
USING YOUR DISC DRIVE

Supplement to manual P/N 09114-90000 Dated August 1,1984

Introduction

This supplement contains computer system operating information. "How to Use Your Disc Drive with Your Computer." Information for the following computers and calculators is presented.

HP Portable
HP Series 70
HP Series 40
IBM PC and PC XT

HP Portable Operations

System Configuration

External disc drives are labeled starting with drive C. As many as eight single disc drives can be connected (drives C, D, E, F, G, H, I, and J). Turn on all the equipment. The first step is system configuration.

1. When the P.A.M. menu appears on the screen, press the following softkey:

**SYSTEM
CONFIG**

This is softkey f6.

2. The display that appears is shown next. There are three lines that have to do with external disc drives. These lines are the only lines of interest at this time. These lines are "Memory/Edisc:", "External disc drives:", and "Disc write verify:." Please locate these; they are the first three lines.

[System Configuration

*Memory / Edisc: 160K / 112K
External disc drives: 1
Disc write verify: Off
Power Save mode: On
Display timeout: 5 min
Cursor: Underscore
Console Mode: HP
Console Font: HP*

*Beep: Long
Plotter Interface: HP-IL
Printer: HP Graphics / Alpha
Printer Interface: HP-IL
Print pitch: Normal
Print line spacing: 6 lines/inch
Printer skip perf: Yes*

The default configuration for "Memory/Edisc:" should be used at this time. This line must be changed only if you run out of room in the HP Portable's memory or its electronic disc. A warning is displayed if this ever happens to you. Space can be taken from either memory or electronic disc and allocated to the other when needed.

The next line of importance is "External disc drives:". The default configuration for an external disc drive is NONE. This must be changed to "1" or the number of HP 9114As you have connected to your system. Press the cursor control keys (arrow keys – top

right) until the "External disc drives:" line is highlighted. Then press the next and previous softkeys until you obtain the proper number.

The other line of interest is the "Disc write verify:". This function can be off or on. When on, everything written to the disc is verified or checked to ensure that it is correct. This takes about twice as long, but ensures correct data on the disc. When, off the data is just written to the disc. Nothing needs to be done at this time, but you should know that verify is available. When the system configuration display is correct, press the "Exit Config" softkey.

The HP Portable automatically assigns each disc drive it sees on the HP-IL (loop). Tracing from the "OUT" HP-IL cable the first disc drive is assigned the letter C, the next disc drive is assigned D, and so on until the maximum of 8 external drives have been assigned. You need to know these letter assignments as they are used whenever you specify commands that store or retrieve data from the external disc.

Disc Formatting

The HP 9114A uses double-sided discs. Data is written on both sides of the disc. Thus the normal formatting procedure is double-sided formatting. Single-sided formatting is allowed for transferring data from older systems. See the next section for single-sided formatting.

Before a flexible disc can be used for the first time, it must be formatted. Formatting establishes the directory and volume label as well as verifying that the media is not damaged. Shown next are two ways to format discs. Insert a blank disc into the disc drive.

From the P.A.M. display, pressing the "File Manager" (f2) softkey gets you to a "Format" softkey. Press the key labeled "Format" (f5) and answer the next questions.

"Enter the disc to format". The first disc drive is assigned the letter C. Type C: and press return.

"Enter a volume label (optional)." The volume label is the name you want to call the disc. This can be up to 11 characters. For example, let's call this disc "First". Type First and press Return.

The information is displayed on the first two lines below the cursor. Press the Start Format key (f1) if these two lines are correct.

"Formatting Disc. Please wait." appears on the display. Formatting a disc takes about 1 1/2 minutes. The interleave used with this formatting method is 8, the optimal for HP Portable/9114A operation.

After formatting is complete, pressing the "Exit Format" (f8) softkey returns you to the main File Manager display. To exit File Manager press the "Exit File Manager" softkey. This ends the format procedure.

The second method of formatting discs is to use the MS DOS Format command. From the initial P.A.M. display, tabbing over to the area called "DOS Commands" and pressing "Return" allows you to use the DOS command called Format. The interleave used in this command is 8 which is optimal for your HP Portable/9114A system.

Type **FORMAT C:** and press Return.

"Press any key to begin formatting C:" is displayed. Press any key on the keyboard. Formatting takes about 1 1/2 minutes.

After formatting is complete there is another prompt on the display "Volume label (11 characters, Enter for none)?." Press "Return" if you don't want a label or enter the name and press "Return" if you want to label the volume.

When completed "Format another (Y/N)?" appears on the display. Typing "N" gets you back to entering MS DOS commands. Type "EXIT" to return to P.A.M.

Formatting Single-sided

The HP Portable/9114A system can format double-sided discs in a single-sided format. This is allowed for data compatibility with other 3 1/2-inch disc systems. There is a utility called "Format.Com" on the utility disc supplied with your HP Portable computer. You must load the "Format.Com" utility into your HP Portable. Use the following sequence.

Place the Utility disc into your HP 9114A.

Tab over to the DOS Command block and press Start Applic.

From the MS DOS command display type:

COPY C: FORMAT.COM A: and press Return

This loads the utility and allows you to use the extra parameters explained in the following FORMAT command.

The MS DOS command that allows this compatibility with its parameters is shown next.

Format C:/W -Single-sided

/X -Double-sided with 256 byte sectors

/Y -Double-sided with 512 byte sectors

/Z -Double-sided with 1024 byte sectors

Copying to and from the Electronic Disc

Two MS-DOS commands are used when transferring files (data and programs) between the electronic and external discs. These commands are Copy and Check Disc (CHKDSK). The DIR C: command is used to list the file directory on the external disc.

