Dual BX
Single Board Computer
User's Guide

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Preface

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How to Use This Guide

This guide is designed to be used as step-by-step instructions for installation, and as a reference for operation, troubleshooting, and upgrades.

Note: Additional technical information, BIOS updates, and drivers are available on the ICS Advent Web site, **www.icsadvent.com,** under **Support**.

The following is a summary of the chapter contents:

- **Chapter 1, Introduction,** presents the product specifications and system architecture for the Dual BX single board computer.
- **Chapter 2, Hardware Configuration Settings,** shows the definitions and locations of jumpers and connectors that you can easily configure for your system.
- **Chapter 3, System Installation,** describes how to properly mount the CPU, main memory, and M-system's Flash Disk for safe installation. It also discusses the Watchdog Timer function and introduces the graphics controller driver installation procedure.
- **Chapter 4, BIOS Setup Information,** specifies the meaning of each setup parameter and describes how to get advanced BIOS performance. The POST checkpoint list provides a basic troubleshooting guide.
- **Chapter 5 : Troubleshooting,** provides a few hints to building a valid and working system with the Dual BX single board computer, in terms of hardware and software. Issues addressed are based on customer application history, which has been collected over time.
- **Appendix A: WDT Programming** provides a general description of watchdog timer programming, configuration register definitions, guidelines, and a demo program.
- **Appendix B, Abbreviations,** provides definitions for the abbreviations used in this manual.

Customer Comments

If you experience any problems with this manual or just want to provide some feedback, please send us a message using the online form under "Contact Us" on our Web site (*www.icsadvent.com*) under "Technical Support." Detail any errors you find. We will correct the errors or problems as soon as possible and post the revised manual in our online Support Library. Thank you.

Note: You may also use the online form on our Web site to submit comments or concerns about our products, or request technical support.

Advisory Conventions

Three types of advisories are used throughout the manuals to provide helpful information or to alert you to the potential for hardware damage or personal injury. They are Notes, Cautions, and Warnings. The following is an example of each type of advisory. Use caution when servicing any electrical component.

Note: A Note indicates information that will help you make better use of the system.

CAUTION

A CAUTION indicates potential damage to hardware and tells you how to avoid the problem.

WARNING

A WARNING indicates the potential for bodily harm and tells you how to avoid the problem.

Disclaimer: We have tried to identify all situations that may pose a warning or caution condition in this manual. However, ICS Advent does not claim to have covered all situations that might require the use of a Caution or Warning.

Safety Instructions

Before handling the Dual BX , read the following instructions and safety guidelines to prevent damage to the product and to ensure your own personal safety. Refer to the "Advisories" section for advisory conventions used in this manual, including the distinction between Warnings, Cautions, and Notes.

- Always use caution when handling/operating the computer. Only qualified, experienced, authorized electronics service personnel should access the interior of the computer. The power supplies produce high voltages and energy hazards, which can cause bodily harm.

- Use extreme caution when installing or removing components. Refer to the installation instructions in this manual for precautions and procedures. If you have any questions, please contact ICS Advent Post-Sales Technical Support.

WARNING

High voltages are present inside the chassis when the unit's power cord is plugged into an electrical outlet. Turn off system power, turn off the power supply, and then disconnect the power cord from its source before removing the chassis cover. Turning off the system power switch does not remove power to components.

When Working Inside a Computer

Before taking covers off a computer, perform the following steps:

1) Turn off the computer and any peripherals.

2) Disconnect the computer and peripherals from their power sources to prevent electric shock or system board damage.

3) Follow the guidelines provided in "Protecting Against Electrostatic Discharge" on the following page.

4) Disconnect any telephone or telecommunications lines from the computer.

In addition, take note of these safety guidelines when appropriate:

- To help avoid possible damage to system boards, wait five seconds after turning off the computer before removing a component, removing a system board, or disconnecting a peripheral device from the computer.
- When you disconnect a cable, pull on its connector or on its strain-relief loop, not on the cable itself. Some cables have a connector with locking tabs. If you are disconnecting this type of cable, press in on the locking tabs before disconnecting the cable. As you pull connectors apart, keep them evenly aligned to avoid bending any connector pins. Also, before connecting a cable, make sure both connectors are correctly oriented and aligned.

CAUTION

Do not attempt to service the system yourself except as explained in this manual. Follow installation and troubleshooting instructions closely.

Protecting Against Electrostatic Discharge

Static electricity can harm system boards. Perform service at an ESD workstation and follow proper ESD procedure to reduce the risk of damage to components. ICS Advent strongly encourages you to follow proper ESD procedure, which can include wrist straps and smocks, when servicing equipment.

You can also take the following steps to prevent damage from electrostatic discharge (ESD):

- When unpacking a static-sensitive component from its shipping carton, do not remove the component's antistatic packing material until you are ready to install the component in a computer. Just before unwrapping the antistatic packaging, be sure you are at an ESD workstation or grounded.
- When transporting a sensitive component, first place it in an antistatic container or packaging.
- Handle all sensitive components at an ESD workstation. If possible, use antistatic floor pads and workbench pads.
- Handle components and boards with care. Don't touch the components or contacts on a board. Hold a board by its edges or by its metal mounting bracket.

When Operating a Computer

When operating a computer, observe the following operating guidelines:

- To help prevent electric shock, plug computer power cables into properly grounded power sources. Use cables equipped with three-prong plugs to ensure proper grounding. Do not use adapter plugs or remove the grounding prong from the cable.
- Be sure nothing rests on chassis cables and that cables are not located where they can be stepped on or tripped over.
- Keep objects out of chassis openings. This can cause fire or electric shock by shorting out interior components.
- Keep chassis away from radiators and heat sources. Do not block cooling vents or place chassis in a closed-in wall unit.
- To help protect chassis from sudden, transient increases and decreases in electrical power, use a surge suppressor, line conditioner, or uninterruptible power supply (UPS).
- Consideration should be given to the connection of the equipment to the supply circuit and the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
- The ambient temperature within the rack may be greater than room ambient temperature. Installation should be such that the amount of air flow required for safe operation is not compromised. Consideration should be given to the maximum rated ambient temperature.

Rack Stability

Installation should be such that a hazardous stability condition is not achieved due to uneven loading. The chassis should be secured to the rack frame with retaining screws when it is slid in the rack. This will prevent the chassis from sliding forward on the slide rails if the cabinet is tilted or vibrated, resulting in possible mechanical or electrical damage to the system or injury to personnel.

WARNING

There is a real danger of a rack toppling if a heavy chassis is extended on its slide rails from the rack. ICS Advent strongly recommends you anchor the mounting rack to the floor or wall to prevent this from happening.

Safety Standards

The product(s) described in this manual has met the safety requirements of Underwriters Laboratories (UL) for the US and Canadian market based on UL's published Standards for Safety.

Regulatory Compliance Statements

This section provides the FCC compliance statement for Class A devices and describes how to keep the system CE compliant.

FCC Compliance Statement for Class A Devices

The product(s) described in this manual has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and radiates radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his or her own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note: The assembler of a personal computer system may be required to test the system and/or make necessary modifications if a system is found to cause harmful interference or to be noncompliant with the appropriate standards for its intended use.

CE Certification

CE The product(s) described in this manual complies with all applicable European Union (CE) directives. For computer systems to remain CE compliant, only CE-compliant parts may be used. Maintaining CE compliance also requires proper cable and cabling techniques. Although ICS Advent offers accessories, the customer must ensure that these products are installed with proper shielding to maintain CE compliance. ICS Advent does not offer engineering services for designing cabling systems. In addition, ICS Advent will not retest or recertify systems or components that have been reconfigured by customers.

Guarantee and Warranty Policy

Guarantee

A thirty day money-back guarantee is provided on all standard products sold. Special order products are covered by our Limited Warranty, *however they may not be returned for refund or credit. EPROMs, RAM, Flash EPROMs or other forms of solid electronic media are not returnable for credit - but for replacement* only. An extended warranty is available. Consult the factory.

Refunds

In order to receive a refund on a product for the purchase price, the product must not have been damaged by the customer or by the common carrier chosen by the customer to return the goods and the product must be returned complete (meaning all manuals, software, cables, etc.) within 30 days of receipt and in an as-new and resalable condition. The "Return Procedure" must be followed to assure a prompt refund.

Restocking Charges

Product returned *after* 30 days, and *before* 60 days, of the purchase will be subject to a minimum 20% restocking charge and charges for any damaged or missing parts. Products not returned within 60 days of purchase, or products which are not in an as-new and resaleable condition, are not eligible for a credit return and will be returned to the customer.

Limited Warranty

Effective April 1, 1998, all products carry a 2-year limited warranty. Within 2 years of purchase, ICS Advent will repair or replace, at our option, any defective product. ICS Advent will service the warranty for all standard catalog products for the first two years from the date of shipment. Please note: The 2-year warranty may not apply to special promotion items. Please consult the factory for warranty verification.

The limited warranty is void if the product has been subjected to alteration, neglect, misuse, or abuse; if any repairs have been attempted by anyone other than ICS Advent or its authorized agent; or if the failure is caused by accident, acts of God, or other causes beyond the control of ICS Advent or the manufacturer. Neglect, misuse, and abuse shall include any installation, operation, or maintenance of the product other than in accordance with the user's manual.

No agent, dealer, distributor, service company, or other party is authorized to change, modify, or extend the terms of this Limited Warranty in any manner whatsoever. ICS Advent reserves the right to make changes or improvements in any product without incurring any obligation to similarly alter products previously purchased.

Return Procedure

For any Guarantee or Limited Warranty return, please contact ICS Advent Customer Service at 800-480-0044 or 858-677-0877 and obtain a Return Material Authorization (RMA) Number. All product(s) returned to ICS Advent for service or credit **must** be accompanied by a Return Material Authorization (RMA) Number. Freight on all returned items **must** be prepaid by the customer who is responsible for any loss or damage caused by common carrier in transit. Returns for Warranty **must** include a Failure Report for each unit, by serial number(s), as well as a copy of the original invoice showing the date of purchase.

To reduce risk of damage, returns of product must be in an ICS Advent shipping container. If the original container has been lost or damaged, new shipping containers may be obtained from ICS Advent Customer Service at a nominal cost.

ICS Advent owns all parts removed from repaired products. ICS Advent uses new and reconditioned parts made by various manufacturers in performing warranty repairs and building replacement products. If ICS Advent repairs or replaces a product, its warranty term is not extended.

ICS Advent will normally return your replacement or repaired items via Second Day Air. Overnight delivery or delivery via other carriers is available at an additional charge.

Shipments not in compliance with this Guarantee and Limited Warranty Return Policy will not be accepted by ICS Advent.

Limitation of Liability

In no event shall ICS Advent be liable for any defect in hardware, software, loss, or inadequacy of data of any kind, or for any direct, indirect, incidental, or consequential damages in connection with or arising out of the performance or use of any product furnished hereunder. ICS Advent's liability shall in no event exceed the purchase price of the product purchased hereunder. The foregoing limitation of liability shall be equally applicable to any service provided by ICS Advent or its authorized agent.

Some sales items and customized systems are **not** subject to the guarantee and limited warranty. However in these instances, any deviations will be disclosed prior to sales and noted in the original invoice. **ICS Advent reserves the right to refuse returns or credits on software or special order items.**

Chapter 1
Introduction

Overview

The Dual BX single board computer (Figure 1-1) is designed to fit high performance Pentium-III based CPUs and is compatible for high-end computer system applications with PCI Local Bus architecture. It is designed to meet today's demanding pace, and keep complete compatibility with hardware and software designed for the IBM PC/AT. With the onboard VGA and fast Ethernet interfaces, you can build up a high performance and high data availability system for VARs or system integrators.

This single board computer will operate with single or dual Intel Pentium III processors, and support Dual Inline Memory Modules (DIMM) to 1GB DRAM. The enhanced onboard PCI IDE interface is capable of supporting 4 drives to PIO mode 4 timing and the Ultra DMA/33 synchronous mode feature. The onboard Super I/O Chipset integrates a floppy controller, two serial ports, one Fast Infrared FIR (FIR) port and one parallel port. The high performance 16C550-compatible UARTs provide 16-byte send/receive FIFOs, and the multi-mode parallel port supports SPP/EPP/ECP functions. In addition, Universal Serial Bus (USB) ports are packaged to provide high-speed data communication between peripherals and the PC. The PICMG standard makes the Dual BX single board computer compatible with the legacy ISA, ISA/PCI or multi-slots PCI-bus backplane. The onboard 32-pin DIP sockets support M-systems' Disk-On-Chip products up to 144MB. The Watchdog Timer function allows users to monitor the system status. One 6-pin Mini-DIN connector is provided to connect a PS/2 mouse and keyboard through a Y-cable. The onboard Flash ROM is used for easy BIOS updates. Two standard 5.25-inch disk drive power connectors are reserved to directly induce sufficient current required for large power applications, and the additional 5-pin shrouded connector is reserved for connecting the keyboard interface on the backplane. The high precision Real Time Clock/calendar is built-in to support the Y2K roll-over for accurate scheduling and storing of configuration information. In addition, one 4-pin header is designed to support the ATX power function. All of these features make the Dual BX single board computer excellent in stand-alone applications.

