WAFER-4823
DX4-100 MHz with LCD/CRT & Ethernet SBC

User Manual

Version 2.1

November 27, 2003

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Chapter 1 Introduction

Thank you for choosing WAFER-4823 DX4-100 with LCD/CRT & Ethernet Single Board Computer. WAFER-4823 is a stand alone board with PC/104 connector, which comes equipped with ACC Maple Chipset (includes DX4-100 CPU) and advanced high-performance multi-mode I/O,LCD Controller and Ethernet function, designed for the system manufacturers, integrators, or VARs to provide all the performance, reliability, and quality at a reasonable price.

An advanced high performance super I/O function is supported by the Maple chipset. The on-chip UARTs are compatible with the NS16C550. The parallel port and IDE interface are compatible with IBM PC/AT and XT architecture's, as well as EPP and ECP.

The LCD/CRT controller TOPRO TP6508 can provide the LCD and CRT display at the same time. The LCD interface connector is a 44-pin 2.0mm pitch type.

The most outstanding feature in the WAFER-4823 is the built-in PC/104 expansion bus. Based on the PC/104 bus, you can easily install over thousands of PC/104 modules from hundreds vendors in the world. The WAFER-4823 has external power connector that can let it connects to power supply directly. It is very suitable for your standalone applications.

1.1 Specifications

The WAFER-4823 DX4-100 with LCD/CRT & Ethernet Single Board Computer provides the following specification:

- **System**

CPU	ACC Maple, includes DX4-100 CPU
DMA channels	7
Interrupt levels	15
Real-time clock/calendar	STM48T86 or equivalent chip and quartz oscillator, powered by lithium battery for over 10 years of data retention.

- **Memory**

DRAM memory	1 piece of 72-pin SIMM up to 32MB

- **LCD/CRT Interface**

Chipset	TP6508
Resolution	1MB EDO RAM on board support 800 x 600 resolution for STN and TFT LCD Flat Panel. Simultaneous LCD and CRT display.
Display Memory	1MB EDO RAM on board.

- **Ethernet Interface**

Chipset	Realtek RTL-8019AS chipset (on board).
Type	16-bit Ethernet, Novell NE2000 compatible, 10Base-T 10 MBps.
Connection	on-board RJ-45 connector.

- **Integrated Multi I/O**

IDE hard disk drive interface	Supports up to two IDE hard disk drives. Can be disabled by BIOS Setup.
Floppy disk drive interface	Supports two 2.88 MB, 1.44MB, 1.2MB, 720KB, or 360KB floppy disk drives. Can be disabled by BIOS Setup.
Two high speed Serial ports	One ports RS232 port, and one RS232 port or RS422/485 port.
PS/2 Mouse/Keyboard Connector	6-pin Mini DIN Keyboard Connector.

- **Digital I/O**
  4 inputs and 4 outputs

- **Industrial features**

Watch-dog timer	can be set for 1,2,10,20,110,or 220 seconds period. Reset or NMI is generated when CPU does not periodically trigger the timer. Your program uses hex 043 and 443 to control the watch-dog and generate a system reset.
PC/104 expansion bus	can be set for 1,2,10,20,110,or 220 seconds period. Reset or NMI is generated when CPU does not periodically trigger the timer. Your program uses hex 043 and 443 to control the watch-dog and generate a system reset.
External power connector	5-pin male connector (model: 2571-08TS
Keyboard connector	6-pin mini-DIN keyboard connector.

- **General**

Power Consumption	+5V @ 1.92A (DX4-100MHz, 32MB RAM)
Operating Temperature	0° ~ 60° C
Humidity	5% ~ 95%, non-condensed
Dimension	102.01mm(W) x 146.48mm(L)

1.2 Package of Contents

WAFER-4823 package includes the following items:

- One WAFER-4823 DX4-100 with LCD/CRT & Ethernet single board computer
- One printer cable
- One FDD/HDD cable
- One 6-pin mini-din keyboard/mouse adapter cable
- One power cord
- One RS-232/422/485 cable
- One user manual

