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TECHNICAL MANUAL

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL

INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS

(INCLUDING DEPOT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS)

FOR

FACILITIES IN PLACE

PATCH AND TEST FACILITY

OAKLAND ARMY BASE, CALIFORNIA

HEADQUARTERS, DEPARTMENT OF THE ARMY

NOVEMBER 1976

WARNING

HIGH VOLTAGES AND CURRENT EXIST IN EQUIPMENTS IN THIS FACILITY

DO NOT TAKE CHANCES!

TECHNICAL MANUAL
NO. 11-5895-862-14 & P

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON DC, 16 November 1976

OPERATOR'S, ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS (INCLUDING DEPOT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS) FOR FACILITIES IN PLACE PATCH AND TEST FACILITY OAKLAND ARMY BASE, CALIFORNIA

Current as of August 1976

REPORTING OF ERRORS

You can improve this manual by recommending improvements using DA Form 2028-2 (Test) located in the back of the manual. Simply tear out the self-addressed form, fill it out as shown on the sample, fold it where shown, and drop it in the mail.

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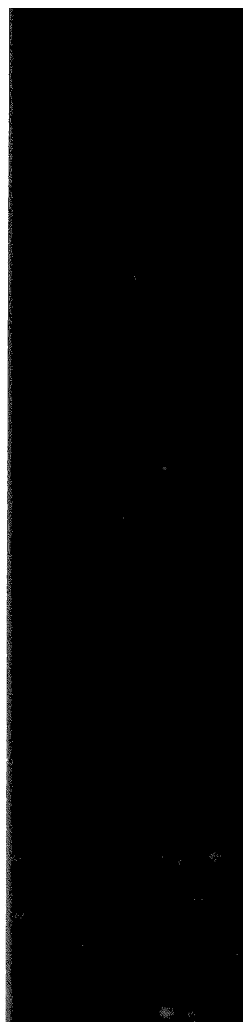
This technical manual is an authentication of the manufacturer's commercial literature and does not conform with the format and content specified in AR 310-3, Military Publications. This technical manual does, however, contain available information that is essential to the operation and maintenance of the equipment.



LIST OF ILLUSTRATIONS

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes the Patch and Test Facility at Oakland Army Terminal, California, and provides instructions for operating and maintaining the facility equipment. A list of items installed (app B) and a repair parts list (app C) are also included.

b. Throughout this manual references are made to other publications that cover equipment in the facility. A complete listing of applicable publications is provided in appendix A.

c. All illustration are located in the rear of the manual.

1-2. Indexes of Publication

a. DA Pam 310-4. **Refer to the latest issue of DA Pam 310-4 to determine whether there are new editions, changes, or additional publications pertaining to the equipment.**

b. DA Pam 310-7. **Refer to DA Pam 310-7 to determine whether there are modification work orders (MWO's) pertaining to the equipment.**

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. **Use equipment forms and records in accordance with instructions in TM 38-750.**

b. Station Operation and Maintenance. **Use forms and records in accordance with instructions in the station Standard Operating Procedures (SOP).**

c. Plant-in-Place Records. **Changes, corrections, and updating of Plant-in-Place records (para 4-5) should be reported to US Army Communications Electronics Engineering Installation Agency (CED-SWSR), Fort Huachuca, Ariz 85613.**

1-4. Administrative Storage

The procedures for administrative storage are outlined in TM740-90-1. However, the exact procedure for repacking for limited storage depends on the material available and the conditions under which the equipment is to be stored.

1-5. Destruction Army Electronics Material.

Refer to TM 750-244-2 for demolition procedures for electronic equipment.

Section II. DESCRIPTION AND DATA

1-6. Purpose and Use.

The patch and test facility (PTF) provides a centralized point, which is part of the Automated Telecommunications Station at Oakland Army Terminal, California, for the termination and interconnection of cables to and from the station. Additionally, the PTF contains equipment which provides access to the communications lines, transmission security, and line/component testing.

1-7. Purpose and Use

NOTE

See individual technical manuals (app A) for technical characteristics of installed components of the PTF

Circuits (PTF)	Number	Speed
Autodin (Mode I)	2 ea	240 bps
Remote Terminals	11 ea (expandable to 24)	1200 bps
WU TWX	1 ea (not used)	
WU ACU	2 ea	

Patching Facilities	Number
2/wire jack appearances	
VF	60
DC High Level	24 (mon, 24 Rec.
DC Low Level	24 (mon, 24 Rec/bay
12/wire jack appearances	48 (3 bays)

COMSEC Facilities	K-13 (2 operation, 2 spare)
AC Power: Red and black	120/208, 3 phase 60 Hz (supplied from separate power panels)

DC Power Supplies	Uses
120 VDC (Dual)	Alarm panel and high level signalling.
60 VDC (Dual)	DLSU operation
6 VDC (Dual	Tuning purposes and DLSU operation
Red/ Black Isolators	Modulated light sources and photosensitive receivers.

Alarms	Condition
(Audible alarm and alarm panel (light) Isolator	Loss of power, door open, high temp (120°).
DC Power supplies	Loss of 60, 120, or 6 volt power.
Fuse alarm panel	Any blown fuse

1-8. Description of Parts and Tam Facility, Panel

The Patch and Test Facility (PTF) is part of the Automated Telecommunications Center at Oakland Army Terminal, California. The PTF is installed in building 6 (Kern Building) along with the Automated Multimedia Exchange (AMME) which it serves. The PTF equipment is laid out in four rows (fig. 1-1) in two rooms (the P&T and crypto rooms) using standard cabinets which accept 19-inch rack-mounted equipment/components and provides housing for cable distribution frames. Cable ducts for carrying signal and power cables between the cabinets are installed overhead of the cabinet rows in the crypto room and under the floor in the P&T room. Conduits from the cable ducts bring the cables and power into the rear of the cabinets. In addition, a large conduit is connected between the signal line junction box (fig. 1-1) into the cable duct to carry the entrance signal cables. Power for operating the cabinet components is taken from duplex outlets installed in the rear of cabinets. The COMSEC equipment bays in the crypto room (fig. 1-10) are part of special circuits not covered in this manual.

1-9. Rev 1 Equipment Days (Parts and Tam Panel)

The row 1 equipment bays are located in the P&T room. Row 1 equipments (fig. 1-2) include a Western Electric Modem (bay 1.1), a miscellaneous rack (bay 1.2) containing dc power supplies, an intercom system, two alarm panels, fuse panel, and two digital line interface units (DLSU), a cabinet containing the vf entrance frame and patch panels (bay 1.3), a rack containing test equipment (bay 1.4), a cabinet containing patching panels (both dc and vf) on the black side of the digital lines (bay 1.5), the black IDF cabinet (bay 1.6), a modem bay containing Timeplex modems (bay 1.7), a modem bay (1.8) containing four each Western Union Model 1200/24 Modems and two Western Electric Dataphone 2400 Modems, and a modem bay (1.9) containing three additional Western Union 2200/24 Modems. The Western Union, Western Electric, and Timeplex modems are maintained and furnished by the contractors. Bay 1.10 is available for use in further expansion of the PTF.

a. Western Electric Bay. A Western Electric modem is installed in bay 1.1. The cabinet is connected to the underground cable ducts with conduits that carry signal cables and black power.

b. Miscellaneous Equipment Bay 1.2. Bay 1.2 is designated the miscellaneous equipment bay. It mounts the DLSU shelf (fig. 1-3), fuse and alarm panel, major alarm panel, major-minor alarm panel, audible alarm, intercom and 6 and 60 vdc power supplies (fig. 1-4). All wiring connections (signal and power) are made on the rear of the units (fig. 1-5, 1-6, and 1-7).

c. VF Entrance Frame and Patch Bay 1.3. Bay 1.3 contains a dual speaker panel (fig. 1-8), five 2-wire patch modules, an INT BAY patch module, and cable terminating blocks located on the bottom of the rack (fig. 1-9). Each 2W AUDIO module has the capability for 24 2-wire normal through circuits. Connections are made through connectors on the rear of the patch panels (fig. 1-10) to the cable terminating blocks. The main signal cable from the signal line junction box is connected to the terminating blocks.

d. Test Bay 1.4 (fig. 1-11). Test bay equipments consist of three pieces of test equipment, one interbay patch panel and a pull-out writing shelf. The patch panel provides connections to other bays (through the INT BAY patch). Test equipment power input connections are made at the cabinet rear, along with signal and cable connectors for the patching modules.

e. Black Patch Bay 1.5 (fig. 1-12). The black patch bay contains seven patch modules (patch panels) and a rollout shelf. Three patch panels are multicircuit or 12 wire types. Each multicircuit module handles 16 each 12-wire circuits which are normalled through, from, and to cable connectors on the module rear. Two patch modules are of the 2-wire type, each containing 24 normalled through circuits and used for low level dc patching (black). The last (bottom) panel is used for miscellaneous and interbay 2-wire connections and has facilities for 48 patch connections. All connections to the patch panels are at the rear of the bay (fig. 1-13).

f. Black IDF Cabinet, Bay 1.6 (fig. 1-14). The black IDF cabinet contains cable terminating blocks mounted on a metal frame rack. The cable blocks are used to terminate and cross-connect

signal cables on the black side of the signal path through the PTF.

g. Modem Bay 1.7 (fig. 1-15). Timeplex modems are mounted in bay 1.7 along with associated power supplies. Signal cables from the cable ducts are terminated on blocks on the black IDF and cross-connected to cables which connect on the rear of each individual modem (fig. 1-16).

h. Modem Bay 1.8 (fig. 1-17). Bay 1.8 contains four WU 2200/24 modems and two WE Dataphone 2400 modems. Interface and amplifier units for the WE modems are located behind and below the modems with one spare.

i. Modem Bay 1.9. (fig. 1-18). Bay 1.9 contains two WU 2200 modems with one spare.

j. Bay 1-10. Bay 1-10 is available for future expansion.

1-10. Row 2 Equipment Bays (Crypte Room). (fig. 1-19.)

Row 2 equipments include a cabinet for mounting patching modules, two bays of COMSEC equipment and some miscellaneous equipment (not shown) used for special circuits not part of the PTF.

a. Bay 2.1 Red Dc Patch (Secure). Six patching modules and a pullout shelf are installed in the front panel of red dc patch bay 2.1. Three patch modules are 12-wire types containing 16 individual patch circuits. Two patch modules are 2-wire types containing 24 individual patch circuits each. The last patch module is used for miscellaneous circuits containing 24 individual patch modules. Mounted behind the patch modules, and available from the rear of the cabinet, are cable terminating blocks from which cross-connections are made to cables entering the cabinet from the overhead signal cable ducts to the cables connecting to the patch modules.

b. COSMEC Equipment Bays 2.2 and 2.3. Two identical racks are used to mount two sets of communication security (COMSEC) equipment. Each rack has a Western Union junction box (J-box) installed above the COMSEC equipment. Signal wiring and cabling on the rear of the equipment is all carried through conduit or ducts for shielding purposes.

1-11. Row 3 Equipment Bays (Crypte Room) (fig. 1-20)

Bays 3.1 and 3.2 are used in row 3. Bay 3.1 is the black dc patch and is identical with bay 1.5 in row 1. Bay 3.2 is the black distribution frame and is identical with bay 1.6.

1-12. Row 4 Equipment Bays (Crypte Room) (fig, 1-21)

Row 4 equipment bays are located in the crypto room. Row 4 equipments include two cabinets used for equipment that isolates black signal circuits from red signal circuits, the red dc patch (unsecure) bay and the red IDF cabinet. Overhead signal ducts are used to carry signal and power cables to the cabinets as required.

a. Red/Black Isolator Cabinets (Bay 4.3). Two separate side-by-side cabinets, using special radiofrequency (rf) door seals and a series of clamps around the edges to hold the doors tightly closed, are used to house the red/black isolator circuitry. Black and red signals and power are connected through conduits from the overhead cable ducts into the cabinets. The left cabinet contains all the black signals, the right cabinet the red signals. Connection of signals between the cabinets is made through common wall bushings that carry fiberglass light pipes between light transmitting and receiving modules installed in both cabinets. The doors are wired so that the opening of one causes an alarm to sound and illuminate an indicator on the major alarm panel (bay 1.2 of row 1) (fig. 1-3).

b. Red Dc Patch Bay (Unsecure). Bay 4.2 is designated the red dc (unsecure) patch bay. It contains six patching modules: three 16 circuit, 12 wire patching modules, two 24 circuit, 2 wire patch modules and one miscellaneous patch module (48, 2-wire jack appearances).

c. Red IDF Cabinet (fig. 1-22). The red IDF (bay 4.1) contains cable terminating blocks mounted on a metal frame work. The blocks are used to terminate and cross connect cables between AMME and the PTF.

1-13. Mobile Test Bay (fig. 1-23)

The mobile test bay, normally located in the crypto room, consists of two pieces of test equipment (Test Set, Telegraph AN/GGM-15(V) and a BERT 901 tester) and an interbay patch panel mounted in a mobile (movable) metal cabinet. The test equipment can be connected to circuits in the patch and test facility through the interbay patch panel.

NOTE

The BERT 901 tester can be utilized only when testing the remote vf circuits containing the Timeplex modems. The BERT 901 is not compatible with Western Union and Western Electric data circuits.

CHAPTER 2

FACILITY CIRCUIT DESCRIPTION

2-1. General

This chapter provides an introduction to the signals that are handled by the PTF. The introduction is made on a block diagram and circuit diagram level. Circuit details and possible cable routings are shown in figures 2-1 and 2-2. Detailed functioning of the individual items of equipment represented by the blocks in the block diagram is covered in separate manuals (app A).

2-2. Station Description

a. The PTF described in this manual is part of the Automated Telecommunications Station at Oakland Army Terminal, California. The station itself is a Defense Communication System (DCS) Automatic Digital Network (AUTODIN) tributary station, part of a worldwide system of tributaries interconnected through 19 Automatic Switching Centers (ASC), which route message and data traffic between tributaries. Each ASC essentially functions to receive, store, and forward messages between tributaries and ASCs but also performs other functions in connection with the traffic it handles. These other functions include processes concerning the message handling such as error correction, insuring proper delivery, timely delivery, message security, and others, but they are not relevant to the tributary operation. The ASC, in addition to containing the message handling and processing equipment, also contains equipments which are used to interface with different types of equipment contained at the tributary stations and to transmit and receive the digital messages on the voice frequency communications channels used between stations.

b. For the purpose of this discussion the Oakland Automated Telecommunications Station can be separated into three functional sections: the Patch and Test Facility (PTF), the Automatic Multimedia Exchange (AMME), and a system of remote terminals.

(1) *PTF.* The patch and test portion of the station is used to terminate all communication lines for the station except the autodin circuits. It contains equipment for monitoring, measuring, and routing these lines. It also contains equipment for processing the signals received and transmitted to the remote terminals, and to AMME.

(2) *AMME.* The AMME performs a function similar to an ASC as it is a store and forward facility between AUTODIN and the remote terminals. As with the ASC's, AMME also performs other functions in connection with the transmission of the data and message traffic. The AMME contains equipment to record all traffic; switch traffic to proper remote terminal; provide AUTODIN routing symbols on outgoing messages; and other message handling functions. The AMME equipment is leased and maintained by a private contractor.

(3) *Remote terminals.* Several different equipment configurations are used between the PTF and remote terminals. The equipments required depend on the traffic intended to the

2-3. Facility Signal Block Diagram

a. *Station Signal Routing.* The signal flow for received and transmitted traffic to the telecommunications station (except the AUTODIN lines) passes through the PTF. The received signal flow from the ASC enters the station, is processed and fed to AMME. From AMME, the signal path to the intended remote terminal is through the PTF. A transmitted signal from a remote terminal follows the reverse of a received signal, from the remote terminal to the PTF, to AMME, and then to the ASC.

b. *ASC Signal.* The signal received from, and also transmitted to the ASC, is a data message which has been encrypted for message security and changed to an analog signal for transmittal on the voice frequency lines between stations. On the block diagram (fig. 2-1) the ASC line is shown entering at the signal line junction box.

(1) The ASC signal to and from the AMME pass through four significant blocks. The blocks represent equipment which modify the signal, such as the WU modem or CONRAC blocks. The remaining block represents the signal line junction box.

(2) The Western Union (WU) Modulator-Demodulator (modem) requires 4 wires input on the ASC side of the equipment (full duplex) and 2 wires output on the AMME side of the equipment.

(3) The signal on the ASC side of the WU modem is a carrier or tone at 1800 Hz. The carrier is frequency modulated at the digital rate (2400 bits per second) with the data (message) information. The WU modem converts the signal received from

the ASC to digital, direct current signal, for use by the AMME and converts the digital signal originating in the AMME to the vf signal transmitted to the ASC.

(*b*) On the AMME side of the WU modem, data, control and clock signals are exchanged with the AMME. The data contains the message information received from or to be transmitted to the ASC. The control signals are dc levels which are exchanged between the AMME and the modem which allows the AMME to control the modem. The clock signals are used in synchronizing the AMME and the modem.

(3) The Communication Security (COMSEC) block provides for security of the data (message) transmitted by encrypting them automatically. Received data, which has been encrypted at the ASC, is decrypted automatically in the equipment represented by the COMSEC block. The COMSEC equipment provides a dividing point between red and black signal lines.

c. Remote Terminal Signal. The signal flow between the AMME and the remote terminals is more complex than the signal between the AMME and the ASC, more circuits are involved. In general, however, the signal processing is, in most cases, the same. The remote terminal lines are shown entering the PTF.

(1) Following circuits 1 through 23 from the AMME through the PTF, six significant blocks are encountered. The most significant block in the six is the modem which transposes the dc digital signal, used in the AMME, into the analog frequency signal which is used on the voice frequency transmission lines. to the individual remote terminals. The second most significant block is the Red/Black Isolator which electrically separates the red signal from the black signal wiring. Other blocks remaining are the patch panel blocks (3), and the signal line junction box. The patch panels and the signal line junction box function just the way they did in the AUTODIN signal line described previously.

(2) The LO-HI level circuit channel passes through the PTF as follows: The signal line junction box, the vf equipment frame (VFEF), DLIU (Digital Line Interface Unit), the black dc patch panel in the P&T room, and the black dc patch panel in the COMSEC room. The remote terminals for these lines will be teletypewriters (tty) and will require high level dc voltages to operate. The DLIU transposes the low level digital signals required in the AMME to high level signal used to operate the tty.

2-4. Circuit Configurations

The circuits that pass through the communication center can be placed in three general categories: the LO-HI level dc teletypewriter lines (A, fig. 2-2), the lines to the remote terminals (C, fig. 2-2), and the AUTODIN lines (B, fig. 2-2).

CHAPTER 3

PATCH AND TEST FACILITY OPERATIONS

Section I. PRACTICES AND METHODS

3-1. General

This chapter identifies and establishes responsibilities and procedures which will contribute to successful PTF operation and maintenance. When PTF personnel become familiar with procedures in this chapter and become familiar with the circuits of the PTF and its equipment, they will be truly contributing to the successful PTF operation. Information contained here will aid operating personnel in training themselves and bring out the importance of maintaining accurate operating data. It will also point out many items which can be used by responsible maintenance personnel from the base electronics shop. Information here should be read and studied by new personnel to bring them "on board" as soon as possible.

3-2. Duties of PTF Personel

The basic duties of PTF personnel is to maintain proper communication and, when necessary, locate a defective communication circuit. These functions require a knowledge of the circuit status at all times. The basic requirements can be further divided into individual duties below:

a. Perform quality control checks and tests on circuits and equipment in the PTF.

b. Provide assistance to the ASOs in the checking of circuits.

c. Substitute mediums or channels to isolate circuit and equipment faults.

d. Answer fault alarms and restore communications.

e. Perform the required administration and record keeping.

f. Maintenance of records (para 3-3).

3-3. Maintenance of Facility

NOTE

Maintenance of records, as well as the equipment, are to be handled by the base electronic shop.

Maintenance of records, as defined here, is the insuring that all the PTF technical data (technical manuals, as built drawings, circuit drawings, circuit and switch markings) is up to date and complete. PTF records are divided into the following categories:

a. Plant-in-Place Records. Plant-in-place records are those engineering drawings and cable run lists which show what, where, and how site electronic equipment is installed. These records are essential to site maintenance.

(1) Plant-in-place records (sometimes called "As Built") are prepared by the engineering/installation agency who is responsible for the original design of the PTF. The plant-in-place records are first developed as part of the engineering done prior to the construction update of a communication site or station. After the work done on the site is completed, the plant-in-place records must document the installation and should be used for any new additions or station update planning.

(2) Plant-in-place records are used by the electronic maintenance personnel as maintenance data. Plant-in-place records must show all circuit and wiring connections at the telecommunication station. Copies of the original drawings must be retained at the telecommunication site and used as a guide in troubleshooting and fault location.

(3) Prior to site construction, errors may creep into the plant-in-place records as they are being produced. These errors become obvious during the installation process as equipments are installed and connected. Corrections to the plant-in-place records must be made on prints by installation personnel and sent to the engineer/installation agency for correction of the originals. Corrected prints should be returned to the telecommunication site for use in troubleshooting, circuit and wiring tracing, etc. While the corrections are made by the installation personnel, electronic maintenance personnel have the responsibility to insure that all corrections are indeed completely accurate and portray the equipment as installed.

(4) The importance of accurate and complete plant-in-place records cannot be over emphasized. They are needed to document the site equipment and circuits and to provide information for updating, modernizing or expanding the site at some future date. Plant-in-place records are to be used by the electronic maintenance personnel for circuit tracing and troubleshooting. If the circuit tracing or troubleshooting is brought about in an effort to restore communications a faulty or incorrect

diagram can add hours on to the time of the communications outage. Simple fault location can become a long drawnout procedure due to a faulty drawing. Plant-in-place records must be accurage and complete.

b. Equipment Manuals. The equipment manuals which come under the heading of station records are commercial and military that cover the various items of station equipment. These items of equipment are either mounted in a rack or are whole equipment racks. They are not built by the installation/engineering agency but procured as a commercial item from a separate company. A list of military and commercial equipment manuals is included in appendix A.

c. Reference Publications. Reference publications which should be included in the station records are those manuals, documents and other data which provide background, standards, or testing information. A list of these type of documents are included in appendix A.

d. Locally Prepared Data. Locally prepared operator data, which should be included as part of station operator records, are patch board labels, labels on the power distribution panels denoting circuit breaker application, simplified patching diagrams placed on patch bays, and operator trouble logs. In general, any instruction or adiid to operation and troubleshooting of the equipment must be considered part of the station records.

Section II. PATCHING OPERATIONS

3-4. Patching, General

a. The communication lines or paths that run through the PTF are provided with patch panels which are wired between equipments and at the line entrance and exit points. The patch panels are equipped with jacks that allow for either a parallel circuit connection for monitoring or a series connection which breaks the line and connects it to the patchcord when it is inserted. The series jacks on the patch panels are used for testing and rearranging circuit paths for troubleshooting and temporary restoration of communications.

b. Patching requires knowledge of the circuits and equipments, a certain technique that comes from practice, and attention to certain precautions to be successful.

(1) Knowledge of the circuits and the type of signals they handle is essential for proper patching. Like signals (dc to dc, vf to vf, multichannel to multichannel, etc) have to be patched to like signals. Signal paths must be maintained; e.g., the *output* from one piece and equipment must go into the *input* of the equipment being patched into.

(2) Operational spare circuits and equipment must be maintained. Standby equipment maintained in these spare circuits are to be used when patching around a defective item.

(3) Patches should not be made without thought to the interruption of traffic. Always know what is on the circuit to be interrupted. When possible coordinate with others affected so that when circuits have to be patched traffic is not on the line.

(4) *Technique.* Develop the habit of rechecking your cord and plug positions just prior to completing the patch. Set the patch up with the cable plugs only loosely set into the patch jacks. Then, recheck the signal flow prior to plugging in the idle section; then plug in idle section fully; and finally complete the patch by setting in (or throwing) the plugs to the active line section simultaneously.

(5) *Prohibitions.* Although the PTF was designed to minimize the chances that red and black circuits can be patched together, operators should especially be alert to this possibility. Red circuits must not be patched to black circuits directly. The electrical isolation of circuits provided by the red/black isolator cabinets must not be defeated.

3-5. Patching for Equipment Solutions

Some typical patch cord connections are provided here to illustrate connections for patching in substitute equipments. PTF operator personnel should examine the diagrams and determine if they understand the principle involved.

a. Modem Substitution (fig. 3-1). This patch removes the modem on circuit number 2 and substitutes a spare modem from circuit number 21. At bay 1.5 a multicircuit patch cord is connected from the COMP jack of channel 2 to the MODEM jack of channel (circuit) 21. On the VF entrance panel, Bay 1.2, two 2-wire cords are used to connect the modem transmit and receive lines from circuit 21 to the lines of circuit 2.

b. Isolator Substitution (fig. 3-2). Isolator substitution involves the multicircuit (12-wire) patch cords. In this case, it is assumed that operational spares for the isolators are connected to circuit 19. On the black patch the MODEM jack of circuit 2 is connected to the COMP jack of circuit 19. On the other side of the isolator cabinet

(red dc patch) the MODEM jack of circuit 19 is connected to the COMP jack of circuit number 2 to complete the patch.

c. DLIU Substitution (fig. 3-2). This patch is presented schematically which better shows the principle involved in patching. The defective DLIU is the top one in the diagram. Patch cords are connected to divert the signal (transmit only) from the top 2-wire line to the spare DLIU on the bottom line and then back to the correct line on the top.

3-6. Patching for Park Location

Patching for fault location includes loopback by use of special test cords and plugs and use of the BERT for troubleshooting.

a. Loopback. Loopback is a method for connecting the transmitting lines of a communication device to its received lines. The purpose of the loopback is so that a standard, or test message may be sent from and to the communication device for comparison of the transmitted to the received message for testing purposes. At the PTF, request for loopback comes for either the AMME or the remote terminals. Two special loopback cables and one special plug are provided at the PTF. The use of the cables and plug is illustrated in figure 3-4.

(1) *Black test patch cord.* The black test cord is identified by the plug ends. One end has three pins and the other nine pins. It is used for looping back the AMME signal as shown in B, figure 3-4.

(2) *Red test patch cord.* The red test cord is identified by the plug ends. One end has three pins and the other has five pins. It is used in conjunction with the red test plug for looping back a secure remote terminal as shown in C, figure 3-4.

(3) *Red test plug.* The red test plug is used to loop back a remote terminal signal as shown in C and D, figure 3-4.

b. BERT Patching. When the BERT is used for troubleshooting as described in chapter 4, it is connected and patched into the system as shown in figure 3-5. This arrangement may or may not be practical depending on the length of the patch cords.

CHAPTER 4

MAINTENANCE

Section I. GENERAL

4-1. scope of Maintenance

NOTE

Daily checks must be performed by the PTF operator. All other checks will be performed by base electronic repair personnel.

Maintenance for a PTF includes the follow& functions:

a. Dally and weekly preventive maintenance checks and services (para 4-5).

b. Monthly preventive maintenance checks and services (pare 4-6).

c. Quarteti preventive maintenance checks and services (para 4-7).

d. **Cleaning (para 4-8).**

e. Touchup painting (para 4-9).

j! Troubleshooting

4-2. Tab, Materials, and Test Equipment Required for Maintenance

Q. Tools. Tool Kits, Electronic Equipment TK-100/G TK-101/G, and TK-105/G.

b. Materids.

(1) Lint-free cloth.

(2) Brush (MIL-G-7241).

(3) Distilled water.

(4) Lubricating oil, general purpose, preservative (PL Special) (NSN 9150-00-1P5-0629).

(5) Fine sandpaper, No. 000.

c. Test Equipment.

(1) All rack-mounted test equipment listed in appendix B.

(2) Multimeter AN/USM-223, or equivalent.

Section II. PREVENTIVE MAINTENANCE PROCEDURES

4-3. Preventive Maintenance

Preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in serviceable condition and assure maximum operational capability. Preventive maintenance is the responsibility of PTF operating personnel (daily) and base electronic repair personnel (all other times).

a. Systematic Care. **The procedures given in paragraphs 4-4 through 4-7 cover routine systematic care and cleaning essential to proper unkeep and operation of the equipment.**

b. Preventive Maintenance Checks and Services. **The preventive maintenance checks and service charts (para 4-5, 4-6, and 4-7) outline functions to be performed at specific intervals (para 4-4). These checks and services are to maintain equipment in good general (physical) condition and in good operating condition. To assist maintenance personnel in maintaining the equipment in peak condition, the charts indicate what to check, how to check, and the normal conditions. The *References* column lists the paragraphs or manuals that contain detailed repair or replacement procedures.**

4-4. Preventive Maintenance Checks and Service Periods

Preventive maintenance checks and services of the PTF are required on a daily, weekly, monthly, and quarterly basis unless otherwise directed by the station commander.

a. **Paragraph 4-5 specifies checks and services that must be accomplished weekly and under the special conditions listed below.**

(1) When the equipment is installed initially.

(2) When the equipment is reinstalled after removal for any reason.

(3) At least once each month if the equiment is maintained in standby condition.

b. **Paragraphs 4-6 and 4-7 specify additional maintenance checks and services that must be performed monthly and quarterly, respectively.**

4-5. Daily and Weekly Preventive Maintenance Checks and Services Charts

Perform the maintenance functions indicated in the daily and weekly preventive maintenance checks and service charts below daily (operator) and weekly (base electoronic repair personnel) respectively. Adjustment of the maintenance in-

terval must be made to compensate for any unusual operating conditions.

a. Patch and Test Facility (Daily).

Sequence No.	Item to be inspected	Procedure	References
	Alarm lamps	Press test button on alarm panels.	

b. Equipment Racks, Equipment, and Power Distribution Panel (Weekly).

Sequence No.	Item to be inspected	Procedure	References
1	Cleanliness	Remove dirt, dust, and other foreign matter from all exposed exterior surfaces.	Para 4-8
2	Connectors	Check cables and connectors for secure fit.	None
3	Mounting	Check to be sure that the units are securely mounted.	None
4	Operation	During normal operation, observe that the mechanical action of each switch and control is smooth and free of binding.	None
5	Lamps	Check all indicating lamps. Replace defective lamps.	None

4-6. Monthly Preventive Maintenance Checks and Service Charts

Perform the maintenance functions indicated in the monthly preventive maintenance checks and service chart below once each month. A month is defined as approximately 30 calendar days. Adjustment of the maintenance interval must be made to compensate for any unusual operating conditions. Equipment maintained in a standby condition must have monthly preventive checks and service.

a. Patch and Test Facility (Monthly).

Sequence No.	Item to be inspected	Procedure	References
1	Grounding System	Inspect the station grounding system.	
2	Movable parts	Check all hinges, latches, and metal-to-metal moving parts as necessary. a. Clean and paint bare metal parts. b. Tighten loose screws, nuts, and bolts. c. Lubricate.	Para 4-9 and 4-9
3	Cables, wires, and cords	a. Tighten screws, clamps, and nuts that secure wires to terminals. b. Repair insulation cuts and abrasions with electrical insulation tape.	a. None. b. None.
4	Electrical system conduits and switching	Tighten loose screws, bolts, and clips. Repair or replace defective switches, switchplates, outlets, and receptacles.	Fig. 5-3 through 5-5
5	Equipment mountings	a. Tighten all loose bolts, nuts, screws, and clamps that secure equipment racks frames, shelves, braces, and mounting hardware. Replace missing hardware. b. Check to see that equipment mounting racks, frames, shelves, braces and clamps are not bent, broken, or out of shape to endanger equipment or personnel	None None

Sequence No.	Item to be inspected	Procedure	References
6	Fuses	Check fuses at fuse panel and equipment. Replace defective fuses. Verify that all operating fuses are of the correct value. Check spare fuses for proper value and quantity.	Fig. 1-3

b. Equipment (Monthly). Perform periodic checks and services on each equipment in the facility (app A).

4-7. Quarterly Preventive Maintenance Checks and Service Charts

Quarterly preventive maintenance checks are required on the PTF. Periodic daily, weekly and monthly services constitute a part of the quarterly preventive maintenance checks and services and must be performed concurrently. All deficiencies will be recorded and corrected.

a. Patch and Test Facility (Quarterly).

Sequence No.	Item to be inspected	Procedure	References
1	Publications	Check to see that all publications are complete, serviceable, and current.	None
2	Mounting	Verify that all bolts, nuts, and washers are correctly positioned and properly tightened. Check for cracked, bent, or broken brackets.	None

b. Equipment.

Sequence No.	Item to be inspected	Procedure	References
1	Completeness	See that the equipment is complete.	App A
2	Reservation	Check all surfaces for evidence of fungus. Remove rust and corrosion and spotpaint bare spots.	Para 4-8
3	Connections	Verify that plugs, sockets, and jacks are clean, intact, and not loose fitting.	None
4	Pluck-out items	Inspect clamps and seating of pluck-out items. Check for wrong, bent, or broken parts.	None
5	Knobs, dials, and switches	While making the operating checks, observe that the mechanical action of each knob, dial, and switch is smooth and free of external or internal binding.	None

4-8. Cleaning

a. Remove dust and loose dirt from the exterior surfaces with a clean, soft cloth.

WARNING

The fumes of trichloroethane are toxic. Provide thorough ventilation whenever used. DO NOT use near an open flame. Trichloroethane is not flammable, but exposure of the fumes to an open flame or hot metal surface forms highly toxic phosgene gas.

b. Remove grease, fungus, and ground-in dirt from the equipment; use a cloth dampened (not wet) with trichloroethane.

CAUTION

Do not press on the indicator face (glass when cleaning; the indicator may be damaged.

c. Clean indicator glass; use a soft, clean cloth. If difficulty in removing dirt occurs, dampen the cloth with water. Mild soap may be used to make cleaning more effective.

4-9. Touchup Painting Instructions

a. When the finish on the exterior of the equipment has been scarred or damaged, corrosion may be prevented by touching up the surfaces. Touch up the surface as outlined in (1), (2), and (3) below.

(1) Use No. 000 sandpaper to clean the surface down to the bare metal; obtain a bright clean finish.

(2) Sand the area back to solid paint and feather the paint edge that leads to exposed metal.

(3) Wipe the area clean and apply to metal surfaces one coat of zinc chromate metal primer

(NSN 8010-00-835-2114) and two thin finish coats of enamel.

b. When a touchup paint job is necessary, apply paint with a small brush.

Section III. TROUBLESHOOTING

4-10. General

a. Troubleshooting in the PTF involves determining which circuit is defective and then locating the defect in the item or equipment unit. The first approach or step is on a system basis, to find out what piece of equipment is faulty in a series of equipments that make up the communications chain. The active components of the communication chain are the AMME, red/black isolators, modem, the communication lines, modem at the remote site, and the remote terminal equipment. A fault in any unit will degrade or interrupt communications.

b. The time required in the troubleshooting procedure depends on the complexity of the trouble. The simpler type troubles, such as a power supply failure, provide an alarm indication and can be located immediately. Troubles that degrade the signal or increase the errors received in a message require more time because they require the use of test equipment and a test procedure.

c. Repairing the faulty piece of equipment depends on the maintenance concept for that item. *For example*, if the equipment is maintained by a contractor, PTF personnel must take the equipment out of service and notify the contractor. When the equipment is maintained by base electronic repair personnel at the PTF, the equipment must be taken out of service to be repaired using the troubleshooting procedure in the equipment manual for that equipment (app A).

d. Troubleshooting procedures in this section cover the procedure used in the first troubleshooting step; that is, locating the faulty equipment in the communication chain (para 4-11) and a troubleshooting chart for a specific equipment item which does not have its own manual. The PTF equipment item that does not have its own manual is the major and major-minor alarm panels. The troubleshooting chart (para 4-13) will aid in locating the defective component of the faulty major or major-minor alarm panel. All other equipment items have their own manuals, listed in appendix A, which contain troubleshooting data for the repair of the item.

4-11. Troubleshooting Communications Channel

NOTE

The following procedure applies only to those circuits utilizing Timeplex modems.

a. The communication chain which connects the AMME to the remote terminal equipment has several functional areas that can degrade communications. The functional areas are shown on the block diagram, figure 4-1. The slow degradation of a communication signal is more of a problem to the person in care of repair than the complete failure of a single equipment. In the communication chain shown, a diagnostic program can be run on the AMME and the remote terminal equipment, to determine if they are degrading the system. The transmission system represented by the modems and communication lines requires a special piece of test equipment called a bit error rate tester (BERT). It generates a known digital signal that can be transmitted to itself for the purpose of determining any errors created in the transmission. The number of errors is received by the BERT, installed by it and the total gives an indication of the quality of the transmission medium or circuits being tested. That is, a high number of errors represent the transmission through faulty circuits, a low number of errors recorded represent normal transmission.

b. Use of the BERT in testing a typical communications system is shown in figure 4-1. In this case the BERT is connected into the modem side of the black patch panel to supply signals to the modem, the communications lines and the remote terminal modem. The lines looped back at the points are shown separately, progressing from left to right on the diagram. At each loop back point, the BERT is operated and the total number of errors is noted. A significant increase in errors, caused by the addition of a loop back segment, pinpoints, the cause of the trouble to that added segment. If the modems prove defective by this method, they should be replaced (or patched around). If the communications lines prove defective, they should be reported to the maintenance personnel responsible for the communications lines.

4-12. Station Diagrams

In addition to this manual, a considerable amount of data is contained in the station drawings. Site personnel must become familiar with the in-

formation contained in them. Source of the information contained in the station drawings are as follows:

a. Cable runs (routing through cable ducts).
b. Cable pair color coding connections.
c. Cross-connection diagrams.
d. Location and stenciling of terminal blocks.

4-13. Use of Trouble Charts.

Troubleshooting of this facility is based upon malfunctions that may occur during normal operation of the equipment in the system. When a trouble occurs, refer to the *Trouble symptom* column in the chart. Perform the checks and corrective measures indicated in the *Check and corrective maintenance* column to locate and clear the trouble.

Item	Trouble symptom	Probable trouble	Check and corrective maintenance
1	No tone from audible indicator with an alarm panel light illuminated.	*a.* Tellite has been depressed, locking out audible tone.	*a.* Check for trouble as indicated by switch light.
		b. Ground from alarm panel not being extended to audible indicator.	*b.* Provide ground on audible indicator with jumper wire. If alarm does not sound, check for voltage at audible indicator. If voltage is present, audible indicator is defective. (1) If alarm sounds when ground is provided, circuit trace ground back to alarm panel. (1) If voltage is not found at alarm, trace voltage back to the dc power supplies.
		c. Ground not being extended through alarm panel.	*c.* If no continuity exists to ground from the alarm panel, remove alarm panel from rack to gain access to the component parts. With the top and bottom covers removed, make a continuity check, using a volthohmmeter (VOM), from the pin number corresponding to the illuminated lamp to switch pins NC1 COM1. Refer to LBAD-D-33163, symbol SW3, for switch location. If continuity is obtained on COM1 but not NC1, this indicates a defective switch. Be sure that the (+) lead of the VOM is connected to the corresponding lead (1-4). This will forward bias the diode in the circuit, thus insuring a valid VOM reading. If continuity is not obtained at either NC1 or COM1, check associated diode. Refer to parts list, symbol CR1, parts location.
2	Audible tone from alarm converter without any lamp indication on alarm panels.	Defective lamp in switch.	*a.* Depress switch SW1. All switches should glow red. Press switch SW2. All switches should glow amber. If any switch fails to glow in either color, replace associated bulb. *b.* If all switches fail to light, check circuit breaker located on front panel. Reset if found deactivated.
3	Equipment is known to be in an alarm condition with no alarm indication given.	Ground not being extended from equipment to alarm panel.	Remove connector from back of alarm panel. Locate pin associated with equipment alarm and check for ground. *a.* If ground is found, internal wiring of alarm panel is defective. *b.* If no ground is found, circuit trace wiring back to MDF where ground originates. Use station drawing showing the alarm wiring.
4	Audible alarm interrupted only while switch is depressed.	Switch is defective.	To check the switch coil, remove the panel from the bay to gain access to the component parts. With the top and bottom covers removed, a reading of approximately 340 ohms across pins 4 and 5 indicates a good coil, while an open reading will require the replacement of the switch.

CHAPTER 5

COMPONENT FUNCTIONING

5-1. General

This chapter covers the functioning of items manufactured by Lexington-Blue Grass Army Depot and installed in the PTF. These items do not have their own individual manuals but are covered in this manual and in the station drawings. The station drawings cover the complete schematic diagram and how the item is connected into the station. The parts for these depot manufactured items are listed in appendix C.

5-2. Patching Modules (fig. 5-1)

Four different types of patching modules (patch panels) are used in the PTF. The differences are based on the type of signals that the patch panels are designed to handle. Four different types of signals are involved in the PTF. These are the dc signals from the modem to the AMME, the audio signals which enter and leave the PTF, the low level teletype-writer signal transmitted between the DLIU and AMME (at present is not used), and the high level signal output from the DLIU (when used). Each type signal has a special requirement and a special type of patch panel.

a. 12-Wire Patch Module (A, fig. 5-1). The 12-wire patch module is required for the signal between the AMME and the modem. Of the 12 wires, six are required to carry the transmitting data and control signals, the other six carry the receiving data and control signals. A series of three 12 wire jacks is used for each of 16 circuits available in the module. There are two normal through and one monitor jack per circuit.

(1) Following the circuit path from the AMME to the modem through the patch module, is a separate 12-wire connector for the wires from the AMME, a normal through jack (marked COMP), another normal through jack (marked MODEN), to a separate connector for the 12 wires to the modem. A 12-wire jack, marked MON, is also connected to the circuit for monitoring purposes.

(2) During patching operations one end of a patch cord connected to the COMP jack breaks the through connection to the MODEM jack and puts the lines from the AMME in series with the patch cord. The other end of the patch cord transfers the wires to another circuit which would be connected to the MODEM jack. The connection into the MODEM jack disconnects the through circuit connection and puts the patch cord in series connection to the modem.

b. 2-Wire Audio Module. The 2-wire audio module is used in the vF entrance jackfield. A module handles twenty-four 2-wire circuits using four 2-wire jacks arranged vertically for each 2-wire circuit. A duplex circuit uses two vertical jack sets, one for the transmit line and one for the receive line.

(1) A 2-wire line connected to pins 1 and 2 on C1 (B, fig. 5-1), proceeds through the equipment as follows: from C1 to the LINE jack; from the LINE jack to C2 where it is looped around by P1; from C2 to the EQUIP jack; from the EQUIP jack to the equipment side of the line at C1. Two jacks, marked MON, are used for monitoring lines connected to the equipment and the line jacks.

(2) For patching, a 2-wire patch cord is used for each transmit and receive line. Connecting to the LINE jack, the patch cord is in series with the line side of the patch panel and the equipment side of the patch panel is disconnected by action of the LINE jack. To transfer the line to another circuit's equipment line, the second end of the patch cord is inserted into the EQUIP jack of that circuit. This action disconnects the line from the equipment in that circuit and completes the patch.

c. Low Level Patch Module. The low level patch module is configured the same as the 2-wire audio patch modules. That is, there are two normal through and two monitor jacks per circuit and 24 circuits per module.

(1) Following the circuit of the diagram (C, fig. 5-1) from where the line is connected to where the equipment is connected, are the LINE normal through jack and the EQUIP normal through jack. Parallel connections from both the LINE and EQUIP jacks are two monitor jacks marked LINE and EQUIP. jacks are tow monitor jacks marked LINE and EQUIP. Both monitor jacks are isolated by 15K resistors from the communication lines to reduce any possible loading by the monitoring equipment.

(2) Patching for this module is the same as the 2-wire audio module explained above. That is, a 2-wire patch cord set into a normal through jack to break the communication line and divert it to a new path.

d. High Level Dc Patch Module. The high

level dc patch module is used to patch the high level (120 vdc) teletypewriter signals that are the output of the DLIU. The patch module is configured similar to the other 2-wire patch modules; that is, four vertical jacks per circuit, 24 circuits to the module.

(1) Following the line connections to the equipment connections on the diagram (D, fig. 5-1), an arrangement different from the ones previously encountered is found. One wire of each circuit pair is routed through a monitor jack before connecting to the normal through patch jacks. In this case each monitoring jack (MON) is connected in series with the lines rather than as before, in parallel.

