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FB2645 ULV PIII / Celeron Half-size CPU Card User's Manual

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If you have problems or difficulties in using the system board, or setting up the relevant devices, and software that are not explained in this manual, please contact our service engineer for service, or send email to support@fabiatech.com.

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- ❑ A list of your name, address, telephone, facsimile number, or email address where you may be reached during the day
- ❑ Description of you peripheral attachments
- ❑ Description of you software (operating system, version, application software, etc.) and BIOS configuration
- ❑ Description of the symptoms (Extract wording any message)

For updated BIOS, drivers, manuals, or product information, please visit us at www.fabiatech.com

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Chapter 1 Introducing the FB2645 System Board

Overview

The FB2645 is a low power PIII all-in-one CPU card. This user's manual provides information on the physical features, installation, and BIOS setup of the FB2645.

Built to unleash the total potential of the Pentium Processor, the FB2645 is a single boards computer capable of handling today's demanding requirements. Able to support up to 933 MHz low power Pentium-III/Celeron CPUs, this unit supports 10/100M interface network port, synchronous pipe line burst SDRAM up to 512MB, and on board VGA port uses the 815E chipset with UMA share memory with 4MB.

Each FB2645 has two ports for I/O communications. One RS-232C and one RS-232C /422/485 ports are available. There is also a watchdog timer that can be configured from software to automatically reset the system or generate an interrupt. And for easy configuration, AMI BIOS are available.

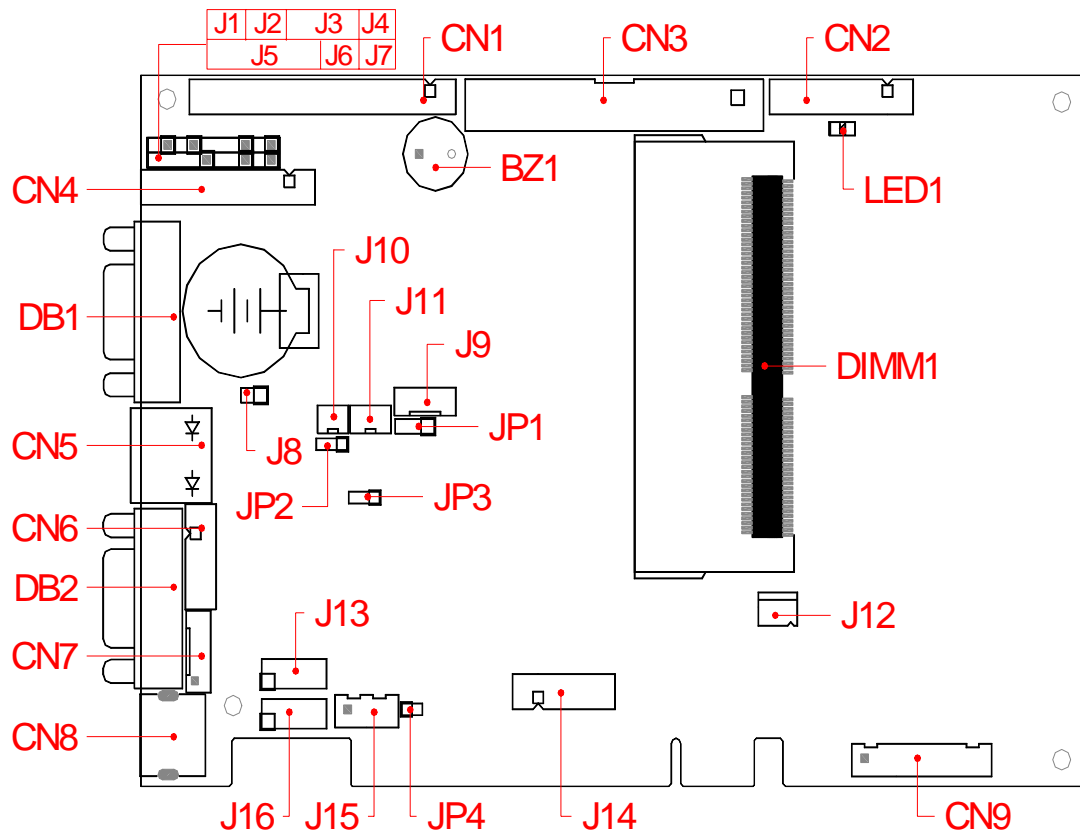
Power management is also featured to lower the rate of consumption. The unit supports doze mode, <Suspend Mode> and <Standby mode> as well as it adheres to the "Green Function" standard.

The FB2645 is perfect for POS and POI applications, network systems, panel / MMI's, order entry kiosks and test equipment. The Compact size is only 185X122mm.

Series Comparison Table

Model	FB2645	FB2645A
Processor	Celeron-650Mhz	PIII-933Mhz
Chipset	I815E	
Onboard/ 1So-DIMM(Max. SDRAM)	128MB/512MB	
VGA CRT	815E	
Watchdog Timer	Yes	
Multi I/O Chip	2S1P	
Enhanced IDE	Yes	
USB	Yes	
Audio	Yes	
Ethernet (10/100Mbps)	10/100 Base-TX	1G/100 Base-TX
Board Size	185mm x 122mm	

Layout



Specifications

- Supports ULV 650 MHz Celeron or 933 MHz PIII CPU.
- Compact size slot card with PICMG PCI expansion bus.
- Intel chipset 815E, ICH2 and 256KB or above L2 cache inside the CPUs.
- Supports onboard SDRAM 128MB and one DIMM socket for up 512MB maximum.
- FB2645 supports Realtek 8100C chipset 100M/10M Ethernet with RJ-45 connector.
- FB2645A Support Realtek 8110S Chipset 1G/100M Ethernet with RJ-45 connector.
- Intel 815E chipset provides CRT use UMA share memory VRAM up to 4MB.
- Parallel port, floppy and two IDE channels supports four IDE devices with ultra DMA 33. In addition, channel one IDE supports ultra DMA 33/66/100.
- One RS-232 and one RS-232/RS-422/RS-485.
- PS/2 compatible keyboard and mouse interface.
- E2KEY function for safe CMOS data keeping. (Option)
- On-board buzzer and LED indicator.
- Flash BIOS with easy upgrade utility.
- Software programmable watchdog timer.
- Four USB ports and hardware monitoring functions.
- Provides CPU cooling fan connector for monitoring.
- Provides one audio function.
- EMI Considered on every output signals.
- Compact size, 185 mm x 122 mm.

Packing List

Upon receiving the package, verify the following things. Should any of the mentioned happens, contact us for immediate service.

- Unpack and inspect the FB2645 package for possible damage that may occur during the delivery process.
- Verify the accessories in the package according to the packing list and see if there is anything missing or incorrect package is included.
- If the cable(s) you use to install the FB2645 is not supplied from us, please make sure the specification of the cable(s) is compatible with the FB2645 system board.

Note: after you install the FB2645, it is recommended that you keep the diskette or CD that contains drivers and document files, document copies, and unused cables in the cartoon for future use.

The following lists the accessories that may be included in your FB2645 package. Some accessories are optional items that are only shipped upon order.

- One FB2645 system board
- One compact disc containing manual file in PDF format and necessary drivers and utilities
- One 40-pin hard disk drive interface cable
- One 20 pin to 34-pin floppy drive interface cable
- One serial port and parallel port interface cable with bracket
- One Y-type keyboard and mouse port adapter cables
- One USB and Audio adapter board with cables
- One hard copies of this quick setup manual

Chapter 2 Hardware Installation

To set up a FB2645 system board, complete the description Chapter 2 and Chapter 3.

This chapter introduces the system board connectors, jumper settings and then guides you to apply them for field application.

Before Installation

Before you install the system board, make sure you follow the following descriptions.

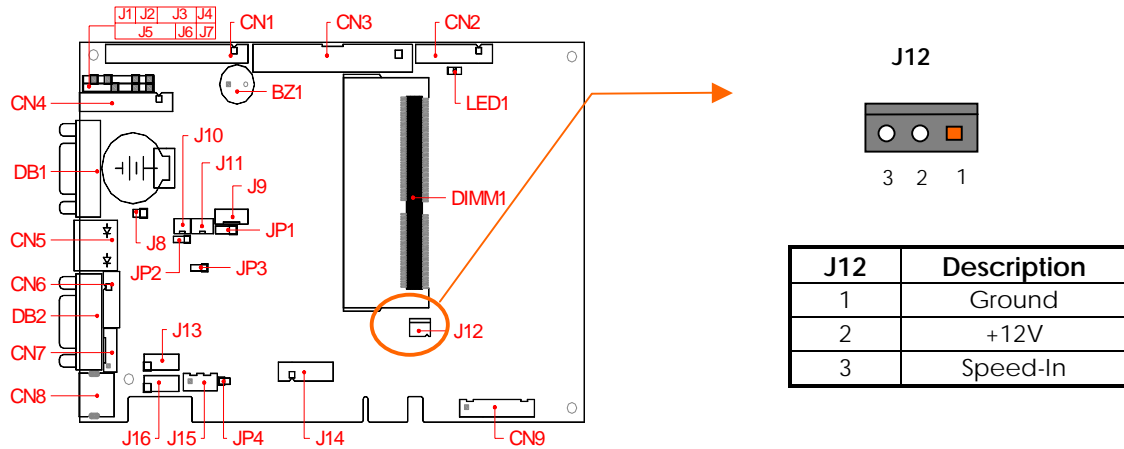
1. Before removing the board from its anti-static bag, wear an anti-static strap to prevent the generation of Electricity Static Discharge (ESD). The ESD may be created from human body that touches the board. It may do damage to the board circuit.
2. Install or unplug any connector, module, or add-on card, be sure that the power is disconnected from the system board. If not, this may damage the system board components, module, or the add-on-card.
3. Installing a heat sink and cooling fan is necessary for heat dissipation from your CPU. If heat sink or cooling fan is not mounted, this may cause the CPU fail due to over-heating problem.
4. When you connect the connectors and memory modules, be careful with the pin orientations.

Hardware Features

The following lists the connectors and jumpers to install the FB2645.

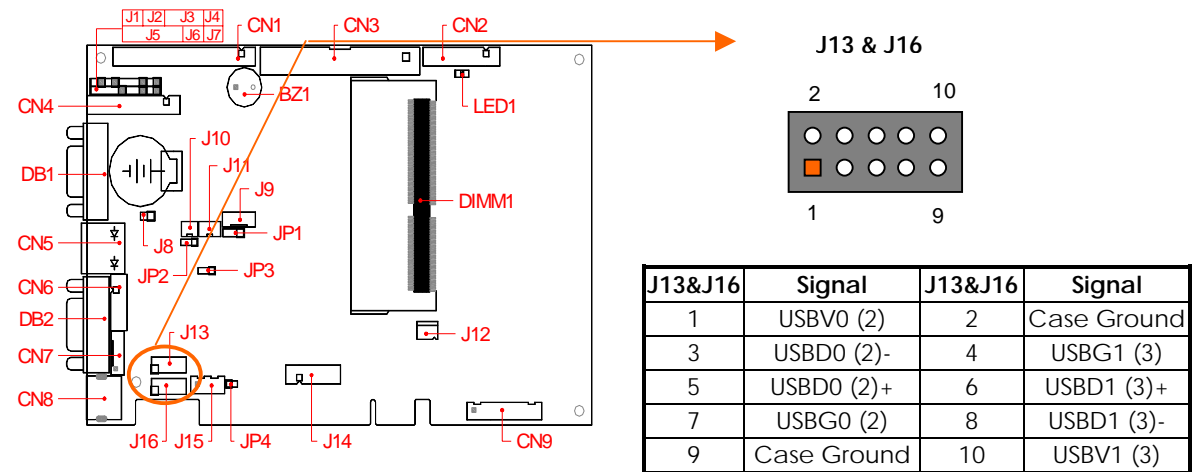
Item	Description
CN1	44-pin-2.0mm IDE 2 hard disk connector
CN2,	20-pin 2.0mm floppy connector
CN3	40-pin 2.54mm IDE 1 hard disk connector
CN4	26-pin 2.0mm parallel port connector
CN5	RJ45-LAN connector
CN6	10-pin RS-232/422/485 port 2 connector
CN7	6 – pin 2.0mm IDC connector for Keyboard and Mouse
CN8	Keyboard and Mouse connector
CN9	9-pin AUX. power connector
J1	2-pin Reset header
J2	2-pin HDD LED Indicator header
BZ1, J3	Onboard Buzzer and external speaker header
J4	Connector to button switcher as soft power switch
J6	3-pin for external power/Watchdog LED header
J7	2-pin for external temperature sensor
J8	2-pin for external TX-LED with LAN
J9	5-pin for TTL I/O
J10	Reserved
J11	3-pin RS232C touch screen header for serial port 2
J12	3-pin for case/CPU cooling fan
J13	USB #1 connector
J14, J16	Connector to daughter board FB4641, provides AC97 signals for Audio and USB
JP4, J15	Soft start connector for AXT power supply only
J16	USB #0 connector
JP1, J17	Compact Flash Socket and Master/Slave Select
JP2	To clear CMOS data
JP3	3-pin Terminal Resistor of Serial port 2
DB1	CRT connector
DB2	RS232 9-pin D – type male connector
DIMM1	144-pin SoDimm Socket
LED1	Power/Watchdog LED indicator

□ **J12: CPU or System Fan Connector**



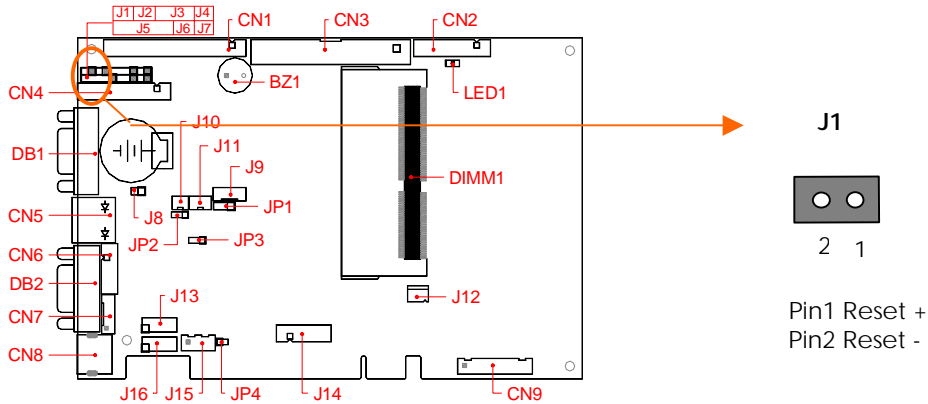
□ **J13 & J16: USB#1/0 & #2/3 Connectors**

J13 and J16 are 10-pin connectors. Use the USB adapter cable and FB4641 board, you can attach up to 2 USB devices.

