

ASUS[®] TRL-DLS
Dual Tualatin[™] Motherboard

USER'S MANUAL

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(Turn to page 66 for detailed contents on OS Drivers)

FCC & DOC COMPLIANCE

Federal Communications Commission Statement

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

- This device may not cause harmful interference, and
- This device must accept any interference received, including interference that may cause undesired operation.

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 manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. 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:

- Re-orient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment to 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.

WARNING! Any changes or modifications to this product not expressly approved by the manufacturer could void any assurances of safety or performance and could result in violation of Part 15 of the FCC Rules.

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Canadian Department of Communications Statement

This digital apparatus does not exceed the Class B limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

This Class B digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

1. INTRODUCTION

1.1 How This Manual Is Organized

This manual is divided into the following sections:

1. INTRODUCTION	Manual information and checklist
2. FEATURES	Production information and specifications
3. HARDWARE SETUP	Instructions on setting up the motherboard.
4. BIOS SETUP	Instructions on setting up the BIOS
5. SOFTWARE SETUP	Instructions on setting up the included software
6. SOFTWARE REFERENCE	Reference material for the included software
7. APPENDIX	Optional items and general reference

1.2 Item Checklist

Check that your package is complete. If you discover damaged or missing items, contact your retailer.

- (1) ASUS Motherboard
- (1) I/O Shield
- (1) Ribbon cable for master and slave IDE drives
- (1) 68-pin LVD SCSI ribbon cable for Ultra160 devices with Terminator
- (1) Ribbon cable for a 3.5" floppy disk drive
- (1) Motherboard Support CD
- (1) Socket 370 CPU Terminator (UMB type)
- (1) User's Manual

2. FEATURES

2.1 ASUS TRL-DLS Motherboard

The ASUS TRL-DLS motherboard is designed for server systems that require flexible configurations. Powered by dual Intel® Pentium® III Tualatin™ /Coppermine processors, the TRL-DLS efficiently complies with today's demand for a high-integration server.

2.1.1 Specifications

- **Processor Support:** Supports dual Socket 370-based Intel Pentium III Coppermine (256KB L2) and Tualatin (512KB L2) processors running up to 1.53+GHz with 133MHz Front Side Bus (FSB) frequency.
- **Host Bridge:** Features the ServerWorks® CNB20HE-SL North Bridge that supports a two-way Pentium III interface, 133MHz Front Side Bus (FSB), and 1.0 GB/s FSB bandwidth
- **I/O Bridge:** Features ServerWorks® CIOB20 to support dual 64-bit/66MHz PCI buses and PCI 2.2 protocol
- **South Bridge:** Features ServerWorks® CSB5 to support 32-bit/33MHz PCI following PCI 2.2 protocol, XIO-APIC for multiprocessor system, 4-port USB 1.1 interface, ACPI power management and event detection, dual-channel ATA-100 HDD controller, and legacy functions such as 8237DMA, 8259PIC, and 8254 Timer
- **LPC Super I/O:** Features the NS 87417 low-pin count (LPC) to support UART compatible serial ports and one parallel port with EPP and ECP capabilities, floppy drive, and PS/2 keyboard and mouse.
- **Onboard Graphics:** Features ATI RAGE-XL PCI VGA controller that supports up to 8MB display SDRAM for 1280x1024 and true color resolutions.
- **LAN Support:** Features Intel 82550 Fast Ethernet LAN controller that fully supports 10BASE-T/100BASE-TX networking protocols, and two RJ-45 ports with status LEDs.
- **PC133 Memory Support:** Equipped with six Dual Inline Memory Module (DIMM) sockets that support up to 6GB of registered ECC SDRAMs (available in 128/256/512MB or 1GB densities).
- **Ultra160 SCSI Support:** Equipped with Adaptec® AIC7899W 64-bit/66MHz SCSI controller to support up to 30 SCSI devices through the onboard dual-channel Ultra160 SCSI connectors.

2. FEATURES

- **ATA-100 IDE Support:** Comes with an onboard PCI Bus Master IDE controller with two connectors that support four IDE devices on two channels. Supports ATA-100, Multi-Word DMA Mode 2, PIO Modes 3 & 4 IDE devices, such as ATAPI IDE CD-ROM, CD-R/RW, ZIP, and LS-120 drives.
- **PCI Expansion Slots:** Comes with four 64-bit/66MHz 3.3V PCI slots and two 32-bit/33MHz 5V PCI slots. One of the 64-bit 3.3V PCI slots supports the Adaptec EMRL (Embedded RAID Logic).
- **USB Ports:** Two stacked USB connectors to provide for additional peripherals
- **SMBus:** Features the System Management Bus interface, which is used to physically transport commands and information between SMBus devices.
- **Wake-Up Support:** Supports Wake-On-LAN and Wake-On-Ring, and BIOS Wake-Up.
- **Chassis Intrusion Detection:** Chassis intrusion circuitry can log chassis open events into the system BIOS. The onboard battery supports detection even when normal power is removed and through a new design, battery drain is even lower than the RTC used for keeping time!
- **Server Health Monitoring:** Provides an easy way to examine and manage system status information, such as CPU and system voltages, temperatures, and fan status through the onboard hardware ASUS ASIC.
- **Enhanced ACPI:** Programmable BIOS (Flash EEPROM), offering enhanced ACPI for Windows NT/2000/XP compatibility, and autodetection of most devices for virtually automatic setup.
- **Smart BIOS:** 4Mbit firmware gives a new easy-to-use interface which provides more control and protection over the motherboard. Provides boot block write protection, and HD/SCSI/MO/ZIP/CD/Floppy boot selection. Year 2000 certified.
- **CPU Throttling:** CPU throttling protects CPU from overheating.
- **Integrated IOAPIC:** Supports full 32-APIC entries and removes the need for a separate IOAPIC chip.
- **ASUS Server Management Card:** The optional ASMC-LE, ASMC-ME, and ASMC-HE cards support Intelligent Platform Management Interface (IPMI), system health monitor, and LAN security mode solutions to achieve server reliability, availability, and serviceability requirements.

2. FEATURES

2.1.2 Performance

- **Ultra Performance:** Onboard Ultra160 dual channel SCSI controller with two connectors that support 30 Ultra160 SCSI devices in two channels.
- **CPU Speed:** CPU frequency operates at 133MHz
- **High-Speed Data Transfer Interface:** SCSI transfers using Ultra160 dual-channel SCSI controller can handle rates up to 160MB/s. Ultra160 is backward compatible with slower SCSI devices so that older SCSI devices are not wasted. (Ultra160 SCSI cables have twisted pairs compared to flat ribbon cables used in older SCSI standards.)
- **Advanced 64-bit PCI:** Maximizes IO bandwidth for the next generation of 64-bit PCI cards, supports four full 64-bit 66/33MHz PCI busses, and two 32-bit 33MHz PCI busses.
- **Full Peer-to-Peer Support:** Allows full peer-to-peer transactions between PCI busses and increases options for intelligent IO and Server Management cards.
- **SDRAM Optimized Performance:** This motherboard supports interleaved PC133 “registered” Synchronous Dynamic Random Access Memory (SDRAM) that supports a data transfer rate of up to 2128MB/s.
- **ACPI Ready:** Advanced Configuration and Power Interface (ACPI) is also implemented on all ASUS smart series motherboards. ACPI provides more Energy Saving Features for future operating systems (OS) supporting OS Direct Power Management (OSPM) functionality. With these features implemented in the OS, PCs can be ready around the clock, yet satisfy all the energy saving standards. To fully utilize the benefits of ACPI, an ACPI-supported OS, such as Windows 2000, must be used.
- **New Compliantcy:** Both the BIOS and hardware levels of the motherboard meet the stringent requirements for SDG2.0 certification. The new SDG2.0 requirements for systems and components are based on the following high-level goals: support for Plug and Play compatibility and power management for configuring and managing all system components, and 32-bit device drivers and installation procedures for Windows NT/2000/XP. Color-coded connectors and descriptive icons make identification easy as required by PC ‘99.

2. FEATURES

2.1.3 Intelligence

- **Fan Status Monitoring and Alarm:** To prevent system overheat and system damage, the CPU, power supply, and system fan speeds are monitored. All the fans are set to normal RPM range and alarm thresholds.
- **Temperature Monitoring and Alert:** To prevent system overheat and system damage, this motherboard supports processor thermal sensing and auto-protection.
- **Voltage Monitoring and Alert:** System voltage levels are monitored to ensure stable current to critical motherboard components. Voltage specifications are more critical for future processors, so monitoring is necessary to ensure proper system configuration and management.
- **Dual Function Power Button:** Through BIOS, the power button can be defined as the “Stand by” (a.k.a. Suspend or Sleep) button or as the Soft-Off button. Regardless of the setting, pushing the power button for more than 4 seconds will enter the Soft-Off mode.
- **Remote Ring In (requires modem):** This allows a computer to wake up remotely through an internal or external modem. With this benefit on-hand, users can access any information from their computers from anywhere in the world.
- **Server Management:** The motherboard comes with an ASMC card connector (supports the optional ASMC-LE and ASMC-ME cards) that complies with server reliability, availability, and serviceability requirements. Remote management response via remote diagnostics and troubleshooting still works even when the operating system has frozen.

2. FEATURES

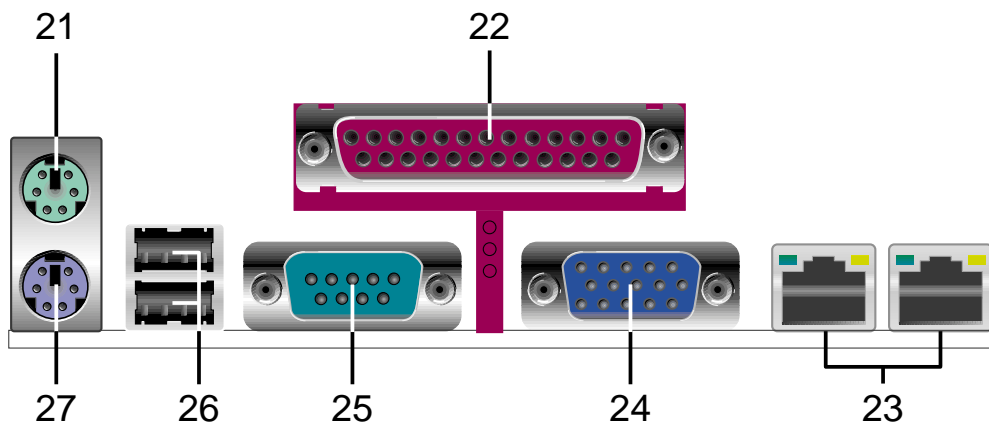
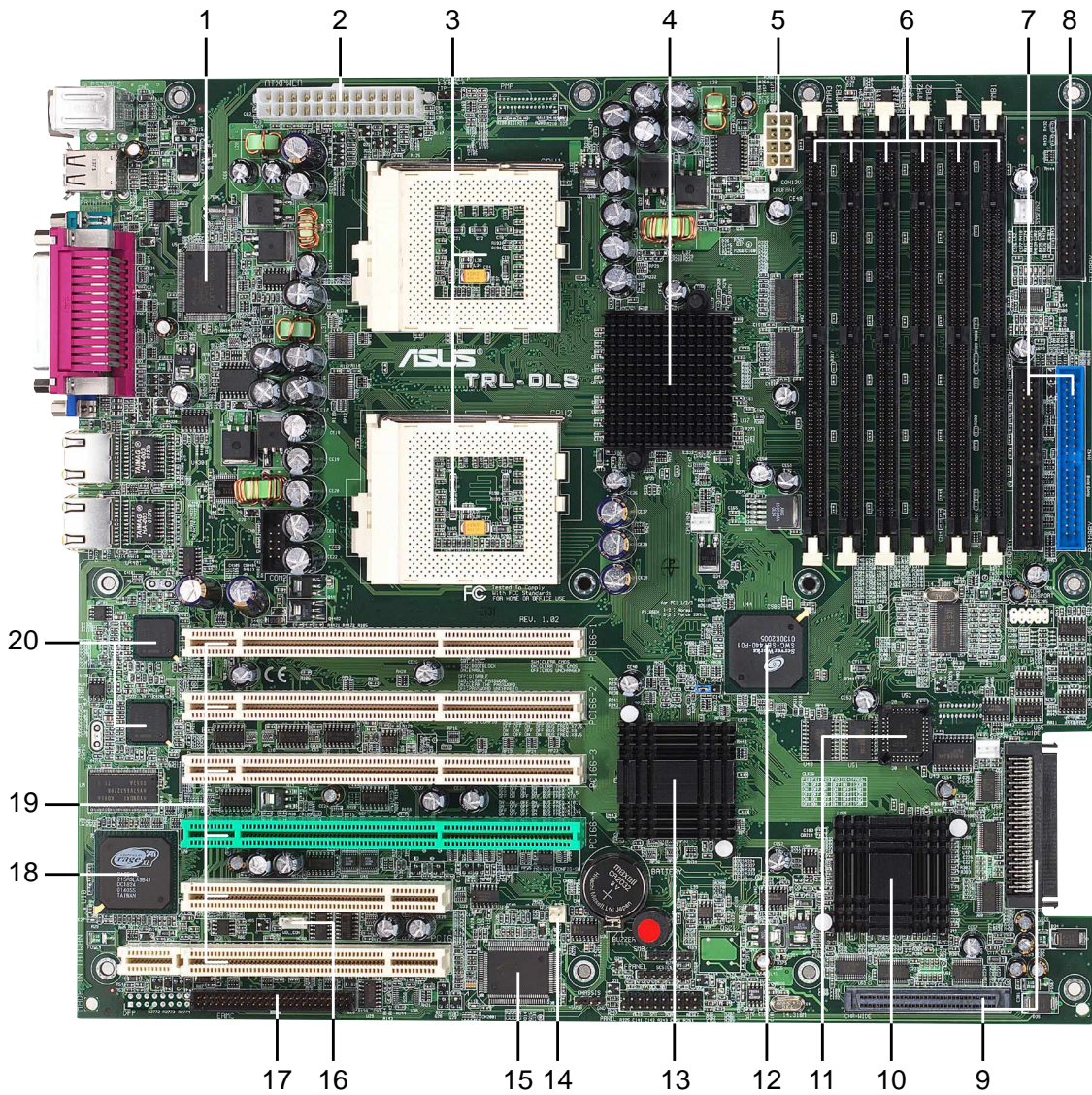
2.2 TRL-DLS Motherboard Components

See opposite page for locations.

	Location
Processor Support	(2) Socket 370 for Pentium® III Tualatin™ /Coppermine Processors 3
Chipsets	ServerWorks® CNB20HE-SL Host Bridge 4
	ServerWorks® CIOB2 I/O Bridge 13
	ServerWorks® CSB5 South Bridge 12
	Super I/O 1
	4Mbit Flash ROM 11
Main Memory	(6) DIMM Sockets 6
	Maximum 6GB memory support using interleaved PC133 registered ECC SDRAM DIMMs
Expansion Slots	(4) 64-bit / 66MHz 3.3V (PCI66-1 to PCI66-4) 19
	(2) 32-bit / 33MHz 5V (PCI5 and PCI6) 19
System I/O	(1) Floppy Disk Drive Connector 8
	(2) IDE Connectors (UltraDMA100 support) 7
	(1) Parallel Port 22
	(1) Serial Port 1 (COM1) 25
	(2) USB Ports 26
	(1) PS/2 Mouse Port 21
	(1) PS/2 Keyboard Port 27
Network Features	Intel® 82550 Fast Ethernet Controllers 20
	(2) RJ-45 Fast-Ethernet Ports 23
	Wake-On-LAN Connector 16
	Wake-On-Ring Connector 14
Video Features	ATI Rage-XL PCI VGA Controller 18
	(1) VGA Monitor Port 24
SCSI Features	Adaptec AIC7899W 64-bit 66MHz SCSI controller 10
	Ultra160 SCSI Connectors 9
Hardware Monitoring	System Voltage Monitoring (integrated in ASUS ASIC) 15
	(4) Fan Power & Speed Monitoring Connectors (see layout on p. 14)
Power	EATX 24-pin Power Supply Connector 2
	+12V 8-pin Power Supply Connector 5
Special Features	eRMC Connector 17
Form Factor	EATX 12 in. x 13 in. (30.5 cm x 33 cm)

2. FEATURES

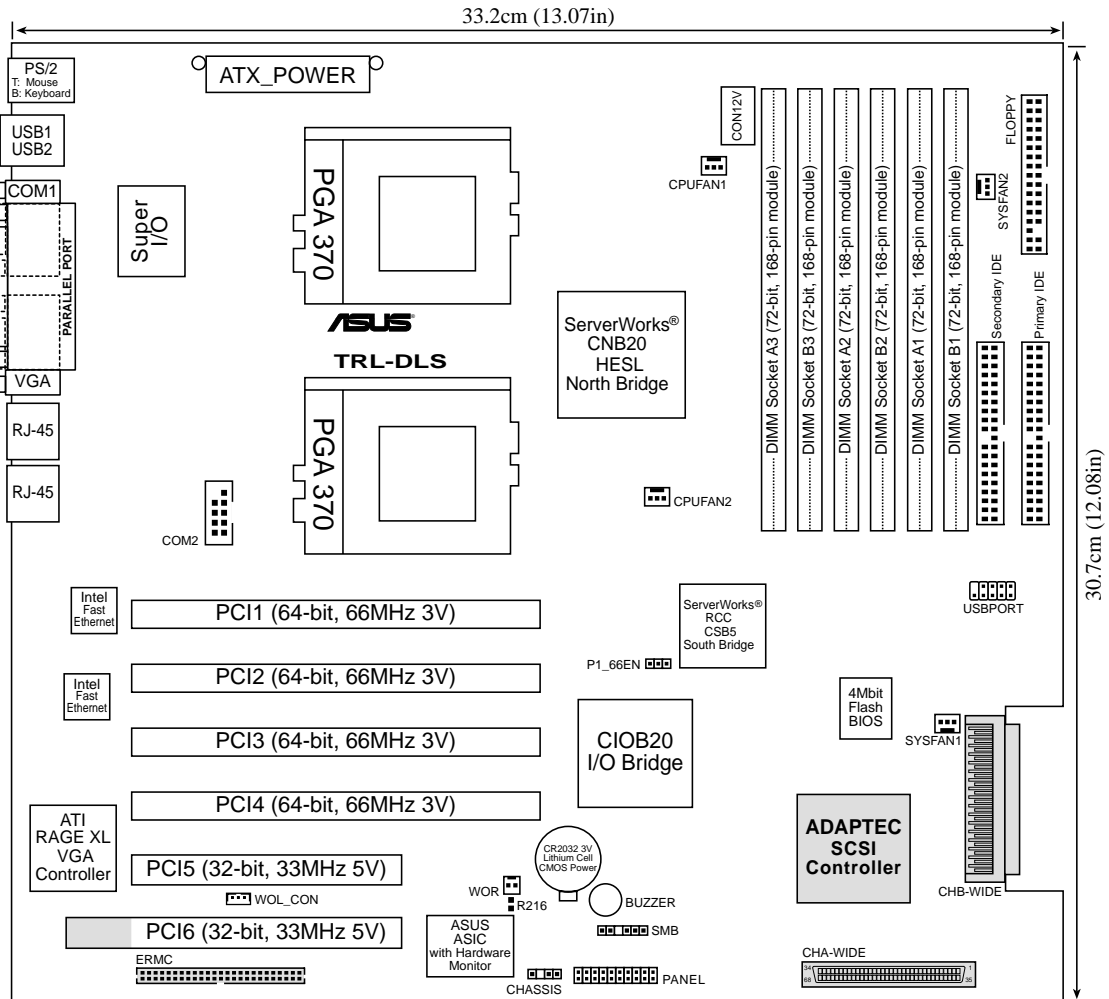
2.2.1 Component Locations



2. FEATURES
Component Locations

3. HARDWARE SETUP

3.1 TRL-DLS Motherboard Layout



NOTE: The SCSI and eRMC components are optional. These are grayed out in the above motherboard layout.

