

**MBPC-140**

486 Microbox PC with VGA/LAN

**User's Manual**

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5. Write the RMA number visibly on the outside of the package and ship it prepaid to your dealer.

## **Packing list**

Before installing your board, make sure that the following materials have been received:

- 1 warranty certificate
- This user's manual
- Y cable (part no. 1700060201)
- Phoenix power connector (part no. 1652002101)

If any of these items are missing or damaged, contact your distributor or sales representative immediately.

## **Technical support and sales assistance**

If you have any technical questions about the MBPC-140 or any other Advantech products, please visit our support website at:

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For more information about Advantech's products and sales information, please visit:

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# Hardware Configuration

This chapter gives background information on the MBPC-140. It shows you how to configure the board to match your application and prepare it for installation into your PC.

Sections include:

- Introduction
- Specifications
- Safety precautions
- Jumper settings
- Board layout: connector locations

# 1.1 Introduction

---

Advantech's new MicroBox PC, the MBPC-140, is truly an all-in-one 486 processor-based controller. It comes equipped with 32 MB DRAM, a DB-15 SVGA interface which supports CRT monitors with up to 4 MB display memory, a 10/100Base-T Ethernet interface, a DB-9 RS-232 serial port, and a Phoenix connector for DC 5 V power input.

In addition, the MBPC-140 is equipped with a CompactFlash™ solid state disk socket which functions as an emulated hard disk. Several interfaces are also reserved, including an IDE interface and a floppy disk interface. With its industrial grade reliability, the MBPC-140 can operate continuously at temperatures up to 60° C (122° F). This compact unit offers all these functions within a hand-sized chassis, measuring merely 142 x 36 x 94 mm. The MBPC-140 can be either wall- or DIN-rail mounted. These numerous features provide an ideal price/performance solution for commercial and industrial applications where reliability and stability are essential.

The MBPC-140 is compact, highly integrated and easy to maintain and install. These features make it ideal for applications such as small industrial controllers, security systems, Internet gateways, Web servers, laboratory instruments, building automation, and so on.

## 1.2 Specifications

---

### 1.2.1 General

- **CPU:** 486, 66 MHz
- **On-card cache:** 8 KB
- **BIOS:** Award 256 KB Flash BIOS
- **RAM memory:** 32 MB EDO RAM on board
- **Solid state disk:** Supports one CompactFlash™ card as an emulated HDD
- **VGA with 64-bit Windows accelerator:**
  - Display memory: 4 MB share memory architecture (UMA structure)
  - Display resolution: 1280 x 1024 @ 64 K colors, 1024 x 768 @ 16 M colors
  - DB-15 VGA connector
- **10/100Base-T Ethernet interface controller:** RTL-8139, 10 Mbps/100 Mbps RJ-45 connector
- **Serial ports:** One DB-9 COM1 for RS-232
- **Keyboard and PS/2 mouse:** Supports standard PC/AT keyboard and PS/2 mouse
- **Watchdog Timer:** 1.6 sec. interval
- **Power connector:**
  - 2-pin Phoenix connector
  - 5 V DC single power supply

### 1.2.2 Internal Interfaces

- **Enhanced IDE hard disk drive interface:** Supports up to two hard disk drives. BIOS auto-detect
- **Floppy disk drive interface / multi-mode parallel port:** FDD interface and parallel port share the same connector. Switchable in BIOS setup.

- **FDD interface:** Supports up to two floppy disk drives, 5.25" (360 KB and 1.2 MB) and/or 3.5" (720 KB, 1.44 MB and 2.88 MB)
- **Parallel port:** Supports SPP, ECP and EPP
- **Serial port:** One box header for COM2

### 1.2.3 Mechanical and environmental

- **Power supply voltage:** +5 V (4.75 V ~ 5.25 V)
- **Max. power requirements:** +5 V @ 1.6 A
- **Operating temperature:** 0 ~ 60° C (32 ~ 122° F)
- **Size (W x H x D):** 142 x 36 x 94 mm
- **Weight:** 0.4 kg (0.89 lb)

## 1.3 Safety precautions

---

The following sections tell how to make each connection. In most cases, you will simply need to connect a standard cable. All of the connector pin assignments are shown in Appendix A.

**Warning!** *Always completely disconnect the power cord from your PC chassis whenever you are working on it. Do not make connections while the power is on. Sensitive electronic components can be damaged by a sudden rush of power. Only experienced electronics personnel should open the PC chassis.*



**Caution!** *Always ground yourself to remove any static charge before touching any PC board or card. Modern electronic devices are very sensitive to static electric charges. Use a grounding wrist strap at all times. Place all electronic components on a static-dissipative surface or in a static-shielded bag when they are not in the PC chassis.*



## 1.4 Jumper settings

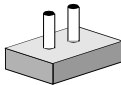
---

This section tells how to set the jumpers to configure your board. It gives the board default configuration and your options for each jumper. After you set the jumpers and install the board, you will also need to run your BIOS Setup program to configure the serial port addresses, floppy/hard disk drive types and system operating parameters. Connections, such as hard disk cables, appear in Chapter 2.

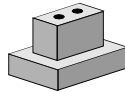
You configure your board to match the needs of your application by setting jumpers. A jumper is the simplest kind of electric switch. It consists of two metal pins and a small metal cap (often protected by a plastic cover) that slides over the pins to connect them. To "close" a jumper, connect the pins with the cap. To "open" a jumper, remove the cap. Sometimes a jumper will have three pins, labeled 1, 2 and 3. In this case, connect either pins 1 and 2 or 2 and 3.

You may find a pair of needle-nose pliers useful for setting the jumpers.

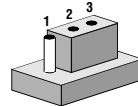
If you have any doubts about the best hardware configuration for your application, contact your local distributor or sales representative before you make any changes.