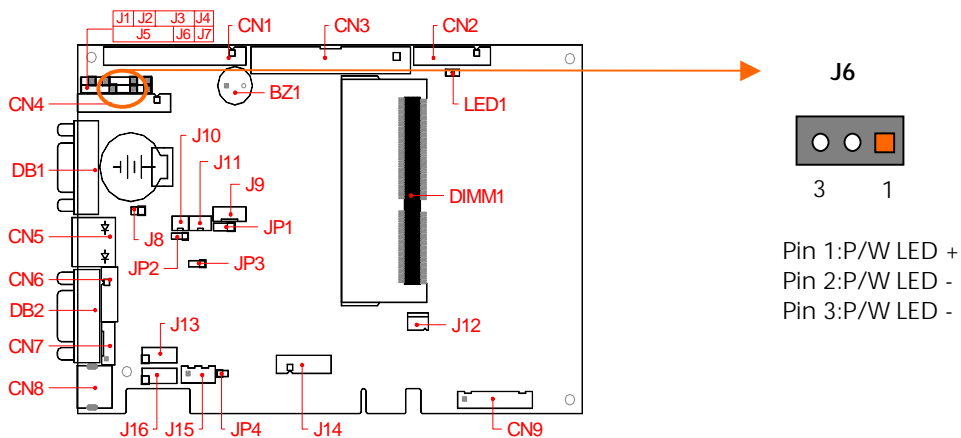


□ **J1: Reset Header**

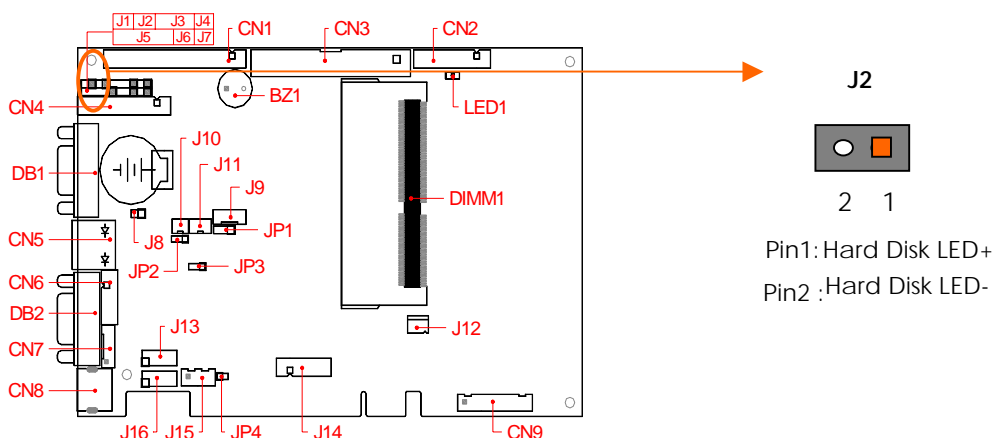
J1 is a 2-pin header for connecting to system reset bottom. Short-circuit these 2 pins to hardware reset FB2645 as well as restart system. It is similar to power off the system and then power it on again.



□ **J6: External Power/Watchdog LED Header**

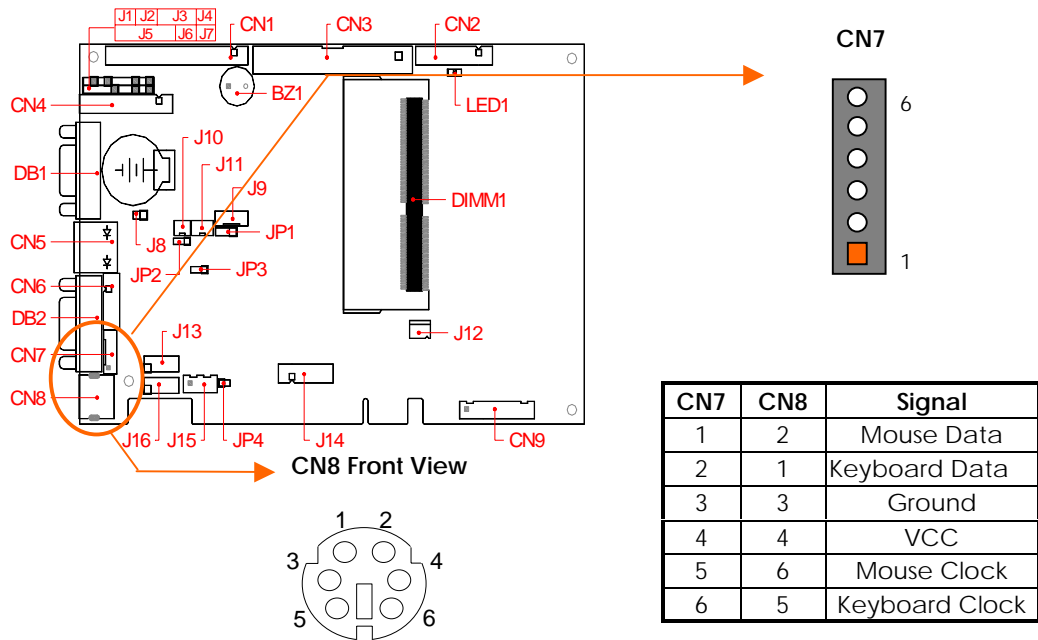


□ **J2: HDD LED Header**



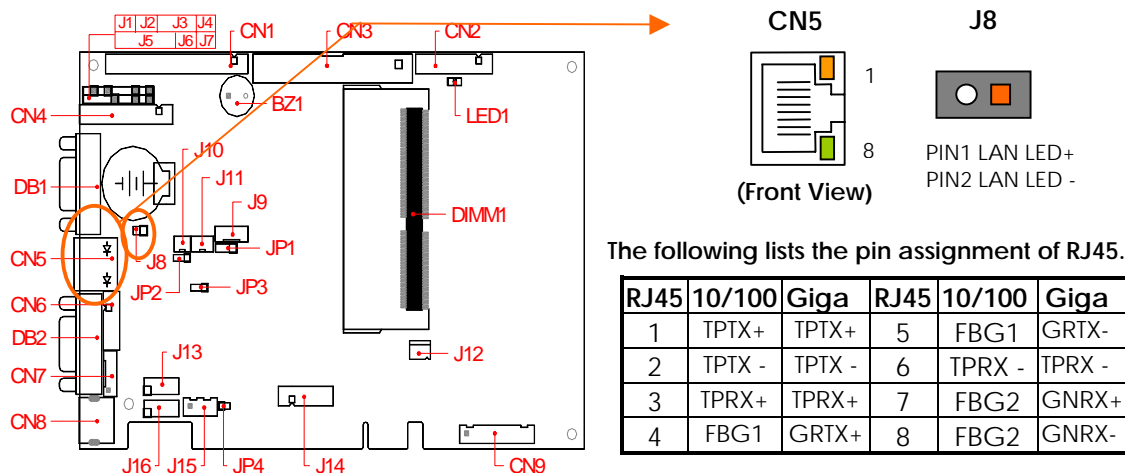
□ **CN7, CN8: Keyboard/Mouse Connector**

CN8 is a standard PS/2 type keyboard connector, so any PS/2 type keyboard can plug into CN8 directly without extra adapter cable. CN7 provides PS/2 mouse interface, use the included mouse adapter cable to connect between CN7 and standard PS/2 mouse.



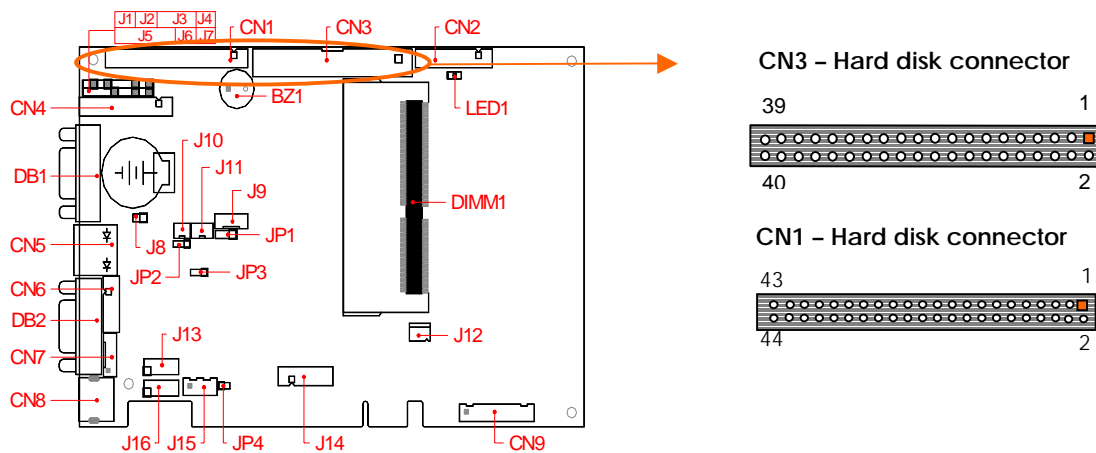
□ **CN5 & J8: RJ45 LAN Connector**

The CN5 contain LAN twist pair signals and LAN accesses indicator signal is RJ45 type connector with 2 LED indicators. The up side LED (orange) indicates data is accessing and the down side LED (green) indicates on-line status. (When lighted indicates on-line and off indicates off-line). The following lists the pin assignment of CN5 and J8:



□ **CN1, CN3: IDE hard Disk Connector**

CN 3 is 40-pin 2.54mm IDE hard disk connector. CN1 is 44-pin 2.0mm IDC connectors. The included hard disk is able to attach up to four hard disk drives.

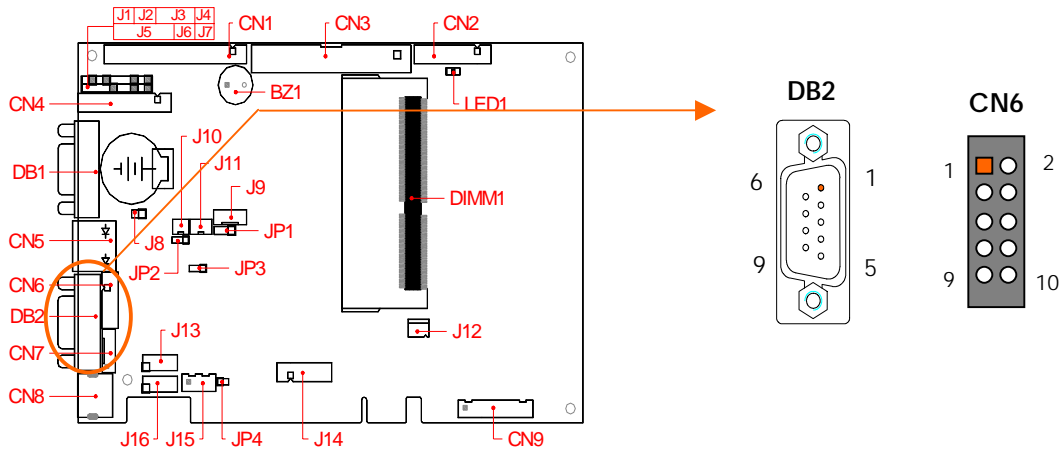


The following table lists the pin description of CN1, CN3.

Pin	Signal	Pin	Signal
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	NOT USED
21	IDEDREQ	22	GROUND
23	-IOW	24	GROUND
25	-IOR	26	GROUND
27	IDEIORDYA	28	GROUND
29	-DACKA	30	GROUND
31	AINT	32	GROUND
33	SA 1	34	Not Used
35	SA 0	36	SA 2
37	CS 0	38	CS 1
39	HD LED A	40	GROUND
41 (CN1)	VCC	42 (CN1)	VCC
43 (CN1)	GROUND	44 (CN1)	Not Used

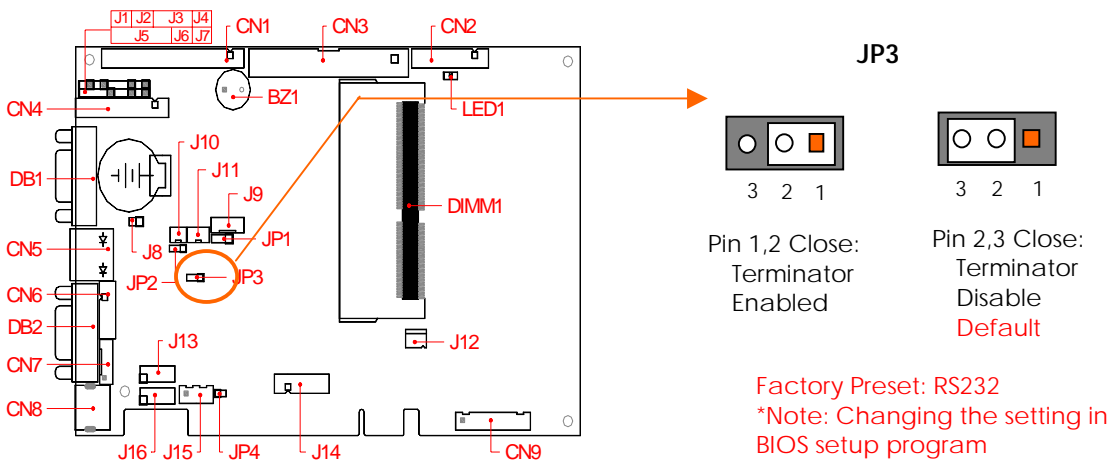
□ **DB2 & CN6: RS232 Serial Ports 1,2 Connectors and Jumpers**

The DB2 connector on bracket is 9-pin D-type male connector the serial port 2 adapter cables are used to transfer 10-pin IDC connector into standard DB9 connectors.



