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

FEB 2005
Version: 1.0
Part Number: FB2645

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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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If your board requires servicing, contact the dealer from whom you purchased the product for service information. You can help assure efficient servicing of your product by following these guidelines:

- ❑ 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 384MB, 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.

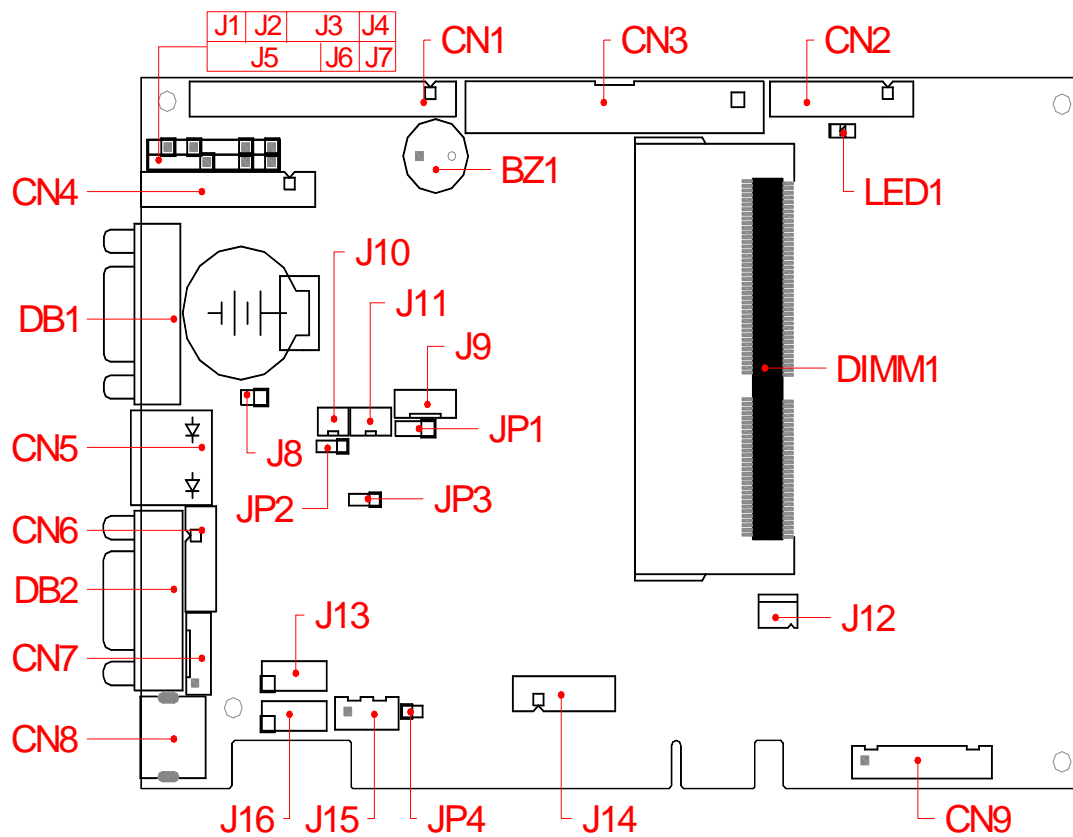
Power management is also featured to lower the rate of consumption. The unit supports doze mode, <Suspend Mode> and <Standby mode> as well as it adheres to the "Green Function" standard.

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/384MB	
VGA CRT/LCD	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 to 384MB 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 carton 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 3-page hard copy of Quick Installation Guide

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.

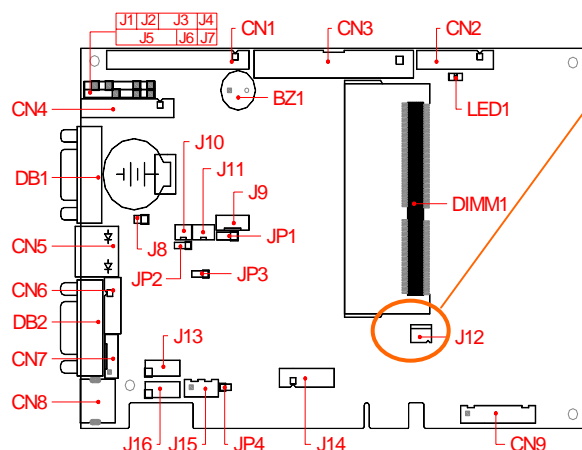
1. Before removing the board from its anti-static bag, wear an anti-static strap to prevent the generation of Electricity Static Discharge (ESD). The ESD may be created from human body that touches the board. It may do damage to the board circuit.
2. Install or unplug any connector, module, or add-on 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

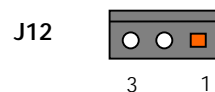
The following lists the connectors and jumpers to install the FB2645.

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 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	2-pin for external battery backup CMOS
J11	3-pin RS232C touch screen header for serial port 2
J12	3-pin for case/CPU cooling fan
J13	USB #1 connector
J14	External Bus for Piggyback place with audio
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
LED1	Power/Watchdog LED indicator

□ J12: CPU or System Fan Connector



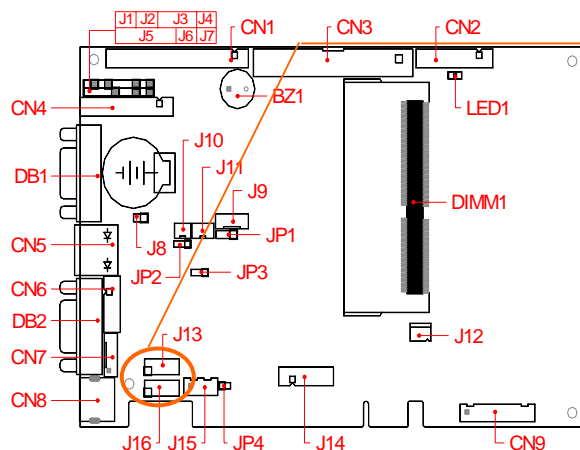
For CPU or System cooling fan



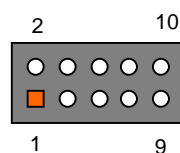
J12	Description
1	Ground
2	+12V
3	Speed-In

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

J13 and J16 are 10-pin connectors. Use included adapter cable for transferring to standard ports USB connector.



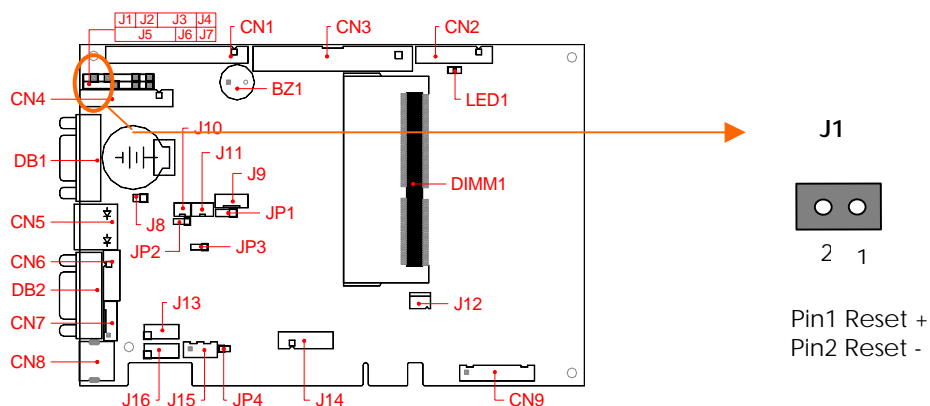
J13 & J16



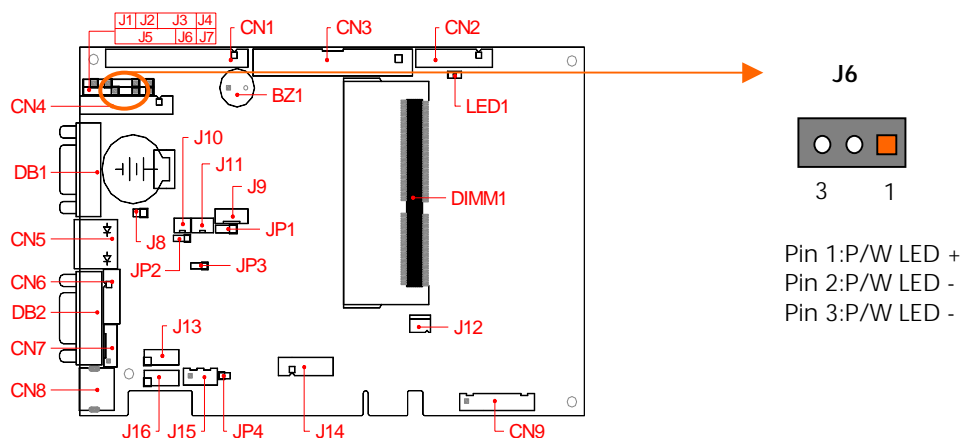
J13&J16	Signal	J13&J16	Signal
1	USBV0 (2)	2	Case Ground
3	USBG0 (2)-	4	USBG1 (3)
5	USBG0 (2)+	6	USBG1 (3)+
7	USBG0 (2)	8	USBG1 (3)-
9	Case Ground	10	USBV1 (3)

