A-111

TM 11-5815-238-12

TECHNICAL MANUAL

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL INCLUDING REPAIR PARTS AND SPECIAL TOOLS LISTS

TELETYPEWRITER SETS AN/GGC-3, AN/GGC-3A, AN/GGC-53, AND AN/GGC-53A AND TELETYPEWRITER REPERFORATOR-TRANSMITTERS TT-76/GGC, TT-76A/GGC, TT-76B/GGC, TT-76C/GGC, TT-699/GGC, TT-699A/GGC, TT-699B/GGC, AND TT-699C/GGC

This copy is a reprint which includes current pages from Changes 1 through 5.

HEADQUARTERS, DEPARTMENT OF THE ARMY
DECEMBER 1965

WARNING

DANGEROUS VOLTAGES EXIST IN THIS EQUIPMENT

Be careful when working on the 115-volt motor circuit or on the 95- to 250-volt power supply circuits. Serious injury or death may result from contact with these circuits. Turn off the power and discharge all high voltage capacitors before making any connections or replacing any parts inside of the equipment.

DON'T TAKE CHANCES!

TECHNICAL MANUAL
No. 11-5815-238-12

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, DC, *6 December 1965*

OPERATOR'S AND ORGANIZATIONAL MAINTENANCE MANUAL
TELETYPEWRITER SETS
AN/GGC-3 (NSN 5815-00-503-3309)
AN/GGC-3A (NSN 5815-00-581-9751)
AN/GGC-53 (NSN 5815-01-012-8772)
AN/GGC-53A (NSN 5815-00-017-0956)
AND
TELETYPEWRITER REPERFORATOR-TRANSMITTERS
TT-76/GGC (NSN 5815-00-503-2760)
TT-76A/GGC (NSN 5815-00-553-6061)
TT-76B/GGC (NSN 5815-00-553-6061)
TT-76C/GGC (NSN 5815-00-553-6061)
TT-699/GGC (NSN 5815-01-012-8446)
TT-699A/GGC (NSN 5815-01-017-9166)
TT-699B/GGC (NSN 5815-01-017-9166)
TT-699C/GGC (NSN 5815-01-017-9166)

***This manual supersedes so much of TM 11-2225, 4 April 1957, including C1, 6 November 1957; C 2, 19 December 1957; C 3, 8 September 1958; C 4, 2 February 1959; C 7, 8 June 1962; C 8, 18 July 1963; C 9, 4 October 1963; and C 10, 24 February 1964 as pertains to the operation, installation, and organizational maintenance of the equipments; and TM 11-5815-238-20P, 22 January 1964.**

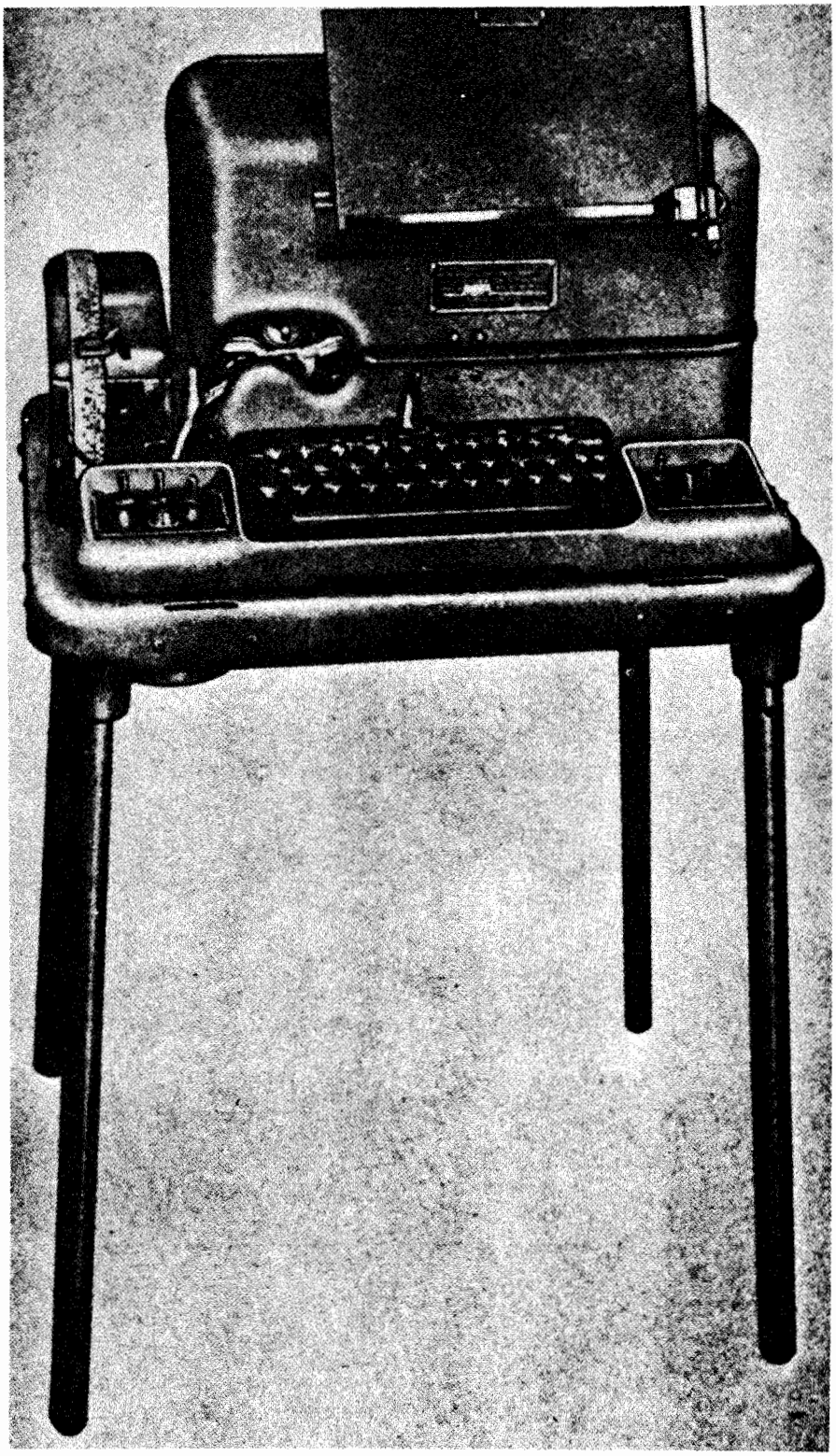


Figure 1-1. Teletypewriter Set AN/GGC-3, less running spares.

CHAPTER 1
INTRODUCTION

Section I. GENERAL

1-1. Scope

a. This manual describes Teletypewriter Sets AN/GGC-3, AN/GGC-3A, AN/GGC-53, and AN/GGC-53A, and Teletypewriter Reperforator-Transmitters TT-76/GGC, TT-76A/GGC, TT-76B/GGC, TT-76C/GGC, TT-699/GGC, TT-699A/GGC, TT-699B/GGC, and TT-699C/GGC. The manual contains information covering installation, operation, cleaning, and inspection of equipment, periodic maintenance services, and the replacement of parts available to organizational personnel.

b. Official nomenclature followed by (*) is used to indicate all models of the equipment items covered in this manual; therefore, Teletypewriter Set AN/GGC-3(*) refers to Teletypewriter Sets AN/GGC-3 and AN/GGC-3A; Teletypewriter Set AN/GGC-53(*) refers to Teletypewriter Sets AN/GGC-53 and AN/GGC-53A; Teletypewriter Reperforator-Transmitter TT-76(*)/GGC refers to Teletypewriter Reperforator-Transmitter TT-76/GGC, TT-76A/GGC, TT-76B/GGC and TT-76C/GGC; Reperforator-Transmitter TT-699(*)/GGC refers to Reperforator-Transmitter TT-699/GGC, TT-699A/GGC and TT-699C/GGC. If reference is not made to a specific model, the information is applicable to all models of the equipment.

c. Unless otherwise specified, references to the AN/GGC-3(*) will also refer to the AN/GGC-53(*) and references to the TT-76(*)/GGC will also refer to the TT-669(*)/GGC. The following relationship exists between indicated models:

High-Level Equipment	*Low-Level Equipment*
AN/GGC-3/GGC	AN/GGC-53/GGC
AN/GGC-3A/GGC	AN/GGC-53A/GGC
TT-76/GGC	TT-699/GGC
TT-76A/GGC	TT-699A/GGC
TT-76B/GGC	TT-699B/GGC
TT-76C/GGC	TT-699C/GGC

(1) High-level reperforators-transmitters operate with line currents of 20 or 60 milliamperes.

(2) Low-level reperforators-transmitters operate with line currents of approximately 100 microamperes.

(3) Low-level reperforators-transmitters are high-level reperforators converted to low-level signaling operation. Although quite a number of electronic circuits are added with the low-level conversion, there is virtually no difference in operation of the equipment. Additionally, there is very little difference in the outward appearance of the equipment.

1-2. Indexes of Publications

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

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

1-3. Forms and Records

a. Reports of Maintenance and Unsatisfactory Equipment. Maintenance forms, records, and reports which are to be used by maintenance personnel at all maintenance levels are listed in and prescribed by TM 38-750.

b. Report of Packaging and Handling Deficiencies. Fill out and forward DD Form 6 (Packaging Improvement Report) as prescribed in AR 700-58/NAVSUPINST 4030.29/AFR 71-13/MCO P4030.29A, and DLAR 4145.8.

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

1-3.1. Reporting of Errors

The reporting of errors, omissions, and recommendations for improving this publication 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 Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, New Jersey 07703.

1-3.2. Reporting Equipment Improvement Recommendations (EIR)

EIR's will be prepared using Standard Form 368, Quality Deficiency Report. Instructions for preparing EIR's are provided in TM 38-750, the Army Maintenance Management System. EIR's should be mailed direct to Commander, US Army Communications and Electronics Materiel Readiness Command, ATTN: DRSEL-ME-MQ, Fort Monmouth, New Jersey 07703. A reply will be furnished direct to you.

1-3.3. Administrative Storage

For procedures, forms, and records, and inspections required during administrative storage of this equipment refer to TM 750-90-1.

1-3.4. Destruction of Army Electronics Materiel

Demolition and destruction of electronic equipment will be under the direction of the commander and in accordance with TM 750-244-2.

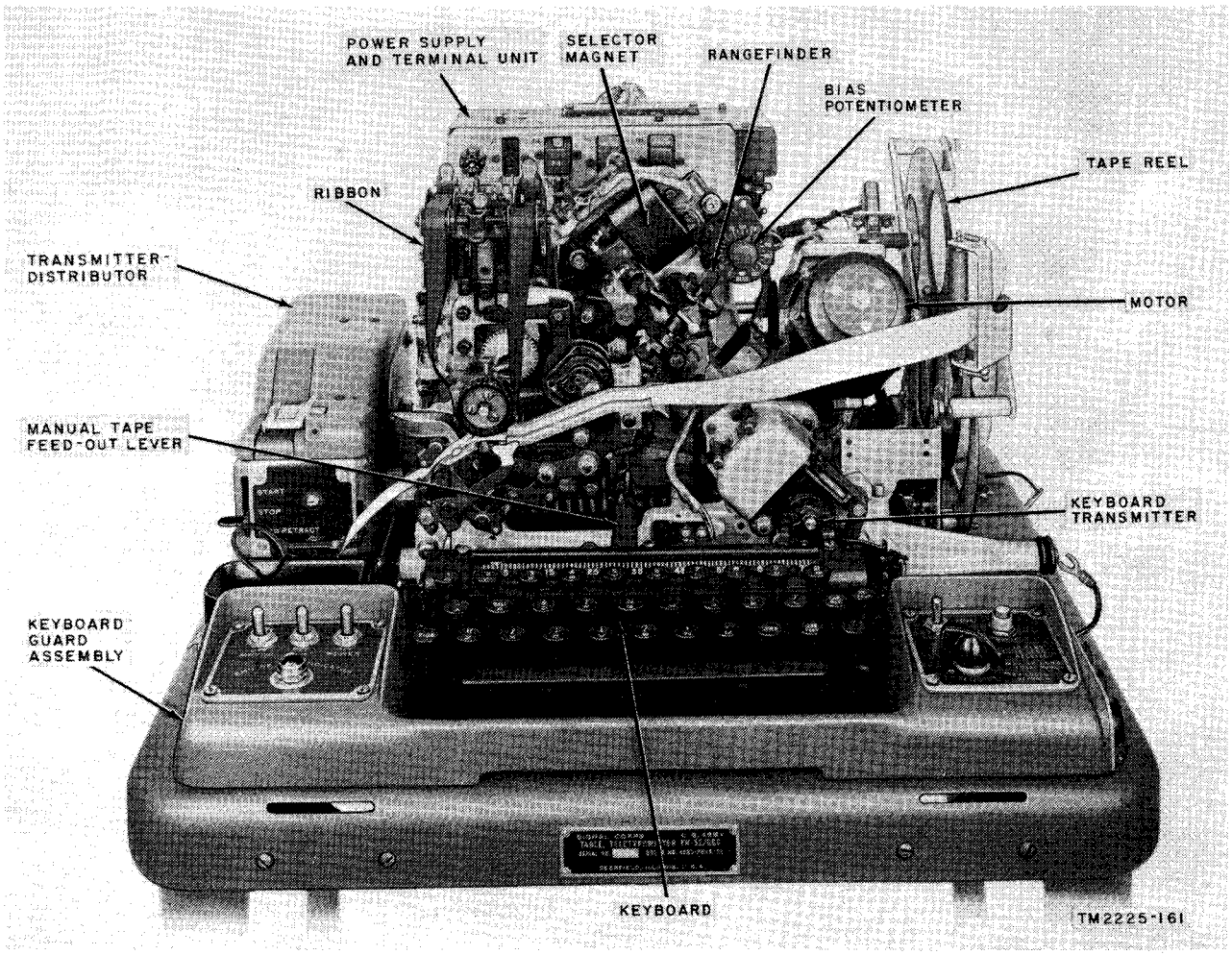


Figure 1-2. Teletypewriter Reperforator-Transmitter TT-76/GGC.

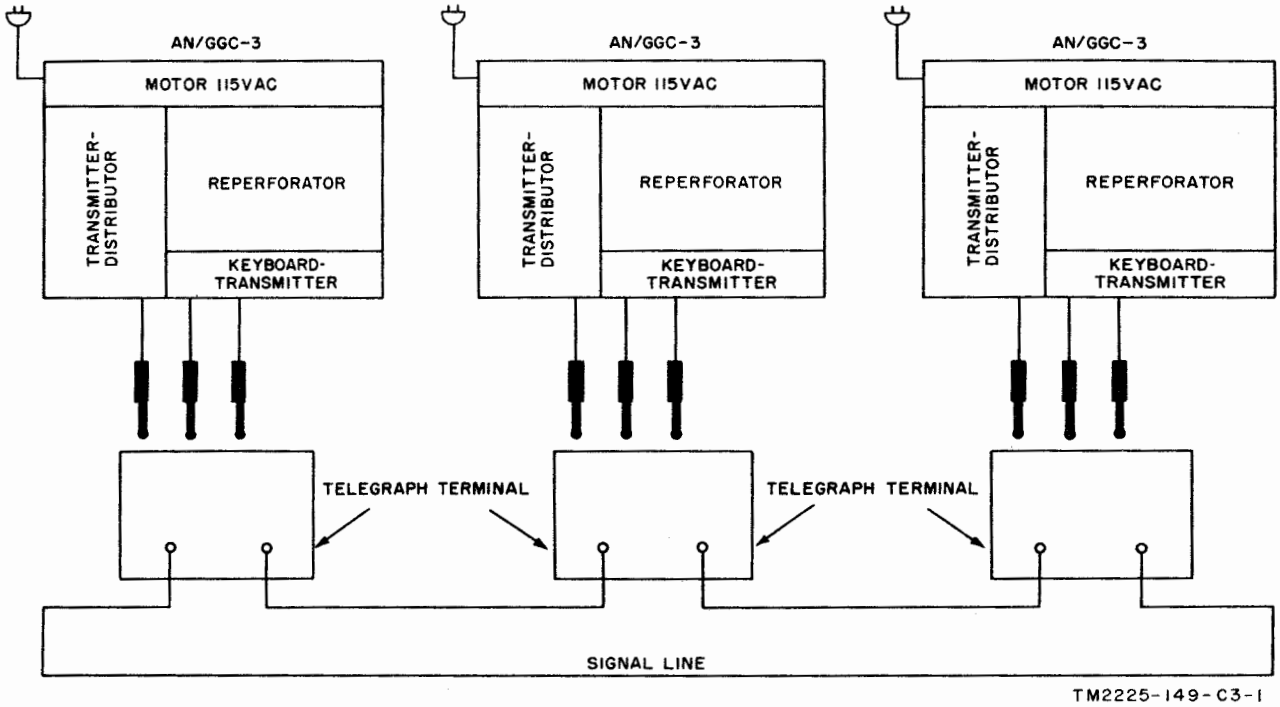


Figure 1-3. Dc wire system, block diagram (AN/GGC-3(*)only).

Section II. DESCRIPTION AND DATA

1-4. Purpose and Use

a. Teletypewriter Set AN/GGC-3(*) (fig. 1-1) is a lightweight, transportable unit which may be used in either fixed or tactical military teletypewriter stations. It provides facilities for manual transmission direct from keyboard (fig. 1-2) and for tape transmission from the transmitter-distributor. Received messages are printed and perforated on a paper tape for later transmission.

b. The TT-76(*)/GGC may be used to send and receive over direct current (dc) wire lines (fig. 1-3) carrier, or radio systems (fig. 1-4) in association with Telegraph Terminal TH-5/TG, or similar line terminating devices.

c. Teletypewriter Reperforator-Transmitter TT-699(*)/GGC may be used to send and receive over direct current (6-volt polar) signal circuits only.

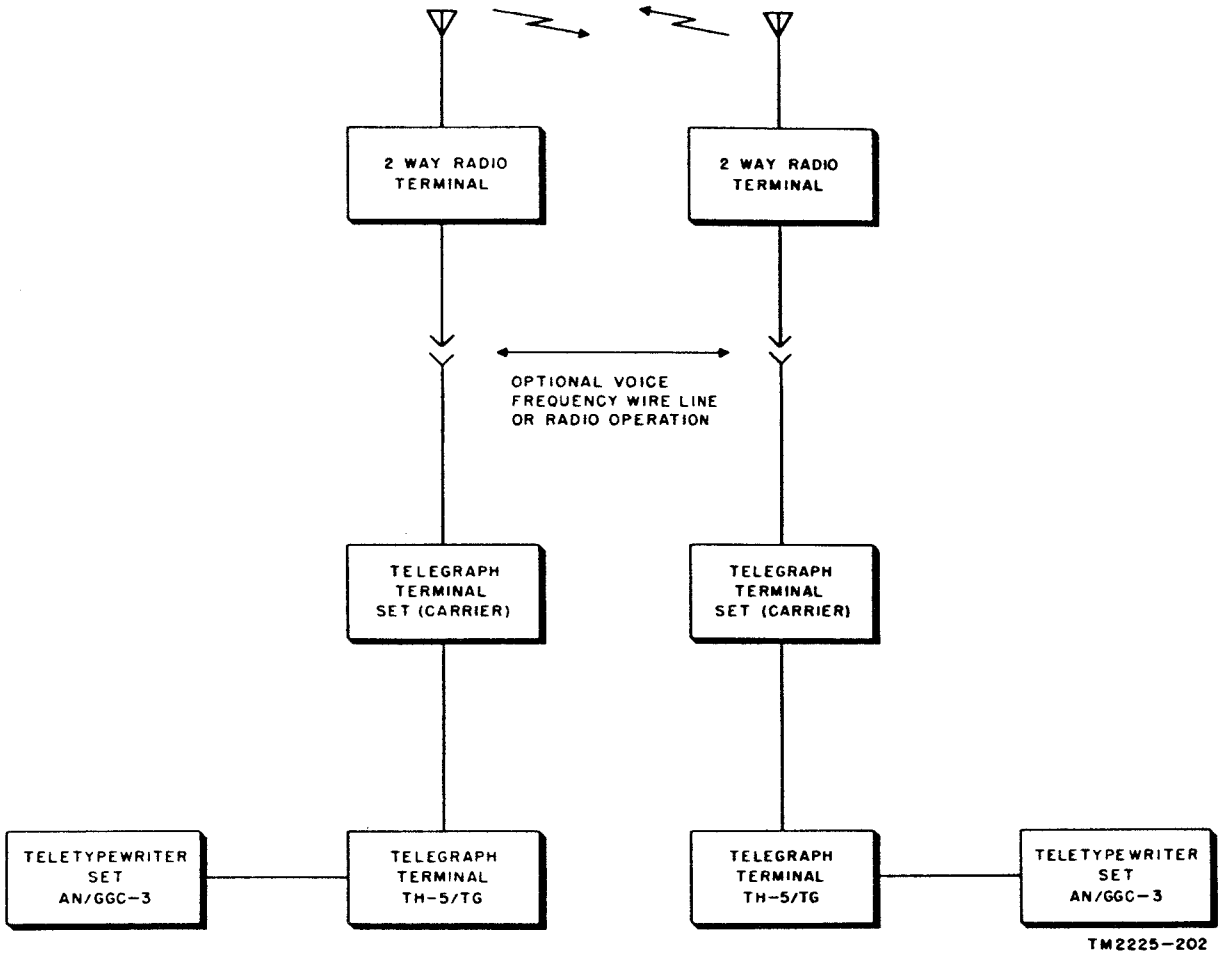


Figure 1-4. Carrier or radio system, block diagram, (AN/GGC-3(*) only.

1-5. Technical Characteristics

Technical characteristics of Teletypewriter Set AN/GGC-3(*) are given in *a* below. Technical characteristics of the TT-76(*)/GGC are given in *b* below.

a. Teletypewriter Set AN/GGC-3 (*).

Type of installation	Field or fixed station; sending and receiving; wire or radio.
Total weight of equipment (including Teletypewriter Reperforator-Transmitter Case CY-1110/GGC).	97 lb with full roll of paper tape.
Space requirements of installed equipment (not including Teletypewriter Reperforator-Transmitter Case CY-1110/GGC).	8 cu ft.
Ambient temperature limits:	
Equipment in use	+32°F. (0°C.) to +132°F. (+55.6°C.).
Equipment in storage	−80°F. (−62.2°C.) to +160°F. (+71.1°C.).
Minimum barometric pressure:	
Operating	16.88-in. mercury (equivalent to 15,000-ft altitude).
In transportation	5.5-in. mercury (equivalent to 40,000-ft altitude).
Other climatic conditions	Equipment withstands high humidity and moisture as encountered in tropics; Teletypewriter Set AN/GGC-3* has an immersionproof transportation and storage case.

b. TT-76 (*)GGC.