Open



Closed

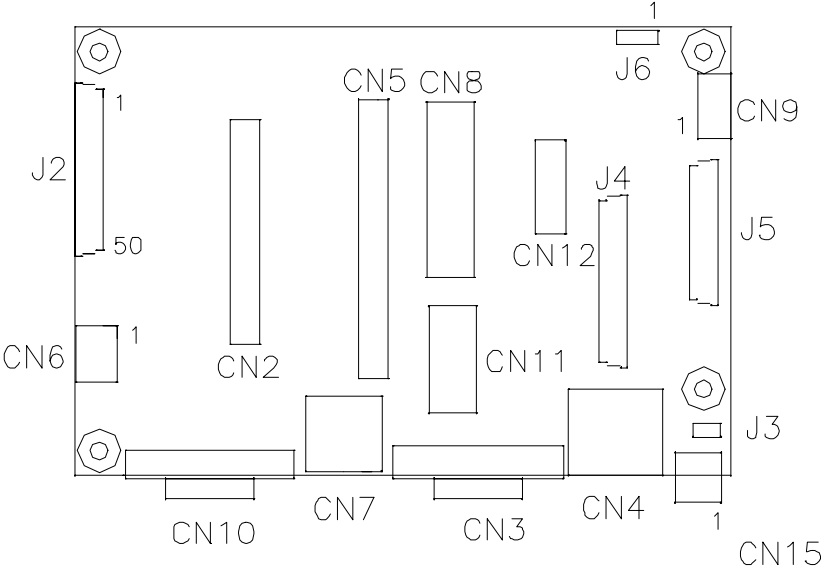


Closed 2 - 3

### 1.4.2 Reset (J3)

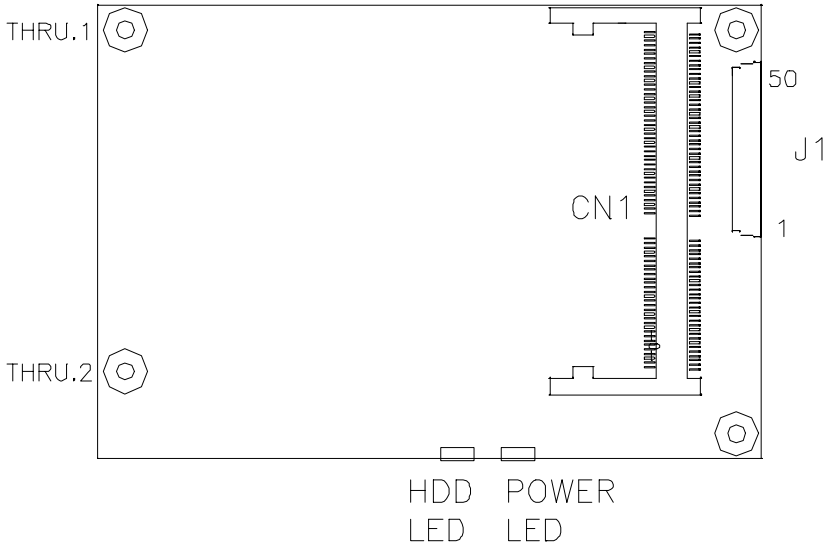
Connect a wire from a reset button to J3. To "close" J3 will activate a reset.

# 1.5 Board layout: dimensions



**Figure 1-1: Board layout: connector locations (component side)**





**Figure 1-2: Board layout: dimensions (solder side)**

## 1.6 Installing a CompactFlash™ disk

---

The procedure for installing a CompactFlash™ disk into the MBPC-140 is as follows. (see Fig. 1-3 ) Please follow these steps carefully.

1. Unscrew four screws from the back cover of the MBPC-140.
2. Remove the back cover.
3. Plug a CompactFlash™ disk with user's OS and application program into a CompactFlash™ socket.
4. Screw back the cover with four screws

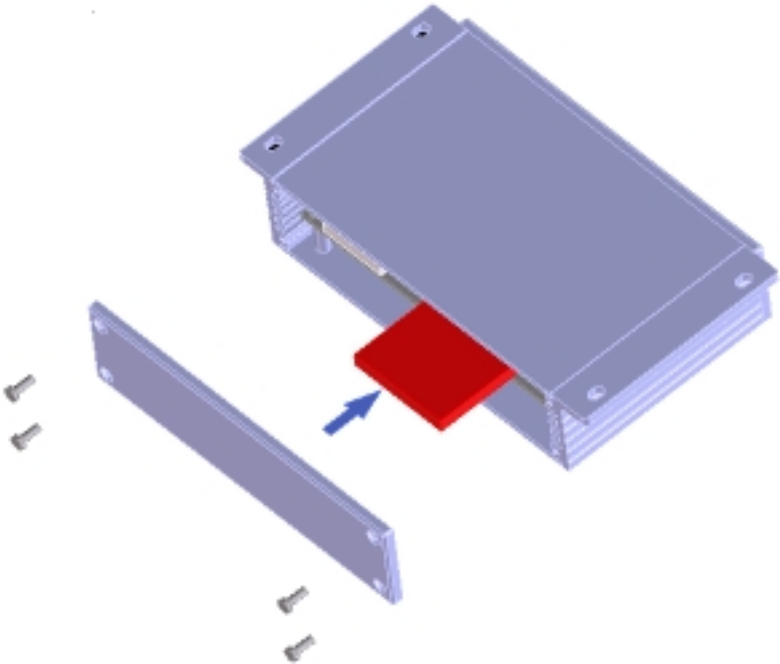
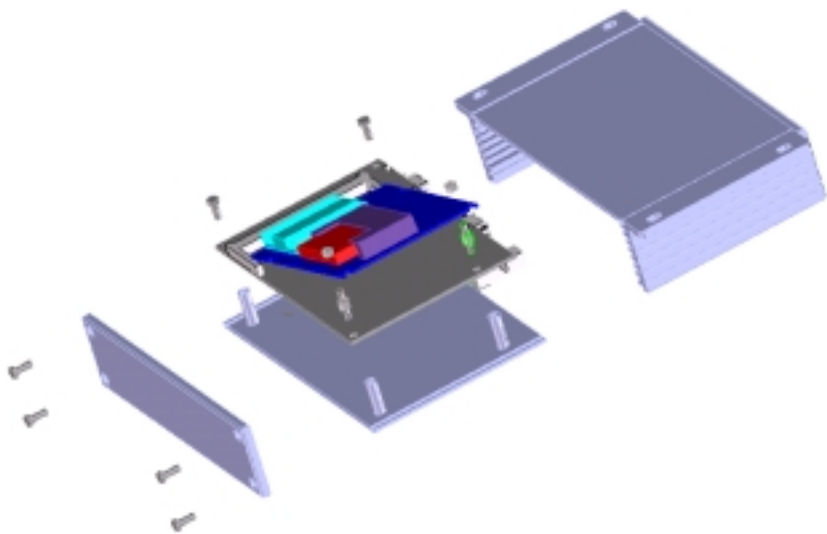