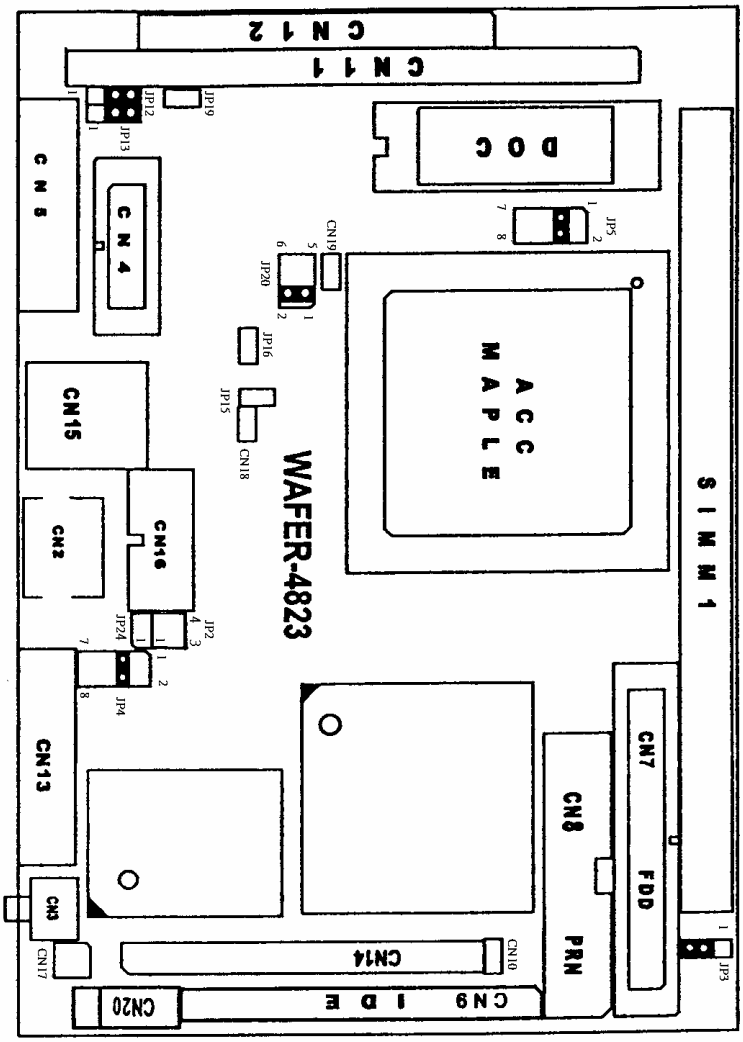
Chapter 2 Installation

This chapter describes how to install the WAFER-4823. The layout of WAFER-4823 is shown on the next page and the Unpacking Precautions that you should be careful with is described on the following page. Also included is the jumpers and switches setting for this board's configuration, such as: CPU type selection, system clock setting and Watchdog timer.

2.1 Layout

< Please, refer to next page >

Layout


CN12
CN11
DOC
SIMM1
CN5
CN4
JP12
JP13
JP19
JP5
CN19
JP20
JP16
JP15
CN18
ACC
MAPLE
WAFER-4823
CN15
CN16
CN2
JP24
JP2
JP4
CN13
CN3
CN17
CN14
CN10
CN9
IDE
CN20
CN8
PRN
CN7
FDD
JP3

2.2 Unpacking Precautions

Some components on WAFER-4823 SBC are very sensitive to static electric charges and can be damaged by a sudden rush of power. To protect it from unintended damage, be sure to follow these precautions:

- ✓ Ground yourself to remove any static charge before touching your WAFER-4823 SBC. You can do it by using a grounded wrist strap at all times or by frequently touching any conducting materials that is connected to the ground.
- ✓ Handle your WAFER-4823 SBC by its edges. Don't touch IC chips, leads or circuitry if not necessary.
- ✓ Do not plug any connector or jumper while the power is on.

2.3 CPU Settings

• **JP2 : CPU CLOCK SETTING**:
The system clock is generated by the ICS650R-01, and the different CPU clock frequency can be selected by JP2 and shown as following table:

CPU CLK	1-2	3-4
75MHz	ON	ON
100MHz	OFF	OFF

2.4 Watchdog Timer

The Watch-Dog Timer is enabled by reading port 443H. It should be triggered before the time-out period ends, otherwise it will assume the program operation is abnormal and will issue a reset signal to start again, or activate NMI to CPU. The Watch-Dog Timer is disable by reading port 043H.

• JP3 : Watchdog Timer Type Selector

1-2	NMI
2-3	**RESET**

• JP4 : Watchdog Timer Time Out Period

TIME	1-2	3-4	5-6	7-8
1sec	OFF	OFF	ON	OFF
2sec	OFF	OFF	ON	ON
10sec	**OFF**	**ON**	**OFF**	**OFF**
20sec	OFF	ON	OFF	ON
110sec	ON	OFF	OFF	OFF
220sec	ON	OFF	OFF	ON

2.5 Disk-On-Chip™ Flash Disk

The Disk-On-Chip™ Flash Disk Chip(DOC) is produced by M-Systems. Customers don't need any extra software utility because the DOC is 100% compatible to hard disk and DOC. It is just "plug and play", easy and reliable.

• JP5 : Disk-On-Chip™ Memory Address Setting

JP5	Description
1-2	CE00H
3-4	D600H
5-6	DE00H

2.6 RI Pin Settings for Serial port2

The Serial port2 (CN4) can supply +5V or +12V power to the serial devices via RI pin (Pin 9) of the serial port connector. The max. current is 1A with fuse protection for the total two connector's 5V/12V output. If the output is set to 12V, make sure that you have 12V to supply the board.

• JP12, JP13 : for CN4, Pin 8 Selector

CN4 Pin9	JP12	JP13
RI Signal	2-3	Don't care
+5V	1-2	2-3
+12V	1-2	1-2

2.7 The Settings of Serial port2

The Serial port2 (CN4) can be set to RS-232 or RS-422/485 for industrial field site application.

- **JP20 : COM2(CN4) RS-232/422/485 setting**

	RS-232	RS-422	RS-485
1-2	ON	OFF	OFF
3-4	OFF	ON	ON
5-6	OFF	OFF	ON

2.8 Free IRQ3 and IRQ4 Settings

If you want to free IRQ3 and IRQ4 for other application then the COM2 and COM1 have to be disabled by BIOS setting and the jumper JP15 and JP16 have to be closed to free IRQ3 and IRQ4, respectively.

- **JP15 : Free IRQ3 setting**

OFF	Enable serial port2
ON	Disable serial port2

- **JP16 : Free IRQ4 setting**

OFF	Enable serial port1
ON	Disable serial port1

2.9 Clear CMOS Setup

If you forget the CMOS password, you can clear or reset it by closing the **JP19**. After JP19 is closed, turn on the power for about 3 seconds then turn it off and open the JP19. Now, the password has been cleared from your CMOS.

- **JP19 : Clear CMOS**

OFF	NORMAL
ON	CLEAR

2.10 Realtek8019AS Setting

The Realtek8019AS can be set to PNP MODE or JUMPERLESS MODE.

