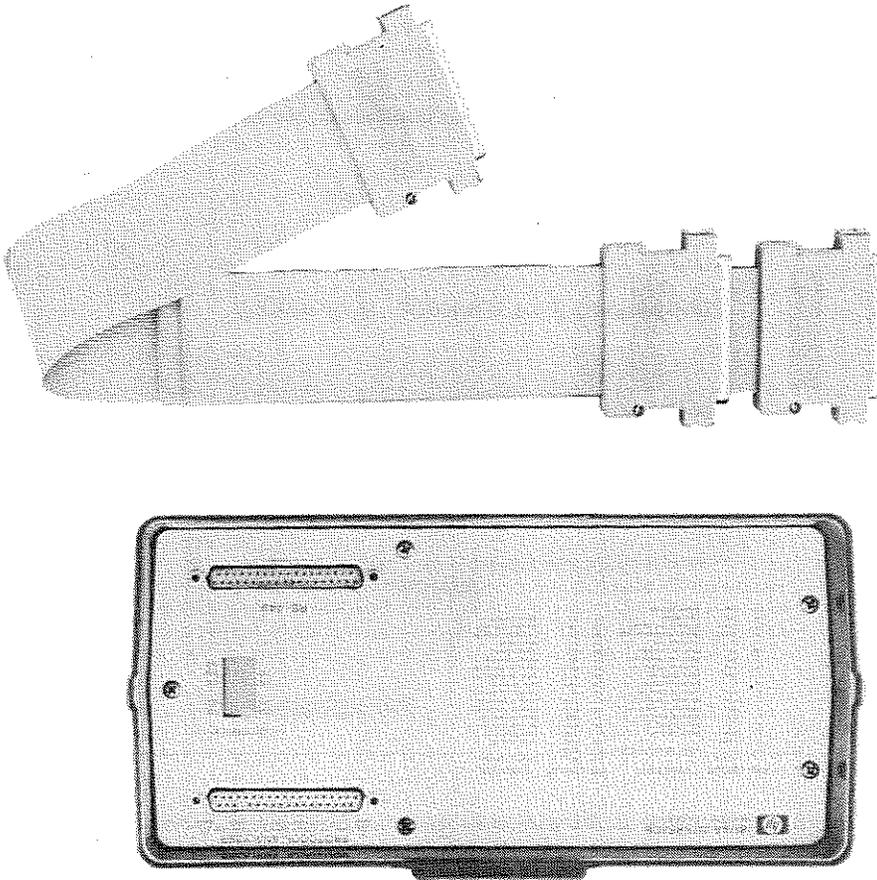


The HP 18174A is an RS-449 Interface Pod designed to provide the connection between the HP 4951C Protocol Analyzer and Data Terminal Equipment (DTE) and/or Data Circuit-Terminating Equipment (DCE). The HP 18174A is compatible with EIA RS-449/422A/423A electrical, mechanical, functional, and procedural specifications.

This appendix includes information to install, operate, and service the HP 18174A.

### B-1. INTRODUCTION

Figure B-1. HP 18174A Interface Pod



APPENDIX B  
HP 18174A  
RS-449 INTERFACE POD

- 1. Turn on the HP 4951C.
- 2. Press MORE.
- 3. Select <SELFTST>.
- 4. Select <EXT DLC>.

**Set Up**

This test checks that there is an Interface Pod connected to the Protocol Analyzer and verifies that the lines work.

**Description**

**HP 18174A Self Test -**

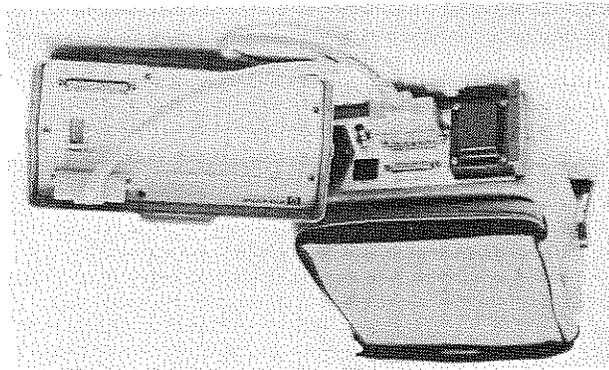
The Performance Verification test is performed by the operator. Follow the procedure described below.

