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## **FB-2680 Socket 370 CPU Card**

### **Full Size Pentium II/!!! User's Manual**

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- ❑ 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](http://www.fabiatech.com)

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## Chapter 1 Introducing the FB-2680 System Board

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### Overview

The FB-2680 is a Socket 370 based CPU card. This user's manual provides information on the physical features, installation, and BIOS setup of the FB2680.

Built to unleash the total potential of the Pentium Processor, the FB2680 is a single boards computer capable of handling today's demanding requirements. Able to support 300-800 MHz CPUs, this unit supports 10/100M MII interface dual network port, Ultra -Wide 2 SCSI interface the data transfer up to 80 MB/s, synchronous pipe line burst SDRAM up to 768B, DiskOnChip (DOC), and a 4MB AGP-VGA controller that can support LCD's and CRT's simultaneously or independently.

Each FB2680 has two ports for I/O communications. One RS-232C and one RS-232C /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 if there is a system's or EMI problem. And for easy configuration, AMI and Award BIOS are available.

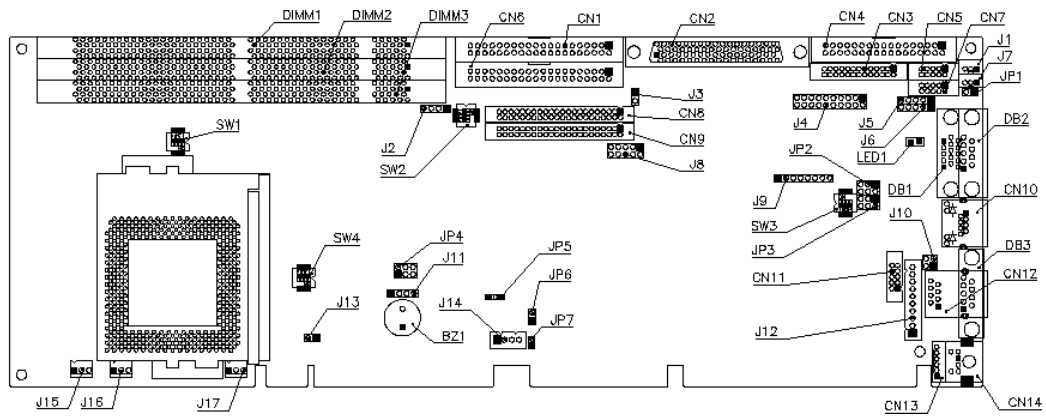
Power management is also featured to lower the rate of consumption. The unit supports doze mode, <Suspend Mode> and <Standby mode> as well as it adheres to the "Green Function" standard.

The FB2680 is perfect for POS and POI applications, network systems, panel / MMI's or RAID subsystem, workstation, order entry kiosks, test equipment, OEM projects or as a motherboard for a panel PC. The unit is only 338X122mm, offering unparalleled performance in a very small footprint.

## Series Comparison Table

Model	FB-2680A	FB-2680B	FB-2680
Processor Socket	Socket 370	Socket 370	Socket 370
Chipset	Intel 440BX	Intel 440BX	Intel 440BX
BIOS	AMI	AMI	AMI
L2 cache	CPU Integrated	CPU Integrated	CPU Integrated
Max. SDRAM	768MB	768MB	768MB
Memory Sockets	3 x DIMM	3 x DIMM	3 x DIMM
SCSI Interface	No	No	Yes
VGA CRT/LCD	SMI712	SMI712	SMI712
Watchdog Timer	Yes	Yes	Yes
Multi I/O Chip	One	One	One
SSD Interface	DOC	DOC	DOC
Enhanced IDE	Yes	Yes	Yes
2S/1P	Yes	Yes	Yes
USB	Yes	Yes	Yes
IrDA	Yes	Yes	Yes
Ethernet (10/100Mbps)	One	None	None
Board Size	338mm x 124mm	338mm x 124mm	338mm x 124mm

## Layout



## Specifications

- Supports 300~800 MHz Celeron/Coppermine CPU. (Socket 370)
- PICMG PCI-ISA bus slot card.
- Intel 440BX chipset and 128KB or above L2 cache inside the CPUs.
- Supports three 168-pin DIMM socket (PC-100 SDRAM), 768MB maximum.
- 100M/10M Ethernet with RJ-45 connector. (Dual LAN is option item)
- SMI SM712 chipset provides CRT and LCD interface with 4MB VRAM.
- SYM 53C895 Ultra -Wide SCSI chipset supports up to 80MB/s transfer rate
- Parallel port, floppy and 2 PCI IDE Interface.
- 1 RS-232C and 1 RS-232C/RS-485/IrDA.
- PS/2 compatible keyboard and mouse interface.
- E2KEY function for safe CMOS data keeping. (Option)
- 2 TTL input lines and 2 TTL output lines. (Option item)
- On-board buzzer and LED indicator.
- Flash BIOS with easy upgrade utility.
- Software programmable watchdog timer.
- Provides 1 socket for up to 288MB DiskOnChip.
- 2 USB ports and hardware monitoring functions.
- Provides 3 (CPU & case) cooling fan connectors for monitoring.
- EMI Considered on every output signals.
- Compact size, 338 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 FB2680 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 FB2680 is not supplied from us, please make sure the specification of the cable(s) is compatible with the FB2680 system board.

**Note:** after you install the FB2680, 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 FB2680 package. Some accessories are optional items that are only shipped upon order.

- One FB2680 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 34-pin floppy drive interface cable
- One serial port and parallel port interface cable with bracket
- One mouse port adapter cable with bracket
- One 5-page hard copy of Quick Installation Guide
- One 2-port USB adapter cable (Optional)
- One LAN adapter cable with FB4605 transfers board. (FB2680 only)
- One 68-pin Ultra-Wide SCSI adapter cable. (FB2680 only)

## Chapter 2 Hardware Installation

To set up a FB2680 system board, complete the description in 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.

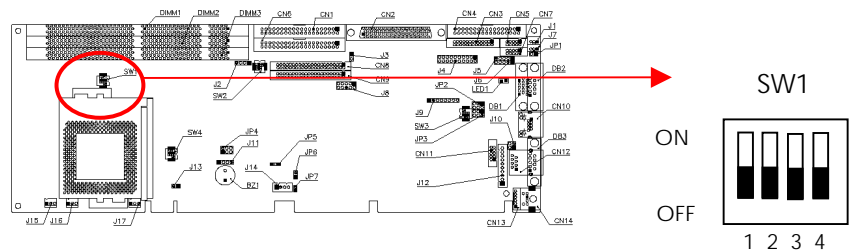
1. Before removing the board from its anti-static bag, wear an anti-static strap to prevent the generation of Electricity Static Discharge (ESD). The ESD may be created from human body that touches the board. It may do damage to the board circuit.
2. Install or unplug any connector, module, or add-on 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 FB2680.

Item	Description
CN1, CN6	40-pin 2.54mm IDE hard disk connector
CN2	Ultra-Wide SCSI connector
CN3	26-pin 2.0mm parallel port connector
CN4	34-pin 2.54mm floppy connector
CN5	10-pin RS-232 connector
CN8, CN9	44/44 –PIN 2.0mm LCD interface connector
CN10	RJ45-Lan connector
CN13, CN14	Keyboard and Mouse connector
J1, J7	3-pin RS232C touch screen header for serial port 1,2
J3	2-pin HDD LED Indicator
J5	5-pin keyboard lock and external LED header
J6	5-pin for external Infra module
J8	USB connector
J11	4-pin for external speaker
J12	10-pin JST connector for LAN2
J13	2-pin for temperature sensor
J14	4-pin for ATX power control signals from back plane
J15, J16, J17	3-pin for case/CPU cooling fan
JP1	2-pin Reset header
JP2	Terminator on/off in RS485 mode
JP3	RS232/RS485 select for serial port 2
JP4	Select 3.3 /5 v for LCD
JP5	To clear CMOS data
JP6	Connector to button switcher as soft power switch
JP7	Select PS/2 power or ATX power
DB1	CRT connector
DB3	9-pin D – type male connector
LED1	Power and watchdog of LED indicator
SW1	To select CPU base clock and PCI clock
SW2	To select the type of LCD panel
SW3	To selects DOC memory mapping
SW4	To select internal clock multiplier

SW1: Selecting CPU Base Clock and PCI Clock



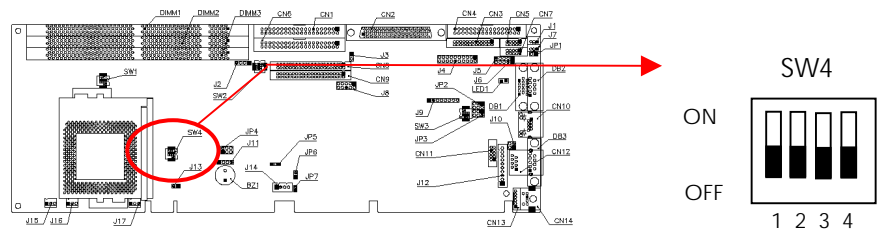
The following lists the switch settings of CPU Base Clock and PCI clock.

