answers²

Mainboard D1356

English

FUJITSU COMPUTERS
SIEMENS

Are there ...

... any technical problems or other questions you need clarified?
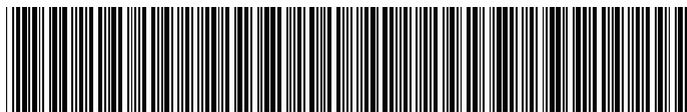
Please contact:
- your sales partner
- your sales outlet

The latest information and updates (e. g. BIOS update) on our mainboards can be found on the Internet under: *http://www.fujitsu-siemens.com*

A26361-D1356-Z120-1-7619

Mainboard D1356

Technical Manual

January 2003 edition

Contents

Mainboard D1356

Your mainboard is available in different configuration levels. Depending on the configuration chosen, some of the hardware components described may not be available on your mainboard.

Notational conventions

The meanings of the symbols and fonts used in this manual are as follows:

> ⚠ indicates information which is important for your health or for preventing physical damage.

> **i** indicates additional information which is required to use the system properly.

► Text which follows this symbol describes activities that must be performed in the order shown.

␣ This symbol indicates that you must enter a blank space (press the Space Bar) at this point.

↵ This symbol indicates that you must press the Enter key.

`Text in this typeface` indicates screen outputs.

`Text in this bold typeface` indicates the entries you make via the keyboard.

Text in italics indicates commands or menu items.

"Quotation marks" indicate names of chapters or terms.

Important notes

With the mainboard installed you must open the system to access the mainboard. How to dismantle and reassemble the system is described in the operating manual accompanying the system.

Connecting cables for peripherals must be adequately shielded to avoid interference.

Observe the safety notes in the operating manual of your system.

Incorrect replacement of the lithium battery may lead to a risk of explosion. It is therefore essential to observe the instructions in the "Replacing lithium battery" section.

Components can become very hot during operation. Ensure you do not touch components when making extensions to the mainboard. There is a danger of burns!

The shipped version of this board complies with the requirements of the EEC directive 89/336/EEC "Electromagnetic compatibility".

Compliance was tested in a typical PC configuration.

When installing the board, refer to the specific installation information in the manual for the receiving device.

The warranty is invalidated if the system is damaged during the installation or replacement of expansions. Information on which expansions you can use is available from your sales outlet or the customer service centre.

Information about boards

To prevent damage to the mainboard, the components and conductors on it, please take great care when you insert or remove boards. Take great care to ensure that extension boards are slotted in straight, without damaging components or conductors on the mainboard, or any other components, for example EMI spring contacts.

Remove the plug from the mains outlet so that system and mainboard are totally disconnected from the mains voltage.

Be careful with the locking mechanisms (catches, centring pins etc.) when you replace the mainboard or components on it, for example memory modules or processors.

Never use sharp objects (screwdrivers) for leverage.

Boards with electrostatic sensitive devices (ESD) are identifiable by the label shown.

When you handle boards fitted with ESDs, you must, under all circumstances, observe the following:

- You must always discharge static build up (e.g. by touching a grounded object) before working.

- The equipment and tools you use must be free of static charges.

- Remove the power plug from the mains supply before inserting or removing boards containing ESDs.

- Always hold boards with ESDs by their edges.

- Never touch pins or conductors on boards fitted with ESDs.

List of features

Processor

- mPGA478 ZIF socket
- Supports Intel Pentium 4 processor
- Supports 400/533MHz Front-Side Bus
- Supports Hyper-Threading
- Onboard 3-phase switching VRM 9.0

Chipset

- Intel E7205 chipset
- MCH + ICH4 + FWH
- Winbond W83627HF super I/O chip
- Analog Device ADM1027 system monitor chip

Memory

- Four 184-pin 2.5-Volt DDR DIMM sockets
- Supports dual channel memory
- Supports up to 4GB unbuffered DDR memory
- Supports ECC/non-ECC DDR200/266 DIMM

Expansion Slots

- One AGP 8X/4X Pro50 slot
- Five 32-bit 33MHz (5V) PCI slots
- Total of six usable slots

Integrated I/O

- Six USB 2.0 and 1.1 compatible ports
  (2 rear connectors and 4 internal headers for chipcard reader, front panel and/or optional USB cable)
- Supports one floppy drive with 3 mode
- Two 9-pin serial connectors
- One 25-pin ECP/EPP/SPP parallel connector
- PS/2 mouse and keyboard connectors

IDE

- ICH4 provides two PCI bus master channels for up to four Enhanced IDE devices
- Supports for UDMA 33/66/100 IDE drives and ATAPI compliant devices

