NuPRO-A331

Full-Size PICMG 1.0 Intel® Core™ i7/i5/i3
Q57 Express Chipset SBC

User's Manual



Manual Rev.: 2.02

Revision Date: May 27, 2016

Part No: 50-13067-1020

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Advance Technologies; Automate the World.

Revision History

Revision	Release Date	Description of Change(s)
2.00	2010/12/31	Initial release
2.01	2011/02/17	Correct PICMG “1.3” to “1.0”, update DVI cable P/N, remove SATA power cable from packing list
2.02	2016/5/27	I/O spec listing adjusted

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Preface

Copyright 2016 ADLINK Technology Inc.

This document contains proprietary information protected by copyright. All rights are reserved. No part of this manual may be reproduced by any mechanical, electronic, or other means in any form without prior written permission of the manufacturer.

Disclaimer

The information in this document is subject to change without prior notice in order to improve reliability, design, and function and does not represent a commitment on the part of the manufacturer.

In no event will the manufacturer be liable for direct, indirect, special, incidental, or consequential damages arising out of the use or inability to use the product or documentation, even if advised of the possibility of such damages.

Environmental Responsibility

ADLINK is committed to fulfill its social responsibility to global environmental preservation through compliance with the European Union's Restriction of Hazardous Substances (RoHS) directive and Waste Electrical and Electronic Equipment (WEEE) directive. Environmental protection is a top priority for ADLINK. We have enforced measures to ensure that our products, manufacturing processes, components, and raw materials have as little impact on the environment as possible. When products are at their end of life, our customers are encouraged to dispose of them in accordance with the product disposal and/or recovery programs prescribed by their nation or company.

Trademarks

Product names mentioned herein are used for identification purposes only and may be trademarks and/or registered trademarks of their respective companies.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Using this Manual

Audience and Scope

The NuPRO-A331 User's Manual is intended for hardware technicians and systems operators with knowledge of installing, configuring and operating industrial grade single board computers.

Manual Organization

This manual is organized as follows:

Preface: Presents important copyright notifications, disclaimers, trademarks, and associated information on the proper understanding and usage of this document and its associated product(s).

Chapter 1, Introduction: Introduces the NuPRO-A331, its features, specifications and mechanical drawing.

Chapter 2, Hardware Information: Provides information on board layout, connectors and jumpers for configuring the NuPRO-A331.

Chapter 3, Getting Started: Illustrates how to install components on the NuPRO-A331 such as CPU, heatsink, and memory modules.

Chapter 4, Driver Installation: Provides information on how to install the NuPRO-A331 device drivers.

Chapter 5, BIOS Setup: Describes basic navigation for the AMIBIOS®8 BIOS setup utility.

Appendix A, Watchdog Timer: Presents information on implementing the watchdog timer.

Appendix B, System Resources: Presents information on I/O mapping, IRQ routing, and resource allocation.

Important Safety Instructions: Presents safety instructions all users must follow for the proper setup, installation and usage of equipment and/or software.

Getting Service: Contact information for ADLINK's worldwide offices.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Conventions

Take note of the following conventions used throughout this manual to make sure that users perform certain tasks and instructions properly.


NOTE:

Additional information, aids, and tips that help users perform tasks.


CAUTION:

Information to prevent ***minor*** physical injury, component damage, data loss, and/or program corruption when trying to complete a task.


WARNING:

Information to prevent ***serious*** physical injury, component damage, data loss, and/or program corruption when trying to complete a specific task.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

This page intentionally left blank.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Table of Contents

NuPRO-A331 i

Revision History ii

Preface iii

Table of Contents vii

List of Figures xi

List of Tables xiii

1 Introduction 1

1.1 Overview 1
1.2 Features 2
1.3 Specifications 3
1.4 Block Diagram 5
1.5 Functional Description 6
1.6 Mechanical Drawing 8
1.7 I/O Connectivity 9
1.8 Power Consumption 10
1.9 Package Contents 14

2 Hardware Information 15

2.1 Rear Panel I/O Ports 15
2.2 Board Layout 18
2.3 Onboard Connectors 19
2.4 Jumpers 28

3 Getting Started 29

3.1 Installing the CPU 29
3.2 Installing the CPU Fan and Heatsink 33

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.3 Installing Memory Modules 34
3.4 Installing the Power Connectors 36

4 Driver Installation 37
4.1 Intel® Rapid Storage Technology Driver 37
4.2 Intel® Q57 Express Chipset Driver 38
4.3 Display Driver 38
4.4 Ethernet Driver 39
4.5 Intel® Rapid Storage Technology Utility 39
4.6 TPM Driver 40
4.7 ISA Driver 40
4.8 Audio Driver 41
4.9 Management Engine 41

5 BIOS Setup 43
5.1 Starting the BIOS 43
5.2 Main Setup 47
5.3 Advanced BIOS Setup 48
5.3.1 CPU Configuration 49
5.3.2 IDE Configuration 50
5.3.3 Super IO Configuration 51
5.3.4 Hardware Health Configuration 52
5.3.5 ACPI Settings 55
5.3.6 AHCI Configuration 56
5.3.7 Remote Access Configuration 57
5.3.8 Trusted Computing 59
5.3.9 USB Configuration 60
5.4 PCI/PnP Settings 62
5.4.1 IRQ/DMA 62
5.4.2 Enable ISA PnP Configuration 62
5.5 Boot Settings 63
5.5.1 Boot Settings Configuration 63
5.5.2 Boot Device Priority 65

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.5.3 Boot Device Groups 65
5.6 Security Setup 66
5.7 Chipset Setup 68
5.7.1 Graphics and Memory Configuration 69
5.7.2 PCH Configuration 70
5.8 Exit Menu 71

A Appendix: Watchdog Timer 73
A.1 Sample Code 73

B Appendix: System Resources 77
B.1 System Memory Map 77
B.2 Direct Memory Access Channels 77
B.3 IO Map 78
B.4 Interrupt Request (IRQ) Lines 79

Important Safety Instructions 85

Getting Service 87

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

This page intentionally left blank.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

List of Figures

Figure 1-1: NuPRO-A331 Block Diagram 5
Figure 1-2: NuPRO-A331 Board Dimensions 8
Figure 2-1: Rear Panel I/O Ports..... 15
Figure 2-2: Connectors and Jumpers..... 18

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

This page intentionally left blank.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

List of Tables

Table 1-1: NuPRO-A331 General Specifications 4
Table 1-2: NuPRO-A331 I/O Connectivity 9
Table 1-3: Core™ i7-860 Processor Power Consumption 10
Table 1-4: Core™ i5-660 Processor Power Consumption 11
Table 1-5: Core™ i3-540 Processor Power Consumption 12
Table 1-6: Pentium® G6950 Processor Power Consumption 13
Table B-1: System Memory Map 77
Table B-2: Direct Memory Access Channels 77
Table B-3: IO Map 78
Table B-4: IRQ Lines PIC Mode 79
Table B-5: IRQ Lines APIC Mode 81
Table B-6: PCI Configuration Space Map 83
Table B-7: PCI Interrupt Routing Map 84

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

This page intentionally left blank.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1 Introduction

1.1 Overview

The ADLINK NuPRO-A331 is a PICMG 1.0 Single Board Computer (SBC) supporting the next-generation Intel® Core™ i7/i5/i3 and Pentium® processors in LGA1156 package to deliver a scalable high performance platform for a wide array of industrial applications. The NuPRO-A331 supports 32nm and 45nm process CPUs at up to 3.33GHz with integrated graphics and memory controllers, Direct Media Interface (DMI) and Flexible Display Interface (FDI) connectivity to the Intel® Q57 Express Chipset. Dual-channel DDR3 1066/1333 MHz memory is supported up to a maximum of 8GB in two DIMM slots.

These advanced features, coupled with dual PCI Express®-based Gigabit Ethernet, PCI Express Mini Card slot and diverse I/O and storage make the NuPRO-A331 ideal for instrumentation and automation control applications.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.2 Features

- Supports Intel® Core™ i7/i5/i3 and Pentium® processors in LGA1156 package
- Integrated Intel® HD Graphics on dual core 32nm (Clarkdale) processors
- PCI Express Mini Card slot
- Dual Gigabit Ethernet
- 8x USB 2.0 ports (2x on bracket, 6x onboard)
- 6x SATA 3 Gb/s ports onboard
- 6x COM ports (including 2x RS-232/422/485/485+)
- Watchdog Timer, Hardware Monitor
- Optional HD audio kit (DB-Audio2 daughter board)
- TPM hardware security chip (optional)
- RoHS compliant


NOTE:

To purchase the optional DB-Audio2 daughter board, please contact your ADLINK sales representative.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.3 Specifications

System	
CPU	Intel® Core™ i7/i5/i3 and Pentium® Dual Core processors in LGA1156 package: • Intel® Core™ i7-860 Processor, 2.80 GHz, 8M Cache, 45nm, 95W, 4 cores/8 threads • Intel® Core™ i5-750 Processor, 2.66 GHz, 8M Cache, 45nm, 95W, 4 cores/4 threads • Intel® Core™ i5-660 Processor, 3.33 GHz, 4M Cache, 32nm, 73W, 2 cores/4 threads, HD Graphics • Intel® Core™ i3-540 Processor, 3.06 GHz, 4M Cache, 32nm, 73W, 2 cores/4 threads, HD Graphics • Intel® Pentium® G6950 Processor, 2.80 GHz, 3M Cache, 32nm, 73W, 2 cores/2 threads, HD Graphics
Chipset	• Intel® Q57 Platform Controller Hub
Memory	• Two 240-pin DIMM sockets support dual-channel 1066/1333MHz DDR3 (up to 8GB)
BIOS	• AMI BIOS in 64-Mbit SPI Flash
Audio	• Intel® High Definition Audio support via DB-Audio2 daughter board
Watch Dog Timer	• 1-255 second/minute programmable and can generate system reset.
Hardware Monitor	• CPU/System temperature, fan speed and onboard DC voltage
TPM	• Infineon SLB 9635 TT 1.2 (NuPRO-A331DV only)
Operating Systems	• Windows® XP, 7 32/64-bit, Server 2008; Fedora™ 12, Redhat Enterprise Linux 5

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

I/O Interfaces	
Serial ATA	• 6x SATA 3 Gb/s ports onboard
I/O Ports	• 2x USB 2.0 port on rear panel, 6x via onboard header • 6x serial ports via onboard pin-header (4x RS-232, 2x RS-232/422/485/485+) • 2x GbE RJ45 ports (1x GbE on NuPRO-A331LV) • VGA port (Dsub-15) • Optional DVI-D via onboard header to bracket (NuPRO-A331DV only) • PS/2 Keyboard/Mouse (onboard header) • 1 Parallel port
Expansion	• PCI 32bit/33MHz • PCI-to-ISA Bridge: IT8888 (DMA not supported) • PCI Express Mini Card slot
Display	
Integrated Graphics	• Integrated Intel® HD Graphics on dual core 32nm (Clarkdale) processors
External Graphics	• Onboard PCI Express Mini Card slot for optional mPCIe-8770
Ethernet	
Controller	• Dual Intel® 82574L Gigabit Ethernet Controllers • Supports Preboot Execution Environment (PXE), Wake-On-LAN
Ports	• Two RJ-45 Ethernet ports
Mechanical and Environment	
Form Factor	• Standard full-size PICMG 1.0 SBC
Dimensions	• 338 x 122 mm (L x W)
Operating Temp.	• 0ºC to 60ºC
Storage Temp.	• -20ºC to 80ºC
Relative Humidity	• 10% to 90% non-condensing
Safety	• CE, FCC Class A

Table 1-1: NuPRO-A331 General Specifications

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.4 Block Diagram

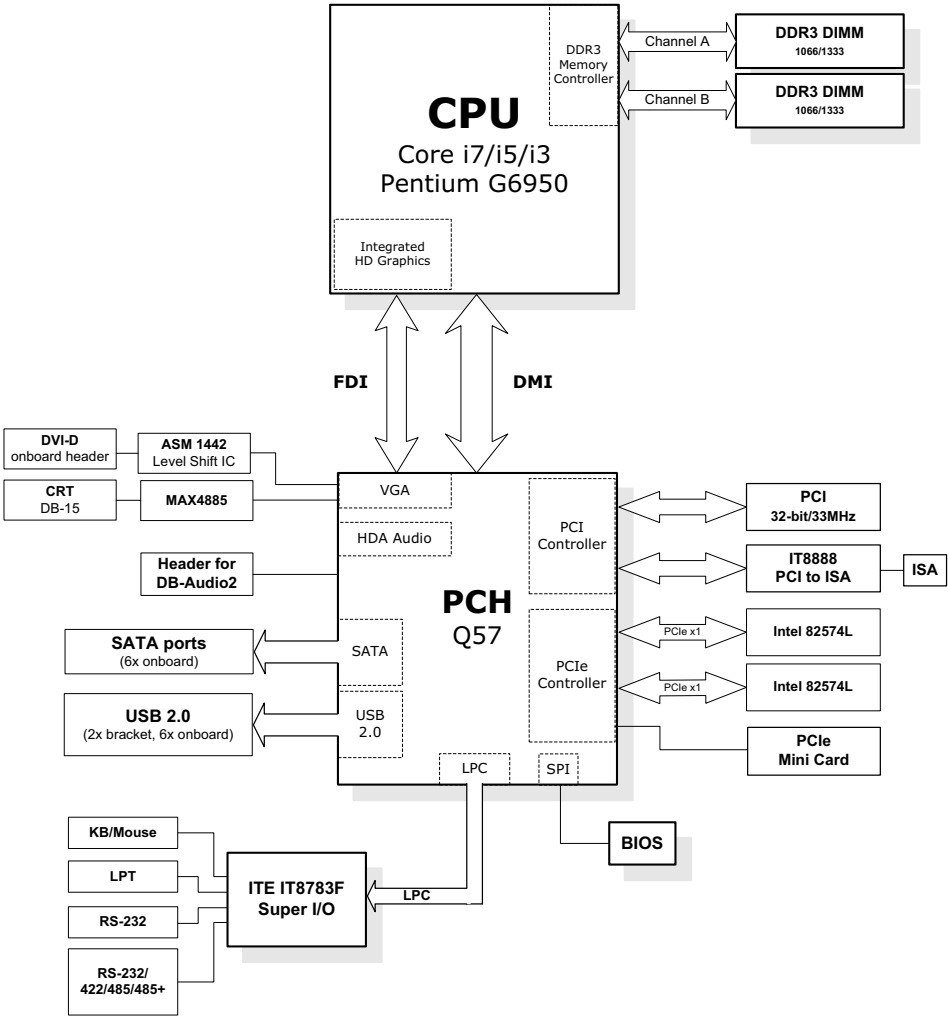


Figure 1-1: NuPRO-A331 Block Diagram

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.5 Functional Description

Processor Support

The NuPRO-A331 is a single processor design for the latest Intel Clarkdale (32nm) and Lynnfield (45nm) processors in LGA1156 socket (Intel® Core™ i7/i5/i3, Pentium® G6950). An integrated memory controller supports dual channel 1066/1333 MHz DDR3 and integrated Intel® HD Graphics is supported on dual core 32nm (Clarkdale) processors. Direct Media Interface (DMI) and Flexible Display Interface (FDI) provide connectivity to the Intel® Q57 Express Chipset.

Intel® Q57 Express Chipset

The Intel® BD82Q57 Platform Controller Hub (PCH) combines with the processor to provide a compact yet powerful 2-chip solution. Direct Media Interface (DMI) is the chip-to-chip connection between the processor and PCH. Intel® Flexible Display Interface carries display traffic from the integrated graphics in the processor to the legacy display connectors in the PCH. The PCH supports all other required interfaces including PCI Express, Serial ATA, USB 2.0, PCI, LPC, and SPI.

Dual-Channel DDR3 Memory

To meet the requirements of memory-intensive applications, the NuPRO-A331 has a dual-channel memory architecture supporting DDR3 1066/1333 MHz DIMMs. The key advantages of DDR3 are the higher bandwidth and the increase in performance at lower power than DDR2. DDR3 memory technology meets the requirements of the latest 3D graphics, multimedia, and network application, and boosts system performance by eliminating bottlenecks.

Gigabit Ethernet

The NuPRO-A331 utilizes two Intel® 82574L Gigabit Ethernet Controllers connected to the PCIe bus of the Q57 PCH. Wake-on-LAN and PXE are supported.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Serial ATA

The NuPRO-A331 provides six Serial ATA ports with data transfer rates of up to 3.0 GB/s. Intel® Rapid Storage Technology supports AHCI and RAID 0/1/5/10 functionality.

