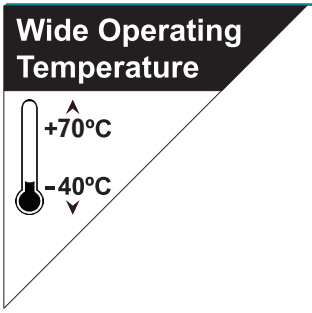

Rigid-313

Fanless Extreme Rugged Embedded Controller with Intel® Atom™ D2550 Platform

User's Manual

Version 1.1

P/N: 4016031300110P

2014.11

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Revision History

Version	Release Time	Description
1.0	June 2012	Initial release
1.1	November 2014	The computer newly features a JACC1 Jumper for automation and vehicle power mode control. This gives rise to the following changes in this manual: ▸ 2.1. Board Layout ▸ 2.2.2 Jumper Setting JACC1 description added ▸ 3.7. Wire DC-Input Power Source divided into Vehicle and Automation power mode ▸ 2.2.2. Jumper Setting SW1 & SW2 pin configuration updated The BIOS is updated and gives rise to the following changes in this manual: ▸ RS485 AutoFlow description added to 5.2.5 Super IO Configuration ▸ 5.2.1 ACPI Settings updated ▸ 5.3.2 South Bridge TPT section updaged

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Contents

Copyright Notice

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

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

Declaration of Conformity

CE

The CE symbol on your product indicates that it is in compliance with the directives of the Union European (EU). A Certificate of Compliance is available by contacting Technical Support.

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from ARBOR. Please contact your local supplier for ordering information.

This product has passed the CE test for environmental specifications when shielded cables are used for external wiring. We recommend the use of shielded cables. This kind of cable is available from ARBOR. Please contact your local supplier for ordering information.

FCC Class B

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions:

(1)This device may not cause harmful interference, and

(2)This device must accept any interference received, including interference that may cause undesired operation.

NOTE:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular instal-

lation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:
-- Reorient or relocate the receiving antenna.
-- Increase the separation between the equipment and receiver.
-- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
-- Consult the dealer or an experienced radio/TV technician for help.

RoHS

ARBOR Technology Corp. certifies that all components in its products are in compliance and conform to the European Union's Restriction of Use of Hazardous Substances in Electrical and Electronic Equipment (RoHS) Directive 2002/95/EC.
The above mentioned directive was published on 2/13/2003. The main purpose of the directive is to prohibit the use of lead, mercury, cadmium, hexavalent chromium, polybrominated biphenyls (PBB), and polybrominated diphenyl ethers (PBDE) in electrical and electronic products. Member states of the EU are to enforce by 7/1/2006.
ARBOR Technology Corp. hereby states that the listed products do not contain unintentional additions of lead, mercury, hex chrome, PBB or PBDB that exceed a maximum concentration value of 0.1% by weight or for cadmium exceed 0.01% by weight, per homogenous material. Homogenous material is defined as a substance or mixture of substances with uniform composition (such as solders, resins, plating, etc.). Lead-free solder is used for all terminations (Sn(96-96.5%), Ag(3.0-3.5%) and Cu(0.5%)).

SVHC / REACH

To minimize the environmental impact and take more responsibility to the earth we live, Arbor hereby confirms all products comply with the restriction of SVHC (Substances of Very High Concern) in (EC) 1907/2006 (REACH --Registration, Evaluation, Authorization, and Restriction of Chemicals) regulated by the European Union.
All substances listed in SVHC < 0.1 % by weight (1000 ppm)

Important Safety Instructions

Read these safety instructions carefully.

1. Read all cautions and warnings on the equipment.
2. Place this equipment on a reliable surface when installing. Dropping it or letting it fall may cause damage
3. Make sure the correct voltage is connected to the equipment.
4. For pluggable equipment, the socket outlet should be near the equipment and should be easily accessible.
5. Keep this equipment away from humidity.
6. The openings on the enclosure are for air convection and protect the equipment from overheating. DO NOT COVER THE OPENINGS.
7. Position the power cord so that people cannot step on it. Do not place anything over the power cord.
8. Never pour any liquid into opening. This may cause fire or electrical shock.
9. Never open the equipment. For safety reasons, the equipment should be opened only by qualified service personnel.
10. If one of the following situations arises, get the equipment checked by service personnel:
    a. The power cord or plug is damaged.
    b. Liquid has penetrated into the equipment.
    c. The equipment has been exposed to moisture.
    d. The equipment does not work well, or you cannot get it to work according to the user's manual.
    e. The equipment has been dropped or damaged.
    f. The equipment has obvious signs of breakage.
11. Keep this User's Manual for later reference.

About This User's Manual

This User's Manual is intended for experienced users and integrators with hardware knowledge of personal computers. If you are not sure about any description in this User's Manual, please consult your vendor before further handling.

Warning

The Box PC and its components contain very delicately Integrated Circuits (IC). To protect the Box PC and its components against damage caused by static electricity, you should always follow the precautions below when handling it:

1. Disconnect your Box PC from the power source when you want to work on the inside.

2. Use a grounded wrist strap when handling computer components.
3. Place components on a grounded antistatic pad or on the bag that came with the Box PC, whenever components are separated from the system.

Replacing the Lithium Battery

Incorrect replacement of the lithium battery may lead to a risk of explosion.
The lithium battery must be replaced with an identical battery or a battery type recommended by the manufacturer.
Do not throw lithium batteries into the trashcan. It must be disposed of in accordance with local regulations concerning special waste.

Technical Support

If you have any technical difficulties, please consult the user's manual first at:
ftp://ftp.arbor.com.tw/pub/manual
Please do not hesitate to call or e-mail our customer service when you still cannot find out the answer.

http://www.arbor.com.tw
E-mail:info@arbor.com.tw

Warranty

This product is warranted to be in good working order for a period of one year from the date of purchase. Should this product fail to be in good working order at any time during this period, we will, at our option, replace or repair it at no additional charge except as set forth in the following terms. This warranty does not apply to products damaged by misuse, modifications, accident or disaster.
Vendor assumes no liability for any damages, lost profits, lost savings or any other incidental or consequential damage resulting from the use, misuse of, or inability to use this product. Vendor will not be liable for any claim made by any other related party.
Vendors disclaim all other warranties, either expressed or implied, including but not limited to implied warranties of merchantability and fitness for a particular purpose, with respect to the hardware, the accompanying product's manual(s) and written materials, and any accompanying hardware. This limited warranty gives you specific legal rights.
Return authorization must be obtained from the vendor before returned merchandise will be accepted. Authorization can be obtained by calling or faxing the vendor and requesting a Return Merchandise Authorization (RMA) number. Returned goods should always be accompanied by a clear problem description.

Chapter 1

General Information

1.1. Introduction

Rigid-313 is an extreme rugged embeded system made slim, compact and robust. The product incorporates a series of temperature-aware designs to reach the durability in -40 °C ~ 70 °C.

The product has a main board loaded with Intel® Atom™ D2550 1.86GHz processor and industrial-grade components for wide-temperature applications. Also built in is a validated memory module to cope with bad weather.

The fanless thermal conduction and well-designed power circuit ensure the reliable running of the system. The mechanical design takes into account the hot spots, fin orientation and surface emissivity to enable the most efficient heat dissipation. The product has gone through a number of rigorous tests for design verification before it is delivered to customers.

Thanks to the specially designed main board, Rigid-313's dimensions are substantially reduced for an ultra-low profile enclosure, which facilitates its service in narrow space.

The Rigid-313 is a powerful system by carrying rich I/O and networking modules, which makes it an ideal choice for your Thin Client, KIOSK, information booth, GSM Server, environment-critical and space-critical applications.

1.2. Product Highlights

- **All-In-One Platform**

  The CPU, DRAM and even software are integrated to provide a plug-and-play machine.

- **Compact-sized**

  The kernel of Rigid-313 is FMB-i2505-WT, which is a non-standard form factor embedded board. The whole system consumes only a few space.

- **Fanless and Modular CPU Board**

By using a low power processor, the system does not have to rely on fans, which are often unreliable and cause dust to circulate inside the equipment. The modular design of CPU board facilitates maintenance or possible upgrades on the CPU board. Modular Box PC can be easily modified to fit for many different applications according to customers' requests.

- **Powerful Networking**

  The Rigid-313 provides COM, Ethernet, USB, Mini Card slot, CFast, SIM and DVI.

- **Numerous Display/Video Output**

  With Intel® HD Graphics core, the Rigid-313 improves graphics and 3D rendering performance and supports display/video output options includes DVI-I and DVI-D.

- **Trustworthy**

  The onboard Watchdog Timer can invoke an NMI or system RESET when your application loses control over the system.

1.3. Packing List

Upon unpacking, carefully inspect the contents. If any of the items listed hereunder is missing or appears damaged, contact your local dealer or distributor.

1 x Rigid-313 Fanless Extreme Rugged Embedded Controller

1 x Driver CD

1 x User's Manual

PAC-P065W
65W AC/DC adapter kit

WMK-3100
Wall-mount kit

CBL-7100-COM
COM converter cable

1.4. Ordering Information

Rigid-313	Fanless Embedded Controller

The following items are normally optional, but some vendors may include them as a standard package, or some vendors may not carry all the items.

Optional Accessories

	DRK-001 Din rail kit of FPC series
	VMK-3100 VESA mount kit

Optional Configuration (Configure to Order)

	SSD-25040 Intel® 2.5” 40GB SATAII SSD kit
	HSPA-SI1400 HSUPA 3.75G module kit & internal wiring
	WIFI-AT2300 Atheros AR9462 Wi-Fi module w/ 20cm internal wiring
	ANT-H11 1 x 2dBi HSUPA antenna
	ANT-D11 1 x WiFi Dual-band 2.4G/5G antenna

1.5. Paths to the Drivers on CD

Windows 7-32bit

Driver	Path
CHIPSET	\Chipset\Win7_x86
VGA	\VGA\Win7_x86
LAN	\LAN\Install_Win7_7048_09162011
AUDIO	\Driver\Audio ALC662\Win 7(32,64 bits) Driver_R2.66

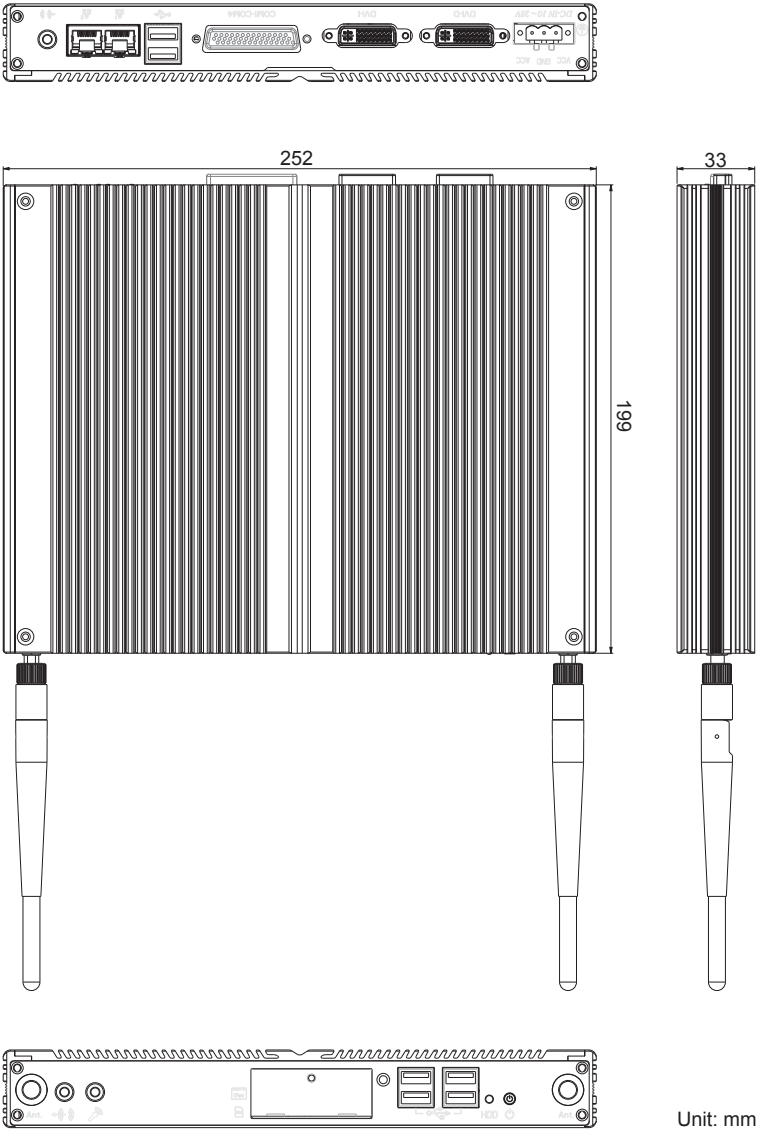
Note: Rigid-313 only supports Windows 7 32bit.

1.6. Specification

System Kernel	
Processor	Soldered onboard Intel® Atom™ D2550 1.86GHz processor
BIOS	AMI Flash BIOS
Chipset	Intel® NM10 PCH
Graphics	Integrated Intel® GMA 3650
System Memory	1 x 204-pin Dual Channels DDR3 SO-DIMM Socket up to 4GB at 800/1066MHz
	2GB WT DDR3 memory module installed
Serial ATA	1 x Serial ATA port with 300MB/s HDD transfer rate
Ethernet Controller	2 x Realtek 8111 Gigabit Ethernet controllers
Watchdog Timer	1 ~ 255 levels reset
I/O Ports	
Serial Port	2 x RS-232 ports & 2 x RS-232/422/485 ports with DB-44 pin connector
Expansion Bus	• 1 x Mini-card slot interconnected with SIM card socket for optional WiFi or HSUPA module • 1 x SIM Card Socket (outside accessible)
USB Port	6 x USB 2.0 ports
LAN	2 x RJ-45 ports for Gigabit Ethernet
Video Port	• 1 x DVI-I female connector for Digital Video Output • 1 x DVI-D female connector for Digital Video Output
Audio	Mic-in/Line-in/Line-out (6W pre-amplified)
Storage	
Type	• 1 x 2.5” drive bay for HDD/SSD • 1 x CFast Socket
Qualification	
FCC	Class B certified
CE	Certified

Environmental	
Operating Temp.	-40 ~ 70°C (-40 ~ 158°F), ambient w/ air flow
Storage Temp.	-40 ~85 °C (-40 ~ 185°F)
Relative Humidity	10 ~ 95% @ 40°C (non-condensing)
Vibration	3 Grms/5 ~ 500 Hz/random operation
Shock & Crash	• Operating 20G (11ms), Non-operating 60G with HDD • Operating 40G (11ms), Non-operating 80G with CF/SSD
Mechanical	
Construction	Aluminum alloy
Mounting	Wall-mount/VESA-mount/Din rail mounting
Weight	1.89 kg (4.16 lb) (Bare-bone) (ref.)
Dimensions (W x D x H)	252 x 199 x 33 mm (9.92” x 7.83” x 1.3”)
Power Requirement	
Power Input	DC 10~28V input (w/ 1 x 3-pin DC input terminal block)
Power Consumption	30W (Max.)
OS Support	Windows XP Embedded / Windows XP Professional / Windows Embedded 7 Professional / Windows Embedded 7 Standard

1.7. Dimensions

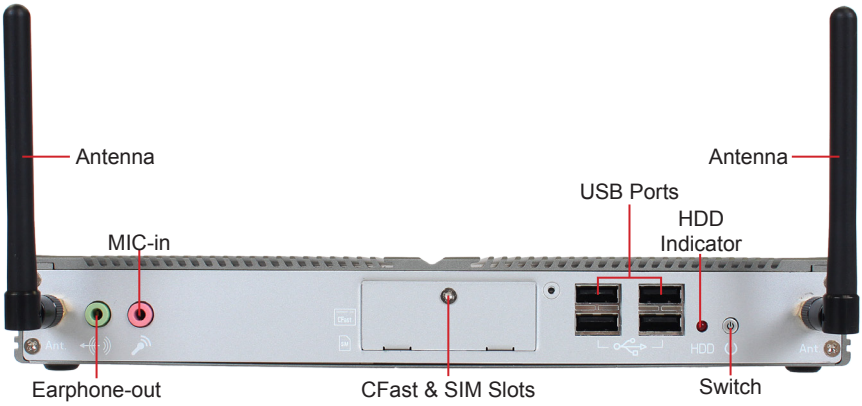


Unit: mm

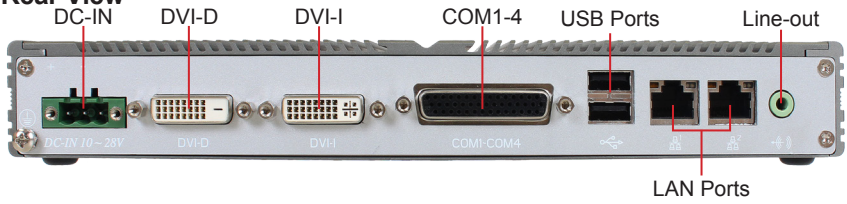
1.8. Find Controls and Connectors

Take a look around the Rigid-313 computer and find the external controls and connectors.

