GENERAL INFORMATION

CHAPTER 1

Introduction

The HP 9133D Disc Memory (Figure 1-1) is a random access data storage device. The 9133D contains a 3 1/2-inch double-sided disc drive with a storage capacity of 710 Kbytes and a 5 1/4-inch Winchester disc drive providing a total storage capacity of 15.710 Mbytes.

The 9133D uses the SUBSET 80 command set.

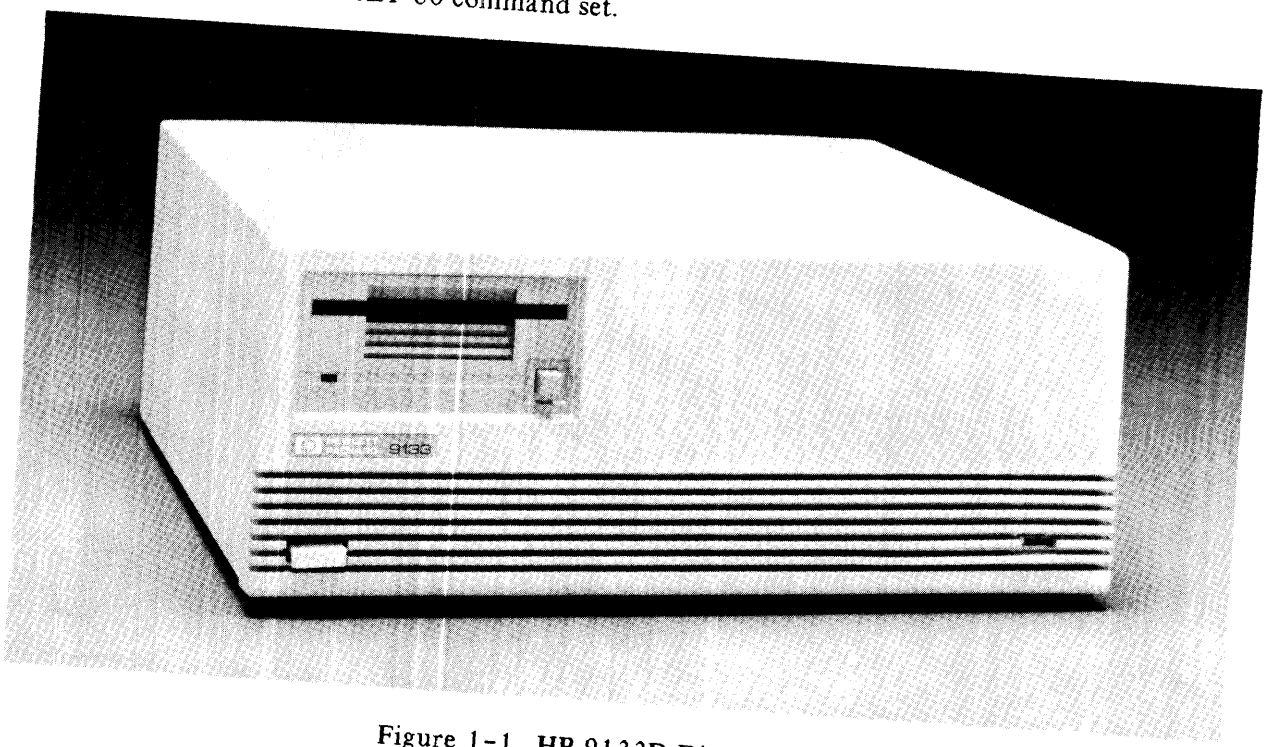


Figure 1-1. HP 9133D Disc Memory

Part Number 5957-6560

Date Printed 9/1/84

Technical Specifications

PERFORMANCE CHARACTERISTICS

	Double-Sided 3 1/2" Flexible Disc	15 Mbyte Winchester Disc
Maximum Formatted Capacity:		
HP 150		
Bytes Per Unit	710 Kbytes	14.8M
Bytes per Sector	512	256
Sectors per Track	9	32
Series 200 (BASIC and Pascal)		
Bytes Per Unit	630 Kbytes	14.8M
Bytes Per Sector	256	256
Sectors per Track	16	32
Series 200 (HPUX)		
Bytes Per Unit	630 Kbytes	16.6M
Bytes Per Sector	256	1024
Sectors per Track	16	9
Tracks per Surface	80	303
Surfaces per disc	2	2 (3 platters)
Tracks per inch	135	345
Recording Format	MFM	MFM
Max Sustained Transfer Rate*	17 Kbytes/sec	145 Kbytes/sec
Average Access Time	497 msec	85 msec
Maximum Access Time	1.742 secs	205 msecs
Rotational Speed	600 rpm	3600 rpm

* Mainframe and interleave dependent.

