

# UCSD p-System™

## Version IV.1 Runtime Unit

### Instruction Sheet



The runtime unit is designed for use with HP-86/87 programs that require the p-System be loaded prior to program execution. Use these instructions to:

- Set up your system.
- Load the p-System.
- Backup the runtime disc.
- Change the autostart program (optional).

### A Minimum System

To use the p-System with an application program, you will need at least an HP-87XM, an HP-86 with a 32K memory module, or an HP-87 with a 64K memory module, and an HP Series 80 compatible disc drive.

An HP-IB compatible printer such as the HP 82905B Printer may be used with the system to produce hard copy output. The p-System can also communicate with the RS-232C interface if you install an HP 82939A Serial interface.

**Note:** The p-System cannot use certain Series 80 options including the HP 82938A HP-IL Interface, the HP 82940A GPIO Interface, the HP 82941A BCD Interface, and the HP 82949A Printer interface.

If you are not familiar with how to set up your computer with peripheral devices, you should read the section in your computer's introductory manual that explains set-up procedures. You will need to have your disc drive(s) connected before using the p-System. When your computer and peripherals are set up and operable, you are ready to load the p-System.

### Device Assignments

Each peripheral device is assigned a unique address by the HP-86/87 operating system. Refer to the introductory manual for your computer regarding device addressing.

The p-System translates each device address into a device number. For example, the disc drive containing the runtime disc, typically assigned device address :0700 by the HP-86/87, is assigned device number #4 by the p-System. (For the HP-86, this drive must have an address of :0700 or lower.) Some numbers are reserved by the p-System for a specific device, such as #6 for the system printer.

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**Example:**

Connecting two disc drives whose HP-86/87 device addresses are :0700 and :0701 causes the p-System to assign device numbers as follows:

HP-86/87 Device Address	p-System Device Number
:0700	#4
:0701	#5

Adding two additional disc drives with HP-86/87 device addresses of :0720 and :0721 would result in the following p-System device number assignments:

HP-86/87 Device Address	p-System Device Number
:0700	#4
:0701	#5
:0720	#11
:0721	#12

## Loading the p-System

Use the following instructions to load (or "boot") your System:

1. Turn on your disc drive and insert the disc marked UCSD p-System® Runtime Unit. Close the disc drive door. If you're using multiple disc drives, use the drive with the lowest interface select code and device address. This drive is identified as drive #4 by the p-System. Be sure that no other peripheral device is identified by the same select code and device address.
2. Turn on your printer, if you have one.
3. Turn on your computer.

After an initial self-test, the p-System is loaded into memory through a BASIC Autostart program. While the p-System is loading, you will see a welcome message from the autostart program. After approximately 1½ minutes, your computer should display a message indicating the p-System is loaded, followed by the System prompt:

```
Command: E(dit), R(run), F(ile), C(omp), L(ink), X(ecute), A(ssem),  
D(ebug)? [IV.12 A]
```

—indicating the system is ready to go.

The "?" at the end of the System command prompt indicates there are other options. By pressing (SHIFT) (?) you will see the rest of the options:

```
Command: H(alt), I(nitalize), U(ser restart), M(onitor)  
[IV.12 A]
```

—and pressing another (SHIFT) (?) will return the original options to the display:

```
Command: E(dit), R(un), F(ile), C(omp), L(ink), X(ecute), A(ssem),  
D(ebug)? [IV.12 A]
```

Most of the options in the System command prompt are for writing programs. Because they are not part of the runtime system, choosing an option such as E(dit) would result in the following message:

```
Cannot find SYSTEM.EDITOR
```

Options you can use are X(ecute), I(nitialize), H(alt), D(ebug), and M(onitor). Choose X(ecute) if you want to run programs or format and copy discs. To return to the HP-86/87 operating system, choose H(alt). Use I(nitialize) to reload the p-System, which should rarely be necessary. The commands D(ebug) and M(onitor) are documented in the *UCSD p-System™ Version IV.1 Operating System Reference Manual* (part number 00087-90381). If you accidentally (or intentionally) press (D) —for D(ebug), return to the System prompt by pressing (Q) —Q(uit). If you press (M) —M(onitor), you can recover using S(uspend).

## How to Execute a p-System Program

To run a program you will use the X(ecute) option. With the runtime disc inserted in drive #4, press (X). To respond to the Execute what file? prompt you will need to consult the documentation provided with your p-System program.

## To Exit the p-System

Your program should display the System prompt when it is finished. Press (H) to halt and return to the HP-86/87 operating system. You can also leave the p-System by pressing (SHIFT) (RESET).