Keyboard	Standard communications.
Type of characters	English.
Method of recording	Message printed and perforated on 7/8-inch paper tape.
Characters pin line	Character counter records a maximum of 76 characters.
Type of feed	Sprocket.
Signaling code	Five-unit, start-stop; stop impulse equals start impulse length multiplied by 1.42.
Type of signals	Neutral or polar receiving, neutral sending.
Speed:	
Operations per minute (send and receive).	368.1, 404, 460, or 600 opm.
Words per minute (send and receive).	60, 66, 75, or 100 wpm.
Service range:	
368.1 opm	25 mi
600 opm	15 mi
Motor type	Series governed.
Motor speed	3,600 revolutions per minute.
Power required:	
Voltage	115 vac or 230 vac.
Frequency	50 to 60 cps (single phase).
Consumption	Approx 150 watts.
Line current requirements:	
Dc line	60 ma dc.
Voice-frequency line	20 ma dc.
Polar line	Not more than 30 ma dc.
Tape capacity	Enough for— 5 hours, 20 minutes at 368.1 opm. 3 hours, 10 minutes at 600 opm.
Distortion tolerances:	
Transmitted signals	±5% max at 368.1 opm on dc line.
Bias tolerance (received signals):	
368.1 opm	±40%.
600 opm	±35%.
End-distortion tolerance (received signals):	
368.1 opm	35% marking or spacing.
600 opm	30% marking or spacing.
Range adjustment (for received signal bias and end distortion).	Scale calibrated 0 to 120; 100 scale units equal width of 1 unit equal width of 1 unit signal pulse (22 milliseconds at 368.1 opm).
Bias potentiometer	Adjusts current flow in selector magnet bias windings.
Radio frequency suppression.	Teletypewriter does not interfere with radio reception at frequencies between .35 and 150 megacycles when located 1 foot or more from radio antenna.
Safety shielding	Points at which potentials of 30 volts or more exist are shielded against accidential contact by personnel.

c. TT-699 (*)/GGC. **The technical characteristics particular to Teletypewriter Reperforator-Transmitter TT-699(*)/GGC are listed below. Except for these characteristics, those in *b* above are also applicable to Teletypewriter Reperforator-Transmitter TT-699(*)/GGC.**

Line current requirements:

Polar line	100 ma dc.
Distortion tolerances:	
Transmitter signals	Not applicable.
Bias tolerance	Not applicable.
End distortion	Not applicable.
Current delivered to keyboard and distribtuion-transmitter:	
Contacts in mark condition	60 (±5) microamperes.
Voltage across teletypewriter:	1 (±0.5) volt.
Contacts in space condition	
Voltage across selection magnet:	
In a mark or space condition	13.5 (±0.5) volts.
Bias potentiometer	Not applicable.

1-6. Components Data

a. Size and Weight of Major Components. **The following chart lists the dimensions and weight of the major components.**

b. Running Spares. **Running spares are shown in figure 1-5.**

Item		Height (in.)	Depth (in.)	Width (in.)	Unit weight (lb)
TT-76(*)/GGC		12½	18	21	45
FN-52/GGC or FN-108/GGC		26	18	21	15
CY-1110/GGC		16	22	25	30

1-6.1. Items Comprising an Operable Equipment

FSN	Quantity 1	Quantity 2	Nomenclature, part No., and mfr code	Fig. No.
			NOTE The part number is followed by the applicable five digit Federal supply code for manufacturers or distributor or Government agency, etc., which is identified in SB 708-42.	
5815-503-3309			TELETYPEWRITER SETS AN/GGC-3; AND AN/GGC-3A; consisting of:	1-1
			NOTE Quantity Column 1 refers to AN/GGC-3; Column 2 refers to AN/GGC-3A.	
5815-503-1647	1		Case, Teletypewriter Reperforator-Transmitter CY-1110/GGC (Order No. 4683-PH-52 only).	1-5
5815-537-7906		1	Case, Teletypewriter Reperforator-Transmitter CY-1110/GGC	1-5
5815-503-2760	1		Teletypewriter Reperforator-Transmitter TT-76/GGC: portable; std comm keyboard; English characters; 72 characters per line; sprocket feed; series governed motor; 7.42 unit code; 110v, 50-60 cyc, single phase ac, 100 vdc	1-5
5815-553-6061		1	Teletypewriter Reperforator-Transmitters TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC: portable; std comm keyboard; English characters; 72 characters per line; sprocket feed; series governed motor; 7.42 unit code; 110v, 50-60 cyc, single phase ac, 100 vdc	3-2
5815-503-2620	1		Table, Teletypewriter FN-52/GGC:	1-5
5815-543-1353		1	Table, Teletypewriter FN-108/GGC	5-1
			TELETYPEWRITER REPERFORATOR-TRANSMITTER TT-76/GGC, TT-76A/GGC, TT-76B/GGC AND TT-76C/GGC	
			NOTE Model Column 1 refers to TT-76/GGC; Column 2 refers to TT-76A/GGC, TT-76B/GGC and TT-76C/GGC.	
	1		Teletypewriter Reperforator-Transmitter TT-76/GGC (Basic Component) which includes:	1-5
		1	Teletypewriter Reperforator-Transmitters TT-76A/GGC, TT-76B/GGC and TT-76C/GGC (Basic Component) which includes:	3-2
5815-392-7822	1	1	Bracket Assembly: Kleinschmidt p/n 52656A (Not required for TT-76/GGC, TT-76A, B, C, /GGC when part of AN/GGC-3 and 3A.	
5815-392-7813	1	1	Chad, Bin: Sig dwg SM-B-157283	
5815-219-7020			Clip: Kleinschmidt p/n 53442	
5815-224-9717	1	1	Fork, Tunning: Sig dwg SC-DL-70237 (Mounted in Cover)	1-5
5815-203-1678	1	1	Gear, Worm: 60 wpm, Sig dwg SC-B-69681 (Installed in equip)	1-5
5815-203-1327	1	1	Gear, Worm: 100 wpm, Sig dwg SC-B-70842 (Mounted in equip)	
5815-378-5593	1	1	Gear, Worm Wheel: 60 wpm, Kleinschmidt p/n 50352A (Installed in equipment)	
5815-351-7944	1	1	Gear, Worm Wheel: 100 wpm; Sig dwg SC-B-70478 (Mounted in equip)	1-5
7510-082-2648	1	1	Ribbon, Teletypewriter: Fed Spec DDD-R-311d, type 1, grade 1, class 1 (Installed in equip)	1-5
5305-206-5877	4	4	Screw, Tapping, Thread Forming: Kleinschmidt p/n 10302 (Not required for TT-76/GGC; TT-76A, B, C,/GGC when part of AN/GGC-3 and 3A)	
5815-356-3227	1	1	Spool, Printing Ribbon: Kleinschmidt p/n 10900 (Installed in equip)	1-5
7530-634-6237	1	1	Tape, Teletypewriter, Perforator: Fed spec UU-T-120	1-5
5815-01-012-8772			TELETYPEWRITER SET AN/GGC-53	
			AN/GGC-53 is identical to AN/GGC-3 except that Teletypewriter Reperforator-Transmitter TT-699/GGC (NSN 5815-01-012-8446) is used instead of TT-76/GGC.	
5815-01-017-0956			TELETYPEWRITER SET AN/GGC-53A	
			AN/GGC-53A is identical to AN/GGC-3A except that Teletypewriter Reperforator-Transmitter TT-699A/GGC (NSN 5815-01-017-9166), TT-699B/GGC (NSN 5815-01-017-9166), or TT-699C/GGC (NSN 5815-01-017-9166) is used instead of TT-76A/GGC, TT-76B/GGC, or TT-76C/GGC.	
			NOTE Teletypewriter Reperforator-Transmitter TT-699(*)/GGC is identical to TT-76(*)/GGC except that it contains circuits for low level operation.	

FSN	Quantity 1	Quantity 2	Nomenclature, part No., and mfr code	Fig. No.
5815-672-6727		1	Template, Bench: Kleinschmidt p/n 57259 (Not required for TT-76A, B or C/GGC when part of AN/GGC-3A)	2-3
			TABLE TELETYPEWRITER FN-52/GGC consisting of:	
5815-392-7821			Leg: Sig dwg SM-B-157297	
5815-392-7812			Table, Top-Assembly: Sig dwg SM-B-157281	
			TABLE, TELETYPEWRITER FN-108/GGC consisting of:	
5815-614-5238			Frame, Table Top: Kleinschmidt p/n 59505A	
5815-392-7821			Leg: Sig dwg SM-B-157297	

1-6.2. Expendable Consumable Supplies and Material

Expendable consumable supplies and material are listed in table 1-1.

Table 1-1. Expendable Consumable Supplies and Materials

The supplies and material listed in this table are required for operation of this equipment and are authorized to be requisitioned by SB 700-50. The FSN for the applicable unit of issue required can be found in appropriate supply catalogs. The FSCM is used as an element in item identification to designate manufacturer, distributor, or Government agency, etc., and is identified in SB 708-42.

Item	Description	Ref No. and FSCM	FSC
1	Ribbon, Printing, Teletypewriter	DDD-R-311D, type 1, grade A, class 1	7510
2	Tape, Teletypewriter	UU-T-120	7530

1-7. Description of Major Components

a. Teletypewriter Set AN/GGC-3 (fig. 1-5). The AN/GGC-3 consists of Teletypewriter Reperforator-Transmitter TT-76/GGC, Teletypewriter Table FN-52/GGC, and Teletypewriter Reperforator-Transmitter Case CY-1110/GGC.

(1) *Teletypewriter Reperforator-Transmitter TT-76/GGC* (fig. 1-2). The TT-76/GGC is mounted on Table FN-52/GGC and is provided with a dust cover and a copyholder. The keyboard, mounted at the front of the unit, uses a conventional teletypewriter keyboard. Control switches are installed on either side of the keyboard in the keyboard guard. The transmitter-distributor is located on the left side of the unit and is provided with its own dust cover.

(2) *Teletypewriter Table FN-52/GGC* (fig. 1-5). The FN-52/GGC is made of steel and has four removable tubular legs. The table top has rounded corners and is provided with holes to properly mount the reperforator-transmitter.

(3) *Teletypewriter Reperforator-Transmitter Case CY-1110/GGC* (fig. 1-5). The CY-1110/GGC is an immersion proof carrying and storage case. It is provided with metal handles and spring-loaded latches.

b. Teletypewriter Set AN/GGC-3A. The AN/GGC-3A consists of Teletypewriter Reperforator-Transmitters TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC, Teletypewriter Table FN-108/GGC, and Teletypewriter Reperforator-Transmitter Case CY-1110/GGC.

(1) *Teletypewriter Reperforator-Transmitter TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC.* The TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC is similar in appearance to the TT-76/GGC described in *a* (1) above, except that it is mounted on a separate base, which contains the major portion of the wiring.

(2) *Teletypewriter Table FN-108/GGC.* The FN-108/GGC is similar to the FN-52/GGC described in *a* (2) above, except that the portion of the table top immediately under the TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC is cut away to give access to the wiring in the base.

(3) *Teletypewriter Reperforator-Transmitter Case CY-1110/GGC.* The CY-1110/GGC used with the AN/GGC-3A is identical with the CY-1110/GGC used with the AN/GGC-3.

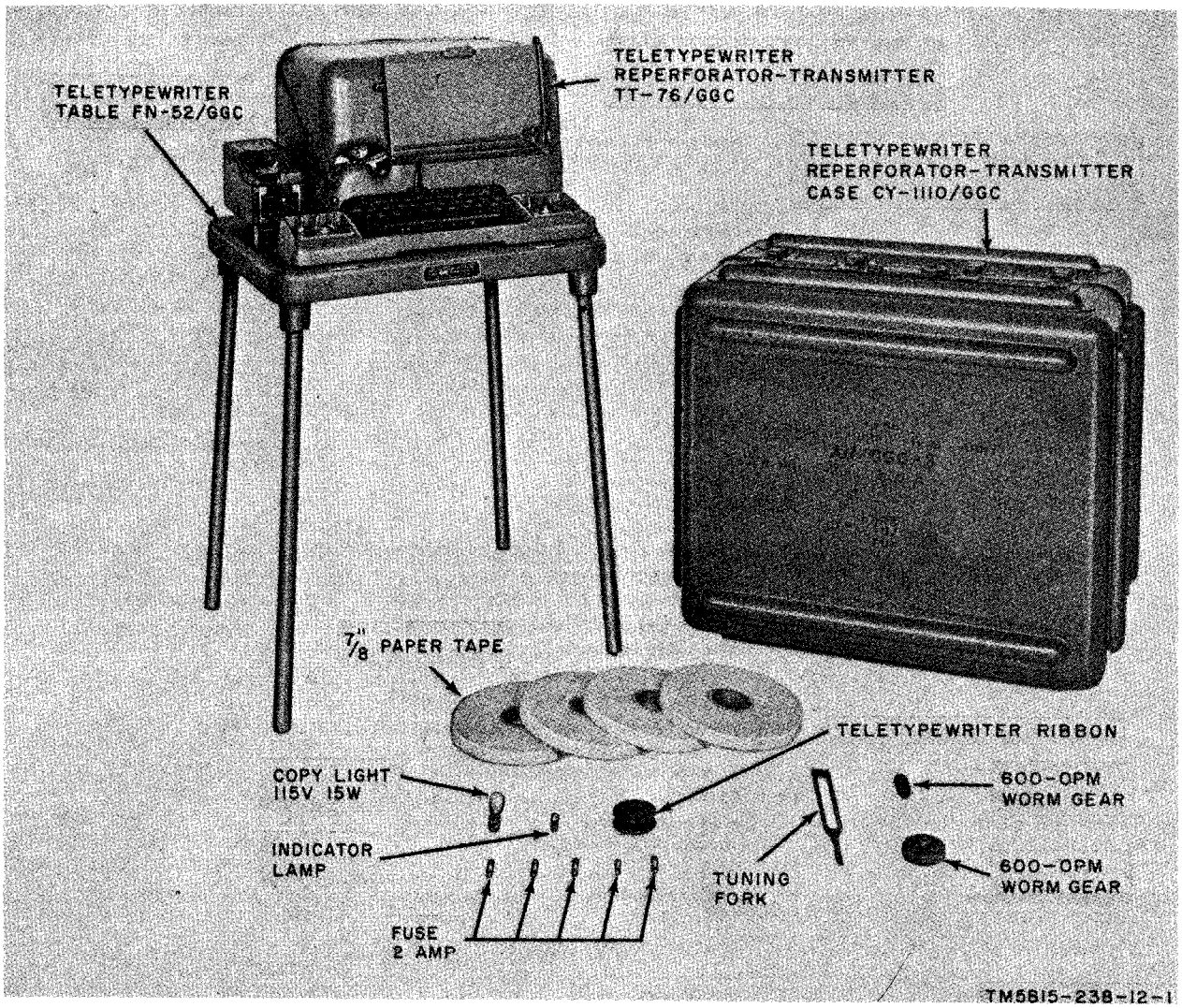


Figure 1-5. Teletypewriter Set AN/GGC-3.

1-8. Differences in Models

Operationally, the TT-76/GGC and the TT-76A/GGC, when not used as part of the AN/GGC-3, are directly interchangeable. However, certain assemblies in the TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC have been changed for ease of installation and maintenance. The chart below lists these differences.

Item	Teletypewriter Reperforator-Transmitter TT-76/GGC [a]	Teletypewriter Reperforator-Transmitters TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC [b]
End-of-line indicator	Lamp lights	Lamp lights and margin bell rings
Tape reel	Nonremovable reel	Removable reel.
Tape-out alarm lever	Tape-out alarm lever rides against top of the paper tape roll.	Tape-out alarm lever rides against bottom of the paper tape roll.
Tape roll retention	Secured by the support arm latch	Locked in place by circular plate equipped with tabs and slots.
Tape puller mechanism	None	Mounted in path of tape at the front of the reperforator.
Tape tear wire	None	Mounted on the left of the code die support.
Tape guide lever and position indicator.	None	Mounted on the code die assembly.
Ribbon spool retainer	U-shaped holding clip	Locking clips at each end of the ribbon spool shaft.
Keyboard guard	Secured to the base plate by machine screws and washers.	Hinged, can be tilted away from the reperforator-transmitter.
Rangefinder	Held in position by knurled nut and lockwasher or spigot-type dial lock.	Secured by spring-loaded dial detent.
Potentiometer adjustment	Bias potentiometer knob provided. [c]	Screwdriver adjustment; locked in optimum position by locknut. [c]
Wiring options	Made by wiring changes on terminal board. [c]	Made by inserting selector magnet plug in alternate receptable and setting SIGNAL/BIAS switch. [c]
Tape cover latch	Mounted on eccentric stud attached to frame.	Part of tape cover.
Transmitter-distributor front plate.	Not stepped	Stepped to prevent accidental movement of the STOP-START lever to FEED RETRACT position.
Motor. series-governed	Bodine (1/23-hp)	Bodine (1/23-hp) on TT-76A/GGC; Bodine (1/23-hp) or Howard (1/20 or 1/23-hp) on TT-76B/GGC; Howard (1/20-hp) on TT-76C/GGC.
Felt lubricating washer	Not included	Not included on TT-76A/GGC and all TT-76B/GGC's procured before December 1959; included on all TT-76B/GGC's procured after December 1959 and on all TT-76C/GGC's.

[a] Also applicable to TT-699/GGC.
[b] Also applicable to TT-699A/GGC, TT-699B/GGC and TT-699C/GGC.
[c] Not applicable to TT-699(*)/TG.

CHAPTER 2

INSTALLATION

NOTE: The procedures described in this chapter should be performed by qualified teletypewriter maintenance personnel.

Section I. SERVICE UPON RECEIPT OF EQUIPMENT

2-1. Siting

Selection of a suitable location for the installation of Teletypewriter Set AN/GGC-3(*) or Teletypewriter Reperforator-Transmitter TT-76(*)/GGC requires consideration of the following:

a. Power. A 115- or 230-volt ac power supply capable of providing at least 150 watts of power is required for the operation of the motor and rectifier. If Telegraph Terminal TH-5/TG or other line-terminating device is to be used, the power requirements will have to be increased accordingly.

b. Space Requirement. Provide enough space at the front and sides of the equipment to permit freedom of movement for operating personnel. Allow at least 10 inches at the back of the set for installation and maintenance purposes.

c. Lighting. Provide an adequate lighting arrangement for the operating personnel.

2-2. Unpacking

Note. Teletypewriter Set AN/GGC-3A is packaged in exactly the same manner as the AN/GGC-3A except that the AN/GGC-3A contains a TT-76A/GGC and an FN-108/GGC.

a. Packaging Data.

(1) *Teletypewriter Set AN/GGC-3.* When the AN/GGC-3 is packed for shipment, Teletypewriter Reperforator-Transmitter TT-76/GGC is fastened to Teletypewriter Table FN-52/GGC. This assembly is then placed in Teletypewriter Reperforator-Transmitter Case CY-1110/GGC and the remaining space is used for storage of the removable table legs, technical manuals, chad bin, and running spares. The CY-1110/GGC is then placed in a case liner barrier bag which, in turn, is placed in a wooden shipping container 38⅛ inches long, 31⅞ inches wide, and 26 15/16 inches high. A 3-inch layer of excelsior is placed between the case liner barrier bag and the interior of the wooden shipping container.

(2) *Teletypewriter Set AN/GGC-3A* (fig. 2-1). When the AN/GGC-3A is packed for domestic or export shipment, Teletypewriter Reperforator - Transmitter TT-76A/GGC or the TT-76B/GGC is fastened to the table top of Teletypewriter Table FN-108/GGC. This assembly is then placed in Teletypewriter Reperforator-Transmitter Case CY-110/GGC and the remaining space is used for storage of the removable table legs, chad bin, and running spares. The assembled CY-1110/GGC is placed in a corrugated carton and two technical manuals are secured to the top of the sealed corrugated carton. The corrugated carton is placed in a wooden shipping container 30⅛ by 25¼ by 20 inches. The top is nailed and, on export shipments, secured with steel strapping. The wooden shipping container has an approximate volume of 9 cubic feet and weighs 155 pounds when completely packed.

(3) *Teletypewriter Reperforator-Transmitter TT-76(*)/GGC.* When the TT-76(*)/GGC is shipped, it is mounted on a wooden shipping base (fig. 2-2). The chad bin accessory pack is taped to the top of the transmitter-distributor and contains the chad bin, tape guide, lamp, inking ribbon, spool, and fuses. The complete unit is placed in a corrugated box with folded corrugated end liners each containing two rolls of paper tape. A top liner of folded corrugated fiberboard is placed in the box and rests on the dust cover of the unit. The bench layout template (TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC only) and

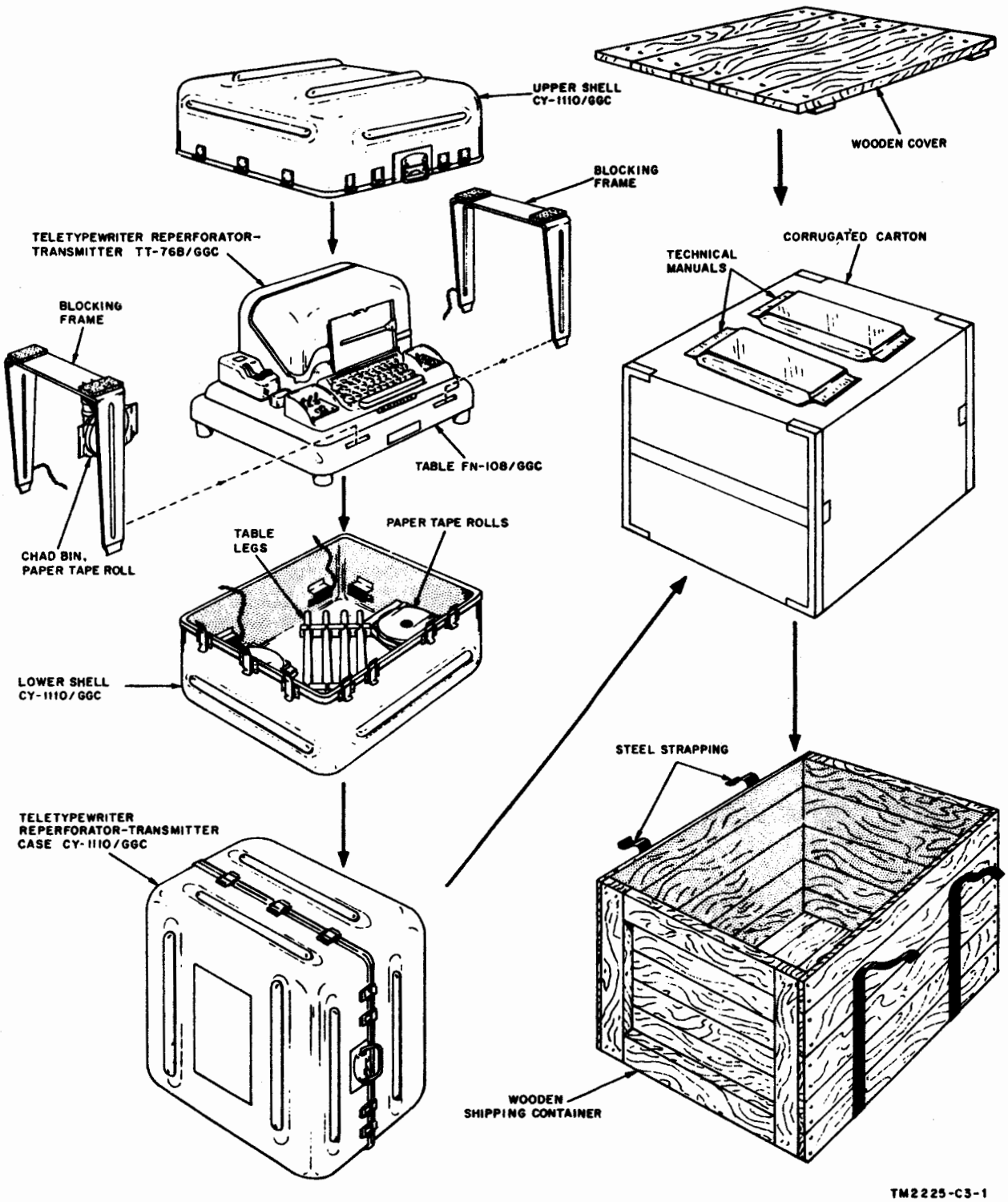


Figure 2-1. Packaging arrangement, Teletypewriter Set AN/GGC-3A.