SW1-1	SW1-2	SW1-3	SW1-4	CPU Base Clock	PCI Clock	Remark
Off	On	Off	Off	66.7 MHz	33.3 MHz	
Off	Off	Off	Off	100.0 MHz	33.3 MHz	Default
Other				Reserved	Reserved	Reserved

Caution (\*1): Avoid any of the following conditions that will directly destroy or severely cause damage to your CPU, or make your system unstable if you select an inappropriate base clock.

- ✧ Celeron CPUs: over 66.7 MHz CPU base clock
- ✧ Coppermine CPUs: over 100 MHz CPU base clock
- ✧ Over 33.3 MHz PCI clock

SW4: Selecting CPU Internal Clock Multiplier

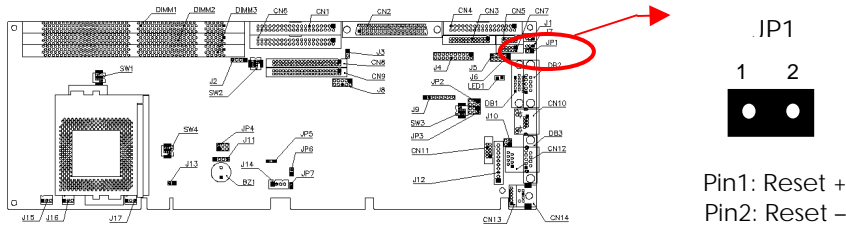


SW4-4	SW4-3	SW4-2	SW4-1	Multiplier	Remark
On	On	On	On	2.0	
On	On	Off	On	3.0	
On	On	On	Off	4.0	
On	On	Off	Off	5.0	Default
On	Off	On	On	2.5	
On	Off	Off	On	3.5	
On	Off	On	Off	4.5	
On	Off	Off	Off	5.5	
Off	On	On	On	6.0	
Off	On	Off	On	7.0	
Off	On	On	Off	8.0	
Off	Off	On	On	6.5	
Off	Off	Off	On	7.5	
Others				Reserved	Reserved

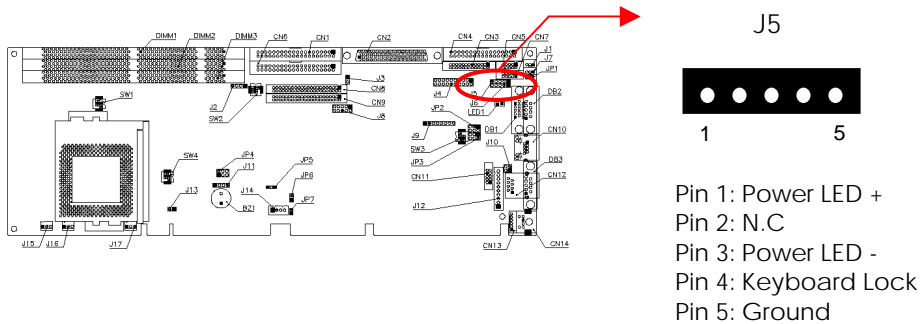
Note: The latest CPUs fix their clock multiplier internally, so it is not necessary to set SW1 any more.

### JP1: Reset Header

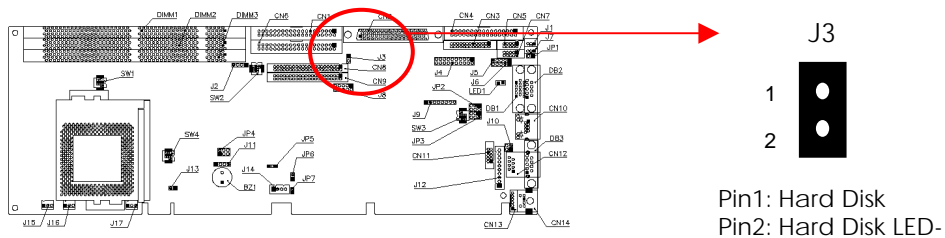
J2 is a 2-pin header for connecting to system reset bottom. Short-circuit these 2 pins to hardware reset FB2680 as well as restart system. It is similar to power off the system and then power it on again.



### J5: Power LED Header

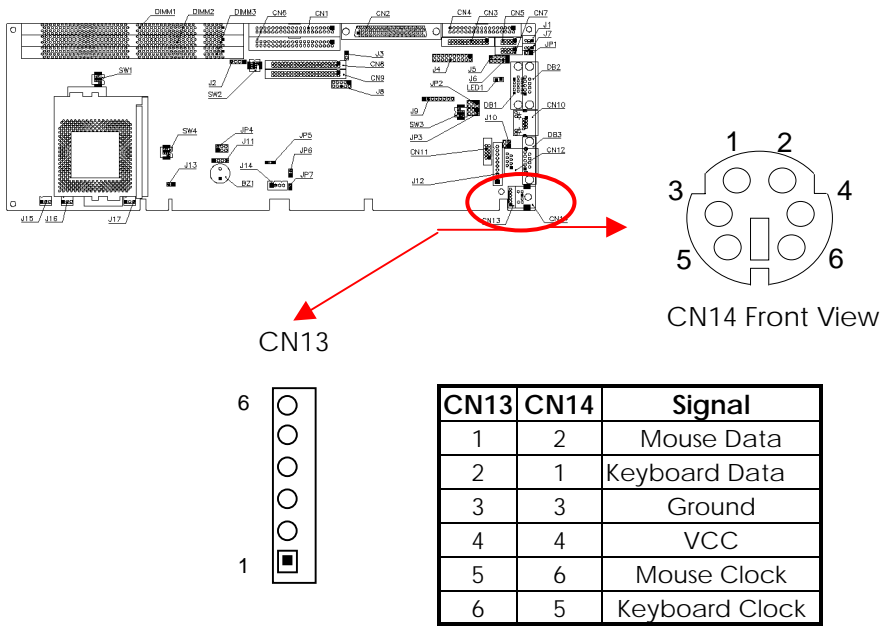


### J3: HDD LED Header



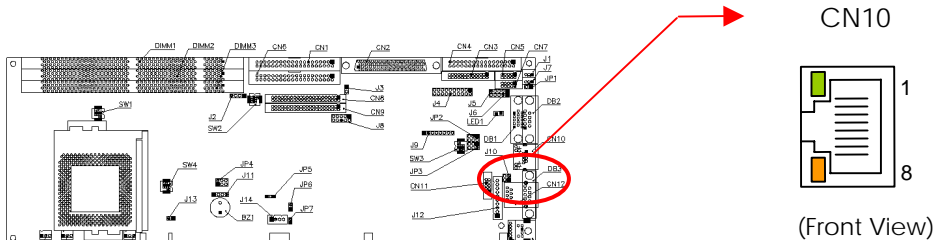
**CN13, CN14: Keyboard/Mouse Connector**

CN14 is a standard PS/2 type keyboard connector, so any PS/2 type keyboard can plug into CN14 directly without extra adapter cable. CN13 provides PS/2 mouse interface, use the included mouse adapter cable to connect between CN13 and standard PS/2 mouse.



### CN10: RJ45 LAN Connector

The CN10 contain LAN twist pair signals and LAN accesses indicator signal is RJ45 type connector with 2 LED indicators. The down side LED (orange) indicates data is accessing and the up side LED (green) indicates on-line status. (When lighted indicates on-line and off indicates off-line).

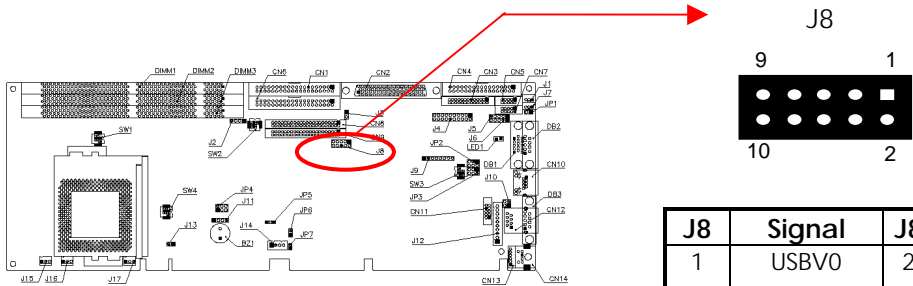


The following lists the pin assignment of RJ45.

RJ45	Signal	RJ45	Signal
1	TPTX+	5	FBG1
2	TPTX -	6	TPRX -
3	TPRX+	7	FBG2
4	FBG1	8	FBG2

### J8: USB Connector

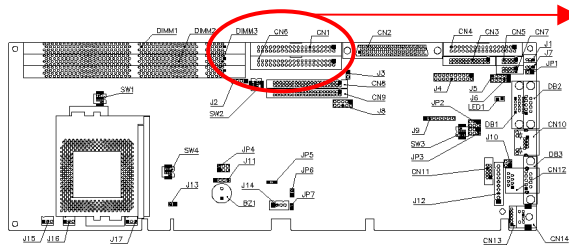
J8 is a 10-pin connector. Use included adapter cable (Optional) for transferring to standard double port USB connector. The upper port is USB #1 and the lower port is USB#2



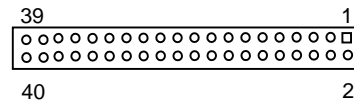
J8	Signal	J8	Signal
1	USBV0	2	Case Ground
3	USBD0+	4	USBG1
5	USBD0-	6	USBD1-
7	USBG0	8	USBD1+
9	Case Ground	10	USBV1

# **CN1, CN6: IDE hard Disk Connector**

CN 3 is 40-pin 2.54mm IDE hard disk connector. The included hard disk cable is able to attach up to two 3.5" hard disk drives.



