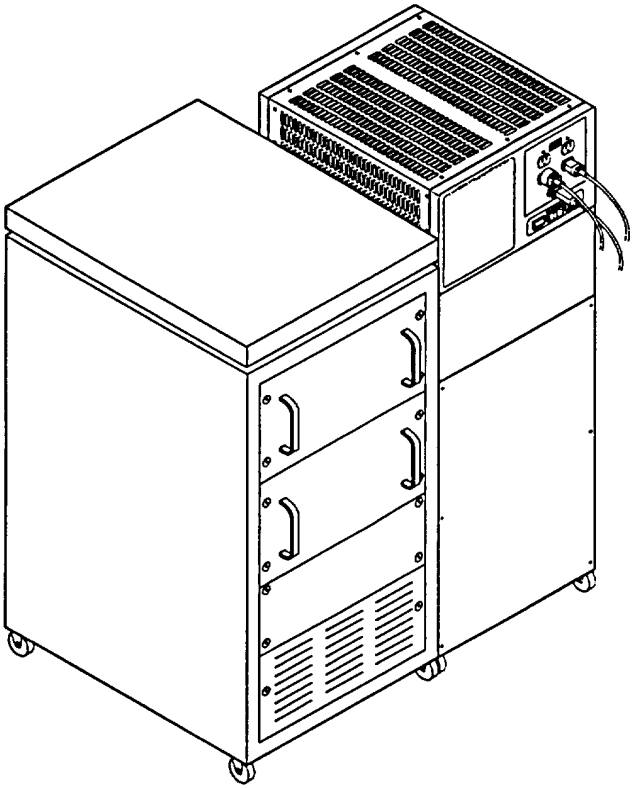
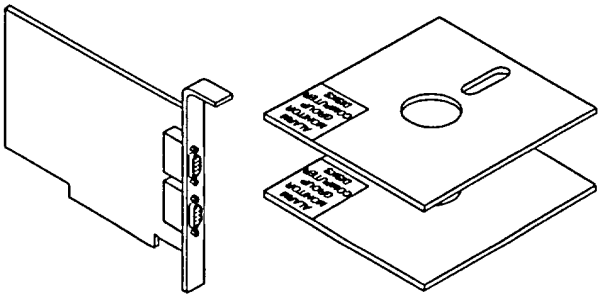
TECHNICAL MANUAL

UNIT AND DIRECT SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST

ALARM-MONITOR GROUP (AMG) OA-9431/FSS-9(V) CAGEC 97403





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30 DECEMBER 1993

CHANGE

NO. 2

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WASHINGTON, D.C., 5 August 1996

**UNIT AND DIRECT SUPPORT
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SPECIAL TOOLS LIST
ALARM-MONITOR GROUP (AMG)
OA-9431/FSS-9(V) CAGEC 97403**

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E-1 and E-2	E-1 and E-2

2. Retain this sheet in front of manual for reference purposes.

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CHANGE

NO. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
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Remove pages	Insert pages
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i and ii	i and ii
4-43 and 4-44	4-43 and 4-44

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Acting Administrative Assistant to the
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00447

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WARNING

- **Do not work on energized equipment alone. The equipment contains dangerous voltage: do not touch energized circuits when testing equipment. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.**

- **Do not lift heavy objects without aid. Always use more than one person for lifts above 45 lbs or mechanical lifting devices for lifts above 200 lbs. Failure to obey this warning could result in personal injury.**

- **High Voltage is used in the operation of this equipment. Serious injury or death may result if personnel fail to observe safety precautions. Remove all jewelry from fingers. wrists. and neck before working on live electrical components.**

First aid procedures are provided in FM 21-11.

TECHNICAL MANUAL

NO. 5-6350-280-23&P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON D.C., 30 December 1993

TECHNICAL MANUAL

UNIT AND DIRECT SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST

ALARM-MONITOR GROUP (AMG) OA-9431/FSS-9(V) CAGEC 97403

Current as of 1 December 1993

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 the back of this manual directly to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. You may also submit your recommended changes by E-mail directly to <daf2028@st-louis-emh7.army.mil>. A reply will be furnished directly to you.

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TABLE OF CONTENTS

TABLE OF CONTENTS - Continued

TABLE OF CONTENTS - Continued

HOW TO USE THIS MANUAL

DESCRIPTION OF THE MANUAL.

Manual Organization. This manual is designed to help you maintain the Alarm-Monitor Group (AMG) OA-9431/FSS-9(V). Read the warning pages located in the front of the manual before doing maintenance on the equipment.

The front cover of this manual provides an index that lists subjects that are commonly used. Each item indexed on the front cover has a black box at the edge of the cover. There is a corresponding black box on the first text page for each subject listed on the cover index.

The Table of Contents is provided for quick reference to the subjects covered by each chapter, section, and appendix. Chapters 2 and 4 also have a subject index that list the major paragraphs and some subordinate paragraphs in numerical order under the section title.

The major elements of this manual are its chapters and appendixes. The chapters and appendixes can be divided into one or more sections. This manual has four chapters and five appendixes.

A glossary follows the last appendix. The glossary lists and explains the special or unique abbreviations and the unusual terms used in this manual.

An alphabetical index follows the glossary. That index is for use in locating specific items of information.

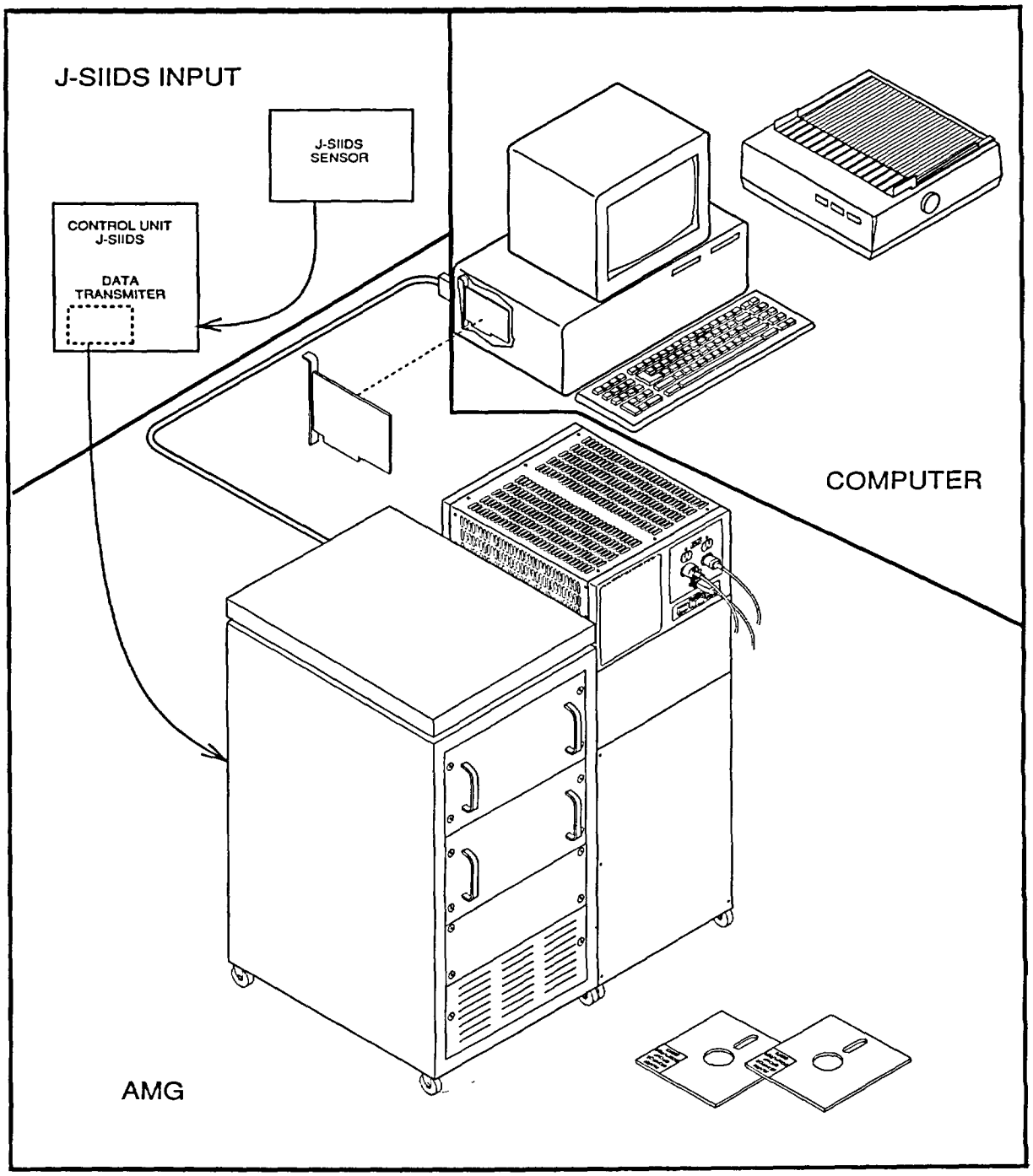


Figure 1-1. Functional Installation (Typical).

CHAPTER 1
INTRODUCTION

SECTION I GENERAL INFORMATION

1.1 SCOPE.

This manual is for your use in maintaining the Alarm-Monitor Group (AMG) OA-9431/FSS-9(V). The AMG requires a user furnished IBM-PC/AT compatible computer, with MS-DOS® Version 3.2 or higher, keyboard, color monitor, and dot matrix printer to make the AMG functional (figure 1-1). When used in conjunction with an IBM-PC/AT compatible computer, keyboard, color monitor, and printer, the AMG replaces the existing Monitor Cabinet(s) of the Joint Service Interior Intrusion Detection System (J-SIIDS) and enhances J-SIIDS installations.

NOTE

Microsoft and MS-DOS are registered trademarks of the Microsoft Corporation.

1.2 MAINTENANCE FORMS AND RECORDS.

Department of the Army forms and procedures used for equipment maintenance will be those prescribed by DA PAM 738-750, The Army Maintenance Management System (TAMMS).

1.3 DESTRUCTION OF ARMY MATERIEL TO PREVENT ENEMY USE.

Instructions for the destruction of Army materiel to prevent enemy use are contained in TM 750-244-3.

1.4 PREPARATION FOR STORAGE OR SHIPMENT.

Refer to paragraph 2.8 for administrative storage instructions.

1.5 OFFICIAL NOMENCLATURE, NAMES, AND DESIGNATIONS.

Refer to table 1-1.

Table 1-1. Nomenclature Cross Reference List.

Common Name	Official Nomenclature
Computer	Consist of: IBM-PC/AT compatible computer Keyboard Color Monitor Dot Matrix Printer
Data Receiver CCA	Printed Wiring Board Assembly, A4
Application software, AMG operating system, or AMG program	AMG PC Software Diskette Number 1 and AMG PC Software Diskette Number 2

1.6 REPORTING EQUIPMENT IMPROVEMENT RECOMMENDATIONS (EIR).

If your AMG needs improvement, let us know. Send us an EIR. You, the user are the only one who can tell what you don't like about your equipment. Let us know why you don't like the design. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at: Commander, U.S. Army Aviation and Troop Command, ATTN: AMSAT-I-MDO, 4300 Goodfellow Boulevard, St. Louis, MO 63120-1798. We will send you a reply.

1.7 WARRANTY INFORMATION.

The warranty program is governed by DA PAM 738-50. Report all defects in material or workmanship to your supervisor, who will take appropriate action.

1.8 SAFETY, CARE, AND HANDLING.

The AMG contains parts that are sensitive to electrostatic discharge (ESD). All protective and control measures to be taken are provided in the maintenance function or task.

1.9 CORROSION PREVENTION AND CONTROL (CPC).

Corrosion Prevention and Control (CPC) of Army materiel is a continuing concern. It is important that any corrosion problems with this item be reported so that the problem can be corrected and improvements made to prevent the problem in future items.

While corrosion is typically associated with rusting of metals, it can also include deterioration of other materials, such as rubber and plastic. Unusual cracking, softening, swelling, or breaking of these materials may be a corrosion problem.

If a corrosion problem is identified, it can be reported using Standard Form 368, Product Quality Deficiency Report. Use of key words such as "corrosion," "rust," "deterioration," or "cracking" will ensure that the information is identified as a CPC problem. The form should be submitted to the address specified in DA PAM 738-750.

1.10 SECURITY MEASURES.

A password is required to set up the AMG. The operators and maintenance personnel are not provided the password. The accessibility of the password will be the responsibility of individual commands. Personnel with access to the password shall ensure that the password is controlled using existing security procedures for control of the password. The password should be changed periodically to ensure system security. In addition, the password should be changed in the event that any person with access to the password is transferred, discharged, or leaves the command.

SECTION II EQUIPMENT DESCRIPTION AND DATA

1.11 EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES.

The AMG and computer provide J-SIIDS with an automatic system for monitoring up to 64 remote areas. The AMG and computer provide the following:

- Automatic resynchronization
- System status information.
- Alarms, secure, and access information.
- Area notes.
- Date and time.
- Power status (main ac or battery backup).

1.11.1 Location of Major Components. Table 1-2 provides the major components indexed to figure 1-2 for major components with a brief description.

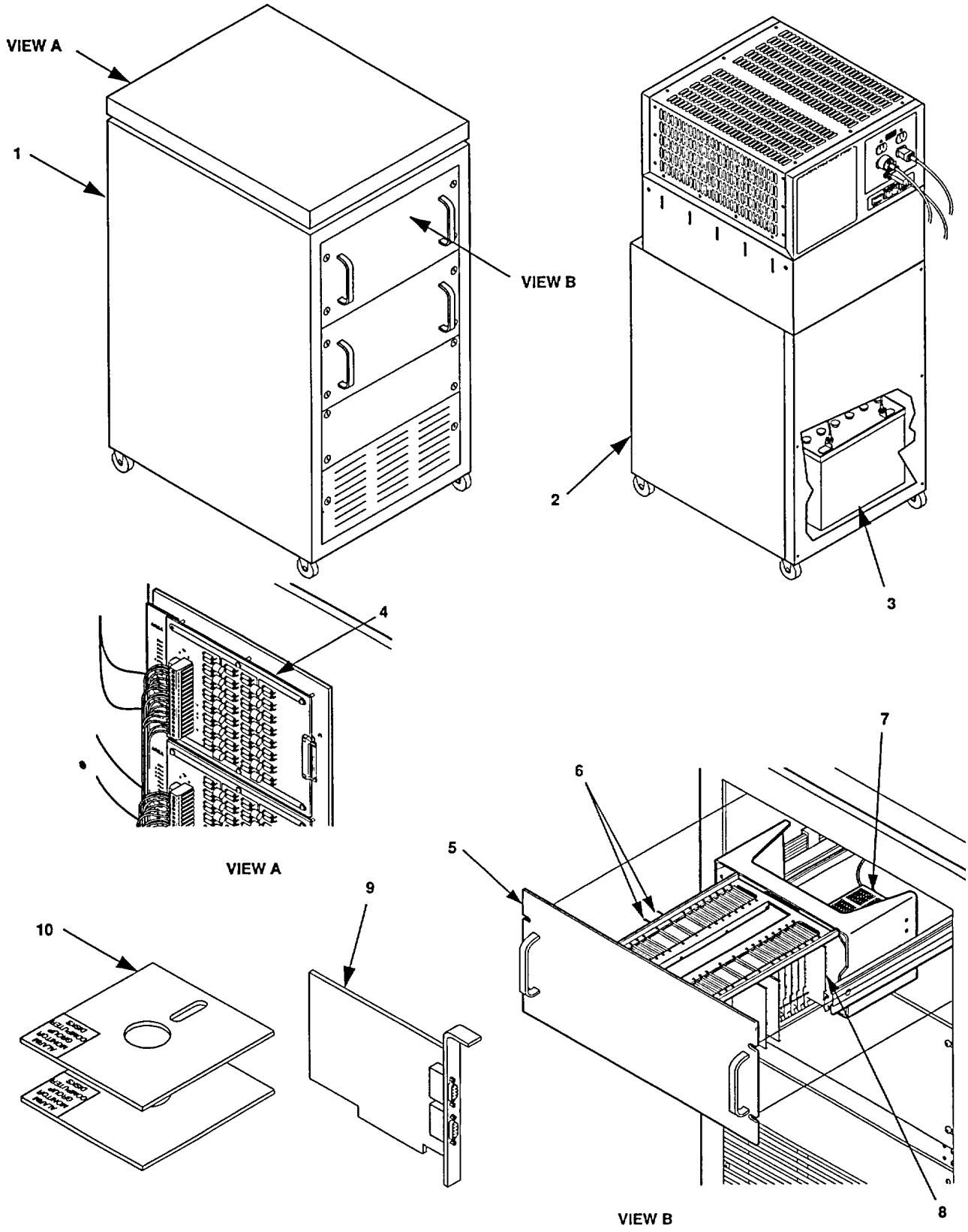


Figure 1-2. AMG Major Components.

Table 1-2. Major Components.

Item No.	Component	Description
1	Converter Multiplexer Assembly (CMA)	Converter multiplexer that receives and decodes data from J-SIIDS and provides multiplexed data blocks for the AMG software to process.
2	Uninterruptible Power Supply (UPS)	Power source with at least 4 hour backup ac power provided from batteries.
3	Batteries	Direct voltage (72 V dc) source to generate 120 Vac power during main power failures.
4	Surge Suppressor Circuit Card Assembly (CCA)	Provides surge protection for transmitted line inputs.
5	Drawer Assembly	Assembly to hold various CCAs for monitoring 32 remote areas.
6	Central Processing Unit (CPU) CCA	Processes data received from 8 Data Receiver CCAs into multiplexed data blocks for use by AMG.
7	+5/20 V dc Power Supply	Provides low voltage dc power for drawer assembly components.
8	Data Receiver CCA	Data receiver to receive data from J-SIIDS.
9	Communications CCA	RS-485 communication CCA to receive multiplexed data blocks from the AMG.
10	AMG Application Software	Application software which uses DOS 3.2 or greater. AMG software processes received data blocks and displays processed information on the computer monitor.

1.11.2 J-SIIDS Equipment. Refer to J-SIIDS technical manual TM 5-6350-264-14-1 for major components of J-SIIDS.

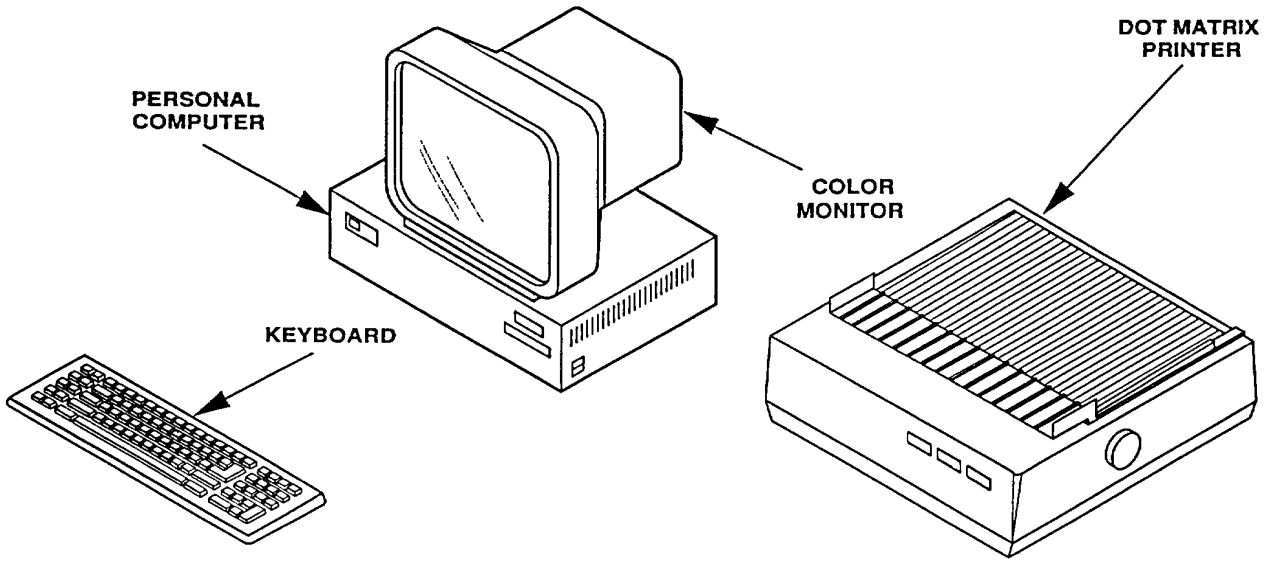


Figure 1-3. IBM-PC/AT Compatible Computer (Typical).

1.11.3 IBM-PC/AT Compatible Computer. Major components (figure 1-3) of computer are as follows:

- Personal computer.
- Keyboard.
- Monitor.
- Dot Matrix printer.

1.12 EQUIPMENT DATA.

1.12.1 Uninterruptible Power Supply (UPS) Equipment Data. The data for the UPS is as follows:

Input:	
Voltage:	100, 120, 230, or 240 Vac at 60 Hz
or	100, 120, 230, or 240 Vac at 50 Hz
Output:	
Power Rating:	1,500 Volt amps
Voltage:	120 Vac at 60 Hz ± 3 Hz
Waveform:	True Regulated Sine Wave
Harmonic Distortion:	Less than 5% total
Operating Temperature:	32º to 104º F (0º to 40ºC)
Battery Backup:	At least four hours
Weight:	
with batteries:	670 lbs (304 kg)
without batteries:	208 lbs (094 kg)
Batteries:	
Weight	77 lbs (35 kg)
Nominal Voltage:	12 V dc
Charging Voltage:	13.5 to 13.6 V dc at 77º F (25º C)
Max Charger Current:	22 amps
Discharge Current:	351 amps to 1.75 volt/cell
Internal Resistance (Charge)	3.9 milliohms
Operating Temperature:	32º to 80° F (0º to 25º C)
Rated	110 Amps/hour
Total required	Six (sealed cell)

Dimensions in inches:

Height	Width	Depth
45.25 in. (1.15 m)	17 in. (43.18 cm)	21 in. (53.34 cm)

1.12.2 Converter-Multiplexer Assembly (CMA) Equipment Data. The data for the CMA is as follows:

Weight:	250 lbs (114 Kg)

Dimensions in inches:

Height	Width	Depth
42.5 in. (1.08 m)	22.5 in. (57.15 cm)	31.5 in. (80.01 cm)

1.12.3 J-SIIDS Equipment Data. Refer to TM 5-6350-264-14-1 for the J-SIIDS equipment data.

1.12.4 IBM-PC/AT Compatible Computer Data. The system requires the computer to operate using 120 Vac power at 60Hz. The minimum requirements for the user furnished IBMPC/AT compatible computer are as follows:

Computer:

Industry Standard Architecture (ISA) Bus computer (8-bit bus) or compatible
8 MHz
20 MByte Hard Drive
5 1/4 Inch double density (360K) or 5 1/4 Inch high density (1.2M) drive for Drive A
Parallel printer port
Enhanced Graphics Adapter (EGA) video driver board
Standard IBM-PC/AT compatible keyboard
640 Kbyte RAM

Operating Software:

MS-DOS® version 3.2 or higher

Monitor:

EGA compatible color monitor with 13 inch screen

Printer:

Dot matrix
Parallel communications interface
Error or fault output on pin 32 (paper out, offline, printer error)
Tractor feed

Optional Equipment:

Computer equipment cart or table
Floppy disk drive lock
Surge protection power strip
Virus checking software

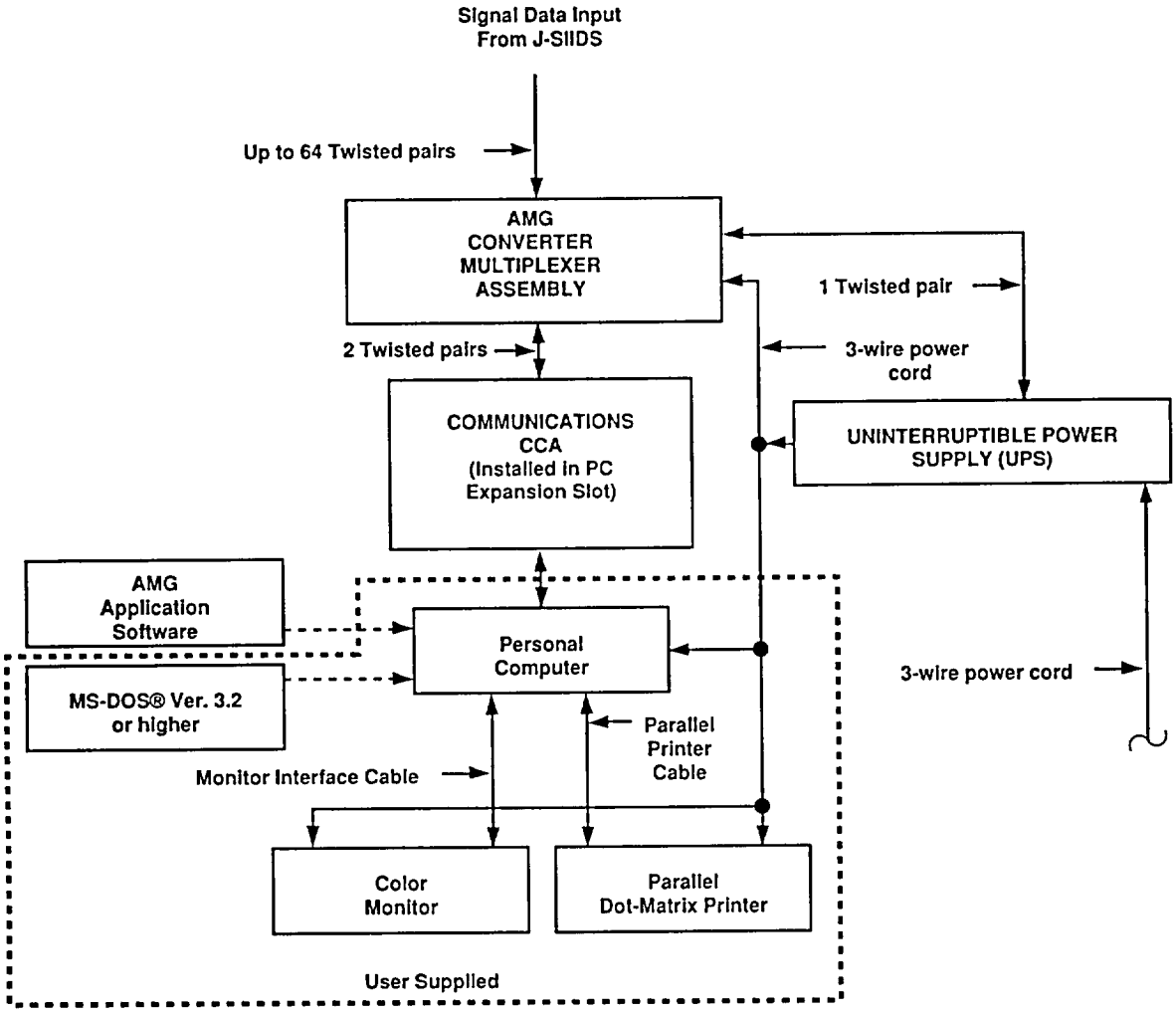


Figure 1-4. Simplified Functional Diagram (Typical).

SECTION III PRINCIPLES OF OPERATION

1.13 FUNCTIONAL DESCRIPTION.

The AMG (figure 1-4) requires a computer to monitor remote areas protected by the J-SIIDS. The UPS is used to provide a minimum of 4 hours standby power should the monitor facility lose its ac power. The UPS is connected to the applicable ac power source (100, 120, 230, or 240 Vac at either 50 or 60 Hz). The UPS provides its 120 Vac output power at 60 Hz to the CMA and computer. The CMA receives the data signals from up to 64 remote areas. Each data signal is transmitted from a remote area by the J-SIIDS Data Transmitter for up to 10 miles over a dedicated telephone line pair or a 600-ohm balanced transmission line pair. Each line pair is connected to the CMA. The CMA demodulates the data signals and sends the resulting data to the Communications CCA installed in the computer. The application software instructs the computer to process the data from the Communications CCA and to update the status information displayed on the color monitor. When the application software processes a status change, it alerts the operator with an audible tone and flashing status indicators. The following paragraphs provide a more detailed description of the AMG and computer.

