AR-B5890 Board

Intel GM45 with Core 2 Duo CPU board

User Manual

Manual Rev.: 1.0
Book Number: AR-B5890-2009.11.27

Revision

Version	Date	Author	Description
1.0	2009.11.27	Ken	

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1 INTRODUCTION

AR-B5890 incorporates the advanced Intel® GM45 & ICH9M Chipset. Intel® GM45 chipset supports the Intel Core 2 Duo and Celeron M processors, while coming with a 667/800/1066MHz Front Side Bus. It integrated Intel® GMA 4500MHD Graphic Core, brings great 3D graphic performance for corporate and industrial application.

AR-B5890 provides outstanding video playback with high image quality, increased clarity, and customization color controls. Enables enhanced visual quality of interlaced content on progressive displays.

AR-B5890 is the best choice of industrial SBC. It provides high performance computing ability and agile functions can help you build up outstanding embedded system.

1.1 Specifications

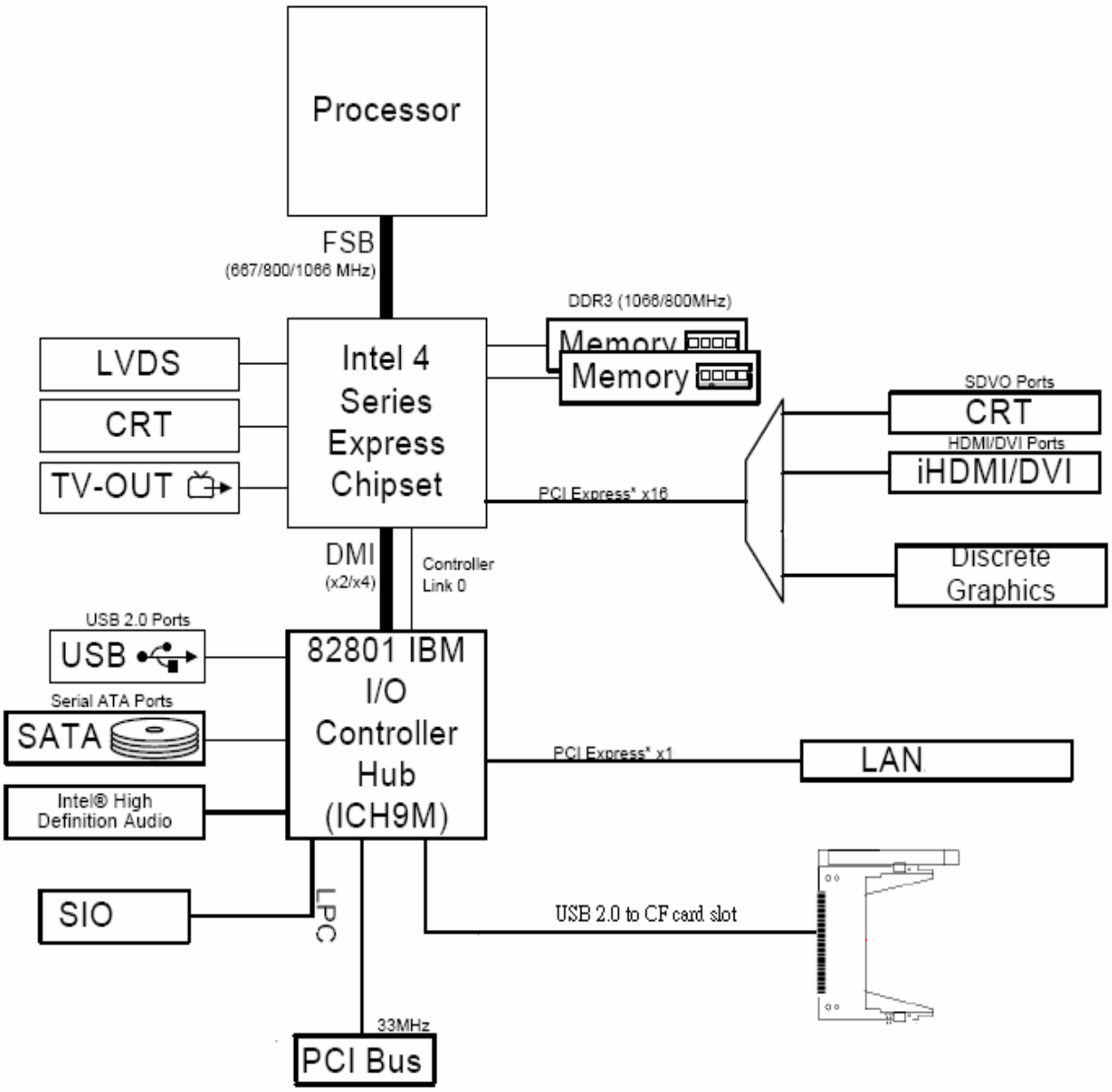
- Intel® Core 2 Duo Mobile Processor for Mobile Intel GM45 Express Chipset Family.
- Intel® GM45 & ICH9M chipset.
- Intel® GMA4500MHD Graphic Core.
- Dual Channel DDR3-1066MHz, max. 8GB.
- Dual Channel 2x24-bit LVDS.
- 2 x SATA.
- 1 x CF II.
- 5 x RS232, 1 x RS232/422/485.
- 9 x USB2.0.
- 1 x PCI & 1 x PCI-E.
- 1 x GbE LAN.
- 8-bit GPIO.
- DVI-D / TV-out interface.

1.2 Package Contents

Check if the following items are included in the package.

