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Notice

This manual is suitable for HB-402P and HB-202P products. Generally, there is little difference between the HB-402P and the HB-202P products. If there is some difference, we will show you the related information in that place.

UPGRADE NOTICE



1Q '93

Thank you for buying this HB buffer. For HB-402P or HB-202P, its speedy throughput has been upgraded to 16K Bytes/sec.

For Turbo version HB-402P+ its speedy throughput is 26K Bytes/sec.

The HB-402P (referred to in Figure 1-3.1) can receive data from all personal computers and transmit data to printers at the same time. The buffer memory for data ranges from 256K bytes to 4,096K bytes. We also provide DB-WARE which can perform functions like connecting various units to the buffer, lock file, setting the number of copies, linking status, etc. The HB-402P also provides a special function called Auto-Link. (Please refer to section 4-1 and 4-2 for details.)

The structure of the HB-402P can be extended to more input ports and output ports by a chain to other HB-402P's. The maximum Daisy-Chain ability is up to four stages, and provides 4x2, 7x3, 10x4, 13x5 and 16x6. Five linking structures in all. It can also be operated through software codes from a personal computer. (Please refer to section 2-3 for details.)

The HB-402P also provides a special function called Slow Down. When the available memory size of the smart link is less than 16K bytes during operation, the HB-402P will enter the Slow Down Mode. The smart link will fetch 1 byte of data from the input port every 0.1 second. (Please refer to section 3-4 for details.)

The HB-202P (referred to in Figure 1-3.2) can receive data from all personal computers and transmit data to printers at the same time. The buffer memory for data ranges from 256K bytes to 4,096K bytes. We also provide DB-WARE which can perform functions like connecting various units to the buffer, lock file, setting the number of copies, linking status, etc. The HB-202P also provides a special function called Auto-Link. (Please refer to section 4-1 and 4-2 for details.)

The structure of the HB-202P can be extended to more input ports and output ports by a chain to other HB-202P's. The maximum Daisy-Chain ability is up to four stages, and provides 2x2, 3x3. Two linking structures in all. It can also be operated through software codes from a personal computer. (Please refer to section 2-3 for details.)

The HB-202P also provides a special function called Slow Down. When the available memory size of the smart link is less than 16K bytes during operation, the HB-202P will enter the Slow Down Mode. The smart link will fetch 1 byte of data from the input port every 0.1 second. (Please refer to section 3-4 for details.)

1-2 Function/Product Specification Table

FUNCTIONS		THE HB-402P SPECIFICATION
Power Supply		DC 9V 1.2A
Distance		Up to 200 Feet
Connector	IN	Centronics, DB-25 Female
	OUT	Centronics, DB-25 Female
DRAM Memory		256K -4096K (Dynamic allocation)
Interface	IN	4 Centronics parallel ports
	OUT	2 Centronics parallel ports
Front panel indications		Buffer ready (Green)
		Buffer full (Yellow)
CPU		Z-80B
Input arbitration		Con-current
Function key		Reset
MAX. copies		255
The ways to select channels		AUTO
		DB-WARE (Software Code control)
Time out selection		3/5/10/20/30/40/50/60/100/200 sec.
Auto form feed selection		Enable, Disable
Buffer speed		Maximum 16 K bytes/sec.
Extension of Daisy Chain		4x2 - 16x6, Max. up to 4 stages
Slow down input speed		10 bytes/sec
Operation temperature.		5°C - 40°C
Stock temperature.		-20°C - 60°C
Humidity		0 % - 80%
Enclosure		Plastic and Metal.
Weight		1.1 Kg
Dimensions		270x145x33 mm

Figure 1-2.1 The HB-402P Function Specification Table.

FUNCTIONS		THE HB-202P SPECIFICATION
Power Supply		DC 9V 1.2A
Distance		Up to 200 Feet
Connector	IN	Centronics, DB-25 Female
	OUT	Centronics, DB-25 Female
DRAM Memory		256K -4096K (Dynamic allocation)
Interface	IN	2 Centronics parallel ports
	OUT	2 Centronics parallel ports
Front panel indications		Buffer ready (Green)
		Buffer full (Yellow)
CPU		Z-80B
Input arbitration		Con-current
Function key		Reset
MAX. copies		255
The ways to select channels		AUTO
		DB-WARE (Software Code control)
Time out selection		3/5/10/20/30/40/50/60/100/200 sec.
Auto form feed selection		Enable, Disable
Buffer speed		Maximum 16 K bytes/sec.
Extension of Daisy Chain		2x2 - 3x3, Max. up to 4 stages
Slow down input speed		10 bytes/sec
Operation temperature.		5°C - 40°C
Stock temperature.		-20°C - 60°C
Humidity		0 % - 80%
Enclosure		Plastic and Metal.
Weight		1.1 Kg
Dimensions		270x145x33 mm

Figure 1-2.2 The HB-202P Function Specification Table.

1-3 Description

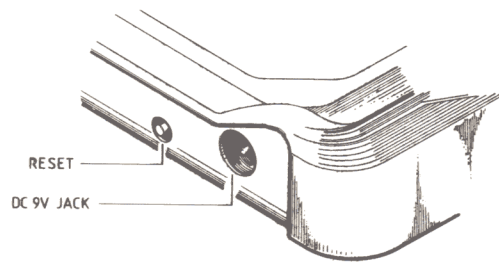
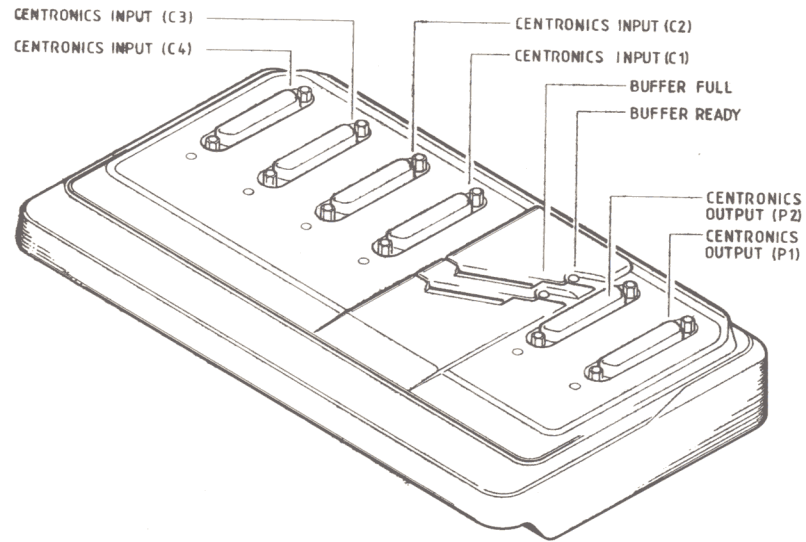


