

MI941

LGA775 Core™ 2 Duo

Intel® G41 Chipset

Mini-ITX Motherboard

USER'S MANUAL

Version 1.0

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Introduction

Checklist

Your MI941 Core 2 Duo motherboard package should include the items listed below:

- The MI941 motherboard
- This User's manual
- 1 x I/O shield
- 1 x IDE cable
- 1 x SATA cable
- 1 CD containing the following:
 - Chipset Drivers
 - Flash Memory Utility

Product Description

The MI941 Mini-ITX motherboard is designed for either the Intel® Core™2 Duo or Core™2 Quad processors of up to 1333MHz FSB. It is based on the Intel G41 Express chipset and it comes with two dual-channel DDR3 memory slots and 8GB memory capacity for faster system responsiveness and support of 64-bit computing.

Dual independent display comes to life with the onboard Intel® G41 integrated graphics with CRT and DVI display interface. LAN functionality is supported with a single Gigabit Ethernet controllers.

MI941 is supports high-end features including high definition audio, ten fast USB 2.0 ports, four SATAII and an eSATA port, watchdog timer, digital I/O and four serial ports. Board dimensions are 170mm by 170mm.

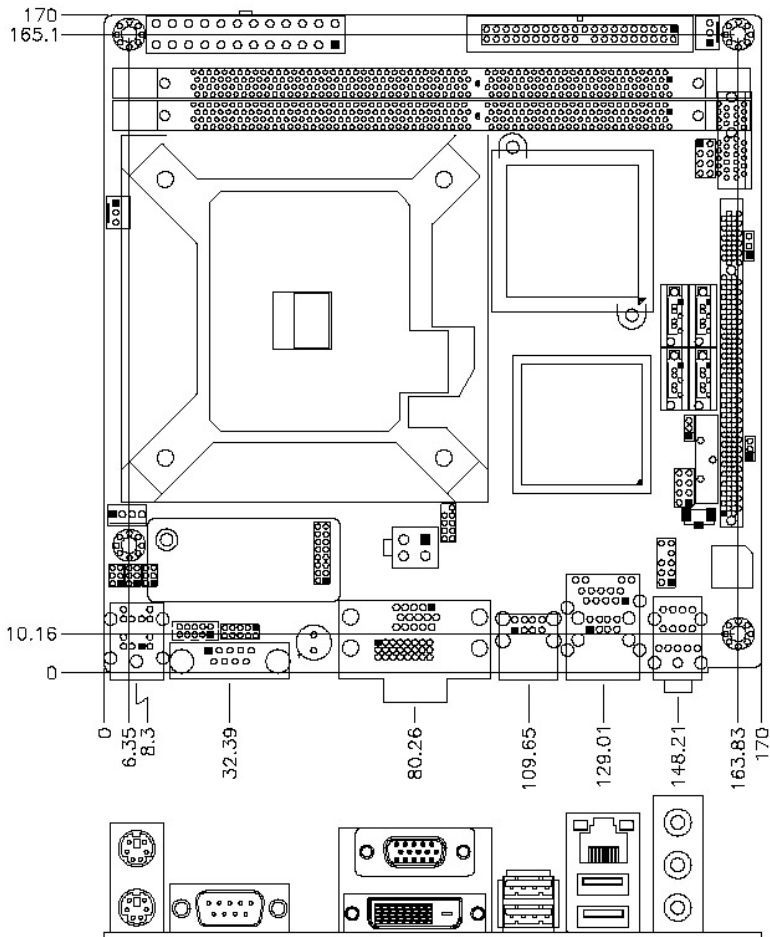
MI941 FEATURES

- Supports Intel® Core™2 Quad / Core™2 Duo / Pentium® Dual Core/ Celeron® processors
- 800MHz/1066MHz/1333MHz FSB
- DDR3 DIMM x2, Max. 8GB
- Single Gigabit LAN
- Integrated G41 VGA for CRT & DVI interface
- 6x USB 2.0, 4x SATA II, 2x COM
- HD audio, Watchdog timer, 1x PCI , 1x PCI-E x1

Specifications

Form Factor	Mini ITX
Processor	Supports Intel® Core™ 2 Quad /Core™ 2 Duo/ Celeron® processor LGA775 socket
FSB	800/1066/1333 MHz
Chipset	Intel® G41 Chipset consisting of: Intel® 82G41 Graphic Memory Controller Hub (GMCH) (25W) Intel® 82801GB (ICH7) I/O Controller Hub(3.3W)
BIOS	Phoenix BIOS
Memory	Two 240-pin DDRIII 800/1066 DIMM sockets Supports max. 4 GB system memory
Video	Intel G41 integrated graphic subsystem(GMA X4500) , dual independent display available through on-board VGA and DVI-D
LAN	1. Intel 82583V PCI Express Gigabit LAN controller x1
USB	Intel ICH7 built-in USB 2.0 host controller, supports 6 ports: - 4 ports in the rear I/O region, 2 ports with on-board headers
SATA II	Intel ICH7 built-in SATA II controller (3.0Gb/sec) w/ 4 ports
IDE	ICH7 built-in one channel Ultra DMA 33/66/100
Audio	Intel ICH7 built-in high definition audio w/ Realtek ALC662 Codec
LPC I/O	Winbond W83627DHG-P: COM1 (RS232), COM2 (RS232/422/485) & Hardware monitor
Hardware Monitor	One fan connectors with tachometer support CPU fan connector supports 4-wire fan with PWM control Supports three thermal diodes (CPU die + 2 on-board) Voltage monitoring for VCC (processor), 3.3V, 5V, and 12V
Edge Connectors	PS/2 stack connector x1 for KB/MS DB9 connector x 1 for COM1 Stack connector x 1 for VGA+DVI-D RJ45 + dual USB stack connector x1 for LAN1 & USB1~2 Stack dual USB connector x1 for USB 3 & 4 Triple (3x1) phone jack stack connector x1 for High-Definition Audio
On Board Headers / Connectors	Standard SATA (7-pin shrouded vertical) connector x4 2x4 pins pin-header x1 for USB 5-6 2x5 pins DF11-10 x1 for COM2 (RS232/422/485) 2x5 pins pin-header x1 for Digital I/O 2x5 pins pin-header x1 for front panel audio 40 pins box-header x1 for IDE 4 pins pin-header x1 for CPU fan & 3 pins pin-header x2 system fan
Expansion	PCI +PCI-e(x1) slot x1 2x8 pins pin header x1 for adaptor card: <ul style="list-style-type: none"> ▪ ID394 (4 serial ports) ▪ ID395 (TPM function)
RTC	ICH7 built-in RTC with on-board lithium battery
Watchdog Timer	Yes (256 segments, 0, 1, 2...255 sec/min)
Digital IO	4 in and 4 Out
Other	LAN Wakeup
Power Connector	ATX
System Voltage	+5V, +3.3V, +12V, -12V & 5VSB
RoHS Compliant	Yes
Board Size	170 x 170mm

Board Dimensions



Installations

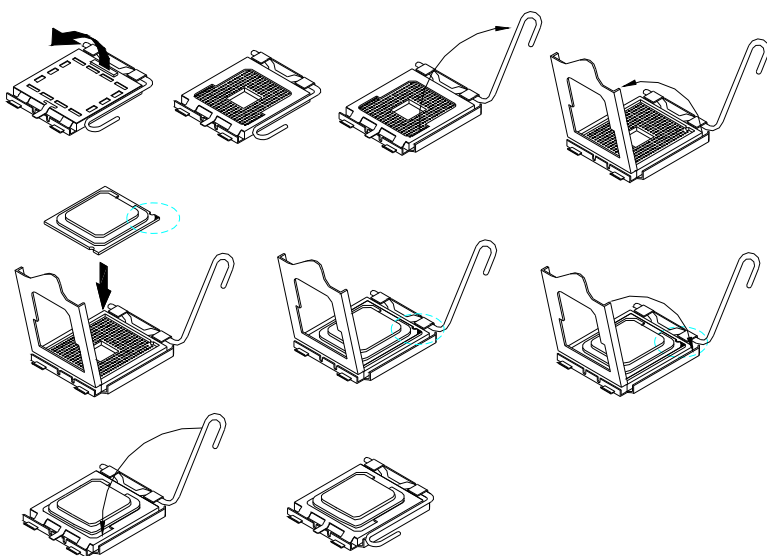
This section provides information on how to use the jumpers and connectors on the MI941 in order to set up a workable system. The topics covered are:

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Installing the CPU

The MI941 motherboard supports an LGA 775 processor socket for Intel® Core 2 Duo processors.

