NOVA-4899

Low Power GXLV/GX1 MMX with

SVGA, Ethernet, & Audio SBC.

Manual Version 1.0

September 10, 2003

Copyright Notice

The information in this document is subject to change without prior notice in order to improve reliability, design and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

Trademarks

NOVA-4899 is a registered trademark of ICP Electronics Inc.   IBM PC is a registered trademark of International Business Machines Corporation.   Intel is a registered trademark of Intel Corporation.   Other product names mentioned herein are used for identification purpose only and may be the trademarks and/or registered trademarks of their respective companies.

Support

For any enquiries regarding the product or the content of this manual, please email us at: support@iei.com.tw.

Table of Contents

1   Introduction

NOVA-4899 is designed for limited space applications with only the size of a 5 1/4" hard drive.   It supports the full functions of an AT& ATX-compatible industrial computer on a single board.   NOVA-4899 is equipped with a low-power consumption and high performance GX1 processor on board.   It also contains an SDRAM SO-DIMM socket that can support up to 512 MB memory. NOVA-4899 provides three Ethernet interfaces, audio interface, socket for DiskOnChip, EIDE interface, one parallel port, two RS-232 serial ports, and a PS/2 keyboard/mouse interface.

NOVA-4899 offers CRT resolutions of up to 1280 x 1024 @ 256 colors & 1024 x 768 @ 16 bpp.   The display type is configured by software utility.   The Flash ROM supports BIOS and the VGA BIOS.   Reprogramming the Flash ROM could do modification if necessary.   In addition, a PCI slot is included.

1.1   Specifications

Field	Description
NS GX1-233/266/300 MMX 32-bit x86 Processor	Supports Intel MMX instruction set extension for the acceleration of multi media applications. 16 KB unified L1 cache. Five-stage pipelined integer unit. Integrated Floating Point Unit (FPU).
System Memory	One 144-pin SO-DIMM socket support up to 512MB SDRAM.
BIOS	AWARD 256 KB Flash memory
Display Controller	MediaGx processor has applied the UMA technology, which provides 1.5~4 MB display memory, to be set up by BIOS. Supports non-interlaced CRT monitors resolutions up to 1280x1024 @ 256 colors & 1024x768 @ 16bpp.
Audio	Compliant to AC97, support stereo connectors: Speaker, Mic-in, Line-in, Line-out, and CD-in.

IDE interface	The IDE supports up to four PCI Enhanced IDE hard drives.
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 2.88MB).
Serial ports	Two RS232 ports, one RS232 port can be set to infrared port with Transfer rate up to 115 KBPS.
Parallel port	One Parallel port, supports SPP/EPP/ECP mode.
PS/2 Mouse/Keyboard connector	A 6-pin connector for easy connection to a keyboard or PS/2 mouse.
USB interface	Two USB ports, USB 1.0 compliant.
Power management	Supports power saving modes including Normal/Doze/Sleep modes. APM 1.1 compliant.
Watchdog timer	Can be set by 1-255 seconds period. Reset or NMI is generated when CPU does not periodically trigger the timer.
10/100Mbps Ethernet Controller	Intel 82559, 82551,or Realtek RTL8100BL IEEE802.u 100 BASE-TX standard Dual Auto-sensing interface to 10MBps or 100MBps networks. On board RJ45 connectors are provided for easy connection.
DiskOnChip^{TM} Flash Disk	Supports one 32-pin socket for DiskOnChip Flash Disk.
CompactFlash Disk	The CompactFlash Storage Card also runs in True IDE Mode that is compatible with an IDE disk drive. It can be used with a passive adapter in a Type II socket.
Expansion bus	One PCI slot.
Power supply	+5V @1.8A (typical), +12V @50mA (typical)
Operating temperature	0~60 ℃
Dimension	8″ (L) x 5.75″ (W) (203 mm x 146 mm)

1.2 Package Contents

Before you begin installing the product, please check the following materials are included in the package:

- NOVA-4899 all-in-one single board computer x 1
- CD disk for utility and drivers x 1
- 3.5" IDE flat cable (40-pin to 40-pin 2.54mm pitch) x 1
- Standard D25 connector for parallel cable (Printer) x 1
- Serial port flat cable (RS-232, 2.54mm pitch) x 2
- Floppy cable (for 3.5" FDD only) x 1
- 2.5" IDE flat cable (44-pin to 44-pin 2.0mm pitch) x 1
- VGA round cable (10 pin to D-SUB 15 pin) x 1
- One-to-two 6-pin mini din connector for keyboard and mouse x 1
- Audio cable set x 1

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

2 Installation

Follow the instructions of installing NOVA-4899.　Pay attention to the unpacking precautions for safety.

2.1 NOVA-4899 Board Layout

2.2 Unpacking Precautions

Some components of NOVA-4899 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 NOVA-4899 SBC.   You can do it by using a grounded wrist strap at all time or by frequently touching any conducting materials connected to the ground.
- Handle your NOVA-4899 SBC by its edges.
- Do not touch IC chips, leads or circuitry if not necessary.
- Do not plug any connector or jumper while the power is on.

There is one 144-pin SO-DIMM socket to accept 3.3V non-buffered SDRAM.   The maximum memory size is 512 MB.

2.3 Compact Flash Setting (JP1)

Set the operating mode of CompactFlash disk

- **JP1: Compact Flash Setting**

Address	JP1
MASTER	CLOSE
SLAVE	OPEN

2.4   Clear CMOS Setup

If you need to clear the CMOS Setup (for example forgot the password you should clear the setup and then set the password again.), you should close the JP2 about 3 seconds, then open it again.   To set CMOS to normal operation mode, open JP9.

