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PC104 CPU Card
Low Power Series
FB2410 User's Manual

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

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

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Chapter 1 Introducing the FB2410 System

Overview

The FB2410 is an ST STPC ATLAS processor, all in one, PC/104 CPU board. This user's manual provides information on the physical features, installation, and BIOS setup of the FB2410.

Built to unleash the total potential of the STPC ATLAS Processor, the FB2410 is a single board computer capable of handling today's demanding requirements. Able to support 133MHz CPU, this unit supports 10/100M interface network port, 1 DIMM socket supports up to 128 SDRAM, two USB1.1 ports, and a VGA controller.

Each FB2410 has two ports for I/O communications. Two RS-232 ports are available. There is also a watchdog timer that can be configured from software to automatically reset the system. And for easy configuration, AMI BIOS are available.

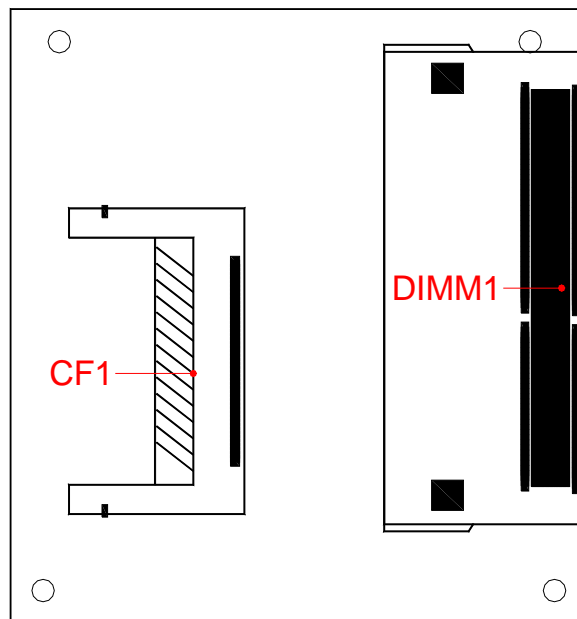
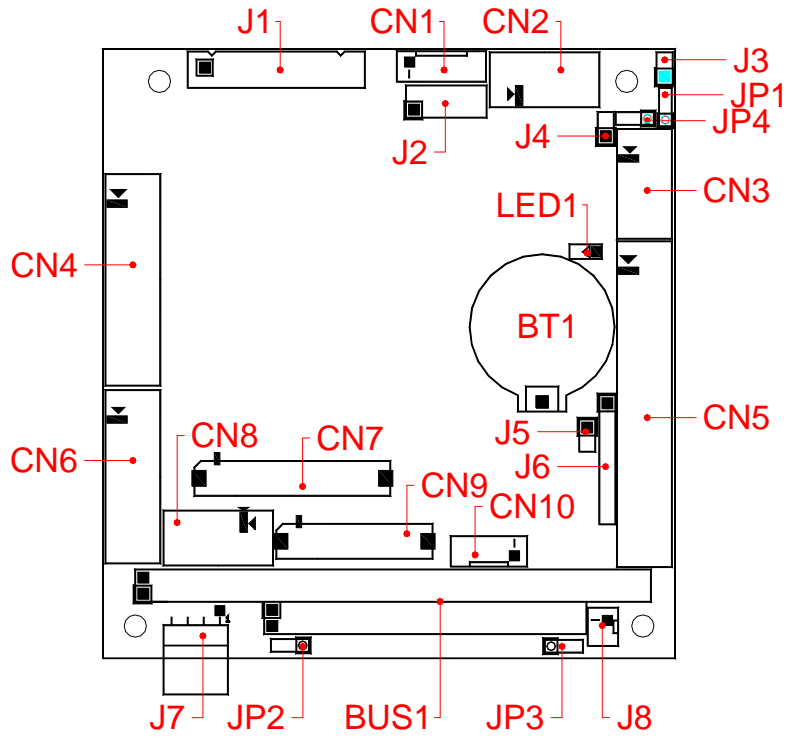
Power management is also featured to lower the rate of consumption. The unit supports doze mode, <Suspend Mode> and <Standby mode> as well as it adheres to the "Green Function" standard.

The FB2410 is perfect for POS and POI applications, network systems, panel / MMI's, order entry kiosks, test equipment, OEM projects or as a motherboard for a panel PC. The unit is only 90.2x95.9mm, offering unparalleled performance in a very small footprint.

Series Comparison Table

Model	FB2410	FB2410A
Processor	STPC ATLAS	
VGA Chipset		
CRT / LCD	CRT/TFT/LVDS	CRT
Watchdog Timer	Yes	
Multi I/O	2S/1P/FDD/IDE	
Serial Port	One RS232,One RS-232/RS485	
Parallel	Yes	
FDD	Yes	
Enhanced IDE	One	
Compact Flash Socket	One	
USB 1.1	Two	
RJ45 port (10/100Mbps)	One	
Dimensions (Unit: mm)	90.2(D) x 95.9(W)	

Layout



Specifications

- ❑ STPC ATLAS CPU and 8KB L1 cache inside the CPUs.
- ❑ Supporting One So-DIMM socket for up 128MB SDRAM
- ❑ One 10M/100M Base-TX Ethernet port.
- ❑ Supports CRT port and TFT/LVDS LCD with up to 4MB shared memory.
- ❑ One RS-232, one RS-232/RS-485 ports, parallel, floppy, and PCI IDE interface.
- ❑ Compact Flash socket for 3.3V Compact Flash and Micro Drives.
- ❑ PS/2 compatible keyboard and mouse interface.
- ❑ Providing header for external speaker and hard disk access LED.
- ❑ Two USB (1.1) ports and Software programmable watchdog timer.
- ❑ Flash BIOS with easy upgrade utility.
- ❑ PC/104 form factor, 90.2 mm x 95.9 mm (3.55" x 3.775")
- ❑ Power requirement: +5V only, 1.5A maximum.

Packing List

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

- Unpack and inspect the FB2410 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 FB2410 is not supplied from us, please make sure the specification of the cable(s) is compatible with the FB2410 system.

Note: After FB2410 is installed, it is recommended that you keep the diskette or CD that contains drivers and document files, and keep the document copies, or unused cables in the carton for future use.

The following list the accessories that may be included in your FB2410 package. Some of the accessories are optional shipped only upon order.

- One FB2410 All-In-One PC/104 CPU board.
- One VGA (CRT interface) adapter cable.
- One 44-pin hard disk drive interface cable.(Option)
- One 20-pin to 34-pin floppy driver interface cable. (Option)
- Two serial port adapter cables.
- One PS2 keyboard and mouse port adapter cable.
- One 10-pin LAN adapter cable with FB4605A board.
- One USB adapter cable. (Optional items)
- One compact disc containing manual file in PDF format and necessary drivers and utilities.

Chapter 2 Hardware Installation

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

Before Installation

Before you install the system, make sure you follow the below descriptions.

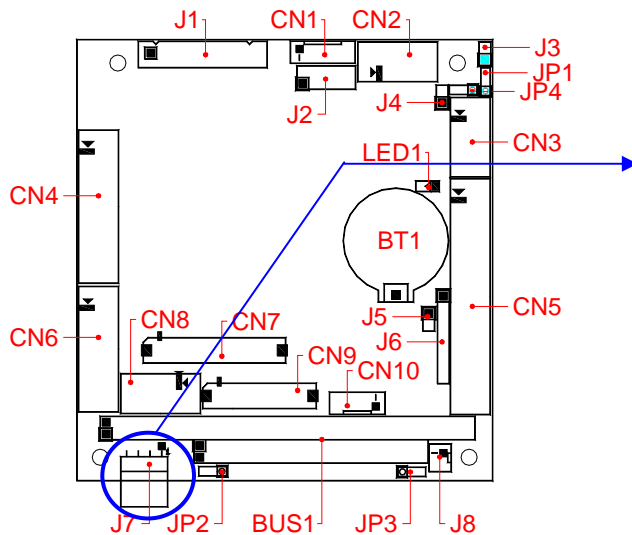
1. Before removing the board from its anti-static bag, wear an anti-static strap to prevent the generation of Electricity Static Discharge (ESD). The ESD may be generated by man's physical touch. It may do damage to the board circuit.
2. Install any connector, module, or add on card, be sure that the power is disconnected from the system board. If not, this may damage the system board components, module, or the add-on-card.
3. When you connect the connectors and memory modules, be careful with the pin orientations.

