

## Appendix F: 8813 Hardware

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## Appendix F: 8813 Hardware

## GENERAL DESCRIPTION

## 1.1 CHASSIS LAYOUT

Referring to figure 1, note that several components are mounted within the main chassis. Viewed from the front, the power supplies are to the left. One or two optional minicards may be mounted on the rear panel just above the power supply. The right section contains the backplane assembly, mounted in the rear, and up to three disk drives in front.

## 1.1.1 Power Supply

The power transformers are mounted in the left rear, and in front of them is the power supply printed circuit card (PC card). Along the left of the transformers are two cooling fans. The power supply supplies unregulated power to the backplane and regulated power to up to three disk drives. The drives are connected through three connectors mounted on the right rear corner of the card.

## 1.1.2 Disk Drives

The minifloppy drive offers the user the random access storage capability of large disk drives in a package about the size of most cassette tape units. In addition, they provide superior data integrity and faster throughput. Up to three disk drives may be mounted in the 8813 chassis. Each drive can store 89,600 bytes of information on a single five inch minidisk. Attached to each drive is a PC card containing the control electronics.

## 1.1.3 Backplane

The backplane contains ten edge connectors spaced at 3/4" intervals along the PC card, for the insertion of ten S-100 bus compatible cards. Behind the edge connectors are seven bus termination networks and the components for the real-time clock. Power enters the backplane through four slide connectors mounted at the left rear edge of the card. The adjacent connector is used for the real-time clock signal and front panel controls.

The 8813 in its minimum configuration uses four card positions, leaving six free for additional memory or input/output (I/O) cards. The first position contains the disk controller card. Mounted behind it are the CPU card and one 16K memory card. The rearmost position contains the Video Terminal Interface (VTI) card. Other memory cards may be installed between the first one and the VTI card.

### WARNING

The CPU card must always be installed in the second or third slot from the front of the card cage in order for the system to operate properly.

#### 1.1.4 Minicards

Space is provided on the rear panel for mounting two optional minicards. An audio cassette interface minicard and a serial printer interface minicard are available. Both of these cards plug into the CPU card, without using up positions on the S-100 backplane.

#### 1.1.5 Rear Panel

All connections to other devices are made through connectors mounted on the rear panel. The left side of the panel as viewed from the front contains the power line connector and fuse. Two accessory outlets are provided for powering the video monitor and the optional audio cassette recorder. The power line voltage and fuse rating are marked on the serial number sticker on the rear panel. Use only the type of fuse and power source indicated; other types can cause severe damage to the computer.

To the right of the accessory outlets are the mounting holes for the minicards. These are covered by a sticker unless the minicards are installed. The sticker ensures proper air circulation by covering up the unused holes, and should not be removed except as provided in the minicard installation instructions.

The right side of the rear panel contains cutouts for various I/O device connectors. At the edge of the panel is a column of four cutouts for 25-pin "D" connectors. The top connector is the keyboard connector in the standard configuration. To the left are four cutouts for "UHF" coaxial connectors. The top-most connector is the video monitor output in the standard configuration. Left one column are four more cutouts for 25-pin "D" connectors. Next are two cutouts for 24-pin micro-ribbon connectors. These are normally used for connection to the IEEE-488 instrumentation bus (also known as GPIB bus, HP-IB bus, and ANSI standard MC 1.1-1975). Below these are cutouts for two 37-pin "D" connectors.

#### 1.1.6 Switches

The 8813 has only two switches. A key-operated switch is on the left. Above it is a red LED (light-emitting diode) power-on indicator. The pushbutton is marked "Load." When pressed, it causes the system software to be loaded off of drive 1.

#### 1.1.7 Drives

Up to three disk drives may be mounted. The leftmost drive is drive 1, usually the system drive. The middle drive is 2, and

the rightmost drive is 3. The red LED indicators on each drive light up when that drive is being used. If a system has fewer than three drives, matching filler panels are installed in place of disk drives.

## 1.2 SPECIFICATIONS

### 1.2.1 Power Supply

AC Line:		
	Voltage:	110-125 or 220-250 VAC
	Frequency:	50 or 60 Hz
DC Output (to backplane w/ 3 drives):		
	Pins 1 and 51	+7.5 to 10 VDC 15 A (max.)
	Pin 2	+15 to 20 VDC 2A (max.)
	Pin 52	-15 to 20 VDC 1A (max.)

