

HP 82973A HP-IL Interface Card

OWNER'S MANUAL

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1. HOW TO USE THIS MANUAL

This manual describes how to use the HP 82973A HP-IL Interface. This manual is all on this disc. You can read any part, jump to other topics, and select topics from a table of contents or an index.

Each screen that you read shows at the bottom the keystrokes allowed to move to another screen. In addition, each table of contents prompts you to press a number key to select a topic. If you attempt to select an option not shown, the computer beeps to remind you to make a valid selection. For example, press [Q] now to hear the beep.

NOTE: This manual assumes you know how to run a computer with MS-DOS.

To get a printed copy of a screen, use the [PrtSc] key while the screen you want to print is displayed. To print a copy of the entire manual, use the DOS PRINT command to print the file MANUAL.TXT which is located on the interface software disc. (The PRINT command is on the DOS disc.)

The table below summarizes the operations available for moving from screen to screen. Each letter in parentheses indicates that you press that letter key to perform that operation. (Not all operations are available from each screen. Operations allowed are shown at the bottom of each screen.)

Operation	Description
(E)xit	Press [E] to exit and return to the operating system.
(I)ndex	Press [I] to go to the Index.
(H)elp	Press [H] to go to Help.
(R)eturn	Press [R] to return to your screen from the Index or Help.
(C)ontents	Press [C] to go to the main Table of Contents.
(P)revious	Press [P] to go to the previous screen.
(N)ext	Press [N] (or the space bar) to go to the next screen.
(T)op	Press [T] to move to the start of troubleshooting.

2. INTRODUCTION TO THE HP 82973A HP-IL INTERFACE

Congratulations! You have purchased a quality Hewlett-Packard Interface Loop (HP-IL) card that enables you to transfer information such as spreadsheets, memos, and data files between your HP Portable Computer and your Desktop Computer (the Portable-Desktop Link).

The HP 82973A HP-IL Interface also enables you to form a desktop link between a desktop computer and your HP-IL peripheral devices.

NOTE: This manual contains instructions for the Revision C (or later) HP-IL Interface Card. These instructions do not apply to cards with revision designation A.

The HP 82973A HP-IL Interface is a powerful yet easy-to-use addition to your desktop computer. It enables the desktop PC to serve as:

1. A "peripheral device" on an HP-IL loop controlled by an HP Portable.
2. A "loop controller" using HP-IL peripheral devices. (If your desktop PC runs MS-DOS 3.0 or greater, use this mode.)

If you have one interface card installed on the desktop PC, it can be either a peripheral device or the loop controller (but not both at the same time).

The software disc included with the interface card contains programs and information needed to operate the interface. To protect your investment in this product, you should make a backup copy of the disc as soon as possible and then store the original disc in a safe place. Use the copy of the software disc for all your operations.

To make a copy of your disc, follow the instructions in the owner's manual for your computer on how to care for and copy discs.

Since your programs and information are stored on disc, you should handle the software disc, and all discs, carefully:

- * Return flexible discs to their storage envelopes immediately after removing them from the disc drive.
- * Do not bend, fold, or emboss flexible discs.
- * Keep discs away from sources of strong magnetic fields, such as magnets, wires carrying heavy currents, transformers, and degaussers (magnetic erasers).
- * Refer to the MS-DOS manual for more information about disc care.

Several programs are referred to throughout this manual. The table below lists those programs and gives a brief description of each.

Program Name	Description
HPLINK	Makes the desktop PC an HP-IL device.
HPIL.SYS HPIL_PRN.SYS HPIL_LPT.SYS	Makes the desktop PC an HP-IL controller.
HELP	Enables you to read this manual on the display.
TEST	Enables you to test the interface card.
HPILFOR	Enables you to format discs from the desktop PC that are inserted in HP-IL disc drives.

The following items are supplied with the HP 82973A HP-IL Interface:

- * An HP 82973A HP-IL Interface software disc.
- * A 1-meter HP-IL cable.
- * A service card.

3. INSTALLING THE HP 82973A HP-IL INTERFACE

3.1 Introduction

To install the HP 82973A HP-IL Interface in your desktop PC, follow the instructions in computer owner's manual. (If these instructions are not available, consult your dealer for information about installing the interface.) You don't need to set any system switches on the desktop PC.