Hardware Features

The following list is for the setup of the connectors and jumpers of the FB2410.

Item	Description
CN1	6-pin for Keyboard and Mouse connector (JST)
CN2	10-pin 2.0mm COM2 RS-232/RS485 port connector (IDC)
CN3	10-pin 2.0mm COM1 RS-232 port connector (IDC)
CN4	26-pin 2.0mm parallel port connector (IDC)
CN5	44-pin 2.0mm IDE hard disk connector (IDC)
CN6	20-pin 2.0mm floppy connector (IDC).
CN7	40-pin LCD Connector with 24 bit LCD signals (DF13)
CN8	10-pin 2.0mm CRT connector (IDC)
CN9	30-pin LCD Connector with LVDS LCD signals (DF13)
CN10	5-pin Power Connector for LCD inverter board (JST)
CF1,JP1	Compact Flash Socket and Master/Slave Select
JP2	RS232/RS-485 Select Header
JP3	Clear CMOS data and Select external battery header
JP4	Terminator header for RS485
J1	10-pin for RJ45-Lan 2.54mm connector (JST)
J2	10-pin USB ports #0/1 2.54mm connector header
J3	2-pin Reset header
J4	2-pin for HDD LED indicator header
J5	2-pin for external speaker header
J6	Reserved
J7	4-pin Power connector
J8	2-pin for external battery header
LED1	Power and watchdog of LED indicator
BUS1	PC-104 Connector
DIMM1	SDRAM So-DIMM Socket 144-pin

□ J7: Power Connector (4-pin 2.5mm JST)



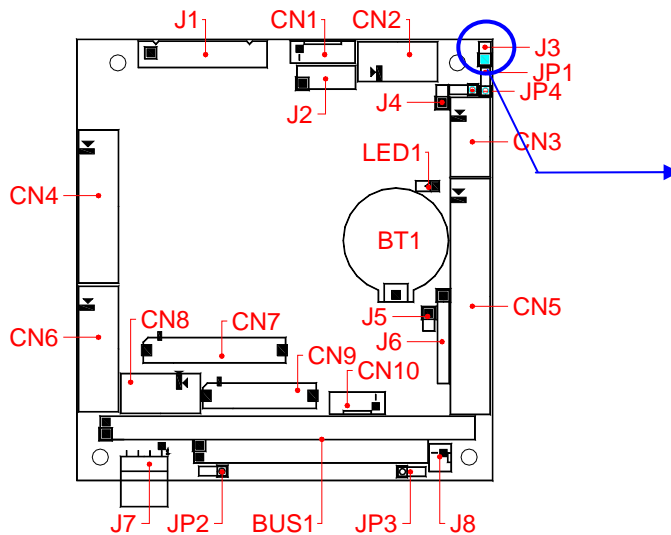
PIN	Signal
1	VCC (+5V)
2	Ground
3	Ground
4	VDD (+12V)

Note: FB2410 needs +5V only, +12V is not necessary.

Note: Be careful with the pin orientation when installing power connector. A wrong connection can easily destroy your FB2410 board.

□ J3: Reset Header

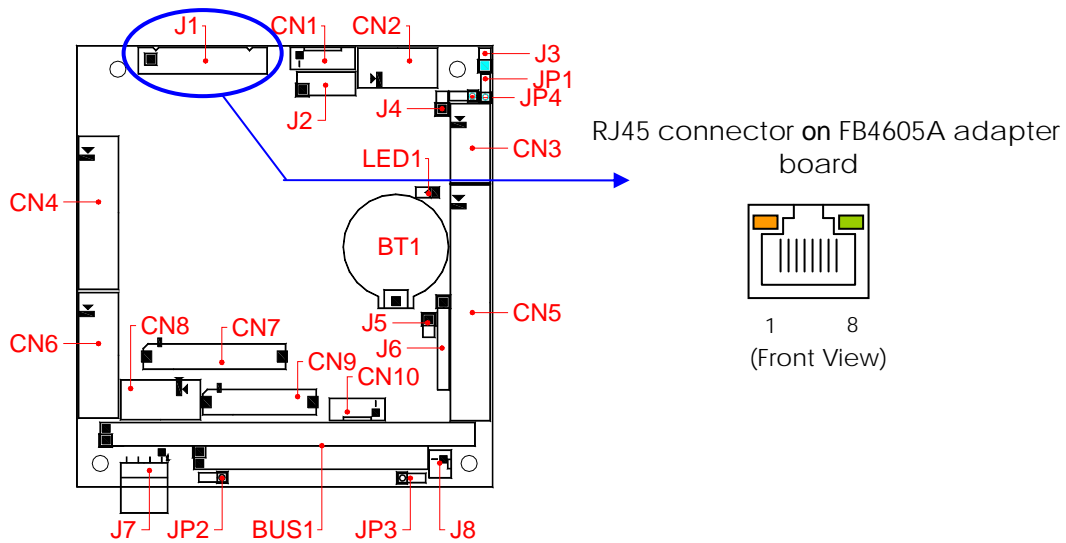
J3 is a 2-pin header for connecting to system reset button. Shorting the circuit of the 2 pins makes the hardware reset and FB2410 restart system. It is similar to power off the system and then power it on again.



PIN	Signal
1	Reset +
2	Reset -

□ **J1: RJ45 LAN /Adapter Connector with LED indicators**

FB4605A is a RJ45 connector with 2 LEDs for LAN. The left side LED (orange) indicates data which is being accessed and the right side LED (green) indicates on-line status. (On indicates on-line and Off indicates off-line) J1 provides twist-pair signals of LAN port if you got LAN version and adapter board (FB4605A) with cable. The following lists the pin assignments of J1 to RJ45 connector on the FB4605A LAN adapter board:

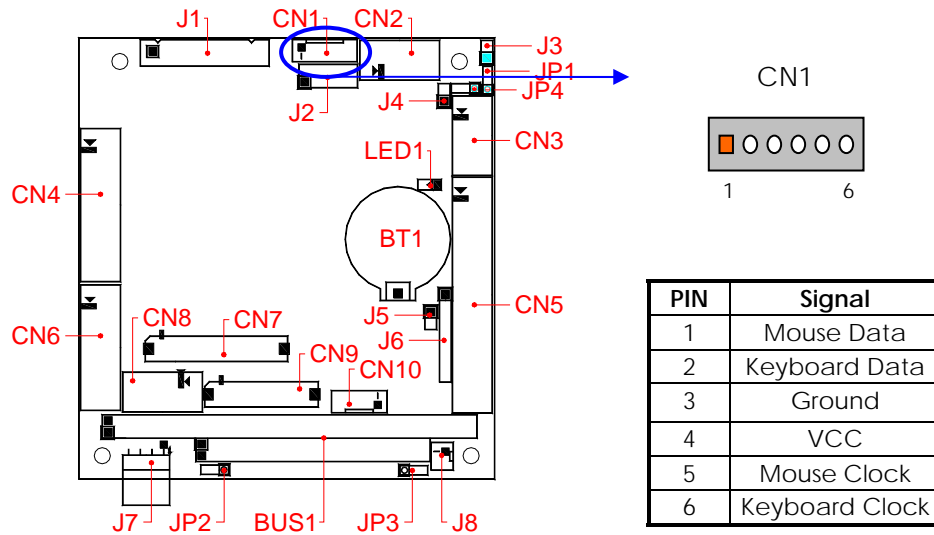


The following list the pin assignments of J1.

