SBC-4212

Full-size PICMG CPU Card

USER MANUAL
Version 1.1
2004.12

Packing List:

Please check the contents of the package before you install the system.

Hardware:

SBC-4212 Single Board Computer x 1

Cable Kit:

40-pin ATA100 IDE flat cable x 2

Floppy flat cable x 1
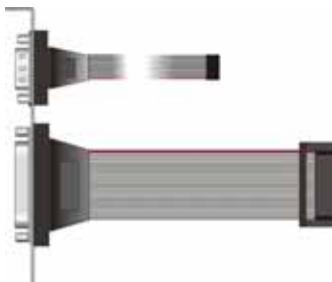
DB25 & DB9 cable with bracket x 1
(SBC-4212ANL only)
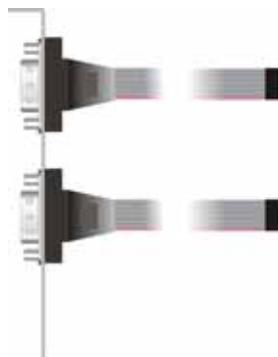
Dual DB9 cable with bracket x 1
(SBC-4212AG2NL only)
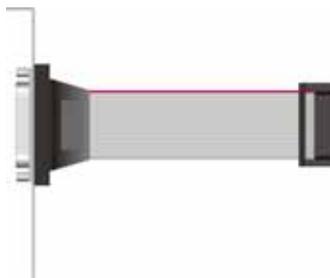
DB25 cable with bracket x 1
(SBC -4212AG2NL only)
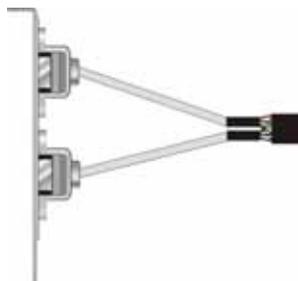
Dual USB cable with bracket x 2

CPU Cooler x 1

Audio cable with bracket x 1
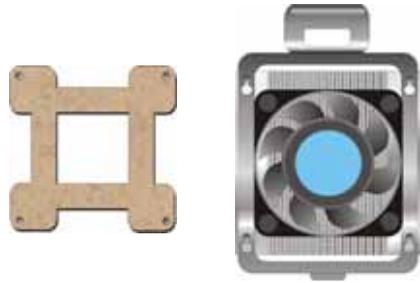
4-pin to 3-pin ATX cable x 1

PS/2 Keyboard & Mouse Cable x 1

CD Content:

Divers CD

User Manual

Index

Chapter 1 <Introductions>

1.1 < Product Overview>

The **SBC-4212** is an all-in-one single board computer with PICMG interface. Based on Intel Mobile solutions with 855GME chipset, it supports socket 479 Intel Pentium-M processor, DDR266/333 SDRAM up to 2GB capacity, onboard Intel Extreme Graphics 2 Technology, AC97 2 channel audio, USB2.0 interface and one optional Gigabit Ethernet controller.

As a powerful multimedia platform, **SBC-4212** is also integrated with 24-bit dual channel LVDS interface and one Compact Flash Type II socket. Thanks to these features **SBC-4212** is the perfect choice for industrial multimedia platform like POS or KIOSK systems.

Powerful Embedded System

SBC-4212 supports Intel Pentium M FC-BGA2 with lower voltage and power consumption for a fan free embedded system.

Embedded operating system like windows CE.net or Linux Embedded can be ported through compact flash type II socket.

Hi-Speed USB 2.0 Interface

SBC-4212 offers up to 480Mbps Hi-Speed USB 2.0 interfaces with Intel ICH4 built-in Hi-Speed USB 2.0 controller.

1.2 <Product Specifications>

General Specification	
Form Factor	Full-size PICMG CPU card
CPU	Intel Pentium-M Processor with FC-PGA478/FC-BGA479
	FSB: 400MHz
	L2 Cache: 512KB/1MB/2MB
	Battery Mode is not supported
	Intel Speed Step Technology function is not supported
Memory	Two 184-pin DIMM sockets support DDR200/266/333 up to
	2GBytes SDRAM
	ECC is supported
Chipset	Intel 82855GME GMCH and 82801DB ICH4
BIOS	Phoenix-Award v6.00PG 4Mb PnP flash BIOS
Green Function	Power saving mode includes doze, standby and suspend modes.
	ACPI version 1.0 and APM version 1.2 compliant
Watchdog Timer	System reset programmable watchdog timer with 1 ~ 255
	sec./min. of timeout value
Real Time Clock	Intel ICH4 built-in RTC with lithium battery
Enhanced IDE	PCI enhanced IDE interface supports dual channels and up to 4
	ATAPI devices at UltraATA/100
	Two 40-pin IDE ports
	DiskOnModule (DOM) embedded flash disk up to 1GBytes

Multi-I/O Port	
Chipset	Intel 82801DB ICH4 and Winbond W83627HF-AW LPC Super I/O
	controller
Serial Port	Two internal RS-232 serial port with 16C550 compatible UART
	and 16 bytes FIFO
USB Port	Four Hi-Speed USB 2.0 ports with 480 Mbps of transfer rate
Parallel Port	One internal bi-direction parallel port with SPP/ECP/EPP mode
Floppy Port	One FDD port supports up to two FDD
IrDA Port	One IrDA compliant Infrared interface supports SIR
K/B & Mouse	External PS/2 keyboard and mouse ports on rear I/O panel
	One internal AT keyboard port
GPIO	One 12-pin Digital I/O connector with 8-bit programmable I/O
	interface

VGA Display Interface	
Chipset	Intel 855GME GMCH built-in Intel Extreme Graphics 2
	With 266 MHz VGA core and 256-bit 3D engine
Memory	Intel dynamic video memory up to 64Mbytes shared with system
Display Type	CRT, LCD monitor and analog display
Connector	External DB15 female connector on rear I/O panel
	Internal 40-pin LVDS connector

Ethernet Interface	
Chipset	Intel PRO/100+ LAN interface with Intel 82562ET
	Optional secondary Gigabit LAN interface with Intel 82540EM
Type	10Base-T / 100Base-TX/1000Base-T for 82540EM
	10Base-T / 100Base-TX for 82562ET
	auto-switching Fast Ethernet
	Full duplex, IEEE802.3U compliant
Connector	External RJ45 connector with LED on rear I/O panel

Audio Interface	
Chipset	Intel ICH4 with Realtek ALC201A AC97 3D audio codec
Interface	2 channel 3D audio with Line-in, Line-out and MIC-in
Connector	Internal 10-pin header for line-in/-out, MIC-out, 4-pin header for CD-in

Extended Interface	
Type	Onboard 144-pin Mini-AGP interface
Bus type	4x AGP bus

Solid State Disk Interface	
Flash Type	Compact Flash Type-I/II for CFC (Compact Flash Card) or IBM MicroDrive
Capacity	Up to 1GB flash memory

Power and Environment	
Power Requirement	4-pin onboard +5V/+12V power connector
ATX function	Onboard 3-pin PS-ON & 5V standby connector
Dimension	338 (L) x 122 (H) mm
Temperature	Operating within 0 ~ 60°C (32 ~ 140°F)
	Storage within -20 ~ 85°C (-4 ~ 185°F)

Ordering Code	
SBC-4212ANL	Full-size PICMG single board computer with Intel Socket 479 Pentium-M processor Motherboard with onboard Intel VGA, LAN, Audio, Hi-Speed USB 2.0, Compact Flash socket and LVDS interface.
SBC-4212AG2NL	Same as above and with secondary Gigabit LAN

1.3 <Component Placement>

Optional Intel 82540EM Gigabit LAN

Compact Flash Socket

Intel 82562ET LAN

Super I/O

ISA Bridge

BIOS

ICH4

Audio Codec

Mini-AGP

2 x 184 pin sockets for DDR266/333 DIMM up to 2GB

Intel 855GME

Socket 479 for Intel Pentium-M Processor at 400MHz FSB
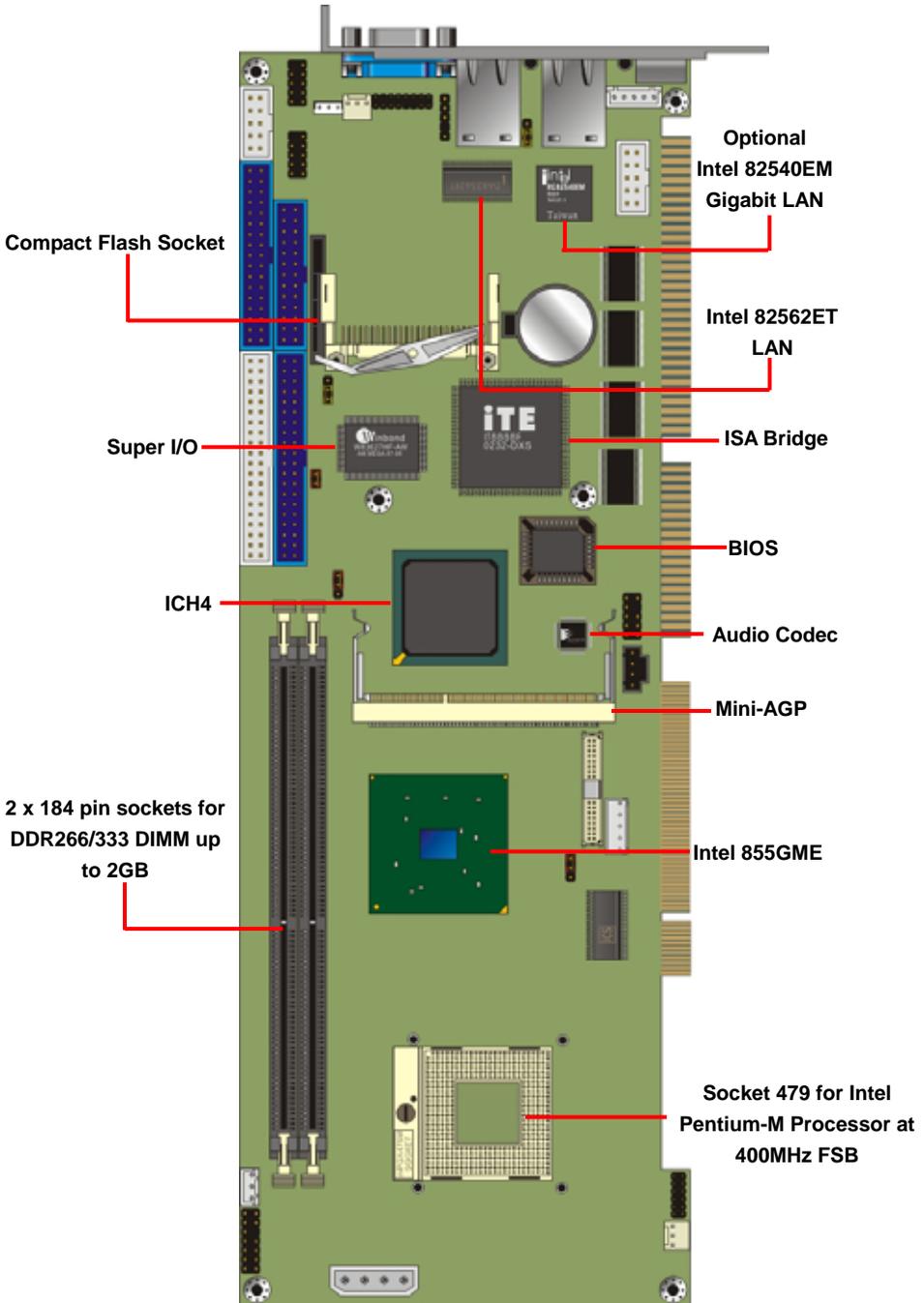
1.4 <Block Diagram>
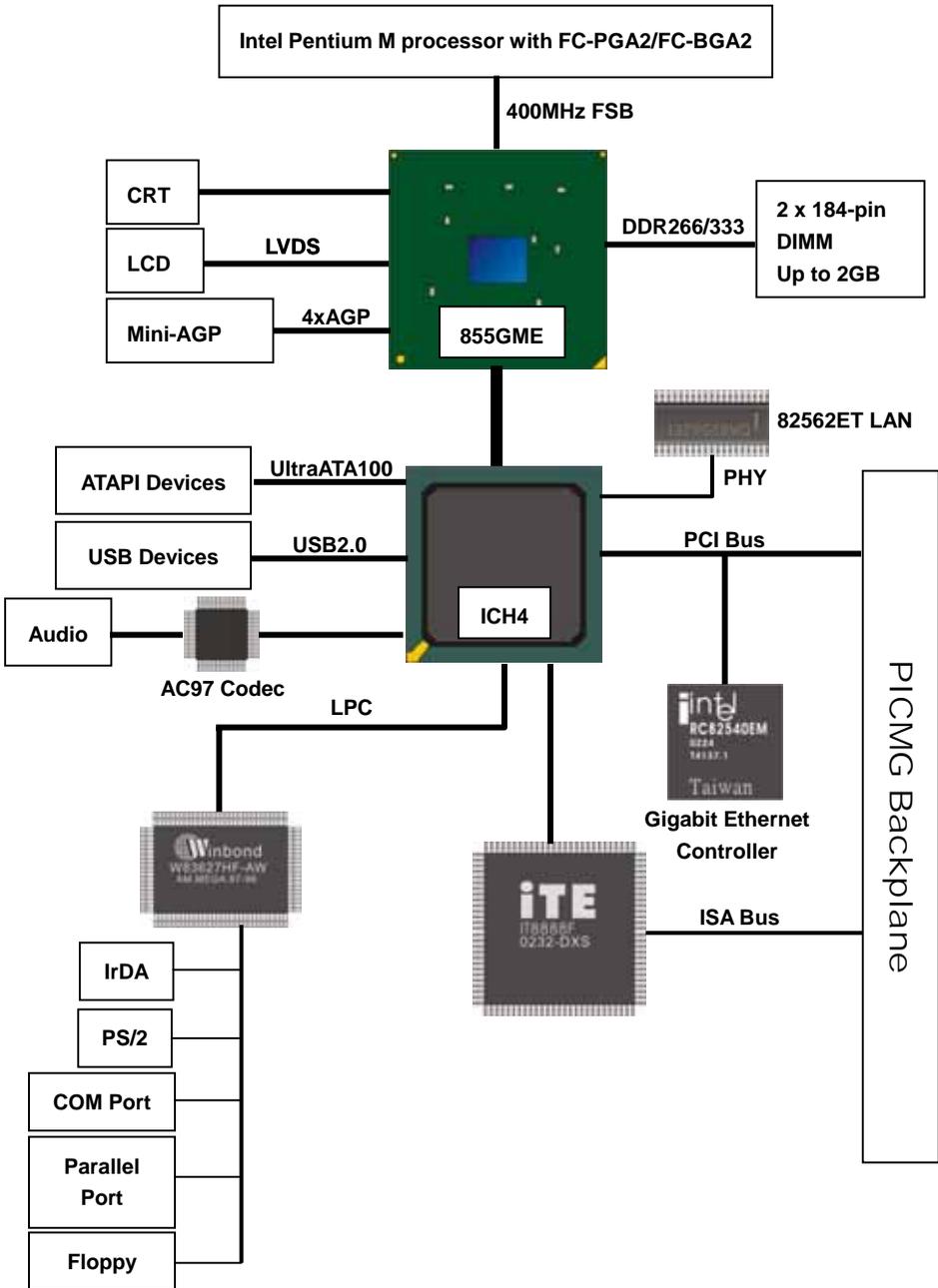
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Chapter 2 <Hardware Setup>

