

TELETYPEWRITER DISTRIBUTOR-TRANSMITTERS  
TT-122A/FG, TT-123A/FG, AND TT-235/FG

TM 11-2277  
TO 31W4-2FG-1141  
CHANGES No. 2

DEPARTMENTS OF THE ARMY  
AND THE AIR FORCE  
WASHINGTON 25, D. C., 10 January 1961

TM 11-2277/TO 31W4-2FG-1141, 13 January 1958, is changed as indicated so that the manual also applies to the following equipment:

Nomenclature	Order No.
Teletypewriter Distributor-Transmitter TT-123A/FG.	21904-PC-60
Teletypewriter Distributor-Transmitter TT-235/FG.	21526-PC-60

Change the title of the manual to: **TELETYPEWRITER DISTRIBUTOR-TRANSMITTERS TT-122A/FG, TT-123A/FG, AND TT-235/FG.**

*Note.* The parenthetical reference to previous changes (for example: page 2 of C 1) indicates that pertinent material was published in that changes.

*Page 3.* Add the following note below the title of chapter 1.

*Note.* Teletypewriter Distributor-Transmitter TT-123A/FG supplied on Order No. 21904-PC-60 is similar to the TT-123A/FG covered in this manual except that felt lubricating washers have been added to extend the lubrication intervals. Teletypewriter Distributor-Transmitter TT-235/FG is similar to TT-122A/FG covered in this manual with the following exceptions: it transmits 7.00 equal unit code, it contains a control box assembly for external control of its clutch magnet, and it contains felt lubricating washers.

Change "TT-122A/FG and TT-123A/FG" to "TT-122A/FG, TT-123A/FG, and TT-235/FG" in the following places:

*Page 3,* paragraph 1, line 4.

*Page 4,* paragraph 7, heading.

*Page 10,* paragraph 17, note.

*Page 19,* paragraph 29, line 7.

Change "TT-122A/FG or TT-123A/FG" to "TT-122A/FG, TT-123A/FG or TT-235/FG" in the following places:

*Page 13,* paragraph 23*b*, line 2.

*Page 16,* paragraph 26*a*, line 3.

Add "and TT-235/FG" after "TT-122A/FG" in the following places:

*Page 36,* paragraph 62, line 7, and subparagraph *a*, heading.

*Page 44,* paragraph 74, heading.

*Page 54,* paragraph 90, heading.

*Page 3,* paragraph 1. Make the following changes:

Subparagraph *a*, line 6. Change "both" to: **all.**

*b.* (Superseded) Forward all comments on this publication direct to Commanding Officer, U.S. Army Signal Materiel Support Agency, ATTN: SIGMS-PA2d, Fort Monmouth, N.J.

Paragraph 3*b*, line 3. After "transmit" add: 7.42.

*c.* (Added) The TT-235/FG is used in a similar manner except that it transmits 7.00 start-stop, five-unit code and has built-in facilities in its transmission for the control of the clutch magnet circuit by an external equipment.

Paragraph 4. Delete the first sentence.

Second item, delete "Signaling code\_\_\_7.42 start-stop five-unit," and substitute:

Code transmission:

TT-122A/FG and TT-123A/FG ----- 7.42 start-stop, five-unit code.  
 TT-235/FG ----- 7.00 start-stop, five-unit code.

Fourth item, "Operating speed." Delete fourth item in its entirety and substitute:

Operational speeds:

368.1-opm gearset ----- 65 wpm with 7.00 unit code; 61.5 wpm with 7.42 unit code;  
 both equivalent to 45.5 bauds per second.  
 404-opm gearset <sup>a</sup> ----- 71.3 wpm with 7.00 unit code; 67.7 wpm with 7.42 unit code;  
 both equivalent to 50 bauds per second.  
 460-opm gearset <sup>b</sup> ----- 81.2 wpm with 7.00 unit code; 75 wpm with 7.42 unit code;  
 both equivalent to 56.8 bauds per second.  
 600-opm gearset ----- 107 wpm with 7.00 unit code; 100 wpm with 7.42 unit code;  
 both equivalent to 75 bauds per second.

Code impulse lengths:

45.5 ----- 22-millisecond impulse length.  
 50 ----- 20-millisecond impulse length.  
 56.8 ----- 17.6-millisecond impulse length.  
 75 ----- 13.5-millisecond impulse length.

Fifth item, "Motor." Make the following changes:

Add "and TT-235/FG" after "TT-122A/FG" in the following places:

Subitem, "Power requirements."

Subitem, "Type."

Subitem, "Speed." Delete "(both models)".

Page 4, paragraph 4.

Last item, delete "Total weight ---- 17 lb, 3 oz" and substitute:

Total weight:

TT-122A/FG or TT-123A/FG ----- 17 lb 3 oz.  
 TT-235/FG ----- 20 lb 8 oz.

5.1. (Added) Components of Teletypewriter Distributor-Transmitter TT-235/FG

Qty.	Item	Height (in.)	Depth (in.)	Width (in.)
1	Distributor-transmitter -----	6 <sup>9</sup> / <sub>16</sub>	14 <sup>1</sup> / <sub>2</sub>	9 <sup>5</sup> / <sub>8</sub>
2	Fuse, 1 amp -----			
1	Worm (107 wpm, 75 baud) -----	<sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	
1	Worm gear (107 wpm, 75 baud) -----	1 <sup>1</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	
1	Worm (71.3 wpm, 50 baud) -----	<sup>3</sup> / <sub>4</sub>	1 <sup>1</sup> / <sub>4</sub>	
1	Worm gear (71.3 wpm, 50 baud) -----	1 <sup>1</sup> / <sub>8</sub>	2 <sup>1</sup> / <sub>2</sub>	
2	TM 11-2277 -----			
1	Running spares (5, fuses, 1 amp) -----			
set				

Paragraph 6. After "TT-123A/FG" add: and Teletypewriter Distributor-Transmitter TT-235/FG.

Page 5, paragraph 7. Add the following at the end of the last sentence: on the TT-122A/FG and TT-123A/FG. The same items extend

from the rear of the control box assembly fastened in back of the main frame casting on the TT-235/FG. The additional controls required for the operation of the control box assembly components appear on top the control box assembly.

<sup>a</sup> Supplied with TT-235/FG only.

<sup>b</sup> Not supplied but available through supply channels.

## 8. (Superseded) Differences in Models

Item	Distributor-Transmitter, Teletypewriter TT-122A/FG	Distributor-Transmitter, Teletypewriter TT-123A/FG	Distributor-Transmitter, Teletypewriter TT-235/FG
Motor type	Synchronous	Series-governed	Synchronous.
Guard on dust cover	Not included	Includes guard to protect target wheel and governor adjusting worm shaft.	Not included.
Fuses	Uses two 1-ampere fuses.	Uses two 1.6-ampere fuses	Uses two 1-ampere fuses.
Motor circuit components	See figure 45	See figure 46	See figure 46.1.
Control box components	Not included	Not included	Included to permit external control of the transmitter-distributor.

Page 6, paragraph 9a. After the heading, add: *TT-122A/FG and TT-123A/FG.*

a.1. (Added) *Packaging Data TT-235/FG.* When packed for shipment, each distributor-transmitter is fastened to a wooden shipping base with four machine screws and flat washers. The distributor-transmitter and wooden shipping base are then placed on a  $\frac{5}{16}$ -inch fiberboard cushion in a fiberboard carton  $15\frac{5}{8}$ -inches long by  $11\frac{7}{8}$ -inches wide by 8 inches high. Folded corrugated liners are inserted at both sides of the distributor-transmitter and a corrugated top liner is placed on top. The fiberboard carton is then closed and sealed with tape. Two technical manuals, sealed in a vapor-proof bag, are taped to the top of the carton. The two fiberboard cartons are then placed in a single fiberboard shipping container 24-inches long by  $15\frac{3}{4}$ -inches wide by 9-inches high. The shipping carton is then closed and sealed with tape. It occupies 2.1 cubic feet and weighs approximately 50 pounds.

Paragraph 9b. Delete the introductory sentence and substitute: Use the applicable steps outlined below to remove the contents.

Paragraph 10b, line 5. Change "(par. 5)" to: (pars. 5 and 5.1).

Page 8, paragraph 12. Make the following changes:

Subparagraph a, line 1. Change "(par. 5)" to: (pars. 5 and 5.1).

Subparagraph c, line 2. Add "and TT-235/FG" after: TT-122A/FG.

Page 10, paragraph 15. Add (TT-122A/FG and TT-123A/FG) after the heading.

## 15.1 (Added) Clutch Magnet Control (TT-235/FG) (fig. 6.1)

The clutch magnet circuit of TT-235/FG is energized by dc current derived from a rectifier CR1 within the control box assembly. The rectifier, in turn, is supplied ac power through the ac power cord.

a. If the distributor-transmitter is to be used without external clutch control apparatus, no further connections than those listed for TT-122A/FG or TT-123A/FG are required. The TD CLUTCH switch, however, must be positioned to FREE.

b. If the distributor-transmitter is to be used in conjunction with external control equipment, proceed as follows:

- (1) Determine whether the clutch magnet control circuit (terminating at the binding posts on top of the control box assembly) is to be furnished current from the external equipment or through the internal circuitry. Position the CHARACTER PULSE switch accordingly.
- (2) When external battery is to be used, check the control leads from the external equipment and determine the polarity of the leads. Connect the leads at binding posts E3 (—) and E4 (+). If necessary, place an ammeter in series between one of the binding posts and an external control lead and check the dc current. A dc current of 20 ma at 60 volts must be provided. If the

current value does not meet the requirement, adjust variable resistor R3.

- (3) When current for the clutch magnet control circuit is to be supplied by TT-235/FG, connect one of the control leads to one of the binding posts and insert an ammeter between the other binding post and the unconnected control lead. Arrange to have the external equipment provide a circuit

closure and adjust the variable resistor R3 until the current is 20 ma. Disconnect the ammeter and connect the remaining control lead to the unoccupied binding post.

Change "(fig. 6)" after paragraph 18 heading to read: (figs. 6 and 6.1).

Page 10, paragraph 18, Add the following to the chart:

Control	Location	Function
CHARACTER PULSE switch (fig. 6.1).	Top of control box	When in the INT. BAT. position, power for energizing relay K2 is supplied locally under control of pulsing contacts located at the distant (receiving) station. When in the EXT. BAT. position, power for energizing relay K2 is supplied and pulsed by the distant station. Relay K2 completes the local power supply circuit which energizes the clutch magnet.
TD CLUTCH switch (fig. 6.1).	Top of control box	When in the FREE position, the distributor-transmitter can run continuously (normal operation). When in the STEP position, the distributor-transmitter sends out a code group each time a pulse is received from the distant receiving station.