□ J1: Reset Header

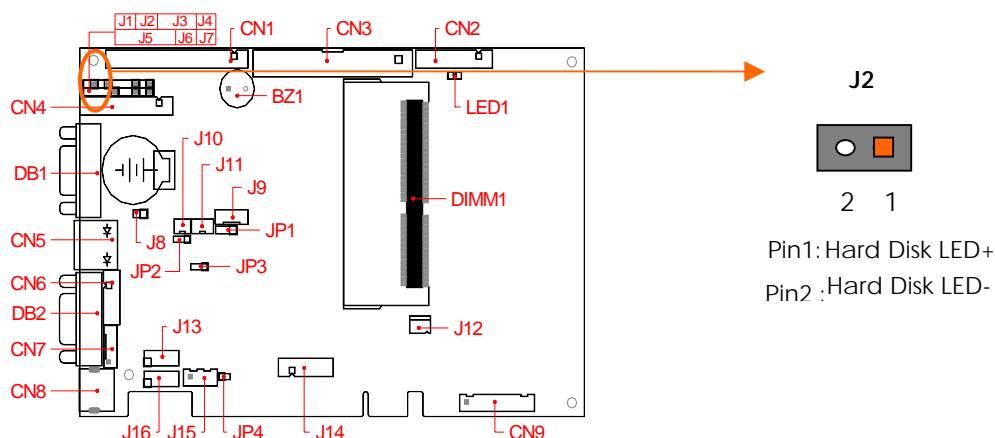
J1 is a 2-pin header for connecting to system reset bottom. Short-circuit these 2 pins to hardware reset FB2645 as well as restart system. It is similar to power off the system and then power it on again.



□ J6: External Power/Watchdog LED Header

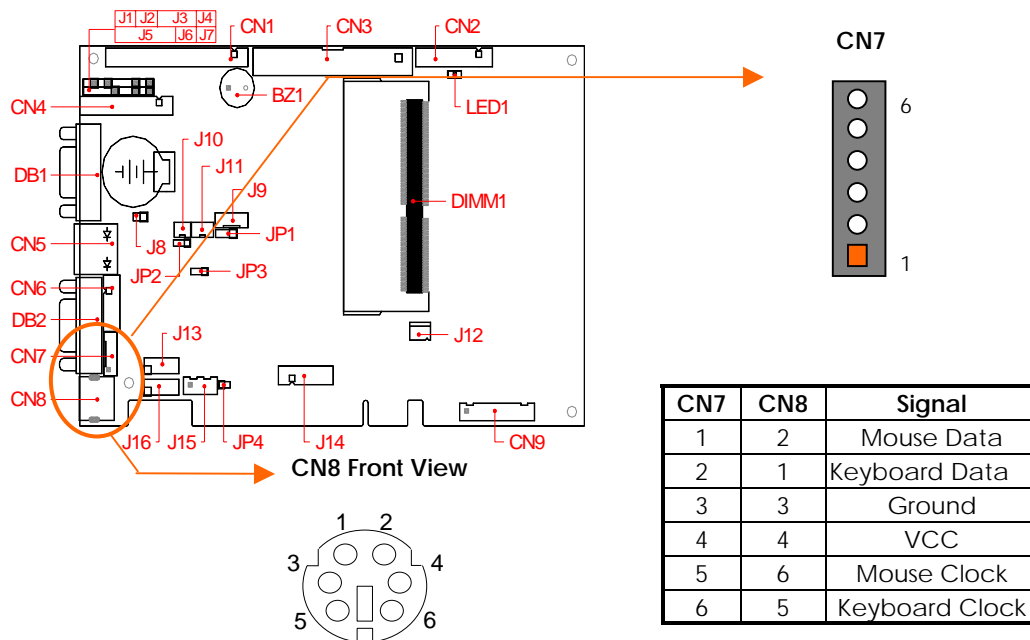


□ J2: HDD LED Header



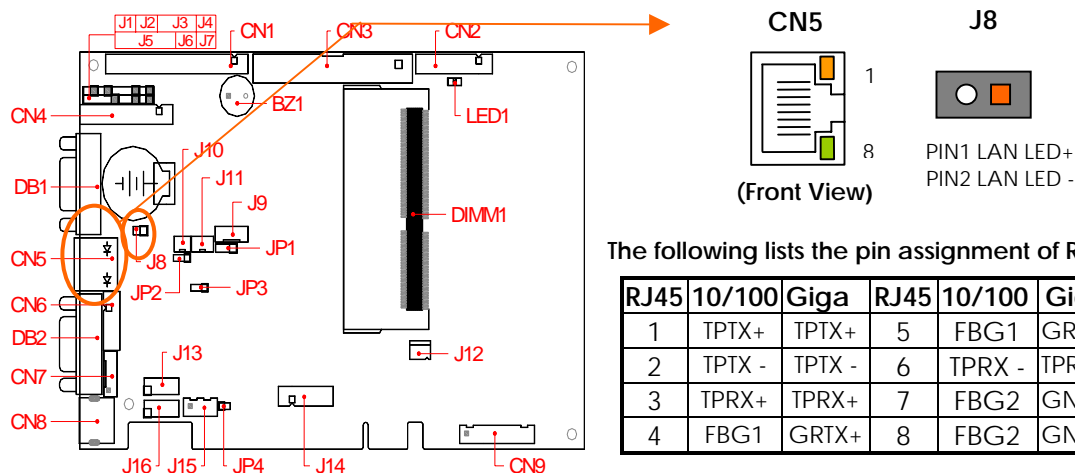
□ CN7, CN8: Keyboard/Mouse Connector

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.



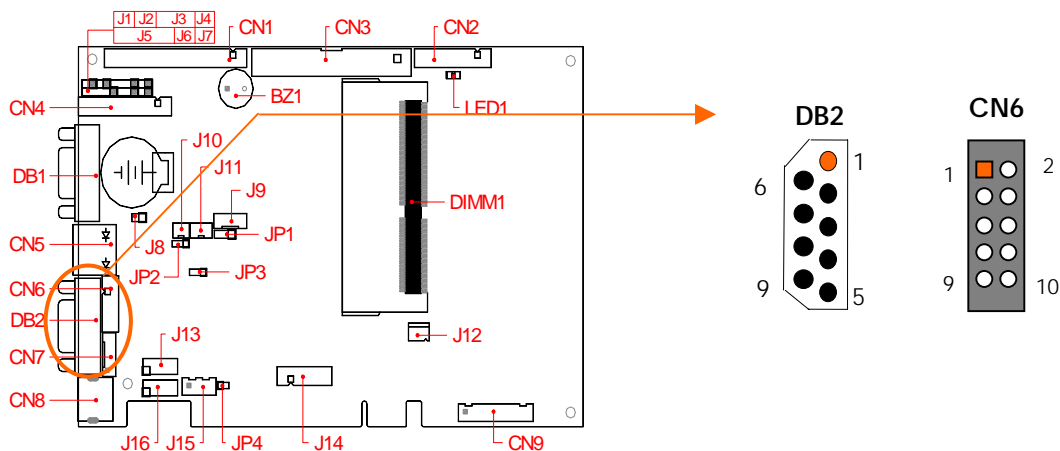
□ CN5 & J8: RJ45 LAN Connector

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:



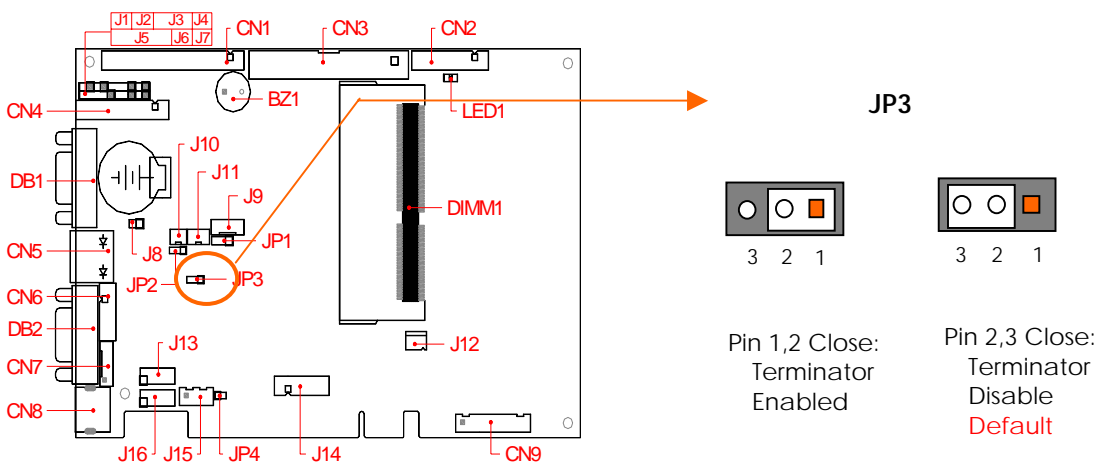
□ DB2 & CN6: RS232 Serial Ports 1,2 Connectors and Jumpers

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.