- **JP2: Clear CMOS Setup (Reserve Function)**

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

2.5   Watchdog Timer Setting

Reading port 443H enables the Watchdog Timer.   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.   Watchdog Timer is disabled by reading port 043/843H.

- **JP3: Watchdog Active Type Setting**

JP3	Description
2-3	Reset when WDT time-out
OPEN	Disable WDT

2.6 DiskOnChip™ Flash Disk Memory Address setting

DiskOnChip™ Flash Disk Chip (DOC) is produced by M-Systems.   It is 100% compatible to hard disk and no any extra software utility is needed.   It is just "plug and play", easy to use and reliable.   For MD-2200-Xmb series, DOC will share only 8KB memory address.

- **JP4 & JP5: DiskOnChip Memory Address Setting**

ADDRESS	JP5				JP4		
	1-2	**3-4**	**5-6**	**7-8**	**1-2**	**3-4**	**5-6**
CC000	OPEN	OPEN	CLOSE	OPEN	OPEN	CLOSE	CLOSE
CE000	OPEN	OPEN	OPEN	CLOSE	OPEN	CLOSE	CLOSE
D0000	CLOSE	OPEN	OPEN	OPEN	CLOSE	OPEN	CLOSE
D2000	OPEN	CLOSE	OPEN	OPEN	CLOSE	OPEN	CLOSE
D4000	OPEN	OPEN	CLOSE	OPEN	CLOSE	OPEN	CLOSE
D6000	OPEN	OPEN	OPEN	CLOSE	CLOSE	OPEN	CLOSE
D8000	CLOSE	OPEN	OPEN	OPEN	OPEN	OPEN	CLOSE
DA000	OPEN	CLOSE	OPEN	OPEN	OPEN	OPEN	CLOSE
DC000	OPEN	OPEN	CLOSE	OPEN	OPEN	OPEN	CLOSE
DE000	OPEN	OPEN	OPEN	CLOSE	OPEN	OPEN	CLOSE

3 Connection

This chapter describes how to connect peripherals, switches and indicators to the NOVA-4899 board.

3.1 Floppy Disk Drive Connector (FDD)

NOVA-4899 board is equipped with a 34-pin daisy-chain driver 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 (HDD1, HDD2)

For IDE HDD connection, NOVA-4899 is designed with a 2.54mm connector (HDD1) and a 2.0mm connector (HDD2), which could be converted to two 2.54mm standard IDE connector via proprietary cable.   You can use these cables to attach four IDE hard disk drives to NOVA-4899.

- **HDD1: 40-pin Primary 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	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND–DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND

- **HDD2: 44-pin Secondary Mini-pitched 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	IDE DRQ	22	GROUND
23	IOW#	24	GROUND
25	IOR#	26	GROUND
27	IDE CHRDY	28	GROUND
29	IDE DACK	30	GROUND−DEFAULT
31	INTERRUPT	32	N/C
33	SA1	34	N/C
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GROUND
41	VCC	42	VCC
43	GROUND	44	N/C

3.3 Parallel Port (LPT)

This port is usually connected to a printer; The NOVA-4899 includes an on-board parallel port (LPT), accessed through a 26-pin flat-cable connector.

- **LPT: Parallel Port Connector**

PIN	Description	PIN	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	PRINTER SELECT LN#	18	GROUND
19	GROUND	20	GROUND
21	GROUND	22	GROUND
23	GROUND	24	GROUND
25	GROUND	26	N/C

3.4   Serial Ports (COM1, COM2)

NOVA-4899 offers two high speeds 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 DB-9 connector and one 10-pin header are provided by NOVA-4899.   The detailed pin assignment of the connectors are specified as following tables:

- **COM1: Serial Port DB-9 Connector**

PIN	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)

- **COM2, Serial Port (10-pin Header/W Housing)**

PIN	Description	PIN	Description
1	DCD	6	DSR
2	RXD	7	RTS
3	TXD	8	CTS
4	DTR	9	RI
5	GND	10	GND

3.5 Audio Connector

The audio function was organized by CX5530 I/O companions and NS AD1881 CODEC, which compliant with AC97. You can use CD-IN1 as the input port (e.g.: connected to the output of CD player), depending on the type of connector that you have.

- **CD-IN1: CD_AUDIO INPUT Connector**

PIN	Description
1	JCD_R
2	GND
3	GND
4	JCD_L

- **CN1: Audio Connector**

This is the output port of your Sound System. Pin 1-2-3 can be connected to earphone and 5-6-7 can be connected to loudspeaker. Pin 9-10-11 can be used as input port if it is connected to the earphone jack of your CD. Pin 15-16 is for microphone.

PIN	Description	PIN	Description
1	LINE OUT R	2	GND
3	LINE OUT L	4	GND
5	LINE OUT R	6	LINE OUT L
7	GND	8	GND
9	LINE IN L	10	LINE IN R
11	GND	12	GND
13	GND	14	GND
15	MIC IN	16	GND

3.6 Keyboard & PS/2 Mouse Connector (CN8)

A 6-pin connector (CN8) for easy connection to a keyboard or PS/2 mouse.   The
card comes with a cable to convert from the 6-pin connector to two 6-pin
mini-DIN connectors for keyboard and mouse connection

- **CN8: 6-pin Keyboard & Mouse Connector**

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

3.7 USB Port Connector (CN9)

The NOVA-4899 provides two USB interfaces, which give the completed plug and
play, for up to 127 external devices.