Universal Serial Bus (USB) 2.0

The NuPRO-A331 provides eight USB 2.0 ports supporting transfer speeds up to 480 Mbps. All ports are high-speed, fullspeed, and low-speed capable.

Hardware monitoring

A built-in, proactive hardware monitoring system in the Super I/O monitors the CPU temperature, system fan speed, and voltage levels to prevent overheating and/or component damage, effect timely failure detection, and ensure a stable supply of current for critical components.

Watchdog Timer

The watchdog timer (WDT) monitors system operations based on user-defined configurations. The WDT can be programmed for different time-out periods, such as from 1 to 255 seconds or from 1 to 255 minutes. The WDT generates a reset signal, then a reset request, after failure to strobe it within the programmed time period. A register bit may be enabled to indicate if the watchdog timer caused the reset event. The WDT register is cleared during the power-on sequence to enable the operating system to take appropriate action when the watchdog generates a reboot.

Trusted Platform Module

The NuPRO-A331 optionally supports TPM ver. 1.2 (Trusted Platform Module) for secure storage of keys, passwords and digital certificates. Systems supporting TPM offer improved hardware-based security in numerous applications, such as file and folder encryption, local password management, S-MIME e-mail, VPN and PKI authentication and wireless authentication for 802.1x and LEAP.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.6 Mechanical Drawing

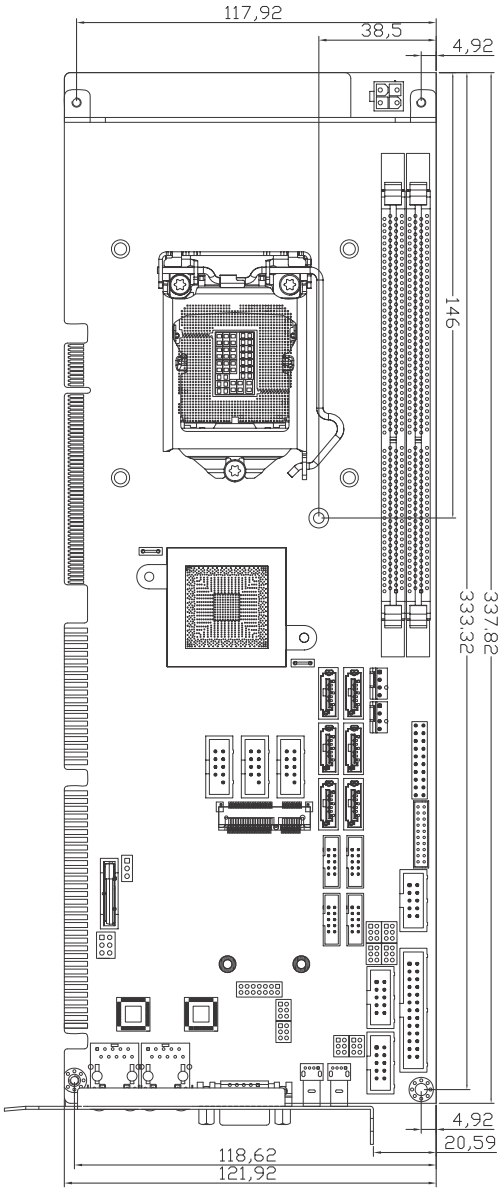


Figure 1-2: NuPRO-A331 Board Dimensions

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.7 I/O Connectivity

I/O	Bracket	Onboard	Golden Finger	Remarks
VGA	Y	—	—	DB-15
DVI	—	Y (DV only)	—	cable w/ bracket optional
LAN1/2 (RJ-45)	Y (LV: 1x LAN)	—	—	Act/Link/Speed LEDs
PS/2 KB/MS	—	Y	—	cable w/ bracket optional
USB Rear Panel	2	—	—	
USB headers	—	6	—	2.54” pitch
COM1-2	by cable w/ bracket	Y	—	2.54” pitch
COM3-6	by cable w/ bracket	Y	—	2.00" pitch
Parallel port	—	Y	—	—
SATA	—	6	—	—
PCIe Mini Card	—	Y	—	—
PCI 32bit/33MHz	—	—	Y	—
ISA	—	—	Y	—

Table 1-2: NuPRO-A331 I/O Connectivity

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.8 Power Consumption

Intel® Core™ i7-860 Processor, 2.80 GHz

Test Configuration	
CPU	Intel® Core™ i7-860 Processor, 2.80 GHz
Memory	ATP AQ56M64B8BJH9S 2GB DDR3 1333 2x 2GB in 2 DIMM slots
Graphics	Intel® Graphics Media Accelerator HD (Integrated)
SATA Channel 1	Seagate ST9160412AS Barracuda 7200.4 160GB
Power Supply	FSP FSP350-60PFG
Backplane	ADLINK HPCI-6S4

DOS (idle)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	3.041A	3.128A	13.98mA	—
Watts (W)	36.492	15.64	0.046	52.178
Windows XP, logon screen (idle)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	1.966A	2.779A	12.23mA	—
Watts (W)	23.592	13.895	0.040	37.527
Windows XP, Total System Stress (BurnIn Test 6.0)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	7.098A	3.768A	15.5mA	—
Watts (W)	85.176	18.84	0.051	104.067

Table 1-3: Core™ i7-860 Processor Power Consumption

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Intel® Core™ i5-660 Processor, 3.33 GHz

Test Configuration	
CPU	Intel® Core™ i5-660 Processor, 333 GHz
Memory	ATP AQ56M64B8BJH9S 2GB DDR3 1333 2x 2GB in 2 DIMM slots
Graphics	Intel® Graphics Media Accelerator HD (Integrated)
SATA Channel 1	Seagate ST9160412AS Barracuda 7200.4 160GB
Power Supply	FSP FSP350-60PFG
Backplane	ADLINK HPCI-6S4

DOS (idle)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	3.342	0.750	1.583	—
Watts (W)	40.10	3.75	5.23	49.08
Windows XP, logon screen (idle)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	1.602	0.730	1.572	—
Watts (W)	19.22	3.65	5.19	28.06
Windows XP, Total System Stress (BurnIn Test 6.0)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	3.360	1.199	1.644	—
Watts (W)	40.32	5.99	5.43	51.74

Table 1-4: Core™ i5-660 Processor Power Consumption

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Intel® Core™ i3-540 Processor, 3.06 GHz

Test Configuration	
CPU	Intel® Core™ i3-540 Processor, 3.06 GHz (2 cores)
Memory	Unigen MUUUDM8000ACELPAA DDR3 1333MHz 2x 1GB in 2 DIMM slots
Graphics	Integrated on CPU
SATA Channel 1	Seagate Barracuda 7200.10 160GB
Power Supply	LEMACS HG2-6350P 350W
Backplane	ADLINK EBP-5E1

DOS (idle)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	3.342	0.750	1.583	—
Watts (W)	40.10	3.75	5.23	49.08
Windows XP, logon screen (idle)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	1.602	0.730	1.572	—
Watts (W)	19.22	3.65	5.19	28.06
Windows XP, CPU Stress (Intel Power Thermal Utility)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	4.990	0.726	1.645	—
Watts (W)	59.88	3.63	5.43	68.94
Windows XP, Total System Stress (BurnIn Test 6.0)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	3.360	1.199	1.644	—
Watts (W)	40.32	5.99	5.43	51.74

Table 1-5: Core™ i3-540 Processor Power Consumption

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Intel® Pentium® G6950 Processor, 2.80 GHz

Test Configuration	
CPU	Intel® Pentium® G6950 Processor, 2.80 GHz (2 cores)
Memory	Unigen MUUUDM8000ACELPAA DDR3 1333MHz 2x 1GB in 2 DIMM slots
Graphics	Integrated on CPU
SATA Channel 1	Seagate Barracuda 7200.10 160GB
Power Supply	LEMACS HG2-6350P 350W
Backplane	ADLINK EBP-5E1

DOS (idle)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	3.030	0.751	1.640	—
Watts (W)	36.36	3.76	5.41	45.53
Windows XP, logon screen (idle)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	1.594	0.728	1.621	—
Watts (W)	19.13	3.64	5.35	28.12
Windows XP, CPU Stress (Intel Power Thermal Utility)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	4.522	0.722	1.635	—
Watts (W)	54.26	3.61	5.40	63.27
Windows XP, Total System Stress (BurnIn Test 6.0)				
Power Req.	+12V	+5V	+3.3V	Total
Current (A)	3.044	1.640	1.568	—
Watts (W)	36.53	8.20	5.17	49.90

Table 1-6: Pentium® G6950 Processor Power Consumption

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

1.9 Package Contents

Before unpacking, check the shipping carton for any damage. If the shipping carton and/or contents are damaged, inform your dealer immediately. Retain the shipping carton and packing materials for inspection. Obtain authorization from the dealer before returning any product to ADLINK.

- NuPRO-A331 SBC
- Driver DVD
- User Manual
- SATA data cable with latch x2
- 2-port USB cable w/ bracket
- 2-port COM cable w/ bracket for COM1/COM2 (2.54mm pitch)
- 2-port COM cable w/ bracket x2 for COM3-6 (2.00mm pitch)



The NuPRO-A331 must be protected from static discharge and physical shock. Never remove any of the socketed parts except at a static-free workstation. Use the anti-static bag shipped with the product to handle the board. Wear a grounded wrist strap when installing and/or servicing.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2 Hardware Information

This chapter provides information on the NuPRO-A331 board lay-out, connector pin assignments, and jumper settings.

2.1 Rear Panel I/O Ports

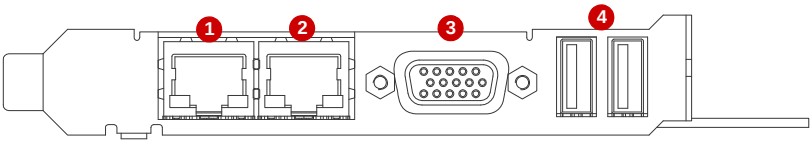
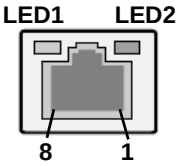


Figure 2-1: Rear Panel I/O Ports

	Connector	Description
1	LAN1 port	Gigabit Ethernet (RJ-45)
2	LAN2 port	Gigabit Ethernet (RJ-45)
3	VGA port	DB-15 connector for CRT or LCD monitor
4	USB 2.0 ports	High-speed USB 2.0 ports

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

LAN (RJ-45) Ports

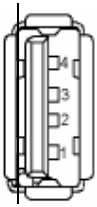


Pin #	10BASE-T/ 100BASE-TX	1000BASE-T
1	TX+	BI_DA+
2	TX-	BI_DA-
3	RX+	BI_DB+
4	--	BI_DC+
5	--	BI_DC-
6	RX-	BI_DB-
7	--	BI_DD+
8	--	BI_DD-

Refer to the table below for the LAN port LED definitions.

LED1		LED2	
Status	**Description**	**Status**	**Description**
Off	No Link	Off	10 Mb connection
On	Linked	Green	100 Mb connection
Blinking	Data Activity	Orange	1 Gb connection

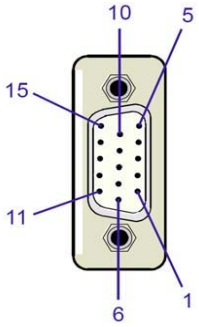
USB Connector



Pin #	Signal Name
1	Vcc
2	Data-
3	Data+
4	GND

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

VGA Port



Pin #	Signal
1	Red
2	Green
3	Blue
4	NC
5	Ground
6	Ground
7	Ground
8	Ground
9	+5 V
10	Ground
11	NC
12	DDC DAT
13	HSYNC
14	VSYNC
15	DDC CLK

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2.2 Board Layout

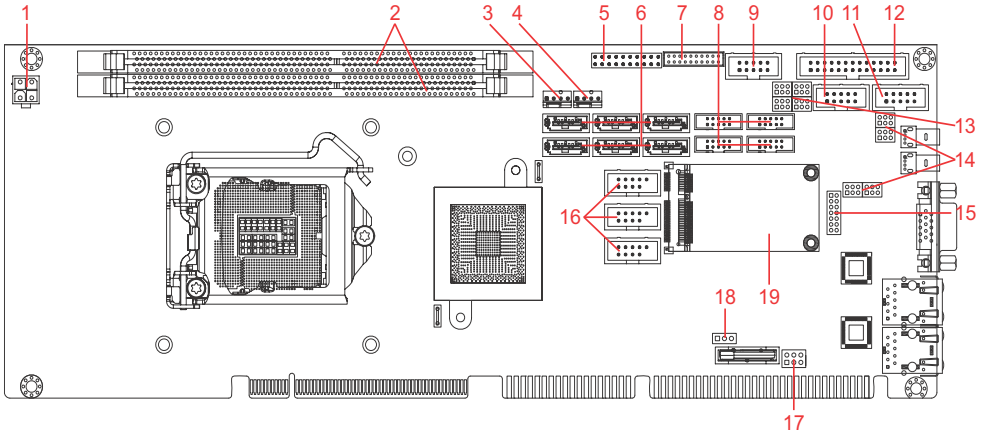


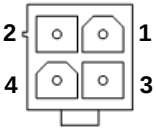
Figure 2-2: Connectors and Jumpers

	Connector	Description
1	CN1	ATX 12V Power connector
2	DIMM1/2	DDR3 DIMM slots
3	FAN1	FAN1 connector
4	FAN2	FAN2 connector
5	CN27	System Panel pin header
6	CN7/8/11/12/28/29	SATA connectors
7	CN2	DVI-D onboard connector
8	CN13/14/17/18	COM3/4/5/6 connector
9	CN26	Audio connector
10	CN10	COM2 connector
11	CN6	COM1 connector
12	CN5	Parallel Port connector
13	JP8-11	COM2 mode jumpers
14	JP1-4	COM1 mode jumpers
15	JP6	PCIe Mini Card VGA pin header
16	CN19/20/21	USB connectors
17	CN4	Keyboard/Mouse pin header
18	JBAT1	Clear CMOS
19	SLOT1	PCIe Mini Card slot

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2.3 Onboard Connectors

ATX 12V Power Connector (CN1)

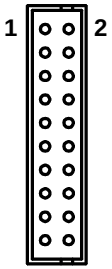


Pin #	Signal
1	GND
2	GND
3	+12V DC
4	+12V DC

NOTE: The ATX 12V power connector must be connected to provide sufficient power to the SBC in either ATX or AT modes. See “Installing the Power Connectors” on page 36.