Figure 1-3.1 The HB-402P

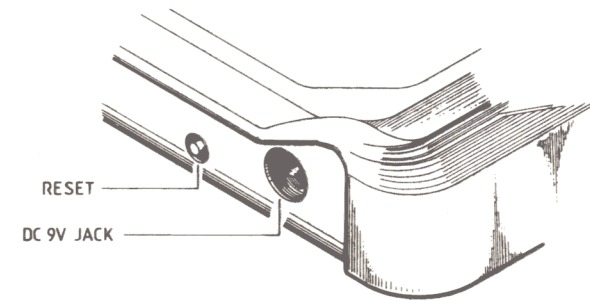
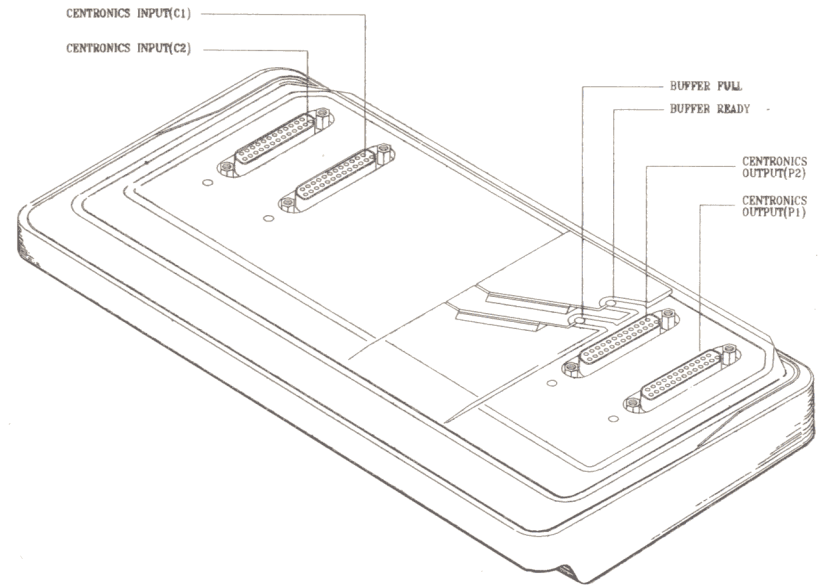


Figure 1-3.2 The HB-202P

2. INSTALLATION AND POWER ON PROCEDURE

2-1 Installation Procedure

A complete connection of all the possible units to the HB-402P is shown in Figure 2-1.1

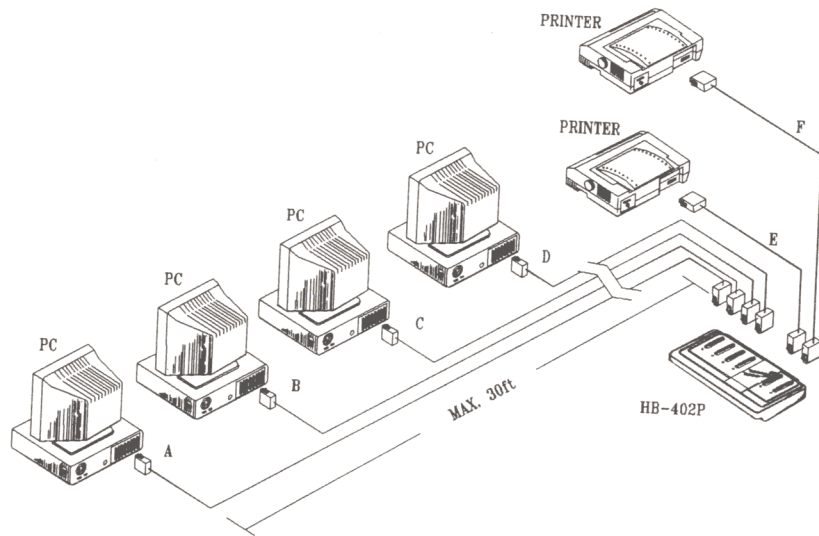


Figure 2-1.1 The HB-402P

Note:

A, B, C and D are all 25-pin, male-to-male cables. Both E and F are 25-pin to 36-pin, male-to-male cables.

A complete connection of all the possible units to the HB-202P is shown in Figure 2-1.2

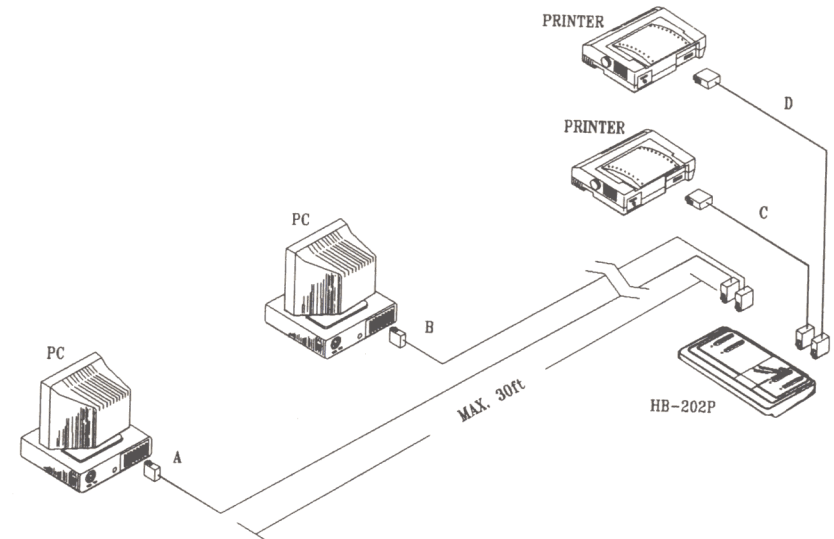


Figure 2-1.2 The HB-202P

Note: A, B are all 25-pin, male-to-male cables.