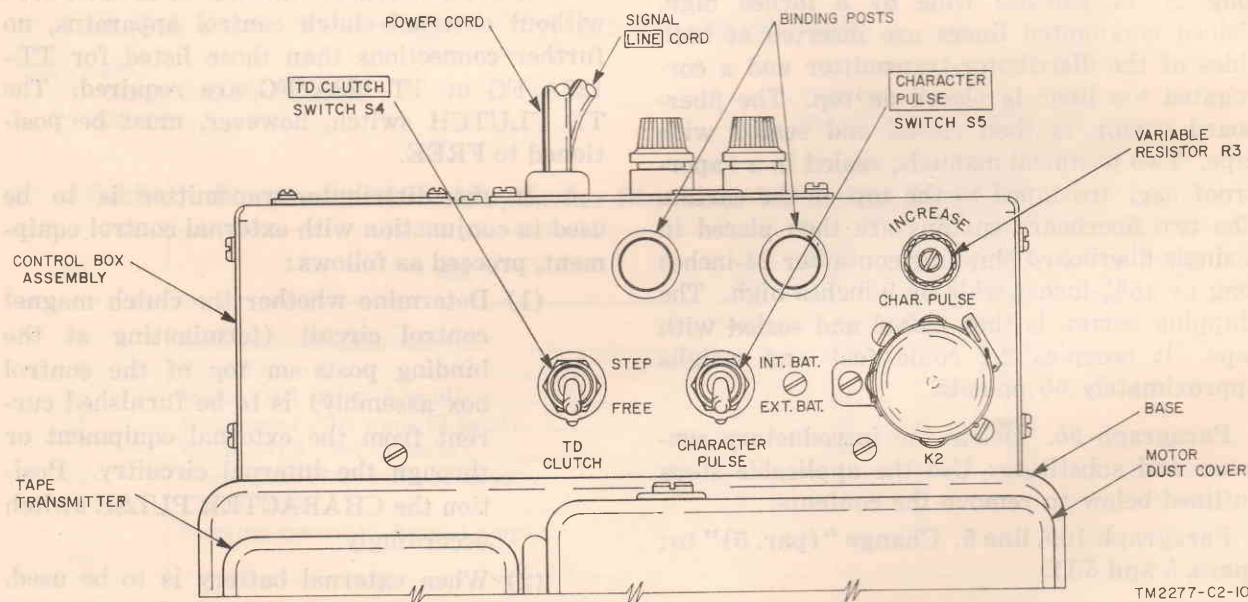


Figure 6.1 (Added) Control box assembly, top view (TT-235/FG).

Page 11, paragraph 19.

- b. 1. (Added) On TT-235/FG, move the TD CLUTCH control switch (fig. 6.1) to FREE.  
h. (Added) On TT-235/FG, position the TD CLUTCH switch to STEP and repeat the procedures in a through e above.

i. (Added) TT-235/FG should not transmit until the leads attached to the binding posts are energized by the associated equipment. Arrange to have the operator of that equipment furnish individual pulse (circuit closures of from 20 to 30 milliseconds each) at a rate that

does not exceed one control pulse for each code group to be transmitted.

j. (Added) Observe the transmission pattern of TT-235/FG; one code group should be transmitted for each control pulse received.

k. (Added) Follow the procedures outlined in g above.

Page 18, paragraph 28a.

(5) (Added) On TT-235/FG, remove the control box assembly from the base frame (par. 103.1a(3), (4), and (5)).

Page 19, paragraph 28h(1).

(a.1) (Added) on TT-235/FG, install the control box assembly on the base frame (par. 103.1b).

Paragraph 31. Change as follows:

Designate existing information as subparagraph a.

Add subparagraph b.

b. Lubricate TT-235/FG as required but avoid oversaturation of the felt washers.

Page 20, figure 9, captain. Delete "Distributor-transmitter" and substitute: TT-123A/FG.

Page 22, paragraph 34.

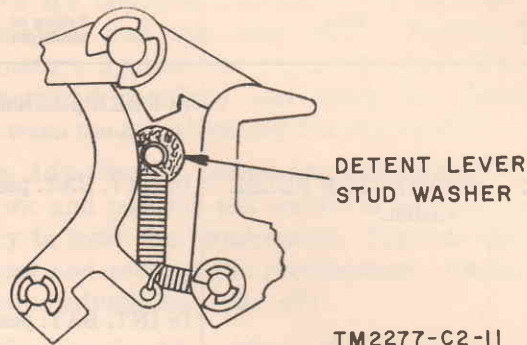
d.1. (Added) *Lubricating Felt Washers.* Apply lubricating oil around the periphery of each of the lubricating felts. Avoid oversaturation.

Page 26, paragraph 38e. Add the following after Item No. 4 in the "PREPARATORY" section:

Item No.	Item	Action or condition	Normal indications	Corrective measures
4.1	TD CLUTCH switch <sup>a</sup> ---	In STEP or FREE position.	None-----	Position as required (par. 19.1).
4.2	CHARACTER PULSE switch. <sup>a</sup>	In EXT. BAT. or INT. BAT. position.	None-----	Position as required (par. 19.1).
4.3	Binding posts E3 and E4. <sup>a</sup>	Lines from external pulsing source properly secured to each post.	None-----	Fasten external lines properly.

Add the following after Item No. 9, in the "EQUIPMENT PERFORMANCE" section:

Item No.	Item	Action or condition	Normal indications	Corrective measures
9.1	TD CLUTCH switch <sup>a</sup> ---	In STEP position-----	Transmitter sends one code group for each external pulse received.	Check binding posts E3 and E4 connections.



Stop-start, detent lever stud  
Figure 10.1. (Added) Location of detent lever stud washer (TT-235/FG).

Subparagraph e, chart. Make the following changes:

Add the following to the chart, below "Fig. No. 10, Item No. 9."

Fig. No.	Item No.	Name of part	Method and quantity
10.1		Detent lever stud washer.	Saturate felt washer.

In "Method and quantity" column, add "and oil lubricating felt." in the following places:

Fig. No. 10, Item No. 4, after "surfaces."

Fig. No. 10, Items No. 5 and 6, after "points."

Fig. No. 10, Item No. 9, after "stud."

Fig. No. 11, Items Nos. 1 and 5, after "points."

Item No.	Item	Action or condition	Normal indications	Corrective measures
9.2	CHARACTER PULSE switch.*	In FREE position-----	Transmitter sends at maximum rate.	Check START-STOP switch and clutch magnet.
		In EXT. BAT. position----	Transmitter sends successive code groups in response to receipt of current pulses from external equipment.	Check current received from external lines terminating at E3 and E4.
		In INT. BAT. position----	Transmitter sends one code group for each circuit closure provided by the external equipment.	Check rectifier CRI and clutch magnet control circuit (fig. 46.1).

\* Applicable only to equipments which provide a control box assembly for external control of the clutch magnet.

Paragraph 39, fourth sentence. Delete and substitute: Adjustments not otherwise specified apply to all equipments in this manual; those applicable only to the TT-122A/FG, TT-123A/FG, or TT-235/FG are so identified.

#### 40.1. (Added) Transmitting Camshaft End Play Adjustment (fig. 14.1)

*a. Requirement.* There should be .001 to .005 inch clearance between the spacer and the ball bearing when the transmitting camshaft is held towards the casting and against the ball bearing.

*b. Method of Checking.* Press the transmitting camshaft towards the casting and against the ball bearing. Check the requirement.

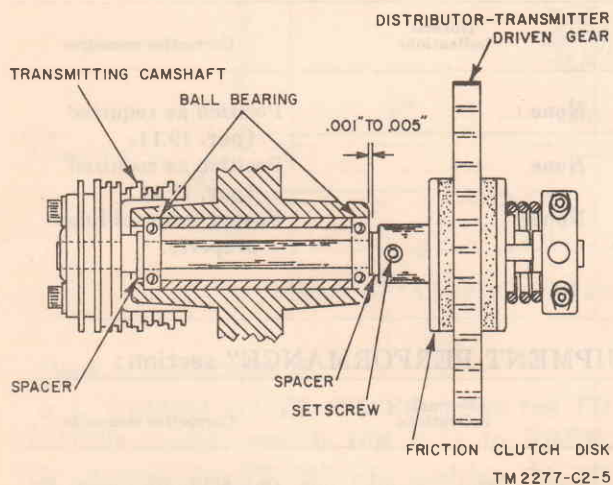


Figure 14.1. (Added) Transmitting camshaft end play adjustment.

*c. Adjustment.* Loosen the setscrews in the friction clutch disk. While holding the transmitter camshaft towards the casting and against the ball bearing, slide the friction clutch disk and spacer against the ball bearing. Be certain the setscrews are properly positioned over the flats on the shaft. Tighten the setscrews.

#### 45.1. (Added) Sensing Levers Comb Adjustment (fig. 19.1)

*a. Requirement.* There should be a minimum of .010-inch clearance between the sensing levers and the comb, and between the feed claw and the comb when the distributor-transmitter is in the stop position.

*b. Adjustment.* Loosen the two mounting screws that hold the comb and position it to meet the requirement. Tighten the two mounting screws and recheck the requirement.

Add figure 19.1 after figure 19.

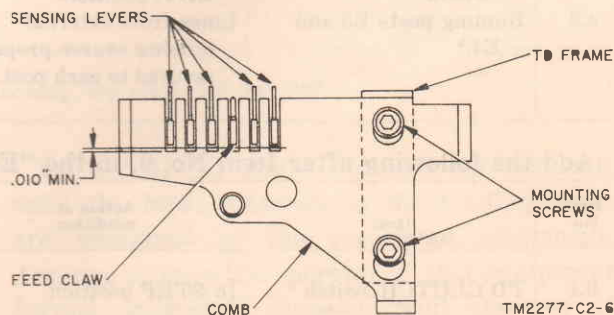


Figure 19.1. (Added) Sensing levers comb adjustment.

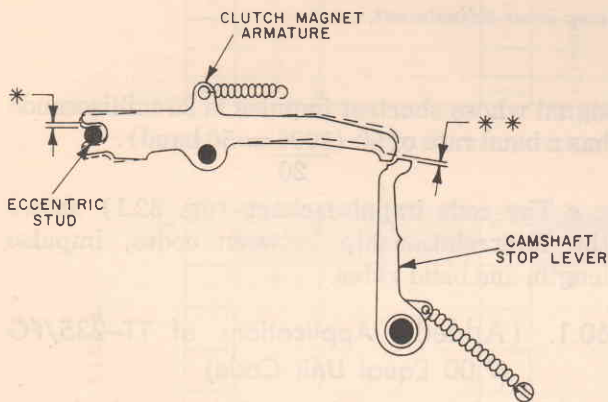
Page 29, paragraph 46. After the heading, add: TT-122A/FG and TT-123A/FG.

**46.1. (Added) Clutch Magnet Armature Eccentric Stud Adjustment TT-235/FG**

(fig. 20.1)

*a. Requirement.* With the stop lever unoperated and the clutch magnet deenergized, the clearance between the top of the eccentric stud and the armature governs the required clearance between the armature and the camshaft stop lever when the clutch magnet is energized. The chart in figure 20.1 shows the required clearance between the armature and the stop lever for the measured clearance between the armature and the eccentric stud.