DVI-D Onboard Connector(CN2)

(2x10 Wafer connector, 2.00mm pitch)

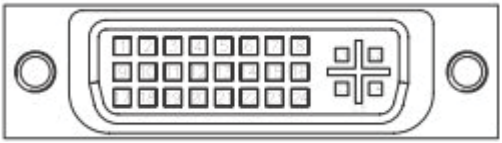


Pin #	Signal	Pin #	Signal
1	GND	2	GND
3	DVI-Clock+	4	DVI-Data0-
5	DVI-Clock-	6	DVI-Data0+
7	GND	8	GND
9	DVI-I2C-Clock	10	DVI-Data1-
11	DVI-I2C-Data	12	DVI-Data1+
13	GND	14	GND
15	DVI-HPD	16	DVI-Data2-
17	+5V	18	DVI-Data2+
19	GND	20	GND

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

DVI-D Bracket Connector

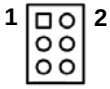
(optional cable w/ bracket, P/N 30-01052-2000)



Pin #	Signal	Pin #	Signal
1	TMDS Data2-	13	TMDS Data3+
2	TMDS Data2+	14	+5 V Power
3	TMDS Data2/4 Shield	15	GND
4	TMDS Data4-	16	Hot Plug Detect
5	TMDS Data4+	17	TMDS Data0-
6	DDC Clock [SCL]	18	TMDSData0+
7	DDC Data [SDA]	19	TMDS Data0/5 Shield
8	Analog vertical sync	20	TMDS Data5-
9	TMDS Data1-	21	TMDS Data5+
10	TMDS Data1+	22	TMDS Clock Shield
11	TMDS Data1/3 Shield	23	TMDS Clock +
12	TMDS Data3-	24	TMDS Clock -

PS/2 Keyboard/Mouse Pin Header (CN4)

(2x3 pin header, 2.54mm pitch)



Pin #	Signal	Pin #	Signal
1	KBDATA	2	KBCLK
3	MSDATA	4	MSCLK
5	KM_VCC	6	GND

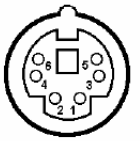
LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

PS/2 Keyboard/Mouse Bracket Connectors

(optional cable w/ bracket, P/N: 30-01019-2000)

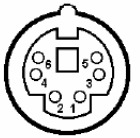
PS/2 Mouse Port (green)

Pin #	Signal	Function
1	MSDATA	Mouse Data
2	NC	not connected
3	GND	Ground
4	+5V	Power
5	CLK	Clock
6	NC	not connected



PS/2 Keyboard Port (purple)

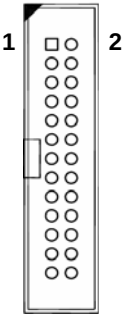
Pin #	Signal	Function
1	KBDATA	Keyboard Data
2	NC	not connected
3	GND	Ground
4	+5V	Power
5	CLK	Clock
6	NC	not connected



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Parallel Port Onboard Connector (CN5)

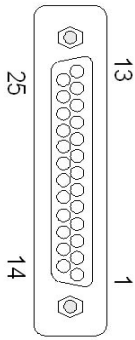
(2x13 box header, 2.54mm pitch)



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

Parallel Port Bracket Connector

(optional cable w/ bracket, P/N: 30-25004-0000)

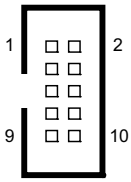


Pin #	Signal	Pin #	Signal
1	Line Printer Strobe	14	Auto-Feed
2	Parallel Data 0	15	Error
3	Parallel Data 1	16	Initialize
4	Parallel Data 2	17	Select
5	Parallel Data 3	18	Ground
6	Parallel Data 4	19	Ground
7	Parallel Data 5	20	Ground
8	Parallel Data 6	21	Ground
9	Parallel Data 7	22	Ground
10	Acknowledge	23	Ground
11	Busy	24	Ground
12	Paper Empty	25	Ground
13	Select		

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

COM1/2 Connector (RS-232/422/485/485+) (CN6/10)

(2x5 box header, 2.54mm pitch)

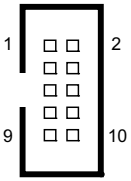


Pin #	RS-232	RS-422/485+	RS-485
1	DCD	TXD-	Data-
2	DSR	NC	NC
3	RXD	TXD+	Data+
4	RTS	NC	NC
5	TXD	RXD+	NC
6	CTS	NC	NC
7	DTR	RXD-	NC
8	RI	NC	NC
9	GND	GND	GND
10	NC	NC	NC

Note: See “COM1/2 Mode Jumper Settings” on page 28 for instructions on how to set COM1/2 to RS-232/422/485/485+ mode.

COM3/4/5/6 Connectors (RS-232) (CN18/17/14/13)

(2x5 box header, 2.00mm pitch)



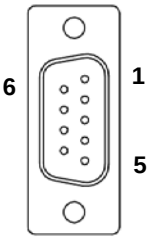
Pin #	RS-232 Signal
1	DCD
2	DSR
3	RXD
4	RTS
5	TXD
6	CTS
7	DTR
8	RI
9	GND
10	NC

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

COM Bracket Connectors

(cables w/ bracket supplied with the NuPRO-A331 - DB9 connector)

Pin #	RS-232	RS422/485+	RS485
1	DCD	TXD-	Data-
2	RXD	TXD+	Data+
3	TXD	RXD+	--
4	DTR	RXD	--
5	GND	GND	GND
6	DSR	--	--
7	RTS	--	--
8	CTS	--	--
9	RI	--	--



Serial ATA Connectors (CN7/8/11/12/28/29)

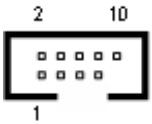
(7P L-connector, 1.27mm pitch)



Pin #	Signal
1	GND
2	TXP
3	TXN
4	GND
5	RXN
6	RXP
7	GND

USB 2.0 Connectors (CN19/20/21)

(2x5 box header, 2.54mm pitch)



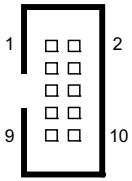
Pin #	Signal	Pin #	Signal
1	+5V	2	+5V
3	USB0-	4	USB1-
5	USB0+	6	USB1+
7	GND	8	GND
9	Key	10	NC

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

HD Audio Daughter Board Connector (CN26)

(2x5 box header, 2.54mm pitch)

This connector is designed for use with the ADLINK DB-Audio2 daughter board.



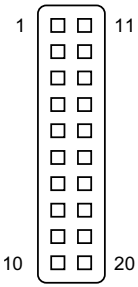
Pin #	Signal	Function
1	GND	Ground
2	AUD_BCLK	Audio Clock
3	GND	Ground
4	ICH_AUD_SDIN1	Audio Data Input
5	P5V	+ 5V
6	ICH_AUD_SDOUT	Audio Data Output
7	P5V_AUD	+ 5V
8	P3V3_DVDD	3.3V
9	AUD_SYNC	Audio Synchronous
10	AUD_RSTJ	Audio Reset

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

System Panel Pin Header (CN27)

(2x10 pin header, 2.54mm pitch)

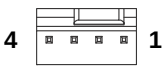
Connects to chassis-mounted buttons, speakers, and LEDs.



Pin #	Signal	Function	Pin Group
1	P5V	+5V Power	Power LED
2	NC		
3	HC_PLED-L	Power LED signal	
4	NC		
5	GND	Ground	
6	GND	Ground	ATX Power
7	NC		
8	ATX_PSON-L	ATX Power-On signal	
9	P5V_SB_ATX	+5V Standby	
10	PMEJ	Power Control signal	
11	HC_SPKR	Speaker signal	Chassis Speaker
12	NC		
13	NC		
14	P5V	+5V Power	
15	HC_RSTBN-L	Reset signal	Reset Button
16	GND	Ground	
17	HDLED_PWR	HDD LED signal	HDD LED
18	P5V	+5V Power	
19	HC_PBTNJ	Power-On signal	Power Button
20	GND	Ground	

Fan Connectors (FAN1/2)

(1x4 Wafer connector, 2.54mm pitch)



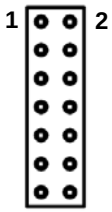
Pin #	Signal
1	GND
2	Fan power (+12V)
3	Fan Tachometer
4	Fan Speed Control

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

PCIe Mini Card VGA Pin Header(JP6)

(2x7 pin header, 2.00mm pitch)

This header is connected to the optional mPCIe-8770 to provide graphics output to the VGA connector on the rear panel.



Pin #	Signal	Pin #	Signal
1	NC	2	CRTDAT
3	NC	4	CRTCLK
5	GND	6	CRTR
7	GND	8	CRTG
9	GND	10	CRTB
11	GND	12	CRTHS
13	GND	14	CRTVS

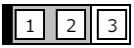
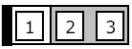
LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

2.4 Jumpers

Clear CMOS (JBAT1)

The CMOS RAM data contains the date/time and BIOS setting information. CMOS is powered by the onboard button cell battery. To erase the CMOS RAM data:

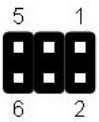
1. Power down and disconnect power from the system.
2. Short pins 2-3 on JP1.
3. Reconnect power and power up the system.
4. After power up, remove the jumper cap from pins 2-3 and reinstall it to pins 1-2.

RTC status	Connection	JBAT1
Normal	1 – 2	
Clear CMOS	2 – 3	

COM1/2 Mode Jumper Settings

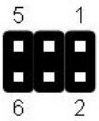
Short the jumper pins according to the following settings to set COM1/2 to RS-232/422/485/485+ mode.

COM1 (JP1-4)



	RS-232	RS-422	RS-485	RS-485+
JP1	-	1-3, 2-4	1-3, 2-4	3-5, 4-6
JP2	1-3, 2-4	3-5, 4-6	3-5, 4-6	3-5, 4-6
JP3	1-3, 2-4	3-5, 4-6	3-5, 4-6	3-5, 4-6
JP4	1-2	3-4	5-6	5-6

COM2 (JP8-11)



	RS-232	RS-422	RS-485	RS-485+
JP11	-	1-3, 2-4	1-3, 2-4	3-5, 4-6
JP9	1-3, 2-4	3-5, 4-6	3-5, 4-6	3-5, 4-6
JP10	1-3, 2-4	3-5, 4-6	3-5, 4-6	3-5, 4-6
JP8	1-2	3-4	5-6	5-6

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3 Getting Started

This chapter provides information on how to install components on the NuPRO-A331 SBC.

3.1 Installing the CPU

The NuPRO-A331 supports an Intel® Core™ i7/i5/i3 or Pentium® processor in an LGA1156 socket.

WARNING:

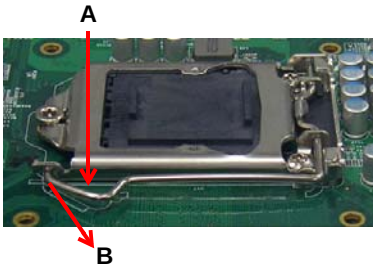
Disconnect all power to the board before installing a CPU to prevent damaging the board and CPU.

Do not touch socket contacts. Damaging the contacts voids the product warranty. Follow the installation instructions carefully to avoid damaging the board components.



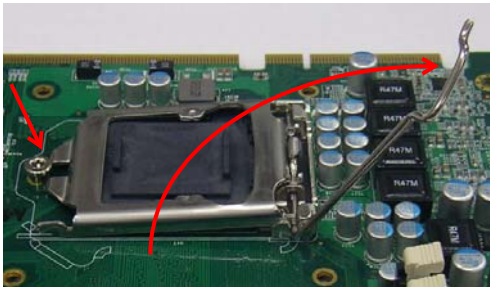
To install the CPU:

1. Press down on the locking arm (A), then push it away from the socket to disengage it from the retention tab (B).

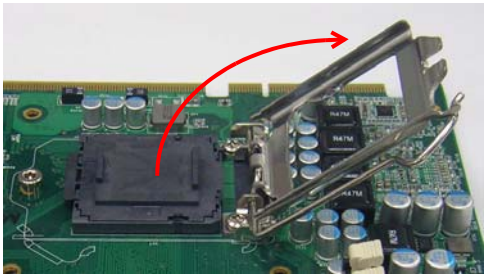


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

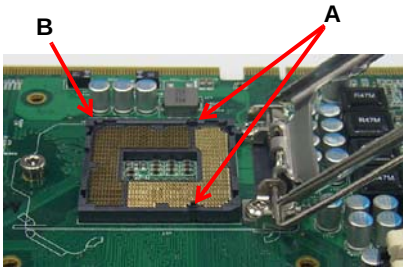
2. Raise the locking arm to unlock the load plate.



3. Lift the load plate to uncover the socket.

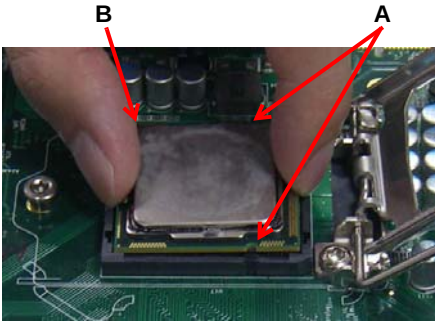


4. Remove the plastic protective cover from the socket. Note the locations of the alignment keys (A) and Pin 1 indicator (B).



WARNING: DO NOT touch socket contacts.

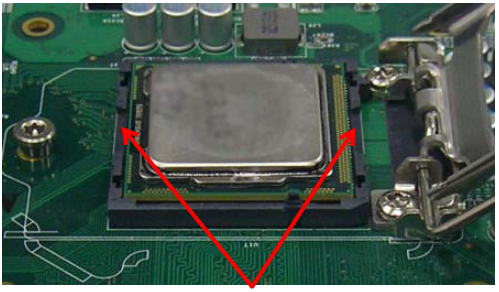
5. Hold the CPU using thumb and forefinger as shown. Position the CPU over the socket, matching the notches on the sides of the CPU with the alignment keys on the socket (A). The golden triangle on the CPU must be positioned at the corner of the socket with the Pin 1 indicator as shown (B).



WARNING:

The CPU fits into the socket in only one orientation. DO NOT force it into the socket to avoid causing damage.

6. Carefully place the CPU into the socket vertically. The socket has cutouts for your fingers to fit into.



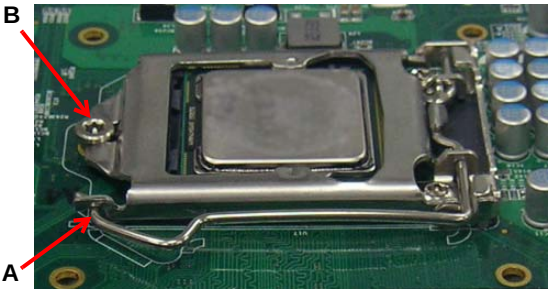
Cutouts

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

7. Gently lower the load plate. Make sure the front edge of the plate is under the screw as indicated.



8. Lower the locking arm and fasten it to the retention tab (A). The load plate should be locked underneath the screw as shown (B)..



Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.2 Installing the CPU Fan and Heatsink



The CPU requires a chassis with an airflow inlet and maximum internal ambient temperature of 60° C. An approved CPU heatsink and fan must be installed before using the SBC. Failure to install a CPU fan and heatsink may damage the system host board and/or the CPU.

When the CPU fan installation procedures presented here are inconsistent with the installation procedures you obtained from the CPU fan and heatsink package, follow the latter.

To install the CPU fan:

1. Apply thermal grease evenly on top of the installed CPU.
2. Lower the CPU fan to the CPU, then secure it using the provided attachments or screws.
3. Connect the CPU fan cable to the CPU fan connector on the SBC labeled FAN1 (see “Board Layout” on page 18).

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3.3 Installing Memory Modules

The NuPRO-A331 supports up to 8 GB of DDR3 1066/1333 MHz memory modules in two DIMM sockets. A DDR3 module has a 240-pin footprint compared to the legacy 184-pin DDR DIMM. DDR3 modules are notched to facilitate correct installation in the DIMM sockets.

WARNING:

Disconnect all power to the board before installing a memory module to prevent damaging the board and memory module .

Memory Configuration Options

The NuPRO-A331 supports 1GB, 2GB and 4GB unbuffered non-ECC DDR3 DIMMs in the following configurations:

- Channel A: DIMM1
  Channel B: DIMM2
- For dual-channel configuration, the total size of memory module installed per channel must be the same (DIMM1 = DIMM2).
- It is recommended that you install DIMMs with the same CAS latency. For maximum compatibility, install memory modules with the same brand, model, and/or rating.

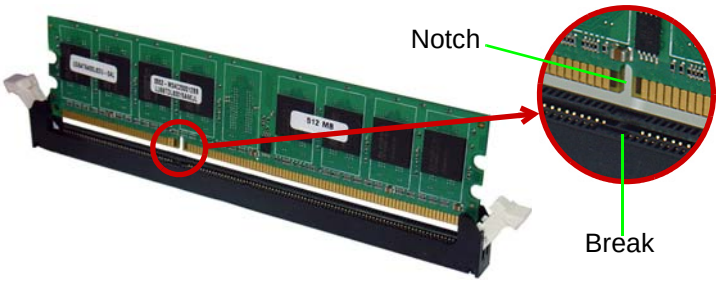
To install a memory module:

1. Locate the DIMM sockets on the motherboard.
2. Press the socket's retaining clips outward to unlock.

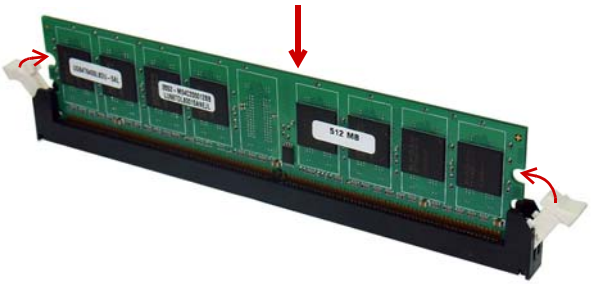


LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

3. Align the memory module on the socket making sure that the notch matches the break on the socket.



4. Insert the module firmly into the slot until the retaining clips snap back inwards and the module is securely seated.



3.4 Installing the Power Connectors

Refer to **Section 2.2 Board Layout** on page 18 and **Section 2.3 Onboard Connectors** on page 19 for detailed information on connectors and pin definitions referred to below.