3. HW SETUP
Motherboard Layout

3. HARDWARE SETUP

3.2 Layout Contents

Jumper

- 1) P1_66EN p. 16 PCI Slot Setting

Expansion Slots

- 1) DIMMB1/2/3 p. 17 168-Pin System Memory Support
DIMMA1/2/3
- 2) CPU p. 19 Central Processing Unit (CPU)
- 3) PCI66-1/2/3/4 p. 21 64-bit PCI Bus Expansion Slots
PCI5, PCI6 p. 21 32-bit PCI Bus Expansion Slots

Connectors

- 1) IDE1/IDE2 p. 24 Primary/Secondary IDE Connectors (two 40-1 pin)
- 2 FLOPPY p. 25 Floppy Disk Drive Connector (34-1 pin)
- 3) WOL_CON p. 25 Wake-On-LAN Connector (3-pin)
- 4) WOR p. 26 Wake-On-Ring Connector (2-pin)
- 5) CHASSIS p. 26 Chassis Open Alarm Lead (4-1 pin)
- 6) CHA-WIDE, p. 27 68-pin Ultra160 SCSI Connectors (two 68-pin)
CHB-WIDE
- 7) CPUFAN1/2 p. 28 CPU Fan Connectors (two 3-pin)
SYSFAN1/2 p. 28 System Fan Connectors (two 3-pin)
- 8) SMB p. 29 SMBus Connector (6-1 pins)
- 9) eRMC p. 29 ASUS Server Management Card Connector
(50-pin)
- 10) ATXPWR, p. 30 ATX Power Supply Connector (20/24-pin)
CON12V p. 30 12V Power Supply Connector (8-pin)
- 11) COM2 p. 31 Serial Port 2 (10-1 pin)
- 12) PCI66-4 p. 31 Zero-channel RAID slot
- 13) USBPORT p. 32 Universal Serial Port Header (10-1pin male)
- 14) PANEL
- NIC p. 33 NIC Activity LED (2-pin)
- STATUS p. 33 Status Activity LED (2-pin)
- PWRSW p. 33 ATX Power Switch/Soft Off Lead (2-pin)
- RESET p. 33 Reset Switch Lead (2-pin)
- PWR.LED p. 33 System Power LED Lead (3-1 pin)
- NMI p. 33 Non-Mask Interrupt Switch (2-pin)
- SPEAKER p. 33 System Warning Speaker Connector (4-pin)
- IDELED p. 33 IDE/SCSI Activity LED (2-pin)

3. HARDWARE SETUP

3.3 Hardware Setup Procedure

Complete the following steps before using your computer:

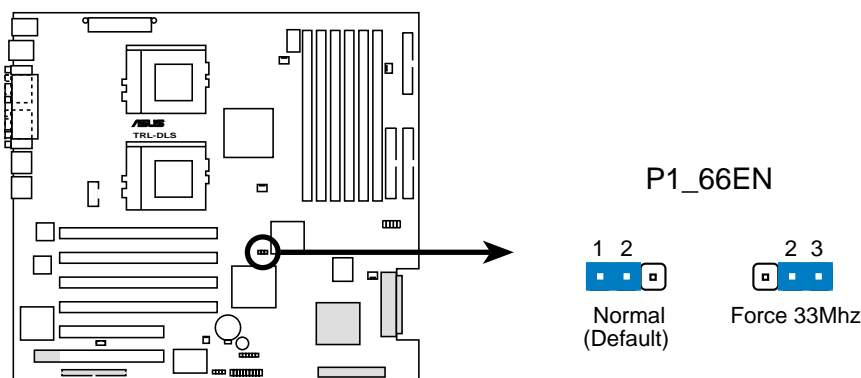
1. Check motherboard settings
2. Install memory modules
3. Install the Central Processing Unit (CPU)
4. Install a CPU terminator, if you installed only one CPU.
5. Install Expansion Cards
6. Connect ribbon cables, panel wires, and power supply cables
7. Configure the BIOS parameter settings

Take note of the following precautions before you install motherboard components or change any motherboard settings.

1. Unplug the power cord from the wall socket before touching any internal component.
2. Use a grounded wrist strap or touch a safely grounded object, such as the power supply case, before handling components to avoid damaging them due to static electricity.
3. Hold components by the edges and do not touch the ICs on them.
4. Whenever you uninstall any component, place the components on a grounded antistatic pad or in the bag that came with the component.
5. **Before you install or remove any component, ensure that the ATX power supply is switched off or the power cord is detached from the power supply.** Failure to do so may cause severe damage to the motherboard, peripherals, and/or components.

3.4 Jumper Settings

There is only one jumper on the motherboard. This jumper allows you to set the speed for the PCI slots.



TRL-DLS PCI Slot Setting

3. HARDWARE SETUP

3.5 System Memory

This motherboard uses interleaved PC133 Dual Inline Memory Modules (DIMMs). Six DIMM sockets are available for **3.3Volt** (power level) registered Synchronous Dynamic Random Access Memory (SDRAM) of 16MB, 32MB, 64MB, 128MB, 256MB, 512MB, or 1GB densities with Serial Presence Detect (SPD) and Error Check and Correction (ECC).

The motherboard supports system memory of up to 6GB in a two-way interleaved configuration. This configuration requires that you install identical DIMMs (exactly the same type and size) in pairs. For example, if you installed a 512MB module into DIMMA1, you must install the same type of 512MB module into DIMMB1. The same rule applies to pairs DIMMA2/DIMMB2 and DIMMA3/DIMMB3.

The following table lists the DIMM socket pairs and the memory modules you can install.

3.5.1 Memory Configurations

DIMM Socket	168-pin DIMM	Total Memory
DIMMB1	SDRAM 128MB, 256MB, 512MB, 1GB	x1
DIMMA1	SDRAM 128MB, 256MB, 512MB, 1GB	x1
DIMMB2	SDRAM 128MB, 256MB, 512MB, 1GB	x1
DIMMA2	SDRAM 128MB, 256MB, 512MB, 1GB	x1
DIMMB3	SDRAM 128MB, 256MB, 512MB, 1GB	x1
DIMMA3	SDRAM 128MB, 256MB, 512MB, 1GB	x1
Total System Memory (Max. 6GB)		=

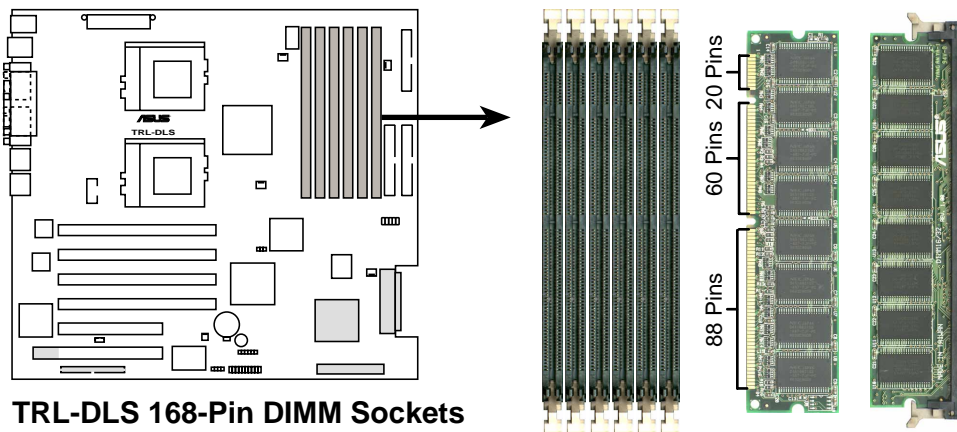
IMPORTANT: The system chipset only supports 64Mbit, 128Mbit, and 256Mbit “registered” SDRAMs with ECC. Make sure to use only the specified DIMM types for smooth system operation.

3. HARDWARE SETUP

3.5.2 Memory Installation

WARNING! Make sure that you unplug the power supply when adding or removing memory modules or other system components. Failure to do so may cause severe damage to both the motherboard and expansion cards (see **3.3 Hardware Setup Procedure** for more information).

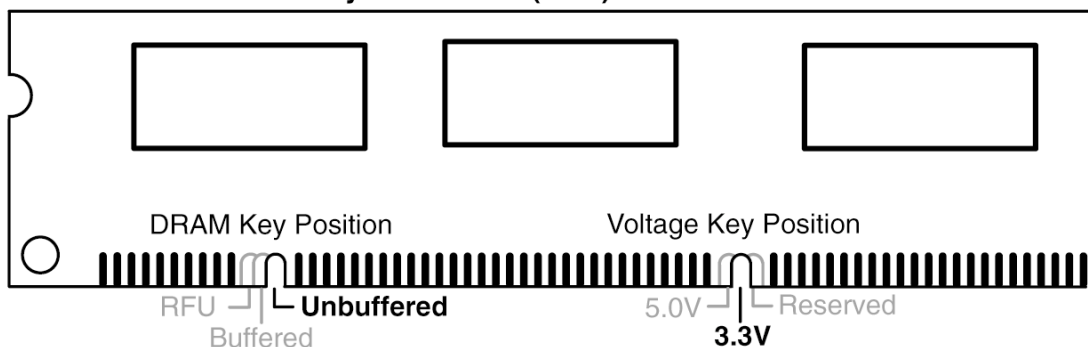
Insert a DIMM into the DIMM socket as shown. Because the number of pins are different on either side of the breaks, the module only fits in one direction. SDRAM DIMMs have different pin contacts on each side.



IMPORTANT: Always install DIMMs in pairs. See previous section for the memory configurations.

Use only 3.3Volt “registered” SDRAM DIMMs. To determine the DIMM type, check the notches on the DIMMs (see the figure below).

168-Pin DIMM Notch Key Definitions (3.3V)

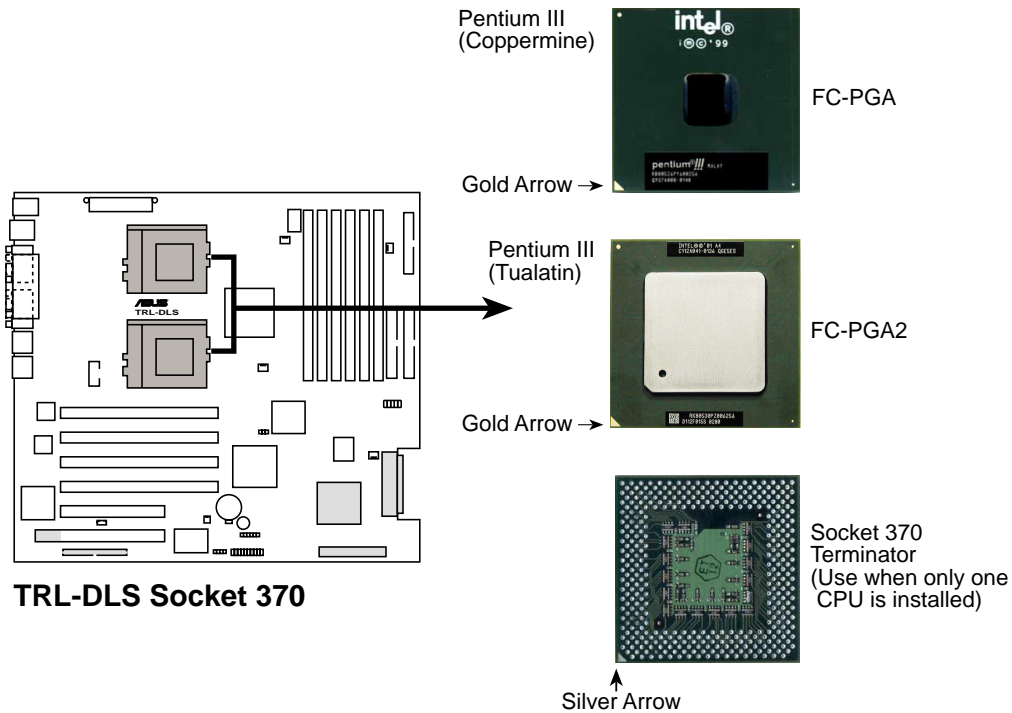


The notches on the DIMM shifts between left, center, or right to identify the type and also to prevent the wrong type from being inserted into the DIMM slot on the motherboard. You must tell your retailer the correct DIMM type before purchasing. This motherboard supports four clock signals per DIMM.

3. HARDWARE SETUP

3.6 Central Processing Unit (CPU)

The motherboard comes with a dual Socket 370 for Intel Pentium III Coppermine (256KB L2 cache) and Tualatin (512KB L2 cache) CPUs running up to 1.53+GHz with 133MHz Front Side Bus (FSB). The following illustration shows the location of the CPU sockets on the motherboard, and the correct CPU and terminator orientation.



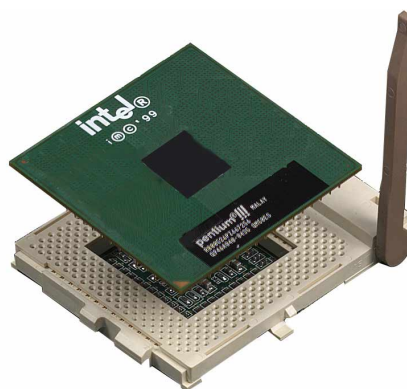
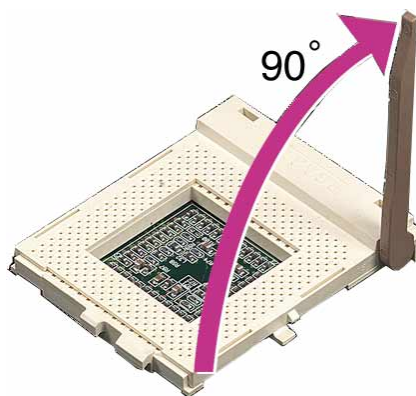
Note in the illustration that the CPU and the terminator have marks (usually a notch or a gold mark on one corner) to help you identify the proper orientation and enable you to correctly install them. It is important that you match the marked corner of the CPU and terminator with the corresponding corner on the socket so as not to damage the CPU pins.

3. HARDWARE SETUP

3.6.1 Installing the CPU and Terminator

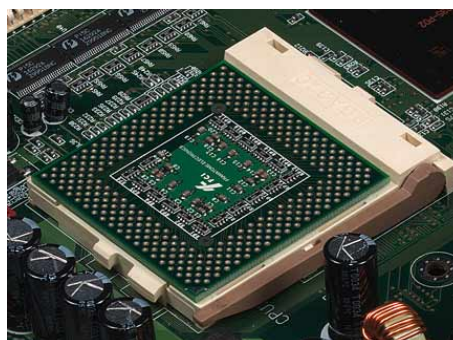
Follow these steps to install a CPU.

1. Locate the ZIF socket on the motherboard.
2. Unlock the socket by pressing the lever sideways then lifting it up to a 90°-100° angle.
3. Position the CPU above the socket such that its notched or marked corner matches the socket corner near the end of the lever, while making sure that the CPU is parallel to the socket.
4. Carefully insert the CPU into the socket until it fits in place.



CAUTION! The CPU fits only in one orientation. Do not force the CPU into the socket to prevent bending the pins and damaging the CPU. If the CPU does not fit completely, check its orientation or check for bent pins.

5. When the CPU is in place, press it firmly on the socket while you push down the socket lever to secure the CPU. The lever clicks on the socket indicating that it is locked.
6. Install a CPU heatsink. Refer to the documentation that came with the heatsink.
7. Install the CPU terminator the same way as you would install a CPU. The figure on the right shows an installed CPU terminator.



CAUTION! DO NOT install a heatsink on the terminator! It will damage the motherboard!

3. HARDWARE SETUP

3.7 Expansion Slots

WARNING! Unplug the power supply when adding or removing expansion cards or other system components. Failure to do so may cause severe damage to both your motherboard and expansion cards.

In the future, you may need to install expansion cards. The motherboard has four 3.3V 64-bit/66MHz PCI slots and two 5V 32-bit/33MHz PCI slots. The slots support PCI 2.2 protocol.

3.7.1 Expansion Card Installation Procedure

Follow these steps to install an expansion card.

1. Before installing the expansion card, read the documentation that came with it and make the necessary hardware settings for the card.
2. Remove the system unit cover (if your motherboard is already installed in a chassis).
3. Remove the bracket opposite the slot that you intend to use. Keep the screw for later use.
4. Align the card connector with the slot and press firmly until the card is completely seated on the slot.
5. Secure the card to the chassis with the screw you removed earlier.
6. Replace the system cover.

3.7.2 Configuring an Expansion Card

After physically installing the expansion card, configure the card by adjusting the software settings.

1. Turn on the system and change the necessary BIOS settings, if any. See Chapter 4 for information on BIOS setup.
2. Assign an IRQ to the card. Refer to the tables on the next page.
3. Install the software drivers for the expansion card.

3. HARDWARE SETUP

The following table lists the default IRQ assignments for standard PC devices. Use this table when configuring your system and for resolving IRQ conflicts.

ISA Interrupt (IRQ) Assignments

ISA INT	Priority	Standard Function
ISA 00	1	System Timer
ISA 01	2	Keyboard Controller
ISA 02	N/A	Programmable Interrupt
ISA 03*	11	Communications Port (COM2)
ISA 04*	12	Communications Port (COM1)
ISA 05*	13	Sound Card (sometimes LPT2)
ISA 06	14	Floppy Disk Controller
ISA 07*	15	Printer Port (LPT1)
ISA 08	3	System CMOS/Real Time Clock
ISA 09*	4	ACPI Mode when used
ISA 10*	5	IRQ Holder for PCI Steering
ISA 11*	6	IRQ Holder for PCI Steering
ISA 12*	7	PS/2 Compatible Mouse Port
ISA 13	8	Numeric Data Processor
ISA 14*	9	Primary IDE Channel
ISA 15*	10	Secondary IDE Channel

*These IRQs are usually available for PCI devices.

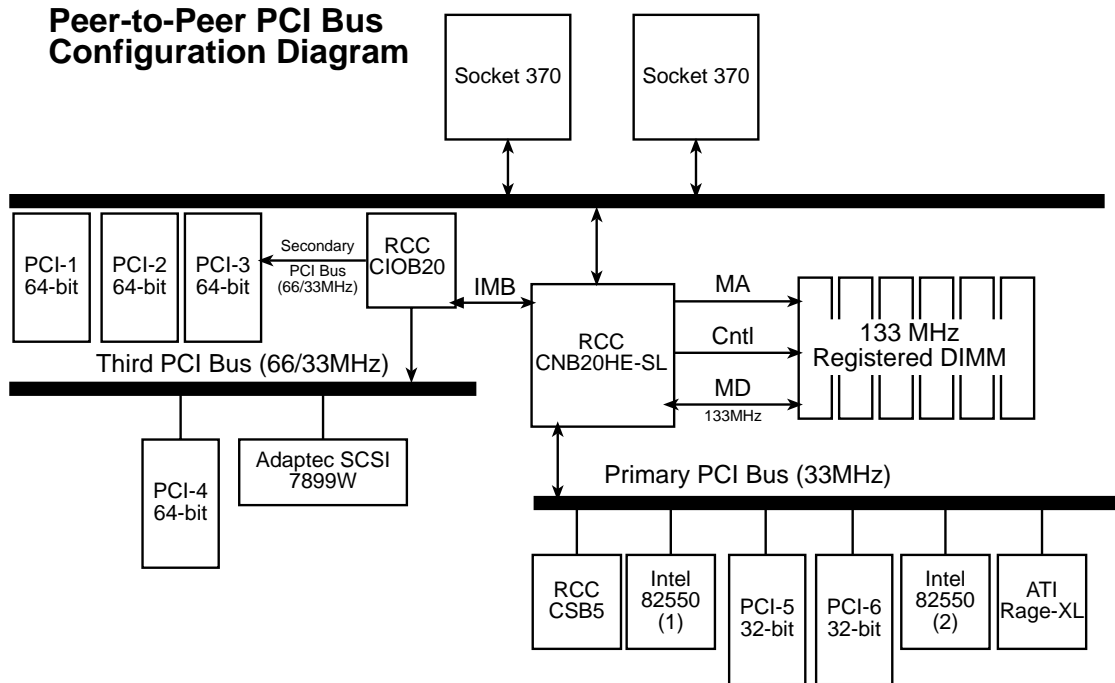
PCI Interrupt (IRQ) Assignments

PCI Slot	PCI INTA	PCI INTB	PCI INTC	PCI INTD
1 (64-bit)	PCI 1	PCI 12	PCI 13	PCI 14
2 (64-bit)	PCI 4	PCI 15	PCI 16	PCI 17
3 (64-bit)	PCI 5	PCI 18	PCI 19	PCI 20
4 (64-bit)	PCI 8	PCI 21	PCI 22	PCI 23
5 (32-bit)	PCI 9	PCI 24	PCI 25	PCI 26
6 (32-bit)	PCI 10	PCI 27	PCI 28	PCI 29

3. HARDWARE SETUP

3.7.3 PCI Configuration Diagram

Peer-to-Peer PCI Bus Configuration Diagram



3. HW SETUP
Expansion Cards

3. HARDWARE SETUP

3.8 Connectors

WARNING! Some pins are used for connectors or power sources. These are clearly distinguished from jumpers in the Motherboard Layout. Placing jumper caps over these connector pins will cause damage to your motherboard.