2.1 <Connectors Location>
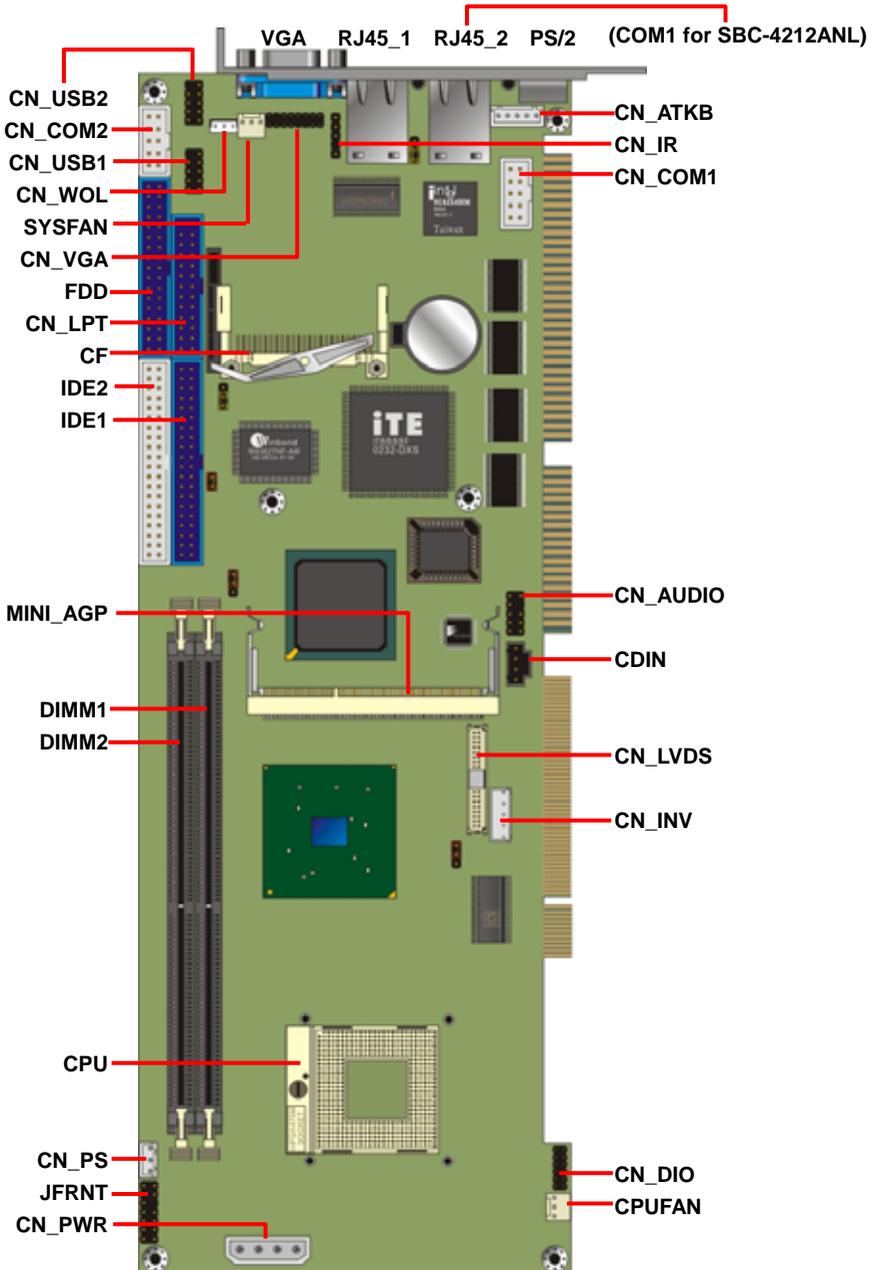
2.2 <Jumper Reference>

Jumper	Function
JRTC	CMOS Operating/Clear Setting
JCFSEL	Compact Flash Addressing Setting
JDOM	IDE1 Pin-20 voltage setting
JVLCD	LCD Panel Voltage Setting
JLAN	Ethernet Controller Enable/Disable Setting
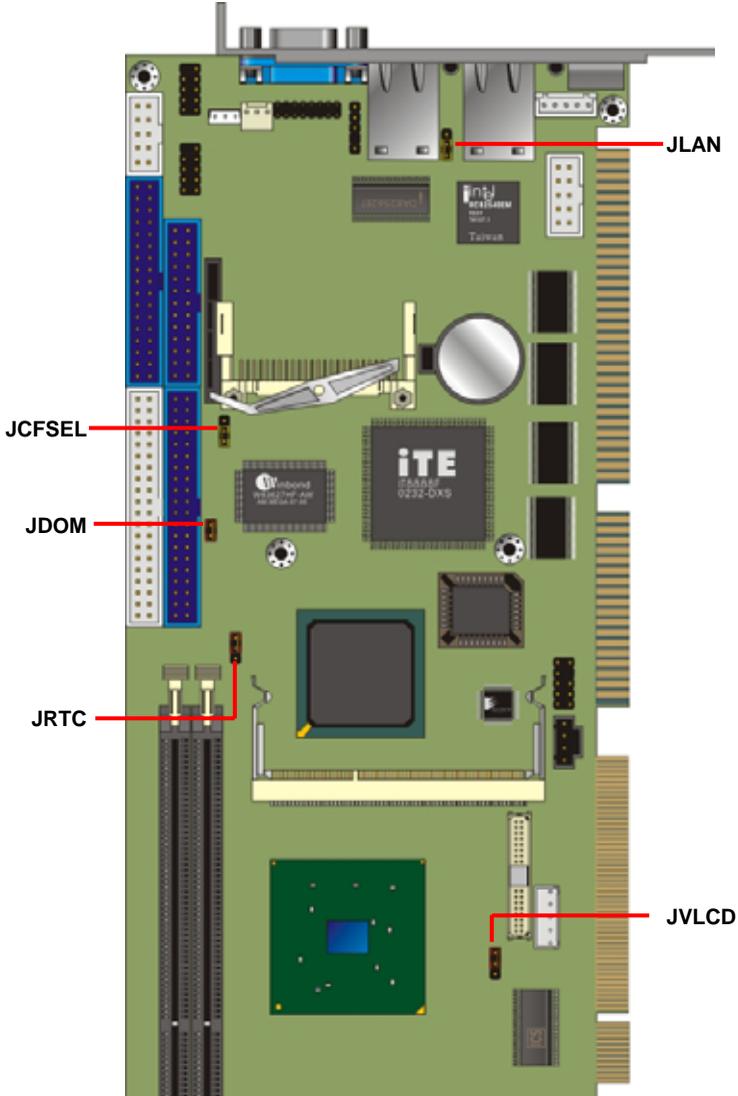
2.3 <Connectors Reference>

2.3.1 <Internal Connectors>

Connector	Function	Remark
CPU	mPGA479 CPU socket	Standard
DIMM1/2	184 -pin DDR SDRAM DIMM socket	Standard
IDE1	40-pin primary IDE connector	Standard
IDE2	44-pin secondary IDE connector	Standard
FDD	34-pin floppy connector	Standard
CN_VGA	8 x 2-pin VGA connector (pitch = 2.0mm)	Standard
CN_USB1/2	5 x 2-pin USB connector (pitch =2.54mm)	Standard
CN_COM1/2	5 x 2-pin serial port connector	Standard
CN_LVDS	20 x 2-pin LVDS connector	Standard
CN_INV	5-pin panel inverter connector	Standard
CN_PS	3-pin ATX function connector	Standard
CN_PWR	4-pin power input connector	Standard
CN_AUDIO	5 x 2-pin audio connector	Standard
CDIN	4-pin CD-ROM audio input connector	Standard
CN_DIO	6 x 2-pin digital I/O connector	Standard
CN_WOL	3-pin wake-on-LAN connector	Standard
CPUFAN	3-pin CPU fan connector	Standard
SYSFAN	3-pin system fan connector	Standard
CN_LPT	26-pin parallel port connector	Standard
CF	Compact Flash Type II socket	Standard

2.3.2 <External Connectors>

Connector	Function	Remark
VGA	DB15 VGA connector	Standard
RJ45_1	RJ45 LAN connector	Standard
RJ45_2	RJ45 LAN connector	**SBC-4212AG2NL**
COM1	Serial port connector	**SBC-4212ANL**
PS2	PS/2 Keyboard/Mouse connector	Standard

2.4 <System Setup>

2.4.1 <CPU Installation>

SBC-4212 has one 479-pin CPU socket to support Intel Pentium M/Celeron M 478-pin

processor.   Please follow the instruction to install the processor.

CPU Socket

1. Use flat-type Screw Driver to

unlock the CPU locket
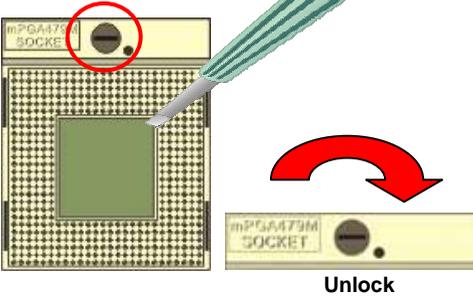
2. Find the pin direction and

install the processor on the

socket.