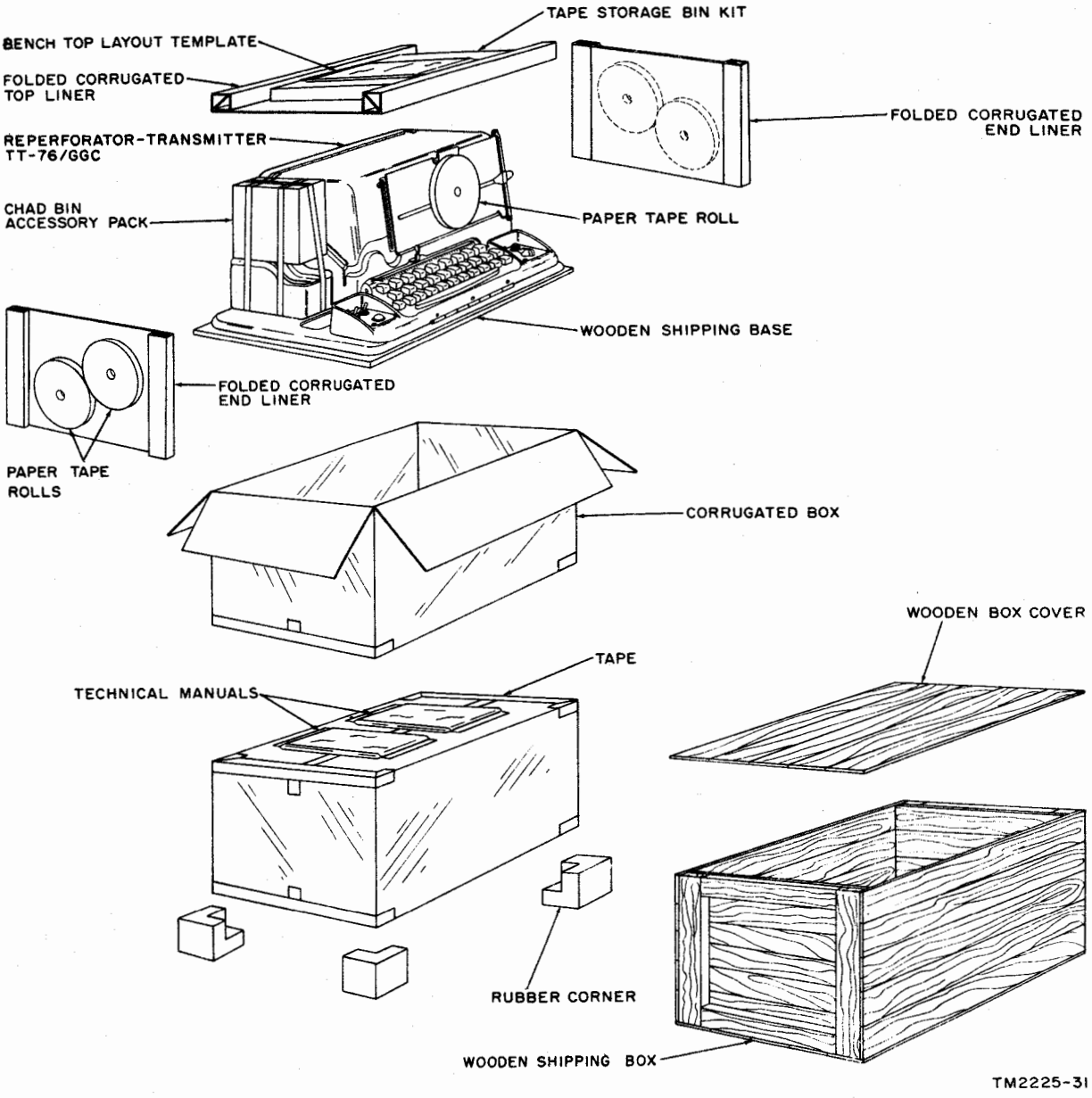


Figure 2-2. Packaging arrangement, Teletypewriter Reperforator-Transmitter TT-76(*)/GGC.

the tape storage bin kit containing the tape storage bin and chad bin mounting accessories are taped between the edges of the folded corrugated top liner. The corrugated box is sealed with tape and is placed in a wooden box with rubber corners installed to reduce shock to the equipment during shipment. Two technical manuals are individually wrapped and taped to the top of the corrugated box. The wooden box cover is nailed securely to the box.

b. Removing Contents.

CAUTION

Be careful when unpacking the equipment. Do not thrust tools into the interior of the shipping container.

(1) *Teletypewriter Set AN/GGC-3.* Unpack the AN/GGC-3 as follows:

(*a*) Cut the steel straps from the wooden shipping container.

(*b*) Remove the top, side, and back sections.

(*c*) Remove the CY-1110/GGC from the wooden shipping container.

(*d*) Release the pressure valves with a pencil or small screwdriver and unfasten the spring-loaded latches on the CY-1110/GGC. Remove the top section.

(*e*) Remove the blocking frames that position the TT-76/GGC and FN-52/GGC during transportation.

(*f*) Remove the TT-76/GGC and FN-52/GGC.

(*g*) Remove the table legs and chad bin from the case.

(*h*) Assemble the CY-1110/GGC and store in a safe place.

(2) *Teletypewriter Set AN/GGC-3A* (fig. 2-1). Unpack the AN/GGC-3A as follows:

(*a*) Cut the steel straps from the wooden shipping container.

(*b*) With a nail puller, remove the nails from the cover and sides.

(*c*) Remove the cover, side, and back sections.

(*d*) Remove the corrugated carton and unfasten the two technical manuals. Remove the CY-1110/GGC.

(*e*) Release the pressure valves with a pencil or small screwdriver and unfasten the spring-loaded latches on the CY-1110/GGC. Remove the top section.

(*f*) Remove the blocking frames that position the reperforator-transmitter and table top during transportation. Remove the chad bin accessory pack from one of the frames.

(*g*) Remove Teletypewriter Reperforator-Transmitter TT-76A/GGC (TT-76B/GGC or TT-76C/GGC) and the table top of the FN-108/GGC.

(*h*) Remove the table legs from the case.

(*i*) Assemble the CY-1110/GGC and store it in a safe place.

(3) *Teletypewriter Reperforator-Transmitter TT-76(*)/GGC* (fig. 2-2). Unpack the TT-76(*)/GGC as follows:

(*a*) Use a nail puller and remove the nails from the wooden box cover.

(*b*) Carefully lift the corrugated box from the wooden shipping box.

(*c*) Remove the technical manuals and open the corrugated box.

(*d*) Remove the folded corrugated top liner.

(*e*) Carefully cut the sealed barrier and remove the equipment from the corrugated box.

(*f*) Remove the nuts and washers that secure the equipment to the wooden shipping base.

(*g*) Cut the tape that secures the chad bin accessory pack to the transmitter-distributor.

(*h*) Remove the contents of the tape storage bin kit, chad bin accessory pack, and the folded corrugated end liners.

(*i*) Save the wooden shipping base for use as a template for drilling mounting holes (TT-76/GGC only).

2-3. 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.

b. See that the equipment is complete as listed on the packing slip. Report all discrepancies in accordance with TM 38-750. Shortage of a minor assembly or part that does not affect proper functioning of the equipment should not prevent use of the equipment.

c. If the equipment has been used or reconditioned, see whether it has been changed by a modification work order (MWO). If the equipment has been modified, the MWO number will appear

on the front panel near the nomenclature plate. Check to see whether the MWO number (if any) and appropriate notations concerning the modification have been entered in the equipment manual.

Note. Current MWO's applicable to the equipment are listed in DA Pam 310-7.

Section II. PREINSTALLATION SERVICES

2–4. Assembly of Components

Note. Teletypewriter Set AN/GGC–3A is assembled in exactly the same manner as the AN/GGC–3 except that the AN/GGC–3A contains either a TT–76A/GGC, TT–76B/GGC, or TT–76C/GGC and an FN–108/GGC.

a. Teletypewriter Set AN/GGC–3.

(1) Place Teletypewriter Reperforator-Transmitter TT–76/GGC and Teletypewriter Table FN–52/GGC (on which it is mounted) on a flat surface. Lift the front of Teletypewriter Table FN–52/GGC until it is almost upright.

(2) Screw the four table legs into the leg mounts on the underside of the table top.

(3) Press the chad bin (fig. 2–6) into its holder under the table and secure it with the wire retainer.

(4) Install the paper tape (para. 3–4*b*) and the inking ribbon (para. 3–4*c*).

b. Teletypewriter Reperforator-Transmitter TT–76(*)/GGC.

(1) Use the paper template (or the wooden base shipping base of TT–76/GGC) and mark the top surface of the table or shelf that will be used to support the unit.

(2) Cut openings in the table or shelf to accommodate the tape storage guide, chad tube, mounting bolts and the chad cup mounting brackets (fig. 2-17).

(3) Secure the TT–76(*)/GGC to the table or shelf with suitable mounting bolts and install the tape guide, tape storage bin TT–76/GGC only), and chad tube retainer with the hardware provided.

(4) Install the paper tape (para. 3–4*b*) and the inking ribbon (para. 3–4*c*).

2–5. Removal and Replacement of Dust Cover

(figs. 3–2 and 3–5)

a. Removal. Remove the dust cover as follows:

(1) Disconnect the grounding straps from the binding posts on the dust cover.

(2) Release the cover latch that is located below the copy holder and raise the dust cover top until it locks in the open position.

(3) Remove the copy light plug from the jack on the power supply and terminal unit.

(4) Remove the dust cover by lifting it straight up off of its rubber mounting grommets.

b. Replacement.

(1) Place the dust cover on the rubber mounting grommets so that the cutouts in the cover are in the groove of the rubber grommet.

(2) Push down on the cover until the cover is seated in the groove of the rubber grommet.

(3) Reverse the procedures described in *a*(1) through (3) above.

2–6. Ground and Power Connections

a. Remove the dust cover (para. 2–5).

b. See that 2-ampere fuses are installed in the fuse holders in the power supply and terminal unit (fig. 2–7) and in the spare fuse clips (fig. 3–4).

(1) TT–76/GGC uses one fuse in the power input circuit.

(2) TT–76A/GGC, TT–76B/GGC, and TT–76C/GGC use two fuses.

Note. All equipments are now supplied to the field with 2-ampere fuses installed. Some equipments are still panel-marked for 1.6-ampere fusing. Disregard the panel markings.

c. Loosen the clamping screw on the power supply and terminal unit which locks the power selector switch, and position the switch to match the supply voltage at the installation site. Tighten the clamping screw.

d. Place the MOTOR, LIGHT, and POWER switches (fig. 3–1) in the OFF position.

e. Connect a wire from the ground post behind the transmitter-distributor to a cold water pipe, ground rod, or similar low resistance ground connection.

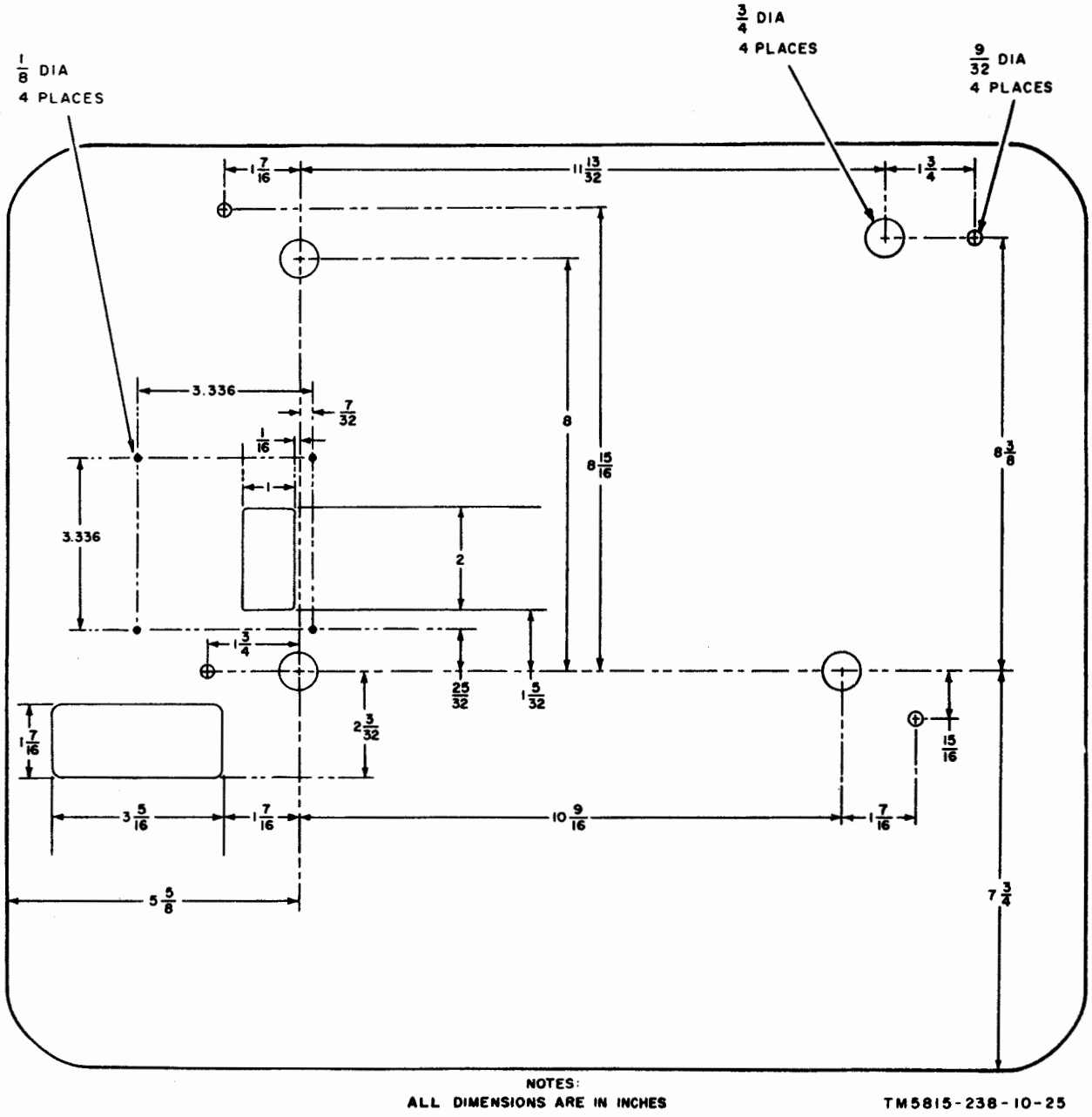


Figure 2–3. Template for mounting TT–76A/GGC, TT–76B/GGC, or TT–76C/GGC.

f. Ground the power supply as follows:

(1) On the TT–76/GGC, connect the braided lead attached to the power cord to a grounded portion of the ac outlet.

(2) On all subsequent models, the power cord is fitted with a 3-pronged plug; the third prong completes the ground connection when the plug is inserted into a mating receptacle. If the available ac outlet will not accommodate the 3-pronged plug, remove the screws that hold the third prong to the plug and turn the prong so that it points in a direction opposite to the other two prongs. Disconnect the ground lead fastened to the third prong and connect it to a grounded portion of the ac outlet.

g. Plug the power cord into the ac outlet.

2-7. Friction Clutches

The reperforator uses four friction clutches. The keyboard-transmitter friction clutch (fig. 2-4), the transmitter-distributor friction clutch (fig. 2-5), the selector camshaft friction clutch, and the function shaft friction clutch. These friction clutches were lubricated and adjusted prior to shipment. However they should be checked for proper lubrication prior to installation into service. If lubrication is required, apply 10 to 15 drops of oil (Federal stock No. 9150-223-4129) around the periphery of each felt washer. Wipe off any excess lubricant with a clean cloth.

2-8. Preliminary Adjustments

a. Checking and Adjusting Motor Speed.

(1) Turn the MOTOR switch to ON.

(2) Remove the 180 vibrations per second (vps) tuning fork (fig. 2-6) from inside the dust cover. Strike the tuning fork gently against the hand to get it into vibration.

(3) View the spots on the rotating target wheel through the vibrating shutter on the end of the tuning fork. If the spots are stationary, no adjustment is neces-

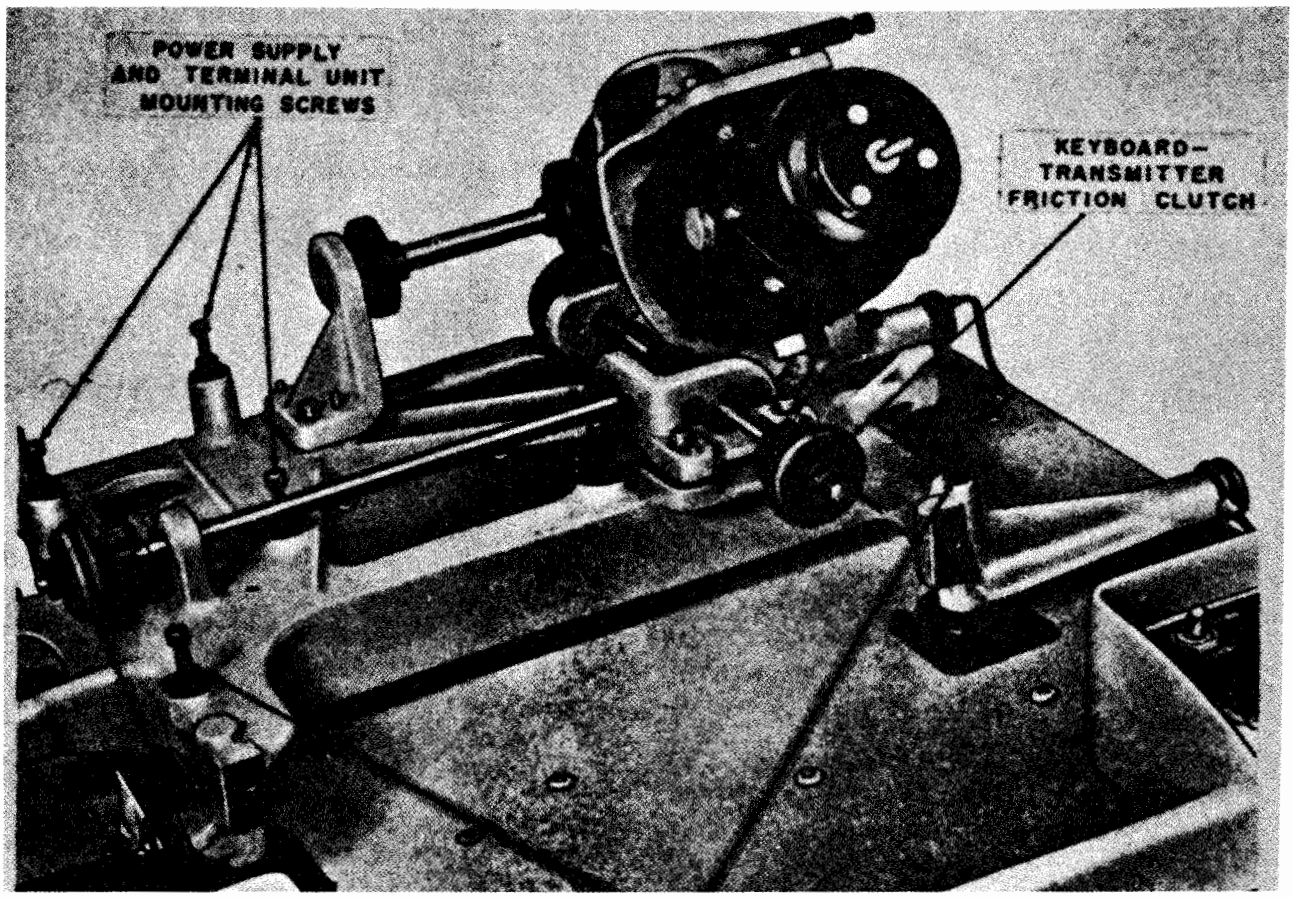


Figure 2-4. Base casting, showing the keyboard-transmitter and transmitter-distributor friction clutches.

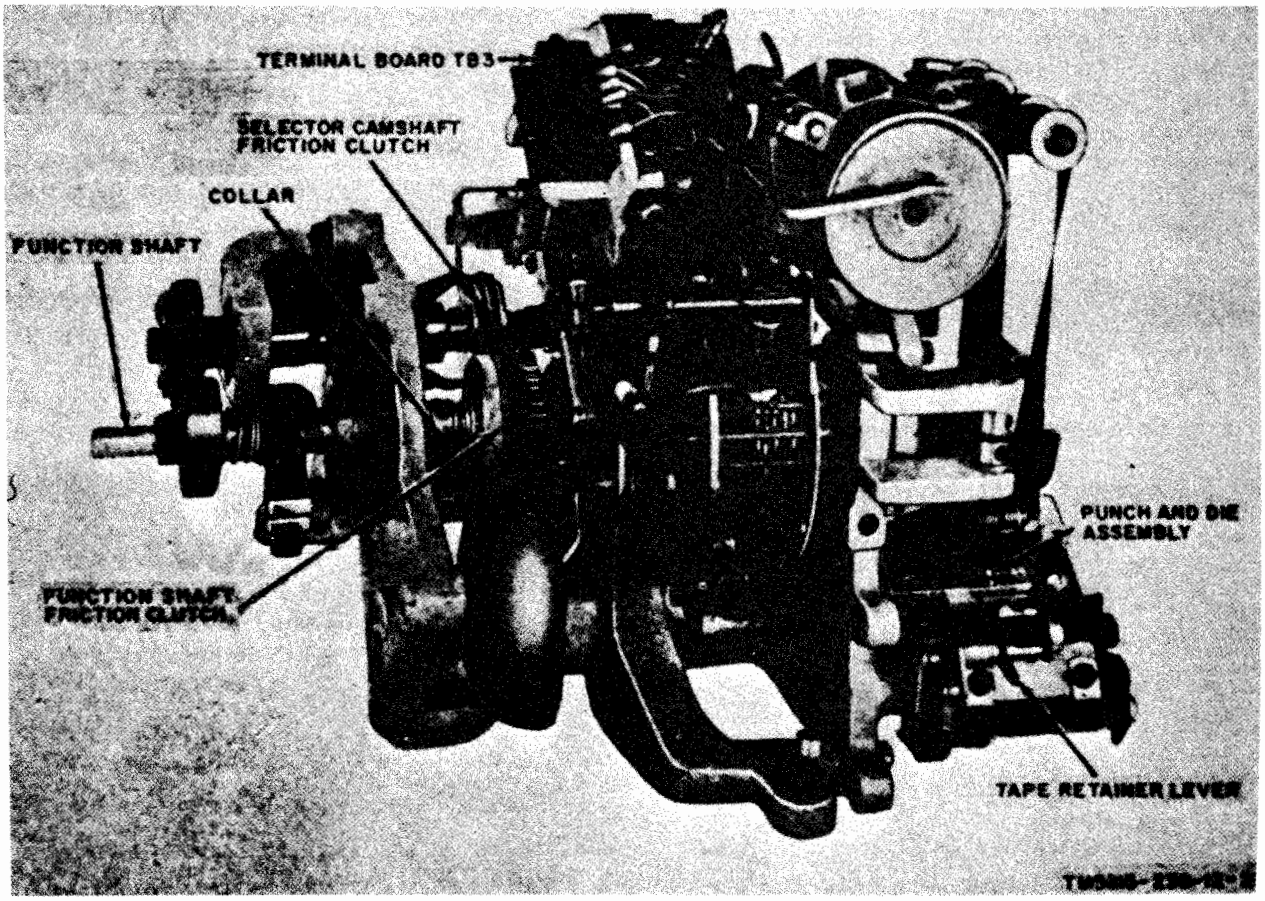


Figure 2–5. Reperforator, showing selector camshaft and function shaft friction clutches.

sary. If the spots are moving clockwise, pull the end of the adjusting worm outward, and hold it until the clockwise motion of the target spots has stopped. If the spots are moving counterclockwise, push the end of the adjusting worm inward until the motion of the target spots has stopped. The motor now is set at its operating speed of 3,600 revolutions per minute (rpm).