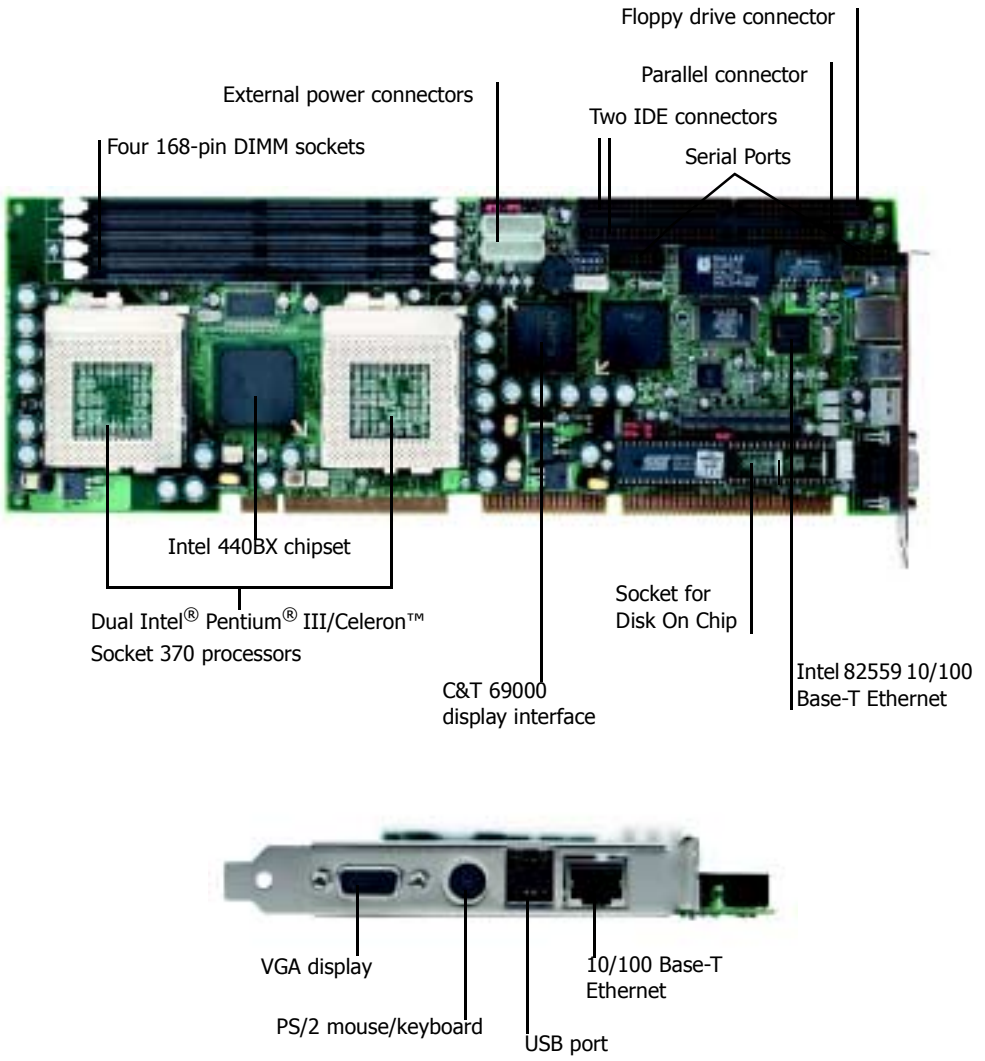


Figure 1-1. Dual BX

Checklist

The Dual BX single board computer is shipped with each of the following items:

- Dual BX single board computer
- Parallel (LPT) port cable
- Serial (COM) port cable supporting two interfaces
- Floppy drive cable
- IDE cable
- 5-pin to 5-pin keyboard cable for backplane connection
- 4-pin ATX power control cable
- Y-cable for PS/2 keyboard or mouse
- Intel 82559 10/100 Base-T Ethernet driver*
- Chips B69000 PCI VGA display driver*

If any of these items is damaged or missing, please contact ICS Advent. Save all packing materials for future replacement and maintenance.

* *Included on the Single Board Computer Technical Reference CD-ROM*

Product Specifications

- **Main processor:** Single or Dual Intel Celeron or Pentium III processors to 850MHz, CPU bus clock of 100 MHz, CPU core/bus clock ratio of x2 to x8, intelligent CPU switching power module, standard socket 370 for FC-PGA370 CPUs

- **BIOS:** AMI system BIOS with 256kB Flash ROM to support Desktop Management Interface (DMI), Plug-n-Play (PnP), and the Green function

- **Main Memory:** Four 168-pin DIMM sockets, applying 64Mbit Dynamic Random Access Memory (DRAM) technology, supporting 3.3V Synchronized Dynamic Random Access Memory (SDRAM) with parity/ECC support up to 1GB

- **L2 Cache Memory:** 128kB L2 cache in Celeron processor and 256kB L2 cache in Pentium III processor

- **Chipset:** Intel 440BX AGP set

- **Bus Interface:** Follows the PICMG standard (32-bit PCI and 16-bit ISA bus), fully complies with PCI bus specification V2.1 (support four master PCI slots)

- **PCI IDE Interface:** Supports two enhanced IDE ports for up to four Hard Disk Drive (HDD) devices with PIO mode 4, Ultra DMA/33 timing transfer, and a bus mastering feature

- **Floppy Drive Interface:** Supports one Floppy Disk Drive (FDD) port up to two floppy drives [5.25-inch (360k, 1.2MB), 3.5-inch (720k, 1.2MB, 1.44MB, 2.88MB) diskette format and 3 mode FDD].

- **Serial Ports:** Supports two high-speed 16C550 compatible UARTs with 16-byte T/R FIFOs

- **IR Interface:** Supports one 6-pin header for serial Fast/Standard Infrared wireless communication

- **Parallel Port:** Supports one parallel port with bi-direction and EPP/ ECP modes

- **USB Interface:** Supports two USB ports for high speed I/O peripheral devices
- **PS/2 Mouse and Keyboard Interface:** Supports two 6-pin Mini-DIN connectors and one 5-pin shrouded connector for PS/2 mouse, keyboard, and backplane connections
- **ATX Power Control Interface:** One 4-pin header to support ATX power control with Modem Ring-On and Wake-On-Local Area Network (LAN) functions
- **Auxiliary I/O Interfaces:** System reset switch, external speaker, keyboard lock, and HDD LED interface
- **Real-Time Clock/Calendar:** Adopts DS1687 to support Y2K Real Time Clock/calendar with battery backup for 10 year data retention
- **Disk-On-Chip Feature:** Reserves one 32-pin socket for M-systems Flash Disk up to 144MB, DOS, Windows, Win95, NT (bootable) drivers and utilities supported
- **Onboard Video Graphics Array (VGA) Interface:** Adopts CHIPS B69000 HiQVideo Accelerator with integrated memory 4MB and AGP interface to provide high performance graphics and panel display capabilities
- **Onboard Ethernet LAN:** Uses the Intel 82559 Fast Ethernet controller to support a Registered Jack 45 (RJ-45) interface at 10/100 Base-T speed
- **CPU Cooling Fan:** Supports three 3-pin headers
- **System Monitoring Feature:** Monitors the CPU and system temperatures, operating voltages, and fan status
- **Bracket:** supports one Mini-DIN, two-port USB, Ethernet, and VGA ports
- **Power Good:** Onboard power good generator with reset time of 300 – 500ms

- **Physical and Environmental Requirements:**
  - Dimension (L X W): 13.36 X 4.78in (339.5 X 122mm)
  - Board Weight: 0.92 lb (0.42 kg)
  - Printed Circuit Board (PCB) layout: eight layers (double-sided component)
  - Power Requirements: +5V @ 10A (typical), +12V @ 300mA, -12V @ 30mA
  - Operating Temperature: 0 ^{o}C to 60 ^{o}C (32 ^{o}F to 140 ^{o}F)
  - Relative Humidity: 5% to 95%, non-condensing
  - MTBF: 100,000 hours

System Architecture

The following diagram will show you how the Dual BX single board computer gives you a highly integrated system solution. The most current system architecture of the Dual BX single board computer includes two main VLSI chips, 82443BX Host Bridge and 82371EB PIIX4E, to support Pentium-III processors, SDRAM with ECC, PCI bus interface, USB port, SMBus communication, and Ultra DMA/33 IDE Master. The onboard super I/O chip, Intel© IOAPIC S82093AA, empowers PS/2 keyboard/mouse, two UARTs, FDC, Parallel and Infrared interface. AGP VGA display and LAN provide more flexibility and reliability in a highly integrated application.

The Dual BX single board computer has two built-in Socket 370 sockets to support the Intel Pentium III Flip Chip Pin Grid Array (FC-PGA) processor for high performance and cost-effective applications.

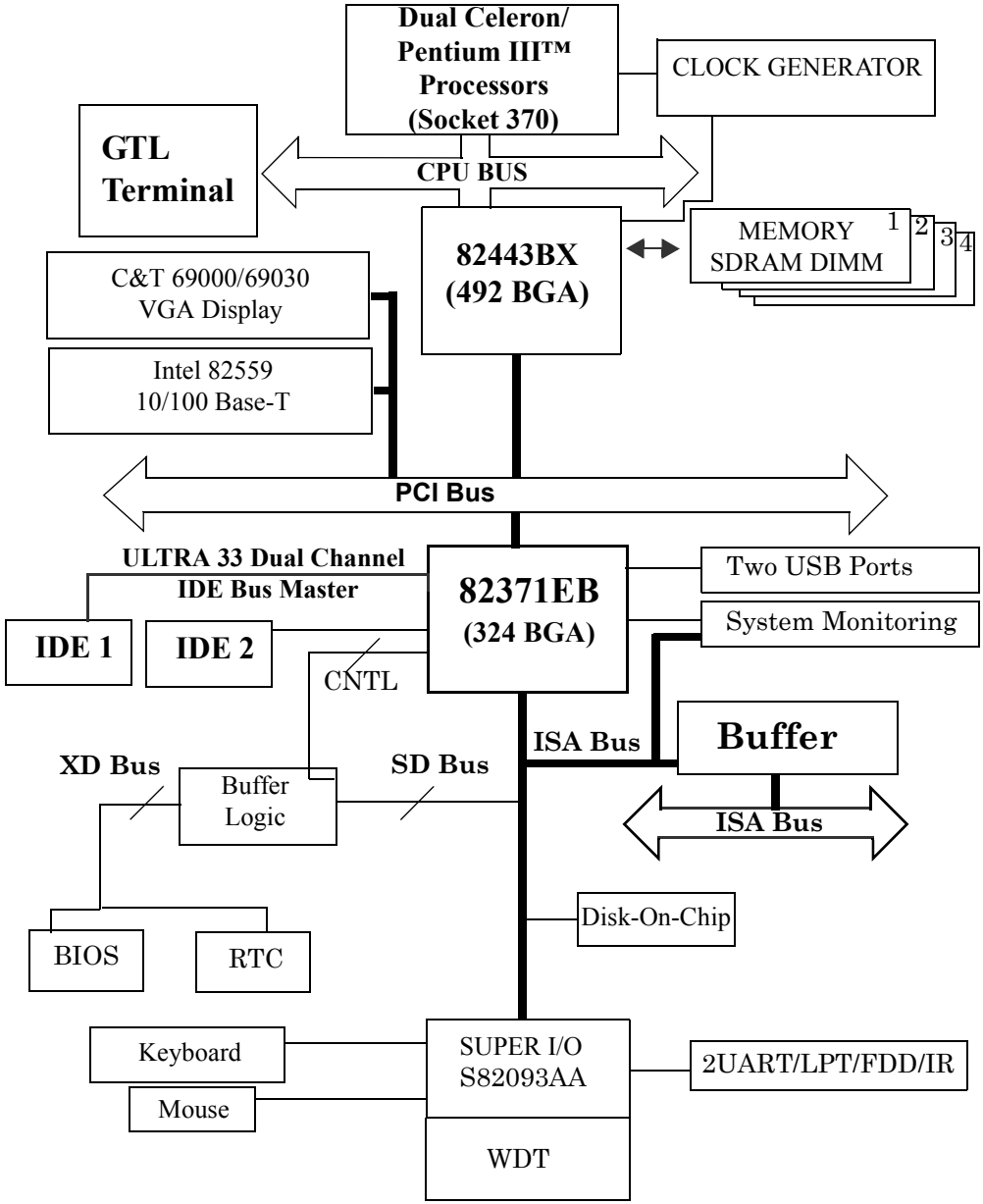
The North Bridge 82443BX provides a completely integrated solution for the system controller and data path components in a Pentium III processor system. It provides a 64-bit GTL+ based host bus interface, an optimized 64-bit DRAM interface with ECC to support four 3.3V DIMMs at the maximum bus frequency of 100 MHz, and a 32-bit PCI bus interface to support 4 PCI masters for external backplane support.

The South Bridge, 82371EB PCI ISA IDE Xcelerator (PIIX4E), provides a highly integrated multifunction PCI-to-ISA bridge solution for the best industry applications. It supports 2-channels dedicated to Ultra DMA-33 IDE master interfaces, full Plug-n-Play compatibility, and Advanced Programmable Interrupt Controller (APIC) interface. It also supports a 2-port USB feature and PCI 2.1 Compliance operation. In addition, it also provides XD-bus via buffer logic control to support BIOS read/write access and the external real-time clock (RTC) to maintain date and time of a system.

The Super I/O chip Intel IOAPIC S82093AA, which integrates two high-speed serial ports, one parallel port, an FIR/SIR interface, a 8042 keyboard controller with PS/2 mouse ports and an FDD interface. This parallel port supports one PC-compatible printer port (SPP), Enhanced Parallel Port (EPP) and Extended Capabilities Port (ECP).

A standard 16-bit ISA bus interface is applied for all slower I/O operations. The Dual BX single board computer contains a Watchdog Timer (WDT) enabled and triggered by software, Disk-On-Chip (DOC) for M-systems Flash disk, and ISA buffer driving for special I/O applications and multi-ISA slots. An advanced feature is used on the Dual BX single board computer to detect the CPU temperature. CPU operation will be automatically forced to slow down when overheating happens. The onboard AGP device, graphics display port, powered by CHIPS 69000 graphics accelerator supports one VGA display. Another onboard PCI device, the LAN port, powered by the Intel 82559 10/100 fast Ethernet controller supports a fast Ethernet interface through the RJ-45 port.

System Block Diagram



Chapter 2

Hardware Configuration Settings

Contents

Overview

This chapter provides the definitions and locations of jumpers, headers, and connectors. All of the configuration jumpers on the Dual BX single board computer are shipped with the default settings. The default settings are marked with a star (*).