ENVIRONMENTAL RANGES

	9133D	9134D
Temperature		
Operating	10 to 40 degrees C (50 to 104 degrees F)	10 to 40 degrees C (50 to 104 degrees F)
Non-Operating	-40 to 60 degrees C (-40 to 140 degrees F)	-40 to 60 degrees C (-40 to 140 degrees F)
Humidity		
Operating (non-condensing) 26 degrees C max wet bulb temperature	20% to 80%	8% to 80%
Non-Operating (non-condensing)	5% to 95%	5% to 95%
Altitude		
Operating	0 to 4572m (0 to 15000 ft)	0 to 4572m (0 to 15000 ft)
Non-Operating	-304 to 1524m (-1000 to 50000 ft)	-304 to 1524m (-1000 to 50000 ft)

PHYSICAL CHARACTERISTICS

Size		
Height	125 mm (4.9 in)	125 mm (4.9 in)
Width	325 mm (12.8 in)	325 mm (12.8 in)
Depth	285 mm (11.2 in)	285 mm (11.2 in)
Weight		
Net	10 kg (22.0 lbs)	8.64 kg (19 lbs)
Shipping	16.8 kg (37.0 lbs)	15.5 kg (34 lbs

POWER REQUIREMENTS

Voltage (selected by rear panel switch)	86-127VAC 195-253VAC	86-127VAC 195-253VAC
Frequency	48-66 Hz	48-66Hz
Power	125W	125W

NOTE

All of HP's computers spare 4 complete tracks on the flexible disc. This reduces the usable storage space to 512*9*154 (bytes/sector times sector/track times unspared tracks). This total equals 709.632 Kbytes for the 3 1/2-inch floppy disc drive.

NOTE

The flexible disc in the HP 9133D Disc Memory is designed for operation in a typical office environment. Use of the equipment in an environment containing dirt, dust, or corrosive substances will cause the flexible disc drive and medium life to be drastically reduced.

Equipment Supplied

The following equipment is supplied with each HP 9133/34D disc memory.

Description	Quantity	HP Part Number
AC Power Cord	1	Dependent on location
Operator's Manual	1	09133-90040

A package of ten discs has been set up as a product. This product is orderable using the 92192A product number.

CAUTION

The DISC MEMORY is a precision instrument. Mechanical shock can misalign the READ/WRITE HEAD, resulting in READ ERRORS and/or DAMAGED DISCS whether the disc is operating or not.

When moving the disc unit, care should be taken to prevent excessive shock. Install the cardboard disc supplied with the product in the flexible disc drive before moving it to another location.

Cleaning the Case

Refer to the operators manual supplied with each unit for the complete cleaning procedures.

CAUTION

Chemical spray-on cleaners used for appliances and other household and industrial applications may damage the case finish. Do not use detergents that contain ammonia, benzenes, chlorides, or abrasives.

Installation

CHAPTER 2

Introduction

Refer to Installation chapter of the HP 9133/34 V and XV section of this manual for installation information. Following is additional information which applies to the HP 9133/34D.

Disc Compatibility Between the HP 9121D/S, 9122D/S, 9114A and 9133/D

Table 1 details the recommended usage of single-sided and double-sided discs. The following terms are used:

* "Exchange only" means that the medium should be used only for copying data and programs and should not be used on a daily basis.

* "OK" means that the medium may be used on a daily basis.

* "NO" means that the medium cannot be used.

TABLE 1

	HP 9121	HP 9122,9133D,9114 *
Single-sided HP medium	OK	exchange only
Double-sided HP medium in single-sided format	exchange only	OK
Double-sided HP medium in double-sided format	NO	OK
HP software-- single-sided or double-sided medium **	OK	OK

*Use only discs with auto-shutters in the HP 9122, 9133D, and 9114.

**Software provided by Hewlett-Packard has been tailored for the computer/disc system on which the software will be used.

Controls and Indicators

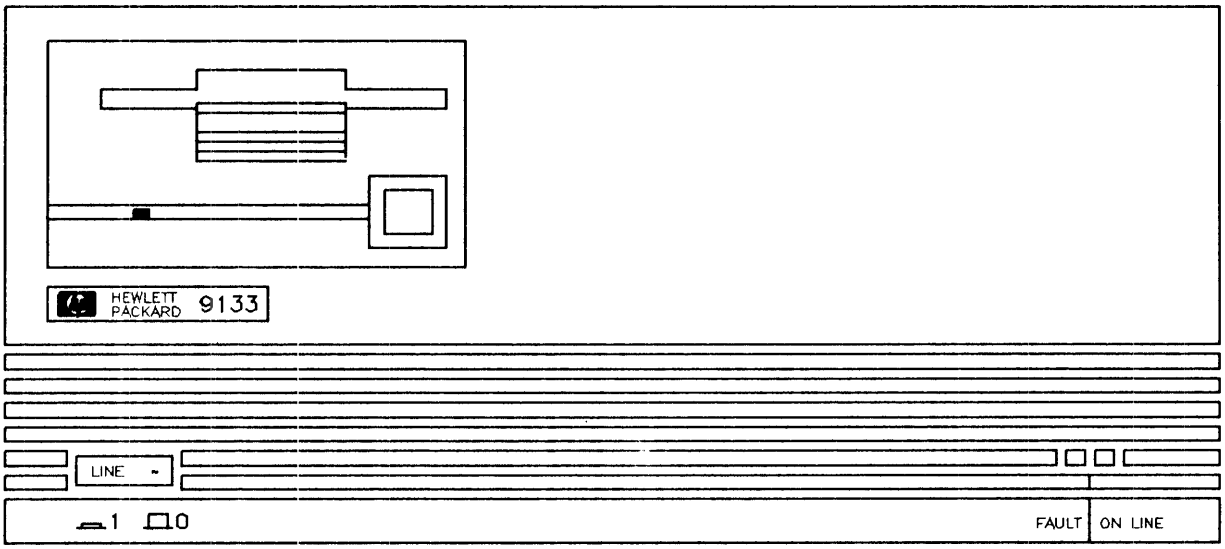
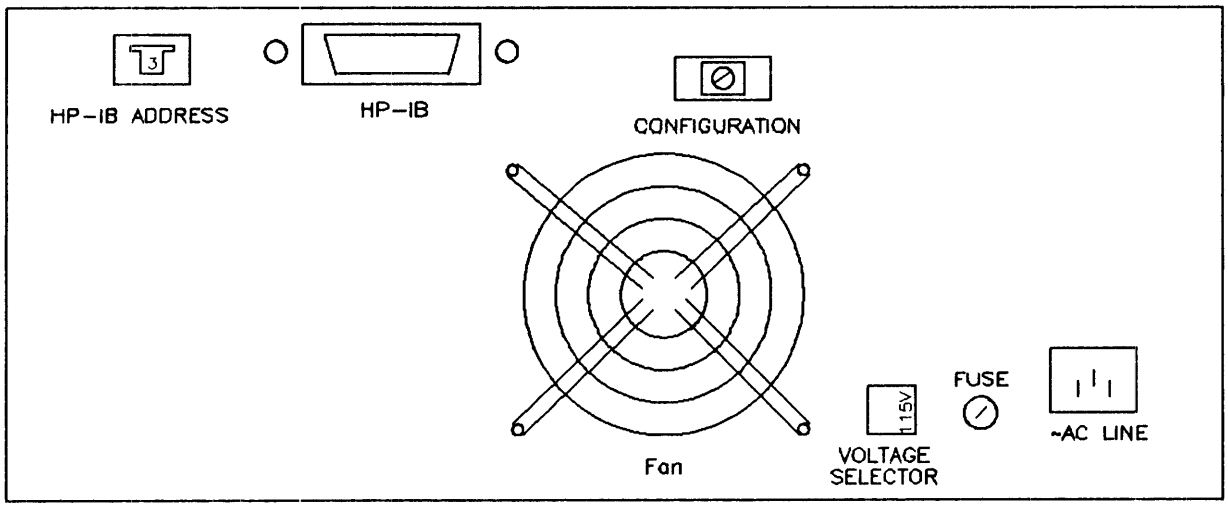


