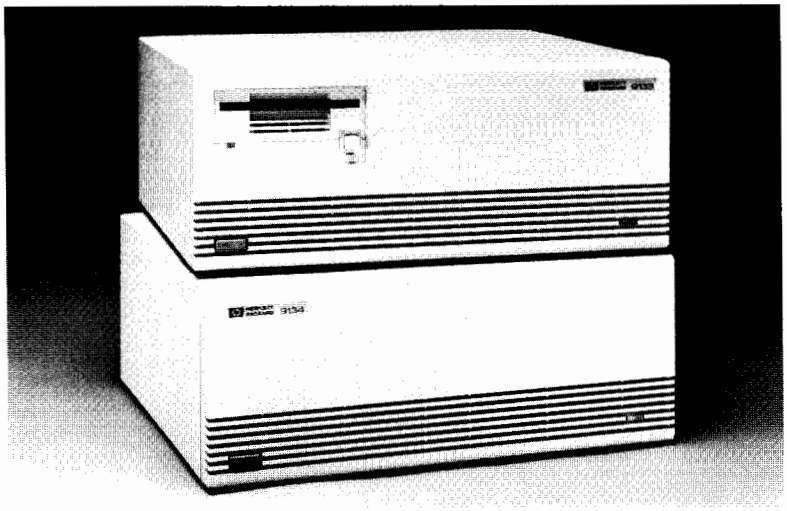
HP 9133/34
V/XV/D/H



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NOTICE

This Handbook is intended only for service personnel trained in its use by Hewlett-Packard. It is designed as a quick reference guide to commonly used service information. The information contained here is highly condensed from other manuals and this volume is not intended to be a substitute for, but rather a supplement to those manuals.

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SECTION I

PRODUCT INFORMATION

[1] INTRODUCTION

The HP 9133 series products each contain a 3 1/2-inch flexible disc drive, and a 5 1/4-inch Winchester drive. The HP 9134 series contain only the 5 1/4-inch Winchester disc drive.

The HP 9133D/H series contains a double-sided 3 1/2-inch flexible disc drive rather than the single-sided drive used in the V and XV products. The D and H series uses the SS-80 (subset-80) command set while the V and XV use the Amigo command set. The remote, HP-85 controlled Amigo exerciser diagnostic can only be used with the V and XV products.

[2] OPTIONS

The options for the V series are:

Standard	single-volume configuration
Option 004	four-volume configuration

The options for the XV series are:

Standard	single-volume configuration (15 megabyte)
Option 010	single-volume configuration (10 megabyte)

The options for the D and H series are:

Standard	single-volume 256 bytes per sector
Option 001	single-volume 1K bytes per sector

[3] TECHNICAL SPECIFICATIONS

POWER REQUIREMENTS

	9133/34 V and XV	9133/34 D and H
Voltage (selected by rear panel switch)	90-125VAC 180-250VAC	86-127VAC 195-253VAC
Frequency	48-66 Hz	48-66Hz
Power consumption (max)	125W	125W

[4] ACCESSORIES

DESCRIPTION	PART NUMBER	
3 1/2-inch flexible discs (pkg. of ten)	92192A 92191A	Double-sided Single-sided

HP-IB cables:

0.5 metre	10833D
1 metre	10833A
2 metres	10833B
4 metres	10833C

[5] SERVICE KITS

The following parts are required to support the V and XV series products:

PART NUMBER	DESCRIPTION	CAPACITY
09133-67120	Power Supply	
09133-69100	Winchester drive	5 Mbyte
09133-69104	Winchester drive	15 Mbyte
09133-69103	Winchester drive electronics	5 Mbyte
09133-69105	Winchester drive electronics	15 Mbyte
09133-69508	Winchester controller	
09121-69521	3 1/2" Flexible drive	
09133-69509	3 1/2" Flexible disc drive controller	

The following assemblies and parts are recommended for repair of the 9133/34 D and H products, in addition to the existing Field Service Inventory (FSI) for the HP 9114A, 9122D/S, and the 9133/34XV products.