Jumpers

In general, the jumpers are used to select options for certain features (Figure 2-1). Some of the jumpers are user-configurable, allowing system enhancement. Other jumpers are used for testing purposes only and should not be altered. To select any option, insert the jumper cap (Short) or remove (NC) the jumper cap from the jumper pins according to the following instructions. (Here NC stands for "Not Connected".)

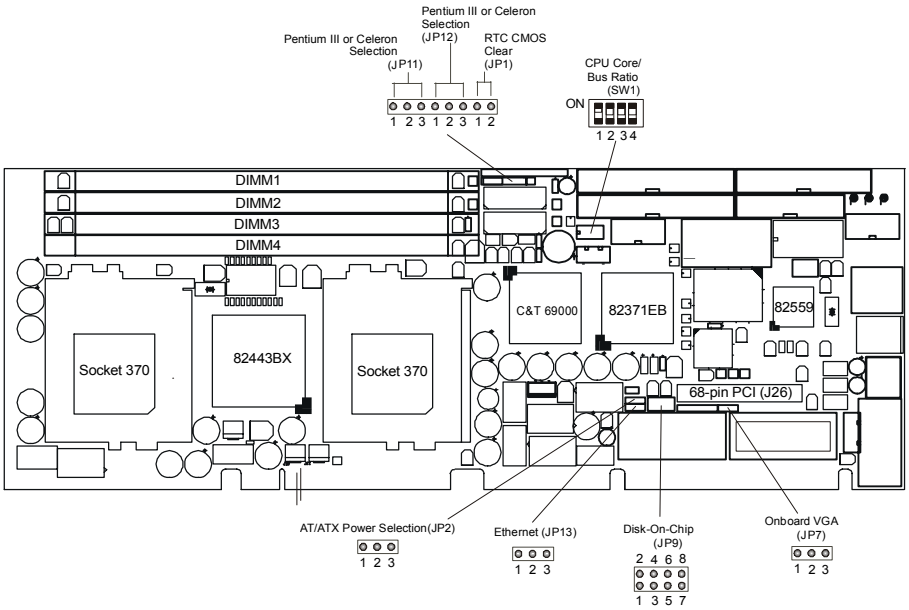


Figure 2-1. Jumper Locations

* *Default setting*

Note: To determine the correct jumper settings, calculate the CPU Core/Bus Ratio as follows:

Core/Bus Ratio = processor speed divided by base speed

Base Speeds: Pentium III = 100MHz

Example: The Core/Bus Ratio of a 700MHz Pentium III processor is calculated as 700MHz divided by 100MHz = 7.0

SW1: Jumper Settings for CPU Core/Bus Ratio				
Core/Bus Ratio	**SW-1**	**SW-2**	**SW-3**	**SW-4**
1.5x	OFF	OFF	ON	OFF
2.0x	OFF	OFF	OFF	OFF
2.0x	ON	ON	ON	ON
2.5x	ON	OFF	ON	ON
3.0x	ON	ON	OFF	ON
3.5x	ON	OFF	OFF	ON
4.0x	ON	ON	ON	OFF
4.5x	ON	OFF	ON	OFF
5.0x	ON	ON	OFF	OFF
5.5x *	ON	OFF	OFF	OFF
6.0x	OFF	ON	ON	ON
6.5x	OFF	OFF	ON	ON
7.0x	OFF	ON	OFF	ON
7.5x	OFF	OFF	OFF	ON

SW1: Jumper Settings for CPU Core/Bus Ratio				
Core/Bus Ratio	**SW-1**	**SW-2**	**SW-3**	**SW-4**
8.0x	OFF	ON	ON	OFF
Reserved	OFF	ON	OFF	OFF

CAUTION

For system stability, do not overclock the CPU unless the system can handle those BIOS parameters. This may damage the board and will void the warranty.

JP9: Disk On Chip Jumper Settings	Memory Address Window
1-2	D0000 – D1FFF*
3-4	D2000 – D3FFF
5-6	D4000 – D5FFF
7-8	D6000 – D7FFF

JP1: RTC CMOS Clear	
JP1	**Processor Selection**
NC:	Normal Operation *
Short:	Clear CMOS Contents

JP7: Onboard VGA	
JP7	**Processor Selection**
1-2:	Onboard VGA enabled *
2-3:	Onboard VGA disabled

JP11/JP12: Dual Processor		
JP11	**JP12**	**Processor Selection**
1-2	1-2	Dual Pentium III processor*
2-3	2-3	Dual Celeron processor

JP2: AT/ATX Power Selection	
JP2	**Processor Selection**
1-2	Select ATX Power Supply
2-3	Select AT Power Supply *

JP13: Onboard Ethernet	
JP13	**Processor Selection**
1-2	Onboard Ethernet enabled*
2-3	Onboard Ethernet disabled

Note: The CMOS clearing operation can be done while the system is running if the CMOS RAM CLEAR funtion is not in Advanced Chipset Setup. It can also be done when the system power is off, but make sure that the CMOS RAM CLEAR option is enabled in Advanced Chipset Setup before clearing CMOS.

Connectors

I/O peripheral devices and the Flash disk are connected to the connectors or to the DOC socket as described in this section (Figure 2-2).

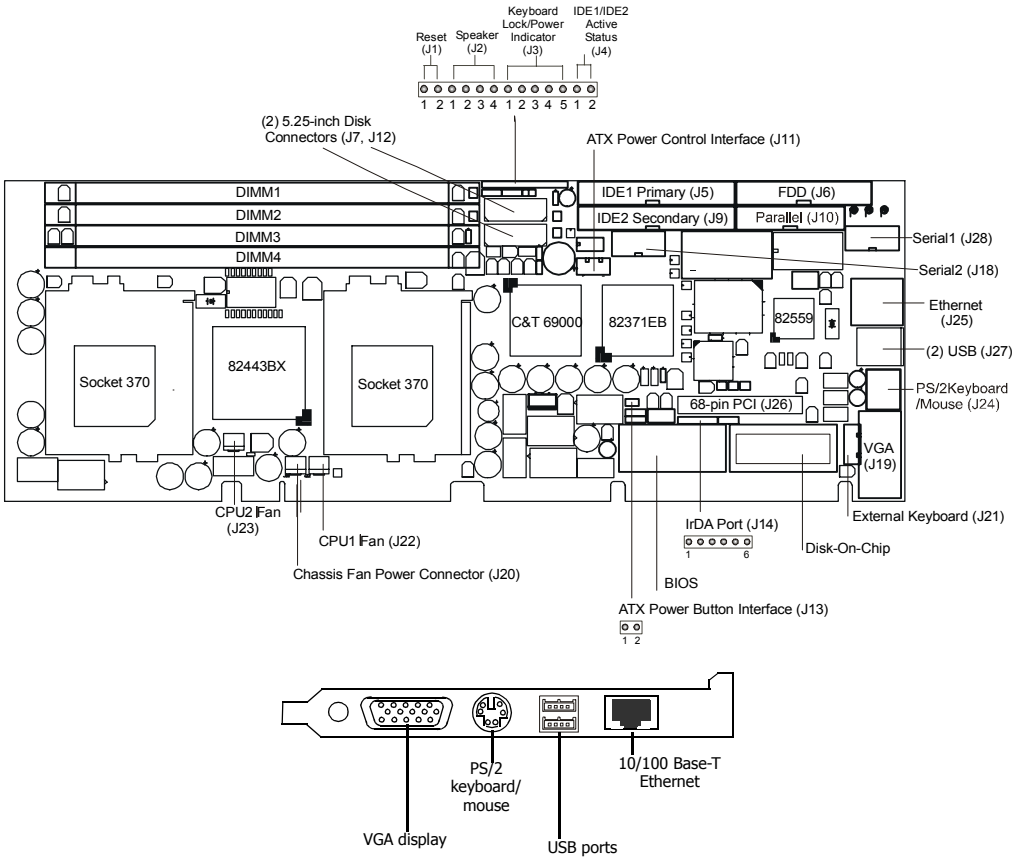


Figure 2-2. Connector Locations

Table 2-1. Connector Functions		
Connector	**Function**	**Remark**
J1	System reset	
J2	External speaker interface	
J3	Keyboard lock and power indicator	
J4	IDE1/IDE2 active status report interface	
J5	IDE1 (Primary) interface	
J6	Floppy connector	
J7	Standard 5.25-inch disk power connector	4-pin connector (pitch: 0.2 inch)
J9	IDE2 (Secondary) interface	
J10	Parallel port connector	
J11	ATX power control interface	Connect to backplane
J12	Standard 5.25-inch disk power connector	4-pin connector (pitch: 0.2 inch)
J13	ATX power button interface	Connect to chassis
J14	IrDA (infrared) port	Support FIR/SIR
J18	COM2 serial port	2 x 5 shrouded
J19	VGA connector	DSUB-15

Table 2-1. Connector Functions (Continued)		
Connector	**Function**	**Remark**
J20	Chassis fan power connector	
J21	External keyboard connector	Connect to backplane
J22	CPU1 fan connector	
J23	CPU2 fan connector	
J24	PS/2 Keyboard/ Mouse connector	6-pin Mini-DIN
J25	Onboard Ethernet interface connector	
J26	Onboard 68-pin PCI connector	
J27	Two port USB interface connector	
J28	COM1 serial port	2 x 5 shrouded

Connector Pin Assignments

J1: Reset Header			
Pin	**Signal**	**Pin**	**Signal**
1	Reset	2	Ground

J2: External Speaker Header			
Pin	**Signal**	**Pin**	**Signal**
1	Speaker signal	2	NC
3	Ground	4	+5V

J3: Keyboard Lock Header	
Pin	**Signal**
1	+5V (330 ohm pull-up for power LED)
2	NC
3	Ground
4	Keyboard inhibit
5	Ground

J4: IDE1/IDE2 Active LED Header	
Pin	**Signal**
1	+5V (470 ohm pull-up for HDD LED)
2	HDD Active # (LED cathode terminal)

J11: ATX Power Control Connector	
Pin	**Signal**
1	ATX Power Good Signal
2	ATX 5V Standby
3	ATX Power On Control
4	Ground

J10: Parallel Port Connector			
Pin	**Signal**	**Pin**	**Signal**
1	Strobe#	2	Data 0
3	Data 1	4	Data 2
5	Data 3	6	Data 4
7	Data 5	8	Data 6
9	Data 7	10	Acknowledge#
11	Busy	12	Paper Empty
13	Printer Select	14	Auto Form Feed#
15	Error#	16	Initialization#
17	Printer Select IN#	18	Ground
19	Ground	20	Ground
21	Ground	22	Ground
23	Ground	24	Ground
25	Ground	26	NC

J14: Fast & Standard IrDA Header			
Pin	**Signal**	**Pin**	**Signal**
1	VCC (+5V)	2	FIR
3	IRRX	4	Ground
5	IRTX	6	OVCROFF (over current off)

J28/J18: Serial Port 1/Port 2 (2x5 Shrouded Connector)			
Pin	**Signal**	**Pin**	**Signal**
1	Data Carrier Detect (DCD)	2	Receive Data (RXD)
3	Transmit Data (TXD)	4	Data Terminal Ready (DTR)
5	Ground (GND)	6	Data Set Ready (DSR)
7	Request to Send (RTS)	8	Clear to Send (CTS)
9	Ring Indicator (RI)	10	NC

J24: PS/2 Keyboard/Mouse Connector (6-pin Mini-DIN)	
Pin	**Signal**
1	Mouse data
2	Keyboard data
3	Ground
4	+5V
5	Mouse clock
6	Keyboard clock

J5/J9: IDE1/IDE2 Interface Connector			
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	NC
21	DMA REQ	22	Ground
23	IOW#	24	Ground
25	IOR#	26	Ground
27	IOCHRDY	28	Pull-down
29	DMA ACK#	30	Ground
31	INT REQ	32	NC
33	SA1	34	NC
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD Active#	40	Ground

J6: FDC Interface Connector			
Pin	**Signal**	**Pin**	**Signal**
1	Ground	2	Density Select
3	Ground	4	NC
5	Ground	6	NC
7	Ground	8	Index#
9	Ground	10	Motor ENA#
11	Ground	12	Drive Select B#
13	Ground	14	Drive Select A#
15	Ground	16	Motor ENB#
17	Ground	18	Direction#
19	Ground	20	Step#
21	Ground	22	Write Data#
23	Ground	24	Write Gate#
25	Ground	26	Track 0#
27	Ground	28	Write Protect#
29	Ground	30	Read Data#
31	Ground	32	Head Select#
33	Ground	34	Disk Change#

J7/J12: Standard 5.25-inch Disk Power Connector	
Pin	**Signal**
1	+12V
2	Ground
3	Ground
4	+5V

J13: ATX Power Button Interface	
Pin	**Signal**
1	Power button control signal
2	Ground

J27: Two-port USB Interface Connector			
Pin	**Signal**	**Pin**	**Signal**
1	+5V	2	USBD0-
3	USBD0+	4	USBGND0
5	+5V	6	USBD1-
7	USBD1+	8	USBGND1

J21: External Keyboard Connector	
Pin	**Signal**
1	Keyboard Clock
2	Keyboard Data
3	NC
4	Ground
5	+5V

J19: Onboard VGA DSUB-15 Connector			
Pin	**Signal**	**Pin**	**Signal**
1	R	2	Ground
3	B	4	NC
5	Ground	6	Ground
7	Ground	8	Ground
9	NC	10	Ground
11	NC	12	DDC_Data
13	HSYNC	14	VSYNC
15	DDC_CLK		

J20/J22/J23: Chassis/CPU1/CPU2 Fan Power Connector	
Pin	**Signal**
1	Ground
2	+12V
3	Pull-up +5V (reserved for sense signal)

J25: Ethernet RJ-45 Interface Connector	
Pin	**Signal**
1	TX+
2	TX-
3	RX+
4	Termination to Ground
5	Termination to Ground
6	RX-
7	Termination to Ground
8	Termination to Ground

J26: 68-pin PCI Connector			
Pin	**Signal**	**Pin**	**Signal**
1	VCC	2	AD0
3	AD1	4	AD2
5	AD3	6	AD4
7	AD5	8	AD6
9	AD7	10	GND
11	VCC	12	AD8
13	AD9	14	AD10
15	AD11	16	AD12
17	AD13	18	AD14
19	AD15	20	GND
21	VCC	22	AD16
23	AD17	24	AD18
25	AD19	26	AD20
27	AD21	28	AD22
29	AD23	30	GND
31	VCC	32	AD24
33	AD25	34	AD26
35	AD27	36	AD28
37	AD29	38	AD30
39	AD31	40	GND
41	VCC	42	BE#0
43	BE#1	44	BE#2

J26: 68-pin PCI Connector			
Pin	**Signal**	**Pin**	**Signal**
45	BE#3	46	PAR
47	Frame#	48	TRDY#
49	IRDY#	50	GND
51	VCC	52	STOP#
53	Devsel#	54	Reserved for PERR#
55	SERR#	56	REQ#2
57	GNT#2	58	Reserved for REQ#3
59	Reserved for GNT#3	60	GND
61	PCI Clock1	62	PCI Clock2
63	PCIRST#	64	LOCK#
65	IRQ#A	66	IRQ#B
67	IRQ#C	68	IRQ#D

Chapter 3

System Installation

Contents

Overview

This chapter describes how to set up your system, install M-system's Flash disk, set up the LCD display, and handle WDT operation.