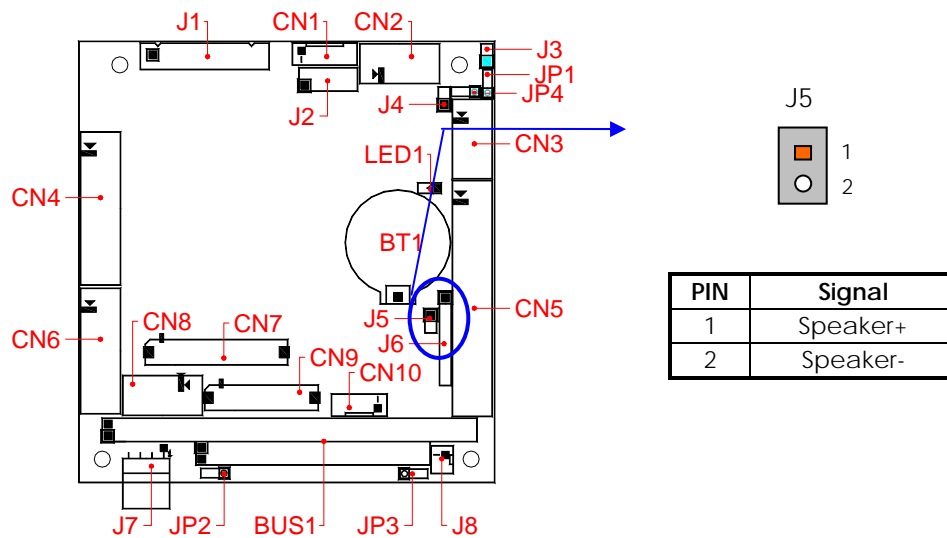
J1	Signal	RJ45	J1	Signal	RJ45
1	TPTX+	1	6	Access LED	-
2	TPTX -	2	7	On-Line LED	-
3	TPRX+	3	8	Case GND	-
4	TPRX -	6	9	FBG1	4
5	LED Common	-		FBG1	5
				FBG2	7
			10	FBG2	8

□ **CN1: Keyboard/Mouse Connector**

CN1 is a 6-pin 2.0mm JST connector, use the included KB/MS adapter cables you can attach standard PS/2 type keyboard and mouse.

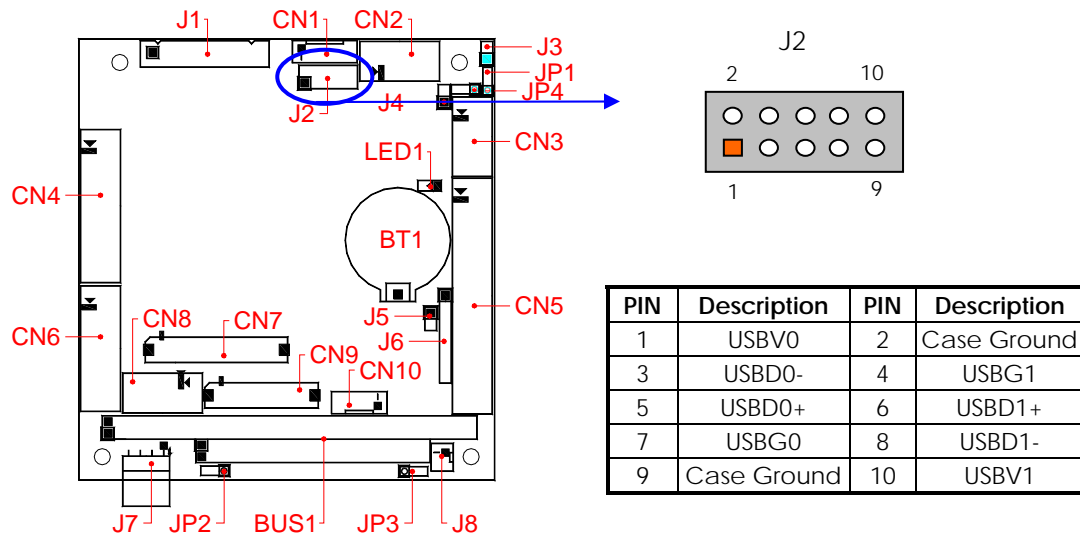


□ **J5: External Speaker Header**

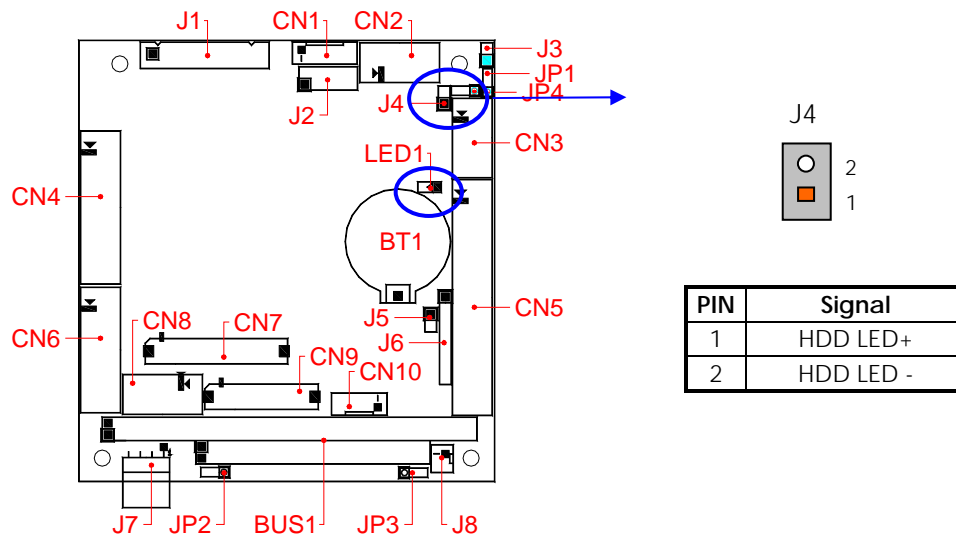


□ **J2: USB Connector**

Use the USB adapter cable and **FB4641 board**, you can attach up to 2 USB devices.

