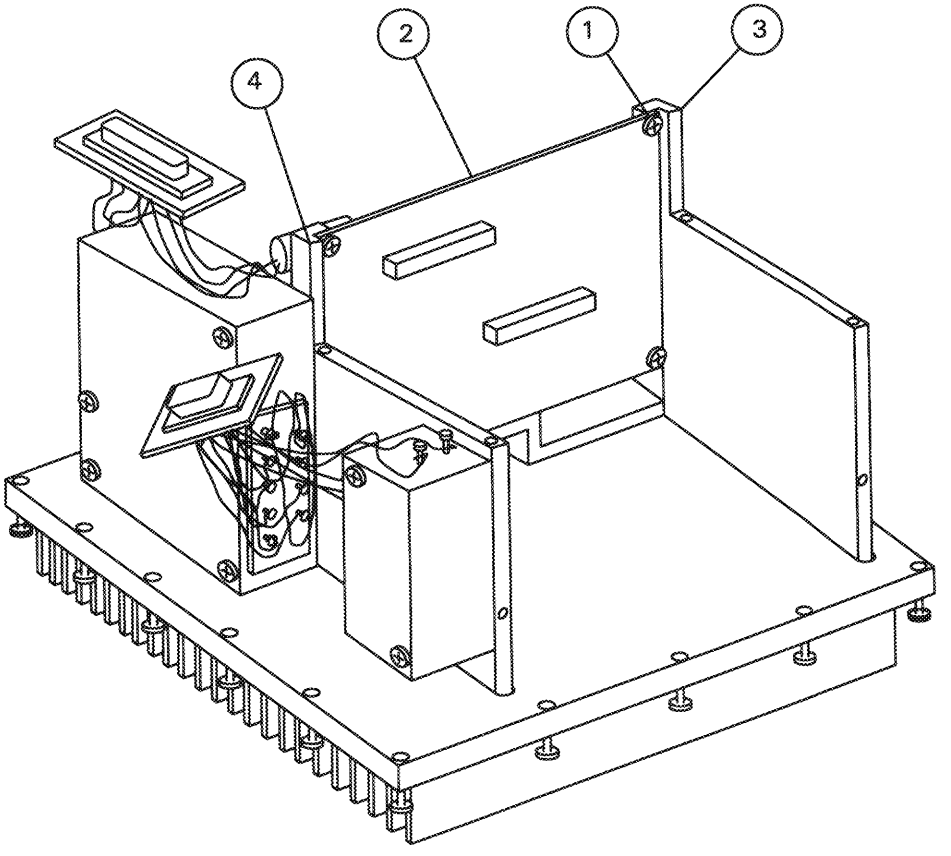
Motherboard CCA, A1PS1A7,
P/N A3024807

Equipment Condition

Power supply removed from controller assembly (para 2-17).
Cover removed (para 3-18).
All heatsink assemblies and CCAs removed (para 3-19 thru 3-23).

CAUTION

This assembly contains devices that are sensitive to ESD. Improper handling will result in component and assembly failure. Use extreme caution when handling. Refer to DOD-HDBK-263 for proper handling procedures.



3-24. REPLACEMENT OF MOTHERBOARD CCA (A1PS1A7) (Cont.)

REMOVE MOTHERBOARD CCA

STEP 1. Remove the 4 screws (1) at each corner of the motherboard CCA (2).

STEP 2. Tag and unsolder all wires from the motherboard terminals.

STEP 3. Remove the motherboard.

REPLACE MOTHERBOARD CCA

STEP 1. Position motherboard CCA (2) against upper (3) and lower (4) brackets.

STEP 2. Solder all wires to the appropriate motherboard terminals.

STEP 3. Install 4 screws (1) at each corner of the motherboard CCA.

STEP 4. Replace all modules removed in initial setup.

STEP 5. Perform PS operational check (para. 3-5).

3-25. REPLACEMENT OF PREFORMED EMI GASKET

The preformed EMI gasketing should be replaced when missing, severely frayed, or when damaged in a manner that prevents good sealing. Procedures to replace the gasketing are as follows:

INITIAL SETUP

Tools

Tool Kit, TK-17

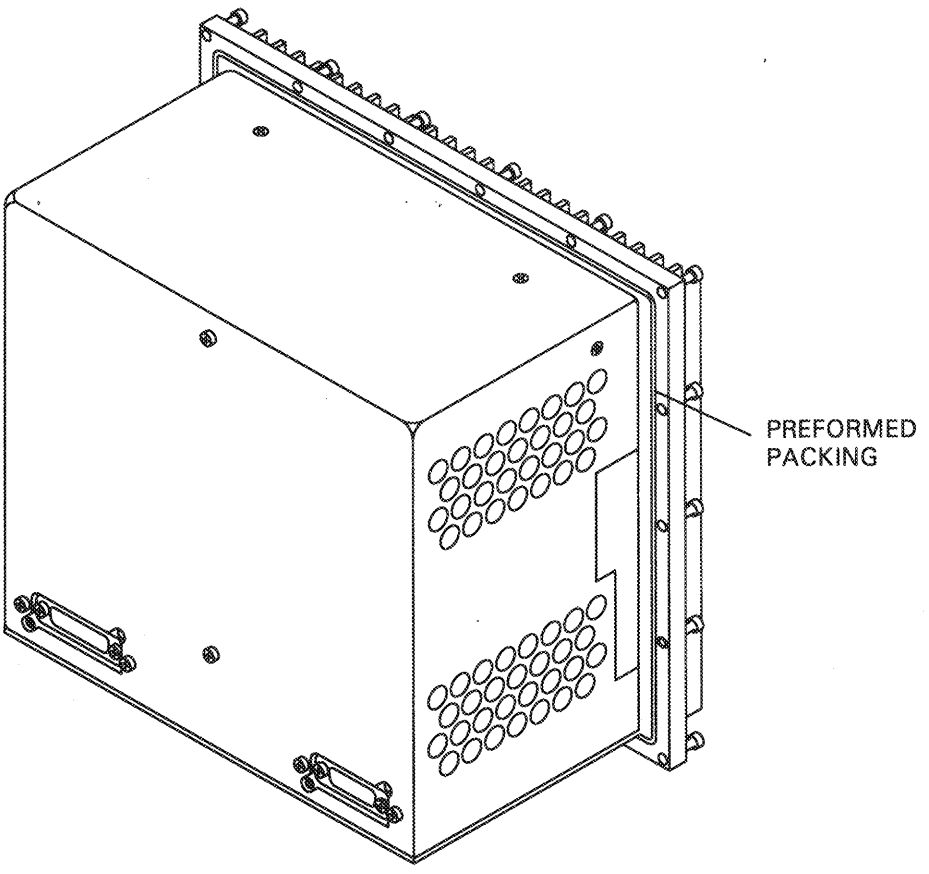
Equipment Condition

Power off.
PS1 removed from controller, (para 2-16).
PS1 cover removed from PS1, (para 3-18).

Material/Parts

Preformed packing, P/N A3032770
Silicone adhesive sealant, P/N MIL-A-46106

3-25. REPLACEMENT OF PREFORMED EMI GASKET (Cont.)



STEP 1. Remove damaged preformed packing.

STEP 2. Clean gasket slot.

STEP 3. Place a thin film of adhesive/sealant in gasket slot.

STEP 4. Press packing into slot.

STEP 5. Permit adhesive to dry for approximately 1 1/2 hours before installing into a chassis.

3-26. REPAIR OF ASSEMBLIES WITH HEATSINK MOUNTED COMPONENTS

INITIAL SETUP

Tools

Tool Kit, TK-17
Workstation, Static

Equipment Condition

Power off.
Heatsink assembly removed, from PS1.

Material/Parts

Appropriate component
Sealing and locking compound, P/N MIL-S-22473

a. Heatsink assemblies A1PS1A2 through PS1A5 are similar in that they contain a CCA and discrete components which are mounted on the heatsink. The removal and replacement of CCAs is required only when the printed wiring board (PWB) requires repair.

CAUTION

The external threads of the post are treated with sealing and locking compound. This is to prevent them from becoming loose. When removing screws from these posts, the post should be held to prevent them from turning. If posts have been removed, a thin coating of locking and sealing compound MIL-S-22473 is applied to the external threads before the post is installed.

b. The method by which an installed CCA is removed is described in paragraph 3-6. Components on the CCA are replaced using standard shop practices with the exception of the input heatsink assembly. This assembly contains MOSFETs which can be damaged by ESD. Additionally, the input heatsink assembly contains a heatsink mounted transient supressor diode. Separate instructions are given in paragraph 3-26.

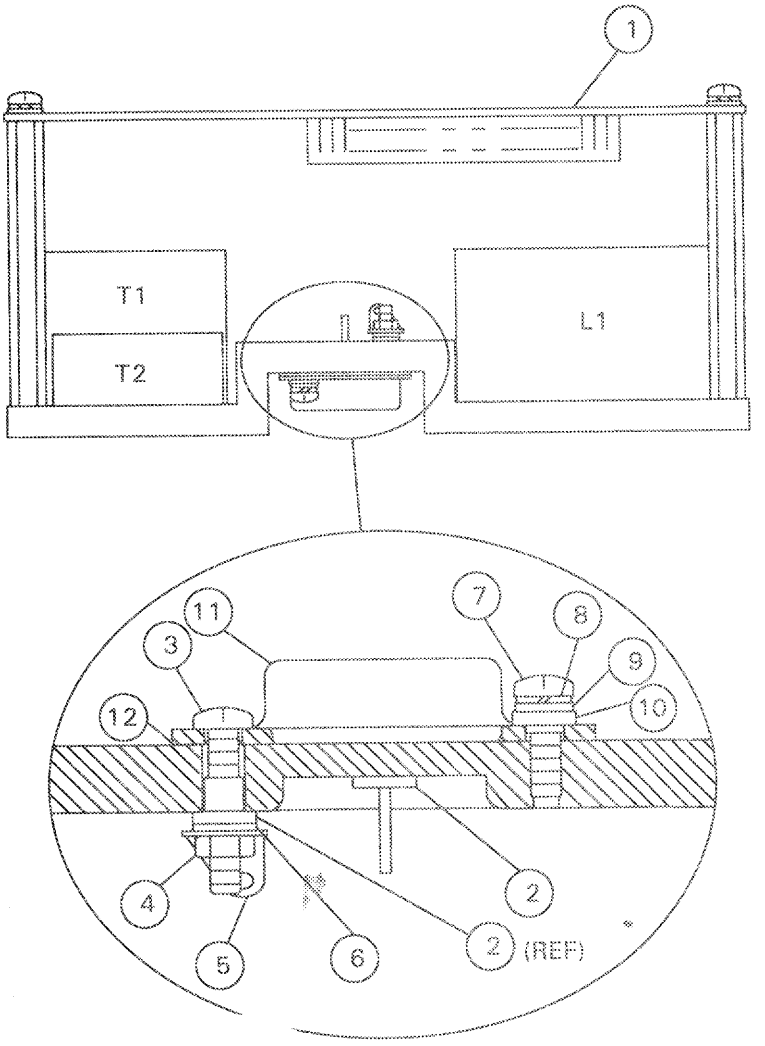
c. Components mounted on the heatsink plates are insulated so that the component caps (flanges) are electrically isolated. Leads placed through the heatsink chassis are insulated with screw insulator. The retaining screws are also individually insulated. The component body is insulated from the chassis by an insulator, usually a mica wafer. All of these insulators must be in their proper position before power is applied or the assembly is tested.

d. The following steps are typical for each of the heatsink assemblies. Use these instructions as a guide when replacing heatsink mounted components.

3-26. REPAIR OF ASSEMBLIES WITH HEATSINK MOUNTED COMPONENTS (Cont.)

CAUTION

The input heatsink assembly PS1A5A1 contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD- HDBK-263 for proper handling procedures.



REPLACEMENT OF HEATSINK MOUNTED COMPONENTS

3-26. REPAIR OF ASSEMBLIES WITH HEATSINK MOUNTED COMPONENTS (Cont.)

REMOVE HEATSINK MOUNTED COMPONENTS

NOTE

If the insulators are serviceable, keep and reuse them when replacing the component. Check to insure that there are no cracks, burns, or other evidence that the insulating properties have deteriorated. Replace if necessary.

STEP 1. Remove the CCA (1), but do not disconnect wires.

STEP 2. On the component to be replaced, tag and disconnect the wires from the component leads and remove insulator (2).

STEP 3. Remove the screw (3), nut (4), wire terminal (5), flat-washer (6), and screw insulator (2).

STEP 4. Remove the screw (7), lockwasher (8), flatwasher (9), and screw insulator (10).

STEP 5. Lift the component (11) and mica insulator (12) from the heatsink plate.

REPLACE HEATSINK MOUNTED COMPONENT

STEP 1. Place an insulator (12) (mica or similar type) on the component (11) and position it on the heatsink plate.

NOTE

Make sure that component and leads are positioned for the correct lead orientation as shown on the heatsink plate.

STEP 2. Insert screw insulators (2) over the leads and solder the leads in place.

STEP 3. Place the longer screw (3) through the heatsink plate and install screw insulator (2), flatwasher (6), terminal (5), and nut (4).

STEP 4. Secure the remaining side with screw (7), lockwasher (8), flatwasher (9), and screw insulator (10).

STEP 5. Replace the CCA (1).

STEP 6. Perform PS operational check (para. 3-5).

3-27. REPAIR OF INPUT DC TO DC HEATSINK ASSEMBLY A1PS1A5

Repair of the input heatsink assembly is similar to other heatsink assemblies within A1PS1 except for replacement of A5CR1. Procedures to remove the CCA to provide access is described in paragraph 3-6. The replacement of A5CR1 is described in the following steps.

CAUTION

The input heatsink assembly A1PS1A5A1 contains devices that are sensitive to damage by electrostatic discharge (ESD). Improper handling will result in component and assembly failure. Use extreme care when handling. Refer to DOD-HDBK-263 for proper handling procedures.

INITIAL SETUP

Tools

Tool Kit, TK-17
Workstation, Static

Equipment Condition

Input heatsink assembly removed from PS1 (para 3-22).
CCA A1PS1A5A1 set aside, (para 3-6).

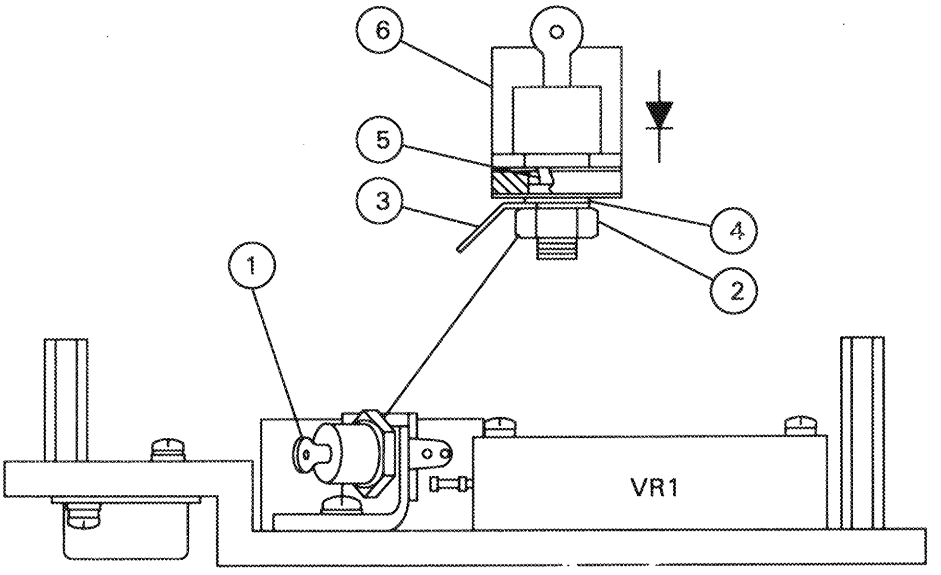
Material/Parts

Diode, A5CR1, P/N 1N3893
Sealing and locking compound, P/N MIL-S-22473

NOTE

Prior to installing posts apply locking and retaining sealant (MIL-S-22473, Grade C) to external post threads before inserting into the heatsink.

3-27. REPAIR OF INPUT DC TO DC HEATSINK ASSEMBLY (A1PS1A5) (Cont.)



REMOVE A5CR1

STEP 1. Disconnect the wire at the anode (1) of A5CR1.

STEP 2. Remove the hexagonal nut (2), A5CR1 terminal lug (3), non-metallic washer (4) and insulator (5) at the cathode of A5CR1.

STEP 3. Pull A5CR1 from the bracket (6).

REPLACE A5CR1

STEP 1. Place an insulator (5) over the threaded diode mount.

STEP 2. Insert the diode mount through mounting bracket (6).

STEP 3. Place a non-metallic washer (4) over the diode mount.

STEP 4. Place the wire with terminal connector (3) over the diode mount and tighten into place with hexagonal nut (2).

STEP 5. Connect wire to anode (1) of A5CR1.

STEP 6. Perform PS operational check (para. 3-5).

APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists all forms, field manuals, technical manuals and miscellaneous publications referenced in this manual.

A-2. FORMS

Transportation Discrepancy Report (TDR) SF-361

Equipment Inspection and Maintenance Worksheet ..... DA Form 2404

Product Quality Deficiency Report SF-368

Recommended Changes to Publications and Blank Forms ..... DA Form 2028

Report of Discrepancy (ROD) SF-364

Technical Order System Publication Improvement Report and Reply ..... AFTO Form 22

A-3. PUBLICATIONS

Consolidated Index of Army Publications and Blank Forms ..... DA Pam 25-30

Destruction of Army Electronics Materiel to Prevent Enemy Use ..... TM 750-244-2

Electrical Characteristics of Digital Interface Circuits MIL-STD-188-114A

First Aid for Soldiers ..... FM 21-11

Installations Practices: Communication Systems Grounding, Bonding, and Shielding ..... FM 11-487-4/TO 31-10-24

Intermediate Direct Support and General Support Maintenance Manual for Radio Set AN/GRC-215 (NSN 5895-01-156-0456) ..... TM 11-5895-1220-34/ Navy EE160-RG-INM-010/W110-GRC215/ Air Force TO 31R2-2GRC215-2

Issue of Ships Maintenance and Material Management (3-M) Manual ..... OPNAVINST 4790.4A

The Army Maintenance Management System (TAMMS) ..... DA Pam 738-750

Maintenance Data Collection System (Air Force)..... AFM 66-267

Military Communication System Technical Standards MIL-STD-188C

Naval Supply Publication 2002 Navy Stock List of
Publications and Forms ..... NAVSUP 2002

Operator's and Unit Maintenance Manual
for Radio Set AN/GRC-215
(NSN-5859-01-156-0456) ..... TM 11-5895-1220-12/
Navy EE160-RG-OMI-010/W110-GRC215/
Air Force TO 31R2-2GRC215-1

Operator, Unit, Intermediate Direct Support
and General Support Maintenance Manual
(including Repair Parts, Special Tools, and
Depot Maintenance Repair Parts List) for
Test Set, Power Supply TS-4243/G
(NSN 6625-01-267-4418) . . . . . TM 11-6625-3218-14&P/
Navy ET940-AC-OMP-010/TS4243G/
Air Force TO 33AA17-191-1

Preservation, Packaging and Packing of Military
Supplies and Equipment, Volume 2 ..... NAVSUP PUB 503

Release for Shipment of Ground Communication
Electronics Cryptographic Equipment ..... AFR 67-31

Reporting of Item and Packaging Discrepancies .... SECNAVINST 4355.18

Reporting of Transportation Discrepancies and
Shipment ..... NAVSUPINST 4610.33C

Unit, Intermediate Direct Support and
General Support Maintenance Repair
Parts and Special Tools List
(Including Depot Maintenance Repair
Parts and Special Tools Lists) for
Input-Output Unit MX-10819/GRC-215
(NSN 5895-01-207-0655) ..... TM 11-5895-1322-24P/
Navy EE119-ND-PLD-010/W110-MX10819/
Air Force TO 31R2-2GRC215-34

APPENDIX B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. GENERAL

This appendix provides a summary of the maintenance operations for Input-Output Unit MX-10819/GRC-215. It authorizes levels of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

B-2. MAINTENANCE FUNCTION

Maintenance functions will be limited to and defined as follows:

a. Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination.

b. Test. To verify serviceability and to detect incipient failure by measuring the mechanical or electrical characteristics of an item and comparing those characteristics with prescribed standards.

c. Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

d. Adjust. To maintain, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to the specified parameters.

e. Aline. To adjust specified variable elements of an item to bring about optimum or desired performance.

f. Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test measuring and diagnostic equipments used in precision measurement. Consists of comparisons of two instruments, one of which is a certified standard of known accuracy, to detect and adjust any discrepancy in the accuracy of the instrument being compared.

g. Install. The act of emplacing, seating, or fixing into position an item, part, module (component or assembly) in a manner to allow the proper functioning of the equipment or system.

h. Replace. The act of substituting a serviceable like type part, subassembly, or module (component or assembly) for an unserviceable counterpart.

i. Repair. The application of maintenance services (inspect, test, service, adjust, aline, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

j. Overhaul. That maintenance effort (service/action) necessary to restore an item to a completely serviceable/operational condition as prescribed by maintenance standards (i.e., DMWR) in appropriate technical publications. Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

k. Rebuild. Consists of those services/action necessary for the restoration of unserviceable equipment to a like new condition in accordance with original manufacturing standards. Rebuild is the highest degree of materiel maintenance applied to Army equipment. The rebuild operation includes the act of returning to zero those age measurements (hours, miles, etc.) considered in classifying Army equipment/components.

B-3. COLUMN ENTRIES

a. Column 1, Group Number. Column 1 lists group numbers, the purpose of which is to identify components, assemblies, subassemblies, and modules with the next higher assembly.

b. Column 2, Component/Assembly. Column 2 contains the noun names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Level. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated level of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance levels, appropriate work time figures will be shown for each category. The number of task-hours specified by the work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

UNIT

C - Operator/Crew
O - Organizational/Unit

INTERMEDIATE

F - Direct Support
H - General Support
L - Specialized Repair Activity (SRA)

DEPOT

D - Depot

e. Column 5, Tools and Equipment. Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support equipment required to perform the designated function.

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

B-4. TOOL AND TEST EQUIPMENT REQUIREMENTS (SECT. III)

a. Tool or Test Equipment Reference Code. The numbers in this column coincide with the numbers used in the tools and equipment column of the MAC. The numbers indicate the applicable tool or test equipment for the maintenance functions.

b. Maintenance Level. The codes in this column indicate the maintenance level allocated to tool or test equipment.

c. Nomenclature. This column lists the noun name and nomenclature of the tools and test equipment required to perform the maintenance functions.

d. National/NATO Stock Number. This column lists the National/NATO stock number of the specific tool or test equipment.

e. Tool Number. This column lists the manufacturer's part number of the tool followed by the Federal Supply Code for manufacturers (5-digit) in parentheses.

B-5. REMARKS (SECT. IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appearing in section II.