Unlock
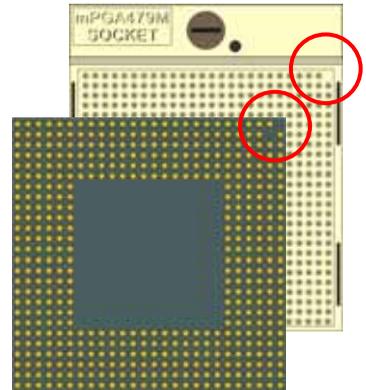
3. Lock the socket well.

2.4.2 <Memory Module Installation>

SBC-4212 supports two DDR266/333 SDRAM sockets up to 2GB of capacity.   It also

supports ECC (error- correcting code) function.

DIMM1/2

104-pin   **80-pin**
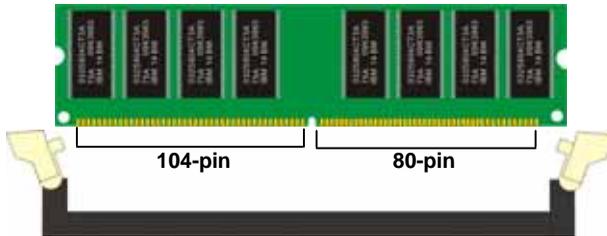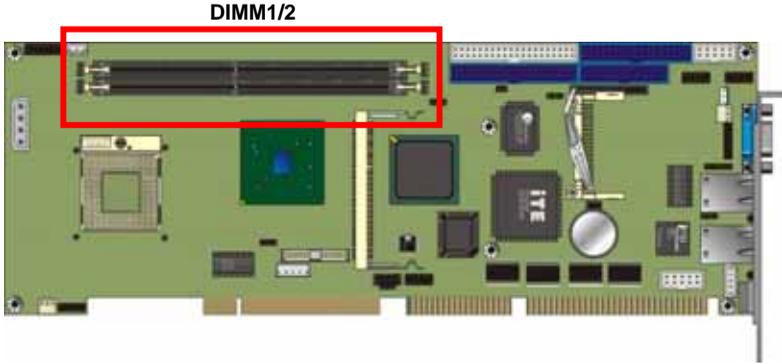
Please check the pin number to match the socket side well

before installing memory module.

2.4.3 <CPU Cooler Installation>

There is a CPU cooler included in the packaging, please follow the instructions to install the

cooler on the processor.

1. Remove the sticker of the base.
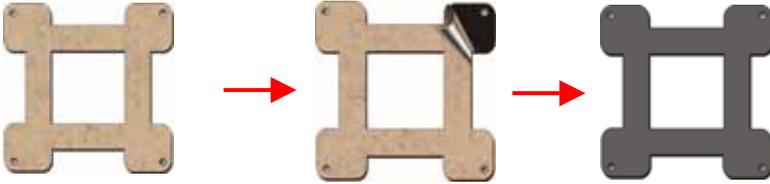
2. Put the base through the fixing hole of the processor and paste on the solder side. Then

put the cooler through the base pillar.
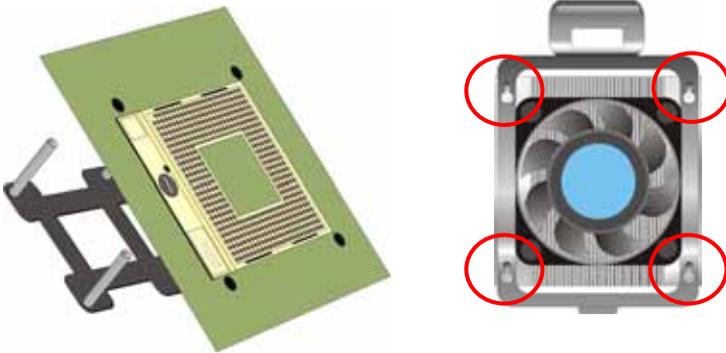
3. Press the both sides of the cooler shield down and push it to move front

Press here

Press here

Move forward
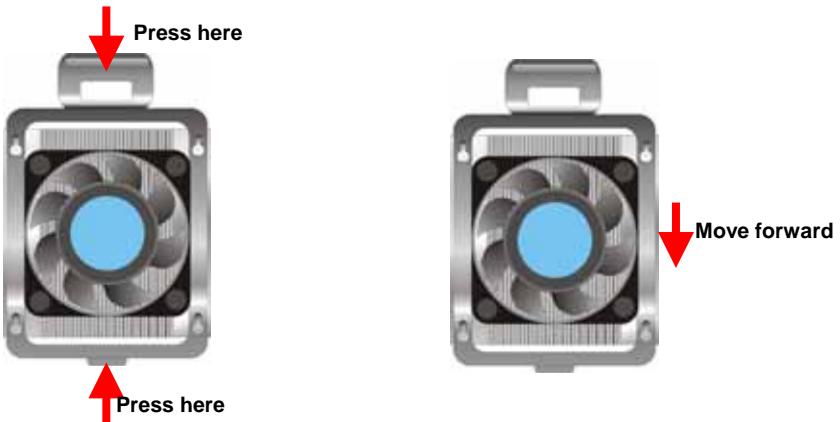
2.4.4 <Complete the system installation>

After CPU, CPU cooler and the memory module(s) are installed, carefully slide the main

board into PICMG slot of the backplane.   If an ATX power supply is to be connected to the

backplane, an ATX function cable is needed to connect the main board and the backplane.

PICMG Bus Slot

Notice:
The ATX function connector
may differ across different
backplanes, please check
the pin assignment for the
connector on the backplane
before you connecting the
ATX function cable.

To power supply

CN_PS
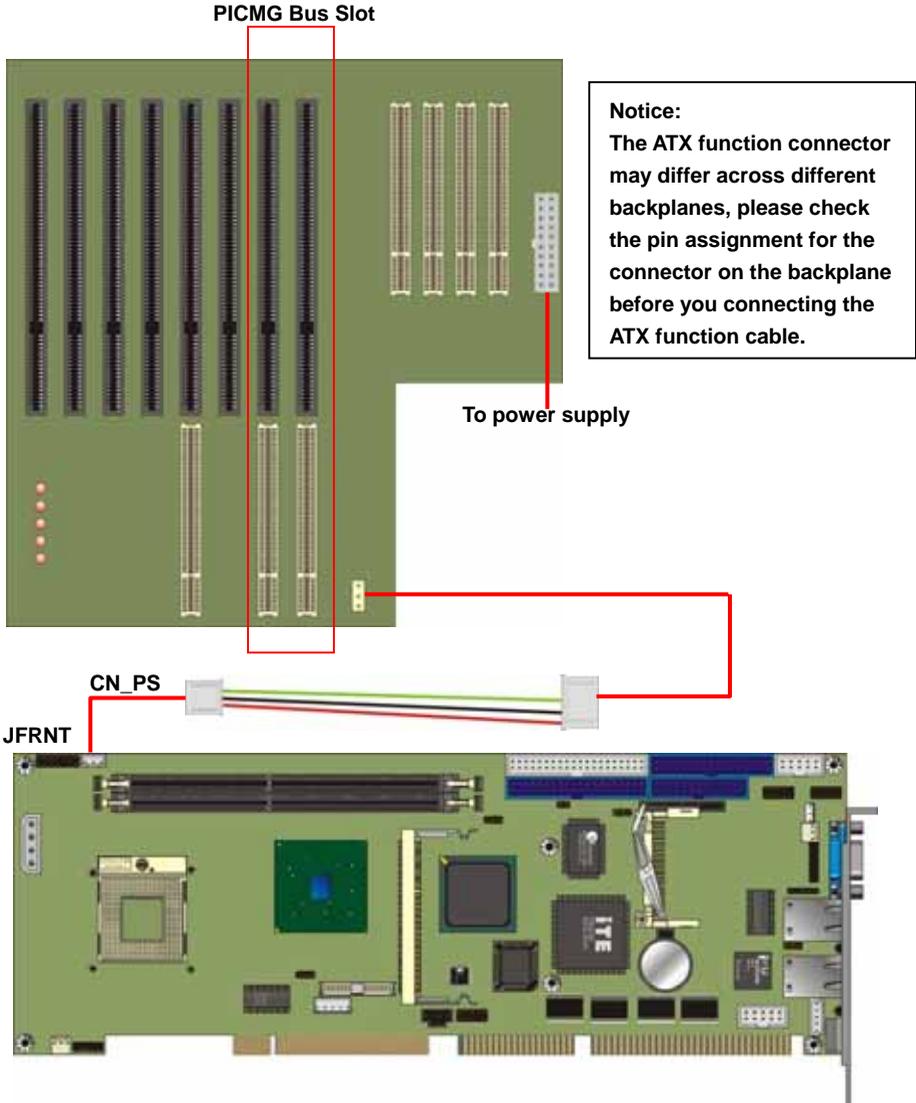
JFRNT

To power on the system, please refer to chapter 2.13 to short the power button pin

on JFRNT.

2.5 <CMOS Setup>

CMOS can be set in BIOS. If the board refuses to boot due to inappropriate CMOS settings, here is how to proceed to clear (reset) the CMOS to its default values.

Jumper: JRTC

Type: Onboard 3-pin jumper

JRTC	Mode
1-2	Clear CMOS
2-3	Normal Operation

Default setting
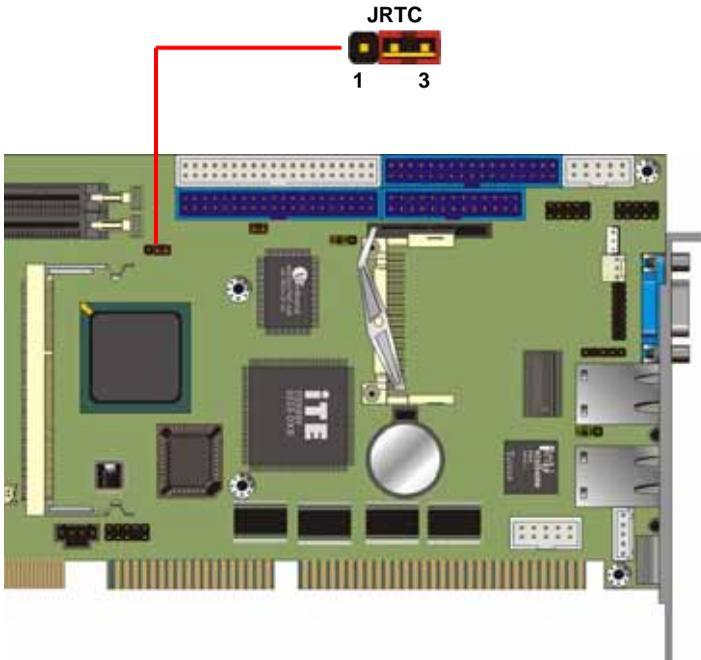
2.6 <Watchdog Timer Setting>

The watchdog timer triggers the system to auto-reset after it stops working for a pre-set timeout period. The integrated watchdog timer can be setup as system reset mode by program.

Timeout Value Range
- 1 to 255
- Second or Minute

Program Sample
Watchdog timer setup as system reset with 5 second of timeout

2E, 87	
2E, 87	
2E, 07	
2F, 08	Logical Device 8
2E, 30	Activate
2F, 01	
2E, F5	Set as Second*
2F, 00	
2E, F6	Set as 5
2F, 05	

* Minute: bit 3 = 0; Second: bit 3 = 1

You can select Timer setting in the BIOS.   After setting the time options, the system will reset according to the period of your selection.

```
             Phoenix - AwardBIOS CMOS Setup Utility
                      Integrated Peripherals
 ┌─────────────────────────────────────────────────────────────────────────┐
 │ ▶ OnChip IDE Device          [Press Enter]        │     Item Help         │
 │ ▶ Onboard Device             [Press Enter]        │                       │
 │ ▶ SuperIO Device             [Press Enter]        │ Menu Level    ▶       │
 │   Watch Dog Timer Select     [Disabled]           │                       │
 │          ┌──────────────────────────────────┐     │                       │
 │          │  Watch Dog Timer Select          │     │                       │
 │          │                                  │     │                       │
 │          │  Disabled ..... [▮]              │     │                       │
 │          │  10   Sec  ..... [ ]             │     │                       │
 │          │  20   Sec  ..... [ ]             │     │                       │
 │          │  30   Sec  ..... [ ]             │     │                       │
 │          │  40   Sec  ..... [ ]             │     │                       │
 │          │  1    Min  ..... [ ]             │     │                       │
 │          │  2    Min  ..... [ ]             │     │                       │
 │          │  4    Min  ..... [ ]             │     │                       │
 │          │                                  │     │                       │
 │          │  ↑↓:Move ENTER:Accept ESC:Abort  │     │                       │
 │          └──────────────────────────────────┘     │                       │
 │                                                                           │
 │ ↑↓→←:Move  Enter:Select  +/-/PU/PD:Value  F10:Save  ESC:Exit  F1:General Help │
 │    F5: Previous Values    F6: Fail-Safe Defaults    F7: Optimized Defaults │
 └─────────────────────────────────────────────────────────────────────────┘
```

For more specification of watchdog timer program, please check appendix document.

