TECHNICAL MANUAL

OPERATOR'S, ORGAIIIZATIONAL, AND DIRECT SUPPORT MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LIST

FOR

SCANNER GROUPS, TELEPHONE TRAFFIC
OA.8746[V)1/GT (5805-143-4670)

AND

OA-8746(V)2/GT (5805-151-3925]

HEADQUARTERS, DEPARTMENT OF THE ARMY

SEPTEMBER 1974

WARNING

HIGH VOLTAGE

is used in the operation of this equipment.

DEATH ON CONTACT

may result if personnel fail to observe safety precautions.
Learn the areas in the equipment containing high voltages.
Be careful not to contact high-voltage connections when installing or operating this equipment.
Before working inside the equipment, turn power off and ground points off high potential before touching them.

WARNING

DANGEROUS CHEMICALS

are used to clean this equipment.

DEATH

or severe burns may result if personnel fail to observe safety precautions.

CHANGE

No. 1

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC *9 October 1978*

Operator's, Organizational, and Direct Support Maintenance Manual
SCANNER GROUPS, TELEPHONE TRAFFIC OA-8746(V)1/GT (NSN 5805-00-1434670) AND OA8746(V) 2/GT (NSN 5805-00-151-3925)

Current as of 20 June 1978

TM 11-5805-640-13, 16 September 1974, is changed as follows to include a new Maintenance Allocation Chart:

1. Change the title as indicated above.
2. A vertical line in the margin indicates changed material.
3. Remove and insert pages as indicated below:

Remove	*Insert*
i and ii	i and ii
4-1 and 4-2	4-1 and 4-2
A-1	A-1
B-1 through B-5	None
C-1 through C-4	C-1 through C-4

4. Retain this change page in the front of the manual for reference.

By Order of the Secretary of the Army:

BERNARD W. ROGERS
General, United States Army
Chief of Staff

Official:

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

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- Fort Gordon (10)
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- Fort Carson (5)
- Ft Monmouth IHISA) (26)
- Ft Richardson (CERCONI) (2)
- Army Dep. (1) except
  - LBAD (14)
  - SAAD (30)
  - TOAD t14)
  - SHAD (2.)
- USAERDAA (1)
- USAERDAW (1)
- USA Dep (1)
- Sig Sec USA Dep (1)
- Units org under fol TOE:
  - (1 cy each unit, UNOINDC)
  - 29-207 (2)
  - 29-610 (2)
  - 29-134
  - 29-136

NG: None
USAR: None
For explanation of abbreviation, see AR 310-50.

TECHNICAL MANUAL

No. 11-5805-640-13

HEADQUARTERS,
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., *16 September 1974*

OPERATOR'S, ORGANIZATIONAL, AND DIRECT SUPPORT MAINTENANCE MANUAL

SCANNER GROUPS, TELEPHONE TRAFFIC
OA-8746(V)1/GT (5805-143-4670) AND OA-8746(V)2/GT (5805-151-3925)

Current As Of 24 July 1974

LIST OF ILLUSTRATIONS

CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope.

This manual contains on-site maintenance (operator/creworganizational and direct support for Scanner Groups, Telephone Traffic OA-8746(V)1GT (rack mounted) and OA-8746 (V)2/GT (portable) hereinafter called the scanner (fig. 1-1). It provides a description, service/installation information, operation and maintenance instructions with parts list for the scanner group of components.

NOTE

Telephone Traffic Scanner Group OA-8746(V)1/GT consists of items 1, 3, 5,7
Telephone Traffic Scanner Group OA-8746(V)2/GT consists of items 1, 2, 3, 4, 6, 7

1-2. Indexes of Publications.

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

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

1-3. Forms and Records.

a. Reports of Maintenance and Unsatisfactory Equipment. Department of the Army forms and procedures used for equipment maintenance will be those prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Report of Packaging and Handling Deficiencies) as prescribed in AR 700-58 (Army)/NAVSUP PUB 378 (Navy)/AFR 71-4 (Air Force)/ and MCO P4030.29 (Marine Corps).

c. Discrepancy in Shipment Report (DISREP) (SF 361). Fill out and forward Discrepancy in Shipment Report (DISREP) (SF 361) as prescribed in AR 55-38 (Army)/NAVSUP PUB 459 (Navy)/AFM 75-34 (Air Force)/and MCO P4610.19 (Marine Corps).

1-4. Reporting of Equipment Publication Improvements.

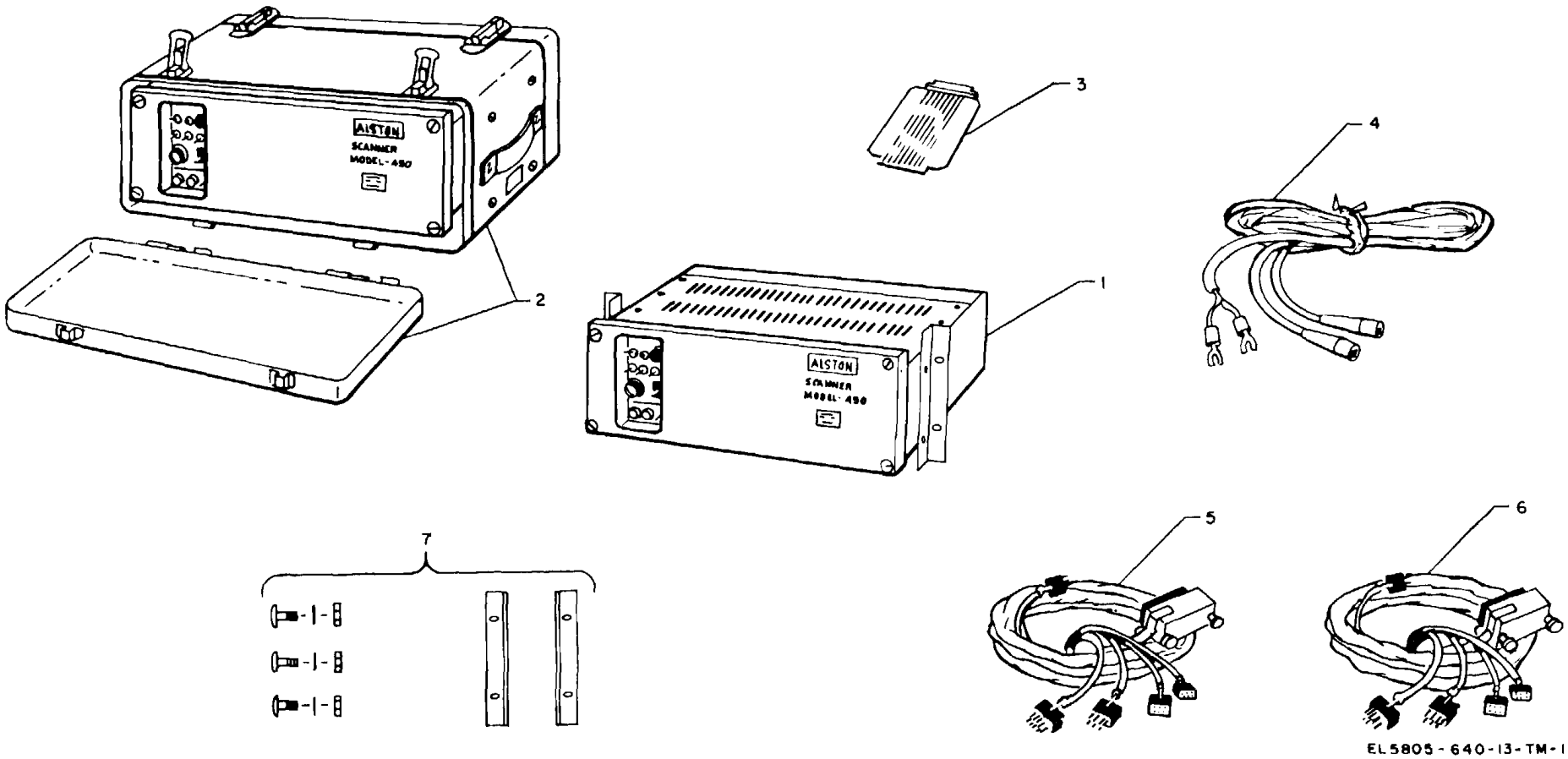
The reporting of errors, omissions, and recommendations for improving this manual by the individual user is encouraged. Reports should be submitted on DA Form 2028 (Recommended Changes to Publications and Blank Forms) and forwarded direct to Commander, US Army Electronics Command, ATTN: AMSEL-MA-CW, Fort Monmouth, N. J. 07703.

1-5. Destruction of Materiel to Prevent Use.

Demolition of equipment will be accomplished only upon order of the commander. Refer to TM 750-244-2 for demolition procedures.

1-6. Administrative Storage.

Administrative storage of the equipment shall be in accordance with the requirements of TM 740-90-1.



Key for fig. 1-1:

1. Telephone Traffic Scanner TA-917/GT
2. Electrical Equipment Case CY-7373/GT
3. Extender card 381001
4. Power cable 83016
5. Input cable 365097-1
6. Input cable 365097-2
7. Hardware mounting kit 370019 (rack mount)

Figure 1-1. Telephone Traffic Scanner Group OA-8746(V)1/GT and OA-8746(V)2/GT.

Section II. DESCRIPTION AND DATA

1-7. Purpose and Use.

Telephone Traffic Scanner TA-917/GT is the primary equipment comprising the telephone traffic scanner group (fig. 1-1). The scanner is used to perform usage studies of a 48-volt dial telephone central office.

1-8. Description.

(fig. 1-1)

a. Telephone Traffic Scanner.

Position	*Description*
3	Power Supply
10	Control Interface
13	Control
14	Address 500-Pt Scanner
16-32	Input/Output

* Includes ASA1 control interface circuit card.

b. Input Cables. Eleven input cables are provided with each scanner configuration. Each of the cables permits connections of a 50-conductor input connector to a patch panel. Each cable consists of a 21-foot wiring harness with a 50-pin connector on one end and five 10-pin connectors on the other end. The 10-pin connectors may be removed for direct-lead connection to input sources in a dedicated installation. The cable used with the rack-mounted configuration utilizes solid cable lines, while the cable used with portable installations uses stranded cable lines.

c. Power Cable. The power cable, which is used with the portable scanner, is a two-conductor, 18-gauge insulated cable, 20 feet long. One end of the cable incorporates two insulated spade lugs for connection to the scanner terminal board connections (-MB and GND) (fig. 1-3). The other end of the cable is provided with two insulated alligator clips (white--battery, black-ground).

d. Electrical Equipment Case. Electrical Equipment Case CY-7372/GT is used for portable applications with the scanner. Mounting brackets within the case provide installation security for the scanner.

e. Extender Card. The extender card is a dummy circuit card which permits bringing out (or extending) the connections of the scanner circuit cards. The card connector fits into the circuit card edge connectors. The card is used for testing and troubleshooting the scanner by making more accessible the circuit card connector terminals.

(1) The scanner (fig. 1-2) is a rack-mounted or portable unit used to obtain usage measurements from up to 500 trunks (fig. 1-3). All controls, except grouping switches, are located on the front panel. All connections are made to the rear of the unit.

(2) The scanner chassis consists, essentially, of a rack-mounted card file containing the following printed circuit cards and assemblies:

Part No.	*Ref. desig.*	*Color code*
331004	A1	Red
220038	A5	
381033	A2	Blue
381034	A3	Green
381036	A4A-A4S	Yellow

f. Hardware Mounting Kit. The hardware mounting kit, composed of screws, washers, nuts, and brackets for mounting the portable scanner in a rack, is contained in a heat-sealed plastic bag. The kit is required for installing the scanner in the equipment rack (or electrical equipment case, for portable scanners).

1-9. System Application.

Scanner application is for usage studies of a 48-volt dial telephone central office. The scan is initiated by an external time pulse each 100 seconds (provided by the digital counter group), and combined 10 and 100 second scanning is provided. Output groups are in blocks of 10 inputs each, and may be grouped in any combination up to 150 inputs per group. Grouping is accomplished by connecting the input cables (para 1-8b) to the SECTION connectors on the rear of the scanner. The outputs of the grouped inputs may be used to drive electronic register unit; i.e., the digital counter group, or another scanner. Refer to chapter 2, section I, for more detailed technical considerations regarding system application.

1-10. Tabulated Data.

Tabulated data pertaining to the scanner performance and physical characteristics are contained in table 1-1.

