NOVA-8890 Series

Version 2.1

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Support

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Chapter 1. Introduction

Thank you for choosing NOVA-8890 SOCKET 478 Pentium 4/4-M Single Board Computer. NOVA-8890 board is a 5.25" embedded form factor board equipped with high performance processor and multi-mode I/O designed for the system manufacturers, integrators, or VARs that needs reliable and quality performance at a reasonable price.

In addition, the VGA controller of NOVA-8890 Built-in AGP4X VGA (Intel 845G/GV) has 3D graphics capability, which provides up to 2048x1536x16-color resolution. The onboard VGA shares 8MB system DDR-SDRAM.

An advanced high performance super AT I/O chip–ITE IT8712 & Winbond W83627 are used in the NOVA-8890 board. On-chip UARTs are compatible with NS16C550. The parallel port and IDE interface are compatible with IBM PC/AT architecture.

NOVA-8890 has built-in (ICH4) 10/100 & Onboard Intel 82540EM 100/1000 Fast Ethernet LAN. They are fully integrated 10BASE-T/100BASE-TX/1000BASE-TX LAN solution with high performance networking functions as well as low power consumption feature.

NOVA-8890 uses Intel 845G/GV chipsets that are 100% software compatible and are of PCI 2.2 standard.

1.1 Specifications

CPU (PGA 478)	Intel Pentium 4/4-M Processor, supports 400/533 MHz FSB
Bus interface	PC/104-PLUS & One PCI SLOT signal are provided
Bus speed	PCI: 33 MHz
DMA channels	7
Interrupt levels	15
Chipset	INTEL 845G/GV (GMCH)
Real-time clock	INTEL 82801DB (ICH4)
System memory	One 184-pin DIMM socket to support DDR 200/266 SDRAM. The maximum memory is up to 1 GB.
ATA/100 IDE interface	● Supports up to four PCI Enhanced IDE hard drives. ● The ATA/100 IDE can handle data transfer up to 100 MB/s. ● Compatible with existing ATA-2 IDE specifications. ● IDE1 can be converted to SATA type of devices.
Floppy disk drive interface	Supports up to two floppy disk drives, 5.25" (360KB and 1.2MB) and/or 3.5" (720KB, 1.44MB, and 2.88MB)
Serial ports	COM1, COM3, COM4 (RS-232) & COM2 (RS-232/RS-422/RS-485) with 16C550 UART (or compatible) with 16-byte FIFO buffer. Supports up to 115.2Kbps.
Bi-directional parallel port	Configurable to LPT1, or disabled. Supports EPP/ECP/SPP
Hardware monitor	Built in to monitor power supply voltage and fan speed status
IrDA port	Supports Serial Infrared (SIR) and Amplitude Shift Keyed IR (ASKIR) interface
USB port	Supports 4 USB 2.0 ports for future expansion
Watchdog timer	Software Programmable Reset generated when CPU does not periodically trigger the timer. Your can use BIOS INT15 to control the watchdog and generate a system reset.
VGA controller	● Built-in AGP2.0 4X 3D graphics engine. ● Share system DDR SDRAM 8MB. ● Onboard flat panel chip ds90c2501 Supports 18bit/24-bit single pixel or 36bit/48bit dual pixel color LVDS TFT LCD.
Ethernet	● ICH4 & 82540EM Fast Ethernet controllers, IEEE 802.3u Auto-Negotiation support for 10BASE-T/100BASE-TX & 100BASE-T/1000BASE-TX standard.

	● Two RJ45 connectors are located on board for easy connection.
Keyboard and PS/2 mouse	A 6-pin header connector is located on board for easy connection to keyboard & PS/2 mouse.
Digital input/output	It provide with 4-bit digital input/output (+5V level). Your can use I/O PORT 201H to control it.
Audio	AC'97 Audio CODEC
1394A port	Supports 2 1394A ports compliant with 1394 OHCI specification 1.1, IEEE 1394-1395 and 1394A-2000.
Compact flash	It can be used (IDE2) with a passive adapter (True IDE Mode) in a Type I/II Socket.
Power consumption	(Pentium 4: 2.4GHz, 512MB DDR266-SDRAM) +5V @ 4.2A, +12V @ 4.85A. (Pentium 4-M (mobile CPU): 2.4GHz, 512MB DDR266-SDRAM) +5V @ 3.9A, +12V @ 4.00A. Recommended: 350-watt power supply or higher
Operating temperature	0 ℃ ~ 60 ℃ (*CPU needs Cooler & silicone heat sink paste*)

WARNING:

1. Run the processor only when the heat sink (cooler) is properly and firmly attached.
2. Please use ATX-12V Power Connector (PW1) to supply power to the CPU.

1.2 Package Contents

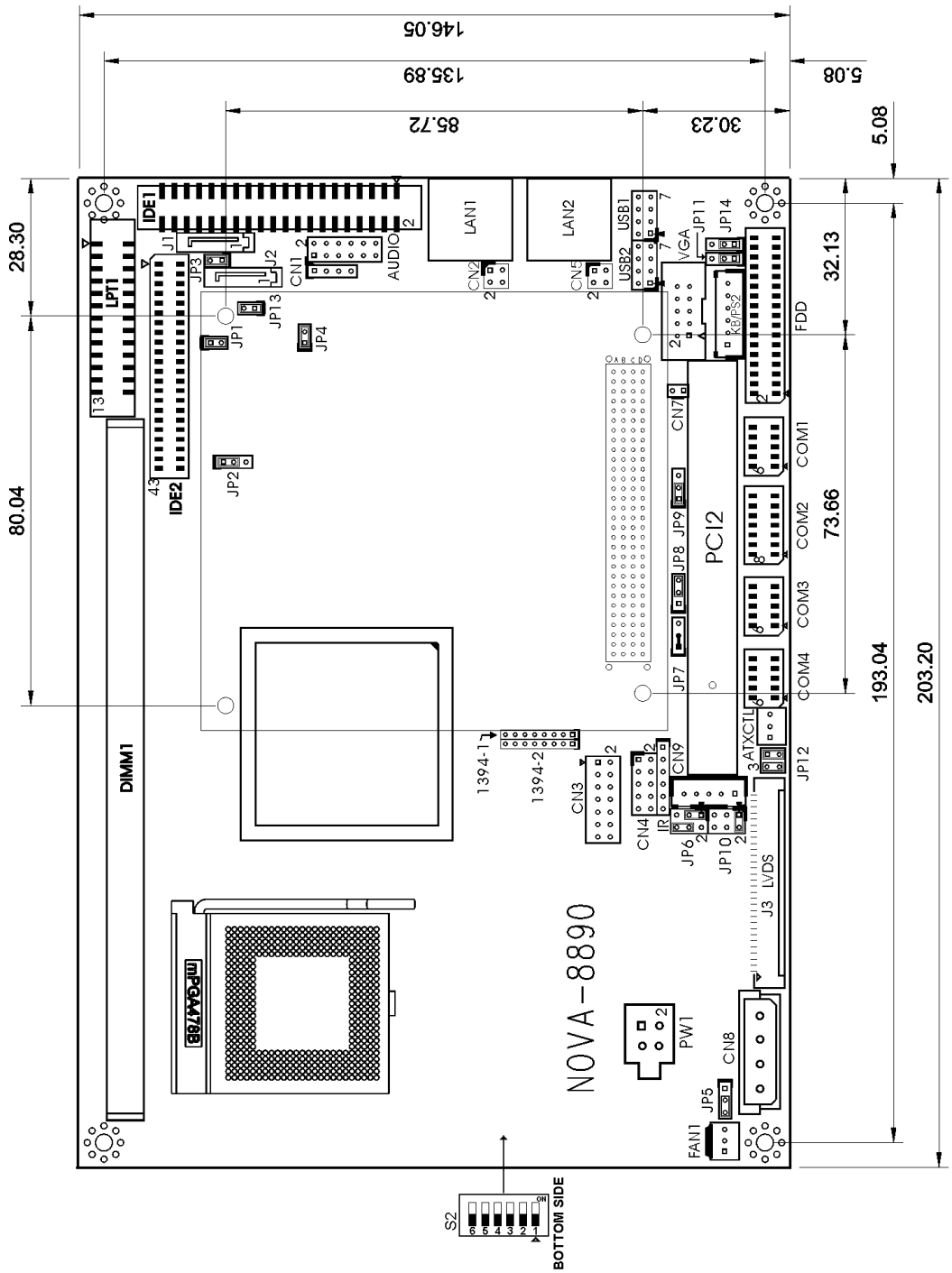
In addition to this *User Manual*, the NOVA-8890 package includes the following items:

- NOVA-8890 single board X 1
- RS-232 & RS232/422/485 cable X 1
- RS-232 cable x 3
- Printer cable X 1
- FDD cable X 1
- USB cable X 1
- 1394A cable X 1 (For model NOVA-8890MSFG/MSF)
- Audio cable X 1
- VGA cable X 1
- SATA IDE cable X 2 (For model NOVA-8890MSFG/MSF)
- SATA IDE Power Y cable X 1 (For model NOVA-8890MSFG/MSF)
- PATA IDE cable X 3 (40-pin X 1,44-pin X 1,44-pin to 40-pin x 1)
- ATX-12V cable X 1
- Power cable X 1 (For ATX 5VSB/Power on)
- One 6-pin cable converts to two 6-pin mini-Din cables for keyboard and mouse connection

If any of these items are missing or damaged, please contact the dealer from whom you purchased this product. Keep the shipping materials and carton in case you want to ship or store the product in the future.

Chapter 2. Installation

2.1 NOVA-8890 Layout



2.2 Unpacking Precautions

Some components on NOVA-8890 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 the precautions listed below:

- Ground yourself to remove any static charge before touching your NOVA-8890 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 NOVA-8890 SBC by its edges. If not necessary, please don't touch IC chips, leads or circuitry on this CPU board.
- Do not plug any connector or jumper while the power is on.

- **Table of Jumpers**

Label	Function
JP1	Disable (close) J2 (IDE1 slave) S-ATA
JP3	Disable (close) J1 (IDE1 master) S-ATA
JP2	CMOS state setting
JP4	CompactFlash Master (close)/Slave (open) setting
JP5	RGB TO LVDS color mapping select
JP6	COM2 PIN11 Voltage Output setting
JP8	PC/104-PLUS Power source setting
JP9	COM2 RS232/RS422/RS485 select
JP10	LCD Power setting
JP11	Keyboard/Mouse power source setting
JP12	LCD pixel type setting
JP14	COM2 RS422 or RS485 select
S2	CPU voltage setting

2.3 PC/104-PLUS Power Source Setting

JP8	Description
1-2	+5V
2-3	+3.3V

Note: All shaded rows in the tables of this manual are the default settings for NOVA-8890.

2.4 Clear CMOS

To clear the CMOS data, close the JP2 (2-3) for about 3 seconds, then open it again.

- **JP2: Clear CMOS (Reserved Function)**

JP2	Description
1-2	Normal Operation
2-3	Clear CMOS Setup

WARNING:
When you change the power supply between ATX and AT, clear CMOS (Power On) first. Otherwise, the CPU Board may fail to boot.

2.5 Onboard Keyboard/Mouse Power Source Setting

JP11	Description
1-2	+5V
2-3	+5VSB

2.6 COM2 RS232/RS422/RS485

COM2 RS232/RS422/RS485 mode Selection & Voltage Output (PIN11) Setting

- **JP9: To set the operating mode of COM2.**

JP9	Description
1-2	RS232
2-3	RS422/485

- **JP14: To set the operating mode of COM2.**

JP14	Description
1-2	RS422
2-3	RS485

- **JP6: To select the function of pin 11 at COM2, you can set this pin to provide RI, 5V or 12V power source.**

JP6	COM2 PIN8
(1-3) (2-4)	+5V
(3-5) (2-4)	+12V
(1-3) (4-6)	RI

2.7 LCD Setting

PANEL MODEL	JP10	JP5	JP12
ChiMei M170E4	3-4	2-3	(1-2) (3-4)
LG LP150X1	1-2	2-3	1-2
Toshiba LTM15C423S	1-2	2-3	(1-2) (3-4)
Torisan TM121XG-02	1-2	2-3	1-2
IMES DM121-53DR	1-2	2-3	1-2
UniPac UB104S01	1-2	2-3	1-2

- **JP5: Shorting (1-2) pin to select non-conventional 24/48-bit color mapping LCD, shorting (2-3) pin to select conventional 18/36-bit & 24/48-bit LCD color mapping LCD.**

JP5	Description
1-2	Non-conventional
2-3	Conventional

- **JP10: LCD Power Setting**

JP10	Description
1-2	+3.3V
3-4	+5V
5-6	+12V

- **JP12: Setting single pixel or dual pixel of LCD panel**

JP12	Description
(1-2) (3-4)	Dual pixel output
(1-2)	Single pixel output

2.8 CPU Voltage Setting

NOVA-8890 board can use two different types of CPU. One is Pentium4 CPU model and the other is Pentium4-M CPU.

- **2.8-1:** While using Pentium4 CPU, please turn OFF 1,2,3,4,5,6 of S2 switch. CPU VID will now automatically configure the power of CPU. (Default)

- **2.8-2:** When using Pentium4-M CPU, turn ON 1,4,6 of S2 switch, and turn OFF 2,3,5. The power of CPU will be set to 1.3V at this time.

Chapter 3. Connection

This chapter describes how to connect peripherals, switches and indicators to the NOVA-8890 board.

- **Table of Connectors**

LABEL	FUNCTION
FAN1	Fan Connectors
PW1/CN8	ATX-12V CPU/SYSTEM Power Source
VGA	VGA 15-pin Female Connector
J3 & CN9	LVDS panel & Inverter Connectors
IR	IrDA Connector
USB1/USB2	USB Connectors
1394-1/1394-2	1394 Connectors
LPT1	Parallel Port Connector
COM1/COM3/COM4	Serial Port Connectors
COM2	Serial Port Connector
ATXCTL	Power supply to Mainboard Connector
CN7	ATX BUTTON (Power ON) Switch
CN4	Digital INPUT/OUTPUT Connector
CN3	External Switches and Indicators
CN2/CN5	LAN State LED Connectors
KB/PS2	6-pin Header Keyboard & PS2 Mouse Connector
AUDIO	AUDIO MIC-IN, LINE-IN, LINE-OUT Connector
CN1	AUDIO CD-IN
LAN1	10/100-TX LAN RJ45 Connector
LAN2	100/1000-TX LAN RJ45 Connector
FDD1	FDC Connector
IDE1	Primary IDE Connector
J1/J2	S-ATA Primary IDE Connector
IDE2/CF	Secondary IDE Connector

3.1 Floppy Disk Drive Connector

The NOVA-8890 board is equipped with a 34-pin daisy-chain drive connector cable.

- **FDD: FDC Connector**

PIN	Description	PIN	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 A#
11	GROUND	12	DRIVE SELECT B#
13	GROUND	14	DRIVE SELECT A#
15	GROUND	16	MOTOR ENABLE B#
17	GROUND	18	DIRECTION#
19	GROUND	20	STEP#
21	GROUND	22	WRITE DATA#
23	GROUND	24	WRITE GATE#
25	GROUND	26	TRACK 0#
27	GROUND	28	WRITE PROTECT#
29	GROUND	30	READ DATA#
31	GROUND	32	SIDE 1 SELECT#
33	GROUND	34	DISK CHANGE#

3.2 PCI E-IDE Disk Drive Connector

You can attach four IDE (Integrated Device Electronics) hard disk drives on two channels. These connectors support Ultra-DMA100 IDE devices. It is recommended to connect Non-DMA100 devices to the secondary IDE connector.