CN1, CN6 – Hard disk connector

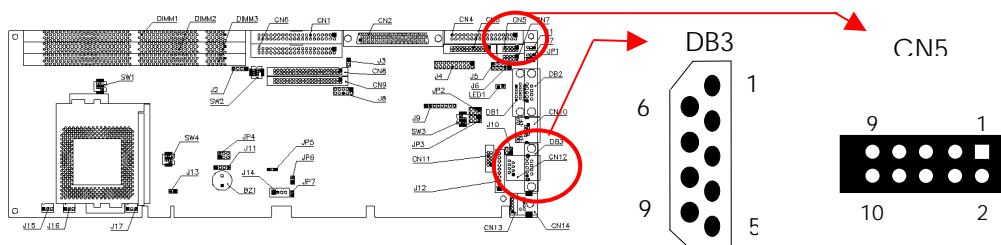


The following table lists the pin description of CN1, CN6.

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 A	24	GROUND
25	-IOR A	26	GROUND
27	IDEIORDYA	28	GROUND
29	-DACKA	30	GROUND
31	AINTE	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

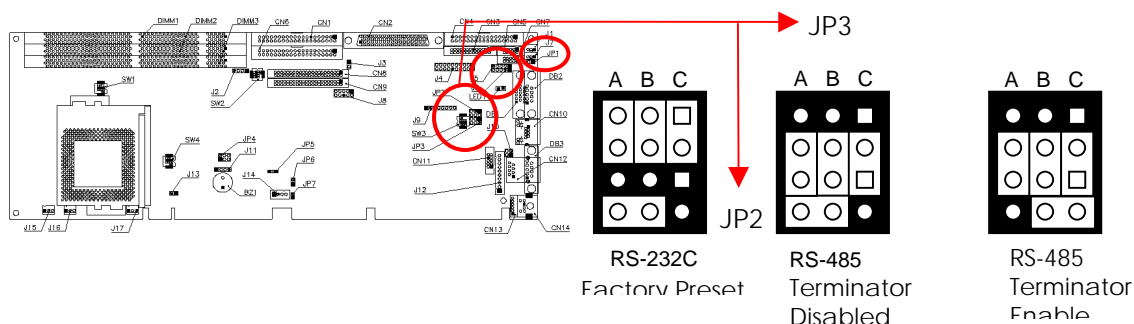
### DB3, CN5:RS232 Serial Ports 1,2 Connectors and Jumpers

The DB3 connector on bracket is 9-pin D-type male connector the serial port 2 CN5 adapter cables are used to transfer 10-pin IDC connector into standard DB9 connectors.



### Serial Port 2 Select (CN5, JP3, JP2, J6, J7)

Serial port 2 is designed for multiple proposes. It could be RS-232C or RS-485 by selecting JP3, and JP2 is use to enable or disable terminator if RS-485 mode is selected. Serial port 2 also could be configured as Infra (IrDA) interface by changing the setting in BIOS setup program. J6 is use to interface with Infra module. When touch screen module is used, you could connect J7 to touch screen controller directly and internally instead of connect from CN5 connector.



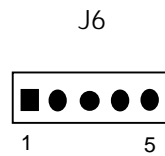
CN5	Signal	DB3	CN5	Signal	DB3
1	-DCD2	1	1		1
2	-DSR2	6	2		6
3	RXD2	2	3	485-	2
4	-RTS2	7	4		7
5	TXD2	3	5	485+	3
6	-CTS2	8	6		8
7	-DTR2	4	7		4
8	-RI2	9	8		9
9	GROUND	5	9	GROUND2	5
10	CASE GROUND		10	CASE GROUND	

Note: RS-232C mode

Note: RS-485 mode

### J6: 5-pin Infrared Header

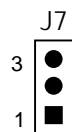
J6 provides infrared signals of serial port 2. The infrared signal is used to interface with Infrared modules.



Pin 1: VCC  
 Pin 2: N.C.  
 Pin 3: IRRX  
 Pin 4: Ground  
 Pin 5: IRTX

### J7: Touch Screen Header

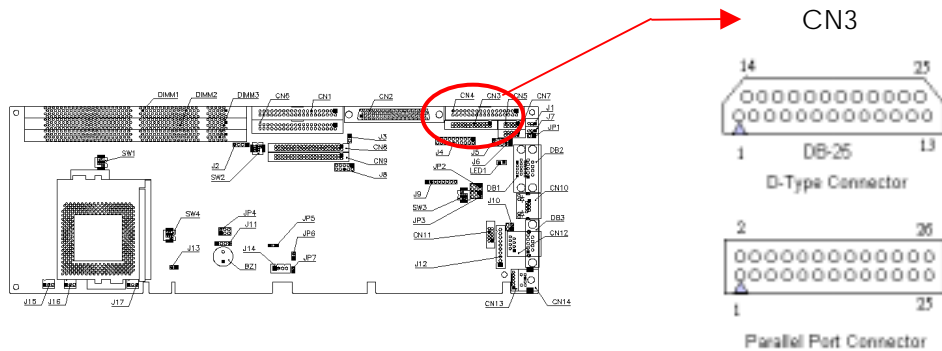
J7 provide basic RS-232C signals of serial port 2 respectively. The basic RS-232C signal is used to interface with touch screen controller internally.



Pin 1: TXD  
 Pin 2: RXD  
 Pin 3: Ground

### CN3: 26-pin Parallel Port Connector

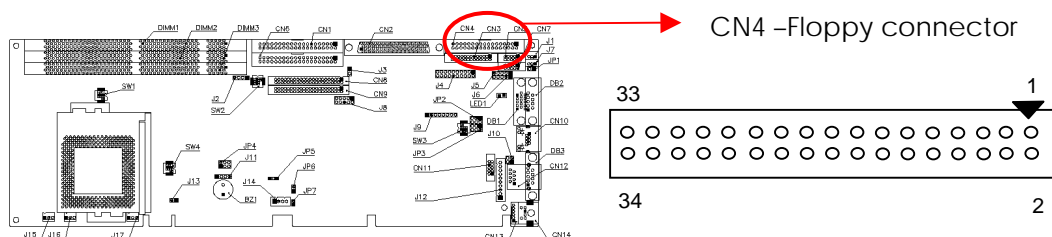
The included printer interface cable is used to transfer 26-pin connector into standard DB25 connector.



CN3	DB-25	Signal	CN3	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

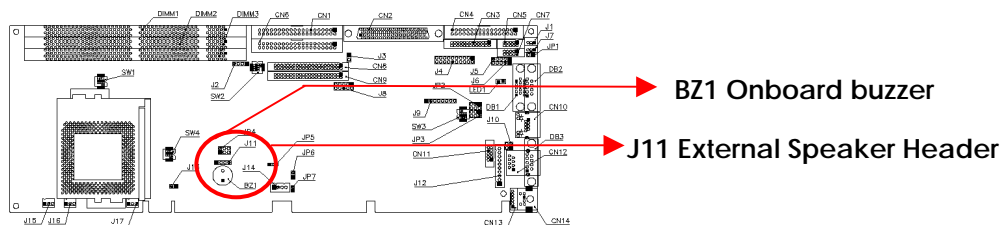
### CN4: Floppy Connector

The included floppy drive interface cable is used standard 34-pin connector. The following table shows signal connections 34-pin connectors.