1.13.1 J-SIIDS Functional Description. The J-SIIDS physical security system monitors the status of various remote areas and provides the status to the operations center for physical security. The J-SIIDS data transmitter generates an FSK signal that contains the encoded status of each area. The two tones employed in the FSK signal are 1070 Hz and 1270 Hz. The data transfer rate of the FSK signal is 12 Hz. The

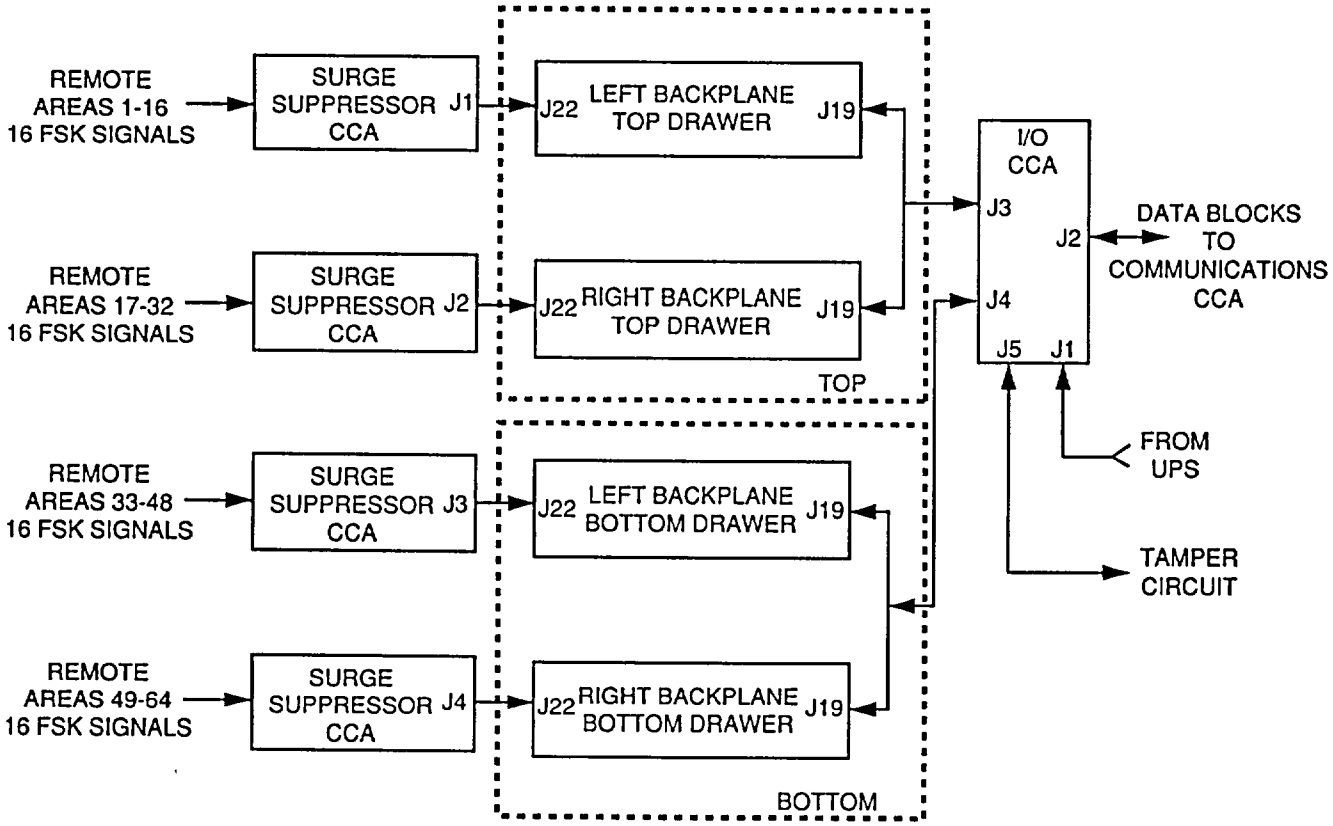


Figure 1-5. CMA Block Diagram.

status information provided is Alarm/No Alarm; Access/Secure; AC Power/AC Power Fail (Battery Power). Refer to J-SIIDS TM 5-6350-264-14-1 for additional information.

1.13.2 Uninterruptible Power Supply (UPS) Functional Description. The UPS is an on-line uninterruptible power system. It provides continuous power to the CMA and computer. In the event there is a loss of facility power, it also provides at least 4 hours of backup ac power before recharging of its batteries is necessary. There is an interface between the CMA and the UPS for the purpose of monitoring the ac power status. When a loss of ac power occurs, the power loss is detected and battery operation is indicated at the monitor.

1.13.3 Converter Multiplexer Assembly (CMA) Functional Description. The CMA (figure 1-5) receives the FSK signals from the J-SIIDS data transmitters located at up to 64 remote areas. It also receives the power status from the UPS. The FSK signals are processed by the CMA for transmission to the computer.

Data signals from the J-SIIDS data transmitters are input at the terminals marked Area 1 through 64 on the inside of the rear door of the CMA. The data signals are input on four surge suppressor CCAs that can accept 16 inputs each. Input line pairs are connected to the terminals labeled A and B for each remote area. The output of the surge suppressor CCAs are routed through wiring harnesses to the two drawer assemblies. Each drawer assembly has a right and left backplane and 16 remote area inputs are routed to each backplane. Each backplane is divided into two modules. Table 1-3 provides the module relationships to the remote area inputs.

Each module consists of eight Data Receivers and one CPU (figure 1-6). The FSK signals are applied to the Data Receiver CCAs where the signals are demodulated. The demodulated signals are applied to the CPU, where the encoded data from each data receiver output are collected and formatted for transmission to the Communications CCA located in the computer.

Table 1-3. AMG Modules.

Module (B) Number	Areas (A) Monitored	Drawer Assembly	Backplanes From Front View
1 (B1)	1-8	Upper	Left
2 (B2)	9-16	Upper	Left
3 (B3)	17-24	Upper	Right
4 (B4)	25-32	Upper	Right
5 (B5)	33-40	Lower	Left
6 (B6)	41-48	Lower	Left
7 (B7)	49-56	Lower	Right
8 (B8)	57-64	Lower	Right

Each CPU also adds the condition of the UPS power and the CMA tamper switches to the formatted data. Each CPU CCA, which has a unique address, outputs its data to the Communications CCA when it is polled by the computer. Each CPU is polled once per second.

1.13.4 Communications Circuit Card Assembly (CCA). The Communications CCA is a dual channel RS-485 asynchronous serial communications adapter for computers implementing an ISA compatible input/output (I/O) bus. It is installed in the computer and provides the interface between the computer and the CPUs within the CMA. The Communications CCA provides for full duplex operation. The data transfer rate between the Communications CCA and the CPUs is 9600 baud.

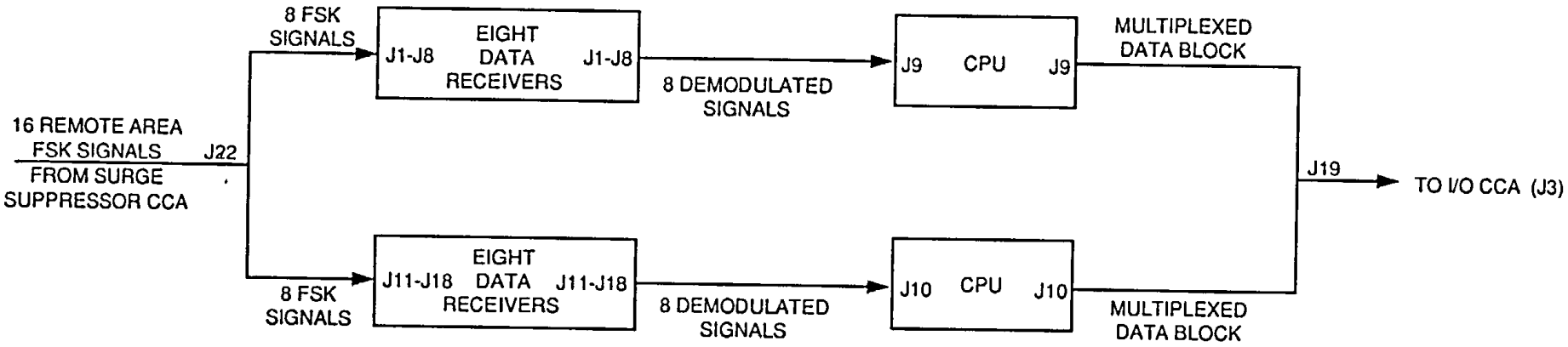


Figure 1-6. Backplane Block Diagram.

1.13.5 IBM-PC/AT Compatible Computer Functional Description. The computer (figure 1-7) consists of a personal computer, monitor, printer, and operating software. The computer uses a data bus to interface computer components. The data bus is controlled by Basic Input/Output System (BIOS) stored in Read Only Memory (ROM), the operating system installed on the hard drive, and the CPU of the computer. The Communications CCA and application software provided with the AMG are installed in the computer. When the AMG application software is copied to the hard drive of the computer, the autoexec.bat file is updated to load the application software. When the computer is powered on, the autoexec.bat file instructs the computer to load the application software. This causes the computer to automatically start the application software. The application software displays an initialization screen for a few seconds and then displays an operational screen. The application software also takes control of the computer and disables unwanted keys of the computer keyboard and unwanted functions of the operating system. It assigns designated controls to the function keys and assigns designated tasks to selected keys. The applications software instructs the computer to send poll requests to the CPUs located in the CMA and to receive and process the data from the CPUs.

When the applications software instructs the computer to send a poll request, the CPU establishes a data transfer path to the Communications CCA and the poll request is then transmitted by the Communications CCA to one of the CPUs in the CMA. The polled CPU, when it recognizes its address, will transmit its data to the Communications CCA. The Communications CCA then receives the formatted data from the CPU that was polled. The polling sequence is repeated until all eight CPUs have been polled and the data has been received by the Communications CCA. Each CPU is polled approximately once each second. The data transfer rate is 9600 baud.

When the formatted data is received from a CPU, the Communications CCA sends a request to the CPU of the computer for a data transfer. The CPU of the computer acknowledges the request and accepts the data which is then transferred to the Random Access Memory (RAM) of the computer. The computer CPU decodes and processes the data into display and print information as instructed by the application software. Display information is sent to the video adapter across the data bus. The video adapter then sends the display signals to the color monitor. Print information is sent to the printer adapter across the data bus. The printer adapter then sends the data to be printed to the dot matrix printer.

When operator commands or data are input from the keyboard, the commands or area data are sent across the data bus to the CPU of the computer. The CPU performs the commands or processes the data in accordance with the AMG application software.

1.14 AMG APPLICATION SOFTWARE FUNCTIONAL DESCRIPTION.

The application software consists of the AMG operating and configuration files. Refer to TM 5-6350-280-10 for a detailed description.

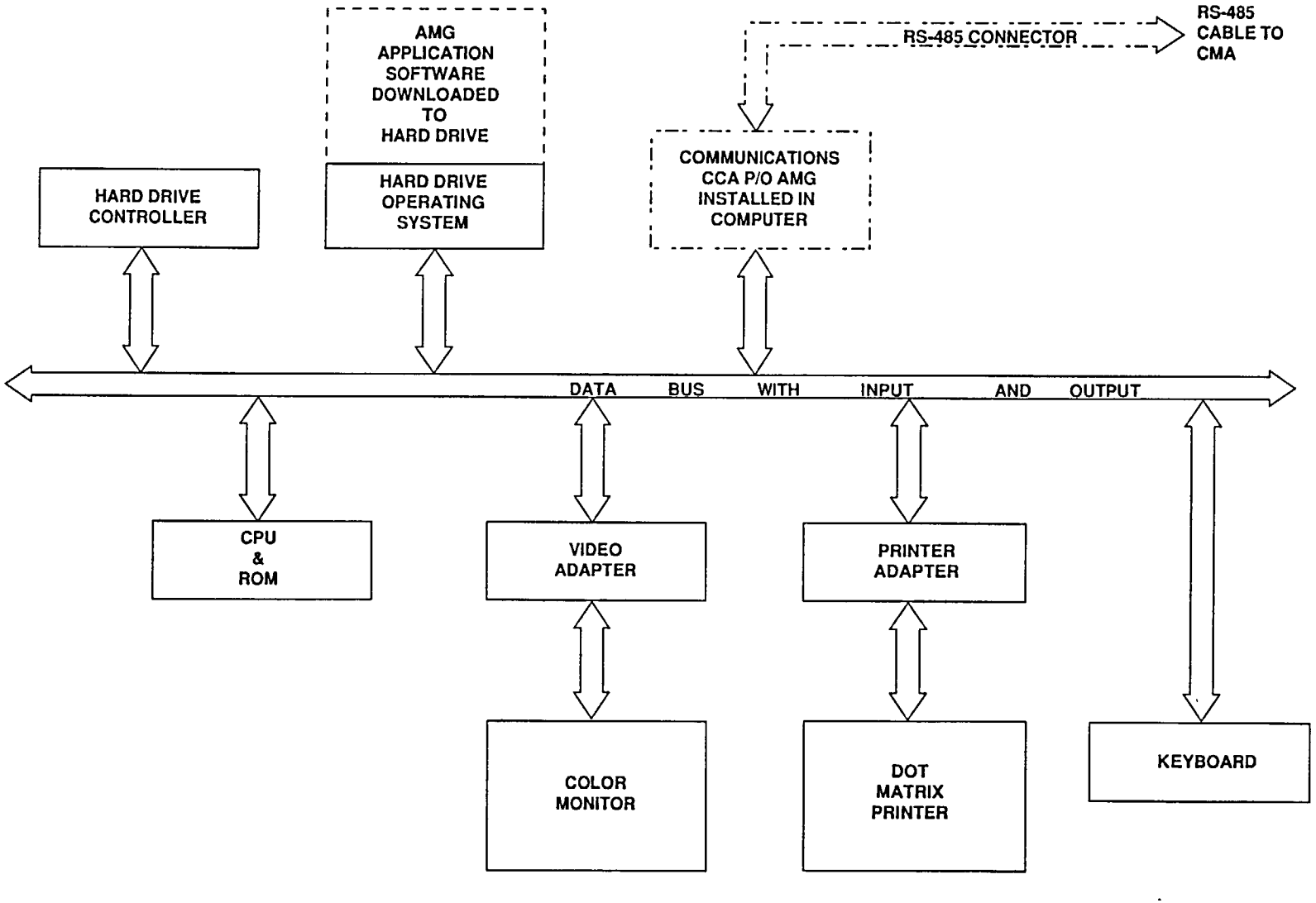


Figure 1-7. Computer Functional Block Diagram (Typical).

CHAPTER 2
INSTALLATION

SUBJECT INDEX PAGE

SECTION I SITE AND SHELTER REQUIREMENTS

2.1 SITE REQUIREMENTS.

2.1.1 System Planning. The responsibility of the AMG initial installation rests with the installation commander and engineering staff. General information for system planning is provided in chapter 2, Section I of TM 5-6350-264-14-1. Installation of the software requires a password to be entered and must be performed by designated personnel. The remainder of this chapter is for information only and recommended special site requirements unique to the AMG.

2.1.2 Power Requirements. Power requirements are provided in chapter 2, Section I of TM 5-6350-264-14-1. The Uninterruptible Power Supply for the AMG can operate on any of the following: 100, 120, 230, or 240 Vac at either 50 or 60 Hz power. The UPS requires an independent fused line rated at 30 amperes (amps) for 120 Vac or 16 amps for 240 Vac at the distribution panel. Each site must provide all power cables.

2.1.3 Installed Equipment. The site must have the Joint-Service Interior Intrusion Detection System (J-SIIDS) equipment installed and user purchased IBM-PC/AT compatible computer, keyboard, color monitor, and dot matrix printer installed. Refer to TM 5-6350-264-14-1 for detailed installation of the J-SIIDS.

2.1.4 AMG Equipment Location Requirements.

2.1.4.1 Uninterruptible Power Supply (UPS) Location. The UPS must be located on flooring that supports a minimum of 669 pounds (lbs) (304 Kg). Environmental temperature must be maintained between 32° to 77° F (0° to 25° C). The power source must be capable of providing a single 30 ampere (amp) circuit breaker that is dedicated to the operation of the UPS. The UPS provides all power requirements of the CMA and computer. Two power cables (not provided) must be routed from the UPS to the locations of the Converter Multiplexer Assembly (CMA) and computer. In addition, the UPS must be located within 100 feet (ft) of the CMA because of restriction of the UPS cable.

2.1.4.2 Converter Multiplexer Assembly (CMA) Location. The CMA must be located to allow installation of two 100 ft signal cables. One signal cable is routed to the UPS and the other is routed to the Communications CCA installed in the computer. When possible, the CMA should be installed where the existing dedicated telephone or transmission lines from the J-SIIDS are routed.

2.1.5 Engineering Support. Requests for additional technical support with regards to installation and maintenance should be addressed to the following. However, all requests must be justified and will be considered on a case by case basis:

Commander
U.S. Army Aviation And Troop Command
ATTN: AMSAT-W-TP
Fort Belvoir, Virginia 22060-5606

SECTION II SERVICE UPON RECEIPT OF MATERIEL

2.2 UNPACKING.

CAUTION

Do not remove CPU CCA without a wrist ground strap and being grounded. The CPU CCA is ESD sensitive and damage to the CCA could result. Failure to obey this caution could result in equipment damage.

2.2.1 Unpacking Alarm-Monitor Group (AMG) OA-9431/FSS-9(V). When unpacking the AMG, the Communications CCA is packaged separately and requires special handling.

2.2.2 Unpacking J-SIIDS Equipment. Refer to J-SIIDS TM 5-6350-264-14 series.

2.2.3 Unpacking IBM-PC/AT Compatible Computer Equipment. Refer to commercial manuals provided with computer.

2.3 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.
b. Check the equipment against the packing slip to see if the equipment is complete. Report all discrepancies in accordance with the instructions in DA Pam 738-750.

2.4 PROCESSING UNPACKED EQUIPMENT.

Remove any plastic tie-wraps necessary to place equipment in operation.

2.5 ASSEMBLY OF EQUIPMENT.

2.5.1 Uninterruptible Power Supply (UPS) Battery Installation. Refer to paragraph 4.6.1.2 and install the UPS batteries.

NOTE

Record switch settings on communications CCA prior to installation in personal computer.

2.5.2 Communications Circuit Card Assembly (CCA) Assembly. Refer to paragraph 4.6.14.2 and install the Communications CCA.

2.6 INSTALLATION INSTRUCTIONS.

The following installation instructions are recommended:

NOTE

- **The power cable between the UPS and the CMA must be able to supply a minimum of 6 amps.**
- **The power cable between the UPS and the personal computer must be able to supply between 6 and 15 amps.**

a. Install power cables from UPS to location of CMA and computer.

b. Install UPS Cable Assembly from UPS to CMA.

c. Route one end of UPS Cable Assembly through opening in bottom of CMA.

d. Connect UPS cable to AC INPUT FAIL ALARM of the UPS and J1 of the Input/Output (I/O) (CCA) in the CMA.

e. Route connector of RS-485 Cable Assembly with ground wire through opening in bottom of CMA.

f. Connect ground wire of RS-485 cable to mounting screw of I/O CCA and connect connector to J2.

g. Route the other end of the RS-485 Cable Assembly to Communications CCA installed in computer and connect to the top connector of the Communications CCA.

h. At personal computer, install a multiple outlet strip with at least three receptacles on power cable from UPS. Plug in user furnished IBM-PC/AT compatible computer, color monitor, and dot matrix printer.

i. At CMA, install a receptacle on power cable from UPS location and plug in CMA multiple outlet strip.

j. Install a three prong plug on power cables from CMA location and computer location.

k. Select a dedicated circuit on power distribution panel. Route a power cable to the UPS location. Connect the UPS and ensure it is wired for the correct input voltage.

l. Set dedicated circuit at power distribution panel to on position.

m. Set UPS AC LINE INPUT BREAKER to on and observe that AC LINE INPUT indicator is lit.

n. Set BATTERY BREAKER to on then INVERTER OUTPUT BREAKER to on.

o. Depress Inverter ON/OFF switch. Wait 2 seconds then observe INV OUTPUT indicator is illuminated.

p. Using VOM, check voltage at output of UPS.

q. Plug CMA and computer into UPS.

r. Power on computer, and ensure MS-DOS version 3.2 or higher is installed.

s. Install AMG software as follows:
   (1) Remove disk labeled "AMG PC Software Diskette 1" from protective sleeve and insert into 5 1/4 inch floppy drive.

(2) Type "a: install".

(3) When message appears on screen, remove disk labeled "AMG PC Software Diskette 1" from floppy drive and store in protective sleeve.

(4) Remove disk labeled "AMG PC Software Diskette 2" from protective sleeve and insert into 5 1/4 inch floppy drive.

(5) Press any key.

(6) When message appears on screen, remove disk labeled "AMG PC Software Diskette 2" from floppy drive and store in protective sleeve.

(7) Restart the computer by pressing <Ctrl>, <Alt>, and <Delete> keys simultaneously.

NOTE

The following installation procedure must be made with the assistance of designated operator level supervisory personnel.

(8) Identify data input twisted pairs from J-SIIDS to be installed to modules in CMA (table 2-1). Connections of twisted pairs are made to Surge Suppressor CCA located on rear door of CMA.

Table 2-1. AMG Modules.

Module Number	Areas Monitored	Drawer Assembly	Backplanes From Front View
1	1-8	Upper	Left
2	9-16	Upper	Left
3	17-24	Upper	Right
4	25-32	Upper	Right
5	33-40	Lower	Left
6	41-48	Lower	Left
7	49-56	Lower	Right
8	57-64	Lower	Right

(9) Refer to TM 5-6350-280-10 and configure AMG operating system software.

2.7 STORAGE.

a. Placement of equipment in administrative storage should be for short periods of time when a shortage of maintenance effort exists. Items should be in mission readiness within 24 hours or within the time factors as determined by the directing authority. During the storage period appropriate maintenance records will be kept.

b. Before placing equipment in administrative storage, current preventive maintenance checks and services should be completed, shortcomings and deficiencies should be corrected, and all modification work orders (MWO's) should be applied.

CHAPTER 3

UNIT MAINTENANCE

There is no unit maintenance on the Alarm-Monitor Group (AMG) OA-9431/FSS-9(V).

CHAPTER 4

DIRECT SUPPORT MAINTENANCE

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

4.1 COMMON TOOLS AND EQUIPMENT.

Authorized common tools and equipment for the Alarm-Monitor Group (AMG) OA-9431/FSS9(V) are listed in the Table of Distribution and Allowances (TDA) and authorized by the Maintenance Allocation Chart (MAC) Appendix B.

4.2 SPECIAL TOOLS AND SUPPORT EQUIPMENT.

None Required.

4.3 REPAIR PARTS.

Repair parts for the OA-9431/FSS-9(V) are listed and illustrated in the Repair Parts and Special Tools List (RPSTL) Appendix C.

SECTION II DIRECT SUPPORT TROUBLESHOOTING

4.4 DIRECT SUPPORT TROUBLESHOOTING.

Use the symptom index or table 4-1 to locate the specific troubleshooting procedure to perform. After locating the listed malfunction, perform the test/inspections and corrective actions in the order listed in the troubleshooting procedure. The symptom index and troubleshooting procedures cannot list all the malfunctions that may occur, all the test and inspections needed to find the fault, or all the corrective actions needed to correct the fault. If the equipment malfunction is not listed or actions listed do not correct the fault, notify your supervisor.

SYMPTOM INDEX

Table 4-1. Remote Area COM Message/Troubleshooting Procedure Cross-Reference List.

COM Message on Computer Printout	Meaning of Refer to COM Message	Troubleshooting Procedure
COM-norm-000	Communications are good.	None*
COM-FAIL-001	A line fault or low signal level is present.	1
COM-FAIL-010	Data signal loss	1

Table 4-1. Remote Area COM Message/Troubleshooting Procedure Cross-Reference List continued.

COM Message on Computer Printout	Meaning of Refer to COM Message	Troubleshooting Procedure
COM-FAIL-100	Synchronization loss.	1*
COM-FAIL-011	Data signal loss and a line fault or low signal level is present.	1
COM-FAIL-110	Synchronization and data signal loss.	1
COM-FAIL-101	Synchronization loss and a line fault or low signal level is present.	1
COM-FAIL-111	Synchronization and data signal loss and a line fault or low signal level is present.	1

*When message is alternating between COM-FAIL-100 and COM-norm-000 perform troubleshooting procedure 9.

Table 4-2. Troubleshooting Table.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. REMOTE AREA COM-FAIL.

NOTE

- **An oscilloscope is required for this procedure.**
- **Refer to figure 4-4, Appendix E and tables 4-6 through 4-10 for schematics and wiring diagrams.**

Step 1. Refer table 4-3, attach A probe to the A input and the B probe to the B input of terminal board, TB1, on surge suppressor CCA. Refer to figure 4-1 and verify signal input from remote area data transmitter, waveform of figure 4-1.

NOTE
The measured waveform will be oscillating between 1,070 and 1,270 Hertz.

If shifting signal is present go to step 2, otherwise refer to J-SIIDS TM 5-6350-264-14 series and troubleshoot the data transmitter or transmission lines of the J-SIIDS.

Table 4-2. Troubleshooting Table - continued.

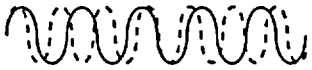
MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

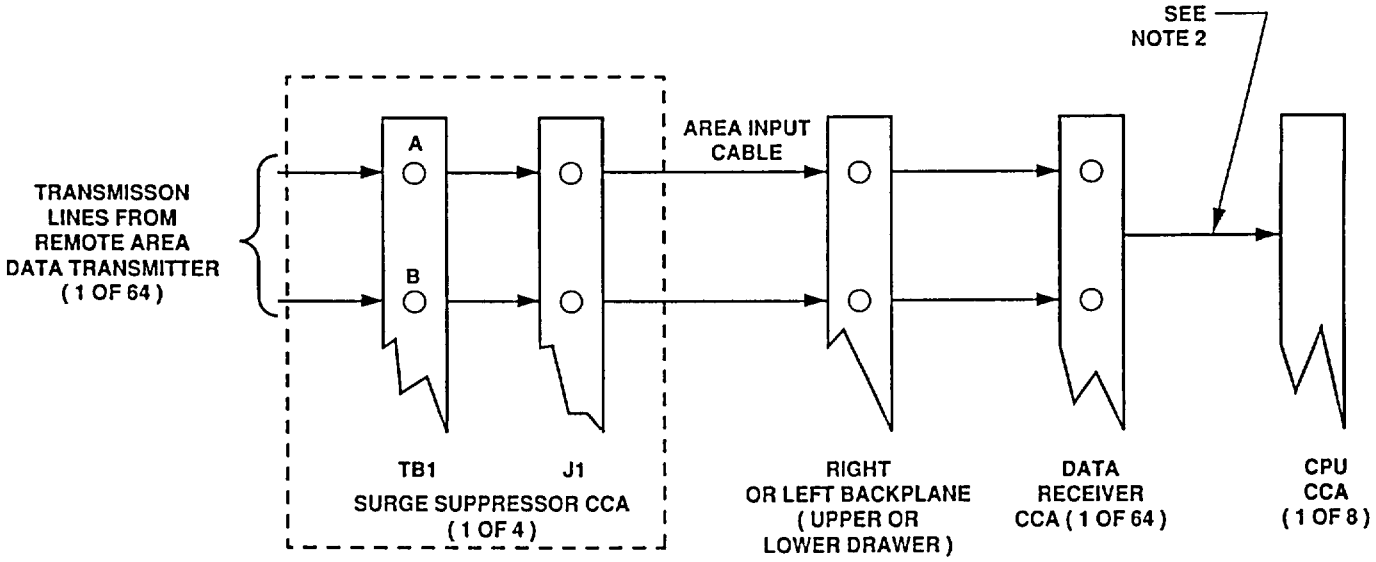
1. REMOTE AREA COM-FAIL - continued.

TEST EQUIPMENT DUAL TRACE OSCILLOSCOPE
TWO ONE TO ONE PROBES (DO NOT GROUND PROBES)

SCOPE SETTINGS

DISPLAY MODE: A & B WITH ONE CHANNEL INVERTED
SYNC: INTERNAL
INPUT COUPLING: BOTH CHANNELS ON DC
VOLTS PER DIVISION: .5 VOLTS (ADJUST AS REQUIRED)
TIME PER DIVISION: 1 MILLISECOND (ADJUST AS REQUIRED)
TRIGGER: A

TYPICAL WAVEFORM  60 MILLIVOLTS MINIMUM PEAK TO PEAK . SEE NOTE 1



NOTE 1 WAVEFORM SHIFTS BETWEEN TWO FREQUENCIES AND A MAXIMUM OF 2 VOLTS PEAK TO PEAK.

NOTE 2 THE SIGNAL HAS BEEN CHANGED FROM AN FSK SIGNAL TO A SQUARE WAVE (REFER TO NOTE 2 OF FIGURE 4-2).

Figure 4-1. FSK Data Signals from Data Transmitters.

Table 4-2. Troubleshooting Table - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. REMOTE AREA COM-FAIL - continued.

NOTE

- **The oscilloscope settings change for this step, refer to figure 4-2.**
- **The signal will be a square wave, refer to figure 4-2.**

Step 2. Refer to table 4-5, attach probe ground to data receiver CCA ground, test point 7 (TP-7), and probe to TP-8. Refer to figure 4-2 and verify data output signal of data receiver CCA, waveform of figure 4-2.

If signal is present go to step 8, otherwise go to step 3.

NOTE

- **The oscilloscope settings change for this step, refer to figure 4-2.**
- **The signal will be an FSK signal shifting between 1,070 and 1,270 hertz, refer to figure 4-2.**

Step 3. Refer to figure 4-2, attach probe ground to data receiver CCA ground, TP-7, and probe to TP-5. Refer to figure 4-2 and verify data input signal of data receiver CCA, waveform of figure 4-2.

If shifting signal is present go to step 7, otherwise if this is the first measurement at TP-5, refer to TM 5-6350-280-10 turn equipment off, ensure data receiver CCA is properly seated, refer to TM 5-6350-280-10 turn equipment on, and repeat step 3, otherwise go to step 4.