IDE 1: Primary IDE Connector (Pitch 2.54 mm)
IDE 2: Secondary IDE Connector (Pitch 2.0 mm)

IDE1 converts to SATA setting:

- **J1 (Master)/J2 (Slave): Primary SATA IDE Connector**

PIN	Description
1	GROUND
2	S-ATA TX+
3	S-ATA TX-
4	GROUND
5	S-ATA RX-
6	S-ATA RX+
7	GROUND

Master only	Master + Slave	Disable SATA function
JP1 (CLOSE)	JP1 (OPEN)	JP1 (CLOSE)
JP3 (OPEN)	JP3 (OPEN)	JP3 (CLOSE)
JP13 (CLOSE)	JP13 (OPEN)	JP13 (CLOSE)

Note: All shaded rows in the tables of this manual are the default settings for NOVA-8890.

- **IDE Interface Connector**

PIN	Description	PIN	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	GROUND	20	N/C
21	N/C	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	N/C	28	BALE – DEFAULT
29	N/C	30	GROUND – DEFAULT
31	INTERRUPT	32	IOCS16# - DEFAULT
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND
41	+5V	42	+5V
43	GROUND	44	N/C

Note: Pins 41~44 are applicable for IDE2 only.

3.3 Parallel Port

This port is usually connected to a printer. NOVA-8890 includes an on-board parallel port, accessed through a 26-pin flat-cable connector.

- **LPT1: Parallel Port Connector**

PIN	Description	PIN	Description
1	STROBE#	14	AUTO FORM FEED #
2	DATA 0	15	ERROR#
3	DATA 1	16	INITIALIZE
4	DATA 2	17	PRINTER SELECT LN#
5	DATA 3	18	GROUND
6	DATA 4	19	GROUND
7	DATA 5	20	GROUND
8	DATA 6	21	GROUND
9	DATA 7	22	GROUND
10	ACKNOWLEDGE	23	GROUND
11	BUSY	24	GROUND
12	PAPER EMPTY	26	GROUND
13	PRINTER SELECT	26	GROUND

3.4 Serial Ports

NOVA-8890 offers four high speed NS16C550 compatible UART.

- **COM1, COM3, COM4: 10-pin header**
- **COM2: 14-pin header**

Connector	Port	Address	Interrupt
COM1	COM1	3F8	IRQ4
COM2	COM2	2F8	IRQ3
COM3	COM3	3E8	IRQ11
COM4	COM4	2E8	IRQ10

- **COM1, COM3, COM4 10-pin Connector**

PIN	Description	PIN	Description
1	DATA CARRIER DETECT (DCD)	6	DATA SET READY (DSR)
2	RECEIVE DATA (RXD)	7	REQUEST TO SEND (RTS)
3	TRANSMIT DATA (TXD)	8	CLEAR TO SEND (CTS)
4	DATA TERMINAL READY (DTR)	9	RING INDICATOR (RI)
5	GROUND	10	NC

- **COM2 14-pin Connector**

PIN	Description	PIN	Description
1	DATA CARRIER DETECT (DCD)	8	DATA SET READY (DSR)
2	RECEIVE DATA (RXD)	9	REQUEST TO SEND (RTS)
3	TRANSMIT DATA (TXD)	10	CLEAR TO SEND (CTS)
4	DATA TERMINAL READY (DTR)	11	RING INDICATOR (RI)
5	GROUND	12	NC
6	RS422/RS485 TX+	13	RS422/RS485 TX-
7	RS422/RS485 RX+	14	RS422/RS485 RX-

3.5 Keyboard & PS/2 Mouse Connector

A 6-pin connector is located on the mounting bracket for easy connection to a keyboard & a PS/2 mouse. The board comes with a cable to convert from the 6-pin mini-DIN connector to two 6-pin mini-DIN connectors appropriate for keyboard and mouse connection.

- **KB/PS2: 6-pin Mini-DIN Keyboard Connector**

PIN	Description
1	+5V
2	MOUSE DATA
3	MOUSE CLOCK
4	KEYBOARD DATA
5	KEYBOARD CLOCK
6	GROUND

3.6 External Switches and Indicators

There are several external switches and indicators available to use for monitoring and controlling the CPU board. All the functions are in CN3 connector.

- **CN3: External Switches and Indicators**

	PIN	Description	PIN	Description	
Power LED	1	+5V	2	Speaker +	Speaker
	3	N/C	4	N/C	
	5	GND	6	N/C	
KEYLOCK	7	KEYLOCK PIN1	8	Speaker -	
	9	KEYLOCK PIN2	10	Reset PIN1	Reset Button
	11	GND	12	Reset PIN2	
HDD LED	13	HDD LED+	14	HDD LED -	HDD LED

- **CN7: 2-pin Header ATX POWER BUTTON Connector**

PIN	Description
1	BUTTON PIN 1
2	BUTTON PIN 2

- **ATXCTL: Power Supply to Mainboard Connector**

PIN	Description
1	5VSB
2	ATX-ON
3	GND

3.7 USB Port Connectors

NOVA-8890 provides 4 built-in USB2.0 ports for new I/O bus expansion.

USB1/USB2			
PIN	**Description**	**PIN**	**Description**
1	VCC	2	GROUND
3	DATA0-	4	DATA1+
5	DATA0+	6	DATA1-
7	GROUND	8	VCC

3.8 IrDA Infrared Interface Port

NOVA-8890 has a built-in IrDA port which supports Serial Infrared (SIR) or Amplitude Shift Keyed IR (ASKIR) interface. To use the IrDA port, configure SIR or ASKIR model in the BIOS under Peripheral Setup COM2. In the case, the normal RS-232 COM 2 will be disabled.

- **IR: IrDA Connector**

PIN	Description
1	VCC
2	NC
3	IR-RX
4	Ground
5	IR-TX
6	NC

3.9 Fan Connectors (FAN1)

NOVA-8890 provides two CPU cooling fan connectors, which can supply 12V/500mA to the cooling fan. All connectors have the same pin assignments and provide a "rotation" pin to get rotation signals from fans and notice the system. Therefore the system BIOS can recognize fan speed. Please note that only specified fan can issue the rotation signals.

- **Fan Connector**

PIN	Description
1	Rotation Signal
2	+12V
3	Ground

3.10 LAN RJ45 & State LED Connectors

NOVA-8890 is equipped with LAN1 10/100-TX & LAN2 100/1000-TX Ethernet controllers. You can connect it to your LAN through RJ45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed below:

- **LAN1 (10/100-TX) RJ45 Connector**

PIN	Description	PIN	Description
1	TX+	5	N/C
2	TX-	6	RX-
3	RX+	7	N/C
4	N/C	8	N/C

- **LAN2 (100/1000-TX) RJ45 Connector**

PIN	Description	PIN	Description
1	TXA+ (TX+)	5	TXC- (N/C)
2	TXA- (TX-)	6	TXB- (RX-)
3	TXB+ (RX+)	7	TXD+ (N/C)
4	TXC+ (N/C)	8	TXD- (N/C)

- **CN2 (10/100-TX)/CN5 (100/1000-TX): LAN State LED Connector**

PIN	Description
1-2	LINK
3-4	ACTIVE

3.11 VGA Connector

NOVA-8890 has a built-in 10-pin VGA connector directly connected to your CRT monitor.

- **VGA: 10-pin Female Connector**

PIN	Description	PIN	Description
1	RED	2	DDC CLK
3	GREEN	4	DDC DAT
5	BLUE	6	GROUND
7	HSYNC	8	GROUND
9	VSYNC	10	GROUND

3.12 Audio Connector

NOVA-8890 has a built-in AC'97 AUDIO CODEC connector directly connected to your MIC-IN & LINE-IN.