- Quick Manual
- AR-B5890
- Software Utility CD X1

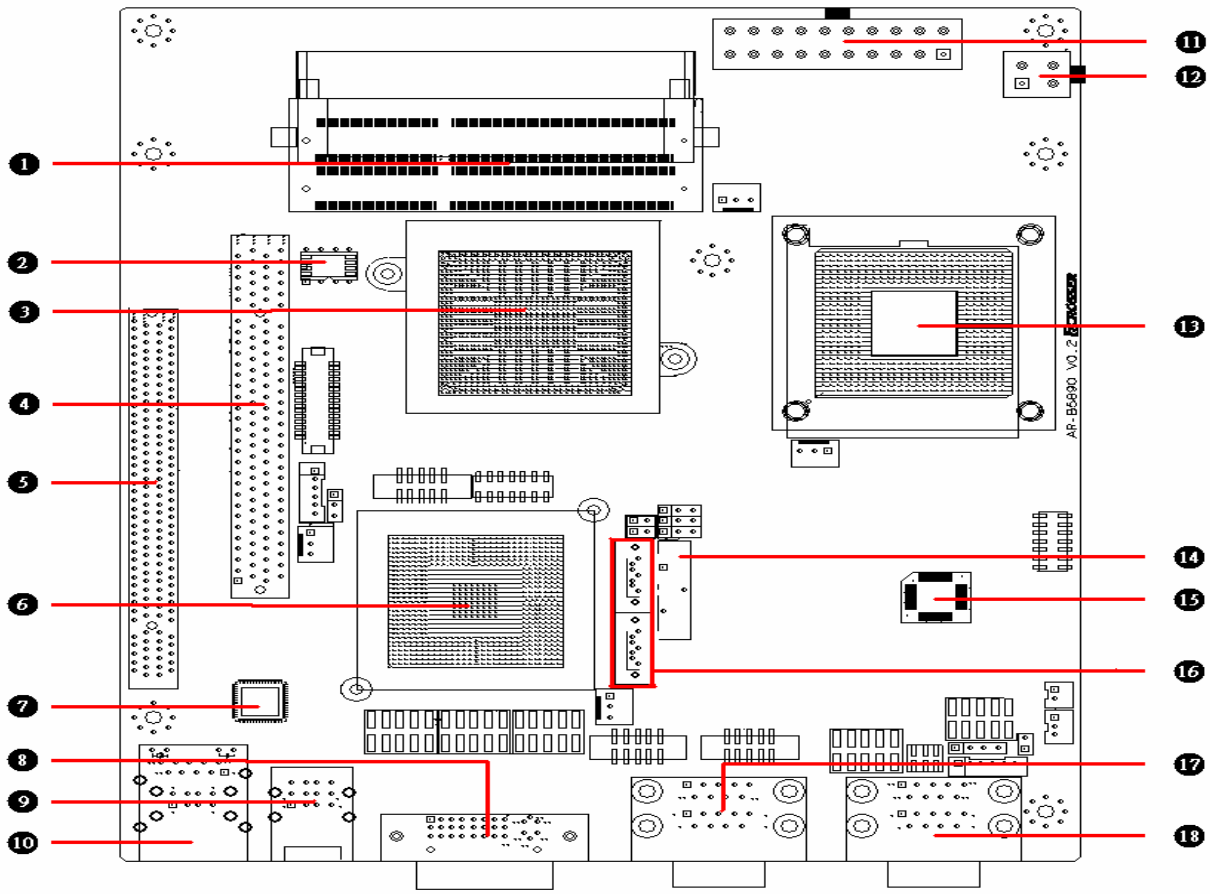
1.3 Block Diagram



2 H/W INFORMATION

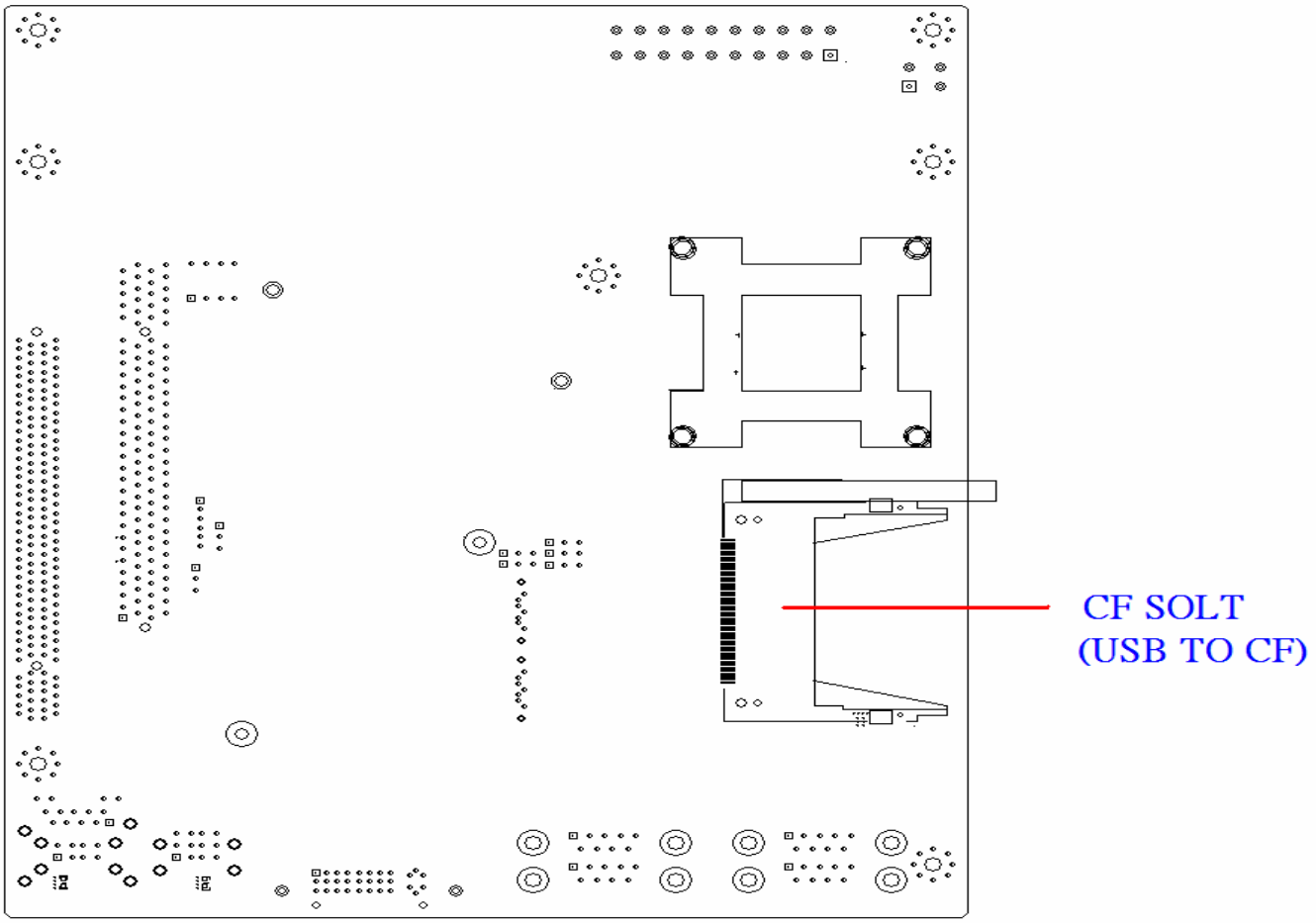
This chapter describes the installation of AR-B5890. At first, it shows the function diagram and the layout of AR-B5890. It then describes the unpacking information which you should read carefully, as well as the connectors/jumper setting for the AR-B5890 configuration.

2.1 Locations (Top side)



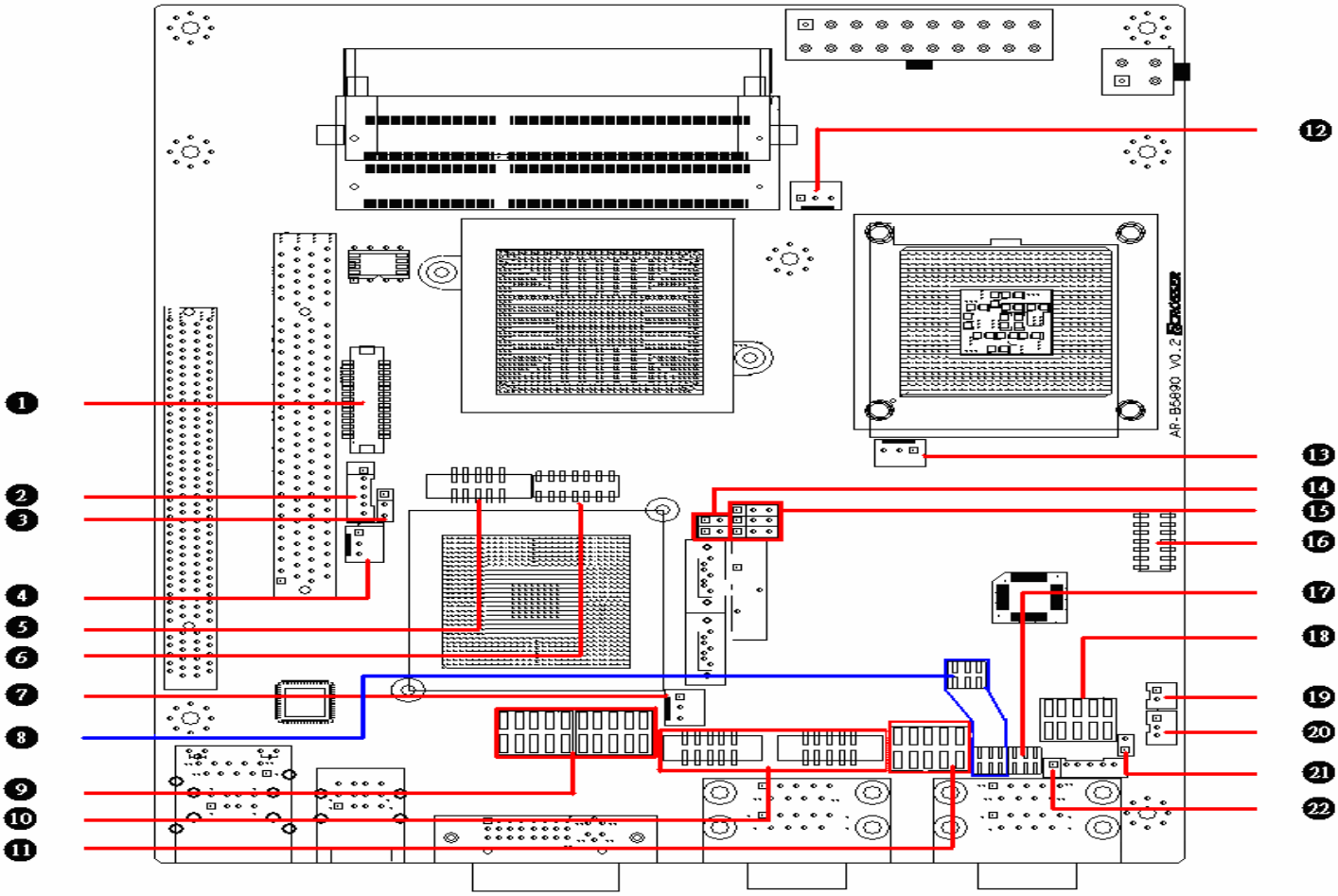
1	**DIMM** SO-DIMM Socket for DDR3.	10	**CN5** 2 USB and 1 RJ-45 for LAN.
2	**BIOS** Serial Peripheral Interface Flash.	11	**ATX1** Power Connector for System Voltage.
3	**GMCH** Graphic Memory Control Hub Intel GM45.	12	**ATX2** Power Connector 12V for CPU Voltage.
4	**PCI1** PCI Socket (5V).	13	**Processor** Socket for Pentium and Celeron mobile on 45nm Celeron T1700,T1600,585 and 575 on 65nm.
5	**PCIE1** PCI Express x16 Socket.	14	**BAT1** CR2032 Size Coin Battery.
6	**ICH9 M** I/O Controller Hub 9 M.	15	**AUDIO CHIP** Realtek ALC662.
7	**LAN Chip** Intel 82574L Gigabit Ethernet.	16	**SATA1 & SATA2** SATA Data Connector.
8	**DVI1** DVI-D Connector.	17	**CN7** RS232 Serial Ports (COM1 & COM2).
9	**CN6** 3 USB Connector.	18	**CN8** RS232 Serial Ports (COM3 & COM4).