SECTION II MAINTENANCE ALLOCATION CHART
FOR
INPUT-OUTPUT UNIT MX-10819/GRC-215

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS
			UNIT		INTERMEDIATE		DEPOT		
			C	O	F	H	D		
00	INPUT-OUTPUT UNIT MX-10819/GRC-215 (A3023811)	REPLACE TEST REPAIR TEST REPAIR OVERHAUL		0.1 0.1 0.2		 L(10.0) L(10.0)	 100.0	 2,11,15 TBD TBD TBD	A B,G D D,G,J
01	CONTROLLER ASSEMBLY A1 (A3025853)	REPAIR REPAIR		0.2		 L(5.0)			C,G,H C,D,G
0101	DATA INTERFACE CCA A1A5,A1A6 (A3023903) (2 EA.)	REPLACE TEST REPAIR		0.1		 L(1.0) L(1.0)		2,11,15 TBD TBD	G D,G D,G
0102	DATA CONTROLLER UNTRUSTED CCA A1A2 (A3028730)	REPLACE TEST REPAIR		0.1		 L(1.0) L(1.0)		2,11,15 TBD TBD	G D,G,K D,G
0103	DATA CONTROLLER TRUSTED CCA A1A3 (A3028731)	REPLACE TEST REPAIR		0.1		 L(1.0) L(1.0)		2,11,15 TBD TBD	G D,G,K D,G
0104	DATA CONTROLLER, BLACK A1A7 (A3028732)	REPLACE TEST REPAIR		0.1		 L(1.0) L(1.0)		2,11,15 TBD TBD	G D,G,L D,G
0105	POWER SUPPLY A1PS1 (A3023920)	REPLACE TEST REPAIR		0.1		 1.0 1.0		2,11 1,4-10,12 3,8,13,14	G G E,G,I
010501	MOTHERBOARD CCA A1PS1A7 (A3024807)	REPAIR				0.5			C,G
010502	HEAT SINK ASSEMBLY, TEMPEST A1PS1A2 (A3024559)	REPAIR				0.5			C,G
01050201	TEMPEST CCA A1PS1A2A1 (A3024808)	REPAIR				0.5			C,G
010503	HEAT SINK ASSEMBLY, HIGH VOLTAGE A1PS1A3 (A3024560)	REPAIR				1.0			C,G
01050301	HIGH VOLTAGE CCA A1PS1A3A1 (A3024811)	REPAIR				0.5			C,G
010504	HEAT SINK ASSEMBLY, OUTPUT A1PS1A4 (A3024561)	REPAIR				1.0			C,G
01050401	OUTPUT CCA A1PS1A4A1 (A3024814)	REPAIR				1.0			C,G
010505	HEAT SINK ASSEMBLY, INPUT DC TO DC CCA A1PS1A5 (A3024562)	REPAIR				1.0			C,G

SECTION II MAINTENANCE ALLOCATION CHART FOR

INPUT-OUTPUT UNIT MX-10819/GRC-215

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS
			UNIT		INTERMEDIATE		DEPOT		
			C	O	F	H	D		
01050501	INPUT DC TO DC CCA A1PS1A5A1 (A3024817)	REPAIR				1.0			C,G
010506	BITE CCA A1PS1A6 (A3024563)	REPAIR				1.0			C,G
010507	BLACK OUTPUT CCA A1PS1A8 (A3024564)	REPAIR				1.0			C,G
0106	CHASSIS ASSEMBLY A1A1 (A3023925)	REPAIR				L(2.0)			C,D,F
010601	CABLE ASSEMBLY, POWER INPUT A1A1W1 (A3023921)	TEST REPAIR				L(0.2) L(0.5)		6 3	D D
010602	CABLE ASSEMBLY, POWER DISTRIBUTION A1A1W3 (A3023922)	TEST REPAIR				L(0.2) L(0.5)		6 3	D D
010603	MOTHERBOARD CCA A1A1A1 (A3023930)	REPAIR				L(1.0)			D
02	DISPLAY/KEYBOARD ASSEMBLY A2 (A3023931)	REPLACE TEST REPAIR		0.1		L(3.0) L(4.0)		TBD TBD	D D
0201	DISPLAY ASSEMBLY A2A1 (A3023912)	TEST REPAIR				L(1.0) L(2.0)		TBD TBD	C,D C,D,G
020101	DRIVER CCA A2A1A1 (A3024181)	TEST REPAIR				L(1.0) L(1.0)		TBD TBD	D,G D,G
020102	DRIVER CCA A2A1A2 (A3024182)	TEST REPAIR				L(1.0) L(1.0)		TBD TBD	D,G D,G
020103	DRIVER CCA A2A1A3 (A3024183)	TEST REPAIR				L(1.0) L(1.0)		TBD TBD	D,G D,G
020104	DRIVER CCA A2A1A4 (A3024184)	TEST REPAIR				L(1.0) L(1.0)		TBD TBD	D,G D,G
020105	PROGRAMMED CONTROLLER CCA A2A1A5 (A3032084)	TEST REPAIR				L(1.0) L(1.0)		TBD TBD	D,G,M D,G,M
020106	DISPLAY CONTROL CCA A2A1A6 (A3024185)	TEST REPAIR				L(1.0) L(1.0)		TBD TBD	D,G D,G
020107	CABLE ASSEMBLY A2A1W1 (A3024056)	TEST REPAIR				L(0.5) L(1.0)		6 3	D D
0202	CHASSIS ASSEMBLY, DISPLAY MODULE A2A2 (A3023933)	TEST REPAIR				L(2.0) L(2.0)		TBD TBD	D D
020201	CABLE ASSEMBLY A2A2W3 (A3023923)	TEST REPAIR				L(0.5) L(1.0)		6 3	D D

SECTION II MAINTENANCE ALLOCATION CHART FOR

INPUT-OUTPUT UNIT MX-10819/GRC-215

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINT. FUNCTION	(4) MAINTENANCE LEVEL					(5) TOOLS AND EQPT.	(6) REMARKS
			UNIT		INTERMEDIATE		DEPOT		
			C	O	F	H	D		
020202	CABLE ASSEMBLY A2A2W2 (A3023932)	TEST REPAIR				L(0.5) L(0.5)		6 3	D D
020203	SURGE PROTECTION CCA A2A2A1 (A3024124)	TEST REPAIR				L(0.5) L(1.0)		6 3	D D
020204	CABLE ASSEMBLY, INDICATOR CONTROL A2A2W4 (A3025926)	TEST REPAIR				L(0.5) L(0.5)		6 3	D D
020205	CABLE ASSEMBLY, INPUT A2A2W1 (A3024211)	TEST REPAIR				L(0.5) L(0.5)		6 3	D D

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS FOR

INPUT-OUTPUT UNIT MX-10819/GRC-215

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE LEVEL	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	H	POWER SUPPLY PP-8202/G *	6130-00-160-0827	HP 6274B
2	O	STATIC CONTROL SERVICE KIT	6625-01-168-2044	3M 8501
3	H,L	TOOL KIT, ELECT. TK-17 (INCL. METRIC)	5180-01-195-0855	JENSEN JTK-17RM
4	H	OSCILLOSCOPE AN/USM-488	6625-01-187-7847	TEK 2235L
5	H	MULTIMETER AN/PSM-45A	6625-01-265-6000	FLUKE 8050A
6	H,L	MULTIMETER, DIGITAL AN/USM-486	6625-01-145-2430	FLUKE 8050A
7	H	TEST SET, POWER TS-4243/G	6625-01-267-4418	MX 900151-801
8	H	WORKSTATION, STATIC	4940-01-087-3458	3M 8021
9	H	ACTIVE LOAD	6625-01-111-3363	ACDC EL750B
10	H	CURRENT SHUNT (0.01 OHM)	6625-01-093-4609	FLUKE 80J-10
11	O,H	SCREWDRIVER SET, TORQUE (1-30 IN-LB)	5120-00-127-2525	EDP 85002-00
12	H	KIT, TEST LEAD (FOR FLUKE)	6625-00-444-4041	
13	H	MAINTENANCE KIT, PCB MX-10897/G	5895-01-267-9473	PACE MODEL RNR P/N 8007-0117
14	H	REPAIR KIT, PCB MK-772/U	5999-00-757-7042	
15	O	TOOL KIT-101/G	5180-00-064-5178	

* PP-8214/G (NSN 6130-00-150-0028) PROVIDES IDENTICAL CAPABILITY WHEN SOURCE POWER IS 230V, 50 CYCLE. AIR FORCE USE ONLY.

SECTION IV, REMARKS

INPUT-OUTPUT UNIT, MX-10819/GRC-215

REFERENCE CODE	REMARKS
A	Built-In-Test (BIT) can fault isolate to the following subassemblies: Power Supply A1PS1, data Controller CCAs A1A2, A1A3, A1A7; Data Interface CCAs A1A5 and A1A6, and Display/Keypad Assembly A2. Tested as part of next higher assembly.
B	Repair by replacement of subassemblies. See Note A. Unit Maintenance also replaces Front Panel bulbs, lens cover, handles, knobs, Front and Top Cover, Top Cover gaskets and cushions and latch assemblies.
C	Repaired/tested as part of next higher assembly.
D	Specialized Repair Activity (SRA). Note: Initial SRA repair will be performed by contractor. Return defective unit(s) to depot.
E	Repair to piece part level.
F	Repair by replacement of defective component. Power Filter A3023928 is a sealed unit and is non-repairable.
G	Electrostatic sensitive components.
H	Repair by replacement of CCAs and Power Supply Assembly A1PS1.
I	Replace Red and Black Filters (A3024556 and A3024557) which are non-repairable.
J	SRA repairs Chassis A1. SRA also repairs returned Display/Keypad Assembly A2, Data Controller CCAs A1A2, A1A3, A1A7; and Data Interface CCAs A1A5 and A1A6.
K	CCA (A3029155) has software burned in to make CCAs A1A2 and A1A3.
L	CCA (A3029041) has software burned in to make CCA A1A7.
M	CCA (A3024186) has software burned in to make programmed CCA A2A1A5.

APPENDIX C
EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

C-1. SCOPE

This appendix lists expendable/durable supplies and materials you will need to operate and maintain the Input-Output Unit MX-10819/GRC-215. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

C-2. EXPLANATION OF COLUMNS

a. Column(1)- Item number. This number is assigned to the entry in the listing and is referenced in the narrative instructions to identify the material (e.g., "Use cleaning compound, item 5, App. C").

b. Column(2)- Level. This column identifies the lowest level of maintenance that requires the listed item.

C - Operator/Crew
O - Organizational Maintenance
F - Direct Support Maintenance
H - General Support Maintenance
L - Specialized Repair Activity

c. Column(3)- National Stock Number. This is the National stock number assigned to the item; use it to request or requisition the item.

d. Column(4)- Description. Indicates the Federal item name and, if required, a description to identify the item. The last line for each item indicates the Federal Supply Code for Manufacturer (FSCM) in parentheses followed by the part number.

e. Column(5)- Unit of Measure (U/M). Indicates the measure used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr). If the unit of measure differs from the unit of issue, requisition the lowest unit of issue that will satisfy your requirements.

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	O	6850-00-105-3084	TRICHLOROTRIFLUORETHANE	oz
2	O	8030-00-823-7917	Locking and Retaining sealant MIL-S-22473	oz

GLOSSARY

Section I. ABBREVIATIONS AND ACRONYMS

A

AC ..... alternating current
ALE ..... Address Latch Enable
AM ..... Amplitude Modulation
ASCII ..... American Standard Code for Information Interchange

B

BIT ..... Built-In-Test
BITE ..... Built-In-Test Equipment
bps ..... bits Per Second
Bps ..... Bytes Per Second

C

CB ..... Circuit breaker
CCA ..... Circuit Card Assembly
CIU ..... Control Interface Unit
CLK ..... Clock
COMSEC ..... Communication Security
CPU ..... Central Processor Unit
CTS ..... Clear to Send

D

DC ..... direct current
D/K ..... Display/Keypad Unit
DCE ..... Data Communication Equipment
DMA ..... Direct Memory Access
DSR ..... Data Set Ready
DTR ..... Data Terminal Ready
DT/R ..... Data Transmit/Receive
DTE ..... Data Terminal Equipment

E

ECM ..... Electronic Countermeasures
ECCM ..... Electronic Counter-Countermeasures
EEPROM ..... Electrically Eraseable, Programmable Read Only Memory
EMI ..... Electromagnetic Interference
EMP ..... Electromagnetic Pulse
ESD ..... Electrostatic Discharge

F

FB ..... Feedback
FIFO ..... First In, First Out

G

GND ..... Ground

H

HF ..... High Frequency
Hz ..... Hertz

I

IAW ..... In Accordance With
I/O ..... Input/Output
INT ..... Interrupt
INTA ..... Interrupt Acknowledge

K

K/D ..... Keyboard/Display Unit

L

LCD ..... Liquid Crystal Display
LED ..... Light Emitting Diode
LRU ..... Line Replaceable Unit

M

MAC ..... Maintenance Allocation Chart
MOSFET ..... Metal Oxide Semi-Conductor Field Effect Transistor
MPSC ..... Multi-Protocol Serial Controller

N

NMI ..... Non-maskable Interrupt

P

PCLK ..... Peripheral Clock
PPC ..... Programmable Peripheral Controller
PPI ..... Programmable Peripheral Interface
PPS ..... Pulses Per Second
PS ..... Power Supply
PWM ..... Pulse Width Modulator

R

RAM ..... Random Access Memory
REC ..... Receiver or Receive
RF ..... Radio Frequency
RFO ..... Reference Frequency Oscillator
RN ..... Regency Net
ROM ..... Read Only Memory
RTS ..... Ready (or Request) To Send

R (Cont.)

RXD ..... Receive Data

S-T

TB ..... Terminal Board
TOD ..... Time Of Day
TRANSEC or TSEC ..... Transmission Security
TT ..... Team Terminal
TTL ..... Transistor Transistor Logic
TXD ..... Transmit Data

U

UUT ..... Unit Under Test

V

VAC ..... Volts, Alternating Current
VCC ..... Voltage, Collector Circuit
VDC ..... Volts, Direct Current

Section II. DEFINITIONS OF UNUSUAL TERMS

ASCII - (Also USASCII) American Standard Code for Information Interchange. Seven-bit-plus-parity code established by the American National Standards Institute to achieve compatibility between data services.

ASYNCHRONOUS - Transmissions in which time intervals between transmitted characters may be of unequal length. In communications, normally characterized by start-stop data bits to indicate the beginning and end of a character.

BAUD - A unit of signaling speed equal to the number of discrete conditions or signal events per second. In asynchronous transmission, the unit of signaling speed corresponding to one unit interval per second.

BIT - The smallest binary element of information.

BLACK POWER - Is a separate +5 Vdc power source in the PS1 Power Supply. This power is used to operate CCAs A1A1A6 and A1A1A7 which handle protected or encrypted text and data only.

BLOCK - A group of digits transmitted as a unit over which a coding procedure is applied for synchronization or error control.

BUFFER - A storage device used to compensate for a difference in the rate of data flow when transmitting data from one device to another.

BYTE - A binary element string operated upon as a unit and usually shorter than a computer word.

CHANNEL - That part of a communications system that connects a message source to a message sink. A path for electrical transmissions between two or more points.

DATA COMMUNICATION - The interchange of data messages from one point to another over communications channels.

DATA COMMUNICATION EQUIPMENT (DCE) - The equipment that provides the functions required to establish, maintain, and terminate a connection, the signal conversion, and coding required for communication between data terminal equipment and data circuit. (A MODEM is normally considered as the DCE.)

DATA SET - In communications equipment, the DCE; in information, a collection of data records with logical relation of one to another.

DATA TERMINAL EQUIPMENT (DTE) - Equipment usually comprising the following functional units: control logic, buffer store, and one or more input/output devices.

DATA TRANSMISSION - The sending of data from one place for reception elsewhere.

DEMODULATION - The process of retrieving an original signal from a modulated carrier wave. Used in data sets to make communications signals compatible with computer signals.

ELECTROLUMINESCENT - An electroluminescent material is one that contains the properties of electroluminescence. That is, it luminesces or gives off light due to a high-frequency discharge through a gas or from an application of alternating current to a layer of phosphor. It is the direct conversion of electrical energy to light energy. The backlighting of the thirty-four bezel switches around the display panel is of the electroluminescent type, using phosphor for the electroluminescent material.

FEEDBACK (FB) - A portion of output signal returned to the input of a circuit for error detection and correction.

FREQUENCY MODULATION - A method of transmission whereby the frequency of the carrier wave is changed to correspond to changes in the information signal wave.

FREQUENCY SHIFT KEYING - A method of frequency modulation in which frequency is made to vary at significant instants by smooth as well as abrupt transitions. Typically a data "1" is represented by one frequency and a data "0" as another frequency.

GATE - A circuit having two or more inputs and a single output, the output signal depending on the combination of signals at the inputs.

HERTZ - A unit of frequency equal to one cycle per second.

INTERFACE - A device or equipment making possible interoperation between two circuits or systems.

INTERLOCK - A circuit in which the action of one portion of the circuit is dependent upon conditions of an associated circuit.

LATCH - A logic storage element; two cross-coupled logic gates store a pulse applied to one logic input until a pulse is applied to the other input.

MARK - The presence of a signal. In telegraphy, MARK represents the closed condition or current flowing. Equivalent to a binary one condition.

MEMBRANE SWITCH - A part or parts of an electronic switch that is embedded into or deposited on a membrane surface and contacts other elements of the switch, to activate the switch, when the membrane is pressed to bring the two parts of the switch together.

MODE - A particular functional arrangement or condition, i.e., Receive Mode which sets up circuits into particular conditions to receive as opposed to Transmit Mode which arranges functional circuits into different conditions.

NMI - Non-maskable interrupt, a microprocessor interrupt which causes the microprocessor to reset to a known state.

PARITY CHECK - Addition of non-information bits to data, making the number of ones in each grouping of bits either always odd, for odd parity, or always even, for even parity. This permits single error detection of each group.

PORT - A place of access to a system or circuit.

PROTOCOL - A formal set of conventions governing the format and relative timing of message exchange between two communication processes.

QWERTY KEYBOARD - Standard U.S. typewriter keyboard. Named for the first row of alphabetical keys which begins with Q, W, E, R, T, and Y.

RED POWER - Is the +5 Vdc used in the circuits for clear text and data (not protected or encrypted). Red Power is also used in the D/K assembly.

RS-232C - The binary serial interchange that is the EIA recommended standard (RS-) for data processing equipment to be interfaced to a carrier. The C denotes that it is the third update of the standard. The standard defines the voltage minimum (3 volt), the voltage maximum (25 volt), and terminal impedance (3000 - 7000 ohm). Negative polarity indicates the binary state 1, marking or OFF control state. The positive polarity indicates the binary state 0, spacing or an ON control state.

RS-442 - A revision of the interface standard that permits TTL voltage levels and increases the distance permitted between the DTE/DCE.

SERIAL TRANSMISSION - A method of transmission in which each bit of information is sent sequentially on a single channel rather than simultaneously as a parallel transmission.

SLAVE - A system, terminal, or circuit whose functions are controlled by a central "master" system, terminal, or circuit.

SPACE - The absence of a signal. In telegraphy, SPACE represents the open condition or lack of current flow; equivalent to a binary zero. Opposite of a teletype MARKING state.

SYNCHRONOUS TRANSMISSION - Transmission in which the data characters and bits are transmitted at a fixed rate with the transmitter and receiver synchronized. This eliminates the need for start-stop elements, providing a greater efficiency.

TALK - In digital communications, the action of receiving and transmitting data between data terminal equipments.

TRICHLOROTRIFLUOROETHANE - A cleaning solution.

TRUSTED (DATA CONTROLLER) - Verifies all traffic in and out of the I/O. It also oversees, supervises, and verifies information to and from the Untrusted Controller. The Trusted Controller has the capability of rejecting messages from the Untrusted Controller if the message does not meet certain criteria and parameters.

UNTRUSTED CONTROLLER - Handles the menus for the display and the editor for the message composition. This controller is supervised by the Trusted Controller.

WATCHDOG CIRCUIT - A circuit which causes a microprocessor to be reset to a known state upon power up or upon detection of a fault. This circuit normally relies upon receiving a pulse at a set interval to prevent it from initiating a reset pulse. Failure to receive this pulse (sometimes referred to as a "pet"), results in the circuit resetting all microprocessor registers.

WORD - An ordered set of characters that is the normal unit in which information may be stored, transmitted, or operated upon within a computer.

SUBJECT INDEX

F (Cont.)

G

H

I

J-K-L-M

N-O

P

Q-R

S

T

T (Cont.)

U-V-W-X-Y-Z

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PAGE NO	PARA-GRAPH	FIGURE NO	TABLE NO
2-25	2-28		
3-10	3-3		3-1
5-6	5-8		
		F03	

IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:

Recommend that the installation antenna alignment procedure be changed throughout to specify a 2^{o} IFF antenna lag rather than 1^{o}.

REASON: Experience has shown that with only a 1^{o} lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2^{o} without degradation of operation.

Item 5, Function column. Change "2 db" to "3db."

REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.

Add new step f.1 to read, "Replace cover plate removed in step e.1, above."

REASON: To replace the cover plate.

Zone C 3. On J1-2, change "+24 VDC to "+5 VDC."

REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

SAMPLE

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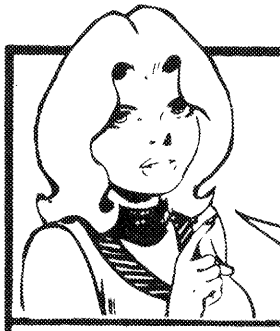

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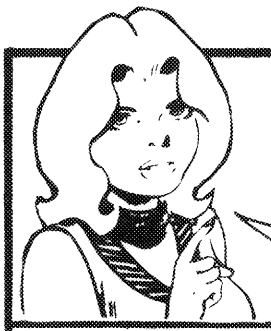

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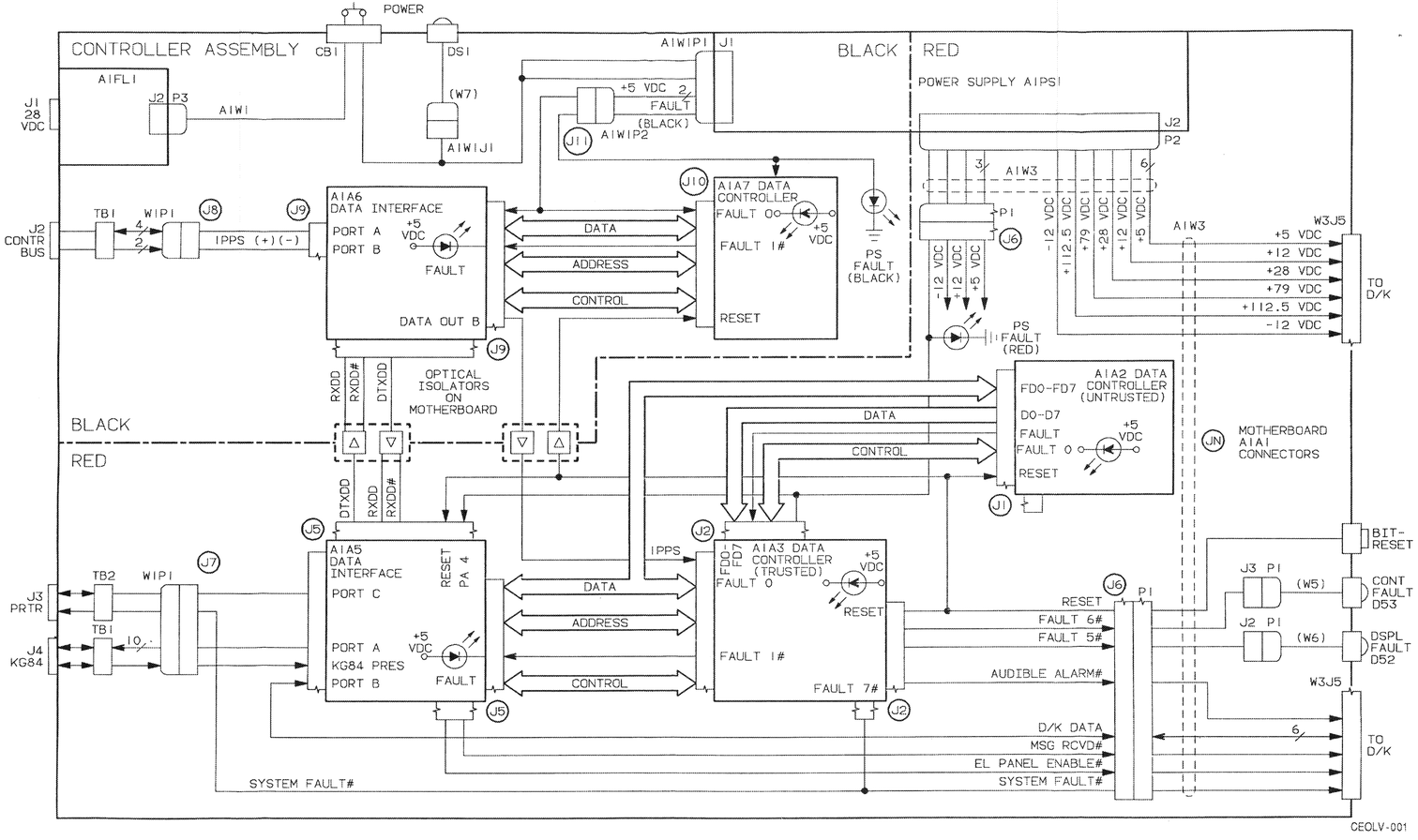


FO-1. I/O Functional Block Diagram

REF DESIGNATION	
HIGHEST USED	NOT USED
A2	
A1 ASSY	
A1	
A1A1 ASSY	
W3	W1,2
A1A1W3 ASSY	
J5	J1 THRU 4
A2 ASSY	
A2	A1
A2A2 ASSY	
W1	
A2A2W1 ASSY	
P1	

CROSS REFERENCE TABLE			
REFERENCE DESIGNATION	ASSEMBLY NUMBER	PRINTED WIRING BOARD	SCHEMATIC
A1	A3025853	NA	A3025921
A1A1	A3023925	NA	NA
A1A1W3	A3023922	NA	NA
A2	A3023931	NA	A3024213
A2A2	A3023933	NA	NA
A2A2W1	A3024211	NA	NA

NOTES:

1.0 GENERAL:

1.1 CHARACTERS UNDERLINED DENOTE LOWER CASE.

1.2 A NUMBER SIGN (#) FOLLOWING A SIGNAL NAME MEANS THE INVERTED (NOT) FORM OF THE SIGNAL.

2.0 SPECIFIC:

2.1 UNLESS OTHERWISE SPECIFIED: VOLTAGES ARE DC.

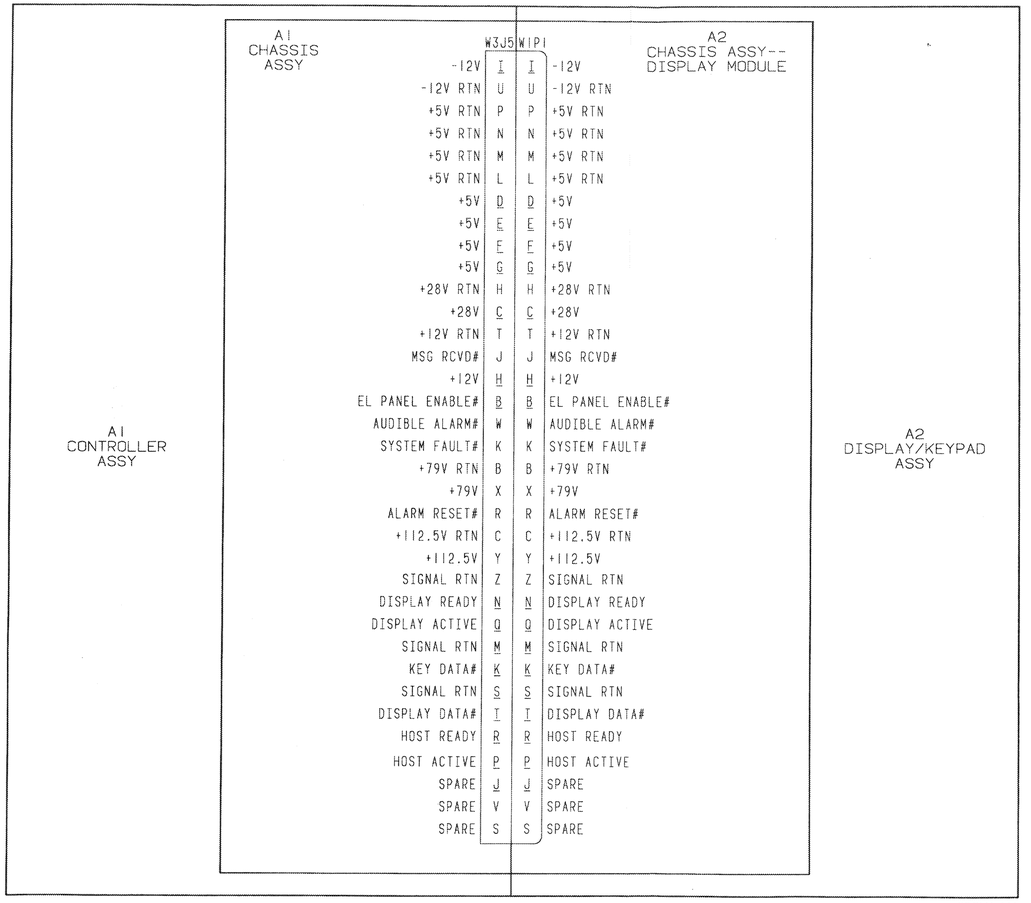
2.2 NOT USED.

2.3 REFERENCE: ASSEMBLY PART NUMBER A3023811.

2.4 FOR CONTINUATION OF CIRCUIT SEE CROSS REFERENCE TABLE.

CEOLV-002

FO-2. I/O Schematic Diagram (Sheet 1 of 2)



FO-2. I/O Schematic Diagram (Sheet 2 of 2)

CROSS REFERENCE TABLE			
REFERENCE DESIGNATION	ASSEMBLY NUMBER	PRINTED WIRING BOARD	SCHEMATIC
A1	A3023925	NA	NA
A1A1	A3023930	A3023875	A3023877
A1A2	A3023919	A3024672	NA
A1A2W1	A3024691	NA	NA
A1A3	A3023924	A3024672	NA
A1A3W1	A3024690	NA	NA
A1W1	A3023921	NA	NA
A1W3	A3023922	NA	NA
A1W4,A1W5,A1W6	A3023918	NA	NA
A1FL1	A3023928	NA	NA
A2	A3028730	NA	NA
A3	A3028731	NA	NA
A2A1,A3A1	A3029155-1	A3029143	A3029144
A5,A6	A3023903	A3023938	A3025951
A7	A3028732	NA	NA
A7A1	A3023904-1	A3023939	A3025953
PS1	A3023920	NA	A3033822

NOTES:

1.0 GENERAL:

1.1 CHARACTERS UNDERLINED DENOTE LOWER CASE.

1.2 A NUMBER SIGN (#) FOLLOWING A SIGNAL NAME MEANS THE INVERTED (NOT) FORM OF THE SIGNAL.

2.0 SPECIFIC:

2.1 UNLESS OTHERWISE SPECIFIED: VOLTAGES ARE DC.

2.2 PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION A1.

2.3 FOR CONTINUATION OF CIRCUIT SEE SCHEMATIC A3025919 & CROSS REFERENCE TABLE.

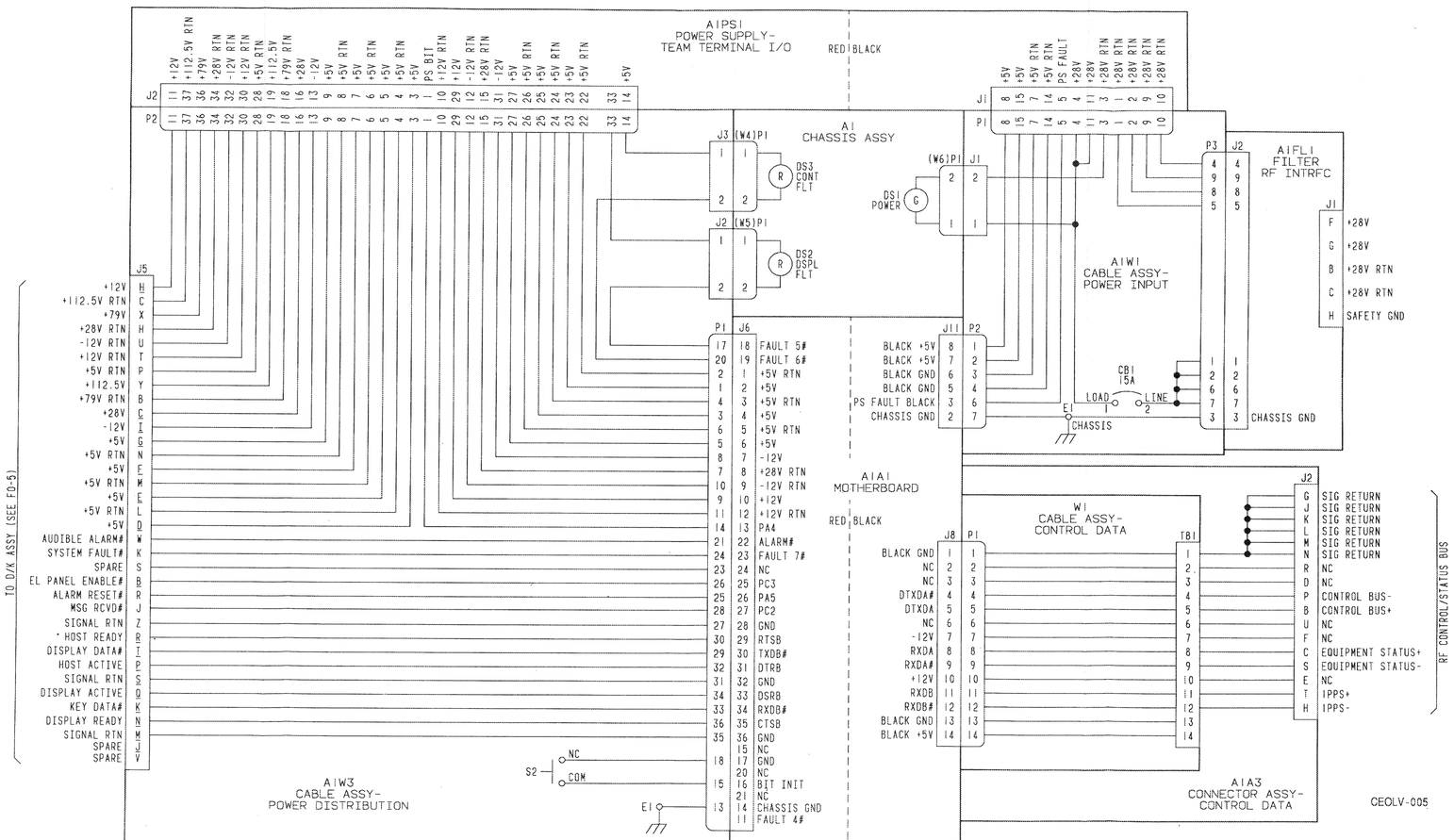
2.4 REFERENCE: ASSEMBLY PART NUMBER A3025853.

REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
A7 PS1	A4
A1 ASSY	
A3 DS3 FL1 W6	 W2
A1A1 ASSY	
J11	J3,4
A1A2 ASSY	
J4 W1	J1,2
A1A2W1 ASSY	
P1 TB2	
A1A3 ASSY	
J2 W1	J1
A1A3W1 ASSY	
P1 TB1	
A1W1 ASSY	
CB1 E1 J1 P3	
A1W3 ASSY	
E1 J5 P2 S2	J1,4 S1
A1W4,A1W5,A1W6 ASSY	
P1	
A1FL1 ASSY	
J2	

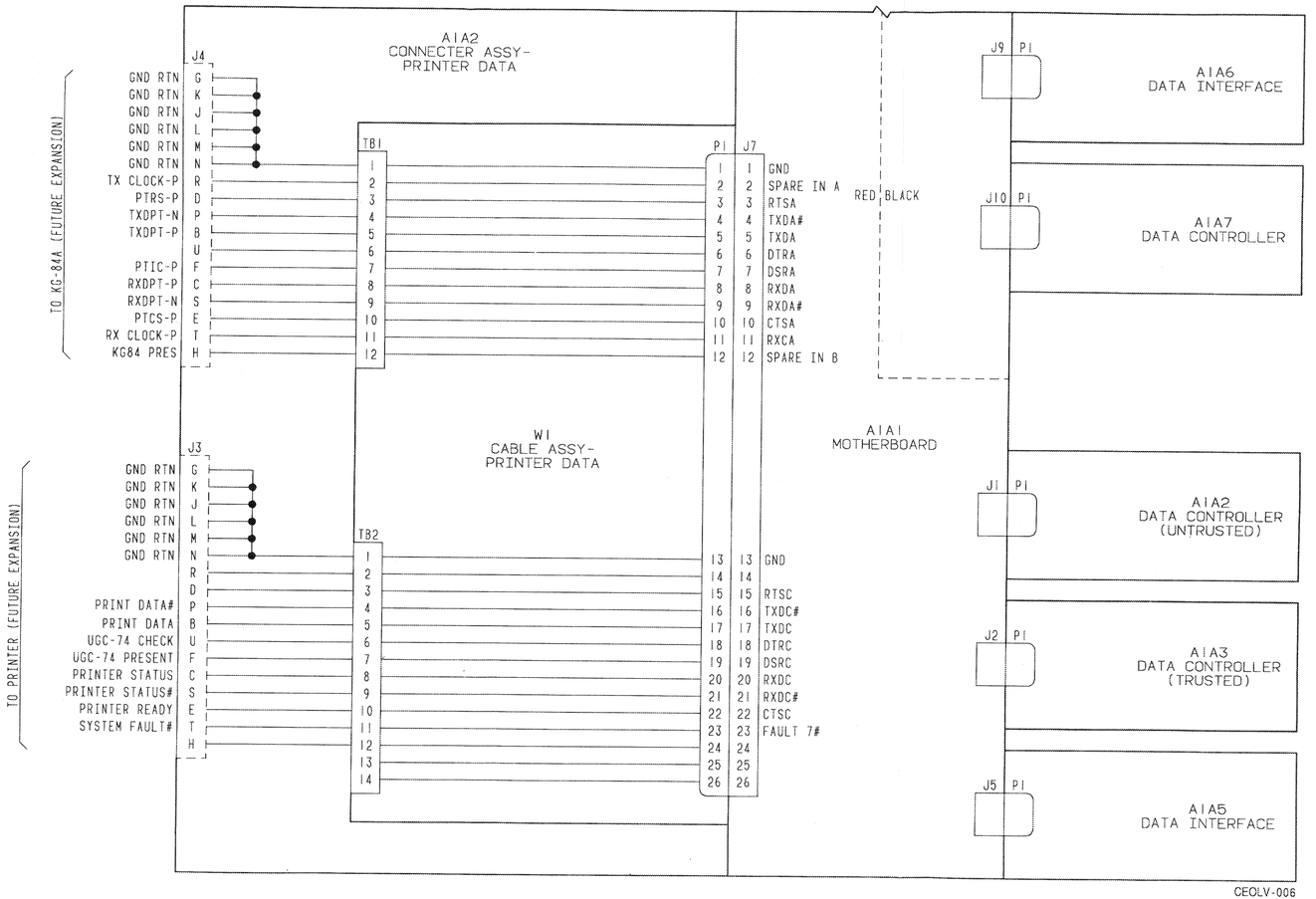
REFERENCE DESIGNATION CONT'D	
HIGHEST USED	NOT USED
A2 ASSY	
A1	
A2A1 ASSY	
P1	
A3 ASSY	
A1	
A3A1 ASSY	
P1	
A5 & A6 ASSY	
P1	
A7 ASSY	
A1	
A7A1 ASSY	
P1	
PS1 ASSY	
J2	

CEOLV-004

FO-3. A1 Controller Assembly Schematic Diagram (Sheet 1 of 3)



FO-3. A1 Controller Assembly Schematic Diagram (Sheet 2 of 3)



FO-3. A1 Controller Assembly Schematic Diagram (Sheet 3 of 3)

REFERENCE DESIGNATIONS	
HIGHEST USED	NOT USED
C4 CR5 DS2 J11 L1 Q4 R22 U2	J3,4

INTEGRATED CIRCUIT TABLE				
REFERENCE DESIGNATION	SECOND TAGGING LINE SYM	PART NUMBER	POWER INPUT PIN	
			+5V	GND
U1,2	M1	810280IEC	NA	NA

NOTES:

1.0 GENERAL:

1.1 CHARACTERS UNDERLINED DENOTE LOWER CASE.

1.2 A NUMBER SIGN (#) FOLLOWING A SIGNAL NAME MEANS THE INVERTED (NOT) FORM OF THE SIGNAL.

2.0 SPECIFIC:

2.1 UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS.
RESISTORS ARE 5%, 1/4W.
CAPACITANCE VALUES ARE IN MICROFARADS
VOLTAGES ARE DC.
DIODES AND/OR TRANSISTORS ARE JANTX TYPE.
INDUCTANCE VALUES ARE IN MICROHENRIES.

2.2 PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION A1A1A1.

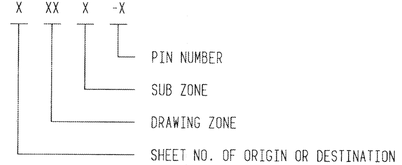
2.3 FOR CONTINUATION OF CIRCUIT SEE SCHEMATIC A3025921.

2.4 THIS DEVICE REQUIRES SPECIAL HANDLING AND PROCESSING TO PREVENT DAMAGE FROM ELECTROSTATIC DISCHARGE TRANSIENTS.

2.5 REFERENCE:
ASSEMBLY NUMBER A3023930.
PRINTED WIRING BOARD A3023875.

2.6 J3 & J4 ARE NOT INSTALLED ON THIS ASSEMBLY. SHOWN FOR FUTURE EXPANSION.

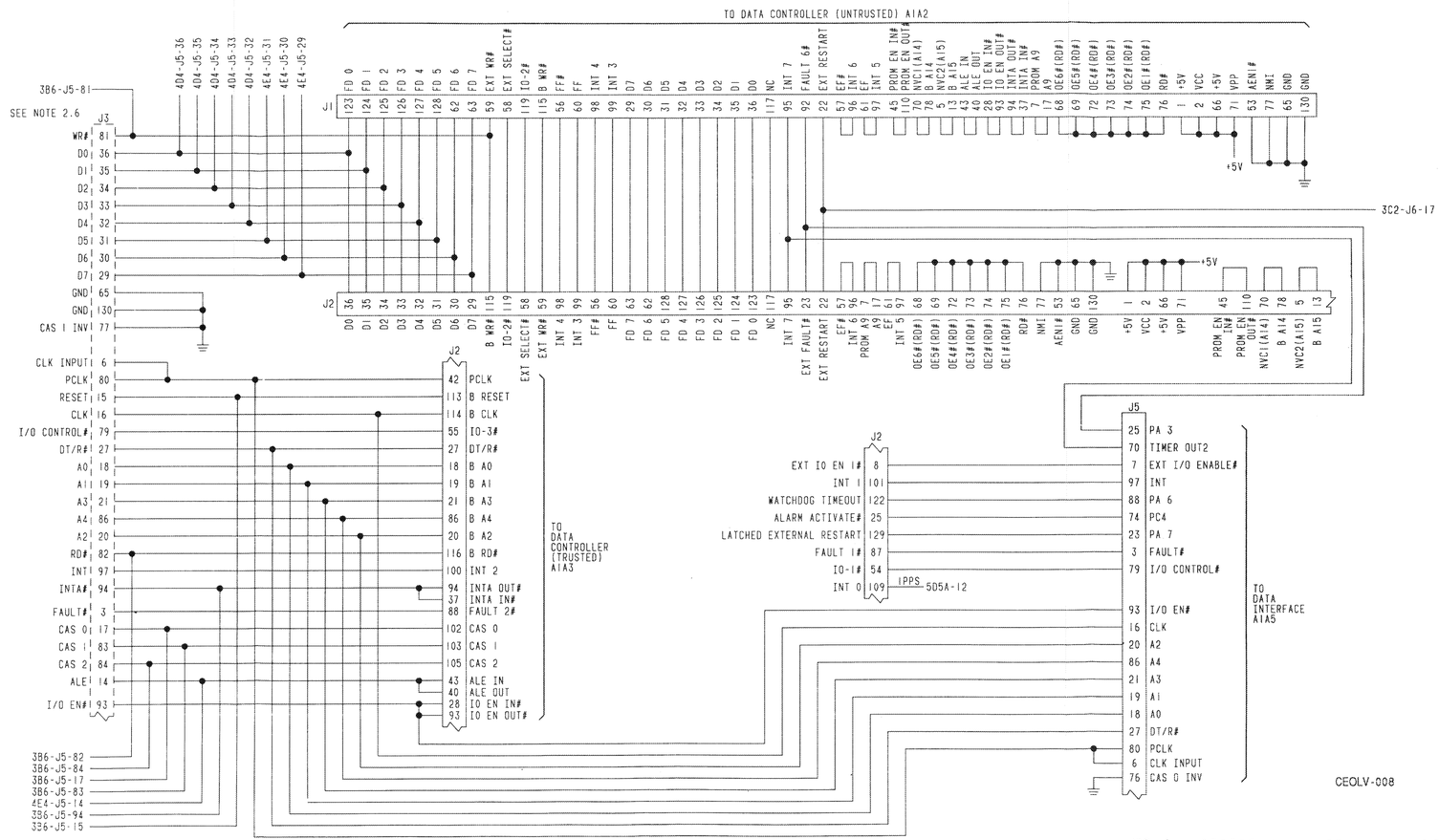
2.7 PART NUMBER A3028012-2.