**B-4. PERFORMANCE VERIFICATION**

Once the Interface Pod is installed, all operations are performed from the keyboard. See the Operating Manual for procedures.

**B-3. OPERATION**

Figure B-2. Interface Pod Connections



Turn off the Protocol Analyzer before connecting or disconnecting any Interface Pod.

**CAUTION**

To connect the Interface Pod to the HP 4951C Protocol Analyzer, turn the power off and attach the 37 pin connector to the port on the back of the Protocol Analyzer as shown in Figure B-2. Tighten the screws to ensure that the cable will not pull off during operation.

**B-2. INSTALLATION**

MFR NO.	MANUFACTURER NAME	ADDRESS	ZIP CODE
00000	ANY SATISFACTORY SUPPLIER		
01121	ALLEN-BRADLEY CO	MILWAUKEE WI	53204
04713	MOTOROLA SEMICONDUCTOR PRODUCTS	PHOENIX AZ	85008
11236	CTS OF BERNE INC	BERNE IN	46711
13606	SPRAGUE ELECT CO SEMICONDUCTOR DIV	CONCORD NH	03301
19701	MEPCO/ELECTRA CORP	MINERAL WELLS TX	76067
24546	CORNING GLASS WORKS (BRADFORD)	BRADFORD PA	16701
28480	HEWLETT-PACKARD CO CORPORATE HQ	PALO ALTO CA	94304
56289	SPRAGUE ELECTRIC CO	NORTH ADAMS MA	01247

Table B-1. HP 18174A Manufacturers Code List

The following tables and figure give information for ordering replacement parts. Table B-1 is the Manufacturer's Code List. Table B-2 lists the replaceable parts in Reference Designer order. Information is given for the description, Quantity, HP Part Number, and Manufacturers Part Number. Chassis and mechanical parts are listed in Figure B-2. To order a listed part, include the HP Part Number, indicate the quantity needed, and send the order to the nearest Hewlett-Packard office.

When ordering a part not listed, include the instrument model number, serial number, and a physical and functional description of the part. Send the order to the nearest Hewlett-Packard office.