Socket 370 Processor

Installing CPU1 and CPU2

1) Note the CPU speed and voltage type to adjust the jumper settings properly.

2) Lift the CPU socket lever outwards and upwards.

3) Align the processor pins with the pin holes in the socket. Make sure the notched corner or dot mark (pin 1) of the CPU corresponds to the socket's beveled end. Press the CPU gently until it fits into place.

4) Push down the lever to lock the processor chip into the socket.

5) Follow the installation instructions for the cooling fan and heat sink to mount it on the CPU surface and lock it on the socket 370.

Note: The Dual BX single board computer allows operation using a single processor.

Removing a CPU

1) Unlock the cooling fan.

2) Lift the CPU socket lever outwards and upwards.

3) Carefully lift the CPU out of the socket.

Main Memory

The Dual BX single board computer provides four 168-pin Dual In-line Memory Modules (DIMM) to support onboard main memory. The maximum memory size for 3.3V Extended Data Out (EDO) DRAM or Synchronized DRAM (SDRAM) is 1GB. Normally, the DIMM used can be either 3.3V EDO memory with a speed less than 70ns or 3.3V SDRAM with a speed less than 100ns. If you use a Pentium III processor with a 100MHz system clock, use SDRAM with a speed less than 80ns (-8); it is best to use PC100-compliant memory.

For system compatibility and stability, do not use generic DIMM. Use single- or double-sided DIMM without parity and ECC functions.

Watch out for the contact and lock integrity of memory modules while they are in the socket, it will impact on the system reliability. Follow the normal procedure to install your DRAM module into the memory socket. Before locking, make sure that the module has been fully inserted into the card slot.

Note: Do not change DRAM from setup defaults. See Chapter 4 for details.

Flash Disk

The Dual BX single board computer includes one 32-pin DIP socket for installing Flash disk from 2MB to 288MB, such as those from M-systems. This operation structure operates with pure ISA bus without the Plug-n-Play (PnP) function. Before installing it, make certain that the I/O address jumper setting is set to the correct position to prevent an I/O resource conflict. Remember to follow the Disk-On-Chip (DOC) installation procedure to prevent the Flash chip from burning out due to incorrect installation.

Installing DOC

CAUTION

Make sure your DOC is properly inserted. Placing the DOC in reverse will damage it severely.

Align the DOC with the pin holes on the socket. Make sure that the notched corner or dot mark (pin 1) of the DOC corresponds to the notched corner of the socket. Then press the DOC gently until it fits into place. When correctly installed, the Flash disk can be viewed as a normal hard disk to access read/write data.

If you want to boot from the Flash disk, refer to the application note from M-systems. You can easily obtain information from M-system's shipping package (such as the product manual) or their Web site: (*www.m-sys.com).*

Installing the Single Board Computer

To install the Dual BX single board computer into a chassis, perform the following steps:

1) Ensure all jumpers are set properly.

2) Install and configure the CPU and memory module.

3) Place the Dual BX into the dedicated position in your system.

4) Attach cables to the existing peripheral devices and secure it.

Note: Refer to the "CHIPS 69000 Graphics Controller" and "Driver Support" sections in this chapter for instructions on how to install the display driver and set up your system.

CHIPS 69000 Graphics Controller

The following table will show you how to enable and disable the onboard C&T 69000 VGA interface by setting jumpers to their proper positions.

JP7	FUNCTION
1-2	Enable onboard VGA
2-3	Disable onboard VGA

The onboard graphics controller adopts the C&T 69000, integrating high performance memory technology for the graphics frame buffer. It incorporates 2MB of integrated SDRAM for the graphics/video frame buffer. The integrated SDRAM memory can support up to 83MHz operation, thus increasing the available memory bandwidth for the graphics subsystem to support high color/high resolution applications.

The CHIPS 69000 is designed to support high performance graphics and video acceleration for all supported display resolutions and color modes.

Display Modes Supported

The 69000 supports the following display modes:

Resolution	Color (bpp)	Refresh Rates (Hz)
640x480	8, 16, 24	60, 75, 85
800x600	16, 16, 24	60, 75, 85
1024x768	8, 16	60, 75, 85
1280x1024	8	60

The Dual BX utilizes the onboard C & T 69000 and an optional panel display module to support 16 types of panels. You can select one of sixteen LCD panel types using the BIOS panel setting in Advanced CMOS Setup.

LCD Driver Support

Note: For successful installation of the VGA driver in NT4.0 environments, ICS Advent recommends that you build a diskette with the VGA drivers to support a valid data path to "Disk 1". Please prepare one diskette and create a directory \disk1 under its root. Copy all files under \Drivers\Graphics from the CD into \disk1. Then when prompted for VGA drivers during the installation of NT4.0, the VGA drivers will all be located on the diskette.

The Dual BX onboard VGA (or 69000) device drivers are provided on CD. Before installing the device driver, please see the reference files in each sub-directory.

The VGA69000 supports NT4.0, Win95, Win98, and Win2000 environments.

Intel 82559 Fast Ethernet Controller

The following table will show you how to enable and/or disable the onboard Intel 82559 LAN interface by putting jumpers at their proper positions.

JP13	FUNCTION
1-2	Enable the onboard Ethernet
2-3	Disable the onboard Ethernet

Ethernet Driver Support

The 82559 LAN driver is located in the Drivers directory under the Ethernet subdirectory of the CD.

Onboard LED Indicator (for LAN status)

The Dual BX provides three LED indicators to show the status of the LAN interface. These messages will assist in troubleshooting.

LED1 (left) (LAN Link Integrity LED)
ON: indicates link is good in either 10 or 100Mbps
OFF: link is bad

LED2 (right) (LAN active LED)
ON: indicates Tx/Rx activity
OFF: no activity

LED3 (center) (LAN speed LED)
ON: indicates 100Mbps activity
OFF: indicates 10Mbps activity

Onboard 68-pin PCI Connector

The Dual BX single board computer provides one onboard 68-pin PCI connector that allows you to apply additional PCI devices, such as SCSI or Ethernet. If you have a compatible PCI device, simply plug it onto the connector and secure it with two retention bars.

Note: If you plug a bus-mastering PCI device, such as a SCSI or Ethernet device, into this 68-pin PCI connector, this PCI device will consume one REQ and GNT pair signal designed on the primary PCI slot #3. In this case, only a non-bus-mastering PCI device is allowed to sit on primary PCI slot #3.

Clear CMOS Operation

The following table indicates how to enable/disable the CMOS Clear Function hardware circuit by putting jumpers at their proper positions.

JP1	FUNCTION
NC	Normal Operation
Short	Clear CMOS Contents

To correct operate CMOS Clear function, users may apply a jumper over JP1 always (this will not consume any power), and configure in the BIOS (Advanced Chipset Setup) CMOS RAM Clear Function to “Enabled”. Reboot system will then produce a “CMOS Check Sum Error” message and hold up the system. Users may then follow the displayed message to load in BIOS default setting.

Watchdog Timer Programming

The super I/O chipset, Intel IOAPIC S82093AA, provides a mechanism for Watchdog Timer operation. As there is no hardware jumper on the Dual BX to enable the Watchdog Timer, users need to produce a program to enable and start the Watchdog Timer. There is one programming guide (source code in C language) and test program in Appendix A, "WDT Programming".
Please refer to the programming guide in Appendix A to create your own Watchdog Timer application.

Power Switch Setup

Momentary Power Switch Setup (ATX Power Supplies Only)*

To configure the single board computer to accommodate Omnix chassis with a momentary power switch, follow these steps:

1) Select jumper pins 1-2 on JP2, AT/ATX Power Select (Figure 3-1).

2) Connect J13, ATX Power Button Interface, to the momentary power switch on the chassis.

3) Route ATX signals from the power supply to J11, ATX Power Control Connector.

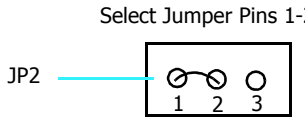


Figure 3-1. JP2, AT/ATX Power Select, Jumper Pins

* *See "Wiring Diagrams" in your chassis user's guide.*

*On/Off Power Switch Setup (AT and ATX Power Supplies)**

To configure the single board computer to accommodate Omnix chassis with an on/off power switch, follow these steps:

1) Select jumper pins 2-3 on JP2, AT/ATX Power Select.

2) Make sure that J13, ATX Power Button Interface, is not connected.

3) Make sure that J11, ATX Power Control Connector, is not connected.

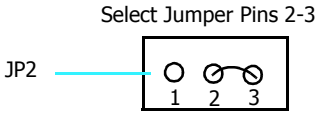


Figure 3-2. JP2, AT/ATX Power Select, Jumper Pins

* *See "Wiring Diagrams" in your chassis user's guide.*

Chapter 4

BIOS Setup Information

Contents

Overview

The Dual BX single board computer is equipped with AMI BIOS, which is stored in Flash ROM. AMI BIOS features a built-in setup program, allowing users to modify the system configuration. The system configuration is stored in CMOS RAM so it is retained during power-off periods. When the computer is turned on, the Dual BX single board computer communicates with peripheral devices and checks its hardware resources against the information stored in CMOS memory. If an error is detected or CMOS parameters need to be initially defined, the diagnostic program will prompt the user to enter the SETUP program. Some errors will abort the start-up.

The Setup program is for viewing and changing the BIOS settings for a computer.

Entering Setup

First Method

1) Setup can be accessed by pressing the [F2] key after the POST memory test begins and before the operating system boot begins.

Second Method

1) Turn on or reboot the computer.

2) When the message "`Hit <DEL> if you want to run SETUP`" appears, press the [Del] key immediately to enter the BIOS setup program. If the message disappears before you respond and you want to enter Setup, you can:

- Press the [RESET] button.
- Restart from a "WARM START" by pressing the [Ctrl], [Alt], and [Del] keys simultaneously.

In the HIFLEX BIOS setup, use the keyboard's editing keys, as shown in the table below, to choose among the options or modify the system parameters to match your system's options.

Editing Keys	Function
[Tab]	Move to the next field
←↑→↓	Move to the next field to the left, above, right, or below
[Enter]	Select in the current field
+ /–	Increment / Decrement a value
[Esc]	Close the current operation and return to previous level
[PgUp]	Returns to the previous option
[PgDn]	Advances to the next option
[F2] / [F3]	Select background color
[F10]	Show "`Save current settings and exit (Y/N)`" in `Main Menu`

Main Menu

Once you enter the Dual BX single board computer AMI BIOS CMOS Setup Utility, the Main Menu will appear. From the Main Menu, you can select from eleven SETUP functions and two exit choices. Use the arrow keys to select an item and press the [Enter] key to accept or enter the sub-menu.

```
AMI BIOS HIFLEX SETUP UTILITY-VERSION 1.21
(C)1998 American Megatrends, Inc.
All Rights Reserved

Standard CMOS SETUP
Advanced CMOS SETUP
Advanced Chipset SETUP
Power Management SETUP
PCI/Plug and Play SETUP
Peripheral SETUP
Hardware Monitor SETUP
Auto-Detect Hard Disks
Change User Password
Change Supervisor Password
Auto Configuration with Optimal Settings
Auto Configuration with Fail Safe Settings
Save Settings and Exit
Exit Without Saving

Standard CMOS SETUP for changing time, date, hard
disk type, etc.
ESC:Exit ↓↑: Sel F2/F3: Color F10: Save & Exit
```

Note: It is strongly recommended to reload the Optimal Setting if CMOS is lost or the BIOS is updated.

CMOS Setup Reference Table

This setup reference table includes all the Optimal, Failsafe, and Other Options settings in each BIOS setup item. For details, you can refer to the item description in the sub-section.