Front View



Rear View



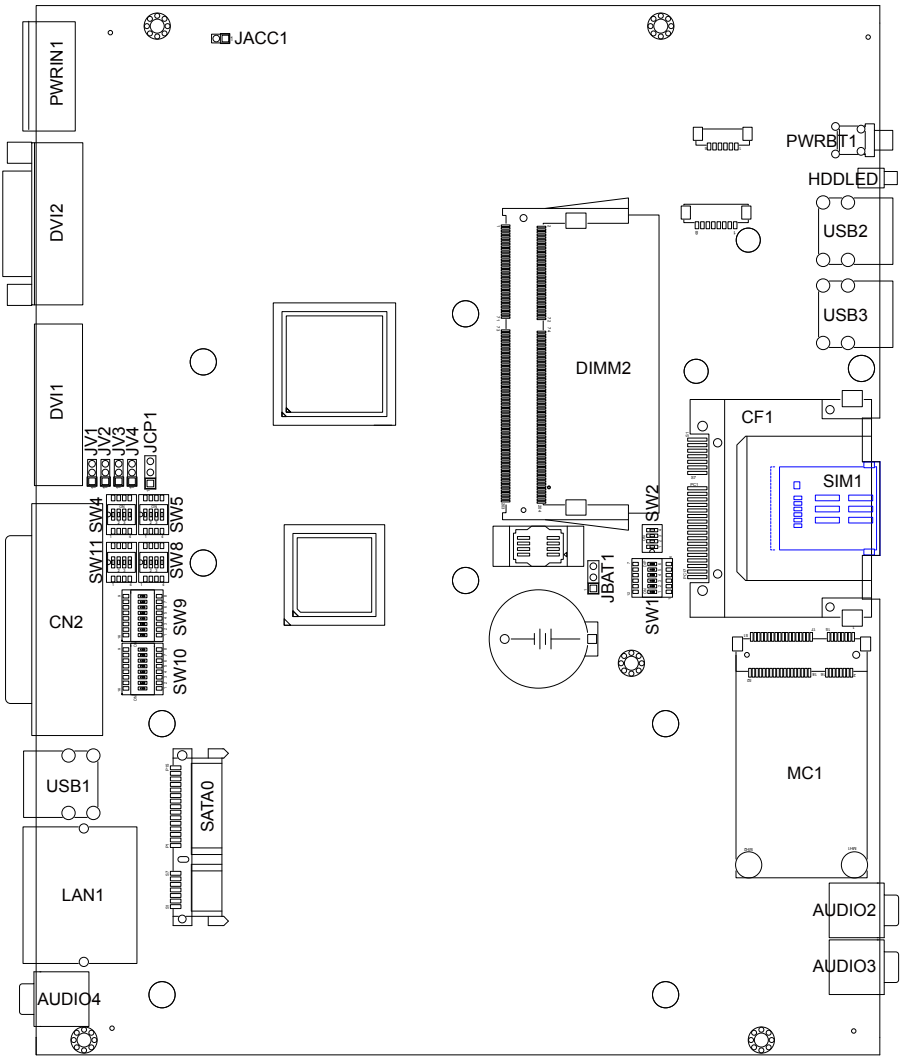
Front-right View

Chapter 2

The Engine of Rigid-313

2.1. Board Layout

The engine of Rigid-313 is FMB-i2505-WT.



2.2. Jumpers and Connectors

2.2.1. Jumpers & Connectors List

Jumpers

Label	Function
JBAT1	Clear CMOS Setting
JCP1	COM Port Power Selector
JV1~4	RI/5V/12V (Pin 9) Selectors for COM1~4 Ports
JACC1	Vehicle/Automation Power Mode Selection
SW1	System On/Off Timing Setting Jumper
SW2	Battery Low Setting Jumper
SW4~5, SW8~11	RS-232/422/485 Mode Selectors for COM3~4 Ports

Connectors

Label	Function
MC1	Mini Card Socket
SATA0	Serial ATA + Power Connector
LAN1	Dual Ethernet Connectors
USB1~3	Double-stacked USB Connectors
AUDIO2	Audio Jack Connector (MIC)
AUDIO3	Audio Jack Connector (Line-out)
AUDIO4	Audio Jack Connector (Line-out with 6W Amplify)
CF1	CFast Slot
CN2	RS-232 (COM1~2); RS-232/422/485 (COM3~4)
HDDLED	HDD Status LED
PWRBT1	Power On/Off Switch
PWRIN1	DC Adapter Power Input
DVI1	DVI-I
DVI2	DVI-D
SIM1	SIM Card Slot

2.2.2. Jumper Setting

JBAT1: Clear CMOS Setting

Pin	Description	
1-2	Keep CMOS (Default)	
2-3	Clear CMOS	

JCP1: COM Port Power Selector

Pin	Description	
1-2	Normal (Default)	
2-3	+12V	

JV1~4: RI/5V/12V (Pin 9) Selection for COM1~4 Ports

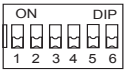
Pin	Description	
1-2	Normal (Default)	
2-3	COMPOWER	

Note: JV1~4 correspond to COM1~4 ports respectively.

JACC1: Vehicle/Automation Power Mode Selection

Pin	Description	
Open	Automation power mode	
Short	Vehicle power mode (Default)	

SW1 for Vehicle Application: System On/Off Timing Setting Jumper



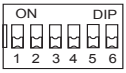
Pin	DIP SW Auto Car Key on Detection	Description
1	On, Off (default)	Auto Power On (1 - Auto / 0 - Manual)
2	On, Off (default)	Auto Power Off (1 - Auto / 0 - Manual)
3 & 4	On, Off (default)	Power-on Waiting Time – Setup Timing (00-4s)(01-8s)(10-12s)(11-16s)
5 & 6	On, Off (default)	Power-off Waiting Time – Setup Timing (00-30s)(01-45s)(10-60s)(11-90s)

Note: Switch Pin1 to On and Pin2 to On to activate Auto Power On and Auto Power Off functions respectively.

Pin1-6 Setting	Action	Pin1-6 Setting	Action
00 XX XX	Manual Power On, Manual Power Off		
01 XX 00	Manual Power On, Auto Power Off (30 sec)	10 00 XX	Auto Power On (4 sec), Manual Power Off
01 XX 01	Manual Power On, Auto Power O ff (45 sec)	10 01 XX	Auto Power On (8 sec), Manual Power Off
01 XX 10	Manual Power On, Auto Pow er Off (60 sec)	10 10 XX	Auto Power On (12 sec), Manual Power Off
01 XX 11	Manual Power On, Auto Power Off (90 sec)	10 11 XX	Auto Power On (16 sec), Manual Power Off
11 00 00	Auto Power On (4 sec), Auto Power Off (30 sec)	11 10 00	Auto Power On (12 sec), Auto Power Off (30 sec)
11 00 01	Auto Power On (4 sec), Auto Power Off (45 sec)	11 10 01	Auto Power On (12 sec), Auto Power Off (45 sec)
11 00 10	Auto Power On (4 sec), Auto Power Off (60 sec)	11 10 10	Auto Power On (12 sec), Auto Power Off (60 sec)
11 00 11	Auto Power On (4 sec), Auto Power Off (90 sec)	11 10 11	Auto Power On (12 sec), Auto Power Off (90 sec)
11 01 00	Auto Power On (8 sec), Auto Power Off (30 sec)	11 11 00	Auto Power On (16 sec), Auto Power Off (30 sec)
11 01 01	Auto Power On (8 sec), Auto Power Off (45 sec)	11 11 01	Auto Power On (16 sec), Auto Power Off (45 sec)
11 01 10	Auto Power On (8 sec), Auto Power Off (60 sec)	11 11 10	Auto Power On (16 sec), Auto Power Off (60 sec)
11 01 11	Auto Power On (8 sec), Auto Power Off (90 sec)	11 11 11	Auto Power On (16 sec), Auto Power Off (90 sec)

Note: 1: ON (upward), 0: Off (downward), X: 0 or 1

SW1 for Automation application: System On/Off Timing Setting Jumper



Pin	DIP SW Auto Car Key on Detection	Description
1	On, Off (default)	Auto Power On (1 - Auto / 0 - Manual)
3 & 4	On, Off (default)	Power-on Waiting Time – Setup Timing (00-4s)(01-8s)(10-12s)(11-16s)

Note: Swith Pin1 to On to activate Auto Power On.

Pin1-6 Setting	Action
00 XX XX	Manual Power On, Manual Power Off
10 00 XX	Auto Power On (4 sec), Manual Power Off
10 01 XX	Auto Power On (8 sec), Manual Power Off
10 10 XX	Auto Power On (12 sec), Manual Power Off
10 11 XX	Auto Power On (16 sec), Manual Power Off

Note: 1: ON (upward), 0: Off (downward), X: 0 or 1

SW2: Battery Low Setting Jumper (Only for Vehicle Application)

Pin	Battery Low	Description
1	On, Off (default)	24V Standard Battery Voltage (EX:BUS)
2	On (default), Off	12V Standard Battery Voltage (EX: CAR)
3	On, Off (default)	N/A
4	On, Off (default)	Car Engine Igenition Detection

Pin1-4 Setting	Action	Pin1-4 Setting	Action
100 X	Bus* Low Voltage Detection*	010 X	CAR* Low Voltage Detection*
XXX 1	TURN on after Engine Start Check Setting	000 X	Disable Low Voltage Detection
Other	Setting Error	XXX 0	Immediate Power On

Note: 1: ON (upward), 0: Off (downward), X: 0 or 1

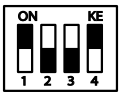
The ignition power control module is capable to continuously mointor the voltage of DC input when system is running. If input voltage is less than 11V (for 12VDC inpute) or less than 22V (for 24VDC inpute) over a 60 seconds duration, it will shut down the system automatically.

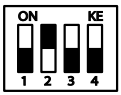
Voltage range of Battry low Voltage detection

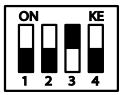
DC input	V-min	V-typ	V-max
12VDC	10.5V	11V	11.5V
24VDC	21.5V	22V	22.5V

SW4~5, SW8~11: RS-232/422/485 Mode Selectors for COM3~4 Ports

Pin	SW4~5			SW8 & 11		
	RS-232 (Default)	RS-422 Mode	RS-485 Mode	RS-232 (Default)	RS-422 Mode	RS-485 Mode
1	ON	OFF	OFF	OFF	ON	ON
2	OFF	ON	OFF	OFF	ON	ON
3	OFF	OFF	ON	OFF	ON	OFF
4	ON	OFF	OFF	OFF	ON	OFF





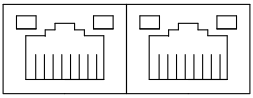


Note: SW4, 8, 9 control COM3; SW5, 11, 10 control COM4. You must set the same group of switches together for different modes.

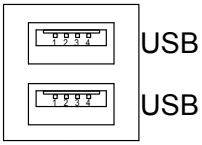
Pin	SW9~10			
	RS-232 Mode (Default)		RS-422/RS-485 Mode	
1	ON		OFF	
2	ON		OFF	
3	ON		OFF	
4	ON		OFF	
5	ON		OFF	
6	ON		OFF	
7	ON		OFF	
8	ON		OFF	

2.2.3. Pin Assignments for Connectors

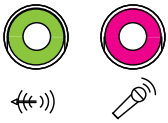
LAN1: Dual Ethernet Connectors



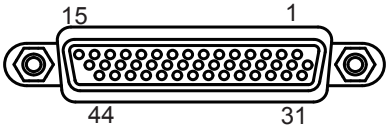
USB1~3: Double-stacked USB Connectors



AUDIO2~4: Audio Jack Connectors

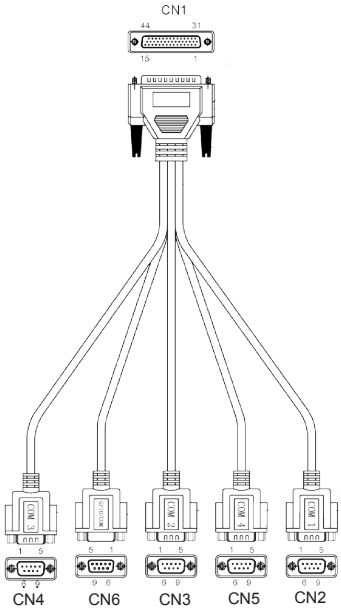


CN2: RS-232 (COM1~2); RS-232/422/485 (COM3~4)



	Pin	Desc.	Pin	Desc.		Pin	Desc.	Pin	Desc.
COM1 (RS-232)	1	DCD	2	RXD	COM2 (RS-232)	11	DCD	12	RXD
	3	TXD	4	DTR		13	TXD	14	DTR
	5	GND	6	DSR		15	GND	16	DSR
	7	RTS	8	CST		17	RTS	18	CST
	9	RI	10	GND		19	RI	20	GND
COM3 (RS-232)	21	DCD	22	RXD	COM4 (RS-232)	31	DCD	32	RXD
	23	TXD	24	DTR		33	TXD	34	DTR
	25	GND	26	DSR		35	GND	36	DSR
	27	RTS	28	CST		37	RTS	38	CST
	29	RI	30	GND		39	RI	40	GND
N/C	41	N/C	42	N/C					
	43	N/C	44	N/C					

CBL-7100-COM (COM Converter Cable) (optional)
1 to 5 COM converter cable: 4 x DB9 male and 1 x DB9 female connectors



Note: CN6 on DB9 Cable Controller is unused.