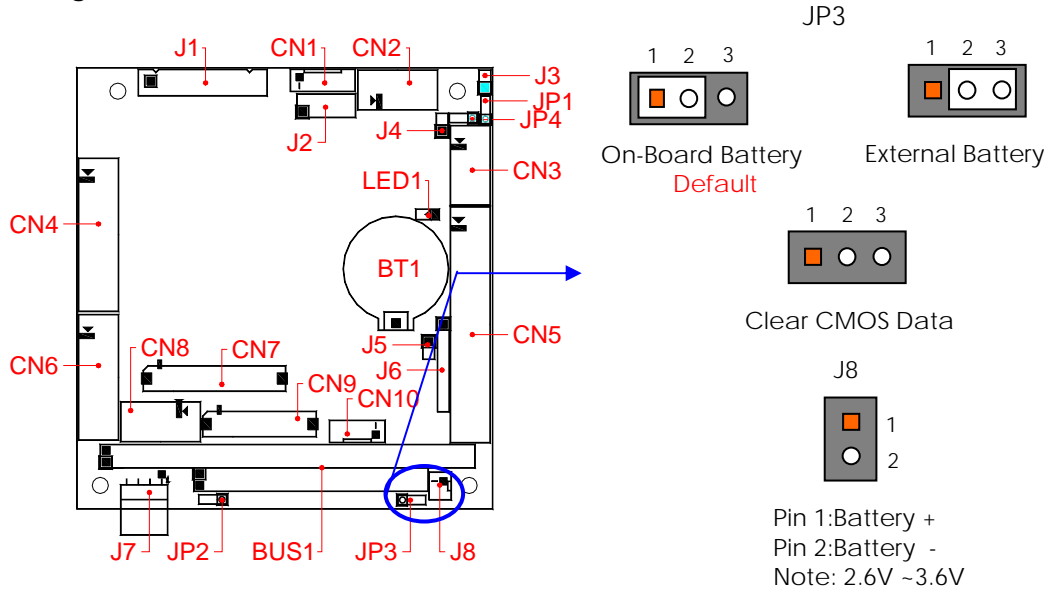


□ **LED1: Power/WatchDog LED indicator, J4: External HDD LED Header**



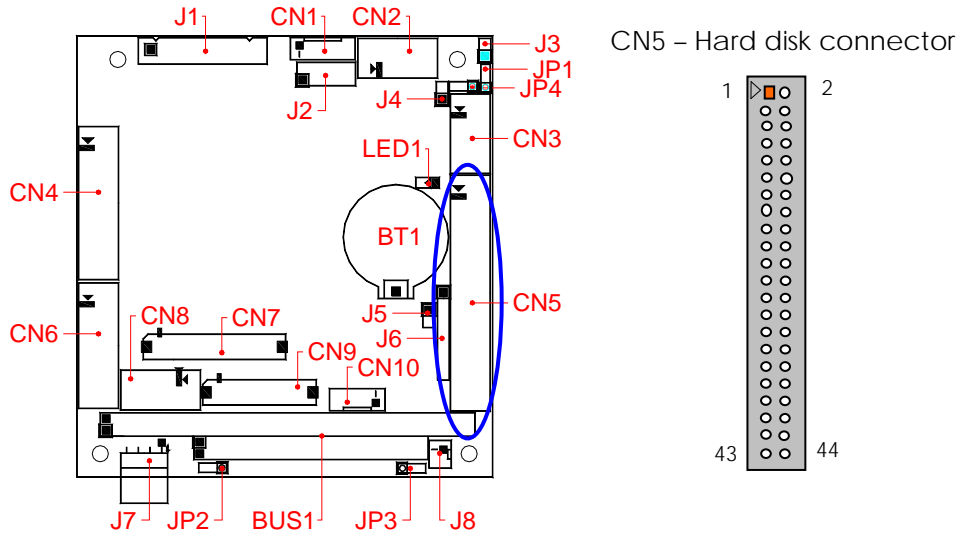
□ **J8 & JP3: External Battery Connector and Battery Select Jumper**

J8 is used to connect an external battery pack if on-board Lithium battery is empty, and please setting JP3 properly of in-board battery or external battery .You can use JP3 to clear CMOS data. The CMOS store information like system date, time, boot up device, password, IRQ... which are set up with the BIOS. To clear the CMOS, set JP3 to open and then return to 1-2 before system power off. The default setting is 1-2.



□ **CN5: IDE hard Disk Connectors**

CN5 is 44-pin 2.0mm IDC connectors. Use the hard disk cable to attach up to two 2.5" hard disk drives.



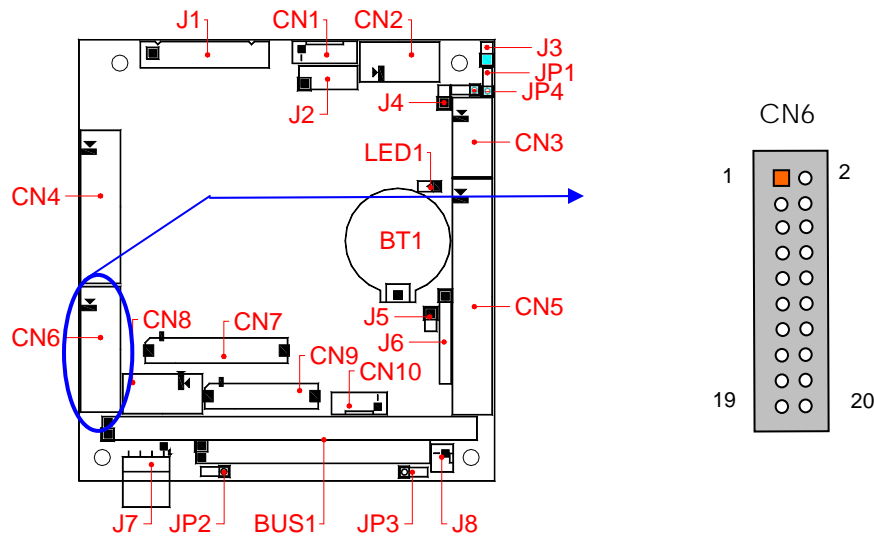
The following table lists the pin description of CN5.

Pin	Description	Pin	Description
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	AIN T	32	GROUND
33	SA 1	34	Not Used
35	SA 0	36	SA 2
37	CS 0	38	CS 1
39	HD LED A	40	GROUND
41	VCC	42	VCC
43	GROUND	44	Not Used

Note: Be careful with the pin orientation when installing connectors and the cables. A wrong connection can easily destroy your hard disk. CN5 is used to connect a 2.5" HDD with included 44-pin flat-cable or 44-pin DiskOnModule directly.

□ **CN6: Floppy Connector**

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

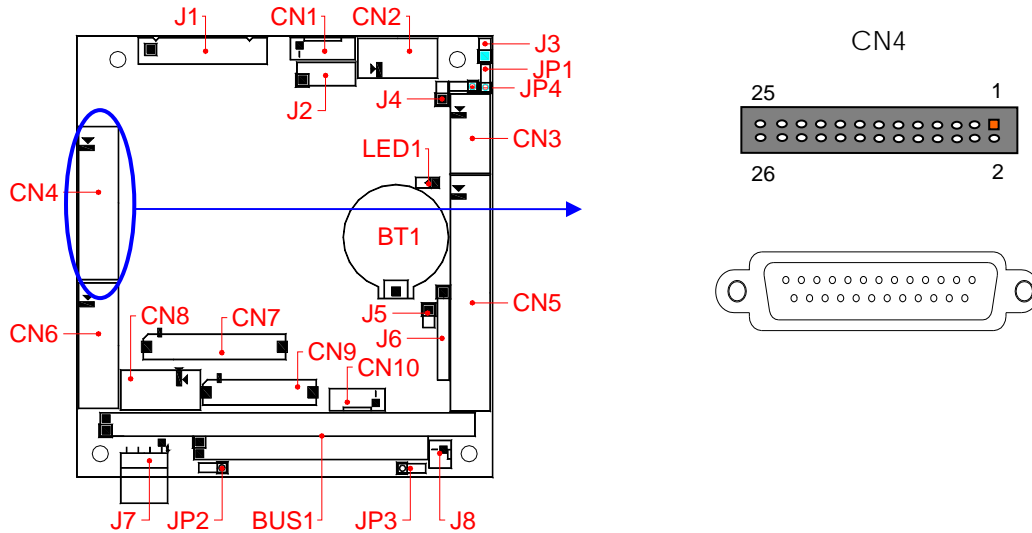


The following table shows signal connections.