Both C and D are 25-pin to 36-pin, male-to-male cables.

INSTALLATION AND POWER ON PROCEDURE

The Centronics input connectors on the HB-402P are all 25-pin white female connectors. The Centronics output connectors on the HB-402P are both 25-pin blue female connectors. The parallel ports on most printers are 36-pin female connectors. Therefore, the cables between the printers and HB-402P should be male-to-male, 25-pin to 36-pin cables.

Instructure 1: Cabling from Computer to Smart Link HB-402P

Personal computer 25-pin female connector	25-pin to 25-pin male-to-male cable	HB-402P Centronics input
1 _____	STROBE _____	1
2 _____	DATA 0 _____	2
3 _____	DATA 1 _____	3
4 _____	DATA 2 _____	4
5 _____	DATA 3 _____	5
6 _____	DATA 4 _____	6
7 _____	DATA 5 _____	7
8 _____	DATA 6 _____	8
9 _____	DATA 7 _____	9
10 _____	ACK _____	10
11 _____	BUSY _____	11
12 _____	PE _____	12
13 _____	SLCT _____	13
14 _____	AUTO FEED XT _____	14
15 _____	ERROR _____	32
16 _____	INIT _____	31
17 _____	SLCT IN _____	36
18-25 _____	GROUND _____	19-30

Figure 2-1-1

INSTALLATION AND POWER ON PROCEDURE

Instructure 2: Cabling from Smart Link HB-402P to printer

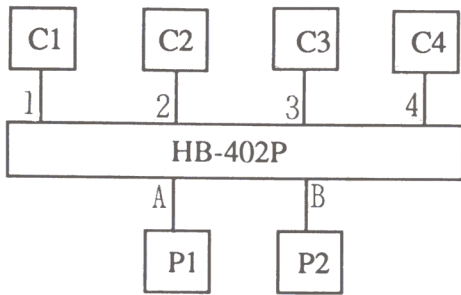
HB-402P Centronics output	25-pin to 36-pin male-to-male cable	Printer or Laser Printer
1 _____	STROBE _____	1
2 _____	DATA 0 _____	2
3 _____	DATA 1 _____	3
4 _____	DATA 2 _____	4
5 _____	DATA 3 _____	5
6 _____	DATA 4 _____	6
7 _____	DATA 5 _____	7
8 _____	DATA 6 _____	8
9 _____	DATA 7 _____	9
10 _____	ACK _____	10
11 _____	BUSY _____	11
12 _____	PE _____	12
13 _____	SLCT _____	13
14 _____	AUTO FEED XT _____	14
15 _____	ERROR _____	32
16 _____	INIT _____	31
17 _____	SLCT IN _____	36
18-25 _____	GROUND _____	19-30

Figure 2-1-2

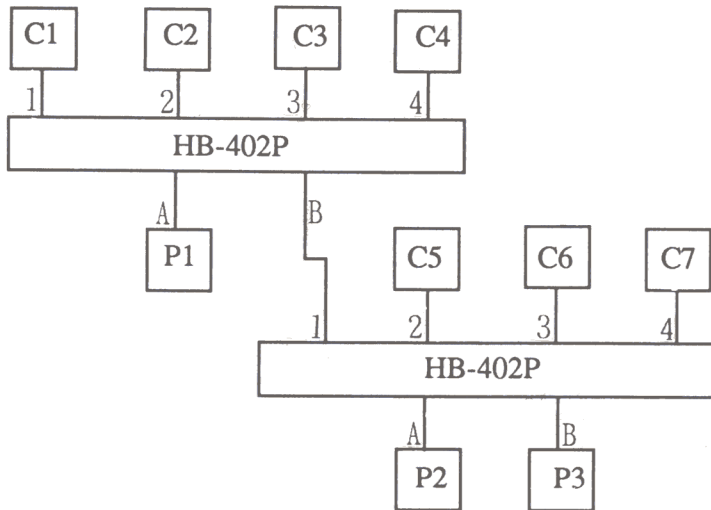
THE HB-402P's Link Structures:

