TermiNet DATA COMMUNICATION PRODUCTS

**VERTICAL FORMAT UNIT
44C414352
INSTRUCTION MANUAL
GEK-36143B**

Printed February, 1977

PREFACE

This manual provides installation, operation and service information for the paper tape Vertical Format Unit (VFU) option used on TermiNet 300 and 1200 Printers. A replacement parts list is also included.

For information concerning the associated Printers, refer to the publications listed below.

Operation

       TermiNet 300 and 1200 Operator's Manual . . . . GEK-36150 & GEK-49257

Service

       TermiNet 300 Printer Service Manual GEH-2185
       TermiNet 1200 Printer Service Manual GEK-36105

Parts

       TermiNet 300 and 1200 Parts Manual GEK-14999

Drawings

       Service Drawings for TermiNet 300 Printer and Paper Punch and Reader . . . GEZ-5775
       TermiNet 1200 Printer Drawings GEZ-5777

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LIST OF ILLUSTRATIONS

VERTICAL FORMAT UNIT (VFU)
(PAPER TAPE TYPE)
44C414352

DESCRIPTION

The paper tape VFU option (Figure 1) is used to feed Printer paper rapidly to a predetermined line position upon recognition of a locally or remotely generated (including computer control) form feed (FF) or vertical tabulation (VT) code. The paper tape VFU uses a standard one-inch-wide (2.54 cm), eight-channel pa-paper tape with 1/10 inch (.254 cm) pitch sprocket holes located between channels 3 and 4 (see Figure 2). The sprocket hole serves as the strobe control for operating the VFU assembly and as a tape-in/tape-out

function designed so the machine will not respond to the VFU codes when the paper tape is missing. Channel 1 is used for Form Feed and Channel 6 is used for Vertical Tab. No other channels are recognized. For proper operation, the correct tape with good opacity and ASCII specified spacing of sprocket holes must be used.

The paper tape VFU can replace an existing disk-type VTFF by changing the VFU assembly and replacing the VTFC board with a TVFA board (part No. 44B4417493-G01).
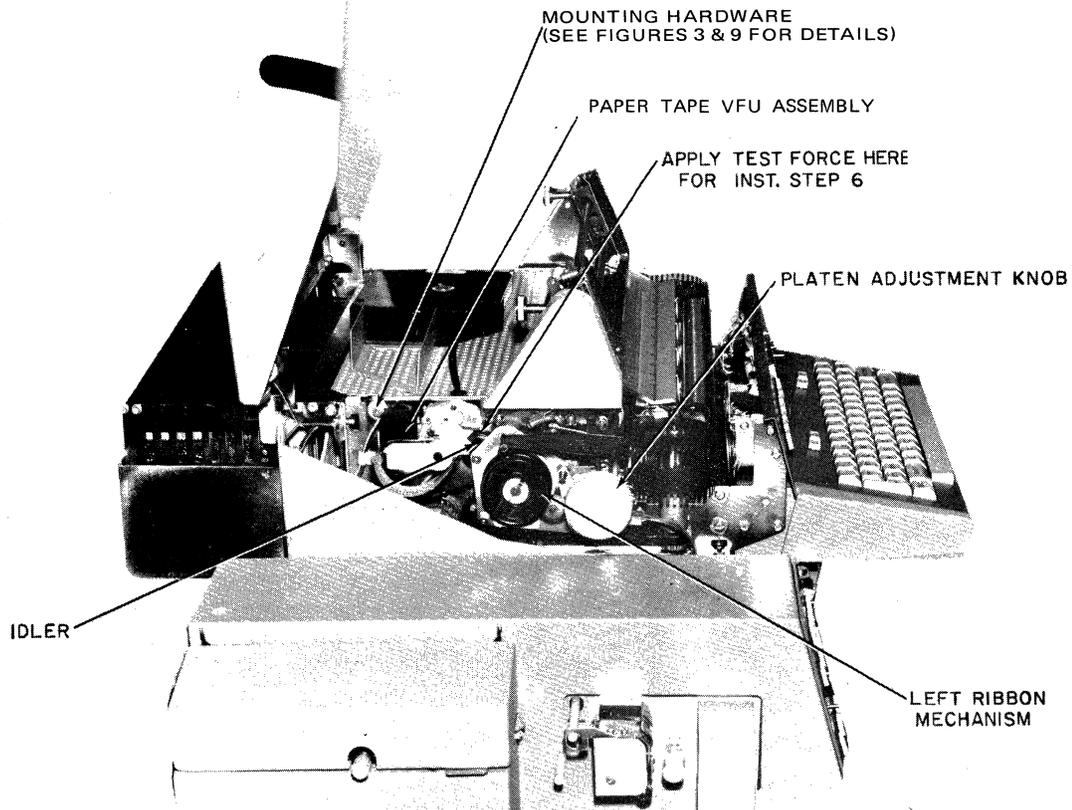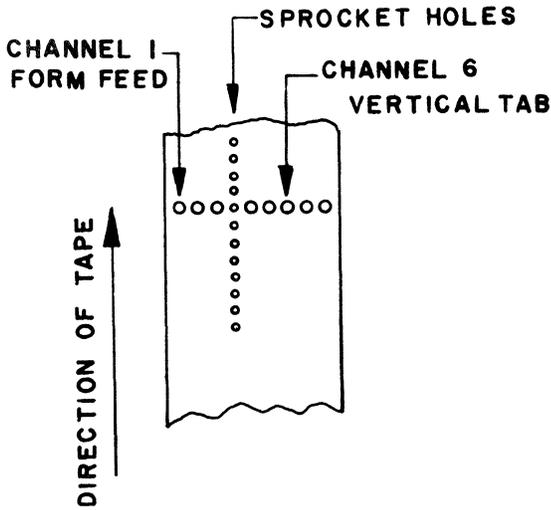

MOUNTING HARDWARE
(SEE FIGURES 3 & 9 FOR DETAILS)

PAPER TAPE VFU ASSEMBLY

APPLY TEST FORCE HERE
FOR INST. STEP 6

PLATEN ADJUSTMENT KNOB

IDLER

LEFT RIBBON
MECHANISM

OVT-4011

Figure 1. Paper Tape VFU Assembly (Installed)

CHANNEL 1
FORM FEED
SPROCKET HOLES
CHANNEL 6
VERTICAL TAB
DIRECTION OF TAPE

OVT-4004

Figure 2. Standard, One-Inch-Wide (2.54 cm),
Eight-Channel Paper Tape
for Use with VFU

INSTALLATION

Read instructions completely before beginning VFU installation. See Figure 3 for location of parts.