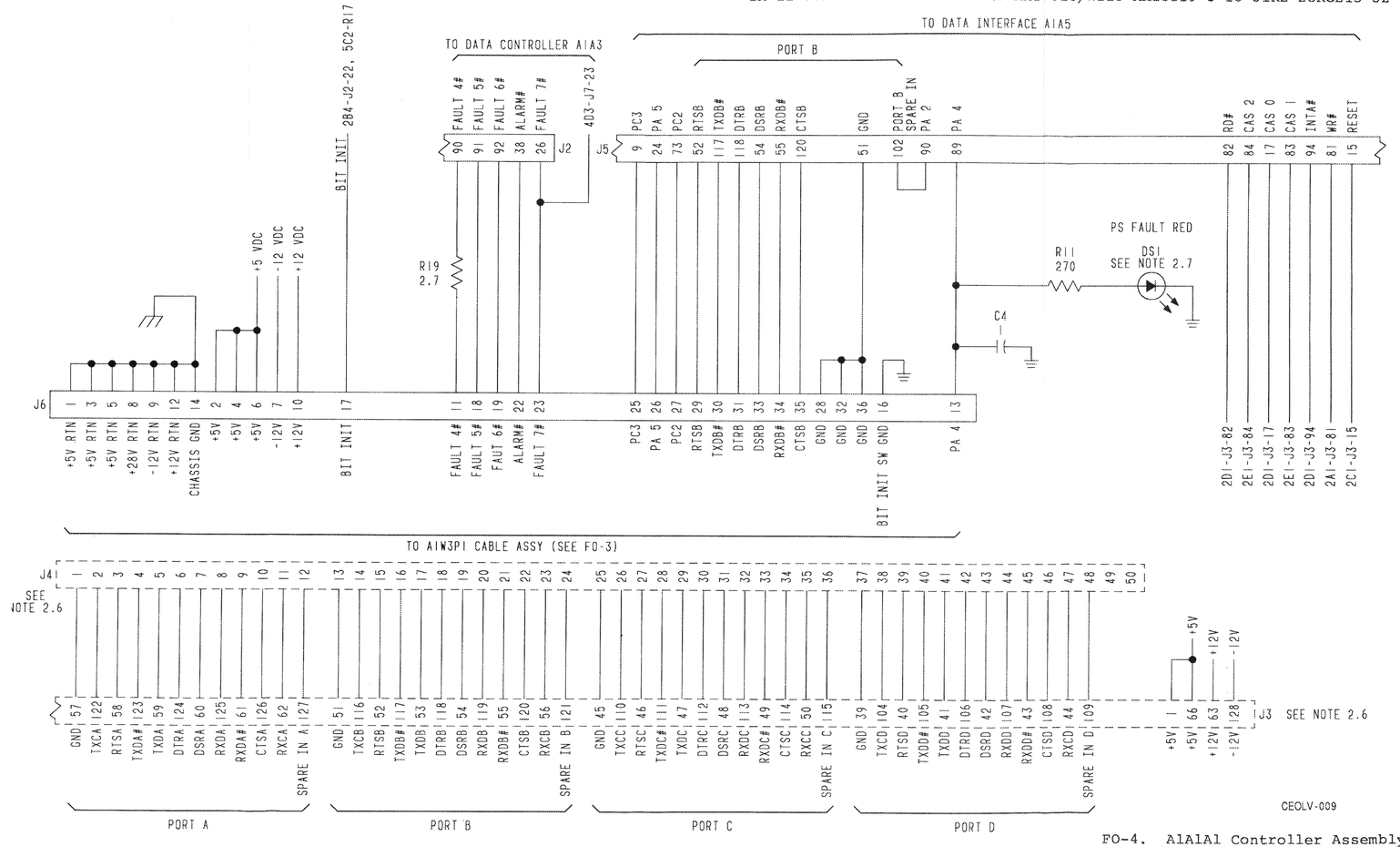
TYPICAL CIRCUIT CONTINUATION CODE

CEOLV-007

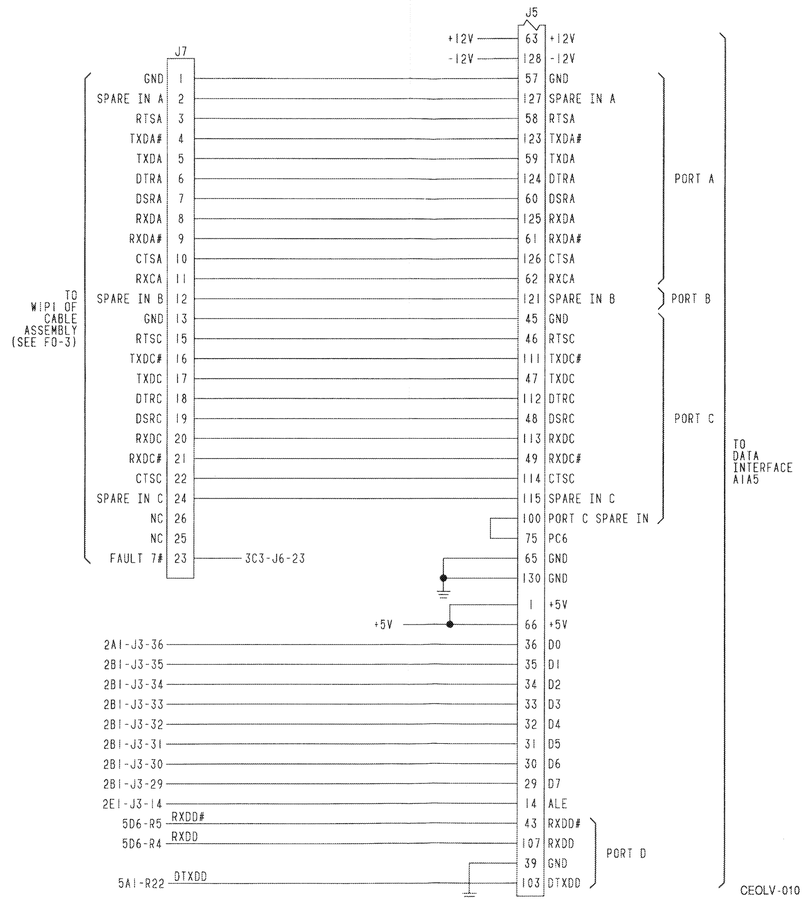
FO-4. A1A1A1 Controller Assembly
Motherboard Schematic Diagram
(Sheet 1 of 6)



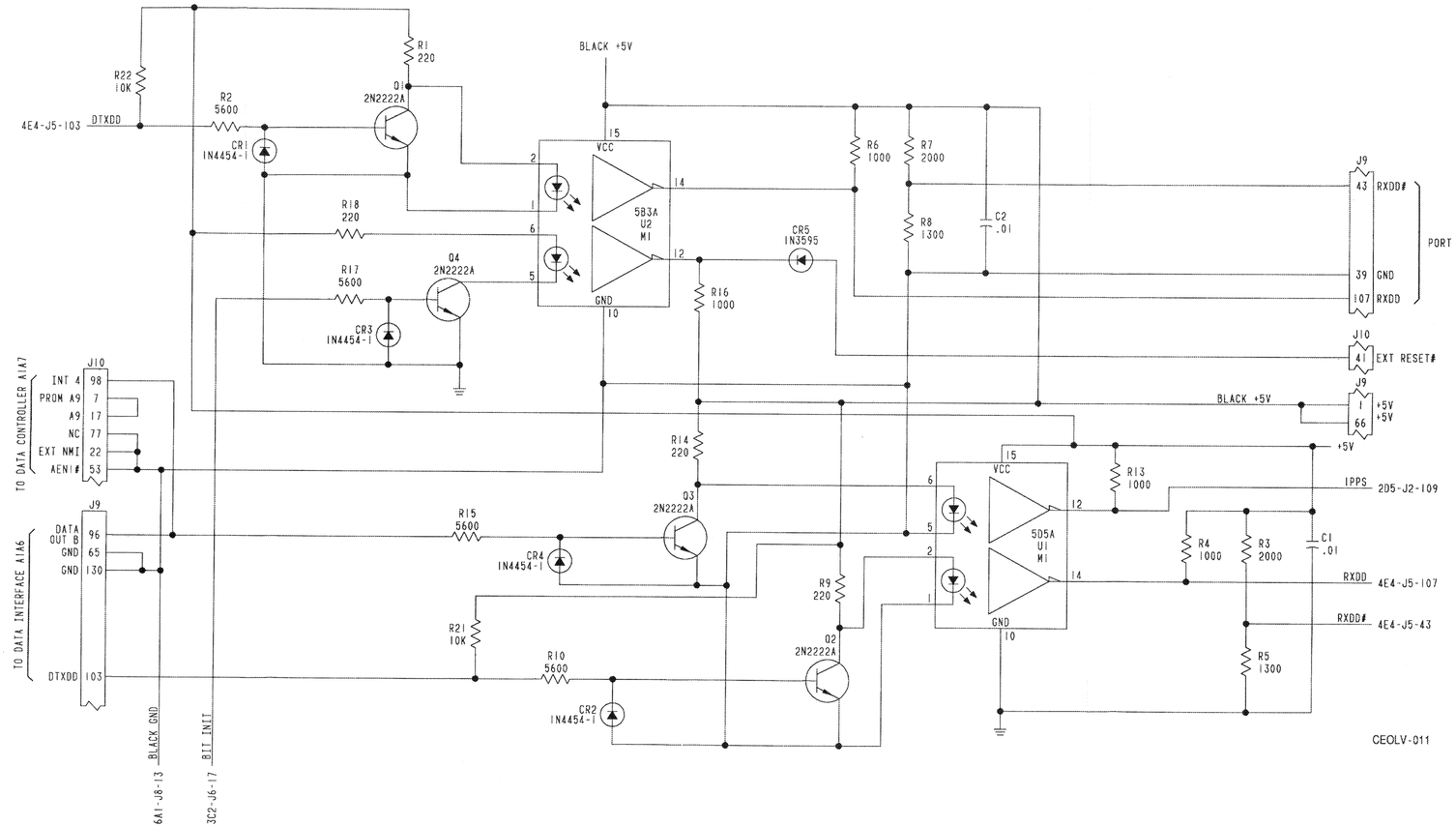
FO-4. AlAlAl Controller Assembly Motherboard Schematic Diagram (Sheet 2 of 6)



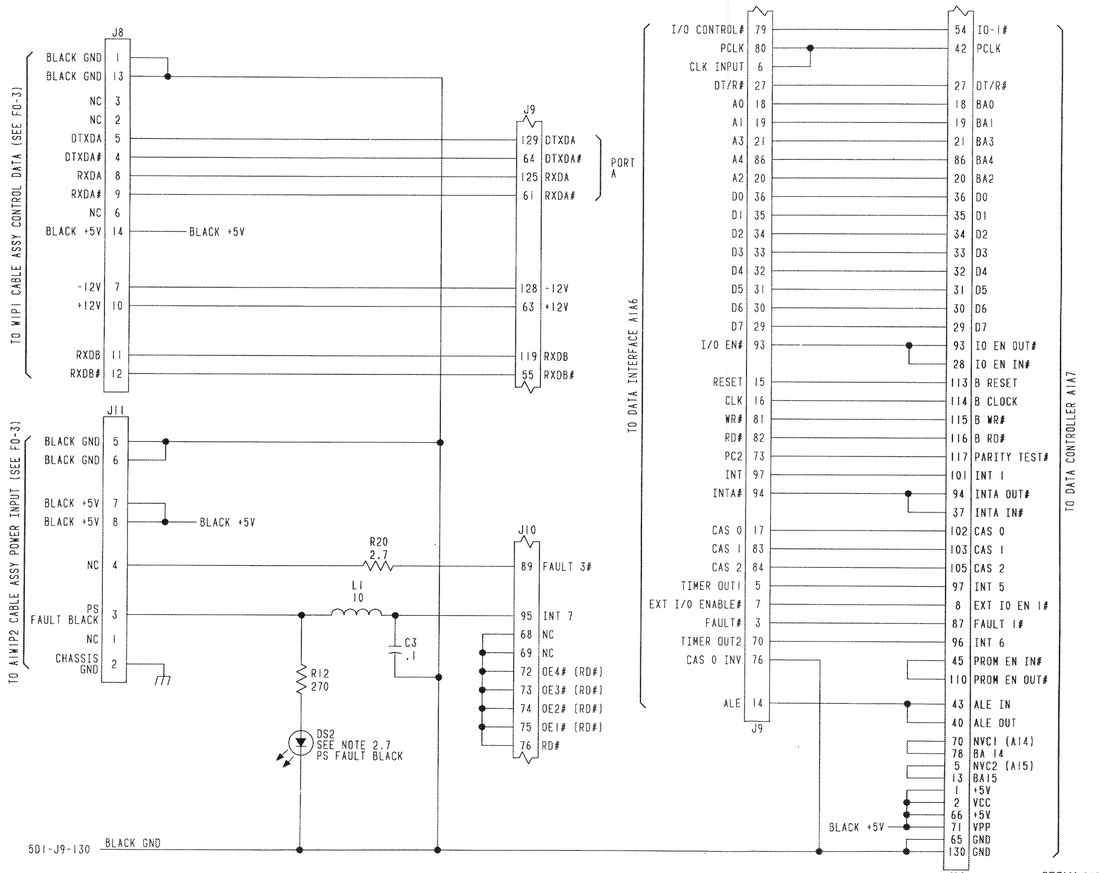
FO-4. A1A1A1 Controller Assembly Motherboard Schematic Diagram (Sheet 3 of 6)



FO-4. A1A1A1 Controller Assembly Motherboard Schematic Diagram (Sheet 4 of 6)



FO-4. A1A1A1 Controller Assembly
Motherboard Schematic Diagram
(Sheet 5 of 6)



FO-4. A1A1A1 Controller Assembly Motherboard Schematic Diagram (Sheet 6 of 6)

REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
A2	
A1 ASSEMBLY	
W1	
A1W1 ASSEMBLY	
J2	
A2 ASSEMBLY	
A1 DS3 LS1 P2 R1 S1 W4	P1
A2A1 ASSEMBLY	
J4	
A2W1 ASSEMBLY	
P1	
A2W2 ASSEMBLY	
P2	
A2W3 ASSEMBLY	
P2	
A2W4 ASSEMBLY	
E2 P1	

CROSS REFERENCE TABLE			
REFERENCE DESIGNATION	ASSEMBLY NUMBER	PRINTED WIRING BOARD	SCHEMATIC
A2A1	A3023912	NA	A3025927
A2A1W1	A3024056	NA	NA
A2A2	A3023933	NA	A3024213
A2A2A1	A3024124	A3024338	A3024212
A2A2W1	A3024211	NA	NA
A2A2W2	A3023932	NA	NA
A2A2W3	A3023923	NA	NA
A2A2W4	A3025926	NA	NA

NOTES:

1.0 GENERAL:

1.1 CHARACTERS UNDERLINED DENOTE LOWER CASE.

1.2 A NUMBER SIGN (#) FOLLOWING A SIGNAL NAME MEANS THE INVERTED (NOT) FORM OF THE SIGNAL.

2.0 SPECIFIC:

2.1 UNLESS OTHERWISE SPECIFIED:
VOLTAGES ARE DC.

2.2 NOT USED.

2.3 FOR CONTINUATION OF CIRCUIT SEE SCHEMATIC A3025919.

2.5 REFERENCE:
ASSEMBLY NUMBER A3023931.

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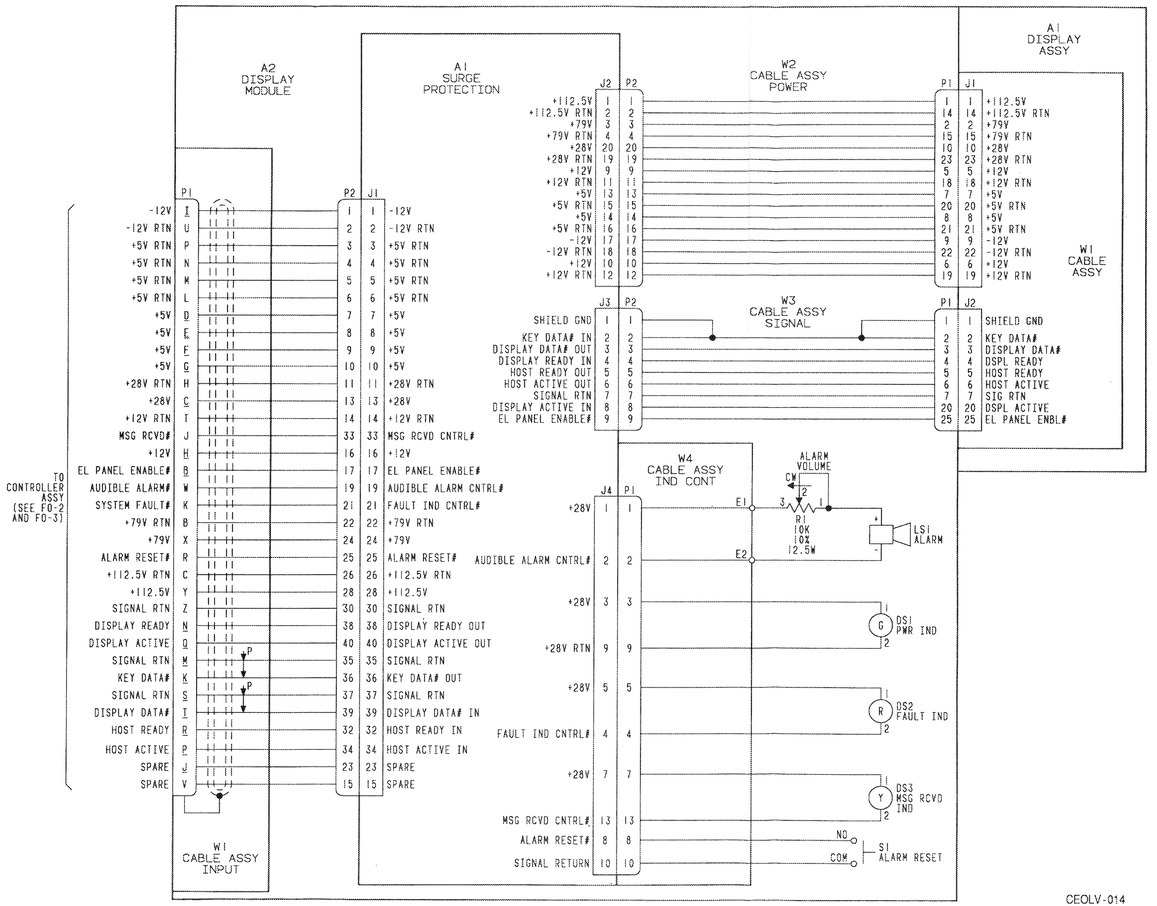
FO-5. A2 D/K Assembly Schematic Diagram (Sheet 1 of 2)



FO-5. A2 D/K Assembly Schematic Diagram (Sheet 2 of 2)

NOTES:

1.0 SPECIFIC:

1.1 UNLESS OTHERWISE SPECIFIED:
CAPACITANCE VALUES ARE IN MICROFARADS.
VOLTAGES ARE DC.

1.2 NOT USED.

1.3 FOR CONTINUATION OF CIRCUIT SEE SCHEMATIC A3025921.

1.4 REFERENCE:
ASSEMBLY NUMBER A3023920.
A2 ASSEMBLY NUMBER A3024559.
A3 ASSEMBLY NUMBER A3024560.
A4 ASSEMBLY NUMBER A3024561.
A5 ASSEMBLY NUMBER A3024562.
A6 ASSEMBLY NUMBER A3024563.
PRINTED WIRING BOARD A3024820.
A7 ASSEMBLY NUMBER A3024807.
PRINTED WIRING BOARD A3024554.
A8 ASSEMBLY NUMBER A3024564.
PRINTED WIRING BOARD A3024822.

REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
A8 C3 FL2 J2	A1
A2 ASSEMBLY A3024559	
P1	
A3 ASSEMBLY A3024560	
P1	
A4 ASSEMBLY A3024561	
P1	
A5 ASSEMBLY A3024562	
P1	
A6 ASSEMBLY A3024563	
P1	
A7 ASSEMBLY A3024807	
E30 J6	
A8 ASSEMBLY A3024564	
P1	