COM1 (RS-232) labelled CN2 on DB9 Cable Controller

DB44 Pin	DB9 Pin	Desc.	DB44 Pin	DB9 Pin	Desc.
1	1	DCD	2	2	RXD
3	3	TXD	4	4	DTR
5	5	GND	6	6	DSR
7	7	RTS	8	8	CTS
9	9	RI	10		GND

COM2 (RS-232) labelled CN3 on DB9 Cable Controller

DB44 Pin	DB9 Pin	Desc.	DB44 Pin	DB9 Pin	Desc.
11	1	DCD	12	2	RXD
13	3	TXD	14	4	DTR
15	5	GND	16	6	DSR
17	7	RTS	18	8	CTS
19	9	RI	20		GND

COM3 (RS-232) labelled CN4 on DB9 Cable Controller

DB44 Pin	DB9 Pin	Desc.	DB44 Pin	DB9 Pin	Desc.
21	1	DCD	22	2	RXD
23	3	TXD	24	4	DTR
25	5	GND	26	6	DSR
27	7	RTS	28	8	CTS
29	9	RI	30		GND

COM4 (RS-232) labelled CN5 on DB9 Cable Controller

DB44 Pin	DB9 Pin	Desc.	DB44 Pin	DB9 Pin	Desc.
31	1	DCD	32	2	RXD
33	3	TXD	34	4	DTR
35	5	GND	36	6	DSR
37	7	RTS	38	8	CTS
39	9	RI	40		GND

COM3/4 (RS-422) labelled CN4/5 on DB9 Cable Controller

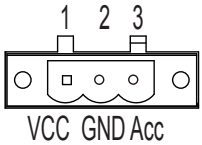
DB9 Pin	Signal	Desc.	DB9 Pin	Signal	Desc.
1	Rx-		2	Rx+	
3	Tx+		4	Tx-	
5	N/C		6	N/C	
7	N/C		8	N/C	
9	N/C				

COM3/4 (RS-485) labelled CN4/5 on DB9 Cable Controller

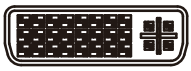
DB9 Pin	Signal	Desc.	DB9 Pin	Signal	Desc.
1	DATA-		2	DATA+	
3	N/C		4	N/C	
5	N/C		6	N/C	
7	N/C		8	N/C	
9	N/C				

PWRIN1: DC Adapter Power Input

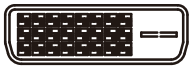
Pin	Description
1	VCC 10~28V
2	GND
3	ACC (ignition signal)



DVI1: DVI-I



DVI2: DVI-D



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Chapter 3

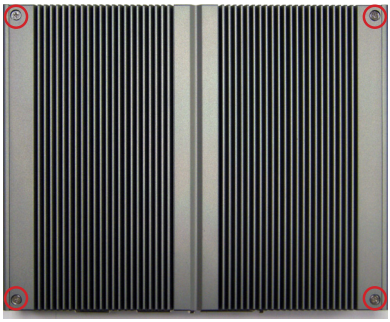
Installation and Maintenance

3.1. Install Memory, Mini-card & HDD

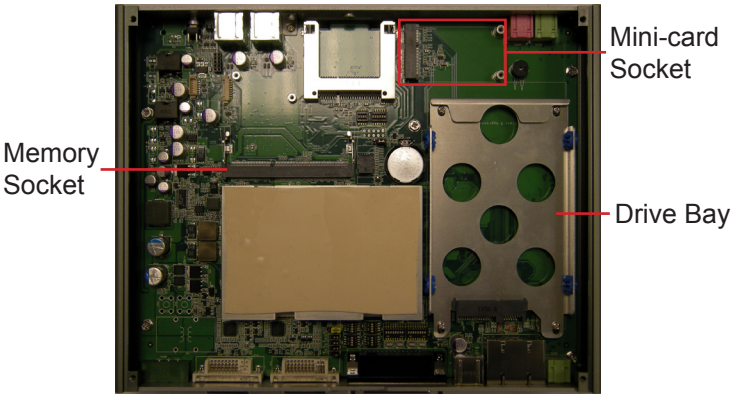
The Rigid-313 is based on modular design to be made slim and lightweight for easier maintenance. This section will cover the simple hardware installations for the rugged computer. Make sure Rigid-313 is powered off before any action is taken.

3.1.1. Remove Top Cover

1. Place the computer on a flat surface. See the picture below. Loosen and remove the four screws that secures the top cover. Part the top cover from the enclosure by prying at the notch on the rear panel's edge with a crosshead screwdriver. Note to apply some force when prying because the top cover is tightly adhered to the internal parts due to a sticky thermal pad.

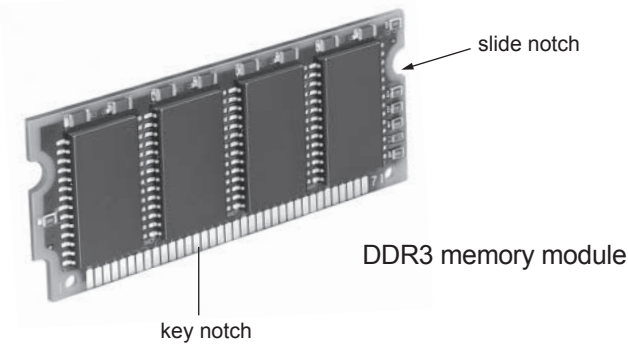


2. Fully dismount the top cover to reveal the inside of the computer. Put the top cover aside for later use.



3.1.2. Install/Uninstall Memory Module

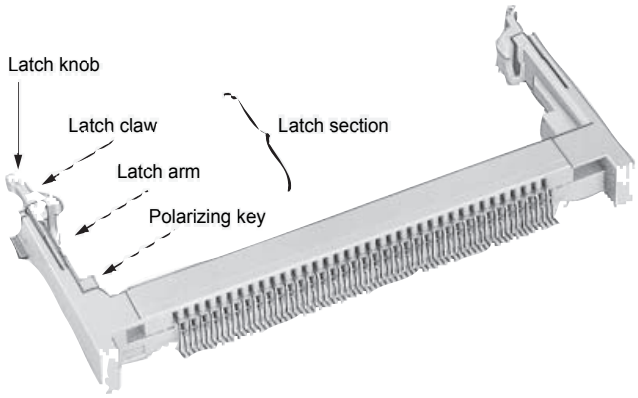
Increase memory capacity to make programs run faster on the system. The memory module for Rigid-313's SO-DIMM socket should be a 204-pin DDR3 with a "key notch" off the centre among the pins, which enables the memory module for particular applications. There are another two notches at each left and right side of the memory module to click the module in the socket.



DDR3 memory module

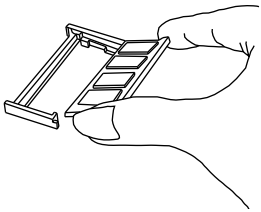
To install a DDR3 memory module:

1. Find the SO-DIMM socket on the main board. The SO-DIMM socket has a slot connector with a off-center break and two spring loaded latches on both sides to fix the DDR3 memory module in place.

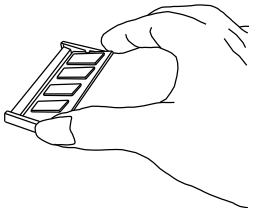


SO-DIMM socket

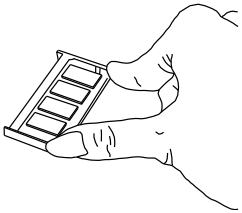
2. Position the memory module's pin side at the SO-DIMM socket, with the memory module's key notch meeting the SO-DIMM socket's slot connector break.



3. Insert the memory module to the slot connector at an slanted angle of 20^{o} to 30^{o}. Note to "fully" insert the memory module to avoid improper insertion.



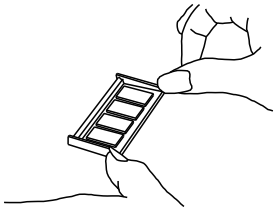
4. Press down the memory module until a click sound is heard.



To uninstall the DDR3 memory module:

1. Pull back the latches from both sides of the SO-DIMM socket.

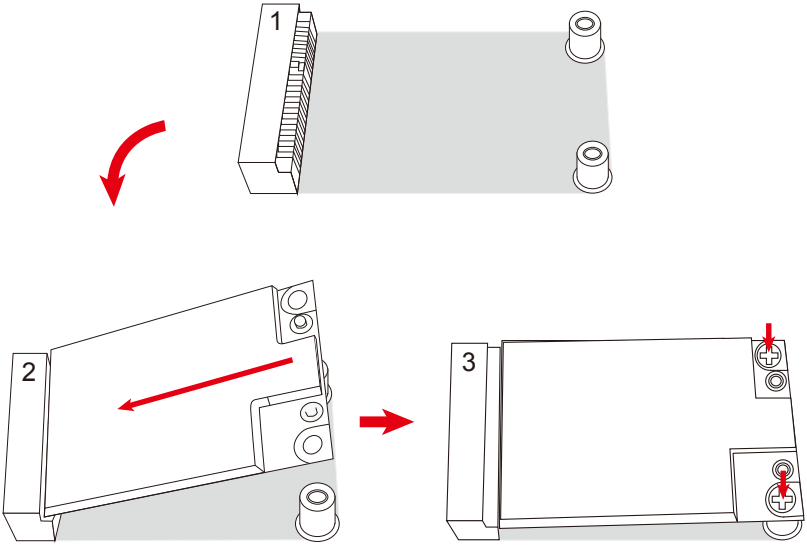
   The DDR3 memory module will be auto-released from the socket.



2. Remove the DDR3 memory module.

3.1.3. Install Mini-Card

1. Locate the Mini-card socket.
2. Plug a HSUPA module to the socket's connector by a slanted angle. Note the notch on the card should meet the break on the connector.
3. Press down the module and fix it in place using two screws.

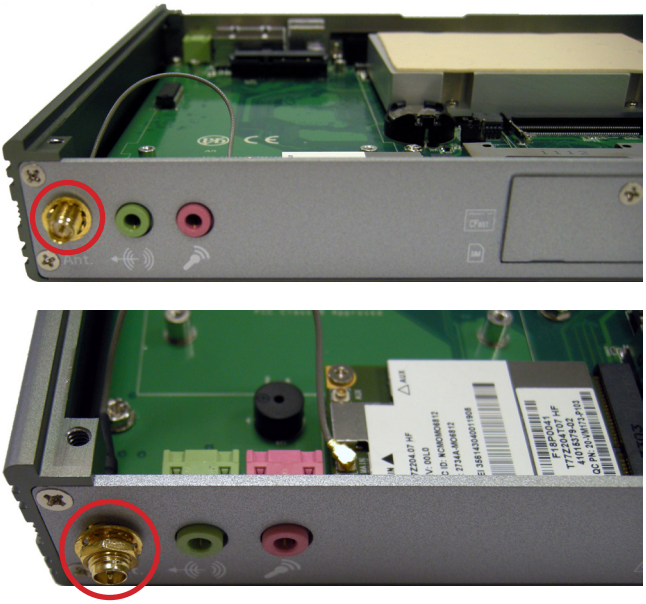


4. See the pictures below. Remove the plastic plug from the enclosure's front panel to make an antenna hole. Keep the plastic plug for later use.

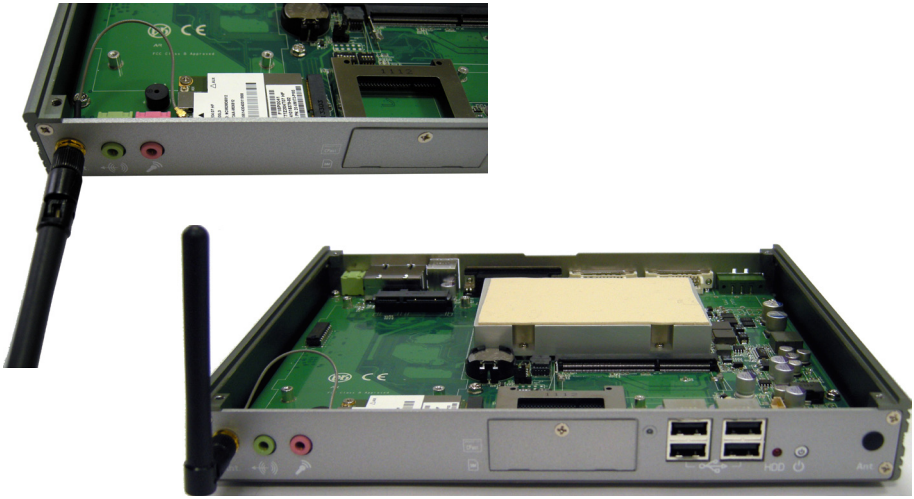
5. Have an RF cable. Connect the RF cable to the mini-card socket's "MAIN" connector.

6. Pull the other end of the RF cable, a SMA connector jack, through the antenna hole. Be sure to arrange the flat side (in red frame) in the right so the connector jack won't get stuck.

7. Mount a round washer on the SMA connector jack from outside the chassis, and secure an nut to it.

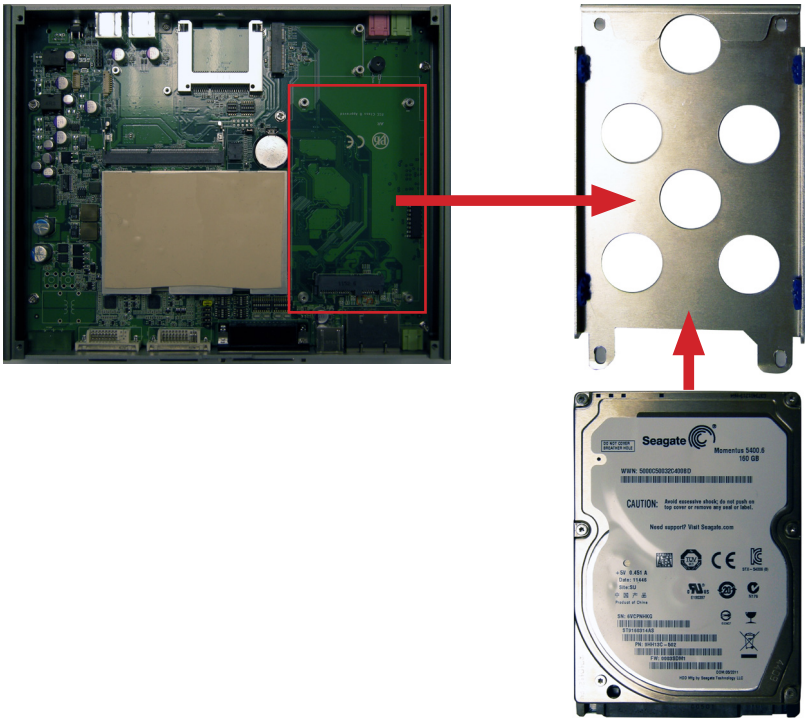


8. Assemble an antenna to the SMA connector jack. Adjust the antenna to an angle for the best signal.

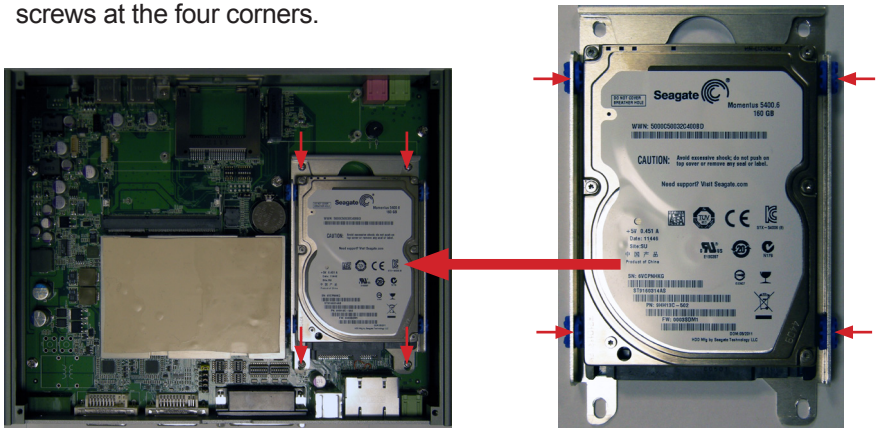


3.1.4. Install Hard Disk Drive

1. Dismount the HDD bracket from the main board. Assemble the HDD onto the bracket.



2. Reinstall the bracket (bearing the HDD) and fix them in place by using screws at the four corners.



3.2. Install/Uninstall CFast/SIM Card

Note: If the OS is installed on the CFast card, power off the computer before installing or uninstalling the CFast card.