## How to Make a Copy of Your Disc

Before you use the p-System, you should make a copy of your disc. Always use the backup copy for loading the p-System. Store the original disc in a safe place and use it only to make a new backup copy.

**Note:** If you don't make a backup copy, your system could become inoperative if your disc is accidentally destroyed, erased, or damaged.

Use the following instructions to format a backup disc, and then to copy the contents of the runtime disc to the newly formatted disc.

### Formatting a Disc

Before a new disc can be used for the first time, it must be formatted. During the formatting process, any previously stored information is erased; therefore, never format a disc that contains information you may later wish to access. Be sure to write-protect the runtime disc. If you don't know how, refer to the owner's manual for your computer.

Insert the runtime disc into the drive with the lowest address and press (X). You will see:

Execute what file?

Type FORMATTER (END LINE). The message HP-86/87 Disc Formatter [IV.1 a1] will be followed by:

Format which drive (4,5,9...22) [END LINE] ?

Insert the disc to be formatted into a drive. Type the p-System device number and (END LINE). For example, to format a disc residing in drive #5, type:

5 (END LINE).

When the disc in drive #5 has been formatted, you will see Format Complete along with:

Format which drive (4,5,9...22) [END LINE] ?

Press (END LINE). You are ready to copy the contents of the runtime disc to the newly formatted disc.



## Copying the Runtime Disc

With the runtime disc inserted in the drive with the lowest address, press (X). When you see:

```
Execute what file?
```

-type COPY (END LINE).

Next, you will see the prompt:

```
-Insert the source disc.  
-What drive is it in?
```

Since you are copying the runtime disc, type 4 followed by (END LINE). Insert the destination disc (or disc to be copied onto) when you are prompted. Specify the drive the destination disc is in and press (END LINE).

When the disc has been copied, you will see:

```
Do you wish to copy boot track 0?
```

Track 0 contains the program that boots the p-System. Press (Y) followed by (END LINE). After boot track 0 has been copied you will see COPY completed.

## The Keyboard

Some programs written to be used with the p-System will refer to keys that are not on the HP-86/87 keyboard. Therefore, you will need to know how to execute a function, such as <Escape>. Use the following table for these p-System functions:

p-System Function	Key to Press	Description
Escape	(ESC)	Use this key when prompted for <esc>.
Accept	(CONT)	Use this accept key when prompted for <etx>.
Stop	(PAUSE)	Use this key to stop and restart System output, as when you wish to examine program output before it scrolls off the top of the display.
Flush	(LIST)	Use to ignore program output until the key is pressed a second time.
Break	(CTRL) (P)	Break will interrupt all System activity by generating an error when it's pressed.
Space	Space Bar	The space bar, indicated by <space> or <sp> in the display, is used to recover from program errors and System interruptions.

Some programs will alter keyboard assignments and other standard p-System features. Be sure to read the documentation provided with any software that you purchase.

## The Autostart Program

### CAUTION

If you are using an HP-86 with no printer connected, you must change the `PRINTER IS` statement of the `Autost` program before attempting to output to p-System device #6, also identified as the `PRINTER`. Otherwise, the System will "lock up," and you will be forced to reset or switch off the HP-86.

### CAUTION

Before attempting to change the `Autost` program, make a backup copy of the runtime disc. There is a chance that you may accidentally overwrite essential information on the runtime disc while storing the modified version of `Autost`.

When your computer is turned on, it searches for a program named `Autost` on the boot disc drive, and if found, loads and executes it. The autostart program on the p-System runtime disc performs the following functions:

- Displays a message.
- Sets the page size to 24 lines per page.
- Specifies the system printer address as 701.
- Loads the binary program `p-SYSTEM`.



If you are using an HP-86 without a printer, you will need to change the `PRINTER IS 701` statement to `PRINTER IS 1`. Exit the p-System (using `HALT`) before changing the autostart program.

To edit the printer address statement, first load the autostart program. Type:

```
LOAD "Autost"
```

Press the **LIST** key. The autostart program should look like this:

```
100 CLEAR ! >>>>> Autost PROGRAM FOR UCSD p-SYSTEM <<<<<<
110 PRINTER IS 701
120 PAGESIZE 24
130 DISP USING "6/,28X,26R" ; "HP_86/87 U.C.S.D. p-SYSTEM "
140 DISP USING "/",35X,12R" ; "Version IV.1"
150 DISP USING "2/,32X,17R" ; "(HP BIOS Rev. A)"
160 DISP USING "3/,23X,34R,7/, " ; "(c) Hewlett-Packard
    Company 1982"
170 DISP "Please wait ..."
180 LOADBIN "p-SYSTEM"
190 END
```