- **Audio: Audio Connector**

1	LEFT SPEAKER OUT SIGNAL (WITH AMPLIFIER)
2	RIGHT SPEAKER OUT SIGNAL (WITH AMPLIFIER)
3	GROUND (FOR SPK CONNECTOR)
4	GROUND
5	LEFT SPEAKER OUT SIGNAL (WITHOUT AMPLIFIER)
6	RIGHT SPEAKER OUT SIGNAL (WITHOUT AMPLIFIER)
7	LEFT LINE IN SIGNAL
8	RIGHT LINE IN SIGNAL
9	GROUND (FOR LINE IN CONNECTOR)
10	GROUND (NO USE)
11	MIC IN
12	GROUND (FOR MIC IN CONNECTOR)

- **CD_IN: CD Audio Input Connector**

1	LEFT CD AUDIO INPUT SIGNAL
2	GROUND
3	GROUND
4	RIGHT CD AUDIO INPUT SIGNAL

3.13 ATX-12V Power Connector

This connector supports the ATX power and provides functions such as modem ring on; wake-up LAN and soft power off are supported by mainboard. (Power source from Mainboard)

PW1			
PIN	**Description**	**PIN**	**Description**
1	GND	2	GND
3	+12V	4	+12V

Note: The power from PW1 should support at least 9A current for the use of P4 CPU. Otherwise, the operation of CPU could be abnormal. Do not connect the power to other devices, such as hard disk. For such occasions, you can choose from other special cables provided by ICP.

3.14 Digital INPUT/OUTPUT Connector

These I/O pins are TTL level with 8mA source-sink capability.

CN4			
PIN	**Description**	**PIN**	**Description**
1	GND	2	+5V
3	OUT3	4	OUT2
5	OUT1	6	OUT0
7	IN3	8	IN2
9	IN1	10	IN0

3.15 LVDS (J3) LCD & Inverter (CN9) Connector

- **J3: LVDS Connector**

PIN	Description	PIN	Description
1	GROUND	16	CH2 DATA3-
2	GROUND	17	CH2 CLK+
3	CH1 DATA3+	18	CH2 CLK-
4	CH1 DATA3-	19	CH2 DATA2+
5	CH1CLK+	20	CH2 DATA2-
6	CH1 CLK-	21	CH2 DATA1+
7	CH1 DATA2+	22	CH2 DATA1-
8	CH1 DATA2-	23	CH2 DATA0+
9	CH1 DATA1+	24	CH2 DATA0-
10	CH1 DATA1-	25	GROUND
11	CH1 DATA0+	26	GROUND
12	CH1 DATA0-	27	LCD power
13	GROUND	28	LCD power
14	GROUND	29	LCD power
15	CH2 DATA3+	30	LCD power

Please refer to Appendix E for LCD application example.

- **CN9: Inverter Connector**

PIN	Description
1	NC
2	GROUND
3	BKL-POWER, 12V
4	GROUND
5	+5V

3.16 IEEE 1394 Port Connector

NOVA-8890 provides two built-in IEEE 1394 ports to connect with 1394 devices.

1394-1/1394-2			
PIN	**Description**	**PIN**	**Description**
1	+12V	5	TPA-
2	GND	6	TPA+
3	TPB-	7	SHIELD
4	TPB+	8	SHIELD

Chapter 4. AMI BIOS SETUP

4.1 Introduction

AMI BIOS Setup program enables users to modify basic system configuration. This special information is then stored in battery-backed RAM so that it retains the Setup information when the power is turned off.

4.2 Starting Setup

AMI BIOS is immediately activated when you first turn on the computer. The BIOS reads the system information contained in the CMOS and begins the process of checking out the system and configuring it. When the process is completed, the BIOS will seek an operating system on one of the disks, launch it then turn control over to that operating system.

While the BIOS is in control, the Setup program can be activated in one of two ways:

1. By pressing <Del> immediately after switching the system on, or
2. By pressing <Del> when the following message appears briefly at the bottom of the screen during the POST.

Press DEL to enter SETUP

If the message disappears before you respond and you still wish to enter Setup, restart the system by turning the power off momentarily or by pressing the "RESET" button on the system case. You may also restart the system by simultaneously pressing <Ctrl>, <Alt>, and <Delete> keys. If you do not press the keys at the right timing and the system does not boot, an error message will be displayed and you will prompt to...

PRESS F2 to continue, DEL to enter SETUP

4.3 Using Setup

In general, you use the arrow keys to highlight items, press <Enter> to select, use the PageUp and PageDown keys to change entries, press <F1> for help and press <Esc> to quit. The following table provides additional details on how to navigate in the Setup program using the keyboard.

Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand
Right arrow	Move to the item on the right hand
Esc key	Main Menu -- Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
PgUp key	Increase the numeric value or make changes
PgDn key	Decrease the numeric value or make changes
+ key	Increase the numeric value or make changes
- key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 /F3 key	Change color from total 16 colors. F2 to select color forward, F3 to select color backward
F4 key	Reserved
F5 key	Reserved
F6 key	Reserved
F7 key	Reserved
F8 key	Reserved
F9 key	Reserved
F10 key	Save all the CMOS changes, only for Main Menu

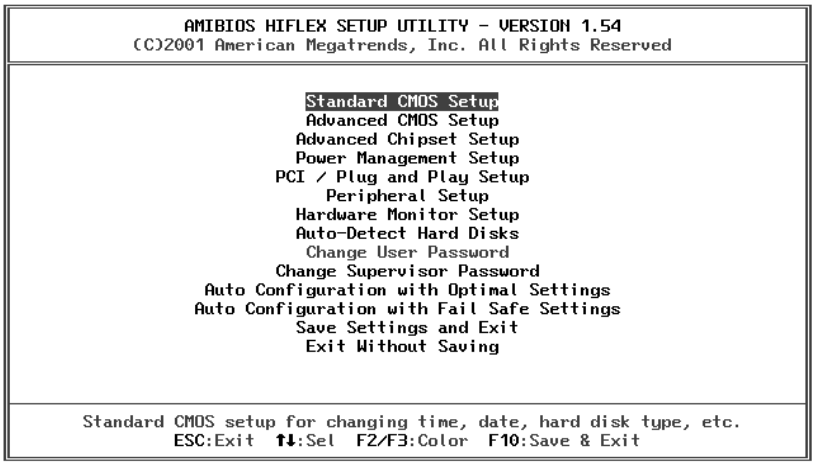
4.4 Getting Help

Press F1, a help window will pop up and describe the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window, press <Esc> or F1 again.

If you discover that your computer cannot boot after making and saving system changes in the Setup Menu, AMI BIOS supports an override to the CMOS settings that consequently resets your system to its default setting.
We strongly recommend you to avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your systems manufacturer to ensure a reliable performance.

4.5 Main Menu

Once you enter the AMIBIOS™ CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu enables you to select from several setup functions and two exit choices. Use the arrow keys to select among the items and press <Enter> to accept and enter the sub-menu.



A brief description of each highlighted selection will appear at the bottom of the screen.
The main menu includes the following main setup categories. Please note that some systems may not include all of the following entries.

Standard CMOS Setup

Use this menu for basic system configuration.

Advanced CMOS Setup

Use this menu to set the Advanced Features available on your system.

Advanced Chipset Setup

Use this menu to change the values in the chipset registers and optimize system performance.

Power Management Setup

When Disabled, SMI will not be initialized, and complete power management functionality is removed until this option is set to Enabled.

PCI / Plug and Play Setup

This entry appears if your system supports PnP/PCI.

Peripheral Setup

Use this menu to specify your settings for integrated peripherals.

Hardware Monitor Setup

Use this menu to monitor your hardware.

Auto-detect Hard Disks

Use this menu to specify your settings for hard disks control.

Change Supervisor Password

Use this menu to set User and Supervisor Passwords.

Auto Configuration with Optimal Settings

Use this menu to load the BIOS default values that are factory settings for optimal performance system operations. While AMI has designed the custom BIOS to maximize performance, the factory has the right to change these defaults to meet their needs.

Auto Configuration with Fail-Safe Settings

Use this menu to load the BIOS default values for the minimal/stable performance for your system to operate.