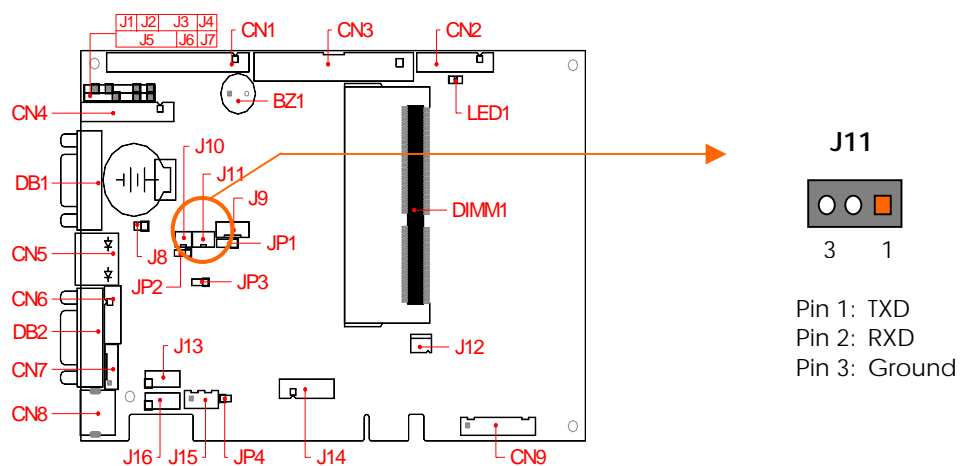
Factory Preset: RS232

*Note: Changing the setting in BIOS setup program

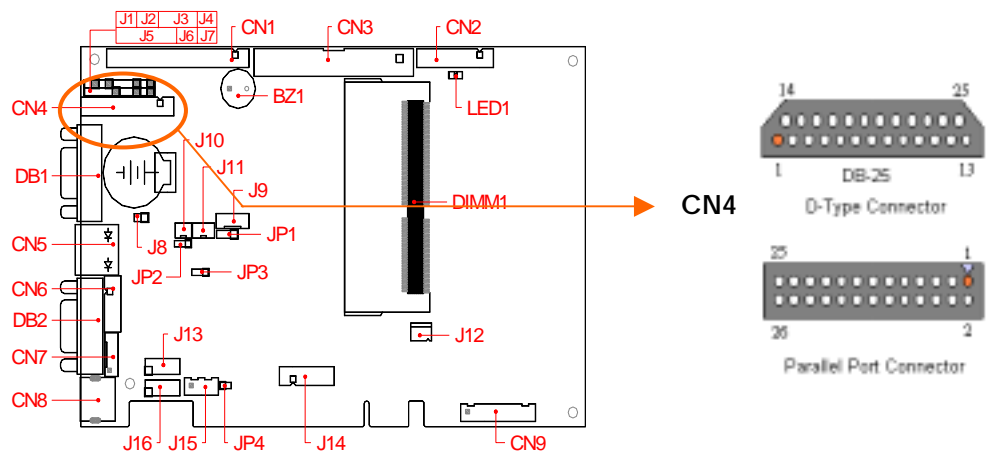
CN6	Signal	RS422	RS485	DB9
1	-DCD2			1
2	-DSR2			6
3	RXD2	RX-	485-	2
4	-RTS2	TX-		7
5	TXD2	RX+	485+	3
6	-CTS2	TX+		8
7	-DTR2			4
8	-RI2			9
9	GROUND			5
10	CASE GROUND			

□ 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.



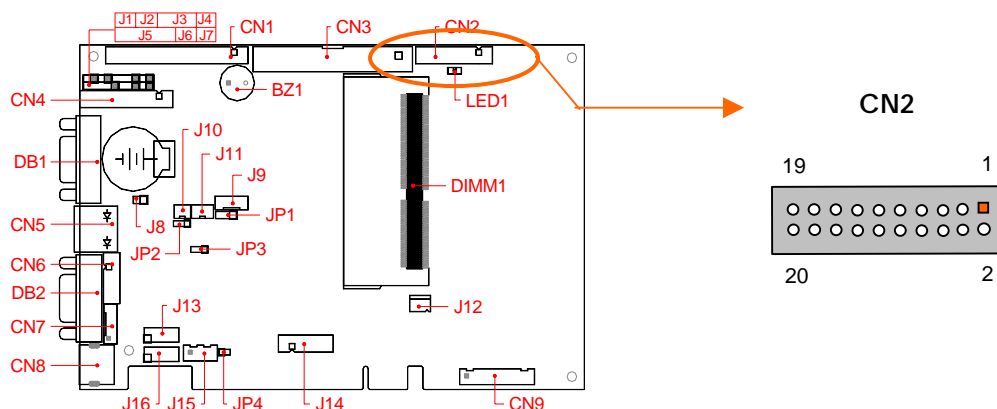
The included printer interface cable is used to transfer 26-pin connector into standard DB25 connector.



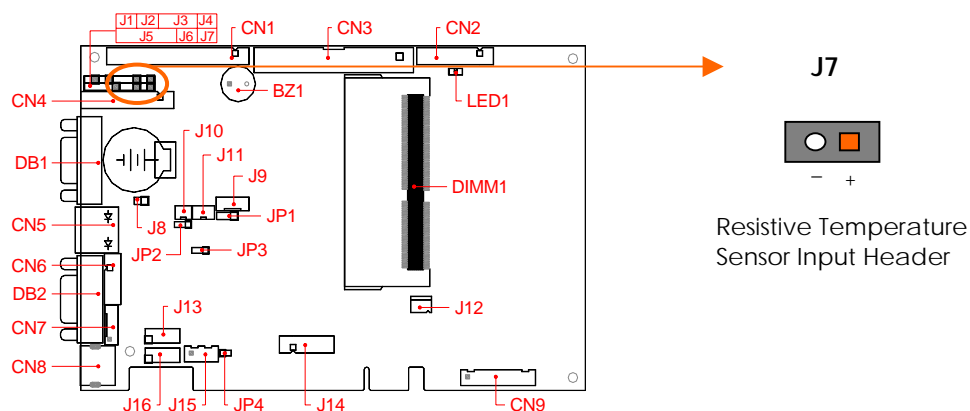
CN4	DB-25	Signal	CN4	DB-25	Signal
1	1	-STROBE	2	14	-AUTO FORM FEED
3	2	DATA 0	4	15	-ERROR
5	3	DATA 1	6	16	-INITIALIZE
7	4	DATA 2	8	17	-PRINTER SELECT IN
9	5	DATA 3	10	18	Ground
11	6	DATA 4	12	19	Ground
13	7	DATA 5	14	20	Ground
15	8	DATA 6	16	21	Ground
17	9	DATA 7	18	22	Ground
19	10	-ACKNOWLEDGE	20	23	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.