2.2 Locations (Bottom side)



2.3 Connectors and Jumper Setting

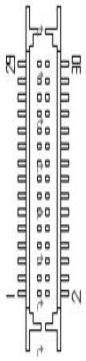
2.3.1 Locations (Top side)



1	LVDS Connector for LVDS Signals	9	CN3 & CN4 Pin Header for 4 USB Ports	17	JP17 Switch for Select COM5 RS232/422/485
2	CN1 Connector for Back Light Inverter	10	COM5 & COM6 RS232 Serial Ports	18	JP13 Power Button & Reset & Buzzer & Power LED & HD LED
3	JP1 Switch for Selecting 3V or 5V Panel	11	GPIO1 Pin Header for User-Defined GPIOs	19	JP11 JST Connector for Microphone
4	SYSFAN2 System Fan Connector	12	CPUFAN CPU Fan Connector	20	JP14 JST Connector for Line In.
5	VGA1 Pin Header for D-Sub 15 Pin VGA	13	SYSFAN1 System Fan Connector	21	JP15 Keyboard Lock
6	TVOUT1 Pin Header for TV-OUT	14	JP3 RTC (Real Time Clock) Reset	22	KM1 JST Connector for Keyboard & Mouse
7	SYSFAN3 System Fan Connector	15	JP2 & JP4 & JP6 Front Side Bus Clock Strapping		
8	JP18 & JP20 Select COM5 RS232/422/485	16	AUDIO1 Audio Output Connector (5.1 CH)		

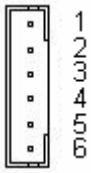
2.4 Connectors and Jumper Setting Table

2.4.1 LVDS (LVDS Signal)



PIN	SIGNAL	PIN	SIGNAL
1	LCDVCC	2	GND
3	B CLK-	4	B CLK+
5	GND	6	B DATA2-
7	B DATA2+	8	GND
9	B DATA1-	10	B DATA1+
11	B DATA3+	12	B DATA3-
13	B DATA0+	14	BDATA0-
15	GND	16	A CLK+
17	A CLK-	18	GND
19	A DATA2+	20	A DATA2-
21	I2C CLK	22	A DATA1+
23	A DATA1-	24	I2C DATA
25	A DATA0+	26	A DATA0-
27	A DATA3+	28	A DATA3-
29	LCDVCC	30	LCDVCC

2.4.2 CN1 (Back Light Inverter)



PIN	SIGNAL
1	12V
2	12V
3	GND
4	Back Light On
5	GND
6	Back Light Control

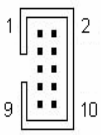
2.4.3 JP1 (Switch for Selecting 3V or 5V Panel)

STATUS	SIGNAL
1-2 Close	3.3V
2-3 Close	5V

2.4.4 SYSFAN2 (System Fan Connector)

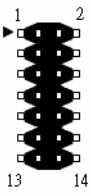
PIN	SIGNAL
1	GND
2	12V
3	3.3V

2.4.5 JP8 (Pin Header for D-SUB 15 PIN VGA)



PIN	SIGNAL	PIN	SIGNAL
1	R	2	GND
3	G	4	GND
5	B	6	GND
7	VSYNC	8	SCL
9	HSYNC	10	SDA

2.4.6 TVOUT1 (Pin Header for TV-OUT)

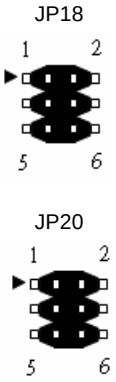


PIN	SIGNAL	PIN	SIGNAL
1	Y	2	DLINE3
3	GND	4	DLINE2
5	Pb	6	NC
7	GND	8	DLINE1
9	Pr	10	GND
11	GND	12	NC
13	NC	14	NC

2.4.7 SYSFAN3 (System Fan Connector)

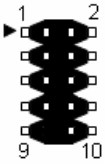
PIN	SIGNAL
1	GND
2	12V
3	3.3V

2.4.8 JP18 & JP20 (Select COM5 RS232/422/485)



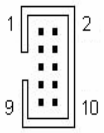
STATUS		SETTING
JP18	1-3,2-4	RS-232
JP20	1-3,2-4	
JP18	3-5, 4-6	RS-422
JP20	3-5, 4-6	
JP18	3-5, 4-6	RS-485
JP20	N/A	

2.4.9 CN3 & CN4 (Pin Header for 4USB Ports)



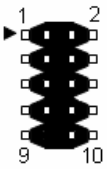
PIN	SIGNAL	PIN	SIGNAL
1	5V	2	5V
3	-USB0	4	-USB1
5	+USB0	6	+USB1
7	GND	8	GND
9	GND	10	GND

2.4.10 COM5 (RS-232/ RS-422/ RS-485 Serial Ports)



PIN	SIGNAL	PIN	SIGNAL
1	DCD	2	DSR(RX-)
3	RX(RX+)	4	RTS
5	TX	6	CTS(TX-)
7	DTR	8	RI(TX+)
9	GND	10	NC

2.4.11 GPIO1 (Pin Header for User-Defined GPIOs)



PIN	SIGNAL	PIN	SIGNAL
1	5V	2	GND
3	GPIO30	4	GPIO34
5	GPIO31	6	GPIO35
7	GPIO32	8	GPIO36
9	GPIO33	10	GPIO37

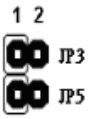
2.4.12 CPUFAN (CPU Fan Connector)

PIN	SIGNAL
1	Fan speed data
2	12V
3	GND

2.4.13 SYSFAN1 (System Fan Connector)

PIN	SIGNAL
1	Fan speed data
2	12V
3	GND

2.4.14 JP3 & JP5 (RTC (Real Time Clock)) Reset

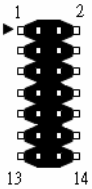


STATUS		SETTING
JP3 JP5	1-2 close	Clear CMOS & RTC
JP3 JP5	NC	Keep CMOS & RTC

2.4.15 JP2 & JP4 & JP6 (Front Side Bus Clock Strapping)

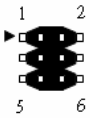
FSB	SETTING	
Auto	JP2	1-2 close
	JP4	1-2 close
	JP6	1-2 close

2.4.16 AUDIO1 (Audio Output Connector(5.1 CH))



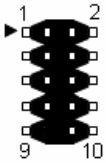
PIN	SIGNAL
1	Front output right channel
2	Front output left channel
3	GND
4	GND
5	Low Frequency output
6	Center output
7	GND
8	GND
9	GND
10	GND
11	Surround out right channel
12	Surround out left channel
13	GND
14	NC