1. Remove Printer from case.

2. Remove Left Ribbon Mechanism, loosen cam pawl assembly screw and rotate cam pawl assembly down.

3. Install VFU Assembly*, Idler, Gear and Retaining Ring. Place belt (part of the VFU Assembly) around Gear.

4. Readjust cam pawl assembly and rotate pawl to a position in alignment with center of spring-loaded shaft. Cam pawl assembly should be places toward side frame enough for disengagement of Gear, but away from side frame enough to:

> a. Remove ribbon drive mechanism.
>
> b. Put a small amount of force on platen adjust knob so it will pop out freely.

5. Replace Left Ribbon Mechanism removed in step 2.

6. Set belt tension such that a force of 2 oz. (57 gms) applied at belt midpoint will cause a deflection of 0.10 ±0.03 inch (2.5 ±0.8 mm).

7. TVFA Printed Circuit Board Strapping. To minimize the fill character requirements for Vertical Tab or Form Feed when using the VFU, strap J1 on the TVFA should be in and J2 out. This will permit the use of the rules for the disk-type VTFF as described in the TermiNet 300 & 1200 Printer Operator's Manual (GEK-36150), pp. 6-9 thru 6-16. However, this strapping is not feasible under the following two conditions.

- TN300 Printer Model A, B or early C printers on which TL was not brought out to the VTFF plug on the motherboard.

- Any printer which may have to perform Form Feeds of more than 11 inches (28 cm).

Under those two conditions J2 must be in and J1 out, and additional fill characters must be provided in accordance with pp. 15-18 of this manual.

CONDITION	J1	J2
TN 1200 and TN300D and later TN300C (TL on motherboard) AND Form Length 11 inches (28 cm) or less	IN	OUT
TN300 Model A, B or early C (TL not on motherboard) OR Form Length Greater than 11 inches (28 cm) up to 14 inches (35½cm)	OUT	IN

8. Remove hardware and cover from back of bustle; install TVFA board in slot marked VTFF Board components are on right side facing rear of Printer.

9. Plug connector from VFU Assembly to mother board. WHITE WIRE OF PLUG CONNECTOR MUST BE UP WHEN PLUGGING INTO

---

*Secure VFU Assembly with shoulder screw and spacer (shown in Section A-A of Figure 3) and screw, lockwasher, washer and spacer (stacked up as shown in top view of Figure 3). Fastener hardware is also shown as parts 1 through 4, 8 and 9 in Figure 9.

PLATEN

SPACER   IDLER

WASHER

LOCKWASHER

SCREW

GEAR

RETAINING
RING

CAM PAWL
ASSEMBLY

SCRIBE OR PENCIL
MARK THIS SURFACE

FRONT EDGE OF
DETECTOR ASSEMBLY

DETECTOR ASSEMBLY

APPLY BELT TENSION HERE
(SEE INSTALLATION, STEP 6)

PLATEN ADJUST
KNOB

VFU
ASSEMBLY

$\frac{1}{4}$-INCH HEX
DETECTOR ASSEMBLY
ADJUSTING SCREW

GEAR

RETAINING
RING

CAM PAWL
ASSEMBLY

VFU ASSEMBLY
(REF)

SHOULDER
SCREW

A

A

SPACER

SECT. A-A

LEFT RIBBON MECHANISM

OVT-4005

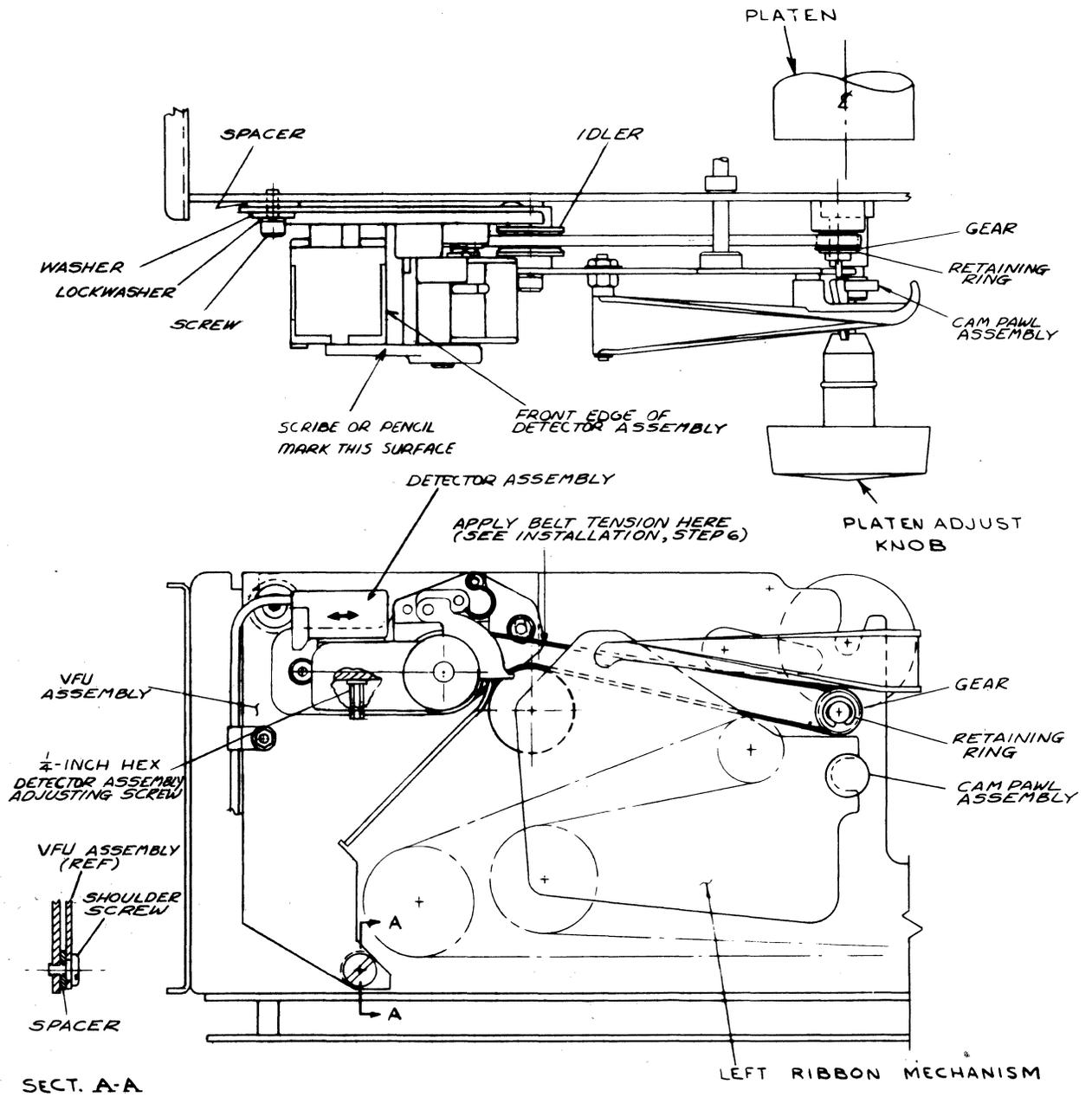Figure 3. Paper Tape VFU Installation

10. Replace bustle cover and secure in place.

11. Replace Printer in case.

DETECTOR ADJUSTMENT

1. Connect voltmeter to test point No. 10 on TVFA PCB using home ground as reference. Use at least a 20,000 ohms/volt voltmeter.