Table 4-1. Advanced CMOS Setup Defaults

BIOS Setup Items	Optimal Default	Failsafe Default	OtherOptions
Quick Boot	Enabled	Disabled	
1st Boot Device	Floppy	Floppy	IDE-0, IDE-1, IDE-2, IDE-3, Floppy, CD-ROM, ATAPI ZIP, LS-120, SCSI, Network, Disabled
2nd Boot Device	IDE	IDE	
3rd Boot Device	CD-ROM	CD-ROM	
4th Boot Device	Disabled	Disabled	
Try Other Boot Device	Yes	Yes	No
S.M.A.R.T. for Hard Disks	Enabled	Enabled	Disabled
BootUp Num-Lock	On	On	Off
PS/2 Mouse Support	Enabled	Enabled	Disabled
System Keyboard	Absent	Absent	Present
Primary Display	Absent	Absent	VGA/EGA, Mono
Password Check	Setup	Setup	Always

Table 4-1. Advanced CMOS Setup Defaults (Continued)			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**OtherOptions**
Boot To OS/2 > 64MB	No	No	Yes
System BIOS Cacheable	Enabled	Disabled	
L1 Cache	Write Back	Write Back	Write Thru, Disabled
L2 Cache	Write Back	Disabled	Write Thru
C000, 16K Shadow	Cached	Cached	Enabled, Disabled
C400, 16K Shadow	Cached	Cached	Enabled, Disabled
C800, 16K Shadow	Cached	Cached	Enabled, Disabled
CC00, 16K Shadow	Disabled	Disabled	Cached, Enabled
D000, 16K Shadow	Disabled	Disabled	Cached, Enabled
D400, 16K Shadow	Disabled	Disabled	Cached, Enabled
D800, 16K Shadow	Disabled	Disabled	Cached, Enabled
DC00, 16K Shadow	Disabled	Disabled	Cached, Enabled

Table 4-2. Advanced Chipset Setup Defaults			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
Configure SDRAM Timing by SPD	Disabled	Disabled	Enabled
SDRAM RAS# to CAS# delay	3 SCLKs	3 SCLKs	2 SCLKs
SDRAM RAS# Precharge	3 SCLKs	3 SCLKs	2 SCLKs
SDRAM CAS# Latency	3 SCLKs	3 SCLKs	2 SCLKs
SDRAM Leadoff Cmd Timing	Auto	Auto	4 SCLKs, 3 SCLKs
DRAM Integrity Mode	Non-ECC	Non-ECC	EC-Only, ECC H/W
DRAM Refresh Rate	15.6 us	15.6 us	31.2 us, 62.4 us, 124.8 us, 249.6 us
Memory Hole	Disabled	Disabled	512kB-640kB, 15MB-16MB
8bit I/O Recovery Time	1 Sysclk	1 Sysclk	Disabled, 2, 3, 4, 5, 6, 7, 8 Sysclk
16-bit I/O Recovery Time	1 Sysclk	1 Sysclk	Disabled, 2, 3, 4 Sysclk
USB Passive Release	Enabled	Enabled	Disabled

Table 4-2. Advanced Chipset Setup Defaults (Continued)			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
PIIX4 Passive Release	Enabled	Enabled	Disabled
PIIX4 Delayed Transaction	Disabled	Disabled	Enabled
USB Function	Enabled	Enabled	Disabled
USB Keyboard Legacy Support	Enabled	Enabled	Disabled

Table 4-3. Power Management Setup Defaults			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
Power Management/ APM	Enabled	Disabled	
Green PC Monitor Power State	Off	Off	Standby, Suspend
Video Power Down Mode	Disabled	Disabled	Standby, Suspend
Hard Disk Power Down Mode	Disabled	Disabled	Standby, Suspend
Standby Time-out (Minute)	Disabled	Disabled	1, 2, 4, 8, 10, 20, 30, 40, 50, 60 minutes
Suspend Time-out (Minute)	Disabled	Disabled	1, 2, 4, 8, 10, 20, 30, 40, 50, 60 minutes
Throttle Slow Clock Ratio	50 to 62.5%	50 to 62.5%	0 to 12.5%, 12.5 to 25%, 25 to 37.5%, 37.5 to 50%, 62.5 to 75%, 75 to 87.5%
Display Activity	Ignore	Ignore	Monitor
Device 6 (Serial Port 1)	Monitor	Monitor	Ignore
Device 7 (Serial Port 2)	Monitor	Monitor	Ignore

Table 4-3. Power Management Setup Defaults (Continued)			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
Device 8 (Parallel Port)	Ignore	Ignore	Monitor
Device 5 (Floppy disk)	Monitor	Monitor	Ignore
Device 0 (Primary master IDE)	Monitor	Monitor	Ignore
Device 1 (Primary slave IDE)	Ignore	Ignore	Monitor
Device 2 (Secondary master IDE)	Monitor	Monitor	Ignore
Device 3 (Secondary slave IDE)	Ignore	Ignore	Monitor
Power Button Function	On/Off	On/Off	Suspend
Ring Resume From Soft Off	Disabled	Disabled	Enabled

Table 4-4. PCI/PnP Setup Defaults			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
Plug-n-Play Aware O/S	No	No	Yes
Clear NVRAM	No	No	Yes
PCI Latency Timer (PCI Clocks)	64	64	32, 96, 128, 160, 192, 224, 248

Table 4-4. PCI/PnP Setup Defaults (Continued)			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
PCI VGA Palette Snoop	Disabled	Disabled	Enabled
Allocate IRQ to PCI VGA	Yes	Yes	No
PCI IDE BusMaster	Disabled	Disabled	Enabled
Offboard PCI IDE Card	Auto	Auto	Slot1, Slot2, Slot3, Slot4
Offboard PCI IDE Primary IRQ	Disabled	Disabled	INTA, INTB, INTC, INTD, Hardwired
Offboard PCI IDE Secondary IRQ	Disabled	Disabled	INTA, INTB, INTC, INTD, Hardwired
PCI Slot 1 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
PCI Slot 2 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
PCI Slot 3 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
PCI Slot 4 IRQ Priority	Auto	Auto	3, 4, 5, 7, 9, 10, 11
DMA Channel 0	PnP	PnP	ISA/ EISA
DMA Channel 1	PnP	PnP	ISA/ EISA
DMA Channel 3	PnP	PnP	ISA/ EISA
DMA Channel 5	PnP	PnP	ISA/ EISA

Table 4-4. PCI/PnP Setup Defaults (Continued)			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
DMA Channel 6	PnP	PnP	ISA/ EISA
DMA Channel 7	PnP	Pnp	ISA/ EISA
IRQ3	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ4	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ5	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ7	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ9	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ10	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ11	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ12	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ14	PCI/ PnP	PCI/ PnP	ISA/ EISA
IRQ15	PCI/ PnP	PCI/ PnP	ISA/ EISA
Reserved Memory Size	Disabled	Disabled	16K, 32K, 64K
Reserved Memory Address	C8000	C8000	C0000, C4000, CC000, DD000, D4000, D8000, DC000

Table 4-5. Peripheral Setup Defaults			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
Onboard FDC	Auto	Auto	Enabled, Disabled

Table 4-5. Peripheral Setup Defaults (Continued)			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
Onboard Serial PortA	Auto	Auto	3F8h/COM1, 2F8h/COM2, 3E8h/COM3, 2E8h/COM4, Disabled
Onboard Serial PortB	Auto	Auto	3F8h/COM1, 2F8h/COM2, 3E8h/COM3, 2E8h/COM4, Disabled
Onboard IR Port	Disabled	Disabled	3F8h/COM1, 2F8h/COM2, 3E8h/COM3, 2E8h/COM4, Auto
IR Mode Select	N/A	N/A	IrDA, ASK-IR, FIR
IR IRQ Select	N/A	N/A	3, 4, 5, 9, 10, 11, 12
IR DMA Select	N/A	N/A	0, 1, 3
OnBoard Parallel Port	Auto	Auto	Disabled, 378h, 278h, 3BCh
Parallel Port Mode	ECP	ECP	EPP, Normal, Bi-Dir
EPP Version	N/A	N/A	1.7 , 1.9

Table 4-5. Peripheral Setup Defaults (Continued)			
BIOS Setup Items	**Optimal Default**	**Failsafe Default**	**Other Options**
Parallel Port IRQ	Auto	Auto	5, 7
Parallel Port DMA Channel	Auto	Auto	0, 1, 3
Onboard IDE	Both	Both	Disabled, Primary, Secondary

Standard CMOS Setup Menu

This setup page includes all the items in a standard compatible BIOS. Use the arrow keys to highlight the item and then use the [PgUp] / [PgDn] or [+] / [-] keys to select the value or number you want in each item and press the [Enter] key to make the selection.

Follow the command keys in the CMOS setup table to change the Date, Time, Drive type, and Boot Sector Virus Protection Status.

Advanced CMOS Setup Menu

This setup includes all of the advanced features of the system. The detailed descriptions are specified as below.

Quick Boot

Set **Disabled** for normal booting or select **Enabled** to skip minor BIOS test items to obtain quick boot response.

Boot Up Sequence

This category includes six items to determine which drive the computer searches first to find the Operating System. You can select **Disabled**, **IDE-0, IDE-1, IDE-2, IDE-3, Floppy, LS-120, ATAPI ZIP, CD-ROM, SCSI,** or **NETWORK**.

Boot Up Num-Lock

Select **On** at boot to enable the numeric function of the numeric keypad. Select **Off** at boot to disregard it.

PS/2 Mouse Support

Select **Enabled** to enable the PS/2 mouse, or **Disabled** to make the IRQ12 interrupt available for other ISA-bus I/O devices.

System Keyboard

This option will be used to ignore a "keyboard error" if you choose the **Absent** setting in your BIOS setup and the system has no keyboard attached.

Primary Display

Choose **Absent, VGA/EGA, CGA40x25, CGA80x25,** or **Mono** to meet your monitor type. If you select **Absent**, the "`CMOS Display Type Wrong`" message will be ignored regardless of the mismatched display card.

Password Check

This option enables password checking when the system boots up or runs the CMOS Setup. It only takes effect after setting the Change Supervisor Password.

Setup – This option will force the system to run a password check before running setup if you have already entered the current user password in "Change User Password". The system will boot, denying access to setup.

Always – Password prompt appears every boot-up. The system will not boot and will deny access to Setup with an invalid password. The best method is to clear CMOS or to reload BIOS Setup to boot up the system.

Boot To OS/2 > 64MB

Set this option to **Yes** to support the OS/2 environment.

System BIOS Cacheable

Enable this option to enhance system performance by shadowing and caching system BIOS. When disabled, this BIOS shadow function will be ignored.

Shadow Memory (from address C000 – DFFF, 16K per segment)

Each segment provides three options **Disabled**, **Enabled**, and **Cached** for a faster adapter's ROM execution. However this shadow function is chipset oriented and dependent on system hardware features. In general, C000 and C800 will be allocated for VGA BIOS and set to **Cached** to get a higher display performance using the shadowing and caching features. If the user chooses the **Enabled** setting, only the BIOS shadow function is active.

Advanced Chipset Setup Menu

This setup is very important to maintain system stability. The optimal default setting is recommended.

Configure SDRAM Timing by SPD

This option provides DIMM Plug-n-Play support by the Serial Presence Detect (SPD) mechanism via the System Management Bus (SMBus) interface. You can disable this option to manage the following four SDRAM timing options by yourself. In addition, SDRAM operating timings may follow serial presence from the EEPROM content by setting this option to **Enabled**, and all of SDRAM timing options will be not available and hidden.

SDRAM RAS# to CAS# Delay

This option controls the number of SDRAM Clocks (SCLKs) from a row activate command to a read or write command. Normally, the option will be set to **3 SCLKs**.

SDRAM RAS# Precharge

This option controls the number of SCLKs for RAS# precharge.

SDRAM CAS# Latency

This option controls the number of SCLKs between the time a read command is sampled by the SDRAMs and the time the North Bridge, 82443BX, samples correspondent data from the SDRAMs. For a registered DIMM with CAS# Latency = 2, this option should be set to **2 SCLKs** to acquire better memory performance.

SDRAM Leadoff Cmd Timing

This option is used to control when the SDRAM command pins (SRASx#, SCASx# and Wex#) and CSx# are considered valid on leadoffs for CPU cycles. If you select **Auto**, this timing will be automatically initialized and set by the BIOS.

DRAM Integrity Mode

There are three options in this feature: Non-Error Checking and Correction hardware (Non-ECC), Error Check Only (EC-Only) and Error Checking and Correction Hardware (ECC). The DRAM integrity mode will be implemented by the parity algorithm when this option is set to **Non-ECC**.

DRAM Refresh Rate

This option specifies the refresh rate frequency for the installed system memory SDRAM DIMMs.

Memory Hole

This option allows the end user to specify the location of a memory hole for memory space requirements from ISA-bus cards.

8bit I/O Recovery Time

This option specifies the length of the delay (in Sysclks) inserted between consecutive 8-bit I/O operations.

16bit I/O Recovery Time

This option specifies the length of the delay (in Sysclks) inserted between consecutive 16-bit I/O operations.

USB Passive Release

When enabled, this allows PIIX4 to use Passive Release to obtain better USB performance while transferring control information or data for USB transactions. When disabled, PIIX4 will perform PCI functions for the USB without using Passive Release.

PIIX4 Passive Release

Choose the **Enabled** option to help raise the available bandwidth of the PCI bus for increasing PCI bus performance.

PIIX4 Delayed Transaction

Choose the **Enabled** option to increase PCI bus performance for slower ISA bus applications.

Spread Spectrum Control

This option is for Electromagnetic Interference (EMI) test issues only.

USB Function

This option will enable the on-chip USB function to support USB peripheral devices if the user chooses the **Enabled** setting.

USB Keyboard Legacy Support

This feature will be automatically disabled and hidden if the user chooses the **Disabled** setting from the foregoing USB Function option. Otherwise, enabling this option provides support for a USB keyboard without the auxiliary driver in a DOS environment.

CMOS RAM Clear Function

If your system supports Y2K RTC, set this option to **Enabled** to support the hardware CMOS clearing operation.

Power Management Setup Menu

This APM (Advanced Power Management) determines how much energy can be saved by setting the below items to handle system power resources. The following descriptions will specify the definition of each item.

Power Management/APM

Use this feature to control system power resources. Set this option to **Enabled** to enable the power management function. It becomes effective when based on the following parameter settings.

Green PC Monitor Power State

This option is used to decide what kind of power states are effective. There are three options **Standby**, **Suspend**, and **Off** . The **Standby** option is to turn off light power by handling monitor signals. The **Suspend** mode is to turn off heavy power. The **Off** state is really to turn off the power of the monitor.