2.4.17 JP17 (Switch for Select COM5 RS-232/422/485



STATUS	SETTING
1-2 close	RS-232
3-4 close	RS-422
5-6 close	RS-485

2.4.18 JP13 (Power Button & Reset & Buzzer & Power LED &HD LED)

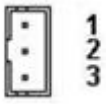


PIN	SIGNAL
1	Power LED +
2	Power LED-
3	HD LED+
4	HD LED-
5	Buzzer+
6	Buzzer-
7-8	Reset
9-10	Power Button

2.4.19 JP11 (JST Connector for Microphone)

PIN	SIGNAL
1	MIC IN
2	GND

2.4.20 JP14 (JST Connector for Line In

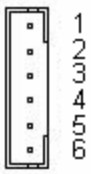


PIN	SIGNAL
1	LINE IN RIGHT
2	GND
3	LINE IN LEFT

2.4.21 JP15 (Keyboard Lock)

PIN	SIGNAL
Open	Keyboard Lock
Close	Keyboard Unlock

2.4.22 KM1 (JST Connector for Keyboard & Mouse)



PIN	SIGNAL	PIN	SIGNAL
1	MS data	4	5V
2	KB data	5	MS clock
3	GND	6	KB clock

3 WATCHDOG, GPIO PROGRAMMING

GPIO Sample Code

```
//============================================================================
// Turbo C++ Version 3.0 Copyright(c) 1990, 1992 by Borland International,Inc.
//============================================================================
// Describe : GPIO30~GPIO37 Test utility for ITE8718F.
// Date     : 02/09/2009
// Author   : Willy
//============================================================================

//============================================================================
//   Language include files
//============================================================================
#include <conio.h>
#include <stdio.h>

//============================================================================
//   Normal procedure
//============================================================================
void Show_Help();
void Show_Fail();
void Show_Pass();

//============================================================================
//   Main procedure
//============================================================================
int main(int argc)
{
   char *Model_Name="AR-B5890";
   unsigned char      IO_PORT_BASE=0x2E;   // DATA_PORT = IO_PORT_BASE + 1;
   unsigned short int SIMPLE_IO_BASE;
   unsigned char data;
   int result=0;

   if ( argc >1 )
      {   Show_Help();     return 1;   }

   clrscr();
   textcolor(WHITE);
   gotoxy(1, 1);   cprintf("<>================================================================================<>");
   gotoxy(1, 2);   cprintf("|| ITE8712F GPIO Test Utility v1.0 Acrosser Technology Co., Ltd.                ||");
   gotoxy(1, 3);   cprintf("<>================================================================================<>");
   gotoxy(1, 4);   cprintf("<>================================================================================<>");
   gotoxy(1, 5);   cprintf("|| Model Name    :                                                               ||");
   gotoxy(1, 6);   cprintf("|| SIO IO Base :                                                                ||");
   gotoxy(1, 7);   cprintf("|| Simple I/O Base :                                                           ||");
   gotoxy(1, 8);   cprintf("<>================================================================================<>");

   // Enter ITE8712F Config
   outportb(IO_PORT_BASE,0x87);
   outportb(IO_PORT_BASE,0x01);
   outportb(IO_PORT_BASE,0x55);
   outportb(IO_PORT_BASE,0x55);

   // Select Logic Device number 7
   outportb(IO_PORT_BASE,0x07);
   outportb(IO_PORT_BASE+1,0x07);

   // Set Multi-function Pins to GPIO30~GPIO37
   outportb(IO_PORT_BASE,0x27);
   outportb(IO_PORT_BASE+1,0xFF);

   // GPIO30~GPIO37 Used Simple I/O Finction
   outportb(IO_PORT_BASE,0xC2);
   outportb(IO_PORT_BASE+1,0xFF);
```

```
    // Get Simple I/O Base Address
    outportb(IO_PORT_BASE,0x62);                // Simple I/O Base address MSB
    SIMPLE_IO_BASE=inportb(IO_PORT_BASE);
    SIMPLE_IO_BASE=SIMPLE_IO_BASE<<8;
    outportb(IO_PORT_BASE,0x63);                // Simple I/O Base address LSB
    SIMPLE_IO_BASE=SIMPLE_IO_BASE|inportb(IO_PORT_BASE);

    // Show Got Parameter Informat
    textcolor(LIGHTGRAY);
    gotoxy(18,5);       cprintf("%s",Model_Name);
    gotoxy(18,6);       cprintf("%X",IO_PORT_BASE);
    gotoxy(22,7);       cprintf("%X",SIMPLE_IO_BASE);

    // Set GPIO30~33 to Output, GPIO34~GPIO37 to Input
    outportb(IO_PORT_BASE,0xCA);
    outportb(IO_PORT_BASE+1,0x0F);    // bit=1 , output

    // Set GPIO30~33 to High
    outportb(SIMPLE_IO_BASE+2,0x0F);
    // Read GPIO34~37 Status, if not High error.
    data=inportb(SIMPLE_IO_BASE+2)&0xF0;
    if(data!=0xF0)
        result=1;

    // Set GPIO30~33 to Low
    outportb(SIMPLE_IO_BASE+2,0x00);
    // Read GPIO34~37 Status, if not Low error.
    data=inportb(SIMPLE_IO_BASE+2)&0xF0;
    if(data!=0x00)
        result=1;

    // Set GPIO30~33 to Input, GPIO34~GPIO37 to Output
    outportb(IO_PORT_BASE,0xCA);
    outportb(IO_PORT_BASE+1,0xF0);    // bit=1 , output

    // Set GPIO34~37 to High
    outportb(SIMPLE_IO_BASE+2,0xF0);
    // Read GPIO30~33 Status, if not High error.
    data=inportb(SIMPLE_IO_BASE+2)&0x0F;
    if(data!=0x0F)
        result=1;

    // Set GPIO34~37 to Low
    outportb(SIMPLE_IO_BASE+2,0x00);
    // Read GPIO30~33 Status, if not Low error.
    data=inportb(SIMPLE_IO_BASE+2)&0x0F;
    if(data!=0x00)
        result=1;

    // Exit ITE8712F Config
    outportb(IO_PORT_BASE,0x02);
    outportb(IO_PORT_BASE+1,0x02);

    if(result)
       Show_Fail();
    else
       Show_Pass();

    return result;
}


void Show_Help()
{
    clrscr();
    printf("GPIO Test utility for ITE8712F\n\n");
    printf("Vcc   ?                    ?GND \n");
    printf("GP30 ?<迁迁迁迁? ?GP34\n");
    printf("GP31 ?<迁迁迁迁? ?GP35\n");
    printf("GP32 ?<迁迁迁迁? ?GP36\n");
    printf("GP33 ?<迁迁迁迁? ?GP37\n");
}

//===========================================================================
// Function    : Show_Fail()
// Input       : -
```

```
// Change      : -
// Return      : -
// Description    : Show Fail Message.
//=============================================================================
void Show_Fail()
{
}

//=============================================================================
// Function    : Show_Pass()
// Input       : -
// Change      : -
// Return      : -
// Description    : Show Pass Message.
//=============================================================================
void Show_Pass()
{
}
```

WATCHDOG TIMER

```
//=========================================================================
// Turbo C++ Version 3.0 Copyright(c) 1990, 1992 by Borland International,Inc.
//=========================================================================
// Describe : ITE8718F WatchDog timer test
// Date        : 03/17/2008
// Author     : Willy
//=========================================================================

#include <conio.h>
#include <stdlib.h>
#include <stdio.h>
#include <dos.h>



//=========================================================================
//   Main procedure
//=========================================================================
int main(int argc, char *argv[])
{
    unsigned char IO_Port_Address=0x2E;
    unsigned char Time;
    int Temp;

    if ( argc != 2 )
      {   Show_Help();     return 1;        }

    clrscr();

    Time=atoi(argv[1]);

    // Set Watchdog
    outportb(IO_Port_Address,0x87);      // Enter configure
    outportb(IO_Port_Address,0x01);
    outportb(IO_Port_Address,0x55);
    outportb(IO_Port_Address,0x55);

    outportb(IO_Port_Address,0x07);      // Point to Logical Device Number Reg.
    outportb(IO_Port_Address+1,0x07);  // Select logical device 7, (Watchdog Function)

    outportb(IO_Port_Address,0x23);      // Select Watchdog use CLKIN
    outportb(IO_Port_Address+1,inportb(IO_Port_Address+1)|0x10);

    outportb(IO_Port_Address,0x72);      // Select Watchdog use keyboard reset
    outportb(IO_Port_Address+1,0x40);

    outportb(IO_Port_Address,0x72);      // Select Watchdog count mode seconds or minutes
    outportb(IO_Port_Address+1,inportb(IO_Port_Address+1)|0x80); // Set Second

    outportb(IO_Port_Address,0x73);      // Set Watchdog Timer Value
    outportb(IO_Port_Address+1,Time);  // 0x00 to disable, max 0xFF
    textcolor(YELLOW);
    for(Temp=Time;Temp>0;Temp--)
     {

        gotoxy(20,10);
```

```
        cprintf(">>> After %3d Second will reset the system. <<<",Temp);

        delay(1000);
     }

    delay(2000);
    textcolor(LIGHTRED);
    gotoxy(18,10);
    cprintf("If you can see this message, Reset system is Fail");

    return 0;
}
```

Note: The WatchDog Timer Fuction has 10% torence.

