PC Specialist's Handbook

ErgoPro

e368-series

Edition 1, Release 1 - December 1998

FUJITSU

FUJITSU ErgoPro e368-Series PC Specialist's Handbook

Document number PM03354EA

This document was produced by Fujitsu Computers in Helsinki, Finland.

We welcome and consider all comments and suggestions. Please send them to:

International Technical Support
Fax : +358 0 569 6609
Internet : PSD-HELPDESK@FUJITSU.FI
Team Office : HELPDESK PSD/ITS

LITHIUM BATTERY

Danger of explosion if battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer's instructions. Dispose of used batteries according to the manufacturer´s instructions.

Eksplosionsfare ved fejlaktig håndtering. Udskiftning må kun ske med batteri af samme fabrikat og type. Lever det brugte batteri tilbage til leverandøren.

Paristo voi räjähtää, jos se on virheellisesti asennettu. Vaihda paristo ainoastaan laitevalmistajan suosittelemaan tyyppiin. Hävitä käytetty paristo valmistajan ohjeiden mukaisesti.

Eksplosionsfare. Ved udskifting benyttes kun batteri som anbefalt av apparatfabrikanten. Brukt batteri returneres apparat leverandøren.

Explosionsfara vid felaktigt batteribyte. Använd samma batterityp eller en ekvivalent typ som rekommenderas av apparattillverkaren. Kassera använt batteri enligt fabrikantens instruktion.

Danger d'explosion en cas de remplacement incorrect de la batterie. Remplacer uniquement avec une batterie de même type ou d'un type recommendé par le constructeur. Jeter les batteries usagées conformément aux instructions du fabricant.
Explosionsgefahr bei unsachgemässigem Austausch der Batterie. Ersatz nur durch denselben oder einen vom Hersteller empfohlenen gleichwertigen Typ. Entsorgung gebrauchter Batterien nach Angaben des Herstellers.

Table of contents

Section 1 : Servicing the unit

Section 2 : System Board & Jumper settings

Section 3 : System setup

Section 4 : Miscellaneous & Hints

Section 5 : Power-on test & error indications

Section 6 : Input, Output & Special functions

Section 7 : Pin assignments

Section 8 : Machines identification

Section 9 : Specification tables and Memory tables

Section 10 : Spare parts table

List of pictures

List of tables

Section 1 :

Disassembling the system units

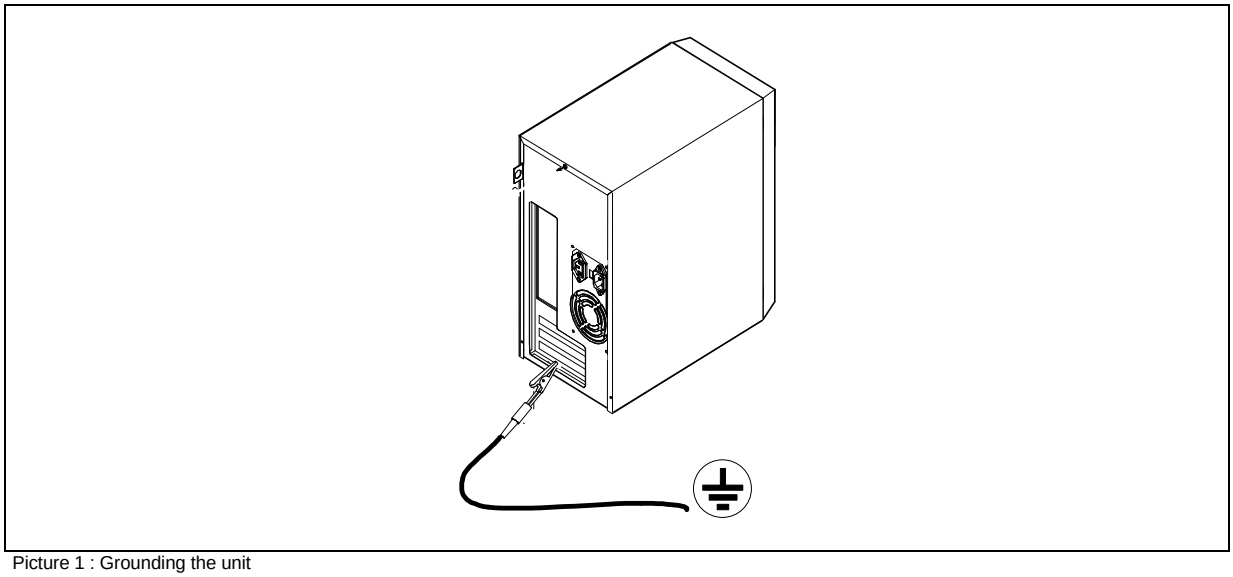
Common procedures

Grounding yourself

Note Even if the power has been turned off from the PC, as long as the mains cable is connected to the PSU (and power is provided) the +5 StandBy voltage is provided to the system for some crucial components. Therefore hardware is sensitive to static electricity.

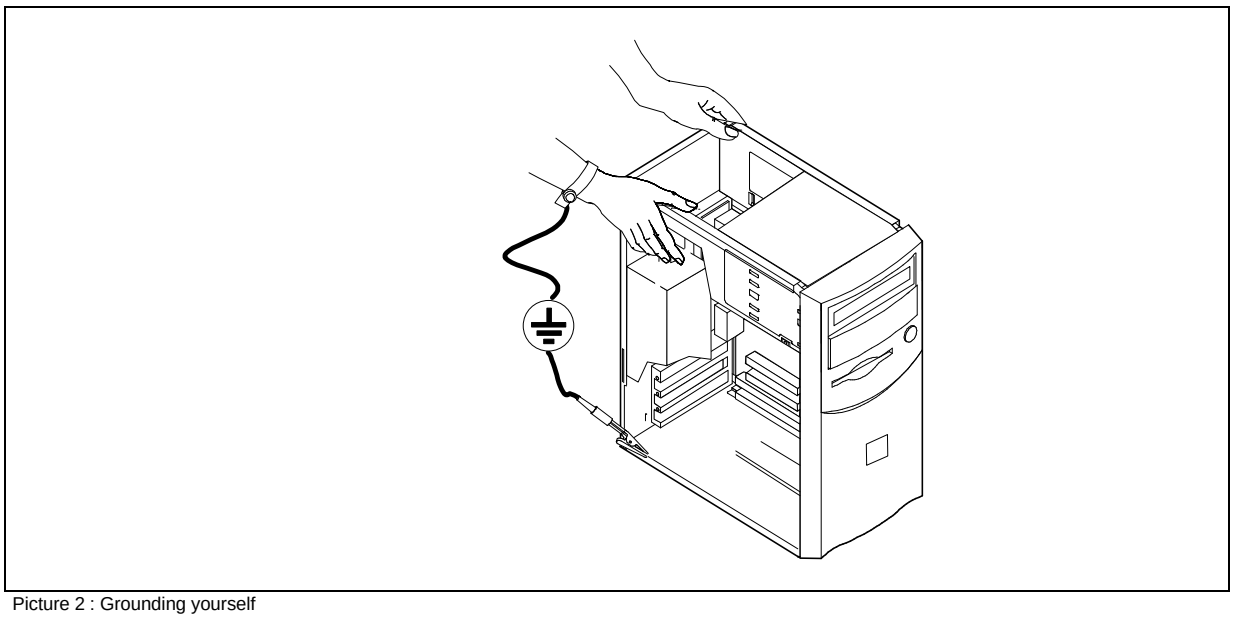
Before touching circuit boards or other devices inside the system unit, be sure to get rid of any static charge you may have by grounding yourself properly. At a minimum, before touching a circuit board, first touch the metal part of the chassis. However, there is a safer way to do this, and the following describes how you should ideally ground yourself :

1. Connect the metal chassis of your computer to a grounded metal object such as a radiator:



Picture 1 : Grounding the unit

2. Ground yourself to any grounded metal object by first attaching a wrist strap made for this purpose around your wrist and then to the metal object:



Picture 2 : Grounding yourself

3. Now you can touch the devices inside your system unit.

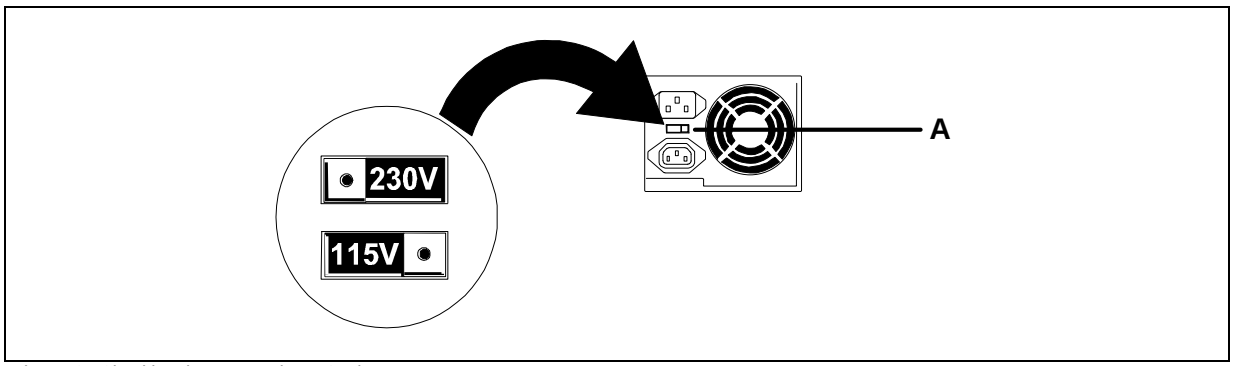
Checking the Input Voltage Setting

A 90 W Power Supply Unit (PSU) in e368-series is integrated into the chassis to provide power for the system board, add-in cards, and peripheral devices. A switch (A) on the system rear panel can be used to set the power supply to operate at:

115 V AC (in the range of 90 - 135 V AC), or

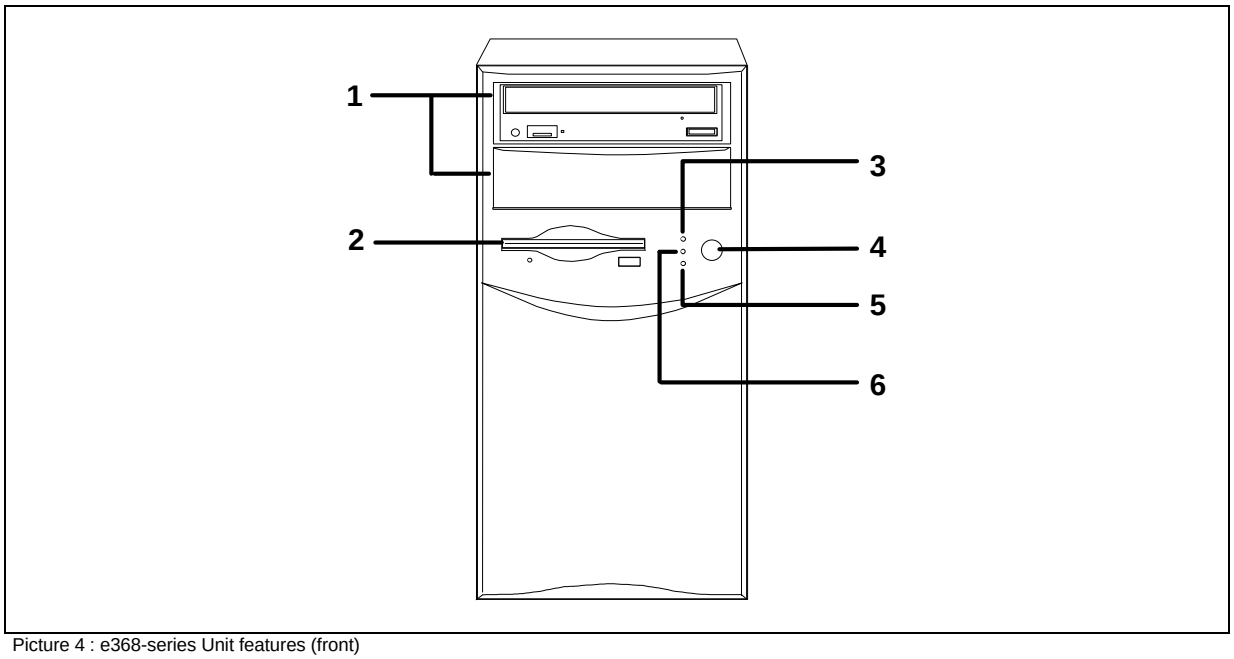
230 V AC (in the range of 180 - 265 V AC)

To verify that your system has the correct setting for your environment, check the input power selection switch.



Picture 3 : Checking the Input Voltage Setting

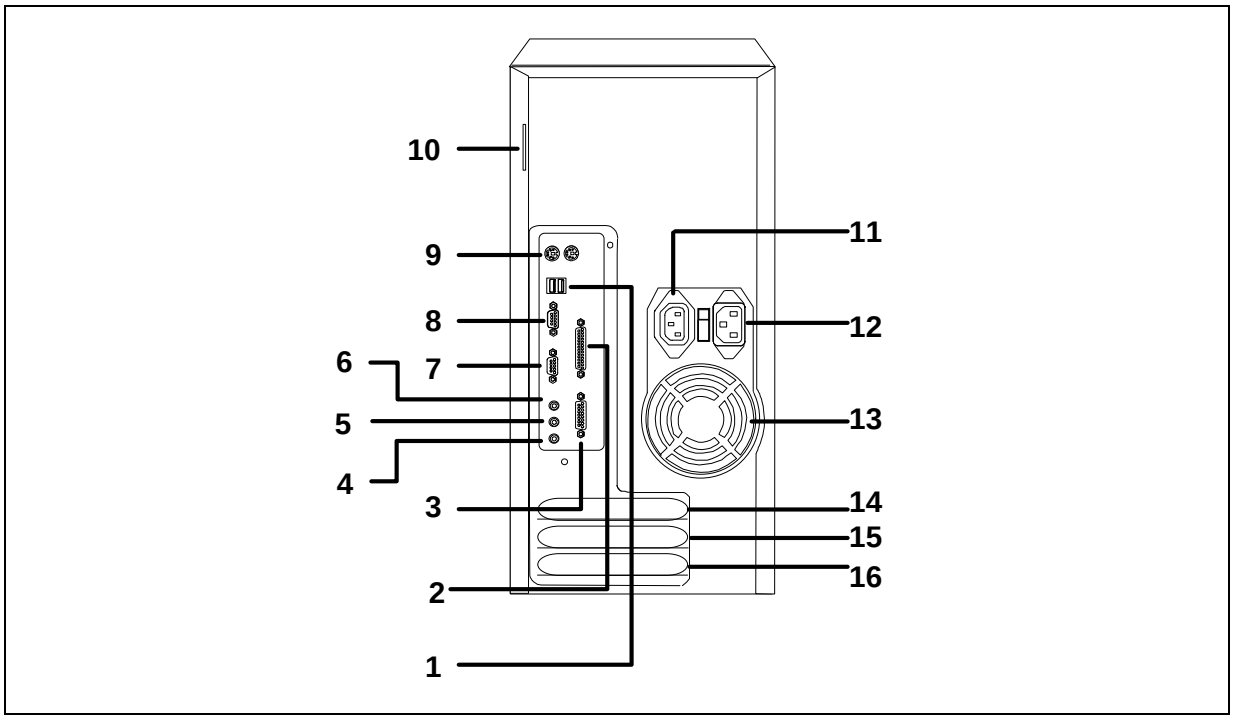
Unit features (front)



Picture 4 : e368-series Unit features (front)

1	5,25” device bay	4	Power On/Off switch
2	3,5” Floppy drive	5	Power save LED (Orange)
3	HDD activity LED (Green)	6	Power On LED (green)

Unit features (rear)



Picture 5: e368-series Unit features (rear)

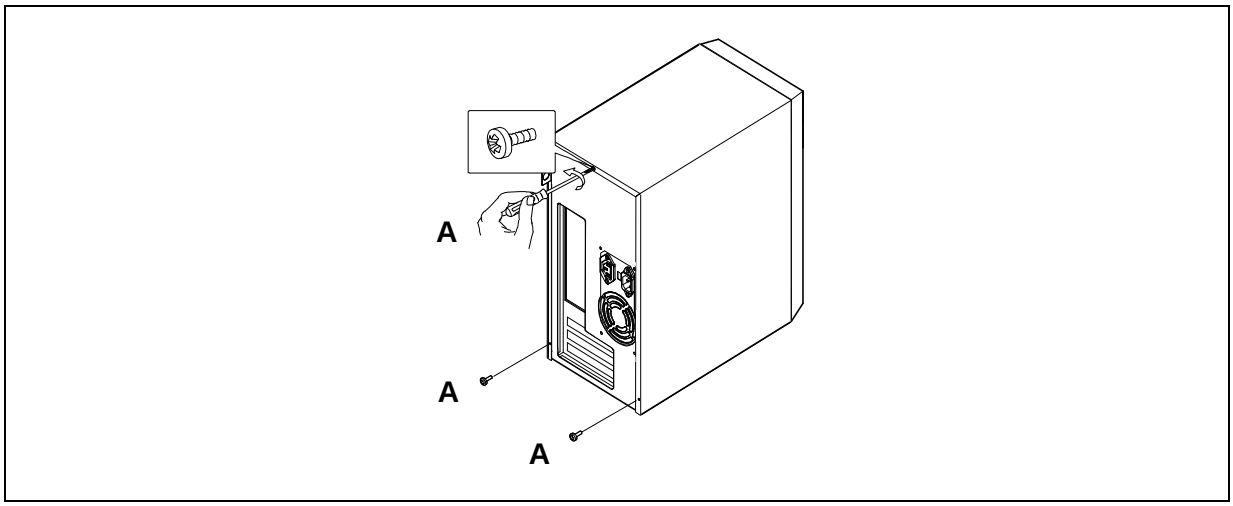
1	USB connectors	9	PS/2 Keyboard port and Mouse port
2	Parallel port	10	Cover lock loop
3	MIDI/Joystick port	11	Power Out for display
4	Mic In	12	Main In
5	Line In	13	Fan (Airflow direction : blows out)
6	Line Out	14	PCI slot
7	Video connector	15	Shared PCI/ISA slot
8	Serial port 1	16	ISA Slot

Opening the system unit cover

Note: **Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.**

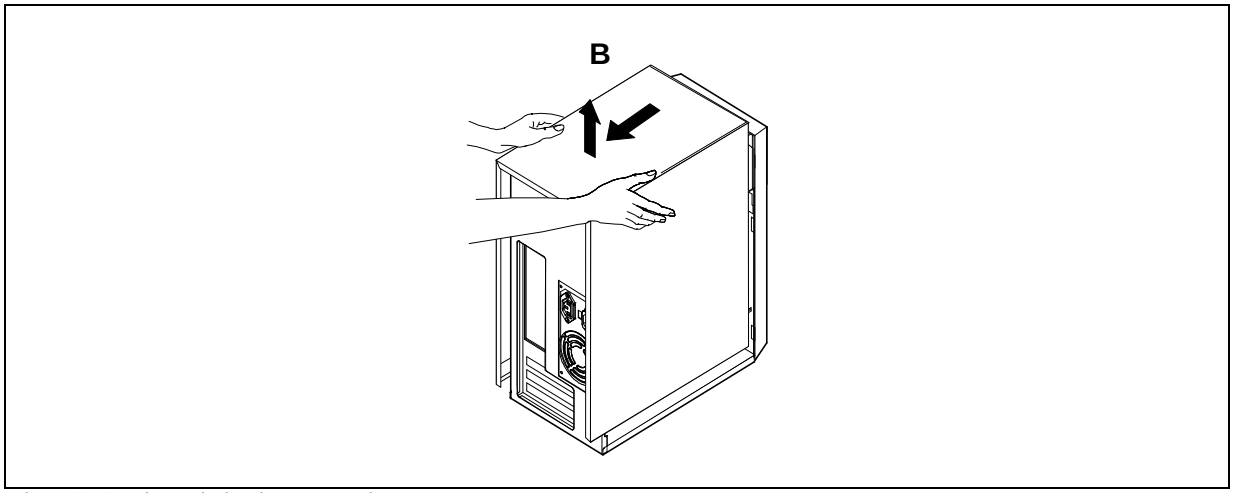
To open the system unit cover, do as follows :

1. Turn off the display unit, system unit (shutting down the Operating System properly before), and all other separately powered attached units.
2. Unplug the power cables of the system unit and other attached cables from their outlets.
3. Remove the upper screw (A) at the rear, and if installed, two other screws (A), too.



Picture 6 : Opening & closing the system unit cover

4. Slide the cover about 30 mm (B) backwards from the front panel of the system unit, and lift it straight up.



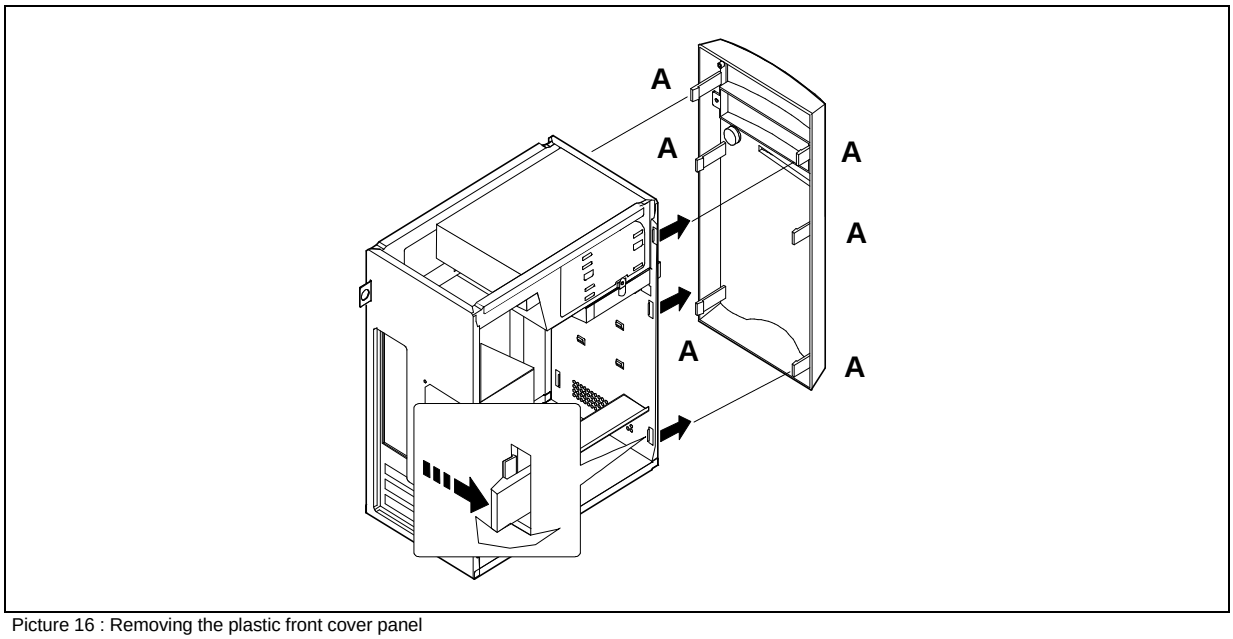
Picture 6 : Opening & closing the system unit cover

Removing the plastic front cover panel

Note: **Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.**

To remove the plastic front cover panel, do as follows :

1. Remove the system unit cover (see page 1-6).
2. Locate the six plastic hooks (A) securing the plastic front cover panel in its place.
3. Gently release each plastic hook from its slot in the chassis (B).
4. Pull the cover off (C).