*b. Method of Checking.* With the stop lever unoperated and the clutch magnet deenergized, check the clearance (\*) between the top of the eccentric stud and the armature. Deter-



* CLEARANCE BETWEEN THE CLUTCH MAGNET ARMATURE AND THE ECCENTRIC STUD	* * CLEARANCE BETWEEN THE CLUTCH MAGNET ARMATURE AND THE CAMSHAFT STOP LEVER
.008"	.002" TO .004"
.009"	.003" TO .005"
.010"	.005" TO .007"
.011"	.007" TO .009"
.012"	.009" TO .011"

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Figure 20.1. (Added) Clutch magnet armature eccentric stud adjustment.

mine the required clearance (\*\*) between the armature and the stop lever. Position the armature against the top of the eccentric and (energized position) and check the clearance between the armature and the stop lever.

*c. Adjustment.* Loosen the eccentric stud set-screw and position the eccentric stud as necessary to meet the requirement. Tighten the set-screw and recheck the requirement. Check the related adjustment (par. 47).

Paragraph 48. After the heading, add: (Neutral Operation).

Page 30, paragraph 48c(2), note. Change "ST-383\*/GG" to: TS-383(\*)/GG.

**57.4. (Added) Start-Stop Lever Adjustment (fig. 31.4)**

*a. Requirements.*

- (1) There should be a minimum of 75 percent engagement (visual check) of the start-stop lever with the step on the tape transmitter front cover plate when the start-stop lever is in the stop position.
- (2) The start-stop lever should be moved into the feed retract position by first applying pressure to the left and then pushing downward into position.
- (3) The neoprene covered end of the start-stop lever should not rub against the tape transmitter front cover.

*b. Adjustments.*

- (1) Remove the side cover of the tape transmitter. Grasp the start-stop lever firmly with long-nosed pliers in the area shown (fig. 31.4) and, with thumb and forefinger, bend the neoprene end of the start-stop lever slightly until the requirements in a(1) and (2) above are met.
- (2) Trim the neoprene on the start-stop lever to meet requirement a(3) above. Replace the side cover and recheck the requirements.

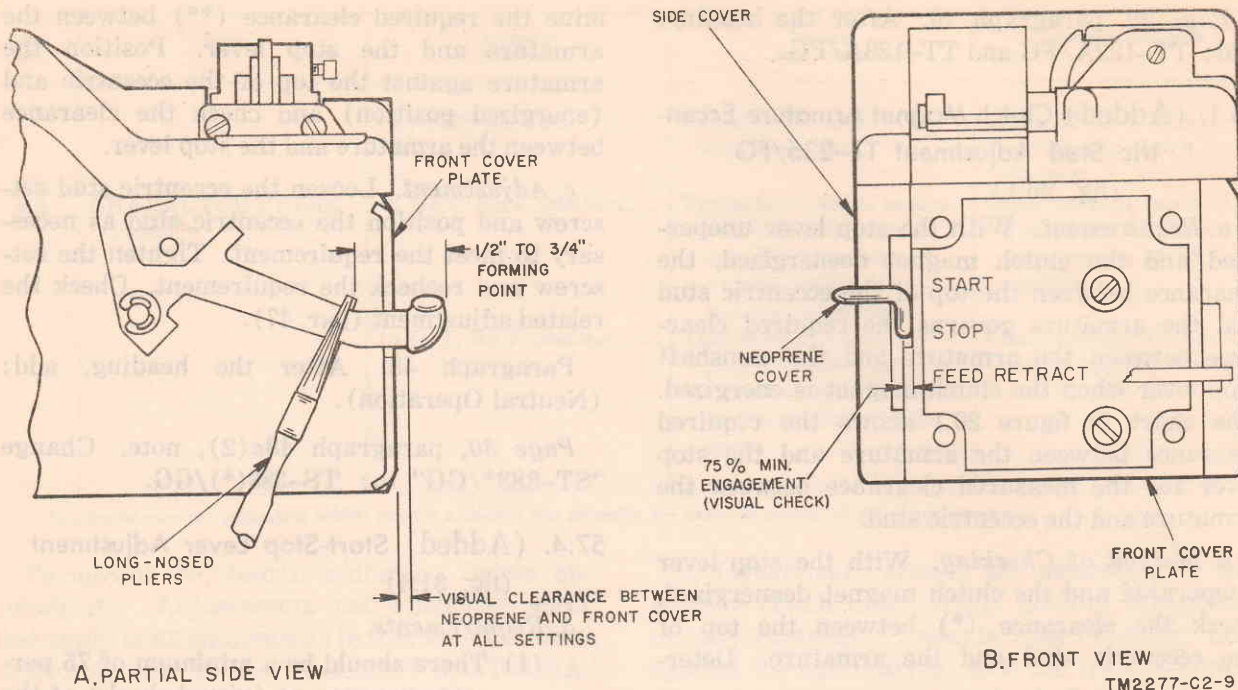


Figure 31.4. (Added) Start-stop lever adjustment.

Page 34, paragraph 58, line 6. After "neutral" add: 7.42 unit code.

Add the following after the first sentence: Teletypewriter Distributor-Transmitter TT-235/FG is similar to TT-122A/FG except that the TT-235/FG transmits 7.00 unit code and provides facilities for the external control of its clutch magnet.

### 59.1. (Added) Baud Rates

a. The term "baud rate" indicates the maximum number of impulses that occur within 1 second. When impulses within a code group vary in length, for example in the 7.42 code, the baud rate is based on the shortest impulse within the code group.

b. The baud rate is obtained by dividing 1,000 milliseconds (1 second) by the length (in milliseconds) of the shortest impulse. Thus, a

signal whose shortest impulse is 20 milliseconds has a baud rate of 50 ( $\frac{1000}{20} = 50$  baud).

c. The code impulse chart (fig. 32.1) shows the interrelationship between codes, impulse length, and baud rates.

### 60.1. (Added) Applications of TT-235/FG (7.00 Equal Unit Code)

a. Signal line routing and tape code transmission is identical with that described in paragraph 60.

b. The transmitter, however, may be controlled by the transmitter by the use of an external pulsing device and control lines and control box. The transmitter can be used to operate independent of external control when the TD CLUTCH switch is positioned to FREE.

Page 35. Add figure 32.1 after figure 32.



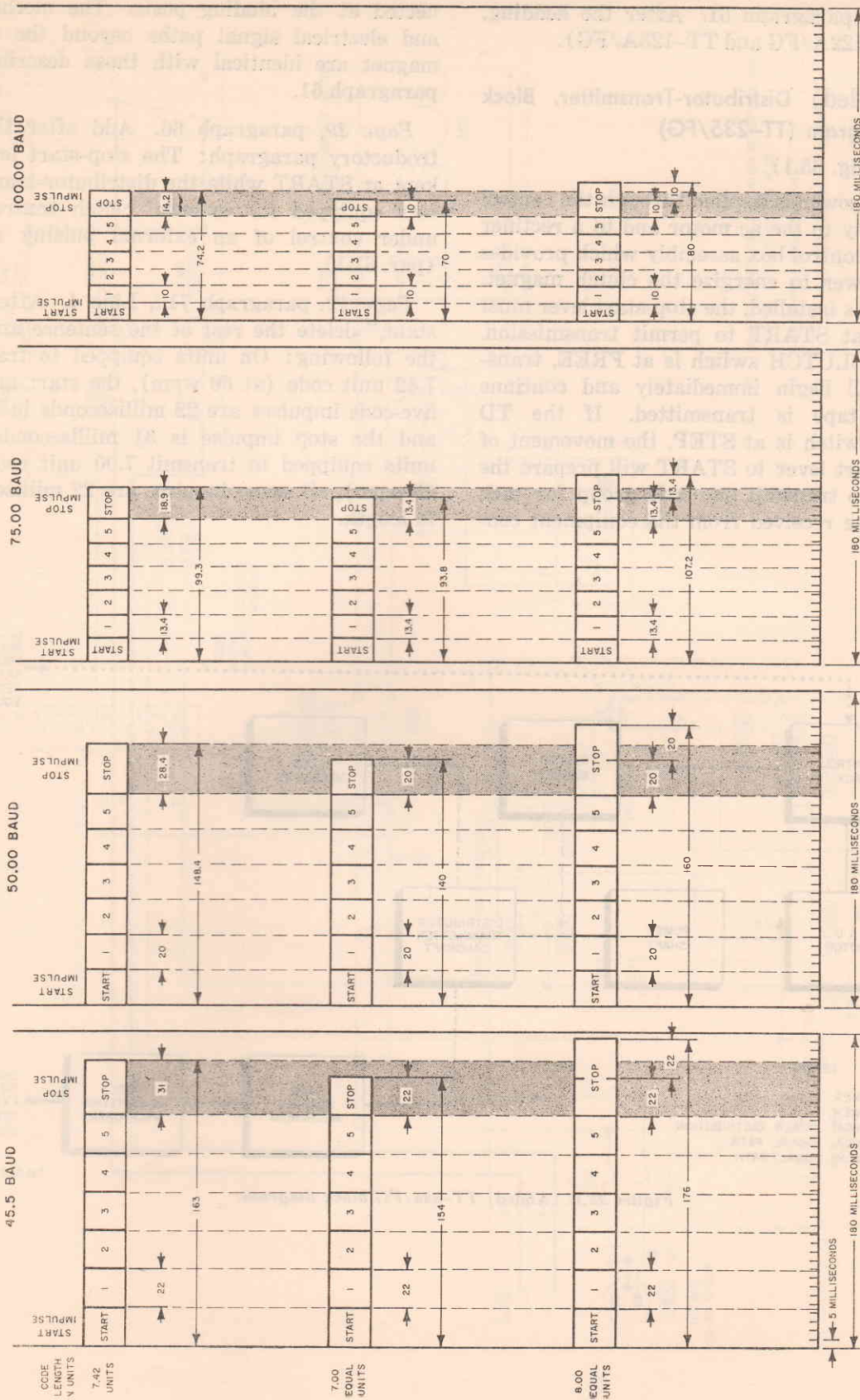


Figure 32.1. (Added) Chart relating codes, impulse lengths, and baud rates.

Page 36, paragraph 61. After the heading, add: (TT-122A/FG and TT-123A/FG).

61.1. (Added) Distributor-Transmitter, Block Diagram (TT-235/FG)

(fig. 35.1)

Input ac power is applied through the control box assembly to the ac motor and to a rectifier within the control box assembly which provides local dc power to energize the clutch magnet. When tape is installed, the stop-start lever must be placed at START to permit transmission. If the TD CLUTCH switch is at FREE, transmission will begin immediately and continue until the tape is transmitted. If the TD CLUTCH switch is at STEP, the movement of the stop-start lever to START will prepare the local unit to transmit one code group for each control pulse received from the equipment con-

nected at the binding posts. The mechanical and electrical signal paths beyond the clutch magnet are identical with those described in paragraph 61.

Page 39, paragraph 66. Add after the introductory paragraph: The stop-start lever is kept at START while the distributor-transmitters equipped for external clutch control are under control of an external pulsing source (par. 61.1).

Page 42, paragraph 71d, Line 4. After "instant," delete the rest of the sentence and add the following: On units equipped to transmit 7.42 unit code (at 60 wpm), the start and the five-code impulses are 22 milliseconds in length and the stop impulse is 31 milliseconds. On units equipped to transmit 7.00 unit code (at 65 wpm), all seven impulses are 22 milliseconds in length.