ATX 12V Power Connector

The NuPRO-A331 requires +12V DC power connected to CN1 for proper operation in either ATX or AT modes. If necessary, order a ATX12V Convert Cable from ADLINK for use with Molex 4-pin power connectors (P/N 30-00006-0000).

Front Panel Connector

Before powering up the NuPRO-A331, connect the necessary signals from the backplane to the System Panel pin header (CN27). The ATX Power Connector pin group (pins 6, 8, 9, 10) and Power Button pin group (pins 19, 20) must be connected for the system to power up in ATX mode.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4 Driver Installation

This chapter provides information on how to install the NuPRO-A331 device drivers under Windows XP 32-bit. The device drivers are located in the following ADLINK All-in-One DVD directories:

Chipset	\NuPRO\NuPRO-A331\Chipset\
Display	\NuPRO\NuPRO-A331\VGA\ \Add-On Card\mPCIe-8770\
Ethernet	\NuPRO\NuPRO-A331\Ethernet\
TPM	\NuPRO\NuPRO-A331\TPM\
.Net Framework	\NuPRO\NuPRO-A331\Others\
Rapid Storage	\NuPRO\NuPRO-A331\Others\
ISA	\NuPRO\NuPRO-A331\ISA
Audio	\Audio Daughter Board\DB-Audio2\

Install the Windows operating system before installing any driver. Most standard I/O device drivers are installed during Windows installation.


NOTE:

In order to enable RAID or AHCI mode, you must pre-install the Intel® Rapid Storage Technology driver during the Windows installation process. using the F6 installation method.

4.1 Intel® Rapid Storage Technology Driver

1. Create a floppy image as described in the F6Readme.txt file contained in **X:\NuPRO\NuPRO-A331\Others\ F6_SATA_Floppy_Install_Image_9.6.0.1014_Windows7_XP_32.zip.**
2. During Windows installation, press **F6** when you see the message "*Press F6 if you need to install a third party SCSI or RAID driver.*" Then press **S** to *Specify Additional Device*.
3. Insert the floppy disk and follow the remaining instructions. Leave the disk in until the system has rebooted and copied the necessary files, then remove the disk.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4.2 Intel® Q57 Express Chipset Driver

This section describes the installation of the Intel® Q57 Express chipset driver.

1. Locate the directory **X:\NuPRO\NuPRO-A331\Chipset** on the ADLINK All-in-One DVD, and extract the contents of the following archive:
   Intel Chipset Device Software_All OS_9.1.2.1007.zip.
2. Run the program **setup.exe** and follow the onscreen instructions. Restart the system if prompted.

4.3 Display Driver

Integrated Intel® HD Graphics

This section describes the driver installation for the Integrated Intel® HD Graphics on dual core 32nm (Clarkdale) processors.

Before installing the graphics driver, first install **Microsoft .NET Framework 3.5 SP1** (not required for Windows 7).

1. Locate the directory **X:\NuPRO\NuPRO-A331\Others** on the ADLINK All-in-One DVD, and extract the contents of the following archive: **Microsoft_Net_Framework_v3.5_SP1.zip**
2. Run the program
   Microsoft_Net_Framework_v3.5_SP1.exe and follow the onscreen instructions.Restart the system if prompted.

Follow these instructions to install the graphics driver:

1. Locate the directory **X:\NuPRO\NuPRO-A331\VGA** on the ADLINK All-in-One DVD, and extract the contents of the following archive:
   Intel_ Graphics Driver_6.14.10.5268_Windows XP_32.zip.
2. Run the program **setup.exe** and follow the onscreen instructions. Restart the system if prompted.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

mPCIe-8770 Graphics Card

This section describes the driver installation for the mPCIe-8770 graphics card.

Follow these instructions to install the display driver:

1. Locate the directory **X:\NuPRO\NuPRO-A331\Add-On Card\mPCIe-8770** on the ADLINK All-in-One DVD, and extract the contents of the following archive: **mPCIe-8770_VGA_driver_Z11_All_WinOS_v6.14.10.1130.zip**.
2. Run the program **xgirun.exe** and follow the onscreen instructions. Restart the system if prompted.

4.4 Ethernet Driver

Follow these instructions to install the Ethernet driver.

1. Locate the directory **X:\NuPRO\NuPRO-A331\Ethernet** on the ADLINK All-in-One DVD, and extract the contents of the following archive: **Network Adapter Driver_15.4.1_Windows XP_32.zip**.
2. Run the program **Network Adapter Driver_15.4.1_Windows XP_32.exe** and follow the onscreen instructions. Restart the system if prompted.

4.5 Intel® Rapid Storage Technology Utility

Follow these instructions to install the Intel® Rapid Storage Technology utility.

1. Locate the directory **X:\NuPRO\NuPRO-A331\Others** on the ADLINK All-in-One DVD, and extract the file the contents from the following archive: **Intel_Rapid_Storage_Technology_All_WinOS_v9.6.0.1014.zip**.
2. Run the program **Intel_Rapid_Storage_Technology_All_WinOS_9.6.0.1014.exe** and follow the onscreen instructions. Restart the system if prompted.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4.6 TPM Driver

Follow these instructions to install the TPM driver (not required for Windows 7).

1. Locate the directory **X:\NuPRO\NuPRO-A331\TPM** on the ADLINK All-in-One DVD, and extract the contents of the following archive: **ST_TPM_All_WinOS_v3.5.SP1.zip**.
2. Run the program **\win32\setup.exe** and follow the onscreen instructions. Restart the system if prompted.

4.7 ISA Driver

Follow these instructions to install the ISA driver (not required for Windows 7).

1. Open the **Device Manager** on your system.
2. Right click on '**Other PCI Bridge Devices**'.
3. A dialog box will appear. Select '**Update Driver...**'
4. The '**Hardware Update Wizard**' dialog box will open. Read the instructions and then click option 3, '**No, not this time**', then click '**Next**' to continue.
5. The next screen will prompt you to search for the location of the driver for your device. Click option 2, '**Install from a list or specific location (Advanced)**' and then click '**Next**'.
6. Locate the following folder on the ADLINK All-in-One DVD: **X:\NuPRO\NuPRO-A331\ISA.** Press '**Next**' to install the **ite.inf** file.
7. After successfully installing the files, the '**Hardware Update Wizard**' will display the '**Completing the Hardware Update Wizard**' screen. Click '**Finish**'.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

4.8 Audio Driver

Follow these instructions to install the audio driver for the optional DB-Audio2 daughter board.



Before installing the audio driver, check the BIOS settings to make sure that audio is enabled: **Chipset > PCH Configuration > HDA Controller** (see “PCH Configuration” on page 70).

1. Place the ADLINK All-in-One DVD to the optical drive.
2. Locate the audio driver from the directory **X:\Audio Daughter Board\DB-Audio2**, then double-click on the **setup.exe** file to start installation.
3. Follow the screen instructions to complete installation, then restart the system if prompted.

4.9 Management Engine

After installing all required drivers, Windows Device Manager will show one device without a driver: **PCI Simple Communications Controller**. This device is the Intel Active Management Technology Management Engine. Intel Active Management Technology is not supported by the NuPRO-A331, but the driver can be installed in order to remove the “question mark” from the Device Manager.

Follow these instructions to install the Intel® Active Management Technology driver.

1. Locate the directory **X:\NuPRO\NuPRO-A331\Others** on the ADLINK All-in-One DVD, and extract the contents of the following archive: **Intel_Management_Engine_Interface_SOL_driver_All_WinOS.zip**.
2. Run the program **\ME_Drivers\MEI_SOL_Installer\Setup.exe** and follow the onscreen instructions. Restart the system if prompted.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

This page intentionally left blank.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5 BIOS Setup

The following chapter describes basic navigation for the AMIBIOS®8 BIOS setup utility.

5.1 Starting the BIOS

To enter the setup screen, follow these steps:

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 main BIOS setup menu displays. You can access the other setup screens from the main BIOS setup menu, such as Chipset and Power menus.



Note: In most cases, the < Delete > key is used to invoke the setup screen. There are several cases that use other keys, such as < F1 >, < F2 >, and so on.

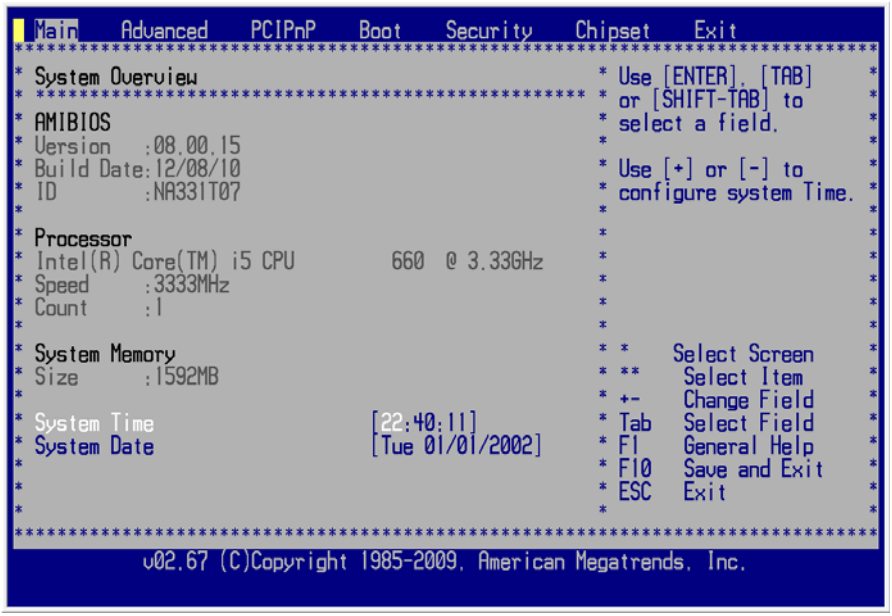
LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Setup Menu

The 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" options cannot be configured, "Blue" options 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.

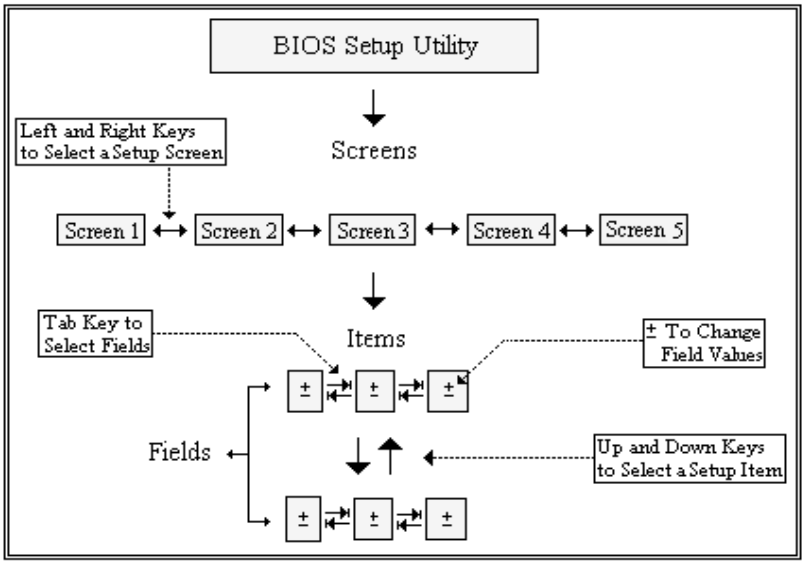


Navigation

The BIOS setup/utility uses a key-based navigation system called hot keys. Most of the 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. .

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



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

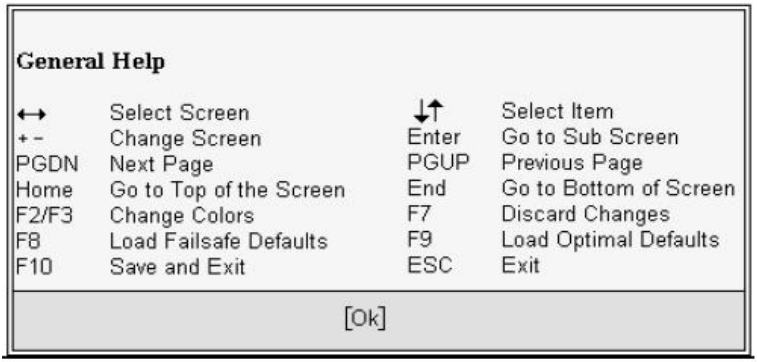
The < F8 > key on your keyboard is the Fail-Safe key. It is not displayed on the key legend by default. To set the Fail-Safe settings of the BIOS, press the < F8 > key on your keyboard. It is located on the upper row of a standard 101 keyboard. The Fail-Safe settings allow the motherboard to boot up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

Hotkey Descriptions

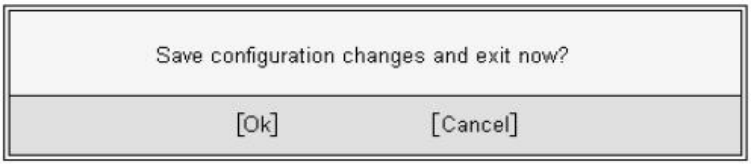
F1 The < F1 > key allows you to display the General Help screen.

Press the < F1 > key to open the General Help screen.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

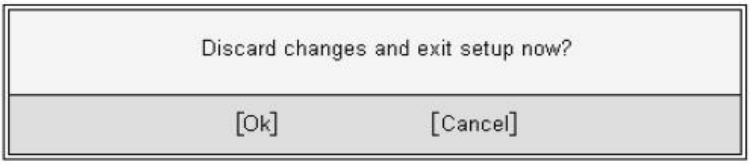


F10 The < F10 > key allows you to save any changes you have made and exit Setup. Press the < F10 > key to save your changes. The following screen will appear:



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 Setup. Press the < Esc > key to exit the setup without saving your changes. The following screen will appear:



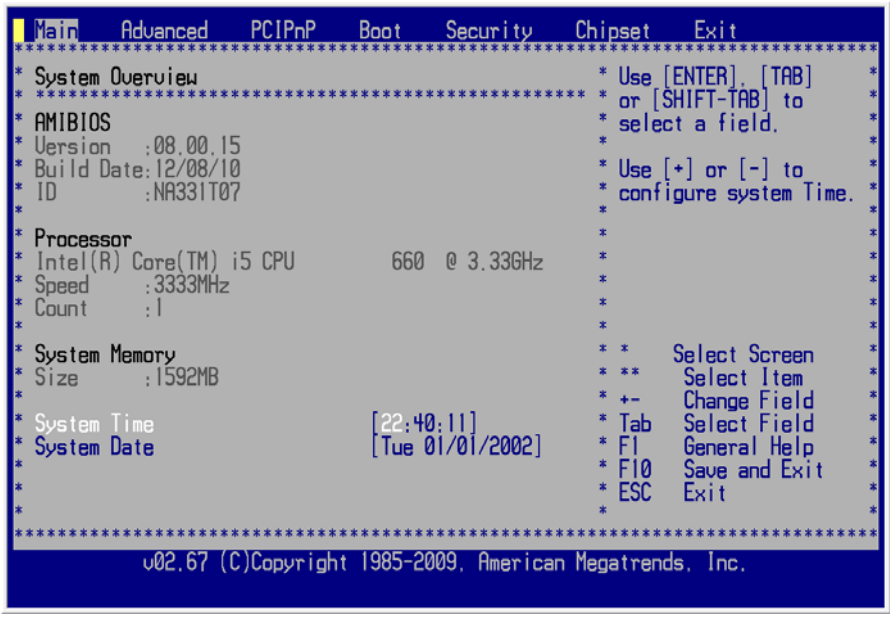
Press the < Enter > key to discard changes and exit. You can also use the < Arrow > key to select Cancel and then press the < Enter > key to abort this function and return to the previous screen.