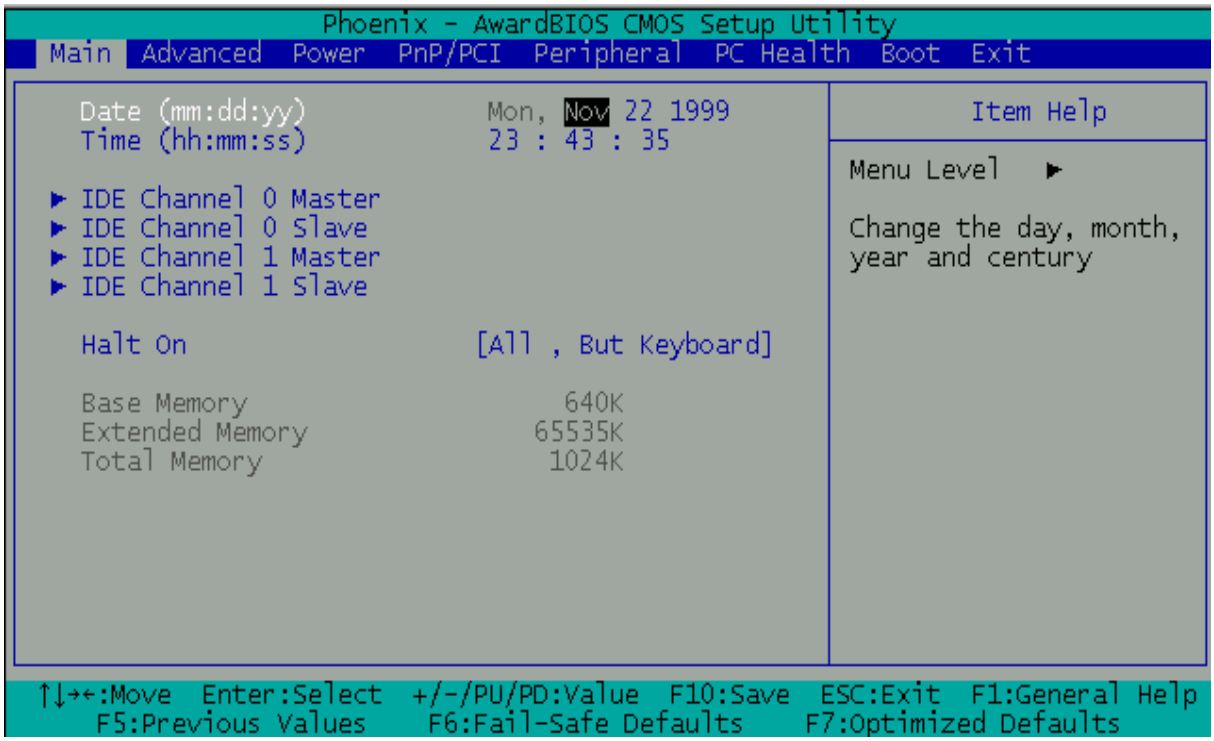
4 BIOS SETTING

This chapter describes the BIOS menu displays and explains how to perform common tasks needed to get the system up and running. It also gives detailed explanation of the elements found in each of the BIOS menus. The following topics are covered :

- Main Setup
- Advanced Chipset Setup
- Power Setup
- PnP/PCI Setup
- Peripherals Setup
- PC Health Setup
- Boot Setup
- Exit Setup

4.1 Main Setup

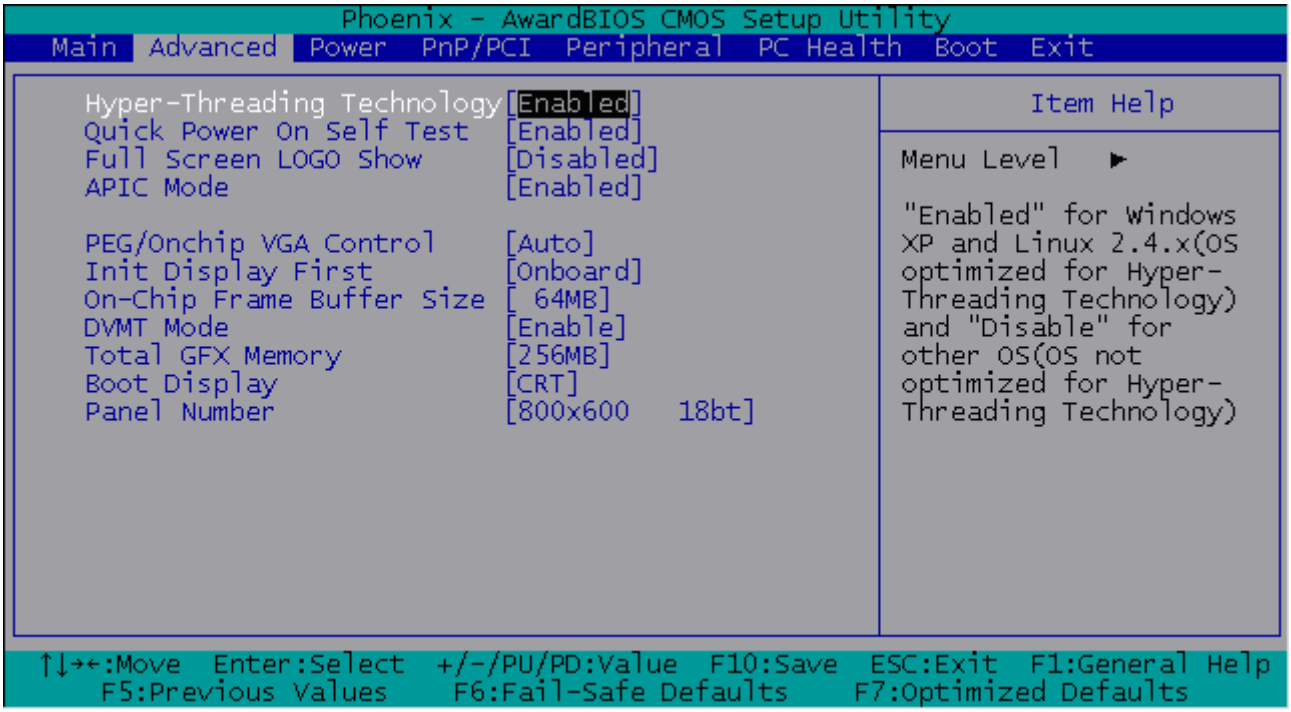
Once you enter the Award BIOS™ CMOS Setup Utility, the Main Menu will appear on the screen. Use the arrow keys to highlight the item and then use the <Pg Up> <Pg Dn> keys to select the desired value in each item.



Note: The control keys are listed at the bottom of the menu. If you need any help with the item fields, you can press the <F1> key, and the relevant information will be displayed.

Option	Choice	Description
Date Setup	N/A	Set the system date. Note that the 'Day' automatically changes when you set the date.
Time Setup	N/A	Set the system time.
IDE Channel 0 Master/Slave	N/A	The onboard SATA Ports support user connecting up to 2 SATA HDD. The first SATA Port is the "IDE Channel 0 Master" and the second is "IDE Channel 1 Master". BIOS will auto-detect the HDD type.
Halt On	All Errors, No Errors, All but keyboard.	Select the situation in which you want the BIOS to stop the POST process and notify you.