(2) The patching principal for this module is the same as previously encountered. The patch cord inserted into the normal through jack breaks the circuit and the patch cord is used to transpose the wires to another circuit number. Monitoring however, is entirely different because instead of a parallel connection a series one is used. The series connection provides a means of connecting a dC milliammeter in series with the line for measuring and setting the teletypewriter current.

5-3. Major -Minor Alarm Panel

The major-minor alarm panel centralizes, within a single panel, alarm controls up to 45 alarm circuits. Each alarm circuit condition is displayed through a lighted segment of the front panel, which is also a switch used for removing the audio alarm. Each item which provides an alarm input to the alarm panel can be designated a major or minor alarm. The major and minor alarms conditions are displayed in different colors.

a. Considering first the external circuits which connect to the major-minor alarm panel (fig. 5-2), there is a possibility of 90 inputs for alarms. Each alarm is signaled by a ground input to pins 1 through 90 on the main connector. Pins 91 and 92 are outputs (grounds) which go to an audible indicator, causing it to sound. Other pins on the main connector are dc ground and input power, negative 60 volts direct current.

b. Internal circuits are 45 identical switches and components used for controlling the alarm and items common to all circuits, such as power.

(1) Following an alarm ground, generated by the closing of a switch, left hand side of figure 5-2, through the main connector pin 1 or 2, the following occurs: diode CR1 or CR2 is forward biased, current flows through either CR1 or CR2, voltage dropping resistor R1 or R2, indicating lamp L1 or L2, from the negative power supply connected at pins 97 through 100 of the main connector. Indicating lamp L1 or L2 is part of switch S3 and causes the segment on the front panel representing the alarm to light, signaling the alarm condition.

(2) Again, following an alarm ground from either the major or minor switch, into pin 1 or 2 of the main connector, a second path can be followed. This path provides an interruptable output ground (at pin 91) which goes to the audible alarm. The other side of the audible alarm (not shown) is connected to the 60 vdc supply. The current path is from the negative 60 vdc supply to the audible alarm; to pin 91 on the alarm panel; through the normally closed switch contact of S3; through forward biased diode CR3 or CR4; to pin 1 or 2 on the main connector on the alarm panel.

(3) As the result of the alarm ground input to the alarm panel, indicator lamp L1 or L2 lights. Also, the audible alarm sounds. The operator responding to the alarm, presses the alarm switch (lighted panel segment) on the alarm panel front. This action silences the audible alarm and sets the alarm switch into the manual lock, or latch position.

(4) The electrical circuit set up when the operator presses the alarm switch, results in energizing the coil in S3 (alarm switch). Current flow is now routed through R3, limiting resistor, pin 5 of S3, through the coil of S3, which holds the armature and switch S3 in the locked position and through diode CR3 or CR4 to ground. This condition holds until the alarm ground on the input to the alarm panel is removed by clearing the trouble which caused the alarm.

(5) To test the lamps of the alarm panel, switches S1 and S2 are provided. Operation of each is the same. When the switch is pressed, a ground is connected to the input of all 45 alarm switch circuits. They are all similar to circuit number 1 shown. Either CR5 or CR6, depending on which switch is pressed in every circuit, is forward biased and current flows through each individual lamp (L1 or L2) from the negative power supply and resistor R1 or R2.

5-4. Major Alarm Panel (Fig. 5-3)

The major alarm panel operates as an indicator for remote troubles. Except for the number of components utilized in the circuitry, its function is similar to the operation of the major-minor alarm panel described in paragraph 5-3.

5-5. Fuse and Alarm Panel

The fuse and alarm panel is used as a central point for the location of fuses. It also contains indicator lamps which indicate when an alarm sounds (where the alarm is the result of a blown fuse in the alarm

palmi or results from a problem in piece of equipment outside the fuse and alarm panel). A third, and indpendent function of the fuse and alarm panel involves a milliammeter installed on the front panel. The milliammeter is connected to three front panel jacks and is used to measure the line current and voltage in connection with the DLIU adjustment.

a. Fuse Alarm Circuit. When a fuse blows in the fuse and alarm panel, a lamp marked FUSE ALARM lights on the panel. Also, an audible alarm sounds bringing the operator's attention to the FUSE ALARM LIGHT. Defective fuses are found by inspection and replaced manually to clear the alarm.

(1) Starting on the left hand side of the simplified schematic diagram (fig. 5-4) with pin 1 of TB-1, the input, and following the line to the right through fuse F1 and the output. Fuse F1 is the alarm type and when its link fails, the output is disconnected and the input is then connected to coil of K1, energizing it. When K1 energizes, the FUSE ALARM lamp lights and an alarm ground is connected to the alarm panel which eventually sounds the audible alarm.

(2) The fuse and alarm panel contains five other relay circuits similar to the circuit of K1 described above. There is a separate relay for each of the six voltages passing through the fuse and alarm panel. A failure of any fuse in any one of these voltages causes a relay to energize and lights the FUSE ALARM lamp.

b. Equipment Alarm Circuit. An equipment alarm ground, shown as an input at pin 8, TB-1, to energize and EQUIP ALARM DS2 to light. A second relay contact connects ground to the major minor alarm panel which sounds the audible alarm.

5-6. Power Circuits

Power for operation of the patch and test facility are provided as follows; alternating current (ac) is provided through power distribution boxes located in the P&T crypto rooms (fig. 1-1); direct current (dc) is provided by the dc power supplies located in bay 1.2. Schematic and wiring diagrams for power distribution are provided by figures 5-5 through 5-8.

APPENDIX A

REFERENCE

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	US Army Equipment Index of Modifications Work Orders.
DECEO H500-12-64	DCS Technical Control Engineering Criteria.
TB 43-0118	Field Instructions for: Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 11-6625-602-12	Operator's and Organizational Maintenance Manual Including Repair Parts and Special Tools Lists: Test Set, Telephone AN/USM-181 and Hewlett-Packard Model 3550B.
TM 11-6625-1510-15	Operator's Organizational, DS, GS, and Depot Maintenance Manual: Textronix Incorporated Oscilloscope, Type 561A; Time Base Type 2B67; Amplifier Type 2A60, and Dual-Trace Amplifier Type 3A72.
TM 11-6625-2626-15	Operator's, Organizational, Direct Support, General Support, and Depot Maintenance Manual; Northeast Electronics Corporation Noise-Level-VU Measuring Set, Model TTS-57B.
TM 750-244-2	Procedures for Destruction of Electronics Material to prevent Enemy use.
TO 31W2-FGC151-2	SVC Instr—Power Supply, Type PP-6132/FGC-151, Model 643C, 643P (Tele-Signal)—AN/FGC-151.
TO 31W4-2FGC-152	SVC Instr-Electrical Equipment Shelves, Types MT-3488/FGC, MT-4238/G, Models 639, 639B (Tele-Signal).
TO 31W-4-261-2	SVC Instr—Power Supply, Type PP-6062/G, Model 676D, 676P (Tele-Signal).

COMMERCIAL MANUALS

(The following commercial manuals may be procured from the addresses listed below the manual)

"Bert 901 Bit Error Rate Tester"
II Communications Corporation
159 Terwood Rd.
Willow Grove, Pa 19090

"Bert 901-Use of the I.I. 202C Interface
Adapter and Applications to Bell 201 and 202
Modems"

"Power Supply Model P-12 (P/N 11857)"
Venitron, Inc.
6930 Chillum Place NW
Washington, D C, 20011

"Isolation Device Model B-2028" Venitron, Inc.

"Series T Housing" Venitron, Inc.

"Model 676D PP-6062/G/FSA-62 Polar 6V Power
Supply"
Tele-Signal Corp.
250 Crossways Park Drive
Woodbury, LI, NY 11797

"Model 643C Power Supply"
Tele-Signal Corp.

"Intercom, Master, R261A"
Webster Electric Company
Racine, Wisconsin 53403
Intercom, Master R2812A "Bulletin 211-46170"
"Type R561B Oscilloscope"
Tektronic, Inc.
P.O. Box 500
Beaverton, Oregon 97005
"Type 3A72 Type Plug-in"
Tektronic, Inc.
"Type 3B3 Plug-In Unit"
Tektronic, Inc.
MDS Model 2407 ICC Automated Telecommunications
Center (ATCC)
Mohawk Data Science Corp.
Palisade Street
Herkimer, NY 13350
"Dual Speaker Panel"
Engineered Devices Company, Inc.
680 Bizzel Drive
Lexington, KY 40504
"Model TTS 37B Noise-Level VU Measuring Set"
Northeast Electronics Corp.
P.O. Box 649
Concord, NH 03301

DEFENSE COMMUNICATION AGENCY CIRCULARS

DCAC 310-50-3	Concept for Technical Control of the Defense Communication System.
DCAC 310-70-1	Vol I, DCS Technical Control Policy and Facilities; Vol II, DCS Technical Control Procedures; Vol IV, DCS Technical Control Glossary.
DCAC 370-D95-1	System Description DCS-AUTODIN
DCAC 330-175-1	DCS Engineering-Installation Standards Manual.
DCAC 300-175-9	DCS Operating-Maintenance Electrical Performance Standards.

APPENDIX B

L I S T O F I N S T A L L E D

Section I. INTRODUCTION

B-1. Scope

This appendix contains a list of items installed. This list is required for operation and performance of organizational, direct support, and general support maintenance of the Automated Telecommunications Center (ATCC) Patch and Test Facility (P and T), Oakland Army Base, Oakland, California.

B-2. General

This list is divided into the following sections:

a. Section II—List of Items Installed. A list of items installed, by bay sequence, in the Oakland Panel T.

b. Section III—National Stock Number and Part Number Index. Not applicable.

B-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings:

a. Illustration. This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item number.* The number used to identify each item called out in the illustration.

b. Source, Maintenance, and Recoverability Codes (SMR). Not applicable.

c. National Stock Number. Indicates the National stock number assigned to the item and will be used for requisitioning purposes.

d. Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.

NOTE

When a stock-numbered item is requisitioned, the repair part received may have a different part number than the part being replaced.

e. Federal Supply Code for Manufacturer (FSCM). The FSCM is a 5-digit numeric code listed in SB 708-42 which is used to identify the manufacturer, distributor, or Government agency, etc.

f. Description. Indicates the Federal item name and, if required, a minimum description to identify the item.

g. Unit of Measure (U/M). Indicates the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr, etc.). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.

h. Quantity Incorporated in Unit. Indicates the quantity of the item used in the breakout show on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly.

B-4. Sported Information

Not applicable.

B-5. Row to Remote Repair Parts

This appendix does not contain an index. To locate an installed item scrutinize column 6 of the list of items installed.

SECTION II. LIST OF ITEMS- INSTALLED (OAKLAND P & T)

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UNIT OF MEAS	(8) QTY INC IN UNIT
						ROW 1 ELEVATION PATCH AND TEST AREA LBAD-D-51506		
						BAY 1.2 MISC EQUIP. BAY LBAD-C-51515		
C-8	1			LBAD-D-51556	21617	CABINET, CY3397A/C Modified	EA	1
C-3				LBAD-D-29022	21617	FUSE AND ALARM PANEL	EA	1
C-1				LBAD-D-29011	21617	SHELF - DLIU		
C-12				DLI	NONE	DIGITAL LINE INTERFACE UNIT, APPLIED ELECTRONIC MFG. INC. STANFORD CONN.	EA	2
C-13				LBAD-D-33162	21617	MAJOR ALARM PANEL	EA	1
C-2				LBAD-D-33161	21617	MAJOR-MINOR ALARM PANEL	EA	1
				SR-143A	10241	±60/120 VDC ALARM PANEL, TELE SIGNAL	EA	2
			6350-00-102-4210	SC-628		AUDIBLE INDICATOR	EA	1
				R2812A	64294	INTERCOM WEBSTER	EA	1
				H522-1	64294	HANDSET INTERCOM	EA	1
			5975-00-122-2359	SK-2419	74156	SHELF, WRITING	EA	1
			5805-00-939-3964	639	10241	SHELF, TELE SIGNAL	EA	1
			5805-00-103-3572	643C	10241	POWER SUPPLY ±60/120 VDC	EA	2
			5895-00-531-9742	639B	10241	SHELF, TELE SIGNAL, ±60/120 VDC	EA	2
			580500-103-7136	676D	10241	POWER SUPPLY, ±60/120 VDC	EA	2
			5805-00-939-3964	639	10241	SHELF, TELE SIGNAL	EA	1
			5805-00-103-3572	643C	10241	POWER SUPPLY, ±60/120 VDC	EA	2
C-8				LBAD-D-29094	21617	AC OUTLET		
						BAY 1.3 VF ENTRANCE FRAME AND PATCH BAY LBAD-C-51516		
C-8				LBAD-D-51556	21617	CABINET, CY3397A/C Modified	EA	1
				SD2 SP00	NONE	SPEAKER PANEL, DUAL	EA	1
C-7				LBAD-D-28563	21617	2 W AUDIO PATCH PANEL	EA	3
C-6				LBAD-D-28568	21617	INTERBAY PATCH PANEL	EA	1
			5975-00-122-2359	SK-2419	74156	WRITING SHELF	EA	1
C-10				LBAD-D-51524	21617	VF ENTRANCE FRAME	EA	1
C-10	2			421C-1CN	81812	TERMINAL BLOCK	EA	
						BAY 1.4 TEST BAY LBAD-C-51517		
C-8				LBAD-D-51556	21617	CABINET, CY3397A/C Modified	EA	1
			6625-00-133-7496	TIS-378R	06819	NOISE MEASUREMENT SET	EA	1
			6625-00-740-9344	HP3550BR	28480	TRANSMISSION MEASURING SET AN/USM-[illegible]	EA	1
			6625-00-449-7652	R561B	80009	OSCILLOSCOPE	EA	1
			6625-00-248-3620	3A72	80009	DUAL TRACE AMPLIFIER, OSCILLOSCOPE	EA	1
			6625-00-247-4461	3B3	80009	TIME BASE, OSCILLOSCOPE	EA	1
C-6				LBAD-D-28568	21617	INTERBAY PATCH PANEL	EA	1
			5975-00-122-2353	SK-2419	74156	SHELF, WRITING		
C-8				LBAD-D-29094	21617	AC OUTLET	EA	1

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SECTION II. LIST OF ITEMS- INSTALLED (O-P&T) (CONTINUED)

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION / USABLE ON CODE	(7) UNIT OF MEAS	(8) QTY INC IN UNIT
						BAY 1.5 BLACK DC PATCH BAY LBAD-C-51518		
C-8				LBAD-D-51556	21617	CABINET, CY3397A/G Modified	EA	1
				153-094A(16)	02002	MULTI CIRCUIT PATCH PANEL	EA	3
C-5				LBAD-D-2414	21617	DC L/L PATCH PANEL W/O CK & LP (XMIT)	EA	2
C-6				LBAD-D-33684	21617	MISC PATCH PANEL	EA	1
			5975-00-122-2359	SF-2419	74156	SHELF, WRITING	EA	1
C-8				LBAD-D-29094	21617	AC OUTLET	EA	1
						BAY 1.6 BLACK DISTRIBUTION FRAME LBAD-D-51519		
C-8				LBAD-D-51556	21617	CABINET, CY3397A/G Modified	EA	1
C-8				SM-D-433907	80063	DOOR CABINET	EA	1
C-11				LBAD-D-51527	21617	FRAME	EA	1
C-11	2			421C-10W	81812	TERMINAL BLOCK	EA	
						BAYS 1.7, 1.8, 1.9 MODEM BAYS LBAD-C-51520		
C-8				LBAD-D-51556	21617	CABINET, CY3397A/G Modified (All Bays)	EA	1
						POWER SUPPLY (Astrodyne) (Bay 1.7) *	EA	2
						MODEM (Timeplex) (Bay 1.7) *	EA	16
						MODEM (WE Dataphone 2400) (Bay 1.8) *	EA	2
						MODEM (WU 2200/24) (Bay 1.8 and 1.9) *	EA	7
C-6				LBAD-D-28576	21617	INTERBAY PATCH PANEL	EA	1
			5975-00-122-2359	SF-2419	74156	SHELF, WRITING (Bay 1.7)	EA	1
C-8				LBAD-D-29094	21617	AC OUTLET (All Bays)	EA	1
						BAY 1.10 FUTURE EQUIPMENT BAY LBAD-D-51506		
C-8				LBAD-D-51556	21617	CABINET, CY3397A/G Modified	EA	1
C-8				LBAD-D-29094	21617	AC OUTLET		
						ROW 2 ELEVATION (COMSEC) (Vault) LBAD-D-51509		
						BAY 2.1 RED DC PATCH BAY LBAD-C-51521 (SAME AS BAY 1.5)		
						BAY 2.2 COMSEC AUTODIN CKT. NO. 1 BAY		
						BAY 2.3 COMSEC AUTODIN CKT. NO. 2 BAY		
						BAYS 2.4, 2.5, AND 2.6. SPACE RESERVED FOR FUTURE USE.		
						BAY 2.7 COMSEC HY-2 SCS NEST AUTOSEVOCOM		
						ROW 3 ELEVATION (COMSEC VAULT) LBAD-C-51510		
						BAY 3.1 BLACK DC PATCH BAY LBAD-C-51518 (SAME AS BAY 1.5)		
						BAY 3.2 BLACK DISTRIBUTION FRAME LBAD-C-51519 (SAME AS BAY 1.6)		

*Leased Equipment.

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SECTION II. LIST OF ITEM - INSTALLED (OAKLAND P & t) (CONTINUED)

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION / USABLE ON CODE	(7) UNIT OF MEAS	(8) QTY INC IN UNIT
						ROW 4 ELEVATION (COMSEC VAULT) LBAD-C-51511		
						BAY 4.1 RED DISTRIBUTION FRAME BAY LBAD-D-51522		
C-8				LBAD-D-51556	21617	CABINET, CY33397A/G Modified	EA	1
C-8				SM-D-433907	80063	DOOR, CABINET	EA	1
C-9				LBAD-D-51532	21617	FRAME	EA	1
C-9				421C-10W	81812	TERMINAL, MOUNTING BLOCK	EA	40
						BAY 4.2 RED DC PATCH BAY LBAD-C-51521 (SAME AS BAY 1.5)		
						BAY 4.3 RED-BLACK ISOLATOR LBAD-C-51532		
				LBAD-D-51638	21617	RED/BLACK, ISOLATOR CABINET MOD ARR	EA	1
				T-126W	17297	HOUSING, RED/BLACK ISOLATOR CABINET	EA	1
			5805-00-009-3475	P-12	17297	POWER SUPPLY	EA	150
				R-2028	17297	ISOLATOR, DIGITAL DATA AND TIMING	EA	75
						MOBILE TEST BAY LBAD-D-51559		
						CABINET, INSTRUMENT, PORTABLE	EA	1
C-6				LBAD-D-38567	21617	MISC PATCH PANEL	EA	1
				BERT-901	51527	BIT ERROR RATE TESTOR	EA	1
				MIL-STD-188	51527	INTERFACE MODULE FOR BERT 901	EA	1
			6625-00-988-2892	AN/USM-16	80058	DISTORTION TEST SET	EA	1
						PATCH CORDS, PLUGS, AND MISC		
				#SPC-12-24	02002	PATCH COND	EA	9
				#SPC-12-48	02002	PATCH COND	EA	9
				LBAD-D-51561	21617	PATCH COND, BLACK TEST	EA	2
				LBAD-D-51561	21617	PATCH COND, RED TEST	EA	4
				MP-LTD	02002	PLUG, RED TEST (COOK ENGINEERING CO)	EA	4
			9875-00-246-7966	ASC-3001	70674	PATCH COND, 1 Ft. Lg.	EA	20
			5975-00-246-9772	ASC-3002	70674	PATCH COND, 2 Ft. Lg.	EA	20
			5975-00-989-1589	ASC-3004	70674	PATCH COND, 4 Ft. Lg.	EA	20
			5975-00-245-9792	ASC-3006	70674	PATCH COND, 6 Ft. Lg.	EA	20
				2000AT	04294	TWEEZER, DESK, END, WEBSTER	EA	2

APPENDIX C

ORGANIZATIONAL, DIRECT SUPPORT, AND GENERAL SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST'

(INCLUDING DEPOT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS)

Section I. INTRODUCTION

C-1. Scope

This appendix lists repair parts required for performance of organizational, direct support, and general support maintenance of the Automated Telecommunications Center (ATTCC) Patch and Test Facility (P and T), Oakland Army Base, Oakland, California.

C-2. General

This repair parts list is divided into the following sections:

a. Section II—Repair Parts List. A list of repair parts authorized for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending numerical sequence, with the parts in each group listed in figure and item number sequence.

b. Section III—Special Tools List. Not applicable.

c. Section IV—National Stock Number and Part Number Index. A list, in ascending numerical sequence, of all National stock numbers appearing in the listings, followed by a list, in alphameric sequence, of all part numbers appearing in the listings. National stock number and part numbers are corss-referenced to each illustration figure and item number appearance.

C-3. Explanation of Columns

The following provides an explanation of columns found in the tabular listings:

a. Illustration. This column is divided as follows:

(1) *Figure number.* Indicates the figure number of the illustration in which the item is shown.

(2) *Item number.* The number used to identify each item called out in the illustration.

b. Source, Maintenance, and Recoverability Codes (SMR).

(1) *Source code.* Source codes are assigned to support items to indicate the manner of acquiring support items for maintenance, repair, or overhaul of end items. Source codes are entered in the first and second positions of the Uniform SMR Code format as follows:

Code	Definition
PA	Item procured and stocked for anticipated or known usage.
XB	Item is not procured or stocked. If not available through salvage, requisition.

(2) *Maintenance code.* Maintenance codes are assigned to indicate the levels of maintenance authorized to USE and REPAIR support items. The maintenance codes are entered in the third and fourth positions of the Uniform SMR Code format as follows:

(*a*) The maintenance code entered in the third position will indicate the lowest maintenance level authorized to remove, replace, and use the support item. The maintenance code entered in the third position will indicate one of the following levels of maintenance:

Code	Application/ Explanation
C	Crew or operator maintenance performed within organizational maintenance.
O	Support item is removed, replaced, used at the organizational level.
F	Support item is removed, replaced, used at the direct support level.
H	Support item is removed, replaced, used at the general support level.

(*b*) The maintenance code entered in the fourth position indicates whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions). This

position will contain one of the **following** maintenance codes:

Code	Application/ Explanation
F	The lowest maintenance level capable of complete repair of the support item is the direct support level.
H	The lowest maintenance level capable of complete repair ofthe support item is the general support level.
Z	Nonreparable. No repair is authorized.

(3) ***Recoverability code.*** **Recoverability codes are assigned to support items to indicate the disposition action on unserviceable items. The recoverability code is entered is the fifth position of the Uniform SMR Code format as follows:**

Recoverability Codes	Definition
Z	Nonreparable item. When unserviceable, condemn and dispose at the level indicated in position 3.
F	Reparable item. When uneconomically reparable, condemn and dispose at the direct support level.
H	Reparable item. When uneconomically reparable, condemn and dispose at the general support level.
D	Reparable item. When beyond lower level repair capability, return to depot. Condemnation and disposal not authorized below depot level.

c. National Stock Number. **Indicates the National stock number assigned to the item and will be used for requisitioning purposes.**

d. Part Number. **Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements, to identify an item or range of items.**

NOTE

When a stock-numbered item is requisitioned, the repair part received may have a different part number than the part being replaced.

e. Federal Supply Code for Manufacturer (FSCM). **The FSCM is a 5-digit numeric code listed in SB 708-42 which is used to identify the manufacturer, distributor, or Government agency, etc.**

f. Description. **Indicates the Federal item name and, if required, a minimum description to identify the item.**

g. Unit of Measure (U/M). **Indicates the standard of the basic quantity of the listed item as used in performing the actual maintenance function. This measure is expressed by a two-character alphabetical abbreviation (e.g., ea, in, pr, etc). When the unit of measure differs from the unit of issue, the lowest unit of issue that will satisfy the required units of measure will be requisitioned.**

h. Quantity Incorporated in Unit. **Indicates the quantity of the item used in the breakout shown on the illustration figure, which is prepared for a functional group, subfunctional group, or an assembly. A "V" appearing in this column in lieu of a quantity indicates that no specific quantity is applicable.**

C-4. Special Information

Not applicable.

C-5. How to Locate Repair Parts

a. When National stock number or part number is unknown:

(1) ***First.*** **Using the table of contents, determine the functional group within which the repair part belongs. This is necessary since illustrations are prepared for functional groups and listings are divided into the same groups.**

(2) ***Second.*** **Find the illustration covering the functional group to which the repair part belongs.**

(3) ***Third.*** **Identify the repair part on the illustration and note the illustration figure and item number of the repair part.**

(4) ***Fourth.*** **Using the Repair Parts Listing, find the figure and item number noted on the illustration.**

b. When National stock number or part number is known:

(1) ***First.*** **Using the Index of National Stock Numbers and Part Numbers, find the pertinent National stock number or part number. This index is in ascending NSN sequence followed by a list of part numbers in ascending alphameric sequence, cross-referenced to the illustration figure number and item number.**

(2) ***Second.*** **After finding the figure and item number, locate the figure and item number in the repair parts list.**

SECTION II. REPAIR PARTS LIST (OAKLAND)

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UNIT OF MEAS	(8) QTY INC IN UNIT
						GROUP 01 SHELF, DLIU (Digital Line Interface Unit) LBAD-D-29011 (EPL 70)		
C-1		PAFHD		90409000-000	96238	UNIVERSAL SHELF	EA	1
C-1	1	PAHZZ		SD4288	46384	RIVET, TUBULAR	EA	40
C-1	2	PAFHD		80409000-000	96238	PRINTED WIRING BOARD	EA	1
C-1	3	PAFZZ		HBD22W0-4080	81312	CONNECTOR, RECEPTACLE, ELECTRICAL, 22AH	EA	12
C-1	4	XBHZZ		LBAD-C-29005	21617	COVER MOUNTING BRACKET	EA	2
C-1	5	XBHZZ		LBAD-D-29004	21617	COVER PANEL	EA	1
C-1	6	PAFZZ	5305-00-984-4983	MS35206-226	73734	SCREW, 6-32 x 1/4 LG	EA	2
C-1	7	PAFZZ	5310-00-725-4719	CLS632-2	46384	NUT, PLAIN, CLINCH CRES #6-32	EA	2
C-1	8	PAFZZ	5305-00-054-6654	MS51957-30	96906	SCREW, MACHINE, CRES, #6-32 x 1/2 LG	EA	4
C-1	9	PAFZZ	5310-00-722-5998	MS15795-805	96906	WASHER, FLAT, CRES, 0.156" ID, 0.312" OD	EA	4
C-1	10	PAFZZ	5310-00-929-6395	MS35338-136	96906	WASHER, LOCK, SPLIT, CRES, 0.138" ID, 0.250" OD	EA	4
C-1	11	XBFZZ		SST4-40SNPAT	70318	NUT, PLAIN, HEXAGON, STAINLESS STEEL #4-40	EA	24
C-1	12	PAFZZ	5310-00-933-8118	MS35338-135	96906	WASHER, LOCK, SPLIT, CRES, 0.115" ID, 0.250" OD	EA	24
C-1	13	PAFZZ	5310-00-595-6211	MS15795-803	96906	WASHER, FLAT, CRES, 0.125" ID, 0.250" OD	EA	24
C-1	14	PAFZZ	5305-00-177-5545	MS51957-120	96906	SCREW, MACHINE, CRES, #4-40 x 9/16" LG	EA	24
C-1	15	PAFZZ	5310-00-725-4719	CLS632-2	46384	NUT, PLAIN, CLINCH, CRES, #6-32	EA	4
						GROUP: 02 ALARM ASSY, MAJOR MINOR LBAD-D-33161 (GROUP-2) -60VDC		
C-2	1	XBFZZ		LBAD-D-33167	21617	ALARM COVER PANEL	EA	1
C-2	2	PAFZZ	5305-00-889-3000	MS-35206-230	96906	SCREW, (PHMS) STEEL CAD PLTD 6-32 x 1/2 LG	EA	31
C-2	3	PAFZZ	5935-00-847-7840	513938	44038	CONNECTOR, SERIES MIC TYPE "D"	EA	1
C-2	4	PAFZZ	5935-00-799-2442	513936	44038	CONNECTOR, 100 PIN	EA	1
C-2	5	XBFHD		LBAD-D-33172-GP2	21617	CIRCUIT BOARD ASSY (-60V)	EA	3
C-2	6	XBHZZ		LBAD-D-33171	21617	PCB ASSY (MAJOR-MINOR)	EA	3
C-2	7	PAHZZ	5961-00-068-4708	5A4	81483	SEMICONDUCTOR DEVICE, DIODE	EA	270
C-2	8	PAHZZ	5905-00-953-5132	4421	44655	RESISTOR, CARBON, 900 OHMS, 3.25 W	EA	90
C-2	9	PAHZZ	5905-00-758-4724	4410	44655	RESISTOR, CARBON, 470 OHMS, 3.25 W	EA	45
C-2	10	XBHZZ		LBAD-C-12684	21617	BRACKET, CIRCUIT BOARD	EA	6
C-2	11	XBFZZ		MS-35237-37	96906	SCREW, (PHMS) CAD PLTD 6-32 x 1/2 LG	EA	12
C-2	12	PAFZZ	5310-00-983-8483	MS-27183-5	96906	WASHER, FLAT, ROUND STEEL CAD PLTD #6	EA	12
C-2	13	PAFZZ	5310-00-045-4007	MS-35338-41	96906	WASHER, LOCK, CAD PLATED #6	EA	15
C-2	14	PAFZZ	5310-00-038-0553	MS-21044-5	96906	NUT, HEX, 6-32	EA	15
C-2	15	PAFZZ	5930-00-268-0309	1381878	96182	SWITCH, PUSH BUTTON	EA	1
C-2	16	PAFZZ	5930-00-164-1548	1381870	96182	SWITCH, PUSH BUTTON	EA	1
C-2	17	XBFZZ		90E A2C2 P3J4 (RA) L4-NL	96182	SWITCH, THUMB	EA	45
C-2	18	PAOHZ	6240-00-155-7836	MS-35237-327	81344	LAMP, INCANDESCENT (2 ea in button)	EA	90
C-2	19	XBFZZ		117-210-101	79405	CIRCUIT BREAKER	EA	1
						GROUP: 03 FUSE AND ALARM PANEL ASSY (DLIU) - LBAD-D-29022 (21617)		
C-3	1	XBOZZ		9-85-11	75382	BLOCK, TERMINAL, PRESSURE CONTACT	EA	1
C-3	2	PAFZZ	9305-00-984-7199	MS-35206-274	96906	SCREW, PHMS, 6-32 x 1-1/2 LG, STL CAD. PLTD.	EA	2

SECTION II. REPAIR PARTS LIST (OAKLAND) (CONTINUED)

(1) ILLUSTRATION (A) FIG NO.	(B) ITEM NO	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION / USABLE ON CODE	(7) UNIT OF MEAS	(8) QTY INC IN UNIT
C-3	3	PAFZZ	5310-00-809-5844	MS-27183-7	96906	WASHER, FLAT, RD, STL, CAD PLATED, #8	EA	2
C-3	4	PAFZZ	5310-00-934-9757	MS-35649-282	96906	NUT, PLAIN HEX, 8-32 UNC, STEEL, CAD PLATED #8	EA	2
C-3	5	PAFZZ	5940-00-643-5717	7-170	71785	BLOCK, TERMINAL STRIP	EA	7
C-3	6	PAFZZ	5305-00-889-2999	MS-35206-217	96906	SCREW, PHMS, 4-40 UNC x 1/2 LG STL, CAD PLATED	EA	18
C-3	7	PAFZZ	5310-00-934-9739	MS-35649-242	96906	NUT, PLAIN HEX, 4-40 UNC STL, CAD PLATED	EA	18
C-3	8	X-FZZ		1AAD-D-29024	21617	COVER		
C-3	9	PAFZZ	5305-00-984-4992	MS-35206-232	96906	SCREW, PHMS, 6-32 UNC x 3/4 LG, STL, CAD PLATED	EA	12
C-3	10	XBFZZ		TYPE GOR-1104	24324	GROMMET, RUBBER, 2-1/8 OD, 1-1/2 ID	EA	1
C-3	11	PAFZZ	6210-00-235-2054	81-1059-01-102	72619	LAMP HOLDER, BASE ASSY	EA	2
C-3	12	PAOZZ	6240-00-081-6321	60PSB	08108	LAMP, SLIDE, BASE 60 VDC, TYPE	EA	2
C-3	13	PAOZZ	2530-00-250-2065	95-3271	72619	LENSE, SMOOTH, TYPE, RED	EA	2
C-3	14	PAFZZ	5920-00-896-3239	HLT	71400	FUSEHOLDER, TYPE HLT	EA	36
C-3	15	PAFZZ	5310-00-383-8483	MS-27183-5	96906	WASHER, FLAT, RD #6, STL CAD PLATED	EA	12
C-3	16	PAFZZ	5310-00-934-9747	MS-35649-262	96906	NUT, PLAIN HEX, 6-32 UNC, STL CAD PLATED	EA	12
C-3	17	PAOZZ	5730-00-857-9416	GMT-1-1-3	71400	FUSE, TELEPHONE, TYPE - G.M.T., 1-1/3 AMP	EA	6
C-3	18	PAOZZ	990-00-981-5998	GMT-3	71400	FUSE, TELEPHONE, TYPE GMT, 3 AMP	EA	6
C-3	19	PAOZZ	5960-00-901-9936	GMT-1	71400	FUSE, TELEPHONE, TYPE GMT, 1 AMP	EA	12
C-3	20	PAOZZ	5960-00-928-5926	GMT .18	71400	FUSE, TELEPHONE, TYPE GMT, .180 AMP	EA	12
C-3	21	PAFZZ	5935-00-576-5447	241C	64959	JACK, TELEPHONE	EA	1
C-3	22	PAFZZ	5945-00-198-4825	238A	64959	JACK, TELEPHONE	EA	2
C-3	23	XBFZZ		[illegible]	[illegible]	METER VOLT, DC [illegible]	EA	1
C-3	24	PAFZZ	[illegible]	MS-35650-302	96906	NUT, PLAIN, HEX, 10-32 UNF STL, CAD PLATED	EA	6
C-3	25	PAFZZ	[illegible]	[illegible]	96906	WASHER, FLAT - RD, STL, CAD PLTD #10	EA	6
C-3	26	PAFZZ	[illegible]	[illegible]	[illegible]	RESISTOR, POWER, MINIATURE, 100 OHM, 5 WATT, 5%	EA	1
C-3	27	XBFZZ		[illegible]	[illegible]	TERMINAL, STRIP, [illegible] TYPE	EA	1
C-3	28	PAFZZ	[illegible]	[illegible]	[illegible]	RESISTOR, FIXED FILM 133K, 1/2 W, 1%	EA	1
C-3	29	XBFZZ		[illegible]	73734	SPACER, BRASS-NICKEL PLATED 7/32 DIA, 3/8 LG	EA	4
C-3	30	XBFHH		[illegible]	21617	P.C.B. ASSY	EA	1
						GROUP: 04 P.C.B. ASSY, [illegible]; 21617		
C-4	1	XBHZZ		[illegible]	21617	PRINTED CIRCUIT BOARD		
C-4	2	XBHZZ		[illegible]	73734	TERMINAL, TURRET, [illegible]	EA	[illegible]
C-4	3	PAHZZ	[illegible]	[illegible]	[illegible]	SOCKET, RELAY	EA	6
C-4	4	PAHZZ	[illegible]	[illegible]	[illegible]	RELAY, [illegible], 6 VDC	EA	2
C-4	5	PAHZZ	[illegible]	[illegible]	[illegible]	RESISTOR, CARBON COMP, [illegible] OHM, 1/2 WATTS	EA	2
C-4	6	PAHZZ	[illegible]	[illegible]	[illegible]	RELAY, [illegible], 6VDC	EA	2
C-4	7	PAHZZ	[illegible]	[illegible]	[illegible]	RESISTOR, CARBON COMP, [illegible] OHM, 1/2 W	EA	2
C-4	8	PAHZZ	[illegible]	[illegible]	[illegible]	RELAY, [illegible], 115VDC	EA	2
C-4	9	PAHZZ	[illegible]	[illegible]	[illegible]	RELAY, [illegible], 115VAC	EA	1

SECTION II. REPAIR PARTS LIST (OAKLAND) (CONTINUED)

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION / USABLE ON CODE	(7) UNIT OF MEAS	(8) QTY INC IN UNIT
						GROUP: 05 PATCH PANEL ASSY, DC VOLT LOW LEVEL. LEAD-D-28973; (21617) AND PATCH PANEL ASSY. DC REC. LOW LEVEL - LEAD-D-28972; (21617)		
C-5	1	PAFZZ	5935-00-847-7840	513938	44038	CONNECTOR (FRAME) 100 JACKS	EA	1
C-5	2	PAFZZ	5935-00-799-2442	513936	44038	CONNECTOR (CABLE) 100 PIN	EA	1
C-5	3	PAFZZ	5305-00-984-4988	MS-35206-228	96906	P.H.M.S. CAD PLTD. 6-32 x 3/8	EA	96
C-5	4	PAFZZ	5310-00-081-8087	MS-21046-N06	96906	ELASTIC STOP NUT 6-32	EA	10
C-5	5	XBFZZ		LEAD-C-28998	21617	CONNECTOR COVER	EA	1
C-5	6	XBFHH		LEAD-D-28993	21617	RESISTOR BOARD ASSY	EA	1
C-5	7	PAHZZ	5905-00-195-6453	RC20GF562J	44655	RESISTOR, 5.6K, 5%, 1/2W	EA	25
C-5	8	XBFZZ		LEAD-C-28992	21617	RESISTOR BOARD MTG BRACKET	EA	2
C-5	9	XBFZZ		LEAD-D-24514	21617	PANEL TOP & BOTTOM	EA	2
C-5	10	PAFZZ	5305-00-833-8862	MS18211-19C	96906	P.H.M.S. 4-40 x 5/16 NC (NYLON)	EA	22
C-5	11	XBFZZ		MS18211-84F	96906	P.H.M.S. 10-32 x 3/8 NF (NYLON)	EA	6
C-5	12	PAFZZ	5310-00-595-7203	MS35338-117	96906	LOCK, WASHER #6	EA	96
C-5	13	PAFZZ	5935-00-578-2701	240C	64959	JACK, TELEPHONE 240C	EA	48
C-5	14	PAFZZ	5935-00-194-3079	239C	64959	JACK, TELEPHONE 239C	EA	48
C-5	15	PAHZZ	5905-00-106-1273	RCR20G153JS	81349	RESISTOR, 15K OHMS 1/2W 5%	EA	96
						GROUP: 06 PATCH PANEL ASSY. MISC. LEAD-D-28567; 21617 AND PATCH PANEL ASSY. INTERBAY LEAD-D-28568; 21617		
C-6	1	PAFZZ	5935-00-085-4730	512240	44038	CONNECTOR, 80 PIN (FRAME)	EA	1
C-6	2	PAFZZ	5935-00-841-0421	512241	44038	CONNECTOR, 80 PIN (CABLE)	EA	1
C-6	3	PAFZZ	5305-00-889-3000	MS-35206-230	96906	SCREW, PAN-HD., 6-32 x 1/2 LG	EA	6
C-6	4	PAFZZ	5310-00-081-8087	MS-21044-N06	96906	ELASTIC STOP NUT, 6-32NC	EA	6
C-6	5	XBFZZ		LEAD-D-24514	21617	COVER, TOP & BOTTOM	EA	2
C-6	6	PAFZZ	5305-00-995-6653	MS-35190-222	96906	SCREW, FLAT HEAD, 4-40 NC x 5/16 LG	EA	4
C-6	7	PAFZZ	5305-00-984-7361	MS-35191-270	96906	SCREW, FLAT HD, 10-32 NF x 3/8	EA	4
C-6	8	PAFZZ	5305-00-984-4988	MS-35206-228	96906	SCREW, R.H. 6-32 x 3/8 LG	EA	48
C-6	9	PAFZZ	5310-00-209-1368	MS-35335-38	96906	WASHER, LOCK #6 (EXTERNAL TEETH)	EA	48
C-6	10	XBFZZ		LEAD-D-28568-3	21617	SPACER, FIBER #2335	EA	4
C-6	11	PAFZZ	5305-00-054-5657	MS-51957-17	96906	SCREW, R.H. 4-40 x 1/2 LG	EA	4
C-6	12	PAFZZ	5805-00-877-2969	238A	64959	JACK, TELEPHONE 238A (Key)	EA	48
						GROUP: 07 PATCH PANEL ASSY. 2/WIRE AUDIO, LEAD-D-28563; 21617		
C-7	1	PAFZZ	5935-00-085-4730	512240	44038	CONNECTOR 80 PIN (FRAME)	EA	4
C-7	2	PAFZZ	5935-00-246-6421	512241	44038	CONNECTOR 80 PIN (CABLE).	EA	2
C-7	3	XBFZZ		LEAD-D-28592	21617	CONNECTOR - NUMBAL THROUGH	EA	2
C-7	4	PAFZZ	5310-00-841-8474	MS-21044-N06	96906	ELASTIC STOP NUT 6-32NC	EA	12
C-7	5	PAFZZ	5305-00-889-3000	MS-35206-230	96906	SCREW, CAD PLTD. 6-32 x 1-1/2 NC	EA	12
C-7	6	XBFZZ		LEAD-D-24514	21617	COVER, TOP AND BOTTOM	EA	2
C-7	7	PAFZZ	5305-00-859-6653	MS-35190-222	96906	SCREW, FLAT HD 4-40 NC 5/16 LG	EA	4
C-7	8	PAFZZ	5305-00-984-7361	MS-35191-270	96906	SCREW, FLAT HD 10-32 NF x 3/8 LG	EA	6
C-7	9	XBFZZ		LEAD-D-28563	21617	SPACER, FIBER #2335	EA	4

SECTION II. REPAIR PARTS LIST (OAKLAND) (CONTINUED)