□ **Serial Port 2 (CN6, J11, JP3)**

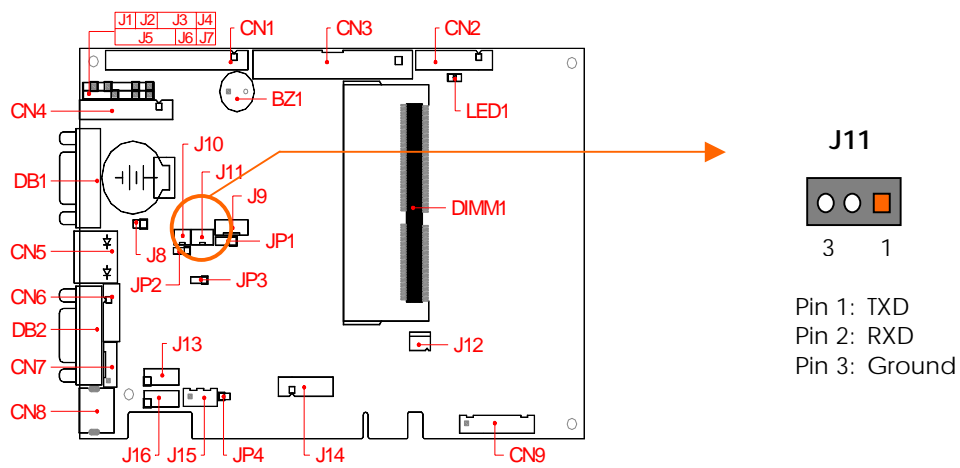
Serial port 2 is designed for multiple proposes. It could be RS-232C, RS-422 or RS-485 by changing the setting in BIOS setup program. And JP3 is use to enable or disable terminator if RS-485 mode is selected. When touch screen module is used, you could connect J11 to touch screen controller directly and internally instead of connect from CN6 connector.



CN6	Signal	RS422	RS485	DB9
1	-DCD2			1
2	-DSR2			6
3	RXD2	RX-	485-	2
4	-RTS2	TX-		7
5	TXD2	RX+	485+	3
6	-CTS2	TX+		8
7	-DTR2			4
8	-RI2			9
9	GROUND			5
10	CASE GROUND			

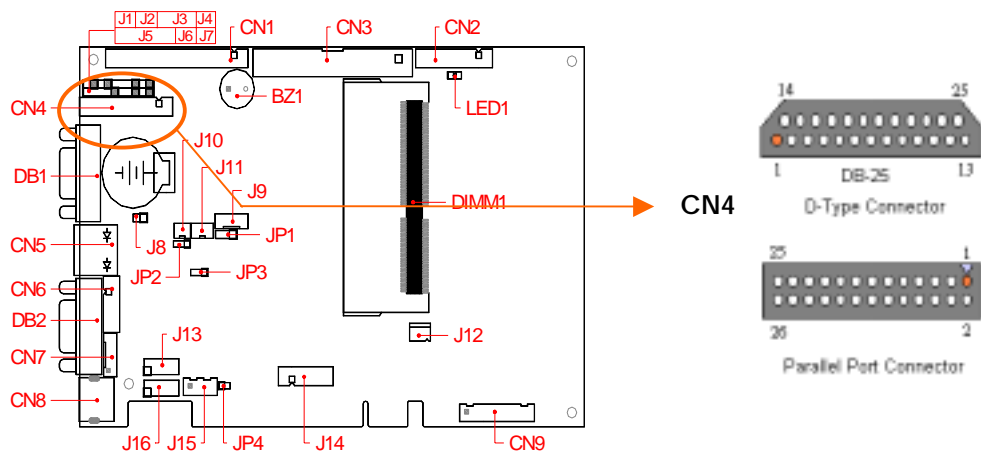
□ **J11: Touch Screen Header**

J11 provide basic RS-232C signals of serial port 2 respectively. The basic RS-232C signal is used to interface with touch screen controller internally.



□ **CN4: 26-pin Parallel Port Connector**

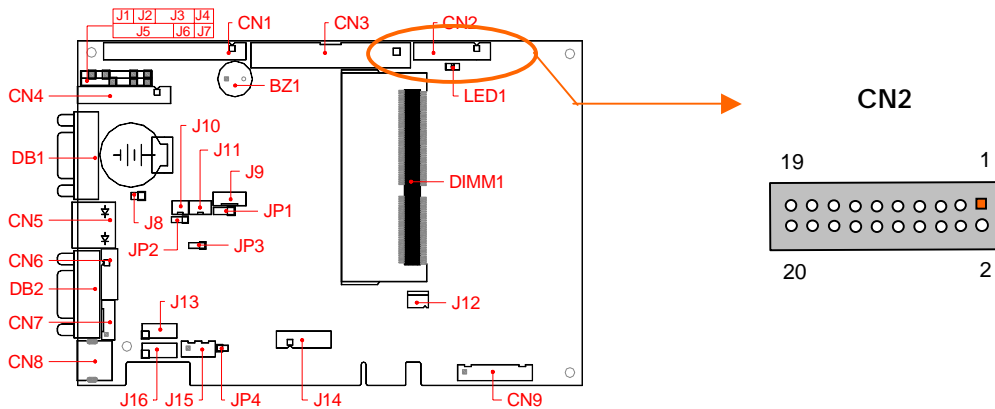
The included printer interface cable is used to transfer 26-pin connector into standard DB25 connector.



CN4	DB-25	Signal	CN4	DB-25	Signal
1	1	-STROBE	2	14	-AUTO FORM FEED
3	2	DATA 0	4	15	-ERROR
5	3	DATA 1	6	16	-INITIALIZE
7	4	DATA 2	8	17	-PRINTER SELECT IN
9	5	DATA 3	10	18	Ground
11	6	DATA 4	12	19	Ground
13	7	DATA 5	14	20	Ground
15	8	DATA 6	16	21	Ground
17	9	DATA 7	18	22	Ground
19	10	-ACKNOWLEDGE	20	23	Ground
21	11	BUSY	22	24	Ground
23	12	PAPER	24	25	Ground
25	13	PRINTER SELECT	26	--	No Used

□ **CN2: Floppy Connector**

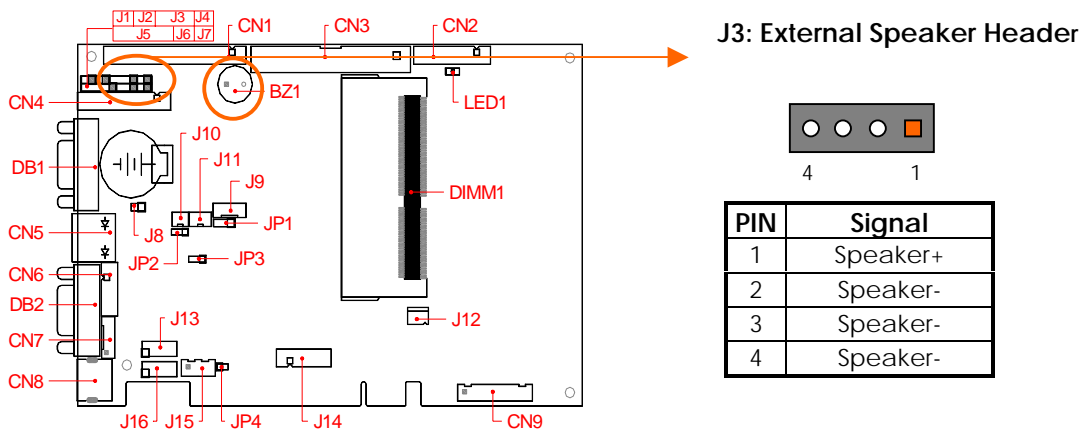
The included floppy drive interface cable is used to transfer 20-pin connector into standard 34-pin connector. The following table shows signal connections between 20-pin & 34-pin connectors.



The following table shows signal connections.

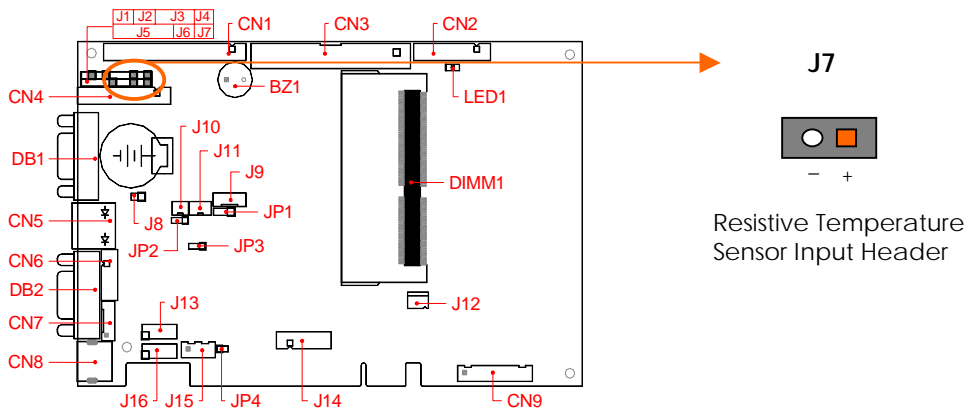
20-pin	Signal	34-pin	20-pin	Signal	34-pin
1	Drive Enable A	2	12	Ground	23
2	-Index	8	13	-Write Enable	24
3	-Select A	12	14	-Track 0	26
4	Ground	11	15	-Write Protect	28
5	-Motor A	16	16	Ground	29
6	- Select B	14	17	-Read Data	30
7	-Motor B	10	18	-Head	32
8	Ground	9	19	-Disk Change	34
9	-Direction	18	20	Ground	31
10	-Step	20			
11	-Write Data	22			
			-	No Connection	Others

□ **BZ1 & J3: On-Board Buzzer & External Speaker Header**



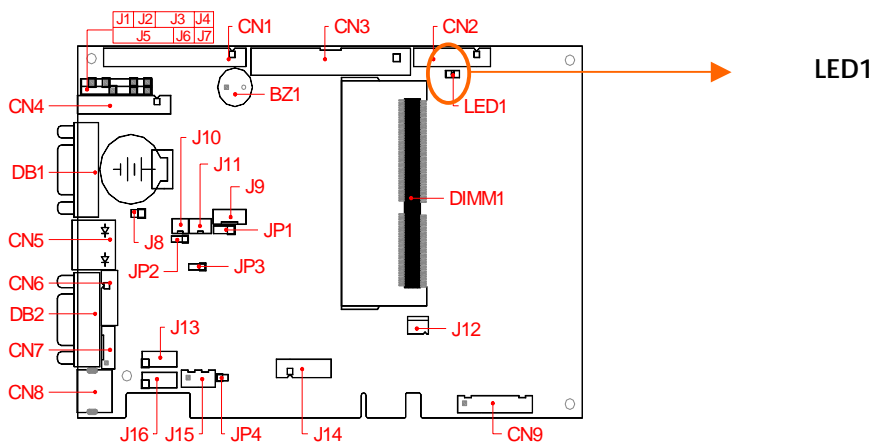
PIN	Signal
1	Speaker+
2	Speaker-
3	Speaker-
4	Speaker-

□ **J7: Temperature Sensor Header**

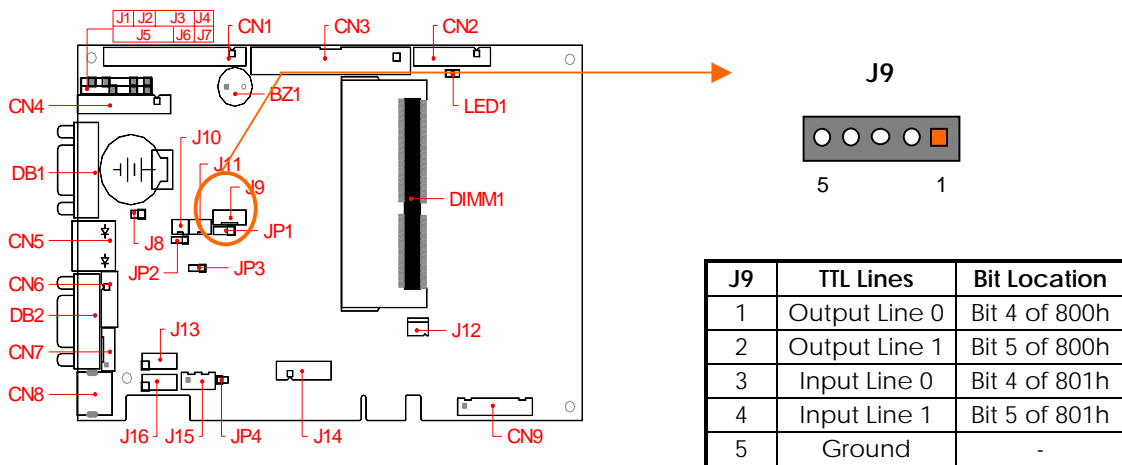


□ **LED1: On-Board Power LED**

LED1 indicates power is active when it lights.

