



HP 13255

CTU TFST MODULE

Manual Part No. 13255-91082

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1.0 INTRODUCTION.

The CTU Test Module provides a method of verifying the operation of the CTU Transport Assembly. The CTU Tester PCA replaces the standard top plane connector used with the CTU Module PCA's. The CTU Test Module provides optional manual control over tape motion and verifies record/read operations. In addition, it provides a status display and test point array (one test point for each signal line on the top plane). Circuitry is provided to monitor tape speed accuracy and to implement the stop-on-hole feature which prevents cartridge tape run-off in OFF LINE (local) mode.

2.0 OPERATING PARAMETERS.

A summary of operating parameters for the CTU Test Module is contained in tables 1.0 through 4.1.

Table 1.0 Physical Parameters

Part Number	Nomenclature	Size (L x W x D) +/-0.100 Inches	Weight (Pounds)
02640-60082	CTU Tester PCA	6.5 x 3.6 x 2.4	0.38

Number of Backplane Slots Required: NOT APPLICABLE

Table 2.0 Reliability and Environmental Information

Environmental: (X) HP Class B () Other:
Restrictions: Type tested at product level
Failure Rate: 1.239 (percent per 1000 hours)

Table 3.0 Power Supply and Clock Requirements - Measured
(At +/-5% Unless Otherwise Specified)

+5 Volt Supply	+12 Volt Supply	-12 Volt Supply	-42 Volt Supply
@ 150 mA	@ mA	@ mA	@ mA
	NOT APPLICABLE	NOT APPLICABLE	NOT APPLICABLE
115 volts ac		220 volts ac	
@ A		@ A	
NOT APPLICABLE		NOT APPLICABLE	
Clock Frequency:		MHz	
NOT APPLICABLE			

Table 4.0 Connector Information

Connector and Pin No.	Signal Name	Signal Description
P1, Pins - 1 through -22		} Not Used
P1, Pin - A	$\overline{L0}$	Negative True, Lamp Unit 0
- B	$\overline{HOL0}$	Negative True, Hole Unit 0 Detected
- C	$\overline{L1}$	Negative True, Lamp Unit 1
- D	$\overline{HOL1}$	Negative True, Hole Unit 1 Detected
- E		Not used
- F	\overline{RE}	Negative True, Record Enable
- H	US0	Unit Select 0

Signal lines are fed directly through the Read/write PCA from the cartridge drives. $\overline{L0}$ and $\overline{L1}$ turn on the eject button lamp. $\overline{HOL0}$ and $\overline{HOL1}$ indicate that a hole has been detected on the associated drive.

Selects read or write mode of operation. Low level selects record mode. High level selects read mode.

Selects Unit 0 when high and Unit 1 when low.

Table 4.0 Connector Information (Cont'd.)

Connector and Pin No.	Signal Name	Signal Description
P1, Pin - J	DATA	Negative True, Write Data
- K	2XTACH	Two Times Tachometer Frequency
- L	RUNG	Running (>1 ips forward or reverse)
- M	TACH	Tachometer Frequency
- N	DZX	Data Zero Crossing
- P	GAP	Gap Detector
- R	CINO	Cartridge Inserted in Unit 0
- S	CINI	Cartridge Inserted in Unit 1
- T	RIP	Record in Progress
- U	DZX	Negative True, Data Zero Crossing
- V		Not Used
- W	FFD	Negative True, Fast Forward
- X	SFD	Negative True, Slow Forward
- Y	FREV	Negative True, Fast Reverse
- Z	SREV	Negative True, Slow Reverse

Table 4.1 Connector Information

Connector and Pin No.	Signal Name	Signal Description
P2, Pin - 1 through Pin - 6		} } Not Used
- 7	GND	Ground
Pin - 8 through Pin -22		} } Not Used
P2, Pin - A	$\overline{L0}$	Negative True, Lamp Unit 0
- B	$\overline{HOL0}$	Negative True, Hole Unit 0 Detected
- C	$\overline{L1}$	Negative True, Lamp Unit 1
- D	$\overline{HOL1}$	Negative True, Hole Unit 1 Detected
- E	+5V	+5 Volts DC
- F	\overline{RE}	Negative True, Record Enable
- H	US0	Unit Select 0

Signal lines are fed directly through the Read/write PCA from the cartridge drives. I0 and L1 turn on the eject button lamp. $\overline{HOL0}$ and $\overline{HOL1}$ indicate that a hole has been detected on the associated drive.