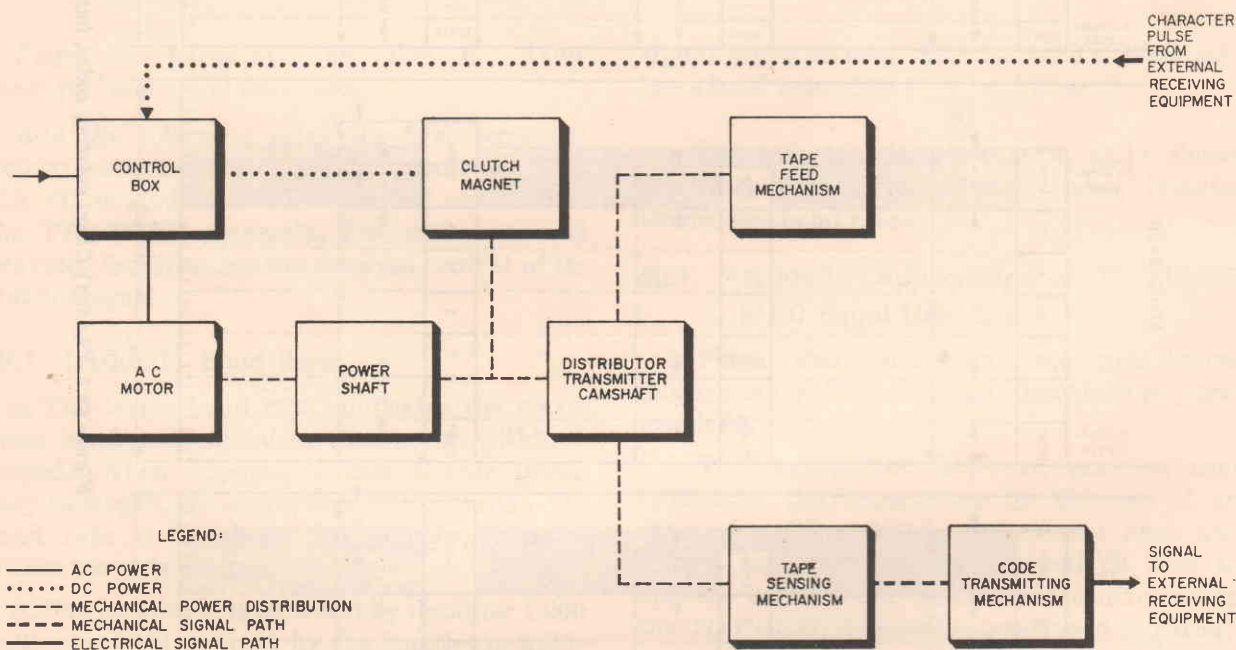
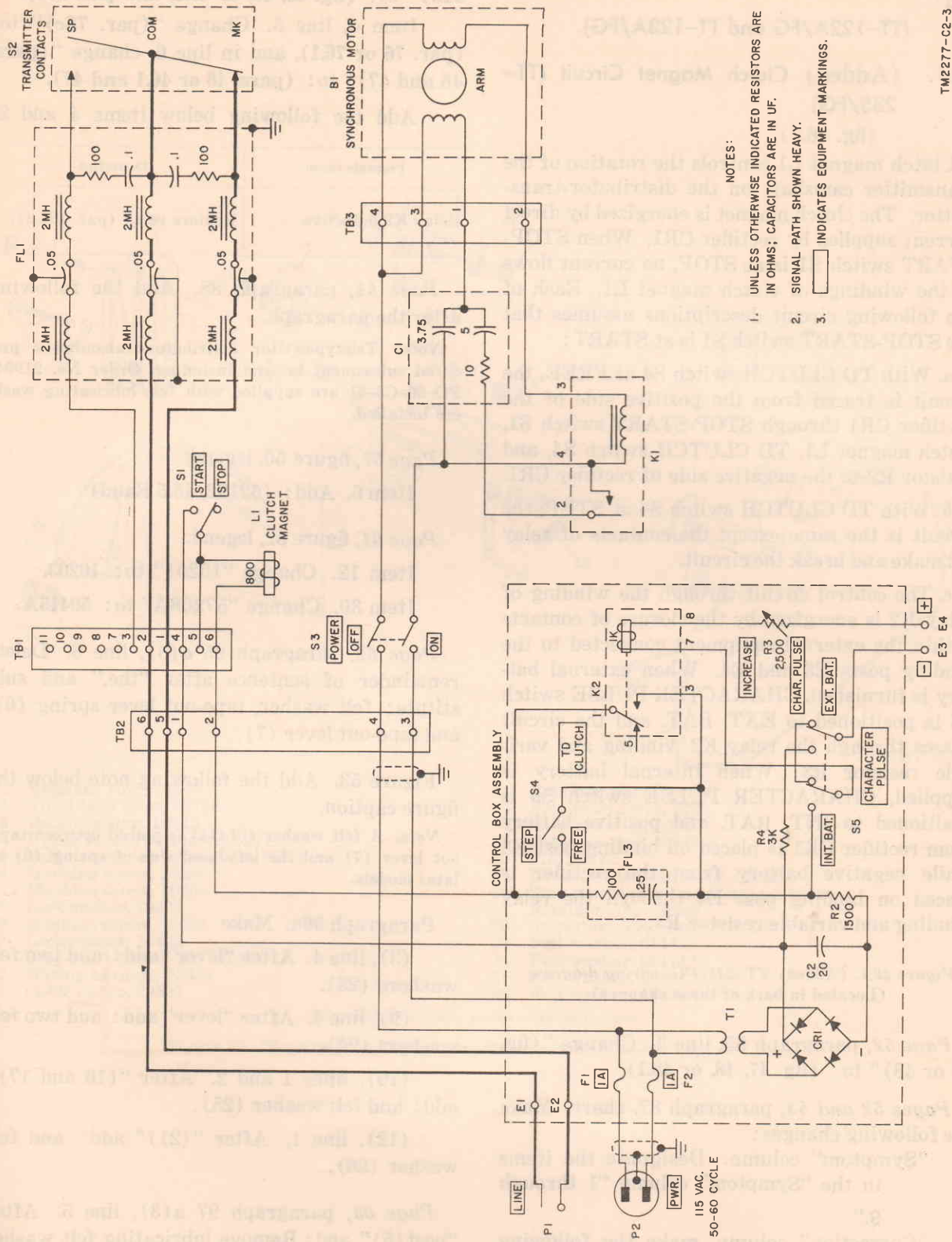


Figure 35.1. (Added) TT-235/FG block diagram.

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NOTES:

1. UNLESS OTHERWISE INDICATED RESISTORS ARE IN OHMS; CAPACITORS ARE IN UF.
2. SIGNAL PATH SHOWN HEAVY.
3.  INDICATES EQUIPMENT MARKINGS.

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Figure 46.1. (Added) TT-295/FG, schematic diagram.

Page 47, paragraph 76. After the heading, add:

(TT-122A/FG and TT-123A/FG).

76.1. (Added) Clutch Magnet Circuit (TT-235/FG)  
(fig. 46.1)

Clutch magnet L1 controls the rotation of the transmitter camshaft on the distributor-transmitter. The clutch magnet is energized by direct current supplied by rectifier CR1. When STOP-START switch S1 is at STOP, no current flows in the windings of clutch magnet L1. Each of the following circuit descriptions assumes that the STOP-START switch S1 is at START:

a. With TD CLUTCH switch S4 at FREE, the circuit is traced from the positive side of the rectifier CR1 through STOP-START switch S1, clutch magnet L1, TD CLUTCH switch S4, and resistor R2 to the negative side of rectifier CR1.

b. With TD CLUTCH switch S4 at STEP, the circuit is the same except the contacts of relay K2 make and break the circuit.

c. The control circuit through the winding of relay K2 is energized by the closure of contacts within the external equipment connected to the binding posts E3 and E4. When external battery is furnished, CHARACTER PULSE switch S5 is positioned to EXT. BAT. and the circuit passes through the relay K2 winding and variable resistor R3. When internal battery is supplied, CHARACTER PULSE switch S5 is positioned to INT. BAT. and positive battery from rectifier CR1 is placed on binding post E3 while negative battery from the rectifier is placed on binding post E4 through the relay winding and variable resistor R3.

Figure 48.1. (Added) TT-235/FG, wiring diagram.  
(Located in back of these changes)

Page 52, paragraph 85, line 3. Change "(fig. 47 or 48)" to: (fig. 47, 48, or 48.1).

Pages 52 and 53, paragraph 87, chart. Make the following changes:

"Symptom" column. Designate the items in the "Symptom" column "1 through 9."

"Correction" column, make the following changes:

Item 3, line 4. Change "(fig. 45 or 46, par. 91b)" to: (fig. 45, 46, or 46.1, and par. 104).

Item 4, line 3. Change "(par. 76c)" to: (par. 76 or 76.1), and in line 6, change "(pars. 46 and 47)" to: (pars. 46 or 46.1 and 47).

Add the following below items 4 and 8:

Probable cause	Correction
Relay K2 defective.....	Replace relay (par. 103.2).

Page 54, paragraph 88. Add the following after the paragraph.

Note. Teletypewriter distributor-transmitters procured subsequent to, and including, Order No. 21904-PC-60-C5-51 are supplied with felt lubricating washers installed.

Page 57, figure 50, legend.

Item 6. Add: (62192, 45.5 Baud).

Page 61, figure 52, legend.

Item 12. Change "10201" to: 10203.

Item 30. Change "57208A" to: 59415A.

Page 62, paragraph 95 a(3), line 6. Delete remainder of sentence after "the," and substitute: felt washer, tape-out lever spring (6), and tape-out lever (7).

Figure 53. Add the following note below the figure caption.

Note. A felt washer (61474) is placed between tape-out lever (7) and the left-hand side of spring (6) on later models.