**B-6. REPLACEABLE PARTS**

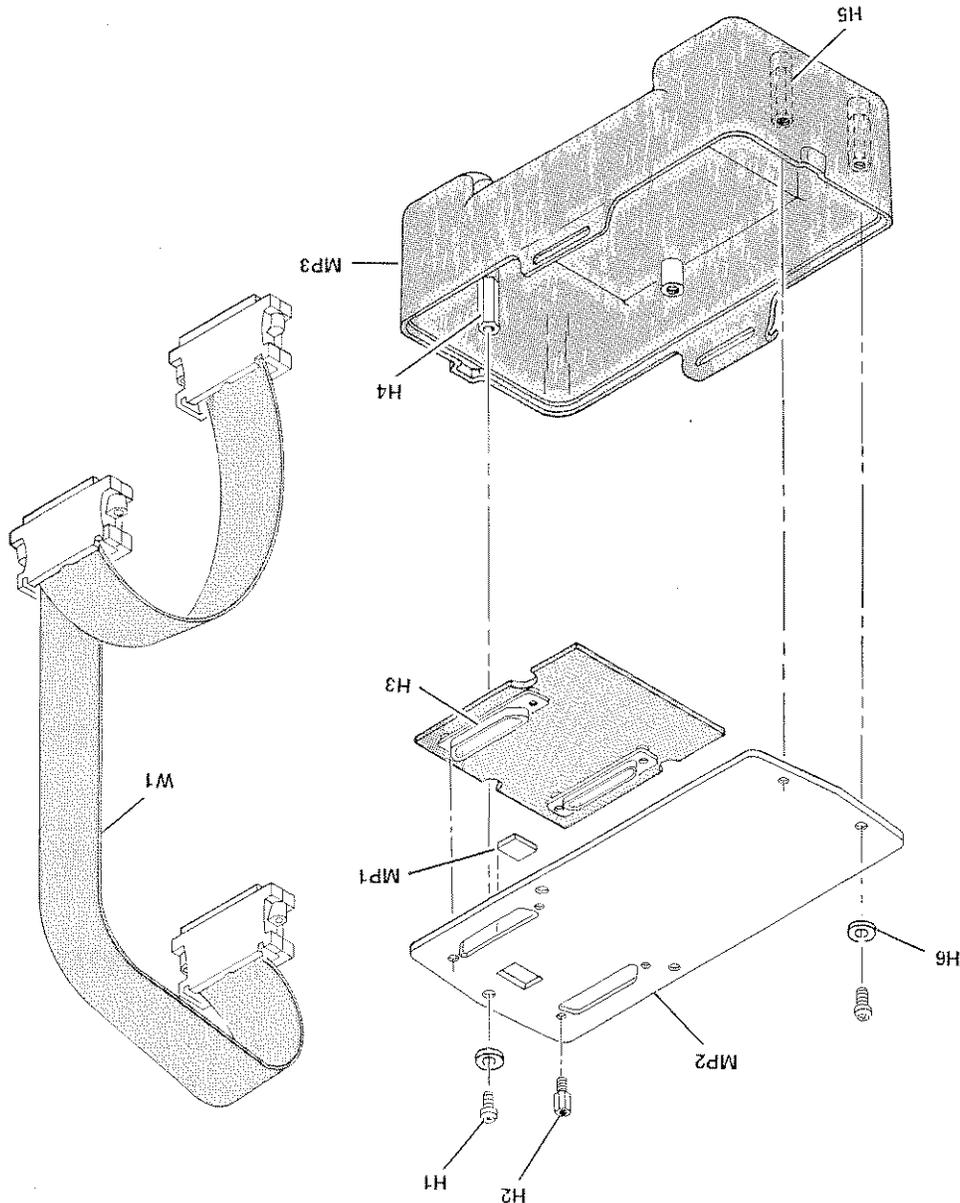
There are no adjustments for the HP 18174A.

**B-5. ADJUSTMENTS**

- Procedure**
1. When the <EXT DLC> softkey is pressed, the Interface Pod test is automatically performed.
  2. If there are no failures DLC TEST PASSED will be displayed.

Figure B-3. HP 18174A Exploded View

Reference Designation	HP Part Number	Qty	Description	Mfr Code	Mfr Part Number
H1	2300-0195	3	SCR, MCH, 6-32 312	04771	ORDER BY DESCRIPTION
H2	1251-2942	4	SCR POST LOCK	01300	206509-1
H3	1251-6074	4	CONNECTOR-37 PIN	04486	DC375V
H4	0380-1719	1	STANDOFF	28190	0300-1719
H5	0380-1720	2	STANDOFFS	28480	0300-1720
MP1	5040-4478	5	WASHER, FLAT, #6	00000	ORDER BY DESCRIPTION
MP2	18174-00001	1	RS-449 PANEL	29480	5040-4478
MP3	5041-6749	1	HOUSING, COATED	29480	18174-00001
W1	19174-61801	1	CABLE, RS-449	20400	5041-6749
J1	8120-4219	4	CABLE JUMPER	29480	8120-4219
J2	8120-4219	5	CABLE JUMPER	29480	8120-4219