Now, from the P.A.M. display, let's tab to the MS DOS Command section and press "(Return or Start Applic)." This puts the HP Portable into MS DOS command mode. Type the next line(s) to display the file directory.

Dir C: and press Return for the external disc

or

Dir A: and press Return for the electronic disc

When using the Copy command don't forget the space between the filename and the destination address (filename A: and filename C:); this also applies to the space between the * and destination address (* C: and * A:) when copying the entire disc.

Copy C:filename A:

and pressing Return – copies the file specified from the external disc C to the electronic disc A.

Copy A:filename C:

and pressing Return – copies the file specified from the electronic disc A to the external disc C.

Copy A:*. * C:

and pressing Return copies the entire electronic disc to the external disc.

Copy C:*. * A:

and pressing Return copies the entire external disc to the electronic disc.

The CHKDSK command is used to check the available disc space. This command can be used to ensure space is available before transferring files. If you get the "Insufficient Disc Space" error when transferring files you can either allocate more space for the electronic disc (if this is the disc that is out of space) or insert another formatted disc into the external drive. To gain more space for the electronic disc, you can either purge some existing file or get the space from the memory space. Memory space is allocated using the first line in the display presented earlier – the System Configuration.

Chkdsk C:

and pressing Return – displays the usable space remaining on the external disc.

Chkdsk A:

and pressing Return – displays the usable space remaining on the electronic disc.

Typing EXIT gets you back to the P.A.M. display.

Error Messages

The following error messages can occur with the HP Portable.

"Non – DOS Disc Error Reading Drive ____." The disc contains a non recognizable volume label.

"No Disc in Drive – Drive Not Ready – Error Reading Drive ____."

These three errors indicate the disc drive does not contain a disc, or the disc drive is not turned on or connected (HP-IL cable), or the disc drive contains a bad disc or a disc formatted by another type of computer. In the case of the bad disc, the problem could be a bad file; try this several times and access different files to determine the extent of disc damage.

"Disc Space Unavailable" – The electronic disc or external disc is full.

Series 70 Operation

Operation with the HP 71B

Disc storage for the HP 71B is handled using the following commands: ASSIGN IO, INITIALIZE, COPY, and CAT.

ASSIGN IO is used to assign an address to each device on the loop. A position as well as a two letter code is used to establish this address.

ASSIGN IO ":DD"

and pressing END LINE – assigns DD to the first or next sequential HP-IL device on the loop. Also assigned is the position or device number. This is the number (1, 2, 3, etc.) of the device on the HP-IL cable. Numbering is obtained sequentially by position on the HP-IL cable as you trace the "OUT" cable from your computer. The DD is used as an example here. Whatever two characters you use can be used in the INITIALIZE, COPY, and CAT commands. After you execute the ASSIGN IO statement you can address a device by the position number or the two letter code. This will be used later in some examples.

INITIALIZE is used to get the disc ready to receive data and to establish a volume label as well as to verify that the media is not damaged.

INITIALIZE "TEST:DD"

and pressing END LINE – establishes the volume label of TEST on the disc at device location DD. You might want to write the volume name you give the disc on the disc jacket label. This volume name can be used to access the disc using the CAT and COPY commands and is very easy to forget. Initializing takes approximately 1 1/2 minutes. The disc access light on the disc drive goes out when initializing is complete.

COPY allows you to move files and data to and from the disc drive. The next two examples of the COPY command are shown three times. Each time a different form of HP-IL addressing is used.

Example one – Copying a file from the HP 71 to the disc drive.

COPY filename TO :1

COPY filename TO.TEST

COPY filename TO :DD

and pressing END LINE – writes the file specified to the disc.

Example two – Copying a file from the disc drive to the HP 71.

COPY filename:1

COPY filename.TEST

COPY filename:DD

and pressing END LINE – reads the file specified from the disc.

CATALOG (CAT) is used to obtain a list of the files that are stored on the disc. The display scrolling keys are used to view the different files (scrolling up and down) and the entire file name and data concerning each file (scrolling to the end of the display).

CAT :1

and pressing END LINE – displays the filenames on the disc.

The “1” represents the position of the disc drive on the HP-IL.

CAT.TEST

and pressing END LINE – displays the filenames on the disc.

TEST is the volume name.

CAT :DD

and pressing END LINE – displays the filenames on the disc.

DD was the assignment made in the previous ASSIGN IO command.

Formatting Singled-sided Discs

The HP 9114A Disc Drive is a double-sided disc drive. When you initialize a disc, the disc is initialized in double-sided format. For single-sided compatibility and data exchange with other computers, the following program allows your HP 71B/9114A system to initialize a double-sided disc in single-sided format.

