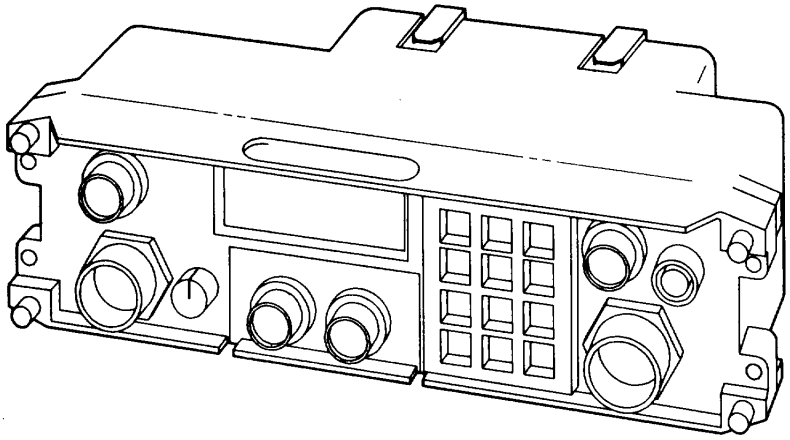
ARMY TM 11-5895-1315-24
NAVY EE005-FG-MMI-010/W110-C11670G
AIR FORCE TO 31R2-4-567-2

UNIT, INTERMEDIATE DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL



**CONTROLLER,
RECEIVER-TRANSMITTER
C-11670/G
(NSN 5895-01-205-0662) (EIC: N/A)**

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

15 JANUARY 1992

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

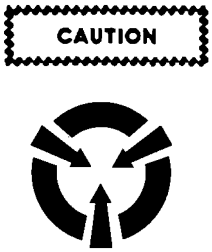
NOTE: DON'T WAIT UNTIL AN ACCIDENT HAPPENS ! READ ABOUT ARTIFICIAL RESPIRATION IN FM21-11. AIR FORCE PERSONNEL REFER TO AFOSH 127-50 AND AFOSH 127-66, CHAPTER 10.

WARNING

Do not put battery in fire or mutilate, may burst or release toxic materials.

WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETH1ANE. Avoid prolonged breathing of vapor. The solvent should not be used near eat or flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, avoid prolonged contact with skin. The use of chemical gloves (solvent resistant), chemical splash goggles and full faceshield are required when using TRICHLOROTRIFLUOROETHANE. DO NOT use compressed air to dry parts when TRICHLOROTRIFLUOROETHANE has been used. TRICHLOROTRIFLUOROETHANE is an ozone-depleting substance.



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 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 material when not installed in the equipment.

Technical Manual
TM 11-5895-1315-24
Technical Manual
NAVY EE005-FG-MMI-010/W110-C11670G
Technical Order
TO 31R2-4-567-2

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

Washington, DC, 15 January 1992

UNIT, INTERMEDIATE DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE MANUAL CONTROLLER, RECEIVER-TRANSMITTER C-11670/G (NSN 5895-01-205-0662) (EIC: N/A)

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-LM-LT, Fort Monmouth, New Jersey 07703-5007.

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 003-242, Washington, DC, 20363-5100.

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

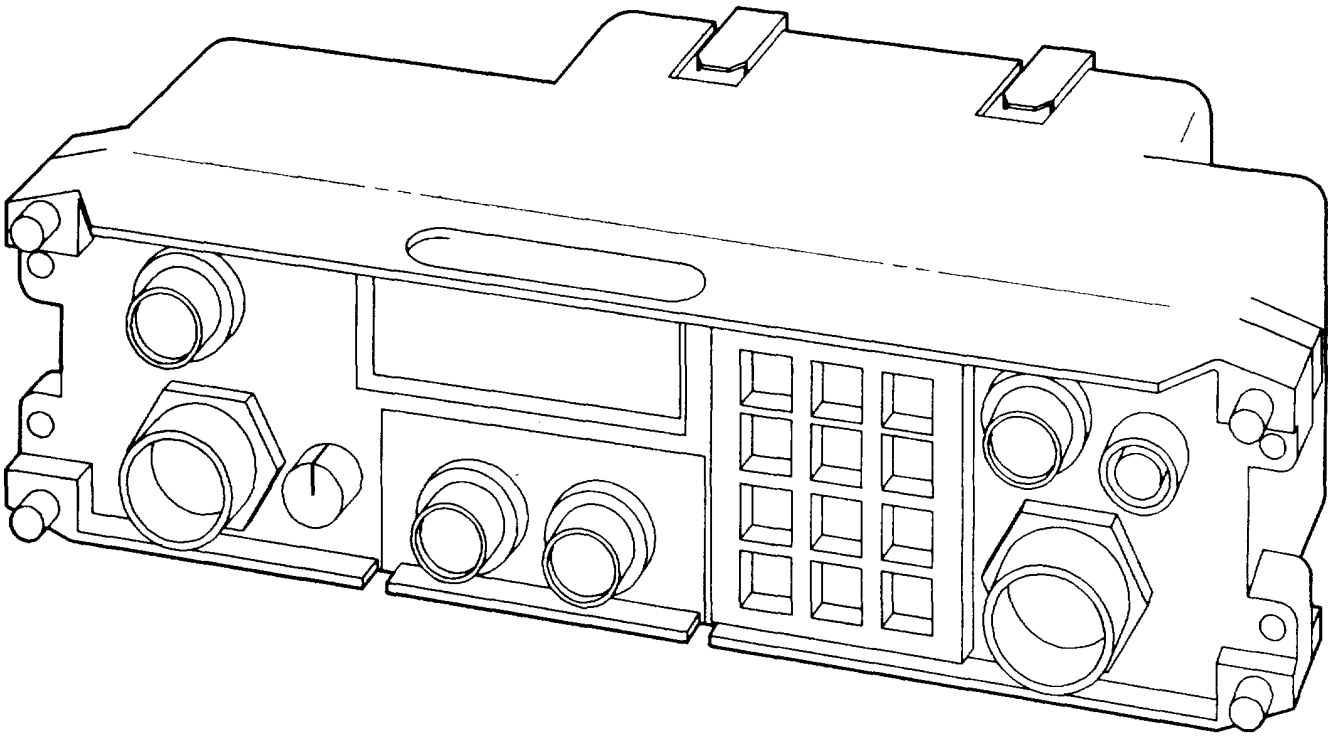
Page

Page

FOLDOUTS

HOW TO USE THIS MANUAL

- The front cover index identifies frequently used information. Each item is identified by topic and page number.
- The first page containing the information you are looking for has a black box on the edge of the page.
- Bend the manual in half and follow the margin 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.



CONTROLLER, RECEIVER-TRANSMITTER C-I 1670/G

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 Number. Controller, Receiver-Transmitter C-11670/G.

c. Purpose of Equipment. Installed in and controls receiver and receiver-transmitter functions in Regency Net (RN) Network, including those that provide jam-resistant communications when operating in the Electronic Counter-Countermeasures (ECCM) mode of operation.

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 00-35D-54 for unsatisfactory equipment reporting. Navy personnel will report maintenance performed utilizing the Maintenance Data Collection Subsystem (MDCS) IAW OPNAVINST 4790.4A, and unsatisfactory material/conditions utilizing the PMS Feedback Report.

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 the design. Put it on an SF-368 (Quality Deficiency Report). Mail it to Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: AMSEL-ED-PH, Fort Monmouth, New Jersey 07703-5007. 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 MATERIEL TO PREVENT ENEMY USE

a. Army. Destroy the Controller, Receiver-Transmitter C-11670/G in accordance with the procedures in TM 750-244-2 to prevent enemy use.

1-5. DESTRUCTION OF MATERIEL TO PREVENT ENEMY USE (Cont.)

b. Navy. Navy Personnel will comply with the local Command Materiel Destruction Plan.

c. Air Force. Air Force personnel comply with TM 750-244-2 or the local emergency destruction plan.

1-6. PREPARATION FOR STORAGE OR SHIPMENT

a. Army. Prepare the Controller, Receiver-Transmitter C-11670/G for storage in accordance with the procedures in TM 740-90-1.

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**
ECCM module	Controller, Receiver-Transmitter C11670/G, P/N A3023813
Battery	Battery, BA-1372/U
Keyboard	Keyboard, Illuminated (A8S1), P/N A3024336

SECTION II. EQUIPMENT DESCRIPTION AND DATA

1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

a. Characteristics

• Uses KGV-10 for Transmission Security (TRANSEC).

• Controls operation of interfaced receiver-transmitters or receivers (voice and data).

• Low power consumption.

• Common to communication terminals throughout the RN system.

b. Capabilities and Features

• All circuit cards are contained in plug-in assemblies with the exception of the display CCA, which is a part of the chassis assembly.

• Can be interfaced through remote input devices.

• Operator interface provided by liquid crystal display (LCD).

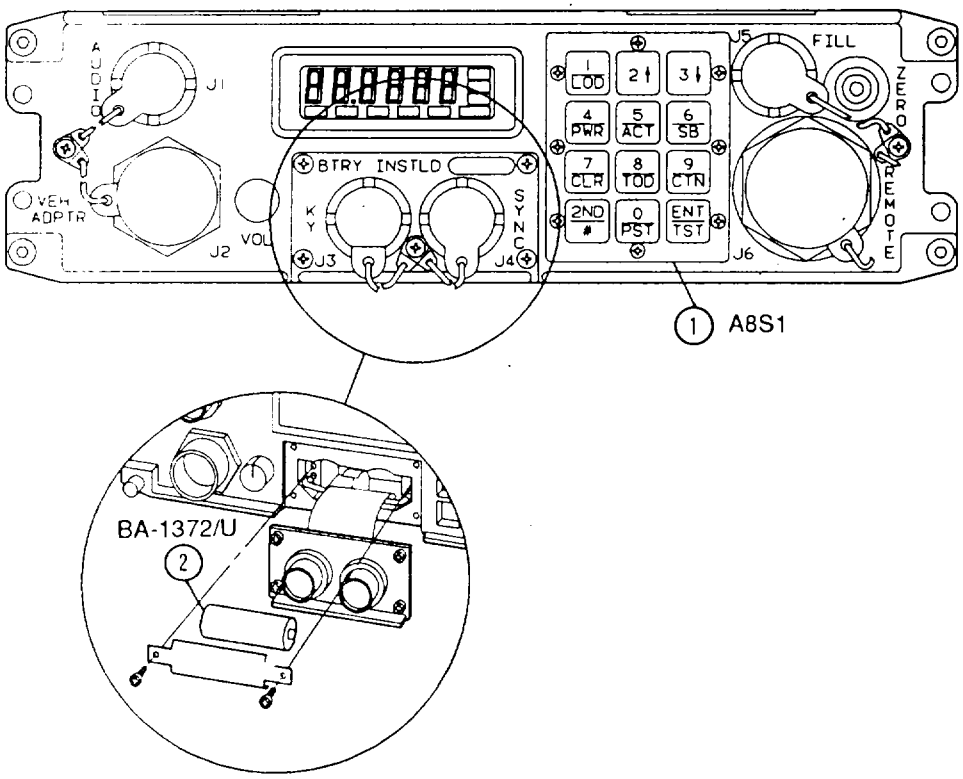
1-8. EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES (Cont.)

- Display easily read from all operating angles.
- Provides control for all functions of receiving and transmitting, including frequency and power selectability.
- Built-in-test (BIT) for fault isolation.

1-9. LOCATION AND DESCRIPTION OF MAJOR COMPONENTS

(1) Keyboard (A8S1), used to change operations of the communications system, to initiate BIT, and to load Crypto variables.

(2) Battery BA-1372/U, used in keep-alive memory circuits when primary power is lost. ECCM Module Front Panel

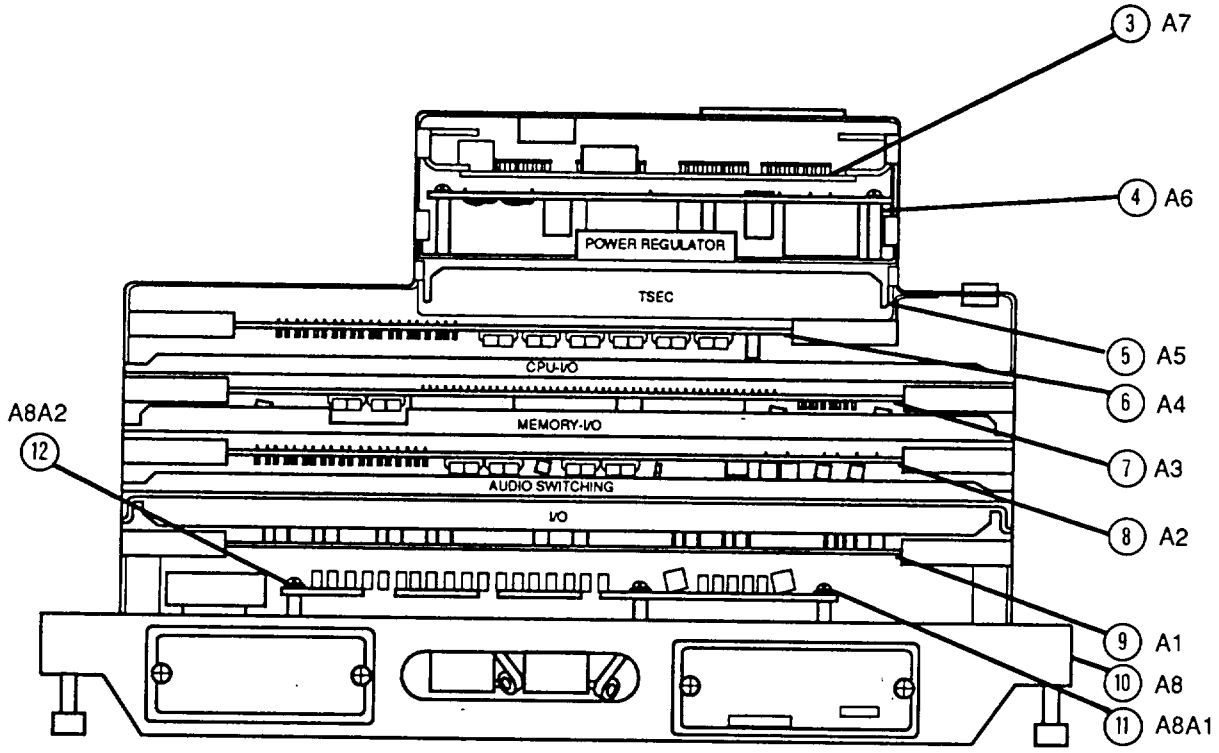


(3) Timing Assembly (A7), uses reference clock frequency of 10 kHz from RT and divides/multiplies to produce all reference frequencies used in the ECCM.

(4) Power Regulator Assembly (A6), provides regulated voltages to all devices in ECCM requiring controlled voltage levels.

(5) TSEC Assembly (A5), contains the Transmission Security device and its interface to the serial data buss.

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



ECCM MODULE CHASSIS AND PANEL TOP VIEW

(6) CPU I/O Assembly (A4), contains the interface between the fill device and TSEC assembly, and controls sending of data to the TSEC assembly. The 8088 and 1802 processors are in this assembly.

(7) Memory I/O Assembly (A3), used for RAM/ROM memory storage for CPU I/O assembly. It contains the serial data interface for the CIU, and controls interrupt for the MUP processor.

(8) Audio Switching Assembly (A2), routes audio to and from RT and handset. Also sets audio levels to and from RN modems.

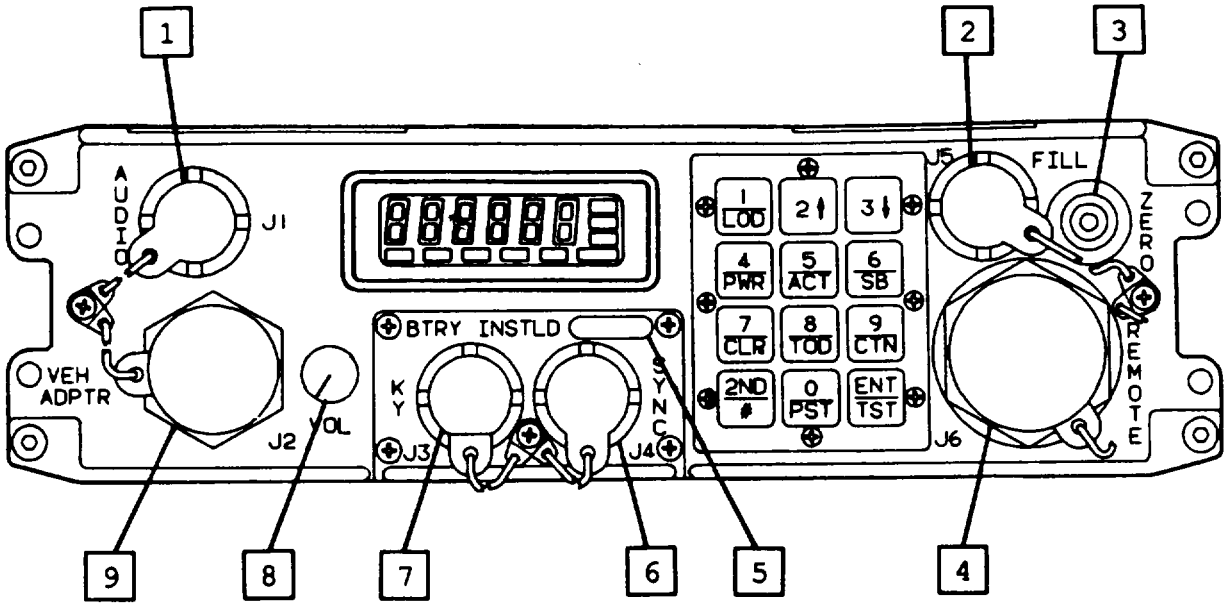
(9) I/O Assembly (Al), provides interfaces to receiver-transmitters RT-1512/G, RT-1511/GRC-215, 400 watt ATU, and RN modem MD-1204/G.

(10) Panel and Chassis Assembly (A8), provides mounting for all assemblies and components that comprise the ECCM module.

(11) Display Assembly (A8A1), provides visual LED display of ECCM operational modes, (i.e., sideband used, power level, etc.) and operational frequency.

(12) Interconnection CCA (A8A2), used as physical mounting point for Al through A7 assemblies. Provides electrical connection from front panel to assemblies.

1-10a. FRONT PANEL CONTROL AND INDICATORS



(1) AAUDIO connector J1 - Interfaces with audio signals from TSEC/KY-75 or handset.

(2) FILL Connector J5 - Interfaces with fill device for loading variables into the ECCM module.

(3) ZERO Switch - Depressing this switch zeroizes all variables in the ECCM module.

(4) REMOTE Connector J6 - Provides interface connections to the RN modem and remote control devices such as the I/O unit.

(5) BATTERY INSTLD - This is space for writing the date when a battery was last installed in the compartment behind front panel of ECCM module. Battery provides for non-destructive storage of variable and presets when equipment is powered-off.

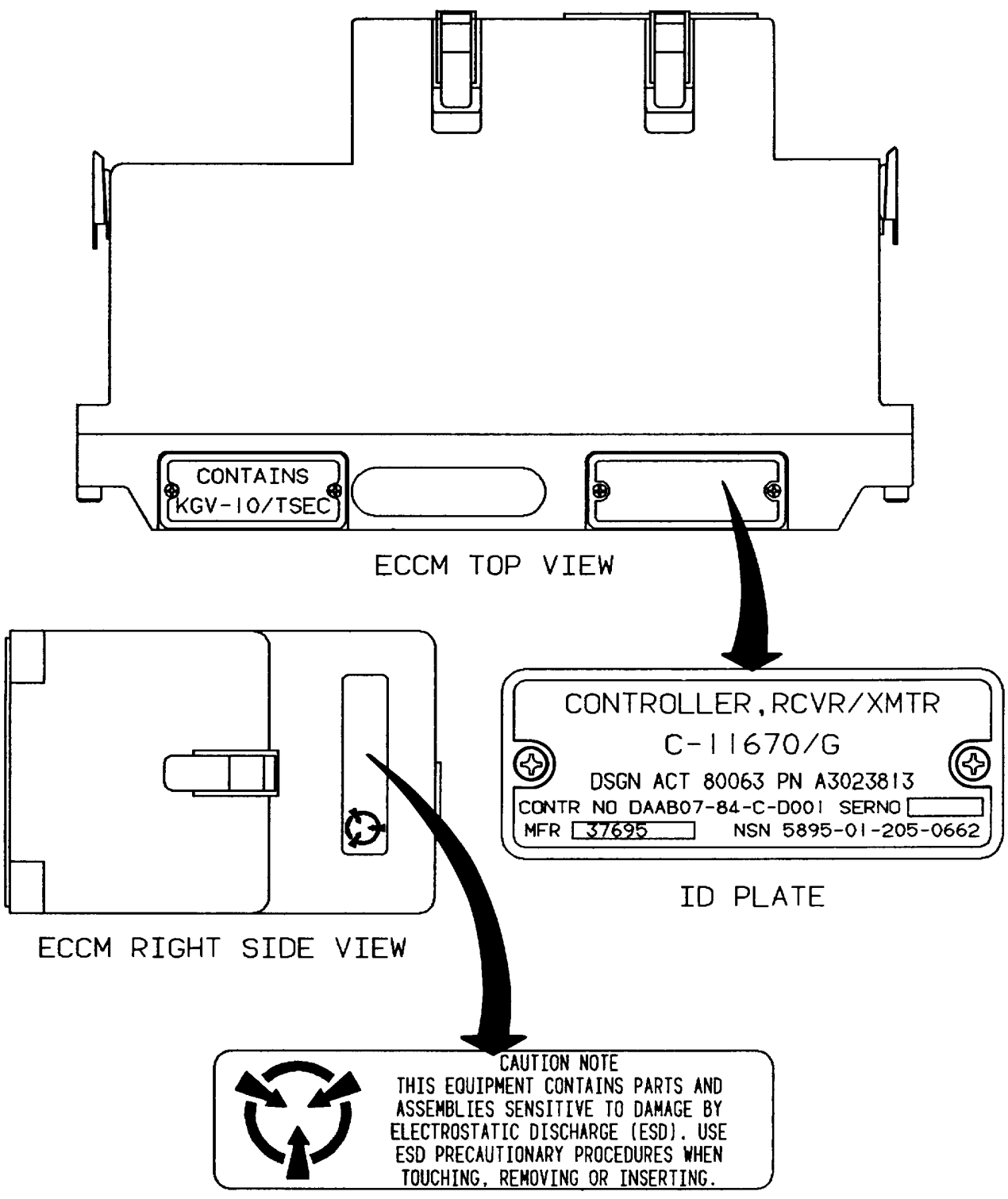
(6) SYNC Connector J4 - Provides audio signals and synchronized push-to-talk (PTT) keying from the R/T to TSEC/KY-75.

(7) KY Connector J3 - When operating in secure voice mode, the handset is connected to this connector. It obtains PTT keying for processing and routes audio signals to the SYNC connector J4.

(8) VOL Control - Adjusts receive audio level to AUDIO connector J1.

(9) VEH ADPTR Connector J2 - Provides interface from ECCM module to control the synthesizer in the vehicular adapter. (Not used in Force Terminal).

1-10b. IDENTIFICATION AND INSTRUCTION PLATES



1-11. EQUIPMENT DATA

a. Electrical Characteristics:

- Power input - +18 Vdc to +32 Vdc
- Power consumption - 6 watts (maximum), 2.5 watts nominal in low power configuration.
- Local or remote control
- Data and voice ECCM or non-ECCM operating capability
- Compatible with Receiver-Transmitters RT-1511/GRC-215 and RT-1512/G and Radio Receiver R-2322/G.

b. Physical Characteristics:

- Width - 10.85 in.
- Height - 3.15 in.
- Depth - 4.69 in.
- Weight - 8 lb.

1-12. SAFETY, CARE, AND HANDLING

CAUTION

Prior to removing or installing a component, ensure that power to the component has been turned off. Cables disconnected 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 overtightened and damage to the connector and pins may occur.

CAUTION

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

- Any maintenance 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.

1-12. SAFETY, CARE, AND HANDLING (Cont.)

- 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 equipment.

SECTION III. PRINCIPLES OF OPERATION

1-13. GENERAL

a. The ECCM module provides all the control functions for the Receiver-Transmitter RT-1512/G and RT-1511/GRC-215 or Receiver R-2322/G. In addition, it supports each of the ECCM modes in the Regency Net system. The ECCM module plugs in and becomes an integral part of the RT or receiver units.

b. All radio functions, including operating frequency, power level, sideband, etc., are selected by means of a keyboard on the front panel of the ECCM module. The operating frequency and mode are displayed by means of an LCD display.

c. The ECCM module also accepts full function remote control data from the control interface unit control bus. When being remotely controlled, the local keyboard and display are disabled.

d. Fault BIT signals are received from other units and processed in the ECCM module. When a fault occurs the ECCM module indicates this on its display. The modules or units at fault can be determined by fault codes displayed on the ECCM module by keyboard inputs.

1-14. FUNCTIONAL DESCRIPTION OF THE ECCM MODULE

a. The ECCM module provides control signals to an R/T or a receiver. Three microprocessors are used in the ECCM module to control timing and the operation of the ECCM. Some of the items controlled are frequency changes, power output (low, medium, or high), mode of operation (single-sideband lower or upper), and crypto variables. The functional block diagram shows only circuits necessary to illustrate general module operation. Note that this is a triple computer processing unit multiplexed bus system. This means that there are three completely separate subsystems which are running different programs.

1-14. FUNCTIONAL DESCRIPTION OF THE ECCM MODULE (Cont.)

b. Multiplexed Data Bus. The multiplexed data bus provides connection for the microprocessors to communicate with all other devices in the ECCM module via the data bus. Devices are in tri-state mode unless enabled by the address decoder. This means that the microprocessors can transmit or receive data from any device on the bus while all others are isolated from it.

c. Microprocessors. In general, these devices get instructions from the program memory and execute them. The execution of an instruction may be a transfer of data to or from any of the other devices on the bus or an internal operation such as a calculation or a program branch.

d. Read only memory (ROM) and random access memory (RAM). ROMs are used for program and permanent data storage. The microprocessor uses the address bus, the address decoder, and the memory read signal to access a specific location. The RAM is accessed in a similar manner except it has the capability of having data read from or written into (stored in) memory according to a memory read or write signal.

e. Address Decoder. Each of the three microprocessors have a separate address decoder. The address decoders are used to access a specific device on the appropriate data bus.

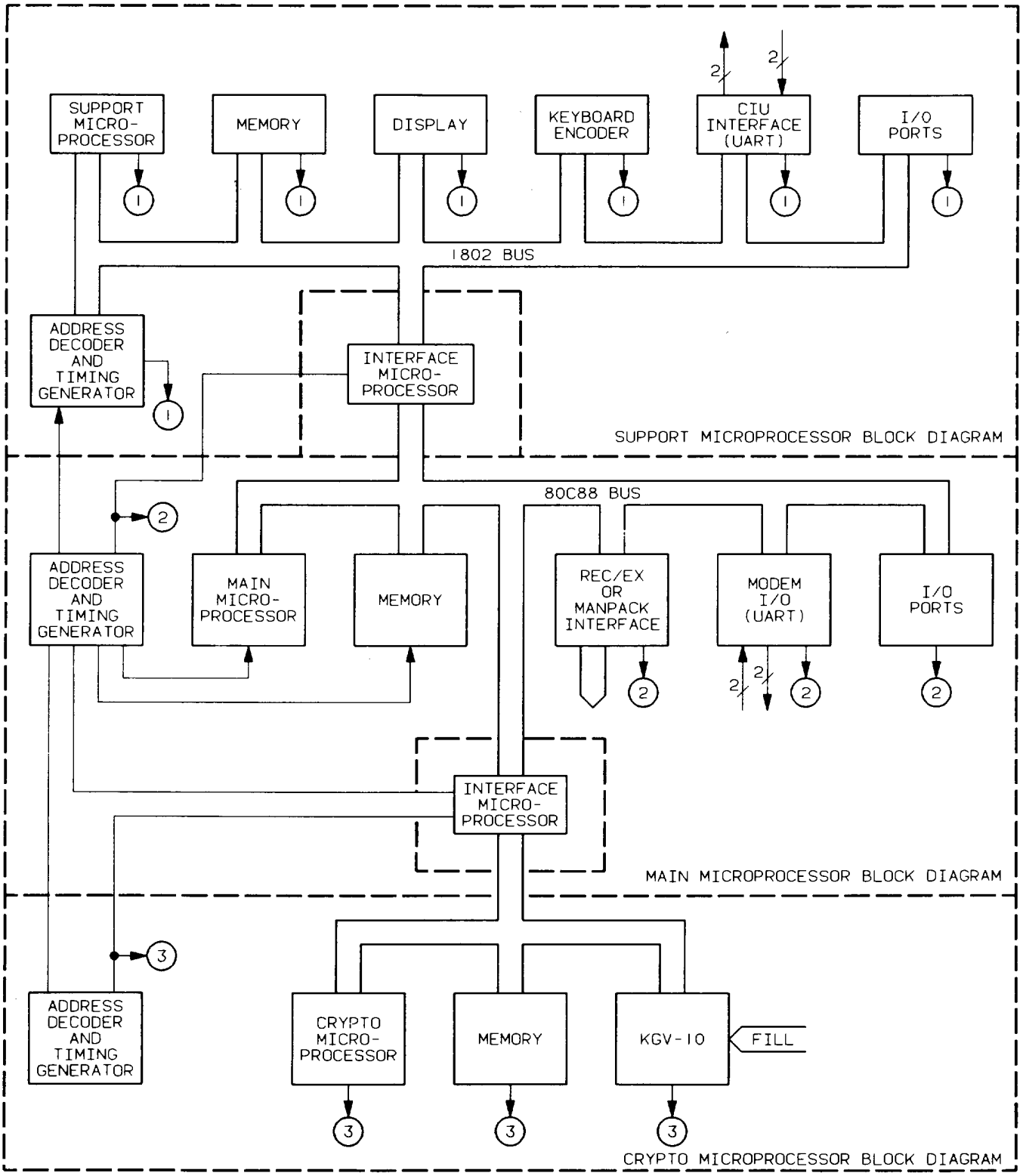
f. Microprocessor to microprocessor Interface. The interface is a temporary storage device which allows for data transfer between the microprocessors. When the interface receives data from one microprocessor, it stores this data and signals the other microprocessor. The signalled microprocessor responds by reading the data from the interface.

g. Timing Generator. The timing generator uses a very accurate reference clock to generate clock signals of various frequencies. These clocks are used by the microprocessors, universal asynchronous receiver-transmitters (UARTs) and other devices.

h. UARTs. These devices permit the microprocessors to communicate with the control interface unit (CIU) and the RN Modem (MD-1204/G) when installed in a systems environment.

i. I/O Ports. The input/output (I/O) ports are temporary storage devices similar to the microprocessor to microprocessor interface. The output lines of the input ports are connected to the data bus and are enabled by the address decoder. The input lines of the output ports are connected to the data bus and transfer data to the output lines when signalled by the address decoder. The output lines of the output ports are always enabled.

1-14. FUNCTIONAL DESCRIPTION OF ECCM MODULE (Cont.)



NOTE: CIRCLED NUMBERS ARE TIED BACK TO THE SAME NUMBER AT THE ADDRESS DECODER BLOCK

1-14. FUNCTIONAL DESCRIPTION OF THE ECCM MODULE (Cont.)

j. LCD Display. The display is a seven segment LCD display controlled by two display drivers. Data and clocking of the display drivers are controlled by the support microprocessor.

k. Keyboard. The keyboard is a 4 row by 3 column switch matrix that shorts a single row to a single column corresponding to the key depressed. This information is received and interpreted by an encoder in the ECCM module. The support microprocessor reads the encoded information from the encoder via the data bus.

1. Built-In-Test-Equipment (BITE) Circuitry. The ECCM module has extensive BITE circuitry which is incorporated in all three microprocessors and throughout the entire ECCM module. For this reason it is not shown as a block on the block diagram.

1-15. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS

a. Battery. The battery provides the keep-alive voltage for the memory circuits in the ECCM module when power is off. This battery power is also used by the memory keep-alive circuits when an ECCM module is removed from one unit and installed on another unit. It can be reinstalled on the same unit after repairs have been made to that unit. This eliminates the necessity of reloading data and other variables into the ECCM module.

b. Keyboard. The keyboard encodes inputs and sends this data to the microprocessor. Frequency changes, power output (low, medium, or high) changes, single sideband (lower or upper) operation changes, crypto variables loading, and BIT initiation can be entered through the keyboard.

c. Timing Assembly (A7). The A7 assembly uses a reference clock frequency of 10 kHz from RT and divides/multiplies to produce 8 mHz, 4 mHz, 2 mHz, 500 k Hz, 3 kHz, 300 Hz, 5 Hz, and 1 PPS reference frequences used in the ECCM.

d. Power Regulator Assembly (A6). The power regulator operates on 18 to 32 Vdc, and provides regulated outputs of +6.3, +12, -12, and -29 Vdc (not used) to the A8A2 interconnection CCA, where they are distributed to the assemblies requiring regulated voltages.

e. TSEC Assembly (A5). The A5 assembly contains the transmission security device. It also contains the output interface for the TSEC device.

f. CPU I/O Assembly (A4). The A4 contains the 8088 and 1802 processors and their interfaces. It also contains the interface between the fill device and TSEC assembly. It controls the sending of data to the TSEC assembly.

1-15. FUNCTIONAL DESCRIPTION OF MAJOR COMPONENTS (Cont.)

g. Memory I/O Assembly (A3). The A3 contains the RAM/ROM for the 8088 and 1802 processors in the CPU I/O module. It contains the interrupt control circuitry for the MUP processor, and the serial data interface to the CIU.

h. Audio Switching Assembly (A2). The A2 assembly has two main functions. The first is to route audio to and from RT and handset. The second is to set audio levels to and from the RN modem. It contains the CUP (8031) processor and its ROM. The 8031 processor controls data to the TSEC Assembly.

i. I/O Assembly (Al). The Al assembly contains interfaces to the synthesizer module in the receiver-transmitter RT-1512/G to tune the RT and 400 watt ATU. It also contains the interface for the receiver-transmitter RT-1511/GRC-215 and the RN modem serial data port.

j. Panel and Chassis Assembly (A8). The A8 provides mounting for all assemblies and components that comprise the ECCM module.

k. Display Assembly (A8A1). The display is a LCD type display, driven by two drivers also mounted on the A8A1 CCA. The keyboard interface is located on the display CCA. The A8A1 is mounted on the rear of the front panel.

l. Interconnection CCA (A8A2). The A8A2 is used as the physical mounting point for the Al through A7 assemblies. The front panel components J1, J2, J5, J6, R1, and S1 are actually part of the A8A2 CCA, connected by ribbon cable.

CHAPTER 2
UNIT MAINTENANCE

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

1-1. 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, Appendix B.

2-3. REPAIR PARTS

Repair parts used during unit maintenance are listed and illustrated in the repair parts and special tools list located in TM 11-5895-1315-24P (Navy) EE005-FG-PLD-010/WllO-C11670G (Air Force) TO 31R2-4-567-4.

SECTION II. SERVICE UPON RECEIPT

2-4. UNPACKING

There are no special procedures for unpacking the ECCM Module. However, avoid damaging the container during unpacking operation and report the empty container through established supply channels or, if applicable, use it to package another unserviceable ECCM Module.

2-5. CHECKING UNPACKED EQUIPMENT

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the 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. Refer to DA Pam 25-30 to see if your equipment has had any Modification Work Orders (MWO) applied.