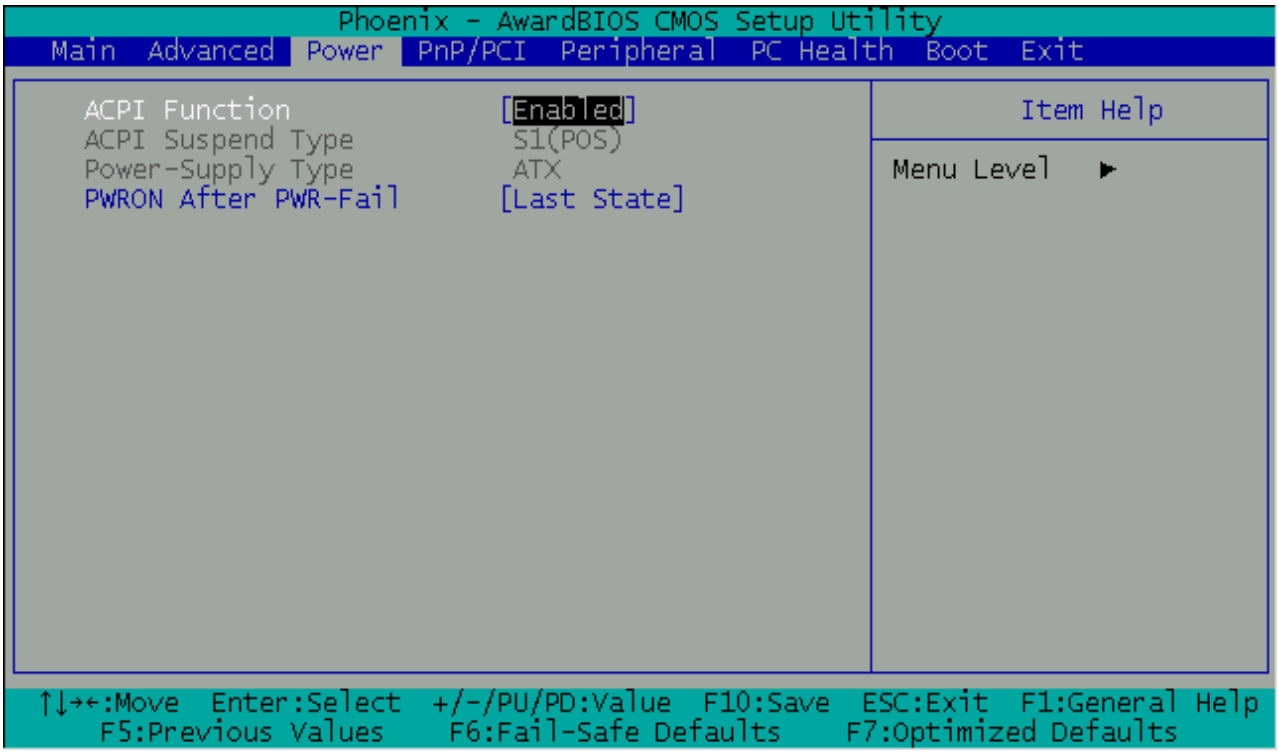
4.2 Advanced Chipset Setup



Option	Choice	Description
Quick Power On Self Test	Enabled Disabled	This category speeds up the Power On Self Test (POST) after you have powered on the computer. If it is set to Enabled, the BIOS will shorten or skip some check items during POST.
Full Screen Logo Show	Enabled Disabled	Select Enabled to show the full screen logo if you have an add-in BIOS.
APIC Mode	Enabled Disabled	Select Enable or Disable the APIC Mode.
PEG/Onchip VGA Control	Auto PEG Port On Chip	Forced or auto detecting Onboard VGA/ PCIE VGA Card.
INIT Display First	PCI Slot Onboard PCIEx	Select Init display first to VGA Card or Onboard VGA.

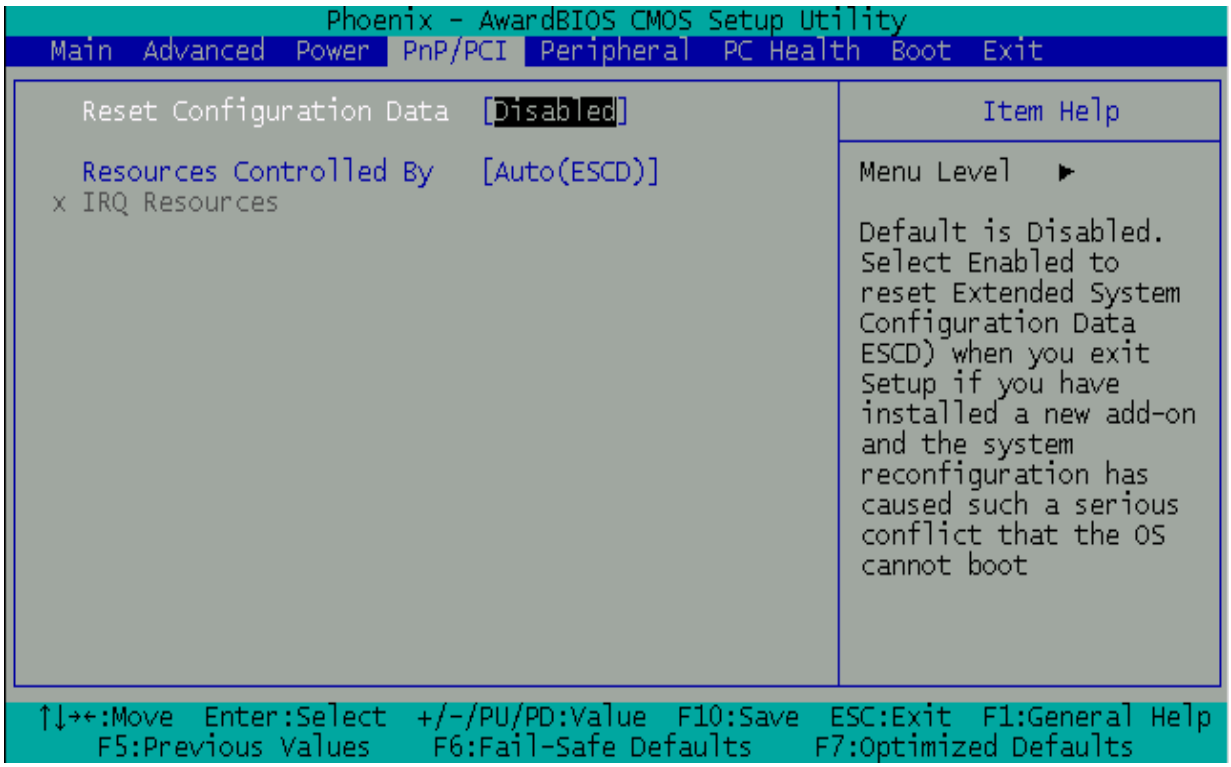
On-Chip Frame Buffer Size	32M 64M 128M	Pre-allocated main memory for onboard VGA frame buffer.
DVMT mode	Enabled	This item sets the mode for OS dynamic video memory technology (DVMT).
Total GFX Memory	128M 256M MAX.	The item sets DVMT size and handle by VGA driver.
Boot Display	CRT LFP DVI TV CRT+CRT2 (Option) CRT+LFP CRT+HDMI (Option) CRT+DVI	For User selected the onboard display combination. The CRT, LFP, DVI, and TV are onboard features. The CRT2 is optional and it's from AR-B2013 for VGA. The HDMI is optional and it's from AR-B2013 for HDMI.
Panel Number	800 x 600 18bt 1024 x 768 18bt 1280 x 1024 18bt 800 x 600 24bt 1024 x 768 24bt 1280 x 1024 24bt	For User selected the LCD Panel Type. The 18 bt is for 18 bit LCD panel. The 24 bt is for 24 bit LCD panel.

4.3 Power Setup



Option	Choice	Description
ACPI Function	Enabled	ACPI System Support.