Video Power Down Mode

This option specifies the power conserving state that the Video Electronics Standards Association (VESA) VGA video subsystem enters after the specified period of display inactivity has expired.

Hard Disk Power Down Mode

This option specifies the power management state that the HDD enters after the specified period of hard drive inactivity has expired. It is the same as video power control. If the user chooses **Standby** or **Suspend**, it will depend on the duration of **Standby Time-out** or **Suspend Time-out**.

Standby Time-out (Minute)

This option specifies the length of the period of system inactivity while the computer is in a full-on power state before the computer is placed in **Standby** mode. When this length of time expires, the computer enters the **Standby Time-out** state. In **Standby** mode, some power use is curtailed.

Suspend Time-out (Minute)

This option is the same as the **Standby Time-out** function. These two features are enabled to monitor the power of sub-items **Display Activity**, **Serial Port**, **Parallel Port**, **Floppy**, **Pri-HDD**, and **Sec-HDD** independently. It is also used to control CPU throttle running function. All of the sub-items will be ineffective in disabling **Standby Time-out** or **Suspend Time-out** even if they can be chosen by the user in the BIOS setup menu.

Throttle Slow Clock Ratio

This option specifies the speed at which the system clock runs in power saving modes. The settings are expressed as a duty cycle of the STPCLK# signal. This duty cycle indicates the percentage of time the STPCLK# signal is asserted while in the throttle mode.

Display Activity

This option specifies whether the BIOS will monitor activity on the display monitor for power conservation purposes. If set to **Monitor** and the computer is in a power saving state, BIOS watches for video display activity. The computer enters the full-on power state if any activity occurs. BIOS reloads the Standby and Suspend timeout timers if activity occurs on the specified IRQ lines. If set to **Ignore**, video display monitor activity is not monitored.

Device 6/7/8/5/0/1/2/3 (Serial 1&2, Parallel, FDD, Pri/Sec HDD)

When set to **Monitor**, these options enable event monitoring on the specified hardware device. If set to **Monitor** and the computer is in a power saving state, BIOS watches for activity on the device with specified IRQ line. The computer enters the full-on power state if any activity occurs. BIOS reloads the Standby and Suspend time-out timers if activity occurs on the specified device. No monitoring activity occurs if the option is set to **Ignore**. The settings for each of these options are **Monitor** or **Ignore**.

Power Button Function

This feature is only available on systems with an ATX power control interface. If you use a standard AT power supply, this option will be ignored. If you set it to **on/off**, you can easily power on/off the system by pressing the power button (toggle switch). However, if the **Suspend** setting is chosen, the system will be forced into suspend mode when the user turns it off, unless the power button is continuously pressed for more than 4 seconds to initiate soft off mode.

Ring Resume From Soft Off

This item wakes up the system from remote ringing control under a soft off condition. If you choose the **Disabled** setting, the system will not be resumed by a modem ring.

PCI/Plug-n-Play Setup

This section describes how to configure the PCI bus system. PCI is a system which allows I/O devices to operate at speeds close to the CPU's speed when they communicate.

All of the options described in this section are important and technical and it is strongly recommended that only experienced users make changes to the default settings.

Plug-n-Play Aware O/S

Set this option to **Yes** if the operating system installed in the computer is Plug-n-Play (PnP) aware. The BIOS only detects and enables PnP ISA adapter cards that are required for the system to boot. The Windows 95/98/2000 operating systems detect and enable all other PnP aware adapter cards and are PnP aware. Set this option to **No** if the operating system (such as DOS, OS/2, Windows 3.x) does not use PnP.

Note: Set this option correctly or the PnP aware adapter cards installed in your computer will not be configured properly.

Clear NVRAM

This option is used to clear NVRAM and to check or update the Extended System Configuration Data (ESCD) data after a system power on. Setting this option to **No** will not clear NVRAM. Updating the ESCD is effective in a different ESCD data comparision. If you select the **Yes** setting, the BIOS will update the ESCD every power on.

PCI Latency Timer (PCI Clocks)

This option is used to control the PCI latency timer period (follow PCI clocks). Based on PCI specification 2.1 or later and the PCI bus frequency in the system, the user can select a different timer to meet their PCI bus environment.

PCI VGA Palette Snoop

Some display cards that are non-standard VGA, such as graphics accelerators or MPEG video cards, may not show colors properly. You can choose the **Enabled** setting to correct this display mismatch problem. Supporting ISA adapter cards installed in the computer requires VGA palette snooping.

Allocate IRQ to PCI VGA

This option will be used to allocate an IRQ for a PCI VGA card.

PCI IDE BusMaster

Set this option to **Enabled** to specify that the IDE controller on the PCI local bus has a bus mastering capability.

Offboard PCI IDE Card

This option specifies if an offboard PCI IDE controller adapter board is used in the computer. You must also specify the PCI expansion slot on the single board computer (SBC) where the offboard PCI IDE controller card is installed. If an offboard PCI IDE controller is used, the onboard IDE controller on the SBC is automatically disabled. If **Auto** is selected, BIOS automatically determines the correct setting for this option. If you want to respectively control offboard PCI IDE primary/secondary IRQ resources, you should set this option between **Slot 1** and **Slot 4**. Otherwise, all of these sub-options will not be available.

Offboard PCI IDE Primary/Secondary IRQ

This option specifies the PCI interrupt used by the primary/secondary IDE channel on the offboard PCI IDE controller. The settings are **Disabled**, **INTA**, **INTB**, **INTC**, **INTD**, or **Hardwired** for installing offboard non-compliant PCI IDE cards.

PCI Slot 1/2/3/4 IRQ Priority

These options specify the priority IRQ to be used for PCI devices installed in PCI expansion slots 1 through 4, but do not force selection. The settings are Auto (AMI BIOS automatically determines the priority IRQ), (IRQ) 3, 4, 5, 7, 9, 10, or 11.

DMA Channel 0/1/3/5/6/7

These options specify if the named DMA channel is available for use on the ISA/ EISA bus or PnP.

IRQ 3/4/5/7/9/10/11/12/14/15

These options specify the bus that the named interrupt request lines (IRQs) are used on. These options allow you to specify IRQs for use by legacy ISA adapter cards. These options determine if AMI BIOS should remove an IRQ from the pool of available IRQs passed to devices that are configurable by the system BIOS. The available IRQ pool is determined by reading the ESCD NVRAM. If more IRQs are needed, the user can use the PCI/PnP setup to remove the IRQ by assigning the option to the ISA/EISA setting. All IRQs used by onboard I/O peripherals are configured as PCI/PnP.

Peripheral Setup

This section describes the I/O resources assignments for all onboard peripheral devices.

Onboard FDC

If you want to install a different add-on super I/O card to connect floppy drives, set this field to **Disabled**. Otherwise, set it to **Auto** to call BIOS to automatically determine if the floppy controller should be enabled.

Onboard Serial Port A/Port B

These fields control the resource assignments of two onboard serial interfaces: SIO1 and SIO2. The following list shows the options of onboard serial port A/port B:

Auto → set serial I/O resources automatically
Disabled → indicates onboard COM port function is disabled
3F8h/COM1 → assign I/O address 3F8h to COM1
2F8h/COM2 → assign I/O address 2F8h to COM2
3E8h/COM3 → assign I/O address 3E8h to COM3
2E8h/COM4 → assign I/O address 2E8h to COM4

Onboard IR Port

This option controls the resource assignments of onboard serial port 3. The IR Mode Select has three settings **IrDA**, **ASK IR**, and **FIR**.

Onboard Parallel Port

There are four optional items used to control the onboard parallel port interface while the user selects the I/O base address manually: **Parallel Port Mode**, **EPP Version**, **Parallel Port IRQ**, and **Parallel Port DMA Channel**. The following lists the available options of the onboard parallel port:

Auto → LPT port I/O resources assigned automatically
Disabled → onboard parallel port function is disabled
378h → IRQ7 for this default I/O address
278h → assign this I/O address to LPT1
3BCh → assign this I/O address to LPT1

Parallel Port Mode:

This option specifies the parallel port mode. **ECP** and **EPP** are both bi-directional data transfer schemes that adhere to the IEEE 1284 specifications. This parallel port mode includes four options: **Normal**, **Bi-Dir**, **EPP**, and **ECP**. The optimal default setting is **Bi-Dir**.

Setting	Description
Normal	Uni-direction operation at normal speed
Bi-Dir	Bi-direction operation at normal speed
EPP	The parallel port can be used with devices that adhere to the Enhanced Parallel Port (EPP) specification. EPP uses the existing parallel port signals to provide asymmetric bi-directional data transfer driven by the host device.
ECP	The parallel port can be used with devices that adhere to the Extended Capabilities Port (ECP) specification. ECP uses the DMA protocol to achieve data transfer rates up to 2.5 Megabits per second. ECP provides symmetric bi-directional communication.

EPP Version:

This option is only valid if the parallel port mode option is set to **EPP**. This option specifies the version of the Enhanced Parallel Port specification that will be used by the AMI BIOS.

Parallel Port IRQ:

This option is only valid if the onboard parallel port option is set to **Enabled**. This option sets the IRQ used by the parallel port.

Parallel Port DMA Channel:

This option is only available if the onboard parallel port is set to a fixed I/O address and the setting of parallel port mode is ECP. This option sets the DMA channel used by the ECP-compatible parallel port.

Onboard IDE

This option specifies the onboard IDE controller channels that will be used. The settings are **Disabled**, **Primary**, **Secondary**, or **Both**.

Hardware Monitor Setup

This setup describes the current system status detected by the hardware monitor sensor. The status shown on screen will include:

- Current CPU Temperature (Generally indicates the surface temperature of the SBC),
- Current Chassis Fan Speed,
- Current CPU1 and CPU2 Fan Speed, and
- System operating voltages including **Vcore**, **Vtt**, **Vcc3**, **+5V**, **+12V**, **-12V**, and **-5V**.

BIOS POST Check Point List

The AMI BIOS provides all IBM standard Power On Self Test (POST) routines as well as enhanced AMI BIOS POST routines. The POST routines support CPU internal diagnostics. The POST checkpoint codes are accessible via the Manufacturing Test Port (I/O port 80h).

During the POST, the BIOS signals a checkpoint by issuing one code to I/O address 80h. This code can be used to establish the status of the BIOS power-on sequence and what test is currently being performed. This is done to help troubleshoot a faulty system board.

If the BIOS detects a terminal error condition, it will halt the POST process and attempt to display the checkpoint code written to I/O address port 80h. If the system hangs before the BIOS detects the terminal error, the value at port 80h will be the last test performed. In this case, the terminal error cannot be displayed on the screen. The following POST checkpoint codes are valid for all AMI BIOS products with a core BIOS date of 07/15/95.

Uncompressed Initialization Codes

The uncompressed initialization checkpoint hex codes are listed below in order of execution:

Code	Description
D0	NMI is disabled. CPU ID saved. INIT code checksum verification will be started.
D1	Initializing the DMA controller, performing the keyboard controller BAT test, starting memory refresh, and going to 4GB flat mode.
D3	To start memory sizing.
D4	Returning to real mode. Executing any OEM patches and setting the stack.
D5	Passing control to the uncompressed code in shadow RAM at E000:0000h. The INIT code is copied to segment 0 and control will be transferred to segment 0.
D6	Control is in segment 0. Next, checking if [Ctrl + Home] was pressed and verifying the system BIOS checksum. If [Ctrl + Home] was pressed or the system BIOS checksum is bad, will go to checkpoint code E0h. Otherwise, going to checkpoint code D7h.
D7	To pass control to interface module.
D8	Main BIOS runtime code is to be decompressed.
D9	Passing control to the main system BIOS in shadow RAM.

Bootblock Recovery Codes

The bootblock recovery checkpoint hex codes are listed in order of execution:

Code	Description
E0	The onboard floppy controller is initialized. Beginning the base 512kB memory test.
E1	Initializing the interrupt vector table.
E2	Initializing the DMA and Interrupt controllers.
E6	Enabling the floppy drive controller and Timer IRQs. Enabling internal cache memory.
ED	Initializing the floppy drive.
EE	Looking for a diskette in drive A: and reading first sector of the diskette.
EF	A read error occurred while reading the floppy drive in drive A:.
F0	Searching for the AMIBOOT.ROM file in the root directory.
F1	The AMIBOOT.ROM file is not in the root directory.
F2	Reading and analyzing the floppy diskette FAT to find the clusters occupied by the AMIBOOT.ROM file.
F3	Reading AMIBOOT.ROM file, cluster by cluster.
F4	The AMIBOOT.ROM file is not the correct size.
F5	Disabling internal cache memory.
FB	Detecting the type of Flash ROM.
FC	Erasing the Flash ROM.
FD	Programming the Flash ROM
FF	Flash ROM programming was successful. Restarting the system BIOS.

Uncompressed Initialization Codes

The following runtime checkpoint hex codes are listed below in order of execution. These codes are uncompressed in F0000h shadow RAM.

Code	Description
03	The NMI is disabled. Checking for a soft reset or a power on condition.
05	The BIOS stack has been built. Disabling cache memory.
06	Uncompressing the POST code next.
07	Initializing the CPU and the CPU data area.
08	The CMOS checksum calculation is done next.
0B	Performing required initialization before the keyboard BAT command is issued.
0C	The keyboard controller input buffer is free. Issuing the BAT command to the keyboard controller.
0E	The keyboard controller BAT command result has been verified. Performing necessary initialization after the K/B controller BATcommand test.
0F	The keyboard command byte is written next.
10	Issuing pin 23 and 24 blocking and unblocking commands.
11	Checking if the [End] or [Ins] keys were pressed during power on.
12	Initializing CMOS if the "`initialize CMOS RAM in every boot`" is set or the [End] key is pressed. Disabling DMA and Interrupt controllers.
13	The video display has been disabled. Port B has been initialized. Initializing the chipset.
14	The 8254 timer test will begin next.
19	The 8254 timer test is finished. Starting the memory refresh test.