- **CN9: Internal USB Connector**

PIN	Description	PIN	Description
1	VCC1	2	GND
3	D0-	6	D1+
5	D0+	7	D1-
7	GND	8	VCC

USB

3.8 IrDA Infrared Interface Port (CN3)

NOVA-4899 has built in an IrDA port which supports Serial Infrared (SIR) or Amplitude Shift Keyed IR (ASKIR) interface.   When using the IrDA port, set SIR or ASKIR model in the Peripheral Setup COM2 of BIOS.   Then the normal RS-232 COM2 will be disabled.

- **CN3: IrDA Connector**

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

3.9 VGA Connector (VGA & CN6)

NOVA-4899 has a built-in 15-pin VGA connector directly to your CRT monitor & 10-pin VGA connector, the card comes with a cable to convert from the 10-pin connector to 15-pin VGA connector, directly the CRT monitor.

- **VGA: 15-pin Female Connector**

PIN	Description	PIN	Description
1	RED	2	GREEN
3	BLUE	4	NC
5	GROUND	6	GROUND
7	GROUND	8	GROUND
9	NC	10	GROUND
11	NC	12	DDC DAT
13	HSYNC	14	VSYNC
15	DDCCLK		

- **CN6: 10-pin VGA Connector**

PIN	Description	PIN	Description
1	RED	6	DDCCLK
2	GREEN	7	DDCDAT
3	BLUE	8	GROUND
4	HSYNC	9	GROUND
5	VSYNC	10	GROUND

3.10 LAN RJ45 Connector and Ethernet LED

NOVA-4899 has three built-in RJ45 LAN connectors for 10/100Mbps Ethernet (Intel 82551 or Realtek 8100BL).   NOVA-4899N (Intel 82551) has only one LAN connector which supports wake up on LAN function.   NOVA-4899R (Realtek 8100BL) has three RJ45 LAN connectors to support wake up on LAN function.

- **LAN1, LAN2, LAN3: LAN RJ45 Connector**

PIN	Description	PIN	Description
1	TX+	5	GND
2	TX-	6	RX-
3	RX+	7	GND
4	GND	8	GND

- **LAN1, LAN2, LAN3: LAN LED DESCRIBE**

LED COLOR	DESCRIBE
Orange	Link
Green	Active

3.11 External Switches and Indicators (JP6)

There are several external switches and indicators for monitoring and controlling your CPU board.   All the functions are in the JP6 connector.

- **JP6: External Switches and Indicators**

	PIN	Description	PIN	Description	
Power LED	2	+5V	1	Speaker	Speaker
	4	N/C	3	N/C	
	6	GND	5	N/C	
KeyLock	8	KeyLock	7	+5V	
	10	GND	9	Reset Switch	Reset button
	12	GND	11	GND	
	14	N/C	13	IDE LED	IDE LED
ATX Signal	16	ATX Power Control Pin	15	+5V	
	18	ATX 5Vsb	17	ATX Power Button Pin1	* ATX Power Button
	20	ATX 5Vsb	19	ATX Power Button Pin2	

3.12 External Power Connector

NOVA-4899 has an on-board external power connector CN5.   You can connect power directly to the CPU board.

- **CN5: External Power Connector**

PIN	Description
1	+12V
2	GROUND
3	GROUND
4	VCC5V

- **CN4: External Power Control Connector**

PIN	Description
1	GROUND
2	PSON
3	5VSB

3.13 Digital I/O (CN7)

One of the characteristics of digital circuit is its fast response to high or low signal. This kind of response is highly needed for harsh and critical industrial operating environment. That's why we design 4-bit digital inputs and 4-bit digital outputs on the NOVA-4899.

Digital Input and Output are control signals generally. You can use these signals to control external devices that needs On/Off circuit or TTL devices. The register address is 240H, 260H or 280H, which is selected in BIOS SETUP. You can read or write data to the selected address to enable the function of digital IO.

- **CN7: Digital I/O**

READ		WRITE	
Bit0	DIN0	Bit0	DO0
Bit1	DIN1	Bit1	DO1
Bit2	DIN2	Bit2	DO2
Bit3	DIN3	Bit3	DO3

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

3.14 SYSTEM LED (D9)

LED COLOR	DESCRIBE
Orange	HDD ACTIVE
Green	POWER ON

4 AWARD BIOS Setup

NOVA-4899 uses the AWARD PCI/ISA BIOS for system configuration.   The AWARD BIOS setup program is designed to provide maximum flexibility in configuring the system by offering various options that may be selected to meet end-user requirements.   This chapter is written to assist you in the proper usage of these features.

4.1   Getting Started

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

" Hit DEL if you want to run SETUP"
To access AWARD BIOS SETUP UTILITY, press <Del> key.   The following screen will be displayed at this time:

```
                    ROM PCI/ISA BIOS (2A434I9E)
                        CMOS SETUP UTILITY
                       AWARD SOFTWARE, INC.
   ┌──────────────────────────────┬──────────────────────────────┐
   │  STANDARD CMOS SETUP          │   INTEGRATED PERIPHERALS      │
   │                               │                              │
   │  BIOS FEATURES SETUP          │   SUPERVISOR PASSWORD         │
   │                               │                              │
   │  CHIPSET FEATURES SETUP       │   USER PASSWORD               │
   │                               │                              │
   │  POWER MANAGEMENT SETUP       │   IDE HDD AUTO DETECTION      │
   │                               │                              │
   │  PNP/PCI CONFIGURATION        │   SAVE & EXIT SETUP           │
   │                               │                              │
   │  LOAD BIOS DEFAULTS           │   EXIT WITHOUT SAVING         │
   │                               │                              │
   │  LOAD SETUP DEFAULTS          │                              │
   ├──────────────────────────────┴──────────────────────────────┤
   │  Esc : Quit                    ↑ ↓ → ←   : Select Item        │
   │  F10 : Save & Exit Setup      (Shift)F2 : Change Color        │
   ├──────────────────────────────────────────────────────────────┤
   │                                                              │
   │                                                              │
   └──────────────────────────────────────────────────────────────┘
```

