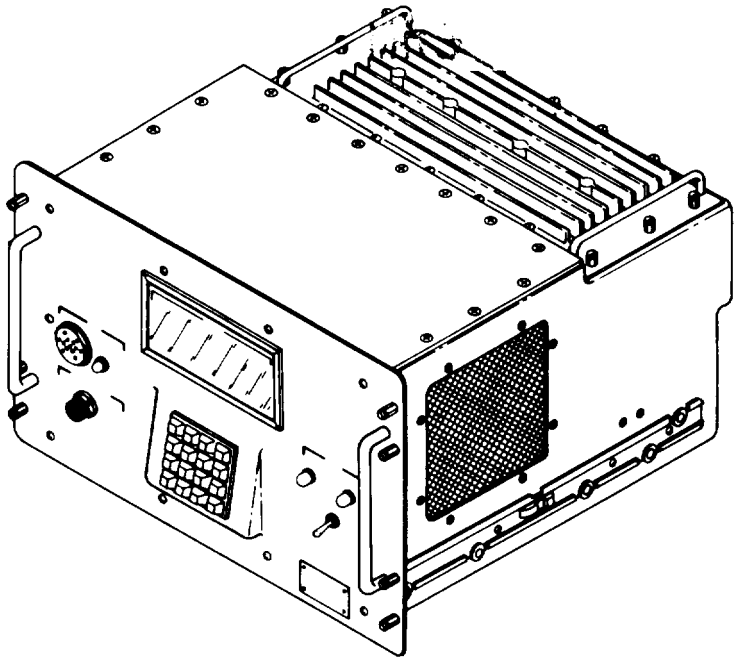
ARMY TM 11-7025-221-20
AIR FORCE T.O. 31S5-2G-252
MARINE CORPS TM-08467A-2012

ORGANIZATIONAL MAINTENANCE MANUAL



MULTIPLEXER, DIGITAL TD-1337(V)1/G
(NSN 7025-01-1 12-6311)
MULTIPLEXER, DIGITAL TD-1337(V)2/G
(NSN 7025-01-112-6310)
MULTIPLEXER, DIGITAL TD-1337(V)3/G
(NSN 7025-01-1 12-6312)
MULTIPLEXER, DIGITAL TD-1337(V)4/G
(NSN 7025-01-127-7020)

DEPARTMENTS OF THE ARMY, THE AIR FORCE, AND THE MARINE CORPS

NOVEMBER 1982

◆ ◆ WARNING ◆ ◆

- TD-1337(V)/G weighs approximately 62 pounds. Have another person help you lift and support it to prevent injury to yourself and others,
- When locks on slides are bypassed, there are no mechanical restraints to prevent TD-1337(V)/G from rolling out of slides and falling. If locks are bypassed, use a second person to help you support TD-1337(V)/G to prevent possible injury to yourself and others.
- High voltage is applied to TD-1337(V)/G when rack power is on. To prevent a serious shock hazard that could result in DEATH or SERIOUS INJURY, turn off rack power when removing or installing a TD-1337(V)/G.
- High voltage is applied to front panel when rack power is on. To prevent a serious shock hazard that could result in DEATH or SERIOUS INJURY, turn off rack power when removing or installing a front panel.

FOR ARTIFICIAL RESPIRATION, REFER TO FM 21-11.

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

1. DO NOT TRY TO PULL OR GRAB THE INDIVIDUAL

2. IF POSSIBLE , TURN OFF THE ELECTRICAL POWER

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

4. SEND FOR HELP AS SOON AS POSSIBLE

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

A

TECHNICAL MANUAL

DEPARTMENTS OF THE ARMY,
THE AIR FORCE. AND THE MARINE CORPS
Washington, DC, 1 November 1982

Organizational Maintenance Manual
MULTIPLEXER, DIGITAL TD-1337(V)1/G
(NSN 7025-01-1 12-6311)
MULTIPLEXER, DIGITAL TD-1337(V)2/G
(NSN 7025-01-1 12-6310)
MULTIPLEXER, DIGITAL TD-1337(V)3/G
(NSN 7025 -01-1 12-6312)
MULTIPLEXER, DIGITAL TD-1337(V)4/G
(NSN 7025-01-1 27-7020)

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

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

For Air Force, submit AFTO Form 22 (Technical Order System publication Improvement Report and Reply) in accordance with paragraph 6-5, Section VI, T.O. 00-5-1. Forward direct to prime ALC/MST.

Marine Corps Units should submit NAVMC10772.

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

HOW TO USE THIS MANUAL

You can maintain Digital Multiplexer TD-1337(V)/G more efficiently if you become familiar with the contents of this manual.

The table of contents, preceding this page, lists 011 the sections, chapters, and appendixes in the manual. There is an alphabetical index at the back of the manual. This index lists all the types of information in the manual in alphabetical order. For example, look under "P" if you want to locate which pages in the manual contain "Plug-in card replacement instructions".

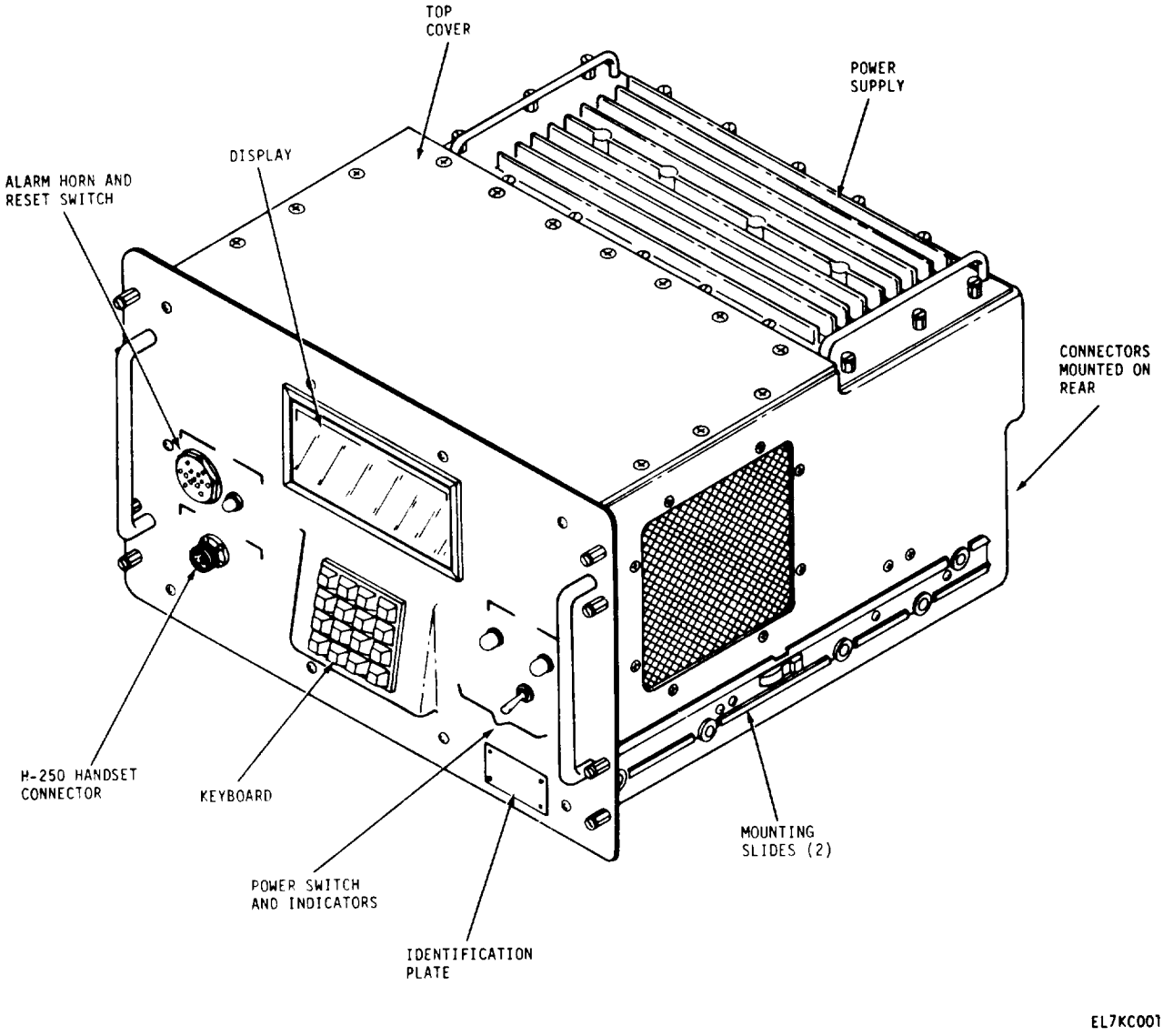
There is a quick-locate index on the front cover that shows the most used information in the manual. Each index entry shows the first page number of a section or chapter. In turn, there is an index of all the paragraphs in the section or chapter on the page listed. This type of indexing helps you to quickly locate troubleshooting or maintenance information, or other types of information described below.

- Equipment *Description* (page 1-5). Descriptions of the TD-1337(V)/G physical and electrical characteristics are in this section. Identification plates and stenciling on the TD-1337(V)/G are also described in this section.
- *Principles of Operation* (page 1-15). This section contains card-level block diagram discussions for the multiplexer and demultiplexer sections of the TD-1337(V)/G. There are separate discussions for the sections in V1/V2 models and the sections in V3/V4 models.
- Service *Upon Receipt* (page 2-1). Normally, the TD-1337(V)/G is installed as part of a shelter configuration. If you have to plan a TD-1337(V)/G installation, the physical and electrical interface requirements are described in this section. Unpacking instructions for a TD-1337(V)/G are in this section.

NOTE

There are no preventive maintenance checks and services authorized for organizational maintenance.

- *Troubleshooting* (page 2-1 1), This section contains troubleshooting procedures that will isolate a problem to an assembly or item that you are authorized to replace, The troubleshooting procedures are presented on easy-to-follow flowcharts that you can use without having a detailed understanding of the electrical circuits in the TD-1337(V)/G. You always start with the flowchart in paragraph 2-9. This flowchart will isolate the problem or direct you to use one of the other troubleshooting procedures in the section.
- *Maintenance* (page 2-3 1). Replacement procedures for the assemblies and indicators that you are authorized to replace are in this section. You will use one or more of these instructions when you are directed by troubleshooting. Installation and removal procedures for the front panel and the complete TD-1337(V)/G are also in this section.
- Storage *and Shipment* (page 2-52), Requirements for preparing red CESE assembly, power supply, plug-in cards, and complete TD-1337(V)/G for storage and shipment are in this section.
- *Maintenance Allocation Chart (MAC)* (page B-1). The MAC lists and explains the maintenance and repair functions authorized for each level of maintenance. In addition to the maintenance functions, a list of the tools and test equipment required for the functions are also in this appendix.



Multiplexer, Digital TD-1337(V)/G.

CHAPTER 1
INTRODUCTION

Section 1. GENERAL INFORMATION

1-1. scope.

a. *Type of ManuaL* This manual contains organizational maintenance instructions for the Digital Multiplexer TD-1337(V)/G family.

b. Model Numbers and Equipment Name. Digital Multiplexer TD-1337(V)/G (hereafter referred to as the TD-1337(V)/G) is the military nomenclature assigned to a family of digital multiplexer. There are four models in the TD-1337(V)/G family. Each model is assigned its own military nomenclature as listed below.

Digital Multiplexer TD-1337(V)1/G
Digital Multiplexer TD-1337(V)2/G
Digital Multiplexer TD-1337(V)3/G
Digital Multiplexer TD-1337(V)4/G

This manual covers all four models. Differences between models are denoted throughout this manual by notes, exceptions, or other appropriate means. When the term TD-1337(V)/G is used in this manual, it means all four models,

c. *Purpose of* Equipment. The TD-1337(V)/G is a synchronous time division multiplexer-demultiplexer used in a satellite earth terminal. The TD-1337(V)/G provides a full duplex capability in interfacing the modem in the terminal radio equipment with ground equipments. Inputs from synchronous data users are multiplexed (combined) into a single output supergroup (SG) and supplied to the modem in the terminal radio equipment for transmission. Similarly, received SG(s) are demultiplexed (recombined) into their composite parts and supplied to the respective data users.

1-2. Repair Parts, Special Tools, TMDE, and Support Equipment.

a. *Common Tools and Equipment.* For authorized common tools and equipment, refer to the' Modified Table of Organization and Equipment (MTOE) applicable to your unit.

b. Special Tools, TMDE, and Support Equipment. No special tools, TMDE, or support equipment are required to carry out the maintenance instructions in this manual.

c. *Repair Parts.* Repair parts are listed and illustrated in the repair parts and special tools list (TM 11-7025-221-20P) covering organizational maintenance for this equipment.

1-3. Maintenance Forms, Records and Reports

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750, The Army Maintenance Management System (Army). Air Force personnel will use AFR 66-1 for maintenance reporting and TO-00-35D54 for unsatisfactory equipment reporting. Marine Corps personnel will use forms and procedures prescribed by TM 4700-15-1/D.

b. Report of Packaging and Handling Deficiencies Fill out and forward SF 364 (Report of Discrepancy (ROD)) as prescribed in AR 735-11-2/DLAR 4140.55 /NAVMATINST 4355.73/AFR 400-54/MCO 4430.3E.

c. Discrepancy in Shipment Report *(DISREP) (SF 36 I).* Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38/NAVSUPINST 4610.33B/AFR 75-18/MCO P4610.19C/DLAR 4500.15.

1-4. Destruction of Army Electronics Materiel

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

1-5. Preparation for Storage or Shipment.

Special instructions for preparing the TD-1337(V)/G for storage or shipment are in paragraph 2-26. Storage requirements for the TD-1337(V)/G, including administrative storage, are in paragraph 2-27. These paragraphs also contain special instructions for packaging and storing spare parts used by organizational maintenance.

1-6. Official Nomenclature, Names, and Designations.

Shortened nomenclature (common names) are used in this manual to make procedures easier for you to read.

a. Nomenclature Cross-Reference fist. A cross-reference between the common name and the official nomenclature for each TD-1337(V)/G model is listed below.

Nomenclature Cross-Reference List

Common name	Official nomenclature
TD-1337(V)1/G or V1	Multiplexer, Digital TD-1337(V)1/G
TD-1337(V)2/G or V2	Multiplexer, Digital TD-1337(V)2/G
TD-1337(V)3/G or V3	Multiplexer, Digital TD-1337(V)3/G
TD-1337(V)4/G or V4	Multiplexer, Digital TD-1337(V)4/G

b. Reference Designations. Each major component of the TD-1337(V)/G is assigned a reference designation. Reference designations are combinations of letters and numbers used to identify these major components. The following chart lists the reference designations applicable to the equipment covered in this manual and indicates, by a X, in which models each is used. The chart also lists the part No., item name, and common name for each major component. The common names are the abbreviated names used throughout this manual.

Reference Designations and Common Names

Reference designation	Model used on V1	V2	V3	V4	Part No.	Item	Common name
A1	-	-	X	X	SM-D-978615	CESE status collector card	CESE collector
A2	X	X	X	X	SM-D-978560	Synchronizer/synthesizer/ vinson buffer card	SSV
A3	X	X	-	-	SM-D-978610	TD-660 I/O card	660 I/O
A4	X	X	X	X	SM-D-978590	Loop modem/rate measure-ment card	Loop modem/rt meas
A5	X	-	X	X	SM-D-978595	Multiplexer input buffer card	Mux input buffer
A6	X	X	X	X	SM-D-978570	Multiplexer card	Mux
A7	X	X	X	X	SM-D-978585	16 Kb/s digital voice orderwire card	16 DVOW
A8	-	-	X	X	SM-D-978580	2.4 Kb/s digital voice orderwire card	2.4 DVOW
A9	X	X	X	X	SM-D-978555	Non-volatile memory/remote interface card	NVM
A10	-	-	-	-	-----	Spare card slot	-----
A11	X	X	-	-	SM-D-978550	Microprocessor card (A)	M proc
A11	-	-	X	X	SM-D-978630	Microprocessor card (B)	M proc
A12	X	X	X	X	SM-D-978600	Output buffer 1 and 2 card	Output buffer 1 & 2
A13	X	-	X	X	SM-D-978600	Output buffer 3 and 4 card	Output buffer 3 & 4
A14	X	-	X	-	SM-D-978600	Output buffer 5 and 6 card	Output buffer 5 & 6
A15	X	-	X	-	SM-D-978600	Output buffer 7 and 8 card	Output buffer 7 & 8
A16	X	X	X	X	SM-D-978565	Demultiplexer 1 card	Demux 1
A17	X	-	X	-	SM-D-978565	Demultiplexer 2 card	Demux 2
A18	X	-	X	-	SM-D-978565	Demultiplexer 3 card	Demux 3
A19	X	-	X	-	SM-D-978565	Demultiplexer 4 card	Demux 4
A20	X	X	X	X	SM-D-978605	Group modem card	Group modem
A21	-	-	-	-	-----	Spare card slot	-----
A22	X	X	X	X	SM-D-978575	Phase locked loop card	PLL
A23	X	X	X	X	SM-F-978490	Multiplexer control panel assembly	Front panel
A23A1	X	X	X	X	SM-D-978510	Display card	Display
A23A2	X	X	X	X	SM-D-978498	Keyboard	Keyboard
A24	X	X	X	X	SM-D-978500	Card file assembly	Card file
A25	-	-	X	X	SM-D-978520	Red CESE assembly	Red CESE assembly
PS1	X	X	X	X	SM-F-978450	Power supply assembly	Power supply

1-7. Reporting Equipment Improvement Recommendations (EIR's).

If your TD-1337(V)/G needs improvement, let us know. Send us an EIR. You, the user are the only one who can tell us what you don't like about your equipment. Let us know why you don't like the design or performance. Put it on an SF 368 (Quality Deficiency Report). Mail it to us at Commander, US Army Communications-Electronics Command and Fort Monmouth, ATTN: DRSEL-ME-MP, Fort Monmouth, New Jersey 07703. We'll send you a reply.

1-8. List of Abbreviations.

Special or unusual abbreviations used in this manual and their meanings are listed below. common abbreviations that you already know are not listed.

List of Abbreviations

Abbreviation	Meaning
ANDVT	Advanced Narrowband Digital Voice Terminal
ATACS	Army Tactical Area Communications System
b/s	Bits per second
CESE	Communications Equipment Support Element
CNCE	Communications Nodal Control Element
CVSD	Continuous variable slope delta
DLED	Digital Loop Encryption Device
DVOW	Digital voice orderwire
EMI	Electromagnetic interference
ESDS	Electrostatic discharge sensitive
FS	Frame sync
I/O	Input/output
kb/s	Kilobits per second
MTOE	Modified Table of Organization and Equipment
NRZ	Non-return to zero
NVM	Non-volatile memory
PCM	Pulse code modulation
PMCS	Preventive Maintenance Checks and Services
Rmux	Remote multiplexer
SG	Supergroup
TAMMS	The Army Maintenance Management System
TMDE	Test Measurement and Diagnostic Equipment
TRI-TAC	Joint Tactical communications
TSSP	Tactical Satellite Signal Processor (also means TD-1337(V)/G in this manual)
TTL	Transistor-transistor-logic
VCXO	Voltage-controlled crystal oscillator

Section II. EQUIPMENT DESCRIPTION AND DATA

1-9. Characteristics, Capabilities, and Features.

a. Characteristics.

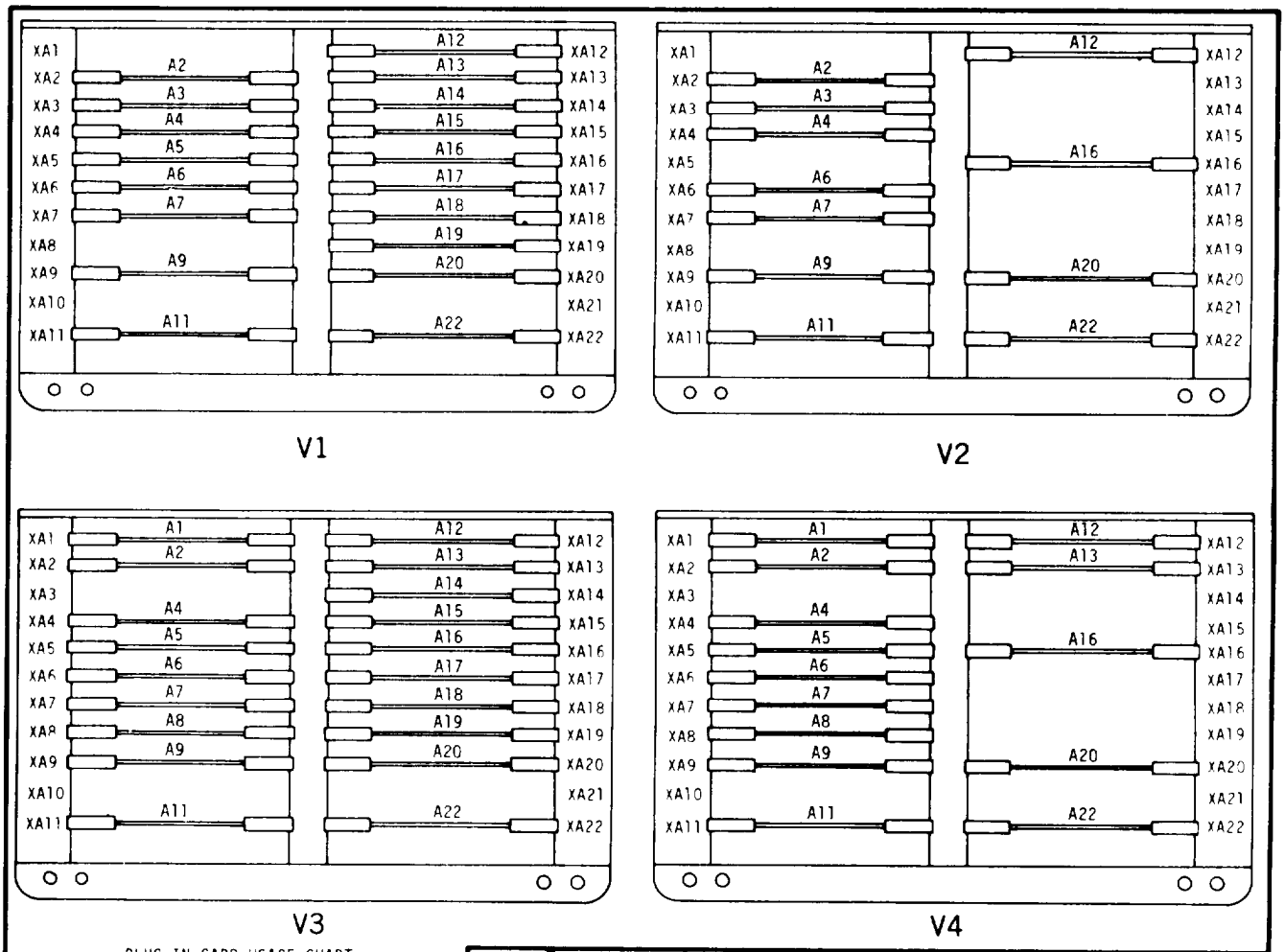
- *Interface Ground Equipments* to *Radio Terminal Modem.* Inputs from synchronous data users are multiplexed (combined) into a single supergroup output and supplied to the modem in the terminal radio equipment for transmission. Received supergroup(s) are demultiplexed (recombined) into their composite parts and supplied to respective data users.
- *Synchronous Time Division* Operation. Timing between data users and TD-1337(V)/G is synchronized. Time division principles used in multiplexing and demultiplexing operations.
- *Fu// Dup/ex Operation.* Multiplexing and demultiplexing operations are performed independently.

b. Capabilities and Features.

- *ATACS and TRI-TAC Compatible.* Processes ATACS 6-bit PCM and TRI-TAC CVSD signal families.
- *Operator Programmable.* Operator enters configuration information by means of a front panel mounted keyboard. A 3-line, 96-character display presents configuration information or instructional messages to the operator.
- *Non-Volatile Memory (NVM).* Configuration data that has been entered is retained in NVM during electrical power interrupt and equipment turn-off periods.
- Voice *Orderwires.* A 16 kb/s digital voice orderwire is selectable to secure or non-secure mode of operation. Additionally, models V3 and V4 have a separate 2.4 kb/s digital voice orderwire capability.
- *Built-in Test Circuits.* Performance parameters are constantly monitored. Detected faults are displayed as discrete alarm indications or circuit card fail messages on the front panel display.
- *Rack Mounted.* Mounted in standard 19-inch equipment rack. Secured to rack by quick-disconnect slides and front panel fasteners.

1-10. Location and Description of Major Components.

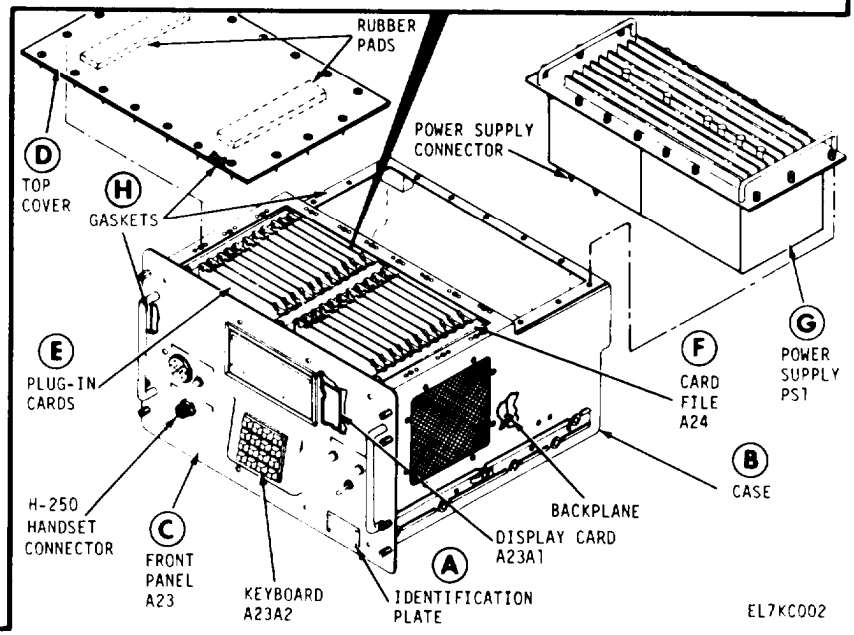
Major Components Less Rear Connectors



PLUG-IN CARD USAGE CHART

PLUG-IN CARD	MODEL USED ON V1	V2	V3	V4
A1 CESE COLLECTOR	-	-	X	X
A2 SSV	X	X	X	X
A3 660 I/O	X	X	-	-
A4 LOOP MODEM/RT MEAS	X	X	X	X
A5 MUX INPUT BUFFER	X	-	X	X
A6 MUX	X	X	X	X
A7 16 DVOW	X	X	X	X
A8 2.4 DVOW	-	-	X	X
A9 NVM	X	X	X	X
A10 SPARE CARD SLOT	-	-	-	-
*A11 M PROC	X	X	X	X
A12 OUTPUT BUFFER 1 & 2	X	X	X	X
A13 OUTPUT BUFFER 3 & 4	X	-	X	X
A14 OUTPUT BUFFER 5 & 6	X	-	X	-
A15 OUTPUT BUFFER 7 & 8	X	-	X	-
A16 DEMUX 1	X	X	X	X
A17 DEMUX 2	X	-	X	-
A18 DEMUX 3	X	-	X	-
A19 DEMUX 4	X	-	X	-
A20 GROUP MODEM	X	X	X	X
A21 SPARE CARD SLOT	-	-	-	-
A22 PLL	X	X	X	X

*THERE ARE TWO M PROC CARDS:
SM-D-978550 USED IN V1 AND V2.
SM-D-978630 USED IN V3 AND V4.



1-10. Location and Description of Major Components - Continued.

Different models of the TD-1337(V)/G family are achieved by variations in plug-in card usage, presence or absence of red CESE assembly, and presence or absence of certain rear connectors. Front panel, power supply, backplane and its wiring, and case are identical for all four models.

(A) *Identification Plate.* Provides model of TD-1337(V)/G in use.

(B) *Case.* Welded enclosure that provides mounting facilities for all TD-1337(V)/G subassemblies. Openings on each side of case allow forced air from rack ducting to pass through card file area for plug-in card cooling. Openings (intake and exhaust) are covered with honeycomb electromagnetic interference (EMI) shield grilles.

(C) *Front Pane/ A23.* All controls and indicators used during operation and organizational maintenance are on front panel A23. A connector that interfaces the H-250 handset is also located on the front panel. Display card A23A1 is secured to the rear surface of the front panel and includes displays that are visible through a window on the front panel. Keyboard A23A2 is located below the display window and is used to enter instructional data or cause messages to be displayed.

(D) *Top Cover.* Access to plug-in cards is obtained by removing top cover from case. Top cover is secured to case by turnlock fasteners that are captive to the rover. Rubber pads located on underside of the top cover press against the plug-in cards to ensure that the cards remain seated in their connectors when top cover is installed.

(E) *Plug-in Cards.* Plug-in cards are assigned reference designators A1 through A22. Each TD-1337(V)/G model contains a different complement of plug-in cards. The facing illustration lists and illustrates which plug-in cards are used and where they are installed in each model.