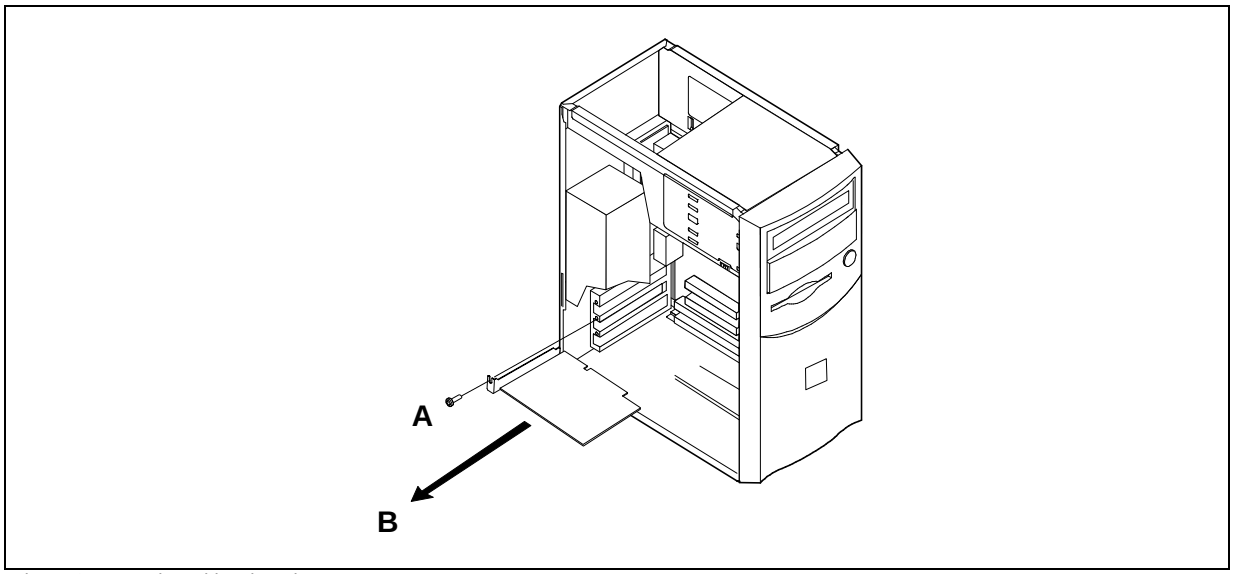
Picture 16 : Removing the plastic front cover panel

Removing an add-on board

Note: **Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.**

To remove an add-on board (i.e LAN adapter), do as follows:

1. Remove the system unit cover (see page 1-6)
2. Disconnect possible cables from the adapter.
3. Remove one screw (A) that holds the add-on board in expansion slot.
4. Pull the add-on board from expansion slot with care (B).



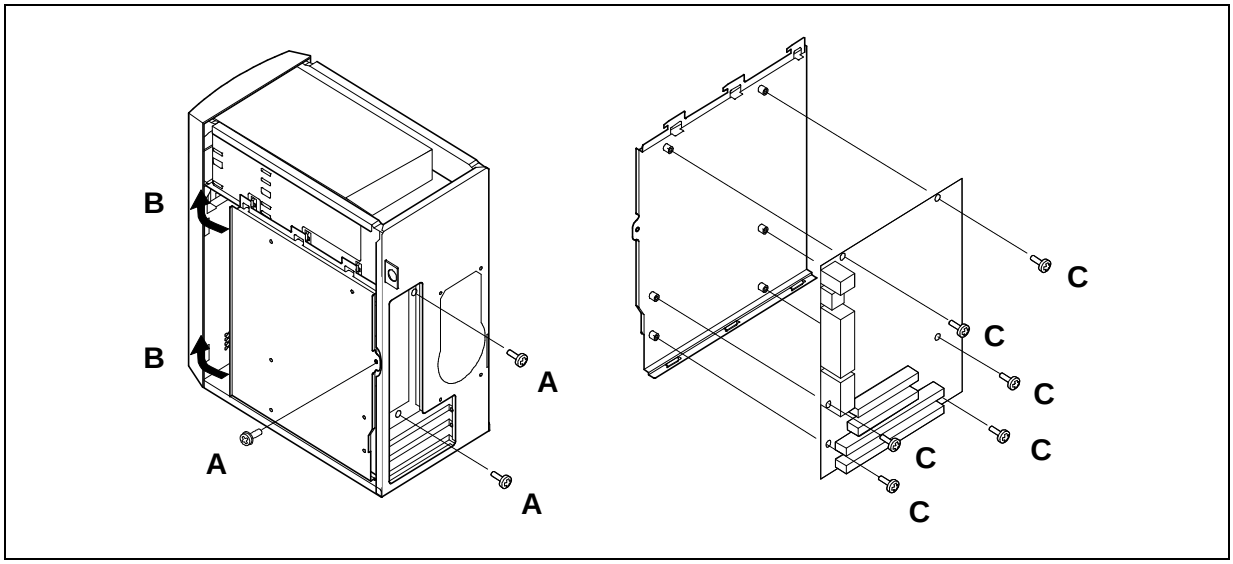
Picture 9 : Removing add-on board.

Removing the system board

Note: **Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.**

To remove the system board, do as follows :

1. Remove the system cover (see page 1-6).
2. If there are any additional add-on boards installed, remove the add-on boards (see page 1-8).
3. Disconnect **all data and power cables** from system board.
4. Disconnect **all cables from additional add-on boards.**
5. The system board is attached to the metal base plate. Remove the 3 screws (A) which secure the plate to the system unit.
6. The metal base plate has six metal hooks fitting into the slots in the system unit. Slide the base plate towards the front of the system unit (B) until you are able to lift the plate out of the chassis.
7. Remove the six screws (C) and detach the system board from the plate.



Picture 12 : Removing the system board

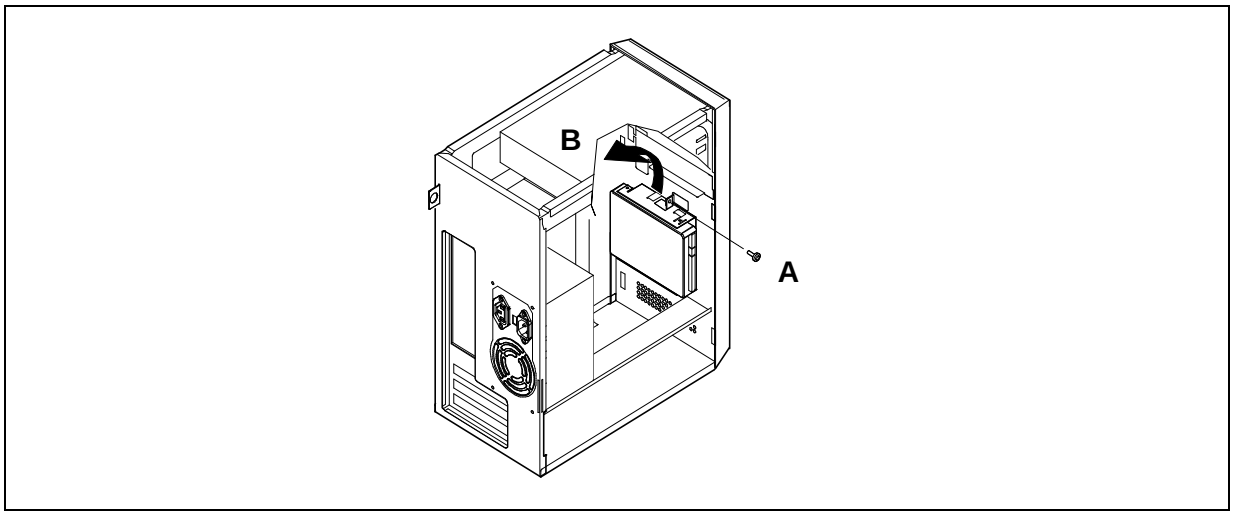
Removing a Hard Disk drive

Note: **Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.**

If you have installed a CD-ROM, a Hard Disk or replaced an existing floppy drive, check the parameters in the SETUP.

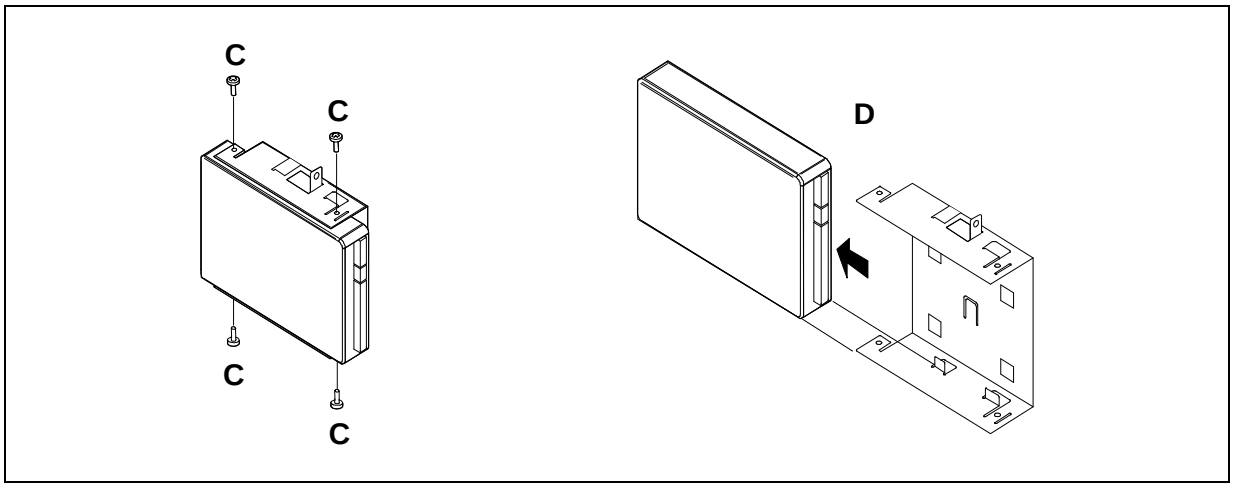
To remove the Hard Disk drive, do as follows :

1. Remove the system unit side cover (see page 1-6).
2. Disconnect the power and data cables from the HDD. which is located in the non-front accessible 3.5" carriage frame (A).
3. Remove the screw (A) securing the 3.5" carriage frame.
4. The 3.5" carriage frame is held in its place with the four hooks on the front panel. Slide the carriage frame upwards until you are able to lift it out (B).



PIcture 13 : Removing a Hard Disk drive

5. The hard disk drive is fastened to the drive carriage frame with four screws (C). Remove the screws (C) and slide the drive out of the carriage frame (D).



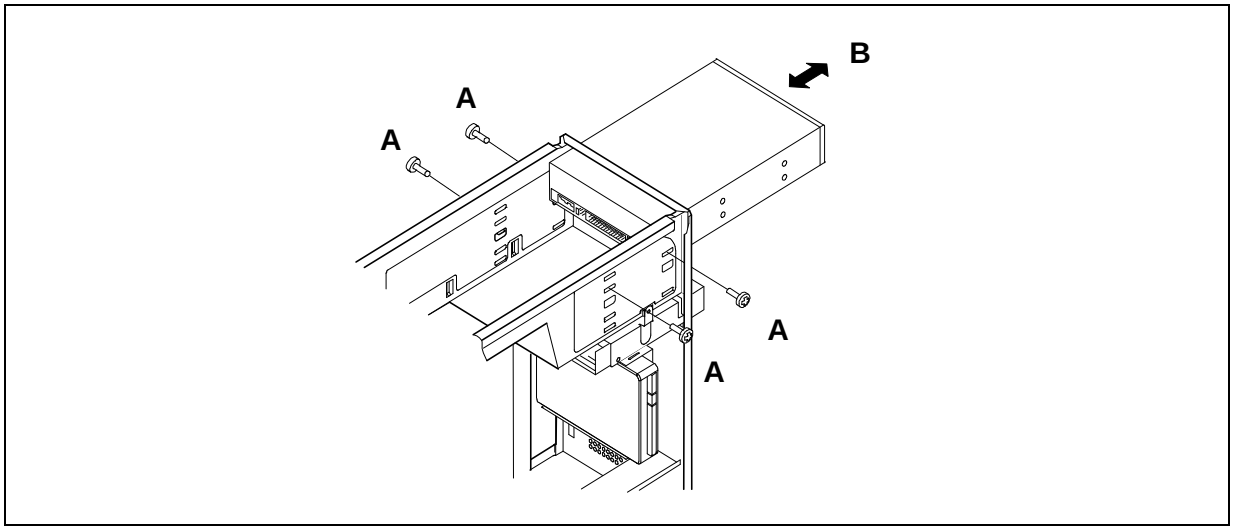
Removing the CD-ROM drive

Note: Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.

If you have installed a CD-ROM, a Hard Disk or replaced an existing floppy drive, check the parameters in the SETUP.

To remove the CD-ROM drive, do as follows :

1. Remove the system unit cover (see page 1-6).
2. Remove the plastic front cover panel (see page 1-7).
3. Disconnect the power, data and audio cables from the CD-ROM, which is located in the 5.25” bay.
4. Open four screws (A) that hold CD-ROM drive both side of the 5,25” device bay.



Picture 14: Removing the CD-ROM drive

5. Push CD-ROM drive towards to, or backwards to, the plastic front cover panel of the system unit (B) and pull it off.

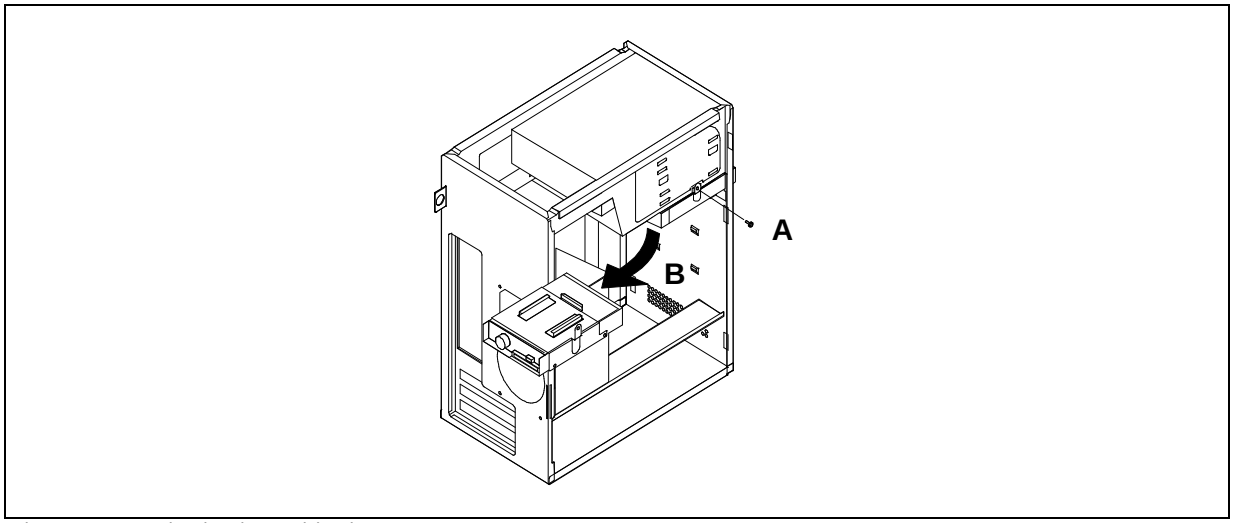
Removing the Floppy Disk Drive

Note: **Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.**

If you have installed a CD-ROM, or replaced an existing floppy drive, check the parameters in the SETUP.

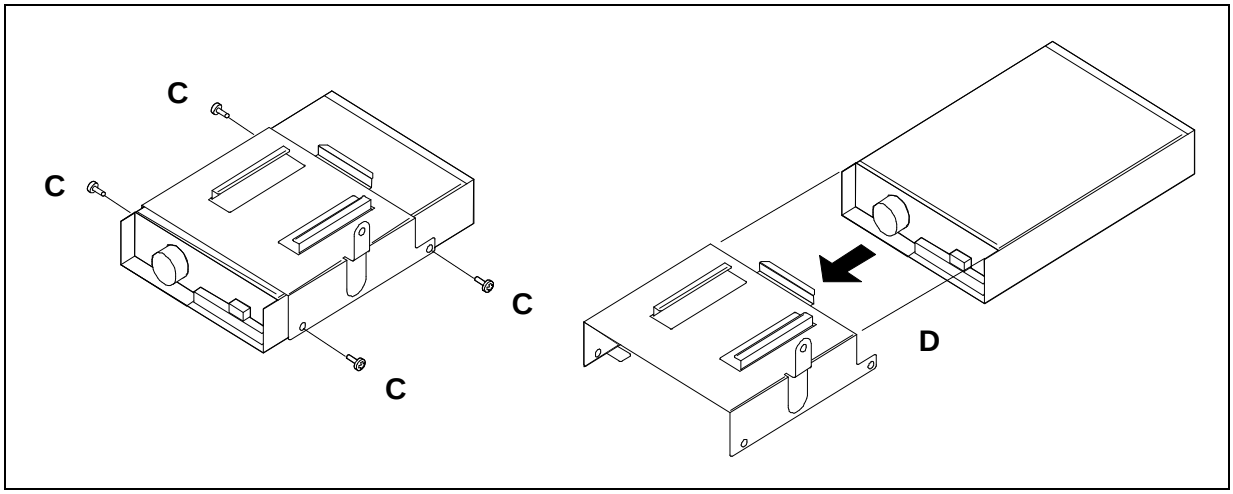
To remove the Flopppy Disk drive, do as follows:

1. Remove the system unit side cover (see page 1-6).
2. Remove the plastic front cover panel (see page 1-7).
3. Disconnect the power and data cables from the floppy disk drive, which is located in the front accessible, removable 3.5” carriage frame.
4. The floppy disk drive is fastened into a removable 3.5” carriage frame . Remove the screw (A) that secures the carriage frame to the chassis.
5. The carriage frame is now held in its place by the two metal rails on the top of the frame and the two matching rails on the bottom of the 5.25” device bay. There is also a metal hook which fits into the slot on the front of the chassis. Pull the carriage frame out (B).



Picture 17 : Removing the Floppy Disk Drive

6. The floppy disk drive is fastened to the carriage frame with four screws. Remove the screws (C) and slide the drive out of the carriage frame (D).



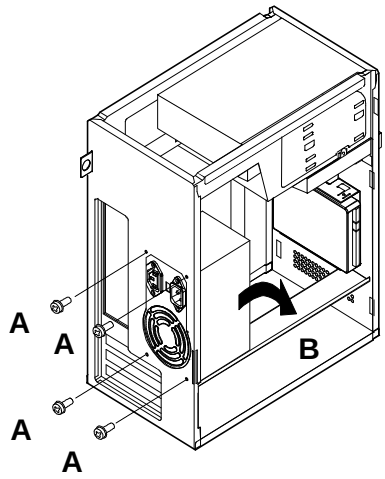
Picture 18 : Removing the Floppy Disk Drive

Removing the Power Supply Unit

Note: **Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.**

To remove the Power Supply Unit, do as follows:

1. Remove the system unit side cover (see page 1-6).
2. Disconnect power cables from the System board and other devices.
3. Remove three screws (A) that holds the Power Supply Unit from behind of the system unit.
4. Lift the Power Supply Unit out of the system unit (B).



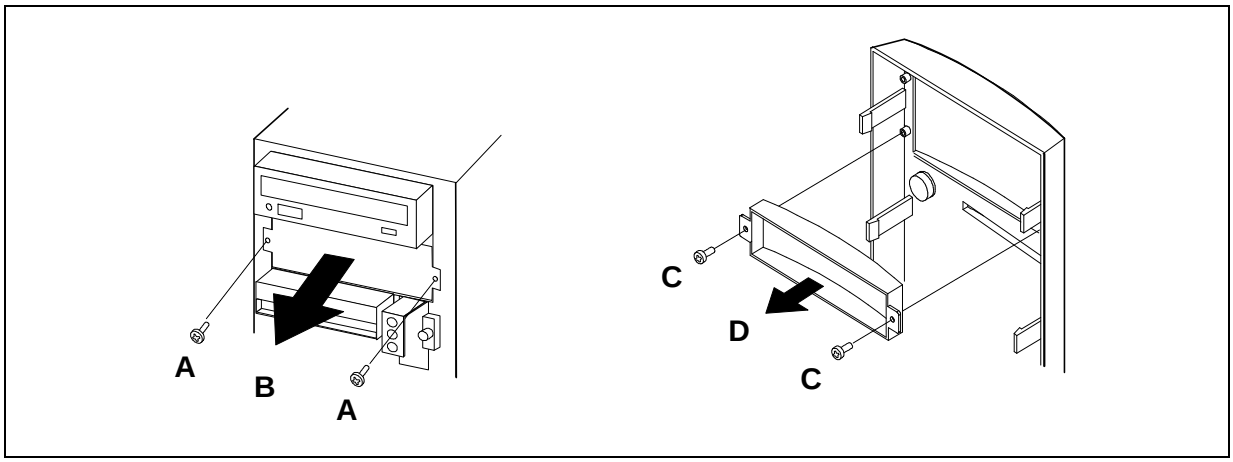
Picture 19 : Removing the Power Supply Unit

Adding a 5.25" device

Note: **Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.**

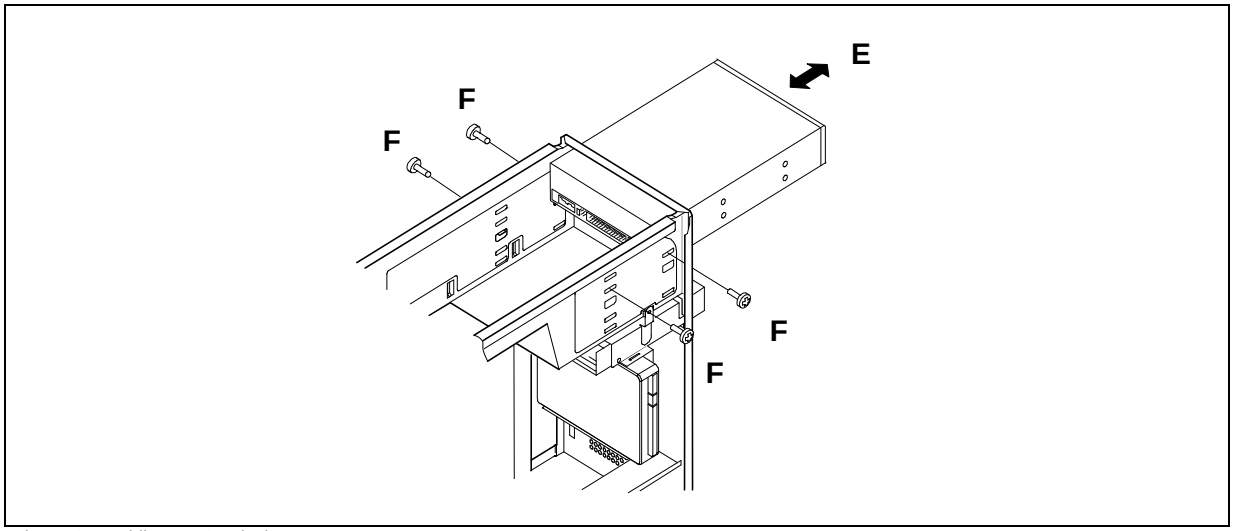
To add a 5.25" device in the unit (f.eg. a backup device), do as follows:

1. Remove the system unit side cover (see page 1-6).
2. Remove the plastic front cover panel (see page 1-7).
3. Remove the two screws (A) securing the metal cover plate in the front panel of the computer (B).
4. Remove the plastic cover plate (D) from the front cover by removing the two screws (C) securing it.