Reference	HP Part	C	D	Qty	Description	Mfr Code	Mfr Part Number
A1	18174-80003	1		1	RS-449 POD	28480	18174-60003
A1C1	0188-1846	6		6	CAPACITOR-FXD 2.2UF+-10% 35VDC 1A	56289	150D225X9035B2
A1C2	0188-1846	6		6	CAPACITOR-FXD 2.2UF+-10% 35VDC 1A	56289	150D225X9035B2
A1C3	0188-1746	5		5	CAPACITOR-FXD 15UF+-10% 20VDC 1A	56289	150D156X9020B2
A1C4	0168-0576	5		5	CAPACITOR-FXD 15UF+-10% 20VDC 1A	56289	150D156X9020B2
A1C5	0168-0576	5		5	CAPACITOR-FXD 15UF+-10% 20VDC 1A	56289	150D156X9020B2
A1C6	0160-0576	5		5	CAPACITOR-FXD 1UF +-20% 50VDC CER	28480	0160-0576
A1C7	0160-0576	5		5	CAPACITOR-FXD 1UF +-20% 50VDC CER	28480	0160-0576
A1D51	1990-0883	7		7	DISPLAY-LI9-XTAL	28480	1990-0883
A1J1	1251-6074	4		4	CONNECTOR 37-PIN F D SUBMINIATURE	28480	1251-6074
A1J2	1251-6074	4		4	CONNECTOR 37-PIN F D SUBMINIATURE	28480	1251-6074
A1R1	0698-3266	5		5	RESISTOR 237K 1% .125W F TC=0+-100	24546	C4-1/8-10-2373-F
A1R2	0698-3266	5		5	RESISTOR 237K 1% .125W F TC=0+-100	24546	C4-1/8-10-2373-F
A1R3	0698-3266	5		5	RESISTOR 5.11 1% .125W F TC=0+-100	28480	C4-1/8-10-2373-F
A1R4	0698-3266	5		5	RESISTOR 5.11 1% .125W F TC=0+-100	28480	C4-1/8-10-2373-F
A1R5	0757-0442	9		9	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-10-1002-F
A1R6	0757-0442	9		9	RESISTOR 10K 1% .125W F TC=0+-100	24546	C4-1/8-10-1002-F
A1R201	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1R202	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1R203	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1R204	1810-0732	5		5	NETWORK:RES 100K OHM X 5	28480	1810-0732
A1R301	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1R302	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1R303	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1R304	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1R401	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1R402	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1R403	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1R404	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1R405	0181-0680	2		2	RES NETWORK SIF 2	28480	1810-0680
A1U100	1820-3273	7		7	IC MV CMOS/74HC MONOSTBL CLEAR DUAL	28480	1820-3273
A1U101	1820-3296	4		4	IC GATE CMOS/74HC AND-OR-INV DUAL 2-INP	28480	1820-3296
A1U102	1820-3081	4		4	IC FF CMOS/74HC D-TYPE PDS-EDGE-TRIG	28480	1820-3081
A1U104	1820-3007	4		4	IC GATE CMOS/74HC EXCL-OR QUAD 2-INP	28480	1820-3007
A1U200	1826-0759	9		9	IC COMPARATOR GP QUAD 14-DIP-C PKG	28480	1826-0759
A1U202	1826-0759	9		9	IC COMPARATOR GP QUAD 14-DIP-C PKG	28480	1826-0759
A1U300	1826-0759	9		9	IC COMPARATOR GP QUAD 14-DIP-C PKG	28480	1826-0759
A1U302	1826-0759	9		9	IC COMPARATOR GP QUAD 14-DIP-C PKG	28480	1826-0759
A1U400	1826-0759	9		9	IC COMPARATOR GP QUAD 14-DIP-C PKG	28480	1826-0759
A1U402	1826-0759	9		9	IC COMPARATOR GP QUAD 14-DIP-C PKG	28480	1826-0759
A1U403	1820-3007	4		4	IC GATE CMOS/74HC EXCL-OR QUAD 2-INP	28480	1820-3007
A1U404	1820-3007	4		4	IC GATE CMOS/74HC EXCL-OR QUAD 2-INP	28480	1820-3007
ORDER BY DESCRIPTION							
					KEYING PLUG	28480	1251-7642
					STANDOFF-RVT-CN 107-IN-LG 4-40TND	00000	

Table B-2. HP 18174A Replaceable Parts List

The EIA status of the selected interface lines is displayed on a bargraph LCD. Clock and data indicators are flashed at a 2Hz rate when line state transitions are detected. Table B-3 lists these RS-449 lines.

