

Rugged Industrial Portable Computer

System Assembly Guide



A Technical Guide for System Integrators
and Service Technicians

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Getting Started

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Before You Start

The major component of the subassembly is the chassis, which comes in two models supporting two system board form factors--**ATX** and **Passive Backplane**. The chassis comes pre-assembled with an active matrix LCD, LCD controller, power supply, keyboard, ventilation fans and internal speaker. To complete the system you must add the system board, CPU and peripheral devices.

Before adding these devices, it is important to follow certain basic safety precautions. You should become familiar with the chassis both externally and internally. And you should also have the right tools available to you.

Precautions

Power Connections

Use Supplied Power Cord

The subassembly is shipped with a power cord compatible with the AC wall outlet in your region.

Non-Autosensing Power Supply

Before plugging in the power cord, examine the power supply to see if you have an autosensing or non-autosensing power supply.

Autosensing power supplies automatically adjusts to the AC outlet voltage. A non-autosensing power supply comes with a voltage selector switch located near the AC power connector. Make sure it's set to the appropriate voltage setting for your power outlet.

ATX Power Switch

The power supply shipped with the ATX chassis may or may not have an ON/OFF switch. To power up your system where the power supply has an ON/OFF switch, you must first press the switch to the ON position and then press the ATX power up/down button located on the front to start your system.



The ATX power switch found on the front of the chassis DOES NOT turn off the AC power. To remove AC power from your system, you must unplug the AC power cord from the AC outlet or the chassis.

Ventilation

The chassis comes with two intake fans and one power supply exhaust fan providing cooling and air flow. When operating the system, never block any ventilation openings. Always leave enough room around the chassis to allow adequate air flow.

Care for the LCD

The chassis comes with a pre-assembled active matrix LCD. Liquid crystal displays are made of glass which will break or crack if mishandled. During system assembly, keep the keyboard latched to the chassis. The keyboard housing is constructed of metal and provides front impact protection for the LCD during transportation.

Tools and Supplies Needed

Before beginning your work, make sure you have the following tools and supplies available:

- A #2 Phillips (cross head) screwdriver.
- An anti-static wrist strap (recommended).

Subassembly Contents

The subassembly consists of,

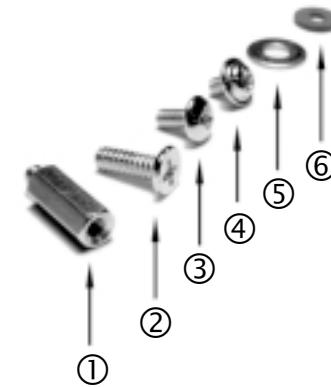
- This subassembly guide.
- Chassis with pre-assembled LCD, LCD controller, power supply, cooling fans, internal speaker and keyboard with integrated pointing device.
- Power cord.
- Carry case.
- Parts for installing motherboard and drives.

See Appendix for technical specifications.

Parts Contents

The subassembly parts kit contains the following hardware for installing boards and drives.

1. System board standoff.
2. Flat head screw (for securing hard disk drives).
3. Round head screw (for securing floppy and CD ROM drives).
4. Round head screw (for securing motherboard on the standoffs).
5. Metal washer (use with the flat head and round head screws for mounting the drives).
6. Insulating washer (when installing the motherboard use it with the round head screw 4).



Identifying Parts and Controls

Opening the Side Access Covers

The side access covers provide side impact protection for the I/O ports and drive bays. Two thumbscrews secure them to the chassis. The access covers must be opened to access the external drive bays and I/O connectors.

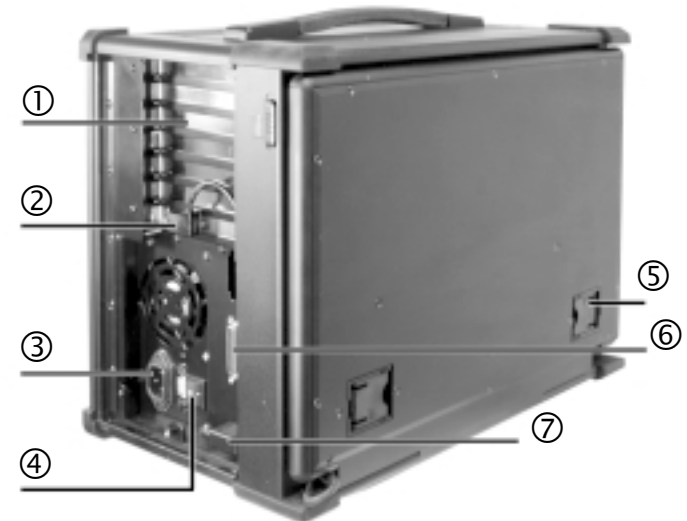
Turn the thumbscrew in the counter clockwise direction to open the access covers.