CAUTION!

The interface card is shipped in a wrapping that protects it from electrostatic discharge (ESD). A common example of ESD occurs when you walk across a carpet and get an electrical shock from touching a doorknob. The shock you feel is a discharge.

Even if you don't feel a shock, a static discharge can occur.

To prevent ESD from damaging the interface card, keep the card in its protective wrapping until you are ready to install it. When you are ready to install the card, touch a grounded metal object to remove any static charge that you might have. After grounding yourself, you can remove the card from the wrapping and remove the protective cover from the edge connector. Always handle the interface card by its edges!

After you remove the interface card from its protective wrapping and remove the protective cover from the edge connector, you can install the interface card in the desktop PC.

The HP 82973A HP-IL Interface has an I/O address of 700 (hex) preset at the factory. In most cases, you won't need to change this address. But if another card has this address, change the address setting on either the HP-IL interface or the other card.

If this card does not appear to operate, or another card does not operate with this card plugged into the PC, you probably need to change the address of either card. The rest of this section describes how to change the address of the HP-IL Interface.

NOTE: In most cases you won't need to change the address of the interface. Therefore, you probably don't need to read the rest of this section.

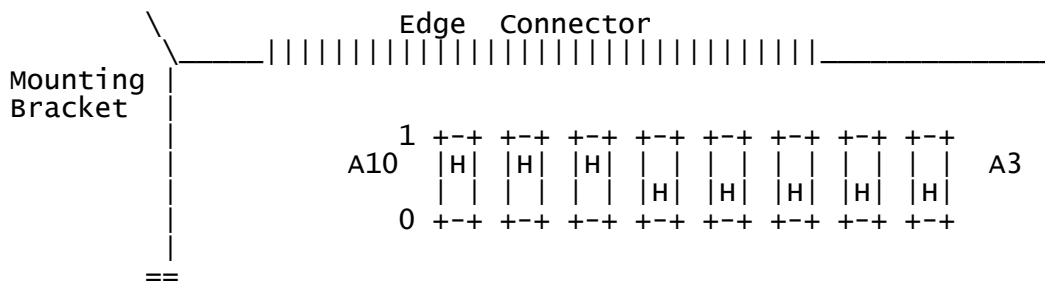
To change the address of the HP-IL interface, first determine a new, unique address, such as 218 (hexadecimal). Then:

1. Physically set the address switch on the HP-IL interface. (The procedure, and suggested address settings, are described beginning on the next screen.)
2. Enter the new address in the file HPLINK.BAT. (This is described later in this section.)

3.2 Adjusting The Address Of The Interface

Hold the interface card so the mounting bracket is to the left and the edge connector is toward the top. The address switch is at the upper right of the center of the board.

The address switch has eight switch segments that can be set with a ballpoint pen. The designation "A10" is to the left of the switch and the designation "A3" is to the right of it. (Ignore the print on the switch.)



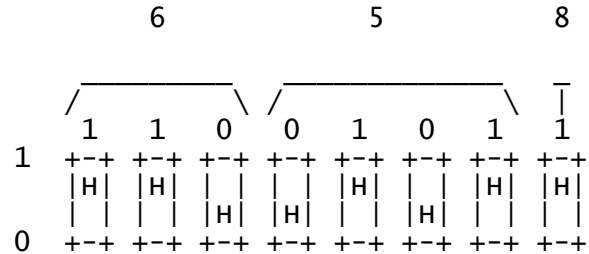
Shown below are the switch settings for some alternative addresses:
In the table, a "1" indicates that you slide the switch segment to the
"1" position and a "0" indicates that you slide the switch segment to "0."
The next screen shows more alternative settings.