2-6. PRELIMINARY SERVICING AND ADJUSTMENT OF EQUIPMENT

At the Unit and Intermediate levels of maintenance the ECCM and its mating Receiver-Transmitter or Receiver are always replaced as one unit. Therefore replacement procedures are found in the following manuals.

Receiver-Transmitter RT-1512/G	(Army) TM 11-5895-1303-24 (Navy) EE162-NG-MMI-010/WIlO-RT1512G (Air Force) TO 31R2-4-562-2
Receiver, Radio R-2322/G	(Army) TM 11-5895-1310-24 (Navy) EE020-JM-MMI-010/WIlO-R2322G (Air Force) TO 31R2-4-566-2
RT-1511/GRC-215	(Army) TM 11-5895-1318-24 (Navy) EE150-LS-MMI-010/WIlO-RT1511 (Air Force) TO 31R2-2GRC215-42

The following procedures are performed before equipment is put into operation:

a. Check all connectors

- Check that connectors are securely mounted to chassis
- Connector pins will not be bent or broken
- Ensure all connector covers are present and on connectors not used

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

b. Check panel mounted switches

* Set power switches on receiver-transmitter or receiver to off before installing ECCM.

c. Check general mechanical condition of ECCM

- Check display is securely mounted in front panel.
- Check that keyboard is securely mounted in front panel.
- Check that BTRY INSTLD plate is securely mounted in panel.
- Check that ECCM module is securely mounted to the radio.

NOTE

Battery is not supplied with ECCM Module. Contact intermediate general support maintenance for battery installation.

SECTION III. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

2-7. GENERAL

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 should be reported and corrected when found.

- Cleaning and dusting.
- Checking for frayed or loose cables.
- Covering unused receptacles
- Checking for loose nuts, bolts, and screws.

2-7. INTRODUCTION (Cont.)

b. 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 specifies the item that is to be checked.

(4) Procedures column. This column describes the procedure by which the check is to be performed.

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

Item No.	Interval M	Interval O	Item To Be Inspected	Procedures
1	•		End item equipment	Inspect for completeness
2		•	Battery	Check condition of battery by programming a preset frequency into the ECCM module. Remove power from the ECCM module for 5 minutes. Reconnect power and call up preset frequency just programmed. If frequency is not retained in memory, replace battery. Procedures for programming frequencies are in TM 11-5895-1218-12 (Navy) EE150-LQ-OMI-010/WllO-TRC179V1 (Air Force) TO 31R2-2TRC179-21 and TM 11-5895-1220-12 (Navy) EE160-RG-OMI-010/Wl10-GRC215 (Air Force) TO 31R2-2GRC215-1.
3	•		Communications equipment performance	Initiate terminal off-line BIT. If BIT fails, refer to trouble-troubleshooting procedures in Section IV, Chapter 2.

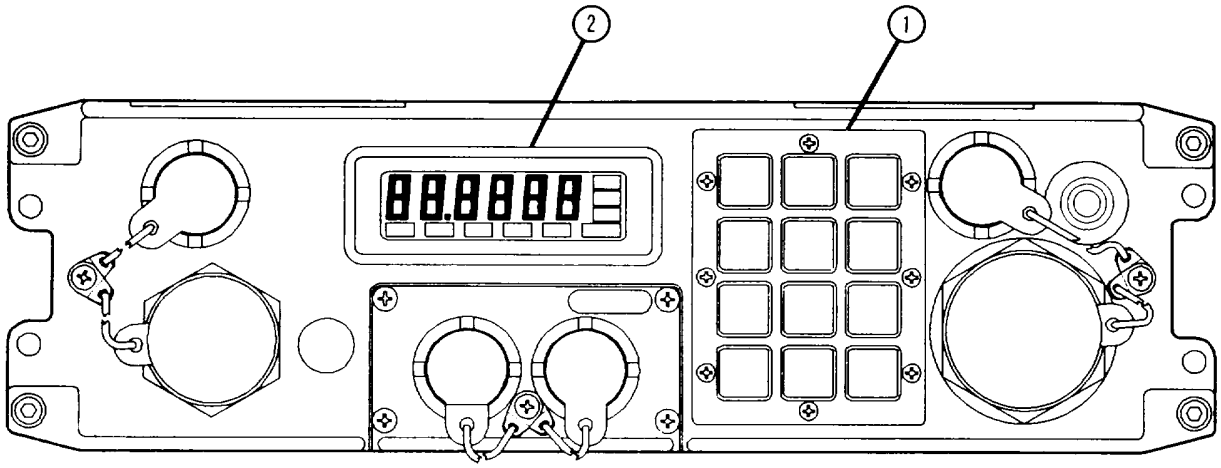
SECTION IV. UNIT TROUBLESHOOTING

2-9. GENERAL

a. Unit level troubleshooting procedures for the ECCM module are simplified and consist of both on-line and off-line built-in test (BIT) and fault detection capabilities. BIT is to be initiated only when the ECCM Module is connected with a receiver-transmitter or receiver for the test to be reliable.

2-9. GENERAL (Cont.)

- ECCM module off-line BIT is initiated automatically upon power-up or by keyboard (1) entries.
- ECCM module BIT will indicate a defective ECCM, which is denoted by fault codes on the display (2).



b. Defects and corrective measures for items listed below are not a part of BIT. These should be corrected as noted:

- Front panel control knob replacement.
- Front panel connector dust cover replacement.

2-10. TROUBLESHOOTING PROCEDURES

Troubleshooting the ECCM Module is limited to running the BIT test with the ECCM installed in its respective receiver or receiver/transmitter. If a fault is detected during BIT, "FAILED" will be shown on the LCD display, and the small "FAIL" LCD will come on. The ENT (enter) switch is then depressed to display the fault code number. Refer to the following manuals for fault code numbers and ECCM module replacement procedures.

- TM-11-5895-1318-24 (Navy) EE150-LS-MMI-010/WllO-RT1511 (Air Force) TO 31R2-2GRC215-42
- TM 11-5895-1310-24 (Navy) EE020-JM-MMI-010/WllO-R2322G (Air Force) TO 31R2-4-566-2
- TM 11-5895-1303-24 (Navy) EE162-NG-MMI-010/WllO-RT1512G (Air Force) TO 31R2-4-562-2

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), Appendix B.

2-12. OPERATIONAL CHECK

Upon completion of corrective action and before returning the ECCM module to service, check the operational condition of the ECCM module by initiating BIT as described in TM 11-5895-1218-12 (Navy) EE150-LQOMI-010/WllO-TRC179Vl (Air Force) TO 31R2-2TRC179-21 or in TM 11-5895-1220-12 (Navy) EE160-RG-OMI-010/WllO-GRC215 (Air Force) TO 31R22GRC215-1.

2-13. INSPECTION OF INSTALLED ITEMS

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

2-14. REPLACEMENT OF CONNECTOR COVER J1 OR J2

INITIAL SET UP

Tools	Equipment Condition
Tool Kit TK-101/G Work station, Static	Power removed. If required, covers can be removed and replaced with ECCM module in the RT or receiver and power applied.
Materials/Parts	
Connector covers A3028769-3, A3028769-1	

CAUTION

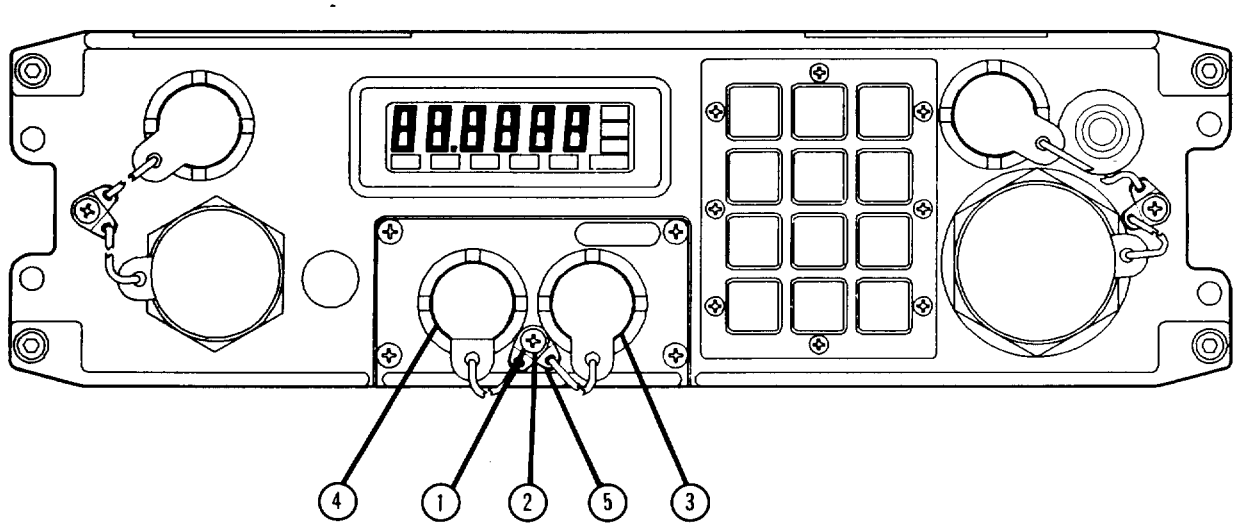
This equipment contains components that are sensitive to damage by ESD. Improper handling will result in component and assembly failure. Use extreme caution when handling, especially do not touch pins in the connectors. Refer to DOD-HDBK-263 for proper handling procedures.

REMOVE CONNECTOR COVER J1 OR J2

STEP 1. Remove screw (1) and lockwasher (2) holding J1 and J2 connector cover lanyards to front of ECCM module.
STEP 2. Remove cover (3) or (4) with lanyard as applicable.

REPLACE CONNECTOR COVER J1 OR J2

STEP 1. Place screw (1) into lockwasher (2) and both lanyard retainers (5) and secure to front panel of ECCM module.
STEP 2. Place connector cover over connector as applicable.



ECCM MODULE FRONT PANEL

2-15. REPLACEMENT OF CONNECTOR COVER J3 OR J4

INITIAL SET UP

Tools	Equipment Condition
Tool Kit TK-101/G Work station, Static	Power removed. If required, covers can be removed and replaced with ECCM module in the RT or receiver and power applied.
Materials/Parts	
Connector covers A3028769-3	

CAUTION

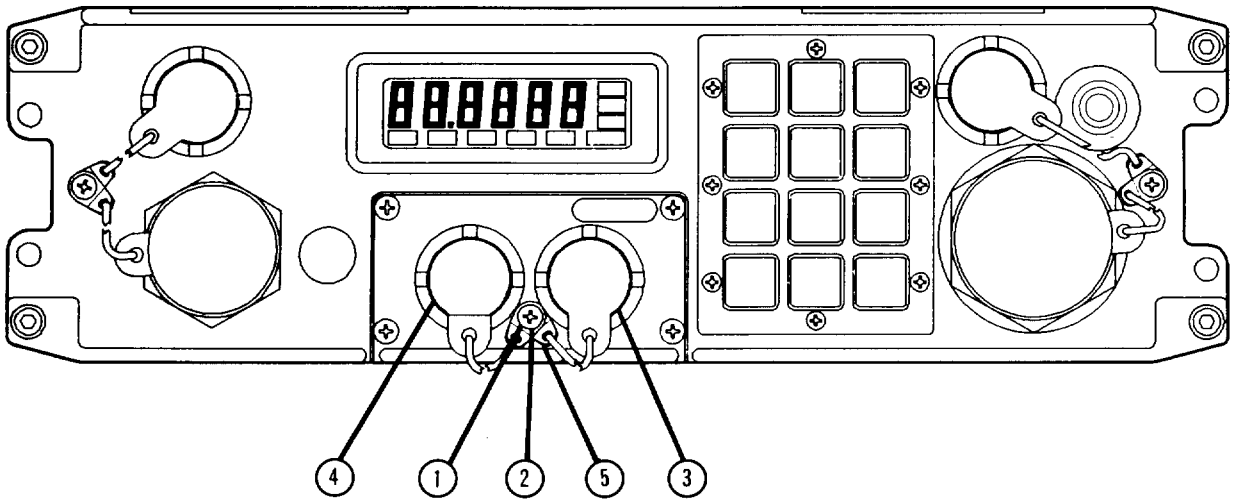
This equipment contains components that are sensitive to damage by ESD. Improper handling will result in component and assembly failure. Use extreme caution when handling, especially do not touch pins in the connectors. Refer to DOD-HDBK-263 for proper handling procedures.

REMOVE CONNECTOR COVER J3 OR J4

STEP 1. Remove screw (1) and lockwasher (2) holding J3 and J4 connector cover lanyards to front of ECCM module.
STEP 2. Remove cover (3) or (4) with lanyard as applicable.

REPLACE CONNECTOR COVER J3 OR J4

STEP 1. Place screw (1) into lockwasher (2) and both lanyard retainers (5) and secure to front panel of ECCM module.
STEP 2. Place connector cover over connector as applicable.



ECCM MODULE FRONT PANEL

2-16. REPLACEMENT OF CONNECTOR COVER J5 OR J6

INITIAL SET UP

Tools	Equipment Condition
Tool Kit TK-101/G Work station, Static	Power removed. If required, covers can be removed and replaced with ECCM module in the RT or receiver and power applied.
Materials/Parts	
Connector covers A3028769-3	

CAUTION

This equipment contains components that are sensitive to damage by ESD. Improper handling will result in component and assembly failure. Use extreme caution when handling, especially do not touch pins in the connectors. Refer to DOD-HDBK-263 for proper handling procedures.

REMOVE CONNECTOR COVER J5 OR J6

STEP 1. Remove screw (1) and lockwasher (2) holding J5 and J6 connector cover lanyards to front of ECCM module.

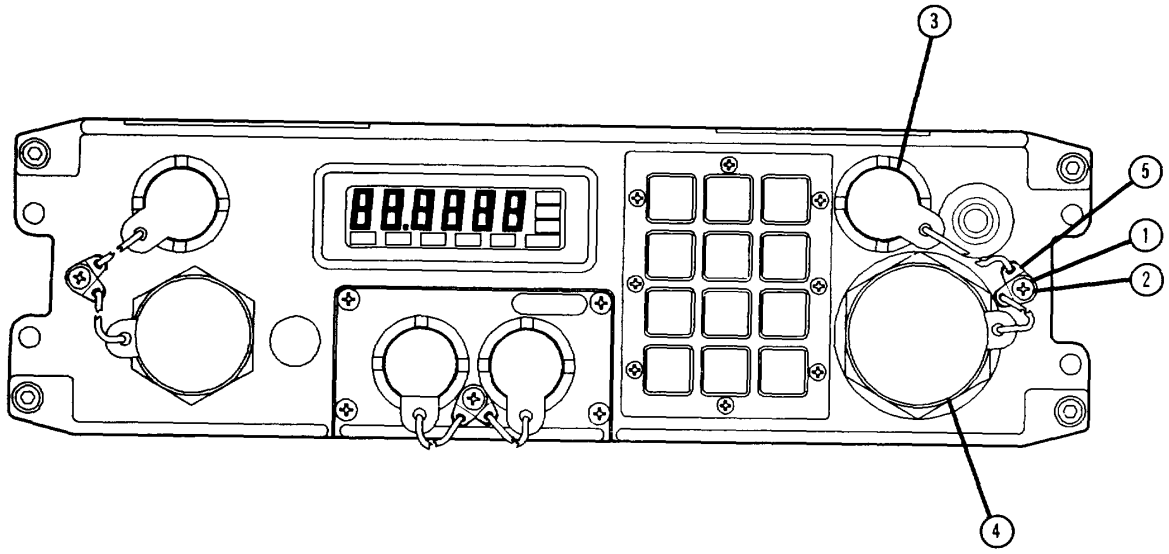
STEP 2. Remove cover (3) or (4) with lanyard as applicable.

REPLACE CONNECTOR COVER J5 OR J6

STEP 1. Place screw (1) into lockwasher (2) and both lanyard retainers (5) and secure to front panel of ECCM module.

STEP 2. Place connector cover over connector as applicable.

2-16. REPLACEMENT OF CONNECTOR COVER J5 OR J6 (Cont.)



ECCM MODULE FRONT PANEL

ECCM MODULE FRONT PANEL

2-17. REPLACEMENT OF VOL CONTROL KNOB

INITIAL SET UP

Tools	Equipment Condition
Tool Kit TK-101/G Work station, Static	Power removed. If required, knob can be removed and replaced with ECCM module in the RT or receiver and power applied.
Materials/Parts	
Knob A3028291	

CAUTION

This equipment contains components 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.

REMOVE VOL CONTROL KNOB

STEP 1. Loosen 2 self locking set screws (1) and (2) from knob (3).

STEP 2. Pull knob (3) from control panel.

REPLACE VOL CONTROL KNOB

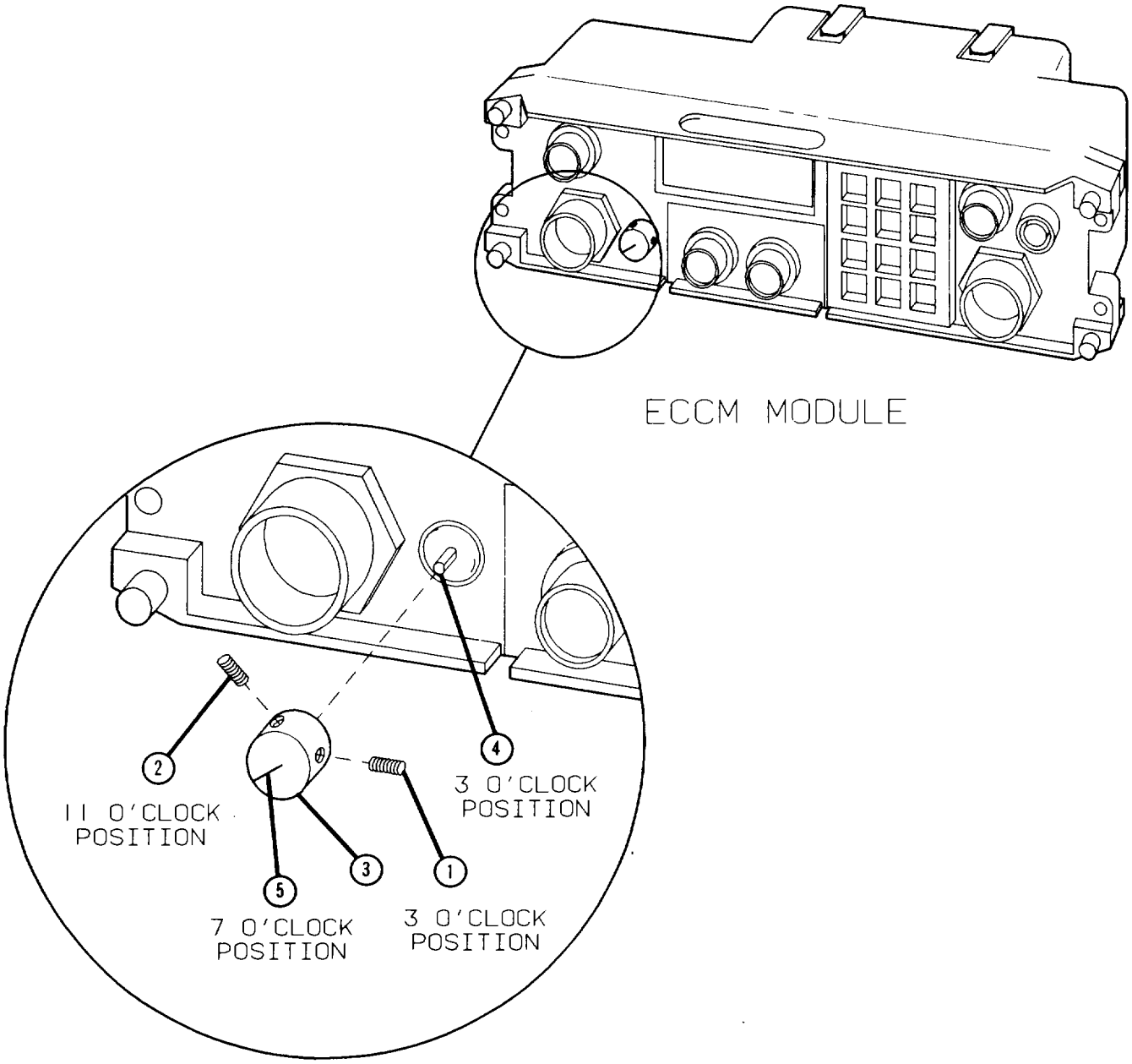
STEP 1. Turn the VOL control shaft Q to the full counterclock-wise (CCW) position. The flat side of the shaft will be in the 3 o'clock position (right side).

STEP 2. Position knob (5) on VOL control shaft (4) so the white marker (5) on the knob is in the 7 o'clock position.

STEP 3. Tighten set screw (1) (at 3 o'clock position) first and then tighten set screw (2) (at approximately 11 o'clock position) on knob (3).

STEP 4. Check knob (3) position by checking that the white marker (5) on the knob is in the 7 o'clock position when turned to the complete CCW position and at approximately the 5 o'clock position when turned to the full clockwise (CW) position.

2-17. REPLACEMENT OF VOL CONTROL KNOB (Cont.)



2-18. CLEANING

WARNING

Turn off all equipment power before using TRICHLOROTRIFLUOROETHANE. 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.

a. Use a dry, clean, lint-free cloth (item 4, Appendix C) or brush (item 5, Appendix C) to remove dust or dirt. If needed, moisten the cloth or brush with TRICHLOROTRIFLUOROETHANE (item 1, Appendix C).

b. After cleaning, wipe dry with a clean cloth.

SECTION VI. PREPARATION FOR STORAGE OR SHIPMENT

2-19. GENERAL

CAUTION

Contact intermediate general support maintenance to remove battery before packing for storage or shipment to prevent corrosion damage to battery compartment.

a. Army. Prepare the ECCM Module for storage in accordance with the procedures in TM 740-90-1.

b. Navy. Refer to NAVSUP PUB 503.

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

2-20. MARKING

The marking on the exterior of the container shall be in accordance with MIL-STD-129H.

CHAPTER 3
INTERMEDIATE DIRECT SUPPORT AND GENERAL SUPPORT MAINTENANCE

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 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).

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

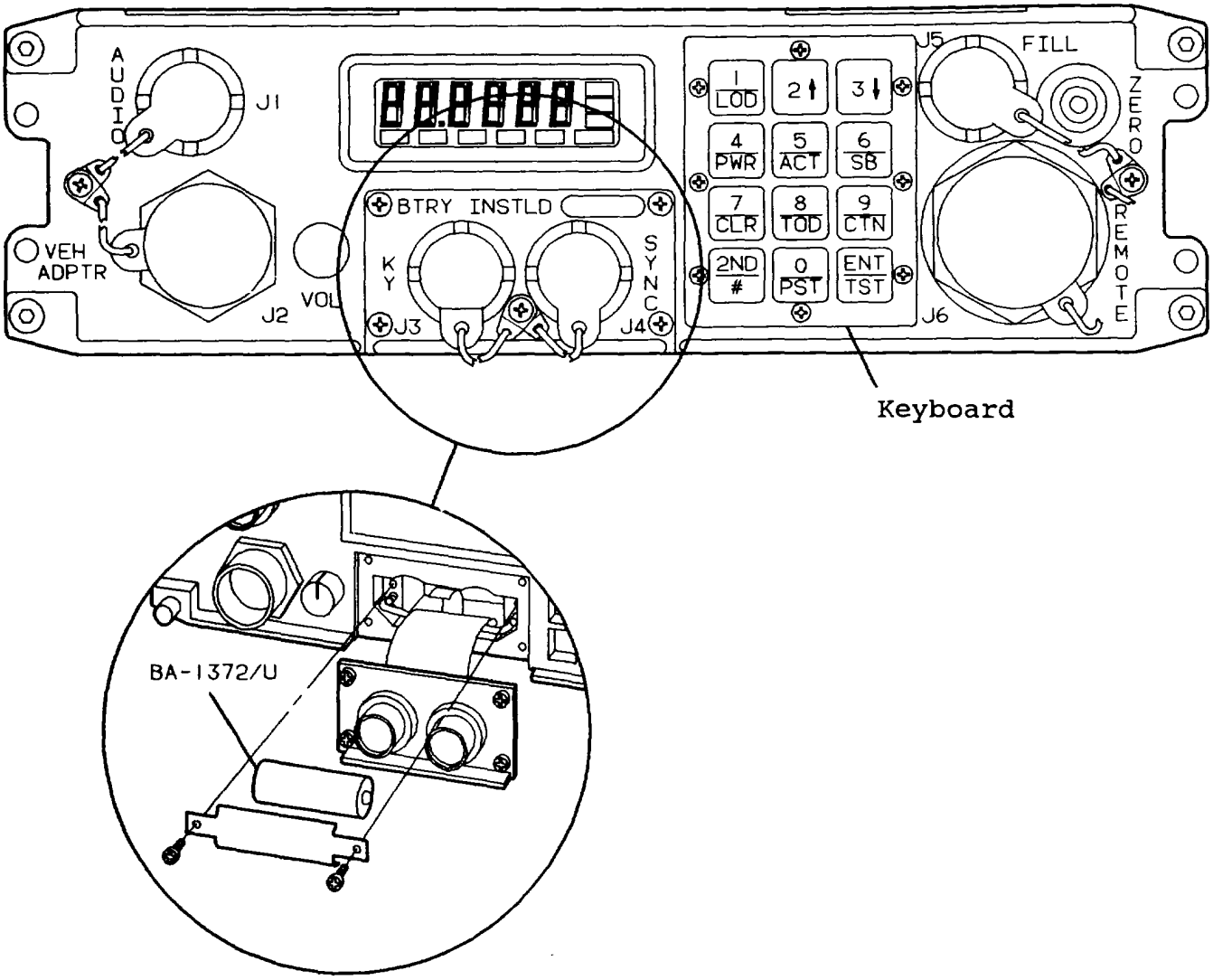
Special tools, TMDE, and support equipment and their purposes are listed in the Maintenance Allocation Chart, Appendix B.

3-3. REPAIR PARTS

Repair parts used during unit maintenance are listed and illustrated in the repair parts and special tools list located in TM 11-5895-1315-24P (Navy) EE005-FG-PLD-010/WllO-C11670G (Air Force) TO 31R2-4-567-4.

SECTION II. INTERMEDIATE GENERAL SUPPORT TROUBLESHOOTING

There are no troubleshooting procedures for the ECCM Module at the intermediate level of maintenance. BIT is to be initiated only when the ECCM Module is connected to a receiver-transmitter or a receiver for the test to be reliable. There is no special support equipment for the ECCM Module at this level of maintenance.



ECCM MODULE FRONT PANEL

SECTION III. INTERMEDIATE GENERAL SUPPORT MAINTENANCE

3-4. GENERAL

Maintenance procedures are provided to aid technicians at the intermediate general support levels in the successful removal and replacement of the defective assembly.

Intermediate general support maintenance for the ECCM Module consists of replacing the battery (BA-1372/U) or the Keyboard. This is all the maintenance authorized at the intermediate general support level.

3-5. REPLACEMENT OF THE BATTERY

The battery is located behind the BTRY INSTLD plate located on the front of the ECCM Module. Mounted on this plate are connectors J3 and J4.

INITIAL SET UP

Tools	Equipment Condition
Tool Kit TK-17 Work station, Static	Power removed
Materials/Parts	
Battery BA-1372/U	

CAUTION

This equipment contains 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.

NOTE

When removing battery, the ECCM module front panel should be facing straight up.

3-5. REPLACEMENT OF THE BATTERY (Cont.)

REMOVE BATTERY

STEP 1. Loosen 4 captive screws (1) on the battery cover (2).

CAUTION

Battery cover is connected to unit with a flexible cable assembly. Do not pull or put undue strain on flexible cable.

STEP 2. Tilt battery cover (2) down to gain access to battery compartment.

STEP 3. Loosen 2 captive screws (3) on battery plate (4) and remove plate with needle nose pliers.

STEP 4. Pull on end of strap extractor (5) that goes behind battery (6) to remove battery from unit.

WARNING

Do not put old battery in fire or mutilate. May burst or release toxic material.

REPLACE BATTERY

NOTE

When replacing battery ensure strap extractor (5) is behind battery (6) and end of strap extractor is out over top of battery and accessible to remove battery.

STEP 1. Place battery (into mounted position with the round contact end to the right. Ensure strap extractor (is in place as stated in note above.

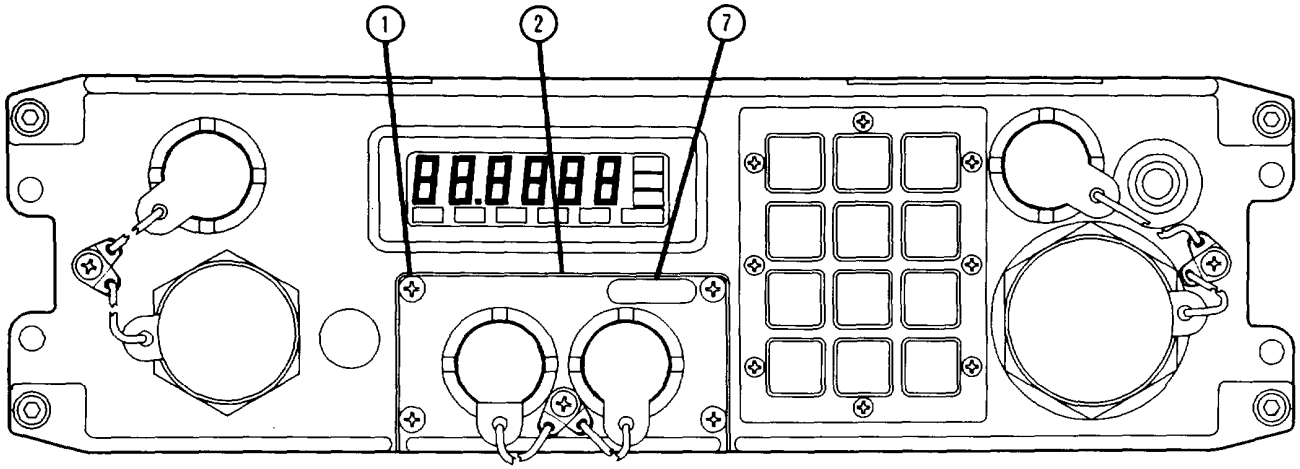
STEP 2. Secure battery in place with battery plate (4) and tighten 2 captive plate screws (3).

STEP 3. Tilt battery cover (2) up into mounted position and tighten 4 captive mounting screws (1) in an "X" pattern.

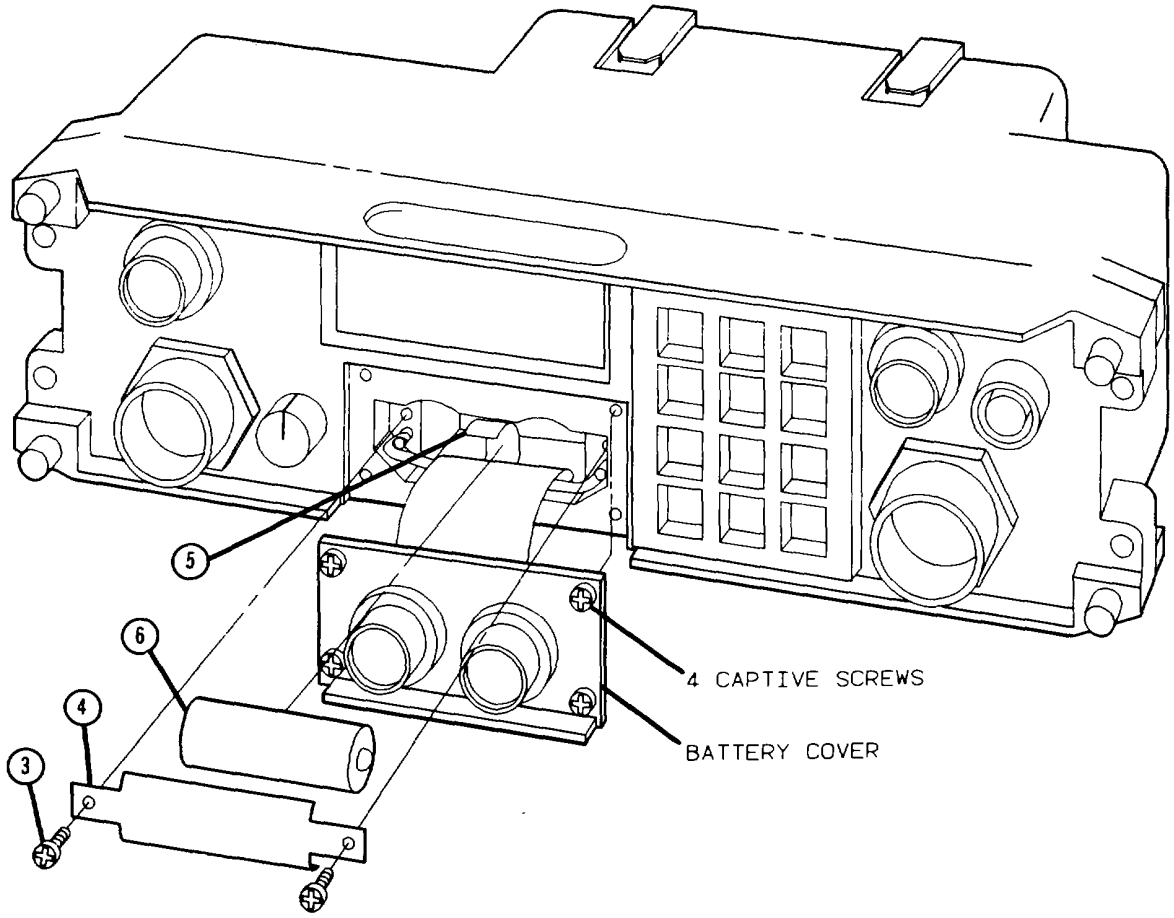
STEP 4. Write the date in block on the battery cover.

STEP 5. Check condition of battery; program a preset frequency into ECCM Module. Refer to TM 11-5895-1218-12 (Navy) EE150-LQ-OMI-10/W110-TRC179V1 (Air Force) TO 31R22TRC179-21 and TM 11-5895-1220-12 (Navy) EE160-RG-OMI-010/W110-GRC215 (Air Force) TO 31R2-2GRC215-1. Remove power from ECCM Module for 5 minutes. Reconnect power and call up frequency just programmed. If frequency is not retained in memory, battery is defective.

3-5. REPLACEMENT OF THE BATTERY (Cont.)



ECCM MODULE FRONT PANEL



3-6. REPLACEMENT OF KEYBOARD

The keyboard is located on the front panel assembly and has a connector on the back side of the panel.

INITIAL SET UP

Tools	Equipment Condition
Tool Kit TK-17 Work station, Static	Power removed
Materials/Parts	
Keyboard A8S1 A3024336 Grease MIL-Q-4343	

CAUTION

This equipment contains 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.

REMOVE KEYBOARD

STEP 1. Remove 8 crosstip screws (1) and lockwashers (2) securing keyboard (3) to ECCM Front Panel (4).

STEP 2. Pull keyboard (3) away from front panel (4), being careful not to damage connector pins on back of keyboard.

REPLACE KEYBOARD

CAUTION

When inserting connector pins on back of keyboard into connector receptacle on unit, use care to aline connector pins to prevent damage to pins.

3-6. REPLACEMENT OF KEYBOARD (Cont.)