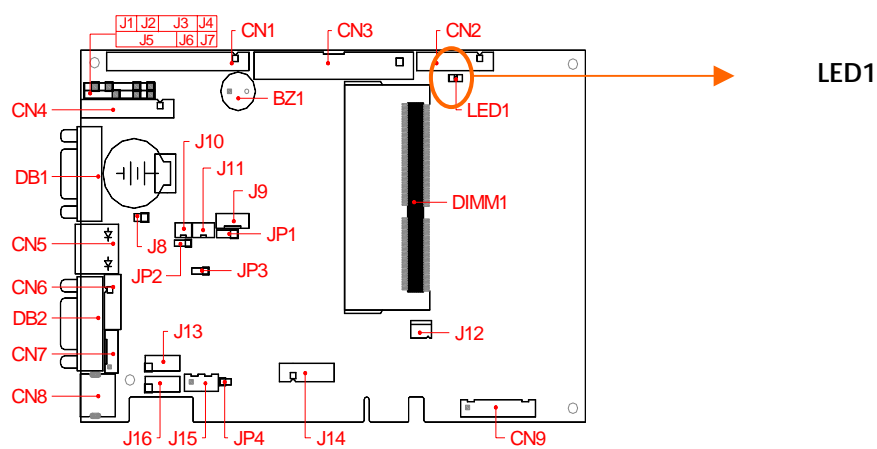


□ J7: Temperature Sensor Header

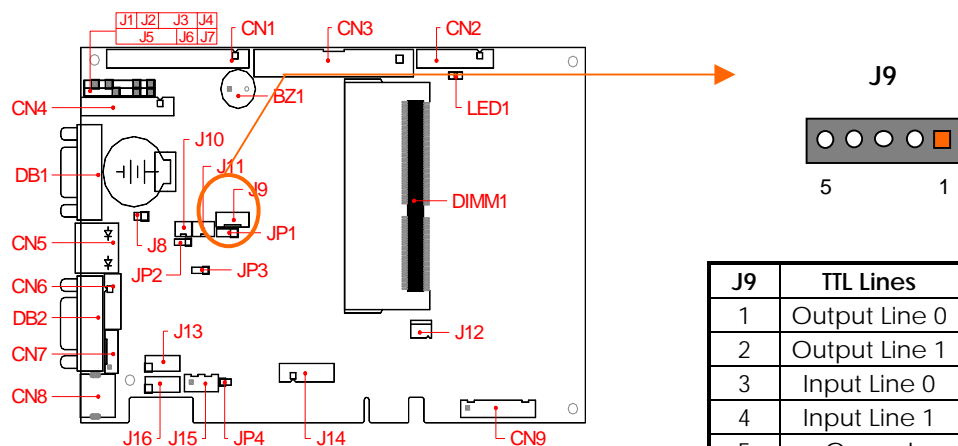


□ LED1: On-Board Power LED

LED1 indicates power is active when it lights.



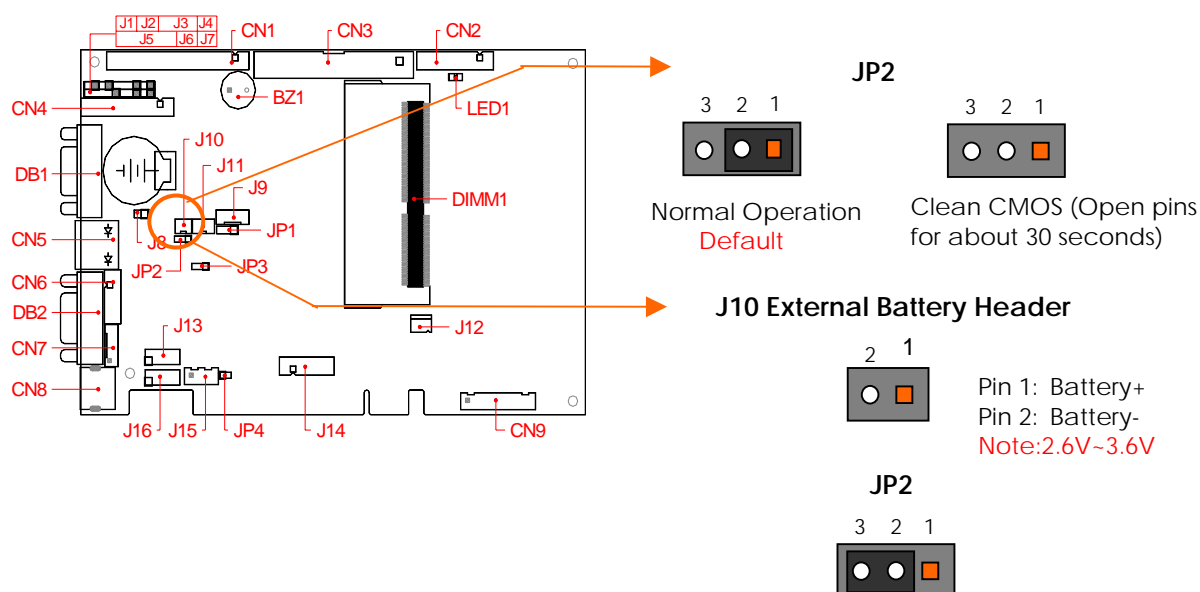
□ J9: TTL I/O Connector



J9	TTL Lines	Bit Location
1	Output Line 0	Bit 4 of 190h
2	Output Line 1	Bit 5 of 190h
3	Input Line 0	Bit 4 of 191h
4	Input Line 1	Bit 5 of 191h
5	Ground	-

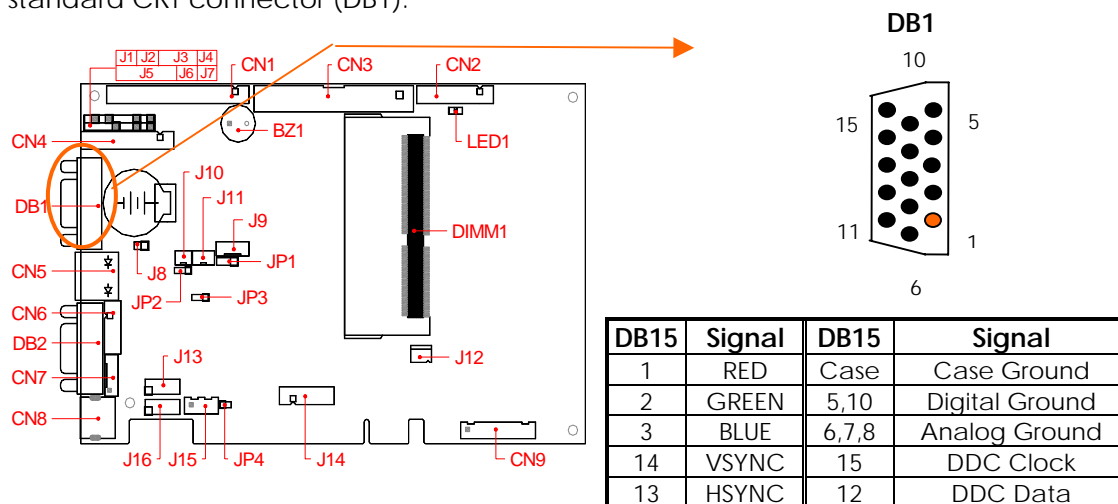
□ J10&JP2: External Battery Header/CMOS Data Clear Jumper

J10 is used to connect an external battery pack if on-board Lithium battery is low, and please setting JP2 properly of on-board battery or external battery. And you can use JP2 to clear CMOS data. 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 and then return to 1-2. The default setting is 1-2.



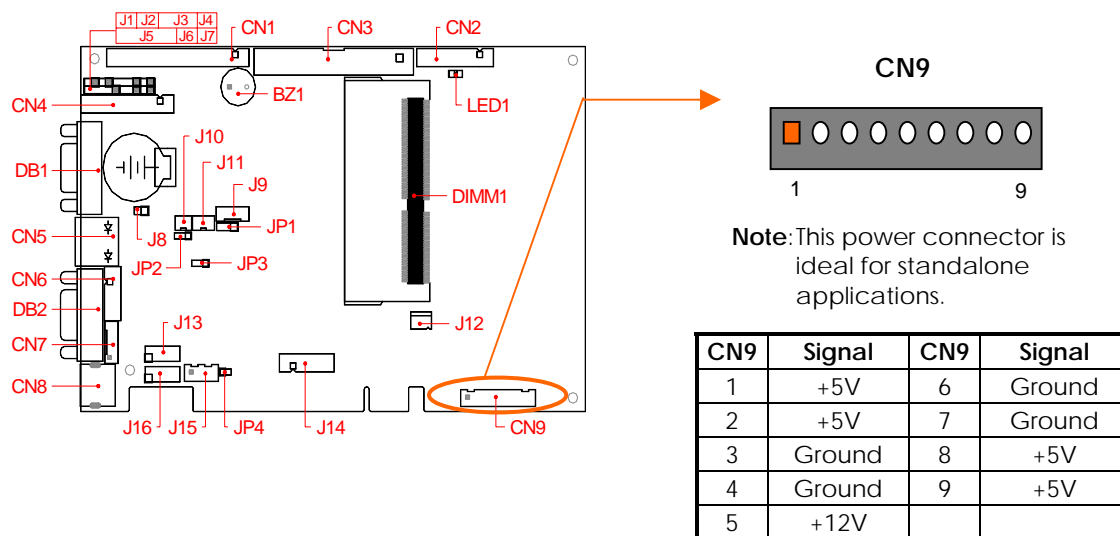
□ DB1: CRT connector

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).