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.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.2 Main Setup

When you first enter the 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 using 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.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.3 Advanced BIOS Setup

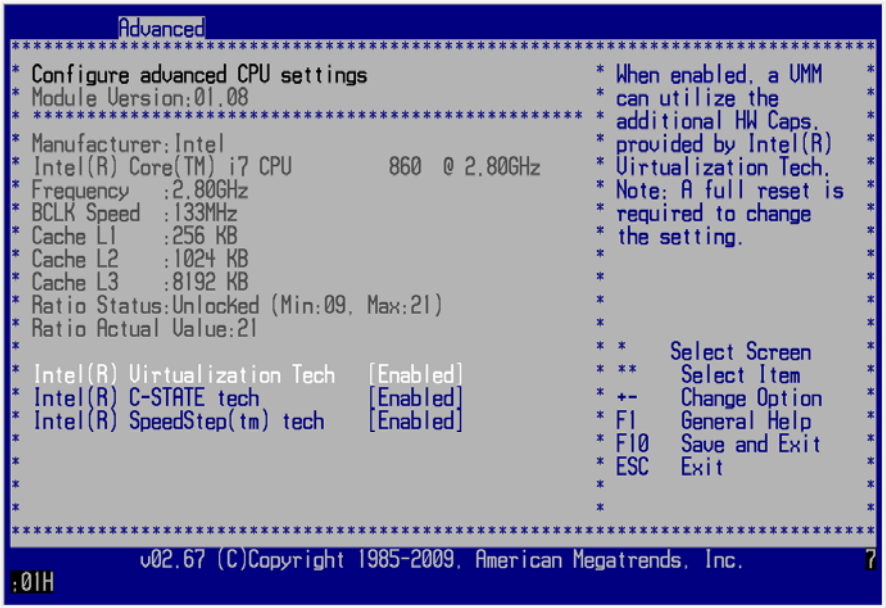
Select the Advanced tab from the setup screen to enter the Advanced BIOS Setup screen. You can select any of the items in the left frame of the screen, such as SuperIO Configuration, to go to the submenu for that item. You can display an Advanced BIOS Setup option by highlighting it using the < Arrow > keys. The Advanced BIOS Setup screen is shown below.

The sub-menus are described on the following pages.



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.3.1 CPU Configuration



Intel® Virtualization Tech

When enabled, Intel® Virtualization Technology (Intel® VT) makes a single system appear as multiple independent systems to software. This allows for multiple, independent operating systems to be running simultaneously on a single system.

Intel® C-STATE Tech

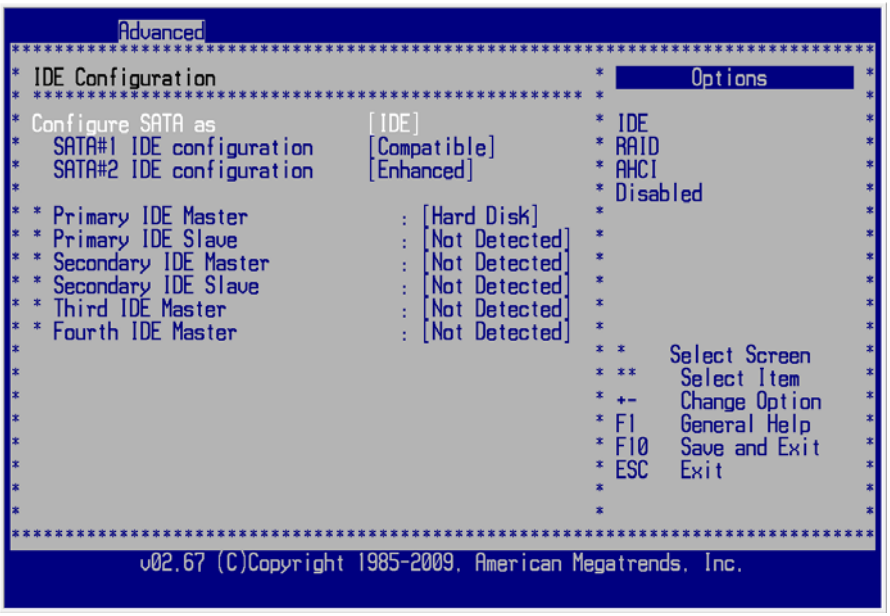
C-states are processor power states within the S0 system state that provide for various levels of power savings.

Intel® SpeedStep™ Tech

This option allows you to enable or disable Intel® SpeedStep Technology.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.3.2 IDE Configuration



Configure SATA as

Options: IDE, RAID, AHCI, Disabled

SATA#1 IDE Configuration

When running in Compatible mode, SATA channels 1, 2, 3 and 4 can be configured as legacy IDE channels.

SATA#2 IDE Configuration

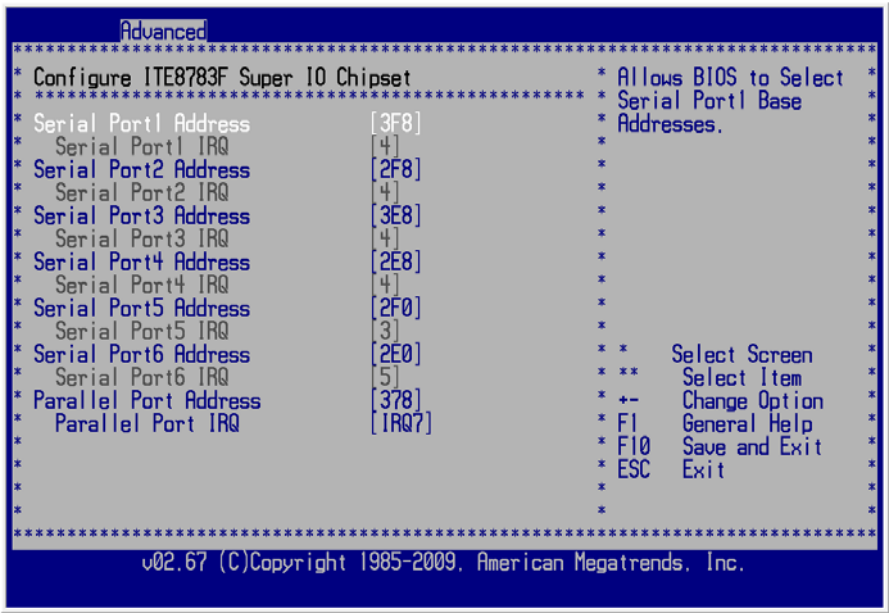
When running at compatible mode, SATA channels 5 and 6 can be configured as legacy IDE channels.

IDE Master/Slave

Select one of the hard disk drives to configure it. Press < Enter > to access its submenu.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.3.3 Super IO Configuration



Serial Port1-6 Address/IRQ

Specifies the serial port addresses. The options are:

- Port1-2: 3F8, 2F8, 3E8, 2E8, Disabled
- Port3-6: 3F8, 2F8, 3E8, 2E8, 2F0, 2E0, Disabled

IRQ settings are fixed as shown.

Parallel Port Address/IRQ

This option specifies the base I/O port address and IRQ of the parallel port.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.3.4 Hardware Health Configuration

This option displays the current status of all of the monitored hardware devices/components such as voltages and temperatures. The options are Enabled and Disabled.

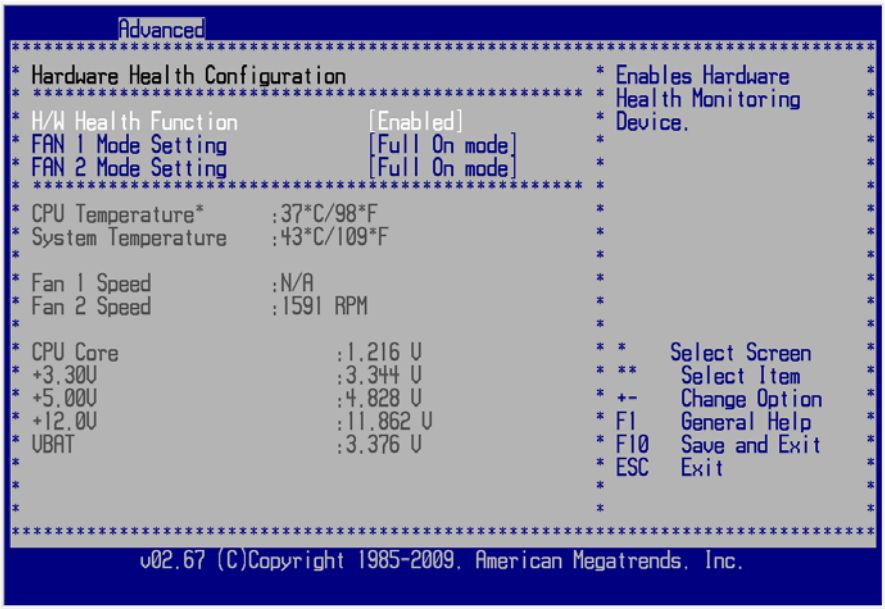
H/W Health Function

Select this option to enable or disable the BIOS Hardware Health Monitoring Device.

Fan 1/2 Mode Setting

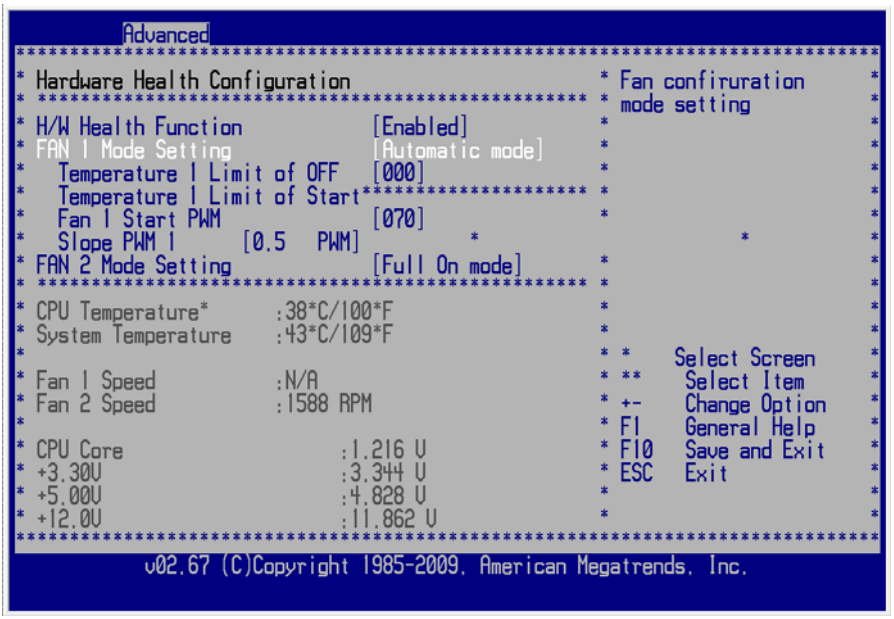
Three modes are provided for each fan: Full On mode, Automatic mode, and PWM Manually mode. Full On mode runs the fan at full speed. Automatic mode is Smart Fan mode. PWM Manually mode runs the fan at the set speed.

Full On Mode



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Automatic Mode



Temperature 1 Limit of OFF

When the temperature (°C) is higher than the set value, Fan1/2 will run at Start PWM speed. When the temperature is lower than the set value, Fan1/2 will stop.

Temperature 1 Limit of Start

When the temperature (°C) is higher than the set value, Fan1/2 will increase its speed by Slope PWM 1 value.

Fan 1/2 Start PWM

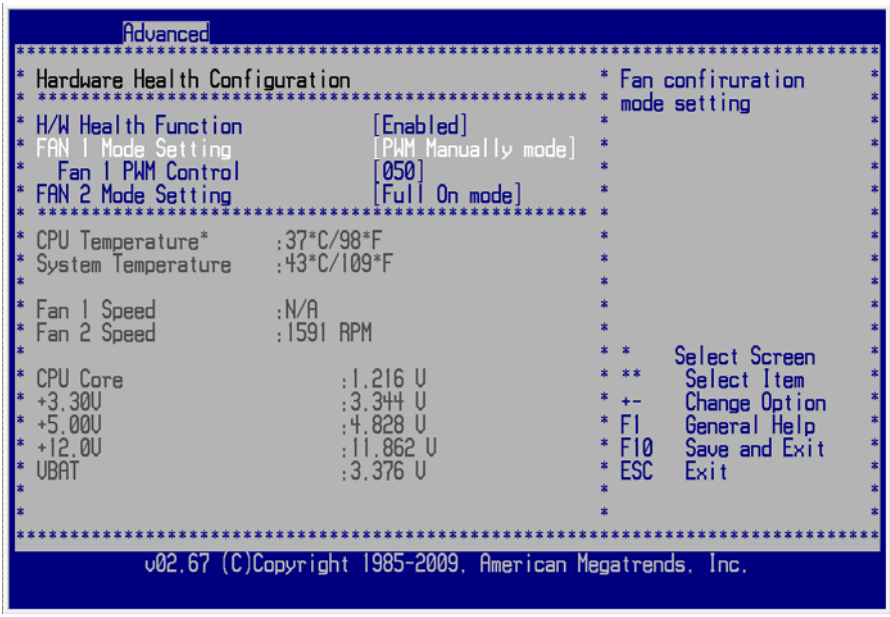
Sets a value to control the fan speed between Limit of OFF and Limit of Start. Minimum is 0 and Maximum is 127.

Slope PWM 1/2

The Slope PWM Value sets the rate of increase the fan speed when the temperature is above Limit of Start.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

PWM Manually Mode

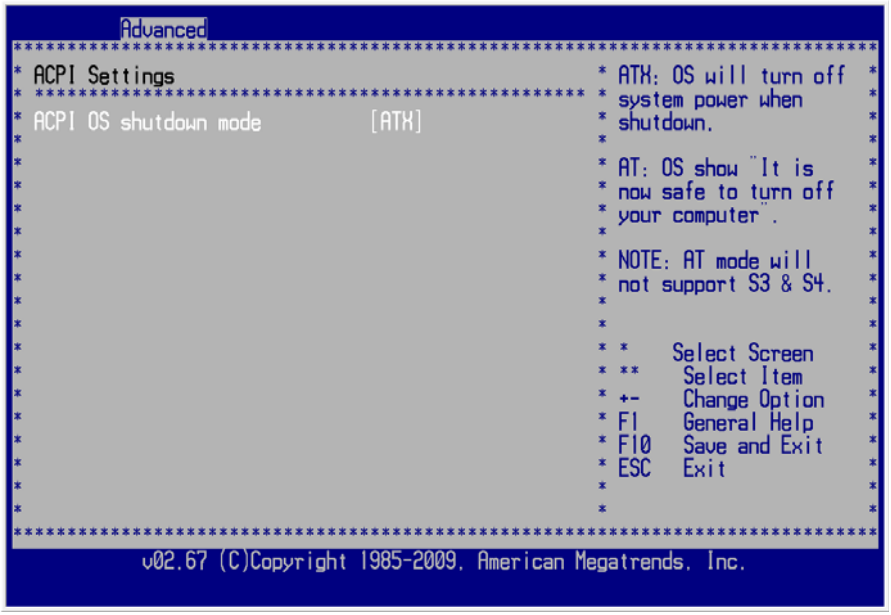


Fan 1/2 PWM Control

Sets a value to control the fan speed. Minimum is 0 and Maximum is 127.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.3.5 ACPI Settings



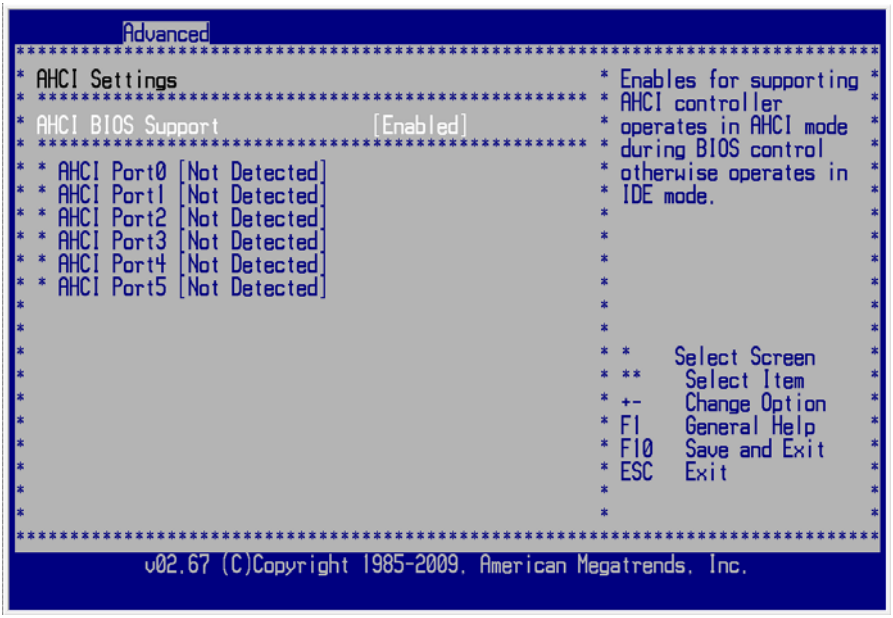
ACPI OS Shutdown Mode

This option sets the OS shutdown mode to ATX or AT. ATX: OS will turn off system power when shutdown. AT: OS will display “It is now safe to turn off your computer."