NOTE

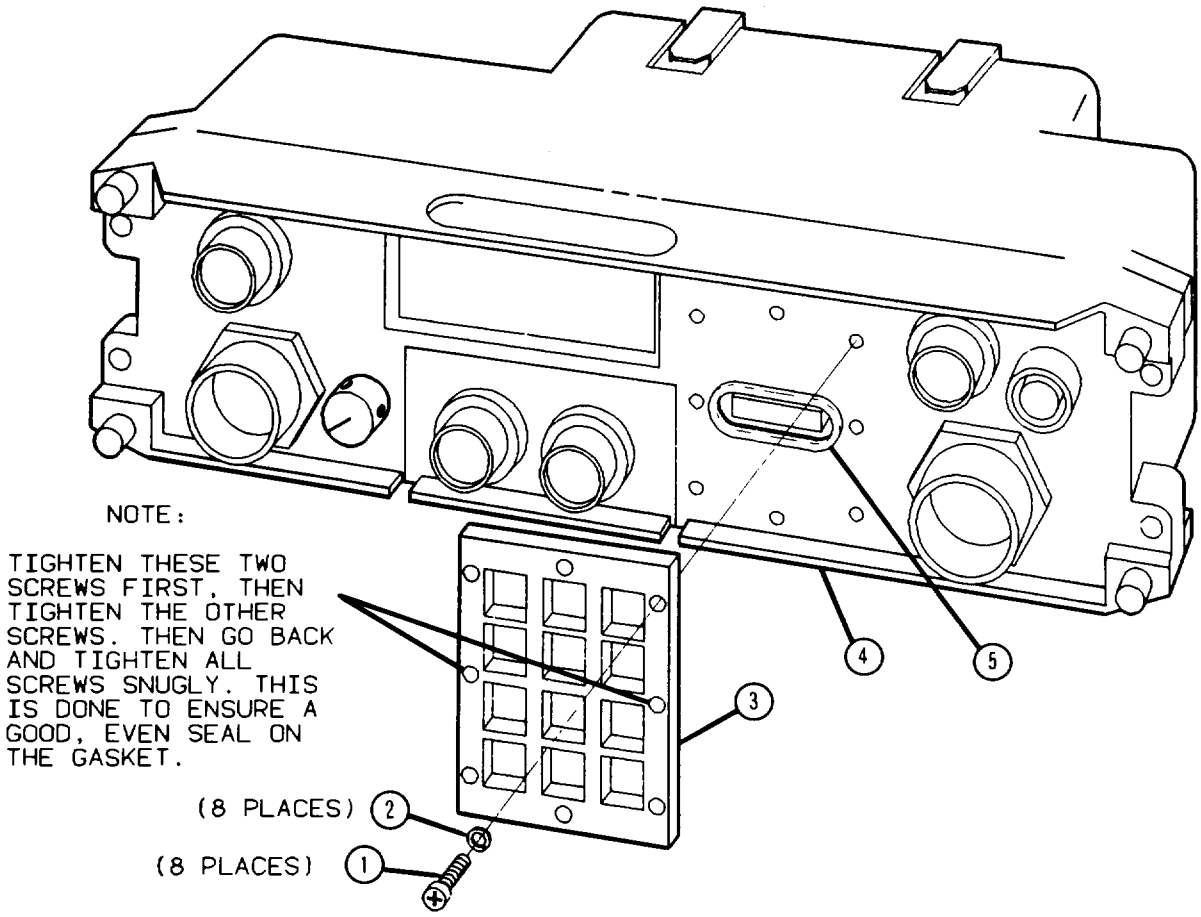
* Remove all foreign matter on keyboard connector pins prior to installation.
* Inspect gasket (. If loose, attach using silicone adhesive sealant (item 2, Appendix C).
* Make sure keyboard connector pins do not come in contact with grease on gasket. This will cause a poor electrical connection between pins in the connector.

STEP 1. Apply thin coat of grease (item 3, Appendix C) to gasket (5).

STEP 2. Aline connector pins on keyboard (3) to receptacle on unit and push keyboard into its mounted position.

STEP 3. Install 8 crosstip screws (1) and 8 lockwashers (2) securing keyboard (3) to unit. (See note on illustration.)

STEP 4. Run BIT to ensure proper operation of ECCM Module. Refer to paragraph 2-12.



CHAPTER 4
SPECIALIZED REPAIR ACTIVITY
(SRA) MAINTENANCE

SECTION I. INTRODUCTION

4-1. SCOPE

a. This chapter contains Specialized Repair Activity (SRA) maintenance work requirements. It provides references and general specifications for SRA maintenance of the C-11670/G Controller, Receiver-Transmitter (ECCM module).

b. These instructions are for use by SRA, Depot, and equivalent level contractor personnel, and apply to items maintained at SRA level. Requirements stated or referenced in this chapter are the minimum acceptable standards.

SECTION II. SPECIALIZED REPAIR ACTIVITY (SRA) TROUBLESHOOTING

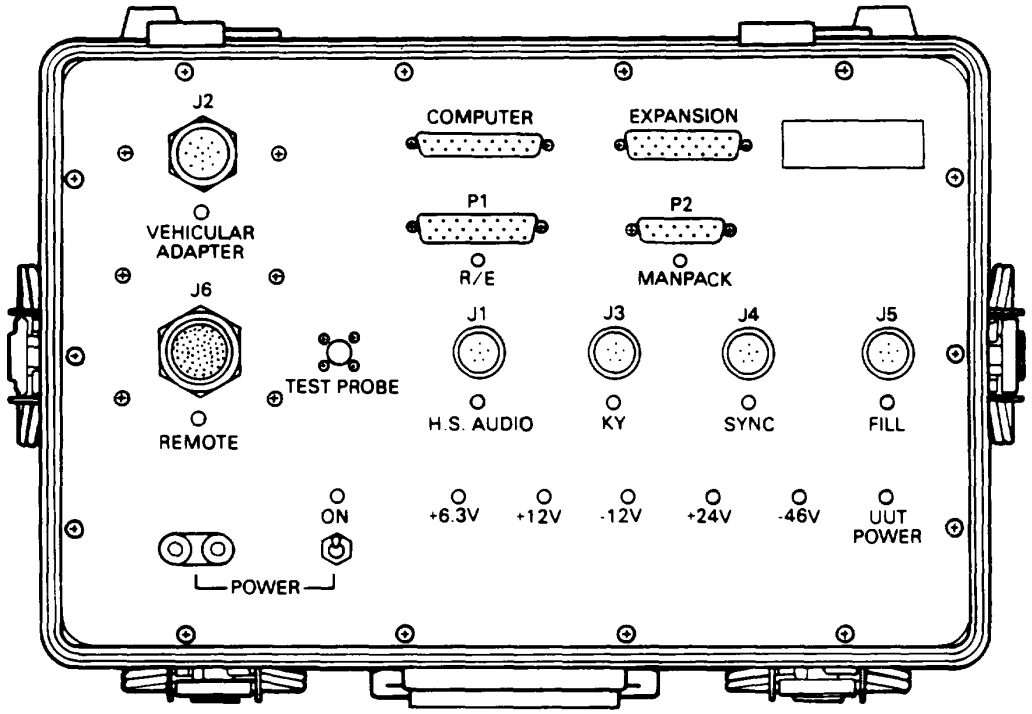
4-2. GENERAL

a. The following troubleshooting procedures will help technicians to isolate a fault to the defective module/subassembly or piece part. Upon completion of troubleshooting/repair of a defective chassis or subassembly, the ECCM module performance test shall be performed to ensure proper operation of the replaced component and its related circuits.

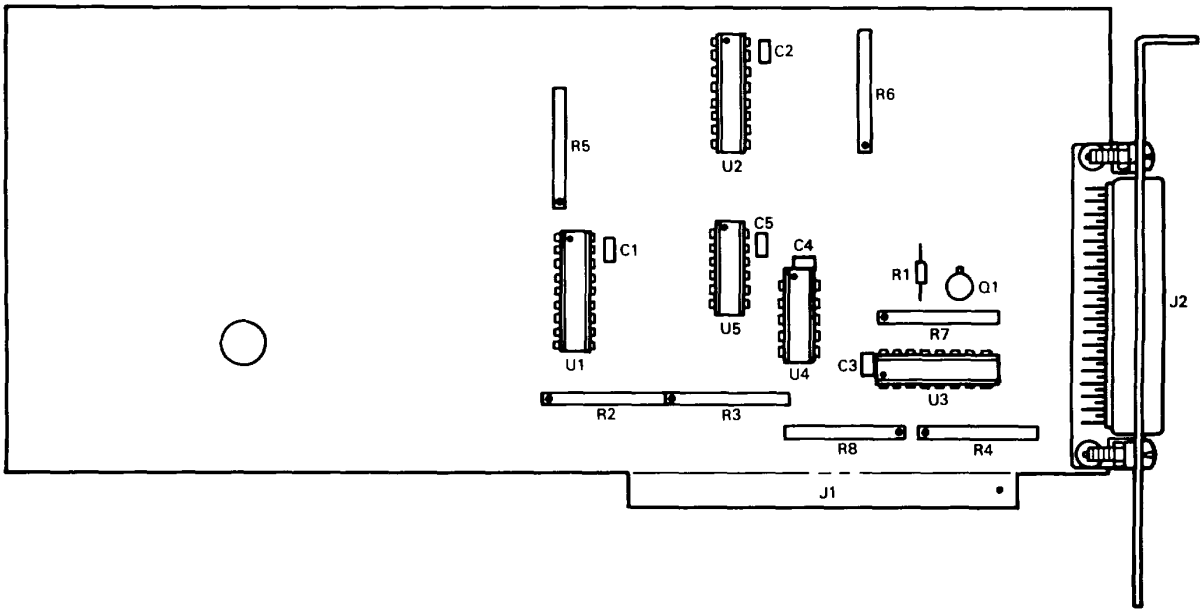
b. Test Set, ECCM TS-4257/G. Provides controls and indicators for operating/testing the ECCM module using standard support equipment and an IBM PS/2 personal computer (or equivalent) to perform diagnosis and performance testing in a workshop/bench environment. Refer to TM 116625-3216-14&P for complete operating controls and indicators, and maintenance instructions.

c. Interface Unit, Test J-4673/G. This card is installed into the IBM PS/2 personal computer and provides RS-232 serial port connector for inter-connecting the computer and TS-4257/G test set. Refer to TM 11-6625-3219-14&P and TM 11-6625-3216-14&P for installation and maintenance instructions.

4-2. GENERAL (Cont.)



TEST SET, ECCM TS-4257/G



INTERFACE UNIT, TEST J-4673/G

4-3. TROUBLESHOOTING PROCEDURES

a. Troubleshooting is performed utilizing bench testing procedures. Bench test procedures involve the use of the TS-4257/G ECCM Test Set, an IBM PS2 personal computer (with J-4673/G installed), and standard support equipment. When performing the ECCM module performance test, the computer performs all built-in-test (BIT) procedures, controls power to the ECCM, and runs all diagnostic tests. Results are reported on the computer display. The diagnostic routines are self prompting, providing the repairman with instructions to connect specific cables, or replace modules.

b. The ECCM module performance test (para 4-4) shall be performed to determine if the ECCM module meets specifications. Along with the stated criteria for various steps of the performance test is a Symptom Index paragraph reference to assist as a beginning point for troubleshooting. After performing a remove/replace procedure as directed by the computer display, run the performance test again to ensure that the ECCM module meets specifications.

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 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 material when not installed in the equipment.

4-4. ECCM MODULE DIAGNOSTIC PERFORMANCE TEST

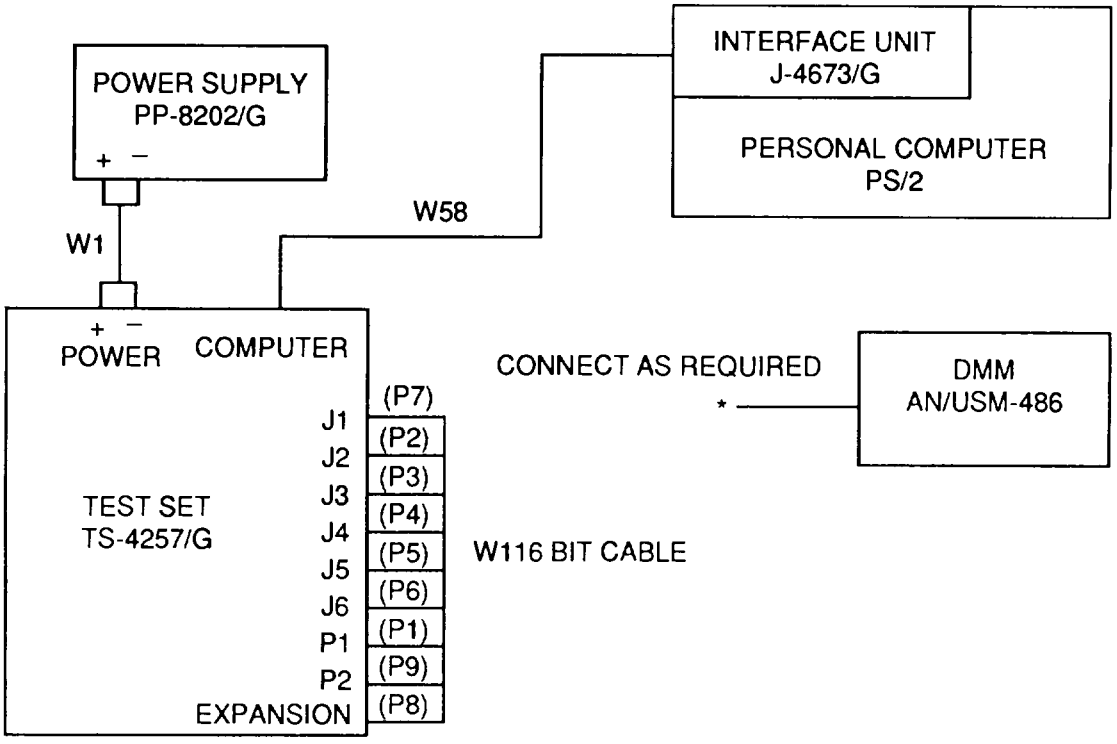
INITIAL SETUP

TEST EOUIPMENT	EQUIPMENT CONDITION
ECCM Test Set, TS-4257/G	Personal Computer, TS-4257/G including W116, and PP-8202/G connected as shown below.
Power Supply, PP-8202/G	All power set to OFF.
Personal Computer, PS/2 W/J-4673/G Interface Unit installed.	Battery removed from ECCM module, refer to para 3-5.
Multimeter, Digital AN/USM-486	ECCM interlock switch A8A2SI1 pulled out to test positon.
Kit, Test Lead (for AN/USM-486)	

CAUTION

This equipment contains components 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.

Do not, at any time, connect or disconnect the W58 cable between the computer and the test set with power applied to either or both pieces of equipment. Damage may occur to the J-4673/G interface CCA installed in the computer.



INITIAL TEST SETUP

4-4. ECCM MODULE DIAGNOSTIC PERFORMANCE TEST (Cont.)

1. The following diagnostic tests are performed on the ECCM module C-11670/G at SRA level maintenance to determine performance capability after repair. The ECCM must pass the tests to be considered repaired.

2. Prior to testing the ECCM module, the ECCM Test Set (TS4257/G) selftest must be performed. The TS-4257/G must pass the selftest five times to ensure that anomalies do not arise during testing that are not fault of the ECCM module. Perform the following steps, or refer to TM 11-6625-3217-14&P, Chapter 5, paragraph 5-2f to test the TS-4257/G Test Set.

STEP 1. Insert the DOS disk into drive "A" of the computer. Set computer power switches (display and CPU) to ON.

STEP 2. At the "A: >" prompt, type "B: " and then press ENTER.

STEP 3. Insert ECCM diagnostic disk into drive "B" of the personal computer, type "dir" and press RETURN. The computer display will show:

```
B>dir
Volume in drive B has no label
Directory of B:\par

SELFTEST    EXE     144780    10-20-88    7:52a
ATPTEST     EXE     184126    10-20-88    8:38a
PRETEST     EXE     152814    10-20-88    8:34a
CRYTEST     EXE     149646    10-20-88    8:41a

B>
```

The files displayed in the directory are:

* SELFTEST.EXE - This file is the ECCM Test Set TS-4257/G self test diagnostic routine.

* ATPTEST.EXE - This file is the final performance test routine for the ECCM module.

* PRETEST.EXE - This file is the first diagnostic routine for the ECCM module, it tests the I/O, timing, and audio interface assemblies for failures.

* CRYTEST.EXE - This file is the second diagnostic routine for the ECCM module, it tests the TSEC CCA A5 for failure.

4-4. ECCM MODULE DIAGNOSTIC PERFORMANCE TEST (Cont.)

STEP 4. Set PP-8202/G to ON. Using DMM, set output to +27.99 to +28.01 Vdc. Set TS-4257/G to ON.

STEP 5. Type "SELFTEST" and press ENTER. The following menu will appear on the computer display:

SELF TEST OF TEST FIXTURE

PROGRAM NAME = SELFTEST.EXE REV. 1

1) TEST FIXTURE TEST
2) END SELF TEST

ENTER SELECTION >

STEP 6. Type a "1" on the computer keyboard. Follow the prompts on the computer display. Select the COMPREHENSIVE SELF TEST when prompted. After five successful tests, select 8 to exit to SELF TEST OF TEST FIXTURE menu (If the ECCM test set will not pass five successive tests, refer to TM 11-6625-3217-14&P to troubleshoot and repair the TS-4257/G). Selecting 2 to end self test will return you to the "B>" prompt.

STEP 7. Set TS-4257/G to OFF, and then set PP-8202/G to OFF.

4. Refer to the ECCM Performance Test Setup illustration and connect equipment as shown.

STEP 1. On the computer keyboard, type "PRETEST", and press return. The following will be displayed on the computer:

PRETEST

MAIN MENU ECCM MODULE PRETEST

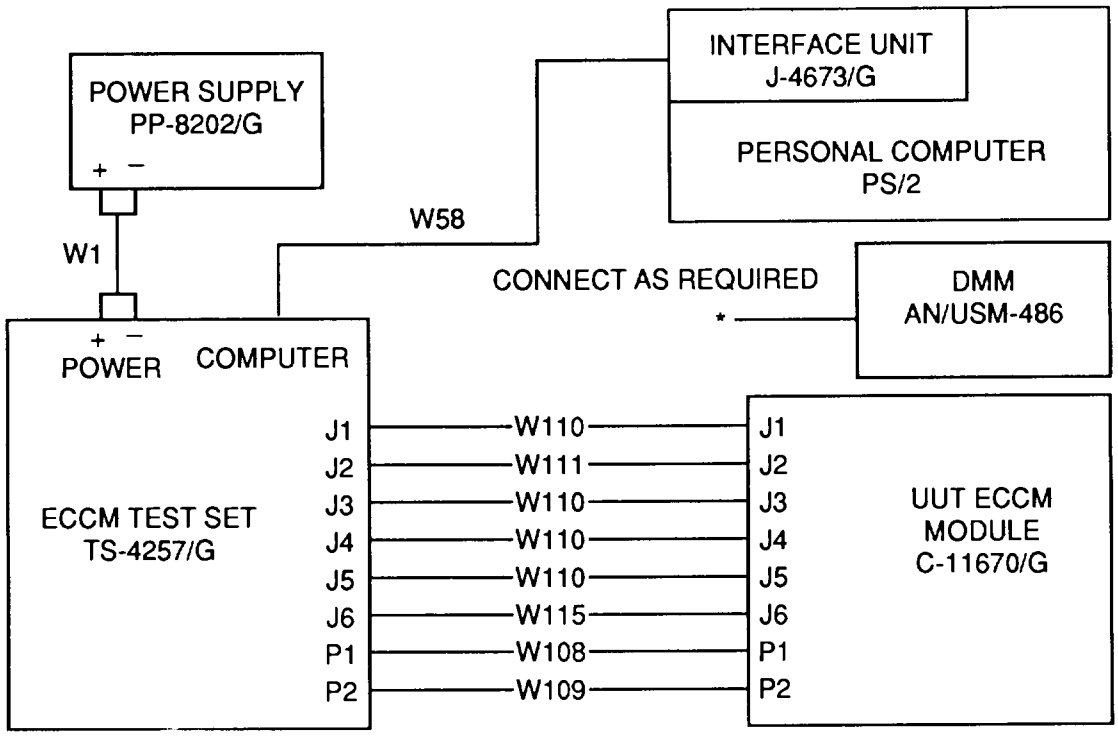
PROGRAM NAME = PRETEST.EXE REV 1

1) ECCM MODULE PRETEST
2) END PROGRAM, RETURN TO MS-DOS
3) ENABLE PRINTING TEST
4) ENABLE PRINTING ONLY TIME
5) VALIDATION MENU
6) DISABLE ALL PRINTING

PRINTER DISABLED

ENTER SELECTION >

4-4. ECCM MODULE DIAGNOSTIC PERFORMANCE TEST (Cont.)



ECCM PERFORMANCE TEST SET UP

NOTE

When prompted by the computer display "press any key to continue", do not press the SHIFT key. No response from the computer will be received. It is recommended that the SPACE BAR or RETURN be pressed at this prompt.

STEP 2. Set the PP-8202/G to ON, and then set the TS-4257/G power switch to ON.

STEP 3. Type a "1" on the computer keyboard. The diagnostic programs are self linking. When one completes, the next one will automatically appear on the computer display and, assisted by computer prompted operator entries, will run. Follow the steps in order, pay close attention to the computer display and test set LEDs, and perform required actions when prompted.

4-4. ECCM MODULE DIAGNOSTIC PERFORMANCE TEST (Cont.)

5. When running the test, the ECCM test set will turn power on and off to the ECCM module. Each time power is turned back on the ECCM will run BIT. It will fail BIT each time. When prompted to make an entry and the ECCM keypad & display does not respond, take the following corrective action:

   On ECCM keypad press TST. A fault code will appear.

   Press 2ND, then CLR, until a frequency or FILL appears on the display.

   Perform indicated keypad entries (i.e. 2ND, LOD, 1, ENT)

   Follow the prompts on the computer display.

6. If a test fails, the computer will prompt you to change a module and then "press any key". The computer will then rerun the test.

7. In some instances, an ECCM may have a defect that prevents use of the computer diagnostics for troubleshooting. Refer to paragraph 4-5, SYMPTOM INDEX, to determine which troubleshooting paragraph to use.

4-5. SYMPTOM INDEX

Find the ECCM module failure in the index below. Then go to the paragraph referenced for the troubleshooting procedure.

SYMPTOM INDEX

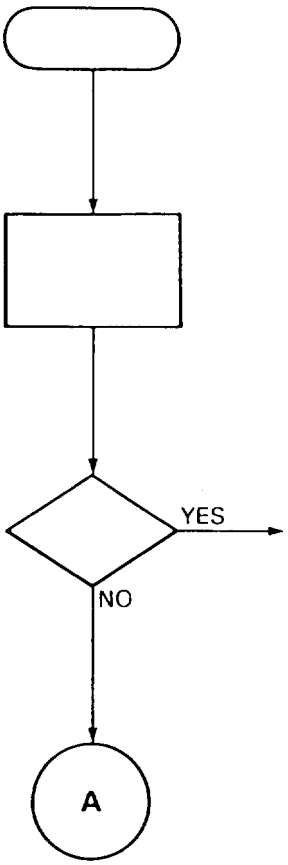
NOTE

While troubleshooting the C-11670/G, power to the UUT is controlled by the computer. Power is applied to the UUT when the computer terminal display states "POWER IS TURNED ON TO THE ECCM MODULE" and the TS-4257/G UUT POWER light is illuminated. After turning off the TS-4257/G to remove a card or perform some other check on the ECCM module, it will be necessary to re-initiate the test program by pressing the CONTROL, ALT and DELETE key simultaneously.

4-6. FLOW CHARTS AND HOW TO USE THEM

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

To use the flow chart, begin at the Start symbol 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.

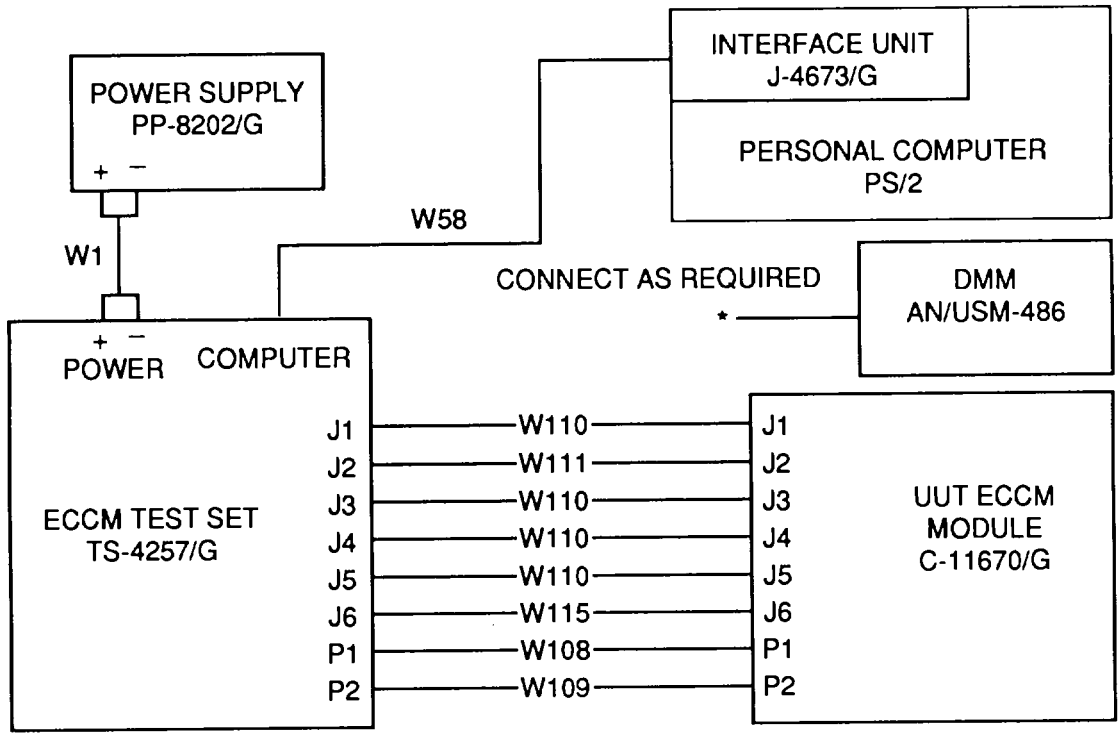
4-7. ECCM MODULE WILL POWER ON BUT NOT OPERATE

INITIAL SETUP

TEST EQUIPMENT	EQUIPMENT CONDITION
ECCM Test Set, TS-4257/G	ECCM case removed, refer to para
Power Supply, PP-8202/G4-11.	
Personal Computer, PS/2 W/J-4673/G Interface Unit installed.	ECCM module and test equipment connected as shown in ECCM Performance Test Setup illustration.
Digital Multimeter, AN/USM-486	All power set to OFF.
Test Lead Kit (for AN/USM-486)	Test equipment controls and indicators preset as indicated in step 1 below.

CAUTION

This equipment contains components 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. ECCM MODULE TROUBLESHOOTING SETUP

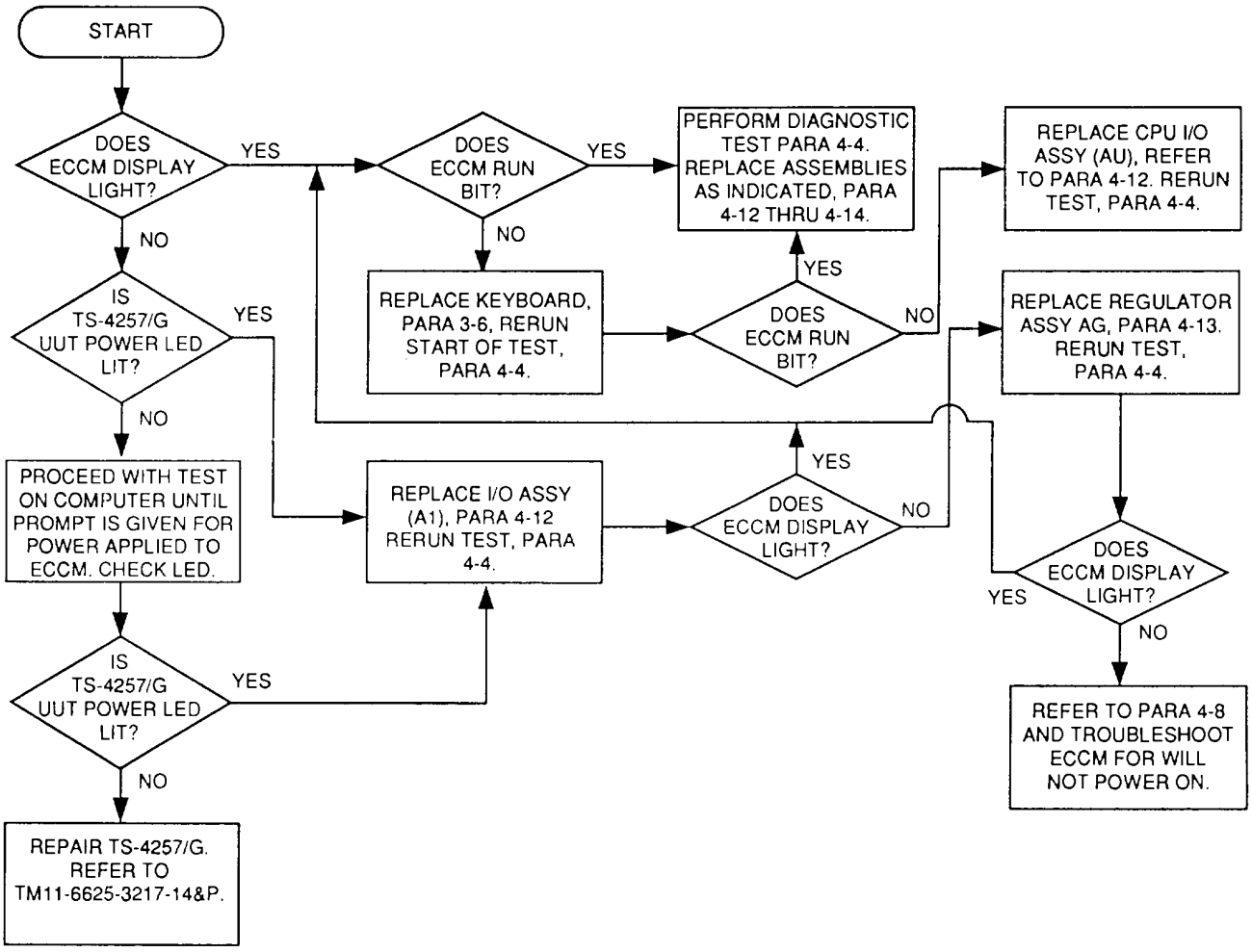


4-7. ECCM MODULE WILL POWER ON BUT NOT OPERATE (Cont.)

STEP 1. Set PP-8202/G power to ON. Using the AN/USM-486 Digital multimeter (DMM), set the output voltage to +28.0 Vdc.

STEP 2. Set TS-4257/G POWER switch to ON and observe that the TS-4257/G POWER ON and voltage indicators light. Press interlock switch A8A2SI1.

STEP 3. Initiate ECCM module PRETEST (refer to para 4-4). Stop responding to prompts when the display shows "POWER IS TURNED ON TO THE ECCM MODULE". This will enable you to troubleshoot the ECCM with power applied. To set power to ECCM to OFF (i.e., when changing modules), continue with test until prompt on display indicates ECCM power set to OFF and set the TS-4257/G to OFF.



4-8. ECCM MODULE WILL NOT POWER ON

INITIAL SETUP

TEST EQUIPMENT	EQUIPMENT CONDITION
ECCM Test Set, TS-4257/G	Chassis portion only of A8 removed from A8A2 Interconnection CCA, refer to para 4-14a, steps 1, 2 and 6, 7.
Power Supply, PP-8202/G	ECCM modules Al through A7 reinserted into A8A2 and ECCM upside down on bench.
Personal Computer, PS/2 W/J-4673/G w/Interface Unit J-4673/G installed	Test set connected as shown in test setup illustration.
Digital Multimeter, AN/USM-486	All power set to OFF.
Kit, Test Lead (for AN/USM-486)	Test equipment controls and indicators preset as indicated in step 1 below.

CAUTION

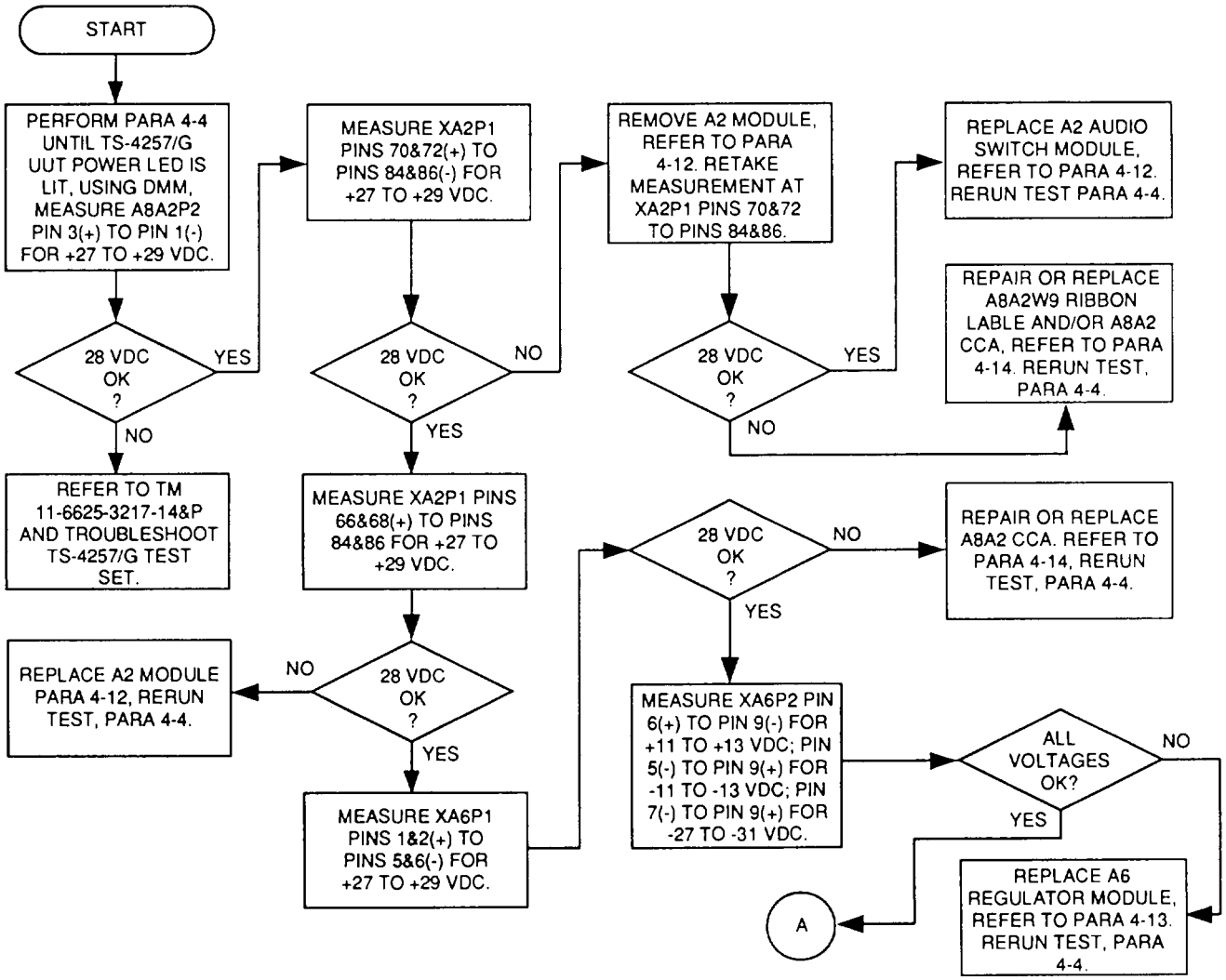
This equipment contains components that are sensitive to damage by ESD. Improper handling will result in component and assembly failure. Use extreme caution when handling. Refer to DOD-HDBK-263 for proper handling procedures.