Figure 2-1



HP 9133D REAR PANEL

Figure 2-2

Media Monitor

Through a feature called Media Monitor, the disc drive automatically monitors the cumulative use of each individual disc. When the usage of a disc approaces a level at which normal disc wear may cause data loss, the disc access light on the front panel blinks and a clicking sound is heard. Commands will still be performed by the computer. However, after a command has been performed, the disc drive immediately resumes the warning indication.

When the Media Monitor warning occurs, immediately copy the disc. If you continue to use this disc, the disc drive will eventually automatically write protect the disc. After that time, you will be able only to read data from the disc or copy the disc.

Volume Configuration

The HP 9133/34D hard disc can be divided into multiple volumes of various sizes. Multiple volumes are available only on Series 200 computers. The following chart shows the selections available. Refer to Figure 2-2 for location of the volume configuration switch.

Configuration Setting	Number of Volumes	Size of Volumes	
		256 bytes/sector	1024 bytes/sector
0	One	14.84 Mbyte/volume	16.64 Mbyte/volume
1	One	14.84 Mbyte/volume	16.64 Mbyte/volume
2	Two	7.37 Mbyte/volume	8.23 Mbyte/volume
3	Three	4.91 Mbyte/volume	5.47 Mbyte/volume
4	Four	3.64 Mbyte/volume	4.03 Mbyte/volume
5	One	12.29 Mbyte/volume	13.76 Mbyte/volume
	One	2.51 Mbyte/volume	2.76 Mbyte/volume
6	Six	2.41 Mbyte/volume	2.65 Mbyte/volume
7	One	9.83 Mbyte/volume	11.00 Mbyte/volume
	Two	2.46 Mbyte/volume	2.70 Mbyte/volume
8	Eight	1.77 Mbyte/volume	1.93 Mbyte/volume
9	One	7.32 Mbyte/volume	8.18 Mbyte/volume
	Three	2.46 Mbyte/volume	2.70 Mbyte/volume

Fuses

The AC line fuse used in the 9133/34D is for both 115 and 230 Vac.

Interface Information

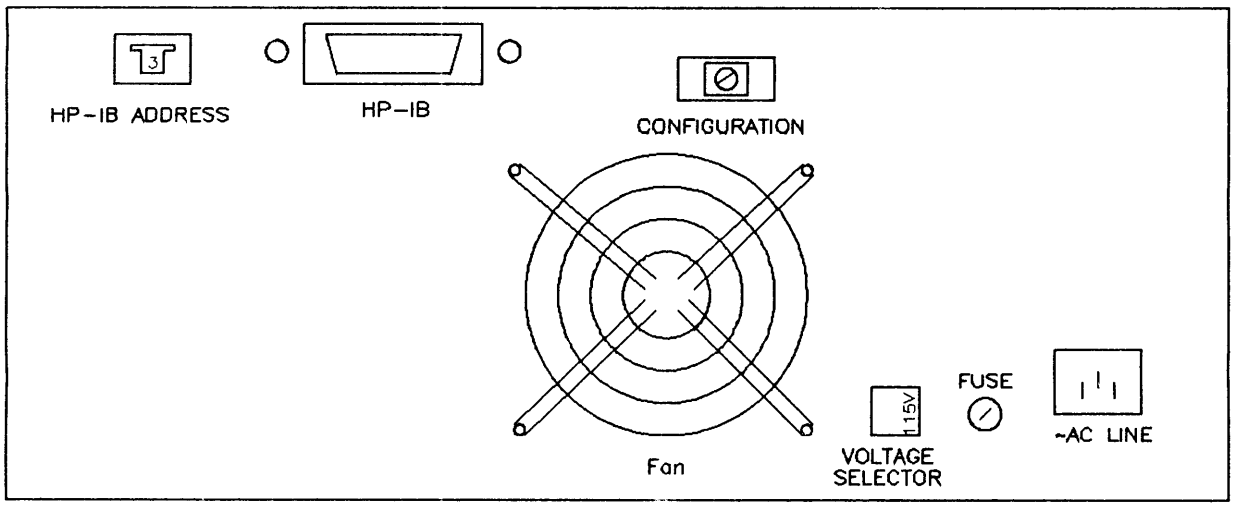
CHAPTER 3

Introduction

Refer to the HP 9133/34 V and XV section of this manual for interface information on the HP 9133/34D. Following is information which applies to the HP 9133/34D.