Power Management

- ACPI - Supports ACPI S1, S3, S4 and S5 modes
    - S3 is enabled by default, it can be disabled via BIOS setting in which case the suspend mode will be S1 instead of S3.
- Wake-Up from S1 (stand by)
    - PCI_PME#, RI#
    - PS/2 keyboard, PS/2 mouse
    - USB activity/connect/disconnect
    - RTC
    - External Modem Ring Indicator (#RI)
    - Power Button
- Wake-Up from S3 (suspend to RAM)
    - PCI_PME#
    - PS/2 keyboard, PS/2 mouse
    - USB activity/connect/disconnect (optional)
    - RTC
    - Power Button
    - External Modem Ring Indicator (#RI)
- Power-On from S4 (save to disk) and S5
    - RTC
    - Power Button
    - USB activity/connect/disconnect
    - PS/2 keyboard, PS/2 mouse
    - PCI_PME#
    - External Modem Ring Indicator (#RI)

Integrated LAN

- Intel 82540EM Gigabit Ethernet 10/100/1000Mbit
- PME wakeup support

Integrated Audio

- Intel ICH4 AC'97 compliant audio link
- ADI 1981A CODEC
- Line-in, , Mic-in rear jacks, Headphone out
- SPDIF digital output with rear RCA connector
- Front panel audio header
- One 4-pin CD-ROM audio input header
- One 4-pin Auxiliary audio header

System Management

- Analog Device ADM1027 at I^2C serial bus
- Total four 3-pin fan headers
- All fan headers with tachometer monitoring
- One 3-pin chassis intrusion header
- Temperature, voltage and fan monitoring

General Power Management

- CPI 2.0b compliant
- PCI Bus Power Management 1.1 compliant
- Memorize power-state before AC power cut & restore upon boot

BIOS

- Phoenix BIOS 4.06 on 4 Mbit Flash ROM
- Supports Hyper-Threading technology
- Supports BIOS Boot Specification v1.1 (BBS)
- Supports ACPI 2.0 S1, S3, S4 and S5
- Supports SMBIOS v2.3
- Auto configuration of IDE hard disk types

Form Factor

- Standard ATX footprint (12" x 9.6")
- Six-layer design
- ATX12V (20pin+4pin+6pin) power connectors
- Stacked parallel (one), serial (two) connectors
- Stacked USB (two) connectors
- Stacked PS/2 keyboard and mouse connectors
- Stacked audio Line-in, Headphone out, and Mic-in jacks (Amplifier integerated)
- One SPDIF RCA connector (output)
- One RJ-45 10/100/1000 LAN connector with LEDs

Regulatory

- FCC Class B (Declaration of Conformity)
- European Community CE (Declaration of Conformity)

Overview Board, Jumpers and Connectors
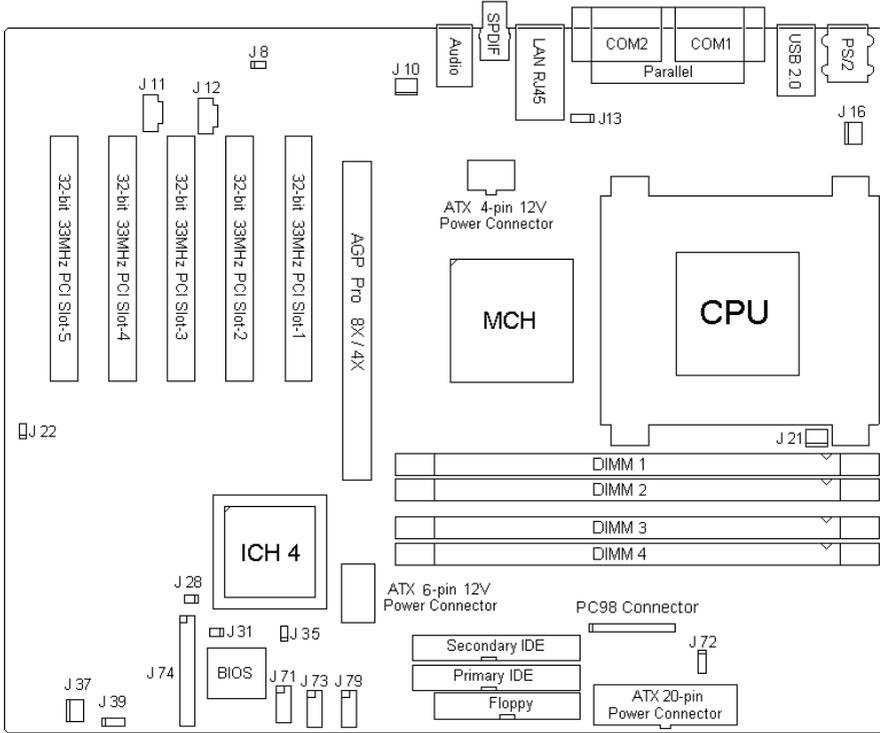
This diagram is representative of the latest board revision available at the time of publishing. The board you receive may not look exactly like the above diagram.