4-8. ECCM MODULE WILL NOT POWER ON (Cont.)

STEP 1. Set PP-8202/G power to ON. Using the AN/USM-486 Digital multimeter (DMM), set the output voltage to +28.0 Vdc.

STEP 2. Set TS-4257/G POWER switch to ON and observe that the TS-4257/G POWER ON and voltage indicators light. Press interlock switch A8A2S1.

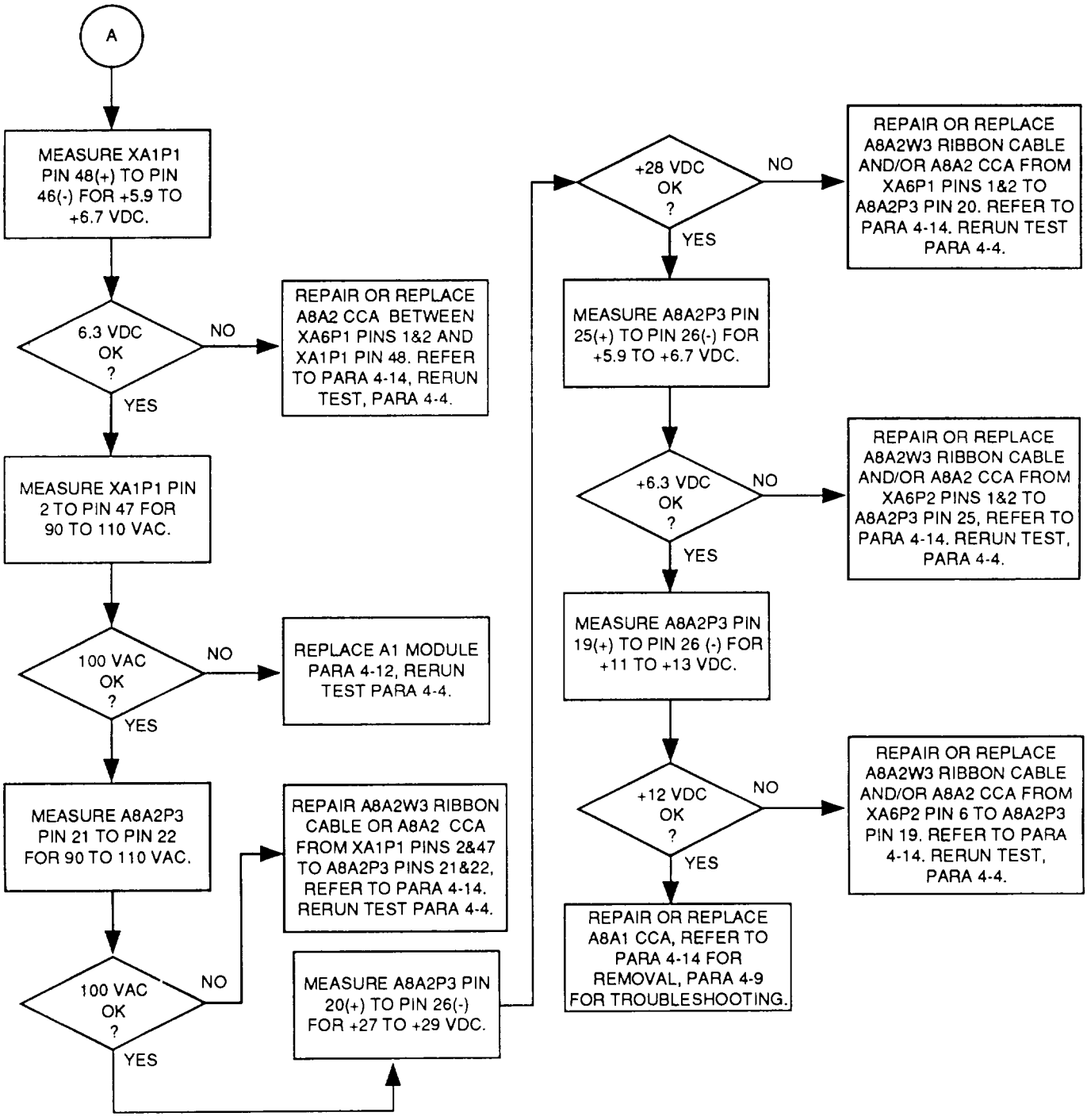
STEP 3. Initiate ECCM module PRETEST (refer to para 4-4). Stop responding to prompts when the display shows "POWER IS TURNED ON TO THE ECCM MODULE". This will enable you to troubleshoot the ECCM with power applied. To set power to ECCM to OFF (i.e., when changing modules), continue with test until prompt on display indicates ECCM power set to OFF and set the TS-4257/G to OFF.



NOTE

REFER TO FO-6 FOR A8A1, AND FO-5 FOR A8A2 COMPONENT LOCATIONS.

4-8. ECCM MODULE WILL NOT POWER ON (Cont.)



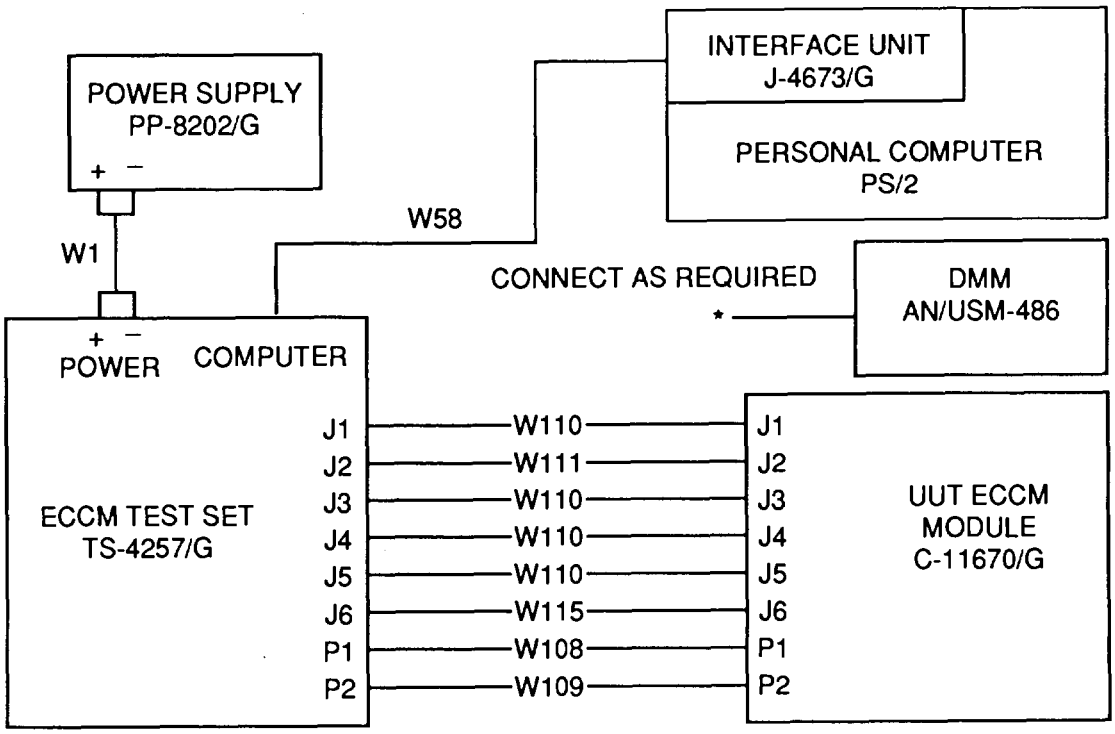
4-9. ECCM DISPLAY CCA A8A1 DOES NOT FUNCTION PROPERLY

INITIAL SETUP

TEST EQUIPMENT	EQUIPMENT CONDITION
ECCM Test Set, TS-4257/G	Chassis portion of A8 removed from front panel portion, refer to para 4-14.
Power Supply, PP-8202/G	ECCM modules A1 through A7 reinserted into A8A2 and ECCM upside down on bench.
Personal Computer, PS/2 W/J-4673/G w/Interface Unit J-4673/G installed.	Test set connected as shown in test setup illustration.
Digital Multimeter, AN/USM-486	All power set to OFF.
Kit, Test Lead (for AN/USM-486)	Test equipment controls and indicators preset as indicated in step 1 below.

CAUTION

This equipment contains components 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.



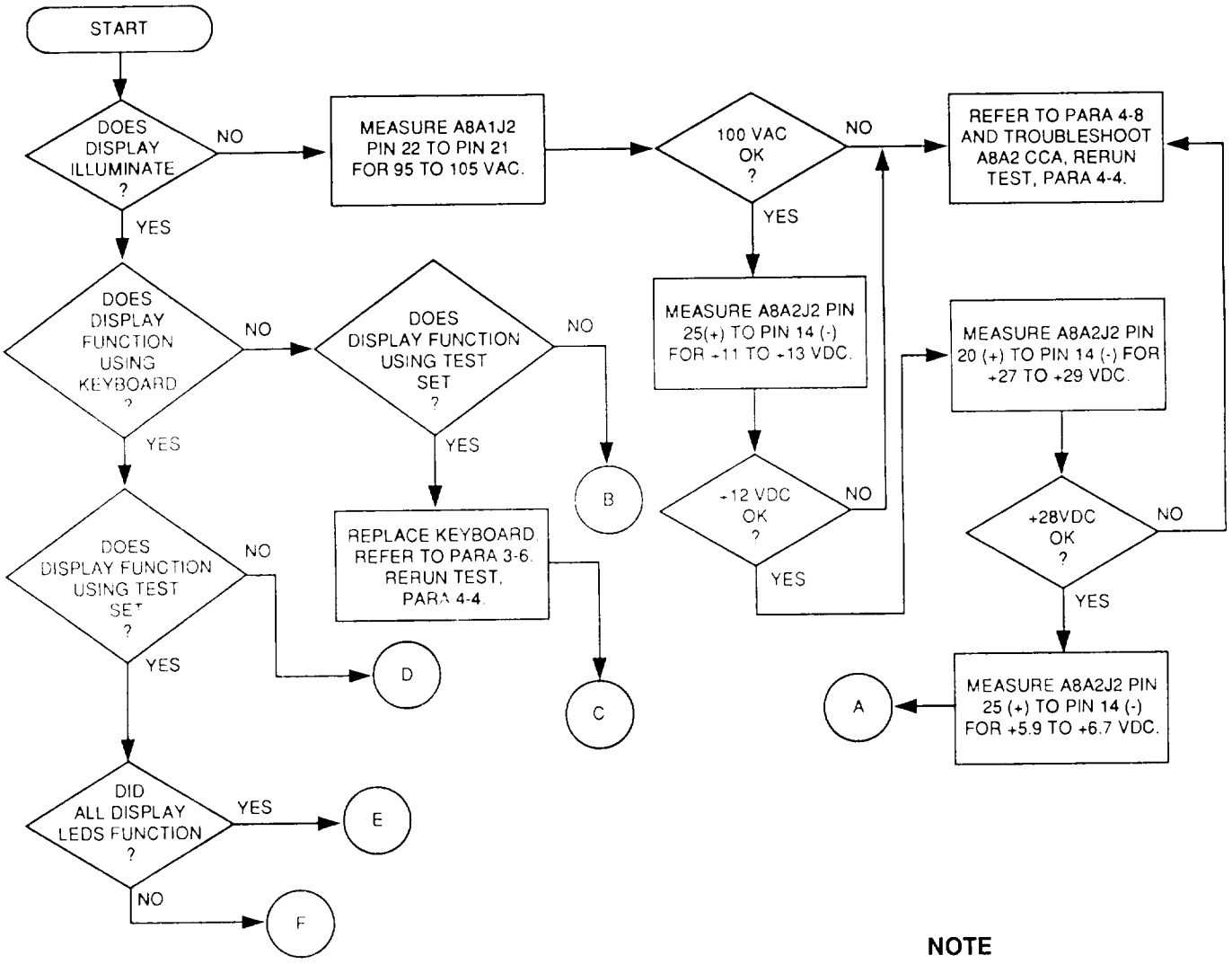
ECCM MODULE TROUBLESHOOTING SETUP

4-9. ECCM DISPLAY CCA A8A1 DOES NOT FUNCTION PROPERLY (Cont.)

STEP 1. Set PP-8202/G power to ON. Using the AN/USM-486 Digital multimeter (DMM), set the output voltage to +28.0 Vdc.

STEP 2. Set TS-4257/G POWER switch to ON and observe that the TS-4257/G POWER ON and voltage indicators light. Press interlock switch A8A2SI1.

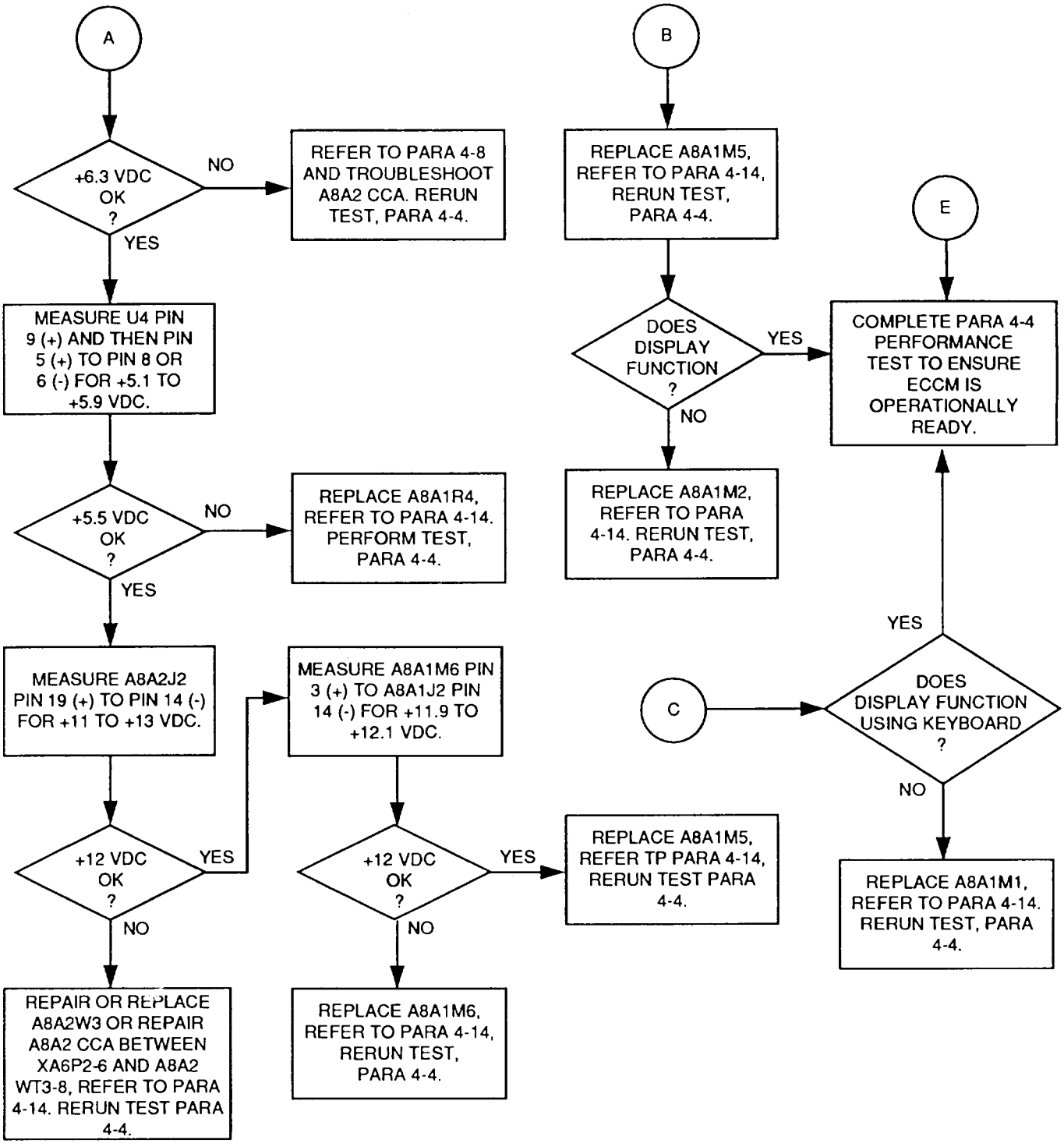
STEP 3. Initiate ECCM module PRETEST (refer to para 4-4). Stop responding to prompts when the display shows "POWER IS TURNED ON TO THE ECCM MODULE". This will enable you to troubleshoot the ECCM with power applied. To set power to ECCM to OFF (i.e., when changing modules), continue with test until prompt on display indicates ECCM power set to OFF and set the TS-4257/G to OFF.



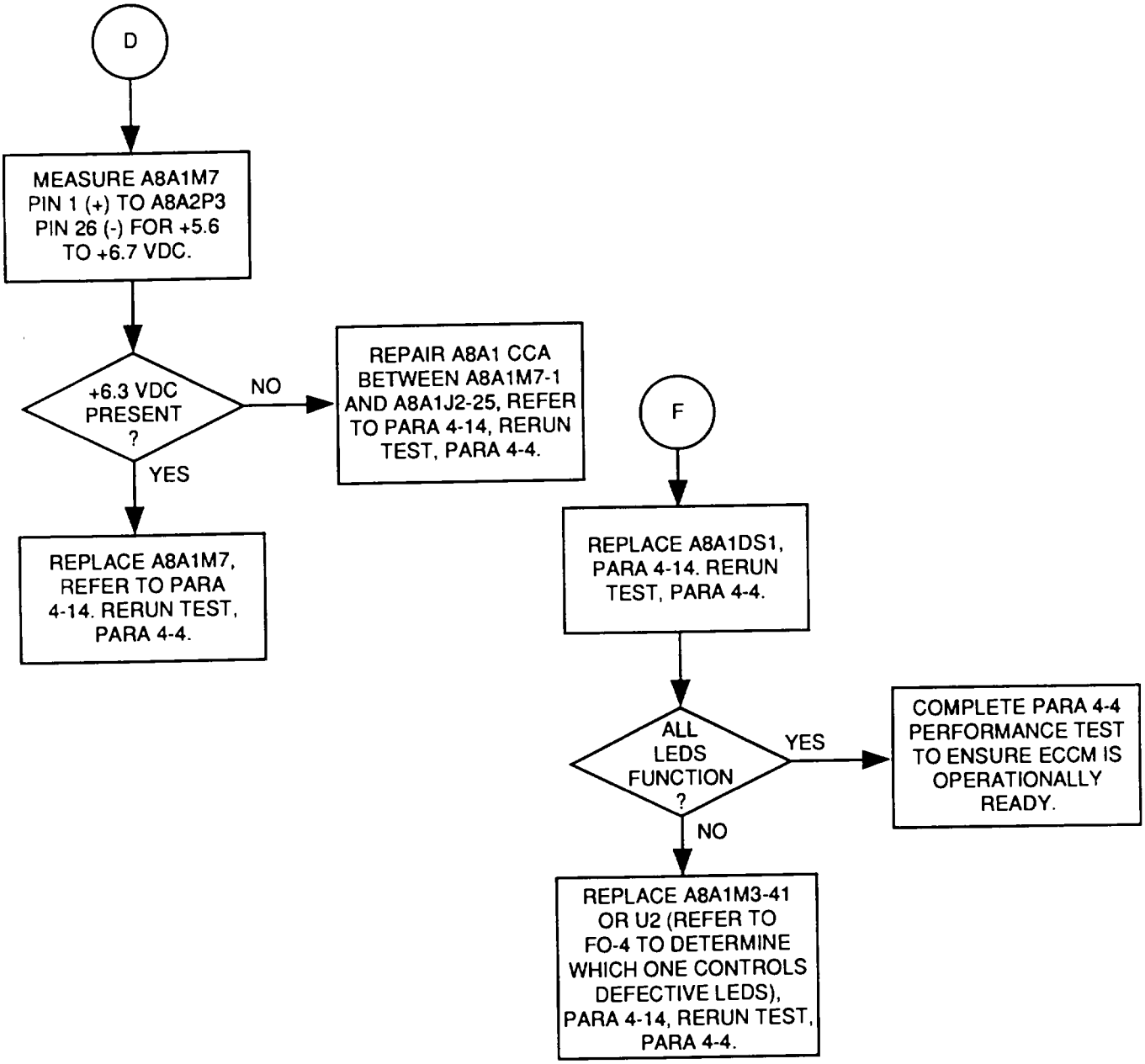
NOTE

REFER TO FO-6 FOR A8A1, AND FO-5 FOR A8A2 COMPONENT LOCATIONS.

4-9. ECCM DISPLAY CCA A8A1 DOES NOT FUNCTION PROPERLY (Cont.)



4-9. ECCM DISPLAY CCA A8A1 DOES NOT FUNCTION PROPERLY (Cont.)



SECTION III. SPECIALIZED REPAIR ACTIVITY (SRA) MAINTENANCE

4-10. GENERAL

Maintenance at the SRA level consists of fault isolation to defective subassembly and replacement of I/O Assembly Al, Audio Switching Assembly A2, Memory I/O Assembly A3, CPU I/O Assembly A4, TSEC Assembly A5, Power Regulator Assembly A6, Timing Assembly A7. The Panel and Chassis Assembly A8 may be repaired by replacement of Interconnection CCA A8A2, Display Assembly A8A1, and chassis piece parts. Further repair of the ECCM module or subassemblies requires Depot level maintenance.

Upon completion of any repair action, the ECCM module performance test shall be performed to ensure proper operation of the replaced component and its related systems. Refer to para 4-4.

CAUTION

This equipment contains components 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.

Use extreme care when inserting a module into the chassis. The pins on the module plugs are easily bent or damaged. Failure to exercise proper care in installing a module could result in equipment damage and failure.

Working with components that are connected with flexible ribbon (flex) cable requires extreme caution. Do not use unnecessary force, and make all movements in the direction of a flat side of the ribbon. When soldering/unsoldering ribbon cable and components, care must be made to use the lowest temperature tip that will perform the task. Do not touch the cable anywhere except at the solder point. The tip of the soldering iron will instantly burn through the cable. Failure to observe proper caution when handling ribbon cables may result in costly damage and unnecessary replacement.

4-11. REMOVAL OF CASE ASSEMBLY

INITIAL SETUP

Tools

Tool Kit, TK-17
Workstation, Static
Maintenance Kit, MX-10879/G

EQUIPMENT CONDITION

No power connected.
ECCM module on bench.

Materials/Parts

Refer to TM 11-5895-1315-24P for part number of part to be replaced.

CAUTION

This equipment contains components 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.

REMOVE

STEP 1. Loosen four captive hex-head screws (1).

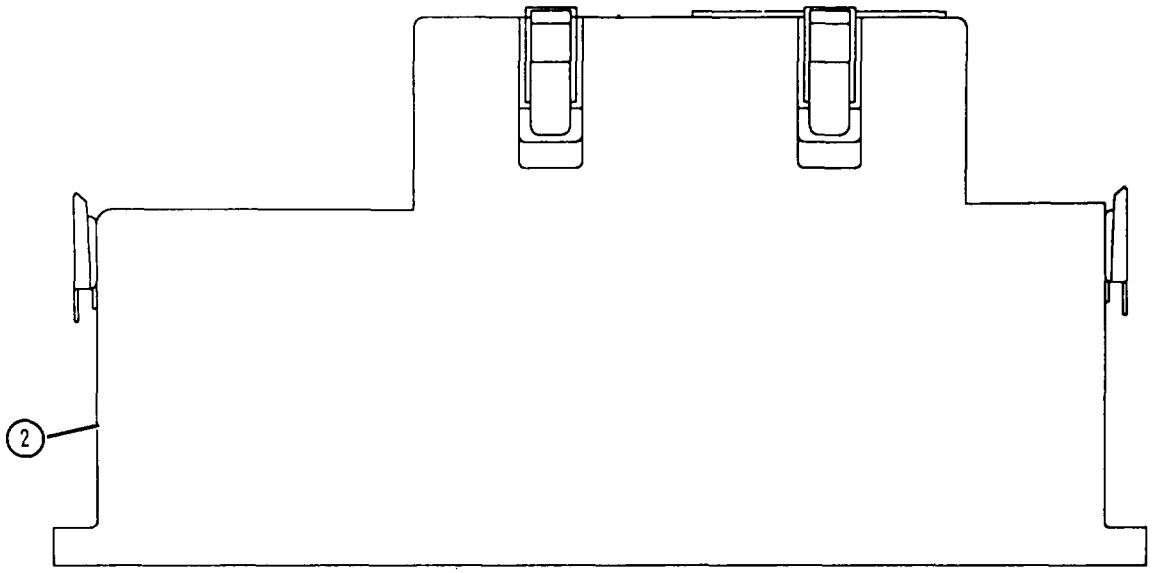
STEP 2. Slide case (2) off chassis & front panel assembly (3)

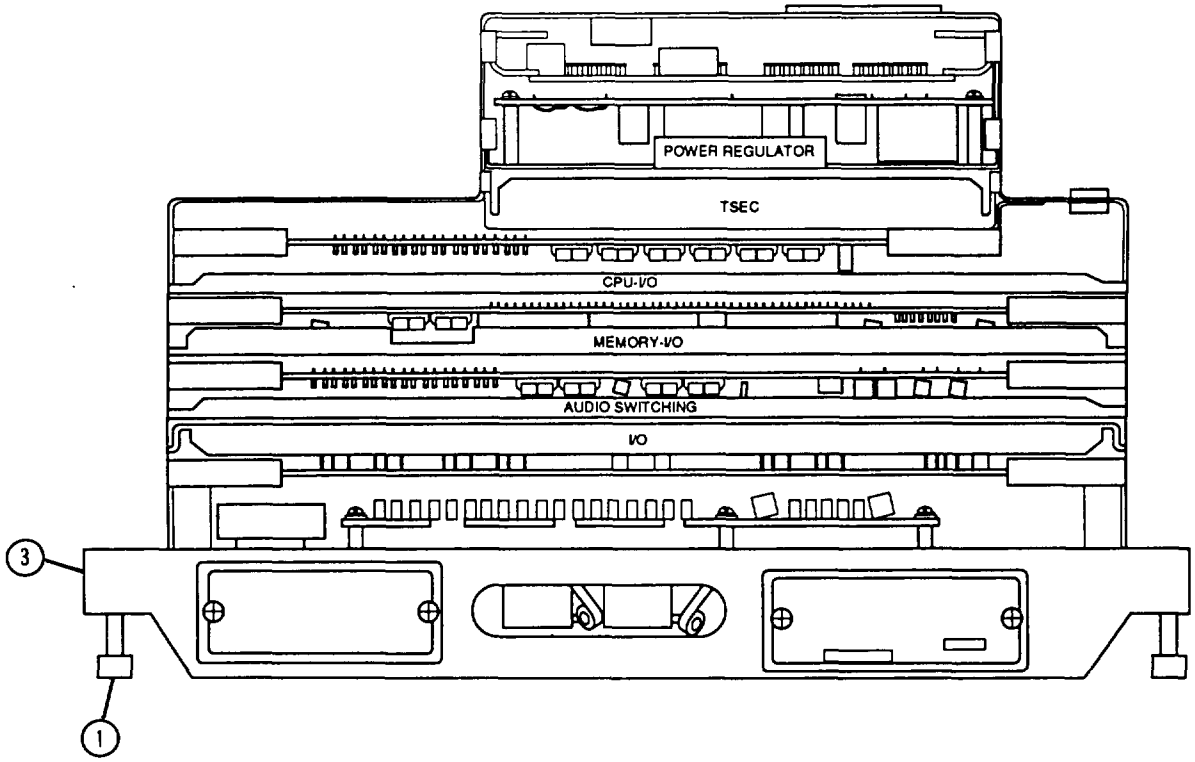
REPLACE

STEP 1. Correctly orient case (2) to chassis & front panel assembly (3) and slide case over chassis to front panel.

STEP 2. Start all four captive hex-head screws (1) and then tighten all four screws.

4-11. REMOVAL OF CASE ASSEMBLY (Cont.)





4-12. REPLACEMENT OF I/O (Al, A3, AND A4) AND AUDIO SWITCHING (A2) ASSEMBLIES

INITIAL SETUP

Tools

Tool Kit, TK-17
Workstation, Static
Maintenance Kit, MX-10879/G

Materials/Parts

Refer to TM 11-5895-1315-24P for part number of part to be replaced.

EQUIPMENT CONDITION

ECCM module case removed, para 4-11.
ECCM module on bench, with bottom of chassis up.

CAUTION

This equipment contains components 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.

REMOVE

STEP 1. Loosen two captive cross-tip screws (1) securing I/O or audio assembly (2) in chassis (3) .

STEP 2. Turn ECCM module so that I/O or audio assembly is up. Lift the I/O or audio assembly (2) from the chassis (3) using the two module removal arms (4).

REPLACE

CAUTION

Use extreme care when inserting a module into the chassis. The pins on the module plugs are easily bent or damaged. Failure to exercise proper care in installing a module could result in equipment damage and failure.

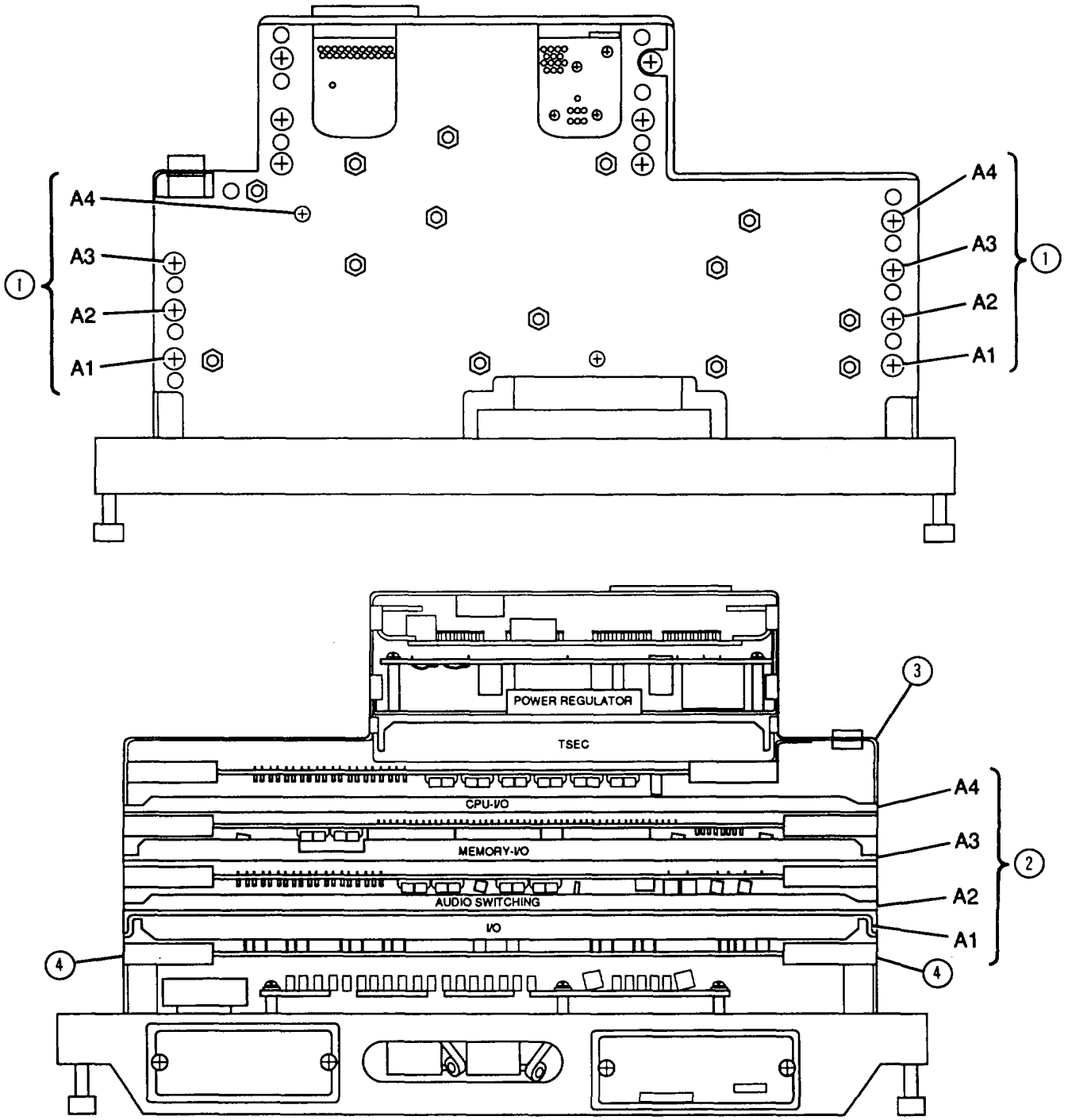
STEP 1. Aline the I/O or audio assembly (2)into the chassis (3) and firmly seat into connector. Press down firmly on the module removal arms (4)

STEP 2. Turn ECCM module so that bottom of chassis is up. Start both captive cross-tip screws (1) and then tighten.

STEP 3. Reinstall assemblies removed for this procedure.

STEP 4. Perform ECCM module performance test, para 4-4.

4-12. REPLACEMENT OF I/O (AI, A3, AND A4) AND AUDIO SWITCHING (A2) ASSEMBLIES



4-13. REPLACEMENT OF TSEC (A5), TIMING (A7), AND POWER REGULATOR (A6) ASSEMBLIES

INITIAL SETUP

Tools

Tool Kit, TK-17
Workstation, Static
Maintenance Kit, MX-10879/G

Materials/Parts

Refer to TM 11-5895-1315-24P for part number of part to be replaced.

EQUIPMENT CONDITION

ECCM module case removed, para 4-11.
ECCM module on bench, with bottom of chassis up.

CAUTION

This equipment contains components 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.

REMOVE

STEP 1. Loosen two captive cross-tip screws (1) securing assembly (2) in chassis (3).

STEP 2. Turn ECCM module so that assembly (2) is up. Lift the assembly (2) from the chassis (3).

REPLACE

CAUTION

Use extreme care when inserting a module into the chassis. The pins on the module plugs are easily bent or damaged. Failure to exercise proper care in installing a module could result in equipment damage and failure.

