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TEKTRONIX®

TTY PORT INTERFACE
FOR 4010-SERIES
COMPUTER TERMINALS

021-0067-00

FOR
(DEC PDP 8i,L,12, OR 15)

INSTRUCTION MANUAL

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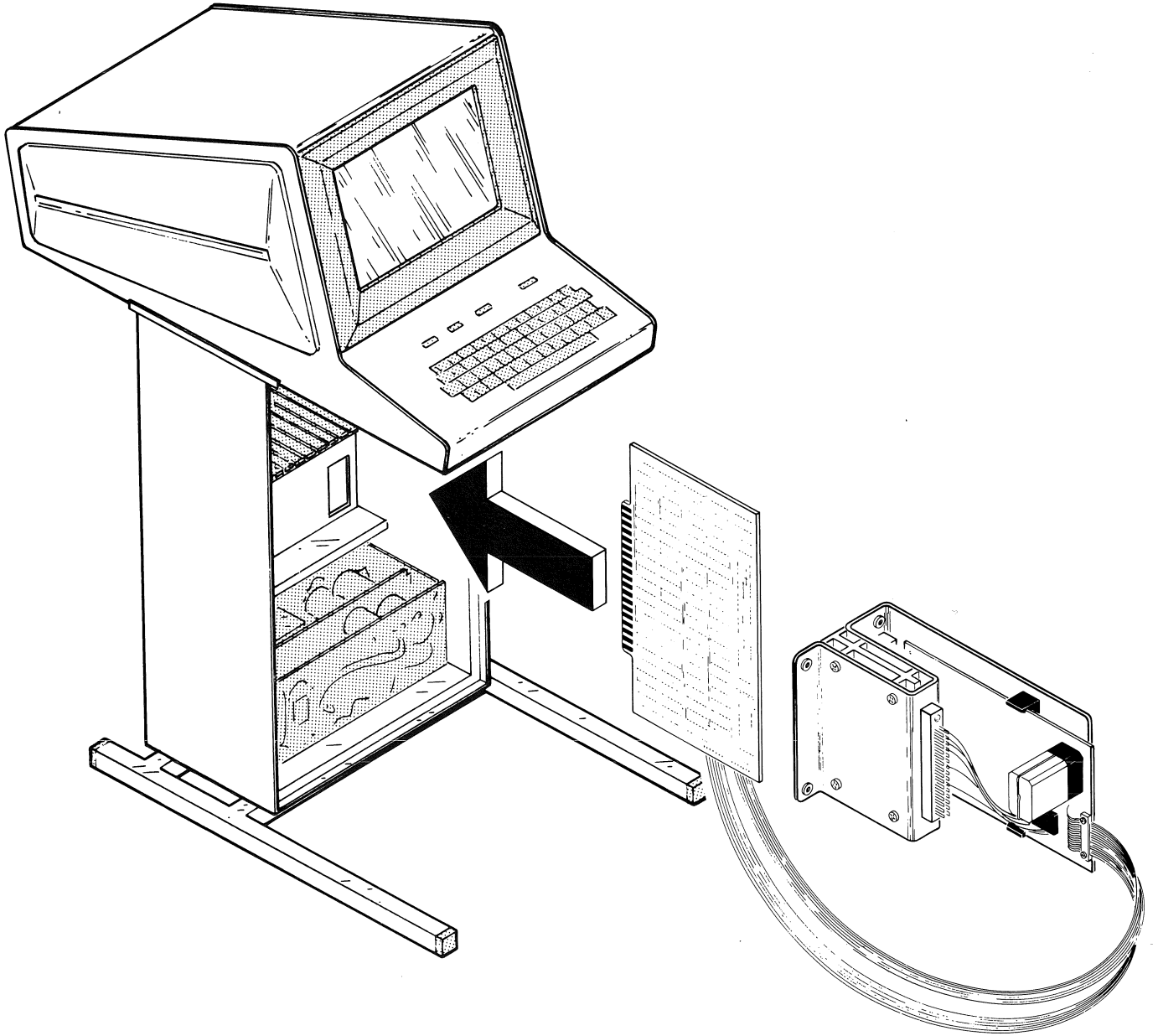


Fig. 1-1. TTY Port Interface.

MODIFICATION AND INSTALLATION INSTRUCTIONS

Introduction

This manual describes the circuit changes and interconnections necessary to interface TEKTRONIX 4010-Series Computer Display Terminals with a DEC PDP-8i, L, 12, or 15 computer.

The installation instructions are divided into two parts. Section 1 covers the specific modifications and installation for this computer. Section 4 gives a procedure for testing the system a part at a time. This is to simplify troubleshooting.

The Interface consists of a Control Card, a Relay Card with connectors and mounting hardware, two interconnecting cables, and a computer modification kit.