(1) ILLUSTRATION (A) FIG NO.	(B) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION / USABLE ON CODE	(7) UNIT OF MEAS	(8) QTY INC IN UNIT
C-7	10	PAFZZ	5305-00-838-9821	MS-24629-13	96906	SCREW, TAPPING PAN HD, CAD PLATED, 4-40 x 1/2	EA	4
C-7	11	PAFZZ	5935-00-193-1805	280C	64959	JACK, TELEPHONE 280C	EA	48
C-7	12	PAFZZ	5935-00-578-3647	241C	64959	JACK, TELEPHONE 241C	EA	48
C-7	13	PAFZZ	5305-00-984-4365	MS-35206-228	96906	PINS, CAD PLATED, 6-32 x 3/8 NC	EA	96
C-7	14	PAFZZ	5310-00-309-4360	MS-35335-58	96906	LOCK, WASHER #6, EXTERNAL TEETH	EA	96
						GROUP: 08 CABINET, 1AAD-D-51556; 21617		
C-8	1	XDFHD		1AAD-D-51556	21617	CABINET, CY-8397A/G (MODIFIED)	EA	1
C-8	2	XDFZZ		1AAD-C-51539	21617	TOP, COVER, CY-8397A/G	EA	1
C-8	3	XDFZZ		1AAD-D-51540	21617	BOTTOM, COVER, CY-8397A/G	EA	1
C-8	4	XDFHD		SM-D-433907	21617	DOOR, CABINET	EA	1
C-8	5	PAFFF	6110-00-856-2410	SA-238/G	32757	SWITCH PANEL ASSY	EA	1
C-8	6					FUSE, PLUG 15 AMP	EA	2
C-8	7	PAFZZ	5330-00-389-3783	#1202	74545	SWITCH, TOGGLE, DPST	EA	1
C-8	8	PAFZZ	5935-00-233-4803	#5242	27193	OUTLET, CONVENIENCE, DUPLEX	EA	1
C-8	9	PAFZZ	5930-00-280-4831	7561K5	15605	SWITCH, TOGGLE, DPST	EA	1
C-8	10					FUSEHOLDER (for 1 AMP Glass Fuse)	EA	1
C-8	11	PAFZZ	5930-00-403-8497	FM 03-1A	[illegible]	FUSE, 3AG, 1 AMP	EA	1
C-8	12	XDFZZ			32757	LAMP, TROUBLE, W/PROTECTOR AND TERMINAL TUBE	EA	1
C-8	13	XDFZZ		TYPE 4069	27193	RECEPTACLE (for 15 AMP Plug Fuse)	EA	2
						GROUP: 09 RED DISTRIBUTION FRAME MOUNTING ASSEMBLY, 1AAD-D-51538; 21617		
C-9	1	XDFZZ		[illegible]	21617	MOUNTING BRACKET	EA	4
C-9	2	XDFZZ		[illegible]	[illegible]	TERMINAL, BLOCK, 10 x 20 PINS	EA	40
C-9	3	XDFZZ		[illegible]		[illegible]	EA	4
C-9	4	XDFZZ		[illegible]	21617	TERMINAL, BLOCK MOUNTING BRACKET	EA	[illegible]
C-9	5	XDFZZ		[illegible]	21617	MOUNTING BRACKET	EA	2
C-9	6	PAFZZ	5934-00-487-4305	[illegible]	96906	SCREW, 10-32 UNF x 3/8 LG	EA	40
C-9	7	PAFZZ	5805-00-277-9757	[illegible]	96906	NUT, SELF-LOCKING 10-32NF	EA	40
C-9	8	XDFZZ		[illegible]	21617	CABINET, SUPPORT CY-8397A/G	EA	[illegible]
C-9	9	PAFZZ	5305-00-984-4687	[illegible]	96906	SCREW, 6-32 UNC x 3/8 LG	EA	[illegible]
C-9	10	PAFZZ	5305-00-277-5785	[illegible]	96906	NUT, SELF-LOCKING 6-32 UNC	EA	[illegible]
C-9	11	XDFZZ		[illegible]	21617	CABLE, LADDER	EA	2
C-9	12	XDFZZ		[illegible]	21617	[illegible]	EA	[illegible]
C-9	13	XDFZZ		[illegible]		[illegible]	EA	4
C-9	14	XDFZZ		[illegible]	[illegible]	[illegible]	EA	2
						GROUP: 10 [illegible] FRAME MOUNTING ASSY, [illegible]; 21617		
C-10	1	XDFZZ		[illegible]	21617	MOUNTING BRACKET	EA	4
C-10	2	XDFZZ		[illegible]	[illegible]	TERMINAL, BLOCK 10 x 20 PINS	EA	12
C-10	3	XDFZZ		[illegible]		[illegible]	EA	4
C-10	4	XDFZZ		[illegible]	21617	TERMINAL, BLOCK MTG BRACKET	EA	4

SECTION II. REPAIR PARTS LIST (OAKLAND (CONTINUED)

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UNIT OF MEAS	(8) QTY INC IN UNIT
C-10	5	XBFZZ		LBAD-C-51542	21617	MOUNTING BRACKET	EA	2
C-10	6	PAFZZ	5305-00-989-6265	MS-35207-262	96906	SCREW, 10-32 - UNF x 3/8 LG	EA	V
C-10	7	PAFZZ	5310-00-877-5797	MS-21044-N3	96906	NUT, SELF-LOCKING 10-32 NF	EA	V
C-10	8	XBFZZ		LBAD-D-51551	21617	CABINET, SUPPORT, CY-3397A/G	EA	V
C-10	9	PAFZZ	5305-00-984-6208	MS-3A206-261	96906	SCREW, 8-32 UNC x 3/8	EA	V
C-10	10	PAFZZ	5310-00-877-5795	MS-21044-N8	96906	NUT, SELF-LOCKING 8-32 UNC	EA	V
C-10	11	XBFZZ		LBAD-C-51545	21617	CABLE, LADDER	EA	2
C-10	12	XBFZZ		LBAD-D-51546	21617	JUMPER, RING	EA	V
						GROUP: 11 BLACK DISTRIBUTION FRAME MOUNTING ASSY, LBAD-D-51527; 21617		
C-11	1	XBFZZ		LBAD-C-51544	21617	MOUNTING BRACKET	EA	4
C-11	2	XBFZZ		412C-10M	81812	TERMINAL BLOCK 10 x 20 PINS (TRIMM CO)	EA	20
C-11	3	XBFZZ		PMR-52A		ANCOR, ANGLE	EA	4
C-11	4	XBFZZ		LBAD-C-51543	21617	TERMINAL BLOCK MTG BRACKET	EA	4
C-11	5	XBFZZ		LBAD-C-51542	21617	MOUNTING BRACKET	EA	2
C-11	6	PAFZZ	5305-00-898-6265	MS-35207-262	96906	SCREW, 10-32 UNF x 3/8 LG	EA	40
C-11	7	PAFZZ	5310-00-877-5797	MS-21044-N3	96906	NUT, SELF-LOCKING, 10-32 UNF	EA	40
C-11	8	XBFZZ		LBAD-D-51551	21617	CABINET, SUPPORT, CY-3397A/G	EA	V
C-11	9	PAFZZ	5305-00-984-6208	MS-3A206-261	96906	SCREW 8-32 UNC x 3/8	EA	112
C-11	10	PAFZZ	5310-00-877-5795	MS-21044-N8	96906	NUT, SELF-LOCKING 8-32	EA	112
C-11	11	XBFZZ		LBAD-C-51545	21617	CABLE, LADDER	EA	2
C-11	12	XBFZZ		LBAD-D-51546	21617	JUMPER, RING	EA	4
C-11	13	XBFZZ		DR 6176		STANDOFF 3/8 x 1-1/16 LG, 6-32 THD (WILLIAMS CO, GARDALE, PA)	EA	4
C-11	14	XBFZZ		ASTM 187	88729	GROUND BUSS 1 x 1/4 x 12	EA	2
						GROUP: 12 DLTU MODULE MODEL DLI		
C-12	1	PAHZZ	5905-00-256-0412	RC42GF181J	81349	RESISTOR, FIXED COMPOSITION, 180 OHM, 5%, 2W	EA	2
C-12	2	PAHZZ	5905-00-982-0211	RN55C4751F	81349	RESISTOR, FIXED FILM, 4.75K, 1%, .1W	EA	4
C-12	3	PAHZZ	5905-00-982-0942	RN55C6042F	81349	RESISTOR, FIXED FILM, 60.4K, 1%, .1W	EA	2
C-12	4	PAHZZ	5905-00-586-5082	RN55C1821F	81349	RESISTOR, FIXED FILM, 1.82K, 1%, .1W	EA	2
C-12	5	PAHZZ	5905-00-928-8161	RN55C8450F	81349	RESISTOR, FIXED FILM, 845 OHM, 1%, .1W	EA	2
C-12	6	PAHZZ	5905-00-955-0171	RN55C6810F	81349	RESISTOR, FIXED FILM, 681 OHM, 1%, .1W	EA	2
C-12	7	PAHZZ	5905-00-140-0123	3007P-1-102	32997	RESISTOR, VARIABLE WIREWOUND, 1K	EA	2
C-12	8	PAHZZ	5908-00-932-2952	RN55C2150F	81349	RESISTOR, FIXED, FILM, 215 OHM, 1%, .1W	EA	2
C-12	9	PAHZZ	5905-00-461-3127	RC20GF392MS	81349	RESISTOR, FIXED, COMPOSITION, 3.9K, 10%, .5W	EA	2
C-12	10	PAHZZ	5905-00-104-8352	RC32GF153KS	81349	RESISTOR, FIXED COMPOSITION, 15K, 10%, 1W	EA	2
C-12	11	PAHZZ	5905-00-106-1273	RC20GF153KS	81349	RESISTOR, FIXED COMPOSITION, 15K, 5%, .5W	EA	5
C-12	12	PAHZZ	5905-00-192-0626	RC42GF123K	81349	RESISTOR, FIXED COMPOSITION, 12K, 10%, 2W	EA	2
C-12	13	PAHZZ	5905-00-111-4742	RC20GF391KS	81349	RESISTOR, FIXED COMPOSITION, 390 OHM, 10%, .5W	EA	2
C-12	14	PAHZZ	5905-00-494-8517	RC20GF475KS	81349	RESISTOR, FIXED COMPOSITION, 4.7M, 10%, .5W	EA	8
C-12	15	PAHZZ	5905-00-104-8336	RC20GF104KS	81349	RESISTOR, FIXED COMPOSITION, 100K, 10%, .5W	EA	4
C-12	16	PAHZZ	5905-00-494-7855	RW79U3001F	81349	RESISTOR, FIXED WIREWOUND, 3.0K, 1%, 3W	EA	2

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SECTION II. REPAIR PARTS LIST (OAKLAND) (CONTINUED)

(1) ILLUSTRATION (A) FIG NO.	(B) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UNIT OF MEAS	(8) QTY INC IN UNIT
C-12	17	PAHZZ	5905-00-111-4858	RCR20G471JS	81349	RESISTOR, FIXED COMPOSITION, 470 OHM, 10%, .5W	EA	2
C-12	18	PAHZZ	5905-00-104-8347	RCR32G101JS	81349	RESISTOR, FIXED COMPOSITION, 100 OHM, 10%, 1W	EA	2
C-12	19	XBHZZ		RV4NAYSA501A	81349	RESISTOR, VARIABLE, 500 OHM, 10%, 2.25W	EA	2
C-12	20	PAHZZ	5905-00-889-0122	RW-5-200	75042	RESISTOR, FIXED WIREWOUND, 200 OHM, 10%, 5W	EA	2
C-12	21	PAHZZ	59085-00-464-4172	RCR20G334JS	81349	RESISTOR, FIXED CARBON COMP, 330K, 10%, .5W	EA	2
C-12	22	XBHZZ		RCR20G474JS	81349	RESISTOR, FIXED CARBON COMP, 470K, 10%, .5W	EA	2
C-12	23	PAHZZ	5905-00-114-5430	RCR20G433JS	81349	RESISTOR, FIXED CARBON COMP, 43K, 5%, .5W	EA	6
C-12	24	PAHZZ	5905-00-104-5796	RCR20G105JS	81349	RESISTOR, FIXED CARBON COMP, 1 MEG, 10%, .5W	EA	2
C-12	25	PAHZZ	5905-00-114-5398	RCR20G224JS	81349	RESISTOR, FIXED CARBON COMP, 220K, 10%, .5W	EA	2
C-12	26	PAHZZ	5905-00-104-8335	RCR20G124JS	81349	RESISTOR, FIXED CARBON COMP, 120K, 10%, .5W	EA	2
C-12	27	PAHZZ	5905-00-141-0996	RCR20G473JS	81349	RESISTOR, FIXED CARBON COMP, 47K, 10%, .5W	EA	4
C-12	28	PAHZZ	5905-00-141-116	RCR20G562JS	81349	RESISTOR, FIXED CARBON COMP, 5.6K, 10%, .5W	EA	2
C-12	29	PAHZZ		RCR20G750JS	81349	RESISTOR, FIXED CARBON COMP, 75 OHM, 5%, .5W	EA	4
C-12	30	PAHZZ	5905-00-935-9398	RCR20G202JS	81349	RESISTOR, FIXED CARBON COMP, 2.0K, 5%, .5W	EA	1
C-12	31	PAHZZ	5905-00-279-1935	RCR42G361JS	81349	RESISTOR, FIXED CARBON COMP, 360 OHM, 5%, 2W	EA	1
C-12	32	PAHZZ	5905-00-106-9351	RCR20G273JS	81349	RESISTOR, FIXED CARBON COMP, 27K, 10%, .5W	EA	1
C-12	33	PAHZZ	5905-00-110-0196	RCR20G102JS	81349	RESISTOR, FIXED CARBON COMP, 1K, 10%, .5W	EA	2
C-12	34	PAHZZ	5910-00-938-6745	CK05BX102K	81349	CAPACITOR, FIXED CERAMIC, 1000 PF, 10%, 200V	EA	2
C-12	35	PAHZZ	5310-00-111-4813	CK05BX103K	81349	CAPACITOR, FIXED CERAMIC, .01 uF, 10%, 100V	EA	4
C-12	36	PAHZZ	5910-00-784-7734	CSR13C336K	81349	CAPACITOR, FIXED TANT., 33 uF, 10%, 16V	EA	6
C-12	37	PAHZZ	9340-00-975-9837	[illegible]	[illegible]	CAPACITOR, FIXED, MYLAR, 1.0 uF, 10%, 200V	EA	2
C-12	38	PAHZZ	5910-00-179-9834	CSR13D475K	80131	CAPACITOR, FIXED TANT., 4.7 uF, 10%, 16V	EA	4
C-12	39	PAHZZ	5010-00-787-5908	CSR13D335K	81349	CAPACITOR, FIXED TANT., 3.3 uF, 10%, 15V	EA	4
C-12	40	PAHZZ	5905-0-902-9824	CSR13E155K	81349	CAPACITOR, FIXED TANT., 1.5 uF, 10%, 20V	EA	4
C-12	41	PAHZZ	5904-00-935-3424	[illegible]	[illegible]	CAPACITOR, FIXED ELECT., 250 uF, -10%, +75%, 16V	EA	4
C-12	42	PAHZZ	5910-00-189-7285	[illegible]	[illegible]	CAPACITOR, FIXED CERAMIC, 0.22 uF, 20%, 50V	EA	2
C-12	43	PAHZZ	[illegible]	[illegible]	[illegible]	DIODE, SILICON	EA	[illegible]
C-12	44	PAHZZ	[illegible]	[illegible]	[illegible]	DIODE, SILICON	EA	[illegible]
C-12	45	PAHZZ	[illegible]	[illegible]	[illegible]	DIODE, SILICON	EA	[illegible]
C-12	46	PAHZZ	[illegible]	[illegible]	01295	DIODE, SILICON	EA	6
C-12	47	PAHZZ	[illegible]	1N751A	01295	DIODE, SILICON	EA	6
C-12	48	PAHZZ	[illegible]	[illegible]	81349	DIODE, SILICON	EA	4
C-12	49	PAHZZ	[illegible]	[illegible]	[illegible]	DIODE, SILICON	EA	[illegible]
C-12	50	XBHZZ		[illegible]	[illegible]	OP. AMP, SILICON	EA	2
C-12	51	PAHZZ	[illegible]	[illegible]	[illegible]	TRANSISTOR, SILICON, NPN	EA	2
C-12	52	PAHZZ	[illegible]	[illegible]	[illegible]	TRANSISTOR, SILICON, PNP	EA	4
C-12	53	PAHZZ	[illegible]	[illegible]	[illegible]	TRANSISTOR, SILICON, NPN	EA	2
C-12	54	PAHZZ	[illegible]	[illegible]	[illegible]	TRANSISTOR, SILICON, PNP	EA	2
C-12	55	PAHZZ	[illegible]	[illegible]	[illegible]	TRANSISTOR, SILICON, PNP	EA	2
C-12	56	PAHZZ	[illegible]	[illegible]	[illegible]	TRANSISTOR, SILICON, NPN	EA	2

SECTION R. REPAIR PARTS = @M&MD) (CONTINUED)

(1) ILLUSTRATION (A) FIG NO.	(1) ILLUSTRATION (B) ITEM NO.	(2) SMR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION USABLE ON CODE	(7) UNIT OF MEAS	(8) QTY INC IN UNIT
C-12	57	PAHZZ	5961-00-401-0505	2N889	80131	TRANSISTOR, SILICON, PNP	EA	2
C-12	58	XBHZZ		MPS3739	80131	TRANSISTOR, SILICON, NPN	EA	2
C-12	59	PAHZZ	5961-00-241-3423	2N5133	80131	TRANSISTOR, SILICON, NPN	EA	8
C-12	60	PAHZZ	5961-00-452-1496	2N4410	81349	TRANSISTOR, SILICON, NPN	EA	2
C-12	61	XBHZZ		TAPC-35		TRANSFORMER, PULSE	EA	2
C-12	62	XBHZZ		A90-100-7001		TRANSFORMER, POWER	EA	1
C-12	63	XBHZZ		CR2-EDC5-5000 EOL		RELAY, 2C15K COIL SPL	EA	2
C-12	64	XBHZZ		CR2-EDC5-5000 EOL		RELAY, 2C5K COIL SPL	EA	1
C-12	65	PACZZ	6240-00-941-2204	48BBB	58854	LAMP, 48V, 4CNB, T^2 SLIDE	EA	3
C-12	66	XBHZZ				LAMPHOLDER, T^2 SLIDE	EA	3
C-12	67	PAHZZ	5935-00-934-2758	1AB	82389	JACK, 3 CONDUCTOR	EA	2
C-12	68	PACZZ	3455-00-266-9448	GMT	5A251	FUSE, 1ACMR	EA	4
C-12	69	PAHZZ	5920-00-968-3238	HLT	71400	FUSEHOLDER	EA	4
						GROUP: 13 ALARM ASSY, MAJOR LRAD-D-33162		
C-13	1	PAFZZ	5305-00-889-3000	MS-35206-230	96906	SCREW, PAN HD. 6-32 x 1/2 LG	EA	31
C-13	2	PAFZZ	5935-00-948-9096	513927	44038	CONNECTOR SERIES MFC TYPE D	EA	1
C-13	3	PAFZZ	5935-00-948-9095	513925	44038	CONNECTOR	EA	1
C-13	4	PAFZZ	5310-00-934-9747	MS-35649-262	96906	NUT, PLAIN, HEX, CAD. PLTD. 6-32	EA	15
C-13	5	PAFZZ	5310-00-045-4007	MS-35338-41	96906	WASHER, LOCK #6	EA	15
C-13	6	XBFHH		LRAD-D-33175-GP-2	21617	CIRCUIT BOARD ASSY (-60VDC)	EA	3
C-13	7	XBHZZ		LRAD-D-33174	21617	PCB, MAJOR	EA	3
C-13	8	PAHZZ	5961-00-068-4708	5AA	81483	DIODE	EA	135
C-13	9	PAHZZ	5905-00-758-4724	4A10	44655	RESISTOR, CARBON COMP, 470 OHMS, 2W, 5%	EA	90
C-13	10	XBFZZ		LRAD-C-12684	21617	BRACKET, CIRCUIT BOARD	EA	6
C-13	11	PAFZZ	5305-00-059-4553	MS-35190-238	96906	SCREW PH 6-32 x 1/2 LG	EA	12
C-13	12	XBFZZ		138127R	96182	SWITCH, PUSH BUTTON, UCINITE CO, NEWTONVILLE, MASS	EA	1
C-13	13	XBFZZ		90B AGC2-F3F1(R) L4-HL	96182	SWITCH, TELLITE, UCINITE	EA	45
C-13	14	XBFZZ		117-210-101	79A05	CIRCUIT BREAKER	EA	1
C-13	15	XBFZZ		LRAD-D-33167	21617	ALARM COVER PANEL	EA	1

SECTION IV. NATIONAL STOCK NUMBER INDEX (OAKLAND)

STOCK NUMBER	FIG. NO.	ITEM NO.
2530-00-950-2065	C-3	13
2455-00-266-9448	C-12	68
5305-00-054-5657	C-6	11
5305-00-054-6654	C-1	8
5305-00-059-4553	C-13	11
5305-00-177-5545	C-1	14
5305-00-784-6208	C-9	9
5305-00-828-9821	C-7	10
5305-00-833-8862	C-5	10
5305-00-889-2999	C-3	6
5305-00-889-3000	C-2	2
5305-00-889-3000	C-6	3
5305-00-889-3000	C-7	5
5305-00-559-3000	C-13	1
5305-00-984-4983	C-1	6
5305-00-984-4988	C-5	3
5305-00-984-4988	C-6	8
5305-00-984-4988	C-7	13
5305-00-984-4992	C-3	9
5305-00-984-6208	C-10	9
5305-00-984-6208	C-11	9
5305-00-984-7199	C-3	2
5305-0-984-7361	C-6	7
5305-00-984-7361	C-7	[illegible]
5305-00-989-6865	C-9	[illegible]
5305-00-989-6265	C-10	[illegible]
5305-00-989-6265	C-11	6
5305-00-995-6653	C-6	6
5305-00-995-6653	C-7	7
5310-00-045-4007	C-2	13
5310-00-045-4007	C-13	5
5310-00-081-8087	C-5	4
5310-00-081-8087	C-6	4
5310-00-081-8087	C-7	4
5310-00-088-0553	C-2	14
5310-00-209-1366	C-7	14
5310-00-209-1366	C-6	9
5310-00-595-6211	C-1	13
5310-00-595-7203	C-5	12
5310-00-722-5998	C-1	9
5310-00-725-4719	C-1	7
5310-00-725-4719	C-1	15
5310-00-809-8544	C-3	3
5310-00-809-8946	C-3	25
5310-00-877-5795	C-9	10
5310-00-877-5795	C-10	10
5310-00-877-5795	C-11	10
5310-00-877-5797	C-9	7
5310-00-877-5797	C-10	7
5310-00-877-5797	C-11	7
5310-0-829-6375	C-1	10
5310-00-939-6710	C-1	12
5310-00-934-5739	C-3	7
5310-00-934-5747	C-3	16
5310-00-934-9747	C-13	4
5310-00-934-9751	C-3	24
5310-00-934-9757	C-3	4
5310-00-983-8483	C-2	12
5310-00-983-8483	C-3	15
5340-00-879-4473	C-1	1
5805-00-877-2965	C-6	12
5815-00-863-5876	C-12	56
5835-00-921-1650	C-12	55
5903-00-984-4988	C-6	8
5905-00-071-1629	C-3	26
5905-00-104-5756	C-12	29
5905-00-104-8335	C-12	26
5905-00-104-8336	C-12	15
5905-00-104-9347	C-12	18
5905-00-104-8352	C-12	10
5905-00-106-1273	C-5	15
5905-00-106-1273	C-12	11
5905-00-106-9351	C-12	32
5905-00-110-0196	C-12	33
5905-00-111-4742	C-12	13
5905-00-111-4858	C-12	17
5905-00-114-5393	C-12	25
5905-00-114-5430	C-12	23
5905-00-116-8567	C-12	29
5905-00-140-6132	C-12	7
5905-00-141-0596	C-12	27
5905-00-141-1116	C-12	28
5905-00-171-1999	C-4	5
5905-00-190-8887	C-4	7
5905-00-192-0626	C-12	12
5905-00-195-6453	C-5	7
5905-00-256-0412	C-12	1
5905-00-279-1915	C-12	31
5905-00-279-1922	C-2	9
5905-00-279-5656	C-2	8
5905-00-461-3127	C-12	9
5905-00-464-4172	C-12	21
5905-00-494-5517	C-12	14
5905-00-494-7855	C-12	16
5905-0-518-7504	C-3	28
5905-00-585-5082	C-12	4
5905-00-758-4724	C-2	9
5905-00-758-4724	C-13	9
5905-00-889-8122	C-12	20
5905-00-920-8151	C-12	5
5905-00-932-2952	C-12	8
5905-00-935-8539	C-12	30
5905-00-953-9132	C-2	6
5905-955-9171	C-12	6
5905-00-932-9217	C-12	2
5905-00-932-3942	C-12	3
5910-00-111-1811	C-12	35
5910-00-179-5824	C-12	18

SECTION III. NATIONAL STOCK NUMBER AND PART NUMBER (OAKLAND) (CONTINUED)

STOCK NUMBER	FIG. NO.	ITEM NO.
5910-00-451-7286	C-12	42
5910-00-777-6928	C-12	39
5910-00-784-7714	C-12	36
5910-00-893-6745	C-12	34
5910-00-902-3662	C-12	40
5910-00-925-3817	C-12	37
5910-00-995-1662	C-12	41
5920-00-023-2926	C-3	20
5920-00-081-5958	C-3	18
5920-00-403-4897	C-8	11
5920-00-857-8416	C-3	17
5920-00-901-9936	C-3	19
5920-00-968-3238	C-3	14
5920-00-968-3238	C-12	69
5930-0-194-1548	C-2	16
5930-00-268-0309	C-2	15
5930-00-501-4859	C-8	9
5930-00-989-6788	C-8	7
5935-00-085-4730	C-6	1
5935-00-085-4730	C-7	1
5935-00-192-4805	C-7	11
5935-00-192-4825	C-3	22
5935-00-194-3079	C-5	14
5935-00-246-6421	C-7	2
5935-00-283-4003	C-8	8
5935-00-578-2647	C-3	21
5935-00-578-2647	C-7	12
5935-00-578-2701	C-5	13
5935-00-799-2442	C-2	4
5935-00-799-2442	C-5	2
5935-00-841-6421	C-6	2
5935-00-847-7840	C-2	3
5935-00-847-7840	C-5	1
5935-00-866-5894	C-4	3
5935-00-934-2758	C-12	67
5935-00-948-9095	C-13	3
5935-00-948-9096	C-13	2
5940-00-643-5717	C-3	5
5945-00-013-6953	C-4	4
5945-00-494-8898	C-4	9
5945-00-732-5763	C-4	8
5945-00-988-0851	C-4	6
5961-00-068-4708	C-2	7
5961-00-068-4708	C-13	8
5961-00-076-1403	C-12	49
5961-00-116-8950	C-12	53
5961-00-241-3423	C-12	59
5961-00-269-2242	C-12	52
5961-00-401-0505	C-12	57
5961-00-452-1496	C-12	60
5961-00-458-9516	C-12	54
5961-00-719-4355	C-12	47
5961-00-840-4826	C-12	51
5961-00-892-3544	C-12	45
5961-00-914-6005	C-12	43
5961-00-921-3781	C-12	44
5961-0-938-1135	C-12	46
5961-00-995-2310	C-12	48
6110-00-856-2410	C-8	5
6210-00-235-2064	C-3	11
6240-00-081-6321	C-3	12
6240-00-155-7836	C-2	18
6240-00-941-2204	C-12	65

SECTION IV. NATIONAL STOCK NUMBER AND PART NUMBER INDEX (OAKLAND) (CONTINUED)

PART NUMBER	FSCM	FIG. NO.	ITEM NO.
ASTM-B187	88724	C-9	14
ASTM-B187	88724	C-11	14
A90-100-7001		C-12	62
SK05BX103K	81349	C-12	35
CIS-632-2	46384	C-1	7
CIS-632-2	46384	C-1	15
CR2-DDCS-5000-ROL		C-12	64
CR2-DDCS-200-ROS		C-12	63
CS13BC336K	81349	C-12	36
CS13BC475K	80131	C-12	38
CS13BD335K	81349	C-12	39
CS13BE155K	81349	C-12	40
DR-6176		C-9	13
DR-6176		C-11	13
FM-03-1A	81349	C-9	11
GMT	54251	C-12	68
GMT-180	71400	C-3	20
GMT-1	71400	C-3	19
GMT-1-1-3	71400	C-3	17
GMT-3	71400	C-3	18
GOB-1104	24324	C-3	10
GBD22W0-406D	81312	C-1	3
GLT	71400	C-3	14
MLT	71400	C-12	69
IB4001	96990	C-12	44
IM4004	96990	C-12	43
IB4148	01295	C-12	46
IB4748	04713	C-12	49
IB7584	81349	C-12	48
IB7534	01295	C-12	47
IB755A	81349	C-12	45
LEAD-C-12684	21617	C-9	10
LEAD-C-12684	21617	C-11	10
LEAD-C-28992	21617	C-3	4
LEAD-C-28998	21617	C-3	5
LEAD-C-29005	21617	C-1	4
LEAD-C-29007	21617	C-3	30
LEAD-C-29049	21617	C-1	1
LEAD-C-81539	21617	C-3	2
LEAD-C-51942	21617	C-9	5
LEAD-C-51964	21617	C-10	5
LEAD-C-51947	21617	C-11	5
LEAD-C-51943	21617	C-9	4
LEAD-C-53949	21617	C-10	4
LEAD-C-61943	21617	C-11	4
LEAD-C-51944	21617	C-9	1
LEAD-C-51944	21617	C-10	1
LEAD-C-51944	21617	C-11	1
LEAD-C-51945	21617	C-9	11
LEAD-C-51945	21617	C-10	11
LEAD-C-52445	21617	C-11	11
LEAD-C-54454	21617	C-5	9
LEAD-C-54954	21617	C-6	5
LEAD-C-54967	21617	C-7	6
LEAD-C-58593	21617	C-7	9
LEAD-C-58953-3	21617	C-6	10
LEAD-C-58932	21617	C-7	3
LEAD-C-98933	21617	C-6	6
LEAD-C-89464	21617	C-2	5

PART NUMBER	FSCM	FIG NO.	ITEM NO.
LBAD-D-29024	21617	C-3	8
LBAD-D-33167	21617	C-2	1
LBAD-D-33167	21617	C-13	15
LBAD-D-33171	21617	C-2	6
LRAD-D-33172-GP2	21617	C-2	5
LRAD-D-33174	21617	C-13	7
LRAD-D-33175-GP2	21617	C-13	6
LRAD-D-51540	21617	C-8	3
LRAD-D-51546	21617	C-9	12
LBAD-D-51546	21617	C-10	12
LBAD-D-51546	21617	C-11	12
LBAD-D-51551	21617	C-9	6
LBAD-D51551	21617	C-10	6
LRAD-D-51551	21617	C-11	6
LRAD-D-51556	21617	C-8	1
MTE-3739	50131	C-12	58
MS-15795-803	96906	C-1	13
MS-15795-805	96906	C-1	9
MS18211-190	96906	C-5	10
MS-18211-841	96906	C-5	11
MS-21044-M3	96906	C-9	7
MS-21044-N3	96906	C-10	7
,S-21044-N3	96906	C-11	7
MS-21044-N3	96906	C-9	10
MS21044-MS	96906	C-10	10
MS-21044-N3	96906	C-9	14
MS-21046-NO6	96906	C-5	4
MS-21046-NO6	96906	C-6	4
MS-21046-NO6	96906	C-7	4
MS-27183-8	96906	C-9	25
MS-24699-13	96906	C-7	10
MS-5237-327	81349	C-2	16
MS-27183-5	96906	C-2	12
MS-27183-5	96906	C-4	15
MS-27183-7	96906	C-3	3
MS-34206-261	96906	C-9	9
MS-34206-261	96906	C-10	9
MS-34206-261	96906	C-11	9
MS-35190-222	96906	C-4	6
MS-35190-222	96906	C-7	7
MS-35190-238	96906	C-13	13
MS-35192-270	96906	C-4	7
MS-35192-270	96906	C-7	8
MS-35206-217	96906	C-3	4
MS-35206-226	73734	C-4	6
MS-35206-228	96906	C-5	3
MS-35206-228	96906	C-6	8
MS-35206-228	96906	C-7	11
MS-35206-230	96906	C-2	2
MS-35206-230	96906	C-4	3
MS-35206-230	96906	C-7	5
MS-35206-230	96906	C-13	1
MS-35206-232	96906	C-2	9
MS-35206-252	96906	C-2	2
MS-35207-262	96906	C-2	6
MS-35207-262	96906	C-10	6
MS-35207-262	96906	C-11	6
MS-35207-87	96906	C-2	11
MS-[illegible]	96906	C-4	9

SECTION IV NATIONAL STOCK NUMBER AND PART NUMBER (OAKLAND) (CONTINUED)

PART NUMBER	FSCM	FIG. NO.	ITEM NO.
MS-35335-58	96906	C-7	14
MS-35388-117	96906	C-5	12
MS-35338-135	96906	C-1	12
MS-35338-136	96906	C-1	10
MS-35338-41	96906	C-2	13
MS-35649-242	96906	C-3	7
MS-35649-262	96906	C-3	16
MS-35649-26	96906	C-13	4
MS-35649-282	96906	C-3	4
MS-35650-302	96906	C-3	24
MS-51957-120	96906	C-1	14
MS-51957-17	96906	C-6	11
MS-51957-30	96906	C-1	8
M1C17090G	80131	C-12	50
NDW	14655	C-12	41
PMA-52A		C-9	3
PMA-52A		C-10	3
PMA-52A		C-11	3
PW-5-200	75042	C-12	20
RCR20G102KS	81349	C-12	33
RCR20G104RS	81349	C-12	15
RCR20G105KS	81349	C-12	24
RCR20G124KS	81349	C-12	26
RCR20G153JS	81349	C-5	15
RCR20G153JS	81349	C-12	11
RCR20G202JS	81349	C-12	30
RCR20G224KS	81349	C-12	25
RCR20G273KS	81349	C-12	32
RCR20G334KM	81349	C-12	21
RCR20G391KS	81349	C-12	13
RCR20G392KS	81349	C-12	9
RCR20G433JS	81349	C-12	23
RCR20G471KS	81349	C-12	17
RCR20G472KM	81349	C-12	14
RCR20G473KS	81349	C-12	27
RCR220G474KS	81349	C-12	22
RCR20G562KS	81349	C-12	28
RCR20G750JS	81349	C-12	29
RCR32G101JS	81349	C-12	18
RCR32G153KS	81349	C-12	10
RC20GF202J	81349	C-4	7
RC20GF562J	44655	C-5	7
RC20GF821J	81349	C-4	5
RC42GF123K	81349	C-12	12
RC42GF181J	81349	C-12	1
RC42GF361J	81349	C-12	31
RN55C1821F	81349	C-12	4
RN55C2150F	81349	C-12	8
RN55C4751F	81349	C-12	2
RN55C6042F	81349	C-12	3
RN55C6810F	81349	C-12	6
RN55C8450F	81349	C-12	5
RN70A1333F	81349	C-3	28
RS-2	91637	C-3	26
RV4NAYSA501A	81349	C-12	19
RW79U3001F	81349	C-12	16
SA-238/G	32757	C-8	5
SD-42-BS	46384	C-1	1
SM-D-433907	21617	C-8	4
SST4-40SMPAT	70318	C-1	11

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PART NUMBER	FSCM	FIG. NO.	ITEM NO.
TAPC-35		C-12	61
TF-255-2C (115VAC)	02288	C-4	9
T154-2C (6VDC)	02288	C-4	4
T154 (48VDC)	02288	C-4	6
T154 (115VDC)	02288	C-4	8
X663F	84411	C-12	37
117-210-101	79405	C-13	14
1202	74545	C-8	7
125220	73734	C-4	2
138127E	96182	C-13	12
138177E	96182	C-2	15
138187G	96182	C-2	16
14B	82389	C-12	67
2N3439	02735	C-12	53
2N4123	80131	C-12	51
2N4125	80131	C-12	52
2N4410	81349	C-12	60
2N4889	80131	C-12	57
2N5133	80131	C-12	59
2N5416	80131	C-12	54
2SDVV-15U	32171	C-3	23
238A	64959	C-6	12
238A	64959	C-3	22
239A		C-5	14
240A	64959	C-5	13
241C	64959	C-3	21
241C	64959	C-7	12
280C	64959	C-7	11
300555	02288	C-4	3
2007P-1-102	32997	C-12	7
4063	27193	C-8	13
421C-10W	81812	C-9	2
421C-10W	81812	C-10	2
421C-10W	81812	C-11	2
4410	44655	C-2	9
4410	44655	C-13	9
4421	44655	C-2	8
48ESB	58854	C-12	65
5A4	81483	C-2	7
5A4	81483	C-13	8
512240(Frame)	44038	C-6	1
512240(Frame)	44038	C-7	1
512240(Cable)	44038	C-6	2
512240(Cable)	44038	C-7	2
512241	44038	C-7	2
513925	44038	C-13	3
513927	44038	C-13	2
513936	44038	C-2	4
513936	44038	C-5	2
513938	44038	C-2	3
513938	44038	C-5	1
5242	27193	C-8	8
60PSB	08180	C-3	12
7-170	71785	C-3	5
7C023324X0500D	56289	C-12	42
7561K5	15605	C-8	9
80409000-000	96238	C-1	2
8101059-01-102	72619	C-3	11
863	83330	C-3	27
9-85-11	75382	C-8	1
90409000-000	96238	C-1	
90E-42C2-F3F1(R)L1-R1 96182	96182	C-13	13
90E-A2C2-F3J4(R)L4R4 96182	96182	C-2	17
9433	73734	C-8	29
95-3171	72619	C-3	13

APPENDIX D

OPERATOR'S MAINTENANCE AND PARTS

FOR

THE DIGITAL LINE INTERFACE UNIT (DLIU)

APPLIED ELECTRONIC /W-G<, IN.

MODEL DLI

Section I. INTRODUCTION

D1-1. Scope

This appendix describes the in&Nation, operatim, functioning of equipment, maintenance, and alignment for the DLIU. It also includes a complete listing of electricai parts for parts-ordering purposes.

D1-2. Purpose and Use

The DLIU is a rack-mounted, plug-in assembly containing two units (A and B), each of which provides the following:

a. **Interface (level conversion and dc isolatio..) between in-put-to-output combinations of high level neutral, high level polar, and low level polar data signals.**

b. **Built-in loop battery fusing.**

c. **Automatic adjustable loop current regulation (high level only).**

d. **No transition/open-loop detection and alarm.**

D1-3. Description

a. Physical. **The DLIU contains two independent interface units (marked A and B) on one plug-in assembly. The module is designed for mounting in a universal shelf, requiring 5¼ inches of vertical rack space in a standard 19-inch relay rack or cabinet. Up to six DI IU's can be housed in one shelf. The DLIU has all its active elements mounted on a printed-circuit board that slides into guides and connects to a receptacle at the rear of the universal shelf. All input-output connections, alarm closure connections and loop and power voltages for the DLIU are brought to the DLIU through the rear connector. The front panel of the DLIU mounts an output loop MONITOR jack, an open line/no transition alarm (OL/NT ALARM) indicator light, and an output loop CURRENT ADJUST control for each of the units. In addition a single blown FUSE ALARM lamp provides a monitor to indicate [illegible] of the units fuses.**

b. Electrical. **The DLIU provides two channels of interface between high level and low level equipment. Input and output circuits are dc isolated from each other [illegible] and from the ac power source. The following combinations of input and output [illegible] by means of a strapping option:**

(1) High level polar input to low level output.

(2) High level [illegible] input to high level neutral or polar output.

(3) Low level [illegible] high level neutral or polar output.

(4) Low level [illegible] to low level polar output. The DLIU operates with other synchronous or [illegible] speeds up to 2400 bauds. Automatic adjustable loop current regulation for high level output [illegible] is provided as well as no transition open loop detection and alarm, loop battery and [illegible] power fusing, output loop monitor [illegible] and self contained power supplies for [illegible].

D1-4. Specifications

a. Input Characteristics.

(1) *High level.*

(*a*) Impedance [illegible] ohms; reactance essentially [illegible].

(*b*) Keyed pulse [illegible] ma ±0.7 ma (20 ma neutral signal) 30 [illegible] (60 ma neutral signal) 0 ma ±[illegible].

(*c*) Input [illegible] maximum [illegible] positive voltage between [illegible] negative voltage [illegible].

(2) [illegible] input

capacitance less than 2500 picofan

(b) Keyover point: 0 ± amperes.

(c) Keying sense: Mark with excess of 00001 ampere producing between line and signal ground: sp not in excess of 0.0001 ampere pr' voltage.

b. Output Characteristics.

(1) High level.

(a) Impedance (not including network) less than 50 ohms at curl 150 ma. Reactance essentially (modulation rates.

(b) Contact voltage rat between either mark and tongu tongue. Maximum reference, signal volts.

Cc) Space leakage less microamperes at 260 volts.

(d) Waveshaping PPJ[1 **option): Series-connected 200 ok 1** wirewound resistor plus a 1 volt capacitor between line side. and output common lead.

(e) current regular b 1 operating range: 15 ma to 65 nb: percent of operating current fql resistance of 0 to 1**500** (neutral ohms (polar).

(2) tow level

(a) Impedance less than current between 100 **microampe reactance** essentially 0 ohm **for rates.**

(b) Maintenance **short** circ output terminals 100 ma

(c) Waveshaping networks (strap se&~ table): Series resistors **and shunt capacitors** providing risetimes and falltimes of 5 to 7 percent of the duration of unit intervals for 50, 75, **and** 150 bauds. Terminals provided and values listed in manual for components required for 42, 45.5, 300, 600, 1200, and 2400 bauds.

c. Input/Output Characteristics.

(1) Side stable: Unit remains in **the last** signaled **contact position.**

(2) Modulation rate: Up to 2400 bauds.

(3) Distortion: Less than 1 percent distortion of all types switched bias, bias **end. cyclic and** fortuitous at **all rates up to 2400 bauds.**

d. Alarm Section **(Strappable Options).**

(I) Open loop-alarm **light (front panel) and** ground contact (to rear connector) **for continuous** acing condition on output line in excess **of 1.0** second.

(2) No-transition-alarm light (front **panal) and ground contact (rear connector) for continuous** *FE conditions on output line in excess of 1.0

ring and Fusing.

Monitor jacks for output loops (front panel mounted) Series connected in high level output mode, bridging output on low level mode (1K ohm resistors in series with each lead).

(2) Fusing (indicating type fuses) for all loop power supply inputs and internal supply input. Ground contact output to rear for alarm condition.

f. Temperature Conditions.

(1) Operating: 0° C to 75° C.

(2) Nonoperating: —55° C to 125° C.

g. Ac Power Supply Requirements. **120 vac ±10 percent, 47-63 Hz, single phase, ¼ watt (approx).**

Section II. INSTALLATION AND OPERATION

D2-1. Unpacking

No special instructions are requir Inspect the DLIU carefully fo damage upon removal. The equ shipped for installation. The strap given in paragraph 2-2 must be fol equipment can be installed and h

D2-2. Strapping Options

The DLIU must be checked for prior to installation. Determine put/output requirements for in stallation must be made by sonnel. Strapping is accomplishe soft drawn solder tinned copper terconnect appropriate terminals on the printed circuit board and on the MONITOR jacks. Use insulating sleeving when connecting nonadjacent terminals. Selection of the required strapping arrangement is made as indicated by table D-1. The terminals associated with Unit A are sequentially numbered from 1 to 43. The corresponding terminals associated with Unit B are numbered from 101 to 143. The numbers of the terminals can be located on the printed circuit board (fig. D-2). All numbers, except 35, are on the board; 35, 36, 135 and 136 on the back of the front panel

Table D-1 Required Strapping Arrangement

Function	Operation	Unit A Strapping	Unit B Strapping
Input	High Level Polar	1-2, 3-5	101-102, 103-105
	High Level Neutral	1-2, 3-6	101-102, 103 106
	Low Level	3-4	103-104
Signal Sense Input to Output	Normal	7-8, 9-10	107-108, 109 110
	Reverse	7-10, 8-9	107-110, 108-109
Output	High Level Polar: Without Rheostat and Waveshaper	13-13, 15-15, 21-25, 26-34, 35-36, 38-39	13-114, 115 16, 212-125, 126 134, 135 136, 138-139
	High Level Polar: with Rheostat without Waveshapter	13-14, 15-16, 21-34, 35-36, 38-39	13-114, 115-15 121-134, 135 136, 138 139
	High Level Neutral: with Rheostat and Waveshaper	11 12, 12-14, 21-25, 26-34, 35-36, 38-39	11-112, 112 114, 121-125, 126 134, 135 136, 138 139
	High Level Neutral: with Rheostat, without Waveshaper	11 12 12-14, 21-34, 35-36, 38 39	11 112 [illegible] 114, 121 134 135 136 138 139
	Low Level: 50 baud	13-14, 15-16, 17-20, 27-33, 33-39, 32-37, 27-28	13-114 115 15, 117-120, 127-133, 133 139, 132 137, 127-128
	Low Level: 75 baud	13-14, 15-16, 17-20, 27-33, 33 39, 32-37, 27-29	13 114, 115 16, 117 120 127 133, 133 139 132 137, 127 129
	Low Level: 150 baud	13-14, 15-16, 17-20, 27-33, 33 39, 32-37, 27-30	13-114 [illegible] 117 [illegible] 133 [illegible] 132 [illegible] 130
	Low Level: 42, 45.5, 300, 600, 1200 or 2400 baud	13-14, 15-16, 17-20, 27-33, 33 39, 32-37, 27-31 and add two capacitors, values listed in table II, one between terminals 32 and 24 (plus to 32) and the second between terminals 24 and 37 (plus to 37)	13 114 [illegible] 117 [illegible] 133, 133 [illegible] 132 [illegible] 131 and add two capacitor values listed in table II one between terminals [illegible] and 124 (plus to 132) and the second between terminals 124 and 137 (plus to 137)
Alarm	Steady Mark	42-43	142 143
	Steady Space	41-42	141 142
	Steady Mark or Steady Space	42 43, 41-42	142 143, 141 142

Table D-2 [illegible]

42 Baud	[illegible]	[illegible]
45.5	[illegible]	[illegible]
300	[illegible]	[illegible]
600	33	[illegible]
1200	22	[illegible]
2400	[illegible]	[illegible]

D2-3. Operation

Q. After appropriate strapping as described in paragraph D2-2, the equipment can be plugged into a prepared shelf position. Operation of the equipment starts automatically. Where high level output lines are being keyed, the CURRENT ADJUST control must be set to the desired loop current. This is done for neutral output signals by setting the input to a mark condition and monitoring the loop current by means of the unit's MONITOR jack. Set the loop current by adjusting the CURRENT ADJUST control to the desired mark current (normally 60 ma). Once set, the mark current will be regulated to within *S percent of its set value few external loop resistance from 0 to 1500 ohms.

b. For polar output signals, set the input to either a steady mark or steady space condition. Monitor the loop and set the CURRENT ADJUST control to the desired current (normally 20 ma). Once set, the mark and space current will be regulated to within ±5 percent of its set value for external loop resistances of 0 to 2500 ohms.

connector pin	External circuit
A	**input** Unit A--Hi& hiplo
B	Input Unit A-Low (ring
C	Output Unit A-H,& (tip)
&	output Unit A-Low (**ring**)

Connector pin	External circuit
E	Input unit B-High (tip)
F	**Input Unit B—Low (ring)**
H	Output Unit B-Hi& (tip)
J	Output Unit B-Low (ring)
K	NT/OL Alarm Closure lb ground) Unit A&B
L	**Fuse Alarm Closure (to ground)**
M	**Not used**
N	**Not used**
P	**Not used**
R	**Not used**
S	**+60 volts dc in**
T	**—60 volts dc in**
U	**Not used**
V	**Not used**
W	**Dc ground**
X	**-130 volts dc in**
Y	**120 volts ac input**
Z	**120 volts ac input**

Section III. FUNCTIONING OF EQUIPMENT

D3-1. General

(fig D-2)

The main sections of the DLIU are the power supply and two identical circuits with their associated NT/OL alarm and a fuse alarm. Each of the two identical circuits (unit A and unit B) contains an input amplifier, an output keying section, a current-regulating device and various components for low level limiting and high and low level waveshaping. A MONITOR jack is also included to monitor a current waveform in the high level mode and a voltage waveform in the low level mode.