	TYPE	INPUT	OUTPUT
1)	4x2	4	2
2)	7x3	7	3
3)	10x4	10	4
4)	13x5	13	5
5)	16x6	16	6

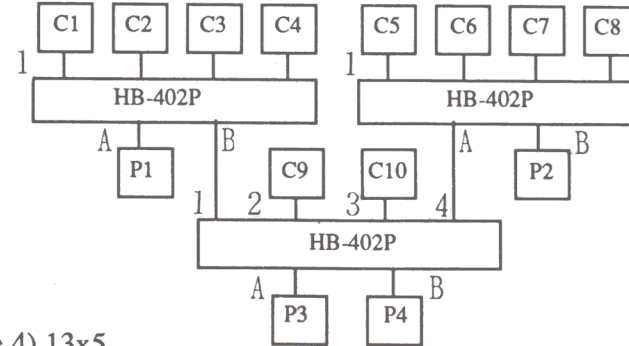
type 1) 4x2



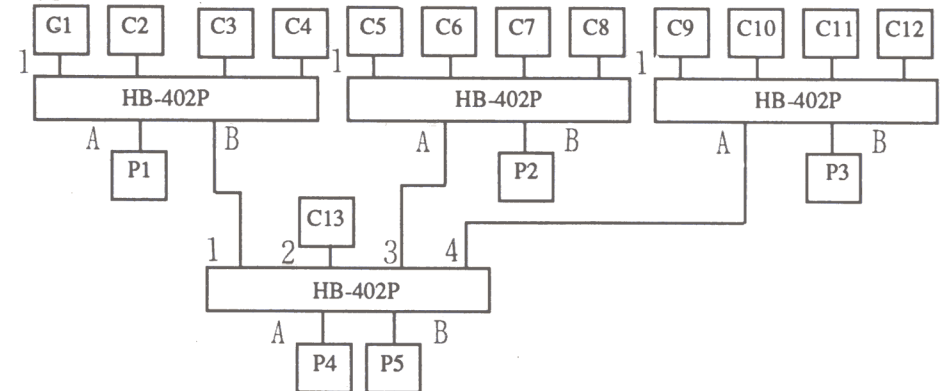
type 2) 7x3



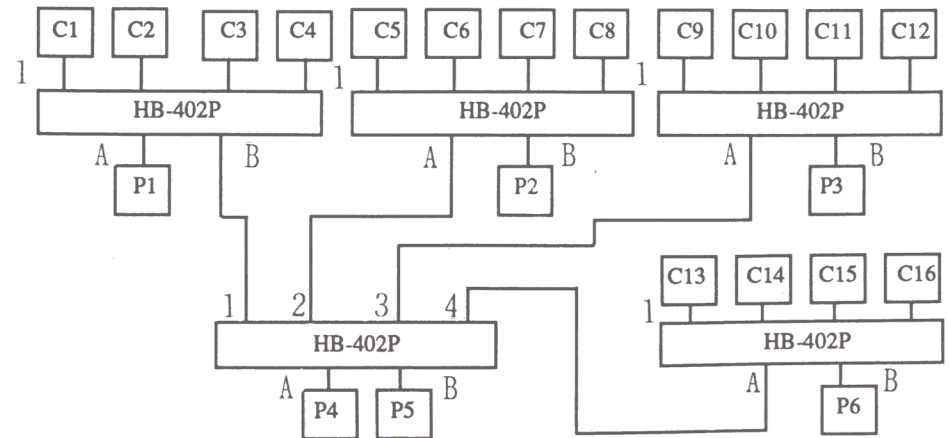
type 3) 10x4



type 4) 13x5



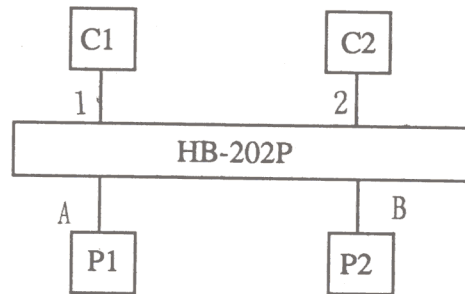
type 5) 16x6



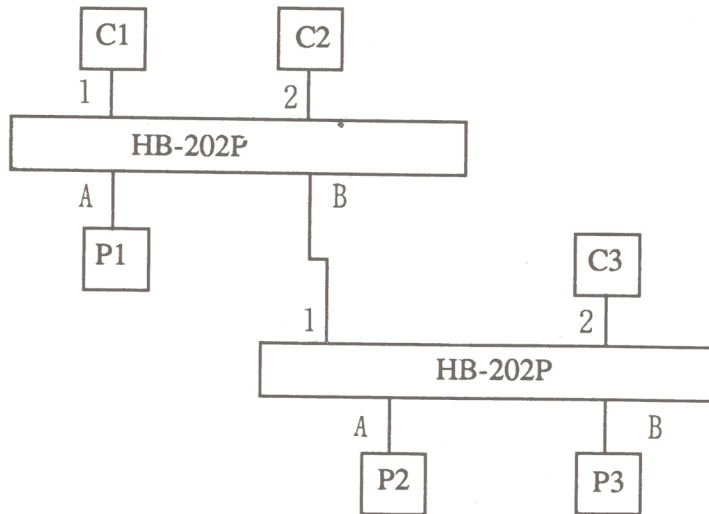
The HB-202P's Link Structures:

	TYPE	INPUT	OUTPUT
1)	2x2	2	2
2)	3x3	3	3

type 1) 2x2



type 2) 3x3



2-2 Power On Procedure

1. Connect four DB-25 cables between the parallel ports of the IBM PC/XT/AT compatible computer to the HB402P's input ports.
2. Connecting a male-to-male, 25 PIN to 36 PIN Centronics cable which is from the HB-402P output port to the printer input port.
3. Plug the DC 9V adaptor into the device's DC 9V jack and a standard wall outlet.
4. When HB-402P powers on it goes through the RAM Test mode. The 'BUFFER READY' LED (Green) will be flashing and the 'BUFFER FULL' LED (Yellow) will be turned off. The Printer Sharing Device is ready to receive data when 'BUFFER READY' LED (Green) is turned on, and 'BUFFER FULL' LED (Yellow) is turned off.
5. During the RAM Test Mode, if the user pushes the 'RESET' key, the HB-402P will skip the RAM Testing and enter the Ready Mode.

2-3 Daisy Chain Structure (for the HB-402P only)

The HB-402P also provides a specially function — the Daisy Chain structure. This structure of the HB-402P can be extended to more input ports and output ports by chaining it with other HB-402P's. The maximum Daisy-Chain ability is up to four stages, and provides 4x2, 7x3, 10x4, 13x5 and 16x6. Five linking structure in all.

Note: If user uses the HB-202P, the maximum Daisy-Chain ability is up to four stages, and provides 2x2, 3x3. Two linking structures in all.

2-4 Expansion Card Installation

2-4-1 The HB-402P provides an expansion memory card option, which is shown in Figure 2-4-1. The capacity of this RAM card is up to 3 Mega bytes (MB). With this RAM card the total buffer size will be up to 4 MB if the main board of the HB-402P has 1 MB memory on board. The RAM chips used in the expansion card are all 1 M x 1 bit DRAM chips (speed: 80ns to 120ns).

The RAM card can be divided into 3 BANKs. Each bank consists of eight 1 M x 1 bit DRAM chips. The user must plug in the whole BANK at one time, this is shown in Figure 2-4-2. Here the 1 MB DRAM has been plugged into the BANK 1 location on the expansion card.