- **JP24 : Realtek8019AS setting**

OFF	PNP mode
ON	JUMPERLESS mode

Chapter 3 Connection

This chapter describes how to connect peripherals, switches and indicators to the WAFER-4823 board. You can access most of the connectors from the top of the board while it is installed in the chassis.

3.1 Floppy Disk Drive Connector

WAFER-4823 board comes equipped with a 34-pin daisy-chain driver connector cable. The detailed pin assignment of the connector is specified as following table:

- **CN7 : FDC CONNECTOR**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GROUND	2	REDUCE WRITE
3	GROUND	4	N/C
5	GROUND	6	N/C
7	GROUND	8	INDEX#
9	GROUND	10	MOTOR ENABLE 0#
11	GROUND	12	DRIVE SELECT 1#
13	GROUND	14	DRIVE SELECT 0#
15	GROUND	16	MOTOR ENABLE 1#
17	GROUND	18	DIRECTION#
19	GROUND	20	STEP#
21	GROUND	22	WRITE DATA#
23	GROUND	24	FDCWE#
25	GROUND	26	TRACK 0#
27	GROUND	28	WRITE PROTECT#
29	GROUND	30	READ DATA#
31	GROUND	32	HEAD#
33	GROUND	34	DISK CHANGE#

3.2 IDE Disk Drive Connector

You can attach two IDE (Integrated Device Electronics) hard disk drives to the WAFER-4823 internal controller. The board comes equipped with a 44-pin flat-cable connector. The detailed pin assignment of the connector is specified as following table:

- **CN9: IDE Interface Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RESET#	2	GROUND
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	GND	20	N/C
21	N/C	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	BALE – DEFAULT
29	N/C	30	GROUND – DEFAULT
31	IRQ14	32	IOCS16#-DEFAULT
33	SA 1	34	N/C
35	SA 0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND
41	VCC	42	VCC
43	GND	44	VCC

3.3 Parallel Port

This port is usually connected to a printer, The WAFER-4823 includes an on-board parallel port, accessed through a 26-pin flat-cable connector CN8. The detailed pin assignment of the connector is specified as following table:

- **CN8 : Parallel Port Connector**

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	STROBE#	2	DATA 0
3	DATA 1	4	DATA 2
5	DATA 3	6	DATA 4
7	DATA 5	8	DATA 6
9	DATA 7	10	ACKNOWLEDGE
11	BUSY	12	PAPER EMPTY
13	PRINTER SELECT	14	AUTO FORM FEED #
15	ERROR#	16	INITIALIZE
17	LPT SELECT LN#	18	GND
19	GND	20	GND
21	GND	22	GND
23	GND	24	GND
25	GND	26	N/C

3.4 Serial Ports

The WAFER-4823 offers two high speed NS16C550 compatible UARTs with Read/Receive 16 byte FIFO serial ports. These ports let you connect to serial devices or a communication network. One 9-pin connector and one 14-pin headers are provided by the WAFER-4823. The detailed pin assignment of the connectors are specified as following tables:

• CN5 : Serial Port1 Connector (9-pin DSUB)

PIN NO.	DESCRIPTION
1	DATA CARRIER DETECT (DCD)
2	RECEIVE DATA (RXD)
3	TRANSMIT DATA (TXD)
4	DATA TERMINAL READY (DTR)
5	GROUND (GND)
6	DATA SET READY (DSR)
7	REQUEST TO SEND (RTS)
8	CLEAR TO SEND (CTS)
9	RING INDICATOR (RI)

• CN4 : Serial Port2 Connector (14-pin Header/W Housing)

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION	
1	DCD	2	DSR	
3	RX	4	RTS	
5	TX	6	CTS	RS-232
7	DTR	8	RI	
9	GND	10	N/C	
11	TX2+	12	TX2-	RS-422/485
13	RX2+	14	RX2-	

Note : TX2+,TX2- and RX2+,RX2- are for transmitting and receiving, respectively, in the RS-422 connection. While in RS-485 connection, TX2+,RX2+ and TX2-,RX2- must be twisted each. Any how, you can only choose to use **RS-232** or **RS-422/485**.

3.5 Keyboard/Mouse Connector

The WAFER-4823 provides a 6-pin Mini-DIN connector CN2 on the board mounting bracket for single board computer applications.

- **CN2 : PS/2Mouse, Keyboard Connector (Mini Din)**

PIN NO.	DESCRIPTION
1	KBDAT
2	MDAT
3	GND
4	+5V
5	KBCLK
6	MCLK

3.6 External Switches and Indicators

There are many external switches and indicators for monitoring and controlling your CPU board. These features are completely optional. The detailed pin assignment of the connectors is specified as following table:

- **CN3 : RESET BUTTON**

PIN NO.	DESCRIPTION
1	RESET
2	GND

- **CN10 : IDE LED connector**

PIN-NO	DESCRIPTION
1	HDD ACTIVE#
2	+5V

3.7 External Power Connector

The WAFER-4823 has an on-board external power connector CN20 and a 2-pin power connector CN18. It let you connect power directly to the CPU board without passive backplane application.

- **CN20 : EXTERNAL POWER CONNECTOR**

PIN NO.	Description
1	+5V
2	+5V
3	GND
4	GND
5	+12V

- **CN18 : LED POWER CONNECTOR**

PIN NO.	Description
1	+5V LED
2	GND

3.8 External Speaker

The WAFER-4823 has its own buzzer, you also can connect it to the external speaker through the connector CN19 :

- **CN19 : External Speaker Connector**

PIN NO.	DESCRIPTION
1	+5V
2	Speaker

3.9 PC/104 Connection Bus

The WAFER-4823 PC/104 expansion bus let you attach any kind of PC/104 modules. The PC/104 bus has already become the industrial embedded PC bus standard, so you can easily install over thousands of PC/104 modules from hundreds of vendors in the world. There are two PC/104 connectors on this board: PC/104-64 and PC/104-40.