Selects read or write mode of operation. Low level selects record mode. High level selects read mode.

Selects Unit 0 when high and Unit 1 when low.

4.1 Connector Information (Cont'd.)

Connector and Pin No.	Signal Name	Signal Description
P2, Pin - J	DATA	Negative True, Write Data
- K	2XTACH	Two Times Tachometer Frequency
- L	RUNG	Running (>1 ips forward or reverse)
- M	TACH	Tachometer Frequency
- N	DZX	Data Zero Crossing
- P	GAP	Gap Detector
- R	CIN0	Cartridge Inserted in Unit 0
- S	CIN1	Cartridge Inserted in Unit 1
- T	RIP	Record In Progress
- U	DZX	Negative True, Data Zero Crossing
- V		Not Used
- W	FFD	Negative True, Fast Forward
- X	SFD	Negative True, Slow Forward
- Y	FREV	Negative True, Fast Reverse
- Z	SREV	Negative True, Slow Reverse

3.0 FUNCTIONAL DESCRIPTION. Refer to the block diagram (figure 1), schematic diagram (figure 2), timing diagram (figure 3), component location diagram (figure 4), and parts list (02640-60082) located in the appendix.

The CTU Test Module consists of manual control, selector control, indicators, speed reference, and selector functional blocks.

3.1 MANUAL CONTROL.

3.1.1 The mode of the module is controlled by the ONLINE/OFFLINE switch (S1). The CTU Tester operates as a standard top plane connector with status displays (indicators) when in ONLINE mode. In OFFLINE mode, the control functions are done manually (locally) with switches.

3.1.2 The manual control switches implement the following control functions.

S1: ONLINE-OFFLINE Switches

ONLINE : CTU Interface PCA controls tape motion, recording reading, etc.

OFFLINE: CTU Tester switches control tape motion, recording, reading, etc.

OFF : No action offline. Online control is inhibited.

S2: UNIT Switch

Selects the unit to be controlled while in OFFLINE mode and turns on the corresponding eject button light.

S3: FWD-REV Switch

Controls tape motion direction in OFFLINE mode.



S4: 60-10 IPS Switch

Controls the tape speed in OFFLINE mode.

S5: OFFLINE RCD Switch

INHIBIT: Read mode enabled in OFFLINE mode.

ENABLE : Record mode enabled in OFFLINE mode.

The DATA terminal may be used to inject a data signal:

No connection = gap

4kHz square wave = bi-phase
101010 data
pattern

8kHz square wave = bi-phase all "1"
or all "0" data
pattern

3.2 SFLECTOR CONTROL. The action of the (U8) latch through U5 inhibits the tape motion commands when a hole is detected by U5, Pins 1, 2, and 3 thus preventing cartridge tape run-off while in OFFLINE mode. The latch is reset by momentarily selecting the OFF position of the ONLINE/OFFLINE switch.

3.3 INDICATORS. The output of a speed monitor circuit on the CTU Tester is displayed. The display of miniature red LED's indicates the following status in OFFLINE mode.