Picture 20 : Adding a 5.25" device

5. Slide the device in the bay from the front of the chassis (E) and secure it with four screws (F).



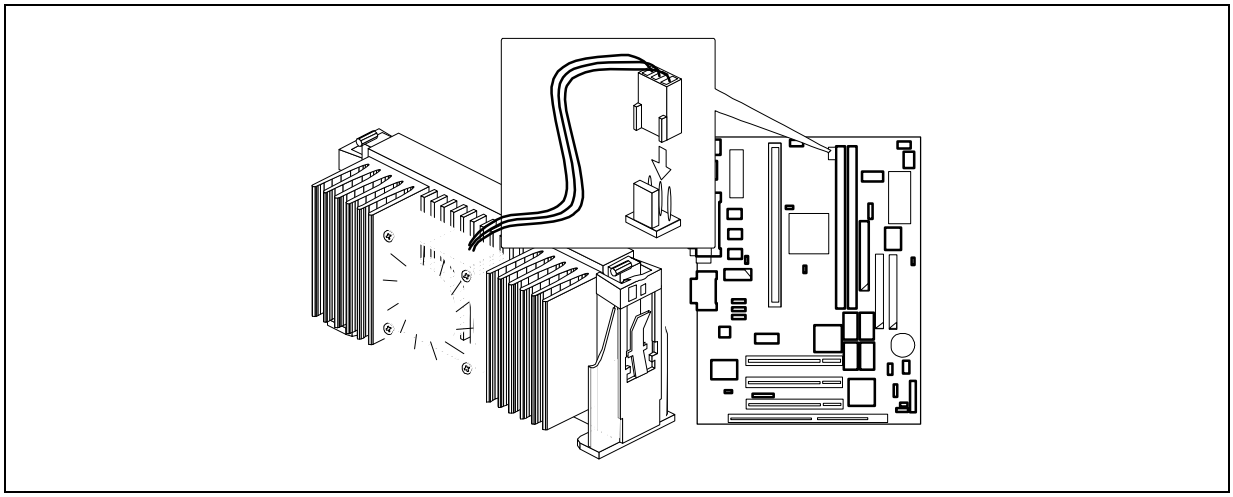
Picture 21 : Adding a 5.25" device

Removing a Pentium II processor

Note: Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.

To remove the processor, do as follows:

1. Remove the system unit side cover (see page 1-6).
2. Remove the power supply unit (see page 1-13).
3. Touch the metal chassis before touching the processor or system board. Keep part of your body in contact with the metal chassis to dissipate the static charge while handling the processor and avoid moving around needlessly.
4. Unplug the heatsink fan power cord from the system board, as shown in the picture below.
5. Locate the two release tabs at each end of the retention mechanism. Press the tabs inward until you are able to remove the processor from its slot, as shown in the picture below.



Picture 22 : Removing a Pentium II processor

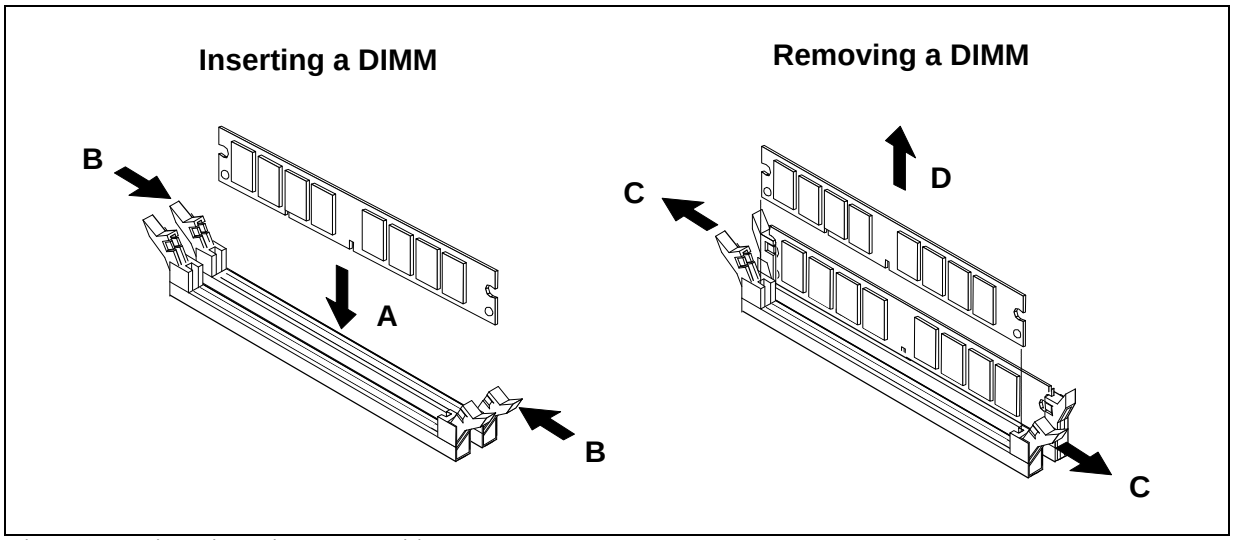
Note: When replacing the processor, always check the processor speed settings, i.e. jumper block SW1 (see page 2-4).

Adding or Removing a DIMM module

Note: **Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.**

To add a DIMM, memory module, do as follows:

1. Remove the system unit side cover (see page 1-6).
2. Touch the metal chassis before touching the DIMM module or system board. Keep part of your body in contact with the metal chassis to dissipate the static charge.
3. Holding the DIMM only by the edges, remove it from its antistatic package.
4. Place the DIMM into the socket (A) and secure it in place with the two plastic clips (B).



Picture 23 : Inserting and removing a DIMM module

To remove a DIMM, memory module, do as follows:

5. Gently spread the retaining clip (C) at each end of the DIMM, as shown above.
6. Holding the DIMM only by the edges, lift it away from the socket (D), as shown above.

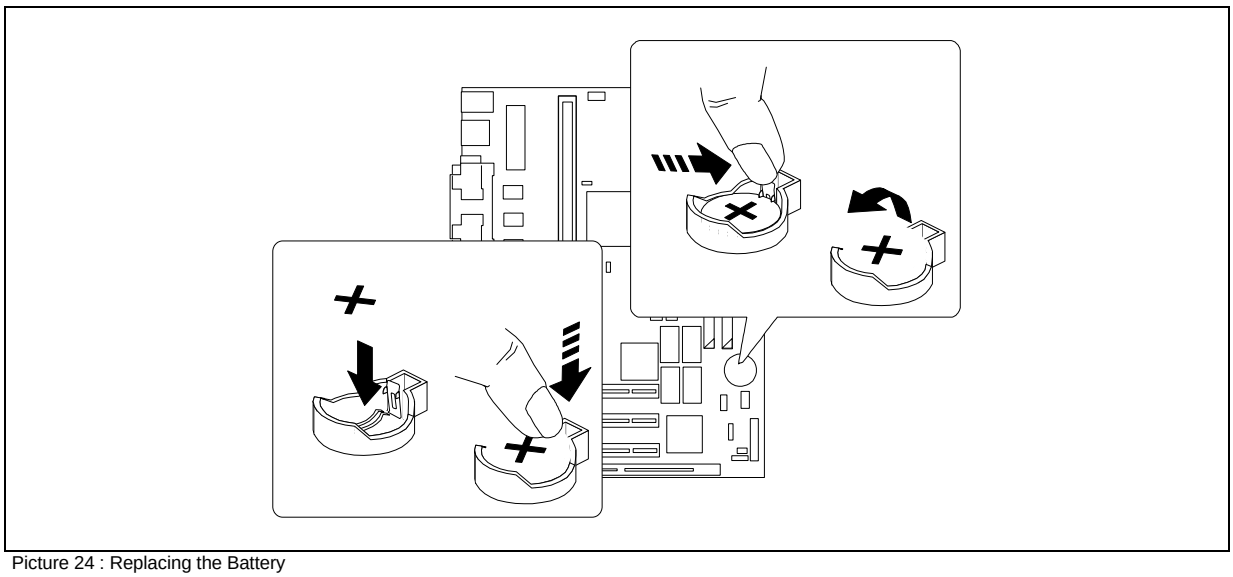
Replacing the battery

Note: **Always shut down the running applications and the operating system properly, turn the computer off and disconnect the power cable(s) before making any hardware changes.**

A lithium battery, installed in a socket on the system board, provides power for the real-time clock and CMOS RAM. If the battery fails, replace it with an equivalent battery (3 V Lithium Cell battery, Sony CR2032).

To replace the battery, do the following:

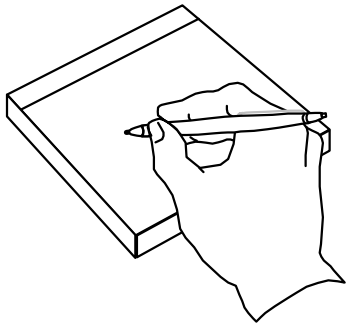
1. Remove the system unit side cover (see page 1-6).
2. Gently remove the battery from its socket. Note the "+" and "-" orientation of the battery.

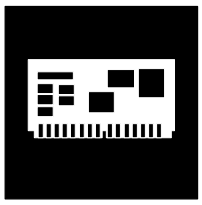


Picture 24 : Replacing the Battery

4. While installing the new battery, note the "+" and "-" orientation of the battery.

THIS PAGE IS INTENTIONALLY LEFT BLANK !

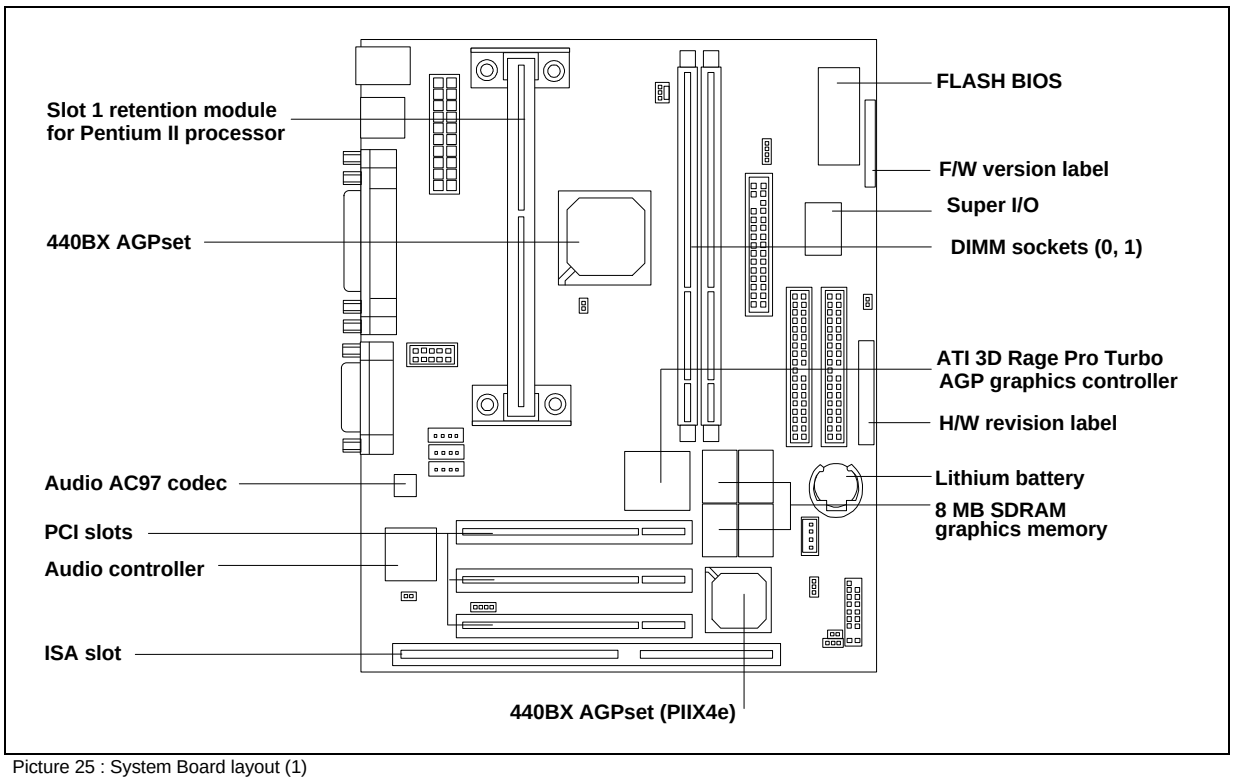




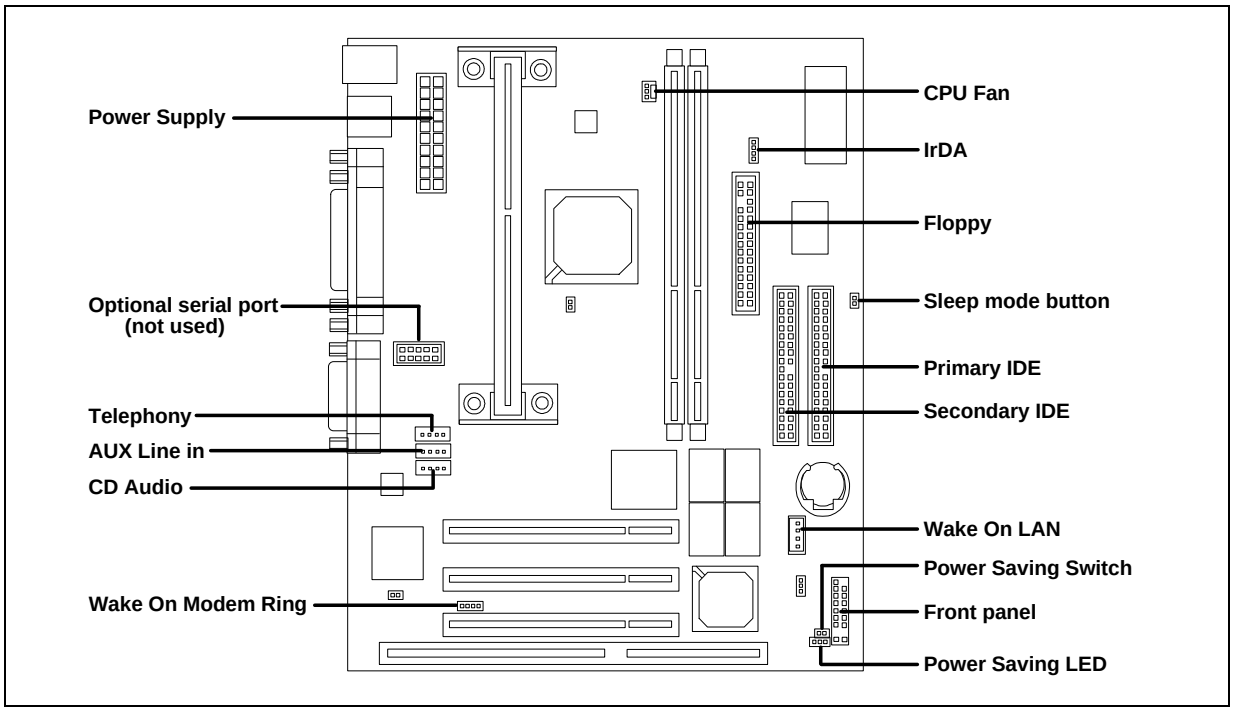
Section 2 :

Board
&
Jumper settings

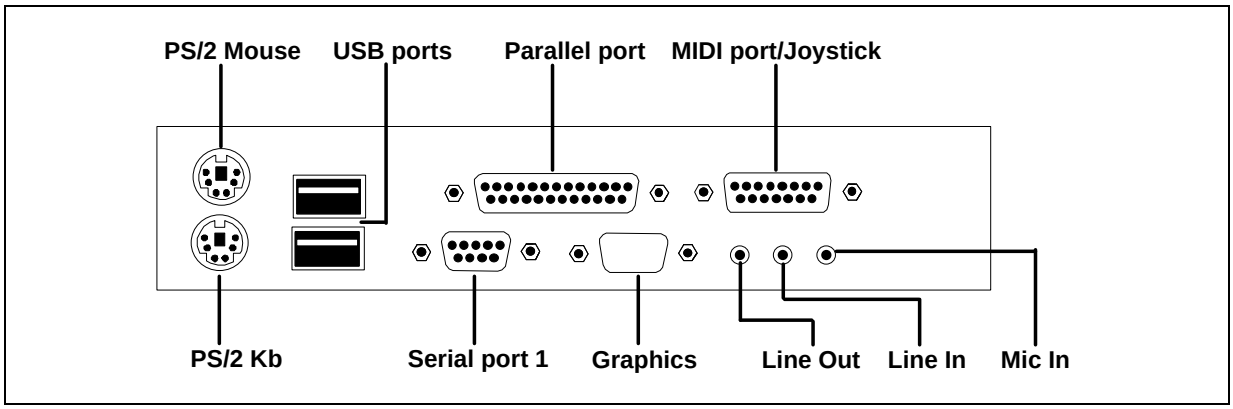
System Board layout



Picture 25 : System Board layout (1)



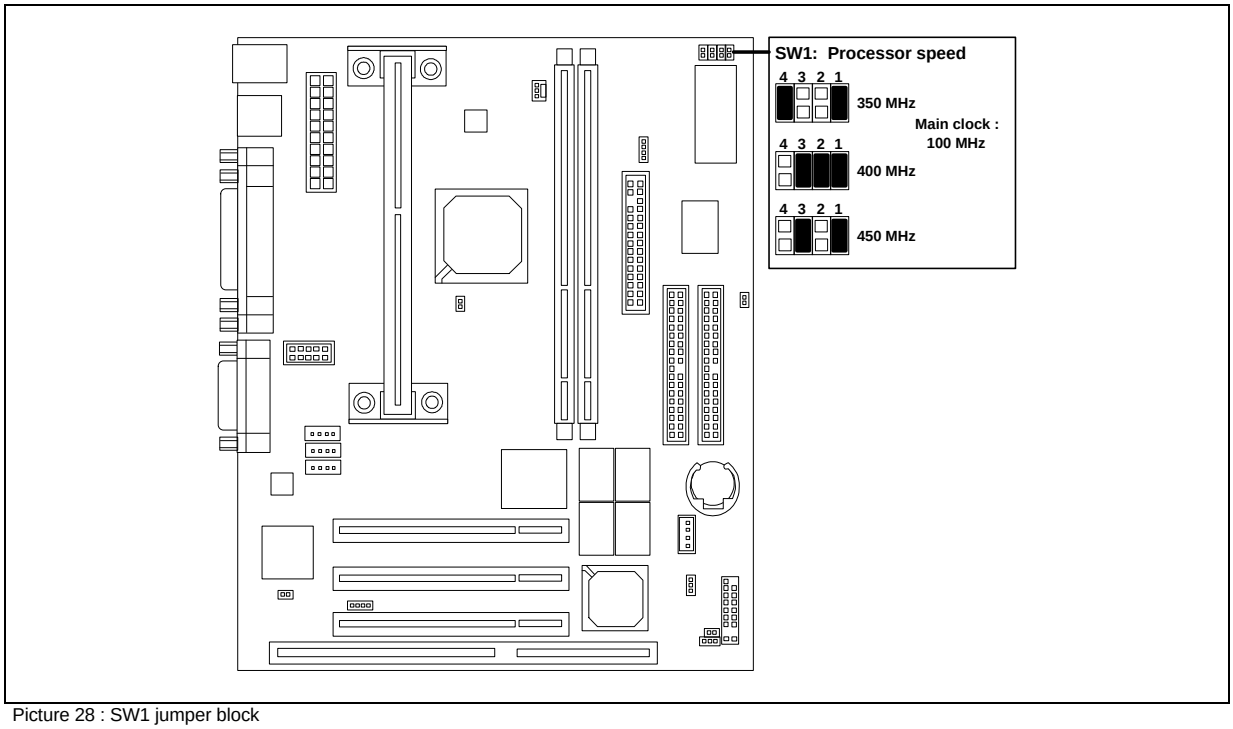
Picture 26: System Board layout (2)



Picture 27 : System Board rear connectors

Processor speed (SW1)

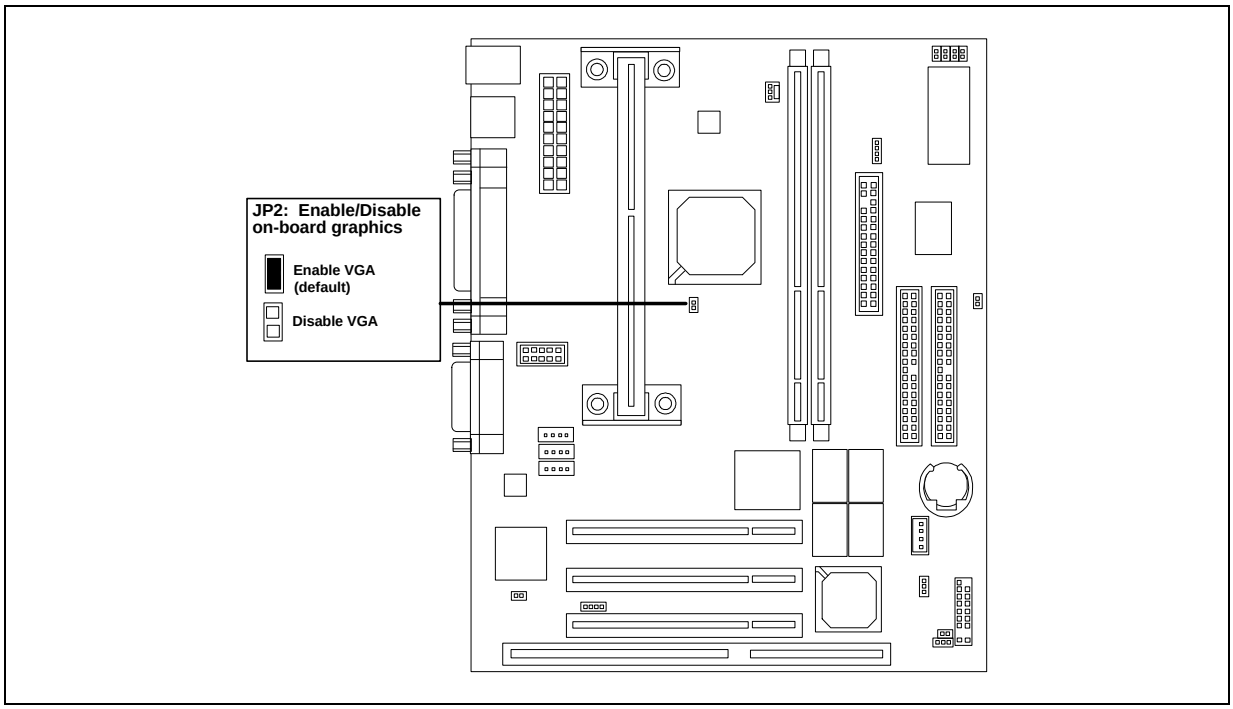
The processor clock speed for the Pentium II processor are set by jumpers in SW1 jumper block. Only 100 MHz speed of the Main clock is supported.