Setting the HP-IB Address

Figure 3-1 shows the location of the HP-IB address switch. This is a thumbwheel switch with numbers 0 through 9. To select the proper address, turn the thumbwheel untill the number you want appears in the window.



HP 9133D REAR PANEL

Figure 3-1

Troubleshooting

CHAPTER 4

Repair Philosophy

The 3 1/2-inch floppy and 5 1/4 inch Winchester disc drive assemblies are serviced on the exchange program. The assemblies include the drives, the drive electronics PCAs, and the Drive Controller PCA.

The selftest and alignment procedures are given to enable you to isolate problems and correct misalignment in the field.

Power supply information is presented in each tabbed section. Detailed information on the controller is not included.

Exchange Assemblies

PART NUMBER	DESCRIPTION
3 1/2-inch Flexible Disc Drive	-- 09114-69511
15 Mbyte Winchester	-- 09133-69104
Winchester Drive Electronics	-- 09133-69105
Controller Board	-- 09133-69510

Non-Exchange Assemblies

Fan Assembly	-- 09133-68501
3 1/2 in Disc Drive Ctlr Cable	-- 09133-61622
Winchester Disc Ctlr Cable	-- 09133-61623
Winchester Disc R/W Cable	-- 09133-61624
Power Supply	-- 09133-67110
Fuse 3A 250V	-- 2110-0003

Field Service Inventory

The following list of assemblies and parts is recommended in addition to the Field Service Inventory (FSI) which currently exists for the HP 9114A, 9122D/S and the 9133/34XV products.

Controller Board	-- 09133-69510
3 1/2 in Disc Drive Ctlr Cable	-- 09133-61622
Winchester Disc Ctlr Cable	-- 09133-61623
Winchester Disc R/W Cable	-- 09133-61624
Power Supply	-- 09133-67110

Drive Controller and Power Supply Assemblies

Figure 4-1 shows the test-points, adjustments, jumpers, and key components on the Drive Control PCA.