PART NUMBER	DESCRIPTION
09133-69520	Controller board (D/H series, Rev B or C)
09133-61622	3 1/2-inch Disc Drive controller cable
09133-61623	Winchester Disc controller cable
09133-61624	Winchester Disc R/W cable
09133-67120	Power supply
09133-69106	Winchester Disc Drive (Complete assembly)

SECTION II

ENVIRONMENTAL/INSTALLATION/PM

[1] ENVIRONMENTAL CONSIDERATIONS

Operating Limits

Temperature:	10° C to 40° C(50° F to 104° F)
Humidity:	Maximum wet bulb temperature not to exceed 29° C(85° F)
Altitude:	0 to 4572 m (0 to 15,000 ft)

Non-operating Limits (storage and transit)

Temperature:	-40°C to 60°C(-40° to 140° F)
Altitude:	-304 to 15240 m (-1000 to 50,000 ft)

[2] INSTALLATION CONSIDERATIONS

Installation is normally a customer responsibility. Refer to the configuration section for information on HP-IB address settings.

Fuse: 115 VAC 3A 250 VAC normal blow 2110-0003

NOTE

Part number 2110-0003 is used for both 115 and 230 volt settings.

HP 9133/34 V and XV

HP-IB device address:		Switch Setting			
Address	*Test	4	2	1	
0	*	0	0	0	-(Factory Setting
1	*	0	0	1	Winchester)
2	*	0	1	0	-(Factory Setting
3	*	0	1	1	Floppy)
4	*	1	0	0	
5	*	1	0	1	
6	*	1	1	0	
7	*	1	1	1	

HP 9133/34 D and H

To select the address for the 9133/34D you need only to turn the thumbwheel switch until the number you want appears in the window.

The HP-IB address switch is a rotary switch with decimal numbers. This switch setting has the following meanings:

HP-IB switch = 0 through 7	HP-IB address of device is the same as the switch setting. Hard disc= unit 0 Floppy = unit 1
HP-IB switch = 8 or 9	HP-IB address of device is 0. Hard disc= unit 1 Floppy = unit 0

Thus the HP-IB switch is being used for more than just the HP-IB address of the device. It is being used to change whether the floppy is unit 0 or unit 1. This was necessary for the HP 150 since certain versions could only boot from HP-IB address 0 and unit 0.

Note that the actual HP-IB addresses are still numbers from 0 through 7. Addresses 8 and 9 are the same as address 0.

[3] PREVENTIVE MAINTENANCE

No preventive maintenance is required.

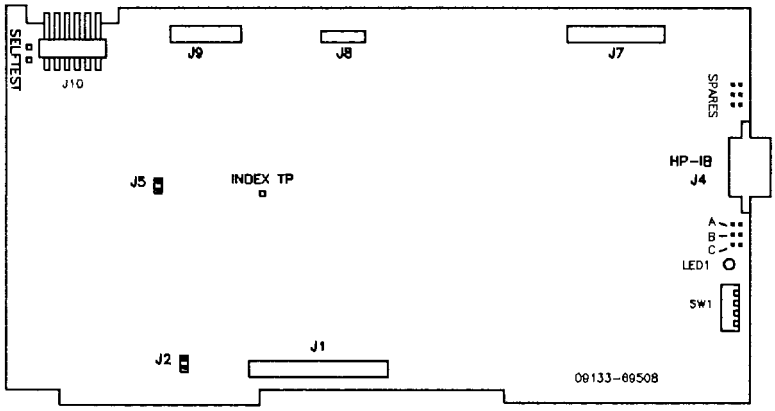
SECTION III

CONFIGURATION

[1] HP 9133/34 V and XV

There are three jumpers on the Winchester Controller PCA which must be checked prior to installation in a host unit.

The jumpers are located on the controller assembly, adjacent to the selftest LED and HP-IB address switch. The jumper assembly is labeled J3. These jumpers must be checked at any time the controller or drive assemblies are changed. The proper settings are shown in the configuration matrix on the next page. Figure 3-1 is provided as a quick reference for jumper location.



J1,J9 To Winchester
J7 To Flexible Disc Controller
J10 Power
J8 Pins 6 and 7 To Fan
Pins 1-4 To Front Pannel LEDS
J2,J5 For Production Test Only (They MUST BE INSTALLED FOR PROPER OPERATION)

Figure 3-1. Controller PCA Configuration.