D3-2. Circuit Analysis

The following description covers unit A circuit. Operation of unit B circuit is identical in all respects. Numbering of unit B components follow the same order as in unit A, beginning with 101

a. Input Section. **The input section functions so as to switch at the appropriate level of the input waveform and conditions the signal for application to the output section. The input amplifier consists of operational amplifier U-1 and a complimentary emitter follower stage Q1 and Q2, with appropriate resistors and capacitors for each operating mode. The input signal develops a voltage across R2 and R3 (or R1 in the high level mode). This voltage is applied to one input of U-1. A comparison voltage established by the particular strapping option (WT5, WT6, or WT7) is applied to the second input of U-1. When the input voltage reaches the level of the comparison voltage, the amplifier rapidly changes state and remains in this state until the opposite threshold voltage is attained by the input. Resistor R5 is for low level, R6 for high level polar, and R7, R8 and R9 for high level neutral. Resistor R8 is factory-adjusted to provide for keyover with an input of 30 ma (the half-current point on a 60 ma. neutral input signal). Transistors Q1 and Q2 drive isolation transformer**

T-1, which couples the transistion signal to the output section.

b. Output Section. The output section operates in a bistable manner. Transistors Q3 and Q5 operate in the positive region and Q4 and Q6 in the negative region. Feedback is from Q5 and Q6 collectors to Q3 and Q5 bases through R17. The operating voltage is selected by strapping (+130 vdc for neutral and ±60 vdc for polar and low level).

c. Current Regulator. The current regulator has a range of approximately 15 to 65 ma, adjusted by R21, a front panel mounted potentiometer. The current regulator consists of a regulator section (CR6 and CR7, Q8, R20 and R21), a reference current regulation section (CR4 and CR5, Q7 and R19), and a diode bridge (CR2, CR3, CR8 and CR9). The reference current regulator maintains a constant current through CR6 and CR7 to establish a constant reference voltage for Q8. The diode bridge depolarizes the circuit for poler operation. Diode CR29 protects Q7 from high-voltage spikes developed when switching inductive loads.

d. Low Level Limiting and Waveshaping. Resistor R18 and diodes CR22 and CR23 provide low level limiting and short circuit protection. Short circuit current is 20 ma maximum in the low level mode. Resistor R18 also serves as the charging resistor for low level shaping capacitors C6 through C11 inclusive. A linear ramp is generated because of the high value of R18, yet a low output impedance is maintained because of the low impedance of CR22 and CR23. The high level waveshaping components are R22, a 200-ohm wirewound resistor, and C5, a 1μ capacitor.

e. MONITOR Jack. The MONITOR jack is strapped in series with the output loop to provide current monitoring in the high level mode. In the low level mode, the monitor jack are bridged across the output pair with a 15K resistor placed in series with each output lead.

f. Signal Alarm. The signal alarm consists of two differential amplifiers and two output transistors. The circuit can be strapped to alarm on constant mark, constant space, or both (no transition). The input differential amplifier controls the charge on timing capacitors C12 and C13 which are strapped to the output differential amplifier through diodes CR11 and . The output amplifier, Q11 and Q12, h ference voltage established at the base of Q1 and R36 and R37. When the input voltage exceeds this level, Q11 turns on, thereby signaling an alarm. In the constant mark mode, C12 is allowed to charge, and in the constant space mode, C12 charges, to provide an input voltage to Q11. In the no-transistion mode both capacitor voltages are summed, thereby giving an alarm condition no matter what state the unit stopped signaling. Transistor Q14 and Lamp DS201 (unit A) and Q114 and DS202 (unit A) and Q114 and DS202 (unit B) form the output for the front panel lamps. Transistors Q14 and Q114 pull in relay K201 to provide a contact closure output to the connector. The signal alarm will reset upon resumption of normal signaling.

g. Fuse Alarm.

(1) The fuse alarm circuit provides a visual indication (front panel lamp DS203) and an electrical output (contact closure to connector) if any fuse blows or ac power is lost.

(2) The ac failure signal is derived by relay K202 across the channel B power supply. The dc fuse alarms are actuated by fuses F1, F2, and F3. If a failure occurs, a voltage will be applied to K203, causing it to activate, which in turn lights front panel lamp DS203 and produces a contact closure on the connector.

h. Power Supply (Internal). The power supply consists of transformer T201 with dual center-tapped secondaries. The secondary voltage is bridge-rectified, filtered and regulated to provide the necessary operating voltages for the input amplifiers.

SECTION IV. PARTS LIST

Refertam Designation	Description				Military of Mf's Part No	Mfr or Source
RI, R101	Res, Fxd, Comp	180	5%	2W	RC42GF181J	AB
R2- R3. R102, R103	Res, Fxd, Film	4.75K	1%	.1W	RN55C4751F	MEPCO
R4, R104	Res, Fxd, Film	60.4K	1%	.1W	RN55C6042F	MEPCO
R5, R105	Res, Fxd, Film	1 82K	1%	.1W	RN55C1821F	MEPCO
R6, R106	Res, Fxd, Film	845	1%	.1W	RN55C8450F	MEPCO
R7, R107	Res, Fxd, Film	681	1%	.1W	RN55C6810F	MEPCO
R8, R106	Res, Var, W.W.	1K			3007P-1-102	BOURNS
R9, R109	Res, Fxd, Film	215	1%	.1W	RN55C2150F	MEPCO
R12, R112	Res, Fxd, Comp	3.9K	10%	5W		
R13, R113						
R14, R114						
R15, R115						
R16, R116						
R38, R138						
R12, R121, R142						
R203						
R207						
R204						
R10, R110	Res, Fxd, Carbon Comp	360	5%	2W		
C1, C101	Res, Fxd, Carbon Comp	27K	10%	.5W		
C2, C3, C102, C103	Res, Fxd, Carbon Comp	1K	10%	.5W		
C4, C12, C104, C112 C113	Cap, Fxd, Ceramic	1000pf	10%	200V	CK06BX102K	VIT
C5, C105	Cap, Fxd, Ceramic	.01uf	10%	100v	CK05BX103K	VIT
C6, C7, C106, C107	Cap, Fxd, Tant	33uf	10%	10V	CS12BC336K	SPR
C8, C9, C108, C109	Cap, Fxd, Mylar	1.0uf	10%	200V	X663F	TRW
C10, C11, C110, C111	Cap, Fxd, Tant.	4.7uf	10%	10V	CS13BC475K	SPR
C14, C15, C114, C115	Cap, Fxd, Tant.	3.3uf	10%	15V	CS13BD335K	SPR
	Cap, Fxd, Tant.	1.5uf	10%	20V	CS13BE155K	SPR
	Cap, Fxd, Elect.	250mf	-10% +75	16V	NLW	CD

Reference Designation	Description				Military of Mf's Part No.	Mfr or Source
C16, C116	Cap. Fxd, Ceramic	0.22MF	20%	50V	7C023224X0500D	SPR
CR& 2, 8, 9, 13, 102, 103, 108, lo@, 113, 204, aa, 29. la@	Diode, Silicon				IN4004	FAIR
cm, 5, e, II, 15, Is, 17, 104. la, 106, 114, 115, 116, 117	Diode, Silicon				IN4001	FAIR
cm, CR107	Diode, Silicon				IN755A	MOT
CR10, 11, 12, 110, 111, 112	Diode, Silicon				IN4148	TI
CR18, 19, so, 21, 118, 119. 120, 121, aa, 203	Diode, Silicon				IN753A	MOT
CR22, 23, 122, 123	Diode, Silicon				IN752A	MOT
CR201	Diode, Silicon				IN4742	MOT
Al. A10	Op. Amp, Silicon				MIC1709CG	MOT
Ql, Q101	Transistor, Silicon, Npn				2N4123	MOT
Q13, Q113, Q2, Q102	Transistor, Silicon Pnp				2N4125	MOT
Q3, A103	Transistor, Silicon Npn				2N3439	RCA
Q4, Q104	Transistor, Silicon Pnp				2N5416	RCA
Q5, Q105	Transistor, Silicon Pnp				62591	AEM
Q6, Q106	Transistor, Silicon Npn				62590	AEM
Q7, Q107	Transistor, Silicon Pnp				2N4889	FAIR
Q8, Q108	Transistor, Silicon Npn				MJE3739	MOT
Q9, 10, 11, 12, 109, 110, 111 112	Transistor, Silicon Npn				2N5133	FAIR
Q14, Q114	Transistor, Silicon Npn				2N4410	MOT
T1, T101	Transformer, Pulse				TAPC-35	AEM
T201	Transformer, Pwr				A90-100-7001	AEM
K201, K203	Relay 2C, 15K Coil, Special				CR2-DDCS-1500RDS	AEM
K202	Relay, 2C 5K Coil, Special				CR2-DDCS-5000RDS	AEM
DS201, 202, 203	Lamp, 48V, 40MA, T2 Slide				48ESB	SYL
XS201, 202, 203	Lampholder, T2 Slide					SYL
J1 J2	Jack, 3 Conductor				14B	SC
F1, 2, 3, 4,	Fuse, 180MA				GMT	BUSS
XF1, 2, 3, 4	Fuse Holder				HLT	BUSS

Section V. MANUFACTURER OR SOURCE LIST

Abbreviation	Manufacturer or Source	
AEM	Applied Electronics Mfg , Inc	Stamford, CT
AB	Allen Bradley Company	Milwaukee, WI
BOURNS	Bourns Inc	Riverside, CA
BUS	Bussman Mfg	St Louis, MO
CD	Cornell Dubilier	Newark, NJ
DALE	Dale Electronics Inc	Columbia, NE
FIAR	Fairchile/Semiconductor	San Rafael, CA
MEPCO	Mepco Inc	Morristown NJ
MOT	Motorola, Inc	Franklin Park IL
RCA	RCA Corp	New York NY
SPR	Sprague Electric Co	North Adams MA
SC	Switcheraft Inc	Chicago IL
SYL	Sylvania Elec Products	New York NY
TI	TI Supply Co	Dallas, TX
TRW	TRW Inc	Cleveland OH
VIT	Vitramon Inc	Bridgeport CT

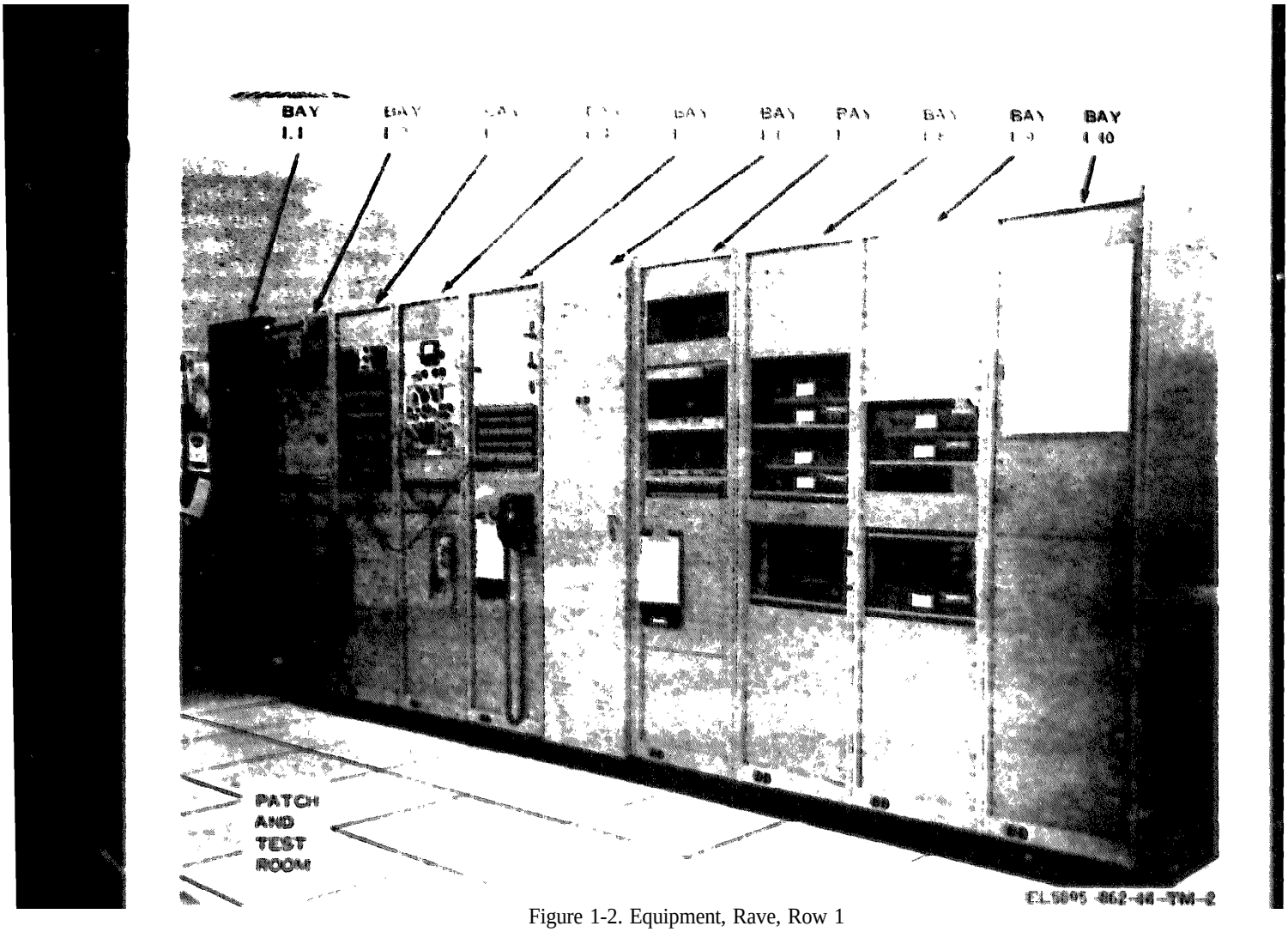


Figure 1-2. Equipment, Rave, Row 1

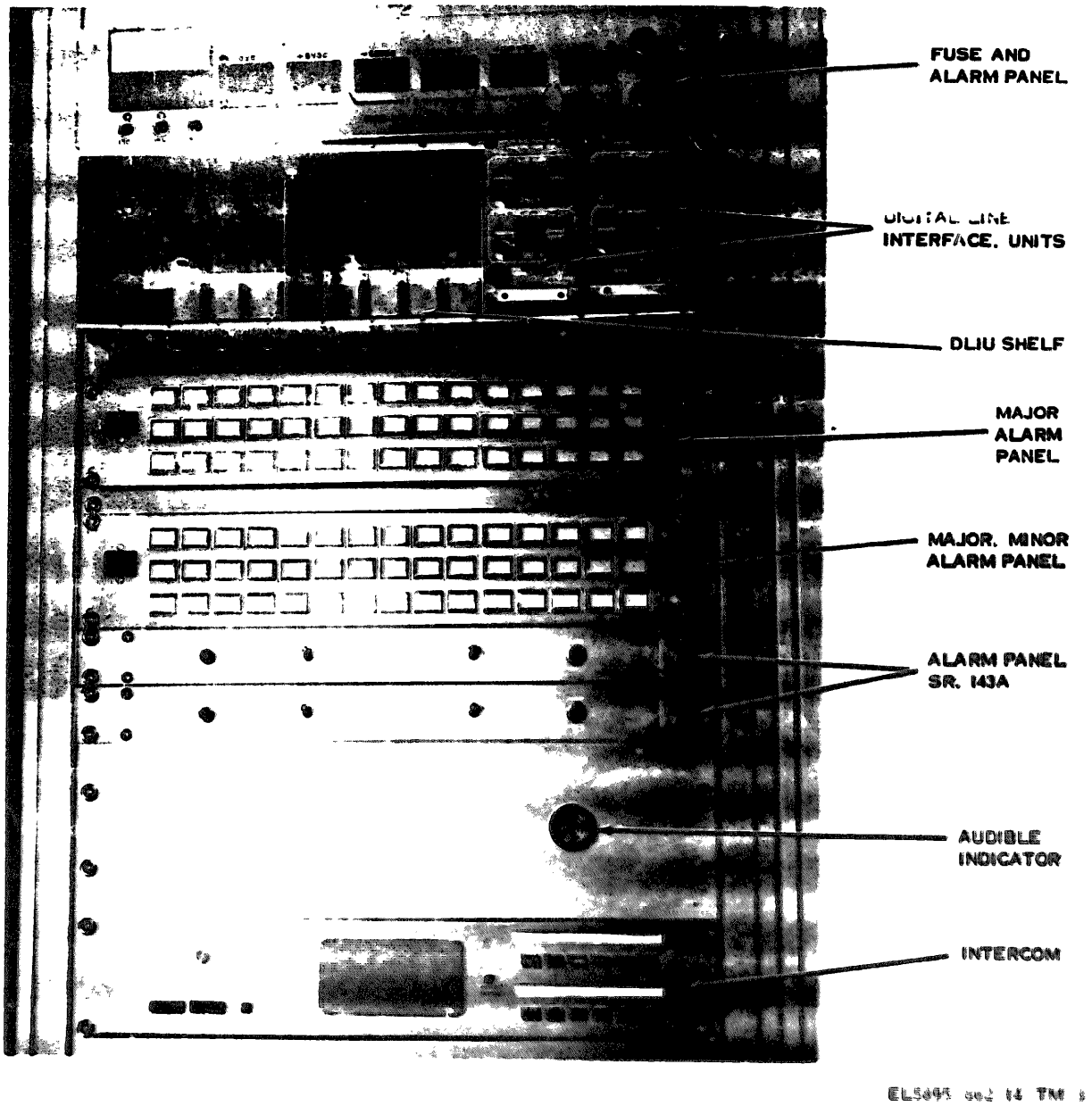


Figure 1-3. Equipment 12. Front Upper View.

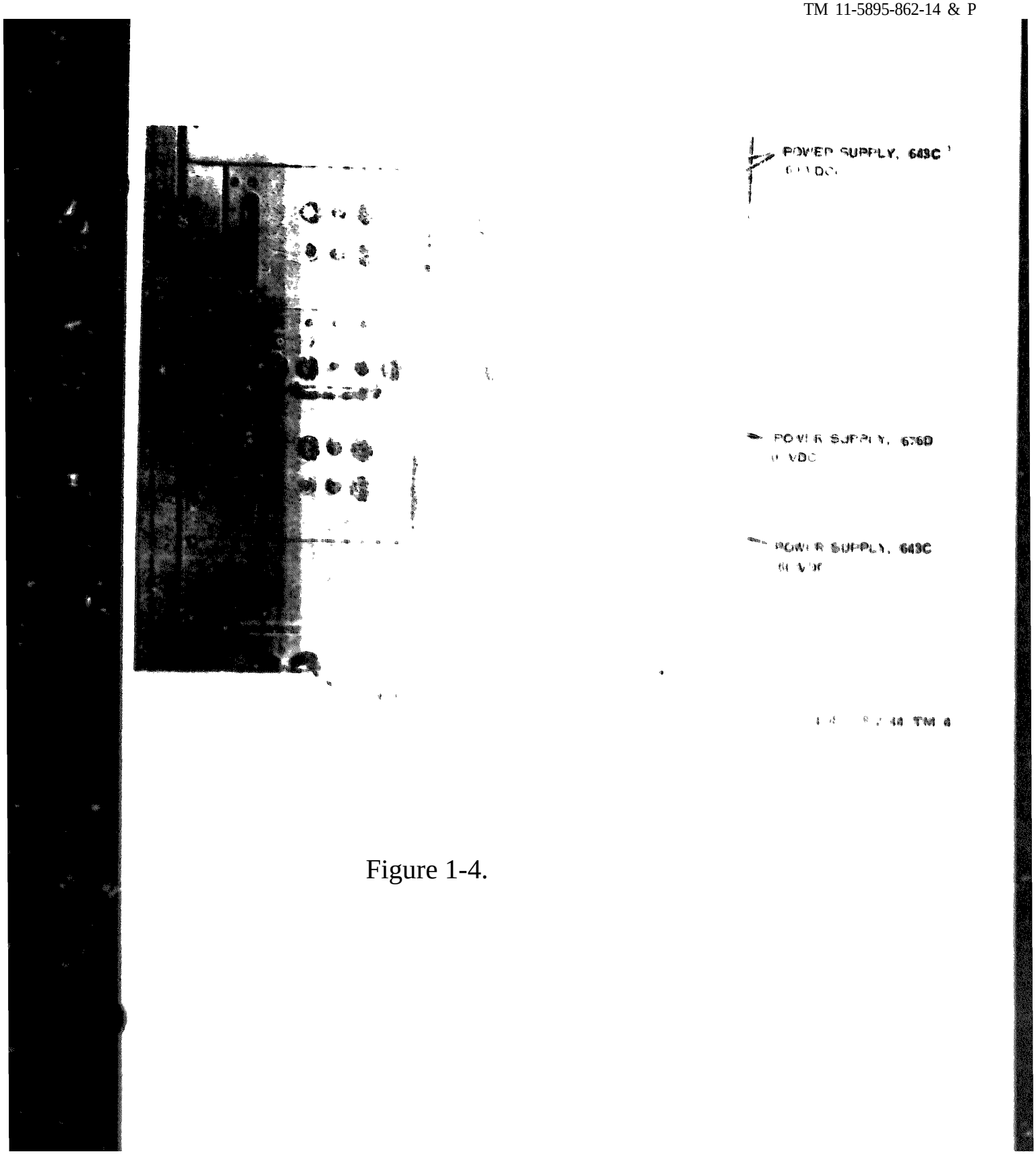


Figure 1-4.

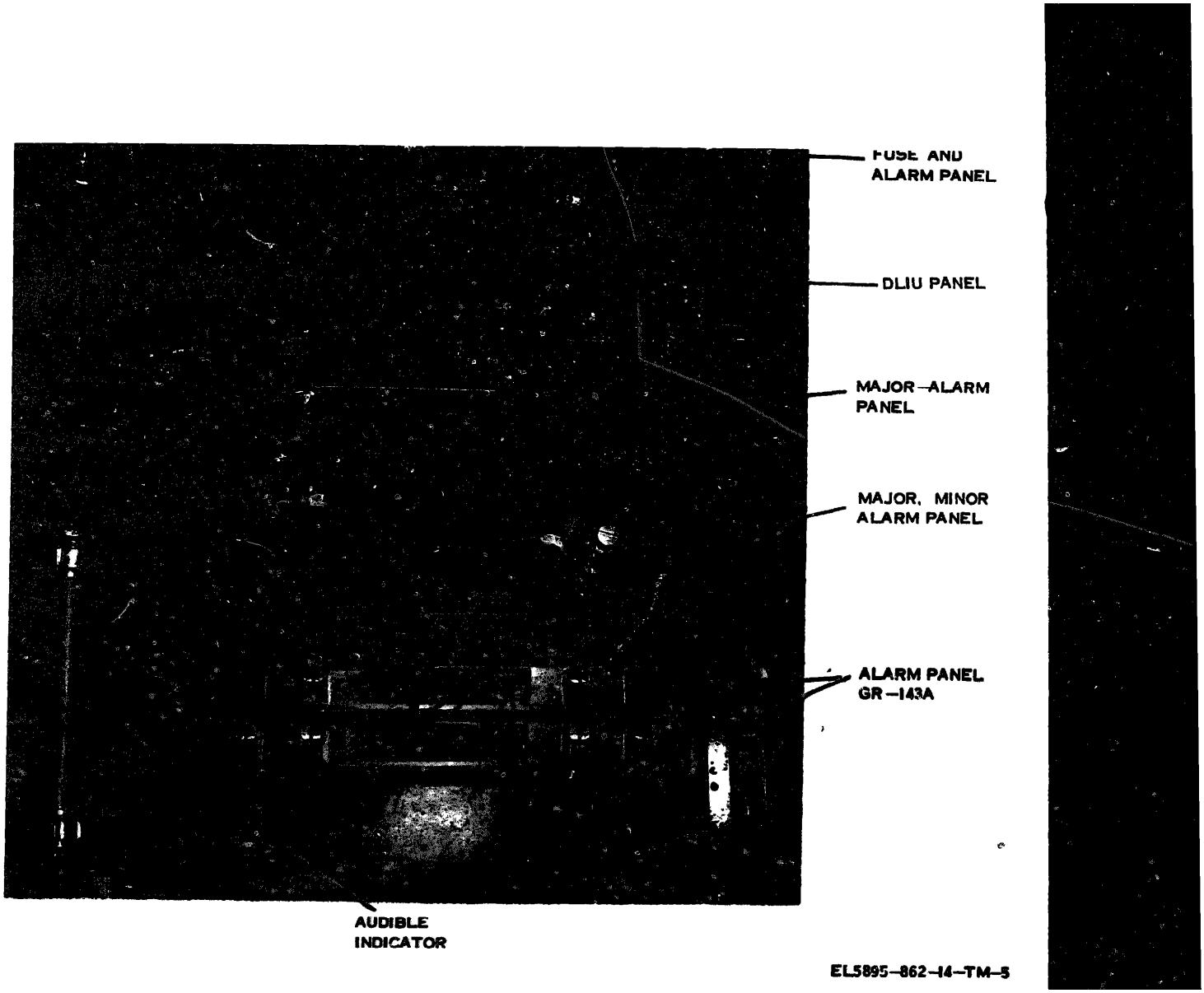


Figure 1-5. Equipment Bay 1-2. Rear Upper View

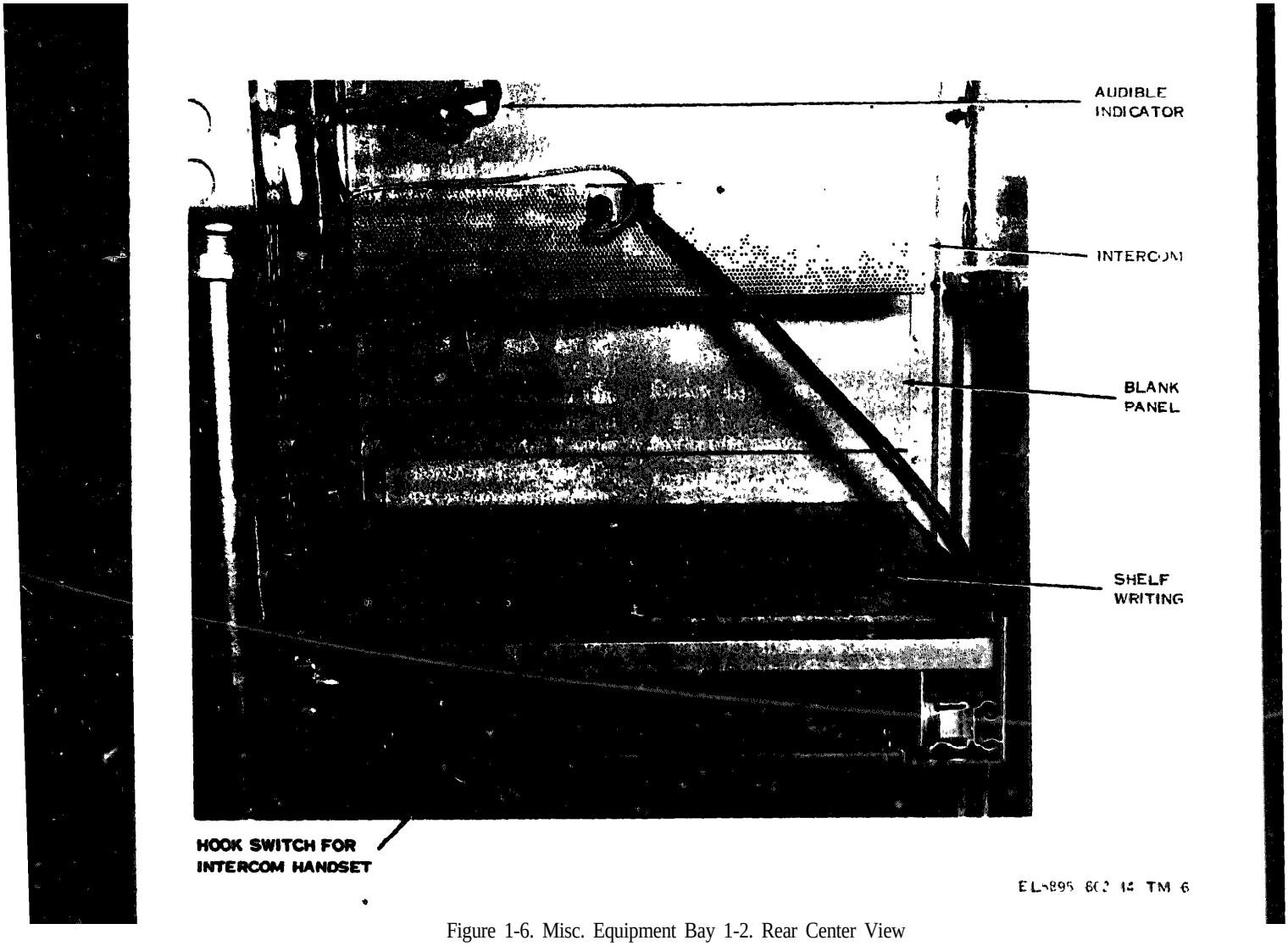


Figure 1-6. Misc. Equipment Bay 1-2. Rear Center View

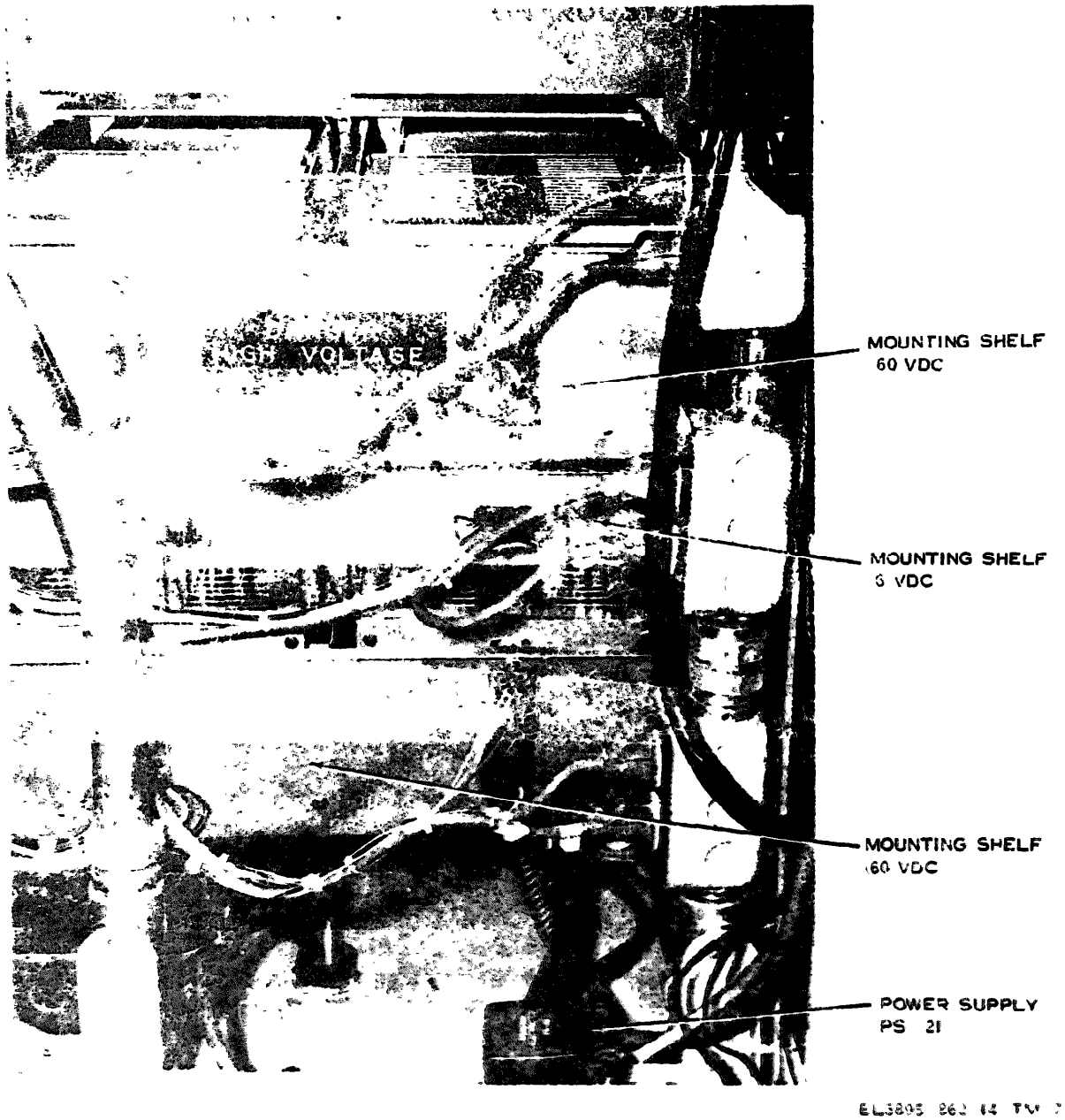


Figure 1-7. Misc. Equipment Bay 1-2. Rear Lower View.

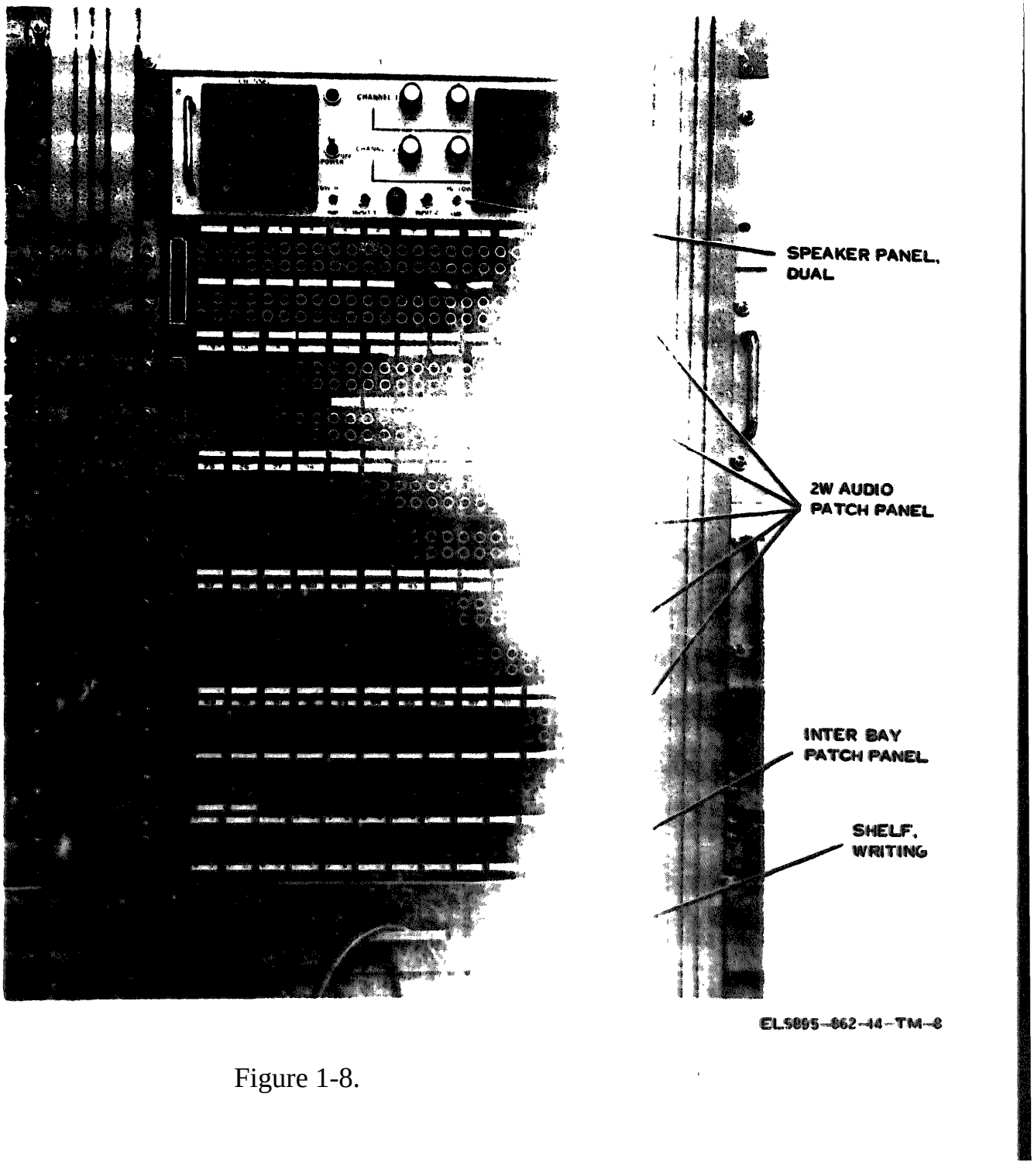

SPEAKER PANEL, DUAL
2W AUDIO PATCH PANEL
INTER BAY PATCH PANEL
SHELF, WRITING
EL5895-862-14-TM-8

Figure 1-8.

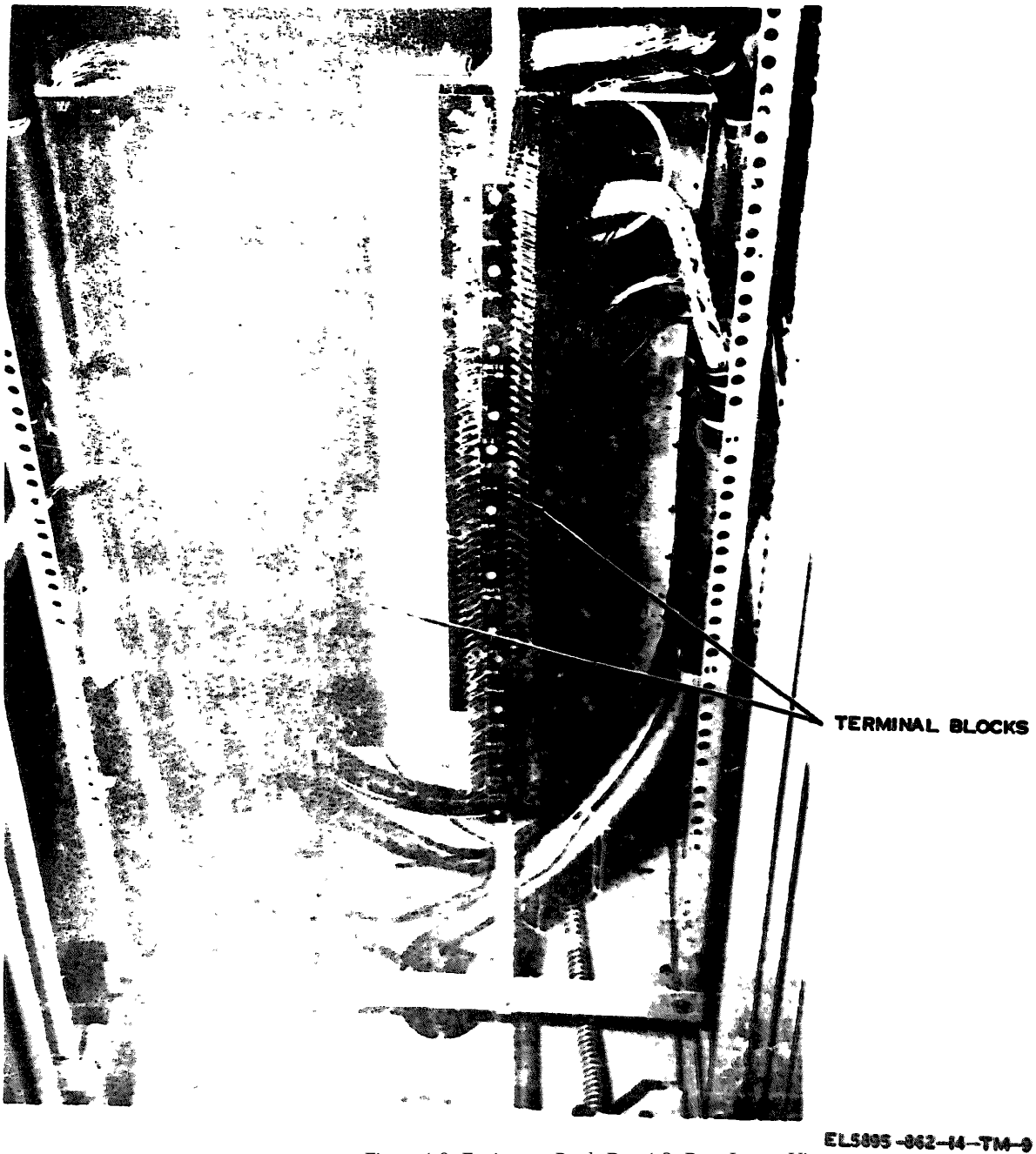


Figure 1-9. Equipment Patch Bay 1-3. Rear Lower View.