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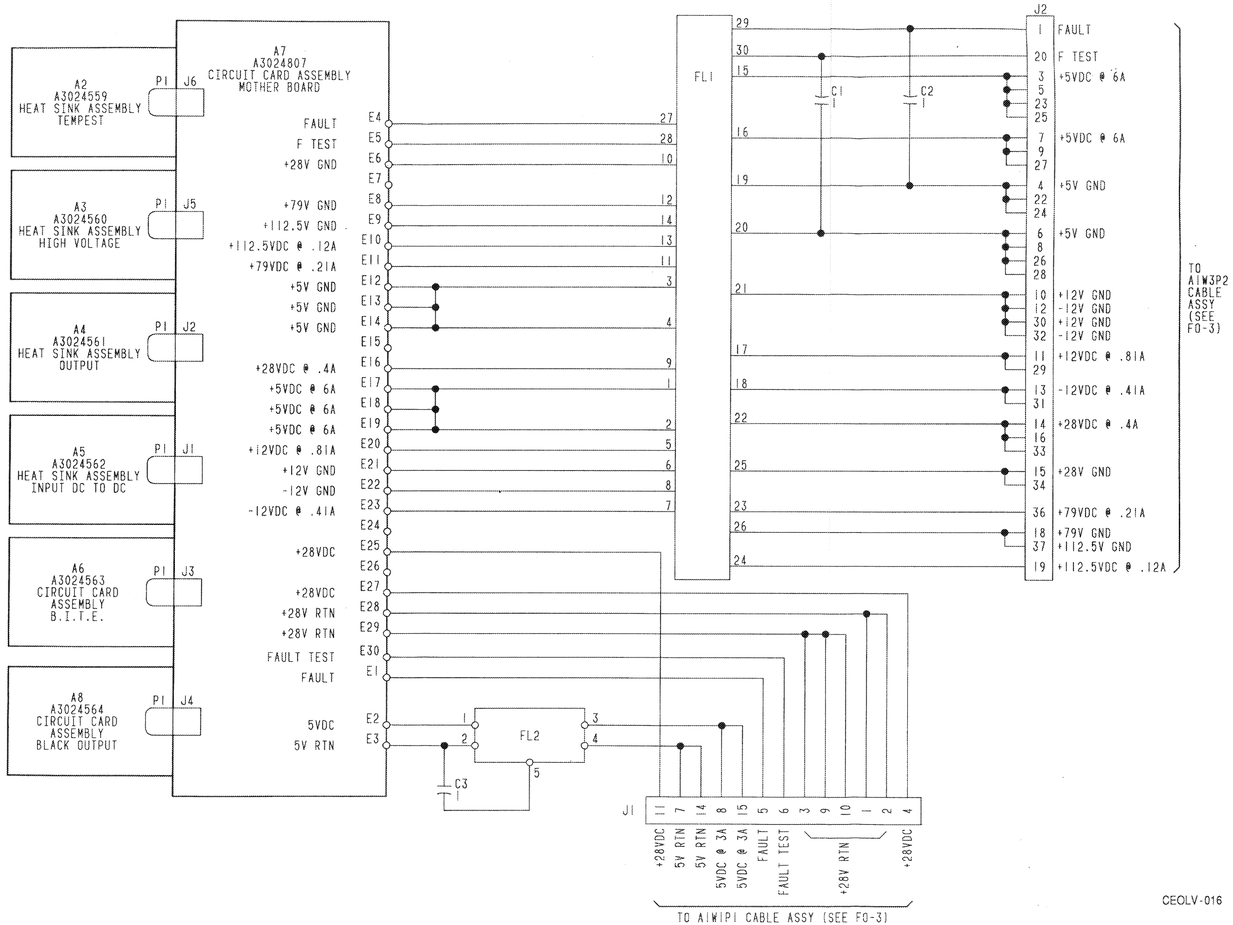
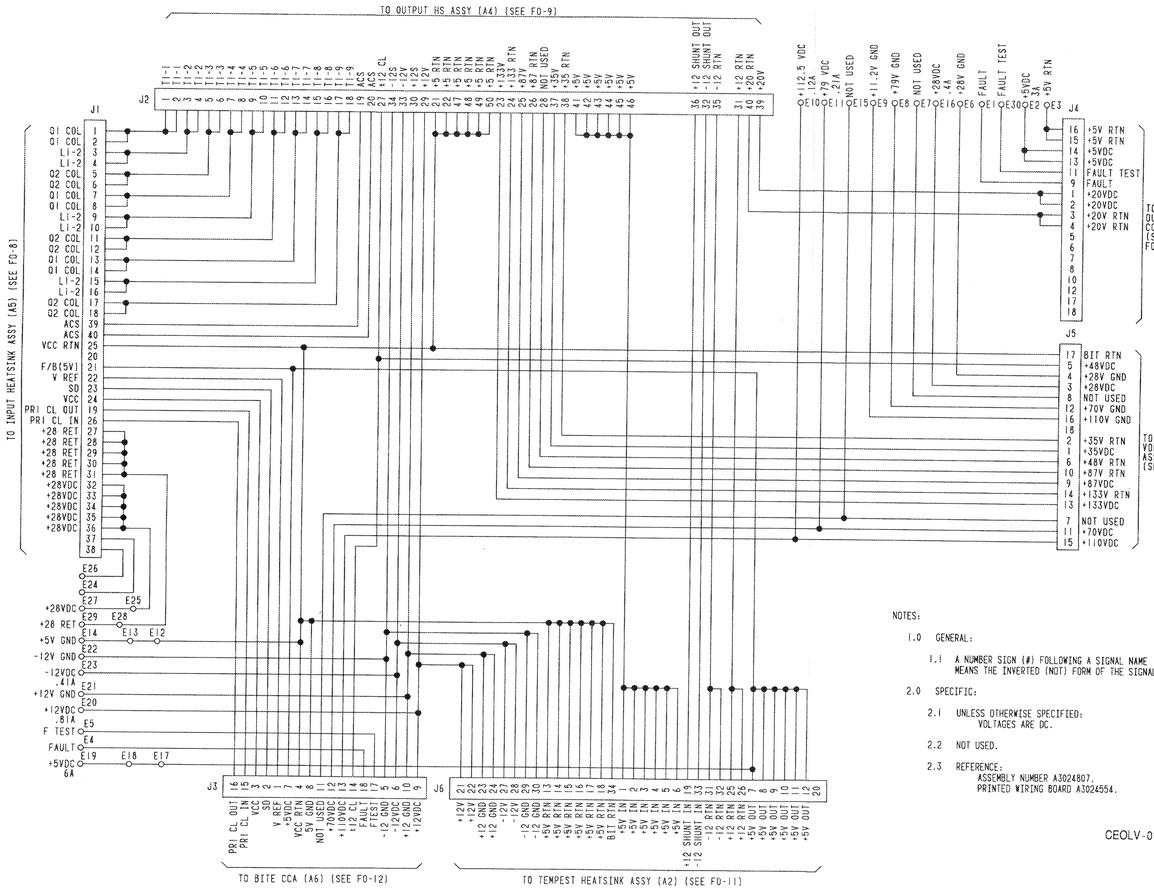
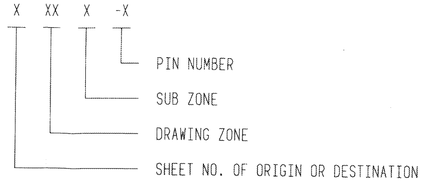
FO-6. A1PS1 Power Supply Schematic Diagram (Sheet 1 of 2)



FO-6. A1PS1 Power Supply Schematic Diagram (Sheet 2 of 2)



FO-7. A1PS1A7 Power Supply Motherboard Schematic Diagram



TYPICAL CIRCUIT CONTINUATION CODE

NOTES:

1.0 SPECIFIC:

1.1 UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS.
RESISTORS ARE 5%, 1/4W.
1% RESISTORS ARE 1/8W.
CAPACITANCE VALUES ARE IN MICROFARADS.
VOLTAGES ARE DC.
DIODES AND/OR TRANSISTORS ARE JANTX TYPE.

1.2 NOT USED.

1.3 FOR CONTINUATION OF CIRCUIT SEE SCHEMATIC A3024555.

1.4 PART NUMBER A3028858.

1.5 PART NUMBER A3028267.

1.6 VALUE SELECTED AT TEST, NOMINAL VALUE SHOWN.

1.7 THIS DEVICE REQUIRES SPECIAL HANDLING AND PROCESSING TO PREVENT DAMAGE FROM ELECTROSTATIC DISCHARGE TRANSIENTS.

1.8 REFERENCE:
ASSEMBLY NUMBER A3024562
WIRE LIST A3033800
A1 ASSEMBLY NUMBER A3024817
PRINTED WIRING BOARD A3024818

REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
A1 CR1 E3 L1 VR1 Q2	
A1 ASSEMBLY	
C27 CR30 E12 J6 P1B Q5 R47 T3 U2 VR3	C11,C24

INTEGRATED CIRCUIT TABLE		
REFERENCE DESIGNATION	SECOND TAGGING LINE SYMBOL	PART NUMBER
A1U1	M1	A3028263
A1U2	M2	A3028083-2

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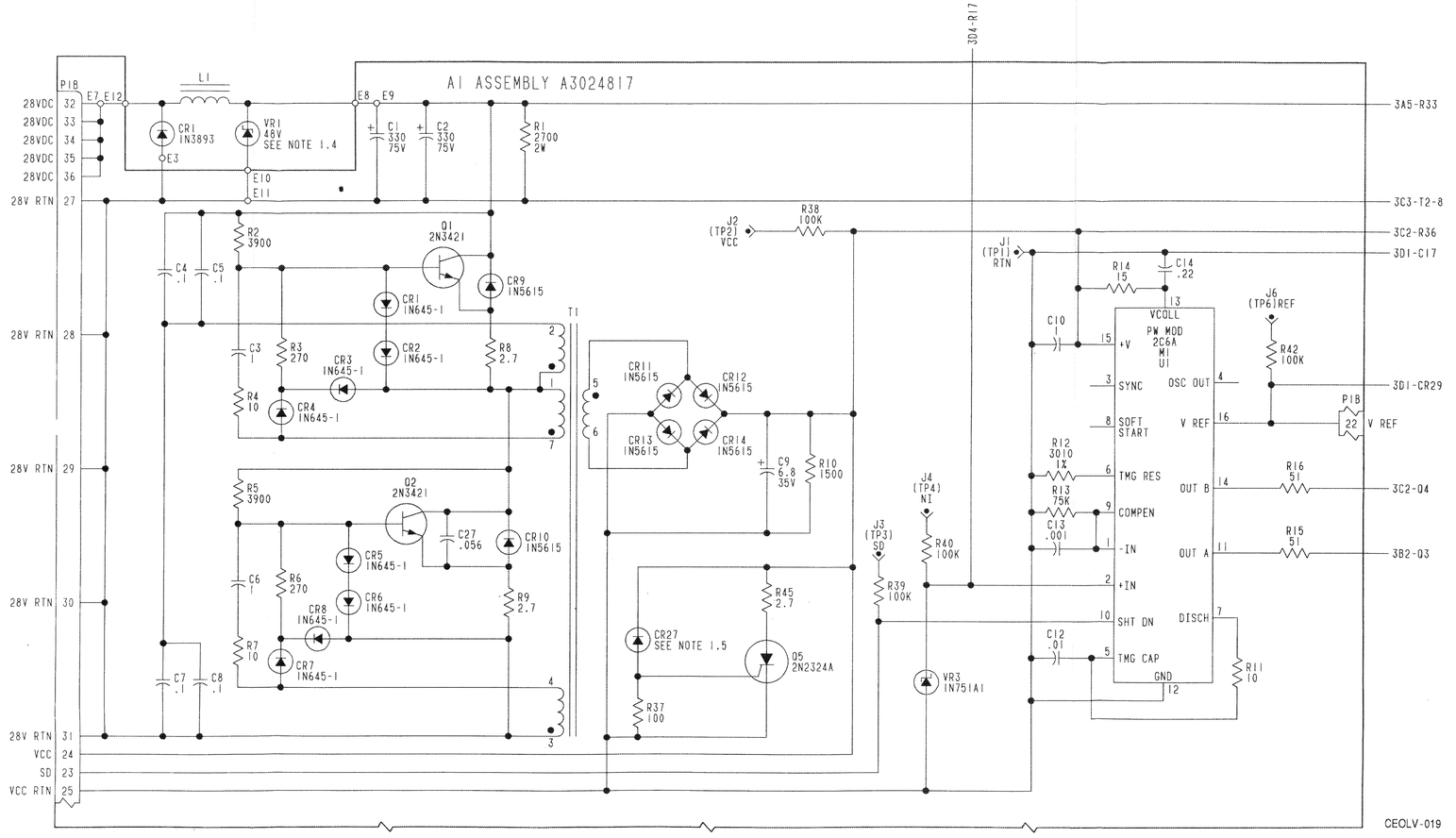
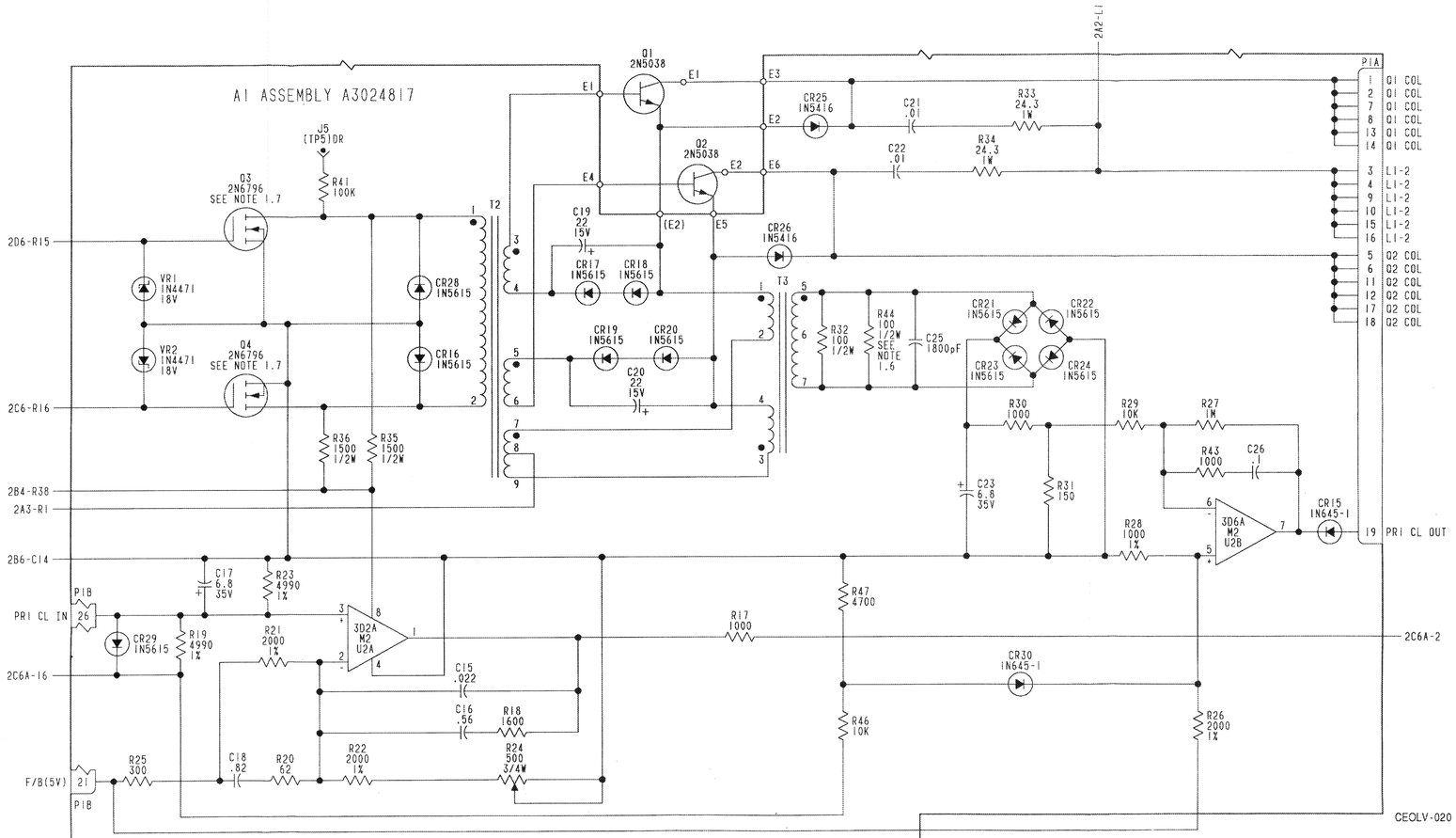
FO-8. A1PS1A5 Input DC to DC Heatsink Assembly Schematic Diagram (Sheet 1 of 3)



FO-8. A1PS1A5 Input DC to DC Heatsink Assembly Schematic Diagram (Sheet 2 of 3)



FO-8. A1PS1A5 Input DC to DC Heatsink Assembly Schematic Diagram (Sheet 3 of 3)

INTEGRATED CIRCUIT TABLE		
REFERENCE DESIGNATION	THIRD TAGGING LINE SYMBOL	PART NUMBER
U1	M1	JM38510/10707BYX
U2	M2	JM38510/11506BYX

NOTES:

1.0 SPECIFIC:

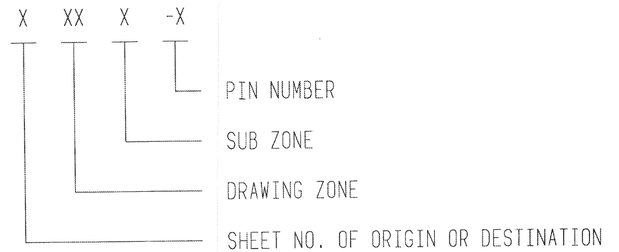
1.1 UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS.
RESISTORS ARE 5%,1/4W.
1% RESISTORS ARE 1/8W.
CAPACITANCE VALUES ARE IN MICROFARADS.
VOLTAGES ARE DC.
DIODES AND/OR TRANSISTORS ARE JANTX TYPE.

1.2 NOT USED.

1.3 FOR CONTINUATION OF CIRCUIT SEE SCHEMATIC A3024555.

1.4 PART NUMBER A3028264.

1.5 REFERENCE:
ASSEMBLY NUMBER A3024561.
TEST SPECIFICATION NUMBER A3033804.
WIRE LIST A3033801.
A1 ASSEMBLY NUMBER A3024814.
PRINTED WIRING BOARD A3024815.



TYPICAL CIRCUIT CONTINUATION CODE

REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
C2 CR3 E3 L1 T2 U2	
A1 ASSEMBLY A3024814	
C22 CR23 E58 J6 P1B R17	C3 CR9 E3,13,44 R6

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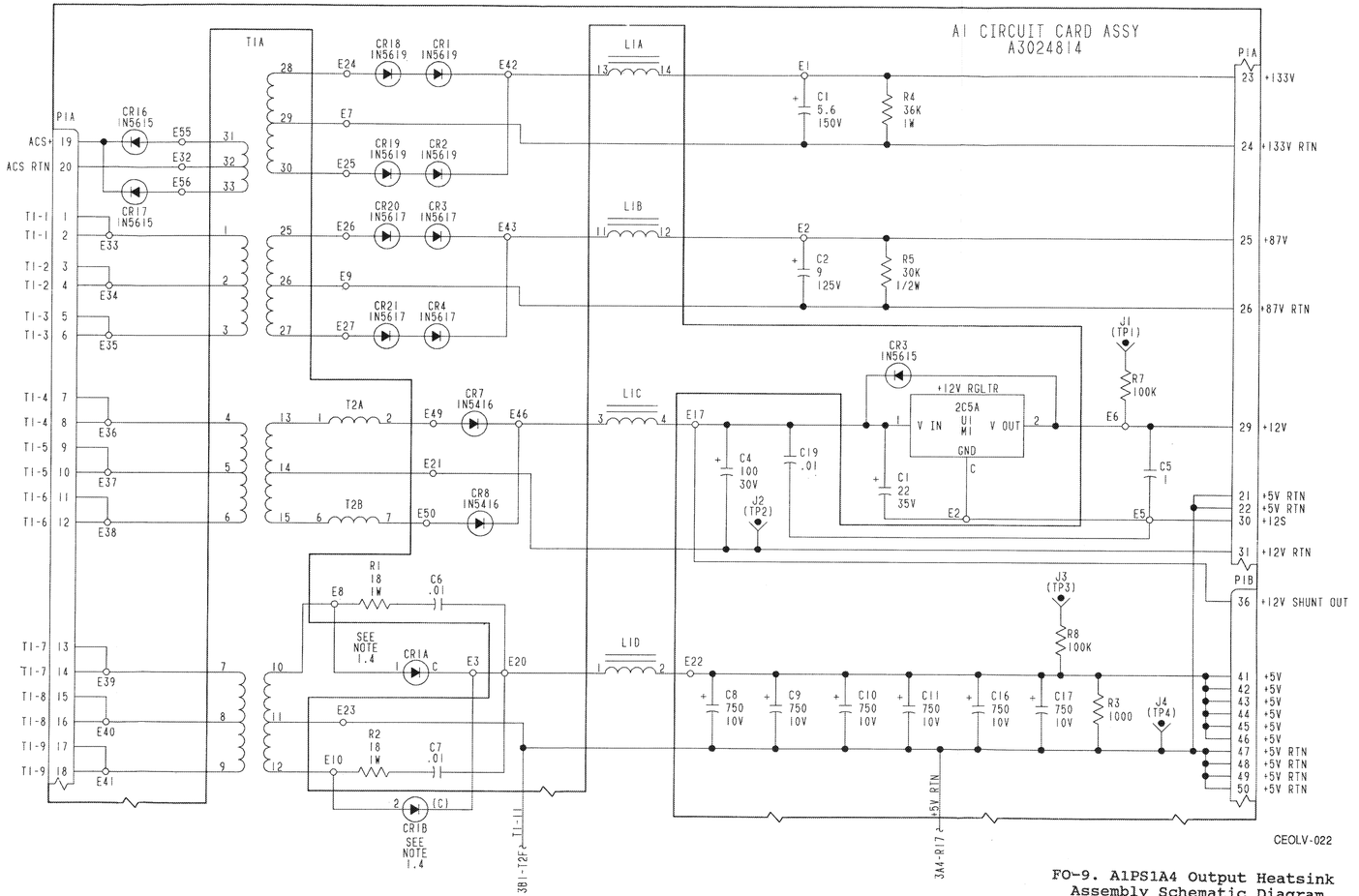
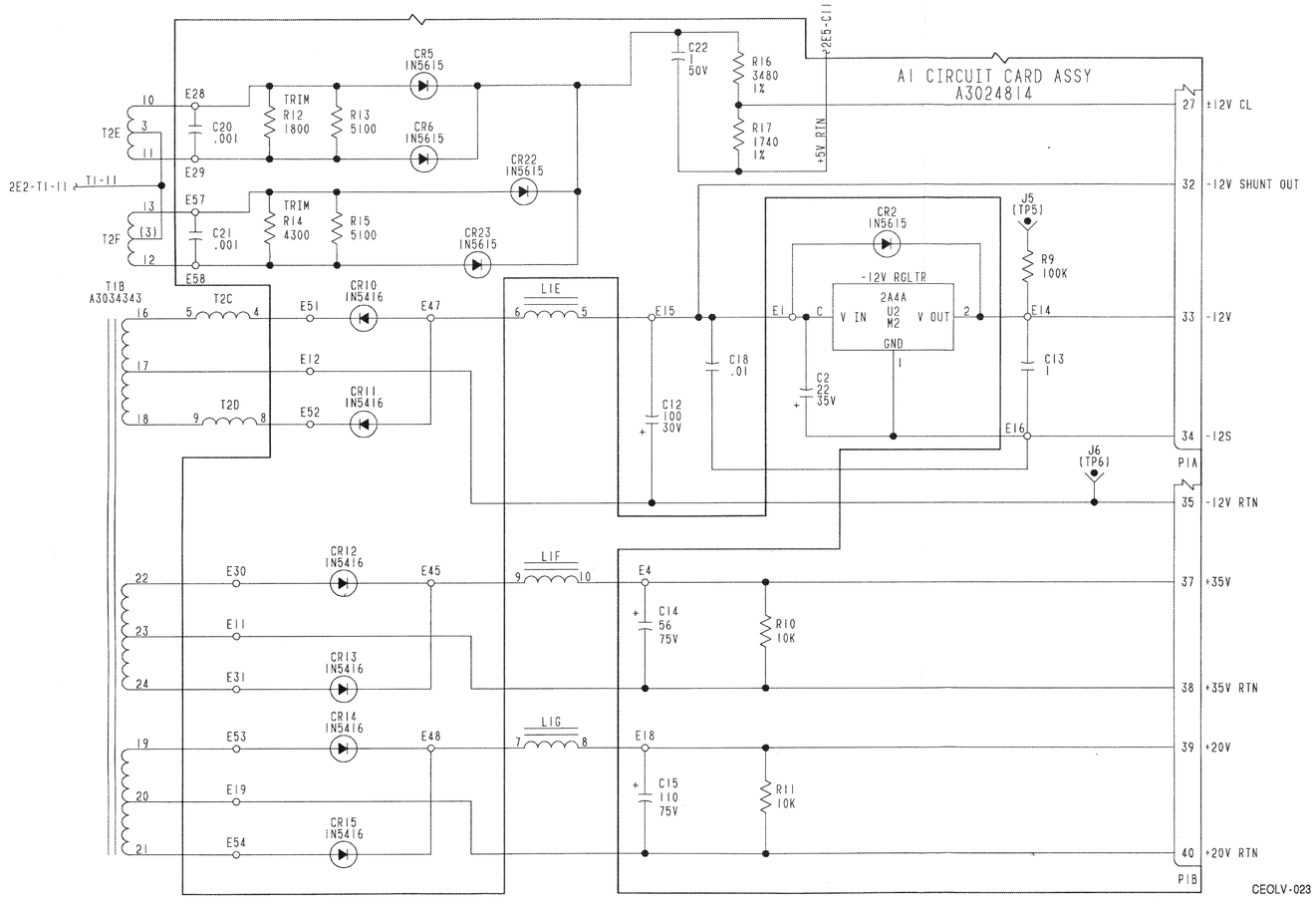
FO-9. A1PS1A4 Output Heatsink Assembly Schematic Diagram (Sheet 1 of 3)



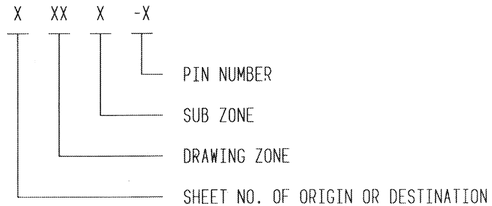
FO-9. A1PS1A4 Output Heatsink Assembly Schematic Diagram (Sheet 2 of 3)



FO-9. A1PS1A4 Output Heatsink Assembly Schematic Diagram (Sheet 3 of 3)

REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
A1 Q2 U4	U3
A1 ASSEMBLY A3024811	
C22	C11 THRU C14, C21
CR18	CR9 THRU CR12
E24	E11,12,13, 21,22
J12	J7,8,9
P1	
Q6	Q5
R51	R3,10,15 THRU R21,33,34,42 43,48
VR2	
W3	

INTEGRATED CIRCUIT TABLE		
REFERENCE DESIGNATION	THIRD TAGGING LINE SYM	PART NUMBER
U1,2,4	M1	7703402YX



TYPICAL CIRCUIT CONTINUATION CODE

NOTES:

1.0 SPECIFIC:

1.1 UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS.
RESISTORS ARE 5%,1/4W.
1% RESISTORS ARE 1/8W.
CAPACITANCE VALUES ARE IN MICROFARADS.
VOLTAGES ARE DC.
DIODES AND/OR TRANSISTORS ARE JANTX TYPE.