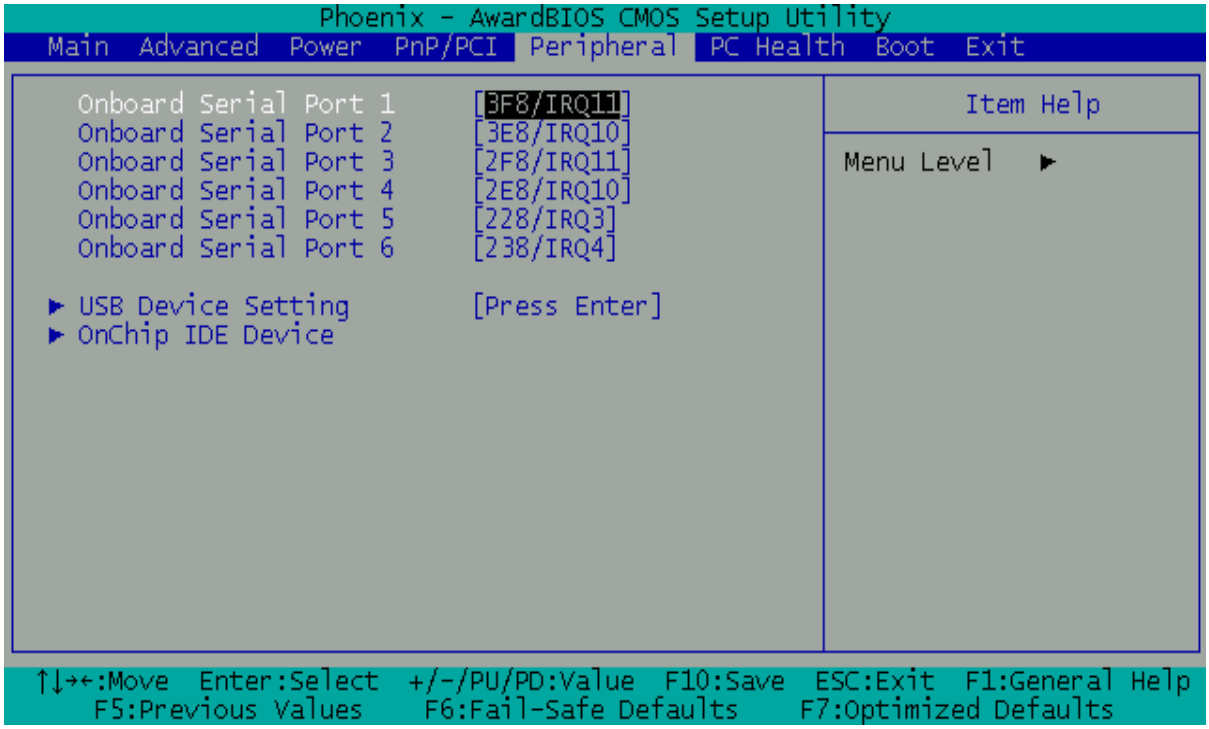
4.4 PnP/PCI Setup



Option	Choice	Description
Reset Configuration Data	Enabled Disabled	Normally, you leave this field Disabled. Select Enabled to reset the Extended System Configuration Data (ESCD), when you exit Setup. This may be necessary, if you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operating system can not boot.
Resources Controlled By	Auto (ESCD) Manual	The Award Plug and Play BIOS has the capacity to automatically configure all of the boot and Plug and Play compatible devices. However, this capability means absolutely nothing unless you are using a Plug and Play operating

		system such as Windows 95 or higher. If you set this field to “Manual”, you may choose specific resources by entering each of the submenus.
IRQ Resources	N/A	When resources are controlled manually, assign a type to each system interrupt, depending on the type of the device that uses the interrupt.

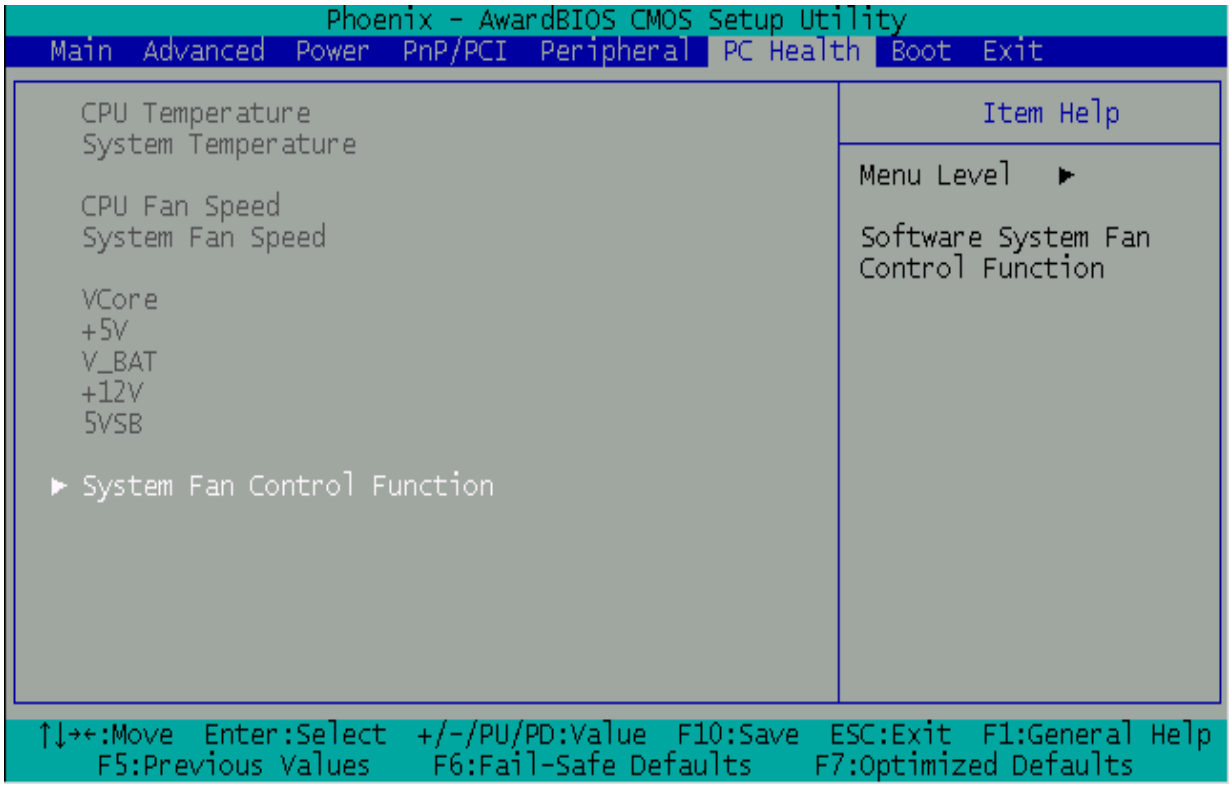
4.5 Peripherals Setup



Option	Choice	Description
Onboard Serial Port 1	Serial Port 1: 3F8 / IRQ11	Select an address and the corresponding interrupt for each serial port.
Onboard Serial Port 2	Serial Port 2: 3E8 / IRQ10	
Onboard Serial Port 3	Serial Port 3: 2F8 / IRQ11	
Onboard Serial Port 4	Serial Port 4: 2E8 / IRQ10	
Onboard Serial Port 5	Serial Port 5: 228 / IRQ3	
Onboard Serial Port 6	Serial Port 6: 238 / IRQ4	