Configuration Matrix

		Products 9133V	Products 9133XV
Serial Number		All	All
Power Supply		09133-67120	09133-67120
Winchester Drive		09133-69100	09133-69104
Winchester Electronics PCA		09133-69103	09133-69105
Single-Volume Configuration		Standard Option	
Controller		09133-69508	09133-69508
Jumpers	C	No	Yes
	B	Yes	No
	A	Yes	Yes
Four-Volume Configuration		#004 Option	#010 Option
Controller		09133-69508	09133-69508
Jumpers	C	No	Yes
	B	No	Yes
	A	Yes	Yes
Flexible Disc Drive Parts		****** 9133 products only *****	
Drive		09121-69521	09121-69521
Controller		09133-69509	09133-69509

NOTE

Although option#004 is not an advertised option for the 9133/34 XV products, they can be jumpered to a four-volume 5 megabyte configuration. The jumpers for the 09133-69508 controller are:

		#004 Option
Jumpers	C	Yes
	B	No
	A	Yes

[2] HP 9133/34 D and H

Volume Configuration (for series 200 systems only)

The HP 9133/34 D and H hard discs can be divided into multiple volumes of different sizes. The following charts (Figures 3-2 and 3-3), show the different selections available. The configuration setting refers to the setting of the configuration switch on the rear of the unit. See Figure 3-4 for internal unit configuration.

Config. 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

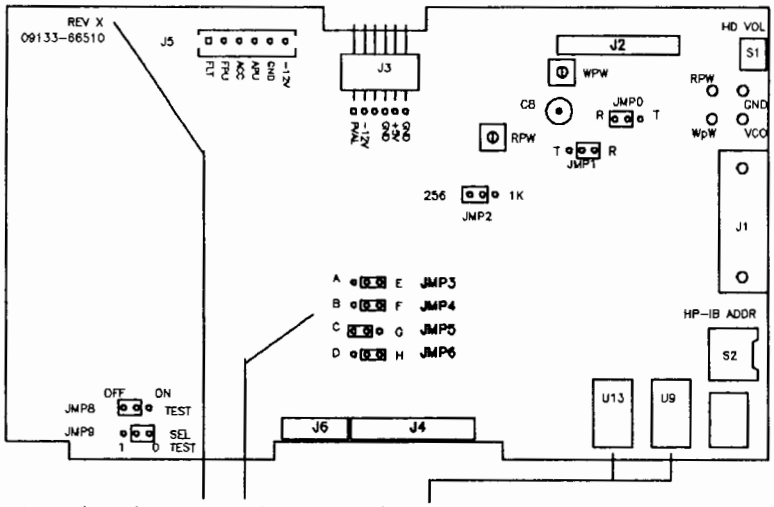
Figure 3-2. Volume configuration settings (9133/34 D).

Config. Setting	Number of Volumes	Size of Volumes	
		256 bytes/sector	1024 bytes/sector
0	One	19.92 Mbyte/volume	22.33 Mbyte/volume
1	One	19.92 Mbyte/volume	22.33 Mbyte/volume
2	Two	9.92 Mbyte/volume	11.09 Mbyte/volume
3	Three	6.61 Mbyte/volume	7.37 Mbyte/volume
4	Four	4.49 Mbyte/volume	5.49 Mbyte/volume
5	Five	3.93 Mbyte/volume	4.34 Mbyte/volume
6	Six	3.27 Mbyte/volume	3.61 Mbyte/volume
7	Seven	2.81 Mbyte/volume	3.09 Mbyte/volume
8	Eight	2.45 Mbyte/volume	2.69 Mbyte/volume
9	One	19.92 Mbyte/volume	22.33 Mbyte/volume

Figure 3-3. Volume configuration settings (9133/34 H).

Unit Configuration

The following figure shows the proper jumper settings for the type of hard disc and flexible disc used.



Product	S/N Prefix	Rev	JMP3–JMP6	Required Firmware
9133D	2419A/2511A	B	EFCH	Any 09133-8910X/-8920X
9133D	2419A/2511A	C	EFCD	09133-89105/-89205 and above
9133D	2513A and above	B	ABCH	09133-89105/-89205 and above
9133D	2513A and above	C	ABCD	09133-89105/-89205 and above
9134D	2425A	B	EFGH	Any 09133-8910X/-8920X
9134D	2425A	C	EFGD	09133-89105/-89205 and above
9134D	2514A and above	B	ABGH	09133-89105/-89205 and above
9134D	2514A and above	C	ABGD	09133-89105/-89205 and above
9133H	ALL	B	AFCH	09133-89105/-89205 and above
9133H	ALL	C	AFCD	09133-89105/-89205 and above
9134H	ALL	B	AFGH	09133-89105/-89205 and above
9134H	ALL	C	AFGD	09133-89105/-89205 and above

NOTE: JMP2 is shown in the position for standard product.
Option001 will have JMP2 in 1K position.