2.7 <Embedded Solid State Disk>

The **SBC-4212** supports the IDE-based, bootable and driver free DiskOnModule (DOM) embedded flash disk. The onboard 40-pin IDE1 and 44-pin IDE2 box header supports normal DOM (DiskOnModule) or M-systems DiskOnChip IDE Pro flash disk with or without additional VCC power cable.

The **SBC-4212** also supports Compact Flash Card Type I/II interface. The jumper **JCFSEL** is provided to setup the CF card on master or slave mode.

Jumper: **JCFSEL**

Type: onboard 3-pin header

JCFSEL	Mode
1-2	Master
2-3	Slave

Default setting

Jumper: **JDOM**

Type: onboard 3-pin header

JDOM	Mode
ON	IDE1 pin-20 5V power supply enable
OFF	No 5V power supply on IDE1 pin-20

Default setting
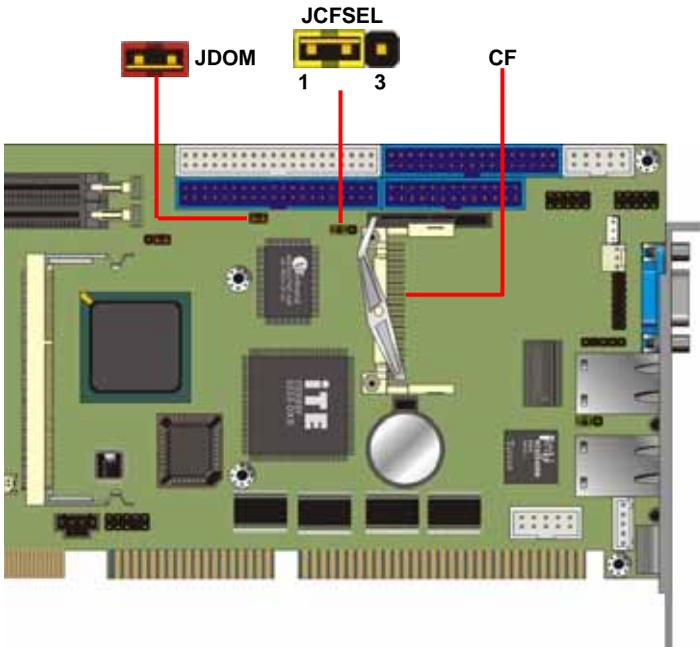
2.8 <Power and Fan Setup>

SBC-4212 has one 4-pin power input connector to power up PICMG bus; it also has two fan connectors.   For ATX function, you should connect the ATX connector on the backplane with CN_PS on **SBC-4212**.

Connector: **CN_PWR**
Type: 4-pin P-type connector for +5V/+12V input

Pin	Description	Pin	Description	Pin	Description	Pin	Description
1	+12V	2	Ground	3	Ground	4	+5V

Connector: **CPUFAN**, **SYSFAN**
Type: 3-pin fan wafer connector

Pin	Description	Pin	Description	Pin	Description
1	Ground	2	+12V	3	Fan Control

Connector: **CN_PS**
Type: 3-pin ATX function connector

Pin	Description	Pin	Description	Pin	Description
1	5V Standby	2	Ground	3	Power On
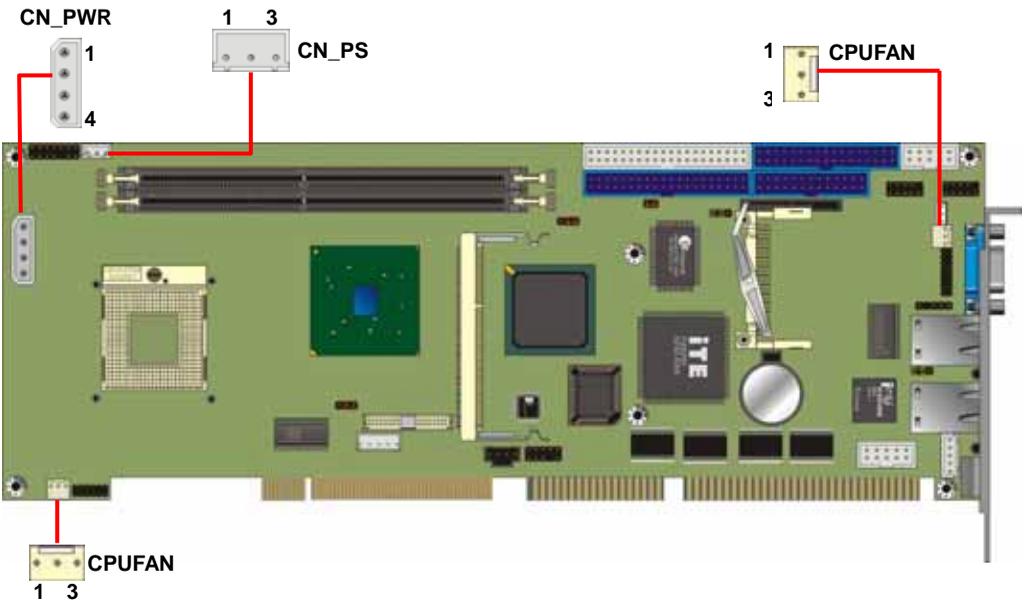
2.9 <Display Interface>

2.9.1 <Analog VGA interface>

The board is integrated with Intel 855GM GMCH chipset built-in Intel Extreme Graphics 2 with 266 MHz VGA core, 256-bit 3D engine and Intel Dynamic Video Memory up to 64MBytes shared with system memory. The CRT / analog VGA interface includes one external DB15 female connector on bracket and one 8 x 2-pin header connector on board.

(Note : The two interfaces can not be used at the same time)

Connector: **CN_VGA**

Type: 16-pin (2 x 8) pin header (pitch = 2.0mm)

Pin	Description	Pin	Description
1	Red	9	Green
2	Blue	10	N/C
3	Ground	11	Ground
4	Ground	12	Ground
5	N/C	13	Ground
6	N/C	14	Data
7	HSYNC	15	VSYNC
8	Clock	16	N/C
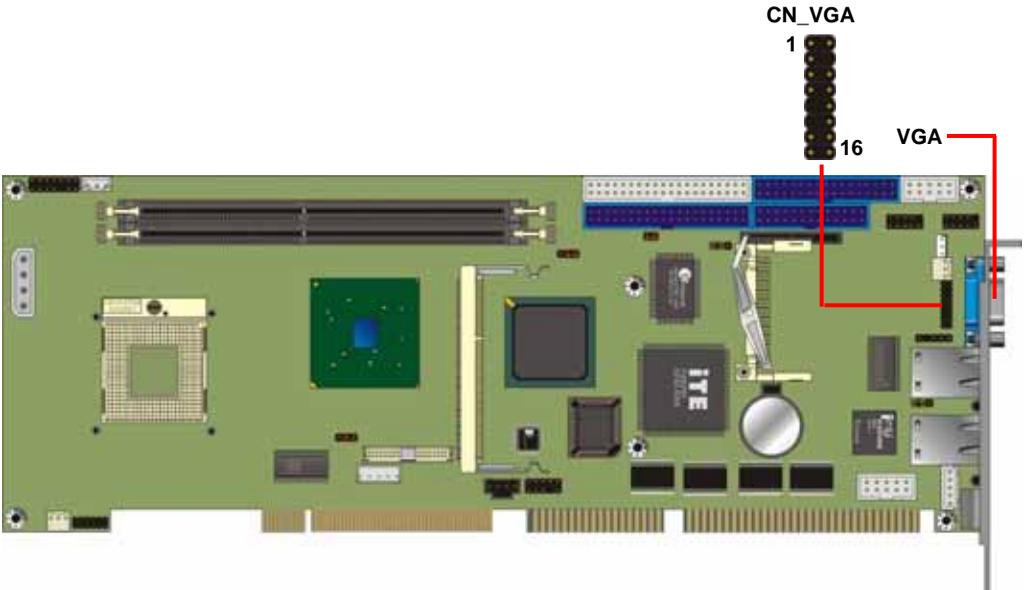
2.9.2 <Digital VGA interface>

The board provides one 20 x 2-pin LVDS interface for LCD panel, it supports 18/24-bit single/dual channel up to 1600 x 1200 resolution. The jumper **JVLCD** allows the selection of +5V or +3.3V of voltage to support your LCD and the **CN_INV** provides panel inverter interface includes backlight controlling and powering.
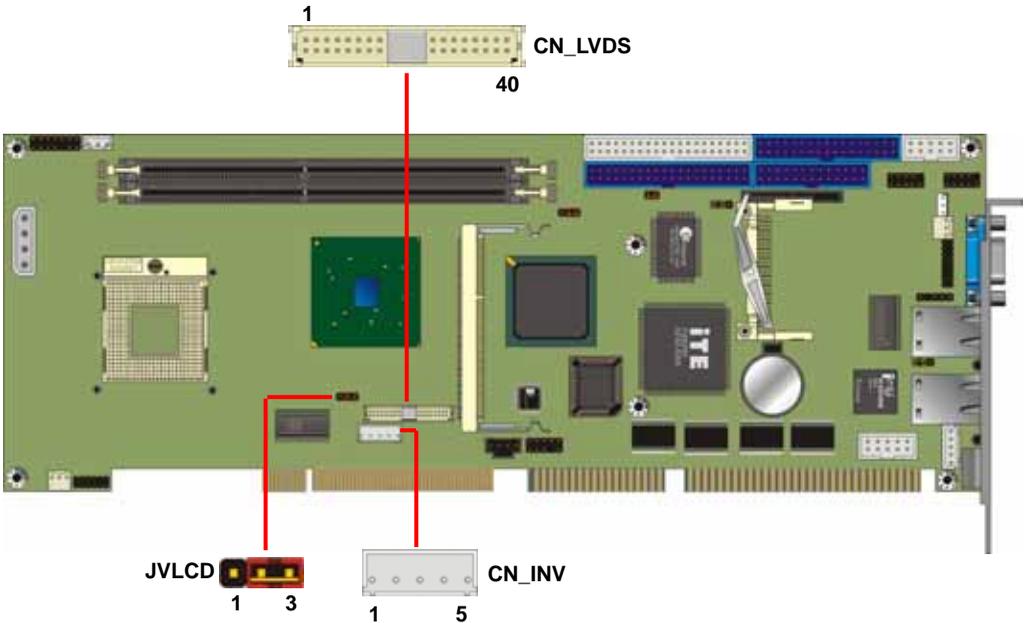
Connector: **CN_INV**

Type: 5-pin LVDS Power Header

Pin	Description
1	+12V
2	GND
3	GND
4	GND
5	ENABKL

Connector: **JVLCD**

Type: 3-pin Power select Header

Pin	Description
1	VCC
2	LCDVCC
3	VCC3

Connector: **CN_LVDS**

Type: onboard 40-pin connector for LVDS connector

Connector model: **HIROSE DF13-40S**

Pin	Signal	Pin	Signal
2	LCDVCC	1	LCDVCC
4	GND	3	GND
6	ATX0-	5	BTX0-
8	ATX0+	7	BTX0+
10	GND	9	GND
12	ATX1-	11	BTX1-
14	ATX1+	13	BTX1+
16	GND	15	GND
18	ATX2-	17	BTX2-
20	ATX2+	19	BTX2+
22	GND	21	GND
24	ATXCK-	23	BTX3-
26	ATXCK+	25	BTX3+
28	GND	27	GND
30	ATX3-	29	BTXCK-
32	ATX3+	31	BTXCK+
34	GND	33	GND
36	PANELCLK	35	N/C
38	PANELDATA	37	N/C
40	N/C	39	N/C

To setup the LCD, you need the components below:

1. A panel (support up to 24-bit dual channel) with LVDS interfaces.
2. An inverter for panel's backlight power.
3. An LCD cable and an inverter cable.

