ThinkIO™ - P

Premium DIN Rail PC
for Fieldbus and IO Systems

Manual ID: 29867.03, Rev. Index 01
17 October, 2005

HARDWARE REFERENCE GUIDE

-

THINKIO-P STANDARD

The product described in this manual is in compliance with all applied CE standards.

29867.03_01.VC.051017/115449

Revision History

Publication Title:	ThinkIO™ - P: Hardware Reference Guide - ThinkIO-P Standard	
ID Number:	29867.03	
Rev. Index	**Brief Description of Changes**	**Date of Issue**
01	Initial issue	17 Oct, 2005

Imprint

Kontron Modular Computers GmbH may be contacted via the following:

MAILING ADDRESS

Kontron Modular Computers GmbH

Sudetenstraße 7

D - 87600 Kaufbeuren Germany

TELEPHONE AND E-MAIL

+49 (0) 800-SALESKONTRON

sales@kontron.com

For further information about other Kontron Modular Computers products, please visit our Internet web site: www.kontron.com

Copyright

Copyright © 2005 Kontron Modular Computers GmbH. All rights reserved. This manual may not be copied, photocopied, reproduced, translated or converted to any electronic or machine-readable form in whole or in part without prior written approval of Kontron Modular Computers. GmbH.

Disclaimer:

Kontron Modular Computers GmbH rejects any liability for the correctness and completeness of this manual as well as its suitability for any particular purpose.

29867.03_01.VC.051017/115449

Table of Contents

29867.03_01.VC.051017/115449

 © 2005 Kontron Modular Computers GmbH

Chapter 3

Chapter 4

29867.03_01.VC.051017/115449

© 2005 Kontron Modular Computers GmbH

List of Tables

29867.03_01.VC.051017/115450

© 2005 Kontron Modular Computers GmbH

This page has been intentionally left blank.

29867.03_01.VC.051017/115450

© 2005 Kontron Modular Computers GmbH

List of Figures

29867.03_01.VC.051017/115450

 © 2005 Kontron Modular Computers GmbH

This page has been intentionally left blank.

29867.03_01.VC.051017/115450

© 2005 Kontron Modular Computers GmbH

Proprietary Note

This document contains information proprietary to Kontron Modular Computers GmbH. It may not be copied or transmitted by any means, disclosed to others, or stored in any retrieval system or media without the prior written consent of Kontron Modular Computers GmbH or one of its authorized agents.

The information contained in this document is, to the best of our knowledge, entirely correct. However, Kontron Modular Computers GmbH cannot accept liability for any inaccuracies or the consequences thereof, or for any liability arising from the use or application of any circuit, product, or example shown in this document.

Kontron Modular Computers GmbH reserves the right to change, modify, or improve this document or the product described herein, as seen fit by Kontron Modular Computers GmbH without further notice.

Trademarks

Kontron Modular Computers GmbH, the *PEP* logo and, if occurring in this manual, “CXM” are trademarks owned by Kontron Modular Computers GmbH, Kaufbeuren (Germany). In addition, this document may include names, company logos and trademarks, which are registered trademarks and, therefore, proprietary to their respective owners.

Environmental Protection Statement

This product has been manufactured to satisfy environmental protection requirements where possible. Many of the components used (structural parts, printed circuit boards, connectors, batteries, etc.) are capable of being recycled.

Final disposition of this product after its service life must be accomplished in accordance with applicable country, state, or local laws or regulations.

29867.03_01.VC.051017/115450

© 2005 Kontron Modular Computers GmbH

Explanation of Symbols

CE Conformity

This symbol indicates that the product described in this manual is in compliance with all applied CE standards. Please refer also to the section “Applied Standards” in the ThinkIO-P Hardware Reference Guide.

Caution, Electric Shock!

This symbol and title warn of hazards due to electrical shocks (> 60V) when touching products or parts of them. Failure to observe the precautions indicated and/or prescribed by the law may endanger your life/health and/or result in damage to your material.

Please refer also to the section “High Voltage Safety Instructions” on the following page.

Warning, ESD Sensitive Device!

This symbol and title inform that electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

Please read also the section “Special Handling and Unpacking Instructions” on the following page.

Warning!

This symbol and title emphasize points which, if not fully understood and taken into consideration by the reader, may endanger your health and/or result in damage to your material.

Note ...

This symbol and title emphasize aspects the reader should read through carefully for his or her own advantage.

29867.03_01.VC.051017/115450

© 2005 Kontron Modular Computers GmbH

For Your Safety

Your new Kontron product was developed and tested carefully to provide all features necessary to ensure its compliance with electrical safety requirements. It was also designed for a long fault-free life. However, the life expectancy of your product can be drastically reduced by improper treatment during unpacking and installation. Therefore, in the interest of your own safety and of the correct operation of your new Kontron product, you are requested to conform with the following guidelines.

Temperature and High Voltage Safety Instructions

Warning!

All operations on this device must be carried out by sufficiently skilled personnel only.

Be careful, this device will heatup during operation, and if touched may cause burns. The temperature of the product housing may reach up to approximately 50° C. Allow for sufficient cool down before handling after power is turned off.

Caution, Electric Shock!

Before installing your new Kontron product into a system always ensure that your mains power is switched off. This applies also to the installation of piggybacks.

Serious electrical shock hazards can exist during all installation, repair and maintenance operations with this product. Therefore, always unplug the power cable and any other cables which provide external voltages before performing work.

Special Handling and Unpacking Instructions

ESD Sensitive Device!

Electronic boards and their components are sensitive to static electricity. Therefore, care must be taken during all handling operations and inspections of this product, in order to ensure product integrity at all times.

- Do not handle this product out of its protective enclosure while it is not used for operational purposes unless it is otherwise protected.
- Whenever possible, unpack or pack this product only at EOS/ESD safe work stations. Where a safe work station is not guaranteed, it is important for the user to be electrically discharged before touching the product with his/her hands or tools. This is most easily done by touching a metal part of your system housing.
- It is particularly important to observe standard anti-static precautions when changing piggybacks, ROM devices, jumper settings etc. If the product contains batteries for RTC or memory backup, ensure that the board is not placed on conductive surfaces, including anti-static plastics or sponges. They can cause short circuits and damage the batteries or conductive circuits on the board.

29867.03_01.VC.051017/115450

 © 2005 Kontron Modular Computers GmbH

General Instructions on Usage

- In order to maintain Kontron's product warranty, this product must not be altered or modified in any way. Changes or modifications to the device, which are not explicitly approved by Kontron Modular Computers GmbH and described in this manual or received from Kontron's Technical Support as a special handling instruction, will void your warranty.
- This device should only be installed in or connected to systems that fulfill all necessary technical and specific environmental requirements. This applies also to the operational temperature range of the specific board version, which must not be exceeded. If batteries are present, their temperature restrictions must be taken into account.
- In performing all necessary installation and application operations, please follow only the instructions supplied by the present manual.
- Keep all the original packaging material for future storage or warranty shipments. If it is necessary to store or ship the board, please re-pack it as nearly as possible in the manner in which it was delivered.
- Special care is necessary when handling or unpacking the product. Please consult the special handling and unpacking instruction on the previous page of this manual.

29867.03_01.VC.051017/115451

© 2005 Kontron Modular Computers GmbH

Two Year Warranty

Kontron Modular Computers GmbH grants the original purchaser of Kontron's products a ***TWO YEAR LIMITED HARDWARE WARRANTY*** as described in the following. However, no other warranties that may be granted or implied by anyone on behalf of Kontron are valid unless the consumer has the express written consent of Kontron Modular Computers GmbH.

Kontron Modular Computers GmbH warrants their own products, excluding software, to be free from manufacturing and material defects for a period of 24 consecutive months from the date of purchase. This warranty is not transferable nor extendible to cover any other users or long-term storage of the product. It does not cover products which have been modified, altered or repaired by any other party than Kontron Modular Computers GmbH or their authorized agents. Furthermore, any product which has been, or is suspected of being damaged as a result of negligence, improper use, incorrect handling, servicing or maintenance, or which has been damaged as a result of excessive current/voltage or temperature, or which has had its serial number(s), any other markings or parts thereof altered, defaced or removed will also be excluded from this warranty.

If the customer's eligibility for warranty has not been voided, in the event of any claim, he may return the product at the earliest possible convenience to the original place of purchase, together with a copy of the original document of purchase, a full description of the application the product is used on and a description of the defect. Pack the product in such a way as to ensure safe transportation (see our safety instructions).

Kontron provides for repair or replacement of any part, assembly or sub-assembly at their own discretion, or to refund the original cost of purchase, if appropriate. In the event of repair, refunding or replacement of any part, the ownership of the removed or replaced parts reverts to Kontron Modular Computers GmbH, and the remaining part of the original guarantee, or any new guarantee to cover the repaired or replaced items, will be transferred to cover the new or repaired items. Any extensions to the original guarantee are considered gestures of goodwill, and will be defined in the "Repair Report" issued by Kontron with the repaired or replaced item.

Kontron Modular Computers GmbH will not accept liability for any further claims resulting directly or indirectly from any warranty claim, other than the above specified repair, replacement or refunding. In particular, all claims for damage to any system or process in which the product was employed, or any loss incurred as a result of the product not functioning at any given time, are excluded. The extent of Kontron Modular Computers GmbH liability to the customer shall not exceed the original purchase price of the item for which the claim exists.

Kontron Modular Computers GmbH issues no warranty or representation, either explicit or implicit, with respect to its products' reliability, fitness, quality, marketability or ability to fulfil any particular application or purpose. As a result, the products are sold "as is," and the responsibility to ensure their suitability for any given task remains that of the purchaser. In no event will Kontron be liable for direct, indirect or consequential damages resulting from the use of our hardware or software products, or documentation, even if Kontron were advised of the possibility of such claims prior to the purchase of the product or during any period since the date of its purchase.

Please remember that no Kontron Modular Computers GmbH employee, dealer or agent is authorized to make any modification or addition to the above specified terms, either verbally or in any other form, written or electronically transmitted, without the company's consent.

29867.03_01.VC.051017/115451

 © 2005 Kontron Modular Computers GmbH

This page has been intentionally left blank.

29867.03_01.VC.051017/115451

© 2005 Kontron Modular Computers GmbH

Chapter 1

Introduction

29867.03_01.VC.051017/115451

© 2005 Kontron Modular Computers GmbH

This page has been intentionally left blank.

29867.03_01.VC.051017/115451

© 2005 Kontron Modular Computers GmbH

1. Introduction

1.1 About This Guide

This Hardware Reference Guide is intended to familiarize the user with the ThinkIO-P hardware specifications and functions.

1.2 The ThinkIO-P

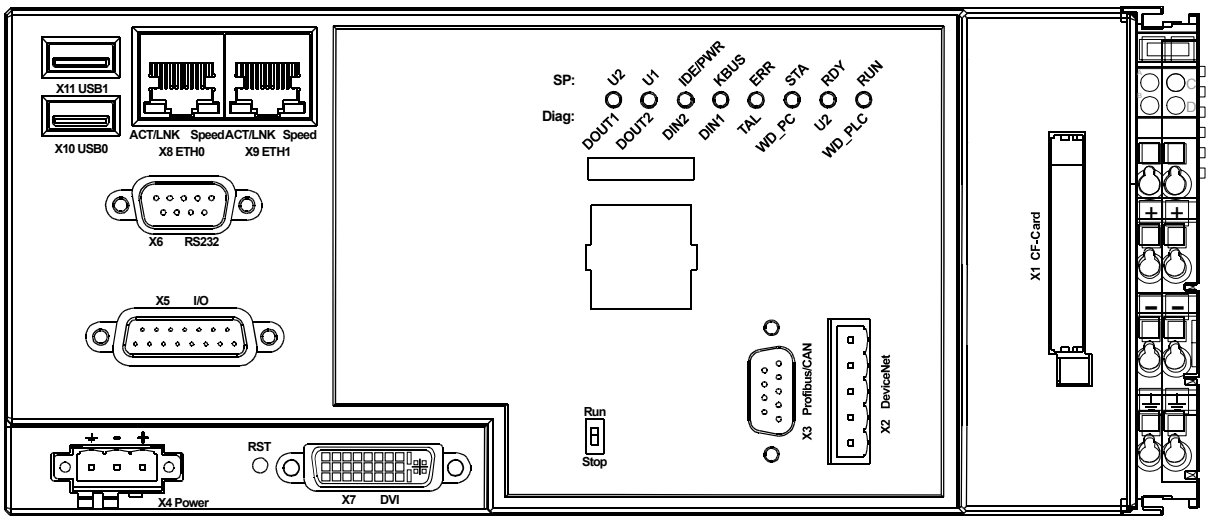
The ThinkIO-P DIN Rail PC is a part of an innovative concept to integrate high performance PC functionality, fieldbusses, and DIN Rail input / output modules to provide system integrators with a complete range of off-the-shelf solutions for industrial automation applications.

Packaged in a DIN rail mountable housing, 224 x 70 x 100 mm, the ThinkIO-P provides standard interfacing for Fast Ethernet, USB, serial communications, TFT/CRT display, and user definable digital I/Os. Optionally, a single fieldbus interface (CANopen, Profibus-DP, or DeviceNet) is also available.

In addition, the ThinkIO-P can be fitted with an optionally available WAGO interface module (K-Bus) which provides direct access to the complete family of the WAGO-I/O-SYSTEM 750/753 input / output modules.

The following figures illustrate the physical layout of the ThinkIO-P and its application interfacing capabilities. Connectors X2 and X3 are optional fieldbus interfaces, CANopen, PROFIBUS DP or DeviceNet, and are exclusive of each other if available. Only one is possible per ThinkIO-P.

Figure 1-1: ThinkIO-P with WAGO Interface Module (K-Bus) Assembled on the Right



 © 2005 Kontron Modular Computers GmbH

Figure 1-2: Rear View of ThinkIO-P without the WAGO Interface Module (K-Bus)

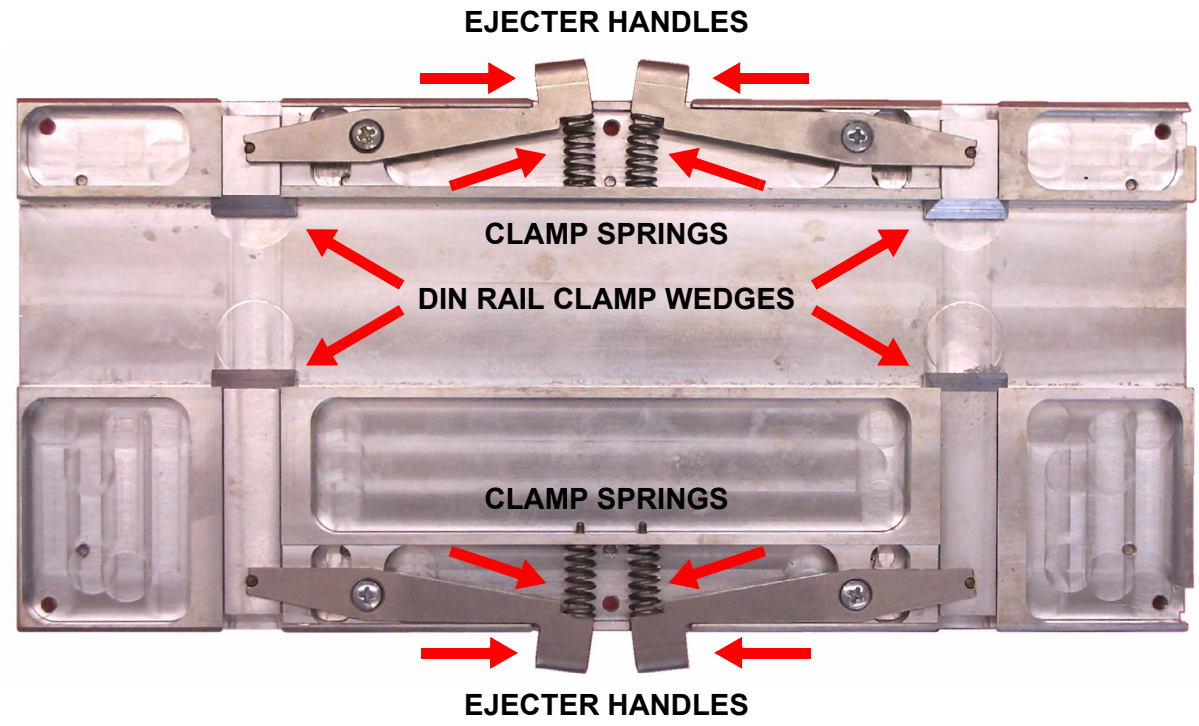
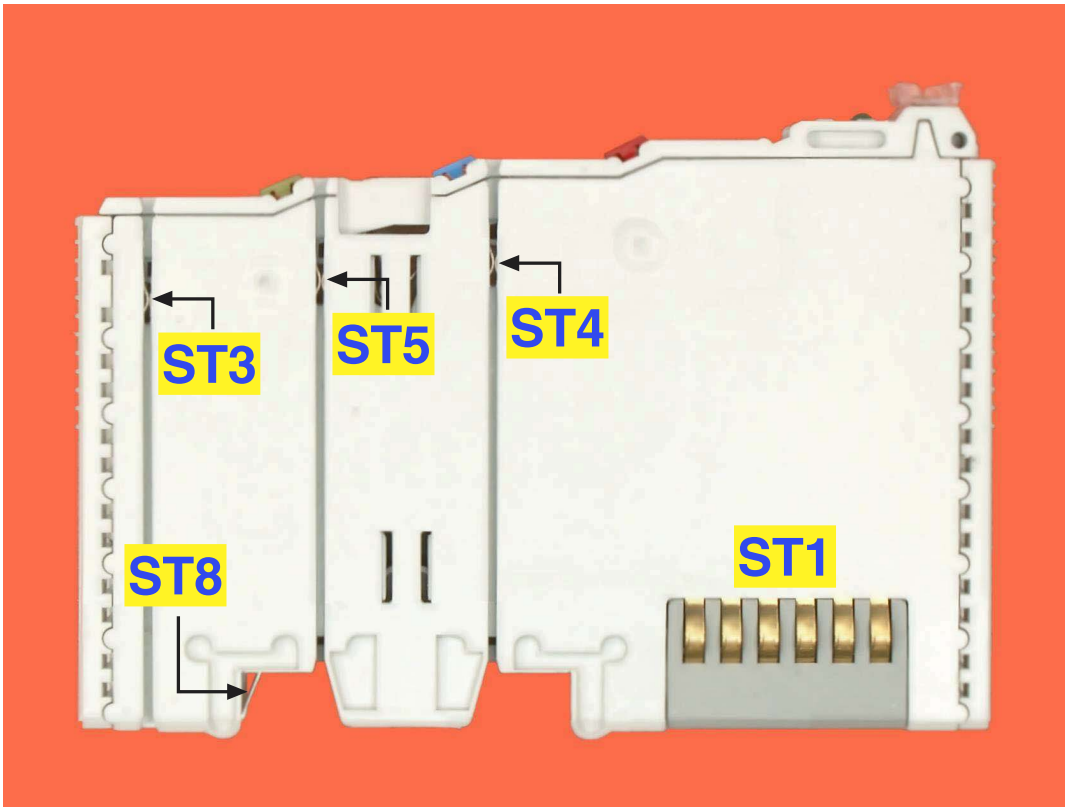


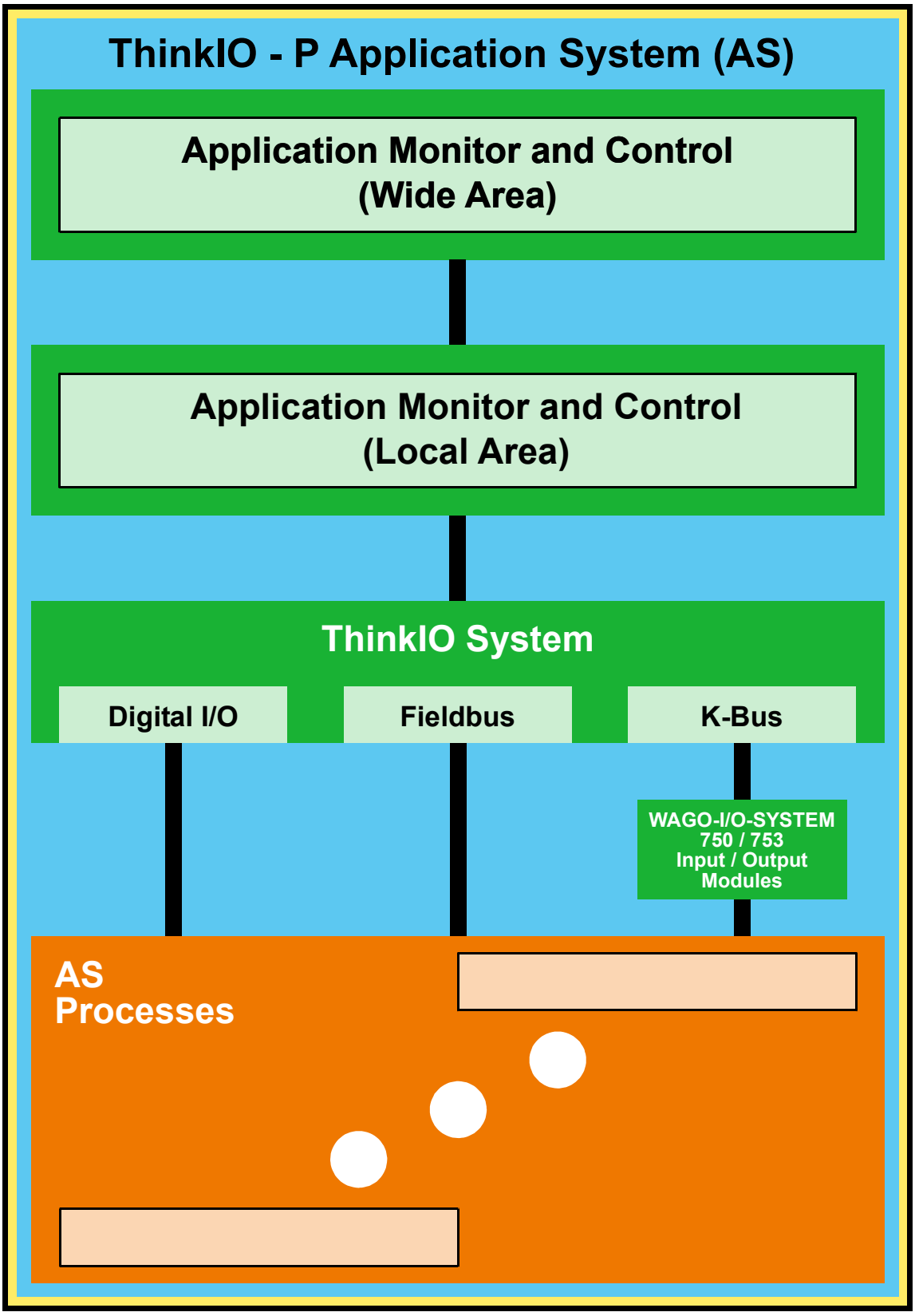
Figure 1-3: View of WAGO Interface Module (K-Bus) - I/O Module Side



© 2005 Kontron Modular Computers GmbH

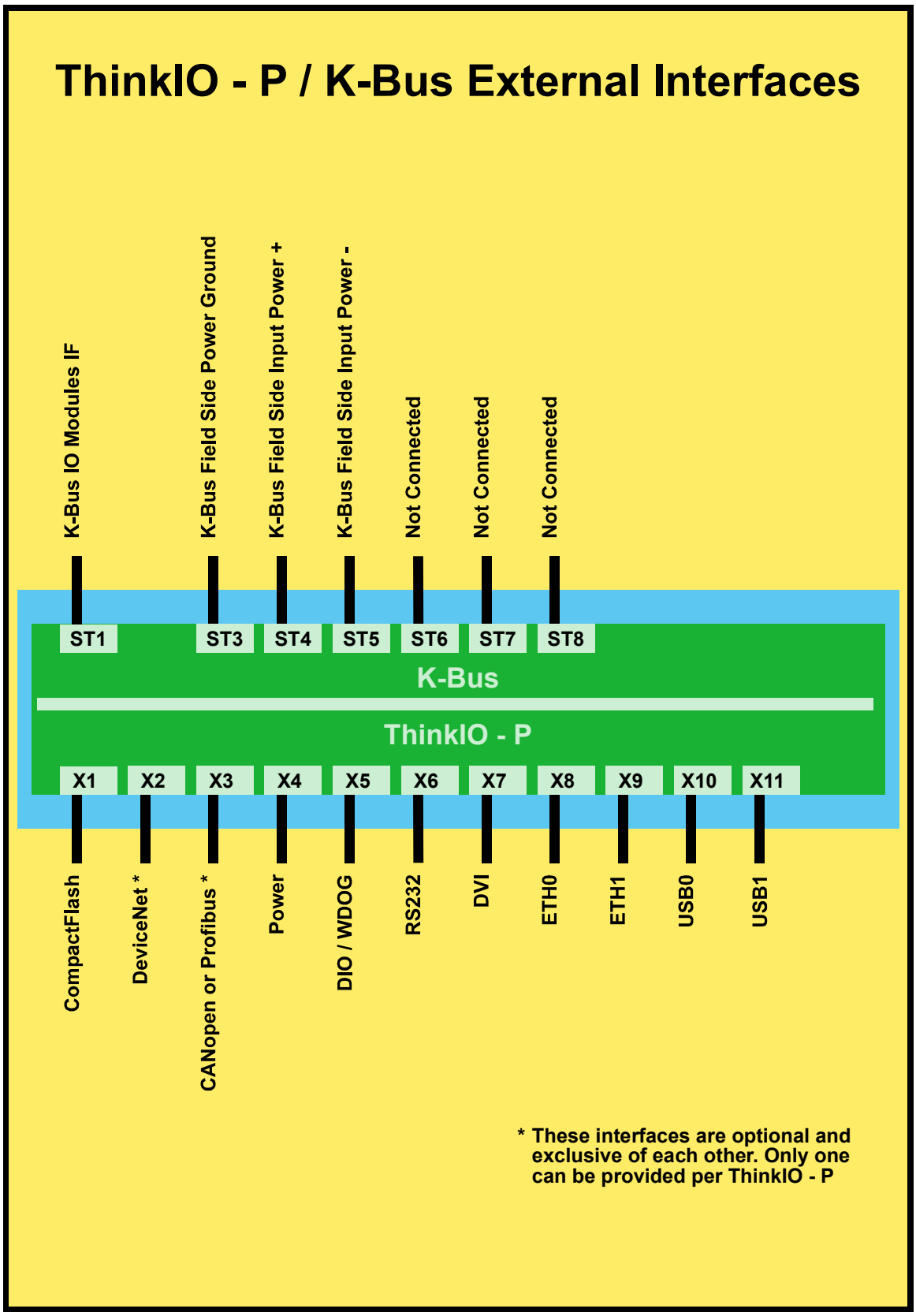
29867.03_01.VC.051017/115451

Figure 1-4: ThinkIO-P Application System Interfacing Diagram



© 2005 Kontron Modular Computers GmbH

Figure 1-5: ThinkIO-P with WAGO Interface Module (K-Bus) External Interfacing



© 2005 Kontron Modular Computers GmbH

29867.03_01.VC.051017/115456

Figure 1-6: Top and Bottom Views of WAGO Interface Module (K-Bus)