After keying in and starting the program, you are prompted for the address of the disc drive. The address is the position of the HP 9114A in the HP-IL (loop). The program also asks for the number of directory entries and a volume label. The directory entries are usually set to 200. The volume label is a name you give the disc. This name can be six characters or less. See the HP 71 Owner's manual for more details. As a final question the program asks if you want to initialize another disc. Y for yes and N for no is the required response. After this, the program either repeats or stops.

```

0010 ! SINGLE SIDED FORMAT UTILITY FOR 71B AND THE HP 9114A
0020 INPUT "ADDRESS OF DRIVE? ";A
0030 RESET HPIL
0040 CLEAR :A
0050 SEND UNL MTA LISTEN A SAD 5 DATA CHR$(49)&CHR$(243) END 95
0060 SEND UNL MTA LISTEN A SAD 14
0070 SEND END 4
0080 SEND UNL MLA TALK A SAD 16
0090 ENTER :LOOP USING "#,b";Q
0100 IF Q=0 THEN GOTO 'NOERR'
0110 DISP "ERROR"
0120 STOP
0130 'NOERR': !
0140 INPUT "NUMBER OF DIRECTORY ENTRIES? ";N
0150 INPUT "VOLUME LABEL? ";V$
0160 INPUT "PRESS END LINE TO START";C$
0170 DISP "INITIALIZING"
0180 INITIALIZE V$&"":&STR$(A),N
0190 INPUT "FORMAT ANOTHER(Y/N)? ";C$
0200 IF C="$Y" THEN GOTO 140
0210 CLEAR :A
0220 STOP

```

Operation with the HP 75

Disc storage for the HP 75 is handled using the following commands: ASSIGN IO, INITIALIZE, COPY, and CAT.

ASSIGN IO is used to assign a device code to each device on the loop. A device code is generally a two character code representing each device. In our example we use DD to represent Disc Drive.

ASSIGN IO ':DD'

and pressing Return – assigns DD to the first or next sequential HP-IL device on the loop. The DD is used as an example here.

Whatever two characters you use must be used in the INITIALIZE, COPY, and CAT commands. This is used in the examples.

INITIALIZE is used to get the disc ready to receive data.

INITIALIZE ':DD'

and pressing Return – prepares the disc at device code DD to receive data. The device code must be used in all the commands to this device. Initializing takes approximately 1 1/2 minutes. The disc access light on the disc drive goes out when initializing is complete.

COPY allows you to move files and data to and from the disc drive.

COPY 'filename' TO 'filename:DD'

and pressing Return – writes the file specified to the disc.

COPY 'filename:DD' TO 'filename'

and pressing Return – reads the file specified from the disc.

CATALOG (CAT) is used to obtain a list of the files that are stored on the disc. The display scrolling keys are used to view the different files (scrolling up and down) and the entire file name and data concerning each file (scrolling to the end of the display).

CAT ':DD'

and pressing END LINE – displays the filenames on the disc.

Formatting Single-sided Discs

The following utility can be entered into the HP 75 to format 3 1/2-inch double-sided discs in single-sided format. These discs are compatible with other HP disc products that use single-sided drives. This utility requires either the I/O Utilities (00075-13013) or the I/O ROM (00075-15001) to be resident in your HP 75.

This utility prompts you for the device code. This is the device code specified using the ASSIGN IO command. The utility then prompts you for the number of directory entries. A typical number of directory entries for the single-sided formatted disc is 200. After RTN is pressed, the HP 75 begins the format operation.

```
10 ! SINGLE SIDED FORMAT UTILITY FOR HP75 AND HP9114A
20 ! THIS PROGRAM REQUIRES EITHER I/O UTILITIES OR THE I/O ROM
30 INPUT "DEVICE CODE OF DRIVE? ";A$
40 SENDIO A$,'UNL,LAD#,SDC',"
50 SENDIO A$,'UNL,LAD#,CD:65,DS:31,DS:F3,EN:5F',"
60 SENDIO A$,'UNL,LAD#,CD:6E,EN:04',"
70 Q = $ENTIO$(A$,'TAD# ,CD:70,SDA')
80 IF Q = $CHR$(0) THEN 110
90 DISP "ERROR IN SETTING FORMAT"
```

```

100 GOTO 160
110 INPUT 'NUMBER OF DIRECTORY ENTRIES? ';N
120 INPUT "PRESS 'RTN' TO START";N$
130 INITIALIZE A$,N
140 INPUT "FORMAT ANOTHER (Y/N)? ";C$
150 IF C = $"Y" THEN 110
160 SENDIO A$,'UNL,LAD# ,SDC',"
170 END

```

Series 40 Operations

Disc storage for the Series 40 is handled using the following commands: NEWM, DIR, WRTP, READP, WRTA, and READA. These commands are explained next. Also for a more complete explanation of these commands see the HP-IL Module Owner's Manual (P/N 82160-90001).

NEWM

The NEWM command is used to initialize the flexible disc. NEWM is automatically directed to the first device on the loop. The first device must be your HP 9114A. Pressing the following keys initiates the NEWM command.

XEQ ALPHA NEWM ALPHA

The calculator then prompts you for the number of directory entries or number of files you plan to store on the disc. This number can be as high as 447, but generally is around 80. The more directory entries the longer the search times when using the DIR (directory) command.

When you see NEWM , type 080 or the number of directory entries you want. One to two seconds after you type the final number, the disc access light should come on as the 9114A begins the 1 1/2 minute initialize sequence.

DIR

The DIR command is used to read the directory which includes the file names, file types, and file sizes. DIR always accesses the first device on the loop which must be the tape drive. Press the following key sequence.

XEQ ALPHA DIR ALPHA

DIR uses the ALPHA register to display directory information.

WRTP, READP, WRTA, and READA

These four operations require that you place the program name into the ALPHA register before you execute the operation. To execute the operations, press the following keys.

XEQ ALPHA READP ALPHA

Substitute your operation in place of the READP.

WRTP – Write program

READP – Read program

WRTA – Write all (the entire calculator contents and memory modules are written to the mass storage).

READA – Read all (the entire calculator contents and memory modules are read from the mass storage).