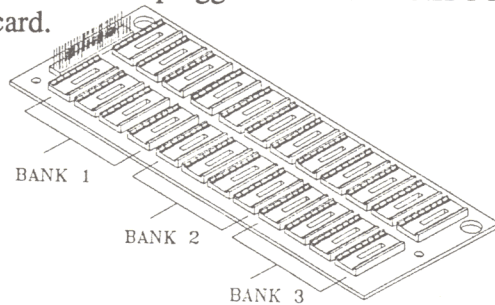


Figure 2-4-1 An expansion memory card

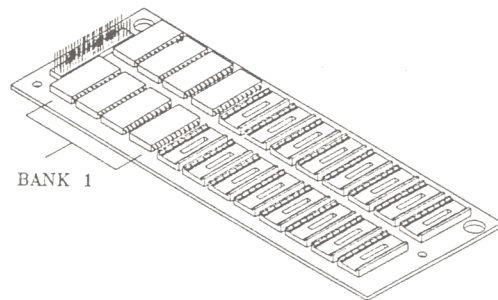


Figure 2-4-2 An expansion memory card with one BANK (1 MB) DRAM

2-4-2 RAM Card Installation Procedure

- step 1. According to Section 2-4-1 plug in the quantity of DRAM you need into the sockets on the expansion card. Remember that this must be done as one BANK unit. (see Figure 2-4-2)
- step 2. Open the metal case of HB402P by turning the bottom screws counterclockwise until they come out. (see Figure 2-4-3)
- step 3. Plug in the expansion card by matching the pins of the connectors and then turn the screws clockwise until they are tight. (see Figure 2-4-4)
- step 4. In reverse order, do steps 3 and 2 to reassemble.

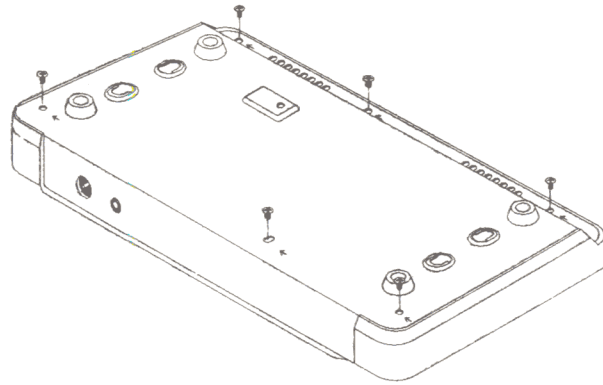


Figure 2-4-3 Open the metal case on the bottom of the HB-402P

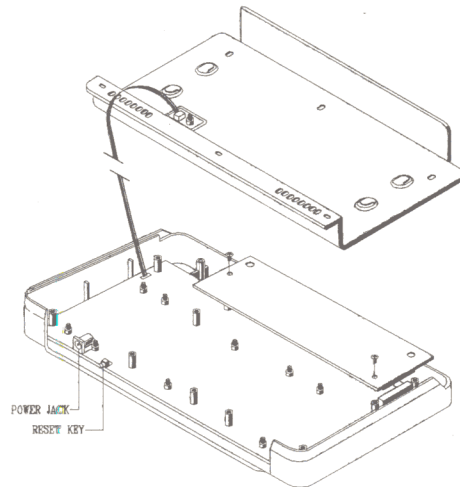


Figure 2-4-4 Plug in the expansion card and tighten the screws

3. BUFFER STATUS DISPLAY

3-1 RAM Test Mode

3-1-1 The purpose of the RAM Test Mode is to test the RAM and make sure it can read and write properly. The RAM Test will be initiated when the HB-402P's power is turned on. While the RAM Test is in progress, the 'BUFFER FULL' LED will be turned off and the 'BUFFER READY' LED will be flashing.

3-1-2. If the user pushes the 'RESET' key during the RAM Test Mode, the HB-402P will skip the RAM Test Mode and enter the Ready Mode.

3-1-3. During the RAM Test Mode, if the HB-402P discovers that any part of the RAM is not functioning properly, the RAM Test will be terminated and LEDs on the panel will be flashing. A table of all the LED displays is shown in Figure 3-1.

3-2 Ready Mode

When the HB-402P enters the Ready Mode, the 'BUFFER READY' LED will be turned on and the 'BUFFER FULL' LED will be turned off. Now the data buffer will be ready to receive data. When the HB-402P is ready, the user can start transmitting data.

3-3 Printer Error Mode

If the printer is off line to the HB-402P, the 'BUFFER READY' LED will be flashing and 'BUFFER FULL' LED will be turned off. This will also occur if there is no printer connected to the HB-402P or if they are not ready.

3-4 Slow Down Mode

The purpose of Slow Down is to avoid disconnecting the HB-402P and input channels. When the buffer memory of the HB-402P runs out of memory, the HB-402P will fully stop. In this case some application software packages will assume the printer is off line and it will stop printing. When the available memory size of the Smart Link Printer Buffer is less than 16K bytes during normally operation, the receiving input rate of HB-402P will slow down and the 'BUFFER READY' LED will be turned on, the 'BUFFER FULL' LED will also be flashing. This mode will be discontinued if the available memory size of Smart Link Printer Buffer is greater than 32K bytes during the Slow Down Mode.

3-5 Full Stop Mode

When the HB-402P runs out of memory it will enter the Full Stop Mode and fully stop receiving data, both also the 'BUFFER READY' LED and the 'BUFFER FULL' LED will be turned on.

3-6 Error and Slow Mode

If the printer is not ready during Slow Down Mode, both the 'BUFFER READY' LED and the 'BUFFER FULL' LED will be flashing.

3-7 Error and Full Mode

If the printer is not ready during the Full Stop Mode, the 'BUFFER READY' LED will be flashing and the 'BUFFER FULL' LED will be turned on.

3-8 Buffer Condition Display Table

BUFFER READY (GREEN)	BUFFER FULL (YELLOW)	MESSAGE
Flash (slow)	Turned off	RAM Test Mode
Turned on	Turned off	Ready Mode
Flash (fast)	Turned off	Printer Error Mode
Turned on	Flash	Slow Down Mode
Turned on	Turned on	Full Stop Mode
Flash	Flash	Error & Slow
Flash	Turned on	Error & Full
Turned off	Turned on	ROM Error

Figure 3-1

4. SOFTWARE CODE CONTROL

4-1 Package DB-WARE

The HB-402P also provides a package called DB-WARE, which can perform functions like connecting various units to the buffer, setting the number of copies, locking files, linking status, etc. DB-WARE provides a menu-driven operation. Please refer to Appendix C for details.