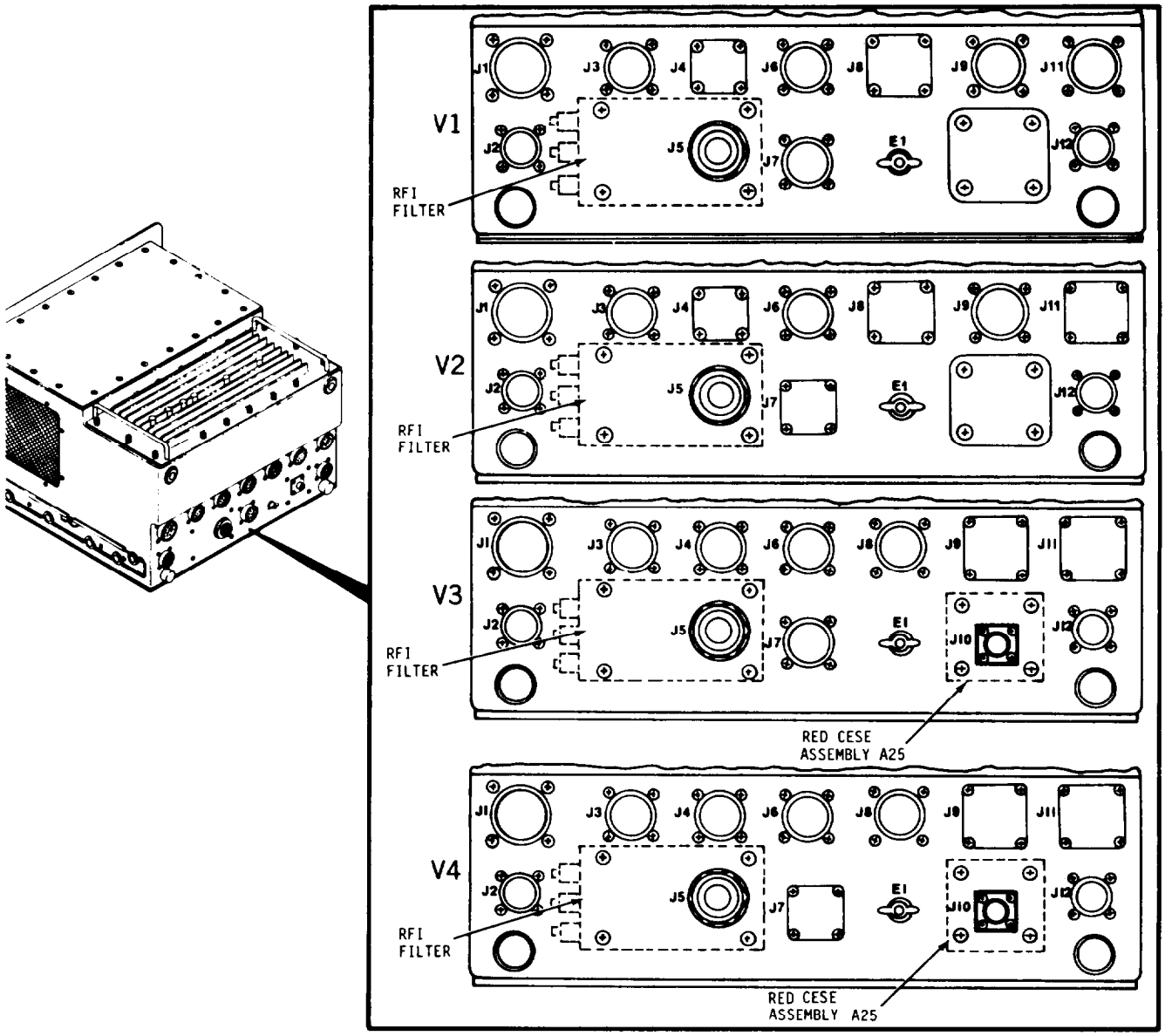
(F) *Card File A24.* Card file A24 is a rigid framework that houses the plug-in cards. A backplane, which is part of the card file, contains connectors into which the plug-in cards are installed. These connectors are assigned reference designators XA1 through XA22. Interconnection wiring and power distribution busses are located on bottom side of backplane. Polarizing keys are an integral part of the backplane. The plug-in cards contain cutouts which engage with polarizing keys to ensure that correct type plug-in card is installed into each backplane connector.

(G) *Power Supply PS1.* Power supply PS1 is mounted in the upper rear of the case. Screws captive to the power supply secure the power supply to the case. There is one connector on the bottom of the power supply that provides electrical interface with the other circuits in the TD-1337(V)/G. A guide pin located on each side of the connector ensures that the power supply connector mates properly with the case connector when installing the power supply in the case.

(H) *Gaskets.* Gaskets are used to provide EMI shielding. A gasket is mounted to the top cover and provides shielding for the interface between the top cover and the case. Similarity, another gasket (not shown) is mounted to the bottom cover. Gaskets are also mounted to the case and provide shielding for the front panel to case interface and the power supply to case interface. You will be requested to inspect these gaskets when performing certain maintenance procedures in this manual.

1-10. Location and Description of Major Components-Continued.

Rear Connectors



REAR CONNECTOR USAGE CHART

CONNECTOR	CABLE	MODEL USED ON V1	V2	V3	V4	FUNCTION	CARD(S) CONNECTED TO
J1	W7	X	X	X	X	SUPERGROUPS	A6, A16-A19
J2	W9	X	X	X	X	REMOTE INTERFACE	A9
J3	W8	X	X	X	X	CONDITIONED DIPHASE (GROUP MODEM)	A20
J4	W2	-	-	X	X	CESE TELEMETRY, 2.4 DVOW, AND DLED INTERFACE (BLACK)	A1, A8
J5	---1	X	X	X	X	AC POWER INPUT	----
J6	W10	X	X	X	X	BALANCED NRZ GROUPS 1-4	A5, A6, A12, A13
J7	W4	X	-	X	-	BALANCED NRZ GROUPS 5-8	A5, A14, A15
J8	W3	-	-	X	X	CESE STATUS POINT INPUTS	A1
J9	W6	X	X	-	-	UNBALANCED NRZ (TD-660) GROUPS 1 AND 2	A3
J10	---2	-	-	X	X	DLED INTERFACE (RED)	----
J11	W5	X	-	-	-	UNBALANCED NRZ (TD-660) GROUPS 3 AND 4	A3
J12	W11	X	X	X	X	VINSON INTERFACE, 16/32 KB/S DEDICATED USER, AND REMOTE ALARMS	A2, A4, A9
E1	---	X	X	X	X	CASE GROUND	----

1 CONNECTOR J5 PART OF RFI FILTER
2 CONNECTOR J10 PART OF RED CESE ASSEMBLY A25

EL7KC003

1-10. Location and Description of Major Components - Continued.

Except for the H-250 handset connector located on front panel A23, all external connections are made to connectors located on the rear of the TD-1337(V)/G.

a. Each TD-1337(V)/G model has a different complement of rear connectors, The facing illustration shows which connectors are used on each TD-1337(V)/G model. The illustration also contains a chart that provides information about each rear connector. Using rear connector J3 as an example, the chart provides the following information:

Connector J3 is one end of cable assembly W8 (refer to b below).

Connector J3 is used on all four models.

Connector J3 provides the conditioned diphase (group modem) interface.

Input/output signals appearing at connector J3 go to or come from plug-in card A20.

When a rear connector is not used on a given model, a plate is installed to cover that connector's cutout. Organizational maintenance will be involved with these rear connectors when installing or removing a TD-1337(V)/G,

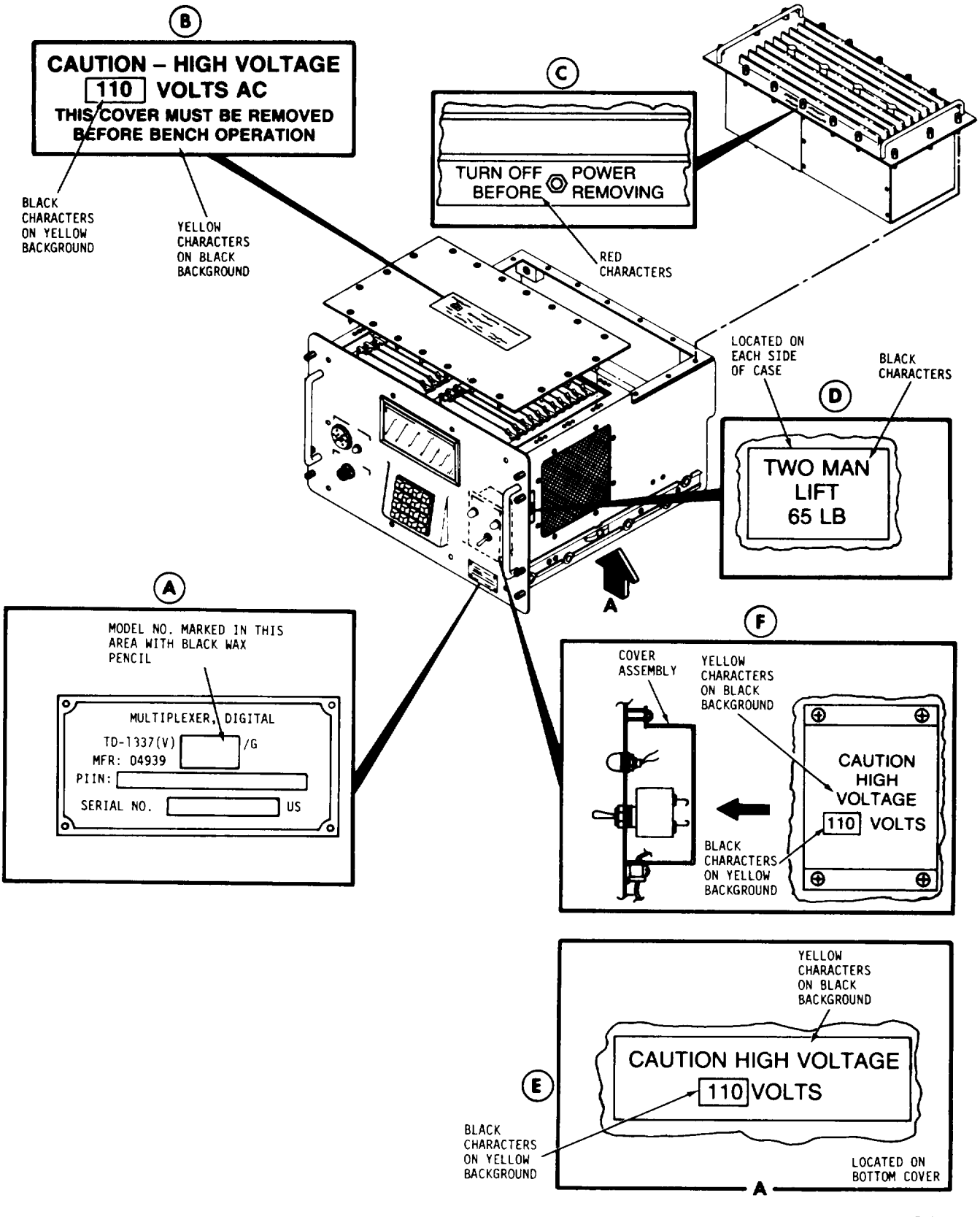
b. Each rear connector, except for J5, J10, and E1, is one end of a cable assembly. The other end of each cable assembly is one or more plugs that slip over pins on the bottom of the backplane and completes the interconnection to the plug-in card. Organizational maintenance is not authorized to remove or repair these cable assemblies (does not apply to U.S. Air Force).

c. Connector J5 is an integral part of the RFI filter which is attached to the inner rear of the case. The RFI filter provides rf filtering of the ac input power. Organizational maintenance is not authorized to replace the RFI filter (does not apply to U.S. Air Force).

d. Connector J10 is an integral part of red CESE assembly A25. The red CESE assembly performs final formatting of CESE telemetry and outputs the data (in red) to the DLED. Red CESE assembly A25 is replaceable by organizational maintenance.

e. El is a ground stud and is used to ground the TD-1337(V)/G case.

1-11. Identification Plates and Stencils.



1-11. Identification Plates and Stencils - Continued.

Identification plates and stencils that are of importance to organizational maintenance are shown on the facing illustration.

(A) Identification Plates. Each TD-1337(V)/G has an identification plate located on the lower right front of front panel A23. The identification plate will provide you the model of the particular TD-1337(V)/G you are working with. The model No. is marked in the indicated area with a black wax pencil.

(B) Top Cover. A stencil is located in the middle of the top cover and provides the following information.

- A CAUTION that 110v ac input power exists within the TD-1337(V)/G. Additional guarding and labeling is provided within the TD-1337(V)/G to protect and inform maintenance personnel of these ac input power points.
- That the top cover must be removed when the TD-1337(V)/G is operated on a bench. *This is* necessary since rack ducted air is not available for plug-in card cooling.

(C) *Power Supply.* A stencil is located on the upper front of the power supply which advises that power must be turned off before removing power supply. POWER ON/OFF circuit breaker switch on front panel controls application of ac power to the power supply. Additionally, two CAUTION stencils (not shown) are located on the bottom (connector side) of power supply advising of high voltages within the power supply. Organizational maintenance is not authorized to remove power supply covers and gain access to internal power supply components.

(D) Case. A stencil is located on each side of the case advising that the weight of the TD-1337(V)/G (approximately 65 pounds) is such that two persons are required to lift it.

(E) Bottom Cover. A stencil is located in the middle of the bottom cover advising that 110v ac input power exists within the TD-1337(V)/G.

(F) *Front Panel.* Whenever ac input power is applied to the TD-1337(V/G, it is present at terminals of the POWER ON/OFF circuit breaker switch and the POWER AC indicator. These terminals are guarded by a cover assembly to protect maintenance personnel. The rear of the cover assembly contains a CAUTION advising of the 11 O-volt power.

1-12. Differences Between Models.

Physical differences between models are different plug-in card usage and presence or absence of certain rear connectors. These physical differences are described in paragraph 1-10 and result in the following functional differences between models.

Functional Differences Between Models

Capability	V1	V2	V3	V4
GROUP INTERFACES				
Max No. of active ports (group inputs/outputs)	8	2	8	4
No. of unbalanced NRZ interfaces	4	2	0	0
No. of balanced NRZ interfaces	8	2	8	4
No. of conditioned diphase (group modem) interfaces	1	1	1	1
SG INTERFACES				
No. SG's transmitted	1	1	1	1
No. SG's received	4	1	4	1
ORDERWIRES				
16 kb/s non-secure digital voice (H-250 handset)	yes	yes	yes	yes
16 kb/s secure digital voice (Vinson)	yes	yes	yes	yes
2.4 kb/s digital voice (ANDVT)	no	no	yes	yes
MISCELLANEOUS				
16/32 kb/s dedicated user conditioned diphase interface (loop modem)	yes	yes	yes	yes
CESE telemetry reporting function	no	no	yes	yes
TD-754 demux function	yes	yes	no	no
TD-754 mux function	yes	no	no	no
TD-976 mode capability	yes	no	no	no

1-13. Equipment Data.

a. *Physics/ Data.*

Dimensions:
- Width (front panel) . . . . . 19.0 inches (46.26 cm)
- Height (front panel) . . . . . 12.22 inches (31.04 cm)
- Depth (including handles) . . . . . .18.625 inches (47.31 cm)

Weight . . . . . .62 pounds(28.1 kg)max

Cooling Air Requirements:
- Source . . . . . External
- Flow rate . . . . . 50 cfm (1.42 cu m/min)
- Back pressure . . . . . 0.5 inches (1.27 cm) max
- Temperature . . . . . 145°F (62.78°C) max

Power:
- Supply voltage . . . . . 115v (103.5 to 126.5v), 45 to 440 Hz
- Consumption . . . . . 140 watts max
- Overload protection . . . . . AC POWER ON/OFF circuit breaker switch on front panel

b. Satellite Side (Supergroup) Interfaces.

- Format . . . . . Unbalanced NRZ
- Rates . . . . . 16 kb/s to 4664 kb/s in 8 kb/s increments or 4915.2 kb/s
- Data 1 . . . . . 0.0 to -0.4v
- Data O . . . .2.2 to -2.6v
- Input/output impedance 91ohms

c. Earth Side Interfaces.

Unbalanced NRZ Group (V1and V2 models only):
- Format . . . . . Unbalanced NRZ
- Rates . . . . . 288 and 576 kb/s (input) 288, 576, and 1152 kb/s (output)
- Data 1 . . . . . 0.0 to -0.4v
- Data 0 . . . .2.2 to -2.6v
- input/output impedance . . . .91 ohms

Balanced NRZ Group:
- Format . . . . . .Balanced NRZ (two wire system)
- Rates . . . .8. 16, 32, 84, 72, 128, 144, 256, 288, 512, 576, 1024, and 1152 kb/s. 4915.2 kb/s for TD-976.mode.
- Data 1 . . . . . High side of two wire system positive with respect to low side.
- Data O . . . . . .High side of two wire system negative with respect to low side.
- Transmit level . . . . . .87mv to 3 v
- Receiver sensitivity 50mv
- Input/output impedance . . . . . .100 ohms

1-13. Equipment Data - Continued.

Group Modem:
- Group Data:
  - Format . . . . . Conditioned diphase
  - Rates . . . .72. 128, 144, 256, 288, 512, 576, 1024, and 1152 kb/s
  - Data . . . . . .Intelligence contained in signal transitions rather than voltage levels.
  - Transmit level . . . . . 3.0v (2.4 to 3.6v) peak-to-peak
  - Receive level . . . . . Transmit level fixed; receive level is that received through appropriate length of CX-11230/G cable.
  - Cable length . . . . . 0 to 2 miles for data rates of 72 to 576 kb/s. 0 to 1 mile for data rates of 1024 and 1152 kb/s. Internal cable equalization circuits compensate receive signal based on cable length in l/4-mile increments.
  - Input/output impedance . . . . . 58 ohms
- Combined Digital Orderwire:
  - Availability . . . . Transmitted along with group data when group data rates are 256 kb/s and above.
  - Format . . . . . NRZ
  - Rates:
    - CESE data (V3 and V4 models only) . . . .2 kb/s
    - Digital voice orderwire . . . . . 16 kb/s
    - Data 1 . . . . +0.5v (+0.45 to +0.55v)
    - Data 0... . . . . . 4.5v (-0.45 to -0.55v)

Dedicated User (Loop Modem):
- Format . . . .Conditioned diphase
- Rates . . . . . 16 or 32 kb/s
- Data . . . . . Intelligence contained in signal transitions rather than voltage levels.
- Transmit level . . . . . 3.0v (2.7 to 3.3v) peak-to-peak
- Receiver sensitivity .. . . . . 100mv peak-to-peak
- lnput/output impedance . . . . . 125 ohms

16 kb/s Digital Voice Orderwires:
- Non-Secure Mode:
  - Interface device . . . . . H-250 Handset
  - Format . . . . . Analog
- Secure Mode:
  - Interface device . . . . W.57/58 Vinson
  - Format . . . . . .Digtial,±6v
  - Rate . . . . . 16 kb/s

2.4 kb/s Digital Voice Orderwire (V3 and V4 models only):
- Interface device . . . . Advanced narrowband digital voice terminal
- Format . . . . . Digital, ± 6v
- Rate . . . .2.4 kb/s

1-13. Equipment Data-Continued.

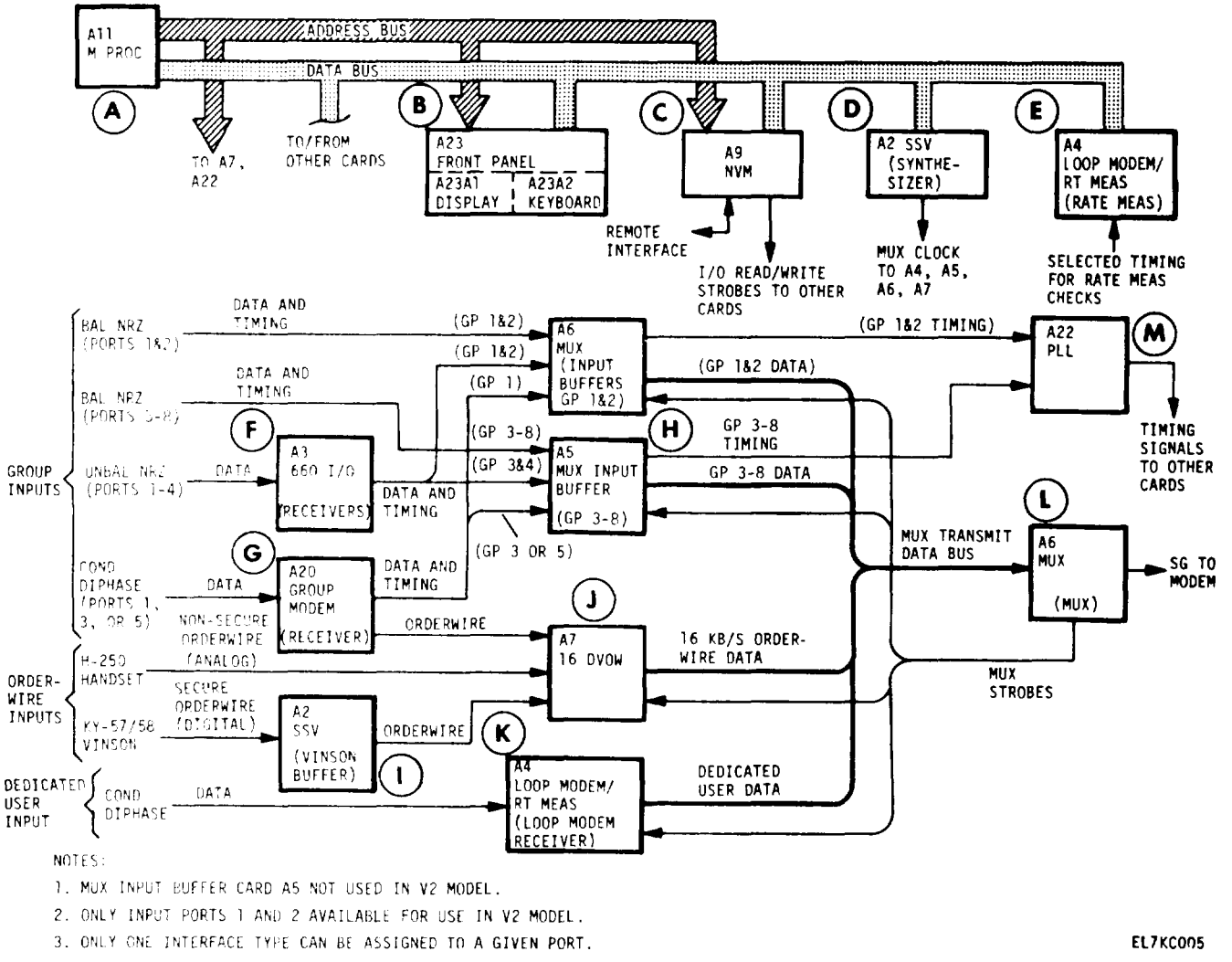
CESE Functions (V3 and V4 models only):
- Status Point Inputs:
  - No. . . . . 56 max
  - Normal condition (any point) . . . . . +2.4 to +5.0v
  - Fault condition (any point) . . . . . 0.0 to +0.4V
- Data to DLED (Red):
  - Format . . . . . Digital, ±6v
  - Rate . . . . . 150 b/s
- Data from DLED (Black):
  - Format . . . . . Digital, ±6v
  - Rate . . . . . 2 kb/
- CESE Telemetry Outputs:
  - No. . . . . 4 max
  - Format . . . . . Balanced NRZ
  - Rate . . . . . 2 kb/s

Section III. PRINCIPLES OF OPERATION

OVERVIEW

This section contains card level block diagram discussions. Separate discussions are provided for the multiplexer and demultiplexer sections of V1/V2 models and V3/V4 models. These discussions describe the major data paths and can be of assistance during troubleshooting operations.

1-14. Multiplexer Section Block Diagram Discussion (V1/V2 Models).



A M proc card A11 contains the microprocessor and controls TD-1337(V)/G operation. Data are transferred between the microprocessor and other cards over an 8-bit bidirectional data bus.

B Front panel A23 provides for operator interface. Display card A23A1 provides the operator with information via a 3-line display and five alarm indicators. Keyboard A23A2 is used to enter instructional data or cause messages to be displayed.

C NVM card A9 contains non-volatile memory (NVM) circuits that retain configuration data entered by the operator. Up to two operating configurations can be entered and retained. A battery, on the card, provides power to the memory circuits when the TD-1337(V)/G is turned off or input ac power is lost.

A remote interface function provides for sending (or receiving) configuration data in NVM to (or from) a standby TD-1337(V)/G.

An address decoding function decodes addresses from M proc card A11 to generate I/O read/write strobes. These strobes allow the microprocessor to communicate (write and read data) with other cards over the 8-bit data bus.

D The synthesizer circuit on SSV card A2 produces a mux clock output. The rate of the mux clock is dependent on system operating configuration and will be between 16 kHz and 4664 kHz in 8 kHz steps. Rate of SG output is equal to rate of the mux clock.

1-14. Multiplexer Section Block Diagram Discussion (V1/V2 Models) - Continued.

(E) The rate measurement circuit on loop modem/rt mess card A4 measures the frequency of selected timing signals within the TD-1337(V)/G. The frequency of each selected timing signal is counted and compared by the microprocessor to a stored value. Any errors in this measurement result in alarm displays.

(F) Input data from up to four TD-660/G multiplexer (in unbalanced NRZ format) are processed by receivers on 660 I/O card A3. Data are converted to a NRZ transistor-transistor logic (TTL) format (logic 1 is +5 volts and logic O is O volts). Timing is recovered based on data transitions. Data and timing for each group input are applied to their respective input buffer.

(G) The receiver on group modem card A20 processes the group modem conditioned diphase input. A combined digital orderwire may also be received on this input. The group data and orderwire inputs are separated and converted into TTL formats. Timing is recovered from the data. Group data and timing are applied to the respective input buffer. Orderwire data are routed to 16 DVOW card A7.

(H) There are eight input buffers; one for each potential input port. Buffers for groups 1 and 2 are located on mux card A6. Buffers for groups 3 thru 8 are on mux input buffer card A5. Each buffer provides an elastic storage function for one group input. Data for each group are clocked into its buffer at its incoming data rate. Data are strobed out of the buffers and onto the mux transmit data bus in response to mux strobes. Thus, data are clocked into each buffer at a regular rate and strobed out when it is to be inserted into the SG,

(I) Incoming 16 kb/s orderwire data from the KY-57/58 Vinson are processed by the Vinson buffer on SSV card A2 for application to 16 DVOW card A7. Processing entails converting the data to a TTL format and buffering. The KY-57/58 Vinson is not synchronized to the TD-1337(V)/G. Therefore, buffering is required to accommodate for differences between the clock source in the KY-57/58 Vinson and TD-1337(V)/G timing.

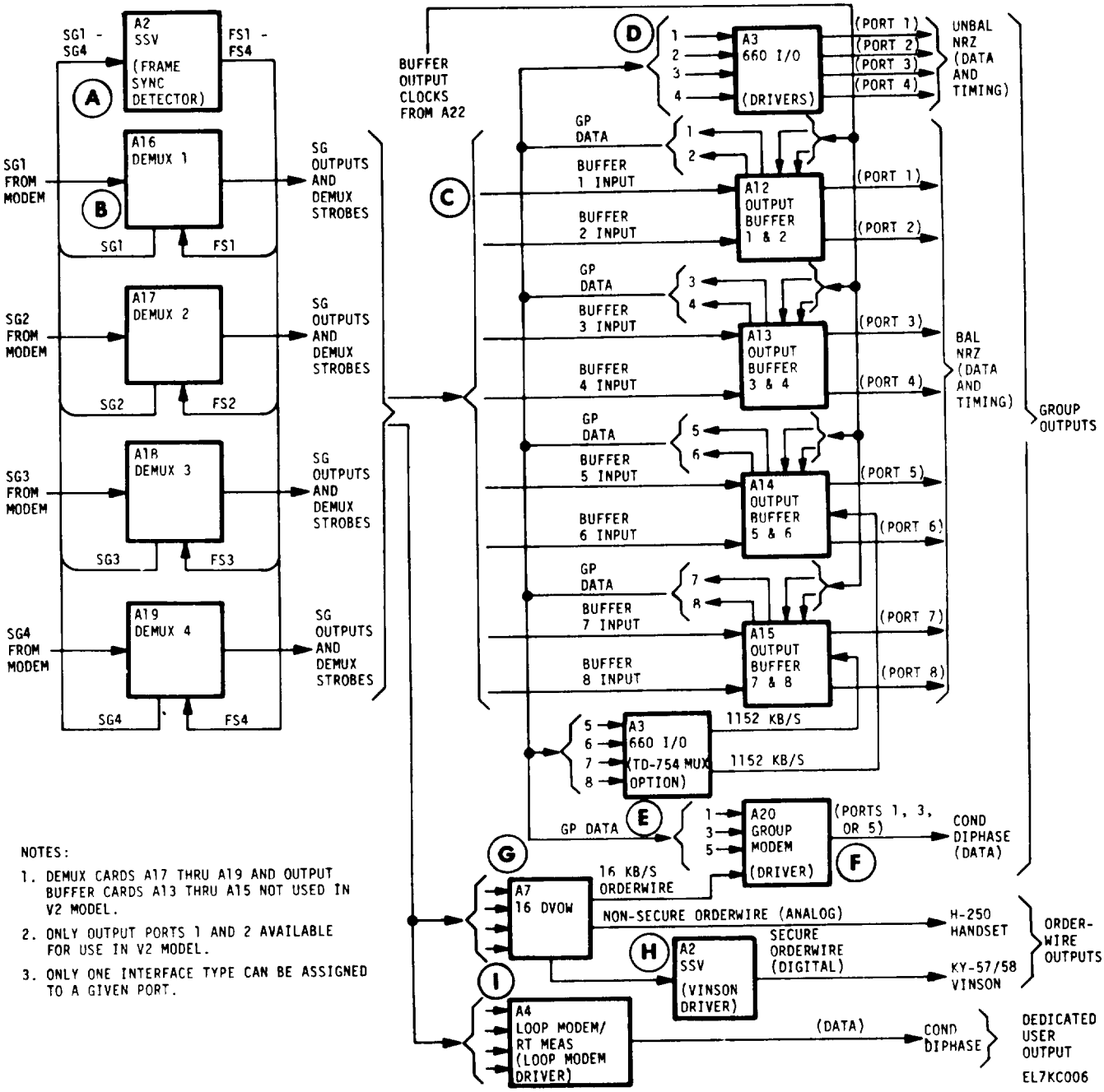
(J) 16 DVOW card A7 provides access to the mux transmit data bus for the 16 kb/s orderwires. The three 16 kb/s orderwires are: the Vinson orderwire input from SSV card A2, the CNCE orderwire input from group modem card A20, and the H-250 handset input. Only one input can be accepted **at a** time, and entry is on a first-come, first-served basis. The H-250 handset input is in analog form and is converted to a TTL format by 16 DVOW card A7. Data for a given orderwire are processed and entered into a buffer. Data are strobed out and onto the mux transmit data bus in response to mux strobes. Ring codes to be transmitted are received from the microprocessor and strobed onto the mux transmit data bus.