Receivers U200, U300, and U400 operate over a common mode voltage range from -7 to +7 volts and require a minimum differential of 200 millivolts to change states. They maintain operation over a differential voltage range from 200 millivolts to 6 volts; however, the positive common mode signal voltage cannot exceed the RS-449 specification of 10 volts. The receivers are protected by divider resistors from signals up to 12 volts.

### Receivers

U202, U302, and U402 convert the HP 4951C signals from single-ended logic levels to differential voltage waveforms. These drivers are tristate devices and are disabled when the pod is in the monitor mode to isolate them from the RS-449 interface.

### Drivers

1. Translates voltages to and from RS-449 and HP 4951C logic levels.
2. Displays EIA line signal status (of selected lines only).
3. Programmable for monitoring and DTE or DCE simulation.
4. Supports differentially driven category 1 circuits.

The RS-449 interface Pod has the following capabilities.

The interface Pod is configured for the correct mode of operation by the DTESIM and DCEsim output signals from the protocol analyzer.

1. Monitor mode: The HP 4951C monitors traffic on a communication line.
2. DTE simulate: The HP 4951C drives the data lines and acts as a terminal.
3. DCE simulate: The HP 4951C drives the data lines and acts as the digital side of a modem or another piece of Data Circuit-Terminating Equipment.

The HP 4951C operates in three modes.

## B-8. THEORY OF OPERATION

The following paragraphs contain service information for the HP 18174A. Included is the Theory of Operation, RS-449 Signal Mnemonics, Troubleshooting, Component Locators, and Schematics.

## B-7. SERVICE

CS	Clear to Send
DM	Data Mode
RD	Receive Data
RR	Receiver Ready
RS	Request to Send
RT	Receive Timing
SD	Send Data
ST	Send Timing
TR	Terminal Ready

Table B-3. HP 18174A Front Panel LCD Display

Table B-4. RS-449 Signal Mnemonics

DESCRIPTION	CIRCUIT	RS449 PIN #
Shield	Shield	1
Signaling-rate Indicator	SI	2
	Space	3
Send Data (a)	SDa	4
Send Timing (a)	STa	5
Receive Data (a)	RDa	6
Request to Send (a)	RSa	7
Receive Timing (a)	RTa	8
Clear to Send (a)	CSa	9
Local Loopback	LL	10
Data Mode (a)	DM	11
Terminal Ready (a)	TR	12
Receiver Ready (a)	RR	13
Remote Loopback	RL	14
Incoming Call	IC	15
Select Frequency/	SF	16
Signaling-rate Selector	TT	17
Terminal Timing (a)	TM	18
Signal Ground		19
Receive Common		20
Send Data (b)	DTE	22
Send Timing (b)	ST	23
Receive Data (b)	DCE	24
Request to Send (b)	RS	25
Receive Timing (b)	RT	26
Clear to Send (b)	CS	27
Terminal in Service	IS	28
Data Mode (b)	DM	29
Terminal Ready (b)	TR	30
Receiver Ready (b)	RR	31
Select Standby	SS	32
Signal Quality	SQ	33
New Signal	NS	34
Terminal Timing (b)	TT	35
Standby Indicator	SB	36
Send Common		37

\*Indicates lines for which parameters can be selected from HP 4951C display.



3. If any of the above conditions fail, troubleshoot that part of the circuit.
  - a. All lines on the HP 4951C display should be active except DTE and RS.
  - b. Segments RD, ST, and RT should be flashing. Segments CS, DM, and RR should be on, and segments SD, RS, and TR should be off.

Select Run Menu Simulate

2. Run the program entered in Table B-5.

Select	Next Block
Press	MORE
Set Lead	CS
On	and then
Press	MORE
Select	Set Lead
DM	and then
On	and then
Press	MORE
Select	Set Lead
CS ON	and then
Type in	Send
Press	RTN (return)
Select	and then
Press	MORE
Select	Wait
Type in	500
Press	RTN (return)
Select	Next Block
When Trig	Lead
CS	On
then goto	1
Type in	RTN (return)
Press	(HALT)EXIT

Table B-5. DCE Test Program (continued)