CRTG IN 0: Unit 0 Cartridge Inserted

CRTG IN 1: Unit 1 Cartridge Inserted

RCD : Record In Progress

HOLE : Hole Detected on Either Unit

RAMP CMD : The Servo Ramp Circuit is Active

10 IPS : Speed Adjusted Within 10 ips, +/- 1.5%

GAP : Gap detected During Read Operation

- 3.3.1 CRTG IN Status Lights. These are used to verify the operation of cartridge (Unit 0,1) inserted switches on the respective mechanisms (Unit 0,1) and the cartridge inserted delay circuits on the Read/Write PCA.
- 3.3.2 RCD Status Light. This is used to verify the operation of the cartridge "Record" switch, one side of the recording head connection, and the write circuitry on the selected unit.
- 3.3.3 Hole Status Light. This display is used to verify the hole detect circuitry on the selected mechanism. The LED is displayed when the hole on the tape becomes positioned in the center of the light mirrors.
- 3.3.4 RAMP CMD Status Light. This LED indicates that the servo is responding to a tape motion command.
- 3.3.5 10 IPS Status Light. This display indicates that the forward tape speed is set within +/-1.5% of 10 ips.
- 3.3.6 GAP Status Light. This LED verifies record/read operations.
- 3.4 SPEED REFERENCE. The servo speed at 10 ips is monitored as follows: The 2X tachometer frequency is divided by two (U7). The resulting output clock at U7, Pin 9 is used to clock the 10 ips status bit (U7, Pin 3) and to generate a +/-1.5% window around the nominal position of the next clock, which provides the data input to the 10 ips status bit. Therefore, if the 10 ips speed is adjusted for maximum intensity of the 10 ips status indicator, the speed will be centered at 10 ips +/-1.5%.
- 3.5 SELECTOR. The selection of mechanism control is accomplished by U1, U4, U6, and part of U5. U1, U4, and U6 select mechanism control signals from the CTU Interface PCA, or the switches and the NDATA IN terminal on the CTU Tester PCA. U5 (Pins 9, 10, 12, and 13) inhibits CTN0 and CIN1 to prevent processor action in the OFF and OFFLINE modes.