Paragraph 96a. Make

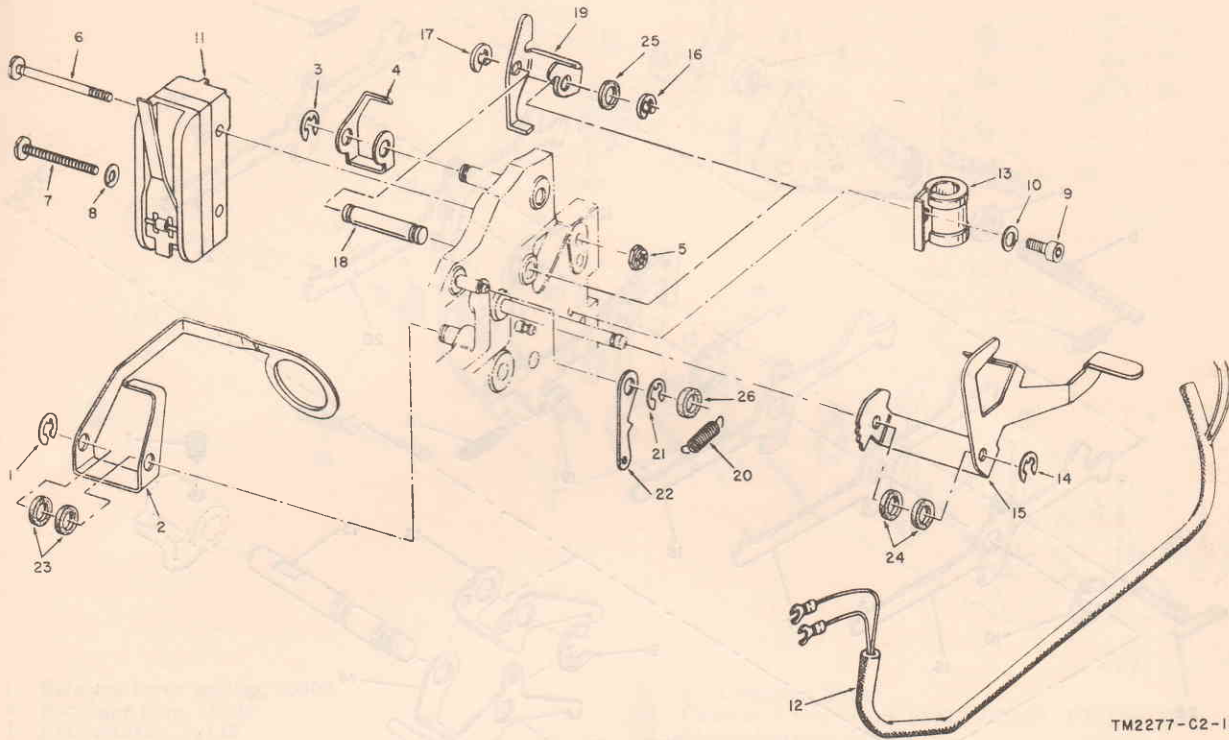
(3), line 4. After "lever" add: and two felt washers (23).

(9), line 4. After "lever" add: and two felt washers (24).

(10), lines 1 and 2. After "(16 and 17)" add: and felt washer (25).

(12), line 1. After "(21)" add: and felt washer (26).

Page 63, paragraph 97 a(3), line 5. After "post(5)" and: Remove lubricating felt washer (22).

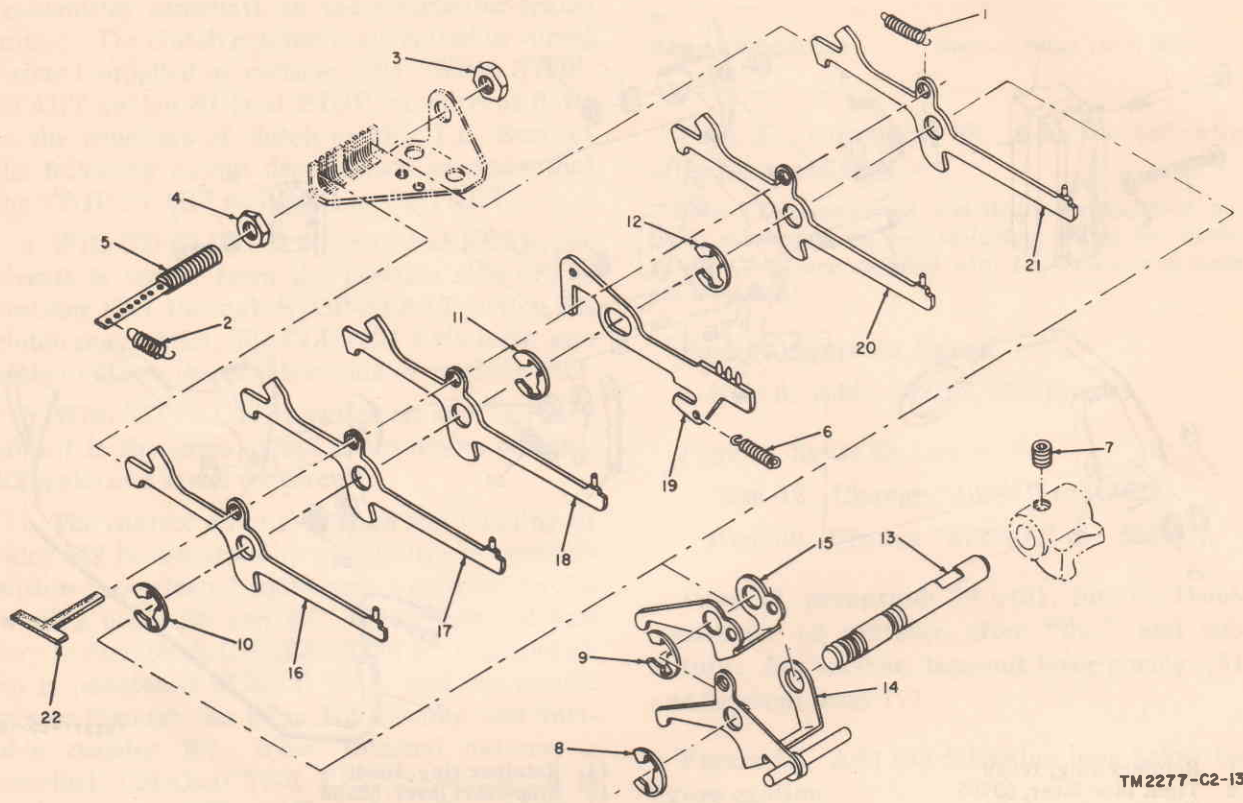


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- |    |                                   |    |                                       |
|----|-----------------------------------|----|---------------------------------------|
| 1  | Retainer ring, 10949              | 14 | Retainer ring, 10949                  |
| 2  | Tight tape lever, 59705           | 15 | Stop-start lever, 52863               |
| 3  | Retainer ring, 10949              | 16 | Retainer ring, 10949                  |
| 4  | Upper switch bail lever, 52811    | 17 | Retainer ring, 10949                  |
| 5  | Self-locking hexagonal nut, 10500 | 18 | Pin, 52872                            |
| 6  | Machine screw, 10385              | 19 | Lower switch bail lever, 52812        |
| 7  | Machine screw, 10359              | 20 | Stop-start lever detent spring, 53149 |
| 8  | Lockwasher, 10429                 | 21 | Retainer ring, 10949                  |
| 9  | Machine screw, 10003              | 22 | Stop-start lever detent, 57206        |
| 10 | Lockwasher, 10429                 | 23 | Felt washer, 61474 <sup>a</sup>       |
| 11 | Stop-start switch S1, 20108       | 24 | Felt washer, 61474 <sup>a</sup>       |
| 12 | Wiring harness, 53339             | 25 | Felt washer, 61477 <sup>a</sup>       |
| 13 | Cable clamp, 20507                | 26 | Felt washer, 61474 <sup>a</sup>       |

<sup>a</sup> Not supplied on early models of the equipment.

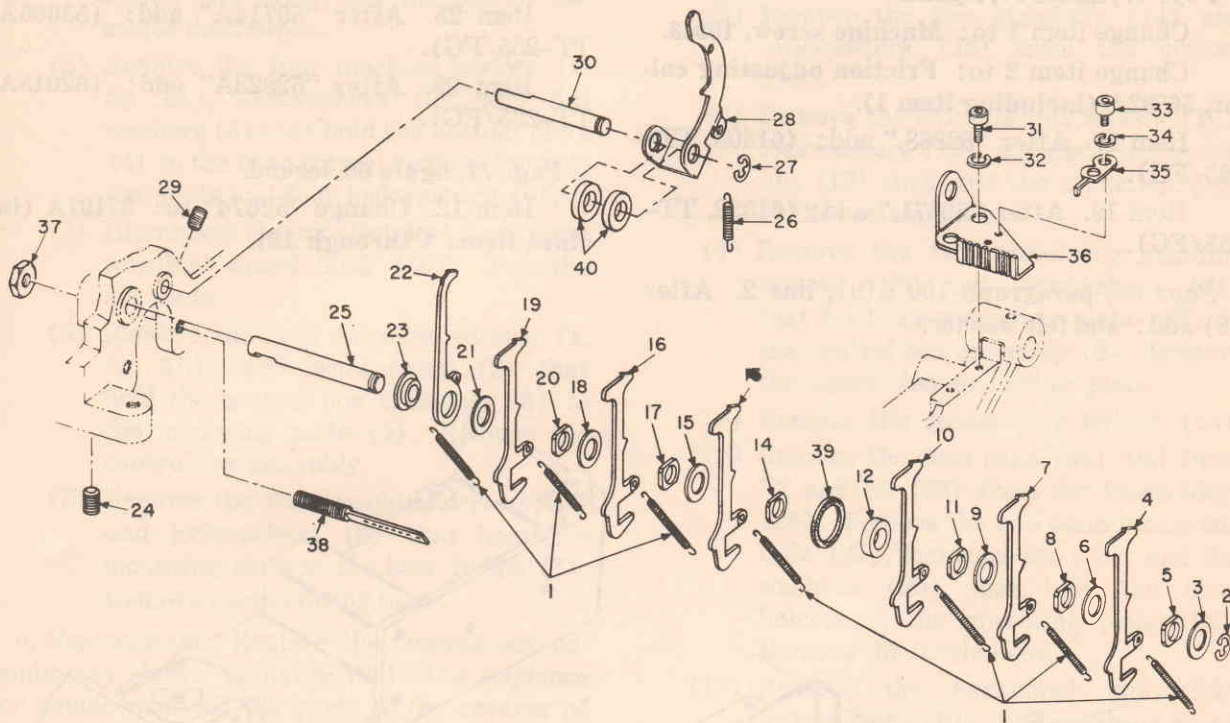
Figure 54. (Superseded) Tape transmitter operating levers, exploded view.



TM2277-C2-13

- |    |  |    |   |
|----|--|----|---|
| 1  | Code sensing lever spring, 53152         | 13 | Code sensing lever stud, 52835                        |
| 2  | Tape feed retracting lever spring, 53154 | 14 | Tape feed retracting lever, 52829A                    |
| 3  | Plain hexagonal nut, 10509               | 15 | Sensing lever restoring bail, 52858                   |
| 4  | Plain hexagonal nut, 10509               | 16 | Code sensing lever, 52844                             |
| 5  | Code sensing lever spring post, 50325    | 17 | Code sensing lever, 52844                             |
| 6  | Tape feed claw spring, 53153             | 18 | Code sensing lever, 52844                             |
| 7  | Setscrew, 10209                          | 19 | Tape feed claw, 52836                                 |
| 8  | Retainer ring, 10957                     | 20 | Code sensing lever, 52844                             |
| 9  | Retainer ring, 10957                     | 21 | Code sensing lever, 52844                             |
| 10 | Retainer ring, 10957                     | 22 | Lubricating felt 61460 (not supplied on early models) |
| 11 | Retainer ring, 10957                     |    |   |
| 12 | Retainer ring, 10957                     |    |   |

Figure 55. (Superseded) Code sensing levers, exploded view.