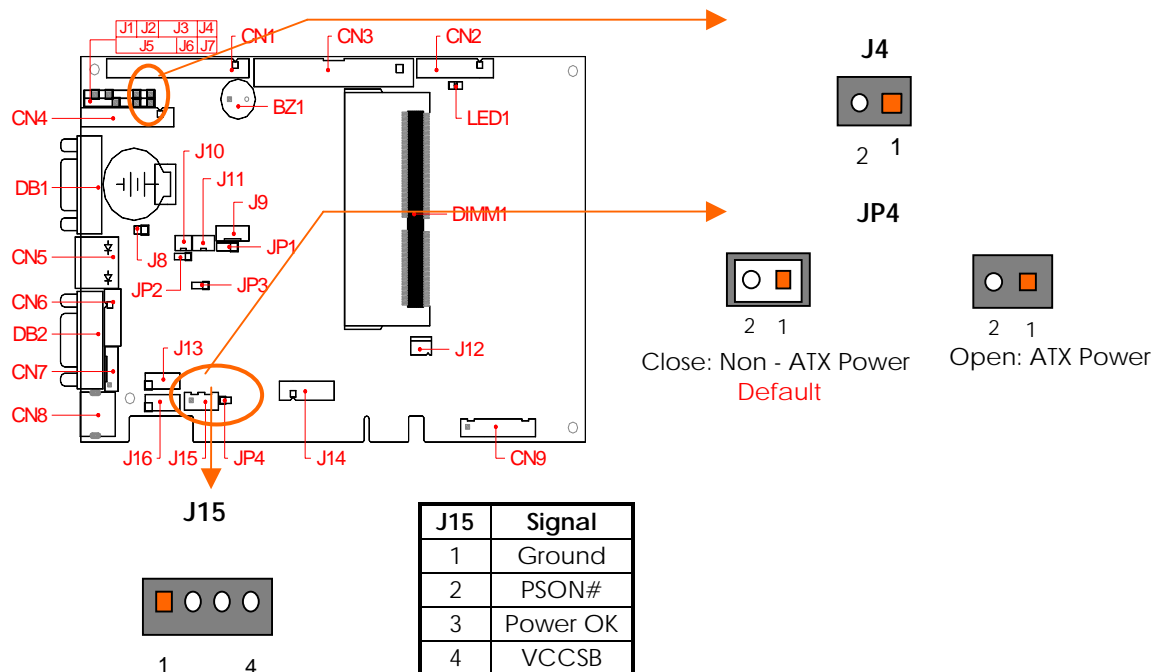
□ **CN9: Power Connector (9-pin 2.54mm JST)**

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



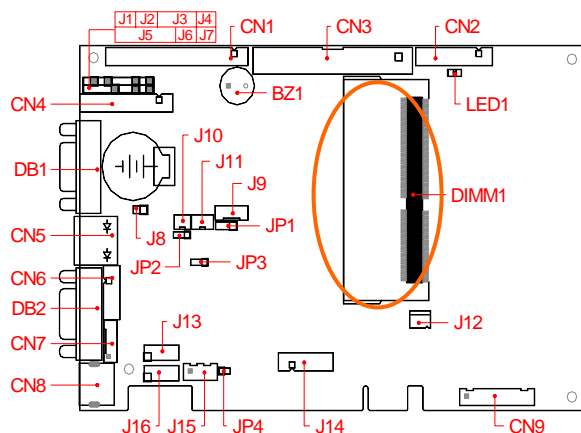
□ **J15, J4 & JP4: Soft Start Connector (for ATX Power Supply Only)**

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.



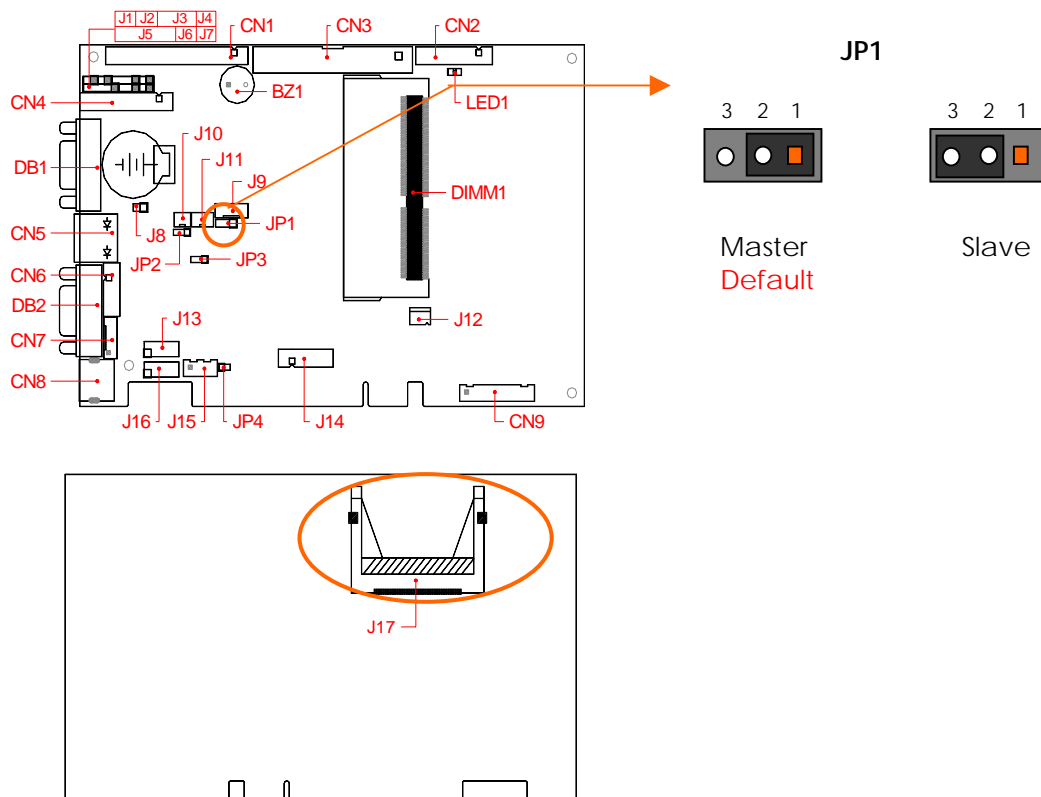
□ DIMM1: SoDIMM Socket

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



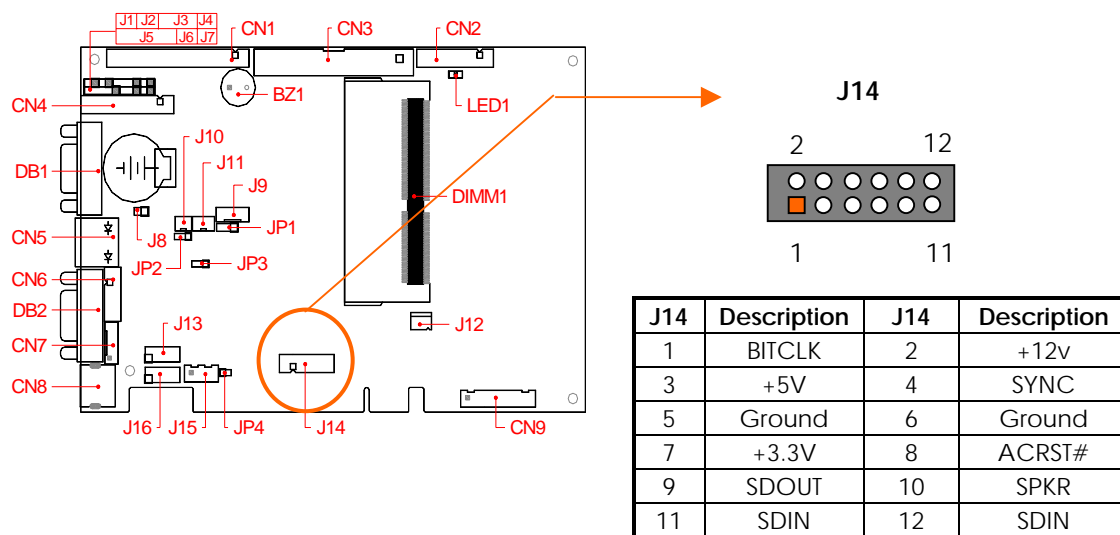
□ J17 & JP1: Compact Flash Socket and Master/Slave Select

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.