Code	Description (Continued)
1A	The memory refresh line is toggling. Checking the 15us on/off time.
23	Reading the 8042 input port and disabling the MEGAKEY Green PC feature. Making the BIOS code segment writable and performing any necessary configuration before initializing the interrupt vectors.
24	The configuration or setup required before interrupt vector initialization has been completed. Interrupt vector initialization is about to begin.
25	Interrupt vector initialization is done. Clearing the password if the POSTDIAG switch is on.
27	Performing initialization before setting video mode.
28	Beginning monochrome mode and color mode settings.
2A	Bus initialization system, static, output devices will be done, if present.
2B	Passing control to the video ROM to perform any required configuration before the video ROM test.
2C	Looking for optional video ROM to transfer control.
2D	The video ROM has returned control to BIOS POST. Performing any required processing after the video ROM had control.
2E	Completed post-video ROM test processing. If the EGA/VGA controller is not found, perform the display memory read/write test.
2F	EGA/VGA not found. Begin the display memory R/W test.
30	Display memory R/W test passed. Look for retrace checking.
31	Display memory R/W test or retrace checking failed. Begin alternate display retrace checking.
32	Alternate display memory R/W test passed. Looking for the alternate display retrace checking.

Code	Description (Continued)
34	Video display checking is over. Setting the display mode next.
37	The display mode is set. Displaying the power on message next.
38	Initializing the bus input, IPL, and general devices, if present.
39	Displaying bus initialization error message.
3A	The new cursor position has been read and saved. Displaying the "Hit [DEL]" message next.
40	Preparing the descriptor tables next.
42	Entering protected mode for the memory test.
43	Entered protected mode. Enabling interrupts for diagnostics mode.
44	Interrupts enabled if the diagnostics switch is on. Initializing data to check memory wraparound at 0:0.
45	Data initialized. Checking for memory wraparound at 0:0 and finding the total system memory size.
46	The memory wraparound test has completed. The memory size calculation has been done. Writing patterns to test memory.
47	The memory pattern has been written to extended memory. Writing patterns to the base 640kB memory test.
48	Patterns written in base memory. Determining the amount of memory below 1MB.
49	The amount of memory below 1MB has been found and verified. Determining the amount of memory above 1MB memory.
4B	The amount of memory above 1MB has been found and verified. Checking for a soft reset and clearing the memory below 1MB for the soft reset. If this is a power on situation, checkpoint 4Eh is next.
4C	The memory below 1MB has been cleared via a soft reset. Clearing the memory above 1MB.

Code	Description (Continued)
4D	The memory above 1MB has been cleared via soft reset. Saving the memory size. Going to checkpoint 52h next.
4E	The memory test started, but not as the result of a soft reset. Displaying the first 64kB memory size.
4F	Memory size display started. This will be updated during the memory test. Performing the sequential and random memory test.
50	Memory testing/initialization below 1MB completed. Adjusting the displayed memory size for relocation and shadowing.
51	The memory size display was adjusted for relocation and shadowing. Testing the memory above 1MB.
52	The memory above 1MB has been tested and initialized. Saving the memory size information.
53	The memory size information and the CPU registers are saved. Entering real mode.
54	Shutdown was successful. The CPU is in real mode. Disabling the Gate A20 line, parity, and the NMI.
57	The A20 address line, parity, and the NMI are disabled. Adjusting the memory size depending on relocation and shadowing.
58	The memory size was adjusted for relocation and shadowing. Clearing the "`Hit [DEL]`" message.
59	The "`Hit [DEL]`" message is cleared. The "`[WAIT...]`" message is displayed. Starting the DMA and interrupt controller test.
60	The DMA page register test passed. DMA#1 base register test is next.
62	DMA#1 base register test passed. DMA#2 base register test is next.
65	DMA#2 base register test passed. To program DMA units 1 and 2.

Code	Description (Continued)
66	DMA units 1 and 2 programming finished. Initializing the 8259 interrupt controller.
7F	Extended NMI sources enabling is in progress.
80	The keyboard test has started. Clearing the output buffer and checking for stuck keys. Issuing the keyboard reset command.
81	A keyboard reset error or stuck key was found. Issuing the keyboard controller interface test command.
82	The keyboard controller interface test completed. Writing the command byte and initializing the circular buffer.
83	The command byte has been written and the global data initialization complete. Checking for locked key.
84	Locked key checking is finished. Checking for a memory size mismatch with the CMOS RAM data.
85	The memory size check is done. Displaying a soft error and checking for a password or bypassing setup.
86	Password checked. About finish the programming before setup.
87	The programming before setup has been completed. Uncompressing the setup code and executing the AMI BIOS setup utility.
88	Returned from CMOS setup program and screen is cleared. About to do programming after setup.
89	The programming after setup has been completed. Displaying the power on screen message.
8B	The first screen message has been displayed. The "[WAIT...]" message is displayed. Performing the PS/2 mouse check and the extended BIOS data area allocation check.
8C	Programming the setup options next.
8D	Hard disk controller reset is next.

Code	Description (Continued)
8F	Hard disk controller reset done. Floppy setup is next.
91	The floppy drive controller has been configured. Configuring the hard disk drive controller.
95	Initializing the bus option ROMs from C800.
96	Initializing before passing control to the adaptor ROM at C800.
97	Initialization before the C800 adaptor ROM gains control. The adaptor ROM check is next.
98	The adaptor ROM had control and has now returned control to the BIOS POST. Performing the required processing after the BIOS POST regained control.
99	Any initialization required after the option ROM test has been completed. Configuring the timer data area and printer base address.
9A	Returned after setting the timer and printer base addresses. Setting the RS-232 base address.
9B	Returned after setting the RS-232 base address. Performing any required initialization before the coprocessor test.
9C	Required initialization before the coprocessor test is over. Initializing the coprocessor.
9D	Coprocessor initialized. Initialization after coprocessor test.
9E	Initialization after the coprocessor test is complete. Checking the extended keyboard, keyboard ID, and Num Lock key. Issuing the keyboard ID command.
A2	Displaying any soft errors.
A3	Soft error display complete. Setting keyboard typematic rate.
A4	Keyboard typematic rate set. Programming memory wait states.
A5	Memory wait state programming is over. Clearing the screen and enabling parity and the NMI.

Code	Description (Continued)
A7	NMI and parity enabled. Performing any initialization required before passing control to the adaptor ROM at E000.
A8	Initialization before passing control to the adaptor ROM at E000h completed. Passing control to the adaptor ROM at E000h.
A9	Returned from adaptor ROM at E000h control. Performing any initialization required after the E000 option ROM had control.
AA	Initialization after E000 option ROM control has been completed. Displaying the system configuration.
AB	Building the multiprocessor table, if necessary.
AC	Uncompressing the DMI data and initializing DMI POST.
B0	The system configuration is displayed.
B1	Copying code to specific areas.
00	Code copying to specific areas is done. Passing control to INT 19h boot loader.

Flash BIOS Utility

Utilize the AMI Flash BIOS programming utility to update the onboard BIOS for future BIOS versions. Please contact ICS Advent to get this utility if necessary.

Note: Boot to a clean DOS system.

Chapter 5

Troubleshooting

Contents

Overview

This chapter gives you a few useful tips to quickly get the Dual BX single board computer running without failure. Since basic hardware installation is addressed in Chapter 3, this chapter focuses on system integration issues in terms of backplane setup, BIOS settings, and Operating System diagnostics.

BIOS Settings

It is assumed that the user has correctly adopted the modules and connected all the device cables required before turning on AT power. The CPU, the CPU fan, the CPU fan power cable, the 168-pin SDRAM, the keyboard, the mouse, the floppy drive, the IDE hard disk, the printer, the VGA connector, the device power cables, ATX accessories, and P8/P9 power cables are good examples. With no assurance that these modules and devices are properly accomodated, it is very possible to have system failures that result in the malfunction of any devices applied.

To ensure a successful first-run with the Dual BX single board computer, it is recommended that you proceed to the boot-up sequence, by pressing the [DEL] key and entering the BIOS Setup menu to set up a stable BIOS configuration.

Loading the Default Optimal Setting

When prompted with the main setup menu, please scroll down to "**Auto Configuration with Optimal Settings**", press [Enter] and [Y] to load the default optimal BIOS Setup. This will force your BIOS setting back to the initial factory configuration. This is recommended to ensure that the system is running with the BIOS setting that ICS Advent has highly recommended. A user can load the default BIOS setting any time the system appears to be unstable in the boot-up sequence.

Auto Detect Hard Disks

It is common for a user to proceed with "**Auto Detect Hard Disks**" to backup the hard drive status in BIOS memory to reduce the time spent in the boot-up hard disk detection process. However, as BIOS has already kept this information, if another hard drive is applied without redoing the "**Auto Detect Hard Disks**" procedure, the system will fail to identify the hard disks that are actually connected. A quick way to fix this problem is to enter the BIOS Setup menu and redo "**Auto Detect Hard Disks**" again.

There is also another way to prevent this detour. Go to "**Standard CMOS Setup**" and tune in the hard disk status, the "**Primary Master**", and "**Primary Slave**" to "**Auto**" with their "**32 bit mode**" being tuned to "**ON**". This will force your system to automatically detect the current attached hard disks during each boot-up sequence. It is then no longer necessary to manually detect the hard disks each time the boot-up sequence is tried.

Note that loading the default optimal BIOS setting will not change the hard disk detection status back to "**Auto**". You may find that when you load the default BIOS setting, the hard disk detection status remains unchanged.

Additionally, it is also recommended to double check the hard disk or CD-ROM setting in the event of connecting two IDE devices through one IDE port. One of these two devices needs to be configured as a slave device to prevent a detection failure of the IDE devices. There cannot be two IDE devices configured as the master devices at the same time.

Improper Disable Operation

There are many occasions in BIOS Setup where users disable a certain device/feature in one application, but do not enable it before manipulating another application where the disabled device is needed. Users fail to detect this device/feature and end up with a system failure. Please check the BIOS setting so that the devices or ports that you need are not disabled. These include the floppy drive, COM1/COM2 ports, parallel port, USB ports, external cache, onboard VGA and Ethernet.

It is also very common that users would like to disable a certain device/port to release IRQ resources. A few good examples are:

- Disable COM1 serial port to release IRQ #4
- Disable COM2 serial port to release IRQ #3
- Disable parallel port to release IRQ #7
- Disable PS/2 mouse to release IRQ #12

A quick review of basic IRQ mapping is given below.

Table 5-1. Basic IRQ Mapping

IRQ #	Description
0	System Counter
1	Keyboard
2	Programmed Controller
3	COM2
4	COM1
5	Nothing
6	Floppy Disk Controller
7	Printer Port (Parallel Port)
8	CMOS Clock
9	Nothing
10	USB Interface
11	Nothing
12	PS/2 mouse
13	Data Processor
14	Primary IDE Controller
15	Secondary IDE Controller

It is very easy to find out which IRQ resource is ready for additional peripherals. If IRQ resources are insufficient, disable some of the devices listed above to release resources.

OS Diagnostics

This is a brief guide to properly storing the driver for any Microsoft Windows 95/98/NT device, as well as starting special functions in a specific operating system. For other operating systems, please refer to the the operating system (OS) manual/guidebook.

Booting

Users may find that Windows 95/98 freezes in a loading sequence; the Windows logo freezes or no display is given. Restart the system and hit [F5] when loading the Windows system and enter “Safe mode”. Users will always be allowed to enter “Safe mode” successfully to remove devices that are not properly running. Proceed to enter “Safe mode” and restart Windows. Removed devices will be automatically detected again and drivers will be loaded if they have been copied to the system database, or you will be asked to provide the driver source for installation.

For Windows NT 4.0 users, it is never recommended to change your hardware configuration after your first installation. However, if such a change is needed, please note that sometimes Windows NT 4.0 will stop loading and prompt you with a whole page of error messages. Please note that reinstallation of this NT hard disk is inevitable, and you should backup your data stored in this hard disk because it is almost impossible to switch back to this system unless booting up with another hard disk. If this NT hard disk is installed with FAT16 disk format, boot up your system with any Windows Operating System. You will be able to see this NT hard disk and retrieve any data you have interest in. However, if this NT hard disk is installed with NTFS disk format, only NTFS allows you to retrieve this NT hard disk again.

Display Setup

By default, any Windows Operating System starts with a resolution of 640 x 480 ppi and a 16-color display. Please load the display driver provided on the Single Board Computer Technical Reference CD to maximize the VGA performance. If you are using a monitor that Windows cannot identify, you will need to set up a system monitor to correctly retrieve display output, found in the display setup menu. For Windows NT 4.0 users, as the Dual BX single board computer provides an AGP type onboard display feature, Service Pack 3.0 or above is required to activate the AGP VGA display feature.

Network Setup

Windows 95/98 users – Perform the following steps:

1) Install an ISA/PCI network card into an ISA/PCI slot.

2) Start Windows 95/98 and let Window 95/98 automatically detect your network adapter.

3) Provide the driver and complete installation.

4) After you come back to Windows, restart your Windows system.

5) Go to Control Panel > System > Device Manager and verify your network adapter has been installed properly. A warning sign will be displayed if the network adapter has not been installed properly.

6) If the network adapter has not been installed properly, remove this network device from the system Setup menu and restart Windows to detect the network adapter again.

7) When the hardware installation is completed, go to Control Panel > Network to set up the networking configuration. This includes DNS, IP, and Gateway. Appropriate protocols are required to carry out networking activities. Refer to your system administrator for additional assistance.

Windows NT 4.0 users – Perform the following steps:

1) Install the network adapter manually in the Control Panel > Network > Adapter directory. Drivers are required at this stage.

2) Proceed “Binding” after you load the driver.

3) Change to *Protocol Label* and load the desired protocols (generally, TCP/IP). Configuring IP, gateway, and DNS is required for TCP/IP protocol.

4) When the protocol loading is complete, proceed again to “Binding”.

5) Restart the system.