Jumper Legend

	Jumper OFF	without jumper cover
	Jumper ON	with jumper cover

Jumper and Connector Settings

Overview

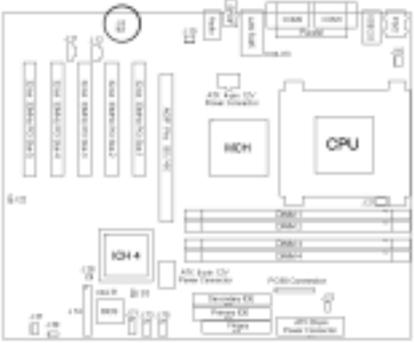| Jumper / Connector	Function	Settings
J8	Enable/Disable Onboard Intel 82540EM GbE NIC	Open: Enable (Default) Close: Disable
J10	Fan Connector	With tachometer monitoring
J11	AUX Audio Connector	
J12	CD Audio Input Connector	
J13	ACPI Wake-up Jumper (USB Port-A and USB Port-B)	Close Pin-1 and Pin-2 Rear panel USB devices' ACPI S1 wake up Close Pin-2 and Pin-3 (Default) Rear panel USB devices' ACPI S1/S3/S4 wake up
J16	Fan Connector	With tachometer monitoring
J21	Fan Connector	With tachometer monitoring
J28	Clear CMOS Jumper	Open: Normal (Default) Close: Clear CMOS Mode
J35	Recovery	Open: Normal (Default) Close Pin-1 and Pin-2: Recovery mode
J37	Fan Connector	With tachometer monitoring
J39	ACPI Wake-up Jumper (USB Port-C, USB Port-D, USB Port-E and USB Port-F)	Close Pin-1 and Pin-2 Front panel USB devices' ACPI S1 wake up Close Pin-2 and Pin-3 (Default) Front panel USB devices' ACPI S1/S3/S4 wake up
J71	Front Panel Audio Connector	
J72	Chassis Intrusion Connector	
J73	Front Panel USB Header-1	
J74	Front Panel Connector	
J79	Front Panel USB Header-2	

Enable/Disable On board LAN Jumper (J8)

	OPEN (Default) - To enable onboard LAN
	CLOSE - To disable onboard LAN

Fan Connectors (J10, J16, J21 and J37)

	GND Power Speed
	Use these headers to connect chassis and processor cooling fans to your motherboard. Cooling fans can keep the system stable and reliable for its product life.
	Max 850mA fans supported

AUX Audio connector (J11) and CD Audio connector (J12)

J11 (AUX Audio connector)	
Connects to internal audio sources such as TV tuner, MPEG, or other similar cards	
J12 (CD Audio connector)	
Connects to a CD-ROM drive via an optional CD audio cable	

ACPI Wake-up Jumper for USB Port-A and Port-B (J13)

pin-1
CLOSE Pins 1 and 2   Rear panel USB devices' ACPI S1 wake up
pin-1
CLOSE Pins 2 and 3 (Default)   Rear panel USB devices' ACPI S1/S3/S4 wake up   total current of all USB devices should not exceed the standby current rating of the power supply

Clear CMOS Jumper (J28)

	Clear	Default

You can reset the CMOS settings by using this jumper when you

- Have forgotten your system/setup password
- Need to clear system BIOS setting
- ► Power off system and disconnect power supply from AC source
- ► Use jumper to close JP28 for several seconds to Clear CMOS
- ► Take off jumper from JP28 (default setting)
- ► Reconnect power supply to AC source
- ► Power on system

Use "F2" key to go into system BIOS setup

Recovery Jumper (J35)
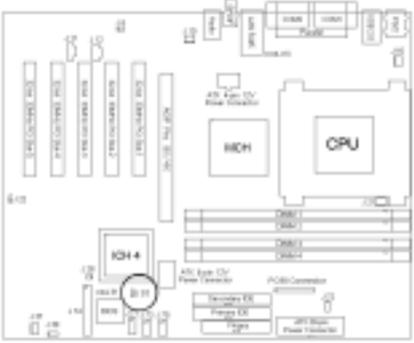
OPEN (Default)
CLOSE Pins 1 and 2 Recovery mode

ACPI Wake-up Jumper for USB Port-C, Port-D, Port-E and Port-F (J39)

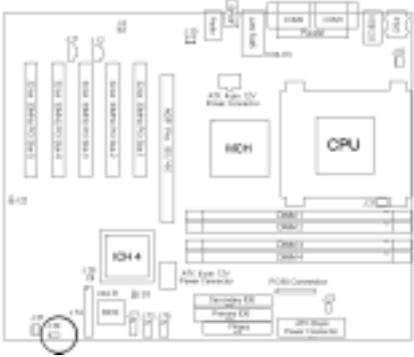|	
pin-3	
CLOSE Pins 1 and 2	
Front panel USB devices' ACPI S1 wake up	
pin-3	
CLOSE Pins 2 and 3 (Default)	
Front panel USB devices' ACPI S1/S3/S4 wake up	
Total current of all USB devices should not exceed the standby current rating of the power supply	

Front Panel Audio Connector (J71)
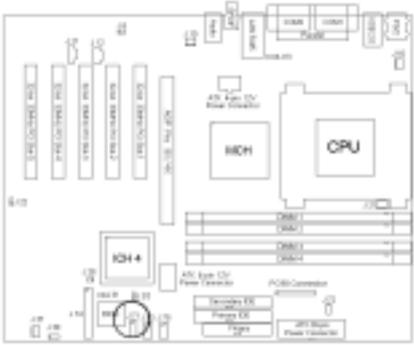
Signal Description	Pin #	Pin #	Signal Description
MIC input	1	2	Analog GND
MIC power	3	4	Analog VCC
Right line output	5	6	Right line return
NC	7	8	Key
Left line output	9	10	Left line return

Note: If Audio Front panel is not being used, put jumper on pins 5-6, and 9-10.