Set Up	Select	
SDLC (Protocol)		
ASCII 8 (Code)		
9600 (Bits/sec)		
Sync (Mode)		
Data & State (Display)		
DTE (DTE clock)		
	Press	(HALT)EXIT
The Top Level Menu will be displayed.		
Simulate	Select	
DTE		
MORE	Press	
Set Lead	Select	
RS		
Off		
and then		
MORE		
Set Lead		
TR		
Off		
and then		
Send		
RS OFF	Type in	
RTN (return)	Press	
Next Block	Select	
MORE	Press	
Set Lead	Select	
RS		
On		
and then		
MORE	Press	
Set Lead	Select	
TR		
On		
and then		
Send		
RS ON	Type in	
RTN (return)	Press	

Table B-6. DTE Test Program

1. Enter the following DTE test program.

Turn off the HP 4951C when connecting or disconnecting the Interface Pod.



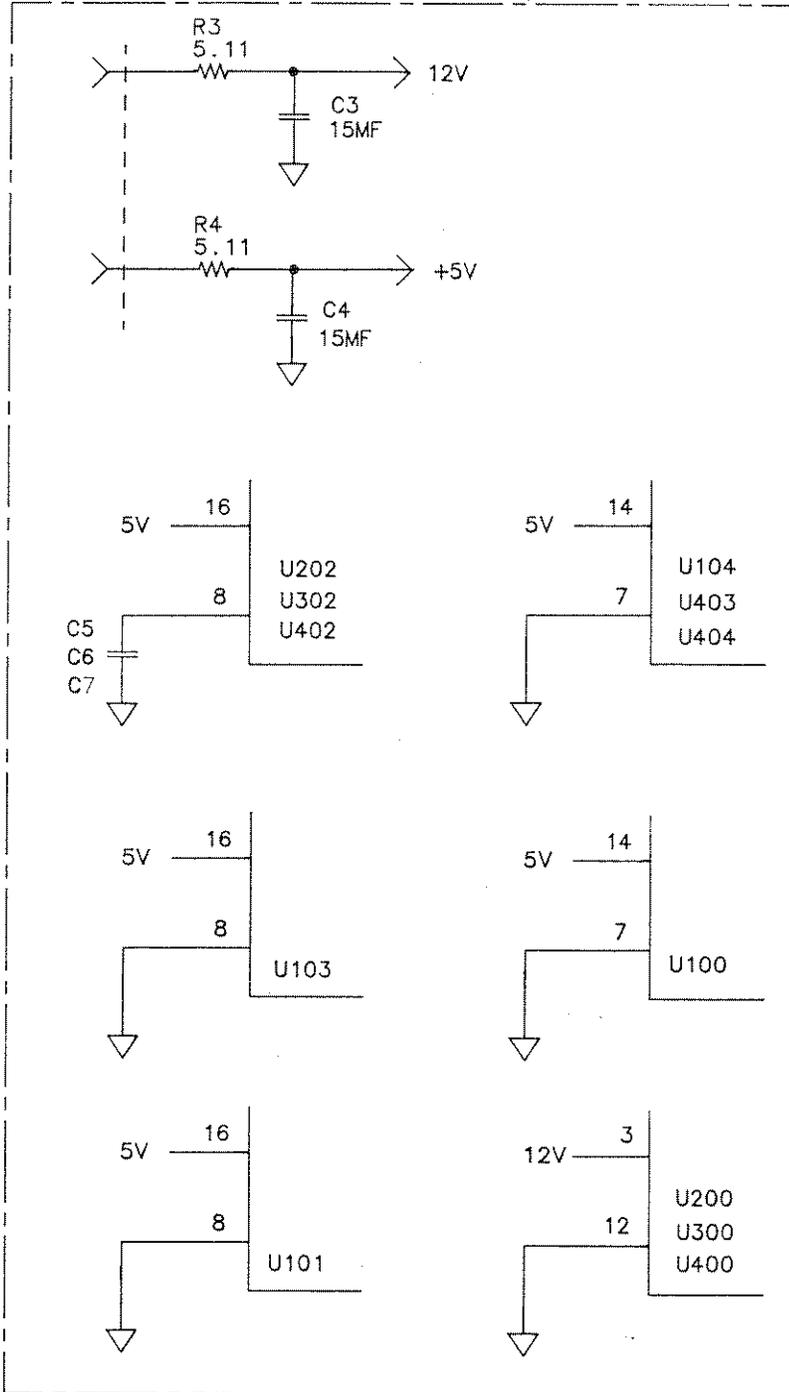
DTE TROUBLESHOOTING PROCEDURE

3. Segments SD and ST should be flashing, RS and TR should be on, and all of the other segments should be off (-- is never active).