700 (default)	1	+++	+++	+++	+++	+++	+++	+++
		H	H	H	H	H	H	H
	0	+++	+++	+++	+++	+++	+++	+++
218	1	+++	+++	+++	+++	+++	+++	+++
		H	H	H	H	H	H	H
	0	+++	+++	+++	+++	+++	+++	+++
258	1	+++	+++	+++	+++	+++	+++	+++
		H	H	H	H	H	H	H
	0	+++	+++	+++	+++	+++	+++	+++
288	1	+++	+++	+++	+++	+++	+++	+++
		H	H	H	H	H	H	H
	0	+++	+++	+++	+++	+++	+++	+++
200	1	+++	+++	+++	+++	+++	+++	+++
		H	H	H	H	H	H	H
	0	+++	+++	+++	+++	+++	+++	+++

For Technical Users:

The leftmost three switches represent the leftmost digit of the address, the next four switches represent the middle address digit, and the last switch represents the rightmost digit.

The example at right shows how to set the I/O address to 658 Hex. The range of the leftmost digit is 0-7, the range of the middle digit is 0-F, and the last digit can be either 0 or 8. The card uses only 8 bytes of I/O address space.



If the default address conflicts with another I/O card, you might try to use one of the following (or any other that you wish): 688, 218, 258, 288, 658, or 200.

3.3 Changing The Address In HPLINK.BAT (For Non-Controller Operation)

HPLINK.BAT is a batch file that, among other things, tells the desktop PC the memory address of the HP-IL interface. After altering the address on the HP-IL interface, you need to change the address specified in HPLINK.BAT.

To change the address in HPLINK.BAT, type:

```
COPY CON HPLINK.BAT <RETURN>
A:CS80 nnn <RETURN>
<Ctrl> Z <RETURN>
```

where nnn is the three-digit hexadecimal address of the interface. For example, to set the address to 218, the second line above becomes:

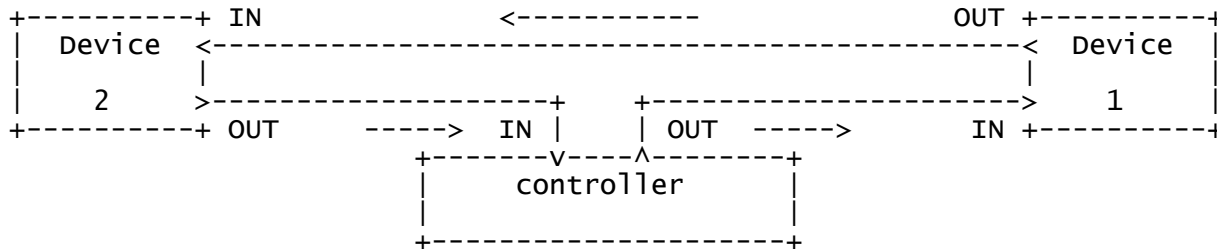
```
A:CS80 218 <RETURN>
```

After changing the address on the HP-IL interface, installing it, and changing the address line in the file HPLINK.BAT, the interface is ready to use.

If you can't determine a new address for the interface or, after consulting your desktop PC manuals, you are unable to properly install the interface, consult your dealer.

4. CONNECTING AND USING HP-IL

The Hewlett-Packard Interface Loop (HP-IL) consists of a controller (a computer), and one or more devices (such as disc drives and printers) connected in a series. All devices must be connected and switched on for the loop to operate. You can have up to 31 devices in a loop.



Peripheral devices are connected to your computer (and to each other) using HP-IL cables. A 1-meter cable is shipped with the interface card, and one is shipped with each peripheral device.

The receptacles on the interface card indicate the direction information travels around the loop. With the desktop PC as loop controller, instructions and data are sent from the card through the receptacle labeled "OUT" and are received by the card through the receptacle labeled "IN."

When only one peripheral is connected to the interface card (the card is installed in the desktop PC), one HP-IL cable runs from the OUT receptacle on the back of the computer to the IN receptacle on the peripheral. The other HP-IL cable connects the OUT receptacle on the peripheral to the IN receptacle on the computer.

If you want more than one peripheral in the loop, HP-IL cables should be connected from the OUT receptacle on each device to the IN receptacle on the next device. Repeat this procedure until all peripheral devices are connected.

The loop is completed when the OUT receptacle on the last peripheral is connected to the IN receptacle on the computer. Note that EITHER the desktop PC OR the Portable may be the loop controller at a given time--not both.

Instructions and data on HP-IL originate from the controller and travel to the first peripheral, on to the second and continue around the circuit until that information returns to the controller. If the information isn't intended for a particular peripheral, it travels to the next peripheral in the loop. When the information reaches its destination, that peripheral responds as directed and then passes on the information.