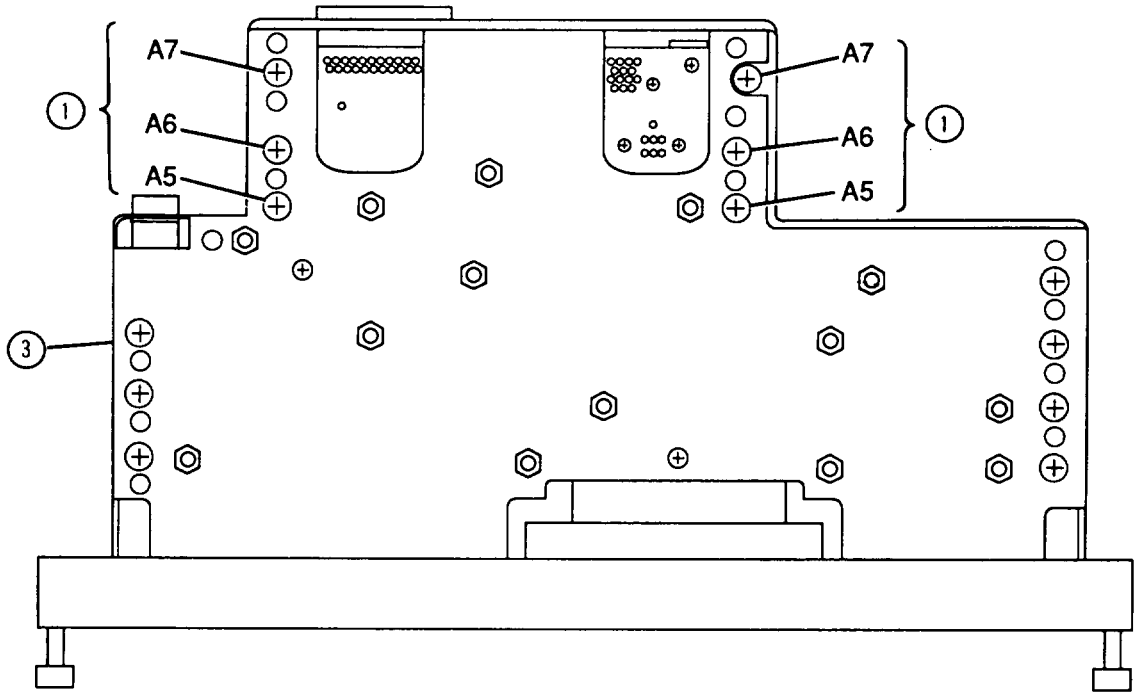
STEP 1. Aline the replacement assembly (2) into the chassis (3) and firmly seat into connector.

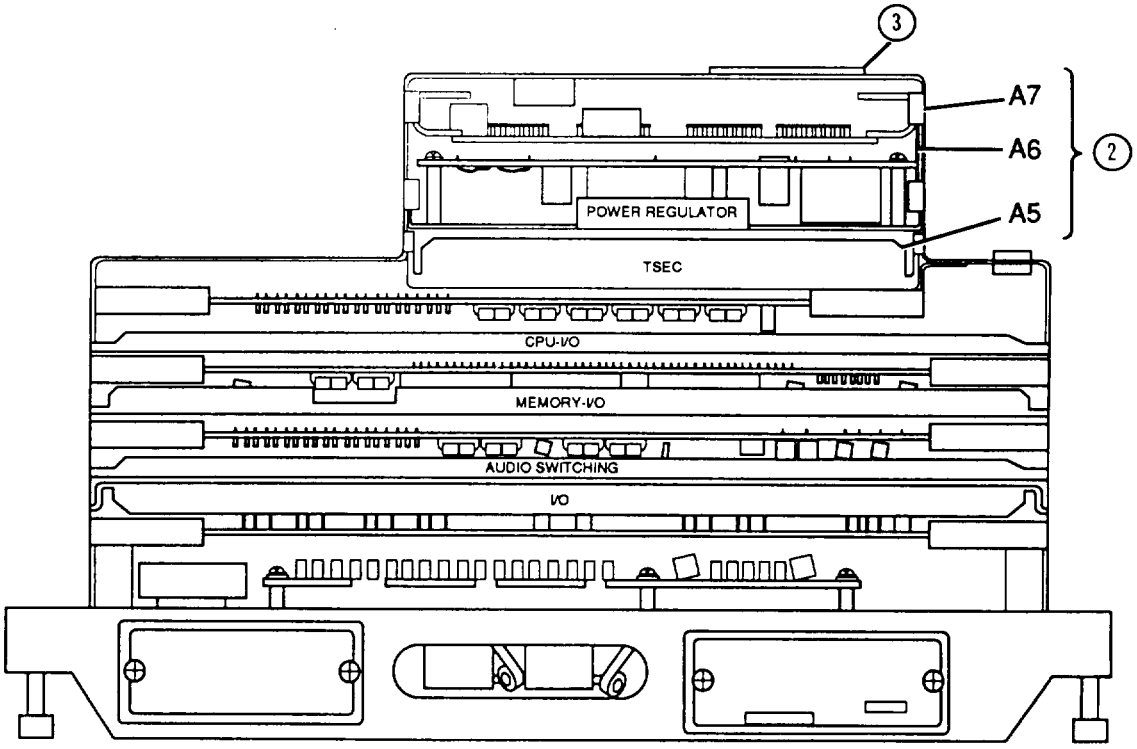
STEP 2. Turn ECCM module so that bottom of chassis is up. Start both captive cross-tip screws (1) and then tighten.

STEP 3. Reinstall assemblies removed for this procedure.

STEP 4. Perform ECCM module performance test, para 4-4.

4-13. REPLACEMENT OF TSEC (A5), TIMING (A7), AND POWER REGULATOR (A6) ASSEMBLIES





4-14. REPAIR OF PANEL AND CHASSIS ASSEMBLY (A8)

INITIAL SETUP

Tools	EQUIPMENT CONDITION
Tool Kit, TK-17 Workstation, Static Maintenance Kit, MX-10879/G	ECCM module case removed, para 4-11. ECCM module on bench, with bottom of chassis up.
Materials/Parts	Al through A7 modules removed from chassis, para 4-12 and 4-13.
Refer to TM 11-5895-1315-24P for part number of part to be replaced.	Volume control knob removed, para 2-17.

CAUTION

This equipment contains components 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.

Working with components that are connected with flexible ribbon (flex) cable requires extreme caution. Do not use unnecessary force, and make all movements in the direction of a flat side of the ribbon. When soldering/unsoldering ribbon cable and components, care must be made to use the lowest temperature tip that will perform the task. Do not touch the cable anywhere except at the solder point. The tip of the soldering iron will instantly burn through the cable. Failure to observe proper caution when handling ribbon cables may result in costly damage and unnecessary replacement.

1. SRA repair of the Front Panel and Chassis Assembly A8 consists of replacing the A8A1 and A8A2 CCA's, chassis mounted components, and front panel mounted components.

2. Replacement of chassis and front panel mounted components is not given due to the lack of complexity involved. Procedures for removal of the A8A1 and A8A2 CCAs are given due to the design of the ECCM involving the use of flex ribbon cable.

3. Refer to the following subparagraph listing to determine which procedure is necessary for desired component removal:

    a. Replacement of Interconnection CCA A8A2.

    b. Replacement of Display Assembly A8A1.

4-14. REPAIR OF PANEL AND CHASSIS ASSEMBLY (A8) (Cont.)

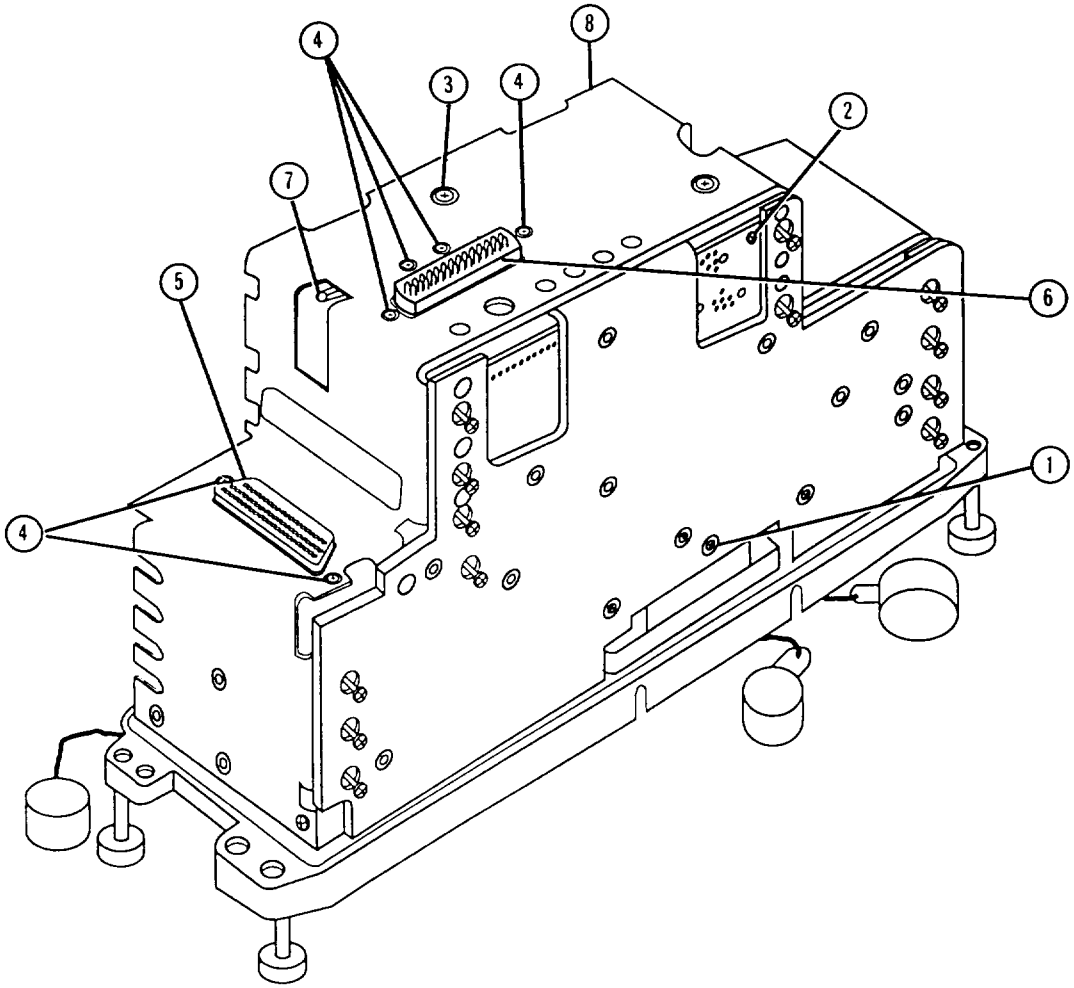
a. Replacement of Interconnection CCA A8A2.

REMOVE

STEP 1. Remove cross-tip screws (1) and (2) from bottom and rear of chassis.

STEP 2. Remove cross-tip screw and nut (3) holding switch wiring to chassis.

STEP 3. Remove two cross-tip screws (4) and nuts securing A8A2P1(5) A8A2P2(6)', and switch A8S2 (7) to chassis(8).



4-14. REPAIR OF PANEL AND CHASSIS ASSEMBLY (A8) (Cont.)

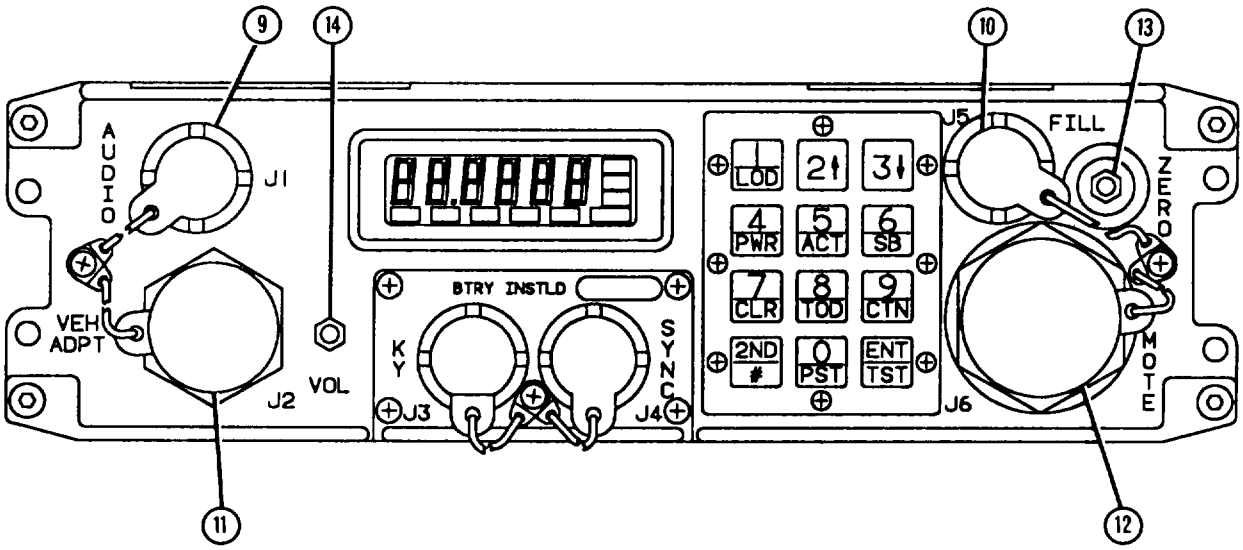
a. Replacement of Interconnection CCA A8A2 (Cont.)

REMOVE (Cont.)

STEP 4. On front panel, remove spanner nuts from A8A2J1 (9) and A8A2J5 (10) .

STEP 5. On front panel, remove retaining nuts from A8A2J2 (11) and A8A2J6 (12).

STEP 6. Using a spring hook, pull button off of switch A8A2S1 (13) ON and remove retaining nuts securing A8A2S1 (13) and A8A2R1 (14) in front panel.



4-14. REPAIR OF PANEL AND CHASSIS ASSEMBLY (A8) (Cont.)

a. Replacement of Interconnection CCA A8A2 (Cont.)

REMOVE (Cont.)

NOTE

In the following step, care must be exercised after removing the screws (three on each side) securing the chassis to the front panel. The front panel is secured to the A8A2 CCA using flex cables. To prevent damage to the flex cables do not use undue force to rotate the front panel to gain access to the rear.

STEP 7. On both sides of chassis, remove three cross-tip screws (15) securing chassis (8) to front panel (16) Rotate front panel forward to gain access to rear.

STEP 8. Remove fifteen cross-tip screws (17) securing CCA to chassis.

STEP 9. Tag and unsolder three wires (18) from battery compartment (18) .

CAUTION

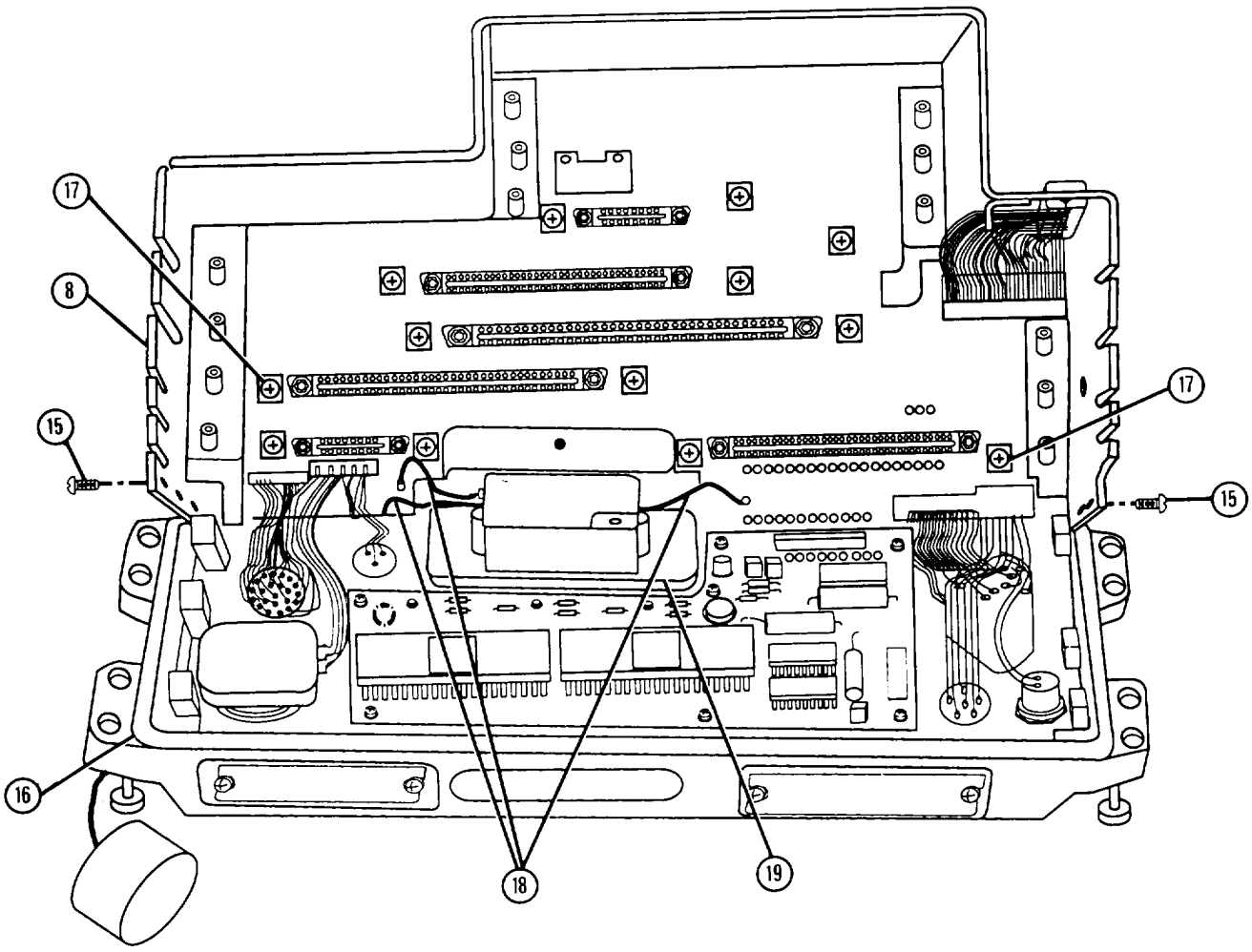
When working with components that are connected with flex cable, it is necessary to use extreme caution. Do not use more force than necessary, and make all movements in the direction of a flat side of the ribbon. When soldering or unsoldering ribbon cable and components, extreme care must be made to use the lowest temperature tip that will perform the task. Do not touch the cable anywhere except at the solder point. The tip of the soldering iron will instantly burn through the cable. Failure to observe proper caution when handling ribbon cables may result in costly damage and unnecessary replacement of the cables.

STEP 10. Carefully remove components attached to CCA with flex cable from front panel and chassis. Lift CCA out of chassis.

4-14. REPAIR OF PANEL AND CHASSIS ASSEMBLY (A8) (Cont.)

a. Replacement of Interconnection CCA A8A2 (Cont.)

REMOVE (Cont.)



4-14. REPAIR OF PANEL AND CHASSIS ASSEMBLY (A8) (Cont.)

a. Replacement of Interconnection CCA A8A2 (Cont.)

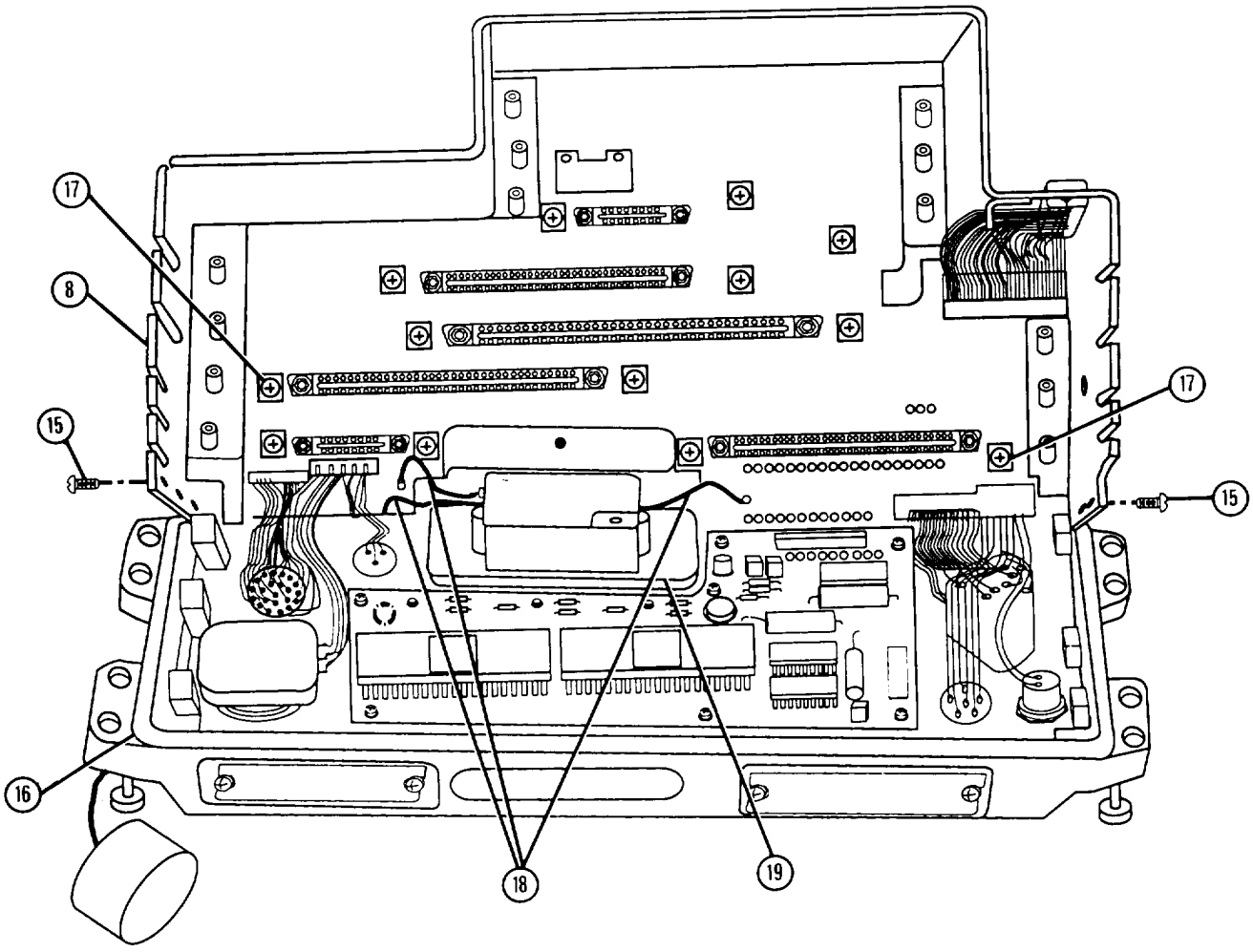
REPLACE

STEP 1. Carefully install CCA into chassis (8).

STEP 2. Install and then tighten fifteen cross-tip screws (17) securing CCA to Chassis(8).

STEP 3. Carefully insert A8A2J1 (9) , A8A2J2 Q (11) A8A2J5(10) A8A2J6 (12) , A8A2R1 G (14), AND A8A2S1 (13) into the front panel Q (16).

STEP 4. Solder three wires (18) to battery compartment (19) and remove tags.



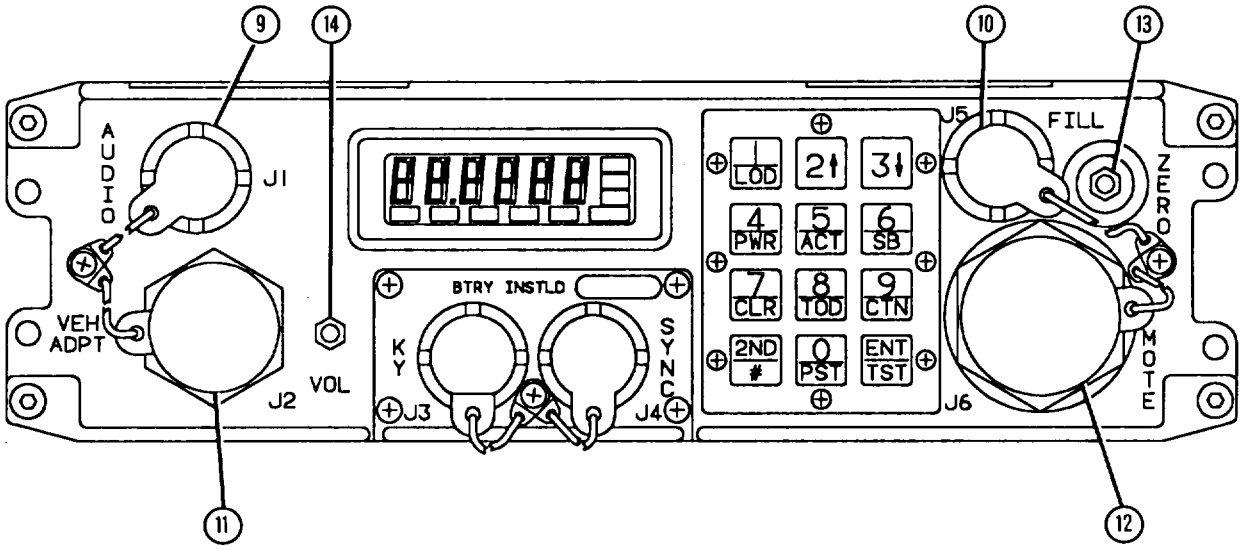
4-14. REPAIR OF PANEL AND CHASSIS ASSEMBLY (A8) (Cont.)

a. Replacement of Interconnection CCA A8A2 (Cont.)

REPLACE (Cont.)

STEP 5. Carefully rotate front panel (16) upwards and secure to chassis (8) using cross-tip screws (15) . Tighten all screws.

STEP 6. Install spanner nuts and retaining nuts (remove steps 3, 4, & 5) onto A8A2J5 (10) , A8A2J6 (12) , A8A2S1 (13) and A8A2R1 (14). Tighten nuts and install button onto A8A2S1 (13).



4-14. REPAIR OF PANEL AND CHASSIS ASSEMBLY (A8) (Cont.)

a. Replacement of Interconnection CCA A8A2 (Cont.)

REPLACE (Cont.)

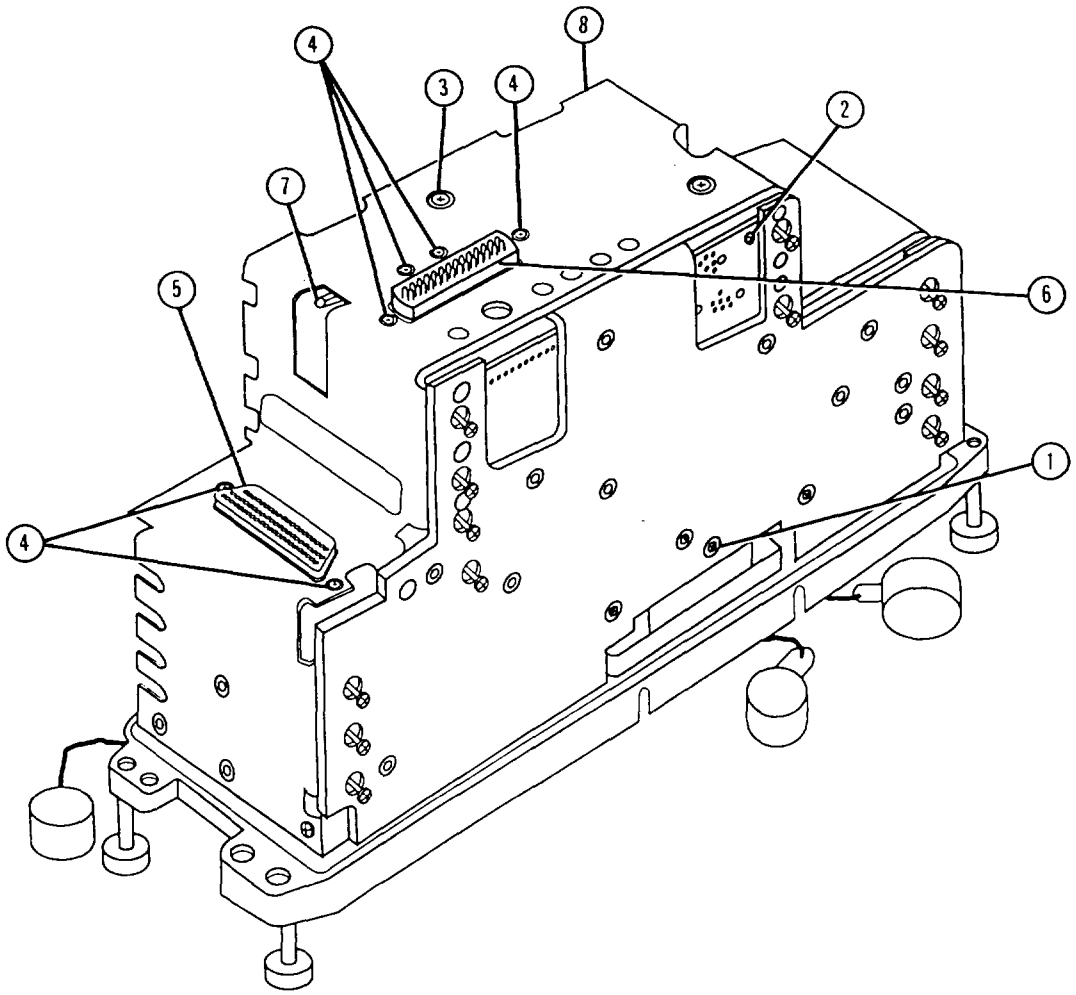
STEP 7. Aline A8A2P1 (5) A8A2P2 (6), and A8S2 (7) to chassis (8)and secure using two cross-tip screws a (4) and nuts for each component. Tighten nuts.

STEP 8. Install and tighten cross-tip screws (1) and (2) on bottom and rear of chassis.

STEP 9. Install and tighten cross-tip screw and nut (3) holding switch wiring to chassis.

STEP 10. Reinstall assemblies removed for this procedure.

STEP 11. Perform ECCM module performance test, para 4-4.



4-14. REPAIR OF PANEL AND CHASSIS ASSEMBLY (A8) (Cont.)

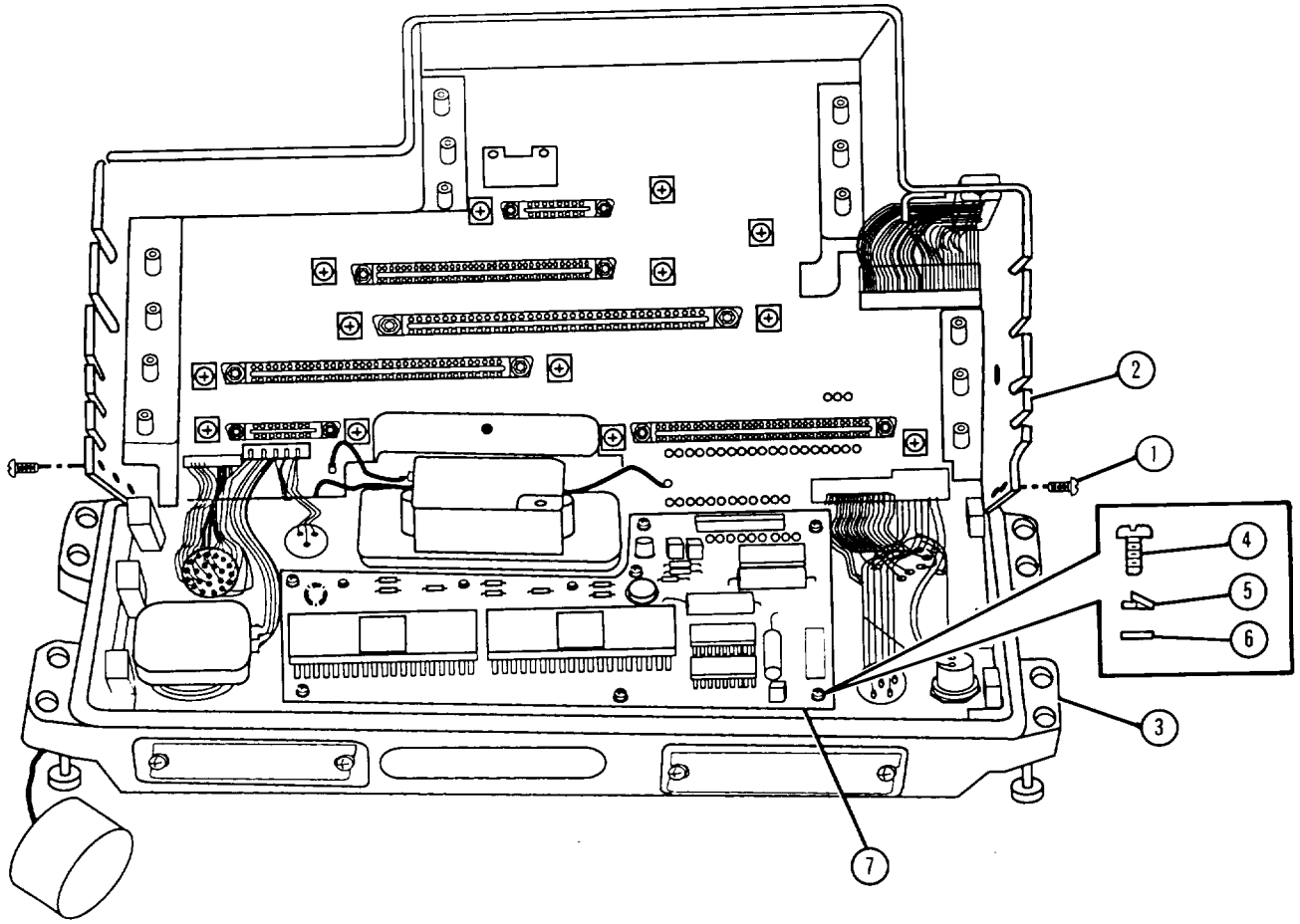
b. Replacement of Display Assembly A8A1.

REMOVE

STEP 1. On both sides of chassis, remove three cross-tip screws (1)securing chassis (2) to front panel (3) . Carefully rotate front panel (3) forward to gain access to rear.

STEP 2. Remove seven cross-tip screws (4) lockwashers(5), and flatwashers (6) securing A8A1 CCA (7) to front panel.

STEP 3. Carefully lift CCA (7) straight up from rear of front panel (3) , with a slight rocking motion to unplug A8A1Jl from front panel A8S1. Remove CCA.



4-14. REPAIR OF PANEL AND CHASSIS ASSEMBLY (A8) (Cont.)

b. Replacement of Display Assembly A8A1 (Cont.)

REPLACE

CAUTION

Use extreme care when inserting a module into the chassis. The pins on the module plugs are easily bent or damaged. Failure to exercise proper care in installing a module could result in equipment damage and failure.