ASCII Data Files

The two ASCII data file commands SAVEAS and GETAS were not designed to operate with a disc drive that powers down when not in use. When using these commands an error is generated because the disc drive does not power up fast enough. When programming with these two commands set up the following sequence.

Disable the errors

Send command (SAVEAS or GETAS) – This starts the disc drive.

Enable the errors

Resend the command (SAVEAS or GETAS) – Executes the command.

SAVEAS and GETAS are explained in the section titled “Accessing Mass Storage Files” in the Series 40 Owner’s Manual P/N 00041-90492.

Series 40/9114 Utility

The Series 40 calculators can access 130 kbytes of the HP 9114A’s 630 kbytes. The following utility, when entered into a Series 40, allows you to access the full 630 kbytes. The utility requires that the 82183A Extended I/O Module be installed in your calculator. Additionally, this utility is available from the User’s Library (#41-09114) on 3 1/2-inch media.

There are six operations or functions that are affected by this utility when they are executed: WRTP, WRTPV, WRTS, WRTK, WRTA, AND CREATE. These functions must create new directory entries. All these functions operate the same as before (documented in the HP-IL Module Owner's manual). These functions require correct information be placed in the ALPHA and (in some cases) the X registers.

Following are the 4 most common errors you can get when using this utility.

Error Number	Error Description
18	Uninitialized Media
20	No Media
21	Low Battery
99	Other Errors (This includes the write-protect disc error.)

The Utility is listed next.

```

01*LBL "DSC?"
02  ADRON      --
03  16
04  FINDAID    --  FIND MASS STORAGE DEVICE
05  X#0?      --
06  GTO "VLL"
07  "NO DRIVE"
08  PROMPT
09  GTO "DONE"
10*LBL "VLL"
11  SELECT
12  0
13  ENTER
14  XEQ "SEEK"  --  SEEK TO VOLUME LABEL TRACK 0, RECORD 0
15  RCLSEL
16  TAD
17  2
18  DDT        --  READ RECORD
19  XEQ "WAIT"
20  4
21  DDT        --  SWAP BUFFERS
22  XEQ "WAIT"
23  1
24  DDT        --  SEND BUFFER 1
25  8
26  INAN
27  1
28  ATOXX
29  128
30  X#Y?      --  CHECK FOR NON-LIF DISC

```

31	GTO "NL"	
32	XEQ "B2D"	- READ LOCATION OF 1ST RECORD OF DIRECTORY
33	STO 01	
34	4	
35	INAN	
36	XEQ "B2D"	- DIRECTORY LENGTH
37	1	--
38	-	
39	RCL 01	
40	+	- CONSTRUCT COUNTER TO SEARCH DIRECTORY
41	STO 02	
42	1 E3	
43	/	
44	ST+ 01	--
45	RCL 01	
46	INT	
47	XEQ "D2B"	
48	XEQ "SEEK"	- SEEK TO START OF DIRECTORY
49*	LBL 10	
50	RCLSEL	
51	TAD	
52	2	- READ RECORD FROM DIRECTORY
53	DDT	
54	XEQ "WAIT"	
55	RCLSEL	
56	LAD	
57	9	
58	DDL	- COPY BUFFER 0 TO BUFFER 1
59	XEQ "WAIT"	
60	3	
61	DEVL	
62	234	- SET BYTE POINTER TO LAST ENTRY IN RECORD
63	OUTXB	
64	RCLSEL	
65	TAD	
66	1	
67	DDT	- SEND BUFFER 1
68	INXB	
69	INXB	
70	+	
71	510	- FOUND A RECORD WITH ROOM
72	X=Y?	
73	GTO "RS"	
74	XEQ "B2D"	--
75	STO 03	- SAVE LOCATION AND LENGTH OF FILE
76	XEQ "B2D"	IN LAST ENTRY IN RECORD
77	ST+ 03	
78	ISG 01	
79	GTO 10	--
80*	LBL "DF"	- DIRECTORY FULL-PACK OR USE NEW MEDIA
81	"DIR FULL"	
82	PROMPT	
83	GTO "DONE"	
84*	LBL "NL"	- EXIT IF NOT A LIF DISC
85	"NOT LIF DISC"	
86	PROMPT	
87	GTO "DONE"	
88*	LBL "RS"	- START SEARCH OF RECORD FOR LOCATION
89	RCLSEL	TO WRITE DUMMY ENTRY

90	LAD	
91	3	
92	DEVL	
93	CLX	
94	OUTXB	– RESET BYTE POINTER TO 0
95	RDN	
96	TAD	
97	1	
98	DDT	– SEND BUFFER 1
99	1.007	
100	STO 04	
101	*LBL 12	
102	12	
103	INAN	
104	ATOXR	
105	ATOXR	– READ 2 BYTES OF FILETYPE – IF BOTH 255,
106	+	THEN THIS IS WHERE WE WRITE DUMMY ENTRY
107	510	
108	X = Y?	
109	GTO "WRT"	
110	XEQ "B2D"	--
111	STO 03	
112	XEQ "B2D"	– SAVE LOCATION AND LENGTH OF FILE-
113	ST + 03	NEEDED FOR DUMMY ENTRY
114	12	
115	INAN	
116	ISG 04	
117	GTO 12	
118	RCL 01	
119	INT	
120	RCL 02	
121	X = Y?	– IF LAST RECORD – LAST ENTRY OF RECORD, DI-
122	GTO "DF"	RECTORY IS FULL – LAST ENTRY RESERVED BY 41
123	*LBL "WRT"	
124	RCL 01	
125	INT	
126	XEQ "D2B"	
127	XEQ "SEEK"	– SEEK TO TRACK AND RECORD WHERE DUMMY
128	RCLSEL	ENTRY IS TO BE WRITTEN
129	LAD	
130	3	--
131	DDL	
132	RCL 04	
133	1	
134	–	– SET BYTE POINTER
135	32	
136	*	
137	OUTXB	--
138	RCLSEL	
139	LAD	
140	6	– PARTIAL WRITE MODE
141	DDL	
142	"D"	– DUMMY DIRECTORY ENTRY
143	0	
144	XTOAR	
145	XTOAR	
146	XTOAR	
147	XTOAR	
148	RCL 03	