Since each panel has its own pin assignment, there is no standard cable can be provided by

AICSYS Inc.   Therefore, please refer to the pin assignment of the connector of your LCD to

make a suitable cable; please find a local cable manufacturer to make the cable for you.

LCD installation procedures :

1. Prepare a panel, inverter and **SBC-4212**.
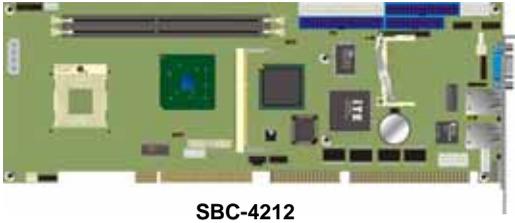
SBC-4212

LCD panel   **Inverter**

2. Please check the datasheet of the panel to see the voltage of the panel, and set the jumper **JVLCD** to +5V or +3.3V.
3. Prepare an LVDS type LCD cable

Panel side   **For illustrator sample only**   **Board side**

4. Connect SBC-4212, inverter and the LCD as below. Check the connection to make sure that the connections are all properly connected.

To CN_LVDS

To CN_INV

5.   Enter the BIOS to select the LCD panel type.

```
           Phoenix - AwardBIOS CMOS Setup Utility
                  Advanced Chipset Features

   DRAM Timing Selectable      [By SPD]              Item Help
   CAS Latency Time            [2.5]
   Active to Precharge Delay   [7]          Menu Level    ▶
   DRAM RAS# to CAS# Delay     [3]
   DRAM RAS# Precharge         [3]
   DRAM Data Integrity Mode    [ECC]
   System BIOS Cacheable       [Enabled]
   Video  BIOS Cacheable       [Enabled]
   Memory Hole At 15M-16M      [Disabled]
   Delayed Transaction         [Enabled]
   Delay Prior to Thermal      [16 Min]
   AGP Aperture Size (MB)      [64]

   *** On-Chip UGA Setting ***
   On-Chip UGA                 [Enabled]
   On-Chip Frame Buffer Size   [32MB]
   Boot Display                [AUTO]
   LCD Type                    [1]
   TV Standard                 [NTSC]

 ↑↓→←:Move   Enter:Select   +/-/PU/PD:Value   F10:Save   ESC:Exit   F1:General Help
     F5: Previous Values      F6: Fail-Safe Defaults     F7: Optimized Defaults
```
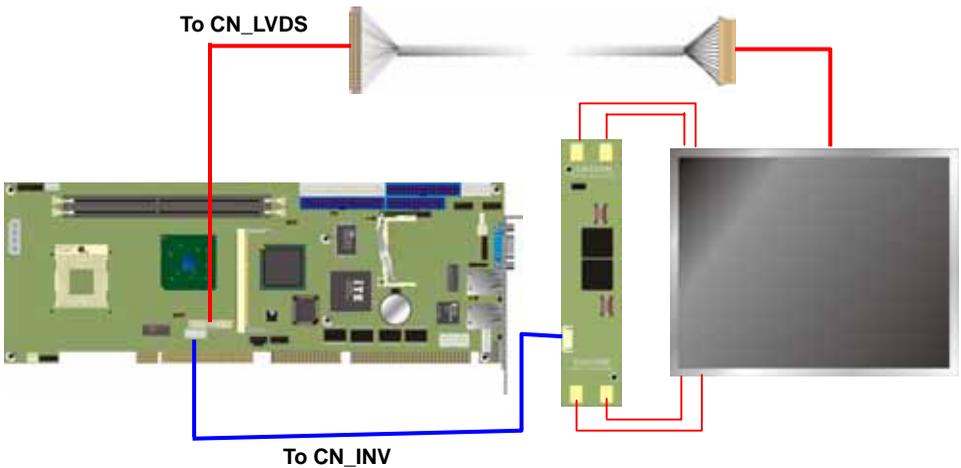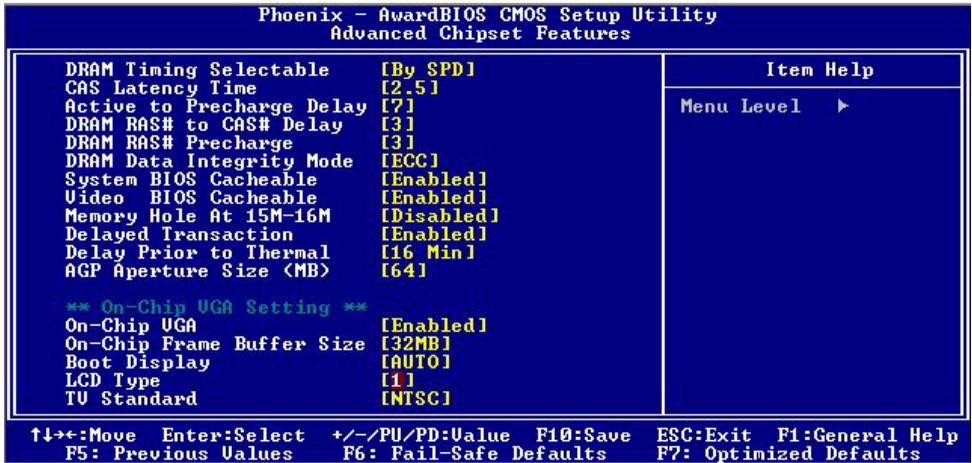
The panel type mapping is list below:

BIOS panel type selection form			
For 18-bit color		For 24-bit color	
NO.	Output format	NO.	Output format
1	640 x 480	8	1024 x 768
2	800 x 600	9	1280 x 1024 Dual Channel
3	1024 x 768	10	1400 x 1050 Dual Channel
4	1280 x 1024	11	1600 x 1200 Dual Channel
5	1400 x 1050 Dual Channel @ 108Mhz	13	1024 x 768 Dual Channel
6	1400 x 1050 Dual Channel @ 122Mhz	14	1920 x 1080 Dual Channel
7	1600 x 1200 Dual Channel		
12	1024 x 768 Dual Channel		

2.10 < Ethernet Network Interface>

The **SBC-4212** is integrated with one Intel **82562ET** PRO/100+ Ethernet interface type 10Base-T/100Base-TX auto-switching Ethernet with full duplex and IEEE 802.3U compliant. The **optional** secondary Ethernet controller is Intel **82540EM** PRO/1000+ at the type of 10Base-T/100Base-TX/1000Base-T auto-switching Ethernet with full duplex and IEEE 802.3U compliant. The jumper **JLAN** allows you to enable/disable onboard primary network function.

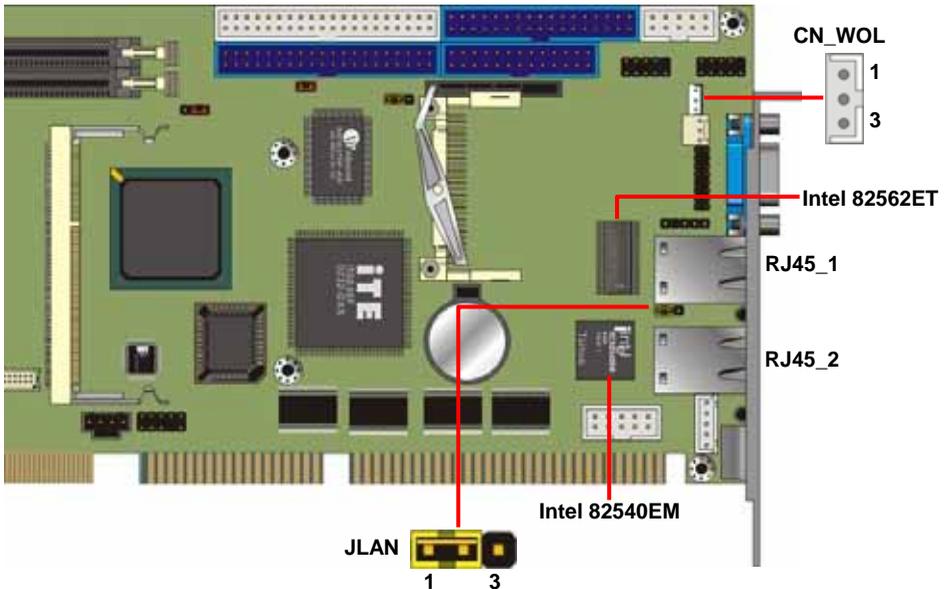Connector: **CN_WOL**

Type: onboard 3-pin (1 x 3) wafer connector

Pin	1	2	3
Description	WOL-Ctrl	Ground	+5V Standby

Jumper: **JLAN**

Type: onboard 3-pin header

JRTC	**Mode**
1-2	Enable Onboard LAN1 controller
2-3	Disable Onboard LAN1 controller

Default setting

2.11 <Audio Interface>

SBC-4212 provides a stereo audio interface with Realtek ALC201A AC97 Codec. The

CN_AUDIO provides the interface to use attached audio cable, the **CDIN** allows you to

connect audio output from CD-ROM drives.
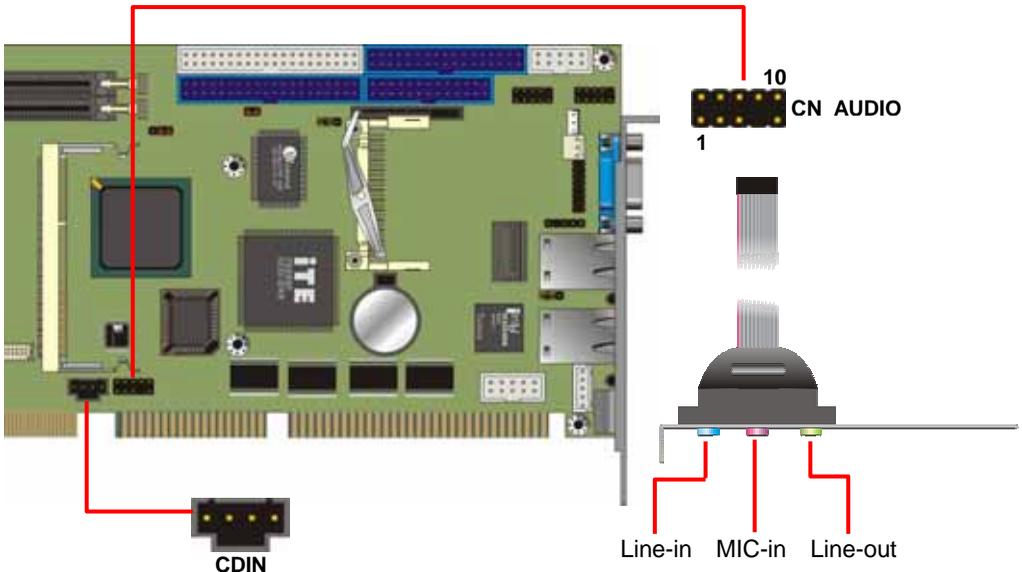
Connector: CN_AUDIO

Type: 10-pin (2 x 5) 2.54-pitch header

Pin	Description	Pin	Description
1	Line – Right	2	Ground
3	Line – Left	4	MIC
5	MIC	6	Ground
7	N/C	8	Line Out – Left
9	Line Out – Right	10	Ground

Connector: CDIN

Type: 4-pin header

Pin	Description
1	CD – Left
2	Ground
3	Ground
4	CD – Right

Line-in   MIC-in   Line-out

**CDIN**

2.12 <GPIO interface>

The board offers 8-bit digital I/O which can be configured to work according to the applications' needs.   For example, the digital I/O can be configured to control the opening and closing of the cash drawer or to sense the warning signal from a tripped UPS. The following is a detailed description of how the digital I/O is controlled via software programming.