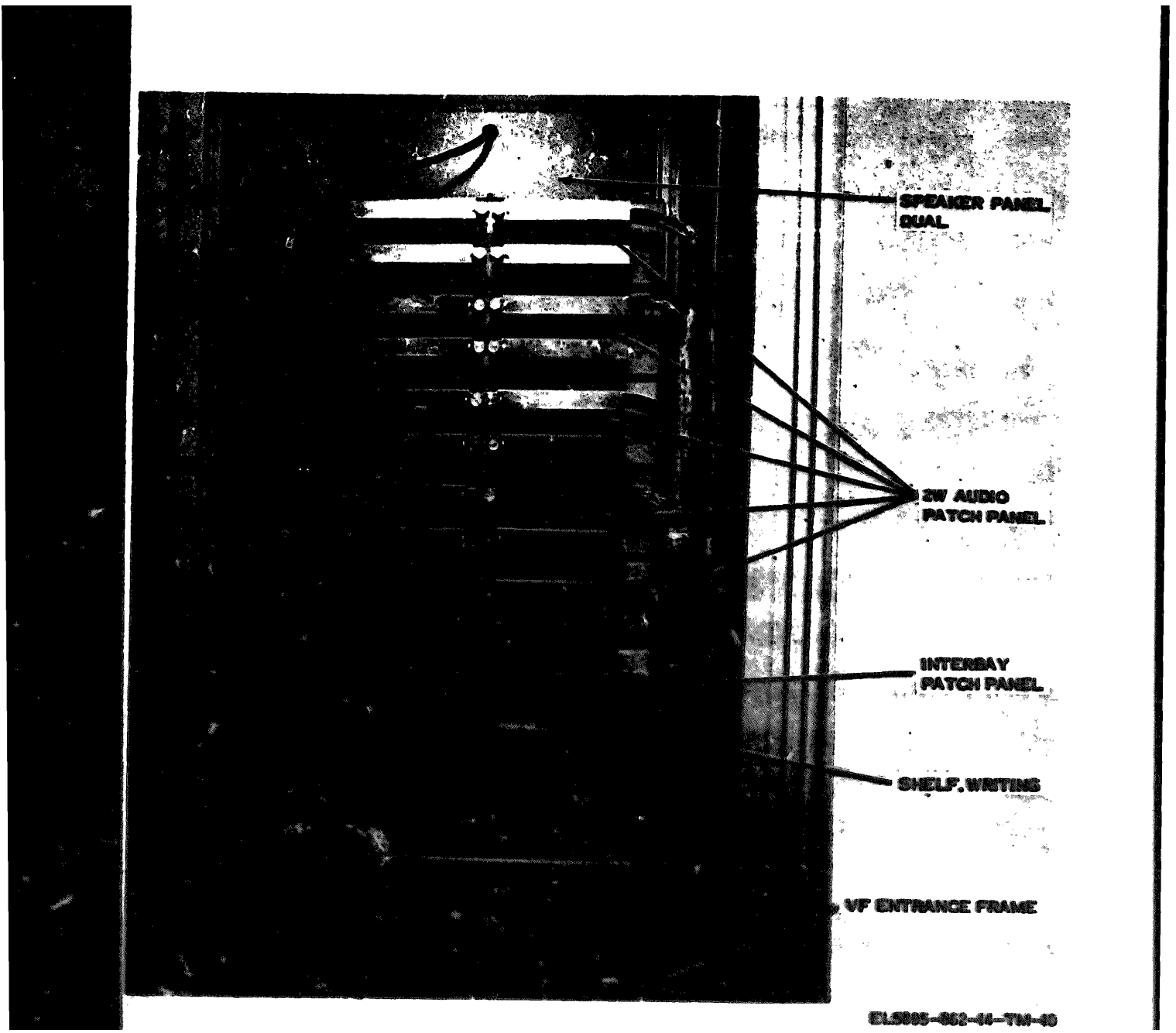


Figure 1-10. VP Entrance Frame and Patch Bay 1-3, Rear Upper View,

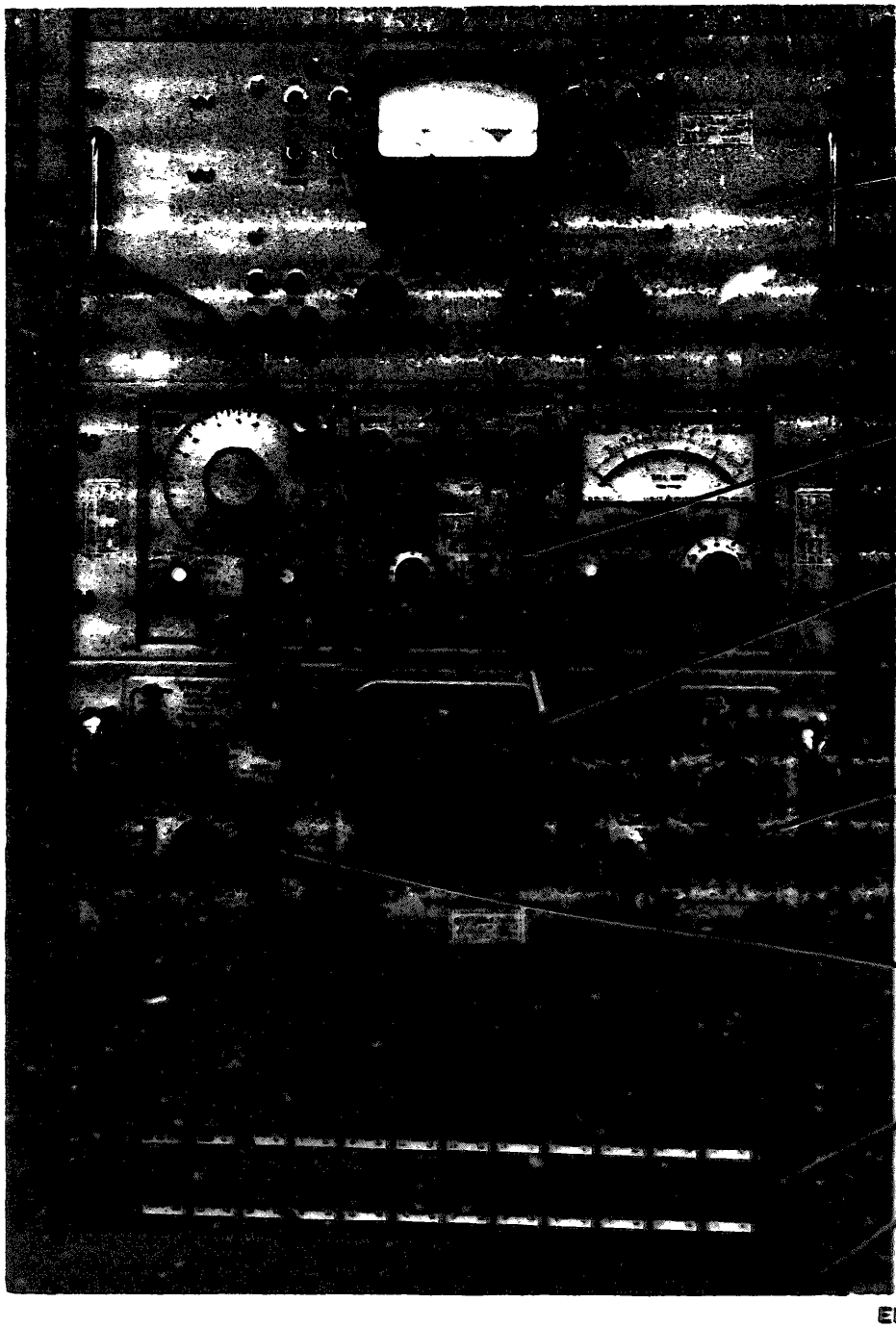


Figure 1-11. Test Bay 1-4, Front View

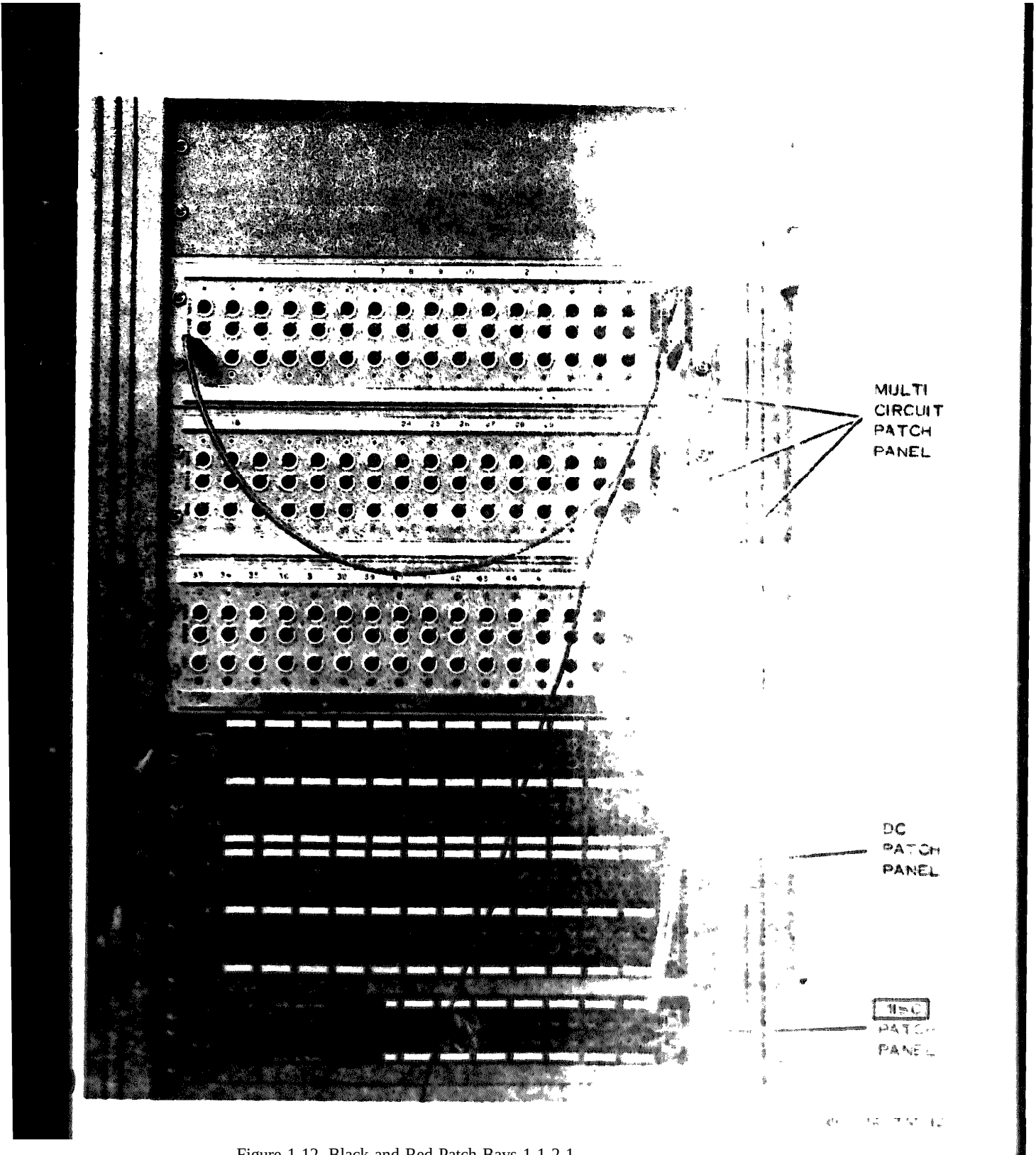


Figure 1-12. Black and Red Patch Bays 1-1 2-1

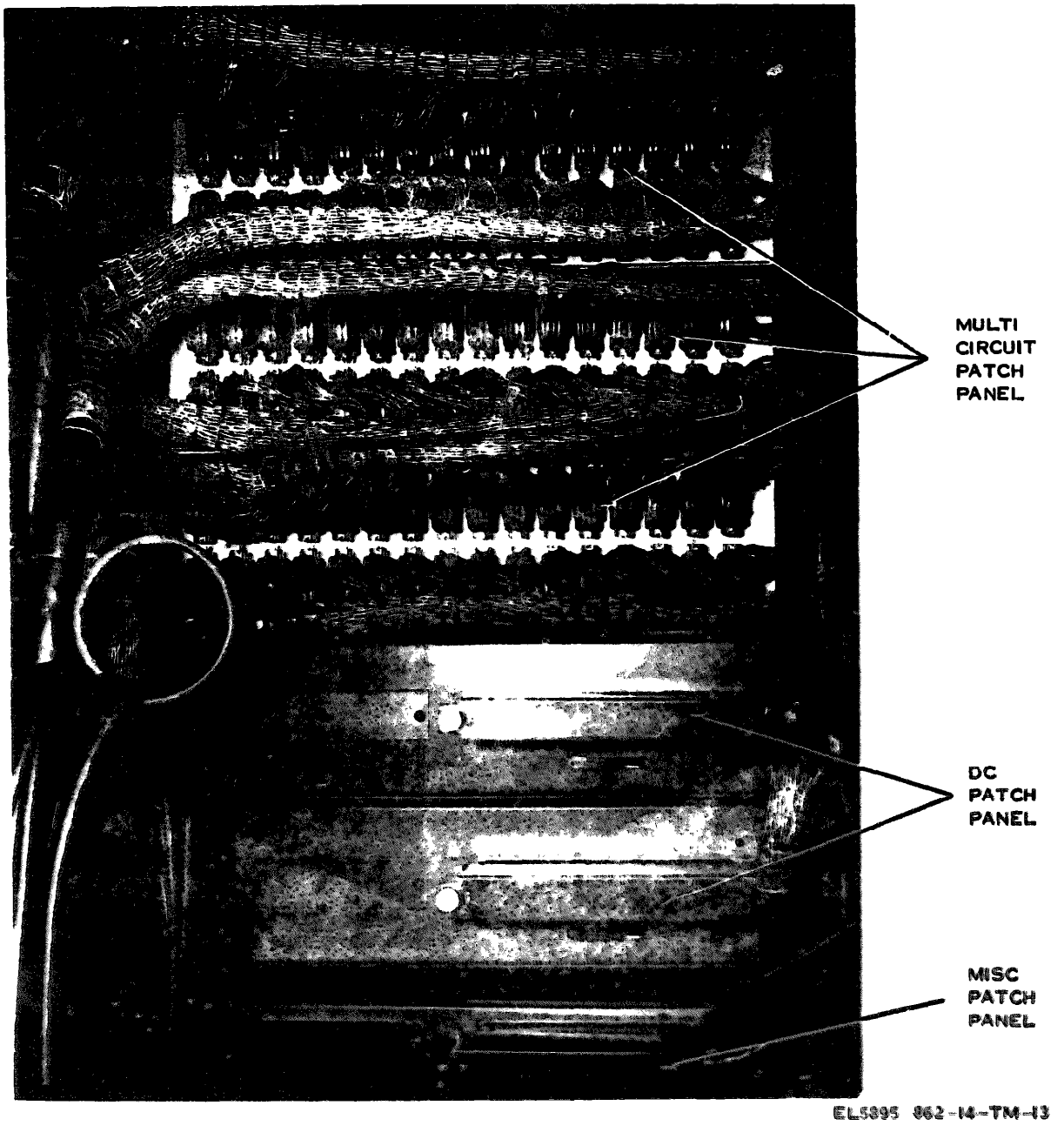


Figure 1-13. Black and Red Patch Bays, 15, 2, 1 3,1 and 4 2 Rear Upper View

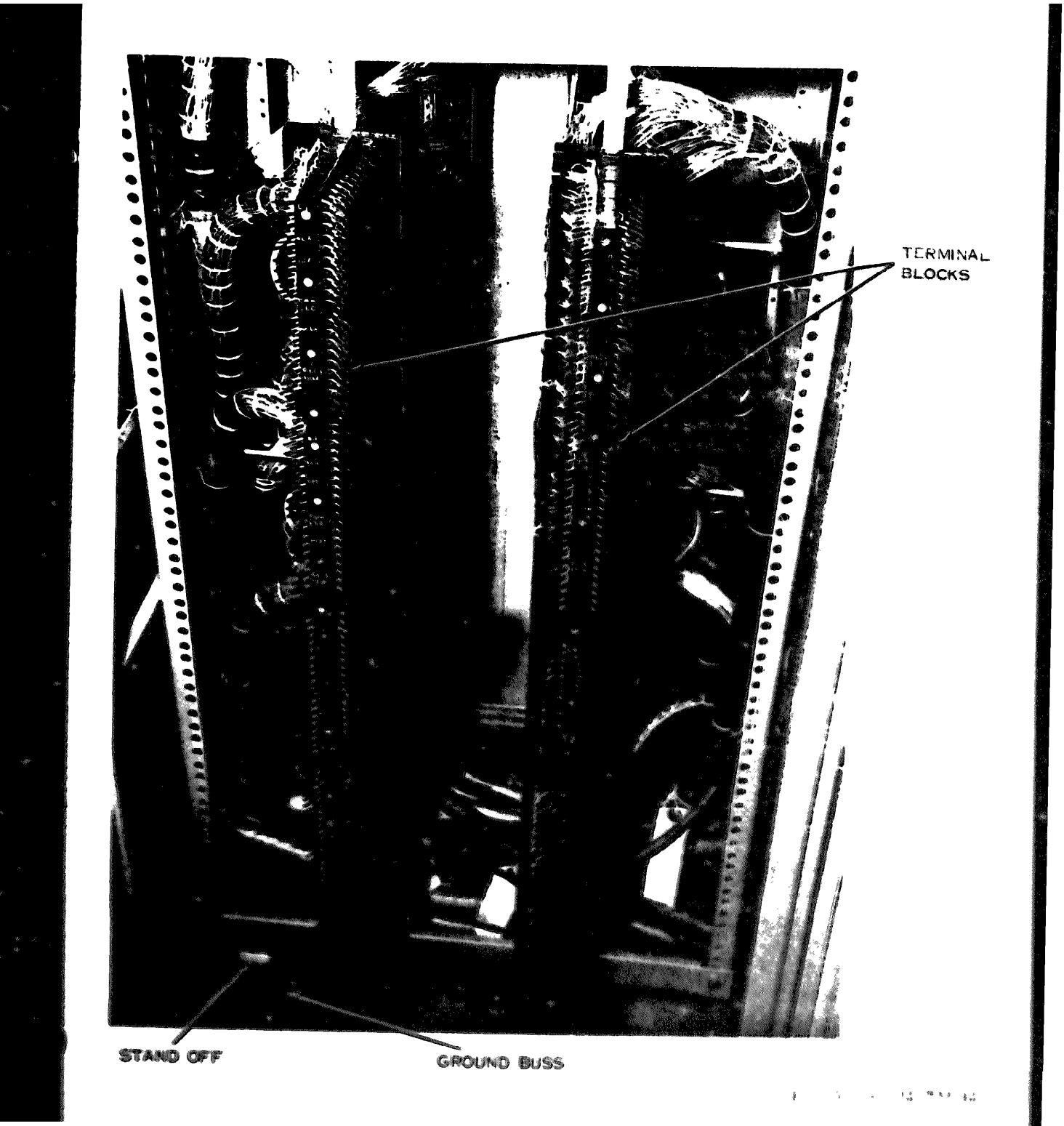


Figure 1-14. Black distribution Frame, Bays 1 6 and 2 2

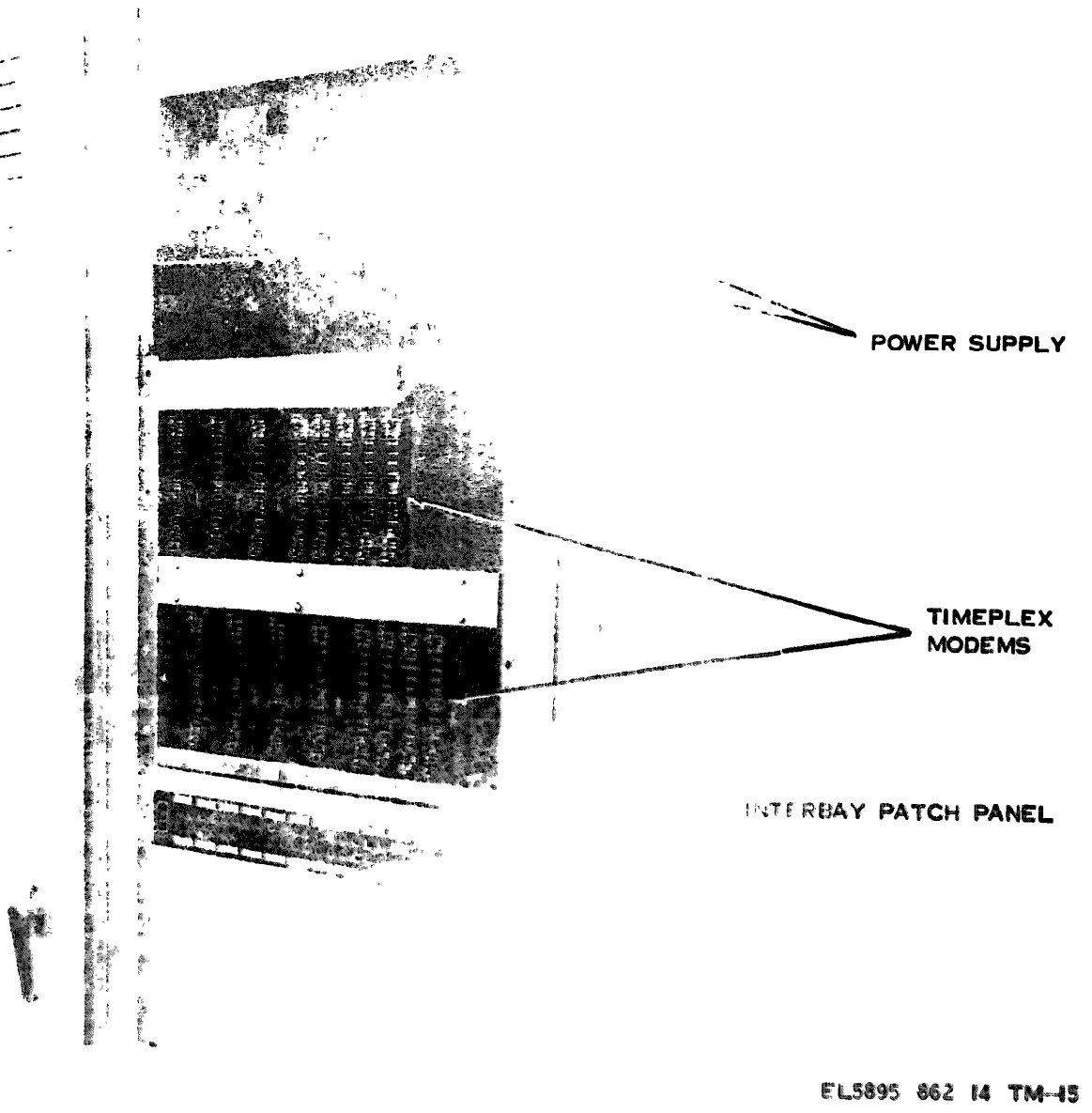
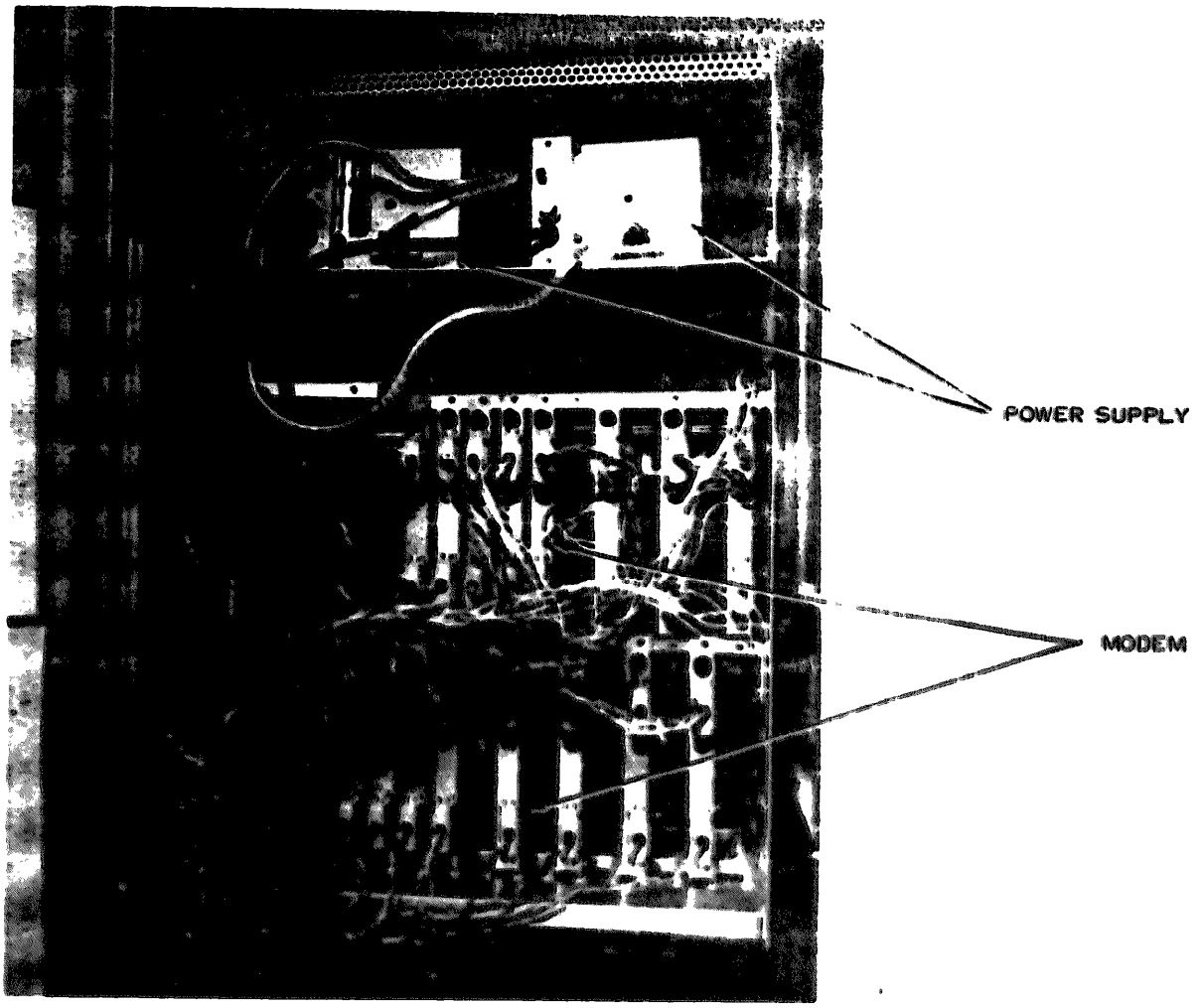

POWER SUPPLY
TIMEPLEX MODEMS
INTERBAY PATCH PANEL
EL5895 862 14 TM-15

Figure 1-15.



L 5895 862 14 TM 46

Figure 1-

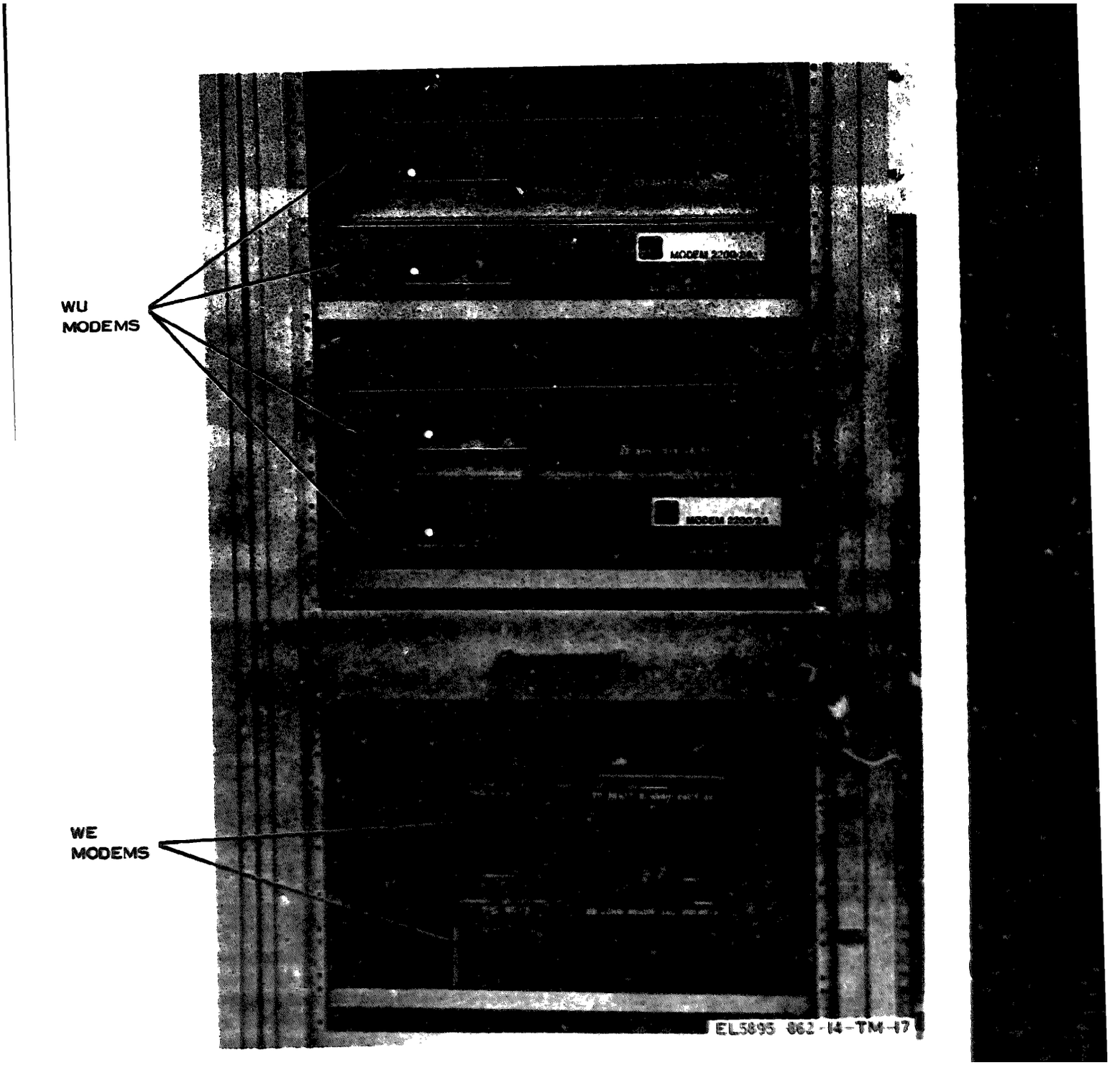


Figure 1-17. Modem Bay 1-3

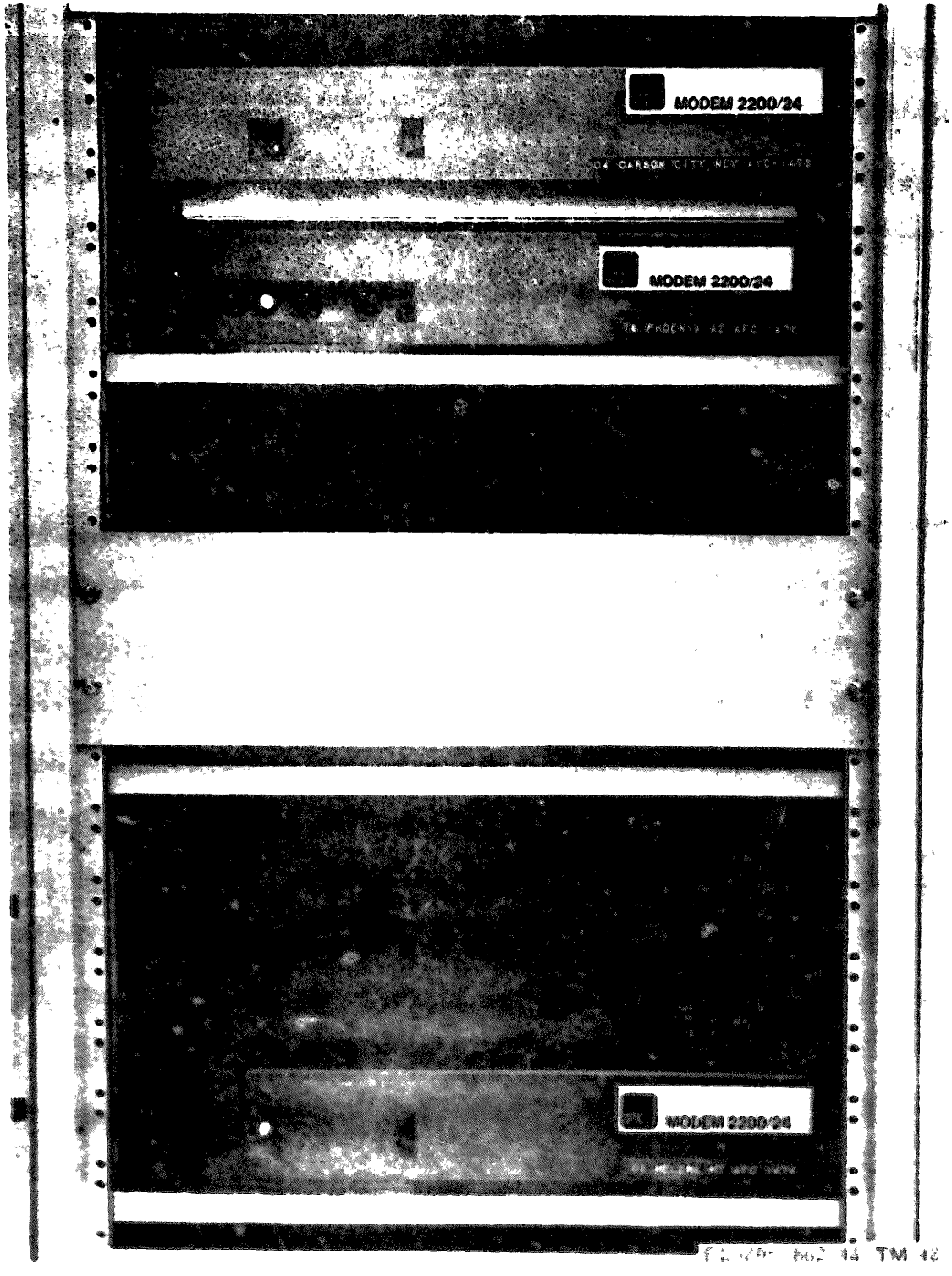


Figure 1-18 Modem Rack 19

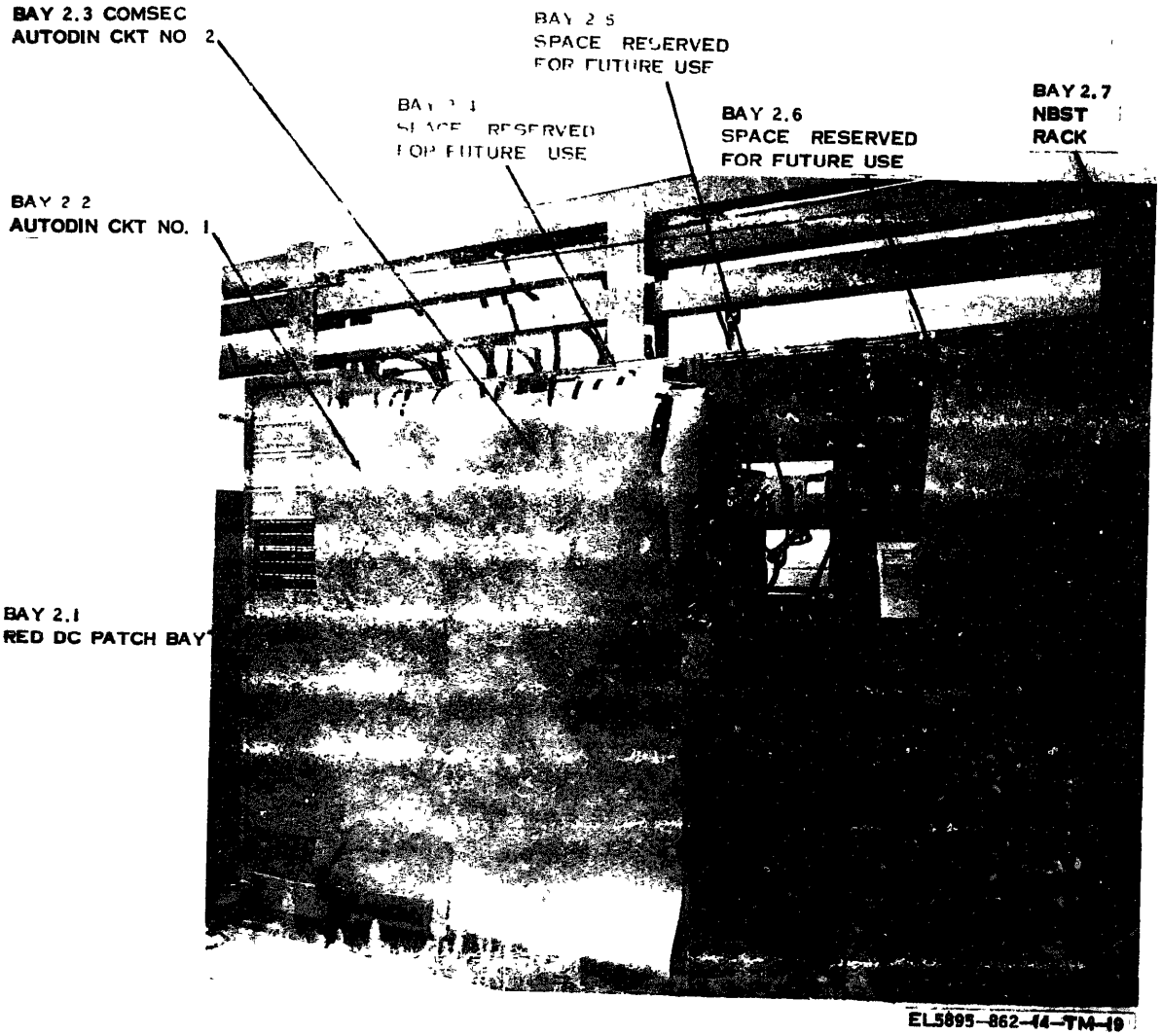


Figure 1-1 ... Equipment Bays, Row 2

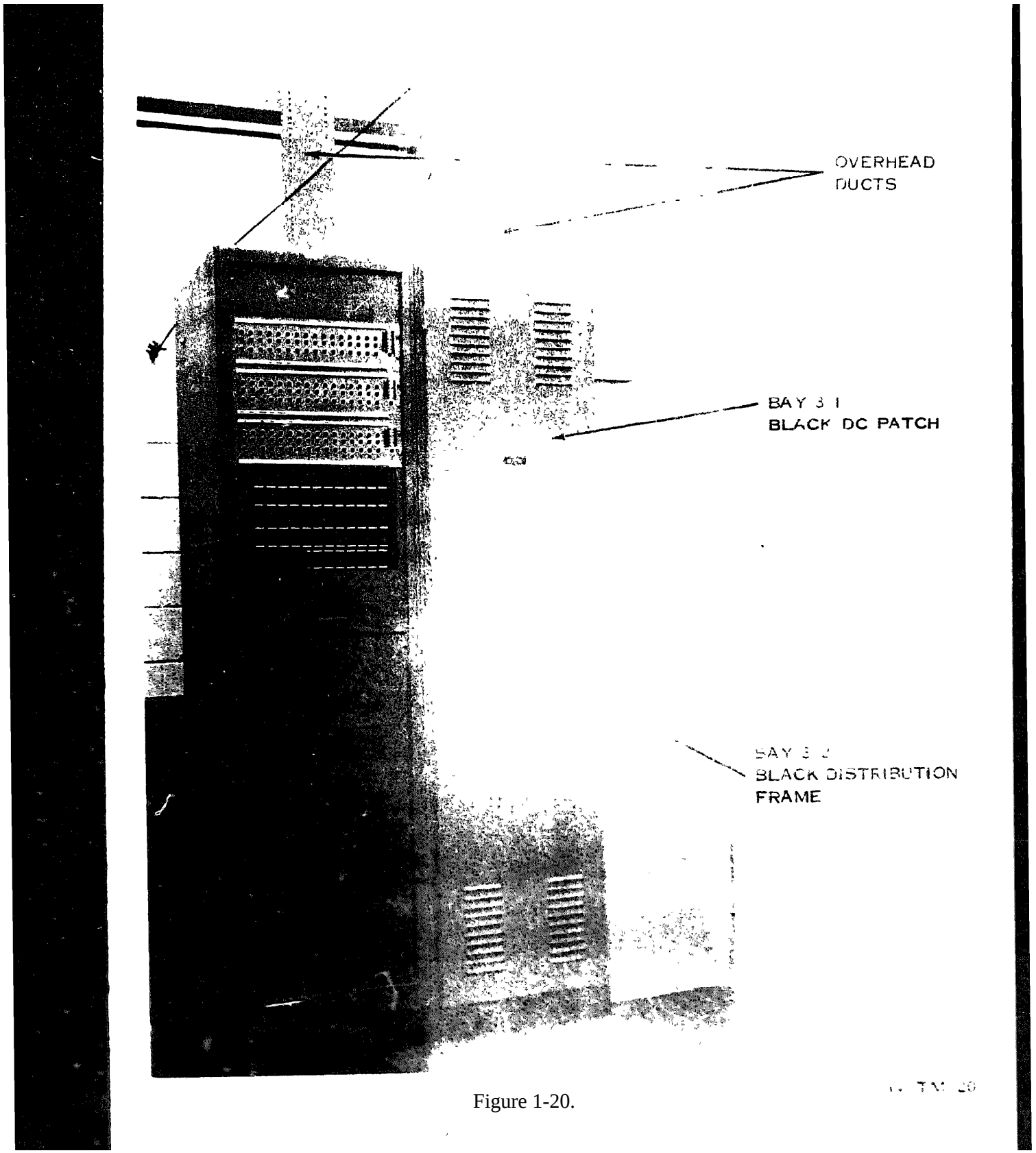

OVERHEAD
DUCTS
BAY 3 1
BLACK DC PATCH
BAY 3 2
BLACK DISTRIBUTION
FRAME

Figure 1-20.