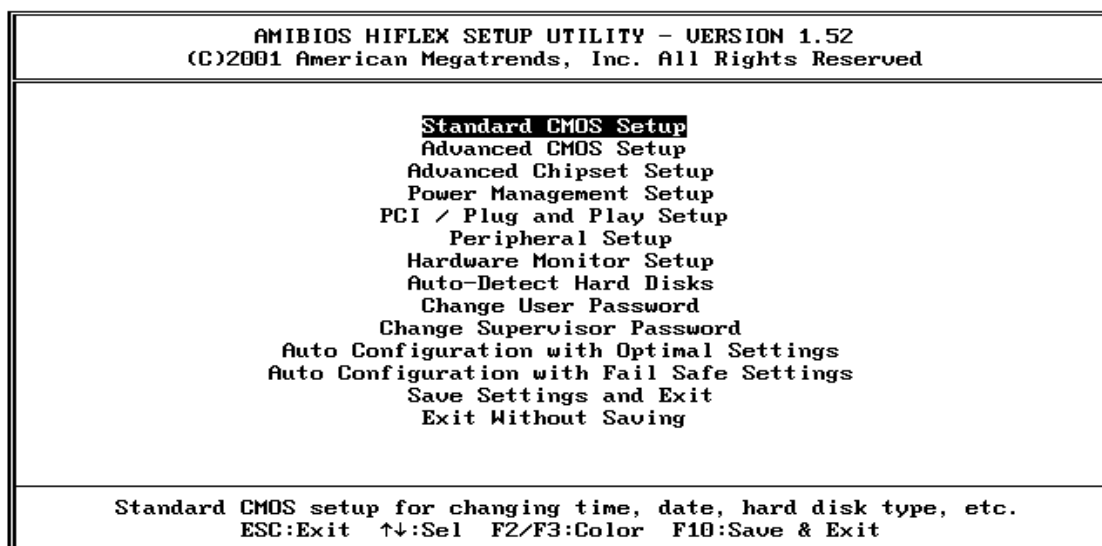
The BIOS provides a menu-driven interface to the console subsystem. The console subsystem contains special software, called firmware that interacts directly with the hardware components and facilitates interaction between the system hardware and the operating system.

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.



BIOS Functions

On the menu, you can perform the following functions

1. Standard CMOS Setup
2. Advanced CMOS Setup
3. Advanced Chipset Setup
4. Power Management Setup
5. PCI/ Plug and Play Setup
6. Peripheral Setup
7. Hardware Monitor Setup
8. Auto-Detect Hard Disks
9. Change User Password
10. Change Supervisor Password
11. Auto Configuration with Optimal Settings: to auto configure the system according to optimal setting with pre-defined values. This is also the factory default setting of the system when you receive the board.
12. Auto Configuration with Fail Safe Settings: to configure the system in fail-safe mode with predefined values.
13. Save Settings and Exit: perform this function when you change the setting and exit the BIOS Setup program.
14. Exit without saving: perform this function when you want to exit the program and do not save the change.

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
F2/F3	To change the color of the menu display. F2 is to go forward and F3 is to go backward.
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.

AMIBIOS SETUP - STANDARD CMOS SETUP									
(C)2001 American Megatrends, Inc. All Rights Reserved									
Date (mm/dd/yyyy): Tue Dec 03, 2002					Base Memory: 0 KB				
Time (hh/mm/ss) : 08:33:02					Extd Memory: 0 MB				
Floppy Drive A: 1.44 MB 3½									
Floppy Drive B: Not Installed									
	Type	Size	Cyln	Head	WPcom	Sec	LBA Mode	Blk Mode	PIO 32Bit Mode
Pri Master:	Auto								Off
Pri Slave :	Auto								Off
Sec Master:	Auto								Off
Sec Slave :	Auto								Off
Boot Sector Virus Protection					Disabled				
Month: Jan - Dec					ESC:Exit ↑↓:Sel				
Day: 01 - 31					PgUp/PgDn:Modify				
Year: 1980 - 2099					F1:Help F2/F3:Color				

□ 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.

□ Floppy Setup

The <Standard CMOS Setup> option records the types of floppy disk drives installed in the system.

To enter the configuration value for a particular drive, highlight its corresponding field and then select the drive type using the left-or right-arrow key.

□ Hard Disk Setup

The BIOS supports various types for user settings, The BIOS supports <Pri Master>, <Pri Slave>, <Sec Master> and <Sec Slave> so the user can install up to four 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.

☐ **Boot Sector Virus Protection**

This option protects the boot sector and partition table of your hard disk against accidental modifications. Any attempt to write to them will cause the system to halt and display a warning message. If this occurs, you can either allow the operation to continue or use a bootable virus-free floppy disk to reboot and investigate your system. The default setting is <*Disabled*>. This setting is recommended because it conflicts with new operating systems. Installation of new operating system requires that you disable this to prevent write errors.

ADVANCED CMOS SETUP

AMIBIOS SETUP - ADVANCED CMOS SETUP	
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Quick Boot	Enabled
1st Boot Device	IDE-0
2nd Boot Device	Floppy
3rd Boot Device	CD/DVD
Try Other Boot Devices	Yes
Initial Display Mode	BIOS
Floppy Access Control	Read-Write
Hard Disk Access Control	Read-Write
S.M.A.R.T. for Hard Disks	Disabled
BootUp Num-Lock	On
Floppy Drive Swap	Disabled
Floppy Drive Seek	Disabled
PS/2 Mouse Support	Enabled
System Keyboard	Absent
Primary Display	Absent
Password Check	Setup
Boot To OS/2	No
Wait For 'F1' If Error	Disabled
Hit 'DEL' Message Display	Enabled
L1 Cache	WriteBack
L2 Cache	WriteBack
C000,16k Shadow	Cached/WP
C400,16k Shadow	Cached/WP
C800,16k Shadow	Cached/WP
CC00,16k Shadow	Disabled
D000,16k Shadow	Disabled
D400,16k Shadow	Disabled
D800,16k Shadow	Disabled
DC00,16k Shadow	Disabled

Available Options:

Off

► On

ESC:Exit ↑↓:Sel
PgUp/PgDn:Modify
F1:Help F2/F3:Color

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.

❑ Quick Boot

This field is used to activate the quick boot function of the system. When set to Enabled,

1. BIOS will not wait for up to 40 seconds if a Ready signal is not received from the IDE drive, and will not configure its drive.
2. BIOS will not wait for 0.5 seconds after sending a RESET signal to the IDE drive.
3. You cannot run BIOS Setup at system boot since there is no delay for the Hit, Del. To run Setup message.

Available Options: Disabled, Enabled

Default setting: Enabled

☐ **1st –3rd Boot Device**

These fields determine where the system attempts to look for the boot drive priority for an operating system. The default procedure is to check the hard disk, and then the floppy drive, and last the CDROM.

Available options: Disabled, IDE0-1, IDE-2, IDE-3, Floppy, ARMD-FDD, ARMD-HDD, CD/DVD, USB-FLOPPY, USB-CDROM, USB-HDD and SCSI, Network

Default setting: IDE-0 for 1st Boot device; Floppy for 2nd Boot Device; CDROM for 3rd Boot Device

☐ **Try Other Boot Device**

If all 3 1st –3rd boot devices specified by CMOS setup are not available to boot, BIOS will try to boot other available devices in following order if this question is set to "Enabled".

☐ **Initial Display Mode**

This field specifies can set Normal POST screen (BIOS) or Boot with logo, no POST messages (Client).

☐ **Floppy Access Control**

This field specifies the read/write access when booting from a floppy drive.

Available options: Normal, Read-only

Default setting: Normal

☐ **Hard Disk Access Control**

This field specifies the read/write access when booting from a HDD drive.

Available options: Normal, Read-only

Default setting: Normal

☐ **S.M.A.R.T for Hard Disk**

This field is used to activate the S.M.A.R.T (System Management and Reporting Technologies) function for S.M.A.R.T HDD drives. This function requires an application that can give S.M.A.R.T message.

Available options: Disabled, Enabled

Default: Disabled

☐ **Boot Up Num-lock**

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

☐ **Floppy Drive Swap**

The field reverses the drive letter assignments of your floppy disk drives in the Swap A, B setting, otherwise leave on the default setting of **Disabled** (No Swap). This works separately from the BIOS Features floppy disk swap feature. It is functionally the same as physically interchanging the connectors of the floppy disk drives. When the function's setting is **<Enabled>**, the BIOS swapped floppy drive assignments so that Drive A becomes Drive B, and Drive B becomes Drive A under DOS.

Available options: Disabled, Enabled

Default setting: Disabled

☐ **Floppy Drive Seek**

This field is used to set if the BIOS will seek the floppy <A> drive upon boot.

Available Options: Disabled, Enabled

Default setting: Disabled

☐ **PS/2 Mouse Support**

The setting of **Enabled** allows the system to detect a PS/2 mouse on boot up. If detected, IRQ12 will be used for the PS/2 mouse. IRQ 12 will be reserved for expansion cards if a PS/2 mouse is not detected. **Disabled** will reserve IRQ12 for expansion cards and therefore the PS/2 mouse will not function.

Available options: Disabled, Enabled

Default setting: Enable

☐ **System Keyboard**

This field specifies if an error message should be prompted when a keyboard is not attached.

Available options: Absent, Present

Default setting: Absent

☐ **Primary Display**

The field specifies the type of monitor installed in the system.

Available options: Absent, VGA/EGA, CGA40x25, CGA80x25, and Mono

Default setting: Absent

☐ **Password Check**

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

☐ **Boot To OS2**

If OS2 operating system is used, and the system RAM is over 64MB, please select yes. Otherwise, select No.