1.2 NOT USED.

1.3 FOR CONTINUATION OF CIRCUIT SEE SCHEMATIC A3024555.

1.4 VALUE SELECTED AT TEST, NOMINAL VALUE SHOWN.

1.5 PART OF ASSEMBLY A3024560.

1.6 REFERENCE:
ASSEMBLY NUMBER A3024560.
A1 ASSEMBLY NUMBER A3024811.
PRINTED WIRING BOARD A3024812.
TEST SPECIFICATION NUMBER A3033806.
WIRE LIST A3033799.

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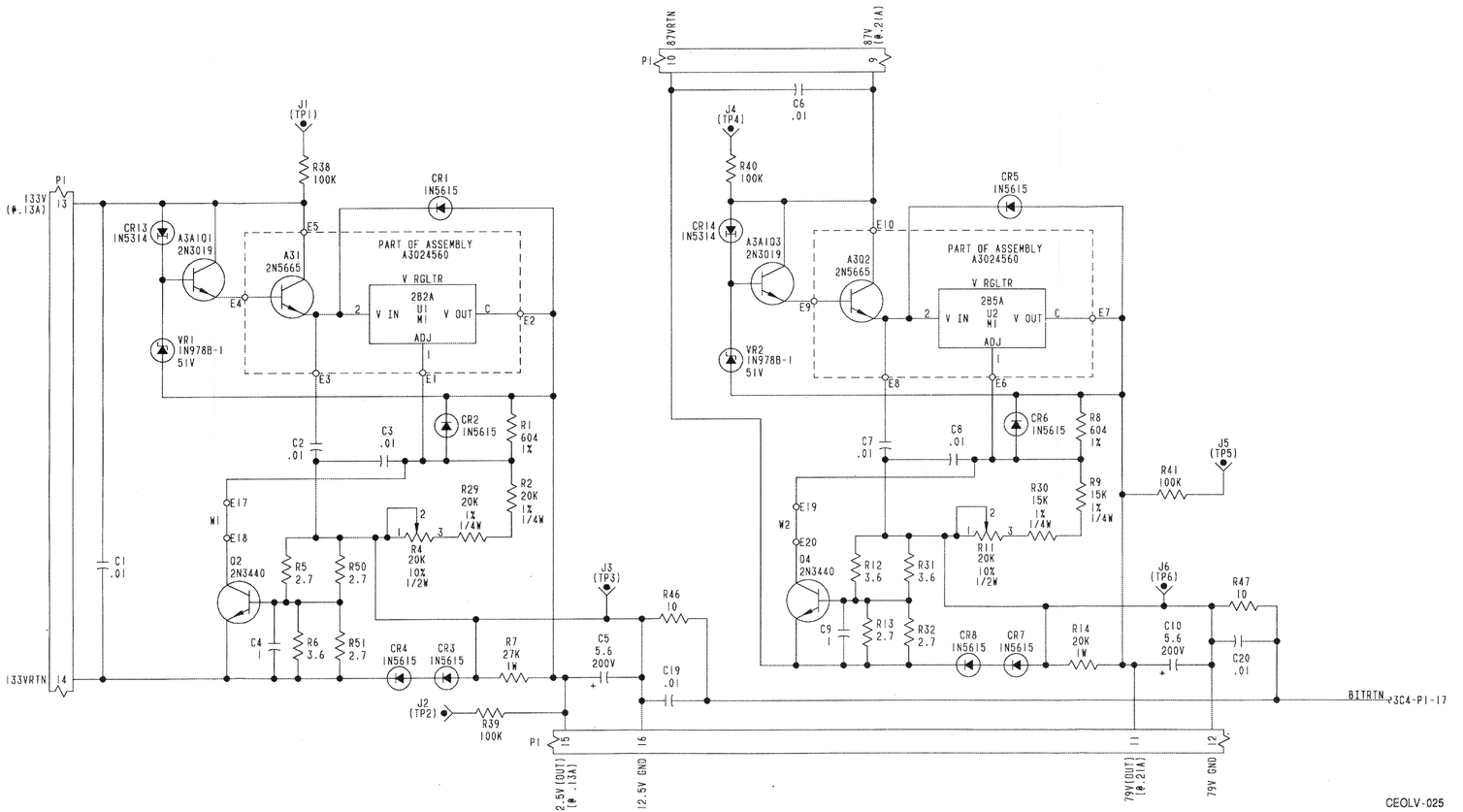
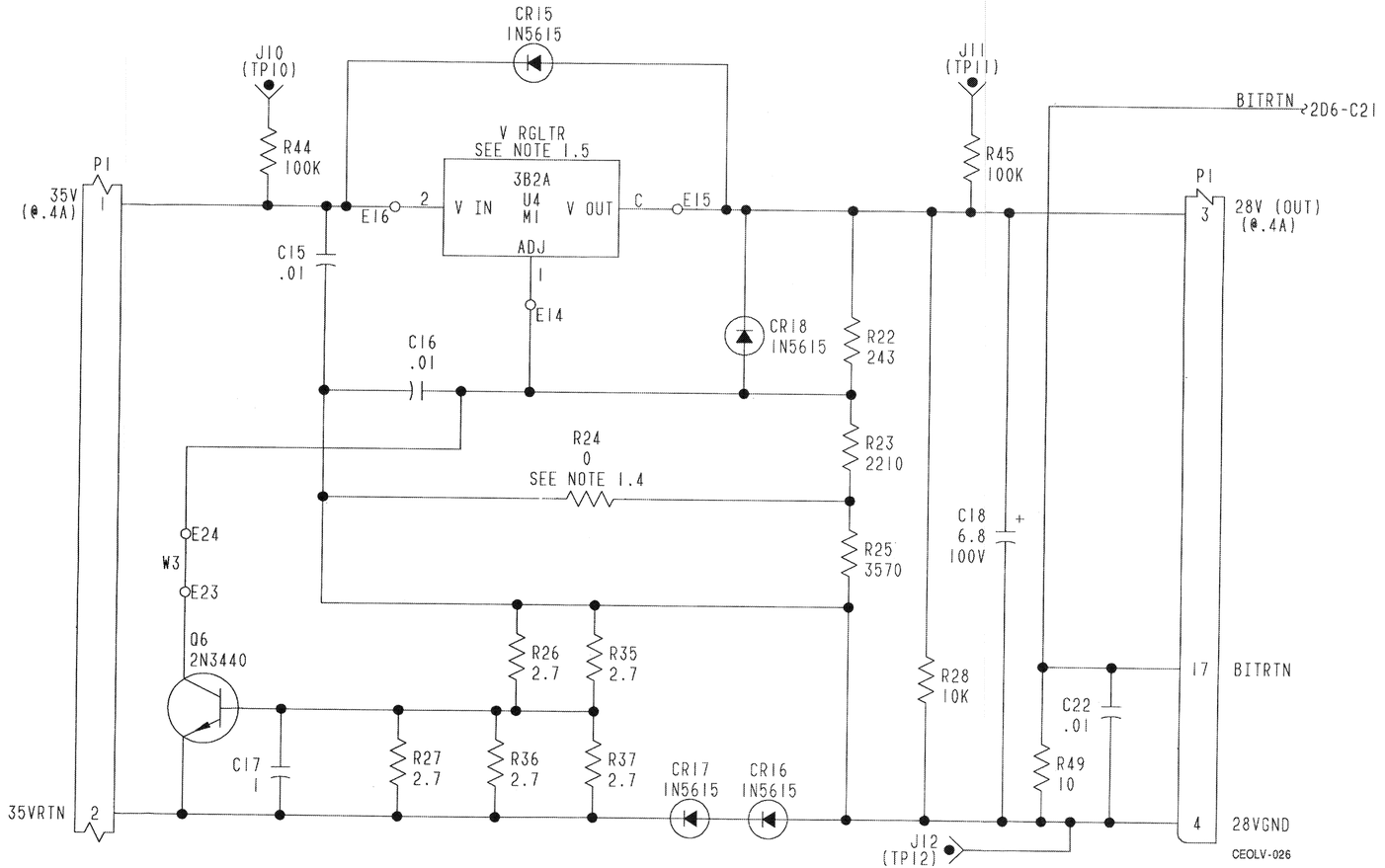
FO-10. A1PS1A3 High Voltage Heatsink Assembly Schematic Diagram (Sheet 1 of 3)



FO-10. A1PS1A3 High Voltage Heatsink Assembly Schematic Diagram (Sheet 2 of 3)



FO-10. A1PS1A3 High Voltage Heatsink Assembly Schematic Diagram (Sheet 3 of 3)

INTERGRATED CIRCUIT TABLE		
REF DES	SECOND TAGGING LINE SYMBOL	PART NUMBER
U1	M1	JM38510/11704
U2	M2	JM38510/11804

NOTES:

1.0 SPECIFIC:

1.1 UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS.
RESISTORS ARE 5%,1/4W.
CAPACITANCE VALUES ARE IN MICROFARADS
VOLTAGES ARE DC.
DIODES AND/OR TRANSISTORS ARE JANTX TYPE.

1.2 NOT USED.

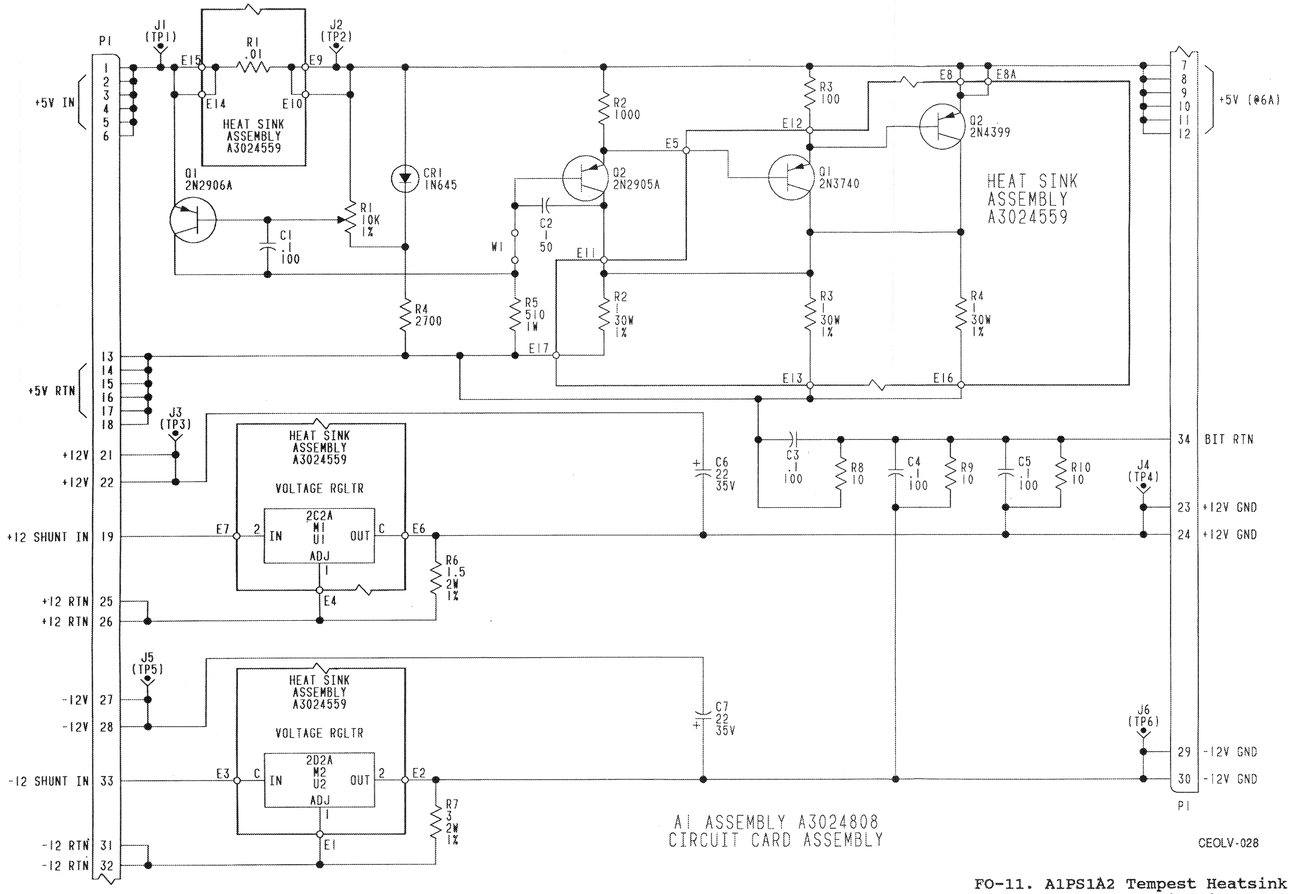
1.3 FOR CONTINUATION OF CIRCUIT SEE SCHEMATICS A3024555.

1.4 REFERENCE:
ASSEMBLY NUMBER A3024559.
TEST SPECIFICATION A3033803.
A1 ASSEMBLY NUMBER A3024808.
PRINTED WIRING BOARD A3024809.

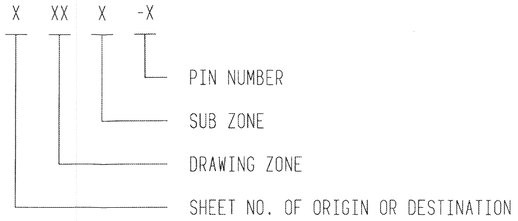
REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
A1 E17 Q2 R4 U2	
A1 ASSEMBLY A3024808	
C7 CR1 J6 P1 Q2 R10	

CEOLV-027

FO-11. A1PS1A2 Tempest Heatsink Assembly Schematic Diagram (Sheet 1 of 2)



FO-11. A1PS1A2 Tempest Heatsink Assembly Schematic Diagram (Sheet 2 of 2)



TYPICAL CIRCUIT CONTINUATION CODE

INTEGRATED CIRCUIT TABLE				
REFERENCE DESIGNATION	THIRD TAGGING LINE SYMBOL	PART NUMBER	POWER INPUT PINS	
			VCC	VCCRTN
U1	M1	A3028260	16	14
U2,3,4,5	M2	JM38510/11201BCX	3	12

NOTES:

1.0 SPECIFIC:

1.1 UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS.
RESISTORS ARE 1%, 1/8W.
5% RESISTORS ARE 1/4W.
CAPACITANCE VALUES ARE IN MICROFARADS.
VOLTAGES ARE DC.
DIODES AND/OR TRANSISTORS ARE JANTX TYPE.

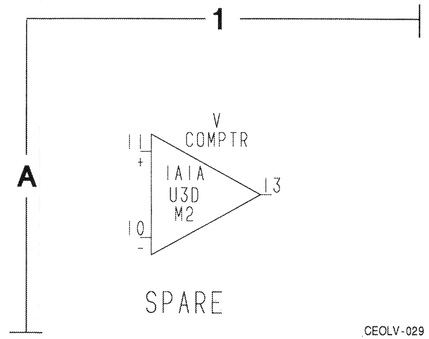
1.2 NOT USED.

1.3 FOR CONTINUATION OF CIRCUIT SEE SCHEMATIC A3024555.

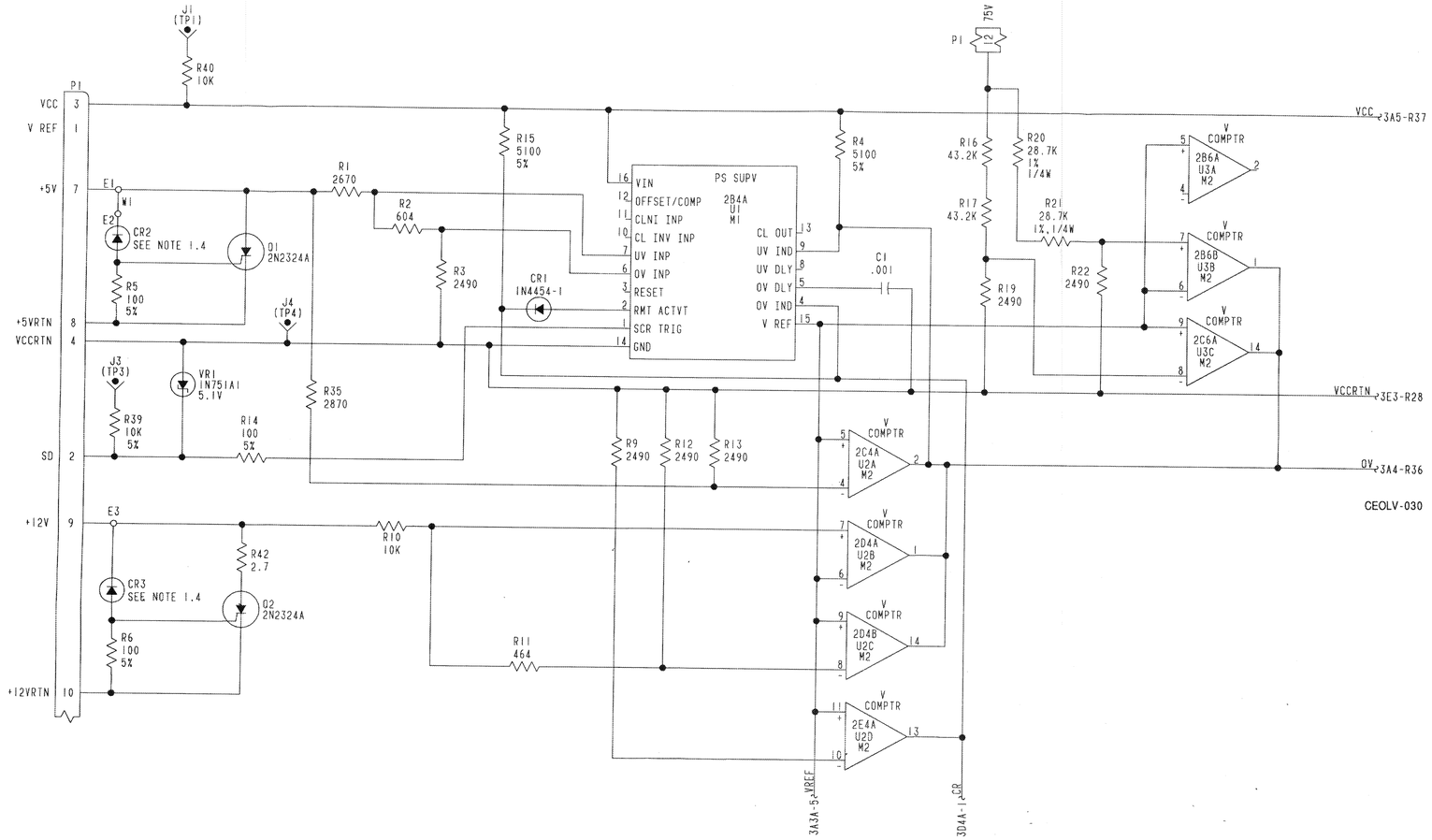
1.4 PART NUMBER A3028267.

1.5 REFERENCE:
ASSEMBLY NUMBER A3024563.
PRINTED WIRING BOARD A3024820.
TEST SPECIFICATION NUMBER A3033805.

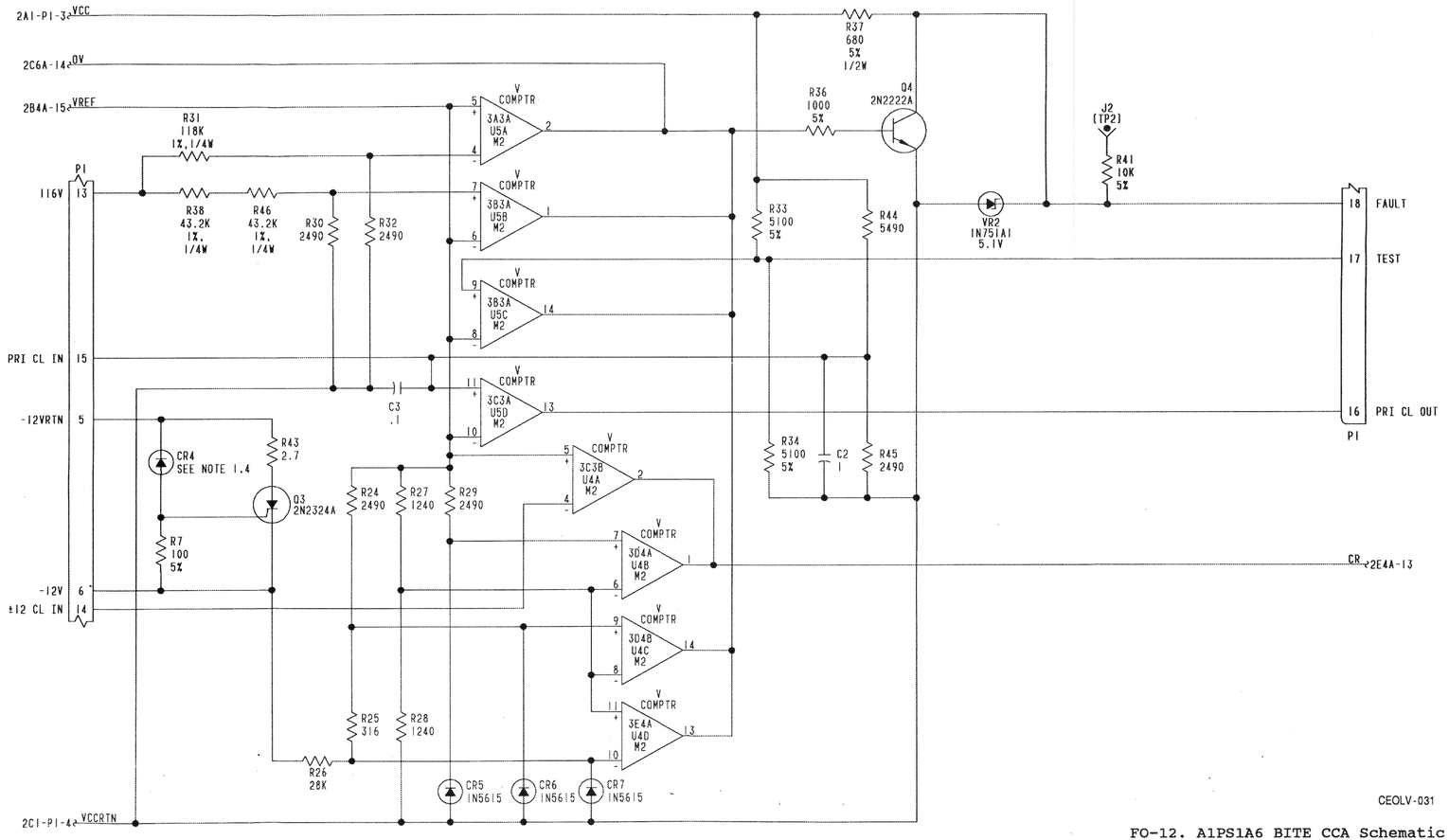
REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
C3 CR7 E3 J4 P1 Q4 R46 U5 VR2 W1	R8,18,23



FO-12. A1PS1A6 BITE CCA Schematic Diagram (Sheet 1 of 3)



FO-12. A1PS1A6 BITE CCA Schematic Diagram (Sheet 2 of 3)



FO-12. A1PS1A6 BITE CCA Schematic Diagram (Sheet 3 of 3)

INTEGRATED CIRCUIT TABLE		
REF DES	THIRD TAGGING LINE SYMBOL	PART NUMBER
U2	M1	A3028260
U3	M2	A3028265
U1	M3	A3028266

NOTES:

1.0 SPECIFIC:

1.1 UNLESS OTHERWISE SPECIFIED:
RESISTANCE VALUES ARE IN OHMS.
RESISTORS ARE 5%, 1/4W.
1% RESISTORS ARE 1/8W.
CAPACITANCE VALUES ARE IN MICROFARADS.
VOLTAGES ARE DC.
DIODES AND/OR TRANSISTORS ARE JANTX TYPE.