4-2 DB-WARE Function Setting

ITEM (UNIT)	C1/C2/C3/C4	
	SELECTION	DEFAULT
TIME OUT (SECONDS)	3/5/10/20/30/40/50/60/100/200	10 SECONDS
FORM FEED	ENABLE, DISABLE	DISABLE
SOFTWARE CODE	ENABLE, DISABLE	ENABLE
COPY NUMBER	0 ~ 255	0
LOCK STATUS	ENABLE, DISABLE	DISABLE
LINK STATUS	AUTOMATIC, Cx→P1, Cx→P2	AUTOMATIC
CHAIN STRUCTURE	4-2, 7-3, 10-4, 13-5, 16-6	AUTOMATIC

Figure 4-1

Note: Please refer to Appendix C for details.
EEPROM's default setting is the same as DB-WARE's default setting.

4-3 Software Code Control

The HB-402P's functions can be operated by DB-WARE or a Software Code Control. Software Code Control means the PC passes Software Codes into the HB-402P to control certain functions. The HB-402P will identify the following Software Codes: &+&A, &+&P1, &+&P2, &+&CA, &+&C###, &+&D, &+&EW, &+&FE (FD), &+&IN, &+&T#, &+&LE (LD), &+&SE(SD), &+&P1:????, &+&P2:????, &+&AE1, &+&AE2, &+&AD1, &+&AD2, &+&AC1, &+&AC2, etc.

4-3-1 Software Code Control Table

Software Code	Meaning	Default
&+&SE	Software Control Enable	Enable
&+&SD	Software Control Disable	
&+&A	Auto Link	AUTO
&+&P1	Linking to Printer 1	
&+&P2	Linking to Printer 2	
&+&CA	Cancel all File	
&+&C###	Copy number	000
&+&D	Delete Current File	
&+&EW	Save Option	
&+&ED	EEPROM default setting	
&+&FE	Form Feed Enable	
&+&FD	Form Feed Disable	Disable
&+&IN	Reset System	
&+&LE	File Lock Enable	
&+&LD	File Lock Disable	Disable
&+&T#	Timeout Selectable	10 Seconds
&+&AE1	Printer 1 Auto Pause enable	
&+&AE2	Printer 2 Auto Pause enable	
&+&AD1	Printer 1 Auto Pause Disable	Disable
&+&AD2	Printer 2 Auto Pause Disable	Disable
&+&AC1	Clear Printer 1 Pause	
&+&AC2	Clear Printer 2 Pause	
&+&P1:????	Daisy Chain Command	
&+&P2:????	Daisy Chain Command	

Figure 4-2

Note:

???? is any Software Code.

The software control codes must be entered in upper case letters and the codes <CR> <LF> must be followed in the end of software codes. Otherwise, they will not be able to be recognized.

4-3-2. &+&SE

This Software Code will enable the HB-402P to enter the Software Code Mode. It also allows the HB-402P to process Software Codes.

4-3-3. &+&SD

This Software Code will disable the HB-402P Software Code mode. It also disallows the HB-402P to process Software Codes, and refers to future Software Codes as data.

4-3-4. &+&A

This Software Code will cause the HB-402P to switch to the Automatic Link Mode for which the HB-402P will automatically transmit data to the first available output port.

4-3-5. &+&P1

This Software Code will cause the HB-402P to transmit data to the Centronics output port 1.

4-3-6. &+&P2

This Software Code will cause the HB-402P to transmit data to the Centronics output port 2.

4-3-7. &+&CA

This Software Code will allow you to stop printing and cancel all received files.

4-3-8. &+&C###

This Software Code will allow you to copy a file up to a maximum of 255 times. The Software Code &+&C### controls the number of copies. The number of copies must be a three-digit number (000~255).

4-3-9. &+&D

This Software Code will allow you to cancel the current file.

4-3-10 &+&EW

This Software Code will allow you to save the current option status to the EEPROM of the HB-402P. If the user alternates status and doesn't save to EEPROM, it will be lost after system initialization.

4-3-11 &+&ED

This Software Code will allow you to set the EEPROM to default values. Please refer to section 4-2, Figure 4-1.

4-3-12 &+&FE

This Software Code will cause the HB-402P to automatically generate a Form Feed code at the end of each file.

4-3-13 &+&FD

This Software Code will cause the HB-402P to disable generating a Form Feed code at the end of each file.

4-3-14 &+&IN

This Software Code will allow the user to initial the HB-402P (reset system), and the data of the buffer memory will be lost.

4-3-15 &+&LE

This Software Code will allow the user to enable the File Lock Mode of the HB-402P. When the File Lock is enabled, it will allow the user to lock the printer until the lock disable command is received.

4-3-16 &+&LD

This Software Code will allow the user to disable the HB-402P File Lock Mode.

4-3-17 &+&T#

This Software Code will allow the user to change the timeout period. The HB-402P provides 10 kinds of time out periods, they are 3, 5, 10, 20, 30, 40, 50, 60, 100 and 200 seconds. If no data input goes beyond the timeout period, the HB-402P will suppose it is the end of the file.

4-3-18 &+&AE1

This Software Code allows the user to enable the HB-402P to pause at printer 1 after it is finished printing a file, automatically. This is convenient for those who use a plotter so they can change the paper after plotting a file.

4-3-19 &+&AE2

This Software Code allows the user to enable HB-402P to pause at printer 2 after finishing printing a file, automatically.

4-3-20 &+&AC1

This Software Code allows the user to remove the pause on printer 1 after it is finished printing file.

4-3-21 &+&AC2

This Software Code allows the user to remove the pause on printer 2 after it is finished printing a file.

4-3-22 &+&AD1

This Software Code will disable the pausing function of printer 1 after it is finished printing a file, automatically.

4-3-23 &+&AD2

This Software Code will disable the pausing function of printer 2 after it is finished printing a file, automatically.

4-3-24 Daisy Chain Code, &+&P#:????

If the user needs to provide a command to the lower level buffer in the Daisy Chain structure the user should add daisy chain command head "&+&P#:" in front of the command line. Where 'P#' is the current stages of HB-402P's output port #, "????" can be any possible Daisy-Chain command.

