

TM 11-5805-686-14 & P

**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  
MULTIPLEXER GROUP  
OB-79(V)1/FSC AND OB-79(V)2/FSC  
AND  
MAINTENANCE COORDINATION CIRCUIT EXTENSION UNIT**

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**HEADQUARTERS, DEPARTMENT OF THE ARMY  
OCTOBER 1977**

TECHNICAL MANUAL  
NO. 11-5805-686-14&P

HEADQUARTERS  
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WASHINGTON, DC, 7 October 1977

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MAINTENANCE COORDINATION CIRCUIT EXTENSION UNIT  
Current as of June 1977**

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

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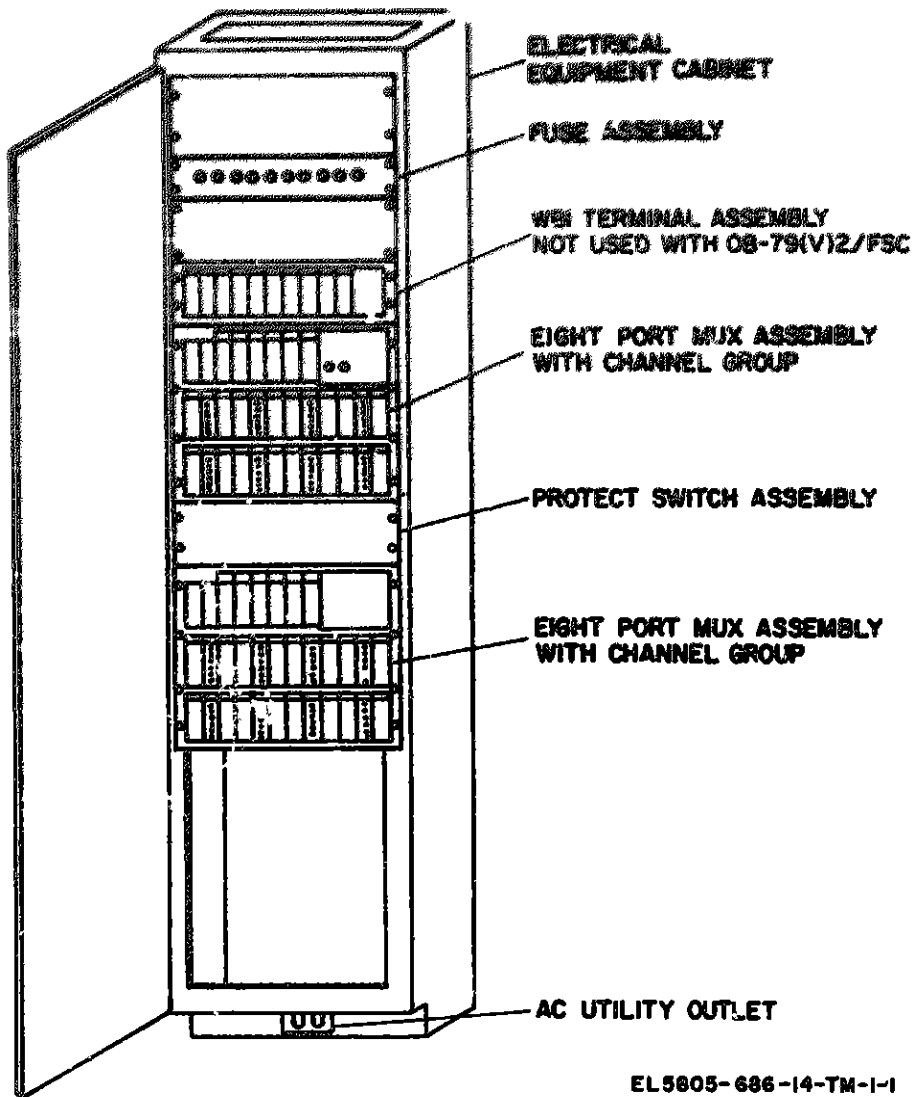
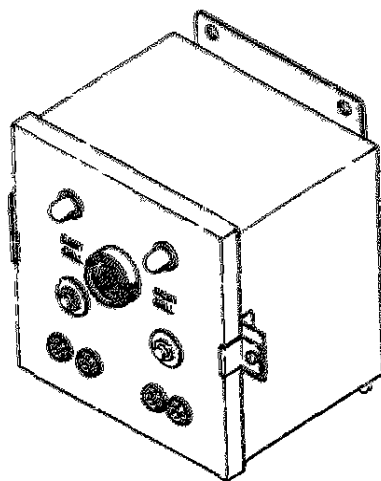
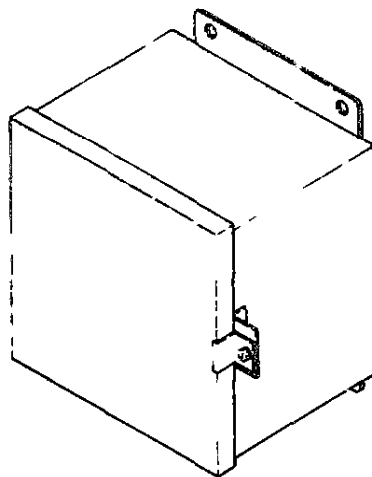


Figure 1-1  Multiplexer Group and MCC unit (sheet 1 of 2).



RADIO TERMINAL BOX



RELAY BOX

EL5805-686-14-TM-1 (2)

Figure 1-1 (2) Multiplexer Group and MCC unit (sheet 2 of 2).

## CHAPTER 1

## INTRODUCTION

## Section I. GENERAL

## 1-1. Scope

This manual contains information and instruction for installation, operation, on-site and off-site maintenance of Multiplexer Groups OB-79(V)1/FSC and OB-79(V)2/FSC and also the maintenance coordination circuit extension unit (fig 1-1) Multiplexer Group OB-79(V)1/FSC is hereinafter referred to as multiplexer 1 Multiplexer Group OB-79(V)2/FSC is hereinafter referred to as multiplexer 2 The maintenance coordination circuit extension unit is hereinafter referred to as the MCC unit. The maintenance coverage includes all maintenance procedures as authorized by the maintenance allocation chart (MAC) (appx C) The components of multiplexer 1, 2 and the MCC unit are listed in paragraph 1-9 and illustrated in the repair parts and special tools list (RPSTL) (appx B)

## 1-2. Indexes of Publications

*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* Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM

1-7. Purpose and Use  
(fig 1-1)

*a. Multiplexer 1* Multiplexer 1 consists of two eight-port MUX assemblies with channel group hereafter referred to as the T1-4000 multiplexer, fuse assembly, protect switch and a WB1 terminal assembly hereafter referred to as the T1WB1 multiplexer which are all housed in the electronic equipment cabinet. It provides time division multiplexers (tdm) for eight groups of data into a single stream of data for transmission between sites. It also accepts a stream of data for conversion into eight groups of data. These data

3 8 - 7 5 0

*b. Report of Packaging and Handling Deficiencies* Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030 29/AFR 71-13/MCOP4030 29A, and DSAR41458

*c. Discrepancy in Shipment Report (DISREP) (SF 361)* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610 33A/AFR 75-18MCOP4610 19B. and DSAR4500 15

## 1-4. Report of Equipment Improvement Recommendations (EIR)

EIR's will be prepared using DA 2407 (Maintenance Request) Instructions for preparing EIR's are provided in TM 38-750, The Army Maintenance Management System EIR's should be mailed directly to Commander, US Army Electronics Command. ATTN DRSEL-MA-Q, Fort Monmouth, NJ 07703 A reply will be furnished direct to you

## 1-5. Administrative Storage

Administrative storage of equipment issued to and used by Army activities shall be in accordance with TM 740-90-1

## 1-6. Destruction of Army Electronics Material

Destruction of Army electronics material to prevent enemy use shall be in accordance with TM 750-244-2

## Section II. DESCRIPTION AND DATA

can contain 24 voice-frequency (vf) pulse-coded modulated channels or eight 50 Kh/s high speed data channels

*b. Multiplexer 2* Multiplexer 2 is used the same way as multiplexer 1, except it does not contain a T1WB1 multiplexer The remainder of the equipment is identical with multiplexer 1

*c. MCC Unit* The MCC unit provides order wire repeater functions to permit communications from site to site on a party line as well as local extension termination facilities. Both voice-frequency and signaling information are transmitted It is designed to be locat-

ed in an area adjacent to a site as part of the fixed microwave telecommunications system

**NOTE**

General technical characteristics are given

for the T1-4000 multiplexer, T1WB1 multiplexer and protect switch. For more detailed characteristics refer to their applicable technical manuals.

1-8. Tabulated Data

**a. T1-4000 Multiplexer**  
Channels (8 duplex T1 lines):

Signal format	Bipolar
Channel rate	1 544 mb/s, + 150, - 300 b/s
Maximum input voltage	6 volts p-p
Minimum input voltage	2 5 volts p-p
Output voltage	6 volts p-p
Input/output impedance	100 ohms, balanced
Multiplexed baseband signal	
Signal format	3 level partial response signal
Bit rate	12 56 mb/s approx (8 channels)
Bandwidth (3 db)	4 4 MHz
Input voltage	1 0 ± 0 5 volts p-p
Output voltage	Adjustable 0 5 to 1 0 volt p-p
Input/output impedance	75 ohms, unbalanced
Signal-to-noise ratio	Maximum 28 db peak-to-peak signal to rms noise (at channel error rate threshold of $3 \times 10^{-7}$ )

**b. T1WB1 Multiplexer**  
Channels:

Capacity	Maximum of eight 0-64 Kb/s data channels
Signal format	NRZ data
Input level	0 dbm to -7 dbm, adjustable (135 ohms)
Input/output impedance	135 ohms ± 5%, balanced
Output level	+5 dbm to -2 dbm (135 ohms) adjustable
Looped terminal	
Transitional jitter (Timing error)	± 1 3 sec
Multiplexed T1 signal	
Line rate	1 544 Mb/s ± 50 ppm
Line code	Bipolar
Output voltage	6 volts p-p
Maximum input voltage	6 volts p-p
Minimum input voltage	3 volts p-p
Input/output impedance	100 ohms, balanced
Bit and frame organization	Transitional encoding into 3-bit words as follows

**c. Protect Switch.**

Far end failure transfer time	4 4 seconds
Near end failure transfer time	5 42 seconds

**d. Fuse Assembly**

Circuits protected	10 (3 used, 7 for expansion)
Fuse rating	3 amperes

**e. MCC Unit.**

Channels	1 East, 1 West, interconnects for back-to-back operation
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1-9. Items Comprising an Operable Equipment

The items comprising an operable equipment for the multiplexer groups and MCC unit are listed in the following chart.

**NOTE**

Refer to applicable TMs for the dimensions and weight of the T1-4000 multiplexer, T1WB1 multiplexer and protect switch.



NSN	Item	Qty	Dimensions (in.)			Unit weight (lb)
			Height	Depth	Width	
	Multiplexer Group OB-79(V)1/FSC consisting of	1	76	31	23.25	320
	Electrical equipment cabinet 713412-1	1	3.47	15	19	10
	Fuse assembly 897516-1	2				
	Eight port MUX assembly with channel group, 4008-02 with 4100-02	1				
	Protect switch 4030-2	1				
	WB1 terminal assembly 5201-01	1				
	Multiplexer Group OB-79(V)-2/FSC consisting of	1	76	31	23.25	320
	Electrical equipment cabinet 713412-1	1	3.47	15	19	10
	Fuse Assembly 897516-1	2				
	Eight port MUX assembly with channel group, 4008-02 with 4100-02	1				
	Protect Switch 4030-02	1				
	MCC Extension Unit consisting of	1	7.5	4.25	7.5	15
	Radio terminal Assembly Box 888230-1	1	7.5	4.125	7.5	15
	Relay Assembly Box 888225-1	1				

**1-10.0 Description**

a. **Multiplexers 1 and 2** (fig. 1-1). The OB-79(V)1/FSC and OB-79(V)2/FSC are housed in identical steel cabinets. Each multiplexer consists of various equipments which are accessed through a front door. Controls and indicators of the individual equipments are located on their respective front panels. A rear door on the cabinets allows access to the rear of the equipments for all interconnections. A hole is provided at the top of the cabinet for conduit entry. The base of the cabinet is open for ventilation.

b. **MCC Unit** (fig. 1-1). The MCC unit consists of two similar metal boxes which house the components necessary for operation. Each assembly has a hole located at the bottom for cable entry. The radio terminal box front panel contains operator controls and indicators; the relay box has no operator controls or indicators.

**1-11. Differences in Models**

The differences between the two multiplexers are explained in paragraph 1-7. The chart provided in paragraph 1-9 details each model.

**1-12. System Application**

a. **Multiplexer Group** (fig. Fo-1) The multiplexer equipment provides time divisional multiplexing for high-speed digital data transmission. Multiplexer 1 uses the T1WB.1 multiplexer to multiplex eight channels of 50KBo data into a single 1544 MBS stream of data input to the T1-4000 multiplexer along with up to seven additional channels of 1,544 MBs data. Multiplexer 2 does not use the T1WB1 thus providing a capacity of eight 1544 MBS channels. Both configurations of the multiplexer equipment operate in a duplex mode. Data are either received or transmitted by the sight radio for processing by the multiplexer equipment. Each system operates with a redundant T1-4000 multiplexer for backup in case of failure.

b. **MCC Unit** (fig. FO-1). The maintenance coordination current (MCC) is a two channel baseband facility which modulates an 8.1 MHz carrier in the radio baseband. This permits maintenance personnel to communicate between sites. The MCC unit provides signal and voice mdvommtwamwho facilities for this circuit at sites where a back-to-back repeater function is required in addition to drop facilities.

C H A P T E R 2

INSTALLATION

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Packaging and Repackaging Data

**a. Multiplexer Equipment.** Both configurations of the multiplexer equipment are shipped with all internal assemblies and components included. Each cabinet is placed in a moistureproof plastic wrapper and placed in a wooden crate. Mounted at all corners of the crates are shock absorbers to prevent damage to the units during shipment

**b. MCC Unit.** The relay box assembly and ratio terminal box assembly are individually wrapped in moistureproof plastic and placed in wooden crates. Protective padding is placed in each crate to prevent damage to the units during shipment.

**c. Repackaging** Repackaging of the equipment for shipment or limited storage normally will be performed at a repackaging facility or by a repackaging team. If emergency packaging is required, select the materials from those listed in SE 38-100

**b. Carefully open wooden crates**

c. remove plastic wrapper and place equipment in their respective mounting positions.

2 - 3 . C h e c k i n g

a Inspect the equipment for damage that may have occurred during shipment. If equipment has been damaged, fill out and forward DD Form 6 (para 1-3b)

**b. Check to see that the equipment is complete as** listed on the packaging slip If a packing slip is not available, check the equipment against the items listed in paragraph 1-9 Report all discrepancies in accordance with TM 38-750 The equipment should be placed in service even though a minor assembly or part that does not affect proper functioning is missing

c Check to see whether the equipment has been modified The MWO number will appear on the front panel, near the nomenclature plate Check also to see whether all MWO's current at the time the equipment is placed in use have been applied.

2-2. Unpacking Instructions

**a. Place wooden crates in the area where the equipment will be installed**

**NOTE**

**Be careful when unpacking and handling the equipment. If damaged or exposed, the equipment may be rendered useless and a complete overhaul required.**

**NOTE**

Current MWO's applicable to the equipment are listed in DAPam310-7

d. Check the latest issue of DA Pam 310-4 and its latest changes to see whether you have the latest editions of all applicable maintenance literature

Section II. Installation Instructions

2-4. Tools, Test Equipment and

**Required for Installation**

The tools, test equipment and materials needed to install the multiplexer equipment and MCC unit are listed in appendix C.

cedures as follows.

**NOTE**

**Make all power external signal connections through access hole at the top of the electron**

**W A R N I N G**

**Make certain site dc power is off before making connections to the equipment**

- (1) Connect - 48 vdc and ground wires to the terminal board adjacent to the fuse assembly
- (2) Connect site ac source to terminal board adjacent to the ac utility assembly
- (3) Connect external signal cables to equipment cabinet connectors as indicated in chart below

2-5. Installation Procedures

These installation procedures are to serve as a guide For specific information regarding cable routing, floor plans and dimensions, refer to applicable site installation drawings and the applicable equipment technical manuals.

**a. Multiplexer Equipment.** With multiplexer equipment located in position perform interconnecting pro-

Equipment	Equipment identification number
T1 Channel 1 RCV	J1
T1 Channel 2 RCV	J2
T1 Channel 3 RCV	J3
T1 Channel 4 RCV	J4
T1 Channel 5 RCV	J5
T1 Channel 6 RCV	J6
T1 Channel 7 RCV	J7
T1 Channel 8 RCV	J8
T1 Channel 1 XMT	J9
T1 Channel 2 XMT	J10
T1 Channel 3 XMT	J11
T1 Channel 4 XMT	J12
T1 Channel 5 XMT	J13
T1 Channel 6 XMT	J14
T1 Channel 7 XMT	J15
T1 Channel 8 XMT	J16

3. **MCC Unit.** With the relay box assembly and radio terminal box assembly located at their respective positions, perform installation procedures as follows.