6) If there is a situation where the installed network adapter is not working anymore, or the old network driver stays in the system after the network card is changed, remove all the network adapters and protocols from the network setup menu and reload the driver and protocols again. Network setup within Windows NT 4.0 is not as easy as within Windows 95/98. Special familiarity and care are required to have a successful installation.

Appendix A
WDT Programming

Contents

General Description

Winbond has a WDT feature inside its chip. There are many configuration registors (CR) in 83977. The following sequence must be followed for CR programming:

1) Enter the extended function mode

2) Configure the configuration registers

3) Exit the extended function mode

For instance:

1) Enter extended function mode.

```
MOV  DX,3F0H
MOV  AL,87H
CLI                    ; disable interrupt
OUT  DX,AL
JMP  $+2
OUT  DX,AL
STI                    ; enable interrupt
```

2) Configurate logical device 1, configuration register CRF0

```
MOV  DX,3F0H
MOV  AL,07H

OUT  DX,AL             ; point to Logical Device Number Register
MOV  DX,3F1H
MOV  AL,01H
OUT  DX,AL             ; select logical device 1
;
MOV  DX,3F0H
MOV  AL,0F0H
OUT  DX,AL
MOV  DX,3F1H
MOV  AL,3CH
OUT  DX,AL             ; update  CRF0 with value 3Ch
```

3) Exit extended function mode.

```
MOV  DX,3F0H
MOV  AL,0AAH
OUT  DX,AL
```

The Configuration Register (CR) Definition:

** Chip (Global) Control Register (CCR) :CR02 -->CR2F
CR07 = Logical Device Number Register (LDNR)
** Logical Device 0 (LD0) = FDC , with CR :CR30 -->CRF5
When LDNR (= CR07) = 00h , you can program the CR30 --CRF5 related to FDC feature.
** Logical Device 1 (LD1) = Parallel Port,with CR :CR30 -->CRF0
** LD2 = UART A (Serial Port 1) ,with CR :CR30 -->CRF0
** LD3 = UART B (Serial Port 2) ,with CR :CR30 -->CRF0
** LD5 = KBC ,with CR : CR30 -->CRF0
** LD6 = IR ,with CR : CR30 -->CRF0
** LD7 = GP I/O Port I, with CR :CR30 -->CRF1
** LD8 = GP I/O Port II, with CR :CR30 -->CRF4
** LD9 = GP I/O Port III, with CR :CR30 -->CRF1
** LDA = ACPI, with CR :CR30 -->CRFF

Related CR for WDT Programming

CR2C-Bit 3,2 ; [1,0] for WDT function
LD8-CRF2 ; WDT time-out period,
00h = disabled
01h = 30 seconds
02h = 1.5 minutes
03h = 2.5 minutes
04h = 3.5 minutes
05h = 4.5 minutes
.....
FEh = 253.5 minutes
FFh = 254.5 minutes

When writing a non-zero value to LD8-CRF2 , this value will be loaded into WD counter and start to count down .Read this register can not get the WDT time-out period (the orginal one written into) , but the current value in WD counter.

Enable and Refresh WDT : program LD8-CRF2 a non-zero value.
Disable WDT : program LD8-CRF2 with 00h.

LD8-CRF4- Bit 0 : WDT Status
1 = WDT time-out happened
0 = WDT counting

WDT Programming Guide

1) Enter extended function mode as mentioned as above.

2) Program WDT related CR.

a) CR2C-b[3,2]P[1,0] ; Set pin output as WDT function

b) CR07-P08h ; Point to LD8

c) CRF2-Pxyh ; Program WDT time-out period and start count down.
xy = 00 ; No WDT time-out and counting
xy = 01 ; WDT time-out = 30 sec. and starts counting.
.....

d) Read CRF4-b0 if needed ; 0 : WDT counting
1 : WDT time-out happened

3) Exit extended function mode as mentioned as above.

Example (ENABLE WDT AND SET WDT time-out = 1.5 minutes)

Step 1.

```
MOV  DX,3F0H
MOV  AL,87H
CLI                 ; disable interrupt
OUT  DX,AL
JMP  $+2
OUT  DX,AL
STI                 ; enable interrupt
```

Step 2.

```
MOV  DX,3F0H
MOV  AL,2CH
OUT  DX,AL
MOV  DX,3F1H
IN   AL,DX              ; READ  CR2C
OR   AL,08H
AND  AL,0FBH
MOV  AH,AL

MOV  DX,3F0H
MOV  AL,2CH
OUT  DX,AL
MOV  DX,3F1H
MOV  AL,AH
OUT  DX,AL              ; CR2C-b[3,2]P[1,0]

MOV  DX,3F0H
MOV  AL,07H
OUT  DX,AL              ; point to Logical Device Number Register
MOV  DX,3F1H
MOV  AL,08H
OUT  DX,AL              ; select logical device 8
;
MOV  DX,3F0H
MOV  AL,0F2H
OUT  DX,AL
MOV  DX,3F1H
MOV  AL,02H
OUT  DX,AL              ; LD8-CRF2-P02h
```

Step 3. Exit extended function mode.

```
MOV  DX,3F0H
MOV  AL,0AAH
OUT  DX,AL
```

Remark:

**** I/O PORT 3F0h --> Index port for programming CR.
3F1h --> Data port for programming CR.

**** LD8-CRF2-P02h : Program CR index F2h of Logical Device 8
with the value "02h".

WDT Demo Program

```
#include <stdio.h>
#include <conio.h>
#include <dos.h>

unsigned char time_out;    /* recode WDT time-out value */

void show_title(void)
{
    clrscr();
    printf("\n\n W83977ATF WDT DEMO PROGRAM
     V1.00\n\n");
    printf("1.Set WDT Time-out value and Enable WDT\n");
    printf("2.Retriggle WDT\n");
    printf("3.Disable WDT and Exit\n");
    printf("\n\nPress 1 - 3 :");
}

void enable_WDT(void)
{
    printf("\n\nPress number 1 - 255 to select time-out time");
    printf("\n(1:0.5Min, 2:1.5Min, 3:2.5Min...) :");
    scanf("%d",&time_out);
    asm cli;
    /* Step1. Enter W83977ATF extended function mode:
       write 0x87 to port 3f0 twice
    */
    outportb(0x3f0, 0x87);
    outportb(0x3f0, 0x87);
    /* Step2. Select W83977ATF logic device 8:
       write 0x07 to port 3f0 to point W83977ATF CR_07
       write 0x08 to port 3f1 to select logic device 8
    */
    outportb(0x3f0, 0x07);
    outportb(0x3f1, 0x08);
    /* Step3. Config W83977ATF Pin104 to be WDT time-out signal:
       write 0x2c to port 3f0 to point W83977ATF CR_2c
       write 0x08 to port 3f1 to select Pin104 to bo WDT
        time-out signal
```

```
    */
    outportb(0x3f0, 0x2c);
    outportb(0x3f1, 0x08);
    /* Step4. Set WDT time-out time:
       write 0xf2 to port 3f0 to point W83977ATF CR_f2
       write time_out to port 3f1 to set time-out time in
        W83977ATF
    */
    outportb(0x3f0, 0xf2);
    outportb(0x3f1, time_out);
    /* Step5. Exit W83977ATF extended function mode:
       write 0xaa to port 3f0
    */
    outportb(0x3f0, 0xaa);
    asm sti;
}

void retriggle_WDT(void)
{
    asm cli;
    /* Step1. Enter W83977ATF extended function mode:
       write 0x87 to port 3f0 twice
    */
    outportb(0x3f0, 0x87);
    outportb(0x3f0, 0x87);
    /* Step2. Select W83977ATF logic device 8:
       write 0x07 to port 3f0 to point W83977ATF CR_07
       write 0x08 to port 3f1 to select logic device 8
    */
    outportb(0x3f0, 0x07);
    outportb(0x3f1, 0x08);
    /* Step3. Retriggle WDT time-out time:
       write 0xf2 to port 3f0 to point W83977ATF CR_f2
       write time_out to port 3f1 to set time-out time in
        W83977ATF
    */
    outportb(0x3f0, 0xf2);
    outportb(0x3f1, time_out);
    /* Step4. Exit W83977ATF extended function mode:
       rite 0xaa to port 3f0
    */
```

```
    outportb(0x3f0, 0xaa);
    asm sti;
    printf("\n\n!!! Trigle !!!");
    delay(1000);
}

void disable_WDT(void)
{
    asm cli;
    /* Step1. Enter W83977ATF extended function mode:
       write 0x87 to port 3f0 twice
    */
    outportb(0x3f0, 0x87);
    outportb(0x3f0, 0x87);
    /* Step2. Select W83977ATF logic device 8:
       write 0x07 to port 3f0 to point W83977ATF CR_07
       write 0x08 to port 3f1 to select logic device 8
    */
    outportb(0x3f0, 0x07);
    outportb(0x3f1, 0x08);
    /* Step3. Disable WDT :
       write 0xf2 to port 3f0 to point W83977ATF CR_f2
       write 0x00 to port 3f1 to set time-out time in W83977ATF
    */
    outportb(0x3f0, 0xf2);
    outportb(0x3f1, 0x00);
    /* Step4. Exit W83977ATF extended function mode:
       write 0xaa to port 3f0
    */
    outportb(0x3f0, 0xaa);
    asm sti;
}
```

```
int main(void)
{
    int key;

    show_title();
    while(1)
    {
         key = getch();
         switch (key)
         {
         case '1':
            enable_WDT();
            break;
         case '2':
            retriggle_WDT();
            break;
         case '3':
            disable_WDT();
            return(0);
         default:
            break;
         }
         show_title();
}
}
```

Appendix B

Abbreviations

Abbreviations

ACPI - Advanced Configuration and Power Interface

AGPset - A chipset that supports the Accelerated Graphics Port

ACPI - Advanced Configuration and Power Interface

APM - Advanced Power Management

AT - Advanced Technology

ATX - Advanced Technology Extended

BIOS - Basic Input-Output System

bps - bits per second

CE - European Community

CFM - Cubic Feet per Minute, such as 47 CFM of air flow

COM - Component Object Model

CPU - Central Processing Unit

DIMM - Dual Inline Memory Module

DIP - Dual Inline Processor

DMA - Direct Memory Access

DMI - Desktop Management Interface

DOC - Disk-On-Chip

DOS - Disk Operating System

DRAM - Dynamic Random Access Memory

DSTN - Dual-scan super twisted nematic

ECC - Error Correction Code

ECP - Extended Capabilities Port

EDO - Extended Data Out

EIDE - Enhanced Integrated Drive Electronics

EMI - Electromagnetic Interference

EN - European Norm

EPP - Enhanced Parallel Port

ESD - Electrostatic Discharge

FC-PGA - Flip Chip Pin Grid Array

FDD - Floppy Disk Drive

FIFO - First In First Out

FIR - Fast Infrared

GTL+ - Gunning Transceiver Logic

HDD - Hard Disk Drive

IDE - Integrated Drive Electronics

I/O - Input/Output

IRQ - Interrupt Request Lines

ISA - Industry Standard Architecture

LAN - Local Area Network

LCD - Liquid Crystal Display

LED - Light Emitting Diode

LVDS - Low Voltage Differential Signal

NC - Not Connected

NVRAM - Non-volatile Random Access Memory

OS - Operating System

PBSRAM - Pipeline Burst Static Random Access Memory

PC - Personal Computer

PCB - Printed Circuit Board

PCI - Peripheral Component Interconnect

PICMG - PCI Industrial Computer Manufactures Group

PIIX4 - 82371EB PCI ISA IDE Xcelerator

PG - Power Good

PIO - Programmed Input/Output

POST - Power On Self Test

PPGA - Plastic Pin Grid Array

PS/2 - Personal System/2

RAM - Random Access Memory

RFI - Radio Frequency Interference

RJ11 - Registered Jack 11

RJ12 - Registered Jack 12

RJ45 - Registered Jack 45

ROM - Read Only Memory

RTC - Real-Time Clock

SBC - Single Board Computer

SDRAM - Synchronous Dynamic Random Access Memory

SIMM - Single Inlin Memory Module

SIR - Speaker Independent (Voice) Recongition (ASR)

SMBUS - System Management Bus

SPD - Serial Presence Detect

SPP - PC-compatible Printer Port

SRAM - Static Random Access Memory

STN - Super Twisted Nematic

SVGA - Super Video Graphics Array

TFT - Thin Film Transistor

UARTS - Universal Asynchronous Receiver Transmitter

USB - Universal Serial Bus

VESA - Video Electronics Standards Association

VGA - Video Graphics Array

VLSI - Very Large Scale Integration

WDT - Watchdog Timer

XGA - Extended Graphics Array

Declaration of Conformity

Information Technology Equipment

6260 Sequence Drive
San Diego, CA 92121-4371
800 523-2320 / 858-677-0877

The product(s) covered by this declaration:

Dual BX Single Board Computer – model number SBC-DBX-VE

The European Union directives covered by this declaration:

EMC Directive 89/336/EEC and Low Voltage Directive 73/23/EEC

The basis on which conformity is declared:

EN 50081-1:1992 Emissions, Generic Requirements

-EN 55022 Limits and Methods of Measurement of Radio Disturbance Characteristics of Information Technology Equipment

EN 50082-1:1992 Immunity, Generic Requirements

- EN61000-4-2: 1995 Electrostatic Discharge (ESD) Immunity
- EN61000-4-3: 1995 Radiated RF Field Immunity
- EN61000-4-4: 1995 EFT Immunity for AC and I/O Lines

EN 60950:1992 Safety of Information Technology Equipment

The technical documentation required to demonstrate this product meets the requirements of the EMC Directive and the Low Voltage Directive has been compiled by ICS Advent and is available for inspection by the relevant enforcement authorities.

Attention

The attention of the specifier, purchaser, installer, or user is drawn to special measures and limitations for use which must be observed when the product is taken into service to maintain compliance with the above directives.

Details of these special measures and limitations are in the product manual.

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