(K) The loop modem receiver on loop modem/rt mess card A4 processes the incoming 16 kb/s or 32 kb/s conditioned diphase dedicated user input. The input is converted to a TTL format and entered into a buffer. Data are strobed out and onto the mux transmit data bus in response to mux strobes.

(L) The mux circuits on mux card A6 generate mux strobes that control strobing of data onto the mux transmit data bus. In this way, all parts of the SG are assembled in the proper sequence and at the proper time. Data on the mux transmit data bus are converted to an unbalanced NRZ format and applied to the modem.

(M) PLL card A22 produces the major timing signals used to control TD-1337(V)/G operation. These timing signals are derived from **a** voltage-controlled crystal oscillator (VCXO) on the card. Method of VCXO control is based on the timing source selection made during configuration. If CNCE or external standard selection is made, the VCXO is controlled by a phase-locked loop that receives timing from one of the group inputs, If master is selected, the VCXO is driven to its nominal mid-range by the microprocessor, If slave is selected, the VCXO is controlled by the microprocessor in response to control telemetry data received in an incoming SG.

1-15. Demultiplexer Section Block Diagram Discussion (V1/V2 Models).



A frame sync detector circuit on SSV card A2 is time shared by each active demux card. This circuit sequentially monitors each incoming SG for a 20-bit sync word. When the sync word is found, a frame sync (FS) signal is applied to the demux card supplying the SG. This allows the demux card to start operating at the proper time. Thereafter, each demux card performs a sync maintenance function to ensure that it is still in sync. If sync is lost, the demux card is turned off and the frame sync detector would again attempt to acquire sync.

1-15. Demultiplexer Section Block Diagram Discussion (V1/V2 Models) - Continued.

(B) Each demux card contains a group strobe generator which is turned on by a FS signal. This synchronizes the group strobe generator with the incoming SG. The group strobe generator produces a demux strobe for each of the various component parts of the incoming SG. By routing a SG and a specific demux strobe to another circuit, that circuit will use the strobe to extract (demultiplex) designated data out of the incoming serial SG data stream. SG and strobe routing to output buffer cards are controlled by the demux cards in response to configuration data in NVM. Thus, for example, a SG and a demux strobe for specific group data in that SG are routed from a demux card to a particular output buffer input. This enables that output buffer to extract designated group data out of a specific SG.

(C) Output buffer cards A12 through Al 5 provide elastic storage for demultiplexed group data. Each card contains two output buffers. Buffer length is varied dependent on group data rate under microprocessor control. For group data rates of 1024 kb/s and 1152 kb/s, an odd numbered buffer is strapped to its associated even numbered buffer to make one large buffer.

Data are strobed into a buffer by the applied demux strobe. Since the demux strobe is synchronized to the incoming SG, it contains variations due to satellite path delays. Also, data bits for a given group are not regularly spaced in the SG. Thus, data are strobed into a buffer at an irregular rate. Data are clocked out of a buffer by a synchronous buffer output clock timing signal from PLL card A22.

The output of each buffer is routed through a driver and available in a balanced NRZ format. Outputs are also available in a TTL format for use by other cards.

(D) Outputs from buffers 1 through 4 are routed to 660 l/O card A3. Drivers on this card convert the data to an unbalanced NRZ format. If the TD-754 demux option has been selecied, a 1152 kb/s output from buffer 1 and/or buffer 3 will be outputted in parallel, in unbalanced NRZ format, at ports 1 and 2 or 3 and 4.

(E) 660 I/O card A3 also contains circuits to accomplish a multiplexing function normally performed by a TD-754/G (TD-754 mux option), If this option is selected, the data outputs of buffers 5 and 6 (each at 576 kbs/) are combined by card A3 into a 1152 kb/s signal, routed through the driver associated with buffer 5, and made available at port 5 in a balanced NRZ format. Similarly, the outputs of buffers 7 and 8 can be combined and made available at port 7 in a balanced NRZ format.

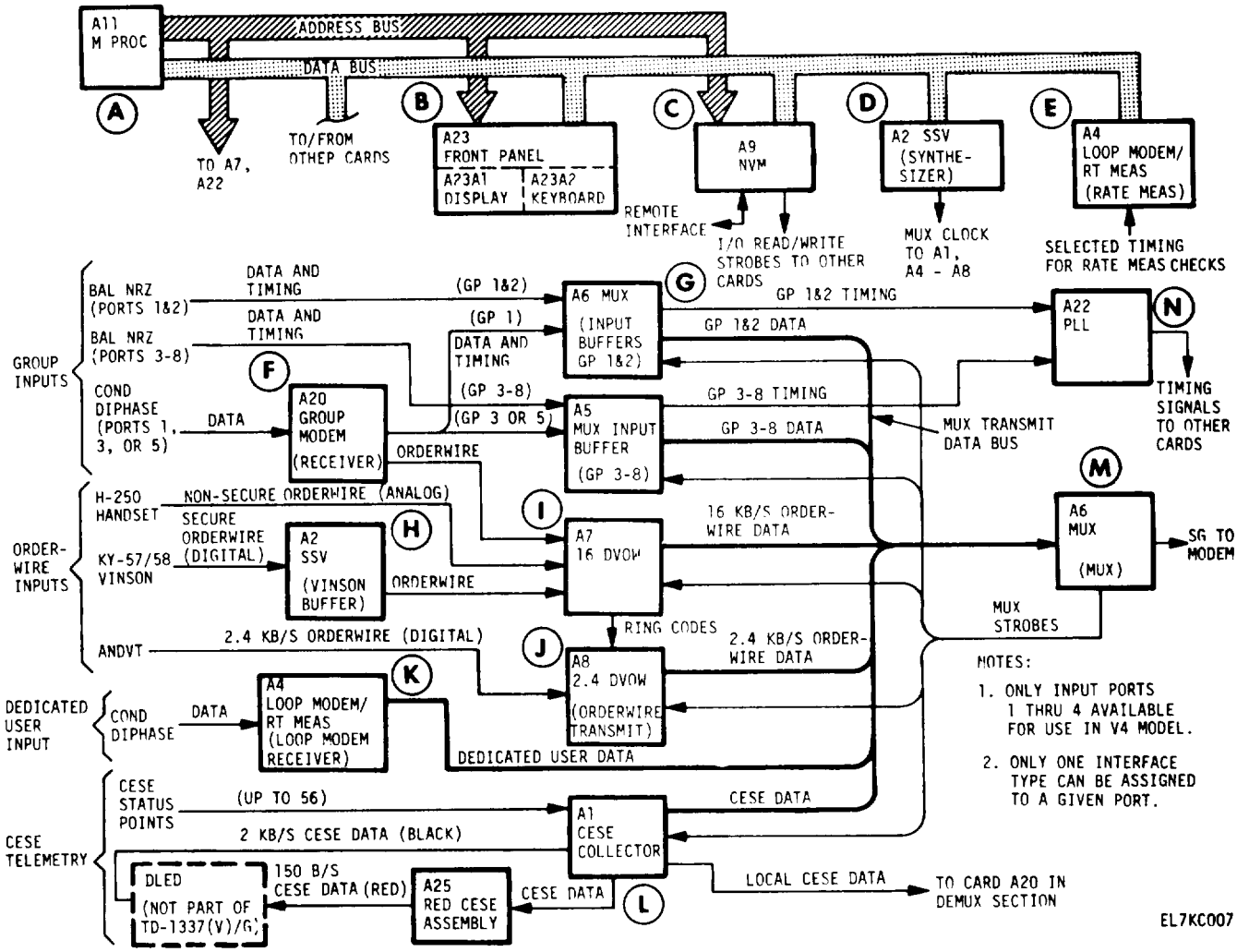
(F) Group data outputs from buffers 1, 3, and 5 are applied to group modem card A20. Also, a 16 kb/s orderwire input is received from 16 DVOW card A7. Based on configuration data in NVM, one of the group data inputs is selected. The orderwire input is also selected if the group data rate is 256 kb/s or higher. The selected group data input is converted to a conditioned diphase format and combined with the orderwire, if present, for transmission to the CNCE.

(G) 16 DVOW card A7 receives a SG and associated demux strobe from each active demux card. These inputs are handled on a first-come, first-sewed basis. A ring detector will detect when an incoming call is for your station. Orderwire data is extracted out of the SG and buffered. Orderwire data are routed to group modem card A20 and the Vinson driver on SSV card A2 if the call is secure. Orderwire data for non-secure calls are routed to the H-250 handset.

(H) The Vinson driver on SSV card A2 converts orderwire data received from 16 DVOW card A7 to a MIL-STD-188-100 format as required by the Vinson.

(I) The loop modem driver on loop modem/rt mess card A4 receives a SG and associated demux strobe from each active demux card, Based on configuration data in NVM, one SG input will be selected for processing. Dedicated user data is extracted from the selected SG, buffered, and converted to a conditioned diphase format for output to the dedicated user.

1-16. Multiplexer Section Block Diagram Discussion (V3/V4 Models).



A M proc card A11 contains the microprocessor and controls TD-1337(V)/8 operation. Data are transferred between the microprocessor and other cards over an 8-bit hi-directional data bus.

B Front panel A23 provides for operator interface. Display card A23A1 provides the operator with information via a 3-line display and five alarm indicators. Keyboard A23A2 is used to enter instructional data or cause messages to be displayed.

C NVM card A9 contains non-volatile memory (NVM) circuits that retain configuration data entered by the operator. Up to two operating configurations can be entered and retained. A battery, on the card, provides power to the memory circuits when the TD-1337(V)/G is turned off or input ac power is lost.

A remote interface function provides for sending (or receiving) configuration data in NVM to (or from) a standby TD-1337(V)/G.

An address decoding function decodes addresses from M proc card A11 to generate I/O read/write strobes. These strobes allow the microprocessor to communicate (write and read data) with other cards over the 8-bit data bus.

D The synthesizer circuit on SSV card A2 produces a mux clock output. The rate of the mux clock is dependent on system operating configuration and will be between 16 kHz and 4664 kHz in 8 kHz steps. Rate of SG output is equal to rate of the mux clock.

E The rate measurement circuit on loop modem/rt mess card A4 measures the frequency of selected timing signals within the TD-1337(V)/G. The frequency of each selected timing signal is counted

1-16. Multiplexer Section Block Diagram Discussion (V3/V4 Models) - Continued.

and compared by the microprocessor to a stored value. Any errors in this measurement result in alarm displays.

(F) The receiver on group modem card A20 processes the group modem conditioned diphase input. A combined digital orderwire may also be received on this input. The group data and orderwire inputs are separated and converted into TTL formats. Timing is recovered from the data. Group data and timing are applied to the respective input buffer. Orderwire data are routed to 16 DVOW card A7.

(G) There are eight input buffers; one for each potential input port. Buffers for groups 1 and 2 are located on mux card A6, Buffers for groups 3 through 8 are on mux input buffer card A5. Each buffer provides an elastic storage function for one group input. Data for each group are clocked into its buffer at its incoming data rate. Data are strobed out of the buffers and onto the mux transmit data bus in response to mux strobes. Thus, data are clocked into each buffer at a regular rate and strobed out when it is to be inserted into the SG.

(H) Incoming 16 kb/s orderwire data from the KY-57/58 Vinson are processed by the Vinson buffer on SSV card A2 for application to 16 DVOW card A7. Processing entails converting the data to a TTL format and buffeting. The KY-57/58 Vinson is not synchronized to the TD-1337(V)/G. Therefore, buffering is required to accommodate for differences between the clock source in the KY-57/58 Vinson and TD-1337(V)/G timing.

(I) 16 DVOW card A7 provides access to the mux transmit data bus for the 16 kb/s orderwires. The three 16 kb/s orderwires are: the Vinson orderwire input from SSV card A2, the CNCE orderwire input from group modem card A20, and the H-250 handset input. Only one input can be accepted at a time, and entry is on a first-come, first-sewed basis. The H-250 handset input is in analog form and is converted to a TTL format by 16 DVOW card A7, Data for a given orderwire are processed and entered into a buffer. Data are strobed out and onto the mux transmit data bus in response to mux strobes. Ring codes to be transmitted are received from the microprocessor and strobed onto the mux transmit data bus.

(J) Orderwire transmit circuits on 2.4 DVOW card A8 provide access to the mux transmit data bus for the 2.4 kb/s ANDVT input. The input is converted to a TTL format and entered into a buffer. In turn, data are strobed out and onto the mux transmit data bus in response to mux strobes. Ring codes to be transmitted are received from 16 DVOW card A7 and strobed onto the mux transmit data bus.

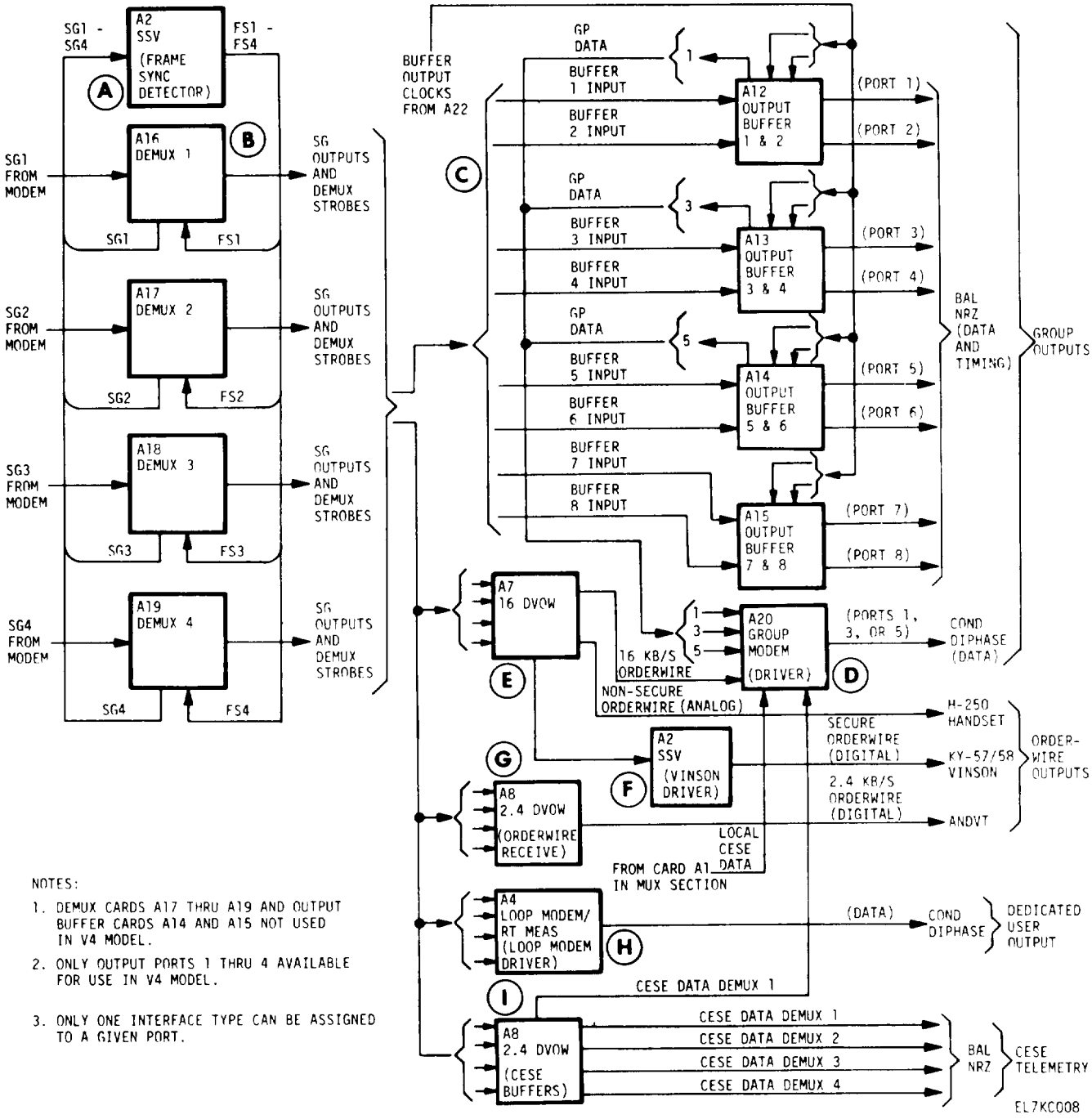
(K) The loop modem receiver on loop modem/rt mess card A4 processes the incoming 16 kb/s or 32 kb/s conditioned diphase dedicated user input. The input is converted to a TTL format and entered into a buffer. Data are strobed out and onto the mux transmit data bus in response to mux strobes.

(L) Under microprocessor control, CESE collector card Al monitors up to 56 external status points. The status points are scanned and a message is assembled that is applied to red CESE assembly A25 which converts the message to a 150 b/s serial data stream for application to an external DLED. The DLED encrypts the message and applies it back to card Al as a 2 kb/s serial data stream. The input from the DLED is converted to a TTL format and entered into a buffer. Data are strobed out and onto the mux transmit data bus in response to mux strobes.

(M) The mux circuits on mux card A6 generate mux strobes that control strobing of data onto the mux transmit data bus. In this way, all parts of the SG are assembled in the proper sequence and at the proper time. Data on the mux transmit data bus are converted to an unbalanced NRZ format and applied to the modem.

(N) PLL card A22 produces the major timing signals used to control TD-1337(V)/G operation. These timing signals are derived from a voltage-controlled crystal oscillator (VCXO) on the card, Method of VCXO control is based on the timing source selection made during configuration. If CNCE or external standard selection is made, the VCXO is controlled by a phase-locked loop that receives timing from one of the group inputs. If master is selected, the VCXO is driven to its nominal mid-range by the microprocessor. If slave is selected, the VCXO is controlled by the microprocessor in response to control telemetry data received in an incoming SG.

1-17. Demultiplexer Section Block Diagram Discussion (V3/V4 Models).



A A frame sync detector circuit on SSV card A2 is time shared by each active demux card. This circuit sequentially monitors each incoming SG for a 20-bit sync word. When the sync word is found, a frame sync (FS) signal is applied to the demux card supplying the SG. This allows the demux card to start operating at the proper time. Thereafter, each demux card performs a sync maintenance function to ensure that it is still in sync. If sync is lost, the demux card is turned off and the frame sync detector would again attempt to acquire sync.

1-17. Demultiplexer Section Block Diagram Discussion (V3/V4 Models) - Continued.

(B) Each demux card contains a group strobe generator which is turned on by a FS signal. This synchronizes the group strobe generator with the incoming SG. The group strobe generator produces a demux strobe for each of the various component parts of the incoming SG. By routing a SG and a specific demux strobe to another circuit, that circuit will use the strobe to extract (demultiplex) designated data out of the incoming serial SG data stream. SG and strobe routing to output buffer cards are controlled by the demux cards in response to configuration data in NVM. Thus, for example, a SG and a demux strobe for specific group data in that SG are routed from a demux card to a particular output buffer input. This enables that output buffer to extract designated group data out of a specific SG.

(C) Output buffer cards Al 2 through Al 5 provide elastic storage for demultiplexed group data. Each card contains two output buffers. Buffer length is varied dependent on group data rate under microprocessor control. For group data rates of 1024 kb/s and 1152 kb/s, an odd numbered buffer is strapped to its associated even numbered buffer to make one large buffer.

Data are strobed into a buffer by the applied demux strobe. Since the demux strobe is synchronized to the incoming SG, it contains variations due to satellite path delays. Also, data bits for a given group are not regularly spaced in the SG. Thus, data are strobed into a buffer at an irregular rate. Data are clocked out of a buffer by a synchronous buffer output clock timing signal from PLL card A22.

The output of each buffer is routed through a driver and available in a balanced NRZ format. Outputs are also available in a TTL format for use by other cards.

(D) Group data outputs from buffers 1, 3, and 5 are applied to group modem card A20. Based on configuration data in NVM, one of the group data inputs is selected for processing.

A 16 kb/s orderwire input and CESE data inputs are also received. CESE data inputs consist of local CESE data from CESE collector card A1 in the multiplexer section and CESE data received through demux 1. Configuration data in NVM will determine which CESE data input is selected for processing. If the group data rate is 256 kb/s or higher, the 16 kb/s orderwire and the selected CESE data input are combined into a digital data orderwire.

The selected group data input is converted to a conditioned diphase format and combined with the digital data orderwire, if present, for transmission to the CNCE.

(E) 16 DVOW card A7 receives a SG and associated demux strobe from each active demux card. These inputs are handled on a first-come, first-sewed basis. A ring detector will detect when an incoming call is for your station. Orderwire data is extracted out of the SG and buffered. Orderwire data are routed to group modem card A20 and the Vinson driver on SSV card A2 if the call is secure. Orderwire data for non-secure calls are routed to the H-250 handset.

(F) The Vinson driver on SSV card A2 converts orderwire data received from 16 DVOW card A7 to a MIL-STD-188-100 format as required by the Vinson.

(G) Orderwire receive circuits on 2.4 DVOW card A8 receive a SG and associated demux strobe from each active demux card. These inputs are handled on a first-come, first-sewed basis. 2.4 kb/s orderwire data is extracted out of the SG, buffered, and converted to a MIL-STD-188-100 format as required by the ANDVT.

(H) The loop modem driver on loop modem/rt mess card A4 receives a SG and associated demux strobe from each active demux card. Based on configuration data in NVM, one SG input will be selected for processing. Dedicated user data is extracted from the selected SG, buffered, and converted to a conditioned diphase format for output to the dedicated user.

(I) There are four CESE buffers on 2.4 DVOW card A8. Each buffer extracts CESE data out of a received SG, buffers the data, and outputs it in a balanced NRZ format.

CHAPTER 2
MAINTENANCE INSTRUCTIONS

Section I. SERVICE UPON RECEIPT

OVERVIEW

This section provides service upon receipt instructions.

. Normally, you will receive your TD-1337(V)/G already installed in a rack with proper cabling connected. However, if you have to plan a TD-1337(V)/G installation, refer to paragraphs 2-2 through 2-5 which contain physical and electrical interface requirements.

. Unpacking instructions are contained in paragraphs 2-6 and 2-7.

. Refer to paragraph 2-16 for procedures to install a TD-1337(V)/G.

2-1. Site and Shelter Requirements.

The TD-1337(V)/G is designed to be installed in an equipment rack and operated in the environment of a shelter or a fixed plant. Normally, you will receive your TD-1337(V)/G already installed in a rack with proper cabling connected. In this case, appropriate physical and electrical interface requirements were considered and accounted for during design of the rack. Use the information in paragraphs 2-2 through 2-5 if you have to plan a TD-1337(V)/G installation.

2-2. Power Requirements.

The TD-1337(V)/G requires an external power input of 115v (103.5 to 126.5v), 45 to 440 Hz, 140 watts maximum.

2-3. Rack Mounting Requirments.

The TD-1337(V)/G is built for mounting in a 19-inch equipment rack. The following conditions must be considered in the installation planning.

a. Mounting *S/ides. The* TD-1337(V)/G is slide mounted in an equipment rack. One set of inner-channel slides and one set of matching outer-channel slides are required to support the TD-1337(V)/G in a rack. The inner-channel slides SM-D-777131-6 (right) and SM-D-777132-6 (left) come installed on a TD-1337(V)/G. The outer-channel slides SM-D-777131-5 (right) and SM-D-777132-5 (left) are not supplied with a TD-1337(V)/G. These slides must be obtained and mounted in the rack.

b. Rack Cooling System. The rack cooling system must be capable of supplying at least 50 cfm (1.42 cu m/min) of air flow for cooling the TD-1337(V)/G. This air is directed into the side panel air inlet and over the power supply. The temperature of the cooling air must not exceed 145°F (62.8°C).

2-3. Rack Mounting Requirements - Continued.

c. Space Requirements. Approximately 24 inches of clearance is required directly in front of the rack. When the TD-1337(V)/G is pulled out on the slides, there must be sufficient clearance to service the sides, top, bottom, and rear of the unit. The rack must contain adequate space to make the necessary cable connections, with service loops, to the rear of the TD-1337(V)/G.

d. Location *in Rack.* When mounting the TD-1337(V)/G in a rack, choose a location in the rack that is not at the extreme bottom or top of the rack. Operator actions are accomplished at the keyboard and display located on the front of the TD-1337(V)/G. Organizational maintenance tasks will require access to the top of the TD-1337(V)/G when it is pulled out on the slides.

2-4. Interface Connector Data.

All external connections are made to connectors J1 through J12 located cm the rear of the TD-1337(V)/G. As explained in paragraph 1-10, each TD-1337(V)/G model has a different complement of rear connectors. The following chart provides data as to what type connector will mate with each TD-1337(V)/G rear connector. Paragraph 2-5 lists the signals for each pin of each rear connector.

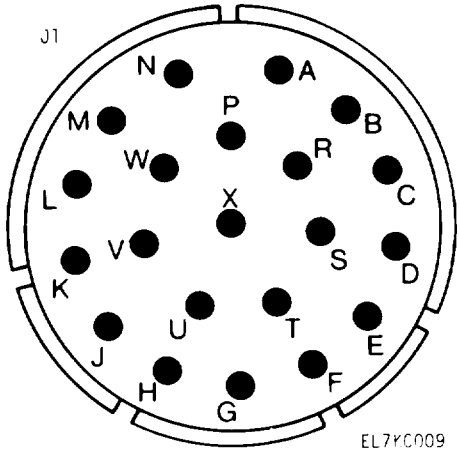
TD-1337(V)/G Connector Data

TD-1337(V)/G connector		Mating connector type	Function
No.	Type		
J1	MS27656T23B21P	MS27467T23B21S	Supergroups
J2	MS27656T13B35PA	MS27467T13B35SA	Remote interface
J3	MS27656T17B8P	MS27467T17B8S	Conditioned diphase (group modem)
J4	MS27656T17B35PA	MS27467T17B35SA	CESE telemetry, 2.4 DVOW, and DLED interface (black) (V3 and V4 models only)
J5	MS3114E-12-3P	MS3116E-12-3S	Ac power input
J6	MS27656T17B35P	MS27467T17B35S	Balanced NRZ groups 1 thru 4
J7	MS27656T17B35P	MS27467T17B35S	Balanced NRZ groups 5 thru 8 (V1 and V3 models only)
J8	MS27656T21B35P	MS27467T21B35S	CESE status point inputs (V3 and V4 models only)
J9	MS27656T21B16P	MS27467T21B16S	Unbalanced NRZ (TD-660) groups 1 and 2 (V1 and V2 models only)
J10	MS27656T9B35P	MS27467T9B35S	DLED interface (red) (V3 and V4 models only)
J11	MS27656T21B16P	MS27467T21B16S	Unbalanced NRZ (TD-660) groups 3 and 4 (V1 model only)
J12	MS27656T13B35P	MS27467T13635S	Vinson interface, 16/32 kb/s dedicated user, and remote alarms

2-5. Rear Connector Signal-To-Pin Relationships.

Each of the 12 rear connectors are shown below. Adjacent to each connector is a chart listing the signal on each connector pin. The "I/O" column of each chart identifies whether the signal is an input (I) or output (0) signal.

a. *Connector J1.* Supergroups enter and exit the TD-1337(V)/G through this connector.



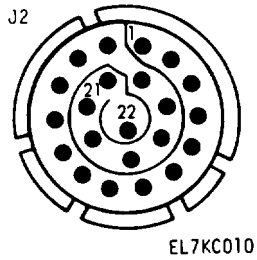
J1 Signal-To-Pln Relationship

Pin	I/O	Signal
A	o	Mux transmit timing
B	0	Mux transmit timing shield
c	0	Mux transmit data
D	0	Mux transmit data shield
E	I	Demux 1 received timing
F	I	Demux 1 received timing shield
G	I	Demux 2 received timing
H	I	Demux 2 received timing shield
J	I	Demux 3 received timing
K	I	Demux 3 received timing shield
L	I	Demux 4 received timing
M	I	Demux 4 received timing shield
N	I	Demux 1 received data
P	I	Demux 1 received data shield
R	I	Demux 2 received data
s	I	Demux 2 received data shield
T	1	Demux 3 received data
u	I	Demux 3 received data shield
v	I	Demux 4 received data
w	I	Demux 4 received data shield
x	--	Not used

b. *Connector* J2. Remote interface signals to/from a standbyTD-1337(V)/G use this connector.

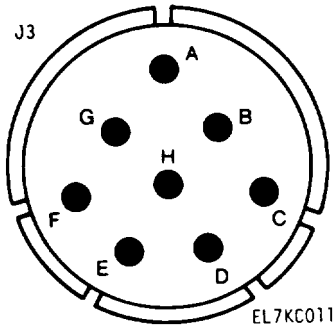
J2 Signal-To-Pin Relationship

Pin	I/O	Signal
1	O	NVM 5v supply
2	I	NVM 5v load
3-14	--	Not used
15	O	Transmitter data
16	I	Receiver data
17	O	Data terminal ready
18	I	Data set ready
19	O	Request to send
20	I	Clear to send
21	--	Ground
22	--	Ground



2-5. Rear Connector Signal-To-Pin Relationships - Continued.

c. Connector J3. Conditioned diphase signals to/from a CNCE (group modem) use this connector.