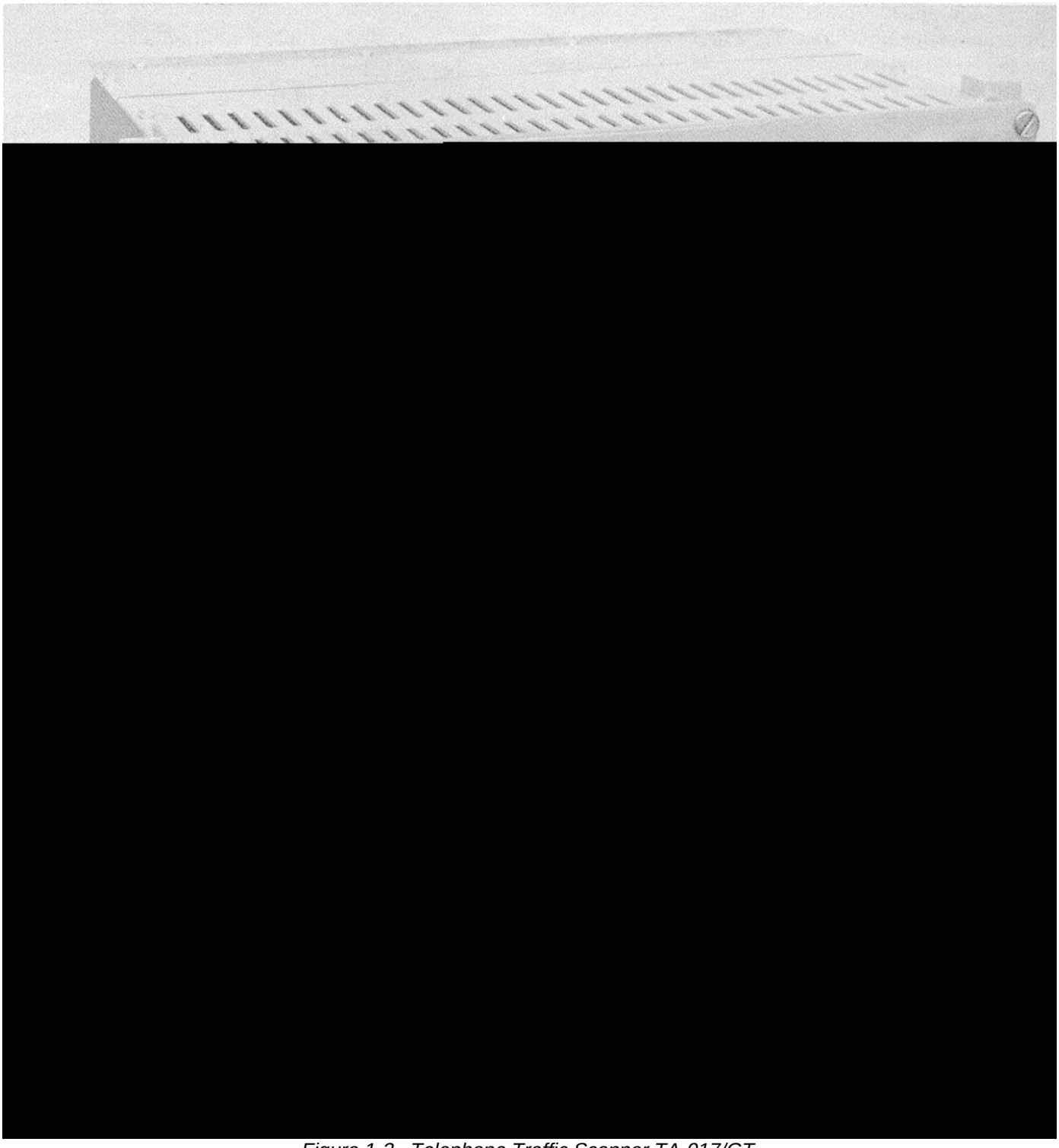


Figure 1-2. Telephone Traffic Scanner TA-917/GT.

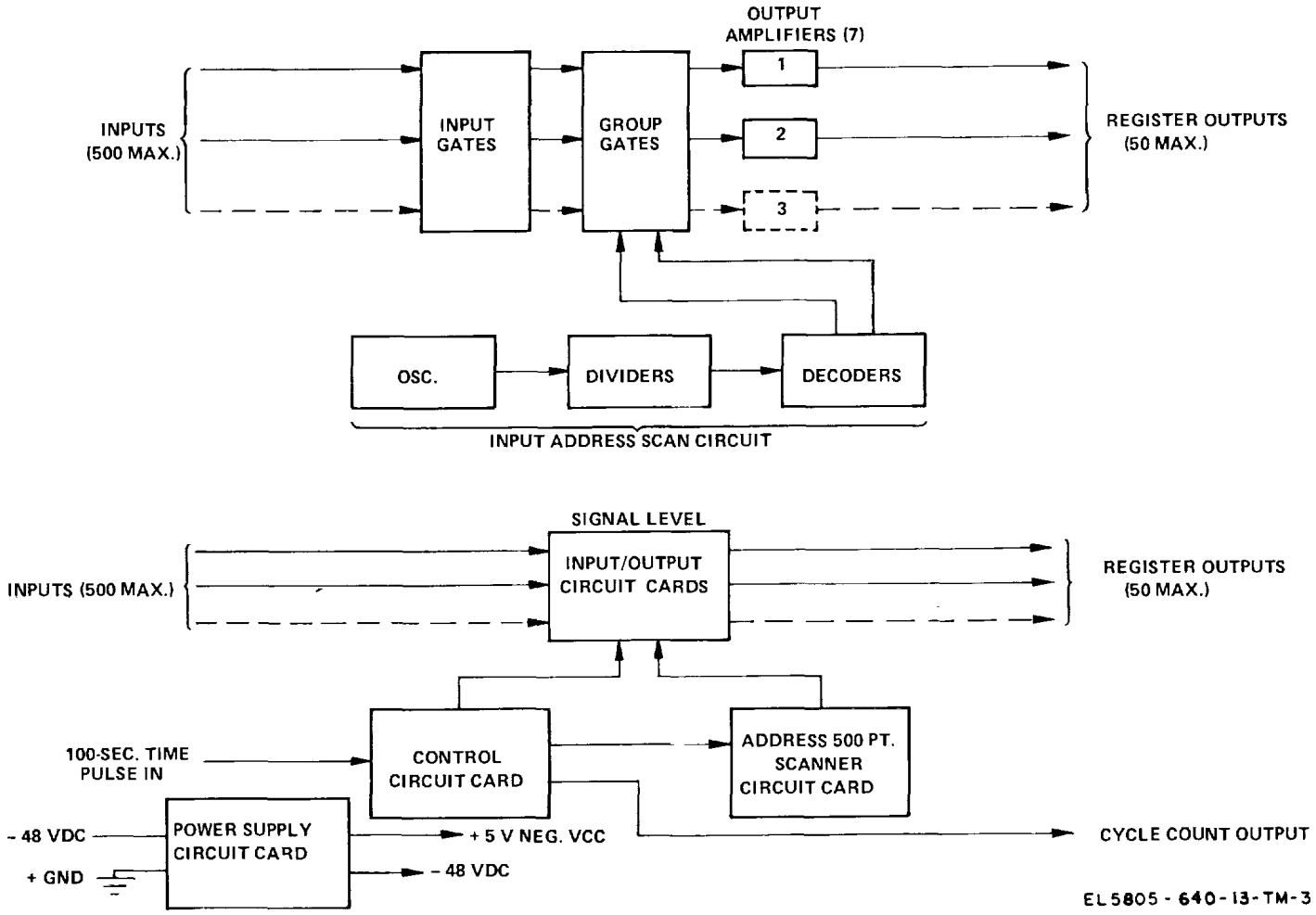


Figure 1-3. Telephone traffic scanner, block diagram.

1-11. Items Comprising an Operable Equipment.

Components comprising a complete scanner group are listed in table 1-2.

Table 1-1. Tabulated Data

Trunk Inputs:	
Capacity	500 input leads, maximum
Level	+ Ground (-12 vdc or more positive), busy -48 vdc (-20 vdc or more negative) or open, idle
Impedance	100K ohms to negative battery
Transient Protection	-2000 vdc, maximum
Scan Command Signal Input	Ground pulse each 100 seconds
Outputs:	
Capacity	50 maximum groups of 10 inputs each (tens groups)
Level	Ground pulse of 30 ms duration for each busy input scanned; capable of driving electronic registers
Grouping	Output groups of 1 to 15 tens groups selectable by means of jumpers on output connector
Cycle Count	Ground pulse upon completion of scan; capable of driving mechanical or electronic register
Scan Interval	1 to 10 scans each 100 seconds; selectable in input blocks of 150/150/150/50 by means of switches
Built-In Test Mode (BIT)	Integral (para 5-1d)
Power Requirements	-48 vdc at 0.75 A, maximum
Physical Characteristics:	
Construction	Modular; all solid-state circuitry mounted on plug-in circuit cards
Connections	Inputs-ten 50-pin connectors Outputs-one 50-pin connector Control and Power-terminal board

Table 1-2. Scanner Group

FSN	*Item*	*Quantity*	*Dimensions (in.)* *Height*	*Depth*	*Width*	*Weight (lb)*
5805-143-4670	Telephone Traffic Scanner Group OA-8746(V) 1/GT					
5805-281-3866	Scanner, Telephone Traffic TA-917/GT	1	7	12	19	20
5995-163-9003	Cable, input	11	252 (lg)	--	--	5
	Card, extender	1	7 1/4	5/16	5 3/8	1/4
	Kit, hardware mounting	1	--	--	--	1
5805-151-3925	Telephone Traffic Scanner Group OA-8746(V) 2/GT					
5805-281-3866	Scanner, Telephone Traffic TA-917/GT	1	8	15 1/2	20	35
	Cable, input	11	252 (lg)	--	--	5
	Cable, power	1	240 (lg)	--	--	2
5805-281-3860	Case, Electrical Equipment CY-7372/GT	1				8
	Card extender	1	7 1/4	5/16	5 3/8	1/4
	Kit hardware mounting	1	--	--	--	1

CHAPTER 2

SERVICE UPON RECEIPT AND INSTALLATION

Section I. SYSTEMS PLANNING

2-1. Scanner Configurations.

a. The scanner, which is supplied in two configurations (rack-mounted and portable), is installed in a telephone central office environment. The scanner is used, in a system application, with the following items:

Digital Counter Group TM 11-5805-642-13
OA-8745 (V) 1/GT (rack mounted)
OA-8745(V) 2/GT (portable)
Decoder Group OX-32/GT TM 11-5805-643-13
consisting of:
Pulse Decoder Monitor
KY-791/GT
Decoder-Monitor Control
C-9433/GT
Telephone Connector Switch
SA-1962/GT
Signal Data Recorder Group TM 11-5805-641-13
OA-8744/GT

b. A typical scanner equipment configuration is shown in figure 2-1. System planning should take into account the associated equipment listed above, the installation and suitability of racks (for rack-mounted versions of the scanner), patch panels to be used as distribution points, and interconnection cabling and/or wiring. Power requirements for the scanner are given in table 1-1.

2-2. Site and Shelter Requirements.

The rack-mounted scanner is normally housed in a permanent shelter during use; i.e., a central telephone office. Normally, 19-inch relay racks are used for installation. The racks are furnished in three heights: 7 feet 6 inches, 9 feet, and 11 feet 8 inches. Refer to paragraph 6-1 for the installation of these racks at the site. Refer to paragraph 2-6 for installing the scanner and associated equipment (patch panel) in the rack.

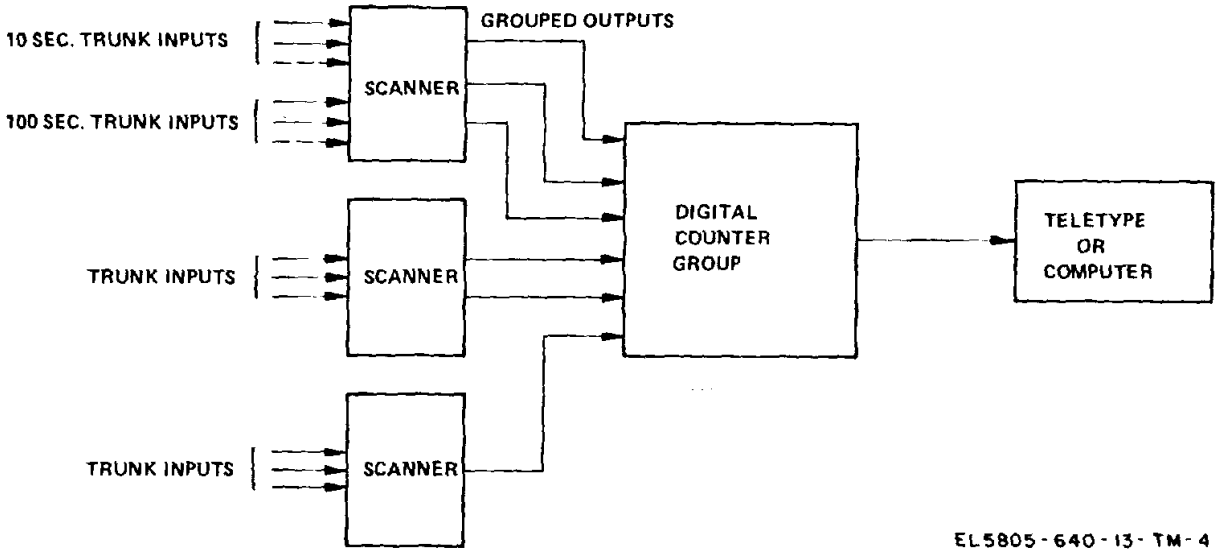


Figure 2-1. Typical scanner configuration, block diagram.