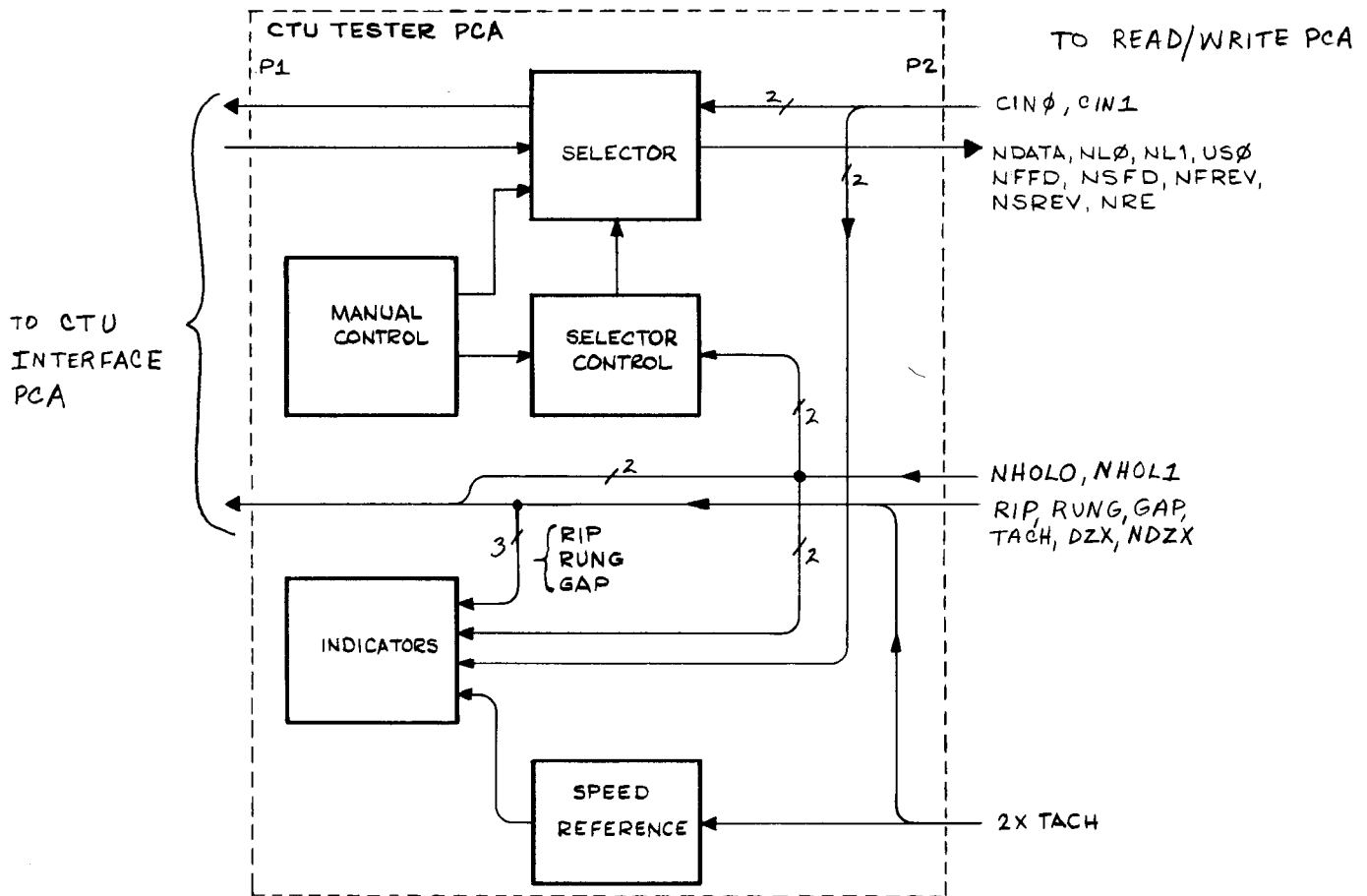


Figure 1
 CTU Test Module Block Diagram
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