CAUTION

The Computer, Teletype,¹ and Terminal must be turned off before modifying the system.

If the Interface was ordered with the Terminal, the installation will already have been completed by the factory. In this case, go to Section 4 for the system checkout. If the Interface is being field-installed, the procedure is as follows:

1. Install the Control Card into the minibus in the Pedestal.
2. Attach the Relay Card Assembly to the rear panel of the Pedestal using the four screws. If two interfaces are being installed, a two hole rear panel will be needed. See the Dual Interface Manual for more detail.
3. Connect the two cables from the Relay Board to the Control Card.
4. Go to Section 4 for the system checkout. The following describes the modifications referred to in the checkout:

Interface Modifications

- a. Install all straps on the Control Card as shown in Fig. 1-2.
- b. Install all straps on the Relay Card as shown on the Relay Card Diagram.

Computer I/O Modifications

1. Locate the group of teletype control cards in the computer I/O section. These consists of types M707 (teletype transmitter), M706 (teletype receiver), M452 (clock), and a teletype connector card. The TTY connector card type will vary depending upon age and type of computer.

- a. PDP-8i and PDP-8L use W076 or W078.
- b. PDP-15 uses G858.

¹Registered trademark of Teletype Corporation.

021-0067-00 TTY Port Interface

c. PDP-12 may use either W076 or W078.

d. The W078 is a short W076 with mate and lock connector.

e. In any case, the cards all contain a cable termination from the teletype machine. This cable will help locate the teletype group of cards.

2. Remove the M707 transmitter card from the computer and lift C22, a disc capacitor, which suppresses noise on the teletype drive line to pin AV2. Some versions of M707 do not include this capacitor.

3. Remove the M706 receiver card from the computer and lift C25, a disc capacitor, which suppresses noise on the teletype paper tape reader line to pin AU2. Some versions of the M706 do not include this capacitor.

4. Replace the M706 and M707 cards in the computer. Be sure to place them in the proper slots.

5. Disconnect the teletype connector (W076, W070, or G858) from the computer and connect it to J267 on the rear of the Terminal Pedestal. The finger contacts should be facing left as you face the rear of the Terminal.

6. The TEKTRONIX supplied interface cable should now be connected. One end contains a 25 pin connector which plugs into J261 on the rear of the Terminal Pedestal. Secure the connector to the Terminal with its two hold down screws. The other end of the cable contains two circuit cards. One is the connector card (No IC's) and plugs into the teletype I/O of the computer where the W076, W070, or G858 was plugged in. The other card (mini coax connects to it) is the Terminal Interface Clock card. This card replaces the M452 clock card in the computer I/O.

7. After a check of all switch and strap options as given on the following page, the equipment is ready to power up and use. Details of operation are found in the Terminal Users Manual.

TC-2 PAGEFULL INTERRUPT strap can be placed IN to assert $\overline{\text{TBUSY}}$ at bottom of 4010 page (Pagefull condition). This inhibits input from teletype port until cleared by Reset or Page keys, the strap can also be placed OUT, to ignore Pagefull.

SWITCH OR STRAP POSITIONS IN 021-0067-00

Strap/Switch	Position
Interface Control Card	
BAUD SHIFT	IN (OR AS DESIRED)
AUX TSUP	OUT
16X	OUT
CLOCK	X8
MAX BAUD	307
TSL	IN
INPUT	232
INTERFACE CLOCK	INVERT
T-DATA	NORMAL
R-DATA	NORMAL
TAPEFETCH	OUT
CLEAR TO SEND	HIGH
READER ON	NORMAL
ECHO	OUT
PARITY	AB-A and CD-C
BIT 8	IN
TTY MASTER OPT	NO STRAP