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

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

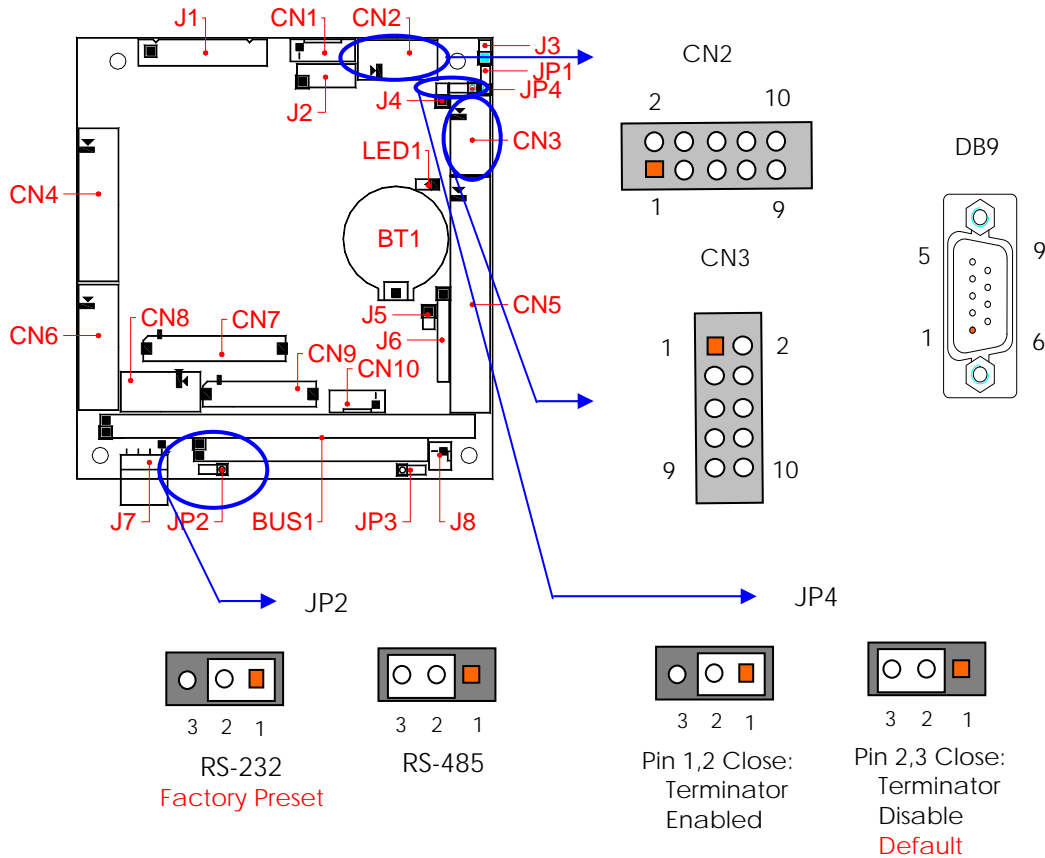
The included printer interface cable is used to transfer 26-pin connector into standard DB25 connector.



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

□ **CN2 & CN3: Serial Port Connectors RS-232C Pin Definitions**

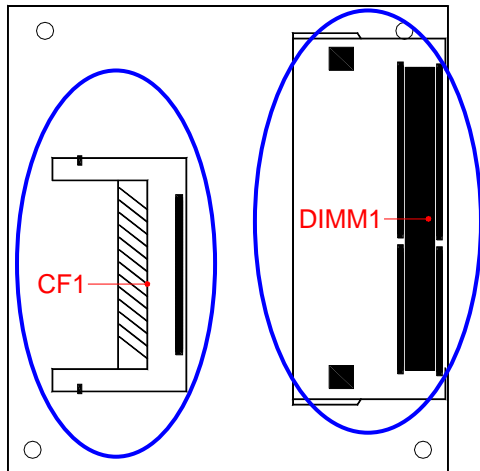
CN3 (COM1) & CN2 (COM2) are 10-pin 2.0mm IDC connectors. The included serial port adapter cables are used to transfer 10-pin 2.0mm IDC into standard DB-9 connector. The serial port 2 is designed for multiple purposes. Use JP2 selects the RS-232 or RS-485, and JP4 provides terminator select of RS-485 mode. The following tables show the signal connections of these connectors and the included adapter cable for CN2 & CN3:



CN3	Signal	CN2	RS485	DB9
1	-DCD2	1		1
2	-DSR2	2		6
3	RXD2	3	485-	2
4	-RTS2	4		7
5	TXD2	5	485+	3
6	-CTS2	6		8
7	-DTR2	7		4
8	-RI2	8		9
9	GROUND	9		5
10	CASE GROUND	10		Shield

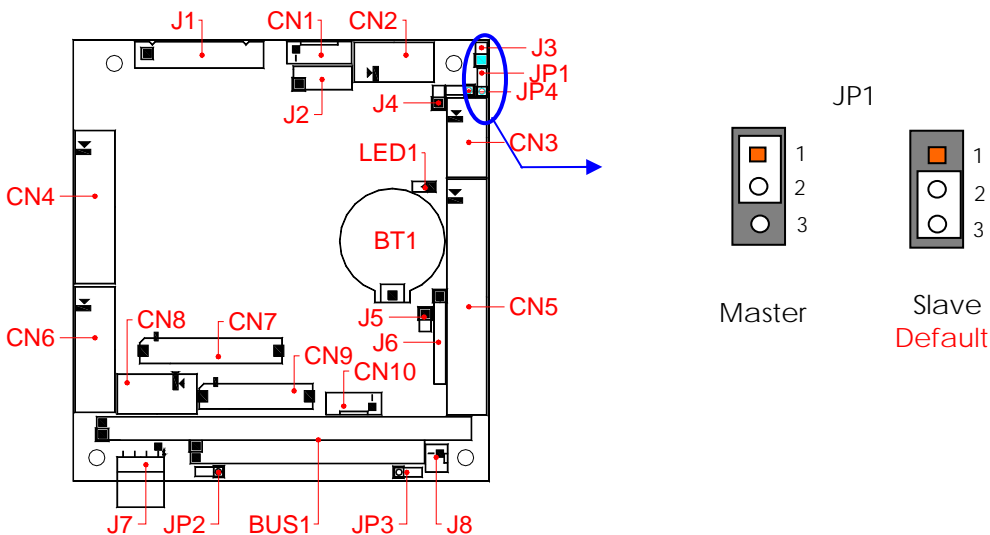
□ **DIMM1: So-DIMM Socket**

The DIMM1 socket on the solder side accepts 64MB to 128MB of SDRAM modules



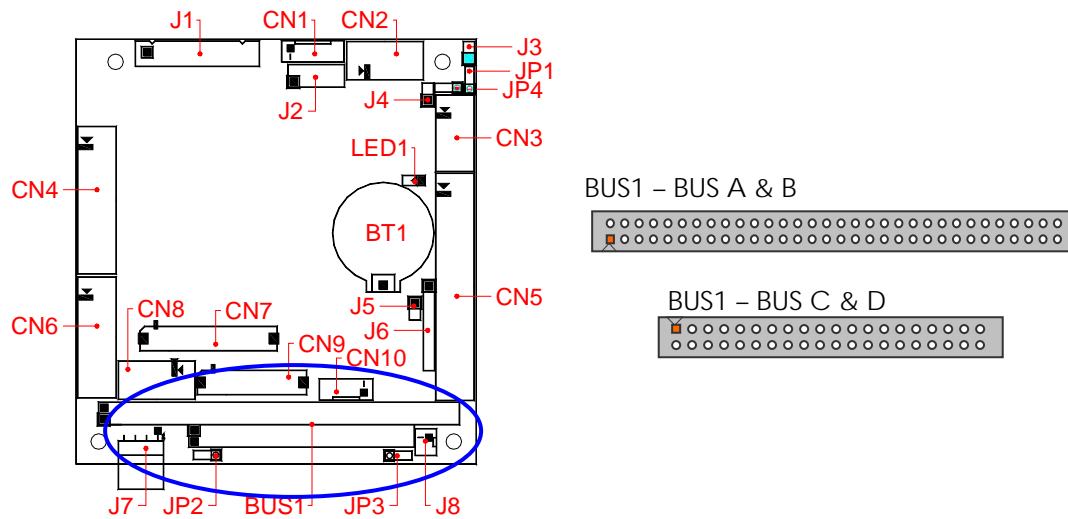
□ **CF1 & JP1: Compact Flash Socket and Master/Slave Select**

The Compact Flash socket CF1 (on the solder side) supports 3.3V Compact Flash and Micro Drives. JP1 is used to select master/slave device of this socket. Be sure to ward off the same master/slave setting with which connects to IDE (CN5) connector, if you use CF1 and CN5 simultaneously.