149	XEQ "D2B"	
150	XTOAR	
151	RDN	
152	XTOAR	
153	0	
154	XTOAR	
155	XTOAR	
156	RCL 05	
157	FC? 09	
158	GTO 00	
159	32	
160	/	
161	ENTER	
162	INT	
163	X# Y?	
164	ISG X	
165	FIX 4	
166*	LBL 00	
167	XEQ "D2B"	- LENGTH OF FILE
168	XTOAR	
169	RDN	
170	XTOAR	
171	20	
172	OUTAN	- WRITE TO TAPE
173	ADRON	
174	RCLSEL	
175	LAD	
176	8	- CLOSE RECORD
177	DDL	
178	SF 10	
179	CLA	
180	ARCL 06	--
181	ARCL 07	
182	ARCL 08	- RECALL CONTENTS OF ALPHA + X BEFORE
183	ARCL 09	41 FUNCTION WAS ATTEMPTED
184	RCL 05	--
185	GTO IND 00	
186*	LBL "WRTP"	--
187	CF 10	
188	CF 09	
189	1	- WRITE PROGRAM
190	STO 00	
191	9	
192	STO 05	
193*	LBL 01	
194	SF 25	
195	WRTP	
196	GTO "OP"	--
197*	LBL "WRTPV"	--
198	CF 10	
199	CF 09	
200	2	
201	STO 00	
202	9	- WRITE PRIVATE PROGRAM
203	STO 05	
204*	LBL 02	
205	SF 25	
206	WRTPV	
207	GTO "OP"	--

```

208*LBL "WRTS"      --
209  CF 10
210  SF 09
211  3
212  STO 00
213  1              - WRITE STATUS
214  STO 05
215*LBL 03
216  SF 25
217  WRTS
218  GTO "OP"      --
219*LBL "WRTK"      --
220  CF 10
221  CF 09
222  4
223  STO 00
224  1              - WRITE KEYS
225  STO 05
226*LBL 04
227  SF 25
228  WRTK
229  GTO "OP"      --
230*LBL "WRTA"      --
231  CF 10
232  CF 09
233  5
234  STO 00        - WRITE ALL
235  11
236  STO 05
237*LBL 05
238  SF 25
239  WRTA
240  GTO "OP"      --
241*LBL "CREATE"     --
242  CF 10
243  SF 09
244*LBL 06
245  SF 25        - CREATE
246  CREATE
247  STO 05
248  6
249  STO 00
250  GTO "OP"      --
251*LBL "B2D"       --
252  4
253  INAN
254  ATOXR        - TAKE 4 BYTES FROM LOOP AND RETURN TO X DE-
255  ATOXR        CIMAL # OF LAST 2 BYTES, (16-BIT WORD)
256  ATXOR
257  256
258  *
259  +
260*LBL "D2B"       --
261  ENTER
262  ENTER
263  256
264  MOD          - BREAK DECIMAL # IN X INTRO 2 BYTES
265  X<>          XY MOST SIG. BYTE

```

266	LASTX	Y	LEAST SIG. BYTE
267	/		
268	INT		
269	RTN	--	
270*	LBL "OP"	-	EXECUTED AFTER FUNCTION ATTEMPT
271	FS? 25		
272	GTO "WP?"	-	IF SUCCESSFUL, GOTO WP?
273	99		IF NOT, WAS IT 2ND TRY?
274	FS? 10		IF 2ND TRY, EXIT
275	GTO "ERROR"		IF 1ST TRY, SAVE ACYNA AND X + TRY AGAIN
276	6.009		
277	STO L		
278*	LBL 07		
279	ASTO IND L		
280	ASHF		
281	ISG L		
282	GTO 07		
283	GTO "DSC?"		
284*	LBL "WAIT"	-	CHECK STATUS OF DRIVE
285*	LBL 11		
286	SF 25	-	KEEP CHECK IF BUSY
287	INSTAT		
288	FC?C 25	-	RETURN IF IDLE
289	GTO 11		
290	FS? 05	-	DISPLAY ERROR # IF ERROR
291	GTO 11		
292	FS? 04		
293	GTO "ERROR"		
294	RTN		
295*	LBL "WP?"	-	IF SUCCESSFUL ON 1ST TRY, EXIT
296	FC? 10		
297	GTO "DONE"		
298	2	--	
299	RCL 00	-	IF NOT WRTP OR WRTPV, ENT
300	X>Y?		
301	GTO "DONE"	--	
302	RCL 01		
303	INT		
304	XEQ "D2B"	-	MUST ALTER DIR ENTRY FOR WRTP AND WRTPB
305	XEQ "SEEK"		TO SHOW CORRECT # OF REGISTERS CONSUMED -
306	RCLSEL		NO WAY TO DETECT THIS WHEN DUMMY
307	LAD		ENTRY IS WRITTEN
308	3		
309	DDL		
310	RCL 04		
311	32		
312	*		
313	4		
314	-		
315	OUTXB		
316	RCLSEL		
317	TAD		
318	1		
319	DDT		
320	INXB		
321	INXB	-	READ LENGTH OF FILE IN BYTES
322	X>0?		
323	ISG Y		
324	FIX 4		