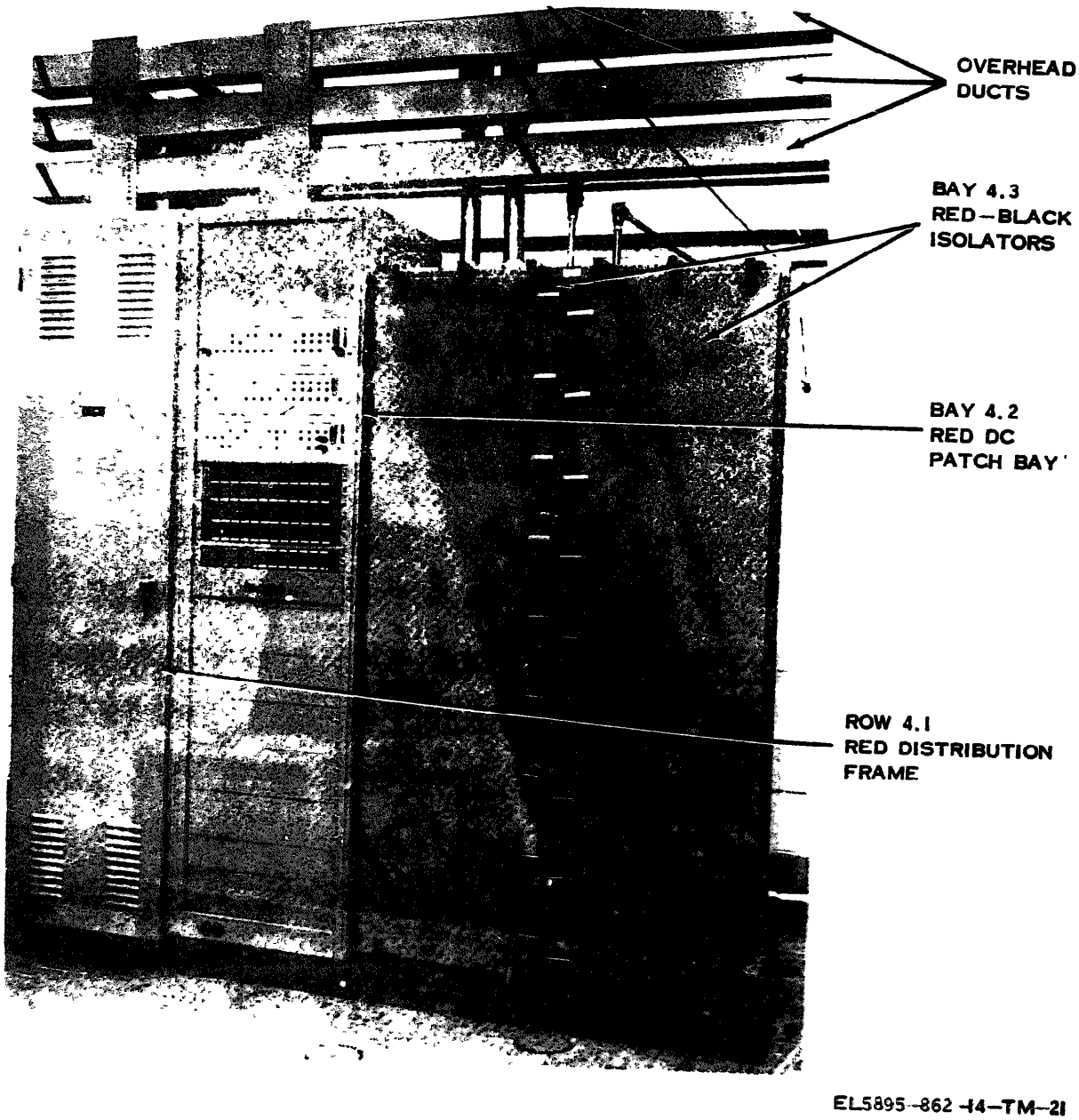


Figure 1-21. Equipment Bays, Row 4

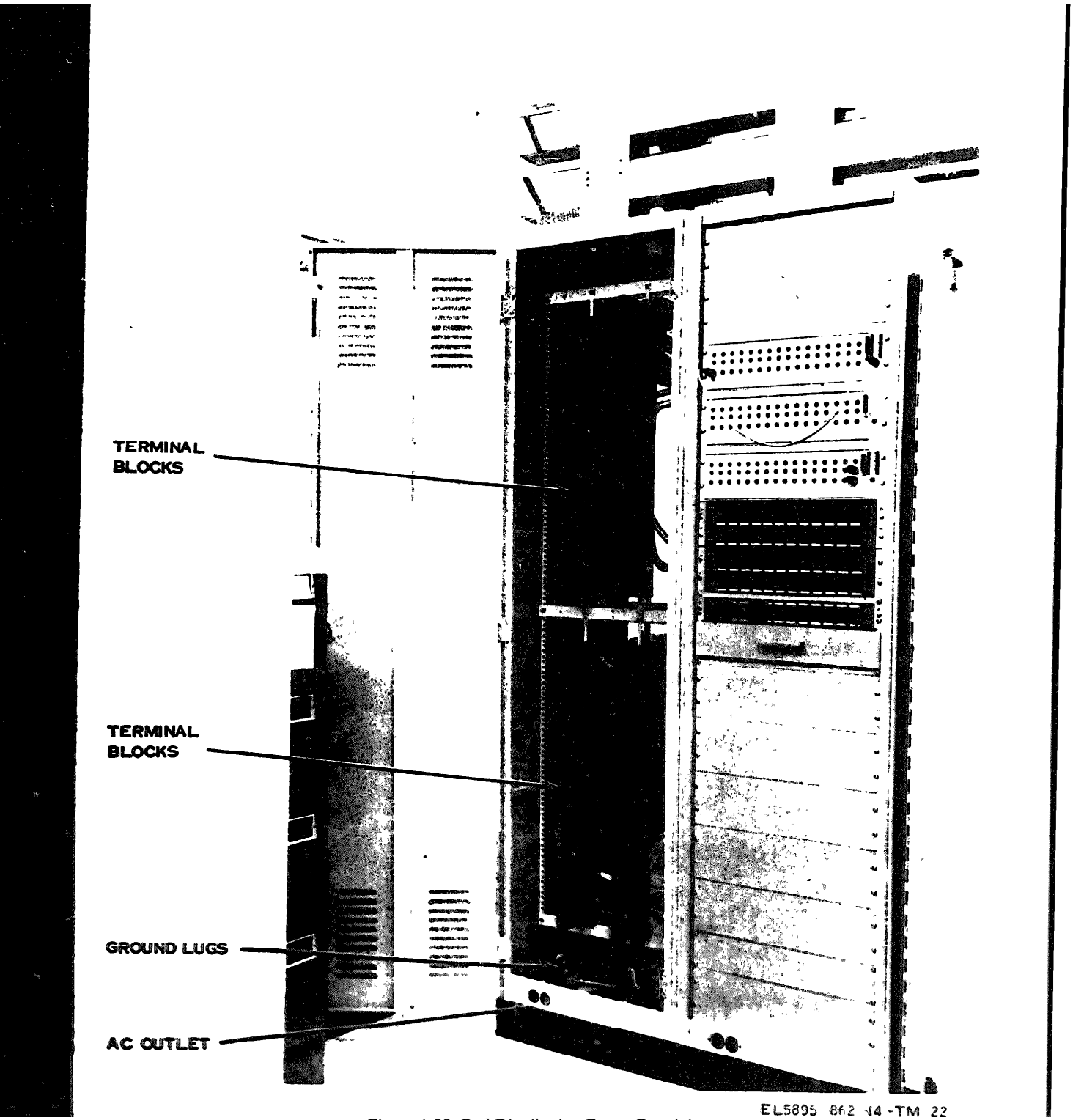


Figure 1-22. Red Distribution Frame Bay 4-1.

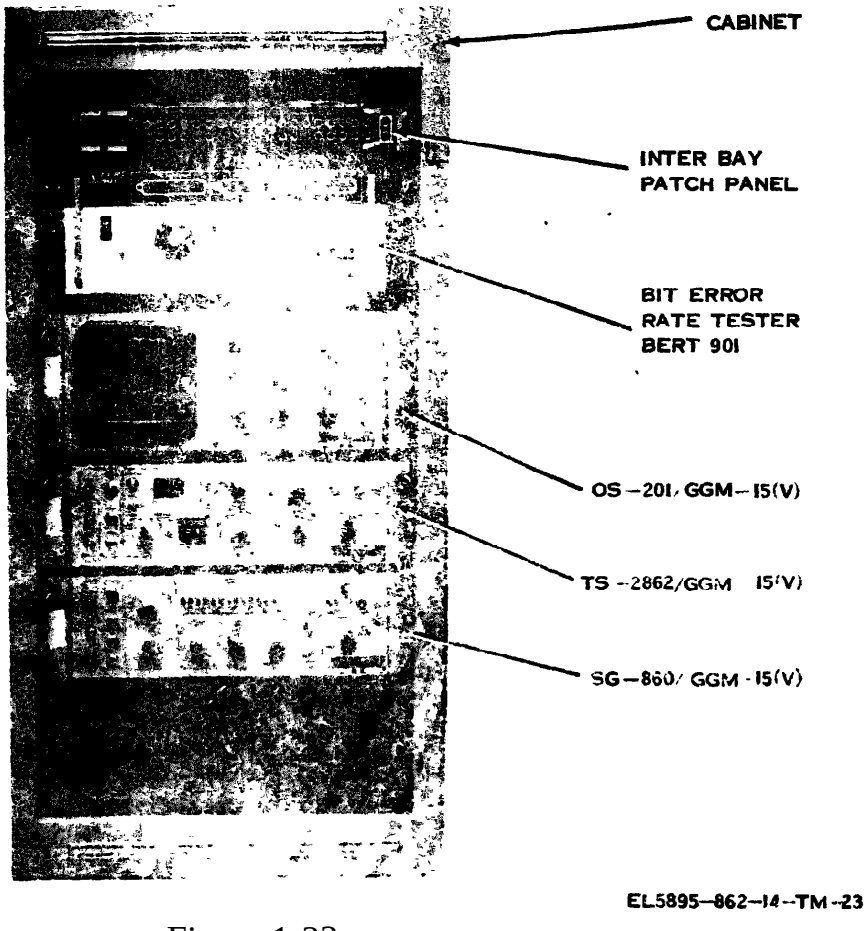


Figure 1-23. *Mobile Test Bay.*

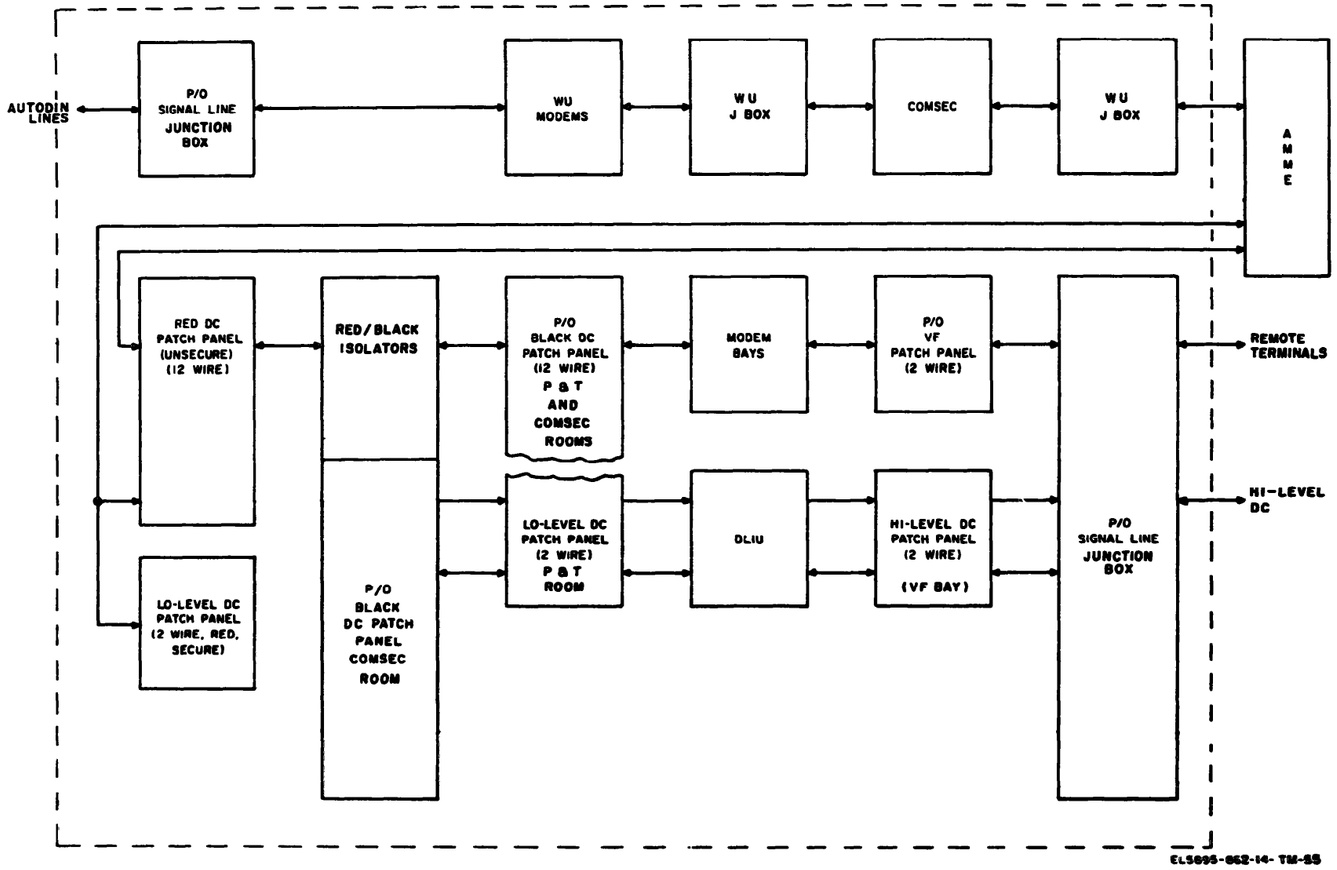
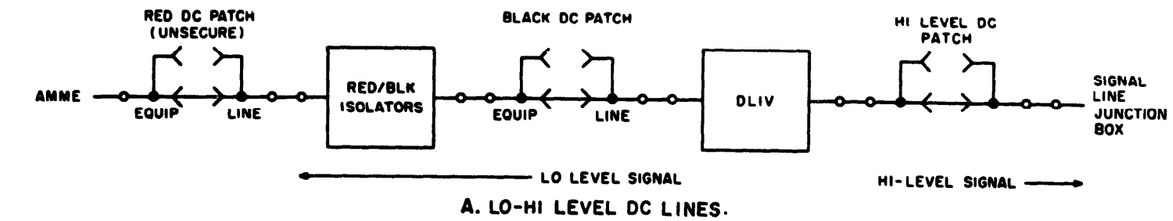
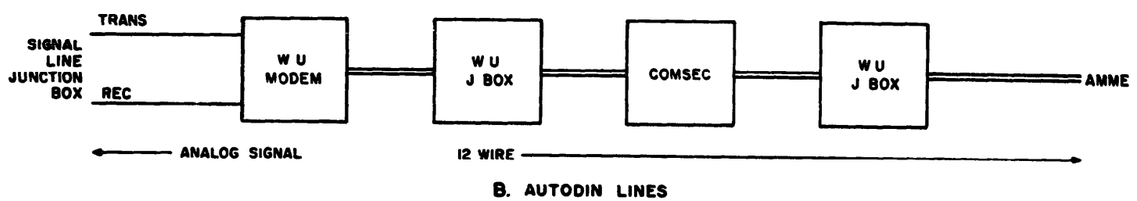


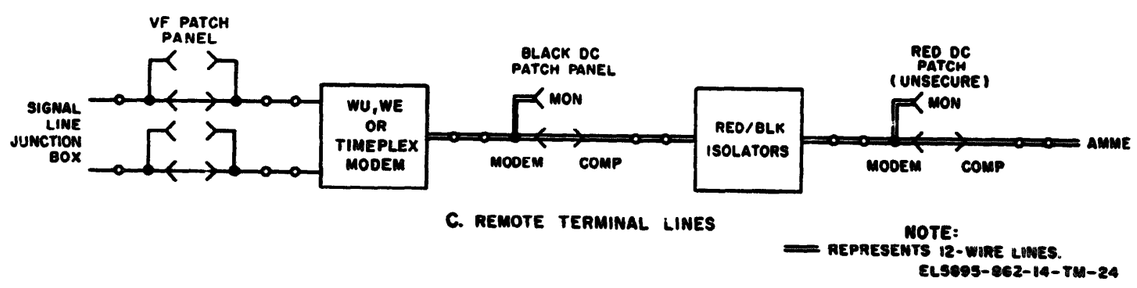
Figure 2-1. Patch and Test Facility, Block Diagram



A. LO-HI LEVEL DC LINES.



B. AUTODIN LINES



C. REMOTE TERMINAL LINES

Figure 2-2. Typical Circuit Configuration

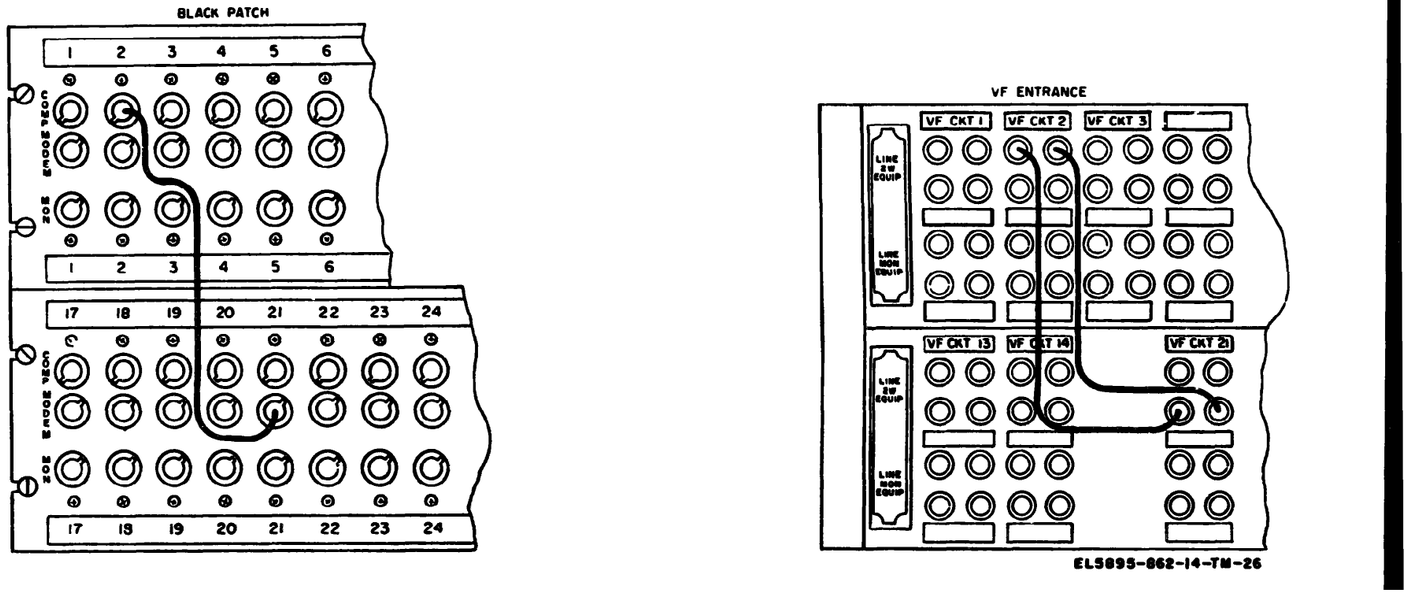


Figure 3-1. Patching from Modem Substitution

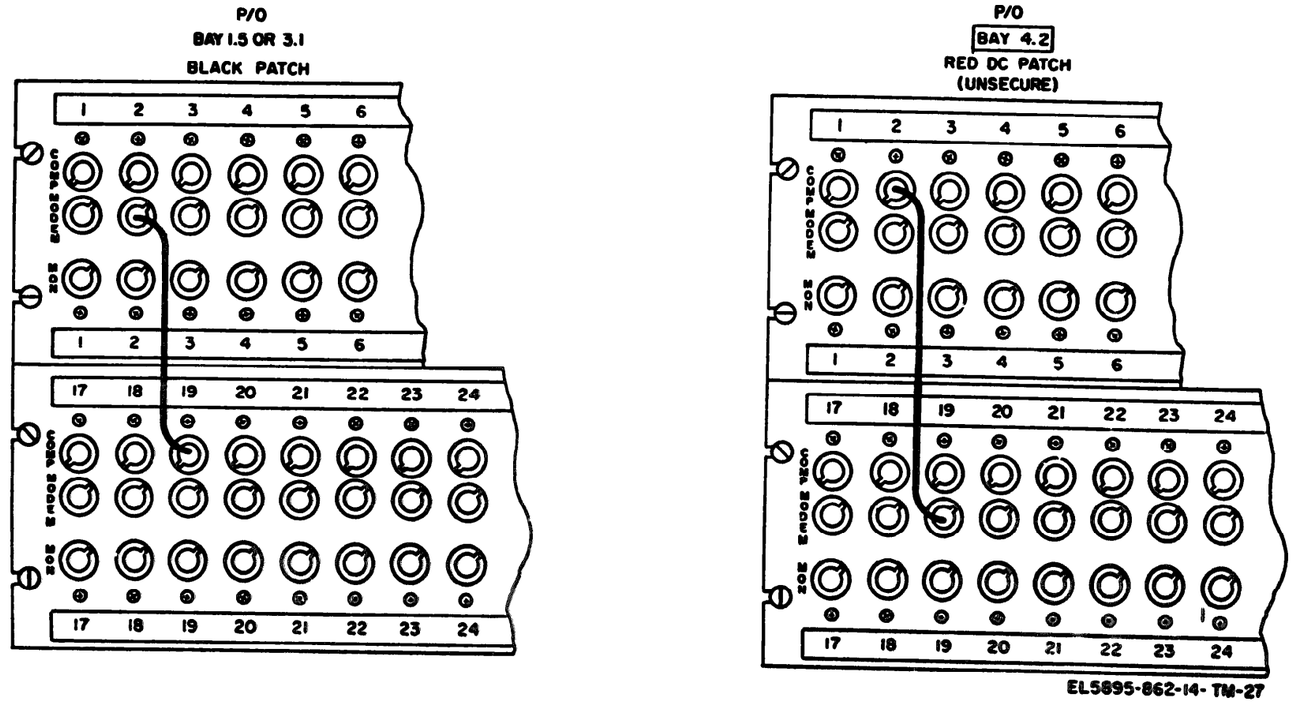


Figure 3-2. Patching for Isolator Substitution

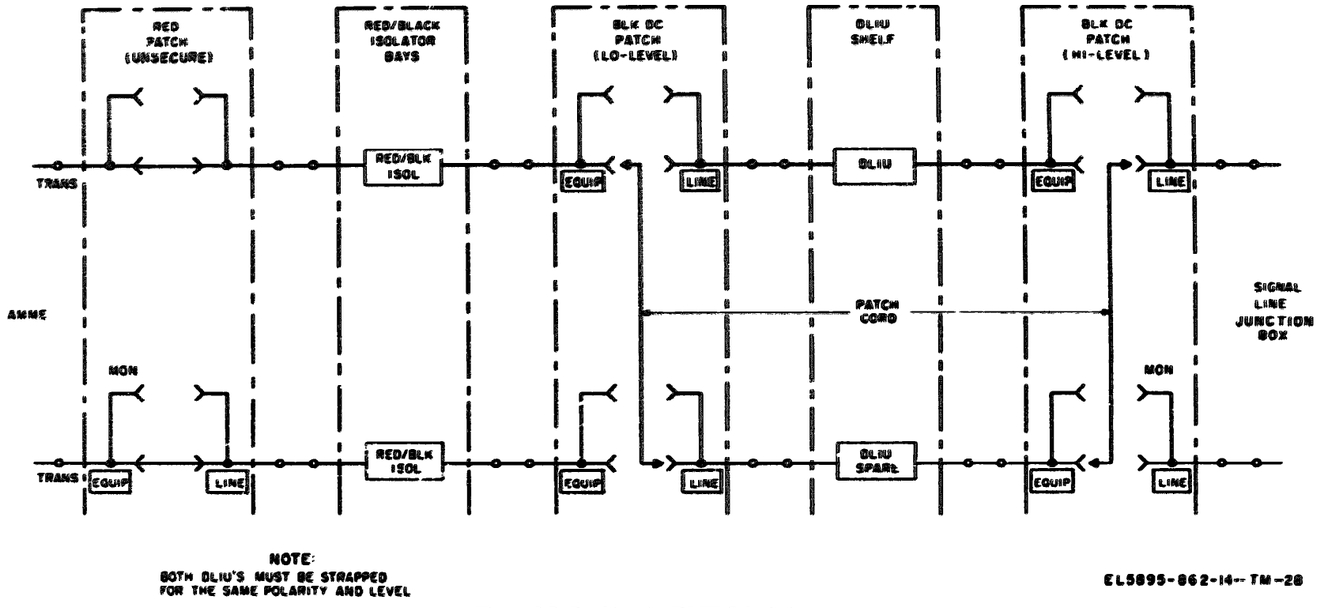
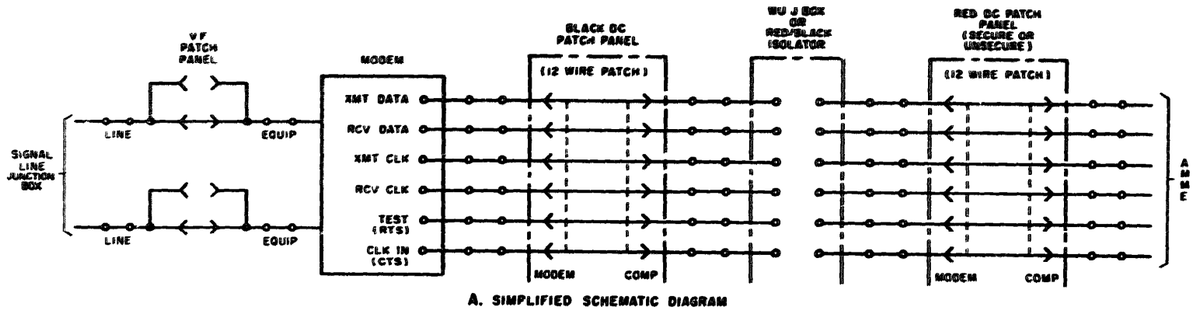
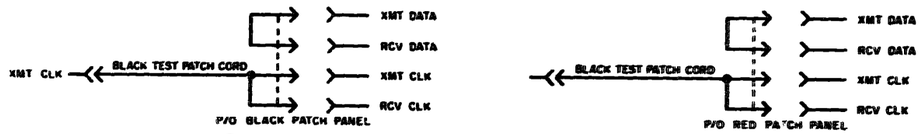


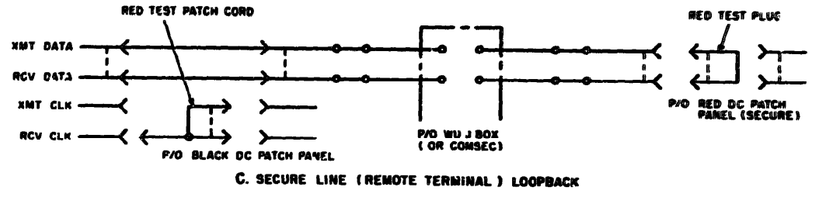
Figure 3-3. Patching for DLIU Substituion



A. SIMPLIFIED SCHEMATIC DIAGRAM

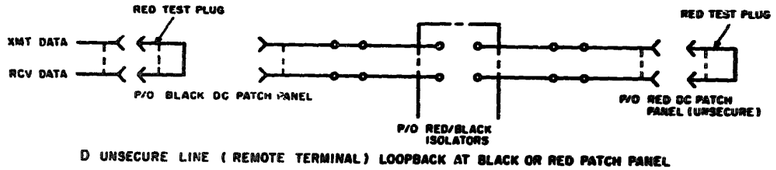


B. AMME SIGNAL LOOPBACK AT BLACK OR RED PATCH PANEL



C. SECURE LINE (REMOTE TERMINAL) LOOPBACK

NOTE
ONLY SIGNALS BEING LOOPED ARE SHOWN OTHER SIGNALS ARE NORMALLED THRU



D UNSECURE LINE (REMOTE TERMINAL) LOOPBACK AT BLACK OR RED PATCH PANEL

EL5895-862-14-TM-29

Figure 3-4. Test Plug and Test Cord Use, Simplified Schematic Diagram

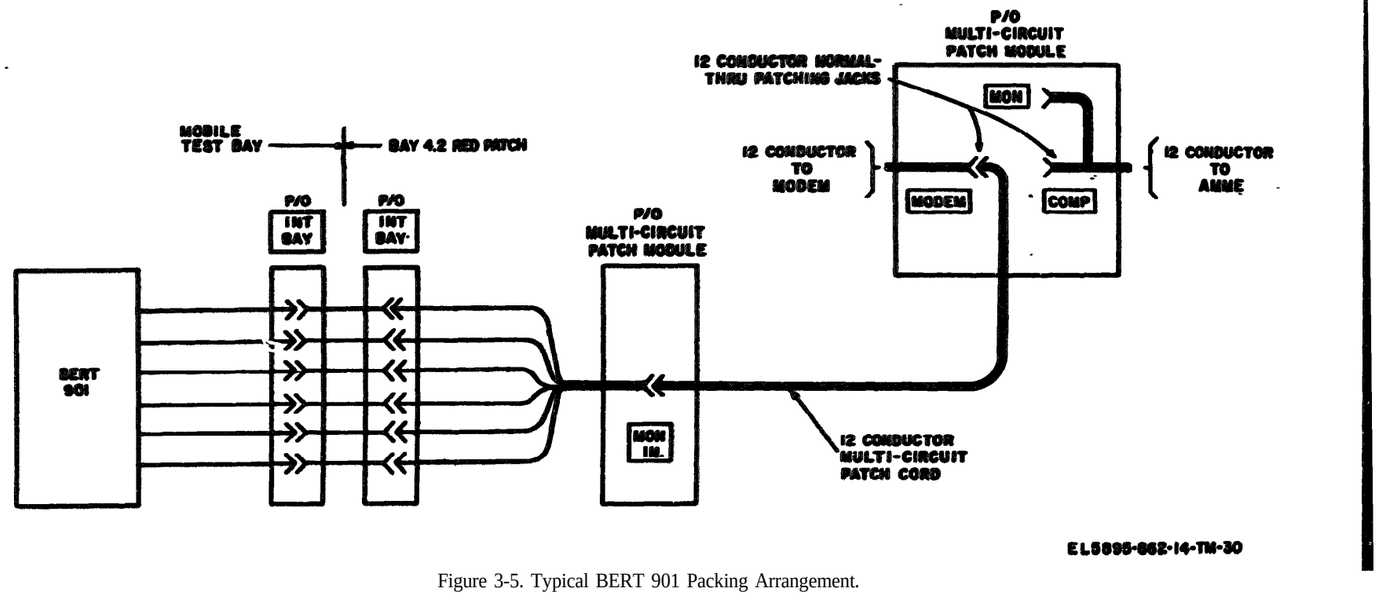


Figure 3-5. Typical BERT 901 Packing Arrangement.

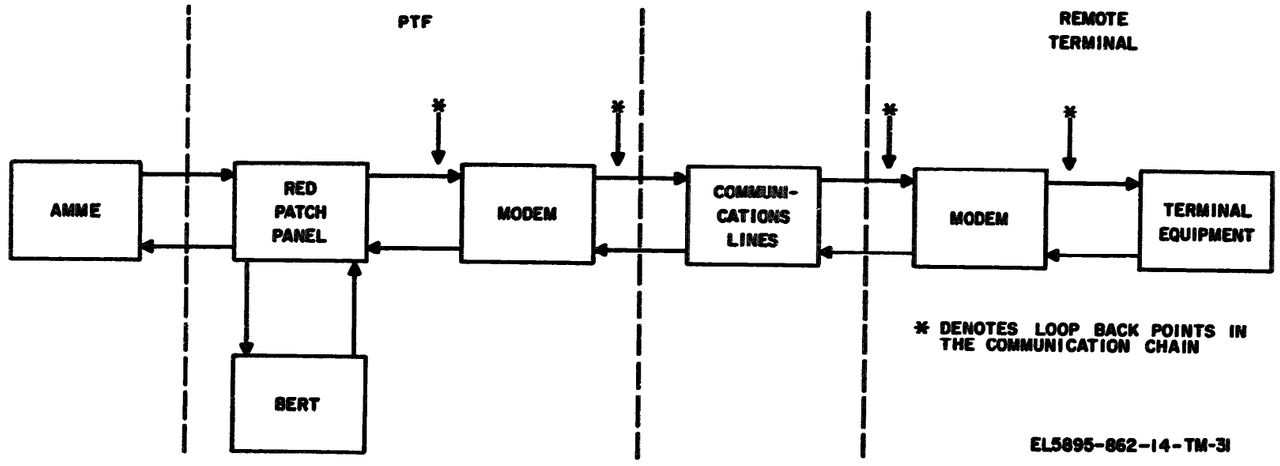


Figure 4-1. Troubleshooting the Communication Chain.