1. See the picture below, find the CFast card door on the front panel of the computer.

2. Use a crosshead screwdriver (#1 tip) to loosen and remove the screw that fixes the CFast/SIM card door. Move the door to the left first and then to the right to release the door from the chassis. Then remove the door.

3. See the pictures below. Push-click the CFast/SIM card into the due slot according to the graphics printed besides it. Restore the card door.

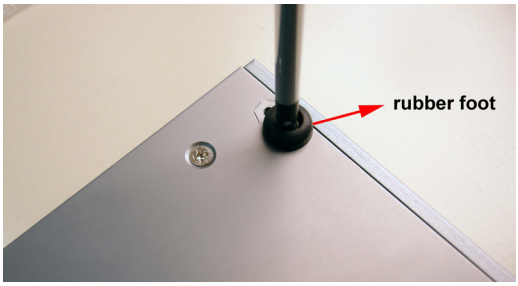
To remove the CFast/SIM card, follow the foregoing steps 1 and 2. Then push-eject the card.

3.3. Wall Mounting

Prepare the wall-mount bracket and a screwdriver. Follow the instructions below to mount the computer to a wall.

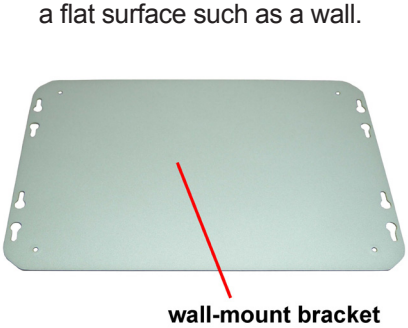
1. Place the computer upside down on a flat surface and find the 4 rubber feet, each of which is fixed to the computer by a screw.

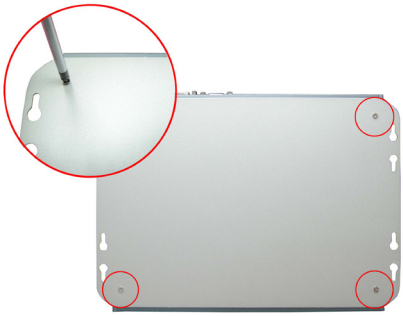
2. Loosen and remove the 4 screws and rubber feet. Keep the screws for later use.



3. Have the wall-mount bracket. Assemble it to the computer by the screw holes left by the rubber feet.

4. Once the bracket is assembled, the computer is mountable to an object with a flat surface such as a wall.





3.4. VESA Mounting (Optional)

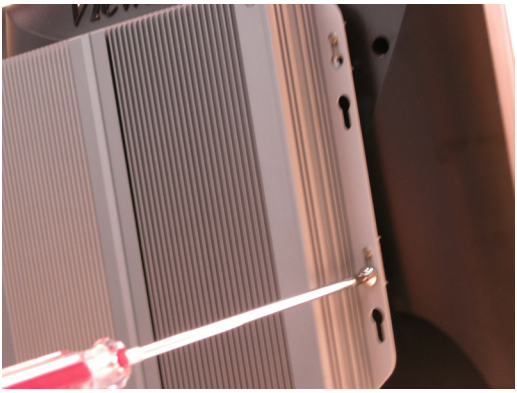
Rigid-313 is designed to mount a LCD monitor's rear that is VESA 75/100 compliant. Prepare the wall-mount bracket, VESA-mount brackets, the accompanying screws and a screwdriver. Then follow through the steps below for VESA mounting:

1. Assemble the wall-mount bracket to the computer as described in 3.3. Wall Mounting on page 35.

2. Find the VESA-compliant screw holes at the rear of the LCD monitor.

3. Assemble the VESA mounting adaptor to the rear of the LCD monitor.

4. Mount the computer onto the VESA bracket. Fix the assemblage with the accompanying screws.

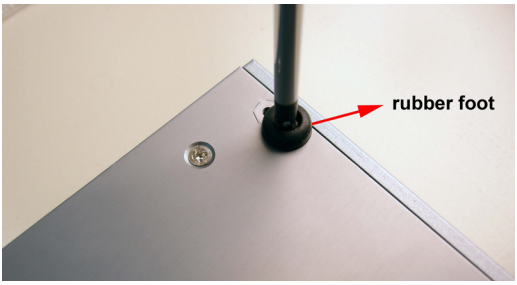


3.5. DIN Rail Mounting (Optional)

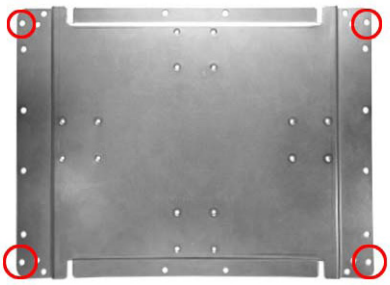
Prepare the DIN rail kit and a screwdriver. Follow through the steps below to use DIN-rail on the computer:

1. Place the computer upside down on a flat surface and find the 4 rubber feet, each of which is fixed to the computer by a screw.

2. Loosen and remove said screws to uninstall the rubber feet. Keep the screws and the rubber feet for future use.



3. Have the DIN-rail bracket. Assemble it to the computer by the four screw holes left by the said rubber feet. Fix the assemblage by the accompanying screws.



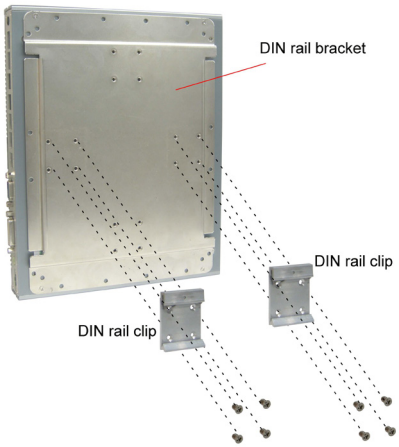
DIN-rail bracket

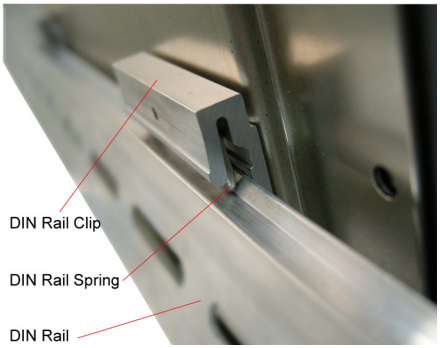
Once assembled with a DIN-rail bracket, the computer can be integrated with a DIN-rail, by either landscape or portrait orientation.

4. Fix a pair of DIN-rail clips onto the DIN-rail bracket. See the following sections for each horizontal and vertical mounting of the DIN-rail.

3.5.1. Portrait-Oriented Mounting

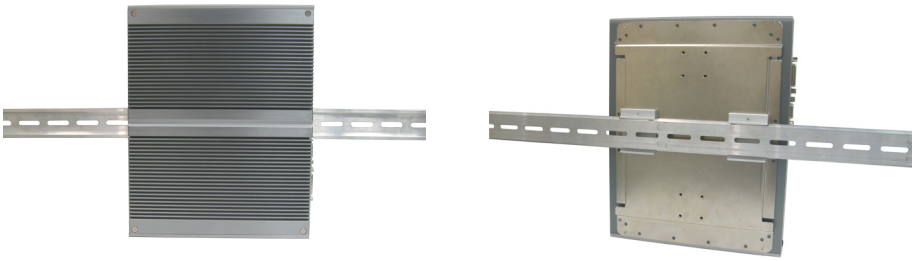
1. Fix two DIN-rail clips onto the DIN rail bracket as depicted in the illustration on the right side.





2. Confront the computer's bracket side with the DIN-rail. Clip the top side of the computer on the DIN-rail first. Push the bottom of the computer and snap it onto the DIN-rail.

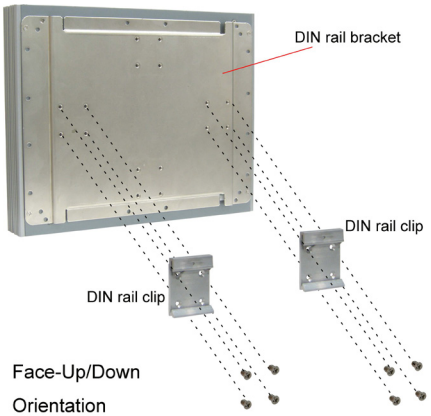
   If the computer cannot be fixed, reverse the computer and clip the computer onto the DIN-rail by the bottom side.

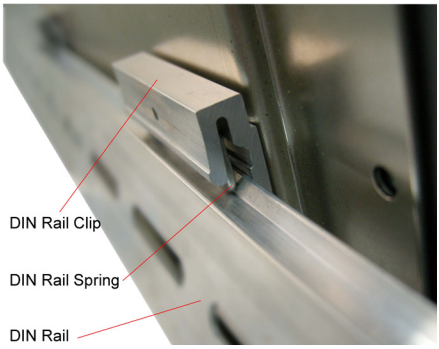


computer mounted on DIN-rail - portrait orientation

3.5.2. Landscape-Oriented Mounting

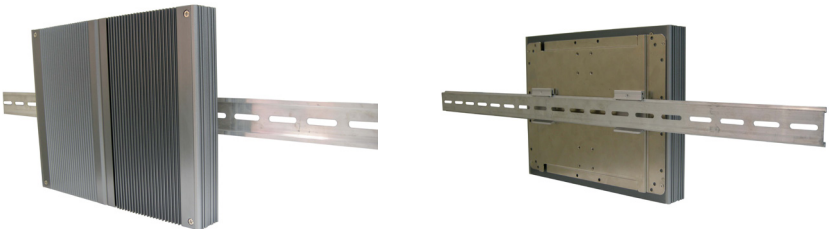
1. Fix two DIN-rail clips onto the DIN rail bracket as depicted in the illustration on the right side.





2. Confront the computer's bracket side with the DIN-rail. Clip the top side of the computer on the DIN-rail first. Push the bottom of the computer and snap it onto the DIN-rail.

   If the computer cannot be fixed, reverse the computer and clip the computer onto the DIN-rail by the bottom side.



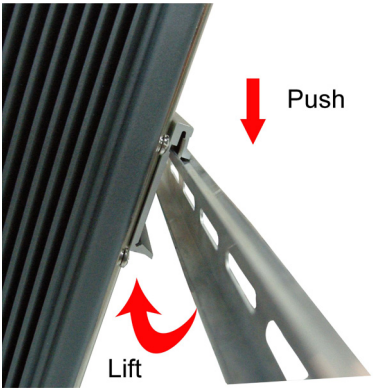
computer mounted on DIN-rail - landscape orientation

3.5.3. Dismount from DIN-Rail

Power off the computer and disconnect all cables from it before dismouting the computer off the DIN-rail.

1. Push down the computer by the top side with both hands.

   The clilps are then released from the DIN-rail.



2. Completely dismount the computer off the DIN-rail by lifting the computer's bottom side.

3.6. Ground the Computer

Follow the instructions below to ground the computer onto land. Be sure to follow every grounding requirement in your place.

> ⚠ **Warning** Whenever installing the unit, the ground connection must always be made first of all and disconnected lastly.

1. See the illustration above. Remove the ground screw from the bottom-left of the rear panel.

2. Attach a ground wire to the rear panel with the screw.

3.7. Wire DC-Input Power Source

> **Warning** Only trained and qualified personnel are allowed to install or replace this equipment.

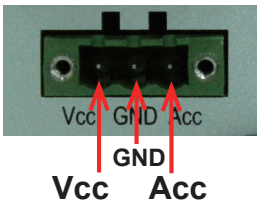
Follow the instructions below for connecting the computer to a DC-input power source.

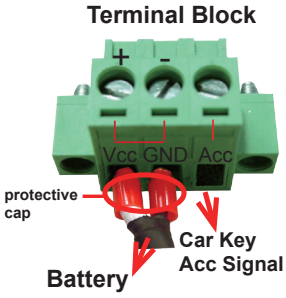
1. Before wiring, make sure the power source is disconnected.
2. Find the terminal block in the accessory box.
3. Use the wire-stripping tool to strip a short insulation segment from the output wires of the DC power source.
4. Identify the positive and negative feed positions for the terminal block connection. See the symbols printed on the rear panel indicating the polarities and DC-input power range in voltages.
5. Insert the exposed wires into the terminal block plugs according to the power mode (see next section). Only wires with insulation should extend from the terminal block plugs. Note that the polarities between the wires and the terminal block plugs must be positive to positive and negative to negative.
6. Use a slotted screwdriver to tighten the captive screws. Plug the terminal block firmly, which wired, into the receptacle on the rear panel.

3.7.1 Vehicle Power Mode

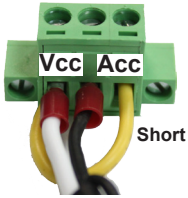
1. Vehicle DC Power Input Wiring

For Vehicle application, DC power Input wiring pin configuration is as below. Please connect the Acc pin with your car Acc, and the device will be activated when you turn your ignition key to Acc.





Warning: For internal testing, please short the Vcc and Acc pin before connecting to power source, or the device won't be activated



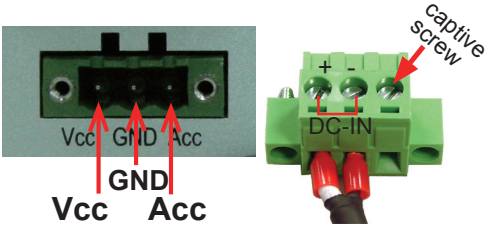
2. Make sure JACC1 jumper is short for vehicle power mode
By default, JACC1 is short for Rigid-313. Refer to 2.2.2. Jumper Setting on page 14.

3. Set System Automatic Power Mode
Use SW1 to set desired power mode. Refer to SW1 for Vehicle Appplica-toin under 2.2.2. Jumper Setting on page 14.

4. Set Battery Low Voltage Protection
Use SW2 to set battery low voltage protection. Refer to SW2 Setting under 2.2.2. Jumper Setting on page 14.

3.7.2 Automation Power Mode

1. **Automation DC Power Input Wiring**



terminal block

2. Make sure JACC1 jumper is open to enable automation power mode
By default, JACC1 is short for Rigid-313 so you have to make is open. Refer to 2.2.2. Jumper Setting on page 14.

3. System Automatic Power ON/OFF
Use SW1 to set desired power mode. Refer to SW1 for Automation Ap-plication under 2.2.2. Jumper Setting on page 14.

4. Battery Low Voltage Protection
Not Supported

Chapter 4

Driver & AP

4.1. Prior to Installation

After everything aforementioned is done, proceed to install the necessary drivers and application programs so the computer can function for you. As Rigid-313 supports Windows 7 32-bit only, the following section will only focus on the installation therein. And note to install the drivers as the sequece below:

CHIPSET→VGA→AUDIO→LAN

Do **Follow This Procedure** to install all necessary pieces of software in most cases to escape errors.

Find the drivers & AP for Windows 7 on the CD that goes with your purchase. The paths to find them on CD are tabulated as below.

Windows 7-32bit

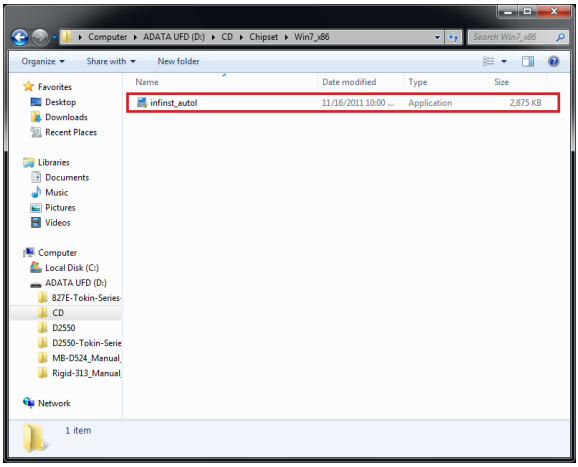
Driver	Path
CHIPSET	\Chipset\Win7_x86
VGA	\VGA\Win7_x86
LAN	\LAN\Install_Win7_7048_09162011
AUDIO	\Driver\Audio ALC662\Win 7(32,64 bits) Driver_R2.66

Note: Rigid-313 only supports Windows 7 32bit.