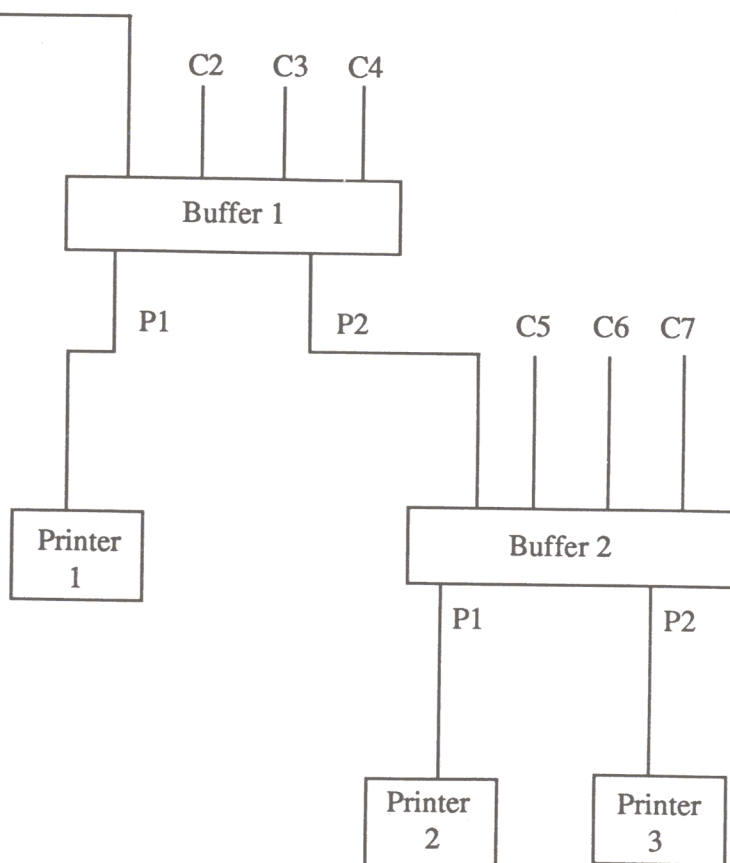
Example:

Source C1 Sends

&+&P2: P1 => to link C1 to Printer 2 through Buffer1's P2
and Buffer2's P1.

&+&P2: D => to delete the Buffer2's Current file sent from C1.

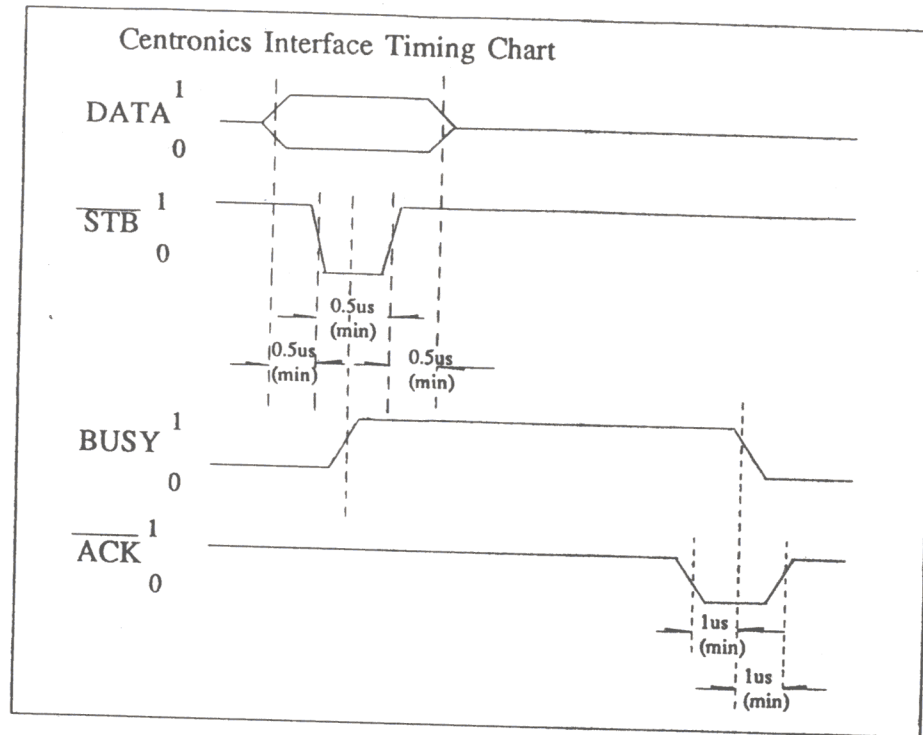
Source C1

**5. TROUBLE SHOOTING**

Problem	Solution
LED fails to light up	Check if the power is turned ON or not
Failure of data transmission	<ol style="list-style-type: none"> 1. Check if Connector and 25 PIN Centronics cables are well plugged or not. 2. Check if the PC is turned ON or not. 3. Check if the PRINTER is turned ON or not. 4. Check if the paper for the PRINTER is well prepared or not. 5. Check if the print command on the PC is correct or not. 6. Check if the connection on the Computer end has been connected in accordance with the menu. 7. Push the RESET key, if the above processes are correct.

If failure of printing still exists upon the aforesaid solutions, please contact your dealer or us immediately.

APPENDIX A CENTRONICS INTERFACE TIMING CHART



APPENDIX B PREVENTING RADIO & TV INTERFERENCE

Warning: This equipment generates, uses and can radiate radio frequency energy and if not installed and used in accordance with the instruction manual, may cause interference to radio and television reception. It has been tested and found to comply with the limits for a Class A computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference when operated in a commercial environment. Operation of this equipment in a residential area is likely to cause interference, in which case the user at his own expense will be required to take whatever measures may be required to correct the interference.

If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

1. Reorient the receiving antenna
2. Relocate the computer with respect to the receiver.
3. Move the computer away from the receiver.
4. Plug the computer into a different outlet so that computer and receiver and on different branch circuits.
5. Ensure that the mounting screws, attachment connector screws and ground wires are tightly secured.
6. Ensure that good quality, shielded and grounded cables are used for data communications.

If necessary, the user should consult the dealer or an experienced radio/television technician for additional suggestions. The user may find the following booklet prepared by the Federal Communications Commission helpful:

“How to Identify and Resolve Radio-TV Interference Problems.”

This booklet is available from the U. S. Government Printing Office, Washington, DC 20402, Stock No. 004-000-0345-4.

APPENDIX C USING THE DB-WARE

There is a diskette named DB-WARE which is enclosed within the product. This section will instruct on how to use the DB-WARE with the HB-402P.