TM 2277-C2-14

- |                                |  |
|--------------------------------|--|
| 1 Selector lever spring, 50902 | 21 Flat washer, 50147                            |
| 2 Retainer ring, 10949         | 22 Camshaft stop lever, 53613 (62020, TT-235/FG) |
| 3 Flat washer, 50147           | 23 Sleeve bearing, 52834                         |
| 4 Selector lever, 51598A       | 24 Setscrew, 10210                               |
| 5 Bearing shoe, 51644A         | 25 Selector lever stud, 52840                    |
| 6 Flat washer, 50147           | 26 Tape feed lever spring, 53151                 |
| 7 Selector lever, 51598A       | 27 Retainer ring, 10949                          |
| 8 Bearing shoe, 51644A         | 28 Tape feed lever, 52845                        |
| 9 Flat washer, 50147           | 29 Setscrew, 10210                               |
| 10 Selector lever, 51598A      | 30 Tape feed lever stud, 52842                   |
| 11 Bearing shoe, 51644A        | 31 Machine screw, 10003                          |
| 12 Spacer collar, 52833        | 32 Lockwasher, 10429                             |
| 13 Selector lever, 51598A      | 33 Machine screw, 10002                          |
| 14 Bearing shoe, 51644A        | 34 Lockwasher, 10429                             |
| 15 Flat washer, 50147          | 35 Stop selector lever latch, 55870              |
| 16 Selector lever, 51598A      | 36 Selector lever comb, 52841 (62019, TT-235/FG) |
| 17 Bearing shoe, 51644A        | 37 Plain hexagonal nut, 10509                    |
| 18 Flat washer, 50147          | 38 Anchor post, 50325                            |
| 19 Selector lever, 51598A      | 39 Felt washer, 61479 <sup>a</sup>               |
| 20 Bearing shoe, 51644A        | 40 Felt washer, 61474 <sup>a</sup>               |

<sup>a</sup> Not supplied on early models of the equipment.

Figure 56. (Superseded) Selector levers, exploded view.

Page 66, paragraph 98a.

(4), line 7. After "(12)" add: and felt washer (39).

(7), line 4. After "lever" add: Remove the two lubricating felt washers (40).

Page 67, figure 57, legend.

Change item 1 to: Machine screw, 10043.

Change item 2 to: Friction adjusting collar, 56832A (including item 1).

Item 17. After "52868," add: (61403, TT-235/FG).

Item 19. After "52871," add: (61322, TT-235/FG).

Page 68, paragraph 100 a(9), line 2. After (9) add: and felt washer.

Figure 58. Add the following note below the figure caption.

Note. A felt washer (61476) appears at the right of the retainer ring (16) in the latest models of the equipment.

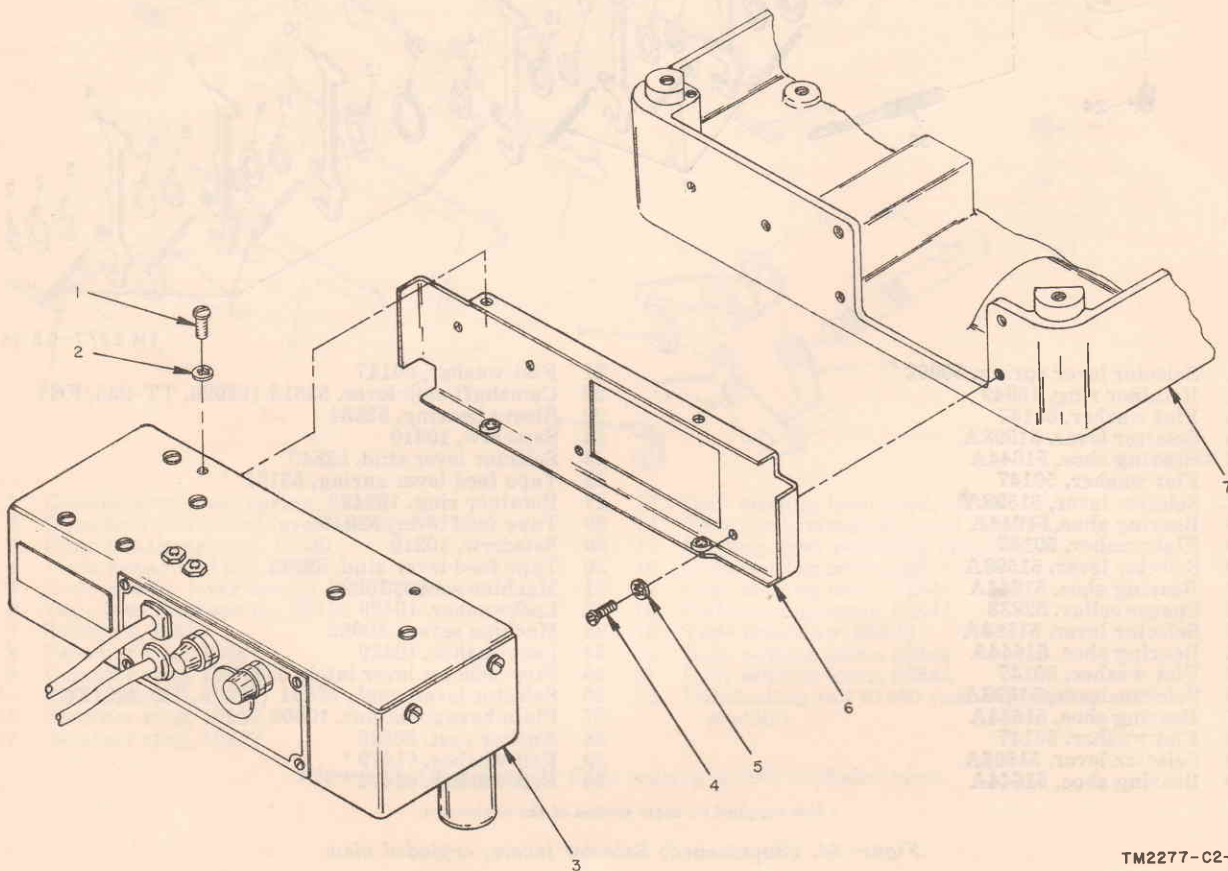
Page 69, figure 59, legend.

Item 25. After "59714A" add: (53605A, TT-235/FG).

Item 28. After "52828A" add: (62018A, TT-235/FG).

Page 71, figure 60, legend.

Item 12. Change "52674" to: 57197A (includes items 4 through 12).



TM2277-C2-1

- 1 Machine screw, 10393
- 2 Lockwasher, 10403
- 3 Control box assembly, 62177A
- 4 Mounting plate, 62179A

- 5 Machine screw, 10393
- 6 Lockwasher, 10403
- 7 Base frame, 62190A

Figure 61.1. (Added) Control box assembly, plate, and base frame, (TT-235/FG) exploded view.



### 103.1. (Added) Removal and Replacement of Control Box Assembly (TT-235/FG)

#### a. Removal.

- (1) Invert the distributor-transmitter unit so that it rests on the tape transmitter top cover and the top of the motor dust cover.
- (2) Remove the four machine screws (1, fig. 61), lockwashers (2), and flat washers (3) that hold the bottom plate (4) to the base frame; remove the bottom plate and four lockwashers (5).
- (3) Disconnect the six electrical leads from terminal board TB2 (50). Tag the six leads.
- (4) Remove the four machine screws (1, fig. 61.1) and lockwashers (2) that hold the control box assembly (3) to the mounting plate (4). Remove the control box assembly.
- (5) Remove the four machine screws (5) and lockwashers (6) that hold the mounting plate to the base frame (7). Remove the mounting plate.

b. *Replacement.* Replace the control box assembly as shown in figure 61.1; the sequence for replacement of the parts is the reverse of the removal sequence.

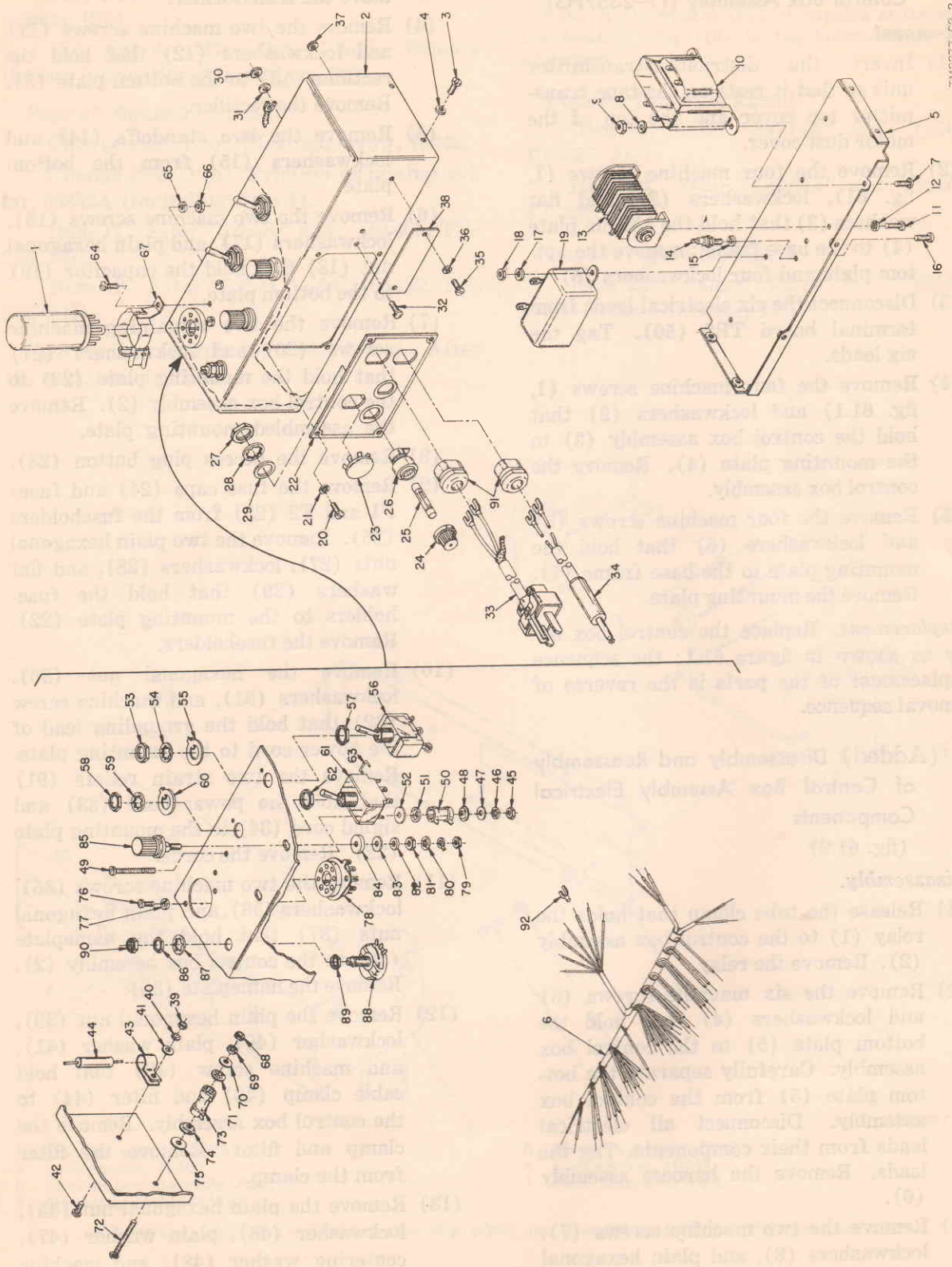
### 103.2. (Added) Disassembly and Reassembly of Control Box Assembly Electrical Components (fig. 61.2)

#### a. Disassembly.

- (1) Release the tube clamp that holds the relay (1) to the control box assembly (2). Remove the relay.
- (2) Remove the six machine screws (3) and lockwashers (4) that hold the bottom plate (5) to the control box assembly. Carefully separate the bottom plate (5) from the control box assembly. Disconnect all electrical leads from their components. Tag the leads. Remove the harness assembly (6).
- (3) Remove the two machine screws (7), lockwashers (8), and plain hexagonal nuts (9) that hold the transformer

(10) to the bottom plate (5). Remove the transformer.