4.2. Drivers

4.2.1. CHIPSET

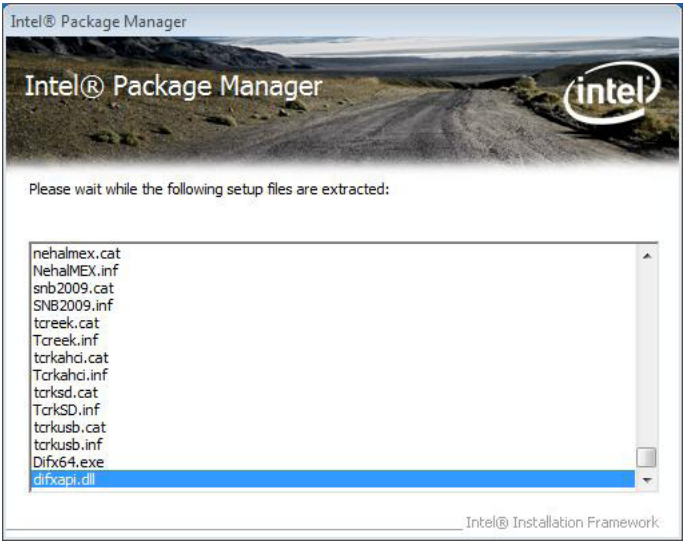
1. Run the executable file “infinst_autol.exe” at the folder **\Chipset\Win7_x86** as described in 4.1. Prior to Installation on page 46.



The installation wizard then opens

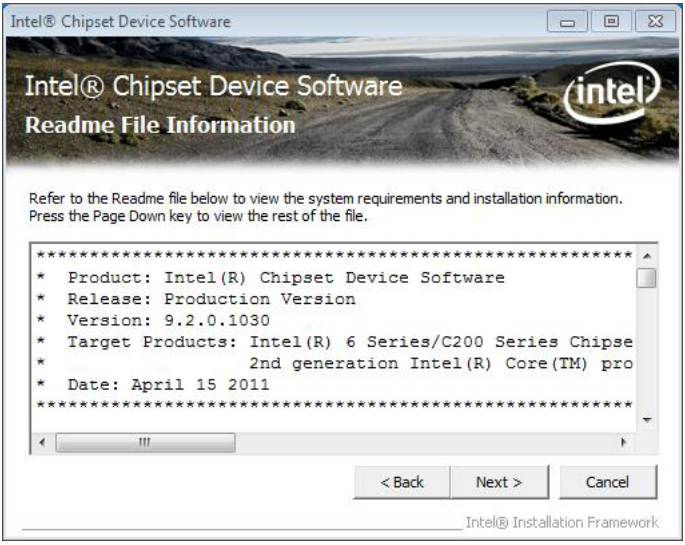
2. Select **Next** to proceed.

The installation wizard then starts to extract the files required for the driver installation, which is through in a few seconds.



3. Read the license agreement and click **Yes** to proceed.

4. Read the readme file and click **Next** to proceed.

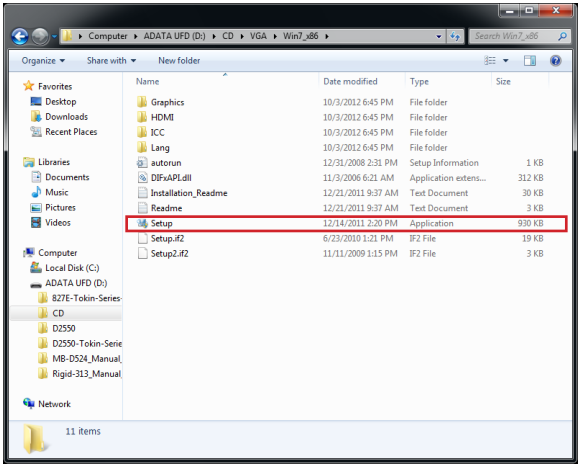


The driver installation then starts and finishes in a few seconds.

5. Click **Finish** to finish and quit the installation.

4.2.2. VGA

1. Run the executable file “Setup.exe” at the folder **\VGA\Win7_x86** as described in 4.1. Prior to Installation on page 46.

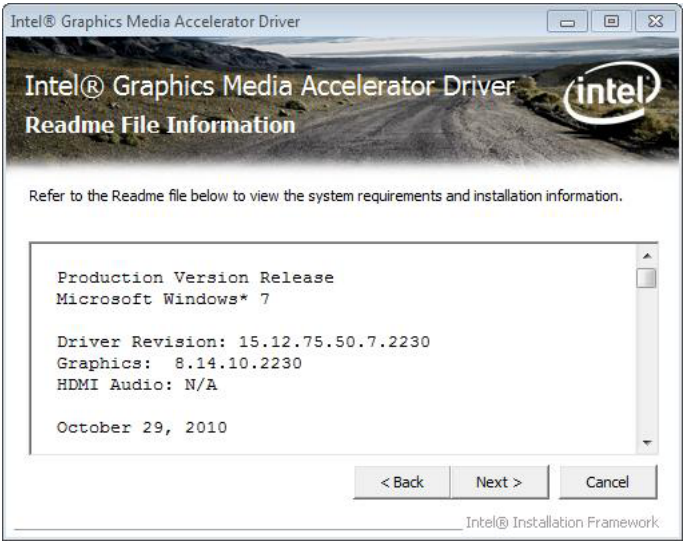


The installation wizard then opens.

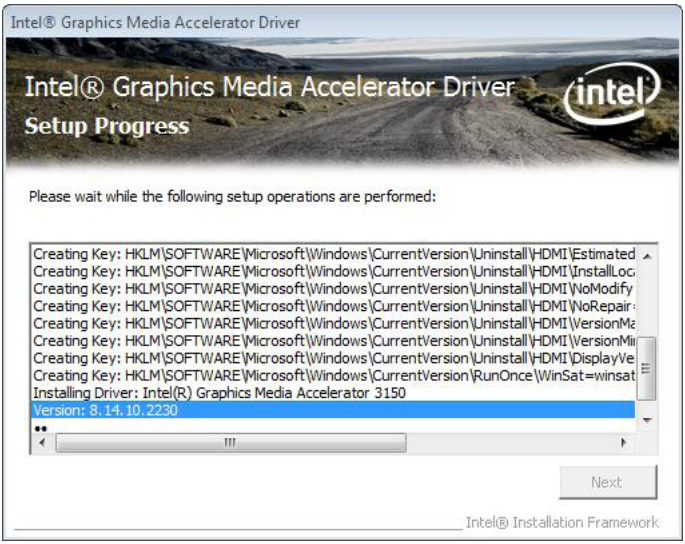
2. Click **Next** to proceed.

3. Read the license agreement and click **Yes** to proceed.

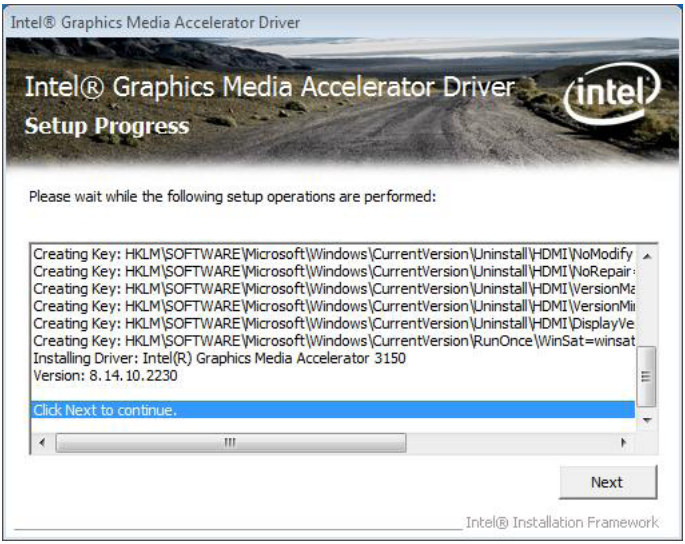
4. Read the readme file and click **Next** to proceed.



The setup operation then starts and progresses.



5. Once the setup operation is through, click **Next** to proceed.



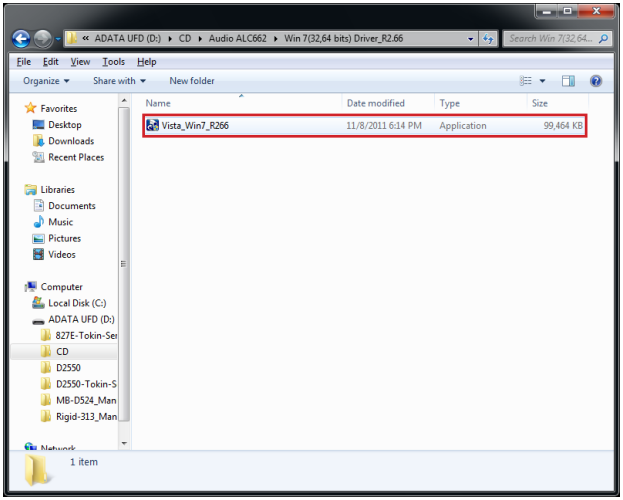
6. Select **Yes, I want to restart this computer now** and press **Finish** button to restart the computer by the support of the VGA driver you just installed.

   OR

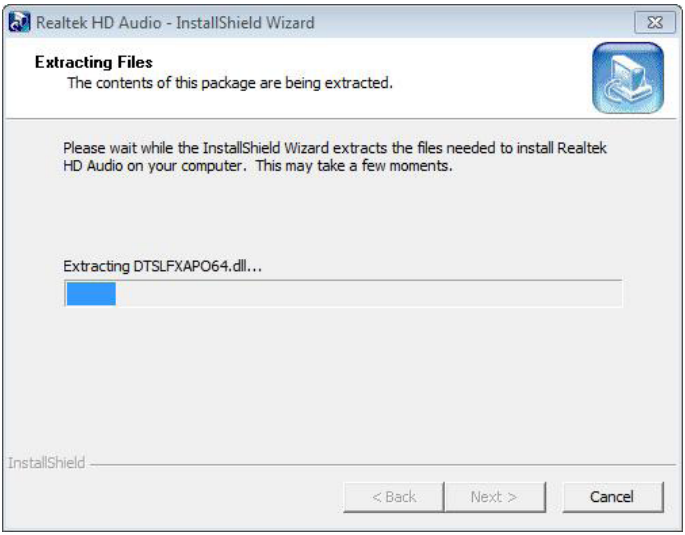
   Select **No, I will restart this computer later** and press **Finish** button to finish and quit the driver installation.

4.2.3. Audio

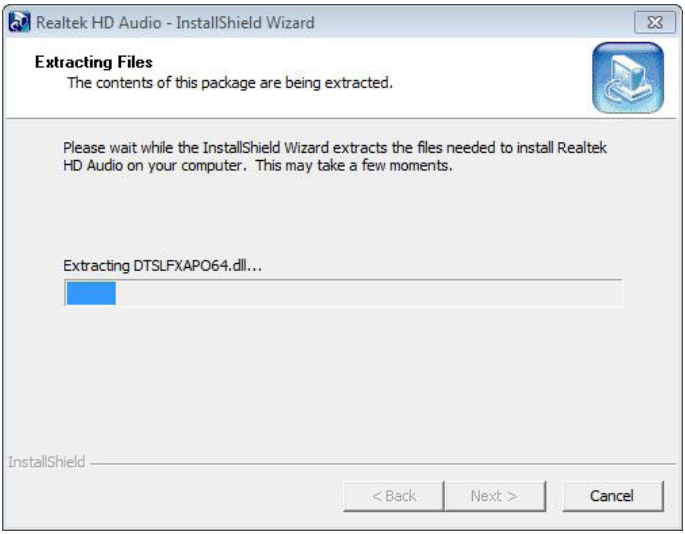
1. Run the executable file "Vista_Win7_R266.exe" at the folder **\Audio ALC662\ Win 7(32,64 bits) Driver_R2.66** as described in 4.1. Prior to Installation on page 46.



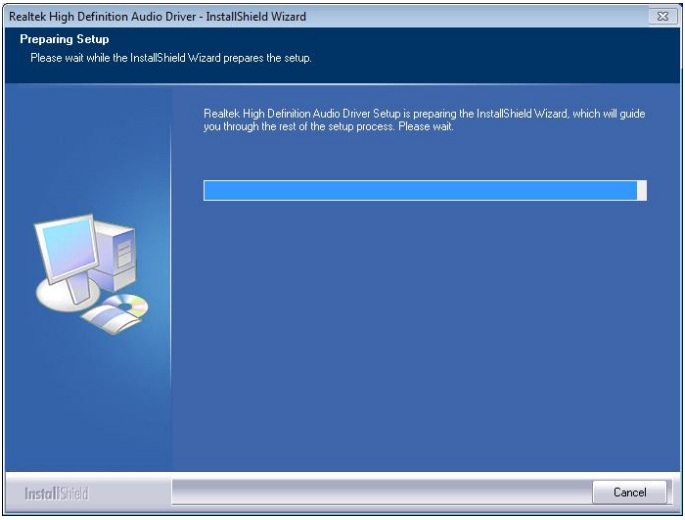
File extraction then starts and progresses for the driver installation.



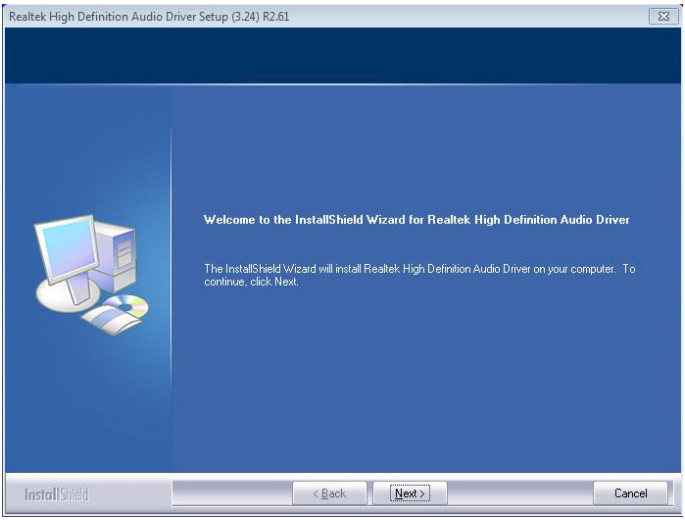
2. Once the file extraction is through, click **Next** to proceed.



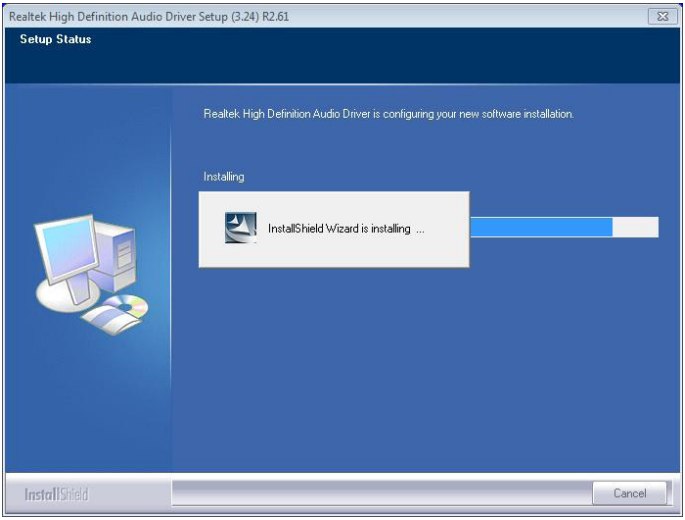
The installation wizard proceeds to prepare for the setup.