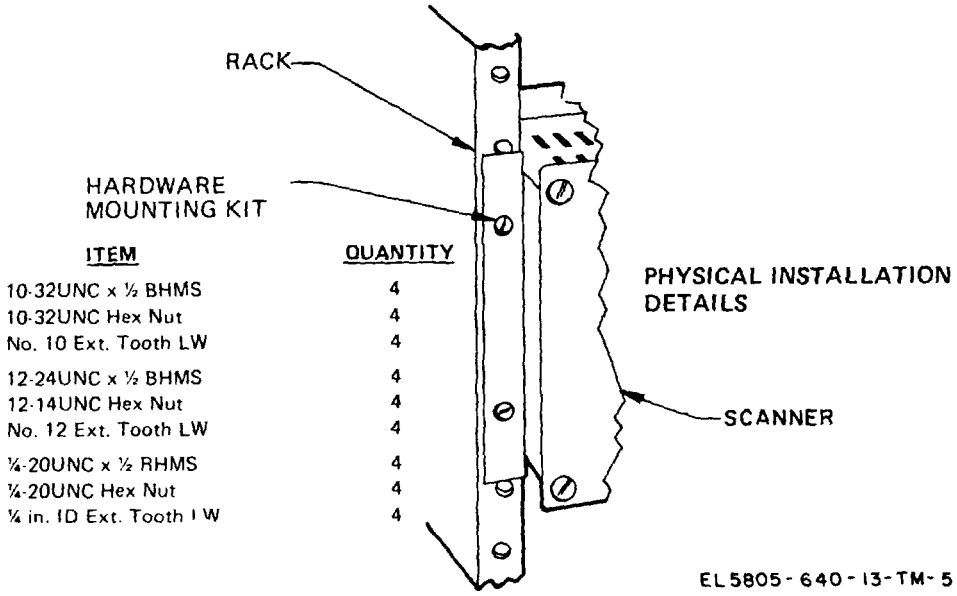


Figure 2-2. Scanner, installation details.

Section II. SERVICE UPON RECEIPT OF MATERIEL

2-3. Unpacking.

No special unpacking instructions are necessary except to observe precautions normally taken with precision electronic equipment.

2-4. Checking Unpacked Equipment.

a. Inspect the equipment for damage incurred during shipment. If the equipment has been damaged, report the damage on DD Form 6 (para 1-3b).

b. Check the equipment against the component listing on the packing slip to see if the ship- ment is complete. Report all discrepancies in accordance with the procedures specified in paragraph 1-3. The equipment should be placed in service even though a minor assembly or part that does not affect proper functioning is missing.

c. Check to see whether the equipment has been modified. (Equipment which has been modified will have the MWO number on the front panel, near the nomenclature plate.) Check to see whether all currently applicable MWO's applicable to the equipment are listed in DA Pam 310-7 as applicable.

Section III. INSTALLATION INSTRUCTIONS

2-5. Tools, Test Equipment, and Materials Required for Installation.

a. No special tools or test equipment are required for installing the scanner in either the rack or electrical equipment case.

b. A hardware mounting kit (fig. 1-1), contained within a heat-sealed plastic bag, contains screws, washers, nuts, and brackets (for portable scanners) necessary for installation of the scanner in either the rack or electrical equipment (portable) case (fig. 2-2).

2-6. Installation of Scanner and Patch Panel in Rack.

Install scanner as shown in figure 2-2. Use standard rack-mounting procedures for 19-inch relay type racks. Patch panel(s) are installed similar to the scanner. The scanner input/output connec-

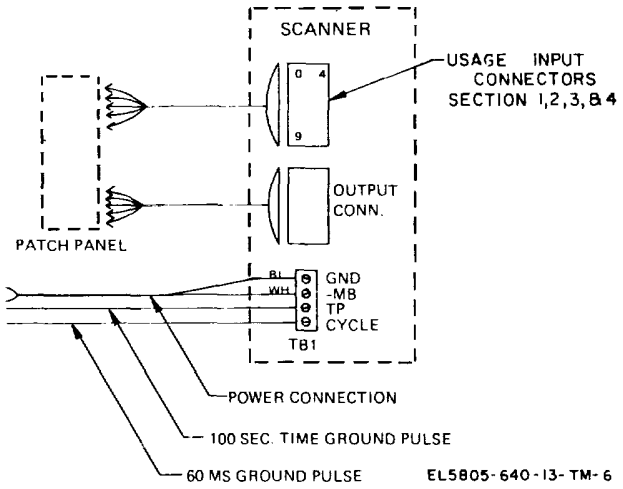


Figure 2-3. Scanner electrical interconnections.

tions and connections to the terminal board are shown in figure 2-3. Detailed procedures for electrical interconnection on the equipment are contained in paragraph 2-7.

2-7. Interconnections.

a. Trunk Inputs.

(1) Input connections are made by means of input cables (fig. 1-1 and 2-3). These cables, of which eleven are furnished with both the rack-mounted and portable configurations, connect directly to the 50-pin connectors on the rear of the scanner.

(2) The input connectors are in sets of three and one, labeled SECTION 1, SECTION 2, and SECTION 3, with SECTION 4 having one connector.

(3) Usage output is represented by a single connector (OUTPUT) and contains 50 inputs.

(4) Input numbering is indicated on the first connector at the left side of the rear panel.

(5) The terminals are arranged in five vertical columns, labeled 0 through 9. The rows are labeled 0 through 4.

(6) Scanning begins at the first pin (00) of the first (left-hand) connector in each input section, and moves down and to the right.

(7) When input trunks are connected to the scanner, the desired scan interval (10 to 100 seconds) should be established, since all the inputs in any one section must be set for the same interval by setting the SECTION SCAN INTERVAL toggle switch to the desired position.

NOTE

The input cables are furnished in two versions: the solid cable type for the rack-mounted configuration, and the stranded-cable type for the portable configuration (para 1-8b).

b. Outputs.

(1) Usage. Unit outputs to external electronic registers (or other equipment, as desired) are provided at the usage OUTPUT 50-pin connector. There is one output terminal for each input tens group (one for each column of input terminals), or a total of 50 outputs. Pin 00 of the connector is the output for the first tens group of SECTION 1, pin 01 is the output of the second tens group of input SECTION I, etc. Output grouping is accomplished by jumper-ing together the outputs to be grouped. Any size group, from 1 tens group (10 inputs) to 15 tens groups (150 inputs) may be thus formed, as required.

CAUTION

Do not group together any two outputs which are greater than 15 terminals apart (150 inputs) or confused data will result. This is due to the fact that the four sections of inputs are scanned simultaneously. Do not group together any two outputs from two separate input groups if the 10 SEC/100 SEC switches for these groups are set for different intervals. The grouping output lines thus obtained may be connected to the inputs of an electronic register unit such as the Digital Counter Group OA-8745(V)1/GT (rack-mounted) or OA-8745(V)2/GT (portable).

(2) Cycle count. The CYCLE terminal of the terminal board on the rear of the scanner delivers a 60 ms ground pulse (from -48 vdc at 200 ma, maximum) each time a unit scan has concluded. This output may be connected to an external mechanical register to obtain a cycle count. The register must be referenced to -48 vdc.

c. Time Pulse and Power.

(1) The 100-second time ground pulse source (normally supplied from the Digital

Counter Group) is connected to the TP terminal of the screw-terminal board on the rear of the scanner.

(2) The -48 vdc central office source (1 ampere, minimum) is connected to the -MB terminal, with +ground to the GND terminal on the terminal board. An external 1 1/3 ampere alarm office fuse should be placed in the dc line.

(3) Insure that the scanner is properly grounded.

Section IV. PRELIMINARY ADJUSTMENT OF EQUIPMENT

2-8. Preliminary Inspection.

a. Check all connector and terminal board connections for firm seating/security.

b. Make certain that input cables and terminal board wiring (power cable) are properly routed to equipment and/or patch panel, and that the equipment is properly grounded.

c. Make certain that the front cover is securely attached to the chassis for four thumbscrews. Tighten thumbscrews.

d. Make switch settings described in paragraph 2-9.

2-9. Presetting of Scanner Switches and Controls.

Set the scanner switches and controls (fig. 1-2) to the following preliminary settings:

Switch/control	*Set to*
POWER	OFF
TEST/NORMAL	NORMAL
BUSY/NORMAL	NORMAL
COUNT SELECT	OFF
10 SEC/100 SEC (4 switches-rear)	As required

CHAPTER 3

OPERATING INSTRUCTIONS

WARNING

Be sure the equipment is properly grounded before operating it.

Section I. CONTROLS AND INSTRUMENTS

3-1. Damage from Improper Settings.

The scanner is protected by internal circuitry from improper settings. Improper settings however, can result in confused data and non-operation. Refer to table 3-1 for proper settings of switches/controls.

3-2. Operator/Crew Controls.

Operating controls and instruments for the scanner are tabulated in table 3-1 and shown in figure 3-1.

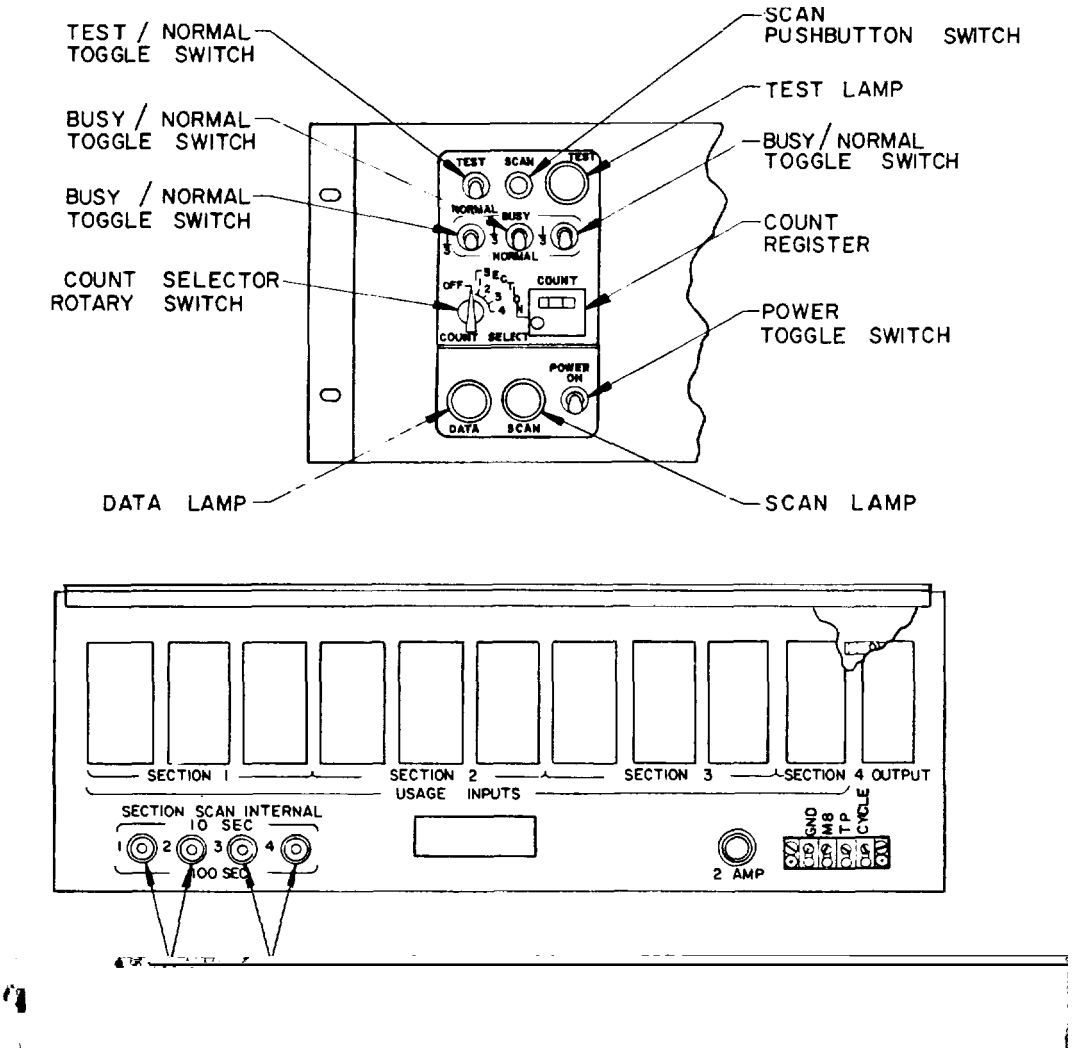


Figure 3-1. Operator's controls and instruments.

Section II. OPERATION UNDER USUAL CONDITIONS

3-3. Preliminary Starting Procedure.

When the scanner is in shutdown condition, the switches and controls should be set as prescribed in paragraph 2-9.

Table 3-1. Operator Controls and Instruments

Controls/indicator	*Function*
TEST lamp (red)	Illuminates when scanner is in TEST mode.
DATA lamp (green)	Flashes once for each busy input scanned.
SCAN lamp (yellow)	Illuminates continuously when unit power is on. Flashed 5 seconds on and 5 seconds off during a unit scan.
TEST/NORMAL toggle switch	Interrupts incoming 100-second time pulse during unit scan (for test procedure-permits response to a 100-second time pulse). Enables SCAN button (for test procedure).
SCAN pushbutton switch	Initiates a single unit scan when depressed, with the TEST/NORMAL switch in TEST setting.
POWER ON toggle switch	Controls de input power.
BUSY/NORMAL toggle switches (3 switches)	Permits any of all of the three input test groups (every 1/3) to be forced to a busy state for test.
COUNT SELECT 5-position rotary switch	Permits the COUNT register to be connected to any one of the four input sections (1 through 4) for test.
COUNT mechanical register (3-digit resettable)	Counts busy inputs of input sections selected by COUNT SELECT rotary switch.
SECTION SCAN INTERVAL-10 SEC/100 SEC toggle switches (4 switches)	Determine the scan interval of each of the four input sections (1 - 2 - 3 - 4).

3-4. Operating Procedure.

Operation of the scanner is accomplished as follows:

a. Inspect equipment to ascertain that scanner installation instructions, as prescribed in paragraphs 2-5, 2-6, and 2-7, have been followed.

b. Place POWER switch to ON position. Note that SCAN lamp illuminates, indicating the presence of dc power.

c. Check that TEST lamp is extinguished at this time. If TEST lamp illuminates, one or more of the BUSY/NORMAL switches is set to BUSY. All three BUSY/NORMAL switches must be set to NORMAL or incorrect usage data will result.

d. Set the four SECTION SCAN INTERVAL switches on the rear of the scanner, as required. These four switches (1 through 4) determine the scan interval of each of the four input sections. If the switches are not already set (para 2-7a (7)), they should be set at this time.

e. Upon reception of the incoming 100-second time pulse, the first interrogation scan will commence. During the scan (96 seconds) the SCAN lamp will flash 5 seconds on and 5 seconds off to indicate that a scan is in progress.