- (1) Secure each box assembly to the wall using the mounting bracket provided for each unit.
- (2) Connect wires from the radios through access hole located at the bottom of each box to the appropriate terminals as indicated in figure 2-1

**NOTE**

Connectors J17 through J32, J35 and J36 are not used with Multiplexer Group OE-79(V)2/FSC

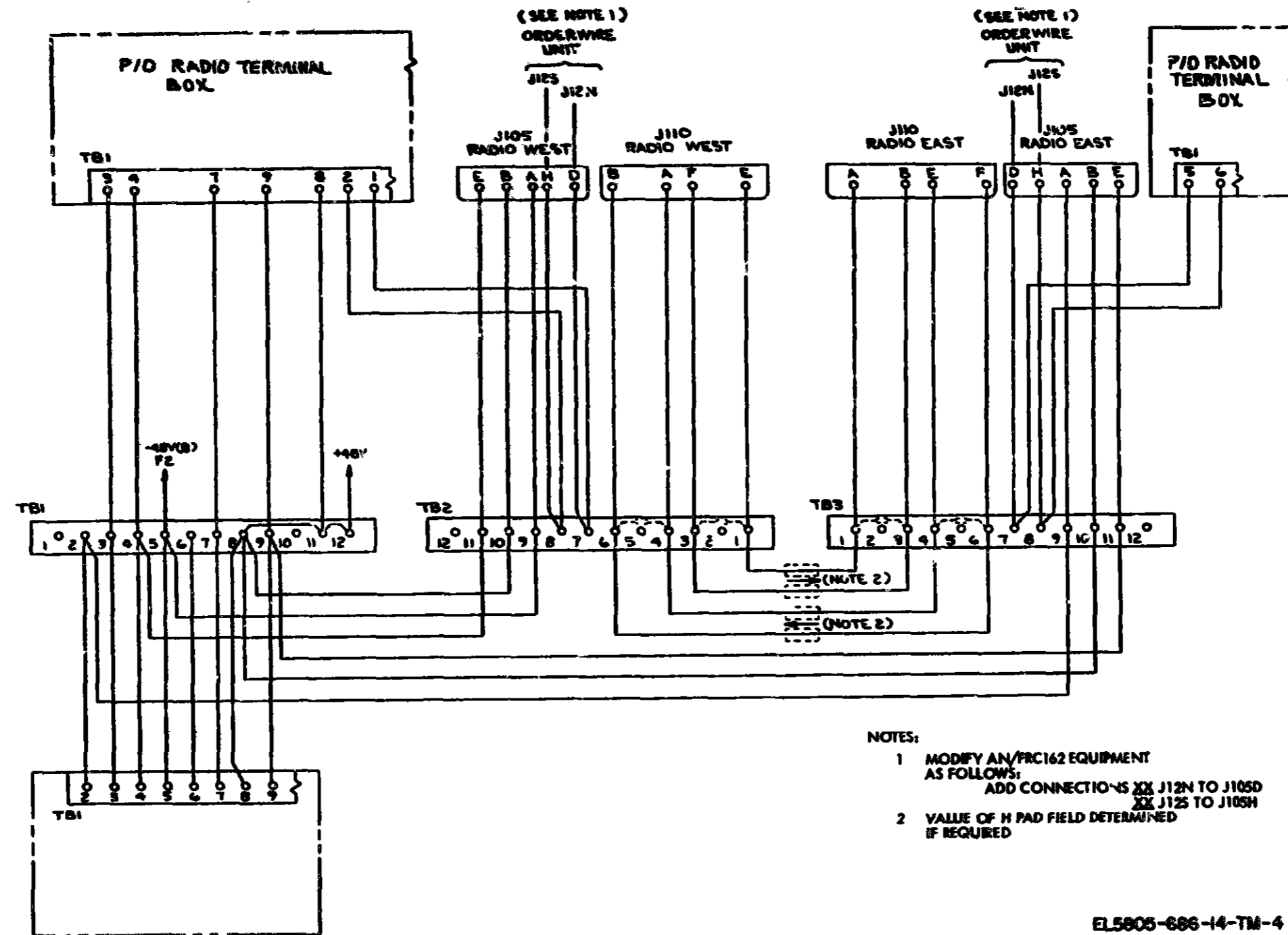
50 Kb/s Channel 8 RCV	J17
50 Kb/s Channel 7 RCV	J18
50 Kb/s Channel 6 RCV	J19
50 Kb/s Channel 5 RCV	J20
50 Kb/s Channel 4 RCV	J21
50 Kb/s Channel 3 RCV	J22
50 Kb/s Channel 2 RCV	J23
50 Kb/s Channel 1 RCV	J24
50 Kb/s Channel 8 XMT	J25
50 Kb/s Channel 7 XMT	J26
50 Kb/s Channel 6 XMT	J27
50 Kb/s Channel 5 XMT	J28
50 Kb/s Channel 4 XMT	J29
50 Kb/s Channel 3 XMT	J30
50 Kb/s Channel 2 XMT	J31
50 Kb/s Channel 1 XMT	J32
Radio RCV	J33
Radio XMT	J34

2-6. Initial Checks and Adjustments

a. **Multiplexer Equipment.** Refer to applicable TMs for initial checks and adjustment procedures for the T1-4000 multiplexer, T1WB1 multiplexer and the protect switch.

b. **MCC Unit.** The initial checks for the MCC unit require personnel to be located at remote sites east and west of the radio terminal box location. To establish communications between these points, the site east/west radios must be operative. Perform the following procedures to verify equipment operation.

- (1) Connect handset to the handset jack terminals located directly under the EAST CALL button.
- (2) Press EAST CALL button.
- (3) Receive acknowledgment from personnel located at site east of the radio terminal to transmit a signal to your location and observe EAST CALL indicator illuminates and the buzzer is energized.
- (4) Repeat (1), (2), and (3) above for the site west of the radio terminal



NOTES:

- 1 MODIFY AN/PRC162 EQUIPMENT AS FOLLOWS:  
ADD CONNECTIONS ~~XX~~ J12N TO J105D  
~~XX~~ J12S TO J105H
- 2 VALUE OF H PAD FIELD DETERMINED IF REQUIRED

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Figure 2-1 MCC Unit Interconnection Diagram

C H A P T E R 3

O P E R A T I O N

Section I. OPERATOR CONTROLS AND INDICATORS

3-1. General

This section contains information on the description, location, and function of all operator's controls and indicators applicable to the multiplexer and MCC unit.

3-2. Controls and Indicators

**The controls and indicators required for normal operation of the multiplexer** multiplexer equipment are located on the

front panels. Access to them requires opening the front door of the equipment cabinet. The controls and indicators for normal operation of the MCC unit are located on the front of the radio terminal box.

a. Fuse Assembly ( fig 3-1).

Controswitch or indicator	Function
F1 through F10	Provides protection to the equipment using the 48 vdc input-

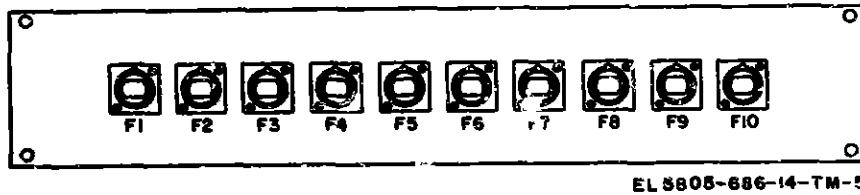


Figure 3-1 Fuse Assembly

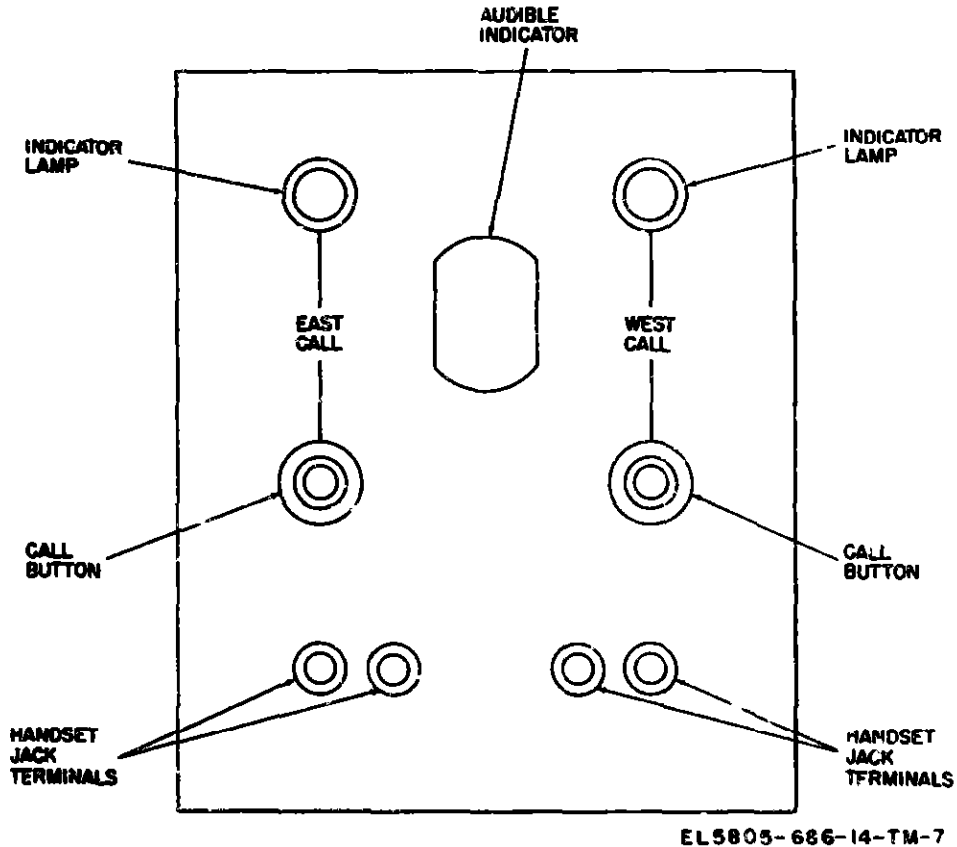


Figure 3-2 Radio Terminal Box Assembly

**b. T1-4000 Multiplexer** Refer to equipment manual.

**c. Protect switch.** Refer to equipment manual

**d. T1WB1 Multiplexer** Refer to equipment manual

**e. Radio Terminal Box Assembly** (fig 3-2).

Control, switch or indicator	Function
<b>EAST CALL</b>	
Indicator lamp	Illuminates when a signal is received from a site east of the radio terminal.
Call button	Used to signal a site east of the radio terminal.

Control, switch or indicator	Function
<b>EAST CALL (cont)</b>	
terminals	terminals for voice communication to a site east of the radio terminal.
<b>Audible indicator</b>	Provides an audio alarm signal when either east/west site transmits.
<b>WEST CALL</b>	
Indicator lamp	Illuminates when a signal is received from a site west of the radio terminal.
Call button	Used to signal a site west of the radio terminal.
Handset jack terminals	Telephone handset connections for voice communications to a site west of the radio terminal.

Section II. OPERATION UNDER USUAL AND UNUSUAL CONDITIONS

3 - 3 . Preliminary Starting Procedures

**a. Multiplexer Equipment** Before primary power is applied to the equipment, refer to the applicable technical manuals for verification of control settings. The remaining equipment require no preliminary starting procedures

**b. MCC Unit** No preliminary starting procedures are required for the MCC unit.

3-4. Starting Procedures

**a. Multiplexer Equipment** Refer to the applicable technical manuals for the procedures required for energizing the equipment

**b. MCC Unit** To energize the radio terminal box and relay box, the site dc source must be turned on and the site radio energized.

3-5. Operating Procedures

**a. Multiplexer Equipment** Refer to each individual equipment TM (appx A) for operating instructions. The fuse assembly requires no operating instructions

**b. MCC Unit** Operation of the MCC unit requires an operator to be stationed at the terminal box location to achieve voice and signalling communication. The operating procedure for this unit is as follows.

terminals

(2) Press either **EAST** or **WEST CALL** button (depending on which handset terminals are being used) to signal desired site

(3) When other sites wish to communicate with the radio terminal box location, a signal is transmitted illuminating either the **EAST/WEST CALL** indicator and simultaneously an audio alarm is energized

3-6. Partial Failure of Equipment

**a. Multiplexer Equipment** Both configurations of the multiplexer group equipment contain two identical T1-4000 multiplexers. If one fails the other is switched on line by the protect switch. Redundant power systems at each site supply continuous power regardless of power failures. Also, each site contains two entire systems which will provide partial service while the defective equipment is repaired

**b. MCC Unit** Failure of the MCC unit may prevent signaling and MCC communications from being repeated through the site. It will not have an effect on the main digital traffic and, generally, orderwire communications from the radio equipment location will not be affected

C H A P T E R 4  
FUNCTION OF EQUIPMENT

4-1. Introduction

This chapter contains a general functional description of the operation of the multiplexer equipment. Detailed functional and circuit description for the multiplexer are contained within their individual technical manuals. Also, included in this chapter are general and detailed functional descriptions for the MCC unit

4-2. Block Diagram Description

**a Multiplexer Equipment (fig FO-1)** The multiplexer equipment is an integral part of the fixed microwave telecommunications system. It provides time divisional multiplexing of eight channels of 1.544 Mb/s data into a single stream of 12.6 Mb/s data for transmission by the fm microwave transmitter. It also receives a 12.6 Mb/s stream of data from the fm receiver radio for decoding into eight channels of 1.544 Kb/s data. The T1WB1 multiplexer is used in the multiplexer 1 configuration and converts eight channels of 50 Kb/s subscriber data into a single stream of 1.544 Kb/s data for connection to one channel of the T1-4000 multiplexer.

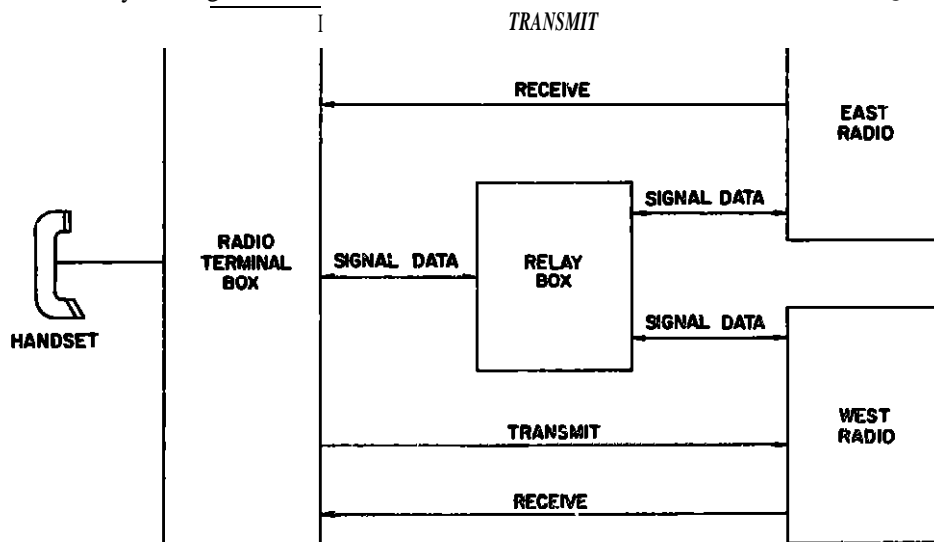
(1) *T1-4000 multiplexer.* The T1-4000 multiplexer provides for conversion of a group of eight duplex T1 channels of 1.544 Mb/s data to a single stream of 12.6 Mb/s data. This equipment includes three level coding and partial response filtering to achieve performance over the basically analog fm radio. Two identical

T1-4000 multiplexers provide redundancy in the system to assure continuous flow of data.

(2) *Protect switch.* The protect switch operates with a normal and standby T1-4000 multiplexer. It responds to information from the receiver side of the normal multiplexer and transfers operation to the standby multiplexer when the normal multiplexer fails. The standby multiplexer is fully powered and is in a normal mode of operation to provide uninterrupted service.

(3) *T1WB1 multiplexer.* The T1WB1 multiplexer accepts up to eight 50 Kb/s data channels for asynchronous time division multiplexing of the input channels to a 1.544 Mb/s output data stream. Each data channel is encoded with a three bit word for each transition (start bit, timing bit, and logic sense bit). The multiplexed output is a typical bipolar T1 data stream.

**b MCC Unit (fig 4-1)** The MCC unit provides a termination and signaling facilities for the radio orderwire (MCC) circuits at a location remote from the radio equipment as well as facilities to enable operation of the two MCC circuits in a back-to-back mode. It consists of a radio terminal box and a relay box with circuits that are integral parts of the site radios. The radio terminal box controls permit voice communications and signaling with sites east and west of its location. The relay box serves as an interface and control for all transmitted or received signalling.



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Figure 4-1 MCC Extension Unit Block Diagram

4-3. MCC Unit Description

a. *Radio Terminal Box (fig 4-2)* The radio terminal box operates two modes. They are receiving and sending signals to sites east and west of the terminal location and voice communications with these sites. Signaling a site east of the the terminal is accomplished by pressing the EAST CALL button S1 This results in providing a ground level at pin 9 of TB1 which passes through the relay box and is ultimately transmitted by the east as a signal indication to the site east of the terminal Signaling a site west of the terminal is accomplished by pressing the WEST CALL button S2 which ultimately results in the west radio transmitting a signal to west site Signals received from the east site energize relay K1 in the relay box **which** causes a -dc control voltage to appear at pin 3 of TB1 This voltage (-24 +/- 4 vdc) forward biases steering diode CR1 and energizes audible indicator DS1 Simultaneously, indicator DS2 is illuminated The signal from the west site produces a -dc control voltage at pm 7 of TP1 energizing the audible indicator DS1 and

simultaneously illuminating indicator DS3 Voice communications are accomplished by connecting the telephone handset to terminals J1A and J1B for east calls and J2A and J2B for west calls.

b. *Relc. Box (fig 4-3)* The relay box contains the relay control circuits which route the signaling calls from the east and west radios A ground level signal from the east radio at pin 2 of TB-1 energizes relay K1 This enables a -dc control voltage, which is generated by the drop across Zener CR3, to be applied through the contacts of K1 to pin 3 of TB-1 for use by the radio terminal box Simultaneously, the other contact of K1 places a ground level at pin 4 of TB-1 which energizes the use of the west radio signal channel to repeat the signaling function A ground level signal from the west radio, at pin 6 of TB-1, energizes relay K2 This enables the -dc control voltage to be applied through the contacts of K2 to pin 7 of TB-1 for use by the radio terminal box Simultaneously, the other contact of K2 places a ground level at pin 9 of TB-1 which energizes the east radio signal channel to repeat the signaling function