Figure 3-4. Controller board configuration.

SECTION IV

TROUBLESHOOTING

[1] HP 9133/34 V and XV

The primary troubleshooting approach for this unit is the service test or diagnostic performed from a host computer (usually the HP-85). The Amigo Protocol is used by the host, and an INITIATE SELFTEST command is issued. If this test fails, the results of the test may be read from the disc using a READ SELFTEST command.

Decimal values returned by the READ SELFTEST command may be interpreted by comparing the SELFTEST PRINTOUT available at the beginning of the host diagnostic test.

Decimal results can be interpreted using the chart on the next page.

The flexible disc controller is also equipped with a step-by-step service test switch that will indicate the failing test without the aid of a host unit.

See **DIAGNOSTICS** for Selftest and Power-on Test information.

HP-85 AMIGO EXERCISER ERROR CODE INTERPRETATION (09133-69514 AND 09133-69508 CONTROLLERS)

Decimal Code	Description	Possible problem area
220	Jumper on logic board set incorrectly.	1)Check drive electronics jumper configuration for unit number 2)Drive Electronics PCA
222	Faulty HP-IB Chip	1)Controller PCA
223	Faulty I/O ports or LED	1)Controller PCA
224,254,253	Faulty Drive	1)Drive 2)Drive Electronics PCA 3)Motor speed
225,227,229, 232,241,246	Faulty controller chip	1)Controller PCA
226	Track 0 not detected	1)Drive 2)Drive Electronics PCA
228,245,248, 249	No error	
230	Controller RAM failure	1)Controller PCA
231,242	Sector spare failure	1)Controller PCA
243	Write Failure	1)Controller jumper configuration 2)Controller PCA
244,247	Host error/ Faulty HP-IB chip	1)Host 2)Controller PCA
250,251,255	Data error	1)Controller PCA 2)Drive Electronics PCA 3)Drive
252	Jumper on Controller PCA set incorrectly	1)Controller jumper configuration 2)Controller PCA

[2] HP 9133/34 D and H

Troubleshooting this unit is accomplished primarily by the use of the power-on and selectable selftests. Selftests procedures are outlined in the Diagnostics section on page 5-2. The remote Amigo diagnostics used with the V/XV series will not work with the HP 9133/34 D and H products.

The 3 1/2-inch floppy and 5 1/4-inch Winchester disc drive assemblies are serviced on the exchange program. 9133D products having a prefix later than 2513 and 9134 products having a prefix later than 2514 will use the 09133-69106 20Mbyte Winchester disc drive. The drive is a complete exchange assembly.

SECTION V

DIAGNOSTICS

[1] HP 9133/34 V and XV SELFTESTS

Winchester disc selftests		Results
1. Power-on	Tests RAM, ROM, and HP-IB chip, then executes INITIATE SELFTEST. Most complete level of selftest.	Pass: LED on full then off Fail: LED on or blinks
2. Initiate selftest	Tests WD1010, RESTORE, SEEK, SCANID, READ/WRITE, I/O ports.	Same as above
3. Remote	Same as above	Read via Host (HP-85)

Flexible disc selftests

1. Power-on	Tests RAM, ROM, FDC (flexible disc controller chip)	Pass: 5 LED blinks off Fail: LED off, or on 5 sec., then off
2. User Confidence	No disc installed:RAM,ROM,FDC, HP-IB. Disc installed: RAM,ROM,FDC,HP-IB, SEEK,MOTOR SPEED,FORMAT/VERIFY. (Write Protect OFF!)	Pass: 10 LED blinks, then off.(30sec/dr) Fail: Led on 5 sec. then off
3. Service	Same as User confidence test, but tests selected individually by HP-IB switch setting.	Pass: LED blinks number of times as test no. plus 1. Fail: LED on 5 sec. then off

For test selection, refer to the following page.

To initiate a test, set the Flexible Disc HP-IB address switch to the test address switch number, and push the TEST switch segment down, then up. The Power-on test will run after test completion.