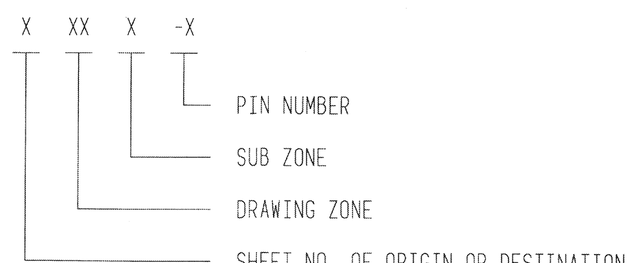
1.2 NOT USED.

1.3 FOR CONTINUATION OF CIRCUIT SEE SCHEMATIC A3024555.

1.4 PART NUMBER A3028267.

1.5 REFERENCE:
ASSEMBLY NUMBER A3024564.
PRINTED WIRING BOARD A3024822.

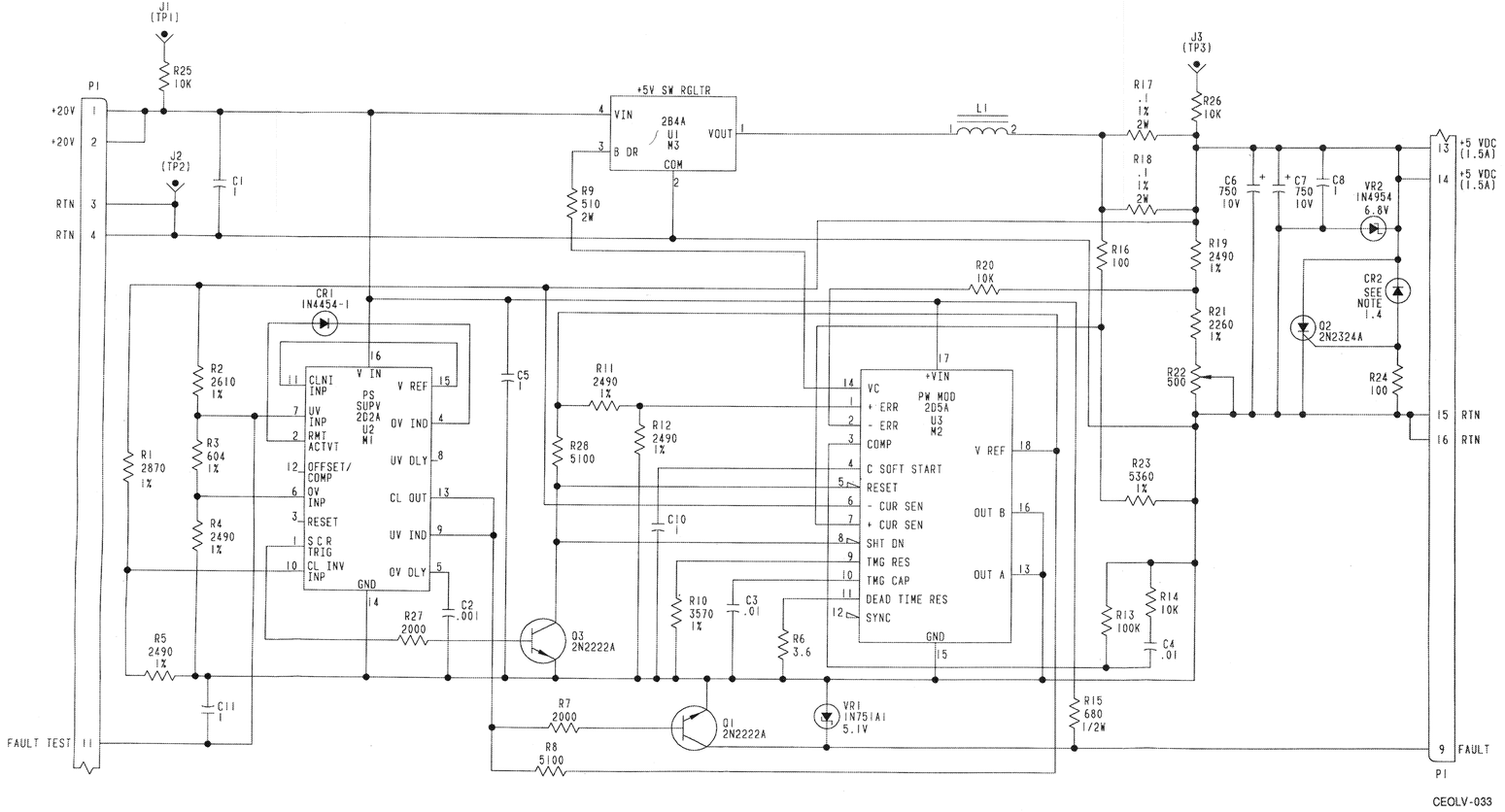
REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
C11 CR2 J3 L1 P1 Q3 R28 (TP3) U3 VR2	C9



TYPICAL CIRCUIT CONTINUATION CODE

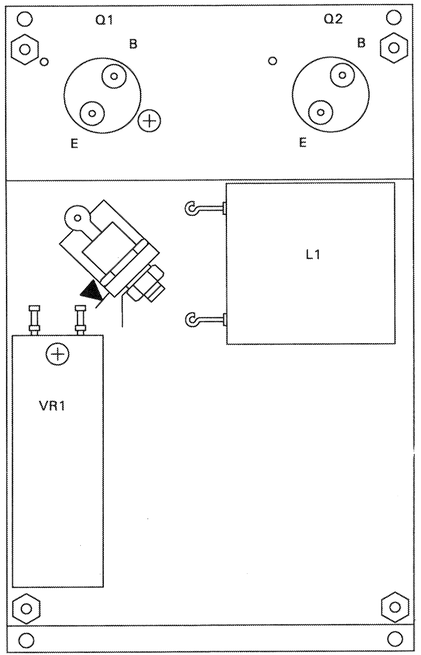
CEOLV-032

FO-13. A1PS1A8 Black Output CCA Schematic Diagram (Sheet 1 of 2)



CEOLV-033

FO-13. A1PS1A8 Black Output CCA Schematic Diagram (Sheet 2 of 2)



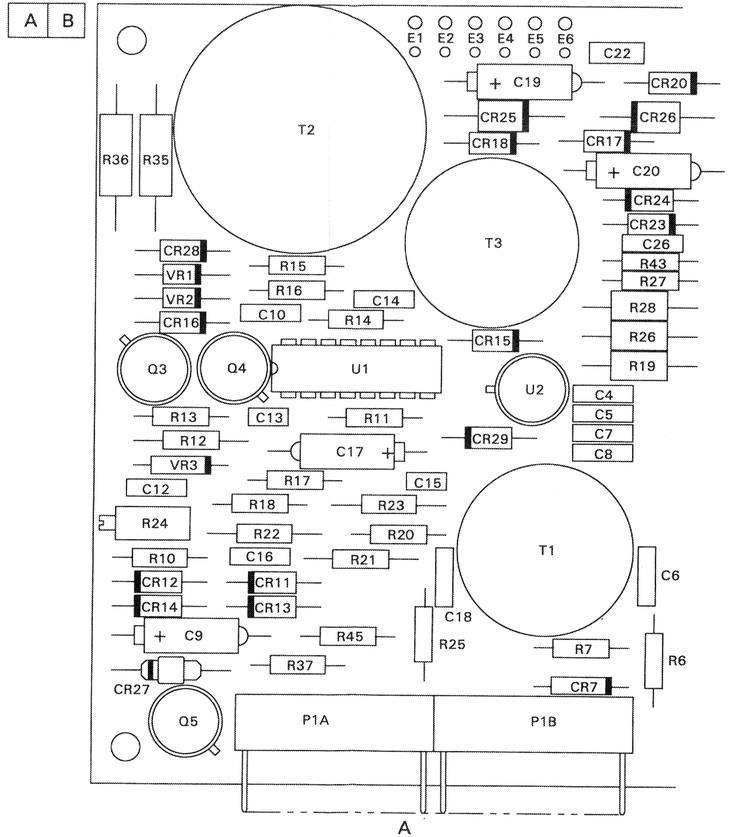
INPUT DC TO DC HEATSINK ASSEMBLY
(A1PS1A5A1 REMOVED)

WIRE NO	COLOR	FROM	TO
1	GRN	Q1-B	A1-E1
2	YEL	Q1-E	A1-E2
3	RED	E1	A1-E3
4	GRN	Q2-B	A1-E4
5	YEL	Q2-E	A1-E5
6	RED	E2	A1-E6
7	BLK	VR1(-)	A1-E10
8	BLK	VR1(-)	A1-E11
9	RED	L1-2	A1-E8
10	RED	L1-2	A1-E9
11	RED	CR1-K	L1-1
12	RED	L1-2	VR1(+)
13	RED	L1-1	A1-E7
14	BLK	CR1-A	VR1(-)
15	RED	L1-1	A1-E12

CEOLV-034

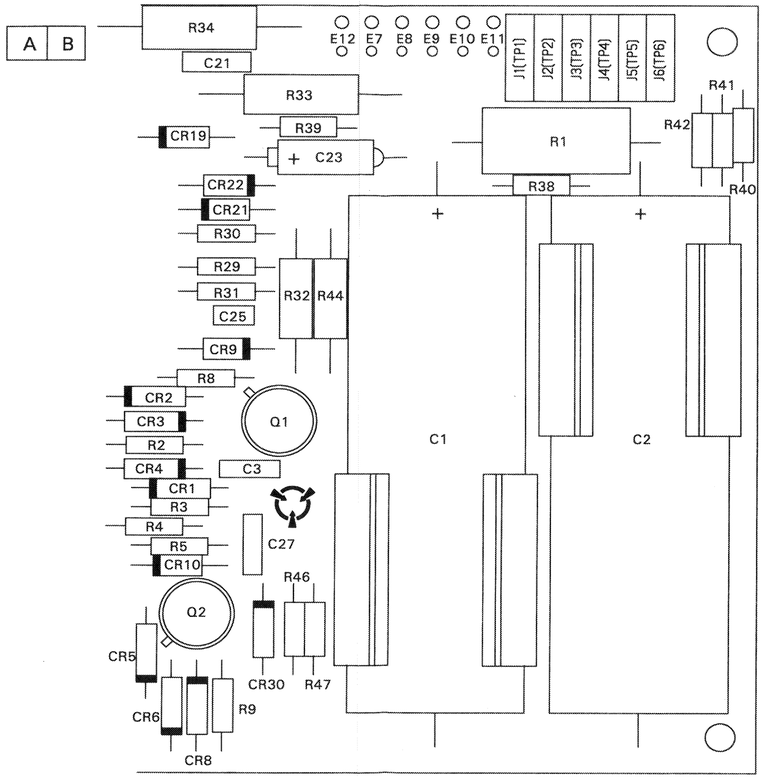
FOLDOUT	A1PS1 SUBASSEMBLY
1 of 15	A1PS1A5A1 Input DC to DC Assembly (A1PS1A5A1 removed)
2 of 15	A1PS1A5A1 Input DC to DC Heatsink CCA
3 of 15	A1PS1A5A1 Input DC to DC Heatsink CCA
4 of 15	A1PS1A5A1 Input DC to DC Heatsink CCA
5 of 15	A1PS1A4 Output Heatsink Assembly
6 of 15	A1PS1A4A1 Output Heatsink CCA
7 of 15	A1PS1A4A1 Output Heatsink CCA
8 of 15	A1PS1A3 High Voltage Heatsink Assembly
9 of 15	A1PS1A3A1 High Voltage Heatsink CCA
10 of 15	A1PS1A2 TEMPEST Heatsink Assembly
11 of 15	A1PS1A2A1 TEMPEST Heatsink CCA
12 of 15	A1PS1A6 BITE CCA
13 of 15	A1PS1A8 Black Output CCA
14 of 15	A1PS1A7 Motherboard
15 of 15	A1PS1 Major Components

FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 1 of 15)



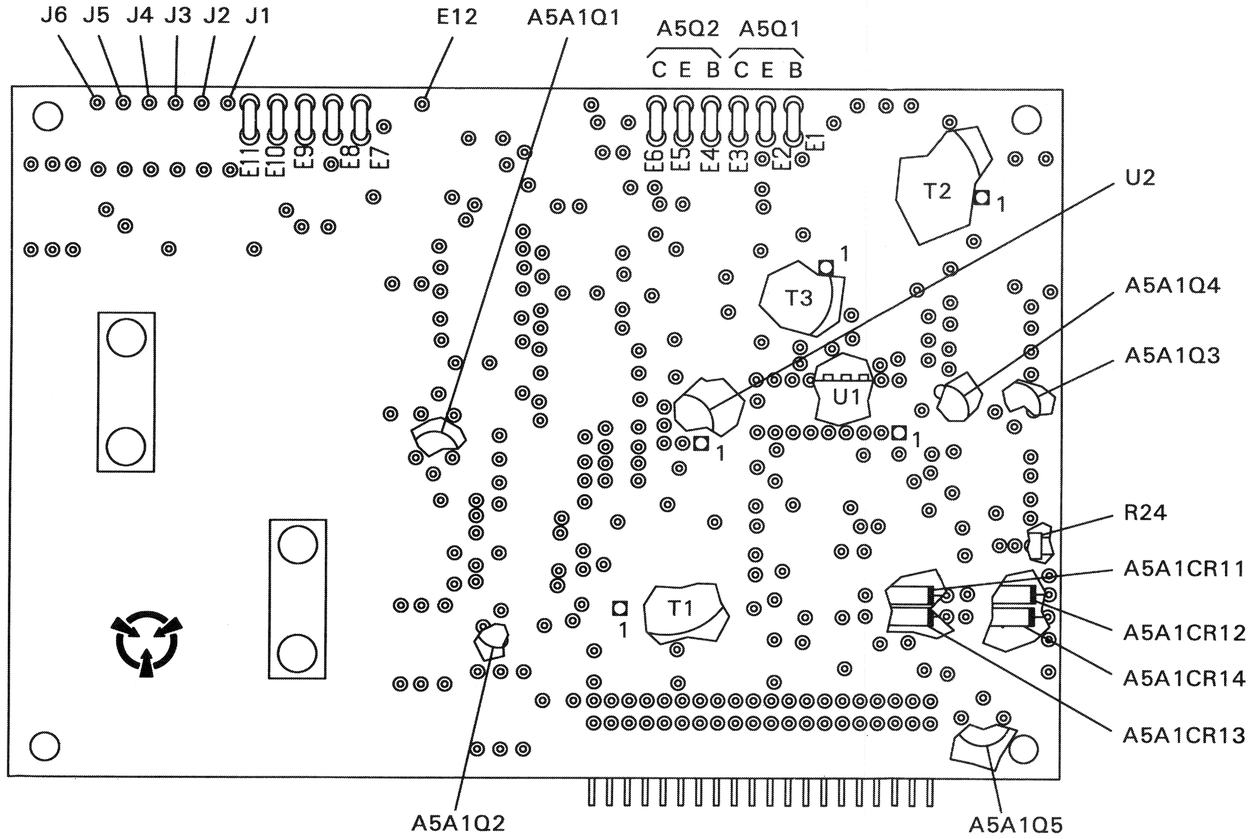
INPUT DC TO DC HEATSINK ASSEMBLY CCA A1PS1A5A1 CEOLV-035

FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 2 of 15)



INPUT DC TO DC HEATSINK ASSEMBLY CCA A1PS1A5A1 CEOLV-036

FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 3 of 15)

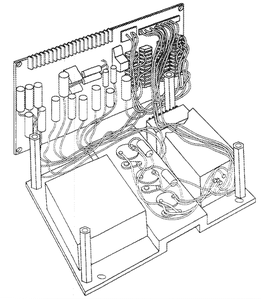


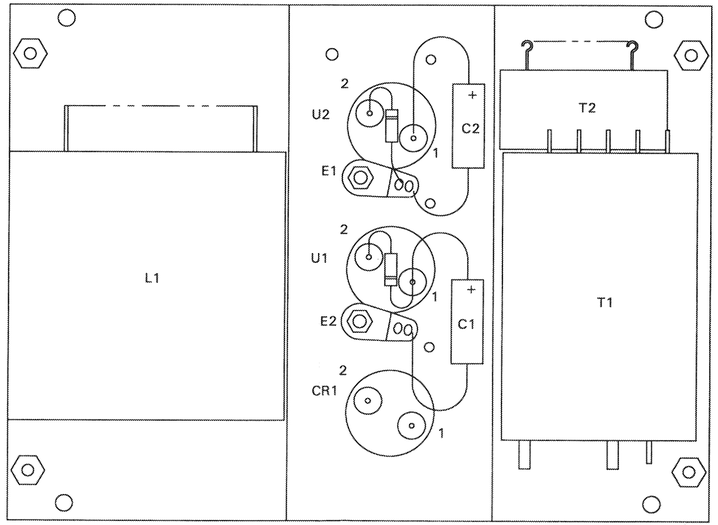
INPUT DC TO DC HEATSINK ASSEMBLY CCA A1PS1A5A1 (FOIL SIDE)

CEOLV-037

FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 4 of 15)

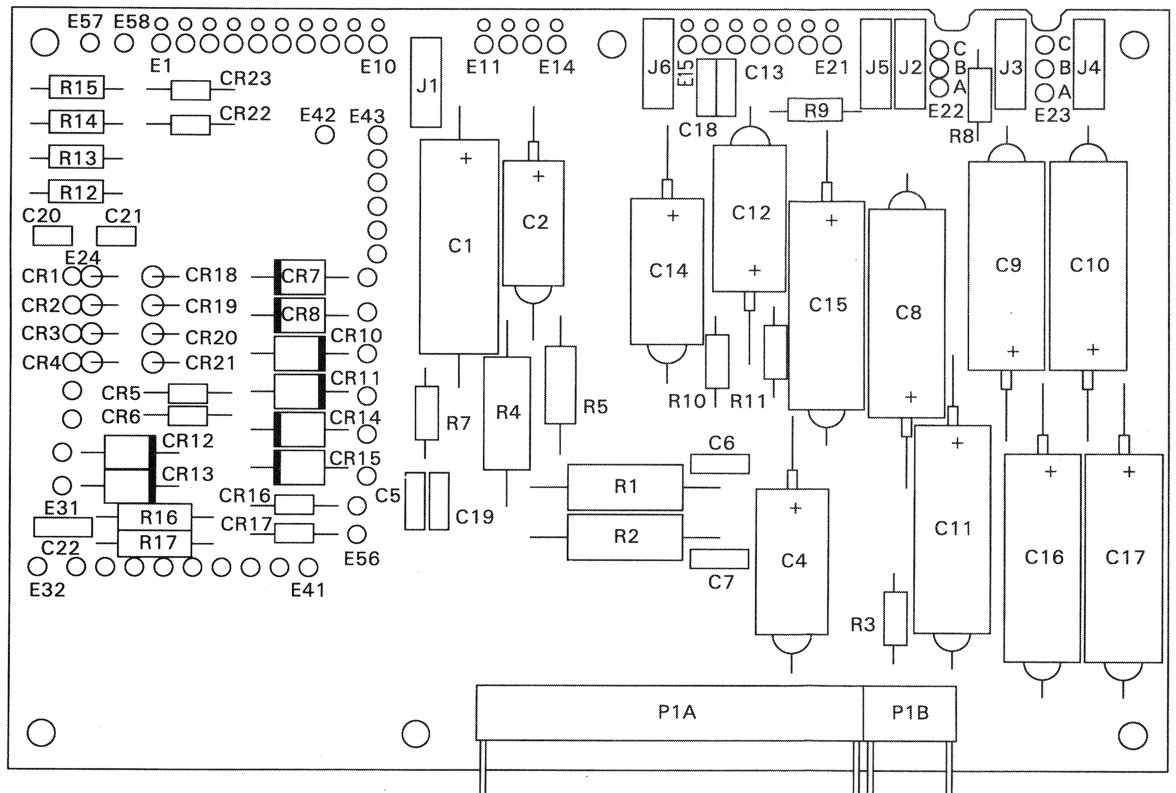
SEE NEXT SHEET





OUTPUT HEATSINK ASSEMBLY A1PS1A4

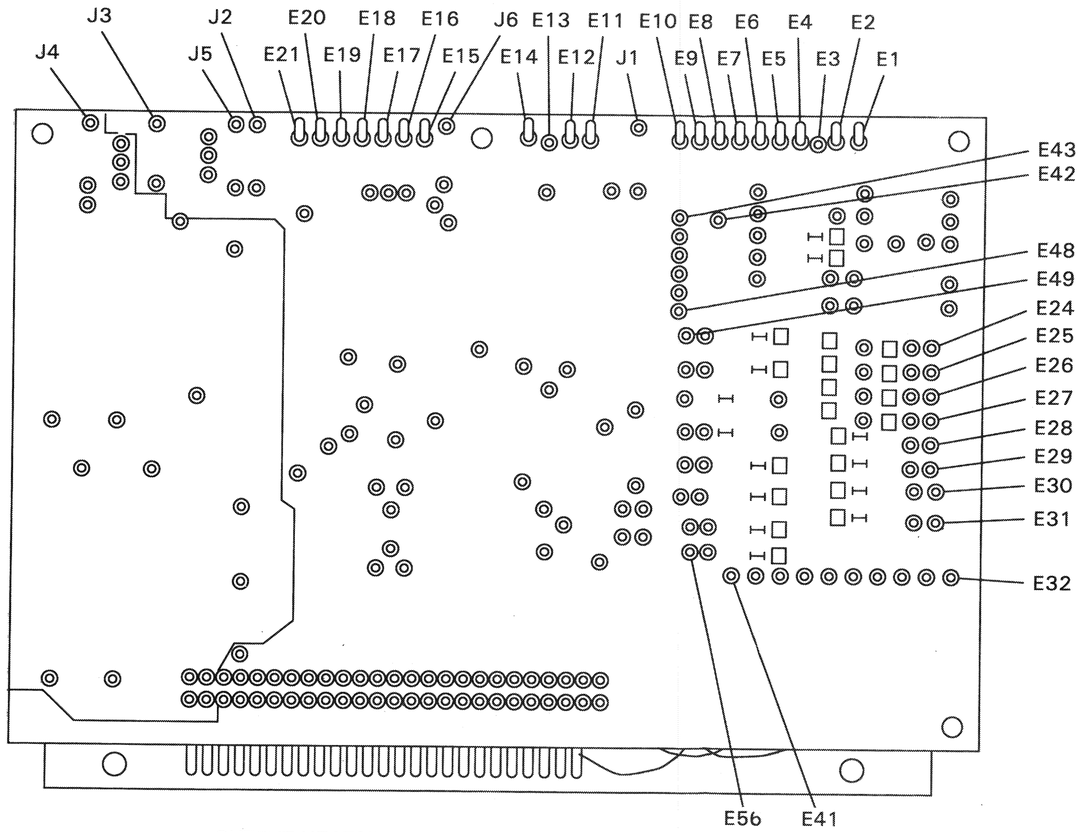
FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 5 of 15)