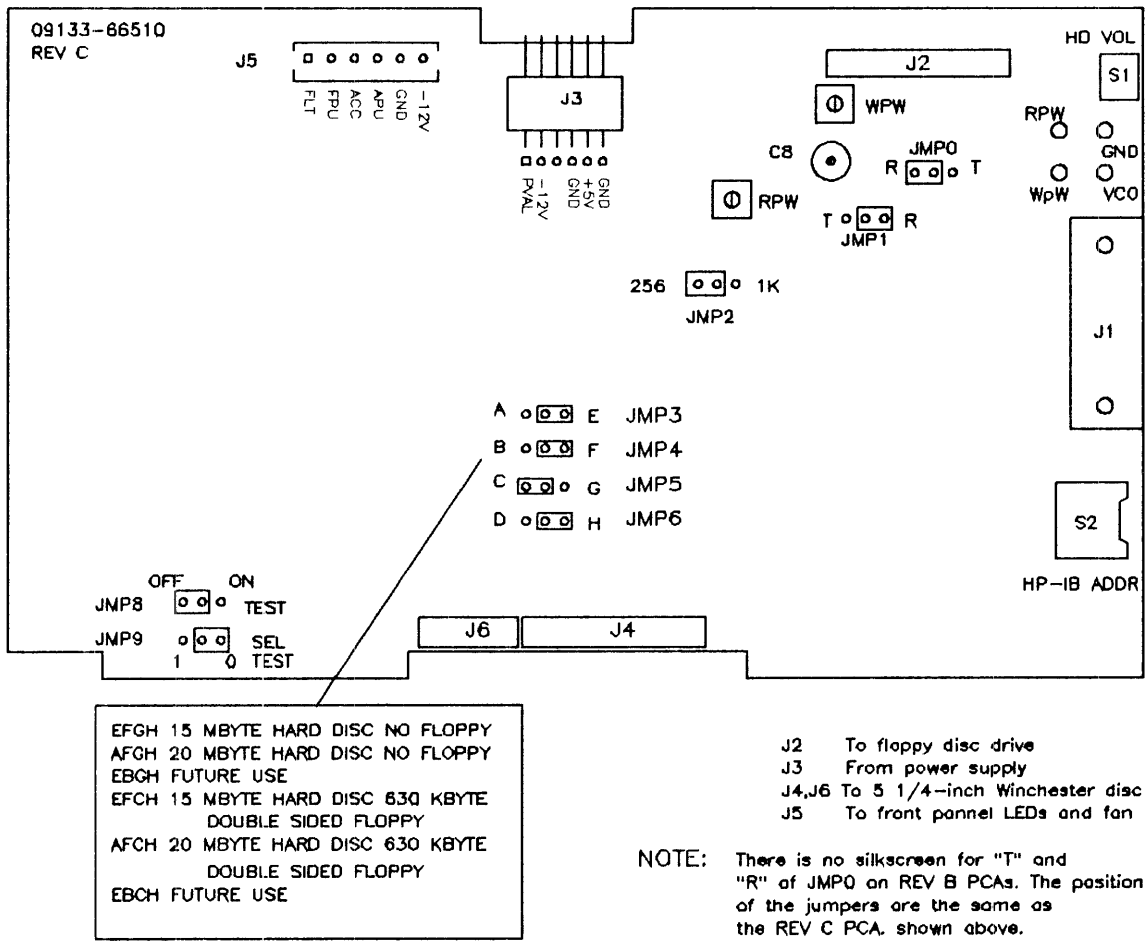


Figure 4-1

Selftest

Selftest routines can be initiated in 3 different ways and test the 2 different portions of the controller board (3 1/2-inch drive and the 5 1/4 -inch Winchester drive). Selftests are initiated as follows:

1. At power-on a selftest of the processor, ROM, HP-IB chip, microprocessor RAM, buffer RAM, and both drives is performed. The hard disc test includes reading and writing sectors, comparing each byte written, seeking back and forth from track 0 to the maximum track, checking the spindle speed, and checking that the ECC chip functions correctly by introducing errors and correcting them.

2. With a host, the Initiate Diagnostic command can be given.It runs a test similar to those at power on.

   A switch and/or jumper can be set which causes the HP 9133/34D to go into the diagnostic test mode. It interprets the 4 bit HP-IB switch as a selftest to perform. The LED is blinked (to show that it works) and then the test, as selected by the address switch setting, is performed. A successful test is indicated by the LED blinking. A failure causes the LED to stay on. The test results are displayed for 5 seconds. If the test jumper (JMP8) is left on (0), the same test will be performed again. When the service test jumper is no longer in the diagnostic test position, the HP 9133/34D will go through the power-up sequence and will again be in the peripheral mode of operation, waiting for commands over HP-IB.

The following table illustrates how to select the desired test using the HP-IB address switch and the SELECT TEST jumper (JMP9).

TABLE 1

HB-IB ADDRESS SW	SELECT TEST JUMPER	SELECTED TEST
0	0	0
1	0	1
2	0	2
3	0	3
4	0	4
5	0	5
6	0	6
7	0	7
0	1	8
1	1	9
2	1	10
3	1	11
4	1	12
5	1	13
6	1	14
7	1	15

The SELFTEST capability of the HP 9133/34D consists of being able to select and optionally loop on any one selected test from the following choices:

NOTE: Since the RAM test will clear all parameters, some of which are needed for other tests, you can't switch arbitrarily from test to test. The best sequence is as follows:

1. Turn off power.

2. Select the RAM test using TABLE 1 to set the switches correctly. (Refer to Figure 4-1 for jumper locations.)

3. Turn on power. Device will do all or part of power on selftest and will then start doing the RAM test. When the test is completed, the selftest LED should blink 5 times. If it doesn't, the test failed.

4. Turn power off. Select next test.

5. Turn on power. Device will do all or part of the power on selftest and will then start doing the test specified. When the test is completed, the selftest LED should blink 5 times. If it doesn't, the test failed.

6. Now select the next test you want. You can test anything but the RAM test. There is a 4-second wait between tests to "debounce" while you are changing the switches. When the test is completed, the selftest LED should blink 5 times. It it doesn't, the test failed.

7. You can do step 6 over and over until all tests are performed except the microprocessor RAM test.

LED FUNCTIONING

Start	1. LED ON 4 seconds	-will stay here until test selection
	2. LED OFF .5 seconds	-is the same for 4 seconds.
	3. LED ON during test	-test in progress
	TEST PASSES	TEST FAILS
	4. LED ON/OFF 5 times (.5 seconds each).	4. LED stays ON.
	5. Go to start.	5. Go to start.

The results of a successful test are displayed by the FAULT-LED blinking. A failure causes the LED to stay on. Results are displayed for five seconds followed by a complete power-up sequence.

NOTE

A disc must be in the drive to perform test 4,6,8,10, and 12. Ensure that the disc is not write protected and that it is an initialized scratch disc.

Available Test

0	RAM	All possible patterns are written in all locations of both RAMS.
1	ROM	A checksum calculation is performed.
2	HP-IB	Two of the registers on the HP-IB chip are written and their contents verified.
3	FDC chip	Two of the registers on the FDC chip are written and their contents verified.
4	Floppy Seek	Commands are given to the FDC to move the head on and off track 0. The track 0 indicator is checked to see that movement occurred.
5	Winchester Seek	Commands are given to the WD1010 to restore to cylinder 0 and then step off of cylinder 0. The track 0 indicator is checked to see that it works.
6	Floppy Speed	The head is stepped to track 35 and loaded. The period of the index pulse is measured and compared against the specification. No test is performed if there is no medium in the drive.
7	Winchester Speed	The spindle speed of the drive is checked and compared with the allowed range.
8	Floppy Write/Verify	Every sector on the disc is written and the data is verified. All user data on the medium is lost.
9	Winchester Write/Verify	All sectors on the selftest cylinder are written and read. Each byte including the ECC is checked. Error correction is also checked. No user data is affected.
10	Floppy Verify	All sectors in the data area of the disc are checked for CRC errors. No user data is affected.
11	Winchester Verify	All sectors in the data area of the disc are checked for CRC errors. No user data is changed.