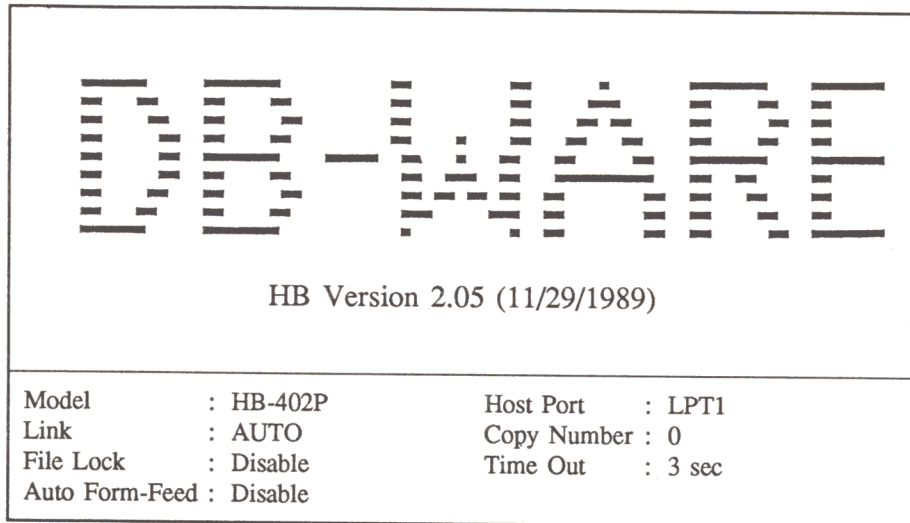
Assuming your floppy drive is in drive “A”, insert the diskette into the floppy drive A and type:

```
A:HB<Enter>
```

When DB-WARE is loaded, the Main Menu will appear. There are six columns on the top of the Main Menu. It is shown in the following Figure C-1.

Full help can be called up at any time in DB-WARE by pressing the <F1> key. Within the full help, the user will quickly understand how to operate the DB-WARE and how to control and setup the parameters of the buffer product through the DB-WARE.

F1=Help F2=Print F3=Model F4=Option F6=Config F9=Quit



<↑>, <↓>, <←>, <→>, <PgUp>, <PgDn>: move cursor <Enter> : execute
<+>, <->, <space>: change option <ESC> : escape

Figure C-1 Main Menu Screen

1. FUNCTION OVERVIEW

1-1 Introduction

The HB-402P is a high performance, low cost printer buffer. It can be connected to up to 4 personal computers and two printers as shown in Figure 1-1.1

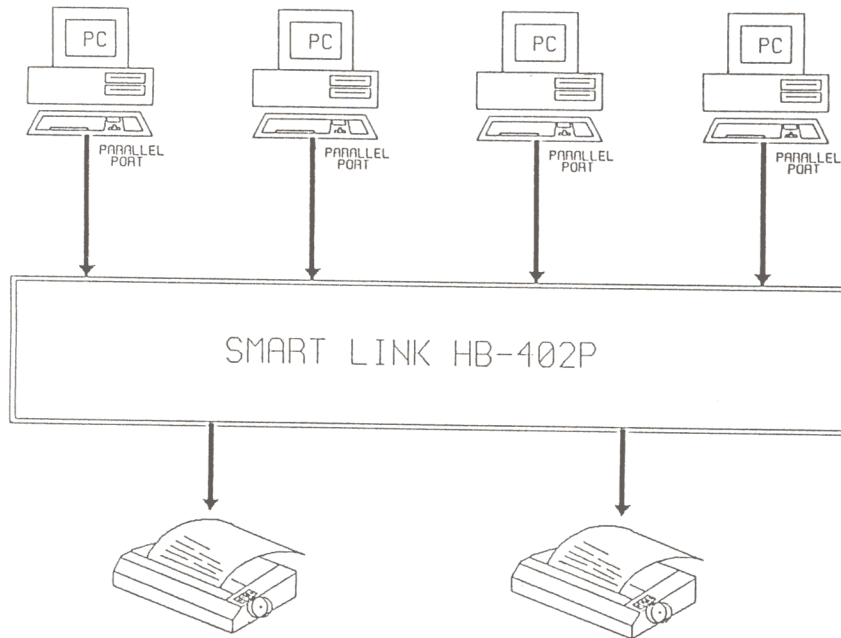


Figure 1-1.1 The HB-402P Configuration

The HB-202P can be connected to up to 2 personal computers and two printers as shown in Figure 1-1.2

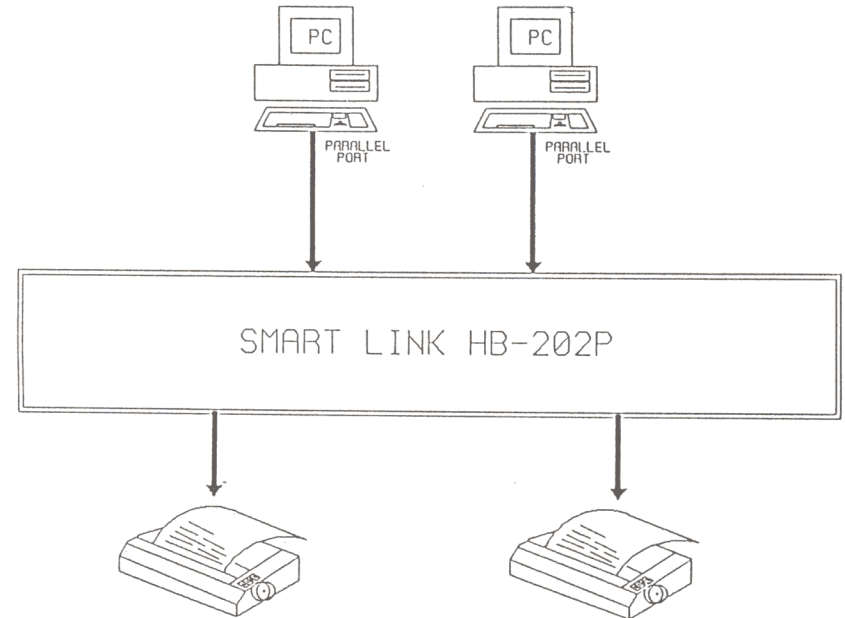


Figure 1-1.2 The HB-202P Configuration