J3 Signal-To-Pln Relationship

Pin	I/O	Signal
A	I	Conditioned diphase modem receive data
B	I	Conditioned diphase modem receive data shield
C,D	--	Not used
E	0	Conditioned diphase modem transmit data
F	0	Conditioned diphase modem transmit data shield
G,H	--	Not used

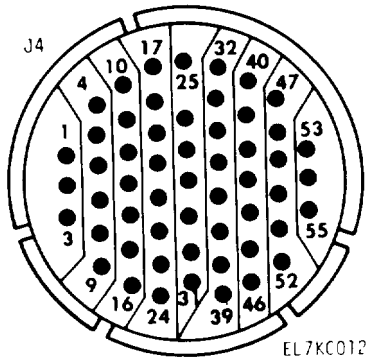
d. Connector J4 (V3 and V4 models only). This connector is used for CESE telemetry output signals, input/output signals for 2.4 kb/s ANDVT, and input signals from the DLED.

J4 Signal-To-Pin Relationship

Pin	I/O	Signal
1	o	32 kHz clock low side
2	0	32 kHz clock high side
3,4	..	Not used
5	0	CESE data demux 1 low side
6	0	CESE data demux 1 high side
7	0	CESE data demux 2 low side
8	0	CESE data demux 2 high side
9,10	--	Not used
11	0	CESE data demux 3 low side
12	0	CESE data demux 3 high side
13	0	CESE data demux 4 low side
14	0	CESE data demux 4 high side
15-21	..	Not used
22	0	Analog-to-digital voice telephone transmit data return
23	0	Analog-to-digital voice telephone transmit data
24	I	Analog-to-digital voice telephone receive data
25-29	..	Not used
30	I	Analog-to-digital voice telephone receive data ground
31	I	Analog-to-digital voice telephone receive timing ground
32-36	..	Not used
37	0	Analog-to-digital voice telephone transmit timing return

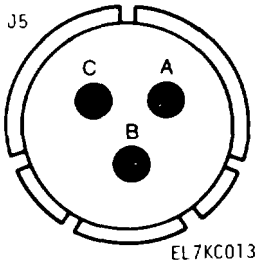
J4 Signal-To-Pin Relationship - Continued

Pin	I/O	Signal
38	o	Analog-to-digital voice telephone transmit timing
39	I	Analog-to-digital voice telephone receive timing
40-47	.-	Not used
48	0	DLED clock
49	0	DLED clock return
50	I	DLED timing
51	I	DLED timing return
52,53	--	Not used
54	I	DLED data
55	I	DLED data return



2-5. Rear Connector Signal-To-Pin Relationships - Continued.

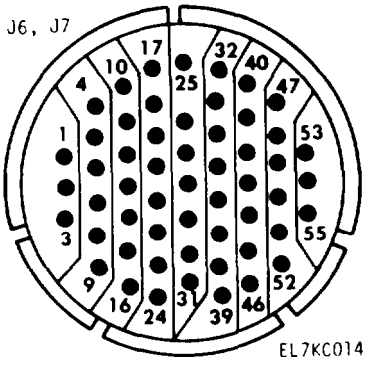
e. Connector J5. Input ac power is routed through this connector.



J5 Signal-To-Pin Relationship

Pin	I/O	Signal
A	I	115v ac
B	I	Ground
c	I	Neutral

f. *Connectors* J6 (all models) and J7 (V1 *and* V3 *models on/y).* These connectors are used for balanced NRZ inputs/outputs. Connector J6 is for groups 1 through 4 and connector J7 is for groups 5 through 8.



J6 Signal-To-Pin Relationship

Pin	I/O	Signal
1	I	Receive timing group 1 low side
2	I	Receive timing group 1 high side
3	--	Not used
4	O	Transmit timing buffer 1 low side
5	O	Transmit timing buffer 1 high side
6	I	Receive timing group 1 shield
7	I	Receive data group 2 shield
8	I	Receive timing group 2 low side
9	I	Receive timing group 2 high side
10	O	Transmit data buffer 1 shield
11	O	Transmit timing buffer 1 shield
12	I	Receive data group 1 shield
13	I	Receive data group 2 low side
14	I	Receive data group 2 high side
15	I	Receive timing group 2 shield
16	O	Transmit timing buffer 2 shield
17	O	Transmit data buffer 1 low side
18	O	Transmit data buffer 1 high side
19	I	Receive data group 1 low side
20	I	Receive data group 1 high side

J6 Signal-To-Pin Relationship - Continued

Pin	1/0	Signal
21	O	Transmit data buffer 2 low side
22	O	Transmit data buffer 2 high side
23	O	Transmit timing buffer 2 low side
24	O	Transmit timing buffer 2 high side
25,26	--	Not used
27	O	Transmit data buffer 3 shield
28	--	Not used
29	O	Transmit data buffer 2 shield
30,31	--	Not used
32	O	Transmit timing buffer 3 low side
33	O	Transmit timing buffer 3 high side
34	O	Transmit data buffer 3 low side
35	O	Transmit data buffer 3 high side
36	I	Receive data group 4 low side
37	I	Receive data group 4 high side
38	O	Transmit data buffer 4 low side
39	O	Transmit data buffer 4 high side
40	O	Transmit timing buffer 3 shield
41	I	Receive timing group 3 shield
42	I	Receive data group 3 low, side
43	I	Receive data group 3 high side
44	I	Receive data group 4 shield
45	O	Transmit timing buffer 4 shield
46	O	Transmit data buffer 4 shield
47	I	Receive timing group 3 low side
48	I	Receive timing group 3 high side
49	I	Receive data group 3 shield
50	I	Receive timing group 4 shield
51	O	Transmit timing buffer 4 low side
52	O	Transmit timing buffer 4 high side
53	--	Not used
54	I	Receive timing group 4 low side
55	I	Receive timing group 4 high side

2-5. Rear Connector Signal-To-Pin Relationships - Continued.

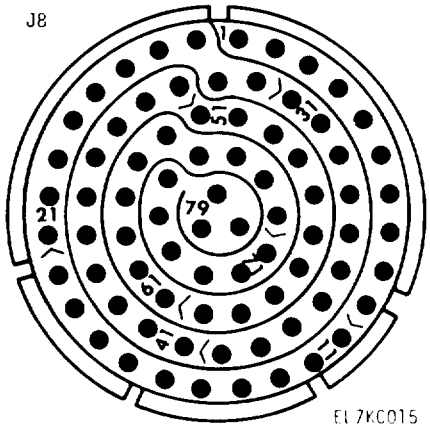
J7 Signal-To-Pin Relationship

Pin	I/O	Signal
1	I	Receive timing group 5 low side
2	I	Receive timing group 5 high side
3	--	Not used
4	O	Transmit timing buffer 5 low side
5	O	Transmit timing buffer 5 high side
6	I	Receive timing group 5 shield
7	I	Receive data group 6 shield
8	I	Receive timing group 6 low side
9	I	Receive timing group 6 high side
10	O	Transmit data buffer 5 shield
11	O	Transmit timing buffer 5 shield
12	I	Receive data group 5 shield
13	I	Receive data group 6 low side
14	I	Receive data group 6 high side
15		Receive timing group 6 shield
16	O	Transmit timing buffer 6 shield
17	O	Transmit data buffer 5 low side
18	O	Transmit data buffer 5 high side
19	I	Receive data group 5 low side
20	I	Receive data group 5 high side
21	O	Transmit data buffer 6 low side
22	O	Transmit data buffer 6 high side
23	O	Transmit timing buffer 6 low side
24	O	Transmit timing buffer 6 high side
25,26	--	Not used
27	O	Transmit data buffer 7 shield
28	--	Not used

J7 Signal-To-Pin Relationship - Continued

Pin	I/O	Signal
29	O	Transmit data buffer 6 shield
30,31	--	Not used
32	O	Transmit timing buffer 7 low side
33	O	Transmit timing buffer 7 high side
34	O	Transmit data buffer 7 low side
35	O	Transmit data buffer 7 high side
36	I	Receive data group 8 low side
37	I	Receive data group 8 high side
38	O	Transmit data buffer 8 low side
39	O	Transmit data buffer 8 high side
40	O	Transmit timing buffer 7 shield
41	I	Receive timing group 7 shield
42	I	Receive data group 7 low side
43	I	Receive data group 7 high side
44	I	Receive data group 8 shield
45	O	Transmit timing buffer 8 shield
46	O	Transmit data buffer 8 shield
47	i	Receive timing group 7 low side
48	I	Receive timing group 7 high side
49	I	Receive data group 7 shield
50	I	Receive timing group 8 shield
51	O	Transmit timing buffer 8 low side
52	O	Transmit timing buffer 8 high side
53	--	Not used
54	I	Receive timing group 8 low side
55	I	Receive timing group 8 high side

g. Connector J8 (V3 and V4 models only). CESE status point inputs are routed through connector J8. There is a CESE message that will be displayed as part of the alarms recall routine (see TM 11-7025-221 -10) when a CESE status point input reports a failure condition. The failure message associated with each status point input is shown in parenthesis. For example, “945TX1” is the message that would be displayed if status point 1 reports a failure. Status points 51 through 56 are spares and have no message assignments.



J8 Signal-To-Pin Relationship

Pin	I/O	Signal
1	I	Status point 1 (945TX1)
2	I	Status point 2 (945RX1)
3	I	Status point 3 (945TX2)
4	I	Status point 4 (945RX2)
5	I	Status point 5 (945TX3)
6	I	Status point 6 (945RX3)
7	I	Status point 7 (945TX4)
8	i	Status point 8 (945RX4)
9	I	Status point 9 (945TX5)

2-5. Rear Connector Signal-T&Pin Relationships - Continued.

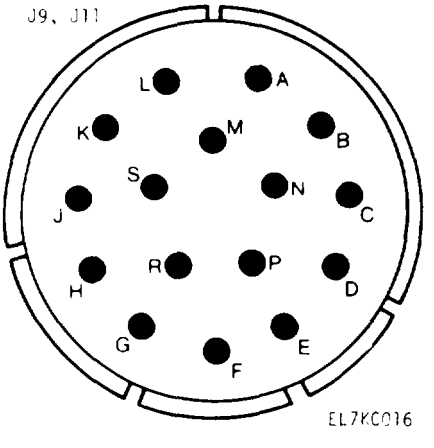
J8 Signal-To-PIn Relationship - Continued

Pin	I/O	Signal
10	I	Status point 10 (945RX5)
11	I	Status point 11 (AJ1TX)
12	I	Status point 12 (AJ1RX1)
13	I	Status point 3 (AJ1RX2)
14	I	Status point 4 (AJ1RX3)
15	I	Status point 5 (AJ1RX4)
16	I	Status point 6 (AJ2TX)
17	I	Status point 7 (AJ2RX1)
18	I	Status point 8 (AJ2RX2)
19	I	Status point 9 (AJ2RX3)
20	I	Status point 20 (AJ2RX4)
21	I	Status point 21 (DCSCU1)
22	I	Status point 22 (DCSCU2)
23	I	Status point 23 (HPA1)
24	I	Status point 24 (HPA2)
25	I	Status point 25 (DLED)
26	I	Status point 26 (TED1)
27	I	Status point 27 (TED2)
28	I	Status point 28 (TED3)
29	I	Status point 29 (TED4)
30	I	Status point 30 (TED5)
31	I	Status point 31 (TED6)
32	I	Status point 32 (LRM1TX)
33	I	Status point 33 (LRM1RX)

J8 Signal-To-Pin Relationahip - Continued

Pin	I/O	Signal
34	I	Status point 34 (LRM2TX)
35	I	Status point 35 (LRM2RX)
36	I	Status point 36 (LRM3TX)
37	I	Status point 37 (LRM3RX)
38	I	Status point 38 (LRM4TX)
39	I	Status point 39 (LRM4RX)
40	I	Status point 40 (LRM5TX)
41	I	Status point 41 (LRM5RX)
42	I	Status point 42 (LRM6TX)
43	I	Status point 43 (LRM6RX)
44	I	Status point 44 (GMSA)
45	I	Status point 45 (TSSP1T)
46	I	Status point 46 (TSSP1R)
47	I	Status point 47 (TSSP2T)
48	I	Status point 48 (TSSP2R)
49	I	Status point 49 (TRANS1)
50	I	Status point 50 (TRANS2)
51		Status point 51 – spare
52	I	Status point 52 – spare
53	I	Status point 53 – spare
54	I	Status point 54 – spare
55	I	Status point 55 – spare
56	I	Status point 56 – spare
57-79	I.	Not used

h. Connectors J9 (V1 and V2 models only) and J11 (V1 model only). These connectors are used for unbalanced NRZ (TD-660) inputs/outputs. Connector J9 is for groups 1 and 2 and connector J11 is for groups 3 and 4.



J9 Signal-To-Pin Relationship

Pin	I/O	Signal
A	I	Receive data from TD-660 group 1
B	I	Receive data group 1 shield
C,D		Not used
E	O	Unbalanced timing group 1
F	C	Unbalanced timing group 1 shield
G	O	Unbalanced timing group 2
H	O	Unbalanced timing group 2 shield
J,K	--	Not used
L	I	Receive data from TD-660 group 2
M	I	Receive data group 2 shield
N	O	Unbalanced data group 1
P	O	Unbalanced data group 1 shield
R	O	Unbalanced data group 2
S	O	Unbalanced data group 2 shield

2-5. Rear Connector Signal-To-Pin Relationships - Continued.

J11 Signal-To-Pin Relationship

Pin	I/o	Signal
A	I	Receive data from TD-660 group 3
B	I	Receive data group 3 shield
C,D	--	Not used
E	0	Unbalanced timing group 3
F	0	Unbalanced timing group 3 shield
G	0	Unbalanced timing group 4
H	0	Unbalanced timing group 4 shield

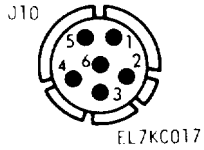
J11 Signal-To-Pin Relationship - Continued

Pin	I/O	Signal
J,K	--	Not used
L	I	Receive data from TD-660 group 4
M	I	Receive data group 4 shield
N	0	Unbalanced data group 3
P	0	Unbalanced data group 3 shield
R	0	Unbalanced data group 4
s	0	Unbalanced data group 4 shield

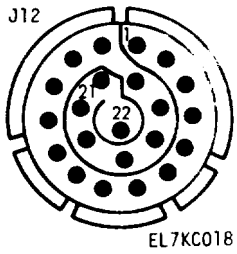
i. Connector J10 (V3 and V4 models only). Signals to the DLED (in red form) are routed through this connector.

J10 Signal-To-Pin Relationship

Pin	I/O	Signal
1	--	Signal ground
2	O	DLED data high side (to DLED)
3-5	--	Not used
6	--	Case ground



j. Connector J12. This connector is used for input/output signals for the Vinson, input/output signals for the dedicated user, and TD-1337(V)/G remote alarm signals.



J12 Signal-To-Pin Relationship

Pin	I/O	Signal
1	--	Ground
2	I	Vinson data in (from Vinson)
3	0	Vinson data out (to Vinson)
4	I	Vinson press-to-talk
5	--	Not used
6	I	Loop modem receive data low side
7	I	Loop modem receive data high side
8	0	Loop modem transmit data low side
9	0	Loop modem transmit data high side
10	--	Not used
11	--	Ground
12	0	Receive alarm
13	0	Transmit alarm
14	--	Ground
15-22	--	Not used

2-6. Unpacking.

There are no special or unique unpacking requirements for the TD-1337(V)/G. No loose or separate parts or cables are shipped with a TD-1337(V)/G.

2-7. Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on SF 364 (Report of Discrepancy).

b. Check the equipment against the packing slip to see if the equipment is complete. Report all discrepancies with the instructions of TM 36-750.

c. Perform (1) through (5) below to check that correct complement of plug-in cards are installed and that red jumper plugs are installed on certain plug-in cards. Report all discrepancies with the instructions of TM 36-750. Correct any discrepancies.

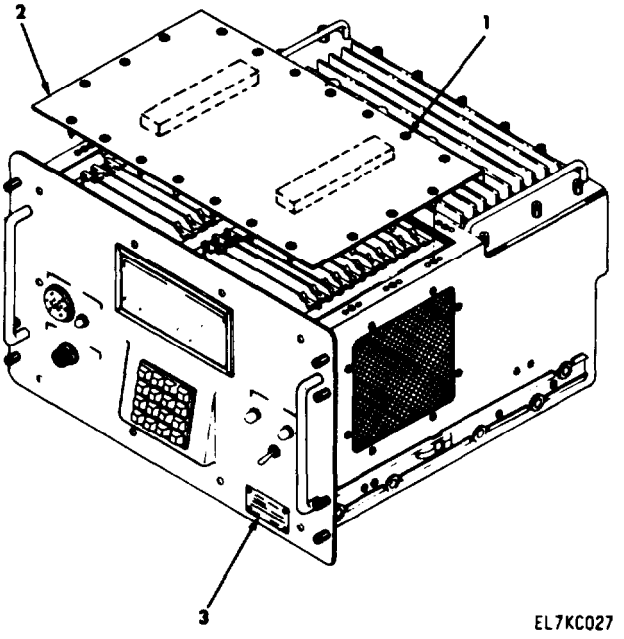
(1) Use cross tip No. 2 screwdriver and loosen 20 fasteners (1) and remove top cover (2).

(2) Check that identification plate (3) has proper model designation (V1, V2, V3, or V4) listed. If model designation is missing or you suspect it is wrong, look at rear connectors to confirm which model you have. (Rear connectors on each model are shown on page 1-6.) Enter correct model designation on plate if it is missing.

(3) Use following list and check that correct complement of plug-in cards are installed for your model. There should be a plug-in card installed in cacti card slot that has an “X’ listed under your model number.

	Model			
Card Slot	V1	V2	V3	V4
XA1			X	X
XA2	X	X	X	X
XA3	X	X		
XA4	X	X	X	X
XA5	X		X	X
XA6	X	X	X	X
XA7	X	X	X	X
XA8			X	X
XA9	X	X	X	X
XA10				
XA11	X	X	X	X

	Model			
Card Slot	V1	V2	V3	V4
XA12	X	X	X	X
XA13	X		X	X
XA14	X		X	
XA15	X		X	
XA16	X	X	X	X
XA17	X		X	
XA18	X		X	
XA19	X		X	
XA20	X	X	X	X
XA21				
XA22	X	X	X	X



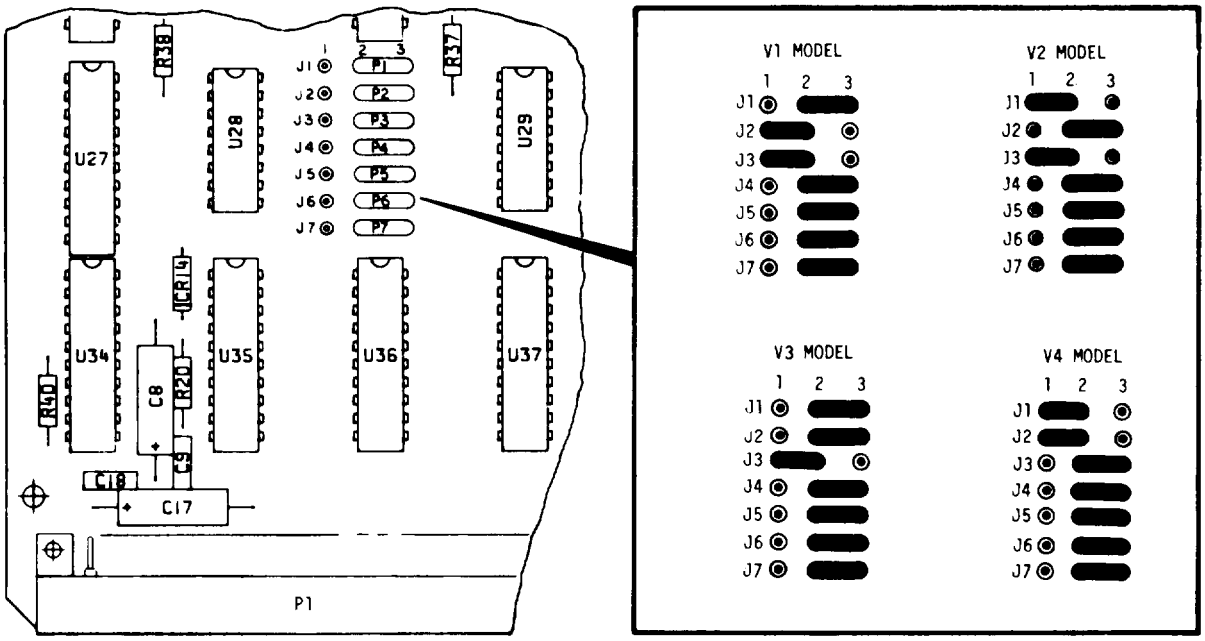
EL7KC027

1. FASTENER (20)
2. TOP COVER
3. IDENTIFICATION PLATE

2-7. Checking Unpacked Equipment - Continued.

(4) One-at-a-time, pull each below listed card, perform the indicated check, and then reinstall card.

Card	Card slot	Card part No.	Check
A2	XA2	SM-D-978560	That red jumper plugs are installed in J1 through J6.
A7	XA7	SM-D-978585	That red jumper plugs are installed in J1 and J2.
A9	XA9	SM-D-978555	That red jumper plugs are installed in proper positions in J1 through J7 for your model as shown on below illustration. If necessary, rearrange red jumper plugs to proper positions.
A11	XA11	SM-D-978550/ SM-D-978630	That SM-D-978550 card is installed in V1 or V2. That SM-D-978630 card is installed in V3 or V4.
A20	XA20	SM-D-978605	That red jumper plugs are installed in J1 and J2.



NVM CARD A9 JUMPER PLUG ARRANGEMENT

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(5) Position top cover (2) on card file and tighten 20 fasteners (1).

d. Check to see whether the equipment has been modified.

2-8. installation instructions.

The TD-1337(V)/G is installed with quick-disconnect slides in a 19-inch equipment rack. Perform the “installation” portion of paragraph 2-16 to install a TD-1337(V)/G. After installation, perform the operational test in paragraph 2-17.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES (PMCS)

There are no PMCS applicable to organizational maintenance.

Section III. TROUBLESHOOTING

OVERVIEW

This section contains troubleshooting procedures for isolating a malfunction to an assembly or item that organizational maintenance is authorized to replace. Malfunctions are detected by an abnormal front panel display, by communications from personnel at another equipment location, or by the inability to process orderwire calls.

Always start troubleshooting by using the procedures in paragraph 2-9. The procedures in this paragraph will direct you to replace suspected faulty assemblies, and in some cases direct you to another paragraph to continue troubleshooting. If replacement of the items called out in the troubleshooting procedures does not correct the fault, refer the problem to DS maintenance.

The troubleshooting procedures in this section do not cover faulty system operation that could be caused by improper system configuration data entered in NVM. If you suspect a configuration problem, the orderwire and system configuration data in NVM should be displayed and checked using the display routines in TM 11-7025-221-10.

If during the course of troubleshooting, you observe physical damage (such as broken wiring) beyond your authorized repair capability, report the problem to next higher level of maintenance.

2-9. TD-1337(V)/G Troubleshooting.

Use the procedures in this paragraph to start troubleshooting a TD-1337(V)/G. The troubleshooting procedures are In the form of an easy to follow flowchart. The flowchart is arranged so that you will identify and replace the faulty assembly or be directed to another paragraph to continue troubleshooting.

a. *Description of Troublshooting Flowchart. The* left-hand side of each flowchart page contains a series of decision blocks with each block describing a particular fault condition. Adjacent to each block Is the action to be taken for that fault condition. Following are descriptions of these fault conditions.

(1) POWER AC or DC *Indicators Off.* Either or both of these indicators being off indicates a power problem.

(2) *ALARMS hdicator(s) Lit.* There is a block for each ALARMS indicator. One or more of these Indicators will light when the TD-1337(V)/G detects a fault. if more than one indicator is lit, perform the action with the first lit indicator appearing In the flowchart.

(3) *Display/Keyboard Problem.* Use this block to start troubleshooting when entries made on keyboard are not displayed correctly (or missing) on display.

(4) *Dedicated User Problem.* There would be no ALARMS indicator lit. Use this block to start troubleshooting when a problem is reported by the dedicated user.

(5) Download To Standby Problem. There would be no ALARMS indicator lit, Use this block to start troubleshooting when it is determined that a download standby routine cannot be performed properly with a standby TD-1337(V)/G.

(6) Orderwire *Problem.* There would be no ALARMS indicator lit. Use this block to start troubleshooting when you have an orderwire probliem.

(7) *Group Problem.* There would be no ALARMS indicator lit. Use this block to start troubleshooting when a problem is reported by a earth-side user connected to one of your input/output ports.

(8) Control Te/emetry Problem. There would be no ALARMS indicator lit. Use this block to start troubleshooting when you cannot perform a transmit download routine or receive control telemetry routine Property.

(9) CNCE *Reports Loss of CESE.* There would be no ALARMS indicator lit. Use this block to start troubleshooting when the CNCE reports a loss of CESE data.

b. *Use of Troubleshooting Flowchart. Go* to the START entry in the flowchart. Proceed through the blocks until your fault condition is described. if you have more than one fault condition, perform the troubleshooting actions for the first faulot condition appearing in the flowchart. Then, proceed to any remaining fault conditions. Troubleshooting is completed when no fault conditions exist. Some troubleshooting actions direct you to replace more than one assembly. in these cases, replace them one at a time, in the order hated, until fault no longer exists. At the conclusion of troubleshooting, replace any substituted assemblies with the original assemblies (except for faulty ones). Use appropriate replacement procedures as directed in c below.

2-9. TD-1337(V)/G Troubleshooting - Continued.

c. Replacement Procedures. When the flowchart directs you to replace an item, replace it by using the instructions for the item as listed in the below chart.

●● CAUTION ●●

Cooling air flow through TD-1337(V)/G is interrupted when TD-1337(V) is extended out of rack. Remove top cover and limit operating time to one hour when cooling air is not being applied to TD-1337(V)/G. Otherwise, excessive heating condition may occur and cause damage to electrical components.

NOTES

- Remember that when replacing cards A2, A7, A9, and A20 you must check for certain jumper plugs being installed,
- Remember that when replacing card A9 it may be necessary to re-enter system configuration data.