Picture 28 : SW1 jumper block

Enable/Disable on-board graphics (JP2)

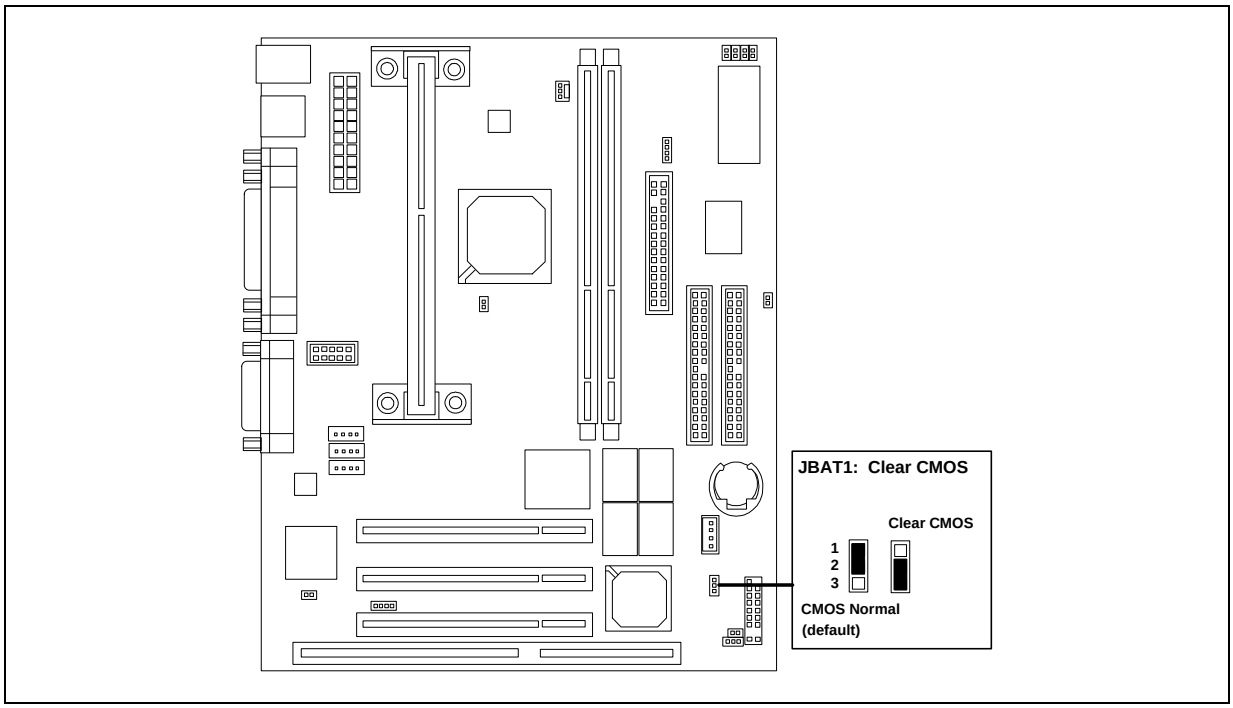
By removing the jumper JP2 the on-board graphics controller cam be disabled.



Picture 28 : JP2 Enable/Disable on-board VGA

CMOS Clear (JBAT1)

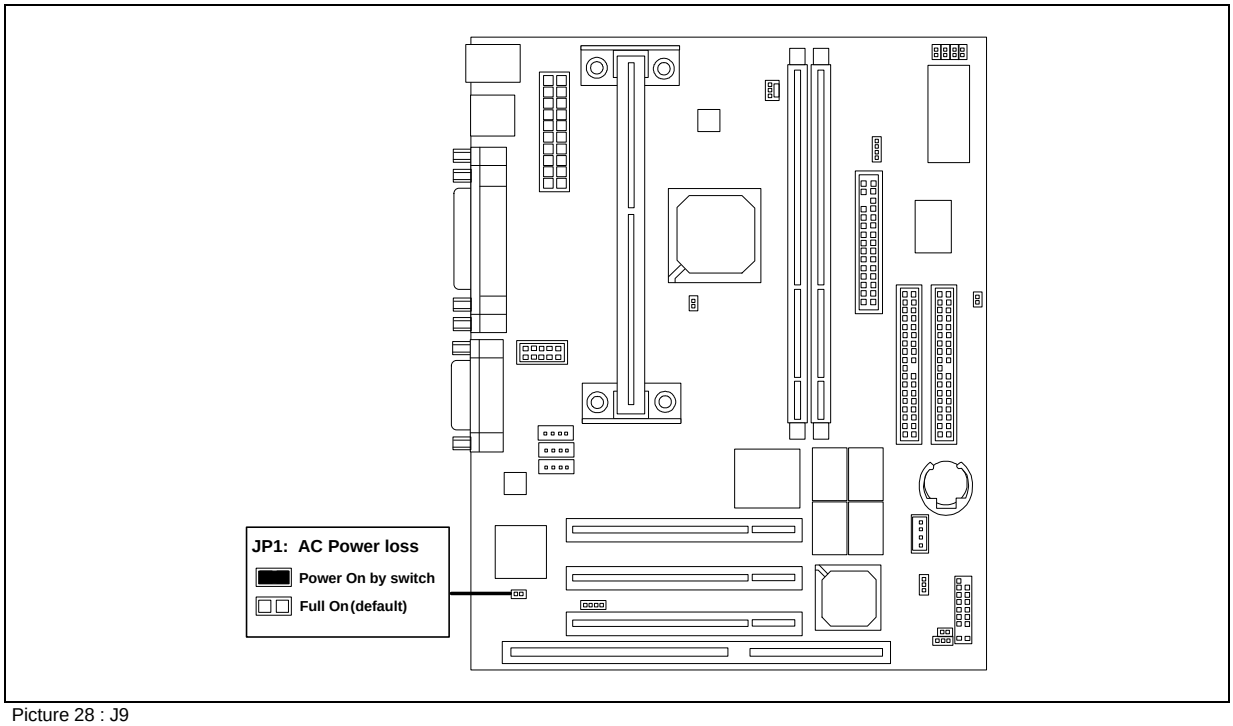
By jumper JBAT1 the contents of the CMOS RAM can be cleared. To clear the CMOS, switch off the power and disconnect the mains cable. Take out the jumper from normal operation position and install it in the clear CMOS position; keep it there for 10 seconds, then put the jumper back to normal operation position and reconnect the mains cable.



Picture 28 : JBAT1 Clear CMOS

AC Power Loss selection (JP1)

Controls whether the power is automatically switched on after AC loss.



Picture 28 : J9

System board front panel connectors

There is one connector (ie. bundled front panel cables) mounted to the system board's front panel connector and it includes the following functions/features:

Power Switch

This header supports the green mode function (power management) for the system board components. As a default it is closed (i.e. green mode is used).

HDD LED

This header is connected to the upper LED on the front panel. The LED will light when there is activity in the IDE HDD.

Power LED

This header is connected to the middle LED on the front panel. The LED will light when the computer is powered on.

Speaker

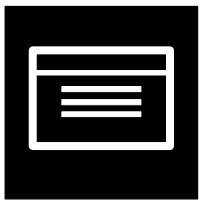
This header is reserved for the speaker. As a default, there is a speaker connected to this header.

Reset

When closing this header, a hardware reset is generatated. As a default, it is open.

Green function LED

This header is connected to the lower LED on the front panel. The LED will light when the computer is in power save mode.



Section 3 :

System Setup

Entering Resident Setup Utility (RSU)

Close all open files and leave your application program before entering Setup. You cannot exit back into an application. The system automatically reboots when you leave Setup.

Award's BIOS has a built-in Setup program that allows users to modify the basic system configuration. This type of information is stored in battery-backed CMOS SRAM so that it retains the Setup information when the power is turned off.

Power ON the computer and press <Del> immediately will allow you to enter Setup. If the message disappears before you respond and you still wish to enter Setup, restart the system to try again by turning it OFF then ON. You may also restart by simultaneously press <Ctrl>, <Alt>, and <Del> keys.

Control keys

Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item in the left hand
Right arrow	Move to the item in the right hand
Esc key	Main Menu - Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu - Exit current page and return to Main Menu
PgUp key	Increase the numeric value or make changes
PgDn key	Decrease the numeric value or make changes
F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 key	Change color from total 16 colors
F5 key	Restore the previous CMOS value from CMOS, only for Option Page Setup Menu
F6 key	Load the default CMOS value from BIOS default table, only for Option Page Setup Menu
F7 key	Load the default
F10 key	Save all the CMOS changes, only for Main Menu

Getting help

Main Menu

The on-line description of the highlighted setup function is displayed at the bottom of the screen.

Status Page Setup Menu / Option Page Setup Menu

Press F1 to pop up a small help window that describes the appropriate keys to use and the possible selections for the highlighted item. To exit the Help Window press <Esc>.

Main menu

Once you enter Award BIOS CMOS Setup Utility, the Main Menu will appear on the screen. The Main Menu allows you to select from nine setup functions and two exit choices. Use arrow keys to select among the items and press <Enter> to accept or enter the sub-menu. Default value of each menu entry, that is used in ErgoPro e368-series, is shown as **bold text** (in BIOS version 1.1).

Standard CMOS setup

This setup page includes all the items in standard compatible BIOS.

BIOS features setup

This setup page includes all the items of Award special enhanced features.

Chipset features setup

This setup page includes all the items of chipset special features.

Power management setup

This setup page includes all the items of Green function features.

PNP/PCI configuration

This setup page includes all the configurations of PCI & PnP ISA resources.

Load setup defaults

Setup Defaults indicates the value of the system parameters which the system would be in best performance configuration.

Integrated peripherals

This setup page includes all onboard peripherals.

Supervisor password

Change, set, or disable password. It allows you to limit access to the system and Setup, or just to Setup.

User password

Change, set, or disable password. It allows you to limit access to the system.

Save & exit setup

Save CMOS value settings to CMOS and exit setup.

Exit without saving

Abandon all CMOS value changes and exit setup.

Standard CMOS Setup menu

The items in Standard CMOS Setup Menu are divided into 9 categories. Each category includes no, one or more than one setup items. Use the arrows to highlight the item and then use the <PgUp> or <PgDn> keys to select the value you want in each item.

Date

The date format is <day>, <month> <date> <year>.

day	The day, from Sun to Sat, determined by the BIOS and is display-only
month	The month, Jan. Through Dec.
date	The date, from 1 to 31 (or the maximum allowed in the month)
year	The year, from 1994 through 2079

Time

The times format in <hour> <minute> <second>. The time is calculated base on the 24-hour military-time clock. For example, 1 p.m. is 13:00:00.

Primary HDDs / Secondary HDDs

The category identifies the types of hard disk from drive C to F that has been installed in the computer. There are two types: auto type, and user definable type. User type is user-definable; Auto type which will automatically detect HDD type. Default value is **Auto**.

Note that the specifications of your drive must match with the drive table. The hard disk will not work properly if you enter improper information for this category.

If you select User Type, related information will be asked to enter to the following items. Enter the information directly from the keyboard and press <Enter>.

CYLS.	Number of cylinders
HEADS	number of heads
PRECOMP	write precomp
LANDZONE	Landing zone
SECTORS	number of sectors

If a hard disk has not been installed select NONE and press <Enter>.

Drive A type / Drive B type

The category identifies the types of floppy disk drive A or drive B that has been installed in the computer. Default values are **1.44M;3.5 in.** for Drive A and **None** for Drive B.

None	No floppy drive installed
360K, 5.25 in.	5.25 inch PC-type standard drive; 360K byte capacity.
1.2M, 5.25 in.	5.25 inch AT-type high-density drive; 1.2M byte capacity (3.5 inch when 3 Mode is Enabled).
720K, 3.5 in.	3.5 inch double-sided drive; 720K byte capacity
1.44M, 3.5 in.	3.5 inch double-sided drive; 1.44M byte capacity.
2.88M, 3.5 in.	3.5 inch double-sided drive; 2.88M byte capacity.

Video

The category detects the type of adapter used for the primary system monitor that must match your video display card and monitor. Although secondary monitors are supported, you do not have to select the type in setup. Default is **EGA/VGA**.

EGA/VGA	Enhanced Graphics Adapter/Video Graphics Array. For EGA, VGA, SVGA, or PGA monitor adapters
CGA 40	Color Graphics Adapter, power up in 40 column mode
CGA 80	Color Graphics Adapter, power up in 80 column mode
MONO	Monochrome adapter, includes high resolution monochrome adapters

Halt on

The category determines whether the computer will stop if an error is detected during power up. Default is **All,But Keyboard**.

No Errors	The system boot will not stop for any error that may be detected
All Errors	Whenever the BIOS detects a non-fatal error the system will be stopped and you will be prompted
All, But Keyboard	The system boot will not stop for a keyboard error; it will stop for all other errors
All, But Diskette	The system boot will not stop for a disk error; it will stop for all other errors
All, But Disk/Key	The system boot will not stop for a keyboard or disk error; it will stop for all other errors

Memory

The category is display-only which is determined by POST (Power On Self Test) of the BIOS.

Base Memory

The POST of the BIOS will determine the amount of base (or conventional) memory installed in the system. The value of the base memory is typically 512 K for systems with 512 K memory installed on the motherboard, or 640 K for systems with 640 K or more memory installed on the motherboard.

Extended Memory

The BIOS determines how much extended memory is present during the POST. This is the amount of memory located above 1 MB in the CPU's memory address map.

Expanded Memory

Expanded Memory in memory defined by the Lotus / Intel / Microsoft (LIM) standard as EMS. Many standard DOS applications can not utilize memory above 640 K; the Expanded Memory Specification (EMS) swaps memory, which not utilized by DOS with a section, or frame, so these applications, can access all of the system memory. Memory can be swapped by EMS is usually 64 K within 1 MB or memory above 1 MB, depends on the chipset design. Expanded memory device driver is required to use memory as Expanded Memory.

Other Memory

This refers to the memory located in the 640 K to 1024 K address space. This is memory that can be used for different applications. DOS uses this area to load device drivers to keep as much base memory free for application programs. Most use for this area is Shadow RAM.

Bios Feature Menu

Anti-Virus Protection

If it is set to enable, the category will flash on the screen when there is any attempt to write to the boot sector or partition table of the hard disk drive. The system will halt and an error message will appear in the mean time. You can run an anti-virus program to locate the problem.

Default value is **Disabled**.

Enabled	Activate automatically when the system boots up causing a warning message to appear when anything attempts to access the boot sector or hard disk partition table
Disabled	No warning message to appear when anything attempts to access the boot sector or hard disk partition table

CPU L2 Cache ECC Checking

The default value is **Enabled**.

Enabled	Enable CPU L2 Cache ECC Checking
Disabled	Disable CPU L2 Cache ECC Checking

Quick Power On Self Test

This category speeds up Power On Self Test (POST) after you power on the computer. If it is set to Enabled, BIOS will count the memory only once. When set to Disabled, the memory is counted three times during the POST. The default value is **Disabled**.

Enabled	Enable quick POST
Disabled	Normal POST

Boot From LAN First

When set to Enabled, the BIOS hooks interrupts 18h and 19h. Note that some LAN adapters with boot prom boot from LAN despite of how this entry is set. The ErgoPro default value is **Disabled**.

Enabled	Enable Boot From LAN First
Disabled	Disable Boot From LAN First

Boot Sequence

This category determines which drive computer searches first for the disk operating system. In addition to CD-ROM boots, also Ls-120 and ZIP drive boots are supported. Default value is **A, C, CDROM**.

X1, X2, X3	System will first search for X1 disk drive then X2 disk drive and then X3 disk drive.

Boot Up NumLock Status

The default value is **On**.

On	Keypad is number keys
Off	Keypad is arrow keys

Gate A20 Option

The default value is **Fast**.

Normal	The A20 signal is controlled by KBC or chipset hardware
Fast	The A20 signal is controlled by port 92 or chipset specific method

Security Option

This category allows you to limit access to the system and Setup, or just to Setup. The default value is **System**.

System	The system can not boot and access to Setup page will be denied if the correct password is not entered at the prompt.
Setup	The system will boot, but access to Setup will be denied if the correct password is not entered at the prompt.

PCI/VGA Palette Snoop

The default value is **Disabled**.

Enabled	For having Video Card on ISA Bus and VGA Card on PCI Bus.
Disabled	For VGA Card only.

OS Select For DRAM>64MB

The default value is **Non-OS2**.

Non-OS2	Using non-OS/2 operating system.
OS2	Using OS/2 operating system and DRAM>64MB.

C8000-CBFFF Shadow

The default value is **Disabled**.

Enabled	The specified memory area is shadowed.
Disabled	The specified memory area is not shadowed.

CC000-CFFFF Shadow

The default value is **Disabled**.

Enabled	The specified memory area is shadowed.
Disabled	The specified memory area is not shadowed.

D0000-D3FFF Shadow

The default value is **Disabled**.

Enabled	The specified memory area is shadowed.
Disabled	The specified memory area is not shadowed.

D4000-D7FFF Shadow

The default value is **Disabled**.

Enabled	The specified memory area is shadowed.
Disabled	The specified memory area is not shadowed.

D8000-DBFFF Shadow

The default value is **Disabled**.

Enabled	The specified memory area is shadowed.
Disabled	The specified memory area is not shadowed.

DC000-DFFFF Shadow

The default value is **Disabled**.

Enabled	The specified memory area is shadowed.
Disabled	The specified memory area is not shadowed.

Chipset Feature Setup Menu

DRAM Data Integrity Mode
The default value is **Non-ECC** (read-only information).

ECC
Non-ECC

System BIOS Cacheable
The default value is **Disabled**.

Enabled	Allows caching of the system BIOS at F-segment
Disabled	

Video BIOS Cacheable
The default value is **Disabled**.

Disabled	Disable this function.
Enabled	Allows caching of the system BIOS at C0000H-F7FFFh.

Video RAM Cacheable
The default value is **Disabled**.

Disabled	Disable this function.
Enabled	Allows caching of the video RAM.

Memory Hole At 15M-16M
The default value is **Disabled**.

Disabled	Normal Setting.
Enabled	Set Address=15~16MB remap to ISA BUS.

Passive Release
When enabled, CPU to PCI bus accesses are allowed during passive release. Otherwise, the arbiter only accepts another PCI master access to local DRAM. The default value is **Enabled**. More detailed information about this setting is available in Intel 82371AB datasheet.

Disabled
Enabled

Delayed Transaction
The chipset has an embedded 32-bit posted write buffer to support delay transactions cycles. Select Enabled to support compliance with PCI 2.1 specification. The default value is **Disabled**. More detailed information about this setting is available in Intel 82371AB datasheet.

Disabled	Normal operation.
Enabled	For slow speed ISA device in system.

AGP Aperture Size (MB)
Select the size of the AGP aperture. The aperture is a portion of the PCI memory address range dedicated for graphics memory address space. Host cycles that hit the aperture range are forwarded to the AGP without any translation. The defaul value is **64**.

64
128
256

Spread Spectrum Modulated
This item allows to select the clock generator Spread Spectrum function. The default value is **Enabled**.

Disabled
Enabled

CPU Host/PCI Frequency
The default value is **100/33MHz**.

100/33MHz
103/34MHz
112/33MHz
133/44MHz

POWER MANAGEMENT SETUP

Power Management
The default value is **User Define**.

User Define	User can configure their own power management.
Min Saving	
Max Saving	
Disable	Power Management is disabled.

PM Control by APM
The default value is **Yes**.

Yes	Enable APM BIOS function for the DOS.
No	Disable APM BIOS function.

Video Off Method
The default value is **DPMS**.

V/H SYNC+Blank	BIOS will turn off V/H-SYNC when gets into Green mode for Green monitor power saving.
Blank Screen	BIOS will only black monitor when gets into Green mode.
DPMS	BIOS will use DPMS Standard to control VGA card. (The Green type VGA card will turn off V/H-SYNC automatically.)

Video Off After
The default value is **Standby**.

NA
Doze
Standby
Suspend

Modem use IRQ
The default value is **3**.

Reserve IRQ9
When set to Yes, the SCI, IRQ is allocated. This setting should be used only in ACPI mode of the Windows 98. The default value is **Yes**.

Yes
No

Doze Mode
The default value is **Disable**.

Disable
Time from 1 min to 1 h

Standby Mode
The default value is **Disable**.

Disable
Time from 1 min to 1 h

Suspend Mode
The default value is **Disable**.

Disabled	Disable Suspend Mode.
1 min - 1 Hour	Setup the timer for the Suspend Mode.

HDD Power Down
The default value is **Disable**.

Disable	Disable IDE HDD Power Down mode function.
1-15 mins.	Enable IDE HDD Power Down mode between 1 to 15 mins.

Throttle Duty Cycle
The default value is **62.5%**.

VGA Active Monitor
The default value is **Disabled**.

Disabled	Disable monitor VGA activity.
Enabled	Enable monitor VGA activity.

Soft-off by PWR-BTTN
The default value is **Instant-Off** in Windows NT 4.0 configurations and **Delay 4 Sec.** in Windows 9x configurations.

Instant-off	Soft switch ON/OFF for POWER ON/OFF
Delay 4 Sec.	Soft switch ON 4sec. for POWER OFF.

CPUFAN Off In Suspend
The default value is **Enabled**.

Disabled	Disable this function.
Enabled	Stop CPU FAN when entering Suspend mode.

Resume by Ring
The default value is **Disabled**.