For information on the HP-85 controlled, Amigo diagnostic refer to the Amigo Exerciser section in this handbook.

Address	Test	#Flashes
0	RAM	1
1	ROM	2
2	HP-IB	3
3	FDC	4
4	SEEK	5
5	MOTOR SPEED	6
6	FORMAT	7
7	VERIFY	8

[2] HP 9133/34 D and H SELFTESTS

The selftest routines can be initiated in the following 3 ways:

1. **At Power-On**:A selftest of the processor, ROM, HP-IB chip, microprocessor RAM, and buffer RAM is performed. Read/Write tests are then performed on both drives, followed by spindle speed and ECC chip tests. (A disc must be inserted to test the 3 1/2-inch drive.)

2. **Host Computer Initiated**:The Diagnostic command from the host initiates the selftest routine that is performed at power-on.

3. **Switch/Jumper Selected**: The Test Jumper (JMP8) starts the test that is selected by the 4-bit HP-IB Address Switch and Select Test Jumper (JMP9). If JMP8 is left in the on position (0), the test will be repeated. When JMP8 is taken out of the test position, the unit finishes the selected test, goes through the power-on sequence, and is then ready for HP-IB commands. Use Figure 5-1 for location of JMP8 and JMP9.

When a test is performed, the LED is first blinked once (to show that the LED works). If the test is successful, the LED blinks 5 times. If the test fails, the LED stays on for 5 seconds, and then goes off.

Selectable Selftests

NOTE

The RAM test (Test 0) will clear all RAM-loaded parameters, some of which are needed for other tests. Once the RAM test is performed, the RAM must be refreshed by powering the unit off, then on again in order to perform any of the other tests. The RAM test is repeatable without refreshing the RAM.

Tests other than the RAM Test can be selected randomly with the power on.

SELFTEST PROCEDURE

1. Select the desired test. Use the Selfest table on page 5-4 and the Test Description table on page 5-5.

2. Observe the LED. The unit will do all or part of the power-on selftest and will then start the selected test. When the test is completed, the selftest LED should blink 5 times. If it doesn't, the test failed.

3. Repeat steps 1 and 2 for any additional tests. Refresh the RAM (see the above note) if the RAM test was performed and a test OTHER THAN the RAM test is desired.

HP-IB ADDRESS SWITCH (S2)	SELECT TEST JUMPER (JMP9)	SELECTED TEST NUMBER
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

SELFTEST SELECTION

LED INDICATIONS

Start 1. LED ON 4 seconds
2. LED OFF 0.5 seconds
3. LED ON during test

	TEST PASSES	TEST FAILS
4.	LED ON/OFF 5 times	LED stays ON.

NOTE

A disc must be in the drive to perform tests 4,6,8,10, and 12. Ensure that the disc is an unprotected and initialized scratch disc.

TEST DESCRIPTION

TEST	DURATION (sec.)	DESCRIPTION
0 RAM	35	All possible patterns are written in all locations of both RAMS.
1 ROM	10	A checksum calculation is performed.
2 HP-IB	10	Two of the registers on the HP-IB chip are written to and their contents verified.
3 FDC chip	10	Two of the registers on the FDC chip are written to and their contents verified.
4 Floppy Seek	10	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	10	Seek commands step the Winchester on and off cylinder 0 in order to test the track 0 indicator.
6 Floppy Speed	10	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 disc in the drive.
7 Winchester Speed	10	The spindle speed of the drive is checked and compared with the allowed range.
8 Floppy Write Verify	85	Every sector on the disc is written and the data is verified. All user data on the disc is lost.
9 Winchester Write Verify	25	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	45	All sectors in the data area of the disc are checked for CRC errors. No user data is affected.
11 Winch. Verify	330	All sectors in the data area of the disc are checked for CRC errors. No user data is affected.