2. Move the VFU detector assembly, using the adjustment lever, toward the rear of Printer until voltmeter indicates -12 to -15 Volts. Then move assembly forward to point where voltage goes to zero. At this point place a mark on the detector frame in line with the front edge of the adjustment lever.

3. Continue moving the detector assembly forward to the point where the voltmeter again reads -12 to -15 Volts. Then place another mark on the front edge of the lever.

4. Move the adjustment lever toward the rear of the Printer again until the front edge is past the first mark. Then push the lever forward until the front edge is midway between the two marks.

5. Tighten the detector assembly adjustment screw. Make sure the assembly does not move from the set position while the screw is being tightened.

CAUTION

DO NOT OVERTIGHTEN. Limit torque on hex screw to 3 in. lb. Exceeding this torque limit may break plastic.

TVFA PCB ADJUSTMENT

As may be seen on the TVFA Schematic Diagram (Figure 8), the TVFA board includes either a J1 or a J2 strap. All possible strapping arrangements are explained under PAPER TAPE VFU FILL CHARACTER REQUIREMENTS on page 14.

In addition, again referring to Figure 8 and page 14, note that the TVFA board contains a factory-adjusted 200K potentionmeter (R31). If necessary, this potentionmeter may be readjusted to obtain an 8.3 msec pulse rate at board test point 3 to reduce fill character requirements if the Printer does not have the TL signal brought out from the motherboard and form length does not exceed 11 inches (27.9 cm).

OPERATION

INSERTING VFU PAPER TAPE

NOTE

Always use good quality opaque tape, with ASCII specified spacing of sprocket holes.

1. Lift Printer top cover to permit access to VFU tape reader.

2. Lift tape hold-down cover and install tape over sprocket, ensuring that sprocket teeth engage paper tape sprocket holes.

3. Close Printer top cover.

4. Turn Printer on and press Form Feed key (button on RO units). This will advance paper tape to next Form Feed position.

5. Adjust form on platen to form position per user's requirement.

DETERMINING LENGTH OF PAPER TAPE

1. Refer to Table 1 to determine the paper tape length.

2. Because of a 6-inch (15.24 cm) minimum tape length, short forms will require repetitive tape lengths.

3. A suggested maximum tape length is 12 inches (30.5 cm).

NOTE

When making a punched paper tape prepared in accordance with Figure 6, it should be noted that there is no parity bit. Therefore, if it is necessary to reproduce this tape, the tape reproducing equipment could detect a parity error.

PREPARING VFU PAPER TAPE ON AN ASR PRINTER. (See Figure 4 and Table 1)

1. Turn Printer power on.

2. Place Printer in LOCAL mode.

3. Press RETURN key to reset Print Position Indicator to "1".

4. Press paper punch ON pushbutton.

5. Press and hold Paper Punch FEED pushbutton to obtain a tape lead of approximately 2 inches (5.1 cm).

6. Set ALL CAPS switch to ON.

NOTE

On Printers not equipped with ALL CAPS switch, use the SHIFT key to obtain a capital "P".

7. Prepare VFU tape as follows:

a. Press number "5" key for FORM FEED sense position.

b. Press a capital "P" for each line space desired before first VERTICAL TAB position.

c. Press number "0" key for a VERTICAL TAB sense position.

d. Again press a capital "P" for each line space desired before next VERTICAL TAB position.

e. Repeat steps c and d until length of form has been tabulated in accordance with user's needs.

NOTE

When preparing a tape for use with an 11-inch form, the Print Position Indicator will display the number 66 at the last line of the form. When the Print Position Indicator displays the number 67, this is the FORM FEED sense position for the second form.

8. Press and hold Paper Punch FEED pushbutton to a tape trail approximately 2 inches (5.1 cm) long.

9. Remove prepared paper tape from punch. Verify that format of tape is correct. (See Figure 4 for format.)
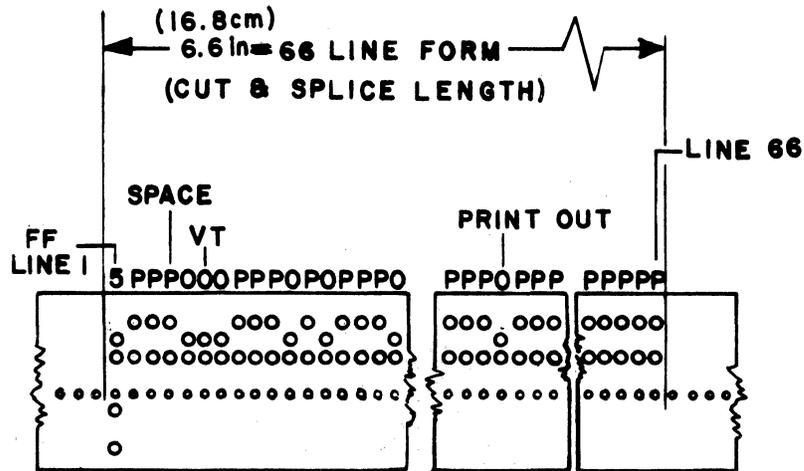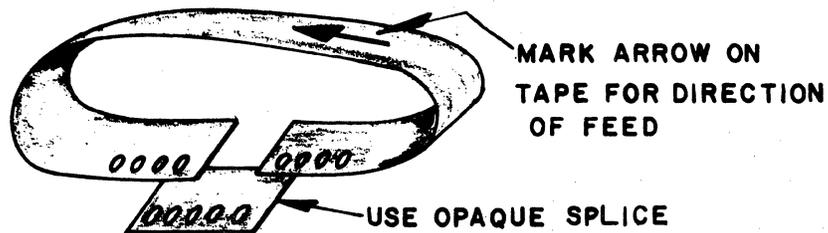
OVT-4006

Figure 4. Example for 66-Line, 11-Inch (27.9 cm) Form Preparation on an ASR Printer.