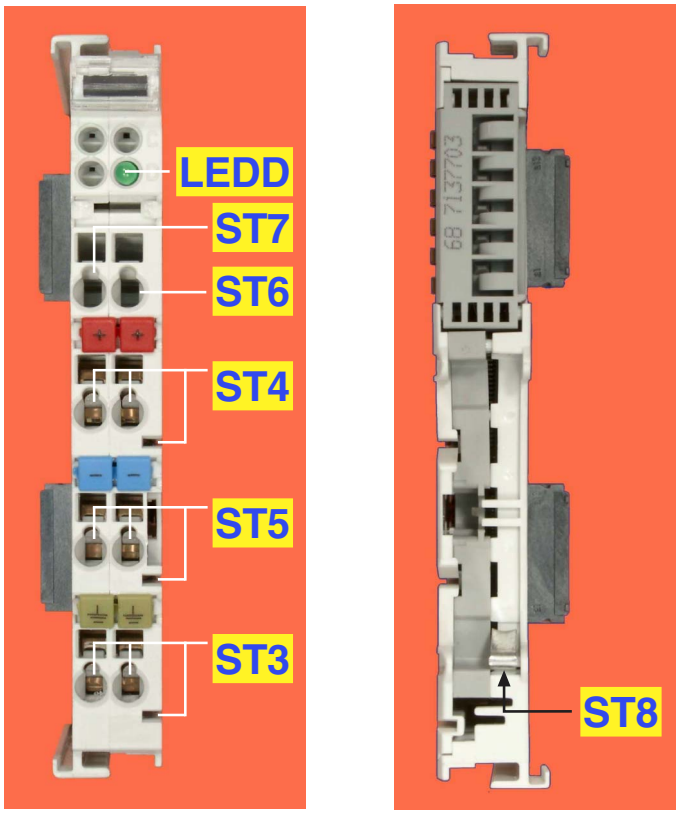
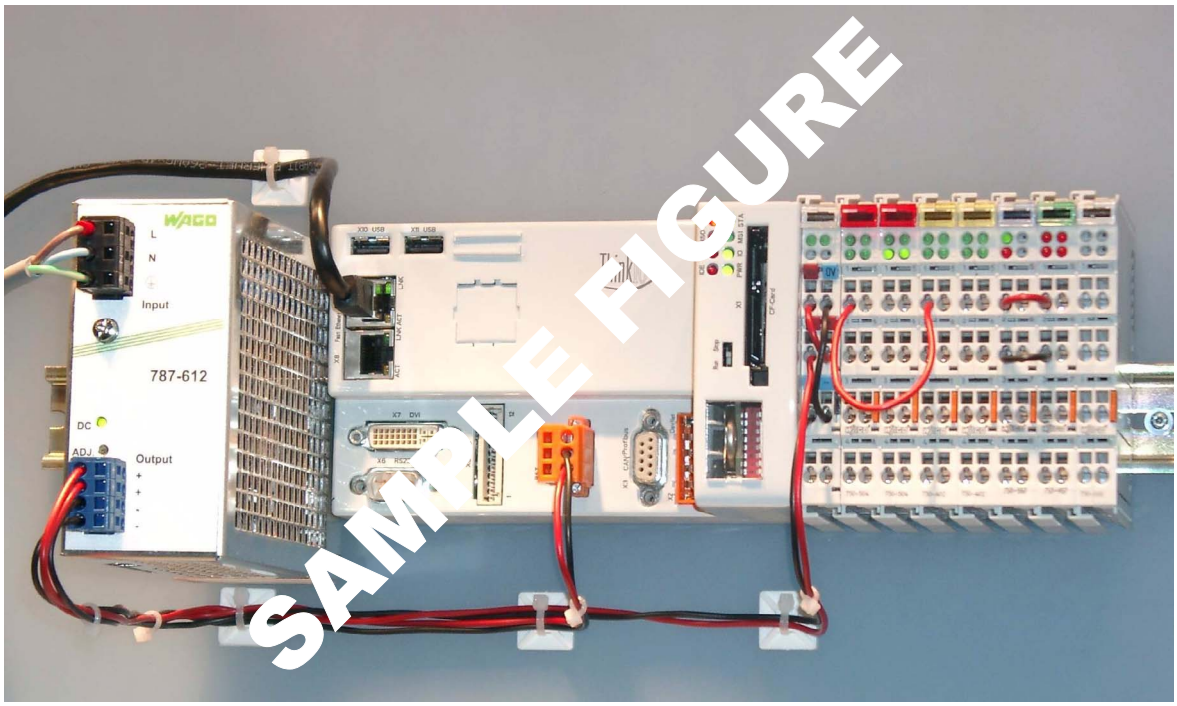


Figure 1-7: ThinkIO-P with K-Bus Module in Application Environment



© 2005 Kontron Modular Computers GmbH

1.3 Technical Specifications

Table 1-1: ThinkIO-P Main Specifications

	DESIGNATOR	SPECIFICATIONS
CPU and Controllers	CPUs	The following CPU configurations are available: - Intel® Celeron® Processor at 600 MHz (ULV) with 400 MHz PSB (Processor Side Bus) with 64 kB L1 cache and 0 kB L2 cache; in 479 µFCBGA packaging - Intel® Pentium® M 738 at 1.4 GHz (LV) with 400 MHz PSB (Processor Side Bus) with 64 kB L1 cache and 2MB L2 cache; in 479 µFCBGA packaging
	Fieldbus (optional)	Embedded Communication Controller - Supports PROFIBUS DP, CANopen, or DeviceNet - Programmable for one or the other of the above fieldbusses - Fieldbus to be programmed must be specified at time of ordering
Memory	Main Memory	Up to 1024 MB of DDR memory, 333 MHz
	Flash	1 MB of Flash for BIOS
	Mass Storage	Up to 1024 MB soldered IDE Flash
	SRAM	Up to 2 MB, 16-bit, battery backed up SRAM
ThinkIO - P Interfaces	Application Process and Monitor and Control	Types: - Fast Ethernet (two, 10/100BASE-T, FE1, FE2) - PanelLink (one, DVI (TFT/CRT)) - Serial (one, RS232, COM1) - USB (two, USB 2.0, USB0, USB1) - Digital input (two channels) - Digital output (two channels) - Watchdog (one PLC output channel with relay contacts, one PC internal) - Fieldbus (optional, one of the following: PROFIBUS DP, CANopen, or DeviceNet, as either Master or Slave) - CompactFlash, type I/II - Run / Stop switch - Reset switch - Operational status indicators (eight LEDs) - Backup battery
K-Bus (Optional)	WAGO Interface Module (K-Bus)	WAGO-I/O-SYSTEM 750/753 WAGO interface module (K-Bus) - compatible to all of WAGO's "750/753"-Series input / output modules - Form factor: W x H x L: 12 mm x 70 mm x 100 mm
	IO Modules and Field Side Power	Types: - I / O bus for WAGO-I/O-SYSTEM 750/753 input / output modules - + 5 V power bus for input / output modules - Field side power supply via power jumper contacts - Operational status indicator (one LED)

29867.03_01.VC.051017/115500

© 2005 Kontron Modular Computers GmbH

Table 1-1: ThinkIO-P Main Specifications (Continued)

	DESIGNATOR		SPECIFICATIONS
Power Interfaces	X4	+ 24 V	Main input power interface to the ThinkIO-P: - Tolerance: - 25% to +30% - 3-pin male receptacle
	ST1 (K-Bus)	+ 5 V	Input power interface to input / output module electronics - Maximum current load: 1.0 A - Power jumper contacts
	ST4 (K-Bus)	EXT +	Field side input power interface to input / output modules - Is function of application requirements (module types installed and their power requirements) - Electrically isolated from module electronics - Maximum electrical loading: 10 A - Contacts: - Double CageClamp™, internally bridged - Power jumper contact, female, internally bridged to CageClamp™
	ST5 (K-Bus)	EXT -	Field side input power interface to input / output modules - Is function of application requirements (module types installed and their power requirements) - Electrically isolated from module electronics - Maximum electrical loading: 10 A - Contacts: - Double CageClamp™, internally bridged - Power jumper contact, female, internally bridged to CageClamp™
	ST3 (K-Bus)	Shield (Ground)	Field side power shielding (ground) interface to input / output modules - Is function of application requirements (module types installed and their power requirements) - Electrically isolated from module electronics - Contacts: - Double CageClamp™, internally bridged - Power jumper contact, female, internally bridged to CageClamp™
	ST8 (K-Bus)	Shield (Ground)	WAGO interface module (K-Bus) to DIN rail ground contact - Contact: - Sliding spring - Internally not connected
	Battery socket	AUX Power	Battery input power interface to ThinkIO-P for power backup of RTC and SRAM memory devices - Battery type: 3.3 V, lithium, non-rechargeable - Battery: CR2025

29867.03_01.VC.051017/115500

 © 2005 Kontron Modular Computers GmbH

Table 1-1: ThinkIO-P Main Specifications (Continued)

	DESIGNATOR	SPECIFICATIONS
General	Electrical	Main input power voltage: + 24 V DC (nominal) Main input power range: - 25% to + 30%
	Power Consumption	ThinkIO-P in stand-alone configuration: - with 600 MHz CPU: 17 watts maximum @ 24 volts - with 1.4 GHz CPU: 24 watts maximum @ 24 volts A maximum of 5 watts @ 5 volts is available for I/O modules via the ThinkIO-P. If more power is needed, (an) additional WAGO-IO-SYSTEM 750 internal power supply module(s) (750-613) must be added to satisfy power requirements. It may even be necessary to provide additional 24 VDC input power to the internal power supply module(s).
	Temperature Range	Operational: 0ºC to +55ºC Standard Storage: -10ºC to +85ºC
	Climatic Humidity	93% r.h. at 40° C, non-condensing (acc. to IEC 60068-2-78)
	Dimensions	Form factor: ThinkIO-P assembled with WAGO interface module (K-Bus) - W x H x L: 236 mm x 70 (65*) mm x 100 mm * from upper edge of 35 DIN rail Form factor: ThinkIO-P stand-alone - W x H x L: 224 mm x 70 (65*) mm x 100 mm * from upper edge of 35 DIN rail
	Weight(s)	ThinkIO-P plus WAGO interface module (K-Bus): 1055 g (with all connectors populated) ThinkIO-P in stand-alone configuration: 1016 g (with all connectors populated)

29867.03_01.VC.051017/115501

© 2005 Kontron Modular Computers GmbH

1.4 Applied Standards

The Kontron Modular Computers' ThinkIO-P DIN Rail PC complies with the requirements of the following standards:

Table 1-2: Applied Standards

COMPLIANCE	TYPE	STANDARD	REMARKS
CE	Emission	EN55022 EN61000-6-3	
	Immission	EN55024 EN61000-6-2	
	Electrical Safety	EN60950-1	The ThinkIO-P is specified I/O only for: SELV and EVL. It is **NOT SPECIFIED** for "Hazardous"
	PLC Product Standard	EN61131-2	EMC-Zone "A" and "B"
Mechanical	Mechanical Dimensions	EN 50022	
Environmental and Health Aspects	Vibration (Sinusoidal)	IEC60068-2-6	
	Shock	IEC60068-2-27	
	Temperature Tests A: Cold	IEC 60068-2-1	
	Temperature Tests B: Dry Heat	IEC 60068-2-2	
	Climatic Humidity	IEC60068-2-78	93% RH at 40 °C, non-condensing
	WEEE	Directive 2002/96/EC	Waste electrical and electronic equipment
	RoHS	Directive 2002/95/EC	Restriction of the use of certain hazardous substances in electrical and electronic equipment

WARNING!

To satisfy CE requirements regarding ESD protection, special dust caps must be installed on connectors X3, X6, and X7 (CAN/Profibus, RS232, and DVI) when these connectors are not in use, i.e. no cable is connected. This is intended to prevent electrostatic discharging to the pins of these connectors.

Appropriate dust caps are supplied with the ThinkIO-P. In the event they are damaged or lost, replacement caps may be obtained by contacting Kontron Modular Computers.

29867.03_01.VC.051017/115501

 © 2005 Kontron Modular Computers GmbH

1.5 Related Publications

Table 1-3: Related Publications

	ISSUED BY	DOCUMENT
WAGO-I/O-SYSTEM	WAGO Kontakttechnik GmbH	WAGO-I/O-SYSTEM 750 Input / Output Modules WAGO-I/O-SYSTEM 753 Input / Output Modules with Pluggable Field Wiring Internet Address: www.wago.com

29867.03_01.VC.051017/115501

© 2005 Kontron Modular Computers GmbH

Chapter 2

Interfaces

29867.03_01.VC.051017/115501

© 2005 Kontron Modular Computers GmbH

This page has been intentionally left blank.

29867.03_01.VC.051017/115501

© 2005 Kontron Modular Computers GmbH

2. Interfaces

The following chapters present interface information about the ThinkIO-P DIN Rail Automation PC.

2.1 General Information

The ThinkIO-P provides the following application interfaces:

- X1: a CompactFlash card, type I/II, socket
- X2: an optional connector for a DeviceNet fieldbus *
- X3: an optional connector for either a CANopen or PROFIBUS DP fieldbus *
- X4: a power connector for 24 V DC main power input
- X5: a connector for digital inputs and outputs
- X6: a serial communications connector
- X7: a DVI-type, PanelLink, display connector for a TFT or CRT
- X8: a Fast Ethernet connector (ETH0) for a network
- X9: a Fast Ethernet connector (ETH1) for a network
- X10: a USB device connector (USB0)
- X11: a USB device connector (USB1)
- B1: a battery holder for backingup the RTC and SRAM

* The DeviceNet and the CANopen/PROFIBUS DP interfaces are optional, exclusive interfaces. Only one or the other of these interfaces is possible to have on one ThinkIO-P.

In addition, the optional WAGO interface module (K-Bus) provides the following interfaces:

- ST1: a bus type interface for data exchange with WAGO-I/O-SYSTEM 750/753 I/O modules
- ST3: a fieldside power ground interface
- ST4: a fieldside power input interface
- ST5: a fieldside power input interface

2.2 X1 CompactFlash

This interface is a standard IDE type interface which supports CompactFlash cards (type I and II) including IBM Microdrives.

29867.03_01.VC.051017/115501

 © 2005 Kontron Modular Computers GmbH

2.3 X2 DeviceNet

This fieldbus interface is optional and is exclusive of the other fieldbus interfaces available with the ThinkIO-P. If installed, it is the only fieldbus interface available. The connector for this interface is a 5-pin, male, WAGO connector.

The following figure and table provide pinout information for this interface.

Figure 2-1: X2 DeviceNet Interface

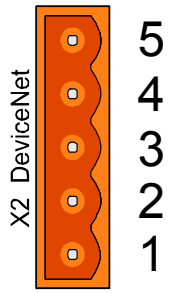


Table 2-1: X2 DeviceNet Interface

SIGNAL	PIN
DEVNET_V+	5
CAN+	4
SHIELD	3
CAN-	2
DEVNET_V-	1

29867.03_01.VC.051017/115501

© 2005 Kontron Modular Computers GmbH

2.4 X3 CANopen

This fieldbus interface is optional and is exclusive of the other fieldbus interfaces available with the ThinkIO-P. If installed, it is the only fieldbus interface available. The connector for this interface is a 9-pin, male, D-Sub connector.

The following figure and table provide pinout information for this interface.

Figure 2-2: X3 CANopen Interface

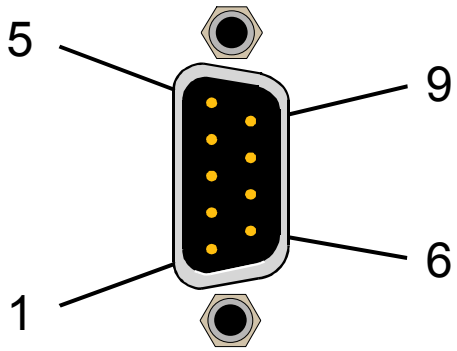


Table 2-2: X3 CANopen Interface

SIGNAL	PIN
CAN_+5V	9
NC	8
CAN+	7
NC	6
NC	5
NC	4
CAN_GND	3
CAN-	2
NC	1

WARNING!

To satisfy CE requirements regarding ESD protection, a special dust cap must be installed on this connector when it is not in use, i.e. no cable is connected. This is intended to prevent electrostatic discharging to the pins of this connector.

An appropriate dust cap is supplied with the ThinkIO-P. In the event it is damaged or lost, a replacement cap may be obtained by contacting Kontron Modular Computers.

29867.03_01.VC.051017/115501

© 2005 Kontron Modular Computers GmbH

2.5 X3 PROFIBUS-DP

This fieldbus interface is optional and is exclusive of the other fieldbus interfaces available with the ThinkIO-P. If installed, it is the only fieldbus interface available. The connector for this interface is a 9-pin, female, D-Sub connector.

The following figure and table provide pinout information for this interface.

Figure 2-3: X3 Profibus-DP

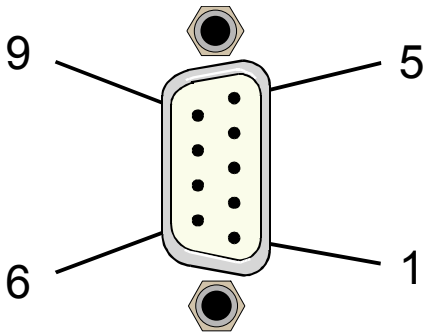


Table 2-3: X3 Profibus-DP

SIGNAL	PIN
NC	9
PB-	8
NC	7
PB_+5V	6
PB_GND	5
PB_ENA	4
PB+	3
NC	2
NC	1

WARNING!

To satisfy CE requirements regarding ESD protection, a special dust cap must be installed on this connector when it is not in use, i.e. no cable is connected. This is intended to prevent electrostatic discharging to the pins of this connector.

An appropriate dust cap is supplied with the ThinkIO-P. In the event it is damaged or lost, a replacement cap may be obtained by contacting Kontron Modular Computers.

© 2005 Kontron Modular Computers GmbH

2.6 X4 Power

The ThinkIO-P input power should be a nominally 24 V DC whereby a tolerance range of - 25% to + 30% (18.0 V DC … 31.2 V DC range) is permitted. The connector for this interface is a 3-pin, male, WAGO connector.

The following figure and table provide pinout information for this interface.

Figure 2-4: X4 Power

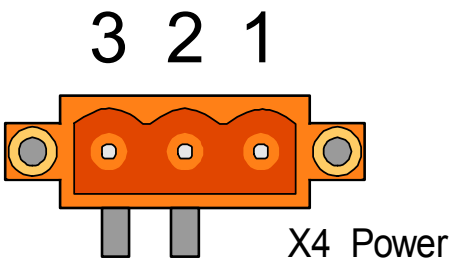


Table 2-4: X4 Power

SIGNAL	PIN
V_IN (+)	1
GND (-)	2
Shield (⏚)	3

© 2005 Kontron Modular Computers GmbH

2.7 X5 Digital Input / Output - DIO

The connector for this interface is a 15-pin, male, D-Sub connector. It provides two two digital input channels, two digital output channels, and one Watchdog relay output channel.

The following figures and tables provide detailed information for this interface.

For further information concerning the PLC Watchdog Timer, refer to chapter 3.5 of this guide.

Figure 2-5: X5 Digital I/O

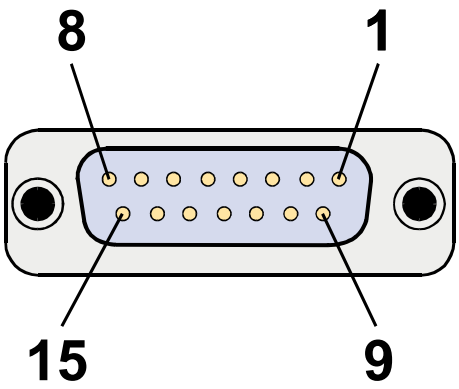


Table 2-5: X5 Digital I/O

SIGNAL	PIN
DIN0+	1
DIN1+	2
DOUT0+	3
DOUT1+	4
NC	5
NC	6
REL_NO	7
REL_NC	8
DIN0-	9
DIN1-	10
DOUT0-	11
DOUT1-	12
NC	13
NC	14
WDG_OUT	15

29867.03_01.VC.051017/115502

© 2005 Kontron Modular Computers GmbH

Table 2-6: Digital Input Characteristics

CHARACTERISTIC	DESCRIPTION
Voltage range	Low: - 3 V to + 5 V High: + 11 V to + 30 V (+ 24 V standard)
Current	5 mA maximum per channel
Channels	2
Channel Connection	2 pins per channel, single ended Each channel can be configured separately as required.
Input Impedance	Minimum: 1.5 kOhm Maximum: 6 kOhm @ 30 V
Other Features	Optoisolation: 2 kV to system Lowpass filtering: edge frequency is 10 kHz Current Limitation Overvoltage protection: 8 kV ESD Peak Pulse Power (tp = 8/20µs): Ppk = 300 W Inverse polarity protection

Figure 2-6: Functional Drawing of Single Digital Input

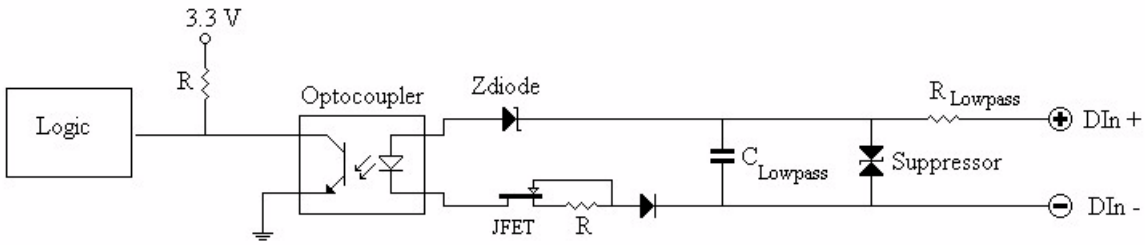
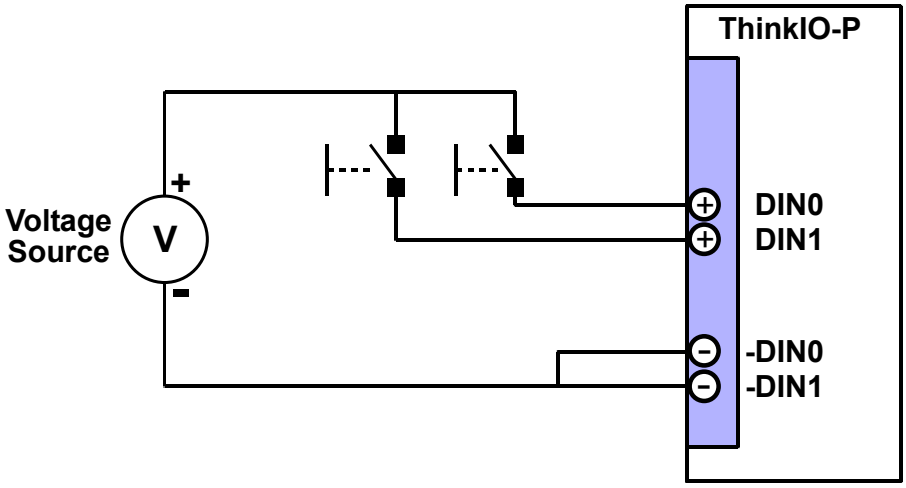


Figure 2-7: Connection to the Digital Inputs

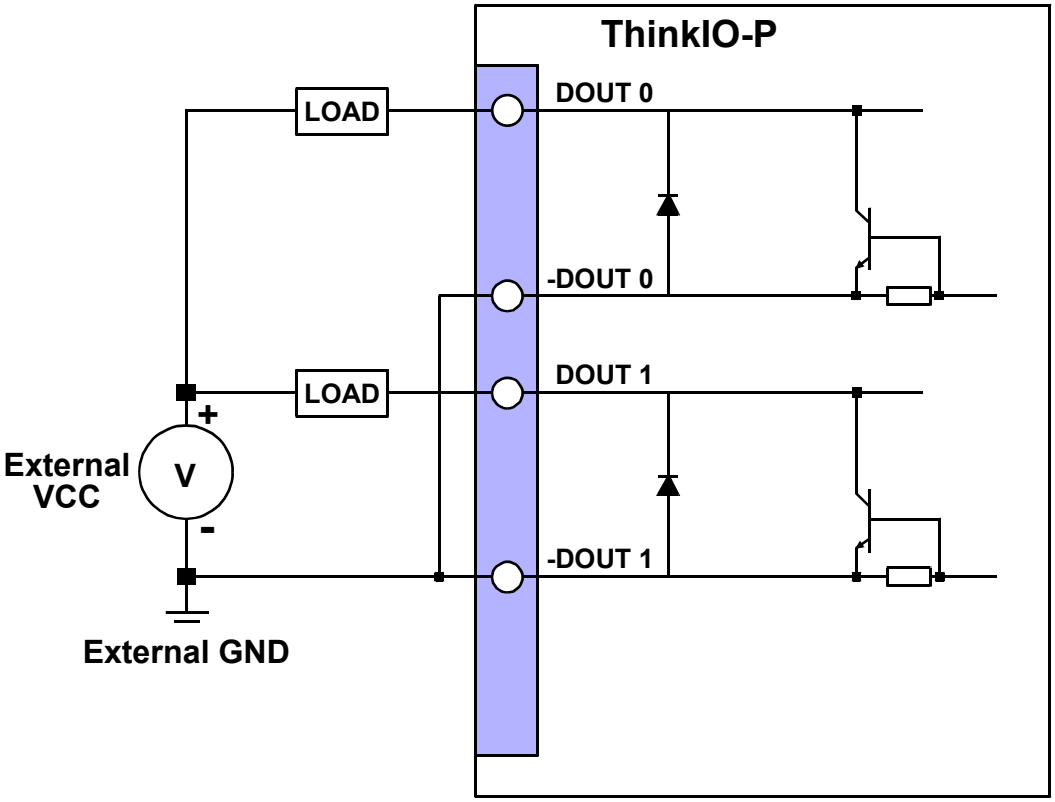


© 2005 Kontron Modular Computers GmbH

Table 2-7: Digital Output Characteristics

CHARACTERISTIC	DESCRIPTION
External VCC	Maximum VCC: 24 VDC
Current	100 mA typical 200 mA absolute maximum
Channels	2
Channel Connection	2 pins per channel, single ended Each channel can be configured separately as required.
Other Features	Optoisolation 2 kV to system Current Limitation Inverse polarity protection

Figure 2-8: Connection to the Digital Outputs

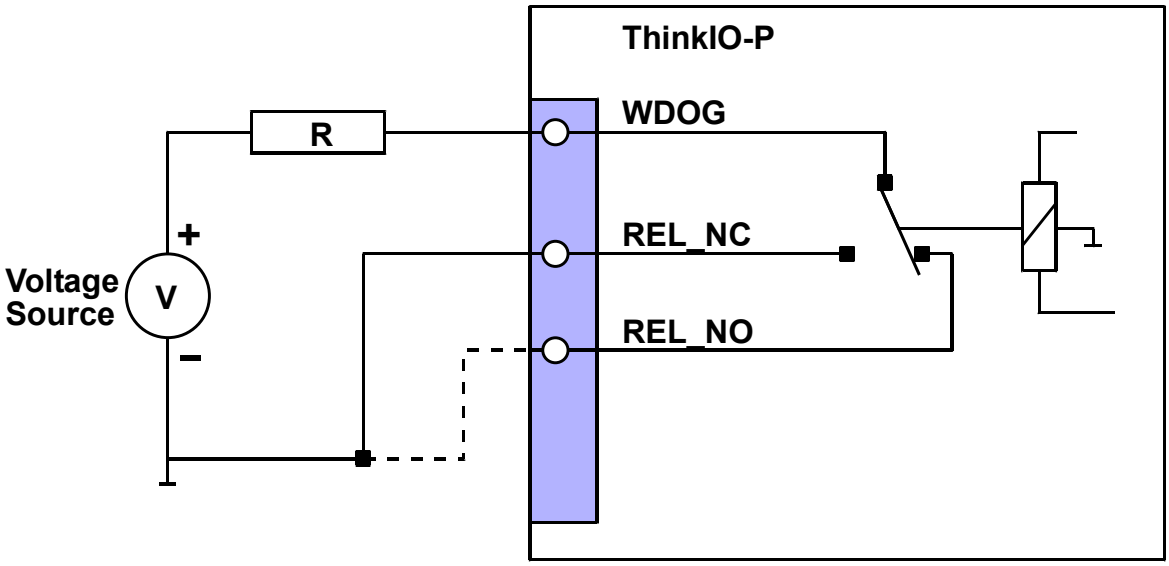


© 2005 Kontron Modular Computers GmbH

Table 2-8: PLC Watchdog Output Characteristics

CHARACTERISTIC	VALUE
Relay Output	DIO/WDG connector, X5 Pin 7: Normally open (REL_NO) Pin 8: Normally closed (REL_NC) Pin 15: WDG_OUT
Switching Voltage	32 VDC maximum
Switching Current	1A maximum

Figure 2-9: Connection of PLC Watchdog Outputs



© 2005 Kontron Modular Computers GmbH

2.8 X6 Serial Comunications

The connector for this interface is a 9-pin, male, D-Sub connector. This is a standard RS2323 interface with full handshaking capability.

The following figure and table provide pinout information for this interface.

Figure 2-10:X6 Serial Communications

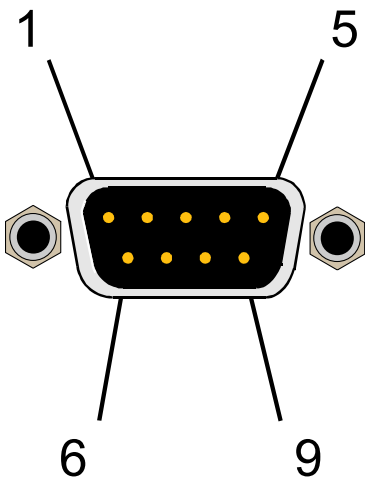


Table 2-9: X6 Serial Communications

SIGNAL	PIN
DCD1	1
RXD1	2
TXD1	3
DTR1	4
GND	5
DSR1	6
RTS1	7
CTS1	8
RI1	9

29867.03_01.VC.051017/115503

© 2005 Kontron Modular Computers GmbH

2.9 X7 DVI

The connector for this interface is a 30-contact, female DVI compliant combined analog and digital receptacle connector.

The following figure and table provide pinout information for this interface.

Figure 2-11:X7 DVI

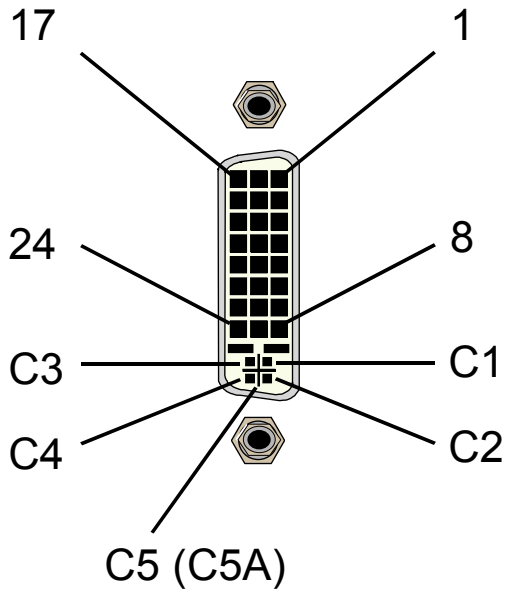


Table 2-10:X7 DVI

SIGNAL	PIN	SIGNAL	PIN	SIGNAL	PIN
TXD2-	1	TXD1-	9	TXD0-	17
TXD2+	2	TXD1+	10	TXD0+	18
GND	3	GND	11	GND	19
NC	4	NC	12	NC	20
NC	5	NC	13	NC	21
DDCCLK	6	VCC_DVI	14	GND	22
DDCDATA	7	GND	15	TXCP	23
CRT_VSY	8	NC	16	TXCN	24
CRT_R	C1	CRT_G	C2	CRT_B	C3
CRT_HSY	C4	GND	C5	GND	C5A

WARNING!