Replacement Procedures References

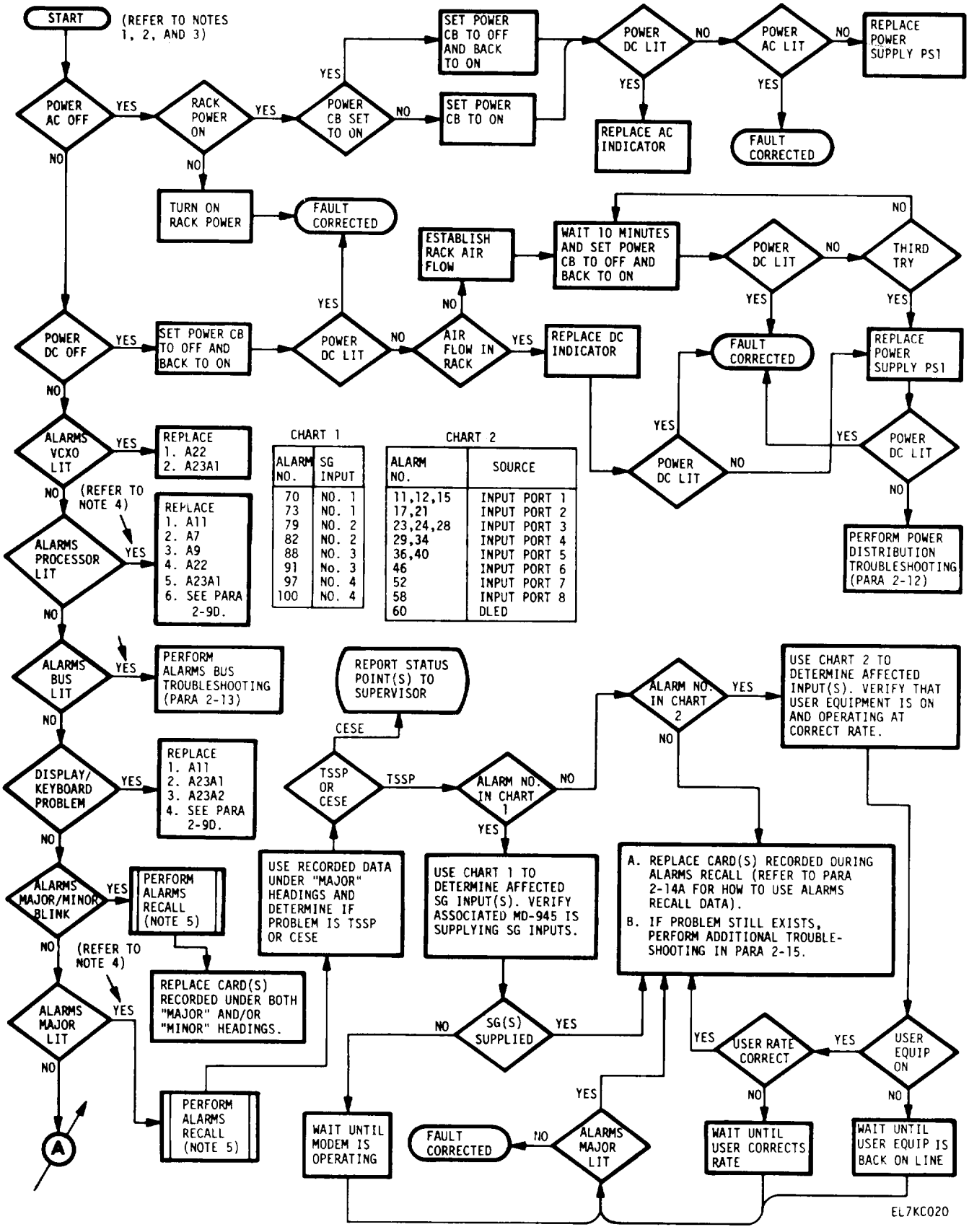
Item	Para No.	Remarks
PS1	2-20	Replace power supply PS1 in TD-1337(V)/G
AC or DC Indicator	2-19	Replace POWER AC or DC indicator on front panel
A1 thru A22	2-18	Replace plug-in card(s) in card file
A23	2-21	Remove and install front panel on TD-1337(V)/G
A23A1	2-22	Replace display card on front panel
A23A2	2-23	Replace keyboard on front panel
A25	2-24	Replace red CESE assembly
TD-1337(V)/G	2-16	Remove and install in rack

NOTE

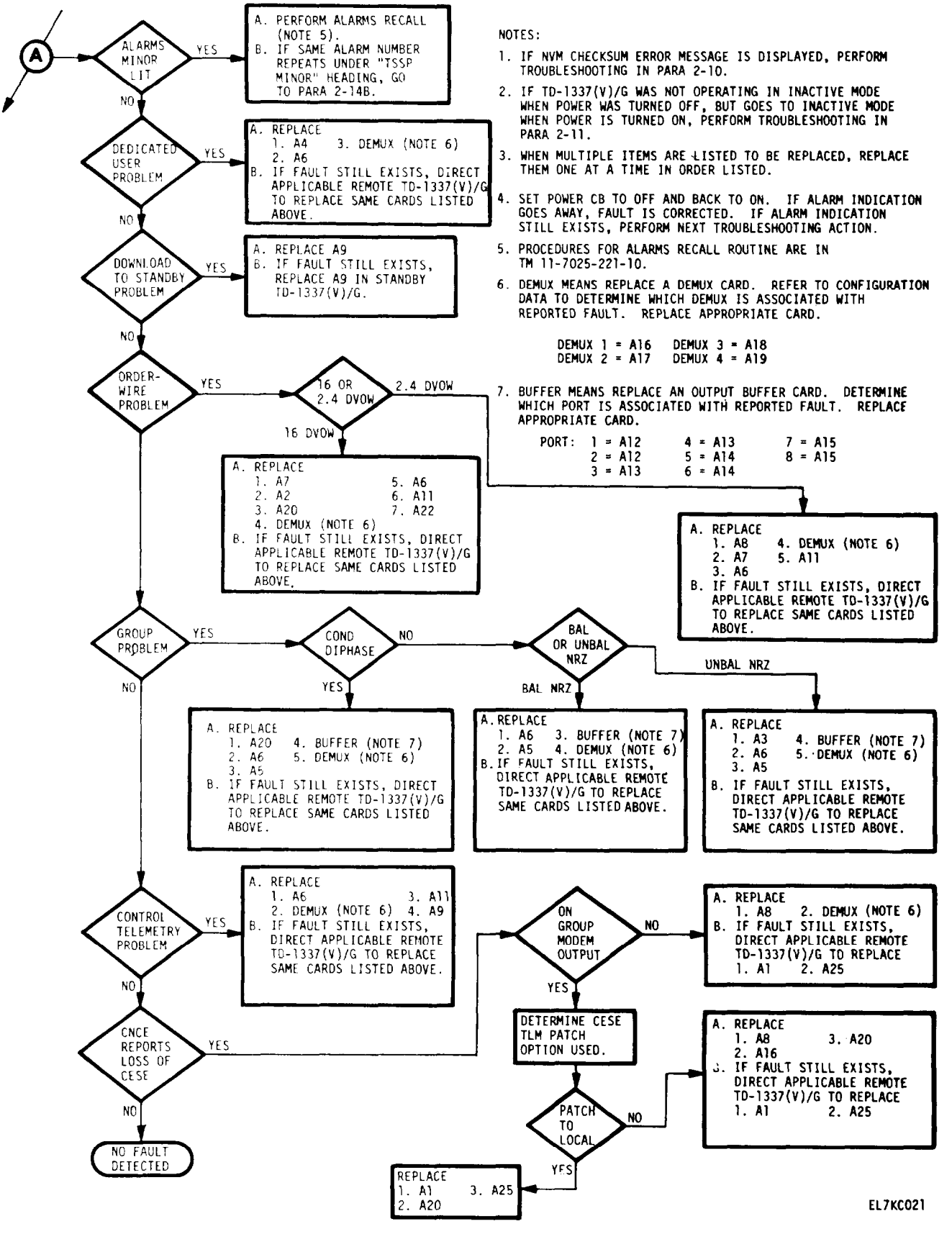
Use the following instructions only when directed to do so in flowchart.

d. flowchart *Supplementary Troubleshooting.* Certain faults can inhibit processing and display operations which, in turn, affect diagnostic presentations. Typically, these conditions will light the ALARMS PROCESSOR indicator; or all ALARMS indicators are off and the display cannot be activated. When these conditions exist, and replacement of the assemblies associated with the ALARMS PROCESSOR LIT or DISPLAY/KEYBOARD PROBLEM actions do not correct the problem, you are directed to this subparagraph. At this time, perform the ALARM BUS troubleshooting procedures in paragraph 2-13. These procedures will enable you to find the faulty assembly and correct the problem. When using the procedures in paragraph 2-13, it is not necessary that you replace those assemblies that you have already replaced prior to being directed to this paragraph by the flowchart.

2-9. TD-1337(V)/G Troubleshooting - Continued.



2-9. TD-1337(V)/G Troubleshooting - Continued



2-10. NVM CHECKSUM ERROR Troubleshooting.

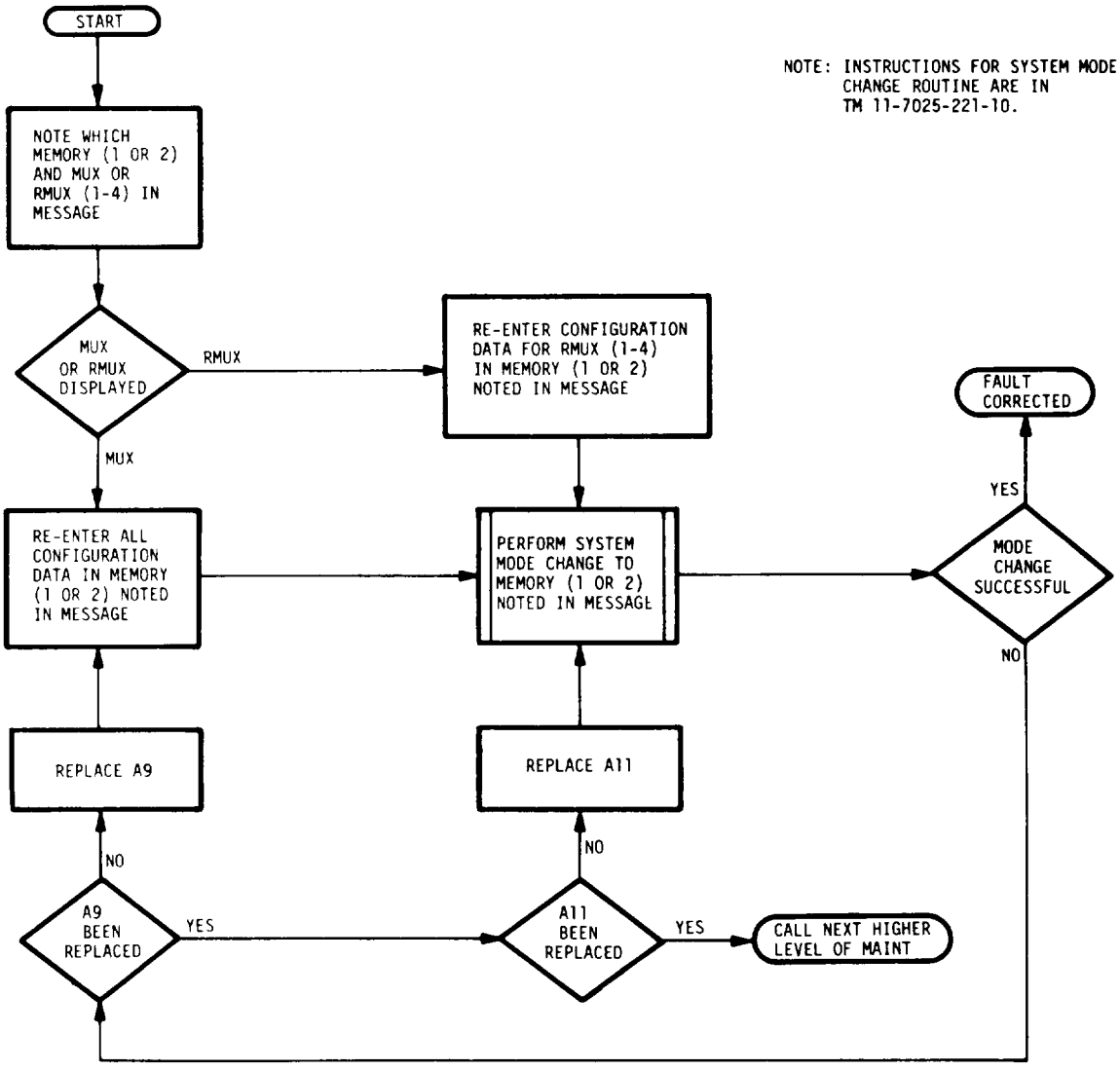
Perform the troubleshooting procedures in this paragraph when the NVM CHECKSUM ERROR message is displayed. This message can be displayed when a system mode change is performed to place the TD-1337(V)/G in memory 1 or memory 2 mode of operation. Troubleshooting procedures are in the form of an easy to follow flowchart.

a. Description of Problem. Whenever a system mode change to memory 1 or memory 2 mode is performed, an automatic check is made on data in that NVM memory area. If this check determines that the configuration data has been altered, the NVM CHECKSUM ERROR message is displayed. Configuration data could have been altered by a transient problem or as a result of a faulty plug-in card.

b. *Description of Troubleshooting.* The NVM CHECKSUM ERROR message will tell you which memory (1 or 2) has the error and which portion of the configuration data (roux or Rmux) is faulty. If MUX is displayed, the flowchart will direct you to re-enter all the configuration data for the selected memory. If RMUX (1, 2, 3, or 4) is displayed, you will be directed to re-enter the configuration data for the Rmux displayed. After the configuration data is entered, you are directed to perform a system mode change. If the mode change is successful, then the NVM CHECKSUM ERROR message was caused by a transient and there are no faulty cards in your TD-1337(V)/G. If the mode change cannot be performed (NVM CHECK-SUM ERROR repeats), then you will be directed to replace cards.

c. *Use of Troubleshooting Flowchart. Go* to the START entry in the flowchart. Perform the actions as directed until the problem is isolated and corrected. If you are directed to replace a card, refer to the plug-in card replacement instructions in paragraph 2-18.

2-10. NVM CHECKSUM ERROR Troubleshooting - Continued.



2-11. Inactive Mode Change Troubleshooting.

Perform the troubleshooting procedures in this paragraph when the following fault condition is observed:

Message display shows TD-1337(V)/G is operating in INACTIVE MODE when POWER CB is set to ON, but TD-1337(V)/G was operating in another mode when POWER CB was set to OFF. (TD-1337(V)/G should not change mode of operation when power is turned off and on,)

a. Description of Problem. There are two situations that could cause the TD-1337(V)/G to come up in the INACTIVE MODE when power is turned on and you expect it to be operating in some other mode.

(1) Someone turned on your TD-1337(V)/G and changed to INACTIVE MODE or erased data in NVM without telling you. In this case, no hardware fault exists.

(2) Each time the TD-1337(V)/G is turned on, certain checks are automatically made on the data in NVM to ensure that the data has not been altered. If the checks are not successful, configuration data in NVM is erased and the TD-1337(V)/G is placed in the INACTIVE MODE. Configuration data could have been altered by a transient or as a result of a faulty plug-in card.

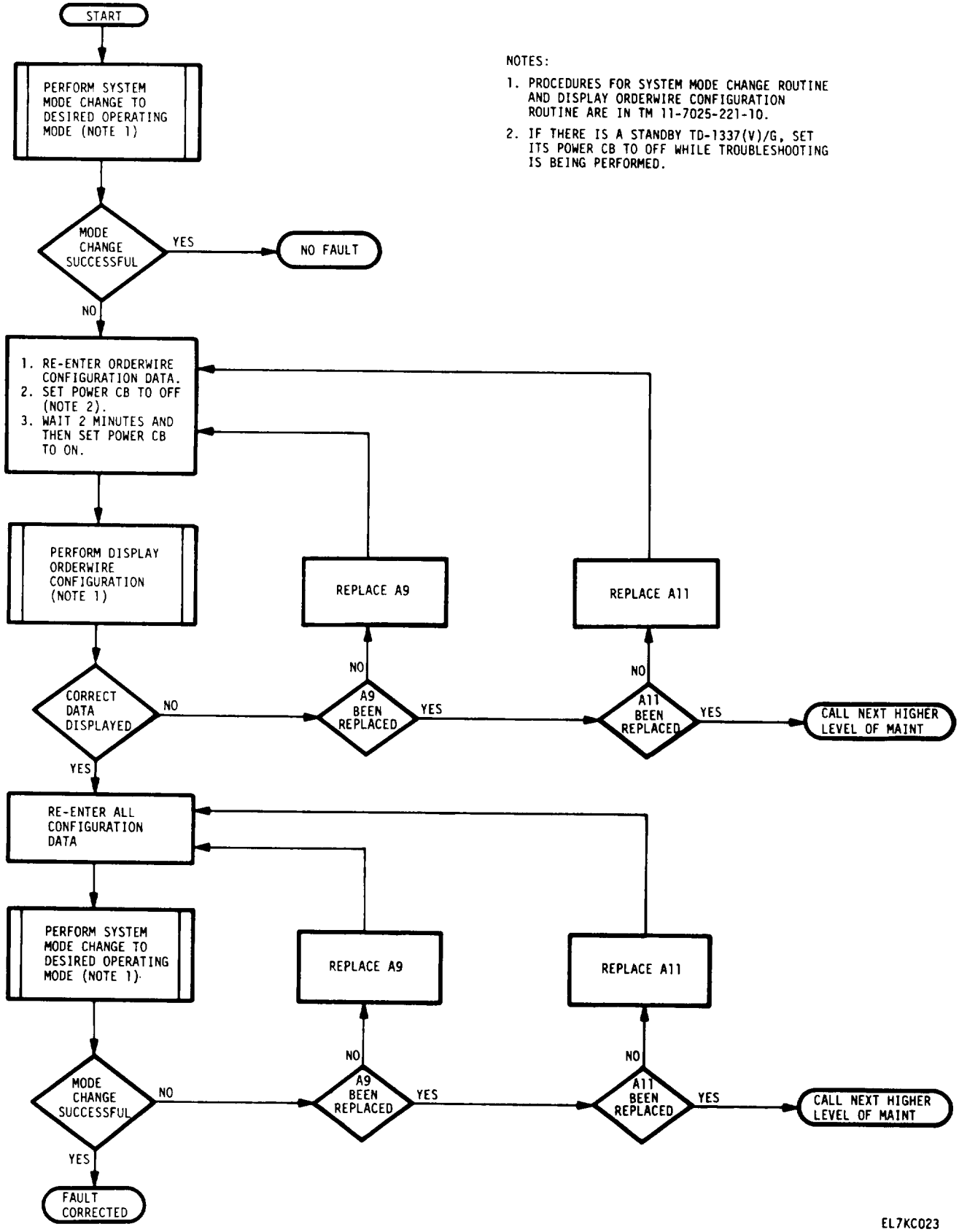
b. Description of Troubleshooting. The procedures in the flowchart first direct you to perform a system mode change to determine if a fault condition really exists, If the mode change is successful, there is no problem. If the mode change cannot be performed, the procedures then direct you to perform a short configuration routine (enter orderwire configuration data). Power is turned off and then back on. Then a display routine is performed to determine if the entered data was retained by NVM. If the brief routine is successful, then complete configuration data is recentered and further checks performed.

c. *Use of Troubleshooting Flowchart. Go* to the START entry in the flowchart. Perform the actions as directed until the problem is isolated and corrected. If you are directed to replace a card, refer to the plug-in card replacement instructions in paragraph 2-18.

NOTE

If your TD-1337(V)/G is connected to a standby TD-1337(V)/G, the POWER CB on the standby must be set to OFF during trouble-shooting. When standby is on and your TD-1337(V)/G is off, the standby provides dc power to the NVM circuits on card A9. If your problem is caused by a faulty battery on card A9, you cannot isolate it if the standby is on.

2-11. Inactive Mode Change Troubleshooting - Continued.



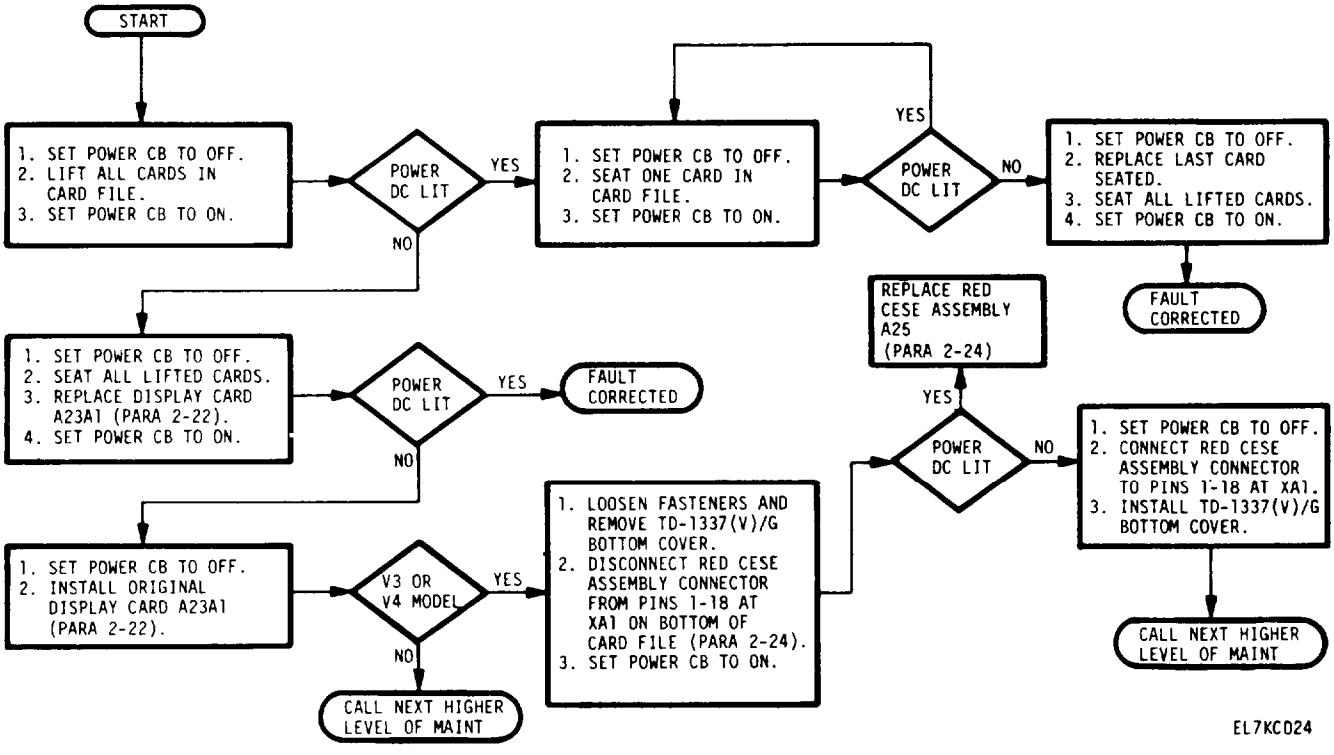
2-12. Power Distribution Troubleshooting.

Perform the troubleshooting procedures in this paragraph when directed by the TD-1337(V)/G troubleshooting procedures in paragraph 2-9.

a. *Description of Problem.* POWER DC indicator remains off after POWER DC indicator and power supply PSI have been replaced. This symptom can be caused by a shorting condition in one of the replaceable assemblies. The shorting condition has forced one or more of the power supply dc outputs into an under-voltage state which turns off the POWER DC indicator.

b. Description of Troubleshooting. The procedures in the flowchart first direct you to lift all of the plug-in cards in the card file. If the POWER DC indicator lights after the cards have been lifted, then one of the lifted cards is faulty. One at a time, the cards are seated (installed) in the card file. The card that causes the POWER DC indicator to be off when power is turned on is faulty. If the POWER DC indicator remains off when all the cards are lifted, then the fault is associated with display card A23A1 or red CESE assembly A25.

c. *Use of Troubleshooting Flowchart Go* to the START entry in the flowchart. Perform the actions as directed until the fault is isolated and corrected. If necessary, refer to the plug-in card replacement instructions in paragraph 2-18. When you are directed to lift a card, extend the two card ejector handles on the edge of the card. This action lifts the card so that the card edge connector is disconnected from the connector pins in the card file. It is not necessary to completely lift the card out of the card file. If none of the replaceable assemblies are faulty, the flowchart will direct you to call next higher level of maintenance.



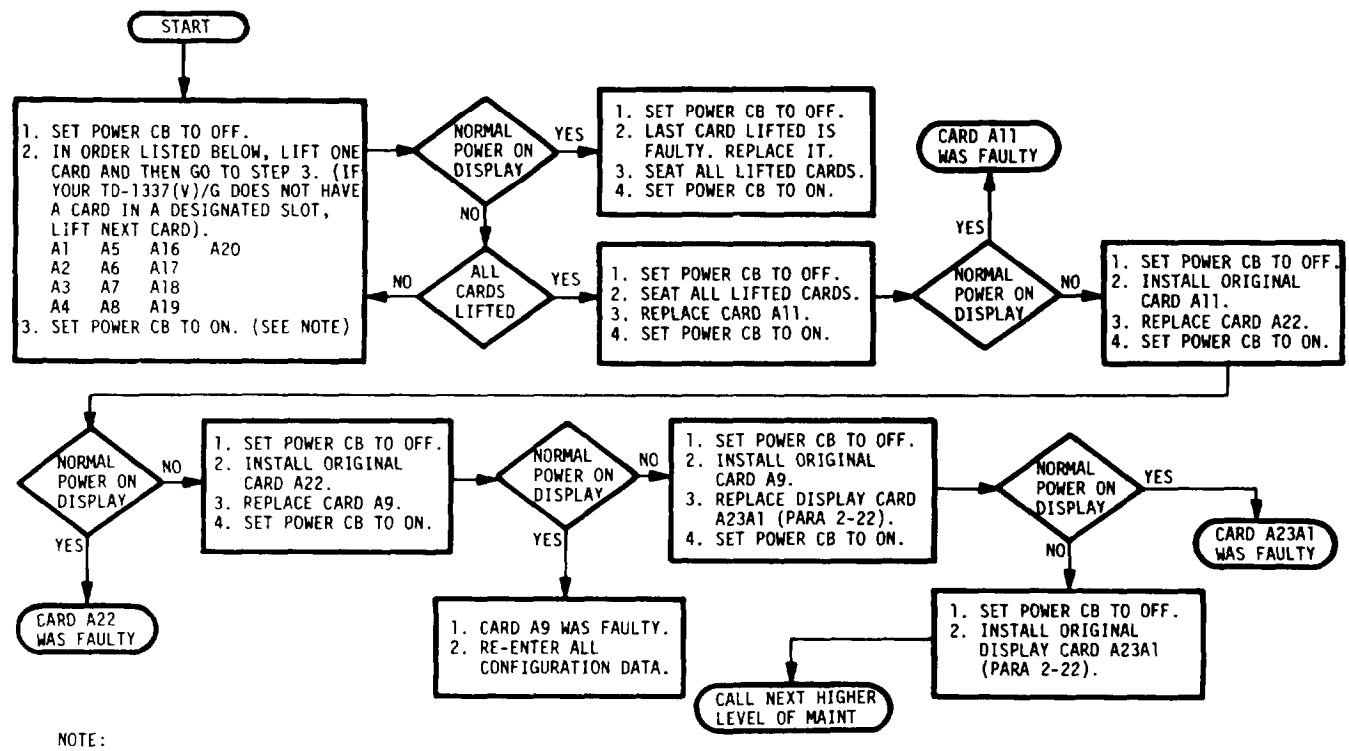
2-13. ALARMS BUS Troubleshooting.

Perform the troubleshooting procedures in this paragraph when directed by the TD-1337(V)/G troubleshooting procedures in paragraph 2-9.

a. *Description of Problem.* Data are exchanged between the microprocessor and the other cards via an eight-bit hi-directional data bus. At regular intervals, a test is automatically performed on the data bus. The test consists of writing data to and reading that data from unused areas of memory on NVM card A9 and display card A23A1 .Failure of this test will cause the ALARMS BUS indicator to light. There are four cards (A9, A11, A22, and A23A1) directly involved in conduct of the test. The other cards connected to the data bus can cause a test failure if they have a fault that pulls one or more bits of the data bus low.

b. *Description of Troubleshooting.* The procedures in the flowchart first direct you to lift, one-at-a-time, those cards not directly involved in conduct of the test. If one of these cards is faulty, a normal power on display will occur when faulty card is lifted and POWER CB is set to ON. If none of these cards are faulty (normal power on display does not occur when ail designated cards are lifted), they are seated (installed) in the card file. Next, YOU are directed to replace, one-at-a-time, each of the four cards directly involved with conduct of the bus test.

c. *Use of Troubleshooting* Flowchart. Go to the START entry in the flowchart. Perform the actions as directed until the fault is isolated and corrected. If necessary, refer to the plug-in card replacement instructions in paragraph 2-18 and the display card replacement instructions in paragraph 2-22. When you are directed to lift a card, extend the two card ejector handles on the edge of the card. This action lifts the card so that the card edge connector is disconnected from the connector pins in the card file. It is not necessary to completely lift the card out of the card file. If none of the replaceable assemblies are faulty, the flowchart will direct you to call next higher level of maintenance.



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2-14. How to Use Alarms Recall Data.

When you are directed by the TD-1337(V)/G troubleshooting procedures in paragraph 2-9 to “Replace Card(s) Recorded During Alarms Recall”, follow the instructions in *a below.* When you are directed by the trouble-shooting procedures to check out a recurring ALARMS MINOR indication, use the troubleshooting procedures in b below.

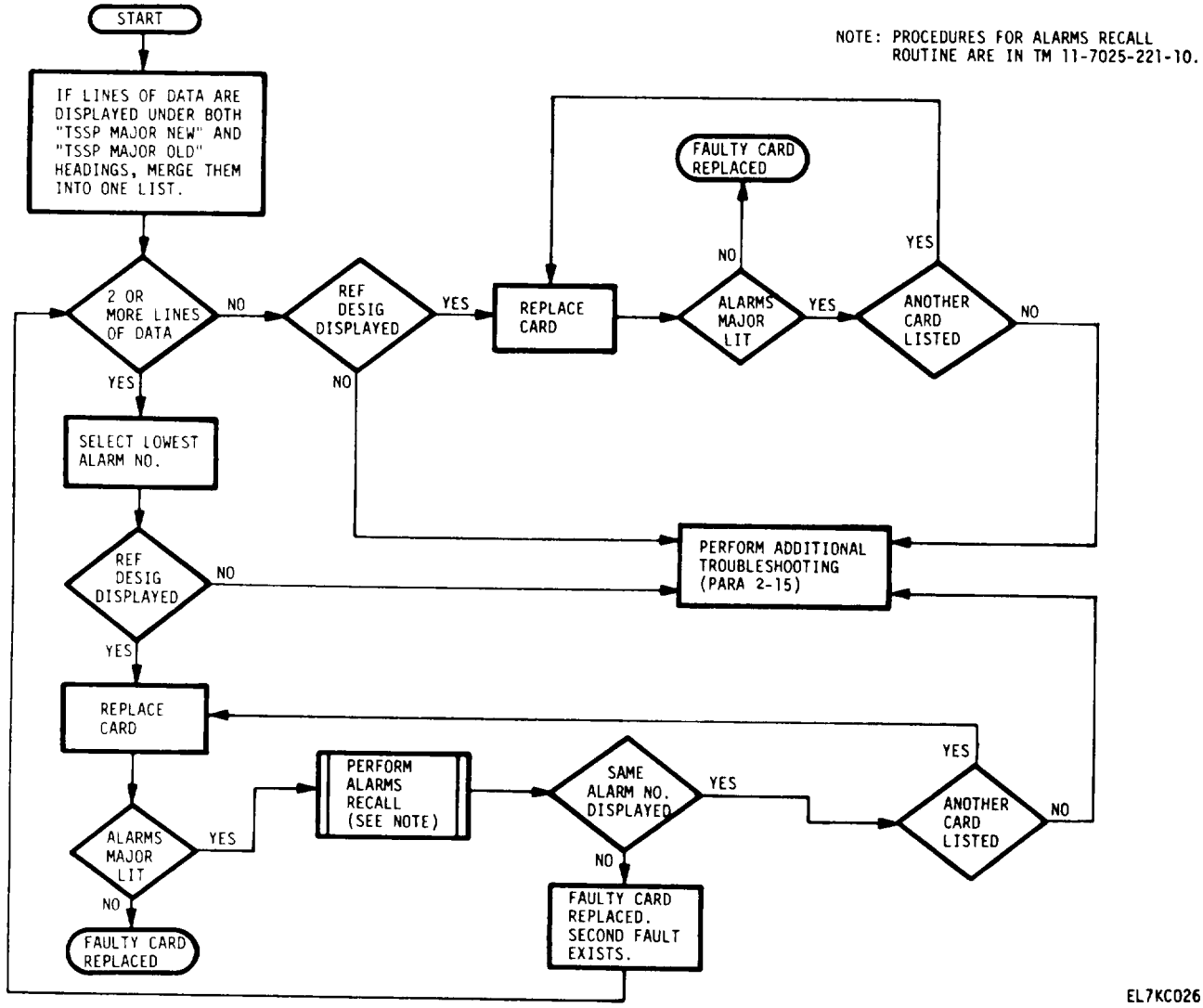
a. Troubleshooting Based on ALARMS MAJOR Problems. Use the instructions in the flowchart on the facing page. You will find the faulty card faster and with less confusion if you follow these instructions. Flowchart hi-lights are listed below.