12	Floppy Format	80	The disc is re-initialized with a 011 data pattern.
13	HDC Check	10	All read/write registers on the HDC chip are checked. HDC = Hard Disc Controller.
14	WD1100 Check	10	Writes data pattern to all registers with all combinations and verifies the data. Rev B controllers only.
15	WD1100 Buffer RAM	10	Tests the WD data buffer RAM (Rev B controllers only)

ADDITIONAL HINTS

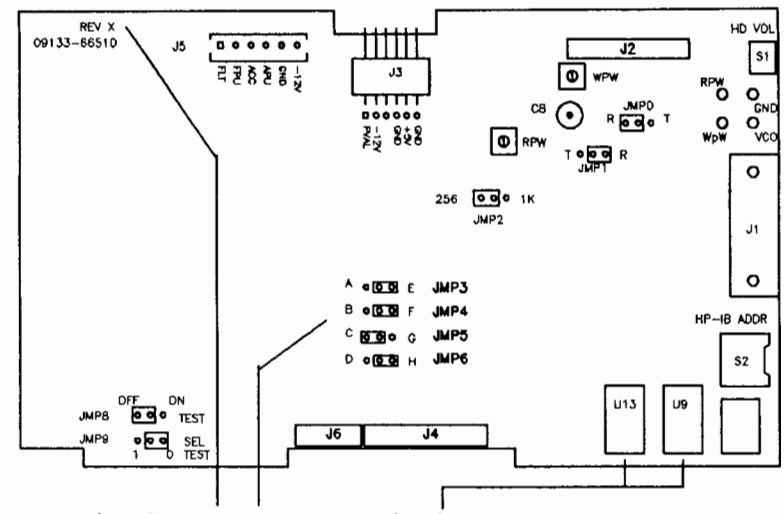
If the unit does not respond to commands after power-on, the fault LED can be used to locate a failing section of the PCA. The LED will respond in one of the following ways:

- LED on continuously	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 through H set wrong
- LED blinks off 5 times/6 seconds	8291 is bad

DISC INTERCHANGING

It is possible for a drive to pass all READ/WRITE tests, yet fail when reading a disc which has been initialized or written on by another drive. This type of failure can be caused by misalignment of the drive mechanism or of the PLL frequency.

To determine which drive is misaligned, test with a disc that has been initialized and written on by a known-good drive.



Product	S/N Prefix	Rev	JMP3–JMP6	Required Firmware
9133D	2419A/2511A	B	EFCH	Any 09133-8910X/-8920X
9133D	2419A/2511A	C	EFCD	09133-89105/-89205 and above
9133D	2513A and above	B	ABCH	09133-89105/-89205 and above
9133D	2513A and above	C	ABCD	09133-89105/-89205 and above
9134D	2425A	B	EFGH	Any 09133-8910X/-8920X
9134D	2425A	C	EFGD	09133-89105/-89205 and above
9134D	2514A and above	B	ABGH	09133-89105/-89205 and above
9134D	2514A and above	C	ABGD	09133-89105/-89205 and above
9133H	ALL	B	AFCH	09133-89105/-89205 and above
9133H	ALL	C	AFCD	09133-89105/-89205 and above
9134H	ALL	B	AFGH	09133-89105/-89205 and above
9134H	ALL	C	AFGD	09133-89105/-89205 and above

NOTE: JMP2 is shown in the position for standard product.
Option001 will have JMP2 in 1K position.

Figure 5-1. Controller jumper location.

SECTION VI

ADJUSTMENTS

[1] 9133/34 V/XV/D/H

The 9133/34 V/XV/D/H products have no suggested field adjustments. Refer to the service manual for adjustment information.

The Power Supply has no adjustable voltages, but should be checked when the unit is serviced. The Specifications for the supply (measured at the test points on the front of the power suppy PCA) are:

5V	5 VDC +/-5%
12V	12 VDC +/-5%
12P	12 VDC +/-5%
-12V	-12 VDC +/-5%

Use the following figure to locate the voltage test points.

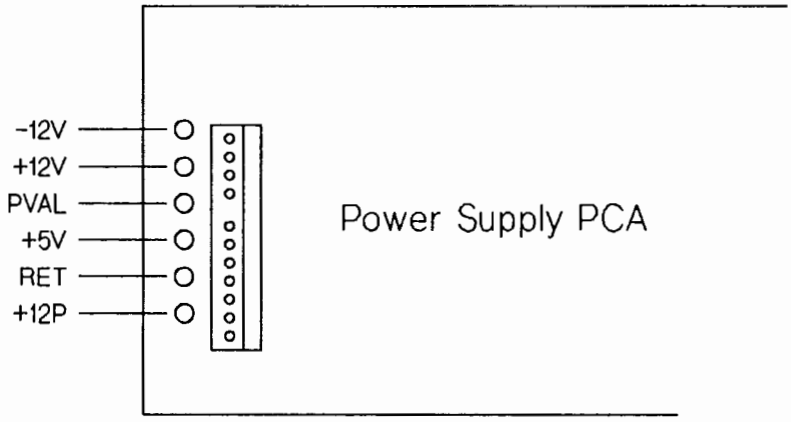


Figure 5-1. Power supply voltage test points.