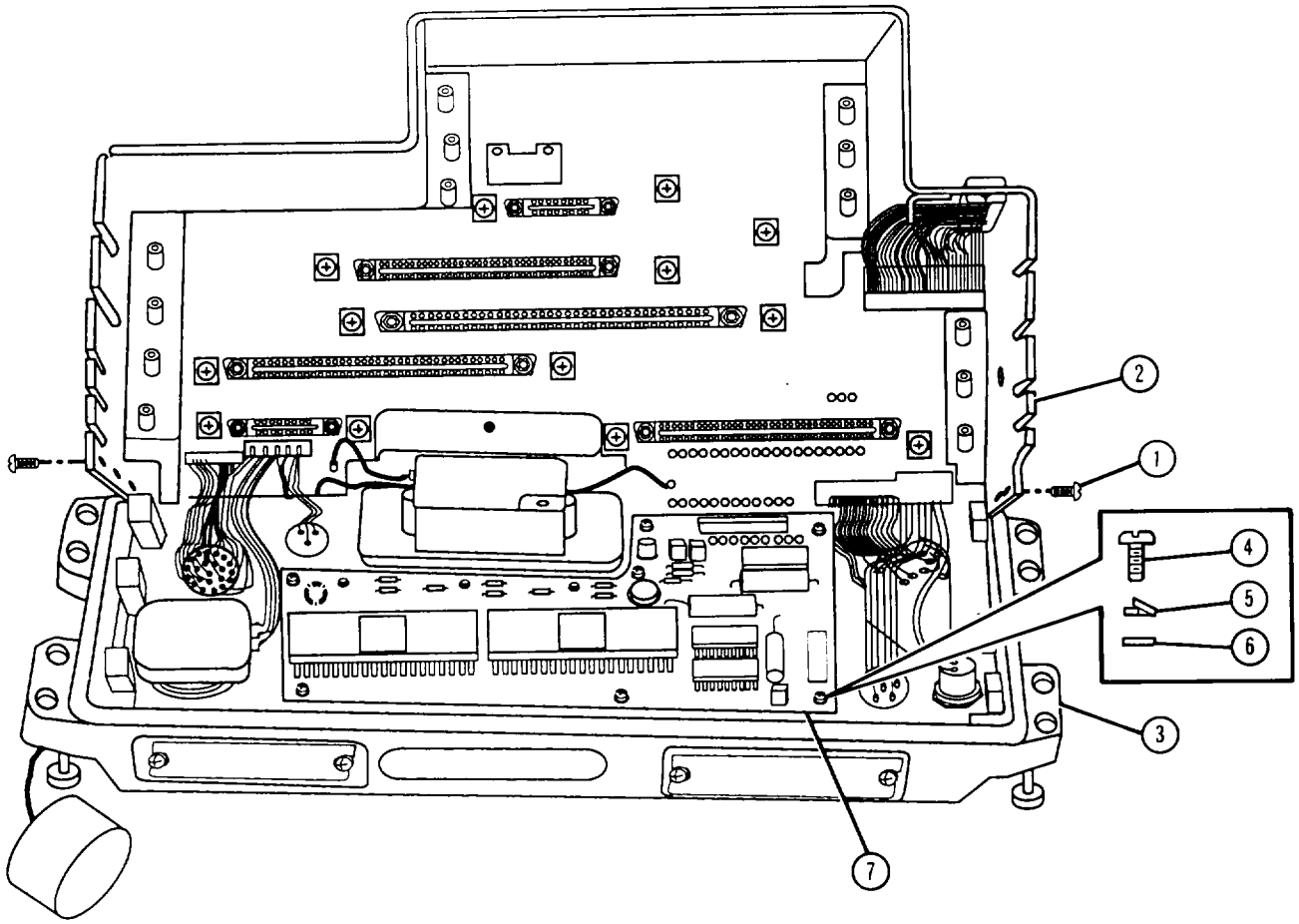
STEP 1. Carefully aline CCA (7) to front panel (3) and plug A8A1 CCA into A8S1 jack. Firmly seat CCA.

STEP 2. Install seven cross-tip screws (4), lockwashers(5), and flatwashers (6). Tighten screws.

STEP 3. Rotate front panel upward, and secure to chassis using three cross-tip screws (1) on each side. Tighten screws.

STEP 4. Reinstall assemblies removed for this procedure.

STEP 5. Perform ECCM module performance test, para 4-4.



APPENDIX A
REFERENCES

A-1. SCOPE

This appendix lists publications that are referenced in this manual or that contain information applicable to the operation and maintenance of the ECCM Module.

A-2. PUBLICATIONS

Administrative Storage ..... TM 740-90-1

Chemical, Biological, and Radiological (CBR)
Decontamination ..... TM 3-220

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

Electrostatic Discharge Control Handbook For
Protection of Electrical and Electronic Parts,
Assemblies and Equipment (Excluding Electrically
Initiated Explosive Devices) metric DOD-HDBK-263

Operator's and Unit Maintenance Manual
for Communications Terminal, AN/TRC-179(V)l,
(NSN 5895-61-156-0411) ..... TM 11-5895-1218-12/
EE150-LQ-OMI-010/Wl10-TRC179Vl/
TO 31R2-2TRC179-21

Operator's and Unit Maintenance Manual
for Radio Set AN/GRC-215
(NSN 5895-01-202-8672) ..... TM 11-5895-1220-12/
EE160-RG-OMI-010/WllO-GRC215/
TO 31R2-2GRC215-1

Operator, Unit, Intermediate Direct Support,
and General Support Maintenance Manual Including
Repair Parts, and Special Tools List For
Test Set, ECCM TS-4257/G
(NSN 6625-01-270-5112) ..... TM 11-6625-3217-14&P/
ET800-AC-OMP-010/TS-4257G/
TO 33D7-13-108-1

Operator, Unit, Intermediate Direct Support,
and General Support Maintenance Manual Including
Repair Parts, and Special Tools List For
Interface Unit, Test J-4673/G
(NSN 6625-01-270-3934) ..... TM 11-6625-3219-14&P/
ET800-BB-OMP-010/J-4673G/
TO 33D7-50-1322-1

Packaging and Handling Deficiencies ..... NAVSUPINST 4355.73B

Packaging for Shipment ..... NAVSUP PUB 503

Preparation for Storage or Shipment ..... TM 740-9-1

Procedures for Destruction of Electronics Material to Prevent Enemy Use (Electronics Command) ..... TM 750-244-2

Report of Maintenance Performed: Maintenance Data Collection Subsystem (MDCS) ..... OPNAVINST 4790.4A

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

Unit, Intermediate Direct Support and General Support Maintenance Manual for Receiver, Radio R-2322/G (NSN 5895-01-205-6269) ..... TM 11-5895-1310-24/ EE020-JM-MMI-010/WllO-R2322G/ TO 31R2-4-566-2

Unit, Intermediate Direct Support and General Support Maintenance Manual for Receiver-Transmitter R-1512/G (NSN 5895-01-205-6148) ..... TM 11-5895-1303-24/ EE162-NG-MMI-010/WllO-RT1512G/ TO 31R2-4-562-2

Unit, Intermediate Direct Support and General Support Maintenance Manual for Receiver-Transmitter, Radio RT-1511/GRC-215 (NSN 5895-01-205-6180) ..... TM 11-5895-1318-24/ EE150-LS-MMI-010/W11O-RT1511G/ TO 31R2-2GRC215-42

Unit, Intermediate Direct Support and General Support Maintenance Repair Parts and Special Tools List (Including Depot Maintenance Repair Parts and Special Tools) for Controller, Receiver-Transmitter C-11670/G (NSN 5895-01-205-0662) ..... TM 11-5895-1315-24P/ EE005-FG-PLD-010/WllO-C11670G/ TO 31R2-4-567-4

APPENDIX B
MAINTENANCE ALLOCATION CHART

SECTION I. INTRODUCTION

B-1. GENERAL

This appendix provides a summary of the maintenance operations for the Controller, Receiver-Transmitter C-11670/G. 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/actions 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 equipments/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 the 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 - Special 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 EOUIPMENT REOUIREMENTS (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

CONTROLLER, RECEIVER-TRANSMITTER C-11670/G

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
00	Controller, Receiver-Transmitter C-11670/G (A3023813)	Replace		0.1	9,14	A,F			
		Test		0.1	B,H				
		Test				L(3.0)		3-8,11,12	C,F
		Repair		0.1				1.11,14	D,H,F
		Repair				0.5		2,9,11	E,F
		Repair				L(2.0)		2,10,11,13	F,G,I
		Overhaul					80.0	TBD	
01	I/O Assembly Al (A3024017)	Replace				L(O.2)		2,11,14	F
		Test				L(2.0)		TBD	F,I
		Repair				L(2.0)		TBD	F,G,I
0101	I/O CCA A1A1 (A3024019)	Repair				L(2.0)			H
02	Memory I/O Assembly A3 (A3024023)	Replace				L(0.2)		2,11,14	F
		Test				L(2.0)		TBD	F,I
		Repair				L(2.0	)	TBD	F,G,I
0201	Memory I/O CCA A3A1 (A3078379)	Repair				L(1.O)			H
03	CPU I/O Assembly A4 (A3024029)	Replace				L(0.2)		2,11,14	F
		Test				L(2.0)		TBD	F,I
		Repair				L(2.0)		TBD	F,G,I
0301	CPU I/O CCA A4A1 (A3024031)	Repair				L(2.0)			H
04	Timing Assembly A7 (A3024685)	Replace				L(0.2)		2,11,14	F
		Test				L(2.0)		TBD	F,I
		Repair				L(2.0)		TBD	F,G,I
05	Power Regulator Assy A6 (A3024035)	Replace				L(0.2)		2,11,14	F
		Test				L(2.0)		TBD	I
		Repair				L(2.0)		TBD	G,I
0501	Power Regulator CCA A6A1 (A3086579)	Repair				L(1.5)			H
06	TSEC Assembly A5 (A3024041)	Replace				L(0.2)		2,11,14	F
		Test				L(2.0)		TBD	F,I
		Repair				L(2.0)		TBD	F,G,I
0601	TSEC CCA A5Al (A3024043)	Repair				L(2.0)			H
07	Panel & Chassis Assy A8 (A3024004)	Test				L(2.0)		TBD	F,I
		Repair				L(2.0)		TBD	F,G,I

SECTION II. MAINTENANCE ALLOCATION CHART

FOR

CONTROLLER, RECEIVER-TRANSMITTER C-11670/G

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE LEVEL C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
0701	Interconnection CCA A8A2 (A3024009)	Replace Repair				L(1.0) L(O.5)		2,11,14 2	F G,H
0702	Display Assembly A8A1 (A3024013)	Replace Test Repair				L(O.5 L(1.5) L(1.0)	)	2,11,14 TBD TBD	F F,I F,G,I
08	Audio Switching Assy A2 (A3029244)	Replace Test Repair				L(0.2) L(2.0) L(2.0)		2,11,14 TBD TBD	F F,G F,G,I
0801 A2A1 (A3078377)	Audio Switching CCA	Repair				L(2.0)			H

SECTION III. TOOL AND TEST EQUIPMENT REQUIREMENTS FOR CONTROLLER, RECEIVER-TRANSMITTER C-11670/G

REF CODE	MAINT LEVEL	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	0	Tool Kit TK-101/G	5180-00-064-5178	
2	H,L	Tool Kit, ElectTK-17 (Incl. Metric)	5180-00-195-0855	JENSEN JTK-17RM
3	L	Interface Unit, Test J-4673/G	6625-01-270-3934	MX 818331-801
4	L	Kit, Test Lead (for Fluke)	6625-00-444-4041	
5	L	Test Set, ECCM TS-4257/G	6625-01-270-5112	MX 950594-801
6	L	Multimeter, Digital AN/USM-486	6625-01-145-2430	FLUKE 8050A-01
7	L	Power Supply PP-8202/G *	6625-00-160-0827	HP-6274B
8	L	Personal Computer PS/2 with dual disk drives		IBM Model 30-002
9	O,H	Static Control Service Kit	6625-01-168-2044	3M 8501
10	L	Maintenance Kit, PCB MX-10879/G	5895-01-267-9473	Pace Model RNR PIN 8007-0117
11	H,L	Workstation, Static	4940-01-087-3458	3M 8021
12	L	Monochrome Display		IBM 8503
13	L	Repair Kit, PCB MK-772/U	5999-00-757-7042	
14	O,H,L	Key Set, Socket Head (Metric)	5120-00-112-9599	

* PP-8214/G(NSN6130-00-150-0028) provides identical capability when source power is 230V, 50 cycle. Air Force use only.

SECTION IV. REMARKS

FOR

CONTROLLER, RECEIVER-TRANSMITTER C-11670/G

REFERENCE CODE	REMARKS
A	Allen wrench (5 mm.) is required in removal of unit as installed in the Communications Terminal AN/TRC-179. No tools required in removal of unit as installed in AN/GRC-215.
B	Unit maintenance runs BIT and verifies status of "Keep Alive" Battery BA-1372/U.
C	SRA fault isolates to faulty subassemblies (I/O Assembly Al, Memory I/O Assembly A3, CPU I/O Assembly A4, Timing Assembly A7, Power Regulator Assembly A6, TSEC Assembly A5, Display Assembly A8A1, Audio Switching Assembly A2) and Chassis components. Note: Initial SRA repair of the ECCM will consist of subassembly replacement only. Return CCAs to depot.
D	Repair by replacement of defective ECCM. Unit Maintenance also replaces Front Panel knob, connector dust covers, and "zeroised" button cap.
E	MMCT replacement of dry cell Battery BA-1372/U and keypad membrane.
F	Electrostatic sensitive components.
G	Piece part repair.
H	Test/repair as part of next higher assembly.
I	Specialized Repair Activity (SRA). Note: Initial SRA repair of subassemblies will be done by contractor. Return defective unit(s) to depot.

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 ECCM Module. 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. E") .

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 (SRA)

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.

SECTION III. EXPENDABLE/DURABLE SUPPLIES AND MATERIALS LIST

(1) ITEM NUMBER	(2) LEVEL	(3) NATIONAL STOCK NUMBER	(4) DESCRIPTION	(5) U/M
1	0	6850-00-105-3084	TRICHLOROTRIFLUOROETHANE	oz
2	H		Silicone Adhesive Sealant, MIL-A-46106	oz
3	H		Grease, MIL-Q-4343	oz
4	0	8305-00-267-8215	Cloth, Cheese cloth: Cotton; lintless, bleached, 36 in. (CCC-C-440, 81348) in Tool Kit TK-101/G	YD
5	0	8020-00-245-4509	Brush, squirrel tail hair bristles; 1 in (M-B-39, 81348) (15335001099)	EA wd.
6	H	6135-00-801-3493	Battery, BA-1372	EA

GLOSSARY
OF ABBREVIATIONS, ACRONYMS
AND UNUSUAL TERMS

SECTION I. ABBREVIATIONS AND ACRONYMS

B

BIT ..... Built In Test
BTRY INSTLD ..... Battery Installed

C

CCA ..... Circuit Card Assembly
CCW ..... Counterclockwise
CIU ..... Control Interface Unit
CW ..... Clockwise

D

DISREP ..... Discrepancy in Shipment Report

E

ECCM ..... Electronic Counter - Countermeasures
EIR ..... Equipment Improvement Recommendations
ESD ..... Electrostatic Discharge

I

I/O ..... Input/Output

L

LCD ..... Liquid Crystal Display

M

MAC ..... Maintenance Allocation Chart
MDCS ..... Maintenance Data Collection Subsystem
MTOE ..... Modified Table of Organization and Equipment
MWO ..... Modification Work Order

P

PMCS ..... Preventive Maintenance Checks and Services

GLOSSARY - (Cont.)

SECTION II.

R

RAM ..... Random Access Memory
ROD ..... Report of Discrepancy
ROM ..... Read Only Memory

S

SRA ..... Specialized Repair Activity

T

TMDE ..... Test, Measurement, and Diagnostic Equipment
TSEC or TRANSEC ..... Transmission Security

U

UART ..... Universal Asynchronous Receiver-Transmitter

V

VOL ..... Volume

GLOSSARY - (Cont.)

SECTION II. DEFINITION OF UNUSUAL TERMS

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.

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

KEEP-ALIVE This refers to a circuit that pulses RAM memory circuits periodically to prevent loss of stored data. When power is turned off of a unit, the KEEP-ALIVE circuit is battery powered to prevent loss of memory data.

TRI-STATE MODE A condition of a device in which it can be isolated from the data bus. In this condition it does not affect, in any way, the messages to other devices on the bus. The Tri-State Mode of a device means the device is 1) ON the bus, 2) OFF the bus, or 3) ISOLATED from the bus.

TRANSEC Transmission Security. Measures taken to provide nonintersectable and or jam resistance to communications.

SUBJECT INDEX

SUBJECT INDEX - (Cont.)

SUBJECT INDEX - (Cont.)

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
00506

By Order of the Secretary of the Navy:

ROBERT AILES
Rear Admiral, United States Navy
Command, Space and Naval Warfare
Systems Command

By Order of the Secretary of the Air Force:

LARRY D. WELSH
General, United States Air Force
Chief of Staff

Official:

CHARLES D. McDONALD
General, United States Air Force
Commander, Air Force
Logistics Command

DISTRIBUTION:

To be distributed in accordance with DA Form 12-36-E, block 8821, Unit, and Direct Support/General Support Maintenance requirements for TM 11-5895-1315-24.

NOTES:

1.0 GENERAL:

1.1 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 1A1A2, 1A2A2, 1A3A2, 1A4A2, 1A5A2, 6A1A2, 6A2A2, 6A3A2, 6A4A2 AND 6A5A2.

2.3 REFERENCE:
ASSEMBLY NUMBER A3023813.

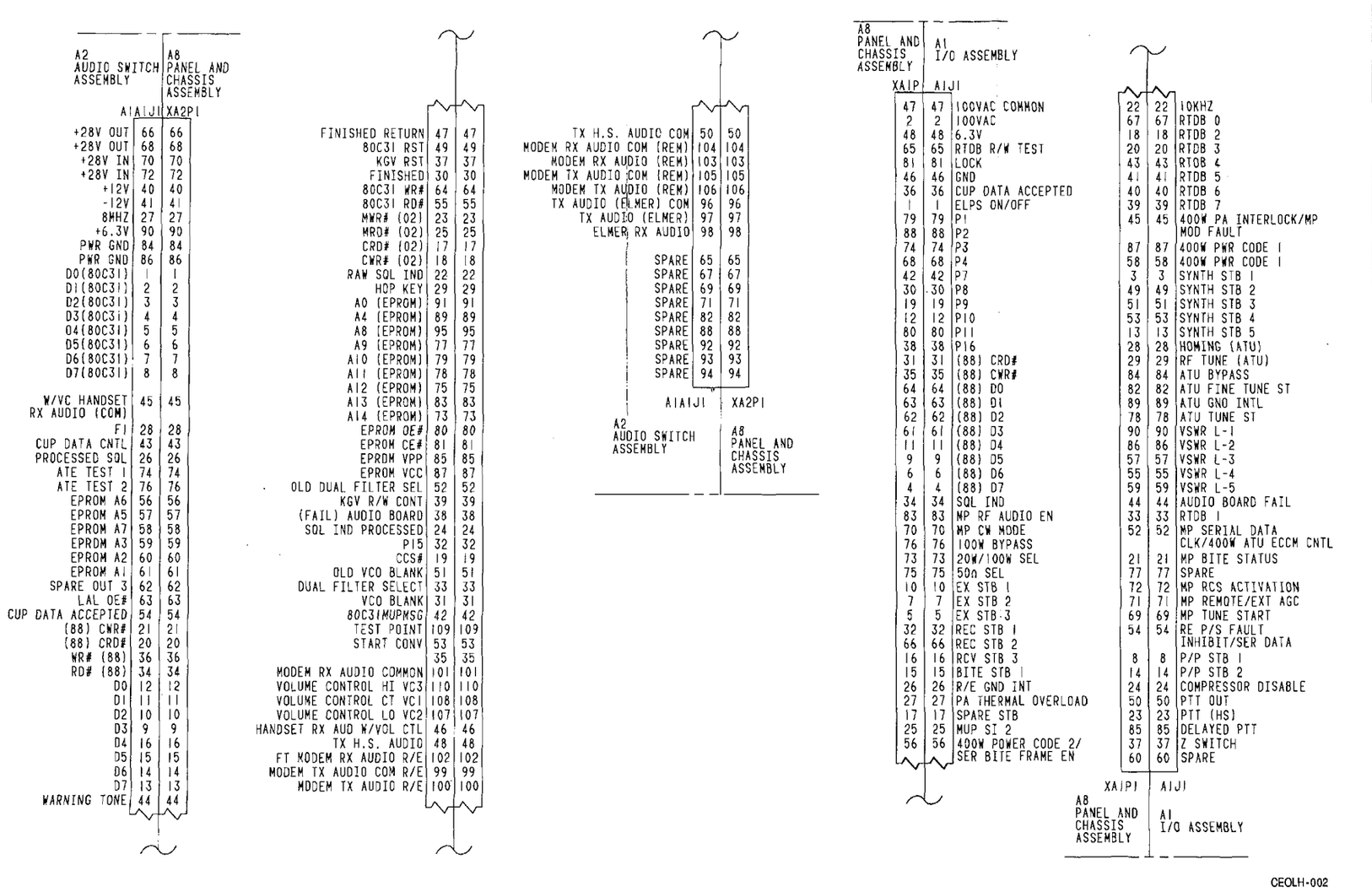
REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
A8	
A1 ASSEMBLY	
A1	
A1A1 ASSEMBLY	
J2	
A2 ASSEMBLY	
A1	
A2A1 ASSEMBLY	
J1	
A3 ASSEMBLY	
A1	
A3A1 ASSEMBLY	
A1	
A3A1A1 ASSEMBLY	
J1	
A4 ASSEMBLY	
A1	

REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
A4A1 ASSEMBLY	
J1	
A5 ASSEMBLY	
A1	
A5A1 ASSEMBLY	
J1	
A6 ASSEMBLY	
A1	
A6A1 ASSEMBLY	
J2	
A7 ASSEMBLY	
J1	
A8 ASSEMBLY	
XA1P2 XA2P1 XA3P1 XA4P1 XA5P1 XA6P2 XA7P1	

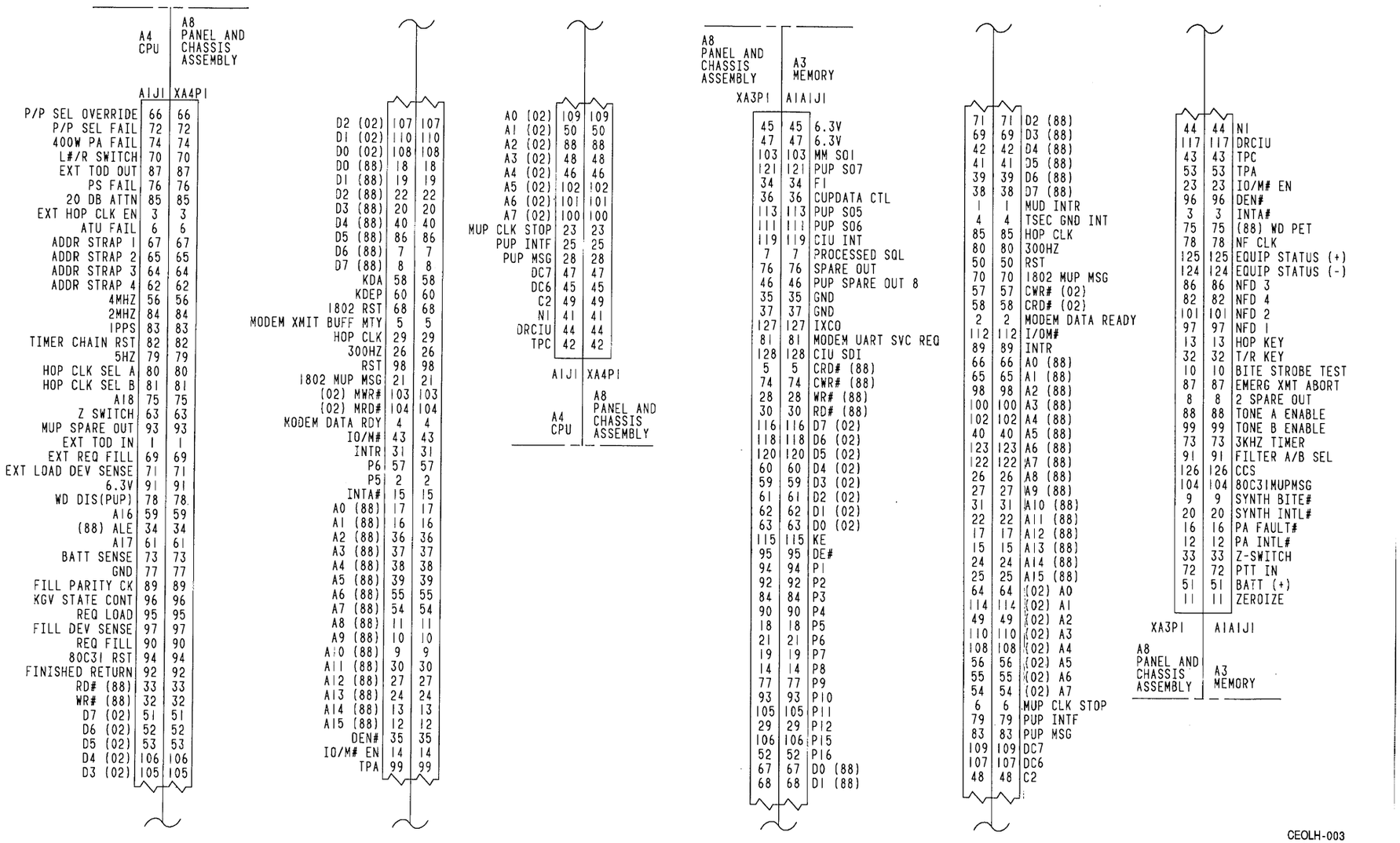
CROSS REFERENCE TABLE			
REF DES	ASSEMBLY NUMBER	PRINTED WIRING BOARD	SCHEMATIC NUMBER
A1	A3024017		
A1A1	A3024019	A3024020	A3024021
A2	A3029244		A3024027
A2A1	A3078377		
A2A1A1	A3029246	A3029247	A3029248
A3	A3024023		
A3A1	A3078379		
A3A1A1	A3024025	A3024026	A3024027
A4	A3024029		
A4A1	A3024031	A3024032	A3024033
A5	A3024041		
A5A1	A3024043	A3024044	A3024045
A6	A3024035		
A6A1	914874-802	410907-1	492697
A7	A3024685	A3024664	A3024686
A8	A3024004		A3024005
A8A1	A3024013	A3024014	A3024015
A8A2	A3024009	A3024010	A3024011

CEOLH-00

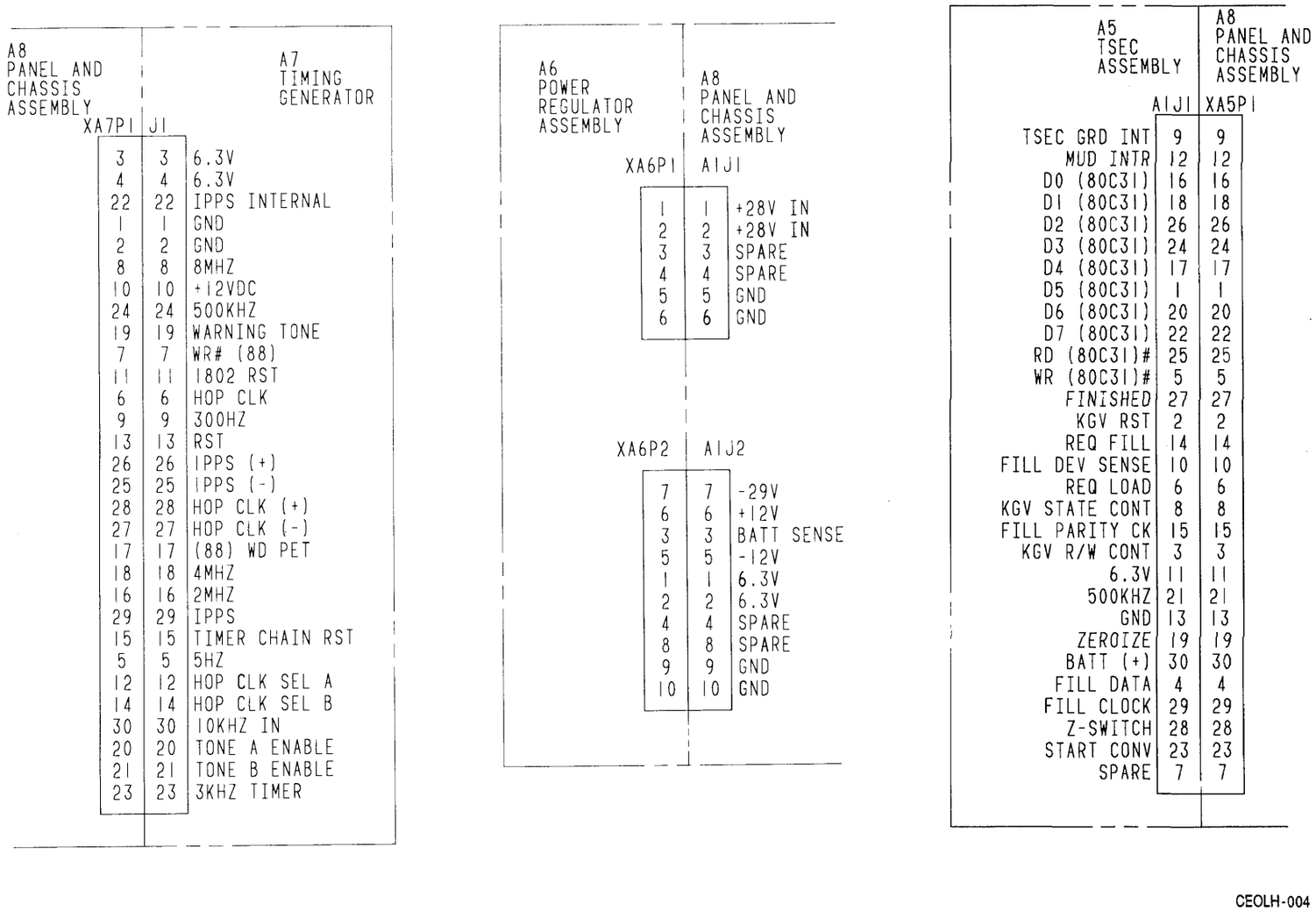
FO-1. ECCM Schematic Diagram
(Sheet 1 of 4)



FO-1. ECCM Schematic Diagram
(Sheet 2 of 4)



FO-1. ECCM Schematic Diagram
(Sheet 3 of 4)



FO-1. ECCM Schematic Diagram
(Sheet 4 of 4)

REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
A2 FL3 S2 W1	
A1 ASSEMBLY	
J2	
A2 ASSEMBLY	
E3 J6 P3 XA1P2 XA2P1 XA3P1 XA4P1 XA5P1 XA6P2 XA7P1	J3,4
W1 ASSEMBLY	
J4	J1,2

CROSS REFERENCE TABLE			
REF DES	ASSEMBLY NUMBER	PRINTED WIRING BOARD	SCHEMATIC NUMBER
A1	A3024013	A3024014	A3024015
A2	A3024009	A3024016	A3024011
W1	A3028125	————	————

NOTES:

1.0 GENERAL:

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

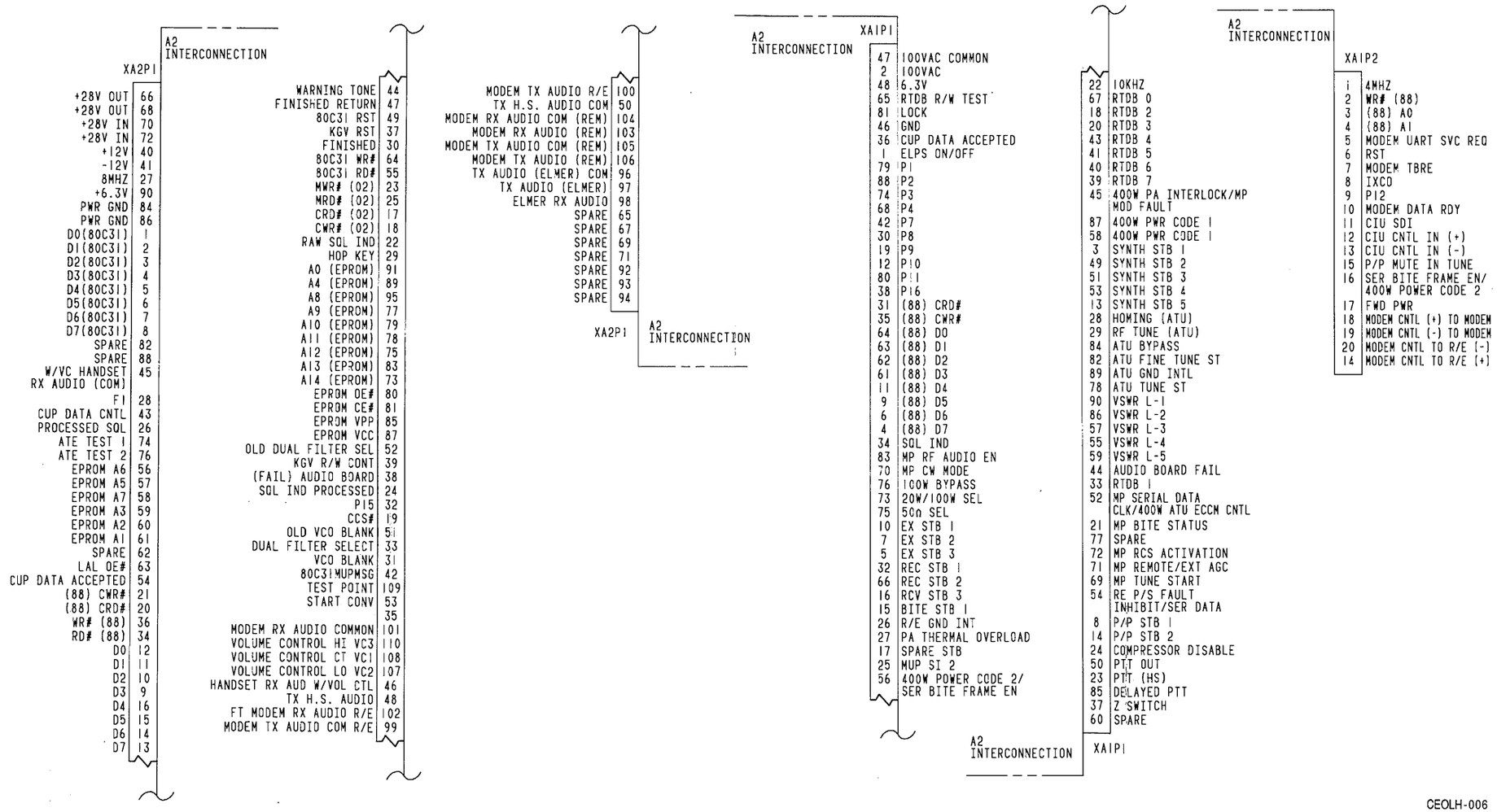
2.0 SPECIFIC:

2.1 UNLESS OTHERWISE SPECIFIED:
VOLTAGES ARE DC.

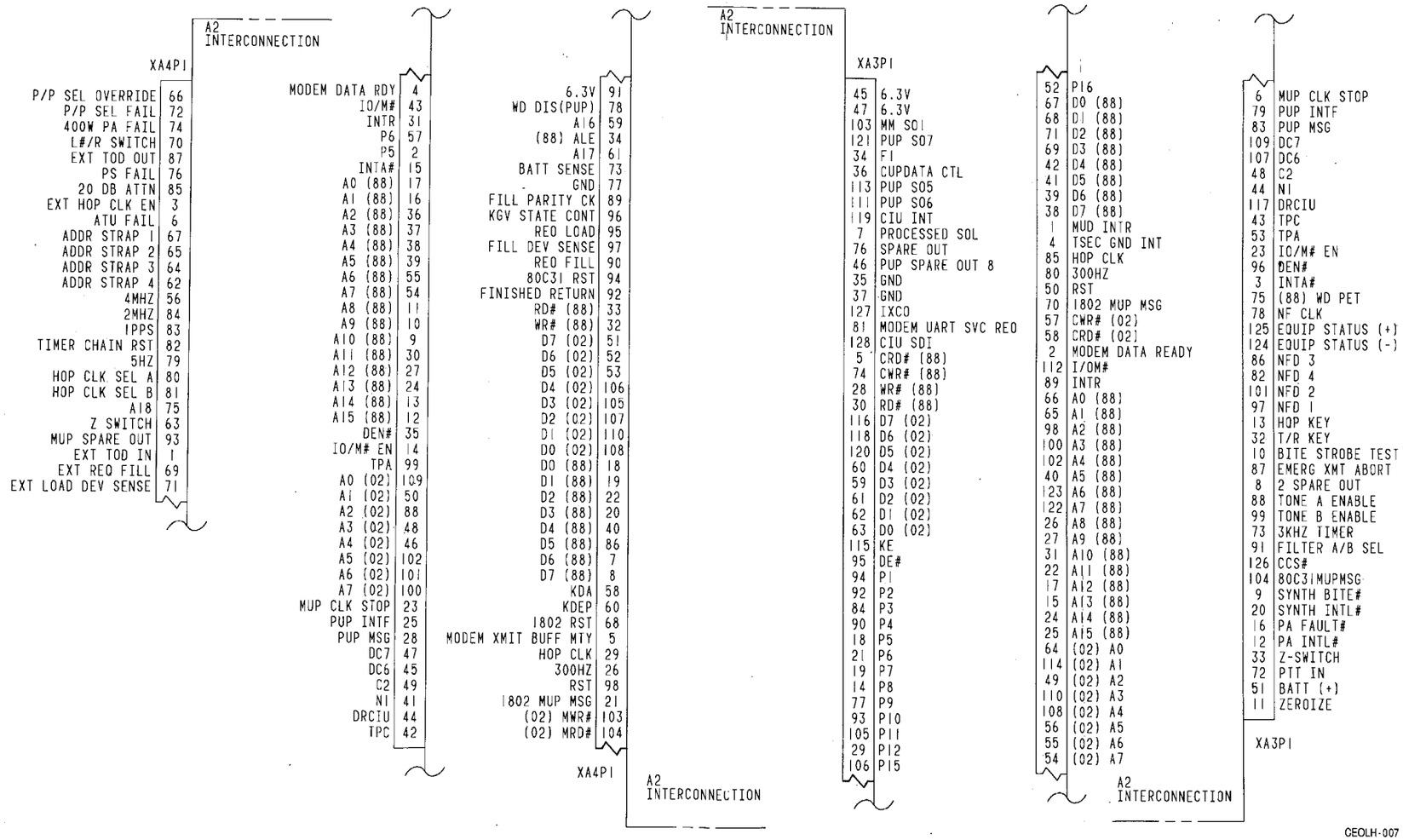
2.2 PARTIAL REFERENCE DESIGNATIONS ARE SHOWN:
FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION 1A1A2A8,1A2A2A8, 1A3A2A8,1A4A2A8,1A5A2A8,2A1A2A8,6A1A2A8,6A2A2A8, 6A3A2A8,6A4A2A8 AND 6A5A2A8.