Chassis Intrusion Connector (J72)
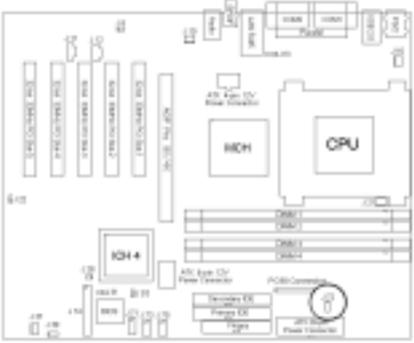
	Pin-1
	Intrusion cable detection (low asserted)
	Pin-2
	Intrusion detection (low asserted)
	Pin-3
	GND

Front Panel USB Header (J73)
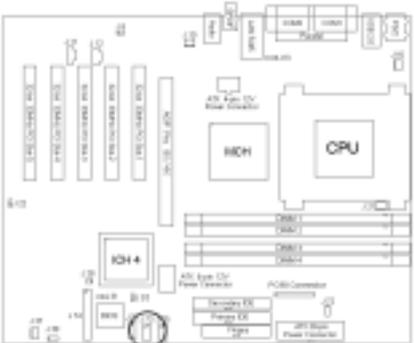
Signal Description	Pin #	Pin #	Signal Description
Key	1	2	Chipcardreader on
VCC	3	4	VCC
Data negative A	5	6	Data negative B
Data positive A	7	8	Data positive B
GND	9	10	GND
Key	11	12	Not connected

Front Panel USB Header (J79)

Signal Description	Pin #	Pin #	Signal Description
Key	1	2	Chipcard-reader On
VCC	3	4	VCC
Data negative A	5	6	Data negative B
Data positive A	7	8	Data positive B
GND	9	10	GND
Key	11	12	Not connected
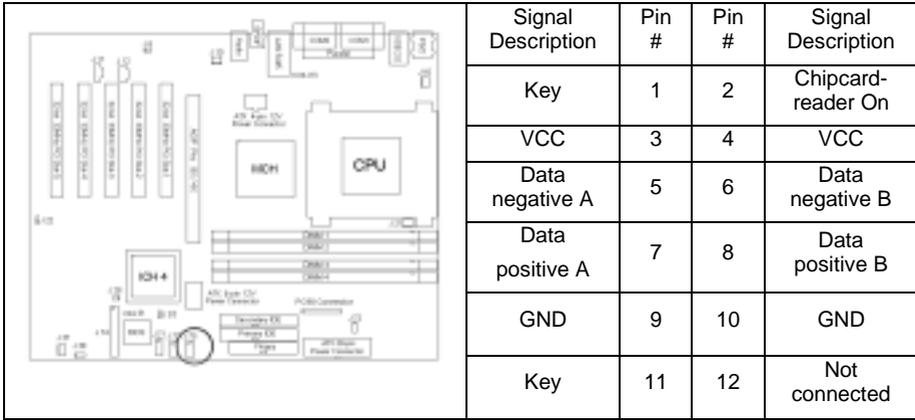
Front Panel Connector (J74)
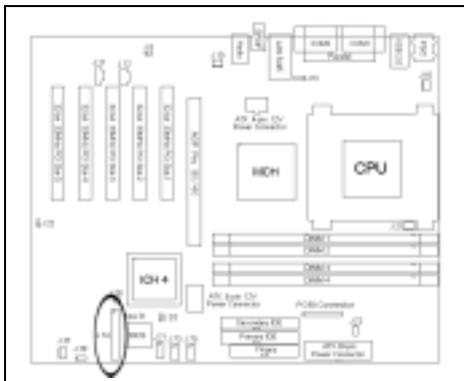
Signal Description	Pin #		Pin #	Signal Description
Sleep LED "– "	1		2	Speaker "– "
Sleep LED "+ "	3		4	Key
Key	5		6	GND
Power LED "+ "	7		8	Speaker "+ "
Power LED "+ "	9		10	Key
GND	11		12	Key
Message LED "+ "	13		14	Key
Message LED "– "	15		16	Not connected
Key	17		18	SCSI LED Input
HD LED "+ "	19		20	SCSI LED Input
HD LED "– "	21		22	Not connected
GND	23		24	Key
Power Button	25		26	GND
Sleep Button	27		28	GND
Reset Button	29		30	GND

Installing the Memory

Before attempting to install any memory, make sure that the memory you have is compatible with the motherboard as well as the processor. For example, **DDR200 and DDR266 memory modules can be used for FSB=400MHz Intel Pentium 4 processor but only DDR266 memory modules can be used for FSB=533MHz Intel Pentium 4 processor.**

A current list of the memory modules recommended for this mainboard is available on the Internet at: *www.fujitsu-siemens.de/mainboards*.