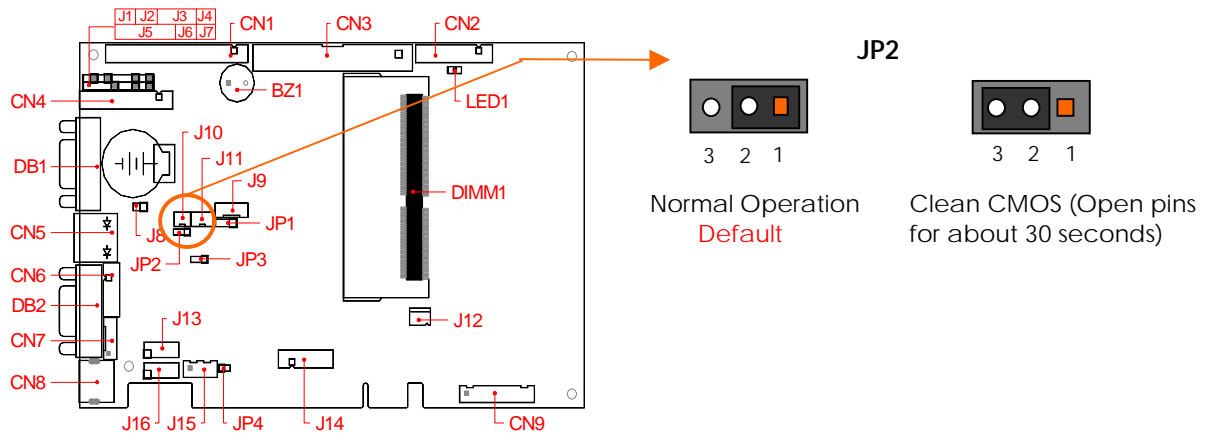


□ **J9: TTL I/O Connector**



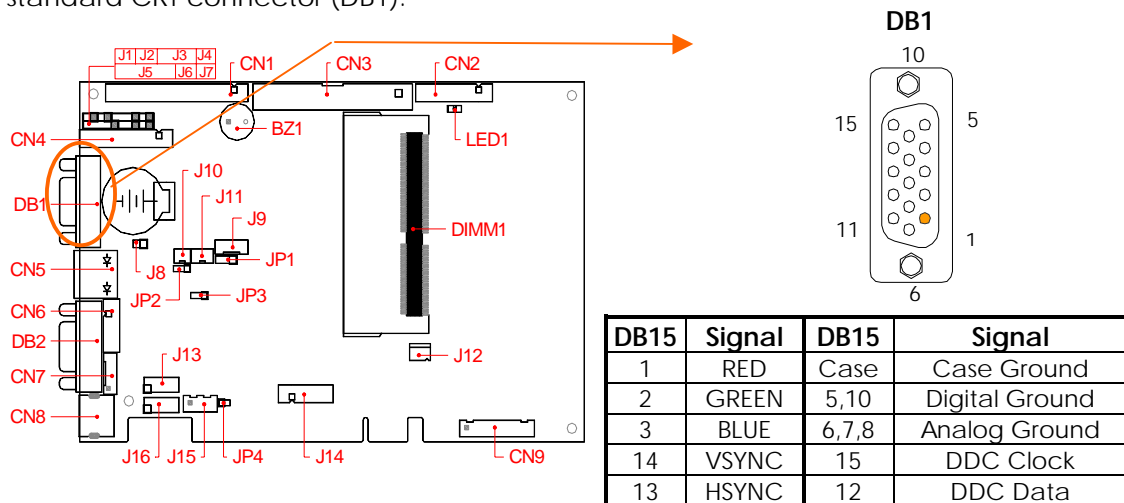
□ **JP2: CMOS Data Clear Jumper**

The CMOS store information like system date, time, boot up device, password, IRQ... that are set up with the BIOS. To clear the CMOS, set JP2 to open or 2-3 and then return to 1-2. The default setting is 1-2.



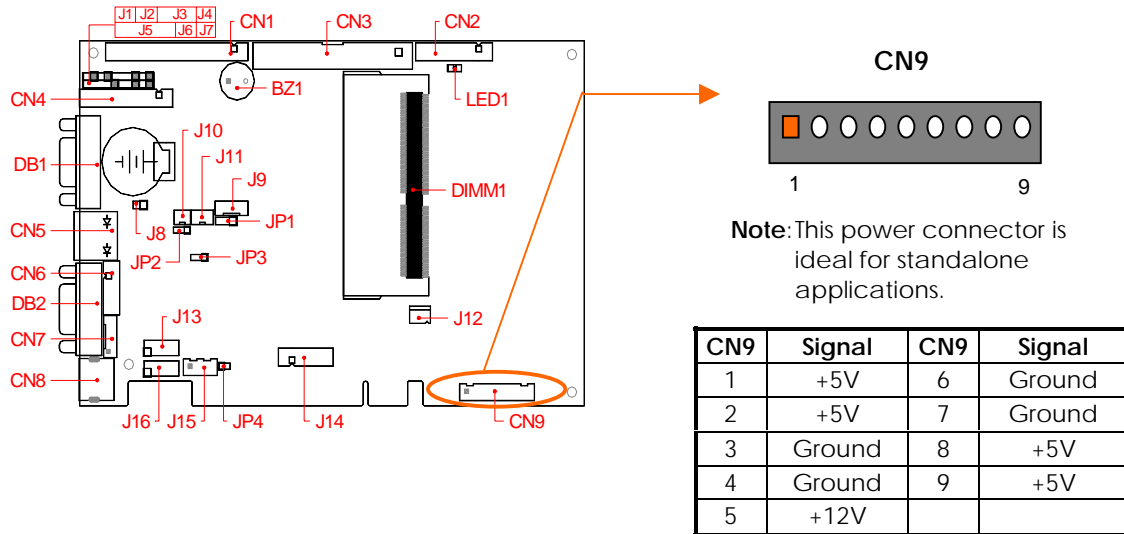
□ **DB1: CRT connector**

The FB2645 supports a CRT colored monitor. It can be connected to create a compact video solution for the industrial environment. The VGA control in the 815E chipset and supports AGP, the VGA memory is UMA memory with 4MB caching buffer allows a maximum CRT resolution of 1280X1024 with 24bpp colors. The CRT is use to a standard CRT connector (DB1).



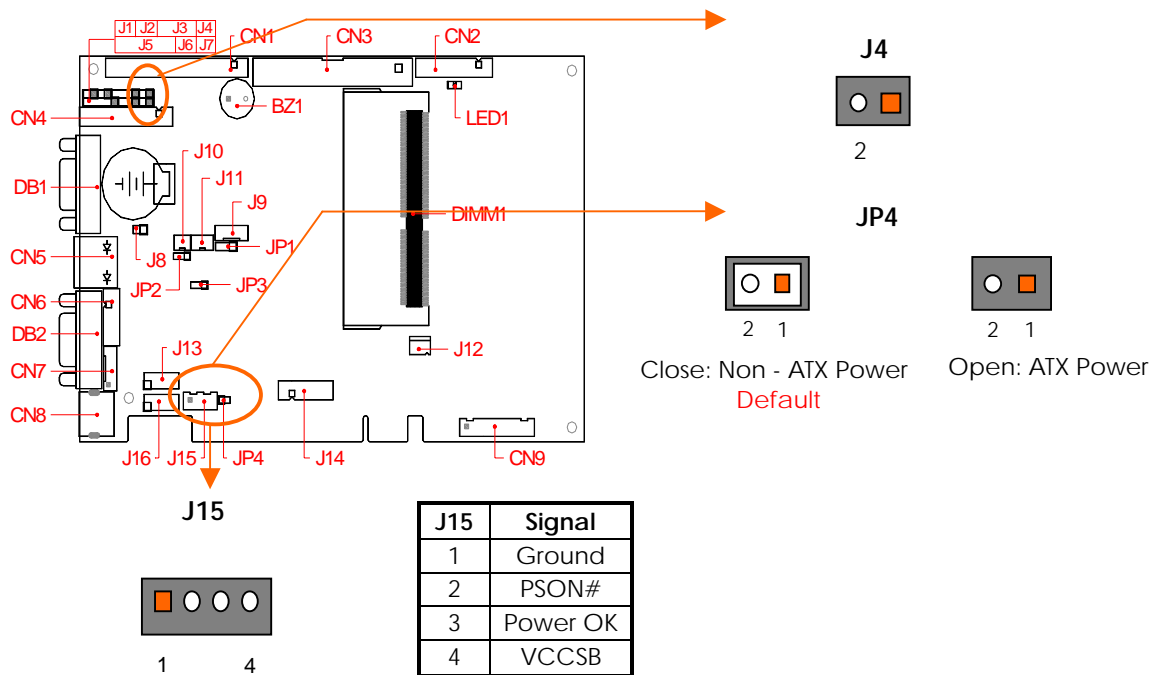
□ **CN9: Power Connector (9-pin 2.54mm JST)**

CN9 is the power connector for FB2645 is used with stand-alone applications.



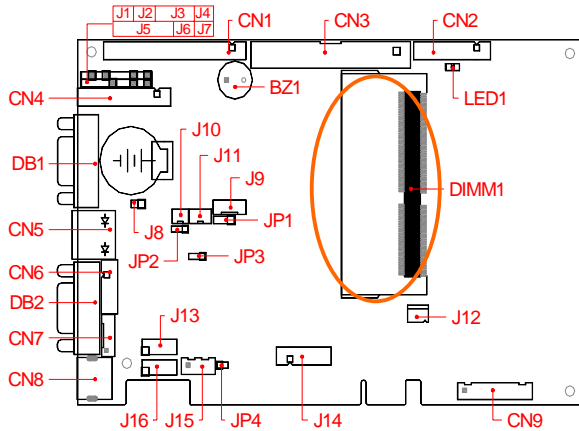
□ **J15, J4 & JP4: Soft Start Connector (for ATX Power Supply Only)**

When ATX power supply is used, you can connect J15 to ATX control signals from the back plane, and connect J4 to a push bottom switch as soft power switch. If non-ATX power supply is used, please short JP4 with jumper and you don't need to connect J15 and J4.



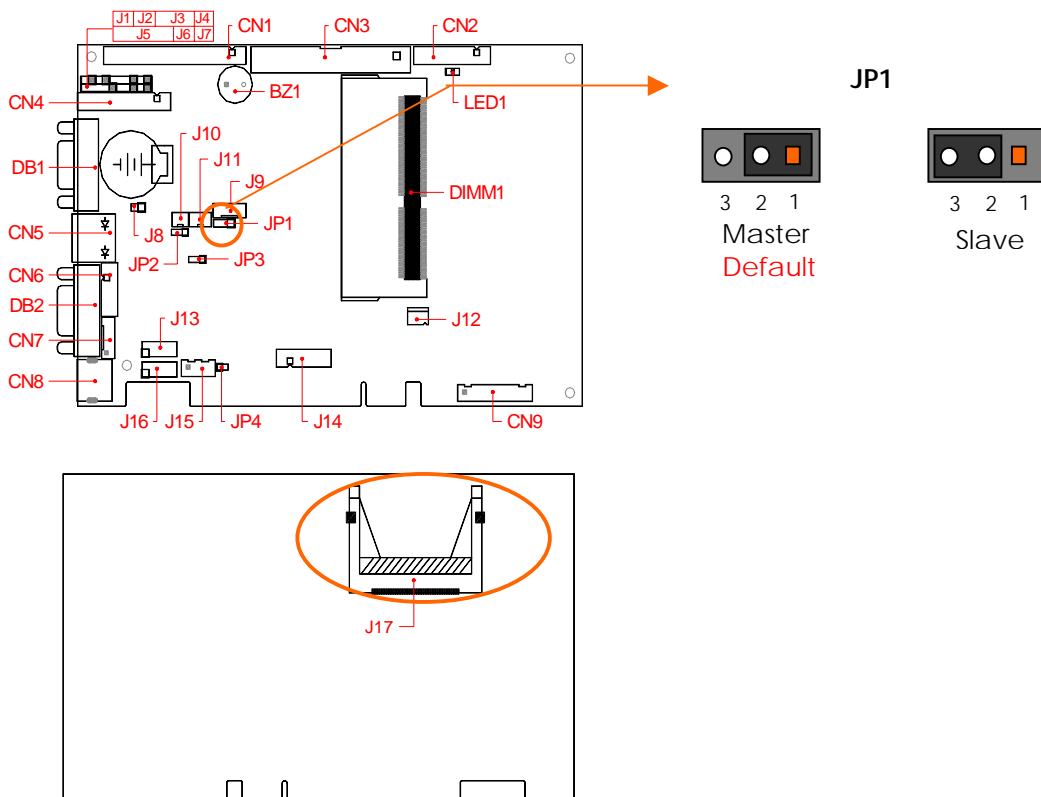
□ **DIMM1: SoDIMM Socket**

DIMM1 supports 144-pin, 3.3V, and PC-133 SDRAM with size of 32MB, 64MB, 128MB, 256MB and 512MB.



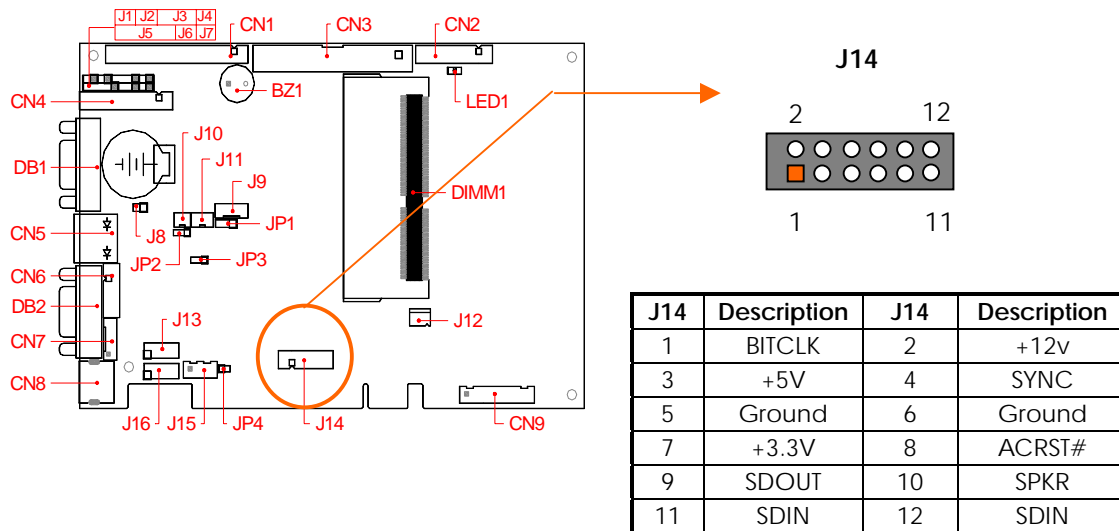
□ **J17 & JP1: Compact Flash Socket and Master/Slave Select**

The Compact Flash socket J17 (on the solder side) is optional and supports 3.3V Compact Flash and Micro Drives. JP1 is used to select master/slave device of this socket. Be sure to avoid the same master/slave setting with which connects to IDE#2 (CN1) connector, if you use J17 and CN1 simultaneously.