The LGA 775 processor socket comes with a lever to secure the processor. Refer to the pictures below, from left to right, on how to place the processor into the CPU socket. ***Please note that the cover of the LGA775 socket must always be installed during transport to avoid damage to the socket.***



ATX Power Installation

The system power is provided to the motherboard with the ATX2 and ATX1 power connectors. ATX2 is a 24-pin power connector and ATX1 is a 4-pin 12V power connector.

The 24-pin power connector can be connected to a standard 20-pin ATX power connector in a standard ATX power supply (Min. 400watt).

Note: The power supply 5VSB voltage must be at least 2A.

Installing the Memory

The MI941 motherboard supports two DDR3 memory sockets for a maximum total memory of 8GB. It supports DDR3 800/1066MHz.

Basically, the system memory interface has the following features:

- Supports two 64-bit wide DDR data channels

- Available bandwidth up to 6.4GB/s (DDR3 1066) for two-channel mode.

- Supports 512Mb, 1Gb, 2Gb DDR3 technologies.

- Supports only x8, x16, DDR3 devices with four banks

- Supports only unbuffered DIMMs

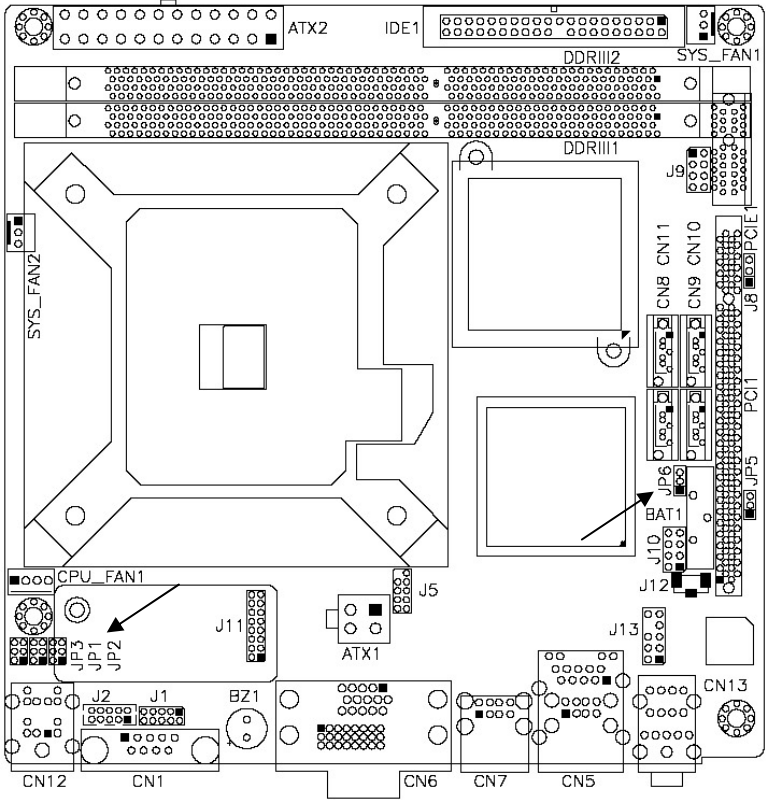
- Supports opportunistic refresh

- Up to 32 simultaneously open pages (four per row, four rows maximum)

Setting the Jumpers

Jumpers are used on the motherboard are used to select various settings and features according to your needs and applications. Contact your supplier if you have doubts about the best configuration for your needs. The following lists the connectors and their respective functions.

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JP1, JP2, JP3: RS232/422/485 (COM2) Selection	10
JP6: Clear CMOS Contents	10

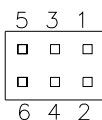


Jumper Locations on MI941

- JP1, JP2, JP3: RS232/422/485 (COM2) Selection 10
- JP6: Clear CMOS Contents 10

JP1, JP2, JP3: RS232/422/485 (COM2) Selection

COM2 is selectable for RS232, RS-422 and RS-485.



COM2 Function	RS-232	RS-422	RS-485
Jumper Setting (pin closed)	JP1: 1-2	JP1: 3-4	JP1: 5-6
	JP2: 3-5 & 4-6	JP2: 1-3 & 2-4	JP2: 1-3 & 2-4
	JP3: 3-5 & 4-6	JP3: 1-3 & 2-4	JP3: 1-3 & 2-4

JP6: Clear CMOS Contents

Use JP6, a 3-pin header, to clear the CMOS contents.

Note that the ATX-power connector should be disconnected from the motherboard before clearing CMOS.

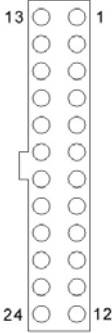
JP6	Setting	Function
 1 2 3	Pin 1-2 Short/Closed	Normal
 1 2 3	Pin 2-3 Short/Closed	Clear CMOS

Connectors on MI941

The connectors on MI941 allow you to connect external devices such as keyboard, floppy disk drives, hard disk drives, printers, etc. The following table lists the connectors on MI941 and their respective functions.

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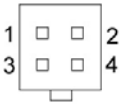
ATX2: 24-pin ATX Power Connector



Signal Name	Pin #	Pin #	Signal Name
3.3V	13	1	3.3V
-12V	14	2	3.3V
Ground	15	3	Ground
PS-ON	16	4	+5V
Ground	17	5	Ground
Ground	18	6	+5V
Ground	19	7	Ground
-5V	20	8	Power good
+5V	21	9	5VSB
+5V	22	10	+12V
+5V	23	11	+12V
Ground	24	12	+3.3V

ATX1: ATX 12V Power Connector

This connector supplies the CPU operating voltage.

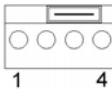


Pin #	Signal Name
1	Ground
2	Ground
3	+12V
4	+12V

DDRIII1: Channel A DDR3 Socket

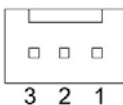
DDRIII2: Channel B DDR3 Socket

CPU_FAN1: CPU Fan Power Connector



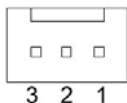
Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection
4	Control

SYS_FAN1: System Fan1 Power Connector

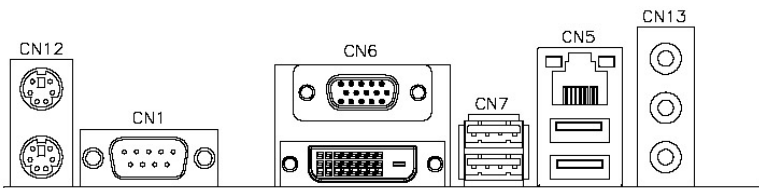


Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection

SYS_FAN2: System Fan2 Power Connector

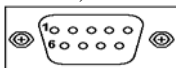


Pin #	Signal Name
1	Ground
2	+12V
3	Rotation detection



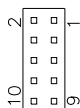
CN1: Serial Ports(COM1)

CN1 (COM1) is a DB-9 connector,

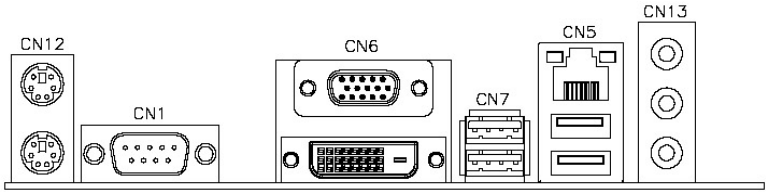


Signal Name	Pin #	Pin #	Signal Name
DCD, Data carrier detect	1	6	DSR, Data set ready
RXD, Receive data	2	7	RTS, Request to send
TXD, Transmit data	3	8	CTS, Clear to send
DTR, Data terminal ready	4	9	RI, Ring indicator
GND, ground	5	10	Not Used

J2: COM2 is jumper selectable for RS-232, RS-422 and RS-485.