- If there are multiple fault conditions, you could have data displayed under both TSSP MAJOR NEW and TSSP MAJOR OLD headings. In this case, merge the recalled data into one list, in alarm number sequence. Each time power is turned off and back on, data recorded under TSSP MAJOR OLD headings will appear under TSSP MAJOR NEW headings. Conversely, performing a second alarms recall routine, without turning power off, will cause data originally appearing under TSSP MAJOR NEW headings to be displayed under a TSSP MAJOR OLD heading.
- If two or more alarm numbers (lines of data) are recorded, start with the lowest alarm number.
- When two or more alarm numbers are recorded, it is very likely that multiple fault conditions exist. In this case, you could replace a card that corrected the first fault, but the ALARMS MAJOR indicator would still be lit due to the second fault. It now becomes necessary to perform an alarms recall routine after each card replacement to determine if the original alarm number is still displayed (first fault corrected or not corrected).
- Replace the cards, one-at-a-time, in the order listed for a given alarm number. If "DEMUX" is included in the listing, it means replace a demux card. Refer to paragraph 2-15 to determine demux card (Al 6 through Al 9) to be replaced.
- If an alarm number does not have a reference designator displayed, go to paragraph 2-15.
- If all cards associated with an alarm number have been replaced and the problem still exists, go to paragraph 2-15.

b. Troubleshooting Based On Repeating TSSP MINOR Problems. A faulty condition is indicated when the same alarm number is repeated under the TSSP MINOR heading. Depending on the operating system configuration, the alarm number could repeat in minutes or it could repeat several days apart. When the same alarm number is repeated, perform the troubleshooting procedures as directed in a above; with the following exceptions.

- Ignore block in flowchart that merges TSSP MAJOR NEW and TSSP MAJOR OLD headings into one listing. There is only one TSSP MINOR heading.
- When a card is replaced, observe that ALARMS MINOR indicator is not lit instead of ALARMS MAJOR indicator.
- When a card is replaced, wait a given amount of time for ALARMS MINOR indicator to light. Waiting time should be same as that noted when it was determined that same alarm number is repeating.

2-14. How to Use Alarms Recall Data - Continued.



2-15. Additional Troubleshooting Procedures.

Use the information in the following chart when directed to do so by another paragraph. This information will be used when one of the following conditions exist:

- When all of the cards for an alarm number have been replaced and the fault still exists.
- When "DEMUX" is next card listed as replacement for alarm number being used in troubleshooting.

. There is no reference designator listed after alarm number being used.

a. Description of Additionsl Troubleshooting Chart. All the alarm numbers, associated data, and applicable additional troubleshooting data are listed under the columns described below.

(1) *"Alarm No." Column.* This column lists all the alarm numbers, in numerical order, that can be displayed.

(2) "Message" *Column.* This column lists all the data that are displayed with each alarm number. If "Not used" appears, this is an inactive alarm.

(3) "Additional *Troubleshooting" Column.* Additional troubleshooting actions that can be performed for an alarm number appear in this column.

b. Use of Additions/ *Troubleshooting* Chart. Use the data in the chart by performing the following steps:

(1) Go to alarm number listed in "Alarm No." column.

(2) Ensure that you have replaced each card listed in the "Message" column for the given alarm number. If "'DEMUX" is listed, refer to "Additional Troubleshooting" column to determine demux card to be replaced.

(3) Replace any cards listed in "Additional Troubleshooting" column. If fault still exists, report problem to next higher level of maintenance.

Additional Troubleshooting Chat

Display		Additional Troubleshooting
Alarm No.	Message	
01	BUS	
02	A23A1	
03	A9	
04	A7	
05	A4	
06	A2	
07	A6	
08	A6	
09	A22	
10	A5	
11	LOS1 A3 A7	
12	L O S 1 A 2 0	A6, A5

2-15. Additional Troubleshooting Procedures - Continued.

Additional Troubleshooting Chart - Continued

Alarm No.	Display Message	Additional Troubleshooting
13	A6	
14	Not used	
15	LOT1 A6	If port 1 is conditioned diphase, replace A20. If port 1 is unbalanced NRZ, replace A3.
16	Not used	
17	LOS2 A3 A7	
18	Not used	
19	A6	
20	Not used	
21	LOT2 A6	If port 2 is unbalanced NRZ, replace A3.
22	Not used	
23	LOS3 A3 A7	
24	LOS3 A20	
25	Not used	
26	A6 A5	
27	Not used	
28	LOT3 A5	If port 3 is conditioned diphase, replace A20, If port 3 is unbalanced NRZ, replace A3.
29	LOS4 A3 A7	
30	Not used	
31	Not used	
32	A6 A5	
33	Not used	
34	LOT4 A5	If port 4 is unbalanced NRZ, replace A3.
35	Not used	
36	LOS5 A20	

2-15. Additional Troubleshooting Procedures - continued.

Additional Troubleshooting Chart - Continued

Display		Additional Troubleshooting
Alarm No.	Message	
37	Not used	
38	A6 A5	
39	Not used	
40	LOT5 A5	if port 5 is conditioned diphase, replace A20.
41	Not used	
42	Not used	
43	Not used	
44	A6 A5	
45	Not used	
46	LOT6 A5	
47	Not used	
46	Not used	
49	Not used	
50	A6 A5	
51	Not used	
52	LOT7 A5	
53	Not used	
54	Not used	
55	Not used	
56	A6 A5	
57	Not used	
56	LOT8 A5	
59	A1	
60	LOT A1	

2-15. Additional Troubleshooting Procedures - continued.

Additional Troubleshooting Chart - Continued

Display		Additional Troubleshooting
Alarm No.	Message	
61	A1 A6 A2	
62	A1	A25
63	A25	
64	A8	
65	A4	
66	A7	
67	A2	
68	A2	
69	A16	
70	LOT A16	
71	A16	
72	A16 A11	
73	00S1	Replace A16, A2. Direct remote TD-1337(V)/G supplying SG to replace A6.
74	A16	
75	A16 A8	
76	A8	A16
77	A4 A16	
78	A17	
79	LOT A17	
80	A17	
81	A17A11	
82	00S2	Replace A17, A2. Direct remote TD-1337(V)/G supplying SG to replace A6,
83	A17	

2-15. Additional Troubleshooting Procedures - Continued.

Additional Troubleshooting Chart - Continued

Display		Additional Troubleshooting
Alarm No	Message	
64	A17 A8	
85	A8	A17
86	A4 A17	
87	A18	
88	LOT A18	
89	A18	
90	A18 A11	
91	00S3	Replace A18, A2. Direct remote TD-1337(V)/G supplying SG to replace A6.
92	Al 8	
93	A18 A8	
94	A8	A18
95	A4 A18	
96	A19	
97	LOT A19	
98	A19	
99	A19A11	
100	00S4	Replace A19, A2. Direct remote TD-1337(V)/G supplying SG to replace A6.
101	A19	
102	A19 A8	
103	A8	A19
104	A4 A19	
105	A12	

2-15. Additional Troubleshooting Procedures - Continued.

Additional Troubleshooting Chart - Continued

Display		Additional Troubleshooting
Alarm No.	Message	
106	A12 A22 DEMUX	DEMUX means replace demux card supplying data to your output port No. 1.'
107	A3 A12 A7	
108	A20 A12	
109	A12	
110	A12 A22 DEMUX	DEMUX means replace demux card supplying data to your output port No. 2.
111	A3 A12 A7	
112	Not used	
113	A13	
114	A13 A22 DEMUX	DEMUX means replace demux card supplying data to your output port No. 3.*
115	A3 A13 A7	
116	A20 A13	
117	A13	
118	Al 3 A22 DEMUX	DEMUX means replace demux card supplying data to your output port No. 4.*
119	A3 A13 A7	
120	Not used	
121	A14	
122	A14 A22 DEMUX	DEMUX means replace demux card supplying data to your output port No. 5.
123	Not used	
124	A20 A14	
125	A14	

2-15. Additional Troubleshooting Procedures - Continued.

Additional Troubleshooting Chart - Continued

Display		Additional Troubleshooting
Alarm No.	Message	
126	A14 A22 DEMUX	DEMUX means replace demux card supplying data to your output port No. 6.*
127	Not used	
128	Not used	
129	A15	
130	A15 A22 DEMUX	DEMUX means replace demux card supplying data to your output port No. 7.*
131	Not used	
132	Not used	
133	A15	
134	A15 A22 DEMUX	DEMUX means replace demux card supplying data to your output port No. 8.*

*Check your local mux configuration data and determine which demux (1, 2, 3, or 4) is assigned to output port reporting the fault condition. When demux number is determined, replace associated demux card. See following list:

DEMUX 1 = A16
DEMUX 2 = A17
DEMUX 3 = A18
DEMUX 4 = A19

Section IV. MAINTENANCE PROCEDURES

OVERVIEW

Repair of the TD-1337(V)/G consists of replacing the TD-1337(V)/G, a faulty plug-in card, or one of the other items listed above. A replacement action is performed when directed by troubleshooting.

All of the replaceable assemblies, except the red CESE assembly, can be replaced without removing the TD-1337(V)/G from the equipment rack, providing that there is adequate space above the TD-1337(V)/G to remove and install the assemblies.

There are no special cleaning or servicing requirements.

Notify your local users and remote TD-1337(V)/G's in your network when your TD-1337(V)/G is to be turned off for maintenance. This will help them expect and understand any alarm signals and conditions that could occur when your communications functions are interrupted.

2-16. TD-1337(V)/G Removal and Installation Instructions.

This task covers:

a. *Removal* *b. Installation*

INITIAL SETUP

Applicable Configurations

All models

Tools

Cross-tip screwdriver, No. 2

Hex socket wrench, 3/8-inch opening

Personnel Required: 2

Tactical Satellite Microwave System operator MOS 26Q

Second person to help support and lift TD-1337(V)/G

Equipment Condition

Notify local users and remote TD-1337(V)/G(s) that your TD-1337(V)/G is being turned off for maintenance.

If installing a replacement TD-1337(V)/G, ensure it was inspected as directed in paragraph *2-7.*

General Safety Instructions

TD-1337(V)/G weighs approximately 62 pounds. Two persons are required to lift and handle it to prevent injury to personnel.

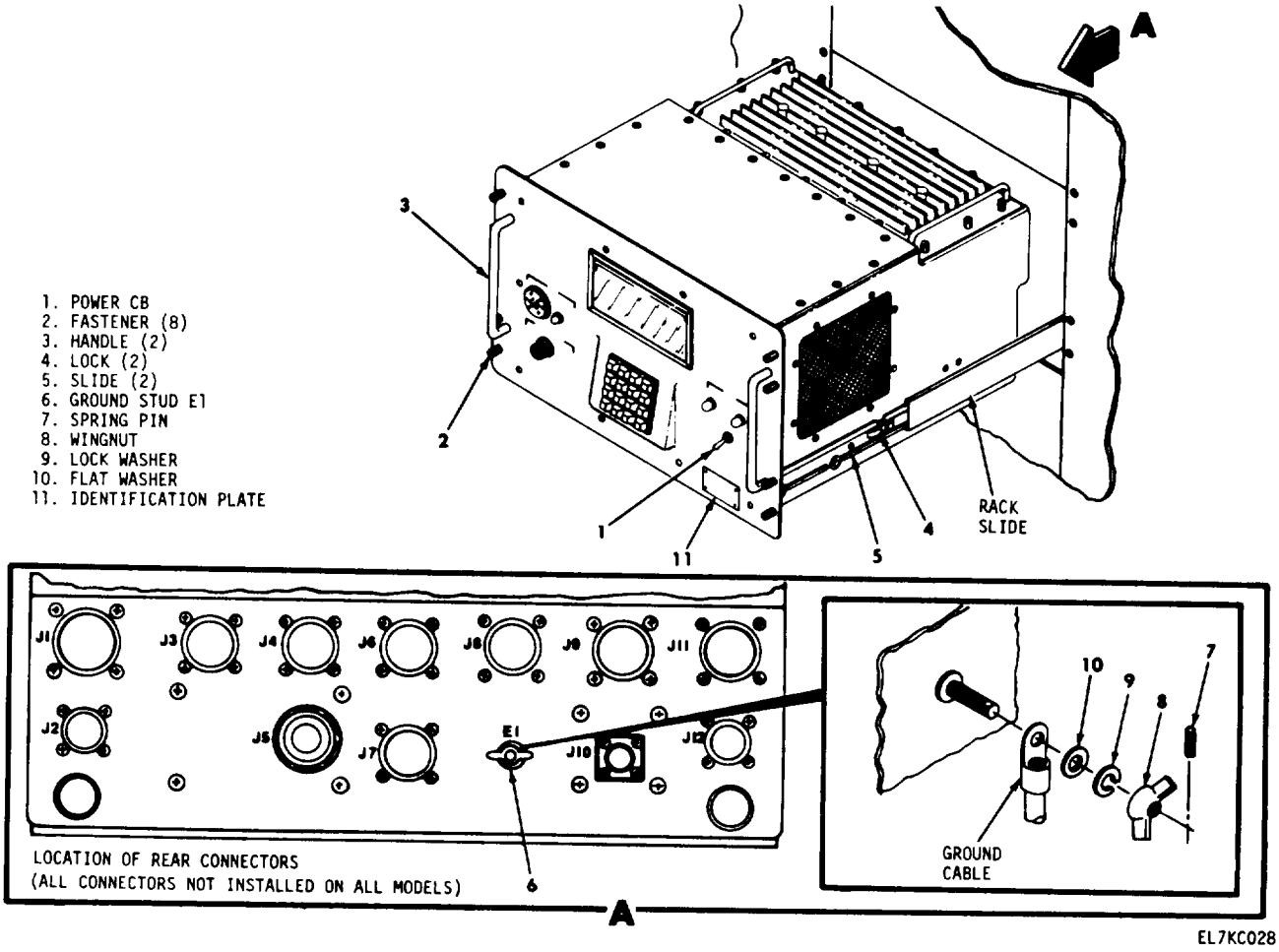
High voltage is applied to TD-1337(V)/G when rack power is on. Turn off rack power when removing or installing a TD-1337(V)/G.

2-16. TD-1337(V)/G Removal and Installation Instructions - Continued.

Location/Item	Action	Remarks
	◆ ◆ WARNING ◆ ◆	
	High voltage is applied to TD-1337(V)/G when rack power is on. To prevent a serious shock hazard, that could result in DEATH or SERIOUS INJURY turn off rack power when removing or installing a TD-1337(V)/G.	
Removal		
1. POWER CB (1)	Set to OFF	
2. Rack power	Turn off	
3. 8 fasteners (2)	Loosen	Turn counterclockwise to loosen.
4. TD-1337(V)/G	Extend	Use handles (3) and pull TD-1337(V)/G out of rack until locks (4) in slides (5) engage.
	◆ ◆ WARNING ◆ ◆	
	When locks on slides are bypassed, there are no mechanical restraints to prevent TD-1337(V)/G from rolling out of slides and falling. Use a second person to help you support TD-1337(V)/G in the following steps to prevent possible injury to yourself and others.	
	NOTE	
	If cables are not accessible for steps 5 and 6, release locks (4) and extend TD-1337(V)/G as necessary to reach and disconnect cables.	
5. Cables connected to rear of TD-1337(V)/G	Disconnect all cables except ground cable to El (6).	Check each cable to see if mating case connector is marked on it. If not, tag cable to identify its mating case connector.
6. Ground cable connetted to El (6)	Disconnect	Place flat washer (10), lockwasher (9), and wingnut (8) back on El after ground cable is removed. Install spring pin (7).
	◆ ◆ WARNING ◆ ◆	
	TD-1337(V)/G weighs approximately 62 pounds. Have another person help you lift and support it to prevent injury to yourself and others.	
7. TD-1337(V)/G	Remove using two persons.	If not released, release two locks (4) and then pull TD-1337(V)/G from slides (5).

2-16. TD-1337(V)/G Removal and Installation Instructions - Continued.

Location/Item	Action	Remarks
Removal – Continued		



2-16. TD-1337(V)/G Removal and Installation Instructions - Continued.

Location/item	Action	Remarks
Installation		
8. TD-1337(V)/G	Check that proper model will be installed.	Check identification plate (11) on replacement TD-1337(V)/G to ensure that proper model (V1, V2, V3, or V4) is being installed. If model designation is missing or you suspect it is wrong, look at rear connectors to confirm which model you have. (Rear connectors on each model are shown on page 1-8.) Enter correct model designation on plate if it is missing.
9. TD-1337(V)/G		Position slides (5) in rack slides and push in until locks (4) engage.
	◆ ◆ WARNING ◆ ◆ When locks on slides are bypassed, there are no mechanical restraints to prevent TD-1337(V)/G from rolling out of slides and falling. If locks are bypassed in steps 10 and 11, use a second person to help you support TD-1337(V)/G to prevent possible injury to yourself and others.	
	NOTE If cables and connectors are not accessible for steps 10 and 11, release locks and extend TD-1337(V)/G as necessary to reach and connect cables.	
10. Ground cable for E1 (6)	Connect	Remove spring pin (7), wingnut (8), lock washer (9), and flat washer (10) from E1. Install ground cable. Re-install washers, wingnut, and spring pin.
11. System cables	Connect	Connect cables to rear of TD-1337(V)/G as designated by system configuration.
12. TD-1337(V)/G	Close	Release locks (4). Use handles (3) and push TD-1337(V)/G into rack.
13. 8 fasteners (2)	Tighten	
14. Rack power	Turn on	
15. POWER CB (1)	a. Set to ON.	Check that POWER AC and DC indicators are lit.
	b. If TD-1337(V)/G is being installed because red CESE assembly was replaced, check that fault is corrected.	Correct configuration data will be in NVM.
	c. If TD-1337(V)/G being installed is a replacement, perform operational test in para 2-17.	TD-1337(V)/G will be configured for system operation when operational test is performed.

2-17. Operational Test.

Perform the following operational test on a newly installed TD-1337(V)/G to verify it is operating properly in its assigned system configuration.

NOTE

If normal indication is not obtained for any step, refer to troubleshooting procedures in paragraph 2-9.

Operational Test

Step	Action	Normal indication	
1	Set POWER CB to ON.	POWER AC and DC indicators are lit.	f indicators are not lit, check that rack power is
2	Check displayed message.	POWER ON SYSTEM IS IN* MODE	
3	Check ALARMS indicators.	All ALARMS indicators are	
4	Perform display test routine.	Keyboard responses and message displays are normal,	
5	Obtain and enter configuration data in TD-1337(V)/G.	Keyboard responses and message displays are normal.	
6	Perform system mode change to place TD-1337(V)/G in system operation.	Message display confirms TD-1337(V)/G is operating in selected mode.	
		NOTE	
7			
8			
9			
10			

2-18. Plug-In Card Replacement Instructions.

This task covers:

a. *Removal* *b. Installation*

INITIAL SETUP

Applicable Configurations

All models

Tools

Cross-tip screwdriver, No. 2

Equipment Condition

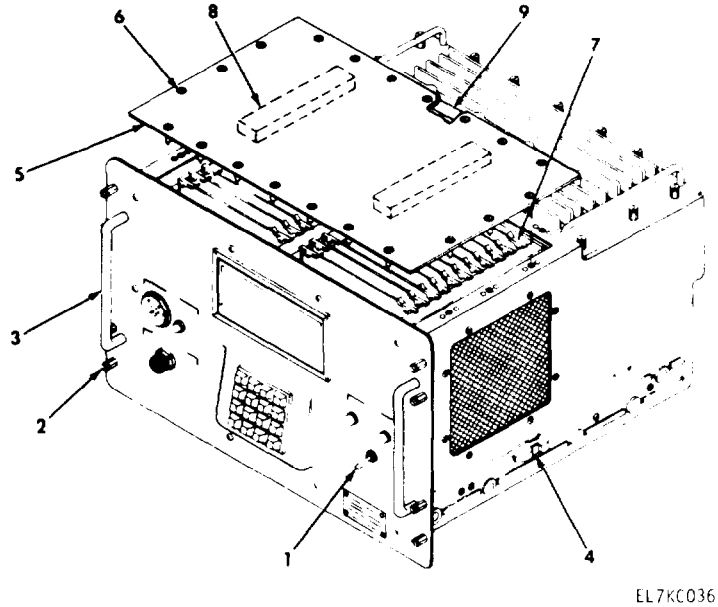
Notify local users and remote TD-1337(V)/G(s) that your TD-1337(V)/G is being turned off for maintenance.

General Safety Instructions

	• • **CAUTION** • •	

2-18. Plug-In Card Replacement Instructions - Continued.

Location/Item	Action	Remarks
Installation		
	NOTES • Before installing a card in card slot XA2, XA7, or XA20, check that card has proper number of red jumper plugs installed as listed below: XA2 - SSV card A2 has plugs in J1 thru J6 XA7 -16 DVOW card A7 has plugs in J1 and J2 XA20 - Group modem card A20 has plugs in J1 and J2 • When installing NVM card A9 in card slot XA9, check that card has 7 red jumper plugs properly installed for your model as shown on illustration on bottom of next page. necessary, rearrange jumper plugs.	
6. Card slots XA1 thru XA22	Install replacement plug-in card in appropriate card slot.	Slide card into guides in card slot and seat card in connector by pressing down on ejector handles (7). Card is seated when handles are parallel to adjacent handles.
7. POWER CB (1)	Set to ON and check if fault causing card replacement has been corrected.	a. If NVM card A9 was replaced, system configuration data must be entered in TD-1337(V)/G. Use procedures in TM 11-7025-221-10. b. If fault is not corrected, perform next action as directed in troubleshooting procedure that directed this card replacement. c. If fault is corrected, go to step 8.
8. Plug-in cards that were replaced before faulty card was replaced.	*a.* Set POWER CB to OFF. *b.* Remove any replacement cards and re-install original good cards. c. Set POWER CB to ON.	If only one card was replaced, and it was the faulty one, go to step 9.

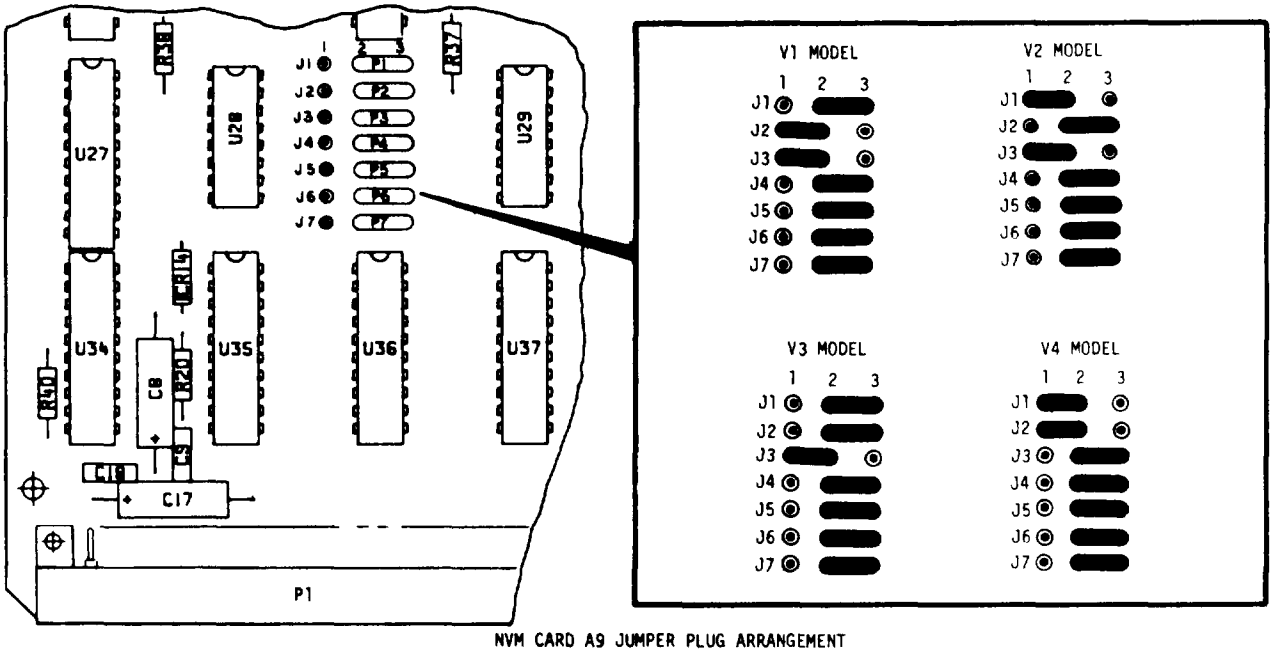


1. POWER CB
2. FASTENER (8)
3. HANDLE (2)
4. LOCK (2)
5. TOP COVER
6. FASTENER (20)
7. CARD EJECTOR HANDLE (2 PER CARD)
8. RUBBER PAD (2)
9. GASKET

EL7KC036

2-18. Plug-In Card Replacement Instructions - Continued.

Location/Item	Action	Remarks
Installation - Continued		
9. Top cover (5)	Inspect pads (8) and gasket (9).	Perform following checks and notify next higher level of maintenance of any problems. 1. Check that there are no rips, tears, or missing chunks of gasket or pad. 2. Check that bonded surfaces of gasket and pads are not pulled away from cover surface.
10. Top cover (5)	Install	Place cover on TD-1337(V)/G and tighten 20 fasteners (6).
11. TD-1337(V)/G	close	Release locks (4). Use handles (3) and push TD-1337(V)/G into rack.
12. 8 fasteners (2)	Tighten	



NVM CARD A9 JUMPER PLUG ARRANGEMENT

EL7KC029

2-19. POWER AC and DC Indicator Replacement Instructions.

This task covers:

a. Removal b. Installation

INITIAL SETUP

Applicable Configurations

All models

Tools

None

Personnel Required: 1

Tactical Satellite Microwave System Operator MOS 26Q

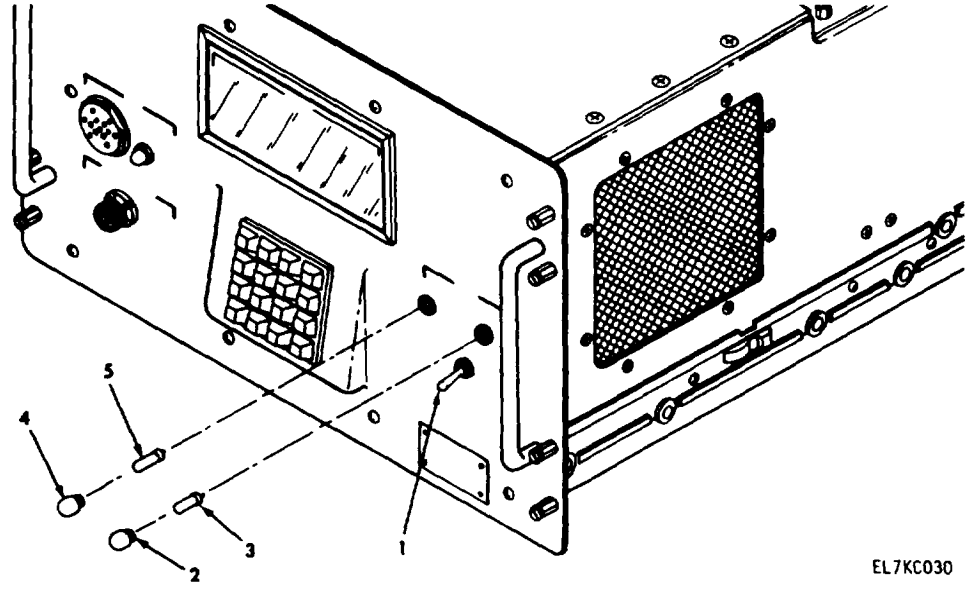
Equipment Condition

Notify local users and remote TD-1337(V)/G(s) that your TD-1337(V)/G is being turned off for maintenance.

General Safety Instructions

None.

Location/Item	Action	Remarks
Removal		
1. POWER CB (1)	Set to OFF	
2. Lens (2 or 4) for indicator being replaced	Remove	Turn counterclockwise to remove.
3. Indicator (3 or 5) being replaced	Remove	Pull it straight out of housing.
Installation		
4. Indicator (3 or 5)	Install	Press it straight into housing.
S. Lens (2 or 4)	Install	Turn clockwise to install.
6. POWER CB (1)	Set to ON. Cheek that POWER AC and DC indicators are lit.	If indicators do not light, refer to troubleshooting procedures (para 2-9).



1. POWER CB
2. AC INDICATOR LENS
3. AC INDICATOR
4. DC INDICATOR LENS
5. DC INDICATOR

EL7KC030

2-20. Power Supply Replacement Instructions.