(4) Turn the MOTOR switch to OFF.

b. Changing Operating Speed of Reperforator. The operating speed of the reperforator is varied by changing the drive gearset which consists of the worm gear on the motor armature shaft and the meshing driven gear. The equipment was shipped from the factory with a 368.1 operations per minute (opm) 60 words per minute (wpm) gearset installed. A gearset for 600 opm (100 wpm) operation is mounted on the gearcase cover at the right rear of the machine. The gears are identified by the marks stamped into the gears. If necessary, change the gear set so that the operating speed of the reperforator conforms to the operating speed of allied equipment as follows:

Note. If operation at either 404 opm (66 wpm) or 460 opm (75 wpm) is desired, it is necessary to obtain the proper gearsets through the usual supply channels.

(1) Remove the tape reel.
(2) Remove the motor.
(3) Remove the worm gear from the shaft of the motor armature.
(4) Remove the driven gear from the power shaft using a puller.
(5) Install the correct worm gear on the shaft of the motor armature.

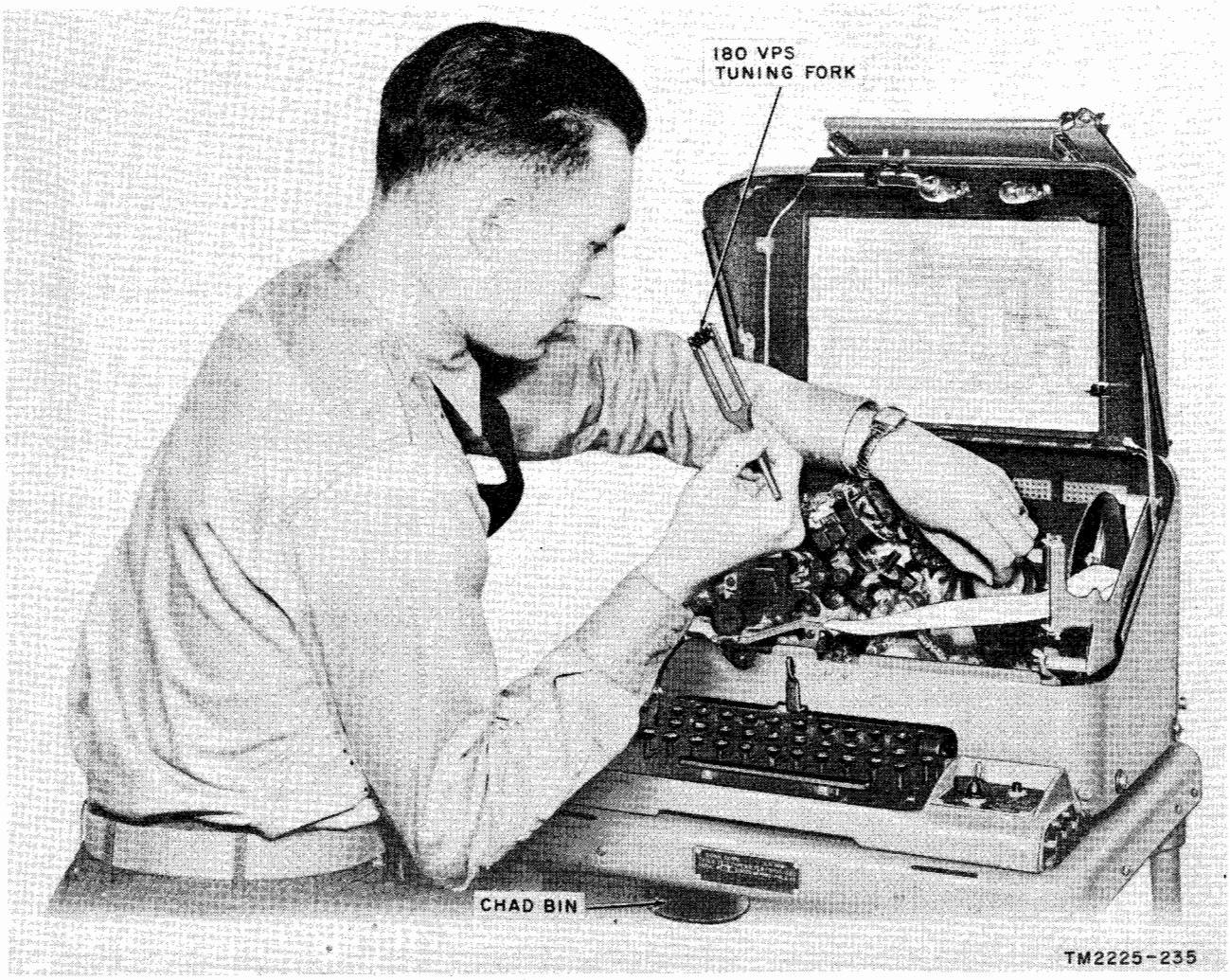


Figure 2-6. Checking motor speed.

(6) Install the correct driven gear on the power shaft.

(7) Install the motor.

(8) Install the tape reel.

c. Bias Potentiometer. (Not applicable to TT-699(*)/GGC.) The bias potentiometer on all equipment except the TT-76/GGC has been adjusted and locked prior to shipment and requires no subsequent adjustment except after a complete overhaul. If the machine does not give the desired range, the potentiometer setting should be checked. Remove shorting bar and connect a milliammeter between the two terminals of the BIAS TEST MA (B, fig. 2-7). Read the current in the bias circuit. The milliammeter should read 12.25 ma if the selector plug is in the 60-ma jack or 8.75 ma if the selector plug is in the 20-ma jack. If the reading does not conform to these values, adjustment by support maintenance personnel is required. Adjust the bias potentiometer (fig. 1-2) on the TT-76/GGC as follows:

(1) Set the KEYBOARD switch to the SEND position and the SELECTOR switch to LOCAL REPUNCH and send continuous R and Y signals from the keyboard-transmitter.

(2) Set the rangefinder dial to 60 and slowly turn the BIAS potentiometer knob to maximum and minimum good copy positions. Note the dial markings at each position.

(3) Set the pointer five points above the midpoint between the readings.

NOTE

This adjustment should be made only when the equipment is operating in a neutral circuit, since the bias windings are not used for polar operation.

d. Adjusting Rangefinder

CAUTION

The rangefinder dial should be moved only when signals are being received in the selector magnet and the selector camshaft is rotating.

(1) Adjust the rangefinder (fig. 1-2) immediately after adjusting the BIAS potentiometer. (TT-76(*)/GGC only.)

(2) Loosen the rangefinder dial lock by turning it counterclockwise.

(2.1) On the TT-699(*)/GGC, set the keyboard switch to SEND and the selector switch to LOCAL REPUNCH.

(3) While receiving RY's, or a test message, rotate the rangefinder dial slowly toward the upper limit of its scale, until errors begin to appear in the printed copy. Stop turning the dial and reverse the direction until no errors appear in the printed copy. Record the dial indication as the upper range limit.

(4) Rotate the range dial slowly toward the lower limit of its scale until errors begin to appear in the printed copy. Reverse the direction until no error occurs and record the dial indication as the lower range limit.

(5) Subtract the lower range reading from the upper range reading to determine the range of devices being tested.

(a) Minimum 70 points of range for 60 wpm operation.

(b) Minimum 60 points of range for 100 wpm operation.

(6) Adjust the rangefinder to the middle of the lower and upper reading. The middle setting is determined by adding the lower and upper reading together and then dividing them by two.

(7) Lock the position by means of the dial lock.

e. Operational Checks.

(1) Perform the operational checks listed in paragraph 3-5*a* through *n*.

(2) Turn the MOTOR, LIGHT, and POWER switches to OFF. The motor should stop, copy light be extinguished, and all local power removed from the reperforator-transmitter.

Section III. SIGNAL CIRCUIT CONNECTIONS (TT-76(*)/GGC)

2-9. General

a. Teletypewriter Set AN/GGC-3(*) or Teletypewriter Reperforator-Transmitter TT-76(*)/GGC provides dc current for operation of the internal local circuits only. Current for external signal line circuits must be supplied by a telegraph switchboard, a line unit, Telegraph Terminal TH-5/TG or other external source.

b. The signal circuits within the reperforator-transmitter are controlled by a SELECTOR switch located to the right of the keyboard. The signal circuits of the transmitter-distributor, the keyboard-transmitter, and the reperforator are terminated in standard 2-conductor jack plugs (fig. 2-7). This arrangement permits operation of the reperforator-transmitter in various sending and receiving combinations.

2-10. Wiring Options

a. Neutral Operation (TT-76/GGC only). The selector magnet is wired for 20-ma neutral operation when the reperforator is delivered by the manufacturer. Wiring options for both 20- and 60-ma neutral operation of the selector magnet are shown in figure 2-8.

b. Neutral Operation (later models). Set the SIGNAL/BIAS switch on the power supply and terminal unit (B, fig. 2-7) to either the 20-ma or 60-ma position, whichever is applicable. Insert the plug from the selector magnet cable into the socket marked 20 or 60, whichever is applicable.

c. Polar Operation. Adapt the reperforator for polar operation as follows:

(1) *Polar receive* (TT-76/GGC only). Remove and tape separately the brown-white wire from terminal 5 and the white wire from terminal 4 of

terminal block TB3 (fig. 2-8).

(2) *Polar receive* (later models). Set the 20-BIAS/OFF-60 switch to the BIAS/OFF setting and insert the plug from the selector magnet cable into the 60-ma socket.

(3) *Polar send* (TT-76(*)/GGC). The transmitter-distributor and keyboard-transmitter may be arranged to send polar signals by making wiring changes (*(a)* and *(b)* below) at terminal block TB2 of TT-76/GGC) or TB1 of TT-76A/GGC, TT-76B/GGC, or TT-76C/GGC) and by adding to the circuit the following items that are not supplied with the reperforator-transmitter: two 220-ohm wire wound resistors, one 7,000-ohm center tapped resistor (voltage divider) and a power source capable of supplying 120 volts dc at 200 ma. A typical 30-ma polar send circuit using the above items is shown in figure 2-9.

(a) Transmitter-distributor. Remove the gray plug and cord from terminals 6 and 7 of the terminal block. Connect marking battery to terminal 7 and spacing battery to terminal 8. Connect

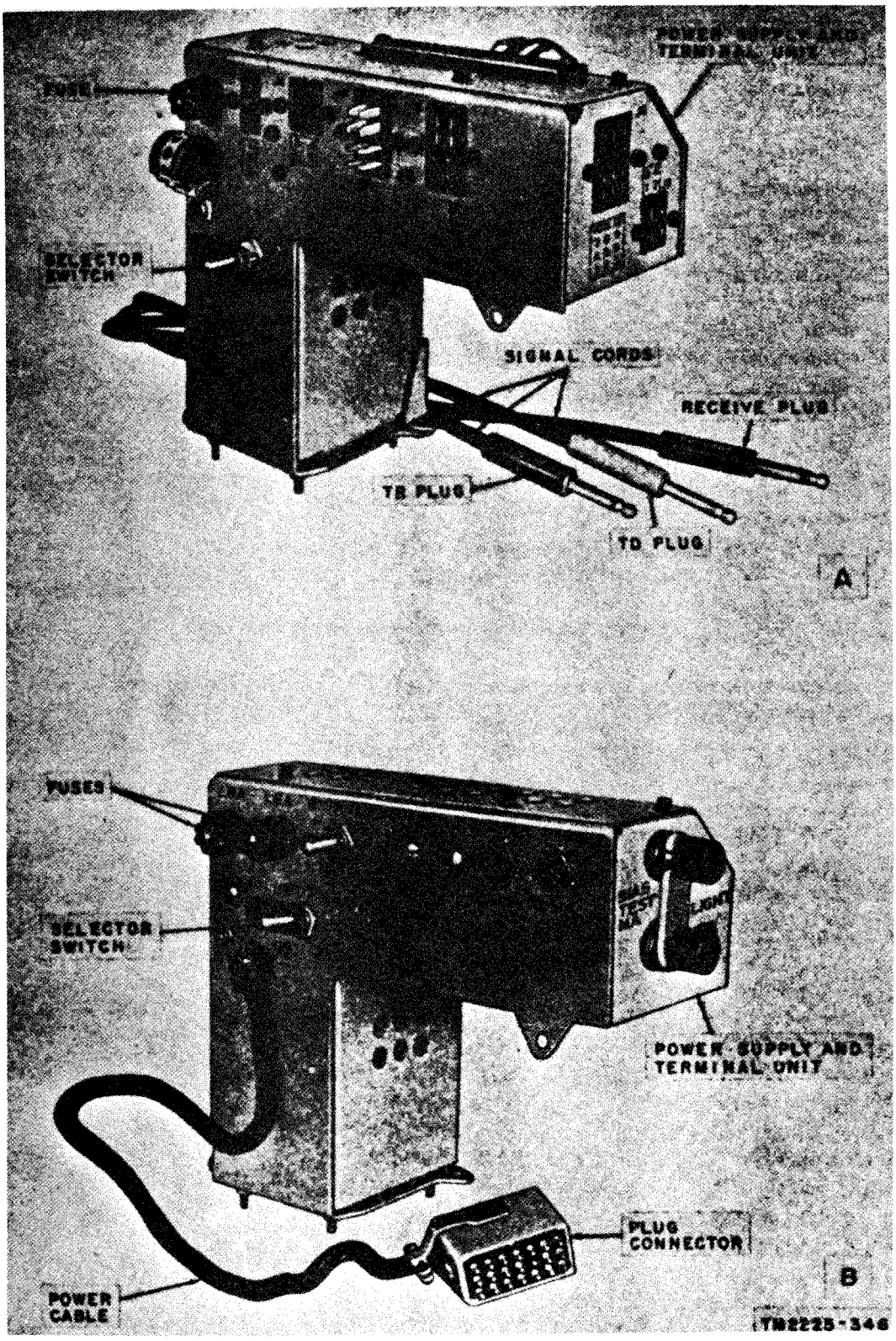


Figure 2-7. Power supply and terminal unit.

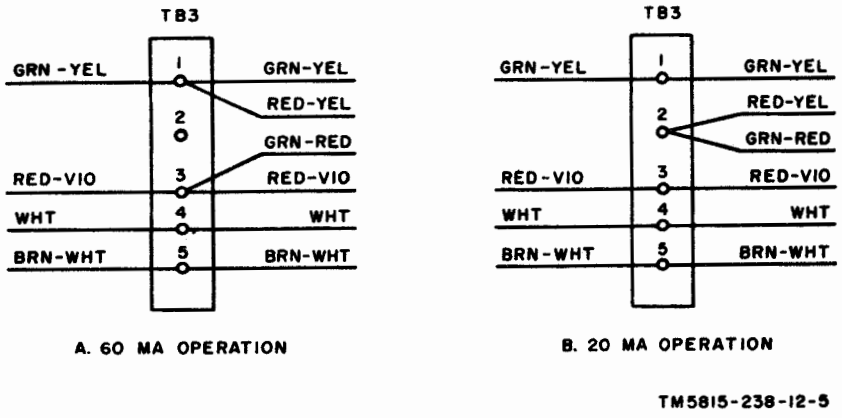


Figure 2-8. Wiring options at TB-3 of TT-76/GGC.

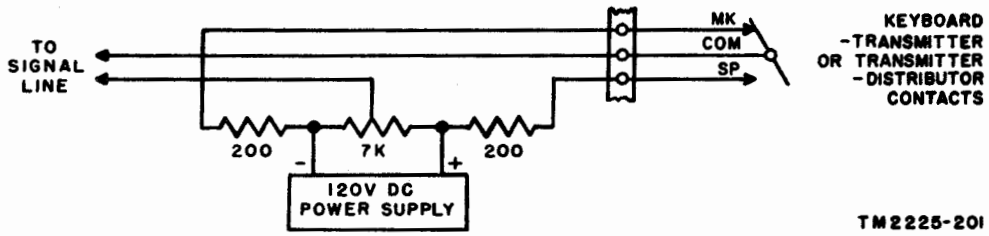


Figure 2-9. Typical wiring arrangement for polar sending.

one wire of the signal line to terminal 6 and connect the second signal line wire to the midpoint of the 7,000-ohm resistor.

(*b*) *Keyboard-transmitter.* Remove the black plug and cord from terminals 1 and 2 of the terminal block. Connect marking battery to terminal 1 and spacing battery to terminal 3. Connect one wire of the signal line to terminal 2 and connect the second signal line wire to the midpoint of the 7,000-ohm resistor.

2-11. Installation Connections

This paragraph includes instructions for connecting the reperforator-transmitter for five different operating combinations. The operational capabilities of each arrangement are also described.

a. Send Only and Local Preparation of Tape. This arrangement provides facilities for preparing a perforated and printed tape locally, using the keyboard-transmitter and reperforator, and for simultaneous transmission to the line from the transmitter-distributor, using a message tape (fig. 2-10).

(1) Set the SELECTOR switch to position 2 (TD SEND LOCAL PUNCH).

(2) Insert the gray plug of the transmitter-distributor in the SEND jack of the line terminating device.

(3) Do not use the red and black plugs.

b. Full-Duplex Operation (fig. 2-11). This arrangement provides facilities for receiving printed and perforated tape from one line and

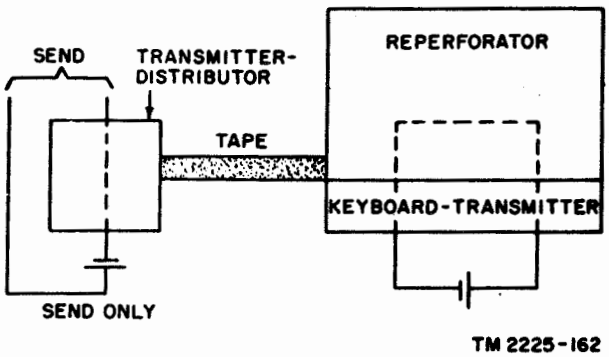


Figure 2-10. Send only with simultaneous local preparation of tape.

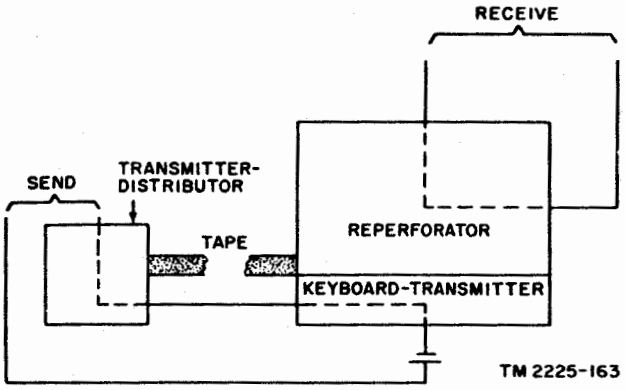


Figure 2–11. Full-duplex operation.

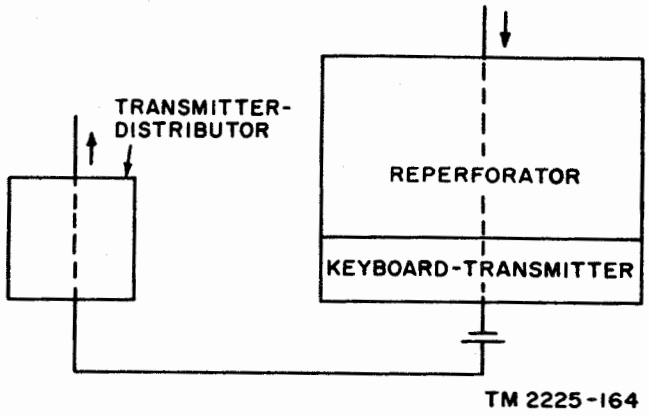


Figure 2–12. Half-duplex operation.

simultaneous sending from the keyboard-transmitter or transmitter-distributor to a second line.

(1) Set the SELECTOR switch to position 1 (TD SEND TR SEND RECEIVE).
(2) Insert the red plug of the reperforator into the REC jack in the line terminating device of one line.
(3) Insert the black and gray plugs into the SEND jacks of the line terminating device of the second line.

c. Half-Duplex Operation (fig. 2–12). This arrangement provides facilities for sending to the line from the keyboard-transmitter or transmitter-distributor and for receiving printed and perforated tape from the same line on the reperforator, but not simultaneously. Home copy is recorded on all transmissions.

(1) Set the SELECTOR switch to position 1 (TD SEND TR SEND RECEIVE).
(2) Insert the red, black, and gray plugs into the SEND and REC jacks of the line terminating device.

d. One-Way Operation (Receive Only) (fig. 2–13). This arrangement provides facilities for receiving a printed and perforated tape from a signal line. No transmission is possible. This type of operation, although possible, is not normally used.

(1) Set the SELECTOR switch to position 1 (TD SEND TR SEND RECEIVE).
(2) Insert the red plug into the REC jack of the line terminating device.
(3) Do not use the black and gray plugs in this arrangement.

e. Half-Duplex and Send Only (fig. 2–14). This arrangement provides facilities for sending

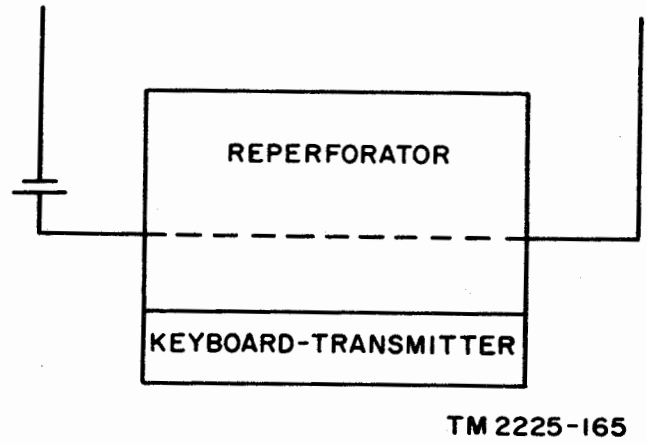


Figure 2–13. One-way operation (receive only).