Figure 1-3a: Installation of MBPC-140



**Figure 1-3b: Installation of MBPC-140**

# 1.7 Chassis: dimensions

---

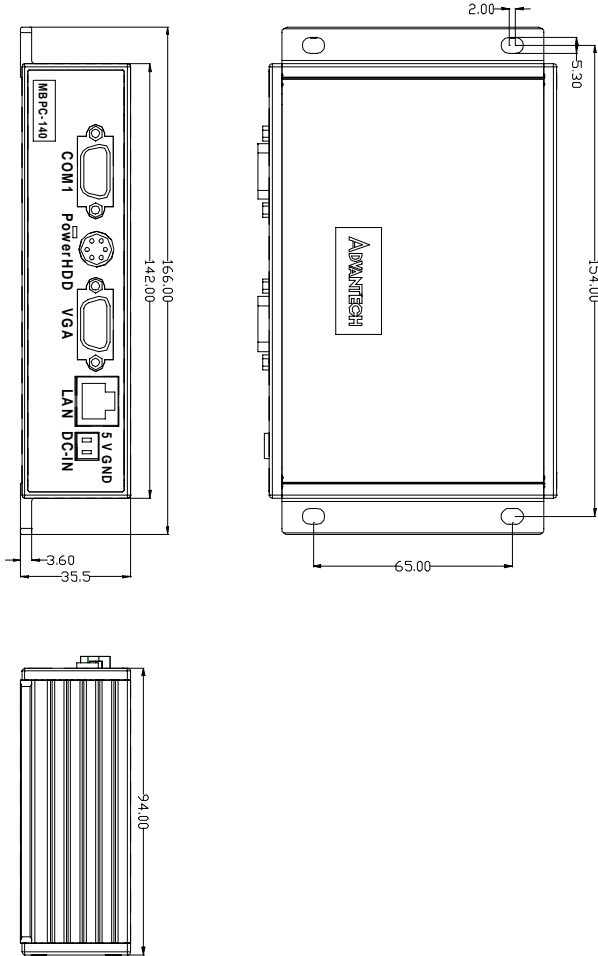


Figure 1-4: Chassis diagram

CHAPTER  
**2**

## **Connecting Peripherals**

This chapter tells how to set up the MBPC-140's hardware, including connecting peripherals, switches and indicators.

## 2.1 Introduction to connectors

The following table lists the connectors on the MBPC-140.

Table 2-1: Connectors

Number	Function
CN2	FDD/LPT connector
CN3	VGA connector
CN4	Ethernet connector
CN5	IDE connector
CN7	Keyboard and PS/2 mouse connector
CN9	LCD inverter connector
CN10	COM1 RS-232 connector
CN12	COM2 RS-232 connector
CN15	Phoenix power connector

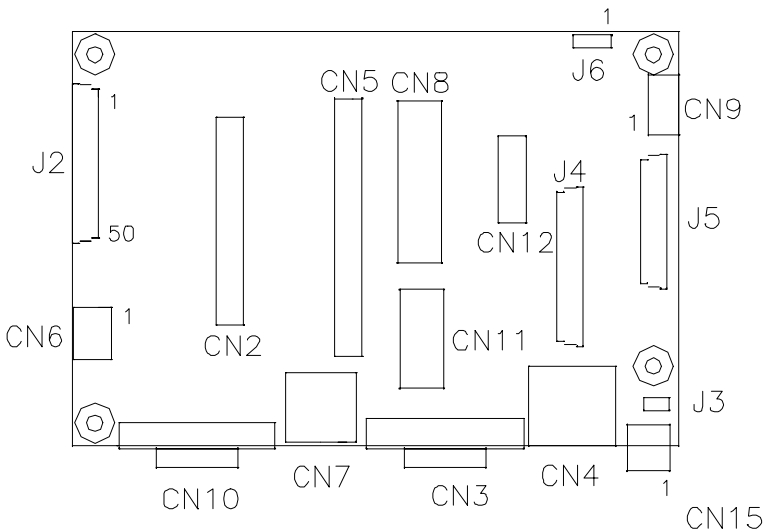


Figure 2-1: Board layout; connector locations (component side)

## 2.2 Floppy drive/parallel port connector (CN2)

---

You can attach up to two floppy disk drives to the MBPC-140 onboard connector. You can use any combination of 5.25" (360 KB / 1.2 MB) and/or 3.5" (720 KB / 1.44 / 2.88 MB) drives.