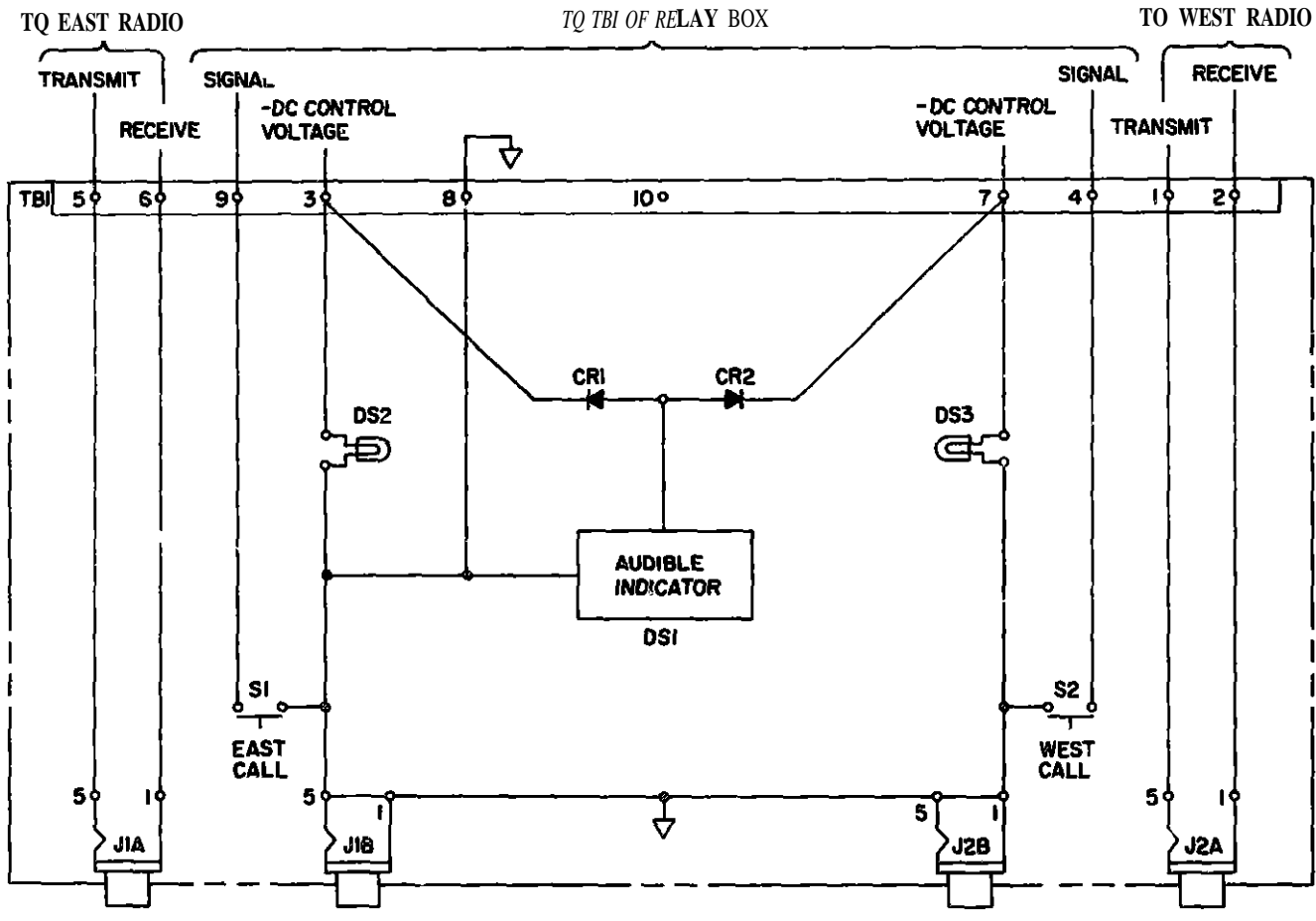
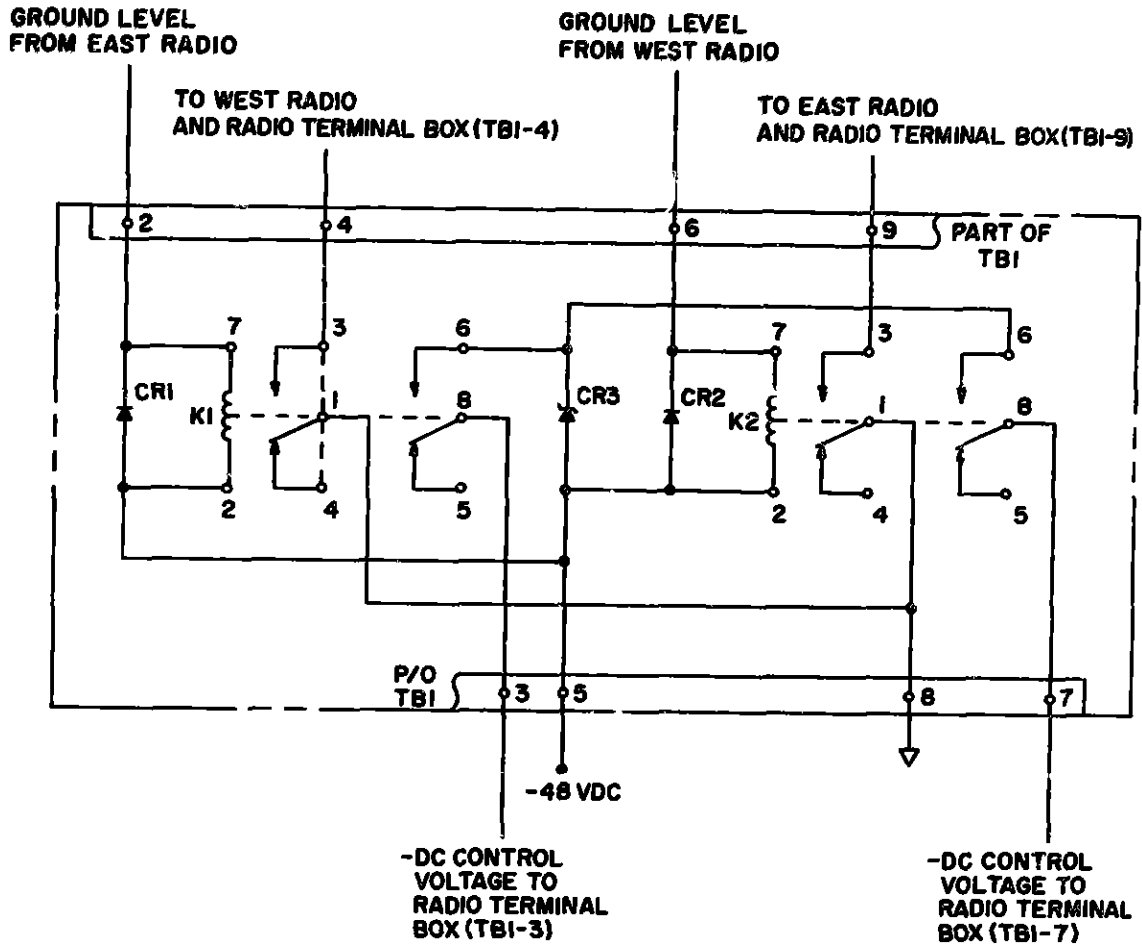


Figure 4-2 Radio Terminal Box Schematic Diagram





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Figure 4-3 Relay box schematic Diagram

## CHAPTER 5

### ON-SITE AND OFF-SITE MAINTENANCE

**WARNING**

**Dangerous electrical potentials and currents are present within the equipment. However, it is not always necessary to remove primary power when servicing the equipment. For general safety, avoid physical contact with all energized components except those designated in appropriate instructions. Observe good working practices at all times. Failure to comply with this warning could result in injury or DEATH.**

#### 5-1. Scope of On-site Maintenance

This chapter contains instructions for performing on-site preventive and corrective maintenance procedures, and the associated testing procedures. The scope of maintenance is assigned by the maintenance allocation chart (appx C). On-site maintenance of the multiplexer equipment and MCC unit includes:

- a. Preventive maintenance decks and services (para 5-3)
- b. Fault isolation (troubleshooting) to a defective printed circuit board (para 5-6)
- c. Removal and replacement procedures for various equipment components (para 5-7)
- d. Adjustment and alignment procedures (para 5-6)

#### 5-2. Tools, Test Equipment, and Materials Required

a. The tools and test equipment required for on-site maintenance are listed and identified in the maintenance allocation chart (appx C).

b. **The materials required for on-site maintenance are listed below:**

NSN	Materials required
8305-00-287-3015	Lint-free cloth Brush paint 1/2 inch width Trichloroethane

#### 5-3. Preventive Maintenance

a. **General preventive maintenance is the systematic care, inspection, and servicing of the power system to maintain it in serviceable condition, prevent break downs, and insure maximum operational capability. Preventive maintenance includes the inspection, testing, and replacement of assemblies that inspection and tests indicate would probably fail before the next scheduled periodic service.**

#### b. Preventive Maintenance Checks and Service Periods

The preventive maintenance checks and services for the multiplexer equipment and MCC unit are given m, f, g, and h below. These checks and services must be performed during the specified periods. Records and reports of the preventative maintenance checks and services must be made in accordance with requirements set forth in TM 38-750.

**WARNING**

Dangerous electrical potentials and currents are present within the equipment and associated cables. Failure to comply with this warning could result in injury or DEATH. Disconnect all power equipment before performing the procedures in c and d below.

#### c. Cleaning

- (1) The exterior and interior surfaces of the equipment should be free of dust, dirt, grease, and fungus.
- (2) Access to the interior of the multiplexer equipment cabinet is made by opening the front door and rear door.

**CAUTION**

- Be extremely careful not to disturb component lead dress or cause damage to components within the cabinet. Do not apply excessive pressure to any wiring harness or assembly mounted within the units.
- (3) Using a vacuum cleaner equipped with a plastic cleaning head and extension hose, carefully remove any accumulated dust and dirt from the equipment interior.

**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.

- (4) Use a dry, clean, lint-free cloth or brush to remove persistent dust or dirt. If necessary, moisten cloth with trichloroethane. After cleaning, wipe dry with a clean cloth.

**WARNING**

Compressed air is dangerous and can cause serious bodily harm. It can also cause mechanical damage to the equipment. Do not use compressed air to dry parts where trichloroethane has been used.

(b) Dry compressed air (not to exceed 60 pounds per square inch) may be used to remove dirt and dust from inaccessible places.

(6) Clean all panel switches and indicators using a soft, clean cloth. If dirt is difficult to remove, dampen the cloth with water. Mild soap may be used.

d. *Refinishing* Remove rust and corrosion from

e. *Daily Preventive Maintenance Checks and Services*

metal surfaces. Refer to applicable cleaning and refinishing practices specified in TB 43-0118

**NOTE**

The equipment must be kept in continuous operation, check and service only those items that can be checked and serviced without affecting operation.

Sequence No.	Item	Procedure	Reference
1	Completeness	<i>Required only for startup of equipment</i> Check to see that all equipments are complete	None.
2	Exterior surfaces	Clean exterior surfaces, including all controls and indicators.	Para 5-3c
3	Interior integrity	Open front and rear door of the multiplexer equipment. Inspect cabinet interior to make certain that the properly assigned complement of pc cards and components are installed, and that all items are secured properly in place.	None
4	Connectors and cables	Check seating, tightness, or clamping of all connectors, cables, and wires.	None

f. *Weekly Preventive Maintenance and Service*

Sequence

	Item	Procedure	Reference
1	Cables and connectors	Inspect cables and wires for chafed, cracked, or frayed insulation. Check connections on terminal boards. Replace connectors that are broken, arced, stripped, or excessively worn.	None.
2	Exterior surfaces	Inspect and clean exposed metal surfaces, touch up paint as required.	Para 5-3a, c and d

g. *Monthly Preventative Checks and Services*

Sequence No.	Item	Procedure	Reference
1	Terminal boards and connectors	Inspect terminal boards. Connections must be tight and there should be no evidence of dirt or corrosion.	None.
2	Interior of cabinet	Clean interior of cabinet. Touchup paint as required.	Para 5-3c and d
3	Publications	Check to see that all publications are complete, serviceable and current.	DA Pam 810-4
4	Modifications	Check DA Pam 310-7 to determine if new applicable MWO's must be applied immediately. All NORMAL MWO's must be scheduled.	TM 38-750 and DA Pam 310-7
5	Spare parts	Check all on-site spare parts for general condition and method for storage. There should be no evidence of overstock, and all shortages must be on valid requisitions.	None.

5-4. Corrective Maintenance

a. *General.* On-site corrective maintenance consists of those activities that can be accomplished by on-site personnel to restore a defective equipment to normal service. This activity normally includes localization of the fault to a specific component or printed circuit board and then repair of the equipment, by replacement of a component or through an adjustment.

b. *Maintenance Procedure.* When the specific trouble symptom is known, refer to the applicable troubleshooting procedures (para 5-6b) or applicable equip-

ment technical manual to isolate the fault to a component or pc card. When the fault is isolated, perform the applicable removal and replacement procedure or alignment and adjustment procedure indicated in the procedure. After it has been ascertained that the equipment has been returned to normal service, restore all equipment to its normal operating configuration.

5-5. Operational Test

a. *General.* The operational tests outlined in the chart below are designed to verify acceptable opera-

tion of the MCC unit. If the normal indication specified is not observed, refer to the applicable troubleshooting procedure Operational tests for the multi-

plexer equipment are included in the respective technical manuals of each equipment

b. MCC Unit Operational Test

Step No.	Test	Test procedure	Normal indication
<b>NOTE</b> Since the radio terminal box and relay box are located in separate buildings, landline communications must be established between the two locations to effectively perform the operational tests. All measurements will be taken at the relay box location.			
1	East call signal	<p>a. Open hinged door on relay box (fig 5-1).</p> <p>b. Connect positive lead of the volt-ohmmeter AN/USM-223 to terminal 3 on TB1 and the negative lead to terminal 3 on TB1</p> <p>c. Set volt-ohmmeter to read dc voltage</p> <p>d. Connect jumper wire between terminals 2 and 8 on TB1 and observe volt-ohmmeter reading and indications at the radio terminal box location.</p> <p>e. Remove jumper wire from terminals 2 and 8 on TB1 and observe volt-ohmmeter reading and indications at the radio terminal box location.</p>	<p>a. None</p> <p>b. None</p> <p>c. None</p> <p>d. <math>-24 \pm 4</math> vac and at the radio terminal box, the audible indicator is energized and the EAST CALL indicator is lighted.</p> <p>e. 0 vdc and at the radio terminal box, the audible indicator and EAST CALL indicator are extinguished.</p>
2	West call signal	<p>a. Disconnect the negative lead of the volt-ohmmeter from terminal 3 of TB1 and connect to terminal 7 of TB1</p> <p>b. Connect jumper wire between terminals 6 and 8 on TB1 and observe volt-ohmmeter reading and indications at the radio terminal box location</p> <p>c. Remove jumper wire from terminals 6 and 8 on TB1 and observe volt-ohmmeter reading and indications at the radio terminal box location.</p>	<p>a. None</p> <p>b. <math>-24 \pm 4</math> vdc and at the radio terminal, the audible indicator is energized and the WEST CALL indicator is lighted</p> <p>c. 0 vdc and at the radio terminal box the audible indicator and WEST CALL indicator are extinguished</p>
3	Signal east	<p>a. Disconnect negative lead of volt-ohmmeter from terminal 7 on TB1 and connect to terminal 9 on TB1</p> <p>b. Set volt-ohmmeter to read ohms and observe reading</p> <p>c. Depress EAST CALL button on the radio terminal box and observe volt-ohmmeter reading</p>	<p>a. None.</p> <p>b. Open circuit.</p> <p>c. Short circuit</p>
4	Signal west	<p>a. Remove negative lead of volt-ohmmeter from terminal 9 on TB1 and connect to terminal 4 on TB1 and observe reading</p> <p>b. Depress WEST CALL button on the radio terminal box and observe volt-ohmmeter reading</p> <p>c. Remove volt-ohmmeter leads from terminal points and close hinged door on relay box</p>	<p>a. Open circuit.</p> <p>b. Short circuit.</p> <p>c. None</p>

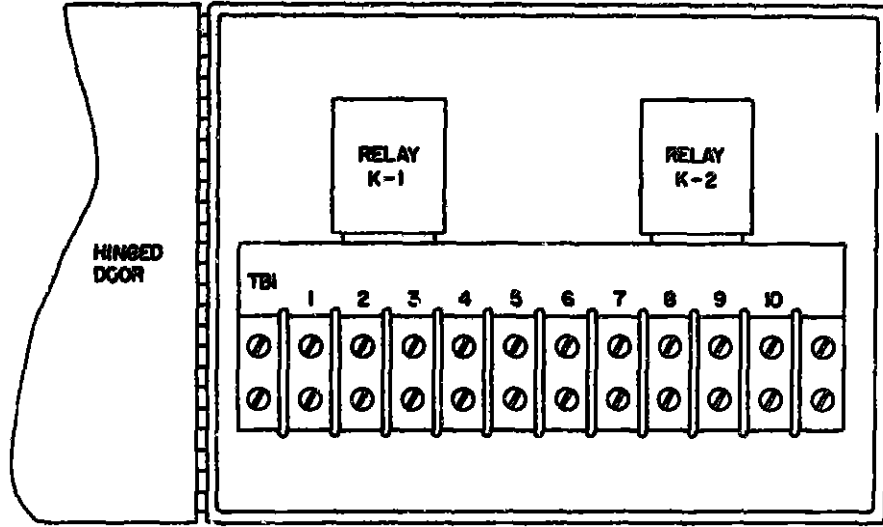
5-6. On-Site Troubleshooting Procedures

a. Multiplexer Equipment. The on-site troubleshooting procedures for the multiplexer equipment are contained in the equipment manuals provided with the equipment. For performing continuity checks and signal tracing between equipments in the electronic equipment cabinet, refer to figure FO-2. Both configurations of the multiplexer equipment utilize the same

connection with one exception. Multiplexer 2 does not contain the T1WB1 multiplexer equipment connection

b. MCC Unit. The on-site troubleshooting procedures for the MCC unit are given in the troubleshooting chart in d below. The chart provides only those corrective measures which can be performed on-site

c. Procedure. Locate the apparent probable trouble



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Figure 5-1 Relay Box

Use the troubleshooting chart below and then take the corrective action. After completion of correction, repeat the applicable operational test procedure to verify proper operation of the replacement

item Before performing the corrective action listed for a particular malfunction inspect all wiring and connections that affect the problem area.

d. MCC Unit Troubleshooting Chart

Item No	Malfunction	Probable trouble	Corrective action
		<p><b>NOTE:</b>                      Since the radio terminal box and relay box are located in separate buildings, landline communications must be established between the two locations to effectively perform troubleshooting procedures.</p>	
1	No east call signal	<p>a. Faulty connection at TB1-3 of the radio terminal box or at TB1-3 of the relay box.                      b. No input voltage at TB1-5 on the relay box.                      c. Defective Zener diode CR3                       d. Faulty indicators DS1 and DS2 located on radio terminal box.                      e. Defective relay K1</p>	<p>a. Check and repair connection.                       b. Check input - 48 vdc source and repair                      c. Check voltage level (-24 ± 4 vdc) at pin 6 of relay K1 on relay box and replace CR3 if not in tolerance                      d. Replace audible indicator DS1 or indicator DS2 (Refer to figure 5-1 for location.)                      e. Replace defective relay K1 in the relay box</p>
2	No west call signal	<p>a. Faulty connection at TB1 7 of the radio terminal box or at TB1 7 of the relay box                      b. No faulty input voltage at TB1-5 on the relay box                      c. Defective Zener diode CR3                       d. Faulty indicators DS1 and DS2 located on radio terminal box                      e. Defective relay K2</p>	<p>a. Check and repair connection                       b. Check input - 48 vdc source and repair                       c. Check voltage level (-24 ± 4 vdc) at pin 6 of relay K1 on relay box and replace CR3 if not in tolerance                      d. Replace audible indicator DS1 or indicator DS2                      e. Replace defective relay K2 in the relay box (Refer to figure 5-1 for location.)</p>
3	Unable to signal east	<p>a. Faulty connection between TB1-9 on the radio terminal box and TB1-9 on the relay box                      b. Defective pushbutton switch S1 on radio terminal box.</p>	<p>a. Check and repair connection                       b. Replace defective switch S1</p>
4	Unable to signal west	<p>a. Faulty connection between TB1-4 on the radio terminal box and TB1-4 on the relay box</p>	<p>a. Check and repair connection</p>

d. MCC Unit Troubleshooting Chart - Continued

Item No.	Malfunction	Probable trouble	Corrective action
		b Defective pushbutton switch S2 on radio terminal box.	b Replace defective switch S2

5-7. Removal and Replacement Procedures

C A U T I O N

Before performing any removal or replacement procedures within the multiplexer equipment or MCC unit always be certain to deenergize the equipment

a. Multiplexer Equipment. Refer to the applicable technical manuals provided with each equipment for the removal and replacement procedures. These manuals provide coverage for the T1-4000 multiplexer, T1WB1 multiplexer and the protect switch

b. MCC Unit. Removal and replacement procedures for components and assemblies of the MCC unit which

are obvious have been omitted. The physical location of these components and assemblies may be located by reference to the parts location diagram given in figure

5-8. Alignment and Adjustment

Alignment and adjustment procedures for the multiplexer equipment are contained in the equipment technical manuals provided with each equipment. The MCC unit requires no alignment or adjustments.