Save Settings and Exit

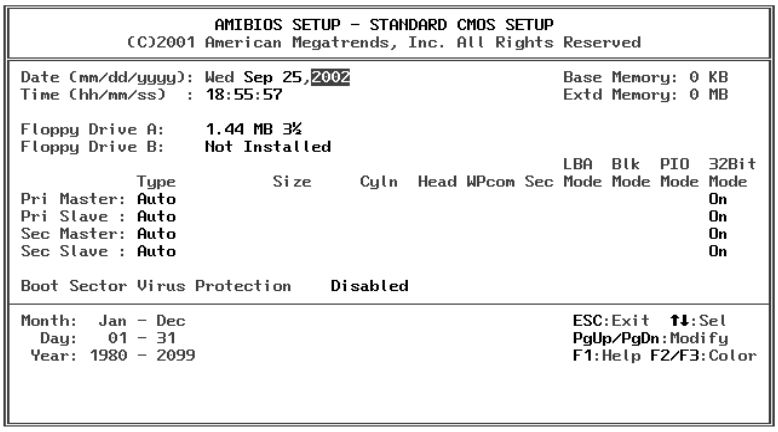
Save CMOS value changes to CMOS and exit setup.

Exit Without Saving

Abandon all CMOS value changes and exit setup.

4.6 Standard CMOS Setup

The items in Standard CMOS Setup Menu are divided into 10 categories. Each category includes no, one or more than one setup items. Use the arrow keys to highlight the item and then use the <PgUp> or <PgDn> keys to select the value in each item.

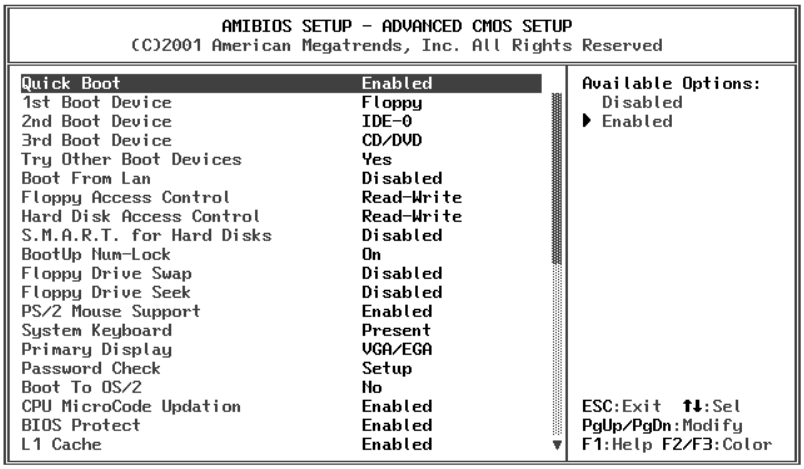


Main Menu Selections

Item	Options	Description
Date	MM DD YYYY	Set the system date
Time	HH: MM: SS	Set the system time
IDE Primary Master	Options are in its sub menu (described in Table 3)	Press <Enter> to enter the sub menu of detailed options
IDE Primary Slave	Options are in its sub menu (described in Table 3)	Press <Enter> to enter the sub menu of detailed options
IDE Secondary Master	Options are in its sub menu (described in Table 3)	Press <Enter> to enter the sub menu of detailed options
IDE Secondary Master	Options are in its sub menu (described in Table 3)	Press <Enter> to enter the sub menu of detailed options
Drive A Drive B	None 360K, 5.25 in 1.2M, 5.25 in 720K, 3.5 in 1.44M, 3.5 in 2.88M, 3.5 in	Select the type of floppy disk drive installed in your system
Halt On	All Errors No Errors All, but Keyboard All, but Diskette All, but Disk/Key	Select the situation in which you want the BIOS to stop the POST process and notify you
Base Memory	N/A	Displays the amount of conventional memory detected during boot up
Extended Memory	N/A	Displays the amount of extended memory detected during boot up

4.7 Advanced CMOS Setup

This section enables you to configure the basic operation of the system including default speed, boot-up sequence, keyboard operation, shadowing and security.



Quick Boot

When set to enabled, DRAM testing function will be disabled.

1st /2nd /3rd Boot Device

This option sets the type of device for the first boot drives that the AMIBIOS attempts to boot from after AMIBIOS POST completes.

The Choice: Disabled, IDE-0, IDE-1, IDE-2, IDE-3, Floppy, ARMD-FDD, ARMD-HDD, CDROM, and SCSI.

Try Other Boot Devices

Set this option to Yes to instruct AMIBIOS to boot from any other drives in the system if it cannot find a boot drive among the drives specified in the 1st, 2nd, 3rd, and 4th Boot Device options.

The Choice: Yes or No.

Floppy Access Control

This option specifies the read/write access that is set when booting from a floppy drive.

The Choice: Read/Write or Read-Only.

Hard Disk Access Control

This option specifies the read/write access that is set when booting from a hard disk drive.

The Choice: Read/Write or Read-Only.

S.M.A.R.T. for Hard Disks

S.M.A.R.T. stands for Self-Monitoring, Analysis and Reporting Technology. When this option is selected, BIOS will warn users of any possible device failure and enable users back up the device before actual failure happens.

The Choice: Disabled, Enabled.

Boot Up Num-Lock

This option turns off Num Lock when the system is powered on so that users can use the arrow keys on both the numeric keypad and the keyboard.

Floppy Drive Swap

Set this option to Enabled to permit drives A: and B: to be swapped. The Choice: Enabled or Disabled.

Floppy Drive Seek

Set this option to Enabled to specify that floppy drives A: will perform a Seek operation at system boot.

The Choice: Enabled or Disabled.

PS/2 Mouse Support

When this option is enabled, BIOS can support a PS/2- type mouse.

System Keyboard

This option does not specify if a keyboard is attached to the computer. Rather, it specifies if error messages are displayed or not when a keyboard is not attached. This option permits you to configure workstation with no keyboard.

The Choice: Absent, Present.

Primary Display

Select this option to configure the type of monitor attached to the computer.

The Choice: Monochrome, Color 40x25, Color 80x25, VGA/PGA/EGA, or Not Install.

Password Check

This option enables the password check option every time the system boots or the end user runs Setup. If 'always' is chosen, a user password prompt will appear every time the computer is turned on. If 'setup' is chosen, the password prompt will appear only when BIOS is executed.

Boot To OS/2

Set this option to Enabled if running OS/2 operating system and using more than 64MB of system memory on the motherboard.

The Choice: YES or NO.

Wait For 'F1' If Error

If this option is enabled, AMIBIOS will wait for users to press <F1> before continuing the boot process. If this option is disabled, AMIBIOS continues the boot process without waiting for <F1> to be pressed.

The Choice: Disabled or Enabled.

Hit 'DEL' Message Display

Disabling this option prevents "Hit <DEL> if you want to run Setup" from appearing when the system boots.

The Choice: Disabled or Enabled.

L1 Cache

This option is used to enable or disable internal cache memory in the processor.

L2 Cache

The option enables secondary cache memory. If Enabled is selected, external cache memory will be enabled. If disabled is selected, external cache memory will be disabled.

System BIOS Cacheable

When this option is set to Enabled, the System ROM area from F0000-FFFFF is copied (shadowed) to RAM for faster execution.

C000, 32k Shadow

When this option is set to Enabled, the Video ROM area from C0000-C7FFF is copied (shadowed) to RAM for faster execution.

- Disabled: The contents of the video ROM are not copied to RAM.
- Cached: The contents of the video ROM area from C0000h - C7FFFh are copied from ROM to RAM and can be written to or read from cache memory.
- Enabled: The contents of the video ROM area from C0000h - C7FFFh are copied (shadowed) from ROM to RAM for faster execution.

C800, 16k Shadow

These options enable shadowing of the contents of the ROM area named in the option title.

The Choice: Enabled, Disabled, and Cached.

The ROM area that is not used by ISA adapter cards will be allocated to PCI

adapter cards.000, 32k Shadow.

CC00, 16k Shadow

These options enable shadowing of the contents of the ROM area named in the option title.