	DDR200 (PC1600)	DDR266 (PC2100)
Pentium 4 mPGA478 FSB=400MHz	Yes	Yes
Pentium 4 mPGA478 FSB=533MHz	No	Yes

Here are a few key points to note before installing memory modules onto your board.

- All installed memory will be automatically detected - no need to set any jumpers
- Supports 128MB, 256MB, 512MB and 1GB unbuffered DDR200/266 modules
- Supports up to 4GB of memory

DDR Unbuffered Non-ECC

supported

DDR Unbuffered ECC

supported
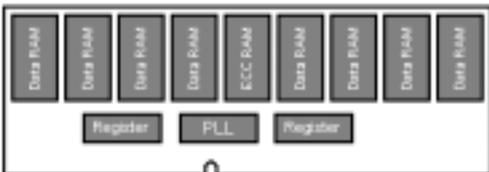
DDR Registered ECC

unsupported

	Memory Slot	Memory Channel	Memory Bandwidth
Two pieces	DIMM1+DIMM2 or DIMM3+DIMM4	Dual	128-bit
Four pieces	DIMM1+DIMM2+DIMM3+DIMM4	Dual	128-bit

	Dual Memory Channel
	At least two unbuffered DDR ECC/non-ECC modules must be installed
	Memory modules must be installed in pairs DIMM1+DIMM2 or
	DIMM3+DIMM4 or
	DIMM1+DIMM2+DIMM3+DIMM4
	Dual channel 128-bit memory bandwidth

Note: The pair of memory module in slots DIMM1 and DIMM2 must be identical to the pair in slots DIMM3 and DIMM4.

Memory Installation Procedure

When installing memory modules, make sure the modules align properly with the memory socket. There should be a key (small indent) on your memory module that fits according to the key in the memory socket. D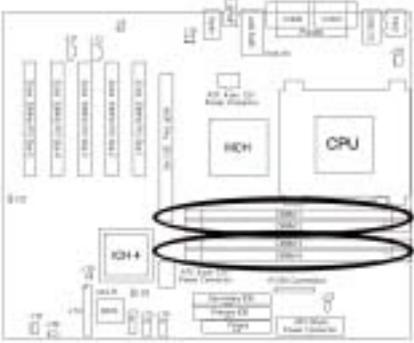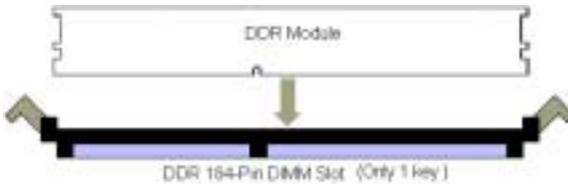DR modules and sockets have only one key, which is slightly off-center of the module/socket. The method of installing memory modules is detailed in the following diagrams.

DDR Module

DDR 184-Pin DIMM Slot (Only 1 key)

Once the memory modules are firmly seated in the socket, two clamps on either side will close and secure the module into the socket. Sometimes you may need to close the clamps manually.

DDR Module

DDR 184-Pin DIMM Slot
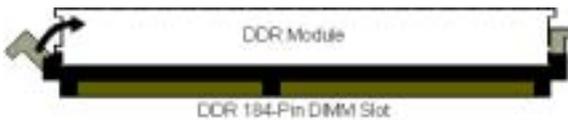
To remove the memory module, simply push the clamps outwards until the memory module pops up. Then remove the module.

i	When installing memory, a module may require a considerable amount of force to seat properly, although this is very rare. To avoid bending and damaging your motherboard, place it on its anti-static bag and onto a flat surface, then proceed with memory installation.

⚠ **YOU MUST** unplug the power supply before performing system hardware changes in order to avoid damaging the board or expansion device..

Installing the Processor and Heatsink

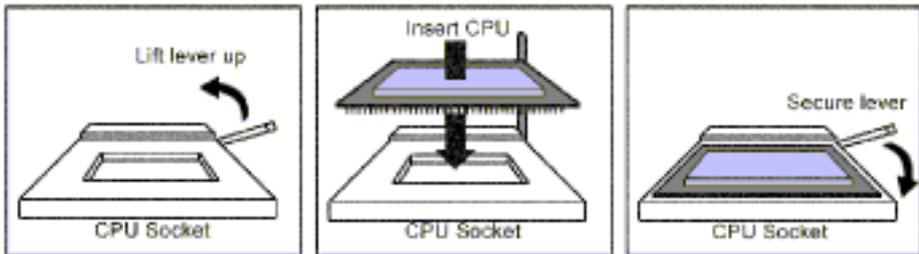The S2662 supports the mPGA478 Pentium 4 processors technologies from Intel. A current list of the processors supported by this mainboard is available on the Internet at: *www.fujitsu-siemens.de/mainboards*.