Rear Panel

AUX/TTY (S7)	TTY
--------------	-----

Relay Board

CLEAR TO SEND	A to C and B to D
TTY LEVEL	270 Ω 1/2 W I to F
PULL UP/DOWN	220 Ω 1 W A to B
TTY REC DATA	B to C

POTENTIOMETER ADJUSTMENTS IN 021-0067-00

Interface Control Card

880 Hz	880 Hz @ TP2
VAR BAUD RATE	880 Hz - 25 kHz @ TP1

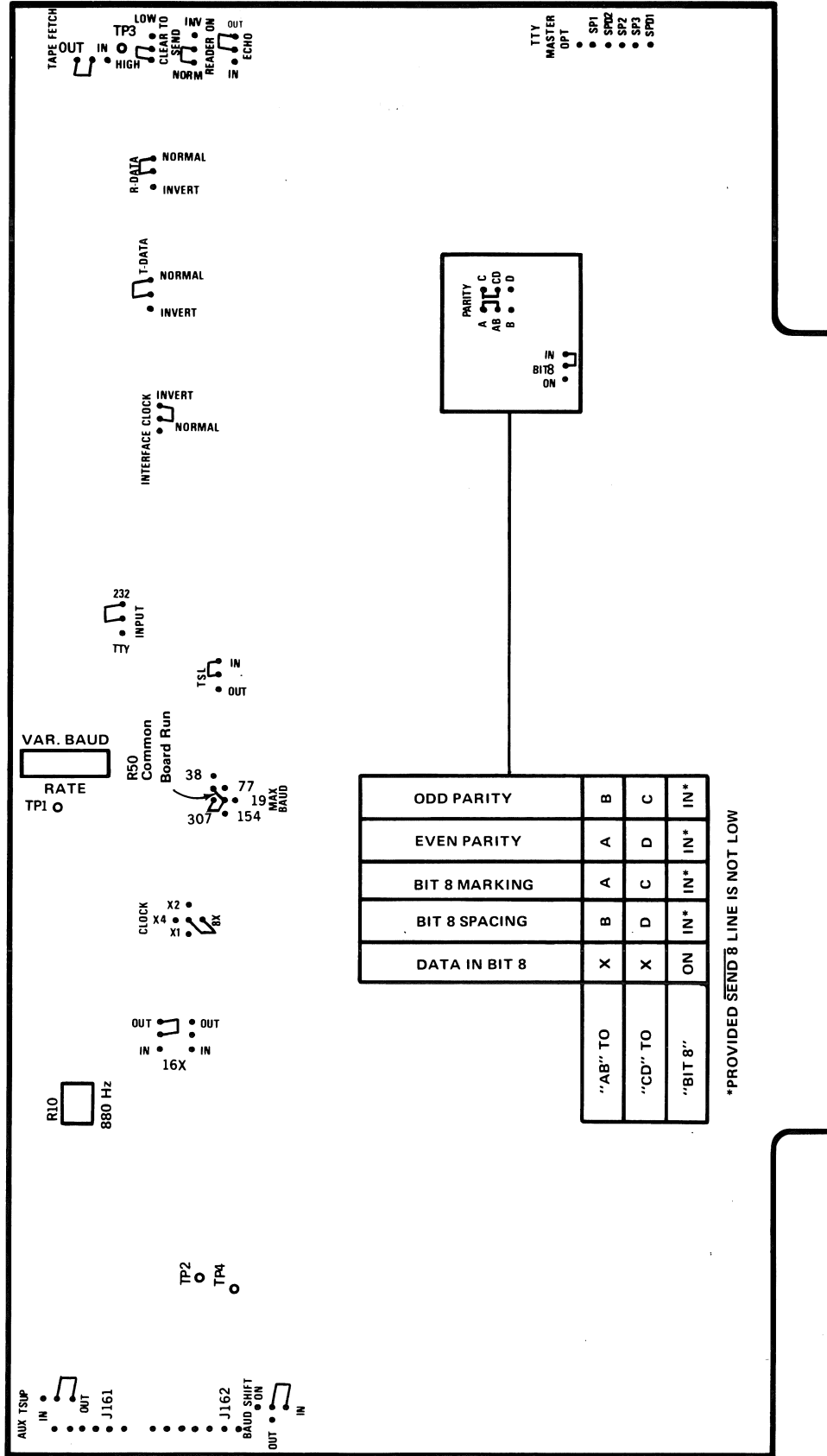


Fig. 1-2. TTY Port Strap Options.

ELECTRICAL PARTS LIST

Replacement parts should be ordered from the Tektronix Field Office or Representative in your area. Changes to Tektronix products give you the benefit of improved circuits and components. Please include the instrument type number and serial number with each order for parts or service.

ABBREVIATIONS AND REFERENCE DESIGNATORS

A	Assembly, separable or repairable	FL	Filter	PTM	paper or plastic, tubular molded
AT	Attenuator, fixed or variable	H	Heat dissipating device (heat sink, etc.)	R	Resistor, fixed or variable
B	Motor	HR	Heater	RT	Thermistor
BT	Battery	J	Connector, stationary portion	S	Switch
C	Capacitor, fixed or variable	K	Relay	T	Transformer
Cer	Ceramic	L	Inductor, fixed or variable	TP	Test point
CR	Diode, signal or rectifier	LR	Inductor/resistor combination	U	Assembly, inseparable or non-repairable
CRT	cathode-ray tube	M	Meter	V	Electron tube
DL	Delay line	Q	Transistor or silicon-controlled rectifier	Var	Variable
DS	Indicating device (lamp)	P	Connector, movable portion	VR	Voltage regulator (zener diode, etc.)
Elect.	Electrolytic	PMC	Paper, metal cased	WW	wire-wound
EMC	electrolytic, metal cased	PT	paper, tubular	Y	Crystal
EMT	electrolytic, metal tubular				
F	Fuse				