If you wish to space peripherals further from the computer than permitted by the cables, connect additional HP-IL cables. The maximum distance allowed between any two devices or a device and the computer is 10 meters (33 feet) with standard cables.

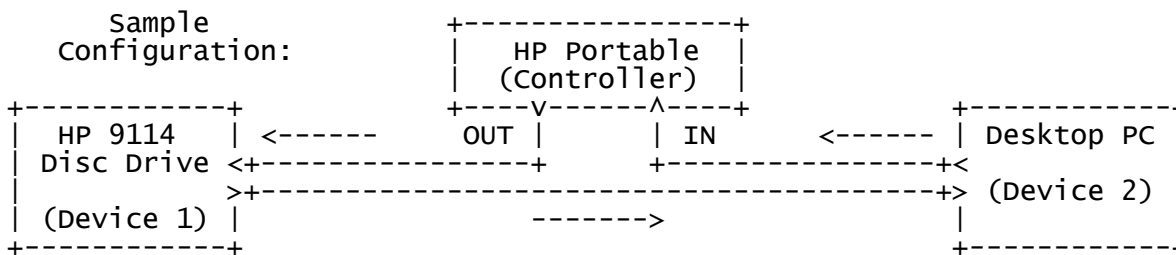
Standard HP-IL cables are:

- HP 82167A .5 meter.
- HP 82167B 1 meter.
- HP 82167D 5 meters.

5. USING THE DESKTOP PC AS AN HP-IL DEVICE

5.1 Introduction

The HPLINK program turns a desktop PC into an HP-IL device controlled by a Portable computer.



NOTE: Don't attempt to use a hard disc that was formatted with DOS 3.0 or greater as a device to be controlled by The Portable. The Portable PLUS, however, recognizes such a disc and controls only the other devices in the loop. The HPLINK program warns a user of DOS 3.0 or greater before it makes the desktop PC a device.

HPLINK is a program that turns the desktop PC into any of three peripheral devices to be operated by an HP Portable Computer:

- * Disc Drive.
- * Printer.
- * Display. (The display operates as a printer.)

Before running HPLINK ensure that all HP-IL devices are connected and turned on.

5.2 How To Run HPLINK

To run HPLINK insert the software disc in drive A and type A:HPLINK. HPLINK displays the following selection of devices:

```
1: Disc
2: Printer
3: Display
(E) Exit
```

HPLINK also displays the current device at the bottom of the display. (The default is "Disc Drive.") A desktop PC can act as one device at a time only. To select a device type, press the number key corresponding to the device you want. For example, to use the desktop PC disc drives, press (1). To end the HPLINK program, press (E). This returns you to the operating system.

So far, this section has described everything you need to know to begin using HPLINK. If you want to try running HPLINK now, press (E) to exit from this manual, ensure the software disc is in drive A and type: A:HPLINK.

The rest of this section describes more about using HPLINK. If you want more information about how disc drives are assigned or about using the desktop PC printer and display, you can continue with the next screen.

Note: If the desktop PC has no physical disc drive B, you should read the screens on using desktop PC disc drives (beginning next screen).

5.3 Using Desktop PC Disc Drives

When you select Disc from the HPLINK menu, the disc drives connected to the desktop PC are accessible to an HP Portable. The drives are automatically assigned drive identifiers that follow in the sequence of the existing Portable PC disc drives.

For example, if you have drives A: and B: assigned on the Portable and then run HPLINK and select Disc from the HPLINK menu, the desktop disc drives are assigned to the Portable as drives C:, D:, and so on. To use the desktop PC drives, ensure that the number of external drives specified in the Portable system configuration is at least the number of desktop PC drives.

Assigning Virtual Drive B

If you are using a desktop computer that has disc drive A but no physical drive B (for example, a desktop PC can have a single floppy disc drive A, virtual drive B, and a hard disc drive, C), execute `ASSIGN C = B` BEFORE you run HPLINK. (The ASSIGN command is a .COM file on the DOS disc.) Otherwise, the screen displayed by HPLINK might be overwritten by messages from the desktop PC as you use drive B. Also, the HP Portable might "time-out" while waiting for you to insert a disc in drive B.