The board comes with a 34-pin daisy-chain drive connector cable. One end of the cable has a 34-pin flat-cable connector. The other end has two sets of floppy disk drive connectors. Each set consists of a 34-pin flat-cable connector (usually used for 3.5" drives) and a printed-circuit-board connector (usually used for 5.25" drives). You can use only one connector in each set. The set on the end (after the twist in the cable) connects to the A: floppy. The set in the middle connects to the B: floppy.

The parallel port is normally used to connect the CPU card to a printer. The MBPC-140 has a parallel port cable, accessed via connector CN2. The parallel port is designated as LPT1, and can be disabled.

Note that an FDD cannot operate simultaneously with the parallel port.

## 2.4 VGA display connector (CN3)

---

The MBPC-140 provides a VGA controller for a high resolution VGA interface. The MBPC-140's CN3 is a DB-15 connector for VGA monitor input. Pin assignments for the CRT display are detailed in Appendix A.

## 2.5 Ethernet configuration (CN4)

---

The MBPC-140 is equipped with a high performance 32-bit PCI-bus Fast Ethernet interface which is fully compliant with IEEE 802.3u 100/10Base-T specifications. It is supported by all major network operating systems.

## 2.6 Enhanced IDE connector (CN5)

---

You can attach two IDE (Integrated Device Electronics) drives to the MBPC-140. The MBPC-140 has an EIDE connector, designated CN5. Wire number 1 on the cable is red or blue, and the other wires are gray. Connect one end to connector CN5 on the board. Make sure that the red (or blue) wire corresponds to pin 1 on the connector (on the right side). See "Board layout: connector locations" earlier in this chapter for help in finding the connector.

Unlike floppy drives, IDE hard drives can connect in either position on the cable. If you install two drives, you will need to set one as the master and one as the slave. You do this by setting the jumpers on the drives. If you use just one drive, you should set it as the master. See the documentation that came with your drive for more information. Connect the first hard drive to the other end of the cable. Wire 1 on the cable should also connect to pin 1 on the hard drive connector, which is labeled on the drive circuit board. Check the documentation that came with the drive for more information.

Connect the second drive, as described above, to CN5.

## 2.7 Power connector (CN15)

---

The MBPC-140 comes with a Phoenix connector which carries 5 V DC for external power input. The MBPC-140 can get power from CN15.

## 2.8 Keyboard and PS/2 mouse connector (CN7)

---

The MBPC-140 board provides a keyboard connector. A 6-pin mini-DIN connector (CN7) is located on the board mounting bracket. The board comes with an adapter to convert from the 6-pin mini-DIN connector to a standard DIN connector and to a PS/2 mouse connector.



## 2.9 Serial ports (CN10: COM1/RS-232; CN12: COM2/RS-232)

---

The MBPC-140 offers two serial ports: COM1 (RS-232) and COM2 (RS-232). These ports allow you to connect to serial devices (a mouse, printers, etc.) or a communications network.

You can select the address for each port (for example, 3F8H [COM1], 2F8H [COM2]), or disable each port..

### 2.9.1 RS-232 connection (COM1: CN10)

Different devices implement the RS-232 standard in different ways. If you are having problems with a serial device, be sure to check the pin assignments for the connector.

### 2.9.2 RS-232 connection (COM2: CN12)

COM2 is an RS-232 serial port. The IRQ and address range are both fixed. However, if you wish to disable the port or change these parameters later, you can do this in the system BIOS setup. The table below shows the settings for the MBPC-140 board's ports:

---

Table 2-2: MBPC-140 serial port default settings

---

Port	Address	Interrupt	Default
COM1	3F8, 3E8	IRQ4	3F8
COM2	2F8, 2E8	IRQ3	2F8

---



# CHAPTER 3

## **Award BIOS Setup**

This chapter describes how to set the BIOS configuration data.

## 3.1 General information

---

Award BIOS ROM has a built-in setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed RAM so that it retains the setup information when the power is turned off.

## 3.2 Starting Award BIOS setup

---

As POST executes, the following appears:

Hit <DEL> if you want to run SETUP

Press <DEL> to run AWARDBIOS setup.

### 3.2.1 Award BIOS main menu

The Award BIOS setup screen appears as follows:



Figure 3-1: Main menu

### 3.3 Standard CMOS features

Choose the "Standard CMOS Features" option from the main menu, and the screen below will be displayed. This standard setup menu allows users to configure system components such as date, time, hard disk drive, floppy drive, display, and memory.

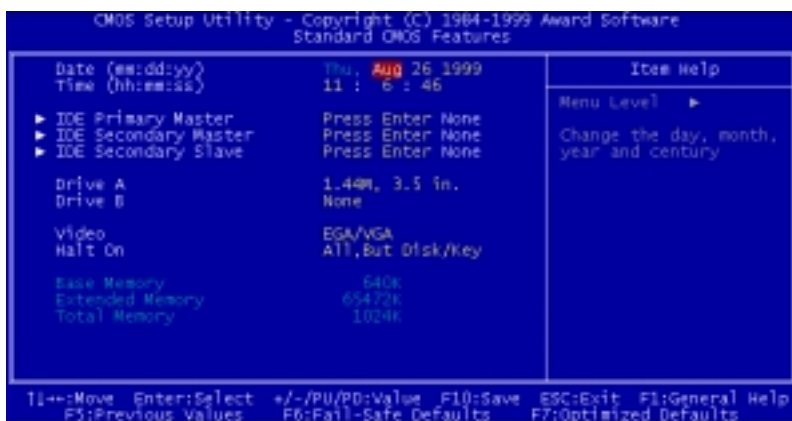


Figure 3-2: Standard CMOS setup screen

### 3.4 Advanced BIOS features

The screen below appears when choosing the "Advanced BIOS Features " item from the main menu. It allows the user to configure the MBPC-140 according to his particular requirements. Below are some major items that are provided in the Advanced BIOS FEATURES setup screen.