Connector: **CN_DIO**

Type: 12-pin (6 x 2) header (pitch = 2.0mm)

Pin	Description	Pin	Description
1	Ground	2	Ground
3	LGP0	4	LGP4
5	LGP1	6	LGP5
7	LGP2	8	LGP6
9	LGP3	10	LGP7
11	VCC	12	+12V

12

CN_DIO
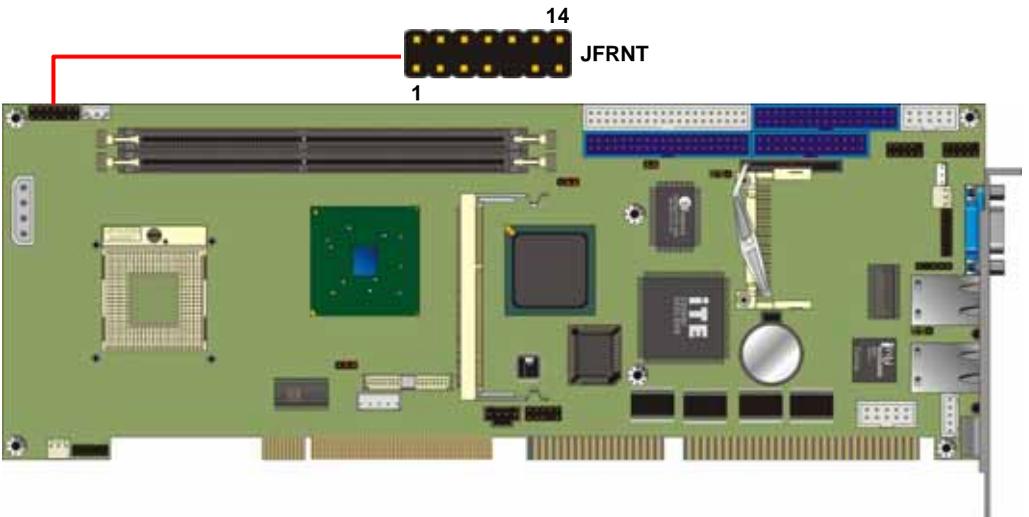
1
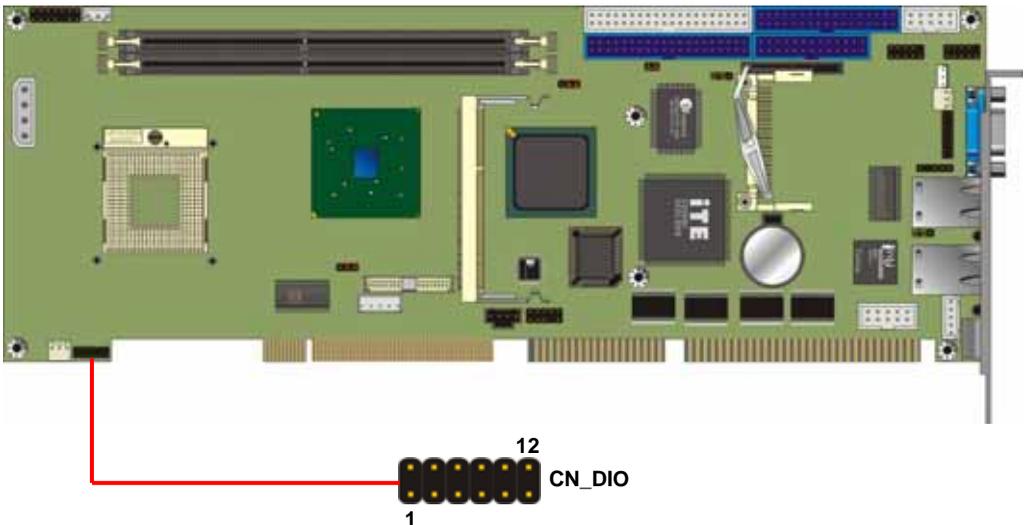
2.13 <Switch and Indicator>

The **JFRNT** connects to the main control of the board, such as power button, reset and beeper, etc.

Connector: **JFRNT**

Type: onboard 14-pin (2 x 7) 2.54-pitch header

Function	Signal	PIN		Signal	Function
IDE LED	VCC(+)	1	2	(+) VCC	**Power** **LED**
	Active	3	4	N/C	
Reset	Reset	5	6	GND	
	GND	7	8	VCC	**Speaker**
	N/C	9	10	N/C	
Power **Button**	PWRBT	11	12	N/C	
	5VSB	13	14	SPKIN	

14

JFRNT

1

Chapter 3 <Display Mode Setup>

This chapter shows you how to setup the display device under Windows OS.

Before you using your display device:
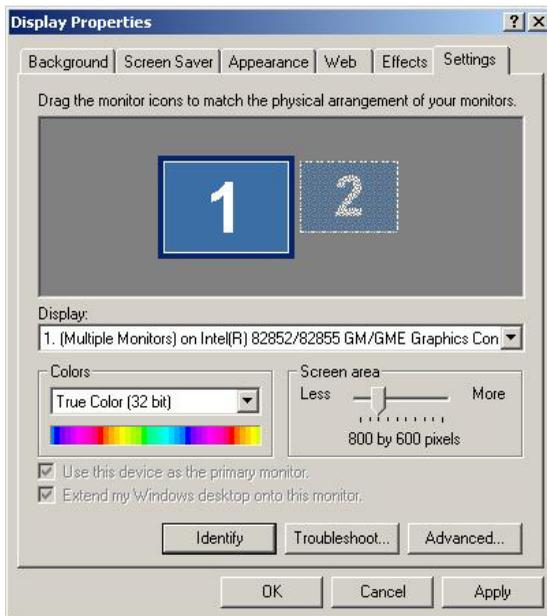
1. Check your software

Before you can use the display device properly, please install the VGA driver.

2. Check your hardware

Please setup the display device properly before you boot up the system.

To configure your Display device, please follow the instructions below:

1. Please launch Display Properties.

You would see two Graphics Controllers. If you connect two display devices, you would be able to setup each device's color bit and resolution.
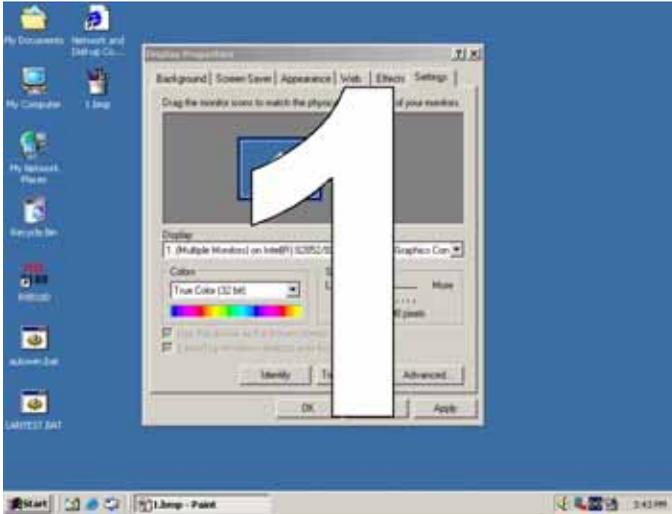

This item enables you to configure which device would be the primary if you connect two display devices.
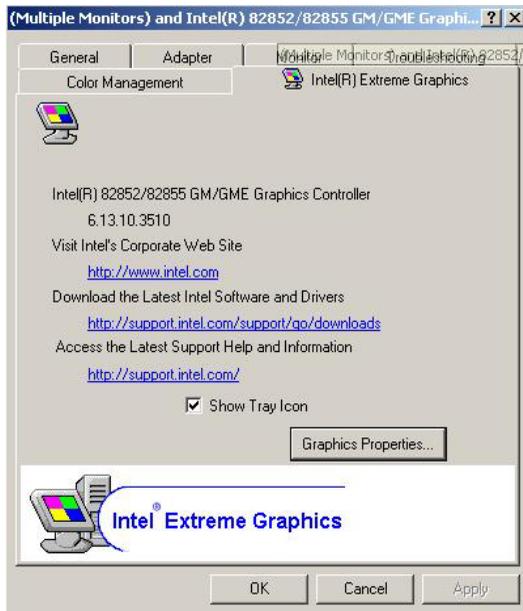

This item enables you to extend your Windows Desktop to second display device.

If you click the identify button, the screen will pop up the number sequence of your device.

For advanced display settings, please click Advanced… button and choose Intel(R)

Extreme Graphics.

Please click Graphics Properties button to enter the advanced setup.

After you enter the Graphics Properties, you will see the options below:
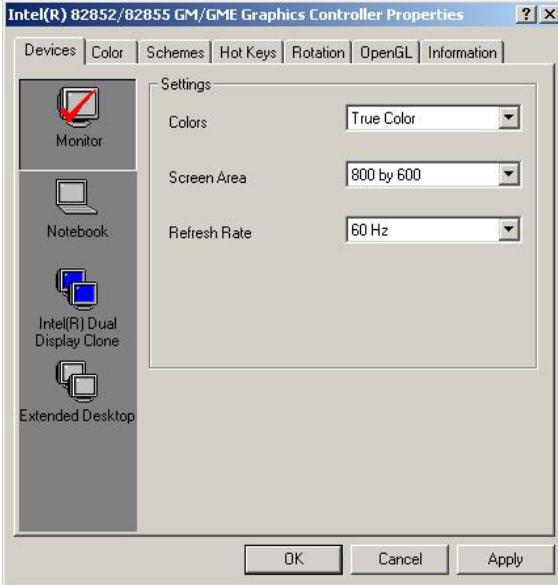
This option allows you to configure the CRT monitors for Colors, Screen Area (Resolution) and Refresh Rate.
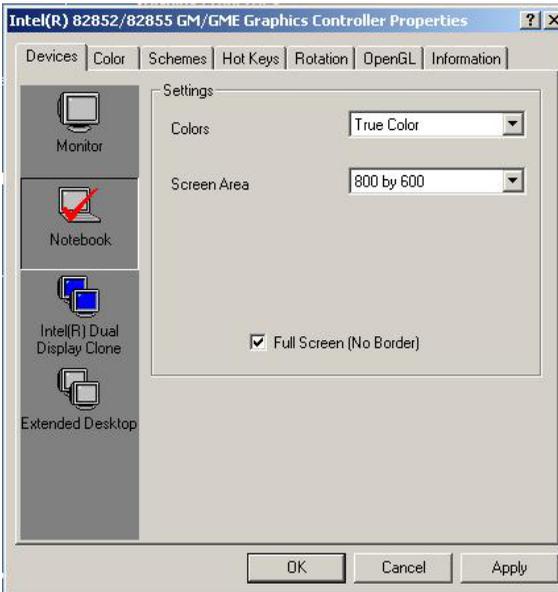
This option allows you to configure the LCD panel for Colors, Screen Area (Resolution) and Full Screen option.
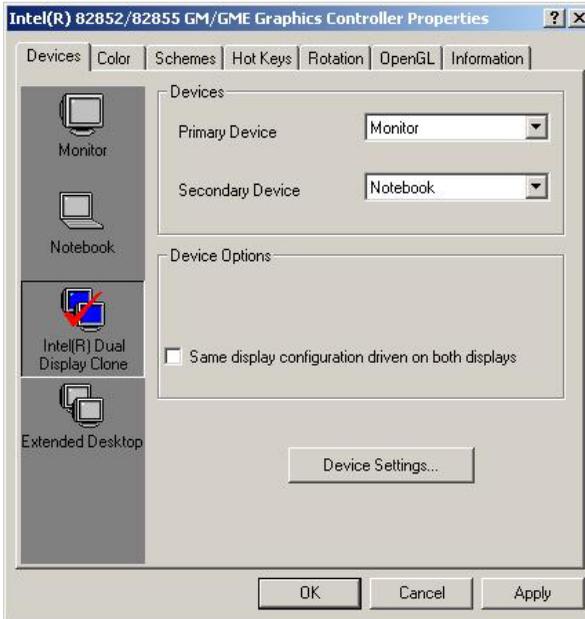
This option allows you to configure the Dual Display for clone mode (same display on two devices)

This option allows you to configure the Dual Display for Extended Desktop mode

Chapter 4 <BIOS Setup>

The **SBC-4212** uses the Award BIOS for system configuration. The Award BIOS in the **SBC-4212** is a customized version of the industrial standard BIOS for IBM PC AT-compatible computers. It supports Intel x86 and compatible CPU architecture based processors and computers. The BIOS provides critical low-level support for the system central processing, memory and I/O sub-systems.