• CN12 : PC/104-40 Connector

PIN NO.	Description	PIN NO	Description
1	GND	21	GND
2	MCS16#	22	SBHE#
3	IOCS16#	23	LA23
4	IRQ10	24	LA22
5	IRQ11	25	LA21
6	IRQ12	26	LA20
7	IRQ15	27	LA19
8	IRQ14	28	LA18
9	DACK0#	29	AL17
10	DRQ0	30	MEMR#
11	DACK5#	31	MEMW#
12	DRQ5	32	SD8
13	DACK6#	33	SD9
14	DRQ6	34	SD10
15	DACK7#	35	SD11
16	DRQ7	36	SD12
17	VCC	37	SD13
18	MASTER#	38	SD14
19	GND	39	SD15
20	GND	40	GND

• CN11 : PC/104-64 Connector

PIN NO.	Description	PIN NO.	Description
1	IOCHCK#	33	GND
2	SD7	34	IRSTDRV
3	SD6	35	VCC
4	SD5	36	IRQ9
5	SD4	37	-5V
6	SD3	38	DRQ2
7	SD2	39	-12V
8	SD1	40	ZWS
9	SD0	41	+12V
10	IOCHRDY	42	GND
11	AEN	43	SMEMW#
12	LA19	44	SMEMR#
13	LA18	45	IOW#
14	LA17	46	IOR#
15	SA16	47	DACK3#
16	SA15	48	DRQ3
17	SA14	49	DACK1#
18	SA13	50	DRQ1
19	SA12	51	REFRESH#
20	SA11	52	SYSCLK
21	SA10	53	IRQ7
22	SA9	54	N/C
23	SA8	55	IRQ5
24	SA7	56	IRQ4
25	SA6	57	IRQ3
26	SA5	58	DACK2
27	SA4	59	TC
28	SA3	60	BALE
29	SA2	61	VCC
30	SA1	62	OSC
31	SA0	63	GND
32	GND	64	GND

3.10 VGA/LCD Interface Connector

The WAFER-4823 provides a 2x22-pin connector for the LCD flat panel interface and a DB15 VGA connector.

• CN13 : 15-pin Female VGA Connector

PIN NO.	Description	PIN NO.	Description
1	RED	2	GREEN
3	BLUE	4	NC
5	GROUND	6	GROUND
7	GROUND	8	GROUND
9	NC	10	GROUND
11	NC	12	NC
13	HSYNC	14	VSYNC
15	NC		

• CN14: LCD Interface Connector

PIN NO.	Description	PIN NO.	Description
1	+12V	2	+12V
3	GND	4	GND
5	+5V	6	+5V
7	FPVEE	8	GND
9	P0	10	P1
11	P2	12	P3
13	P4	14	P5
15	P6	16	P7
17	P8	18	P9
19	P10	20	P11
21	P12	22	P13
23	P14	24	P15
25	P16	26	P17
27	P18	28	P19
29	P20	30	P21
31	P22	32	P23
33	GND	34	GND
35	SHFCLK	36	FLM
37	M	38	LP
39	GND	40	ENABLK
41	GND	42	N/C
43	+5V	44	5V

3.11 LAN RJ45 Connector

The WAFER-4823 built-in RJ45 LAN connector is for 10Mbps Ethernet (NE-2000 compatible) operation.

- **CN15 : LAN RJ45 Connector**

PIN NO.	Description	PIN NO.	Description
1	TX+	5	NC
2	TX-	6	RX-
3	RX+	7	NC
4	NC	8	NC

- **CN17 : LAN LED Connector (4-pin header) for LAN**

PIN NO.	Description
1	LINK
2	+5V
3	RX
4	+5V

3.12 Digital I/O

One characteristic of digital circuit is its fast respond to high or low signal. This kind of respond is badly needed for harsh and critical industrial operating environment. That's why we design 4-bit digital inputs and 4-bit digital outputs on the WAFER-4823.

Digital Input and Output, generally, are control signals. You can use these signals to control external devices that needs On/Off circuit or TTL devices. The register address is 340H.

- **CN16 : Digital I/O**

PIN NO.	Description	PIN NO.	Description
1	GND	6	VCC
2	DO3	7	DO2
3	DO1	8	DO0
4	DIN3	9	DIN2
5	DIN1	10	DIN0

Chapter 4 AMI BIOS Setup

The WAFER-4823 uses AMI BIOS for system configuration, and the AMI BIOS setup program is designed to provide maximum flexibility in configuring the system by offering various options which may be selected for end-user requirements. This chapter is written to assist you in the proper usage of these features.

4.1 Getting Start

When you turn on the power button, the BIOS will enter the Power-On-Self-Test routines. These routines will be executed for system test and initialization and system configuration verification.