To satisfy CE requirements regarding ESD protection, a special dust cap must be installed on this connector when it is not in use, i.e. no cable is connected. This is intended to prevent electrostatic discharging to the pins of these connectors.

An appropriate dust cap is supplied with the ThinkIO-P. In the event it is damaged or lost, a replacement cap may be obtained by contacting Kontron Modular Computers.

29867.03_01.VC.051017/115503

 © 2005 Kontron Modular Computers GmbH

2.10 X8 and X9 Fast Ethernet

These are 10/100BASE-T Fast Ethernet compliant interfaces. The connectors for these interfaces are an 8-contact, RJ45 type connector. In addition, there are two operational status LEDs built into each connector: ACT (yellow) and LINK (green). When the LINK LED is on steady, a link has been established. When the ACT LED blinks, there is activity on the link.

Of the two Fast Ethernet interfaces, the X8 (ETH0) is the primary interface and X9 (ETH1) is the secondary interface.

The following figure and table provide pinout information for these interfaces.

Figure 2-12: X8 and X9 Fast Ethernet

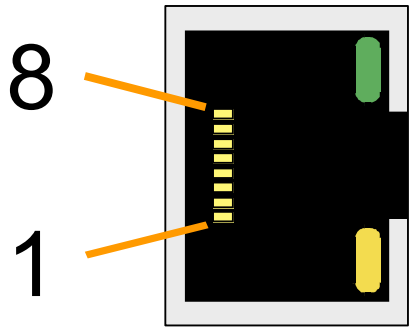


Table 2-11: X8 and X9 Fast Ethernet

SIGNAL	PIN
TX+	1
TX-	2
RX+	3
RXC/CMT	4
RXC/CMT	5
RX-	6
RXC/CMT	7
RXC/CMT	8

© 2005 Kontron Modular Computers GmbH

2.11 X10 and X11 USB

The connector for this interface is a USB standard compliant connector.

The following figure and table provide pinout information for this interface.

Figure 2-13: X10 and X11 USB

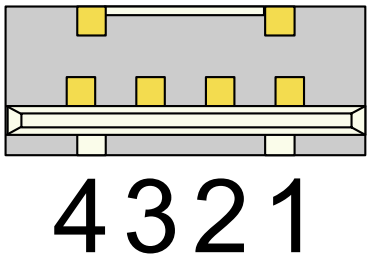


Table 2-12: X10 and X11 USB

SIGNAL	PIN
USB_GND	4
USB_P1	3
USB_N1	2
USB_VCC1	1

2.12 WAGO Interface Module (K-Bus) (Optional)

The WAGO interface module (K-Bus) provides system interfacing between the ThinkIO-P and the WAGO-I/O-SYSTEM 750/753 I/O modules. For a description of the WAGO I/O modules and their operation refer to the WAGO documentation.

The following interfaces are available on the WAGO interface module (K-Bus):

- I/O modules (ST1)
- Power (ST3, 4, 5, 6, 7, 8)
- Operational status LED D

2.12.1 System (ST1)

This interface provides interfacing between the WAGO interface module (K-Bus) and the WAGO-IO-SYSTEM 750/753 input / output modules. It supplies 5 volt power to the K-Bus as well as providing for control and data exchange between the K-Bus module and the input / output modules.

2.12.2 Power (ST3, 4, 5, 6, 7, 8)

These interfaces provide power interfacing capability via the WAGO interface module (K-Bus) to the WAGO-IO-SYSTEM 750/753 input / output modules. They are physically isolated from the K-Bus module electronics and the ThinkIO-P and serve only as distribution points for input power to other WAGO IO modules.

Refer to WAGO-IO-SYSTEM 750/753 documentation for further information concerning the use of these interfaces and input / output module power requirements.

29867.03_01.VC.051017/115503

 © 2005 Kontron Modular Computers GmbH

The following table provides pinout information for these interfaces.

Table 2-13: Power (ST3, 4, 5, 6, 7, 8)

CONNECTOR	MARKING	DESCRIPTION
ST3	GND GND	Input power ground or shield - dual CageClamp™ plus power jumper contact to next IO module
ST4	+ +	Input power plus voltage - dual CageClamp™ plus power jumper contact to next IO module
ST5	- -	Input power minus voltage - dual CageClamp™ plus power jumper contact to next IO module
ST6	0V	Dummy connector - single CageClamp™ - not connected internally
ST7	24V	Dummy connector - single CageClamp™ - not connected internally
ST8	none	Power ground or shield - Spring contact to DIN rail - not connected internally

2.12.3 Operational Status LED D

This interface indicates whether or not if field side power is applied to the WAGO interface module (K-Bus). When on, it indicates the presence of field side power (24 V DC). When off, there is no field side power applied to the WAGO IO system.

29867.03_01.VC.051017/115503

© 2005 Kontron Modular Computers GmbH

Chapter 3

Monitor and Control (M/C)

29867.03_01.VC.051017/115504

© 2005 Kontron Modular Computers GmbH

This page has been intentionally left blank.

29867.03_01.VC.051017/115504

© 2005 Kontron Modular Computers GmbH

3. Monitor and Control (M/C)

3.1 ThinkIO-P LEDs

The ThinkIO-P has eight LEDs visible from the front of the ThinkIO-P for indicating various operational status information. Typical indicators for PLC and fieldbus are implemented along with POST code indications using the same LEDs during power-up and operation. Further, status information for diagnostic purposes or non-PLC mode of operation is also possible to be indicated as well as having the LEDs being controlled by test software.

For economical reasons only one LED type is used for all LED ports. For maximum flexibility, a multi-color, red and green, LED is used. The architecture of this LED type permits the red and green color LEDs to be driven in parallel thus providing a kind of amber (or yellow) color.

3.1.1 Modes of Operation

The different modes of operation for the LED port can be grouped into:

- POST
- Special Purpose (a and b)
- Diagnostic
- Test

In POST mode LED1 to LED8 form an 8-bit wide port to display POST codes in binary format. LED1 is the right most LED and is the least significant bit for POST code representation. POST mode is entered by default on power-up.

In Special Purpose mode the LEDs are mapped to dedicated PLC or fieldbus controller related status information. Special Purpose mode includes two free programmable User LEDs and the special DeviceNet option for a MOD/NET status LED. There are two possible configurations of Special Purpose: SPa and SPb.

In Diagnostic mode the LEDs are mapped to internal device status information regarding Watchdog, Thermal Alarm, and Digital IO.

In Test mode the two User LEDs are replicated alternately on all LEDs starting with U1 on LED1.

29867.03_01.VC.051017/115504

 © 2005 Kontron Modular Computers GmbH

3.1.2 Status Indications

The following table provides an overview of the functions indicated by the various LEDs.

Table 3-1: ThinkIO-P LED Functions

INDICATOR	FUNCTION
RUN	Status indication required in PLC/Fieldbus applications with the EC1 fieldbus controller from Hilscher. Color: green; state: on steady; driven when port signal RUN of the EC1 fieldbus controller chip is low.
RDY	Status indication required in PLC/Fieldbus applications with the EC1 fieldbus controller from Hilscher. Color: amber; state: on steady; driven when port signal RDY of the EC1 fieldbus controller chip is low.
STA	Status indication required in PLC/Fieldbus applications with the EC1 fieldbus controller from Hilscher. Color: amber; state: on steady; driven when Port signal STA of the EC1 fieldbus controller chip is low.
ERR	Status indication required in PLC/Fieldbus applications with the EC1 fieldbus controller from Hilscher. Color: red; state: on steady; driven when Port signal ERR of the EC1 fieldbus controller chip is low.
MOD/NET	Status indication required in PLC/Fieldbus applications when the EC1 fieldbus controller from Hilscher is configured for DeviceNet operation. Color: green; state: flashing; driven when the port signal STA of EC1 is low and the port signal ERR of EC1 is high. Color: red; state: flashing; driven when the port signal STA of EC1 is high and the port signal ERR of EC1 is low. Any other indication is irrelevant.
KBUS	Status indication required in PLC/Fieldbus applications in conjunction with the WAGO interface module (K-Bus) for WAGO-I/O-SYSTEM 750 modules. Color: green; state: on steady; driven when the K-Bus port signal LED_g is low. Color: red; state: on steady; driven when the K-Bus port signal LED_r is low. Color: amber; state: on steady; driven when both of the K-Bus port signals are low.
IDE/Power	Status indication for IDE activity and main input power to the ThinkIO-P. Color: green; state: on steady; driven when main input power is applied and IDE is inactive. Color: red; state: on steady; driven when main input power is applied and IDE is active. This LED indicates two states: power applied and no IDE activity, power applied and IDE activity. The LED indication toggles between green and red when IDE activity occurs.
U1	Free programmable User LED Color: green, red, amber; state: off, on steady, flashing
U2	Free programmable User LED Color: green, red, amber; state: off, on steady, flashing

29867.03_01.VC.051017/115504

© 2005 Kontron Modular Computers GmbH

Table 3-1: ThinkIO-P LED Functions

INDICATOR	FUNCTION
DIN1	Status indication for digital input 1, DIN1. Color: green; state: on steady; driven when DIN1 input is asserted.
DIN2	Status indication for digital input 2, DIN2. Color: green; state: on steady; driven when DIN2 input is asserted.
DOUT1	Status indication for digital output 1, DOUT1. Color: green; state: on steady; driven when DOUT1 output is asserted.
DOUT2	Status indication for digital output 2, DOUT2. Color: green; state: on steady; driven when DOUT2 output is asserted.
TAL	Status indication of a Thermal Alarm for the CPU. Color: green; state: on steady; driven when CPU is within its normal operating temperature. Color: red; state: on steady; driven when CPU is in an over temperature operating state.
WD_PC	Status indication of the PC related Watchdog Timer. Color: none; state: off; driven when the Watchdog Timer is not enabled. Color: green; state: on steady; driven when the Watchdog Timer is enabled and not timed out. Color: red; state: on steady; driven when the Watchdog Timer is enabled and timed out.
WD_PLC	Status indication of the PLC related Watchdog Timer. Color: none; state: off; driven when the Watchdog Timer is not enabled. Color: green; state: on steady; driven when the Watchdog Timer is enabled and not timed out. Color: red; state: on steady; driven when the Watchdog Timer is enabled and timed out.

3.1.3 LED Mapping

The following table summarizes the LED mappings depending on the LED operational modes.

Table 3-2: LED Mapping

MODE	LED8	LED7	LED6	LED5	LED4	LED3	LED2	LED1
POST	D7	D6	D5	D4	D3	D2	D1	D0
SPA	U2	U1	IDE/PWR	KBUS	ERR	STA	RDY	RUN
SPB	U2	U1	IDE/PWR	KBUS	TAL	MOD/NET	RDY	RUN
DIAG	DOUT1	DOUT2	DIN2	DIN1	TAL	WD_PC	U2	WD_PLC
TEST	U2	U1	U2	U1	U2	U1	U2	U1

LED1 and LED2 are used during the pre-POST phase for displaying active RESET (LED1, red when reset active) and POWER GOOD (LED2, red when power not good).

29867.03_01.VC.051017/115504

 © 2005 Kontron Modular Computers GmbH

3.1.4 POST Codes

The following tables provide POST code information for the ThinkIO-P.

Table 3-3: Bootblock Initialization Code Checkpoints

CHECKPOINT	DESCRIPTION
Before D1	Early chipset initialization is done. Early super I/O initialization is done including RTC and keyboard controller. NMI is disabled.
D1	Perform keyboard controller BAT test. Check if waking up from power management suspend state. Save power-on CPUID value in scratch CMOS.
D0	Go to flat mode with 4GB limit and GA20 enabled. Verify the bootblock checksum.
D2	Disable CACHE before memory detection. Execute full memory sizing module. Verify that flat mode is enabled.
D3	If memory sizing module not executed, start memory refresh and do memory sizing in Bootblock code. Do additional chipset initialization. Re-enable CACHE. Verify that flat mode is enabled.
D4	Test base 512KB memory. Adjust policies and cache first 8MB. Set stack.
D5	Bootblock code is copied from ROM to lower system memory and control is given to it. BIOS now executes out of RAM.
D6	Both key sequence and OEM specific method is checked to determine if BIOS recovery is forced. Main BIOS checksum is tested. If BIOS recovery is necessary, control flows to checkpoint E0. See Bootblock Recovery Code Checkpoints section of document for more information.
D7	Restore CPUID value back into register. The Bootblock-Runtime interface module is moved to system memory and control is given to it. Determine whether to execute serial flash.
D8	The Runtime module is uncompressed into memory. CPUID information is stored in memory.
D9	Store the Uncompressed pointer for future use in PMM. Copying Main BIOS into memory. Leaves all RAM below 1MB Read-Write including E000 and F000 shadow areas but closing SMRAM.
DA	Restore CPUID value back into register. Give control to BIOS POST (ExecutePOSTKernel). See POST Code Checkpoints section of document for more information.

29867.03_01.VC.051017/115504

© 2005 Kontron Modular Computers GmbH

Table 3-4: Bootblock Recovery Code Checkpoints

CHECKPOINT	DESCRIPTION
E0	Initialize the floppy controller in the super I/O. Some interrupt vectors are initialized. DMA controller is initialized. 8259 interrupt controller is initialized. L1 cache is enabled.
E9	Set up floppy controller and data. Attempt to read from floppy.
EA	Enable ATAPI hardware. Attempt to read from ARMD and ATAPI CDROM.
EB	Disable ATAPI hardware. Jump back to checkpoint E9.
EF	Read error occurred on media. Jump back to checkpoint EB.
E9 or EA	Determine information about root directory of recovery media.
F0	Search for pre-defined recovery file name in root directory.
F1	Recovery file not found.
F2	Start reading FAT table and analyze FAT to find the clusters occupied by the recovery file.
F3	Start reading the recovery file cluster by cluster.
F5	Disable L1 cache.
FA	Check the validity of the recovery file configuration to the current configuration of the flash part.
FB	Make flash write enabled through chipset and OEM specific method. Detect proper flash part. Verify that the found flash part size equals the recovery file size.
F4	The recovery file size does not equal the found flash part size.
FC	Erase the flash part.
FD	Program the flash part.
FF	The flash has been updated successfully. Make flash write disabled. Disable ATAPI hardware. Restore CPUID value back into register. Give control to F000 ROM at F000:FFF0h.

29867.03_01.VC.051017/115504

 © 2005 Kontron Modular Computers GmbH

Table 3-5: POST Code Checkpoints

CHECKPOINT	DESCRIPTION
03	Disable NMI, Parity, video for EGA, and DMA controllers. Initialize BIOS, POST, Runtime data area. Also initialize BIOS modules on POST entry and GPNV area. Initialized CMOS as mentioned in the Kernel Variable "wCMOSFlags."
04	Check CMOS diagnostic byte to determine if battery power is OK and CMOS checksum is OK. Verify CMOS checksum manually by reading storage area. If the CMOS checksum is bad, update CMOS with power-on default values and clear passwords. Initialize status register A. Initializes data variables that are based on CMOS setup questions. Initializes both of the 8259 compatible PICs in the system.
05	Initializes the interrupt controlling hardware (generally PIC) and interrupt vector table.
06	Do R/W test to CH-2 count reg. Initialize CH-0 as system timer. Install the POSTINT1Ch handler. Enable IRQ-0 in PIC for system timer interrupt. Traps INT1Ch vector to "POSTINT1ChHandlerBlock."
08	Initializes the CPU. The BAT test is being done on KBC. Program the keyboard controller command byte is being done after Auto detection of KB/MS using AMI KB-5.
C0	Early CPU Init Start -- Disable Cache - Init Local APIC
C1	Set up boot strap proccessor Information
C2	Set up boot strap proccessor for POST
C5	Enumerate and set up application proccessors
C6	Re-enable cache for boot strap proccessor
C7	Early CPU Init Exit
0A	Initializes the 8042 compatible Key Board Controller.
0B	Detects the presence of PS/2 mouse.
0C	Detects the presence of Keyboard in KBC port.
0E	Testing and initialization of different Input Devices. Also, update the Kernel Variables. Traps the INT09h vector, so that the POST INT09h handler gets control for IRQ1. Uncompress all available language, BIOS logo, and Silent logo modules.
13	Early POST initialization of chipset registers.
24	Uncompress and initialize any platform specific BIOS modules.
30	Initialize System Management Interrupt.
2A	Initializes different devices through DIM. See DIM Code Checkpoints section of document for more information.
2C	Initializes different devices. Detects and initializes the video adapter installed in the system that have optional ROMs.
2E	Initializes all the output devices.
31	Allocate memory for ADM module and uncompress it. Give control to ADM module for initialization. Initialize language and font modules for ADM. Activate ADM module.

29867.03_01.VC.051017/115504

© 2005 Kontron Modular Computers GmbH

Table 3-5: POST Code Checkpoints

CHECKPOINT	DESCRIPTION
33	Initializes the silent boot module. Set the window for displaying text information.
37	Displaying sign-on message, CPU information, setup key message, and any OEM specific information.
38	Initializes different devices through DIM. See DIM Code Checkpoints section of document for more information.
39	Initializes DMAC-1 & DMAC-2.
3A	Initialize RTC date/time.
3B	Test for total memory installed in the system. Also, Check for DEL or ESC keys to limit memory test. Display total memory in the system.
3C	Mid POST initialization of chipset registers.
40	Detect different devices (Parallel ports, serial ports, and coprocessor in CPU, ... etc.) successfully installed in the system and update the BDA, EBDA...etc.
50	Programming the memory hole or any kind of implementation that needs an adjustment in system RAM size if needed.
52	Updates CMOS memory size from memory found in memory test. Allocates memory for Extended BIOS Data Area from base memory.
60	Initializes NUM-LOCK status and programs the KBD typematic rate.
75	Initialize Int-13 and prepare for IPL detection.
78	Initializes IPL devices controlled by BIOS and option ROMs.
7A	Initializes remaining option ROMs.
7C	Generate and write contents of ESCD in NVRam.
84	Log errors encountered during POST.
85	Display errors to the user and gets the user response for error.
87	Execute BIOS setup if needed / requested.
8C	Late POST initialization of chipset registers.
8D	Build ACPI tables (if ACPI is supported)
8E	Program the peripheral parameters. Enable/Disable NMI as selected
90	Late POST initialization of system management interrupt.
A0	Check boot password if installed.
A1	Clean-up work needed before booting to OS.
A2	Takes care of runtime image preparation for different BIOS modules. Fill the free area in F000h segment with 0FFh. Initializes the Microsoft IRQ Routing Table. Prepares the runtime language module. Disables the system configuration display if needed.
A4	Initialize runtime language module.

29867.03_01.VC.051017/115504

 © 2005 Kontron Modular Computers GmbH

Table 3-5: POST Code Checkpoints

CHECKPOINT	DESCRIPTION
A7	Displays the system configuration screen if enabled. Initialize the CPU's before boot, which includes the programming of the MTRRs.
A8	Prepare CPU for OS boot including final MTRR values.
A9	Wait for user input at config display if needed.
AA	Uninstall POST INT1Ch vector and INT09h vector. Deinitializes the ADM module.
AB	Prepare BBS for Int 19 boot.
AC	End of POST initialization of chipset registers.
B1	Save system context for ACPI.
00	Passes control to OS Loader (typically INT19h).

Table 3-6: DIM Code Checkpoints

CHECKPOINT	DESCRIPTION
2A	Initialize different buses and perform the following functions: Reset, Detect, and Disable (function 0); Static Device Initialization (function 1); Boot Output Device Initialization (function 2). Function 0 disables all device nodes, PCI devices, and PnP ISA cards. It also assigns PCI bus numbers. Function 1 initializes all static devices that include manual configured onboard peripherals, memory and I/O decode windows in PCI-PCI bridges, and noncompliant PCI devices. Static resources are also reserved. Function 2 searches for and initializes any PnP, PCI, or AGP video devices.
38	Initialize different buses and perform the following functions: Boot Input Device Initialization (function 3); IPL Device Initialization (function 4); General Device Initialization (function 5). Function 3 searches for and configures PCI input devices and detects if system has standard keyboard controller. Function 4 searches for and configures all PnP and PCI boot devices. Function 5 configures all onboard peripherals that are set to an automatic configuration and configures all remaining PnP and PCI devices.

29867.03_01.VC.051017/115505

© 2005 Kontron Modular Computers GmbH

3.2 Run/Stop Switch

This switch provides an operational control function which is application dependent. Refer to appropriate documentation for further information.

3.3 Reset Switch

This switch provides an operational control function which is application dependent. Refer to appropriate documentation for further information.

3.4 PC Watchdog Timer

The ThinkIO-P provides a Watchdog Timer implemented in board logic. Before enabling the timer, the timing interval (timeout period) and operational mode must be configured. The timeout period can be programmed within the range of 125 msec to 256 sec in twelve steps. Four operational modes are available: timer only, reset, interrupt, and dual mode. Once enabled, the timer can only be disabled by a system reset or cold start. During the timing period, the timer must be reset (retriggered) before it times out. This is a function of the application software.

What transpires when a timeout occurs depends on the operational mode selected. Failure to retrigger the Watchdog Timer in time can result in a: timeout indication, a system reset, an interrupt being generated, or in dual mode, an automatic retrigger of the timer and an interrupt is generated by the first timeout and by the second consecutive timeout, the system is reset. A hardware status flag is provided to determine if the Watchdog timer generated the reset.

Each operating system is provided with a board support package (BSP) which contains the software for operating the PC Watchdog Timer. For further information, refer to the online documentation provided with the BSP.

3.5 PLC Watchdog Timer

In addition to the CPU related Watchdog Timer with its interrupt and reset capabilities there is a second IO related Watchdog Timer. This timer behaves similiar to the PC timer except that it cannot force a reset or interrupt. Its output is via relay contacts. The timer is in the “On” state as soon it is configured and enabled. It must be retriggered periodically within its programmable timeout period. Once it reaches timeout, it switches back to the “Off” state. The PLC Watchdog Timer cannot be re-enabled again until the next hard reset occurs.

The PLC Watchdog Timer has the same programming model as the PC Watchdog Timer with the following limitation: the operating mode is fixed to “Timer Only”.

The PLC Watchdog output directly controls a relay which provides an electrically isolated switch to the application.

Each operating system is provided with a board support package (BSP) which contains the software for operating the PLC Watchdog Timer. For further information, refer to the online documentation provided with the BSP.

29867.03_01.VC.051017/115505

 © 2005 Kontron Modular Computers GmbH

This page has been intentionally left blank.

29867.03_01.VC.051017/115505

© 2005 Kontron Modular Computers GmbH

Chapter 4

BIOS

29867.03_01.VC.051017/115505

© 2005 Kontron Modular Computers GmbH

This page has been intentionally left blank.

29867.03_01.VC.051017/115505

© 2005 Kontron Modular Computers GmbH

4. BIOS

The ThinkIO-P is provided with a Kontron specifically adapted version of the AMI BIOS for x86 processors. The documentation for this BIOS version is contained in a separate document which is included as an attachment to this Hardware Reference Guide.

29867.03_01.VC.051017/115505

© 2005 Kontron Modular Computers GmbH

This page has been intentionally left blank.

29867.03_01.VC.051017/115505

© 2005 Kontron Modular Computers GmbH

ThinkIO-P Setup for AMIBIOS8

MAN-EZP-80
07/12/02

© Copyright 2002 American Megatrends, Inc.
All rights reserved.
American Megatrends, Inc.
6145F Northbelt Parkway
Norcross, GA 30071

This publication contains proprietary information, which is protected by copyright. No part of this publication may be reproduced, transcribed, stored in a retrieval system, translated into any language or computer language, or transmitted in any form whatsoever without the prior written consent of the publisher, American Megatrends, Inc.

Limitations of Liability
In no event shall American Megatrends be held liable for any loss, expenses, or damages of any kind whatsoever, whether direct, indirect, incidental, or consequential, arising from the design or use of this product or the support materials provided with the product.

Trademarks
Intel, Pentium, Pentium Pro, Pentium II, Pentium III, Pentium 4, and Xeon are registered trademarks of Intel Corporation.
MS-DOS, Microsoft Word, and Microsoft are registered trademarks of Microsoft Corporation. Microsoft Windows, Windows NT, Windows 95, Windows 98, Windows Me, Windows 2000, Windows XP, and .NET are trademarks of Microsoft Corporation.
AT, XT, CGA, VGA, PS/2, OS/2, and EGA are registered trademarks of International Business Machines Corporation.
All other brand and product names are trademarks or registered trademarks of their respective companies.

Table of Contents

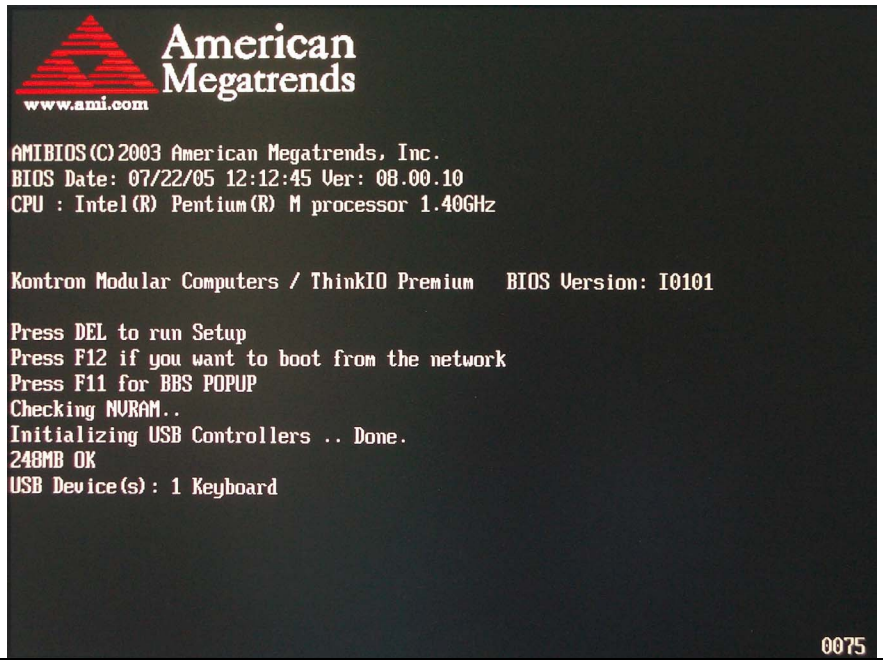
Chapter 1 Starting ThinkIO-P

AMIBIOS has been integrated into many motherboards for over a decade. In the past, people often referred to the AMIBIOS setup menu as BIOS, BIOS setup, or CMOS setup.

With the AMIBIOS **Setup** program, you can modify BIOS settings and control the special features of your computer. The Setup program uses a number of menus for making changes and turning the special features on or off.
Kontron refers to this setup as ThinkIO-P setup. This chapter describes the basic navigation of the ThinkIO-P setup screens.

Starting ThinkIO-P

To enter the ThinkIO-P Setup screens, follow the steps below:

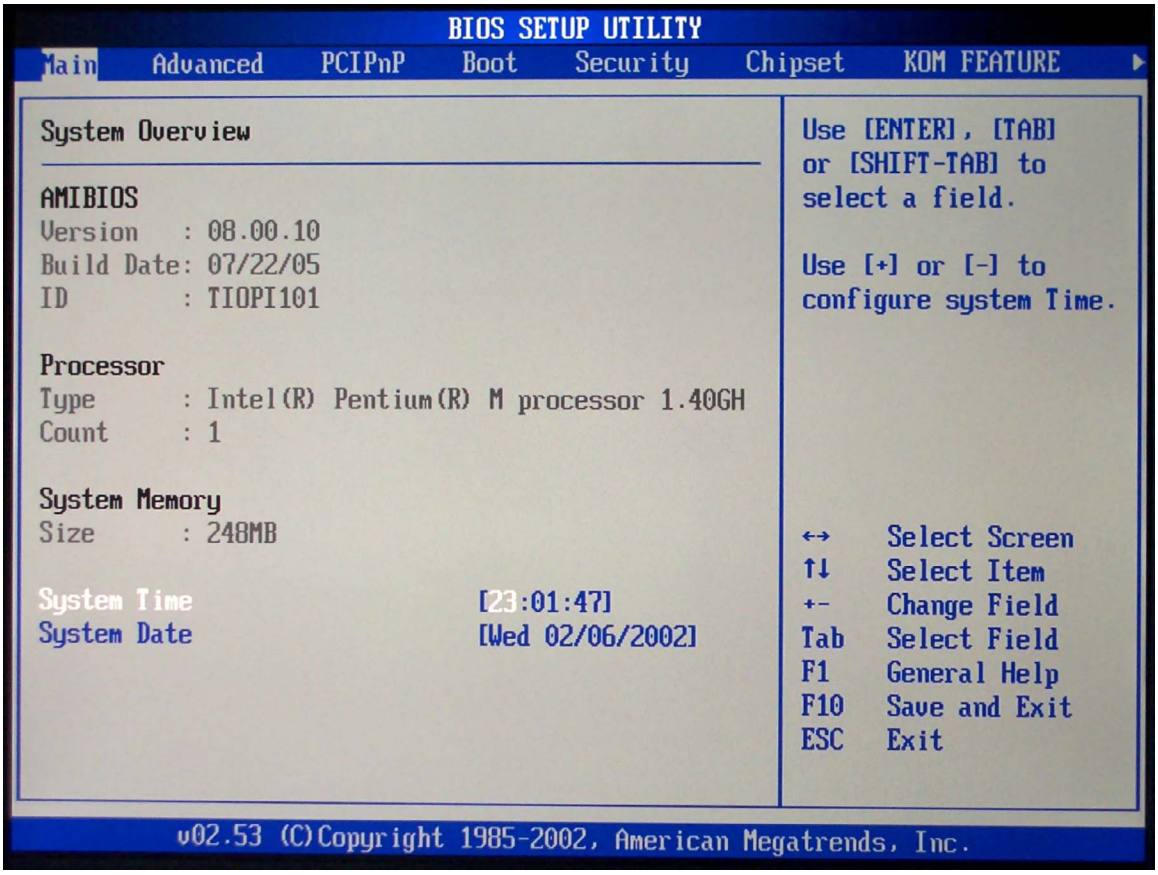
Step	Description
1	Power on the motherboard
2	Press the <Delete> key on your keyboard when you see the following text prompt: `Press DEL to run Setup` 
3	After you press the <Delete> key, the ThinkIO-P main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as the Chipset and Power menus.