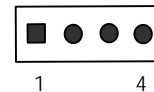


34-pin	Signal	34-pin	Signal
2	Drive Enable A	22	-Write Data
8	-Index	23	Ground
9	Ground	24	-Write Enable
10	-Motor B	26	-Track 0
11	Ground	28	-Write Protect
12	-Select A	29	Ground
14	- Select B	30	-Read Data
16	-Motor A	31	Ground
18	-Direction	32	-Head
20	-Step	34	-Disk Change
-	-	Others	No Connection

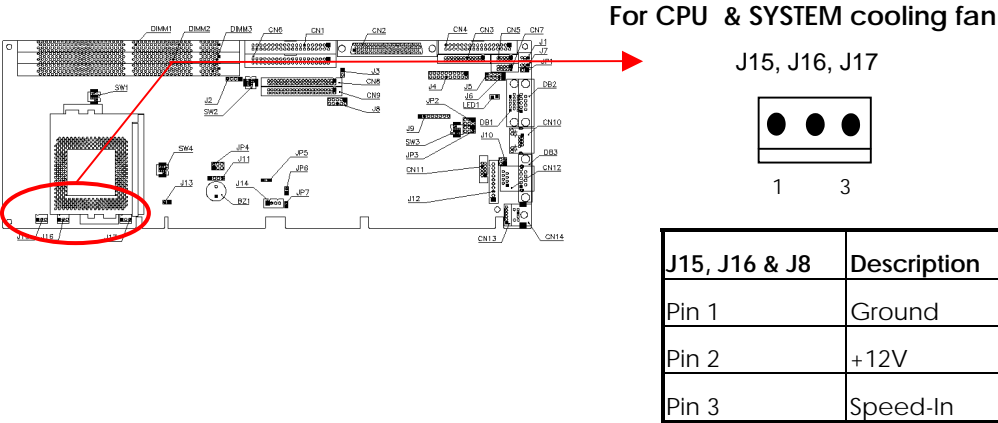
### BZ1: On-Board Buzzer (BZ1) & J11: External Speaker Header



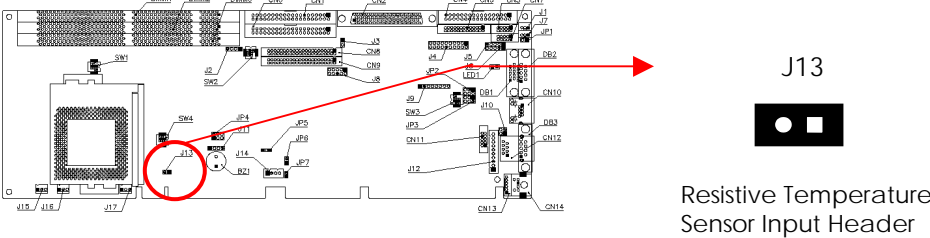
PIN	Signal
1	Speaker+
2	Speaker-
3	Speaker-
4	Speaker-



J15, J16: CPU Fan Connector & J17: System Fan Connector

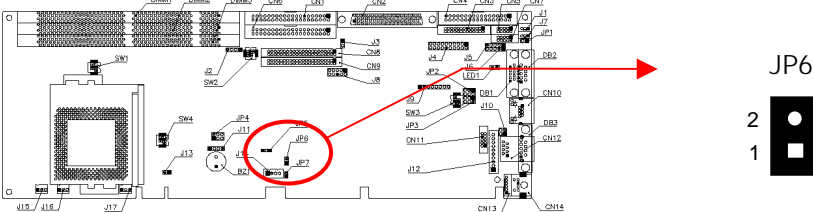


J13: Temperature Sensor Header



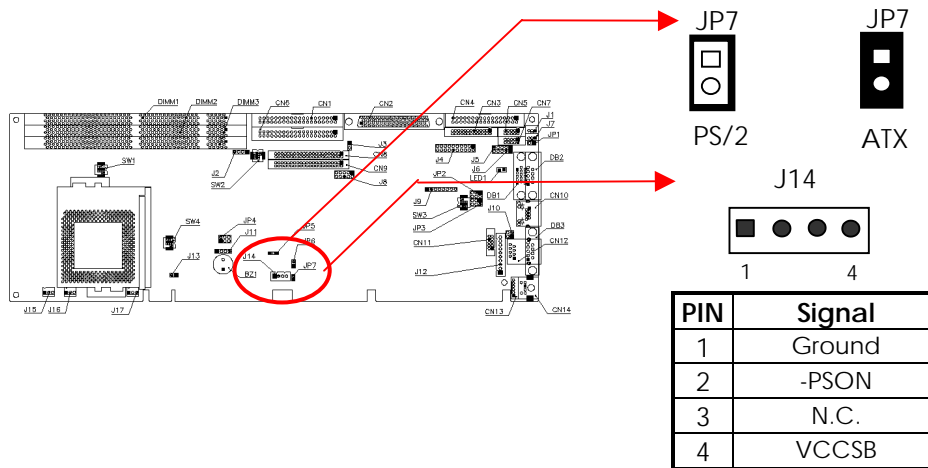
JP6: Soft Start Header

JP6 is a 2-pin header for connecting to system soft start bottom if ATX power supply is used.



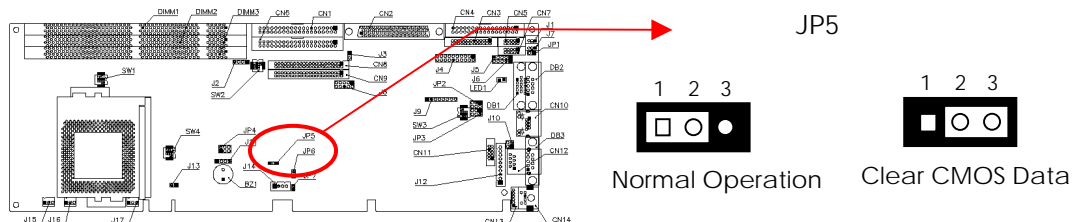
### J14: ATX Power Signal & JP7: PS/2 or ATX Power select

If PS/2 power supply is used, please short JP7 and left J14 unconnected. If ATX power supply is used, leave JP7 open and connect J14 to back-plane.



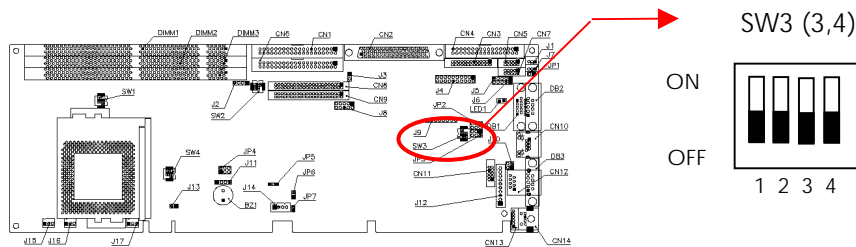
### JP5: CMOS Data Clear Jumper

You can use JP5 to clear CMOS data. The CMOS store information like system date, time, boot up device, password, IRQ, etc. which are set up with the BIOS. To clear the CMOS, set JP5 to 2-3 and then return to 1-2. The default setting is 1-2.



### SW3 (3,4): DiskOnChip Mapping Address Select

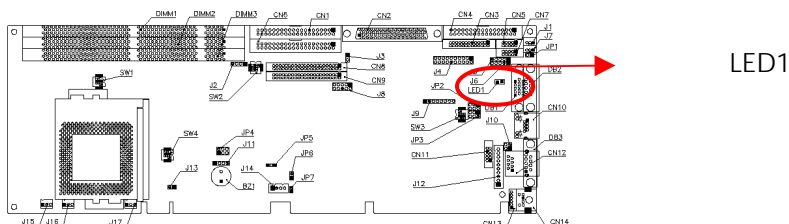
If DiskOnChip is to be used, select a mapping memory address for it. Three addresses are provided, D000, D400 and D800. The default setting is D800.



SW3-3	SW3-4	Mapping Segment	Remark
On	On	Reserved	
On	Off	D400:0	
Off	On	D000:0	
Off	Off	D800:0	Factory Present

### On-Board Power and Watchdog LED (LED1)

LED1 indicates power is active when it lights. If the watchdog is enabled, LED1 will blink in a stable period.





## Chapter 3 Installing CRT and LCD Monitors

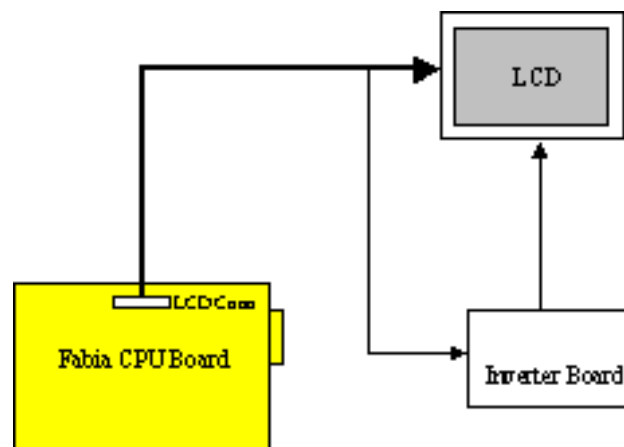
This chapter describes the configuration and installation procedure of LCD and CRT displays. Both CRT and LCD displays may be used at the same time. However, each type of LCD requires different BIOS. This section describes the configuration and installation procedure using LCD display. Skip this section if you are using CRT monitor only.

- LCD Flat Panel Display
- CRT & LCD Display

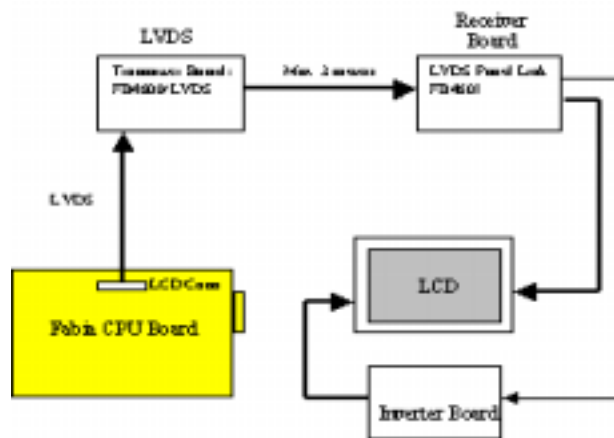
### LCD FLAT PANEL DISPLAY

Using the SW2 setting for different types of LCD panel. And then set your system properly and setting switcher for the right type of LCD panel you are using. Each model of LCD requires different BIOS in order to work properly. If the BIOS you need is not on our website [www.fabiatech.com](http://www.fabiatech.com), then you can send us a sample of the panel you will be using and we will send it back to you with the new BIOS.