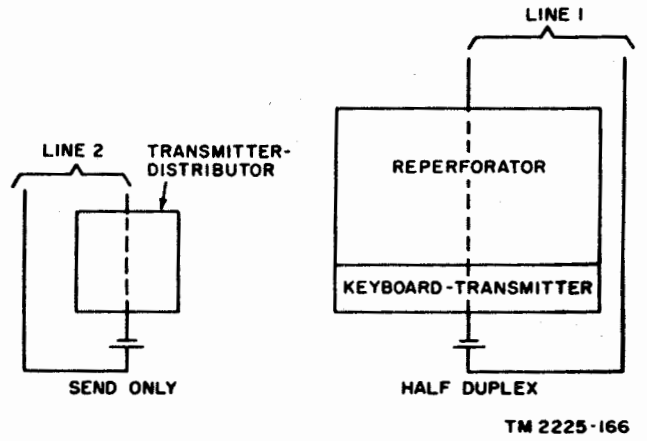


Figure 2–14. Half-duplex and send only operation.

from the keyboard-transmitter to a line or receiving from the same line (making perforated and printed tape in either case) and transmitting another message simultaneously to a second line from the transmitter-distributor.

(1) Set the SELECTOR switch to position 1 (TD SEND TR SEND RESEIVE).

(2) Insert the red and black plugs in the REC and SEND jacks of the half-duplex line.

(3) Insert the gray plug into the SEND jack of the send only line.

2-12. Circuit Lineup

After the reperforator-transmitter is installed in one of the circuit arrangements described in paragraph 2-11, readjust the BIAS potentiometer for the TT-76/GGC (para. 2-8*c*). The potentiometer on the TT-76A/GGC, TT-76B/GGC, or TT-76C/GGC has been set and locked at the factory and requires no subsequent adjustment except after overhaul. Adjust the rangefinder (para. 2-8*d*). Replace the dust cover. The reperforator-transmitter is now ready to be turned over to the operator for traffic.

2-13. External Control of TD Clutch Magnet

To permit external control of the clutch magnet when the TT-76(*)/GGC is used in conjunction with communication security equipment, rewire the associated terminal board of the transmitter-distributors as given in *a* through *c* below.

Notes. 1. When power external to the transmitter-distributor is used, it may be necessary to install the 20,000-ohm, 7-watt, variable resistor in series with the clutch magnet to reduce the current to 20 milliamperes.

Note 2. If internal power (available at terminals 4 and 5 of the transmitter-distributor terminal board (all models)) is used to actuate the clutch magnet, connect the control device in series between terminals 4 and 7 and strap terminals 5 and 8.

Note. 3. On some equipments, the color coding of the leads may not be the same as stated in the following step by step procedure or as shown in the illustrations. Where such conditions exist, determine which leads must be changed by locating their originating and terminating points within the transmitter-distributor.

a. Removal of Front Plate and Outside Cover of Transmitter-Distributors (All Models).

(1) Remove the two screws, lockwashers, and bushings which hold the front plate to the transmitter-distributor frame; remove the front plate.

(2) Ease the outside cover to the left side, and release the studs on the cover from the retaining holes at the rear of the transmitter-distributor; remove the outside cover.

b. Teletypewriter Reperforator-Transmitter TT-76/GGC.

(1) Remove the jumper connected between terminals 4 and 6 on terminal board TB1 of the transmitter-distributor (A, fig. 2-15).

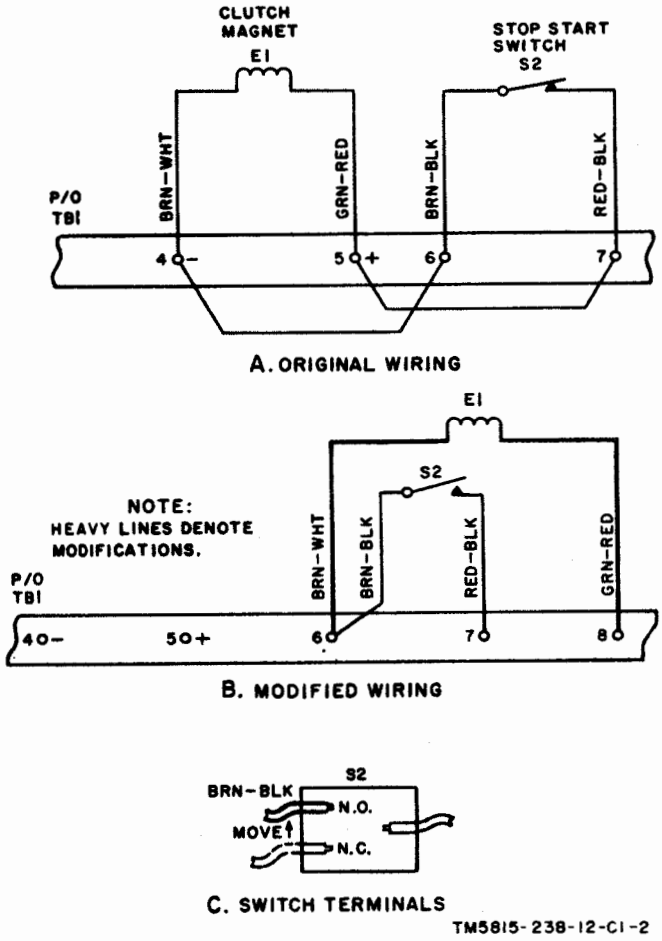


Figure 2-15. Original and modified terminal board wiring of transmitter-distributor of TT-76/GGC.

(2) Remove the jumper connected between terminals 5 and 7 on terminal board TB1 of the transmitter-distributor (A, fig. 2-15).

(3) Locate the brown-white (brn -wht) lead connected between terminal 4 of the terminal board and clutch magnet E1 (A, fig. 2-15).

(4) Remove the end of the lead connected to terminal 4, and connect it to the rear of terminal 6 on the terminal board (B, fig. 2-15).

(5) Locate the green-red (grn-red) lead connected between terminal 5 of the terminal board and clutch magnet E1 (A, fig. 2-15).

(6) Remove the end of the lead connected to terminal 5, and connect it to the rear of terminal 8 on the terminal board (B, fig. 2-15).

(7) Remove the blank terminal lug from the normally open (N.O.) contact terminal of stop-start switch S2 (C, fig. 2-15).

(8) Locate the brown-black (brn-blk) lead connected between terminal 6 on the terminal board and the normally closed (N.C.) contact terminal on stop-start switch S2 (A and C, fig. 2-15).

(9) Remove the end of the lead connected to the normally closed contact terminal of the switch, and connect it to the normally open contact terminal of the switch (C, fig. 2-15).

(10) Install the blank terminal lug (removed from the normally open contact terminal of the switch in (7) above) on the normally closed contact terminal of the switch.

(11) From the rear of the TT-76/GGC, route the cable from the associated COMSEC equipment between the transmitter-distributor and the reperforator-transmitter, through the tunnel at the bottom-center of the transmitter-distributor, under the cable that is connected to the stop-start switch. Bring the cable leads to the front of terminals 7 and 8 on the terminal board. Connect the positive side of the external power source to terminal 8, and connect the external control device in series with the negative side of the power source and terminal 7.

(12) Test across terminals 7 and 8 of the terminal board to make sure the stop-start switch functions properly (circuit completed across terminals 7 and 8 when START-STOP lever is at START).

(13) Check the overall performance of the equipment.

(14) Attach the outside cover to the transmitter-distributor.

(15) Fasten the front plate to the transmitter-distributor frame with the two original screws, lockwashers, and bushings.

c. Modification of Teletypewriter Reperforator-Transmitter TT-76A/GGC and TT-76B/GGC.

(1) Locate the brn-wht and the brn-blk leads connected between terminal 4 on the rear of terminal board TB5 and clutch magnet L1 and start-stop switch S5, respectively (A, fig. 2-16).

(2) Remove the ends of the brn-wht and the brn-blk leads connected to terminal 4, and connect them to the rear of terminal 6 on the terminal board (B, fig. 2-16).

(3) Locate the red-blk lead connected between terminal 5 of the terminal board and start-stop switch S5 (A, fig. 2-16).

(4) Remove the end of the red-blk lead connected to terminal 5, and connect it to the rear of terminal 7 on the terminal board (B, fig. 2-16).

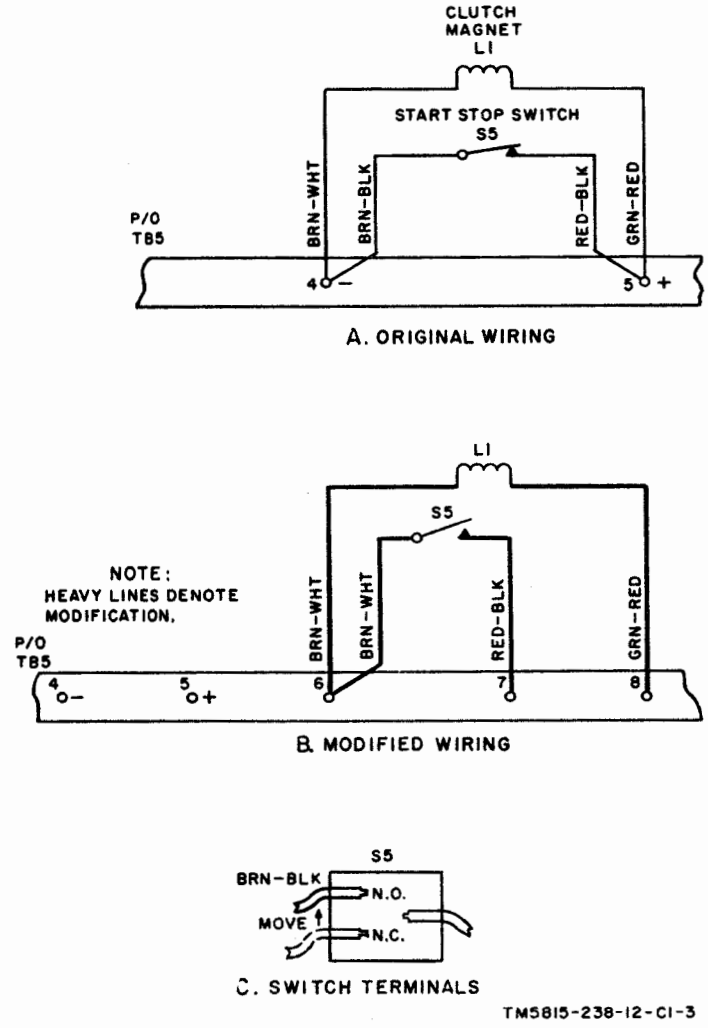


Figure 2-16. Original and modified terminal board wiring of transmitter-distributor for TT-76A/GGC and TT-76B/GGC.

(5) Locate the grn-red lead connected between terminal 5 and clutch magnet L1 (A, fig. 2-16).

(6) Remove the end of the grn-red lead connected to terminal 5, and connect it to the rear of terminal 8 on the terminal board (B, fig. 2-16).

(7) Remove the blank terminal lug from the normally open contact terminal of start-stop switch S5 (C, fig. 2-16).

(8) Remove the end of the brn-blk lead connected to the normally closed contact terminal of start-stop switch S5, and connect it to the normally

open contact terminal of the switch (C, fig. 2-16).

(9) Install the blank terminal lug (removed from the normally open contact terminal of the switch in (7) above) on the normally closed contact terminal of the switch.

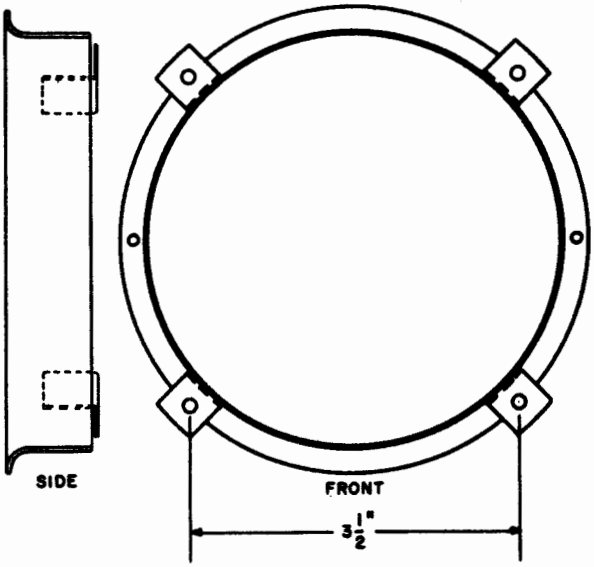
(10) From the rear of the reperforator-transmitter, route the cable from the associated COMSEC equipment between the transmitter-distributor and the reperforator-transmitter, through the tunnel at the bottom-center of the transmitter-distributor, under the cable that is connected to the start-stop switch and bring the cable leads to the front of terminals 7 and 8 on the terminal board. Connect the positive side of the external power source to terminal 8, and connect the external control device in series with the negative side of the power source and terminal 7.

(11) Test across terminals 7 and 8 of the terminal board to make sure the start-stop switch functions properly (*b*(12) above).

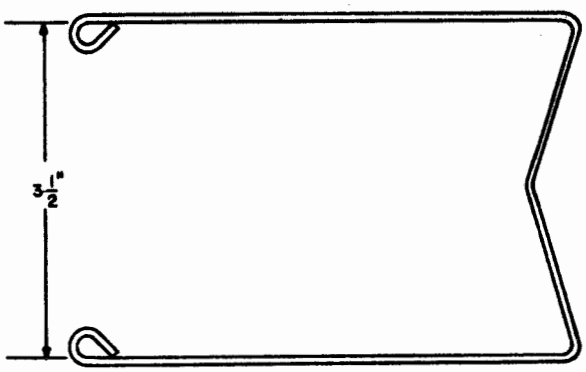
(12) Check the overall performance of the equipment.

(13) Attach the outside cover to the transmitter-distributor.

(14) Fasten the front plate to the transmitter-distributor frame using the two original screws, lockwashers, and bushings.



A. CHAD BOX HOLDER ASSEMBLY.



B. CHAD BIN CLIP.

TM5815-238-12-C1-1

Figure 2-17. Chad bin mounting assembly.

Section IV. SIGNAL CIRCUIT CONNECTIONS (TT-699(*) GGC)

2-14. General

a. Teletypewriter Set AN/GGC-53(*) or Teletypewriter Reperforator-Transmitter TT-699(*)/GGC does not require an external current source.

b. The signal circuits within the reperforator-transmitter are controlled by a SELECTOR switch located to the right of the keyboard. The signal circuits of the transmitter-distributor, the keyboard transmitter and the reperforator can be connected to external signal lines at terminals 5 and 6 and terminals 8 and 9 of A1TB-1 (fig. 2-18). This arrangement permits operation of the reperforator-transmitter in various sending and receiving combinations.

2-15. Wiring

Teletypewriter Reperforator-Transmitter TT-699(*)/GGC is capable of 6-volt polar operation only. No internal wiring changes is required.

2-16. Installation Connections

The connections for POLAR, full duplex operation is shown in figure 2-19. At each end connect the sending signal line to terminals 5 and 6 of A1TB-1 and the receiving line to terminals 8 and 9. The system connections should have terminals 5 and 6 at one end connected respectively to terminals 8 and 9 at the other end. Typical operational configurations are as follows:

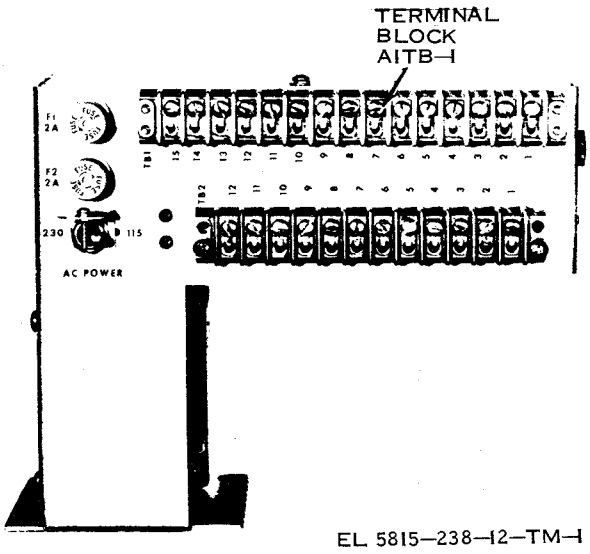


Figure 2-18. Terminal box assembly TT-699(*)/GGC.

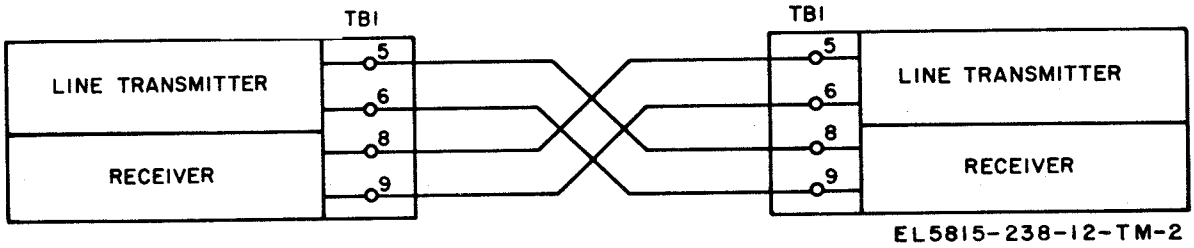
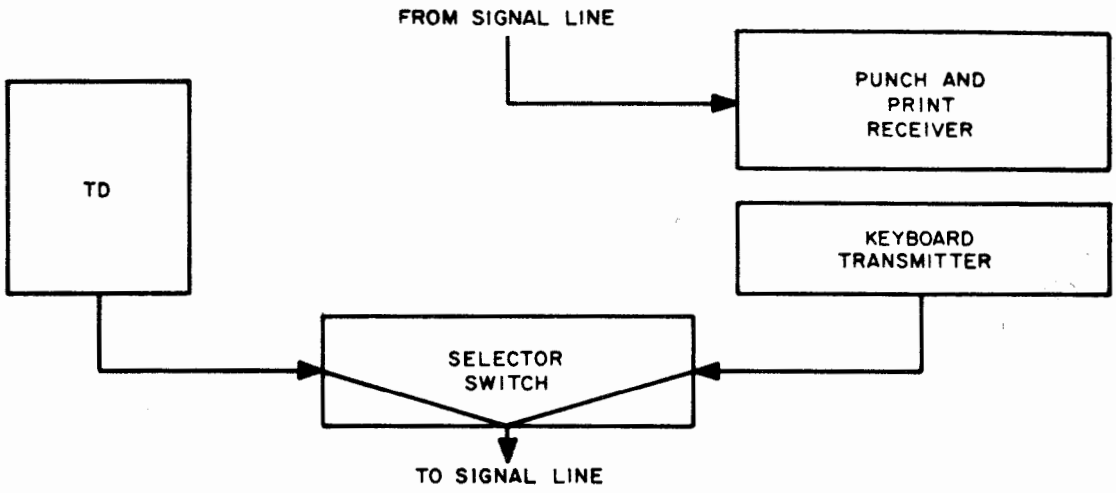
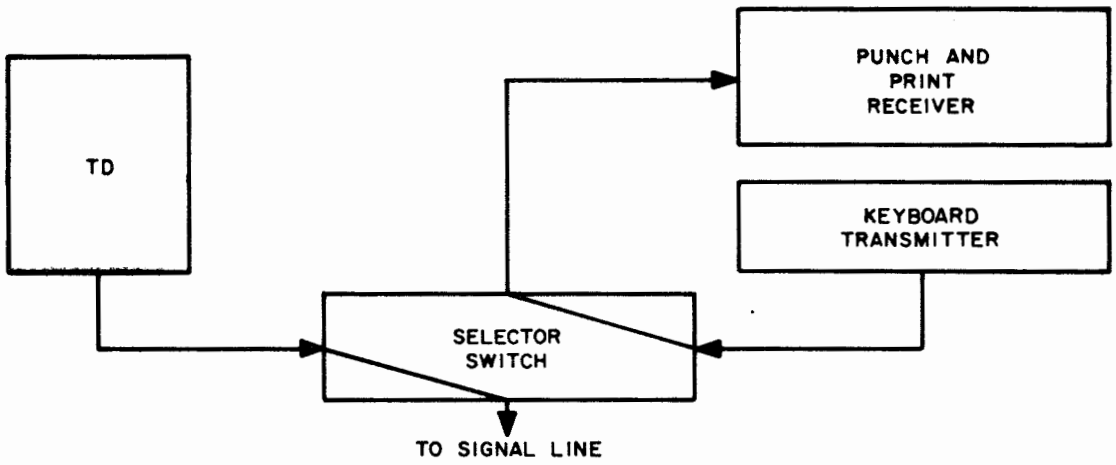


Figure 2-19. Signal line connection, full-duplex operation.

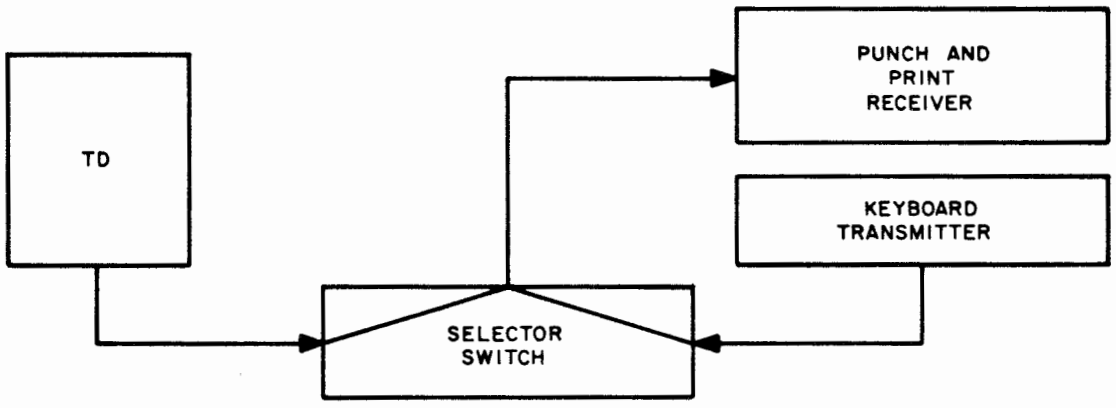
a. Full-Duplex Operation (A, fig. 2-20). Set the SELECTOR switch to 1 (TD SEND TR SEND RECEIVE). This selection provides for receiving printed and perforated tape from one line and simultaneous sending from the keyboard-transmitter or transmitter-distributor to a second line.