Disabled	Disable this function.
Enabled	Enable Wake On Modem Ring function.

Resume by Alarm
The default value is **Disabled**.

Disabled	Disable this function.
Enabled	Enable alarm function to POWER ON system If the default value is Enabled.
Date (of Month) Alarm :	0~31
Time (hh: mm: ss) Alarm :	(0~23) : (0~59) : (0~59)

Power Status Led
The default value is **Dual Color**.

Dual Color
Blinking
Single Color

Wake Up On LAN
The default value is **Disabled**.

Disabled	Disable these functions.
Enabled	Enables these functions.

Restore AC/Power Loss
The default value is **Power On**.

Power On
Last Status

IRQ 8 Clock Event
The default value is **Disabled**.

IRQ [3-7,9-15], NMI
The default value is **Disabled**.

Disabled	Disable this function.
Enabled	Enable monitor IRQ [3-7,9-15] for Green event.

Primary IDE 0 / 1
The default value is **Enabled** for drive 0 and **Enabled** drive 1.

Disabled	Disable this function.
Enabled	Enable monitor Primary IDE 0 / 1 for Green event.

Secondary IDE 0 / 1

The default value is **Disabled** for drive 0 and **Disabled** drive 1.

Disabled	Disable this function.
Enabled	Enable monitor Secondary IDE 0 / 1 for Green event.

Floppy Disk

The default value is **Disabled**.

Disabled	Disable this function.
Enabled	Enable monitor Floppy Disk for Green event.

Serial Port

The default value is **Enabled**.

Disabled	Disable this function.
Enabled	Enable monitor Serial Port for Green event.

Parallel Port

The default value is **Disabled**.

Disabled	Disable this function.
Enabled	Enable monitor Parallel Port for Green event.

PNP/PCI CONFIGURATION menu

PNP OS Installed
Selection whether the PnP BIOS allocated and reserves resources to all devices or only bootable devices. The default value is **No**.

Yes	Enable PNP OS Installed function.
No	Disable PNP OS Installed function.

Reset Configuration Data
The default value is **Disabled**.

Disabled	Disable this function.
Enabled	Enable clears PnP information in ESCD (save BIOS SETUP settings and exit to implement the clearing process of the ESCD).

Assign IRQ For VGA
The default value is **Enabled**.

Enabled	Assign a specific IRQ for VGA.
Disabled	No IRQ is assigned for VGA.

Assign IRQ For USB
The default value is **Enabled**.

Enabled	Assign a specific IRQ for USB
Disabled	No IRQ is assigned for USB

Used MEM base addr
The default value is **N/A**.

N/A	Disable the MEM. block using.
C800 ~ DC00	Select the MEM. block starting address.

LOAD SETUP DEFAULTS menu

Load BIOS Defaults
To load BIOS defaults value to CMOS SRAM, enter "Y". If not, enter "N".

INTEGRATED PERIPHERALS menu

IDE HDD Block Mode

This entry enables the block mode, i.e. larger than one byte entities are copied at one time (BIOS INT 13H). The default value is **Enabled**.

Enabled	Enable IDE HDD Block Mode, data is copied in blocks
Disabled	Disable IDE HDD Block Mode, data is copied per byte

On-Chip Primary PCI IDE

The default value is **Enabled**.

Enabled	Enables on-board primary IDE channel.
Disabled	Disables on-board primary IDE channel.

On-Chip Secondary PCI IDE

The default value is **Enabled**.

Enabled	Enables on-board secondary IDE channel.
Disabled	Disables on-board secondary IDE channel.

USB Keyboard Support

The default value is **Disabled**. This setting needs to be enabled when using the BIOS SETUP with USB Legacy keyboard, but should be enabled in DOS.

Enabled	Enables USB Legacy Keyboard Support.
Disabled	Disable USB Legacy Keyboard Support.

Init Display First

The default value is **AGP**.

AGP
PCI

Onboard Sound

The default value is **Enabled**.

Enabled	Enable onboard audio.
Disabled	Disable onboard audio.

Onboard FDC Controller

The default value is **Enabled**.

Enabled	Enable onboard FDD port.
Disabled	Disable onboard FDD port.

Onboard Serial Port 1

The default value is **3F8/IRQ4**.

Auto	BIOS will automatically setup the port 1 address.
3F8/IRQ4	Enable onboard Serial port 1 and address is 3F8.
2F8/IRQ3	Enable onboard Serial port 1 and address is 2F8.
3E8/IRQ4	Enable onboard Serial port 1 and address is 3E8.
2E8/IRQ3	Enable onboard Serial port 1 and address is 2E8.
Disabled	Disable onboard Serial port 1.

Onboard Serial Port 2

The default value is **2F8/IRQ3**.

Auto	BIOS will automatically setup the port 2 address.
3F8/IRQ4	Enable onboard Serial port 2 and address is 3F8.
2F8/IRQ3	Enable onboard Serial port 2 and address is 2F8.
3E8/IRQ4	Enable onboard Serial port 2 and address is 3E8.
2E8/IRQ3	Enable onboard Serial port 2 and address is 2E8.
Disabled	Disable onboard Serial port 2.

Onboard Parallel Port

The default value is **378/IRQ7**.

378/IRQ7	Enable onboard LPT port and address is 378/IRQ7.
278/IRQ5	Enable onboard LPT port and address is 278/IRQ5.
Disabled	Disable onboard LPT port.
3BC/IRQ7	Enable onboard LPT port and address is 3BC/IRQ7.

Parallel Port Mode

The default value is **SPP**.

SPP	Using Parallel port as Standard Printer Port.
EPP	Using Parallel port as Enhanced Parallel Port.
ECP	Using Parallel port as Extended Capabilities Port.
ECP+EPP	Using Parallel port as combined ECP and EPP mode.

ECP Mode Use DMA

The default value is **3** (showed only when ECP is selected in Parallel Port Mode).

1
3

EPP Mode Select

The default value is **EPP1.7** (showed only when EPP is selected in Parallel Port Mode).

EPP1.7
EPP1.9

SUPERVISOR / USER PASSWORD menu

When you select this function, the ENTER PASSWORD box will appear at the center of the screen.

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

To disable password, just press <Enter> when you are prompted to enter password. A message “PASSWORD DISABLED” will appear to confirm the password being disabled. Once the password is disabled, the system will boot and you can enter Setup freely.

If you select System at Security Option in BIOS Features Setup Menu, you will be prompted for the password every time the system is rebooted or any time you try to enter Setup Menu. If you select Setup at Security Option in BIOS Features Setup Menu, you will be prompted only when you try to enter Setup.

SAVE & EXIT SETUP Menu

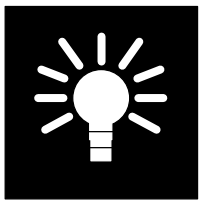
Type "Y" will quit the Setup Utility and save the user setup value to RTC CMOS SRAM.

Type "N" will return to Setup Utility.

EXIT WITHOUT SAVING Menu

Type "Y" will quit the Setup Utility without saving to RTC CMOS SRAM.

Type "N" will return to Setup Utility.



Section 4 :

Miscellaneous and Hints

BIOS

The system BIOS is always shadowed. The system is stored in a Flash RAM, thus the BIOS is field upgradable with a floppy.

At boot-up the logo screen is shown. To see the BIOS version, one need to enter to the legacy boot screen by pressing <tab> key while logo screen is shown. On the legacy boot screen, the BIOS version is shown:

Award Modular BIOS v4.51PG, An Energy Star Ally
Copyright (C) 1985 - 98, Award Software, Inc.

W6147F4 V1.1 112798

11/27/1998-i440BX-W977-2A69KM4EC-00

The Unit ID (i.e. the BIOS ID) is displayed in the BIOS SETUP screen. To see the BIOS ID, one need to enter to the BIOS SETUP by pressing <del> key while logo screen, or legacy boot screen, is shown.

The BIOS IDentification :

PC-type	Unit ID	BIOS Version
e368-series	2A69KM4E	1.1

Larger than 8.4 GB HDD BIOS support

The system BIOS supports, and recoqnises larger than 8.4 GB Hard Disks.

Shadow option proms

The video BIOS and ROMs on add-on boards can be shadowed, if shadowing is supported by the add-on board.

Drivers

Pre-installed Windows 98 and Windows NT 4.0 Workstation in e368-series include all required drivers, f.eg. on-board graphics (AGP), on board audio and for some add-on board LAN.

Original Operating System CD-media of Windows 98 and Windows NT 4.0 do not include all required drivers for devices used in ErgoPro e368-series. Latest drivers can be obtained from

- Fujitsu Computers web-site (i.e. http://www.fujitsu-computers.com, or it's mirror sites http://www.fujitsu.se or http://www.fujitsu.fi)
- GENESIS
- Drivers and Utilities CD for ErgoPro e368-series

Utilities

Pre-installed Windows 98 and Windows NT 4.0 Workstation in e368-series include F-Secure AntiVirus Toolkit and Intel's LANDesk Client Manager (i.e. the DMI 2.0 client s/w).

Original Operating System CD-medias of Windows 98 and Windows NT 4.0 do not include ErgoPro specific utilities that are used in ErgoPro e368-series. ErgoPro specific utilities can be obtained from

- GENESIS
- Drivers and Utilities CD for ErgoPro e368-series

rFlash.exe

This tool is not available for the ErgoPro e368-series.

rSetup.exe

This tool is not available for the ErgoPro e368-series.

BIOS Upgrade

ErgoPro BIOS Upgrade Diskette

There is an automatic way of upgrading the ErgoPro e368-series system BIOS, i.e. using the “ErgoPro BIOS Upgrade diskette for e368-series”. The bootable DOS diskette uses the AWDFL535.EXE BIOS Upgrade utility. The contents of the diskette can be obtained from

- Fujitsu Computers web-site (i.e. http://www.fujitsu-computers.com, or it’s mirror sites http://www.fujitsu.se or http://www.fujitsu.fi), partner side (password required)
- GENESIS
- Indigo CD, volume 3 release 3 (or newer)

Force Flash Load (BIOS Recovery)

TBA.

DOSFLASH.EXE

This tool is not available for the ErgoPro e368-series.

FLASH.EXE

This tool is not availablbe for the ErgoPro e368-series.

IFLASH.EXE

This tool is not availablbe for the ErgoPro e368-series.

BIOS and year 2000

The recommended method of accessing the date in e368-series systems is indirectly from the Real Time Clock (RTC) via the BIOS. The BIOS on the system board contains a century checking and maintenance feature that checks the least two significant digits of the year stored in the RTC during each BIOS request (INT 1Ah, function 04h) to read the date.

Tips & Hints

Hard disk partitioning

DOS 6.XX and Windows NT 4.0, FAT

Partition size	Cluster size (allocation unit)	File system
0 MB - 15 MB	4 096 Bytes (4 kB)	FAT12
16 MB - 127 MB	2 048 Bytes (2 kB)	FAT16
128 MB - 255 MB	4 096 Bytes (4 kB)	FAT16
256 MB - 511 MB	8 192 Bytes (8 kB)	FAT16
512 MB - 1023 MB	16 384 Bytes (16 kB)	FAT16
1024 MB - 2048 MB	32 768 Bytes (32 kB)	FAT16
2048 MB - 4096 MB	65 536 Bytes (64 kB)	FAT16
4096 MB - 8192 MB	131 072 Bytes (128 kB), **Windows NT 4.0 only**	FAT16
8192 MB - 16384 MB	262 144 Bytes (256 kB), **Windows NT 4.0 only**	FAT16

The maximum partition size of the FAT file system in DOS is 2 GB (including Windows 95 FAT).
The maximum partition size of the FAT file system in Windows NT is 4 GB.

The FAT file system only supports 512 byte sectors, so both sectors per cluster and the cluser size is fixed. The FAT file system supports cluster sizes up to 256 kB. Therefore, the physical size of a 1 byte file will be 1 cluster which may be (depending on the disk used) as little as 2048 Bytes or as great as 32 768 Bytes of disk space used.

Windows 95 (OSR 2.xx) and Windows 98, FAT32

Partition size	Cluster size (allocation unit)	File system
	4 096 Bytes (4 kB)	FAT32
< 8 GB	4 096 Bytes (4 kB)	FAT32

The maximum size of the partition, using FAT32, is 8 GB (Gigabytes).
The maximum size of the hard disk, using FAT32, is 2 TB (Terabytes).

Windows NT, NTFS

Partition size	Cluster size (allocation unit)	File system
0 MB - 512 MB	512 Bytes	NTFS
513 MB - 1024 MB	1024 Bytes	NTFS
1025 MB - 2048 MB	2048 Bytes	NTFS
> 2048 MB	4096 Bytes	NTFS

The NTFS file system supports cluster sizes up to 64 kB.
The file record size is always 1 kB regardless of the cluster size.

USB Legacy Support

USB legacy support enables USB keyboards and mice to be used even when no operating system USB drivers are in place. By default, USB legacy support is disabled. USB legacy support is only intended to be used in accessing BIOS Setup and installing an operating system that supports USB. This sequence describes how USB legacy support operates in the default (disabled) mode.

1. When you power up the computer, USB legacy support is disabled.
2. POST begins.
3. USB legacy support is temporarily enabled by the BIOS. This allows you to use a USB keyboard to enter the BIOS SETUP program.
4. POST completes and disables USB legacy support (unless it was set to Enabled while in Setup).
5. The operating system loads. While the operating system is loading, USB keyboards and mice are not recognized. After the operating system loads the USB drivers, the USB devices are recognized.

To install an operating system that supports USB, enable USB Legacy support in BIOS Setup and follow the operating system's installation instructions. Once the operating system is installed and the USB drivers configured, USB legacy support is no longer used. USB Legacy Support can be left enabled in BIOS Setup if needed.

Notes on using USB legacy support:

- The system BIOS supports the Universal Host Controller Interface only (UHCI). The OpenHCI is not supported.
- If USB legacy support is enabled, don't mix USB and PS/2 keyboards and mice. For example, do not use a PS/2 keyboard with a USB mouse, or a USB keyboard and a PS/2 mouse.
- Do not use USB devices with an operating system that does not support USB. USB legacy is not intended to support the use of USB devices in a non USB operating system.
- USB legacy support is for keyboards and mice only. Hubs and other USB devices are not supported.

ATA/ATAPI device support

If Auto is selected as a primary or secondary IDE device in Setup (i.e. RSU), the BIOS automatically sets up the two local-bus IDE connectors with independent I/O channel support. The IDE interface supports hard drives up to PIO Mode 4 and recognises ATAPI devices, including CD-ROM drives, tape drives and Ultra DMA/33 drives.

Add-in ISA IDE controllers are not supported.

The BIOS determines the capabilities of each drive and configures them so as to optimize capacity and performance. To take advantage of the high-capacity storage devices, hard drives are automatically configured for logical block addressing (LBA) and to PIO Mode 3 or 4, depending on the capability of the drive. To override the autoconfiguration options, use the specific IDE device options in Setup. The ATAPI specification recommends that ATAPI devices be configured as shown in table below:

Configuration	**Primary IDE interface**		**Secondary IDE interface**	
	Drive 0	**Drive 1**	**Drive 0**	**Drive 1**
Normal, no ATAPI	ATA			
Disk and CD-ROM for enhanced IDE systems	ATA		ATAPI	
Legacy IDE system with only one cable	ATA	ATAPI		
Enhanced IDE with CD-ROM and a tape or two CD-ROMs	ATA		ATAPI	ATAPI

Functionality of the Power Button

Behaving of the Power On/Off Button depends on the BIOS SETUP setting, "Soft-Off PWR-BTTN", located in the POWER MANAGEMENT SETUP menu. The default value in Windows 9x is "Delay 4 Sec.", and in Windows NT 4.0 "Instant-off".

The Power Button has different functions when the “Delay 4 Sec.” value is used:

- Put the PC into a sleep mode when the button is pressed first time
- Restore the PC back to normal mode from power save mode when the button is pressed the second time in a row (pressing power button less than four (4) seconds)
- Power Off the PC when the button is pressed second time in a row (pressing and holding down the power button more than four (4) seconds)

This means that when the “Delay 4 Sec.” is used, the first press of the Power Button does not switch off the power but it puts the PC into a sleep mode. The type of the sleep mode depends on what Operating System is used, i.e. Windows 95 or Windows 98. It also depends on in what mode the Windows 98 is used, i.e. Legacy mode (APM equivalent) or ACPI mode.

Pressing power button in Windows 9x

As a default, the “Delay 4 Sec.” BIOS SETUP value is used.

Mode	Press Power Button	State after Power Button Pressed
Windows 95, APM enabled	1st time	Suspend mode (APM)
Windows 95, APM enabled	2nd time, < 4 sec.	Restoring system back to normal
Windows 95, APM enabled	2nd time, > 4 sec.	Switching off the power from the PSU
Windows 98 in Legacy mode	1st time	Suspend mode (APM)
Windows 98 in Legacy mode	2nd time, < 4 sec.	Restoring system back to normal
Windows 98 in Legacy mode	2nd time, > 4 sec.	Switching off the power from the PSU
Windows 98 in ACPI mode	1st time	S1 Sleeping State
Windows 98 in ACPI mode	2nd time, < 4 sec.	Restoring system back to normal
Windows 98 in ACPI mode	2nd time, > 4 sec.	S5 Sleeping State (Soft Off)

Section 5 :

Power-on self test and error indications

BIOS Power On Self Test (POST)

After the power has been turned on, the system performs a power on self-test, i.e. POST, to check that all parts are working properly.

During the POST if the BIOS detects an error requiring user to do something to fix, it will either sound a beep code or display a message. During the POST a logo screen is shown. The BIOS information can be seen by pressing the <tab> key:

Award Modular BIOS v4.51PG, An Energy Star Ally
Copyright (C) 1985 - 98, Award Software, Inc.

W6147F4 V1.1 112798

The message indicates the BIOS version (1.1).

The following pages describe the steps that you should take if either fault situation should occur.

POST Beep

Currently there are two kinds of beep codes in BIOS.

This code indicates that a video error has occurred and the BIOS cannot initialize the video screen to display any additional information.

This beep code consists of a single long beep followed by three short beeps. The other code indicates that your DRAM error has occurred. This beep code consists of a single long beep repeatedly.

POST Messages

During the Power On Self Test (POST), if the BIOS detects an error requiring you to do something to fix, it will either sound a beep code or display a message.

Depending on the value of the BIOS SETUP entry Halt On in the STANDARD CMOS SETUP menu, an error message is displayed

Error messages

One or more of the following messages may be displayed if the BIOS detects an error during the POST.

List of Error messages:

Error Message	Explanation
CMOS BATTERY HAS FAILED	CMOS battery is no longer functional. It should be replaced.
CMOS CHECKSUM ERROR	Checksum of CMOS is incorrect. This can indicate that CMOS has become corrupt. This error may have been caused by a weak battery. Check the battery and replace if necessary.
DISK BOOT FAILURE, INSERT SYSTEM DISK AND PRESS ENTER	No boot device was found. This could mean that either a boot drive was not detected or the drive does not contain proper system boot files. Insert a system disk into Drive A: and press <Enter>. If you assumed the system would boot from the hard drive, make sure the controller is inserted correctly and all cables are properly attached. Also be sure the disk is formatted as a boot device. Then reboot the system.
DISKETTE DRIVES OR TYPES MISMATCH ERROR - RUN SETUP	Type of diskette drive installed in the system is different from the CMOS definition. Run Setup to reconfigure the drive type correctly.
ERROR ENCOUNTERED INITIALIZING HARD DRIVE	Hard drive cannot be initialized. Be sure the drive is installed correctly and all cables are correctly and firmly attached. If necessary, be also sure the correct hard drive type is selected in Setup.
ERROR INITIALIZING HARD DISK CONTROLLER	Cannot initialize controller. Be sure the correct hard drive type is selected in Setup. Also check to see if any jumper needs to be set correctly on the hard drive.
FLOPPY DISK CNTRLR ERROR OR NO CNTRLR PRESENT	Cannot find or initialize the floppy drive controller. If there are no floppy drives installed, be sure the Diskette Drive selection in Setup is set to NONE.
KEYBOARD ERROR OR NO KEYBOARD PRESENT	Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot. If you are purposely configuring the system without a keyboard, set the error halt condition in Setup to HALT ON ALL, BUT KEYBOARD. This will cause the BIOS to ignore the missing keyboard and continue the boot.
Memory Address Error at ...	Indicates a memory address error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.
Memory parity Error at ...	Indicates a memory parity error at a specific location. You can use this location along with the memory map for your system to find and replace the bad memory chips.
MEMORY SIZE HAS CHANGED SINCE LAST BOOT	Memory has been added or removed since the last boot.
Memory Verify Error at ...	Indicates an error verifying a value already written to memory. Use the location along with your system's memory map to locate the bad chip.
OFFENDING ADDRESS NOT FOUND	This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem cannot be isolated.

OFFENDING SEGMENT:	This message is used in conjunction with the I/O CHANNEL CHECK and RAM PARITY ERROR messages when the segment that has caused the problem has been isolated.
PRESS A KEY TO REBOOT	This will be displayed at the bottom screen when an error occurs that requires you to reboot. Press any key and the system will reboot.
PRESS F1 TO DISABLE NMI, F2 TO REBOOT	When BIOS detects a Non-maskable Interrupt condition during boot, this will allow you to disable the NMI and continue to boot, or you can reboot the system with the NMI enabled.
RAM PARITY ERROR - CHECKING FOR SEGMENT	Indicates a parity error in Random Access Memory.
SYSTEM HALTED, (CTRL-ALT-DEL) TO REBOOT ...	Indicates the present boot attempt has been aborted and the system must be rebooted. Press and hold down the CTRL and ALT keys and press DEL.
FLOPPY DISK(S) fail (80)	Unable to reset floppy subsystem.
FLOPPY DISK(S) fail (40)	Floppy Type dismatch.
Hard Disk(s) fail (80)	HDD reset failed.
Hard Disk(s) fail (40)	HDD controller diagnostics failed.
Hard Disk(s) fail (20)	HDD initialization error.
Hard Disk(s) fail (10)	Unable to recalibrate fixed disk.
Hard Disk(s) fail (08)	Sector Verify failed.
Keyboard is locked out - Unlock the key	BIOS detect the keyboard is locked. P17 of keyboard controller is pulled low.
Keyboard error or no keyboard present	Cannot initialize the keyboard. Make sure the keyboard is attached correctly and no keys are being pressed during the boot.
Manufacturing POST loop	System will repeat POST procedure infinitely while the P15 of keyboard controller is pull low. This is also used for M/B burn in test.
BIOS ROM checksum error - System halted	The checksum of ROM address F0000H-FFFFFH is bad.
Memory test fail	BIOS reports the memory test fail if the onboard memory is tested error.

BIOS check points (POST codes)

NOTE: POST codes are output to port address 80h.