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.3.6 AHCI Configuration

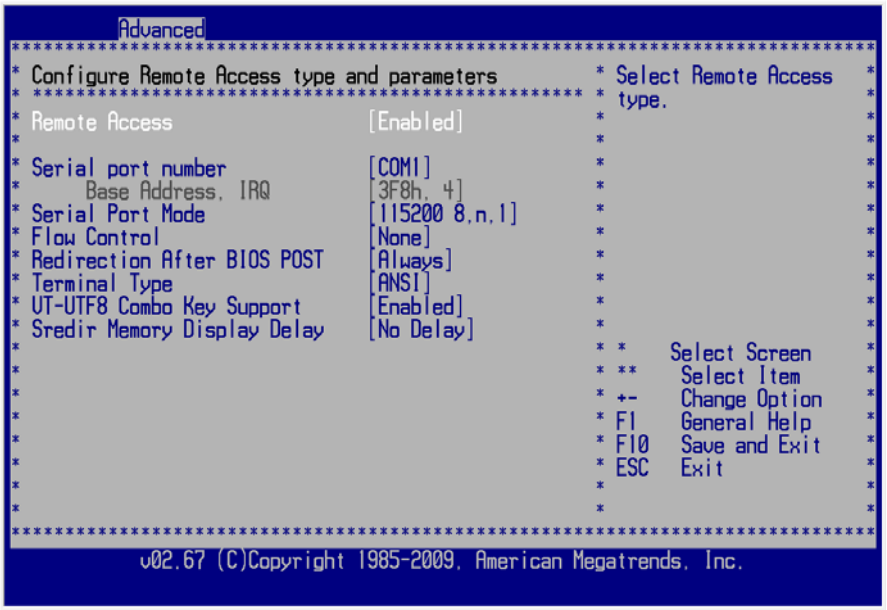
You can use this screen to select options for the AHCI Settings. Use the up and down < Arrow > keys to select an item. Use the < + > and < - > keys to change the value of the selected option.



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.3.7 Remote Access Configuration

Remote access configuration provides the settings to allow remote access by another computer to get POST messages and send commands through serial port access.



Remote Access

Select this option to enable or disable the BIOS remote access feature.

NOTE: Enabling Remote Access requires a dedicated serial port connection. When the assigned serial port is disabled, Remote Access should also be disabled to prevent the system from booting abnormally.

Serial Port Number

Select the serial port you want to use for the remote access interface. You can set the value for this option to COM1 or COM2.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Serial Port Mode

Select the baud rate you want the serial port to use for console redirection. The options are 115200 8,n,1; 57600 8,n,1; 19200 8,n,1; and 09600 8,n,1.

Flow Control

Set this option to select Flow Control for console redirection. The settings for this value are None, Hardware, or Software.

Redirection After BIOS POST

This option allows you to set Redirection configuration after BIOS POST. The settings for this value are Disabled, Boot Loader, or Always.

- **Disabled:** Set this value to turn off the redirection after POST
- **Boot Loader:** Set this value to allow the redirection to be active during POST and Boot Loader.
- **Always:** Set this value to allow the redirection to be always active.

Terminal Type

This option is used to select either VT100/VT-UTF8 or ANSI terminal type. The settings for this value are ANSI, VT100, or VT-UTF8.

VT-UTF8 Combo Key Support

This option enables VT-UTF8 Combination Key Support for ANSI/VT100 terminals. The settings for this value are Enabled or Disabled.

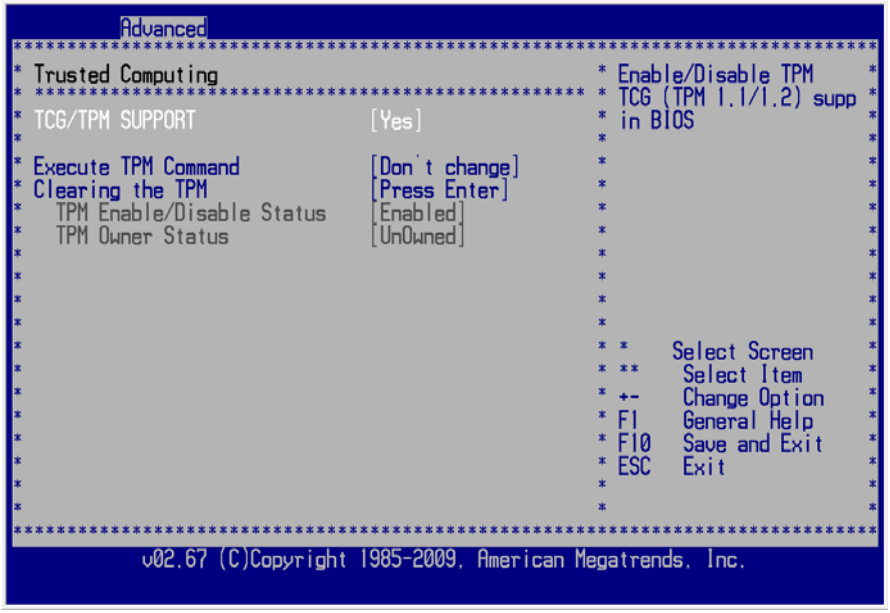
Sredir Memory Display Delay

This option gives the delay in seconds to display memory information. The options for this value are No Delay, Delay 1 Sec, Delay 2 Sec, or Delay 4 Sec.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.3.8 Trusted Computing

Trusted computing is an industry standard to make personal computers more secure through a dedicated hardware chip, called a Trusted Platform Module (TPM). This submenu provides allows you to enable/disable, execute and clear the TPM.



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.3.9 USB Configuration



Legacy USB Support

Legacy USB Support refers to USB mouse and keyboard support. Normally if this option is not enabled, any attached USB mouse or USB keyboard will not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there are no USB drivers loaded on the system. Set this value to enable or disable the Legacy USB Support.

- **Disabled:** Set this value to prevent the use of any USB device in DOS or during system boot.
- **Enabled:** Set this value to allow the use of USB devices during boot and while using DOS.
- **Auto:** This option auto detects USB Keyboards or Mice and if found, allows them to be utilized during boot and while using DOS.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

USB 2.0 Controller Mode

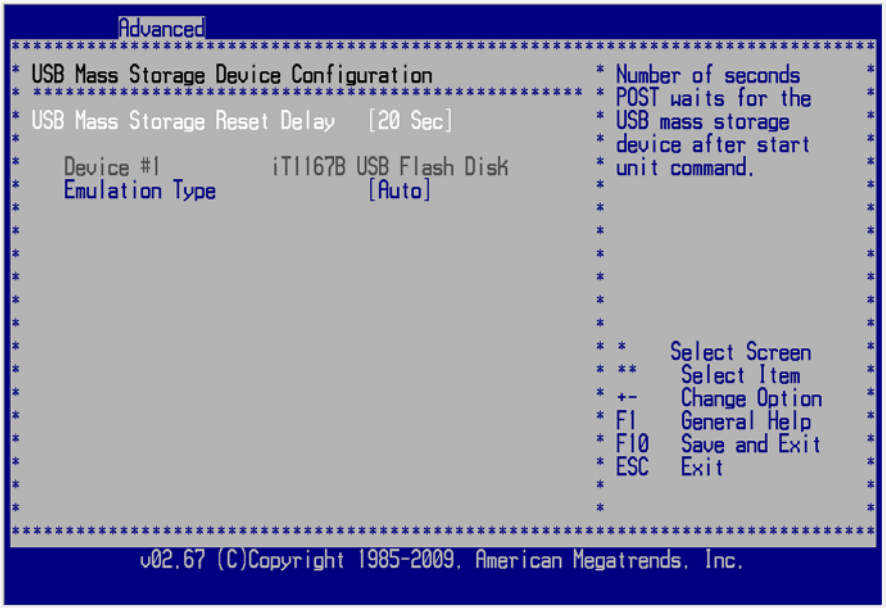
The USB 2.0 Controller Mode configures the data rate of the USB port. The options are FullSpeed (12 Mbps) and HiSpeed (480 Mbps).

Legacy USB 1.1 HC Support

Enables/disables legacy USB 1.1 host controller support.

USB Mass Storage Device Configuration

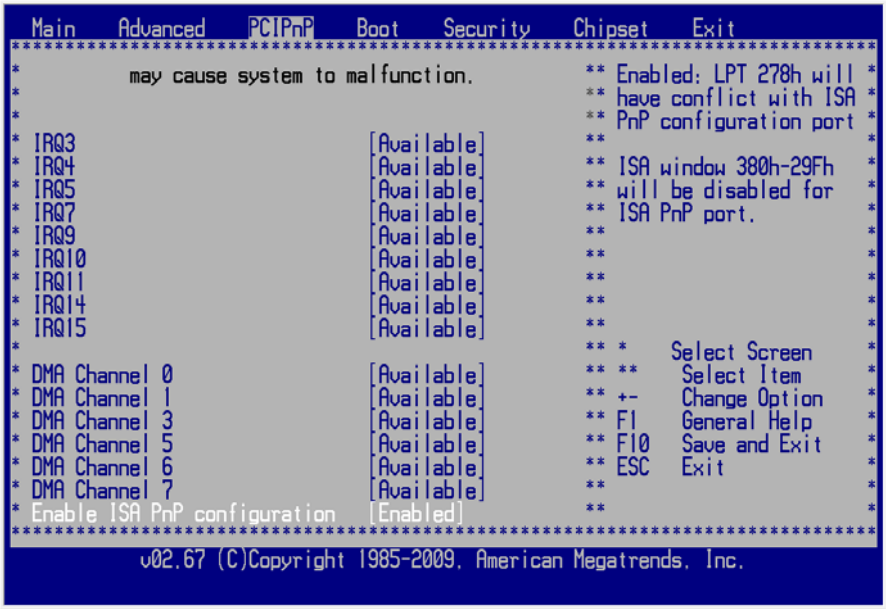
This is a submenu for configuring the USB Mass Storage Class Devices when BIOS finds they are in use on USB ports. Emulation Type can be set according to the type of attached USB mass storage device(s). If set to Auto, USB devices less than 530MB will be emulated as Floppy and those greater than 530MB will remain as hard drive. The Forced FDD option can be used to force a hard disk type drive (such as a Zip drive) to boot as FDD.



LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.4 PCI/PnP Settings

Select the PCI/PnP tab from the 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. The Plug and Play BIOS Setup screen is shown below.



5.4.1 IRQ/DMA

Set this value to allow the IRQ settings to be modified. Available – This setting allows the specified IRQ/DMA to be used by a PCI/PnP device. Reserved – This setting allows the specified IRQ/DMA to be used by a legacy ISA device.

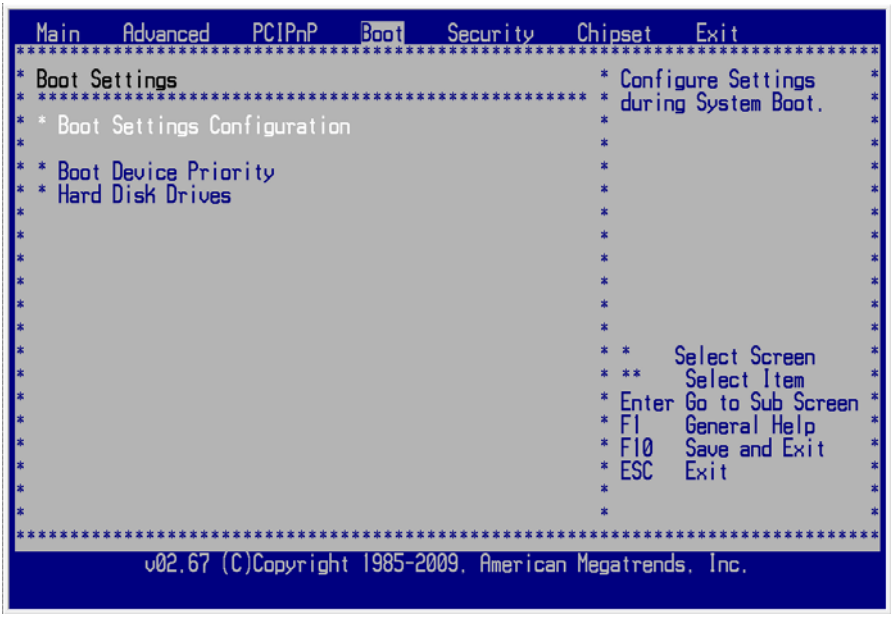
5.4.2 Enable ISA PnP Configuration

This option allows you to enable or disable the ISA PnP function.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.5 Boot Settings

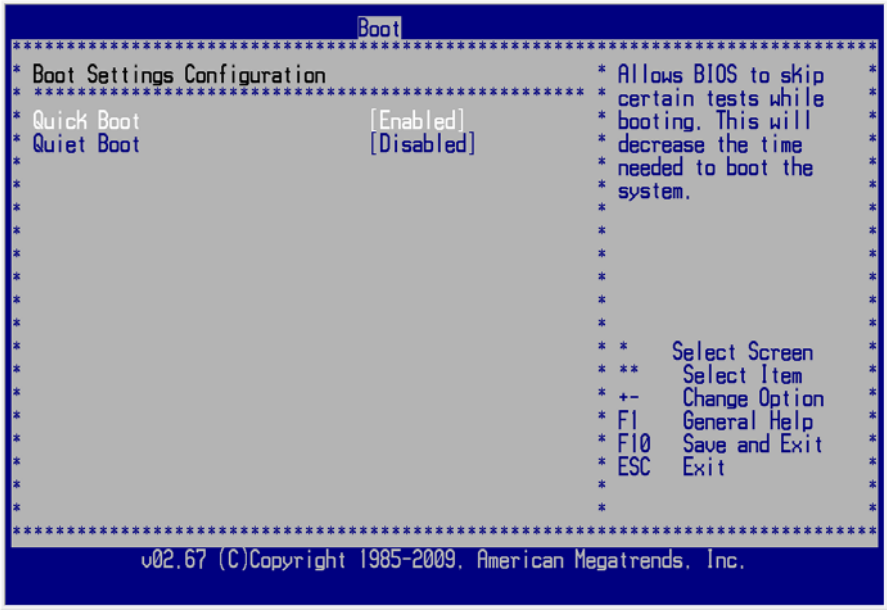
Select the Boot tab from the setup screen to enter the Boot BIOS Setup screen. You can select any of the items in the left frame of the screen, such as Boot Device Priority, to go to the submenu for that item. You can display a Boot BIOS Setup option by highlighting it using the < Arrow > keys. The Boot Settings screen is shown below:



5.5.1 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.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000



Quick Boot

Enabling this setting will cause the BIOS power-on self test routine to skip some of its tests during bootup for faster system boot.

Quiet Boot

When this feature is enabled, the BIOS will display the full-screen logo during the boot-up sequence, hiding normal POST messages.

When it is disabled, the BIOS will display the normal POST messages, instead of the full-screen logo.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.5.2 Boot Device Priority

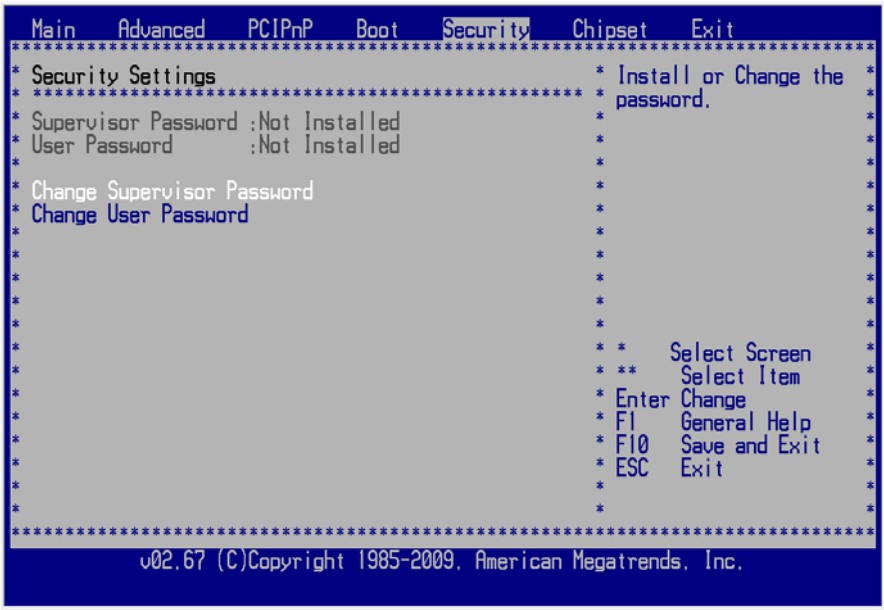
The items allow you to set the sequence of boot devices where BIOS attempts to load the disk operating system. First press <Enter> to enter the sub-menu. Then you may use the arrow keys to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list.