A quick booting function is provided for your convenience. Simply enable the Quick Power On Self Test item to save yourself valuable time.

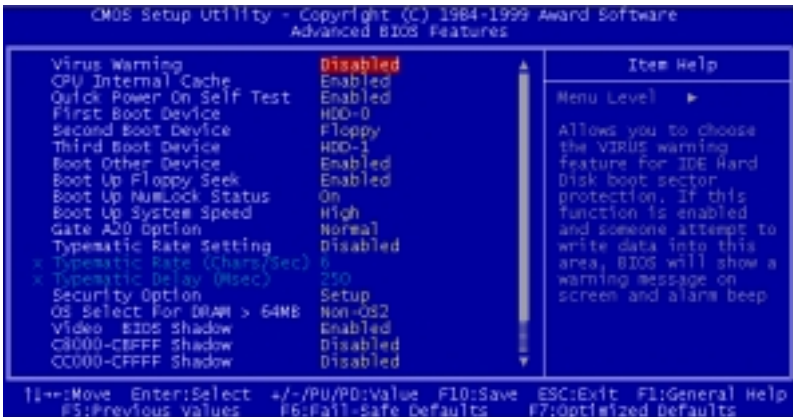


Figure 3-3: BIOS features setup screen

#### 3.4.1 Virus Warning

While the system is booting up, and after boot-up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system. In this case, a warning message will be displayed. You can run the anti-virus program to locate the problem.

If Virus Warning is disabled, no warning message will appear if anything attempts to access the boot sector or hard disk partition.

### **3.4.2 Quick Power On Self Test**

This option speeds up the Power-On Self Test (POST) conducted as soon as the computer is turned on. When enabled, BIOS shortens or skips some of the items during the test. When disabled, the computer conducts normal POST procedures.

### **3.4.3 Boot Sequence**

This function determines the sequence in which the computer will search the drives for the disk operating system (i.e. DOS). The user can define boot sequences from following devices:

Floppy

HDD-0

SCSI

CDROM

HDD-1

HDD-2

HDD-3

### **3.4.4 Boot Up Floppy Seek**

During POST, BIOS will determine if the floppy disk drive installed is 40 or 80 tracks. A 360 KB type drive is 40 tracks; while 720 KB, 1.2 MB, and 1.44 MB type drives are all 80 tracks.

Enabled BIOS searches the floppy drive to determine if it is 40 or 80 tracks. Note that BIOS cannot differentiate 720 KB, 1.2 MB, and 1.44 MB type drives as they are all 80 tracks.

Disabled BIOS will not search for the floppy drive type by track number. Note that there will not be any warning message if the drive installed is 360 KB.

### **3.4.5 Boot Up NumLock Status**

The default is On.

On Keypad boots up to number keys.

Off Keypad boots up to arrow keys.

### **3.4.6 Gate A20 Option**

Normal The A20 signal is controlled by the keyboard controller or chipset hardware.

Fast (Default) The A20 signal is controlled by Port 92 or the chipset specific method.

### **3.4.7 Typematic Rate Setting**

The typematic rate determines the characters per second accepted by the computer. The Typematic Rate setting enables or disables the typematic rate.

### **3.4.8 Typematic Rate (Chars/Sec)**

BIOS fix the following input values (characters/second) for typematic rate: 6.

### **3.4.9 Typematic Delay (msec)**

Typematic delay is the time interval between the appearance of the first and second characters, when holding down a key. The input value is: 250 (msec).

### **3.4.10 Security Option**

This setting determines whether the system will boot up if the password is denied. Access to Setup is, however, always limited.

System                    The system will not boot, and access to Setup will be denied if the correct password is not entered at the prompt.

Setup                     The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.



### **3.4.11 OS Select for DRAM > 64 MB**

This setting is under the OS/2 system.

### **3.4.12 Video BIOS Shadow**

This determines whether video BIOS will be copied to RAM, which is optional according to the chipset design. When enabled, Video BIOS Shadow increases the video speed.

### **3.4.13 C8000-CBFFF Shadow / CC000-CFFFF Shadow**

These determine whether optional ROM will be copied to RAM in blocks of 16 KB.

Enabled                      Optional shadow is enabled.

Disabled                     Optional shadow is disabled.

## 3.5 Advanced chipset features

By choosing the "Advanced CHIPSET FEATURES" option from the Main menu, the screen below will be displayed.

This sample screen contains the manufacturer default values for the MBPC-140.

This section allows you to configure the system based on the specific features of the installed chipset. This chipset manages bus speeds and access to system memory resources, such as DRAM and the external cache. It also coordinates communications between the conventional ISA bus and the PCI bus. It must be stated that these items should never need to be altered. The default settings have been chosen, because they provide the best operating conditions for your system.

### 3.5.1 Video Memory Size

The MBPC-140 adopts VGA share memory structure. Video memory size can be selected from 512 KB to 4096 KB. Onboard VGA video memory size should be zero, in order to release memory when the onboard VGA function is not used.