NOTE

When not scanning, the yellow SCAN lamp will remain continuously illuminated.

f. Each busy trunk encountered during a scan will cause the DATA lamp to flash. Normal data reception is indicated by intermittent flickering of the green DATA lamp. If, however, the DATA lamp remains illuminated or does not illuminate, trouble in the scanner or input leads may be suspected.

g. Verify that correct totals are received at the readout of the electronic register device, and that the scanner is responding properly to the 100-second time pulses.

3-5. Stopping Procedure for Standby Condition.

To deactivate the scanner for standby condition, turn POWER switch to OFF.

3-6. Stopping Procedure for Shutdown.

To deactivate the scanner for shutdown, proceed as follows:

a. Turn POWER switch to off.

b. Disconnect USAGE INPUTS and OUTPUT connectors.

c. Disconnect -48 vdc source from -MB terminal, + ground from GND terminal, the 100-second time ground pulse source from the TP terminal, and the connection to the CYCLE terminal, as applicable.

d. Coil cables (if disconnected from patch panel or other equipment) in loose coils, then wrap

with strands of string or equivalent. If desired, cover connector ends with clear plastic (or equivalent) hoods for environmental protection. Depending upon the environment and the time equipment will be out of service, it may be desirable to cover the scanner USAGE INPUTS and OUTPUT connectors with some kind of protective covering.

e. For rack-mounted configurations, no further deactivation is required, and no additional shutdown or packaging should be performed unless it is desired to completely remove the scanner from its rack mounting. In this case, remove the mounting hardware (screws, washers, nuts) securing the scanner in the rack, then remove the scanner and prepare for packaging.

f. For portable configurations, the front and rear covers of the electrical equipment case can be latched. Make certain that the power cable is stowed with the scanner within the case. It is unnecessary to remove the scanner from the equipment case mounting facilities.

3-7. Preparation for Movement.

The portable configuration of the scanner is provided with an electrical equipment case for portability. Weight of the scanner and case is approximately 35 pounds. The rack-mounted configuration should be deactivated, as prescribed in paragraph 3-6a through e, then packaged, as applicable, preparatory for movement. Weight of the scanner (without case) is approximately 20 pounds.

CHAPTER 4

ON-SITE MAINTENANCE INSTRUCTIONS

Section I. TOOLS AND EQUIPMENT

4-1. General.

Maintenance of the scanner is on-site only. No off-site maintenance is authorized. On-site maintenance instructions cover operator/crew, direct support, and organizational maintenance levels to perform periodic inspections and maintenance, as necessary; restore equipment to operative condition by means of circuit card replacement, fuse/lamp/switch replacement on the control interface assembly; electrical adjustments which can be made to readily exposed devices; i.e., trim potentiometers, etc., using screwdriver and multimeter; and replacement of consumables. Generally, on-site maintenance activities will be limited to standard tool kits, and only the availability of repair parts kit.

4-2. Repair Parts.

Repair parts authorized for use by on-site maintenance activities for the scanner are listed in TM 11-5805-640-23P.

Section II. PREVENTIVE MAINTENANCE CHECKS AND SERVICES

4-3. General.

To insure that the scanner is always ready for operation, it must be inspected systematically so that defects may be discovered and corrected before they result in serious damage or failure. The necessary preventive maintenance checks and services to be performed are listed and described in tables 4-1 and 4-2. The interval/sequence number columns indicate the minimum inspection requirements. Defects discovered during operation of the scanner will be noted for future correction to be made as soon as operation has ceased. Stop operation immediately if a deficiency is noted during operation which would damage the equipment. Record all deficiencies together with the corrective action taken (refer to TM 3-750 for the applicable form number).

4-4. Instructions for the Performance of Preventive Maintenance Checks and Services.

a. General. The scanner contains a series of built-in controls and indicators in the recessed front panel which permit quick operational check-out. A row of three switches, designated as BUSY/NORMAL, permit a busy condition to be forced (simulated) for all unit inputs. Each switch, when set to BUSY, places a busy condition on every third input. The first (or left-hand) switch controls the first set (167 inputs), the middle switch controls the second set (167 in-puts), and the right-hand switch controls the third set (166 inputs). When any or all of these switches is up (on BUSY), the TEST (red) lamp is illuminated. These switches must be set to NORMAL (down) when a test is not in progress.

Table 4-1. Operator/Crew Preventive Maintenance Checks and Services

D-Daily
Time required: 0.4

W--Weekly
Time required: 1.2

Internal and sequence No.		Item to be inspected procedure	Work time (M/H)
D	W		
		CASE/CHASSIS	
1	1	Inspect for dents, cracks, breaks, distortion, cleanliness of ventilation holes. Check electrical equipment case latches for serviceability (para 4-13d).	0.1

Table 4-1. Operator/Crew Preventive Maintenance Checks and Services-Continued

D—Daily
Time required: 0.4

W-Weekly
Time required: 1.2

Internal and sequence No.		Item to be inspected procedure	Work time (M/H)
D	W		
		ATTACHING HARDWARE	
	2	Check for evidence of looseness, damaged threads, worn locking devices and/or inserts.	0.1
		PANEL SWITCHES (toggle, pushbutton, rotary)	
2	3	Check panel switches for general condition and serviceability; check security of installation (para 4-13c (4).	0.2
		INDICATOR LAMPS	
3	4	Check indicator lamps for condition of bulbs and lens; check general serviceability (para 4-13a).	0.1
		REGISTER	
	5	'Check general condition and serviceability (para 4-13c(7)).	0.1
		FUSE/FUSEHOLDER	
	6	Check general condition and serviceability (para 4-13d(4)).	0.1
		TERMINAL BOARD	
	7	Check general condition and serviceability; check installation security of attached leads.	0.1
		CONNECTORS	
	8	Check for evidence of damage, loose or broken terminals, installation security (para 4-13d(2)).	0.2
		CLEANLINESS OF EQUIPMENT (para 4-10)	
	9	Lightly brush all accessible areas and parts with a soft nonmetallic brush. Wipe front and rear panels and chassis with a clean, lint-free cloth dampened with Trichloroethane (MIL-T-27602) or similar cleaning agent. Allow parts to dry thoroughly after using cleaner.	0.2

Table 4-2. Organizational Preventive Maintenance Cheeks and Services

Quarterly
Total man-hours required: 2.4

Sequences No.	Item to be inspected procedure	Work time (M/H)
	ELECTRICAL WIRING	
1	Check all electrical wiring for evidence of burning, damaged insulation, broken strands, security of connections.	0.3
	SOLDERED CONNECTIONS	
2	Check soldered connections for evidence of fractures, loose connections, cold solder joints.	0.5
	CIRCUIT CARDS (para 4-13b, fig. B-2)	
9	Remove each circuit card and check condition of printed circuit connector. Make certain that connector has not been damaged by rough installation into its edge connector.	0.1
	With circuit card removed from card file, check general condition of printed circuitry, freedom from damage, evidence of open or short circuits, mechanical damage, defective components.	0.3
	Check installation of all components.	
	Perform operation verifications tests specified in paragraph 44.	1.2

b. Test Procedure. Unit response to a 100- second time pulse may be checked as follows:

(1) Remove all input connectors to prevent actual trunk busy signals from affecting the test count.

(2) Set the TEST/NORMAL toggle switch to the TEST position. Note that the red TEST lamp illuminates.

(3) Depress the SCAN pushbutton. This initiates one normal unit scan.

(4) Check flashing illumination of amber SCAN lamp. The red TEST lamp should remain illuminated with the TEST/NORMAL switch in the TEST position, even if all of the BUSY/ NORMAL switches are set to NORMAL.

CAUTION

The TEST/NORMAL switch and BUSY/NORMAL switches must be in the NORMAL positions (TEST lamp extinguished) at all times except during tests or inaccurate usage data will result. The unit will not respond to incoming 100-second time pulses with the TEST/NORMAL switch in the TEST position.

(5) Set the COUNT SELECT rotary switch to one of the four SECTION positions and note operation of the digital register. (Normally, the COUNT SELECT switch should be set to OFF.) When the COUNT SELECT switch is set to a position other than OFF, the green DATA lamp will flash only for data received from the input group set.

(6) The register should count the number of

busy inputs in that section during each scan. The BUSY/NORMAL switches may be set to produce a predictable total, depending upon the number of inputs forced busy (167/167/166).

4-5. Special Instructions.

The scanner is an item of equipment that is normally kept in continuous operation for prolonged periods of time. Therefore, operator/crew and organizational maintenance checks and services(tables 4-1 and 4-2) should arrange the inspection intervals with some flexibility. Do not necessarily shut down the equipment in order to make a particular check or service. Make only those inspections that will not disturb normal operation, especially if no malfunction or damage is suspected. Make organizational preventive maintenance checks and services when the equipment can be shut down without impairing system operation.

Section III. TROUBLESHOOTING

4-6. Organization of Troubleshooting Procedure.

Table 4-3. Troubleshooting-Continued

Malfunction	*Probable cause*	*Corrective action*
	b. TEST/NORMAL switch set to TEST.	b. Set switch to NORMAL (para 2-9, fig. 3-1).
	e. Defective switch(s).	c. Replace defective switch (para 4-13c(4).
3. No busy registered from a specific input(s) with known busy condition.	d. Defective control interface circuit card. Defective input/output circuit card (for inputs affected).	d. Replace control interface circuit card (slot 10).
4. No response from one specific input ten's group, with known-good address circuit card.	Defective input/output circuit card (for inputs affected).	Replace input/output circuit card (for inputs affected).
5. No response from a set of three consecutive ten's groups, with known-good address circuit card.	Defective input/output circuit card (for inputs affected).	Replace input/output circuit card (for inputs affected).
6. Power supply voltages normal, but no unit operation or scanning.	a. Refer to causes in 1 and 2 above. b. Defective control circuit card.	a. Refer to corrective action in 1 and 2 above. b. Replace control circuit card (slot 13).
7. No response to the same numerical input(s) in each ten's group.	Defective control circuit card.	Replace control circuit card (slot 13).
8. Input groups set for 100 SEC scan intervals are scanned 10 times (instead of 1) when time pulse received.	a. Defective control circuit card. b. Defective section scan interval toggle switch(s).	a. Replace control circuit card (slot 13). b. Replace defective switch(s) (para 4-13c(4), fig. B-l).
9. Continuous SCAN lamp.	a. Defective control circuit card. b. Defective control interface circuit card.	a. Replace control circuit card (slot 13). b. Replace control interface circuit card (slot 10).
10. No cycle count output.	Defective control circuit card.	Replace control circuit card (slot 13).
11. Continuous, endless scan cycle, with known-good control circuit card.	Defective address 500-point scanner circuit card.	Replace address 500-point scanner circuit card (slot 14).
12. No response to specific ten's group(s) inputs, with known-good input/output circuit cards.	Defective address 500-point scanner circuit card.	Replace address 500-point scanner circuit card (slot 14).
13. No unit operation and no voltage (or incorrect) at positive end of capacitor C4 on power supply circuit card. Should be +5 volts.	a. Defective power supply circuit card. b. Defective control circuit card.	c.84 -1 TD 0 Tc ffected). b. Replace control circuit card (slot

pair parts. Disassembly will not include de-soldering or removal of electronic circuitry parts unless such removal is necessary to replace the part.

4-10. Cleaning.

WARNING

Trichloroethane and isopropyl alcohol flammable and can cause permanent damage to the lungs and general health. Always allow adequate ventilation when using these types of cleaners.

a. Clean areas and parts during disassembly, as applicable, with lint-free cloth dampened with Trichloroethane (MILT-27602) or similar cleaning agent. Allow parts to dry thoroughly after using cleaner.

b. Clean circuit cards as follows:

(1) Clean all soldered connections and electrical connectors by lightly abrading with a rubber eraser (Nile green only). Brush off debris with a camel's-hair brush, or suitable equivalent.

(2) Clean printed circuit cards with isopropyl alcohol (MILA-10428), or equivalent.

4-11. Inspection.

Operator/crew inspection activity is specified in table 4-1. Inspection activity allocated to organizational maintenance is specified in table 4-2.

4-12. Repair.

a. Repair is the work performed to restore a scanner to efficient operating condition after troubleshooting has identified and isolated the fault, It consists of replacement of defective parts and circuit cards, and all necessary disassembly and reassembly work.

Circuit card nomenclature	*Part No.*
Power supply	331004
Control interface	385042
Control	381033
Address 500-point scanner	381034
Input/output	381036

* Input card groupings are as follows:

Input group	*Positions*
1	32 thru 28
2	27 thru 23
3	22 thru 18
4	17, 16

b. After the equipment has been repaired it should be given an operational checkout (para 4-4) to insure that the overall performance is satisfactory.

4-13. Replacement of Scanner Parts/ Components/Circuit Cards.

Unless otherwise indicated, refer to figure B-2 in performing a below.

a. Lamp Assemblies. The TEST, DATA, and SCAN lamps (7) are replaced by moving the lens (8, 9, 11) from the base (6) at front panel of the interface assembly (4, fig. B-1). Standard telephone switchboard lamps (48-C) are used. If lens is replaced, make certain to replace it with an identical color:

TEST-Red
DATA-Green
SCAN-Amber (yellow)

NOTE

Unless otherwise indicated, refer to figure B-1 in performing b through c(3) below.

b. Circuit Cards. The circuit cards are accessible from the front of the chassis, after removing the protective front panel. Each card is held in position by a finger lock (ejector) which must be lifted up to release the card. When replacing cards, push each card all the way into the edge connector.