3. Once the preparation is through, the installation wizard prompts to install the audio driver. Click **Next** to proceed.



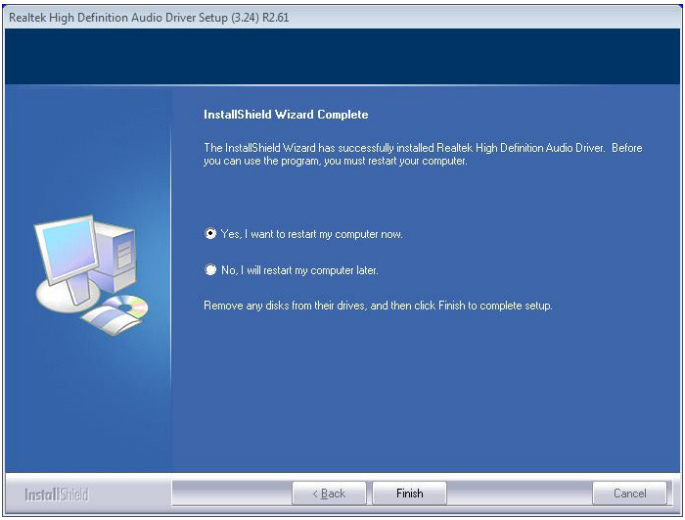
The installation starts and progresses.



4. Once the installation is through, select **Yes, I want to restart my computer now** and press **Finish** button to restart the computer by the support of the audio driver you just installed.

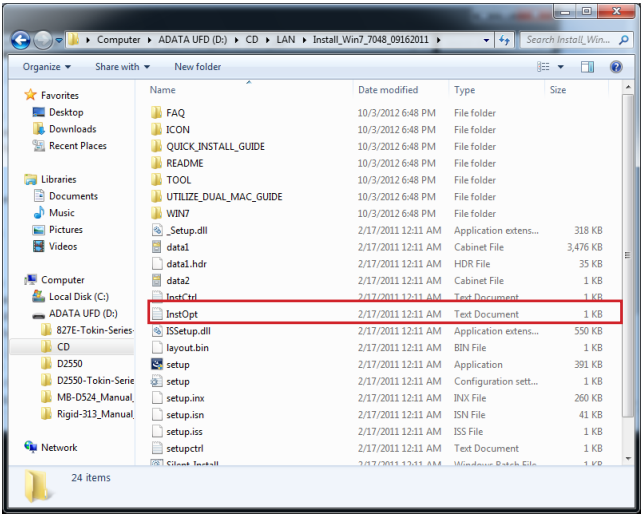
   OR

   Select **No, I will restart my computer later** and press **Finish** button to finish the driver installation.

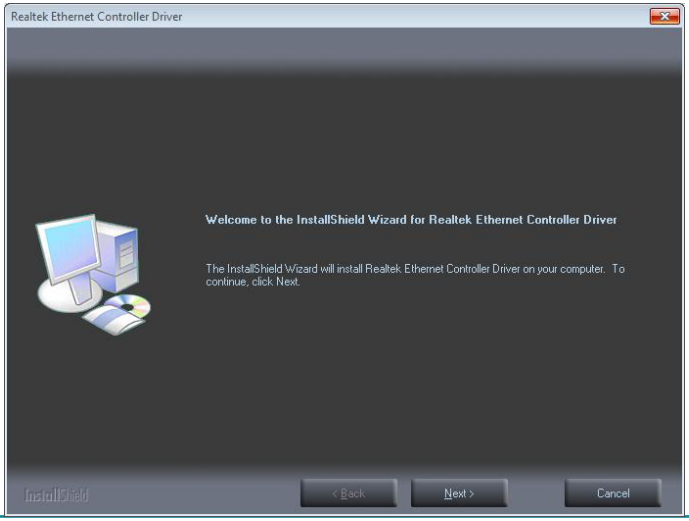


4.2.4. LAN

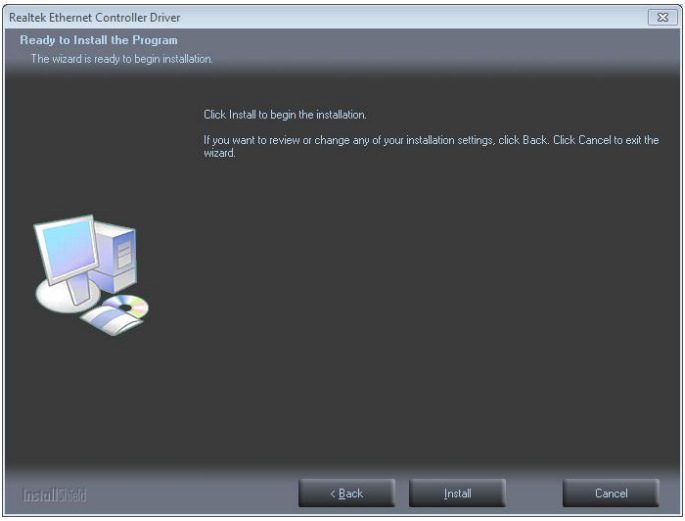
1. Run the executable file “setup.exe” at the folder **\LAN\Install_Win7_7048_09162011** as described in 4.1. Prior to Installation on page 46.



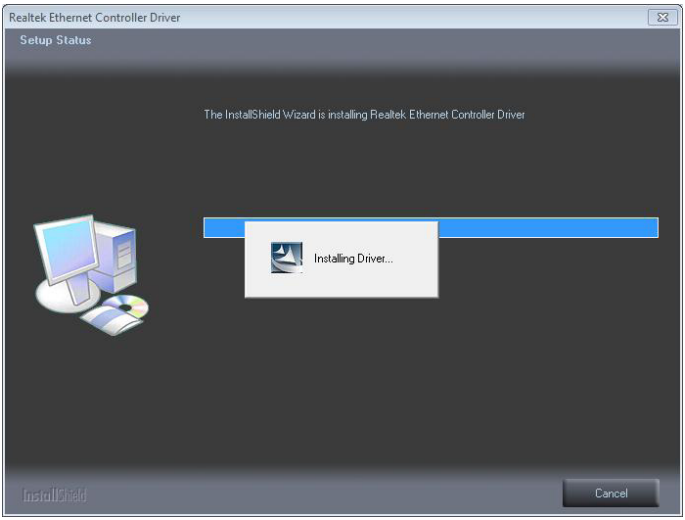
The installation wizard opens and prompts to install the Ethernet controller driver. Click **Next** to proceed.



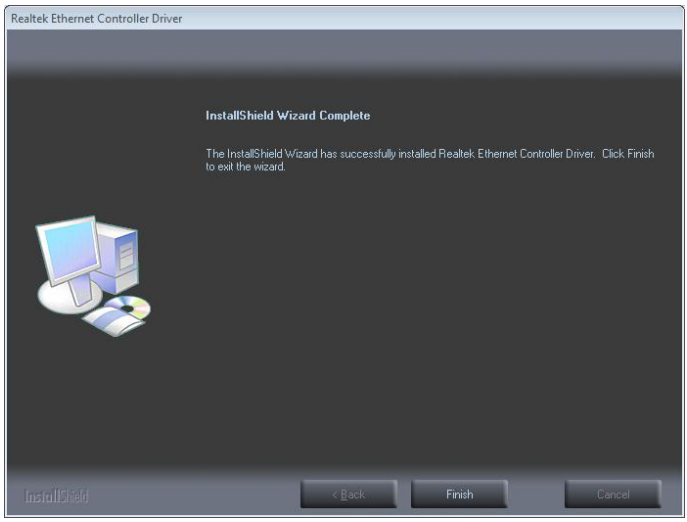
2. Click **Install** to proceed.



The installation starts and progresses.



3. Once the installation is through, select press **Finish** button to finish and quit the driver installation



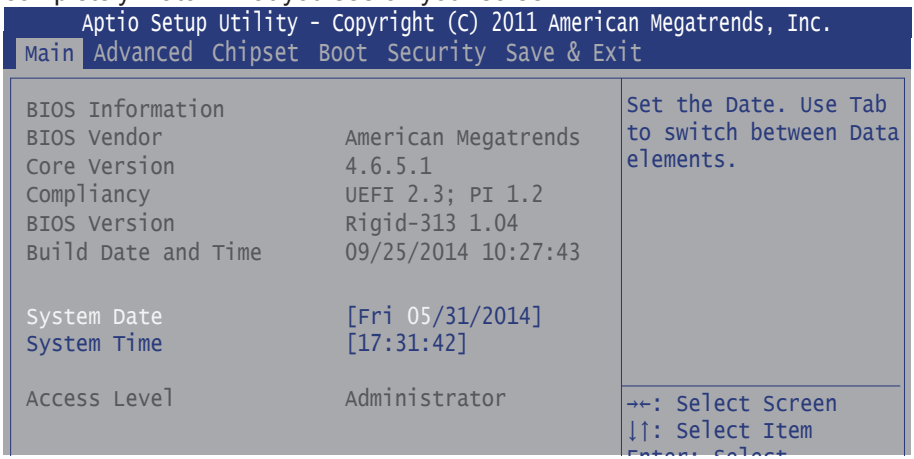
Chapter 5

BIOS

5.1 BIOS Main Setup

The AMI BIOS provides a setup utility program for specifying the system configurations and settings which are stored in the BIOS ROM of the system. When you turn on the computer, the AMI BIOS is immediately activated. After you have entered the setup utility, use the left/right arrow keys to highlight a particular configuration screen from the top menu bar or use the down arrow key to access and configure the information below.

Note: In order to increase system stability and performance, our engineering staff are constantly improving the BIOS menu. The BIOS setup screens and descriptions illustrated in this manual are for your reference only, and may not completely match what you see on your screen.



BIOS Information

Display the BIOS information.

System Date

Set the system date. Note that the 'Day' automatically changes when you set the date.

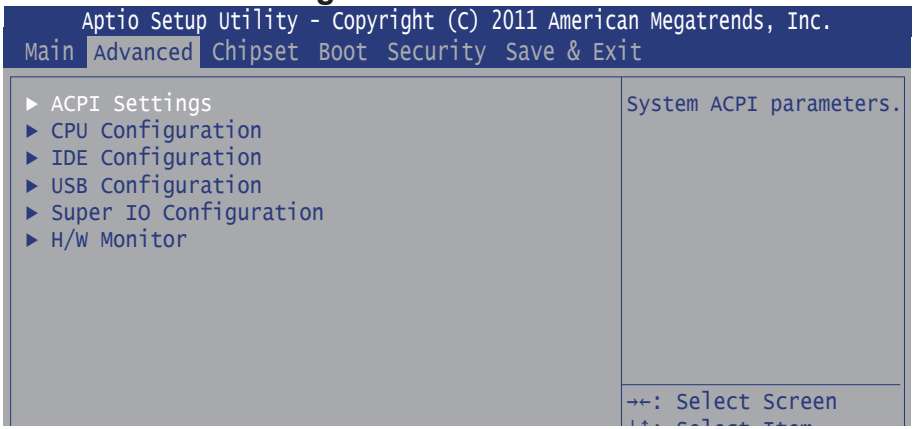
The date format is:

Day : Sun to Sat
Month : 1 to 12
Date : 1 to 31
Year : 1999 to 2099

System Time
Set the system time.
The time format is:

Hour : 00 to 23
Minute : 00 to 59
Second : 00 to 59

5.2 Advanced Settings



ACPI Settings
Set system ACPI parameters.

CPU Configuration
This section is used to configure the CPU. It will also display detected CPU information.

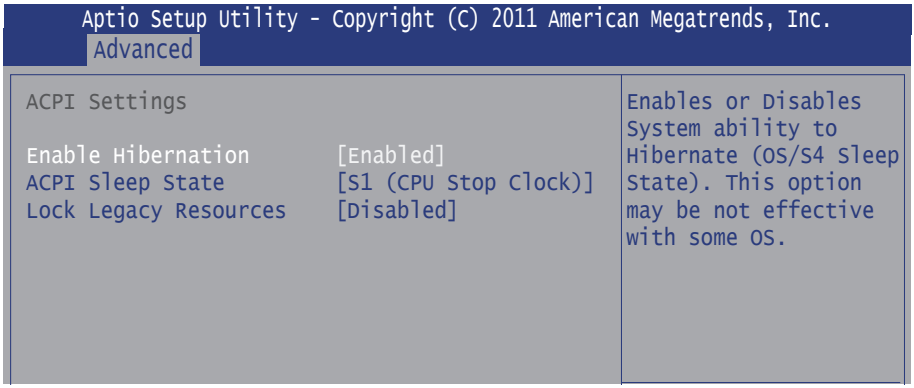
IDE Configuration
Configure IDE devices.

USB Configuration
Configure the USB devices.

Super IO Configuration
Set system super IO chip parameters.

H/W Monitor
Reveal monitor hardware status.

5.2.1 ACPI Settings



Enable Hibernation

Enable/Disable the Hibernation function. This allows the operating system to control power to the computer's disk, monitor and peripheral devices.
Setting: Enabled (Default), Disabled

ACPI Sleep State

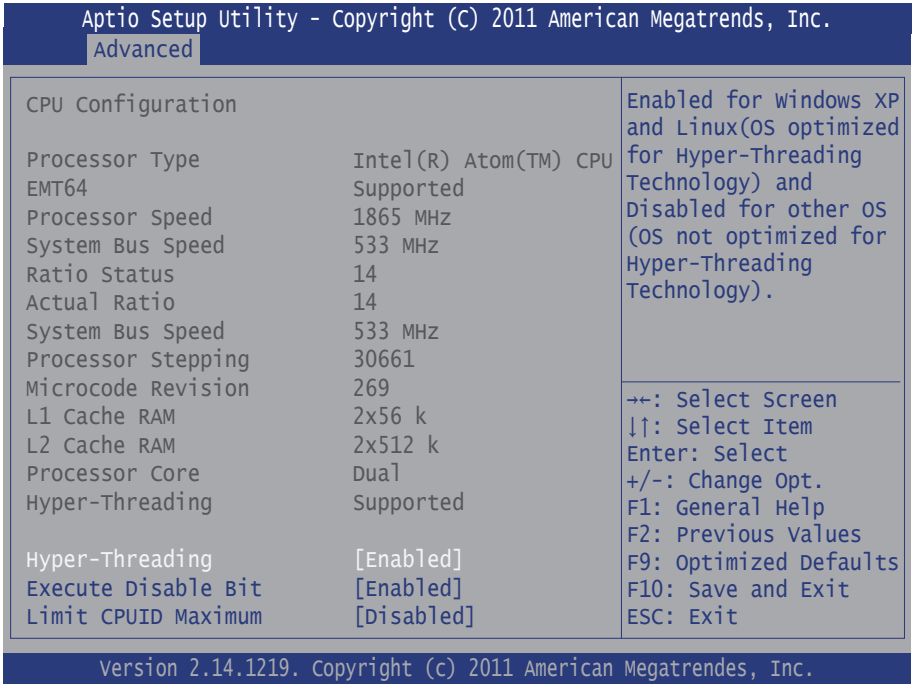
Select the highest ACPI sleep state the system will enter when the SUSPEND button is pressed.
The choice: Suspend Disabled, S1 (CPU Stop Clock)

Lock Legacy Resources

Enable/Disable Lock of Legacy Resources.