5

10. Using opaque splicing tab, splice tape to correct length. Butt ends of tape together at center of splice. (See Figure 4 and Table 1 for details of length and splicing technique.)

PREPARING VFU PAPER TAPE USING A MANUAL PUNCH AND SPLICER (See Figure 5)

1. Obtain 14-inch (35.6 cm) length of paper tape prepunched with sprocket holes.

2. Mark the length of tape for a particular form length by referring to Table 1.

3. Using Figure 6 as a guide, proceed to punch required holes as follows:

a. With Manual Punch and Splicer unit on flat surface in front of operator, place tape parallel to left side of die with tape feed hole on guide pin so that character column to be punched is directly over inscribed line.

b. Slowly swing tape under die and secure by right side guide pins.

c. Insert stylus into desired character hole and push stylus through. (Remove stylus before attempting to remove tape.) Continue until all required holes are punched (refer to Figure 6).

4. Verify punched paper tape to print-out on form and verify end marks obtained in step 2 prior to cutting and splicing.

5. Raise knife on Manual Punch and Splicer, lay tape across die, positioning sprocket holes on guide pins so that knife will cut tape exactly between characters desired. Lower knife blade to cut tape.

6. Butt splice ends of tape together as follows.

a. Partially fold back each half of slip sheet from center of splicing patch.

b. While holding folded portion of slip sheet with adhesive side of patch facing upward, align patch sprocket holes onto four right side guide pins so that patch rests smoothly on unit base.
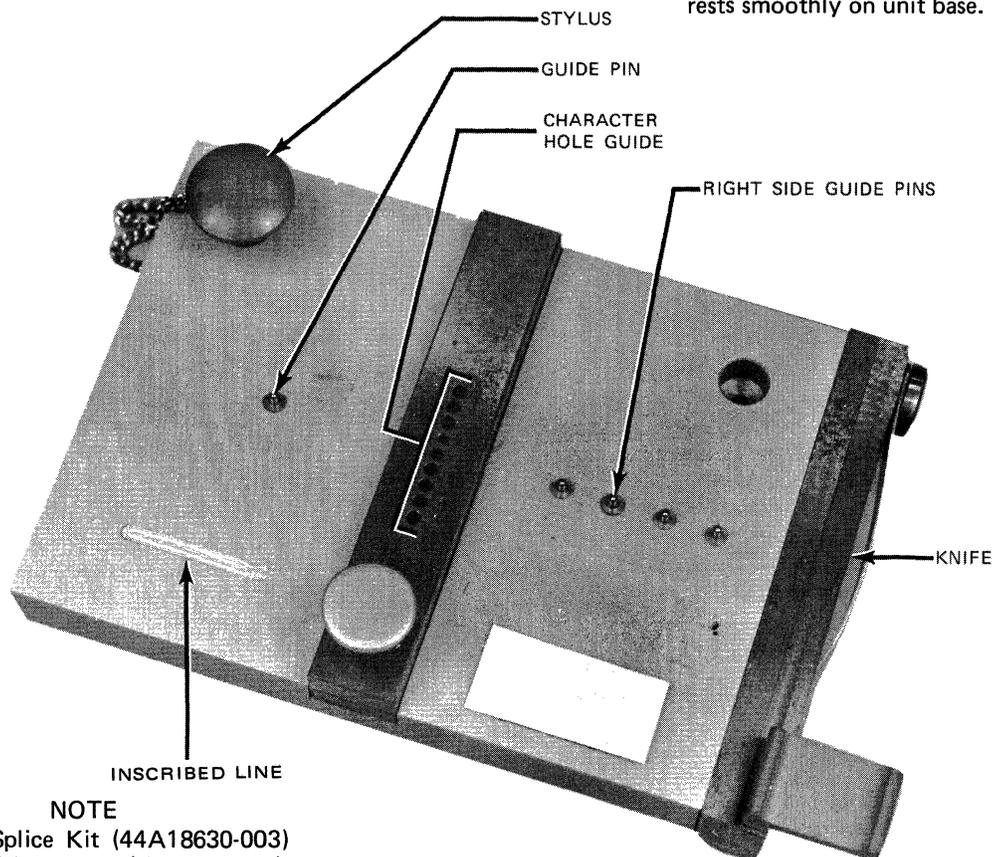
NOTE
Tape and Splice Kit (44A18630-003) includes editing punch (shown above), 5 feet (1½m) of blank tape with pre-punched sprocket holes and 1 dozen splicing patches.

Figure 5. Manual Tape Punch and Splicer.

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Figure 6. Example for 66-Line, 11-Inch (27.9 cm) Form Preparation Using a Punch and Splicer

TABLE 1

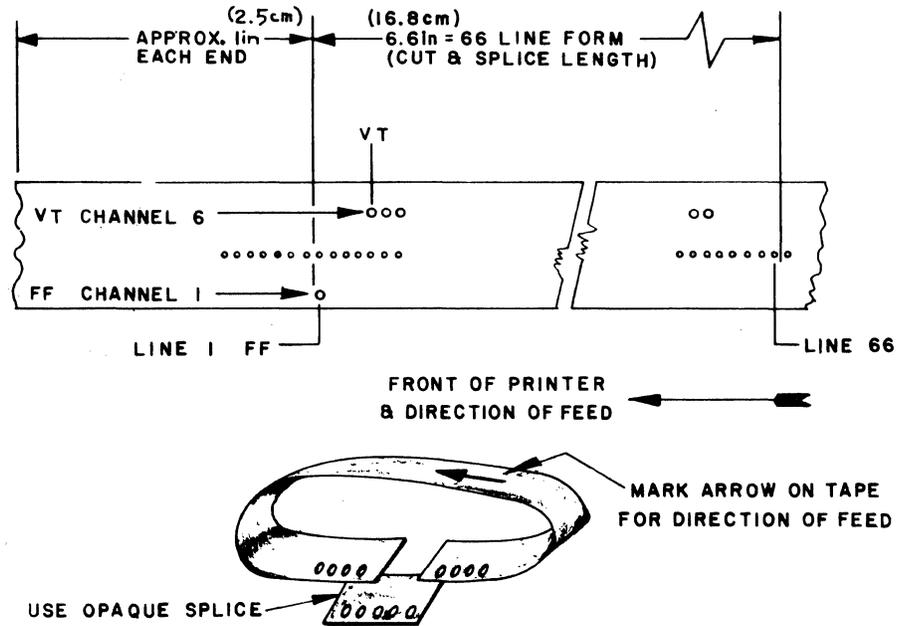| NO. OF LINE SPACES	FORM LENGTH		TAPE LENGTH PER FORM LENGTH		NO. OF REPETITIVE TAPE LENGTHS	TOTAL TAPE LENGTH	
	IN.	CM	IN.	CM		IN.	CM
1			0.1	0.25	60	6.0	15.2
2			0.2	0.51	30	6.0	15.2
3	0.5	1.3	0.3	0.76	20	6.0	15.2
4			0.4	1.02	15	6.0	15.2
5			0.5	1.27	12	6.0	15.2
6	1.0	2.5	0.6	1.52	10	6.0	15.2
7			0.7	1.78	9	6.3	16.0
8			0.8	2.0	8	6.4	16.3
9	1.5	3.8	0.9	2.3	7	6.3	16.0
10			1.0	2.5	6	6.0	15.2
11			1.1	2.8	6	6.6	16.8
12	2.0	5.1	1.2	3.0	5	6.0	15.2
13			1.3	3.3	5	6.5	16.5
14			1.4	3.6	5	7.0	17.8
15	2.5	6.4	1.5	3.8	4	6.0	15.2
16			1.6	4.1	4	6.4	16.3
17			1.7	4.3	4	6.8	17.3
18	3.0	7.6	1.8	4.6	4	7.2	18.3
19			1.9	4.8	4	7.6	19.3
20			2.0	5.1	3	6.0	15.2