12	Floppy Format	The disc is re-initialized with a 011 data pattern.
13	WD1010 Check	All read/write registers on the WD1010 are checked.
14	WD1100 Check	Writes data pattern to all registers with all combinations and verifies the data.
15	WD1100 Data Buffer RAM Test	Test the WD data buffer RAM

Additional Hints

At power on, if the unit does not respond to commands, the fault LED can be used to locate a failing section of the PCA. The LED will respond in one of the following ways:

- LED on solidly	6809 is bad
- LED blinks off once every 6 seconds	ROM checksum is wrong
- LED blinks off 2 times/6 seconds	Processor ram is bad
- LED blinks off 3 times/6 seconds	Buffer ram is bad
- LED blinks off 4 times/6 seconds	Configuration jumpers A thru H set wrong
- LED blinks off 5 times/6 seconds	8291 is bad

NOTE

If you are experiencing **DISC COMPATIBILITY** problems (Flexible Disc Drive), procede to the ADJUSTMENTS section that follows only after you have verified that a known good formatted Flexible Disc presents the same symptoms. This type of problem may mean that the Phase Lock Loop (PLL) has drifted out of tolerance.\NEED 10

Adjustments

The PLL, Read Pulse Width (RPW), and Write Pulse Width (WPW) adjustments are performed as follows. The PLL adjustment should be performed when the unit exhibits read/verify errors or fails the VERIFY test (TEST 10). The RPW and WPW adjustments are not recommended as they rarely drift, and are not

critical. The RPW and WPW procedures are included only for troubleshooting purposes and for the case of unintentional adjustment.

PLL Adjustment

Use Figure 4-1 for locating test points.

1. Power on the unit with the JMP0 jumper in the normal running (R) position, and allow the power-on selftest to finish.

2. Set the JMP0 jumper to the test (T) position. This enables the FDC adjustment mode.

3. After 2 minutes warm up, attatch the frequency counter test leads to the VCO test-point. The frequency should be 500 KHz +-5%. If adjustment is necessary, adjust the variable capacitor C8 for a frequency of 500 KHz +-.2% (+-1 KHz).

4. Return the JMP0 jumper to the original position (R).

5. Verify disc operation.

RPW and WPW adjustment

1. Set jumper JMP1 to the test (T) position.

2. Attach the oscilloscope test lead to the RPW test point.

3. Observe the waveform pulse-width (see FIGURE 4-2). The pulse width should be 250 ns. +-10%.

4. Attach the test lead to the WPW test point and observe the pulse width. The width should be 125 ns. +-10%.

5. The RPW and WPW adjustments are rarely necessary. Perform only if the adjustments were inadvertently altered.

6. Return jumper JMP1 to the (R) position.

7. Verify disc operation.

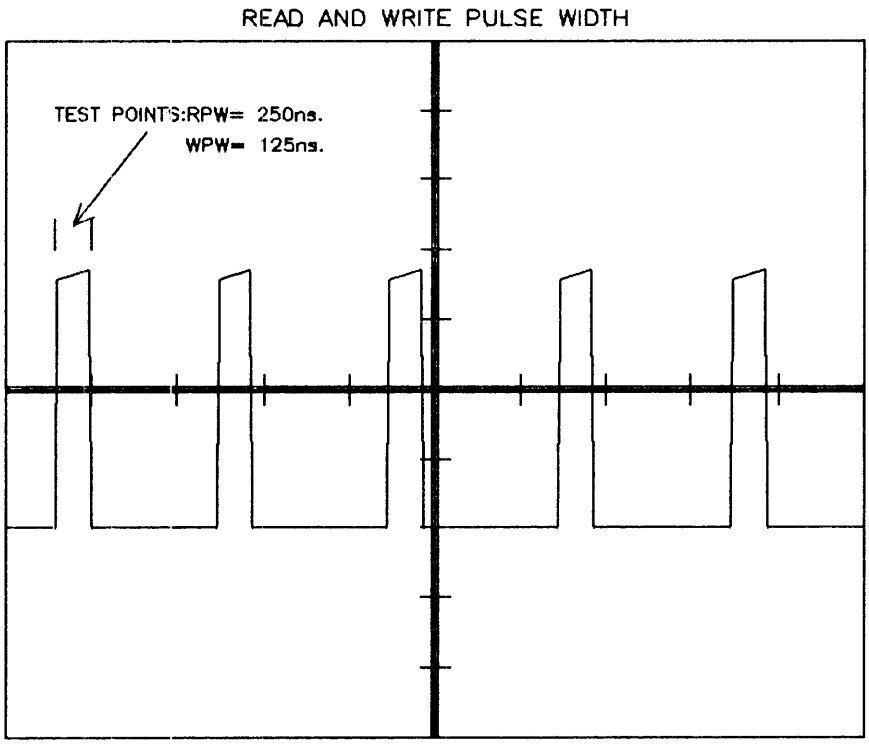


Figure 4-2

Assembly Access

CHAPTER 5

Introduction

Refer to the HP 9133/34 V and XV section of this manual for Assembly Access information.

The following is additional information which pertains to the HP 9133/34D.

Controller PCA Removal

To remove the controller board proceed as follows: (The procedure below assumes that you are facing the front of the unit.)

1. Detach cables J2 thru J6.
2. Remove the 3 mounting screws from the left side of the board.
3. Remove the HP-IB connector nuts from the rear of the chassis.
4. Lift the board clear of the chassis.
5. During reassembly, note that the board slides into lanced board guides on the right side of the chassis.