Available options: Yes, No

Default setting: No

☐ **Wait for 'F1' If Error**

AMIBIOS POST error messages are followed by:

Press <F1> to continue

If this field is set to ***Disabled***, the AMIBIOS does not wait for you to press the <F1> key after an error message.

Available options: Disabled, Enabled

Default setting: Disabled

☐ **Hit 'DEL' Message Display**

Set this field to ***Disabled*** to prevent the message as follows:

Hit 'DEL' if you want to run setup

It will prevent the message from appearing on the first BIOS screen when the computer boots.

Available options: Disabled, Enabled

Default setting: Enabled

❑ **C000, 32k Shadow - E800, 32k shadow**

These fields control the location of the contents of the 32KB of ROM beginning at the specified memory location. If no adapter ROM is using the named ROM area, this area is made available to the local bus. The settings are:

1. **Disabled:** The video ROM is not copied to RAM. The contents of the video ROM cannot be read from or written to cache memory.
2. **Enabled:** The contents of C000h - C7FFFh are written to the same address in system memory (RAM) for faster execution.
3. **Cached/WP:** The contents of the named ROM area are written to the same address in system memory (RAM) for faster execution, if an adapter ROM will be using the named ROM area. Also, the contents of the RAM area can be read from and written to cache memory.

Available options: Disabled, Enabled, Cached

Default setting: Disabled

ADVANCED CHIPSET SETUP

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

AMIBIOS SETUP - ADVANCED CHIPSET SETUP (C)2001 American Megatrends, Inc. All Rights Reserved		
SDRAM Timing by SPD	Disabled	Available Options: ▶ Disabled Enabled
DRAM Refresh	15.6/11.7 uS	
DRAM Cycle time (SCLKs)	7/9	
CAS# Latency (SCLKs)	3	
RAS to CAS delay (SCLKs)	3	
SDRAM RAS# Precharge (SCLKs)	3	
Internal Graphics Mode Select	1MB	
AGP Aperture Window	64MB	
CPU Latency Timer	Disabled	
USB Function	All USB Port	
USB Device Legacy Support	All Device	
Power Turn On Time of Delay	Disabled	
Lan Boot ROM Controller	Disabled	
		ESC:Exit ↑↓:Sel PgUp/PgDn:Modify F1:Help F2/F3:Color

□ SDRAM Timing by SPD

SPD represents Serial Presence Detect. It is an 8-bit, 2048 bits EEPROM, built on the SDRAM for 100 MHz frequencies. If the installed SDRAM supports SPD function, select SPD. If not, you can select based on other access time of the SDRAM.

Available Options: Disabled, Enabled

Default setting: Disabled

□ DRAM Refresh

This specifies the DRAM refresh rate.

Available Options: 15.6/11.7 us, 7.8/5.85 us and 1.28/0.96 us

Default setting: 15.6/11.7 us

□ DRAM Cycle Time (SCLKs)

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

Available Options: 5/7 and 7/9

Default setting: 7/9

☐ **CAS# Latency (SCLKs)**

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

Available Options: 3, 2

Default setting: 3

☐ **RAS# to CAS# delay (SCLKs)**

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

Default setting: 3

☐ **SDRAM RAS# Precharge (SCLKs)**

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

Available Options: 3, 2

Default setting: 3

☐ **Internal Graphics Mode Select**

This field Enable/Disable the internal graphics device and selects the amount of main memory that is dedicated to support the internal graphics device in VGA (non-linear) mode only.

Available Options: 512kB, 1MB and Disable

Default setting: 1 MB

☐ **Graphics Aperture Size**

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

Available Options: 32MB, 64MB

Default setting: 64 MB

☐ **CPU Latency Timer**

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

Available Options: 3, 2

Default setting: 3

☐ **USB Function**

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 Legacy 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

☐ **Power Turn On Time Of Delay**

If this field is set to ***Disabled*** and the system BIOS executes too fast, the result is the BIOS can't find the hard disk drive.

Available Options: Disabled, 3 Sec, 5 Sec and 8 Sec

Default setting: Disabled

☐ **LAN Boot ROM Controller**

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

Available Options: Disabled, Enable

Default setting: Disable

POWER MANAGEMENT

AMIBIOS SETUP - POWER MANAGEMENT SETUP	
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ACPI Aware O/S	No
Power Management/APM	Enabled
Video Power Down Mode	Disabled
Hard Disk Power Down Mode	Disabled
Standby Time Out	Disabled
Suspend Time Out	Disabled
Resume By Alarm	Disabled
Alarm Date	15
Alarm Hour	12
Alarm Minute	30
Alarm Second	30

Available Options:

► No

Yes

ESC:Exit ↑↓:Sel

PgUp/PgDn:Modify

F1:Help F2/F3:Color

- ❑ ACPI Aware O/S

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

Available Options: Disabled, Enabled

- ❑ Power Management /APM

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

Available Options: Disabled, Enabled

Default setting: Enabled

☐ **Video Power Down Mode**

This field specifies the power conserving state that video subsystem enters after the specified period of display inactivity has expired.

Available Options: Disabled, Standby, Suspend

Default setting: Disabled

☐ **Hard Disk Power Down Mode**

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: Disabled, Standby, Suspend

Default setting: Disabled

☐ **Standby Time Out (Minute)**

This field specifies the length of a period of system inactivity (like hard disk or video) while in full power on state. When this length of time expires, the system enters Standby power state.

Available Options: Disabled, 1 Minute, 2 Minute, 4 Minute, and 8 Minute

Default setting: Disabled

☐ **Suspend Time Out (Minute)**

This field specifies the length of a period of system inactivity (like hard disk or video) while in Standby state. When this length of time expires, the system enters Suspend power state.

Available Options: Disabled, 1 Minute, 2 Minute, 4 Minute, and 8 Minute, up to 60 Minute.

Default setting: Disabled

PCI/PLUG AND PLAY

AMIBIOS SETUP - PCI / PLUG AND PLAY SETUP (C)2001 American Megatrends, Inc. All Rights Reserved		
Plug and Play Aware O/S	No	Available Options: ► PnP ISA/EISA
Clear NVRAM on Every Boot	No	
PCI Latency Timer (PCI Clocks)	64	ESC:Exit ↑↓:Sel PgUp/PgDn:Modify F1:Help F2/F3:Color
Primary Graphics Adapter	Auto	
Allocate IRQ to PCI VGA	No	
PCI IDE BusMaster	Disabled	
DMA Channel 0	PnP	
DMA Channel 1	PnP	
DMA Channel 3	PnP	
DMA Channel 5	PnP	
DMA Channel 6	PnP	
DMA Channel 7	PnP	
IRQ3	PCI/PnP	
IRQ4	PCI/PnP	
IRQ5	PCI/PnP	
IRQ7	PCI/PnP	
IRQ9	PCI/PnP	
IRQ10	PCI/PnP	
IRQ11	PCI/PnP	
IRQ14	PCI/PnP	

❑ Plug and Plug Aware O/S

Set to Yes to inform BIOS that the operating system can handle Plug and Play (PnP) devices.

Available Options: Yes, No

Default setting: No

❑ PCI Latency Timer

This field specifies the latency timings (in PCI clock) PCI devices installed in the PCI expansion bus.

Available Options: 32, 64, 96, 128, 160, 192, 224, and 248

Default setting: 64

❑ Primary Graphics Adapter

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: AGP, PCI

Default setting: PCI

☐ **Allocate IRQ to PCI AGP**

When a PCI or AGP VGA device is installed, you can assign an IRQ to this device. Selecting Yes, BIOS will auto-assign IRQ to the device. Selecting No, no IRQ will be assigned to the VGA device.

Available Options: Yes, No

Default setting: No

☐ **PCI IDE BusMaster**

This option is to specify that the IDE controller on the PCI local bus have bus-mastering capability.

Available Options: Enable, Disable

Default setting: Disable

☐ **DMA Channel 0 – 7**

When I/O resources are controlled manually, you can assign each system DMA as one of the following types, based on the type of device using the interrupt:

ISA/EISA devices comply with the original PC AT bus specification, requiring a specific interrupt (Such as IRQ5 for COM1).

PnP (PCI/ISA) devices: comply with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

Available Options: PnP, ISA/EISA

Default setting: PnP

☐ **IRQ 3 –15**

When I/O resources are controlled manually, you can assign each system interrupt as one of the following types, based on the type of device using the interrupt:

ISA/EISA devices comply with the original PC AT bus specification, requiring a specific interrupt (Such as IRQ5 for COM1).

PnP (PCI/ISA) devices: comply with the Plug and Play standard, whether designed for PCI or ISA bus architecture.

PERIPHERAL SETUP

This section describes the function of peripheral features.