Continued

TABLE 1 (Continued)

NO. OF LINE SPACES	FORM LENGTH		TAPE LENGTH PER FORM LENGTH		NO. OF REPETITIVE TAPE LENGTHS	TOTAL TAPE LENGTH	
	IN.	CM	IN.	CM		IN.	CM
21	3.5	8.9	2.1	5.3	3	6.3	16.0
22			2.2	5.6	3	6.6	16.8
23			2.3	5.8	3	6.9	17.5
24	4.0	10.2	2.4	6.1	3	7.2	18.3
25			2.5	6.4	3	7.5	19.1
26			2.6	6.6	3	7.8	19.8
27	4.5	11.4	2.7	6.9	3	8.1	20.6
28			2.8	7.1	3	8.4	21.3
29			2.9	7.4	3	8.7	22.1
30	5.0	12.7	3.0	7.6	2	6.0	15.2
31			3.1	7.9	2	6.2	15.7
32			3.2	8.1	2	6.4	16.3
33	5.5	14.0	3.3	8.4	2	6.6	16.8
34			3.4	8.6	2	6.7	17.0
35			3.5	8.9	2	7.0	17.8
36	6.0	15.2	3.6	9.1	2	7.2	18.3
37			3.7	9.4	2	7.4	18.8
38			3.8	9.7	2	7.6	19.3
39	6.5	16.5	3.9	9.9	2	7.8	19.8
40			4.0	10.2	2	8.0	20.3
41			4.1	10.4	2	8.2	20.8
42	7.0	17.8	4.2	10.7	2	8.4	21.3
43			4.3	10.9	2	8.6	21.8
44			4.4	11.2	2	8.8	22.4
45	7.5	19.1	4.5	11.4	2	9.0	22.9
46			4.6	11.7	2	9.2	23.4
47			4.7	11.9	2	9.4	23.9
48	8.0	20.3	4.8	12.2	2	9.6	24.4
49			4.9	12.4	2	9.8	24.9
50			5.0	12.7	2	10.0	25.4
51	8.5	21.6	5.1	13.0	2	10.2	25.9
52			5.2	13.2	2	10.4	26.4
53			5.3	13.5	2	10.6	26.9
54	9.0	22.9	5.4	13.7	2	10.8	27.4
55			5.5	14.0	2	11.0	27.9
56			5.6	14.2	2	11.2	28.4
57	9.5	24.1	5.7	14.5	2	11.4	29.0
58			5.8	14.7	2	11.6	29.5
59			5.9	15.0	2	11.8	30.0
60	10.0	25.4			1	6.0	15.2
61					1	6.1	15.5
62					1	6.2	15.7
63	10.5	26.7			1	6.3	16.0
64					1	6.4	16.3
65					1	6.5	16.5
66	11.0	27.9			1	6.6	16.8
67					1	6.7	17.0
68					1	6.8	17.3
69	11.5	29.2			1	6.9	17.5

Continued

TABLE 1 (Continued)

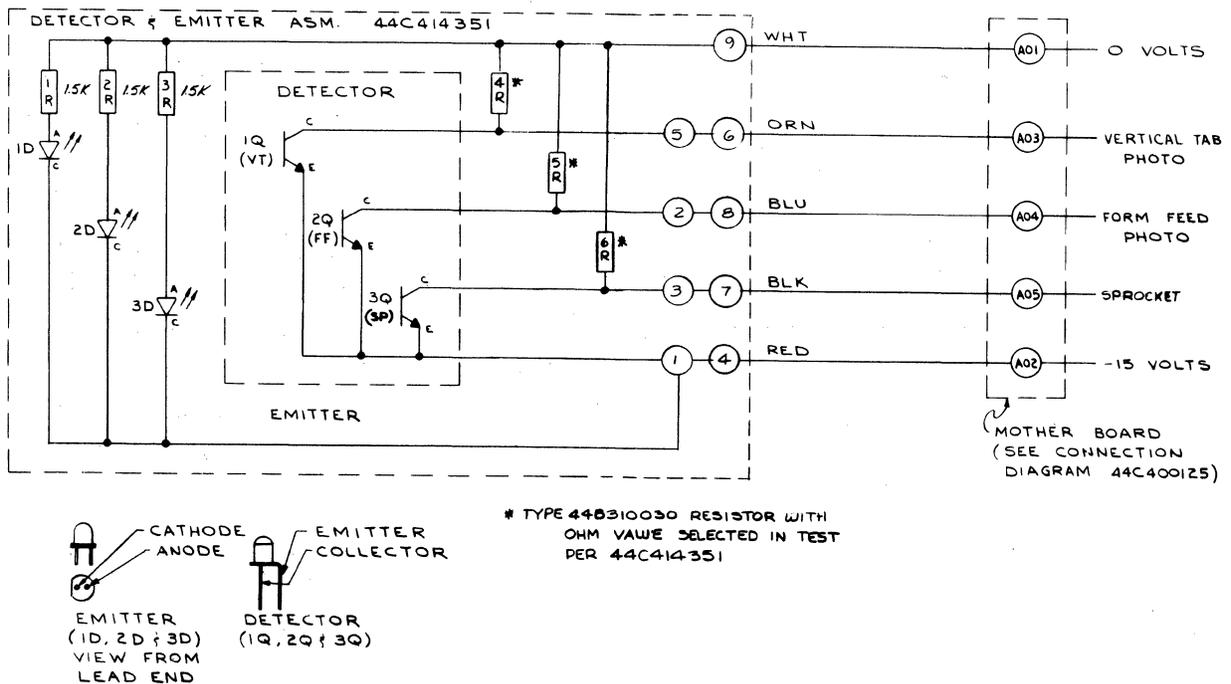| NO. OF LINE SPACES	FORM LENGTH		TAPE LENGTH PER FORM LENGTH		NO. OF REPETITIVE TAPE LENGTHS	TOTAL TAPE LENGTH	
	IN.	CM	IN.	CM		IN.	CM
70					1	7.0	17.8
71					1	7.1	18.0
72	12.0	30.5			1	7.2	18.3
73					1	7.3	18.5
74					1	7.4	18.8
75	12.5	31.8			1	7.5	19.1
76					1	7.6	19.3
77					1	7.7	19.6
78	13.0	33.0			1	7.8	19.8
79					1	7.9	20.1
80					1	8.0	20.3
81	13.5	34.3			1	8.1	20.6
82					1	8.2	20.8
83					1	8.3	21.1
84	14.0	35.6			1	8.4	21.3