The following diagrams will detail how to install your processor:

The processors you choose to use may not look exactly like the one pictured above, nor will the socket look exactly the same. The diagram is a visual guide to help you install processors.

Lift the lever on the socket as far back as possible to the socket.

- ► Align the processor with the socket. There are keys underneath the processor just like on memory modules to ensure that they insert the correct way.

- ► Seat the processor firmly into the socket by gently pressing down until the processor sits flush with the socket.

- ► Place the socket lever back down until it snaps into place.

Your processor is installed.

Take care when installing the processor as it has fragile connector pins that can bend and break if inserted improperly.

Heatsink Installation

After you are done installing the processor, you should proceed to installing the heatsink. The heatsink will ensure that the processor does not overheat, and will continue to operate at maximum performance. An overheated processor is also dangerous to the long-term reliability of the motherboard.

The following diagram will illustrate how to install the most common heatsinks:

Install the mounting bracket onto the motherboard by aligning the bracket with the four holes around the processor socket. Once the bracket is aligned, press down on the four white pegs on the bracket until they insert securely, locking the bracket onto the motherboard. Then proceed to installing the heatsink. Instructions on how to install heatsinks should be provided with the heatsink itself.

First, use thermal compound (also called heatsink compound or thermal grease) and apply a small amount on to the processor's core – the small shiny square in the center of the processor.

Then, at an angle, clip one side of the heatsink onto the socket and then lay the heatsink flat onto the processor. Then clip the other end of the heatsink down by using a flathead screwdriver.

Some heatsinks have a small clip on the inside of one of the clips which you can insert a small flathead screw driver into to secure the heatsink.

Because one side of the socket is raised (and usually has "SOCKET" imprinted into it) heatsinks have an indent on one side to secure flush with the raised side of the socket.

Be sure to carefully observe which side your heatsink is seated before securing it down to avoid damaging the processor, the heatsink or both.
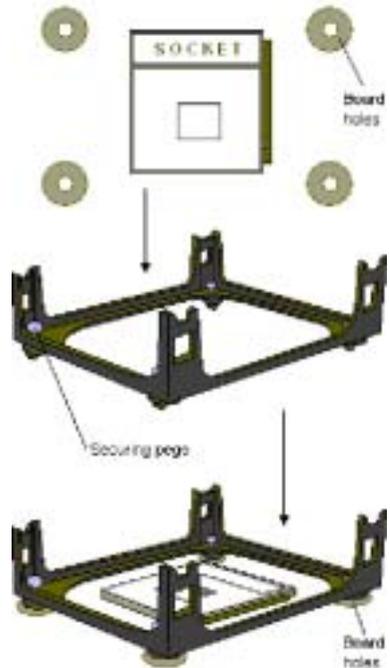
Finishing Installing the Heatsink

After you finish installing the heatsink onto the processor and socket, attach the end wire of the fan (which should already be attached to the heatsink) to the motherboard. The following diagram illustrates how to connect fans onto the motherboard.

After you have finished installing all the fans you can connect your drives (hard drives, CD-ROM drives, etc.) to your motherboard.

Installing Add-In Cards

Before installing add-in cards, it is helpful to know if they are fully compatible with your motherboard. For this reason, we have provided the diagrams below showing the most common slots that may appear on your motherboard. Not all of the slots shown will necessarily appear on your motherboard. However, there will be combinations of what you see here.

AGP Pro 110 / 50 Slot

AGP Slot

PCI-X / 64-bit PCI Slots – 3.3 volts

32-bit / 33MHz PCI Slot - 5 vots

DDR SDRAM DIMM Slot

Find the appropriate slot for your add-in card and insert the card firmly. Do not force any add-in cards (or anything else) into any slots if they will not seat in place.

**YOU MUST** unplug the power supply before performing system hardware changes in order to avoid damaging the board or expansion device.

Before Continuing onto section **Connecting External Devices**, make sure everything is properly connected. Things like jumpers and case wiring are the most common causes of troubleshooting frustrations, both for the end-user and for any company doing technical support.

Connecting External Devices

The following diagrams will detail the rear port stack for this S2662 motherboard:
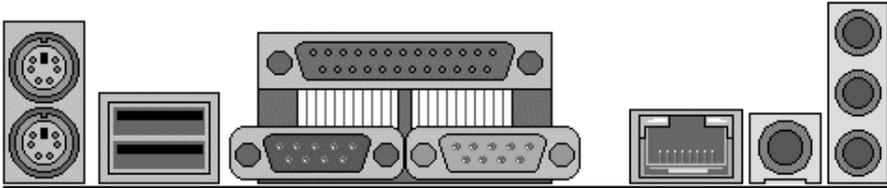
Audio Port	
Blue = Line in Green = Headphone out Pink = Mic in	Line In Jack - Connects to external devices for playback or recording Headphone Out Jack - Connects to headphone or speakers (Amplifier integrated) Microphone In Jack - Connects to an external microphone

USB 2.0/1.1	
	USB 2.0 /1.1 Two rear USB 2.0/1.1 connectors Four front USB 2.0/1.1 headers (J73)

SPDIF	
	SPDIF RCA connector Sony/Philips Digital Interface (SPDIF) is the newest audio transfer file format. It provides impressive sound quality through this RCA connector and allows you to enjoy digital audio instead of analog audio.