To recover from a "time-out", type "A" (abort) in response to the Portable message: `ABORT, RETRY, IGNORE?`

Disc Operations

Using your HP Portable, you can read and store files on desktop PC discs that were formatted using DOS 1.0 or greater.

Since HPLINK is a file transfer utility, you can store and retrieve files from desktop PC discs, but you can't format those discs from a Portable.

Note: Although a desktop PC and a Portable use similar operating systems, .COM files that run on one computer might not run properly on the other.

EXAMPLE: Suppose you want to copy a worksheet from drive A of your Portable to a desktop PC disc so you can work on it using the desktop PC. Assume the desktop PC has two disc drives and the Portable has no external drives. Also, assume that the name of the file to be copied is PROJ.WKS. To transfer the file, you would:

1. Set the number of external disc drives in the system configuration screen of the Portable to 2.
2. With the interface program disc in desktop PC drive A, type: `HPLINK.`
3. Remove the software disc from drive A and insert a disc for data.
4. On the HP Portable, type: `COPY A:PROJ.WKS C:`

A copy of the file is now on the disc in drive A of the desktop PC.

5.4 Using A Desktop PC Printer

If you want to use a printer that is connected to the desktop PC, select Printer on the HPLINK menu. The printer is available to the Portable, and the desktop PC appears as a printer on HP-IL. (Note that when you select Printer, the desktop PC disc drives are no longer on the loop.)

To be used, the desktop PC must be the first printer on the loop. (Refer to the HP Portable owner's manual for more information about assigning devices on HP-IL.)

Also, before you run HPLINK, the printer must be designated the PRN or the LPT1 device on the desktop PC.

When sending information to the desktop printer from the Portable, HPLINK uses the first printer connected to the desktop PC. When using a printer you should know how it responds to special characters such as linefeed (LF) and carriage return (CR). Otherwise, you might get unexpected results.

Many printers respond to special codes called "escape sequences." Escape sequences are used to select different settings on a printer and control how information is printed. (The owner's documentation for your printer should describe how that printer responds to escape sequences.)

5.5 Using The Desktop PC Display

There might be times when it is more convenient to display information on a screen rather than a printer if you don't want to unnecessarily use printer paper. When you select Display on the HPLINK menu, you can use the desktop PC display as a printer. In fact, when you use the display in this manner, the desktop PC appears as a printer on HP-IL.

HPLINK directs information to the display as text. Control codes and escape sequences sent by the Portable are displayed on the screen.

If you use desktop PC screen parameters, you must set them on the desktop PC before you run HPLINK. You can't alter the screen's characteristics while HPLINK is running. (For more information about altering the characteristics of the display, refer to the owner's documentation for your desktop computer.)

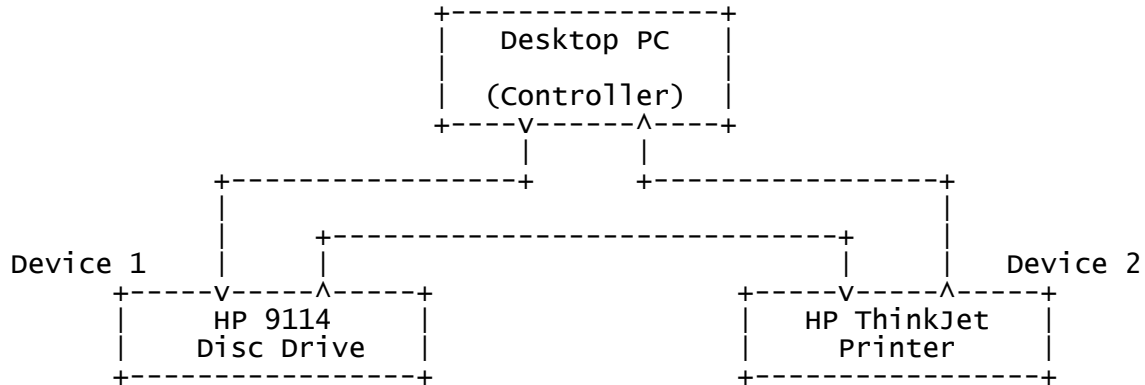
6. USING THE DESKTOP PC AS AN HP-IL CONTROLLER

6.1 Introduction

The desktop PC can be a loop controller as well as a device on HP-IL. (However, a computer can't be a device and a controller on a loop at the same time.)