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 Drive setting.
Please refer the following screen for this setup.

```
                    ROM PCI/ISA BIOS (2A434I9E)
                       STANDARD CMOS SETUP
                       AWARD SOFTWARE, INC.
 ┌──────────────────────────────────────────────────────────────────┐
 │                                                                    │
 │  Date (mm:dd:yy) : Thu, Jul  3 2003                                │
 │  Time (hh:mm:ss) : 15 : 37 :  2                                    │
 │                                                                    │
 │  HARD DISKS         TYPE   SIZE   CYLS HEAD PRECOMP LANDZ SECTOR  MODE │
 │                                                                    │
 │  Primary Master  :   0      0      0    0      0     0      0   AUTO │
 │  Primary Slave   :   0      0      0    0      0     0      0   AUTO │
 │  Secondary Master :  0      0      0    0      0     0      0   AUTO │
 │  Secondary Slave :   0      0      0    0      0     0      0   AUTO │
 │                                                                    │
 │  Drive A : 1.44M, 3.5 in.                                          │
 │  Drive B : None          ┌──────────────────────────────────┐     │
 │                          │                                  │     │
 │  Video  : EGA/VGA        │                                  │     │
 │  Halt On : All,But Keyboard│                                │     │
 │                          └──────────────────────────────────┘     │
 ├──────────────────────────────────────────────────────────────────┤
 │  ESC : Quit          ↑ ↓ → ←  : Select Item    PU/PD/+/- : Modify │
 │  F1  : Help          (Shift)F2 : Change Color                     │
 └──────────────────────────────────────────────────────────────────┘
```

To set the Date, for example, press either the arrow or <Enter> button on your
keyboard to select one of the fields (Month, Date or Year) then press either
<PgUp> or <PgDn> to increase or decrease the value of that field.   Do the
same steps for Time setting.

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

1. Use the Auto setting for detection during boot-up.
2. Use the IDE HDD AUTO DETECTION in the main menu; the computer will
   automatically detect the HDD specifications.
3. Manually enter the specifications by yourself from the "User" option.

Note: If you need more information on any particular field, just highlight it then
press <F1> button.   A window will pop up to give you more information on that
field.

4.3　BIOS Features Setup

This BIOS Features Setup is designed for the 'fine tuning' of your system in order to improve its performance.　As for normal operation, you don't have to change any default setting.　The default setting is pre-set for most reliable operation.

```
                    ROM PCI/ISA BIOS (2A434I9E)
                       BIOS FEATURES SETUP
                      AWARD SOFTWARE, INC.

 Virus Warning             : Disabled   Video  BIOS Shadow  : Enabled
 CPU Internal Cache        : Enabled    C8000-CBFFF Shadow  : Disabled
                                        CC000-CFFFF Shadow  : Disabled
 Quick Power On Self Test  : Enabled    D0000-D3FFF Shadow  : Disabled
 Boot Sequence             : A,C,SCSI   D4000-D7FFF Shadow  : Disabled
 Swap Floppy Drive         : Disabled   D8000-DBFFF Shadow  : Disabled
 Boot Up Floppy Seek       : Enabled    DC000-DFFFF Shadow  : Disabled
 Boot Up NumLock Status    : On         Cyrix 6x86/MII CPUID: Enabled
 Boot Up System Speed      : High
 Gate A20 Option           : Fast
 Memory Parity Check       : Enabled
 Typematic Rate Setting    : Disabled
 Typematic Rate (Chars/Sec): 6
 Typematic Delay (Msec)    : 250
 Security Option           : Setup
 PCI/VGA Palette Snoop     : Disabled   ESC : Quit        ↑↓→← : Select Item
 OS Select For DRAM > 64MB : Non-OS2    F1  : Help        PU/PD/+/- : Modify
 Report No FDD For WIN 95  : Yes        F5  : Old Values  (Shift)F2 : Color
                                        F6  : Load BIOS  Defaults
                                        F7  : Load Setup Defaults
```

4.4　Chipset Features Setup

This setup function works mostly on board's chipset.　This option is used to change the chipset's configuration.　Change the default setting only when necessary, otherwise the system will function improperly.

```
                    ROM PCI/ISA BIOS (2A434I9E)
                     CHIPSET FEATURES SETUP
                      AWARD SOFTWARE, INC.

 SDRAM CAS latency Time   : 3 T
 SDRAM Clock Ratio Div By : 4            Current CPU1 Temperature : 31C/87C
                                         Vcore   2.04 V    +3.3V    3.34 V
 16-bit I/O Recovery (CLK): 5            + 5 V  : 4.99 V   +12 V  : 11.91 V
 8-bit  I/O Recovery (CLK): 5            5VSB(V): 5.10 V

 USB Controller           : Enabled
 USB Legacy Support       : Enabled

 Multiple Monitor Support : PCI First
 Video Memory Size        : 1.5 M

                                         ESC : Quit        ↑↓→← : Select Item
                                         F1  : Help        PU/PD/+/- : Modify
                                         F5  : Old Values  (Shift)F2 : Color
                                         F6  : Load BIOS  Defaults
                                         F7  : Load Setup Defaults
```