□ **J14: External Bus Connector for Audio**

J14 provides AC97 signals for Audio functions. FB4641 (Audio Adapter Board, Optional) is recommended for your best Audio solutions.



Chapter 3 BIOS Setup

This chapter describes the BIOS setup.

Overview

BIOS are a program located on a Flash memory chip on a circuit board. It is used to initialize and set up the I/O peripherals and interface cards of the system, which includes time, date, hard disk drive, the ISA bus and connected devices such as the video display, diskette drive, and the keyboard. This program will not be lost when you turn off the system.

The BIOS provides a menu-driven interface to the console subsystem. The console subsystem contains special software, called firmware that interacts directly with the hardware components and facilitates interaction between the system hardware and the operating system.

The BIOS default values ensure that the system will function at its normal capability. In the worst situation the user may have corrupted the original settings set by the manufacturer.

All the changes you make will be saved in the system RAM and will not be lost after power-off.

When you start the system, the BIOS will perform a self-diagnostics test called Power On Self Test (POST) for all the attached devices, accessories, and the system. Press the [Del] key to enter the BIOS Setup program, and then the main menu will show on the screen.

Note: Change the parameters when you fully understand their functions and subsequence.

a. Keyboard Convention

On the BIOS, the following keys can be used to operate and manage the menu:

Item	Function
ESC	To exit the current menu or message
Page Up/Page Down	To select a parameter
F1	To display the help menu if you do not know the purpose or function of the item you are going to configure
F6	Fail-Safe Default
F7	Optimized Default
F10	Save and exit
UP/Down Arrow Keys	To go upward or downward to the desired item

STANDARD CMOS SETUP

This section describes basic system hardware configuration, system clock setup and error handling. If the CPU board is already installed in a working system, you will not need to select this option anymore.

Phoenix - AwardBIOS CMOS Setup Utility		
Standard CMOS Features		
Date (mm:dd:yy)	Wed, May 26 2004	<i>Item Help</i>
Time (hh:mm:ss)	13 : 42 : 30	
		<i>Menu Level ▶</i>
▶ IDE Primary Master	[ST320014A]	
▶ IDE Primary Slave	[None]	
▶ IDE Secondary Master	[None]	<i>Change the</i>
▶ IDE Secondary Slave	[None]	<i>internal clock.</i>
Drive A	[None]	
Drive B	[None]	
Video	[EGA/VGA]	
Halt On	[All, But Keyboard]	
Base Memory	640K	
Extended Memory	228352K	
Total Memory	229376K	
↑↓→←: Move Enter: Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5: Previous Values F6: Fail-Safe Defaults F7:Optimized Defaults		

□ Date & Time Setup

Highlight the <Date> field and then press the [Page Up] /[Page Down] or [+]/[-] keys to set the current date. Follow the month, day and year format.

Highlight the <Time> field and then press the [Page Up] /[Page Down] or [+]/[-] keys to set the current date. Follow the hour, minute and second format.

The user can bypass the date and time prompts by creating an AUTOEXEC.BAT file. For information on how to create this file, please refer to the MS-DOS manual.

❑ Hard Disk Setup

The BIOS supports various types for user settings, The BIOS supports <Pri Master>, <Pri Slave>, so the user can install up to two hard disks. For the master and slave jumpers, please refer to the hard disk's installation descriptions and the hard disk jumper settings.

You can select <AUTO> under the <TYPE> and <MODE> fields. This will enable auto detection of your IDE drives during boot up. This will allow you to change your hard drives (with the power off) and then power on without having to reconfigure your hard drive type. If you use older hard disk drives, which do not support this feature, then you must configure the hard disk drive in the standard method as described above by the <USER> option.

❑ Video

This option selects the type of adapter used for the primary system monitor that must match your video display card and monitor. Although secondary monitors are supported, you do not have to select the type in Setup.

You have two ways to boot up the system:

When VGA set as primary and monochrome set as secondary, the selection of the video type is "VGA Mode".

When monochrome set as primary and VGA set as secondary, the selection of the video type is "Monochrome Mode".

❑ Error Halt

This option determines whether the computer will stop if an error is detected during power up.

No errors	The system boot will not be stopped for any error that may be detected.
All errors	Whenever the BIOS detect a non-fatal error the system will be stopped and you will be prompted.
All, But Keyboard	The system boot will not stop for a keyboard error; it will stop for all other errors.
All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors.
All, But Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for all other errors.

❑ Memory

This option is display-only which is determined by POST (Power On Self Test) of the BIOS.

❑ Base Memory

The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512K for systems with

512K memories installed on the motherboard, or 640K for systems with 640K or more memory installed on the motherboard.

❑ **Extended Memory**

The BIOS determines how much extended memory is present during the POST. This is the amount of memory located above 1MB in the CPU's memory address map.

❑ **Total Memory**

System total memory is the sum of basic memory, extended memory, and other memory.

BIOS Features Setup

This section describes the configuration entries that allow you to improve your system performance, or let you set up some system features according to your preference. Some entries here are required by the CPU board's design to remain in their default settings.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced BIOS Features

Virus Warning	[Disabled]	<i>Item Help</i>
CPU Internal Cache	[Enabled]	
External Cache	[Enabled]	<i>Menu Level ▶</i>
CPU L2 Cache ECC Checking	[Enabled]	
Processor Number Feature	[Enabled]	
Quick Power On Self Test	[Enabled]	
First Boot Device	[Floppy]	
Second Boot Device	[HDD-01]	
Third Boot Device	[CDROM]	
Boot Other Device	[Enabled]	
Swap Floppy Drive	[Disabled]	
Boot Up Floppy Disk	[Disabled]	
Boot Up NumLock Status	[On]	
Typematic Rate Setting	[Disabled]	
Typematic Rate (Chars/Sec)	6	
Typematic Delay (Msec)	250	
Security Option	[Setup]	
Report No FDD For WIN 95	[NO]	
T↓→←: Move Enter: Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5: Previous Values F6: Fail-Safe Defaults F7:Optimized Defaults		

Virus Warning

This option may flash on the screen. During and after the system boots up, any attempt to write to the boot sector or partition table of the hard disk drive will halt the system and the following error message will appear, in the mean time, you can run an anti-virus program to locate the problem.

Available Options: Disabled, Enabled

Default setting: Disable

CPU Internal & External Cache

This functions speeds up System access. The CPU has an internal cache.

Available options: Disabled, Enabled

Default setting: Enabled

Quick Power On Self Test

This option speeds up Power On Self Test (POST) after you power on the computer. If it is set to Enable, BIOS will shorten or skip some items' checks during POST.

Available options: Disabled, Enabled

Default setting: Enable

First /Second /Third/Boot Other Device/ Boot Device

This field specifies which device the system looks first upon power on.

Available options: Floppy, LS120, HDD-0, SCSI, CDROM, HDD-1, HDD-2, HDD-3, ZIP100, USB-FDD, USB-ZIP, USB-CDROM, USB-HDD, LAN and Disable

Default setting: HDD-0, CDROM, LAN

Boot Up Numlock status

This field is used to activate the Num Lock function upon system boot. If the setting is on, after a boot, the Num Lock light is lit, and user can use the number key.

Available options: On, Off

Default setting: On

Typematic rate Setting

This function specifies the keystroke repeat rate when a key is pressed and held down.

Available options: Disable, Enable

Default setting: Disable

Typematic Rate (Chars/Sec)

Typematic Rate sets the rate at which characters on the screen repeat when a key is pressed and held down.

Available options: 6, 8, 10, 12, 15, 20, 24, or 30 characters per second

Default setting: 6

Typematic Delay (Msec)

The number selected indicates the time period between two identical characters appearing on screen.

Available options: 250,500 750 and 1000

Default setting: 250

Security Option

This field enables password checking every time the computer is powered on or every time the BIOS Setup is executed. If **Always** is chosen, a user password prompt appears every time and the BIOS Setup Program executes and the computer is turned on. If **Setup** is chosen, the password prompt appears if the BIOS executed.

Available options: Setup, Always

Default setting: Setup

Report No FDD for Win95

This option allows Windows 95 to share IRQ6 (assigned to a floppy disk drive) with other peripherals in case the driver does not exist.

Available options: Enable, Disable

Default setting: Disable

Chipset Features Setup

This section describes the configuration of the board's chipset features.

Phoenix - AwardBIOS CMOS Setup Utility
Advanced Chipset Features

SDRAM CAS Latency Time	[3]	<i>Item Help</i>
SDRAM Cycle Time Tras/Trc	[Auto]	
SDRAM RAS# to CAS# Delay	[Auto]	
SDRAM RAS# Precharge	[Auto]	<i>Menu Level ▶</i>
System BIOS Cacheable	[Enabled]	
Video BIOS Cacheable	[Disabled]	
CPU Latency Time	[Enabled]	
AGP Aperture Size (MB)	[64]	
↑↓→←: Move Enter: Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5: Previous Values F6: Fail-Safe Defaults F7:Optimized Defaults		

SDRAM CAS Latency Time

This field specifies the latency for the Synchronous DRAM system memory signals.

Available Options: 2 and 3

Default setting: 3

SDRAM Cycle Time Tras/Trc

This field specifies control the number of DRAM for an access cycles.

Available Options: 5/7, 7/9 and Auto

Default setting: 7/9

SDRAM RAS# to CAS# delay

This field specifies the length of the delay inserted between RAS and CAS signals of the Synchronous DRAM system access cycle when SDRAM is installed.

Available Options: 3, 2 and Auto

Default setting: Auto

DRAM RAS# Precharge Time

This field specifies the length of the RAS pre-charge part of the Synchronous DRAM access cycle when SDRAM is installed.

Available Options: 3, 2 and Auto

Default setting: Auto

System BIOS Cacheable

This field specifies selecting enabled allows caching of the system BIOS ROM at F0000H ~ FFFFFH, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

Available Options: Disabled, Enabled

Default setting: Enabled

Video BIOS Cacheable

This field specifies selecting enabled allows caching of the video BIOS ROM, resulting in better system performance. However, if any program writes to this memory area, a system error may result.

Available Options: Disabled, Enabled

Default setting: Enabled

CPU Latency Timer

This field specifies the chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select Enabled to support compliance with PCI specification version 2.1.

Available Options: Disabled, Enabled

Default setting: Enabled

AGP Graphics Aperture Size (MB)

This field specifies the system memory size that can be used by the Accelerated Graphics Port (AGP).

Available Options: 32MB and 64MB

Default setting: 64 MB

Integrated Peripherals

This section describes the function of peripheral features.

Phoenix – Award CMOS Setup Utility
OnChip IDE Device

OnChip Primary PCI IDE	[Enabled]	<i>Item Help</i>
IDE Primary Master PIO	[Auto]	
IDE Primary Slave PIO	[Auto]	
IDE Primary Master UDMA	[Auto]	<i>Menu Level ▶</i>
IDE Primary Slave UDMA	[Auto]	
OnChip Secondary PCI IDE	[Enabled]	
IDE Secondary Master PIO	[Auto]	
IDE Secondary Slave PIO	[Auto]	
IDE Secondary Master UDMA	[Auto]	
IDE Secondary Slave UDMA	[Auto]	
IDE HDD Block Mode	[Enabled]	
USB Controller	[Enabled]	
USB 2.0 Support	[Enabled]	
USB Keyboard Support	[Disabled]	
AC97 Audio	[Auto]	
Init Display First	[Onboard]	
Onboard LAN Boot ROM	[Disabled]	
Onboard FDC Controller	[Enabled]	
Onboard Serial Port 1	[3F8/IRQ4]	
Onboard Serial Port 2	[2F8/IRQ3]	
Onboard Parallel Port	[378/IRQ7]	
Parallel Port Mode	[SPP]	
EPP Mode Select	EPP1.7	
ECP Mode Use DMA	3	
Serial Port 2 Mode Select	[RS232]	
↑↓→←:Move Enter: Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5: Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults		

❑ OnChip Primary/Secondary PCI IDE

This field specifies the IDE channel that can be applied when using IDE hard disk connector.

Available Options: Disabled, Enable

Default setting: Enable

DE Primary/Secondary Master/Slave PIO

IDE hard drive controllers can support up to two separate hard drives. These drives have a master/slave relationship, which is determined by the cabling configuration used to attach them to the controller. Your system supports one IDE controller – a primary and a secondary – so you have the ability to install up to four separate hard disks.

PIO means Programmed Input/Output. Rather than have the BIOS issue a series of commands to affect a transfer to or from the disk drive, PIO allows the BIOS to tell the controller what it wants and then let the controller and the CPU perform the complete task by them. This is simpler and more efficient (and faster). Your system supports five modes, numbered from 0 to 4, which primarily differ in timing. When Auto is selected, the BIOS will select the best available mode.

IDE Primary/Secondary Master/Slave UMDA

Ultra DMA/33 implementation is possible only if your IDE hard drive supports it and the operating environment includes a DMA driver (Windows 95 OSR2 or a third-party IDE bus master driver). If you hard drive and your system software both support Ultra DMA/33, select Auto to enable This option allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive (HDD).

IDE HDD Block Mode

This option allows your hard disk controller to use the fast block mode to transfer data to and from your hard disk drive (HDD).

USB Controller

Select Enabled if a USB device is installed to the system. If Disabled are selected, the system will not be able to use a USB device.

Available Options: Disabled, Enabled

Default setting: Enabled

USB Device KB Support

Select All Device if a USB device is installed to the system. If Disabled are selected, the system will not be able to use a USB device.