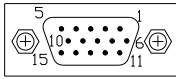


Pin #	Signal Name		
	RS-232	R2-422	RS-485
1	DCD	TX-	DATA-
2	RX	TX+	DATA+
3	TX	RX+	NC
4	DTR	RX-	NC
5	Ground	Ground	Ground
6	DSR	NC	NC
7	RTS	NC	NC
8	CTS	NC	NC
9	RI	NC	NC
10	NC	NC	NC

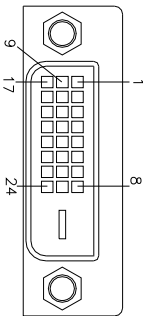


CN5: Gigabit LAN (Intel 82583V) RJ-45 & USB 0/1 Connector

CN6: DVI-D+CRT Connector

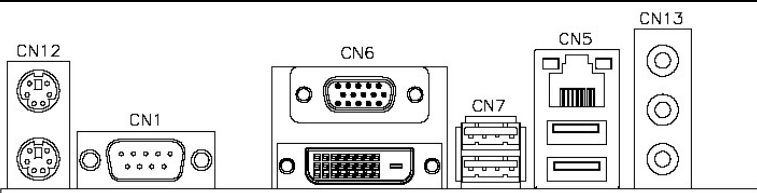


Signal Name	Pin #	Pin #	Signal Name
Red	1	2	Green
Blue	3	4	N.C.
GND	5	6	GND
GND	7	8	GND
VCC	9	10	GND
N.C.	11	12	DDCDATA
HSYNC	13	14	VSYNC
DDCCLK	15		

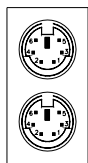


Signal Name	Pin #	Pin #	Signal Name
DATA2-	1	2	DATA2+
GND	3	4	N.C.
N.C.	5	6	DDCCLK
DDCDATA	7	8	N.C.
DATA1-	9	10	DATA1+
GND	11	12	N.C.
N.C.	13	14	VCC
GND	15	16	Hot Plug Detect
DATA0-	17	18	DATA0+
GND	19	20	N.C.
N.C.	21	22	GND
CLK+	23	24	CLK-

CN7: USB 2/3 Connector



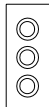
CN12: PS/2 Keyboard and PS/2 Mouse Connectors



Mouse (top)
Keyboard (bottom)

Keyboard Signal	Pin #	Mouse Signal
Keyboard data	1	Mouse data
N.C.	2	N.C.
GND	3	GND
5V	4	5V
Keyboard clock	5	Mouse clock
N.C.	6	N.C.

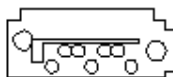
CN13: Audio Connector



Line in
Line out
Microphone

CN13 is a 3-jack audio connector.

CN8, CN9, CN10, CN11: SATA HDD Connectors

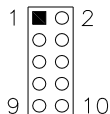


Pin #	Signal Name
1	Ground
2	TX+
3	TX-
4	Ground
5	RX-
6	RX+
7	Ground

J1: Digital I/O Connector (4 in, 4 out)

J1 supports TTL levels and is used to control external devices requiring ON/OFF circuitry.

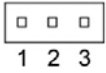
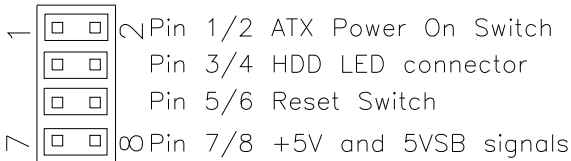
Signal Name	Pin #	Pin #	Signal Name
Ground	1	2	+5V
Out3	3	4	Out1
Out2	5	6	Out0
IN3	7	8	IN1
IN2	9	10	IN0



J5: SPI Debug Tools Port (Factory use only)**J8: Power LED**

The power LED indicates the status of the main power switch.

Pin #	Signal Name
1	Power LED
2	No connect
3	Ground


J9: System Function Connector**ATX Power ON Switch: Pins 1 and 2**

This 2-pin connector is an “ATX Power Supply On/Off Switch” on the system that connects to the power switch on the case. When pressed, the power switch will force the system to power on. When pressed again, it will force the system to power off.

Hard Disk Drive LED Connector: Pins 3 and 4

This connector connects to the hard drive activity LED on control panel. This LED will flash when the HDD is being accessed.

Pin #	Signal Name
4	HDD Active
3	5V

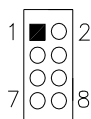
Reset Switch: Pins 5 and 6

The reset switch allows the user to reset the system without turning the main power switch off and then on again. Orientation is not required when making a connection to this header.

+5V and 5VSB Signals: Pins 7 and 8

Pin #	Signal Name
7	+5V
8	+5VSB

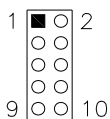
J10: USB 4/5 Connector



Signal Name	Pin	Pin	Signal Name
Vcc	1	2	Ground
D0-	3	4	D1+
D0+	5	6	D1-
Ground	7	8	Vcc

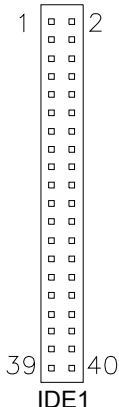
J11: For LPC I/F Adaptor Card

J13: Audio Front Header



Signal Name	Pin #	Pin #	Signal Name
MIC2_L	1	2	Ground
MIC2_R	3	4	Presence#
Line2_R	5	6	MIC2_ID
Sense	7	8	NC
Line2_L	9	10	Line2_ID

IDE1: Primary IDE Connectors



Signal Name	Pin #	Pin #	Signal Name
Reset IDE	1	2	Ground
Host data 7	3	4	Host data 8
Host data 6	5	6	Host data 9
Host data 5	7	8	Host data 10
Host data 4	9	10	Host data 11
Host data 3	11	12	Host data 12
Host data 2	13	14	Host data 13
Host data 1	15	16	Host data 14
Host data 0	17	18	Host data 15
Ground	19	20	Protect pin
DRQ0	21	22	Ground
Host IOW	23	24	Ground
Host IOR	25	26	Ground
IOCHRDY	27	28	Host ALE
DACK0	29	30	Ground
IRQ14	31	32	No connect
Address 1	33	34	No connect
Address 0	35	36	Address 2
Chip select 0	37	38	Chip select 1
Activity	39	40	Ground

PCI1: PCI Slot (supports two masters)

PCIE1: x1 PCI Express Slot

BIOS Setup

This chapter describes the different settings available in the AMI (American Megatrends, Inc.) BIOS that comes with the board. The topics covered in this chapter are as follows:

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BIOS Introduction

This chapter describes the different settings available in the AMI (American Megatrends, Inc.) BIOS that comes with the board. The topics covered in this chapter are as follows:

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Exit Setup.....	39

BIOS Introduction

The BIOS (Basic Input/Output System) installed in your computer system's ROM supports Intel processors. The BIOS provides critical low-level support for a standard device such as disk drives, serial ports and parallel ports. It also adds virus and password protection as well as special support for detailed fine-tuning of the chipset controlling the entire system.

BIOS Setup

The BIOS provides a Setup utility program for specifying the system configurations and settings. The BIOS ROM of the system stores the Setup utility. When you turn on the computer, the BIOS is immediately activated. Pressing the key immediately allows you to enter the Setup utility. If you are a little bit late pressing the key, POST (Power On Self Test) will continue with its test routines, thus preventing you from invoking the Setup. If you still wish to enter Setup, restart the system by pressing the "Reset" button or simultaneously pressing the <Ctrl>, <Alt> and <Delete> keys. You can also restart by turning the system Off and back On again. The following message will appear on the screen:

```
Press <DEL> to Enter Setup
```

In general, you press the arrow keys to highlight items, <Enter> to select, the <PgUp> and <PgDn> keys to change entries, <F1> for help and <Esc> to quit.

When you enter the Setup utility, the Main Menu screen will appear on the screen. The Main Menu allows you to select from various setup functions and exit choices.

Main BIOS Setup

This setup allows you to record some basic hardware configurations in your computer system and set the system clock.