4.5   Power Management Setup

Power Management Setup helps user to handle the NOVA-4899 board's "green" function.   This feature can shut down the video display and hard disk to save energy, for example.   The power management setup screen is as following

```
            ROM PCI/ISA BIOS (2A434I9E)
               POWER MANAGEMENT SETUP
                AWARD SOFTWARE, INC.
╔════════════════════════════════╦═══════════════════════════════╗
║ Power Management    : Disabled  ║ IRQ1  (KeyBoard)   : ON        ║
║                                 ║ IRQ3  (COM 2)      : OFF       ║
║      ** PM Timers **            ║ IRQ4  (COM 1)      : OFF       ║
║ Doze Mode           : Disabled  ║ IRQ5  (LPT 2)      : OFF       ║
║ Standby Mode        : Disabled  ║ IRQ6  (Floppy Disk): OFF       ║
║ HDD Power Down      : Disabled  ║ IRQ7  (LPT 1)      : OFF       ║
║ MODEM Use IRQ       : NA        ║ IRQ9  (IRQ2 Redir) : OFF       ║
║                                 ║ IRQ10 (Reserved)   : OFF       ║
║ Throttle Duty Cycle : 33.3 %    ║ IRQ11 (Reserved)   : OFF       ║
║                                 ║ IRQ12 (PS/2 Mouse) : OFF       ║
║                                 ║ IRQ13 (Coprocessor): OFF       ║
║                                 ║ IRQ14 (Hard Disk)  : OFF       ║
║                                 ║ IRQ15 (Reserved)   : OFF       ║
║                                 ║                                ║
║                                 ║ ESC : Quit      ↑↓→← : Select Item ║
║                                 ║ F1  : Help      PU/PD/+/- : Modify ║
║                                 ║ F5  : Old Values  (Shift)F2 : Color ║
║                                 ║ F6  : Load BIOS  Defaults      ║
║                                 ║ F7  : Load Setup Defaults      ║
╚════════════════════════════════╩═══════════════════════════════╝
```

4.6   PNP / PCI Configuration

This menu is used to assign certain IRQ to your PNP/PCI devices manually.

```
              ROM PCI/ISA BIOS (2A434I9E)
                 PNP/PCI CONFIGURATION
                  AWARD SOFTWARE, INC.
┌─────────────────────────────────┬───────────────────────────────────┐
│ PNP OS Installed       : No      │ PCI IRQ Actived By  : Level       │
│ Resources Controlled By : Auto   │                                   │
│ Reset Configuration Data : Disabled│                                 │
│                                  │                                   │
│                                  │                                   │
│                                  │                                   │
│                                  │                                   │
│                                  │                                   │
│                                  │                                   │
│                                  │ ESC : Quit       ↑↓→← : Select Item│
│                                  │ F1  : Help       PU/PD/+/- : Modify│
│                                  │ F5  : Old Values  (Shift)F2 : Color│
│                                  │ F6  : Load BIOS  Defaults          │
│                                  │ F7  : Load Setup Defaults          │
└─────────────────────────────────┴───────────────────────────────────┘
```

PNP OS Installed: If you install Plug and Play operating system (OS), the OS will reassign the interrupt if you select *Yes* in this field.   If you install a non-Plug and Play OS or if you want to prevent reassigning of interrupt settings, select *No* in this field.

Resources Controlled By: Selecting *Auto* if you want the computer to assign the IRQs automatically and vice versa.

Reset Configuration Data: *Enabling* this field means you allow the configuration data to be reset.

IRQ-xx assigned to: These fields show whether a PCI/ISA uses certain IRQ.

```
              ROM PCI/ISA BIOS (2A434I9E)
                 PNP/PCI CONFIGURATION
                  AWARD SOFTWARE, INC.
┌─────────────────────────────────┬───────────────────────────────────┐
│ PNP OS Installed       : No      │ PCI IRQ Actived By  : Level       │
│ Resources Controlled By : Manual │                                   │
│ Reset Configuration Data : Disabled│ Used MEM base addr  : N/A       │
│                                  │                                   │
│ IRQ-3  assigned to : PCI/ISA PnP │                                   │
│ IRQ-4  assigned to : PCI/ISA PnP │                                   │
│ IRQ-5  assigned to : PCI/ISA PnP │                                   │
│ IRQ-7  assigned to : PCI/ISA PnP │                                   │
│ IRQ-9  assigned to : PCI/ISA PnP │                                   │
│ IRQ-10 assigned to : PCI/ISA PnP │                                   │
│ IRQ-11 assigned to : PCI/ISA PnP │                                   │
│ IRQ-12 assigned to : PCI/ISA PnP │                                   │
│ IRQ-14 assigned to : PCI/ISA PnP │                                   │
│ IRQ-15 assigned to : PCI/ISA PnP │                                   │
│ DMA-0  assigned to : PCI/ISA PnP │                                   │
│ DMA-1  assigned to : PCI/ISA PnP │ ESC : Quit       ↑↓→← : Select Item│
│ DMA-3  assigned to : PCI/ISA PnP │ F1  : Help       PU/PD/+/- : Modify│
│ DMA-5  assigned to : PCI/ISA PnP │ F5  : Old Values  (Shift)F2 : Color│
│ DMA-6  assigned to : PCI/ISA PnP │ F6  : Load BIOS  Defaults          │
│ DMA-7  assigned to : PCI/ISA PnP │ F7  : Load Setup Defaults          │
└─────────────────────────────────┴───────────────────────────────────┘
```