OUTPUT HEATSINK ASSEMBLY CCA A1PS1A4A1

CEOLV-039

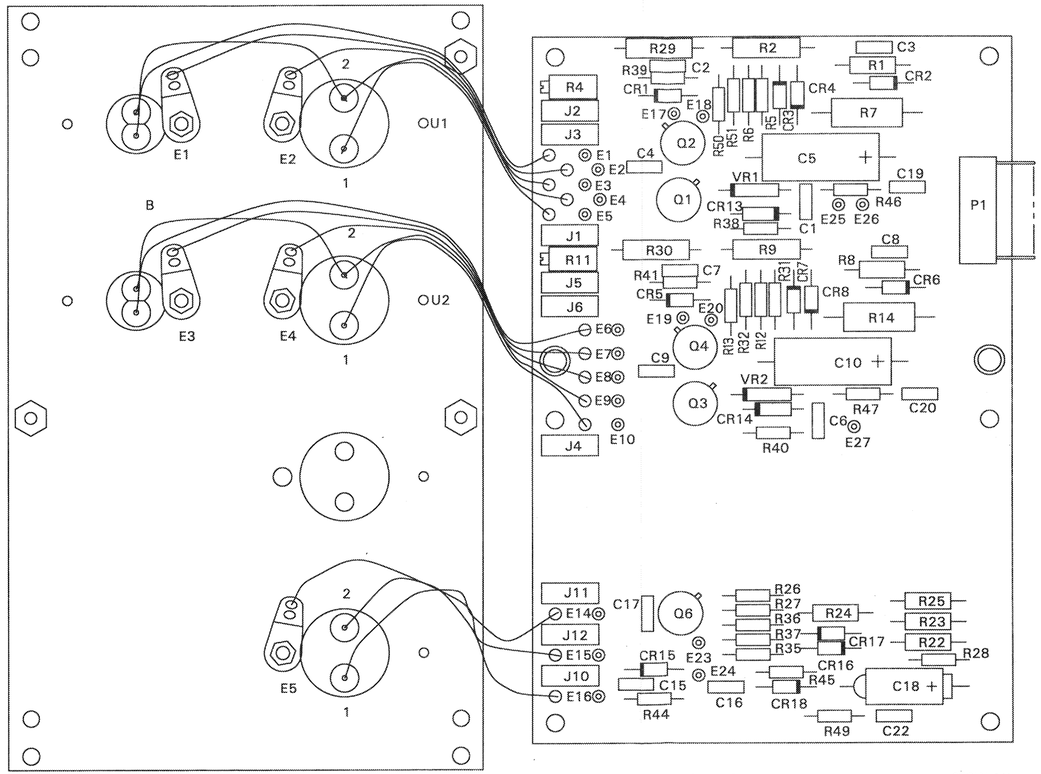
FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 6 of 15)



OUTPUT HEATSINK ASSEMBLY CCA A1PS1A4A1 (FOIL SIDE)

CEOLV-040

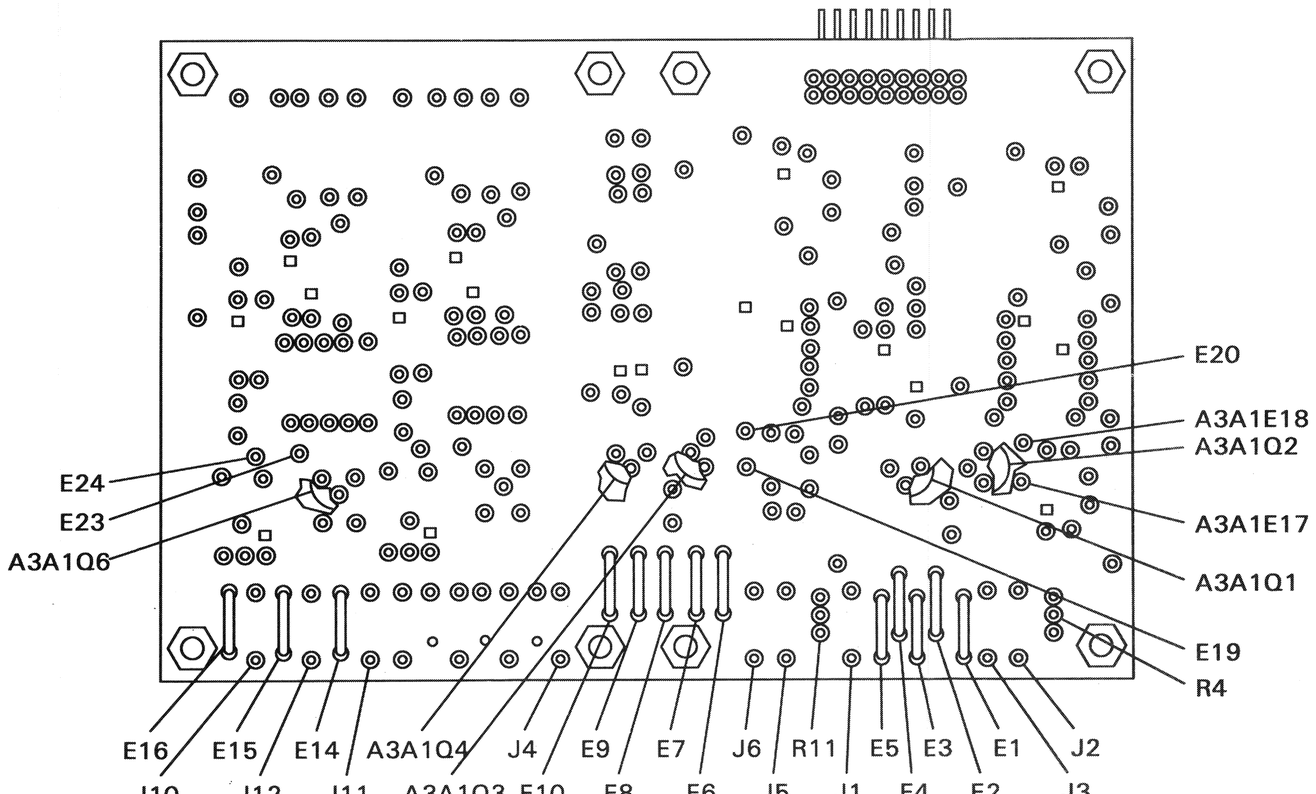
FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 7 of 15)



HIGH VOLTAGE HEATSINK ASSEMBLY A1PS1A3

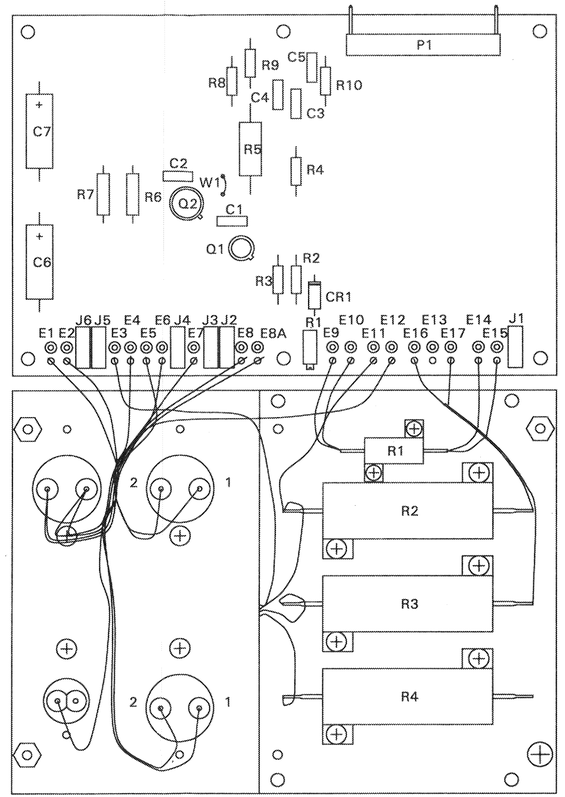
CEOLV-041

FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 8 of 15)



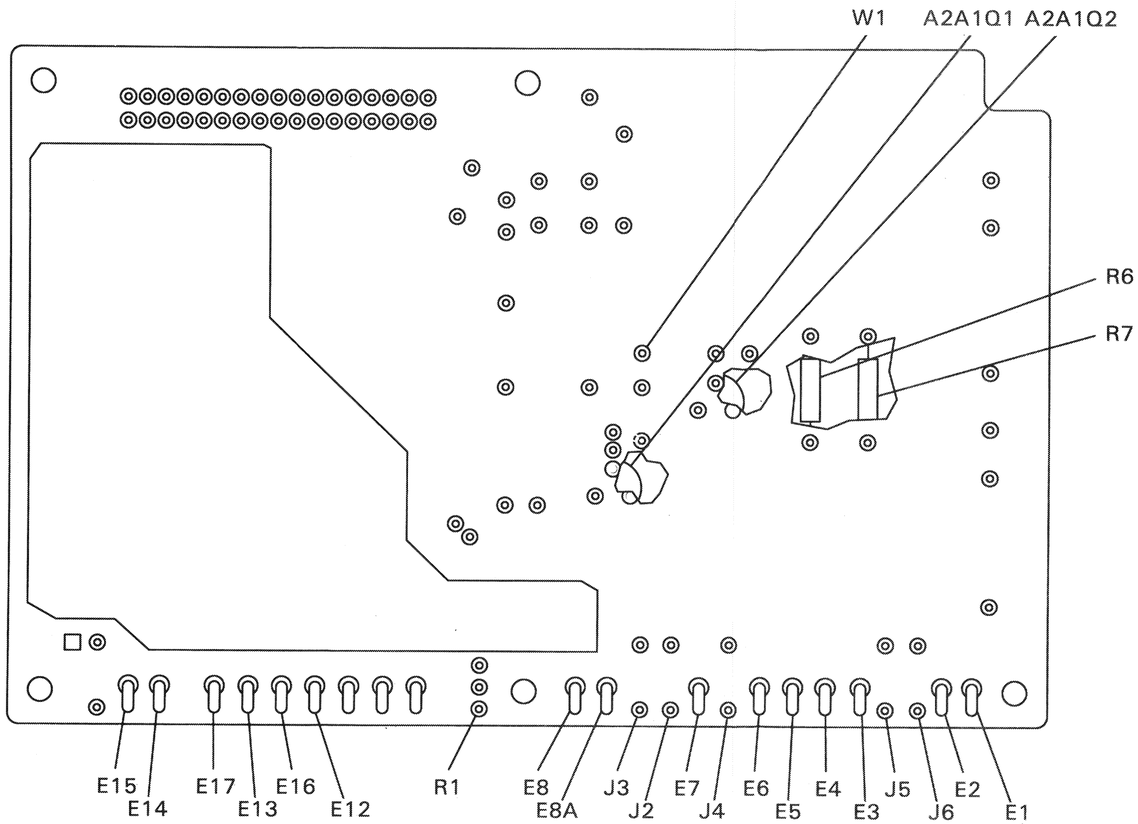
HIGH VOLTAGE HEATSINK ASSEMBLY CCA A1PS1A3A1 (FOIL SIDE)

FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 9 of 15)



TEMPEST HEATSINK ASSEMBLY A1PS1A2 CEOLV-043

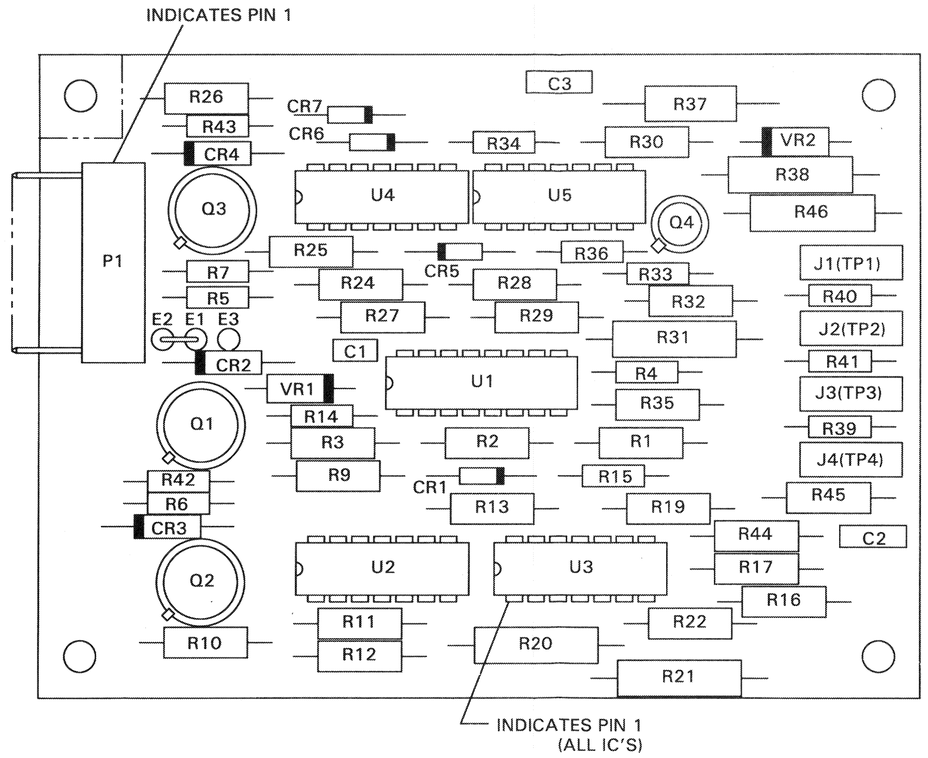
FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 10 of 15)



TEMPEST HEATSINK ASSEMBLY CCA A1PS1A2A1 (FOIL SIDE)

CEOLV-044

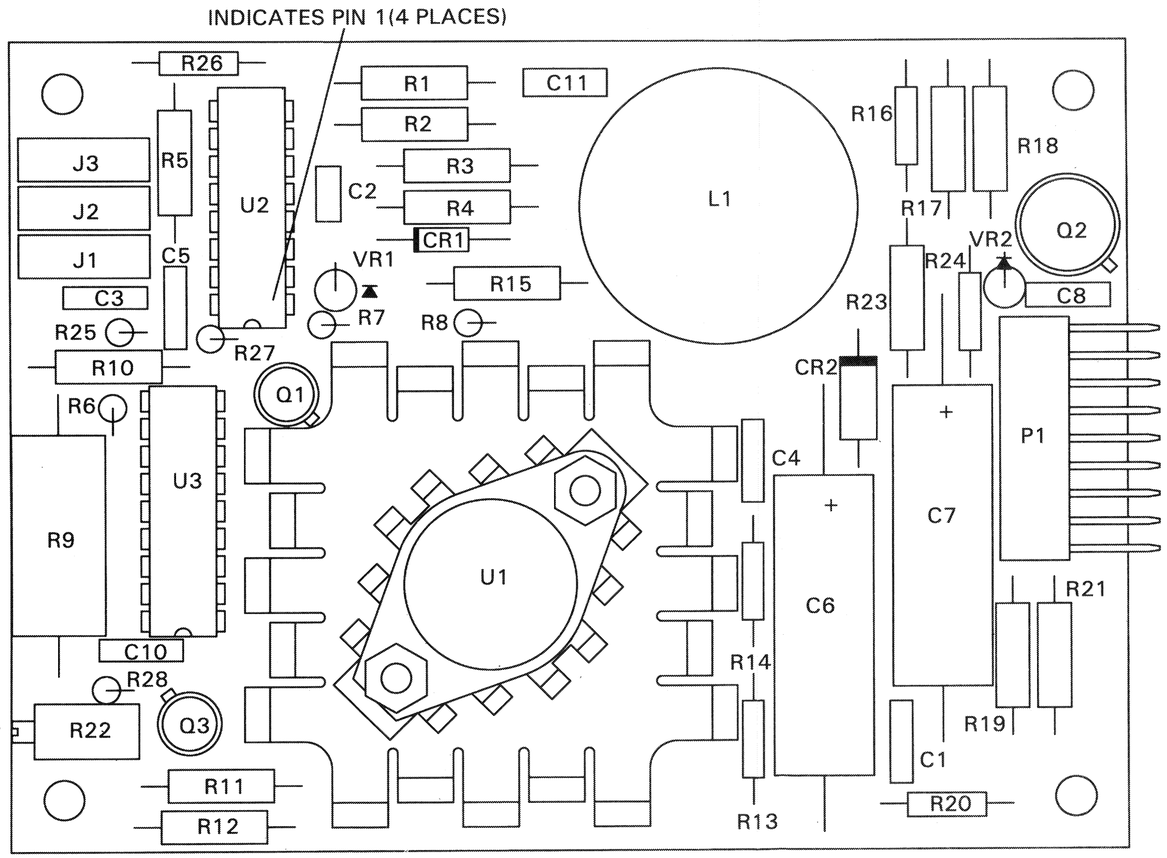
FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 11 of 15)



BITE CCA A1PS1A6

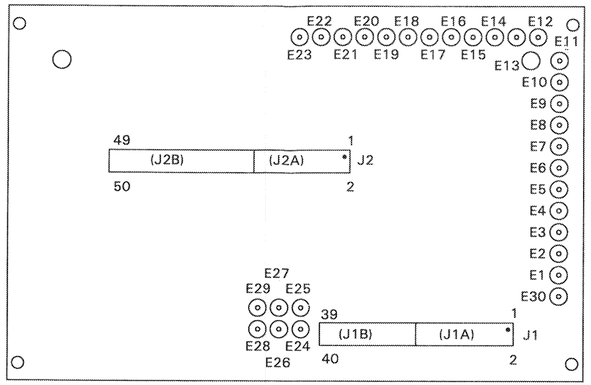
CEOLV-045

FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 12 of 15)

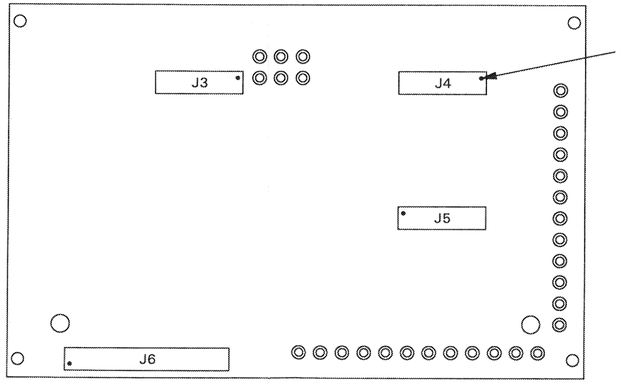


BLACK OUTPUT CCA A1PS1A8

FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 13 of 15)



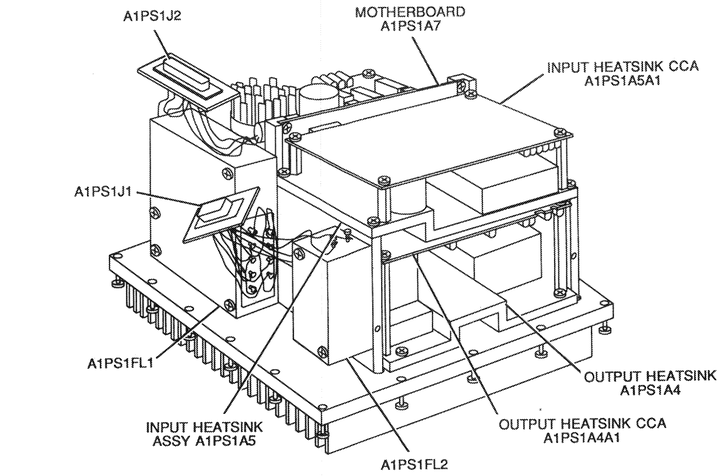
PS1A7 MOTHERBOARD (RIGHT SIDE)



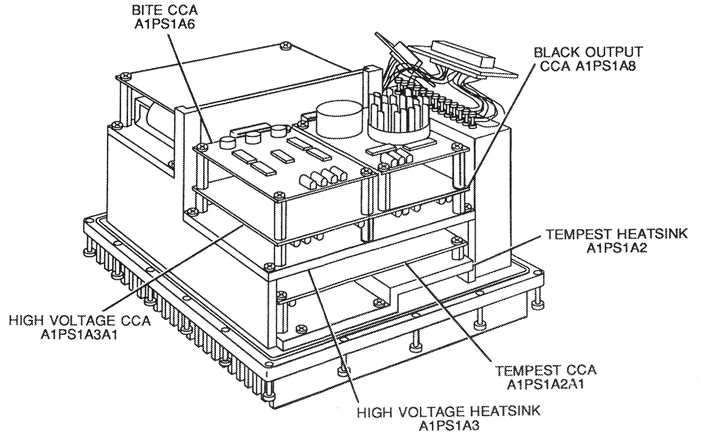
PS1A7 MOTHERBOARD (LEFT SIDE)

CEOLV-047

FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 14 of 15)



(COVERS REMOVED RIGHT SIDE VIEW)



(COVERS REMOVED–LEFT SIDE VIEW) CEOLV-049

FO-14. Power Supply Assemblies
Test Point and Component Location
(Sheet 15 of 15)