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Description
CONNECTORS				
J267 ¹	131-1009-00			Receptacle, electrical, 36 pin, female
P261 ¹	131-0570-00			Receptacle, electrical, 25 pin, male
ASSEMBLY ¹				
	670-1282-00			CLOCK Circuit Card Assembly
CAPACITORS				
C5	281-0580-00			470 pF, Cer, 500 V, ±10%
C8	283-0177-00			1 μF, Cer, 25 V, +80%-20%
C9	283-0177-00			1 μF, Cer, 25 V, +80%-20%
RESISTORS				
R5	315-0471-00			470 Ω, 1/4 W, 5%
R6	315-0221-00			220 Ω, 1/4 W, 5%
INTEGRATED CIRCUITS				
U3	156-0036-00			Dual 4-input positive nand buffer, replaceable by SN7440N
U5	156-0030-00			Quad 2-input positive nand gate, replaceable by SN7400N
U7	156-0041-00			Dual 15 MHz d-type positive-edge-trigger flip-flop, replaceable by SN7474N
ASSEMBLY ¹				
	670-1281-00			CONNECTOR Circuit Card Assembly
DIODE				
CR1	152-0185-00			Silicon, selected from 1N4152 or 1N3605

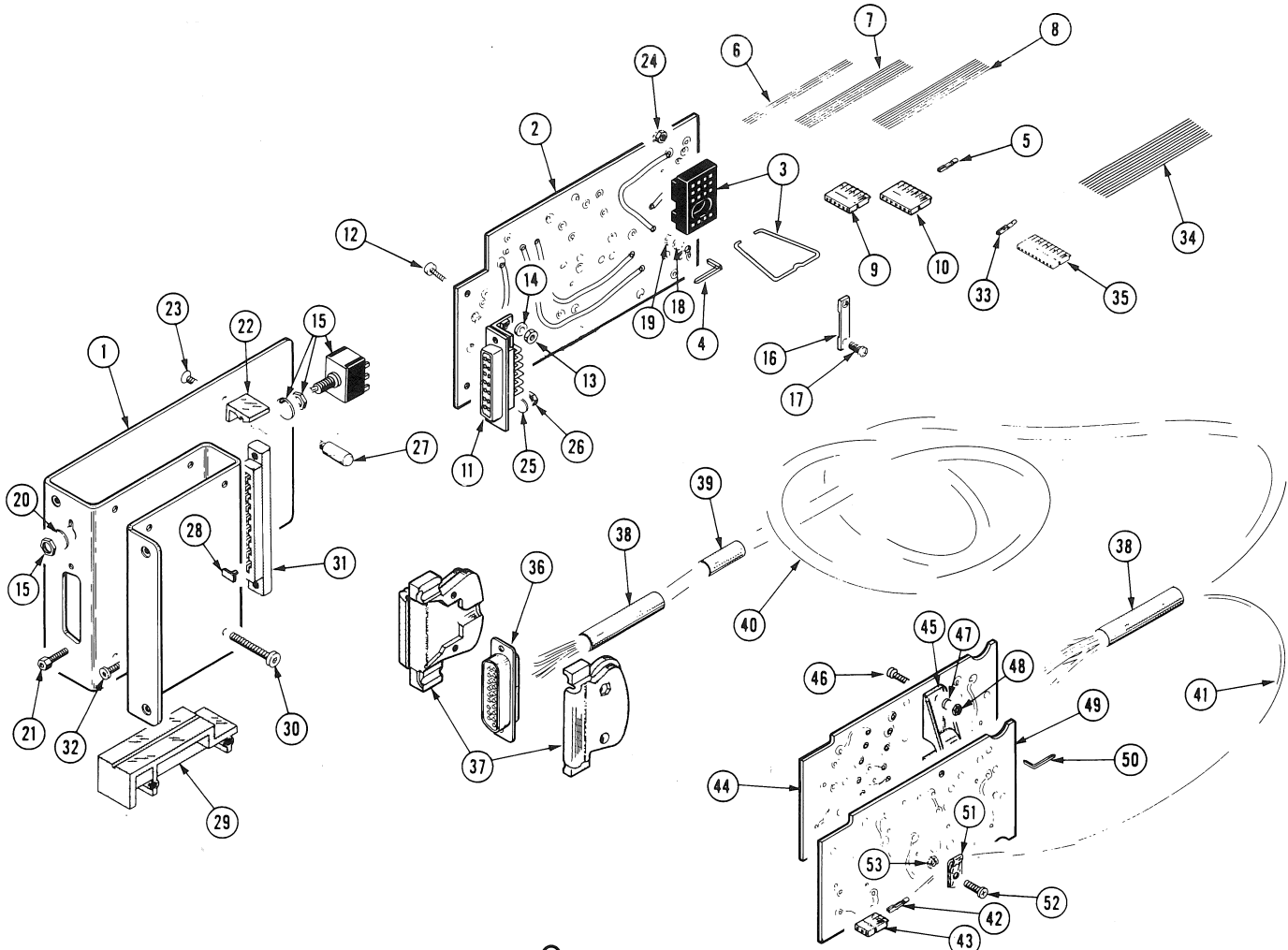
¹Supplied with 012-0255-00 and 012-0255-01.