### 1.2.2 Disk Drives

Data Storage per Disk:	89,600 Bytes
Transfer Rate:	125,000 Bits/Sec.
Latency (average):	83 mS
Track Access:	40 mS
No. Tracks:	35
Sectors/Track:	10
Hard Error Rate (max. per bits read):	1 in 100,000,000,000
Mean Time Between Failures:	8,000 Hours

### 1.2.3 Backplane

Bus Type:	S-100 (except no DMA)	
Number of Card Slots:	10	
Card Spacing:	3/4" center-to-center	
Maximum Card Size:		
	Length:	10"
	Height (0.5" from edge):	5.3"
	Height (center)	5.8"
Bus Termination impedance:	220 ohms	

### 1.2.4 Memory

Maximum addressable:	65,536 Bytes
Access Time:	500 uS
Error Rate (per bits read):	1 in 1,000,000,000,000

### 1.2.5 Central Processor

Type:	8080
No. of user-accessible registers (8-bit):	7
Data Word Size:	8 or 16 bits
Register to Register Add Time:	2 uS

## Section 2

## INSTALLING OPTIONS

## 2.1 SAFETY

Whenever working on the 8813 chassis, perform these three steps before opening the chassis:

- 1) Remove all disks from drives.
- 2) Turn off power with key switch.
- 3) Remove line cord from rear panel socket.

Do not insert or remove any cards or minicards with power on or line cord attached. If this precaution is not observed, portions of the chassis circuitry and cards will probably be destroyed. Remember, there are dangerous voltages in the chassis until the line cord is unplugged (even when the power key is turned off).

## 2.2 CABINET

The 8813 desktop version is enclosed in an attractive walnut cabinet. To avoid damage, do not set wet or sharp objects on it. The surface of the wood is waxed, not varnished; do not apply varnish. To maintain the cabinet, occasionally wax it with a little high-quality furniture wax and a soft, clean cloth.

A 6" airspace on either side of the cabinet is necessary for proper airflow. Air enters through the right bottom opening in the cabinet and exits through the left opening. If the airflow is blocked, internal temperatures may rise enough to cause faulty operation, reduce the operating life of the computer, or cause component failure. Do not run the computer when it is resting on a soft surface.

## 2.2.1 Removing the Cabinet

To get inside the chassis, you must remove the cabinet. Follow the safety precautions above (2.1), and place the computer on a table or workbench so that the front of the chassis overhangs by about 1". On each side of the front panel, just inside the cabinet, are two trim strips. Slide the two trim strips down until they are free of their mounting hardware. Then remove the four 10-32 screws and plastic washers attaching the front panel to the cabinet. Be careful not to scratch the brushed aluminum front panel. Four more screws and washers are located on the rear panel; remove these. Then grip the lower edges and pull upward, sliding off the cabinet.

## 2.2.2 Installing the Cabinet

To install the cabinet, place it over the chassis so that the wooden front mounting brackets on the cabinet are between the front and rear metal mounting brackets on the chassis. Then slide the cabinet down and forward until the rear cabinet edge is flush with the rear panel on the chassis. Secure the cab-

inet front and rear with the 10-32 X 3/4" machine screws and washers (plastic washers for mounting trim strips in front). Then slide the two trim strips on from the bottom.

## 2.3 DISK DRIVES

From one to three floppy disk drives are mounted in the 8813 chassis. Any remaining drive openings are covered by filler panels. These panels must be removed to install additional disk drives. The drives may be added by obtaining an add-on drive kit containing a drive and all the necessary mounting hardware and cables. The part number for a drive add-on kit is 000915; please specify whether you are adding a second or third drive.

### 2.3.1 Removing the Filler Panels

To remove the panel, first remove the cabinet (see section 2.2.2 of this appendix). Then remove the 6-32 screw and associated nut and lockwasher attaching the panel to the front support bracket. Save the hardware for use in attaching the disk drive. Now turn the chassis on its left side (power supply side) and remove the hardware attaching the bottom filler panel angle bracket to the bottom of the chassis. Now slide out the panel.