WARNING

Do not remove circuit cards with the POWER switch in the ON position (fig. 3-1). The protective front panel (2) should be installed at all times except when removing/installing/inspecting the circuit cards. Replace the circuit cards into the card file only as follows:

Position	*Color code*
3	Red
10	Part or interface assembly
12	Blue
13	Green
16 thru 32'	Yellow

c. Control Interface Assembly. Use the following procedure to gain access to components of the control interface assembly (4).

(1) Remove front cover (2) by releasing captive thumbscrews (1) from chassis.

(2) Release control interface assembly (4) from chassis by removing the two screws (5).

(3) Carefully pull assembly (4) from chassis. This assembly includes the control interface card (10, fig. B-2) that mates with the edge connector at rear of the chassis.

NOTE

Before unsoldering connections note or sketch wire leads and color to specific terminal of part to be removed.

CAUTION

Use low wattage soldering iron to prevent damage to parts.

NOTE

Refer to figure B-2 in performing (4) through (8) below unless otherwise indicated.

(4) The toggle switches BUSY/NORMAL 1/3-1/3-1/3 (1), POWER ON (5) TEST-NORMAL (13) and pushbutton switch SCAN (12) are removed in the same way. Loosen and remove the round or hex. nut at the front panel to release the switch from the panel. Pull switch from panel noting position of body nut and wire routing. The securing hardware is part of the switch.

(5) To remove the COUNT-SELECT switch (3), release knob (4) by loosening the set screw and pulling it off the switch shaft. Loosen and remove nut securing the selector switch to panel. Pull switch from panel noting position of body and wire routing. The securing hardware is part of the switch.

(6) To remove the TEST DATA and SCAN lamp bases (6) remove nut and washer at rear of panel. Pull base through front of panel.

(7) The COUNT register (2) is removed by pulling it from the front panel.

(8) The control interface circuit card (10) can be released by removal of the two screws (5, fig. B-1) nuts, and lock washer securing it to the front panel.

NOTE

Refer to figure B-1 in performing d below.

d. Chassis-Mounted Parts.

(1) *Edge connectors*. Each of the circuit cards is associated with an edge connector, installed within the chassis. For access, remove front cover (2) and the circuit cards affected.

(2) *Input connectors*. The input connectors on the rear of the chassis can be removed by disconnecting the interior wiring, then removing the attaching hardware.

(3) *Terminal board.* To remove the terminal board, detach the hardware securing the board to the rear chassis.

(4) *Fuse.* Turn fuse holder cap to reveal the fuse. Pull fuse (12) from holder (13).

4-14. Assembly.

Refer to appendix B for illustrations required for assembly of the scanner. In general, the scanner is assembled in the reverse order of disassembly (para 4-9).

4-1 5. Installation.

Installation procedures for the scanner, as applicable, are contained in paragraphs 2-5, 2-6, and 2-7.

4-16. Testing after Repair.

Following extensive maintenance of the scanner, the following test should be made:

NOTE

Refer to figure 3-1 in performing a through h below, unless otherwise indicated.

a. Ground all of the inputs with grounding plugs (fig. 2-3).

b. Set the three BUSY/NORMAL switches on the control interface assembly to the NORMAL positions (down), and the four 10 SEC/100 SEC toggle switches on the back of the scanner to 100 SEC.

c. Set COUNT SELECT rotary switch on the control interface assembly to groups 1, 2, 3, and 4 for each scan respectively.

d. Depress the SCAN pushbutton switch. This should initiate a scan. Groups 1, 2, and 3 should count 150 each. Group 4 should count 50. These counts should total to 500 on COUNT register.

e. See that each group only counts for the first scan when switches on the back of the scanner are in the 100 SEC position, and that

they count for 10 scans in a row when the switches on the back of the scanner are in the 10 SEC scan.

f. Using a resettable counter (equivalent to the COUNT mechanical register), verify a ground-true pulse out on the cycle count at the completion of a scanning cycle. A scanning cycle is 10, 10-second scans from one TP.

g. Check that when the TEST/NORMAL switch is in the TEST position, a ground on TP does not start a scan, but when in the NORMAL position, a ground to TP will start a scan cycle.

h. Verify that the scanner goes through one scan cycle from one TP, and then is idle until a time pulse is received.

4-17. System Test (Optional)

If desired, a system test can be performed on the scanner. This test is made as follows:

NOTE

Refer to figure 3-1 in performing following procedures, unless otherwise indicated.

a. Remove grounding plugs (para 4-16a) and set the three BUSY/Normal switches to BUSY (up). Set the COUNT SELECT rotary switch to OFF and the TEST/NORMAL switch to TEST.

b. With a 50-conductor cable, connect each output (J11) of the scanner to J1-J5 of a Digital Electronic Counter CP-1147/GT, hereinafter referred to as the counter.

c. Connect 100-second time pulse of counter to TP-in of the scanner. Be sure a clock sync is used on the counter.

d. Operate each group, as desired, on 10 second and 100 seconds. Have the counter print out every one-half hour intervals and hour intervals on the 10-second scan. This should be 1800 for one-half hour and 3600 for an hour on each register, and 0180 and 0360 on each register on 100 second, respectively.

e. Following system test, disconnect counter and restore scanner to an inoperative condition. If desired, the system test can be followed by subjecting the scanner to the test specified in paragraph 4-16.

CHAPTER 5

FUNCTIONING OF EQUIPMENT

5-1. General.

a. Signal flow through the scanner is shown in figure 1-3. Each input lead signal is first fed through a 100K ohm resistor to a diode gate on one of the seventeen input/output circuit cards which blocks its passage. The gate outputs from each ten consecutive inputs are multiplied to a common tens group gate. There are three such gates whose outputs feed a common output amplifier on the circuit card.

b. An interrogation scan of all inputs is begun when an external time pulse, normally 100 seconds, is received at the control circuit card. This circuit card, together with the address 500-point scanner circuit card, supplies a series of units and tens group address lines which are fed to the gates on all input/output circuit cards. These lines are sequentially made low, momentarily opening each input's gate, into its common line. The units inputs are divided into four groups of 150/150/150/50. These four groups are scanned simultaneously.

A complete scan of all inputs requires approximately 9.6 seconds.

c. A 10/100 second switch is provided on the rear of the scanner (fig. 1-2) for each of the four input groups. If a switch is set for 10, all inputs in that group will be scanned ten times, for a total scanning period of 96 seconds. At the conclusion of ten scans, the unit cycle will conclude and scanning will cease. If a switch is set for 100, that group's input will be scanned during the first scan (after 100-second pulse received). At the end of that scan, an inhibit signal will be sent to all ten's group input gates in that group, preventing response on the following nine scans. Other groups programmed for ten scans may thus continue to register. At the end of each complete scan cycle (96 seconds) the control circuit card generates a cycle count pulse which may be used to drive an electronic register or another scanner.

d. The outputs are diode isolated and may be multiplied, as required, to form any desired group size from 10 (one output) to 150 consecutive inputs. Built-in test facilities permit any one of three input sets (every 3rd input) to be driven to a busy condition. A mechanical register (COUNT register) may then be used to obtain a test count of busy inputs in any of the four input groups.

5-2. Circuit Card Functions.

a. Input/Output Circuit Card.

(1) The scanner contains 17 input/output circuit cards (fig. 5-1) if equipped for full 500-input capacity. Each circuit card receives 30 inputs and supplies 3 tens group outputs.

(2) Each input is first fed to a diode gate which receives one of the tens units address clamp lines from the control circuit card. The outputs of each consecutive set of ten gates are diode isolated and multiplied together to form a tens group. The tens group commons (three per circuit card) are each fed to a diode gate which receives one of the 15 tens address clamp lines from the address 500-point scanner circuit card. Each five consecutive circuit cards for groups, 1, 2, and 3, and two circuit cards for group 4, represent one input group circuit card set, and are addressed simultaneously. Thus, each set of five circuit cards (except set 4) represents 15 tens groups, or 150 inputs total. There is one two-stage output amplifier per input circuit card. The three tens-group diode gates feed only one of the three tens groups into the amplifier at any one instant. The output of the amplifier is fed to three output diode gates. Only one of the three is opened with the opening of each input gate. The three gates thus supply three ten's group circuit card inputs, which are fed directly to the usage OUTPUT connector on the rear of the scanner.

b. Control Circuit Card.

(1) The control circuit card (fig. 5-2) provides scanning excitation and delivers units address lines.

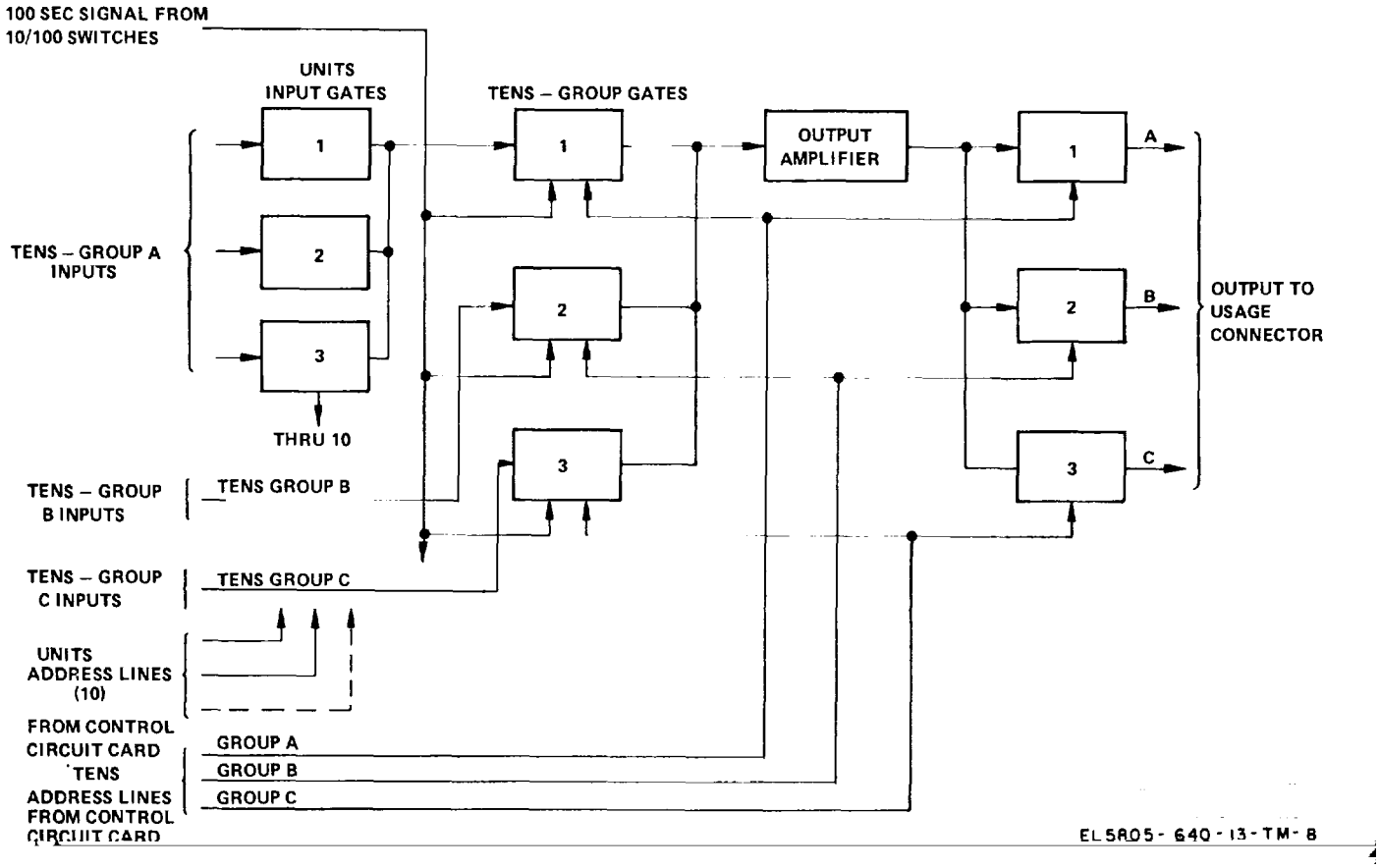


Figure 5-1. Input/output circuit card, block diagram.

(2) A 2 MHz oscillator (multivibrator) supplies continuous square-wave clock pulses to a divider chain consisting of one + 12 and four + 10 counters. The output of this chain (16.6 Hz) is normally blocked from a +10 counter. Upon receipt of a time pulse (or depression of the SCAN button with the TEST/NORMAL switch in the TEST position), a signal is received at a reset/start gating circuit. This circuit resets all counters on this circuit card and on the address 500-point scanner circuit card in preparation for the next scan. This action opens the gate blocking the clock pulses, thus feeding them to the +10 counter. The counter drives a 1-of-10 decoder whose ten output lines are sequentially made low. These lines become the units address (clamp) lines which are fed to the tens group sets on all input/output circuit cards. Each time these lines have been scanned once, the counter sends a tens advance signal to the address circuit card which advances the tens group address by one.