NOTE

- **The oscilloscope settings change for this step, refer to figure 4-1.**
- **The signal will be an FSK signal shifting between 1,070 and 1,270 hertz, refer to figure 4-1.**
- **Noise may be present in signal.**

Step 4. Refer to TM 5-6350-280-10 turn equipment off. Refer to paragraph 4.6.7 and remove data receiver CCA. Refer to figure 4-1 and verify signal output at terminals 2 and 6 on data receiver CCA connector mounted on backplane assembly, waveform of figure 4-1.

If shifting signal is present go to step 7, otherwise go to step 5.

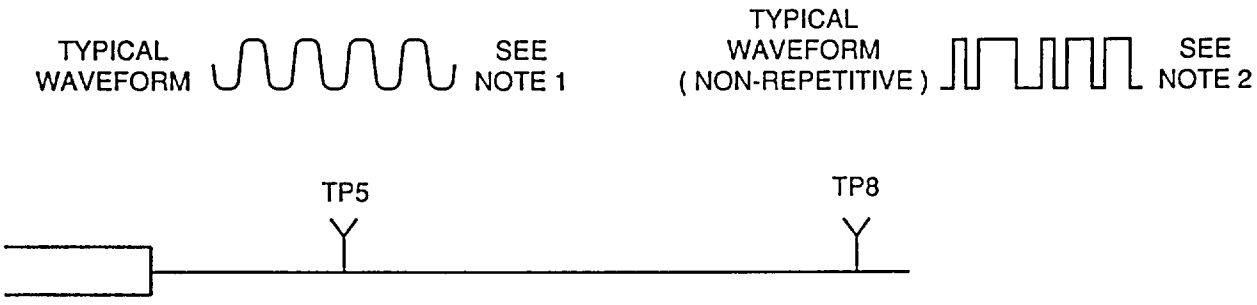
Table 4-2. Troubleshooting Table - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

1. REMOTE AREA COM-FAIL - continued.

TEST EQUIPMENT DUAL TRACE OSCILLOSCOPE
ONE TO ONE PROBE WITH
GROUND CONNECTED TO TP7

SETTINGS	TP5	TP8
DISPLAY MODE:	A or B	A or B
SYNC:	INTERNAL	INTERNAL
INPUT COUPLING	AC	DC
VOLTS PER DIVISION	2 V	2 V DC
TIME PER DIVISION	.2 MILLISECOND	0.1 SECONDS



NOTE 1 WAVEFORM SHIFTS BETWEEN TWO FREQUENCIES, 1,070 Hz AND 1,270 Hz. PERIOD WILL BE .93 TO .79 ms. VOLTAGE WILL BE BETWEEN .25 AND .8 VOLTS PEAK TO PEAK.

NOTE 2 BASELINE DATA FLASHING ON AND OFF IS DIGITAL DATA (ONE'S AND ZERO'S)THAT IS DEPENDENT ON THE TRANSMISSION SIGNALS FROM THE REMOTE AREAS. THE DIGITAL DATA REPRESENTS THE AREA'S STATUS. 8 VOLTS PEAK TO PEAK.

Figure 4-2. Data Receiver CCA Signals.

Table 4-2. Troubleshooting Table - continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

1. REMOTE AREA COM-FAIL - continued.

NOTE

- **The signal will be an FSK signal shifting between 1,070 and 1,270 hertz, refer to figure 4-1.**
- **Noise may be present in signal.**

Step 5. Refer to paragraph 4.6.6 and disconnect area input cable assembly from backplane. Refer to figure 4-1 and table 4-4 and verify signal output from area input cable assembly, waveform of figure 4-1.

If shifting signal is not present go to step 6, otherwise refer to paragraph 4.6.9 and replace backplane.

NOTE

- **The signal will be an FSK signal shifting between 1,070 and 1,270 hertz, refer to figure 4-1.**

Step 6. Refer to paragraph 4.6.6 and disconnect area input cable assembly from surge suppressor CCA. Refer to figure 4-1 and table 4-3 and verify signal output from surge suppressor CCA, waveform of figure 4-1.

If shifting signal is present refer to paragraph 4.6.6 and replace area input cable assembly, otherwise refer to paragraph 4.6.11 and replace surge suppressor CCA.

Step 7. Refer to paragraph 4.6.7 and replace data receiver CCA.

If remote area COM-FAIL is still present on monitor go to step 8.

Step 8. Refer to paragraph 4.6.8 and replace central processing unit (CPU) CCA.

If remote area COM-FAIL is still present on monitor go to troubleshooting procedure 9.

2. SINGLE MODULE (MOD) FAILURE.

Step 1. With the computer monitor displaying the monitor area status screen, refer to table 4-5 and press reset button on central processing unit (CPU) CCA. Wait 30 seconds and check monitor area status screen for module COM failure.

If module COM failure is present go to step 2.

NOTE

Do not seat CPU CCA while equipment power is on.

Step 2. Visually check to ensure CPU CCA is securely seated in backplane.

If CPU CCA is properly seated in backplane go to step 3, otherwise refer to TM 5-6350-280-10 turn equipment off, ensure CPU CCA is properly seated, and refer to TM 5-6350-280-10 turn equipment on. If module COM failure is still present go to step 3.

Table 4-2. Troubleshooting Table - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

2. SINGLE MODULE (MOD) FAILURE - continued.

NOTE

Do not remove and install CPU CCA(s) while equipment power is on.

Step 3. Refer to TM 5-6350-280-10 turn equipment off, swap known good CPU CCA with suspect CPU CCA, and refer to TM 5-6350-280-10 turn equipment on.

Observe monitor area status screen, if module COM failure moved to new module refer to paragraph 4.6.8 and replace suspect CPU CCA, otherwise refer to paragraph 4.6.9 and replace backplane.

3. TWO MODULE (MOD) FAILURES ON SAME BACKPLANE.

NOTE

- **A volt ohm meter (VOM) and oscilloscope are required for this procedure.**
- **Do not seat CPU CCAs while equipment power is on.**

Step 1. Visually check to ensure CPU CCAs are securely seated in backplane.

If CPU CCAs are properly seated in backplane go to step 2, otherwise refer to TM 5-6350-280-10 turn equipment off, ensure CPU CCAs are properly seated, and refer to TM 5-6350-280-10 turn equipment on. Wait 30 seconds and check monitor area status screen, if module COM failures are still present go to step 2.

Step 2. Using VOM check for +5 Vdc, at the +5 Vdc terminal, on both CPU CCAs.

If +5 Vdc is present go to step 5, otherwise go to step 3.

Step 3. If CPU CCAs are mounted on left backplane disconnect connector P1 from connector J21. If CPU CCAs are mounted on right backplane disconnect connector P2 from connector J21. Using VOM check for +5 Vdc on connector P1 or P2 at pins 3 (white lead) and 4 ground (black lead on connector P1 and black and green leads on connector P2).

If +5 Vdc is present go to step 4, otherwise refer to paragraph 4.6.10 and disconnect DC power supply cable assembly leads from DC power supply, disconnect connector P1 or P2 from left or right backplane respectively, and replace DC power supply cable assembly. If module COM failures are still present on monitor area status screen go to step 4.

NOTE

Do not remove CPU CCA(s) while equipment power is on.

Step 4. Refer to TM 5-6350-280-10 turn equipment off, refer to paragraph 4.6.8 and remove CPU CCAs, and refer to TM 5-6350-280-10 turn equipment on. Using, VOM check for +5 Vdc at terminals 2, ground, and 3 on CPU CCA connector mounted on backplane.

If +5 Vdc is present go to step 5, otherwise refer to paragraph 4.6.9 and replace backplane. If module COM failures are still present on monitor area status screen go to step 5.

Table 4-2. Troubleshooting Table - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. TWO MODULE (MOD) FAILURES ON SAME BACKPLANE - continued.

NOTE

Refer to figure 4-4, Appendix E and tables 4-6 through 4-10 for schematics and wiring diagrams.

Step 5. Set oscilloscope to settings specified in figure 4-3, connect A probe ground to ground pin on CPU CCA and connect A probe to RXD pin on either CPU CCA. Refer to figure 4-3 and check for RX signal input, upper waveform figure 4-3.

If RX input signal is present go to step 8, otherwise go to step 6.

NOTE

Oscilloscope settings do not change.

Step 6. Position A probe ground on terminal 4 and A probe on terminal 5 of connector P2, left backplane, or connector P3, right backplane. Refer to figure 4-3 and check for RX signal input, upper waveform figure 4-3.

If RX input signal is present go to step 7, otherwise refer to paragraph 4.6.5 and replace RX-TX cable assembly.

NOTE

- **Do not remove CPU CCA(s) while equipment power is on.**
- **Oscilloscope settings do not change.**

Step 7. Refer to TM 5-6350-280-10 turn equipment off, refer to paragraph 4.6.8 remove CPU CCAs, refer to TM 5-6350-280-10 turn equipment on. Position A probe ground on terminal 26, RX signal return, connect A probe to terminal 27 of CPU CCA connector on backplane. Refer to figure 4-3 and check for RX input signal, upper waveform of figure 4-3.

If RX input signal is present refer to paragraph 4.6.8 and replace CPU CCAs, otherwise refer to paragraph 4.6.9 and replace backplane.

NOTE

Oscilloscope settings do not change.

Step 8. Connect B probe to TXD pin on either CPU CCA. Refer to figure 4-3 and check for TX output signal, lower waveform figure 4-3.

If TX output signal is present go to step 9, otherwise refer to paragraph 4.6.8 and replace CPU CCA.

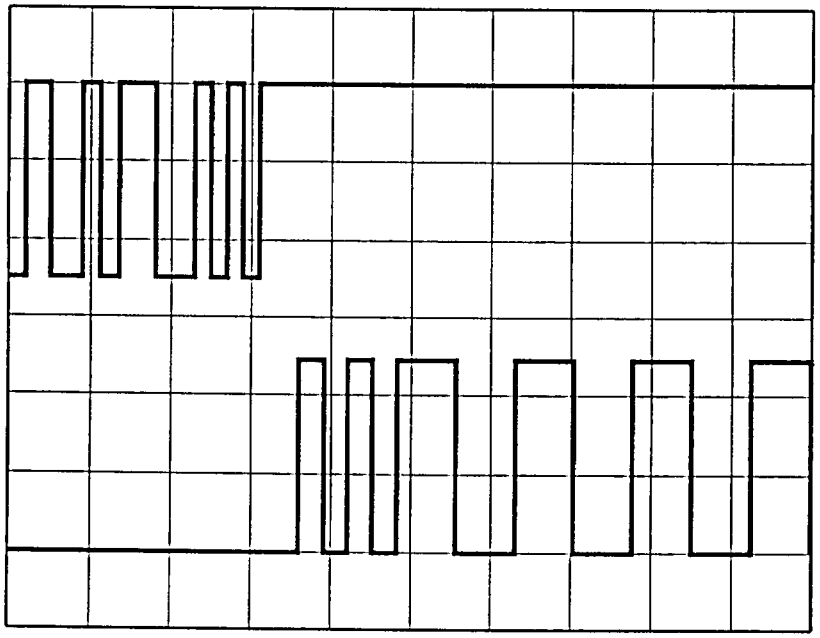
Table 4-2. Troubleshooting Table - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

TEST EQUIPMENT — DUAL TRACE OSCILLOSCOPE
TWO ONE TO ONE PROBES WITH
A PROBE GROUND CONNECTED TO
GROUND PIN ON CPU CCA, A
PROBE CONNECTED TO RXD PIN
OF CPU CCA, AND B PROBE
CONNECTED TO TXD PIN OF
CPU CCA.

SETTINGS	
DISPLAY MODE:	A AND B
SYNC:	INTERNAL
INPUT COUPLING:	DC
VOLTS PER DIVISION:	2V DC
TIME PER DIVISION:	1 MILLISECOND
PERSISTENCE:	ON
TRIGGER ON:	A
TRIGGER:	NEGATIVE
PROBE B:	INV

TYPICAL WAVEFORMS



NOTE 1 EACH WAVEFORM IS APPROXIMATELY 5 VOLTS PEAK TO PEAK

Figure 4-3. RX and TX Data Signals.

Table 4-2. Troubleshooting Table - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

3. TWO MODULE (MOD) FAILURES ON SAME BACKPLANE - continued.

NOTE

- **Do not disconnect RX-TX cable assembly while equipment power is on.**
- **Oscilloscope settings do not change.**

Step 9. Refer to TM 5-6350-280-10 turn equipment off, refer to paragraph 4.6.5 and disconnect RX-TX cable assembly from backplane not in question, disconnect RX-TX cable assembly from input/output (I/O) CCA for drawer not in question, and refer to TM 5-6350-280-10 turn equipment on. Position B probe ground on terminal 6, TX signal return, and B probe on terminal 7 of connector P2, left backplane, or P3 right backplane. Refer to figure 4-3 and check for TX input signal, lower waveform in figure 4-3.

If TX input signal is present, refer to paragraph 4.6.5 and replace RX-TX cable assembly, otherwise refer to paragraph 4.6.9 and replace backplane.

4. FOUR MODULE (MOD) FAILURES SAME DRAWER ASSEMBLY.

NOTE

- **A volt ohm meter (VOM) is required for this procedure.**
- **Refer to figure 4-4, Appendix E and tables 4-6 through 4-10 for schematics and wiring diagrams.**

Step 1. Using VOM, check for +5 Vdc, at the +5 Vdc terminal, on any CPU CCA in drawer assembly.

If +5 Vdc is present go to step 10, otherwise go to step 2.

Step 2. Open rear door of converter multiplexer assembly (CMA) and ensure drawer power cable is plugged into multiple outlet strip.

If power cable is plugged in go to step 3, otherwise plug power cable into multiple outlet strip.

Step 3. Using VOM, check for 120 Vac at CMA multiple outlet strip.

If 120 Vac is present go to step 6, otherwise press reset button on CMA multiple outlet strip. If power is not restored to drawer assembly go to step 4.

Step 4. Disconnect extension cord from uninterruptible power supply (UPS). Using VOM, check for 120 Vac output from UPS.

If 120 Vac is available go to step 5, otherwise refer to UPS manual and troubleshoot UPS.

Step 5. Disconnect CMA multiple outlet strip from extension cord between UPS and CMA. Using VOM check for 120 Vac at end of extension cord.

If 120 Vac is present refer to paragraph 4.6.2 and replace multiple outlet strip, otherwise troubleshoot extension cord.

Table 4-2. Troubleshooting Table - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

4. FOUR MODULE (MOD) FAILURES SAME DRAWER ASSEMBLY continued.

Step 6. Using VOM, check for 120 Vac at drawer assembly direct current (DC) power supply.

If 120 Vac is present go to step 7, otherwise refer to paragraph 4.6.4 and replace power cord assembly.

Step 7. Check drawer assembly DC power supply fuse.

If fuse is not damaged go to step 8, otherwise replace fuse.

Step 8. Using VOM, check DC power supply +5 Vdc output.

If +5 Vdc is present go to step 9, otherwise refer to paragraph 4.6.10 and replace DC power supply.

Step 9. Disconnect connector P1 from connector J21 on left backplane and connector P2 from connector J21 on right backplane. Using VOM, check for +5 Vdc on connector P1 and P2 at pins 3 (white lead) and 4 ground (black lead on connector P1 and black and green leads on connector P2).

If +5 Vdc is present go to step 10, otherwise refer to paragraph 4.6.4 and replace power cable assembly.

Step 10. Is second drawer assembly operational? If second drawer assembly is operational go to step 11, otherwise go to step 13.

Step 11. Refer to paragraph 4.6.5 and replace RX-TX cable assembly.

If module COM failures are still present on monitor area status screen go to step 12.

Step 12. Refer to paragraph 4.6.12 and replace input/output CCA.

If module COM failures are still present on monitor area status screen go to step 13.

Step 13. Refer to paragraph 4.6.15 and replace or repair RS-485 cable assembly.

If module COM failures are still present on monitor area status screen refer to paragraph 4.6.14 and replace communications CCA.

5. COM FAILURE INDICATED ON MONITOR AREA STATUS SCREEN FOR ALL MODULES.

NOTE

A volt ohm meter (VOM) is required for this procedure.

Step 1. Using VOM check for +5 Vdc, at +5 Vdc terminal, on any central processing unit (CPU) CCA.

If +5 Vdc is present go to step 2, otherwise perform troubleshooting procedure 4 step 2.

Table 4-2. Troubleshooting Table - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

5. COM FAILURE INDICATED ON MONITOR AREA STATUS SCREEN FOR ALL MODULES - continued.

NOTE

Do not connect RX-TX cable assembly or RS-485 cable assembly while equipment power is on.

Step 2. Refer to TM 5-6350-280-10 turn equipment off, ensure RS-485 cable assembly and all RX-TX cable assembly connections are secure, and refer to TM 5-63250-280-10 turn equipment on.

If COM failure is present for all modules on monitor area status screen go to step 3.

NOTE

Do not replace input/output CCA while equipment power is on.

Step 3. Refer to paragraph 4.6.12 and replace input/output CCA.

If COM failure is present for all modules on monitor area status screen go to step 4.

NOTE

Do not replace RS-485 cable assembly while equipment power is on.

Step 4. Refer to paragraph 4.6.15 and replace or repair RS-485 cable assembly.

If COM failure is present for all modules on monitor area status screen go to step 5.

NOTE

Do not replace communications CCA while equipment power is on.

Step 5. Refer to paragraph 4.6.14 and replace communications CCA.

If COM failure is present for all modules on monitor area status screen refer to paragraph 4.6.5 and replace RX-TX cable assemblies.

6. TAMPER ALARM INDICATED ON MONITOR AREA STATUS SCREEN WITH CONVERTER MULTIPLEXER ASSEMBLY (CMA) COMPLETELY CLOSED.

Step 1. Open rear door of CMA. Pull plungers for tamper switches S1 and S8 fully out and check monitor area status screen to see if tamper alarm is resettable.

If tamper alarm is resettable go to step 3, otherwise go to step 2.

Step 2. Visually inspect to ensure wiring is properly connected to tamper switches.

Connect wiring to COMMON and OPEN terminals on tamper switches, otherwise go to step 5.

Table 4-2. Troubleshooting Table - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

6. TAMPER ALARM INDICATED ON MONITOR AREA STATUS SCREEN WITH CONVERTER MULTIPLEXER ASSEMBLY (CMA) COMPLETELY CLOSED - continued.

Step 3. Refer to paragraph 4.5.3 and test tamper switches.

Refer to paragraph 4.5.3 and replace defective tamper switches.

Step 4. Check tamper switch mounting bracket position.

Loosen two nuts securing tamper switch mounting bracket to CMA frame. Adjust position of tamper switch mounting bracket such that tamper switch closes when rear door is completely closed and opens when rear door has moved 0.250 inches from its normally closed position.

Step 5. Using volt ohm meter (VOM) refer to figure 4-4 and tables 4-6 through 4-10 and test tamper switch electrical leads for continuity.

NOTE

Recommend that the tamper switches be tested in the following order: upper drawer assembly, lower drawer assembly, front panel, and filter panel.

Replace damaged or defective wiring, otherwise repeat step 1 for upper and lower drawer assemblies, front panel, and filter panel tamper switches.

7. CONVERTER MULTIPLEXER ASSEMBLY (CMA) IS OPEN AND TAMPER ALARM IS NOT INDICATED ON MONITOR AREA STATUS SCREEN.

NOTE

A volt ohm meter (VOM) is required for this procedure.

Using VOM check for +5 Vdc, at +5 Vdc terminal, on each central processing unit (CPU) CCAs in both drawer assemblies.

If +5 Vdc is not present refer to troubleshooting procedure 4, step 2 and ensure power is available to each drawer assembly and CPU CCA.

8. MONITOR AREA STATUS SCREEN INDICATES UNINTERRUPTIBLE POWER SUPPLY (UPS) IS ON BATTERY POWER YET AC POWER IS INDICATED ON UPS.

NOTE

A volt ohm meter (VOM) is required for this procedure.

Step 1. Disconnect UPS status cable assembly and using VOM check for less than 1 ohm resistance between pins 1 and 2 on UPS A/C input fail alarm connector.

If resistance is larger than 1 ohm refer to UPS manual and repair UPS as required, otherwise go to step 2.

Step 2. Disconnect UPS status cable assembly from input/output CCA on converter multiplexer assembly (CMA) and using VOM check for less than 5 ohms resistance between pins 1 and 2 of connector P2.

Replace UPS status cable assembly if open, otherwise go to step 3.

Table 4-2. Troubleshooting Table - continued.

MALFUNCTION
TEST OR INSPECTION
CORRECTIVE ACTION

8. MONITOR AREA STATUS SCREEN INDICATES UNINTERRUPTIBLE POWER SUPPLY (UPS) IS ON BATTERY POWER YET AC POWER IS INDICATED ON UPS - continued.

Step 3. Disconnect connector P2 from connector J19 on left backplane and connector P3 from connector J19 on right backplane of lower drawer assembly. Using VOM, check for less than 25 ohms resistance between pins 2 and 3, COMMON, of connectors P2 and P3.

If an open exists refer to paragraph 4.6.4 and replace power cable assembly, otherwise go to step 4.

Step 4. Disconnect connector P2 from connector J19 on left backplane and connector P3 from connector J19 on right backplane of upper drawer assembly. Using VOM, check for less than 25 ohms resistance between pins 2 and 3, COMMON, of connectors P2 and P3.

If an open exists refer to paragraph 4.6.4 and replace power cable assembly, otherwise refer to paragraph 4.6.12 and replace input/output CCA.

9. REMOTE AREA COM ALTERNATING BETWEEN COM-FAIL-100 AND COM-norm-000.

NOTE

- **Refer to table 4-1 for COM message interpretation.**
- **Resync-A message also occurs between alternating COM-FAIL-100 and COM-norm-000. It does not occur every message.**
- **This action will only occur when maintenance action at remote area transmitter has included a code plug change.**

Have designated personnel with password enter setup mode. Take area off line. Bring area on line and wait two minutes.

If COM failure does not clear refer to troubleshooting procedure 1.

10. NO POWER TO COMPUTER.

NOTE

A volt ohm meter (VOM) is required for this procedure.

Step 1. Check to see if computer, monitor, and printer power switches are in the on position.

If power switches are in on position go to step 2, otherwise position power switches in on position.

Step 2. Disconnect power cable between computer multiple outlet strip and uninterruptible power supply (UPS) power cable. Using VOM, check for 120 Vac output from power cable.

If 120 Vac is present go to step 5, otherwise go to step 3.

Table 4-2. Troubleshooting Table - continued.

MALFUNCTION TEST OR INSPECTION CORRECTIVE ACTION

10. NO POWER TO COMPUTER continued.

Step 3. Check if power cable from uninterruptible power supply (UPS) is plugged in.

If power cable is plugged in go to step 4, otherwise plug it in.

Step 4. Using VOM, check Vac input to UPS.

If Vac is present refer to manual and troubleshoot UPS, otherwise troubleshoot facility power distribution circuit.

Step 5. Check to see if multiple outlet strip is plugged in or turned on.

If multiple outlet strip is on go to step 6, otherwise plug in or turn on multiple outlet strip.

Step 6. Using VOM, check multiple outlet strip for 120 Vac.

If 120 Vac is present notify your supervisor that the computer, monitor, and printer require troubleshooting, otherwise replace multiple outlet strip.

Table 4-3. Input and Output Connections Surge Suppressor CCAs.

Area Inputs to CMA from J-SIIDS				Input Twisted pairs on TB1 of Cards 1 through 4	Output Pins of Cards 1 through 4			
Card 1	Card 2	Card 3	Card 4		Card 1 J1	Card 2 J2	Card 3 J3	Card 4 J4
1	17	33	49	1A 1B	1 2	1 2	1 2	1 2
2	18	34	50	2A 2B	3 4	3 4	3 4	3 4
3	19	35	51	3A 3B	5 6	5 6	5 6	5 6
4	20	36	52	4A 4B	7 8	7 8	7 8	7 8
5	21	37	53	5A 5B	9 10	9 10	9 10	9 10
6	22	38	54	6A 6B	11 12	11 12	11 12	11 12
7	23	39	55	7A 7B	13 14	13 14	13 14	13 14
8	24	40	56	8A 8B	15 16	15 16	15 16	15 16
9	25	41	57	9A 9B	17 18	17 18	17 18	17 18
10	26	42	58	10A 10B	19 20	19 20	19 20	19 20
11	27	43	59	11A 11B	21 22	21 22	21 22	21 22
12	28	44	60	12A 12B	23 24	23 24	23 24	23 24
13	29	45	61	13A 13B	25 26	25 26	25 26	25 26
14	30	46	62	14A 14B	27 28	27 28	27 28	27 28
15	31	47	63	15A 15B	29 30	29 30	29 30	29 30
16	32	48	64	16A 16B	31 32	31 32	31 32	31 32

Table 4-4. Area Input Cable Assembly.

Associated Area Input to Backplane from Surge Suppressor Cards						
Top Backplane 13229E8192 from J1	Top Backplane 13229E8147 from J2	Bottom Backplane 13229E8192 from J3	Bottom Backplane 13229E8147 from J4	Wire Number	From	To
1	1	1	1	1	P1-1	P2-1
2	2	2	2	2	P1-2	P2-2
3	3	3	3	3	P1-3	P2-3
4	4	4	4	4	P1-4	P2-4
5	5	5	5	5	P1-5	P2-5
6	6	6	6	6	P1-6	P2-6
7	7	7	7	7	P1-7	P2-7
8	8	8	8	8	P1-8	P2-8
9	9	9	9	9	P1-9	P2-9
10	10	10	10	10	P1-10	P2-10
11	11	11	11	11	P1-11	P2-11
12	12	12	12	12	P1-12	P2-12
13	13	13	13	13	P1-13	P2-13
14	14	14	14	14	P1-14	P2-14
15	15	15	15	15	P1-15	P2-15
16	16	16	16	16	P1-16	P2-16
17	17	17	17	17	P1-17	P2-17
18	18	18	18	18	P1-18	P2-18
19	19	19	19	19	P1-19	P2-19
20	20	20	20	20	P1-20	P2-20
21	21	21	21	21	P1-21	P2-21
22	22	22	22	22	P1-22	P2-22
23	23	23	23	23	P1-23	P2-23
24	24	24	24	24	P1-24	P2-24
25	25	25	25	25	P1-25	P2-25
26	26	26	26	26	P1-26	P2-26
27	27	27	27	27	P1-27	P2-27
28	28	28	28	28	P1-28	P2-28
29	29	29	29	29	P1-29	P2-29
30	30	30	30	30	P1-30	P2-30
31	31	31	31	31	P1-31	P2-31
32	32	32	32	32	P1-32	P2-32
				33	P1-33	P2-33
				34	P1-34	P2-34

Table 4-5. Module and Remote Area Circuit Card Assembly Cross-Reference and Location.

MODULE NUMBER	CPU CCA CARD NUMBER	REMOTE AREA MONITORED	DATA RECEIVER CCA CARD NUMBER	DRAWER ASSEMBLY	BACKPLANE FROM FRONT VIEW
1	B1	1 - 8	A1 - A8	UPPER	LEFT
2	B2	9 - 16	A9 - A16	UPPER	LEFT
3	B3	17 - 24	A17 - A24	UPPER	RIGHT
4	B4	25 - 32	A25 - A32	UPPER	RIGHT
5	B5	33 - 40	A33 - A40	LOWER	LEFT
6	B6	41 - 48	A41 - A48	LOWER	LEFT
7	B7	49 - 56	A49 - A56	LOWER	RIGHT
8	B8	57 - 64	A57 - A64	LOWER	RIGHT

SECTION III DIRECT SUPPORT MAINTENANCE PROCEDURES

4.5 AMG PERFORMANCE TEST.

4.5.1 UPS Testing. Refer to UPS commercial manual for testing.

4.5.2 Surge Suppressor CCA Test.

This task covers: Input tests

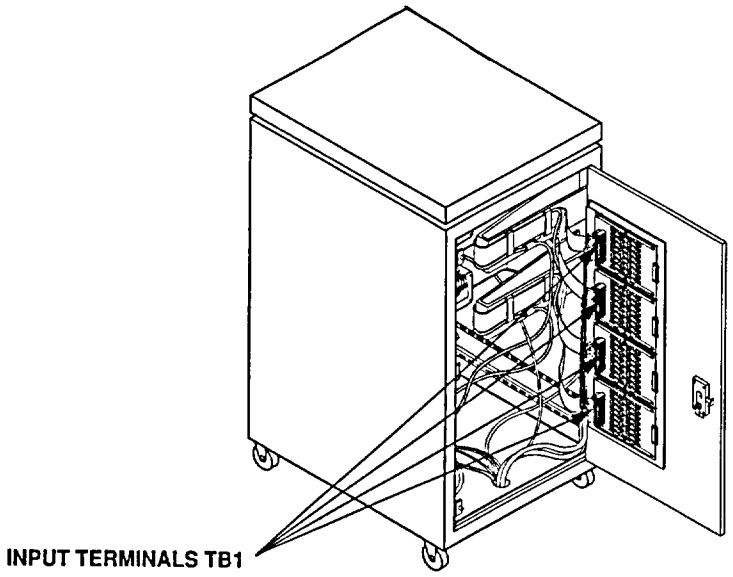
INITIAL SETUP

Test Equipment

Oscilloscope (Appendix B, Section III, item 2)

Equipment Conditions

Rear panel door open.