Available Options: Disabled, Mice and All Devices

Default setting: All Devices

AC'97 Audio

This field specifies the internal Audio Control.

Available Options: Disable, Enable

Default setting: Enable

Init Display First

This field specifies which VGA display will be used when the system is boot. You can select either the onboard AGP or the VGA card installed on the PCI bus.

Available Options: Onboard/AGP, PCI Slot

Default setting: Onboard/AGP

Onboard LAN Boot ROM

This field specifies the PXE boot ROM of the onboard LAN chip.

Available Options: Disabled, Enable

Default setting: Disable

OnBoard FDC

This field enables the floppy drive controller on the FB2642.

Available Options: Disabled, Enabled and Auto

Default setting: Auto

OnBoard Serial Port 1

These fields select the I/O port address for each Serial port.

Available Options: Disabled, 3F8H/IRQ4, 2F8H/IRQ3, and 3E8H/IRQ4, 2E8H/IRQ3.

Default setting: 3F8/IRQ4

OnBoard Serial Port 2

These fields select the I/O port address for each Serial port.

Available Options: Disabled, 3F8H/IRQ4, 2F8H/IRQ3, and 3E8H/IRQ4, 2E8H/IRQ3.

Default setting: 2F8/COM2

OnBoard Parallel Port

This field selects the I/O port address for parallel port.

Available Options: Disabled, 378/IRQ7, 278/IRQ5, and 3BC/IRQ7

Default setting: 378/IRQ7

Parallel Port Mode

This field specifies the parallel port mode. ECP and EPP are both bi-directional data transfer schemes that adhere to the IEEE P1284 specifications.

Available Options: Normal, SPP, EPP, ECP and ECP+EPP

Default setting: SPP

EPP Mode Select

This field specifies the EPP version for the Parallel Port Mode specification used in the system and is not configurable. IF Normal or ECP is selected, this field displays N/A, meaning not available.

Available Options: EPP1.7 and EPP1.9

Default setting: EPP1.9

ECP Mode Use DMA

This option is only available if the setting for the parallel Port Mode option is ECP.

Available Options: 1,3

Default setting: 3

Serial Port Mode Select

These fields item can select RS-232, RS-422, and RS-485 of Serial port 2.

Available Options: RS-232, RS-422 and RS-485

Default setting: RS-232

POWER MANAGEMENT

Phoenix - AwardBIOS CMOS Setup Utility
Power Management Setup

ACPI Function	[Disabled]	<i>Item Help</i>
Power Management	[User Define]	
Video Off Method	[DPMS]	
Video Off In Suspend	[Yes]	
Suspend Type	[Stop Grant]	
Suspend Mode	[Disabled]	<i>Menu Level ▶</i>
Soft-Off by PWR-BTTN	Instant-Off	
Resume by Alarm	[Disabled]	
x Date (of Month) Alarm	0	
x Time (hh:mm:ss) Alarm	0 : 0 : 0	
** Reload Global Timer Events **		
Primary IDE 0	[Disabled]	
Primary IDE 1	[Disabled]	
Secondary IDE 0	[Disabled]	
Secondary IDE 1	[Disabled]	
FDD,COM,LPT Port	[Disabled]	
PCI IRQ [A-D]#	[Disabled]	
↑↓→←: Move Enter: Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5: Previous Values F6: Fail-Safe Defaults F7:Optimized Defaults		

ACPI Function

This field specifies allow you enable Advanced Configuration and Power Management. When you use Windows/OS standby mode can set to enable.

Available Options: Disabled, Enabled

Default setting: Enable

Power Management

Select Enabled to activate the chipset Power Management and APM (Advanced Power Management) features.

Available Options: User Define, Min Saving, Max Saving

Default setting: User Define

Video Of Method

When enabled, this feature allows the VGA adapter to operate in a power saving mode.

V/H SYNC + Blank - This selection will cause the system to turn off the vertical and

horizontal synchronization ports and write blanks to the video buffer.
Blank Screen - This option only writes blanks to the video buffer.
DPMS - Select this option if your monitor supports the Display Power Management Signal (DPMS) standard of the Video Electronics Standards to select video power management values.

Available Options: V/H SYNC + Blank, Blank Screen and DPMS

Default setting: DPMS

Suspend Type

This field defines the continuous idle time before the system enters PwrOn Suspend.

Available Options: Stop Grant and PwrOn Suspend

Default setting: Stop Grant

Suspend Mode

This field specifies the When enabled and after the set time of system inactivity, all devices except the CPU will be shut off.

Available Options: Disabled, 1 Minute, 2 Minute, 4 Minute, 12 Minute, 20 Minute, 30 Minute, 40 Minute and 1 Hour

Default setting: Disabled

HDD Power Down

This field specifies the power conserving state that the hard disk drive enters after the specified period of hard drive inactivity has expired.

Available Options: 1,2,3,4,5,6,7,8,9,10,11,12,13,14,15 and Disabled

Default setting: Disabled

Soft-Off By PWR-BTTN

Pressing the power button for more than 4 seconds forces the system to enter the Soft-Off state when the system has "hung". The choices are Delay 4 Sec and Instant-Off.

Available Options: Instant-Off and Delay 4 sec.

Default setting: Instant-Off

Resume By Alarm

This field specifies the RTC alarm to be turned off by extra software.

Available Options: Disabled, Enabled

Default setting: Disabled

Date (Of Month) Alarm

This field specifies the date of the RTC alarm.

Available Options: 1, 31

Default setting: 15

Time (hh:mm:ss) Alarm

This field specifies the hour/ minute/second of the RTC alarm.

Available Options: 1-24/0-60/0-60

Default setting: 00

IDE/FDD/COM/LPT/PCI IRQ [A-D]#

This field specifies the power down mode of the system based on the device. When the system does not receive signals from the device, it will enter the Power Down mode immediately. To enable the power saving mode, select Monitor. To disable it, select Ignore.

PnP/PCI Configurations

Phoenix - AwardBIOS CMOS Setup Utility		
PnP/PCI Configurations		
Reset Configuration Data	[Disabled]	<i>Item Help</i>
Resources Controlled By	[Auto (ESCD)]	<i>Menu Level ▶</i>
X IRQ Resources	Press Enter	
PCI/VGA Palette Snoop	[Disabled]	
		<i>Select Yes if you are using a Plug and Play capable operating system Select No if you need the BIOS to configure non-boot devices</i>
↑↓→←: Move Enter: Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5: Previous Values F6: Fail-Safe Defaults F7:Optimized Defaults		

- ❑ **Reset Configuration Data:** Enable, Disable

If you select Enable to reset Extended System Configuration Data (ESCD) when you exit setup is you have installed a new add-on and the system reconfiguration has caused such a serious conflict that the operation operating system cannot boot.

Available Options: Enable, Disable

Default setting: Disable

- ❑ **Resources Controlled By:** Auto [ESCD], Manual

If you select Auto, all the interrupt request (IRQ), DMA assignment, and Used DMA fields disappear, as the BIOS automatically assigns them. The default value is "Manual " .

Available Options: Auto. , Manual

Default setting: Manual

❑ **X IRQ Resources**

Phoenix – Award CMOS Setup Utility
IRQ Resources

IRQ-3 assigned to	[PCI Device]	<i>Item Help</i>
IRQ-4 assigned to	[PCI Device]	
IRQ-5 assigned to	[PCI Device]	<i>Menu Level ►</i>
IRQ-7 assigned to	[PCI Device]	<i>Legacy ISA for devices</i>
IRQ-9 assigned to	[PCI Device]	<i>compliant with the</i>
IRQ-10 assigned to	[PCI Device]	<i>original PC AT bus</i>
IRQ-11 assigned to	[PCI Device]	<i>specification, PCI/ISA</i>
IRQ-12 assigned to	[PCI Device]	<i>PnP for devices</i>
IRQ-14 assigned to	[PCI Device]	<i>compliant with the Plug</i>
IRQ-15 assigned to	[PCI Device]	<i>and Play standard</i>
		<i>whether designed for</i>
		<i>PCI or ISA bus</i>
		<i>architecture</i>
↑↓→←:Move Enter: Select +/-/PU/PD:Value F10:Save ESC:Exit F1:General Help F5: Previous Values F6:Fail-Safe Defaults F7:Optimized Defaults		

❑ **IRQ-n Assigned: PCI Device and Reserved**

You may assign each system interrupt a type, depending on the type of device using the interrupt.

❑ **PCI/VGA Palette Snoop**

When Enabled is selected, multiple VGA devices operating on different buses can handle data from the CPU on each set of palette registers on every video device. Bit 5 of the command register in the PCI device configuration space is the VGA Palette Snoop bit. (0 is disabled).

Available Options:

Disabled: Data read and written by the CPU is only directed to the PCI VGA devices palette registers.

Enabled: Data read and written by the CPU is directed to both the PCI VGA devices palette registers.

PC Health Status

On the Hardware Monitor Setup screen, you can monitor the system temperature, CPU voltage, and CPU fan speed...

Phoenix - AwardBIOS CMOS Setup Utility
PC Health Status

Shut Down Temperature	[Disabled]	Item Help
CPU	1.08V	Menu Level ►
VTT	1.24V	
VCC18	1.79V	
VCC25	2.48V	
VCC 3	3.29V	
VCC	4.95V	
+12	12.03V	
-12	12.03V	
Voltage Battery	3.04V	
Current SYS Temp	47°C.	
Current CPU Temp	47°C.	
Fan 1 Speed	0 RPM	

↑↓→←: Move Enter: Select +/-/PU/PD:Value F10:Save ESC:Exit
F1:General Help F5: Previous Values F6: Fail-Safe Defaults
F7:Optimized Defaults

❑ **Shut Down Temperature**

This field allow you can setup CPU shutdown Temperature, this function only effective support WIN98 ACPI mode.

❑ **PC Health Status**

In this field, you can monitor or detect the followings items. These items are view-only and cannot be changed.

- CPU
- VTT
- VCC18.
- VCC25
- VCC3
- +12V
- - 12V
- Voltage Battery
- Current SYS Temp
- Current CPU Temp

Password Setup

There are two security passwords: Supervisor and User. Supervisor is a privileged person that can change the User password from the BIOS.

According to the default setting, both access passwords are not set up and are only valid after you set the password from the BIOS.

To set the password, please complete the following steps.

1. Select **Change Supervisor Password**.
2. Type the desired password (up to 8 character length) when you see the message, "Enter New Supervisor Password."
3. Then you can go on to set a user password (up to 8 character length) if required. Note that you cannot configure the User password until the Supervisor password is set up.
4. Enter Advanced BIOS Features screen and point to the Security Option field.
5. Select System or Setup.
 - ✧ **System:** a visitor who attempts to enter BIOS or operating system will be prompted for password.
 - ✧ **Setup:** a visitor who attempts to the operating system will be prompted for user password. You can enter either User password or Supervisor password.
6. Point to **Save Settings and Exit** and press Enter.
7. Press Y when you see the message, "Save Current Settings and Exit (Y/N)?"

Note: it is suggested that you write down the password in a safe place to avoid that password may be forgotten or missing.

Chapter 4 Driver and Utility

The enclosed diskette includes FB2645 System, VGA, Audio and LAN driver.

System Driver

WIN 98/2000/XP Driver

Installs I815e Chipset, IRQ Routing, AGP Driver and PCI IDE Bus Master Driver.

- Step 1: To install the I815 driver, insert the CD ROM into the CD ROM device, and enter DRIVER>SysChip>I815E.
- Step 2: Execute Infinst_enu.exe file.
- Step 3: The screen shows the SETUP type. Press any key to enter the main menu.
- Step 4: As the setup is completed, the system will generate the message as follows.

Yes, I want to restart my computer now. Installation is done!

No, I will restart my computer later.

System must be restart then complete the installation.

Note: In the Syschip>I815e directory, a Readme.txt file is included to provide installation information.

VGA Driver for WIN98/WIN95

Step 1: To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>VGA>I815e>WIN98.

Step 2: Execute WIN9Xe67.exe file.

Step 3: The screen shows the SETUP type. Press any key to enter the main menu.

Step 4: As the setup is completed, the system will generate the message as follows.

Yes, I want to restart my computer now. Installation is done!

No, I will restart my computer later.

System must be restart then complete the installation.

Step 5: In the WINDOWS98/ME, you can find the <DISPLAYL> icon located in the {CONTROL PANEL} group.

Step 6: Adjust the <Refresh Rate>, and <Resolution>.

Note: In the VGA>INTEL>I815e NT4.0, 2000 or XP directory, a Readme.txt file is included to provide installation information or Visit to <http://developer.intel.com/design/software/drivers/platform/inf.htm>

Audio Drivers

WIN 98/2000/XP Driver

- Step 1: To install the AUDIO driver, insert the CD ROM into the CD ROM device, and enter DRIVER>AUDIO>I815E>WIN9X_2K_XP.
- Step 2: Execute SETUP.exe file.
- Step 3: The screen shows the SETUP type. Press any key to enter the main menu.
- Step 4: As the setup is completed, the system will generate the message as follows.

Yes, I want to restart my computer now. Installation is done!

No, I will restart my computer later.

System must be restart then complete the installation.

FB2645 LAN Utility

- Step 1: To install the LAN utility OR driver, insert the CD ROM into the CD ROM device, and enter DRIVER>LAN>RTL8139C>DIAG.
- Step 2 Execute install.exe file.

Note: In the RTL8139C directory, a HELPME.EXE file is included to provide installation information

FB2645A LAN Utility

- Step 1: To install the LAN utility OR driver, insert the CD ROM into the CD ROM device, and enter DRIVER>LAN>RTL8110S>DIAG.
- Step 2: Execute install2KXP.exe or install98se.exe file.

Note: In the RTL8110S directory, a README.TXT is included to provide installation information

BIOS Flash Utility

In the <UTILITY> directory, there is the FLASH845.EXE file.

Step 1: Use the FLASH845.EXE program to update the BIOS setting.