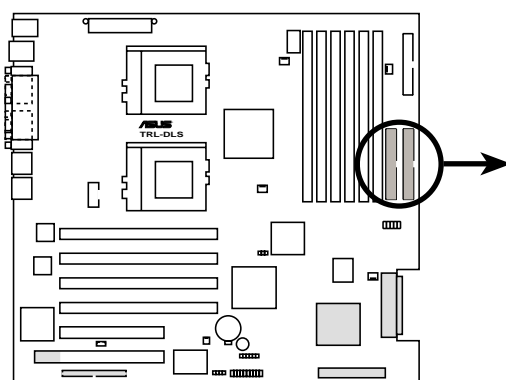
IMPORTANT: Always connect ribbon cables such that the red stripe matches Pin 1 on the connector. Pin 1 is usually on the side closest to the power connector on hard disk drives and CD-ROM drives, but may be on the opposite side on floppy disk drives.

1) IDE Connectors (40-1 pin PRIMARY/SECONDARY)

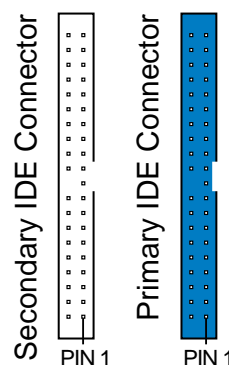
These connectors support ATA-100 IDE hard disks. Use IDE ribbon cables to connect the master and slave devices to these connectors. If you install two hard disks, you must configure the second drive as a slave device by setting its jumper accordingly. Refer to the hard disk documentation for the jumper settings. BIOS supports specific device bootup (see **4.6. Boot Menu**).

NOTE: Pin 20 on each IDE connector is removed to match the covered hole on the ATA-100 cable connector. This prevents incorrect orientation when you connect the cables.

TIP: You may configure two hard disks to be both Masters with two ribbon cables – one for the primary IDE connector and another for the secondary IDE connector.



TRL-DLS IDE Connectors

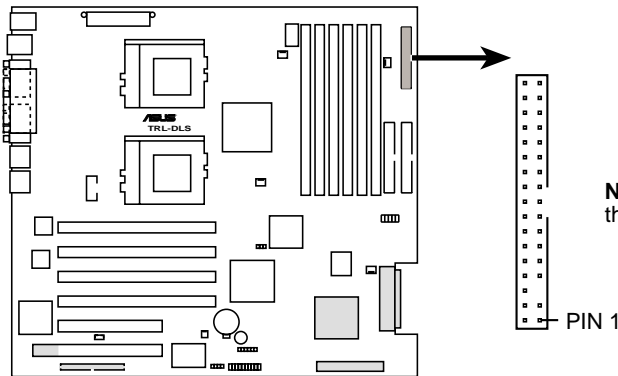


NOTE: Orient the red markings (usually zigzag) on the IDE ribbon cable to PIN 1.

3. HARDWARE SETUP

2) Floppy Disk Drive Connector (34-1 pin FLOPPY)

This connector supports the provided floppy drive ribbon cable. After connecting the single end to the board, connect the two plugs on the other end to the floppy drives. (**Pin 5 is removed to prevent inserting in the wrong orientation when using ribbon cables with pin 5 plugged).**)



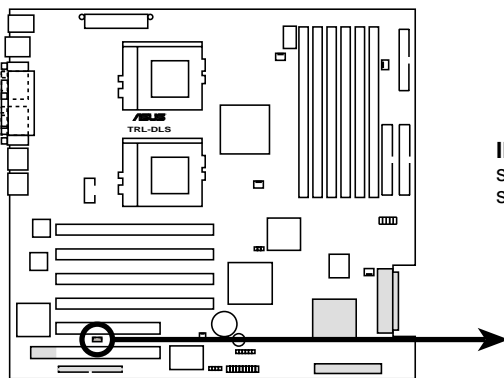
NOTE: Orient the red markings on the floppy ribbon cable to PIN 1.

TRL-DLS Floppy Disk Drive Connector

3) Wake-On-LAN Connector (3-pin WOL_CON)

This connector supports a LAN card with a Wake-On-LAN output. The connector powers up the system when a wakeup packet or signal is received through the LAN card.

IMPORTANT: This feature requires that the BIOS item **Onboard LAN Power Up** is enabled (see **4.5.1 Power Up Control**) and that your system has an ATX power supply with at least 720mA +5V standby power.



IMPORTANT: Requires an ATX power supply with at least 720mA +5 volt standby power

WOL_CON

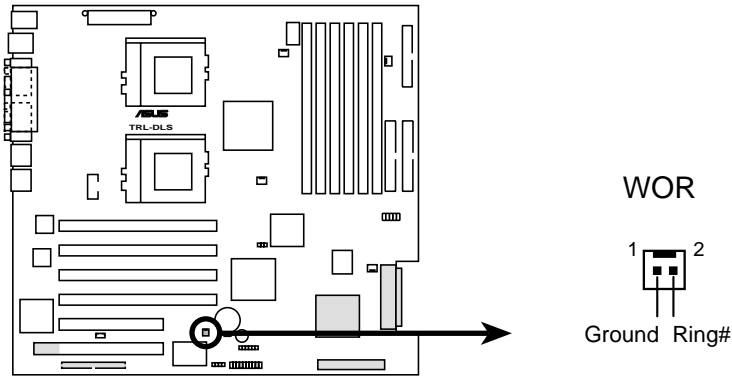
Ground
PME +5 Volt Standby

TRL-DLS Wake-On-LAN Connector

3. HARDWARE SETUP

4) Wake-On-Ring Connector (2-pin WOR)

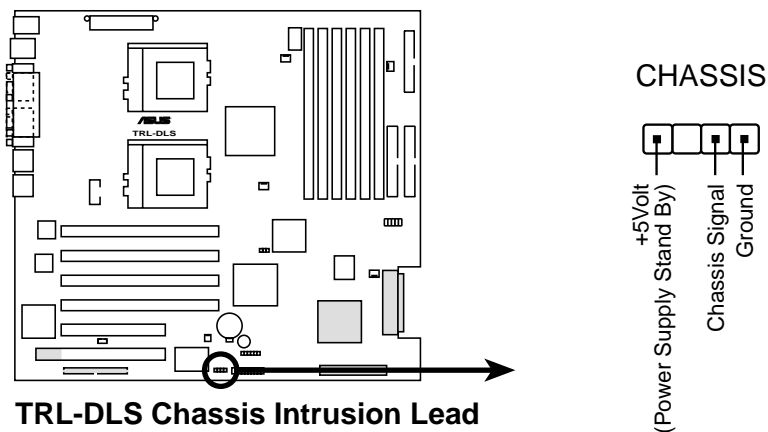
This connector connects to internal modem cards with a Wake-On-Ring output. The connector powers up the system when a ringup packet or signal is received through the internal modem card. **NOTE:** For external modems, Wake-On-Ring is detected through the COM port.



TRL-DLS Wake-On-Ring Connector

5) Chassis Intrusion Connector (CHASSIS)

This connector is designed for chassis intrusion detection. This requires an external detection mechanism such as a chassis intrusion sensor or microswitch. When any chassis component is removed, the sensor triggers and sends a high-level signal to this connector to record a chassis intrusion event.

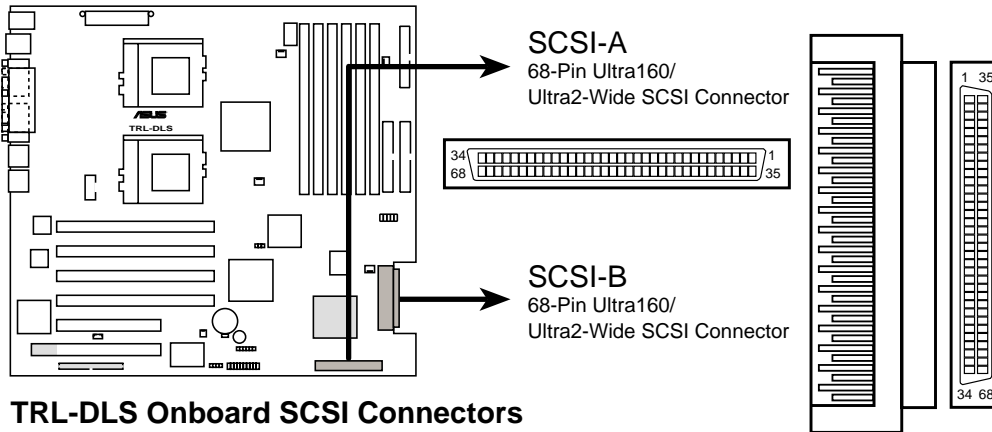


TRL-DLS Chassis Intrusion Lead

3. HARDWARE SETUP

6) Two 68-pin Ultra160 SCSI Connectors (CHA-WIDE, CHB-WIDE)

This motherboard has two 68-Pin Ultra160 SCSI connectors; one for each of the two channels. Each channel can support a maximum of 15 devices as specified by Ultra160 standards.



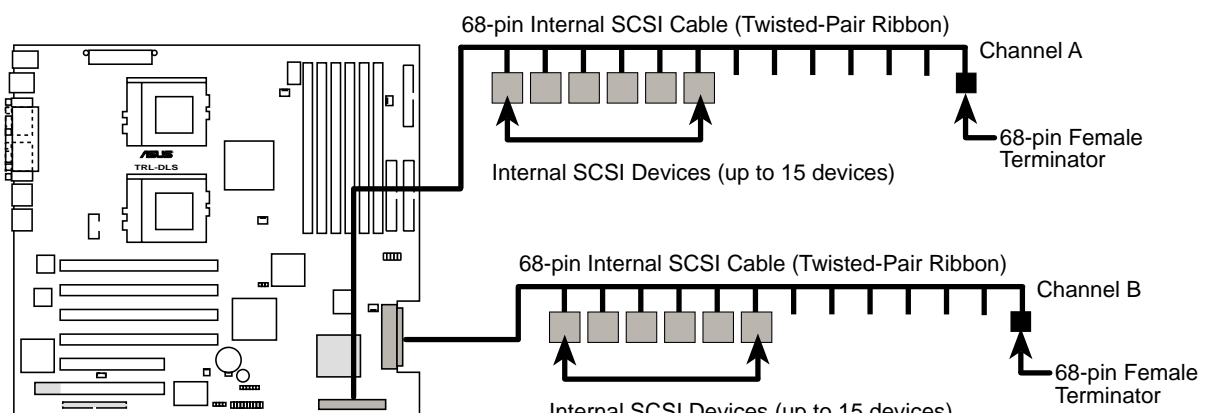
TRL-DLS Onboard SCSI Connectors

SCSI Connection Notes

This motherboard has two 68-Pin Ultra160 SCSI connectors; one for each of the two channels.

The onboard SCSI chipset incorporates an advanced multimode I/O cell that supports both single-ended (SE), Ultra2, and Ultra160 devices. With Ultra160 devices, the SCSI bus platform performs at full Ultra160 speeds (up to 160MB/sec) and extended cabling 12m (or 25m in a point-to-point configuration). When an SE device is attached, the bus defaults to an SE speed and 1.5m cable length.

IMPORTANT: Connect SCSI devices as shown. Each channel should have only one type of SCSI standard (e.g. Ultra160, Ultra2, Ultra-Wide). Mixing SCSI devices on the same channel decreases performance of the slower device.



TRL-DLS SCSI Connection Example

NOTE: Ultra160 SCSI devices do not have termination jumpers and must use a separate terminator on the last connector (internal) or device (external).

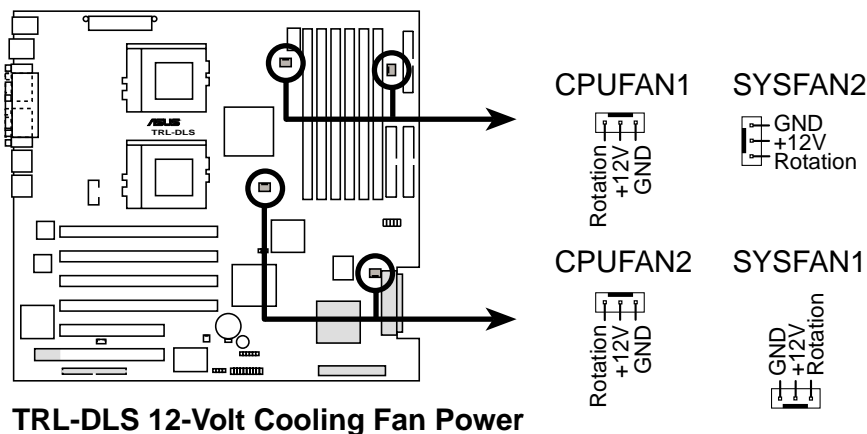
3. HARDWARE SETUP

7) CPU and Chassis Fan Connectors (3-pin CPUFAN1/2, SYSFAN1/2)

These connectors support cooling fans of 860mA (10.3 Watts) or less. Orient the fans so that the heat sink fins allow airflow to go across the onboard heat sink(s) instead of the expansion slots. Depending on the fan manufacturer, the wiring and plug may be different. The red wire should be positive, while the black should be ground. Connect the fan's plug to the board taking into consideration the polarity of the connector.

NOTE: The "Rotation" signal is to be used only by a specially designed fan with rotation signal. The Rotations Per Minute (RPM) can be monitored using Intel LDSM Utility (provided with certain models).

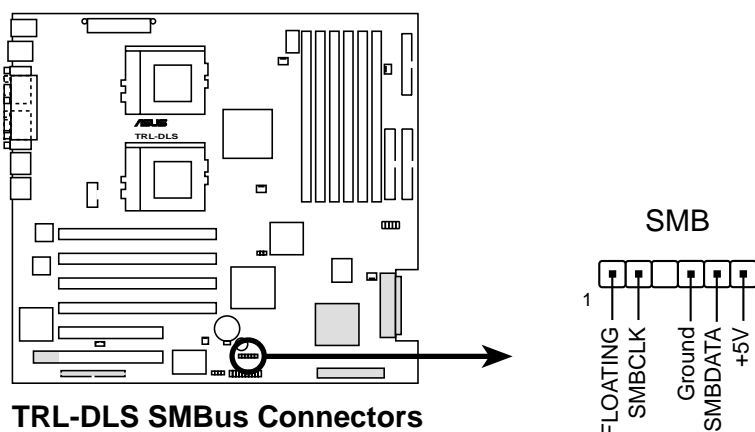
WARNING! The CPU and/or motherboard will overheat if there is no airflow across the CPU and onboard heatsinks. Damage may occur to the motherboard and/or the CPU fan if these pins are incorrectly used. **These are not jumpers, do not place jumper caps over these pins.**



3. HARDWARE SETUP

8) SMBus Connector (6-1 pin SMB)

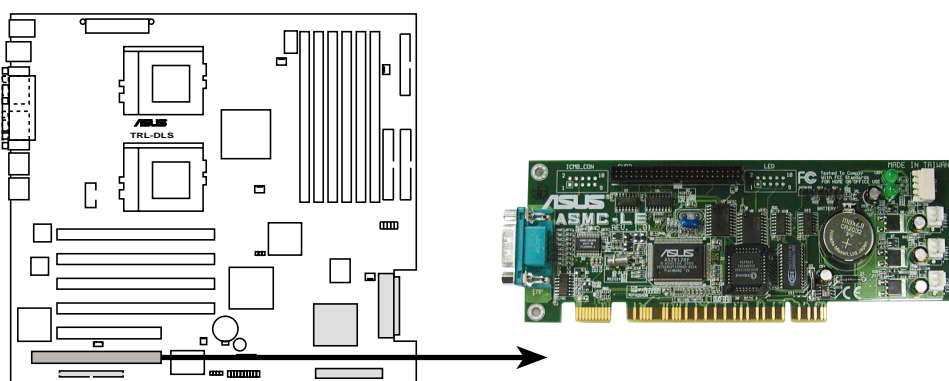
This connector allows you to connect SMBus (System Management Bus) devices. SMBus devices communicate by means of the SMBus with an SMBus host and/or other SMBus devices. SMBus is a specific implementation of an I²C bus, which is a multi-device bus; that is, multiple chips can be connected to the same bus and each one can act as a master by initiating data transfer.



TRL-DLS SMBus Connectors

9) ASMC Connector (50-pin eRMC)

This connector allows you to connect the optional ASMC-LE, ASMC-ME, or ASMC-HE card using an ASMC interface cable. Install the ASMC card into the PCI6 slot and connect the cable from the card to this connector. The PCI6 slot on the motherboard has a Low Pin Count (LPC) signal connector to accommodate the ASMC card.



TRL-DLS ASMC Connector

3. HARDWARE SETUP

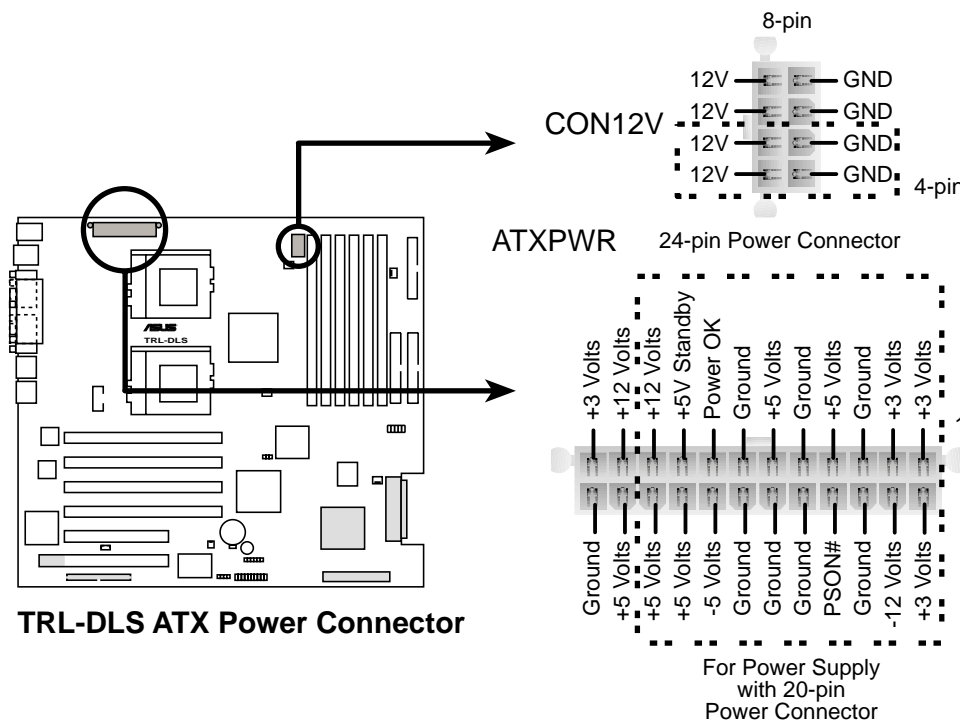
10) ATX Power Connector (20/24-pin block ATXPWR, 8-pin CON12V)

The 20/24-pin connector is for an ATX power supply with 20/24-pin power connector. The connector from the power supply is designed to fit this connector in only one orientation. Find the proper orientation and push down firmly until the plug completely fits in.