Electrical Parts List—021-0067-00

Ckt. No.	Tektronix Part No.	Serial/Model No. Eff Disc	Description
ASSEMBLY	670-1982-00 670-1982-02		TELETYPE RELAY Circuit Board Assembly
CAPACITORS			
C5	283-0177-00		1 μ F, Cer, 25 V, +80%-20%
C6	283-0178-00		0.1 μ F, Cer, 100 V, +80%-20%
DIODE			
CR5	152-0185-00 152-0141-00¹		Silicon, selected from 1N4152 or 1N3605
CONNECTOR			
J261	131-0812-00		Receptacle, electrical, 25 pin, female
RELAY			
K5	148-0045-00		Armature, 12 VDC, 185 Ω , coil
RESISTORS			
R3	301-0510-00		51 Ω , 1/2 W, 5%
A-B ¹	304-0221-00		220 Ω , 1 W, 10%
I-F ¹	301-0271-00		270 Ω , 1/2 W, 5%
SWITCH			
S3	260-1206-00		Toggle

¹Resistor not installed when ordering Circuit Board Assembly, must be ordered separately.

MECHANICAL PARTS LIST



Index No.	Tektronix Part No.	Serial/Model No. Eff	Disc	Q					Description	
				y	1	2	3	4		5
1	386-2259-00			1						PANEL, rear
2	670-1982-00 670-1982-02			1						CIRCUIT BOARD ASSEMBLY--TELETYPE RELAY - circuit board assembly includes:
3	136-0393-00			1						SOCKET, relay, 16 pin
4	131-0589-00			10						TERMINAL, pin, 0.46 inch long
5	131-0707-00			13						CONNECTOR, terminal
6	175-0826-00			in						WIRE, electrical, 3 wire ribbon, 3 inches
7	175-0829-00			in						WIRE, electrical, 6 wire ribbon, 17 inches
8	175-0830-00			in						WIRE, electrical, 7 wire ribbon, 17 inches
9	352-0164-00			1						HOLDER, terminal connector, 6 wire
10	352-0165-00			1						HOLDER, terminal connector, 7 wire
11	131-0812-00			1						CONNECTOR, receptacle, electrical, 25 pin
	- - - - -			-						mounting hardware: (not included w/connector)
12	211-0173-00			2						SCREW, 4-40 x 0.375 inch, Fil HS
13	210-0406-00			2						NUT, hex., 4-40 x 0.188 inch
14	210-0054-00			2						WASHER, lock, split, 0.118 ID x 0.212 inch OD