WARNING

Do not work on energized equipment alone. The equipment contains 120 Vac. Be careful not to contact connections for 120 Vac when testing equipment. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

NOTE

Do not ground oscilloscope probes.

a. Set oscilloscope as follows:

(1) Set display mode to add channels A and B

(2) Set one channel for inverted operation.

(3) Set A and B volts division to 0.5 volts.

(4) Set time division to 1 millisecond.

(5) Set for internal sync.

b. Using dual trace oscilloscope, refer to table 4-3 and connect two 1:1 probes to each twisted pair used.

c. Verify that FSK signal is present, figure 4-1.

d. If FSK signal is not present tag and remove data transmission lines and check for FSK signal across data transmission lines.

e. If FSK signal is present on data transmission lines refer paragraph 4.6.11 and replace surge suppressor CCA, otherwise refer to TM 5-6350-264-14 series and troubleshoot data transmitter or data transmission lines.

f. Disconnect and store test equipment.

4.5.3 Converter Multiplexer Test.

This task covers: Test of tamper switches

INITIAL SETUP

Test Equipment

Multimeter (Appendix B, Section III, item 2)

Material/Parts

Push-Pull Switch (Appendix C, Figure 3, item 6)

Equipment Conditions

Rear panel door open.

General Safety Instructions

Never work on energized equipment alone.

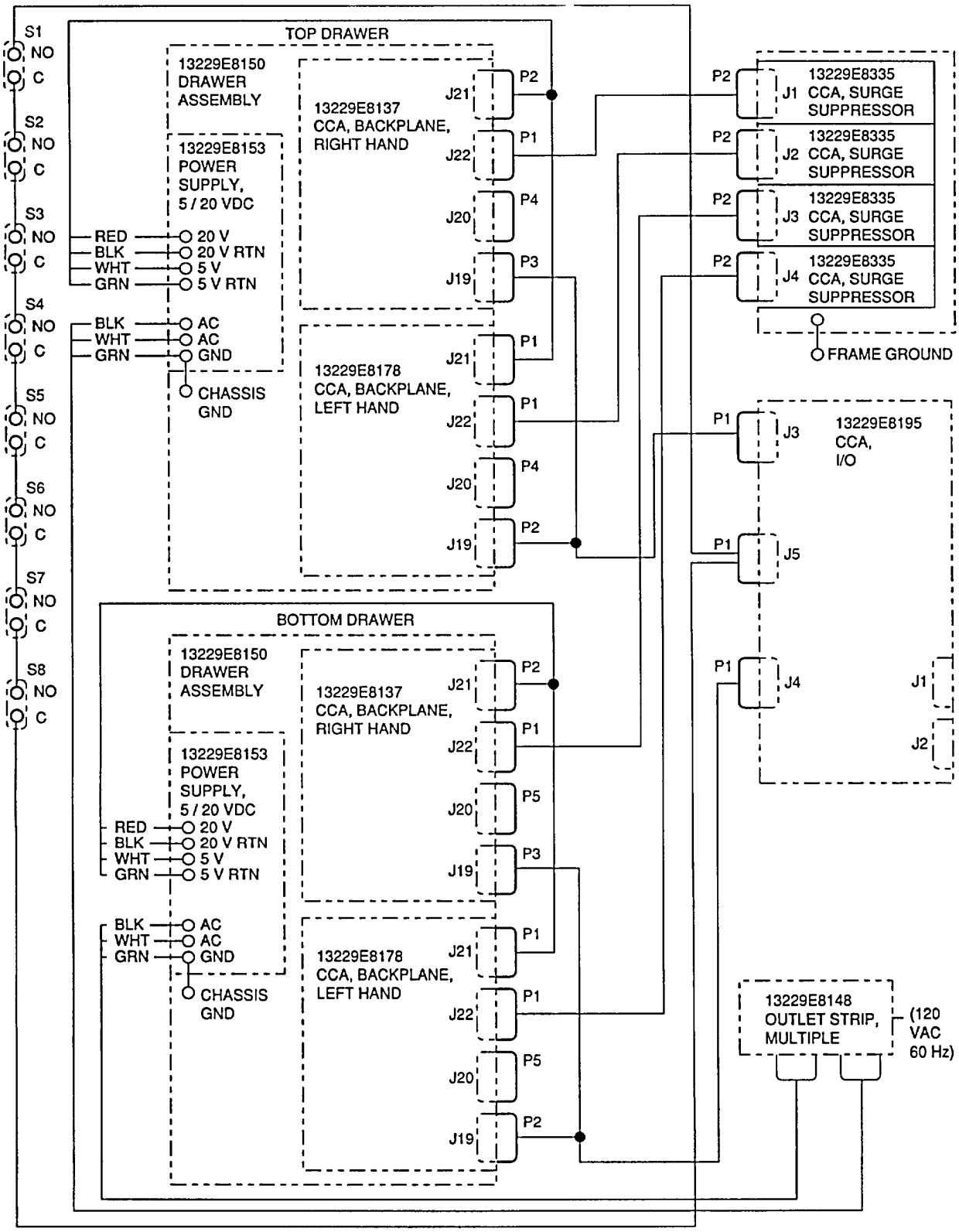


Figure 4-4. Converter Multiplexer Assembly.

Table 4-6. Area Input Cable Assembly, From Surge Suppressor CCA to Backplane CCAs, Wire Run List.

WIRE NO.	TERMINATION		WIRE NO.	TERMINATION	
	FROM	TO		FROM	TO
1	P1-1	P2-1	18	P1-18	P2-18
2	P1-2	P2-2	19	P1-19	P2-19
3	P1-3	P2-3	20	P1-20	P2-20
4	P1-4	P2-4	21	P1-21	P2-21
5	P1-5	P2-5	22	P1-22	P2-22
6	P1-6	P2-6	23	P1-23	P2-23
7	P1-7	P2-7	24	P1-24	P2-24
8	P1-8	P2-8	25	P1-25	P2-25
9	P1-9	P2-9	26	P1-26	P2-26
10	P1-10	P2-10	27	P1-27	P2-27
11	P1-11	P2-11	28	P1-28	P2-28
12	P1-12	P2-12	29	P1-29	P2-29
13	P1-13	P2-13	30	P1-30	P2-30
14	P1-14	P2-14	31	P1-31	P2-31
15	P1-15	P2-15	32	P1-32	P2-32
16	P1-16	P2-16	33	NOT USED	
17	P1-17	P2-17	34	NOT USED	

Table 4-7. DC Power Cable Assembly, Drawer DC Power Supply Assembly (DCPS) to Backplane CCAs, Wire Run List.

WIRE NO.	TERMINATION			
	FROM	TO/FROM	TO	WIRE COLOR
1	P1-2	P2-2	DCPS (+20 Vdc)	RED
2	P1-3	P2-3	DCPS (+5 Vdc)	WHT
3	P1-4	P2-4	DCPS (20 Vdc (RTN))	BLK
4	-	P2-4	DCPS (5 Vdc (RTN))	GRN
SHIELD	P1-1	P2-1	DCPS (FRAME GROUND)	CLEAR

Table 4-8. RX-TX Cable Assembly, From I/O CCA Connectors J3 and J4 to Backplane CCAs, Wire Run List.

WIRE NO.	TERMINATION			WIRE DESIGNATION*
	FROM	TO/FROM	TO	
1	P1-1	P2-1	P3-1	PR1-RED
2	P1-3	P2-3	P3-3	PR1-BLK
3	P1-2	P2-2	P3-2	PR2-RED
4	P1-3	P2-3	P3-3	PR2-BLK
5	P1-4	P2-4	P3-4	PR3-RED
6	P1-5	P2-5	P3-5	PR3-BLK
7	P1-6	P2-6	P3-6	PR4-RED
8	P1-7	P2-7	P3-7	PR4-BLK

* Wire pairs are numbered 1 through 4, interpret wire designation as follows: PR1-BLK, where PR1 is Pair 1 and blk is the wire color.

Table 4-9. RS-485 Cable Assembly, From I/O CCA Connector J2 to Communications CCA, Wire Run List.

WIRE NO.	TERMINATION		WIRE COLOR
	FROM	TO	
1	P1-2	P2-4	WHT/ORG STRIPE
2	P1-4	P2-2	ORG/WHT STRIPE
3	P1-7	P2-8	WHT/BLU STRIPE
4	P1-8	P2-7	BLU/WHT STRIPE
DRAIN	-	GROUND (TERMINAL LUG)	SILVER

Table 4-10. Uninterruptible Power Supply Assembly (UPS), From UPS Connector J1 to I/O CCA Connector J1, Wire Run List

WIRE NO.	TERMINATION		WIRE COLOR
	FROM	TO	
1	P1-1	P2-1	RED
2	P1-2	P2-2	BLK
DRAIN	-	P2-4	SILVER

WARNING

Do not work on energized equipment alone. The equipment contains 120 Vac. Be careful not to contact connections for 120 Vac when testing equipment. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Refer to figure 4-4 in Tables 4-6 through 4-10. Using multimeter, check each wire for continuity.

b. Check each switch as follows:

(1) Position switch in mid position and tag and remove electrical leads.

(2) Using multimeter, measure resistance across switch at OPEN and COMMON terminals. Reading on meter should be open circuit.

(3) While holding switch in depressed position, measure resistance across switch at OPEN and COMMON terminals. Reading on meter should be short circuit.

(4) Pull switch out to maintenance position (all the way out).

(5) Measure resistance across switch. Reading on meter should be short circuit.

c. If any reading in step b is not correct, replace switch as follows:

(1) Remove wires.

(2) Depress tabs on switch and pull outward.

(3) Insert new switch and push inward until switch seats.

(4) Connect wires to OPEN and COMMON terminals.

d. Adjust switch as necessary to ensure switch engages when CMA is closed.

e. Close all drawer assemblies and rear door. Install two lower panels.

4.6 AMG MAINTENANCE.

4.6.1 Uninterruptible Power Supply (UPS) Maintenance.

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)

Materials/Parts

UPS (Appendix C, figure 2)
Battery (Appendix C, figure 2, item 8)

Equipment Conditions

Equipment shutdown (TM 5-6350-280-10)

General Safety Instructions

Do not work on equipment without following standard shop safety precautions.

4.6.1.1 Removal.

WARNING

Do not disconnect UPS with source power on. Source voltage is 100, 120, 230, or 240 Vac. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Set power input breaker from facility to OFF position and tag "DO NOT SET TO ON POSITION".

b. Remove UPS Power Cable from input terminal of UPS. Unplug CMA and computer from UPS. Remove UPS cable assembly from AC INPUT FAIL ALARM connector.

c. Remove six screws (1) from front cover (2) and six screws (1) from rear cover (2).

d. Remove front cover (2) and rear cover (2).

WARNING

Do not touch batteries or allow terminals to come in contact with metal surfaces. Each battery has a high current potential that can be fatal. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury and equipment damage.

e. Tag and disconnect batteries as follows:

(1) Disconnect battery input quick disconnect connector.

(2) Tag and disconnect last negative lead from battery number 6 by removing nut (4), lock washer (5), two flat washers (6 and 7), bolt (8), and lead (9).

(3) Tag and disconnect positive lead from battery number 6 by removing nut (4), lock washer (5), two flat washers (6 and 7), bolt (8), and lead (9).

WARNING

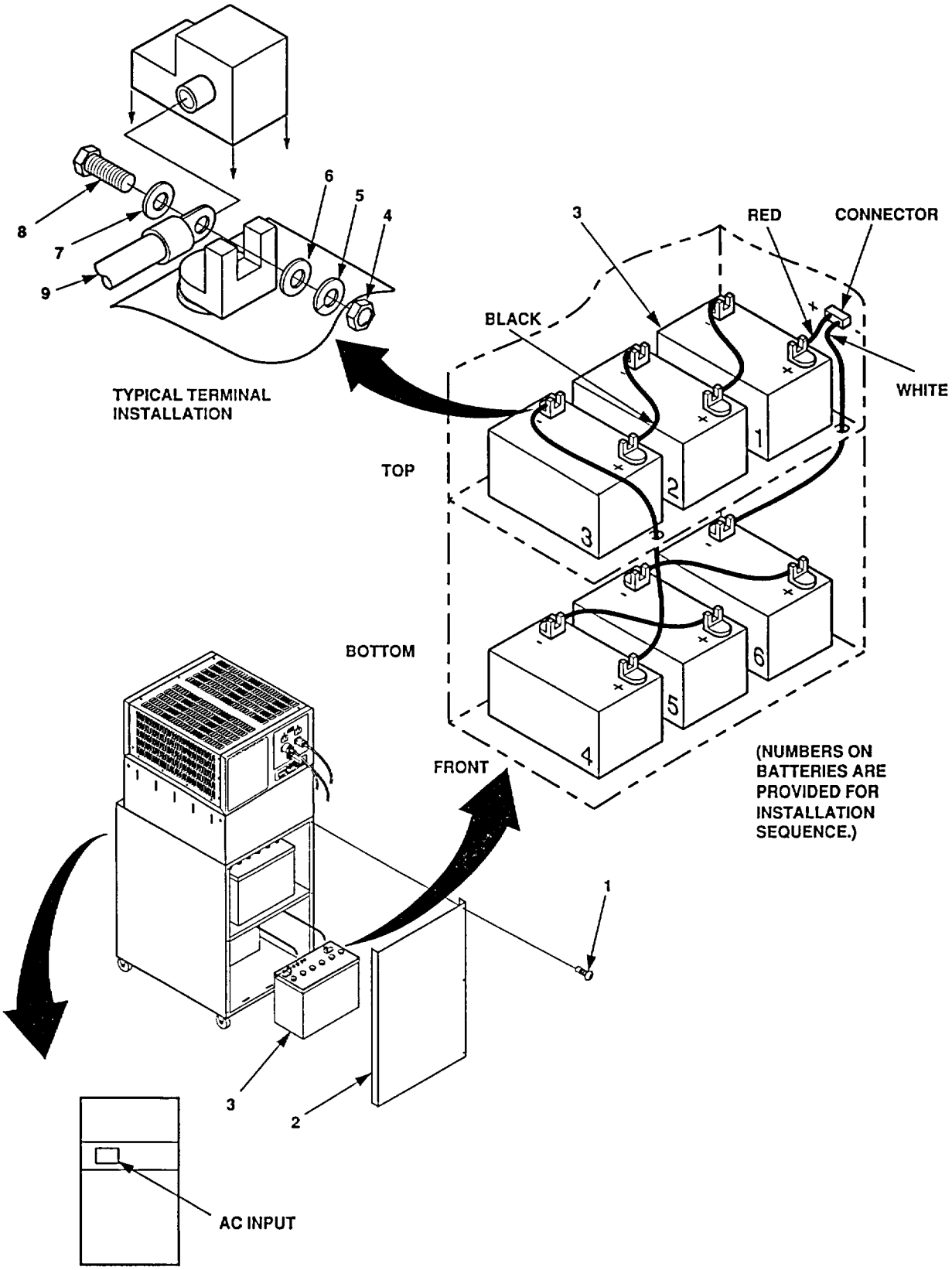
Each battery weighs 77 lbs and requires two personnel to lift batteries. Failure to observe this warning may result in personal injury.

(3) Remove battery.

(4) Starting with battery number 5 working in descending order, disconnect remaining batteries as follows:

a. Disconnect lead that was connected to previously disconnected battery.
b. Disconnect remaining lead and remove battery (3).
c. Repeat steps a. and b. for remaining batteries.

f. Position front cover (2) and rear cover (2) on UPS.


8
7
9
6
5
4
TYPICAL TERMINAL INSTALLATION
3
RED
CONNECTOR
BLACK
WHITE
TOP
BOTTOM
1
2
3
4
5
6
FRONT
(NUMBERS ON BATTERIES ARE PROVIDED FOR INSTALLATION SEQUENCE.)
1
3
2
AC INPUT

g. Install six screws (1) in front cover (2) and six screws (1) in rear cover (2).

WARNING

Do not attempt to lift the UPS without mechanical lifting device. The UPS weighs 208 lbs and requires a mechanical lifting device. Failure to observe this warning may result in personal injury.

h. Remove UPS.

4.6.1.2 Installation.

WARNING

Do not attempt to lift the UPS without mechanical lifting device. The UPS weighs 208 lbs and requires a mechanical lifting device. Failure to observe this warning may result in personal injury.

a. Position new UPS in place.

b. Connect power cable to back of UPS. Make sure voltage input selection is correct.

c. Remove six screws (1) from front cover (2) and six screws (1) from rear cover (2).

d. Remove front cover (2) and rear cover (2).

WARNING

- **Do not lift batteries alone. Each battery weighs 77 lbs and requires two personnel to lift battery.**
- **Do not touch batteries or allow terminals to come in contact with metal surface. Each battery has a high current potential that can be fatal. Always work with another person nearby who is familiar with hazards of electrical equipment and is competent in administering first aid.**
- **Failure to observe these warnings could result in personal injury or death and equipment damage.**

e. Refer to the connection diagram and position battery number 1 on shelf.

f. Connect battery positive terminal then negative terminal as follows:

(1) Install bolt (8), flat washer (7), red lead (9), flat washer (6), lock washer (5), and nut (4).

(2) Remove tags.

(3) Refer to the connection diagram to connect and install remaining batteries. Always connect from positive to negative according to connection diagram.

g. Connect battery input quick disconnect connector.

h. Install front and rear covers (2) using six screws (1) for each cover (2).

4.6.1.2 Installation (continued).

i. Set power input breaker from facility to ON position and remove tag.

j. Refer to TM 5-6350-280-10 and power on UPS. Check that output of UPS is 120 Vac.

k. Plug in CMA and computer power cables. Connect UPS cable assembly to AC INPUT FAIL ALARM.

l. Refer to TM 5-6350-280-10 and power on equipment.

4.6.2 Converter Multiplexer Assembly (CMA) Maintenance.

This task covers: a. Removal
b. Installation
c. Repair

INITIAL SETUP

Tools

Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)

Equipment Conditions

Equipment shutdown (TM 5-6350-280-10)

Materials/Parts

CMA (Appendix C, figure 3)
Multiple Outlet Strip (Appendix C, figure 3, item 15)

General Safety Instructions

Do not work on equipment without following standard shop safety precautions.

4.6.2.1 Removal.

WARNING

Do not remove CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Using key, unlock and open rear access door (1) of CMA.

b. Unplug CMA power cable.

c. Tag and disconnect UPS Cable (2) from I/O Card (3) J1.

d. Remove UPS Cable (2) from CMA.

e. Tag and disconnect RS-485 Cable Assembly (4) from I/O Card (3) J2.

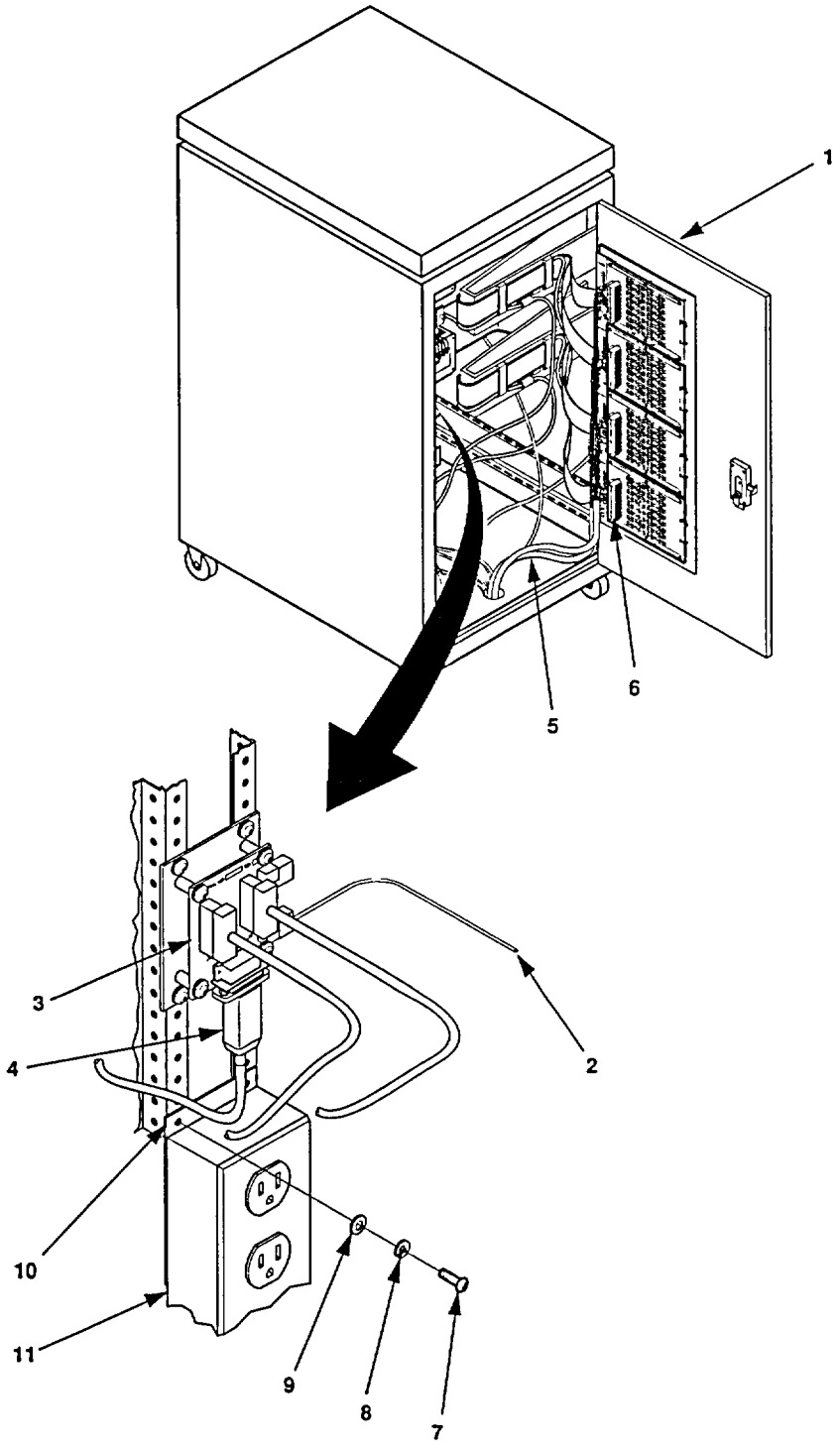
f. Remove RS-485 Cable Assembly (4) from CMA.

g. Tag and disconnect twisted pairs (5) from Surge Suppressor CCA terminal boards (6).

h. Remove twisted pairs (5) from CMA.

i. Close and lock rear access door (1).

j. Remove CMA.


1
2
3
4
5
6
7
8
9
10
11

4.6.2.2 Installation.

WARNING

Do not install CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Using key, unlock and open rear access door (1).
b. Route twisted pairs (5) through access hole into CMA.
c. Connect twisted pairs (5) to Surge Suppressor CCA terminal board (6) and remove tags.
d. Route RS-485 Cable Assembly (4) through access into CMA and connect RS-485 Cable Assembly (4) to I/O Card (3) J2. Remove tags.
e. Route UPS Cable (2) through access into CMA and connect UPS Cable (2) to I/O Card (3) J1. Remove tags.
f. Plug CMA power cable into receptacle.
g. Close and lock rear access door (1).
h. Refer to TM 5-6350-280-10 and power on equipment.

4.6.2.3 Repair.

a. Unlock and open the rear access door (1) of the CMA.
b. Remove four screws (7), lock washers (8), and flat washers (9) securing multiple outlet strip mounting plate (10) to left rear side of CMA.
c. Remove two nuts, lock washers, and one multiple outlet strip (11).
d. Install two nuts, lock washers, and one new multiple outlet strip (11) on multiple outlet strip mounting plate (10).
e. Install four screws (7), lock washers (8), and flat washers (9) to secure multiple outlet strip mounting plate (10).

4.6.3 Drawer Assembly Maintenance.

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools

Electronic System Maintenance Tool Kit
(Appendix B, Section III, item 1)

Equipment Conditions

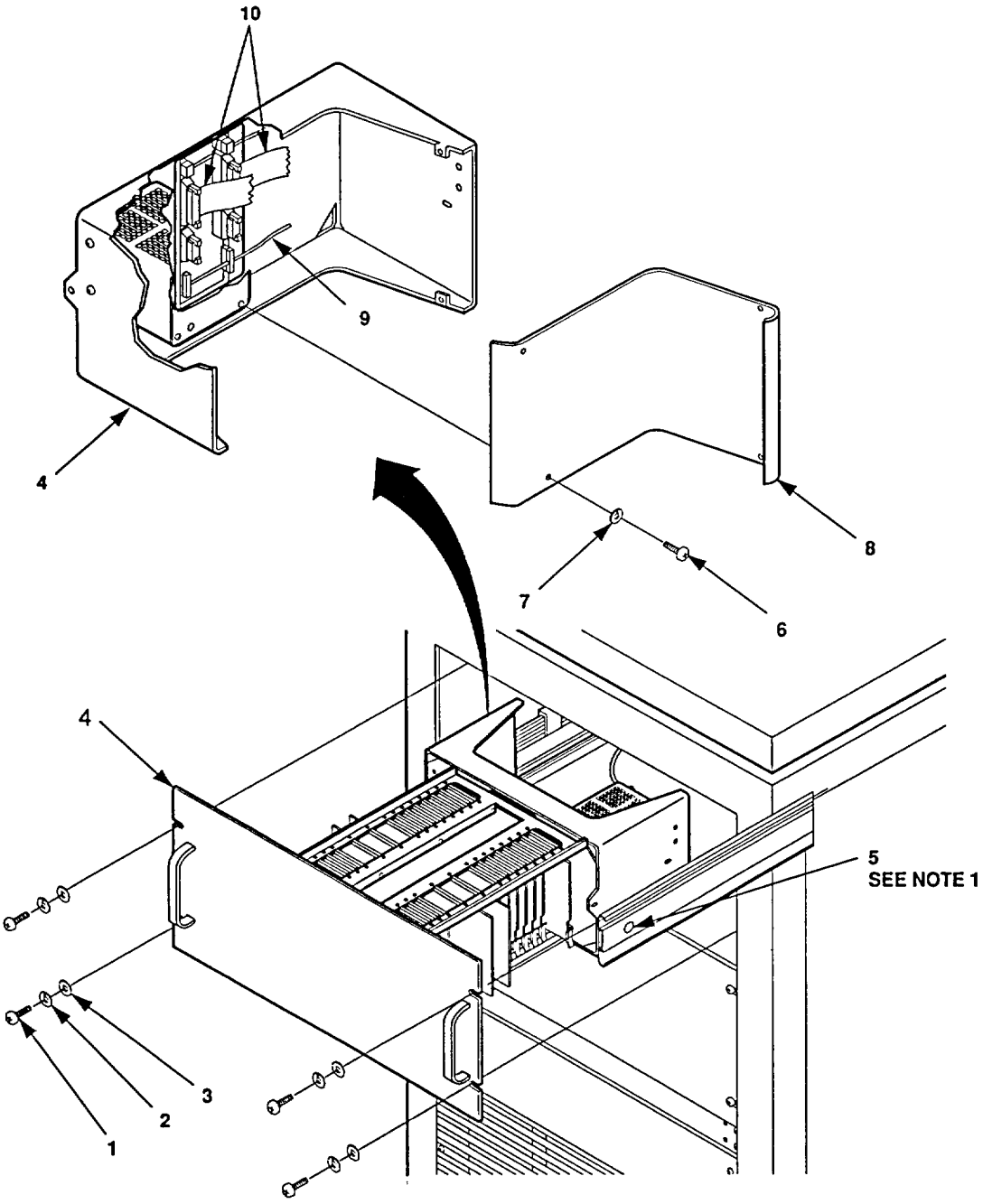
Equipment shutdown (TM 5-6350-280-10)

Materials/Parts

Drawer Assembly (Appendix C, figure 4)

General Safety Instructions

Do not work on equipment without following standard shop safety precautions.



NOTE 1. THERE ARE TWO DETENTS ONE ON EACH SIDE

4.6.3.1 Removal.

WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Remove four screws (1), lock washers (2), and washers (3) from drawer assembly (4).

b. Pull drawer assembly (4) outward until catches (5) engage.

c. Unlock and open rear door.

d. Tag and disconnect power cord from DC power supply.

e. Remove four screws (6) and lock washers (7) from EMI shield (8) on drawer assembly.

f. Remove EMI shield (8).

g. Tag and disconnect RX-TX cable assembly (9) from backplanes.

h. Tag and disconnect two Area Input cable assemblies (10) from backplanes.

i. Release catches (5) and pull outward on drawer assembly until clear of slides.

4.6.3.2 Installation.

WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Align drawer assembly (4) with slides.

b. Push on drawer assembly (4) keeping slides aligned until catches (5) engage.

c. Connect RX-TX cable assembly (9) to backplanes and remove tags.

d. Connect two Area Input cable assemblies (10) to backplanes and remove tags.

e. Install four lock washers (7) and screws (6) to secure EMI shield (8) on drawer assembly.

f. Connect power cord assembly on the DC power supply and remove tags.

g. Release catches and slide drawer assembly (4) inward until flush with cabinet assembly.

h. Install four flat washers (3), lock washers (2), and screws (1).

i. Refer to TM 5-6350-280-10 and power on equipment.