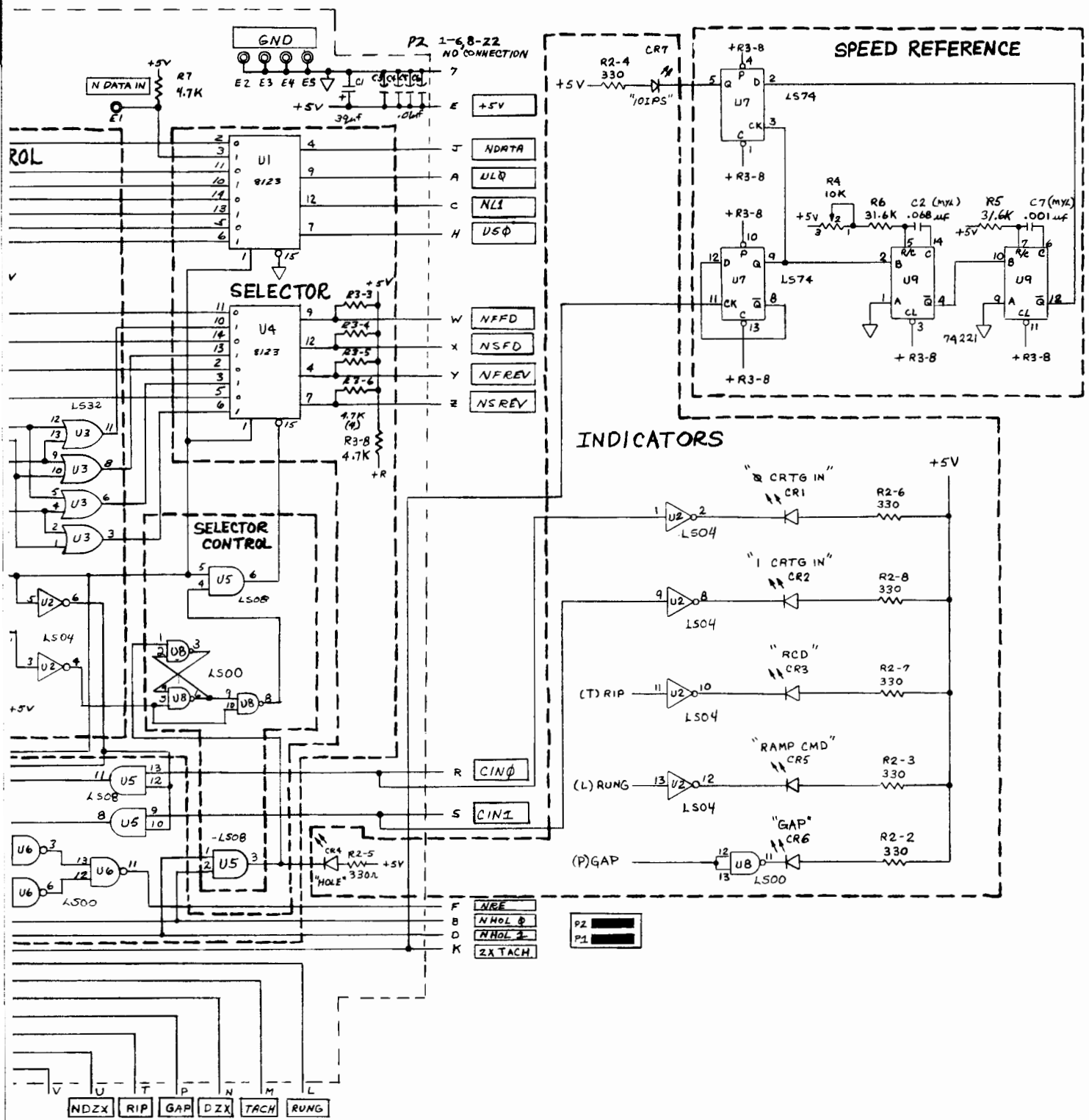
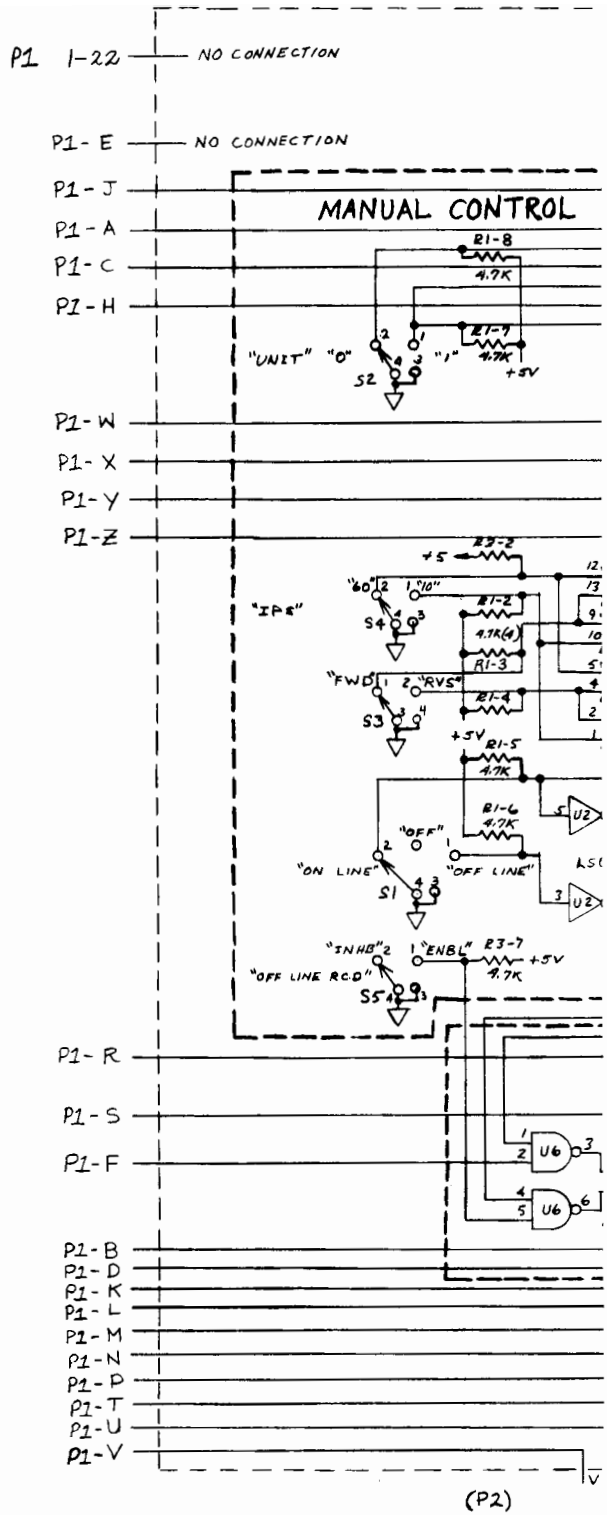