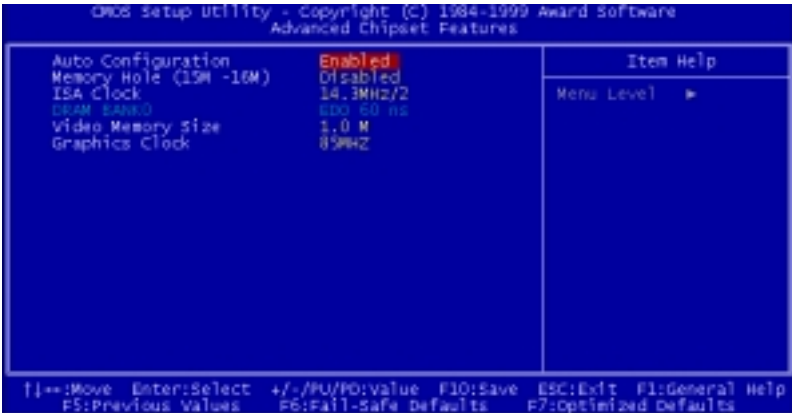


Figure 3-4: Chipset features setup screen

## 3.6 Integrated peripherals

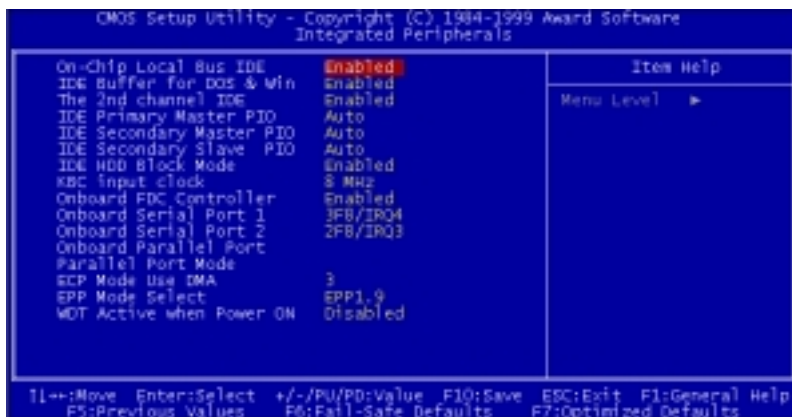


Figure 3-5: Integrated peripherals

### 3.6.1 Onboard FDC Controller

This option enables the floppy drive controller on the MBPC-140.

The settings are Enabled, or Disabled.

### 3.6.2 Onboard Serial Port 1/2

This option enables serial port 1/2 on the board and specifies the base I/O port address for serial port 1~2.

The settings are Disabled, 3F8h/IRQ4, 3E8h/IRQ4, 2E8h/IRQ3, and 2F8h/IRQ3.

### 3.6.3 Onboard Parallel Port

This option enables the parallel port on the MBPC-140 and specifies the parallel port's base I/O address. The settings are Disabled, 378/IRQ7, 3BC/IRQ7 and FDD. The default setting is 378/IRQ7.

The MBPC-140's floppy interface and parallel port share the same pin assignment. When "On board Parallel port" is setting to FDD, floppy drive will be enabled and printer port will be disabled. If "On board Parallel port" is setting to either Disabled, 378/IRQ7 or 3BC/IRQ7, printer port will be enable but floppy drive will be disable.

### 3.6.4 Parallel Port Mode

This option specifies the parallel port mode. The settings are SPP, EPP, ECP and EPP+ECP.

Setting	Description
SPP	The normal parallel port mode is used.
EPP	The parallel port can be used with devices that adhere to the Enhanced Parallel Port (EPP) specification.
EPP	uses the existing parallel port signals to provide asymmetric bidirectional data transfer driven by the host device.
ECP	The parallel port can be used with devices that adhere to the Extended Capabilities Port (ECP) specification. ECP uses the DMA protocol to achieve transfer rates of approximately 2.5 Mbs. ECP provides symmetric bidirectional communications.

## 3.7 Power management setup

The power management setup controls the CPU card's "green" features. The following screen shows the manufacturer defaults.

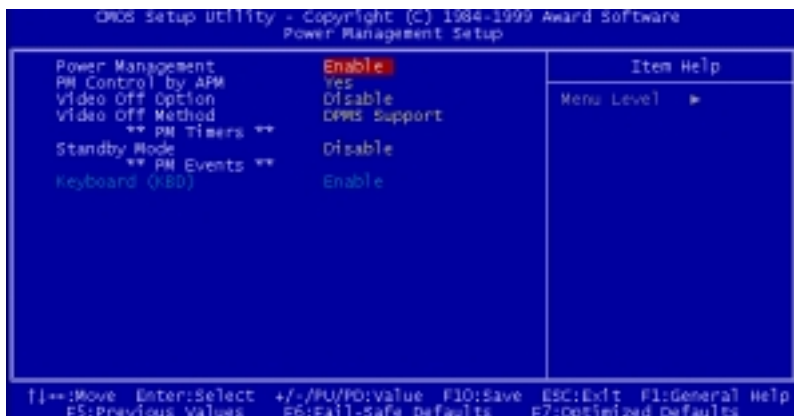


Figure 3-6: Power management setup screen

### 3.7.1 Power Management

Power management lets you set up your computer to save electricity when it is not actively in use by putting the system into progressively greater power saving modes. There are two selections for Power Management (Mode):

**Disabled** Turns off PM

**Enabled** Maximized power saving by activating maximum power saving settings after one minute of system inactivity.

When PM is set to Disabled, some items which are predefined will become unmodifiable.

## Standby mode

This sets the period of system inactivity after which the system goes into Standby mode, the intermediate power saving state.

The settings range from 2 minutes to 16 minutes and can be set manually when power management is Enable. The default setting is Disabled. When the system goes into power saving mode, power management will skip to the next mode in the sequence if this is disabled.