4.6.4 Power Cord Assembly Maintenance.

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools
Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)

Material/Parts
Power Cord Assembly (Appendix C, figure 5, item 3)

Equipment Conditions
Equipment shutdown (TM 5-6350-280-10)
Drawer Assembly open and EMI shield removed paragraph 4.6.3

General Safety Instructions
Do not work on equipment without following standard shop safety precautions.

4.6.4.1 Removal.

WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Unlock and open rear access door.
b. Unplug power cord assembly from multiple outlet strip.
c. Tag and disconnect power cord assembly from DC power supply in CMA.
d. Remove power cord assembly.

4.6.4.2 Installation.

a. Connect power cord assembly to DC power supply in CMA and remove tags.

b. Plug power cord assembly into multiple outlet strip and remove tags.

c. Close and lock rear access door.

d. Install EMI shield and close drawer assembly, paragraph 4.6.3. Refer to TM 5-280-6350-10 and power on equipment.

4.6.5 RX-TX Cable Assembly Maintenance.

This task covers: a. Removal b. Installation

INITIAL SETUP

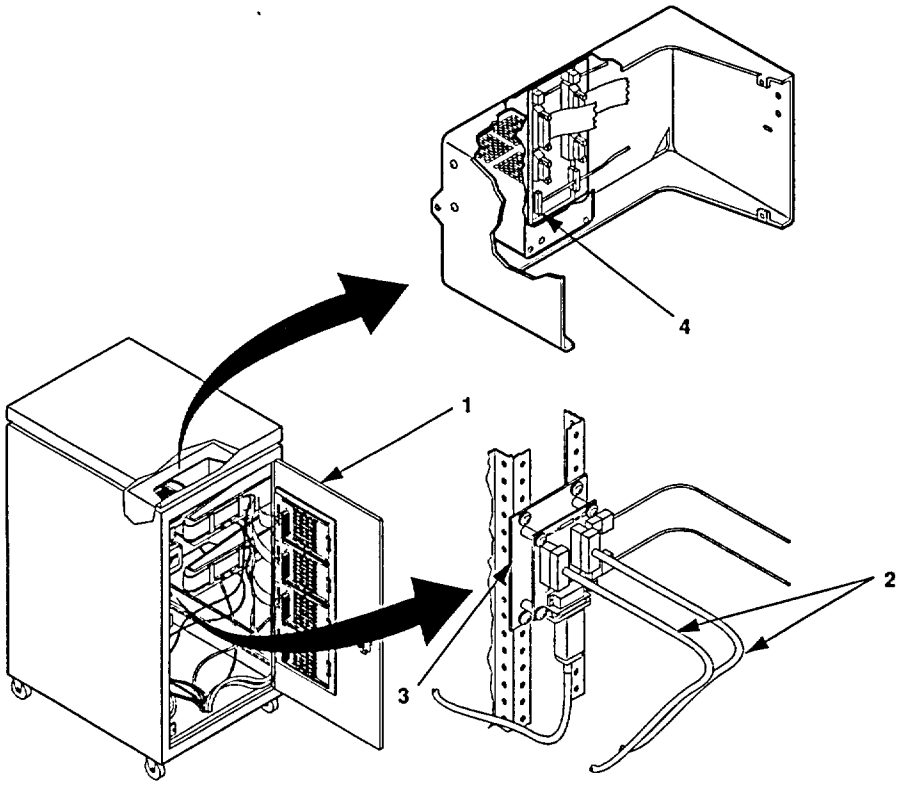
Tools
Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)

Material/Parts
RX-TX Cable Assembly (Appendix C, figure 5, item 4)

Equipment Conditions
Equipment shutdown (TM 5-6350-280-10)
Drawer Assembly open and EMI shield removed paragraph 4.6.3

General Safety Instructions
Do not work on equipment without following standard shop safety precautions.

4.6.5.1 Removal.



WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Unlock and open rear access door (1).

b. Tag and disconnect RX-TX cable assembly (2) from I/O Card (3).

c. Tag and disconnect RX-TX cable assembly (4) from backplanes.

d. Remove RX-TX cable assembly.

4.6.5.2 Installation.

a. Connect RX-TX cable assembly (4) to backplanes and remove tags.

b. Connect RX-TX cable assembly to I/O Card (3) and remove tags.

c. Close and lock rear access door (1).

d. Install EMI shield and close drawer assembly, paragraph 4.6.3. Refer to TM 5-6350-280-10 and power on equipment.

4.6.6 Area Input Cable Assembly maintenance

This task covers: a. Removal b. Installation

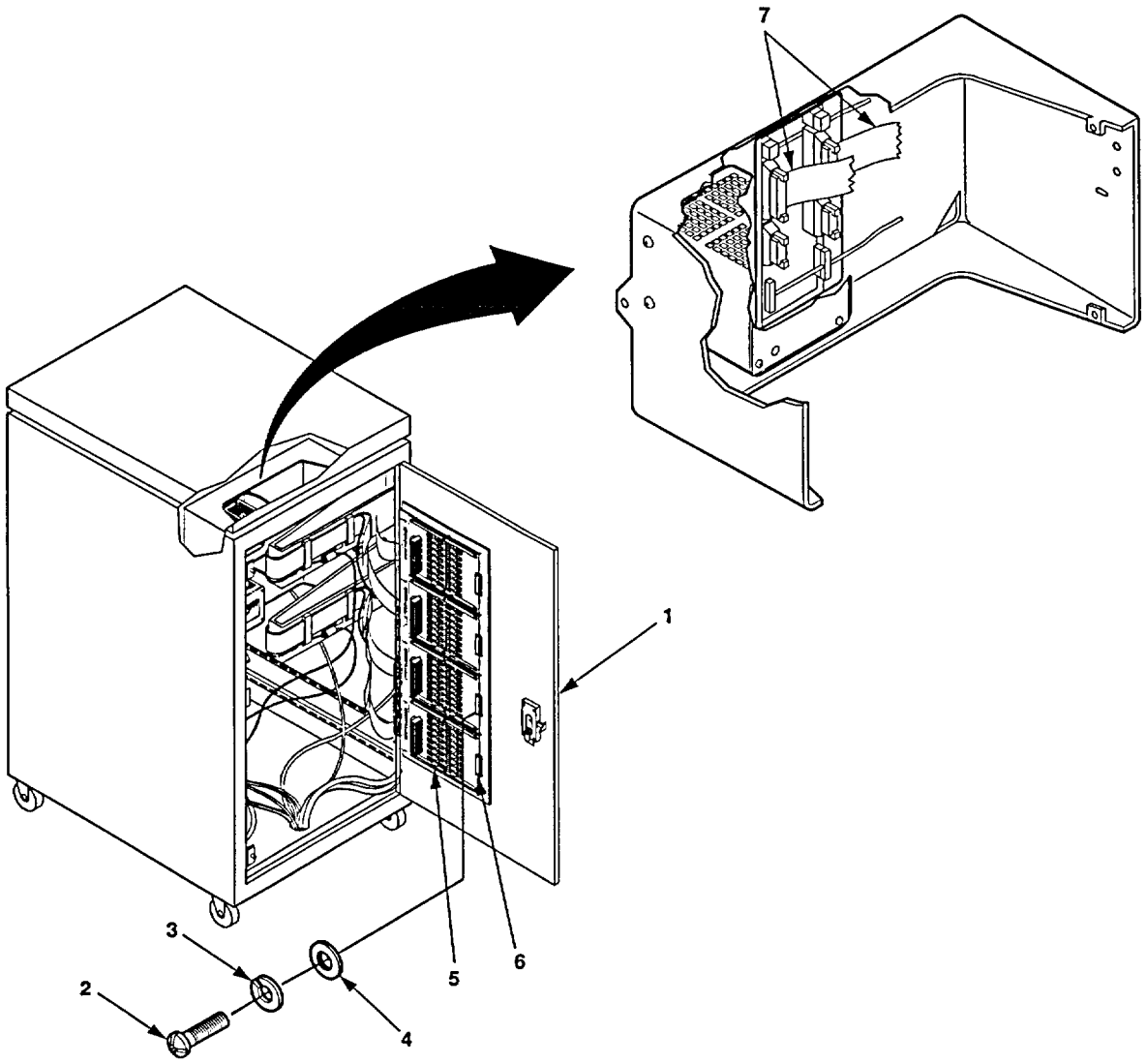
INITIAL SETUP

Tools
Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)

Material/Parts
Area Input cable assembly (Appendix C, figure 5, item 1)

Equipment Conditions
Equipment shutdown (TM 5-6350-280-10)
Drawer Assembly open and EMI shield removed paragraph 4.6.3

General Safety Instructions
Do not work on equipment without following standard shop safety precautions.



4.6.6.1 Removal.

WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Unlock and open rear access door (1).

b. Remove six screws (2), flat washers (4), and lock washers (3).

c. Tag and disconnect Area Input cable assembly (6) from Surge Suppressor CCA (5).

d. Tag and disconnect Area Input cable assembly (6) from backplanes.

e. Remove Area Input cable assembly (6).

4.6.6.2 Installation.

a. Connect Area Input cable assembly (6) to backplanes and remove tags.

b. Connect Area input cable assembly (6) to Surge Suppressor CCA (5) and remove tags.

c. Install Surge Suppressor CCA with six screws (2), flat washers (4), and lock washers (3).

d. Close and lock rear access door (1).

e. Install EMI shield and close drawer assembly, paragraph 4.6.3. Refer to TM 5-6350-280-10 and power on equipment.

4.6.7 Data Receiver CCA Maintenance

This task covers: a. Removal b. Installation

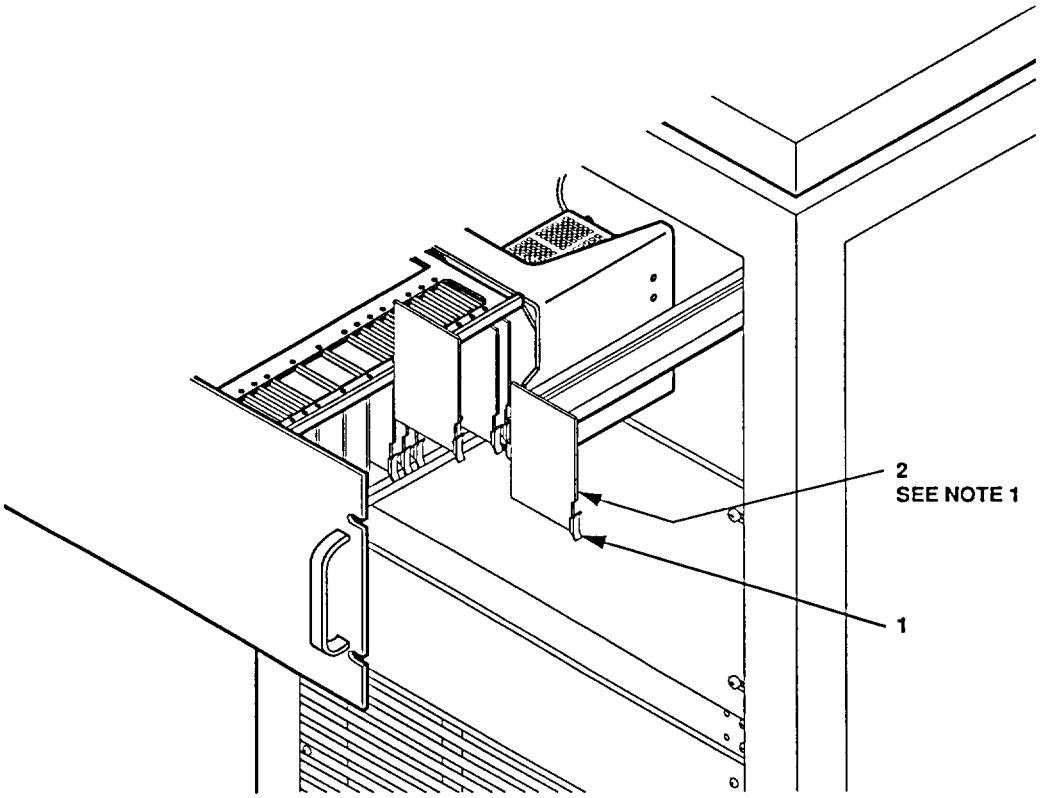
INITIAL SETUP

Tools
Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)

Material/Parts
Data Receiver CCA, (Appendix C, figure 4, item 1)

Equipment Conditions
Equipment shutdown (TM 5-6350-280-10)
Drawer Assembly open (paragraph 4.6.3)

General Safety Instructions
Do not work on equipment without following standard shop safety precautions.



NOTE 1. THERE ARE 32 A4 CCAs 16 ON EACH SIDE

4.6.7.1 Removal.

WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Pull down on lever (1) to release Data Receiver CCA (2) from socket.

b. Remove Data Receiver CCA (2).

4.6.7.2 Installation.

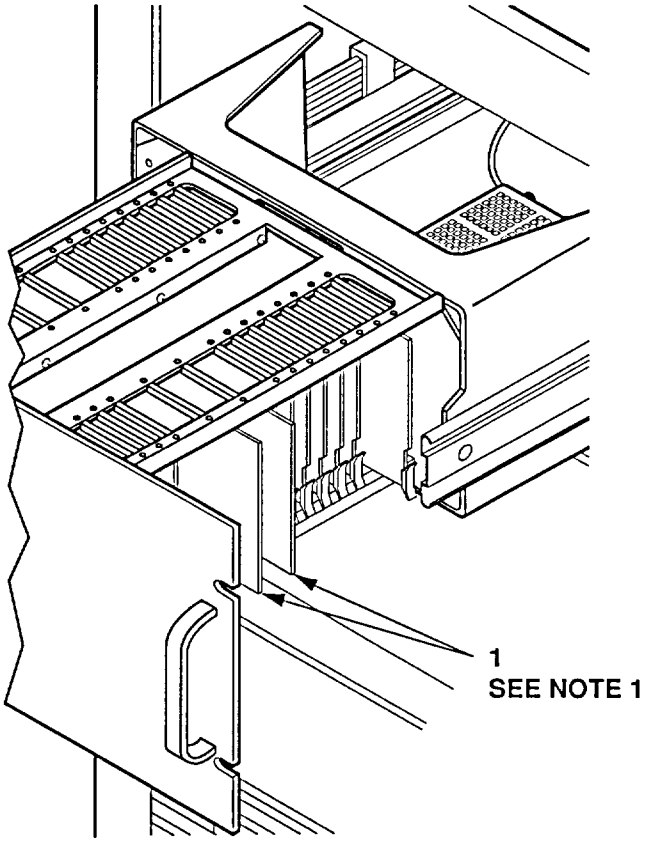
a. Align Data Receiver CCA (2) with guides and insert into drawer assembly.

b. Push inward on Data Receiver CCA (2) until seated in socket.

c. Close drawer assembly, paragraph 4.6.3. Refer to TM 5-6350-280-10 and power on equipment.

4.6.8 Central Processing Unit (CPU) Card Maintenance.

4.6.8 Central Processing Unit (CPU) Card Maintenance	
This task covers: a. Removal	b. Installation
INITIAL SETUP	
Tools Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)	Material/Parts CPU CCA (Appendix C, figure 4, item 2)
Equipment Conditions Equipment shutdown (TM 5-6350-280-10) Drawer Assembly open paragraph 4.6.3	General Safety Instructions Do not work on equipment without following standard shop safety precautions.



NOTE 1. THERE ARE FOUR CPU CCAs TWO ON EACH SIDE

4.6.8.1 Removal.

WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Connect a wrist ground strap between your wrist and ground.

CAUTION

Do not remove CPU CCA without a wrist ground strap and being grounded. The CPU CCA is ESD sensitive and damage to the CCA could result. Failure to obey this caution could result in equipment damage.

b. Free CPU CCA (1) from socket by rocking slightly back and forth.

c. Remove CPU CCA (1) and wrist ground strap.

4.6.8.2 Installation.

a. Connect a wrist ground strap between your wrist and ground.
b. Align CCA (1) with guides and insert into drawer assembly.
c. Push inward on CPU CCA (1) until seated in socket.
d. Remove wrist ground strap.
e. Close drawer assembly, paragraph 4.6.3. Refer to TM 5-6350-280-10 and power on equipment.

4.6.9 Backplane Maintenance

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools
Electronic System Maintenance Tool Kit (Appendix B, Section III, item, 1)

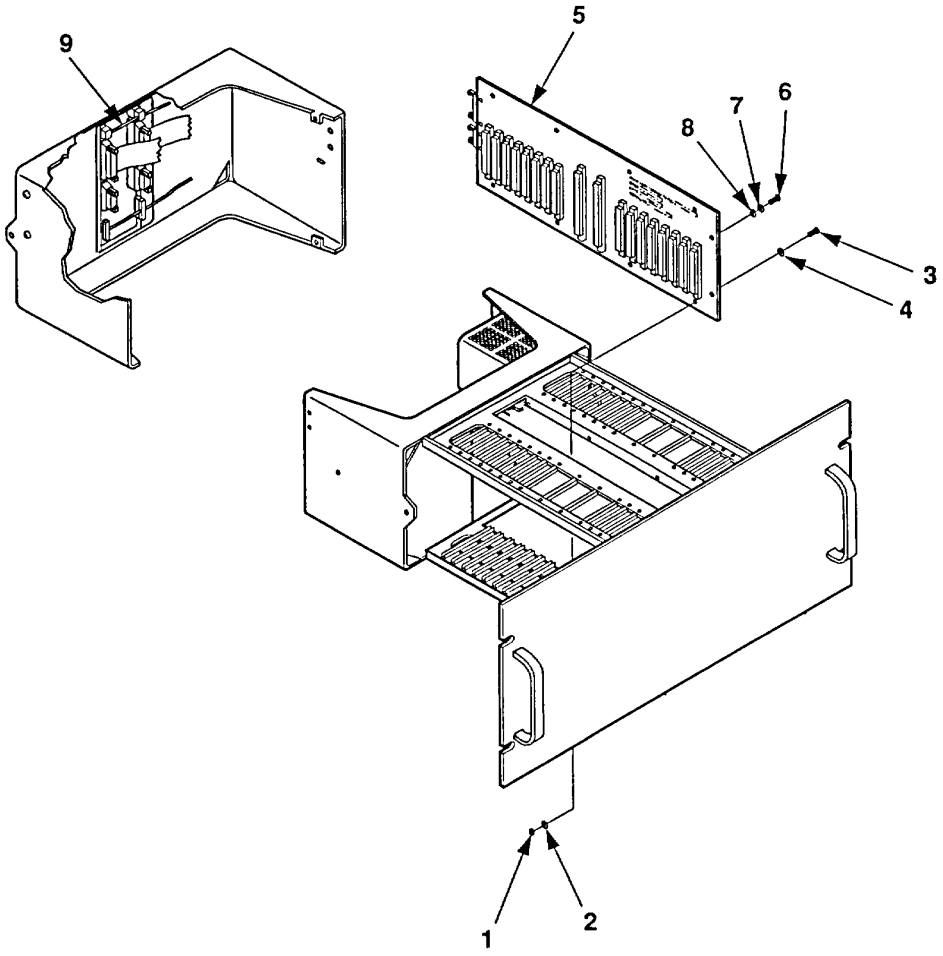
Equipment Conditions
Equipment shutdown (TM 5-6350-280-10)
Drawer assembly open and EMI shield removed (paragraph 4.6.3)
Power Cord Assembly disconnected (paragraph 4.6.4)
RX-TX Cable Assembly disconnected (paragraph 4.6.5)
Area Input Cable Assembly disconnected (paragraph 4.6.6)
All Data Receiver CCAs removed (paragraph 4.6.7)
All CPU CCAs removed (paragraph 4.6.8)

Material/Parts
Right hand Backplane (Appendix C, figure 4, item 12)
Left hand Backplane (Appendix C, figure 4, item 13)

General Safety Instructions

Do not work on equipment without following standard shop safety precautions.

4.6.9.1 Removal.



WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Remove Power Cable (9), ten nuts (1), lock washers (2), screws (3), and flat washers (4) that secure backplane (5) to drawer assembly.

b. Remove backplane (5) from the drawer assembly.

4.6.9.2 Installation.

a. Align mounting holes of new backplane with mounting holes of drawer assembly.

b. Install ten flat washers (4), screws (3), lock washers (2), nuts (1), and Power Cable (9).

c. Assemble the following:

(1) Connect Power Cord Assembly paragraph 4.6.4.

(2) Connect RX-TX Cable Assembly paragraph 4.6.5.

(3) Connect Area Input Cable Assembly paragraph 4.6.6.

(4) Install Data Receiver CCAs paragraph 4.6.7.

(5) Install CPU CCAs paragraph 4.6.8.

(6) Install EMI shield and close drawer assembly, paragraph 4.6.3.

d. Refer to TM 5-6350-280-10 and power on equipment.

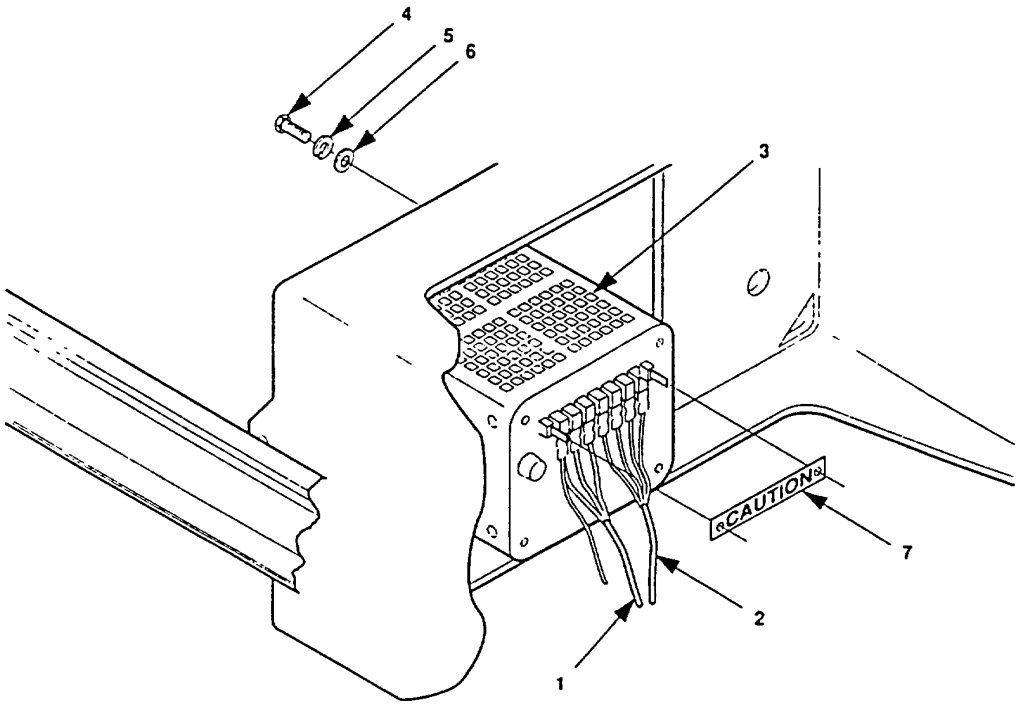
4.6.10 DC Power Supply Maintenance.

4.6.10 DC Power Supply Maintenance	
This task covers: a. Removal	b. Installation

INITIAL SETUP

Tools	Material/Parts
Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)	DC Power Supply (Appendix C, figure 4, item 6)
Equipment Conditions	**General Safety Instructions**
Equipment shutdown (TM 5-6350-280-10) Drawer assembly open (paragraph 4.6.3) Data Receiver CCAs removed (paragraph 4.6.7) CPU Card removed (paragraph 4.6.8)	Do not work on equipment without following standard shop safety precautions.

4.6.10.1 Removal.



4.6.10.1 Removal.

WARNING

- **High Voltage is used in the operation of this equipment. Serious injury or death may result if personnel fail to observe safety precautions. Remove all jewelry from fingers, wrists, and neck before working on live electrical components.**

- **Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic components and is competent in administering first aid. Failure to obey this warning could result in death or injury.**

a. Remove protective cover (7).

b. Tag and disconnect wires (2) from power supply (3).

NOTE

Only remove data receiver A4 and CPU cards that prevent accessing power supply assembly mounting screws.

c. Remove four screws (4), lock washers (5), and flat washers (6) that secure DC Power Supply (3) to drawer assembly.

d. Remove Power Supply (3) from drawer assembly.

4.6.10.2 Installation.

a. Remove four screws from back of new power supply.

b. Align holes where four screws were removed with mounting holes of drawer assembly ensuring back plate of power supply is in correct position.

c. Install four flat washers (6), lock washers (5), and screws (4).

d. Connect wires (2) to power supply (3) and remove tags.

e. Install four all CPU CCAs removed paragraph 4.6.8.

f. Install all Data Receiver CCAs removed paragraph 4.6.7.

g. Close drawer assembly, paragraph 4.6.3.

h. Refer to TM 5-6350-280-10 and power on equipment.

4.6.11 Surge Suppressor CCA Maintenance.

This task covers: a. Removal b. Installation

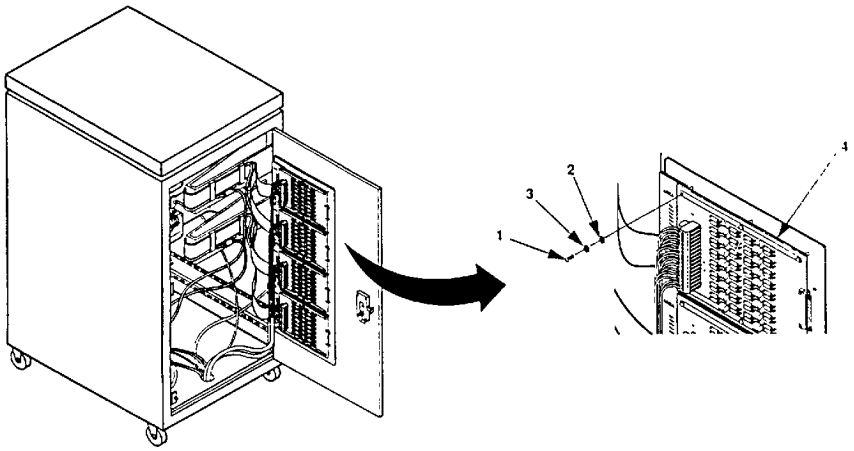
INITIAL SETUP

Tools
Electronic System Maintenance Tool Kit
(Appendix B, Section III, item 1)

Material/Parts
Surge Suppressor (Appendix C, figure 3, item 10.

Equipment Conditions
Equipment shutdown (TM 5-6350-280-10)
Area Input Cable disconnected from surge suppressor, paragraph 4.6.6.
Twisted pairs disconnected, paragraph 4.6.2.

General Safety Instructions
Do not work on equipment without following standard shop safety precautions.



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4.6.11.1 Removal.

WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Remove six screws (1), flat washers (2), and lock washers (3).

b. Remove Surge Suppressor CCA (4).

4.6.11.2 Installation.

a. Align mounting holes on Surge Suppressor CCA (4) with mounting holes on door.

b. Install six lock washers (3), flat washers (2), and screws (1).

c. Install twisted pairs, paragraph 4.6.2 and Area Input Cable Assembly to surge suppressor CCA, paragraph 4.6.6.

4.6.12 Input/Output CCA Maintenance

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools
Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)

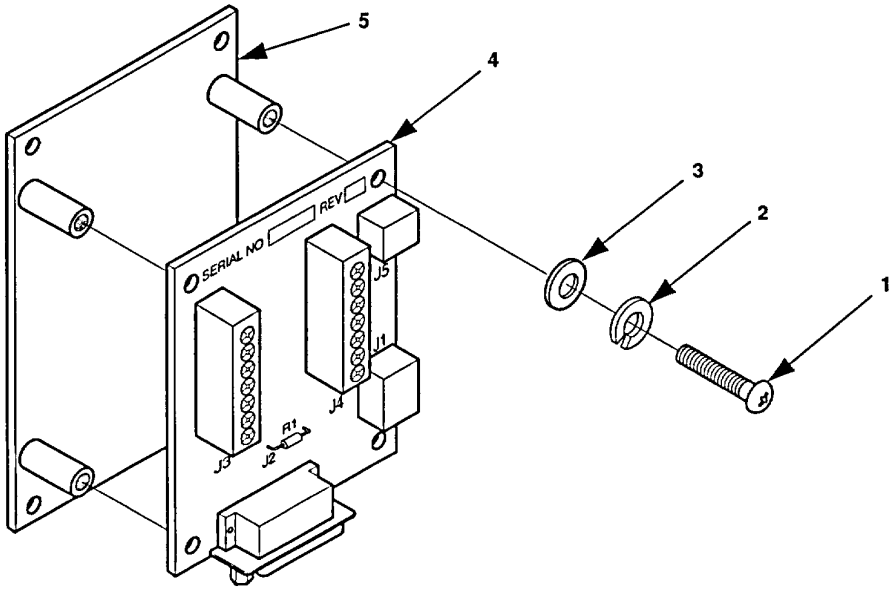
Material/Parts
Input/Output CCA (Appendix C, figure 3, item 11)

Equipment Conditions

Equipment shutdown (TM 5-6350-280-10)
Rear access door open

General Safety Instructions

Do not work on equipment without following standard shop safety precautions.



WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

4.6.12.1 Removal.

a. Tag and disconnect all cables.

b. Remove four screws (1), lock washers (2), and flat washers (3).

c. Remove I/O card (4) from mounting bracket (5).

4.6.12.2 Installation.

a. Position I/O card (4) on mounting bracket (5) and align mounting holes.

b. Install four flat washers (3), lock washers (2), and screws (1).

c. Connect all cables and remove tags.

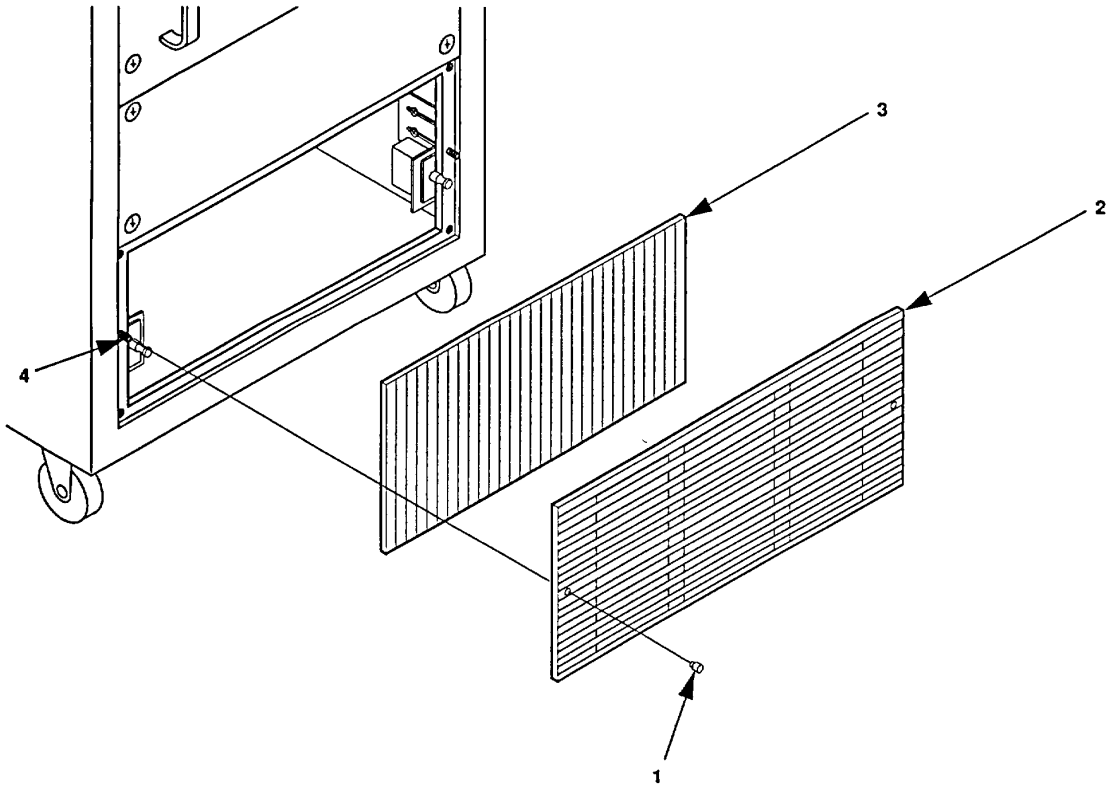
d. Close rear access door. Refer to TM 9-6350-280-10 and power on equipment.

4.6.13 Filter Assembly Maintenance.

4.6.13 Filter Assembly Maintenance.	
This task covers: a. Removal	b. Installation

INITIAL SETUP

Tools	Material/Parts
Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)	Filter, (Appendix C, figure 3, item 14)
Equipment Conditions	**General Safety Instructions**
Equipment shutdown (TM 5-6350-280-10)	Do not work on equipment without following standard shop safety precautions.



4.6.13.1 Removal.

a. Loosen two screws (1).

b. Remove vent grill (2).

c. Remove filter (3).

4.6.13.2 Installation.

a. Install filter (3) into retainer.

b. Align vent grill (2) and screws (1) with studs (4).

c. Tighten two screws (1).

4.6.14 Communications CCA Maintenance.

This task covers: a. Removal b. Installation

INITIAL SETUP

Tools
Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)

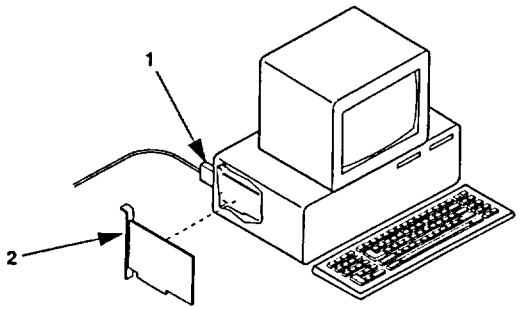
Material/Parts
Communications CCA (Appendix C, figure 1, item 5)

Equipment Conditions

Equipment shutdown (TM 5-6350-280-10)

General Safety Instructions

Do not work on equipment without following standard shop safety precautions.



4.6.14.1 Removal.

WARNING

Do not remove Communications CCA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Connect a wrist ground strap between your wrist and ground.

4.6.14.1 Removal (continued).

CAUTION

Do not remove Communications CCA without a wrist ground strap and being grounded. The Communications CCA is ESD sensitive and damage to the CCA could result. Failure to obey this caution could result in equipment damage.

b. Remove RS-485 cable assembly (1) from upper jack of communications CCA.

c. Refer to commercial manuals and remove retaining hardware from IBM-PC/AT compatible computer cover.

d. Remove cover.

e. Remove retaining screw that secures Communications CCA (CCA).

f. Remove Communications CCA (2) from expansion slot.

4.6.14.2 Installation.

a. Connect a wrist ground strap between your wrist and ground.

b. Insert Communications CCA (2) into expansion slot until it is seated.

c. Install retaining screw to secure Communications CCA (2) in slot.

d. Refer to commercial manual to install cover and retaining hardware on computer cover.

e. Install RS-485 cable assemble (1) to upper jack of communications CCA (2). Refer to TM 5-6350-280-10 and power equipment.

4.6.15 RS-485 Cable Assembly Maintenance.

This task covers: a. Removal b. Installation
b. Repair

INITIAL SETUP

Tools
Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)

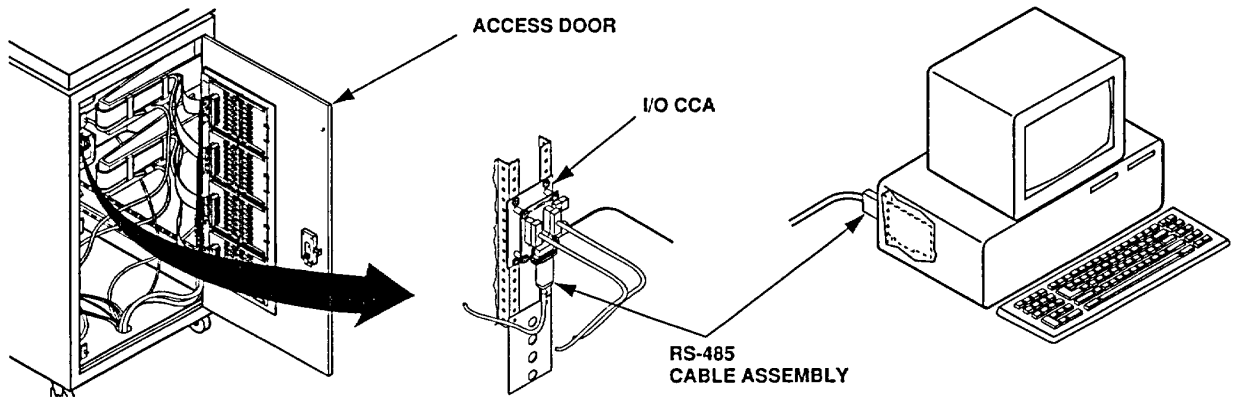
Material/Parts
RS-485 Cable Assembly (Appendix C, figure 1, item 6)

Equipment Conditions

Equipment shutdown (TM 5-6350-280-10)

General Safety Instructions

Do not work on equipment without following standard shop safety precautions.



4.6.15.1 Removal.

WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Unlock and open rear access door of CMA.

b. Tag and disconnect RS-485 cable assembly from I/O Card.

c. Remove RS-485 cable from CMA.

d. Tag and disconnect RS-485 cable assembly from Communications CCA installed in computer upper jack.

e. Remove RS-485 cable assembly.

4.6.15.2 Repair.

Repair in accordance to Appendix D, figure 1.

4.6.15.3 Installation.

a. Route RS-485 cable assembly between CMA and personal computer.

b. Connect RS-485 cable assembly without the ground to Communications CCA upper jack and remove tag.

c. Route the other end of the RS-485 cable assembly through access in CMA.

d. Connect RS-485 cable assembly to I/O CCA and remove tags.

e. Close and lock rear access door.

f. Refer to TM 5-6350-280-10 and power on equipment.

4.6.16 UPS Cable Assembly Maintenance

This task covers: a. Removal
b. Repair
b. Installation

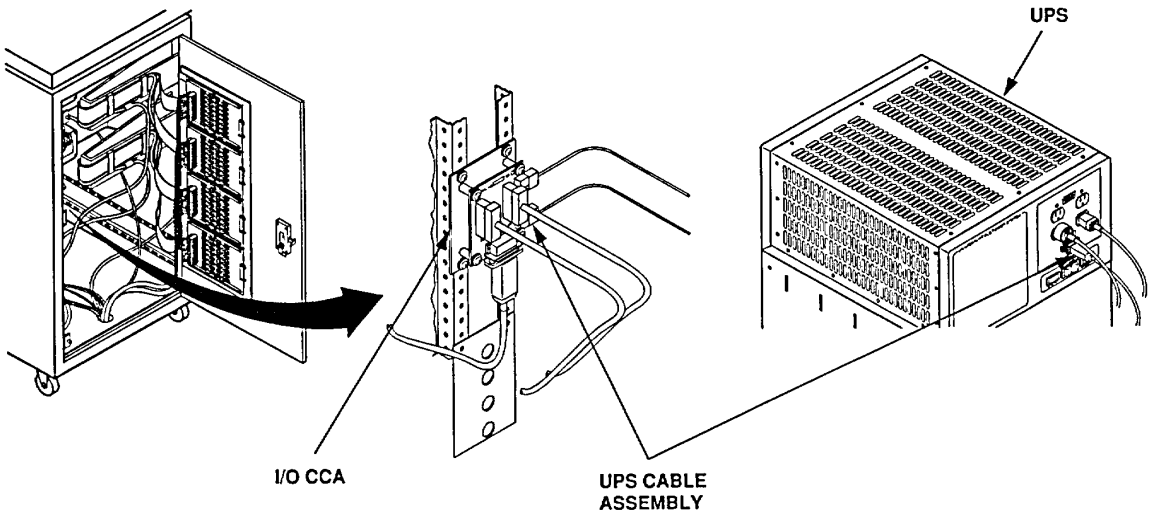
INITIAL SETUP

Tools
Electronic System Maintenance Tool Kit (Appendix B, Section III, item 1)

Material/Parts
UPS Cable Assembly (Appendix C, figure 1, item 7)

Equipment Conditions
Equipment shutdown (TM 5-6350-280-10)

General Safety Instructions
Do not work on equipment without following standard shop safety precautions.



4.6.16.1 Removal.

WARNING

Do not work on CMA with 120 Vac power on. Always work with another person nearby who is familiar with hazards of electronic equipment and is competent in administering first aid. Failure to obey this warning could result in death or injury.

a. Unlock and open rear access door.

b. Tag and disconnect UPS cable assembly from I/O Card.

c. Remove UPS cable from CMA.

d. Tag and disconnect UPS cable assembly from UPS AC FAIL ALARM connector of UPS.

e. Remove UPS cable assembly.

4.6.16.2 Repair.

Repair in accordance to Appendix D, figure 2.

4.6.16.3 Installation.

a. Route UPS cable assembly between CMA and UPS.

b. Connect UPS cable assembly to UPS AC FAIL ALARM connector of UPS.

c. Route UPS cable assembly through access in CMA.

d. Connect UPS cable assembly to J1 of I/O Card and remove tags.

e. Close and lock rear access door.

f. Refer to TM 5-6350-280-10 and power on equipment.

APPENDIX A

REFERENCES

A-1 SCOPE.

Appendix A list publications that are related to the equipment. Since publications are updated the military publication indexes listed in this paragraph should be consulted frequently for latest changes or revisions of references given relating to material covered in this publication.

Military Publication Indexes.

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

A-2 FORMS.

Refer to DA PAM 738-750, the Army Maintenance Management System (TAMMS), for instructions on the use of maintenance forms pertaining to the equipment.

Recommended Changes to Publications and Blank Forms ..... DA Form 2028
Recommended Changes to Equipment Technical Publications ..... DA Form 2028-2
Product Quality Deficiency Report ..... SF 368

A-3 TECHNICAL MANUAL.

The following technical manuals contain information pertinent to the equipment.

Installation, Operation and Checkout Procedures ..... TM 5-6350-264-14-1
Transceiver, Ultrasonic Signal and Processor,
Ultrasonic Motion Detector. ..... TM 5-6350-264-14&P-2
Receiver Passive Signal, Ultrasonic and Processor,
Passive Signal, Ultrasonic ..... TM 5-6350-264-14&P-3
Detector, Vibration Signal and Processor,
Vibration Signal ..... TM 5-6350-264-14&P-4
Switch Balanced Magnetic ..... TM 5-6350-264-14&P-5
Sensor, Grid Wire. ..... TM 5-6350-264-14&P-6
Sensor, Capacity Proximity ..... TM 5-6350-264-14&P-7
Switch, Alarm Latching ..... TM 5-6350-264-14&P-8
Alarm, Audible ..... TM 5-6350-264-14&P-9
Control Unit, Alarm Set ..... TM 5-6350-264-14&P-10
Cabinet, Monitor, Type A, Type B, Type C and Monitor
Module, Status Monitor ..... TM 5-6350-264-14&P-11
Receiver, Data and Transmitter, Data ..... TM 5-6350-264-14&P-12
Sensor, Magnetic Weapons (DT-547) ..... TM 5-6350-264-14&P-13
Selection and Application of Joint Services Interior
Intrusion Detection System ..... TB 5-6350-264
Operator Maintenance for Alarm-Monitor
Group (AMG) OA-9431/FSS-9(V) ..... TM 5-6350-280-10
Procedures for Destruction of Equipment to
Prevent Enemy Use (Mobility Equipment Command) ..... TM 750-244-3

A-4 ARMY REGULATIONS.

The following Army Regulations contain information pertinent to the equipment.

Dictionary of United States Army Terms AR-310-25

A-5 MILITARY STANDARDS.

The following Military Standards contain information pertinent to the equipment.

Abbreviations for Use On Drawings and in Specifications, Standards and Technical Documents.....MIL-STD-12

APPENDIX B
MAINTENANCE ALLOCATION CHART (MAC)

SECTION I
INTRODUCTION

B-1 THE ARMY MAINTENANCE SYSTEM MAC.

B-1.1 Introduction. This introduction (Section I) provides a general explanation of all levels of maintenance and repair functions authorized at various maintenance levels under the standard Army Maintenance System concept.

B-1.2 Maintenance Allocation Chart Section II. The Maintenance Allocation Chart (MAC) in section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance levels, which are shown on I the MAC in column (4) as:

Unit - includes two subcolumns, C (operator/crew) and O (unit) maintenance

Direct support - includes an F subcolumn

General support - includes an H subcolumn

Depot - includes a D subcolumn

B-1.3 Tools and Test Equipment Introduction. Section III lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from section II.

B-1.4 Supplemental Instructions Introduction. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-2 MAINTENANCE FUNCTIONS.

Maintenance functions are limited to and defined as follows:

B-2.1 Inspect. To determine the serviceability of an item by comparing its physical, mechanical, and/or electrical characteristics with established standards through examination (e.g., by sight, sound, or feel).

B-2.2 Test. To verify serviceability by measuring the mechanical, pneumatic, hydraulic, or electrical characteristics of an item and comparing those characteristics with prescribed standards.

B-2.3 Service. Operations required periodically to keep an item in proper operating condition, i.e., to clean (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

B-2.4 Adjust. To maintain or regulate, within prescribed limits, by bringing into proper or exact position, or by setting the operating characteristics to specified parameters.

B-2.5 Align. To adjust specified variable elements of an item to bring about optimum or desired performance.

B-2.6 Calibrate. To determine and cause corrections to be made or to be adjusted on instruments or test, measuring, and diagnostic equipment 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.

B-2.7 Remove/Install. To remove and install the same item when required to perform service or other maintenance functions. Install may be the act of emplacing, seating, or fixing into position a spare, repair part, or module (component or assembly) in a manner to allow the proper functioning of an equipment or system.

B-2.8 Replace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and assigned maintenance level is shown as the 3d position code of the SMR code.

B-2.9 Repair. The application of maintenance services[1], including fault location/troubleshooting [2], removal/installation, and disassembly/assembly [3] procedures, and maintenance actions[4] to identify troubles and 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.

B-2.10 Overhaul. That maintenance effort (service/action) prescribed to restore an item to a completely serviceable/operational condition as required by maintenance standards in appropriate technical publication (i.e., DMWR). Overhaul is normally the highest degree of maintenance performed by the Army. Overhaul does not normally return an item to like new condition.

B-2.11 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 measurement (e.g., hour/miles) considered in classifying Army equipment/components.

B-3 EXPLANATION OF COLUMNS IN THE MAC, SECTION II.

B-3.1 Column 1, Group Number. Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly.

B-3.2 Column 2, Component/Assembly. Column 2 contains the item names of components, assemblies, subassemblies, and modules for which maintenance is authorized.

B-3.3 Column 3, Maintenance Function. Column 3 lists the functions to be performed on the item listed in Column 2. (For detailed explanation of these functions, see paragraph B-2.)

B-3.4 Column 4, Maintenance Level. Column 4 specifies each level of maintenance authorized to perform each function listed in Column 3, by indicating work-time required (expressed as man-hours in whole hours or decimals) in the appropriate subcolumn. This work-time 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

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[1]Services - inspect, test, service, adjust, align, calibrate, and/or replace.

[2]Fault location/troubleshooting - The process of investigating and detecting the cause of equipment malfunctioning; the act of isolating a fault within a system or unit under test (UUT).

[3]Disassembly/assembly - The step-by-step breakdown (taking apart) of a spare/functional group coded item to the level of its least component that is assigned an SMR code for the level of maintenance under consideration (i.e., identified as maintenance significant).

[4]Actions - welding, grinding, riveting, straightening, facing, machining, and/or resurfacing.

maintenance levels, appropriate work-time figures are to be shown for each level. 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 (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. The symbol designations for the various maintenance levels are as follows:

C .....Operator or crew maintenance
O .....Unit maintenance
F.....Direct Support maintenance
L.....Specialized Repair Activity (SRA)5
H .....General support maintenance
D .....Depot maintenance

B-3.5 Column 5, Tools and Test Equipment Reference Code. Column 5 specifies, by code, those common tool sets (not individual tools), common TMDE, and special tools, special TMDE, and special support equipment required to perform the designated function. Codes are keyed to tools and test equipment in Section III.

B-3.6 Column 6, Remarks. When applicable, this column contains a letter code, in alphabetic order, which is keyed to the remarks contained in Section IV.

B-4 EXPLANATION OF COLUMNS IN TOOL AND TEST EQUIPMENT REQUIREMENTS, SECTION III.

B-4.1 Column 1, Reference Code. The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

B-4.2 Column 2, Maintenance Level. The lowest level of maintenance authorized to use the tool or test equipment.

B-4.3 Column 3, Nomenclature. Name or identification of the tool or test equipment.

B-4.4 Column 4, National Stock Number. The National Stock Number of the tool or test equipment.

B-4.5 Column 5. Tool Number. The manufacturer's part number, model number, or type number.

B-5 EXPLANATION OF COLUMNS IN REMARKS, SECTION IV.

B-5.1 Column 1, Remarks Code. The code recorded in Column 6, Section II.

B-5.2 Column 2, Remarks. This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section II.

[5]This maintenance category is not included in Section II, column (4) of the Maintenance Allocation Chart. To identify functions to this category of maintenance, enter a work time figure in the "H" column of Section II, column (4), and use an associated reference code in the Remarks column (6). Key the code to Section IV, Remarks, and explain the SRA complete repair application there. The explanatory remark(s) shall reference the specific Repair Parts and Special Tools List (RPSTL) TM which contains additional SRA criteria and the authorized spare/repair parts.

SECTION II MAINTENANCE ALLOCATION CHART
FOR
ALARM-MONITOR GROUP (AMG) OA-9431/FSS-9(V)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
00	OA-9431/FSS-9(V)								A
0100	Power Supply, Uninterruptible (UPS)	Inspect	0.1		0.1			3	
		Install			1.5			1, 3	
		Test			0.1			1, 3	
		Remove			1.0			1	
		Replace			1.0			1	
0200	Converter Multiplexer Assembly	Inspect	0.1						
		Test			1.0			1, 2, 3	
		Install			6.0			1, 2, 3	
		Repair			4.0			1, 2, 3	B
		Remove			1.0			1	
		Replace			3.5			1, 2, 3	
0201	Drawer Assembly	Inspect	0.1		0.1			1, 3	
		Install			2.0			1, 2, 3	
		Repair			3.0			1, 2, 3	B
		Remove			1.0			1	
		Replace			2.0			1, 2, 3	
020101	Circuit Card Assembly, Data Receiver, A4	Inspect			0.2			1	
		Install			0.4			1, 2, 3	
		Remove			0.2			1, 2, 3	
		Replace			0.5			1 1, 2, 3	
020102	Circuit Card Assembly, CPU	Inspect			0.2			1	
		Install			0.4			1, 2, 3	
		Remove			0.2			1	
		Replace			0.5			1, 2, 3	
020103	Power Supply, 5/20 V DC	Inspect			0.1				
		Install			0.5			1, 3	
		Repair			0.1			1	B
		Remove			0.5			1	
		Replace			0.5			1	
020104	Circuit Card Assembly, Backplane, Right Hand	Inspect			0.1			1	
		Install			1.0			1	
		Remove			1.0			1	
		Replace			1.5			1, 2, 3	

SECTION II MAINTENANCE ALLOCATION CHART
FOR
ALARM-MONITOR GROUP (AMG) OA-9431/FSS-9(V) (continued)

(1) Group Number	(2) Component/Assembly	(3) Maintenance Function	(4) Maintenance Level					(5) Tools and Equipment Ref Code	(6) Remarks Code
			Unit		Direct Support	General Support	Depot		
			C	O	F	H	D		
020105	Circuit Card Assembly, Backplane, Left Hand	Inspect Install Remove Replace			0.1 1.0 1.0 1.5			1 1 1 1, 2, 3	
0202	Circuit Card Assembly, Surge Suppressor	Inspect Install Test Remove Replace			0.2 0.2 0.5 0.5 0.5			1 1, 2, 3 1, 2, 3 1 1, 2, 3	
0203	Input/Output CCA	Inspect Install Remove Replace			0.1 0.2 0.2 0.4			1 1, 2, 3 1 1, 2, 3	
0204	Filter Assembly	Inspect Install Service Remove Replace			0.5 1.0 0.5 0.3 0.5			1 1 1 1 1	
0300	Circuit Card Assembly, Communications	Inspect Install Remove Replace			0.1 0.3 1.0 1.0			1 1, 2, 3 1 1, 2, 3	
0400	Cable Assembly, RS-485	Inspect Install Repair Replace	0.1		0.2 0.1 0.5 0.5			1 1 1	 B
0500	Cable Assembly, UPS	Inspect Install Repair Replace	0.1		0.2 1.0 0.5 2.0			1, 3 1, 3 1, 3 1	 B
0600	Alarm-Monitor Group Program Diskettes	Test Replace			0.6 0.2				 C

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
ALARM-MONITOR GROUP (AMG) OA-9431/FSS-9(V)

(1) TOOL OR TEST EQUIPMENT REF CODE	(2) MAINTENANCE LEVEL	(3) NOMENCLATURE	(4) NATIONAL/NATO STOCK NUMBER	(5) TOOL NUMBER
1	O, F	Tool Kit, Electronic: System Maintenance	5180-01-168-0487	5911336 (19200)
2	O, F	Oscilloscope	6625-01-167-9863	454
3	O, F	Multimeter	6625-01-139-2512	AN/PSM-45

SECTION IV REMARKS
FOR
ALARM-MONITOR GROUP (AMG) OA-9431/FSS-9(V)

(1) REFERENCE CODE	(2) REMARKS
A	Initial installation for the AMG is the responsibility of the installation commander and engineering staff. Installation information is provided in Chapter 2.
B	Repair by replacing those items you are authorized to replace in accordance with Appendix F of this manual.
C	This item is contained on two disk. Backup copies of the disk should be made for usage and the original kept in a safe place. To test the item the software must be download to a personal computer that is connected to the AMG and J-SIIDS. This test has been performed at Ft. Belvoir and does not need to be performed at site. Test procedures are not provided.

APPENDIX C

DIRECT SUPPORT MAINTENANCE

REPAIR PARTS AND SPECIAL TOOLS LIST

SECTION I INTRODUCTION

C-1 SCOPE.

This RPSTL lists and authorizes spares and repair parts; special tools; special test, measurement, and diagnostic equipment (TMDE); and other special support equipment required for performance of organizational maintenance of the Alarm Monitor Group (AMG) OA-9431/FSS-9(V). It authorizes the requisitioning, issue, and disposition of spares, repair parts and special tools by direct support maintenance.

This parts list only provides NSN for some items. The remaining items are to be obtained using the commercial part number.

C-2 GENERAL.

In addition to Section I, Introduction, the Repair Parts and Special Tools List is divided into the following sections:

C-2.1 Section II. - Repair Parts List. A list of spares and repair parts authorized by this RPSTL for use in the performance of maintenance. The lists also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending alphanumeric sequence, with the parts in each group listed in ascending figure and item number sequence.

C-2.2 Section III - Special Tools List. A list of special tools, special TMDE, and other special support equipment authorized by this RPSTL for the performance of maintenance. Section III is not applicable to this manual.