ENGINEERING DRAWINGS
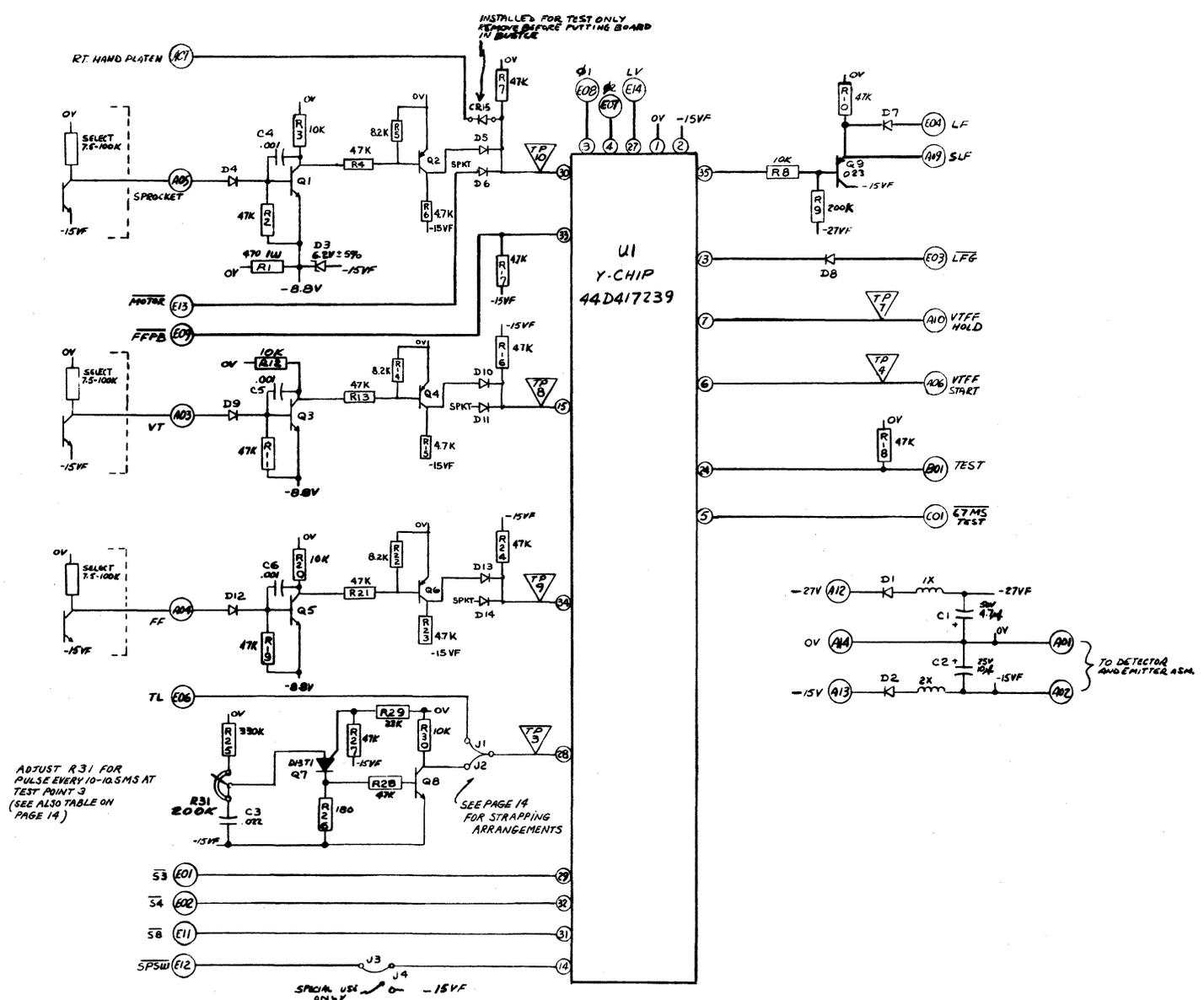

Figure 7. VFU Connection Diagram (44B4000036)

Figure 8. TVFA PWB Elementary Diagram (44C401290, Sheet 1)

c. Remove slip sheet completely from patch without disturbing its position.

d. Position sprocket holes of tape to be spliced onto guide pins, so that ends butt together precisely between second and third guide pins.

e. Smooth tape out gently and remove it from unit.

TROUBLESHOOTING MISSED VT OR FF CONDITION

For malfunction in which Printer misses VT or FF or fails to Vertical Tab or Form Feed, proceed as follows:

1. Check tape for following conditions:
   a. Wear
   b. Tear
   c. Creases
   d. Elongated sprocket holes
   e. Sprocket holes not within ASCII tolerance
   f. Splice or tape contains non-opaque spot
   g. Ends of tape not butted together properly at splice.

2. Check detector-emitter adjustment

3. Check belt tension

4. Check adjustment of LF solenoid

5. If steps 1-4 do not correct malfunction, replace TVFA PCB.

6. If malfunction persists, replace VFU mechanism.

PARTS

Locate on Figure 9 or 10 the part callout number that identifies the part in question. Locate that number on the tabulated list of parts. The information on that line includes the Part Drawing Number and Description. VFU Kit Model 44C414352-G01 is used with standard Printers.