The 8-pin +12V connector is for ground.

IMPORTANT: Make sure that your ATX power supply can supply at least 720mA on the +5-volt standby lead (+5VSB). The system may become unstable and may experience difficulty powering up if the power supply is inadequate.

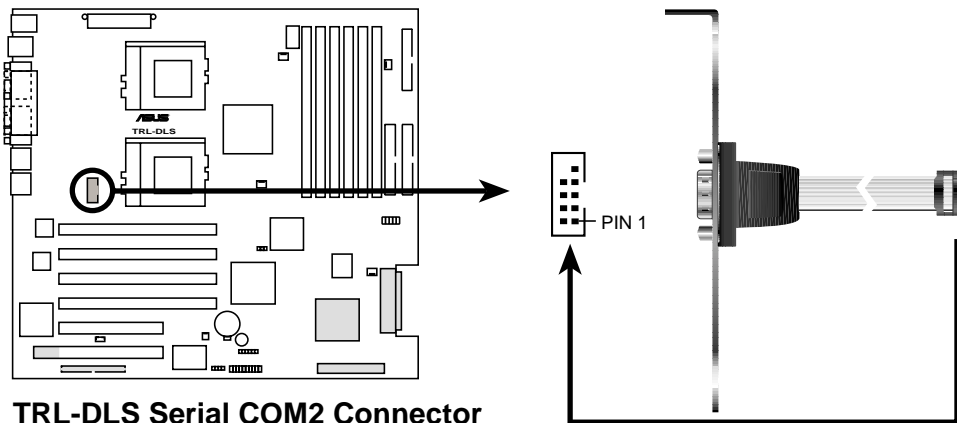
It is recommended that you purchase a power supply with 24-pin power connector.



3. HARDWARE SETUP

11. Serial Port 2 connector (10-1 pin COM2)

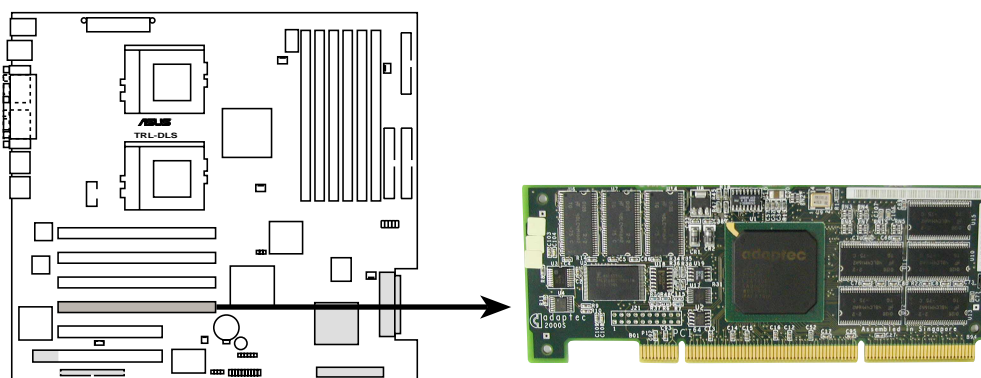
This connector accommodates a second serial port using an optional serial port bracket. Connect the bracket cable to this connector then install the bracket into a slot opening at the back of the system chassis.



TRL-DLS Serial COM2 Connector

12. Zero Channel RAID slot (PCI66-4)

This 64-bit PCI slot (colored green) supports the Adaptec 2000S zero-channel RAID card. The Adaptec 2000S provides advanced RAID functionality through the Adaptec 7899W SCSI controller. The card supports RAID levels 0, 1, 5, multilevel 0/1 and 0/5, cache memory modules with ECC, and predictive caching capability. (Contact Adaptec for more information if you bought the Adaptec 2000S RAID card.)

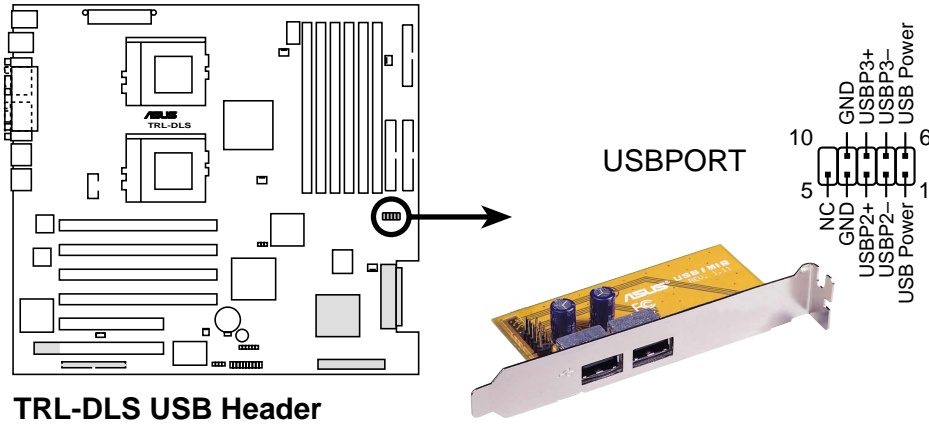


TRL-DLS Zero Channel RAID

3. HARDWARE SETUP

13) USB Header (10-1 pin USBPORT)

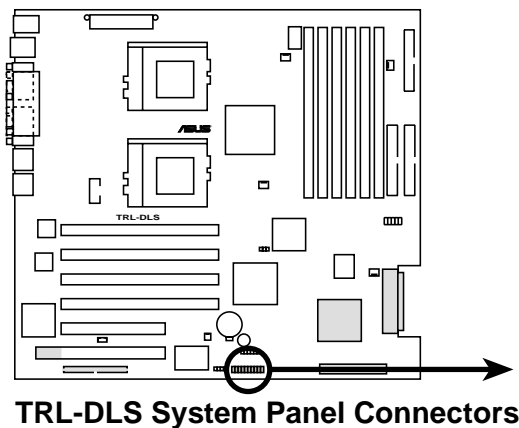
If the USB ports at the back panel are inadequate, one USB header is available for two additional USB port connectors. Connect the USB header to a 2-port USB connector set and mount the bracket to an open slot in the chassis.



TRL-DLS USB Header

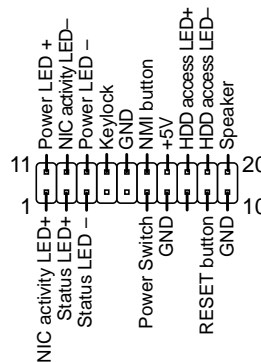
14) System Panel Connector (20-pin PANEL)

This connector is for different front panel functions. See opposite page for the description of the connector leads.



TRL-DLS System Panel Connectors

Pin	Connector
1 & 12	NIC Activity LED
2 & 3	Status LED
6 & 7	Power Switch
9 & 10	Reset Switch
11 & 13	Power LED
14	Keylock
15* & 16	NMI Button
17 & 20	Speaker
18 & 19	HDD Access LED
* Shared	



3. HARDWARE SETUP

- **NIC Activity LED Lead (2-pin)**
This shows the status of the NIC through a panel-mounted LED.
- **Status LED (2-pin)**
This shows the system status as programmed through the ASUS ASIC.
- **ATX Power Switch / Soft-Off Switch Lead (2-pin)**
The system power is controlled by a momentary switch connected to this lead. Pushing the button once switches the system between ON and SLEEP or ON and SOFT OFF, depending on your BIOS or OS setting. Pushing the switch while in the ON mode for more than 4 seconds turns the system off. The system power LED shows the status of the system power.
- **Reset Switch Lead (2-pin)**
This 2-pin connector connects to the case-mounted reset switch for rebooting your computer without having to turn off your power switch. This is a preferred method of rebooting to prolong the life of the system power supply.
- **System Power LED Lead (3-1 pin)**
This 3-1 pin connector connects to the system power LED that lights up when the system is powered on and blinks when it is in sleep or soft-off mode. This feature can be programmed through the ASUS ASIC.
- **NMI Lead (2-pin)**
This 2-pin connector connects to a panel button to allow a non-mask interrupt command to be sent to the operating system.
- **System Warning Speaker Lead (4-pin)**
This 4-pin connector connects to the case-mounted speaker.
- **HDD Activity LED (2-pin)**
This connector supplies power to the IDE and SCSI activity LED. Read and write activity by devices connected to the IDE and SCSI connectors cause this LED to light up.

3. HARDWARE SETUP

3.9 Starting Up the First Time

1. After making all the connections, replace the system case cover.
2. Be sure that all switches are off (in some systems, marked with ○).
3. Connect the power cord to the power connector at the back of the system chassis.
4. Connect the power cord to a power outlet that is equipped with a surge protector.
5. Turn on the devices in the following order:
 - a. Monitor
 - b. External SCSI devices (starting with the last device on the chain)
 - c. System power (For ATX power supplies, you need to switch on the power supply as well as press the ATX power switch on the front of the chassis.)
6. The power LED on the front panel of the system case lights up. For ATX power supplies, the system LED lights up when you press the ATX power switch. If the monitor complies with “green” standards or if it has a power standby feature, the monitor LED may light up or switch between orange and green after the system LED does. The system then runs the power-on tests. While the tests are running, the BIOS beeps or additional messages appear on the screen. If you do not see anything within 30 seconds from the time you turn on the power, the system may have failed a power-on test. Check the jumper settings and connections or call your retailer for assistance.

Award BIOS Beep Codes

Beep	Meaning
One short beep when displaying logo	No error during POST
Long beeps in an endless loop	No DRAM installed or detected
One long beep followed by three short beeps	Video card not found or video card memory bad
High frequency beeps when system is working	CPU overheated System running at a lower frequency

7. At power on, hold down <Delete> to enter BIOS Setup. Follow the instructions in **4. BIOS SETUP**.

* **Powering Off the computer:** You must first exit or shut down the system before switching off the power switch. For ATX power supplies, you can press the ATX power switch after exiting or shutting down the operating system. If you use Windows 9X, click the **Start** button, click **Shut Down**, then click **Shut down the computer?** The power supply should turn off after Windows shuts down.

NOTE: The message “You can now safely turn off your computer” does not appear when shutting down with ATX power supplies.

4. BIOS SETUP

4.1 Managing and Updating Your BIOS

4.1.1 Upon First Use of the Computer System

It is recommended that you save a copy of the original motherboard BIOS along with a Flash Memory Writer utility (AFLASH.EXE) to a bootable floppy disk in case you need to reinstall the BIOS later. **AFLASH.EXE** is a Flash Memory Writer utility that updates the BIOS by uploading a new BIOS file to the programmable flash ROM on the motherboard. This file works only in DOS mode. To determine the BIOS version of your motherboard, check the last four numbers of the code displayed on the upper left-hand corner of your screen during bootup. Larger numbers represent a newer BIOS file.

1. Type **FORMAT A:/S** at the DOS prompt to create a bootable system disk. **DO NOT** copy AUTOEXEC.BAT and CONFIG.SYS to the disk.
2. Type **COPY D:\AFLASH\AFLASH.EXE A:** (assuming D is your CD-ROM drive) to copy AFLASH.EXE to the boot disk you created.

NOTE: AFLASH works only in DOS mode. It does not work in the DOS prompt within Windows and does not work with certain memory drivers that may be loaded when you boot from the hard drive. It is recommended that you reboot using a floppy disk.

3. Reboot the computer from the floppy disk.

NOTE: BIOS setup must specify “Floppy” as the first item in the boot sequence.

4. In DOS mode, type **A:\AFLASH <Enter>** to run AFLASH.

```
ASUS ACPI BIOS
FLASH MEMORY WRITER V2.0
Copyright (C) 1994-2001 ASUSTeK COMPUTER INC.

Flash Memory: Winbond W29C020 or SST 29EE020 or Intel B2802AB

Current BIOS Version: ASUS XXX-XX ACPI BIOS Revision 100X
BIOS Model          : XXX-XX
BIOS Built Date     : 12/25/01

Choose one of the followings:

1. Save Current BIOS To File
2. Update BIOS Including Boot Block and ESCD

Enter choice: [1]

Press ESC To Exit
```

IMPORTANT! If the word “unknown” appears after **Flash Memory:**, the memory chip is either not programmable or is not supported by the ACPI BIOS and therefore, cannot be programmed by the Flash Memory Writer utility.

4. BIOS SETUP

5. Select **1. Save Current BIOS to File** from the Main menu and press <Enter>. The **Save Current BIOS To File** screen appears.

```
Save Current BIOS To File

Flash Memory: Winbond W29C020 or SST 29EE020 or Intel 82802AB
Current BIOS Version: ASUS XXX-XX ACPI BIOS Revision 100X
BIOS Model          : XXX-XX
BIOS Built Date     : 12/25/01
Please Enter File Name to Save: XXX-XX.XXX

BIOS Saved Successfully
Press ESC To Continue
```

6. Type a filename and the path, for example, **A:\XXX-XX.XXX** and then press <Enter>.

```
Update BIOS Including Boot Block and ESCD

Flash Memory: Winbond W29C020 or SST 29EE020 or Intel 82802AB
Current BIOS Version: ASUS XXX-XX ACPI BIOS Revision 100X
BIOS Model          : XXX-XX
BIOS Built Date     : 12/25/01
Please Enter File Name for NEW BIOS: A:\XXX-XX.XXX
```

4. BIOS SETUP

4.1.2 Updating BIOS Procedures

WARNING! Update the BIOS only if you have problems with the motherboard and you know that the new BIOS revision will solve your problems. Careless updating can result to more problems with the motherboard!

1. Download an updated ASUS BIOS file from the Internet (WWW or FTP) (see ASUS CONTACT INFORMATION on page 3 for details) and save to the boot floppy disk you created earlier.
2. Boot from the floppy disk.
3. At the “A:\” prompt, type **AFLASH** and then press <Enter>.
4. At the **Main Menu**, type **2** then press <Enter>. The **Update BIOS Including Boot Block and ESCD** screen appears.
5. Type the filename of your new BIOS and the path, for example, **A:\XXX-XX.XXX**, then press <Enter>.

NOTE: To cancel this operation, press <Enter>.

```
Update BIOS Including Boot Block and ESCD
Flash Memory: Winbond W29C02B or SST 29EE020 or Intel B2802AB

BIOS Version
[CURRENT ] ASUS XXX-XX ACPI BIOS Revision 100X
[test.awd] ASUS XXX-XX ACPI BIOS Revision 100X

BIOS Model
[CURRENT ] XXX-XX
[test.awd] XXX-XX

Date of BIOS Built
[CURRENT ] 09/25/99
[XXXX.XXX] 05/29/00

Check sum of 1001.010 is F266.

Are you sure (Y/N) ? [Y]

Press ESC To Return to Main Menu
```

6. When prompted to confirm the BIOS update, press **Y** to start the update.

4. BIOS SETUP

7. The utility starts to program the new BIOS information into the Flash ROM. The boot block is updated automatically only when necessary. This minimizes the possibilities of boot problems in case of update failures. When the programming is done, *Flashed Successfully* appears.

```
Update BIOS Including Boot Block and ESCD
Flash Memory: Winbond W29C020 or SST 29EE020 or Intel 82802AB
BIOS Version
[CURRENT ] ASUS XXX-XX ACPI BIOS Revision 100X
[test.awd] ASUS XXX-XX ACPI BIOS Revision 100X
BIOS Model
[CURRENT ] XXX-XX
[test.awd] XXX-XX
Date of BIOS Built
[CURRENT ] 12/25/01
[XXXX.XXX] 05/29/00
Check sum of 1001.010 is F266.
Are you sure (Y/N) ? [Y]
Block Erasing -- Done
Programming -- 3FFFF
Flashed Successfully
Press ESC To Continue
```

8. Follow the onscreen instructions to continue.

```
ASUS ACPI BIOS
FLASH MEMORY WRITER V2.0
Copyright (C) 1994-2001 ASUSTeK COMPUTER INC.
Flash Memory: Winbond W29C020 or SST 29EE020 or Intel 82802AB
Current BIOS Version: ASUS XXX-XX ACPI BIOS Revision 100X
BIOS Model : XXX-XX
BIOS Built Date : 12/25/01
Choose one of the followings:
1. Save Current BIOS To File
2. Update BIOS Including Boot Block and ESCD
Enter choice: [1]
You have flashed the EPROM;It is recommended that you turn off
the power, enter SETUP and LOAD Setup Defaults to have CMOS
updated with new BIOS when exits.
Press ESC To Exit
```

WARNING! If you encounter problems while updating the new BIOS, DO NOT turn off the system because this may cause boot problems. Just repeat the process, and if the problem still persists, load the original BIOS file you saved to the boot disk. If the Flash Memory Writer utility is not able to successfully update a complete BIOS file, the system may not boot. If this happens, call the ASUS service center for support.

4. BIOS SETUP

4.2 BIOS Setup Program

This motherboard supports a programmable EEPROM that you can update using the provided utility described in *4.1 Managing and Updating Your BIOS*.

The utility is used if you are installing a motherboard, reconfiguring your system, or prompted to “**Run Setup**”. This section describes how to configure your system using this utility.

Even if you are not prompted to use the Setup program, at some time in the future you may want to change the configuration of your computer. For example, you may want to enable the Security Password Feature or make changes to the power management settings. It will then be necessary to reconfigure your system using the BIOS Setup program so that the computer can recognize these changes and record them in the CMOS RAM of the EEPROM.

The EEPROM on the motherboard stores the Setup utility. When you start up the computer, the system provides you with the opportunity to run this program. This appears during the Power-On Self Test (POST). Press <Delete> to call up the Setup utility. If you are a little bit late in pressing the mentioned key, POST will continue with its test routines, thus preventing you from calling up Setup. If you still need to call Setup, restart the system by pressing <Ctrl> + <Alt> + <Delete>, or by pressing the Reset button on the system chassis. You can also restart by turning the system off and then back on again. But do so only if the first two methods fail.

The Setup program has been designed to make it as easy to use as possible. It is a menu-driven program, which means you can scroll through the various sub-menus and make your selections among the predetermined choices.

To access the BIOS Setup program, press the <Delete> key after the computer has run through its POST.

NOTE: Because the BIOS software is constantly being updated, the following BIOS setup screens and descriptions are for reference purposes only, and may not exactly match what you see on your screen.

4. BIOS SETUP

4.2.1 BIOS Menu Bar

The top of the screen has a menu bar with the following selections:

- MAIN** Use this menu to make changes to the basic system configuration.
- ADVANCED** Use this menu to enable and make changes to the advanced features.
- POWER** Use this menu to configure and enable Power Management features.
- BOOT** Use this menu to configure the default system device used to locate and load the Operating System.
- SERVER** Use this menu to server-related items.
- EXIT** Use this menu to exit the current menu or specify how to exit the Setup program.

To access the menu bar items, press the right or left arrow key on the keyboard until the desired item is highlighted.

4.2.2 Legend Bar

At the bottom of the Setup screen is a legend bar. The keys in the legend bar allow you to navigate through the various setup menus. The following table lists the keys found in the legend bar with their corresponding functions.