Note: The Compact Flash socket supports 3.3V Compact Flash and Micro Drives. The JP1 is used to select master/slave device of this socket and the default is slave (close). Be sure not to set master/slave to the same IDE connector, if you use CF and IDE hard disk simultaneously.

□ **BUS1: PC/104 Bus Connectors**



PC/104 A & B Pin

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
A1	-IOCHK	A17	SA14	B1	Ground	B17	-DACK1
A2	SD7	A18	SA13	B2	RSTDRV	B18	DRQ1
A3	SD6	A19	SA12	B3	+5V	B19	-REFRESH
A4	SD5	A20	SA11	B4	IRQ9	B20	BUSCLK
A5	SD4	A21	SA10	B5	-5V	B21	IRQ7
A6	SD3	A22	SA9	B6	DRQ2	B22	IRQ6
A7	SD2	A23	SA8	B7	-12V)	B23	IRQ5
A8	SD1	A24	SA7	B8	-ZWS	B24	IRQ4
A9	SD0	A25	SA6	B9	+12V	B25	IRQ3
A10	IORDY	A26	SA5	B10	Key1	B26	-DACK2
A11	AEN	A27	SA4	B11	-MEMW	B27	TC
A12	SA19	A28	SA3	B12	-MEMR	B28	ALE
A13	SA18	A29	SA2	B13	-LOW	B29	+5V
A14	SA17	A30	SA1	B14	-IOR	B30	OSC
A15	SA16	A31	SA0	B15	-DACK3	B31	Ground
A16	SA15	A32	Ground	B16	DRQ3	B32	Ground

PC/104 C & D Pin

Pin	Signal	Pin	Signal	Pin	Signal	Pin	Signal
C1	GND	C11	MEMW#	D1	Ground	D11	-DACK#5
C2	SBHE	C12	SD8	D2	MEMCS16#	D12	DREQ5
C3	LA23	C13	SD9	D3	IOCS16#	D13	DACK#6
C4	LA22	C24	SD10	D4	IRQ10	D14	DREQ6
C5	LA21	C25	SD11	D5	IRQ11	D15	DACK#7
C6	LA20	C26	SD12	D6	IRQ12	D16	DREQ7
C7	LA19	C27	SD13	D7	IRQ15	D17	VCC
C8	LA18	C28	SD14	D8	IRQ14	D18	-MEMCS16-
C9	LA17	C29	SD15	D9	DACK#0	D19	GND
C10	MEMR#	C20	KEY	D10	DREQ0	D20	GND

Chapter 3 Installing CRT & LCD Display

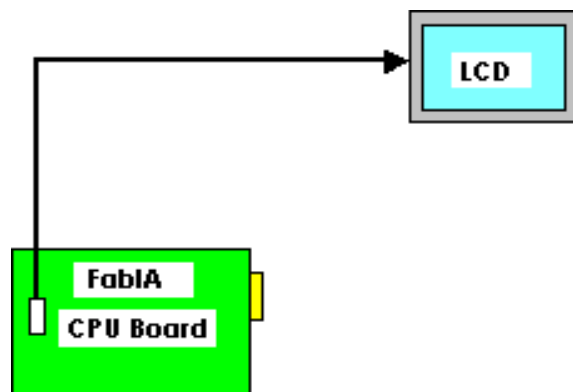
This chapter describes the configuration and installation procedure of LCD and CRT displays. Both CRT and LCD displays may be used at the same time. However, each type of LCD requires different BIOS. This section describes the configuration and installation procedure using LCD display. Skip this section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

- LCD Flat Panel Display
- CRT & LCD Display

LCD FLAT PANEL DISPLAY

Using the BIOS setting for different types of LCD pane, then set your system properly and configures BIOS setting for the right type of LCD panel you are using.

The following shows the block diagram of using FB2410 for LCD display.



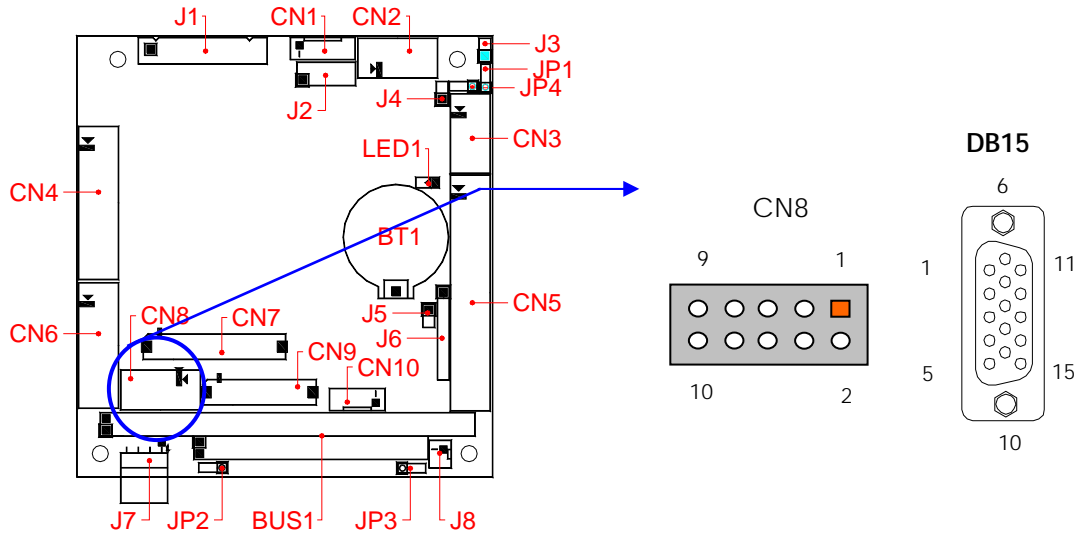
LCD Panel Block Diagram

The diagram shows that FB2410 needs components to be linked with a LCD panel.

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 Display (CN8)

The FB2410x supports a CRT colored monitor. It can be connected to create a compact video solution for the industrial environment. 4MB simulated VRAM allows a maximum CRT resolution of 1280X1024 with 24 bpp at 75Hz. The following table and figure illustrate the pin definition of CN8 and D-sub 15-pin on the CRT adapter cable:

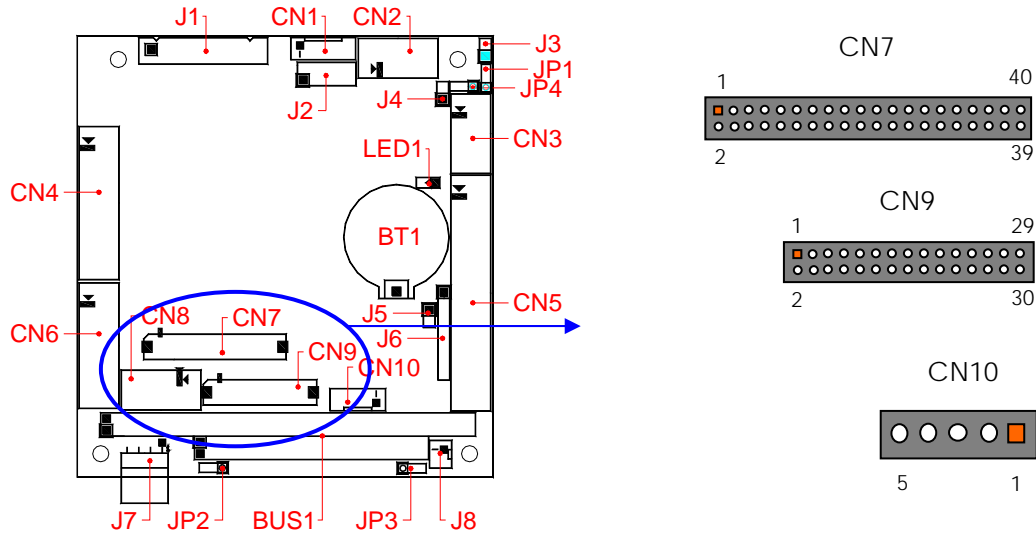


Pin	Signal	DB-15	Pin	Signal	DB15
1	RED	1	2	Case Ground	Case
3	GREEN	2	4	Digital Ground	5,10
5	BLUE	3	6	Analog Ground	6,7,8
7	VSYNC	14	8	DDC Data	12
9	HSYNC	13	10	DDC Clock	15

NOTE: Be careful with the pin orientation when installing VGA connector and the cable.