A. TD OR KB SEND AND RECEIVE



B. TD SEND AND LOCAL PUNCH



C. LOCAL PUNCH OR TEST EL5815-238-12-TM-3

Figure 2-20. Typical uses of reperforator-transmitter, block diagram.

b. Send Only and Local Preparation of Tape (B, fig. 2-20). Set the SELECTOR switch to 2 (TD SEND LOCAL PUNCH). This selection provides for preparing a perforated and printed tape locally, using the keyboard-transmitter and reperforator, and for simultaneous transmission to the line from the transmitter-distributor, using a message tape.

c. Local Repunch (C, fig. 2-20). Set the SELECTOR switch to 3 (LOCAL PUNCH). This selection provides for local preparation of tape or for local testing the set.

2-17. Final Adjustment

Set the power and motor switches to ON and have the distant station send alternate R and Y test signals. While receiving the test signals, determine the high and low operating limits with the rangefinder dial and set the dial midway between the high and low readings.

CHAPTER 3

OPERATION

Section I. CONTROLS

3-1. Keyboard-Transmitter and Reperforator Controls
(fig. 3-1 and 3-2)

The following chart and the chart in paragraph 3-2 list the various controls and switches used in the operation of Teletypewriter Sets AN/GGC-3(*)/GGC, AN/GGC-53(*)/GGC, Teletypewriter Reperforator-Transmitter TT-76(*)/GGC and Teletypewriter Reperforator-Transmitter TT-669(*)/GGC. The operator must become familiar with the location and function of each control before attempting to operate the machine.

Control	Location	Function
POWER switch	In left side of keyboard guard assembly	ON position connects ac input to set. OFF position disconnects ac input to set.
MOTOR switch	In left side of keyboard guard assembly	ON position connects ac power to the motor. OFF position disconnects ac power from the motor.
BREAK switch (TT-76(*)/GGC)	In right side of keyboard guard assembly.	Push-button switch. When it is depressed, opens signal circuit. When released, closes signal line circuit.
BREAK switch (TT-699(*)/GGC	In right side of keyboard guard assembly.	Push-button switch. When it is depressed, opens keyboard-transmitter signal circuit. When released, closes keyboard-transmitter signal circuit.
KEYBOARD switch	In right side of keyboard guard assembly.	SEND position permits keyboard transmission. LOCK position prevents keyboard transmission.
LIGHT switch	In left side of keyboard guard assembly.	ON position lights the copy light. OFF position extinguishes the copy light.
TD, TR, and REC jacks [a]	In right side of keyboard guard assembly.	Permit supervisory or monitoring equipment to be connected in series with transmitter-distributor, reperforator or keyboard-transmitter.
Manual tape feed-out lever	Center above keyboard	Allows tape feeding when no messages are being received.
Backspace lever	Below type wheel	Permits manual backspacing of tape to correct errors in tape.
CAR. RET. key	Extreme right of the middle row of keys (fig. 2-13).	Returns character counter to zero. Returns carriage on page printing machine in circuit to the left margin.
LINE FEED key	Second key from the right in the bottom row of keys.	Causes page-printing machines in the circuit to feed paper.

Control	Location	Function
SELECTOR switch	In right side of keyboard guard assembly.	1. TD SEND TR SEND RECEIVE: Arranges the set to send to the signal line from the transmitter-distributor and keyboard-transmitter and receive from the line on the reperforator. 2. TD SEND LOCAL PUNCH: Permits sending to the line from the transmitter-distributor while a local message is being prepared on the keyboard-transmitter and the reperforator. 3. LOCAL REPUNCH (TT-76(*)/GGC): Places the transmitter-distributor, keyboard-transmitter and the receiving portion of the reperforator in series with each other, electrically, for local preparation of tape, or for local testing the set. 4. LOCAL REPUNCH (TT-699(*)/GGC): Places the line transmitter and receiving portion of reperforator in parallel with each other, electrically, for local preparation of tape, or for local testing the set.
LTRS key	Third key from the right in the bottom row of keys.	Position type wheel mechanism to print lower case characters.
FIGS key	First key from the left in the bottom row of keys.	Positions the type wheel mechanism to print upper case characters.
BELL key (upper case S)	Second key from the right in the middle row of keys.	Rings the signal bell.
REPEAT key	First key from the right in the top row of keys.	Repeats the last character or space, sent from the machine for as long as the two keys are held depressed.
SPACE bar	Forward of the keylevers	Provides for spacing between letters, numerals, and symbols.

[a]Not applicable to TT-699(*)/GGC.

3-2. Transmitter-Distributor Controls (fig. 3-3).

The following chart lists the controls and switches used to operate the transmitter-distributor.

Control	Location	Function
STOP-START lever	In left front side of the transmitter-distributor cover.	START position allows a message to be transmitted from the transmitter-distributor. STOP position stops transmission from the transmitter-distributor. FEED RETRACT position depresses feed pins and permits a tape to be inserted into the transmitter-distributor.

Control	Location	Function
Tight-tape lever	In front of transmitter-distributor	When tape becomes tight, lever stops transmission. Slack in tape allows transmitter-distributor to transmit.
Tape-out lever	Under tape cover	When the end of the tape is reached, the lever is permitted to rise and stop the transmitter-distributor.

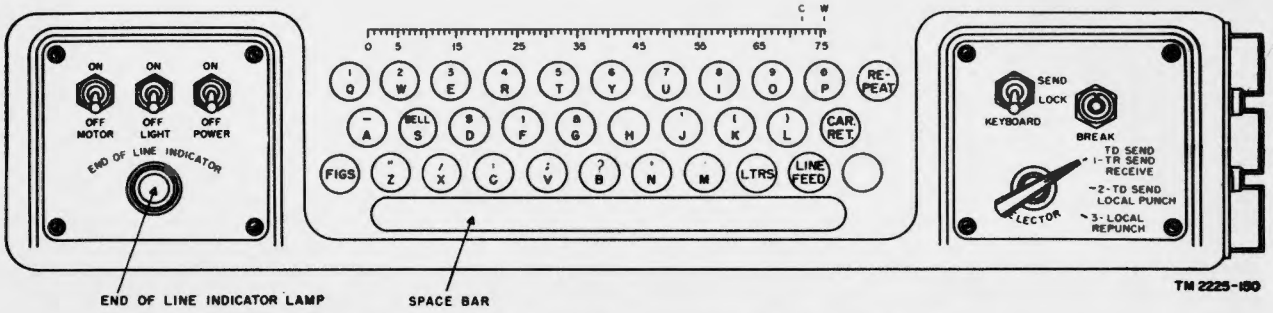


Figure 3-1. Typical keyboard-transmitter and keyboard guard.

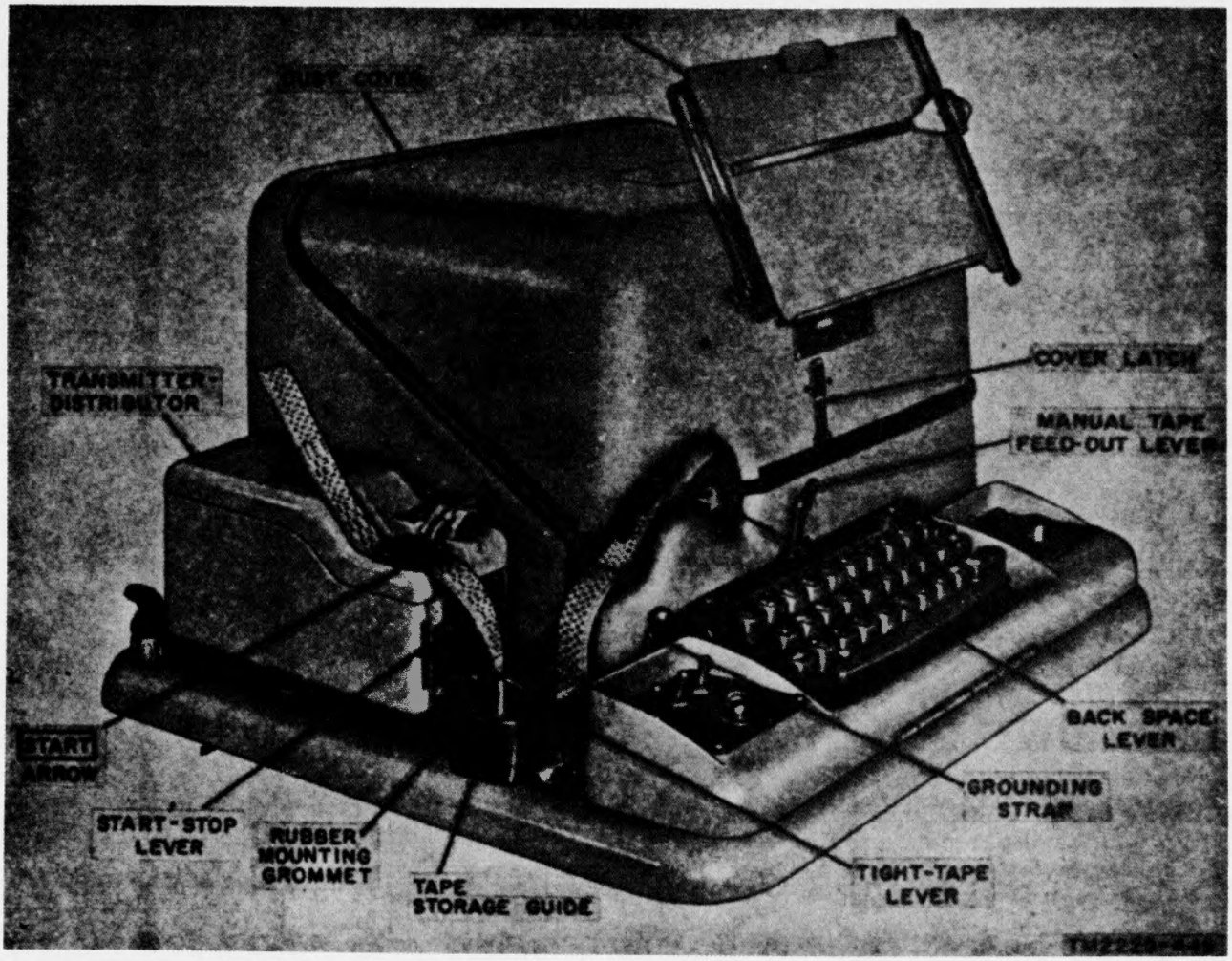


Figure 3-2. Teletypewriter Reperforator-Transmitter TT-76A/GGC.

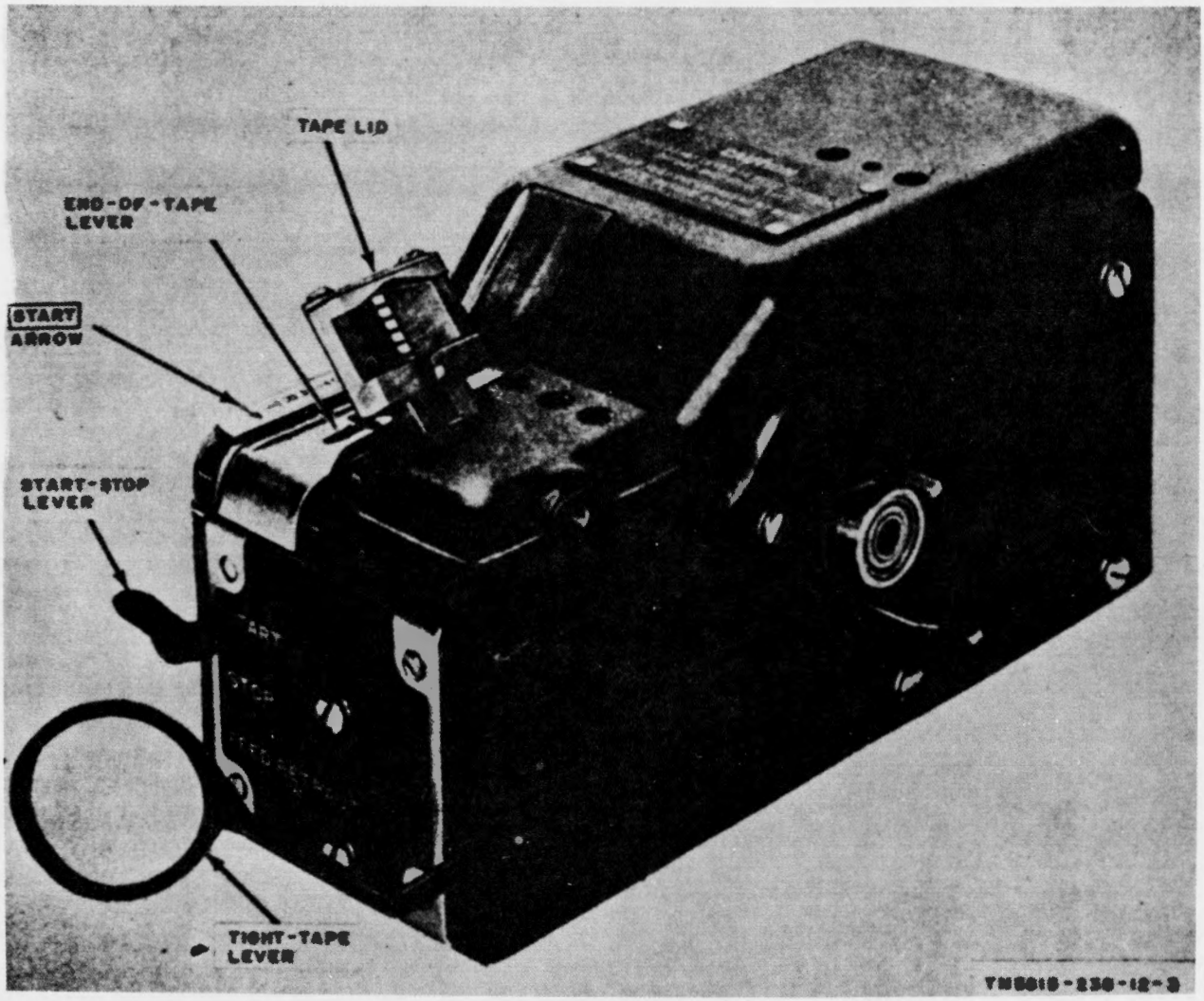


Figure 3-3. Transmitter-distributor controls.

3-3. Warning Devices

(figs. 3-1 and 3-2).

The following devices are used to alert the operator to certain operating conditions.

Control	Location	Function
END OF LINE INDICATOR lamp.	In the left side of the keyboard guard	Visually warns the operator that the end of a line of typing is near.
Warning bell	Between the keyboard-transmitter and the reperforator.	Audibly warns the operator that the end of a line of typing is near.
Character counter	Above the top row of keys	Indicates the number of code groups perforated in the tape since the CAR. RET. key was last depressed.
Tape-alarm buzzer	Behind the tape reel	Audibly indicates diminishing supply of tape.
Signal bell	Mounted on the reperforator	Signals the operator. Bell will ring when the machine is in the figures position and the S code group is received or sent.

Section II. OPERATING PROCEDURE

Note. At the beginning of each operating day, the operator of the reperforator-transmitter should check it as described in paragraphs 3-4 through 3-6.

3-4. Preparation for Starting

a. Be sure the power cord is inserted in the power outlet and is properly grounded.

b. Check for the presence of sufficient paper tape. If the paper tape supply is low, install new paper tape as follows:

(1) *TT-76/GGC* (fig. 3-4).

(*a*) Push the reel support latch and raise the outer reel support arm.

(*b*) Move the tape-out alarm level away from the reel hub; place the roll of paper tape on the hub so that the tape feeds from the rear to the front over the top of the paper tape roll. Release the tape-out alarm lever so that the upper end is against the roll of paper tape.

(*c*) Swing the outer reel support arm down to the latched position, and thread the end of the paper tape around the guide roller.

(*d*) Feed the paper tape into the tape chute; pass it under the type wheel and into the slot in the punch and die assembly.

(*e*) Press down on the tape retainer lever and feed the paper tape under the roller. Feed out enough paper tape so that it will extend through the opening in the dust cover when the dust cover is closed.

(2) *TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC* (fig. 3-5).

(*a*) Lift straight up on the tape reel assembly to remove it from the reperforator-transmitter.

(*b*) Shut off the tape-alarm buzzer, by pivoting the tape-alarm lever counterclockwise until it is locked in place by the tape-alarm level latch.

(*c*) Press the release plunger and turn the tape roll retaining plate counterclockwise to release the tape roll retaining plate from the reel hub; remove the tape roll retaining plate and the core from the old paper tape roll.

(*d*) Position the new paper tape roll on the reel hub so that the paper tape feeds from the rear of the front over the top of the paper tape roll. Position the tape roll retaining plate on the reel hub. Apply slight pressure on the tape roll retaining plate and turn it clockwise until it engages the projections on the reel hub and the release plunger engages the hole in the tape roll retaining plate.

(*e*) Position the assembled tape reel assembly and the paper tape roll on the re-

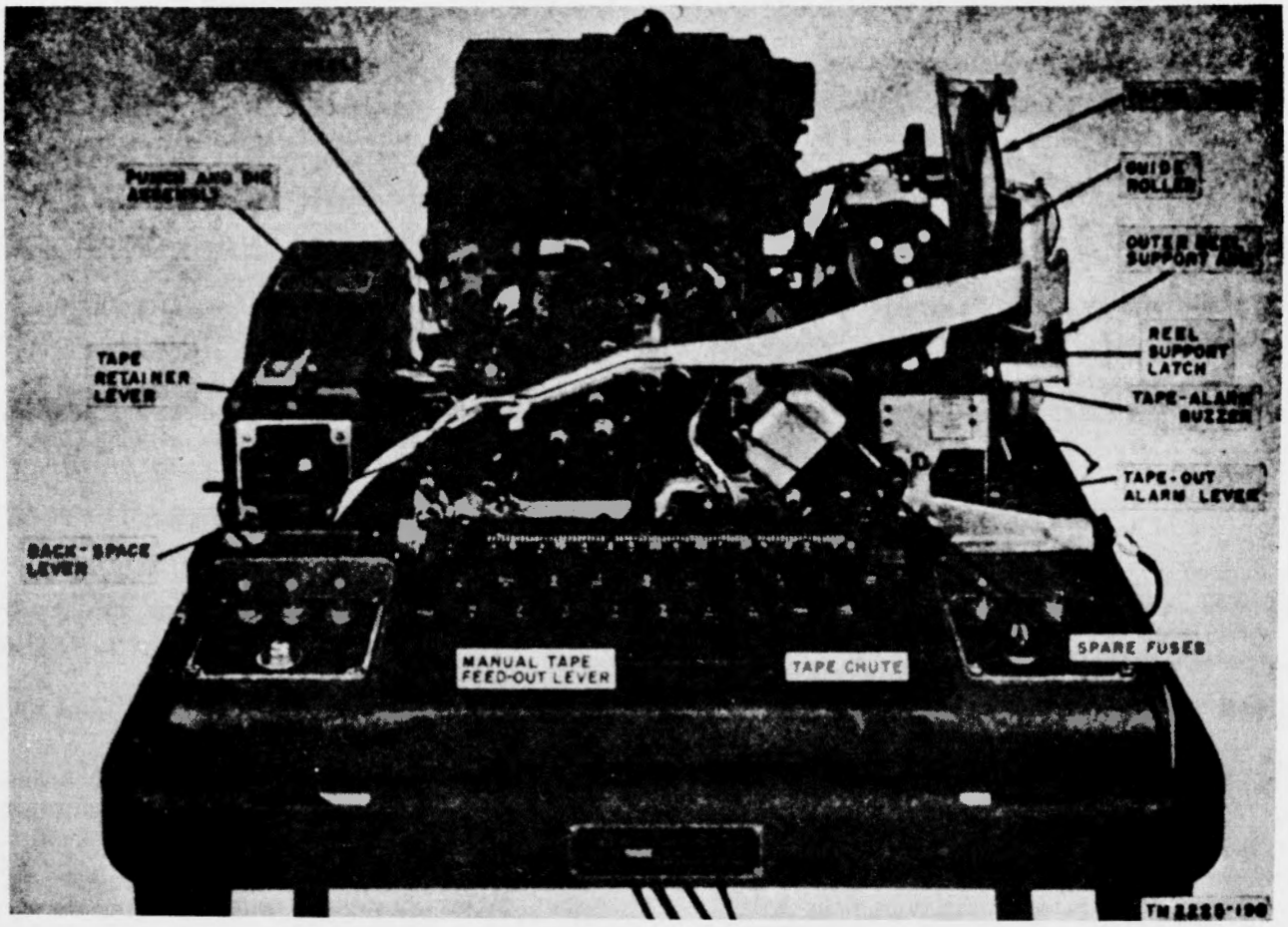


Figure 3-4. Tape installation details (TT-76/GGC).

perforated-transmitter. Press the tape-alarm lever latch release to permit the tape-alarm lever to pivot against the paper tape roll.

(*f*) Thread the end of the paper tape through the tape guide.

(*g*) Thread the paper tape through the tape puller so that the paper tape is under the stud at the end of the tape puller arm and is between the tape puller stud and the tape puller spring.

(*h*) Feed the paper tape into the tape chute; pass it under the type wheel and into the slot in the punch and die assembly.

(*i*) Press down on the tape retainer lever and feed the paper tape under the roller. Feed enough tape through so that the paper tape will extend through the opening in the dust cover when the dust cover is closed.

c. Check the inking ribbon; if it is torn or badly frayed, replace it as follows:

(1) *TT-76/GGC* (fig. 3-6).

(*a*) Raise the spool clip, push backward on the ribbon sensing lever, pull forward on the tab at the top of the ribbon retainer, and place the loaded ribbon spool on the spool shaft. Be sure that the slots in the spool hub engage the projections on the ribbon spool shaft.