BIOS SETUP UTILITY						
Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
System Overview				Use[ENTER], [TAB] or [SHIFT-TAB] to select a field. Use [+] or [-] to configure system Time. <- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit		
Processor						
Intel(R) Core(TM)2 Duo CPU		T9400 @ 266GHz				
Speed	: 2666MHz					
Count	: 1					
System Memory						
Size	: 3995MB					
System Time				[02:29:50]		
System Date				[Fri 01/02/2009]		

Note: *If the system cannot boot after making and saving system changes with Setup, the AMI BIOS supports an override to the CMOS settings that resets your system to its default.*

Warning: *It is strongly recommended that you avoid making any changes to the chipset defaults. These defaults have been carefully chosen by both AMI and your system manufacturer to provide the absolute maximum performance and reliability. Changing the defaults could cause the system to become unstable and crash in some cases.*

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
Configure advanced CPU settings				Configure CPU.		
Manufacturer: Intel Intel® Core(TM)2 Duo CPU T9400 @ 2.66GHz Frequency : 2.66GHz FSB Speed : 1332MHz Cache L1 : 128KB Cache L2 : 6144KB Ratio Actual Value: 8				<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit		
Hardware Prefetcher				[Enabled]		
Adjacent Cache Line Prefetch				[Enabled]		
Max CPU ID Value Limit				[Disabled]		
Intel(R) Virtualization Tech				[Enabled]		

The CPU Configuration menu shows the following CPU details:

- Manufacturer: the name of the CPU manufacturer
- Brand String: the brand name of the CPU being used
- Frequency: the CPU processing speed
- FSB Speed: the FSB speed
- Cache L1: the CPU L1 cache size
- Cache L2: the CPU L2 cache

Hardware Prefetcher

The hardware prefetcher operates transparently, without programmer intervention, to fetch streams of data and instruction from memory into the unified second-level cache. The prefetcher is capable of handling multiple streams in either the forward or backward direction. It is triggered when successive cache misses occur in the last-level cache and a stride in the access pattern is detected, such as in the case of loop iterations that access array elements. The prefetching occurs up to a page boundary.

Adjacent Cache-Line Prefetch

The Adjacent Cache-Line Prefetch mechanism, like automatic hardware prefetch, operates without programmer intervention. When enabled through the BIOS, two 64-byte cache lines are fetched into a 128-byte sector, regardless of whether the additional cache line has been requested or not. In applications with relatively poor spatial locality, the cache miss ratio is higher. A cache miss on an Intel® Pentium® 4 processor-based system (with adjacent sector prefetch enabled) brings in 128 bytes, leading to higher bus utilization (assuming that the application didn't need the other 64 bytes). When adjacent sector prefetch is disabled, an Intel® Pentium® 4 processor-based system only fetches 64 bytes. The other 64 bytes of the sector in the last-level cache are not used unless the application explicitly issues a load to that address. Disabling adjacent sector prefetch on Intel® Pentium® 4 processor-based systems can reduce bus traffic.

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
IDE Configuration				Options: Disabled Compatible Enhanced		
ATA/IDE Configuration			[Compatible]			
Legacy IDE Channels			[SATA Pri, PATA Sec]			
▶ Primary IDE Master			: [Not Detected]			
▶ Primary Slave Master			: [Not Detected]			
▶ Secondary IDE Master			: [Hitachi HDS72]			
▶ Secondary IDE Slave			: [Not Detected]			
IDE Detect Time Out (Sec)			[35]			
						<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit

The IDE Configuration menu is used to change and/or set the configuration of the IDE devices installed in the system.

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
Configure Win627DHG Super IO Chipset						
Serial Port1 Address			[3F8/IRQ4]			
Serial Port2 Address			[2F8/IRQ3]			
Restore on AC Power Loss			[Power Off]			
Power On Function			[None]			
						<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit

Onboard Serial Port

The default values are:

Serial Port 1: 3F8/IRQ4 Serial Port 2: 2F8/IRQ3

Restore on AC Power Loss

This field sets the system power status whether *on* or *off* when power returns to the system from a power failure situation.

Power On Function

This field is related to how the system is powered on . The options are *None*, *Mouse Left*, *Mouse Right*, and *Any Key*.

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
Hardware Health Configuration				Configure CPU.		
System Temperature				:35°C/95°F		
CPU Temperature				:34°C/93°F		
VTIN Temperature				:37°C/98°F		
SystemFan2 Speed				:0 RPM		
CPUFAN Speed				:280 RPM		
Vcore(V)				:1.160 V		
3VCC				:3.392 V		
12V				:12.196 V		
5V				: 5.273V		
VBAT (V)				:3.21 V		
CPU smart fan				[55°C]		
ACPI Shutdown Temperature				[Disabled]		
				<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit		

The Hardware Health Configuration menu is used to show the operating temperature, fan speeds and system voltages.

ACPI Shutdown Temperature

The system will shut down automatically under OS with ACPI mode, when the CPU temperature reaches the configured temperature.

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
ACPI Settings				General ACPI		
▶ General ACPI Configuration				Configuration settings		
				<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit		

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
General ACPI Configuration				General ACPI Configuration settings		
Suspend mode				[S3 (STR)]		
Repost Video on S3 Resume				[No]		
				<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit		

Suspend Mode

The options of this field are *S1*, *S3* and *Auto*.

Repost Video on S3 Resume

The default setting is *No*.

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
APM Configuration				Disable/Enable RI to generate a wake event.		
Power Management/APM			[Enabled]			
Resume On Ring			Disabled			
Resume On PME#			Disabled			
Resume On RTC Alarm			Disabled			
				<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit		

Resume on Ring

This option is used to enable activity on the RI (ring in) modem line to wake up the system from a suspend or standby state. That is, the system will be awakened by an incoming call on a modem.

Resume on PME#

This option is used enable activity on the PCI PME (power managementevent) controller to wake up the system from a suspend or standby state

Resume On RTC Alarm

This option is used to specify the time the system should be awakened from a suspended state

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
MPS Configuration				Select MPS Revision		
MPS Revision VT-d [1.1]				<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit		

MPS Version Control for OS

This option is specifies the MPS (Multiprocessor Specification) version for your operating system.

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
SMBIOS Configuration				SMBIOS SMI Wrapper support for PnP Func 50h-54h		
Smbios SMI Support [Enabled]				<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit		

SMBIOS SMI Support

Use the SMBIOS SMI Support to enable the system to support the SMBIOS SMI wrapper for the PnP function 50h – 54h.

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
USB Configuration					Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected.	
USB Devices Enabled: None						
Legacy USB Support					[Enabled]	
USB 2.0 Controller Mode					[HiSpeed]	
BIOS EHCI Hand-Off					[Enabled]	
					<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit	

The USB Configuration menu is used to read USB configuration information and configure the USB settings.

Legacy USB Support

This option is used to enable the USB mouse and USB keyboard support. This option is enabled by default.

USB 2.0 Controller Mode

This option is used to control USB device in HiSpeed (480Mbps) or FullSpeed (12Mbps). This option is enabled by HiSpeed.

BIOS EHCI Hand-Off

This feature allows you to enable support for operating system without EHCI hand-off feature.

PCIPnP Settings

This option configures the PCI/PnP settings.

BIOS SETUP UTILITY						
Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
Advanced PCI/PnP Settings			Size of memory block to reserve for legacy ISA devices.			
WARNING: Setting wrong values in below sections may cause system to malfunction.						
Clear NVRAM			[No]			
Plug & Play O/S			[No]			
PCI Latency Timer			[64]			
Allocate IRQ to PCI VGA			[Yes]			
Palette Snooping			[Disabled]			
PCI IDE BusMaster			[Enabled]			
Off Board PCI?ISA IDE Card			[Auto]			
IRQ3			[Available]			
IRQ4			[Available]			
IRQ5			[Available]			
IRQ7			[Available]			
IRQ9			[Available]			
IRQ10			[Available]			
IRQ11			[Available]			
IRQ14			[Available]			
IRQ15			[Available]			
DMA Channel 0			[Available]			
DMA Channel 1			[Available]			
DMA Channel 3			[Available]			
DMA Channel 5			[Available]			
DMA Channel 6			[Available]			
DMA Channel 7			[Available]			
Reserved Memory Size			[Disabled]			
			<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit			

Clear NVRAM

This item is used for clearing NVRAM during system boot.