Figure 2
 CTU Tester PCA Schematic Diagram
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SIGNAL NAME	CONNECTOR # PIN NUMBER
2X TACH	P1 AND 2 PIN K
—	U9, PIN 2 U7, PIN 3
—	U9, PIN 4, 10
—	U7, PIN 2
—	U7, PIN 5

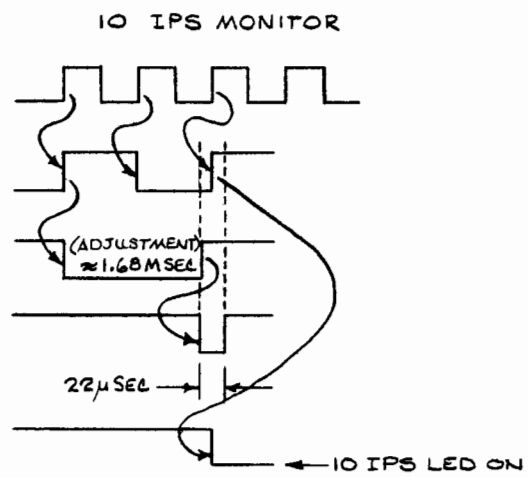


Figure 3
 CTU Tester Timing Diagram
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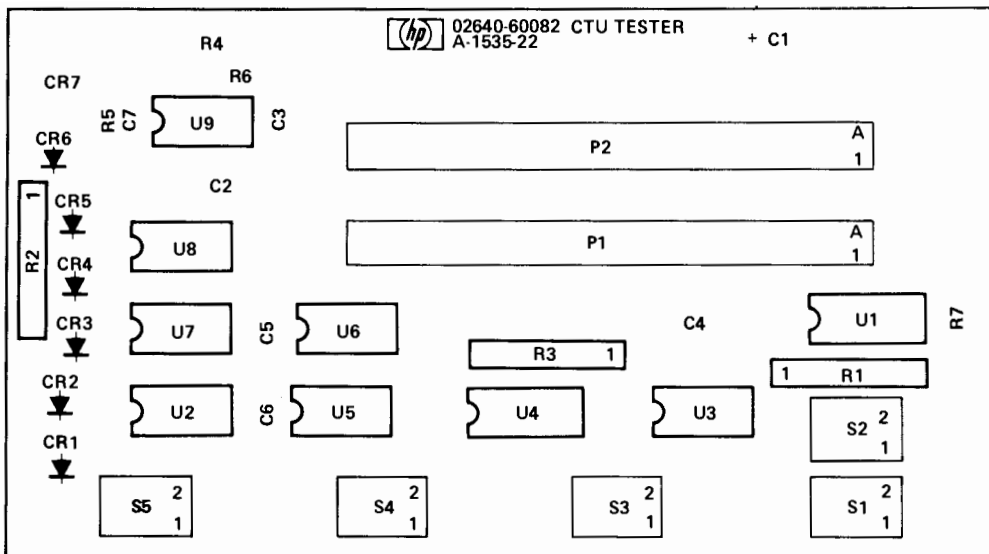


Figure 4
 CTU Tester PCA Component Location Diagram
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Replaceable Parts