The Choice: Enabled, Disabled, and Cached.

The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.800, 16k Shadow.

D000, 16k Shadow

These options enable shadowing of the contents of the ROM area named in the option title.

The Choice: Enabled, Disabled, and Cached.

The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.C00, 16k Shadow.

D400, 16k Shadow

These options enable shadowing of the contents of the ROM area named in the option title.

The Choice: Enabled, Disabled, and Cached.

The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.000, 16k Shadow.

D800, 16k Shadow

These options enable shadowing of the contents of the ROM area named in the option title.

The Choice: Enabled, Disabled, and Cached.

The ROM area that is not used by ISA adapter cards will be allocated to PCI adapter cards.400, 16k Shadow.

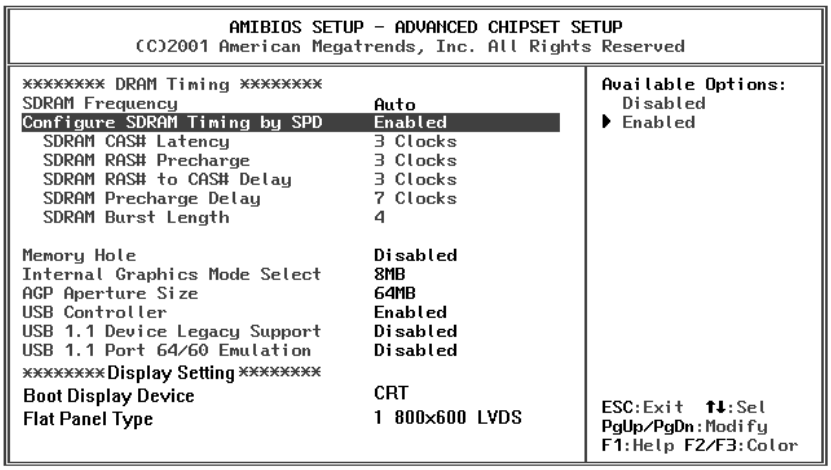
DC00, 16k Shadow

These options enable shadowing of the contents of the ROM area named in the option title.

The Choice: Enabled, Disabled, and Cached.

ISA adapter cards will be allocated to PCI adapter cards.800, 16k Shadow.

4.8 Advanced Chipset Setup



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 external cache. It also coordinates communications between the conventional ISA bus and the PCI bus. Please note that these items should never need to be altered for the default settings have been chosen because they provide the best operating conditions for your system.

SDRAM Frequency

This setting decided by Memory frequency.

Configure SDRAM Timing by SPD

This field detects the capability of the SDRAM modules that you are using - Enabled or Disabled.

SDRAM CAS# Latency

This controls the latency between the SDRAM read command and the time when the data actually is available.

Memory Hole

You can reserve this area of system memory for ISA adapter ROM. When this area is reserved, it cannot be cached. The user information of peripherals that need to use this area of system memory usually discusses their memory requirements.

Internal Graphics Mode Select

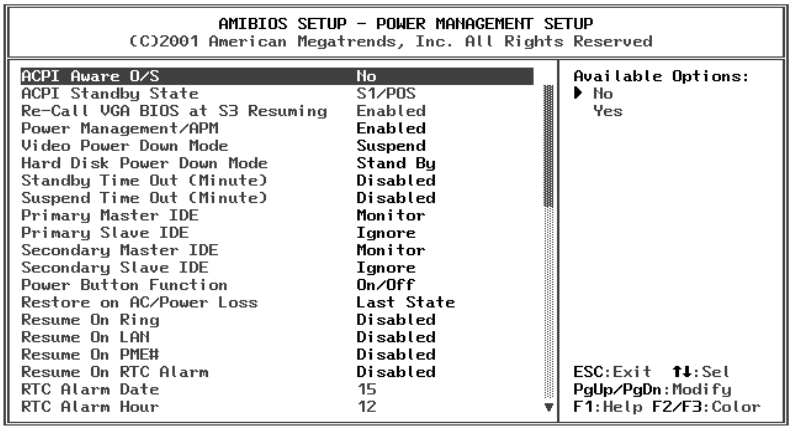
This option is set for sharing memory size from system memory to video memory.

Boot Display Device Select

This option is setting for CRT output or LFP (LCD PANEL) output or dual view output.

Flat Panel Type Select

This option is setting for LVDS PANEL type select.



4.9 Power Management Setup

ACPI Aware O/S

This feature is switch of ACPI function. Configuration options: [No] and [Yes]
****When you are using AT Power supply, please set this option to [NO].**

ACPI Standby State

This feature is switch of POS (S1) function. Configuration options: [S1/POS]

Power Management/APM

When Disabled, SMI will not be initialized. Complete power management functionality is removed until this option is set to Enabled.

Suspend Time Out (Minute)

If no activity occurs during this time period, BIOS will set the system to low power state. The ''Standby Time Out'' period must expire first (if enabled) before this time out period begins.

Hard Disk Time Out

If no disk activity occurs for, this time period, the BIOS will set the hard disk, device(s) to low power mode.

RTC Alarm Date, Hour

When this option is set enabled, system will according to you set time then wakeup from soft off mode.

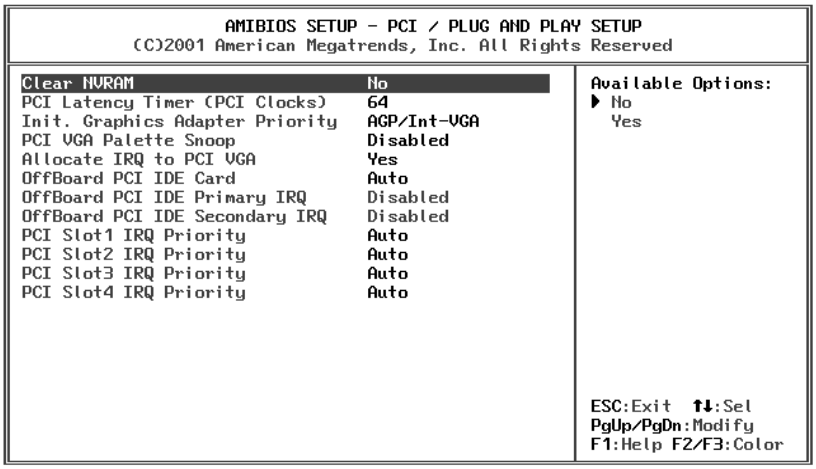
Resume on Ring

Modem Ring Resume From Soft Off.

Power Type Select

This feature is switch of Power Type function.
Configuration options: [AT] [ATX]
****When you are using ATX Power supply, please set this option to [ATX].**
****When you are using AT Power supply, please set this option to [AT].**

4.10 PCI / Plug and Play Setup



Clear NVRAM

When this option is set to Yes, system can auto clear NVRAM.

The Choice: Yes or No.

PCI Latency Timer (PCI Clocks)

This option specifies the latency timings (in PCI clocks) for PCI devices installed in the PCI expansion slots.

The Choice: 32, 64, 96, 128, 160, 192, 224, or 248.

Allocate IRQ to PCI VGA

Set this option to Yes to allocate an IRQ to the VGA device on the PCI bus.

The Choice: Yes or No.

OffBoard PCI IDE Card

This question is needed for off-board non-compliant PCI IDE card. If present, BIOS needs to know which slot it is in and how the IRQ is used by the card.

OffBoard PCI IDE Primary IRQ

This option specifies the PCI interrupt used by the primary IDE channel on the offboard PCI IDE controller.

The Choice: Disabled, Hardwired, INTA, INTB, INTC, or INTD.

OffBoard PCI IDE Secondary IRQ

This option specifies the PCI interrupt used by the secondary IDE channel on the offboard PCI IDE controller.

The Choice: Disabled, Hardwired, INTA, INTB, INTC, or INTD.