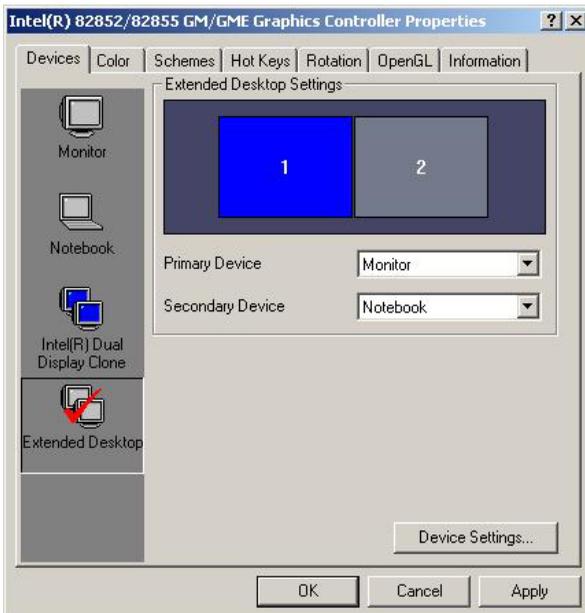The BIOS setup program of the **SBC-4212** let the customers modify basic configuration setting. The settings are stored in a dedicated battery-backed memory, NVRAM, retains information when the power is turned off. If the battery runs out of power, then the settings of BIOS will return to the default setting.

The BIOS section of the manual is subject to change without notice and is provided here for reference purpose only. The settings and configurations of the BIOS are current at the time of print, and therefore they may not be exactly the same as that displayed on your screen.

To activate CMOS Setup program, press   DEL   key immediately after you turn on the system. Following message "Press DEL to enter SETUP" should appear in the lower left hand corner of your screen. When you enter the CMOS Setup Utility, Main Menu will be displayed as **Figure 5-1**. You can use arrow keys to select your function, press Enter   key to accept the selection and enter the sub-menu.

Figure 5-1 CMOS Setup Utility Main Screen

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Appendix A <I/O ports pin assignment>

A.1 <IDE Port>

Connector: **IDE1/2**
Type: 40-pin (20 x 2) box header

Pin	Description	Pin	Description
1	Reset	2	Ground
3	D7	4	D8
5	D6	6	D9
7	D5	8	D10
9	D4	10	D11
11	D3	12	D12
13	D2	14	D13
15	D1	16	D14
17	D0	18	D15
19	Ground	20	VCC
21	REQ	22	Ground
23	IOW-/STOP	24	Ground
25	IOR-/HDMARDY	26	Ground
27	IORDY/DDMARDY	28	IDESEL
29	DACK-	30	Ground
31	IRQ	32	N/C
33	A1	34	CBLID
35	A0	36	A2
37	CS0 (MASTER CS)	38	CS1 (SLAVE CS)
39	LED ACT-	40	Ground
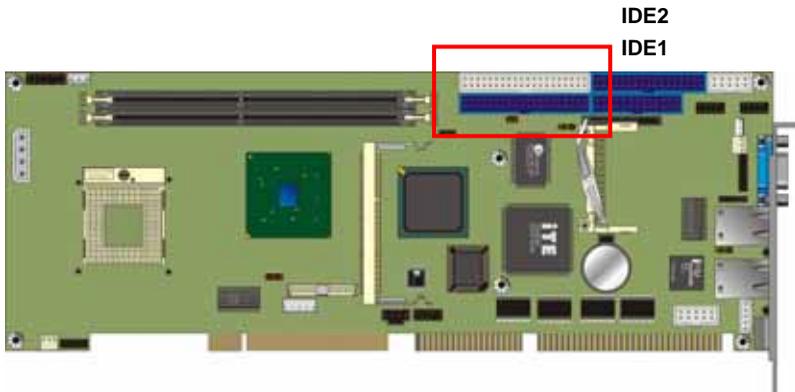
A.2 <Floppy Port>

Connector: **FDD**

Type: 34-pin (2 x 17) 2.54-pitch header

Pin	Description	Pin	Description
1	Ground	2	DRIVE DENSITY SELECT 0
3	Ground	4	DRIVE DENSITY SELECT 1
5	Ground	6	N/C
7	Ground	8	INDEX-
9	Ground	10	MOTOR ENABLE A-
11	Ground	12	DRIVER SELECT B-
13	Ground	14	DRIVER 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	HEAD SELECT-
33	Ground	34	DISK CHANGE-
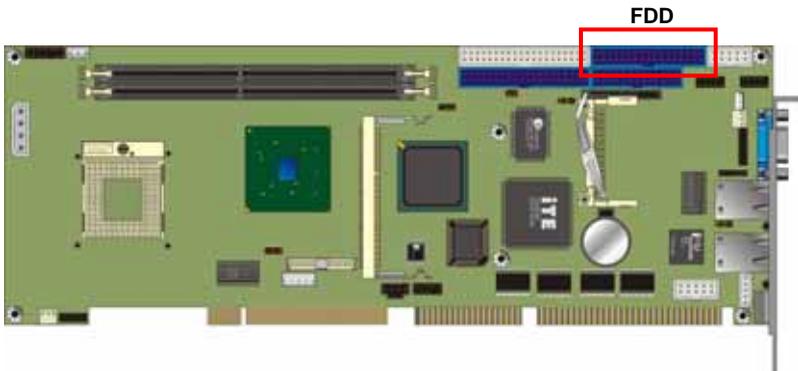
A.3 < Parallel Port>

Connector: **CN_LPT**

Type: 26-pin (2 x 13) 2.54-pitch box header

Pin	Description	Pin	Description
1	STROBE-	14	AUTO FEED-
2	D0	15	ERROR-
3	D1	16	INITIALIZE-
4	D2	17	SELECT INPUT-
5	D3	18	Ground
6	D4	19	Ground
7	D5	20	Ground
8	D6	21	Ground
9	D7	22	Ground
10	ACKNOWLEDGE-	23	Ground
11	BUSY	24	Ground
12	PAPER EMPTY	25	Ground
13	SELECT+	26	N/C

CN_LPT
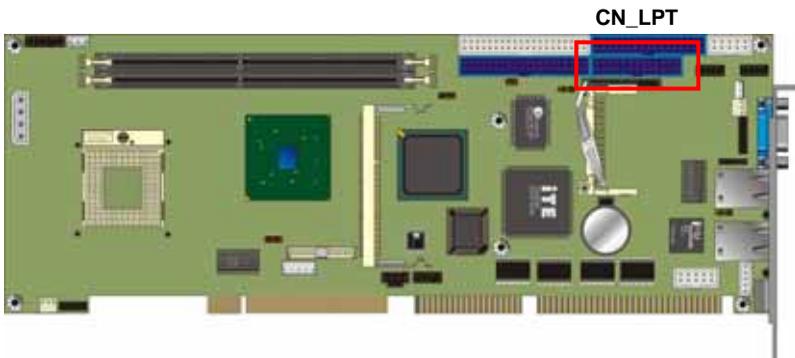
A.4 <Serial Port>

A.4.1 <External DB9 COM>
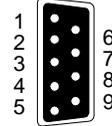
Connector: **COM1**

Type: 9-pin D-sub male connector on bracket

Pin	Description	Pin	Description
1	DCD	6	DSR
2	SIN	7	RTS
3	SO	8	CTS
4	DTR	9	RI
5	Ground		

A.4.2 <Internal COM2>
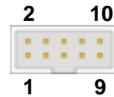
Connector: **CN_COM2**

Type: 10-pin (2 x 5) 2.54-pitch header

Pin	Description	Pin	Description
1	DCD	2	SIN
3	SO	4	DTR
5	Ground	6	DSR
7	RTS	8	CTS
9	RI	10	N/C

CN_COM2

CN_COM1

COM1
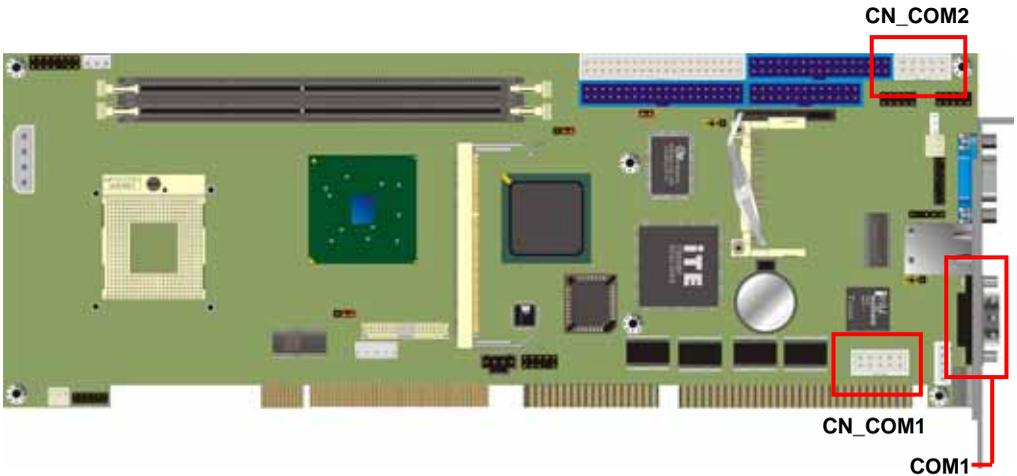
A.5 <USB Port>

Connector: **CN_USB1, CN_USB2**

Type: 10-pin (2 x 5) header for dual USB Ports

2   10

1   9
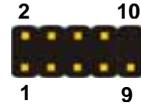
Pin	Description	Pin	Description
1	VCC	2	VCC
3	Data0-	4	Data1-
5	Data0+	6	Data1+
7	Ground	8	Ground
9	Ground	10	N/C

CN_USB1   CN_USB2

A.6 <IrDA Port>

Connector: **CN_IR**

1
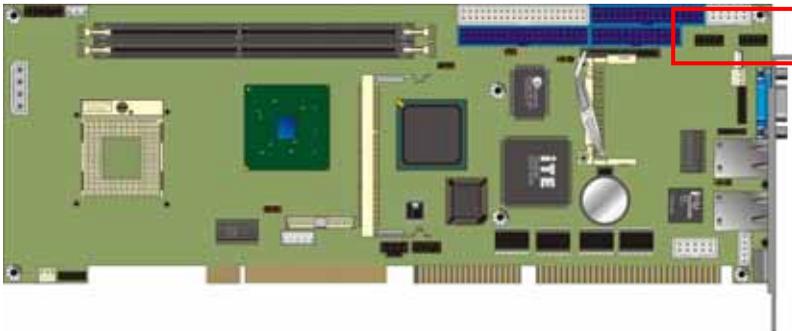
Type: 5-pin (1 x 5) 2.54-pitch header for SIR Port

Pin	Description
1	VCC
2	N/C
3	IRRXD
4	Ground
5	IRTXD

CN_IR
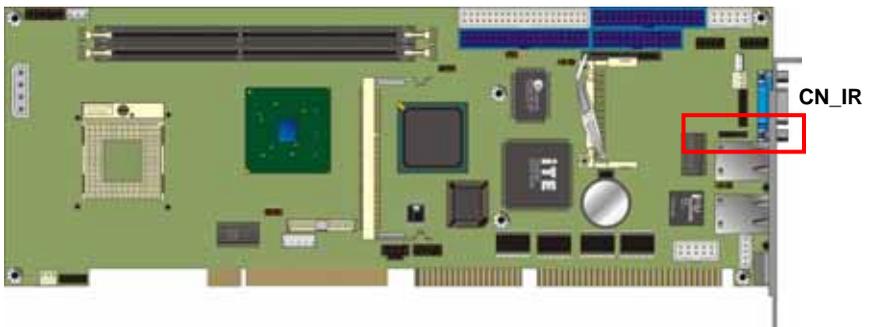
A.7 <VGA Port>

Connector: **VGA**

Type: 15-pin D-sub female connector on bracket
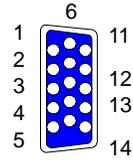
Pin	Description	Pin	Description	Pin	Description
1	RED	6	Ground	11	N/C
2	GREEN	7	Ground	12	5VCDA
3	BLUE	8	Ground	13	HSYNC
4	N/C	9	LVGA5V	14	VSYNC
5	Ground	10	Ground	15	5VCLK