Navigation Key(s)	Function Description
<F1> or <Alt + H>	Displays the General Help screen from anywhere in the BIOS Setup
<Esc>	Jumps to the Exit menu or returns to the main menu from a sub-menu
<← or → (keypad arrow)	Selects the menu item to the left or right
↑ or ↓ (keypad arrow)	Moves the highlight up or down between fields
- (minus key)	Scrolls backward through the values for the highlighted field
+ (plus key) or spacebar	Scrolls forward through the values for the highlighted field
<Enter>	Brings up a selection menu for the highlighted field
<Home> or <PgUp>	Moves the cursor to the first field
<End> or <PgDn>	Moves the cursor to the last field
<F5>	Resets the current screen to its Setup Defaults
<F10>	Saves changes and exits Setup

4. BIOS SETUP

General Help

In addition to the Item Specific Help window, the BIOS setup program also provides a General Help screen. You may launch this screen from any menu by simply pressing <F1> or the <Alt> + <H> combination. The General Help screen lists the legend keys with their corresponding functions.

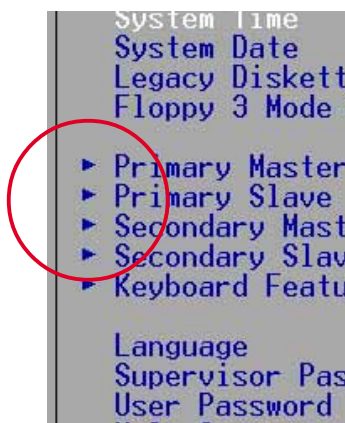
Saving Changes and Exiting the Setup Program

See *4.7 Exit Menu* for detailed information on saving changes and exiting the setup program.

Scroll Bar

When a scroll bar appears to the right of a help window, it indicates that there is more information to be displayed that will not fit in the window. Use <PgUp> and <PgDn> or the up and down arrow keys to scroll through the entire help document. Press <Home> to display the first page, press <End> to go to the last page. To exit the help window, press <Enter> or <Esc>.

Sub-Menu



Note that a right pointer symbol (as shown in the left view) appears to the left of certain fields. This pointer indicates that you can display a sub-menu from this field. A sub-menu contains additional options for a field parameter. To display a sub-menu, move the highlight to the field and press <Enter>. The sub-menu appears. Use the legend keys to enter values and move from field to field within a sub-menu as you would within a menu. Use the <Esc> key to return to the main menu.

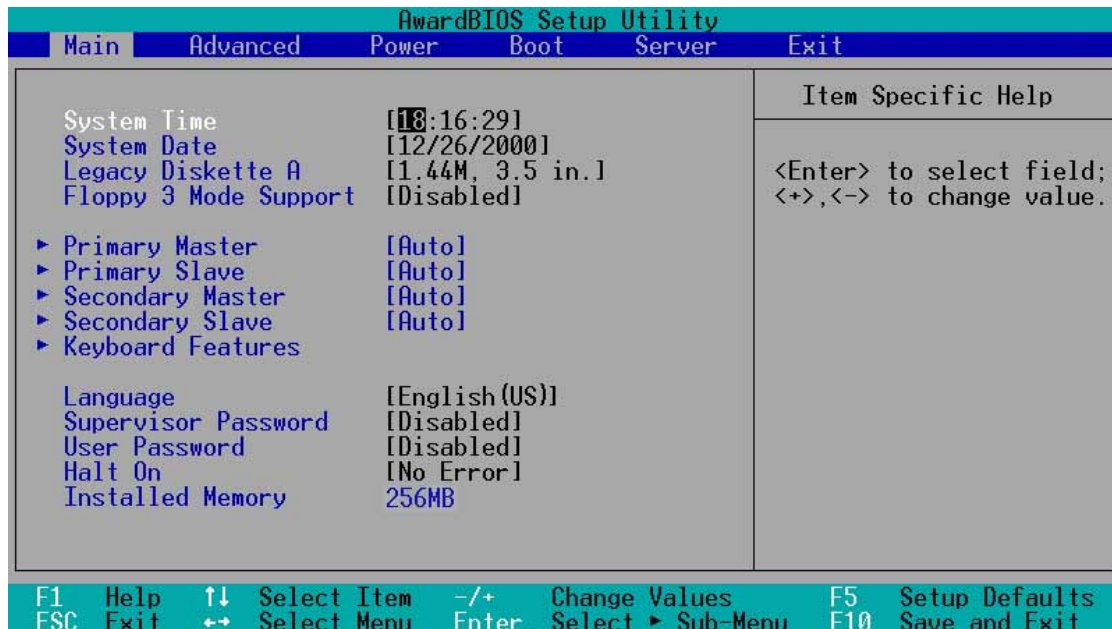
Take some time to familiarize yourself with the legend keys and their corresponding functions. Practice navigating through the various menus and sub-menus. If you accidentally make unwanted changes to any of the fields, use the set default hot key <F5> to load the Setup default values. While moving around through the Setup program, note that explanations appear in the Item Specific Help window located to the right of each menu. This window displays the help text for the currently highlighted field.

NOTE: The item heading in square brackets represents the default setting for that field.

4. BIOS SETUP

4.3 Main Menu

When the Setup program is accessed, the following screen appears:



System Time [XX:XX:XX]

Sets your system to the time that you specify (usually the current time). The format is hour, minute, second. Valid values for hour, minute and second are **Hour: (00 to 23)**, **Minute: (00 to 59)**, **Second: (00 to 59)**. Use the <Tab> or <Shift> + <Tab> keys to move between the hour, minute, and second fields.

System Date [XX/XX/XXXX]

Sets your system to the date that you specify (usually the current date). The format is month, day, year. Valid values for month, day, and year are **Month: (1 to 12)**, **Day: (1 to 31)**, **Year: (100 year range)**. Use the <Tab> or <Shift> + <Tab> keys to move between the month, day, and year fields.

Legacy Diskette A [1.44M, 3.5 in.], Legacy Diskette B [None]

Sets the type of floppy drives installed. Configuration options: [None] [360K, 5.25 in.] [1.2M, 5.25 in.] [720K, 3.5 in.] [1.44M, 3.5 in.] [2.88M, 3.5 in.]

Floppy 3 Mode Support [Disabled]

This is required to support older Japanese floppy drives. The Floppy 3 Mode feature allows reading and writing of 1.2MB (as opposed to 1.44MB) on a 3.5-inch diskette. Configuration options: [Disabled] [Enabled]

4. BIOS SETUP

Language [English (US)]

This field displays the BIOS language version.

Supervisor Password [Disabled] / User Password [Disabled]

These fields allow you to set passwords. To set a password, highlight the appropriate field and press <Enter>. Type in a password then press <Enter>. You can type up to eight alphanumeric characters. Symbols and other characters are ignored. To confirm the password, type the password again and press <Enter>. The password is now set to [Enabled]. This password allows full access to the BIOS Setup menus. To clear the password, highlight this field and press <Enter>. The same dialog box as above appears. Press <Enter>. The password is set to [Disabled].

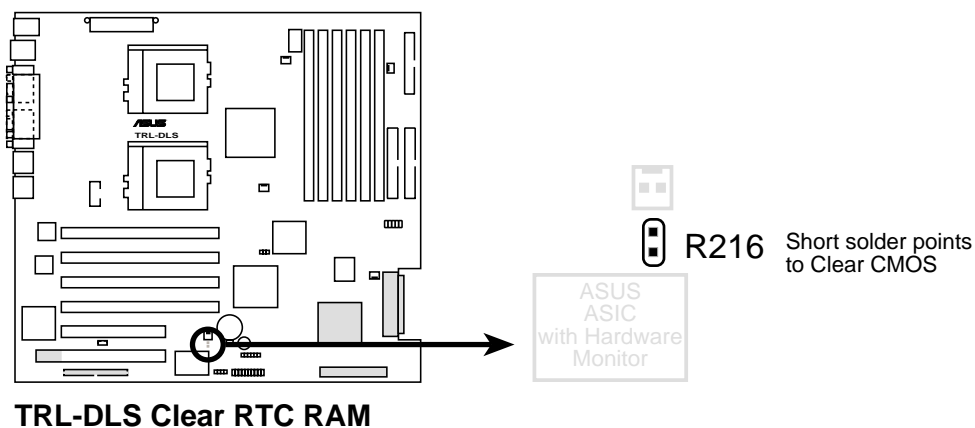
A note about passwords

The BIOS Setup program allows you to specify passwords in the Main menu. The passwords control access to the BIOS during system startup. Passwords are not case sensitive, meaning, passwords typed in either uppercase or lowercase letters are accepted. The BIOS Setup program allows you to specify two different passwords: a Supervisor password and a User password. If you did not set a Supervisor password, anyone can access the BIOS Setup program. If you did, the Supervisor password is required to enter the BIOS Setup program and to gain full access to the configuration fields.

Forgot the password?

If you forget your password, you can clear it by erasing the CMOS Real Time Clock (RTC) RAM. The RAM data containing the password information is powered by the onboard button cell battery.

To clear the CMOS RAM, (1) turn off the computer and unplug the power cable, (2) remove the cell battery, (3) short the solder points for about 5 seconds, (4) re-install the cell battery, (5) plug the power cable and turn on the computer, (6) hold down the key during the boot process to enter BIOS Setup and re-enter CMOS data.



4. BIOS SETUP

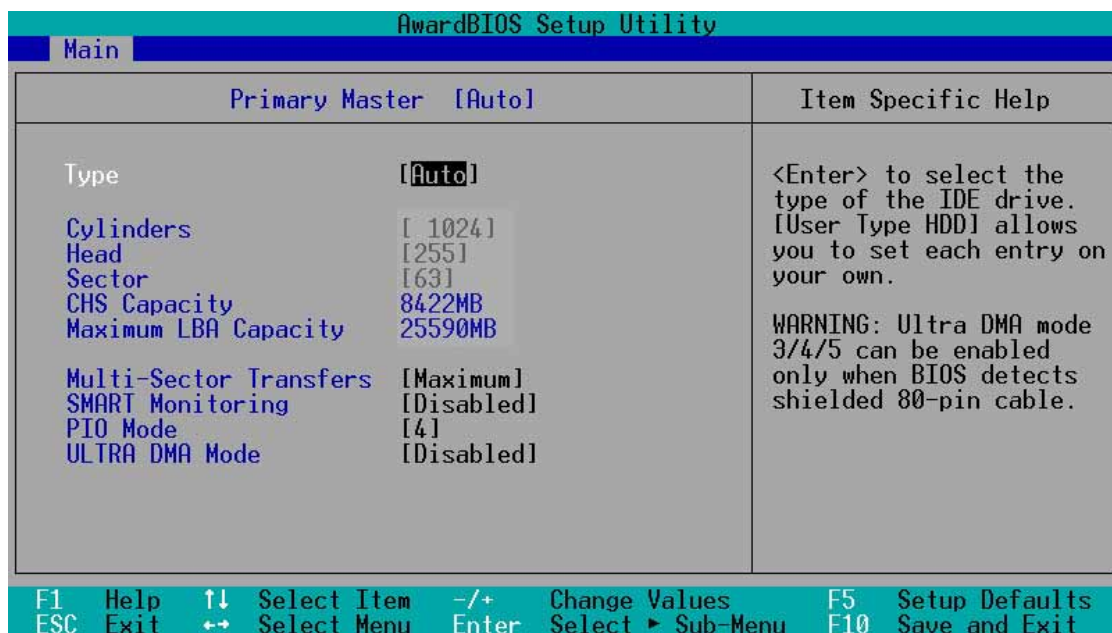
Halt On [All Errors]

This field specifies the types of errors that will cause the system to halt. Configuration options: [All Errors] [No Error] [All but Keyboard] [All but Disk] [All but Disk/Keyboard]

Installed Memory [XXX MB]

This field automatically displays the amount of conventional memory detected by the system during the boot process.

4.3.1 Primary & Secondary Master/Slave



Type [Auto]

Select [Auto] to automatically detect an IDE hard disk drive. If automatic detection is successful, Setup automatically fills in the correct values for the remaining fields on this sub-menu. If automatic detection fails, this may be because the hard disk drive is too old or too new. If the hard disk was already formatted on an older system, Setup may detect incorrect parameters. In these cases, select [User Type HDD] to manually enter the IDE hard disk drive parameters. Refer to the next section for details.

CAUTION! Before attempting to configure a hard disk drive, make sure you have the correct configuration information supplied by the drive manufacturer. Incorrect settings may cause the system to fail to recognize the installed hard disk.

4. BIOS SETUP

[User Type HDD]

AwardBIOS Setup Utility			
Main			
Primary Master [User Type HDD]		Item Specific Help	
Type	[User Type HDD]	<Enter> to select the type of the IDE drive. [User Type HDD] allows you to set each entry on your own. WARNING: Ultra DMA mode 3/4/5 can be enabled only when BIOS detects shielded 80-pin cable.	
Translation Method	[LBA]		
Cylinders	[1024]		
Head	[255]		
Sector	[63]		
CHS Capacity	8422MB		
Maximum LBA Capacity	25590MB		
Multi-Sector Transfers	[Maximum]		
SMART Monitoring	[Disabled]		
PIO Mode	[4]		
ULTRA DMA Mode	[Disabled]		
F1 Help ↑↓ Select Item -/+ Change Values F5 Setup Defaults			
ESC Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit			

Manually enter the number of cylinders, heads and sectors per track for the drive. Refer to the drive documentation or on the drive label for this information.

NOTE: After entering the IDE hard disk drive information into BIOS, use a disk utility, such as FDISK, to partition and format new IDE hard disk drives. This is necessary so that you can write or read data from the hard disk. Make sure to set the partition of the Primary IDE hard disk drives to active.

If no drive is installed or if you are removing a drive and not replacing it, select [None].

Other options for the Type field are:

[CD-ROM] - for IDE CD-ROM drives

[LS-120] - for LS-120 compatible floppy disk drives

[ZIP] - for ZIP-compatible disk drives

[MO] - for IDE magneto optical disk drives

[Other ATAPI Device] - for IDE devices not listed here

After making your selections on this sub-menu, press the <Esc> key to return to the Main menu. When the Main menu appears, the hard disk drive field displays the size for the hard disk drive that you configured.

4. BIOS SETUP

Translation Method [LBA]

Select the hard disk drive type in this field. When Logical Block Addressing (LBA) is enabled, the 28-bit addressing of the hard drive is used without regard for cylinders, heads, or sectors. Note that LBA Mode is necessary for drives with more than 504MB storage capacity. Configuration options: [LBA] [LARGE] [Normal] [Match Partition Table] [Manual]

Cylinders

This field configures the number of cylinders. Refer to the drive documentation to determine the correct value. To make changes to this field, set the Type field to [User Type HDD] and the Translation Method field to [Manual].

Head

This field configures the number of read/write heads. Refer to the drive documentation to determine the correct value. To make changes to this field, set the Type field to [User Type HDD] and the Translation Method field to [Manual].

Sector

This field configures the number of sectors per track. Refer to the drive documentation to determine the correct value. To make changes to this field, set the Type field to [User Type HDD] and the Translation Method field to [Manual].

CHS Capacity

This field shows the drive's maximum CHS capacity as calculated by the BIOS based on the drive information you entered.

Maximum LBA Capacity

This field shows the drive's maximum LBA capacity as calculated by the BIOS based on the drive information you entered.

Multi-Sector Transfers [Maximum]

This option automatically sets the number of sectors per block to the highest number that the drive supports. Note that when this field is automatically configured, the set value may not always be the fastest value for the drive. You may also manually configure this field. Refer to the documentation that came with the hard drive to determine the optimum value and set it manually. To make changes to this field, set the Type field to [User Type HDD]. Configuration options: [Disabled] [2 Sectors] [4 Sectors] [8 Sectors] [16 Sectors] [32 Sectors] [Maximum]

SMART Monitoring [Disabled]

This field allows you to enable or disable the S.M.A.R.T. (Self-Monitoring, Analysis and Reporting Technology) system that utilizes internal hard disk drive monitoring technology. This parameter is normally disabled because the resources used in the SMART monitoring feature may decrease system performance. Configuration options: [Disabled] [Enabled]

4. BIOS SETUP

PIO Mode [4]

This option lets you set a PIO (Programmed Input/Output) mode for the IDE device. Modes 0 through 4 provide successive increase in performance. Configuration options: [0] [1] [2] [3] [4]

Ultra DMA Mode [Disabled]

Ultra DMA capability allows improved transfer speeds and data integrity for compatible IDE devices. Set to [Disabled] to suppress Ultra DMA capability. To make changes to this field, set the Type field to [User Type HDD]. Configuration options: [0] [1] [2] [3] [4] [5] [Disabled]

4.3.2 Keyboard Features

AwardBIOS Setup Utility	
Main	
Keyboard Features	Item Specific Help
Boot Up NumLock Status [On]	Select Power-on state for Numlock
Keyboard Auto-Repeat Rate [6/Sec]	
Keyboard Auto-Repeat Delay [1/4 Sec]	
Hotkey to Lock Keyboard [Disabled]	
Keyboard Idle Timer [Disabled]	

F1 Help ↑↓ Select Item -/+ Change Values F5 Setup Defaults
ESC Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

4. BIOS SETUP
Keyboard Features

Boot Up NumLock Status [On]

This field enables users to activate the Number Lock function upon system boot. Configuration options: [Off] [On]

Keyboard Auto-Repeat Rate [12/Sec]

This controls the speed at which the system registers repeated keystrokes. Options range from 6 to 30 characters per second. Configuration options: [6/Sec] [8/Sec] [10/Sec] [12/Sec] [15/Sec] [20/Sec] [24/Sec] [30/Sec]

Keyboard Auto-Repeat Delay [1/4 Sec]

This field sets the time interval for displaying the first and second characters. Configuration options: [1/4 Sec] [1/2 Sec] [3/4 Sec] [1 Sec]

4. BIOS SETUP

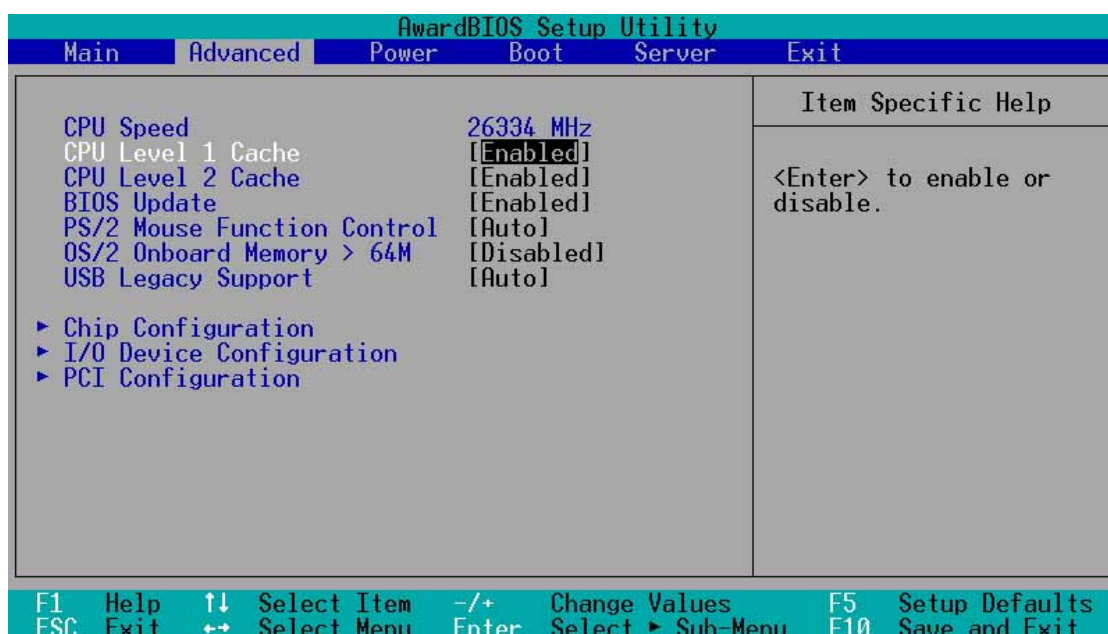
Hotkey to Lock Keyboard [Disabled]

This field allows you to activate the OS independent keyboard lock function using selected hot keys. You must set a user password or a supervisor password before enabling the keyboard lock feature. Configuration options: [Ctrl-Alt A] [Ctrl-Alt Z] [Ctrl-Alt X] [Ctrl-Shft A] [Ctrl-Shft Z] [Ctrl-Shft X] [Disabled]

Keyboard Idle Timer [Disabled]

This field allows you to activate the OS independent keyboard lock function using the keyboard idle timer. You must set a user password or a supervisor password before enabling the keyboard lock feature. Configuration options: [Disabled] [1 Min] [2 Mins] [5 Mins] [15 Mins] [30 Mins]

4.4 Advanced Menu



CPU Speed

This parameter displays the auto-detected CPU speed.