Note: for your convenience, a diskette containing files for updating the BIOS is included with the following contents:

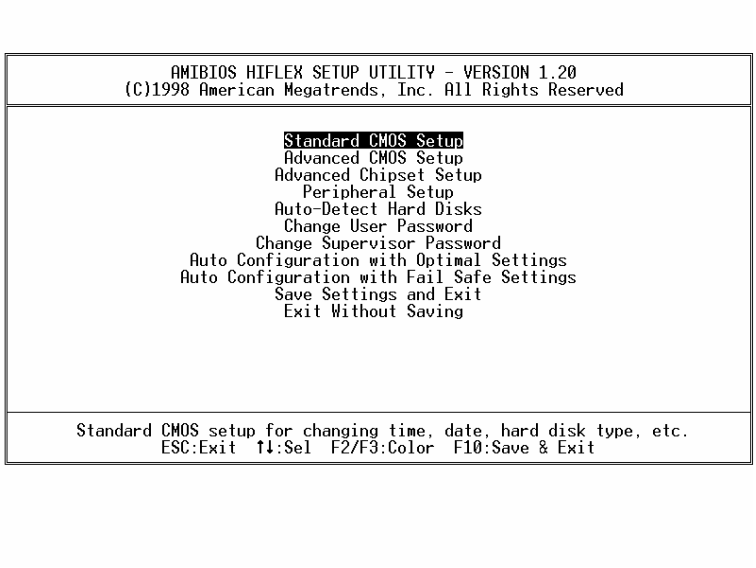
FLASH634.COM : flash utility to update following BIOS

15AMLCD.ROM	WAFER-4823 V1.5A	Mono DSTN640x480 V1.0
15ADSTN.ROM	WAFER-4823 V1.5A	Color DSTN640x480 V1.1
15ATFTS1.ROM	WAFER-4823 V1.5A	TFT640x480-Sync (16bit) V1.0
15ATFTS2.ROM	WAFER-4823 V1.5A	TFT640x480-Sync (18/24bit) V1.0
15ATFTLP1.ROM	WAFER4823 V1.5A	TFT640x480-LP (16bit) V1.0
15ATFTLP2.ROM	WAFER-4823 V1.5A	TFT640x480-LP (18/24bit) V1.0
15ATFT861.ROM	WAFER-4823 V1.5A	TFT800x600-Sync (16bit) V1.0
15ATFT862.ROM	WAFER-4823 V1.5A	TFT800x600-Sync (18/24bit) V1.0
15AEL.ROM	WAFER-4823 V1.5A	EL640x480 V1.1
15APLASMA.ROM	WAFER-4823 V1.5A	PLASMA640x480 V1.0

After the POST routines are completed, the following message appears :

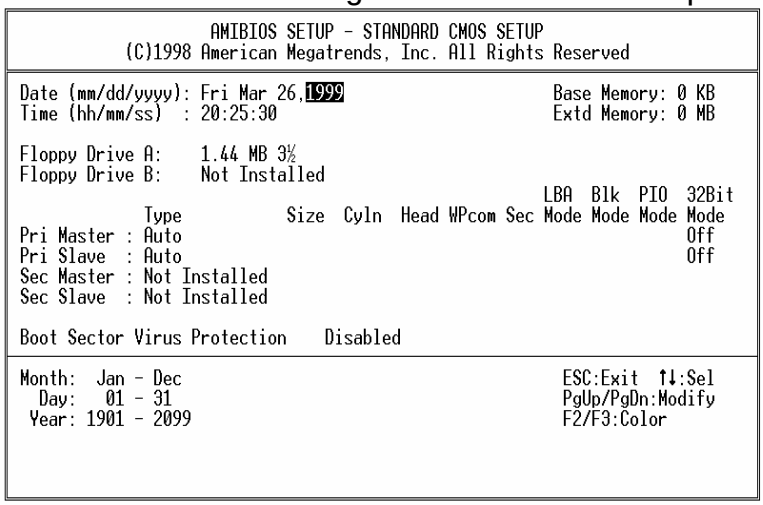
" Hit DEL if you want to run SETUP"

To access AMI BIOS SETUP UTILITY, press <Del> key. The following screen will be displayed at this time:



4.2 Standard CMOS Setup

The standard CMOS Setup is used for basic hardware system configuration. The main function is for Date/Time setting and Floppy/Hard Disk setting. Please refer to the following screen for this setup



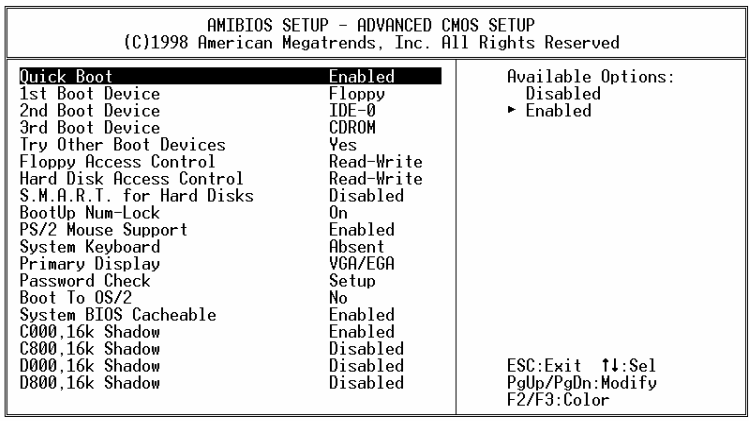
To set the Date, for example, press either the arrow or <Enter> button on your keyboard to select one of the fields (Months, Date or Year) then press either <PgUp> or <PgDn> to set it to the current Months, Date and Year. Do the same steps for Time setting.

For IDE hard disk drive setup, please check the following possible setup procedure:

1. Use the Auto-Detect Hard Disk option in the main menu; the computer will automatically detect the HDD specifications.
2. Manually enter the specifications by yourself by selecting the Type of your HDD.

4.3 Advanced CMOS Setup

The following screen will be displayed if you select Advanced CMOS Setup:



You can change the value of each options by using <PgUp> and <PgDn> key. The available values are shown on the right screen.