This task covers:

a. Removal *b.* Installation

INITIAL SETUP

Applicable Configurations

All models

Tools

Hex socket wrench, 3/8-inch opening

Torque wrench with 3/8-inch socket

Personnel Required: 1

Tactical Satellite Microwave System Operator MOS 26Q

Equipment Condition

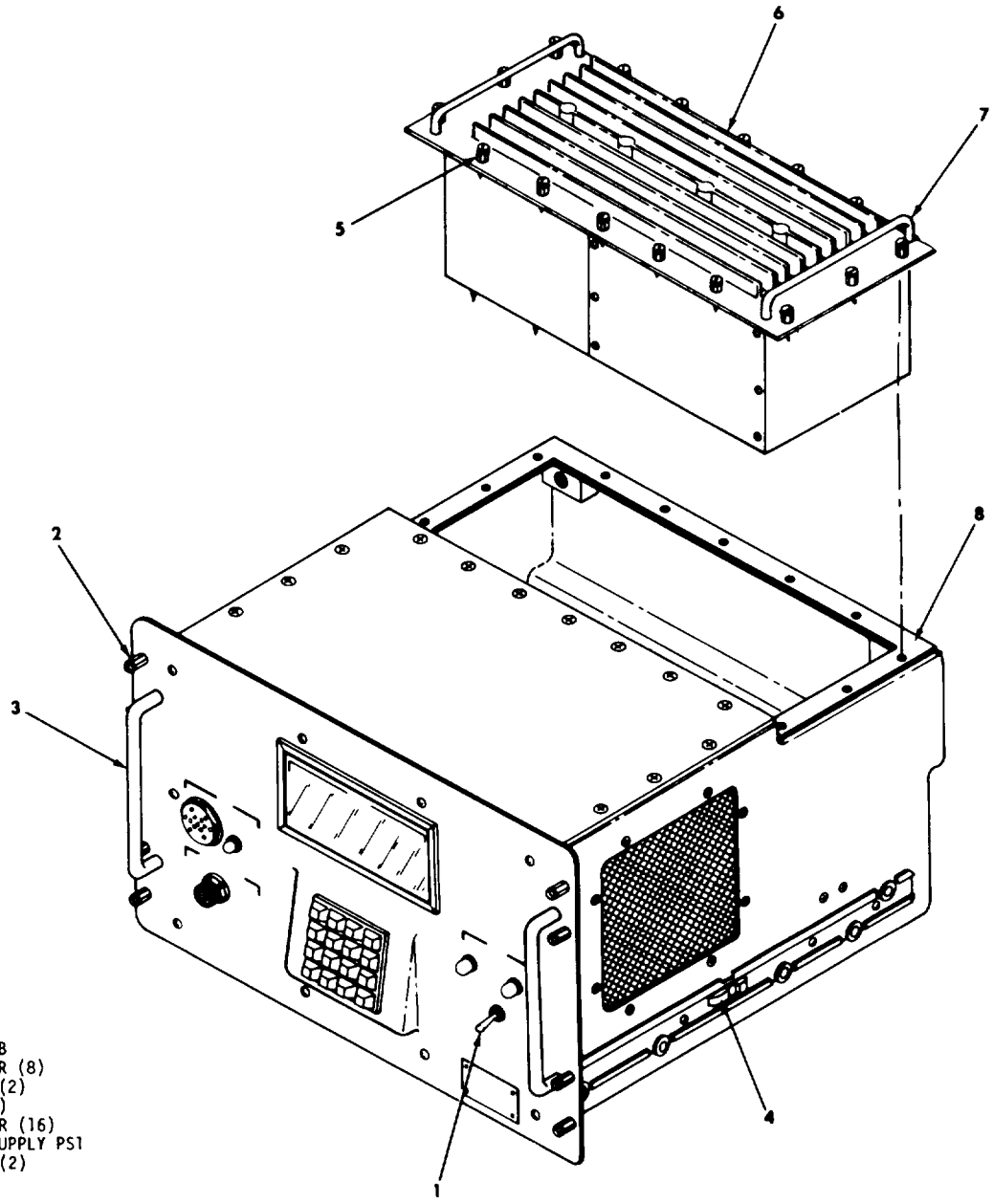
Notify local users and remote TD-1337(V)/G(s) that your TD-1337(V)/G is being turned off for maintenance.

General Safety instructions

None.

Location/Item	Action	Remarks
Removal		
1. POWER CB (1)	Set to OFF	
2. 8 fasteners (2)	Loosen	Turn counterclockwise to loosen.
3. TD-1337(V)/G	Extend	Use handles (3) and pull TD-1337(V)/G out of rack until locks (4) engage.
4. 16 fasteners (5)	Loosen	Turn counterclockwise to loosen.
5. Power supply (6)	Remove	Use handle (7) and lift power supply from case.
Installation		
6. Gasket (8)	Inspect	Perform following checks and notify next higher level of maintenance of any problems. 1. Check that there are no rips, tears, or missing chunks in gasket. 2. Check that bonded surface of gasket has not pulled away from case.
7. Power supply (6)	Install	Use handles (7) and lower evenly into case so that guide pins mate with alignment holes of case connector.
8. 16 fasteners (5)	Tighten. Torque to 8 to 10 inch-pounds.	Loosely install all fasteners and then torque fasteners.
9. TD-1337(V)/G	Close	Release locks (4). Use handles (3) and push TD-1337(V)/G into rack.
10. 8 fasteners (2)	Tighten	
11. POWER CB (1)	Set to ON. Check that POWER AC and DC indicators are lit.	If indicators do not light, refer to troubleshooting.

2-20. Power Supply Replacement Instructions - Continual.



1. POWER CB
2. FASTENER (8)
3. HANDLE (2)
4. LOCK (2)
5. FASTENER (16)
6. POWER SUPPLY PS1
7. HANDLE (2)
8. GASKET

EL7KC031

2-21. Front Panel Removal and Installation Instructions.

This task covers:

a. Removal *b. Installation*

INITIAL SETUP

Applicable Configurations

All models

Tools

Cross-tip screwdriver, No. 2

Hex socket wrench, 3/8-inch opening

Personnel Required: 2

Tactical Satellite Microwave System Operator MOS 26Q

Second person to help support front panel

Equipment Condition

Notify local users and remote TD-1337(V)/G(s) that your TD-1337(V)/G is being turned off for maintenance.

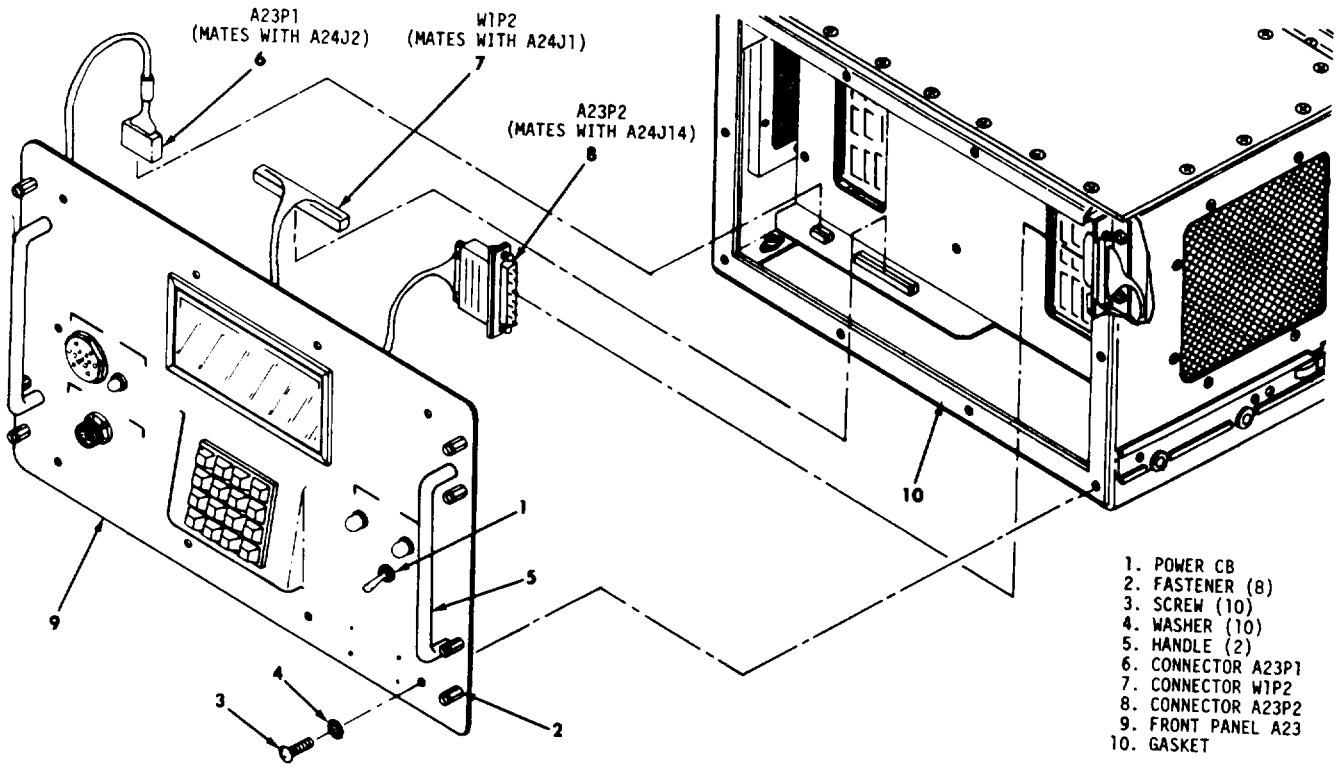
Genera/ Safety *Instructions*

High voltage is applied to front panel when rack power is on. Turn off rack power when removing or installing a front panel.

Location/Item	Action	Remarks
	◆ ◆ WARNING ◆ ◆ High voltage is applied to front panel when rack power is on. To prevent a serious shock hazard that could result in DEATH or SERIOUS INJURY, turn off rack power when removing or installing a front panel.	
Removal		
1. POWER CB (1)	Set to OFF	
2. Rack power	Turn off	
3. 8 fasteners (2)	Loosen	Turn counterclockwise to loosen.
4. 10 sets of screws (3) and washers (4)	Support front panel and remove screws and washers. Use two persons.	Second person support front panel by handles (5) to prevent placing strain on 3 cables attached to front panel.
5. 3 connectors (6, 7, and 8)	Disconnect	Connector (8) has a slide lock that must be opened before it can be removed from case connector.
6. Front panel (9)	Transport to designated work area.	

2-21. Front Panel Removal and Installation Instructions - Continued.

Location/Item	Action	Remarks
Installation		
7. Gasket (10)	Inspect	Perform following checks and notify next higher level of maintenance of any problems. 1. Check that there are no rips, tears, or missing chunks in gasket. 2. Check that bonded surface of gasket has not pulled away from case.
8. Front panel (9)	Support front panel near TD-1337(V)/G using two persons,	
9. 3 connectors (6, 7, and 8)	Connect	A23P1 (6) mates with A24J2. A23P2 (8) mates with A24J14. W1P1 (7) mates with A24J1.
10. 10 sets of screws (3) and washers (4)	Loosely install all screws and washers and then tighten.	
11. 8 fasteners (2)	Tighten	
12. Rack power	Turn on	
13. POWER CB (1)	Set to ON. Check that fault which caused front panel removal has been corrected.	a. If fault has been corrected, TD-1337(V)/G is operational. *b.* If fault still exists, perform next action as directed in troubleshooting procedures (para 2-9).



2-22. Display Card Replacement Instructions.

This task covers:

a. Removal *b. installation*

INITIAL SETUP

Applicable Configurations

All models

Tools

Cross-tip screwdriver, No. 2

Hex socket wrench, 3/6-inch opening

Hex socket wrench, 5/16-inch opening

Torque wrench with 3/8-inch and 5/16-inch sockets

Personnel Required: 1

Tactical Satellite Microwave System Operator MOS 26Q

Equipment Condition

Front panel removed from TD-1337(V)/G (para 2-21).

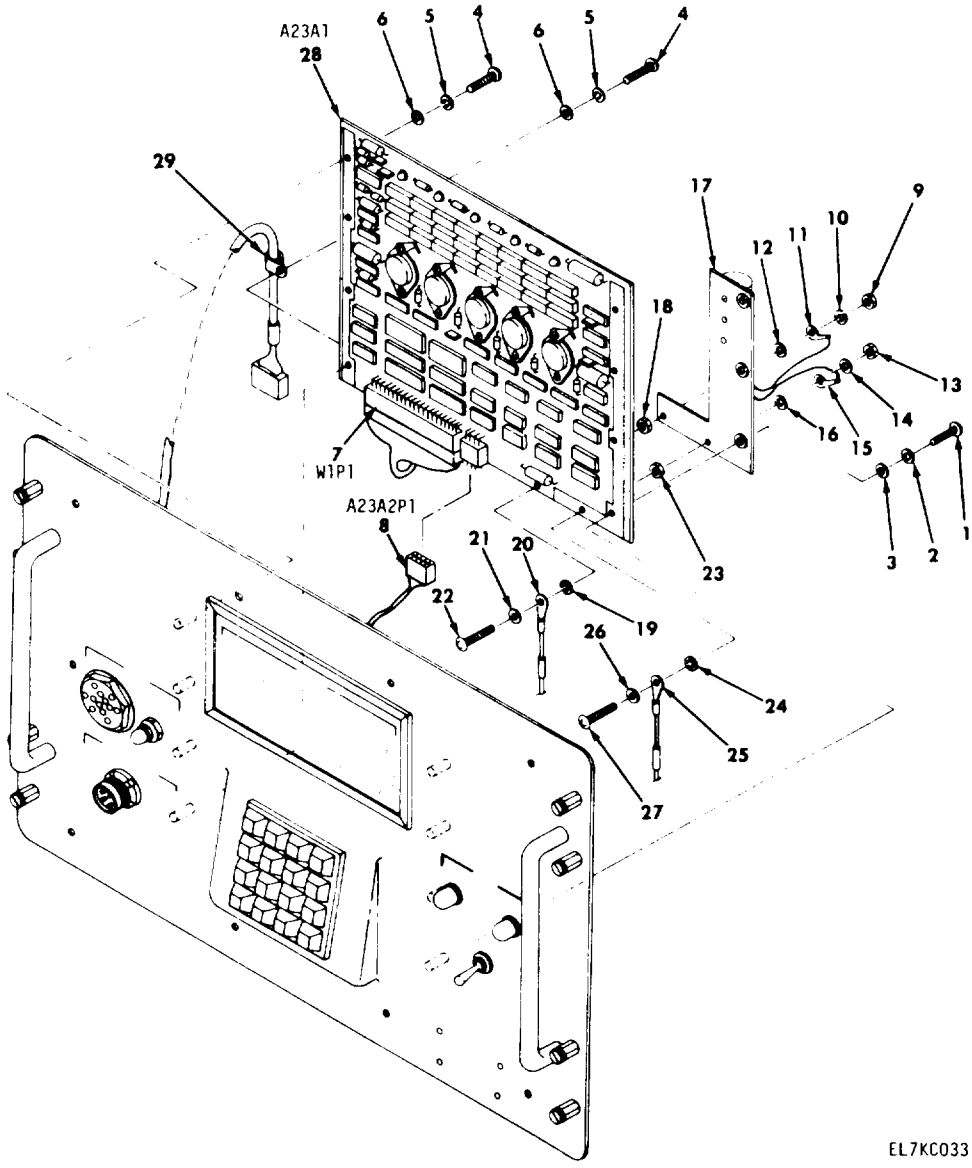
General Safety Instructions

None

Location/Item	Action	Remarks
Removal		
1. *3* sets of screws and washers (1 thru 3)	Remove	1. Retain all hardware removed in this and following steps. 2. These are screws in capacitor bracket (17).
2. 5 sets of screws and washers (4 thru 6)	Remove	These are rest of screws in display card A23A1 (28).
3. Connector (7)	Disconnect	Retain cable W 1.
4. Connector (8)	Disconnect	
5. 2 sets of nuts, washers, and terminal lugs (9 thru 16)	Remove	Do not unsolder terminal lugs (11 and 15).
6. Capacitor bracket (17)	Remove	
7. 2 sets of screws, nuts, washers, and terminal lugs (18 thru 27)	Remove	
8. Display card (28)	Remove	

2-22. Display Card Replacement Instructions - Continued.

Location/Item	Action	Remarks



1. SCREW (3)
2. LOCK WASHER (3)
3. FLAT WASHER (3)
4. SCREW (5)
5. LOCK WASHER (5)
6. FLAT WASHER (5)
7. CONNECTOR (P1 END OF CABLE W1)
8. CONNECTOR A23A2P1 (PART OF KEYBOARD)
9. NUT
10. LOCK WASHER
11. TERMINAL LUG (+ LEAD OF CAPACITOR)
12. FLAT WASHER
13. NUT
14. LOCK WASHER
15. TERMINAL LUG (- LEAD OF CAPACITOR)
16. FLAT WASHER
17. CAPACITOR BRACKET
18. NUT (THREADED SPACER)
19. INTERNAL TOOTH LOCK WASHER
20. TERMINAL LUG (+5V)
21. FLAT WASHER
22. SCREW
23. NUT (THREADED SPACER)
24. INTERNAL TOOTH LOCK WASHER
25. TERMINAL LUG (GROUND)
26. FLAT WASHER
27. SCREW
28. DISPLAY CARD A23A1
29. CABLE CLAMP

2-22. Display Card Replacement instructions - Continued.

Location/Item	Action	Remarks
Installation		
9. Replacement display card (28) and 2 sets of screws, nuts, washers, and terminal lugs (18 thru 27)	Install and torque nut (18) to 25 to 30 inch-pounds and and nut (23) to 16 to 18 inch-pounds.	Assemble in sequence shown on page 2-45.
10. Capacitor bracket (17)	Install	
11. 2 sets of nuts, washers, and terminal lugs (9 thru 16)	Install	Assemble in sequence shown on page 2-45.
12. Connector (8)	Connect	A23A2P1 mates with J2 on display card.
13. Connector (7)	Connect	W1P1 mates with J1 on display card.
14, 5 sets of screws and washers (4 thru 6)	Install and torque nut (9) to 25 to 30 inch-pounds and nut (13) to 16 to 18 inch-pounds.	Align holes in display card with standoffs on rear of front panel and install, but do not tighten screws (4). Ensure that cable clamp (29) is installed.
15. 3 sets of screws and washers (1 thru 3)	Install	Install and tighten.
16. 5 screws (4)	Tighten	Tighten previously installed screws (4).
17. Front panel	Install	Install front panel in TD-1337(V)/G (para 2-21).

2-23. Keyboard Replacement Instructions.

This task covers:

a. Removal b. Installation

INITIAL SETUP

Applicable Configurations

All models

Tools

Cross-tip screwdriver, No. 2

Hex socket wrench, 5/16-inch opening

Torque wrench with 5/16-inch socket

Personnel Required: 1

Tactical Satellite Microwave System Operator MOS 26Q

Equipment Condition

Front panel removed from TD-1337(V)/G (para 2-21).

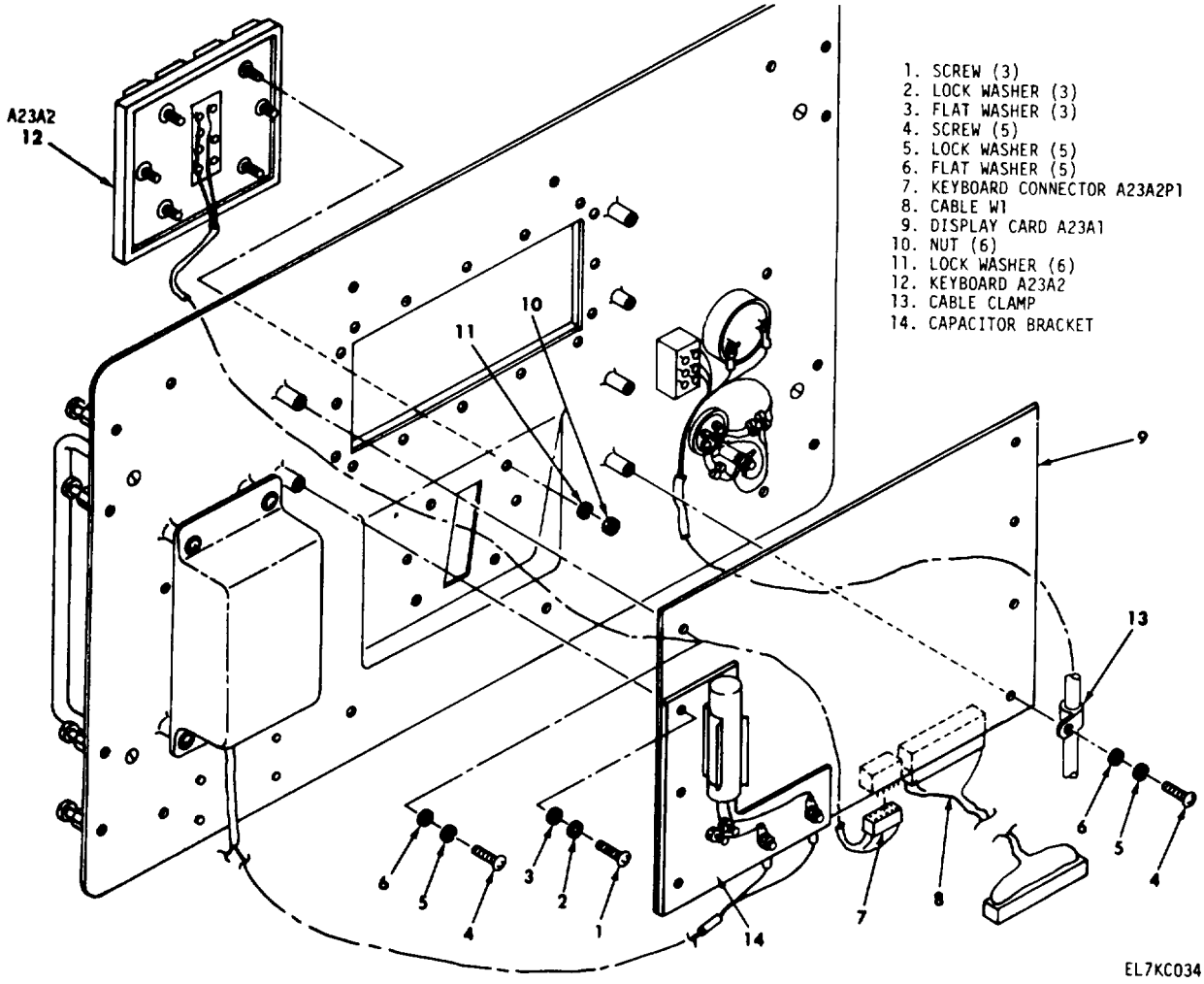
General Safety Instructions

None

Location/Item	Action	Remarks
Removal		
1. *3* sets of screws and washers (1 thru 3)	Remove	1. Retain all hardware removed in this and following steps. 2. These are screws in capacitor bracket (14).
2. 5 sets of screws and washers (4 thru 6)	Remove	These are rest of screws on display card A23A1 (9).
3. Connector (7)	Disconnect	
4. Display card (9)	Position out of way	Carefully lay display card back on table mat to extent of service loop in wiring.
5. 6 sets of nuts and washers (10 and 11)	Remove	
6. Keyboard (12)	Remove	Turn connector (7) to align with slot in front panel.
Installation		
7. Keyboard (12)	Install and torque nuts (1 O) to 4 to 5 inch-pounds.	Insert keyboard connector (7) through slot in front panel and then attach keyboard to panel using 6 sets of nuts and washers (10 and 11).
8. Connector (7)	Connect	Keyboard connector (7) mates with J2 on display card.

2-23. Keyboard Replacement Instructions - Continued.

Location/Item		Action	Remarks
Installation - Continued			
9. Display card (9)	Install		Align holes in display card (9) with stand-offs on rear of front panel. Install, but do not tighten, 5 sets of screws and washers (4 thru 6). Ensure cable clamp (13) is installed. Install 3 sets of screws and washers (1 thru 3). Tighten screws (1 and 4).
10. Front panel	Install		Install front panel in TD-1337(V)/G (para 2-21).



2-24. Red CESE Assembly Replacement Instructions (V3 and V4 Models).

This task covers:

a. Removal *b. Installation*

INITIAL SETUP

Applicable Configurations

V3 and V4 models only

Took

Cross-tip screwdriver, No. 2

Material Required

Sealing compound (item 1, Appendix C)

Personnel Required: 1

Space Communications Systems Equipment Operator Specialist AFSC 304X6

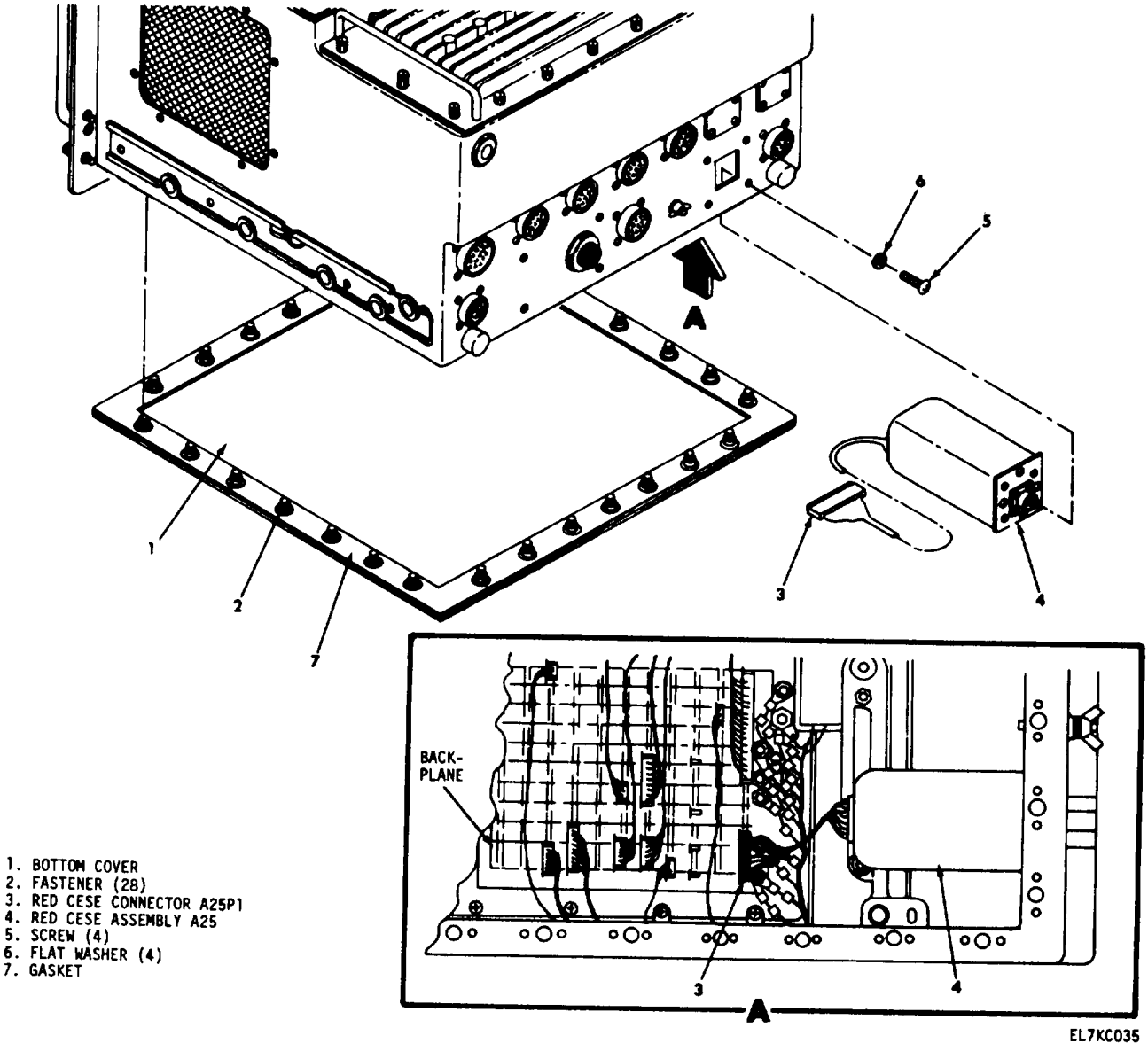
Equipment Condition

TD-1337(V)/G removed from rack (para 2-1 6).

Looation/item	Action	Remarks
Removal		
1. Bottom cover (1)	Remove	Loosen 28 fasteners (2) and remove bottom cover (1).
2. Red CESE assembly connector (3)	Disconnect	Carefully pull connector (3) from pins 1-18 of XA1 on bottom of backplane.
3. Red CESE assembly (4)	Remove	Remove 4 sets of screws and washers (5 and 6). Then carefully work red CESE assembly (4) out of case.
Installation		
4. Screws (5)	Clean	Clean threads of 4 screws (5). Then place sealing compound (item 1, Appendix C) on threads.
5. Red CESE assembly (4)	Install	Carefully work red CESE assembly (4) into case. Attach with 4 sets of screws and washers (5 and 6).
6. Red CESE assembly connector (3)	Connect	Carefully push connector (3) onto pins 1-16 of XA1. There is a keying plug (pin 5) to ensure connector mates with correct pins on XA1.
7. Gasket (7)	Inspect	Perform following cheeks and notify next higher level of maintenance of any problems. 1. Check that there are no rips, tears, or missing chunks in gasket. 2. Check that bonded surface of gasket has not pulled away from bottom cover.

2-24. Red CESE Assembly Replacement Instructions (V3 and V4 Models) - Continued.

Location/Item	Action	Remarks
Installation - Continued		
8. Bottom cover (1)	Install	Place cover on TD-1337(V)/G and tighten 28 fasteners (2).
9. TD-1337(V)/G	Install	Install TD-1337(V)/G in rack (para 2-16).



1. BOTTOM COVER
2. FASTENER (28)
3. RED CESE CONNECTOR A25P1
4. RED CESE ASSEMBLY A25
5. SCREW (4)
6. FLAT WASHER (4)
7. GASKET

Section V. PREPARATION FOR STORAGE OR SHIPMENT

2-25. General.

This section contains the special instruction required for preparing the equipment for storage or shipment. Packaging and packing materials must conform to the requirements in SB 38-100, Preservation, Packaging, pocking and Marking Materials, Supplies, and Equipment Used by the Army.

2-26. Packaging Requirements.

The packaging requirements for a TD-1337(V)/G, power supply PS1, and the other replaceable assemblies are described below.

a. TD-1337(V)/G. The TD-1337(V)/G case is ruggedized, but it is not waterproof. The TD-1337(V)/G is transportable, plug-in cards are firmly seated in a shock and vibration-resistant card" file. There are no cables or separate parts to be packaged with a TD-1337(V)/G. A technical manual shipped with a TD-1337(V)/G is packaged and shipped as described below.