CPU Level 1 Cache, CPU Level 2 Cache [Enabled]

These fields allow you to choose from the default of [Enabled] or choose [Disabled] to turn on or off the CPU's Level 1 and Level 2 built-in cache. Configuration options: [Disabled] [Enabled]

BIOS Update [Enabled]

This functions as an update loader integrated into the BIOS to supply the processor with the required data. In the default position of [Enabled], the BIOS will load the update on all processors during system bootup. Configuration options: [Disabled] [Enabled]

4. BIOS SETUP

PS/2 Mouse Function Control [Auto]

The default of [Auto] allows the system to detect a PS/2 mouse on startup. If detected, IRQ12 will be used for the PS/2 mouse. IRQ12 will be reserved for expansion cards only if a PS/2 mouse is not detected. [Enabled] will always reserve IRQ12, whether on startup a PS/2 mouse is detected or not. Configuration options: [Enabled] [Auto]

OS/2 Onboard Memory > 64M [Disabled]

When using OS/2 operating systems with installed DRAM of greater than 64MB, you need to set this option to [Enabled]; otherwise, leave this on [Disabled]. Configuration options: [Disabled] [Enabled]

USB Legacy Support [Auto]

This motherboard supports Universal Serial Bus (USB) devices. The default setting [Auto] allows the system to detect a USB keyboard at startup. If detected, the USB controller legacy mode is enabled. If not detected, the USB controller legacy mode is disabled.

When you set this field to [Disabled], the USB controller legacy mode is disabled whether or not you are using a USB device. Configuration options: [Disabled] [Enabled] [Auto]

4. BIOS SETUP

4.4.1 Chip Configuration

AwardBIOS Setup Utility	
Advanced	
CHIP Configuration	Item Specific Help
Video Memory Cache Mode [UC] Onboard PCI IDE Enable [Both]	Select [USWC] only when your display card supports this feature.

F1 Help ↑↓ Select Item -/+ Change Values F5 Setup Defaults
ESC Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit

Video Memory Cache Mode [UC]

USWC (uncacheable, speculative write combining) is a new cache technology for the video memory of the processor. It can greatly improve the display speed by caching the display data. You must set this to UC (uncacheable) if your display card cannot support this feature; otherwise your system may not boot. Configuration options: [UC] [USWC]

Onboard PCI IDE Enable [Both]

You can select to enable the primary IDE channel, both the primary and secondary channels, or disable both channels. Configuration options: [Both] [Primary] [Disabled]

4. BIOS SETUP

4.4.2 I/O Device Configuration

AwardBIOS Setup Utility	
Advanced	
I/O Device Configuration	Item Specific Help
Floppy Disk Access Control [R/W]	<Enter> to select.
Onboard Serial Port 1 [3F8H/IRQ4]	
Onboard Serial Port 2 [2F8H/IRQ3]	
Onboard Parallel Port [378H/IRQ7]	
Parallel Port Mode [ECP+EPP]	
ECP DMA Select [3]	

F1 Help ↑↓ Select Item -/+ Change Values F5 Setup Defaults
ESC Exit ↔ Select Menu Enter Select ▶ Sub-Menu F10 Save and Exit

Floppy Disk Access Control [R/W]

When set to [Read Only], this field protects files from being copied to floppy disks by allowing reads from the floppy disk drive but not writes. The setup default [R/W] allows both reads and writes. Configuration options: [R/W] [Read Only]

Onboard Serial Port 1 [3F8H/IRQ4]

Onboard Serial Port 2 [2F8H/IRQ3]

These fields allow you to set the addresses for the onboard serial connectors. Serial Port 1 and Serial Port 2 must have different addresses. Configuration options: [3F8H/IRQ4] [2F8H/IRQ3] [3E8H/IRQ4] [2E8H/IRQ10] [Disabled]

Onboard Parallel Port [378H/IRQ7]

This field sets the address of the onboard parallel port connector. If you disable this feature, **Parallel Port Mode** and **ECP DMA Select** configurations will not be available. Configuration options: [Disabled] [378H/IRQ7] [278H/IRQ5]

Parallel Port Mode [ECP+EPP]

This field allows you to set the operation mode of the parallel port. [Normal] allows normal-speed operation but in one direction only; [EPP] allows bidirectional parallel port operation; [ECP] allows the parallel port to operate in bidirectional DMA mode; [ECP+EPP] allows normal speed operation in a two-way mode. Configuration options: [Normal] [EPP] [ECP] [ECP+EPP]

4. BIOS SETUP

ECP DMA Select [3]

This field allows you to configure the parallel port DMA channel for the selected **ECP** mode. This selection is available only if you select [ECP] or [ECP+EPP] in **Parallel Port Mode** above. Configuration options: [1] [3]

4.4.3 PCI Configuration

The screenshot shows the 'AwardBIOS Setup Utility' interface. At the top, there is a blue bar with 'AwardBIOS Setup Utility' and a sub-menu 'Advanced'. Below this is a table with two columns: 'PCI Configuration' and 'Item Specific Help'. The 'PCI Configuration' column lists several settings with their current values in brackets. The 'Item Specific Help' column provides instructions for the selected item. At the bottom, there is a legend for navigation keys.

PCI Configuration	Item Specific Help
Slot 1 IRQ [Auto]	<Enter> to select an IRQ.
Slot 2 IRQ [Auto]	
Slot 3 IRQ [Auto]	
Slot 4 IRQ [Auto]	
Slot 5 IRQ [Auto]	
Slot 6 IRQ [Auto]	
PCI/VGA Palette Snoop [Disabled]	
PCI Latency Timer [32]	
Onboard SCSI BIOS [Auto]	
ONB SCSI BIOS First [No]	
Primary VGA BIOS [PCI VGA Card]	
USB Function [Enabled]	
Onboard LAN Boot ROM [Disabled]	

Legend:
F1 Help ↑↓ Select Item -/+ Change Values F5 Setup Defaults
ESC Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit

Slot 1, Slot 2, Slot 3, Slot 4, Slot 5, Slot 6 IRQ [Auto]

These fields set how IRQ use is determined for each PCI slot. The default setting for each field is [Auto], which utilizes auto-routing to determine IRQ use. Configuration options: [Auto] [NA] [3] [4] [5] [7] [9] [10] [11] [12] [14] [15]

PCI/VGA Palette Snoop [Disabled]

Some non-standard VGA cards, like graphics accelerators or MPEG video cards, may not show colors properly. Setting this field to [Enabled] corrects this problem. If you are using standard VGA cards, leave this field to the default setting [Disabled]. Configuration options: [Disabled] [Enabled]

PCI Latency Timer [32]

Leave on default setting for best performance vs. stability.

4. BIOS SETUP

Onboard SCSI BIOS [Auto]

[Auto] allows the motherboard BIOS to detect whether you have a Adaptec SCSI controller. If the SCSI controller is detected, the SCSI BIOS will be enabled. If no SCSI controller is detected, the onboard SCSI BIOS will be disabled.

Setting to [Disabled] deactivates the onboard SCSI BIOS so that the BIOS on an add-on SCSI card can be used. If your SCSI card does not have a BIOS, the SCSI card will not function. Configuration options: [Auto] [Disabled]

ONB SCSI BIOS First [No]

This field allows giving priority to the onboard SCSI BIOS for SCSI functions over other SCSI controllers. Configuration options: [No] [Yes]

Primary VGA BIOS First [PCI VGA Card]

This field allows you to select the primary graphics card. Configuration options: [PCI VGA Card] [Onboard VGA]

USB Function [Enabled]

Set this field to [Enabled] if you want to use Universal Serial Bus devices. Configuration options: [Disabled] [Enabled]

Onboard LAN Boot ROM [Disabled]

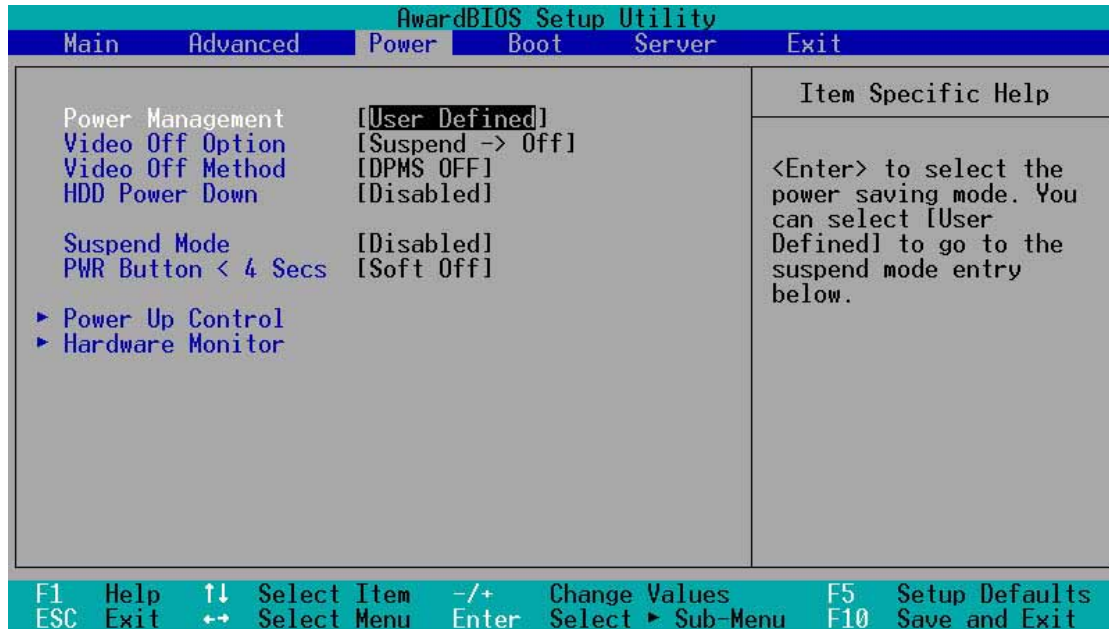
Onboard 2nd LAN Boot ROM [Disabled]

When set to [Enabled], these fields allow the system to boot from the network using the onboard LAN controller boot ROM. Configuration options: [Disabled] [Enabled]

4. BIOS SETUP

4.5 Power Menu

The Power menu allows you to reduce power consumption. This feature turns off the video display and shuts down the hard disk after a period of inactivity.



Power Management [User Defined]

This option must be enabled to use any of the automatic power saving features. If this menu item is set to [Disabled], power management features will not function regardless of other field settings on this menu. The [User Define] option allows you to make your own selections in the Power menu. When set to [Max Saving], system power will be conserved to its greatest amount. The **Suspend Mode** field is then set to predefined value that ensures maximum power saving.

This field acts as the master control for the power management modes. [Max Saving] puts the system into power saving mode after a brief period of system inactivity; [Min Saving] is almost the same as [Max Saving] except that the system inactivity period is longer; [Disabled] disables the power saving features; [User Define] allows you to set power saving options according to your preference. Configuration options: [User Define] [Disabled] [Min Saving] [Max Saving]

IMPORTANT: Advanced Power Management (APM) should be installed to keep the system time updated when the computer enters suspend mode activated by the BIOS Power Management. For DOS environments, you need to add the statement, `DEVICE=C:\DOS\POWER.EXE`, to your `CONFIG.SYS` file. For Windows 3.x and Windows 95, you need to install Windows with the APM feature. For Windows 98 and later, APM is automatically installed. A battery and power cord icon labeled “Power Management” appears in the “Control Panel.” Choose “Advanced” in the Power Management Properties dialog box.

4. BIOS SETUP

Video Off Option [Suspend -> Off]

This field determines when to activate the video off feature for monitor power management. Configuration options: [Always On] [Suspend -> Off]

Video Off Method [DPMS OFF]

This field defines the video off features. The DPMS (Display Power Management System) feature allows the BIOS to control the video display card if it supports the DPMS feature. [Blank Screen] only blanks the screen (use this for monitors without power management or “green” features. If set up in your system, your screen saver will not display with [Blank Screen] selected). [V/H SYNC+Blank] blanks the screen and turns off vertical and horizontal scanning. Configuration options: [Blank Screen] [V/H SYNC+Blank] [DPMS Standby] [DPMS Suspend] [DPMS OFF] [DPMS Reduce ON]

HDD Power Down [Disabled]

Shuts down any IDE hard disk drives in the system after a period of inactivity as set in this user-configurable field. This feature does not affect SCSI hard drives. Configuration options: [Disabled] [1 Min] [2 Min] [3 Min]...[15 Min]

Suspend Mode [Disabled]

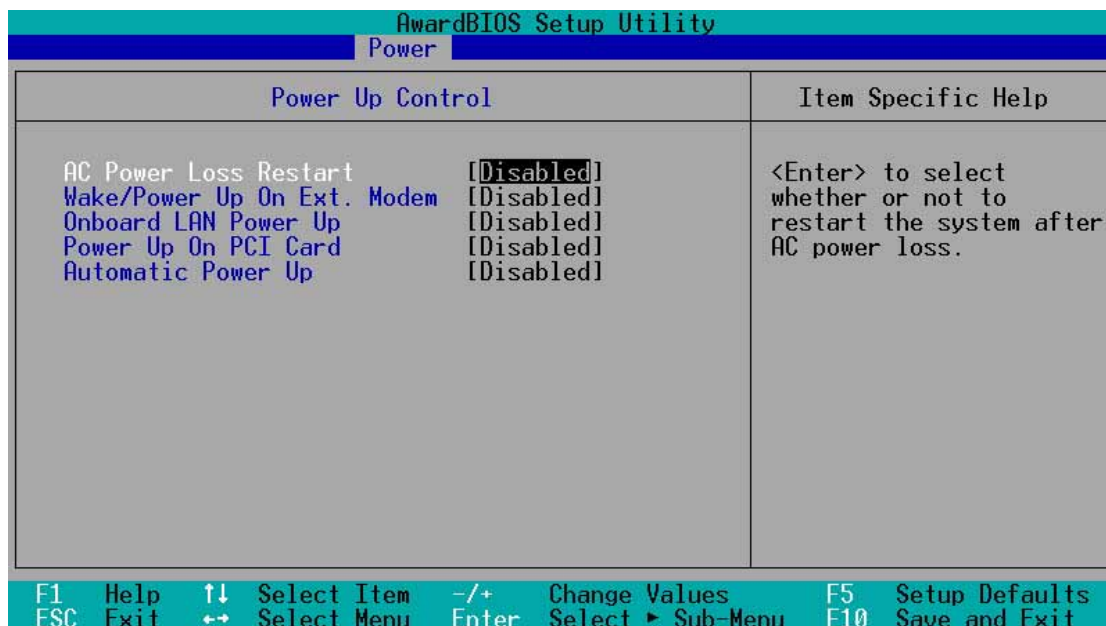
This sets the time period before the system goes into suspend mode. Configuration options: [Disabled] [1~2 Min] [2~3 Min]...[1 Hour]

PWR Button < 4 Secs [Soft Off]

When set to [Soft off], the ATX switch can be used as a normal system power-off button when pressed for less than 4 seconds. [Suspend] allows the button to have a dual function where pressing less than 4 seconds puts the system in sleep mode. Regardless of the setting, holding the ATX switch for more than 4 seconds powers off the system. Configuration options: [Soft off] [Suspend]

4. BIOS SETUP

4.5.1 Power Up Control



AC PWR Loss Restart [Disabled]

This allows you to set whether you want your system to reboot after the power has been interrupted. [Disabled] leaves your system off. [Previous State] reverts your system to the same state before the power interruption. Configuration options: [Disabled] [Previous State]

Wake/Power Up On Ext. Modem [Disabled]

This allows either settings of [Enabled] or [Disabled] for powering up the computer when the external modem receives a call. Configuration options: [Disabled] [Enabled]

NOTE: The computer cannot receive or transmit data until the computer and applications are fully running. Thus, connection cannot be made on the first try. Turning an external modem off and then back on while the computer is off causes an initialization string that turns the system power on.

Onboard LAN Power Up [Disabled]

Power Up on PCI Card [Disabled]

These fields allow you to boot your computer from another computer by sending a wake-up frame or signal to the LAN device, or the PCI modem card if present. Configuration options: [Disabled] [Enabled]

IMPORTANT: This feature requires an optional network interface card with Wake-On-LAN feature and an ATX power supply with at least 720mA +5V standby power.

4. BIOS SETUP

Automatic Power Up [Disabled]

This allows an unattended or automatic system power up. You may configure your system to power up at a certain time of the day by selecting [Everyday] or at a certain time and day by selecting [By Date]. **NOTE:** *Automatic Power Up* will not work if the system is powered down by operating systems, such as Windows 98, which have ACPI support enabled. Configuration options: [Disabled] [Everyday] [By Date]

4. BIOS SETUP

4.5.2 Hardware Monitor

AwardBIOS Setup Utility		
Power		
Hardware Monitor		Item Specific Help
MB Temperature	30°C/86°F	<Enter> to switch between monitoring or ignoring.
CPU1 Temperature	41°C/105.5°F	
CPU2 Temperature	50°C/122.0°F	
CPU1 Fan Speed	7500RPM	
CPU2 Fan Speed	5273RPM	
SYSTEM Fan Speed	N/A	
VCORE1 Voltage	1.50V	
VCORE2 Voltage	1.50V	
3.3V Voltage	3.45V	
5V Voltage	4.91V	
12V Voltage	12.09V	
3VSB Voltage	3.45V	

F1 Help ↑↓ Select Item -/+ Change Values F5 Setup Defaults
ESC Exit ↔ Select Menu Enter Select ► Sub-Menu F10 Save and Exit

MB Temperature [xxx°C/xxx°F]

CPU1 Temperature [xxx°C/xxx°F]

CPU2 Temperature [xxx°C/xxx°F]

The onboard hardware monitor is able to detect the MB (motherboard) and CPU temperatures. Set to [Ignore] only if necessary.

CPU1 Fan Speed [xxxxRPM]

CPU2 Fan Speed [xxxxRPM]

SYSTEM Fan Speed [xxxxRPM]

The onboard hardware monitor is able to detect the CPU and system fan speeds in rotations per minute (RPM). The presence of the fans is automatically detected.