### 2.3.2 Installing Disk Drives

Before installing a new disk drive, the termination network must be removed and the drive addressed as drive 2 or 3. Consult the installation instructions provided with the drive before proceeding.

Remove the card hold-down by removing the 6-32 screws securing it to the chassis. Remove the ribbon cable assembly connecting the drives to the controller card. Then remove the controller card.

Now take the drive power cable and insert one end through the cutout in the card guide bracket near the power supply PC card. Insert the plug into the next empty socket on the power supply PC card. Insert the new drive into the chassis through the front panel, and attach the power cable to the socket on the drive PC card. Make sure the plug is fully inserted into the socket. Make sure that the disk drive PC card does not become detached.

Now insert the drive all the way into the chassis and line up its mounting holes with the holes in the bottom of the chassis. Secure the drive with two 6-32 X 3/8" machine screws and lockwashers provided in the kit. Put the chassis back on its feet and secure the top of the drive to the support bracket with the last of the 6-32 hardware.

Now reinstall the floppy disk controller card in the last card connector. Make sure it is firmly seated. Reconnect the disk drives and controller with the new drive cable provided. The striped side of the cable must be on the right side of the con-

troller card connector and on the top end of each drive connector. The card hold-down must now be installed. Place it over the top of the card guide bracket at the center of the chassis, and secure it with 6-32 screws and lockwashers.

### 2.3.3 Removing Drives

To remove a disk drive, first remove the card hold-down, controller card, and drive cable as detailed in section 2.3.2 of this appendix. Now turn the chassis on its left (power supply) side and remove the three 6-32 screws and lockwashers securing the drive to the chassis and retaining bracket. Pull the drive out far enough to remove the power supply plug, then remove it completely.

Reinstall the controller card, drive cable, and card hold-down as in section 2.3.2 of this appendix.

## 2.4 Backplane

### 2.4.1 Card Hold-Down

To protect cards during handling and shipment, card hold-downs are secured along the card guide brackets in the 8813 chassis. (Only one hold-down is provided in the rack-mountable configuration.) These hold-downs must be removed before removing or installing cards in the backplane and replaced after the task is complete. The hold-downs are secured by 6-32 screws and lockwashers.

### 2.4.2 Installing Cards

When installing cards, make sure the power is off before inserting the card, and make sure the card is fully inserted into the connector before reapplying power. To insert the card, slide its ends into the card guides located on the chassis at each end of the 100-pin connectors. Slide the card down until it reaches the connector. Finally, push down firmly on the card until it seats in the slot. The card must not be tilted in the connector, or the computer will be damaged when power is applied.

### 2.4.3 Removing Cards

When removing a card from the backplane, grasp each end of the card firmly and pull upward, gently rocking the card from side to side. Do not bend the card and do not apply much force. When it comes free from the connector slot, draw it up through the card guides carefully.

### 2.4.4 Memory Cards

When a memory card is installed into the system, the card's address must be set up properly. The memory in a standard system (with 16K of RAM) ends at 05FFFH. The next memory card should be installed with its address switches or jumpers set for address 6000H. Consult the manufacturer's manual for address setup. The next card must always be installed at the



end of current memory, or erratic operation or possible damage to the memory card will result.

After installing a new memory card, turn on the computer and type the ENABLE command and then the MEMTEST command to test the new memory card. If you find errors, consult the memory card's manual or get your dealer to repair the card. If the memory is not working properly, neither will the software.

#### 2.4.5 I/O Cards

If an I/O card is installed in the 8813, that card is not all that is needed. Software, called an I/O driver program, is necessary to make the card run with the system. If none is provided, you must write your own. Consult the System Programmer's Guide (available from PolyMorphic Systems; part number 810133) for information on how to install your own software. When installing I/O devices, remember that all I/O ports below 40H are reserved for system use, and you must not place cards at those addresses unless explicitly instructed to do so by PolyMorphic Systems.

PolyMorphic Systems provides instructions for attaching I/O driver software in its I/O card manuals or system user's manuals.

#### 2.5 I/O Connectors

Cutouts are provided on the rear panel for various types of connectors. Most connectors will mount with standard hardware. However, special hardware is needed if connector mounting screws are to be used with "D" connectors. This hardware is available from PolyMorphic Systems (part number 104415). Preassembled cables are available from PolyMorphic Systems for all of its I/O cards.