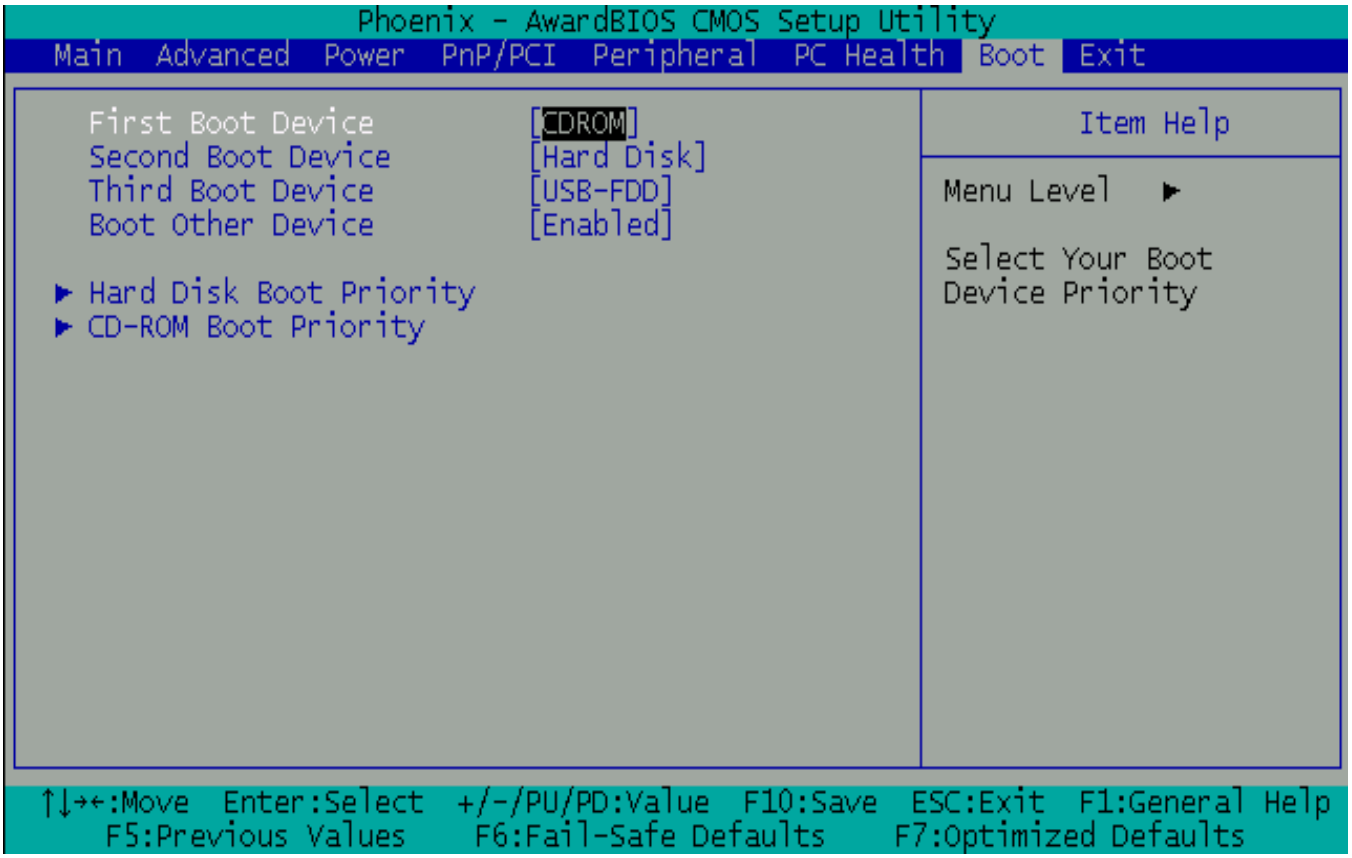
4.6 PC Health Setup

This section shows the parameters for determining the PC Health Status. These parameters include temperatures, fan speeds, and voltages.



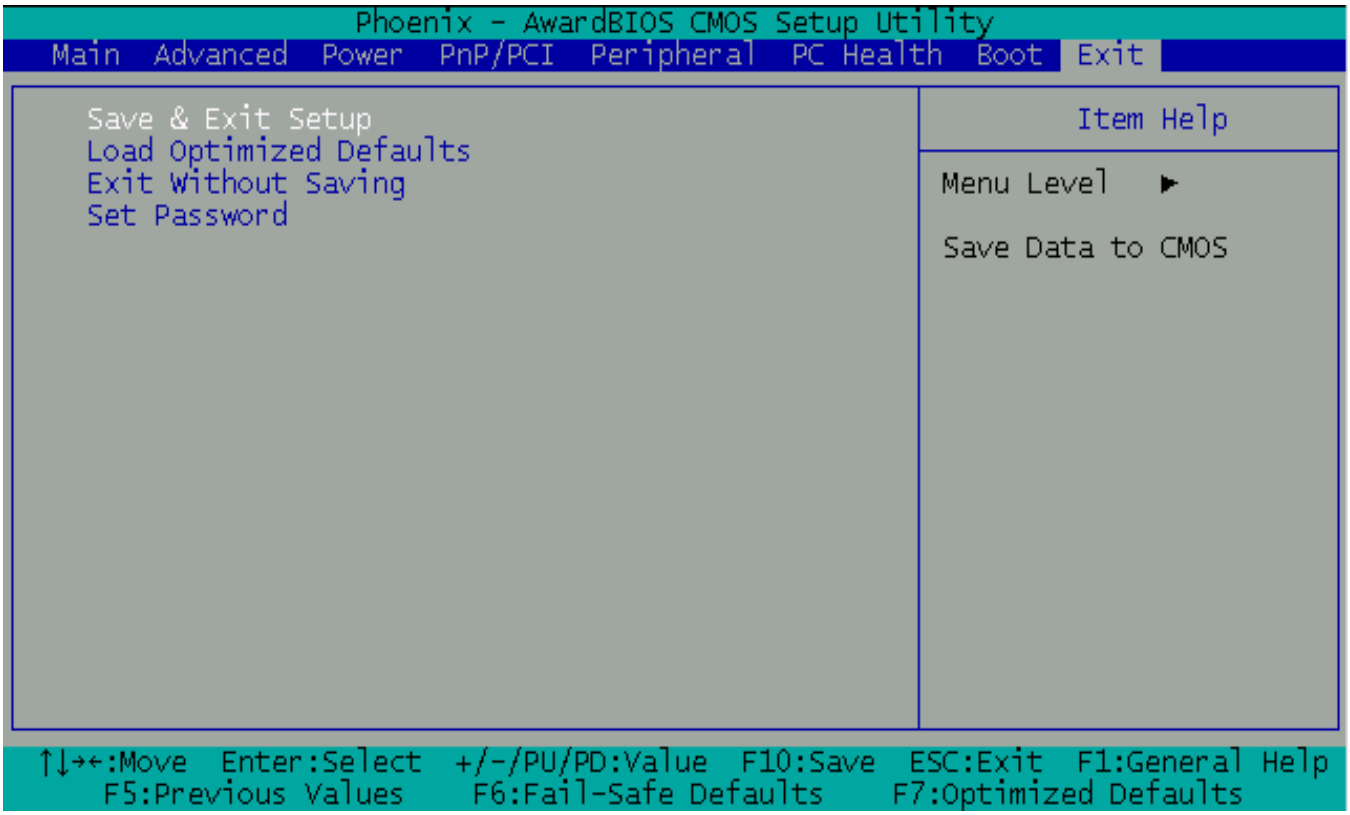
Option	Choice	Description
System Fan Control Function		The FAN will automatic spin up or setting FAN active temperature by user.

4.7 Boot Setup



Option	Choice	Description
First / Second / Third Boot Device/Other Boot Device	Hard Disk CDROM USB-FDD Disabled	The BIOS attempts to load the operating system from the devices in the selected sequence.
Hard Disk Boot Priority	N/A	These fields set the Boot Priority for each Hard Disk.
CD-ROM Boot Priority	N/A	These fields set the Boot Priority for each CR-ROM.

4.8 Exit Setup



Option	Choice	Description
Save & Exit Setup	Press <Enter> on this item to confirm: **Save to CMOS and EXIT (Y/N)? Y**	Press “Y” to store the selections made in the menus in CMOS – a special section of the memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the setup selections stored in CMOS. After saving the values, the system will restart.

Load Optimized Defaults	When you press <Enter> on this item, you will see a confirmation dialog box with a message like this: **Load Optimized Defaults (Y/N)? N**	Press 'Y' to load the default values that are factory-set for optimal-performance system operations.
Exit Without Saving	Press <Enter> on this item to confirm: **Quit without saving (Y/N)? Y**	This allows you to exit Setup without storing any changes in CMOS. The previous selections remain in effect. This will exit the Setup utility and restart your computer.
Set Password	Press <Enter> on this item to confirm: **ENTER PASSWORD:**	When a password has been enabled, you will be prompted to enter your password every time you try to enter Setup. This prevents unauthorized persons from changing any part of your system configuration. Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previous password from the CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <Esc> to abort the selection and not enter a password. To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm that the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

5 ELECTRICAL CHARACTERISTICS

5.1 Basic Electrical Characteristics Table

Electrical Characteristics					
Symbol	Parameter / Condition	Value			Unit
		Min.	Type.	Max.	
+12V	+12V power input	11.4	12	12.6	V
+5V	+5V power input	4.75	5.0	5.25	V
RS232	Maximum operating baud rate	-	-	115.2	Kbps
Blight	LCD panel backlight operating voltage	11.4	12	12.6	V
T.P.C	Total power consumption of ACE-B5890 without External device @ Pentium M 2.0 Ghz	-	33	-	W