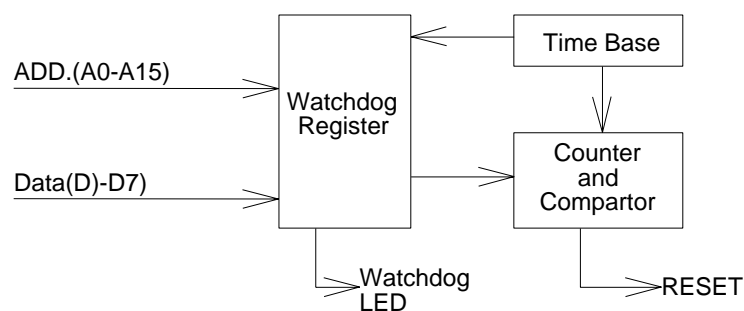
Step 2: And then refer to the chapter "BIOS Setup", as the steps to modify BIOS.

Step 3: Now the CPU board's BIOS loaded with is the newest program; user can use it to modify BIOS function in the future, when the BIOS add some functions.

Watchdog Timer

This section describes how to use the Watchdog Timer, including disabled, enabled, and trigger functions.

The FB2645 is equipped with a programmable time-out period watchdog timer. You can use your own program to enable the watchdog timer. Once you have enabled the watchdog timer, the program should trigger the I/O every time before the timer times out. If your program fails to trigger or disable this timer before it times out, e.g. because of a system hang-up, it will generate a reset signal to reset the system. The time-out period can be programmed to be set from 1 to 255 seconds or minutes.



The CD-ROM includes a Watch Dog demo file. In the file, there are 3 execution programs written in different forms. The sub-directories of the file are:

1. WATCHDOG/ASSEMBLE: Library and Test Program written in Assembly Language
2. WATCHDOG/TURBOC: Library and Test Program written in Turbo C++

The WATCHDOG includes a demonstration program established for users who would like to configure the Watchdog timer by themselves.

Note: In the WATCHDOG>ITE8712 directory, README.TXT file is included to provide demo program information.

Watchdog Timer Setting

The watchdog timer is a circuit that may be used from your program software to detect system crashes or hang-ups. The watchdog timer is automatically disabled after reset.

Once you have enabled the watchdog timer, your program must trigger the watchdog timer every time before it times out. After you trigger the watchdog timer, it will be set to non-zero value to watchdog counter and start to count down again. If your program fails to trigger the watchdog timer before time-out, it will generate a reset pulse to reset the system.

The factor of the watchdog timer time-out constant is approximately 1 seconds. The period for the watchdog timer time-out is between 1 to FF timer factors.

If you want to reset your system when watchdog times out, the following table listed the relation of timer factors between time-out periods.

Time Factor	Time-Out Period (Seconds)	Time-Out Period (Minutes)
1	1	1
2	2	2
3	3	3
4	4	4
5	5	5
"	"	"
"	"	"
"	"	"
FF	FF	FF

Watchdog Timer Enable & Trigger

After you enable the watchdog timer, your program must write the same factor as enabling to the watchdog register at least once every time-out period to its previous setting. You can change the time-out period by writing another timer factor to the watchdog register at any time, and you must trigger the watchdog before the new time-out period in the next trigger. Below is a Turbo C++ program, which demonstrates how to trigger the watchdog timer:

```
#include "stdio.H"
#include "WDLIB.H"

main()
{
char WD_TIME=0x6;

InitWD(equWdUnitS);
printf (" Enable watchdog");
//Trigger watchdog Timer Output is 6 seconds
EnWD(WD_TIME);
}
```

Watchdog Timer Disabled

To disable the watchdog timer, simply write DisWD() function.

```
#include "stdio.H"
#include "WDLIB.H"

main()
{
InitWD(equWdUnitS);
printf ("Disable Watch Dog");
//Disable watch dog
DisWD();
}
```

Programming RS-485

The majority communicative operation of the RS-485 is in the same of the RS-232. When the RS-485 precedes the transmission, which needs control the TXC signal, and the installing, steps are as follows:

Step 1: Enable TXC

Step 2: Send out data

Step 3: Waiting for data empty

Step 4: Disable TXC

Note: Please refer to the section of the "Serial Ports" in the Chapter "Technical Reference" for the detail description of the COM port's register.

□ **Initialize COM port**

Step 1: Initialize COM port in the receiver interrupt mode, and /or transmitter interrupt mode. (All of the communication protocol buses of the RS-485 are in the same.)

Step 2: Disable TXC (transmitter control), the bit 0 of the address of offset+4 just sets "0".

NOTE: Control the FB2645 CPU card's DTR signal to the RS-485 's TXC communication.

□ **Send out one character (Transmit)**

Step 1: Enable TXC signal, and the bit 0 of the address of offset+4 just sets "1".

Step 2: Send out the data. (Write this character to the offset+0 of the current COM port address)

Step 3: Wait for the buffer's data empty. Check transmitter holding register (THRE, bit 5 of the address of offset+5), and transmitter shift register (TSRE, bit 6 of the address of offset+5) are all sets must be "0".

Step 4: Disabled TXC signal, and the bit 0 of the address of offset+4 sets "0"

□ **Send out one block data (Transmit – the data more than two characters)**

Step 1: Enable TXC signal, and the bit 0 of the address of offset+4 just sets "1".

Step 2: Send out the data. (Write all data to the offset+0 of the current COM port address)

Step 3: Wait for the buffer's data empty. Check transmitter holding register (THRE, bit 5 of the address of offset+5), and transmitter shift register (TSRE, bit 6 of the address of offset+5) are all sets must be "0".

Step 4: Disabled TXC signal, and the bit 0 of the address of offset+4 sets "0"

❑ **Receive data**

The RS-485's operation of receiving data is in the same of the RS-232's.

❑ **Basic Language Example**

a. Initial 86C450 UART

```

10      OPEN "COM1:9600,m,8,1" AS #1 LEN=1
20      REM Reset DTR
30      OUT &H3FC, (INP(%H3FC) AND &HFA)
40      RETURN
    
```

b. Send out one character to COM1

```

10      REM Enable transmitter by setting DTR ON
20      OUT &H3FC, (INP(&H3FC) OR &H01)
30      REM Send out one character
40      PRINT #1, OUTCHR$
50      REM Check transmitter holding register and shift register
60      IF ((INP(&H3FD) AND &H60) >0) THEN 60
70      REM Disable transmitter by resetting DTR
80      OUT &H3FC, (INP(&H3FC) AND &HEF)
90      RETURN
    
```

c. Receive one character from COM1

```

10      REM Check COM1: receiver buffer
20      IF LOF(1)<256 THEN 70
30      REM Receiver buffer is empty
40      INPSTR$"
    
```

```
50      RETURN
60      REM Read one character from COM1: buffer
70      INPSTR$=INPUT$(1,#1)
80      RETURN
```

NOTE: The example of the above program is based on COM1 (I/O Address 3F8h).
The RS-422/RS-485 of the FB2645 uses COM2. If you want to program it, please refer to the BIOS Setup for COM2 address setup.

Chapter 5 Technical Reference

This section outlines the errors that may occur when you operate the system, and also gives you the suggestions on solving the problems.

Topic include:

- Trouble Shooting for Error Messages
- Technical Reference

Trouble Shooting for Error Messages

The following information informs the error messages and troubleshooting. Please adjust your systems according to the messages below. Make sure all the components and connectors are in proper position and firmly attached. If the errors still exist, please contact with your distributor for maintenance.

❑ POST BEEP

Currently there are two kinds of beep codes in BIOS setup.

- One indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information. This beep code consists of a single long beep followed by three short beeps.
- The other indicates that an error has occurred in your DRAM. This beep code consists of a constant single long beep.

❑ CMOS BATTERY FAILURE

When the CMOS battery is out of work or has run out, the user has to replace it with a new battery.

❑ **CMOS CHECKSUM ERROR**

This error informs that the CMOS has corrupted. When the battery runs weak, this situation might happen. Please check the battery and change a new one when necessary.

❑ **DISPLAY SWITCH IS SET INCORRECTLY**

Display switch on the motherboard can be set to either monochrome or color. This indicates the switch is set to a different setting than indicated in BIOS Setup. Determine which setting is correct, and then either turn off the system and change the jumper, or enter BIOS Setup and change the video selection.

❑ **DISK BOOT FAILURE**

When you can't find the boot device, insert a system disk into Drive A and press < Enter >. Make sure both the controller and cables are all in proper positions, and also make sure the disk is formatted. Then reboot the system.

❑ **DISKETTE DRIVES OR TYPES MISMATCH ERROR**

When the diskette drive type is different from CMOS, please run setup or configure the drive again.

❑ **ERROR ENCOUNTERED INITIALIZING HARD DRIVE**

When you can't initialize the hard drive, ensure the following things:

1. The adapter is installed correctly
2. All cables are correctly and firmly attached
3. The correct hard drive type is selected in BIOS Setup

❑ **ERROR INITIALIZING HARD DISK CONTROLLER**

When this error occurs, ensure the following things:

1. The cord is exactly installed in the bus.
2. The correct hard drive type is selected in BIOS Setup
3. Whether all of the jumpers are set correctly in the hard drive

❑ **FLOPPY DISK CONTROLLER ERROR OR NO CONTROLLER PRESENT**

When you cannot find or initialize the floppy drive controller, please ensure the controller is in proper BIOS Setup. If there is no floppy drive installed, ensure the Diskette Drive selection in Setup is set to NONE.

❑ **KEYBOARD ERROR OR NO KEYBOARD PRESENT**

When this situation happens, please check keyboard attachment and no keys being pressed during the boot. If you are purposely configuring the system without a keyboard, set the error halt condition in BIOS Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot procedure.

❑ **MEMORY ADDRESS ERROR**

When the memory address indicates error. You can use this location along with the memory map for your system to find and replace the bad memory chips.

❑ **MEMORY SIZE HAS CHANGED**

Memory has been added or removed since last boot. In EISA mode, use Configuration Utility to re-configure the memory configuration. In ISA mode enter BIOS Setup and enter the new memory size in the memory fields.

❑ **MEMORY VERIFYING ERROR**

It indicates an error verifying a value is already written to memory. Use the location along with your system's memory map to locate the bad chip.

❑ **OFFENDING ADDRESS MISSING**

This message is used in connection with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

❑ **REBOOT ERROR**

When this error occurs that requires you to reboot. Press any key and the system will reboot.

❑ **SYSTEM HALTED**

Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.

Technical Reference

Real-Time Clock and Non-Volatile RAM

The FB2645 contains a real-time clock compartment that maintains the date and time in addition to storing configuration information about the computer system. It contains 14 bytes of clock and control registers and 114 bytes of general purpose RAM.

Because of the use of CMOS technology, it consumes very little power and can be maintained for long periods of time using an internal Lithium battery. The contents of each byte in the CMOS RAM are listed below:

Address	Description
00	Seconds
01	Second alarm
02	Minutes
03	Minute alarm
04	Hours
05	Hour alarm
06	Day of week
07	Date of month
08	Month
09	Year
0A	Status register A
0B	Status register B
0C	Status register C
0D	Status register D
0E	Diagnostic status byte
0F	Shutdown status byte
10	Diskette drive type byte, drive A and B
11	Fixed disk type byte, drive C
12	Fixed disk type byte, drive D
13	Reserved
14	Equipment byte
15	Low base memory byte
16	High base memory byte

Address	Description
17	Low expansion memory byte
18	High expansion memory byte
19-2D	Reserved
2E-2F	2-byte CMOS checksum
30	Low actual expansion memory byte
31	High actual expansion memory byte
32	Date century byte
33	Information flags (set during power on)
34-7F	Reserved for system BIOS

CMOS RAM Map

Register	Description
00h -10h	Standard AT-compatible RTC and Status and Status Register data definitions
11h – 13h	Varies
14h	<p>Equipment</p> <p>Bits 7-6 Number of Floppy Drives</p> <p>00 1 Drive</p> <p>01 2 Drives</p> <p>Bits 5-4 Monitor Type</p> <p>00 Not CGA or MDA 01 40x25 CGA</p> <p>01 2 Drives 80x25 CGA</p> <p>Bits 3 Display Enabled</p> <p>0 Disabled</p> <p>1 Enabled</p> <p>Bit 2 Keyboard Enabled</p> <p>00 Not CGA or MDA 01 40x25 CGA</p> <p>01 2 Drives 80x25 CGA</p> <p>Bit 1 Math Coprocessor Installed</p> <p>0 Absent</p> <p>1 Present</p> <p>Bit 0 Floppy Drive Installed</p> <p>0 Disabled</p> <p>1 Enabled</p>
15h	Base Memory (in 1KB increments), Low Byte
16h	Base Memory (in 1KB increments), High Byte
17h	IBM-compatible memory (in 1KB increments), Low Byte
18h	IBM-compatible memory (in 1KB increments), High Byte (max 15 MB)
19h-2Dh	Varies
2Eh	Standard CMOS RAM checksum, high byte
2Fh	Standard CMOS RAM checksum, low byte
30h	IBM-compatible Extended Memory, Low Byte (POST) in KB
31h	IBM-compatible Extended Memory, High Byte (POST) in KB
32h	Century Byte
33h	Reserved. Do not use
34h	Reserved. Do not use
35h	Low byte of extended memory (POST) in 64 KB
36h	High byte of extended memory (POST) in 64 KB
37h-3Dh	Varies
3Eh	Extended CMOS Checksum, Low Byte (including 34h-3Dh)
3Fh	Extended CMOS Checksum, High Byte (including 34h-3Dh)

I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses, which also becomes the identity of the device. There is a total of 1K-port address space available. The following table lists the I/O port addresses used on the Industrial CPU Card.