RJ45 LAN Port

Left   Right

RJ45 Link/Activity LED (Right Side)

Without LINK	Green LED OFF
With LINK	Green LED ON
Activity	Green LED BLINK

RJ45 Speed LED (Left side)

1000	Green LED ON
100	Yellow LED ON
10	LED OFF

Installing the Power Supply

This motherboard requires that you have an ATX12V power supply. The standard ATX12V power supply has two power connectors, a 20-pin ATX connector and an additional 4-pin square connector. The CPU power is provided by the onboard voltage switching regulator which is sourced from the 4-pin square connector. The CPU won't be powered without connecting the 4-pin square connector.

ATX 12V

(4-pin) connector + (6-pin) connector + (20-pin) connector
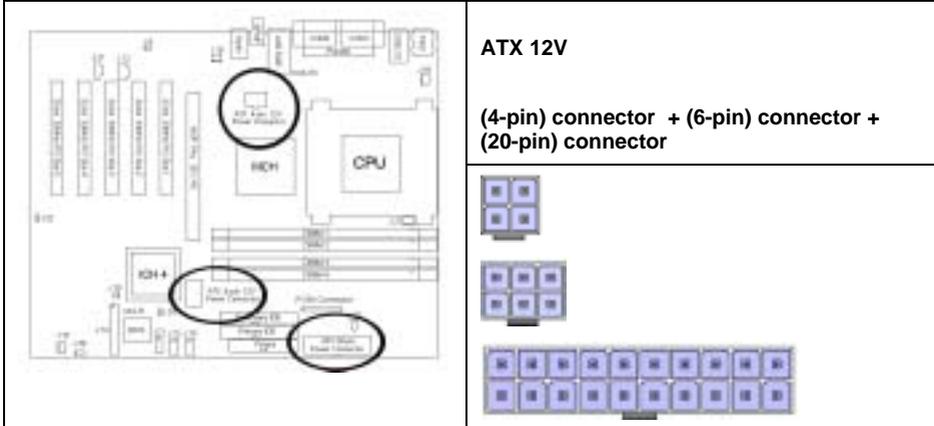
YOU MUST unplug the power supply before plugging the 20-pin and 4-pin cables to motherboard connectors.

Attaching IDE and Floppy Drive Cables

Attaching IDE drive cabling is simple. These cables are "keyed" to only allow them to be connected in the correct manner. Tyan motherboards have two on-board IDE channels, each supporting two drives. The grey connector designates the Primary channel, while the black connector designates the Secondary channel. Attaching IDE cables to the IDE connectors is illustrated below:
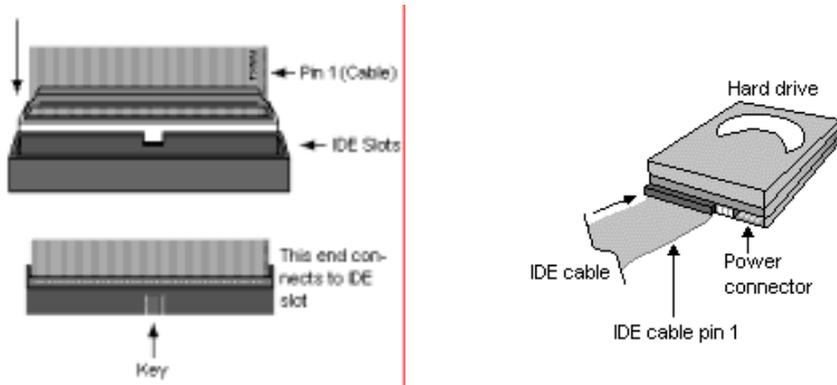
Simply plug in the BLUE END of the IDE cable into the motherboard IDE connector, and the other end(s) into the drive(s). Each standard IDE cable has three connectors, two of which are closer together. The BLUE connector that is furthest away from the other two is the end that connects to the motherboard. The other two connectors are used to connect to drives.

Attaching a floppy drive can be done in a similar manner to an IDE drive. Most of the current floppy drives on the market require that the cable be installed with the colored stripe (pin-1) positioned next to the power connector. In most cases, there will be a key pin on the cable which will force proper connection of the cable.