(3) A counter on the circuit card receives a signal each time all fifteen tens address lines on the address circuit card have been cycled (completion of one scan). This counter drives a BCD-to-decimal decoder. The decoder supplies a signal after ten complete scans have been counted (one complete scan cycle). The signal is used to again block passage of the clock signals to the address system, thus terminating further scanning. The signal is also fed to an amplifier which supplies a cycle count output signal. This signal may be used to drive an external electronic register which will record the number of scan cycles that have occurred.

(4) The decoder also sends a clamp line to the 10/100 SEC switches on the rear of the scanner. There are four switches, or one for each of the four input groups. If a switch is set to 10, it is opened, and that group will be scanned ten times during each scan cycle. If however, the switch is set to 100, it is closed, permitting the clamp line signal to be fed to the tens group gates on all input/output circuit cards. This signal is high during the first scan

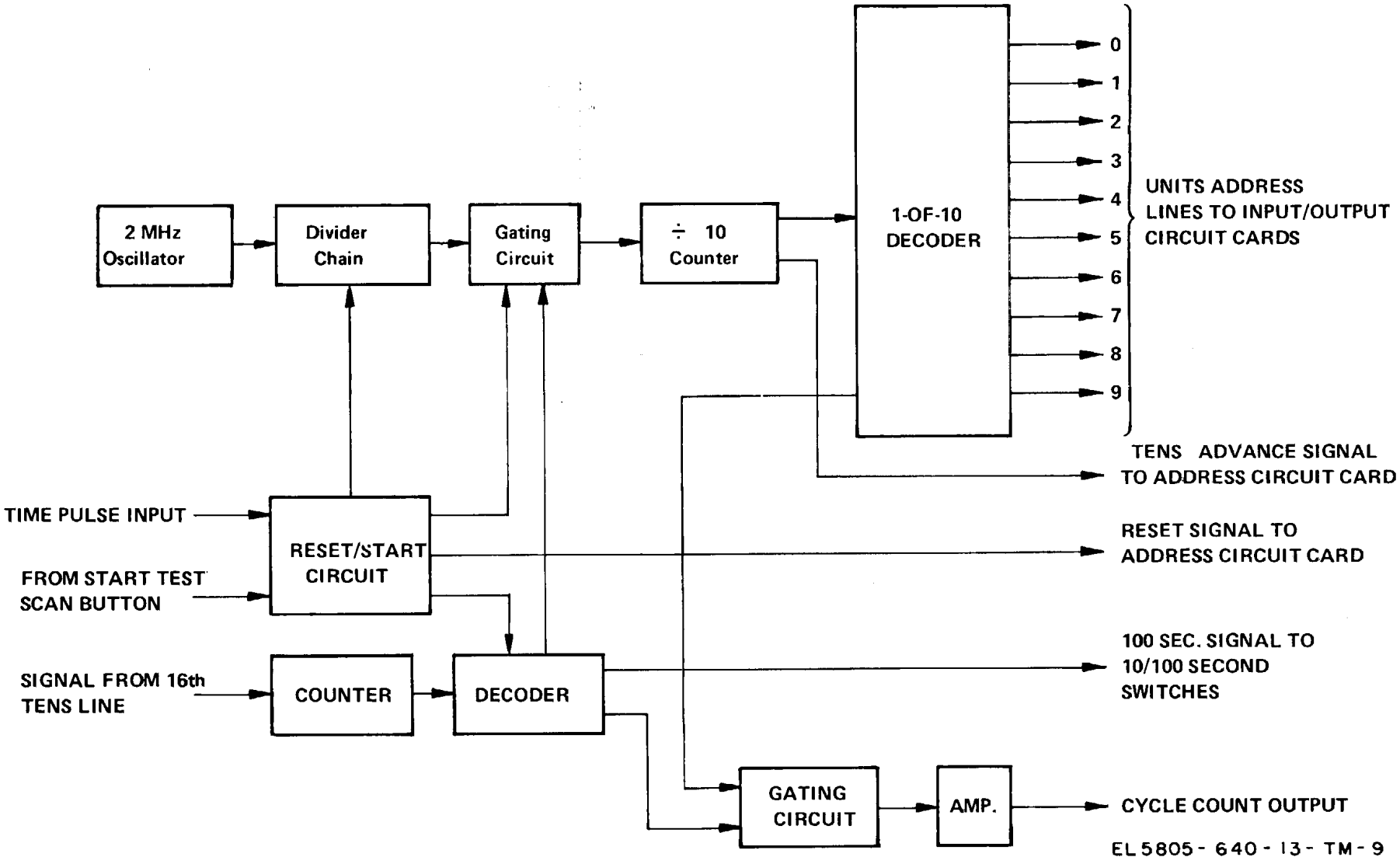


Figure 5-2. Control circuit card, block diagram.

in a cycle, permitting all gates to remain open. The signal goes low, however, at the start of the second scan, remaining so for the nine following scans. This low signal closes the tens group gates of that input group, preventing response to scanned busy trunks during these scans. This group is, therefore, scanned only once (first 9.6 seconds) during a scan cycle, providing CCS(counts-per-hundred-seconds) usage data. Other groups set for ten seconds will be scanned ten times during the scan cycle, providing CCS x 10 usage data.

c. Address 500 Point Scanner Circuit Card.

(1) The address 500-point scanner circuit card (fig. 5-3) receives advance signals from the control circuit card and supplies the tens address (clamp) lines to the input/output circuit cards.

(2) The tens advance signal from the control circuit card is fed to a +16 counter which drives two 1-of-10 decoders. The decoders supply 16 output lines. Each time an advance signal is received at the circuit card, the next sequential output line is made low. Each output is fed through an inverter amplifier to the input/output circuit cards and, together, become the tens address lines. These lines effect un-clamping of the tens group gates, provided no 100-second inhibiting signal is present at those gates. There are three such gates per circuit card, and five circuit cards per input group (group 4 has only two circuit cards); thus, a total of fifteen tens address lines are fed to the four groups. These address signals, together with the units address signals, constitute the unit's input scanning system.

d. Power Supply Circuit Card.

(1) The power supply circuit card consists of a dc-to-dc converter which provides a+5 vdc referenced to negative, which supplies Vcc power for all logic circuitry in the scanner.

(2) The converter consists of a power oscillator employing two power switching tran-

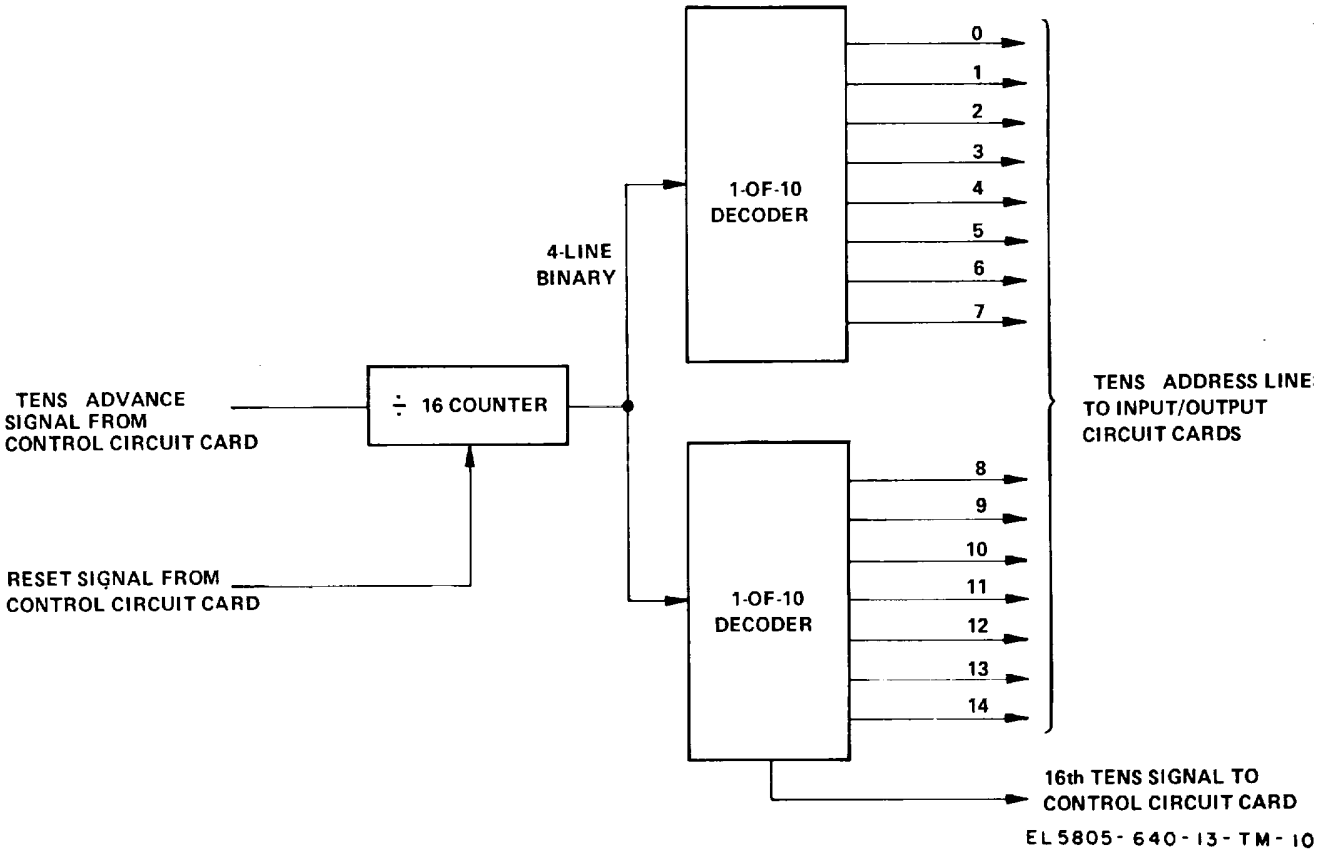


Figure 5-3. Address 500-point scanner circuit card, block diagram

sistors in a push-pull circuit which utilizes a base-drive transformer feedback. The oscillator supplies 100 vac at approximately 20 KHz to a power transformer which steps the voltage down to 5 vac (10 volt, center-tapped secondary) which is full-wave rectified and filtered.

The negative side of this 5 vdc output is tied £o the -48 vdc input line. The positive side of the output thus delivers -43 vdc at 1 ampere, maximum, in relation to + ground.

e. Control Interface Assembly (fig. 3-1 and B-2).

(1) TEST/NORMAL switch-interrupts incoming 100-second time pulse during unit tests; enables SCAN pushbutton.

(2) BUSY/NORMAL switches (3)-permits any or all of the three input test groups (every third) to be forced to a busy state for tests.

(3) SCAN button-initiates a single unit scan when depressed, with the unit in the test mode.

(4) POWER switch-controls dc input power.

(5) COUNT SELECT rotary switch-permits the COUNT register to be connected to any one of the four input sections for test.

(6) COUNT register-counts busy inputs of input sections selected by COUNT SELECT rotary switch.

(7) SCAN lamp-illuminates continuously when unit power is on.

(8) DATA lamp-flashes once for each busy input scanned.

(9) TEST lamp-illuminates when scanner is in TEST mode.

NOTE

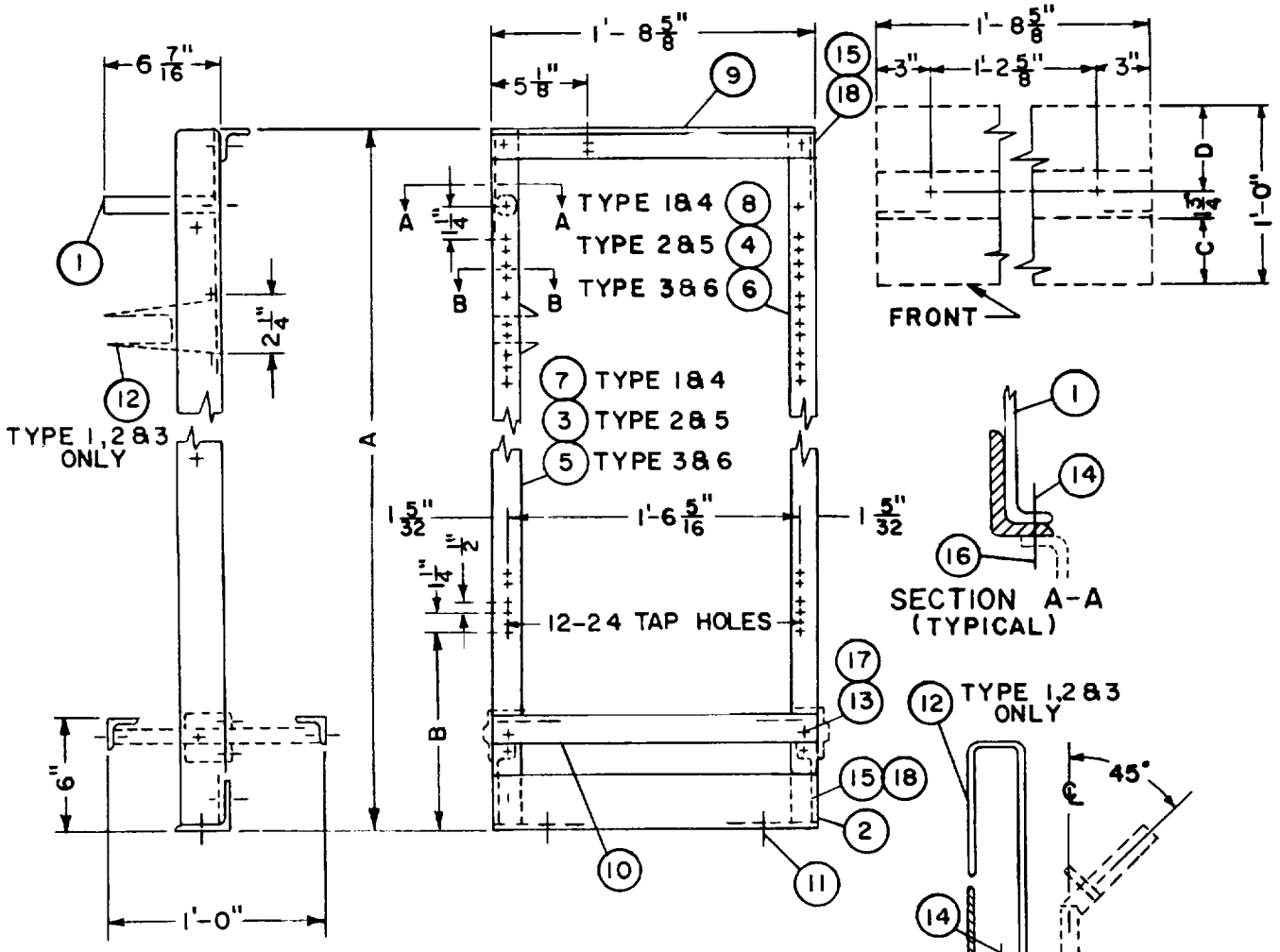
Off-site maintenance instructions are not applicable.