5.5.3 Boot Device Groups

The Boot devices are listed in groups by device type. First press <Enter> to enter the sub-menu. Then you may use the arrow keys to select the desired device, then press <+>, <-> or <PageUp>, <PageDown> key to move it up/down in the priority list. Only the first device in each device group will be available for selection in the Boot Device Priority option.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.6 Security Setup



Password Support

Two Levels of Password Protection

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 Setup is executed, using either or either the Supervisor password or 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. If you forget it, you must drain NVRAM and re-configure.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Remember the Password

Keep a record of the new password when the password is changed. If you forget the password, you must erase the system configuration information in NVRAM.

To access the submenu for the following items, select the item and press < Enter >:

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

Supervisor Password

Indicates whether a supervisor password has been set.

User Password

Indicates whether a user password has been set.

Change Supervisor Password

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

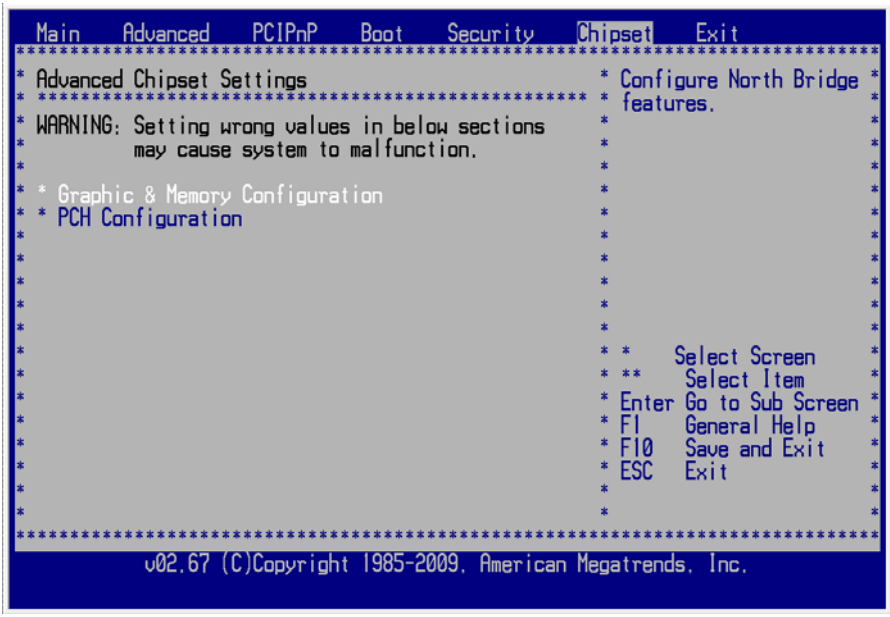
Change User Password

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

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.7 Chipset Setup

Select the Chipset tab from the setup screen to enter the Chipset BIOS Setup screen. You can select any of the items in the left frame of the screen to go to the submenu for that item. The Chipset BIOS Setup screen is shown below.

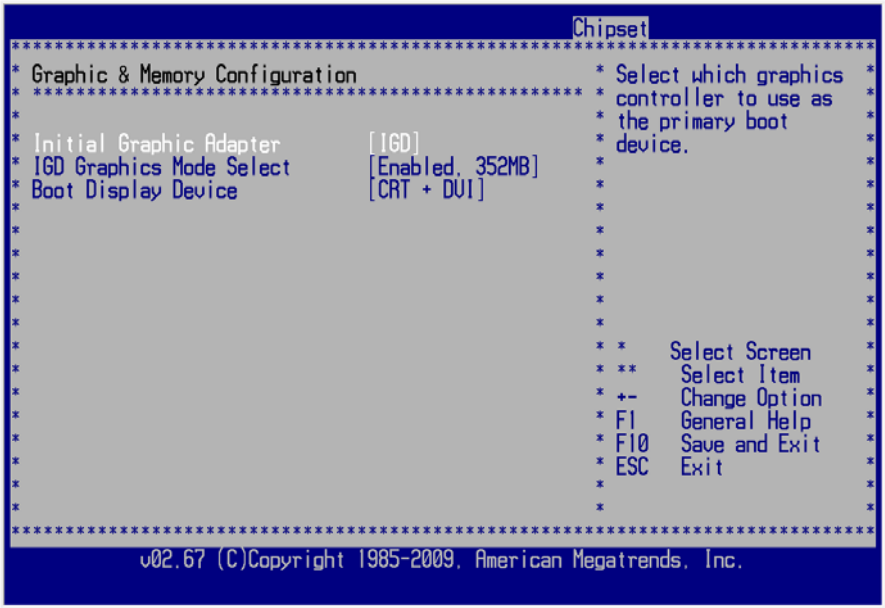


NOTE:

The Power Button Mode option is not available in this BIOS kernel.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.7.1 Graphics and Memory Configuration



Initial Graphics Adapter

Select which graphics controller to use as the primary boot device. (“PCI” includes PCI slot and and PCIe Mini Card. PCI will be first.)

- **IGD:** Integrated graphics only.
- **PCI/IGD:** Detect PCI graphics first, then integrated graphics

IGD Graphics Mode Select

Selects the amount of system memory used by the integrated graphics device.

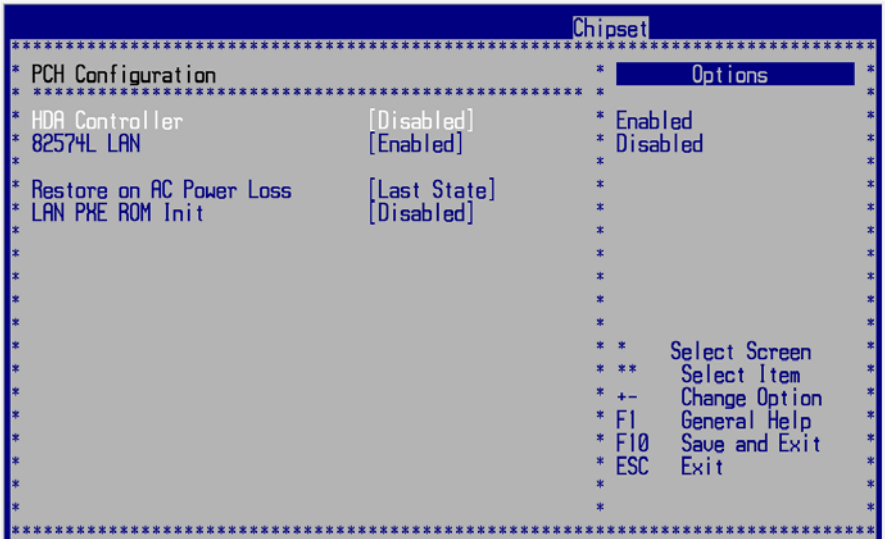
Boot Display Device

This item allows the user to configuration the type of external display used during boot up.

- **CRT:** VGA display only during POST and DOS.
- **DVI:** DVI display only during POST and DOS.
- **CRT+DVI:** VGA and DVI display during POST and DOS.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.7.2 PCH Configuration



HDA Controller

Set this value to Enable/Disable the HD Audio Controller.

82574L LAN Boot

Set this value to enable/disable the LAN controller.

Restore on AC Power Loss

Determines which state the computer enters when AC power is restored after a power loss. The options for this value are Last State, Power On and Power Off.

- **Power Off:** Set this value to always power off the system while AC power is restored.
- **Power On:** Set this value to always power on the system while AC power is restored.
- **Last State:** Set this value to power off/on the system depending on the last system power state while AC power is restored.

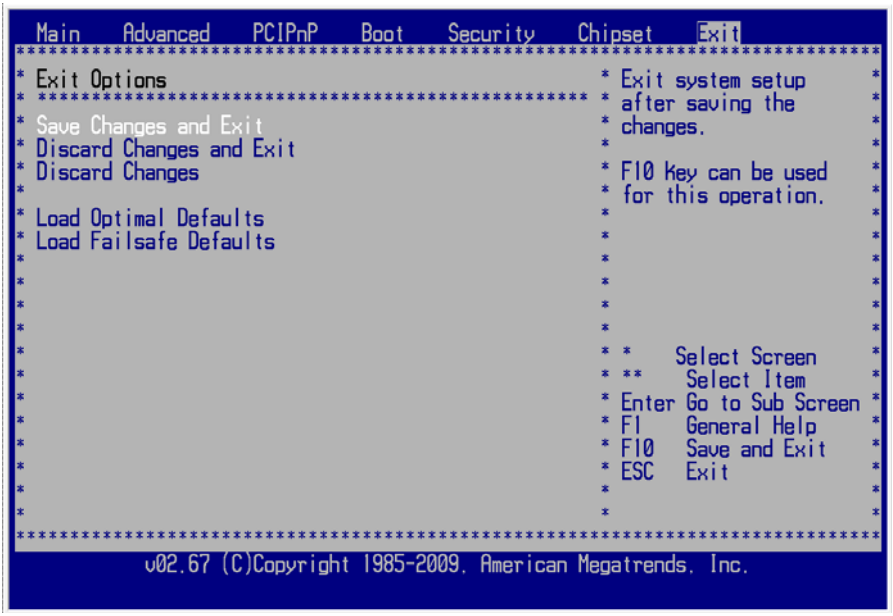
LAN PXE ROM Init

Invokes the onboard LAN's PXE ROM to enable boot from LAN.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

5.8 Exit Menu

Select the Exit tab from the setup screen to enter the Exit BIOS Setup screen. You can display an Exit BIOS Setup option by high-lighting it using the < Arrow > keys. 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 Setup and reboot the computer so the new system configuration parameters can take effect.

Save Configuration Changes and Exit Now?

[Ok] [Cancel]

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

Discard Changes and Exit

Select this option to quit Setup without making any permanent changes to the system configuration.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

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.

Load Optimal Defaults

Automatically sets all 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 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.

Load Failsafe Defaults

Automatically sets all Setup options to a complete set of default settings when you select this option. The Failsafe settings are designed for maximum system stability, but not maximum performance. Select the FailSafe Setup options if your computer is experiencing system configuration problems.

Select Load Fail-Safe Defaults from the Exit menu and press < Enter >.

Load FailSafe Defaults?

[Ok] [Cancel]

appears in the window. Select Ok to load FailSafe defaults.

Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Appendix A - Watchdog Timer

A sample program for configuring the NuPRO-A331's watchdog timer is included on the ADLINK All-in-One DVD in the following directory: **\NuPRO\NuPRO-A331\WDT**.

A.1 Sample Code

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

static unsigned int IT8783_ioPort = 0x2e;

void Enter_IT8783_Config(unsigned int flag)
{
   if(flag) IT8783_ioPort = 0x4e;

   switch(IT8783_ioPort)
   {
      case 0x2E:  //Address port = 0x2E, enter keys =
      0x87, 0x01, 0x55, 0x55
         outportb(0x2E, 0x87);
         outportb(0x2E, 0x01);
         outportb(0x2E, 0x55);
         outportb(0x2E, 0x55);
         break;
      case 0x4E:  //Address port = 0x4E, enter keys =
      0x87, 0x01, 0x55, 0xAA
         outportb(0x4E, 0x87);
         outportb(0x4E, 0x01);
         outportb(0x4E, 0x55);
         outportb(0x4E, 0xAA);
         break;
      default:
         break;
   }
}

void Exit_IT8783_Config(unsigned int flag)
{
   if(flag) IT8783_ioPort = 0x4e;

   outportb(IT8783_ioPort, 0x02);
   outportb(IT8783_ioPort+1, 0x02);
```

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

```
}

void Get_IT8783_ID(unsigned int &ID1, unsigned int &ID2)
{
   outportb(IT8783_ioPort, 0x20);
   ID1 = inportb(IT8783_ioPort+1);
   outportb(IT8783_ioPort, 0x21);
   ID2 = inportb(IT8783_ioPort+1);
}


void IT8783_WDTRun(unsigned int count_value, unsigned int
     PLEDflag)   //for NuPRO-A331
{
   unsigned long tempCount;
   unsigned int registerValue;


   outportb(IT8783_ioPort, 0x07);
   outportb(IT8783_ioPort+1, 0x07);// Device 7

   outportb(IT8783_ioPort, 0xf8);
   outportb(IT8783_ioPort+1, 0x00);// PLED mapping to
      nothing, disable PLED function

   if(PLEDflag == 1)
   {
      outportb(IT8783_ioPort, 0x27);
      registerValue = inportb(IT8783_ioPort + 1);
      registerValue |= 0x80;  // set Pin09 is GPIO
      function GP37
      outportb(IT8783_ioPort+1, registerValue);

      outportb(IT8783_ioPort, 0xc2);
      registerValue = inportb(IT8783_ioPort + 1);
      registerValue &= 0x7fb; // set GP37 is alternate
      function
      outportb(IT8783_ioPort+1, registerValue);

      outportb(IT8783_ioPort, 0xca);
      registerValue = inportb(IT8783_ioPort + 1);
      registerValue |= 0x80;  // set GP42 is output
      outportb(IT8783_ioPort+1, registerValue);
```

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

```
   outportb(IT8783_ioPort, 0xf8);
   outportb(IT8783_ioPort+1, 0x1f);// PLED mapping to
   GP37

   outportb(IT8783_ioPort, 0xf9);
   registerValue = inportb(IT8783_ioPort + 1);
   registerValue |= 0x02;
   registerValue &= 0xfb;
   outportb(IT8783_ioPort+1, registerValue);
}

outportb(IT8783_ioPort, 0x71);
registerValue = inportb(IT8783_ioPort + 1);
registerValue &= 0xfe;
outportb(IT8783_ioPort+1, registerValue);

outportb(IT8783_ioPort, 0x72);
registerValue = inportb(IT8783_ioPort + 1);
registerValue &= 0xdf;
outportb(IT8783_ioPort+1, registerValue);

if(count_value >= 60)
{
   outportb(IT8783_ioPort, 0x72);
   registerValue = inportb(IT8783_ioPort+1);
   registerValue &= 0x8f;
   registerValue |= 0x40; //enable WDT output through
   PRST
   outportb(IT8783_ioPort+1, registerValue); // set
   WDT count is minute

   tempCount = count_value / 60;
   if((count_value%60) > 30)
      tempCount++;
   if(tempCount > 65535)
      tempCount = 65535;
   printf("WDT timeout in %d minutes.\n", tempCount);
}
else
{
   outportb(IT8783_ioPort, 0x72);
```

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

```
        registerValue = inportb(IT8783_ioPort+1);
        registerValue |= 0x80;

        tempCount = count_value;
        if(tempCount != 0)
        {
           printf("WDT timeout in %d seconds.\n",
        tempCount);
           registerValue |= 0x40; //Enable WDT output
        through KBRST
        }
        else
        {
           printf("WDT is Disabled.\n");
           registerValue &= 0xbf; //Disable WDT output
        through KBRST
        }

        outportb(IT8783_ioPort+1, registerValue); // set
        WDT count is second
     }

     outportb(IT8783_ioPort, 0x71);
     registerValue = inportb(IT8783_ioPort + 1);
     registerValue |= 0x60;  // set Mouse & Keyboard
        interrupt Enable
     outportb(IT8783_ioPort+1, registerValue);

     outportb(IT8783_ioPort, 0x73);
     outportb(IT8783_ioPort+1, tempCount); // set WDT count
        LSB