Mechanical Parts List—021-0067-00

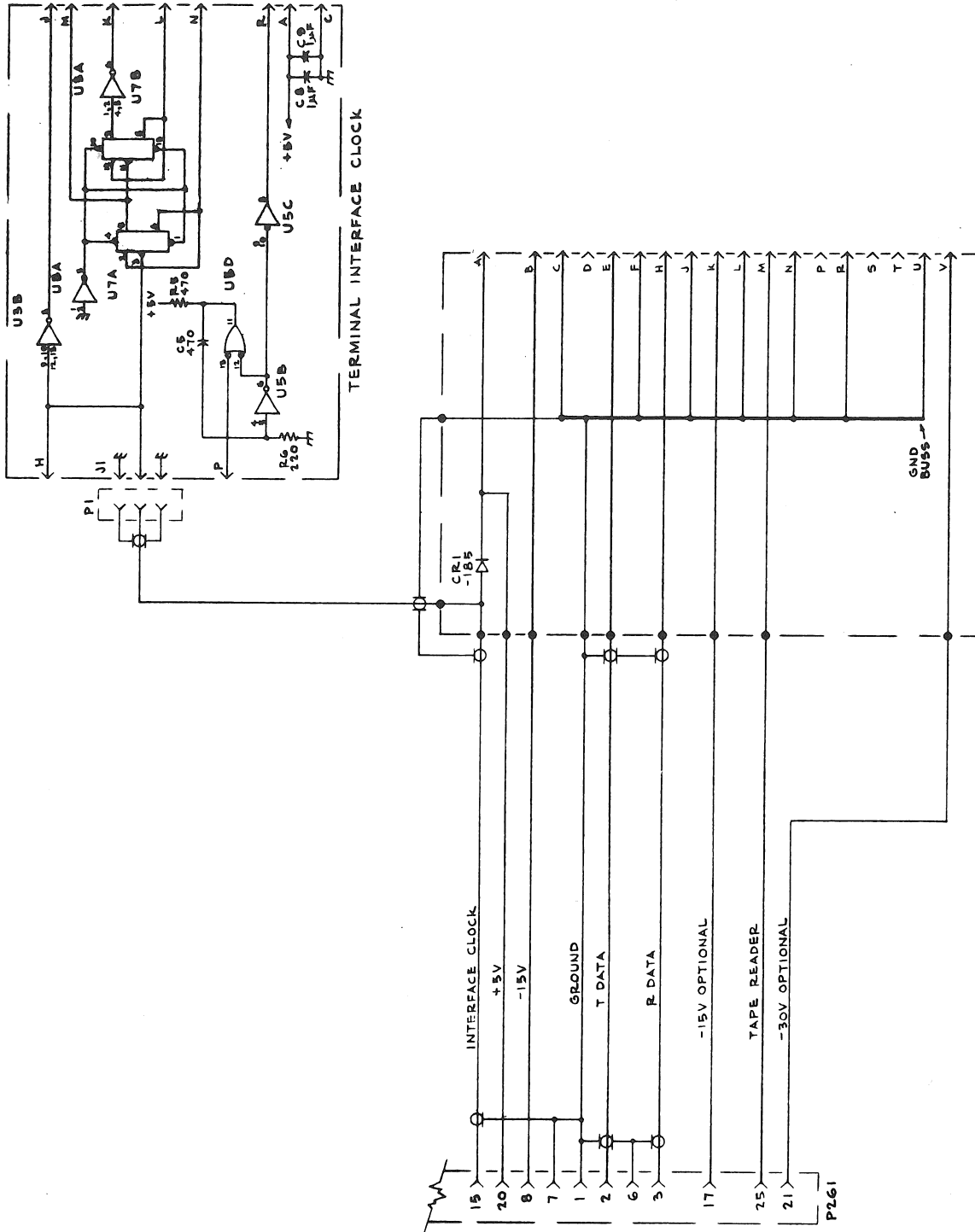
Index No.	Tektronix Part No.	Serial/Model No. Eff	No. Disc	Q					Description	
				t	y	1	2	3		4
15	260-1206-00			1						SWITCH, toggle, w/hardware--AUX-OFF-TTY
16	343-0400-00			1						CLAMP, cable
	- - - - -			-						mounting hardware: (not included w/clamp)
17	211-0008-00			2						SCREW, 4-40 x 0.25 inch, PHS
18	210-0054-00	211-0037-00		2						WASHER, lock, split, 0.118 ID x 0.212 inch OD
19	210-0406-00			2						NUT, hex., 4-40 x 0.188 inch
	- - - - -			-						mounting hardware: (not included w/circuit board assembly)
20	210-0940-00			1						WASHER, flat, 0.25 ID x 0.375 inch OD
21	129-0260-00			2						POST, metallic, stud
22	344-0131-00			2						CLIP, circuit board
23	211-0101-00			2						SCREW, 4-40 x 0.25 inch, 100° csk, PHS
24	210-0586-00			2						NUT, keps, 4-40 x 0.25 inch
25	210-0003-00			2						WASHER, lock, external, #4
26	210-0406-00			2						NUT, hex., 4-40 x 0.188 inch
27	386-2218-00			2						SUPPORT, plug-in unit
28	105-0373-00			2						STOP, circuit card
	334-1978-00			1						LABEL, information (not shown)
29	351-0278-00			2						GUIDE, circuit board, plastic
	- - - - -			-						mounting hardware for each: (not included w/guide)
30	211-0628-00			2						SCREW, 6-32 x 1.125 inches, PHS
31	131-1009-00			1						CONNECTOR, 36 pin, female
	- - - - -			-						mounting hardware: (not included w/connector)
32	211-0097-00			2						SCREW, 4-40 x 0.312 inch, PHS
33	131-0707-00			10						CONNECTOR, terminal
34	175-0833-00			in						WIRE, electrical, 10 wire ribbon, 4.5 inches
35	352-0168-00			1						HOLDER, terminal connector, 10 wire
	012-0255-00			1						CABLE, interconnecting, 16 feet long
	012-0255-01			1						CABLE, interconnecting, 50 feet long (optional)
	- - - - -			-						each cable includes:
36	131-0570-00			1						CONNECTOR, receptacle, electrical, 25 pin, male
37	200-1055-00			1						COVER, connector, plastic
38	200-1104-00			2						CABLE NIPPLE, electrical, 2 inches long
39	334-1645-00			1						SLEEVE, marker, cable (012-0255-00 only)
	334-1646-00			1						SLEEVE, marker, cable (012-0255-01 only)
40	175-1196-01			1						CABLE, special purpose, electrical, 16 feet
	- - - - -			-						(012-0255-00 only)
	175-1196-02			1						CABLE, special purpose, electrical, 50 feet
	- - - - -			-						(012-0255-01 only)
41	175-1020-00			ft						CABLE, coaxial, 50 Ω, 2 feet
42	131-0707-00			2						CONNECTOR, terminal (small)
	131-0708-00			1						CONNECTOR, terminal (large)
43	352-0161-00			1						HOLDER, terminal connector, 3 wire
44	670-1281-00			1						CIRCUIT CARD ASSEMBLY--CONNECTOR
	- - - - -			-						mounting hardware: (not included w/circuit card assembly)
45	343-0242-00			1						CLAMP, cable, plastic
46	211-0097-00			2						SCREW, 4-40 x 0.312 inch, PHS
47	210-0054-00			2						WASHER, lock, split, #4
48	210-0406-00			2						NUT, hex., 4-40 x 0.188 inch