SECTION II REPAIR PARTS LIST

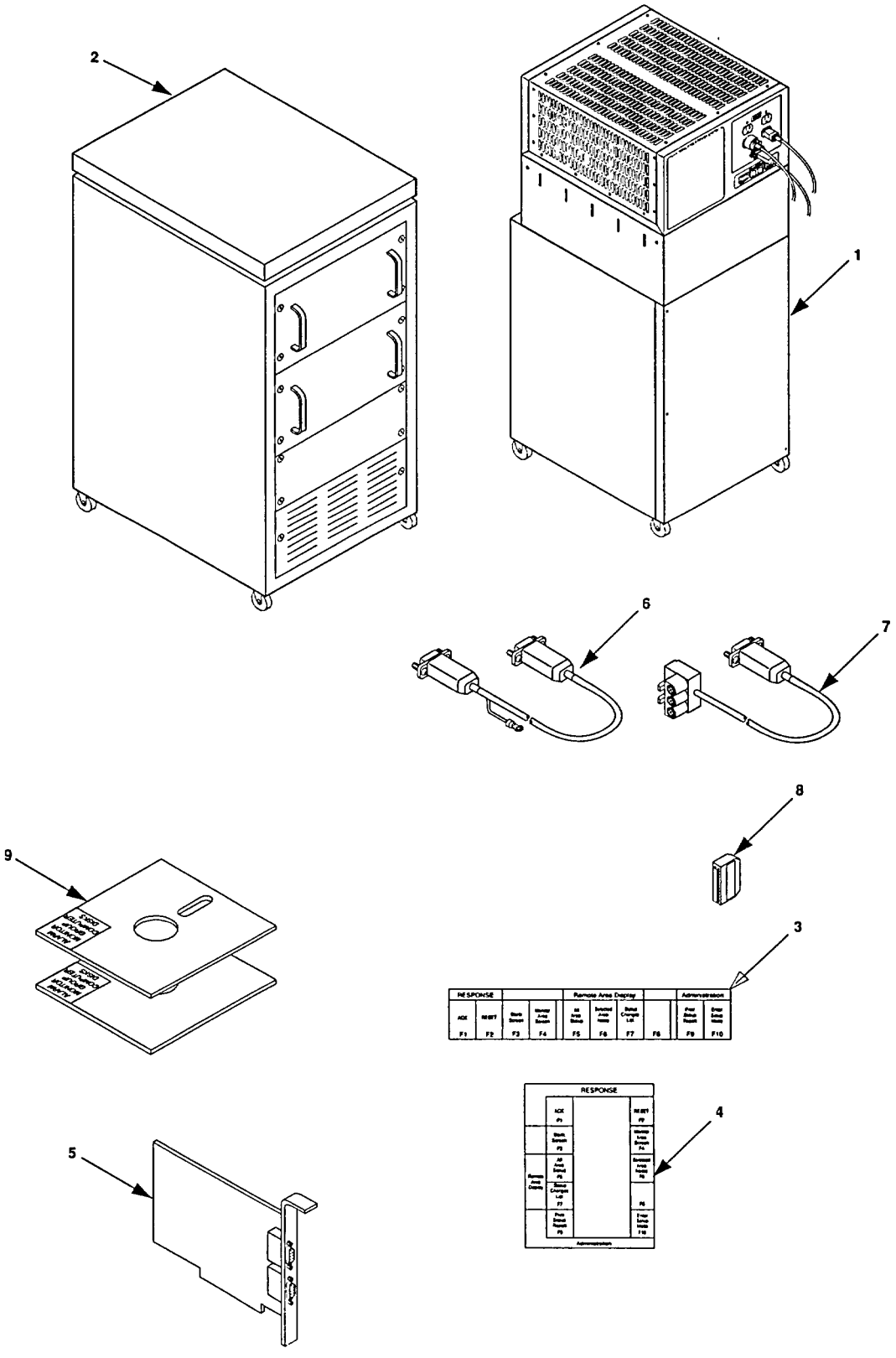


Figure C-1

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Fig	Item No.	CAGEC	OEM PART NO.	CAGEC	TRUE VENDOR PART NUMBER	NATIONAL STOCK NUMBER	DESCRIPTION	QTY
1		97403	13229E8200			TBD	Alarm-Monitor Group	1
	1	97403	13229E8400	OCKT4	MUPSE1500-V-BPFG-110-A-SPECIAL		UPS with batteries not installed.	1
	2	97403	13229E8140				Assembly, Converter Multiplexer	1
	3	97403	13229E8341-1				Template, Keyboard	1
	4	97403	13229E8341-2				Template, Keyboard	1
	5	97403	13229E8149		DS-302		Circuit Card Assembly, Communications	1
	6	97403	13229E8180		See Appendix F		Cable Assembly, RS-485	1
	7	97403	13229E8199		See Appendix F		Cable Assembly, Uninterruptible Power Supply	1
	8	97403	13229E8329				Plug, Shorting • Top Drawer Backplanes -01	2
							• Bottom Drawer Backplanes -02	2
	9		13229E8349				AMG PC Software Diskettes (two disks)	1

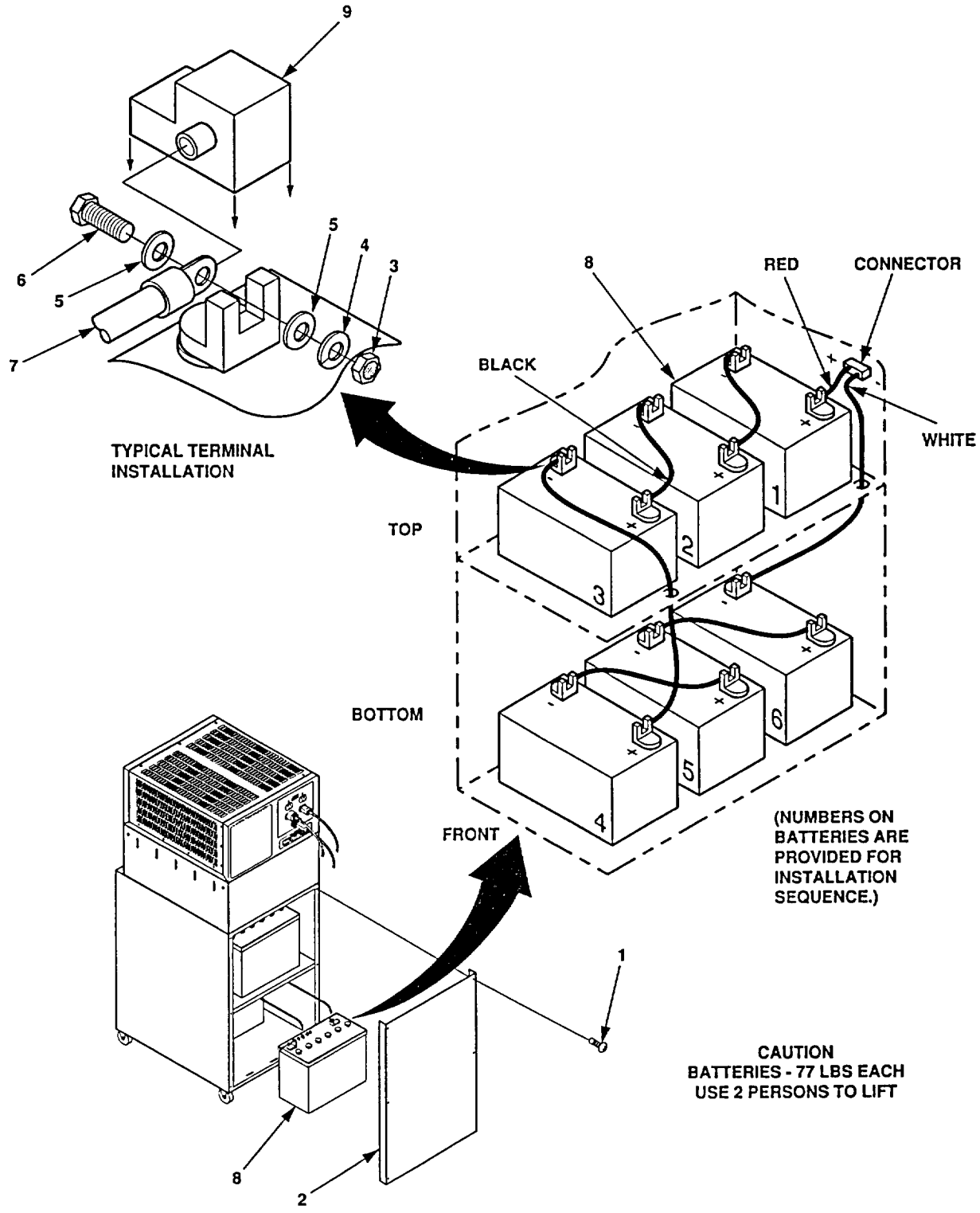

9
6
5
7
5
4
3
TYPICAL TERMINAL INSTALLATION
8
RED
CONNECTOR
BLACK
WHITE
TOP
BOTTOM
1
2
3
4
5
6
FRONT
(NUMBERS ON BATTERIES ARE PROVIDED FOR INSTALLATION SEQUENCE.)
1
CAUTION
BATTERIES - 77 LBS EACH
USE 2 PERSONS TO LIFT
8
2

Figure C-2

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Fig	Item No.	CAGEC	OEM PART NO.	CAGEC	TRUE VENDOR PART NUMBER	NATIONAL STOCK NUMBER	DESCRIPTION	QTY
2		97403	13229E8340-3	OCKT4	MUPSE1500-V-BPFG-110-A-SPECIAL		UPS with batteries not installed.	1
	1			96906	MS51958-63	5305-00-059-3659	Screw, Machine	12
	2						Cover, Front and Back	2
	3			96906	MS35649-2254	5310-00-250-9477	Nut, Plain, Hexagon	12
	4			96906	MS35338-139	5310-00-933-8121	Washer, Lock	12
	5			96906	MS15795-810	5310-00-582-5677	Washer, Flat	24
	6			96906	MS35307-308	5305-00-207-8253	Screw, Cap, Hexagon	12
	7						Cable, Battery, Black	5
	8	97403	13229E8208	64748	PRC 12110X		Battery, Lead-Acid, Sealed, 12 V	6
	9	97403	13229E8340	64748	TC-RL (LEFT HAND)		Terminal cover left	6
					TC-RL (RIGHT HAND)		Terminal cover right	6
					NOTE **Additional repair parts are provided in the commercial UPS commercial manual.**			

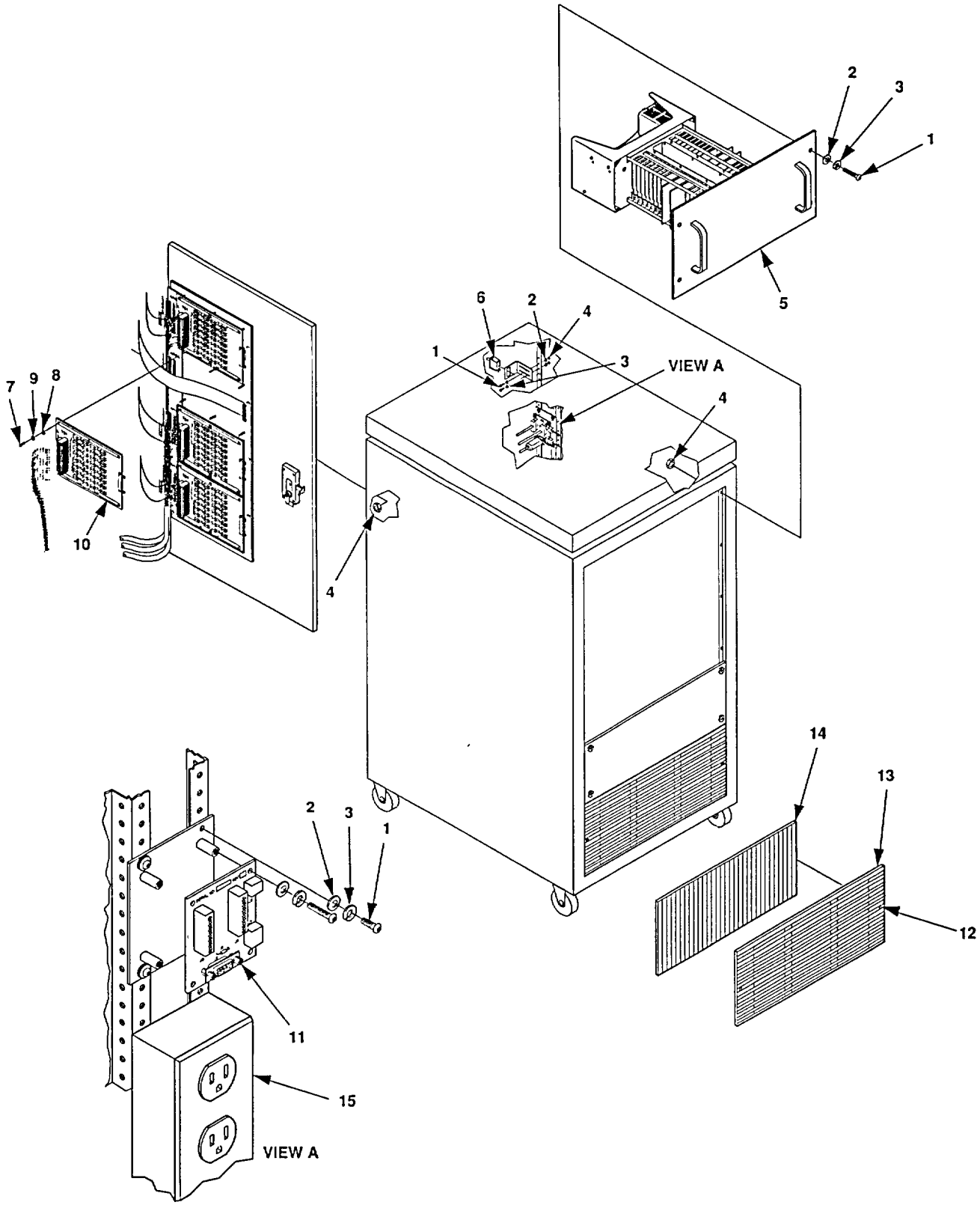


Figure C-3

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Fig	Item No.	CAGEC	OEM PART NO.	CAGEC	TRUE VENDOR PART NUMBER	NATIONAL STOCK NUMBER	DESCRIPTION	QTY
3		97403	13229E8140				Assembly, Converter Multiplexer	1
	1			96906	MS51958-64	5305-00-059-3660	Screw, Mach Pan-head, Cross-recessed, CRES, .190-32UNF-2A x .625L	64
	2			96906	MS15795-842	5310-00-883-9384	Washer, Flat-metal, Round, CRES, .219 Basic ID	64
	3			96906	MS35338-138	5310-00-933-8120	Washer, Lock Spring, Helical, CRES, .190 NOM Size	64
	4	97403	13229E8154-1	55355	A HUX 092-003219		Nut, Clip, Captive	
	5	97403	13229E8150				Assembly, Drawer	2
	6	97403	13229E8181	91929	1DM401		Switch, Push-Pull (Tamper)	6
	7			96906	MS51957-27	5305-00-054-6651	Screw, Mach Pan-head, Cross-recessed, CRES, .138-32UNF-2A x .312L	35
	8			96906	MS-15795-806	5310-00-880-5976	washer, Flat-metal, Round, CRES, .219 Basic ID	35
	9			80205	MS35338-136	5310-00-929-6395	Washer, Lock Spring, Helical, CRES, .138NOM Size	35
	10	97403	13229E8335				Circuit Card Assembly, Surge Suppressor	4
	11	97403	13229E8195				Circuit Card Assembly, Input/Output	1
	12	97403	13229E8194				Screw with internal thread .190-32 UNF-2B	2
	13	97403	13229E8194-4	55355	AVGX-XXXX-000819		Grill	1
	14	97403	13229E8177-4	55355	AFIL-000-000819		Filter	1
	15	97403	13229E8148	22012	ULA4E-6		Multiple outlet Strip	1

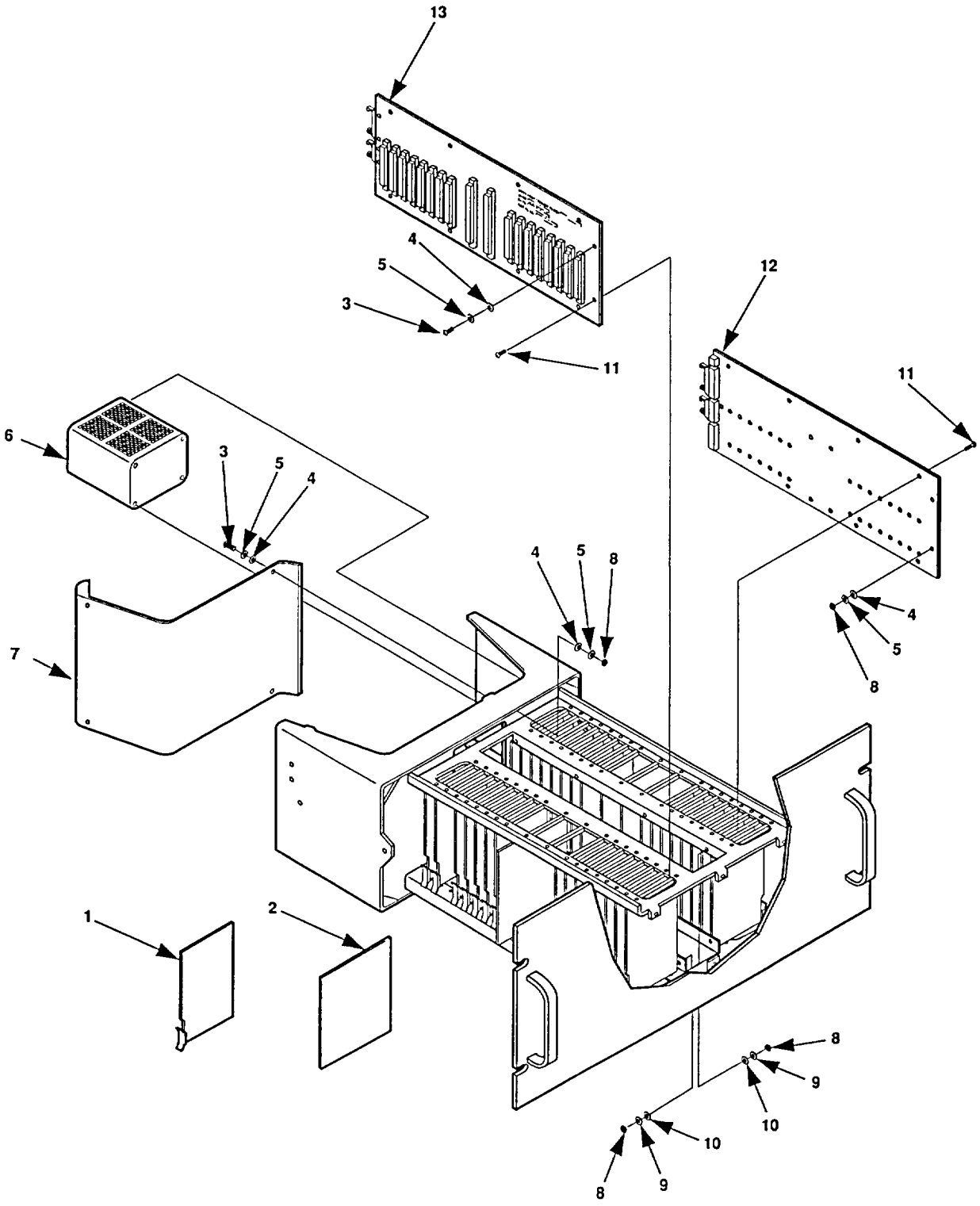


Figure C-4

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Fig	Item No.	CAGEC	OEM PART NO.	CAGEC	TRUE VENDOR PART NUMBER	NATIONAL STOCK NUMBER	DESCRIPTION	QTY
4		97403	13229E8150				Assembly, Drawer	2
	1	97403	13220E3550-1			5998-01-157-6521	Printed Wiring Board Assembly, A4	64
	2	97403	13229E8170				Circuit Card Assembly, CPU	8
	3			96906	MS51957-45	5305-00-054-6670	Screw, Mach Pan-head, Cross-recessed, CRES, .162-32UNF-2A x .500L	40
	4			96906	MS15795-807	5310-00-965-1806	Washer, Flat-metal, CRES .188 Basic Id	80
	5			96906	MS35338-137	5310-00-933-8119	Washer, Lock-spring, Helical, CRES, .164 NOM size	64
	6	97403	13229E8153				Power Supply, 5/20 VDC	2
	7	97403	13229E8321	14749	5GT100D-20GT500-M		Guard, Cable, EMI	2
	8			96906	MS35649-264	5310-00-934-9761	Nut, Plain, Hexagon	40
	9			96906	MS35338-136	5310-00-929-6395	Washer, Lock	40
	10			96906	MS15795-805	5310-00-722-5998	Washer, Flat	2
	11			96906	MS51959-64	5305-00-701-5075	Screw, Mach-flat CSK Hd, 82°, Cross-Recessed, .190-24UNC-2A x .625L	2
	12	97403	13229E8137				Circuit Card Assembly, Backplane, Right Hand	2
	13	97403	13229E8178				Circuit Card Assembly, Backplane, Left Hand	2

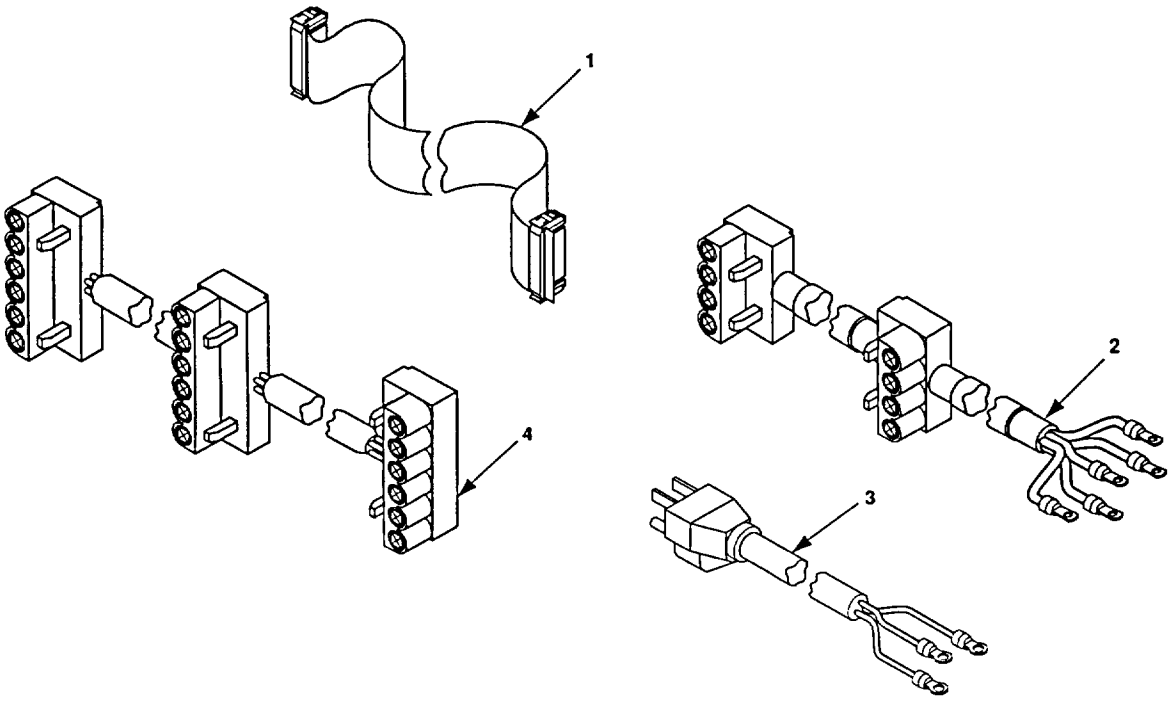


Figure C-5

(A)	(B)	(C)	(D)	(E)	(F)	(G)	(H)	(I)
Fig	Item No.	CAGEC	OEM PART NO.	CAGEC	TRUE VENDOR PART NUMBER	NATIONAL STOCK NUMBER	DESCRIPTION	QTY
5	1	97403	13229E8155				Cable Assembly, Area Input	4
	2	97403	13229E8169				Cable Assembly, DC Power Supply	2
	3	97403	13229E8175				Cord Assembly, Power Supply	2
	4	97403	13229E8160				Cable Assembly, RX-TX	2

APPENDIX D

ILLUSTRATED LIST OF MANUFACTURED ITEMS

Section I INTRODUCTION

D-1 SCOPE.

This appendix includes complete instructions for making items authorized to be manufactured or fabricated at direct support maintenance.

D-2 GENERAL.

A part number index in alphanumeric order is provided for cross-referencing the part number of the item to be manufactured to the figure which covers fabrication criteria.

All bulk materials needed for manufacture of an item are listed by part number or specification number in a tabular list on the illustration.

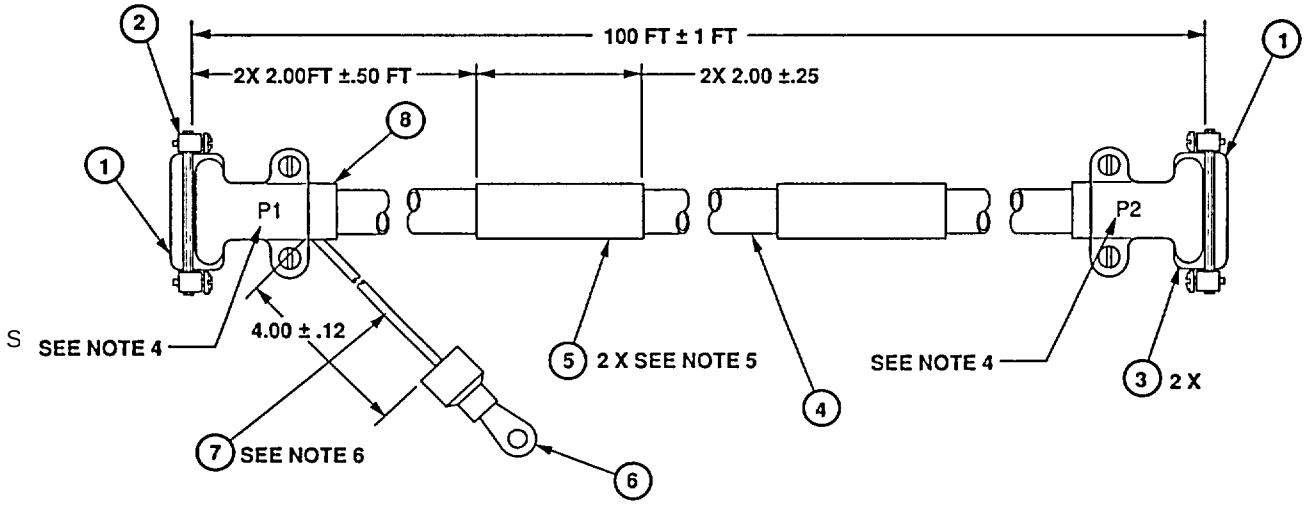
Section II MANUFACTURED ITEMS PART NUMBER INDEX

D-3 PART NUMBERS.

Part number	Item to be Manufactured	Figure number
13229E8180	RS-485 Cable Assembly	D-1
13229E8199	UPS Cable Assembly	D-2

Section III MANUFACTURED ITEM ILLUSTRATIONS

FIND NO.	PART NO.	QTY	DESCRIPTION	SPECIFICATION
8	MS 3420-6A	2	ADAPTER, CABLE CLAMP, BUSHING	
7	M23053/5-201-C	AR	INSULATION SLEEVING, ELEC, HEAT SHRINKABLE	MIL-I-2305315
6	M7928/1-8	1	TERMINAL, LUG, CRIMP STYLE, RING TONGUE	MIL-T-7928/1
5	M23053/5-107-9	AR	INSULATION SLEEVING, ELEC, HEAT SHRINKABLE	MIL-I-23053/5
4	13229E8172	AR	CABLE, ELECTRICAL	
3	M85049/48-2-1	2	CONNECTOR ACCESSORIES, ELEC, STRAIN RELIEF, STRAIGHT	MIL-C-85049/48
2	M24308/25-9	4	CONNECTOR, ELEC, RECTANGULAR, SCREW-LOCK ASSEMBLY, MALE	MIL-C-24308/25
1	M24308/3-1	2	CONNECTOR, ELEC, RECTANGULAR, MINIATURE POLARIZED SHELL, RACK AND PANEL, 9 PIN CONTACTS, GENERAL PURPOSE, CLASS G, SOLDER TYPE	MIL-C-24308/3



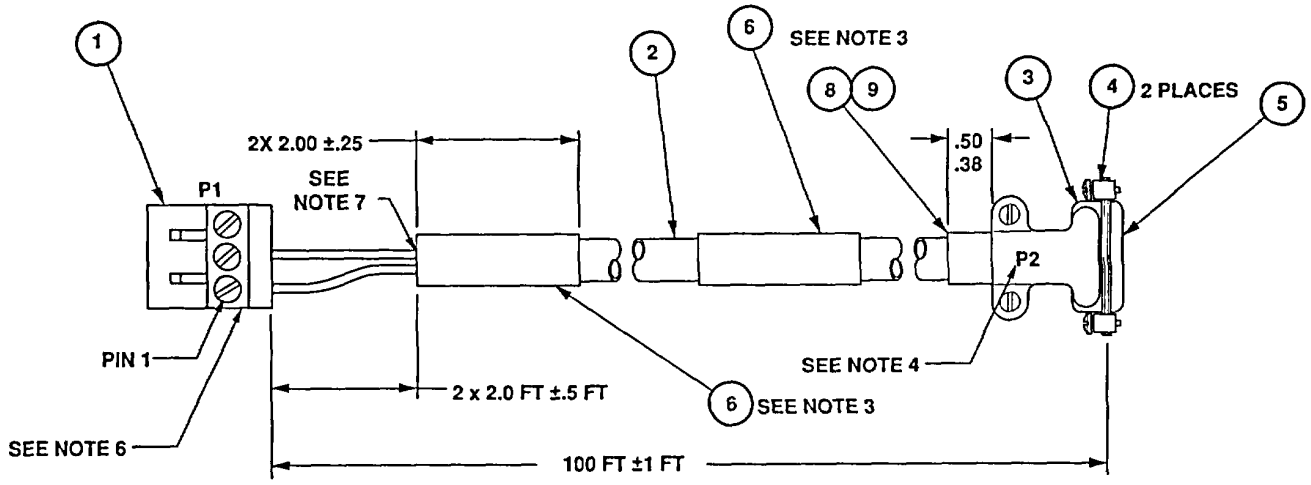
NOTES:

1. DIMENSIONS SHOWN ARE FOR GENERAL ROUTING AND MAY BE ALTERED TO FACILITATE INSTALLATION.
2. ELECTRICAL CONNECTIONS SHALL BE SOLDERED IN ACCORDANCE WITH MIL-STD-2000.
3. INSTALLED TERMINAL, FIND NO. 6, SHALL MEET THE PERFORMANCE REQTS OF MIL-STD-454, REQUIREMENT 19.
4. MARK REFERENCE DESIGNATIONS, TWO PLACES, 180 DEGREES APART IN ACCORDANCE WITH MIL-STD-130, METHOD OPTIONAL.
5. MARK "97403-13229E8180" ON FIND NO. 5 IN ACCORDANCE WITH MIL-STD-130, METHOD OPTIONAL. SHRINK TO FIRM FIT.
6. COVER DRAIN WIRE IN CABLE FIND NO. 4, WITH SLEEVING, FIND NO. 7. SHRINK TO FIRM FIT.
7. TRIM SHIELD AND DRAIN WIRE FLUSH WITH OUTER JACKET AT P2.

WIRE NO.	TERMINATION		WIRE COLOR
	FROM	TO	
1	P1-2	P24	WHT/ORG STRIPE
2	P1-4	P2-2	ORG/WHT STRIPE
3	P1-7	P2-8	WHT/BLU STRIPE
4	P1-8	P2-7	BLU/WHT STRIPE
DRAIN	-	FIND NO. 6	SILVER

Figure D-1. RS-485 Cable Assembly Fabrication.