The following shows the block diagram of using FB2680 for LCD display.



LCD Panel Block Diagram



LVDS Diagram

The block diagram shows that FB2680 still needs components to be used with a LCD panel. The transfer board provides the control for the brightness and the contrast of the LCD panel while inverter board is the one that supplies the high voltage to drive the LCD panel. Both LVDS-K1 and LVDS-K2 are available from FabiATech with all the necessary cables.

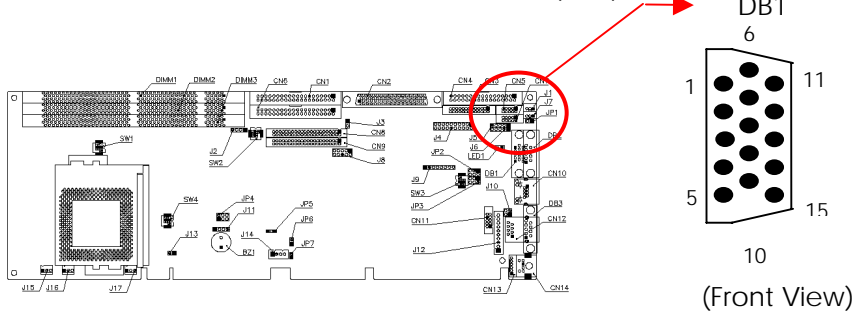
**NOTE:** Be careful with the pin orientation when installing connectors and the cables. A wrong connection can easily destroy your LCD panel. The pin 1 of the cable connectors is indicated with a sticker and the pin1 of the ribbon cable usually has a different color.

## CRT & LCD DISPLAY

The FB2680 supports a CRT colored monitor and a LCD. It can be connected to create a compact video solution for the industrial environment. 4MB of RAM on-boarded allows a maximum CRT resolution of 1280X1024 with 64K colors and a LCD resolution of 1024X768 with 64K colors.

### DB1: CRT connector

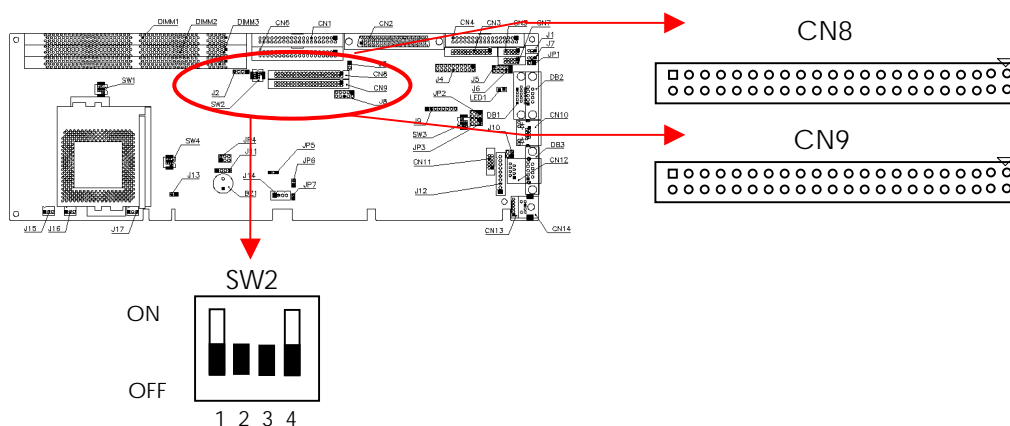
The CRT is use to a standard CRT connector (DB1).



DB15	Signal	DB15	Signal
1	RED	Case	Case Ground
2	GREEN	5,10	Digital Ground
3	BLUE	6,7,8	Analog Ground
14	VSYNC	15	DDC Clock
13	HSYNC	12	DDC Data

### CN8, CN9: LCD Connector and Panel Type: SW2

CN8 and CN9 are 36-bit LCD interface connector and. If LCD BIOS supported, SW2 is used to select which LCD panel type is used.



Pin	CN8	CN9	Pin	CN8	CN9
1	Ground	Ground	2	SHFCLK1	SHFCLK2
3	FPVS1	FPVS2	4	FPHS1	FPHS2
5	DE1	DE2	6	Ground	Ground
7	FP0	FP24	8	FP1	FP25
9	FP2	FP26	10	FP3	FP27
11	FP4	FP28	12	FP5	FP29
13	FP6	FP30	14	FP7	FP31
15	Ground	Ground	16	FP8	FP32
17	FP9	FP33	18	FP10	FP34
19	FP11	FP35	20	FP12	FP36
21	FP13	FP37	22	FP14	FP38
23	FP15	FP39	24	Ground	Ground
25	FP16	FP40	26	FP17	FP41
27	FP18	FP42	28	FP19	FP43
29	FP20	FP44	30	FP21	FP45
31	FP22	FP46	32	FP23	FP47
33	Ground	Ground	34	GPO0	GPO0
35	GPO1	GPO1	36	GPO2	GPO2
37	GPO3	GPO3	38	Ground	Ground
39	+12V	+12V	40	+12V	+12V
41	VLCD1	VLCD2	42	VLCD1	VLCD2
43	ENABLK	ENABLK	44	ENAVEE	ENAVEE

**Selecting LCD Panel: SW2**

Item	SW2				LCD Panel Specification
	SW2-1	SW2-2	SW2-3	SW2-4	
1	On	On	On	On	640x480 TFT Color Panel
2	Off	On	On	On	640x480 Dual Scan STN Color Pane
3	On	Off	On	On	800x600 TFT Color Panel
4	Off	Off	On	On	800x600 Dual Scan STN Color Panel
5	On	Off	On	On	1024x768 TFT Color Panel
6	Off	On	Off	On	1024x768 Dual Scan STN Color Pane

## Chapter 4 Installing SCSI Device

This chapter describes the configuration and installation procedure of SCSI device. This section describes the configuration and installation procedure using SCSI device. Skip this section if your product serial is not.

### ❑ **LVDlink –LSI Logic Universal LVD Transceivers**

To balance backward compatibility with I/O performance, FB2680 embedded LSI Logic Universal LVDlink transceivers on the SYM53C895 chipset. Using the differential sense signal to detect the bus cabling condition, the universal features of LVDlink transceivers support single-ended, high power differential (Using external transceivers) or LVD SCSI modes, depending on the type of device connected to the bus.

The device can support up to 12 –meter cables and up to 16 LVD devices on a wide LVD SCSI bus and provides a complete software solution with BIOS and drivers.

### ❑ **Check the Terminators on the SCSI bus**

In order to stabilize the SCSI bus, only two sets of terminators can be installed –one at each end of the SCSI bus. The FB2680 itself is equipped with Active Terminators that automatically switch from Enabled to Disabled or vice versa by scanning the device connector on the SCSI bus.

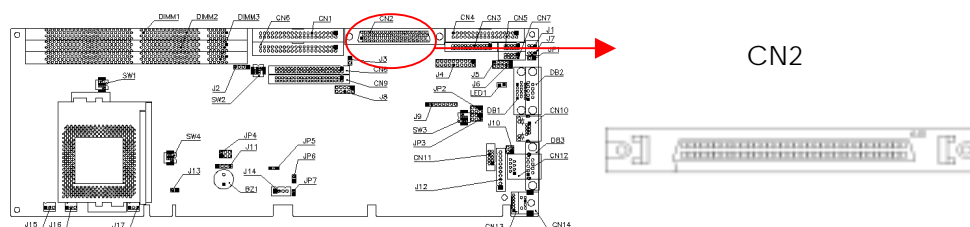
### ❑ **Setting the SCSI ID**

Each SCSI device attached to the FB2680, as well as the card itself, must be assigned a unique SCSI ID number. SCSI ID 7 is present to the FB2680.

The SCSI IDs of your peripheral devices are usually set with jumpers or with a switcher on the peripheral. Refer to the peripheral's manual to determine the ID and how to change it.

Any device with SCSI configured automatically can assign its own SCSI ID dynamically and resolves SCSI ID conflicts automatically. You do not need to manually assign SCSI IDs to these peripherals.