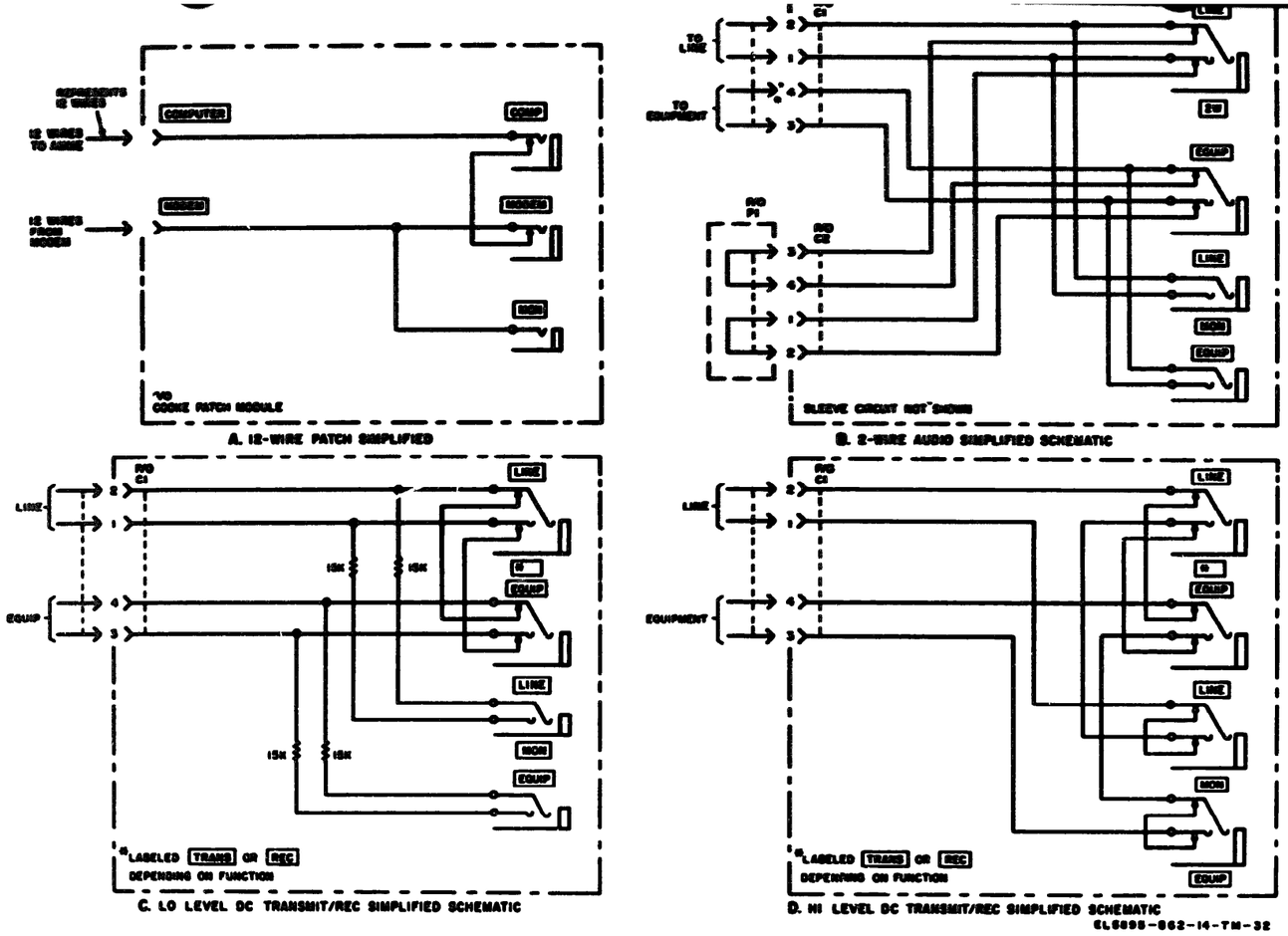


Figure 5-1. Patch Modules, Simplified Schematic

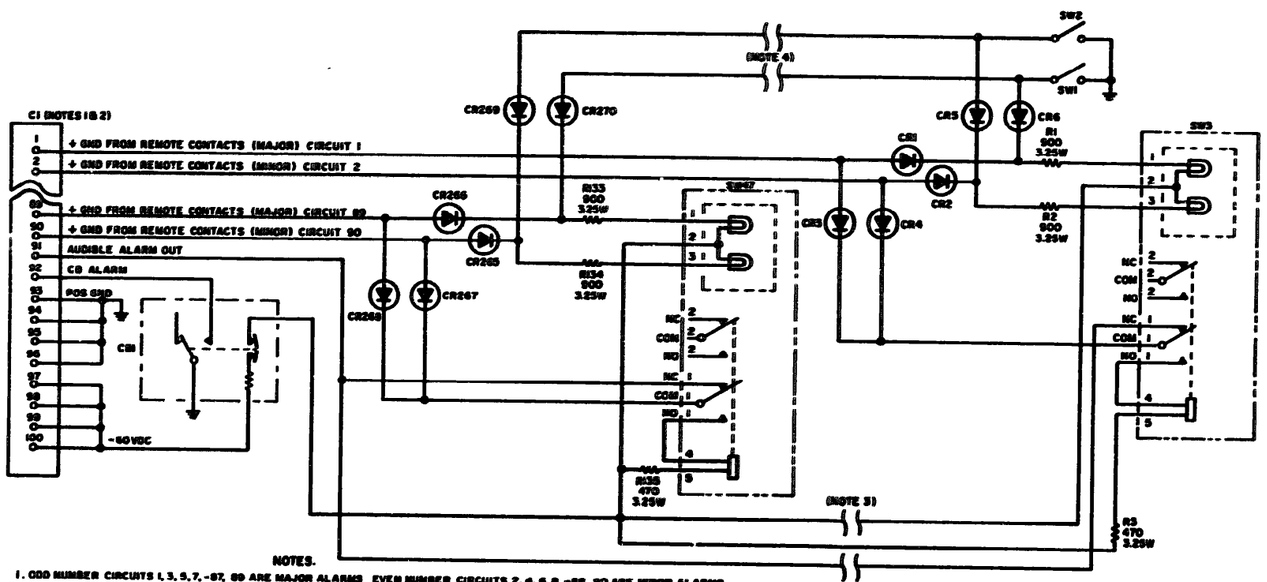


Figure 5-2. Major-Minor Alarm Pane;, Schematic Diagram

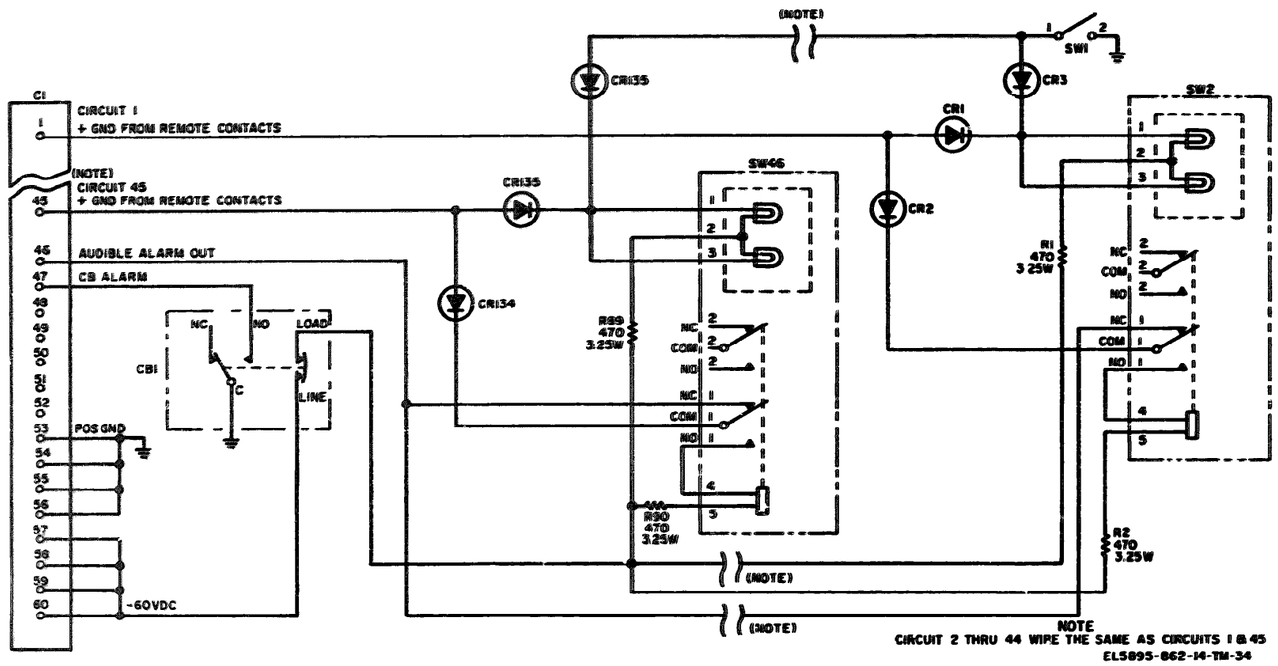


Figure 5-3. Major Alarm Panel, Schematic Diagram

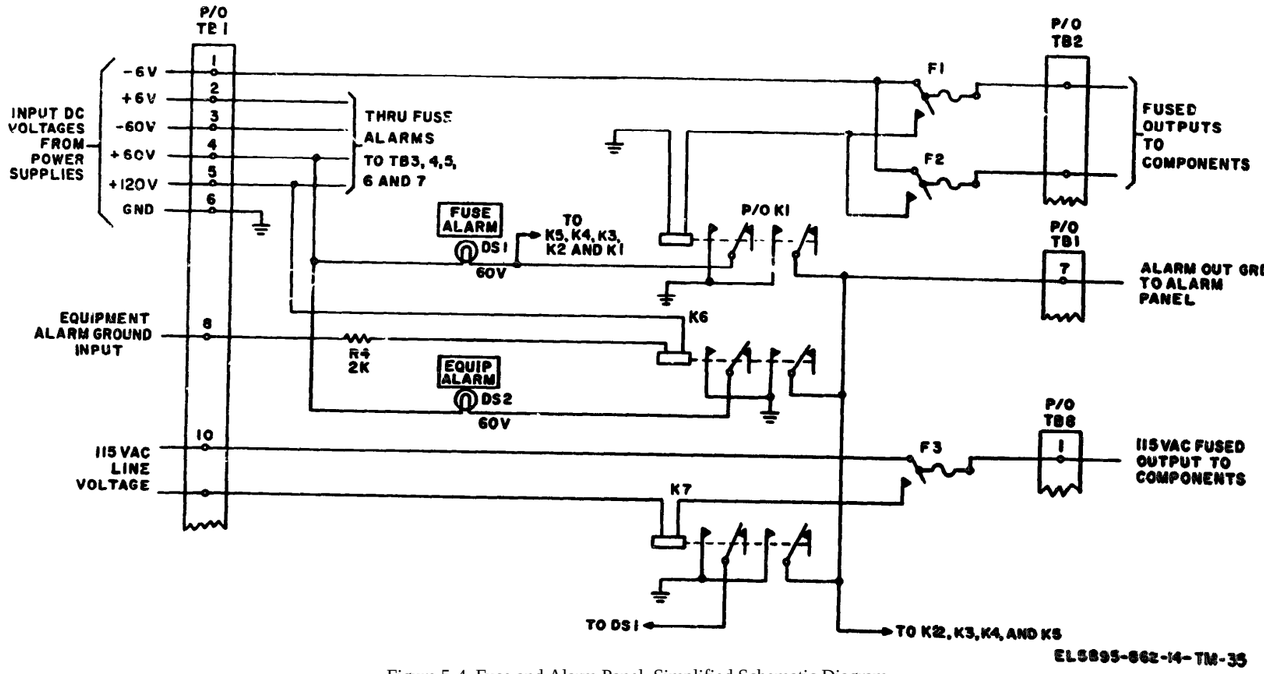


Figure 5-4. Fuse and Alarm Panel, Simplified Schematic Diagram

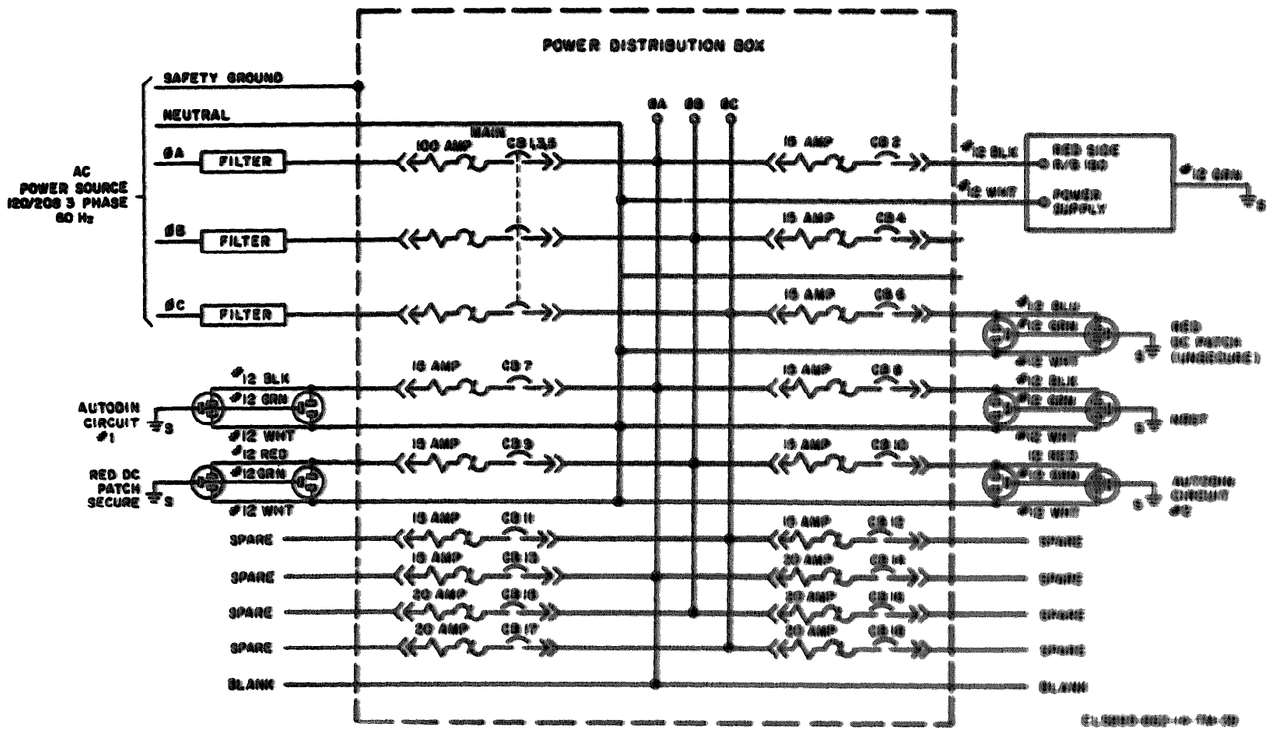


Figure 5-7. AC Power(Red) Distribution Diagram COMSEC Value Area

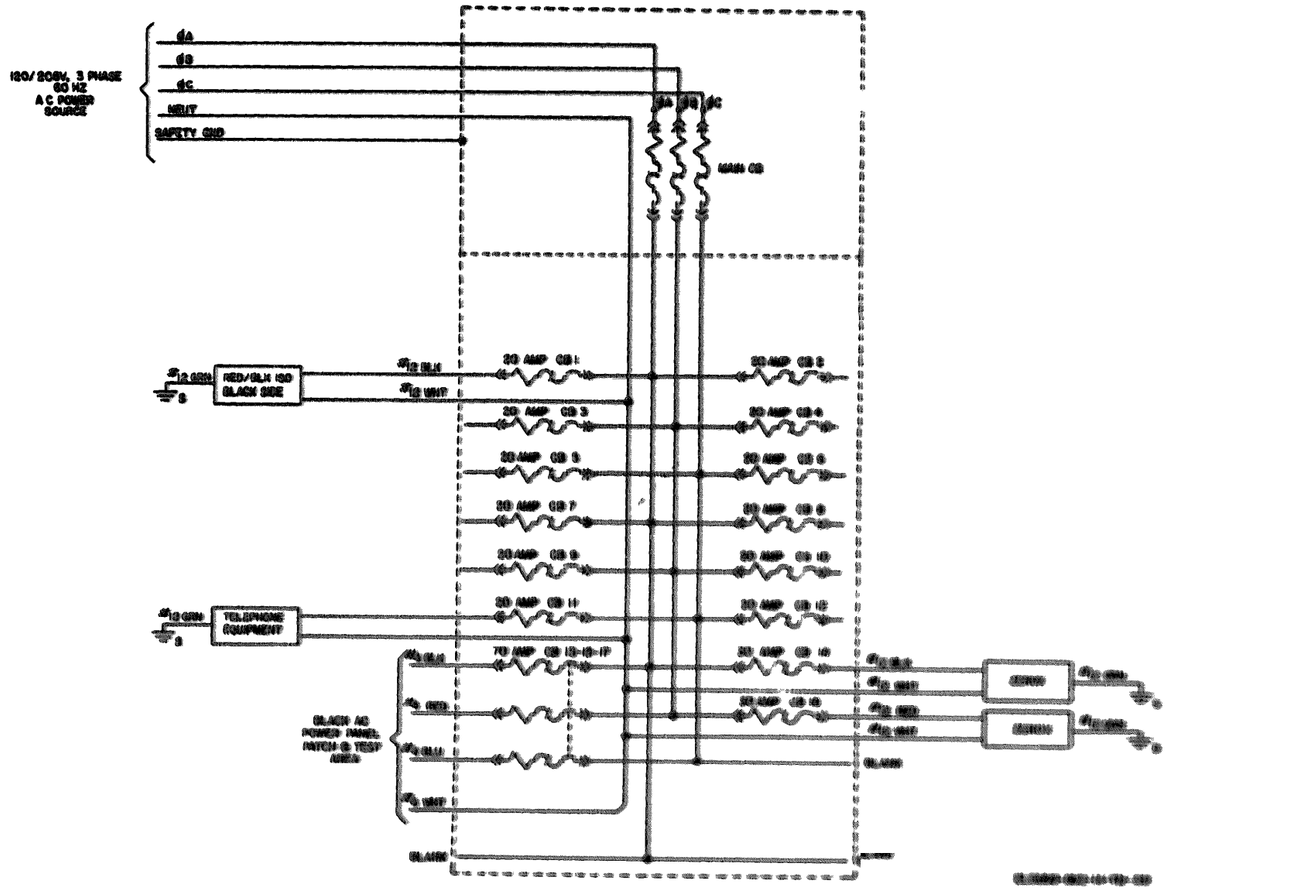


Figure 5-8. AC Power(Black) Distribution Diagram COMSE Value Area

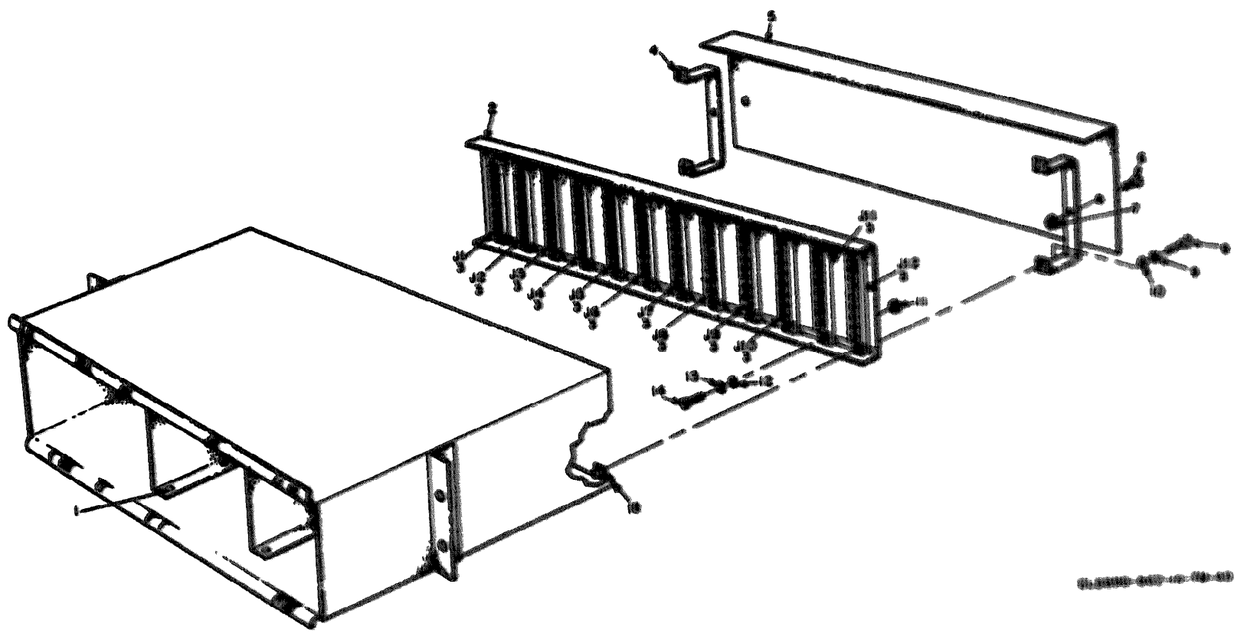


Figure C-1. Staff Signal Line Indicator Unit Power Location

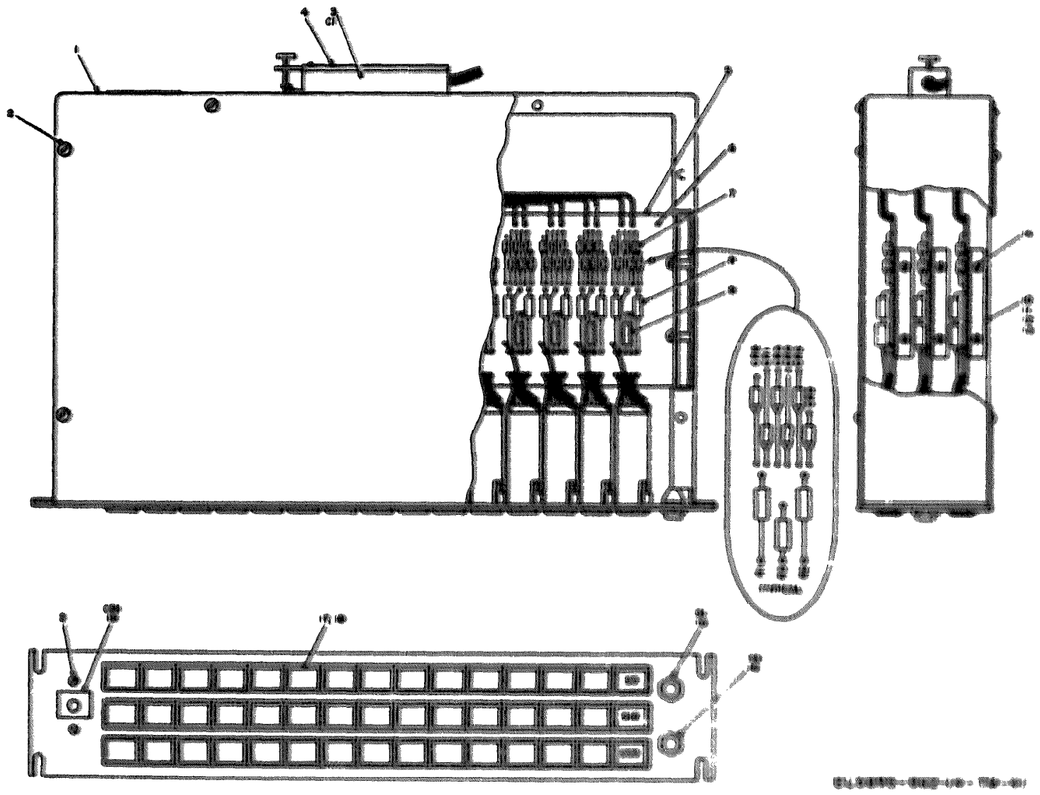


Figure C-3. Alarm Accuracy Alarm- Major-Minor Fuel Distribution

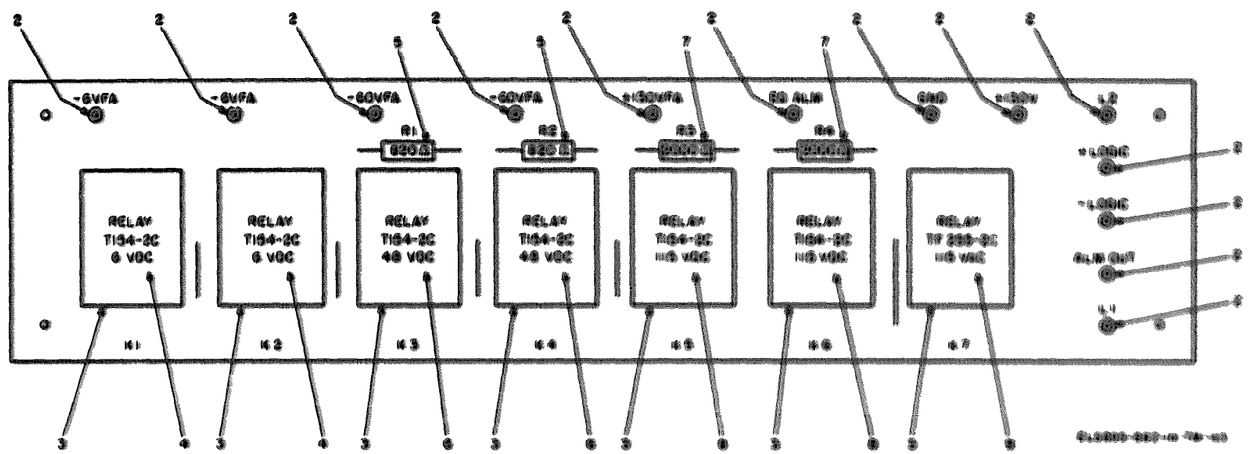


Figure C-4. FCD Army Location

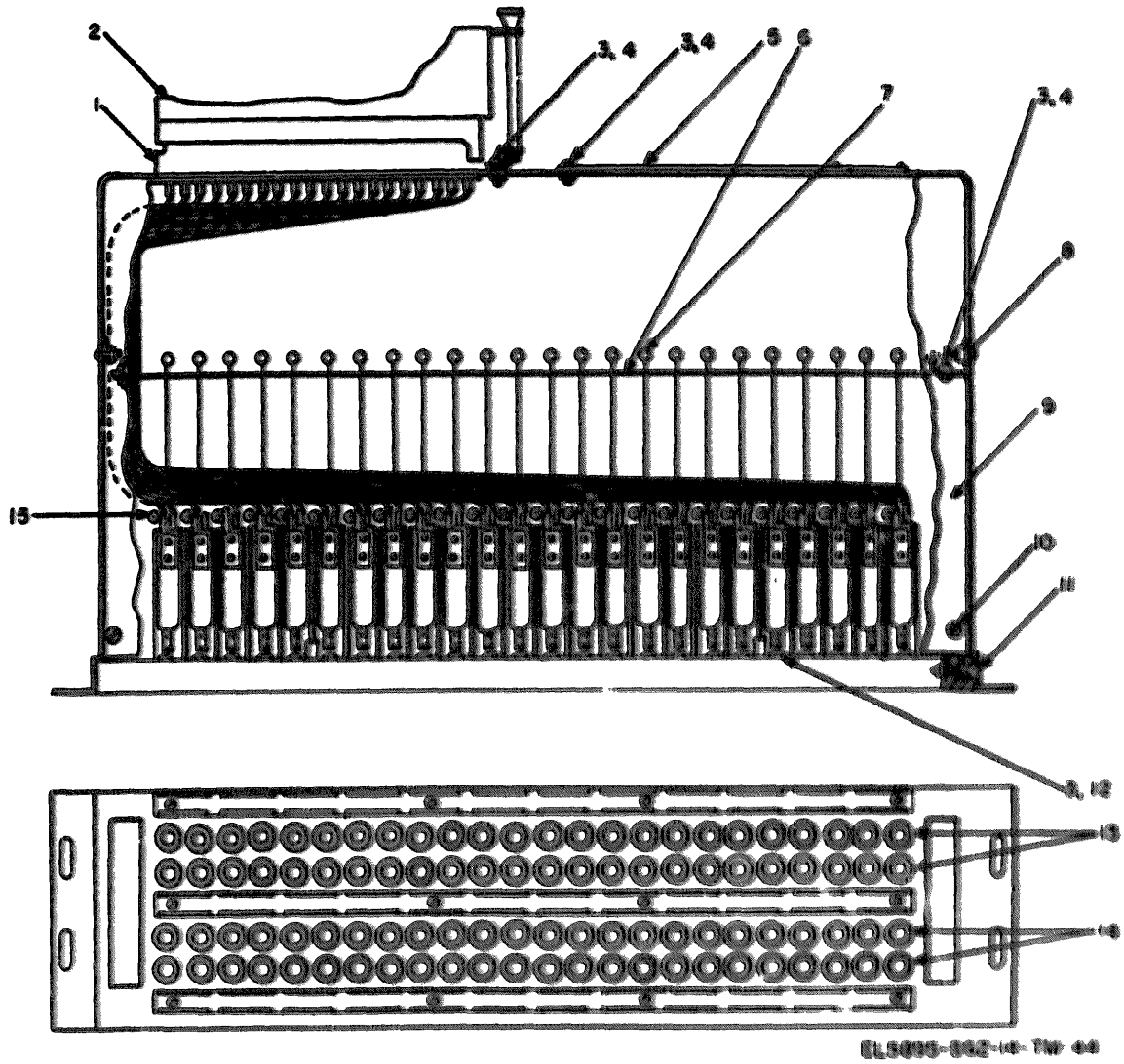


Figure C-5. Patch Pannel Assembly DC Xmit Low and Patch Level Parts Location

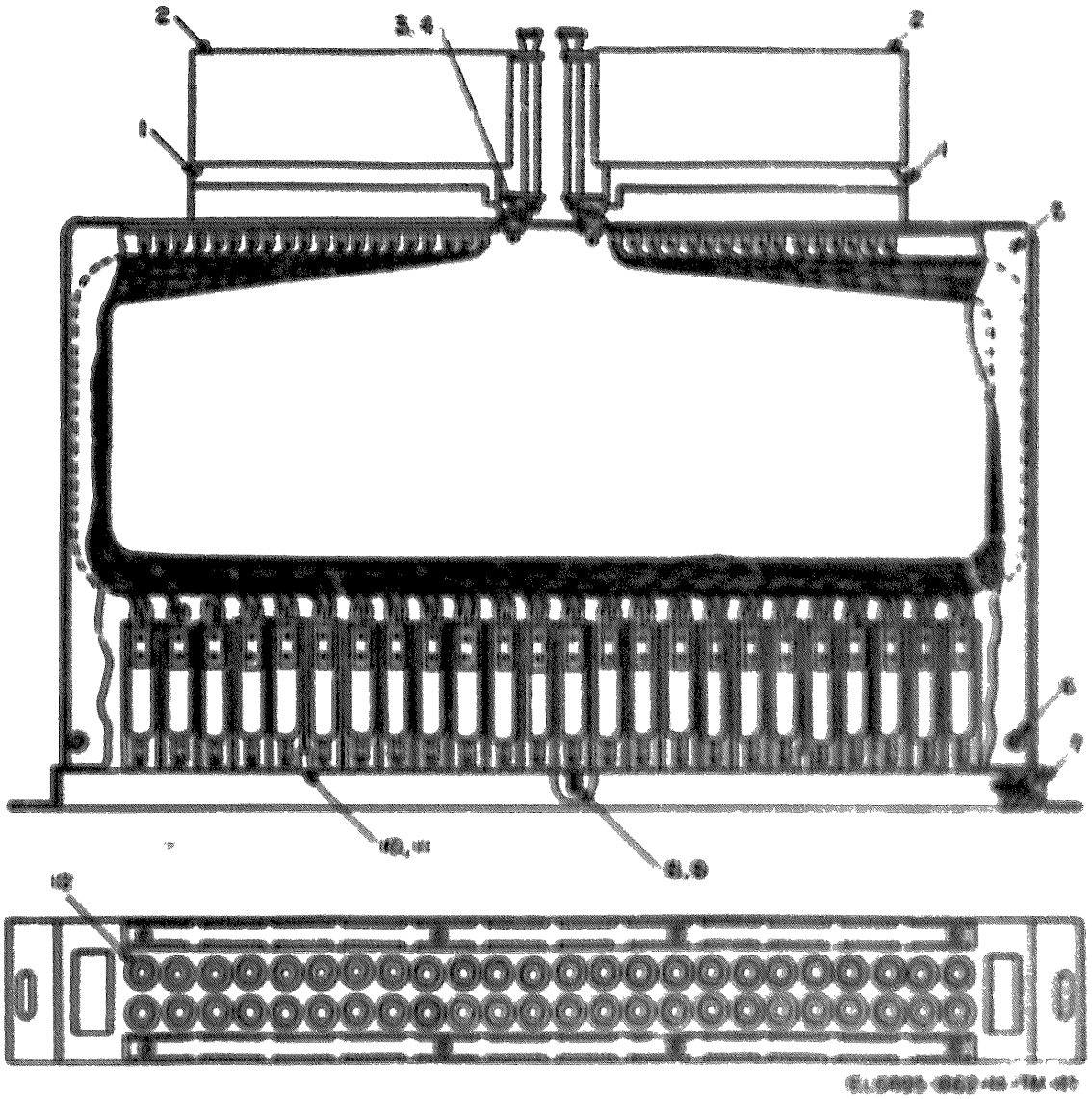


Figure C

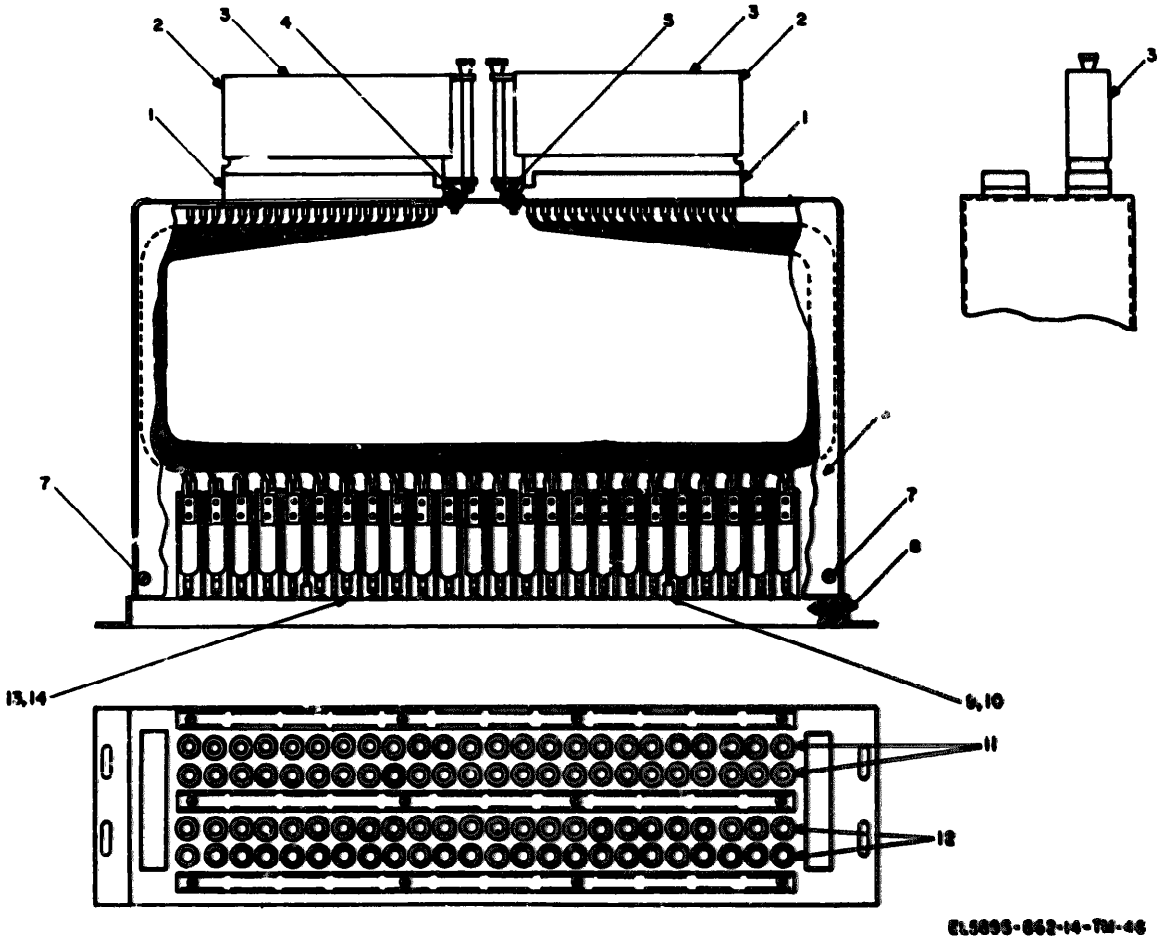


Figure C-7. Patch Assembly, 2-Wire Audio Parts Location

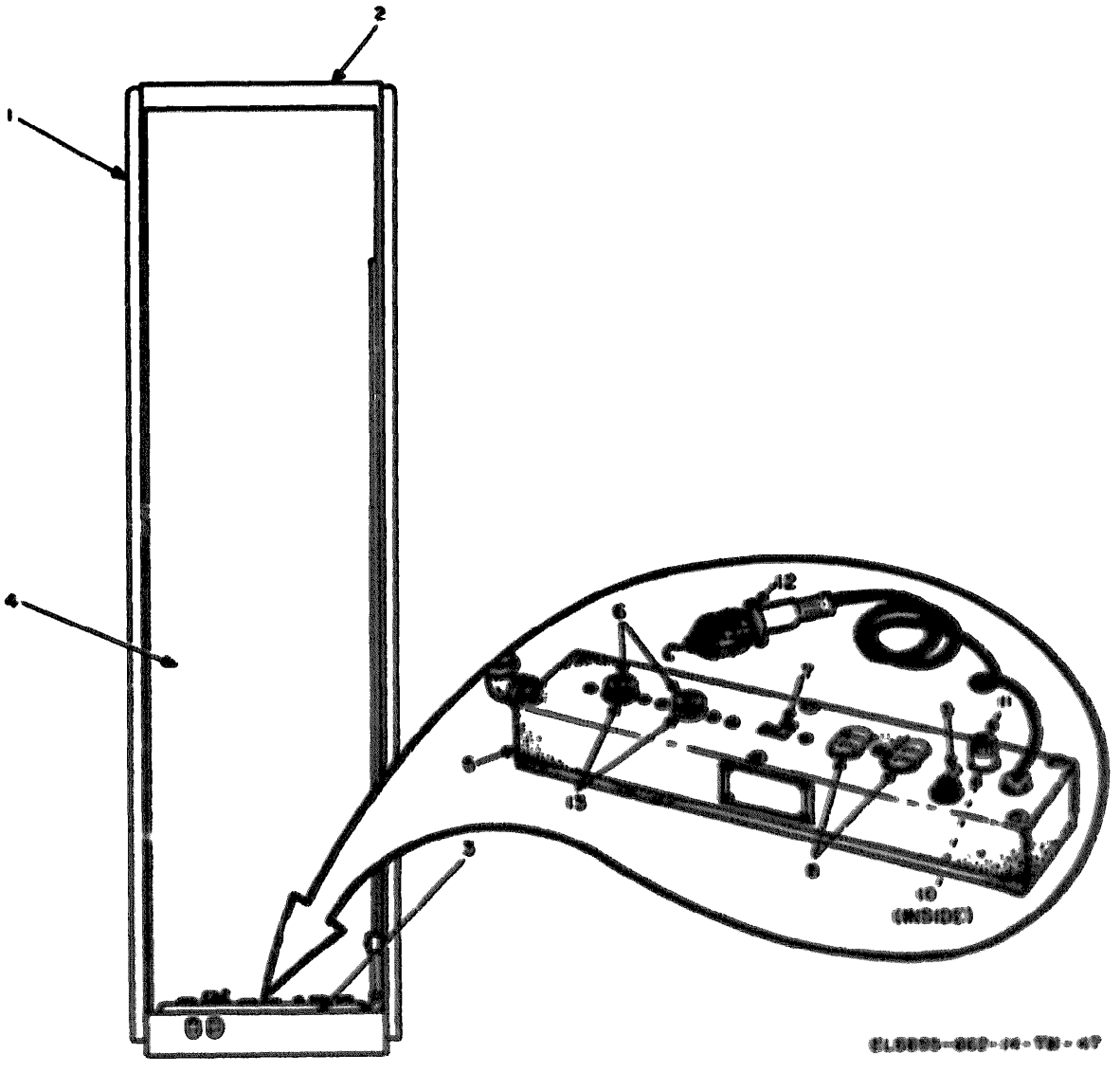


Figure C-8. Cabinet Parts Locator

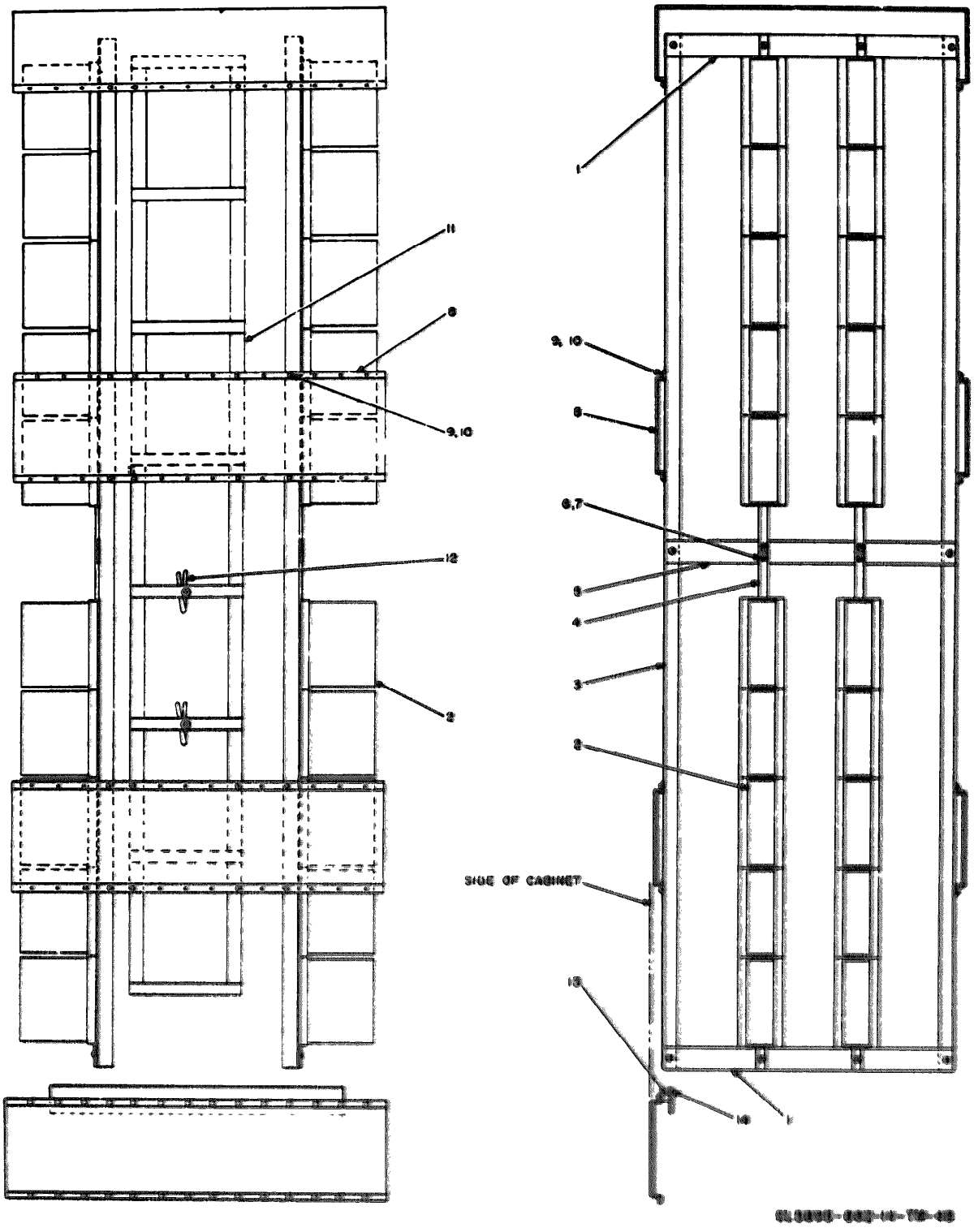


Figure C-9. Red Distribution Forms Mounting Parts Location

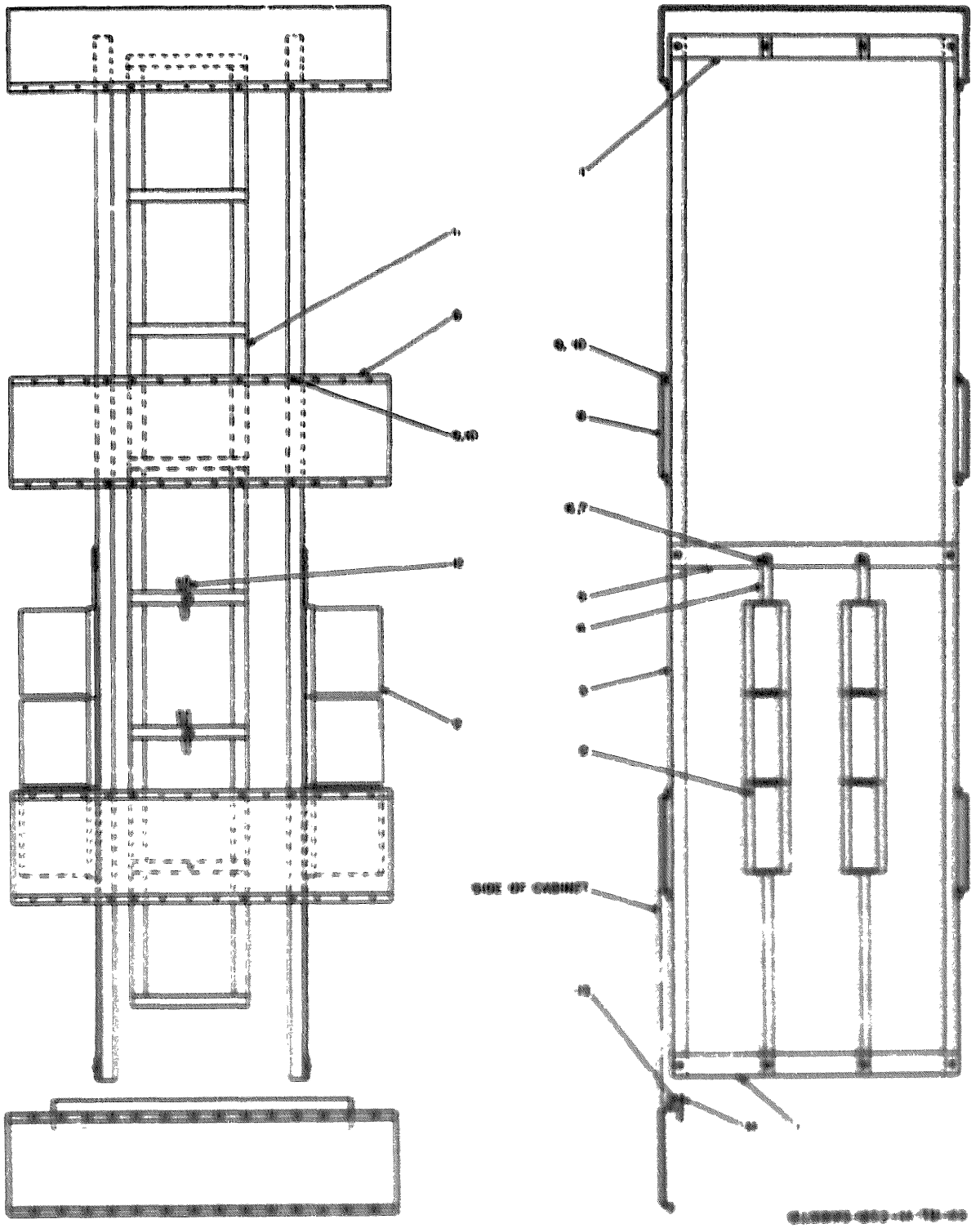


Figure C-10

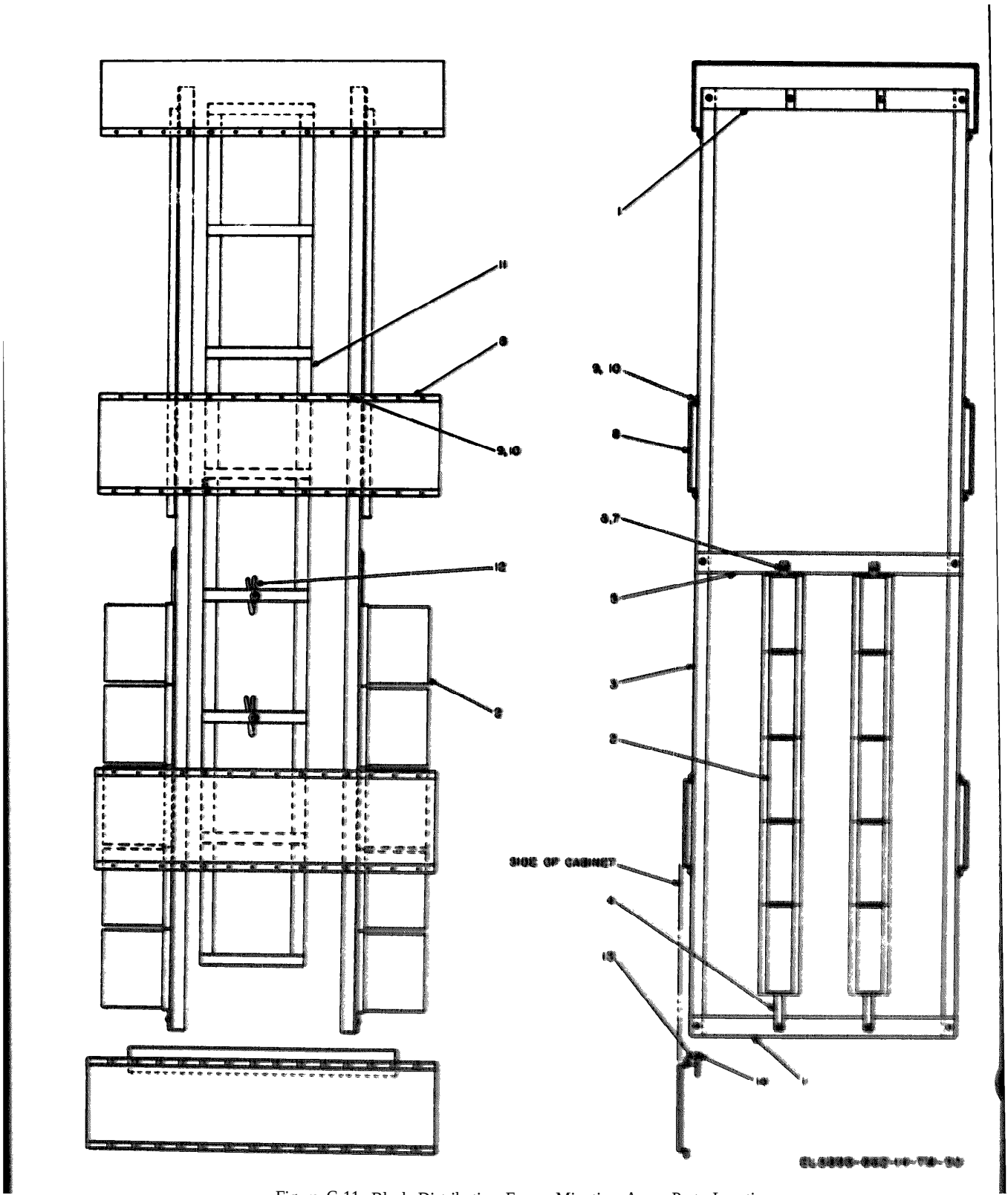


Figure C-11. Black Distribution Forms Miunting Army Parts Location

REFERENCE DESIGNATION	ITEM NO.
R1, R101	1
R2, R3, R102, R103	2
R4, R104	3
R5, R105	4
R6, R106	5
R7, R107	6
R8, R108	7
R9, R109	8
R12, R112	9
R13, R113	10
R23, R24, R123, R124, R201, R202	11
R14, R114	12
R15, R115	13
R16, R25, R27, R116, R125, R127, R205, R206	14
R17, R37, R117, R137	15
R18, R118	16
R19, R119	17
R20, R120	18
R21, R121	19
R22, R122	20
R26, R126	21
R28, R128	22
R29, R30, R31 R129, R130, R131	23
R32, R132	24
R35, R135	25
R34, R134	26
R36, R39, R136, R139	27
R38, R138	28
R41, R42, R141, R142	29
R203	30
R207	31
R204	32
R10, R110	33
C1, C101	34
C2, C3 C102, C103	35
C4, C12, C13 C104, C112, C113	36
C5, C105	37
C6, C7 C106, C107	38
C8, C9, C108, C109	39
C10, C11 C110, C111	40
C14, C15 C114, C115	41
C16, C116	42
CR2, 3, 8, 9, 13 102, 103, 108, 109, 113, 204, 206, 29, 129	43
CR4, 5, 6, 14, 15, 16, 17, 104, 105, 106, 114, 115, 116, 117	44
CR7, CR107	45
CR10, 11, 12, 110, 111, 112	46
CR18, 21, 118, 121, 202, 203	47
CR22, 23, 122, 123	48
CR201	49
A1, A10	50
Q1, Q101	51
Q13, Q113, Q2, Q102	52
Q3, Q103	53
Q4, Q104	54
Q5, Q105	55
Q6, Q106	56
Q7, Q107	57
Q8, Q108	58
Q9, 10, 11, 12, 109, 110, 111, 112	59
Q14, Q114	60
T1, T101	61
T201	62
K201, K203	63
K202	64
DS201, 202, 203	65
XS201, 202, 203	66
J1, J2	67
F1, 2, 3, 4	68
XF1, 2, 3, 4	69

EL5895-862-14-TM-01

Figure C-12. DLIU Parts Location (part 1 of 2)

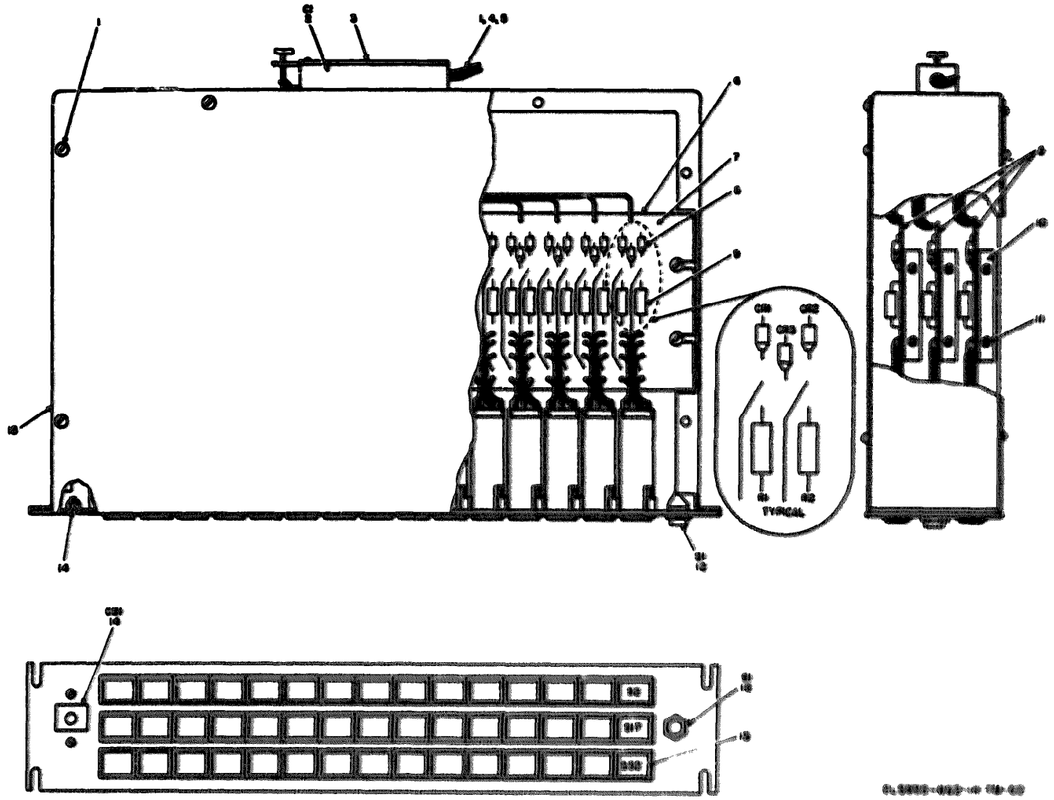


Figure C-13. Alarm Assembly-Major, Parts Location

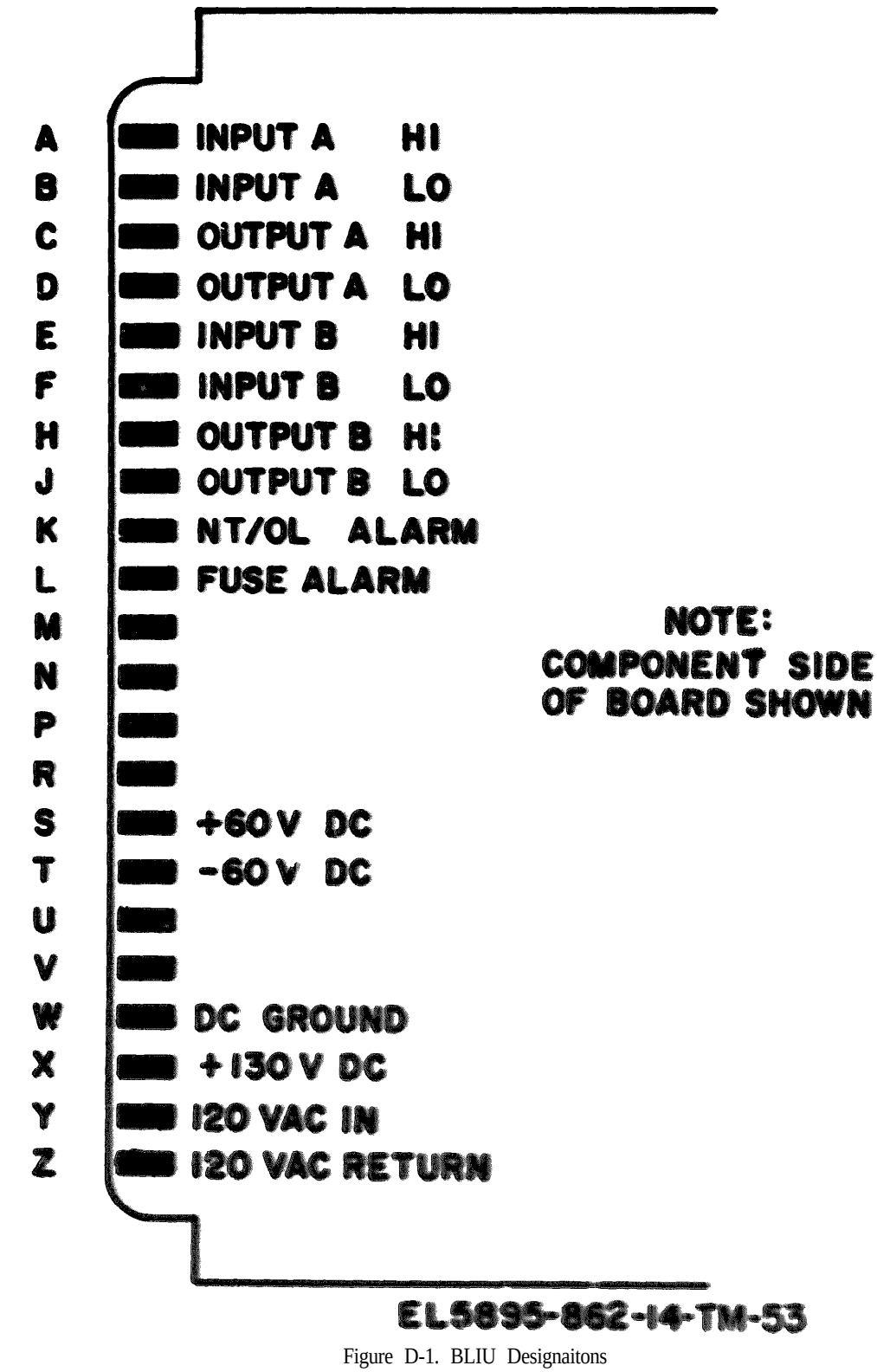


Figure D-1. BLIU Designaitons

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS

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Commander
Stateside Army Depot
ATTN: AMSTA-US
Stateside, N.J. 07703

DATE 10 July 1975

PUBLICATION NUMBER	DATE	TITLE
TM 11-5840-340-12	23 Jan 74	Radar Set AN/[illegible]-76

BE EXACT. . .PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
2-25	2-28			Recommend that the installation antenna alignment procedure be changed throughout to specify a 2° IFF antenna lag rather than 1°. REASON: Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2° without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure for the TRANS POWER FAULT indicator calls for a 3 db (500 watts) adjustment to light the TRANS POWER FAULT indicator.
5-6	5-8			Add new step f.1 to read, "Replace cover plate removed in step e.1, above." REASON: To replace the cover plate.
		FO3		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. + 24 VDC is the input voltage.