Compressed Version only

POST (hex)	Description
C0	1. Turn off OEM specific cache, shadow... 2. Initialize all the standard devices with default values standard devices includes: -DMA controller (8237) -Programmable Interrupt Controller (8259) -Programmable Interval Timer (8254) -RTC chip
C1	Auto-detection of onboard DRAM & Cache
C3	1. Test system BIOS checksum 2. Test the first 256K DRAM 3. Expand the compressed codes into temporary DRAM area including the compressed System BIOS & Option ROMs
C5	Copy the BIOS from ROM into E0000-FFFFF shadow RAM so that POST will go faster
01-02	Reserved
03	Initialize EISA registers (N/A)
04	Reserved
05	1. Keyboard Controller Self-Test 2. Enable Keyboard Interface
06	Reserved
07	Verifies CMOS's basic R/W functionality
BE	Program defaults values into chipset according to the MODBINable Chipset Default Table
09	1. Program the configuration register of Cyrix CPU according to the MODBINable Cyrix Register Table (N/A) 2. OEM specific cache initialization (if needed)
0A	1. Initialize the first 32 interrupt vectors with corresponding Interrupt handlers Initialize INT no from 33-120 with Dummy(Spurious) Interrupt Handler 2. Issue CPUID instruction to identify CPU type 3. Early Power Management initialization (OEM specific)

Boot block

POST (hex)	Description
C0	1. Turn off OEM specific cache, shadow... 2. Initialize all the standard devices with default values standard devices includes: -DMA controller (8237) -Programmable Interrupt Controller (8259) -Programmable Interval Timer (8254) -RTC chip
C1	Auto-detection of onboard DRAM & Cache
C3	Checking checksum of compressed code
C5	Copy the BIOS from ROM into E0000-FFFFF shadow RAM so that POST will go faster
01	Clear base memory 0~640K
0C	Initial interrupt vector 00-1FH
0D	Initial ISA VGA
41H	Enable FDD and detect media type
FFH	Boot from FDD

Non-Compressed Version

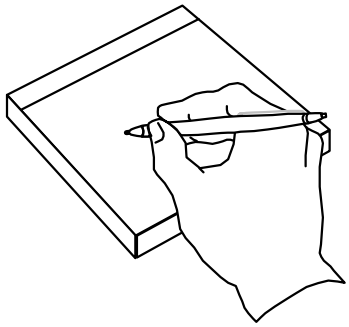
POST (hex)	Description
01-02	Reserved
C0	Turn off OEM specific cache, shadow...
03	1. Initialize EISA registers (EISA BIOS only) 2. Initialize all the standard devices with default values Standard devices includes: -DMA controller (8237) -Programmable Interrupt Controller (8259) -Programmable Interval Timer (8254) -RTC chip
04	Reserved
05	1. Keyboard Controller Self-Test 2. Enable Keyboard Interface
06	Reserved
07	Verifies CMOS's basic R/W functionality
BE	Program defaults values into chipset according to the MODBINable Chipset Default Table
C1	Auto-detection of onboard DRAM & Cache
C5	Copy the BIOS from ROM into E0000-FFFFF shadow RAM so that POST will go faster
08	Test the first 256K DRAM
09	1. Program the configuration register of Cyrix CPU according to the MODBINable Cyrix Register Table 2. OEM specific cache initialization (if needed)
0A	1. Initialize the first 32 interrupt vectors with corresponding Interrupt handlers Initialize INT no from 33-120 with Dummy(Suprious) Interrupt Handler 2. Issue CPUID instruction to identify CPU type 3. Early Power Management initialization (OEM specific)

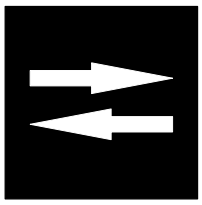
Compress Version & Non-Compress Version

POST(hex)	Description
0B	1. Verify the RTC time is valid or not 2. Detect bad battery 3. Read CMOS data into BIOS stack area 4. PnP initializations including (PnP BIOS only) -Assign CSN to PnP ISAcard -Create resource map from ESCD 5. Assign IO & Memory for PCI devices (PCI BIOS only)
0C	Initialization of the BIOS Data Area (40 : 00 － 40:FF)
0D	1. Program some of the Chipset's value according to Setup. (Early Setup Value Program) 2. Measure CPU speed for display & decide the system clock speed 3. Video initialization including Monochrome, CGA, EGA/VGA. If no display device found, the speaker will beep which consists of one single long beep followed by two short beeps.
0E	1. Initialize the APIC (Multi-Processor BIOS only) 2. Test video RAM (If Monochrome display device found) 3. Show messages including: -Award Logo, Copyright string, BIOS Date code & Part No. -OEM specific sign on messages -Energy Star Logo (Green BIOS ONLY) -CPU brand, type & speed -Test system BIOS checksum(Non-Compress Version only)
0F	DMA channel 0 test
10	DMA channel 1 test
11	DMA page registers test
12-13	Reserved
14	Test 8254 Timer 0 Counter 2.
15	Test 8259 interrupt mask bits for channel 1
16	Test 8259 interrupt mask bits for channel 2
17	Reserved
19	Test 8259 functionality
1A-1D	Reserved
1E	If EISA NVM checksum is good, execute EISA initialization (EISA BIOS only)
1F-29	Reserved
30	Detect Base Memory & Extended Memory Size
31	1. Test Base Memory from 256K to 640K 2. Test Extended Memory from 1M to the top of memory
32	1. Display the Award Plug & Play BIOS Extension message (PnP BIOS only) 2. Program all onboard super I/O chips (if any) including COM ports, LPT ports, FDD port.according to setup value
33-3B	Reserved

3C	Set flag to allow users to enter CMOS Setup Utility
3D	1. Initialize Keyboard 2. Install PS2 mouse
3E	Try to turn on Level 2 cache Note: Some chipset may need to turn on the L2 cache in this stage. But usually, the cache is turn on later in POST 61h
BF	1. Program the rest of the Chipset's value according to Setup. (Later Setup Value Program) 2. If auto-configuration is enabled, programmed the chipset with pre-defined values in the MODBINable Auto-Table
41	Initialize floppy disk drive controller
42	Initialize Hard drive controller
43	If it is a PnP BIOS, initialize serial & parallel ports
44	Reserved
45	Initialize math coprocessor.
46-4D	Reserved
4E	If there is any error detected (such as video, kb...), show all the error messages on the screen & wait for user to press <F1> key
4F	1. If password is needed, ask for password 2. Clear the Energy Star Logo (Green BIOS only)
50	Write all CMOS values currently in the BIOS stack area back into the CMOS
51	Reserved
52	1. Initialize all ISA ROMs 2. Later PCI initializations (PCI BIOS only) -assign IRQ to PCI devices -initialize all PCI ROMs 3. PnP Initializations (PnP BIOS only) -assign IO, Memory, IRQ & DMA to PnP ISA devices -initialize all PnP ISA ROMs 4. Program shadows RAM according to Setup settings 5. Program parity according to Setup setting 6. Power Management Initialization -Enable/Disable global PM -APM interface initialization
53	1. If it is NOT a PnP BIOS, initialize serial & parallel ports 2. Initialize time value in BIOS data area by translate the RTC time value into a timer tick value
60	Setup Virus Protection (Boot Sector Protection) functionality according to Setup setting

THIS PAGE IS INTENTIONALLY LEFT BLANK !





Section 6 :

Input, Output and Special functions

System board

Form factor

The system board is based on the microATX form factor, following the microATX specification. Outer dimensions are 200 mm x 245 mm.

Processor

The system board provides the Slot 1 connector for one, 100 MHz host bus speed, Intel Pentium II processor. The Pentium II processor is provided in the SEC Cartridge (or SECC2) with the 512 kB L2 cache. The active (passive) heatsink is attached to the SECC(2).

Voltage Regulator

The system board has an on-board voltage regulator for the CPU core voltage, which is automatically set to the required value by the CPU itself. Fixed voltages are provided for the GTL bus and clock synthesizer.

Core logic

The system board is based on the Intel's 440BX AGPset (chip set), which consists the following two chips:

- 82443BX, north bridge with AGP interface
- 82371EB (PIIX4e), south bridge with ACPI, USB, IDE and SMBus controllers

The 440BX has the following main features:

- MicroATX form factor support
- Optimized for the Pentium® II processor, with 66 MHz and 100 MHz host bus speed
- Quad Port Acceleration
- SDRAM support
- Advanced Configuration and Power Interface support (ACPI)
- Ultra DMA/33 support

The Intel 82443BX, PCI/AGP Controller (PAC), has the following features:

- Processor interface control
  - Support for processor host bus frequency of 100 MHz or 66 MHz
  - 32-bit addressing
  - Desktop Optimized GTL+ compliant host bus interface
- Integrated DRAM controller, with support for
  - +3.3 V only DIMM DRAM configurations
  - Up to three double sided DIMMs
  - Synchronous 100 MHz SDRAM
  - DIMM serial presence detect via SMBus interface
  - 16- and 64-Mbit devices with 2 k, 4 k, and 8 k page sizes
  - x 4, x 8, x 16, and x 32 DRAM widths
  - SDRAM 64-bit data interface with ECC support
  - Symmetrical and asymmetrical DRAM addressing
- AGP interface
  - Complies with the AGP specification
  - Support for +3.3 V PCI, AGP-66/133 devices
  - Synchronous coupling to the host-bus frequency
- PCI bus interface
  - Complies with the PCI specification Rev 2.1, +5 V 33 MHz interface
  - Asynchronous coupling to the host-bus frequency
  - PCI parity generation support
  - Data streaming support from PCI-to-DRAM
  - Support for six PCI bus masters in addition to the host and PCI-to-ISA I/O bridge
  - Support for concurrent host, AGP, and PCI transactions to main memory

- Data buffering
  - DRAM write buffer with read-around-write capability
  - Dedicated host-to-DRAM, PCI0-to-DRAM, and PCI1/AGP-to-DRAM read buffers
  - AGP dedicated inbound/outbound FIFOs (133/66 MHz), used for temporary data storage
- Power management functions
  - Support for system suspend/resume
  - Compliant with ACPI power management
- SMBus support for desktop management functions
- Support for system management mode (SMM)

The Intel 82371EB, PCI ISA IDE Xcelerator (PIIX4E), has the following features:

- Multifunction PCI-to-ISA bridge
  - Support for the PCI bus at 33 MHz
  - Complies with the PCI specification
  - Full ISA bus support
- USB controller
  - Two USB ports
  - Support for legacy keyboard and mouse
  - Support for UHCI interface
- Integrated dual-channel enhanced IDE interface
  - Support for up to four IDE devices
  - PIO Mode 4 transfers at up to 16 MB/sec
  - Support for Ultra DMA/33 synchronous DMA mode transfers up to 33 MB/sec
  - Bus master mode with an 8 x 32-bit buffer for bus master PCI IDE burst transfers
- Enhanced DMA controller
  - Two 8237-based DMA controllers
  - Support for PCI DMA with three PC/PCI channels and distributed DMA protocols
- Interrupt controller based on 82C59
  - Support for 15 interrupts
  - Programmable for edge/level sensitivity
- Power management logic
  - Sleep/resume logic
  - Support for wake-on-modem, Wake on LAN technology, and wake on PME
  - Support for ACPI
- Real-Time Clock
  - 256-byte battery-backed CMOS SRAM
  - Includes date alarm
- 16-bit counters/timers based on 82C54

Super I/O chipset

The system board has Winbond's W83977TF Super I/O controller (PnP compatible). The Super I/O chipset has the following main features (5 V operation):

- PnP v. 1.0a compliant register set
- PS/2 style keyboard and mouse interfaces
- Floppy controller for a single floppy drive
- Keyboard controller
- One Parallel port
- Two Serial ports (only one port implemented)
- Advanced power control

Floppy disk controller

The floppy disk controller is integrated into the Winbond's W83977TF Super I/O controller. It can handle the following floppy drive types: 360 kB, 1.2 MB (5.25”), 720 kB, 1.44 MB and 2.88 MB (3.5”).

Keyboard (Mouse) controller

The PS/2-type keyboard (and PS/2-type mouse) controller in integrated into the Winbond's W83977TF Super I/O controller and is 8042 software compatible.

Note: *The mouse and keyboard have their own PS/2 connectors. Power to the computer should be turned off before a keyboard or mouse is connected or disconnected.*

Parallel port communication

There is one multi-mode parallel port using a standard 25-pin female D-type connector. The parallel port mode can be set through the Resident Set-up Utility. The following modes are supported:

Standard mode (SPP)	Standard Parallel Port mode.
Enhanced mode (EPP):	Enhanced Parallel Port (EPP 1.7 and 1.9), and is IEEE1284 compliant.
High speed mode (ECP):	Microsoft and Hewlett Packard Extended Capabilities Port, and is IEEE1284 compliant.

The multi mode port interface logic and buffers are placed in the Winbond's W83977TF Super I/O controller.

Serial port communication

It comprises two high speed 16C550 compatible UARTs with send/receive 16 Byte FIFOs with data transfer speeds up to 115 kbit/s with BIOS support. The 2 connectors are 9-pin standard RS-232C D-type connectors. The UARTs are placed in the Winbond's W83977TF Super I/O controller.

Note: *only one serial port connector is available.*

System can be woken up from a sleep mode when the modem generates the Ring Indicator signal. This Wake On modem ring function can be enabled/disabled through the Resident Set-up Utility. More information about available settings of the serial ports , see section 3 in this handbook.

Real-Time Clock, CMOS SRAM, and Battery

The real-time clock is compatible with DS1287 and MC146818 components. The clock provides a time-of-day clock and a multicentury calendar with alarm features and century rollover. The real-time clock supports 256 bytes of battery-backed CMOS SRAM in two banks that are reserved for BIOS use. The time, date, and CMOS values can be specified in the Setup program. The CMOS values can be returned to their defaults by using the Setup program.

A coin-cell battery powers the real-time clock and CMOS memory. When the computer is not plugged into a wall socket, the battery has an estimated life of three years. When the computer is plugged in, the 3.3 V standby current from the power supply extends the life of the battery. The clock is accurate to ± 13 minutes/year at 25 ºC with 3.3 V applied.

System BIOS

The AwardBIOS system BIOS is stored in the 2Mbit Flash EEPROM. The system BIOS has a boot block which is not write protected by the jumper setting. The system BIOS is software upgradeable. The system BIOS includes the video BIOS.

Video BIOS

The Video BIOS is embedded in the system BIOS, i.e. the system BIOS version 1.0 includes the ATI video BIOS version 3.086. The BIOS is made by the manufacturer of the on-board ATI 3D Rage Pro Turbo (2x) AGP graphics controller, i.e. ATI.

System memory

The system board has two, 168-pin, dual inline memory module (DIMM) sockets. Synchronous DRAM (SDRAM) can be installed in one or two sockets. ***EDO DIMMs are not supported***. Using the serial presence detect (SPD) data structure, programmed into an E^2PROM on the DIMM, the BIOS can determine the SDRAM's size and speed. Minimum memory size is 32 MB; maximum memory size is 256 MB. Memory size and speed can vary between sockets. The motherboard supports the following memory features:

- 168-pin DIMMs with gold-plated contacts
- 100 MHz SDRAM
- Non-ECC (64-bit) and ECC (72-bit) memory
- 3.3 V memory only

Note: *Pentium II processors with 100 MHz front-side bus should be paired only with 100 MHz SDRAM. All memory components and DIMMs used with the system board must comply with the PC SDRAM specifications. These include: the PC SDRAM Specification (memory component specific), the PC Unbuffered DIMM Specification, and the PC Serial Presence Detect Specification.*

Video memory

The total of 8 MB, 100 MHz, SDRAM video memory is located (i.e. soldered) on the system board. The video memory is not upgradeable.

PCI bus

The PCI bus is PCI 2.1 specification compliant, running on 33 Mhz (i.e. synchronous to the system bus and runs at half of the system bus frequency). PCI-to-PCI Bridge and altogether six (6) PCI bus master devices are supported.

AGP interface

The on-board graphics system is based on the Accelerated Graphics Port (AGP) specification. The system board has no 'AGP expansion slot' for AGP graphics adapter.

PCI bus enhanced IDE interface

There are two enhanced PCI bus IDE controllers/interfaces (PCI master devices) on the system board, integrated into the Intel 82371EB, i.e. PIIX4e controller, with Bus Master capability and synchronous DMA Mode (i.e. Ultra DMA/33), and can handle up to four IDE devices (in practise, please note the limitation of the mechanics). The 82371EB supports PIO modes 0 to 4 and DMA multiword mode 2 timing up to 16 MB/s and Bus Master synchronous DMA mode up to 33 MB/s. Each IDE device can have independent timings. It does not consume any ISA DMA channels. The IDE conroller has 16 * 32-bit buffers for IDE PCI burst transfers integrated.

Both the primary and the secondary IDE bus can handle up to 2 hard drives or other IDE devices. The BIOS has support for ATAPI devices and it also supports booting from the CD-ROM.

The primary IDE interface, when enabled, reserves IRQ 14, and IRQ 15 is used if the secondary IDE controller is enabled.

BIOS auto-detects attached IDE devices automatically. The on-board PCI bus IDE interfaces, i.e. Primary and Secondary IDE interfaces can be disabled from the Resident SETUP Utility. More information about available settings of the IDE devices and IDE interfaces, see BIOS SETUP settings in section 3 in this handbook.

USB controller

The Universal Serial Bus (USB) master controller with dual-port hub is integrated in PIIX4e. Two USB port connectors are provided on the rear panel.

Graphics

The system board has an on-board graphics controller. The on-board graphics is based on ATI's '3D RAGE PRO TURBO', 2X AGP, 64-bit 3D graphics engine with 4 kB on-chip texture cache and 8 MB SDRAM (100 MHz SDRAM). The AGP bus based graphics accelerator (3.3 V, Bus Master device) supports 133 MHz bus speed with sidebands and pipelining.

The amount of the SDRAM is fixed to 8 MB and cannot be upgraded. The RAMDAC, which has 64-bit data path to the SDRAM, can handle pixel frequencies up to 240 MHz. The video interface is DDC1, DDC2B+ and VESA DPMS compatible. The system board has no video feature / AMC connector. The on-board graphics controller can be disabled via the jumper on the system board. The IRQ for the video can be enabled/disabled from the BIOS SETUP. Main features of the graphics controller:

H/W Video Acceleration

- Full screen/Full speed Video Playback
- YUV to RGB color space conversion
- DVD / MPEG-2 decode assist
- Front and back end scalers support multi-stream video for video conferencing and other applications
- Hardware mirroring

H/W 2D Acceleration of

- BitBlocktransfer
- Line Draw
- Polygon/Rectangle Fill
- Bit Masking
- Monochrome Expansion
- Panning/Scrolling
- Scissoring
- Full ROP support and 64 x 64 x 2 h/w cursor
- Acceleration in 8-32 Bpp modes

3D

- 1M Triangle/s Setup-Engine
- 4 kB on-chip texture (cache)
- 16-bit Z-buffering
- Single-pass trilinear filtering
- Perspective correct mip-mapping
- Video texturing
- Goraud and Specular Shading
- Alpha blending
- Fog
- Edge anti-aliasing
- Texture lighting
- Sub-pixel and sub-texel accuracy

Refresh rates

Maximum refresh rates (2D) defined for the ATI 3D Rage Pro Turbo AGP graphics controller (depends on the monitor in use).

Resolution	8 bpp (256 colours)	16 bpp (65 k colours)	24 bpp (16.7 M colours)	32 bpp (true colour)
	8 MB [1]	8 MB	8 MB	8 MB
640 x 480	200 Hz	200 Hz	200 Hz	200 Hz
800 x 600	200 Hz	200 Hz	200 Hz	200 Hz
1024 x 768	150 Hz	150 Hz	150 Hz	140 Hz
1152 x 864	120 Hz	120 Hz	120 Hz	100 Hz
1280 x 1024	100 Hz	100 Hz	100 Hz	90 Hz
1600 x 1200	85 Hz	85 Hz	76 Hz	60 Hz

Video memory upgrades

The video memory cannot be upgraded.

Ethernet subsystem

The system board has no on-board LAN. For the add-on board LAN with WOL features, there is a three pin Wake On LAN header on the system board.

Audio

Creative ES1371 PCI audio controller

The system board has a Creative ES1371, PCI, on-board audio controller with AC97 Multimedia audio codec. The audio is PCI 2.1 compliant. It is hardware compatible with Sound Blaster Pro.

The ES1371 solution is Sound Blaster and Sound Blaster Pro compatible via emulation, Roland MPU401 compatible via emulation and in full compliance with Multimedia PC Level 3 specifications. In addition, the ES1371 meets Plug and Play specifications, eliminating any requirement for the user to select I/O and DMA address settings through hardware or software.

The ES1371 is a PCI bus master and slave device that is best understood by looking at the device as four interactive subsystems: the PCI interface, DMA control, LEGACY functions, and the CODEC. The PCI subsystem is a bus master interface that performs the memory accesses to keep the audio cache buffers full and empties the A/D Converter (or I 2 S input) buffer to main memory as required. The fundamental concept of ES1371 is that the PCI interface controller has a sufficiently large internal (on-chip) memory cache to meet the memory bandwidth requirements.

There is a sound cache block of 64 bytes for each of the audio channels. It is the responsibility of the DMA control and the software to keep the buffers full. All system control registers are accessed via I/O on the PCI bus. The ES1371 uses 16 Long Words in the I/O space for control registers. All registers are read as Long Words. All registers are written in byte word or long word format. The ES1371 essentially implements a 3 channel DMA controller. These virtual DMA channels are implemented via the CCB, PCI and Serial interface modules. The serial interface signals the CCB module when a cache transfer is required (playback or record). The CCB module then signals the PCI module to initiate a bus master data transfer. At this point the CCB and PCI modules will control the data transfer between host system memory and the ES1371 internal cache.

The LEGACY subsystem is the circuitry required to perform Sound Blaster, OPL-FM and MPU-401 emulation. Functionally the ES1371 traps on access of the Sound Blaster registers and then issues the appropriate IRQ or SERR command on the PCI bus. The ES1371 handles the Legacy DMA function in a similar fashion. The exact functionality of the block cannot be fully disclosed at this time due to pending patent protection for the application of this technique.

AC97 Audio Codec

The CODEC controller supports any AC97 compliant CODEC. The functionality of the A/D and D/A sections are similar to those found in other standard CODECs. The A/D portion of the CODEC is handled as an independent asynchronous event with a DMA buffer control structure. Each time the A/D FIFO is filled, a Bus Master request occurs and the FIFO is transferred to main memory.