5-9. On-site Maintenance

Off-site maintenance consists of returning defective printed circuit boards to the depot maintenance facility for refurbishment and replacement

APPENDIX A

REFERENCES

DA Pam 310-4	<b>Index of Technical Manuals, Technical Bulletins, Supply Manuals (Types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.</b>
DA Pam 310-7	<b>US Army Index of Modification Work Orders.</b>
SB 38-100	<b>Preservation, Packaging, Packing, and Marking Materials, Supplies, and Equipment Used by the Army</b>
TB 43-0118	<b>Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.</b>
TM 38-750	<b>The Army Maintenance Management System (TAMMS)</b>
TM 740-90-1	<b>Administrative Storage of Equipment.</b>
TM 750-244-2	<b>Procedures for Destruction of Electronic Materiel to Prevent Enemy Use (Electronics Command)</b>

APPENDIX B

OPERATOR'S, ORGANIZATIONAL. DIRECT SUPPORT,  
 MAINTENANCE REPAIR PARTS  
 AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

B-1. Scope

This appendix lists repair parts required for operation and performances of organizational and direct support maintenance of the OB-79(V)1/FSC, the OB-79(V)2/FSC, and the MCC Extension Unit

B-2. General

This Basic Issue Items, Items Troop Installed or Authorized, Repair Parts and Special Tools List is divided into the following sections

- a. Section II Basic Issue *Items List* Not applicable
- b. *Section III Items Troop Installed or Authorized List* Not applicable
- c. *Sections IV, VII, and X 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
- d. *Sections V, VIII and XI Special Tools List* Not applicable
- e. *Section VI, IX, and XII 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)*

(1) *Same 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 held for anticipated or known usage

<i>Code</i>	<i>Definition</i>
PD-	Support item, excluding support equipment. procured for initial issue or outfitting and stocked only for subsequent or additional initial uses or outfittings Not subject to automatic replenishments
XA-	Item is not procured or stocked because the requirements for the item will result in the replacement of the next higher assembly

NOTE

Cannibalization or salvage may be used as a source of supply for any items source-coded above, except those coded XA, XD, and aircraft support items as restricted by AB 700-42

(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

<i>Code</i>	<i>Application/Explanation</i>
O-	Support item is removed, replaced, used at the organizational level
F-	Support item is removed, replaced, used at the direct 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 the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (ie, all authorized maintenance functions) This position will contain one of the following maintenance codes.*

<i>Code</i>	<i>Application/Explanation</i>
O-	The lowest maintenance level capable of complete repair of the support item is the organizational



<i>Code</i>	<i>Application/Explanation</i>
	level
<b>F</b> —	The lowest maintenance level capable of complete repair of the support item is the direct support level
<b>Z</b> —	Nonreparable No repair is authorized
	(3) <i>Recoverability code</i> Recoverability codes are assigned to support items to indicate the disposition action on unserviceable items. The recoverability code is entered in the fifth position of the Uniform SMR Code format as follows.
	<i>Recoverability Codes</i>
	<i>Definition</i>
<b>Z</b> —	Nonreparable item When unserviceable, condemn and dispose at the level indicated in position 3
<b>D</b> —	Reparable item When beyond lower level repair capability, return to depot Condemnation and disposal not authorized below depot level
	<i>c National Stock Number</i> Indicates the National stock number assigned to the item and will be used for requisitioning purposes.
	<i>d Part Number</i> 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 measures 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 (i.e shims, spacers, etc.)

B-4. Special Information

*a Usable on codes* are shown in the description column Uncoded items are applicable to all models. Identification of the usable on codes used in this publication are

<i>Code</i>	<i>Used On</i>
<b>CQA</b>	OB-79(V)1/FSC
<b>CQB</b>	OB-79(V)2/FSC

*b. National stock numbers (NSN's)* that are missing from sections IV and X have been applied for and will be added to this TM by future Change/Revision when they are entered in the Army Master Data File (AMDF) Until the NSN's are established and published, submit exception requisitions to Commander, US Army Electronics Command, ATTN DRSEL-M, Fort Monmouth, NJ 07703 for the items required

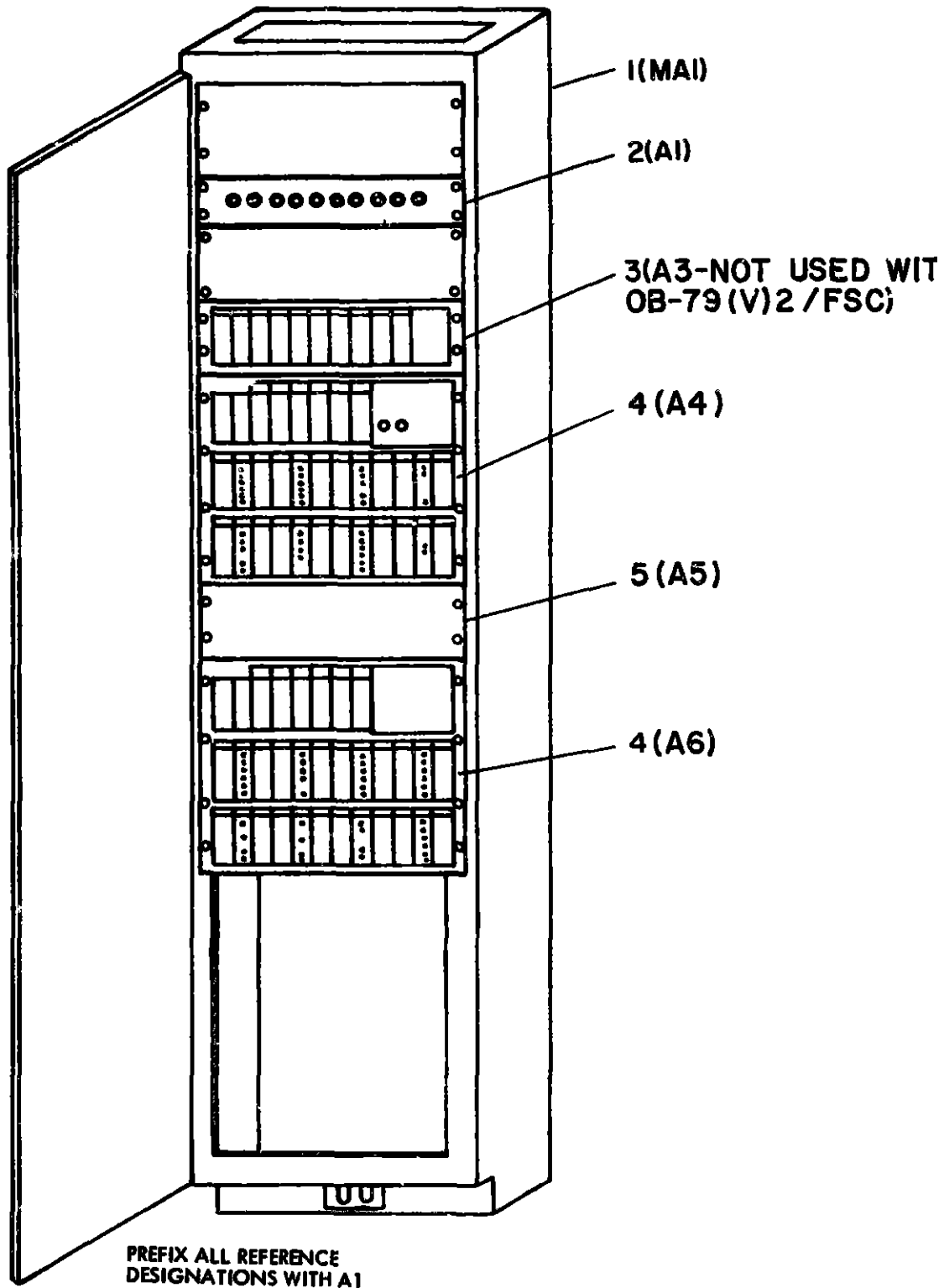
B-5. How to Locate Repair Parts

No National Stock Number or Part Number index is supplied To locate a repair part, scrutinize the repair parts lists until the part is identified

B-6. Abbreviations

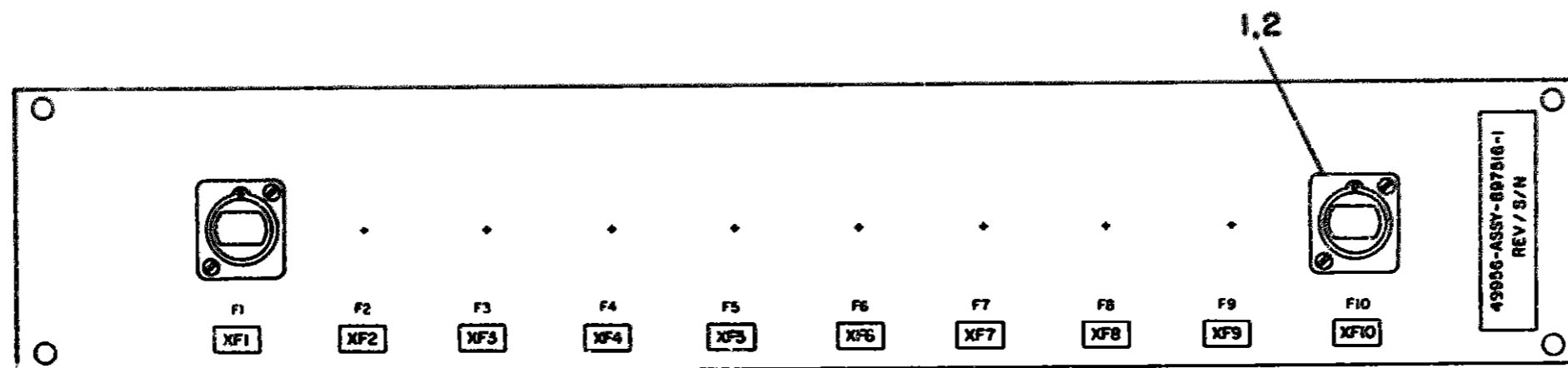
(Not applicable)

(Next printed is B-4.1)



EL5805-686-14-TM-20

Figure B-1 Multiplexer groups OB-79(V)1/FSC and OB-79(V)2/FSC



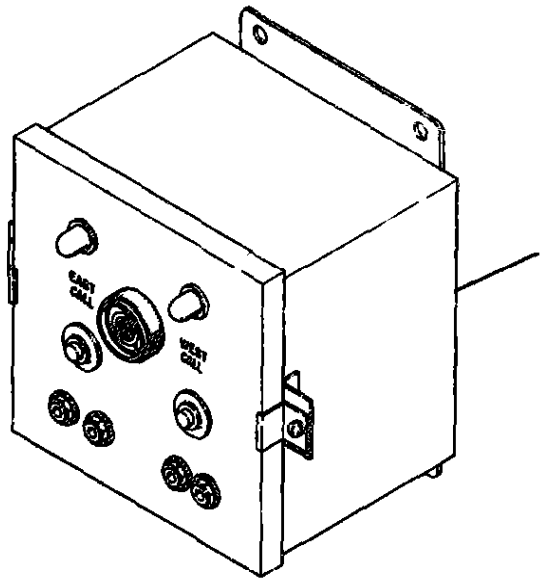
**PREFIX ALL REFERENCE  
DESIGNATIONS WITH A1A1**

**EL5805-686-14-TM-21**

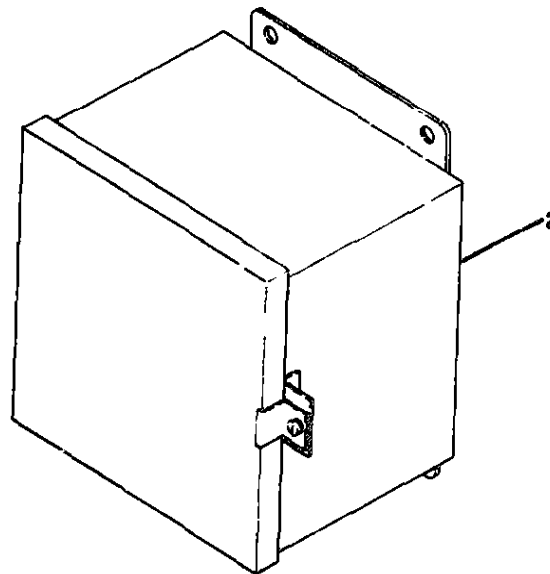
**Figure B-2. Fuse Assembly**

SECTION IV REPAIR PARTS LIST (OB-79(V)1.7BC AND OB-79(V)2/F8C)

(1) ILLUSTRATION		(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
(A) FIG NO.	(B) ITEM NO.								
						GROUP 00 MULTIPLEXER GROUP OB-79(V)1/F8C AND OB-79(V)2/F8C			
B-1	1	IAOZZ		713412-1	49956	RACK ELECTRICAL EQUIPMENT		EA	1
B-1	2	PDOOD		897516-1	49956	FUSE ASSEMBLY		EA	1
B-1	3	PDOOD		4008-002 with 4100-02	81349	EIGHT PORT MIX ASSEMBLY WITH CHANNEL GROUP (GFE)		EA	2
B-1	4	F'COOL		4030-02	81349	PROTECT SWITCH ASSEMBLY (GFE)		EA	1
B-1	5	PDOOD		5201-01	81349	WIDE BAND DATA TERMINAL (GFE) (NOT USED WITH OB-79(V)2/F8C)	CQA	EA	1
						GROUP 02 FUSE ASSEMBLY			
B-2	1	PAOZZ	5920-00-010-6652	PO2A250V3A	81349	FUSE CARTRIDGE		EA	10
B-2	2	PAFZZ	5920-00-054-2192	PHL30G4	81349	FUSE HOLDER		EA	10