When loaded in a desktop PC, the file HPIL.SYS on the software disc is added to the desktop PC operating system, enabling you to use HP-IL. Since HPIL.SYS enables the desktop PC to operate ("drive") HP-IL devices, it is called a "driver." You can load ("install") the driver in the PC using a file called "CONFIG.SYS." (This is described later.)

The HP-IL driver, when installed in the desktop PC, enables the desktop PC to use HP-IL peripheral devices. An example configuration is shown below:



With the HP-IL driver installed, a desktop PC can operate:

- * HP-IL printers.
- * HP 7470A Graphics Plotter, option 003.
- * HP-IL disc drives.

Installing the driver is described beginning with the next screen.

For Technical Users: Programmers can gain access to the HP-IL driver through DOS Interrupt 54h. This is a special interrupt provided by the driver. For more information and an example, read the file INT54H.DOC on this disc.

6.2 Installing The HP-IL Driver

The HP-IL driver you use depends on what you want the name of the HP-IL printer to be. The table below shows the names of the HP-IL drivers on the software disc and for each driver the associated HP-IL printer name.

Driver	Printer Name
HPIL.SYS	HPILPRN
HPIL_PRN.SYS	PRN
HPIL_LPT.SYS	LPT1

Some applications require that the printer name be PRN or LPT1. In this case you might want the HP-IL printer to be either PRN or LPT1.

Example: You want to print information from a spreadsheet program to a ThinkJet printer on HP-IL. The spreadsheet program prints only to PRN. To print on the ThinkJet printer, install the driver HPIL_PRN.SYS before running the spreadsheet program.

NOTE: Not all applications can print to an HP-IL printer.

To install an HP-IL driver, use a file called CONFIG.SYS. CONFIG.SYS is a file you create on your boot disc, which is the disc you use to load DOS and other information when you turn on or reset the computer.

To install the driver using CONFIG.SYS, use an editor or word processor to add one of the following lines to CONFIG.SYS:

```
DEVICE=HPIL.SYS /Annn  
DEVICE=HPIL_PRN.SYS /Annn  
DEVICE=HPIL_LPT.SYS /Annn
```

In the lines above, /Annn specifies a three-digit hexadecimal address of the HP-IL interface card. (The default address is 700.) For example, to load HPIL_PRN.SYS to control a card at address 218, type into CONFIG.SYS:

```
DEVICE=HPIL_PRN.SYS /A218
```

(Create CONFIG.SYS if it doesn't exist.) Whenever you turn on or reset the desktop computer with the boot disc in drive A, the computer automatically loads the driver for you.

NOTE: If after installing an HP-IL driver you want to run HPLINK (making the desktop PC an HP-IL device on the loop), you need to first remove the driver from the system. To do this, reboot the system using a duplicate of the DOS disc that DOES NOT load the driver into the computer. You might want to keep two copies of the DOS disc: one that installs the HP-IL driver and one that doesn't.

Operating HP-IL Devices

You can use HP-IL peripherals as you would other devices connected to your desktop PC. The following table lists the names that your desktop PC recognizes and their corresponding devices on the loop.

Name	Device
HPILPRN, PRN, or LPT1	The first printer on HP-IL. (The printer name depends on the driver installed.)
HPILPLT	HP 7470A Graphics Plotter (option 003).
Drives C to J (D to K)	Disc drives (drives D to K for a desktop PC with a hard disc drive.)

6.3 Using HP-IL Disc Drives

With the driver successfully installed, you can control HP-IL disc drives. Before using HP-IL disc drives, ensure that the discs are properly formatted for use with MS-DOS. (You can use discs formatted by The Portable, The Portable PLUS, HP 150, HP Vectra, or the IBM PC/XT/AT.)

Once you've installed a driver, disc drives on the loop are assigned disc drive identifiers in a sequence following those already assigned by the desktop PC. For example, when disc drives A, B, and C are assigned to the desktop PC and two HP-IL disc drives are 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 desktop PC.