Audio resources (Windows 98, typical resources)

Creative ES1371 audio (drivers provided by Creative):

Device	IRQ	DMA	I/O (hex)
Creative Sound Blaster AudioPCI 64V	10		E800-E83F
SB AudioPCI 64V Legacy Device		01	0220-022F, 0330-033F, 0388-038B, 0530-0537
GamePort			0200-0207

Audio resources (Windows 98, typical resources for DOS applications)

Creative ES1371 audio (SB AudioPCI 64V Legacy Device, drivers provided by Creative):

Device	IRQ	DMA	I/O (hex)
Sound Blaster Pro Emulation	7	01	0220-022F
Soundscape Emulation	7	01	0330-033F, 0530-0537
MPU-401	7		0330-033F, 0388-038B
AdLib			0388-038B

Audio connectors in the system unit:

- On the system board's rear panel: Microphone Input (mono), Input (stereo), Output (stereo), MIDI/Joystick
- On the system board: CD audio, Telephony

Add-on board slots on system board

The system board in ErgoPro e368-series has the following slots:

- 3 PCI slot (32-bit)
- 1 shared PCI slot (32-bit) / ISA slot (16-bit)
- 1 ISA slot (16-bit)

All PCI slots are master slots.

Front panel indicators

The front panel has three (3) indicators (LEDs), from top to bottom:

Function	Colour of the LED	I/O (hex)
IDE Hard Disk activity	Green	Illuminated during IDE HDD activity.
Power On	Green	Illuminated during the power is On.
Power save mode	Orange	Illuminated when the system is in Power Save mode.

Advanced Power Management (APM)

APM's energy saving suspend mode can be initiated in the following ways:

- Specify a time-out period in Setup
- Use an operating system option, such as the Standby menu item in Windows 98

In suspend mode, the system board can reduce power consumption by spinning down IDE hard drives, and reducing power to or turning off VESA DPMS-compliant monitors. Power-management mode can be enabled or disabled in Setup. While in suspend mode, the system retains the ability to respond to external interrupts and service requests, such as incoming faxes or network messages. Any keyboard or mouse activity brings the system out of suspend mode and immediately restores power to the monitor. The BIOS enables APM by default; but the operating system must support an APM driver for the power-management features to work. For example, Windows 9x supports the power-management features upon detecting that APM is enabled in the BIOS.

Advanced Configuration and Power Interface (ACPI)

ACPI gives the operating system direct control over the power management and Plug and Play functions of a computer. ACPI requires an ACPI-aware operating system, f.eg. Windows 98. ACPI features include:

- Plug and Play (including bus and device enumeration) and APM functionality normally contained in the BIOS
- Power management control of individual devices, add-in boards (some add-in boards may require an ACPI-aware driver), video monitor, and hard disk drives
- Methods for achieving less than 30-watt system operation in the Power On Suspend sleeping state, and less than 5-watt system operation in the Suspend to Disk sleeping state
- A Soft-off feature that enables the operating system to power off the computer
- Support for multiple wake up events
- Support for a front panel power and sleep mode switch

Supported ACPI states

The system board supports the ACPI states S0 (=G0), S1 and soft off S5 (=G2).

Wake up devices and events

The table below describes which devices or specific events can wake up the computer from specific states:

These devices / events can wake up the computer ...	... from this state
Power switch	S1, S5
RTC alarm	S1, S5
LAN	S1, S5
Modem	S1, S5
IR command	S1
USB	S1
PS/2 keyboard or mouse	S1

Hardware Monitor

There is no hardware monitor subsystem on the system board.

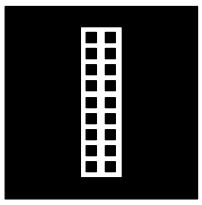
Wake on Modem Ring

Wake on Ring enables the computer to wake from sleep or soft-off mode when a call is received on a telephony device, such as a modem, configured for operation on COM1. The first incoming call powers up the computer. A second call must be made to access the computer. To access this feature use the 'Wake On Modem Ring' connector.

Wake on LAN (WOL)

Wake on LAN technology enables remote wakeup of the computer through a network. Wake on LAN technology requires a PCI add-in network interface card (NIC) with remote wakeup capabilities. The remote wakeup connector on the NIC must be connected to the onboard Wake on LAN technology connector. The NIC monitors network traffic at the MII interface; upon detecting a Magic Packet, the NIC asserts a wakeup signal that powers up the computer. To access this feature use the 'Wake on LAN' connector.

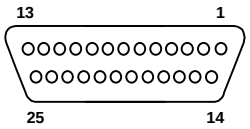
Note: *For Wake on LAN, the 5-V standby line for the power supply must be capable of delivering +5 V ± 5 % at 720 mA. Failure to provide adequate standby current when implementing Wake on LAN, can damage the power supply.*



Section 7 :

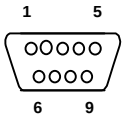
Pin assignments

Parallel port (Standard mode)



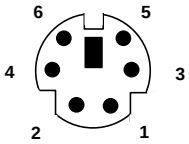
PIN	In/Out	Signal
1	Out	Strobe
2	In/Out	Data bit 0
3	In/Out	Data bit 1
4	In/Out	Data bit 2
5	In/Out	Data bit 3
6	In/Out	Data bit 4
7	In/Out	Data bit 5
8	In/Out	Data bit 6
9	In/Out	Data bit 7
10	In	Acknowledge
11	In	Busy
12	In	Paper End
13	In	Select
14	Out	Auto Line Feed
15	In	Error
16	Out	Initialise Printer
17	Out	Select In
18- 25	-	Ground

Serial port



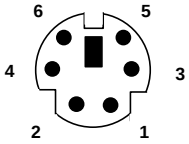
PIN	In/Out	Signal
1	In	Carrier Detect
2	In	Receive Data
3	Out	Transmit Data
4	Out	Data Terminal Ready
5	-	Signal Ground
6	In	Data Set Ready
7	Out	Request to Send
8	In	Clear to Send
9	In	Ring Indicator

Mouse port



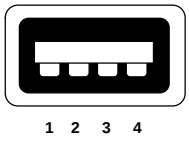
PIN	Signal
1	Data
2	No connect
3	Ground
4	+ 5 V DC
5	Clock
6	No connect
Shield	Frame Ground

Keyboard connector



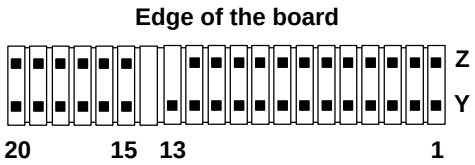
PIN	Signal
1	Data
2	No connect
3	Ground
4	+ 5 V DC
5	Keyboard Clock
6	No connect
Shield	Frame Ground

Universal Serial Bus (USB) connector



PIN	Signal
1	VCC (Cable power)
2	- Data
3	+ Data
4	Ground(Cable ground)

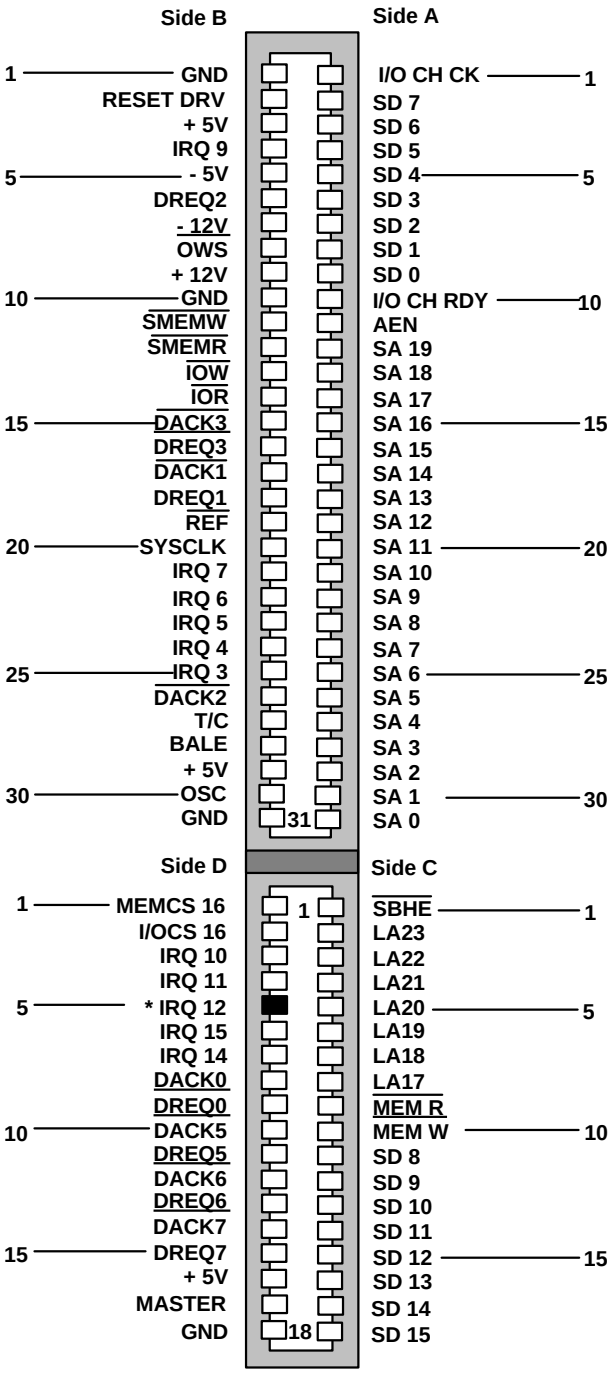
VGA pass-through/AMC connector on ATI graphics adapters



PIN	Signal
Y1	Pixel Data 0
Y2	Pixel Data 1
Y3	Pixel Data 2
Y4	Pixel Data 3
Y5	Pixel Data 4
Y6	Pixel Data 5
Y7	Pixel Data 6
Y8	Pixel Data 7
Y9	Pixel Data Clock
Y10	Blanking
Y11	Horizontal Sync
Y12	Vertical Sync
Y13	Ground
Z1 - Z3	Ground
Z4	Enable external Pixel Data
Z5	Enable External Sync
Z6	Enable External Clock
Z7	Not used
Z8 - Z11	Ground
Z12 - Z13	Not used

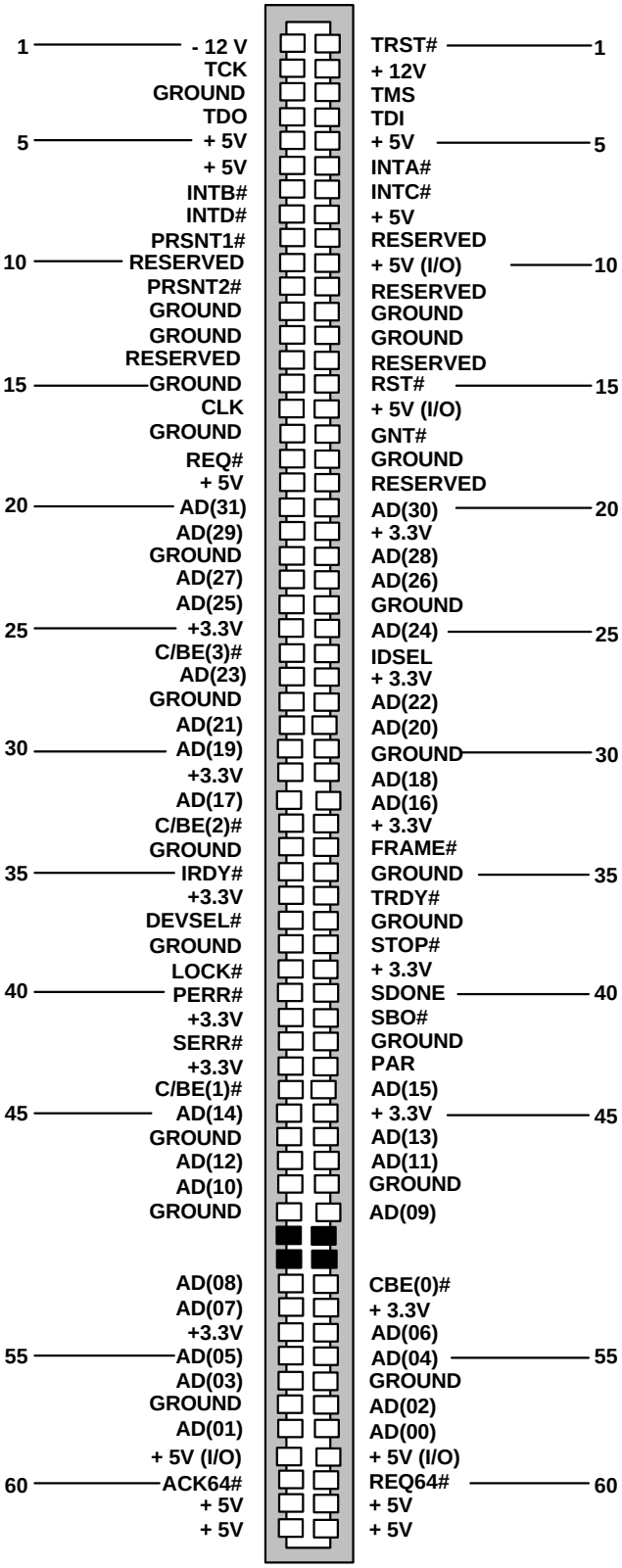
VGA feature connector meets VESA specification VS890803. All VGA feature connector signals are TTL level signals.

ISA bus connector



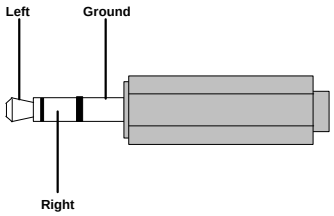
***** : Reserved for PS/2 type mouse, but the mouse interface can be disabled from the RSU (setup)

PCI bus connector

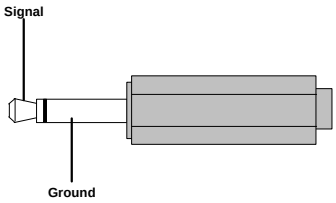


Audio connectors

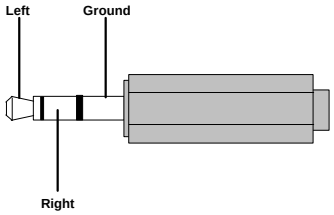
Speaker type connector



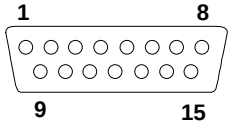
Microphone type connector (if not as speaker type connector)



Line-In type connector

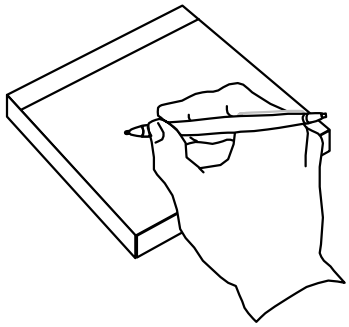


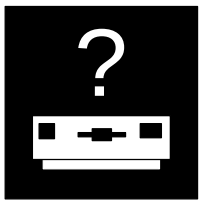
MIDI/Joystick connector



PIN	Signal	PIN	Signal
1	Vcc	**9**	Vcc
2	JBUT0	**10**	JBUT2
3	JSX1	**11**	JSX2
4	Ground	**12**	MIDI OUT
5	Ground	**13**	JSY2
6	JSY1	**14**	JBUT3
7	JBUT1	**15**	MIDI IN
8	Vcc		

THIS PAGE IS INTENTIONALLY LEFT BLANK !





Section 8 :

Machines identification

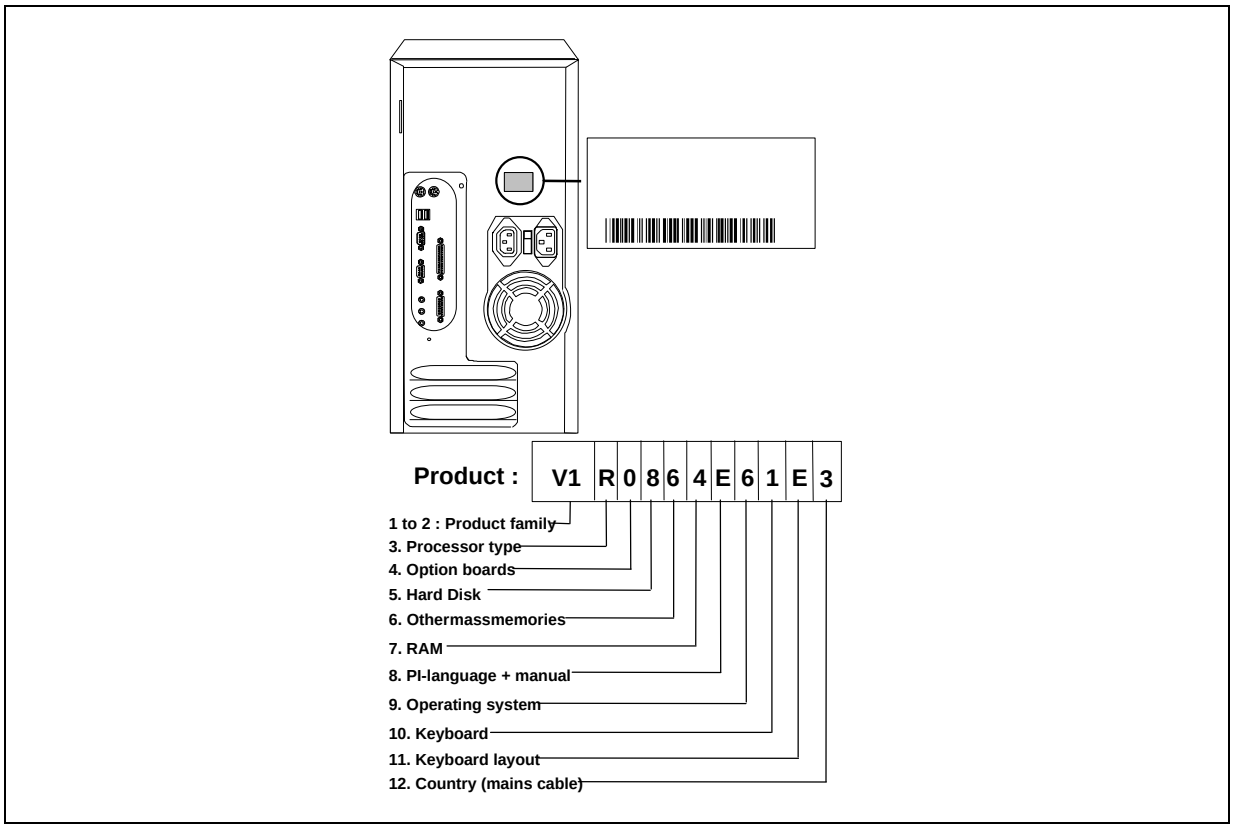
e368-series : structure code

Every ErgoPro has a configuration label located in the system unit. The configuration label consists of information of identifying the ErgoPro model, it's configuration and it's serial number, example:

- the exact name of the ErgoPro model: **e368/450**-64-6.4GB
- the amount of RAM installed: e368/450-**64**-6.4GB
- the size of the Hard Disk installed: e368/450-64-**6.4GB**
- the structure (product) code: **V1R086E61E3**
- the serial number of the PC: **78503V8** (where 7**8**503V8 defines the manufacturing year of this PC as 1998, and 78**50**3V8 defines the manufacturing week of this PC as week 50 of the year 1998.

In ErgoPro e368-series, the configuration label is located in the rear panel. The picture below shows the location of the configuration label in the rear panel on e368-series.

The twelve (12) digit code (i.e. a structure code, sometimes referred as a product code) can be divided into eleven parts, indicating that way the exact configuration of the machine. The following pages explain those codes.



Identification codes

The following code information should be used for product identification **only**. The information should **not** be used to build up an ordering code (Customer specific structure codes are not listed below).

1-2. PRODUCT FAMILY

V1	e368	***with on-board graphics and audio, w/o on-board LAN***	AF33147

3. PROCESSOR TYPE +HEATSINK with FAN + URM

H	Pentium II 350 MHz	AF35004 + A6701776 + A6750207
J	Pentium II 400 MHz	AF35002 + A6701776 + A6750207
R	Pentium II 450 MHz	AF35003 + A6701776 + A6750207

4. OPTION BOARDS

0	No option board(s)	
1	Intel 100 Pro+ WfM, PCI	PN010287 + PN013068
2	Olicom OC3137, PCI	PN011038
3	3COM EtherLink XL, PCI	PN010295 + PN013068

5. HARD DISK

0	No HDD	
4	2.0 GB IDE	AF21229
6	3.2 GB IDE	AF21232
7	4.3 GB IDE	AF21233
8	6.4 GB IDE	AF21234
9	10.1 GB IDE	AF21245

6. OTHER MASSMEMORIES

0	No (other) mass memories	
4	Travan 4 GB	AF23253
6	CD-ROM 32x, IDE	AF23343S
E	CD-RW 6x / 2x, IDE	AF23324

7. RAM

2	32 MB SDRAM (DIMM)	AF33862J
4	64 MB SDRAM (DIMM)	AF33863J
5	128 MB SDRAM (DIMM)	AF33864J

8. PI-LANGUAGE + MANUAL

A	Hungarian
E	English
F	Danish
G	German
H	Spanish
J	French
K	Dutch
L	Norwegian
M	Finnish
N	Swedish
P	Portuguese
S	Italian
V	Czech
Y	Polish

9. PRE-INSTALLED OPERATING SYSTEM

3	Windows NT 4.0 Workstation + MS Word 97
6	Windows 98 + MS Word 97

10. KEYBOARD

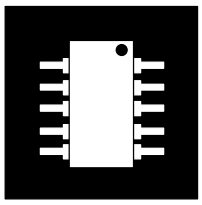
0	None
1	e105
3	a105

11. KEYBOARD LAYOUT

0	None
2	Belgium
3	US
A	Hungarian
B	Swiss
E	English
F	Danish
G	German
H	Spanish
J	French
K	Dutch
L	Norwegian
M	Finnish
N	Swedish
P	Portuguese
S	Italian
V	Czech
Y	Polish

12 COUNTRY (MAINS CABLE(S) + BADGE + WHEELMOUSE)

1	EU cable, Fujitsu
2	EU cable, MikroMikko
3	UK cable, Fujitsu
5	DK cable, Fujitsu
6	CH cable, Fujitsu
7	US cable, Fujitsu
8	IT cable, Fujitsu
A	AUS cable, Fujitsu
B	South Africa, Fujitsu



Section 9 :

Specification tables
Memory tables

Machine specifications

Processor related information of e368-series

Used on	e368/350 (V1H)	e368/400 (V1J)	e368/450 (V1R)
Processor type	Intel Pentium II™, SECC or SECC2 package	Intel Pentium II™, SECC or SECC2 package	Intel Pentium II™, SECC or SECC2 package
Processor speed	350 MHz	400 MHz	450 MHz
MMX support	Yes		
Fujitsu code	SECC: PL060640, SECC2: PL060643 (both kits include active heatsink)	SECC: PL060641, SECC2: PL060644 (both kits include active heatsink)	SECC: PL060642, SECC2: PL060645 (both kits include active heatsink)
Heatsink	Yes, an active heatsink (i.e. with fan) is attached to the processor's SECC(2) package.		
External clock (Front Side Bus)	100 MHz		
Clock multiplier	3.5	4	4.5
System clock	66 MHz (AGP), 33 MHz (PCI), 8 MHz (ISA)		
Operating voltage	2.0 V PSU/regulator is automatically adjusted to the right voltage level by the VID pins of the CPU		
Power consumption of the processor chip (total)	21.5 W	24.3 W	27.1 W
1st level cache (L1)	Built-in to the Pentium II processor: Integrated 16 kB instruction and 16 KB data, nonblocking, level one cache		
2nd level cache (L2)	Built-in to the SECC(2) package, 512 kB, with ECC		
	175 MHz	200 MHz	225 MHz
Co-processor	Floating Point Unit built-in to the Intel Pentium II processor		
Overdrive	Not available		