4. If any of the conditions in step 2 fail, check items a through c.
  - a. The inputs to U202, U302, and U402 should be at TTL levels (between 0 and 5 volts).
  - b. The outputs of U202, U302, and U402 should be RS-449 levels (+/- 12V).
  - c. The inputs and outputs of all other circuits should be at TTL levels. Check for correct amplitudes and pulsing signals.

2. Run the program entered in Table B-6.
  - Select RUN MENU
  - Select SIMULATE

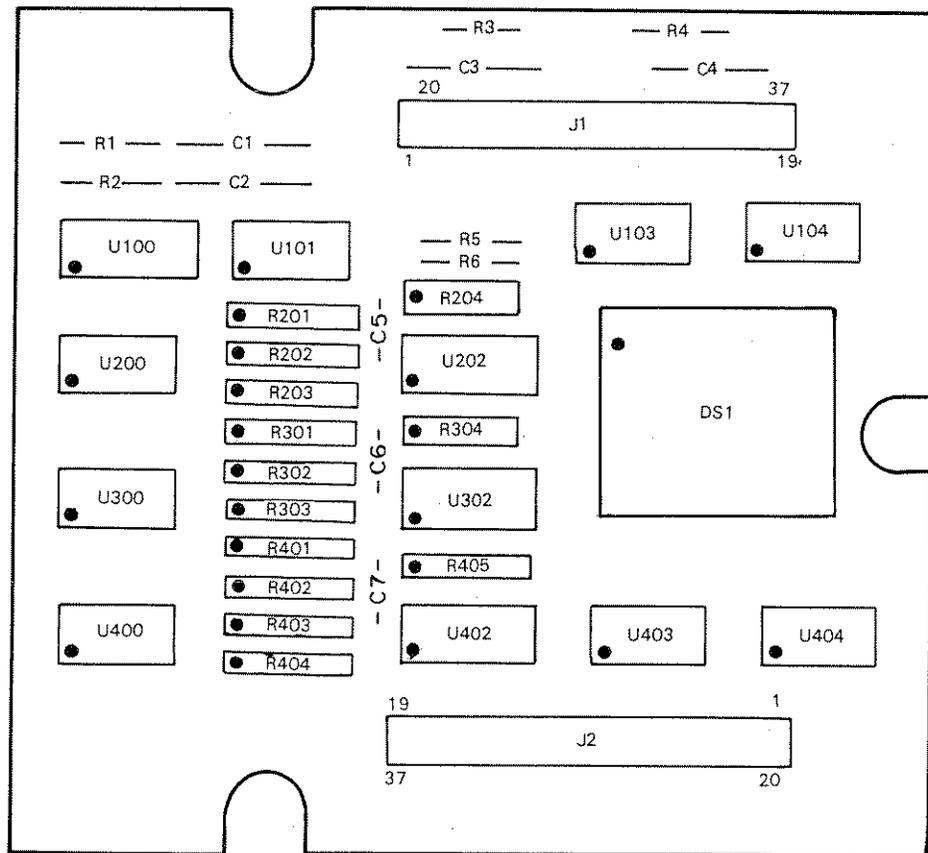
Select	and then
Press	MORE
Select	Wait
Type in	500
Press	RTN (return)
Select	Next Block
	When Trig
	Lead
	RS
	On
	then goto
Type in	1
Press	RTN (return)
	(HALT)EXIT

Table B-6. DTE Test Program (continued)



**Power and Grounds**

Figure B-4. HP 18174A Component Locator



18174-60001-0113-2-84