Quick Boot ➔ *Enabled*: this will enable the BIOS to boot quickly when you turn on your computer. The BIOS will only check the first 1MB of the system memory.

Quick Boot ➔ *Disabled:* the BIOS will test all system memory when it boots up. It will spend about 40 seconds untill it receives a Ready signal from the HDD. It will also wait for you to press the <Del> key or not.

1st, 2nd, 3rd Boot Device ➔ to define the device type for booting after the routines check up completes. If the 1st Boot Device fails, the BIOS will attempt to boot from the 2nd or the 3rd device.

Try Other Boot Devices ➔ the BIOS will try to boot from any other available device in the system if the 1st, 2nd and 3rd device fails to boot.

Floppy Access Control ➔ to define the read/write access which is set when booting from a floppy drive.

Hard Disk Access Control ➔ to define the read/write access which is set when booting from a HDD.

S.M.A.R.T. for Hard Disks ➔ to allow BIOS to use the **S**ystem **Ma**nagement and **R**eporting **T**echnologies protocol for reporting server system information on a network.

BootUp Num-Lock ➔ to turn on/off the Num-Lock option on a enhanced keyboard when you boot. If you turn it off, the arrow keys on the numeric keypad can be used just as the other set of arrow keys on the keyboard and vice versa.

PS/2 Mouse Support ➔ to testify whether or not a PS/2 mouse is supported.

System Keyboard ➔ to testify whether or not a keyboard is attached to the computer.

Primary Display ➔ to define the type of display monitor of the system. The Absent option is for network file servers.

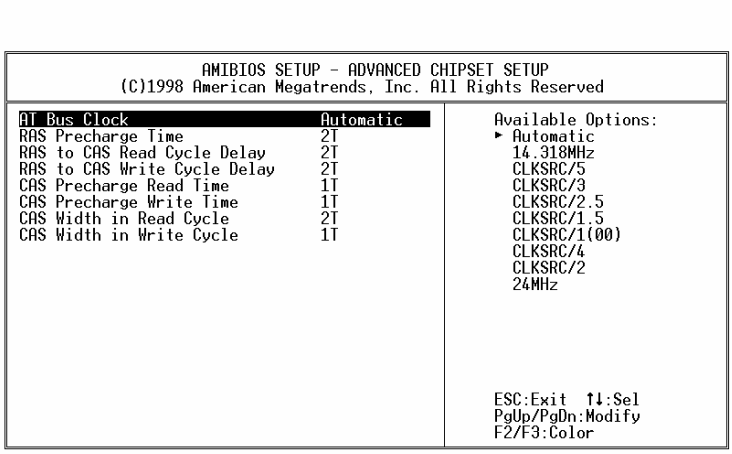
Password Check ➔ to define if a password is necessary or not for access to the system.

Boot to OS/2 ➔ if you run the OS/2 operating system, this option must be set to yes.

System BIOS Cacheable ➔ to define whether or not the memory segment FOOOH can be read from or written to cache memory. Setting it Enabled will give faster execution in your system.

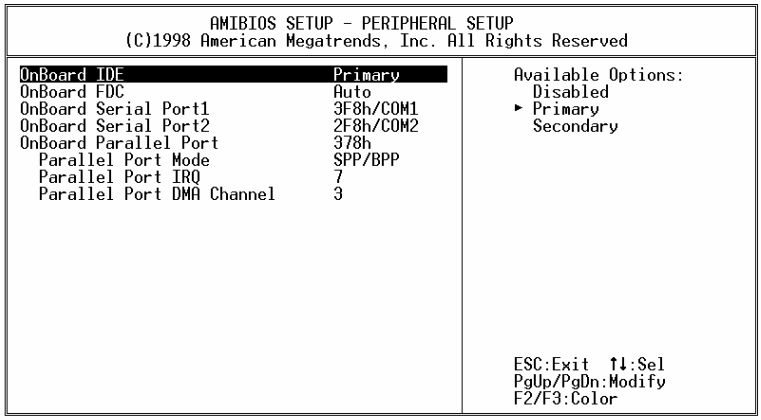
XXXX, 16k Shadow ➔ ROM Shadow is a technique in which BIOS code is copied from slower ROM to faster RAM. If you enable it then the BIOS will be executed form the RAM. Each option allows 16KB segment to be shadowed to the RAM.

4.4 Advanced Chipset Setup



Note: do not change any value on this page unless you understand well the impact of every value to your system.

4.5 Peripheral Setup



When you enter the Peripheral Setup, the following items are available for setting:

On-board IDE ➔ to define the on-board Integrated Drive Electronics controller channel(s) to be used. Available options are: Primary, Secondary and Disabled.

On-board FDC ➔ The floppy disk drive controller can be **Enabled** or **Disabled** by this item. When you do not need floppy disk, the FDD controller can be disabled. If you set it **Auto**, the BIOS will try to enable any floppy drive controller on the ISA Bus.

Serial Port 1 ➔ The options are **Disable**, **3F8**, **2F8, 3E8, 2E8 and Auto**. You can set the I/O address of the serial port 1 (COMA) or disable it.

Serial Port2 ➔ The options are **Disable**, **3F8**, **2F8, 3E8, 2E8 and Auto**. You can set the I/O address of the serial port 2 (COMB) or disable it.

On-board Parallel Port ➔ The options are **Auto**, **Disable**, **3BC**, **378** or **278**. You can set the I/O address of the parallel port or disable it.