(*b*) Attach the free end of the inking ribbon to the empty spool and place it on the ribbon spool shaft as indicated in

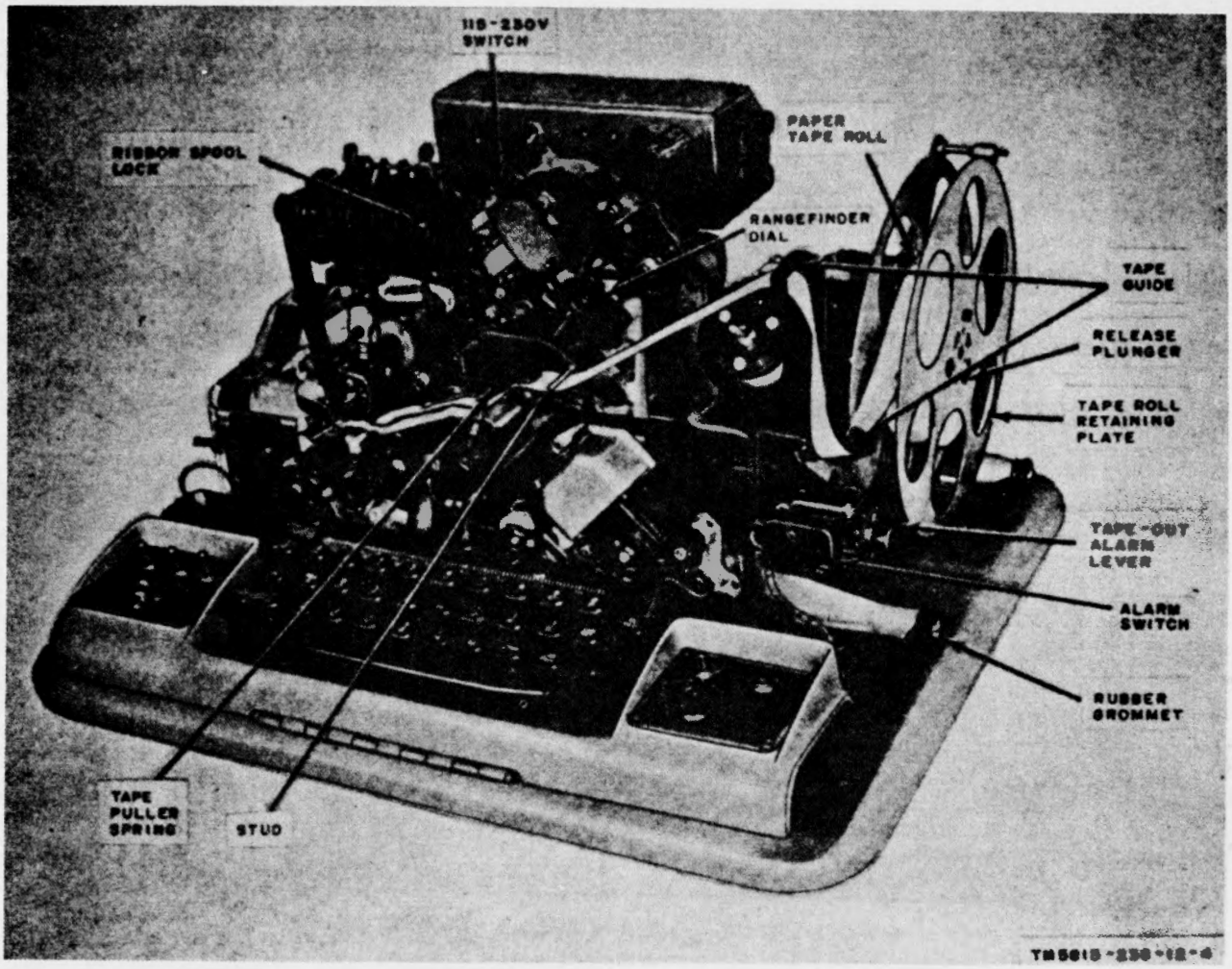


Figure 3–5. Tape installation details for TT–76A/GGC, TT–76B/GGC, and TT–76C/GGC.

(*a*) above. Leave a long loop (approx 10 in.) in the inking ribbon.

(*c*) Move the spool clip down to its locked position.

(*d*) Pass the inking ribbon over the ribbon rollers in front of each spool.

(*e*) Give the inking ribbon a half twist, pass it under the type wheel, then slip it into the slots at each side of the ribbon guide on the type wheel.

(2) *TT–76A/GGC, TT–76B/GGC, or TT–76C/GGC* (fig. 3–5).

(*a*) Turn the ribbon spool locks on the spool shaft to the outward (unlocked) position. Pull forward on the tab at the top of the ribbon retainer, and place the loaded ribbon spool on the spool shaft. Be sure the slots in the spool hub engage the projections on the ribbon spool shaft.

(*b*) Attach the free end of the inking ribbon to the empty spool and place it on the ribbon spool shaft as indicated in (*a*) above. Leave a long loop (approx 10 in.) in the inking ribbon.

(*c*) Turn the two ribbon spool locks to the inward (locked) position.

(*d*) Complete the installation as directed in (1) (*d*) and (*e*) above.

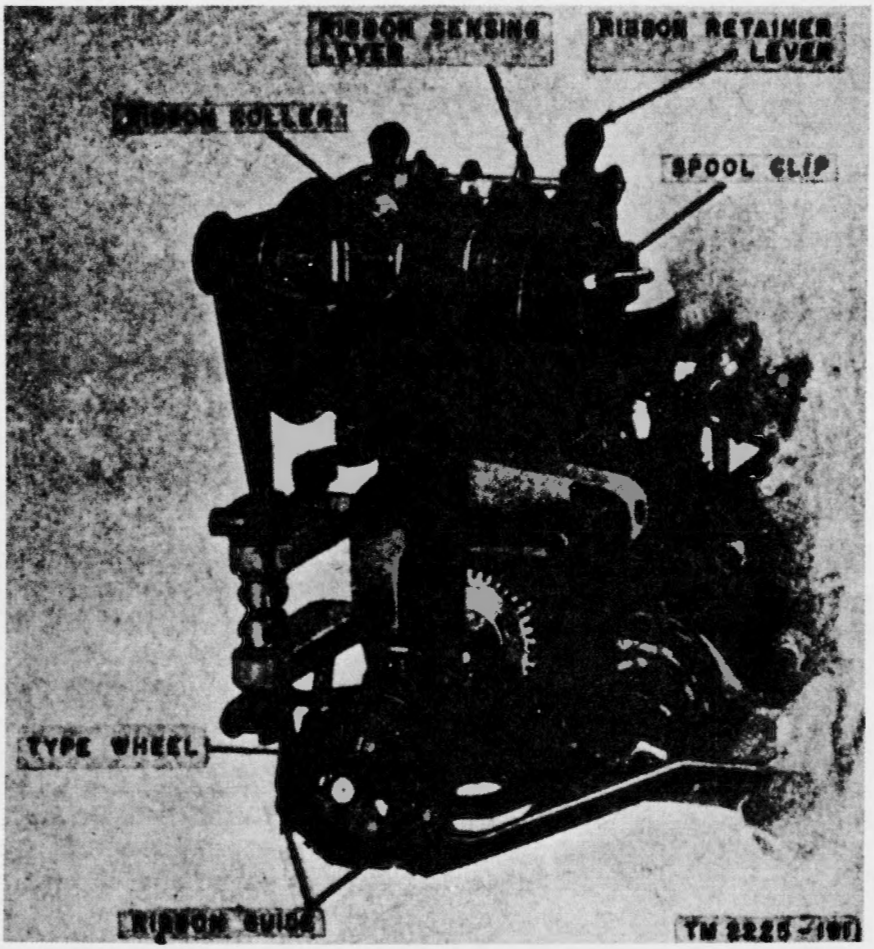


Figure 3-6. Ribbon feed mechanism (TT-76/GGC).

d. Empty the chad bin.

e. Set the SELECTOR switch to the LOCAL REPUNCH position. This removes the set from the signal line and arranges it for a local test by the operator.

3-5. Starting and Testing Procedures

Note. When a local test is desired, set the SELECTOR SWITCH to LOCAL REPUNCH.

a. Operate the POWER, LIGHT, and MOTOR switches to ON. The copy light should light and motor start.

b. Operate the KEYBOARD switch to SEND. Transmission should be possible from the keyboard-transmitter.

c. Depress and hold down the space bar and REPEAT key and check the feeding of the paper tape. Check to see that the character counter on the keyboard-transmitter is operating. The END OF LINE INDICATOR lamp should light on the 66th character. The end-of-line warning bell should also ring on the 66th character.

d. Depress the CAR. RET. key. The END OF LINE INDICATOR lamp should go out and the character counter indicator should return to zero.

e. Send from the keyboard-transmitter at least five copies of the following message: LTRS, THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK, LINE FEED, FIGS, 1234567890 - $! ' ( ) " / : ; ? ,.

f. Observe the printed impression on the paper tape for proper darkness and clarity.

Note. On later models of the equipment the letters combination prints a rectangular symbol.

g. Check the type wheel to be sure it is projected forward and restored for each operation and that it shifts to the figures position properly.

h. Check to insure that the inking ribbon feeds every other time a character is printed, and that it projects forward and backward with the type wheel each time a character is printed.

i. Check the punch and die mechanism for proper punching of the code and feed holes in the paper tape.

j. Push down on the backspace lever (fig. 3-4). The paper tape should move backward through the punch and die assembly one character space each time the backspace lever is operated.

k. Move the manual tape feed-out lever (fig. 3-4) to the left. Paper tape should feed out of the punch and die assembly. The feed hole should be perforated and the blank symbol should be printed on the paper tape.

l. Depress the FIGS (fig. 3-1) and then the S (BELL) keys. The signal belt should ring.

m. Place a perforated paper tape in the transmitter-distributor as follows:

(1) Move the STOP-START lever (fig. 3-3) to the FEED RETRACT position.

(2) Insert a perforated paper tape under the tape cover (the design of the transmitter-distributor permits paper tape to be inserted without raising the tape cover) and line up the first letter or symbol of the message opposite the START arrow (fig. 3-2) on the top cover of the transmitter-distributor.

(3) Move the STOP-START lever to the STOP position. Be sure the feed holes in the paper tape engage the pins on the feed claw.

(4) Raise the STOP-START lever to the START position and send five copies of the test message (*e* above).

(5) While the transmitter-distributor is sending a message, each of the following actions should stop the transmitter-distributor.

(*a*) Raising the tight-tape lever (fig. 3-3).

(*b*) Moving the STOP-START lever to the STOP or FEED RETRACT position.

(*c*) Passing of the end of the message tape over the tape-out lever.

n. Place the SELECTOR switch in position for the circuit operating combination desired. The set is now ready for operation.

3-6. Operating Arrangements

a. Half-Duplex. The following arrangements are possible when the TT-76(*)/GGC is installed for operation on one line (not applicable to the TT-699(*)/GGC).

Operation desired	SELECTOR switch	Transmitter-distributor START-STOP lever	Line cords		
			Red	Black	Gray
Prepare tape locally, using keyboard and reperforator and simultaneously transmitting to the line from the transmitter-distributor.	Position 2 TD SEND, LOCAL PUNCH.	START*	Line 1	Line 1	Line 1.
Send to the line from keyboard or transmitter-distributor and receive from the same line on the same line but not simultaneously. Home copy of all transmissions.	Position 1 TD SEND, TR SEND, RECEIVE.	START*	Line 1	Line 1	Line 1.
Receive on tape from distant station. No transmission possible.	Position 1 TD SEND, TR SEND, RECEIVE.	Not used	Line 1	Not used	Not used.

* A preliminary setting to FEED RETRACT position is required to allow for tape insertion.

b. Full-Duplex. The following operating arrangements are possible when the TT-76(*)/GGC is installed for operation on two lines.

Operation desired	SELECTOR switch	Transmitter-distributor START-STOP lever	Line cords		
			Red	Black	Gray
Receive tape copy on the reperforator from one line and send to a second line from either the keyboard transmitter or the transmitter-distributer.	Position 1 TD SEND, TR SEND, RECEIVE.	START*	Line 1	Line 2	Line 2.
Send from the keyboard or receive from one line on tape and simultaneously transmit to a second line from the transmitter-distributor.	Position 1 TD SEND, TR SEND, RECEIVE.	START*	Line 1	Line 1	Line 2.

* A preliminary setting to FEED RETRACT position is required to allow for tape insertion.

3-7. Stopping Procedure

To shut down Teletypewriter Reperforator-Transmitter TT-76(*)/GGC to traffic, place the MOTOR, LIGHT, and POWER switches to OFF. The motor should stop, copy light should go out, and all power should be removed from the unit.

3-8. Procedure for Correcting Errors in Tape

The backspace lever (fig. 3-2) is used for correcting errors made by the operator when preparing a paper tape locally. To correct an error in the paper tape, replace the wrong combination with the LTRS combination as follows:

a. Depress the backspace lever until the error in the paper tape is over the punches in the punch and die assembly (fig. 3-4). A pointer is provided on TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC, to indicate which code group is aligned with the type wheel and with the punch and die assembly.

b. Depress the LTRS key. This will cancel the incorrect code combination perforated in the tape. In the same manner cancel all code groups that were punched into the paper tape following the error.

c. Type the correct letter or symbol and then continue typing the remainder of the message.

CHAPTER 4
ORGANIZATIONAL MAINTENANCE

Section I. OPERATOR/CREW MAINTENANCE

4-1. Scope of Operator/Crew Maintenance

The maintenance duties assigned to the operator/crew of Teletypewriter Sets AN/GGC-3, AN/GGC-3A, AN/GGC-53, and AN/GGC-53A, and Teletypewriter Reperforator-Transmitters TT-76/GGC, TT-76A/GGC, TT-76B/GGC and TT-76C/GGC, and TT-699/GGC, TT-699A/GGC, TT-699B/GGC, and TT-699C/GGC, are listed below together with a reference to the paragraph covering the maintenance function. The duties assigned do not require tools or test equipment other than those issued with the set.

a. Operator/Crew preventive maintenance checks and services chart (para 4-5).

b. Cleaning (para 4-6).

c. Adjustments (para. 2-8*a* and *d*).

d. Replace chad bin (para. 2-4*a*(3)).

e. Replace dust cover (para. 2-5*b*).

f. Replace defective fuses (para. 2-6*b*).

g. Replace incandescent lamps.

h. Replace teletypewriter inking ribbon (para. 3-4*c*).

i. Replace spool (para. 3-4*c*).

j. Replace electrical fuse caps.

k. Replace indicator light lens.

l. Replace table legs (para. 2-4*a*(2)).

4-2. Materials Required for Operator/Crew Maintenance

The following materials are necessary for operator/crew maintenance.

a. Trichlorotrifluoroethane (NSN 6850-00-105-3084).

b. Cleaning cloth (NSN 8305-00-267-3015).

c. Fine sandpaper (NSN 5350-00-598-5908).

4-3. Operator/Crew Preventive Maintenance

Preventive maintenance is the systematic care, servicing, and inspection of equipment to prevent the occurrence of trouble, to reduce *downtime*, and to maintain the equipment in serviceable condition.

a. Systematic Care. The procedures given in paragraphs 4-4 and 4-6 cover routine systematic care and cleaning essential to proper upkeep and operation of the equipment.

b. Operator/Crew Preventive Maintenance Checks and Services. The preventive maintenance checks and services chart (para. 4-5) outlines functions to be performed at specific intervals. These checks and services are to maintain Army electronic equipment in a combat operable condition; that is, in good (physical) general condition and in good operating condition. To assist the operator/crew in maintaining combat operability, paragraph 4-5 indicates items to be inspected, how to check the item, and what could cause a not ready for reliable combat-operable condition. If a defect cannot be remedied by the operator/crew, higher category maintenance or repair is required. Records and reports of these checks and services must be made in accordance with the requirements set forth in TM 38-750.

4-4. Operator/Crew Preventive Maintenance Checks and Services Periods

Paragraph 4-5 specifies the checks and services that must be accomplished under the conditions below.

a. BEFORE OPERATION, perform your B PMCS to be sure that your equipment is ready to go.

b. DURING OPERATION, perform your D PMCS. This should help you spot small troubles before they become big problems.

c. WEEKLY AND MONTHLY PMCS are important checks you make to keep serious problems from suddenly happening.

d. ROUTINE CHECKS like: cleaning, dusting, washing, checking for frayed cables, stowing items not in use, covering unused receptacles and checking for loose nuts, bolts, and screws are not listed as PMCS checks. They are things that you should do anytime you see that they must be done. If you find that a routine check like one of those above is listed in your PMCS, it

was listed because other operators reported problems with this item.

e. Perform WEEKLY checks as well as BEFORE OPERATION PMCS if:

(1) You are the assigned operator and have not operated the item since the last WEEKLY check.

(2) You are operating the item for the first time.

NOTE

When you are doing any PMCS or ROUTINE CHECKS, keep in mind the *warning* and *cautions*.

NOTE

If your equipment must be in operation all the time, check and service those items that can be checked and serviced without disturbing operation. Make the complete checks and services when the equipment can be shut down.

NOTE

Use the ITEM NO. column in your PMCS chart to get the numbers for the TM ITEM NO. column on DA Form 2404 (Equipment Inspection and Maintenance Worksheet), when you fill out the form.

NOTE

The PROCEDURES column in your PMCS chart instructs you on how to perform the required checks and services. Carefully follow these instructions and if tools are needed, or the chart instructions tell you, get organizational maintenance to do the necessary work.

4-5. Operator/Crew Preventive Maintenance Checks and Services

NOTE

The checks in the interval column are to be performed in the order listed.
(B) Before (D) During (W) Weekly

Item No.	INTERVAL B	D	W	Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/ available if:
				Teletypewriter Reperforator-Transmitters TT-76(*)/GGC and TT-699(*)/GGC	EQUIPMENT PERFORMANCE CHECKS **NOTE** For all tests, except when SELECTOR switch is in position 3 — LOCAL REPUNCH, signal line current must be supplied by an external source.	
	•		•		Place SELECTOR switch to position 3 — LOCAL REPUNCH. Check to make sure the paper tape is installed and threaded through the equipment. Place power selector switch to correspond to available power source (115 or 230 volts ac) and be sure power plug is connected Place KEYBOARD switch in the SEND position and the POWER switch to the ON position.	
1		•	•	Motor and copylight	Place MOTOR and LIGHT switches to ON. Motor starts and runs at constant speed, copylight glows, and machine runs closed.	Motor fails to start or to hold constant speed, or machine runs open.
2		•	•	Rangefinder dial	**CAUTION** Do not change the position of the rangefinder dial while the teletypewriter is idle.	Range is less than 50, or errors appear in the printed copy.

Item No.	INTERVAL B	D	W	Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/ available if:
					Place test tape containing RY code groups in the transmitter-distributor. Place STOP-START lever to START position and turn rangefinder dial to the minimum and maximum good copy positions to determine the range of the equipment. Reset the rangefinder dial midway between the two positions and move the STOP-START lever to the FEED-RETRACT position.	
3		•	•	Test message keyboard-transmitter	Press the following keys in the order given: LTRS, CAR. RET., and LINE FEED. Type test message: THE QUICK BROWN FOX JUMPED OVER THE LAZY DOG'S BACK 1234567890. Repeat test five times and operate the manual tape feed-out lever to the left. Text of tape should be accurate, legible, and evenly spaced. Perforations are cleanly punched. Tape fed out of equipment through use of manual tape feed-out lever is imprinted with blank symbol.	Printed characters are illegible. Tape feed-out mechanism fails to operate. Punch or feed holds are torn, or spacing is erratic.
4		•	•	Test message transmitter-distributor	Insert the prepared test message (Item No. 3 above) in the transmitter-distributor. Raise STOP-START lever to START postion. During transmission, raise and lower the tight-page lever once and move the STOP-START lever to STOP position and restore it to START position. Permit entire tape to feed completely through the transmitter-distributor, and move the STOP-START lever to the FEED RETRACT position.	Received copy is inaccurate in some respect, or controls fail to operate properly.
5		•	•	Ribbon feed mechanism	Wind ribbon almost completely upon the takeup spool. Insert test tape in the transmitter-distributor. Move STOP-START lever to the START position and observe the action of the ribbon mechanism. Move STOP-START lever to STOP.	Ribbon is not moved forward or rearward, or ribbon feed or ribbon reverse actions are faulty.
6		•	•	End-of-line indicators, character counter, and carriage return operation	Press the FIGS and CAR. RET. Keys, and type numerals 1234567890 repeatedly until the indicator lamp lights and the margin bell rings. Note the position of the character counter and press the CAR. RET. key. At 66th numeral typed, character counter indicates 66, indicator lamp lights, and margin bell rings (on all equipment except TT-76/GGC and TT-699/GGC). After CAR. RET. key is pressed, indicator lamp is extinguished and character counter is reset to zero (0).	Character counter or end-of-line indicators fail to operate properly, or CAR. RET. key fails to return character counter to zero (0) position.

Item No.	INTERVAL B	D	W	Item to be Inspected	Procedures Check and have repaired or adjusted as necessary	For readiness reporting equipment is not ready/ available if:
7		•	•	BREAK key, backspace lever, and LTRS key	Press the BREAK key briefly; then press the backspace lever as often as necessary to move the first blank code group into the punch and die assembly. Strike the LTRS key an equivalent number of times.	BREAK key fails to open line, and feedout blank tape or backspace lever fails to operate.
8		•	•	Signal bell and REPEAT key	Press the FIGS key, and then press the S (BELL) key and the REPEAT key downward together. Signal bell rings repeatedly, for as long as REPEAT key is held down.	
9		•	•	Tape-alarm buzzer	Remove the paper tape roll from its mounting at the right side of the reperforator, and then replace the paper tape roll, following the normal procedure. Tape-alarm buzzer should sound as tape roll is removed from reperforator and should be silenced when tape roll is replaced in its normal position.	Tape-alarm buzzer fails to operate.
10		•	•	SELECTOR switch in position 1 — TD SEND TR SEND RECEIVE	Set SELECTOR switch to position 1. Prepare a test message tape using the keyboard-transmitter and the reperforator. Send the tape from the transmitter-distributor. Reperforator produces tape that is identical with test message transmitted.	Reperforator produces tape that is not identical with test message transmitted.
11		•	•	SELECTOR switch in position 2 — TD SEND LOCAL PUNCH	*a.* Set SELECTOR switch to position 2. Send a test message from the keyboard transmitter. The message is received without error on the reperforator. *b.* Send a test tape from the transmitter-distributor. The reperforator does not respond to the message transmitted from the transmitter-distributor. *c.* Send a test message from the transmitter-distributor. The message is received without error by the reperforator.	Equipment does not perform as described in *a*, *b*, and *c*.

4-6. Cleaning

Inspect the exteriors of the teletypewriter set, case, and teletypewriter table (fig. 4-1). The exterior surfaces should be free of dust, dirt, oil, grease, moisture, fungus, rust, or corrosion.

a. Remove dust and loose dirt with a clean soft cloth.

WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

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

CAUTION

Be careful when cleaning around plugs and jacks; dirt forced into jacks will cause malfunction.

c. Remove dust or dirt from plugs and jacks with a brush.

d. Clean copyholder, control knobs, switches, keytops, and spacebar; use a soft clean cloth. If dirt is difficult to remove, dampen the cloth with water; mild soap may be used for more effective cleaning.

WARNING

To be usable for cleaning, the compressed air source must limit the nozzle pressure to no more than 29 pounds per square inch gage, (PSIG). Goggles must be worn at all times while cleaning with compressed air.