4.7   Load BIOS Defaults

```
                    ROM PCI/ISA BIOS (2A434I9E)
                         CMOS SETUP UTILITY
                        AWARD SOFTWARE, INC.
 ┌─────────────────────────────────────────────────────────────┐
 │    STANDARD CMOS SETUP            INTEGRATED PERIPHERALS      │
 │                                                              │
 │    BIOS FEATURES SETUP            SUPERVISOR PASSWORD         │
 │                                                              │
 │    CHIPSET FEATURES SETUP         USER PASSWORD              │
 │                                                              │
 │    POWER MANAGEMENT SETUP         IDE HDD AUTO DETECTION      │
 │                             ┌──────────────────────────┐ETUP │
 │    PNP/PCI CONFIGURA        │ Load BIOS  Defaults (Y/N)? N │     │
 │    LOAD BIOS DEFAULT        └──────────────────────────┘SAVING│
 │                                                              │
 │    LOAD SETUP DEFAULTS                                        │
 ├─────────────────────────────────────────────────────────────┤
 │ Esc : Quit                   ↑ ↓ → ←  : Select Item           │
 │ F10 : Save & Exit Setup      (Shift)F2 : Change Color         │
 ├─────────────────────────────────────────────────────────────┤
 │                                                              │
 └─────────────────────────────────────────────────────────────┘
```
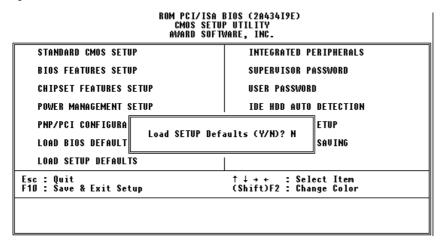
If you select 'Y' to this field, the BIOS Defaults will be loaded except Standard CMOS SETUP.   The default settings are not optimal and turning all high performance into disabled condition.   Select 'N' to abort.

Suggestion: for the first time or for our primary user, we suggest you to use LOAD SETUP DEFAULTS because it is the safest mode for your system.

4.8   Load Setup Defaults

If you select 'Y' in this field, the Setup Defaults will be loaded except Standard CMOS SETUP.   The default settings are optimal configuration settings for your system.

```
                    ROM PCI/ISA BIOS (2A434I9E)
                         CMOS SETUP UTILITY
                        AWARD SOFTWARE, INC.
 ┌─────────────────────────────────────────────────────────────┐
 │    STANDARD CMOS SETUP            INTEGRATED PERIPHERALS      │
 │                                                              │
 │    BIOS FEATURES SETUP            SUPERVISOR PASSWORD         │
 │                                                              │
 │    CHIPSET FEATURES SETUP         USER PASSWORD              │
 │                                                              │
 │    POWER MANAGEMENT SETUP         IDE HDD AUTO DETECTION      │
 │                             ┌──────────────────────────┐ETUP │
 │    PNP/PCI CONFIGURA        │ Load SETUP Defaults (Y/N)? N │     │
 │    LOAD BIOS DEFAULT        └──────────────────────────┘SAVING│
 │                                                              │
 │    LOAD SETUP DEFAULTS                                        │
 ├─────────────────────────────────────────────────────────────┤
 │ Esc : Quit                   ↑ ↓ → ←  : Select Item           │
 │ F10 : Save & Exit Setup      (Shift)F2 : Change Color         │
 ├─────────────────────────────────────────────────────────────┤
 │                                                              │
 └─────────────────────────────────────────────────────────────┘
```

4.9   Integrated Perpherals

```
                    ROM PCI/ISA BIOS (2A434I9E)
                       INTEGRATED PERIPHERALS
                        AWARD SOFTWARE, INC.
 ┌──────────────────────────────────┬──────────────────────────────────────┐
 │ IDE HDD Block Mode     : Enabled │ IR Transmission delay  : Enabled     │
 │ Primary IDE Channel    : Enabled │ IR IRQ Select          :             │
 │   Master Drive PIO Mode : Auto   │ IR Mode Use DMA        : Disable     │
 │   Slave Drive PIO Mode  : Auto   │ Onboard Parallel Port  :             │
 │ Secondary IDE Channel  : Enabled │ Parallel Port Mode     :             │
 │   Master Drive PIO Mode : Auto   │ ECP Mode Use DMA       :             │
 │   Slave Drive PIO Mode  : Auto   │ EPP Mode Select        : EPP1.9      │
 │                                  │ POWER SWITCH Controller : 1 Touch    │
 │ IDE Primary Master UDMA : Auto   │ RTC POWER ON Controller : Disabled   │
 │ IDE Primary Slave  UDMA : Auto   │                                      │
 │ IDE Secondary Master UDMA: Auto  │                                      │
 │ IDE Secondary Slave  UDMA: Auto  │ Digital I/O            : 280h        │
 │                                  │                                      │
 │ KBC input clock        : 8 MHz   │ Build in CPU Audio     : Enabled     │
 │ Onboard FDC Controller : Enabled │ Audio I/O Base Address : 220H        │
 │ Onboard Serial Port 1  : 3F8/IRQ4│ MPU-401 I/O Base Address : 330H      │
 │ Onboard Serial Port 2  : 2F8/IRQ3│ Audio IRQ Select       : IRQ 5       │
 │ Onboard IR Controller  :         │ Audio Low  DMA Select  : DMA 1       │
 │ IR Address Select      : 3E0H    │ Audio High DMA Select  : DMA 5       │
 │ IR Mode                :         │                                      │
 └──────────────────────────────────┴──────────────────────────────────────┘
```

This option is used to assign Onboard I/O, IRQ, and DMA etc.   If you don't know how to configure them, just press <F7> to load Setup Defaults.