SECTION VII

PERIPHERALS

This section has been intentionally left blank.

SECTION VIII

REPLACEABLE PARTS

[1] ASSEMBLIES REPLACED MOST OFTEN

Winchester disc

Part Number	Description
09133-69100	5-Mbyte Drive
09133-69103	5-Mbyte Drive Electronics PCA
09133-69104	15-Mbyte Drive
09133-69105	15-Mbyte Drive Electronics PCA
09133-69508	Hard Disc Controller (9133/34 V&XV)
09133-69520	Hard Disc Controller (9133/34 D and H)
09133-61623	Disc Controller Cable (9133/34 D and H)
09133-61624	Disc R/W cable (9133/34 D and H)
09133-69106	20-Mbyte (9133D Prefix #2513 and later) (9134D Prefix #2514 and later)
09133-69106	20-Mbyte 9133/34 H

Flexible disc

Part Number	Description
09121-69521	Flexible Disc Drive (single-sided)
09114-69511	Flexible Disc Drive (double-sided)
09133-69509	Flexible Disc Drive Controller (V&XV)
09133-61609	Flexible Disc Drive Cable (9133 V&XV)
09133-61622	Flexible Disc Drive Cable (9133D/H)
09133-61610	FDC Interconnect Cable
09133-61611	Flexible Disc Drive Power Cable (9133 V&XV)
09121-88877	Load Pad (single-sided only)
09133-15500	Flexible Disc Drive Controller EPROM (9133 V&XV)

Case/Common Parts

Part Number	Description
09133-67120	Power Supply (ALL)
2110-0003	Fuse, 3A 250V NB
2110-0002	Fuse, 2A 250V NB
0403-0427	Bumper Foot (rear)
0510-1237	Fastener
07940-00026	Fan Guard
07940-40048	Front Panel 9134
09133-40201	Front Panel 9133
09133-08866	Top Cover/Shield

The following figure shows the location of field replaceable assemblies for the HP 9133 and HP 9134 drives.

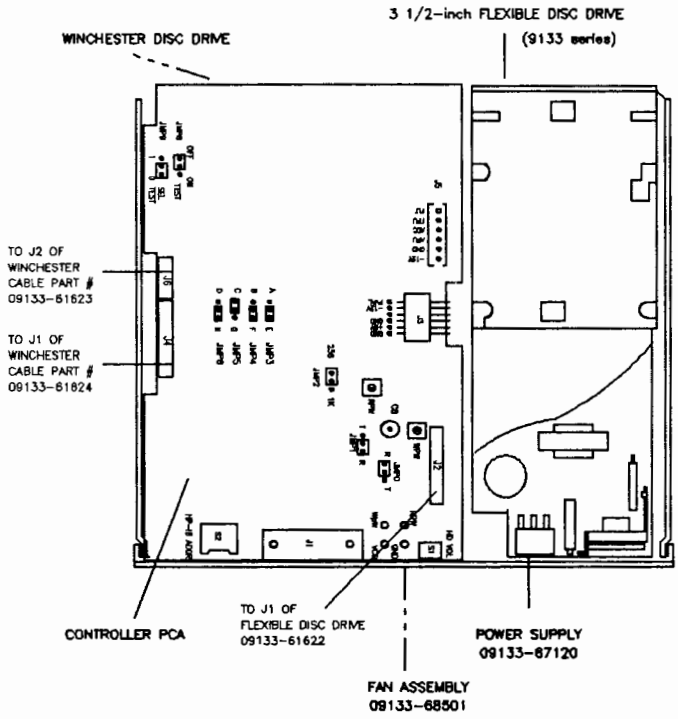


Figure 8-1. Field Replaceable Assemblies.

SECTION IX

DIAGRAMS

No additional diagrams are needed for service.

SECTION X

REFERENCE

For information on the drive mechanisms, refer to the tabbed Reference Section of this handbook.

SECTION XI

SERVICE NOTES/IOSMs

This section of the handbook may be used to file service notes.