5.2.2 CPU Configuration

The CPU Configuration setup screen varies depending on the installed processor.



Hyper-threading

This item is used to Enable/Disable the processor's Hyper-threading feature.
When disabled, only one thread per enabled core is enabled.

Execute Disable Bit

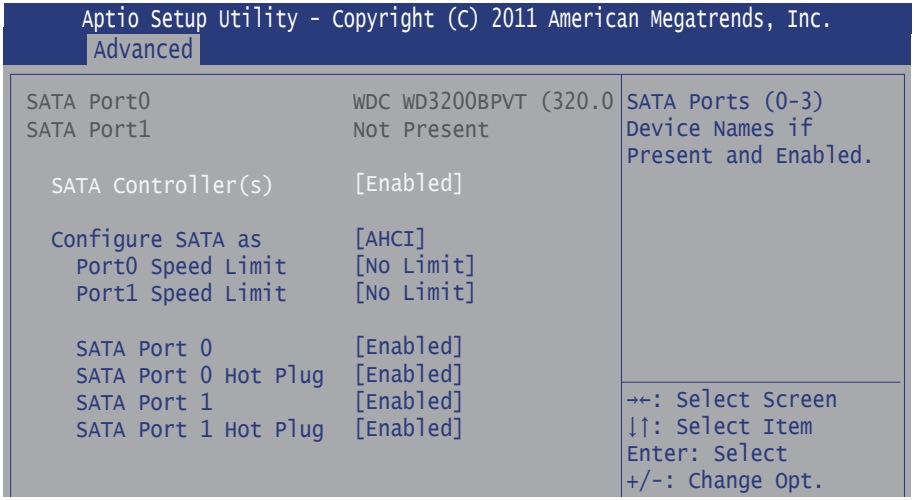
XD can prevent certain classes of malicious buffer overflow attacks when combined with a supporting OS.

Limit CPUID Maximum

Enable/Disable the Limit CPUID Maximum.

5.2.3 IDE Configuration

It allows you to select the operation mode for SATA controller.



SATA Controller(s)

SATA Ports Device Names if Present and Enabled.

Configure SATA as

Select a configuration for SATA controller.

Port0/1 Speed Limit

Select Port0/1 AHCI Speed Limit.

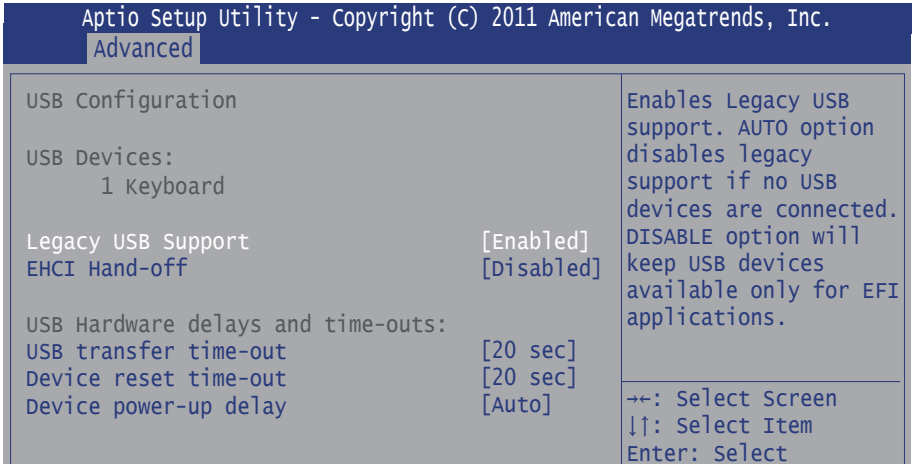
SATA Port 0/1

Enable/Disable SATA Port.

SATA Port 0/1 Hot Plug

Designates this port as Hot Pluggable.

5.2.4 USB Configuration



Legacy USB Support

Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected. DISABLE option will keep USB devices available only for EFI applications.

EHCI Hand-Off

Allows you to enable support for operating systems without an EHCI hand-off feature. Do not disable the BIOS EHCI Hand-Off option if you are running a Windows® operating system with USB device.
Settings: Enabled (Default); Disabled

USB transfer time-out

The time-out value for Control, Bulk, and Interrupt transfers.

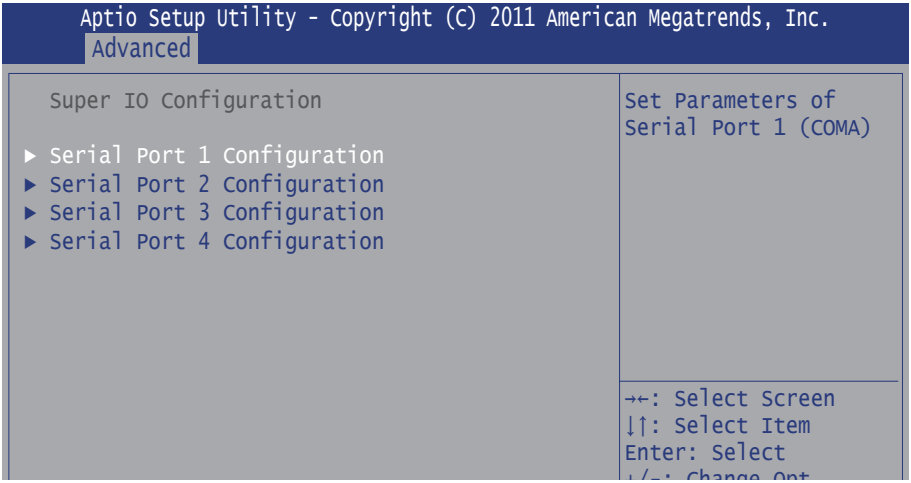
Device reset time-out

USB mass storage device Start Unit command time-out.

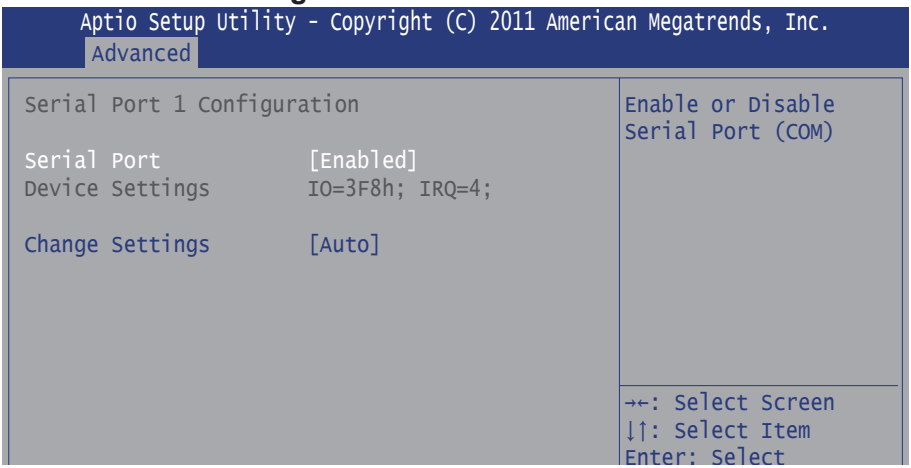
Device power-up delay

Max time the device will take before it properly reports itself to the Host Controller. 'Auto' uses default value: for a Root port the delay is taken from Hub descriptor.
The choice: Auto, Manual

5.2.5 Super IO Configuration



Serial Port 1~4 Configuration

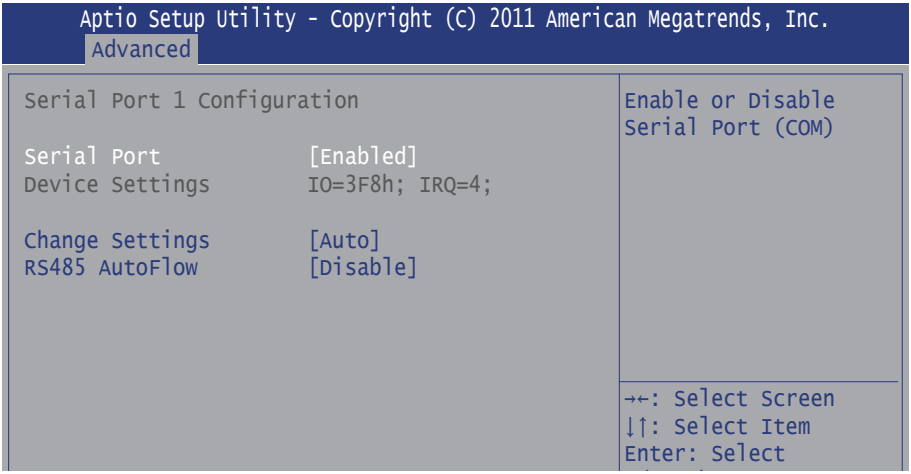


Serial Port

This item allows you to enable/disable Serial Port (COM).

Change Settings

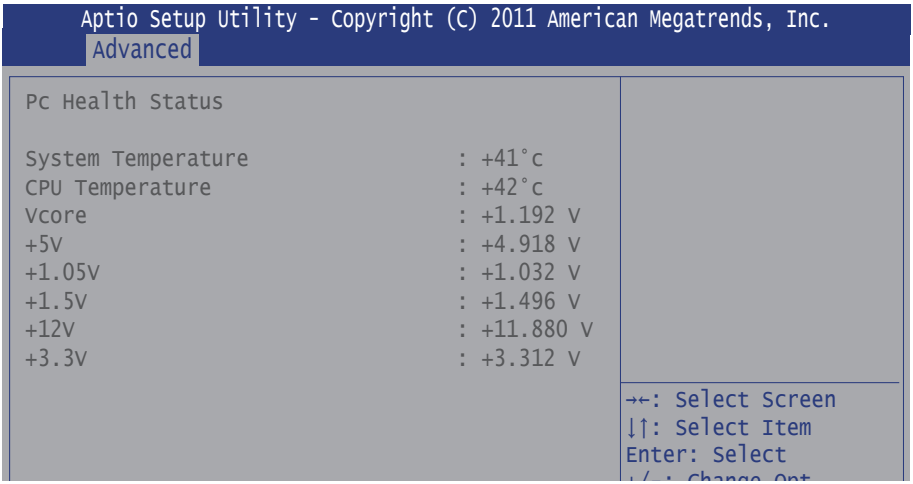
This item allows you to change the serial port IO port address and interrupt address.



RS485 AutoFlow (For Serial Port 3/4 only)

This item allows you to enable/disable the RS485 AutoFlow control.

5.2.6 H/W Monitor



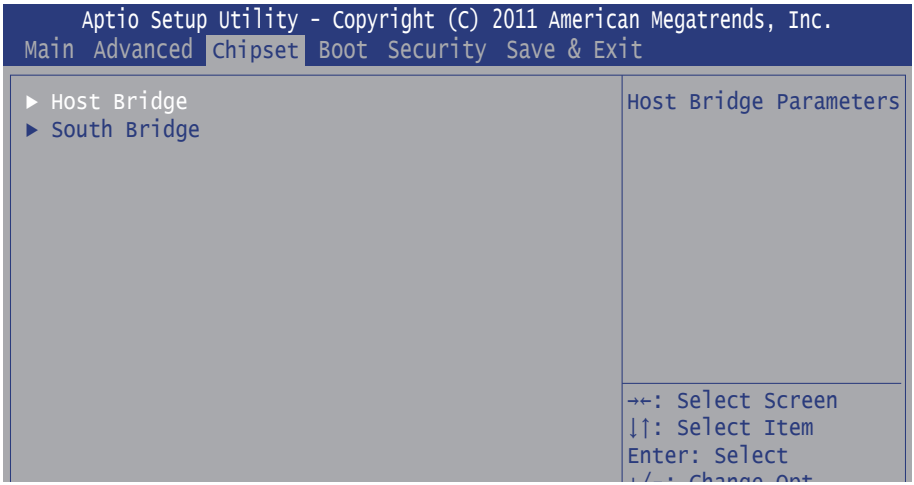
PC Health Status

The hardware monitor menu shows the operating temperature, fan speeds and system voltages.

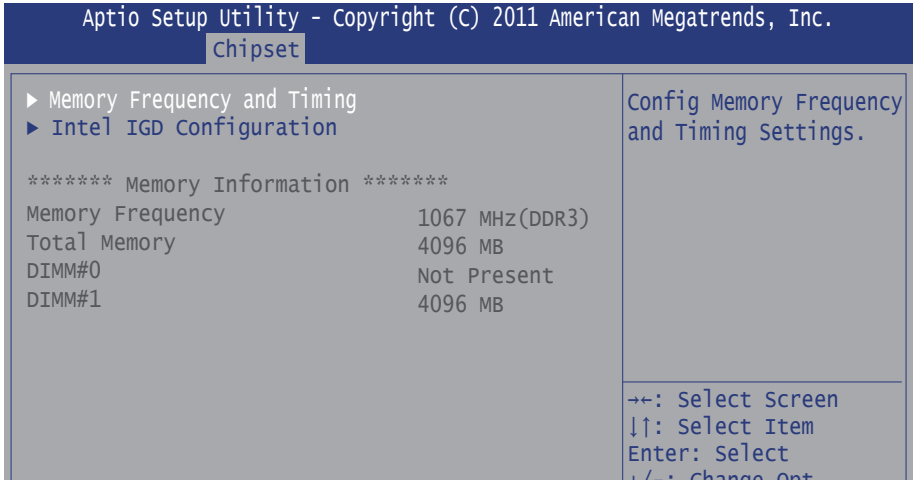
5.3 Chipset Settings

This submenu allows you to configure the specific features of the chipset installed on your system. The chipset manage bus speeds and access to system memory resources, such as DRAM. It also coordinates communications with the PCI bus.

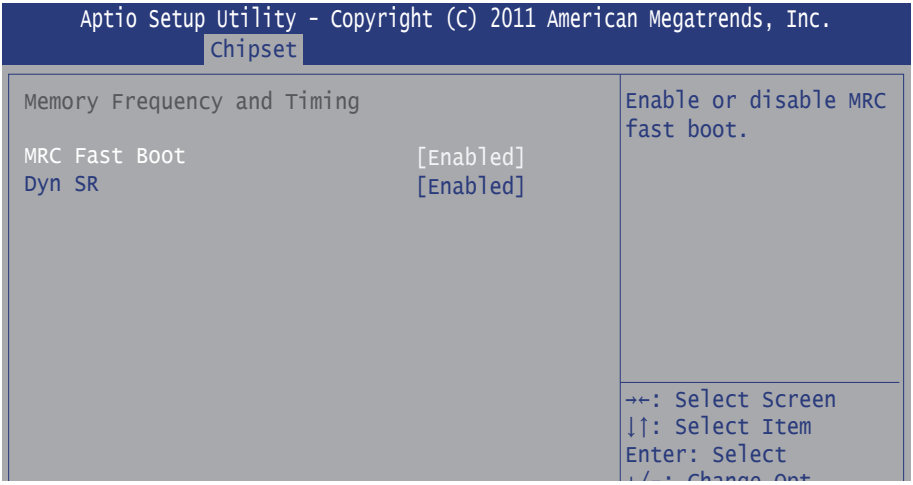
Note: Beware of that setting inappropriate values in items of this menu may cause system to malfunction.