Plug & Play O/S

This lets BIOS configure all devices in the system or lets the OS configure PnP devices not required for boot if your system has a Plug and Play OS.

PCI Latency Timer

This item sets value in units of PCI clocks for PCI device latency timer register. Options are: 32, 64, 96, 128, 160, 192, 224, 248.

Allocate IRQ to PCI VGA

This assigns IRQ to PCI VGA card if card requests IRQ or doesn't assign IRQ to PCI VGA card even if card requests an IRQ.

Palette Snooping

This informs the PCI devices that an ISA graphics device is installed in the system so the card will function correctly.

PCI IDE BusMaster

This uses PCI busmastering for BIOS reading / writing to IDE devices.

OffBoard PCI/ISA IDE Card

Some PCI IDE cards may require this to be set to the PCI slot number that is holding the card.

IRQ#

Use the IRQ# address to specify what IRQs can be assigned to a particular peripheral device.

Boot Settings

BIOS SETUP UTILITY						
Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
Boot Settings Configuration				<p>Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.</p> <p><- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit</p>		
Quick Boot			[Enabled]			
Quiet Boot			[Disabled]			
AddOn ROM Display Mode			[Force BIOS]			
Bootup Num-Lock			[On]			
PS/2 Mouse Support			[Auto]			
Wait for 'F1' If Error			[Enabled]			
Hit 'DEL' Message Display			[Enabled]			
Interrupt 19 Capture			[Disabled]			

Quick Boot

This allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.

Quiet Boot

When disabled, this displays normal POST messages. When enabled, this displays OEM Logo instead of POST messages.

AddOn ROM Display Mode

This allows user to force BIOS/Option ROM of add-on cards to be displayed during quiet boot.

Bootup Num-Lock

This select the power-on state for numlock.

PS/2 Mouse Support

This select support for PS/w mouse.

Wait for 'F1' If Error

When set to Enabled, the system waits for the F1 key to be pressed when error occurs. This allows option ROM to trap interrupt 19.

Hit Message Display

This displays "Press to run Setup" in POST.

Interrupt 19 Capture

This allows option ROM to trap interrupt 19.

Security Settings

This setting comes with two options set the system password. Supervisor Password sets a password that will be used to protect the system and Setup utility. User Password sets a password that will be used exclusively on the system. To specify a password, highlight the type you want and press <Enter>. The Enter Password: message prompts on the screen. Type the password and press <Enter>. The system confirms your password by asking you to type it again. After setting a password, the screen automatically returns to the main screen.

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

BIOS SETUP UTILITY						
Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
Security Settings				Install or Change the Password.		
Supervisor Password : Not Installed				<- Select Screen		
User Password : Not Installed				↑ ↓ Select Item		
Change Supervisor Password				+- Change Field		
Change User Password				Tab Select Field		
Boot Sector Virus Protection [Disabled]				F1 General Help		
				F10 Save and Exit		
				ESC Exit		

Advanced Chipset Settings

This setting configures the north bridge, south bridge and the ME subsystem. **WARNING!** Setting the wrong values may cause the system to malfunction. -

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
Advanced Chipset Settings WARNING: Setting wrong values in below sections may cause system to malfunction. <ul style="list-style-type: none"> ▶ North Bridge Configuration ▶ South Bridge Configuration 					Configure North Bridge features. <- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit	

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
North Bridge Chipset Configuration Memory Remap Feature [Enabled] PCI MMIO Allocation: 4GB To 3072MB DRAM Frequency [Auto] Configure DRAM Timing by SPD [Enabled] Memory Hole [Disabled] Initiate Graphics Adapter [PEG/PCI] IGD Graphics Mode Select [Enabled, 32MB] IGD GTT Graphics memory size [No VT mode, 2MB] PAVP Mode [Lite]					ENABLE: Allow Remapping of Overlapped PCI memory above the total physical memory. DISABLE: Do not allow remapping of memory <- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit	

Memory Remap Feature

This feature allows remapping of overlapped PCI memory above the total physical memory.

DRAM Frequency

This option is, by default, set to Auto.

Configure DRAM Timing by SPD

When this item is enabled, the DRAM timing parameters are set according to the DRAM SPD (Serial Presence Detect). When disabled, you can manually set the DRAM timing parameters through the DRAM sub-items.

Memory Hole

This option is used to reserve memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly.

Initiate Graphic Adapter

This option, by default, is set to PEG/PCI.

IGD Graphics Mode Select

Use the feature to set the amount of system memory to be used by the Internal. Graphics Devices. expansion cards that require a specified area of memory to work properly.

IGD GTT Graphics memory size

This feature allows the user to select the IGD GTT Graphics Size. The Default setting is No VT Mode, 2 MB

PAVP Mode

Use the feature to select the Protect Audio Video Path Mode.

BIOS SETUP UTILITY

Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
South Bridge Chipset Configuration					Disabled 2 USB Ports 4 USB Ports 6 USB Ports	
USB Function		[6 USB Ports]				
USB 2.0 Controller		[Disabled]				
Audio Controller		[Auto]				
					<- Select Screen ↑ ↓ Select Item +- Change Field Tab Select Field F1 General Help F10 Save and Exit ESC Exit	

USB Function

This option enables the number of USB ports desired or disables the USB function.

USB 2.0 Controller

This option is disabled by default.

Audio Controller

This option is used to enable the Southbridge high definition audio controller.

Exit Setup

The exit setup has the following settings which are:

BIOS SETUP UTILITY						
Main	Advanced	PCIPnP	Boot	Security	Chipset	Exit
Exit Options						Exit system setup after saving the changes.
Save Changes and Exit						
Discard Changes and Exit						
Discard Changes						
Load Optimal Defaults						
Load Failsafe Defaults						
						<- Select Screen
						↑ ↓ Select Item
						+ - Change Field
						Tab Select Field
						F1 General Help
						F10 Save and Exit
						ESC Exit

Save Changes and Exit

This option allows you to determine whether or not to accept the modifications and save all changes into the CMOS memory before exit.

Discard Changes and Exit

This option allows you to exit the Setup utility without saving the changes you have made in this session.

Discard Changes

This option allows you to discard all the changes that you have made in this session.

Load Optimal Defaults

This option allows you to load the default values to your system configuration. These default settings are optimal and enable all high performance features.

Load Failsafe Defaults

This option allows you to load the troubleshooting default values permanently stored in the BIOS ROM. These default settings are non-optimal and disable all high-performance features.

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Drivers Installation

This section describes the installation procedures for software and drivers under the Windows XP and Windows Vista. The software and drivers are included with the motherboard. If you find the items missing, please contact the vendor where you made the purchase. The contents of this section include the following:

Intel Chipset Software Installation Utility	42
Intel G41 Chipset Family Graphics Driver Installation	45
Realtek High Definition Audio Driver Installation.....	48
Intel PRO LAN Network Drivers Installation	50

IMPORTANT NOTE:

After installing your Windows operating system (Windows XP/ Vista), you must install first the Intel Chipset Software Installation Utility before proceeding with the drivers installation.

Intel Chipset Software Installation Utility

The Intel Chipset Drivers should be installed first before the software drivers to enable Plug & Play INF support for Intel chipset components. Follow the instructions below to complete the installation under Windows XP/Vista.

1. Insert the CD that comes with the board. Click **Intel** at the left side, then **Intel(R) G41 Chipset Drivers**.



2. Click **Intel(R) Chipset Software Installation Utility**.



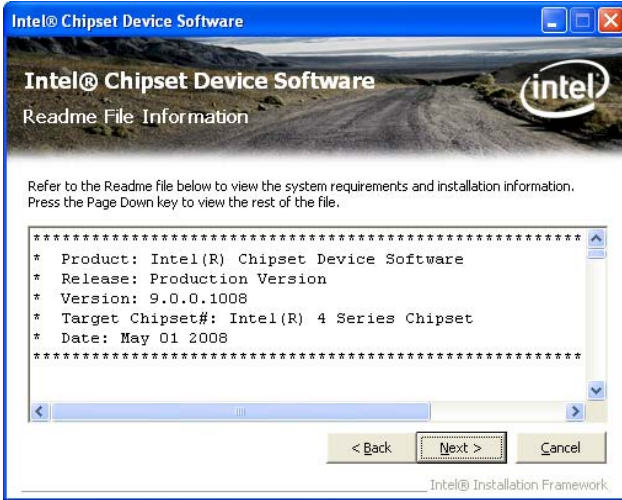
- When the welcome screen to the Intel(R) Chipset Software Installation Utility appears, click *Next* to continue.