ThinkIO-P Setup Menu

The ThinkIO-P main BIOS setup menu is the first screen that you can navigate. Each main BIOS setup menu option is described in this user's guide.

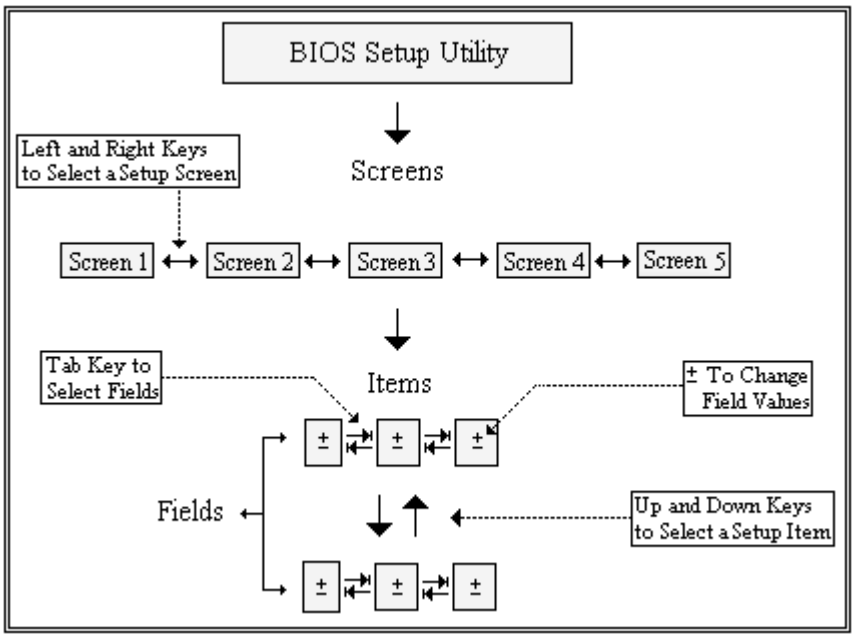
The Main BIOS setup menu screen has two main frames. The left frame displays all the options that can be configured. "Grayed-out" options cannot be configured. Options in blue can be.

The right frame displays the key legend. Above the key legend is an area reserved for a text message. When an option is selected in the left frame, it is highlighted in white. Often a text message will accompany it.



Navigation

The ThinkIO-P BIOS setup/utility uses a key-based navigation system called hot keys. Most of the ThinkIO-P BIOS setup utility hot keys can be used at any time during the setup navigation process. These keys include <F1>, <F10>, <Enter>, <ESC>, <Arrow> keys, and so on.



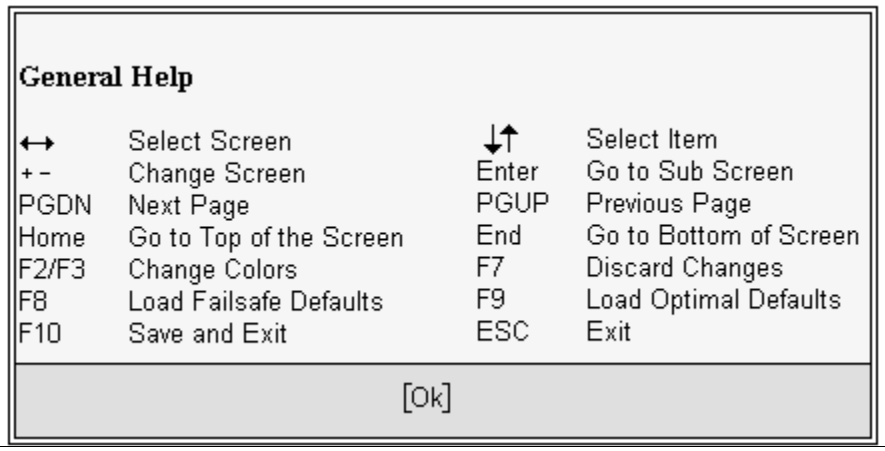
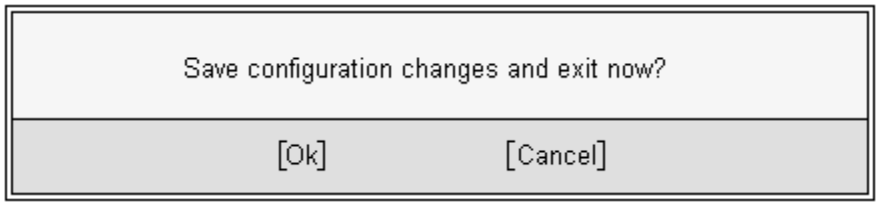
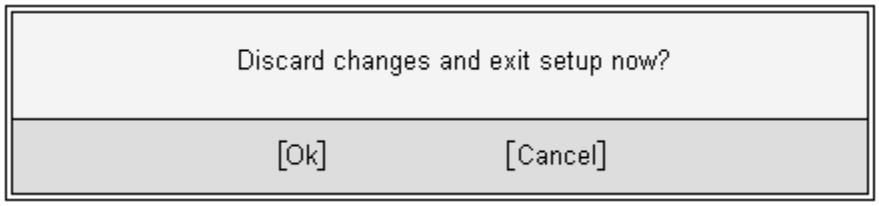
Note: There is a hot key legend located in the right frame on most ThinkIO-P setup screens.

Hot Key	Description
→← Left/Right	The *Left and Right* <Arrow> keys allow you to select an ThinkIO-P setup screen. For example: Main screen, Advanced screen, Chipset screen, and so on.
↑↓ Up/Down	The *Up and Down* <Arrow> keys allow you to select a ThinkIO-P setup item or sub-screen.
+- Plus/Minus	The *Plus and Minus* <Arrow> keys allow you to change the field value of a particular setup item. For example: Date and Time.
Tab	The <Tab> key allows you to select ThinkIO-P setup fields.

Note: The <F8> key on your keyboard is the Fail-Safe key. It is not displayed on the ThinkIO-P key legend by default. To set the Fail-Safe settings of the BIOS, press the <F8> key on your keyboard. It is located on the upper row of a standard 101 keyboard. The Fail-Safe settings allow the motherboard to boot-up with the least amount of options set. This can lessen the probability of conflicting settings

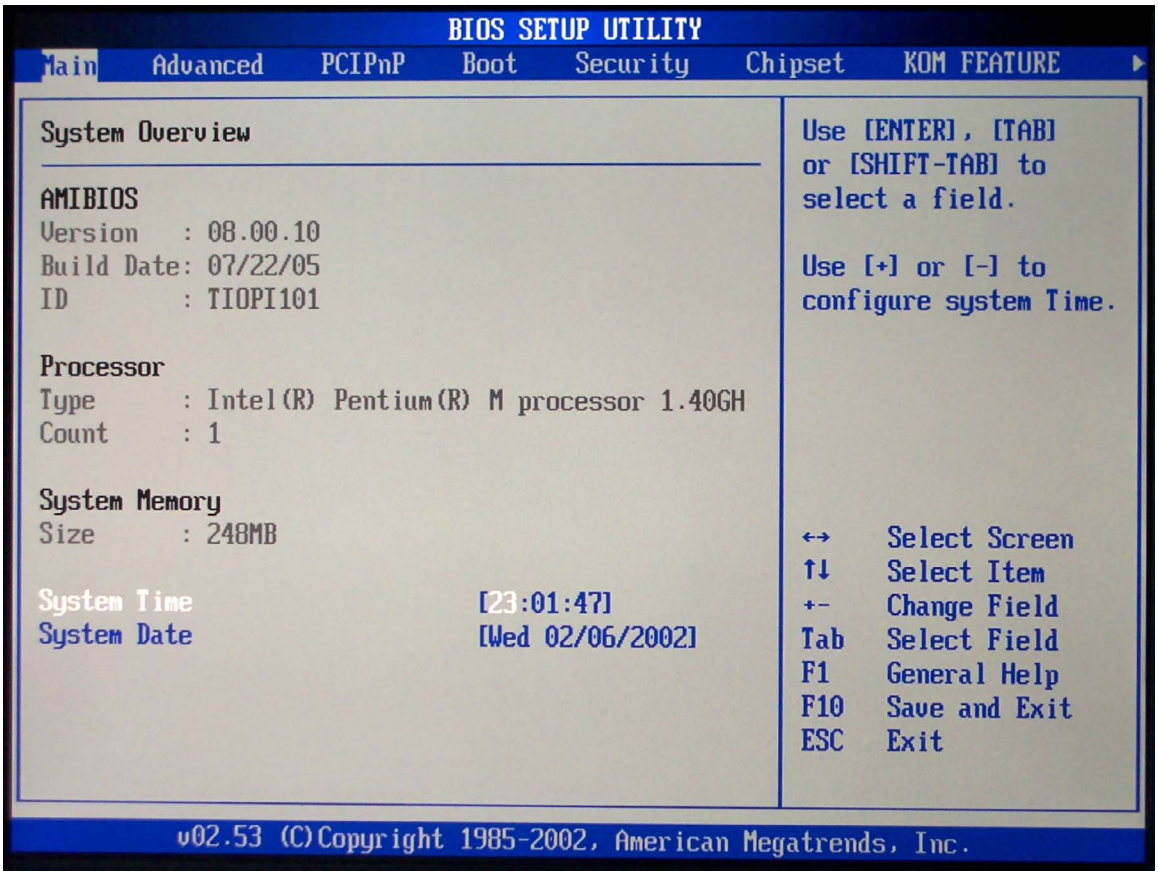
Cont'd

Navigation, Continued

Hot Key	Description
F1	The <F1> key allows you to display the *General Help screen*. Press the <F1> key to open the *General Help screen*. 
F10	The <F10> key allows you to save any changes you have made and exit ThinkIO-P Setup. Press the <F10> key to save your changes. The following screen will appear:  Press the <Enter> key to save the configuration and exit. You can also use the <Arrow> key to select *Cancel* and then press the <Enter> key to abort this function and return to the previous screen.
ESC	The <Esc> key allows you to discard any changes you have made and exit the ThinkIO-P Setup. Press the <Esc> key to exit the ThinkIO-P setup without saving your changes. The following screen will appear:  Press the <Enter> key to discard changes and exit. You can also use the <Arrow> key to select *Cancel* and then press the <Enter> key to abort this function and return to the previous screen.
Enter	The <Enter> key allows you to display or change the setup option listed for a particular setup item. The <Enter> key can also allow you to display the setup sub- screens.

Chapter 2 Main Setup

When you first enter the ThinkIO-P Setup Utility, you will enter the Main setup screen. You can always return to the Main setup screen by selecting the *Main* tab. There are two Main Setup options. They are described in this section. The Main BIOS Setup screen is shown below.



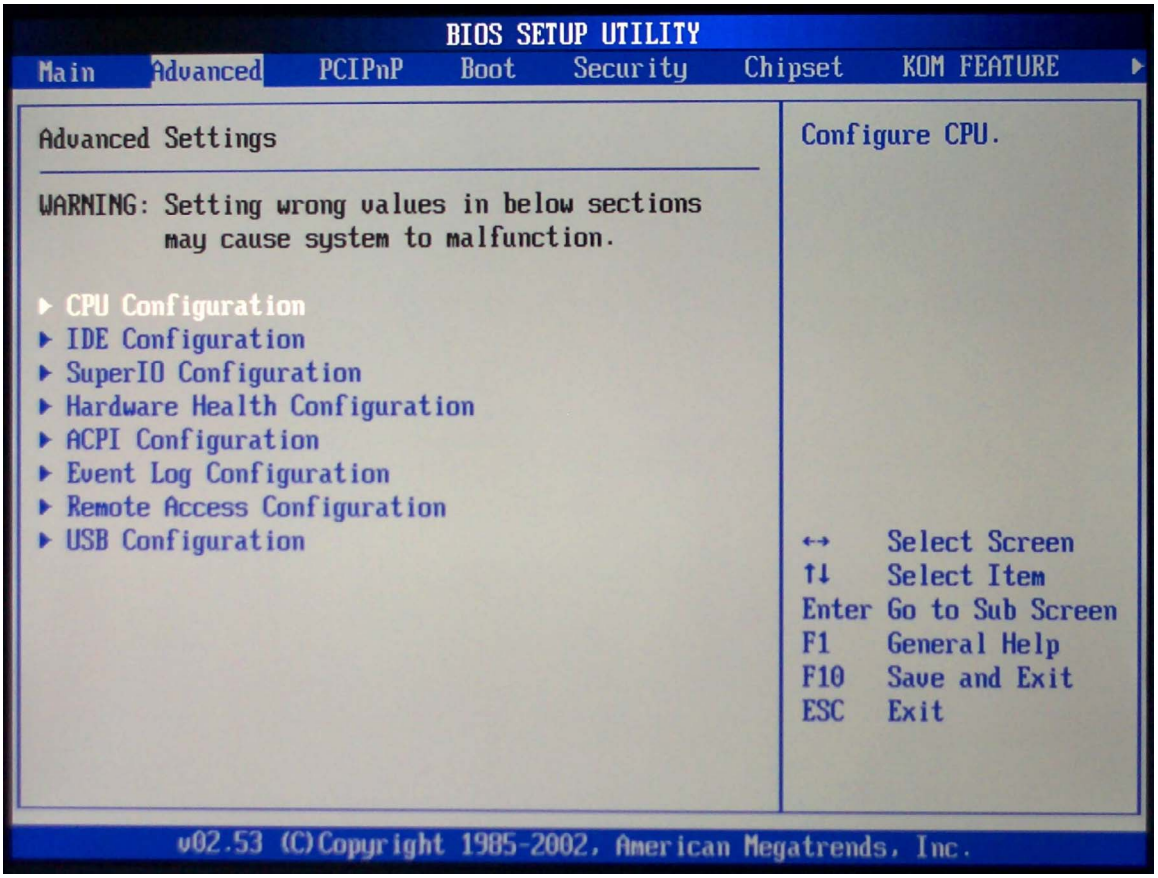
System Time/System Date

Use this option to change the system time and date. Highlight *System Time* or *System Date* using the <Arrow> keys. Enter new values through the keyboard. Press the <Tab> key or the <Arrow> keys to move between fields. The date must be entered in MM/DD/YY format. The time is entered in HH:MM:SS format.

Note: The time is in 24-hour format. For example, 5:30 A.M. appears as 05:30:00, and 5:30 P.M. as 17:30:00.

Chapter 3 Advanced BIOS Setup

Select the *Advanced* tab from the ThinkIO-P setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as SuperIO Configuration, to go to the sub menu for that item. You can display an Advanced BIOS Setup option by highlighting it using the <Arrow> keys. All Advanced BIOS Setup options are described in this section. The Advanced BIOS Setup screen is shown below. The sub menus are described on the following pages.

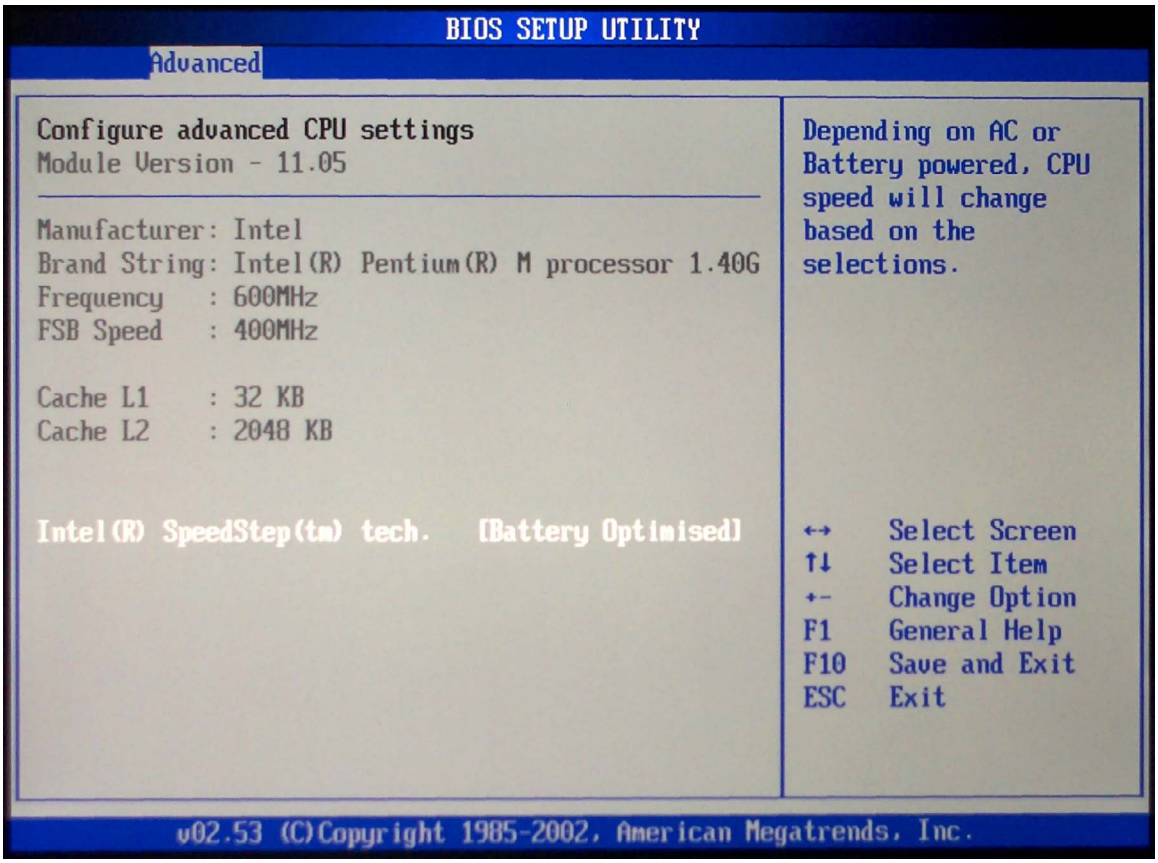


Advanced BIOS Setup, Continued

CPU CONFIGURATION SCREEN

CPU Configuration Settings

You can use this screen for Board information or to select the Intel Speed Step options. Use the <Plus> and <Minus> keys to change the value of the selected option. A description of the item appears on the right side of the screen. The setting is described on the following page. An example of the *CPU Configuration* screen is shown below.



Intel® SpeedStep™ tech.

This item specifies the Intel Speed Step Feature. The settings are *Maximum Performance, Battery Optimized, Reversed, Automatic* and *Disabled.* The Optimal and Fail-Safe default setting is *Maximum Performance.*

If *Maximum Performance* is selected, the BIOS will enable high CPU speed (1.4 GHz).

Using *Automatic* allows the operating system to control the CPU speed. The BIOS will start with high CPU speed.

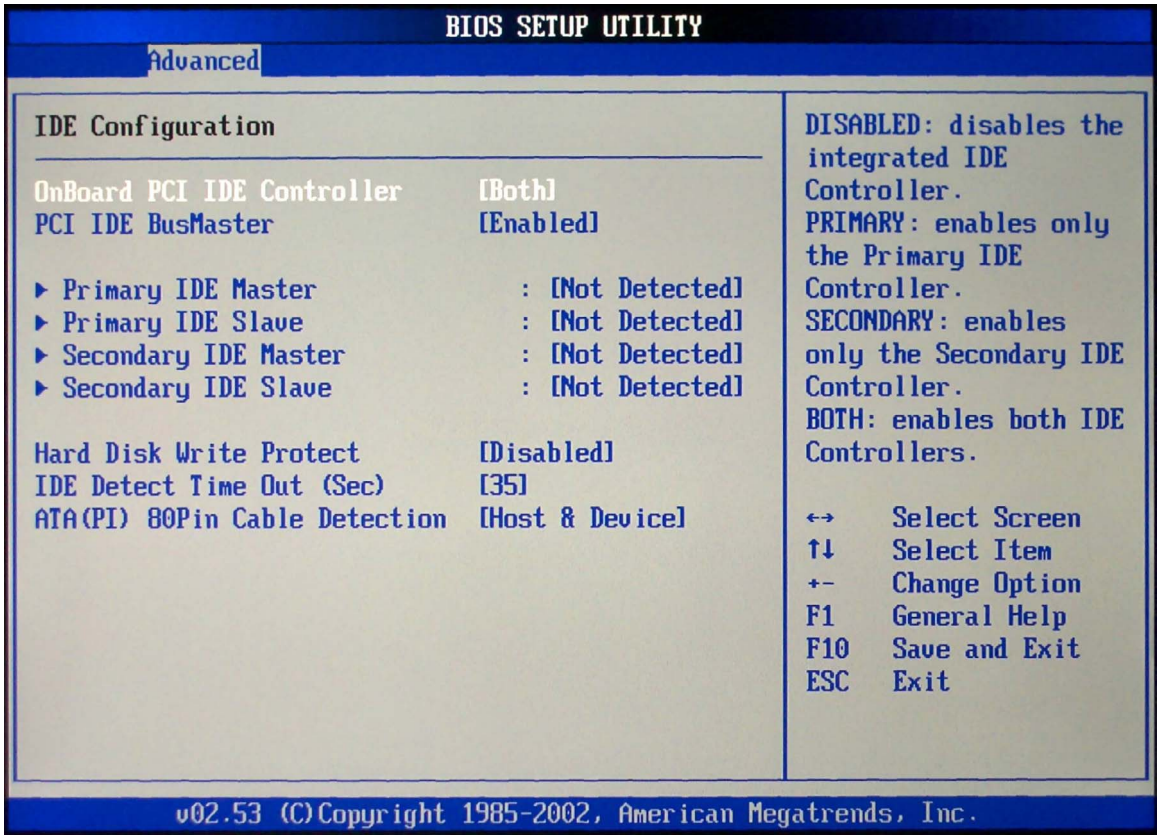
All other settings will force the BIOS to use low speed (600 MHz).

Advanced BIOS Setup, Continued

IDE CONFIGURATION SCREEN

IDE Configuration Settings

You can use this screen to select options for the IDE Configuration Settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on the following pages. An example of the *IDE Configuration* screen is shown below.



Advanced BIOS Setup, Continued

IDE Configuration

Configure the IDE drive mode.

Onboard PCI IDE Controller

This item specifies the IDE channels used by the onboard PCI IDE controller. The settings are *Disabled, Primary, Secondary,* or *Both.* The Optimal and Fail-Safe default setting is *Both.*

Option	Description
Disabled	Set this value to prevent the computer system from using the onboard IDE controller.
Primary	Set this value to allow the computer system to detect only the Primary IDE channel. This includes both the Primary Master and the Primary Slave.
Secondary	Set this value to allow the computer system to detect only the Secondary IDE channel. This includes both the Secondary Master and the Secondary Slave.
Both	Set this value to allow the computer system to detect the Primary and Secondary IDE channels. This includes both the Primary Master, Primary Slave, Secondary Master, and Secondary Slave. This is the default setting.

PCI IDE BusMaster

Set this value to allow or prevent the use of PCI IDE busmastering. The Optimal and Fail-Safe default setting is *Disabled*.

Option	Description
Disabled	Set this value to prevent PCI busmastering. This is the default setting.
Enabled	This option specifies that the IDE controller on the PCI local bus has mastering capabilities.

Primary IDE Master, Primary IDE Slave, Secondary IDE Master, Secondary IDE Slave

Select one of the hard disk drives to configure it. Press <Enter> to access its sub menu. The options on the sub menu are described in the following sections.

Hard disk drive Write Protect

Set this option to protect the hard disk drive from being overwritten. The Optimal and Fail-Safe default setting is *Disabled*.

Option	Description
Disabled	Set this value to allow the hard disk drive to be used normally. Read, write, and erase functions can be performed to the hard disk drive. This is the default setting.
Enabled	Set this value to prevent the hard disk drive from being erased.

Cont'd

Advanced BIOS Setup, Continued

IDE Detect Time Out (Seconds)

Set this option to stop the AMIBIOS from searching for IDE devices within the specified number of seconds. Basically, this allows you to fine-tune the settings to allow for faster boot times. Adjust this setting until a suitable timing that can detect all IDE disk drives attached is found.

The Optimal and Fail-Safe default setting is *35*.

Option	Description
0	This value is the best setting to use if the onboard IDE controllers are set to a specific IDE disk drive in the AMIBIOS.
5	Set this value to stop the AMIBIOS from searching the IDE bus for IDE disk drives in five seconds. A large majority of ultra ATA hard disk drives can be detected well within five seconds.
10	Set this value to stop the AMIBIOS from searching the IDE bus for IDE disk drives in 10 seconds.
15	Set this value to stop the AMIBIOS from searching the IDE bus for IDE disk drives in 15 seconds.
20	Set this value to stop the AMIBIOS from searching the IDE bus for IDE disk drives in 20 seconds.
25	Set this value to stop the AMIBIOS from searching the IDE bus for IDE disk drives in 25 seconds.
30	Set this value to stop the AMIBIOS from searching the IDE bus for IDE disk drives in 30 seconds.
35	*35* is the default value. It is the recommended setting when all IDE connectors are set to *AUTO* in the AMIBIOS setting.

Note: Different IDE disk drives take longer for the BIOS to locate than others do.

ATA (PI) 80-Pin Cable Detection

Set this option to select the method used to detect the ATA (PI) 80 pin cable. The Optimal and Fail-Safe setting is *Host & Device*.

Option	Description
Host & Device	Set this value to use both the motherboard onboard IDE controller and IDE disk drive to detect the type of IDE cable used. This is the default setting.
Host	Set this value to use motherboard onboard IDE controller to detect the type of IDE cable used.
Device	Set this value to use IDE disk drive to detect the type of IDE cable used.

The use of an 80-conductor ATA cable is mandatory for running Ultra ATA/66, Ultra ATA/100 and Ultra ATA/133 IDE hard disk drives. The standard 40-conductor ATA cable cannot handle the higher speeds.

80-conductor ATA cable is plug-compatible with the standard 40-conductor ATA cable. Because of this, the system must determine the presence of the correct cable. This detection is achieved by having a break in one of the lines on the 80-conductor ATA cable that is normally an unbroken connection in the standard 40-conductor ATA cable. It is this break that is used to make this determination. The AMIBIOS can instruct the drive to run at the correct speed for the cable type detected.