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Index No.	Tektronix Part No.	Serial/Model No.		Qty	Description
		Eff	Disc		
49	670-1282-00			1	CIRCUIT CARD ASSEMBLY--CLOCK
	- - - - -			-	circuit card assembly includes:
50	131-0589-00			3	TERMINAL, pin, 0.46 inch long
	- - - - -			-	mounting hardware: (not included w/circuit card assembly)
51	343-0144-00			1	CLAMP, loop
52	211-0008-00			1	SCREW, 4-40 x 0.25 inch, PHS
53	210-0406-00			1	NUT, hex., 4-40 x 0.188 inch

ACCESSORIES

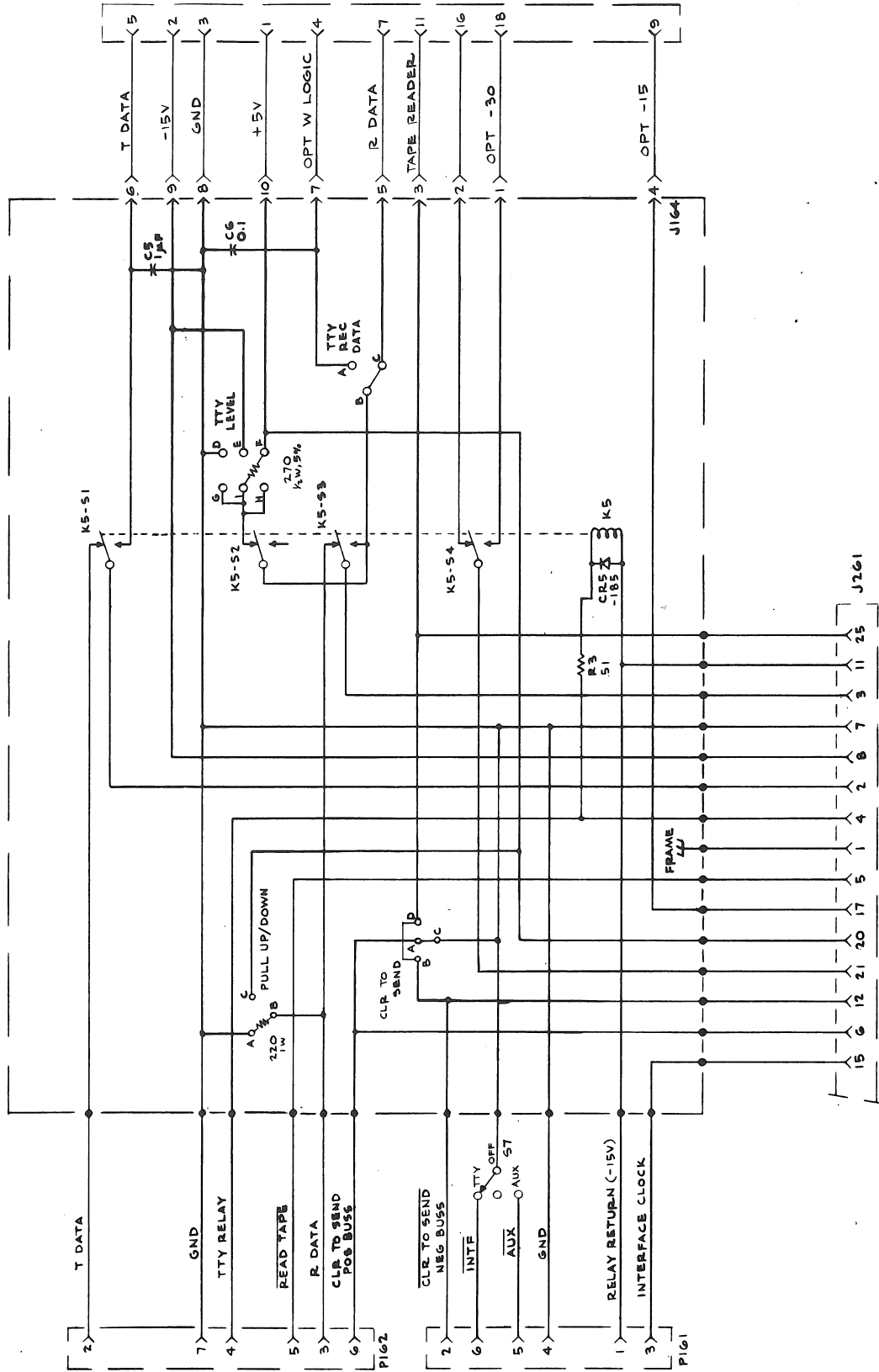
070-1353-00 1 MANUAL, TTY Port Interface (not shown)