CHAPTER 6

MATERIEL USED IN CONJUNCTION WITH MAJOR ITEM

6-1. Electrical Equipment Racks.
(fig. 6-1)
The electrical equipment racks are fabricated from steel and provide installation for the scanner and Electrical Connector Assembly MX9457/GT (para 6-2). The vertical rack columns contain 12-24 tapped holes, 1-1/4 inch apart. The tapped holes are on 19-inch centerline-to centerline patterns. Racks are furnished in three heights: 7-1/2 feet, 9 feet, and 11 feet 8 inches. Hardware required for installation of the scanner and electrical connector assembly (patch panel) is listed in figure 2-2.

6-2. Electrical Connector Assembly MX-9457/GT.
(fig. 6-2)
The electrical connector assembly (patch panel) is equipped with 30 connectors which can receive the 10-pin connectors on the input cables (para 1-8b). The assembly includes cable-hanging U-brackets and a hardware kit for installing the U-brackets to the patch panel and the patch panel to the electrical equipment rack. The electrical connector assembly serves as a 19-inch rack-mounted electrical distribution center to be used with the scanner.



STOCKLIST			TYPE					
			1	2	3	4	5	6
ITEM	DESCRIPTION	PART NO.	QTY	QTY	QTY	QTY	QTY	QTY
1	CABLE BRACKET	H-884460	1	1	1	1	1	1
2	BOT. ANGLE	H-884410	1	1	1	1	1	1
3	UPRIGHT - LEFT	H-884445		1			1	
4	UPRIGHT - RIGHT	H-884445		1			1	
5	UPRIGHT - LEFT	H-884447			1			1
6	UPRIGHT - RIGHT	H-884447		1				1
7	UPRIGHT - LEFT	H-884449	1			1		
8	UPRIGHT - RIGHT	H-884449	1			1		
9	TOP ANGLE	H-884477	1	1	1	1	1	1
10	GUARD RAIL	H-884483	2	2	2	2	2	2
11	5/16"-18 SCR. & ANCHOR-FL.-FAST.	H-58058-A	2	2	2	2	2	2
12	JUMPER RING.	D-65521-A	6	7	10			
13	5/16"-18 NUT-GUARD RAIL MTG.	D-77033-A	4	4	4	4	4	4
14	216-24 NUT	D-77058-B	13	15	21	1	1	1
15	3/8"-16 NUT-TOP & FL. ANGLE	D-7783-A	4	4	4	4	4	4
16	.216-24 x 7/8" PHSMS-CA. BRKT. & JUMPER RING.	D-762052-J	13	15	21	1	1	1
17	5/16-18x7/8" PHSMS-GUARD RAIL.	D-762016-G	4	4	4	4	4	4
18	3/8"-16x1" HHSCS-TOP & FL. ANGLE.	D-762071-E	4	4	4	4	4	4

STOCKLIST

TABLE OF DIMENSIONS		
TYPE	A	B
1 & 4	1'-6"	9"
2 & 5	9'-0"	7 3/4"
3 & 6	11'-8"	8 1/4"

FLOOR DRILLING

TABLE OF DIMENSIONS			
FIG.	C	D	FRONT GD. RAIL MTG.
A	4"	6 1/4"	4 1/4"
B	5 1/4"	5"	5 1/2"

EI 5805-640-13-TM-11

Figure 6-1. Electrical equipment racks.

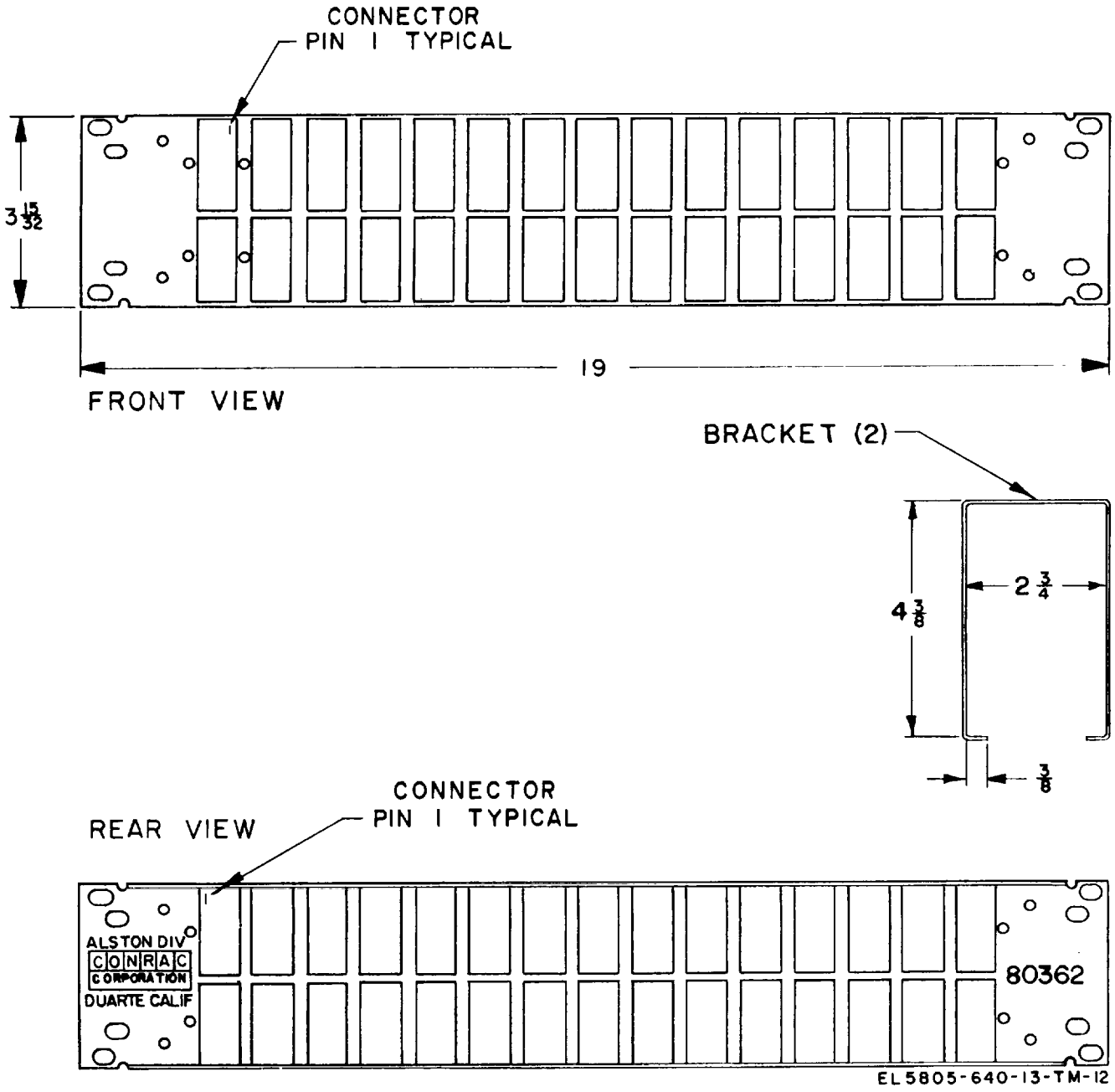


Figure 6-2. Electrical Connector Assembly MX-9457/GT.

APPENDIX A

REFERENCES

The following publications contain information applicable to the operation and maintenance of the scanner.

DA Pam 310-4	Index of Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	US Equipment Index of Modification Work Orders.
SB 708-42	Federal Supply Code for Manufacturers-United States and Canada-Code to Name (Cataloging Handbook H4-2).
TM 11-5805-641-13	Operator's, Organizational, and Direct Support Maintenance Manual, Recorder Group, Signal Data OA-8744/GT Including Repair Parts and Special Tools List.
TM 11-5805-642-13	Operator's, Organizational, and Direct Support Maintenance Manual, Counter Group, Digital OA-8745 (V)1/GT and OA-8745 (V)2/GT.
TM 11-5805-643-13	Operator's, Organizational, and Direct Support Maintenance Manual, Decoder Group OX-32/GT Including Repair Parts and Special Tools List.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 740-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).
TM 11-5805-640-23P	Organizational and Direct Support Maintenance Repair Parts and Special Tools Lists for Scanner Groups, Telephone Traffic OA-8746(V)1/GT (NSN 5805-00-143-4670) and OA-8746(V)2/GT (NSN 5805-00-151-3925).

APPENDIX B

BASIC ISSUE ITEMS LIST AND ITEMS TROOP INSTALLED OR AUTHORIZED LIST AND ORGANIZATIONAL AND DIRECT SUPPORT MAINTENANCE REPAIR PARTS AND SPECIAL TOOLS LIST

Section I. INTRODUCTION

B1. Scope.

This appendix lists basic issue items; items troop installed or authorized; repair parts; and special tools required for operation and performance of organizational and direct support maintenance of the Telephone Traffic Scanner Group OA-8746 (V)1/GT and OA-8746(V)2/GT.

B2. General.

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

a. Section II. Basic Issue Items List. Not applicable.

b. Section III. Items Troop Installed or Authorized List. Not applicable.

c. Section IV. Repair Parts List. A list of repair parts authorized for use in the performance of maintenance. The list also includes parts which must be removed for replacement of the authorized parts. Parts lists are composed of functional groups in ascending numerical sequence, with the parts in each group listed in figure and item number sequence. No parts authorized at the organizational level.

d. Section V. Special Tools List. Not applicable.

e. Section VI. Federal Stock Number and Part 'umber Index. Not applicable.

B-3. Explanation of Columns.

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

a. Illustration. This column is divided as follows:

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

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

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

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

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

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

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

Code	*Application/Ezplanation*
F---	Support item is removed, replaced, used at the direct support level.

NOTE

Codes "I" and "F" will be considered the same by direct support units.

(b) The maintenance code entered in the

fourth position indicates whether the item is to be repaired and identifies the lowest maintenance level with the capability to perform complete repair (i.e., all authorized maintenance functions). This position will contain one of the following maintenance codes:

Code Application/Explanation
F-The lowest maintenance level capable of complete repair of the support item is the direct support level.

Z-Nonrepairable. No repair is authorized.

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

Recoverability Codes Definition
H-Reparable item. When uneconomically reparable, condemn and dispose at the general support level.

Z-Nonreparable item. When unserviceable, condemn and dispose at the level indicated in position 3.

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

d. Part Number. Indicates the primary number used by the manufacturer (individual, company, firm, corporation, or Government activity), which controls the design and characteristics of the item by means of its engineering drawings, specifications standards, and inspection requirements to identify an item or range of items. When a stock numbered item is requisitioned, the repair part received may have a different part number than the part being replaced.

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

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

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

h. Quantity Furnished with Equipment (Basic Issue Items Only). Not applicable.

i. Quantity Authorized (Items Troop Installed or Authorized Only). Not applicable.

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

B-4. Special Information.
Not applicable.

B-5. How to Locate Repair Parts.
To locate a repair part, scrutinize the repair parts list (sec IV), which is arranged in figure number and item number sequence.

B-6. Abbreviations.
Not applicable.