Parallel Port Mode ➔ WAFER-4823 provides **EPP, ECP, ECP/EPP,** and **SPP/BPP Mode. EPP** passes the parallel port to be used with devices which stick to the **EPP** specification. The existing parallel port signals will be used by EPP to provide asymmetric bi-directional data transfer driven by the host devices. **ECP** passes the parallel port to be used with devices which stick to the ECP specification.

Parallel Port IRQ ➔ to define the Interrupt Request (IRQ) which is used by the parallel port.

Parallel Port DMA Channel ➔ to set the DMA Channel used by the parallel port.

4.6 Auto-Detect Hard Disk

This option detects the parameters of an IDE hard disk drive (HDD sector, cylinder, head, etc) automatically and will put the parameters into the Standard CMOS Setup screen. Up to 4 IDE drives can be detected and the parameters will be listed in the box. Press <Y> if you accept these parameters. Press <N> to skip the next IDE drives.

Note: If your IDE HDD was formatted in previous older system, incorrect parameters may be detected. In this case, you need to enter the correct parameters manually or low-level format the disk.

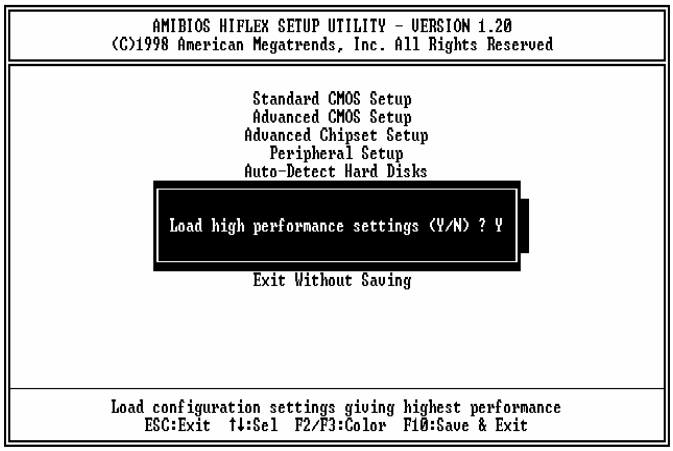
4.7 Change Supervisor Password

This option sets a password that is used to protect your system and Setup Utility. Supervisor Password has higher priority than User Password. Once you setup the password, the system will always ask you to key-in password every time you enter the BIOS SETUP. If you enter the BIOS SETUP with Supervisor Password, you can choose every setup/option on the main menu but with User Password, you can only choose three setup/options (USER PASSWORD, SAVE SETTING AND EXIT and EXIT WITHOUT SAVING). To disable these passwords, enter the BIOS SETUP room with Supervisor Password and then just press the <Enter> key instead of entering a new password when the 'Enter Password' prompt pop-up.

Note : if you forget the password, do the Clear/Reset CMOS procedure (see Part2.3 the CPU Setting for WAFER-4823 >> **Clear CMOS SETUP**)

4.8 Auto Configuration with Optimal Settings

This option lets you load the *Optimal* default settings. These settings are *best-case values* which will provide the best performance. Whenever your CMOS RAM is damaged, this Optimal settings will be loaded automatically.

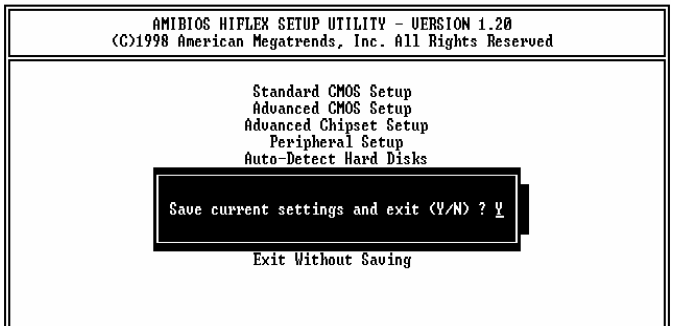


4.9 Auto Configuration with Fail Safe Settings

This option lets you load the *Fail Safe* default settings when something happens to your computer so that it cannot boot normally. These settings are not the most optimal settings but are the most stable settings.

4.10 Save Settings and Exit

Select this option when you finish setting all the parameters and want to save them into the CMOS. Just simply press <Enter> key and all the configuration changes will be saved.



4.11 Exit Without Saving

Select this option if you want to exit the Setup without saving the changes that you made. Just simply press <Enter> key and you will exit the BIOS SETUP without saving the changes.

Appendix A A.Watch-Dog Timer

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have occurred by external EMI or a software bug. When the CPU stops working correctly, hardware on the board will either perform a hardware reset (cold boot) or a Non-Maskable Interrupt (NMI) to bring the system back to a known state.

Two I/O ports control the Watchdog Timer :.

443 (hex)	Read	Enable to refresh the Watchdog Timer.
043 (hex)	Read	Disable the Watchdog Timer.

To enable the Watchdog Timer, a read from I/O port 443H must be performed. This will enable and activate the countdown timer which will eventually time-out and either reset the CPU or cause a NMI, depending on the setting of JP3. To ensure that this reset condition does not occur, the Watchdog Timer must be periodically refreshed by reading the same I/O port 443H. This must be done within the time-out period that is selected by jumper group JP4.

A tolerance of at least 30% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming. Therefore, if the time out period has been

set to 10 seconds, the I/O port 443H must be read within 7 seconds.

Note: when exiting a program it is necessary to disable the Watchdog Timer, otherwise the system will reset.