Spare parts can be purchased from the Data Communication Products Department of General Electric Company, Waynesboro, Virginia.
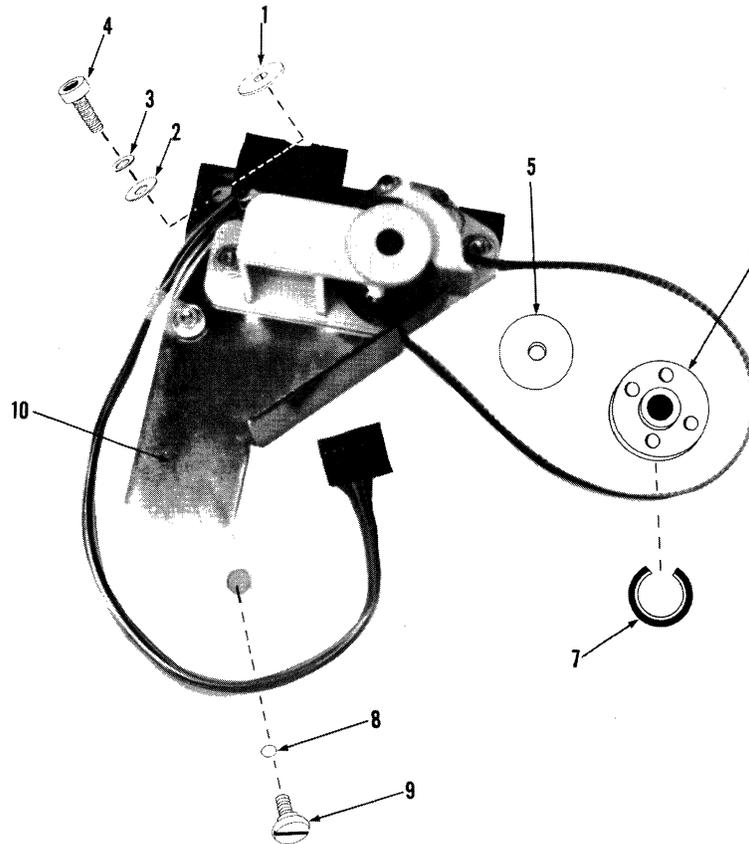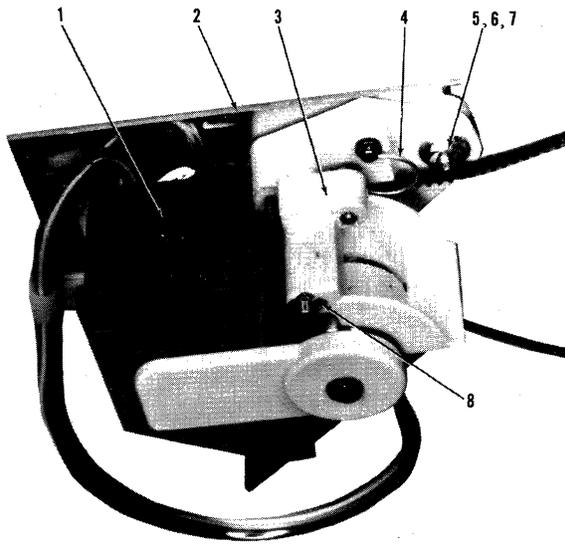
OVT-4008

Figure 9. Paper Tape VFU Kit (44C414352)
(See Figure 3 for fastner hardware build-up)

FIG.	ITEM	DRAWING	DESCRIPTION	CAN BE REPLACED BY THE FOLLOWING PART
9	1	N402P68C	Spacer	Steel Flat Washer (wide) No. 6
	2	N402P38C	Flat Washer	Steel Flat Washer (std.) No. 8
	3	N405P8C	Lockwasher	Steel Spring Lockwasher No. 8
	4	N171P15006C	Socket Head Cap Screw	Socket Hd Cap Screw No. 8-32 x 3/8
	5	44B412305-001	Idler	
	6	44B412304-001	Gear	
	7	N910P31C	Retaining Ring	External E-Type Retaining Ring for .312 shaft
	8	44A411118-001	Spacer	
	9	44A410392-001	Shoulder Screw	
	10	44D415695-G01	VFU Assembly (1,2,5)	
	10	44D415695-G02	VFU Assembly (1,3,5)	
(Not Shown)	--	44B417493-G01	TVFA/1 PCB(4)	

1. See Figure 9 for component breakdown.
2. For use with Standard Printer.
3. For use with Special Configuration Printer.
4. Located in VTFF bustle slot.
5. Various group numbers available, depending on 44C414352 group number used.
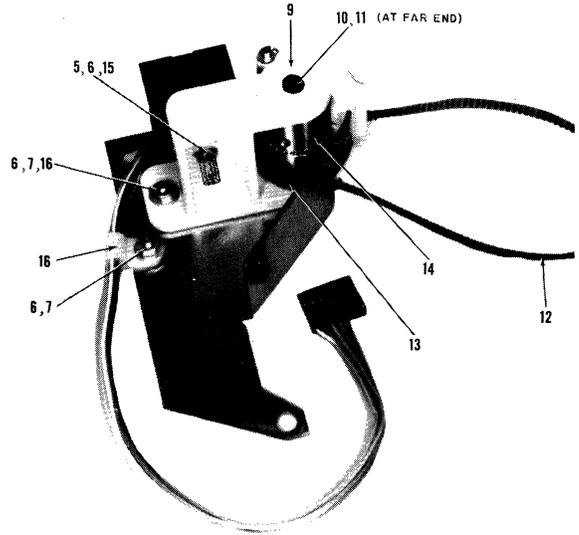
(TOP)   OVT-4009   (BOTTOM)   OVT-4010

Figure 10. VFU Assembly Component Parts (44D415695)
(See Figure 8, Part 10 for next higher assembly)

FIG.	ITEM	DRAWING	DESCRIPTION	CAN BE REPLACED BY THE FOLLOWING PART
10	1	44C414351-G01	Detector and Emitter [1,3]	
	1	44C414351-G02	Detector and Emitter [2,3]	
	2	44B412831-G01	Plate	
	3	44B412830-G01	Tape Hold Down	
	4	44A410082-001	Spring	
	5	N402P35C	Flat Washer (2, 3 or 4 Req'd)	Steel Flat Washer No. 4
	6	N405P5C	Lockwasher (4 Req'd)	Steel Spring Lockwasher No. 4
	7	N210P9C	Hex Nut (3 Req'd)	Steel Hex Nut No. 4-40
	8	44A418017-001	Gripring	
	9	44B412829-G01	Housing	
	10	44B412822-001	Shaft	
	11	N910P25C	Retaining Ring	External E-Type Retaining Ring for .250 shaft
	12	44A417341-006	Posi-Drive Belt (13.219 in.)	
	13	44C414350-001	Pulley (40DP-36T	
	14	44A418020-002	Tape Sprocket	
	15	44A411725-001	Adjustment Screw (1/4 Hex)	
	16	N915P3	Harness Clamp	

1. Has short connection cable for use with Standard Printer.
2. Has long connection cable for use with Special Configuration Printer.
3. Various group numbers available, depending on 44D415695 assembly group number used.