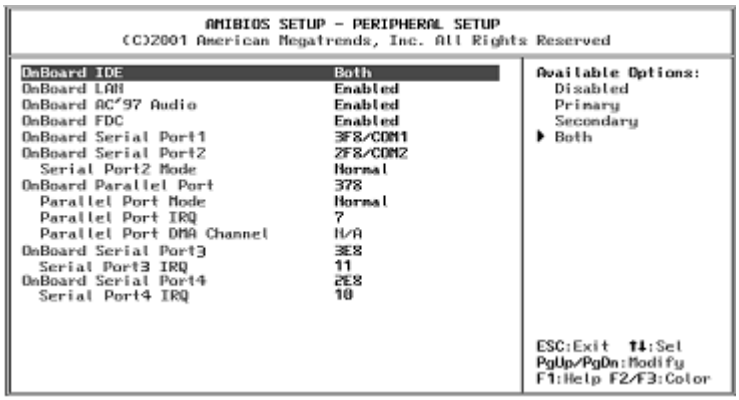
PCI Slot1 / Slot2 / Slot3 / Slot4 IRQ Priority

The option specifies the IRQ priority for PCI device installed in the PCI expansion slot.

The Choice: Auto, (IRQ) 3, 4, 5, 7, 9, 10, and 11, in priority orders.

4.11 Peripheral Setup

Peripheral Setup enables you to configure you system to the most effectively save energy while operating in a user defined system environment.



OnBoard Serial Port1 /Port2

This option specifies the base I/O port address of serial port 1.

The Choice: Auto (AMIBIOS automatically determines the correct base I/O port address), Disabled, 3F8h, 2F8h, 2E8h, or 3E8h.

Serial Port2 Mode

This option specifies the IR active pulse or inverting clock of serial port B.

IR Pin Select

The SINB/SOUTB pin of Serial Port B function or IRRX/IRTX pin if IR function is in normal condition.

OnBoard Parallel Port

This option specifies the base I/O port address of parallel port on the motherboard.

The Choice: Disabled, 378h, 278h, or 3BCh.

Parallel Port Mode

This option specifies the parallel port mode.

The Choice: Normal, Bi-Dir, EPP, and ECP.

- Normal: The normal parallel port mode is used.
- Bi-Dir: Use this setting to support bi-directional transfers on the parallel port.
- EPP: The parallel port can be used with devices adhered to the Enhanced Parallel Port (EPP) specification. EPP uses the existing parallel port signals to provide asymmetric bi-directional 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 data transfer rates up to 2.5 Megabits per second. ECP also provides symmetric bi-directional communication.

EPP Version

EPP data or address read cycle 1.9 or 1.7.

Parallel Port IRQ

This option specifies the IRQ used by the parallel port.

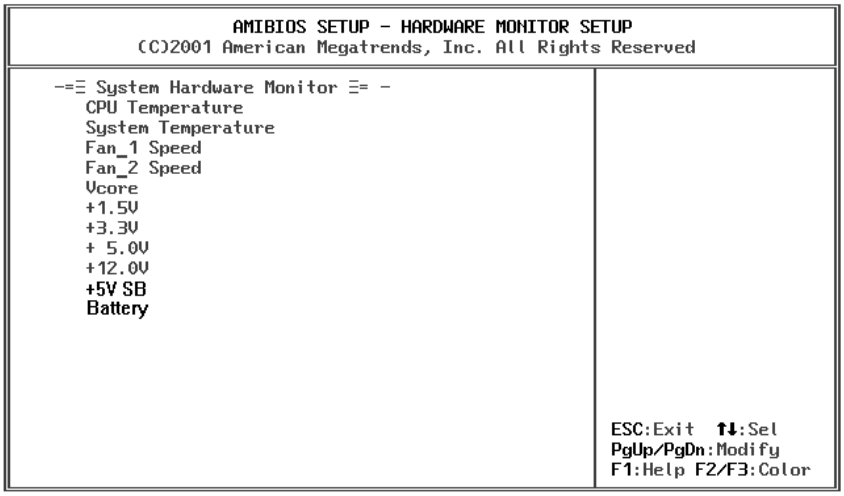
The Choice: Auto, (IRQ) 5, or (IRQ) 7.

Parallel Port DMA Channel

This option is only available if the setting for the Parallel Port Mode option is ECP. This option sets the DMA channel used by the parallel port.

The Choice: DMA Channel 0, 1, or 3.

4.12 Hardware Monitor Setup



4.13 Change Supervisor Password

You can set either supervisor or user password, or both of them. The differences between are:

Supervisor Password:
You can both access the Setup Menu as well as make changes in setting.

User Password:

You can only access but do not have the right to change the settings of BIOS setup menus. When you select this function, the following message will appear at the center of the screen prompt you to create a password.

ENTER PASSWORD:

Type the password of up to eight characters in length and press <Enter>. Any previously entered password will be cleared from CMOS memory. When you are asked to confirm the password, enter the password again and press <Enter>. You may also press <Esc> to abort the selection.
To disable a password, press <Enter> when you are prompted to enter the password. A message will pop up and ask you to confirm the selection. Once the password is disabled, the system will boot and you can enter Setup freely.

PASSWORD DISABLED:

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents any unauthorized party from changing your system configuration.
Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You can also determine when a password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to "Always", password will be required both at boot and at entry to Setup. If the option is set to "Setup", password will only be prompted when trying to enter Setup.

Appendix A: Watchdog 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.

A BIOS function call (INT 15H) is used to control the Watchdog Timer:

INT 15H:

AH – 6FH
Sub-function: **AL – 2**: Set the Watchdog Timer's period **BL:** Time-out value (Its unit--second or minute, is dependent on the item "Watchdog Timer unit select" in CMOS setup).

You have to call sub-function 2 to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer will start counting down. While the timer value reaches zero, the system will reset. To ensure that this reset condition does not occur, please make sure that the Watchdog Timer is being periodically refreshed by calling sub-function 2. However the Watchdog timer will be disabled if you set the time-out value to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

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

Example program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:

      MOV    AX, 6F02H          ;setting the time-out value
      MOV    BL, 30              ;time-out value is 48 seconds
      INT     15H
 ;
; ADD YOUR APPLICATION PROGRAM HERE
;
      CMP    EXIT_AP, 1         ;is your application over?
      JNE     W_LOOP            ;No, restart your application