□ **CN7, CN9 & CN10: LCD Connector and Power connector**

CN7 supports 18-bit TTL LCD signals, CN9 supports 18-bit LVDS LCD signals, and CN10 is the power connector for inverter board.



Pin	CN7	CN9	Pin	CN7	CN9
1	+5V	Ground	2	+5V	TX0+
3	Ground	TX0-	4	Ground	Ground
5	+3.3V	TX1+	6	+3.3V	TX1-
7	NC	Ground	8	Ground	TX2+
9	NC	TX2-	10	NC	Ground
11	FP12(B0)	TXCLK+	12	FP13(B1)	TXCLK-
13	FP14(B2)	Ground	14	FP15(B3)	-
15	FP16(B4)	-	16	FP17(B5)	Ground
17	NC	-	18	NC	-
19	FP6(G0)	Ground	20	FP7(G1)	-
21	FP8(G2)	-	22	FP9(G3)	Ground
23	FP10(G4)	-	24	FP11(G5)	-
25	NC	Ground	26	NC	Ground
27	FP0(R0)	+3.3V	28	FP1(R1)	+3.3V
29	FP2(R2)	+5V	30	FP3(R3)	+5V
31	FP4(R4)		32	FP5(R5)	
33	Ground		34	Ground	
35	SHFCLK		36	FP (VS)	
37	DE		38	LP (HS)	
39	ENVDD		40	ENAVEE	

Pin	CN10
1	+12 V
2	GND
3	ENBLK
4	N.C
5	+5 V

NOTE: 1. Different LCD panels use different BIOS and pin connections.
 2. If any trouble occurs when connecting FB2410 with LCD panels, you could contact technical support division of FabiaTech Corporation.

Chapter 4 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 PCI 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.

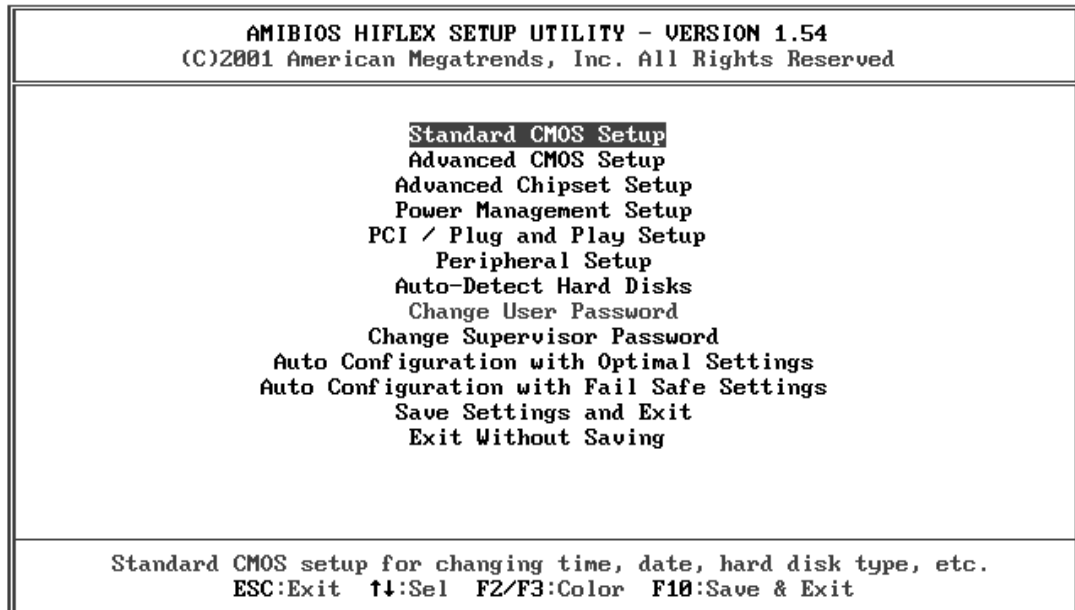
The BIOS provides a menu-driven interface to the console subsystem. The console subsystem contains special software, called firmware that interacts directly with the hardware components and facilitates interaction between the system hardware and the operating system.

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. 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)2001 American Megatrends, Inc. All Rights Reserved									
Date (mm/dd/yyyy): Sat Sep 29,2007					Base Memory: 0 KB				
Time (hh/mm/ss) : 16:02:31					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

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)2001 American Megatrends, Inc. All Rights Reserved		
Quick Boot	Enabled	Available Options: Disabled ▶ Enabled ESC:Exit ↑↓:Sel PgUp/PgDn:Modify F1:Help F2/F3:Color
1st Boot Device	IDE-0	
2nd Boot Device	Floppy	
3rd Boot Device	CD/DVD	
Try Other Boot Devices	Yes	
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	
Hit 'DEL' Message Display	Enabled	
Internal Cache	WriteBack	
C000,16k Shadow	Enabled	
C400,16k Shadow	Enabled	

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”.

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

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

Internal Cache

This functions speeds up memory access. The STPC CPU has L1 internal cache.

Available options: WriteBack, WriteThru, Disabled

Default setting: WriteBack

C000, 32k Shadow - DC00, 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)2001 American Megatrends, Inc. All Rights Reserved	
VGA Frame Buffer Size (KB)	4096
ISA Authorized To Write To IPC	Disabled
IPC Wait State Cycles	4
ISA Clock Frequency	14MHz/2
ISA Insert Wait State	Enabled
ISA to Host Read Buffer	Enabled
ISA to Host Write Posting	Enabled
C0000-C7FFF cacheable	Disabled
SDRAM Clock	066MHz
Lan Chipset Controller	Enabled
Lan Boot ROM Controller	Disabled

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

VGA Frame Buffers Size (KB)

This field is share memory architecture (SMA) for frame buffer memory. SMA allows system memory to be efficiently share by the host CPU and allocated depending on user preference, application requirements, and total size of system memory.

Available Options: None, 128KB~4096KB

Default setting: 4096KB

ISA Authorized To Write to IPC

This field is controls the timing of the DMA controller, and also the number of wait state for write register to IPC.

Available Options: Disabled, Enabled

Default setting: Disabled

IPC Wait State Cycle

This field is specifying the number of ISA clock wait state for read/write to IPC.

Available Options: 1, 2, 3, and 4

Default setting: 4

ISA Clock Frequency

This field sets the polling clock speed of ISA Bus.

Available Options: PCICLK/4, and 14.318MHz/2

Default setting: 14.318MHz/2

ISA Insert Wait State

If selected Enable, posted writes to host memory by ISA DMA or ISA bus Master are enabled.

Available Options: Enable, and Disabled

Default setting: Enabled

ISA to Host Read Buffer

If selected Enable, buffered reads of host memory by ISA DMA or ISA bus Master are enabled.

Available Options: Enable, and Disabled

Default setting: Enabled

ISA to Host writer Posting

If extra wait state is inserted for slower ISA devices, Enable is 1 wait state and disable is 0 wait state.

Available Options: Enable, and Disabled

Default setting: Enabled

C0000~C7FFFF Cacheable

This field is for the 32k VGA video BIOS. Also, the contents of the RAM area can be read from and written to cache memory.