2.3 FOR NEXT HIGHER CIRCUIT SEE SCHEMATIC A3024002.

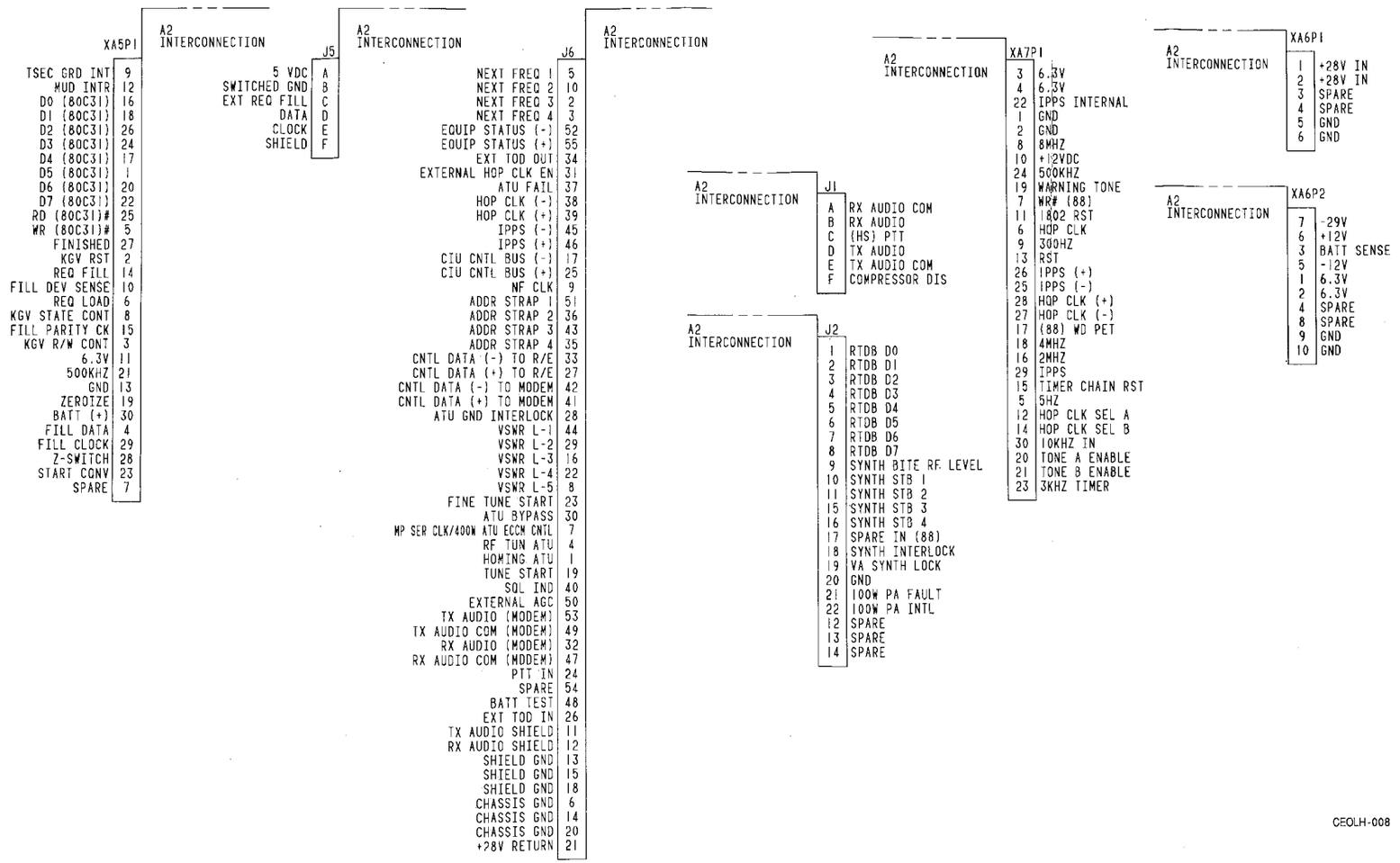
FO-2. Panel and Chassis A8
Schematic Diagram
(Sheet 1 of 5)



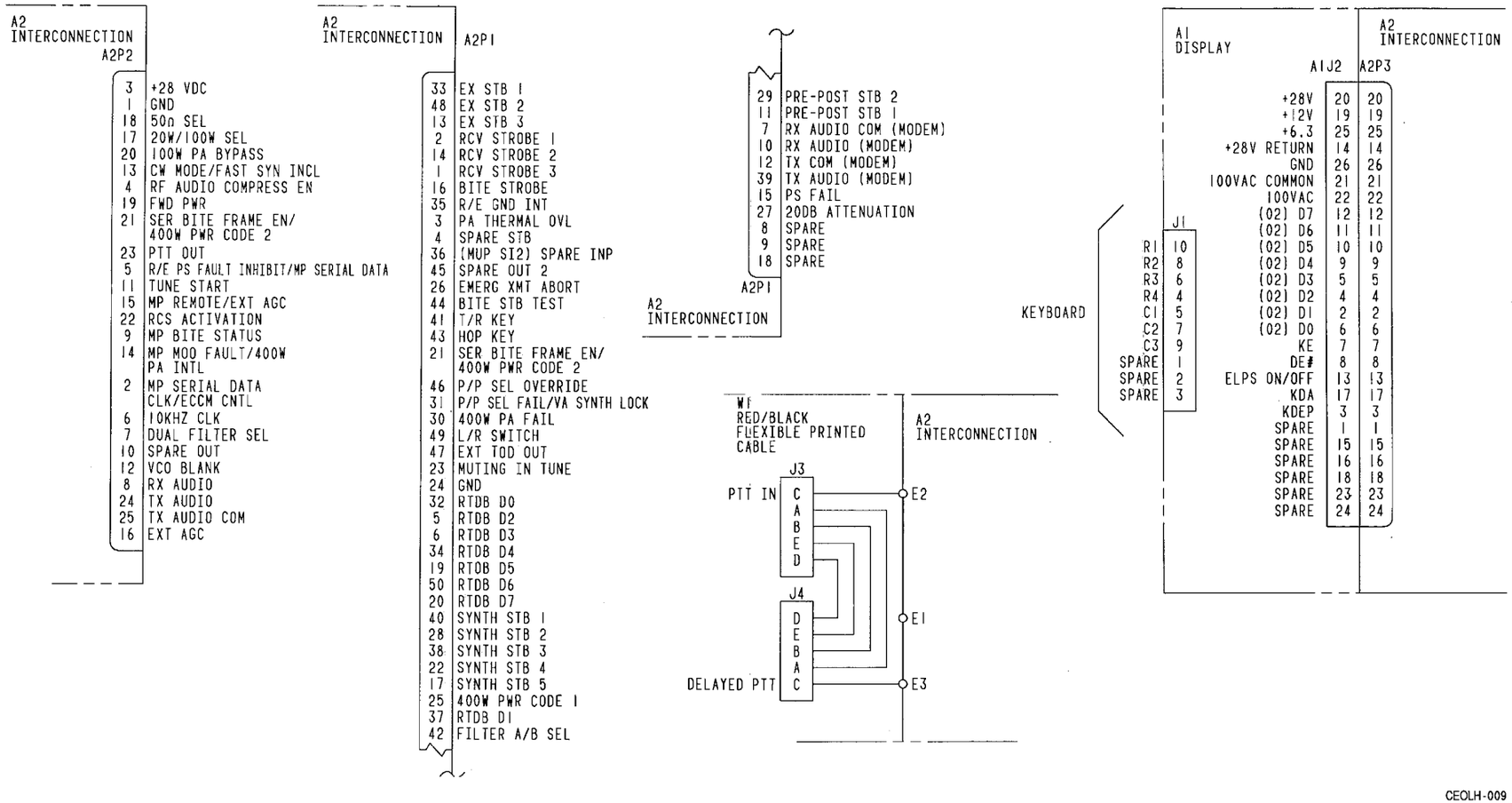
FO-2. Panel and Chassis A8
Schematic Diagram
(Sheet 2 of 5)



FO-2. Panel and Chassis A8 Schematic Diagram
(Sheet 3 of 5)



FO-2. Panel and Chassis A8 Schematic Diagram
(Sheet 4 of 5)



FO-2. Panel and Chassis A8 Schematic Diagram
(Sheet 5 of 5)

NOTES:

1.0 GENERAL:

1.1 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.
VOLTAGES ARE DC.
DIODES AND/OR TRANSISTORS ARE JANTX TYPE.

2.2 PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION 1A1A2A8A2, 1A2A2A8A2, 1A3A2A8A2, 1A4A2A8A2, 1A5A2A8A2, 2A1A2A8A2, 6A1A2A8A2, 6A2A2A8A2, 6A3A2A8A2, 6A4A2A8A2 AND 6A5A2A8A2.

2.3 FOR NEXT HIGHER CIRCUIT SEE SCHEMATIC A3024005.

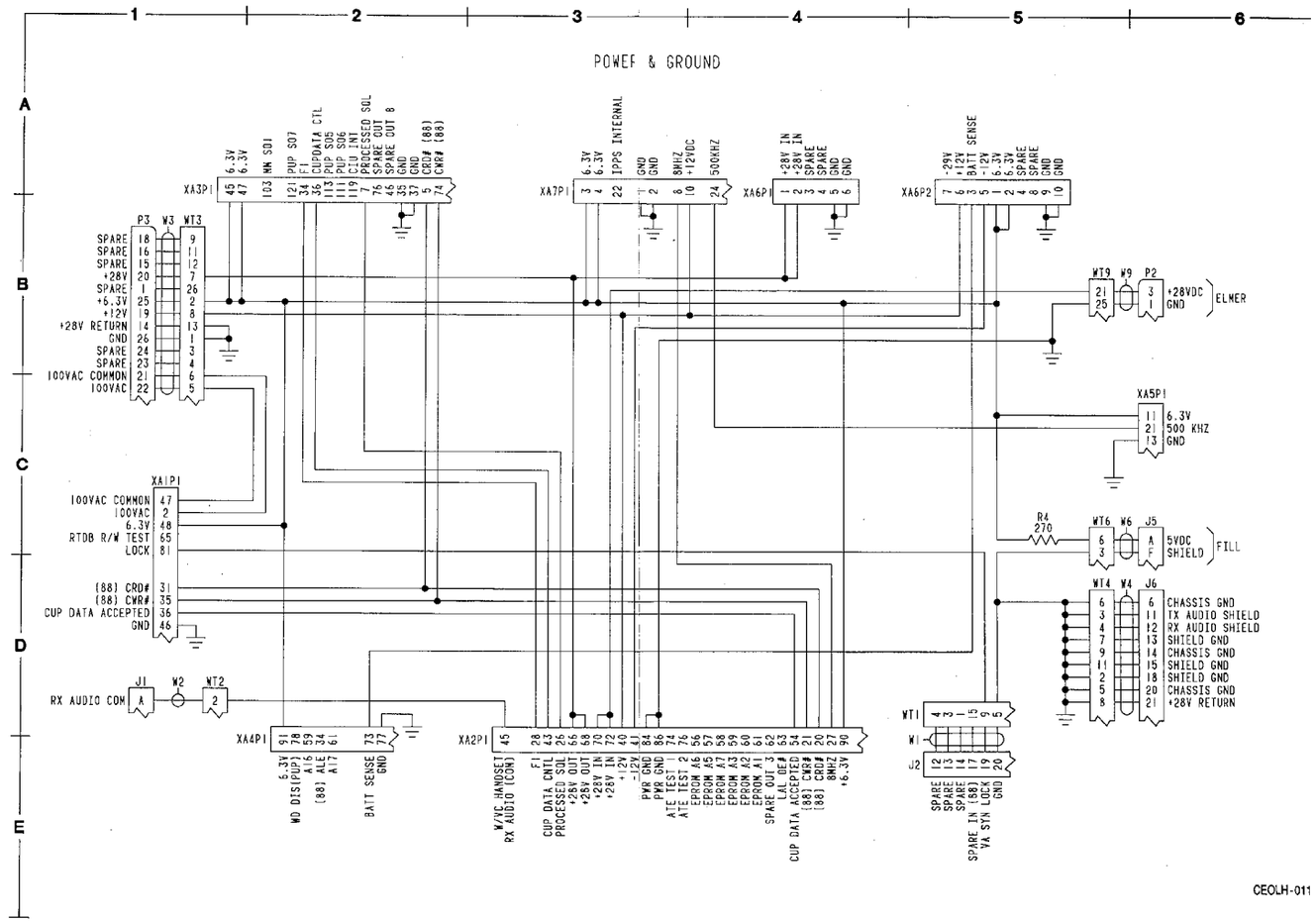
2.4 REFERENCE:
ASSEMBLY NUMBER A3024009.
PRINTED WIRING BOARD A3024010.

REF DESIGNATION	
HIGHEST USED	NOT USED
CR4 E5 J6 P2 R4 S1 W9 XA1P2 XA2P1 XA3P1 XA4P1 XA5P1 XA6P2 XA7P1	CR1 J3,4
W1 ASSY A3028510	
J2 WT1	J1
W2 ASSY A3028515	
J1 WT2	WT1
W3 ASSY A3028514	
P3 WT3	P1,2 WT1,2
W4 ASSY A3028511	

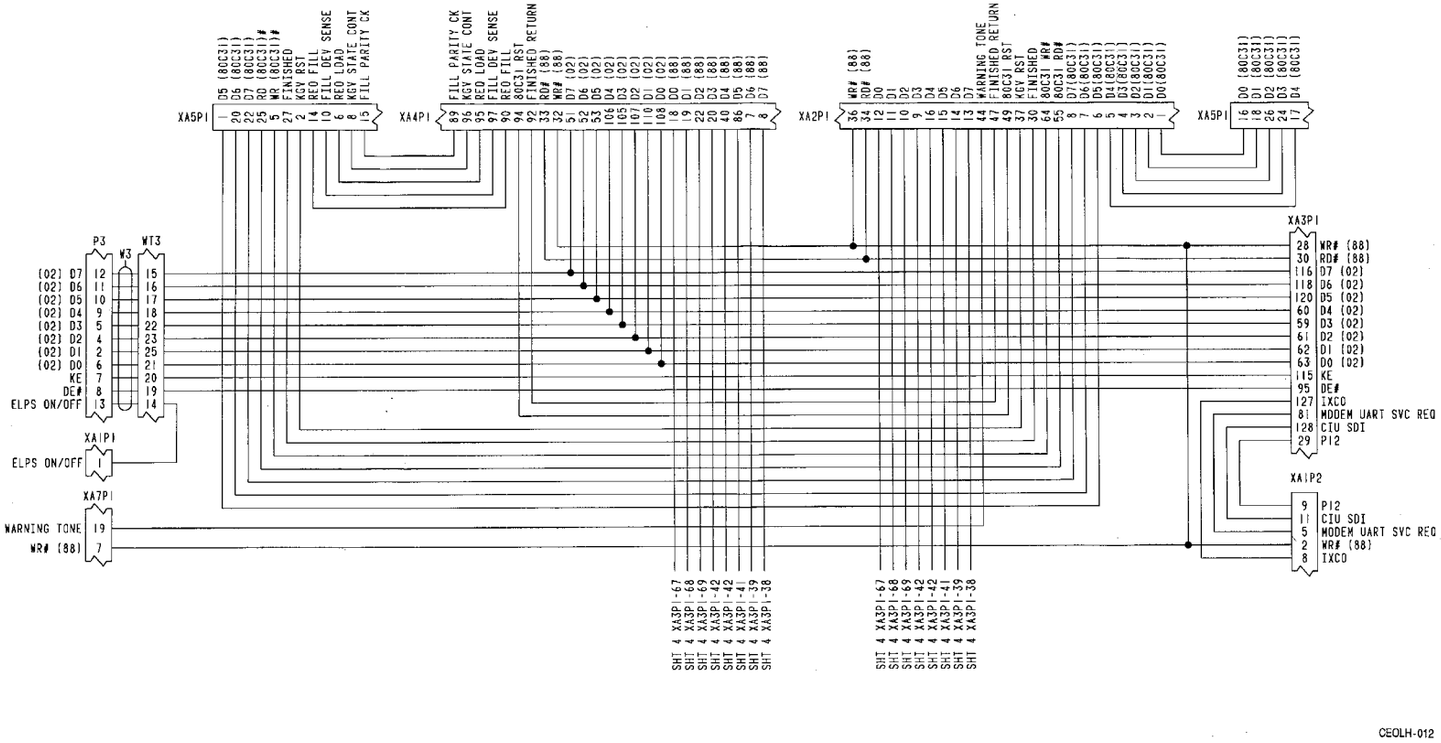
REF DESIGNATION	
HIGHEST USED	NOT USED
J6 WT4	J1 THRU J5 WT1 THRU WT3
W5 ASSY A3028512	
J6 WT5	J1 THRU J5 WT1 THRU WT4
W6 ASSY A3028513	
J5 WT6	J1 THRU J4 WT1 THRU WT5
W7 ASSY A3028509	
P1 WT7	WT1 THRU WT6
W8 ASSY A3028508	
P1 WT8	WT1 THRU WT7
W9 ASSY A3028507	
P2 WT9	P1 WT1 THRU WT8

CEOLH-010

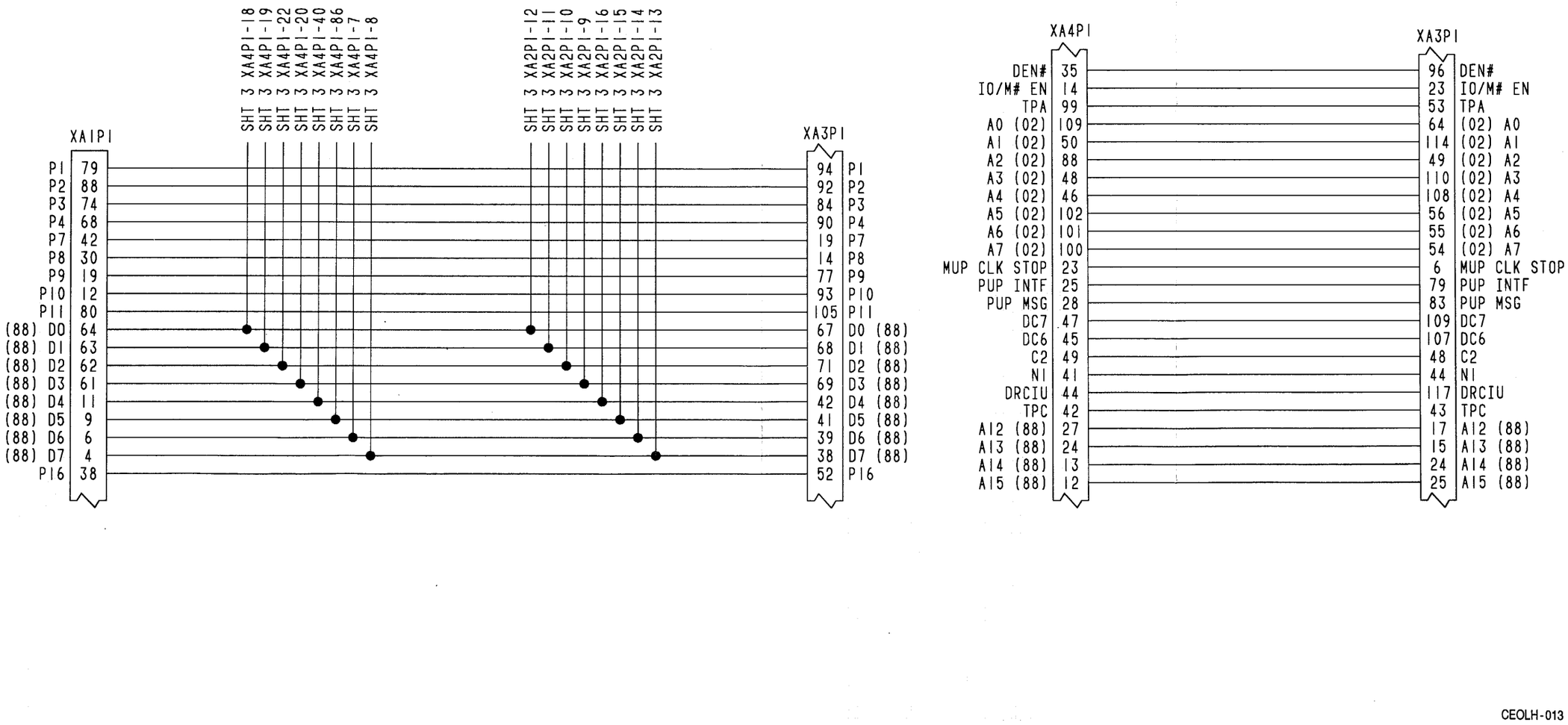
FO-3. Interconnection CCA A8A2 Schematic Diagram (Sheet 1 of 8)



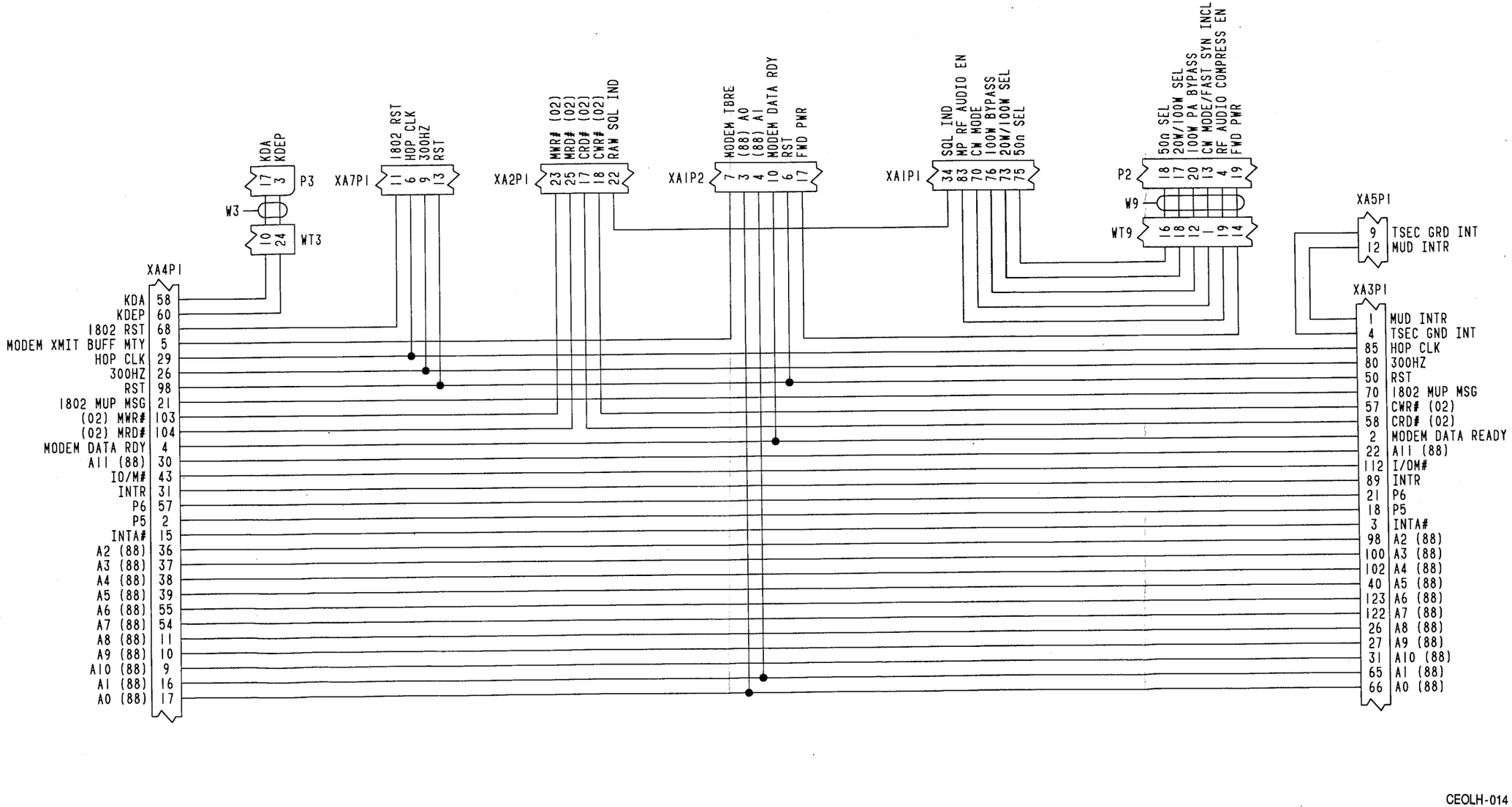
FO-3. Interconnection CCA A8A2
Schematic Diagram
(Sheet 2 of 8)



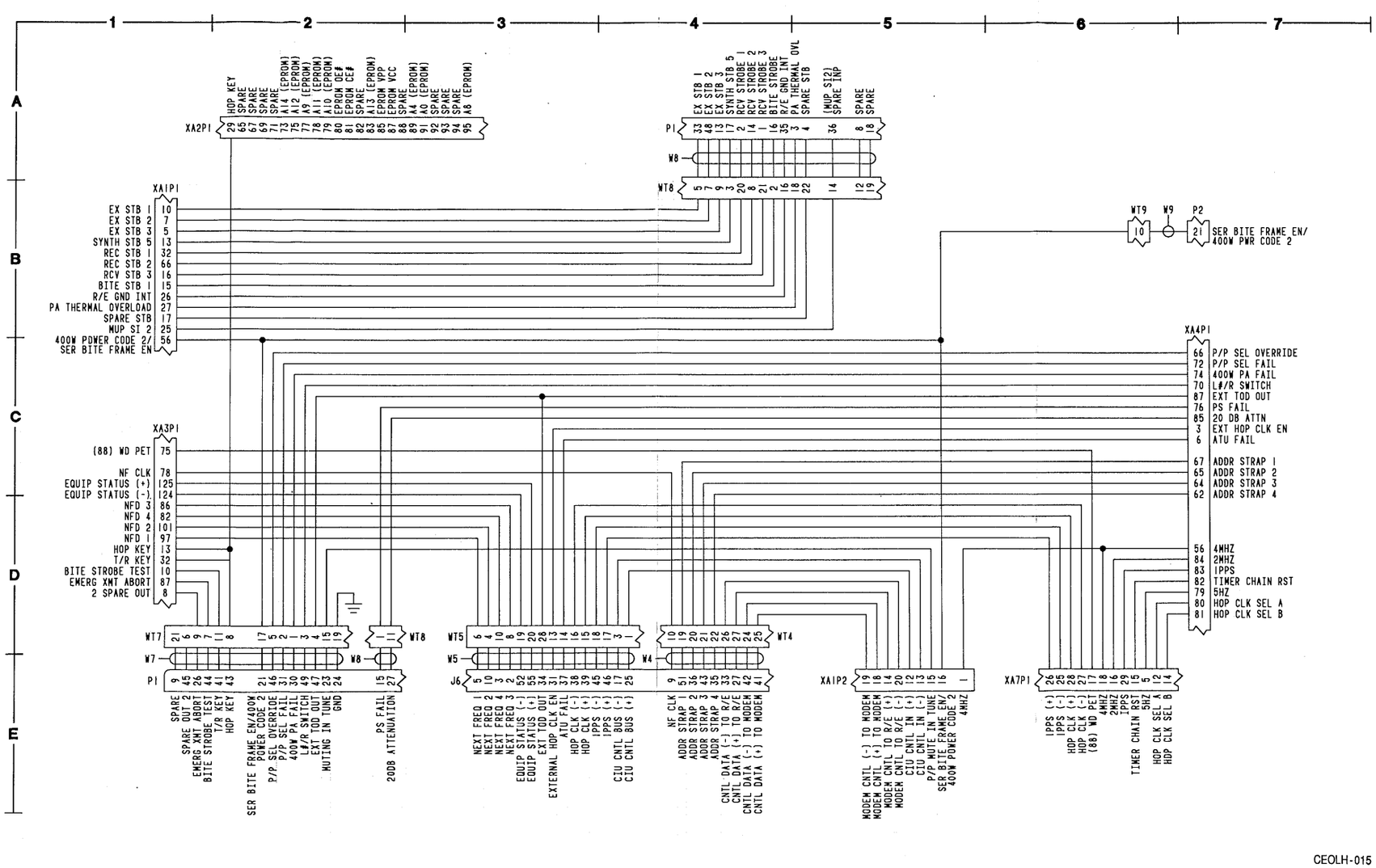
FO-3. Interconnection CCA A8A2
Schematic Diagram
(Sheet 3 of 8)



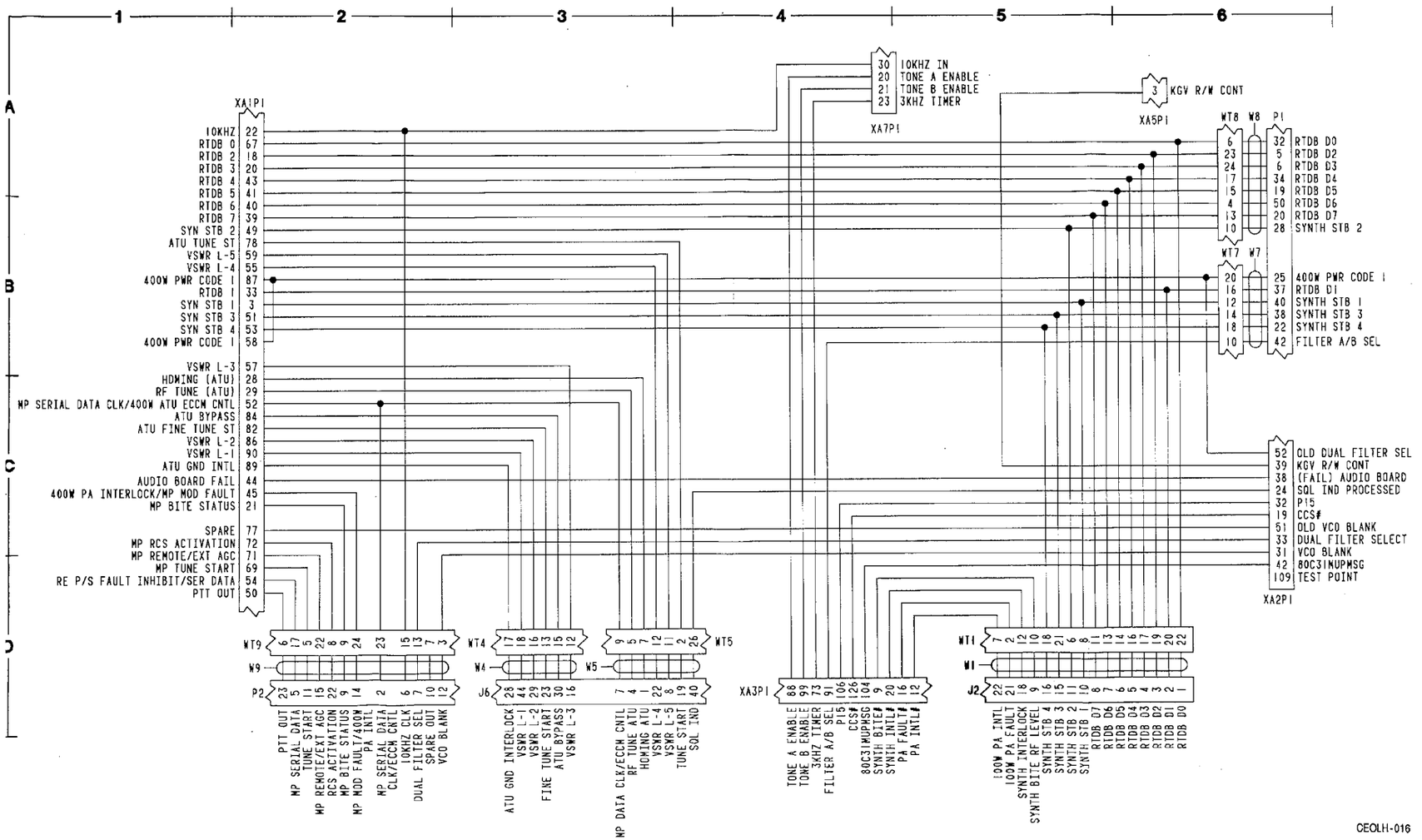
FO-3. Interconnection CCA A8A2
Schematic Diagram
(Sheet 4 of 8)



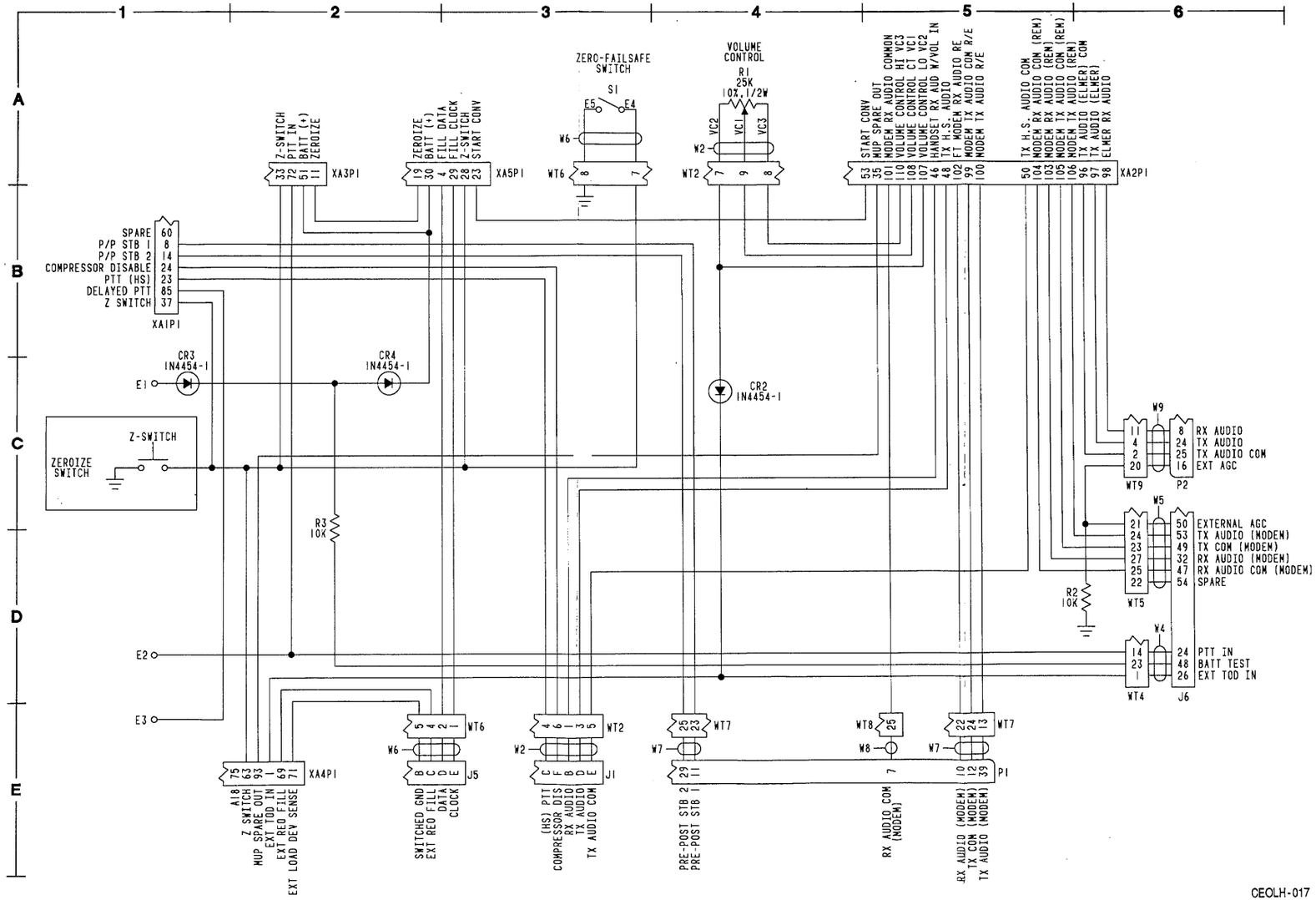
FO-3. Interconnection CCA A8A2
Schematic Diagram
(Sheet 5 of 8)



FO-3. Interconnection CCA A8A2
Schematic Diagram
(Sheet 6 of 8)



FO-3. Interconnection CCA A8A2
Schematic Diagram
(Sheet 7 of 8)



FO-3. Interconnection CCA A8A2
Schematic Diagram
(Sheet 8 of 8)

NOTES:

1.0 GENERAL:

1.1 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%, 1/8W.
CAPACITANCE VALUES ARE IN MICROFARADS.
VOLTAGES ARE DC.
DIODES AND/OR TRANSISTORS ARE JANTX TYPE.