D.E.C. (M SERIES)
COMPUTER INTERFACE CABLE

(A)

021-0067-00



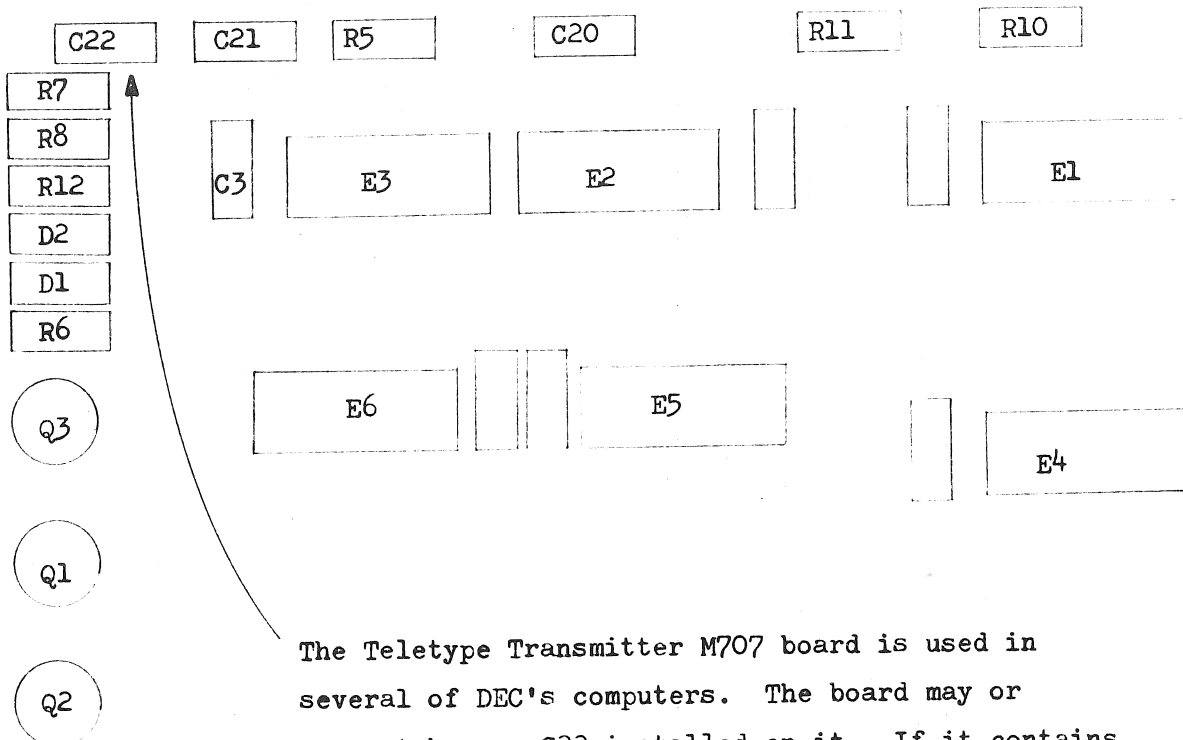
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4010 TELETYPE RELAY CARD

(A)

021-0067-00 TTY Port Interface

Additional Illustration for Step 2 on page 1-2



Board Connectors

The Teletype Transmitter M707 board is used in several of DEC's computers. The board may or may not have a C22 installed on it. If it contains the capacitor, it should be removed.

021-0067-00 TTY PORT INTERFACE

TEXT CORRECTION

Pages 1-3 and 1-4

Interface strap INPUT should go to TTY, not to 232.