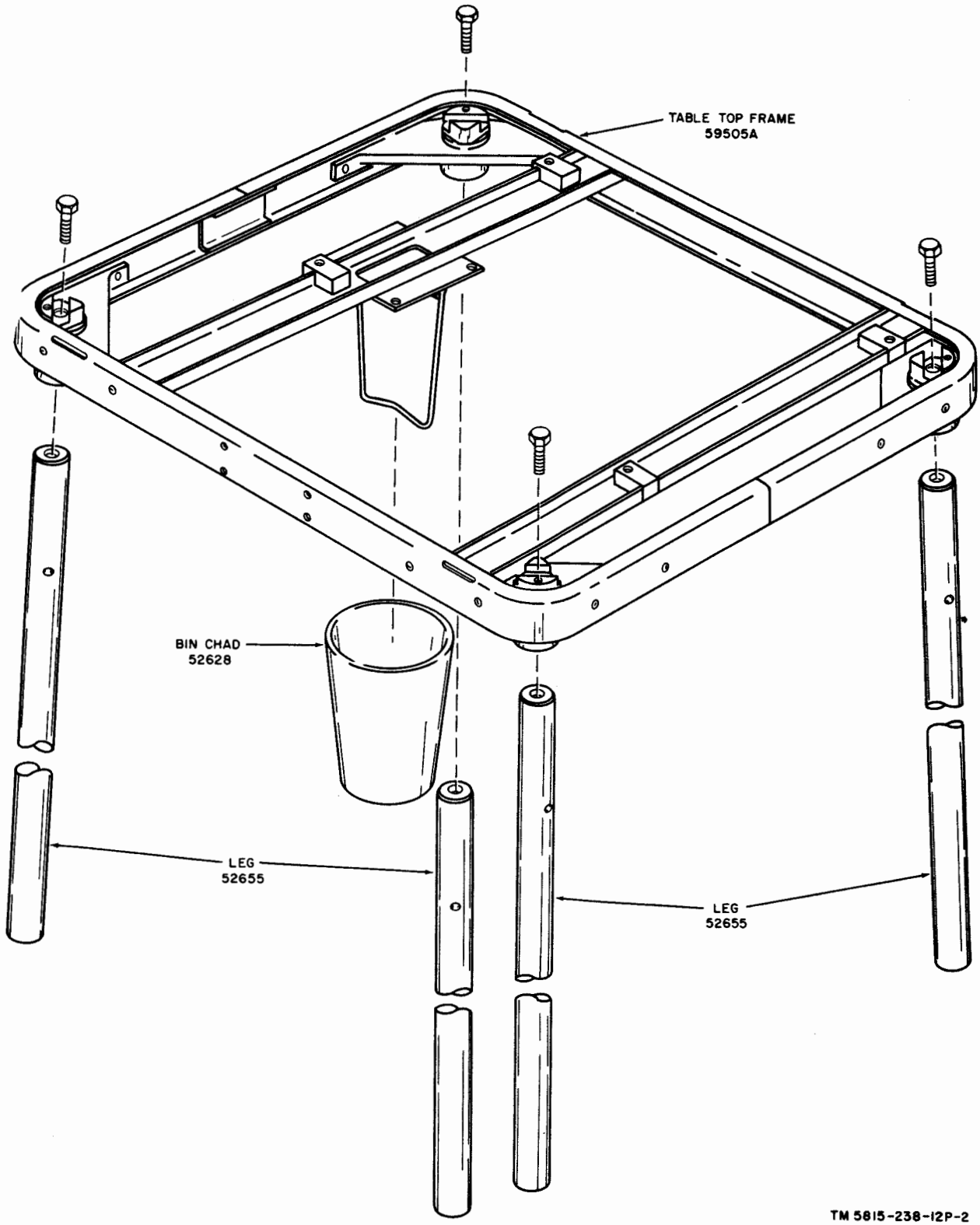


Figure 4-1. Teletypewriter table FN-108/GGC.

Section II. ORGANIZATIONAL MAINTENANCE

4-7. Scope of Organizational Maintenance

The information in this section is applicable to those units required to perform organizational maintenance on Teletypewriter Sets AN/GGC-3, AN/GGC-3A, AN/GGC-53, and AN/GGC-53A; Teletypewriter Reperforator-Transmitters TT-76/GGC, TT-76A/GGC, TT-76B/GGC, TT-76C/GGC, TT-699/GGC, TT-699A/GGC, TT-699B/GGC, and TT-699C/GGC.

4-8. Tools and Maintenance Materials Required

a. Tools. No tools are supplied with Teletypewriter Set AN/GGC-3(*) and AN/GGC-53(*) or with Teletypewriter Reperforator-Transmitter TT-76(*)/GGC and TT-699(*)/GGC. Tool equipment TE-50-B should be available to technical personnel performing maintenance duties at organizational level. This kit contains all tools necessary to maintain the equipment. Tool equipments TE-50 and TE-50-A do not include some special wrenches and gages included in TE-50-B. Organizations that have the TE-50 or TE-50-A should requisition the additional tools in accordance with appropriate supply bulletins.

b. Maintenance Materials.

(1) Materials necessary for maintenance at organizational levels are included in tool equipment TE-50-B with the exception of a liquid cleaning agent and an antiseize compound. Mechanical assemblies should be cleaned with solvent (SD), which is available through established supply channels. Gasoline never should be used as a cleaning fluid. When solvent (SD) is not immediately available, oil, fuel, diesel (DA), QMC stock No. 7-0-142, may be used as a temporary substitute. Trichlorotrifluoroethane (NSN 6850-00-105-3084) should be used for cleaning electrical contact surfaces.

WARNING

Adequate ventilation should be provided while using TRICHLOROTRIFLUOROETHANE. Prolonged breathing of vapor should be avoided. The solvent should not be used near heat or open flame; the products of decomposition are toxic and irritating. Since TRICHLOROTRIFLUOROETHANE dissolves natural oils, prolonged contact with skin should be avoided. When necessary, use gloves which the solvent cannot penetrate. If the solvent is taken internally, consult a physician immediately.

(2) These reperforator-transmitters contain numerous aluminum and magnesium castings. When steel screws are placed in such castings, tendency exists for seizure between the screws and the castings unless the screws are treated first with an antiseize compound. Screws are given such a coating when the machines are assembled. Whenever machines are disassembled after having been in use, the coating should be renewed by maintenance personnel to insure that there will be no difficulty at the time of the next disassembly.

4-9. Preventive Maintenance

a. Preventive maintenance is the systematic care, inspection, and servicing of equipment to maintain it in serviceable condition, prevent breakdowns, and assure maximum operational capability. Preventive maintenance is the responsibility of all categories concerned with the equipment, and includes the inspection, testing, and repair or replacement of parts, subassemblies, or units that inspection and tests indicate would probably fail before the next scheduled periodic service. Preventive maintenance checks and services of Teletypewriter Sets AN/GGC-3, AN/GGC-3A, AN/GGC-53 and AN/GGC-53A and Teletypewriter Reperforator-Transmitters TT-76/GGC, TT-76A/GGC, TT-76B/GGC, TT-76C/GGC, TT-699/GGC, TT-699A/GGC, TT-699B/GGC, and TT-699C/GGC at the organizational level are made at weekly intervals unless otherwise directed by the commanding officer. The preventive maintenance checks and services should be scheduled concurrently with the periodic service schedule of the carrying vehicle for all vehicular installations.

b. Maintenance forms and records to be used and maintained on this equipment are specified in TM 38-750.

4-10. Organizational Preventive Maintenance Checks and Services

NOTE

The checks in the "Interval" column are to be performed in the order listed.

D — During W — Weekly

Item No.	Interval D	Interval W		Item to be inspected	PROCEDURES Check and have repaired or adjusted if necessary
1	•	•		Motor	Check motor speed.
2	•	•		Rangefinder	CAUTION Do not change the position of the rangefinder dial while the teletypewriter is idle. Check to see that the rangefinder dial is set midway between the maximum and minimum good copy positions. NOTE Replace and/or repair any defective or inoperable part authorized. Refer all other problems to higher category maintenance.

4-11 and 4-12 Deleted.

4-13. Touchup Painting Instructions

Remove rust and corrosion from metal surfaces by lightly sanding them with fine sandpaper. Brush two thin coats of paint on the bare metal to protect it from further corrosion. Refer to applicable cleaning and refinishing practices specified in TB 43-0118.

Section III. TROUBLESHOOTING AT ORGANIZATIONAL MAINTENANCE LEVEL

4-14. General

Troubleshooting at the organizational maintenance level requires that the trouble be sectionalized by tracing it to a faulty component as quickly as possible. It must be determined whether the faulty component can be repaired at the organizational maintenance level or whether it must be sent to a field repair shop. The repair work that can be performed at the organizational level is limited in scope by the tools, test equipment, and replaceable parts available.

4-15. Visual Inspection

a. Failure of equipment to operate properly usually is caused by one or more of the following visible faults:

(1) Improperly connected power cord.

(2) Burned out fuse in power supply and terminal unit.

(3) Worn, broken, burnedout, or disconnected cord or plug.

(4) Wires broken by excessive vibration.

(5) Loose ground connection (particularly in dc system using simplex line).

(6) Visibly worn or damaged mechanical part.

b. When failure or troublesome operation occurs and the cause is not immediately apparent, check as many of these items as is practicable before starting a detailed examination. If possible, obtain information from the operator of the equipment regarding the performance at the time trouble occurred.

c. Visually inspect as much of the line system as possible for obvious trouble.

4-16. Sectionalizing Trouble

When the cause of trouble cannot be found by simple visual inspection (para 4-15), follow the procedure outlined in the equipment performance checklist (para 4-18). In this list it is assumed that the teletypewriter is connected to a signal line or to the local test circuit (para

4-17), that a good fuse is inserted properly in the fuse holder, and that the teletypewriter is loaded properly with paper tape. Perform the steps in the order they are listed. If the trouble cannot be found by means of the equipment performance checklist, support maintenance is required.

4-17. Local Test Arrangement

When a trouble exists and cannot readily be located in associated teletypewriters, or in some part of the line circuit between stations by visual inspection, place the SELECTOR switch in the LOCAL REPUNCH position. This connects the teletypewriter transmitter contacts in series with the selector magnet and a local dc supply on TT-76(*)/GGC units. The teletypewriter contacts are connected in series with each other and the input of the line transmitter module on TT-699(*)/GGC units. The reperforator of the local machine now can be operated with signals received directly from the keyboard-transmitter or transmitter-distributor. Perform the steps outlined in the equipment performance checklist (para 4-18). If the trouble no longer is evident, look for it in the line circuit or at the distant teletypewriter.

	Item No.	Item	Action or condition	Normal indications	Corrective measures
PREPARATORY	1	Power selector switch	Set to match ac power	None	None.
	2	Ground	Check connections. Be sure all power connections are in OFF position while checking.	None	Establish good connection (para 2-6).
	3	Power	Power cord plugged in	None	None.
	4	POWER switch	In OFF position	None	None.
	5	Line connections	Signal cords plugged into provided line facilities for type of service desired.	None	Connect as required (para 2-11).
	6	Paper tape	Check for adequate supply; be sure that paper tape is positioned correctly through its guides, under type wheel, and through punch and die assembly.	None	Replenish or adjust paper tape (para 3-4*b*).
	7	Inking ribbon	In proper position around spools and rollers, and passed through guide slots.	None	Adjust inking ribbon (para 3-4*c*).
	8	POWER switch	Operate to ON	None	None.
	9	LIGHT switch	Operate to ON	Copy light should light	Check lamp and switch
	10	MOTOR switch	Operate to ON	Motor starts	Check fuse; check power source connection. Check brushes.
	11	KEYBOARD switch	Operate to SEND	Transmission possible from keyboard-transmitter.	Check switch.
	12	Motor speed	Adjust according to instructions in paragraph 2-8.		
	13	BIAS potentiometer	Adjust according to instructions in paragraph 2-8.		
	14	Rangefinder	Adjust according to instructions in paragraph 2-8.		

EQUIPMENT PERFORMANCE

Item No.	Item	Action or condition	Normal indications	Corrective measures
15	Tape feed (reperforator)	Depress space bar and hold REPEAT key depressed.	Paper tape should feed properly.	Check paper tape reel guides.
16	END OF LINE INDICATOR lamp.	Depress R and Y alternately.	Lamp should light on operation of 66th character.	Check lamp and contacts.
17	CAR. RET. key	Depress key	When depressed, END OF LINE INDICATOR lamp should extinguish; indicator mechanism should return to zero position.	Check function blocking bar, ratchet pawl, and return spring housing.
18	REPEAT key	Depress and hold any key and the REPEAT key.	Selected character should repeat as long as both keys are held depressed.	Check REPEAT key lever, repeat lever, and repeater blocking lever.
19	BREAK key	Depress key	Opens signal line	Check key.
20	Type wheel	Receive test message	Should be projected and restored for each operation and should shift to figures position properly.	Check bellcrank assemblies and operation of the type wheel drive lever.
21	Inking ribbon feed mechanism	Receive test message	Inking ribbon should feed as every other character is typed.	Check inking ribbon in guides and ribbon feed pawl action.
22	Code and feed punches	Receive test message	Check operation by sending continuous R's and Y's on keyboard-transmitters.	Check punch arm, code punch lever and code hole punches.
23	Manual tape feed-out lever	Move lever to left	Paper tape should feed-out; BLANK symbol will print on paper tape.	Check transfer lever trip latch, and manual tape feed-out linkage.

APPENDIX I
REFERENCES

Following is a list of applicable references that should be available to the operator and organizational maintenance personnel of the AN/GGC-3, AN/GGC-3A, AN/GGC-53, AN/GGC-53A, TT-76/GGC, TT-76A/GGC, TT-76B/GGC, TT-76C/GGC, TT-699/GGC, TT-699A/GGC, TT-699B/GGC and TT-699C/GGC.

DA Pam 310-4	Index of Technical Publications; Technical Manuals, Technical Bulletins, Supply Manuals (types 7, 8, and 9), Supply Bulletins, and Lubrication Orders.
DA Pam 310-7	US Army Equipment Index of Modification Work Orders.
SC 5180-91-CL-S13	Index of Components Lists (Sets, Kits and Outfits Components Lists) for Tool Equipment TE-111 (FSN 5180-408-1877).
SM 11-4-5180-S05	Index of Components Lists (Sets, Kits, and Outfits Components Lists) for Tool Equipment TE-50-B.
TB 43-0118	Field Instructions for Painting and Preserving Electronics Command Equipment Including Camouflage Pattern Painting of Electrical Equipment Shelters.
TM 43-0139	Painting Instructions for Field Use.
TM 11-5815-238-20P	Organizational Maintenance Repair Parts and Special Tools Lists: Teletypewriter Sets AN/GGC-3 and AN/GGC-3A and Teletypewriter Reperforator-Transmitters TT-76/GGC, TT-76A/GGC, TT-76B/GGC, and TT-76C/GGC, FSN 5815-503-3309.
TM 11-6625-366-15	Operator's, Organizational, DS, GS, and Depot Maintenance Manual: Multimeter TS-352B/U.
TM 11-6625-422-12	Organizational Maintenance Manual Including Repair Parts List: Test Sets, Teletypewriter AN/GGM-1, AN/GGM-2, AN/GGM-3, AN/GGM-4, and AN/GGM-5.
TM 11-6625-1668-12	Operator and Organizational Maintenance Manual Including Repair Parts and Special Tool Lists: Test Sets, Telegraph AN/GGM-15(V)1 and AN/GGM-15(V)2.
TM 38-750	The Army Maintenance Management System (TAMMS).
TM 750-90-1	Administrative Storage of Equipment.
TM 750-244-2	Procedures for Destruction of Electronics Materiel to Prevent Enemy Use (Electronics Command).

APPENDIX III

MAINTENANCE ALLOCATION

Section I. INTRODUCTION

1. General

This appendix provides a summary of the maintenance operations for Teletypewriter Sets AN/GGC-3, AN/GGC-3A, AN/GGC-53 and AN/GGC-53A. It authorizes categories of maintenance for specific maintenance functions on reparable 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.

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

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

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

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

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

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

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

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

k. Rebuild. Consists of those services/actions necessary 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.

3. Column Entries

a. Column 1, Group Number. Column 1 lists

group numbers, the purpose of which is to identify components, assemblies, subassemblies and modules with the next higher assembly.

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

c. Column 3, Maintenance Functions. Column 3 lists the functions to be performed on the item listed in column 2.

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 man-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 additional 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.

4. Tool and Test Equipment Requirements (Table 1)

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

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

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

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

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

SECTION II MAINTENANCE ALLOCATION CHART
FOR

TELETYPEWRITER SETS AN/GGC-3, AN/GGC-3A, AN/GGC-53 AND AN/GGC-53A

(1) GROUP NUMBER	(2) COMPONENT/ASSEMBLY	(3) MAINTENANCE FUNCTION	(4) MAINTENANCE CATEGORY					(5) TOOLS AND EQUIPMENT
			C	O	F	H	D	
00	TELETYPEWRITER SETS AN/GGC-3, AN/GGC-3A, AN/GGC-53 AND AN/GGC-53A (Note 8)	Service[1]	0.6					
		Service[2]			2.0			
		Adjust[3]			0.5			1
		Adjust[4]			1.5			1
		Inspect[1]	0.2					
		Inspect[2]			0.8			
		Test[5]	0.5					
		Test[6]			5.0			1,2,4,5
01	REPERFORATOR TRANSMITTER TELETYPEWRITER TT-76/GGC, TT-76A/GGC, TT-76B/GGC, TT-76C/GGC, TT-699/GGC, TT-699A/GGC, TT-699B/GGC, AND TT-699C/GGC (Note 8)	Service[1]	1.0					
		Service[2]			2.7			1
		Adjust[3]	0.2					
		Adjust[4]			0.6			1
		Inspect[1]	0.3					
		Inspect[2]			1.0			
		Test[5]	0.5					
		Test[6]			5.0			1,2,4,5,7
		Test[7]				6.0		1,2,3,5,7
		Repair			8.0			1,2,4,5,7
		Overhaul				14.0		1,2,3,5,7
		Overhaul					28.0	1,2,3,5,7
0101	MOTOR, UNIVERSAL	Replace			1.0			1,2
		Overhaul				6.0		1,2,3,5,6
02	TABLE RN-52/GGC, FN-108/GGC	Repair				3.0		1,2
03	CASE CY-1110/GGC	Repair				5.0		1,2

(1) Exterior; replenishes tape, replaces inking ribbon, empties chad bin.
(2) Interior parts; replaces fuses, lamps, lens indicator.
(3) Range finder and motor speed
(4) All adjustments.
(5) Operational test.
(6) Performs resistance, voltage and current measurements to determine condition of circuits: Tests system line up, conducts distortion test.
(7) Conducts all test to insure equipment returned to user meets mechanical, visual, electrical and operational requirements.
(8) The AN/GGC-53 is the low-level version of the AN/GGC-3. The TT-699/GGC is the low-level version of the TT-76.

TABLE 1 TOOL AND TEST EQUIPMENT REQUIREMENTS
FOR

TELETYPEWRITER SETS AN/GGC-3, AN/GGC-3A, AN/GGC-53 AND AN/GGC-53A

TOOL OR TEST EQUIPMENT REF CODE	MAINTENANCE CATEGORY	NOMENCLATURE	NATIONAL/NATO STOCK NUMBER	TOOL NUMBER
1	F,H,D	TOOL EQUIPMENT, TELETYPEWRITER MAINTENANCE TE-50-B	5180-00-356-4662	
2	F,H,D	TOOL, EQUIPMENT TE-111	5180-00-408-1877	
3	H,D	TELETYPEWRITER TEST SET AN/GGM-1 (high-level equipments only)	6625-00-897-5505	
4	F	TEST SET TS-2/TG (high-level equipment only)	6625-00-243-5173	
5	O,H,F,D	MULTIMETER TS-352B/U (to be replaced by the AN/USM-223) [a]	6625-00-553-0142	
6	H,D	VOLTMETER, ME-30/U	6625-00-643-1670	
7	F,H,D	TEST SET, TELEGRAPH AN/GGM-15(V) (high or low-level equipments) CAUTION Use of Teletypewriter Test Sets TS-2/TG and AN/GGM-1 in testing low-level equipment will damage the electronic components.	6625-00-442-6131	

[a] Authorized for performance of organizational maintenance only when using organization includes either a Teletypewriter Repairman (MOS 31J), or an Organizational Communications Repairman (MOS 31B).

ARSEL-MA Form OCT 74 6013

HISA-FM 2881-74

By Order of the Secretary of the Army:

HAROLD K. JOHNSON,
General, United States Army,
Chief of Staff.

Official:
J. C. LAMBERT,
Major General, United States Army,
The Adjutant General.

Distribution:

Active Army:

USASA (2)
CNGB (1)
CC-E (7)
Dir of Trans (1)
CofSptS (1)
TSG (1)
CofSptsS (1)
USAAESWBD (5)
USACDCEA (1)
USACDCCBRA (1)
USACDCCEA (1)
USACDCOA (1)
USACDCQMA (1)
USACDCTA (1)
USACDCADA (1)
USACDCARMA (1)
USACDCAVNA (1)
USACDCARTYA (1)
USACDCSWA (1)
USACDCCEA:
  Ft Huachuca (1)
USACDCEC (10)
USAMC (5)
USCONARC (5)
ARADCOM (5)
ARADCOM Rgn (2)
OS Maj Comd (4)
USAREUR (5)
USAMERCC (5)
LOGCOMD (2)
USAMICOM (4)
USASMC (2)
USASCC (4)
MDW (1)
Armies (2) except
  Seventh (5)
  EUSA (5)
Corps (2)
USAC (3)
11th Air Aslt Div (3)
Svc Colleges (2)
Br Svc Sch (2) except
  USASESCS (60)
  USAQMS (5)
  USASCS (5)
USMA (5)
GENDEP (2)
Sig Sec GENDEP (5)
Sig Dep (12)
A Dep (2) except
  SAAD (30)
  TOAD (14)
  FTWOAD (10)
  LEAD (7)
  SHAD (3)
  NAAD (5)
  SVAD (5)
  CHAD (3)
  ATAD (10)
  LBAD (14)
USASTC (5)
USATC AD (2)
USATC Armor (2)
USATC Engr (2)
USATC Inf (2)
Army Pic Cen (2)
WRAMC (1)
Instl (2) except
  Ft Monmouth (70)
  Ft Hancock (4)
  Ft Gordon (10)
  Ft Huachuca (10)
  Ft Carson (25)
  Ft Knox (12)
  Ft Devens (5)
WSMR (5)
Sig Fld Maint Shops (2)
AMS (1)
USAERDAA (2)
USAERDAW (13)
MAAG: China (5)
KMAG (5)
USASETAF (5)
Units organized under following TOE's (2 copies each):

1-100	5-145
1-101	5-146
1-256	5-155
5-25	5-156
5-26	5-279
5-35	6-555
5-48	6-556
5-52	6-557
5-112	6-615

6-617
7
7-42
8-35
8-36
8-500
8-581
9-22
9-76
9-86
9-87
9-227
9-367
10-22
10-105
10-106
10-107
10-201
10-202
10-206
10-377
10-407
10-445
10-446
10-447
10-448
10-467
10-500 (AA-AD)
10-521
10-536
11-57
11-95
11-97
11-98
11-99
11-105
11-107
11-117
11-127
11-155
11-156
11-157
11-158
11-215
11-217
11-218
11-500 (AA-AC)
11-587
11-592
11-597
17
17-42
19-55
19-56
29-1
29-5
29-6
29-11
29-15
29-16
29-21
29-25
29-26
29-35
29-36
29-41
29-45
29-46
29-51
29-55
29-56
29-65
32-52
37
37-42
47
55-12
55-50
55-51
55-56
55-89
55-99
55-131
55-201
55-202
55-405
55-406
55-416
55-458
55-476
57

NG: State AG (3); units—same as active Army except allowance is one copy.
USAR: None.
For explanation of abbreviations used, see AR 320-50.

*U.S. GOVERNMENT PRINTING OFFICE: 198--341-662/9338

WARNING

This equipment contains selenium rectifiers which immediately release poisonous fumes when they burn out. The fumes are very toxic and have a strong, unpleasant odor resembling the smell of rotten eggs. Whenever this odor is detected, IMMEDIATELY disconnect power and thoroughly ventilate the area. Do not handle the burned-out rectifier until it cools. PERMANENT INJURY OR DEATH MAY RESULT FROM PROLONGED BREATHING OF THE FUMES.