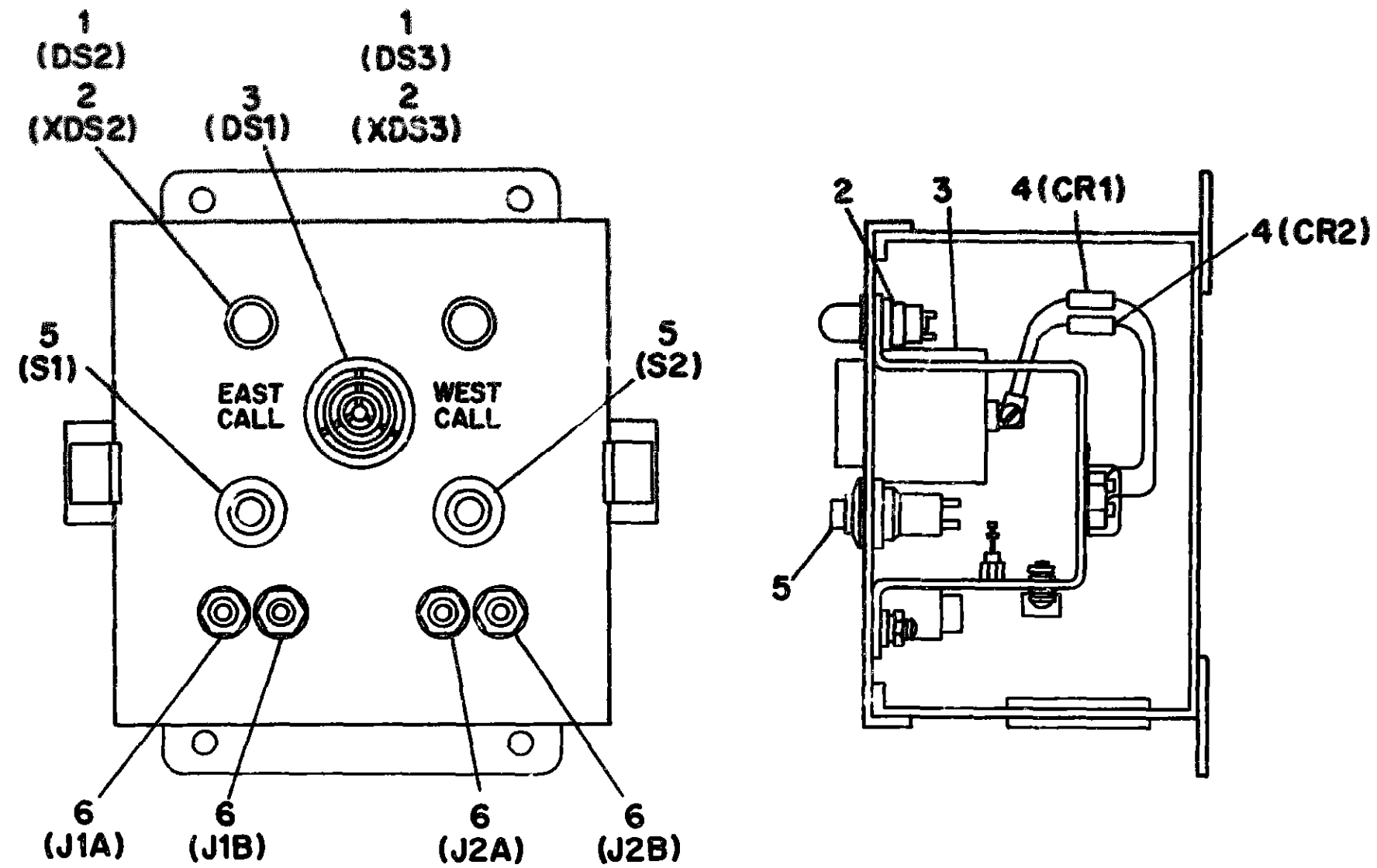
**RADIO TERMINAL BOX**



**RELAY BOX**

EL5805-686-14-TM-23

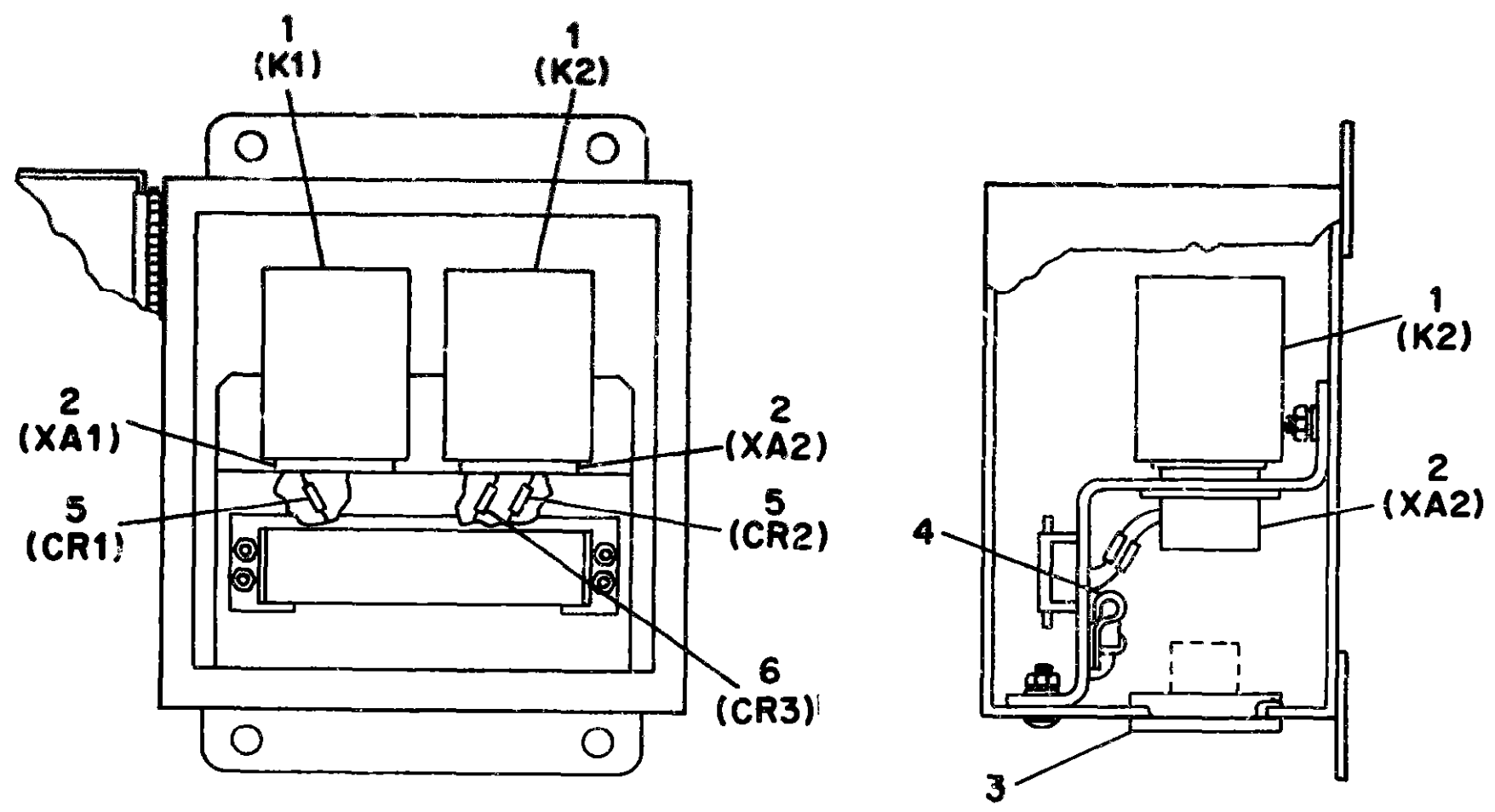
Figure B-3. MCC extension unit



PREFIX ALL REFERENCE DESIGNATIONS WITH A1

EL5805-686-14-TM-24

Figure B-4. Radio terminal assembly box



PREFIX ALL REFERENCE DESIGNATIONS WITH A2

EL5805-686-14-TM-25

Figure B-5. Relay assembly box

SECTION X REPAIR PARTS LIST (HCC EXTENSION UNIT)

(1) ILLUSTRATION		(2) SABR CODE	(3) NATIONAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION	USABLE CW CODE	(7) UNIT OF MEAS	(8) QTY ISSC IN UNIT
(A) FIG NO.	(B) ITEM NO.								
GROUP 00 HCC EXTENSION UNIT									
B-1	1	PCOOD		898230-1	49956	BOX RADIO TERMINAL ASSEMBLY		EA	1
B-3	2	PCOOD		898225-1	49956	RELAY ASSEMBLY BOX		EA	1
GROUP 01 RADIO TERMINAL ASSEMBLY BOX									
B-4	1	PAOZZ		MS25237-387	96906	LAMP INCANDESCENT		EA	2
B-4	2	PAOZZ	6210-00-682-9833	MS25256-6	96906	LIGHT INDICATOR		EA	2
B-4	3	PAOZZ	6350-00-071-2492	8C628P	76055	SONALERT		EA	1
B-4	4	PAOZZ	5961-00-957-6865	IN4003	81349	SEMICONDUCTOR DEVICE DIODE		EA	2
B-4	5	PAOZZ		MS25089-1C	96906	SWITCH PUSH		EA	2
B-4	6	PAOZZ	5935- -9 - 3817	H111	82389	JACK TELEPHONE		EA	4
GROUP 02 RELAY ASSEMBLY BOX									
B-5	1	PAOZZ		ER482C27	71462	RELAY TELEPHONE TYPE		EA	2
B-5	2	PAOZZ	5935-00-933-8462	77M1P8	02660	SOCKET RELAY		EA	2
B-5	3	PAOZZ	5325-00-027-0322	MS2166-3M	96906	GROMMET		EA	
B-5	4	PAOZZ	5340-00-726-9819	MS21919DG3	96906	CLAMP CABLE		EA	2
B-5	5	PAOZZ	5961-00-957-6865	IN4003	81349	SEMICONDUCTOR DEVICE DIODE		EA	2
B-5	6	PAOZZ		IN5361A	81349	SEMICONDUCTOR DEVICE DIODE		EA	1



## A P P E N D I X C

## M A I N T E N A N C E A L L O C A T I O N

## Section I. INTRODUCTION

## C - 1 . G e n e r a l

This appendix provides a summary of the maintenance operations for OB-79(V)1/FSC and OB-79(V)2/FSC and Maintenance Coordination Circuit Extension Unit. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

## C-2. Maintenance Functions

Maintenance functions will be limited to and defined as follows.

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

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

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

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

*e Align* To adjust specified variable elements of an item to about optimum or desired performance

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

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

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

*i. Repair* The application of maintenance services

(inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module/component/assembly, end item or system. This function does not include the trial and error replacement of running spare type items such as fuses, lamps, or electron tubes

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

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

## C-3. Columns Entries

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

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

*c Column 3, Maintenance Function* Column 3 lists the functions to be performed on the item listed in column 3 When items are listed without maintenance functions it is solely for the purpose of having the Group Numbers in the MAC and RPSTL coincide

*d Column 4, Maintenance Category* Column 4 specifies by listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3 This figure represents the active time required to perform that maintenance function at the indicated

category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different maintenance categories, appropriate "worktime" figures will be shown for each category. The number of manhours specified by the "worktime" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time and quality assurance/quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart.

Subcolumns of Column 4 are as follows.

- C—Operator/Crew
- O—Organizational
- F—Direct Support
- H—General Support
- D—Depot

e Column 5, Tools and Equipment Column 5 specifies by code, those common tool sets (not individual tools) and special tools, test, and support

equipment required to perform the designated function.

#### C-4. Tool and Test Equipment Requirements (Table 1)

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

b. *Maintenance Category* The codes in this column indicate the maintenance category allocated the tool or test equipment.

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

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

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

(Next printed page is C-3)

SECTION II MAINTENANCE ALLOCATION CHART  
FOR  
MULTIPLIER GROUP, (OB-79(V)1/FSC and OB-79(V)2/FSC)

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
00	MULTIPLIER GROUP, OB-79(V)1/FSC and OB-79(V)2/FSC (A-1)	Inspect Test Repair		03 05 01				
01	Cabinet, Electrical Equipment (A1A1)							
02	Fuse Assembly (A1A1)	Test 2 Repair		02 03				
03	Eight Port MIX Assembly with Channel Group (A1A4, A1A6)	3						
04	Protect Switch Assembly (A1A5)	4						
05	WEL Terminal Assembly (A1A3) (Not used with OB-79(V)2/FSC)	5						

- (1) Maintenance Operations for unmanned sites will be performed by (F) level personnel
- (2) By replacement of individual fuse assemblies
- (3) See VICOM Bulletin PSB 6003 and 6004 for maintenance instructions
- (4) See VICOM Bulletin PSB 6019 and 6019 for maintenance instructions
- (5) See VICOM Bulletin PSB 6002 and 6005 for maintenance instructions

SECTION IV MAINTENANCE ALLOCATION CHART  
FOR  
MCC EXTENSION UNIT

(1) GROUP NUMBER	(2) COMPONENT, ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
0 0	MCC EXTENSION UNIT	Inspect Test		0.1 0.3				1 2, 4
0 1	Radio Terminal Assembly Box (A1)	Repair		0.3				3
0 2	Relay Assembly Box (A2)	Repair		0.3				3

(1) Maintenance Operations for unmanned sites will be performed by (F) level personnel.

TABLE 1 TOOL AND TEST EQUIPMENT REQUIREMENTS  
 FOR  
 MULTIPLEXER GROUP OB-79(V)1/FSC & OB-79(V)2/FSC  
 AND MCC EXTENSION UNIT

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O	VOLT-OHM METER AN/USM-223	6625-00-999-7465	
2	O	TEST LEADS POMONA 1986-48, R & B		
3	O	TOOL KIT TK-105/G	5180-00-610-8177	
4	O	JUMPER WIRE POMONA 1236-12		

RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL MANUALS



**SOMETHING WRONG WITH THIS MANUAL!**

THEN JOT DOWN THE DOPE ABOUT IT ON THIS FORM TEAR IT OUT FOLD IT AND DROP IT IN THE MAIL!

FROM: (YOUR UNIT'S COMPLETE ADDRESS)  
 Commander  
 Stateside Army Depot  
 ATTN: AMSTA-US  
 Stateside, N.J. 0703

DATE 10 July 1975

PUBLICATION NUMBER: TM 11-5840-340-12      DATE: 23 Jan 74      TITLE: Radar Set AN/SPC-76

BE EXACT. PIN-POINT WHERE IT IS				IN THIS SPACE TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT:
PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.	
2-25	2-28			<p>Recommend that the installat on antenna alignment procedure be changed througho to specify a 2° IFF antenna lag rather than 1°</p> <p>REASON Experience has shown that with only a 1° lag, the antenna servo system is too sensitive to wind gusting in excess of 20 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</p>
3-10	3-3		3-1	<p>Item 5, Function column Change "2 db" to "3db "</p> <p>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</p>
5-6	5-8			<p>Add new step f 1 to read, "Replace cover plate removed in step e 1, above "</p> <p>REASON To replace the cover plate</p>
		FO3		<p>Zone C 3 On J1-2 change "+24 VDC to "+5 VDC "</p> <p>REASON This is the output line of the 5 VDC power supply + 24 VDC is the input voltage</p>

TEAR ALONG DOTTED LINE

TYPED NAME GRADE OR TITLE AND TELEPHONE NUMBER: SSG I. M. DeSpirito 999-1776      SIGN HERE: *SSG I. M. DeSpirito*



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PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.
----------	------------	------------	-----------

TEAR ALONG DOTTED LINE

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DA FORM 1 AUG 74 2028-2 (TEST)

P S --IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR MANUAL FIND, MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS

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*General, United States Army*  
*Chief of Staff*

**Official:**

**J. C PENNINGTON**  
*Brigadier General, United States Army*  
*The Adjutant General*

**Distribution.**

**Active Army**

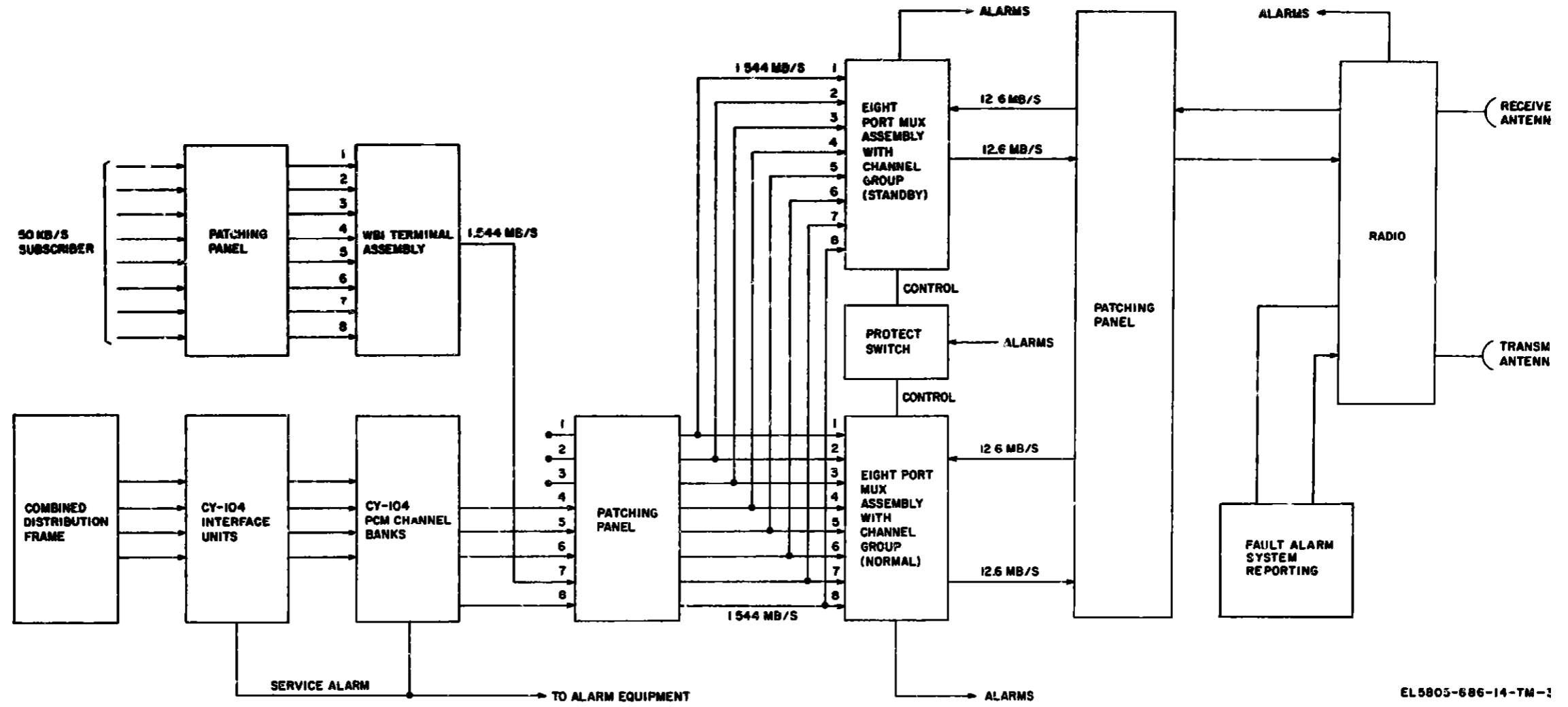
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DARCOM (1)  
TRADOC (1)  
OS Maj Cmd (3)  
USACC (10)  
USACC-PAC (2)  
USACC-EUR (50)  
USACC-SO (2)  
7th Sig Cmd (5)  
USAICS (2)  
HISA (Ft Monmouth) (33)  
SAAD (10)  
TOAD (10)  
LBAD (5)

USA Dep (Europe) (2) Except  
Pirmasens (4)  
MAAG (Europe) (1)  
7th Sig Bde-USACC-Europe (2)  
Units org under fol TOE.  
(1 copy each unit)  
11-87  
11-98  
11-117  
11-127  
11-302  
11-500(AA-AC)  
29-134  
29-136