VGA
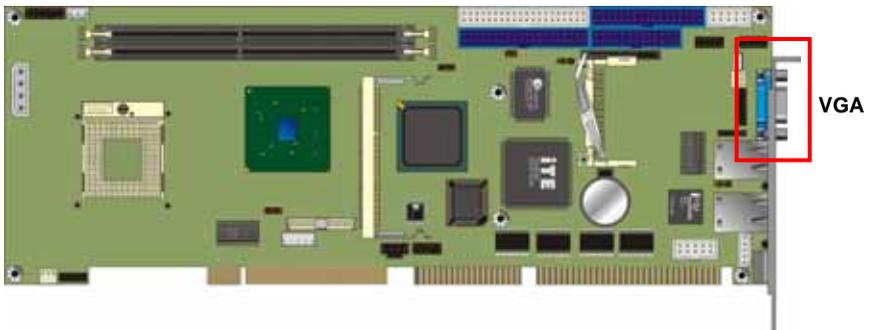
A.8 <LAN Port>

A.8.1 < Fast Ethernet>

Connector: **RJ45_1**
Type: RJ45 connector with LED on bracket
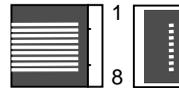
Pin	1	2	3	4	5	6	7	8
Description	TX+	TX-	RX+	N/C	N/C	RX-	N/C	N/C

A.8.2 <Gigabit Ethernet >

Connector: **RJ45_2 (SBC-4212AG2NL Only)**
Type: RJ45 connector with LED on bracket
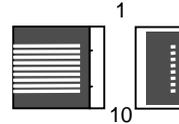
Pin	1	2	3	4	5
Description	TRD0+	TRD0-	TRD1+	TRD1-	NC
Pin	6	7	8	9	10
Description	NC	TRD2+	TRD2-	TRD3+	TRD3-
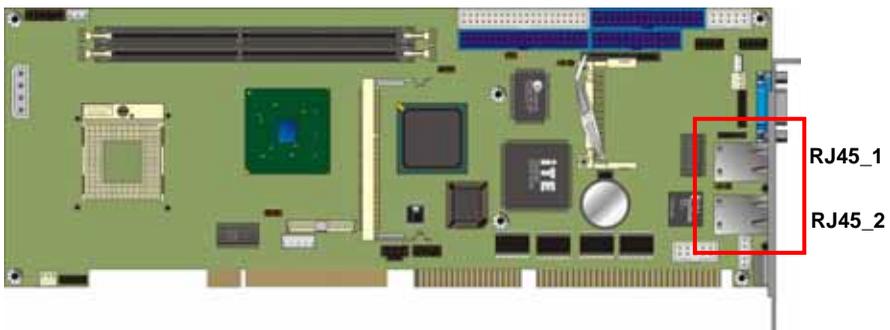
RJ45_1

RJ45_2

A.9 <AT Keyboard Port>

Connector: **CN_ATKB**

Type: 5-pin box header
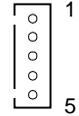
Pin	1	2	3	4	5
Description	VCC	Ground	N/C	DATA	CLK

CN_ATKB
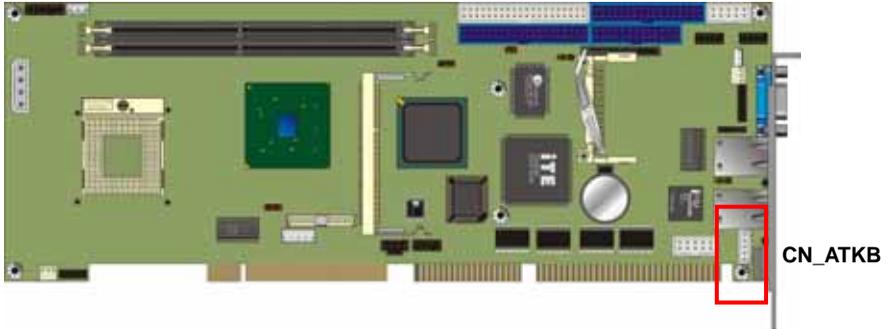
A.10 <PS/2 Keyboard & Mouse Port>

Connector: **PS2**

Type: 6-pin Mini-DIN connector on bracket
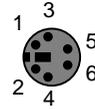
Pin	1	2	3	4	5	6
Description	KBD	MSD	Ground	VCC	KBC	MSC

Note: The PS/2 connector supports standard PS/2 keyboard directly or both PS/2 keyboard and mouse

through the PS/2 Y-type cable.

PS2
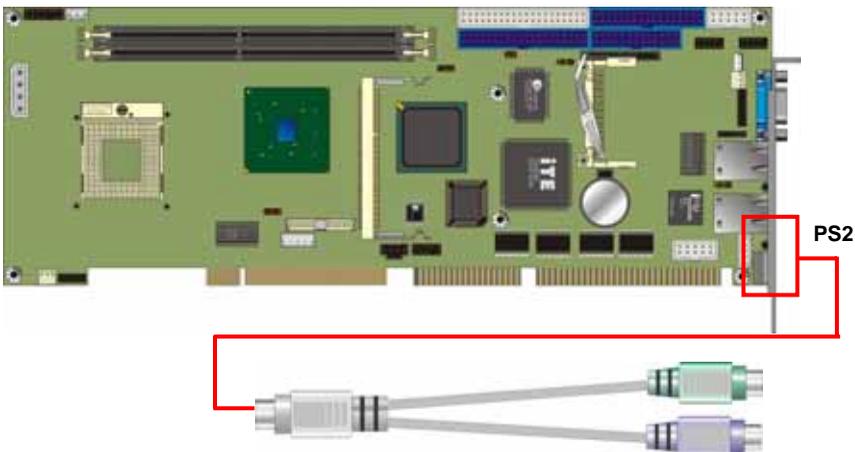
Appendix B <Flash BIOS>

B.1   BIOS Auto Flash Tool

The board is based on Award BIOS and can be updated easily by the BIOS auto flash tool. You can download the tool online at the address below:

http://www.award.com

File name of the tool is "awdflash.exe", it's the utility that can write the data into the BIOS flash ship and update the BIOS.

B.2   Flash Method

1. Please make a bootable floppy disk.
2. Get the last .bin files you want to update and copy it into the disk.
3. Copy awardflash.exe to the disk.
4. Power on the system and flash the BIOS. (Example: C:/ awardflash XXX.bin)
5. Re-star the system.

Any question about the BIOS re-flash please contact your distributors or email us at
support@aicsys.com

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Appendix C <Watchdog Timer Programming Guide>

WDT source from : WinBond 83627HF

(1) General Description

Winbond has a WDT feature inside its chip. We implement its function into our circuit.

There are many configuration Registors (CR) in 83627HF. The following sequence must

be followed for CR programming :

(*1) Enter the extended function mode

(*2) Configure the configuration registers

(*3) Exit the extended function mode

EFER : Extended Function Enable Registers.(EFER=2Eh in our system)

EFIR : Extended Function Index Register. (Same addr. with EFER.)

EFDR : Extended Function Data Register.(Located at addr.[EFIR +1])

For instance ;

(*1) Enter extended function mode

```
        MOV   DX,2EH
        MOV   AL,87H
        CLI              ; disable interrupt
        OUT   DX,AL
        JMP   $+2
        OUT   DX,AL
        STI              ; enable interrupt
```

(*2) Configurate logical device 1 , configuration register CRF0

```
        MOV   DX,2EH
        MOV   AL,07H
        OUT   DX,AL
                         ; point to Logical Device Number Register
        MOV   DX,2FH
        MOV   AL,01H
        OUT   DX,AL
                         ; select logical device 1
        MOV   DX,2EH
        MOV   AL,0F0H
        OUT   DX,AL
        MOV   DX,2FH
        MOV   AL,3CH
        OUT   DX,AL    ; update   CRF0 of LD0 with value 3Ch
```

(*3) Exit extended function mode

```
        MOV   DX,2EH
        MOV   AL,0AAH
        OUT   DX,AL
```

The   Configuration Register (CR) Definition :

** Chip (Global) Control Register (CCR) :   CR02 -->CR2F.

CR07 = Logical Device Number Register (LDNR)

** Logical Device 0 (LD0) = FDC , with CR : CR30 -->CRF5 .
When LDNR (= CR07) = 00h , you can program the CR30 --CRF5
related to FDC feature .

** Logical Device 1 (LD1) = Parallel Port,with CR :CR30 -->CRF0.

** LD2 = UART A (Serial Port 1) ,with CR :CR30 -->CRF0.

** LD3 = UART B (Serial Port 2) ,with CR :CR30 -->CRF1.

** LD5 = KBC ,with CR :CR30 -->CRF0.

** LD6 = CIR ,with CR :CR30 -->CR70.

** LD7 = GAME PORT,MIDI PORT & GP I/O Port I,with CR :CR30 -->CRF2.

** LD8 = GP I/O Port II,with CR :CR30 -->CRF7.

** LD9 = GP I/O Port III,with CR :CR30 -->CRF3.

** LDA = ACPI,with CR :CR30 -->CRFF.

** LDB = HARDWARE MONITOR, with CR : CR30 --> CRF0

(2) Related CR for WDT programming

CR2B-Bit 4 ; [0] for WDT function (via Pin89)

LD8-CRF5-Bit 3; Select WDT count time

0 = second.

1 = minute.

LD8-CRF6 ; WDT time-out period ,

00h = disabled

01h = 1 second/minute .

02h = 2 seconds/minutes .

03h = 3 seconds/minutes .

04h = 4 seconds/minutes .

05h = 5 seconds/minutes .

....

FEh = 254 seconds/minutes .

FFh = 255 seconds/minutes .

When writing a non-zero value to LD8-CRF6 , this value will be loaded into WDT counter
and start to count down .Read this register can not get the WDT time-out period (the
orginal one written into), but the current value in WDT counter .

Enable and Refresh WDT : program LD8-CRF6 a
non-zero value .

Disable WDT : program LD8-CRF2 with 00h .

LD8-CRF7- Bit 4 : WDT Status

1 = WDT time-out happened

0 = WDT counting .

LD8-CRF7- Bit[3..0] : Select IRQ resource for WDT time-out
(Setting of 2 selects SMI)

(3) WDT Programmimg guide

Step 1 .   Enter extended function mode as mentioned as above.

Step 2 .   Program WDT related CR.

    (2-1) CR2B-b[4]P[0] ; Set pin output as WDT function

    (2-2) CR07-P08h   ; Point to LD8

    (2-3) CRF6-Pxyh

                         ; Program WDT time-out period and start

count down . xy = 00 ; No WDT time-out and counting

xy = 01 ; WDT time-out = 30 sec. and starts counting .

                ....

    (2-4) Read CRF7-b4 if needed ; 0 : WDT counting

                               1 : WDT time-out happened

Step 3.   Exit extended function mode as mentioned as above.

Example (ENABLE WDT AND SET WDT time-out = 5 minutes)

Step 1 .

```
        MOV   DX,2EH
        MOV   AL,87H
        CLI               ; disable interrupt
        OUT   DX,AL
        JMP   $+2
        OUT   DX,AL
        STI               ; enable interrupt
```

Step 2 .

```
        MOV   DX,2Eh
        MOV   AL,2BH
        OUT   DX,AL
        MOV   DX,2Fh
        IN    AL,DX       ; READ   CR2B
        AND   AL,0EFH
        MOV   AH,AL

        MOV   DX,2Eh
        MOV   AL,2BH
        OUT   DX,AL
        MOV   DX,2Fh
        MOV   AL,AH
        OUT   DX,AL       ; CR2B-b[4]P[0]

        MOV   DX,2Eh
        MOV   AL,07H
        OUT   DX,AL       ; point to Logical Device Number Register
        MOV   DX,2Fh
        MOV   AL,08H
        OUT   DX,AL       ; select logical device 8
```

```
                    ;
                    MOV  DX,2Eh
                    MOV  AL,0F5H
                    OUT  DX,AL
                    MOV  DX,2Fh
                    IN   AL,DX    ;
                    OR   AL,08h  ; SELECT MINUTE
                    MOV  AH,AL

                    MOV  DX,2Eh
                    MOV  AL,0F5h
                    OUT  DX,AL
                    MOV  DX,2Fh
                    MOV  AL,AH
                    OUT  DX,AL

                    MOV  DX,2Eh   ; SETTING  5 MINUTES
                    MOV  AL,0F6h  ; (   LD8-CRF6-P05h   )
                    OUT  DX,AL
                    MOV  DX,2Fh
                    MOV  AL,05h
                    OUT  DX,AL
```

   Step 3 . Exit extended function mode

```
                    MOV  DX,2Eh
                    MOV  AL,0AAH
                    OUT  DX,AL
```

REMARK :

      **** I/O PORT   2Eh --> Index port for programming CR .

                2Fh --> Data port for programming CR .

      **** LD8-CRF6-P05h :

                Program CR index F6h of Logical Device 8

                    with the value "05h" .