325	RDN	
326	STO 05	
327	RCLSEL	
328	LAD	
329	3	
330	DDL	--
331	RCL 04	
332	32	
333	*	- SET BYTE POINTER
334	13	
335	-	
336	OUTXB	--
337	RCLSEL	
338	LAD	
339	6	- PARTIAL WRITE MODE
340	DDL	
341	RCL 05	- WRITE CORRECT # OF RECORDS
342	OUTXB	
343	RCLSEL	
344	LAD	
345	8	
346	DDL	- CLOSE RECORD
347	GTO "DONE"	
348*	LBL "SEEK"	- SEEK TO TRACK AND RECORD SPECIFIED BY
349	ADROFF	CONTENTS OF X AND Y REGISTERS
350	RCLSEL	
351	LAD	
352	4	
353	DDL	
354	RDN	
355	RDN	
356	OUTXB	
357	RDN	
358	OUTXB	
359	XEQ "WAIT"	
360	ADRON	
361	RTN	
362*	LBL "ERROR"	- DISPLAY ERROR #
363	CF 10	
364	"ERROR: "	
365	ARCL X	
366	AVIEW	
367	STOP	
368*	LBL "DONE"	- EXIT
369	CF 10	
370	END	

Using the 9114A with the IBM PC (PC-XT)

Introduction

This section shows you the following two procedures:

- Step 1 – How to install the HP-IL routines on the IBM PC so you can use the 3 1/2-inch disc drive with your computer.
- Step 2 – How to use your 3 1/2-inch disc with your IBM PC.

Before going any further be sure the HP 82973A HP-IL Interface Card is installed per the HP 82973A manual. The 5 1/4-inch disc that comes with the interface card will be used in the following procedure. This disc is called the HP 82973A HP-IL Interface Disc.

Step 1 – Installing the HP-IL Driver on the IBM PC

This section shows you how to transfer two of the files from the HP 82973A HP-IL Interface disc to your master DOS disc (the disc you use to boot your system). If you have an IBM PC, this master boot disc will be a 5 1/4-inch flexible disc. If you have the IBM PC-XT, this master boot disc would commonly be the Winchester disc at drive C.

First, for you IBM PC users, let's make a copy of your master boot disc. Begin at step 1 of this section. For you IBM PC-XT users, start with step 2 of this section.

1. Use the DISKCOPY command and make a copy of your DOS boot disc. First, boot up your system by placing the boot disc in drive A. Turn the system on and Enter the date and time. Type the next line.

DISKCOPY A: B:

Press Enter, and follow the diskcopy instructions.

Use the new copy of your master DOS disc to make all the following changes. This copy is now in drive B. Remove your master boot disc and put it away for now. Place the copy you have just made in drive A. Continue to step 2.

2. Check to see if you have a file called CONFIG.SYS on your DOS disc by typing the next line and pressing Enter.

DIR CONFIG.SYS

If the file is found the next two lines will appear on your display.

Config Sys

1 File(s)

If CONFIG.SYS is on your DOS disc, perform only **Procedure A** below.

If CONFIG.SYS is NOT on your DOS disc, perform only **Procedure B** below.

PROCEDURE A:

Type in the next line and press Enter.

TYPE CONFIG.SYS

The contents of the CONFIG.SYS file is now displayed. You probably should write these files down as you will have to retype them.

Type the next two lines and add the files you just wrote down beginning at the place indicated. When all the files are added, the Z character is added by holding down the Ctrl key as you press the Z key.

COPY CON CONFIG.SYS

DEVICE = HPIL.SYS

Add the files you wrote down above

Z (Ctrl Z)

Now press the Enter key to store the file to your DOS disc.

PROCEDURE B:

Type the next two lines. The Z character is added by holding down the Ctrl key as you press the Z key.

COPY CON CONFIG.SYS

DEVICE = HPIL.SYS

Z (Ctrl Z)

NOTE

If you set the address on the interface card to an address other than 1700 when you installed the HP-IL interface, you must specify your address when you type DEVICE = HPIL.SYS. For example, if you set the address of the interface card to 2200, enter the following line in CONFIG.SYS:

DEVICE = HPIL.SYS /A 2200

3. Copy the files **HPIL.SYS** and **HPILFOR.COM** from the HP 82973A HPIL Interface software disc to the DOS disc.

EXAMPLE: With the DOS disc in drive A (IBM PC), insert the HP-IL interface disc into drive B and type the next commands. If you have the IBM PC-XT insert the HP 82973A disc into the flexible disc drive and type the next two commands. This drive (IBM PC-XT) responds to both A: and B: identifiers.

After typing each line, press Enter and wait for the file to copy.

COPY B:HPIL.SYS

COPY B:HPILFOR.COM

4. At this time connect the HP 9114A to the HP-IL card and turn the disc drive on. Also remove the HP 82973A HPIL Interface disc. This should be done before you reset the computer.

With the DOS disc in drive A, reset the IBM PC so that the operating system is re-booted. Reset the IBM PC-XT so its operating system re-boots from the Winchester. Reset on both computers is done by pressing the Alt, Ctrl, and Del keys at the same time.