❑ **ULTRA2 CN2: SCSI Connector for Ultra wide SCSI HDD.**



The pin assignments are as follow:

Pin	Signaler	Pin	Signaler	Pin	Signaler	Pin	Signaler
1	SCD+12	18	TPWEX	35	SCD-12	52	TRMPWR
2	SCD+13	19	NC	36	SCD-13	53	NC
3	SCD+14	20	GND	37	SCD-14	54	GND
4	SCD+15	21	SATN+	38	SCD-15	55	SATN-
5	SDP+1	22	GND	39	SCDPH	56	GND
6	SCD+0	23	SBSY+	40	SCD-0	57	SBSY-
7	SCD+1	24	SACK+	41	SCD-1	58	SACK-
8	SCD+2	25	SRST+	42	SCD-2	59	SRST-
9	SCD+3	26	SMSG+	43	SCD-3	60	SMSG-
10	SCD+4	27	SSEL+	44	SCD-4	61	SSEL-
11	SCD+5	28	SCD+	45	SCD-5	62	SCD-
12	SCD+6	29	SREQ+	46	SCD-6	63	SREQ-
13	SCD+7	30	SIO+	47	SCD-4	64	SIO-
14	SDP+0	31	SCD+8	48	SCDPL	65	SCD-8
15	GND	32	SCD+9	49	GND	66	SCD-9
16	DIFS	33	SCD10+	50	AUTO	67	SCD-10
17	TPWEX	34	SCD11+	51	TRMPWR	68	SCD-11

**Note1:** The SCSI function of this CPU Card is designed based on PCI Bus Master, that means one of the PCI Bus Master is occupied. (The SCSI Bus Master (DRQ2) is same as 3rd PCI Slot on the back plane (DRQ2)).

**When on-board SCSI function enabled, the 3rd PCI slot on back plane would support Slave Mode only.** The Bus Master Card plugged in the 3rd PCI Slot on back plane function would fail. The 3rd PCI Slot on the back plane supports Bus Master function when SCSI function of this CPU Card disabled.

**Note:** In the SCSI \ BIOS directory, a Bootrom.TXT file is included to provide setup installation information

## Chapter 5 BIOS Setup

This chapter describes the BIOS setup.

### Overview

The BIOS is 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.

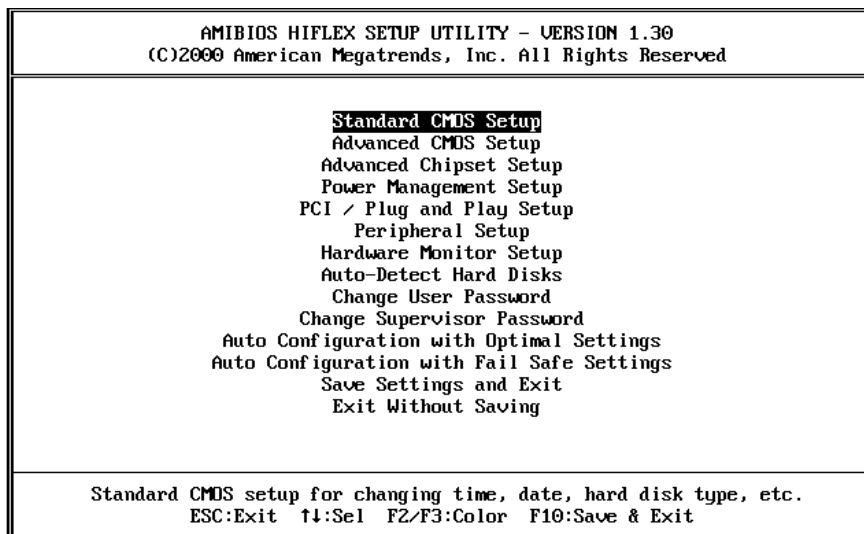
The BIOS provides a menu-driven interface to the console subsystem. The console subsystem contains special software, called firmware that interacts directly with the hardware components and facilitates interaction between the system hardware and the operating system.

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- Advanced CMOS Setup
2. Advanced Chipset Setup
3. Power Management Setup
4. PCI/ Plug and Play Setup
5. Peripheral Setup
6. Hardware Monitor Setup
7. Auto-Detect Hard Disks
8. Change User Password
9. Change Supervisor Password
10. 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.
11. Auto Configuration with Fail Safe Settings: to configure the system in fail-safe mode with predefined values.
12. Save Settings and Exit: perform this function when you change the setting and exit the BIOS Setup program.
13. 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)2000 American Megatrends, Inc. All Rights Reserved											
Date (mm/dd/yyyy): Sat Jan 20,2001						Base Memory: 0 KB					
Time (hh/mm/ss) : 10:16:03						Ext'd Memory: 0 MB					
Floppy Drive A: 1.44 MB 3½											
Floppy Drive B: Not Installed											
	Type	Size	Cyl'n	Head	WPcom	Sec	LBA Mode	Blk Mode	PIO Mode	32Bit Mode	
Pri Master:	Auto									On	
Pri Slave :	Auto									On	
Sec Master:	Auto									On	
Sec Slave :	Auto									On	
Boot Sector Virus Protection						Disabled					
						ESC:Exit ↑↓:Sel PgUp/PgDn:Modify 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 bootup. 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

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.

AMIBIOS SETUP - ADVANCED CMOS SETUP (C)2000 American Megatrends, Inc. All Rights Reserved		
Quick Boot	Enabled	Available Options: ▶ Disabled Enabled
1st Boot Device	IDE-0	
2nd Boot Device	Floppy	
3rd Boot Device	CDROM	
Floppy Access Control	Read-Write	
Hard Disk Access Control	Read-Write	
<b>S.M.A.R.T. for Hard Disks</b>	<b>Disabled</b>	
BootUp Num-Lock	On	
Floppy Drive Swap	Disabled	
Floppy Drive Seek	Disabled	
PS/2 Mouse Support	Enabled	
Typematic Rate	Fast	
System Keyboard	Absent	
Primary Display	Absent	
Password Check	Setup	
Boot To OS/2 > 64MB	No	
Wait For 'F1' If Error	Disabled	
Hit 'DEL' Message Display	Enabled	
C000,16k Shadow	Cached	
C400,16k Shadow	Cached	
C800,16k Shadow	Cached	
CC00,16k Shadow	Disabled	
D000,16k Shadow	Disabled	
D400,16k Shadow	Disabled	
D800,16k Shadow	Disabled	
DC00,16k Shadow	Disabled	

### □ 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

#### ☐ **1<sup>st</sup> –3<sup>rd</sup> 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, CDROM, and SCSI, Network

**Default setting:** IDE-0 for 1<sup>st</sup> Boot device; Floppy for 2<sup>nd</sup> Boot Device; CDROM for 3<sup>rd</sup> Boot Device

#### ☐ **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

#### ☐ **BootUp Numlock**

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 PS/2 mouse function is optional. Before you configure this field, make sure your FB2330 supports this feature. 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:** Disabled

#### ☐ Typematic rate

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

**Available options:** Fast, Slow

**Default setting:** Fast

#### ☐ 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, Normal

**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> 64MB**

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:** 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)2000 American Megatrends, Inc. All Rights Reserved	
***** SDRAM Timing *****	
<b>Configure SDRAM Timing by SPD</b>	<b>Disabled</b>
SDRAM RAS# to CAS# delay	3 SCLKs
SDRAM RAS# Precharge	3 SCLKs
SDRAM CAS# Latency	3 SCLKs
SDRAM Leadoff Cmd Timing	Auto
DRAM Integrity Mode	Non-ECC
DRAM Refresh Rate	15.6 us
Memory Hole	Disabled
Graphics Aperture Size	64MB
Search for MDA Resources	Yes
8bit I/O Recovery Time	1 Sysclk
16bit I/O Recovery Time	1 Sysclk
USB Function	Enabled
LCD/CRT Selection	CRT
TFT Interface Type Selection	18 BIT
<b>Available Options:</b> ▶ Disabled Enabled	
ESC:Exit F4:Sel PgUp/PgDn:Modify F1:Help F2/F3:Color	

### ☐ Configure 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 7 ns or 8 ns based on the access time of the SDRAM.

**Available Options:** Disabled, Enabled

**Default setting:** Disabled

### ☐ 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 SCLKS, 4 SCLKS

**Default setting:** 3 SCLKS

### ☐ SDRAM RAS# Precharge

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

**Available Options:** 3 SCLKS, 2 SCLKS

**Default setting:** 3 SCLKS

☐ **SDRAM CAS# Latency**

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

**Available Options:** Auto, Manual

**Default setting:** Auto

☐ **SDRAM Leadoff Cmd Timing**

When 100 MHz external frequency runs the system, the system will run at 3 cycle clocks. When 66 MHz runs the system, the system will run at 4 cycle clocks. Selecting Auto, the system will be auto adaptive depending on the SDRAM clock that is installed.

**Available Options:** Auto, 4 SCLKS, 3SCLKS

**Default setting:** Auto

☐ **DRAM Integrity Mode**

This field specifies the type of the system memory checking function.

**Available Options:** Non ECC, ECC only, ECC,

**Default setting:** Non-ECC

☐ **DRAM Refresh Rate**

This specifies the DRAM refresh rate.

**Available Options:** 15.6 us, 31.2 us, 62.4 us, 124.8 us, and 249.6 us

**Default setting:** 15.6 us

☐ **Memory Hole**

This field specifies the location of an area of memory that cannot be addressed on the ISA bus.