## 3.8 PnP/PCI configuration setup

---

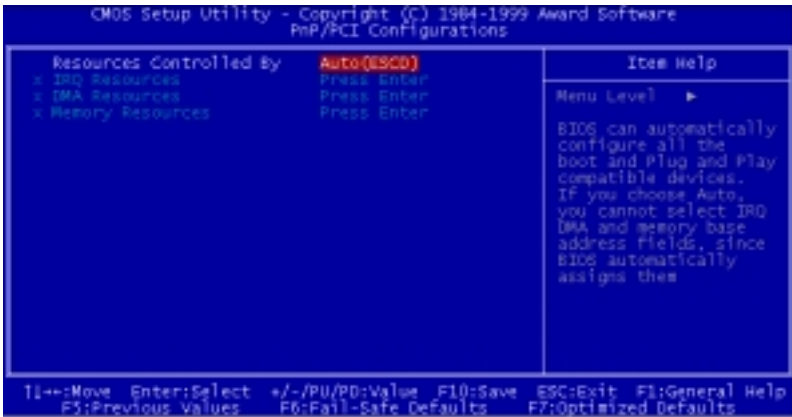


Figure 3-7: PCI configuration screen

### 3.8.1 Resources Control

When Resources Controlled by Auto(ESCD), BIOS can automatically configure all the boot and plug and play compatible devices. IRQ, DMA and Memory resources will become unmodifiable.

When Resources Controlled by Manual, IRQ, DMA and Memory resource can be set up manually.

### **3.8.2 IRQ resources**

These fields indicate whether or not the displayed IRQ for each field is being used by a legacy (non-PnP card). Two options are available: PCI/ISA PnP or Legacy. The first option, the default setting, indicates that the displayed IRQ is not used to determine if an ISA card is using that IRQ. If you install a legacy ISA card that requires a unique IRQ, you must set the field for that IRQ to "Legacy". Say for example that you install a legacy ISA card that requires IRQ10. You must then set "IRQ10" assigned to "Legacy".

### **3.8.3 DMA resources**

These fields indicate whether or not the displayed DMA for each field is being used by a legacy (non-PnP card). Two options are available: PCI/ISA PnP or Legacy. The first option, the default setting, indicates that the displayed IRQ is not used to determine if an ISA card is using that IRQ. If you install a legacy ISA card that requires a unique DMA, you must set the field for that IRQ to "Legacy".

### **3.8.4 Memory resources**

Memory length can be reserved as 8 KB, 16 KB, 32 KB or 64 KB and its address can be selected from C8000 to DC000. Reserved memory address will not be modified when "Reserved Memory Base" is N/A.

## **3.9 Load fail-safe defaults**

---

Load Fail-safe Defaults indicates the most appropriate values for the system parameters for stability. These default values are loaded automatically if the stored record created by the setup program becomes corrupted (and therefore unusable).

## **3.10 Load optimized defaults**

---

"Load Optimized Defaults" loads the values required by the system for maximum performance.

## 3.11 Password setting

---

To change the password:

1. Choose the "SET PASSWORD" option from the main menu and press <Enter>.

The screen will display the following message:

Enter Password:

Press <Enter>.

2. If the CMOS is good or if this option has been used to change the default password, the user is asked for the password stored in the CMOS. The screen will display the following message:

Confirm Password:

Enter the current password and press <Enter>.

3. After pressing <Enter> (ROM password) or the current password (user-defined), you can change the password stored in the CMOS.

The password must be no longer than eight (8) characters.

Remember, to enable the password setting feature, you must first select either SETUP or SYSTEM in "Security Option" item of "Advanced BIOS features".

## 3.12 Save & exit setup

---

If you select this and press <Enter>, the values entered in the setup utilities will be recorded in the CMOS memory of the chipset. The microprocessor will check this every time you turn your system on and compare this to what it finds as it checks the system. This record is required for the system to operate.

## 3.13 Exit without saving

---

Selecting this option and pressing <Enter> lets you exit the setup program without recording any new values or changing old ones.



# CHAPTER 4

## Software Configuration

This chapter details the software configuration information. It shows you how to configure the card to match your application requirements.

Sections include:

- Ethernet interface configuration

## 4.1 Ethernet software configuration

---

The MBPC-140 on-board Ethernet interface supports all major network operating systems. To configure the medium type, to view the current configuration, or to run diagnostics, do the following:

1. Power the MBPC-140 on. Ensure that the RSET8139.EXE file is located in the working drive.
2. At the prompt type RSET8139.EXE and press <Enter>. The Ethernet configuration program will then be displayed.
3. This simple screen shows all the available options for the Ethernet interface. Just highlight the option you wish to change by using the Up and Down keys. To change a selected item, press <Enter>, and a screen will appear with the available options. Highlight your option and press <Enter>. Each highlighted option has a helpful message guide displayed at the bottom of the screen for additional information.
4. After you have made your selections and are sure this is the configuration you want, press ESC. A prompt will appear asking if you want to save the configuration. Press Y if you want to save.

The Ethernet Setup Menu also offers three very useful diagnostic functions. These are:

1. Run EEPROM test
2. Run Diagnostics on Board
3. Run Diagnostics on Network

Each option has its own display screen that shows the format and result of any diagnostic tests undertaken.

## **Pin Assignments**

- Floppy drive/parallel port connector
- CRT display connector
- IDE hard drive connector
- Keyboard and mouse connector
- COM1 RS-232 serial port
- COM2 RS-232 serial port
- Phoenix power connector

# A.1 Floppy drive/parallel port connector (CN2)

---

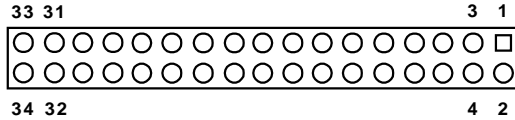


Table A-1: Parallel port connector (CN2)

Pin	Parallel port signal	Pin	Parallel port signal
1	GND	2	AUTOFD
3	GND	4	D5
5	GND	6	\STROBE
7	GND	8	D0
9	GND	10	D6
11	GND	12	\ACK
13	GND	14	D7
15	GND	16	BUSY
17	GND	18	INIT
19	GND	20	SLIN
21	GND	22	PE
23	GND	24	SLCT
25	GND	26	D1
27	GND	28	D2
29	GND	30	D3
31	GND	32	ERR
33	GND	34	D4

Table A-2: Floppy drive connector (CN2)