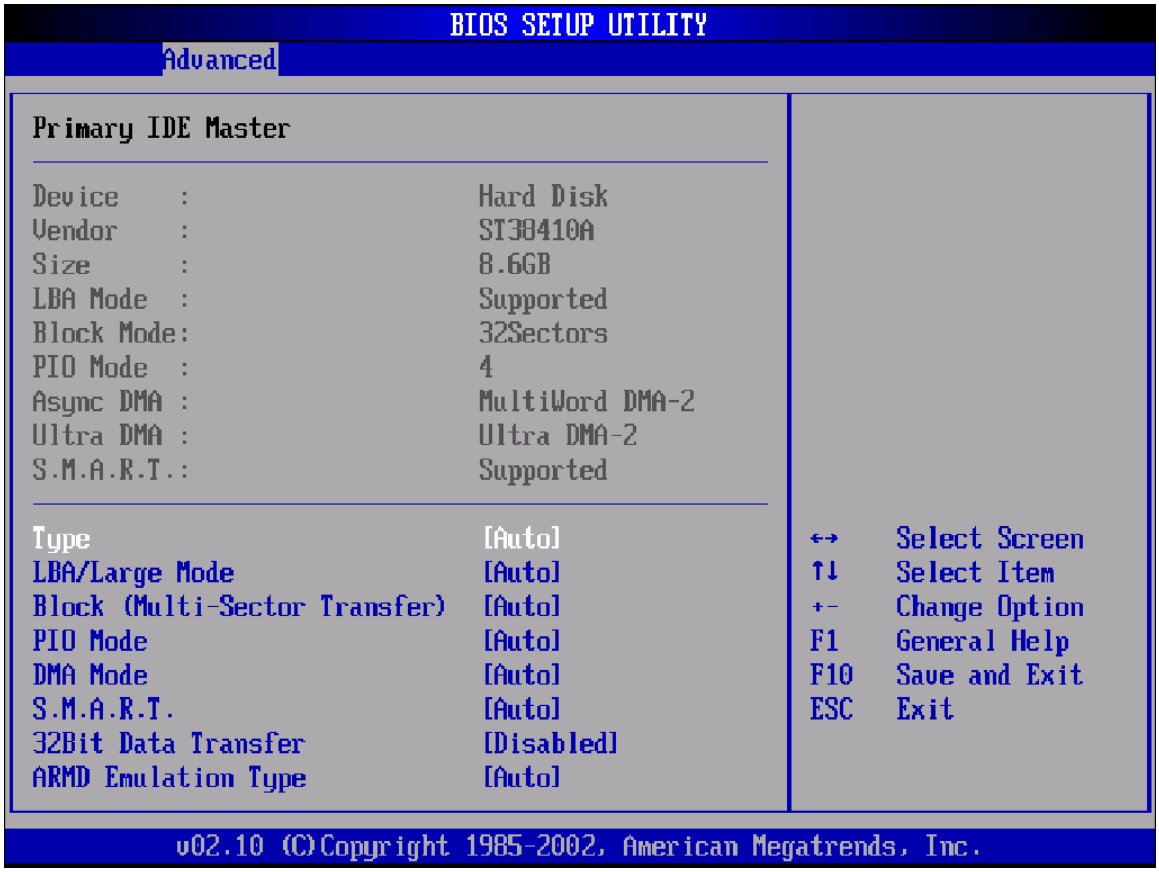
Cont'd

Advanced BIOS Setup, Continued

PRIMARY AND SECONDARY IDE MASTER AND SLAVE SUB MENU

Primary and Secondary IDE Master and Slave Settings

From the IDE Configuration screen, press <Enter> to access the sub menu for the primary and secondary IDE master and slave drives. Use this screen to select options for the Primary and Secondary IDE drives. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen for the Primary IDE Master is shown below.



Advanced BIOS Setup, Continued

Drive Parameters

The "grayed-out" items in the left frame are the IDE disk drive parameters taken from the firmware of the IDE disk drive selected. The drive parameters listed are as follows:

Parameter	Description
Device	Type of device, such as Hard disk drive.
Vendor	Manufacturer of the device.
Size	The size of the device.
LBA Mode	LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB. For drive capacities over 137 GB, your AMIBIOS must be equipped with 48-bit LBA mode addressing. If not, contact your motherboard manufacturer or install an ATA/133 IDE controller card that supports 48-bit LBA mode.
Block Mode	Block mode boosts IDE drive performance by increasing the amount of data transferred. Only 512 bytes of data can be transferred per interrupt if block mode is not used. Block mode allows transfers of up to 64 KB per interrupt.
PIO Mode	IDE PIO mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.
Async DMA	This indicates the highest Asynchronous DMA Mode that is supported.
Ultra DMA	This indicates the highest Synchronous DMA Mode that is supported.
S.M.A.R.T.	Self-Monitoring Analysis and Reporting Technology protocol used by IDE drives of some manufacturers to predict drive failures.

Type

This option sets the type of device that the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) has completed. The Optimal and Fail-Safe default setting is *Auto.*

Option	Description
Not Installed	Set this value to prevent the BIOS from searching for an IDE disk drive on the specified channel.
Auto	Set this value to allow the BIOS auto detect the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel. This is the default setting.
CDROM	This option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS will not attempt to search for other types of IDE disk drives on the specified channel.
ARMD	This option specifies an ATAPI Removable Media Device. This includes, but is not limited to: • ZIP • LS-120

Cont'd

Advanced BIOS Setup, Continued

LBA/Large Mode

LBA (Logical Block Addressing) is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB. The Optimal and Fail-Safe default setting is *Auto.*

Note: For drive capacities over 137 GB, your AMIBIOS must be equipped with 48-bit LBA mode addressing. If not, contact your motherboard manufacturer or install an ATA/133 IDE controller card that supports 48-bit LBA mode.

Option	Description
Disabled	Set this value to prevent the BIOS from using Large Block Addressing mode control on the specified channel.
Auto	Set this value to allow the BIOS to auto detect the Large Block Addressing mode control on the specified channel. This is the default setting.

Block (Multi-Sector Transfer)

This option sets the block mode multi sector transfers option. The Optimal and Fail-Safe default setting is *Auto.*

Option	Description
Disabled	Set this value to prevent the BIOS from using Multi-Sector Transfer on the specified channel. The data to and from the device will occur one sector at a time.
Auto	Set this value to allow the BIOS to auto detect device support for Multi-Sector Transfers on the specified channel. If supported, Set this value to allow the BIOS to auto detect the number of sectors per block for transfer from the hard disk drive to the memory. The data transfer to and from the device will occur multiple sectors at a time. This is the default setting.

PIO Mode

IDE PIO (Programmable I/O) mode programs timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases. The Optimal and Fail-Safe default setting is *Auto*.

Option	Description
Auto	Set this value to allow the BIOS to auto detect the PIO mode. Use this value if the IDE disk drive support cannot be determined. This is the default setting.
0	Set this value to allow the BIOS to use PIO mode 0. It has a data transfer rate of 3.3 MBs.
1	Set this value to allow the BIOS to use PIO mode 1. It has a data transfer rate of 5.2 MBs.
2	Set this value to allow the BIOS to use PIO mode 2. It has a data transfer rate of 8.3 MBs.
3	Set this value to allow the BIOS to use PIO mode 3. It has a data transfer rate of 11.1 MBs.
4	Set this value to allow the BIOS to use PIO mode 4. It has a data transfer rate of 16.6 MBs. This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.

Cont'd

Advanced BIOS Setup, Continued

DMA Mode

This setting allows you to adjust the DMA mode options. The Optimal and Fail-Safe default setting is *Auto*.

Option	Description
Auto	Set this value to allow the BIOS to auto detect the DMA mode. Use this value if the IDE disk drive support cannot be determined. This is the default setting.
SWDMA0	Set this value to allow the BIOS to use Single Word DMA mode 0. It has a data transfer rate of 2.1 MBs.
SWDMA1	Set this value to allow the BIOS to use Single Word DMA mode 1. It has a data transfer rate of 4.2 MBs.
SWDMA2	Set this value to allow the BIOS to use Single Word DMA mode 2. It has a data transfer rate of 8.3 MBs.
MWDMA0	Set this value to allow the BIOS to use Multi Word DMA mode 0. It has a data transfer rate of 4.2 MBs.
MWDMA1	Set this value to allow the BIOS to use Multi Word DMA mode 1. It has a data transfer rate of 13.3 MBs.
MWDMA2	Set this value to allow the BIOS to use Multi Word DMA mode 2. It has a data transfer rate of 16.6 MBs.
UDMA0	Set this value to allow the BIOS to use Ultra DMA mode 0. It has a data transfer rate of 16.6 MBs. It has the same transfer rate as PIO mode 4 and Multi Word DMA mode 2.
UDMA1	Set this value to allow the BIOS to use Ultra DMA mode 1. It has a data transfer rate of 25 MBs.
UDMA2	Set this value to allow the BIOS to use Ultra DMA mode 2. It has a data transfer rate of 33.3 MBs.
UDMA3	Set this value to allow the BIOS to use Ultra DMA mode 3. It has a data transfer rate of 44.4 MBs. To use this mode, it is required that an 80-conductor ATA cable is used.
UDMA4	Set this value to allow the BIOS to use Ultra DMA mode 4. It has a data transfer rate of 66.6 MBs. To use this mode, it is required that an 80-conductor ATA cable is used.
UDMA5	Set this value to allow the BIOS to use Ultra DMA mode 5. It has a data transfer rate of 99.9 MBs. To use this mode, it is required that an 80-conductor ATA cable is used.
UDMA6	Set this value to allow the BIOS to use Ultra DMA mode 6. It has a data transfer rate of 133.2 MBs. To use this mode, it is required that an 80-conductor ATA cable is used.

S.M.A.R.T. for Hard disk drives

Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures. The Optimal and Fail-Safe default setting is *Auto*.

Option	Description
Auto	Set this value to allow the BIOS to auto detect hard disk drive support. Use this setting if the IDE disk drive support cannot be determined. This is the default setting.
Disabled	Set this value to prevent the BIOS from using the SMART feature.
Enabled	Set this value to allow the BIOS to use the SMART feature on support hard disk drives.

32Bit Data Transfer

This option sets the 32-bit data transfer option. The Optimal and Fail-Safe default setting is *Enabled*.

Option	Description
Disabled	Set this value to prevent the BIOS from using 32-bit data transfers.
Enabled	Set this value to allow the BIOS to use 32-bit data transfers on supported hard disk drives. This is the default setting.

Cont'd

Advanced BIOS Setup, Continued

ARMD Emulation Type

ATAPI Removable Media Device (ARMD) is a device that uses removable media, such as the LS120, MO (Magneto-Optical), or Iomega Zip drives. If you want to boot-up from media on an ARMD, it is required that you emulate boot-up from a floppy or hard disk drive. This is especially necessary when trying to boot to DOS. You can select the type of emulation used if you are booting from such a device. The Optimal and Fail-Safe default setting is *Auto*.

Option	Description
Auto	Set this value to allow the BIOS to automatically set the emulation used by ARMD. This is the default setting.
Floppy	Set this value for ARMD to emulate a floppy drive during boot-up.
Hard disk drive	Set this value for ARMD to emulate a hard disk drive during boot-up.

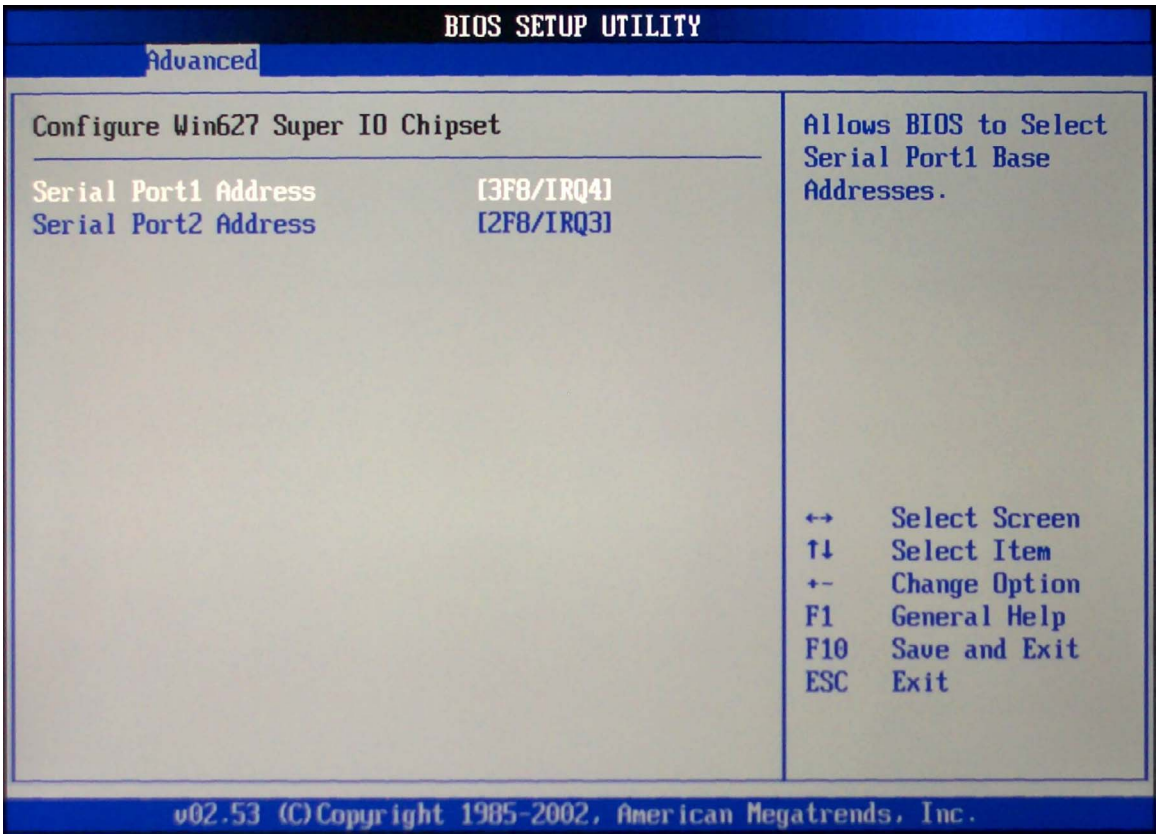
Cont'd

Advanced BIOS Setup, Continued

SUPER IO CONFIGURATION SCREEN

SuperIO Configuration Screen

You can use this screen to select options for the Super I/O settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Advanced BIOS Setup, Continued

Serial Port1 Address

This option specifies the base I/O port address and Interrupt Request address of serial port 1. The Optimal setting is *3F8/IRQ4*. The Fail-Safe default setting is *Disabled.*

Option	Description
Disabled	Set this value to prevent the serial port from accessing any system resources. When this option is set to *Disabled*, the serial port physically becomes unavailable.
3F8/IRQ4	Set this value to allow the serial port to use 3F8 as its I/O port address and IRQ 4 for the interrupt address. This is the default setting. The majority of serial port 1 or COM1 ports on computer systems use IRQ4 and I/O Port 3F8 as the standard setting. The most common serial device connected to this port is a mouse. If the system will not use a serial device, it is best to set this port to *Disabled*.
2F8/IRQ3	Set this value to allow the serial port to use 2F8 as its I/O port address and IRQ 3 for the interrupt address. If the system will not use a serial device, it is best to set this port to *Disabled*.
3E8/IRQ4	Set this value to allow the serial port to use 3E8 as its I/O port address and IRQ 4 for the interrupt address. If the system will not use a serial device, it is best to set this port to *Disabled*.
2E8/IRQ3	Set this value to allow the serial port to use 2E8 as its I/O port address and IRQ 3 for the interrupt address. If the system will not use a serial device, it is best to set this port to *Disabled*.

Serial Port2 Address

This option specifies the base I/O port address and Interrupt Request address of serial port 2. The Optimal setting is *2F8/IRQ3*. The Fail-Safe setting is *Disabled.*

Option	Description
Disabled	Set this value to prevent the serial port from accessing any system resources. When this option is set to *Disabled*, the serial port physically becomes unavailable.
3F8/IRQ4	Set this value to allow the serial port to use 3F8 as its I/O port address and IRQ 4 for the interrupt address. If the system will not use a serial device, it is best to set this port to Disabled.
2F8/IRQ3	Set this value to allow the serial port to use 2F8 as its I/O port address and IRQ 3 for the interrupt address. This is the default setting. The majority of serial port 2 or COM2 ports on computer systems use IRQ3 and I/O Port 2F8 as the standard setting. The most common serial device connected to this port is an external modem. If the system will not use an external modem, set this port to *Disabled*. **Note:** Most internal modems require the use of the second COM port and use 3F8 as its I/O port address and IRQ 4 for its interrupt address. This requires that the Serial Port2 Address be set to *Disabled* or another base I/O port address and Interrupt Request address.
3E8/IRQ4	Set this value to allow the serial port to use 3E8 as its I/O port address and IRQ 4 for the interrupt address. If the system will not use a serial device, it is best to set this port to Disabled.
2E8/IRQ3	Set this value to allow the serial port to use 2E8 as its I/O port address and IRQ 3 for the interrupt address. If the system will not use a serial device, it is best to set this port to *Disabled*.

Cont'd

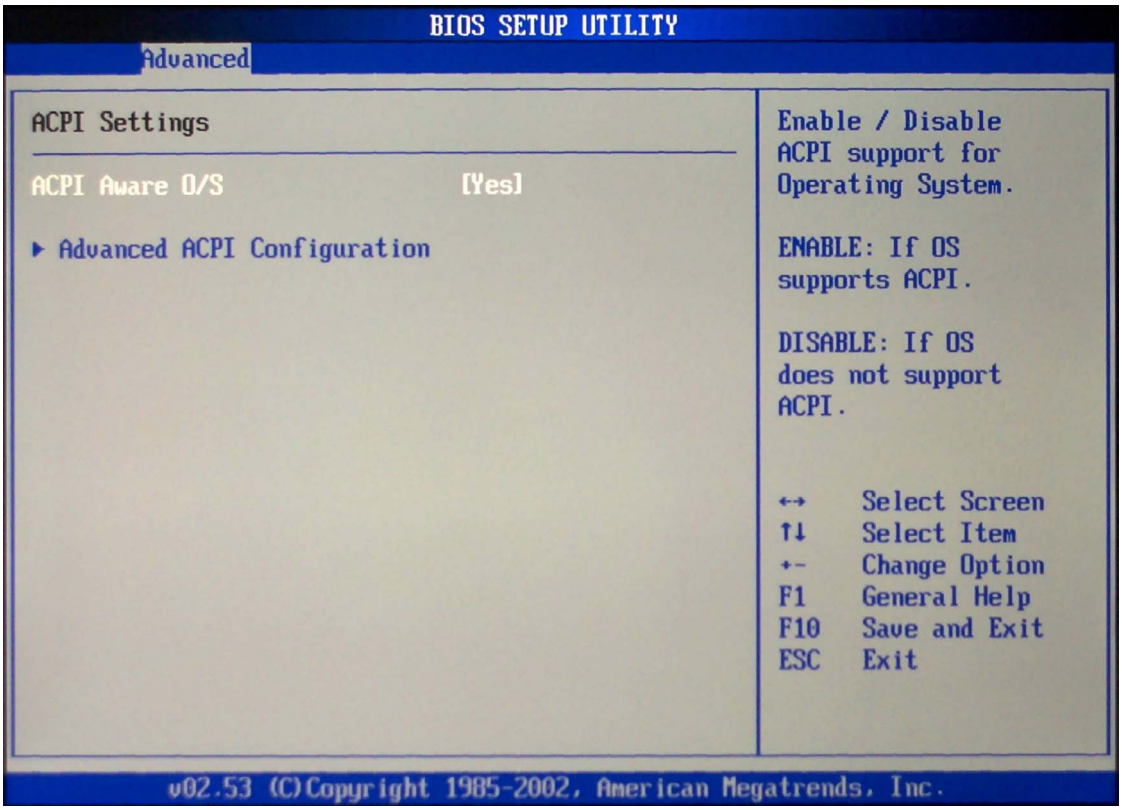
Advanced BIOS Setup, Continued

HARDWARE HEALTH CONFIGURATION

Select the *Hardware Health Configuration* Menu to enter the Hardware Health screen. This screen indicates the status of various system parameters.

ACPI CONFIGURATION

Select the *ACPI Configuration* Menu to enter the ACPI BIOS Setup screen. You can select General ACPI Configuration or Advanced ACPI Configuration in the left frame of the screen to go to the sub menus for that item. You can display an ACPI BIOS Setup option by highlighting it using the <Arrow> keys. All ACPI BIOS Setup options are described in this section. The ACPI BIOS Setup screen is shown below.



ACPI Aware O/S

Set this value to allow the system to utilize the Intel ACPI (Advanced Configuration and Power Interface) specification. The Optimal and Fail-Safe default setting is *Yes*.

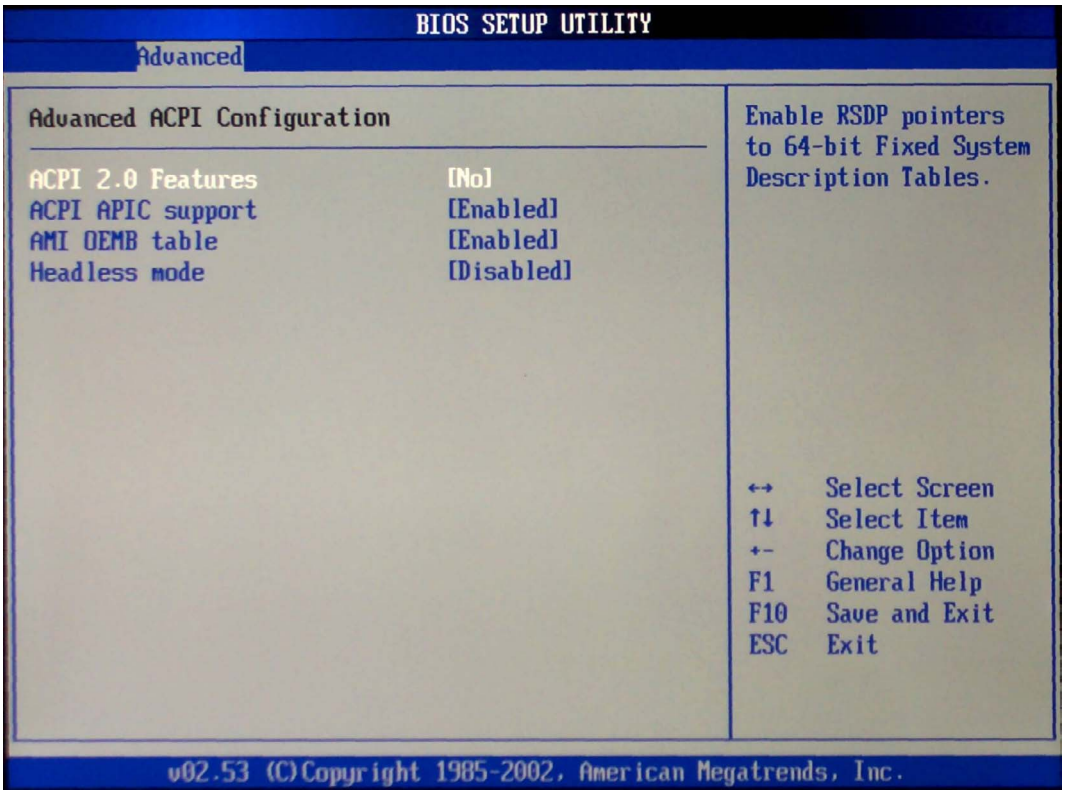
Option	Description
No	This setting should be set if the operating system in use does not comply with the ACPI (Advanced Configuration and Power Interface) specification. DOS®, Windows 3.x®, and Windows NT® are examples of non-ACPI aware operating systems.
Yes	This setting should be set if the operating system complies with the ACPI (Advanced Configuration and Power Interface) specification. This is the default setting. Windows 95®, Windows 98® and Windows 2000® are examples of ACPI aware operating systems.

Cont'd

Advanced BIOS Setup, Continued

Advanced ACPI Configuration

You can use this screen to select options for the ACPI Advanced Configuration Settings. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. A description of the selected item appears on the right side of the screen. The settings are described on this page. The screen is shown below.



ACPI 2.0 Feature

Set this value to allow or prevent the system to be complaint with the ACPI 2.0 specification.

Option	Description
No	This setting prevents the BIOS from supporting the ACPI 2.0 specification.
Yes	This setting allows the BIOS to support the ACPI 2.0 specification.

ACPI APIC Support

Include ACPI APIC table pointer to RSDT pointer list.

AMI OEMB Table

Include OEMB table pointer to R(X)SDT pointer list

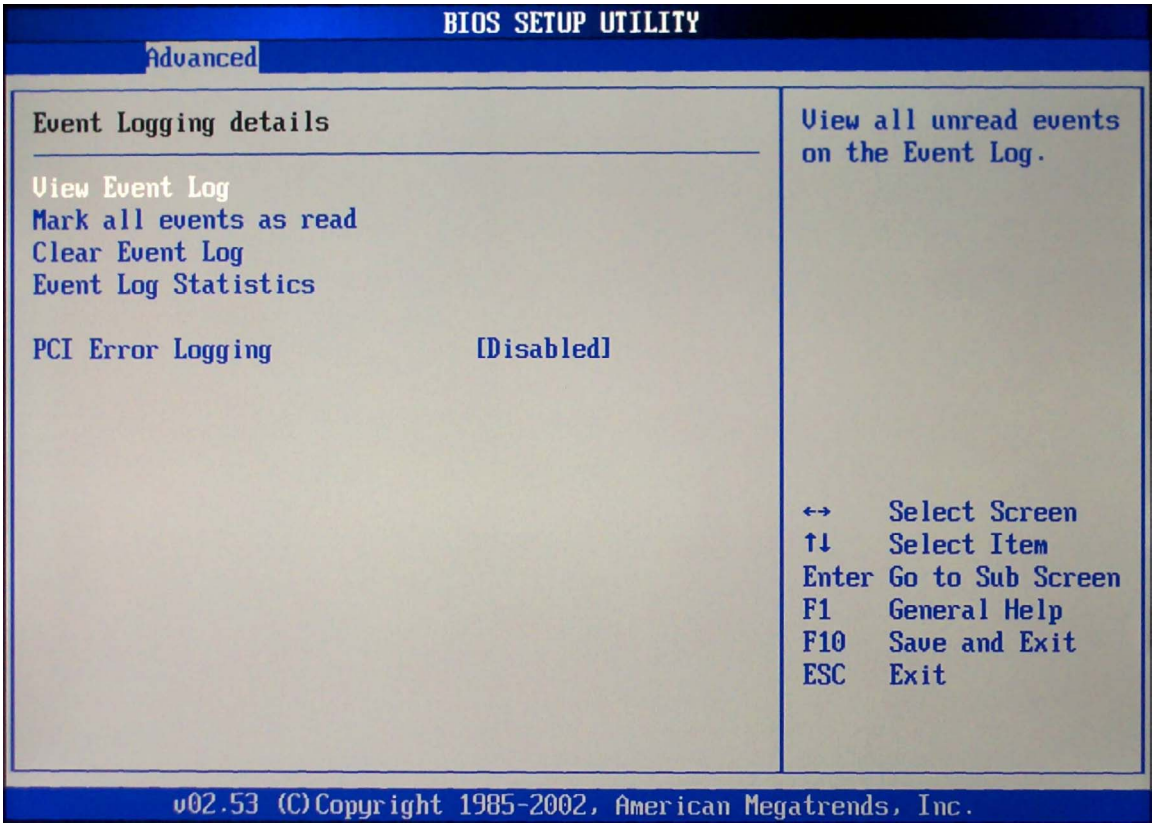
Headless Mode

This option is used to update the ACPI FACP table to indicate headless operations.

Option	**Description**
Disabled	This option disables updating the ACPI FACP table to indicate headless operation.
Enabled	This option enables updating the ACPI FACP table to indicate headless operation.

Advanced BIOS Setup, Continued

Event Log CONFIGURATION



View Event Log

A pop up window displays all unread events. e.g. 01/01/02 13:12:56
CMOS time not set

Mark all events as read

Mark all unread events as read and clear the Event Log buffer.

Clear Event Log

Discard all events in the Event Log.

Event Log Statistics

View details on the count of total unread events.

PCI Error Logging

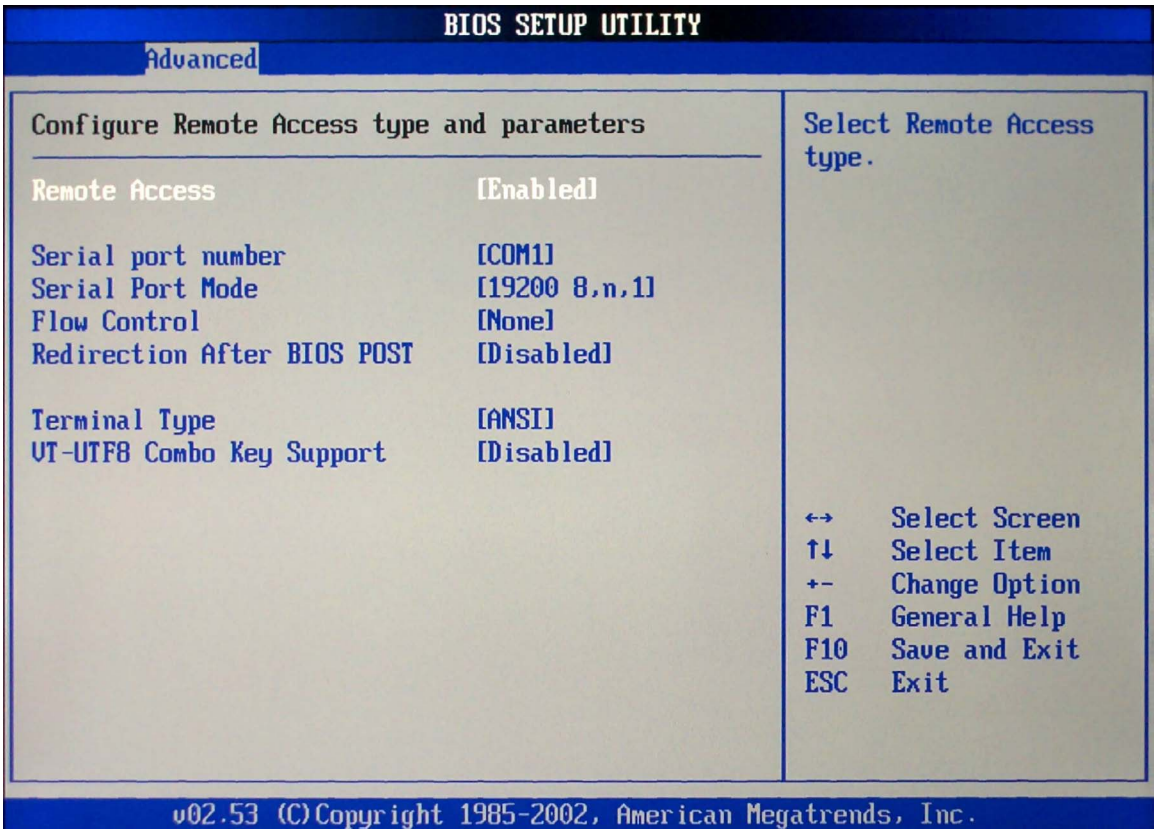
Enables the PCI Error Logging.