Address	Device Description
000h - 00Fh	DMA Controller #1
020h - 021h	Interrupt Controller #1
040h - 043h	Timer
060h - 064h	Keyboard Controller
070h - 071h	Real Time Clock, NMI
080h - 09Fh	DMA Page Register
0A0h - 0A1h	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	IDE Interface
278 - 27F	Parallel Port #2(LPT2)
2F8h - 2FFh	Serial Port #2(COM2)
378h - 3FFh	Parallel Port #1(LPT1)
360 - 36F	Network Ports
3B0 - 3BF	Monochrome & Printer adapter
3C0 - 3CF	EGA adapter
3D0 - 3DF	CGA adapter
3F0h - 3F7h	Floppy Disk Controller
3F8h - 3FFh	Serial Port #1(COM1)
540h-54Eh	SMBUS Controller
C000h-CFFFh	PCI-PCI Bridge
DF00h-DFEEh	USB Controller
FF00h-FF0Eh	IDE Controller

Interrupt Request Lines (IRQ)

There are a total of 15 IRQ lines available on the Industrial CPU Card. Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on the Industrial CPU Card.

Level	Function
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ2	Interrupt Cascade
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	Ethernet
IRQ6	Floppy Disk Controller
IRQ7	Parallel Port #1
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	SMBus
IRQ11	USB
IRQ12	PS2 Mouse
IRQ13	Math coprocessor
IRQ14	Primary IDE
IRQ15	Secondary IDE

DMA Channel Map

The equivalent of two 8237A DMA controllers are implemented in the FB2650 board. Each controller is a four-channel DMA device that will generate the memory addresses and control signals necessary to transfer information directly between a peripheral device and memory. This allows high speeding information transfer with less CPU intervention. The two DMA controllers are internally cascaded to provide four DMA channels for transfers to 8-bit peripherals (DMA1) and three channels for transfers to 16-bit peripherals (DMA2). DMA2 channel 0 provides the cascade interconnection between the two DMA devices, thereby maintaining IBM PC/AT compatibility.

The following is the system information of DMA channels:

DMA Controller 1	DMA Controller 2
Channel 0: Spare	Channel 4: Cascade for controller 1
Channel 1: Reserved for IBM SDLC	Channel 5: Spare
Channel 2: Diskette adapter	Channel 6: Spare
Channel 3: Spare	Channel 7: Spare

Serial Ports

The ACEs (Asynchronous Communication Elements ACE1 to ACE2) are used to convert parallel data to a serial format on the transmit side and convert serial data to parallel on the receiver side. The serial format, in order of transmission and reception, is a start bit, followed by five to eight data bits, a parity bit (if programmed) and one, one and half (five-bit format only) or two stop bits. The ACEs are capable of handling divisors of 1 to 65535, and produce a 16x clock for driving the internal transmitter logic.

Provisions are also included to use this 16x clock to drive the receiver logic. Also included in the ACE a completed MODEM control capability, and a processor interrupt system that may be software tailored to the computing time required to handle the communications link.

The following table is a summary of each ACE accessible register

DLAB	Port Address	Register
0	Base + 0	Receiver buffer (read)
		Transmitter holding register (write)
0	Base + 1	Interrupt enable
X	Base + 2	Interrupt identification (read only)
X	Base + 3	Line control
X	Base + 4	MODEM control
X	Base + 5	Line status
X	Base + 6	MODEM status
X	Base + 7	Scratched register
1	Base + 0	Divisor latch (least significant byte)
1	Base + 1	Divisor latch (most significant byte)

❑ **Receiver Buffer Register (RBR)**

Bit 0-7: Received data byte (Read Only)

❑ **Transmitter Holding Register (THR)**

Bit 0-7: Transmitter holding data byte (Write Only)

❑ **Interrupt Enable Register (IER)**

Bit 0: Enable Received Data Available Interrupt (ERBFI)

Bit 1: Enable Transmitter Holding Empty Interrupt (ETBEI)

Bit 2: Enable Receiver Line Status Interrupt (ELSI)

Bit 3: Enable MODEM Status Interrupt (EDSSI)

Bit 4: Must be 0

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

□ **Interrupt Identification Register (IIR)**

Bit 0: "0" if Interrupt Pending

Bit 1: Interrupt ID Bit 0

Bit 2: Interrupt ID Bit 1

Bit 3: Must be 0

Bit 4: Must be 0

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

□ **Line Control Register (LCR)**

Bit 0: Word Length Select Bit 0 (WLS0)

Bit 1: Word Length Select Bit 1 (WLS1)

WLS1	WLS0	Word Length
0	0	5 Bits
0	1	6 Bits
1	0	7 Bits
1	1	8 Bits

Bit 2: Number of Stop Bit (STB)

Bit 3: Parity Enable (PEN)

Bit 4: Even Parity Select (EPS)

Bit 5: Stick Parity

Bit 6: Set Break

Bit 7: Divisor Latch Access Bit (DLAB)

□ **MODEM Control Register (MCR)**

Bit 0: Data Terminal Ready (DTR)

Bit 1: Request to Send (RTS)

Bit 2: Out 1 (OUT 1)

Bit 3: Out 2 (OUT 2)

Bit 4: Loop

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

□ **Line Status Register (LSR)**

Bit 0: Data Ready (DR)

Bit 1: Overrun Error (OR)

Bit 2: Parity Error (PE)

Bit 3: Framing Error (FE)

Bit 4: Break Interrupt (BI)

Bit 5: Transmitter Holding Register Empty (THRE)

Bit 6: Transmitter Shift Register Empty (TSRE)

Bit 7: Must be 0

□ **MODEM Status Register (MSR)**

Bit 0: Delta Clear to Send (DCTS)

Bit 1: Delta Data Set Ready (DDSR)

Bit 2: Training Edge Ring Indicator (TERI)

Bit 3: Delta Receive Line Signal Detect (DSLSD)

Bit 4: Clear to Send (CTS)

Bit 5: Data Set Ready (DSR)

Bit 6: Ring Indicator (RI)

Bit 7: Received Line Signal Detect (RSLD)

□ **Divisor Latch (LS, MS)**

	LS	MS
Bit 0:	Bit 0	Bit 8
Bit 1:	Bit 1	Bit 9
Bit 2:	Bit 2	Bit 10
Bit 3:	Bit 3	Bit 11
Bit 4:	Bit 4	Bit 12
Bit 5:	Bit 5	Bit 13
Bit 6:	Bit 6	Bit 14
Bit 7:	Bit 7	Bit 15

Desired Baud Rate	Divisor Used to Generate 16x Clock
300	384
600	192
1200	96
1800	64
2400	48
3600	32
4800	24
9600	12
14400	8
19200	6
28800	4
38400	3
57600	2
115200	1

Parallel Ports

□ Register Address

Port Address	Read/Write	Register
Base + 0	Write	Output data
Base + 0	Read	Input data
Base + 1	Read	Printer status buffer
Base + 2	Write	Printer control latch

□ Printer Interface Logic

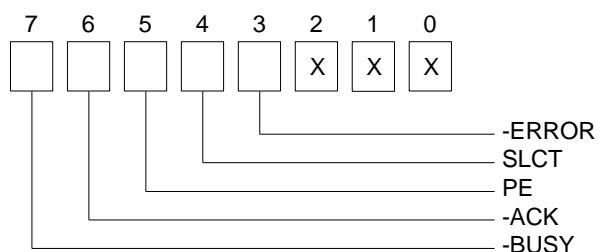
The parallel portion of the SMC37C669 makes the attachment of various devices that accept eight bits of parallel data at standard TTL level.

□ Data Swapper

The system microprocessor can read the contents of the printer's Data Latch through the Data Swapper by reading the Data Swapper address

□ Printer Status Buffer

The system microprocessor can read the printer status by reading the address of the Printer Status Buffer. The bit definitions are described below:

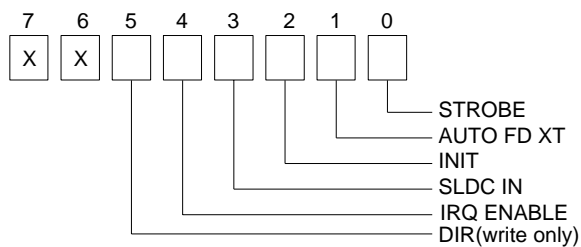


NOTE: X represents not used.

- Bit 7: This signal may become active during data entry, when the printer is off-line during printing, or when the print head is changing position or in an error state. When Bit 7 is active, the printer is busy and cannot accept data.
- Bit 6: This bit represents the current state of the printer's ACK signal. A 0 means the printer has received the character and is ready to accept another. Normally, this signal will be active for approximately 5 microseconds before receiving a BUSY message stops.
- Bit 5: A 1 means the printer has detected the end of the paper.
- Bit 4: A 1 means the printer is selected.
- Bit 3: A 0 means the printer has encountered an error condition.

□ **Printer Control Latch & Printer Control Swapper**

The system microprocessor can read the contents of the printer control latch by reading the address of printer control swapper. Bit definitions are as follows:

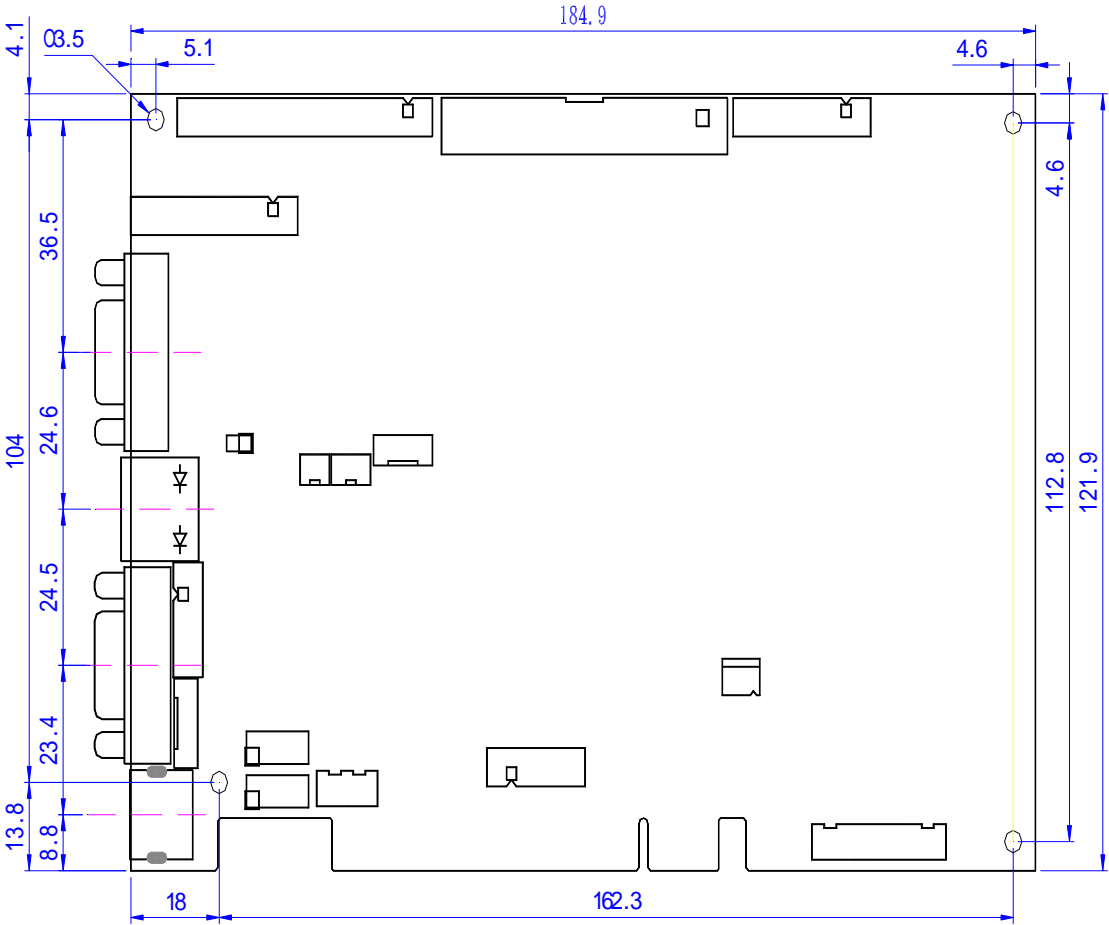


NOTE: X represents not used.

- Bit 5: Direction control bit. When logic 1, the output buffers in the parallel port are disabled allowing data driven from external sources to be read; when logic 0, they work as a printer port. This bit is write-only.
- Bit 4: A 1 in this position allows an interrupt to occur when ACK changes from low state to high state.
- Bit 3: A 1 in this bit position selects the printer.
- Bit 2: A 0 starts the printer (50 microseconds pulse, minimum).
- Bit 1: A 1 causes the printer to line-feed after a line is printed.
- Bit 0: A 0.5 microsecond minimum highly active pulse clocks data into the printer. Valid data must be present for a minimum of 0.5 microseconds before and after the strobe pulse.

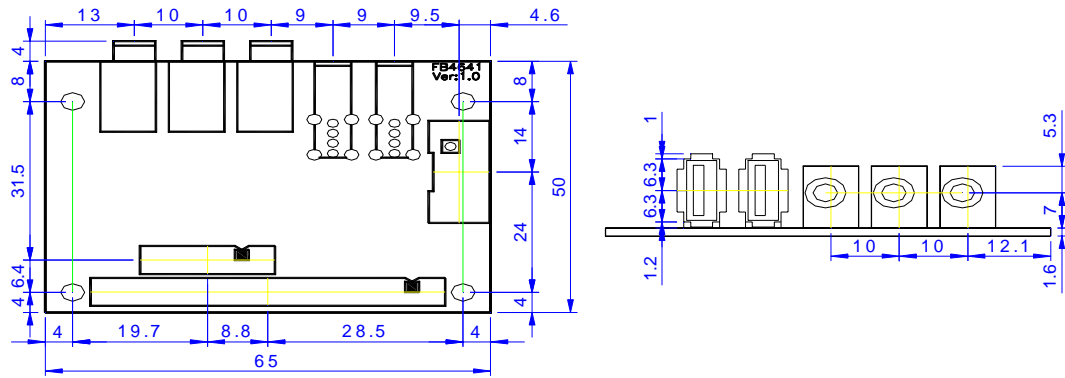
Appendix

Dimension



Unit: mm

FB4641



Unit: mm