AMIBIOS SETUP - PERIPHERAL SETUP (C)2001 American Megatrends, Inc. All Rights Reserved		
OnBoard FDC	Auto	Available Options: ▶ Auto Disabled Enabled ESC:Exit ↑↓:Sel PgUp/PgDn:Modify F1:Help F2/F3:Color
OnBoard Serial Port1	Auto	
OnBoard Serial Port2	Auto	
OnBoard Parallel Port	Auto	
Parallel Port Mode	Normal	
Parallel Port IRQ	Auto	
Parallel Port DMA Channel	N/A	
Com Port Mode Selection	RS-232	
On-Chip IDE	Both	

❑ OnBoard FDC

This field enables the floppy drive controller on the FB2645.

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. Refer to Table 2-2.

Available Options: Auto, Disabled, 3F8H/COM1, 2F8H/COM2, and 3E8H/COM3, 2E8H/COM4.

Default setting: Auto

❑ OnBoard Serial Port 2

These fields select the I/O port address for each Serial port. Refer to Table 2-2.

Available Options: Auto, Disabled, 3F8H/COM1, 2F8H/COM2, and 3E8H/COM3, 2E8H/COM4.

Default setting: Auto

☐ **OnBoard Parallel Port**

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

Available Options: Auto, Disabled, 378, 278, and 3BCH

Default setting: Auto

☐ **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: N/A, Normal, Bi-Dir, EPP, and ECP

Default setting: Normal

☐ **Parallel Port IRQ**

This field specifies the IRQ for the parallel port.

Available Options: Auto, N/A, 5, 7

Default setting: Auto

☐ **Parallel Port DMA Channel**

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

Available Options: N/A, 0,1,3

Default setting: N/A

☐ **Com Port Mode Selection**

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

☐ **On-Chip IDE**

This field specifies the IDE channel that can be applied when using CN3 IDE hard disk connector.

Available Options: Disabled, Primary, and Secondary, Both

Default setting: Both

Hardware Monitor Setup

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

AMIBIOS SETUP - HARDWARE MONITOR SETUP (C)2001 American Megatrends, Inc. All Rights Reserved	
Current CPU Temperature	0°C/32°F
Current System Temperature	0°C/32°F
Current Ext. Temperature	0°C/32°F
Fan1 Speed	0 RPM
CPU1 VCORE	+1.793V
Vtt	+1.499V
+ 1.800V	+1.798V
+ 2.500V	+2.494V
+ 3.300V	+3.284V
+ 5.000V	+4.977V
+ 12.00V	+11.997V
- 12.00V	-12.420V
VBAT	+3.284V
ESC:Exit ↑↓:Sel PgUp/PgDn:Modify F1:Help F2/F3:Color	

□ System Hardware Monitor

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

- Current CPU Temperature
- Current System Temperature
- Current Ext. Temperature
- Fan1 Speed
- CPU1 VCORE
- Vtt
- +1.800V
- +2.500V
- +3.300V
- +5.000V
- +12.00V
- -12.00V
- VBAT (On board Battery)

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 CMOS Setup screen and point to the Password Checkup field.
5. Select Always or Setup.
 - ✧ **Always:** 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.

To set the password, please complete the following steps.

1. Select **Change Supervisor Password**.
2. Press Enter instead of entering any character when you see the message, "Enter New Supervisor Password."
3. Thus you can disable the password.

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 HELPM.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.

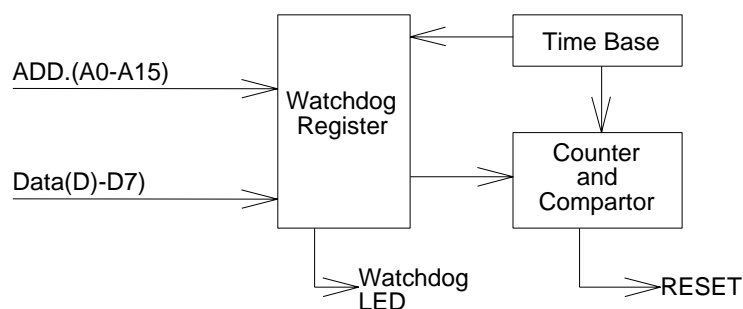
Step 2: And then refer to the chapter “BIOS Setup”, as the steps to modify BIOS.

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 is 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

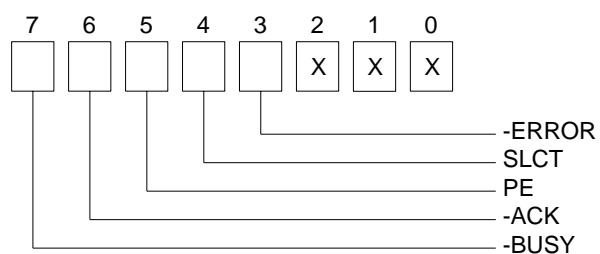
The parallel portion of the SMC37C669 makes the attachment of various devices that accept eight bits of parallel data at standard TTL level.

❑ 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:

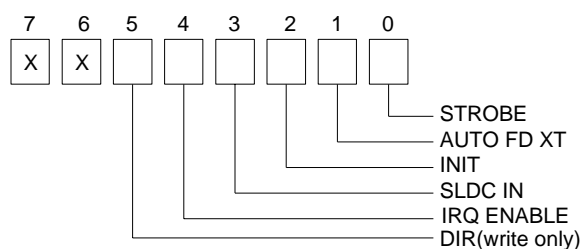


NOTE: X represents not used.

- 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:

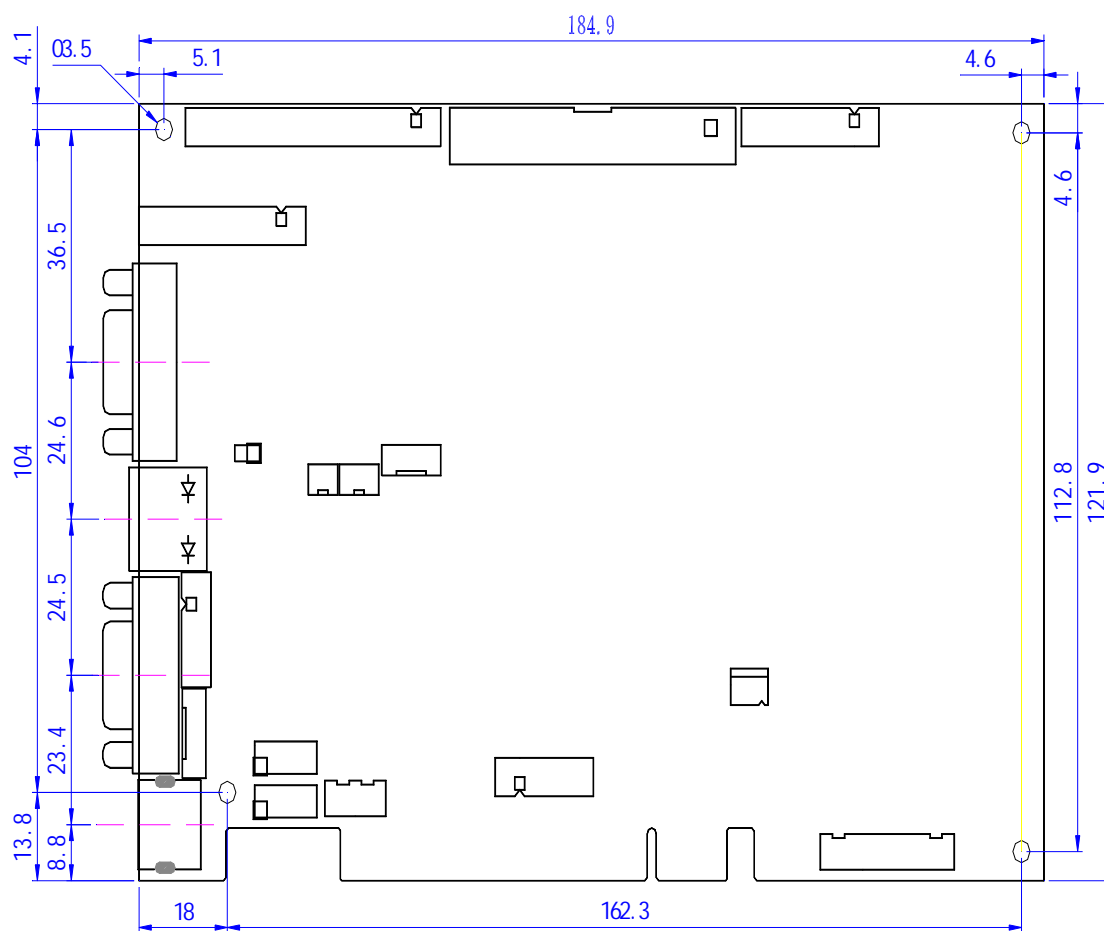


NOTE: X represents not used.

- 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