**NG None**

**USAR. None**

**For explanation of abbreviations used see AR 310-50**



EL5805-686-14-TM-1

Figure FO-1 *Typical System Application Diagram*

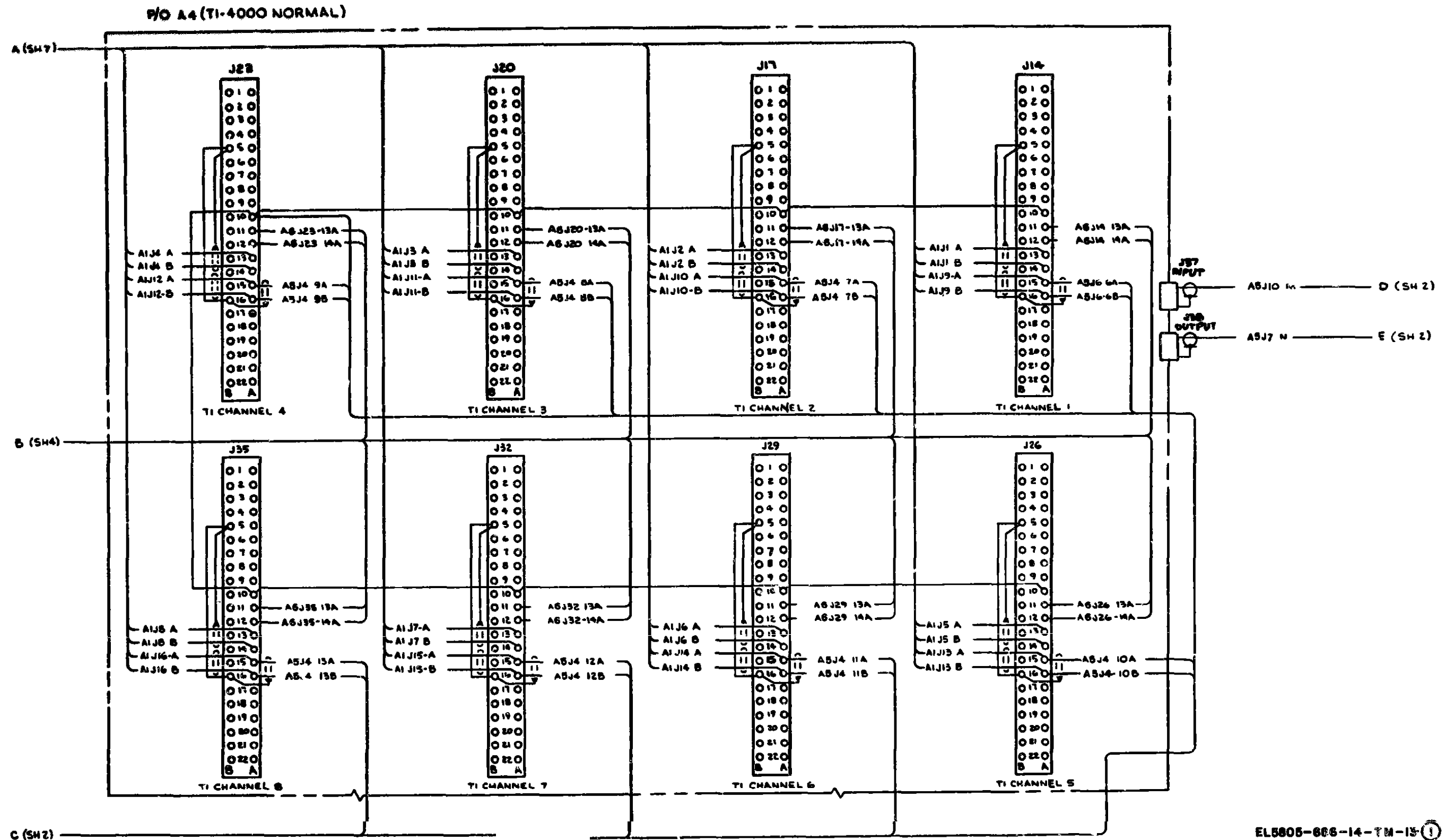
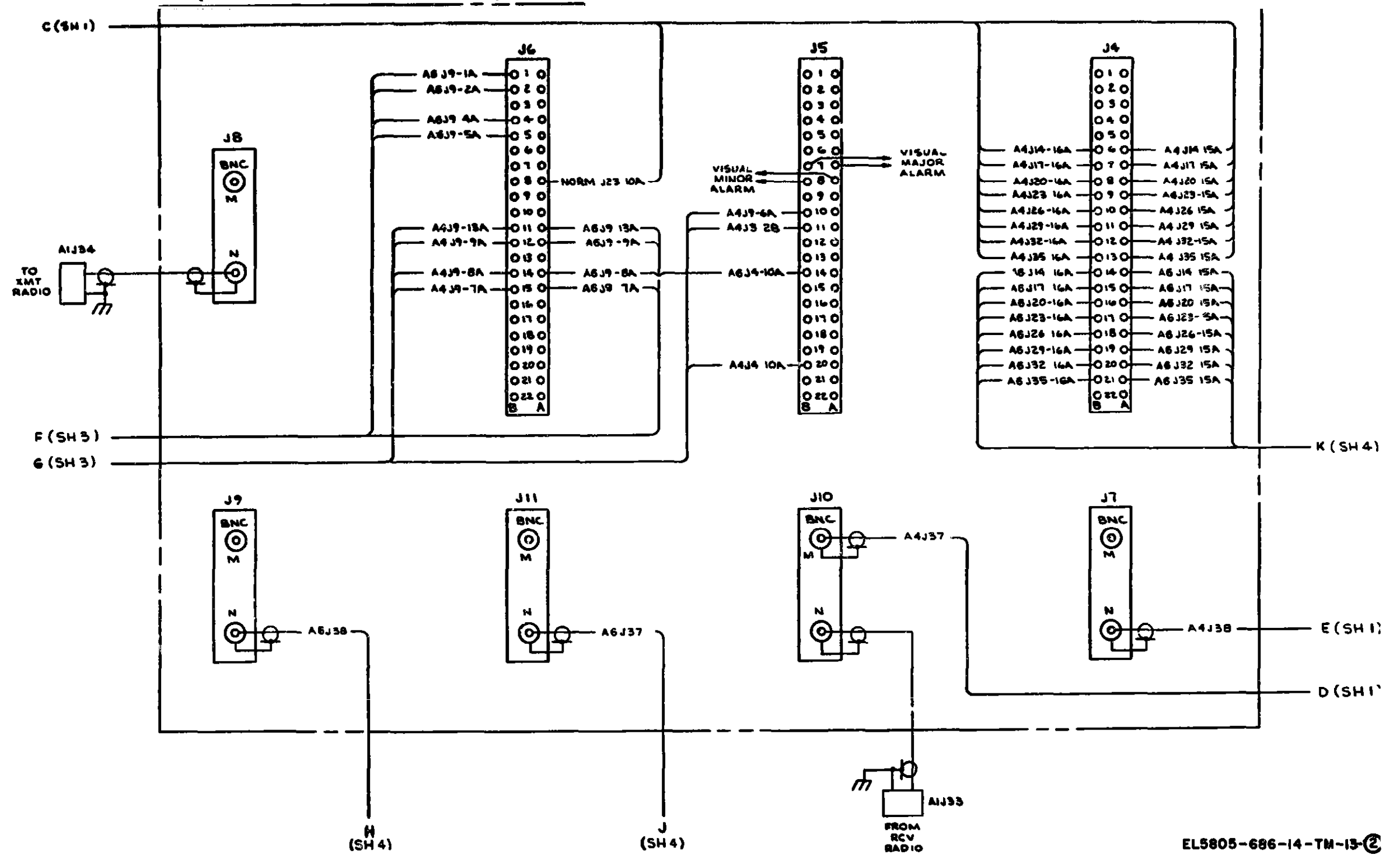


Figure FO-2) System Interconnection Diagram (sheet 1 of 8)

**A5  
(TI-4000 PROTECTION SWITCH)**

TM 11-5805-686-14 & P



EL5805-686-14-TM-13-2

Figure FO-2(2) System Interconnection Diagram (sheet 2 of 8)

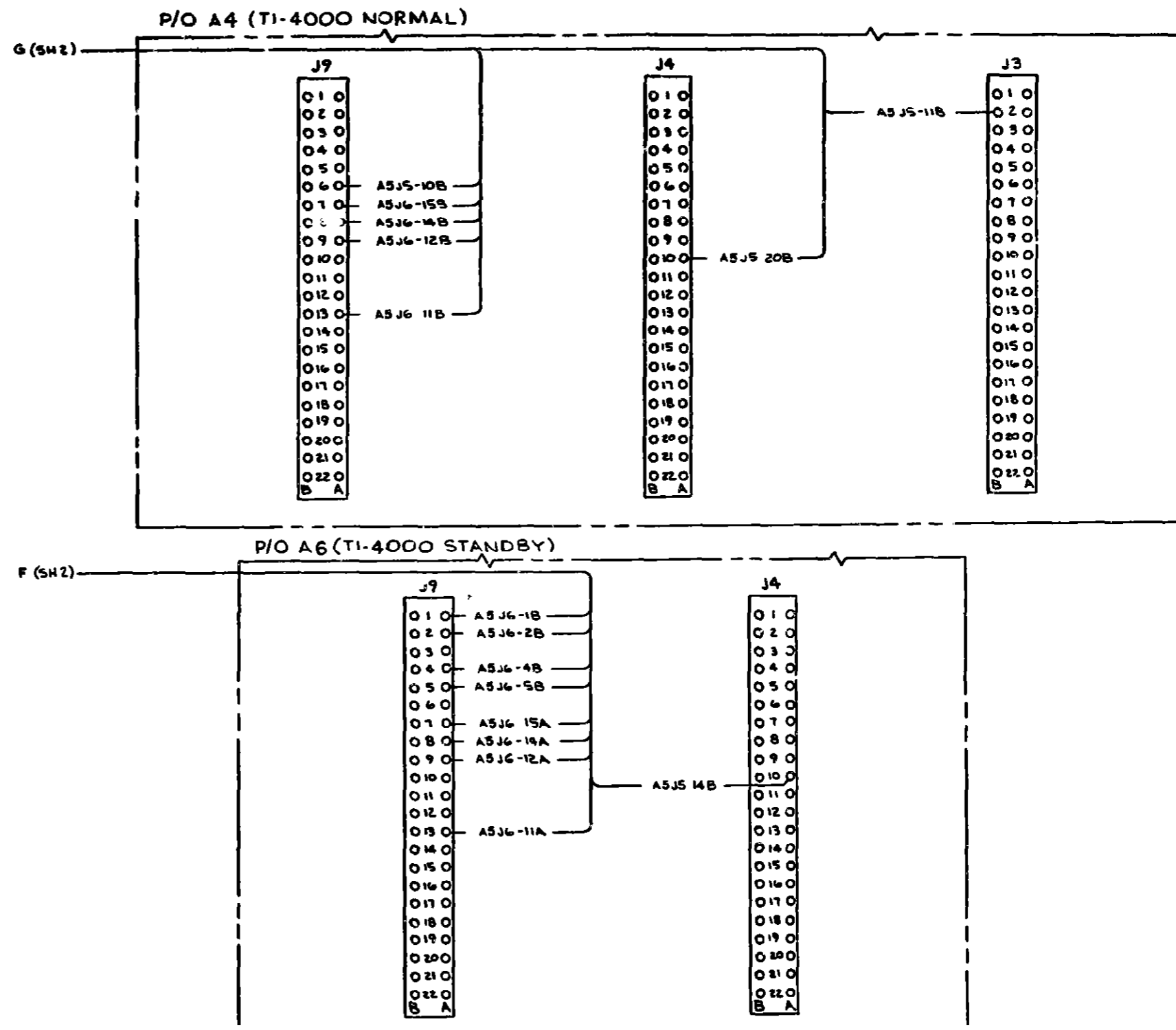


Figure FO-2.③ System Interconnection Diagram (sheet 3 of 8)

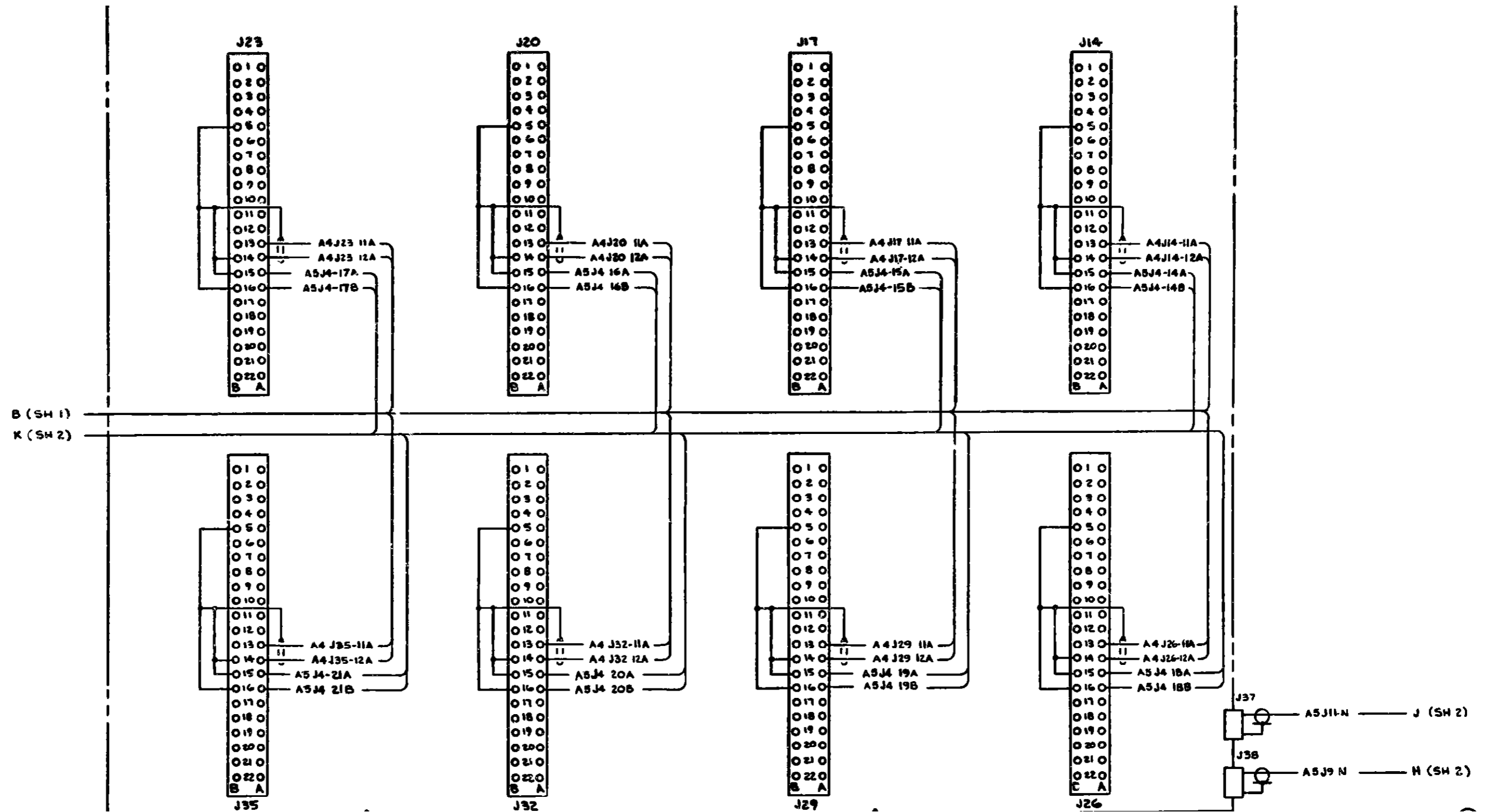


Figure FO-2 ④ System Interconnection Diagram (sheet 4 of 8).



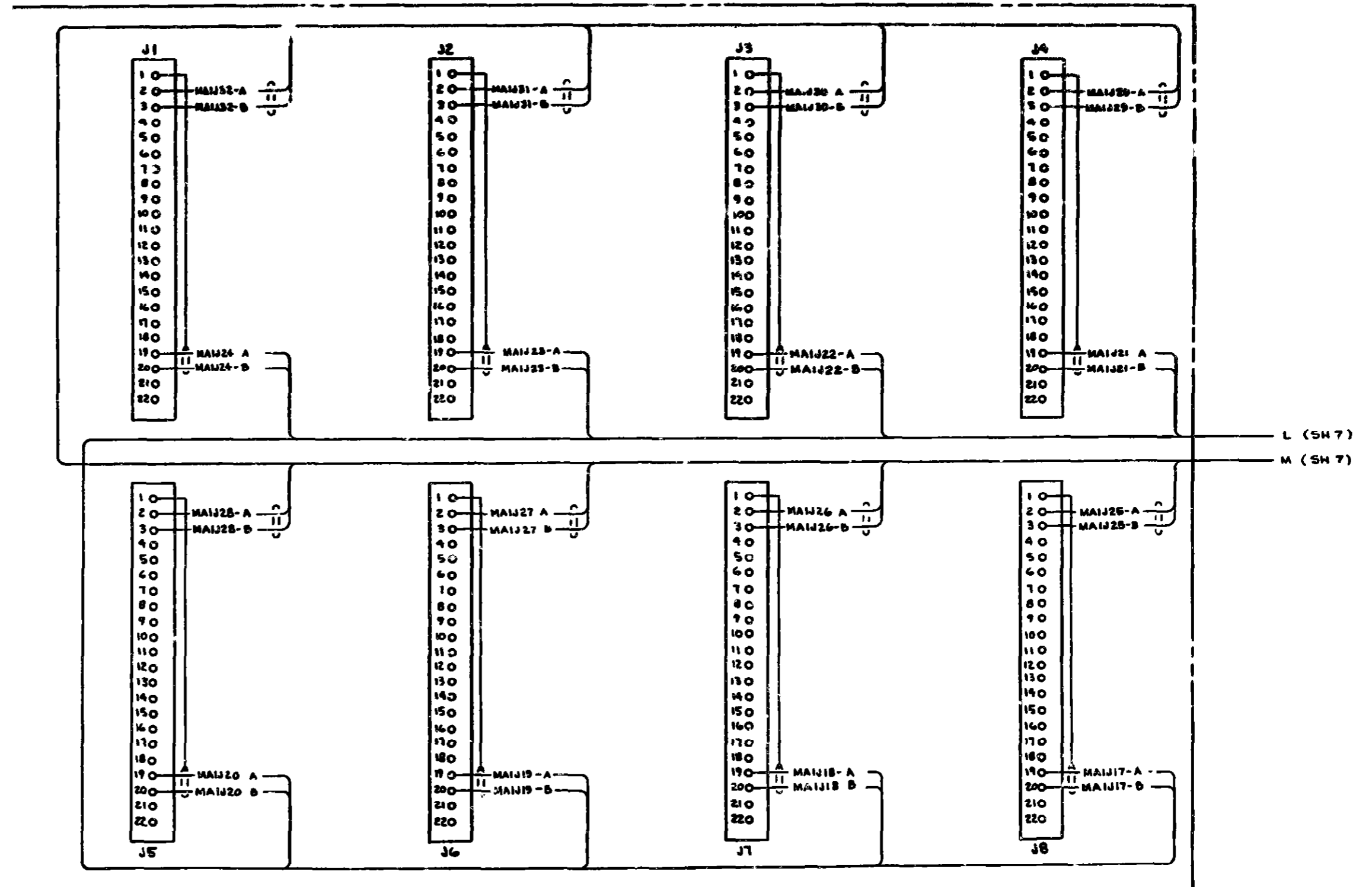
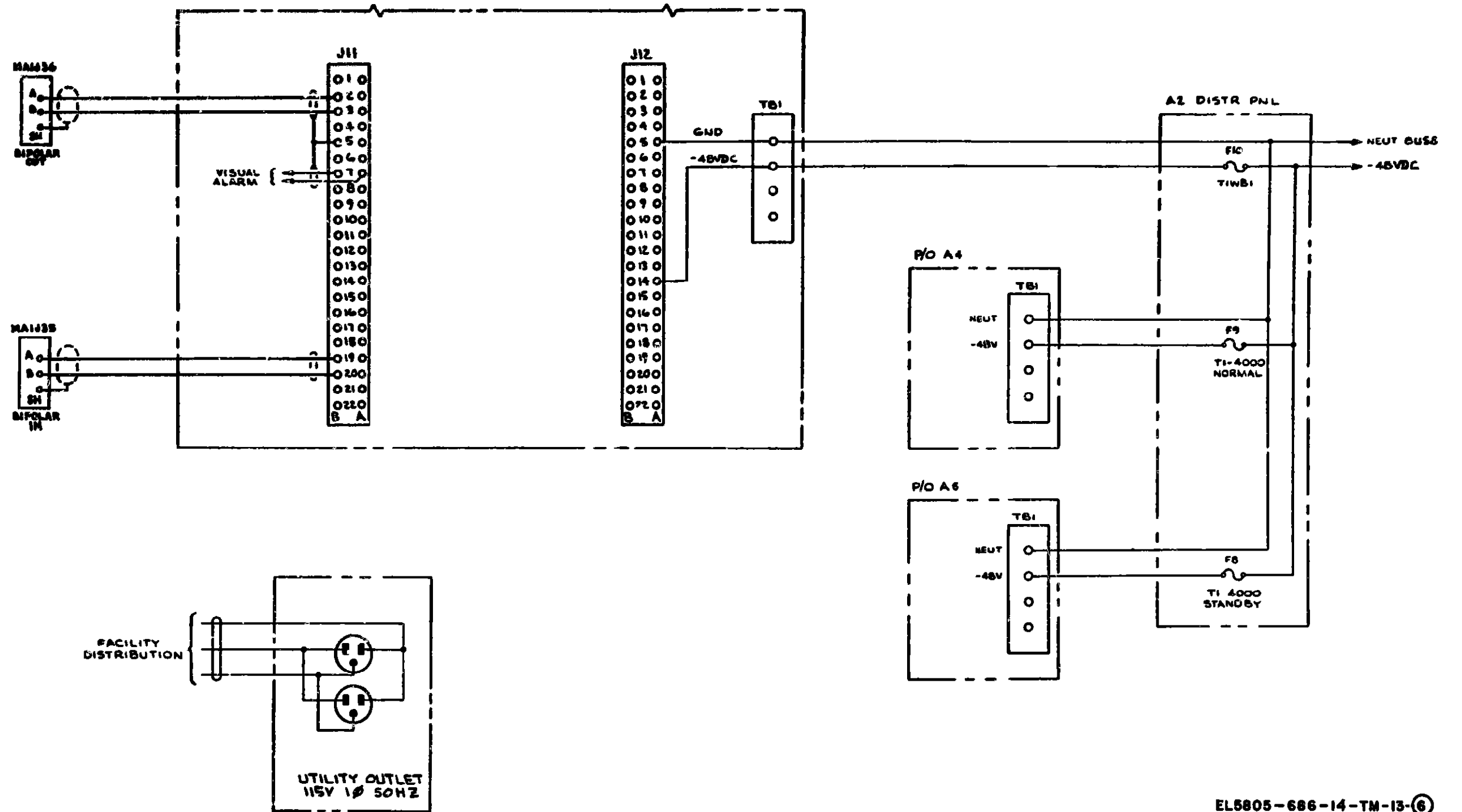


Figure FO-2 ⑤ System Interconnection Diagram (sheet 5 off 8).