HPIL.SYS is now installed if the display screen shows HP-IL being present.

NOTE

If you want to run HPLINK, you need to first remove HPIL.SYS from the system. This allows the IBM PC to reside on the HP-IL without being the system controller.

The easiest way to do this on the IBM PC is to boot your computer with the old DOS disc that does not contain the files CONFIG.SYS, HPIL.SYS, or HPILFOR.COM.

On the PC-XT, remove the following line

DEVICE = HPIL.SYS

from the file CONFIG.SYS and reboot the computer.

Step 2 – Using Your 3 1/2-inch Disc Drive with your IBM PC

The first step in using the 3 1/2-inch disc drive is to format the 3 1/2-inch discs. Formatting 3 1/2-inch discs must always be done using the HPILFOR routine that we installed on the operating system. The commands DISKCOPY and DISKCOMP will not work with the HP 9114A.

Mass storage devices on the loop are assigned disc drive identifiers in a sequence following those already assigned on the IBM. For example, if you have disc drives A:, B:, and C: assigned to the IBM PC-XT and you have two HP-IL mass storage units connected, the HP-IL units will be assigned the identifiers D: and E:. You can then use them as you would any of the disc drives on your IBM PC-XT.

The command to format a disc in the HP 9114A is shown next.

HPILFOR m:

The **m:** is the disc drive identifier of the disc you want to format.

For example, to format a disc using drive D:, type:

HPILFOR D:

Before the computer formats the specified disc drive, it prompts you to press a key to start formatting. This ensures that you do not accidentally format a disc that you do not want erased. (**Remember that formatting a disc erases all information on that disc.**) After pressing the key to confirm that you want a disc formatted, the computer begins the formatting operation.

Once the disc is formatted, you can write data on it. The Copy command is shown next. When using the Copy command don't forget the space between the filename and the destination address (filename A: and filename C:); this also applies to the space between the * and destination address (* C: and * A:) when copying the entire disc.

Copy C:filename A:

and pressing Enter – copies the file specified from disc C to disc A.

Copy A:filename C:

and pressing Enter – copies the file specified from disc A to disc C.

Copy A:*. * C:

and pressing Enter copies the entire disc in drive A to the disc in drive C.

Copy C:*. * A:

and pressing Enter copies the entire disc in drive C to the disc in drive A.

NOTE

When moving data from the IBM PC to the HP 150, the disc must be initialized in single-sided format if you are using any of the following disc drives:

9121D/S

9133A/B/V/XV

An HP 150 system with any of the above disc drives can be used to format a disc in single-sided format.

To initialize an HP-IL disc in single-sided format on the IBM PC, use the /w parameter as shown next.

HPILFOR m:/w

Remember that the m parameter is the identifier of the disc drive containing the disc you want to format.

When using the HP Portable on the loop when the IBM PC is a controller, the HP Portable must be running a program that enables it to be a device on the loop. Otherwise the IBM PC and the HP Portable will both attempt to be the loop controller. The result is that the loop will not operate until either the IBM PC or the HP Portable is disconnected from the loop.

Appendix

Data Logging with the HP 9114A

Here are some points of interest if your application involves data logging.

1. The HP 9114A continues to operate for 30 seconds after it responds to a command on the loop (auto addressing, a disc read or write operation, etc.). The motor stops spinning after 2 seconds of not receiving a command and after 30 seconds the HP 9114A will shut down. This shut down is a very low power condition.
2. Continuous motor-spinning operation will run the battery down in less than one hour if the recharger/adaptor is not connected.
3. The HP 9114A responds to the LPD (Loop Power Down) command by placing itself in a very low power consumption state (shut down).
4. Addressing a data source device (voltmeter) directly by its position number or two letter device code will not cause the disc drive to power up.
5. Store as much data into your host (controller) as possible and write only large amounts of data to the disc drive.
6. Operate the disc drive as much as possible with the adapter/recharger connected.
7. Operate the disc drive within its environmental specifications.

(

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CHANGE SHEET

Change Sheet to Manual P/N 09114-90000

Situation

What if the battery in my HP 9114A doesn't last long enough for me to do what I want to do?

Steps To Take

Always start with a fully charged battery in your HP 9114A. Fully charging the battery requires connecting the recharger for approximately 12 to 16 hours (80% charge in 5 hours).

Place the HP 9114A as the last device on the interface loop. The **Out** cable from the HP 9114A should be the **In** cable to your computer. And don't forget to connect the other cable from your disc drive to the previous device in the loop. This positioning may keep the disc drive from turning on during printer or plotter commands.

Operate with the recharger connected as much as possible. **Remember that even with the recharger connected, high disc usage will run the battery down.**

If you don't have adequate battery life for your particular application after taking the above precautions, consider purchasing a spare battery pack (P/N 88014A). Remember, these batteries can be charged from a wall outlet while outside the HP 9114A.