5.3.1 Host Bridge



Memory Frequency and Timing



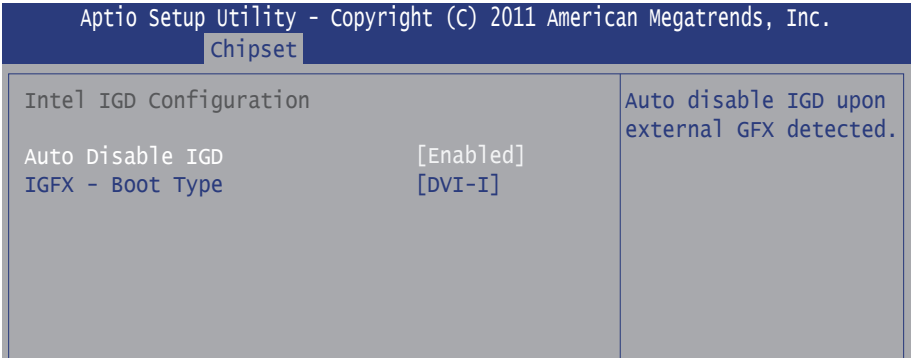
MRC Fast Boot

Enable/Disable MRC fast boot.

Dyn SR

Enable/Disable Dyn SR.

Intel IGD Configuration



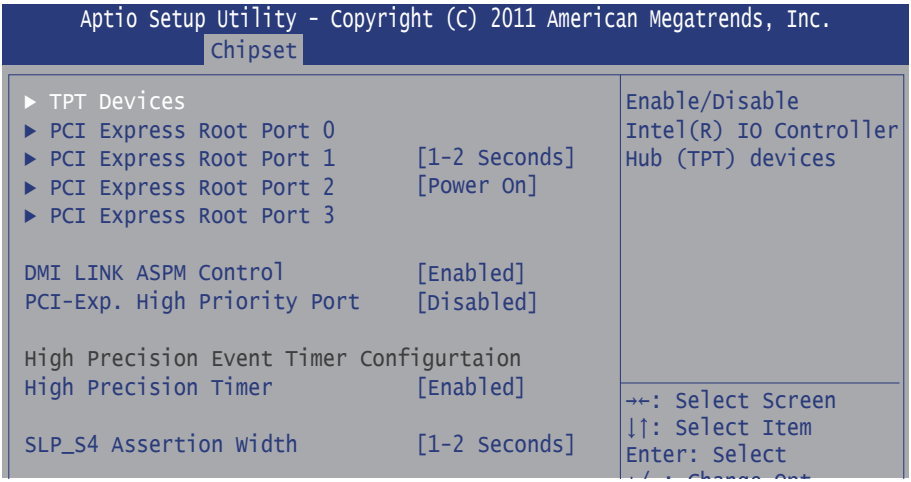
Auto Disable IGD

Auto disable IGD upon external GFX detected.

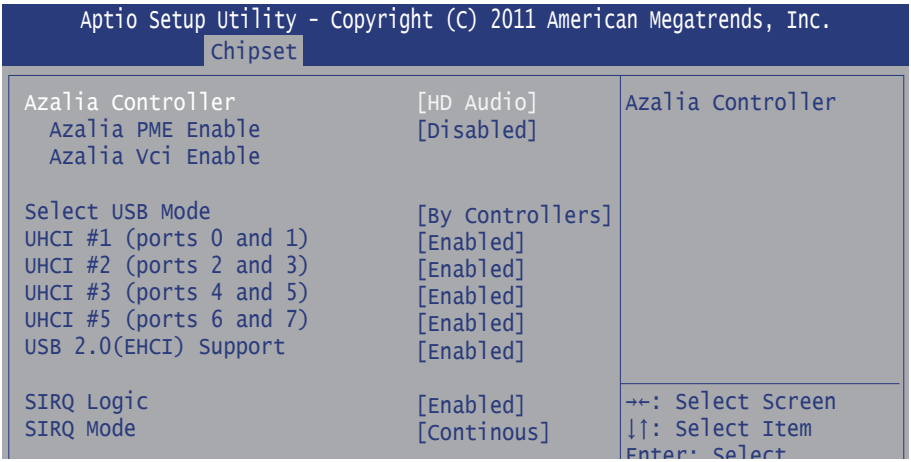
IGFX - Boot Type

Select the Video Device which will be activated during POST. This has no effect if external graphics present.
The choice: DVI-I, DVI-D

5.3.2 South Bridge



TPT Devices



Azalia Controller

Enable/Disable Azalia Controller.

Azalia PME Enable

Enable/Disable Power Management capability of Audio Controller.

Azalia Vci Enable

Azalia supports 1 extended VC, which, when enabled, overrides ICH Vcp settings.

Select USB Mode

Select USB mode to control USB ports.

UHCI #1~4 (ports 0/2/4/6 and 1/3/5/7)

Control the USB UHCI (USB 1.1) functions. Disable from highest to lowest controller.

USB 2.0(EHCI) Support

Enable/Disable USB 2.0(EHCI) Support.

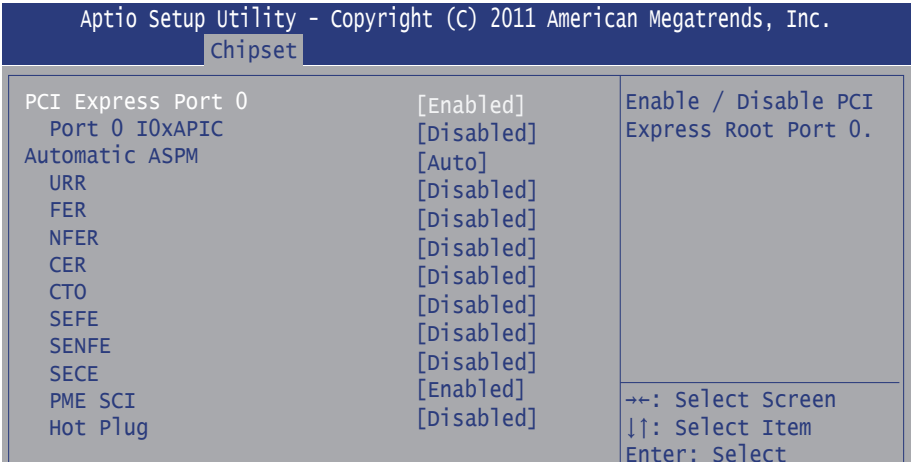
SIRQ Logic

Enable/Disable SIRQ Logic.

SIRQ Mode

Set SIRQ Mode.

PCI Express Root Port 0~3



PCI Express Port 0~3

Enable/Disable PCI Express Root Port 0~3.

Port 0~3 I/OxAPIC

Enable/Disable PCI Express Root Port 0~3 I/O APIC.

Automatic ASPM

Automatically enable ASPM based on reported capabilities and known issues. The choice: Manual, Auto

URR

Enable/Disable PCI Express Unsupported Request Reporting.

FER

Enable/Disable PCI Express Device Fatal Error Reporting.

NFER

Enable/Disable PCI Express Device Non-Fatal Error Reporting.

CER

Enable/Disable PCI Express Device Correctable Error Reporting.

CTO

Enable/Disable PCI Express Completion Timer TO.

SEFE

Enable/Disable Root PCI Express System Error on Fatal Error.

SENFE

Enable/Disable Root PCI Express System Error on Non-Fatal Error.

SECE

Enable/Disable Root PCI Express System Error on Correctable Error.

PME SCI

Enable/Disable PCI Express PME SCI.

Hot Plug

Enable/Disable PCI Express Hot Plug.

DMI Link ASPM Control

The control of Active State Power Management on both NB side and SB side of the DMI Link.

PCI-Exp, High Priority Port

Select a PCI Express High Priority Port.

High Precision Timer

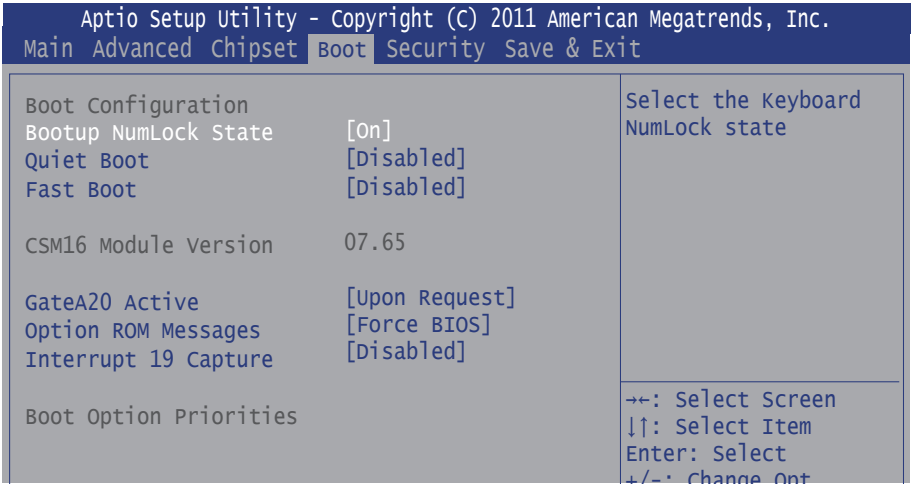
Enable/Disable the High Precision Event Timer.

SLP_S4 Assertion Width

Select a minimum assertion width of the SLP_S4# signal.

5.4 Boot Settings

The Boot menu items allow you to change the system boot options.



Bootup Numlock State

This item determines if the Numlock key is active or inactive at system start-up time.

Quiet Boot

This allows you to select the screen display when the system boots.

Fast Boot

During the POST (Power On Self Test), the BIOS checks the hardware devices and counts the system memory. But all of these system tests are needed every time you boot, and can be turned off to save time. When set to Enabled, this option shortens POST by eliminating some tests.

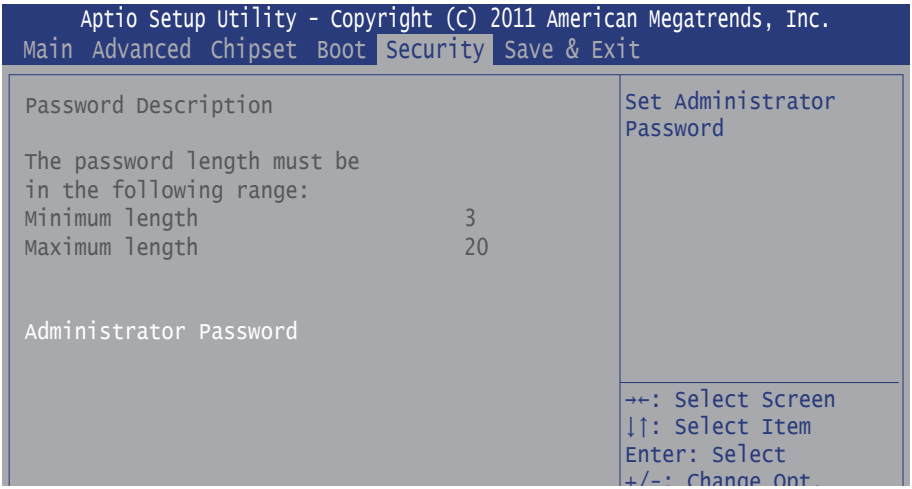
GateA20 Active

UPON REQUEST: GA20 can be disabled using BIOS services.
ALWAYS: disallow to disable GA20; this option is useful when any RT code is executed above 1MB.

Interrupt 19 Capture

Enable/Disable Option ROMs to trap Int 19.

5.5 Security



Administrator Password

Use the Administrator Password to set or change a administrator password.

ENTER PASSWORD

Type the password, up to eight characters in length, and press <Enter>. The password typed now will clear any previously entered password from CMOS memory. You will be asked to confirm the password. Type the password again and press <Enter>. You may also press <ESC> to abort the selection and not enter a password.

To disable a password, just press <Enter> when you are prompted to enter the password. A message will confirm the password will be disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

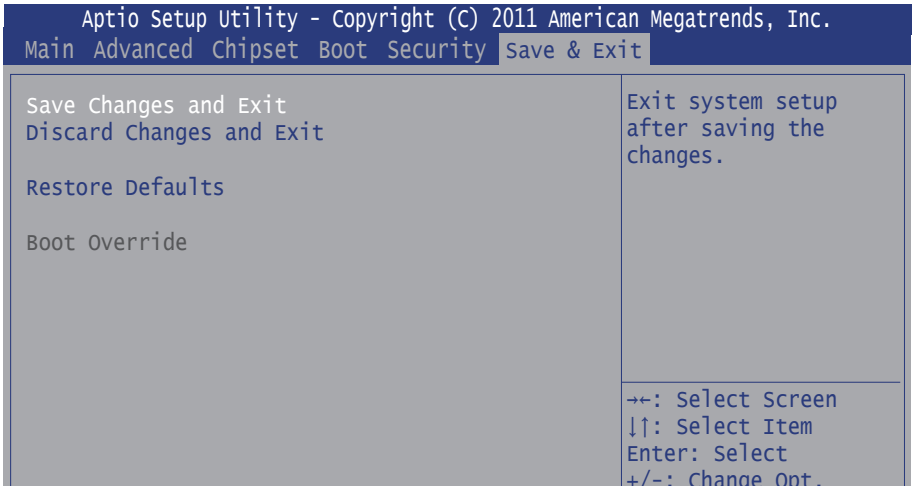
PASSWORD DISABLED

When a password has been enabled, you will be prompted to enter it every time you try to enter Setup. This prevents an unauthorized person from changing any part of your system configuration.

Additionally, when a password is enabled, you can also require the BIOS to request a password every time your system is rebooted. This would prevent unauthorized use of your computer.

You can determine when the password is required within the BIOS Features Setup Menu and its Security option. If the Security option is set to “System”, the password will be required both at boot and at entry to Setup. If it’s set to “Setup”, prompting only occurs when trying to enter Setup.

5.6 Save & Exit



Save Changes and Exit

Pressing <Enter> on this item and it asks for confirmation:

Save configuration changes and exit setup?

Pressing <OK> stores the selection made in the menus in CMOS - a special section of memory that stays on after you turn your system off. The next time you boot your computer, the BIOS configures your system according to the Setup selections stored in CMOS. After saving the values the system is restarted again.

Discard Changes and Exit

Exit system setup without saving any changes.
<ESC> key can be used for this operation.

Restore Defaults

Restore system to settings previously stored by Save as User Defaults. Pressing <Enter> on this item and it asks for confirmation prior to executing this command.

Boot Override

This group of functions includes a list of tokens, each of them corresponding to one device within the boot order. Select a drive to immediately boot that device regardless of the current boot order.

Appendix

Watchdog Timer (WDT) Setting

WDT is widely applied to industry computers to monitor activities of CPU. The programmed application triggers WDT with adequate timer setting depending on its requirement. Before WDT counts down to zero, the functional system will reset the counter. In case the WDT counter is not reset by an abnormal system, it will counts down to zero and then reset the system automatically.

This computer supports the watchdog timer up to 255 levels for users for software programming. Below please take the source code written in C for a WDT application example.

```
/*-----    Include Header Area -----*/
#include “math.h”
#include “stdio.h”
#include “dos.h”

/*-----    routing, sub-routing -----*/

void main()
{
/*-------- index port 0x2e ---------*/
          outportb(0x2e, 0x87);              /* initial IO port */
          outportb(0x2e, 0x87);          /* twice,  */

          outportb(0x2e, 0x07);          /* point to logical device */
          outportb(0x2e+1, 0x07);          /* select logical device 7 */
          outportb(0x2e, 0xf5);          /* select offset f5h */
          outportb(0x2e+1, 0x40);          /* set bit5 = 1 to clear bit5 */
          outportb(0x2e, 0xf0);          /* select offset f0h */
          outportb(0x2e+1, 0x81);          /* set bit7 =1 to enable WDTRST# */
          outportb(0x2e, 0xf6);          /* select offset f6h */
          outportb(0x2e+1, 0x05);          /* update offset f6h to 0ah :10sec */
          outportb(0x2e, 0xf5);          /* select offset f5h */
          outportb(0x2e+1, 0x20);          /* set bit5 = 1 enable watch dog time
*/

          outportb(0x2e, 0xAA);          /* stop program F71869E, Exit */
}
```

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