**Available Options:** Disabled, 15MB-16MB, 512KB-64KB

**Default setting:** Disabled

☐ **Graphics Aperture Size**

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

**Available Options:** 4MB, 8MB, 16MB, 32MB, 64MB, 128 MB, or 256MB.

**Default setting:** 256 MB

☐ **Search for MDA Resources**

When a secondary monochrome adapter is installed with a VGA card installed on the PCI bus, select No. When a secondary monochrome adapter is installed with an AGP card installed on the AGP bus, select yes.

**Available Options:** Yes,

**Default setting:** No

☐ **8bit I/O Recovery Time**

The recovery time is the length of time, measured in CPU clocks, which the system will delay after achieving an input/output request. This delay takes place to wait for the I/O to complete the request. This field specifies the recovery time for 8bit I/O.

**Available Options:** Disabled, 1 –8 Sysclk

**Default setting:** 1 Sysclk

☐ **16Bit I/O Recovery Time**

This field specifies the recovery time for 16Bit I/O.

**Available Options:** Disabled, 1 –4 Sysclk

**Default setting:** 1 Sysclk

☐ **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

☐ **LCD CRT Selection**

This item configures to the incorrect display setting. Can viewing LCD or CRT and BOTH If CRT are selected, the system will be only CRT display.

**Available Options:** LCD, CRT, and BOTH

**Default setting:** CRT

❑ **TFT Interface Type Selection**

This item configures to the color TFT interface type setting. Can select 9, 12, 18 and 24 bit for different LCD type

**Available Options:** 9, 12, 18, and 24 bit

**Default setting:** 18 bit

## POWER MANAGEMENT

AMIBIOS SETUP - POWER MANAGEMENT SETUP (C)2000 American Megatrends, Inc. All Rights Reserved		
<b>Power Management/APM</b>	<b>Enabled</b>	Available Options: Disabled ▶ Enabled
Video Power Down Mode	Disabled	
Hard Disk Power Down Mode	Disabled	
Hard Disk Time Out (Minute)	Disabled	
Standby Time Out (Minute)	Disabled	
Suspend Time Out (Minute)	Disabled	
Device 6 (Serial port 1)	Monitor	
Device 7 (Serial port 2)	Monitor	
Device 8 (Parallel port)	Ignore	
RTC Alarm Resume From Soft Off	Disabled	
RTC Alarm Date	15	
RTC Alarm Hour	12	
RTC Alarm Minute	30	
RTC Alarm Second	30	
		ESC:Exit ↑↓:Sel PgUp/PgDn:Modify F1:Help F2/F3:Color

### ☐ 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

☐ **Hard Disk Time Out (Minute)**

This field specifies the length of period of hard disk inactivity. When this period has expired, the system enters power-conserving state specified in the HARD DISK POWER DOWN MODE field.

**Available Options:** Disable, 1 min (minute), 2 min, 3 min, 4 min, 5 min, 6 min, 7 min, 8 min, 9 min, 10 min, 11 min, 12 min, 13 min, 14 min, and 15 min.

**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, 8 Minute, ...up to 60 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, 8 Minute, ...up to 60 Minute.

**Default setting:** Disabled

☐ **Device 6 (Serial port 1)**

This field specifies the power down mode of the system based on the device connected to COM1. When the system does not receive signals from the COM1, it will enter the Power Down mode immediately. To enable the power saving mode, select Monitor. To disable it, select Ignore.

**Available Options:** Monitor, Ignore

**Default setting:** Monitor

☐ **Device 7 (Serial port 2)**

This field specifies the power down mode of the system based on the device connected to COM2. When the system does not receive signals from the COM2, it will enter the Power Down mode immediately. To enable the Power Down mode, select Monitor. To disable it, select Ignore.

**Available Options:** Monitor, Ignore

**Default setting:** Monitor

☐ **Device 8 (Parallel port)**

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

**Available Options:** Monitor, Ignore

**Default setting:** Ignore

☐ **RTC Alarm Resume from soft off**

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

**Available Options:** Disabled, Enabled

**Default setting:** Disabled

☐ **RTC Alarm Date**

This field specifies the date of the RTC alarm.

**Available Options:** 1, 31

**Default setting:** 15

☐ **RTC Alarm Hour**

This field specifies the hour of the RTC alarm.

**Available Options:** 1-24

**Default setting:** 12

☐ **RTC Alarm Minute**

This field specifies the minute of the RTC alarm.

**Available Options:** 1-60

**Default setting:** 30

☐ **RTC Alarm Second**

This field specifies the second of the RTC alarm.

**Available Options:** 1-60

**Default setting:** 30

## PCI/PLUG AND PLAY

AMIBIOS SETUP - PCI / PLUG AND PLAY SETUP		
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Plug and Play Aware O/S	No	Available Options: ▶ Disabled Enabled
PCI Latency Timer (PCI Clocks)	64	
Primary Graphics Adapter	AGP	
PCI VGA Palette Snoop	Disabled	
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	
IRQ15	PCI/PnP	
Reserved Memory Size	Disabled	
Reserved Memory Address	C8000	

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

### ❑ 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:** Yes

### ❑ 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, 192, and 224, 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:** AGP

☐ **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 device's palette registers and the ISA VGA device palette registers, permitting the palette registers of both devices to be identical.

**Default setting:** Enabled

☐ **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

☐ **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.

☐ **Reserved Memory Size**

You can manually reserve a memory size for a certain interface card if required.

**Available Options:** Disabled, 16K, 32K, 64K

**Default setting:** Disabled

☐ **Reserved Memory Address**

When a memory Reserved Memory Size is enabled, specify an address range within the C8000 and DC000.

**Available Options:** C4000, C0000, CC000, D0000, D4000, D8000, D0000, D4000, D8000, DC000, C8000.

**Default setting:** C8000

## PERIPHERAL SETUP

This section describes the function of peripheral features.

AMIBIOS SETUP - PERIPHERAL SETUP (C)2000 American Megatrends, Inc. All Rights Reserved		
OnBoard FDC	Auto	<b>Available Options:</b> ▶ Auto Disabled Enabled  ESC:Exit ↑↓:Sel PgUp/PgDn:Modify F1:Help F2/F3:Color
OnBoard Serial PortA	3F8h/COM1	
OnBoard Serial PortB	2F8h/COM2	
Serial PortB Mode	Normal	
IrDA Protocol	N/A	
OnBoard Parallel Port	378h	
Parallel Port Mode	Normal	
EPP Version	N/A	
Parallel Port IRQ	?	
Parallel Port DMA Channel	N/A	
OnBoard IDE	Primary	

### ❑ OnBoard FDC

This field enables the floppy drive controller on the FB2640.

**Available Options:** Disabled, Enabled

**Default setting:** Enabled

### ❑ OnBoard Serial Port A

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, 3E8H/COM3, and 2E8H/COM4.

**Default setting:** 3F8H/COM1

### ❑ OnBoard Serial Port B

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, 3E8H/COM3, and 2E8H/COM4.

**Default setting:** 2F8H/COM2

☐ **Serial Port B Mode**

COMB can be configured for either IR or COM port application. Normal is

**Available Options:** Normal, IrDA, ASK IR

**Default setting:** Normal

☐ **IrDA Protocol**

When IrDA or ASK IR is selected on the above Serial Port B Mode, you can select 1.6 us or 3/16 us. When Normal is selected, this field displays N/A and cannot be configured.

**Available Options:** N/A, 1.6 us, 3/16 us

**Default setting:** N/A

☐ **OnBoard Parallel Port**

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

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

**Default setting:** 378H

☐ **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

☐ **EPP Version**

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:** N/A, 1.7, 1.9

**Default setting:** N/A

☐ **Parallel Port IRQ**

This field specifies the IRQ for the parallel port.

**Available Options:** Auto, N/A, 5, and 7.

**Default setting:** IRQ7 for Parallel Port; IRQ5 for Parallel Port 2

❑ **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

❑ **OnBoard IDE**

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

**Available Options:** Disabled, Primary, Secondary, and Both

**Default setting:** Primary

## Hardware Monitor Setup

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

AMIBIOS SETUP - HARDWARE MONITOR SETUP	
(C)2000 American Megatrends, Inc. All Rights Reserved	
<b>CPU High Temperature Limit Alarm Disabled</b>	<b>Available Options:</b> ▶ Disabled 55°C/131°F 60°C/140°F 65°C/149°F 70°C/158°F 75°C/167°F 80°C/176°F
<b>System High Temperature Limit Alarm Disabled</b>	
--≡ System Hardware Monitor ≡--	
Current CPU Temperature	0°C/32°F
Current System Temperature	0°C/32°F
CPU Fan Speed	0 RPM
Chassis Fan1 Speed	0 RPM
Vcore	0.000 V
Vio	0.000 V
+ 5.000V	0.000 V
+12.000V	0.000 V
ESC:Exit ↑↓:Sel PgUp/PgDn:Modify F1:Help F2/F3:Color	

### ❑ CPU High Temperature Limit Alarm

When the CPU temperature exceeds the limit, an alarm will be reported.