◆ ◆ WARNING ◆ ◆

TD-1337(V)/G weighs approximately 62 pounds. Have another person help you lift and support it to prevent injury to yourself and others.

(1) A technical manual shipped with a TD-1337(V)/G will be wrapped and sealed in waterproof material.

(2) TD-1337(V)/G will be wrapped and sealed in waterproof barrier material before it is placed in a container for storage or shipment.

b. Power Supply PS1. Power supply is ruggedized, but it is not waterproof. There are no cables or separate parts to be packaged with the power supply, It should be wrapped and sealed in waterproof barrier material before it is placed in a container for shipment or storage.

c. Plug-in *Cards, Display Card, and Red CESE* Assembly.

• • CAUTION • •

NVM card A9 contains a battery. When placing this card in a static-shielding bag, ensure printed wiring surfaces or connector pins on card do not make contact with any conductive surfaces. It is possible that contact with a conductive surface could provide a shorting condition that could discharge the battery.

Plug-in cards, display card, and red CESE assembly must be placed in static-shielding bags prior to shipment or storage. Use static-shielding bag from which spare assembly was removed. If bag is missing or damaged, obtain a new bag. Use a static-shielding bag (such as 3M Type 2100) which has the following characteristics:

- Conductive outer layer (surface resistivity of 104 ohms/sq)
- Non-conductive inner layer (surface resistivity of 10^{12} ohms/sq)
- High tear and puncture resistance
- High tensile and dielectric strength.

2-27. Storage Requirements.

a. *TD-1337(V)/G.*

(1) Storage Conditions. In addition to the following requirements, an unpackaged TD-1337(V)/G must be stored in a closed sheltered area to protect it from the elements.

Temperature ..... -65°F (-56°C) to +160°F (+71°C)
Relative humidity ..... Low as 5% in air temperature of +120°F (+49°C). High as 100% between air temperature of -25°F (-32°C) to +86°F (+30°C) with condensation at all temperatures lower than +86°F (+30°C).
Salt atmosphere ..... No greater than encountered during coastal service and ocean transport.
Altitude ..... Up to 50,000 feet above sea level.
Tropical renditions ..... No greater than encountered in tropical areas including fungus laden air. .

(2) Administrative *Storage.* Refer to TM 740-90-1 for procedures, forms, records, and inspections required during administrative storage of TD-1337(V)/G.

(3) *Intemediate or Long Term* Storage. TD-1337(V)/G must be packaged as described in paragraph 2-26 for intermediate or long term storage when it is not stored as part of a shelter configuration.

b. Plug-in Cards, Display *Cord,* and *Red CESE Assembly. These* items all contain ESDS components. All spores must be stored in static-shielding bags to prevent possible damage to components.

• • CAUTION • •

Failure to store items in static-shielding bags could cause them to be damaged by static electricity.

APPENDIX A
REFERENCES

DA Pam 310-1	Consolidated Index of Army Publications and Blank Forms.
FM 21-11	First Aid for Soldiers.
SB 38-100	Preservation, Packaging, Packing and Marking Materials, Supplies, and Equipment Used by the Army.
SB 700-20	Army Adopted/Other Items Selected for Authorization/List of Reportable Items.
TM 11-5805-382-12	Operator's and Organizational Maintenance Manual: Multiplexer TD-660/G (NSN 5805-00-930-8079), TD-660A/G and TD-660B/G (5820-00-928-3382).
TM 11-5805-383-12	Operator's and Organizational Maintenance Manual: Multiplexer TD-754/G (NSN 5820-00-930-8078) .
TM 11-7025-202-12	Operator's and Organizational Maintenance Manual for Multiplexer TD-976/G (NSN 7025-01 -048-%78) and Pulse Form Restorer TD-982/G (7025-01 -061-1 245).
TM 11-7025-221-10	Operator's Manual, Multiplexer, Digital TD-1337(V)/G.
TM 11-7025-221-20P	Organizational Maintenance Repair Parts and Special Tools List for Multiplexer, Digital TD-1337(V)/G.
TM 38-750	The Army Maintenance Management Systems (TAMMS).
TM 4700-15-1-1/D	The Marine Carps Maintenance Records and Procedures.
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Material To Prevent Enemy Use (Electronic: Command).
T.O. 00-20-2	Maintenance Data Collection System.

APPENDIX B
MAINTENANCE ALLOCATION CHART

Section I. INTRODUCTION

B-1. General.

a. This section provides a general explanation of all maintenance and repair functions authorized at various maintenance categories,

b. The Maintenance Allocation Chart (MAC) in section II designates overall authority and responsibility for the performance of maintenance functions on the identified end item or component. The application of the maintenance functions to the end item or component will be consistent with the capacities and capabilities of the designated maintenance categories.

c. Section Ill lists the tools and test equipment (both special tools and common tool sets) required for each maintenance function as referenced from section Il.

d. Section IV contains supplemental instructions and explanatory notes for a particular maintenance function.

B-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 (e.g., by sight, sound, or feel).

b. Test, To verify serviceability by measuring the mechanical, pneumatic, hydraulic, 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 (includes decontaminate, when required), to preserve, to drain, to paint, or to replenish fuel, lubricants, chemical fluids, or gases.

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

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

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

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

h. Rep/ace. To remove an unserviceable item and install a serviceable counterpart in its place. "Replace" is authorized by the MAC and is shown as the 3d position code of the SMR code.

i. *Repair.* The application of maintenance services, including fault location/troubleshooting, removal/installation, and disassembly/assembly procedures, and maintenance actions to identify troubles and restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

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

B-2. Maintenance Functions - Continued.

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

B-3. Explanation of Columns in MAC, Section Il.

a. Column *1, Group Number.* Column 1 lists functional group code numbers, the purpose of which is to identify maintenance significant components, assemblies, subassemblies, and modules with the next higher assembly. End item group number shall be “00.”

b. *Column* 2, Component/Assernbly. Column 2 contains the names of components, assemblies, sub-assemblies, 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 2. (For detailed explanation of these functions, see paragraph B-2.)

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a work time figure in the appropriate subcolumn(s), the category 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 work time figures will be shown for each category. The work time figure represents the average time required to restore an item (assembly, subassembly, component, module, end item, or system) to a serviceable condition under typical field operating conditions. This time includes preparation time (including any necessary disassembly/assembly time), troubleshooting/fault location time, and quality assurance/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. The symbol designations for the various maintenance categories are as follows:

C .....Operator or crew
O.....Organizational maintenance
F .....Direct Support Maintenance
H..... General Support Maintenance
D..... Depot maintenance

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

f. Column 6, *Remarks.* This column shall, when applicable, contain a letter code, in alphabetic order, which shall be keyed to the remarks contained in Section IV.

B-4. Explanation of Columns in Tool and Test Equipment Requirements, Section Ill.

a. *Column 7, Reference Code.* The tool and test equipment reference code correlates with a code used in the MAC, Section II, Column 5.

b. *Column* 2, Maintenance *Category.* The lowest category of maintenance authorized to use the tool or test equipment.

c. *Column 3, Nomenclature.* Name or identification of the tool or test equipment.

d. *Column 4, National Stock Number.* The National stock number of the tool or test equipment.

e. *Column 5, Too/ Number.* The manufacturer’s part number.

B-5. Explanation of Columns In Remarks, Section IV.

a. *Column 7, Reference Code.* The code recorded in column 6, Section Il.

b. Column 2, *Remarks.* This column lists information pertinent to the maintenance function being performed as indicated in the MAC, Section Il.

SECTION II MAINTENANCE ALLOCATION CHART
FOR
MULTIPLEXER, DIGITAL TD-1337(V)/G

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY		(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQPT.	(6) REMARKS
00	MULTIPLEXER, DIGITAL TD-1337(V)/G MULTIPLEXER, DIGITAL TD-1337(V)1/G MULTIPLEXER, DIGITAL TD-1337(V)2/G MULTIPLEXER, DIGITAL TD-1337(V)3/G MULTIPLEXER, DIGITAL TD-1337(V)4/G	SM-F-978400 SM-F-978405 SM-F-978410 SM-F-978415	INSPECT		0.1				-	A,B
			INSTALL		0.2				10	
			TEST		0.6				-	C
			REPAIR		0.8				9,10,14, 16,52,54	D
			REPLACE		1.2				10,14	
			REPAIR			1.0			1,4-8,17, 22,23,42, 45,46,49, 50,51,53	E
			ADJUST			0.6			2,17,33	
			REPAIR					3.0	1,2,4-8, 17,22,23, 33,42,45, 46,49-51, 53,57,59, 65-69	
01	POWER SUPPLY		REPLACE		0.5				10,16,52	A,J
		SM-F-978450	REPAIR				5.0		1,11,12, 17,21,24, 26,29-32, 37,39-42, 45,48,55, 58,61,62, 63	
			ADJUST				0.1		1,2,11, 12,17,21, 24,26,28-32,37,39, 42,45,48, 61,62	I
0101	CIRCUIT CARD ASSY, TIMING & CONTROL		REPLACE				0.2		17	
		SM-D-978460	REPAIR				2.0		1,2,11, 12,17,35, 37,38,42, 45,48,55, 56,62	
0102	CIRCUIT CARD ASSY, REGULATOR		REPLACE				0.2		17	
		SM-D-978465	REPAIR				2.0		1,2,11, 12,17,28, 35,37,38, 42,45,55, 56,62	
0103	CIRCUIT CARD ASSY, CHOPPER		REPLACE				0.5		17	
		SM-D-978475	REPAIR				2.0		1,12,17, 42,45	
0104	CIRCUIT CARD ASSY, INTERCONN. BOARD		REPLACE				0.5		17	
		SM-D-978480	REPAIR				2.0		1,12,17, 34,35	
02	PANEL ASSEMBLY, MUX CONTROL		REPAIR		0.5				10,14,16, 52,54	A,F
		SM-F-978490	REPLACE		0.5				10,14	L
			REPAIR			1.6			1,4,17, 42,45,46, 49,64	G

SECTION II MAINTENANCE ALLOCATION CHART
FOR
MULTIPLEXER, DIGITAL TD-1337(V)/G

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
			C	O	F	H	D		
0201	CIRCUIT CARD ASSY, DISPLAY	REPLACE		0.3				9,10,14, 16,52,54	K
	SM-D-978510	REPAIR					2.9	12 ,17, 42,45, 67,68, 70-72	
0202	KEYBOARD ASSY	REPLACE		0.7				9,10,14, 16,54	K
	SM-D-978498	REPAIR			0.2			1,17,46, 49,64	
03	CIRCUIT CARD ASSY, M PROC (A)	REPLACE		0.3				10,14	A,K
	SM-D-978550	REPAIR					2.9	4,12,17, 42,45,67, 68,70-72	
04	CIRCUIT CARD ASSY, NON-VOLATILE MEMORY	REPLACE		0.3				10,14	A,K
	SM-D-978555	REPAIR					2.9	4,12,17, 42,45, 67,68, 70-72	
05	CIRCUIT CARD ASSY, SYNCHRONIZER & SYNTHESIZER	REPLACE		0.3				10,14	A,K
	SM-D-978560	REPAIR					2.9	4,11,12, 17,42, 45,67, 68,70-73	
06	CIRCUIT CARD ASSY, DEMUX	REPLACE		0.3				10,14	A,K
	SM-D-978565	REPAIR					2.9	4,11,12, 17,42,45, 67,68, 70-72	
07	CIRCUIT CARD ASSY, MUX	REPLACE		0.3				10,14	A,K
	SM-D-978570	REPAIR					2.9	4,12,17, 42,45,67, 68,70-72	
08	CIRCUIT CARD ASSY, PHASE LOCKED LOOP	REPLACE		0.3				10,14	A,K
	SM-D-978575	REPAIR					2.9	2,4,11, 12,17,42, 45,67,68, 70-72	
09	CIRCUIT CARD ASSY, 16 DVOW	REPLACE		0.3				10,14	A,K
	SM-D-978585	REPAIR					2.9	4,11,12, 17,42,45, 67,68, 70-73	
10	CIRCUIT CARD ASSY, LOOP MODEM/RATE MEASUREMENT	REPLACE		0.3				10,14	A,K,
	SM-D-978590	REPAIR					2.9	4,11,12, 17,42,45, 67,68, 70-73	
11	CIRCUIT CARD ASSY, MUX INPUT BUFFER	REPLACE		0.3				10,14	A,K
	SM-D-978595	REPAIR					2.9	4,12,17, 42,45,67, 68,70-72	

SECTION II MAINTENANCE ALLOCATION CHART

MULTIPLEXER, DIGITAL TD-1337(V)/G

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY		(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQPT.	(6) REMARKS
				C	O	F	H	D		
12	CIRCUIT CARD ASSY, OUTPUT BUFFER		REPLACE		0.3				10,14	A,K
		SM-D-978600	REPAIR					2.9	4,12,17, 42,45, 67,68, 70-72	
13	CIRCUIT CARD ASSY, GROUP MODEM		REPLACE		0.3				10,14	A,K
		SM-D-978605	REPAIR					2.9	4,11,12, 17,42, 45,67, 68,70-73	
14	CIRCUIT CARD ASSY, TD-660 I/O		REPLACE		0.3				10,14	A,K
		SM-D-978610	REPAIR					2.9	4,12,17, 42,45, 67,68, 70-72	
15	CASE ASSY, CARD FILE	SM-D-978500	REPAIR			0.6			1,4,17, 42,45, 57,59	A
			REPLACE			0.8			17	M
1501	BACKPLANE ASSY, WIRED	SM-D-978505	REPAIR			1.2			1,4,17, 57,59	
16	CASE ASSY		REPAIR			0.5			17	A,H
		SM-D-978420	REPAIR					0.5	17	
17	CABLE ASSY, W1		REPLACE			0.2			17	A
		SM-D-978440	REPAIR			0.2			1,17,46, 49,64	
18	CABLE ASSY, W4		REPLACE			0.3			17	A
		SM-D-978642	REPAIR			0.2			1,7,8, 17,22, 23,46, 49,64	
19	CABLE ASSY, W5		REPLACE			0.3			17	A
		SM-D-978643	REPAIR			0.2			1,5,6, 17,46, 49-51,64	
20	CABLE ASSY, W6		REPLACE			0.3			17	A
		SM-D-978644	REPAIR			0.2			1,5,6, 17,46, 49-51,64	
21	CABLE ASSY, W7		REPLACE			0.3			17	A
		SM-D-978645	REPAIR			0.2			1,5,6, 17,46, 49-51,64	
22	CABLE ASSY, W8		REPLACE			0.5			17	A
		SM-D-978646	REPAIR			0.2			1,5,6, 17,46, 49-51,64	
23	CABLE ASSY, W9		REPLACE			0.3			17	A
		SM-D-978647	REPAIR			0.2			1,7,8, 17,22,23, 46,49,64	

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
MULITIPLEXER, DIGITAL TD-1337(V)/G

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE		NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	F,H	MULTIMETER, DIGITAL	AN/USM-486		
2	F,H	COUNTER, ELECTRONIC DIGITAL READOUT	AN/USM-459	6625-01-061-8928	
3	F	BIT, SCREWDRIVER		5120-00-785-8151	FP32A (55719)
4	F	MAINT. KIT, CONN, RPR	MK-2067/G	5120-01-108-4115	
5	F	CRIMP TOOL	M22520/1-01	5120-00-165-3912	
6	F	TURRET	M22520/1-04	5120-00-016-7582	
7	F	CRIMP TOOL	M22520/2-01	5120-00-165-3910	
8	F	TURRET	M22520/2-09	5120-00-017-3927	
9	O	WRENCH, SOCKET, HEX 5/16 IN. OPENING		5120-00-008-9464	ND110 (55719)
10	O	WRENCH, SOCKET, HEX 3/8 IN. OPENING		5120-00-003-5327	ND112 (55719)
11	H	OSCILLOSCOPE	AN/USM-281C	6625-00-106-9622	
12	H	BENCH TOP REPAIR CENTER		3439-00-389-0329	PRC350C (17794)
13		DELETED			
14	O	SCREWDRIVER, CROSS TIP NO. 2 POINT		5120-00-008-9464	SSDP42 (55719)
15	F	ADAPTER, SOCKET		5120-00-224-9219	TA3 (55719)
16	O,F,H	WRENCH, TORQUE		5120-00-585-8434	TE6A (55719)
17	F,H	TOOL KIT, ELECTRONIC EQUIPMENT	TK-105/G	5180-00-610-8177	
18		DELETED			
19	F	BIT, SCREWDRIVER		5120-00-879-3547	TMP22A (55719)
20		DELETED			
21	H	CARBON PILE			10 (07239)
22	F	REMOVAL TOOL		5120-00-146-6558	11-8675-24(77820)
23	F	INSERTION TOOL		5120-00-032-4064	11-8794-24(77820)
24	H	EXTRACTING TOOL		5120-00-245-9539	1227-06 (01556)
25		DELETED			
26	H	TRANSFORMER, VARIABLE, POWER		5950-00-862-0113	3030-5111(24655)
27		DELETED			
28	H	FUNCTION GENERATOR		6625-00-466-0586	3310A (28480)
29	H	TANG BREAK-OFF TOOL		5120-00-793-1074	3695-06 (01556)
30	H	TANG BREAK-OFF TOOL		5120-00-776-9519	3695-2 (01556)
31	H	WATTMETER			432-9902003 (65092)
32	H	METER, HIGH RESISTANCE		6625-00-160-1131	4329A (28480)
33	F	TOOL, ADJUSTMENT		5120-00-724-3767	5284 (73899)
34	H	EXTRACTION TOOL			600-0002-000 (31413)
35	H	INSERTION TOOL		5120-00-320-4056	600-0004-000 (23350)
36		DELETED			
37	H	POWER SUPPLY (2 EACH)		6625-00-439-5080	6202B (28480)

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
MULTIPLEXER, DIGITAL TD-1337(V)/6

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE		NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
38	H	TEST BOX, ANALOG CARD			73400060 (04939)
39	H	TEST BOX, POWER SUPPLY			73400061 (04939)
40	H	INSERTER, SCREW		5120-00-816-5704	7551-06 (01556)
41	H	INSERTER, SCREW		5120-00-237-4669	7551-2 (01556)
42	F,H	WORK STATION GROUNDING KIT		4940-01-087-3458	8007 (52942)
43		DELETED			
44		DELETED			
45	F,H	BLOWER, IONIZED AIR		6930-01-061-3600	909 (52942)
46	F	REMOVAL TOOL		5120-00-006-9966	91052-1 (00779)
47		DELETED			
48	H	AMMETER, DC (4 EACH)		6625-01-039-2310	931-2912012(65092)
49	F	TOOL, CRIMPING		5120-00-117-4623	90202-2 (00779)
50	F	TOOL, REMOVAL		5120-00-409-5206	11-8675-16 (77820)
51	F	TOOL, INSERTION		5120-00-409-5216	11-8794-16 (77820)
52	O	SOCKET, SOCKET WRENCH		5120-00-189-7922	STM12 (55719)
53	F	PLIERS, RETAINING RING			PR22A (55719)
54	O	SOCKET, SOCKET WRENCH		5120-00-189-7920	STM10 (55719)
55	H	VOLTMETER, ELECTRONIC	ME-459/U	6625-00-229-0457	
56	H	TOOL, EXTRACTION		5120-01-108-5115	600-0001-000 (31413)
57	F	TOOL, INSERTION		5120-01-101-1227	600-0022-000 (31413)
58	H	TOOL, INSERT/REMOVAL			600-0027-000 (31413)
59	F	TOOL, INSERTION			600-0158-000 (31413)
60	H	RHEOSTAT			411A16 (07239)
61	H	RHEOSTAT (2 EACH)			411GN24 (07239)
62	H	POWER SUPPLY		6130-00-497-0505	6284A (28480)

SECTION III TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
MULTIPLEXER, DIGITAL TD-1337(V)/G

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE		NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
38	H	TEST BOX, ANALOG CARD			73400060 (04939)
39	H	TEST BOX, POWER SUPPLY			73400061 (04939)
40	H	INSERTER, SCREW		5120-00-816-5704	7551-06 (01556)
41	H	INSERTER, SCREW		5120-00-237-4669	7551-2 (01556)
42	F,H,D	WORK STATION GROUNDING KIT		4940-01-087-3458	8007 (52942)
43		DELETED			
44		DELETED			
45	F,H, D	BLOWER, IONIZED AIR		6930-01-061-3600	909 (52942)
46	F,D	REMOVAL TOOL		5120-00-006-9966	91052-1 (00779)
47		DELETED			
48	H	AMMETER, DC (4 EACH)		6625-01-039-2310	931-2912012(65092)
49	F,D	TOOL, CRIMPING		5120-00-117-4623	90202-2 (00779)
50	F,D	TOOL, REMOVAL		5120-00-409-5206	11-8675-16 (77820)
51	F,D	TOOL, INSERTION		5120-00-409-5216	11-8794-16 (77820)
52	O	SOCKET, SOCKET WRENCH		5120-00-189-7922	STM12 (55719)
53	F,D	PLIERS, RETAINING RING			PR22A (55719)
54	O	SOCKET, SOCKET WRENCH		5120-00-189-7920	STM10 (55719)
55	H	VOLTMETER, ELECTRONIC	ME-459/U	6625-00-229-0457	
56	H	TOOL, EXTRACTION		5120-01-108-5115	600-0001-000 (31413)
57	F,D	TOOL, INSERTION		5120-01-101-1227	600-0022-000 (31413)
58	H	TOOL, INSERT/REMOVAL			600-0027-000 (31413)
59	F,D	TOOL, INSERTION			600-0158-000 (31413)
60		DELETED			
61	H	RHEOSTAT (3 EACH)			411GN24 (07239)
62	H	POWER SUPPLY		6130-00-497-0505	6284A (28480)
63	H	TOOL, CRIMPING			600-0026-000 (31413)
64	F	STRIPPER, WIRE, HAND		5110-00-897-7723	U18802 (79000)
65	D	TEST STATION, ELECTRONIC	AN/USM-410		
66	D	INTERFACE ADAPTER			815 (04939)
67	D	TEST TAPE CARTRIDGE			870 (04939)
68	D	DIAGNOSTIC TAPE CARTRIDGE			880 (04939)
69	D	CABLE, SPECIAL PURPOSE			805 (04939)
70	D	TEST SET, PORTABLE	AN /USM-465		
71	D	INTERFACE ADAPTER			820 (04939)
72	D	INTERFACE CIRCUIT CARD			825 (04939)
73	D	GENERATOR, FUNCTION	SG-1133/U		

SECTION IV REMARKS
MUITIPLEXER, DIGITAL TD-1337(V)/G

REFERENCE CODE	REMARKS				
	ASSEMBLY	TD-1337(V)1/G	TD-1337(V)2/G	TD-1337(V)3/G	TD-1337(V)4/G
A	POWER SUPPLY 01	X	X	X	X
	PANEL ASSEMBLY, MUX CONTROL 02	X	X	X	X
	CIRCUIT CARD ASSY, M PROC (A) 03	X	X	-	-
	CIRCUIT CARD ASSY, NON-VOLATILE MEMORY 04	X	X	X	X
	CIRCUIT CARD ASSY, SYNCHRONIZER & SYNTHESIZER 05	X	X	X	X
	CIRCUIT CARD ASSY, DEMUX 06	X (4 REQ)	X (1 REQ)	X (4 REQ)	X (1 REQ)
	CIRCUIT CARD ASSY, MUX 07	X	X	X	X
	CIRCUIT CARD ASSY, PHASE LOCKED LOOP 08	X	X	X	X
	CIRCUIT CARD ASSY, 16 DVOW 09	X	X	X	X
	CIRCUIT CARD ASSY, LOOP MODEM/RATE MEASUREMENT 10	X	X	X	X
	CIRCUIT CARD ASSY, MUX INPUT BUFFER 11	X	-	X	X
	CIRCUIT CARD ASSY, OUTPUT BUFFER 12	X (4 REQ)	X (1 REQ)	X (4 REQ)	X (2 REQ)
	CIRCUIT CARD ASSY, GROUP MODEM 13	X	X	X	X
	CIRCUIT CARD ASSY, TD-660 I/O 14	X	X	-	-
	CASE ASSEMBLY, CARD FILE 15	X	X	X	X
	BACKPLANE ASSY, WIRED 1501	X	X	X	X
	CASE ASSY 16	X	X	X	X
	CABLE ASSY, W1 17	X	X	X	X
	CABLE ASSY, W4 18	X	-	X	-
	CABLE ASSY, W5 19	X	-	-	-
	CABLE ASSY, W6 20	X	X	-	-

SECTION IV. REMARKS
MULTIPLEXER, DIGITAL TD-1337(V)/G

REFERENCE CODE	REMARKS				
	ASSEMBLY	TD-1337(V)1/G	TD-1337(V)2/G	TD-1337(V)3/G	TD-1337(V)4/G
A	CABLE ASSY, W7 21	X	X	X	X
	CABLE ASSY, W8 22	X	X	X	X
	CABLE ASSY, W9 23	X	X	X	X
	CABLE ASSY, W10 24	X	X	X	X
	CABLE ASSY, W11 25	X	X	X	X
	RED CESE ASSY 26	-	-	X	X
	CIRCUIT CARD ASSY, RED CESE 2601	-	-	X	X
	CIRCUIT CARD ASSY, 2.4 DVOW 27	-	-	X	X
	CIRCUIT CARD ASSY, CESE STATUS COLLECTOR 28	-	-	X	X
	CIRCUIT CARD ASSY, M PROC (B) 29	-	-	X	X
	CABLE ASSY, W2 30	-	-	X	X
	CABLE ASSY, W3 31	-	-	X	X
B	VISUAL ONLY				
C	BUILT IN TEST PROCEDURES				
D	REPAIR BY REPLACEMENT OF ASSEMBLIES FGC 01, 0201, 03 THRU 14, 26 THRU 29, INDICATOR LAMPS, KEYBOARD (0202), OR COMPLETE END ITEM FGC 00.				
E	REPAIR LIMITED TO REPAIR OF FGC 02, 15 THRU 25, 30, AND 31, AND REPLACEMENT OF SOME MECHANICAL COMPONENTS MOUNTED ON CHASSIS (FGC 00).				
F	REPAIR IS LIMITED TO REPLACEMENT OF FGC 0201 (CIRCUIT CARD) AND FGC 0202 (KEYBOARD) WHICH IS PART OF THE REPAIR ACTION OF FGC 00 (MULTIPLEXER).				
G	REPAIR BY REPLACEMENT OF ALL ELECTRICAL COMPONENTS.				
H	REPAIR BY REPLACEMENT OF GASKETS.				
I	ALL ADJUSTMENTS ARE PART OF REPAIR ACTION OF POWER SUPPLY.				
J	REPLACEMENT OF POWER SUPPLY IS PART OF REPAIR ACTION OF MULTIPLEXER.				
K	REPLACEMENT IS PART OF REPAIR ACTION OF MULTIPLEXER.				
L	REPLACEMENT OF THIS UNIT IS PART OF THE REPAIR ACTIONS SPECIFIED IN REMARKS D, E, AND F.				
M	REPLACEMENT OF THIS UNIT IS PART OF THE REPAIR ACTION OF FGC 1501.				

APPENDIX C
EXPENDABLE SUPPLIES AND MATERIALS LIST

Section I. INTRODUCTION

C-1. scope.

This appendix lists expendable supplies and materials you will need to operate and maintain the TD-1337(V)/G. These items are authorized to you by CTA 50-970, Expendable Items (Except Medical, Class V, Repair Parts, and Heraldic Items).

C-2. Explanation of Columns.

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

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

C - Operator/Crew
0- Organizational Maintenance
F - Direct Support Maintenance
H - General Support Maintenance

c. *Column (3) - Nations/ Stock A/umber.* This is the National stock number assigned to the item; use it to request or requisition the item.

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

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

(1) ITEM NUMBER	*(2)* LEVEL	*(3)* NATIONAL STOCK NUMBER	*(4)* DESCRIPTION	*(5)* U/M
1	0		Sealing, locking, and retaining compound MIL-S-22473, Grade C	

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RECOMMENDED CHANGES TO EQUIPMENT TECHNICAL PUBLICATIONS

SOMETHING WRONG WITH THIS PUBLICATION?

FROM (PRINT YOUR UNIT'S COMPLETE ADDRESS)
Commander
Stateside Army Depot
ATTN: AMSTA-US
Stateside, N.J. 07703

DATE SENT
10 July 1975

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-5840-340-12	23 Jan 74	Radar Set AN/PRC-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^{o} IFF antenna lag rather than 1^{o}. REASON: Experience has shown that with only a 1^{o} lag, the antenna servo system is too sensitive to wind gusting in excess of 25 knots, and has a tendency to rapidly accelerate and decelerate as it hunts, causing strain to the drive train. Hunting is minimized by adjusting the lag to 2^{o} without degradation of operation.
3-10	3-3		3-1	Item 5, Function column. Change "2 db" to "3db." REASON: The adjustment procedure the 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.
		F03		Zone C 3. On J1-2, change "+24 VDC to "+5 VDC." REASON: This is the output line of the 5 VDC power supply. +24 VDC is the input voltage.

SAMPLE

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

SIGN HERE
I. M. DeSpiritof

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FROM: (PRINT YOUR UNIT'S COMPLETE ADDRESS)

DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE
TM 11-7025-221-20		Multiplexer, Digital TD-1337(V)1/G, TD-1337(V)2/G, TD-1337(V)3/G, and TD-1337(V)4/G

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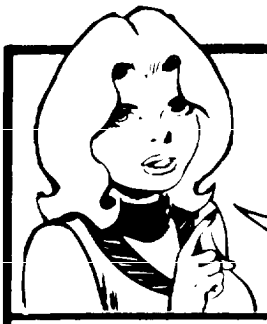

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