Advanced BIOS Setup, Continued

REMOTE ACCESS CONFIGURATION

Remote Access Configuration

You can use this screen to select options for the Remote Access Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Remote Access

You can disable or enable the BIOS remote access feature here.

Option	Description
Disabled	Set this value to prevent the BIOS from using Remote Access.
Enabled	Set the value for this option to enabled to allow the system to use the remote access feature. The remote access feature requires a dedicated serial port connection.

Cont'd

Advanced BIOS Setup, Continued

Serial Port Number

Select the serial port you want to use for console redirection. You can set the value for this option to either *COM1* or *COM2*.

Option	Description
COM1	Set this value to allow the system to use COM1 (Communication port1) for the remote access interface.
COM2	Set this value to allow the system to use COM2 (Communication port2) for the remote access interface.

Serial Port Mode

Select the baud rate you want the serial port to use for console redirection.

Option	Description
115200 8,n,1	Set this value to allow you to select 115200 as the baud rate (transmitted bits per second) of the serial port.
57600 8,n,1	Set this value to allow you to select 57600 as the baud rate (transmitted bits per second) of the serial port.
19200 8,n,1	Set this value to allow you to select 19200 as the baud rate (transmitted bits per second) of the serial port.

Flow Control

Select the flow control type you want to use for console redirection.

Option	Description
XON/XOFF	Set this value for software flow control.
HW	Set this value for hardware flow control.
None	Set this value for no flow control.

Redirection after BIOS POST

Select to continue redirection in (Legacy) OS.

Option	Description
Enable	Set this value if you want to enable redirection after POST.
Disable	Set this value if you want to disable redirection after POST.

Terminal Type

Select the terminal type you want to use for console redirection.

VT-UTF8 Combo Key Supoort

You can disable or enable the VT-UTF8 combination key support for ANSI/VT100 consoles here.

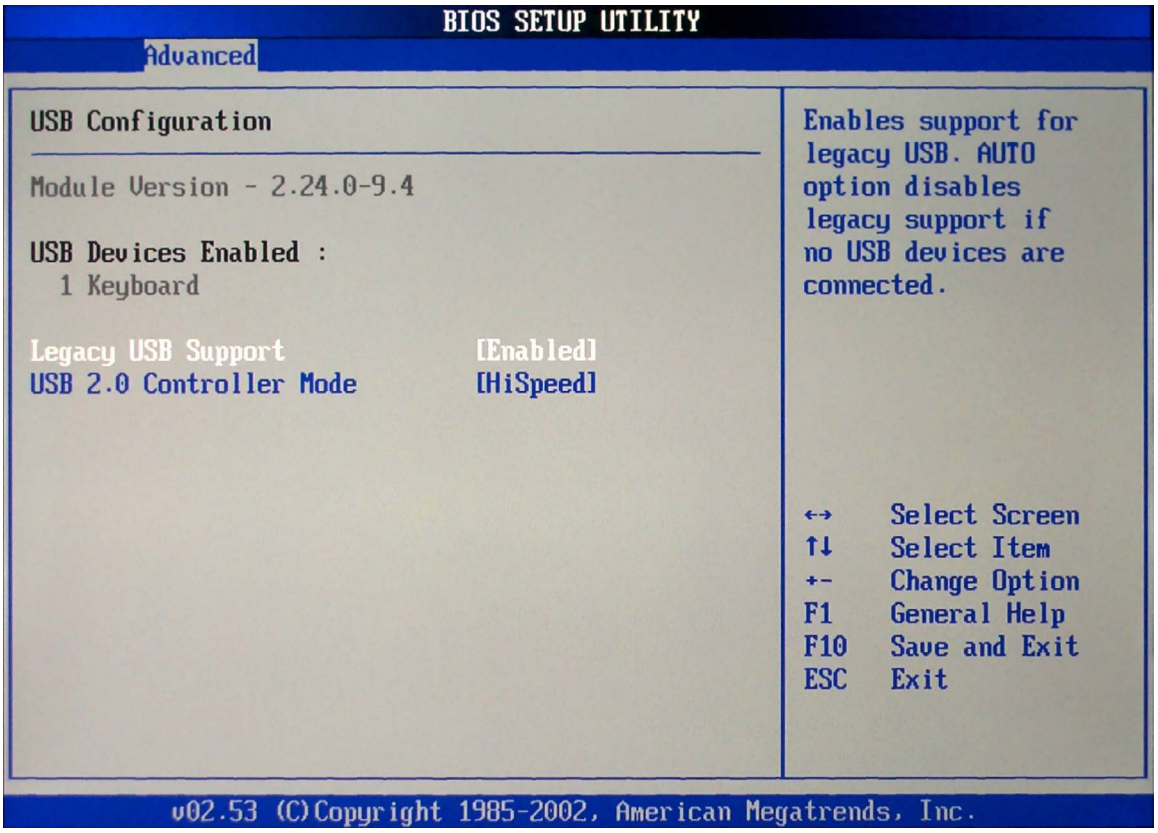
Option	Description
Enable	Set this value if you want to enable the VT-UTF8 combination key support.
Disable	Set this value if you want to disable the VT-UTF8 combination key support

Advanced BIOS Setup, Continued

USB CONFIGURATION

USB Configuration

You can use this screen to select options for the USB Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Legacy USB Support

Set this value to allow the system to enable or disable Legacy USB support.

Option	Description
Disabled	This setting disables USB legacy emulation.
Enabled	This setting enables USB legacy emulation.
Auto	This setting disables USB legacy emulation if there is no USB device attached.

Cont'd

Advanced BIOS Setup, Continued

USB 2.0 Controller Mode

Option	Description
Full Speed	This setting limits the data transfer speed to 12 Mbps.
HiSpeed	This setting allows a USB 2.0 data transfer speed of 480 Mbps.

USB Mass Storage Device Configuration

Configure the USB Mass Storage Class Devices. This option is only displayed when a USB mass storage device is connected. When displayed the following sub-options are available.

USB Mass Storage Reset Delay

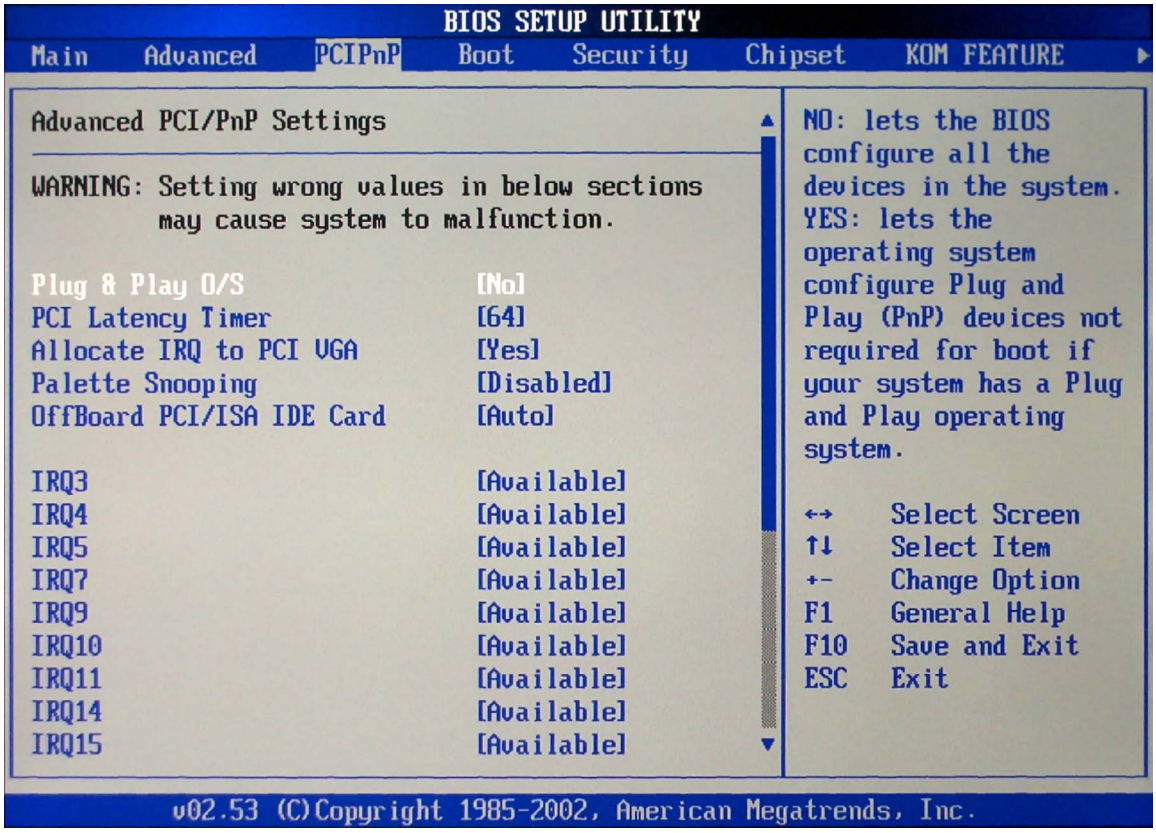
This option is used to set the delay time that the POST waits for the device after the start unit command has been issued.

Emulation Type

This option is used to select the device type that the BIOS should present to the legacy OS for this device.

Chapter 4 PCI/PnP Setup

Select the *PCI/PnP* tab from the ThinkIO-P setup screen to enter the Plug and Play BIOS Setup screen. You can display a Plug and Play BIOS Setup option by highlighting it using the <Arrow> keys. All Plug and Play BIOS Setup options are described in this section. The Plug and Play BIOS Setup screen is shown below.



Plug and Play O/S

Set this value to allow the system to modify the settings for Plug and Play operating system support. The Optimal and Fail-Safe default setting is *No*.

Option	Description
No	The *No* setting is for operating systems that do not meet the Plug and Play specifications. It allows the BIOS to configure all the devices in the system. This is the default setting.
Yes	The *Yes* setting allows the operating system to change the interrupt, I/O, and DMA settings. Set this option if the system is running Plug and Play aware operating systems.

Cont'd

PCI/PnP Setup, Continued

PCI Latency Timer

Set this value to allow the PCI Latency Timer to be adjusted. This option sets the latency of all PCI devices on the PCI bus. The Optimal and Fail-Safe default setting is *64*.

Option	Description
32	This option sets the PCI latency to 32 PCI clock cycles.
64	This option sets the PCI latency to 64 PCI clock cycles. This is the default setting.
96	This option sets the PCI latency to 96 PCI clock cycles.
128	This option sets the PCI latency to 128 PCI clock cycles.
160	This option sets the PCI latency to 160 PCI clock cycles.
192	This option sets the PCI latency to 192 PCI clock cycles.
224	This option sets the PCI latency to 224 PCI clock cycles.
248	This option sets the PCI latency to 248 PCI clock cycles.

Allocate IRQ to PCI VGA

Set this value to allow or restrict the system from giving the VGA adapter card an interrupt address. The Optimal and Fail-Safe default setting is *Yes*.

Option	Description
Yes	Set this value to allow the allocation of an IRQ to a VGA adapter card that uses the PCI local bus. This is the default setting.
No	Set this value to prevent the allocation of an IRQ to a VGA adapter card that uses the PCI local bus.

Palette Snooping

Set this value to allow the system to modify the Palette Snooping settings. The Optimal and Fail-Safe default setting is *Disabled*.

Option	Description
Disabled	This is the default setting and should not be changed unless the VGA card manufacturer requires Palette Snooping to be Enabled.
Enabled	This setting informs the PCI devices that an ISA based Graphics device is installed in the system. It does this so the ISA based Graphics card will function correctly. This does not necessarily indicate a physical ISA adapter card. The graphics chipset can be mounted on a PCI card. Always check with your adapter card's manuals first, before modifying the default settings in the BIOS.

Cont'd

PCI/PnP Setup, Continued

OffBoard PCI/ISA IDE Card

Set this value to allow the OffBoard PCI/ISA IDE Card to be selected. The Optimal and Fail-Safe default setting is *Auto*.

Option	Description
Auto	This setting will auto select the location of an OffBoard PCI IDE adapter card. This is the default setting.
PCI Slot1	This setting will select PCI Slot 1 as the location of the OffBoard PCI IDE adapter card. Use this setting only if there is an IDE adapter card installed in PCI Slot 1.
PCI Slot2	This setting will select PCI Slot 2 as the location of the OffBoard PCI IDE adapter card. Use this setting only if there is an IDE adapter card installed in PCI Slot 2.
PCI Slot3	This setting will select PCI Slot 3 as the location of the OffBoard PCI IDE adapter card. Use this setting only if there is an IDE adapter card installed in PCI Slot 3. This option is available even if the motherboard does not have a PCI Slot 3. If the motherboard does not have a PCI Slot 3, do not use this setting.
PCI Slot4	This setting will select PCI Slot 4 as the location of the OffBoard PCI IDE adapter card. Use this setting only if there is an IDE adapter card installed in PCI Slot 4. This option is available even if the motherboard does not have a PCI Slot 4. If the motherboard does not have a PCI Slot 4, do not use this setting.
PCI Slot5	This setting will select PCI Slot 5 as the location of the OffBoard PCI IDE adapter card. Use this setting only if there is an IDE adapter card installed in PCI Slot 5. This option is available even if the motherboard does not have a PCI Slot 5. If the motherboard does not have a PCI Slot 5, do not use this setting.
PCI Slot6	This setting will select PCI Slot 6 as the location of the OffBoard PCI IDE adapter card. Use this setting only if there is an IDE adapter card installed in PCI Slot 6. This option is available even if the motherboard does not have a PCI Slot 6. If the motherboard does not have a PCI Slot 6, do not use this setting.

IRQ

Set this value to allow the IRQ settings to be modified. The Optimal and Fail-Safe default setting is *Available*.

Interrupt	Option	Description
IRQ3 IRQ4 IRQ5 IRQ7 IRQ9 IRQ10 IRQ11 IRQ14 IRQ15	Available	This setting allows the specified IRQ to be used by a PCI/PnP device. This is the default setting.
	Reserved	This setting allows the specified IRQ to be used by a legacy ISA device.

Cont'd

PCI/PnP Setup, Continued

DMA

Set this value to allow the DMA setting to be modified. The optimal and Fail-Safe default setting is *Available.*

DMA Channel	Option	Description
DMA Channel 0 DMA Channel 1 DMA Channel 3	Available	This setting allows the specified DMA to be used by PCI/PnP device. This is the default setting.
DMA Channel 5 DMA Channel 6 DMA Channel 7	Reserved	This setting allows the specified DMA to be used by a legacy ISA device.

To view this option requires that the screen be scrolled down.

Reserved Memory Size

Set this value to allow the system to reserve memory that is used by ISA devices. The optimal and Fail-Safe default setting is *Disabled.*

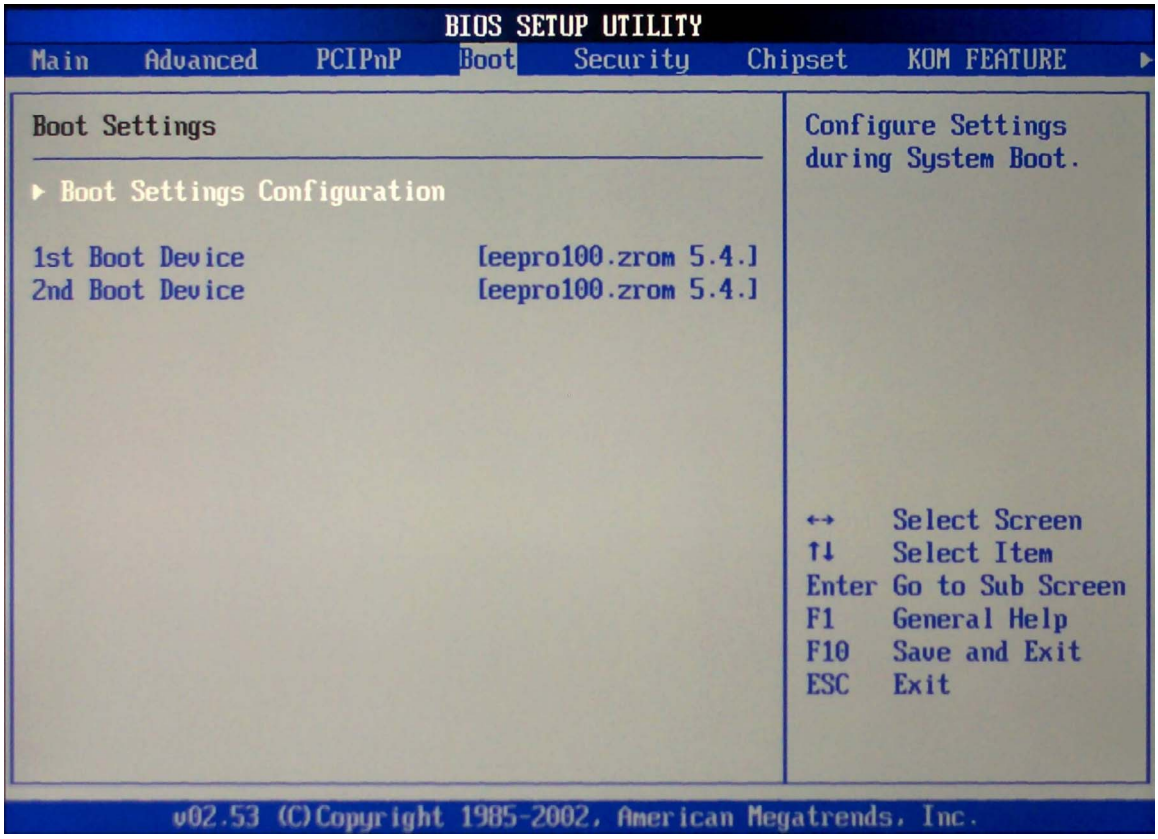
Option	Description
Disabled	Set this value to prevent BIOS from reserving memory to ISA devices.
16K	Set this value to allow the system to reserve 16K of the system memory to the ISA devices.
32K	Set this value to allow the system to reserve 32K of the system memory to the ISA devices.
64K	Set this value to allow the system to reserve 64K of the system memory to the ISA devices.

To view this option requires that the screen be scrolled down.

Chapter 5 Boot Setup

Select the *Boot* tab from the ThinkIO-P setup screen to enter the Boot BIOS Setup screen. You can select any of the items in the left frame of the screen, such as 1st Boot Device , to go to the sub menu for that item. You can display a Boot BIOS Setup option by highlighting it using the <Arrow> keys. Select an item on the Boot Setup screen to access the sub menu to select the device for the Boot priority.

The Boot Setup screen is shown below:

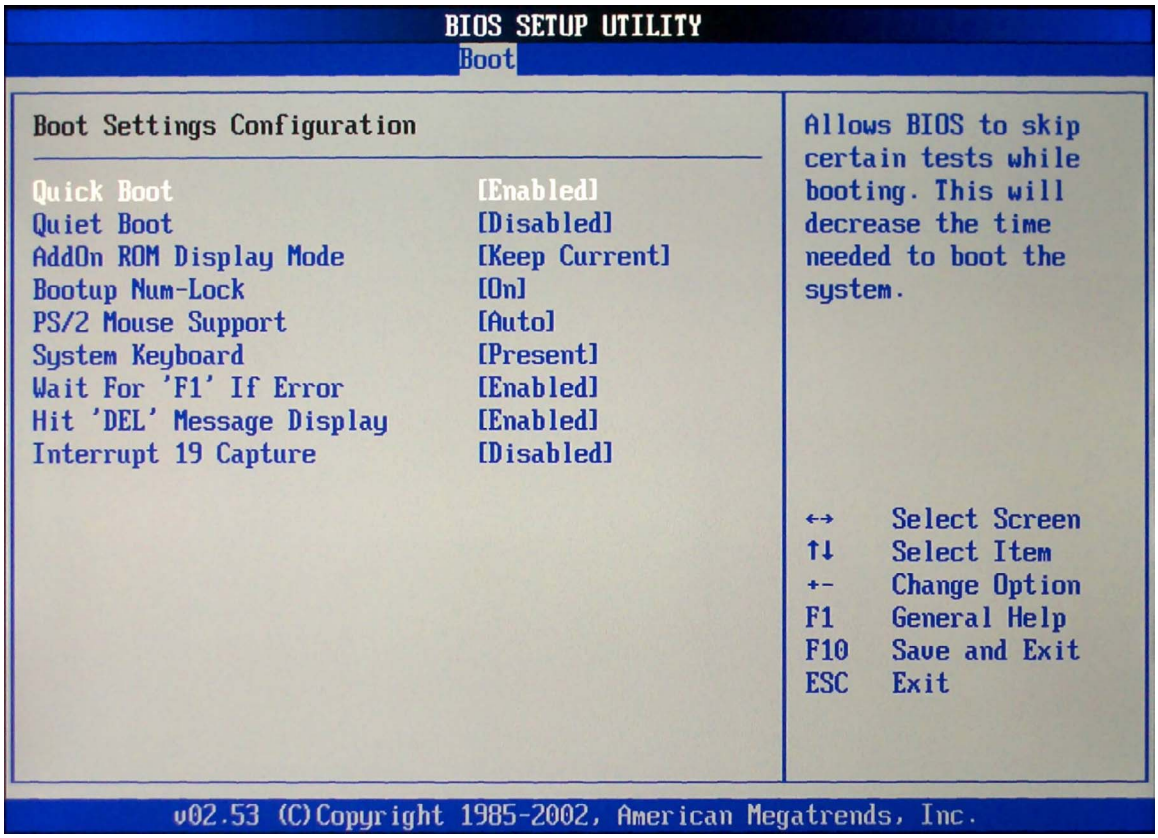


Boot Setup, Continued

BOOT Settings Configuration

Boot Settings Configuration

Use this screen to select options for the Boot Settings Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option. The settings are described on the following pages. The screen is shown below.



Quick Boot

The Optimal and Fail-Safe default setting is *Disabled*.

Option	Description
Disabled	Set this value to allow the BIOS to perform all POST tests.
Enabled	Set this value to allow the BIOS to skip certain POST tests to boot faster.

Quiet Boot

Set this value to allow the boot-up screen options to be modified between POST messages or OEM logo. The Optimal and Fail-Safe default setting is *Enabled.*

Option	Description
Disabled	Set this value to allow the computer system to display the POST messages.
Enabled	Set this value to allow the computer system to display the OEM logo. This is the default setting.

Boot Setup, Continued

Add-On ROM Display Mode

Set this option to display add-on ROM (read-only memory) messages. The Optimal and Fail-Safe default setting is *Force BIOS*. An example of this is a SCSI BIOS or VGA BIOS.

Option	Description
Force BIOS	Set this value to allow the computer system to force a third party BIOS to display during system boot. This is the default setting.
Keep Current	Set this value to allow the computer system to display the ThinkIO-P information during system boot.

Boot-Up Num-Lock

Set this value to allow the Number Lock setting to be modified during boot-up. The Optimal and Fail-Safe default setting is *On*.

Option	Description
Off	This option does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard will light up when the Number Lock is engaged.
On	Set this value to allow the Number Lock on the keyboard to be enabled automatically when the computer system is boot-up. This allows the immediate use of 10-keys numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard will be lit. This is the default setting.

PS/2 Mouse Support

Set this value to allow the PS/2 mouse support to be adjusted. The Optimal and Fail-Safe default setting is *Enabled*.

Option	Description
Disabled	This option will prevent the PS/2 mouse port from using system resources and will prevent the port from being active. Use this setting if installing a serial mouse.
Enabled	Set this value to allow the system to use a PS/2 mouse. This is the default setting.

System Keyboard

Set this value to *Present* to allow a keyboard to be used with the system. Be careful, setting this value to *Absent* prevents the usage of a keyboard with the system and can result in a system lock out if a local keyboard is required.

Wait for 'F1' If Error

Set this value to allow the Wait for 'F1' Error setting to be modified. The Optimal and Fail-Safe default setting is *Enabled*.

Option	Description
Disabled	This prevents the ThinkIO-P to wait on an error for user intervention. This setting should be used if there is a known reason for a BIOS error to appear. An example would be a system administrator must remote boot the system. The computer system does not have a keyboard currently attached. If this setting is set, the system will continue to boot-up in to the operating system. If 'F1' is enabled, the system will wait until the BIOS setup is entered.
Enabled	Set this value to allow the system BIOS to wait for any error. If an error is detected, pressing <F1> will enter Setup and the BIOS setting can be adjusted to fix the problem. This normally happens when upgrading the hardware and not setting the BIOS to recognize it. This is the default setting.

Cont'd

Boot Setup, Continued

Hit 'DEL' Message Display

Set this value to allow the *Hit "DEL" to enter Setup* Message Display to be modified. The Optimal and Fail-Safe default setting is *Enabled*.

Option	Description
Disabled	This prevents the ThinkIO-P to display `Hit Del to enter Setup` during memory initialization. If Quiet Boot is enabled, the Hit 'DEL' message will not display.
Enabled	This allows the ThinkIO-P to display `Hit Del to enter Setup` during memory initialization. This is the default setting.

Interrupt 19 Capture

Set this value to allow option ROMs such as network controllers to trap BIOS interrupt 19.

Option	Description
Disabled	The BIOS prevents option ROMs from trapping interrupt 19.
Enabled	The BIOS allows option ROMs to trap interrupt 19.

BOOT DEVICE PRIORITY

1st Boot Device

This option is used to select the first device to be accessed for system booting. Select the desired device from the options presented.

2nd Boot Device

This option is used to select the second device to be accessed for system booting. Select the desired device from the options presented.

3rd Boot Device

This option is used to select the third device to be accessed for system booting. Select the desired device from the options presented.

4th Boot Device

This option is used to select the fourth device to be accessed for system booting. Select the desired device from the options presented.

Chapter 6 Security Setup

ThinkIO-P Password Support

Two Levels of Password Protection

ThinkIO-P provides both a Supervisor and a User password. If you use both passwords, the Supervisor password must be set first.

The system can be configured so that all users must enter a password every time the system boots or when ThinkIO-P Setup is executed, using either the Supervisor password or the User password.

The Supervisor and User passwords activate two different levels of password security. If you select password support, you are prompted for a one to six character password. Type the password on the keyboard. The password does not appear on the screen when typed. Make sure you write it down.

Remember the Password

Keep a record of all passwords. If you forget the passwords it is possible that you cannot access BIOS SETUP and, if it was selected, the system cannot be booted.

If you still know the Supervisor password it is possible to clear/reset the User password.

If you have forgotten the Supervisor password, it will be necessary to contact the Kontron technical support for further assistance. It is not possible for the user to correct this situation.

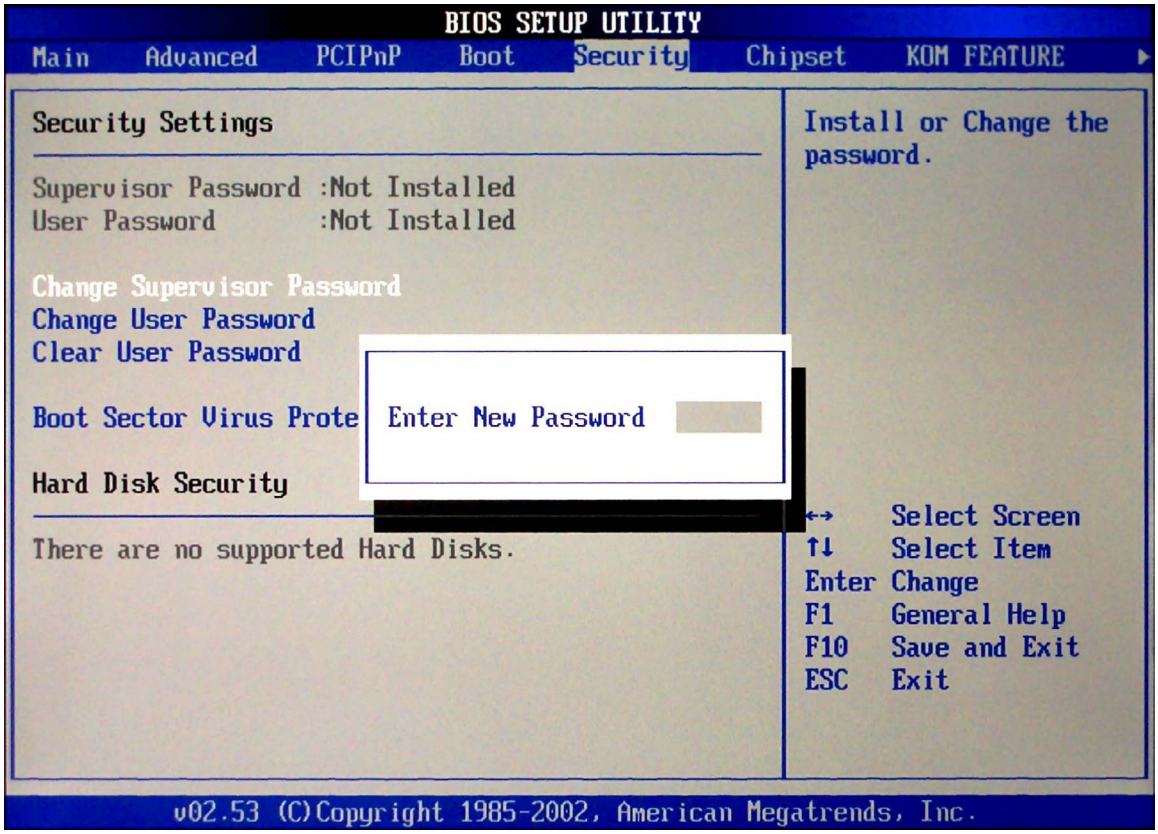
Cont’d

Security Setup, Continued

Select Security Setup from the ThinkIO-P Setup main BIOS setup menu. All Security Setup options, such as password protection and virus protection, are described in this section. To access the sub menu for the following items, select the item and press <Enter>:

- Change Supervisor Password
- Change User Password
- Clear User Password

The Security Setup screen is shown below. The sub menus are documented on the following pages.