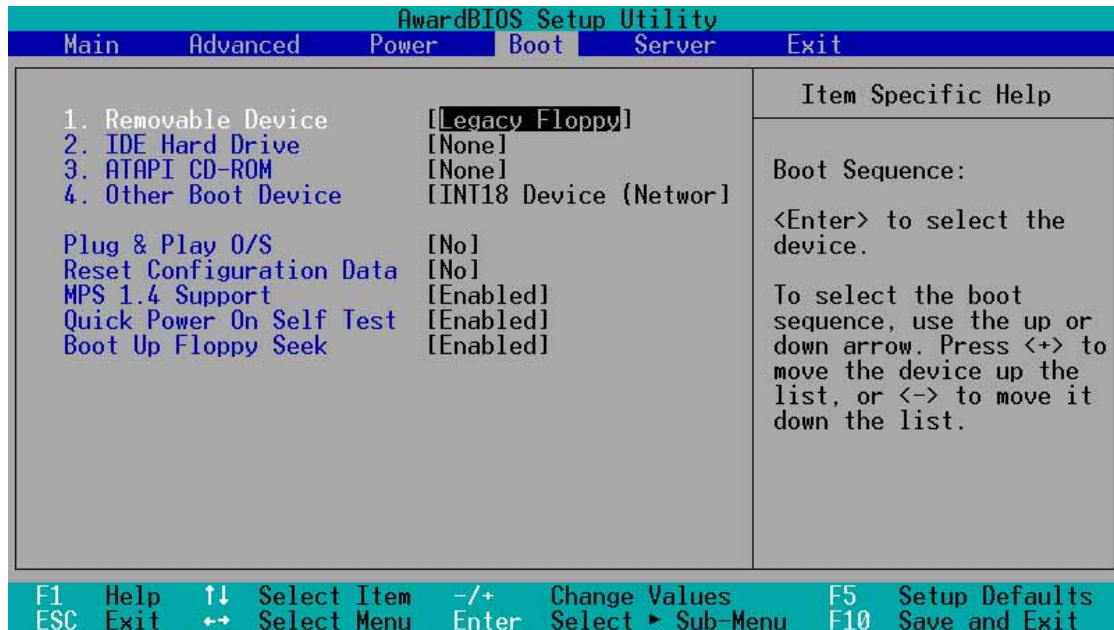
VCORE1 Voltage, VCORE2 Voltage, 3.3V Voltage, 5V Voltage, 12V Voltage, 3VSB Voltage

The onboard hardware monitor is able to detect the voltage output by the onboard voltage regulators.

NOTE: If any of the monitored items is out of range, the following error message appears: “Hardware Monitor found an error. Enter Power setup menu for details”. You will then be prompted to “Press F1 to continue or DEL to enter SETUP”.

4. BIOS SETUP

4.6 Boot Menu



Boot Sequence

The Boot menu allows you to select among the four possible types of boot devices listed using the up and down arrow keys. By using the <+> or <Space> key, you can promote devices and by using the <-> key, you can demote devices. Promotion or demotion of devices alters the priority which the system uses to search for a boot device on system power up. Configuration fields include **Removable Devices**, **IDE Hard Drive**, **ATAPI CD-ROM**, and **Other Boot Device**.

Removable Device [Legacy Floppy]

Configuration options: [Disabled] [Legacy Floppy] [LS120] [ZIP-100] [ATAPI MO]

IDE Hard Drive

This field allows you to select which IDE hard disk drive to use in the boot sequence. Pressing [Enter] shows the product IDs of all connected IDE hard disk drives.

ATAPI CD-ROM

This field allows you to select which ATAPI CD-ROM drive to use in the boot sequence. Pressing [Enter] shows the product IDs of all your connected ATAPI CD-ROM drives.

Other Boot Device Select [INT18 Device (Network)]

Configuration options: [Disabled] [SCSI Boot Device] [INT18 Device (Network)]

4. BIOS SETUP

Plug & Play O/S [No]

This field allows you to use a Plug-and-Play (PnP) operating system to configure the PCI bus slots instead of using the BIOS. When [Yes] is selected, interrupts may be reassigned by the OS. When a non-PnP OS is installed or you want to prevent reassigning of interrupt settings, select the default setting of [No]. Configuration options: [No] [Yes]

Reset Configuration Data [No]

The Extended System Configuration Data (ESCD) contain information about non-PnP devices. It also holds the complete record of how the system was configured the last time it was booted. Select [Yes] if you want to clear these data during the Power-On-Self-Test (POST). Configuration options: [No] [Yes]

MPS 1.4 Support [Enabled]

This field allows you to enable or disable the MultiProcessor Specification 1.4 support. Configuration options: [Disabled] [Enabled]

Quick Power On Self Test [Enabled]

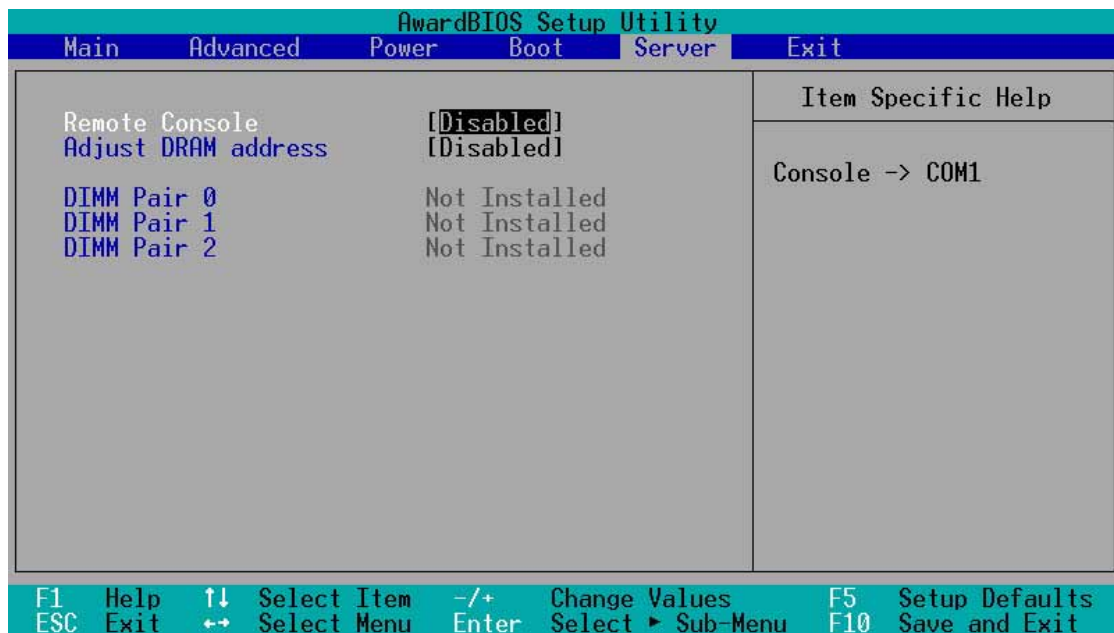
This field speeds up the Power-On-Self Test (POST) routine by skipping retesting a second, third, and fourth time. Configuration options: [Disabled] [Enabled]

Boot Up Floppy Seek [Enabled]

When enabled, the BIOS seeks the floppy disk drive once during bootup. Configuration options: [Disabled] [Enabled]

4. BIOS SETUP

4.7 Server Menu



Remote Console [Disabled]

This field allows the text mode VGA display to be sent out to VT100 terminal through COM1. This function is effective at BIOS POST and DOS environment. Configuration options: [Disabled] [Enabled] [POST Only]

Adjust DRAM Address [Disabled]

Set this item to Enabled to avoid PCI/DRAM overlay if your installed system memory is greater than 4GB. Configuration options: [Disabled] [Enabled]

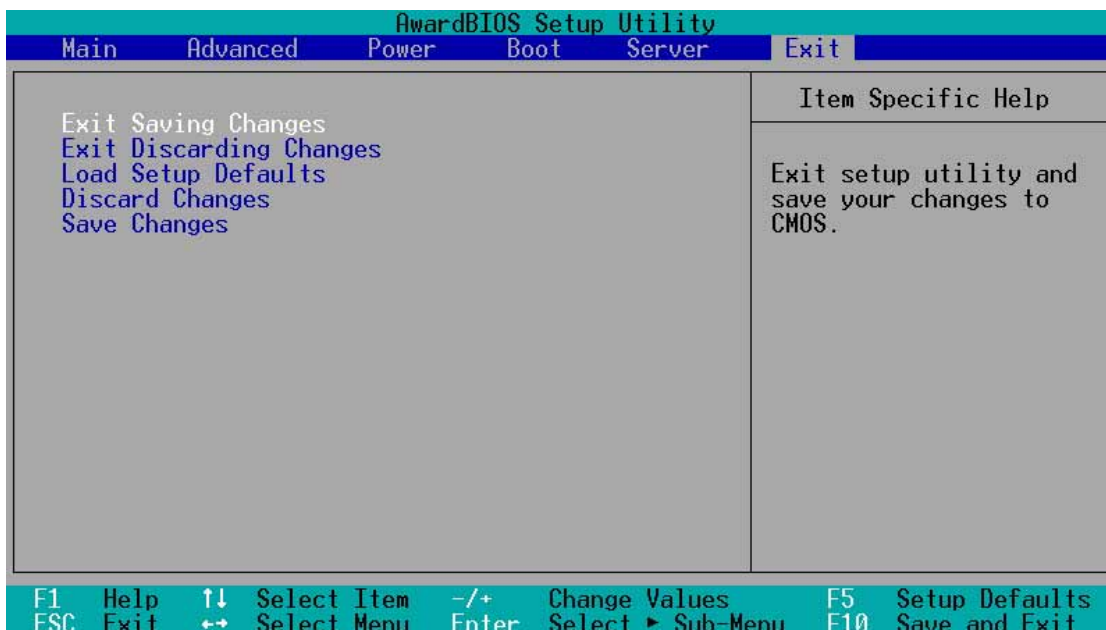
DIMM Pair 0, DIMM Pair 1, DIMM Pair 2

These memory fields display the auto-detected system memory.

4. BIOS SETUP

4.8 Exit Menu

Once you have made all of your selections from the various menus in the Setup program, you should save your changes and exit Setup. Select **Exit** from the menu bar to display the following menu:



NOTE: Pressing <Esc> does not exit this menu. You must select one of the options from this menu or <F10> from the legend bar to exit this menu.

Exit Saving Changes

Once you are finished making your selections, choose this option from the Exit menu to ensure the values you selected are saved to the CMOS RAM. The CMOS RAM is sustained by an onboard backup battery and stays on even when the PC is turned off. Once this option is selected, a confirmation is asked. Select [Yes] to save changes and exit.

NOTE: If you attempt to exit the Setup program without saving your changes, the program will prompt you with a message asking if you want to save your changes before exiting. Pressing <Enter> will then save changes while exiting.

Exit Discarding Changes

This option should only be used if you do not want to save the changes you have made to the Setup program. If you have made changes to fields other than system date, system time, and password, the system will ask for confirmation before exiting.

4. BIOS SETUP

Load Setup Defaults

This option allows you to load the default values for each of the parameters on the Setup menus. When this option is selected or if <F5> is pressed, a confirmation is requested. Select [Yes] to load default values. You can now select **Exit Saving Changes** or make other changes before saving the values to the non-volatile RAM.

Discard Changes

This option allows you to discard the selections you made and restore the values you previously saved. After selecting this option, a confirmation is requested. Select [Yes] to discard any changes and load the previously saved values.

Save Changes

This option saves your selections without exiting the Setup program. You can then return to other menus and make changes. After selecting this option, all selections are saved and a confirmation is requested. Select [Yes] to save any changes to the non-volatile RAM.

ASUS[®] TRL-DLS

Dual Tualatin[™] Motherboard

5. OS Driver Installation

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5. OS Driver Installation

5.1 Microsoft® Windows® NT Server 4.0

I. Adaptec® SCSI Driver Installation

Windows NT 4.0 does not have the drivers for the Adaptec SCSI controller. You must create a driver disk prior to Windows NT 4.0 installation.

NOTE: Prepare one blank formatted high density floppy disk. Label the disk “Ultra160 FMS v1.11 for Microsoft Windows NT 4.0 Setup Disk.”

A. Preparing an Adaptec Driver Disk

1. Insert the ASUS TRL-DLS support CD into your CD-ROM drive.
2. Run the Adaptec Disk Creation Utility from the following path:

`\Drivers\Adaptec\fmsutil.exe`



3. Select **Ultra160 FMS 1.11** from the options. Press Enter.



4. Select **Microsoft Windows NT 4.0**. Press Enter.

5. OS Driver Installation

5. When prompted, insert the floppy disk that you labeled “**Ultra160 FMS v1.11 for Microsoft Windows NT 4.0 Setup Disk.**”
6. Press Enter and follow the succeeding screen instructions.

B. New System Installation

This procedure installs the ADPT160M.SYS driver onto a Windows NT system. Use this procedure when installing Windows NT onto an unused SCSI drive. Windows NT automatically adds the driver to the registry and copies the driver to the appropriate directory. There are two methods to install the Windows NT system. One is installed by booting from NT CD Disc; the other is by booting from NT three installation floppy diskettes.

B1. CD-ROM Installation

1. Start the Windows NT installation by booting from the Windows NT CD-ROM. The system BIOS must support booting from a CD-ROM. Adaptec BIOS settings may need to be changed to allow CD-ROM booting when using SCSI-interface CD-ROM drive.
2. When the screen displays “**Windows NT Setup**”, immediately press the **F6** key. This must be done or else the new driver installed from the Adaptec driver diskette will not be recognized.

NOTE: If **F6** is not pressed, the user is still given the opportunity to load additional drivers later in the installation process. However, any drivers loaded during Windows NT Setup are not immediately recognized and no devices controlled by that driver are available during Windows NT Setup.

3. When prompted for the manufacturer-supplied hardware support disk, insert the appropriate Adaptec driver diskette containing the Windows NT driver required to support your Adaptec adapter(s) and press Enter. The driver files are distributed with ASUS Driver Support CD and are created from above “*Preparing an Adaptec Driver Diskette*” Section.
4. Depending on the driver being installed, “*Adaptec Ultra160 PCI SCSI Controller (NT4.0)*” is shown highlighted. Press **Enter** to proceed.
5. Windows NT should now recognize the miniport driver(s) and the SCSI hardware. Press **Enter** to continue. As for the on-board LAN and VGA, please refer to the later sections for network and graphics driver installation.

5. OS Driver Installation

B2. Boot Floppy Disk Installation

1. Start the Windows NT installation by booting from the Microsoft Setup floppy disk.
2. Press **Enter** when the Welcome to Setup screen appears. The Windows NT Workstation Setup window appears next.
3. Press **S** to skip automatic detection and perform a manual selection. A screen displays the message “*Setup has recognized the following mass storage devices in your computer..*”.
4. With floppy disk 2, there is an initial setup screen that prompts you to continue by pressing **Enter**.
5. Press **S** to skip mass storage device detection. To change the driver, see *Existing System Installation*.
6. When a screen displays the SCSI adapters found, choose **S** to configure additional SCSI adapters.
7. Move the highlight bar to *Other* and press **Enter**.
8. When prompted for the *manufacturer-supplied hardware support disk*, insert the appropriate Adaptec driver diskette containing the Windows NT driver required to support your Adaptec adapter(s) and press Enter. The driver files are distributed with ASUS Driver Support CD and are created from the previous section for “*Preparing an Adaptec Driver Diskette*”.
9. Depending on the driver being installed, *Adaptec 19160, 29160(N), 39160, AHA-3960D, AIC-7892/7899 Ultra160 PCI SCSI Controller (NT4.0)* is shown highlighted. Press **Enter** to proceed.
10. The Windows NT Setup window reappears. If using an IDE CD-ROM Drive for installation, press **S** to load additional drives. Another window appears. Scroll up and select: *IDE CD-ROM (ATAPI 1.2/PCI IDE Controller*. Press **Enter**. (-or-) If you have completed configuring additional SCSI adapters, press **Enter**.
11. Windows NT should now recognize the miniport driver and the SCSI hardware. Press **Enter** to continue. At this point, simply follow the Microsoft Windows NT installation procedure. As for the onboard LAN and VGA, please refer to the later sections for network and graphics driver installation.

5. OS Driver Installation

C. Existing System Installation

1. Boot Windows NT system and log on as Administrator.
2. Click on the **Start** button. Select **Settings**—>**Control Panel**.
3. Double click on **SCSI Adapters** icon.
4. Click the Drivers tab. If the old AIC78XX.SYS, AIC78U2.SYS, or other drivers are listed, select the driver(s) and choose **Remove** before adding the new driver. If the driver name of the driver you are installing ADPT160M.SYS is listed, remove it before adding the new driver. Select **OK** when the Remove Driver message prompts: *“Are you sure you want to remove this driver?”* Click **OK**.
5. Click **Add**. A list of installed adapters will appear.
6. Click the **Have Disk** button.
7. When prompted, insert the appropriate Adaptec driver diskette containing the Windows NT driver required to support your Adaptec adapter(s). The path to copy manufacturer’s files is: A:\WINNT\MINIPORT and select **OK**.
8. Depending on the driver being installed, *Adaptec 19160, 29160(N), 39160, AHA-3960D, AIC-7892/7899 Ultra160 PCI SCSI Controller (NT4.0)* is shown highlighted on the Install Driver menu. If it is not highlighted, select it. Choose **OK**.
9. For the path to the OEM SCSI Adapter files, A:\WINNT\MINIPORT should be displayed. Select **Continue**. Then remove the floppy diskette from your drive A.
10. The System Settings Change message displays: *“You must restart your computer before the new settings take effect. Do you want to restart your computer now?”* Click on the **Yes** button to restart and reboot Windows NT. If you choose **Cancel**, remember that you must restart before the new driver loads.
11. Rebooting loads your new miniport driver(s).

5. OS Driver Installation

II. Intel® 82550 Network Driver Installation

A. Preparing Intel 82550 LAN Driver Diskette

If you need to use a floppy disk to install the on-board Intel 82550 network adapter drivers, use the **dcreat.exe** utility located in the **\Drivers\LAN\MAKEDISK** directory in the ASUS Support CD.

Make sure you have a 1.44 MB formatted, non-bootable diskette in the floppy drive when using this utility.

Choose check bottom of Windows NT4.0 to create Windows NT diskette (two diskette) when appeared create window disk screen.

B. New System Installation

1. Press **Next** when *Installing Windows NT Networking* screen appears.
2. Select **Wired to the Network**: Press **Next**. You can select install IIS or not.
3. Press **Select from list.....** Insert the **PRO/100+ adapter diskette** and click **Have Disk**.

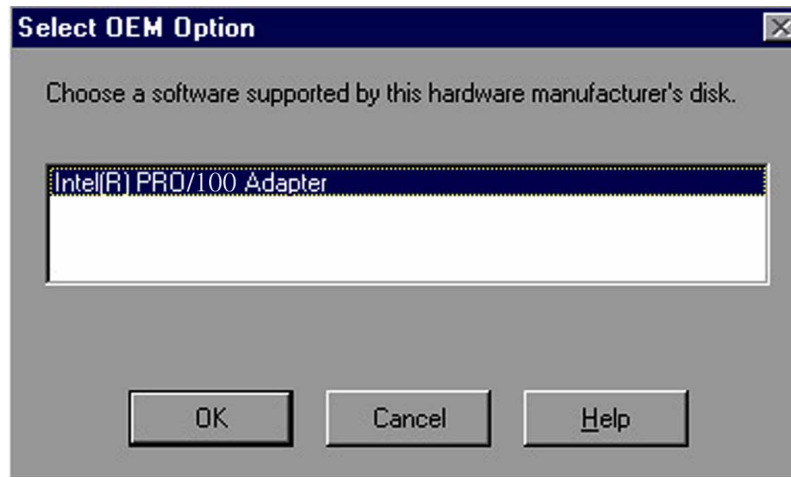
CAUTION! Don't let the Windows NT system to detect the on-board network device. The bundled driver cannot support Intel 82550 network controller and will cause the system installation failure.

4. Type **A:** (for floppy) in the dialog box and click **OK**. Then follow the prompts to complete installation. When the adapter is added you'll see a new adapter "**Intel(R) PRO Adapter**" listed in the Network adapters list.
5. Click **Next** to finish and configure any protocols as prompted.

C. Existing System Installation

1. Double-click the **Network** icon in the **Control Panel**.
2. Select the **Adapter** tab.
3. Click **Add**. You'll see a list of adapters.
4. Don't select an adapter from this list. Instead, insert the **Intel PRO/100+ Adapter diskette** and click **Have Disk**.
5. Type **A:** (for floppy) in the dialog box and click **OK**. Then follow the prompts to complete the installation. When the adapter is added you'll see a new adapter listed in the Network adapters list.