9133/34D PARTS LIST

LEVEL	REFERENCE DESIGNATOR	PART NUMBER	DESCRIPTION
1	A1	09133-69510	FLPY/HRD DISC BD
.2	C8	0121-0552	C-V 7-60PF VAC
.2	C1-7,10-22,25,26, C28-30	0160-4571	C-F .1UF + 80
.2	C31	0160-4803	C-F 68PF 5% 100V
.2	C32	0160-4807	C-F 33PF 5%100V
.2	C37	0160-4809	C-F 390PF 5%
.2	C35,36	0160-4832	C-F .01UF 10%
.2	C38	0160-4833	C-F .022UF 10%
.2	C9,23	0160-4835	C-F .1UF 10% 50V
.2	C39	0160-5861	C-F 100 PF 1%
.2	C24	0180-0291	C-F 1UF 35V 10%
.2	C27	0180-1746	C-F 15UF 20V
.2	R14	0683-1015	R-F 100 OHM .05
.2	R13,15,16	0683-1035	R-F 10K .05 1/4W
.2	R5,6,7,22	0683-3615	R-F 360 OHM .5

.2	R9	0683-4725	R-F 4.7K .05
.2	R8	0698-3438	R-F 147 1% .125W
.2	R21,23	0698-3700	R-F .125W 715 1%
.2	R18	0757-0161	R-F 604 OHM 1%
.2	R17	0757-0274	R-F 1.21K 1%
.2	R1,3,20	0757-0280	R-F 1K 1% .125W
.2	R19	0757-0400	R-F 90.90HM .01
.2	R11,12	0757-0437	R-F 4.75K 1%
.2	U9	09133-89102	PROM-1
.2	U13	09133-89202	PROM-2
.2	U29	1200-0817	SOCKET 40 PIN
.2	U9,13	1200-0861	SKT-IC 28-CONT
.2	J1	1251-7651	CN24 M AMP CHAMP
.2	J5	1251-8089	CN 6.100 ST HDR
.2	J6	1251-8681	20 PIN CONNECTOR
.2	J2	1251-8682	CN 26.1 SQ POST
.2	J4	1251-8683	CONNECTOR,34 PIN
.2	JMP1-JMP9	1252-0058	CN3.1 SQ POST
.2	JMP1-JMP9	1258-0141	JUMPER-REM
.2	RP1	1810-0083	NTWK-R 13X1K DIP
.2	RP3	1810-0182	NTWK-R24XMULTDIP
.2	RP2	1810-0235	NTWK-R15X2.2KDIP
.2	RP4	1810-0286	NTWK-R 15X10KDIP
.2	U57	1813-0067	XTAL-CLK-OSC
.2	U11	1813-0194	XTAL-CLK-OSC
.2	U55	1813-0346	DLAY LINE 60NSEC
.2	U4,17	1818-1611	IC-STATIC RAM
.2	U5	1820-0471	IC-SN7406N
.2	U37,58,59	1820-0621	TTL BUFF 7438N
.2	U63	1820-0693	IC SN74S74
.2	U19,23,49,53	1820-1112	IC SN74LS74AN
.2	U47,51	1820-1144	IC-74LS02
.2	U46	1820-1196	IC-SN74LS174N
.2	U21,26,35,50	1820-1197	IC SN74LS00N
.2	U27,39	1820-1199	IC-74LS04
.2	U31,32,44	1820-1201	IC-SN74LS08N
.2	U54	1820-1202	IC-74LS10N
.2	U24,43,25,34,45,48	1820-1208	IC-74LS32
.2	U38	1820-1216	IC-SN74LS138
.2	U18	1820-1281	IC SN74LS139N
.2	U56	1820-1285	IC SN74LS54N
.2	U1,40	1820-1416	IC SN74LS14N
.2	U20,22	1820-1433	IC SN74LS164N
.2	U28	1820-1568	IC SN74LS125AN
.2	U30,41	1820-1730	IC SN74LS273N
.2	U61	1820-1782	IC 26S02
.2	U7,33,42	1820-2024	IC-SN74LS244
.2	U8	1820-2075	1C SN74LS245N
.2	U15,16	1820-2096	IC SN74LS393N
.2	U62	1820-2203	IC AM26LS32PC
.2	U14	1820-2536	IC SN74LS352N
.2	U6	1820-2549	IC-8291AP
.2	U12	1820-2624	IC-68B09

.2	U64	1820-2749	IC AM26LS31PC
.2	U29	1820-3168	IC WD1010
.2	U52	1820-3318	IC SN74ALS273N
.2	U2	1820-3431	IC DS75160AN
.2	U3	1820-3513	IC DS75161AN
.2	U10	1820-3659	WD-2793-02 FDC
.2	U60	1820-3705	NAT'L DP8460N-4
.2	CR1	1901-0050	DIO SWITCHING
.2	R2,4	2100-3210	RES-TRMR 10K 1%
.2	R10	2100-3874	RES-VAR 5K 10%
.2		2200-0107	SCR-MACH 4-40
.2	S1	3100-1662	SW-RTRY 10 POS
.2	S2	3100-1951	SW-THUMBWHEEL-10
1		09133-68501	FAN ASSY
1		09133-90040	OPRS MNL 34D,33D
1		09144-45404	GUARD, POWER
1		1450-0625	LED HOLDER
1		2190-0843	WASHER
1		2360-0113	SCR-MACH 6-32
1		3050-0010	WSHR-FL MTLC
1		5041-1203	PWR BUTTON WHITE