<b>Pin</b>	<b>Floppy signal</b>	<b>Pin</b>	<b>Floppy signal</b>
1	GND	2	DENSITY SELECT*
3	GND	4	N/C
5	GND	6	N/C
7	GND	8	INDEX*
9	GND	10	MOTOR 0*
11	GND	12	DRIVE SELECT 1*
13	GND	14	DRIVE SELECT 0*
15	GND	16	MOTOR 1*
17	GND	18	DIRECTION*
19	GND	20	STEP*
21	GND	22	WRITE DATA*
23	GND	24	WRITE GATE*
25	GND	26	TRACK 0*
27	GND	28	WRITE PROTECT*
29	GND	30	READ DATA*
31	GND	32	HEAD SELECT*
33	GND	34	DISK CHANGE*

\* low active

## A.2 CRT display connector (CN3)

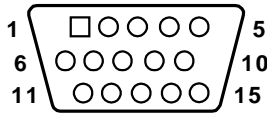


Table A-3: CRT display connector (CN3)

Pin	Signal	Pin	Signal
1	RED	9	N/C
2	GREEN	10	GND
3	BLUE	11	N/C
4	N/C	12	N/C
5	GND	13	H-SYNC
6	GND	14	V-SYNC
7	GND	15	N/C
8	GND		

## A.3 IDE hard drive connector (CN5)

Table A-4: IDE hard drive connector (CN5)

Pin	Signal	Pin	Signal
1	IDE RESET*	2	GND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15

19	SIGNAL GND	20	N/C
21	N/C	22	GND
23	IO WRITE	24	GND
25	IO READ	26	GND
27	IO CHANNEL READY	28	N/C
29	HDACKO*	30	GND
31	IRQ14	32	IOCS16
33	ADDR 1	34	N/C
35	ADDR 0	36	ADDR 2
37	HARD DISK SELECT 0*	38	HARD DISK SELECT 1*
39	IDE ACTIVE*	40	GND

\* low active

## A.4 Keyboard and mouse connector (CN7)

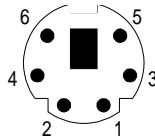
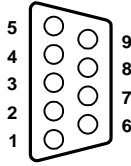


Table A-5: Keyboard and mouse connector (CN7)

Pin	Signal
1	KB DATA
2	MS DATA
3	GND
4	$V_{CC}$
5	KB CLOCK
6	MS CLOCK

## A.5 COM1 RS-232 serial port (CN10)

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---

Table A-6: COM1 RS-232 serial port (CN10)

---

Pin	Signal
1	DCD
2	RXD
3	TXD
4	DTR
5	GND
6	DSR
7	RTS
8	CTS
9	RI

---

## A.6 COM2 RS-232 serial port (CN12)

---

---

Table A-7: COM2 RS-232 serial port (CN12)

---

Pin	RS-232 port	Pin	RS-232 port
1	DCD	6	CTS
2	DSR	7	DTR
3	RxD	8	RI
4	RTS	9	GND
5	TxD	10	N/C

---



## A.7 Phoenix power connector (CN15)

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Table A-8: Phoenix power connector (CN15)

---

<b>Pin</b>	<b>Signal</b>
1	GND
2	+5 V

---



# APPENDIX **B**

## **System Assignments**

This appendix contains information of a detailed or specialized nature. It includes:

- System I/O ports
- DMA channel assignments
- Interrupt assignments
- 1st MB memory map

# B.1 System I/O ports

---

Table B-1: System I/O ports

<b>Addr. range (Hex)</b>	<b>Device</b>
000-01F	DMA controller
020-021	Interrupt controller 1, master
022-023	Chipset address
040-05F	8254 timer
060-06F	8042 (keyboard controller)
070-07F	Real-time clock, non-maskable interrupt (NMI) mask
080-09F	DMA page register,
0A0-0BF	Interrupt controller 2
0C0-0DF	DMA controller
0F0	Clear math co-processor
0F1	Reset math co-processor
0F8-0FF	Math co-processor
1F0-1F8	Fixed disk
200-207	Game I/O
278-27F	Parallel printer port 2 (LPT 3)
2F8-2FF	Serial port 2
300-31F	Prototype card
360-36F	Reserved
378-37F	Parallel printer port 1 (LPT 2)
380-38F	SDLC, bisynchronous 2
3A0-3AF	Bisynchronous 1
3B0-3BF	Monochrome display and printer adapter (LPT1)
3C0-3CF	Reserved
3D0-3DF	Color/graphics monitor adapter
3F0-3F7	Diskette controller
3F8-3FF	Serial port 1

## B.2 DMA channel assignments

---

Table B-2: DMA channel assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

## B.3 Interrupt assignments

---

Table B-3: Interrupt assignments

Interrupt#	Interrupt source
IRQ 0	interval timer
IRQ 1	Keyboard
IRQ 2	Interrupt from controller 2 (cascade)
IRQ 8	Real-time clock
IRQ 12	PS/2 mouse (non-releasable)
IRQ 13	INT from co-processor
IRQ 14	Fixed disk controller (Primary)
IRQ 15	Fixed disk controller (Secondary)
IRQ 3	Serial communication port 2
IRQ 4	Serial communication port 1
IRQ 6	Diskette controller (FDC)
IRQ 7	Parallel port 1 (printer port)

*Note:* The Ethernet function is auto-sensing.

## B.4 1st MB memory map

---

Table B-4: 1st MB memory map

<b>Addr. range (Hex)</b>	<b>Device</b>
F000h - FFFFh	System ROM
C800h - EFFFh	System ROM
C000h - C7FFh	Expansion ROM
B800h - BFFFh	CGA/EGA/VGA text
B000h - B7FFh	Unused
A000h - AFFFh	EGA/VGA graphics
0000h - 9FFFh	Base memory