2.2 PARTIAL REFERENCE DESIGNATIONS ARE SHOWN: FOR COMPLETE DESIGNATION PREFIX WITH UNIT NUMBER AND SUBASSEMBLY DESIGNATION 1A1A2A8A1, 1A2A2A8A1, 1A3A2A8A1, 1A4A2A8A1, 1A5A2A8A1, 2A1A2A8A1, 6A1A2A8A1, 6A2A2A8A1, 6A3A2A8A1, 6A4A2A8A1 & 6A5A2A8A1.

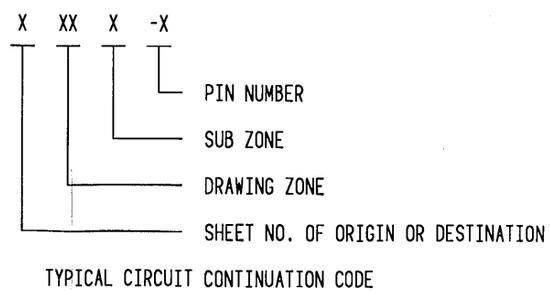
2.3 FOR NEXT HIGHER CIRCUIT SEE INTERCONNECT A3024011.

2.4 THIS ITEM REQUIRES SPECIAL HANDLING AND PROCESSING PER MIL-STD-1686 AND DOD-HDBK-263 TO PREVENT DAMAGE FROM ELECTROSTATIC DISCHARGE TRANSIENTS.

2.5 REFERENCE:
ASSEMBLY NUMBER A3024013.
PRINTED WIRING BOARD A3024014.

INTEGRATED CIRCUIT TABLE					
REFERENCE DESIGNATION	SECOND TAGGING LINE SYM	PART NUMBER	POWER INPUT PINS		
			+5.5V	GND	SEE NOTE
U5	M1	A3024233	18	9	2.4
U6	M2	A3024237	20	10	2.4
U1,2	M3	A3028844	20	1	2.4
U4	M4	JM38510/05151BCX	14	7	2.4
U3	M5	JM38510/11201BCX	NA	12	2.4
U7	M6	JM38510/11703BXX	NA	NA	2.4
R13	M7	M8340109M1003GC	1	NA	2.4

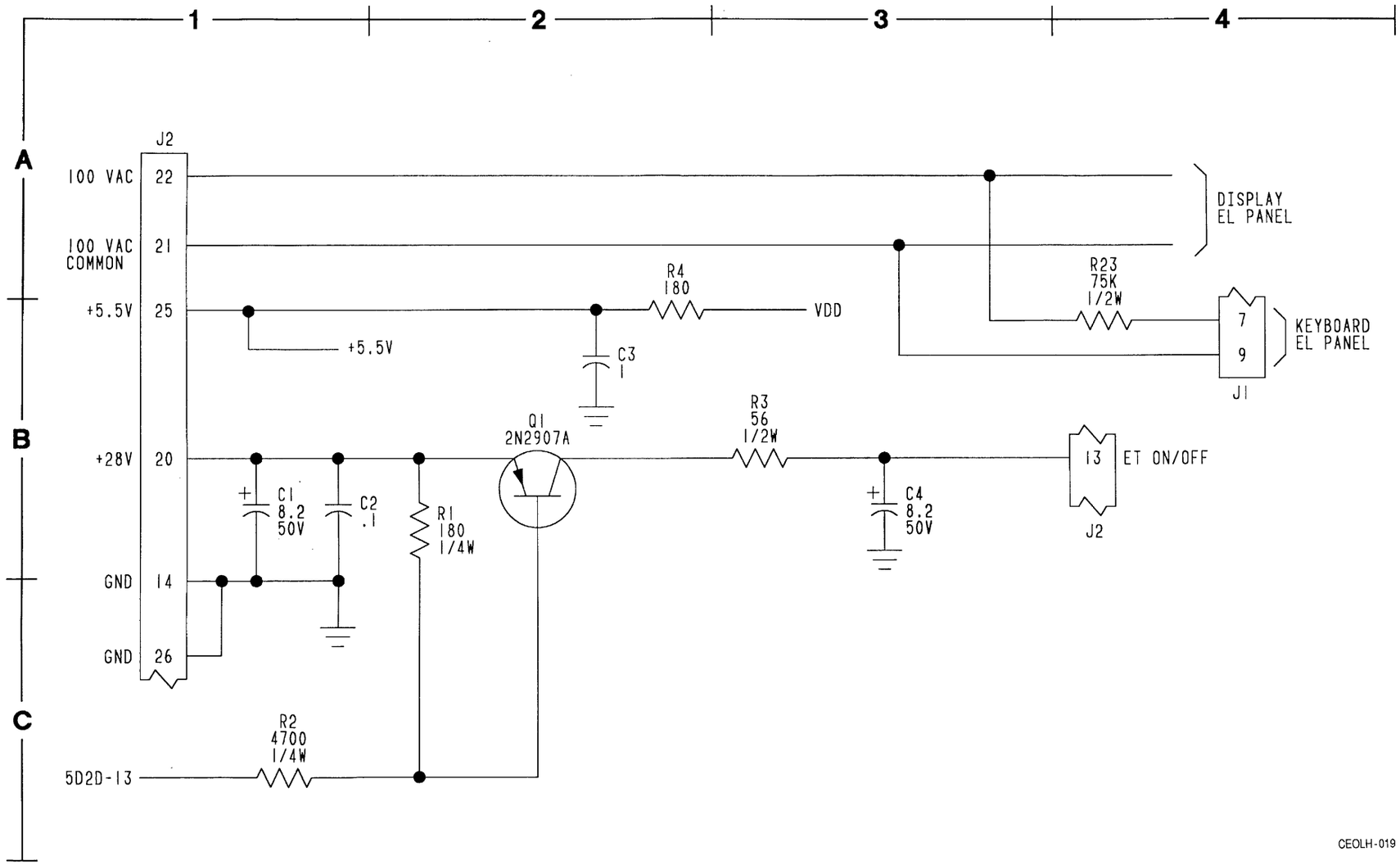
REFERENCE DESIGNATION	
HIGHEST USED	NOT USED
C9 DS1 J2 Q1 R23 U7	



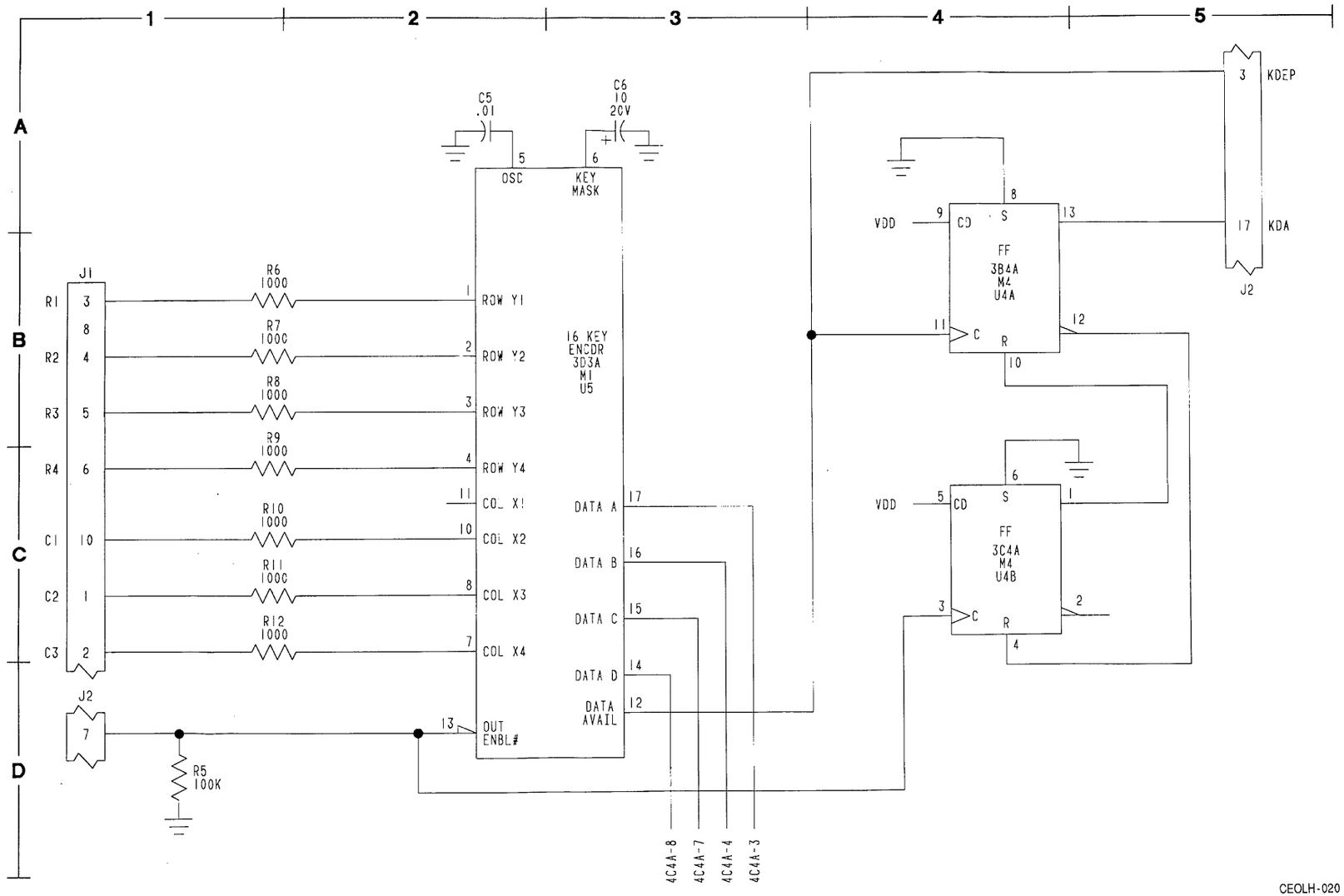
TYPICAL CIRCUIT CONTINUATION CODE

CEOLH-018

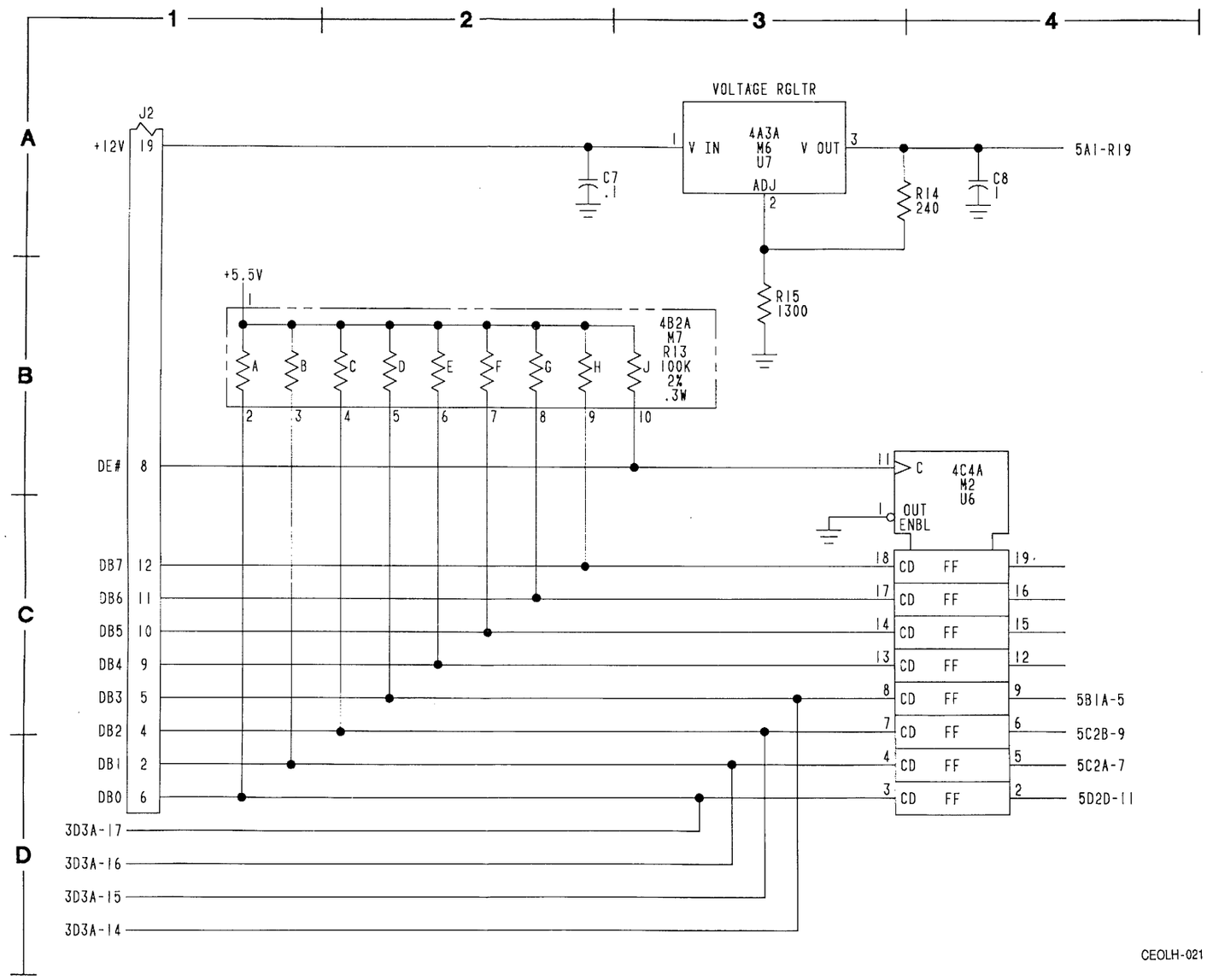
FO-4. Display CCA A8A1 Schematic Diagram (Sheet 1 of 7)



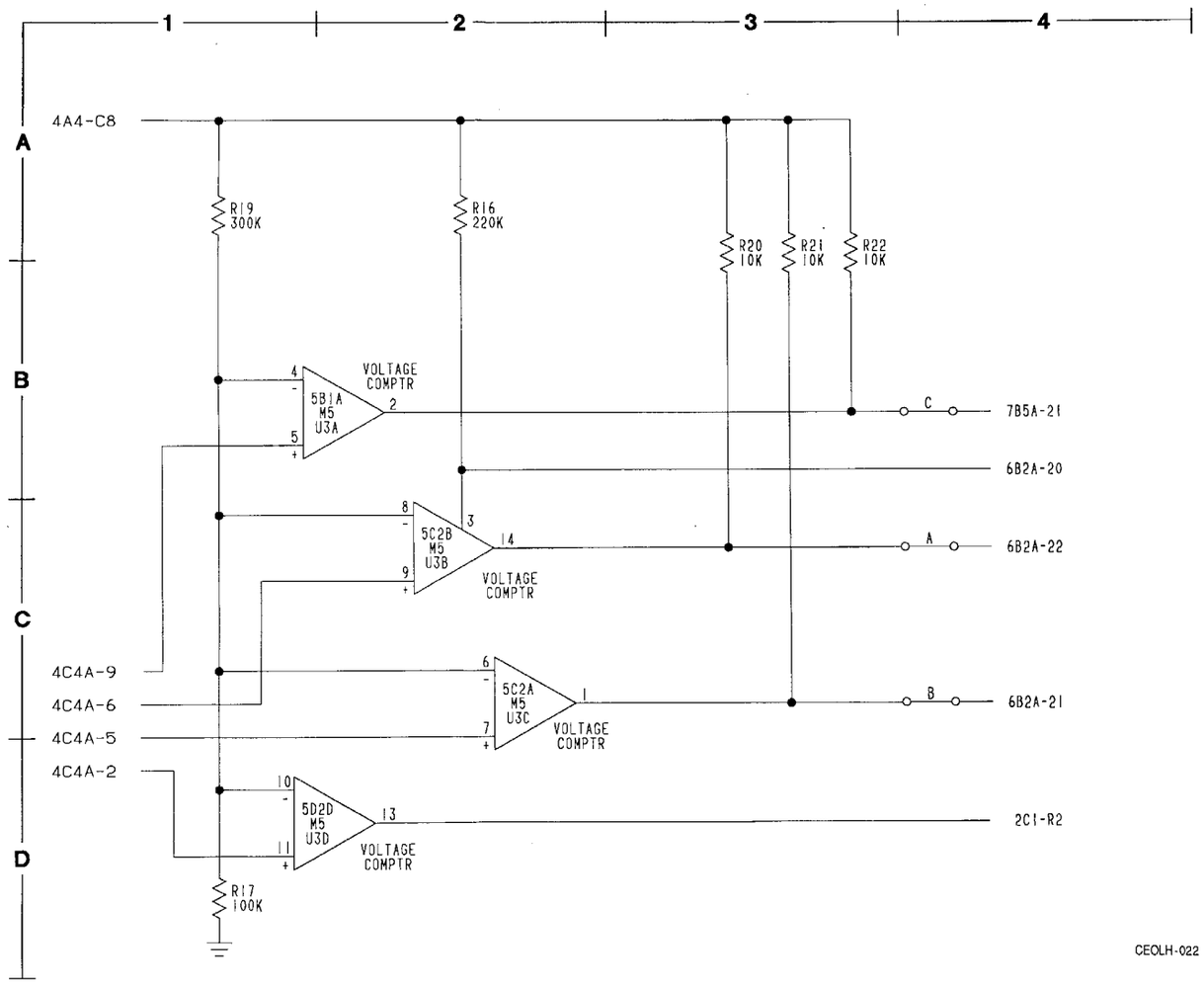
FO-4. Display CCA A8A1 Schematic Diagram (Sheet 2 of 7)



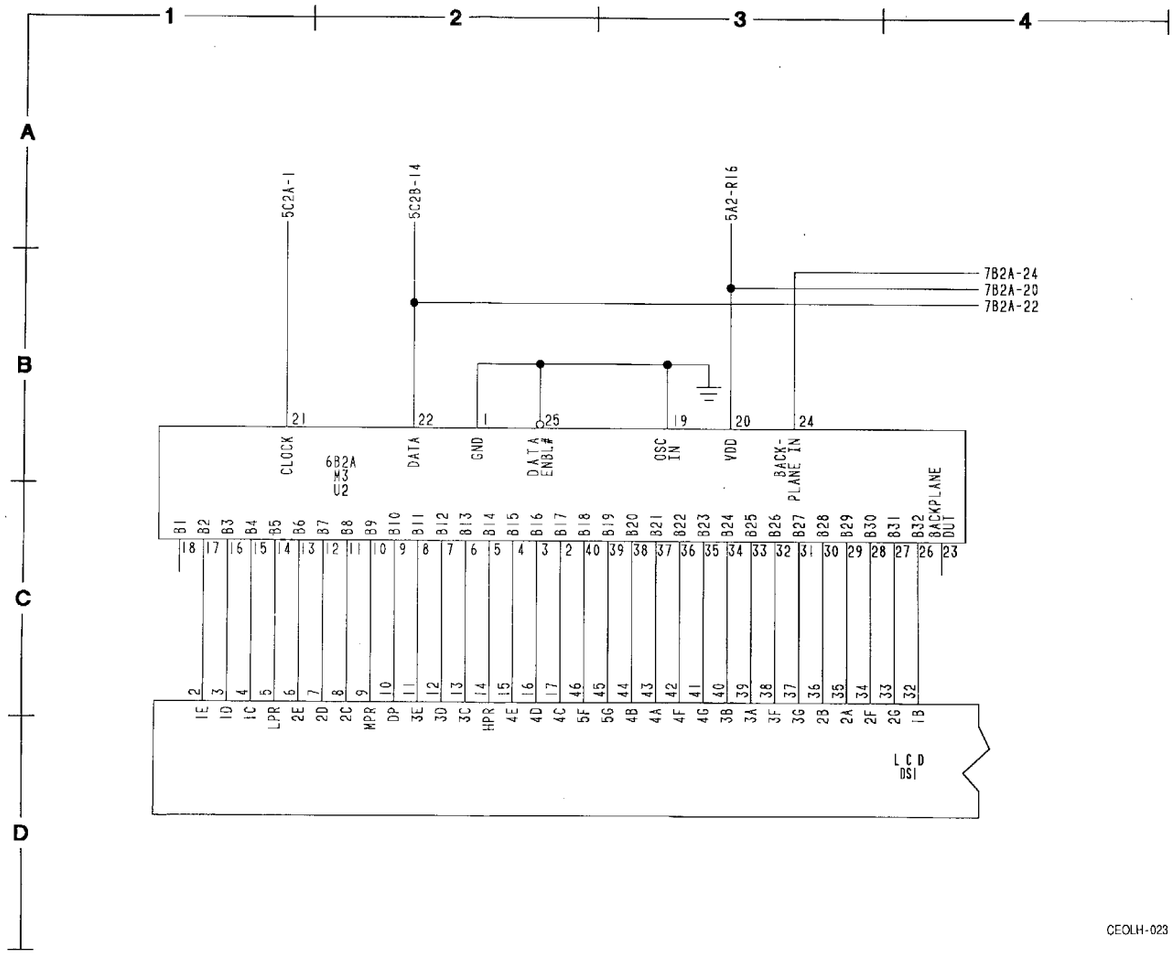
FO-4. Display CCA A8A1 Schematic Diagram (Sheet 3 of 7)



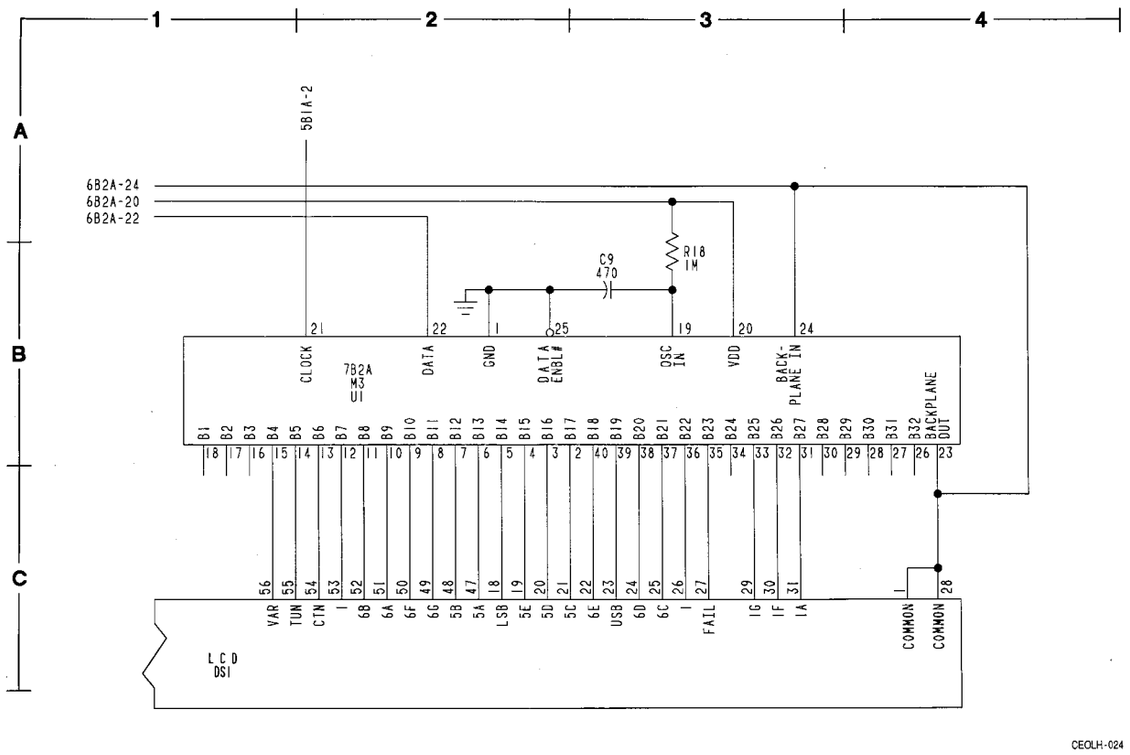
FO-4. Display CCA A8A1 Schematic Diagram (Sheet 4 of 7)



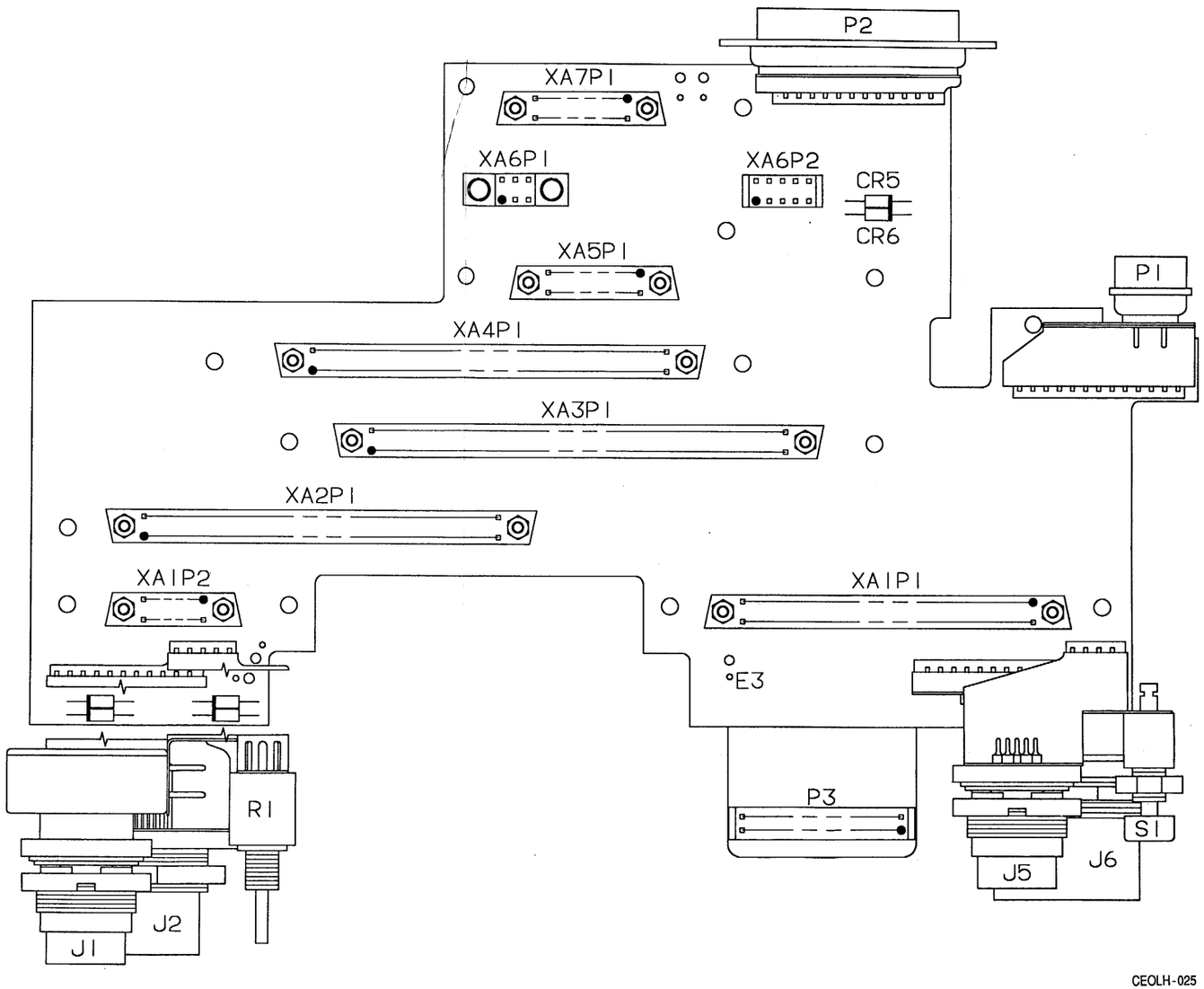
FO-4. Display CCA A8A1 Schematic Diagram (Sheet 5 of 7)



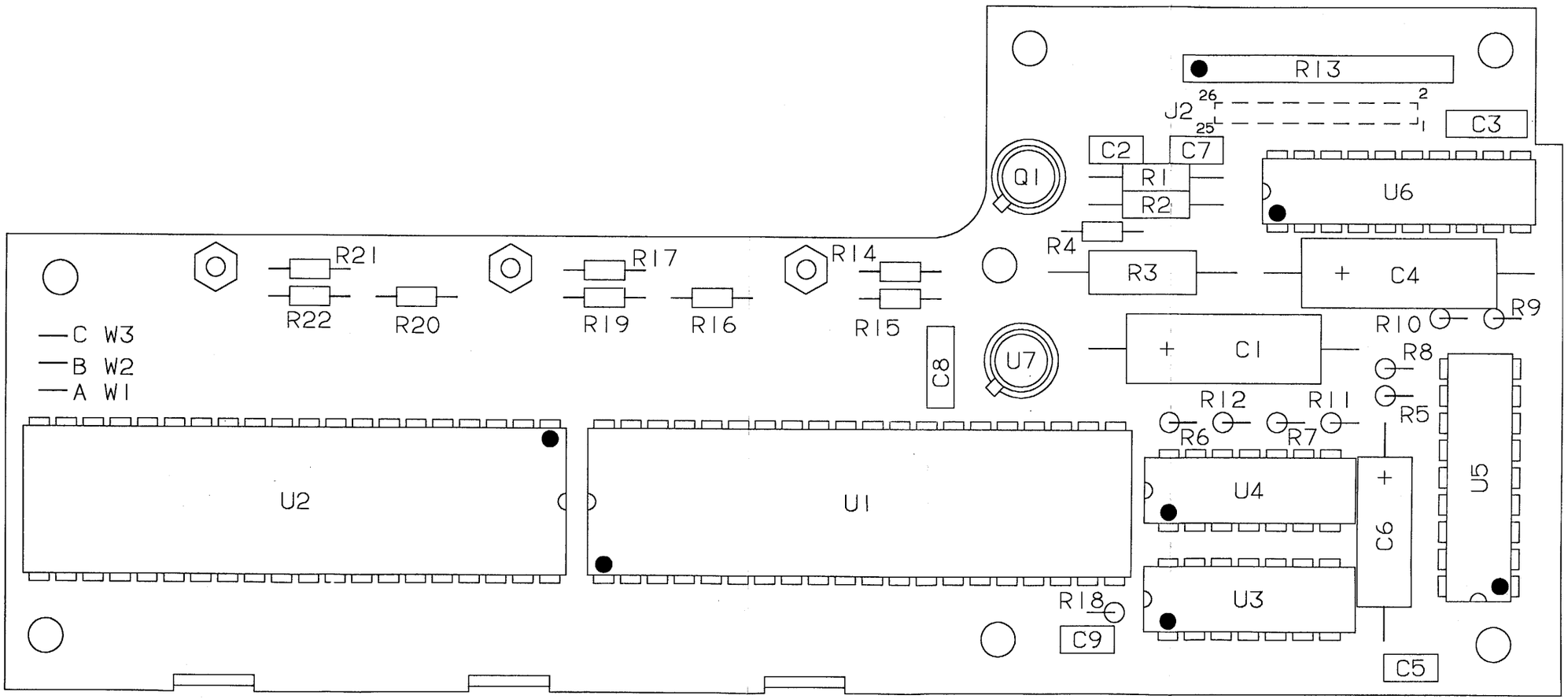
FO-4. Display CCA A8A1 Schematic Diagram (Sheet 6 of 7)



FO-4. Display CCA A8A1 Schematic Diagram (Sheet 7 of 7)



FO-5. Interconnection CCA A8A2
Parts Location Diagram



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FO-6. Display CCA A8A1 Parts Location Diagram

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