### ❑ System High Temperature Limit Alarm

When the system, temperature exceeds the limit, an alarm will be reported.

### ❑ 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
- CPU Fan Speed
- Chassis Fan1 Speed
- Vcore
- VIO
- +5V
- +12V

## 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 6 Driver and Utility

The enclosed diskette includes FB2680 VGA, LAN and SCSI driver.

### VGA Driver for WIN98/ME Driver

- 1 To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>FB2680>VGA>SM710>WIN98&ME. If your system is not equipped with a CD ROM device, copy the VGA driver from the CD ROM to a 1.44" diskette.
- 2 Execute setup.exe file.
- 3 The screen shows the SETUP type. Press any key to enter the main menu.
- 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.

- 7 In the WINDOWS98/ME, you can find the <DISPLAYL> icon located in the {CONTROL PANEL} group.
- 8 Adjust the <Refresh Rate>, <Cursor Animation>, <Font size>, <Resolution>, and <Big Cursor>.

### WINNT Driver

- 1 To install the VGA driver, insert the CD ROM into the CD ROM device, and enter DRIVER>FB2680>VGA>SM710>WinNT. If your system is not equipped with a CD ROM device, copy the VGA driver from the CD ROM to a 1.44" diskette.
- 2 Execute setup.exe file.
- 3 The screen shows the SETUP type. Press any key to enter the main menu.
- 4 There are two items for choice to setup. Please choose the <Install VPM driver only> item notice the function key defined. Pressing [Next] starts to install.
- 5 The screen will show the dialog box, demanding the user to type the WinNT's path. The default is C:\WINNT.
- 6 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.

- 7 In the WINDOWSNT, you can find the <DISPLAYL> icon located in the {CONTROL PANEL} group.
- 8 Adjust the <Refresh Rate>, <Cursor Animation>, <Font size>, <Resolution>, and <Big Cursor>.

<p><b>Note:</b> In the VGA\Linux directory, a readme.txt file is included to provide Linux installation information</p>
---

## BIOS Flash Utility

In the <UTILITY> directory, there is the FLASH818.EXE file.

Step 1: Use the AMIFLASH.COM 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.

## LAN Utility

Step 1: To install the LAN utility OR driver, insert the CD ROM into the CD ROM device, and enter DRIVER>FB2680>LAN>DIAG. If your system is not equipped with a CD ROM device, copy the LAN VGA driver from the CD ROM to a 1.44" diskette.

Step 2 Execute install.exe file.

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

## SCSI DRIVER

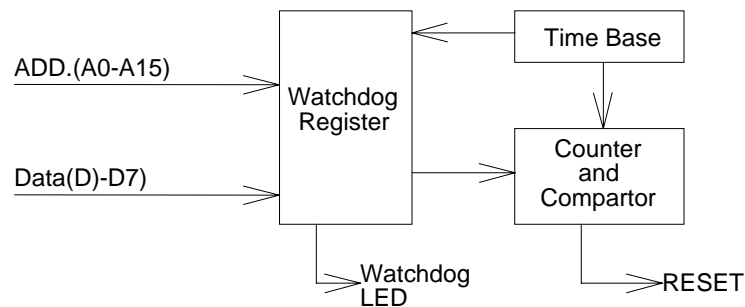
Further information about driver and step-by-step installation procedures can be found in the CD ROM.

**Note:** For Driver installation of other O.S. (especially for WIN95, NT and SCO OpenServer etc.) please refers to the SCSI directory.

## Watchdog Timer

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

The FB2680 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 2 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 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. LED1 on this CPU board is the watchdog timer indicator, which is located at the upper-left corner above the USB connector. Whenever the watchdog timer is enabled, the LED will blink to indicate that the timer is counting. 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	0.5
2	2	1.5
3	3	2.5
4	4	3.5
5	5	4.5
"	"	"
"	"	"
"	"	"
FF	FF	254.5

\* NOTE: Time-Out Period is (Time Factor-1)

\*\* NOTE: Time-Out Period is  $0.5 + 1 \times (\text{Time Factor} - 1)$

### Watchdog Timer Enabled

To enable the watchdog timer, you have to output a byte of timer factor to the watchdog. The following is a Turbo C++ program, which demonstrates how to enable the watchdog timer and set the time-out period at 6 seconds.

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

### Watchdog Timer Disabled

To disable the watchdog timer, simply write a 00H to the watchdog register.

```
#include "studio.H"
```

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

```
main ( )
```

```
{
```

```
printf ("Disable Watch Dog");
```

```
_disable_WD( );
```

## 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

---

Please refer to the section of the "Serial Ports" in the Chapter "System Controllers" 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 FB2680 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-485 of the FB2680 uses COM2. If you want to program it, please refer to the BIOS Setup for COM2 address setup.

## Chapter 7 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 the 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 FB2680 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
17	Low expansion memory byte

Address	Description
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	Equipment Bits 7-6 Number of Floppy Drives 00 1 Drive 01 2 Drives Bits 5-4 Monitor Type 00 Not CGA or MDA 01 40x25 CGA 01 2 Drives 80x25 CGA Bits 3 Display Enabled 0 Disabled 1 Enabled Bit 2 Keyboard Enabled 00 Not CGA or MDA 01 40x25 CGA 01 2 Drives 80x25 CGA Bit 1 Math Coprocessor Installed 0 Absent 1 Present Bit 0 Floppy Drive Installed 0 Disabled 1 Enabled
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 bytes address space available. The following table lists the I/O port addresses used on the Industrial CPU Card.

Address	Device Description
000h - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt Controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard Controller
070h - 07Fh	Real Time Clock, NMI
080h - 09Fh	DMA Page Register
0A0h - 0BFh	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)
2B0 - 2DF	Graphics adapter Controller
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)

### 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	Reserved
IRQ6	Floppy Disk Controller
IRQ7	Parallel Port #1
IRQ8	Real Time Clock
IRQ9	Software Redirected to Int 0Ah
IRQ10	LAN#1
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 FB2680 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 ACE4) 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

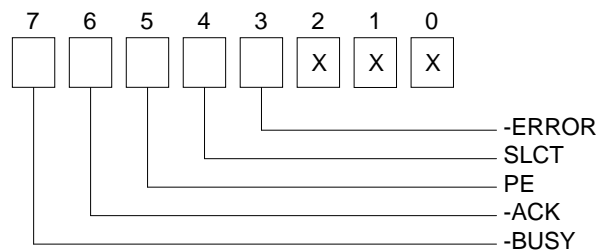
The parallel portion of the SMC37C669 makes the attachment of various devices that accept eight bits of parallel data at standard TTL level.

### ❑ 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:

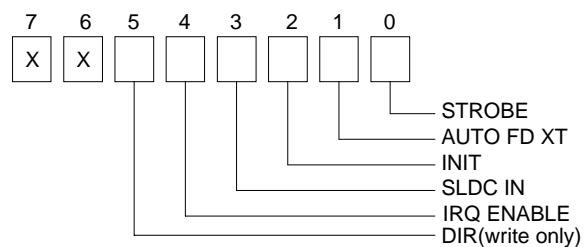


NOTE: X represents not used.

- 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:

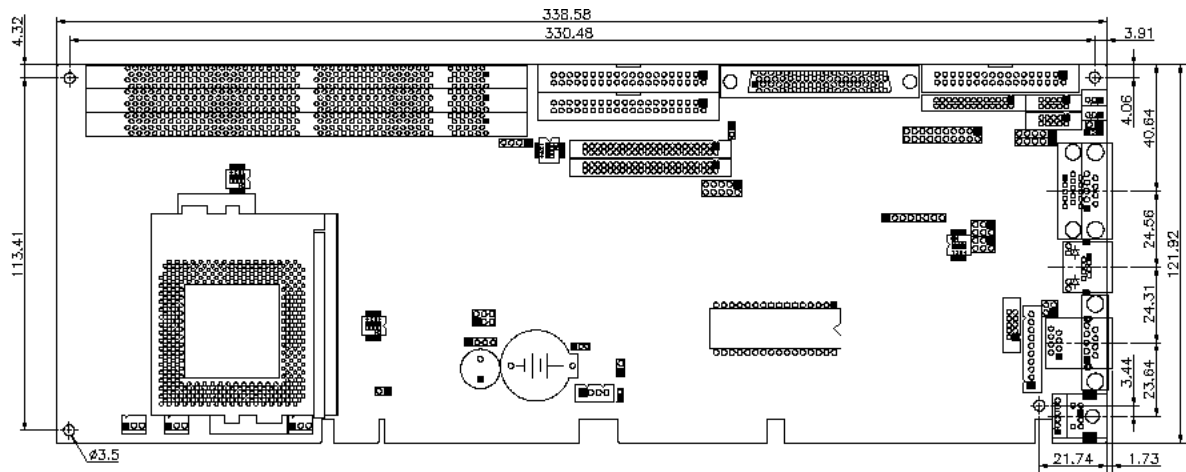


NOTE: X represents not used.

- 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