- Click *Yes* to accept the software license agreement and proceed with the installation process.



5. On Readme Information screen, click *Next* to continue the installation.



6. The Setup process is now complete. Click *Finish* to restart the computer and for changes to take effect.



Intel G41 Chipset Family Graphics Driver Installation

To install the VGA drivers, follow the steps below to proceed with the installation.

1. Insert the CD that comes with the board. Click *Intel* at the left side, then *Intel(R) G41 Chipset Drivers*.



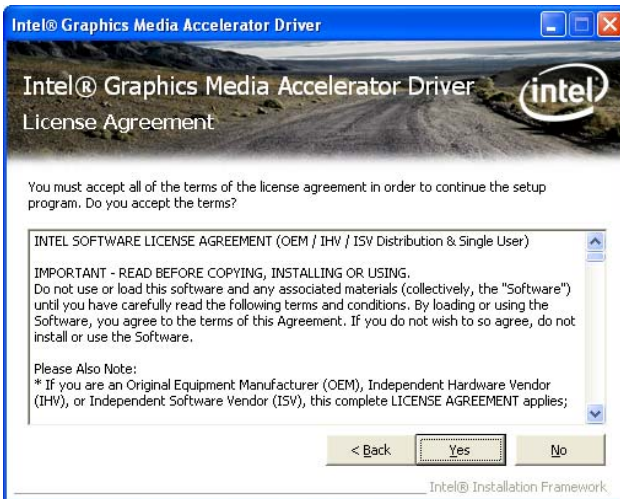
2. Click *Intel G41 Chipset Family Graphics Driver*.



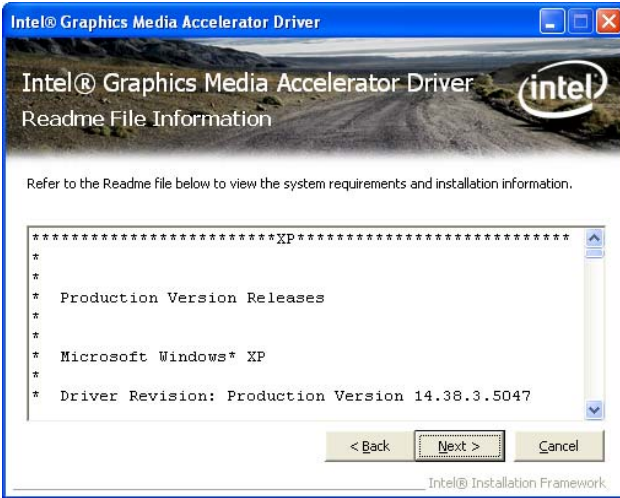
3. When the welcome screen of the Intel(R) Graphics Media Accelerator Driver appears, click *Next* to continue.



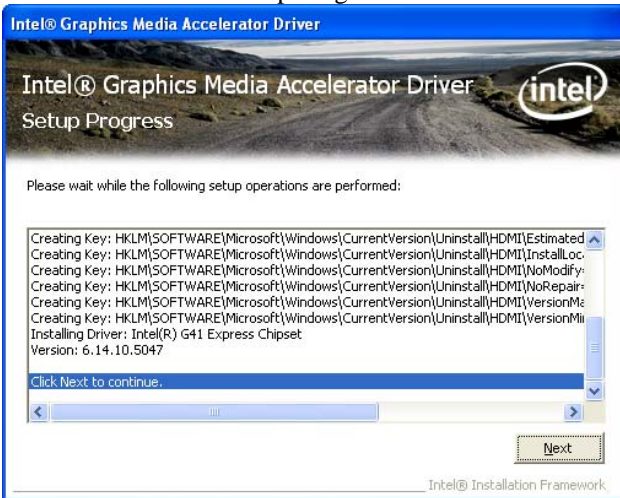
4. Click *Yes* to agree with the license agreement and continue the installation.



5. Click **Next** in the Readme File Information window.



6. Click **Next** in the Setup Progress window.

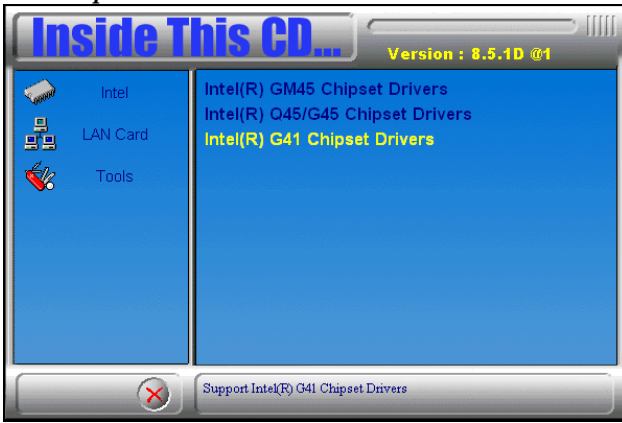


7. Setup is now complete. Click **Finish** to restart the computer and for changes to take effect.

Realtek High Definition Audio Driver Installation

Follow the steps below to install the Realtek HD Codec Audio Drivers.

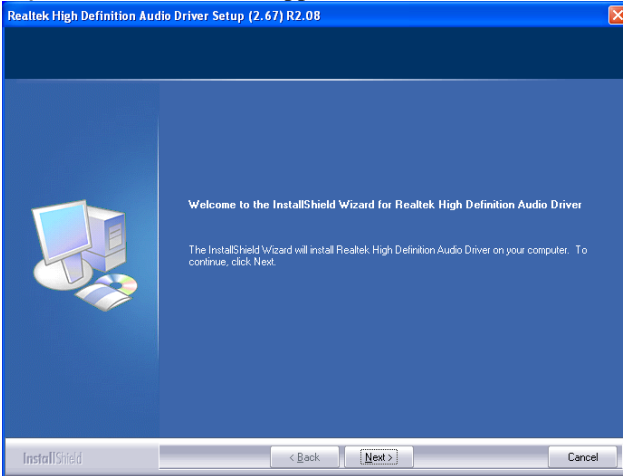
1. Insert the CD that comes with the board. Click **Intel** and then **Intel(R) G41 Chipset Drivers**.



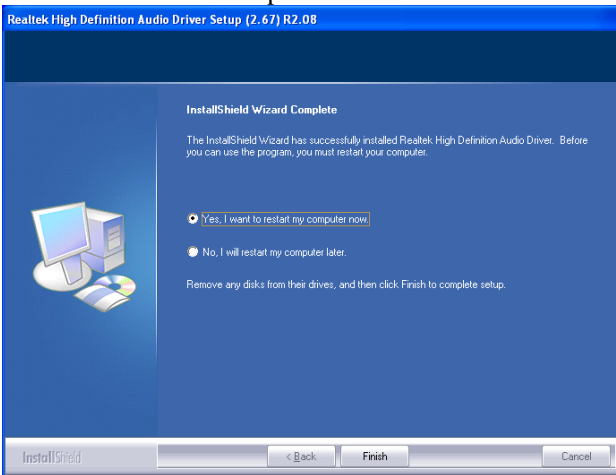
2. Click **Realtek High Definition Audio Driver**.



3. When the welcome screen to InstallShield Wizard for **Realtek High Definition Audio Driver** appears, click **Next** to start the installation.