Supervisor Password

Indicates whether a supervisor password has been set. If the password has been installed, *Installed* displays. If not, *Not Installed* displays.

User Password

Indicates whether a user password has been set. If the password has been installed, *Installed* displays. If not, *Not Installed* displays.

Cont'd

Security Setup, Continued

Change Supervisor Password

Select this option and press <Enter> to access the sub menu. You can use the sub menu to change the supervisor password.

Change User Password

Select this option and press <Enter> to access the sub menu. You can use the sub menu to change the user password.

Clear User Password

Select this option and press <Enter> to access the sub menu. You can use the sub menu to clear the user password.

Boot Sector Virus Protection

This option is near the bottom of the Security Setup screen. The Optimal and Fail-Safe default setting is *Disabled*

Option	Description
Disabled	Set this value to prevent the Boot Sector Virus Protection. This is the default setting.
Enabled	Select Enabled to enable boot sector protection. ThinkIO-P displays a warning when any program (or virus) issues a Disk Format command or attempts to write to the boot sector of the hard disk drive. If enabled, the following appears when a write is attempted to the boot sector. You may have to type N several times to prevent the boot sector write. Boot Sector Write! Possible VIRUS: Continue (Y/N)? _ The following appears after any attempt to format any cylinder, head, or sector of any hard disk drive via the BIOS INT 13 Hard disk drive Service: Format!!! Possible VIRUS: Continue (Y/N)? _

CHANGE SUPERVISOR PASSWORD

Change Supervisor Password

Select Change Supervisor Password from the Security Setup menu and press <Enter>.

```
Enter New Password:
```

appears. Type the password and press <Enter>. The screen does not display the characters entered. Retype the password as prompted and press <Enter>. If the password confirmation is incorrect, an error message appears. The password is stored in non-volatile memory once the configuration is saved and BIOS Setup is exited.

Cont'd

Security Setup, Continued

Change User Password

Select Change User Password from the Security Setup menu and press <Enter>.

```
Enter New Password:
```

appears. Type the password and press <Enter>. The screen does not display the characters entered. Retype the password as prompted and press <Enter>. If the password confirmation is incorrect, an error message appears. The password is stored in non-volatile memory once the configuration is saved and BIOS Setup is exited.

Clear User Password

Select Clear User Password from the Security Setup menu and press <Enter>.

```
Clear New Password

[Ok] [Cancel]
```

appears. Type the password and press <Enter>. The screen does not display the characters entered. Retype the password as prompted and press <Enter>. If the password confirmation is incorrect, an error message appears. The password is stored in non-volatile memory once the configuration is saved and BIOS Setup is exited.

HARD DISK SECURITY

Hard Disk Security

Some modern hard disk drives support password protection. This option permits the setting of a password if supported by the drive. The following options only appear if the corresponding drive supports hard drive security. Hard drive passwords must be entered during startup to unlock the drive.

PRIMARY Master HDD USER Password

Select Primary Master HDD USER Password from the Hard Disk Security menu and press <Enter>.

```
Enter New Password:
```

appears. Type the password and press <Enter>. The screen does not display the characters entered. Retype the password as prompted and press <Enter>. If the password confirmation is incorrect, an error message appears. The password is stored in non-volatile memory once the configuration is saved and BIOS Setup is exited.

Cont'd

Security Setup, Continued

PRIMARY Slave HDD USER Password

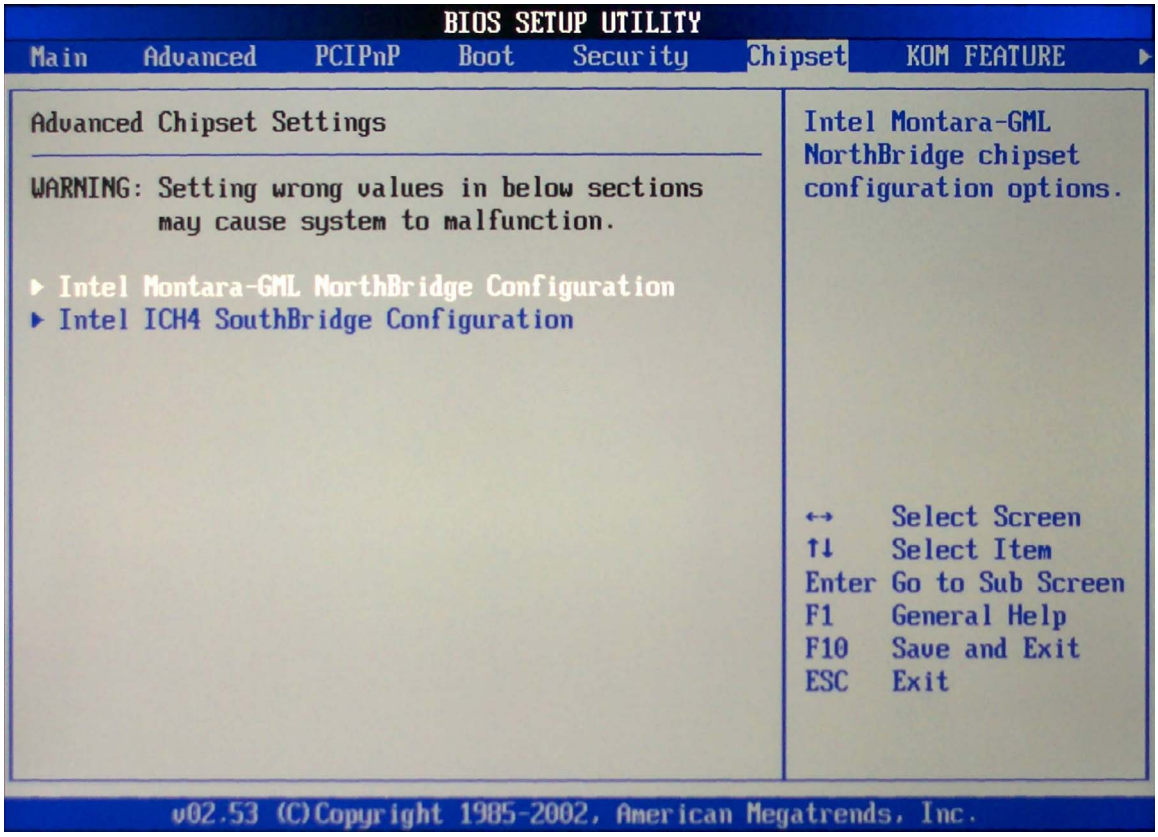
Select Primary Slave HDD USER Password from the Hard Disk Security menu and press <Enter>.

```
Enter New Password:
```

appears. Type the password and press <Enter>. The screen does not display the characters entered. Retype the password as prompted and press <Enter>. If the password confirmation is incorrect, an error message appears. The password is stored in non-volatile memory once the configuration is saved and BIOS Setup is exited.

Chapter 7 Chipset Setup

Select the *Chipset* tab from the ThinkIO-P setup screen to enter the Chipset BIOS Setup screen. You can display a Chipset BIOS Setup option by highlighting it using the <Arrow> keys. All Chipset BIOS Setup options are described in this section. The Chipset BIOS Setup screen is shown below.



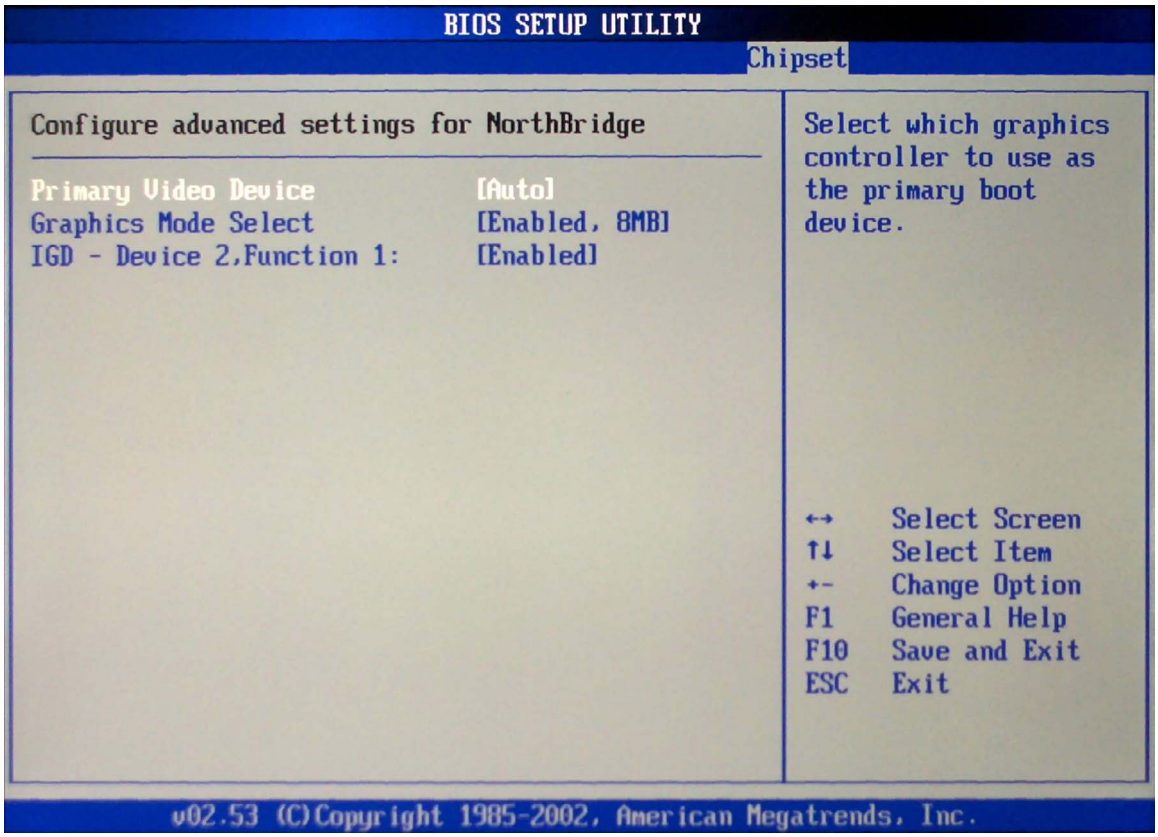
Chipset Setup, Continued

Intel Montara-GML NORTH BRIDGE CONFIGURATION

Intel Montara-GML North Bridge Configuration

You can use this screen to select options for the North Bridge Configuration. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.

Note: The North Bridge Configuration setup screen varies depending on the supported North Bridge chipset.



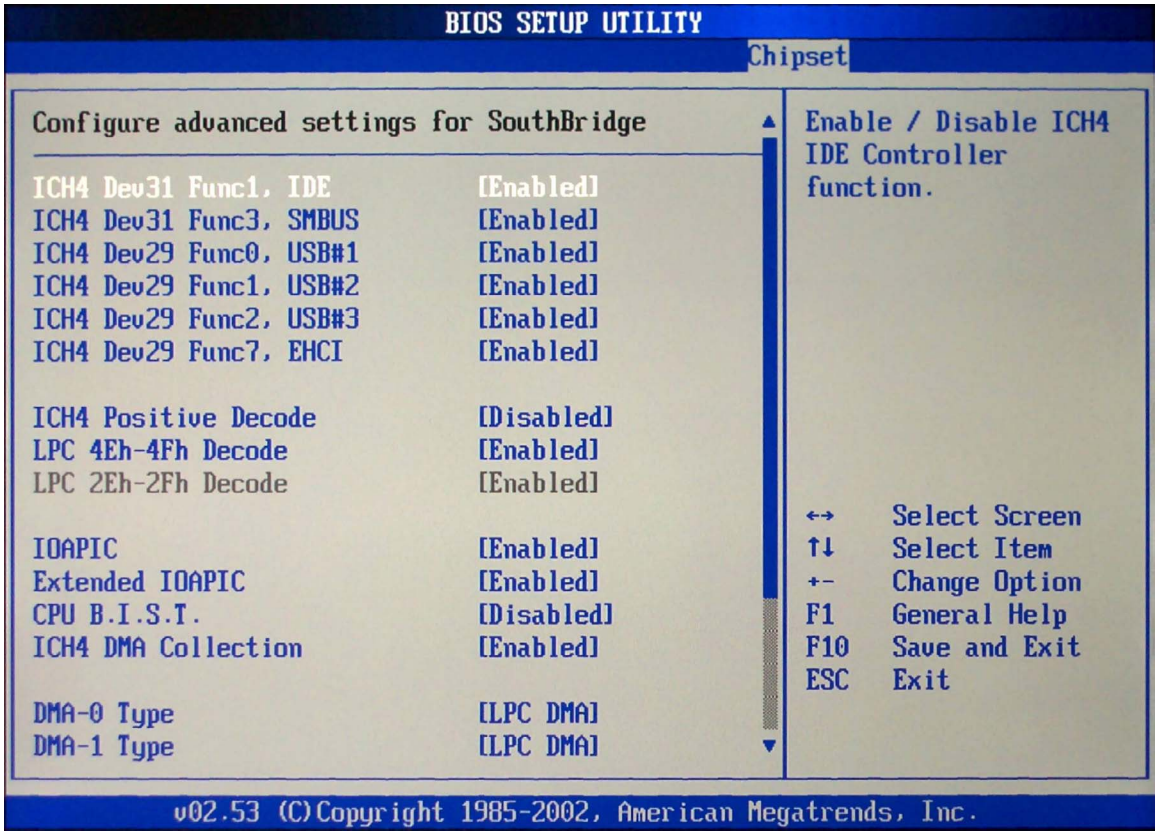
Chipset Setup, Continued

SOUTH BRIDGE CONFIGURATION

South Bridge Configuration

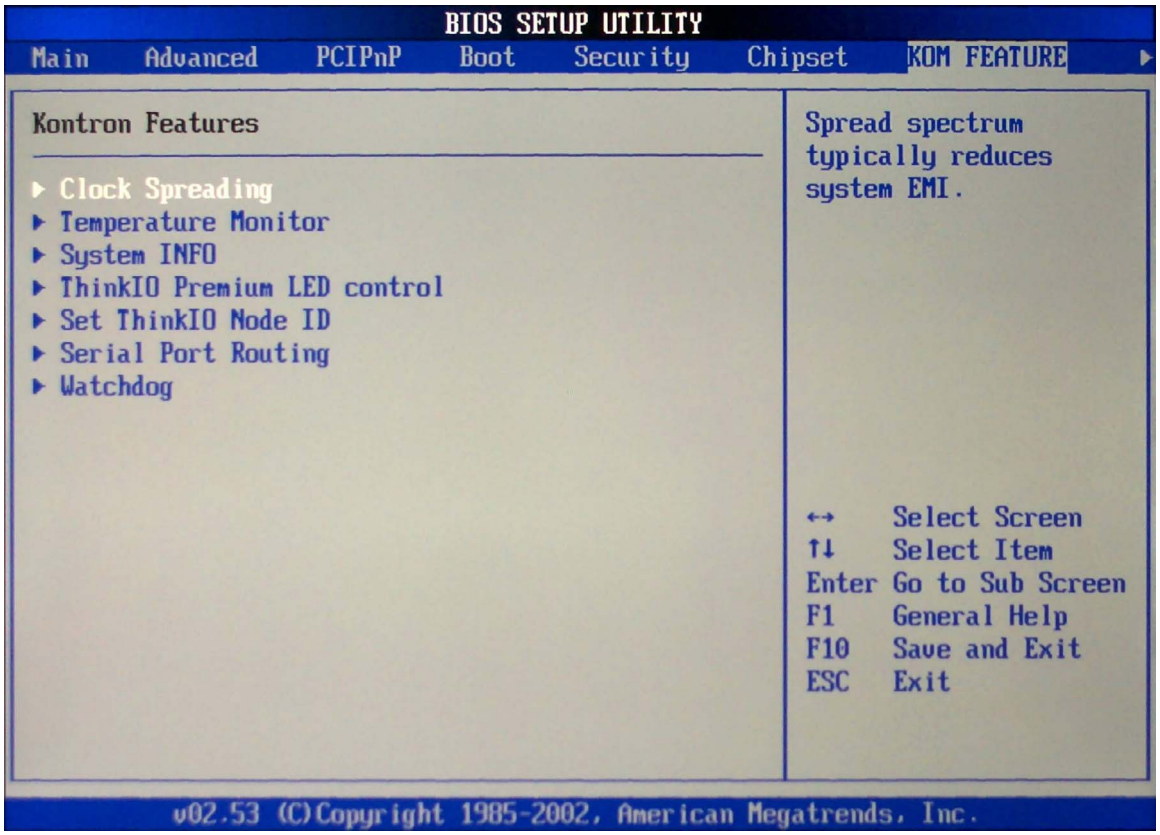
You can use this screen to select options for the South Bridge Configuration. South Bridge is a chipset on the motherboard that controls the basic I/O functions, USB ports, audio functions, modem functions, IDE channels, and PCI slots. Use the up and down <Arrow> keys to select an item. Use the <Plus> and <Minus> keys to change the value of the selected option.

Note: The South Bridge Configuration setup screen varies depending on the supported South Bridge chipset.



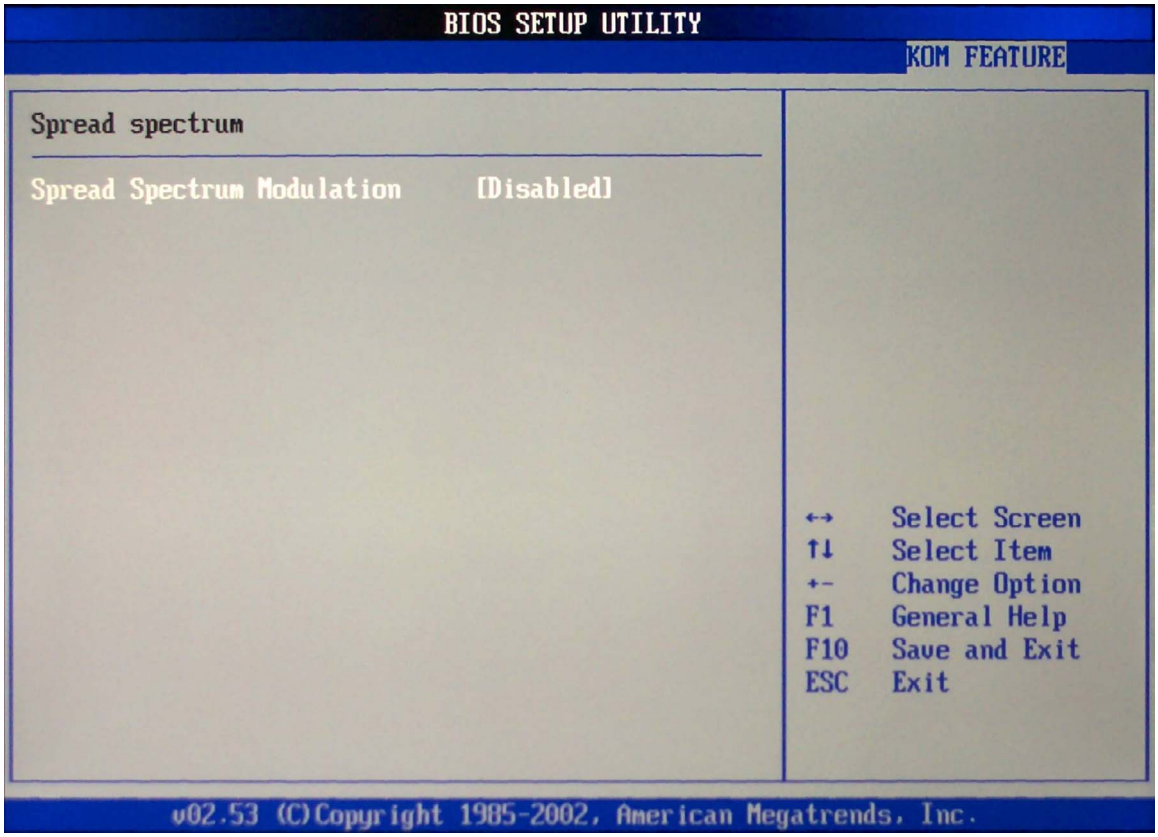
Chapter 8 KOM Feature

Select the KOM Feature tab from the ThinkIO-P setup screen to enter the Kontron specific BIOS Setup screen. You can display a Kontron BIOS Setup option by highlighting it using the <Arrow>keys. All KOM Feature BIOS Setup options are described in this section.



KOM Feature, Continued

Clock Spreading



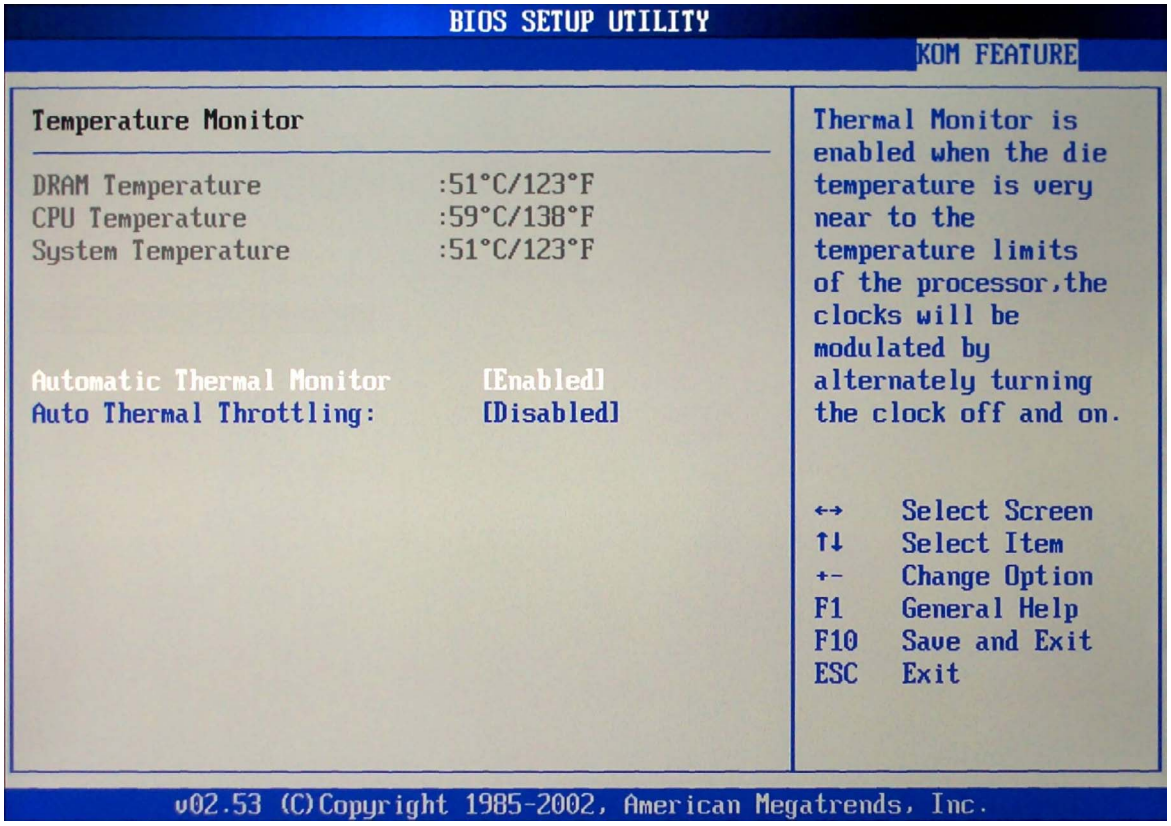
Clock Spreading

The Optimal and Fail-Safe default setting is *Disabled*.

Option	Description
Disabled	No Clock Spectrum Modulation
Enabled	0.5% Clock Spreading. Spread spectrum typically reduces system EMI

KOM Feature, Continued

Temperature Monitor



Automatic Thermal Monitor

Thermal Monitor is enabled and when the die temperature is very near to the temperature limits of the processor, the clocks will be modulated by alternately turning the clocks off and on at a duty cycle of 50%.

Auto Thermal Throttling

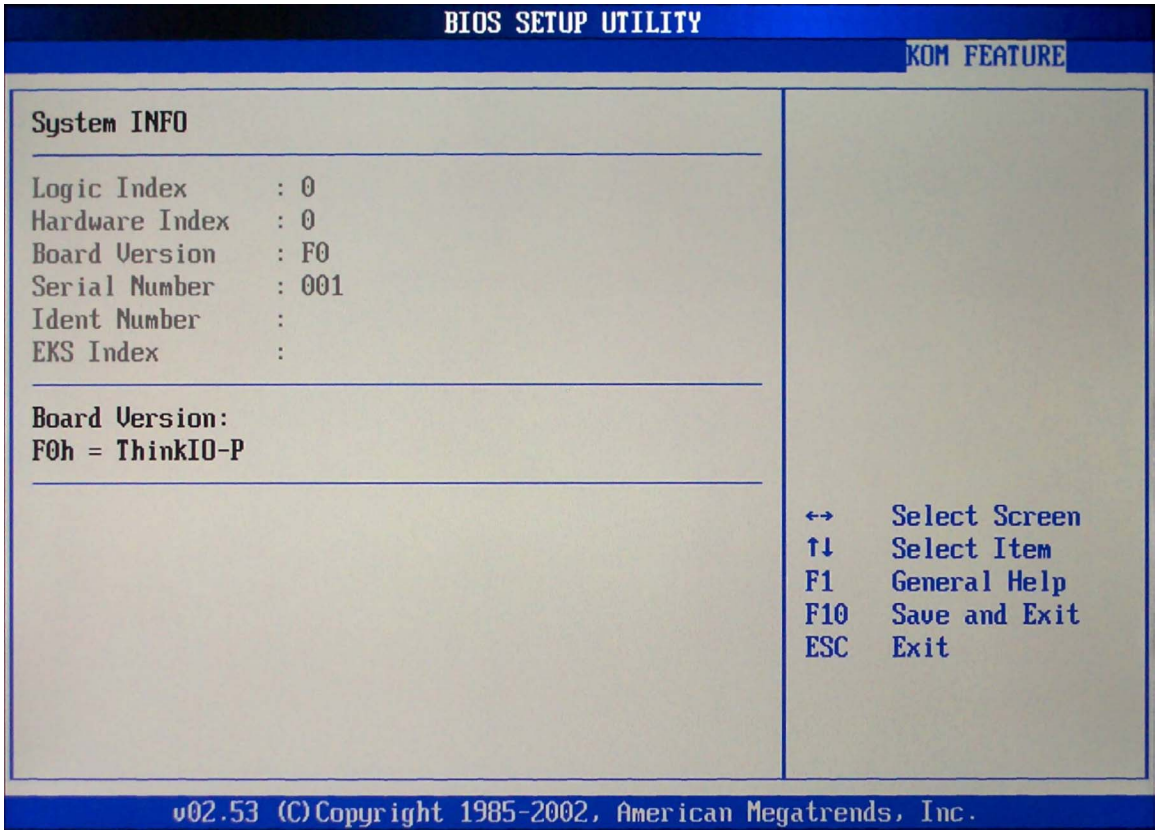
Auto Thermo Throttling reduces CPU speed to avoid overheating. Temperature Range is from 95°C up to 110°C.

CPU Performance

The CPU performance will be reduced to the selected value when reaching the temperature threshold.
CPU Performance 12.5%; 25%; 50%; 75%

KOM Feature, Continued

System INFO



Logic Index

This is a display only field, which reflects the value of an onboard register. It shows the index of the onboard logic.

Hardware Index

This is a display only field, which reflects the value of an onboard register. It shows the index of the Hardware Index.

Board Version

This is a display only field, which reflects the value of an onboard register. This must always correspond with the CPU on which the BIOS is installed.
Compare the value with the table below**.**

Serial Number

This is a display only field, which reflects the value of an onboard register. It indicates the serial number of this ThinkIO-P unit. The serial number is unique to each board produced by Kontron Modular Computers. It could be used also by the customer to identify specific boards.