EL5805-686-14-TM-13-6

Figure FO-2(6) System Interconnection Diagram (sheet 6 of 8)

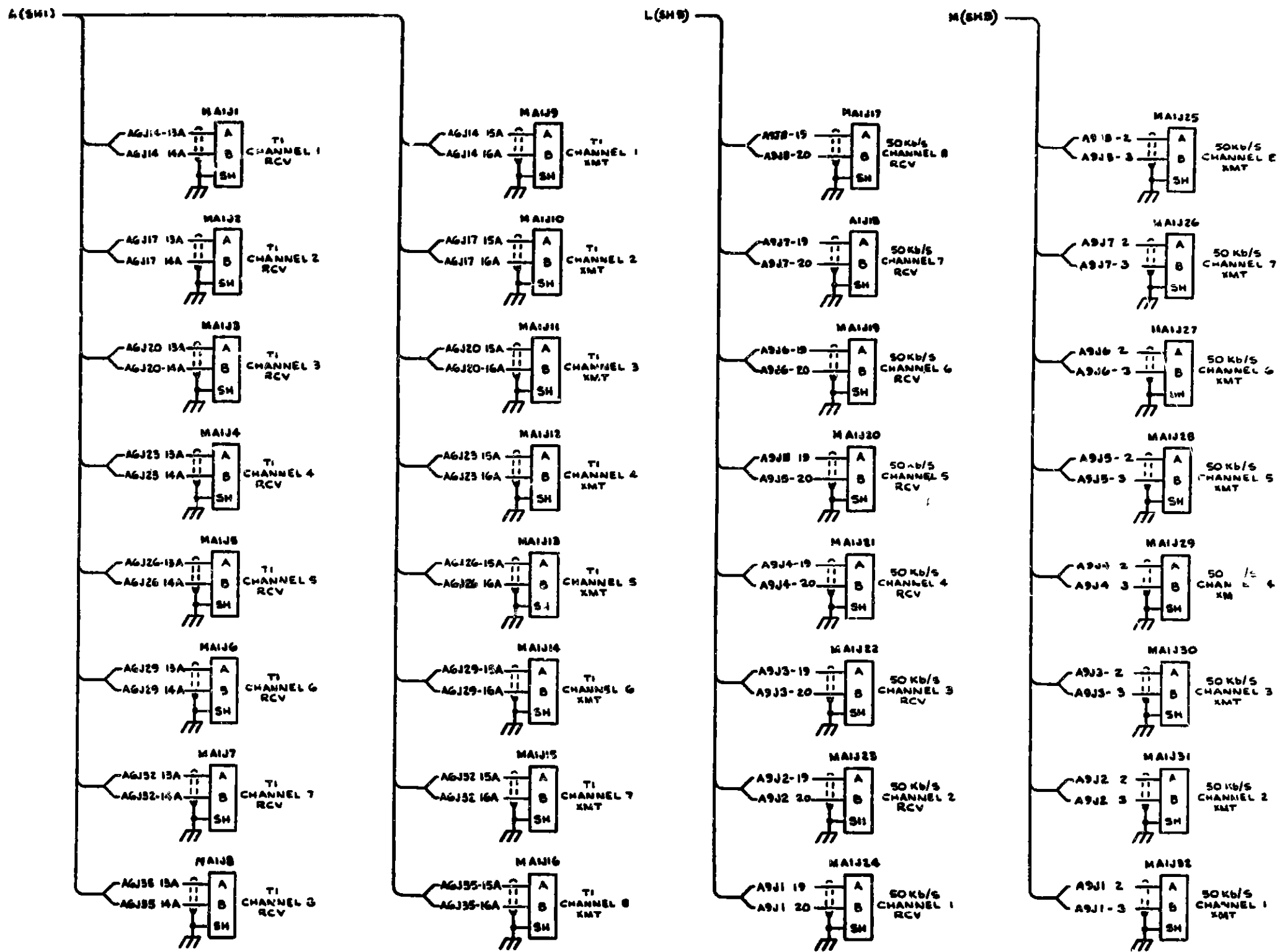
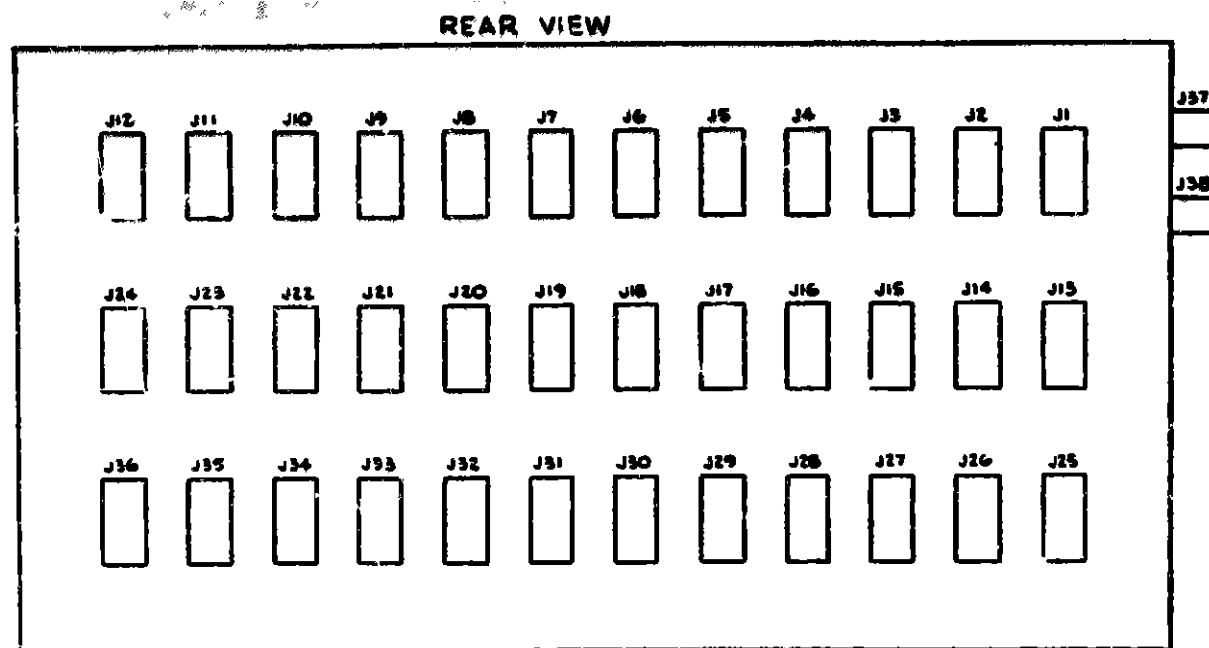
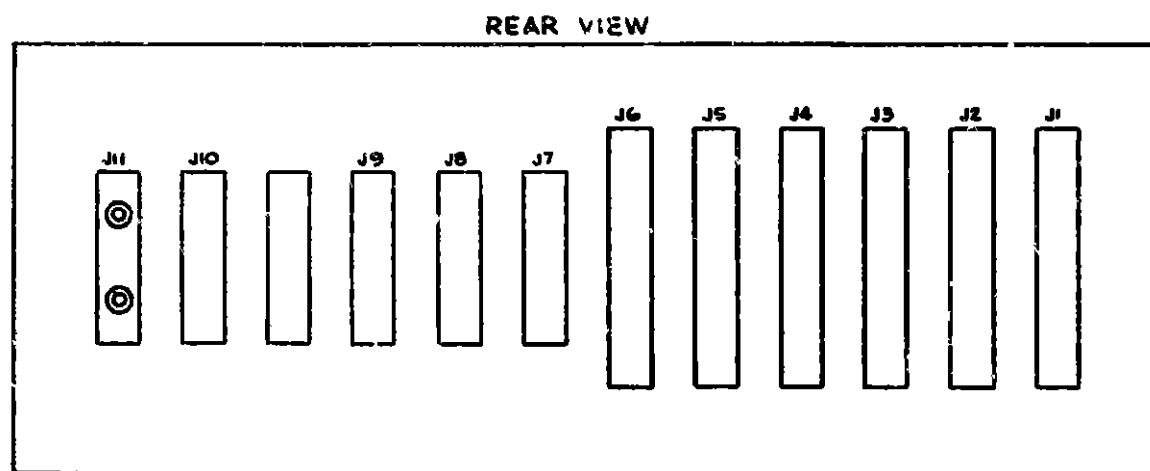


Figure FO-2. ① System Interconnection Diagram (sheet 7 of 8)

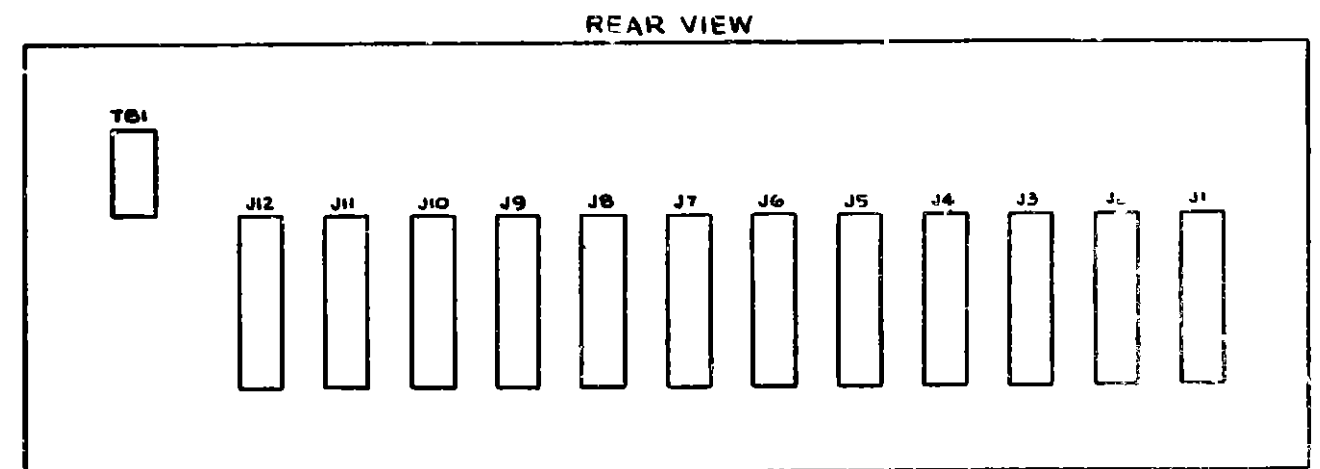


**WIRING DIAGRAM FOR  
TI-4000  
(NORMAL & STANDBY)**

TM 11-5805-686-14 & P



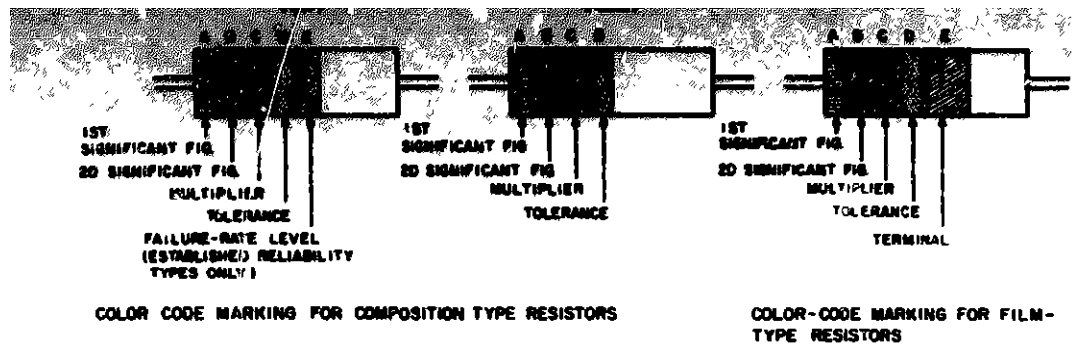
**WIRING DIAGRAM FOR**



**WIRING DIAGRAM FOR**

EL5805-686-14-TM-13-78

Figure FO-2. *System Interconnection Diagram (Sheet 8 of 8).*



**TABLE 1  
COLOR CODE FOR COMPOSITION TYPE AND FILM TYPE RESISTORS**

BAND A		BAND B		BAND C		BAND D		BAND E	
COLOR	FIRST SIGNIFICANT FIGURE	COLOR	SECOND SIGNIFICANT FIGURE	COLOR	MULTIPLIER	COLOR	RESISTANCE TOLERANCE (PERCENT)	COLOR	FAILURE RATE LEVEL
BLACK	0	BLACK	0	BLACK	1			BROWN	M 10
BROWN	1	BROWN	1	BROWN	10			RED	P 01
RED	2	RED	2	RED	100			ORANGE	R 001
ORANGE	3	ORANGE	3	ORANGE	1,000	SILVER	±10 (COMP TYPE ONLY)	YELLOW	S 0001
YELLOW	4	YELLOW	4	YELLOW	10,000			WHITE	
GREEN	5	GREEN	5	GREEN	100,000	GOLD	±5		
BLUE	6	BLUE	6	BLUE	1,000,000	RED	±2 (NOT APPLICABLE TO ESTABLISHED RELIABILITY)		
PURPLE (VIOLET)	7	PURPLE (VIOLET)	7						
GRAY	8	GRAY	8	SILVER	0.01				
WHITE	9	WHITE	9	GOLD	0.1				

**BAND A** — THE FIRST SIGNIFICANT FIGURE OF THE RESISTANCE VALUE (BANDS A THRU D SHALL BE OF EQUAL WIDTH)

**BAND B** — THE SECOND SIGNIFICANT FIGURE OF THE RESISTANCE VALUE

**BAND C** — THE MULTIPLIER (THE MULTIPLIER IS THE FACTOR BY WHICH THE TWO SIGNIFICANT FIGURES ARE MULTIPLIED TO YIELD THE NOMINAL RESISTANCE VALUE)

**BAND D** — THE RESISTANCE TOLERANCE

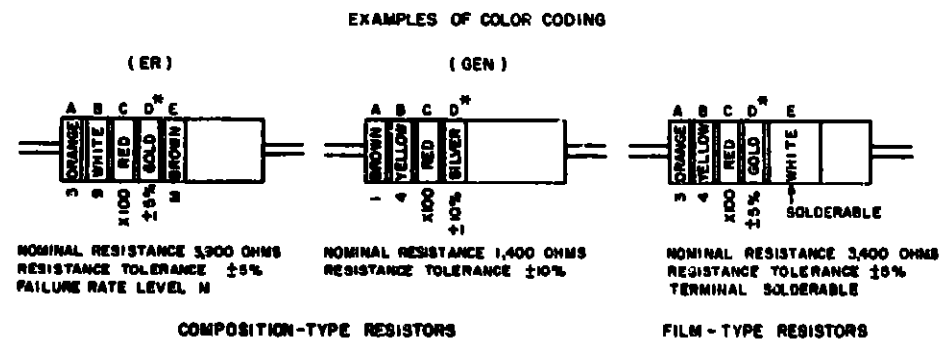
**BAND E** — WHEN USED ON COMPOSITION RESISTORS BAND E INDICATES ESTABLISHED RELIABILITY FAILURE-RATE LEVEL (PERCENT FAILURE PER 1,000 HOURS) ON FILM RESISTORS, THIS BAND SHALL BE APPROXIMATELY 1/2 TIMES THE WIDTH OF OTHER BANDS, AND INDICATES TYPE OF TERMINAL

RESISTANCES IDENTIFIED BY NUMBERS AND LETTERS (THESE ARE NOT COLOR CODED)

SOME RESISTORS ARE IDENTIFIED BY THREE OR FOUR DIGIT ALPHA NUMERIC DESIGNATORS THE LETTER R IS USED IN PLACE OF A DECIMAL POINT WHEN FRACTIONAL VALUES OF AN OHM ARE EXPRESSED FOR EXAMPLE

2R7 27 OHMS 10R0 100 OHMS

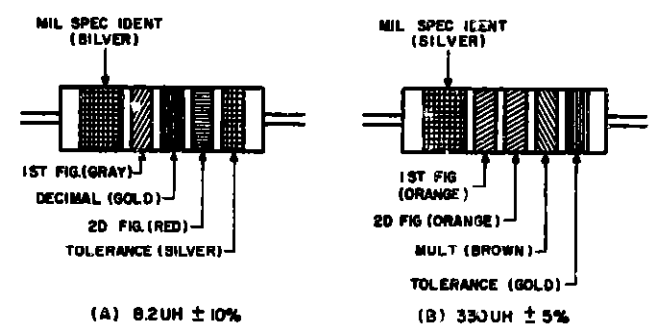
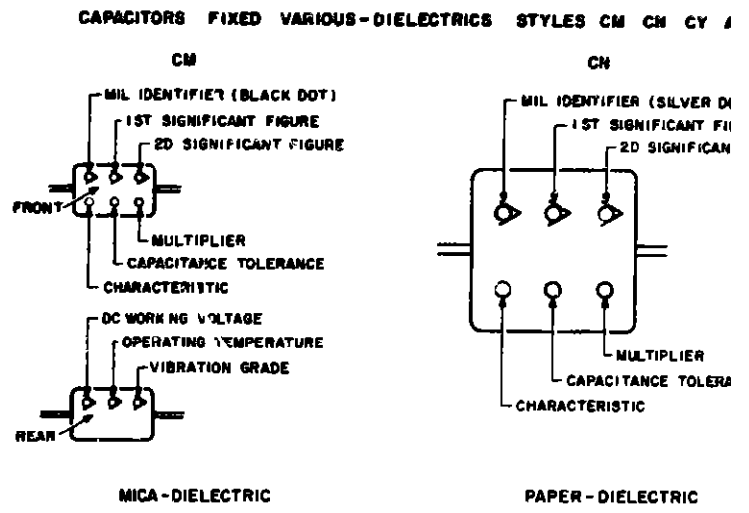
FOR WIRE-WOUND-TYPE RESISTORS COLOR CODING IS NOT USED IDENTIFICATION MARKING IS SPECIFIED IN EACH OF THE APPLICABLE SPECIFICATIONS



**COMPOSITION-TYPE RESISTORS**                      **FILM-TYPE RESISTORS**

\* IF BAND D IS OMITTED THE RESISTOR TOLERANCE IS ±20% AND THE RESISTOR IS NOT MIL-STD.