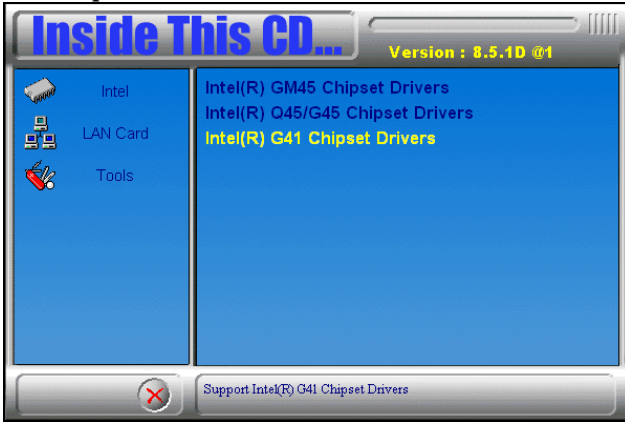
4. When the InstallShield Wizard has finished performing maintenance operations on Realtek High Definition Codec Audio Driver, click **Finish** to restart the computer.



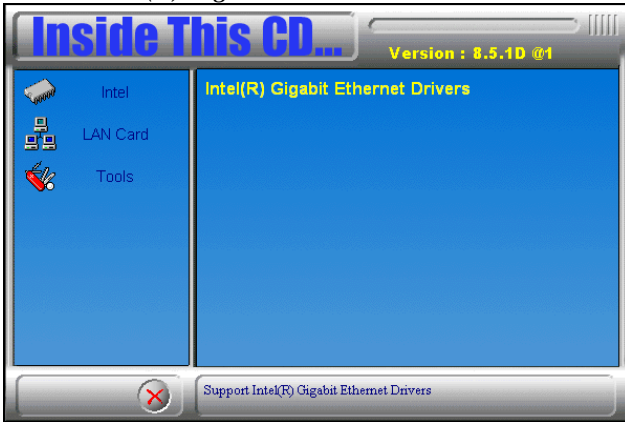
Intel PRO LAN Network Drivers Installation

Follow the steps below to install Intel PRO LAN drivers.

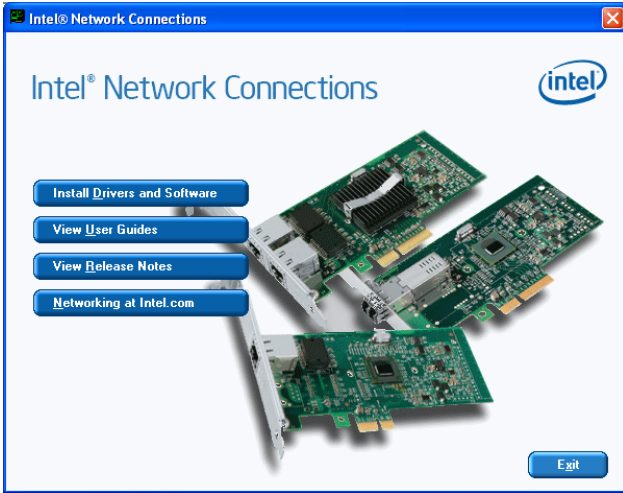
1. Insert the CD that comes with the board. Click *Intel* and then *Intel(R) G41 Chipset Drivers*.



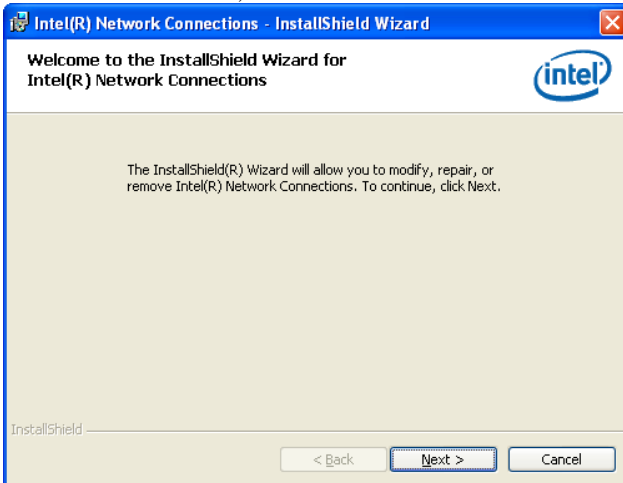
2. Click *Intel(R) Gigabit Ethernet Drivers*.



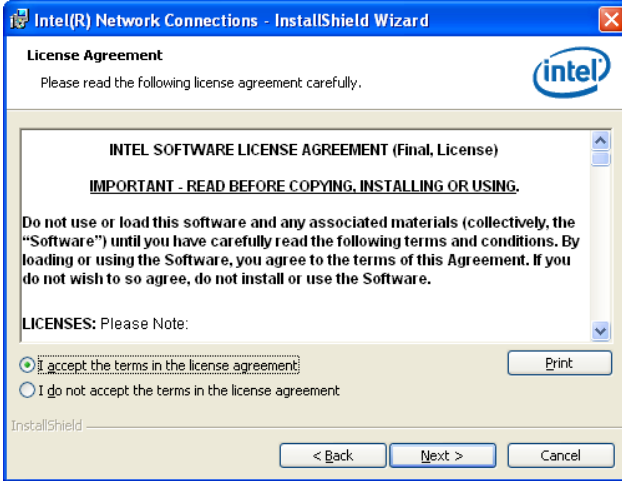
3. In the Intel® Network Connections screen*, click **Install Drivers and Software**.



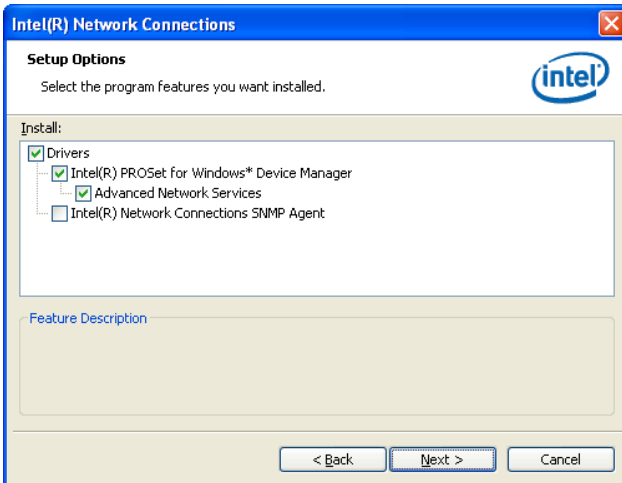
4. In the welcome screen of the InstallShield Wizard for Intel(R) Network Connections, click **Next**.



5. In the License Agreement, Select I accept the terms in the license agreement and click *Next*.



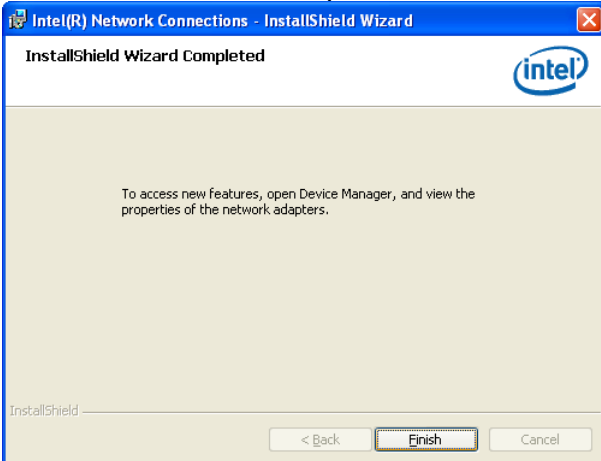
6. In the Setup Options, click the checkbox as shown below and click *Next*.



7. In the InstallShield Wizard screen, click **Install** to begin the installation.



8. InstallShield Wizard is completed. Click **Finish** to exit the Wizard.



Appendix

A. I/O Port Address Map

Each peripheral device in the system is assigned a set of I/O port addresses that also becomes the identity of the device. The following table lists the I/O port addresses used.