Appendix B I/O Information

IO Address Map

I/O address Range	Description
000-01F	DMA Controller #1
020-021	Interrupt Controller #1, Master
040-05F	8254 timer
060-06F	8042 (Keyboard Controller)
070-07F	Real time Clock, NMI Mask
080-09F	DMA Page Register
0A0-0BF	Interrupt Controller #2
0C0-0DF	DMA Controller #2
0F0	Clear Math Coprocessor Busy
0F1	Reset Math Coprocessor
0F2	Core logic programming configuration
0F8-0FF	Math Coprocessor
1F0-1F8	Fixed Disk
200-207	Game I/O
278-27F	Parallel Printer Port 2 (LPT3)
2E8-2EF	Serial Port 4
2F8-2FF	Serial Port 2
300-31F	Prototype Card
360-36F	Reserved
378-37F	Parallel Printer Port 1 (LPT2)
3B0-3BF	Monochrome Display and Printer Adapter (LPT1)
3C0-3CF	Reserved
3D0-3DF	Color/Graphics Monitor Adapter
3E8-3EF	Serial Port 3
3F0-3F7	Diskette Controller
3F8-3FF	Serial Port 1
443	Watch dog timer enable
843 or 043	Watch dog timer disable

1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
C0000-C7FFF	VGA BIOS
C8000-EFFFF	Free for customer application
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

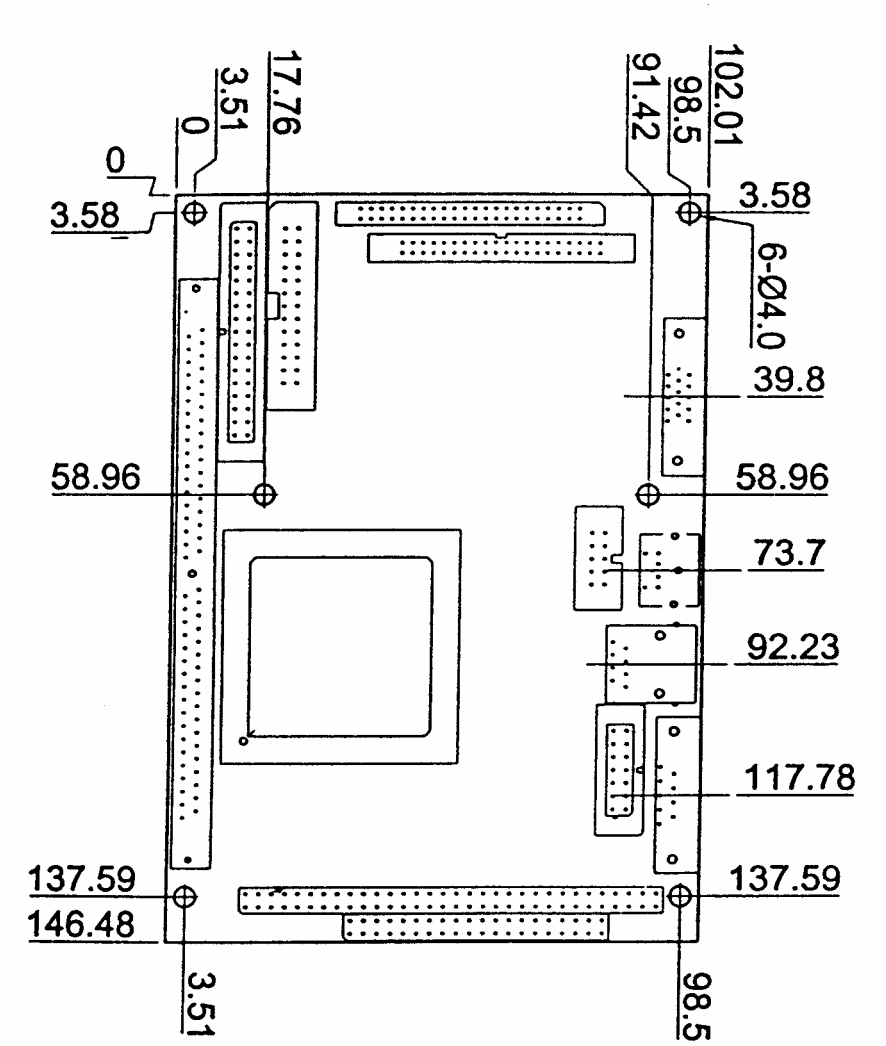
IRQ Mapping Chart

IRQ0	System Timer	IRQ8	RTC Clock
IRQ1	Keyboard	IRQ9	Unused
IRQ2	Cascade to IRQ Controller	IRQ10	Unused
IRQ3	COM2/COM4	IRQ11	Unused
IRQ4	COM1/COM3	IRQ12	PS/2 mouse
IRQ5	Unused	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Printer	IRQ15	Unused

DMA Channel Assignments

DMA 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

Appendix C DIMENSION



Appendix D Appendix D. Digital Input and Output

- **CN16 : Digital I/O**

PIN #	Signal Name	PIN #	Signal Name
1	GND	6	VCC
2	DO3	7	DO2
3	DO1	8	DO0
4	DIN3	9	DIN2
5	DIN1	10	DIN0

Below is the specifications of WAFER-4823 Digital I/O:

- Digital Input/Output channels : 4 bits
- TTL Devices compatible
- Digital Logic level 0: +0.5V max
- Digital Logic level 1: 3.5V to 5V
- Register Address: 340H
- Register Format:

Digital Input (READ 340H)

BIT	D3	D2	D1	D0
VALUE	DIN3	DIN2	DIN1	DIN0

Digital Output (WRITE 340H)

BIT	D3	D2	D1	D0
VALUE	DO3	DO2	DO1	DO0

Example: *If we send **3** to the 340H(inverted)*

BIT	D3	D2	D1	D0
VALUE	*1*	*1*	*0*	*0*