- (4) Remove the two machine screws (11) and lockwashers (12) that hold the rectifier (13) to the bottom plate (5). Remove the rectifier.
- (5) Remove the two standoffs (14) and lockwashers (15) from the bottom plate.
- (6) Remove the two machine screws (16), lockwashers (17), and plain hexagonal nut (18) that hold the capacitor (19) to the bottom plate.
- (7) Remove the two remaining machine screws (20) and lockwashers (21) that hold the mounting plate (22) to the control box assembly (2). Remove the assembled mounting plate.
- (8) Remove the access plug button (23).
- (9) Remove the fuse caps (24) and fuses F1 and F2 (25) from the fuseholders (26). Remove the two plain hexagonal nuts (27), lockwashers (28), and flat washers (29) that hold the fuseholders to the mounting plate (22). Remove the fuseholders.
- (10) Remove the hexagonal nut (30), lockwashers (31), and machine screw (32) that hold the grounding lead of the power cord to the mounting plate. Remove the two strain reliefs (91) that hold the power cord (33) and signal cord (34) to the mounting plate (22). Remove the cords.
- (11) Remove the two machine screws (35), lockwashers (36), and plain hexagonal nuts (37) that hold the nameplate (38) to the control box assembly (2). Remove the nameplate (38).
- (12) Remove the plain hexagonal nut (39), lockwasher (40), plain washer (41), and machine screw (42) that hold cable clamp (43) and filter (44) to the control box assembly. Remove the clamp and filter. Remove the filter from the clamp.
- (13) Remove the plain hexagonal nut (45), lockwasher (46), plain washer (47), centering washer (48), and machine screw (49) that hold the resistor (50)



TW2277-C2-2

Figure 61.2. (Added) Control box assembly electrical components (TT-235/FG), exploded view.

- |   |   |
|---|---|
| 1 Relay K2, 20317   | 47 Plain washer, 10463                                  |
| 2 Control box assembly, 62182A  | 48 Centering washer, 57311                              |
| 3 Machine screw, 10111  | 49 Machine screw, 10130                                 |
| 4 Lockwasher, 10403   | 50 Resistor R3, 20072                                   |
| 5 Bottom plate, 62181A  | 51 Centering washer, 57311                              |
| 6 Harness assembly, 62184A (includes item 90)                         | 52 Washer, 51481  |
| 7 Machine screw, 10252  | 53 Plain hexagonal nut                                  |
| 8 Lockwasher, 10430   | 54 Lockwasher   |
| 9 Hexagonal nut, 10515  | 55 Positioning device                                   |
| 10 Transformer T1, 62176  | 56 Switch S4 (20117, includes items 53, 54, 55, and 57) |
| 11 Machine screw, 10301   | 57 Plain hexagonal nut                                  |
| 12 Lockwasher, 10403  | 58 Plain hexagonal nut                                  |
| 13 Rectifier CR1, 54356A  | 59 Lockwasher   |
| 14 Standoff, 20357  | 60 Positioning device                                   |
| 15 Lockwasher, 10415  | 61 Switch S5 (20121, includes items 58, 59, 60, and 62) |
| 16 Machine screw, 10252   | 62 Plain hexagonal nut                                  |
| 17 Lockwasher, 10430  | 63 Bare wire  |
| 18 Hexagonal nut, 10515   | 64 Machine screw, 10111                                 |
| 19 Capacitor C1, 20313  | 65 Lockwasher, 10403                                    |
| 20 Machine screw, 10111   | 66 Plain hexagonal nut, 10512                           |
| 21 Lockwasher, 10403  | 67 Tube clamp, 20543                                    |
| 22 Mounting plate, 59682  | 68 Plain hexagonal nut, 10515                           |
| 23 Access plug button, 59792  | 69 Lockwasher, 10430                                    |
| 24 Fuse cap   | 70 Plain washer, 10463                                  |
| 25 Fuses F1 and F2, 20468   | 71 Centering washer, 57311                              |
| 26 Fuseholders XF1 and XF2 (20458, includes items 24, 27, 28, and 29) | 72 Machine screw, 10130                                 |
| 27 Plain hexagonal nut  | 73 Resistor R2, 20071                                   |
| 28 Lockwasher   | 74 Centering washer, 57311                              |
| 29 Flat washer  | 75 Washer, 51481  |
| 30 Hexagonal nut, 10512   | 76 Machine screw, 10111                                 |
| 31 Lockwasher, 10403  | 77 Lockwasher, 10403                                    |
| 32 Machine screw, 10111   | 78 Octal socket XK2, 20275                              |
| 33 Power cord, 62186A   | 79 Plain hexagonal nut, 10515                           |
| 34 Signal cord, 62185A  | 80 Lockwasher, 10404                                    |
| 35 Machine screw, 10375   | 81 Plain hexagonal nut, 10515                           |
| 36 Lockwasher, 12408  | 82 Plain washer, 10463                                  |
| 37 Plain hexagonal nut, 10517   | 83 Spacer, 50515  |
| 38 Nameplate  | 84 Insulating washer, 50909                             |
| 39 Plain hexagonal nut, 10517   | 85 Binding post E3 or E4, 20877                         |
| 40 Lockwasher, 10403  | 86 Plain hexagonal nut, 10529                           |
| 41 Plain washer, 10463  | 87 Lockwasher, 10419                                    |
| 42 Machine screw, 10375   | 88 Variable resistor R4 (20023, includes item 90)       |
| 43 Cable clamp, 20541   | 89 Plain hexagonal nut, 10529                           |
| 44 Filter FL3, 20994  | 90 Special hexagonal nut                                |
| 45 Plain hexagonal nut, 10515   | 91 Strain relief  |
| 46 Lockwasher, 10430  | 92 Terminal lug, 20706                                  |

Figure 61.2—Continued.

- to the control box assembly. Remove the resistor, centering washer (51), and washer (52).
- (14) Remove the plain hexagonal nut (53), lockwasher (54), and positioning device (55) that hold the switch (56) to the control box assembly. Remove the switch. Remove the plain hexagonal nut (57) from the switch.

- (15) Remove the plain hexagonal nut (58), lockwasher (59), and positioning device (60) that hold the switch (61) to the control box assembly. Remove the switch. Remove the plain hexagonal nut (62) from the switch (61). Remove the bare wire (63) from the switch only when necessary.
- (16) Remove the machine screw (64), lock-

washer (65), and plain hexagonal nut (66) that hold the tube clamp (67) to the control box assembly. Remove the tube clamp.

- (17) Remove the plain hexagonal nut (68), lockwasher (69), plain washer (70), centering washer (71), and machine screw (72) that hold the resistor (73) to the control box assembly. Remove the resistor, centering washer (74), and washer (75).
- (18) Remove the two machine screws (76) and lockwashers (77) that hold the octal socket (78) to the control box assembly. Remove the octal socket.
- (19) Remove the two plain hexagonal nuts (79), cable leads, lockwashers (80), plain hexagonal nuts (81), plain washers (82), spacers (83), and insulating washers (84) that hold the two binding posts (85) to the control box assembly. Remove the two binding posts.
- (20) Remove the plain hexagonal nut (86) and lockwasher (87) that hold the variable resistor (88) to the control box assembly. Remove the resistor. Remove the plain hexagonal nut (89) from the resistor.

*b. Reassembly.* Reassemble the control box assembly as shown in figure 61.2; the sequence for reassembly of the parts is the reverse of the assembly.

### 103.3. (Added) Disassembly and Reassembly of Base Electrical Components (TT-235/FG) (fig. 61)

#### *a. Disassembly.*

- (1) Disassemble the base electrical components as described in paragraph 103a(1), (2), and (3).
- (2) Remove the machine screws (6 and 9), and lockwashers (7 and 10), that hold

the cable clamps (8 and 11) to the base frame. Remove the cable clamps from the cable.

- (3) Disassemble the base electrical components as described in paragraph 103a(5), (6), (7), (9), and (11).
- (4) Remove the control box assembly as described in paragraph 103.1a(4) and (5).

#### *b. Reassembly.*

- (1) Replace the control box assembly as described in paragraph 103.1b.
- (2) Reassemble the base electrical components. The sequence for reassembly of the parts is the reverse of the disassembly (a(4) through (1) above).

Page 77, figure 63, legend.

Item 3. After "52108" add: (62194, 75.0 baud).

Item 5. After "52109A" add: (62193A, 75.0 baud).

Item 9. Delete "(TT-122A/FG)" and substitute: (TT-122A/FG and TT-235/FG).

Item 16. After "52106A" add: (62191A, 45.5 baud).

Item 24. After "(TT-123A/FG)" add: 62190A (TT-235/FG).

Paragraph 105a(1), line 2. Change "103a" to: **103a or 103.3a.**

Page 81, paragraph 112b, chart. Add the following column to the right of the chart:

---

TT-235/FG

---

P1-tip  
P1-sleeve  
P2-1  
P2-2  
K1-2  
TB1-3  
E3 (with S4 at FREE and S5 at EXT. BAT.)

---

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For explanation of abbreviations used, see AR 320-50.