**A COLOR CODE MARKING FOR MILITARY STANDARD RESISTORS**



COLOR CODING FOR TUBULAR ENCAPSULATED RF CHOKES AT A AN EXAMPLE OF OF THE CODING FOR AN 8.2UH CHOKES IS GIVEN AT B THE COLOR BANDS FOR A 330UH INDUCTOR ARE ILLUSTRATED

**TABLE 2  
COLOR CODING FOR TUBULAR ENCAPSULATED RF CHOKES**

COLOR	SIGNIFICANT FIGURE	MULTIPLIER	INDUCTANCE TOLERANCE (PERCENT)
BLACK	0	1	
BROWN	1	10	1
RED	2	100	2
ORANGE	3	1,000	3
YELLOW	4		
GREEN	5		
BLUE			
VIOLET	7		
GRAY	8		
WHITE	9		
NONE			20
SILVER			10
GOLD	DECIMAL POINT		5

MULTIPLIER IS THE FACTOR BY WHICH THE TWO COLOR FIGURES ARE MULTIPLIED TO OBTAIN THE INDUCTANCE VALUE OF THE CHOKE COIL

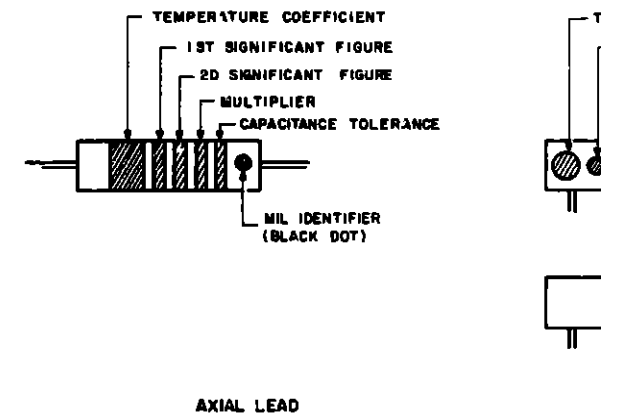


Figure FO-3 Color Code Markings for MIL-STD Resistors

CAPACITORS FIXED VARIOUS-DIELECTRICS STYLES CM, CN, CY AND CB

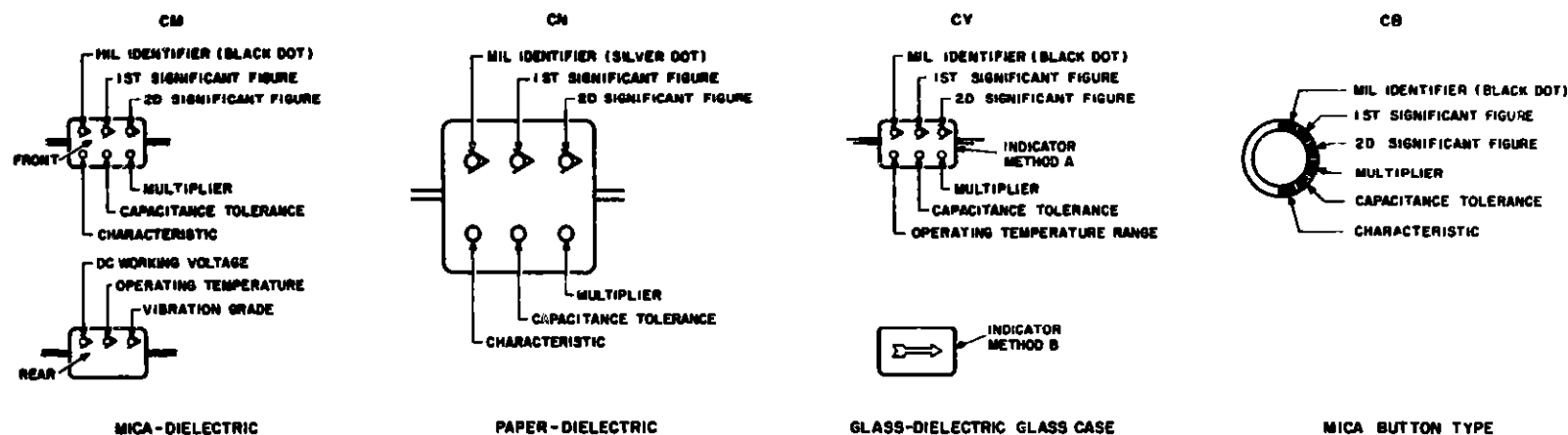
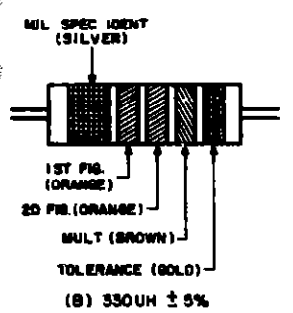


TABLE 3 - FOR USE WITH STYLES CM, CN, CY AND CB

COLOR	MIL ID	1ST SIG FIG	2D SIG FIG	MULTIPLIER	CAPACITANCE TOLERANCE				CHARACTERISTIC	DC WORKING VOLTAGE	OPERATING TEMP RANGE	VIBRATION GRADE
					CM	CN	CY	CB				
BLACK	CM, CY, CB	0	0	1			±20%	±20%	A		50° TO +70°C	10-55 HZ
BROWN		1	1	10					B	E		
RED		2	2	100	±2%		±2%	±2%	C		-55° TO +85°C	
ORANGE		3	3	1,000		±30%			D	D	300	
YELLOW		4	4	10,000					E			-55 TO +125°C
GREEN		5	5		±5%				F		500	
BLUE		6	6									-55° TO +150°C
PURPLE (VIOLET)		7	7									
GRAY		8	8									
WHITE		9	9									
GOLD				01			±5%	±5%				
SILVER	CN			001	±10%	±10%	±10%	±10%				



ATED R.F. CHOKES AT A AN EXAMPLE OF IS GIVEN AT B THE COLOR BANDS FOR B.

TABLE 2 - AXIAL ENCAPSULATED R.F. CHOKES.

MULTIPLIER	INDUCTANCE TOLERANCE (PERCENT)
1	
10	1
100	2
1000	3
20	
10	
5	

BY WHICH THE TWO COLOR FIGURES THE INDUCTANCE VALUE OF THE

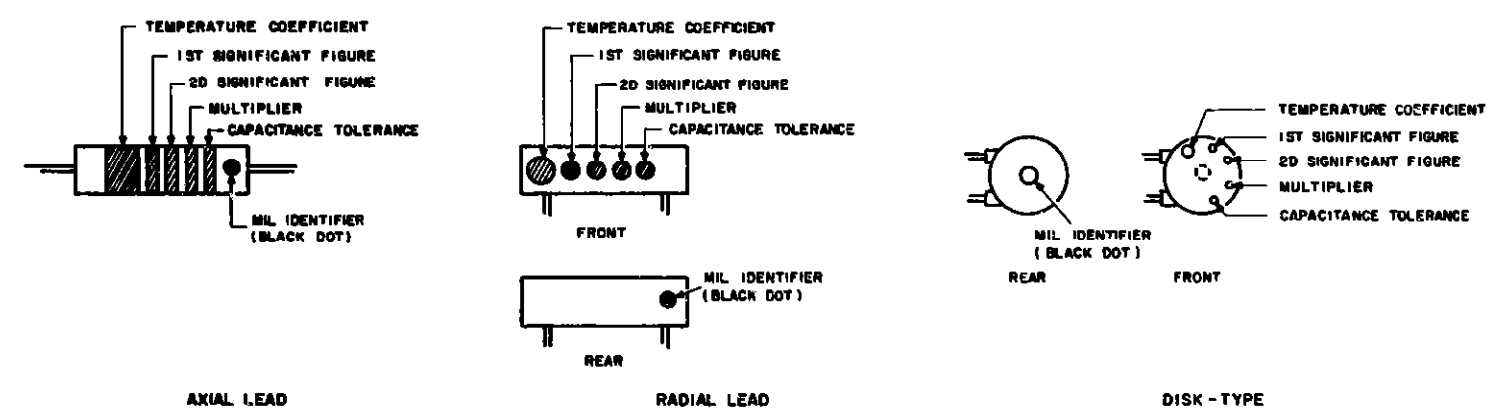


TABLE 4 - TEMPERATURE COMPENSATING STYLE CC

COLOR	TEMPERATURE COEFFICIENT <sup>4</sup>	1ST SIG FIG	2D SIG FIG	MULTIPLIER	CAPACITANCE TOLERANCE		MIL ID
					CAPACITANCES OVER 10 UUF	CAPACITANCES 10 UUF OR LESS	
BLACK	0	0	0	1		+ 2.0 UUF	CC
BROWN	-30	1	1	10	± 2%		
RED	-80	2	2	100	+ 2%	+ 0.25 UUF	
ORANGE	-150	3	3	1,000			
YELLOW	-220	4	4				
GREEN	-330	5	5		± 5%	+ 0.5 UUF	
BLUE	-470	6	6				
PURPLE (VIOLET)	-750	7	7				
GRAY		8	8	0.01*			
WHITE		9	9	0.1*	± 10%		
GOLD	+100			0.1		± 1.0 UUF	
SILVER				0.01			

1. THE MULTIPLIER IS THE NUMBER BY WHICH THE TWO SIGNIFICANT (SIG) FIGURES ARE MULTIPLIED TO OBTAIN THE CAPACITANCE IN UUF  
 2. LETTERS INDICATE THE CHARACTERISTICS DESIGNATED IN APPLICABLE SPECIFICATIONS MIL-C-5 MIL-C-250 MIL-C-112728 AND MIL-C-109600 RESPECTIVELY  
 3. LETTERS INDICATE THE TEMPERATURE RANGE AND VOLTAGE TEMPERATURE LIMITS DESIGNATED IN MIL-C-110180  
 4. TEMPERATURE COEFFICIENT IN PARTS PER MILLION PER DEGREE CENTIGRADE  
 \* OPTIONAL CODING WHERE METALLIC PIGMENTS ARE UNDESIRABLE

MILITARY STANDARD INDUCTORS

C COLOR CODE MARKING FOR MILITARY STANDARD CAPACITORS

Figure FO-3. Color Code Markings for MIL-STD Resistors, Inductors, and Capacitors.

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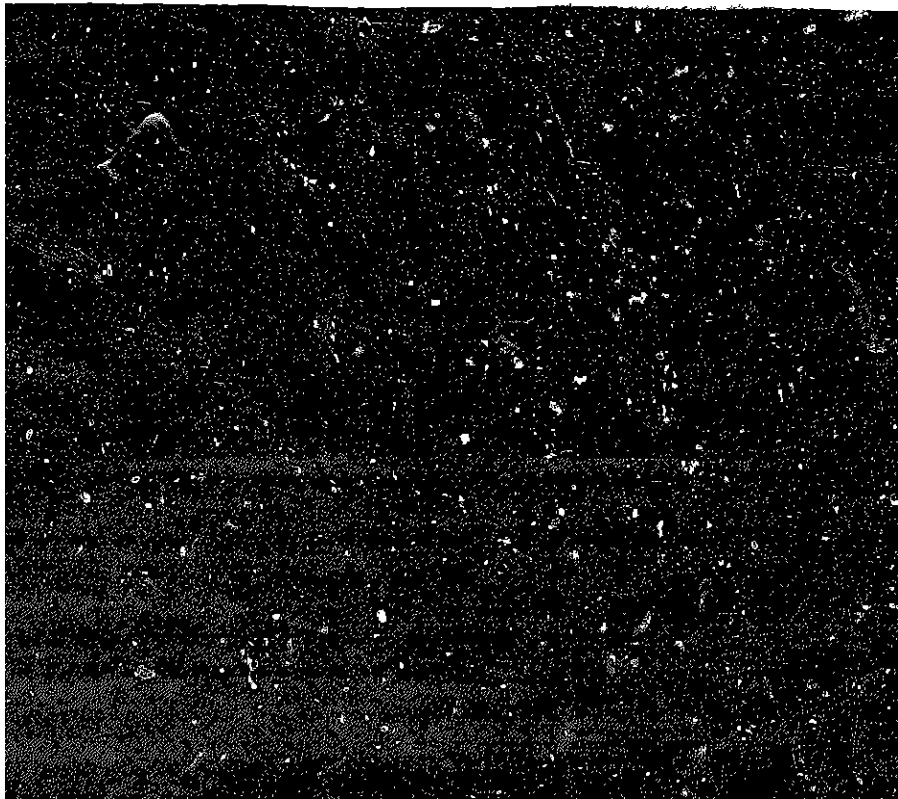
**END**

**02-05-83**

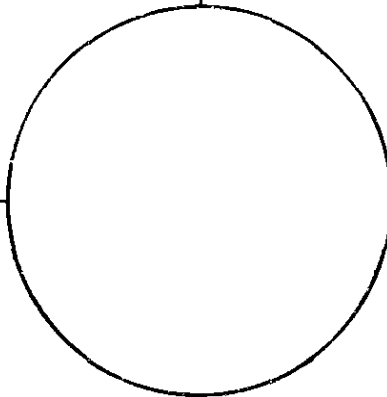
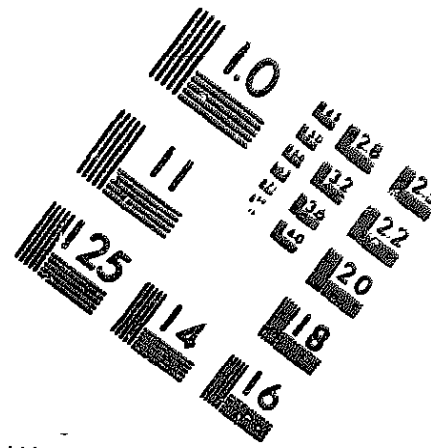
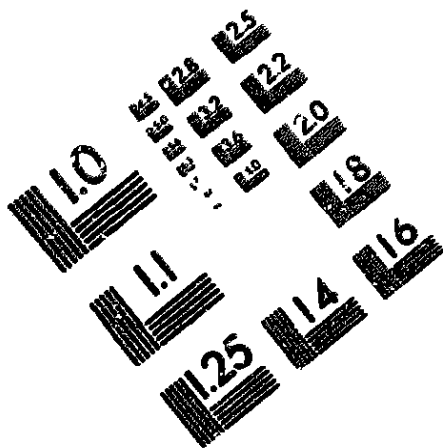
**DATE**







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TEST TARGET



1.0 mm (e= .21 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ 1234567890  
abcdefghijklmnopqrstuvwxyz \$%&' /%# 1/2 1/4 3/4 —+ \* & @ \*

1.5 mm (e= 1.09 mm)

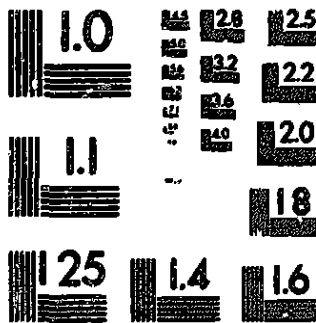
ABCDEFGHIJKLMN OPQRSTUVWXYZ 1234567890  
abcdefghijklmnopqrstuvwxyz \$%&' /%# 1/2 1/4 3/4 —+ \* & @ \*

2.0 mm (e= 1.37 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ  
abcdefghijklmnopqrstuvwxyz  
1234567890 \$%&' /%# 1/2 1/4 3/4 —+ \* & @ \*

2.5 mm (e= 1.77 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ  
abcdefghijklmnopqrstuvwxyz  
1234567890 \$%&' /%# 1/2 1/4 3/4 —+ \* & @ \*



1.0 mm (e= .21 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ 1234567890  
abcdefghijklmnopqrstuvwxyz \$%&' /%# 1/2 1/4 3/4 —+ \* & @ \*

1.5 mm (e= 1.09 mm)

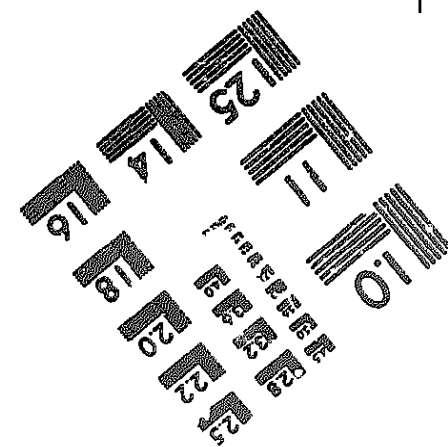
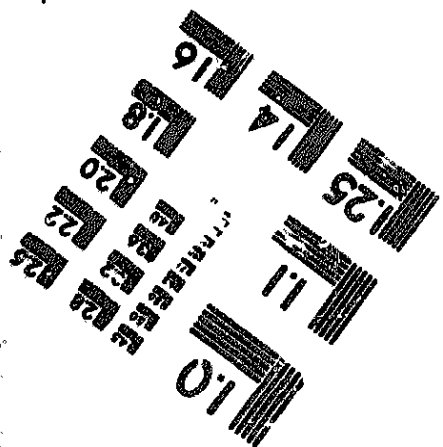
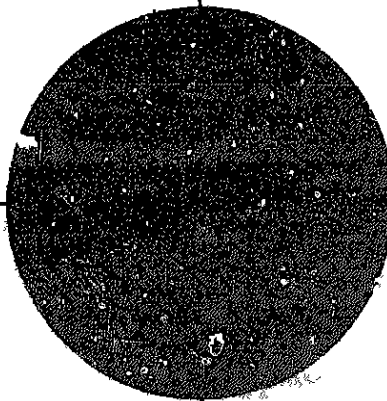
ABCDEFGHIJKLMN OPQRSTUVWXYZ 1234567890  
abcdefghijklmnopqrstuvwxyz \$%&' /%# 1/2 1/4 3/4 —+ \* & @ \*

2.0 mm (e= 1.37 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ  
abcdefghijklmnopqrstuvwxyz  
1234567890 \$%&' /%# 1/2 1/4 3/4 —+ \* & @ \*

2.5 mm (e= 1.77 mm)

ABCDEFGHIJKLMN OPQRSTUVWXYZ  
abcdefghijklmnopqrstuvwxyz  
1234567890 \$%&' /%# 1/2 1/4 3/4 —+ \* & @ \*



250 MM