       MOV   AX, 6F02H          ;disable Watchdog Timer
       MOV   BL, 0                ;
       INT    15H
;
; EXIT
;
```

Appendix B: I/O Address Map

- **I/O Address Map**

I/O Address Map	Description
000-01F	DMA Controller #1
020-021	Interrupt Controller # 1, Master
040-05F	System Timer
060-06F	Standard 101/102 keyboard Controller
070-07F	Real time Clock, NMI Controller
080-0BF	DMA Page Register
0A0-0BF	Interrupt Controller # 2
0C0-0DF	DMA Controller # 2
0F0-0F0	Clear Math Coprocessor Busy
0F1-0F1	Reset Math Coprocessor
0F8-OFF	Math Coprocessor
170-1F7	BUS Master PCI IDE Controller
278-27F	Parallel Printer Port 2
2E8-2EF	Serial Port 4
2F8-2FF	Serial Port 2
376-376	BUS Master PCI IDE Controller
378-37F	Parallel Printer Port 1
3B0-3DF	Intel 82845G/GV/GL Graphic Controller
3E8-3EF	Serial Port 3
3F0-3F7	Floppy Disk Controller
3F8-3FF	Serial Port 1
480-48F	PCI BUS

- **1st MB Memory Address Map**

Memory address	Description
00000-9FFFF	SYSTEM MEMORY
A0000-BFFFF	VGA BUFFER
C0000-CFFFF	VGA BIOS
E0000-FFFFF	SYSTEM BIOS
100000	EXTEND MEMORY

- **IRQ Mapping Chart**

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	AC97 AUDIO
IRQ2	IRQ Controller	IRQ10	COM4
IRQ3	COM2	IRQ11	COM3
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	PCI DEVICES	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE
IRQ7	Printer	IRQ15	Secondary IDE

- **DMA Channel Assignment**

Channel	Function
0	Available
1	Available
2	Floppy disk
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Appendix C: ATX Power Supply

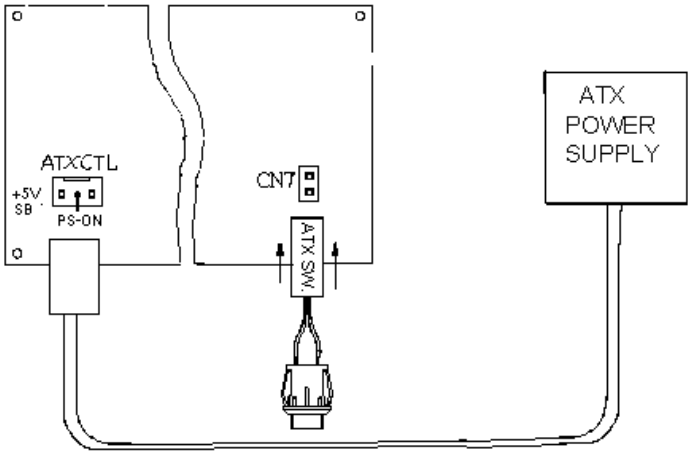
The following notes show you how to connect ATX Power Supply.

For backplanes with ATX Connector

1. Disconnect the AC cord of the Power Supply from the AC source to prevent sudden electric surge to the board.

2. Check the type of your Power Supply and find out +5VSB,PS-ON & GND.

- **NOVA-8890 (through Power Button & GND):**



Connect the ATX power button switch to the CN7 (power button). Then connect the power cable from power supply. To turn ON the system, press the button once. To turn off the power supply, hold down the ATX power switch button for about 4 seconds.

Appendix D: How to use Wake-Up Function

NOVA-8890 provides two kinds of Wake up Function.
This page describes how to use Modem Wake-Up and LAN Wake-Up function.
Wake-Up function is enabled when you use ATX power supply.

Wake–Up On Modem (Ring):

You must set the option Resume on Ring of CMOS SETUP to enable this option.
The ATX power supply will be switched on when there is a ring signal detected on pin "RI" of serial port.

Wake-Up On LAN:

You must set the option Resume on Ring (LAN2) & Resume on LAN (LAN1) of CMOS SETUP to enable this option.

When your computer is turned off while LAN Link/Active LED is flashing, it indicates that LAN chip has entered standby mode and waits for Wake-Up signal. You can use other computers to wake up your computer by sending ID to it.

ID: ID is the MAC address of your system LAN. Every LAN chip has a factory-set ID, which can be found from network information in WINDOWS.

ID's format is xxxxxxxxxxxx
Example ID: 009027388320

Appendix E: Connecting LCD to NOVA-8890

NOVA-8890 can support both one-channel and two-channel LVDS LCD through connector J3. We use the LCD–LTM15C423S (two-channel) for an example to explain the signal mapping and data format.

The pixel data of LTM15C423S is 48-bit wide. To use 36-bit LCD, please neglect the third pair of signals–(DATA3+, DATA3-). In other words, only the data of MSB (R2 ~ R7, G2 ~ G7, B2 ~ B7) are left. On the other hand, if the one-channel LCD is used, only the first channel (CH1) is necessary. The way to deal with 18-bit data is the same as that of 36-. For different types of LCD, you should refer to the data sheet for more detailed information to make the right connection.

(1) Signal mapping between LTM15C423S and J3 (NOVA-8890)

J3 (NOVA-8890)		LTM15C423S	
PIN	**NAME**	**PIN**	**NAME**
3	CH1 DATA3+	15	R1IN3+
4	CH1 DATA3-	14	R1IN3-
5	CH1 CLK+	13	R1CK+
6	CH1 CLK-	12	R1CK-
7	CH1 DATA2+	11	R1IN2+
8	CH1 DATA2-	10	R1IN2-
9	CH1 DATA1+	9	R1IN1+
10	CH1 DATA1-	8	R1IN1-
11	CH1 DATA0+	7	R1IN0+
12	CHA DATA0-	6	R1IN0-
15	CH2 DATA3+	26	R2IN3+
16	CH2 DATA3-	25	R2IN3-
17	CH2 CLK+	24	R2CK+
18	CH2 CLK-	23	R2CK-
19	CH2 DATA2+	22	R2IN2+
20	CH2 DATA2-	21	R2IN2-
21	CH2 DATA1+	20	R2IN1+
22	CH2 DATA1-	19	R2IN1-
23	CH2 DATA0+	18	R2IN0+
24	CH2 DATA0-	17	R2IN0-
		29	SELLVDS (H)
		30	SELFRC (H)
1,2,13,14,25,26	GND	4,5,16,27	GND
27,28,29,30	LCD power	1,2,3	VDD

*48 BIT -- SELLVDS=H, SELFRC=H

(2) DATA format (output of NOVA-8890) for LTM15C423S (48 bit)

Signal Name	Function (Graphics controller output signal)	PIN Name
OR2	RED Odd pixels DATA	CH1 DATA0-
OR3	RED Odd pixels DATA	CH1 DATA0+
OR4	RED Odd pixels DATA	
OR5	RED Odd pixels DATA	
OR6	RED Odd pixels DATA	
OR7	RED Odd pixels DATA (MSB)	
OG2	GREEN Odd pixels DATA	
OG3	GREEN Odd pixels DATA	CH1 DATA1-
OG4	GREEN Odd pixels DATA	CH1 DATA1+
OG5	GREEN Odd pixels DATA	
OG6	GREEN Odd pixels DATA	
OG7	GREEN Odd pixels DATA (MSB)	
OB2	BLUE Odd pixels DATA	
OB3	BLUE Odd pixels DATA	
OB4	BLUE Odd pixels DATA	CH1 DATA2-
OB5	BLUE Odd pixels DATA	CH1 DATA2+
OB6	BLUE Odd pixels DATA	
OB7	BLUE Odd pixels DATA (MSB)	
GND		
GND		
ENAB	COMPOUND SYNCHRONIZATION SIGNAL	
OR0	RED Odd pixels DATA (LSB)	CH1 DATA3-
OR1	RED Odd pixels DATA	CH1 DATA3+
OG0	GREEN Odd pixels DATA (LSB)	
OG1	GREEN Odd pixels DATA	
OB0	BLUE Odd pixels DATA (LSB)	
OB1	BLUE Odd pixels DATA	
GND		
NCLK	DATA SAMPLING CLOCK (Odd)	CH1 CLK+ CH1 CLK-

Signal Name	Function (Graphics controller output signal)	PIN Name
ER2	RED Even pixels DATA	CH2 DATA0- CH2 DATA0+
ER3	RED Even pixels DATA	
ER4	RED Even pixels DATA	
ER5	RED Even pixels DATA	
ER6	RED Even pixels DATA	
ER7	RED Even pixels DATA (MSB)	
EG2	GREEN Even pixels DATA	
EG3	GREEN Even pixels DATA	CH2 DATA1- CH2 DATA1+
EG4	GREEN Even pixels DATA	
EG5	GREEN Even pixels DATA	
EG6	GREEN Even pixels DATA	
EG7	GREEN Even pixels DATA (MSB)	
EB2	BLUE Even pixels DATA	
EB3	BLUE Even pixels DATA	
EB4	BLUE Even pixels DATA	CH2 DATA2- CH2 DATA2+
EB5	BLUE Even pixels DATA	
EB6	BLUE Even pixels DATA	
EB7	BLUE Even pixels DATA (MSB)	
GND		
GND		
GND		
ER0	RED Even pixels DATA (LSB)	CH2 DATA3- CH2 DATA3+
ER1	RED Even pixels DATA	
EG0	GREEN Even pixels DATA (LSB)	
EG1	GREEN Even pixels DATA	
EB0	BLUE Even pixels DATA (LSB)	
EB1	BLUE Even pixels DATA	
GND		
NCLK	DATA SAMPLING CLOCK (Even)	CH2 CLK- CH2 CLK+