FIND NO.	PART NO.	QTY	DESCRIPTION	SPECIFICATION
9	MS3420-4A	1	ADAPTER, CABLE CLAMP, BUSHING	
8	MS3420-6A	1	ADAPTER, CABLE CLAMP, BUSHING	
7	M23053/5-201-C	AR	INSULATION SLEEVING, ELECTRICAL, HEAT SHRINKABLE	MIL-1-23053/5
6	M23053/5-106-9	AR	INSULATION SLEEVING, ELECTRICAL, HEAT SHRINKABLE	MIL-1-23053/5
5	M24308/3-1	1	CONNECTOR, ELEC, RECTANGULAR, MINIATURE POLARIZED SHELL, RACK AND PANEL, 9 PIN CONTACTS, GENERAL PURPOSE, CLASS G, SOLDER TYPE	MIL-C-24308/3
4	M24308/25-9	2	CONNECTOR, ELECTRICAL, RECTANGULAR, SCREW-LOCK, MALE	MIL-C-24308/25
3	M85049/48-2-1	1	CONNECTOR ACCESSORIES, ELECTRICAL, STRAIN RELIEF, STRAIGHT	MIL-C-85049/48
2	13229E8198	1	CABLE, ELECTRICAL	
1	13229E8210-4	1	CONNECTOR, ELECTRICAL	



NOTES:

1. DIMENSIONS SHOWN ARE FOR GENERAL ROUTING AND MAY BE ALTERED TO FACILITATE INSTALLATION.
2. ELECTRICAL CONNECTIONS SHALL BE SOLDERED IN ACCORDANCE WITH MIL-STD-2000.
3. MARK "91403-13229E8199" ON FIND NO. 6, IN ACCORDANCE WITH MIL-STD-130, METHOD OPTIONAL.
4. MARK REFERENCE DESIGNATIONS, TWO PLACES, 180° APART IN ACCORDANCE WITH MIL-STD-130, METHOD OPTIONAL.
5. COVER DRAIN WIRE IN P2 END OF CABLE, FIND NO. 2, WITH SLEEVING, FIND NO. 7. SHRINK TO FIRM FIT.
6. MARK REFERENCE DESIGNATION, ON SURFACE INDICATED, IN ACCORDANCE WITH MIL-STD-130, METHOD OPTIONAL.
7. TRIM SHIELD AND DRAIN WIRE FLUSH WITH OUTER JACKET AT P1.

WIRE NO.	TERMINATION		WIRE COLOR	NOTES
	FROM	TO		
1	P1-1	P2-1	RED	
2	P1-2	P2-2	BLACK	
3-	DRAIN	5		
SHIELD	-	P24	DRAIN	5

Figure D-2. UPS Cable Assembly Fabrication.

APPENDIX E

SCHEMATIC DIAGRAMS

This appendix contains schematic diagrams for the circuit card assemblies used within the AMG. Additionally schematic diagrams are provided as foldouts and located immediately following the index.

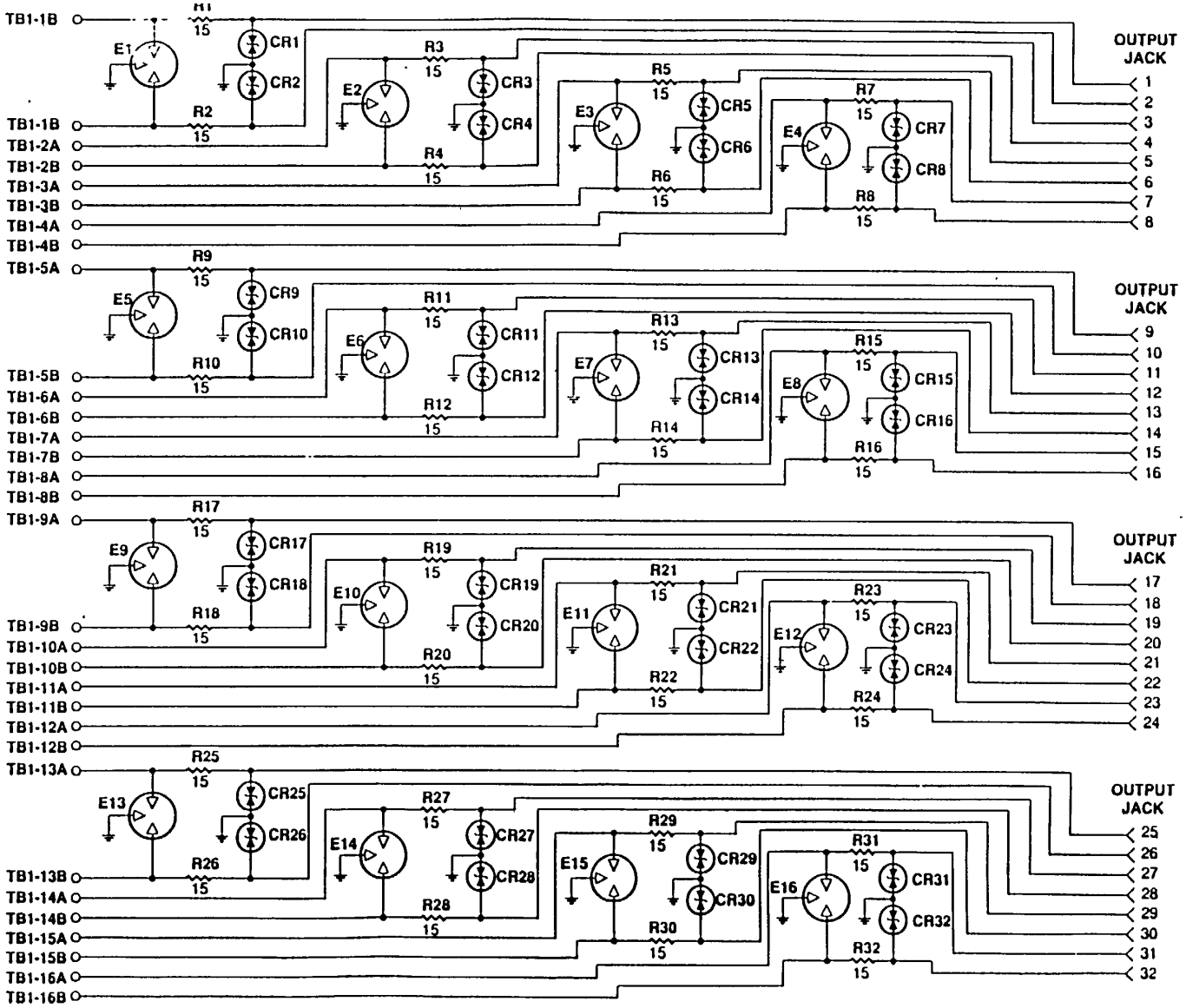


Figure E-1. Surge Suppressor Schematic Diagram.

PIN: 072103-002

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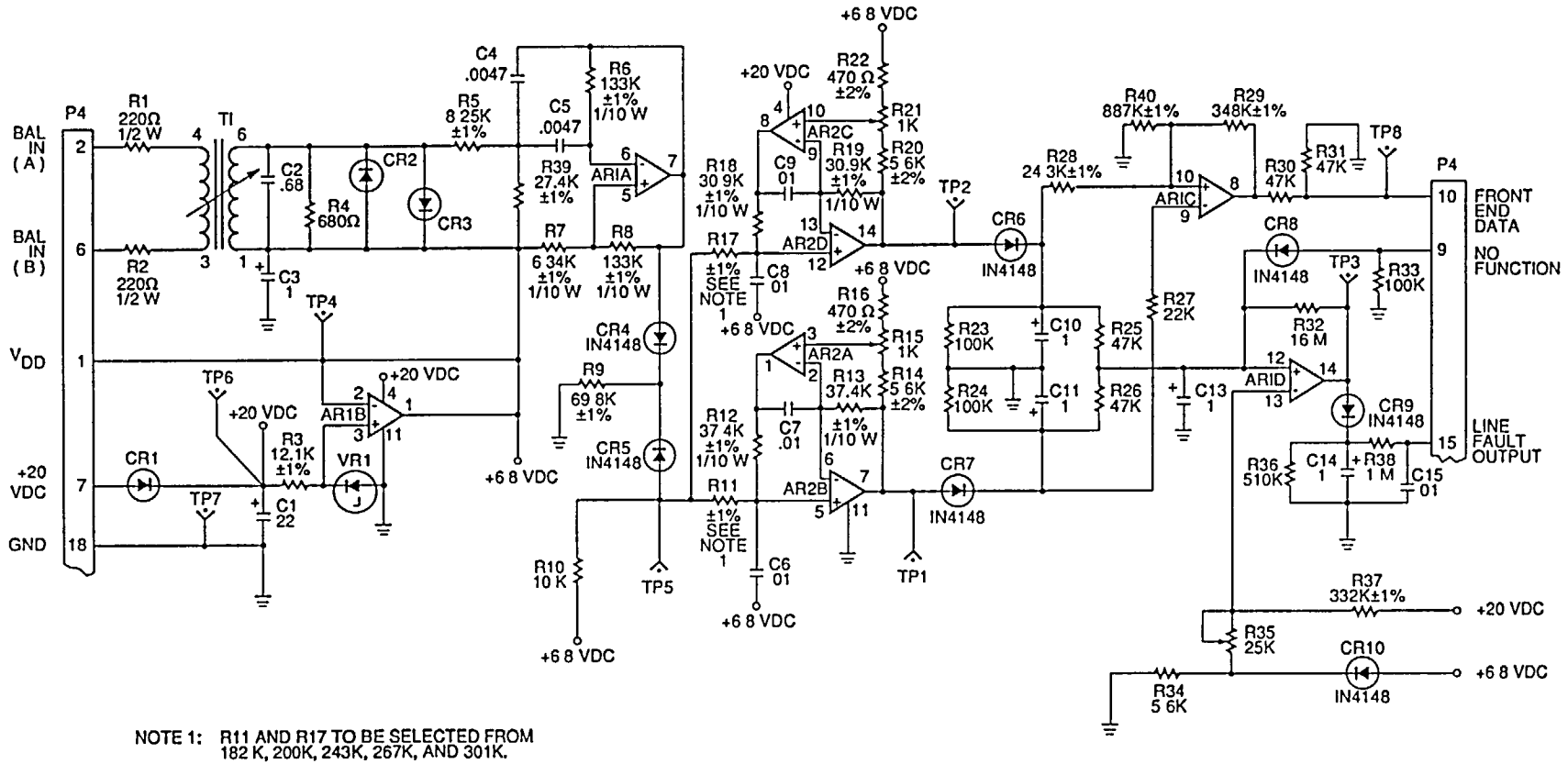

NOTE 1: R11 AND R17 TO BE SELECTED FROM 182 K, 200K, 243K, 267K, AND 301K.

Figure E-2. Data Receiver CCA Schematic Diagram.

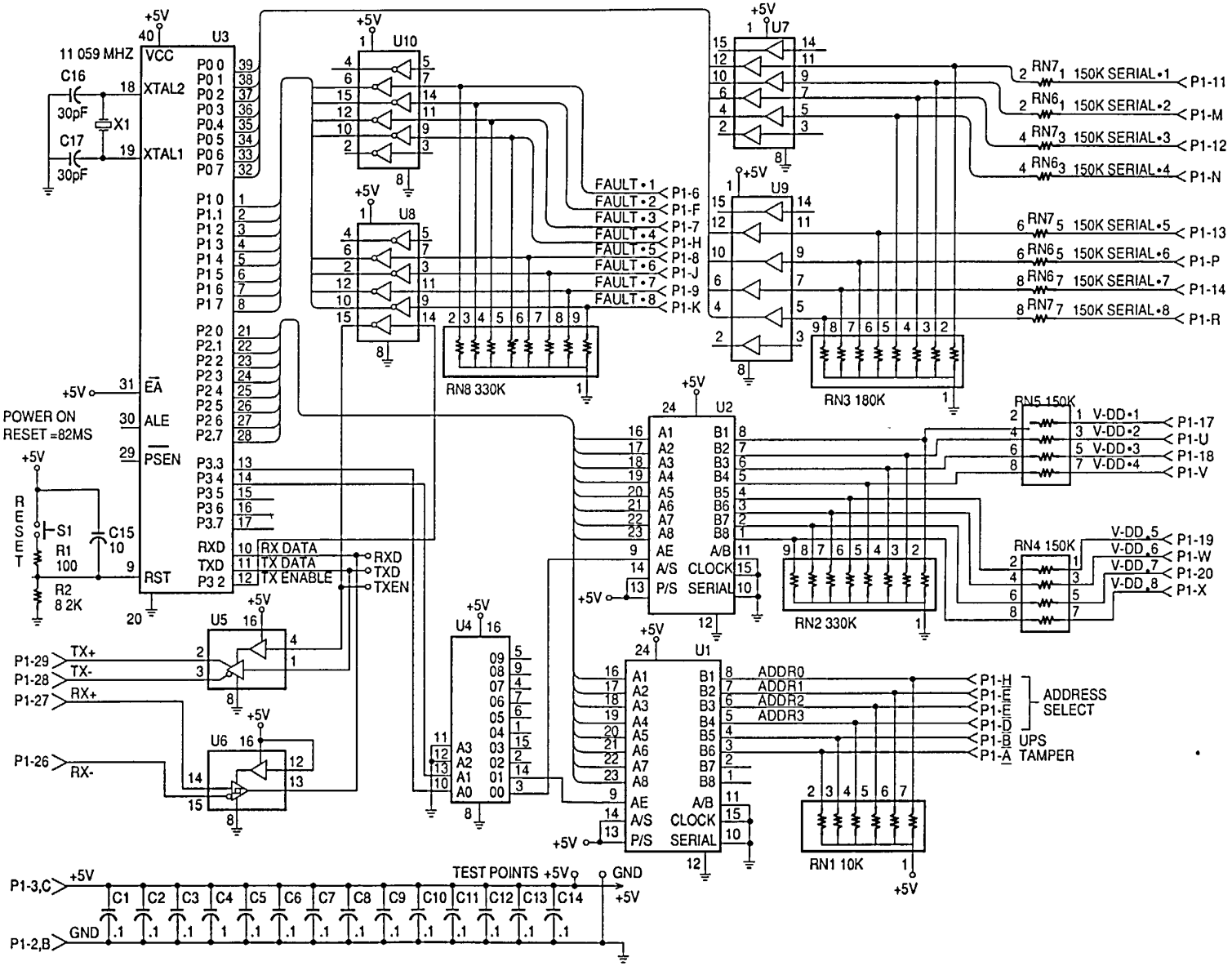

Figure E-3. Central Processing Unit CCA Schematic Diagram.

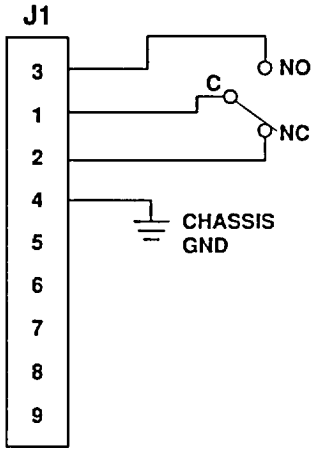

Figure E-4. Uninterruptible Power Supply Assembly Wiring Diagram.

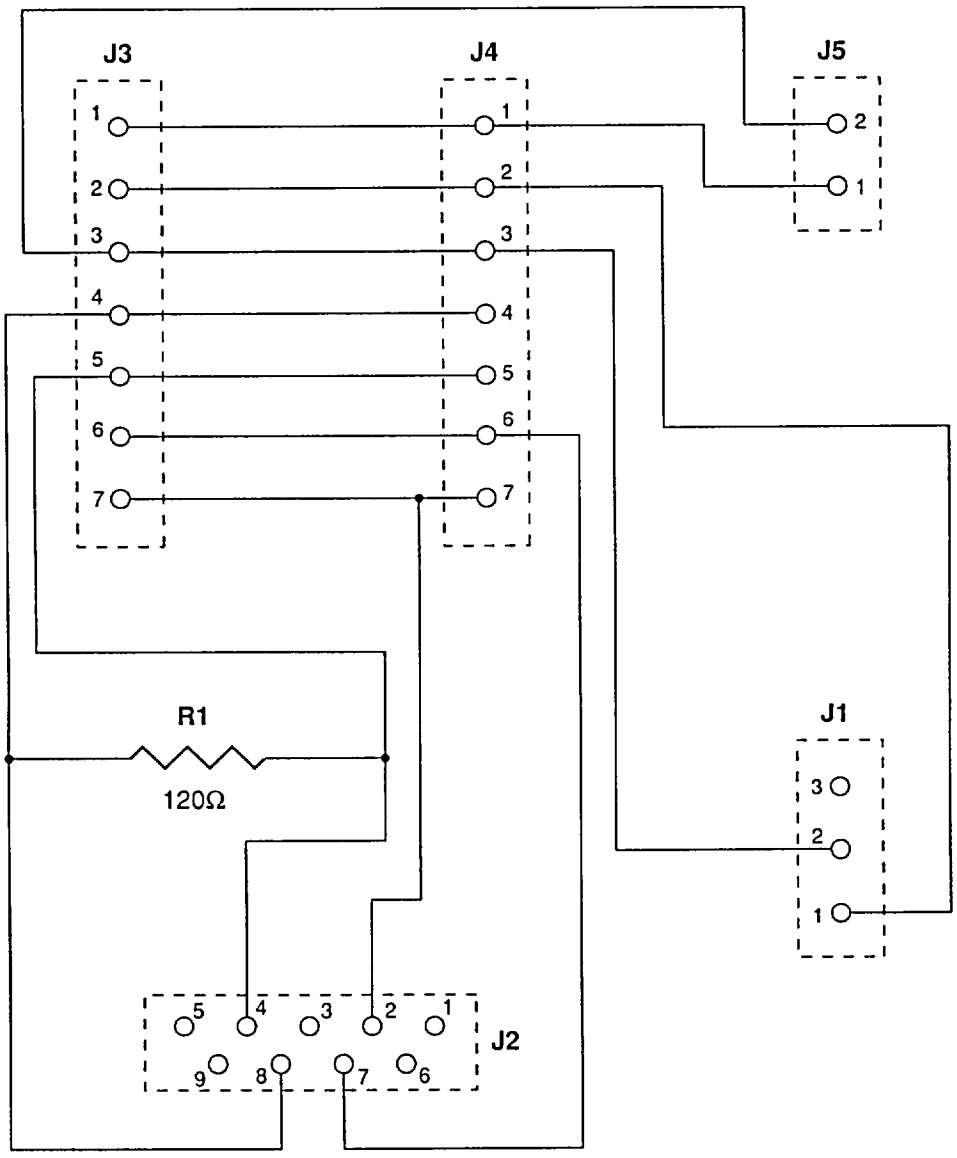

Figure E-5. Input/Output CCA Schematic Diagram.

GLOSSARY

SECTION I ABBREVIATIONS

COMMON ABBREVIATIONS.

The common abbreviations used in this manual are in accordance with MIL-STD-12D and AR 310-25.

SPECIAL OR UNIQUE ABBREVIATIONS.

There are no special or unique abbreviations used in this manual.

SECTION II DEFINITION OF UNUSUAL TERMS

UNUSUAL TERMS.

ACC	Access
AMG	Alarm Monitor Group
ALM	Alarm
BAT	Battery
BIOS	Basic Input/Output System
CCA	Circuit Card Assembly
CCCA	Communications Circuit Card Assembly
CMA	Converter Multiplexer Assembly
COM	Communications
COM-norm	Communications Normal
COM-FAIL	Communications Failure
CPC	Corrosion Prevention and Control
CPU	Central Processing Unit
Data Block	Digital Information that is transmitted in groups during a synchronized time.
DOS	Disk Operating System
EGA	Enhanced Graphics Card
EIR	Equipment Improvement Recommendation
ESD	Electrostatic Discharge
FSK	Frequency Shift Key
IBM	International Business Machine
IBM-PC/AT	International Business Machine-Personal Computer/Advanced Technology
INV	Inverter
I/O	Input/Output
ISA	Industrial Standard Architecture
J-SIIDS	Joint Service Interior Intrusion Detection System
MAC	Maintenance Allocation Chart
MAINT	Maintenance
MOD	Module
MS-DOS	MicroSoft-Disk Operating System
MWO	Modification Work Order
RAM	Random Access Memory
ROM	Read Only Memory
RPSTL	Repair Parts and Special Tools List
RS	Reference Standard
RX/TX	Receive/Transmit
SEC	Secure
TDA	Table of Distribution and Allowances
TP	Test Point
Typical	A representation of an item that is not exact
UPS	Uninterruptible Power Supply
VOM	Volt Ohm Meter

ALPHABETICAL INDEX

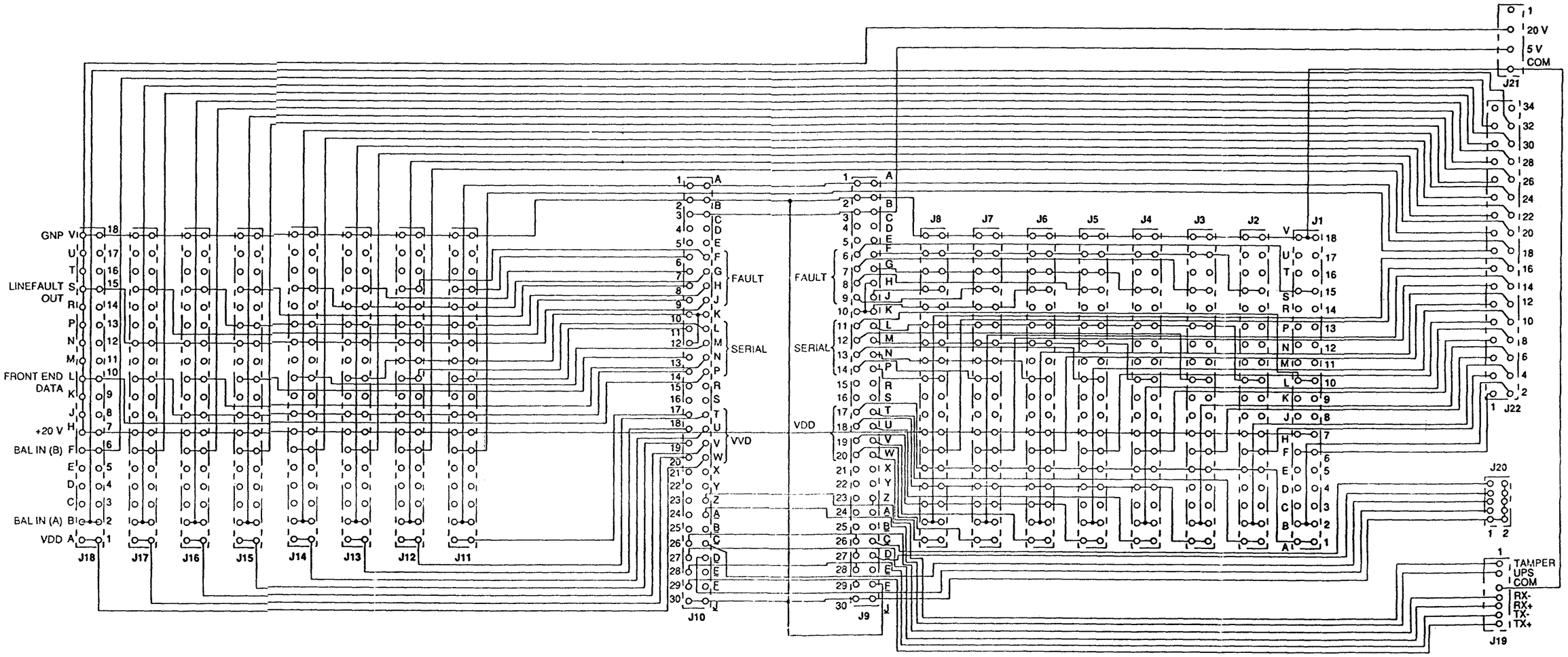

Figure F0-1. Right Hand Backplane Interconnection Diagram

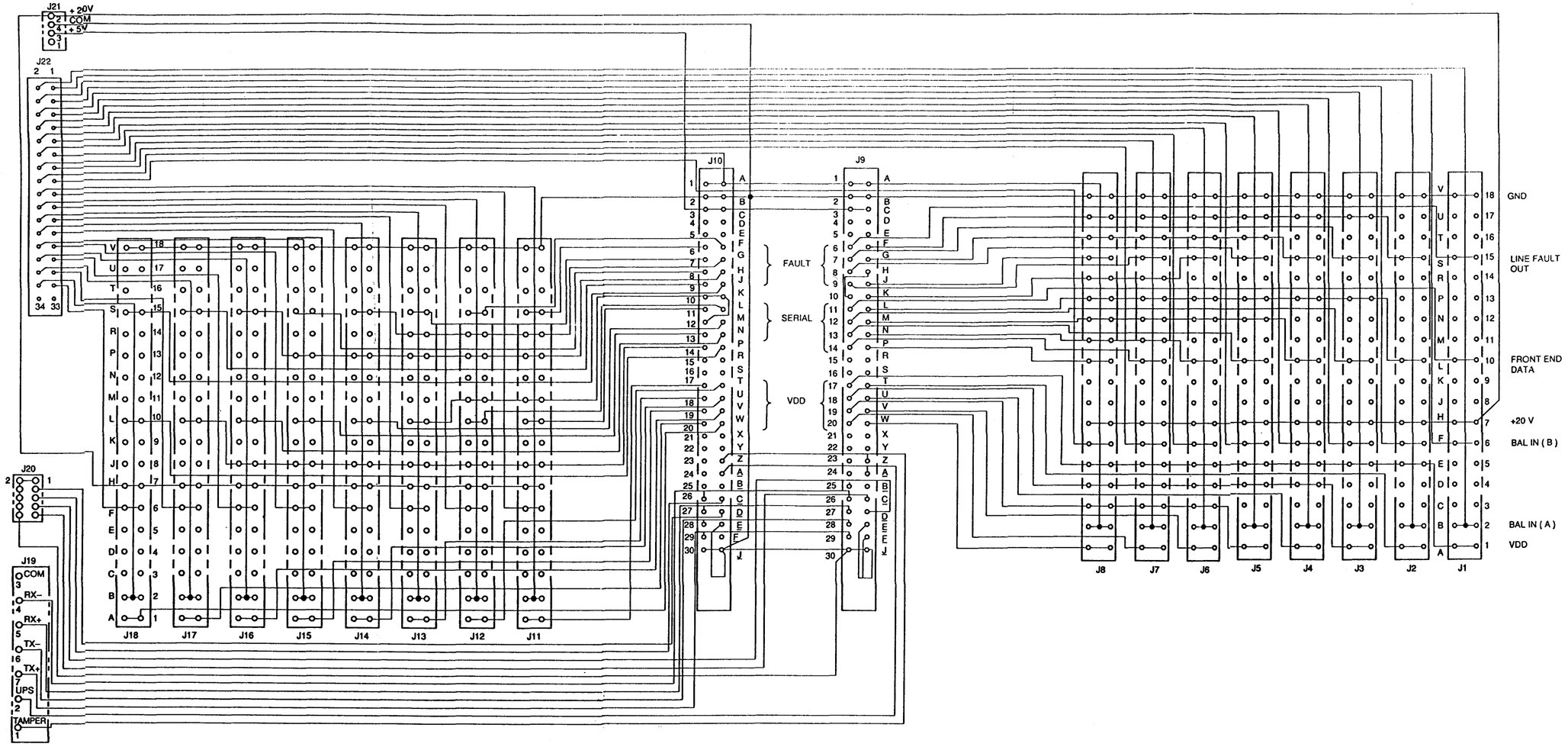

Figure F0-2. Left Hand Backplane Interconnection Diagram.

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
05977

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PAGE NO	PARAGRAPH	FIGURE NO	TABLE NO
6	2-1 a		
81		4-3	
125	line 20		

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

In line 6 of paragraph 2-1a the manual states the engine has 6 Cylenders. The engine on my set only has 4 Cylenders. Clange the manual to show 4 Cylenders.

Callout 16 on figure 4-3 is pointing at a bolt. In key to figure 4-3, item 16 is called a shim - Please Correct one or the Other.

I ordered a gasket, item 19 on figure B-16 by NSN 2910-00-762-3001. I got a gasket but it doesn't fit. Supply says I got what I ordered, so the NSN is wrong. Please give me a good NSN

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SIGN HERE John C Doe
JOHN DOE

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter= 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 Meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = 0.35 ounce
1 dekagram = 10 Grams = .35 ounce
1 hectogram = 10 dekagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fluid ounce
1 deciliter = 10 centiliters = 3.38 fluid ounces
1 liter = 10 deciliters = 33.81 fluid ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 27.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq millimeters = .155 sq. inch
1 sq. decimeter= 100 sq centimeters = 125.5 sq. inches
1 sq. meter (centare) = 100 sq decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. decimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	To	Multiply by	To change	To	Multiply by
inches	centimeters	2.540	ounce-inches	newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	newton-meters	1.356	metric tons	short tons	1.102
pounds-inches	newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit Temperature	5/9 (after subtracting 32)	Celsius Temperature	°C

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