}
```

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Appendix B - System Resources

B.1 System Memory Map

Address Range (decimal)	Address Range (hex)	Size	Description
(4GB-2MB)	FFE00000 – FFFFFFFF	2 MB	High BIOS Area
(4GB-18MB) – (4GB-17MB-1)	FEE00000 – FEEFFFFF	1 MB	FSB Interrupt Memory Space
(4GB-20MB) – (4GB-19MB-1)	FEC00000 – FECFFFFF	1 MB	APIC Configuration Space
960 K – 1024 K	F0000 – FFFFF	64 KB	System BIOS Area
896 K – 960 K	E0000 – EFFFF	64 KB	Extended System BIOS Area
768 K – 896 K	C0000 – DFFFF	128 KB	PCI expansion ROM area C0000 – C7FFF: Onboard VGA BIOS CB800 – CC7FFF: Intel 82578DM PXE option ROM when onboard LAN boot ROM is enabled.
640 K – 768 K	A0000 – BFFFF	128 KB	Video Buffer & SMM space
0 K – 640 K	00000 – 9FFFF	640 KB	DOS Area

Table B-1: System Memory Map

B.2 Direct Memory Access Channels

Channel Number	Data Width	System Resource
0	8-bits	Parallel port(1)
1	8-bits	Parallel port(1)
2	8-bits	Diskette drive(1)
3	8-bits	Parallel port(1)
4		Reserved - cascade channel
5	16-bits	Open
6	16-bits	Open
7	16-bits	Open

Table B-2: Direct Memory Access Channels

Note (1): DMA channel 0/1/3 is selected when using parallel port. Floppy and parallel port cannot be used at the same time.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

B.3 IO Map

Hex Range	Device
000-01F	DMA controller 1, 8237A-5 equivalent
020-02D and 030-03F	Interrupt controller 1, 8259 equivalent
02E-02F, 04E-04F	LPC SIO (ITE8783) configuration index/data registers
040-042, 050-052	Timer, 8254-2 equivalent
060, 062, 064, 066	8742 equivalent (keyboard)
061	NMI control and status
070-077	Real Time Clock Controller(bit 7 -NMI mask)
080-091	DMA page register
092	Reset (Bit 0)/ Fast Gate A20 (Bit 1)
093-09F	DMA page registers continued
0A0-0B1 and 0B4-0BD	Interrupt controller 2, 8259 equivalent
0B2 and 0B3	APM control
0C0-0DF	DMA controller 2, 8237A-5 equivalent
0F0	Read: PCI and Master abort(1) Write: FERR#/ IGNNE# /Interrupt controller
170-177 and 1F0-1F7, 376 and 3F6	SATA controller or PCI
2E0-2FF, 3E0-3FF	Serial port 1~6
378-37F	Parallel port
4D0 and 4D1	Interrupt controller
A70-A7F	ISA PNP port
CF9	Reset Control register (8 bit I/O)
4700	Infineon TPM

Table B-3: IO Map

Note:
(1) A read to this address will subtractively go to ISA, where it will master abort.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

B.4 Interrupt Request (IRQ) Lines

IRQ Lines PIC Mode

IRQ#	Typical Interrupt Resource	Connected to Pin	Available
0	Counter 0	N/A	No
1	Keyboard controller	N/A	No
2	Cascade interrupt from slave PIC	N/A	No
3	Serial Port 5 (COM5)	IRQ3 via SERIRQ, IRQ3 at ISA bus	Note (1)
4	Serial Port 1-4 (COM1/2/3/4)	IRQ4 via SERIRQ, IRQ4 at ISA bus	Note (1)
5	Serial Port 6 (COM6)	IRQ5 via SERIRQ, IRQ5 at ISA bus	Note (1)
6	PCI / ISA	N/A	No
7	Parallel port	IRQ7 via SERIRQ, IRQ7 at ISA bus	Note (1)
8	Real-time clock	N/A	No
9	SCI/PCI	IRQ9 via SERIRQ, IRQ9 at ISA bus	Note (1), (2)
10	PCI/ISA	N/A	Note (1)
11	PCI / ISA	N/A	Note (1)
12	PS/2 Mouse / PCI / ISA	IRQ12 via SERIRQ, IRQ12 at ISA bus	Note (1)
13	Math Processor	N/A	No
14	Primary IDE controller / PCI / ISA	IRQ14 via SERIRQ, IRQ14 at ISA bus	No
15	Primary IDE controller / PCI / ISA	IRQ15 via SERIRQ, IRQ15 at ISA bus	No

Table B-4: IRQ Lines PIC Mode

Notes

(1) These IRQs can be used for PCI devices when onboard device is disabled. If IRQ is from ISA, user must reserve IRQ for ISA in BIOS setup menu.

(2) BIOS does not open IRQ 9 setting for ISA bus.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IRQ Lines APIC Mode

IRQ#	Typical Interrupt Resource	Connected to Pin	Available
0	Counter 0	N/A	No
1	Keyboard controller	N/A	No
2	Cascade interrupt from slave PIC	N/A	No
3	Serial Port 5 (COM5)	IRQ3 via SERIRQ, IRQ3 at ISA bus	Note (1)
4	Serial Port 1-4 (COM1.2.3.4)	IRQ4 via SERIRQ, IRQ4 at ISA bus	Note (1)
5	Serial Port 6 (COM6)	IRQ5 via SERIRQ, IRQ5 at ISA bus	Note (1)
6	PCI / ISA	N/A	No
7	Parallel port	IRQ7 via SERIRQ, IRQ7 at ISA bus	Note (1)
8	Real-time clock	N/A	No
9	ACPI	IRQ9 via SERIRQ, IRQ9 at ISA bus	Note (1)
10	SMbus	IRQ10 via SERIRQ, IRQ14 at ISA bus	No
11	PCI / ISA	N/A	No
12	PS/2 Mouse / PCI / ISA	IRQ12 via SERIRQ, IRQ12 at ISA bus	Note (1)
13	Math Processor	N/A	No
14	Primary IDE controller / PCI / ISA	IRQ14 via SERIRQ, IRQ14 at ISA bus	No
15	Primary IDE controller / PCI / ISA	IRQ15 via SERIRQ, IRQ14 at ISA bus	No
16	N/A	PCIE Port #0, PCIE Port #4, EHCI ontroller #2, UHCI Controller #2, HECI Host #1, HECI Host #2, I.G.D., NAND Controller	Yes
17	N/A	PCIE Port #1, PCIE Port #5, PCIE Root Port #0, KT Controller	Yes

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

IRQ#	Typical Interrupt Resource	Connected to Pin	Available
18	N/A	PCIE Port #2, UHCI Controller #3, UHCI Controller #6, Thermal Controller, SMBus Controller, SATA Host Controller, IDER Controller	Yes
19	N/A	PCIE Port #3, UHCI Controller #1, UHCI ontroller #7, SATA Host Controller1	Yes
20	N/A	PCI Slot 4 , GbE Controller	No
21	N/A	PCI Slot 1, PCI Slot 5, UHCI Controller #5	No
22	N/A	PCI Slot 2, PCI Slot 6, High Definition Audio Controller	No
23	N/A	PCI Slot 3, PCI Slot 7, EHCI Controller #1, UHCI Controller #4	No

Table B-5: IRQ Lines APIC Mode

Notes

(1) These IRQs can be used for PCI devices when onboard device is disabled. If IRQ is from ISA, user must reserve IRQ for ISA in BIOS setup menu.

(2) BIOS does not open IRQ 9 setting for ISA bus.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

PCI Configuration Space Map

Bus #	Device #	Function #	Routing	Description
00h	00h	00h	N/A	Intel PCH 5 Series Bridge
00h	01h	00h	Internal	PEG #1 Root Port
01h	00h	0FFh	N/A	PEG #1 Portt
00h	02h	00h	Internal	PEG #2 Root Port
02	00h	0FFh	N/A	PEG #2 Portt
00h	03h	00h	Internal	PEG #3 Root Port
03	00h	0FFh	N/A	PEG #3 Portt
00h	03h	00h	Internal	PEG #4 Root Port
04	00h	0FFh	N/A	PEG #4 Portt
00h	05h	00h	Internal	PEG #5 Root Port
05	00h	0FFh	N/A	PEG #5 Portt
00h	06h	00h	Internal	PEG #6 Root Port
06	00h	0FFh	N/A	PEG #6 Port
00h	02h	00h	Internal	Intel Integrated Graphics Device
00h	16h	00h	Internal	Intel Management Engine Interface #1
00h	16h	01h	Internal	Intel Management Engine Interface #2
00h	16h	02h	Internal	IDE-R
00h	16h	03h	Internal	KT
00h	18h	03h	Internal	NAND Controller
00h	19h	00h	Internal	GbE Controller
00h	1Ah	00h	Internal	Intel USB EHCI Controller #2
00h	1Bh	00h	Internal	High Definition Audio controller
00h	1Ch	00h	Internal	PCI Express Root port 1
00h	1Ch	01h	Internal	PCI Express Root port 2
00h	1Ch	02h	Internal	PCI Express Root port 3
00h	1Ch	03h	Internal	PCI Express Root port 4
00h	1Ch	04h	Internal	PCI Express Root port 5
00h	1Ch	05h	Internal	PCI Express Root port 6
00h	1Ch	06h	Internal	PCI Express Root port 7
00h	1Ch	07h	Internal	PCI Express Root port 8

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Bus #	Device #	Function #	Routing	Description
00h	1Dh	00h	Internal	Intel USB EHCI Controller #1
00h	1Eh	00h	N/A	Intel PCI to PCI Bridge
00h	1Fh	00h	N/A	Intel LPC Interface Bridge
00h	1Fh	02h	Internal	Intel SATA controller #1
00h	1Fh	03h	Internal	Intel SMBus Controller
00h	1Fh	05h	Internal	Intel SATA controller #2
00h	1Fh	06h	Internal	Thermal Controller
1Eh	0Fh	00h	Internal	PCI Slot 1
1Eh	0Eh	00h	Internal	PCI Slot 2
1Eh	0Dh	00h	Internal	PCI Slot 3
1E0h	0Ch	00h	Internal	PCI Slot 4
1E0h	0Bh	00h	Internal	PCI Slot 5
1E0h	0Ah	00h	Internal	PCI Slot 6
1E0h	09h	00h	Internal	PCI Slot 7
20h	00h	0FFh	Internal	PCIE Port #0
21h	00h	0FFh	Internal	PCIE Port #1
22h	00h	0FFh	Internal	PCIE Port #2
23h	00h	0FFh	Internal	PCIE Port #3
24h	00h	0FFh	Internal	PCIE Port #4
25h	00h	0FFh	Internal	PCIE Port #5
26h	00h	0FFh	Internal	PCIE Port #6
27h	00h	0FFh	Internal	PCIE Port #7

Table B-6: PCI Configuration Space Map

Note:
(1) SATA controller 2 (D31:F5) is only visible in PCH desktop components and when D31:F2 CC.SCC=01h.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

PCI Interrupt Routing Map

PIRQ	A	B	C	D	E	F	G	H
INT Line	INTA	INTB	INTC	INTD				
PEG Root Port 1-6	INTA	INTB	INTC	INTD				
VGA	X							
SATA Controller			X	X				
SATA Controller1				X				
SMBUS controller			X					
Thermal Controller			X					
EHCI 1								X
EHCI 2	X							
HDA							X	
Intel GbE					X			
HECI Host 1	X							
HECI Host 2	X							
IDER Controller			X					
KT Controller		X						
NAND Controller	X							
PCIE Port 0	INTA	INTB	INTC	INTD				
PCIE Port 1	INTB	INTC	INTD	INTA				
PCIE Port 2	INTC	INTD	INTA	INTB				
PCIE Port 3	INTD	INTA	INTB	INTC				
PCIE Port 4	INTA	INTB	INTC	INTD				
PCIE Port 5	INTB	INTC	INTD	INTA				
PCIE Port 6	INTA	INTB	INTC	INTD				
PCIE Port 7	INTB	INTC	INTD	INTA				
PCI Slot 0						X		
PCI Slot 1							X	
PCI Slot 2								X
PCI Slot 3					X			

Table B-7: PCI Interrupt Routing Map

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Important Safety Instructions

For user safety, please read and follow all **instructions**, **WARNINGS**, **CAUTIONS,** and **NOTES** marked in this manual and on the associated equipment before handling/operating the equipment.

- Read these safety instructions carefully.
- Keep this user's manual for future reference.
- Read the specifications section of this manual for detailed information on the operating environment of this equipment.
- When installing/mounting or uninstalling/removing equipment:
  - Turn off power and unplug any power cords/cables.
- To avoid electrical shock and/or damage to equipment:
  - Keep equipment away from water or liquid sources;
  - Keep equipment away from high heat or high humidity;
  - Keep equipment properly ventilated (do not block or cover ventilation openings);
  - Make sure to use recommended voltage and power source settings;
  - Always install and operate equipment near an easily accessible electrical socket-outlet;
  - Secure the power cord (do not place any object on/over the power cord);
  - Only install/attach and operate equipment on stable surfaces and/or recommended mountings; and,
  - If the equipment will not be used for long periods of time, turn off and unplug the equipment from its power source.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

- Never attempt to fix the equipment. Equipment should only be serviced by qualified personnel.

A Lithium-type battery may be provided for uninterrupted, backup or emergency power.



Risk of explosion if battery is replaced with one of an incorrect type. Dispose of used batteries appropriately.

- Equipment must be serviced by authorized technicians when:
  - The power cord or plug is damaged;
  - Liquid has penetrated the equipment;
  - It has been exposed to high humidity/moisture;
  - It is not functioning or does not function according to the user's manual;
  - It has been dropped and/or damaged; and/or,
  - It has an obvious sign of breakage.

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

Getting Service

Contact us should you require any service or assistance.

ADLINK Technology, Inc.
Address: 9F, No.166 Jian Yi Road, Zhonghe District
New Taipei City 235, Taiwan
新北市中和區建一路 166 號 9 樓
Tel: +886-2-8226-5877
Fax: +886-2-8226-5717
Email: service@adlinktech.com

Ampro ADLINK Technology, Inc.
Address: 5215 Hellyer Avenue, #110, San Jose, CA 95138, USA
Tel: +1-408-360-0200
Toll Free: +1-800-966-5200 (USA only)
Fax: +1-408-360-0222
Email: info@adlinktech.com

ADLINK Technology (China) Co., Ltd.
Address: 上海市浦东新区张江高科技园区芳春路 300 号 (201203)
300 Fang Chun Rd., Zhangjiang Hi-Tech Park,
Pudong New Area, Shanghai, 201203 China
Tel: +86-21-5132-8988
Fax: +86-21-5132-3588
Email: market@adlinktech.com

ADLINK Technology Beijing
Address: 北京市海淀区上地东路 1 号盈创动力大厦 E 座 801 室(100085)
Rm. 801, Power Creative E, No. 1, B/D
Shang Di East Rd., Beijing, 100085 China
Tel: +86-10-5885-8666
Fax: +86-10-5885-8625
Email: market@adlinktech.com

ADLINK Technology Shenzhen
Address: 深圳市南山区科技园南区高新南七道 数字技术园
A1 栋 2 楼 C 区 (518057)
2F, C Block, Bldg. A1, Cyber-Tech Zone, Gao Xin Ave. Sec. 7,
High-Tech Industrial Park S., Shenzhen, 518054 China
Tel: +86-755-2643-4858
Fax: +86-755-2664-6353
Email: market@adlinktech.com

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000

ADLINK Technology (Europe) GmbH
Address: Nord Carree 3, 40477 Duesseldorf, Germany
Tel: +49-211-495-5552
Fax: +49-211-495-5557
Email: emea@adlinktech.com

ADLINK Technology, Inc. (French Liaison Office)
Address: 15 rue Emile Baudot, 91300 Massy CEDEX, France
Tel: +33 (0) 1 60 12 35 66
Fax: +33 (0) 1 60 12 35 66
Email: france@adlinktech.com

ADLINK Technology Japan Corporation
Address: 〒101-0045 東京都千代田区神田鍛冶町 3-7-4
神田 374 ビル 4F
KANDA374 Bldg. 4F, 3-7-4 Kanda Kajicho,
Chiyoda-ku, Tokyo 101-0045, Japan
Tel: +81-3-4455-3722
Fax: +81-3-5209-6013
Email: japan@adlinktech.com

ADLINK Technology, Inc. (Korean Liaison Office)
Address: 서울시 서초구 서초동 1506-25 한도 B/D 2 층
2F, Hando B/D, 1506-25, Seocho-Dong, Seocho-Gu,
Seoul 137-070, Korea
Tel: +82-2-2057-0565
Fax: +82-2-2057-0563
Email: korea@adlinktech.com

ADLINK Technology Singapore Pte. Ltd.
Address: 84 Genting Lane #07-02A, Cityneon Design Centre,
Singapore 349584
Tel: +65-6844-2261
Fax: +65-6844-2263
Email: singapore@adlinktech.com

ADLINK Technology Singapore Pte. Ltd. (Indian Liaison Office)
Address: No. 1357, "Anupama", Sri Aurobindo Marg, 9th Cross,
JP Nagar Phase I, Bangalore - 560078, India
Tel: +91-80-65605817
Fax: +91-80-22443548
Email: india@adlinktech.com

LRI Distribuída no Brasil pela LRI | vendas@lri.com.br | 51 2129-3000