Available Options: Enable, and Disabled

Default setting: Enabled

SDRAM Clock

This specifies the SDRAM memory clock frequency.

Available Options: 100MHz, 133MHz

Default setting: 100MHz

LAN Chipset Controller

This field specifies the Enable or Disable of the onboard LAN chip.

Available Options: Disabled, Enable

Default setting: Enable

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		(C)2001 American Megatrends, Inc. All Rights Reserved	
Power Management/APM	Enabled	Available Options:	
*** Seletc Power Down Mode **		Disabled	
Video Power Down Mode	Disabled	▶ Enabled	
Hard Disk Power Down Mode	Disabled		
*** Seletc Time Out Mode ***			
Doze Time Out (Second)	Disabled		
Standby Time Out (Minute)	Disabled		
Suspend Time Out (Minute)	Disabled		
Green PC Monitor Power State	On		
		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

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, 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, 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: ▶ No Yes
Clear NVRAM on Every Boot	No	
PCI Latency Timer (PCI Clocks)	64	
PCI VGA Palette Snoop	Disabled	
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	ISA/EISA	
IRQ4	ISA/EISA	
IRQ5	PCI/PnP	
IRQ7	PCI/PnP	
IRQ9	ISA/EISA	
IRQ10	PCI/PnP	
IRQ11	ISA/EISA	
IRQ14	PCI/PnP	
IRQ15	PCI/PnP	
		ESC:Exit ↑↓: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: No

PCI Latency Timer (PCI Clocks)

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

PCI VGA Palette Snoop

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

Available Options:

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

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

Default setting: Disable

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
OnBoard Serial Port1	3F8h/COM1	
OnBoard Serial Port2	2F8h/COM2	
OnBoard Parallel Port	Auto	
Parallel Port Mode	Normal	
EPP Version	N/A	
Parallel Port IRQ	Auto	
Parallel Port DMA Channel	N/A	
OnBoard IDE	Both	

OnBoard FDC

This field enables the floppy drive controller on the FB2644.

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

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, 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

On-Board 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

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 5 Driver and Utility

The enclosed diskette includes FB2410 LAN driver. To install and configure you FB2410 system, you need to perform the following steps.

LAN Utility & Driver

- 1 To install the LAN utility OR driver, insert the CD ROM into the CD ROM device, and enter DRIVER>LAN>RTL8139C>DIAG. If your system is not equipped with a CD ROM device, copy the LAN driver from the CD ROM to a CF.
- 2 Execute install.exe file.

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

BIOS Flash Utility

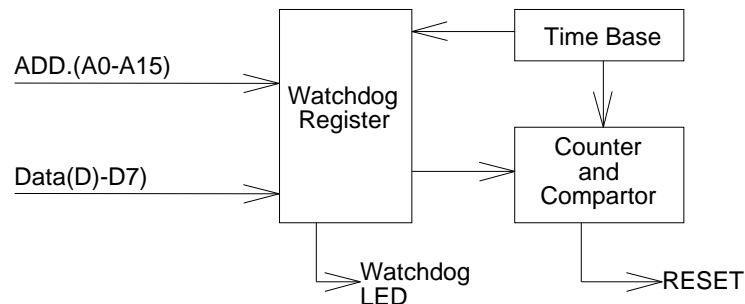
In the <UTILITY> directory, there is the FLASH845.EXE file.

- 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 are 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 FB2410 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/SMSc787/ASSEMBLE: Library and Test Program written in Assembly Language
2. WATCHDOG/SMSc787/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-right 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	1
2	2	2
3	3	3
4	4	4
5	5	5
"	"	"
"	"	"
"	"	"
FF	FF	FF

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( )
{
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 a 00H to the watchdog register.

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

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


Chapter 6 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 Post Beep & Error Messages
- Technical Reference
- How to configuration I/O port resource

Trouble Shooting for Post Beep and Error Messages

The following information informs the Post Beep & error messages. 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.

➤ **Error Message**

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.

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

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

➤ Physical and Environmental

Temperature: Operating 0°C ~ 60°C

Relative humidity 5 % to 95 % non-condensing

➤ Real-Time Clock and Non-Volatile RAM

The FB2410 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

Address	Description
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
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 00 1 Drive 01 2 Drives</p> <p>Bits 5-4 Monitor Type 00 Not CGA or MDA 01 40x25 CGA 01 2 Drives 80x25 CGA</p> <p>Bits 3 Display Enabled 0 Disabled 1 Enabled</p> <p>Bit 2 Keyboard Enabled 00 Not CGA or MDA 01 40x25 CGA 01 2 Drives 80x25 CGA</p> <p>Bit 1 Math Coprocessor Installed 0 Absent 1 Present</p> <p>Bit 0 Floppy Drive Installed 0 Disabled 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 - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt Controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard Controller
070h - 073h	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
290h - 297h	System Chipset
2E8h - 2EFh	Serial Port #4(COM4)
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
3E8h - 3EFh	Serial Port #3(COM3)
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	USB
IRQ6	Floppy
IRQ7	- Reserved -
IRQ8	Real Time Clock
IRQ9	- Reserved -
IRQ10	- Reserved -
IRQ11	LAN #1
IRQ12	PS2 Mouse
IRQ13	FPU
IRQ14	Primary IDE
IRQ15	- Reserved -

➤ **Serial Ports**

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

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

The following table is a summary of each ACE accessible register

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

Receiver Buffer Register (RBR)

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

Transmitter Holding Register (THR)

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

Interrupt Enable Register (IER)

Bit 0: Enable Received Data Available Interrupt (ERBFI)

Bit 1: Enable Transmitter Holding Empty Interrupt (ETBEI)

Bit 2: Enable Receiver Line Status Interrupt (ELSI)

Bit 3: Enable MODEM Status Interrupt (EDSSI)

Bit 4: Must be 0

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

Interrupt Identification Register (IIR)

Bit 0: "0" if Interrupt Pending

Bit 1: Interrupt ID Bit 0

Bit 2: Interrupt ID Bit 1

Bit 3: Must be 0

Bit 4: Must be 0

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

Line Control Register (LCR)

Bit 0: Word Length Select Bit 0 (WLS0)

Bit 1: Word Length Select Bit 1 (WLS1)

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

Bit 2: Number of Stop Bit (STB)

Bit 3: Parity Enable (PEN)

Bit 4: Even Parity Select (EPS)

Bit 5: Stick Parity

Bit 6: Set Break

Bit 7: Divisor Latch Access Bit (DLAB)

MODEM Control Register (MCR)

Bit 0: Data Terminal Ready (DTR)

Bit 1: Request to Send (RTS)

Bit 2: Out 1 (OUT 1)

Bit 3: Out 2 (OUT 2)

Bit 4: Loop

Bit 5: Must be 0

Bit 6: Must be 0

Bit 7: Must be 0

Line Status Register (LSR)

Bit 0: Data Ready (DR)

Bit 1: Overrun Error (OR)

Bit 2: Parity Error (PE)

Bit 3: Framing Error (FE)

Bit 4: Break Interrupt (BI)

Bit 5: Transmitter Holding Register Empty (THRE)

Bit 6: Transmitter Shift Register Empty (TSRE)

Bit 7: Must be 0

MODEM Status Register (MSR)

Bit 0: Delta Clear to Send (DCTS)

Bit 1: Delta Data Set Ready (DDSR)

Bit 2: Training Edge Ring Indicator (TERI)

Bit 3: Delta Receive Line Signal Detect (DSLSD)

Bit 4: Clear to Send (CTS)

Bit 5: Data Set Ready (DSR)

Bit 6: Ring Indicator (RI)

Bit 7: Received Line Signal Detect (RSLD)

Divisor Latch (LS, MS)

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

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

Dimension