KOM Feature, Continued

Ident Number

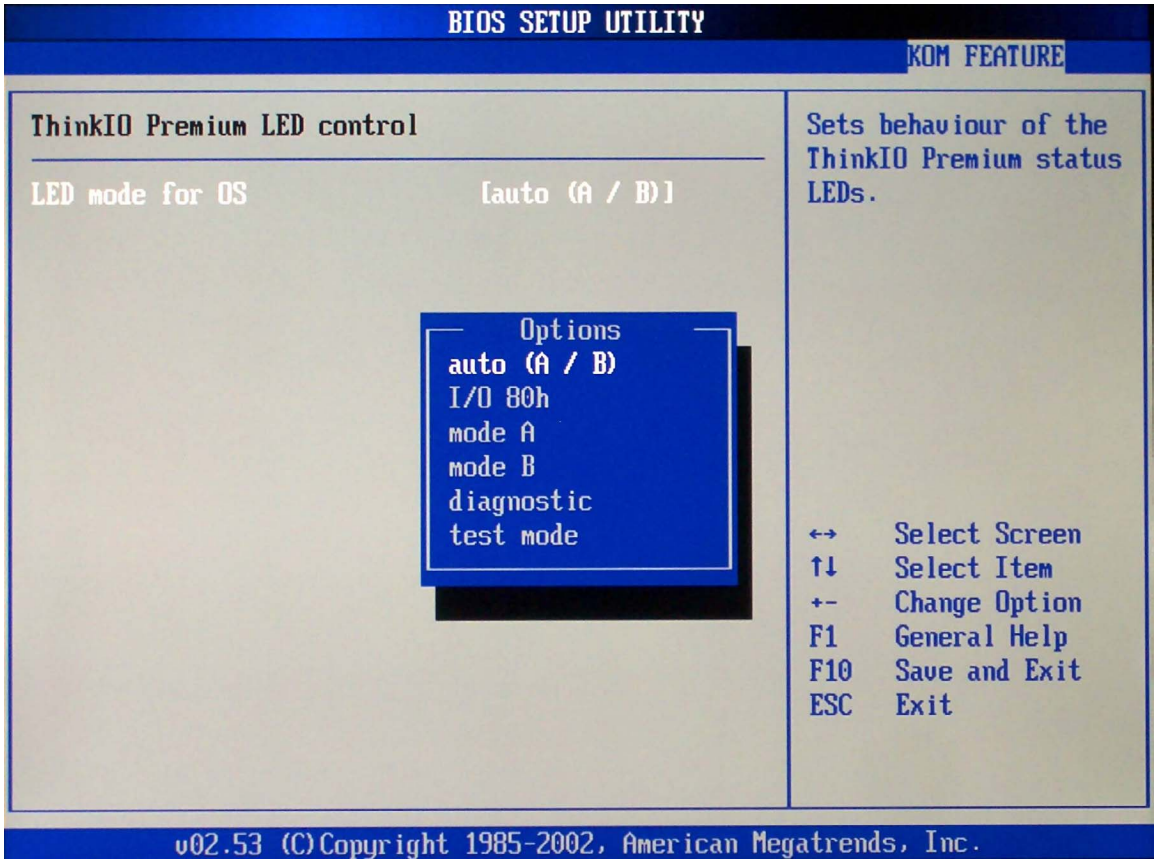
This is a display only field, which shows Kontron internal information about the board (EKS Number).

EKS Index

This is a display only field which shows Kontron internal information about the board. EKS Index refers to the revision status of the haredware and software.

KOM Feature, Continued

ThinkIO Premium LED Control

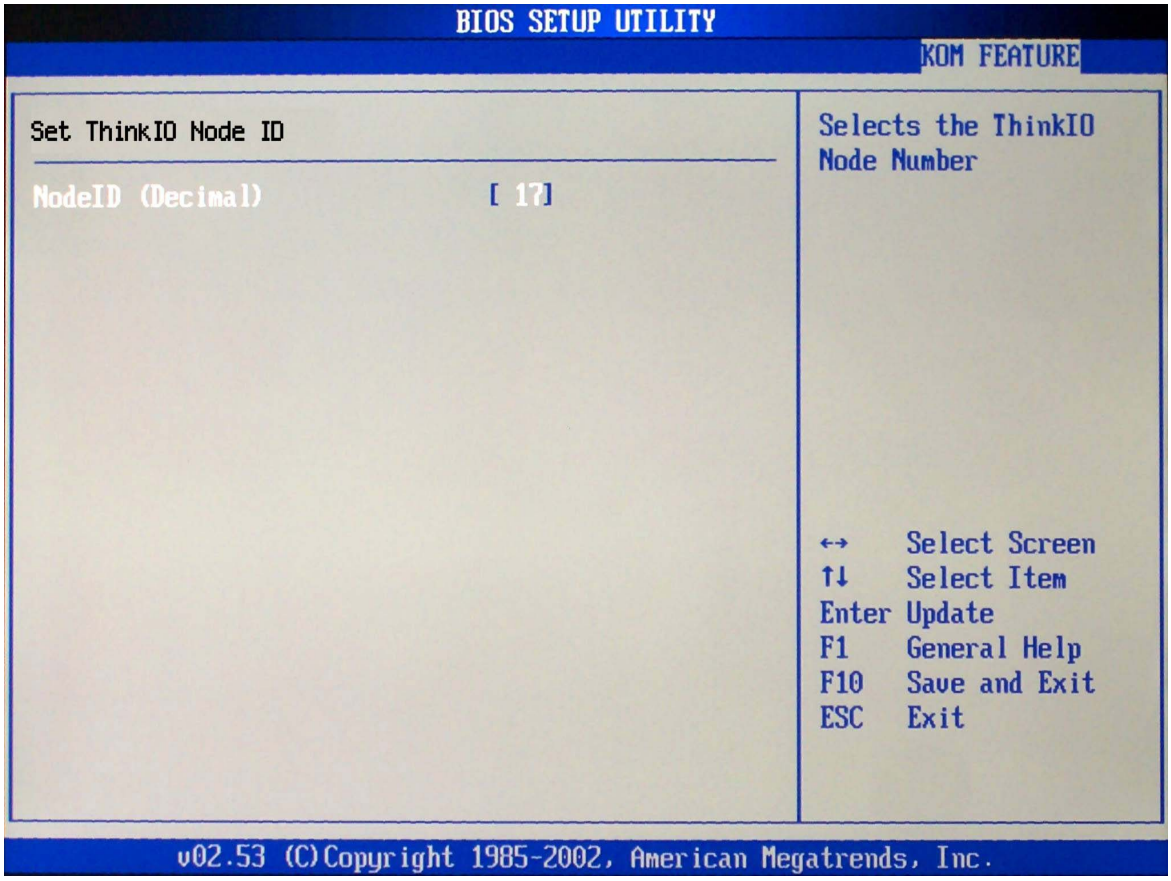


This option allows the selection of the operational mode of the ThinkIO-P status LEDs. To select the operational mode, highlight the option using the arrow keys and press ENTER. Select the mode desired from the list presented and press ENTER. The following table indicates basically what the operational modes are.

Option	Description
auto (A / B)	Set this value to have an automatic selection between special mode A or B.
I/O 80h	Select this option to remain in the POST display mode. In this case, the LEDs reflect the contents of the I/O 80h register.
mode A	Select this option to map LEDs to special mode A (refer to chapter 3 of the Hardware Reference Manual for further information)
mode B	Select this option to map LEDs to special mode B refer to chapter 3 of the Hardware Reference Manual for further information)
diagnostic	Select this option to map LEDs to diagnostic mode (refer to chapter 3 of the Hardware Reference Manual for further information)
test mode	Select this option to map LEDs to test mode (refer to chapter 3 of the Hardware Reference Manual for further information)

KOM Feature, Continued

Set ThinkIO Node ID

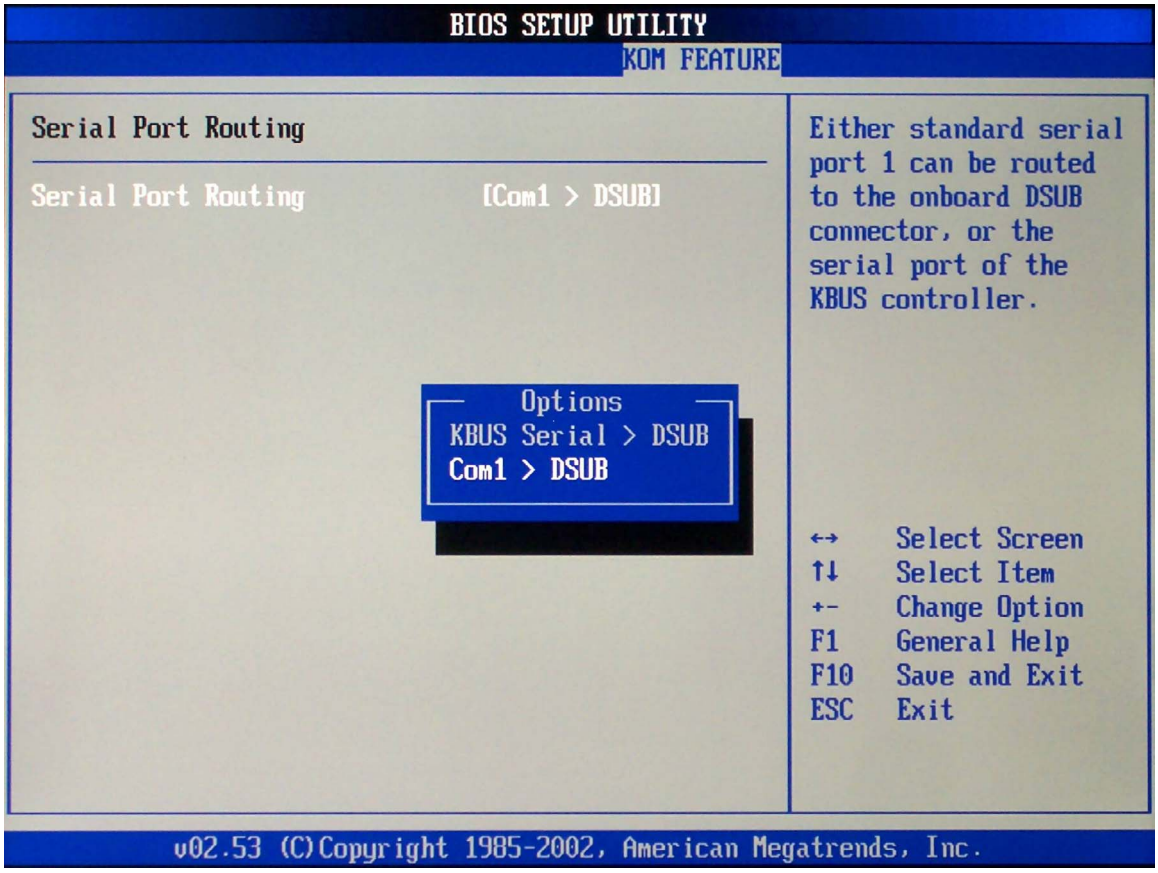


NodeID (Decimal)

Enter the fieldbus node ID of the this ThinkIO-P here.

KOM Feature, Continued

Serial Port Routing

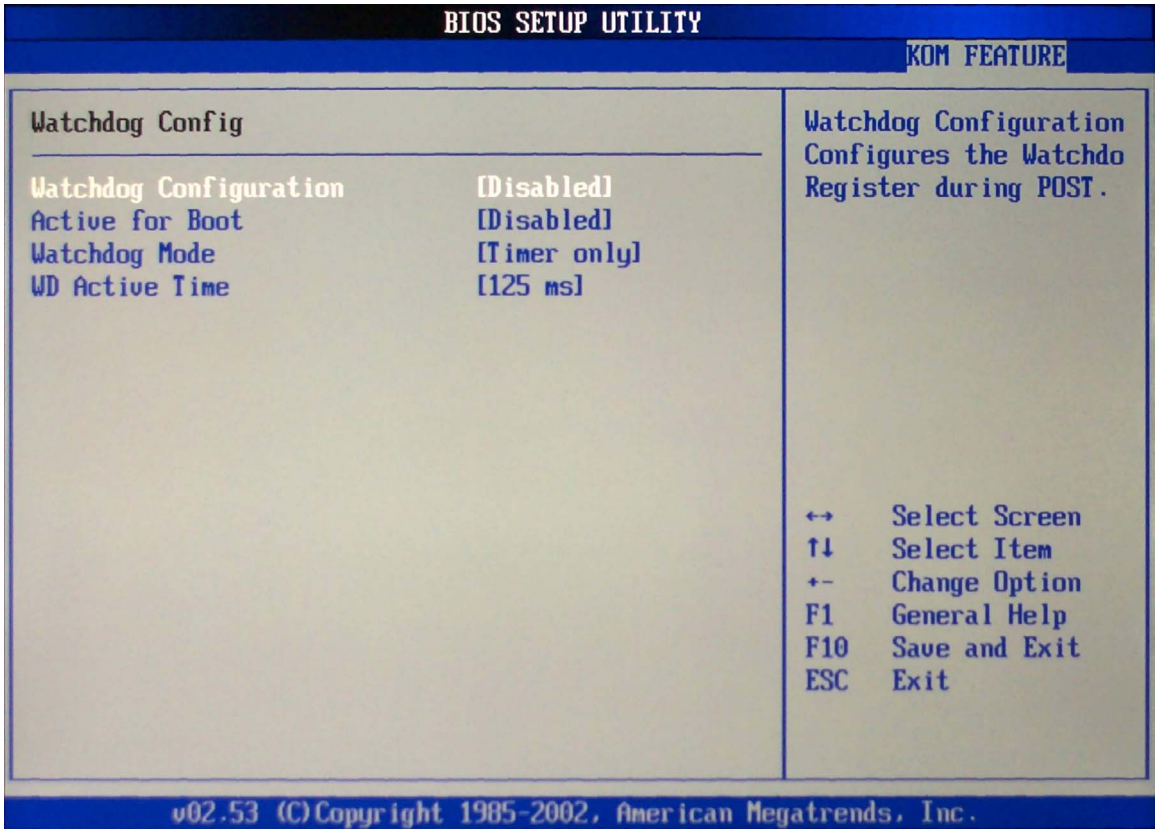


Serial Port Routing

The serial port A of the ThinkIO-P may be routed either to the X5 RS232 front panel D-Sub connector or internally to the K-Bus's serial port.

KOM Feature, Continued

Watchdog



Watchdog Configuration

Option	Description
Disabled	Disables the onboard Watchdog.
Enabled	Enables the onboard Watchdog

Active for Boot

Option	Description
Disabled	Watchdog must be started from the OS.
Enabled	Select Enabled if the watchdog timer requires to be started before the operating system is booted from the BIOS.

Cont'd

KOM Feature, Continued

Watchdog Mode

Selects the operating mode of the Watchdog.

Option	Description
Timer only	Watchdog is used in timer only mode. No interrupt is generated.
Reset	Performs system reset if a Watchdog timeout occurs.
Interrupt	Selecting this option permits the generation of an interrupt depending on the setting of the Interrupt Config. If this mode is selected an additional option “Interrupt Config” is displayed to allow the specification of an interrupt type: IRQ5, NMI, or, if desired, Disabled meaning no interrupt is to be generated.
Cascade (INT+Reset)	In this mode, if the Watchdog times out an interrupt will/will not be generated and the Watchdog timer is automatically retriggered. If a second timeout occurs, the system is reset. If this mode is selected an additional option “Interrupt Config” is displayed to allow the specification of an interrupt type: IRQ5, NMI, or, if desired, Disabled meaning no interrupt is to be generated.

WD Active Time

Option	Description
125ms, 250 ms, 500ms, 1s, 2s, 4s, 8s, 16s, 32s, 64s, 128s, 256s	Select the time after which the action selected occurs if the Watchdog timer is not retriggered. The BIOS itself does not retrigger the Watchdog timer, so care must be taken to ensure that adequate time is available for either the operating system or the application to service the Watchdog timer.

Chapter 9 Power Setup

Select the *Power* tab from the ThinkIO-P setup screen to enter the Power Management BIOS Setup screen. You can display a Power Management BIOS Setup option by highlighting it using the <Arrow> keys. All Power Management BIOS Setup options are described in this section.

Note: The Power Management Setup screen is not displayed when Advanced Power Management (APM) is not supported. The Power Setup screen can vary for different motherboards.

Power Management/APM

Set this value to allow Power Management/APM support. The Optimal and Fail-Safe default setting is *Enabled.*

Option	Description
Disabled	Set this value to prevent the chipset power management and APM (Advanced Power Management) features.
Enabled	Set this value to allow the chipset power management and APM (Advanced Power Management) features. This is the default setting.

Power Savings Under AC

Power Management when AC powered.

Power Savings Level

Configure the timer based Power Management.

Suspend Time Out (Minute)

This option specifies the length of time the system waits before it enters suspend mode. The Optimal and Fail-Safe default setting is *Disabled.*

Option	Description
Disabled	This setting prevents the system from entering suspend mode. This is the default setting.
1Min	Set this value to allow the computer system to enter suspend mode after being inactive for 1 minute.
5Min	Set this value to allow the computer system to enter suspend mode after being inactive for 5 minutes.
10Min	Set this value to allow the computer system to enter suspend mode after being inactive for 10 minutes.

Power Button Mode

This option specifies how the externally mounted power button on the front of the computer chassis is used. The Optimal and Fail-Safe default setting is *On/Off.*

Option	Description
On/Off	Pushing the power button turns the computer on or off. This is the default setting. This is the default setting.
Suspend	Pushing the power button places the computer in Suspend mode or Full On power mode.

Power Setup, Continued

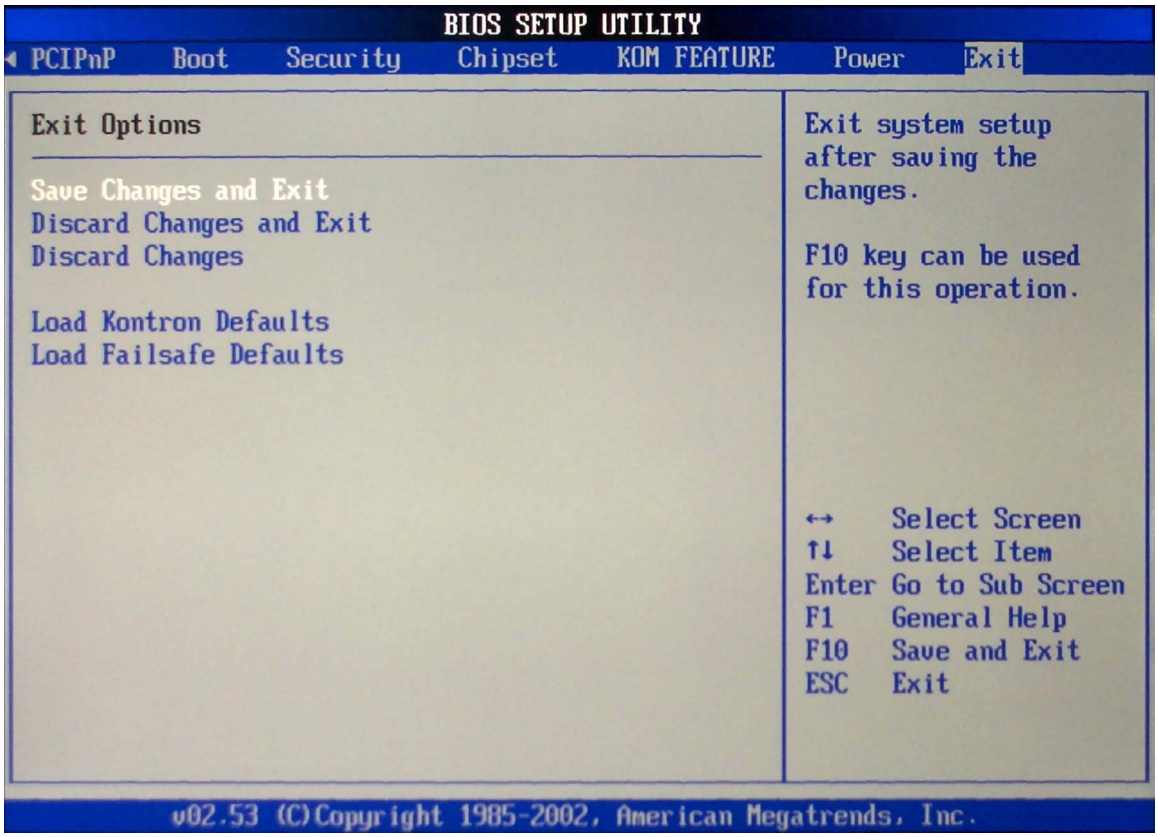
USB Controller Resume
USB wake from sleep state.

PME Resume
PME (Power Management Event) wake from sleep states.

RI Resume
Ring Indicator wake from sleep states.

Chapter 10 Exit Menu

Select the *Exit* tab from the ThinkIO-P setup screen to enter the Exit BIOS Setup screen. You can display an Exit BIOS Setup option by highlighting it using the <Arrow> keys. All Exit BIOS Setup options are described in this section. The Exit BIOS Setup screen is shown below.



Save Changes and Exit

When you have completed the system configuration changes, select this option to leave ThinkIO-P setup and reboot the computer so the new system configuration parameters can take effect. Select Exit Saving Changes from the Exit menu and press <Enter>.

```
Save Configuration Changes and Exit Now?

[Ok]   [Cancel]
```

appears in the window. Select Ok to save changes and exit.

Cont'd

Exit Menu, Continued

Discard Changes and Exit

Select this option to quit ThinkIO-P Setup without making any permanent changes to the system configuration. Select Exit Discarding Changes from the Exit menu and press <Enter>.

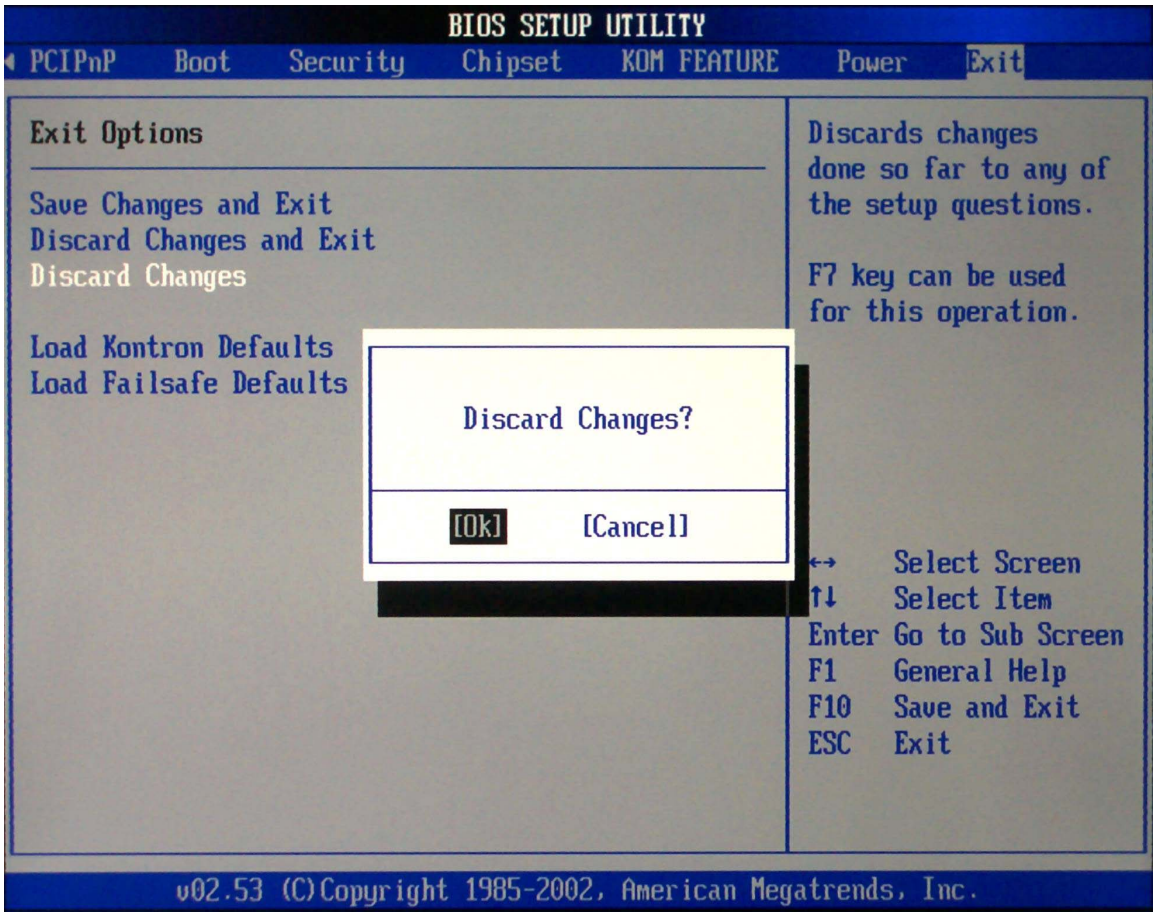
```
Discard Changes and Exit Setup Now?

[Ok]   [Cancel]
```

appears in the window. Select *Ok* to discard changes and exit.

Discard Changes

Select Discard Changes from the Exit menu and press <Enter>.



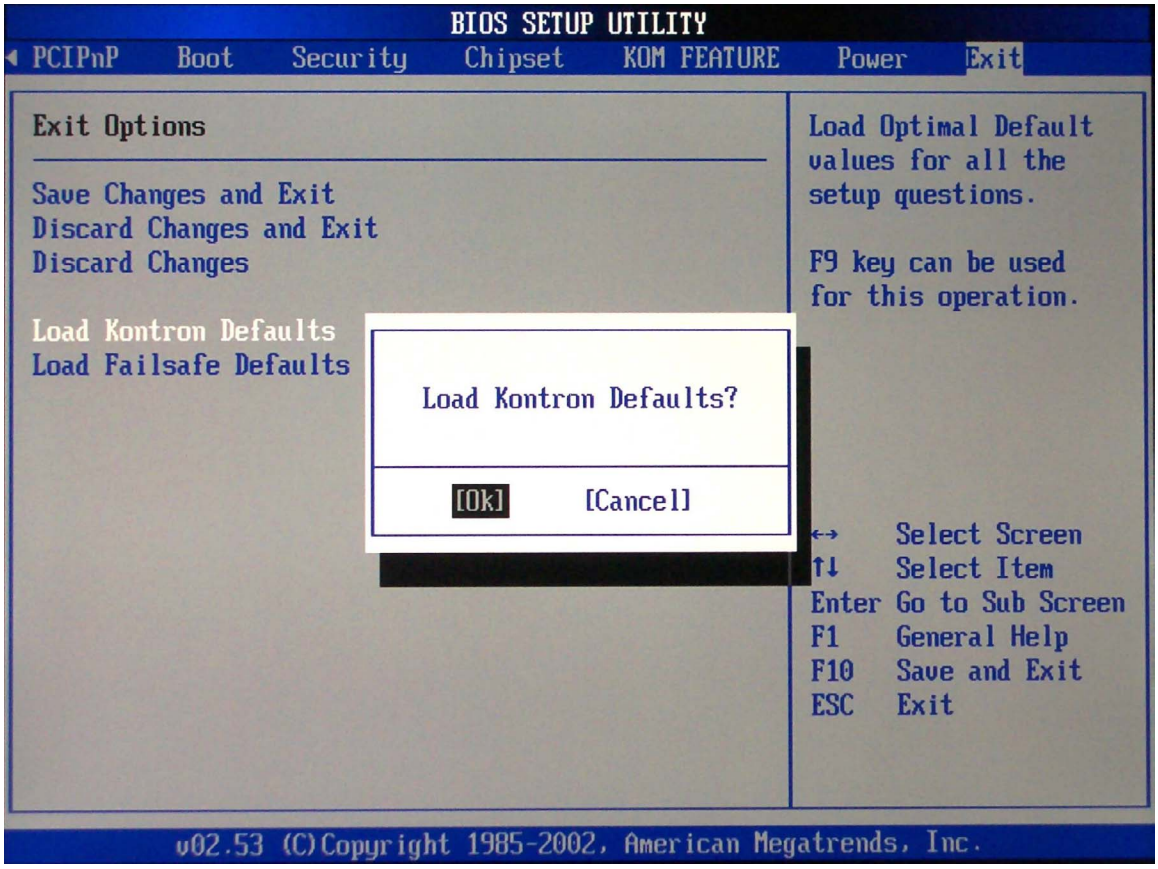
Select *Ok* to discard changes.

Exit Menu, Continued

Load Kontron Defaults

ThinkIO-P automatically sets all ThinkIO-P Setup options to a complete set of default settings when you select this option. The Optimal settings are designed for maximum system performance, but may not work best for all computer applications. In particular, do not use the Optimal ThinkIO-P Setup options if your computer is experiencing system configuration problems.

Select Load Optimal Defaults from the Exit menu and press <Enter>.



Select *Ok* to load optimal defaults.

Cont'd

Exit Menu, Continued

Load Fail-Safe Defaults

ThinkIO-P automatically sets all ThinkIO-P Setup options to a complete set of default settings when you Select this option. The Fail-Safe settings are designed for maximum system stability, but not maximum performance. Select the Fail-Safe ThinkIO-P Setup options if your computer is experiencing system configuration problems.
Select Load Fail-Safe Defaults from the Exit menu and press <Enter>.

```
Load Fail-Safe Defaults?

[Ok]   [Cancel]
```

appears in the window. Select *Ok* to load Fail-Safe defaults.

Chapter 11 Password(s) Forgotten?

If you forget the passwords you set up through the BIOS SETUP, it will not be possible to access the BIOS SETUP and, if it was selected, the system will not boot without a password.

If the Supervisor password is still known it is possible to clear/change the User password and to set the options for the User.

If the Supervisor password is forgotten, you must contact the Kontron technical support for further assistance. It is not possible for the user to correct this situation.