5. OS Driver Installation



6. Click **OK** to finish and configure any protocols as prompted
7. Restart Windows NT when prompted.

II. ATI® Rage XL Display Driver Installation

1. Insert the ASUS TRL-DLS support CD into your CD-ROM drive.
2. Install the display driver from the following path:

\\Drivers\\Display\\Nt40\\Setup.exe

3. Follow the screen instructions to complete the installation.

5. OS Driver Installation

5.2 Microsoft® Windows® 2000 Server

I. Adaptec® SCSI Driver Installation

The Microsoft Windows 2000 Server can autodetect the onboard AIC7899W SCSI controller on the TRL-DLS motherboard. You don't need to load or modify the SCSI driver.

A. Existing System Installation

1. Boot Windows 2000 and log on as Administrator.
2. Right click on **My Computer** and click on **Properties**.
3. Click on the **Hardware** tab, and then click on the **Device Manager** button.
4. Click the “+” to the left of the **SCSI** and **RAID** controllers line. Find the adapter desired for the driver upgrade and double click on the entry. Click on the **Driver** tab.
5. Information on the currently installed driver is displayed, and additional driver details can be viewed by clicking the **Driver Details....** button.
6. To update the existing driver, click the **Update Driver** button. The Upgrade Device Driver Wizard begins. Click on the **Next** button.
7. Make sure Search for a suitable driver for my device is selected, then click on the **Next** button.
8. Make sure the Floppy disk drives location is checked. Insert the appropriate Adaptec driver diskette that contains the Windows 2000 driver required to support your Adaptec adapter(s) and press Enter. The Adaptec driver diskette was created earlier.
9. The system scans the existing driver database and the floppy diskette drive for drivers for the selected adapter.
10. A list of suitable drivers appears. The entry for the upgrade driver can be verified by scrolling the display to the right, and viewing the Location field. Highlight the driver for the upgrade installation disk and click on the **Next** button.

5. OS Driver Installation



11. In some cases, a message will state that this driver is not digitally signed. This message informs the user that a non-signed driver is being installed. Either click **No** to cancel the installation if the non-signed driver is not desired or click **Yes** to continue the installation.

NOTE: Drivers are digitally signed by the Microsoft Windows Hardware Quality Lab (WHQL). Due to the delay between the general customer release by Adaptec Logic of Windows drivers and the completion of WHQL testing, some drivers that are distributed with adapters or downloaded from the Adaptec Logic web site at www.adaptec.com may not be digitally signed.

12. The system will load the driver from the Adaptec driver diskette. A message box may appear indicating that the target (existing) driver is newer than the source (upgrade) driver. Click **No** to cancel the driver upgrade at this point or click **Yes** to continue the installation.

5. OS Driver Installation

II. Intel® 82550 Network Driver Installation

A. Preparing Intel 82550 LAN Driver Diskette

Use a floppy disk to install the onboard Intel 82550 network adapter drivers with the **MAKEDISK.BAT** utility located in the `\Drivers\LAN\MAKEDISK` directory in ASUS Support CD.

MAKEDISK [operating system] [destination]

where **[operating system]** is the OS for which you are creating the diskette, and **[destination]** is the drive letter and path (such as **A:**). If no destination is specified, the **A:** drive will be used. The possible **[operating system]** options are:

NT = Microsoft Windows NT

W2K = Microsoft Windows* 2000

NW = Novell NetWare servers and clients

Make sure you have a 1.44 MB formatted, non-bootable diskette in the floppy drive when using this utility. Alternately, you can use the **MAKEW2K.BAT** files (located in the `\Drivers\LAN\MAKEDISK` directory on this CD) to simplify this process:

MAKEW2K.BAT — Creates a drivers disk for Windows 2000

B. Update Driver on an Existing System Installation

Windows 2000 cannot automatically detect the Intel 82550 LAN controller. Follow these steps to load the drivers.

1. Boot Windows 2000 system and log on as Administrator.
2. Click on the **Start** button. Select **Settings—>Control Panel**.
3. Double-click the **System** icon in the **Control Panel**. Select the **Hardware** tab. Click on **Device Manager....** Button.
4. Click **Other Devices** and highlight **“Ethernet Controller”**. Click the right mouse button and select **Properties**.
5. Select the **Driver** tab. Click on **Update Drivers** button.
6. Click **Next**. Select **“Display a list of the known drivers for this device ...”**.
7. Select **“Network adapters”** under Hardware Type, and click **Next**.
8. Click **Have Disk....** Select **A:** floppy disk for the network driver and click **OK**.
9. Select **“Intel® PRO/100+ PCI Adapter”** from the listed Network Adapters. Click **Next**. The system prompts you with an Update Driver message. Click **Yes** to continue installing driver.

5. OS Driver Installation

10. The following screen appears when the driver update process is completed. Click **Finish**.

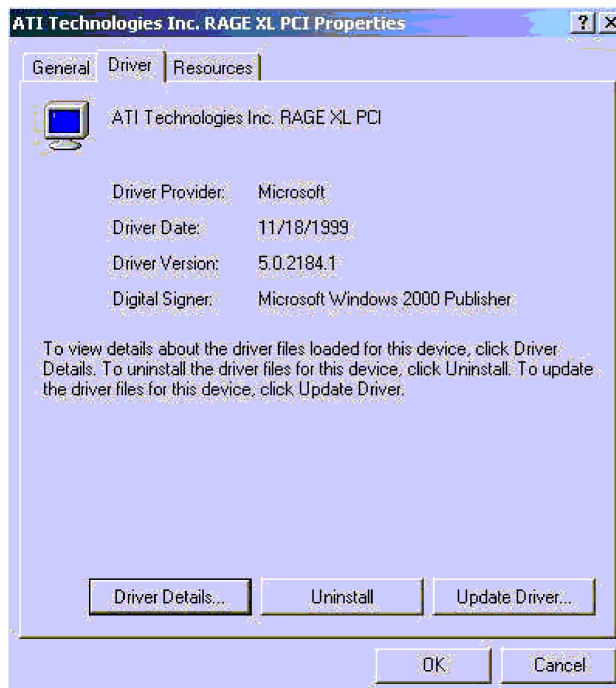


Windows 2000 system prompts if you want to restart the system. After system has been restarted, the new driver is loaded into the system.

11. Repeat the process to install another network adapter.

III. ATI® Rage XL Display Driver Installation

Windows 2000 system can correctly recognize ATI RAGE XL PCI driver during system installation. You do not need to load any driver for supporting the onboard ATI RAGE XL graphics chip.



5. OS Driver Installation

5.3 Microsoft® Windows® XP Professional

Windows XP contains default driver to support Intel 82550 chipset, ATI Rage XL chipset, and Adaptec AIC7899W SCSI chipset.

NOTE: For Windows XP Professional users, we recommended that you use the Intel 82550 driver from the TRL-DLS support CD.

5.4 Novell® NetWare® Server

I. Adaptec® SCSI Driver Installation

A single driver (*HAM) is provided for the Novell NetWare 4.XX, and 5.X environments. This document explains how to install and use Adaptec SCSI Host Adapter Module (HAM) driver for NetWare. The Adaptec solution that consists of the device drivers ADPT160M.DDI and ADPT160M are Host Adapter Modules (HAMs). HAM. To support SCSI devices, load the HAM in conjunction with a SCSI Custom Device Module (CDM). Novell has developed generic CDMs to support SCSI-2 hard drives, SCSI CD-ROM devices, SCSI Magneto Optical devices, SCSI tape devices, and SCSI changer devices. In addition, third party vendors are developing CDMs to support their specific devices.

Novell Netware does not include the drivers for the Adaptec SCSI controller. You must create a driver disk prior to Novell Netware installation.

NOTE: Prepare one blank formatted high density floppy disk. Label the disk “Ultra160 FMS v1.11 for Novell Netware version 3.1x/4.xx Setup Disk” or “Ultra160 FMS v1.11 for Novell Netware version 5.xx Setup Disk”.

A. *Preparing an Adaptec Driver Disk*

1. Insert the ASUS TRL-DLS support CD into your CD-ROM drive.
2. Run the Adaptec Disk Creation Utility from the following path:

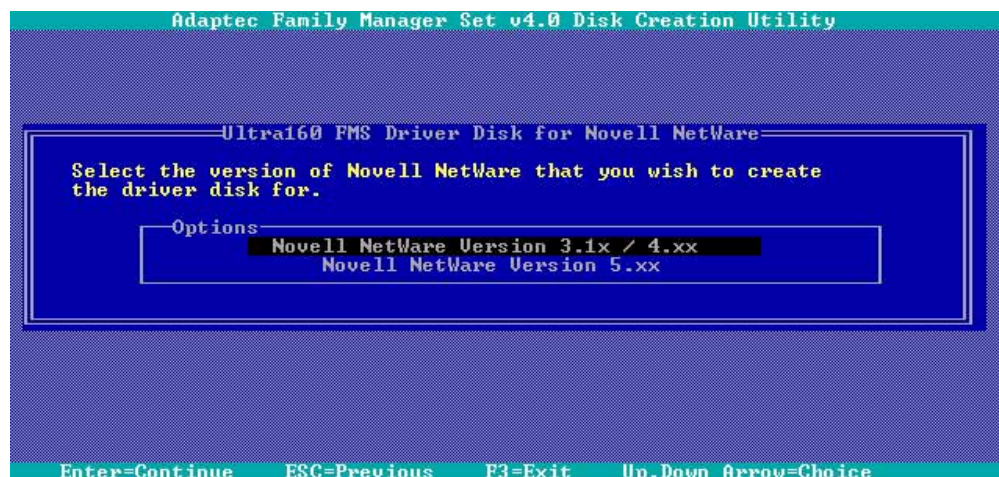
\Drivers\Adaptec\fmsutil.exe

5. OS Driver Installation

3. Select **Ultra160 FMS 1.11** from the options that appear. Press Enter to display the following.



4. Select **Novell Netware 3.1x, 4.xx and 5.xx**. Press Enter.



5. Select either **“Novell Netware Version 3.1x/4.xx”** or **“Novell Netware Version 5.xx.”** Press Enter.
6. When prompted, insert the floppy disk that you labeled **“Ultra160 FMS v1.11 for Novell Netware version 3.1x/4.xx Setup Disk”** or **“Ultra160 FMS v1.11 for Novell Netware version 5.xx Setup Disk”**
7. Press Enter and follow the succeeding screen instructions.

5. OS Driver Installation

B. NetWare 5.X New Installations

1. Begin the file server installation according to the instructions in the file server installation chapter in the Novell NetWare Installation Manual.
2. When the NetWare installation procedure prompts you a *Device type* screen, press **Modify** to add a **Storage adapters:** (Default only **IDEATA** available). Press **INS** for adding a new driver. Please put the *Adaptec driver for NetWare* diskette into drive **A:** Then use the **INS** key to select an unlisted driver. A dialog box appears. If the driver diskette is in the **A:** drive, press **Enter** to continue. The **ADPT160.HAM** drivers appear as a selection.
3. Highlight Disk and CD-ROM Drivers (e.g., IDEATA). Press **Enter** and load an additional driver. Then press the **INS** key. The system always defaults to the **A:** path. Highlight the HAM driver and press **Enter**. Select **Yes** to save and move the driver into the operating system. Press **Enter**, the system will copy the files.
4. Load a separate instance of the driver for every Adaptec controller SCSI channel or host adapter present in the system.
5. When prompted for a slot number, accept the slot numbers displayed. Make sure to write these slot numbers down for future reference.
6. When asked to edit the STARTUP.NCF file, make sure that the ADPT160M.HAM is loaded once for each Adaptec SCSI controller channel present in the system. Add the statement `SLOT=<slot number>` to each load line in the STARTUP.NCF, by specifying the slot numbers written down in step 5 above, with only one slot number per load instance. The HAM driver(s) are loaded for each Adaptec SCSI controller channel from the first LOAD statement to the last LOAD statement.

C. NetWare 4.XX New Installations

1. Begin the file server installation according to the instructions in the file server installation chapter in the Novell NetWare Installation Manual.
2. When the NetWare installation procedure prompts you for a driver disk, insert the *Adaptec driver for NetWare* diskette into drive **A:** Then use the **INS** key to select an unlisted driver. A dialog box appears. If the driver diskette is in the **A:** drive, press **Enter** to continue. The **ADPT160M.HAM** driver appears as a selection.

5. OS Driver Installation

3. Highlight Disk and CD-ROM Drivers (e.g., IDEATA). Press **Enter** and load an additional driver. Then press the **INS** key. The system always defaults to the **A:** path. Highlight the HAM driver and press **Enter**. Select **Yes** to save and move the driver into the operating system. Press **Enter**, the system will start to copy the files.
4. Load a separate instance of the driver for every Adaptec SCSI controller channel or host adapter present in the system. Load the Adaptec SCSI driver twice with different slot number from *STARTUP.NCF* file as follows:
load ADPT160M.HAM Slot=10012
load ADPT160M.HAM Slot=10013
5. When prompted for a slot number, accept the slot numbers displayed. Make sure to write these slot numbers down for future reference.
6. When asked to edit the *STARTUP.NCF* file, make sure that the **ADPT160M.HAM** is loaded once for each Adaptec controller SCSI channel present in the system. Add the statement **SLOT=<slot number>** to each load line in the *STARTUP.NCF*, by specifying the slot numbers written down in step 5 above, with only one slot number per load instance.

II. Intel® 82550 Network Driver Installation

A. *Preparing Intel 82550 LAN Driver Diskette*

1. Use the self-extracting image files.

For the Intel(R) PRO/100 Server Adapter driver, the executable file is located here:

\Drivers\Lan\makedisk\makenw.bat

2. Use the manual to create driver diskette.

If you need to use a floppy disk to install the on-board Intel 82550 network adapter drivers, use the **MAKEDISK.BAT** utility located in the **\Drivers\LAN\MAKEDISK** directory on ASUS Driver Support CD.

MAKEDISK [operating system] [destination]

5. OS Driver Installation

where **[operating system]** is the OS for which you are creating the diskette, and **[destination]** is the drive letter and path (such as A:). If no destination is specified, the A: drive will be used.

The possible **[operating system]** options are:

NT = Microsoft Windows NT

W2K = Microsoft Windows* 2000

NW = Novell NetWare servers and clients

Make sure you have a 1.44 MB formatted, non-bootable diskette in the floppy drive when using this utility.

B. NetWare 4.XX and 5.X Installations

1. Prepare the Intel(R) PRO/100 Server Adapter driver from previous section.
2. Install NetWare 4.xx or 5.x according to the NetWare instructions.
3. When the NetWare installation procedure prompts you for a Network Driver, insert the Intel PRO/100+ driver diskette into drive **A:** Then use the **INS** key to select an unlisted driver. A dialog box appears. The “**CE100B.LAN — Intel 8255X PCI Adapter (CHSM spec 1.11)**” driver appear as a selection.

CAUTION: If the “Loader could not find public symbol: <symbol name>” error message prompted when system is loading Intel Pro/100+ PCI network driver, it’s because the related network driver modules are too old. User must download the latest Netware Support Pack from Novell web site at:

<http://support.novell.com/products/nw411/patches.htm>

(For example: the support pack for NetWare 4.11)

4. Installation of the Intel 82550 Network Adapter for NetWare 5.x or 4.xx is complete.

Add or check the load and bind statements you need to the server’s AUTOEXEC.NCF file so the PRO/100+ adapter driver loads automatically load and bind the server driver as follows:

LOAD CE100B SLOT=x FRAME=ETHERNET_802.2

BIND IPX TO CE100B NET=xxxxxxxx

5. OS Driver Installation

Where: SLOT=x Specifies the NBI (NetWare Bus Interface) slot number. Substitute x with the valid value for the adapter. You will be prompted with the slot number(s) of installed PRO/100+ adapters. The NBI numbers are different from the slot number indicated in the SETUP.EXE utility.

NET=xxxxxxx is the unique network address for that LAN segment. The default frame type is 802.2. If your workstation needs to use the 802.3 frame type, see the section later in this document about using multiple frame types on one adapter.

III. ATI® Rage XL Display Driver Installation

User can select the “Super VGA” for the X Server on NetWare 5.x server system. The other NetWare system didn’t support X Server and user didn’t need the VGA driver support.

5. OS Driver Installation

5.5 SCO OpenServer 5.0.x

I. Adaptec® SCSI Driver Installation

SCO Open Server 5.0.x does not include the drivers for the Adaptec SCSI controller. You must create a driver disk prior to SCO OpenServer installation.

NOTE: Prepare one blank formatted high density floppy disk. Label the disk “Ultra160 FMS v1.11 for SCO Unixware 2.1x Setup Disk” or “Ultra160 FMS v1.11 for SCO Unixware 7.x Setup Disk” or “Ultra160 FMS v1.11 for SCO OpenServer 5.0.x Setup Disk”.

A. Preparing an Adaptec Driver Disk

1. Insert the ASUS TRL-DLS support CD into your CD-ROM drive.
2. Run the Adaptec Disk Creation Utility from the following path:

`\Drivers\Adaptec\fmsutil.exe`

3. Select **Ultra160 FMS 1.11** from the options that appear. Press Enter to display the following.



4. Select **SCO Unixware 2.1x, 7.x, OpenServer 5.0.x**. Press Enter.

5. OS Driver Installation



5. Select either “SCO Unixware 2.1x” or “SCO Unixware 7.x” or “SCO OpenServer 5.0.x”. Press Enter.
6. When prompted, insert the floppy disk that you labeled “Ultra160 FMS v1.11 for SCO Unixware 2.1x Setup Disk” or “Ultra160 FMS v1.11 for SCO Unixware 7.x Setup Disk” or “Ultra160 FMS v1.11 for SCO OpenServer 5.0.x Setup Disk”.
7. Press Enter and follow the succeeding screen instructions.

5. OS Driver Installation

II. Intel® 82550 Network Driver Installation

SCO OpenServer 5.0.6 system can correctly recognize Intel 82550 network controller during installation. You don't need to load or modify the network driver for the onboard LAN device.

You can find the Intel 82550 Network driver from ASUS TRL-DLS support CD at

\Drivers\Lan\UNIX\SCO5

Instructions for Installing the eeE Driver for SCO OpenServer

1. Copy the `eee.vol` file to any directory, say `/tmp`, on the SCO system, renaming the file as **VOL.000.000**. Also, make the file read-only by using `'chmod'`.

For example,

```
# cp eee.vol /tmp/VOL.000.000
# chmod 444 /tmp/VOL.000.000
```

2. If there is an older version of the eeE driver on the system, you must first remove it. To do this, run `'netconfig'`. Remove all instances of the "Intel ..." adapters. Exit `netconfig` without opting to relink the kernel.
3. Install the new driver using **'custom'**. When asked for the installation media, choose **'media images'**, and type the directory path to the `VOL.000.000` file. (In step 1, if you copied it to `/tmp`, type `'/tmp'`). After the installation of the driver is complete, exit `'custom'`.
4. Run **'netconfig'** and add the adapters. For each adapter that is present in the system, enter the appropriate TCP/IP parameters. By default, the driver automatically detects the line speed and duplex mode. If you want to force any of these settings, choose `'Advanced Options'` and set the speed and duplex modes. Exit `'netconfig'` and choose to relink the kernel.
5. Reboot the system. At the command prompt, type:

```
# reboot (or init 6)
```

III. ATI® Rage XL Display Driver Installation

SCO OpenServer 5.0.6 system can correctly recognize ATI Rage XL graphic controller (ATI RAGE PRO/LT-PRO/XL/Mobility P/M/M1) during installation. You don't need to load or modify the video driver for the onboard VGA device.

5. OS Driver Installation

5.6 Linux RedHat 7.x

I. Adaptec® SCSI Driver Installation

The Linux RedHat 7.2 comes bundled with Adaptec AIC7899W Ultra SCSI driver.

II. Intel® 82550 Network Driver Installation

Linux RedHat 7.x system can correctly recognize Intel 82550 network controller during installation. User doesn't need to load or modify the network driver for the onboard LAN device.

III. ATI® Rage XL Display Driver Installation

The RedHat 7.x system can correctly recognize ATI Rage XL graphic controller (ATIRAGE PRO/LT-PRO/XL/Mobility P/M/M1) during installation. You don't need to load or modify the video driver for the onboard VGA device.

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