PAPER TAPE VFU FILL CHARACTER REQUIREMENTS

Fill character requirements for the paper tape VFU unit are different from those required for the disc type VTFF mechanism. This difference was created when the oscillator was slowed down from 8.4 ms to 10 - 10.5 ms to allow use of forms up to 14 inches (35.6 cm) long. A strapping option is provided on the TVFA board (see Figure 8) which allows use of the present fill character rules, but restricts the form length to less than 11 inches (27.9 cm). This strap disconnects the oscillator, and connects the chip input to the TL signal on the mother board. The TL signal is not present on TermiNet 300 A, B, or early C model Printer mother boards and the oscillator must be used if the paper tape VFU is retrofitted onto these Printers.

The following table summarizes the possible arrangements.

TVFA Strap	Setting of R31 on TVFA	Reference
J1 In J2 Out	Not Applicable	Per VTFF (Manual GEK-36150, pp. 6-5 through 6-16)
J2 In J1 Out	10.0 10.5 msec	Per VFU (This manual, pp. 14-16 and Figure 8)
J2 In J1 Out	8.3 msec	Per VTFF (Manual GEK-36150, pp. 6-5 through 6-16)

VFU FILL CHARACTER REQUIREMENTS WHEN USING TVFA OSCILLATOR
(SET AT 10 TO 10.5 MS)

TermiNet 300 PRINTER

Required time delay between

VT or FF command and first character = 320 ms + (27 ms x number of lines)

Example:

At 30 cps, with two lines of VT

320 ms + (27)(2) = 374 ms required time delay

Converting to equivalent number of fill characters,

30 char/sec = 33.3 ms/char.
Fill char. required = 374 ms ÷ 33.3 ms/char. = 11.3 fill characters
= 12 fill characters (always round off to next higher number)

Alternatively, the following table may be used:

	30 cps	15 cps	10 cps
Non-Printing Fill Characters Required	9.6 + .81/line	4.8 + .41/line	3.3 + .27/line

Using the same example as above:

9.6 + (2 lines)(.81) = 9.6 + 1.6 = 11.2 = 12 fill characters

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TermiNet 1200 PRINTER

Function	Definition of Time Interval	Time Interval In Msec	Number of Characters To Equal Time Interval			
			120 cps	30 cps	15 cps	10 cps
Following a Print-able Line Ending in Vertical Tab or Form Feed	Length of New Line including carriage return and/or platen moving code	320 plus 27 per line*	38.5 plus 3.3 per line	9.6 plus .81 per line**	4.8 plus .41 per line**	3.3 plus .27 per line**
Following a Non-Printable Line Ending in Vertical Tab or Form Feed	Length of New Line including carriage return and/or platen moving code	90 plus 27 per line*	10.9 plus 3.3 per line	2.7 plus .81 per line**	1.4 plus .41 per line**	.9 plus .27 per line**

*A maximum of 36 printable characters may be included during this time interval.

**One character minimum - always round off to next higher number.

NOTE

Although the following data format is different from the format specified for TermiNet 300 Printers, all data formatted for TermiNet 300 Printers will be accurately printed by TermiNet 1200 Printers when operated at, or below, the baud rate for which the data was formatted. However, the efficiency of printing on the TermiNet 1200 Printer may be improved by reformatting the data to take advantage of the greater memory of the TermiNet 1200 Printer.

A new line must be at least 300 milliseconds long, including the platen moving code at the end, if it follows a line which has one or more printable characters and ends in LF. This time allows the last printable character on the previous line to be printed and the line feed to be executed before the next platen moving code is received.

This rule is satisfied during normal text where LF is the only platen moving code if each line including the LF code is a minimum of 36 characters long at 1200 baud, 9 characters long at 300 baud, 4.5 characters long at 150 baud, or 3 characters long at 110 baud.

FOLLOWING A PRINTABLE LINE ENDING IN VT OR FF

Of interest here is the time interval of 320 milliseconds plus 27 milliseconds per line of form movement immediately following a VT or FF code at the end of a line including at least one printable character. A platen moving code (LF, VT, or FF) during this time interval must be the last character in the time interval. The time interval may include no more than 36 printable characters. (This restriction is 36 printable characters at all baud rates.) The remainder of the time may be taken up by time delay or fill characters.

Example: (1200 Baud)

Line 1:   1234567890123456789012345678901234567890CV (No fills required)
             (Vertical Tab 3 lines, 320 ms plus 3 x 27 ms = 401 ms)

             Since 120 char/sec = 8.3 ms/char,

             401 ms of fill time is needed while platen is moving:

                    401 ms ÷ 8.3 ms/char = 48.4 character times
                    which rounds off to 49.

             49 Character Fill Time: Printing Characters (36 max.) + enough fill characters to total 49
                                       when added to the Printing Characters + additional data + CL.
Line 2:   1234567890123456789012345678901234 56##############1234CL

FOLLOWING A NON-PRINTABLE LINE ENDING IN VT OR FF

The rule here is the same as that for "Following a Printable Line Ending in VT or FF" except the time interval of interest is 90 milliseconds plus 27 milliseconds per line of form movement.

Example: (1200 Baud)

Line 1:   1234567890123456789012345678901234567890CF (No fills required)
             (Form Feed 3 lines, 320 ms plus 3 x 27 ms = 401 ms)

             401 ms ÷ 8.3 ms/char = 48.4 character times. (Round off to 49.)

Line 2:   ###V
             (Vertical Tab 10 lines, 90 ms plus 10 x 27 ms = 360 ms)

             360 ms ÷ 8.3 ms/char = 43.4 character times
             which rounds off to 44.

             44 Character Fill Time: Printing Characters (36 max.) + enough fill characters to total 44 when
                                       added to the Printing Characters + additional data + CL.

Line 3:   1234567890123456789012345678901234 56########1234CL