FUSES

1		2110-0003	FUSE-3AMPS NB

MECHANICAL PARTS

1		09133-61622	FLPY CTR CABLE
1		09133-61623	DISC CTLR CABLE
1		09133-61624	DISC R/W CABLE
1		8120-1378	CABLE-POWER

CASE PARTS

1		0403-0427	BUMPER FOOT
1		0515-0353	M3X.5X10MM
1		0515-0825	SCR M4X.7 X8MM
1		0515-1079	SCREW-MACHINE
1		0515-1085	SCREW-MACHINE
1		0624-0458	SCR-TPG 8-16

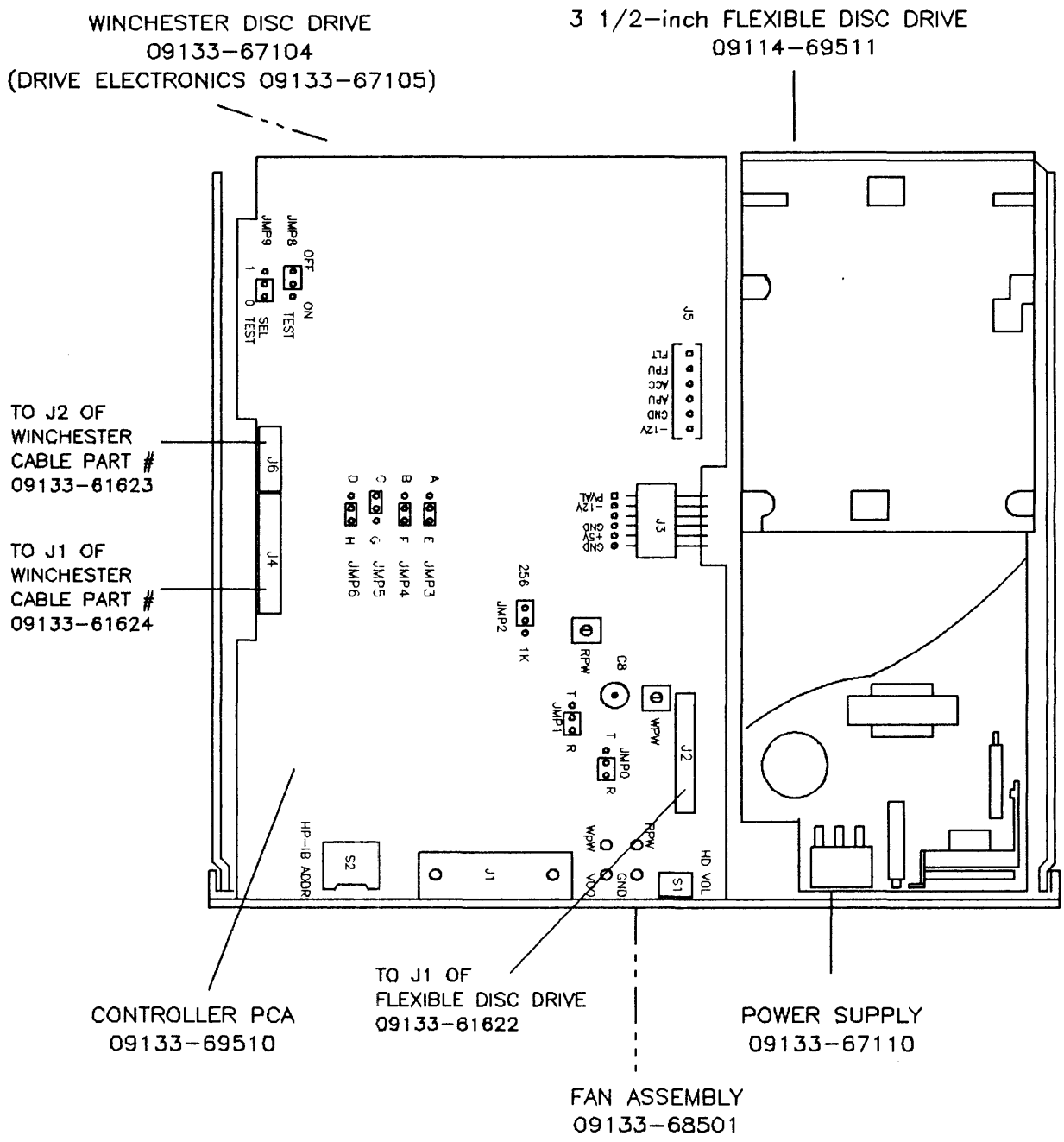
1	0624-0525	SCR-TPG 10-14
1	07940-00026	FAN GUARD
1	09121-48303	FOOT-MOLDED
1	09133-00602	FRT SHIELD-33
1	09133-01201	BRKT,FLPY
1	09133-01202	WIN. BRKT
1	09133-09100	SPRING-RETAINER
1	09133-20101	CHASSIS - 9133
1	09133-40201	FRT PNL- 9133
1	09133-40202	SWITCH SHAFT
1	09133-42501	LIGHT PIPE
1	09133-61606	LED/PWR CABLE
1	09133-61621	PWR HARNESS

EXCHANGE ASSEMBLIES

09114-69511	3 1/2" Drive
09133-69104	15-Mbyte Winchester
09133-69105	Winch. Drive Elec.
09133-69510	Controller Board

NON-EXCHANGE ASSEMBLIES

09133-68501	Fan Assembly
09133-61622	Floppy Cntlr Cable
09133-61623	Disc Cntlr Cable
09133-61624	Disc R/W Cable
09133-67110	Power Supply
09133-08866	Top Cover/Shield Assembly
2110-0003	Fuse 3A 250V



Location of Field Replaceable Assemblies (FRA)