PRINTED NAME, GRADE OR TITLE, AND TELEPHONE NUMBER
SSG I. M. DeSpiritof 999-1776

SIGN HERE:

TEAR ALONG DOTTED LINE

DA FORM 2028-2 (TEST)

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SIGN HERE:

DA FORM 1 AUG 74 2028-2 (TEST)

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Commander
US Army Electronics Command
ATTN: AMSEL-MR-Q
Fort Monmouth, New Jersey 07703

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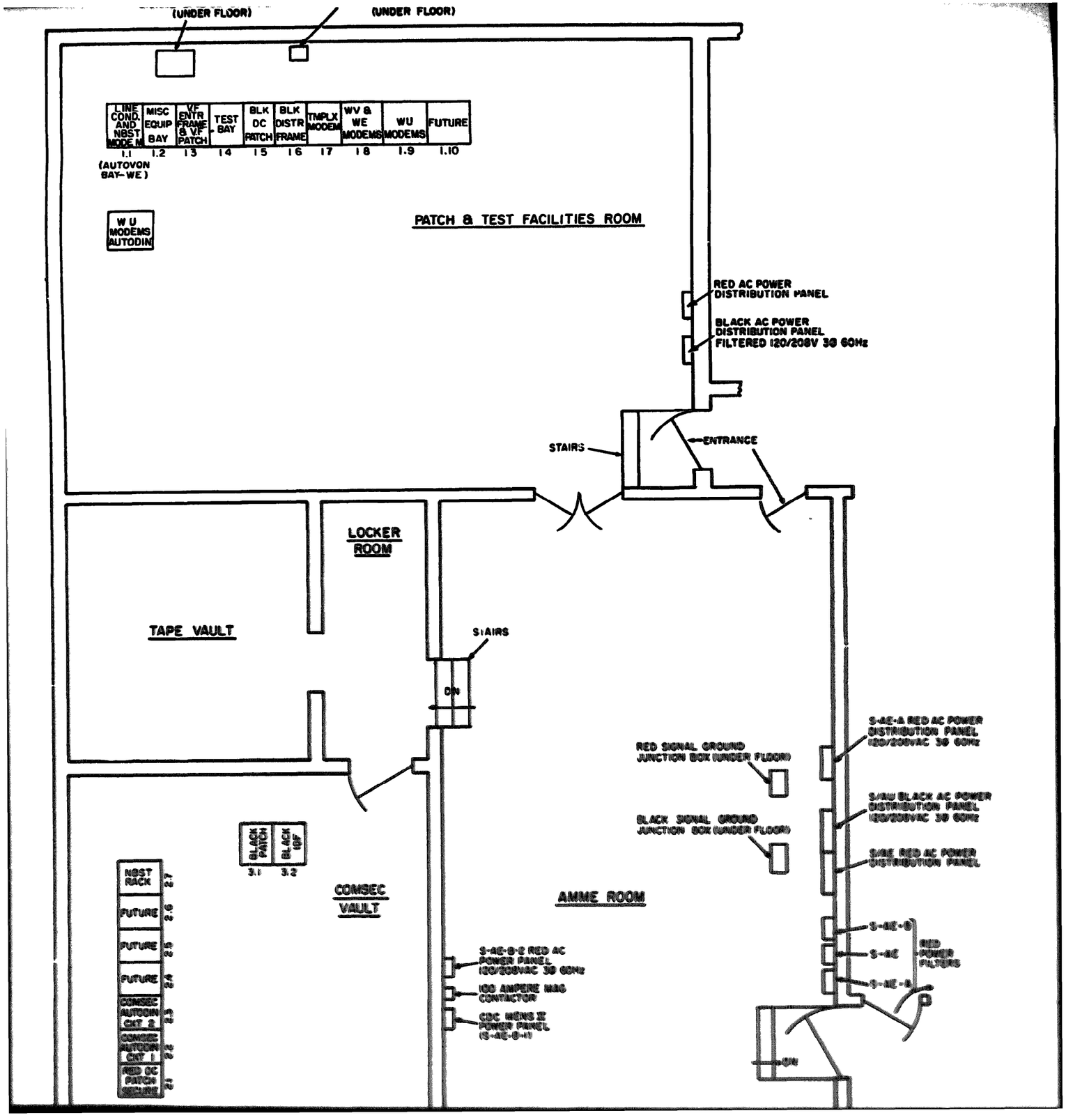
(UNDER FLOOR)
(UNDER FLOOR)
LINE COND. AND NBST MODE M
MISC EQUIP BAY
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BLK DC PATCH
BLK DISTR FRAME
TMPLX MODEMS
WV & WE MODEMS
WU MODEMS
FUTURE
1.1
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1.9
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(AUTOVON BAY-WE)
W U MODEMS AUTODIN
PATCH & TEST FACILITIES ROOM
RED AC POWER DISTRIBUTION PANEL
BLACK AC POWER DISTRIBUTION PANEL FILTERED 120/208V 3Ø 60Hz
STAIRS
ENTRANCE
LOCKER ROOM
TAPE VAULT
STAIRS
DN
BLACK PATCH
BLACK IDF
3.1
3.2
COMSEC VAULT
NBST RACK
FUTURE
FUTURE
FUTURE
COMSEC AUTODIN CKT 2
COMSEC AUTODIN CKT 1
RED DC PATCH & DISTR
2.7
2.6
2.5
2.4
2.3
2.2
2.1
AMME ROOM
S-4E-8-2 RED AC POWER PANEL 120/208VAC 3Ø 60Hz
100 AMPERE MAG CONTACTOR
CDC MENS II POWER PANEL (S-4E-8-1)
RED SIGNAL GROUND JUNCTION BOX (UNDER FLOOR)
BLACK SIGNAL GROUND JUNCTION BOX (UNDER FLOOR)
S-4E-A RED AC POWER DISTRIBUTION PANEL 120/208VAC 3Ø 60Hz
S/4W BLACK AC POWER DISTRIBUTION PANEL 120/208VAC 3Ø 60Hz
S/4E RED AC POWER DISTRIBUTION PANEL
S-4E-B
S-4E
S-4E-A
RED POWER FILTERS
DN

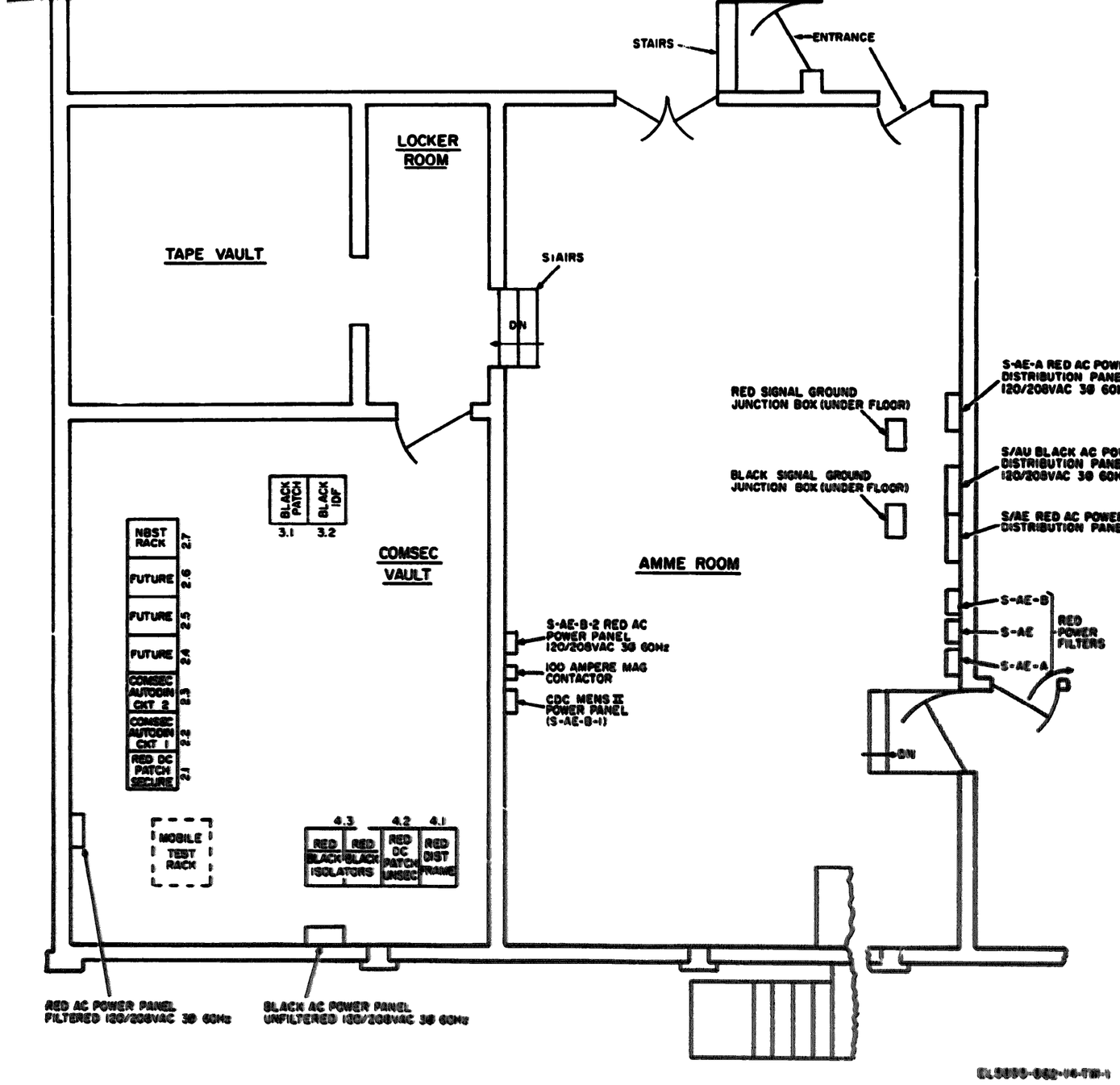
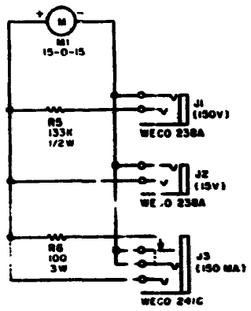
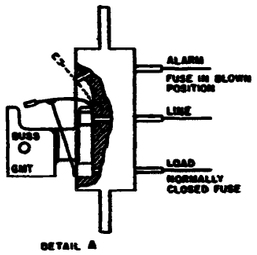
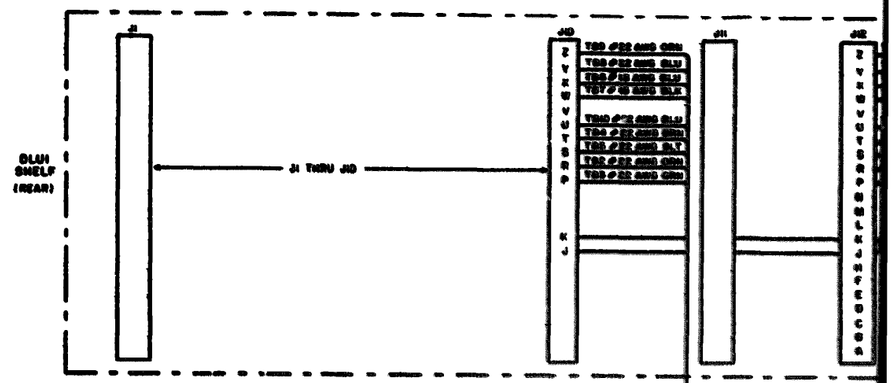


Figure 1-1 Oakland Flour Plan, Patch and Test Facility





DETAIL A



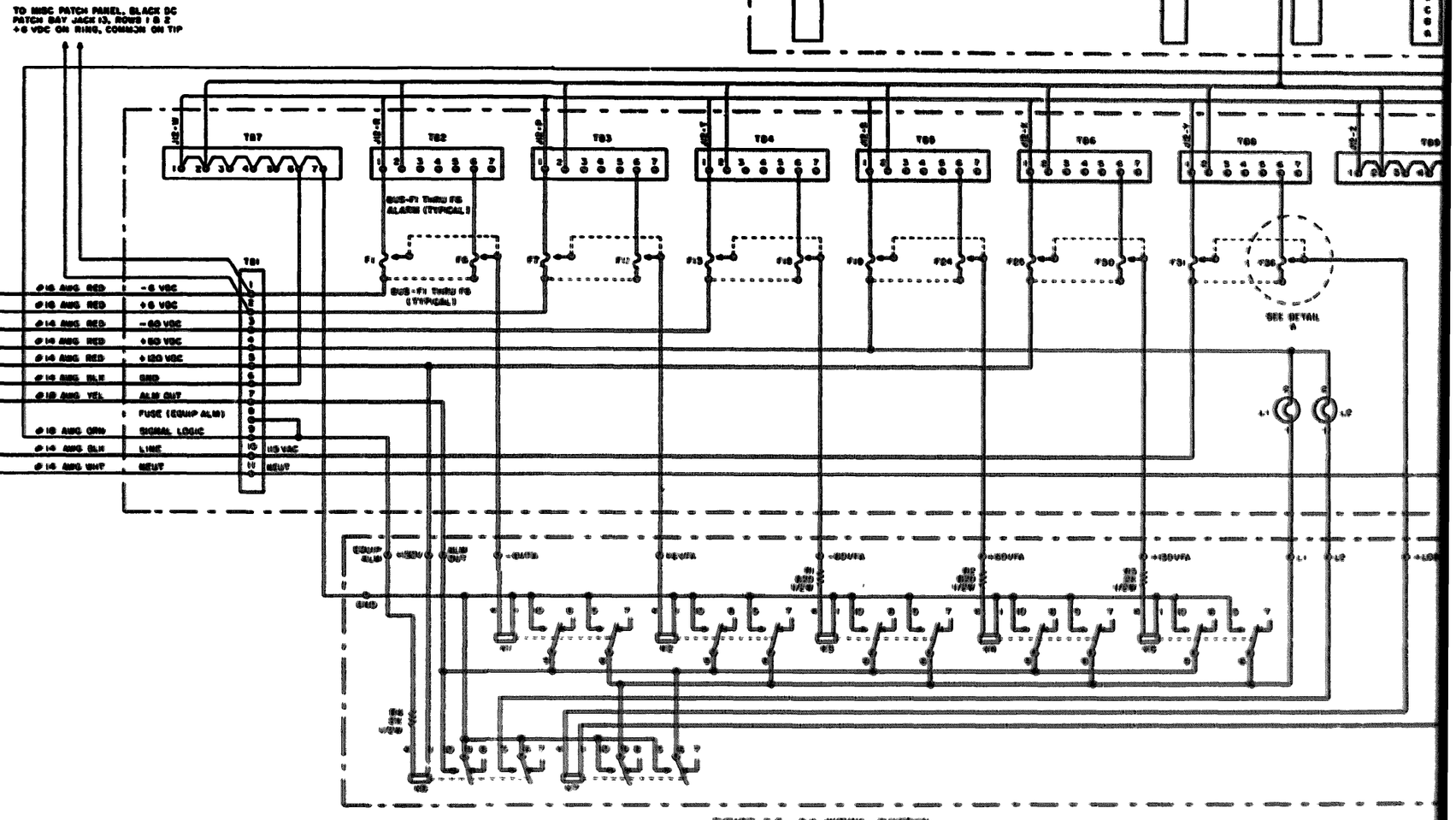


FIGURE 5-5 DC WIRING DIAGRAM

Figure 5-5 DC Wiring Diag

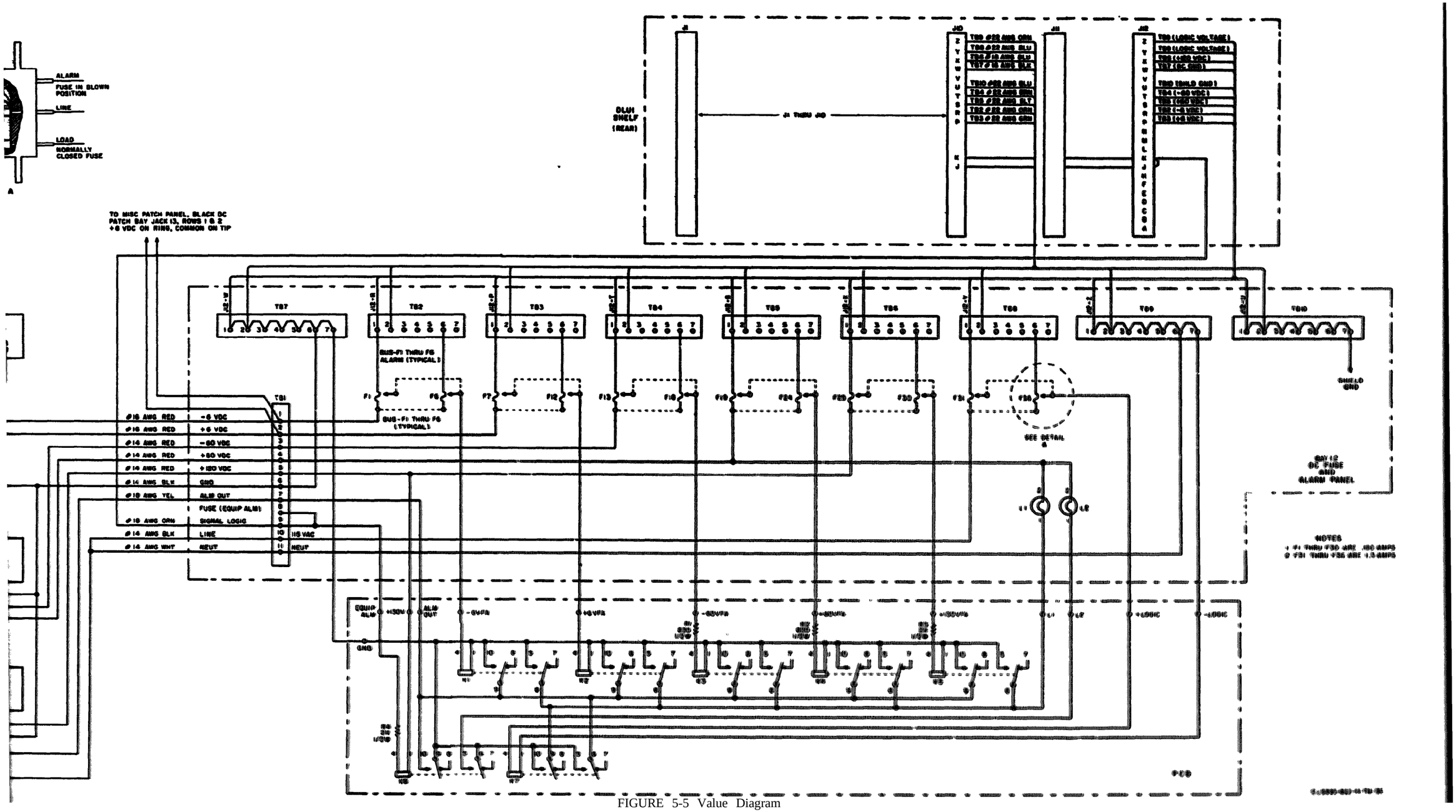


FIGURE 5-5 Value Diagram

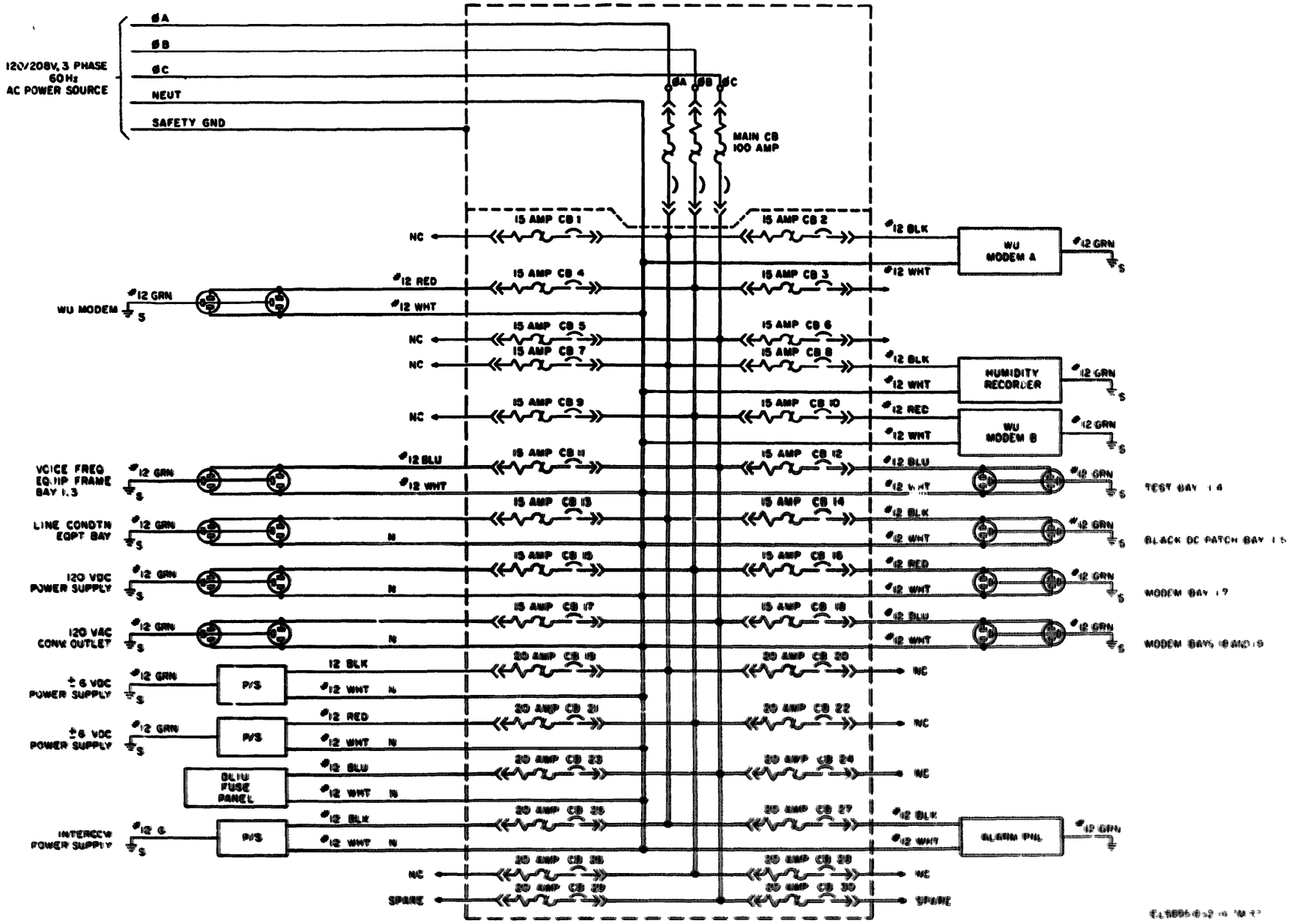


Figure 5-5 AC Power Schematic Patch and Test Publication Area.

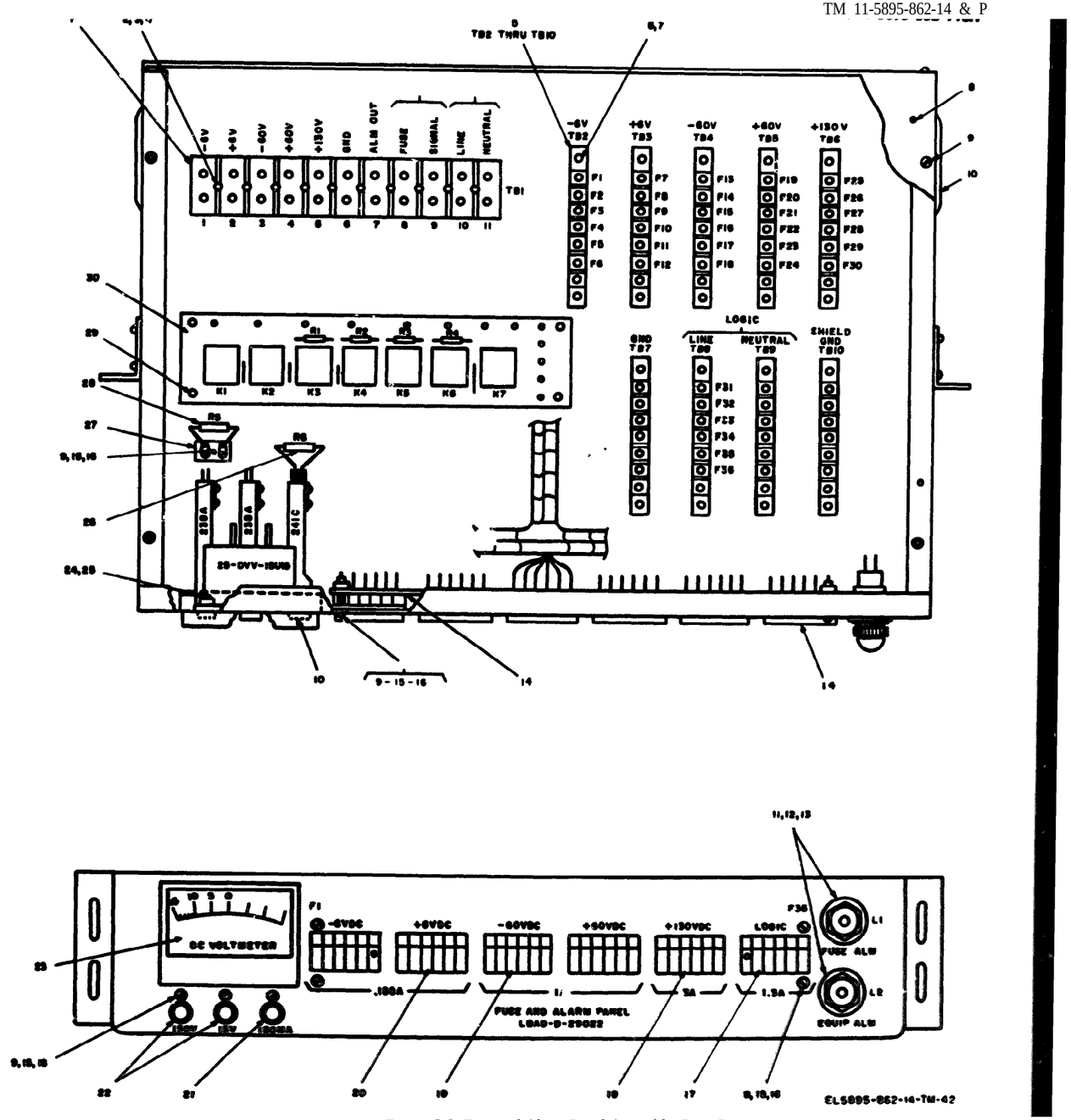


Figure C-3. Fuse and Alarm Panel Assembly, Parts Location

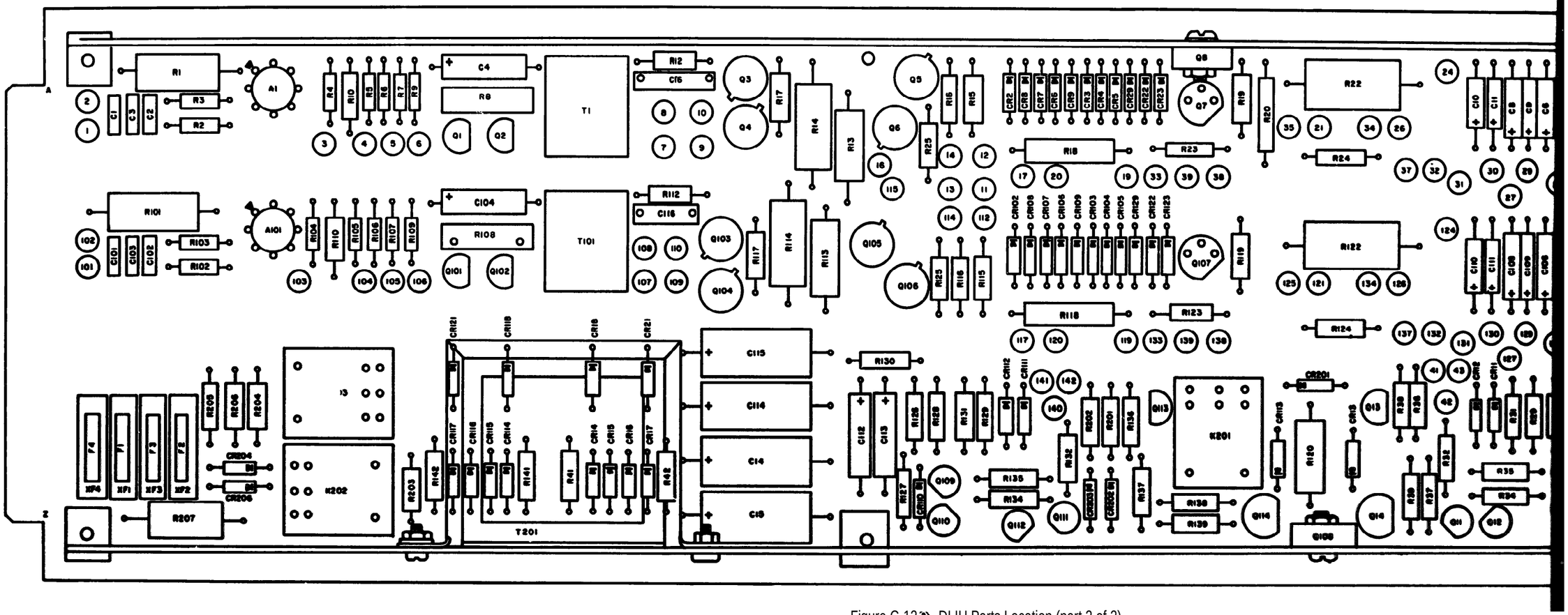


Figure C-12 DLIU Parts Location (part 2 of 2)

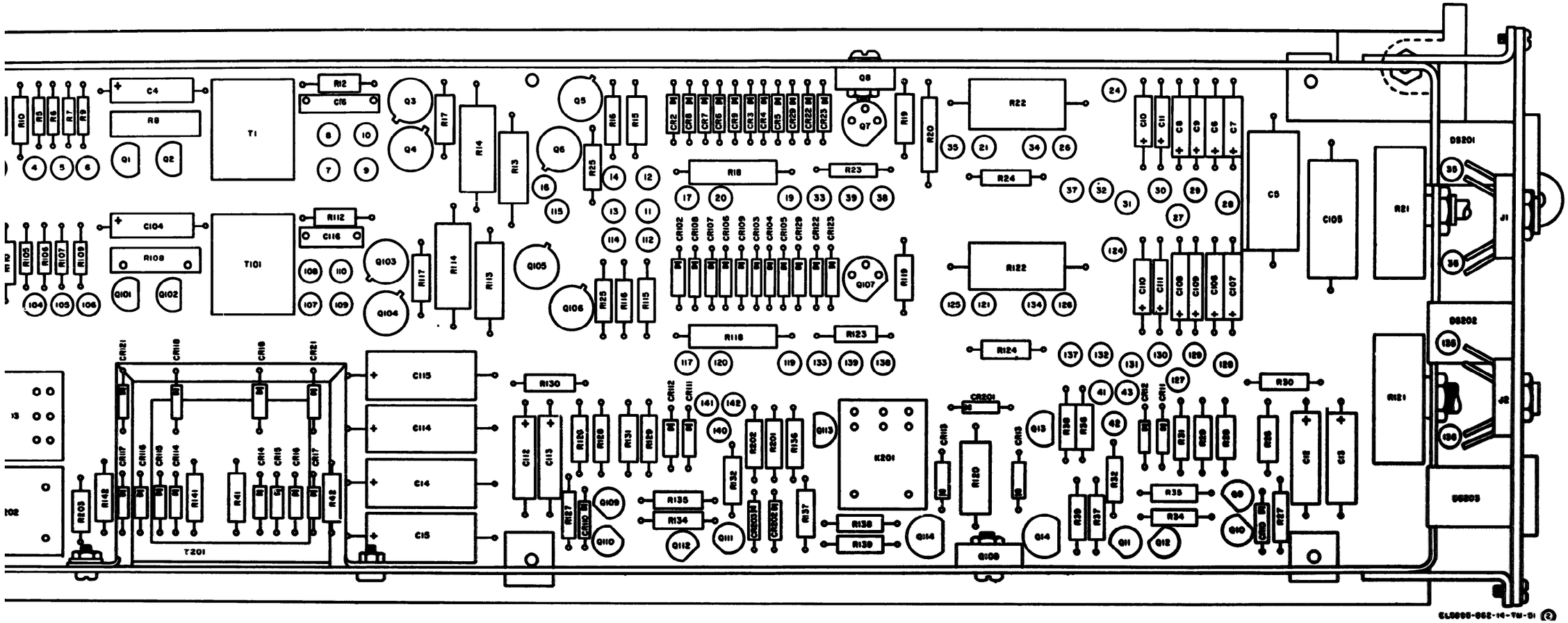


Figure C-2. (2) DLIU Parts Location (part 2 of 2).

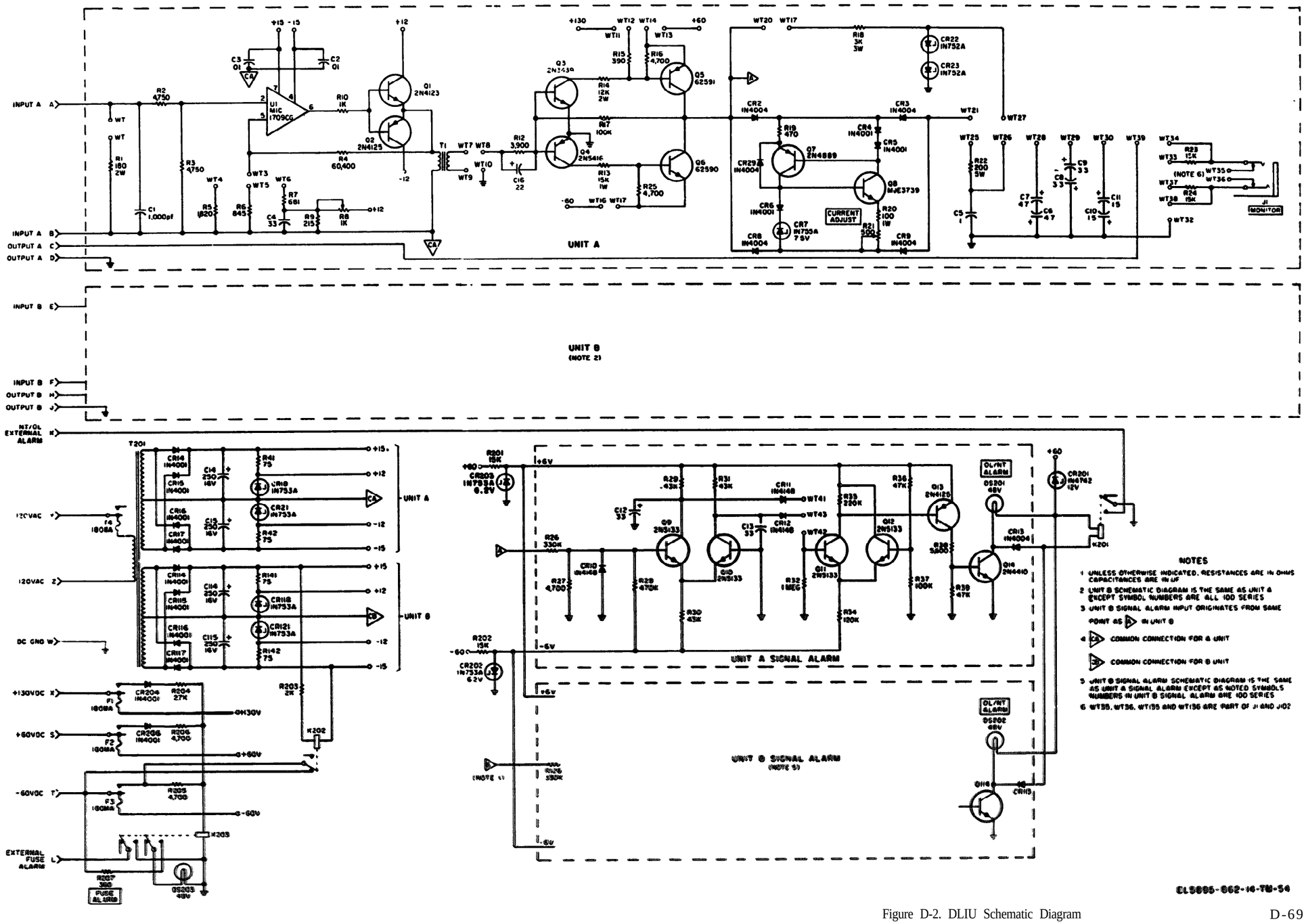


Figure D-2. DLIU Schematic Diagram

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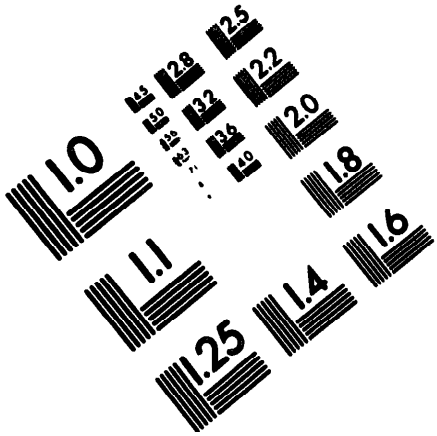

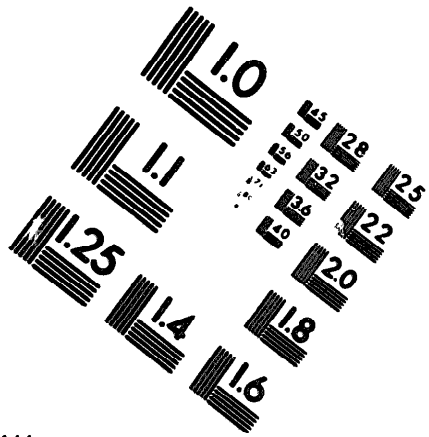

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10 mm (e= 81 mm)

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15 mm (e= 1.09 mm)

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abcdefghijklmnopqrstuvwxyz$¢£/%#½¼¾—=+×&@*

2.0 mm (e= 1.37 mm)

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2.5 mm (e= 1.77 mm)

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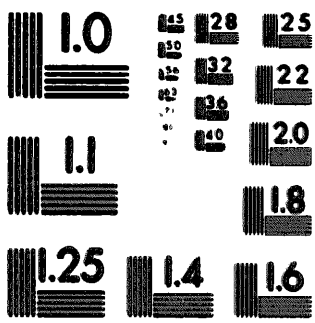

10 mm (e= 81 mm)

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15 mm (e= 1.09 mm)

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2.0 mm (e= 1.37 mm)

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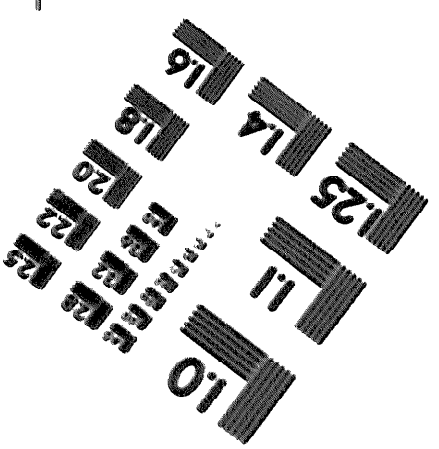

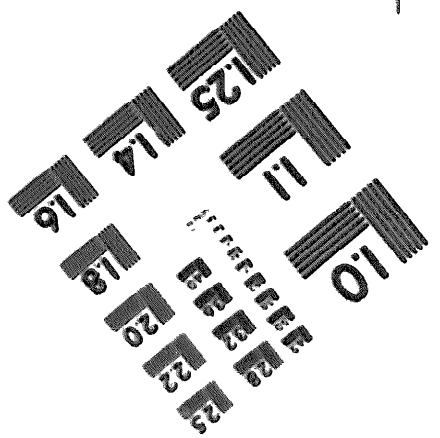

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