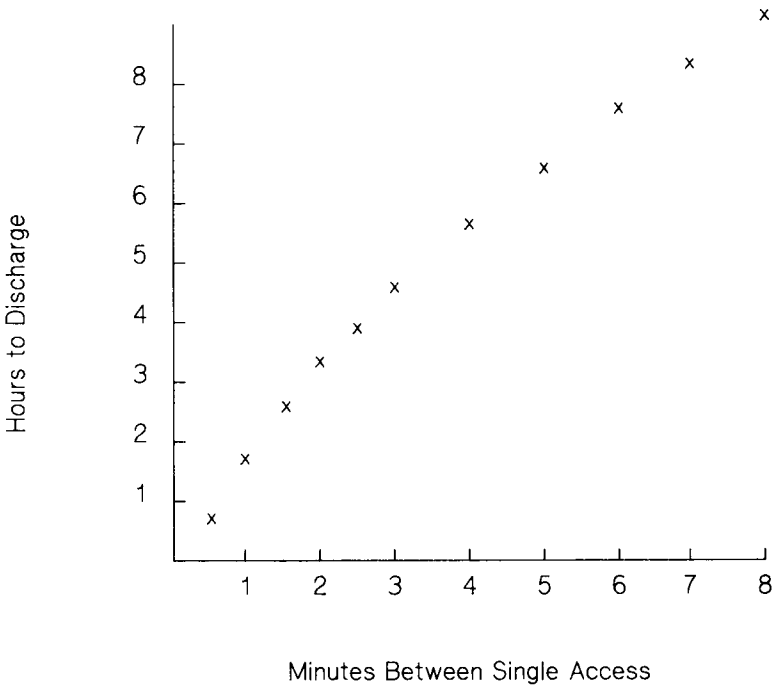
Also, if you are running your own programs, see the technical section later in this change sheet. The programs may be able to be changed to improve the battery life of your disc drive.

November 1, 1984

09114-90010

The following chart tells you how long the battery will last. The chart is based on the amount of time in minutes between disc accesses (the amount of time the disc access light is off). If you have the battery charger connected, your results should be slightly improved. The following assumptions have been made.

- 1) You always start with a fully charged battery.
- 2) Typical access time (disc access light is on) is approximately 5 seconds. If your access times are longer, the hours to discharge will be shorter.



Technical Description of the HP9114A Battery Life

In order to understand how the battery life of the HP 9114A is affected by the application, you need to understand the way the drive's hardware works. Basically, the HP 9114A's hardware can be in three different states. Each of these states uses different amounts of power. The events that cause the drive to switch from one state to another and the amount of power that is consumed in each state is explained below.

The three different states are sleep, active, and access. The first state, called the sleep state, is a very low power state in which all hardware is shut down except for the CMOS HP-IL integrated circuit and a small wake-up circuit. The second state is the active state in which all of the controller circuitry and all other drive electronics are powered. The third state, the access state, is when the flexible disc is being accessed. This state requires extra power to spin the motor, load the head, and step the head. The approximate amount of current drawn from the battery in each state is shown next.

Sleep state	55 milliamps (disc access light off)
Active state	1100 milliamps (disc access light off)
Access state	1650 milliamps (disc access light on)

The state the HP 9114A is in depends upon the activity on the HP-IL. The HP-IL integrated circuit used in the HP 9114A determines which HP-IL commands cause the disc drive to go from the sleep state to the active state. Certain commands are handled automatically by the chip and some require that the command be processed by the CPU on the controller board. This means that power must be applied to the controller board. A detailed list of the HP-IL messages that cause the disc drive to go from the sleep state to the active state are listed at the end of this section.

Basically, two operations cause the transition from sleep to active state. The first one configures the loop with the auto addressing command. This requires the CPU to accept a loop address and pass on the next highest address to the next device on the loop. The second operation is addressing the HP 9114A to be a talker or a listener on the loop.

The commands sent over HP-IL depend on your computer and on the type of operations being performed by your computer.

HP 110

The HP 110 is a portable product and can be reconfigured quickly. Therefore, every time the HP 110 begins talking to any device on the loop, the HP 110 sends out an auto addressing command. This always happens if it has been over five seconds since the HP 110 last accessed a device on the loop. Auto addressing always wakes up any HP 9114A on the loop.

HP 71B

The HP 71B can be controlled to a great extent as to when it will send out auto address commands. It will assign addresses automatically only when it is turned on, and this can be disabled by setting an internal flag. The other area of concern with the HP 71B is how it determines which device is on the loop. If absolute loop addresses or assign codes are not used to specify the device on the loop, the HP 71B may have to sequentially search the loop for the proper device to use. This would require each device on the loop, that has a lower address than the device that the HP 71B is searching for, to send its device ID. This requires the HP 9114A to go to the active mode. For more information on HP-IL operation of the HP 71B, please refer to the HP-IL Interface Owner's Manual for the HP-71. The key is to use assign codes or absolute loop addressing.

HP 75

The HP 75 assigns addresses only with the ASSIGNIO command and the RESTOREIO command. The assignments made with the ASSIGNIO command are always used when addressing the devices. The HP 75 typically will not wake up the HP 9114A when talking to another device such as a printer.

HP Series 40

The HP Series 40 auto addresses the loop on every operation. This causes the HP 9114A to wake up on every operation to the printer or other device.

**HP-IL Commands Catagorized As To When They
Make The HP 9114A Go From The Sleep State
To The Active State**

Always	If Listener or Talker	If Listener or Talker or If Address Equals Device's Address	Never
NOP	Data	LAD (0-31)	IDY
LLO	End	TAD (0-31)	RFC
DCL	GTL		
PPU	SDC		
EAR	PPD		
IFC	GET		
REN	ELN		
NRE	PPE0 (0-7)		
AAU	PPE1 (0-7)		
LPD	DDL (0-31)		
SAD (0-30)	DDT (0-31)		
AAD (0-31)	ETO		
AEP (0-31)	ETE		
AES (0-31)	NRD		
AMP (0-31)	SDA		
	SST		
	SDI		
	SAI		
	TCT		

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