The flat panels will then be applied with two modes: 640x480 or 800x600, for which it needs to set up from BIOS for proper flat panel resolution.

- **Digital I/O Base Address -- 240H, 260H, 280H, Disabled**

  To select the I/O address for digital I/O function.

- **Build in CPU Audio -- Enabled, Disabled**

  To disable/enable the audio function.

- **Audio I/O Base Address -- 220H, 240H, 260H, 280H**

  To select the I/O address for audio function.

- **MPU-401 I/O Base Address -- 300H, 330H, Disabled**

  To select the I/O address for MPU-401 (midi interface).

- **Audio IRQ Select -- 5, 7, 10, Disabled**

  To select the interrupt for audio function.

- **Audio Low DMA Select -- DMA0, DMA1, DMA3, Disabled**

  To select the high DMA channel.

- **Audio High DMA Select -- DMA5, DMA6, DMA7, Disabled**

  To select the high DMA channel.

- **Multiple Monitor Support -- No Onboard, PCI first, M/B first**

  To select the primary VGA for multiple monitor support in WINDOWS.

- **Video Memory Size -- 1.5M, 2.5M, 4.0M**

  To select the size of video memory.   It makes use of system memory for display.

4.10 Password Setting

Password Setting sets a password used to protect your system and Setup Utility. Once you set up 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 Password, you can choose every setup/option on the main menu.   To disable the password, enter the BIOS SETUP room with Password and then just press the <Enter> key instead of entering a new password when the 'Enter Password' prompt pops up.

Note: In case that you forget the password, follow the Clear/Reset CMOS procedure (see Section 2.5 Clear CMOS Setup)

4.11 IDE HDD Auto Detection

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 2 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
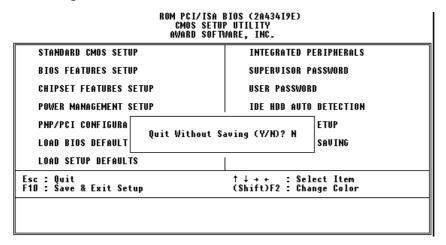
4.12 Save and Exit Setup

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

```
                 ROM PCI/ISA BIOS (2A434I9E)
                     CMOS SETUP UTILITY
                    AWARD SOFTWARE, INC.
  ┌──────────────────────────────────────────────────────────┐
  │  STANDARD CMOS SETUP          INTEGRATED PERIPHERALS       │
  │                                                            │
  │  BIOS FEATURES SETUP          SUPERVISOR PASSWORD          │
  │                                                            │
  │  CHIPSET FEATURES SETUP       USER PASSWORD                │
  │                                                            │
  │  POWER MANAGEMENT SETUP       IDE HDD AUTO DETECTION       │
  │                          ┌─────────────────────────┐      │
  │  PNP/PCI CONFIGURA       │ SAVE to CMOS and EXIT (Y/N)? N │ ETUP │
  │  LOAD BIOS DEFAULT       └─────────────────────────┘ SAVING │
  │  LOAD SETUP DEFAULTS                                        │
  ├──────────────────────────────────────────────────────────┤
  │  Esc : Quit                  ↑ ↓ → ←  : Select Item        │
  │  F10 : Save & Exit Setup     (Shift)F2 : Change Color      │
  ├──────────────────────────────────────────────────────────┤
  │                                                            │
  └──────────────────────────────────────────────────────────┘
```

4.13 Quit Without Saving

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

```
                 ROM PCI/ISA BIOS (2A434I9E)
                     CMOS SETUP UTILITY
                    AWARD SOFTWARE, INC.
  ┌──────────────────────────────────────────────────────────┐
  │  STANDARD CMOS SETUP          INTEGRATED PERIPHERALS       │
  │                                                            │
  │  BIOS FEATURES SETUP          SUPERVISOR PASSWORD          │
  │                                                            │
  │  CHIPSET FEATURES SETUP       USER PASSWORD                │
  │                                                            │
  │  POWER MANAGEMENT SETUP       IDE HDD AUTO DETECTION       │
  │                          ┌─────────────────────────┐      │
  │  PNP/PCI CONFIGURA       │ Quit Without Saving (Y/N)? N │ ETUP │
  │  LOAD BIOS DEFAULT       └─────────────────────────┘ SAVING │
  │  LOAD SETUP DEFAULTS                                        │
  ├──────────────────────────────────────────────────────────┤
  │  Esc : Quit                  ↑ ↓ → ←  : Select Item        │
  │  F10 : Save & Exit Setup     (Shift)F2 : Change Color      │
  ├──────────────────────────────────────────────────────────┤
  │                                                            │
  └──────────────────────────────────────────────────────────┘
```

5 SVGA Setup

5.1 Introduction

NOVA-4899 is equipped with on-board VGA interface.   The specifications and features are described as below:

Chipset

NOVA-4899 uses a Cyrix CX5530 chipset as its SVGA controller.   It has traditional analog CRT monitors.   It also accepts interlaced and non-interlaced analog monitors (color and monochrome VGA) with high-resolution quality while maintaining complete IBM VGA compatibility.   But digital monitors (i.e. MDA, CGA, and EGA) are NOT supported.   Multiple frequency (multisync) monitors are operated as if they are analog monitors.

Display memory

Having 1.5 ~ 4 MB UMA memory, the VGA controller can make CRT displays or color panel displays perform with resolution of up to 1024 x 768 at 64 K colors. The display memory can be modified up to 4 MB in BIOS for true-color resolution of 1024 x 768.