To format a disc on HP-IL, type:

```
[d:] HPILFOR m: [/W]
```

where [d:] is the identifier of the drive containing the software disc, m: is the drive of the disc to be formatted, and /W specifies a single-sided disc.

NOTE: If you are formatting a disc with a desktop PC for use on another computer, you need to find out if that computer uses a single-sided or a double-sided disc format. If it uses a single-sided disc format, use the /W parameter when formatting the disc.

For example, to format a single-sided disc on drive C, type:

```
HPILFOR C: /W
```

To format discs on the desktop's built-in disc drives, use the DOS command FORMAT rather than HPILFOR.

NOTE: If an HP Portable is on the loop when a desktop PC is a controller (the HP-IL driver is installed), the Portable must run HPLINK to be a device on the loop. Otherwise the desktop PC and the Portable both attempt to control the loop. The result is that the loop will not operate until you disconnect one of the computers from the loop.

Before the computer formats the specified drive, it prompts you to press a key to start formatting. This is to ensure that you don't accidentally format a disc that you don't want erased. (Remember that formatting a disc erases all information on that disc.)

After pressing a key to confirm that you want a disc formatted, the computer begins formatting the disc.

Once you've installed a formatted disc in an HP-IL disc drive, you can use it.

EXAMPLE: You want to copy a spreadsheet file called PROJ.WKS on the desktop PC (drive A) to an HP Portable (drive D). In this example, you have two internal floppy disc drives (A and B) and a hard disc drive (C). Besides the Portable, there are no other external drives connected to the desktop PC. To transfer the file to the Portable:

1. Run HPLINK on the Portable. This makes the Portable a disc drive.
2. Ensure that an HP-IL driver is installed, as described at the beginning of this section.
3. On the desktop PC type:
COPY A:PROJ.WKS D: <RETURN>

The file is now on drive A in the Portable.

6.4 Using an HP-IL Printer

You can use an HP-IL printer with the MS-DOS PRINT utility and certain applications. Some applications (and the [Prt Sc] key) cannot talk to HP-IL printers.

NOTE: Not all applications are able to print to HP-IL. This printer capability is provided for applications that are able to use an HP-IL printer.

Be sure you know how your printer operates before using it. If all the information sent to the printer isn't being printed, it may be that the print buffer still has information in it. (Refer to the owner's manual for your printer for more information about how the printer prints information.)

When you use the PRINT command to print files on the HP-IL printer, the computer prompts you to enter the name of the printer device if you haven't done so since booting the operating system.

To specify the HP-IL printer (you can specify the first printer on the loop only), enter the printer name (either HPILPRN, PRN, or LPT1, depending on the driver installed) in response to the prompt. The system printer on the desktop PC retains its designator (LPT1 or PRN) unless the HP-IL printer has that name.

7. TROUBLESHOOTING

The purpose of this section is to help you solve any problems you might have when using the HP 82973A HP-IL Interface.

This section helps you locate a suspected problem by asking you to select one of several choices that indicate something about the trouble. After pressing a number key to indicate your choice, a new screen will be displayed that either prompts you to indicate something further about the trouble, or indicates what the trouble might be and what steps you should take.

If you find that your HP 82973A HP-IL Interface needs service, refer to the service card included with the interface for more information.

RUNNING THE TEST PROGRAM

To run the TEST program, exit this manual, then at the system prompt type

```
A:TEST nnn
```

where nnn is the address of the interface card. (Ensure first that the software disc is in drive A.) For example, if the address of the interface card is set to 700 (factory default), you would type:

```
A:TEST 700
```

Note the test result, read the manual again, and go to the screen in this section that helps you interpret test results (the next screen).

Interpreting Test Results

To interpret test results, pick the result you received from the list below. The computer displays another screen that identifies possible solutions.

TEST	RESULT
(1) Looking for card at address nnn.	Card not found.
(2) Looking for card at address nnn. Testing HP-IL.	Card found. Loop broken.
(3) Looking for card at address nnn. Testing HP-IL. Looking for HP-IL devices.	Card found. Loop OK. Number of devices on loop = nn.

In the table above, nn and nnn indicate a two-digit and three-digit number.