General information of e368-series

General	e368/350, e368/400, e368/450
Socket type	242 pin slot 1 connector with Universal Retention Mechanism (URM) for Intel Pentium II processors
System board	AC41760
BIOS ID	2A69KM4E
Audio	On-board audio (PCI): Creative ES1371 audio controller and AC97 Multimedia Audio Codec
Floppy drive interface	On-board, PC82077AA compatible (integrated in Winbond's W83977TF Super I/O controller)
Graphics	On-board graphics (AGP), no AGP slot: ATI 3D Rage Pro Turbo (2x) graphics controller with 8 MB of SDRAM (memory not upgradeable)
ATI AMC 2.0	Not available (no video feature connector)
IDE interface	On-board: PCI bus enhanced IDE interface with two connectors located on the system board, supporting Ultra DMA/33, PIO 4 and DMA 2 mode IDE hard disks and ATAPI devices
IDE hard disks	2.0 GB, 3.2 GB, 4.3 GB, 6.4 GB and 10.1 GB Ultra DMA/33 IDE HDDs with SMART support.
SCSI interface	Not available
SCSI hard disks	Not available
LAN	No on-board LAN, optional PCI add-on boards: Intel EtherExpress 100+ WfM, 3COM EtherLink XL PCI (3C905B)
Parallel port	On-board: one bi-directional parallel port with 25-pin female connector (supported modes SPP, IEEE1284 ECP and EPP v. 1.7 & v.1.9, integrated in Winbond's W83977TF Super I/O controller)
Serial ports	On-board: two 16C550 compatible serial ports, with one 9-pin male connector on the rear panel (16-bytes FIFO, UARTS integrated in Winbond's W83977TF Super I/O controller). *NOTE: only one serial port available (rear panel) and supported, 2nd serial port connector available on the system board.*
USB	On-board: two USB connectors on the rear panel
Serial Infrared support	Not available

Architecture & Configuration of e368-series

	e368/350, e368/400, e368/450
Chip set	Intel 440BX AGPset (i.e. 82443BX and 82371EB, i.e. PIIX4e)
Memory banks	2, with SDRAM support
SIMM modules / bank	Not available
DIMM modules / bank	1
DIMM type	100 MHz (PC100), non-ECC
BIOS	256 kB (i.e. 2 Mb) Boot Block Flash RAM, Award BIOS platform (kernel v. 4.51PGM) with ACPI 1.0, APM 1.2, DMI 2.0 and SMBIOS 2.1, PnP 1.0a, PCI 2.1, PCI PM 1.0, USB 1.0 support, no Fujitsu Computers XAPI support
Keyboard controller	Industry standard, 8042 compatible, integrated in Winbond's W83977TF Super I/O controller
Theft prevention	User and Admin passwords in System BIOS (no AntiTheft), customised boot order, optional padlock
Power Management	Yes, APM rev. 1.2 compliant (Windows 95 and Windows 98), ACPI 1.0 compliant (for Windows 98 only)
Desktop Management	Yes, DMI 2.0 and SMBIOS 2.1
Floppy drive	Yes, a place for one 3.5" floppy drive, BIOS support: 720kB, 1.44MB and 2.88MB (3.5"), 360kB and 1.2MB (5.25")
Architecture/ Expansion slots	Slots on the system board (no AGP slot): two PCI (32 bit), one shared PCI/ISA, one ISA (16-bit)
Mass memory bays	No 3.5" device bay. Two individual, removable 3.5" frames: one for the FDD (horisontal), front accessible, and another one for the IDE HDD (vertical), not front accessible. A fixed 5.25" device bay for two 5.25" or 3.5" devices. Attaching the 3.5" device to the 5.25" bay requires rails. Devices attached to the 5.25" bay are front accessible.
HD silencer	No
Power supply	90 W MicroATX-style, WOL support, 110/240 V, 48 Hz to 63 Hz, Power Supply Unit has a monitor outlet connector
Fans	One housing fan, embedded in the PSU (air out from the PSU/housing). CPU fan in all models. The fans are not temperature controlled.
Dimensions	
Width	180 mm
Heigth	360 mm
Depth	350 mm (365 mm with lock mechanism)
Weigth	8.5 kg (approx.)

System memory map

Address range	Size	Use	Cached
000000 - 09FBFF	639 kB	Base memory	Yes
09FC00 - 09FFFF	1 kB	Extended BIOS data area	Yes
0A0000 - 0AFFFF	64 kB	VGA graphics	No
0B0000 - 0B7FFF	32 kB	VGA text (colour mode)	No
0B8000 - 0BFFFF	32 kB	VGA text (mono mode)	No
0C0000 - 0C7FFF	32 kB	VGA BIOS	Yes
0C8000 - 0DFFFF	96 kB	Free	No
0E0000 - 0EFFFF	64kB	System BIOS (available as UMB)	No
0F0000 - 0FFFFF	64kB	System BIOS	Yes
100000 - 10000000 (1	255 MB	Extended memory	Yes
E000000 - E3FFFFFF	64 MB	Intel 82443BX PII to PCI bridge	Yes
E400000 - E4FFFFFF	16 MB	ATI 3D Rage Pro Turbo AGP	Yes
E600000 - E6000FFF	4 kB	ATI 3D Rage Pro Turbo AGP	Yes

(1 Top Of Memory (max. 256 MB)

Memory configurations e368-series

Bank 0	Bank 1	Total Memory
32 MB	-	32 MB
32 MB	32 MB	64 MB
64 MB	-	64 MB
32 MB	64 MB	96 MB
64 MB	64 MB	128 MB
128 MB	-	128 MB
32 MB	128 MB	160 MB
64 MB	128 MB	192 MB
128 MB	128 MB	256 MB

The system board provides two 168-pin, gold plated, 3.3 V DIMM sockets. The two (2) DIMM sockets are arranged in one bank per one socket. The sockets are designated from Bank 0 and Bank 1. Both banks provide a 64/72-bit wide data path. There are no jumper settings required for the memory size or type. The system BIOS automatically detects the memory modules.

The sockets support 4M x 64 (32 MB), 8M x 64 (64 MB) and 16M x 64 (128 MB) single- or double-sided modules, Synchronous DRAM DIMM modules. ***EDO DIMMs are not supported***. ***Minimum supported memory size is 32 MB*** and maximum memory size is 256 MB, using two 128 16M x 64 SDRAM DIMM modules. DIMMs must be gold plated, 4-clock, 100 MHz (PC100) or faster, unbuffered, SDRAM modules. Each DIMM module must have an nvram (SPD).

All SDRAM DIMMs that are used must comply with the PC SDRAM specifications:

- *The PC SDRAM Specification (memory component specific), version 1.62*
- *The PC Unbuffered DIMM Specification, version 1.0*
- *The PC Serial Presence Detect (SPD) Specification, version 1.2A*

In addition to memory combinations mentioned in the table above, all memory combinations of mixing 32 MB, 64 MB and 128 MB DIMMs randomly in two sockets are allowed.

Note: All configurations use non-parity (non-ECC) SDRAM DIMMs.

DIMM recommendations for e368-series

DIMM size (MB)	Description	Speed	Voltage	Type	Clock lines	Pins	Module	Kit code
32	4M*64	100 MHz	3.3V	SDRAM	4	168	AF33862K	PL060197
64	8M*64	100 MHz	3.3V	SDRAM	4	168	AF33863K	PL060198
128	16M*64	100 MHz	3.3V	SDRAM	4	168	AF33864K	PL060199

Explainations of the terms :

Speed: For SDRAM DIMMs this is the slowest clock speed that can be used (in MHz).
Module: Product code which is used to identify spares numbers and correct DIMM brands used with these machines.
Kit code: This is the code that can be used when ordering memory upgrades. The kit includes one (1) DIMM.

DMA channels

The system board supports seven ISA-compatible DMA channels by utilising two DMA controller chips which operate in cascade mode as a master-slave pair. The slave uses channels 0 to 3, supporting 8-bit data transfers while the master controller uses channels 4 to 7, supporting 16-bit data transfers. Controllers are 8237A compatible.

The following table lists each DMA channel and its use.

16-bit channels	8-bit channels	Use(s)
Master	Slave	
(CTRL1)	(CTRL2)	
	CH 0	
	CH 1	Audio
	CH 2	Floppy Disk Drive controller
	CH 3	Parallel Port (for ECP)
CH 4		Cascading slave to master
CH 5		
CH 6		
CH 7		

Interrupt levels

Two programmable interrupt controllers supply interrupt control. The controllers are cascaded together as a master-slave pair and provide 15 ISA-compatible interrupt levels. Excluding NMI, all interrupts can be masked. Controllers are 8259A compatible.

The table below shows the interrupt level assignments.

Interrupt	Function
NMI	Parity error (System memory does not have parity checking)
Master (Controller 1)	
IRQ0	Timer output 0 (internal)
IRQ1	Keyboard controller
IRQ2	Interrupt from slave
IRQ3	Audio (shareable)
IRQ4	Serial Port 1 (COM1)
IRQ5	Audio
IRQ6	Floppy Disk Drive controller
IRQ7	Parallel Port 1 (LPT1)
Slave (Controller 2)	
IRQ8	Real-time Clock
IRQ9	System Control Interrupt (SCI, only in Windows 98 ACPI-mode, shareable)
IRQ10	ATI 3D Rage Pro Turbo, when IRQ enabled (shareable)
IRQ11	USB Host controller (shareable)
IRQ12	PS/2-type mouse device
IRQ13	Math co-processor error
IRQ14	Primary IDE interface
IRQ15	Secondary IDE interface

I/O addresses

The I/O address map is shown below. The hexadecimal addresses 0000 to 00FF are reserved for the system board I/O. The addresses hex 0100 through 03FF are available for the I/O channel. Additional addresses are allocated for the TokenRing adapter boards, and serial ports COM3 and COM4.

System board addresses 0000 to 00FF

Hex range	Device
0000 - 000F	DMA controller 1, slave
0020 - 0021	Interrupt controller 1, master
0040 - 0043	System Timer
0060	Keyboard controller
0061	Speaker
0064	Keyboard controller
0070 - 0071	Real Time Clock
0081 - 0091	DMA controller
00A0 - 00A1	Interrupt controller
00C0 - 00DF	DMA controller
00F0 - 00FF	Numeric processor

I/O channel addresses 0100 to 03FF

Hex range	Device
0170 - 0177	Secondary IDE interface
01F0 - 01F7	Primary IDE interface
0201 - 0201	Audio, Gameport
0220 - 022F	Audio
0228 - 022F	Parallel port 3 (LPT 3)
0278 – 027F	Parallel port 2 (LPT 2)
02E8 - 02EB	Serial port 4 (COM4)
02F8 - 02FF	Serial port 2 (COM2)
0330 - 0331	Audio
0376 - 0377	Secondary IDE interface
0378 – 037F	Parallel port 1 (LPT1)
0388 - 038B	Audio
03B0 - 03BB	ATI 3D Rage Pro Turbo
03C0 - 03DF	ATI 3D Rage Pro Turbo
03E8 - 03EF	Serial port 3 (COM3)
03F0 - 03F5	Floppy Disk Drive controller
03F6 - 03F6	Primary IDE interface
03F8 - 03FF	Serial port 1 (COM1)

I/O channel addresses 0400 to FFFF

Hex range	Device
0480 - 048F	PCI bus
04D0 - 04D1	PCI bus
0678 - 067B	Parallel port 2 (LPT 2), ECP mode
0778 - 077B	Parallel port 1 (LPT 1), ECP mode
0CF8- 0CFF	PCI bus (PCI configuration address registers)
4000- 4041	PCI bus
5000- 500F	PCI bus
8000 - 800F	Audio
D000 - D0FF	ATI 3D Rage Pro Turbo controller
E000 - E017	USB controller
F000 - F007	Primary IDE controller
F008 - F00F	Secondary IDE controller
FF00 - FF07	IDE Bus Master register

PCI Configuration Space Map

Bus number (hex)	Device number (hex)	Function number (hex)	Description
00	00	00	Intel 82443BX Host Bridge (PAC)
00	01	00	Intel 82371EB PCI-to-PCI Bridge (PIIX4e)
00	07	00	Intel 82371EB PCI/ISA Bridge (PIIX4e)
00	07	01	Intel 82371EB IDE Bus Master (PIIX4e)
00	07	02	Intel 82371EB USB (PIIX4e)
00	07	03	Intel 82371EB Power Management (PIIX4e)
01	00	00	ATI 3D Rage Pro Turbo graphics controller (PCI)

Timer

The system board has three programmable timers, defined as follows :

Channel	Use
CH 0	System timer
CH 1	DRAM refresh timer
CH 2	Tone generator (Speaker)

Real-time clock (RTC) and CMOS RAM

A real-time clock component provides Real-Time Clock and Calendar functions. The circuit, which is DS1287 and MC146818 compatible, contains 256 bytes of battery-backed-up CMOS-static RAM memory used for clock functions, and for storing the configuration information (e.g., the number of diskette drives, the amount of system board memory, etc.).

The CMOS RAM memory is backed up with a non-rechargeable battery that has a considerable lifetime. However, should the battery begin to fail, the following message (and possibly others) appears on the screen during the power-on test:

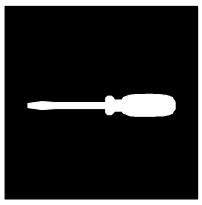
CMOS BATTERY HAS FAILED

A used battery is an external coin-cell style , 3 V Lithium Cell battery (f.eg. ***Sony CR2032***), which provides power to the RTC and CMOS memory. The battery has an estimated life of three (3) years. The clock is accurate to ± 13 minutes per year at 25 °C with 3.3 V applied.

Power supply

Characteristics

Power supply	90 W AF81091
Input voltage ± 10%	100-120 V / 200-240 V
Input frequency ± 5%	50-60 Hz
Max power input (w/o monitor)	N/A
Max power output	90 W
Max output current (peak) :	
+3.3 V ± 5 %	6 A
+5V ± 5 %	12 A
-5V ± 5 %	0.5 A
+12V ± 5 %	4.8 A
-12V ± 5 %	0.2 A
+5VSB ± 5 %	0.72 A
Max ground leakage current	
115V/60Hz	N/A
230V/50Hz	N/A



Section 10 :

Spare parts table

Spare parts for e368-series

Part No	**Description**	**MTBF**
AC41760 (1	System board, with on-board graphics & audio (without on-board LAN)	110 000
AC41762 (2	System board, with on-board graphics & audio (without on-board LAN)	110 000
PL060640 (3	Intel Pentium II processor (PLGA), 350 MHz, with L2 cache (SECC package with active heatsink ready attached)	
PL060643 (4	Intel Pentium II processor (PLGA), 350 MHz, with L2 cache (SECC2 package with active heatsink ready attached)	
PL060641 (5	Intel Pentium II processor (PLGA), 400 MHz, with L2 cache (SECC package with active heatsink ready attached)	
PL060644 (6	Intel Pentium II processor (OLGA), 400 MHz, with L2 cache (SECC2 package with active heatsink ready attached)	
PL060642 (7	Intel Pentium II processor (PLGA), 450 MHz, with L2 cache (SECC package with active heatsink ready attached)	
PL060645 (8	Intel Pentium II processor (OLGA), 450 MHz, with L2 cache (SECC2 package with active heatsink ready attached)	
A6750207 (9	Universal Retention Mechanism (URM) for processors	
AF33862K (10	32 MB SDRAM DIMM module, PC100 (non-ECC)	250 000
AF33863K (10	64 MB SDRAM DIMM module, PC100 (non-ECC)	250 000
AF33864K (10	128 MB SDRAM DIMM module, PC100 (non-ECC)	250 000
AF21229	IDE HDD, 2.0 GB, Ultra DMA/33 with SMART support	300 000
AF21232	IDE HDD, 3.2 GB, Ultra DMA/33 with SMART support	300 000
AF21233	IDE HDD, 4.3 GB, Ultra DMA/33 with SMART support	300 000
AF21234	IDE HDD, 6.4 GB, Ultra DMA/33 with SMART support	300 000
AF21245	IDE HDD, 10.1 GB, Ultra DMA/33 with SMART support	300 000
AF81091	PSU, 90 W	100 000
AF22165	Floppy drive, 1.44 MB, 3.5”	30 000
AF23343S	ATAPI CD-ROM, 32x	100 000
AF23324	ATAPI CD-RW, 6x/2x	120 000
AF23253	ATAPI Travan 4, 4 GB	200 000
CA32071-C010 (11	Front Panel, plastic	
CA72001-0614	Cable, FDD	
CA72001-1687	Cable, IDE (for one IDE HDD/ATAPI device)	
CA72001-0538	Cable, IDE (Cable Select cable for two IDE HDD/ATAPI devices)	
A7108104	Cable, CD audio	
CA72001-1633 (12	Cable, Front Panel (including the LEDs and the power switch)	
SE90244UA (13	Drivers and Utilities CD v. 1.0 for e368-series	

(1 The system board has two Fujitsu identification labels (stickers):
- AC-code without serial number (AC41760)
- AF-code with serial number (AF33147)

The AC-code should be used as a spare part number (because the AC-code includes a Universal Retension Mechanism for processor and rear panel I/O shield ready attached to the board. The AF-code refers only to the system board itself (PCB) and should not be used as such).

(2 New revision of the system board:
- This new revised system board will be phased in production during 1Q99.
- In the new revised board, audio controller Creative ES1371 has been replaced by Creative ES1373.
- AC-code without serial number (AC41762)
- AF-code with serial number (AF33149)

The AC-code should be used as a spare part number (because the AC-code includes a Universal Retension Mechanism for processor and rear panel I/O shield ready attached to the board. The AF-code refers only to the system board itself (PCB) and should not be used as such).

(3 PL-code for 350 MHz processor includes
- The Intel Pentium II processor (PLGA), with 512 kB L2 cache (i.e. SECC package), AF35001
- Active heatsink (i.e. heatsink with fan) ready attached to the SECC, A6701776 (this code can be used if the CPU fan is broken)
- The active heatsink, A6701776, is attached to the SECC with two attachment clips (part number for one clip: A6400892).

(4 PL-code for 350 MHz processor includes
- The Intel Pentium II processor (PLGA), with 512 kB L2 cache (i.e. SECC2 package), AF35004
- Active heatsink (i.e. heatsink with fan) ready attached to the SECC2, A6701780 (this code can be used if the CPU fan is broken). The code A6701780 includes the mounting mechanism for attaching active heatisink to SECC2.

- There is an optional mechanism of attaching active heatsink to SECC2, i.e. by using two Barbed Spring Pins (part number for one spring: A6400904).
- This new active heatsink for SECC2 (PLGA based processor) is not backwards compatible for SECC based Pentium II processors, and vice versa.
- The part A6701780 is not compatible with the part A6701781.
- The SECC2 based 350 MHz Pentium II processor is phased in production during Dec-98 - Jan 99.
- The SECC and SECC2 based processor spare part kits can be used (availability) in parallel (they both fit to slot 1 and URM).

(5 PL-code for 400 MHz processor include
- The Intel Pentium II processor (PLGA), with 512 kB L2 cache (i.e. SECC package), AF35002
- Active heatsink (i.e. heatsink with fan) ready attached to the SECC, A6701776 (this code can be used if the CPU fan is broken)
- The active heatsink, A6701776, is attached to the SECC with two attachment clips (part number for one clip: A6400892).

(6 PL-code for 400 MHz processor includes
- The Intel Pentium II processor (OLGA), with 512 kB L2 cache (i.e. SECC2 package), AF35005
- Active heatsink (i.e. heatsink with fan) ready attached to the SECC2, A6701781 (this code can be used if the CPU fan is broken). The code A6701781 includes the mounting mechanism for attaching active heatisink to SECC2.

- There is an optional mechanism of attaching active heatsink to SECC2, i.e. by using two Barbed Spring Pins (part number for one spring: A6400904).
- This new active heatsink for SECC2 (OLGA based processor) is not backwards compatible for SECC based Pentium II processors, and vice versa.
- The part A6701781 is not compatible with the part A6701780.
- The SECC2 based 400 MHz Pentium II processor is phased in production during 1Q99.
- The SECC and SECC2 based processor spare part kits can be used (availability) in parallel (they both fit to slot 1 and URM).

(7 PL-code for 450 MHz processor include
- The Intel Pentium II processor (PLGA), with 512 kB L2 cache (i.e. SECC package), AF35003
- Active heatsink (i.e. heatsink with fan) ready attached to the SECC, A6701776 (this code can be used if the CPU fan is broken)
- The active heatsink, A6701776, is attached to the SECC with two attachment clips (part number for one clip: A6400892).

(8 PL-code for 450 MHz processor includes
- The Intel Pentium II processor (OLGA), with 512 kB L2 cache (i.e. SECC2 package), AF35006
- Active heatsink (i.e. heatsink with fan) ready attached to the SECC2, A6701781 (this code can be used if the CPU fan is broken). The code A6701781 includes the mounting mechanism for attaching active heatisink to SECC2.

- There is an optional mechanism of attaching active heatsink to SECC2, i.e. by using two Barbed Spring Pins (part number for one spring: A6400904).
- This new active heatsink for SECC2 (OLGA based processor) is not backwards compatible for SECC based Pentium II processors, and vice versa.
- The part A6701781 is not compatible with the part A6701780.
- The SECC2 based 450 MHz Pentium II processor is phased in production during 1Q99.
- The SECC and SECC2 based processor spare part kits can be used (availability) in parallel (they both fit to slot 1 and URM).

(9 Universal Retention Mechanism, i.e. URM for supporting processor in slot 1
- This part should NOT be replaced on the field
- Part number includes only one side, i.e. if the whole retention mechanism needs to be replaces, two pieces of A6750207 are needed

(10 These SDRAM DIMMs are PC100 based memory modules and ***can ONLY be used in e368-series*** models (which have 100 MHz Front Side Bus).

(11 The plastic front panel includes the plastic power button (not power switch) and 5.25” bay plastic cover plates.

(12 The front panel cables include power switch, LEDs and piezo speaker, all bundled together.
- The front panel cable is connected to extension cable, part number A8910061, and the extension cable is connected to the system board

(13 The next version of the Drivers and Utilities CD, i.e. version 1.1, will have a part number SE90244UB. When it will be available (Dec 98 - Jan 99), it will automatically replace v. 1.0 of the CD.