Display drivers

1. Win95, 98 drivers (VGA & Audio) in
    \VGA\MediaGX\National Geode Win9x Drivers 1.3

2. WinNT4.0 drivers in
    \VGA\MediaGX\Nt40Vga\

5.2 Further Information

For more detailed information about the PCI/SVGA installation in NOVA-4899, including driver updates, troubleshooting instructions, please visit our website www.ieiworld.com or contact your local contributor or ICP support team.

6 Audio

6.1 Introduction

With on-board audio interface, NOVA-4899 can perform high-quality stereo sound and FM music synthesis (ESFM) by using the CX5530 audio controller. The audio interface supports functions of recording, compressing, and playing back voice, sound, and music with a built-in mixer control.   In addition, the on board audio interface supports the Plug and Play (PnP) standard and provides PnP configuration for audio, FM, and MPU-104 logical devices.   It is compatible with AC97 version 2.0, voice, and music functions.   The ESFM synthesizer is compatible with OPL3 and has extended capabilities.

Audio drivers

1. Installing software driver in Windows NT
The driver is provided from the CD utility.
WinNT4.0 Audio drivers in
\Audio\MediaGX

2. Installing software driver in Win95/98
The software drivers is supported from Windows 95/98, please set up from…
Win98\drivers\audio\cyrix\mgxsb16.inf

7 PCI Bus Ethernet Interface

7.1 Introduction

NOVA-4899 provides a high performance 32-bit Ethernet chipset, which is completely compliant with IEEE 802.3 100 Mbps CSMA/CD standards. It is both 100Base-T and 10Base-T compatible, and is supported by major network operating system.

The Ethernet port supplies a standard RJ-45 connector on board. The network boot feature is utilized by incorporating the boot ROM image files for appropriate network operating system.

Appendix A Watchdog Timer

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

Three I/O ports control the Watchdog Timer.

443	Write	Set Watchdog Time period
443 (hex)	Read	Enable the refresh the Watchdog Timer.
043/843 (hex)	Read	Disable the Watchdog Timer.

Define Watchdog Time before enabling the function.   The output data is a value of time interval and the range of the value is from 01(hex) to FF (hex) and time interval 1 sec to 255 sec.

Data	Time Interval
01	1 sec
02	2 sec
03	3 sec
04	4 sec
.	.
.	.
.	.
FF	255 sec

This will enable and activate the countdown timer, which will eventually time out and reset the CPU to ensure that this reset condition does not occur.   Watchdog Timer must be periodically refreshed by reading the same I/O port 043/843H and 443H.   This must be done within the time out period that is selected by software, please refer to the example program.

A tolerance of at least 5% 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.

Example assembly program:

```
TIMER_PORT    = 443H
TIMER_START   = 443H
TIMER_STOP    = 843H


;;INITIAL TIME PERIOD COUNTER
MOV DX, TIME_PORT
MOV AL, 8:     ;;8 SECONDS
OUT DX,AL
;;ADD YOUR APPLICATION HERE
MOV DX, TIMER_START
IN AL, DX.     ;;START COUNTER


;;ADD YOUR APPLICATION HERE
W_LOOP:
MOV DX, TIMER_STOP
IN AL, DX
MOV DX, TIMER_START
IN AL, DX.          ;;RESTART COUNTER

;;ADD YOUR APPLICATION HERE
CMP EXIT_AP, 0
JNE W_LOOP
MOV DX, TIMER_STOP
IN AL, DX
;;EXIT AP
```

Appendix B I/O Address Map

System I/O Address Map

I/O Address Map	Description
000-01F	DMA Controller #1
020-021	Interrupt Controller # 1, Master
022-03F	Chipset address
040-043	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
0F0-0FF	Math Coprocessor
170-1FF	VIR BUS Master PCI IDE Controller
220-22F	Audio 16bit sound
2F8-2FF	Serial Port 2
378-37F	Parallel Printer Port 1
3B0-3DF	Cyrix Graphic Adapter
3F0-3F7	Floppy Disk Controller
3F8-3FF	Serial Port 1
443	Watchdog timer enabled
043/843	Watchdog timer disabled

PNP audio I/O map range from 220~250H (16 bytes)

MPU-401 select from 300~330H (2 bytes)

DMA Channel Assignments

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

* Audio DMA defaults setting: DMA 1.5

Audio High DMA select: DMA 1.3

Audio Low DMA select: DMA 5.6.7

** Parallel port DMA default setting: DMA 3

 Parallel port DMA select: DMA 1.3

Interrupt Assignments

Interrupt Number	Interrupt source
NMI	Parity error detected
IRQ 0	System timer
IRQ 1	Keyboard
IRQ 2	Interrupt from controller 2 (cascade)
IRQ 8	Real-time clock
IRQ 9	LAN 1
IRQ 10	LAN 2
IRQ 11	LAN 3
IRQ 12	PS/2 mouse
IRQ 13	Numeric data processor
IRQ 14	CX5530 Primary IDE controller
IRQ 15	CX5530 Second IDE controller
IRQ 3	Serial communication port 2
IRQ 4	Serial communication port 1
IRQ 5	Audio*
IRQ 6	Diskette controller (FDC)
IRQ 7	Parallel port 1 (print port)

*Audio default setting: IRQ5

Ethernet IRQ is automatically set by the system.

1ˢᵗ MB Memory Map

Address	Description
F000h-FFFFh	System ROM
D800h-EFFFh	Unused
C800h-D7FFh	Ethernet ROM*
C000h-C7FFh	Expansion ROM*
A000h-BFFFh	VGA graphics
0000h-9FFFh	Base memory
D000-D400H	Available

* Default setting

** If Ethernet boot ROM is enabled.