Address	Device Description
000h - 01Fh	DMA Controller #1
020h - 03Fh	Interrupt Controller #1
040h - 05Fh	Timer
060h - 06Fh	Keyboard Controller
070h - 07Fh	Real Time Clock, NMI
080h - 09Fh	DMA Page Register
0A0h - 0BFh	Interrupt Controller #2
0C0h - 0DFh	DMA Controller #2
0F0h	Clear Math Coprocessor Busy Signal
0F1h	Reset Math Coprocessor
1F0h - 1F7h	IDE Interface
278h - 27Fh	Parallel Port #2(LPT2)
2F8h - 2FFh	Serial Port #2(COM2)
2B0h - 2DFh	Graphics adapter Controller
378h - 3FFh	Parallel Port #1(LPT1)
360h - 36Fh	Network Ports
3B0h - 3BFh	Monochrome & Printer adapter
3C0h - 3CFh	EGA adapter
3D0h - 3DFh	CGA adapter
3F0h - 3F7h	Floppy Disk Controller
3F8h - 3FFh	Serial Port #1(COM1)

B. Interrupt Request Lines (IRQ)

Peripheral devices use interrupt request lines to notify CPU for the service required. The following table shows the IRQ used by the devices on board.

Level	Function
IRQ0	System Timer Output
IRQ1	Keyboard
IRQ2	Interrupt Cascade
IRQ3	Serial Port #2
IRQ4	Serial Port #1
IRQ5	Reserved
IRQ6	Floppy Disk Controller
IRQ7	Parallel Port #1
IRQ8	Real Time Clock
IRQ9	Reserved
IRQ10	Reserved
IRQ11	Reserved
IRQ12	PS/2 Mouse
IRQ13	80287
IRQ14	Primary IDE
IRQ15	Secondary IDE

C. Watchdog Timer Configuration

The WDT is used to generate a variety of output signals after a user programmable count. The WDT is suitable for use in the prevention of system lock-up, such as when software becomes trapped in a deadlock. Under these sorts of circumstances, the timer will count to zero and the selected outputs will be driven. Under normal circumstance, the user will restart the WDT at regular intervals before the timer counts to zero.

SAMPLE CODE:

```
//=====
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//=====
====
#include <stdio.h>
#include <stdlib.h>
#include "W627EHF.H"
//=====
====
int main (int argc, char *argv[]);
void copyright(void);
void EnableWDT(int);
void DisableWDT(void);
//=====
====
int main (int argc, char *argv[])
{
    unsigned char bBuf;
    unsigned char bTime;
    char **endptr;

    copyright();

    if (argc != 2)
    {
        printf(" Parameter incorrect!!\n");
        return 1;
    }

    if (Init_W627EHF() == 0)
    {
        printf(" Winbond 83627HF is not detected, program abort.\n");
        return 1;
    }
    bTime = strtol (argv[1], endptr, 10);
```

```

printf("System will reset after %d seconds\n", bTime);

EnableWDT(bTime);

return 0;
}
//=====
void copyright(void)
{
printf("\n===== Winbond 83627EHF Watch Timer Tester (AUTO DETECT)
===== \n"
      "      Usage : W627E_WD reset_time\n"
      "      Ex : W627E_WD 3 => reset system after 3 second\n"
      "      W627E_WD 0 => disable watch dog timer\n");
}
//=====
void EnableWDT(int interval)
{
unsigned char bBuf;

bBuf = Get_W627EHF_Reg( 0x2D);
bBuf &= (!0x01);
Set_W627EHF_Reg( 0x2D, bBuf);           //Enable WDTO

Set_W627EHF_LD( 0x08);                 //switch to logic device 8
Set_W627EHF_Reg( 0x30, 0x01);         //enable timer

bBuf = Get_W627EHF_Reg( 0xF5);
bBuf &= (!0x08);
Set_W627EHF_Reg( 0xF5, bBuf);         //count mode is second

Set_W627EHF_Reg( 0xF6, interval);     //set timer
}
//=====
void DisableWDT(void)
{
Set_W627EHF_LD(0x08);                 //switch to logic device 8
Set_W627EHF_Reg(0xF6, 0x00);         //clear watchdog timer
Set_W627EHF_Reg(0x30, 0x00);         //watchdog disabled
}
//=====

```

```
//=====
//
// THIS CODE AND INFORMATION IS PROVIDED "AS IS" WITHOUT WARRANTY OF ANY
// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//=====
====
#include "W627EHF.H"
#include <dos.h>
//=====
====
unsigned int W627EHF_BASE;
void Unlock_W627EHF (void);
void Lock_W627EHF (void);
//=====
unsigned int Init_W627EHF(void)
{
    unsigned int result;
    unsigned char ucDid;

    W627EHF_BASE = 0x2E;
    result = W627EHF_BASE;

    ucDid = Get_W627EHF_Reg(0x20);
    if (ucDid == 0x88)
    {    goto Init_Finish;  }

    W627EHF_BASE = 0x4E;
    result = W627EHF_BASE;
    ucDid = Get_W627EHF_Reg(0x20);
    if (ucDid == 0x88)
    {    goto Init_Finish;  }

    W627EHF_BASE = 0x00;
    result = W627EHF_BASE;

Init_Finish:
    return (result);
}
//=====
void Unlock_W627EHF (void)
{
    outportb(W627EHF_INDEX_PORT, W627EHF_UNLOCK);
    outportb(W627EHF_INDEX_PORT, W627EHF_UNLOCK);
}
//=====
====
void Lock_W627EHF (void)
{
    outportb(W627EHF_INDEX_PORT, W627EHF_LOCK);
}
//=====
void Set_W627EHF_LD( unsigned char LD)
{
    Unlock_W627EHF();
    outportb(W627EHF_INDEX_PORT, W627EHF_REG_LD);
    outportb(W627EHF_DATA_PORT, LD);
}
```

```

    Lock_W627EHF();
}
//=====
void Set_W627EHF_Reg( unsigned char REG, unsigned char DATA)
{
    Unlock_W627EHF();
    outputb(W627EHF_INDEX_PORT, REG);
    outputb(W627EHF_DATA_PORT, DATA);
    Lock_W627EHF();
}
//=====
unsigned char Get_W627EHF_Reg(unsigned char REG)
{
    unsigned char Result;
    Unlock_W627EHF();
    outputb(W627EHF_INDEX_PORT, REG);
    Result = inputb(W627EHF_DATA_PORT);
    Lock_W627EHF();
    return Result;
}
//=====

//=====
//
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// KIND, EITHER EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE
// IMPLIED WARRANTIES OF MERCHANTABILITY AND/OR FITNESS FOR A PARTICULAR
// PURPOSE.
//
//=====
#ifndef __W627EHF_H
#define __W627EHF_H            1
//=====
#define W627EHF_INDEX_PORT    (W627EHF_BASE)
#define W627EHF_DATA_PORT     (W627EHF_BASE+1)
//=====
#define W627EHF_REG_LD        0x07
//=====
#define W627EHF_UNLOCK        0x87
#define W627EHF_LOCK          0xAA
//=====
unsigned int Init_W627EHF(void);
void Set_W627EHF_LD( unsigned char);
void Set_W627EHF_Reg( unsigned char, unsigned char);
unsigned char Get_W627EHF_Reg( unsigned char);
//=====
#endif // __W627EHF_H

```

File of the Main.cpp

```

=====
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=====
#include <dos.h>
#include <conio.h>
#include <stdio.h>
#include <stdlib.h>
#include "W627HF.H"
=====
void ClrKbBuf(void);
int main (int argc, char *argv[]);
=====
int main (int argc, char *argv[])
{
    unsigned char ucDO = 0;           //data for digital output
    unsigned char ucDI;              //data for digital input
    unsigned char ucBuf;

    Set_W627HF_LD( 0x07);            //switch to logic device 7

    Set_W627HF_Reg(0xF1, 0x00);      //clear
    ucDI = Get_W627HF_Reg(0xF1) & 0x0F;

    ClrKbBuf();
    while(1)
    {
        ucDO++;
        Set_W627HF_Reg(0xF1, ((ucDO & 0x0F) << 4));
        ucBuf = Get_W627HF_Reg(0xF1) & 0x0F;
        if (ucBuf != ucDI)
        {
            ucDI = ucBuf;
            printf("Digital I/O Input Changed. Current Data is 0x%X\n",ucDI);
        }

        if (kbhit())
        {
            getch();
            break;
        }
        delay(500);
    }
    return 0;
}
=====
void ClrKbBuf(void)
{
    while(kbhit())
    {
        getch();
    }
}
-----

```