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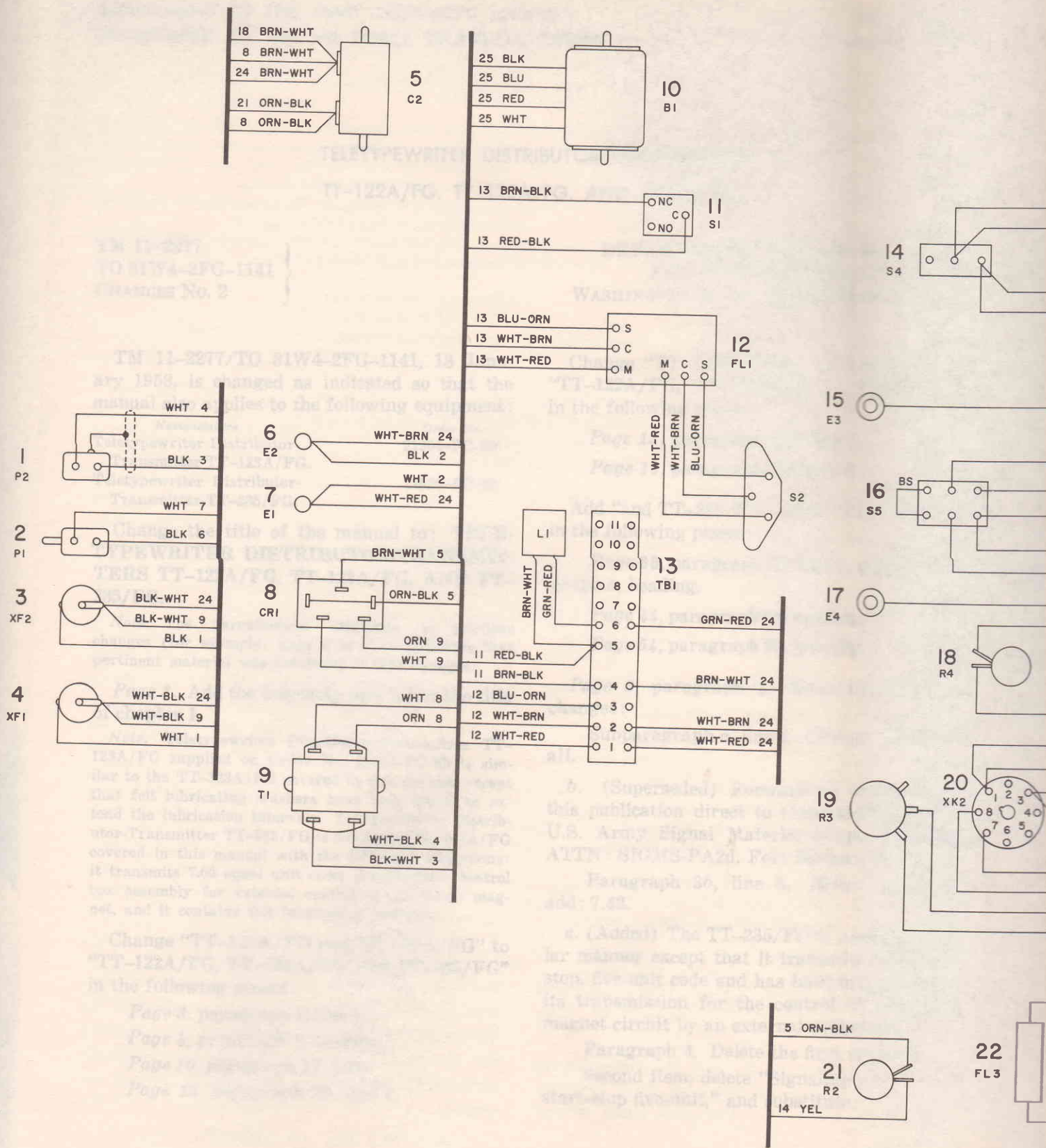


Figure 48.1. (Added) TT-235/FG, w

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 TO 81W4-2FG-1141  
 CHANGES No. 2

13 11-2277/TO 81W4-2FG-1141, 13  
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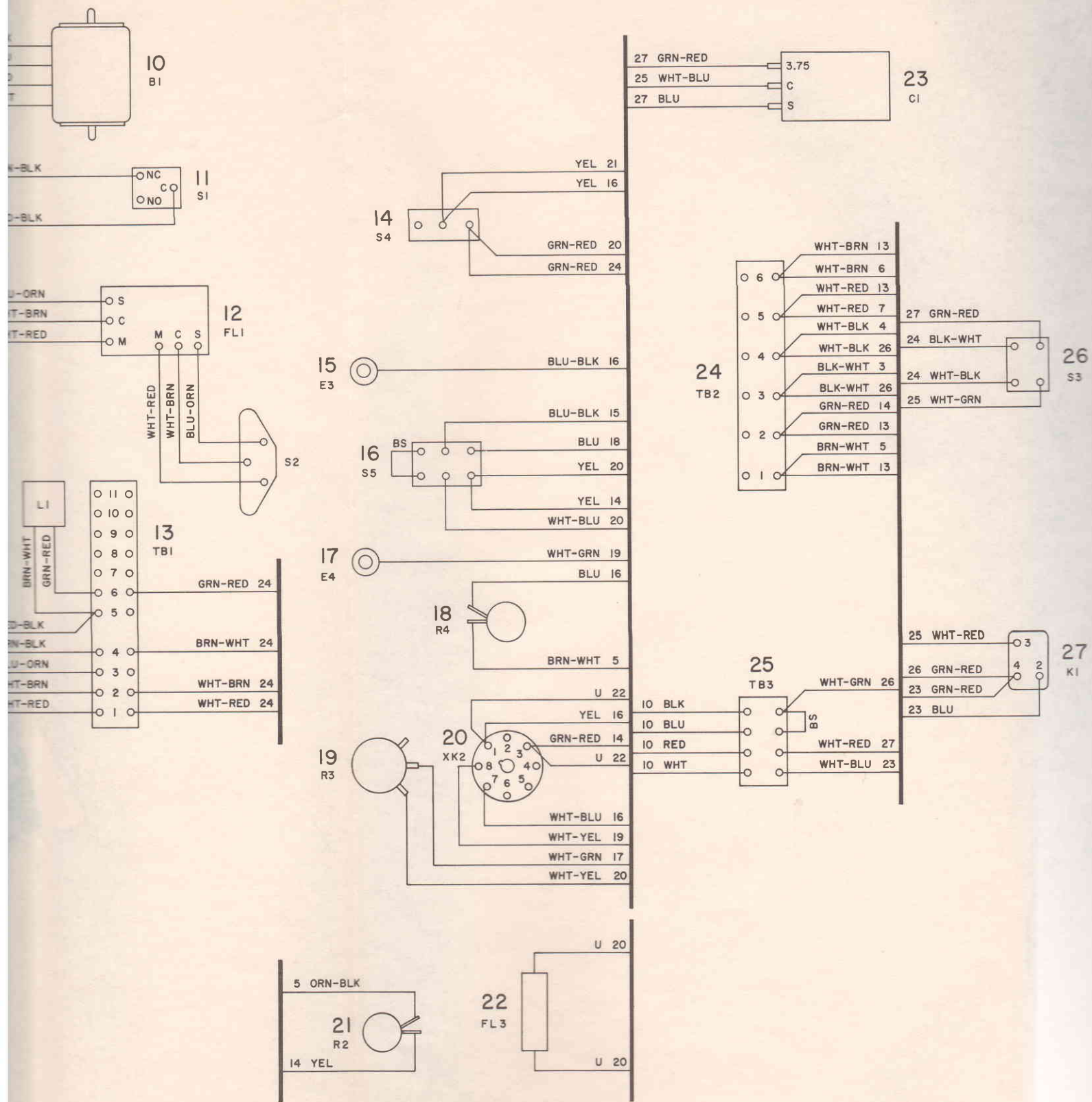
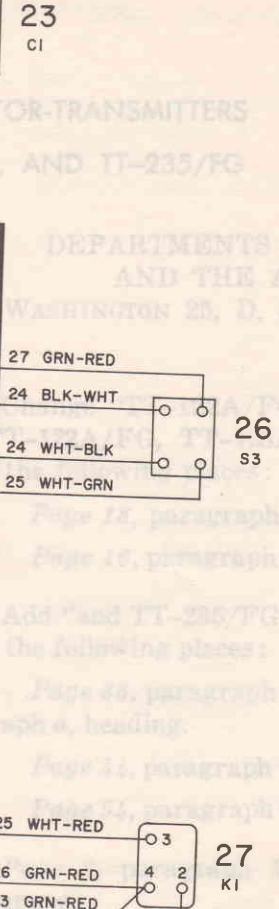
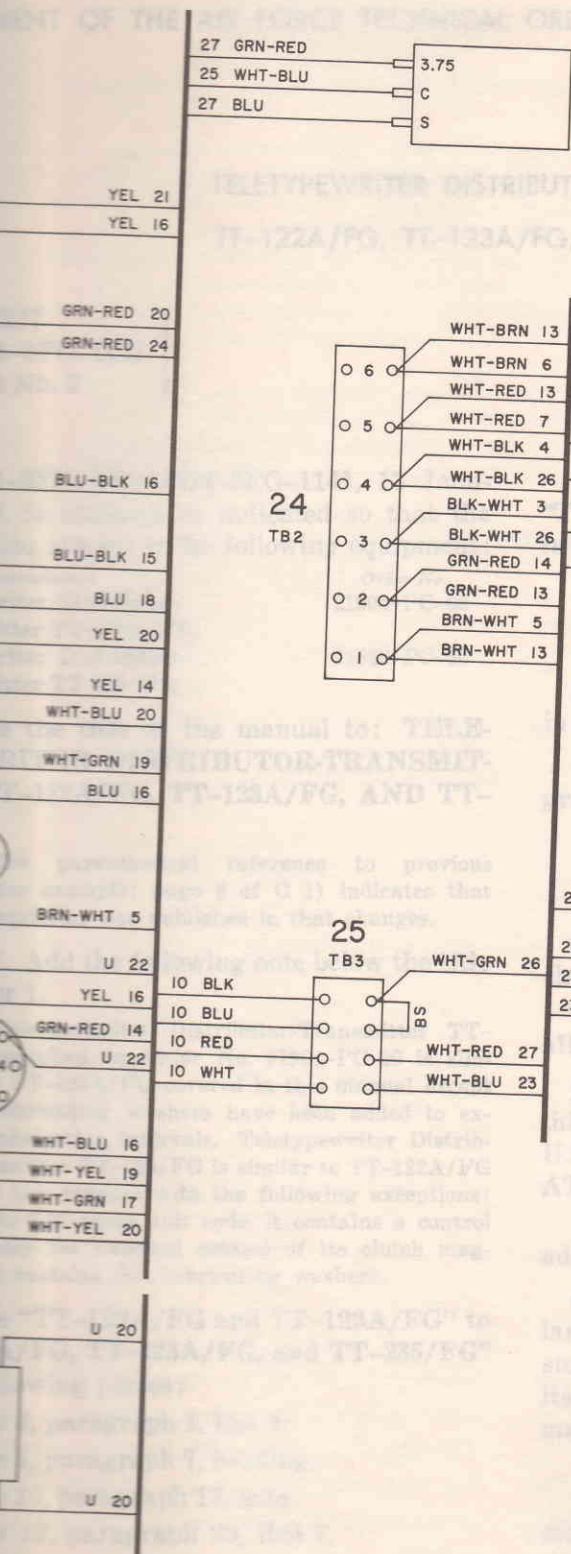


Figure 48.1. (Added) TT-235/FG, wiring diagram.



- YEL 21
- YEL 16
- GRN-RED 20
- GRN-RED 24
- BLU-BLK 16
- BLU-BLK 15
- BLU 18
- YEL 20
- YEL 14
- WHT-BLU 20
- WHT-GRN 19
- BLU 16
- BRN-WHT 5
- U 22
- YEL 16
- GRN-RED 14
- U 22
- WHT-BLU 16
- WHT-YEL 19
- WHT-GRN 17
- WHT-YEL 20
- U 20
- U 20

NOTES:

1. THE SMALL NUMBER ON EACH WIRE (ADJACENT TO THE COMMON OR BASE LINE) CORRESPONDS TO THE LARGE NUMBER ADJACENT TO THE STATION TO WHICH THE WIRE RUNS.
2. BS DENOTES BARE WIRE STRAP.
3. U DENOTES SHIELDED WIRE WITH EXTRUDED NYLON JACKET.
4. DENOTES SHIELDED CONNECTION.

wiring diagram.