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
	02440-60082	1	GTU TESTER ASSEMBLY DATE CODE: A-1535-22 REVISION DATE: 04-15-76	28480	02640-60082
C1	0180-0393	1	CAPACITOR-FXD 39UF+-10% 10VDC TA	56289	150D396X901082
C2	0140-0166	1	CAPACITOR-FXC .068UF +-10% 200WVDC POLYE	56289	292P68392
C3	0140-2055	4	CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C4	0160-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C5	0140-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C6	0140-2055		CAPACITOR-FXD .01UF +80-20% 100WVDC CER	28480	0160-2055
C7	0140-0153	1	CAPACITOR-FXD 1000PF +-10% 200WVDC POLYE	56289	292P10292
CR1	1950-0486	7	LED-VISIBLE LUM-INT=IMCD IF=20MA-MAX	28480	1990-0486
CR2	1950-0486		LED-VISIBLE LUM-INT=IMCD IF=20MA-MAX	28480	1990-0486
CR3	1950-0486		LED-VISIBLE LUM-INT=IMCD IF=20MA-MAX	28480	1990-0486
CR4	1950-0486		LED-VISIBLE LUM-INT=IMCD IF=20MA-MAX	28480	1990-0486
CR5	1950-0486		LED-VISIBLE LUM-INT=IMCD IF=20MA-MAX	28480	1990-0486
CR6	1950-0486		LED-VISIBLE LUM-INT=IMCD IF=20MA-MAX	28480	1990-0486
CR7	1950-0486		LED-VISIBLE LUM-INT=IMCD IF=20MA-MAX	28480	1990-0486
P1	1251-4043	2	CONNECTOR-PC EDGE 22-COND/ROW 2-ROWS	28480	1251-4043
P2	1251-4043		CONNECTOR-PC EDGE 22-COND/ROW 2-ROWS	28480	1251-4043
R1	1810-0125	2	NETWORK-RES 8-PIN-SIP .125-PIN-SPCG	11236	750
R2	1810-0123	1	NETWORK-RES 8-PIN-SIP .125-PIN-SPCG	11236	750
R3	1810-0125		NETWORK-RES 8-PIN-SIP .125-PIN-SPCG	11236	750
R4	2100-3210	1	RESISTOR-TRMR 10K 10% C TOP-ADJ 1-TRN	73138	72-108-0
R5	0658-3160	2	RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
R6	0658-3160		RESISTOR 31.6K 1% .125W F TC=0+-100	24546	C4-1/8-T0-3162-F
R7	0643-4725	1	RESISTOR 4.7K 5% .25W FC TC=-400/+700	01121	C84725
S1	31C1-1513	1	SWITCH-TGL SUBMIN SPDT NS .5A 120VAC PC	81640	T8206
S2	31C1-1213	4	SWITCH-TGL SUBMIN DPST NS .5A 120VAC PC	81640	T8201
S3	31C1-1213		SWITCH-TGL SUBMIN DPST NS .5A 120VAC PC	81640	T8201
S4	31C1-1213		SWITCH-TGL SUBMIN DPST NS .5A 120VAC PC	81640	T8201
S5	31C1-1213		SWITCH-TGL SUBMIN DPST NS .5A 120VAC PC	81640	T8201
U1	1820-1294	2	IC-DIGITAL DM8123N TTL QUAD 2	27014	DM8123N
U2	1820-1199	1	IC-DIGITAL SN74LS04N TTL LS HEX 1	01295	SN74LS04N
U3	1820-1208	1	IC-DIGITAL SN74LS32N TTL LS QUAD 2 OR	01295	SN74LS32N
U4	1820-1294		IC-DIGITAL DM8123N TTL QUAD 2	27014	DM8123N
U5	1820-1201	1	IC-DIGITAL SN74LS08N TTL LS QUAD 2 AND	01295	SN74LS08N
U6	1820-1197	2	IC-DIGITAL SN74LS00N TTL LS QUAD 2 NAND	01295	SN74LS00N
U7	1820-1112	1	IC-DIGITAL SN74LS74N TTL LS DUAL	01295	SN74LS74N
U8	1820-1197		IC-DIGITAL SN74LS00N TTL LS QUAD 2 NAND	01295	SN74LS00N
U9	1820-1260	1	IC-DIGITAL SN74221N TTL DUAL	01295	SN74221N
			MISCELLANEOUS		
	0360-0124	5	TERMINAL-STUD SGL-PIN PRESS-MTG	28480	0360-0124
	0380-0038	4	SPACER-RND .5LG .116ID .1880D BRS NI-PL	28480	0380-0038
	0624-0099	2	SCREW-TPG 4-40 .375-IN-LG PAN-HO-POZI	28480	0624-0100
	2150-0003	4	WASHER-LK HLCL NO.-4 .115-IN-ID	28480	2190-0003
	2150-0772	4	WASHER-FL NM NO.-4 .117-IN-ID .25-IN-OD	28480	2190-0772
	2200-0155	4	SCREW-MACH 4-40 1-IN-LG PAN-HD-POZI	28480	2200-0155
	2260-0002	4	NUT-HEX-DBL-CHAM 4-40-THD .062-THK	28480	2260-0005
	5040-6059	1	HANDLE, CONNECTOR	28480	5040-6059