Below are some symptoms of incorrectly installed floppy drives:

- Drive is not automatically detected
    - Check if the floppy controller is enabled under the BIOS settings
    - Verify that the floppy cable is installed correctly
    - Verify that the floppy drive is working properly (i.e. try a new drive)
- Drive Fail message at bootup
    - Verify with another drive or cable
- Drive does not power on
    - Check power cable and cabling
    - Check power supply
- Drive activity light is constantly on
    - Cable is on backwards

| i | Pin 1 on the cable (usually designated by a colored wire) faces the drive's power connector. |

Replacing lithium battery

In order to permanently save the system information, a lithium battery is installed to provide the CMOS-memory with a current. A corresponding error message notifies the user when the charge is too low or the battery is empty. The lithium battery must then be replaced.

<div style="display:flex;">
⚠
</div>

Incorrect replacement of the lithium battery may lead to a risk of explosion!

The lithium battery may be replaced only with an identical battery or with a type recommended by the manufacturer.

Do not throw lithium batteries into the household waste. They must be disposed of in accordance with local regulations concerning special waste.

Ensure that you insert the battery the right way round. The plus pole must be on the top!

The lithium battery holder exists in different designs that function in the same way.
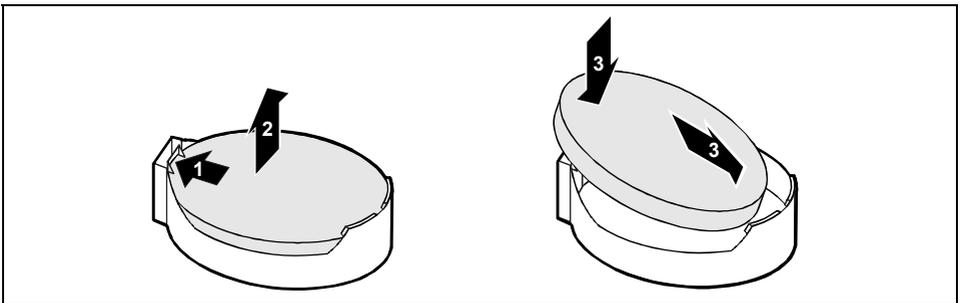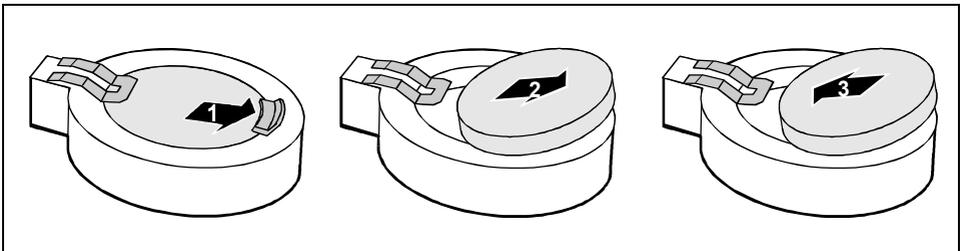
► Press the locking lug in the direction of the arrow; the battery jumps somewhat out of the holder (1).

► Remove the battery (2).

► Insert a new lithium battery of the same type into the socket (3).

Glossary

The technical terms and abbreviations given below represent only a selection of the full list of common technical terms and abbreviations.
Not all technical terms and abbreviations listed here are valid for the described mainboard.

ACPI	Advanced Configuration and Power Management Interface		ISA	Industrial Standard Architecture
AC'97	Audio Codec '97		LAN	Local Area Network
AGP	Accelerated Graphics Port		LSA	LAN Desk Service Agent
AMR	Audio Modem Riser		MCH	Memory Controller Hub
AOL	Alert On LAN		MMX	MultiMedia eXtension
APM	Advanced Power Management		P64H	PCI64 Hub
ATA	Advanced Technology Attachment		PCI	Peripheral Component Interconnect
BIOS	Basic Input Output System		PXE	Preboot eXecution Environment
BMC	Baseboard management controller		RAM	Random Access Memory
CAN	Controller Area Network		RAMDAC	Random Access Memory Digital Analogue Converter
CPU	Central Processing Unit		RDRAM	Rambus Dynamic Random Access Memory
CNR	Communication Network Riser		RIMM	Rambus Inline Memory Module
C-RIMM	Continuity Rambus Inline Memory Module		RTC	Real Time Clock
DIMM	Dual Inline Memory Module		SB	Soundblaster
ECC	Error Correcting Code		SDRAM	Synchronous Dynamic Random Access Memory
EEPROM	Electrical Erasable Programmable Read Only Memory		SGRAM	Synchronous Graphic Random Access Memory
FDC	Floppy disk controller		SIMD	Streaming Mode Instruction (**S**ingle **I**nstruction **M**ultiple **D**ata)
FIFO	First-In First-Out		SMBus	System Management Bus
FSB	Front Side Bus		SVGA	Super Video Graphic Adapter
FWH	Firmware Hub		USB	Universal Serial Bus
GMCH	Graphics and Memory Controller Hub		VGA	Video Graphic Adapter
GPA	Graphics Performance Accelerator		WOL	Wake On LAN
I²C	Inter Integrated Circuit			
IAPC	Instantly Available Power Managed Desktop PC Design			
ICH	I/O Controller Hub			
IDE	Intelligent Drive Electronics			
IPSEC	Internet Protocol Security			