Section IV. REPAIR PARTS LIST

(1) ILLUSTRATION (a) FIG. NO.	(1) ILLUSTRATION (b) ITEM NO.	(2) SMR CODE	(8) FEDERAL STOCK NUMBER	(4) PART NUMBER	(5) FSCM	(6) DESCRIPTION Usable on Code	(7) U/M	(8) QTY INC IN UNIT
						GROUP 01. SCANNER, TELEPHONE TRAFFIC TA-917/GT		
B-1	1	XBFZZ		216035	18672	SCREW, THUMB	EA	4
B-1	2	XBFZZ		208568	18672	COVER, FRONT	EA	1
B-1	3	PAFZZ	5805-164-3610	331004	18672	CIRCUIT CD ASSY, POWER SUPPLY	EA	1
B-1	4	PAFFH	5805-177-3521	220038	18672	INTERFACE, ASSY, CONTROL	EA	1
B-1	5	XBFZZ			Com	SCREW, NO. 4-28 x 5/8	EA	2
B-1	6	PAFZZ	5805-198-2853	381033	18672	CIRCUIT CD ASSY, CONTROL	EA	1
B-1	7	PAFZZ	5805-159-0060	381034	18672	CIRCUIT CD ASSY, ADD. 500 PT SCANNER	EA	1
B-1	8	PAFZZ	5805-167-1102	381036	18672	CIRCUIT CD ASSY, INPUT/OUTPUT	EA	17
B-1	9	PAFZZ		114003	18672	CONNECTOR, ELEC, 60 PIN	EA	21
B-1	10	PAFZZ	5930-849-5679	83050	04009	SWITCH, TOGGLE, SPST	EA	4
B-1	11	PAFZZ		213-50-00-135	71785	CONNECTOR, ELEC, 50 PIN	EA	11
B-1	12	PAFZZ	5920-225-9984	AGC2	71400	FUSE, 2 A	EA	1
B-1	13	PAFZZ	5920-213-1878	HTA-DD	71400	FUSEHOLDER	EA	1
B-1	14	PAFZZ		4-140Y	71785	BOARD, TERMINAL	EA	1
B-2	1	PAFZZ	5930-901-4882	83052	04009	SWITCH, TOGGLE, SPDT	EA	3
B-2	2	PAFZZ	6680-262-9370	FE3RP	12323	REGISTER; DIGITAL, MECH	EA	1
B-2	3	PAFZZ		3236J	76055	SWITCH, ROTARY	EA	1
B-2	4	PAFZZ		PKS9OB	18672	KNOB	EA	1
B-2	5	PAFZZ	5930-045-5021	83050	04009	SWITCH, TOGGLE, SPST	EA	1
B-2	6	PAFZZ	6210-984-6167	95-0428-09-301	72619	BASE, LAMP	EA	3
B-2	7	PAFZZ	6240-715-0037	48-C-2	82219	LAMP, INCAND	EA	3
B-2	8	PAFZZ		135-1473	72619	LENS, AMBER (SCAN)	EA	1
B-2	9	PAFZZ		135-1472	72619	LENS, GREEN (DATA)	EA	1
B-2	10	PAFZZ		385042	18672	CIRCUIT CD ASSY, CONTROL INTERFACE	EA	1
B-2	11	PAFZZ		135-1471	72619	LENS, RED (TEST)	EA	1
B-2	12	PAFZZ		23-1	81073	SWITCH, PB	EA	1
B-2	13	PAFZZ		83054	04009	SWITCH, DPDT	EA	1

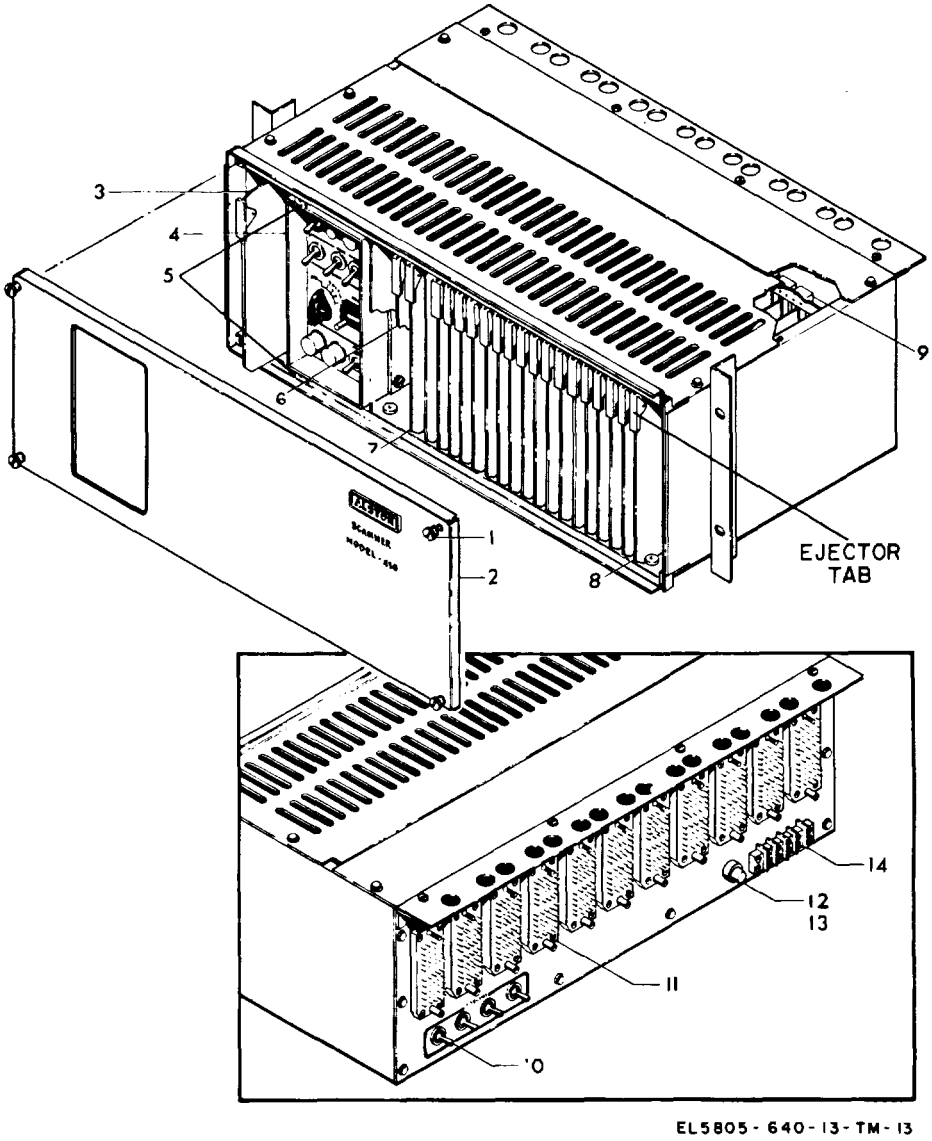


Figure B-1. Telephone traffic scanner, front and rear views.

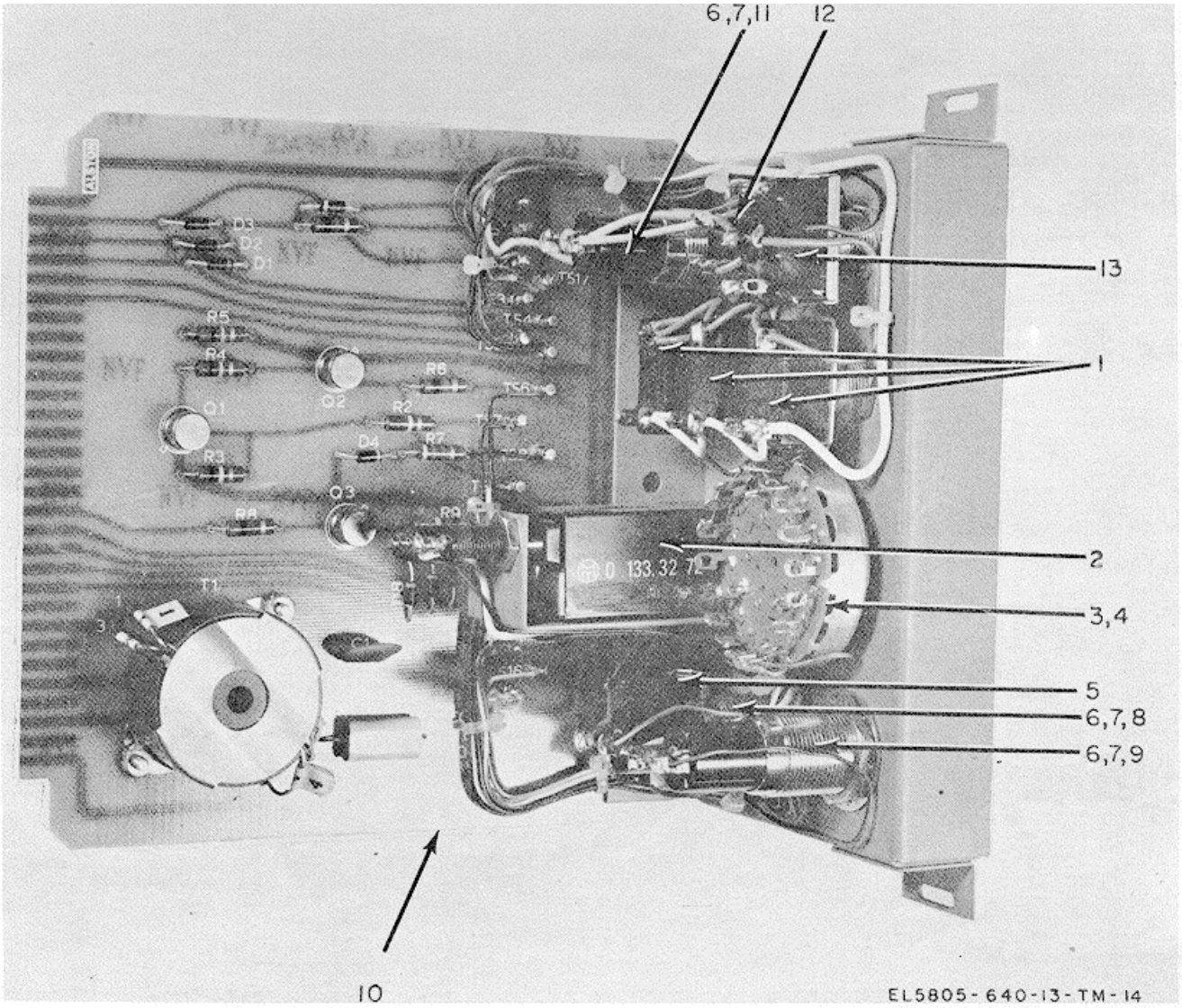


Figure B-2. Control interface assembly.

APPENDIX C
MAINTENANCE ALLOCATION

Section I. INTRODUCTION

C-1. General

This appendix provides a summary of the maintenance operations for Scanner Groups, Telephone Traffic, OH-8746(V)1/GT and OA-8746(V)2/GT. It authorizes categories of maintenance for specific maintenance functions on repairable items and components and the tools and equipment required to perform each function. This appendix may be used as an aid in planning maintenance operations.

C-2. Maintenance Function

Maintenance functions will be limited to and defined as follows:

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

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

c. Set-'ice. Operations required periodically to keep an item in proper operating condition; i.e., to clean (decontaminate), to preserve, to drain, to paint, or to replenish fuel, lubricants, hydraulic fluids, or compressed air supplies.

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

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

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

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

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

i. Repair. The application of maintenance services (inspect, test, service, adjust, align, calibrate, replace) or other maintenance actions (welding, grinding, riveting, straightening, facing, remachining, or resurfacing) to restore serviceability to an item by correcting specific damage, fault, malfunction, or failure in a part, subassembly, module (component or assembly), end item, or system.

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

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

C-3. Column Entries

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

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

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2. When items are listed without maintenance functions, it is solely for purpose of having the group numbers in the MAC and RPSTL coincide.

d. Column 4, Maintenance Category. Column 4 specifies, by the listing of a "worktime" figure in the appropriate subcolumn(s), the lowest level of maintenance authorized to perform the function listed in column 3. This figure represents the active time required to perform that maintenance function at the indicated category of maintenance. If the number or complexity of the tasks within the listed maintenance function vary at different

maintenance categories, appropriate "worktime" figures will be shown for each category. The number of task-hours specified by the "worktime" figure represents the average time required to restore an item (assembly, subassembly, component, module, end item or system) to a serviceable condition under typical field operating conditions. This time includes preparation time, troubleshooting time, and quality assurance, quality control time in addition to the time required to perform the specific tasks identified for the maintenance functions authorized in the maintenance allocation chart. Subcolumns of column 4 are as follows:

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

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

f. Column 6, Remarks. Column 6 contains an alphabetic code which leads to the remark in section IV, Remarks, which is pertinent to the item opposite the particular code.

C4. Tool and Test Equipment Requirements (sec III)

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

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

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

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

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

C-5. Remarks (sec IV)

a. Reference Code. This code refers to the appropriate item in section II, column 6.

b. Remarks. This column provides the required explanatory information necessary to clarify items appealing in section II.

Section II. MAINTENANCE ALLOCATION CHART
FOR
SCANNER GROUPS, TELEPHONE TRAFFIC
OA-8746(V)1/CT and OA-8746(V)2/GT

(1) GROUP NUMBER	(2) COMPONENT ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY C	O	F	H	D	(5) TOOLS AND EQUIPMENT	(6) REMARKS
00	TELFPHONE TRAFFIC SCANNER GROEPS OA-8746(V)l/GT and OA-8746(V)2/GT	Install		0.2				1	
		Test		0.5				2,3	
		Repair			0.8			1	
		Overhaul					20.n	Depot	
01	SCANNER, TEIEPHONE TRAFFIC TA-917/GT	Inspect		0.1					
		Test		0.5				2,3	
		Replace		0.2					
		Repair			0.8			1	
0101	ASSEMBLY, INTERFACE CONTROL. A5	Test			0.4			3	
		Replace			0.4			1	
		Repair			1.0			1	

Section III. TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR
SCANNER GROUPS, TELEPHONE TRAFFIC
OA-8746(V)1/GT and OA-8746(V)2/GT

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	O,F	TOOL KIT, ELECTRONIC EQUIPMENT TK-105/G	5180-00-610-8177	
2	F	DIGITAL ELECTRONIC COUNTER CP-772/U	6625-00-973-4837 6625-00-922-3586	
3	F	4MULTIMETER AN/USM-223	6625-00-499-7463	

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- Sig Dep (2)
- Sig FLDMS (1)
- Units org under fol TOE:
  - (1 cy each)
  - 29-134
  - 29-136

NG: None
USAR: None
For explanation of abbreviations used, see AR 210-50.

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