The access covers are not interchangeable. When operating your system, remove any side cover that does not have ventilation holes to allow adequate air flow.

ATX Model Side Views

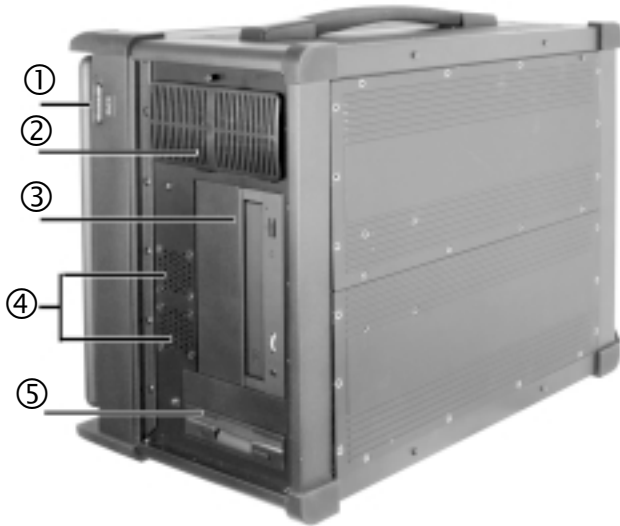
Use the photos below to identify the components and I/O ports that are accessible from the two sides of the chassis. The illustration shows the external connectors and components of a completely assembled ATX system. Your subassembly has only knockout holes instead.



On the left side of the chassis you'll find the following:

1. Slot covers.
2. 15-pin video card connector and cable.
3. AC power connector.
4. Power supply ON/OFF switch.
5. Keyboard tilt-up feet.
6. I/O ports (the type and number of ports are dependent of motherboard).
7. Keyboard/mouse connectors and cable.

On the right side of the chassis you'll find these:

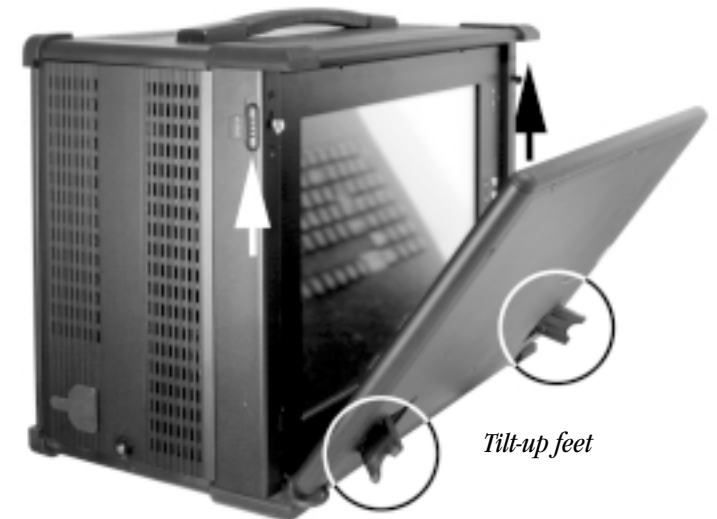


1. Keyboard release latch.
2. Filtered intake fan.
3. Two external 5.25" drive bays.
4. Two intake fans.
5. Two external 3.5" drive bays.

Front View

You access the front panel controls by first disengaging the keyboard. Disengage the keyboard from the chassis latches by sliding the latch tabs on both sides of the chassis upwards as shown, and simultaneously pulling the top part of the keyboard away from the chassis.

The keyboard is still hinged on the bottom by latch bolts. Lay down the keyboard. Use the tilt-up feet to tilt the keyboard if you wish.



Disengaging the keyboard.

On the front side you'll find the following:



Chassis front view showing indicators, controls and keyboard sliding locks.

1. Power ON LED (when on, indicates power delivered to the system) and IDE hard disk activity LED (when blinking, indicates disk activity is occurring).
2. On-screen-display (OSD) menu controls.
3. System reset switch (when pressed, reboots and initializes the system).
4. ATX power switch (powers the system up and down).



The ATX power switch DOES NOT turn off the AC power. To remove AC power from your system, you must unplug the AC power cord from the AC outlet or the chassis.

5. Keyboard latch bolt release pegs.

Detaching the Keyboard

The keyboard is detachable. Normally it's locked to the chassis by two latch bolts. You can detach the keyboard by sliding both release pegs towards each other, compressing the latch bolts until they slide out of the slots. Pull the keyboard away from the chassis and release the pegs.



The standard keyboard.

The Optional Membrane Keyboard

The subassembly comes standard with a mechanical key-switch keyboard. An OPTIONAL membrane keyboard is also available. The membrane keyboard is ideal for use in industrial or field service environments where a sealed keyboard will be protected against air-borne dust particles or water moisture.



The membrane keyboard.

2 Opening The ATX Chassis

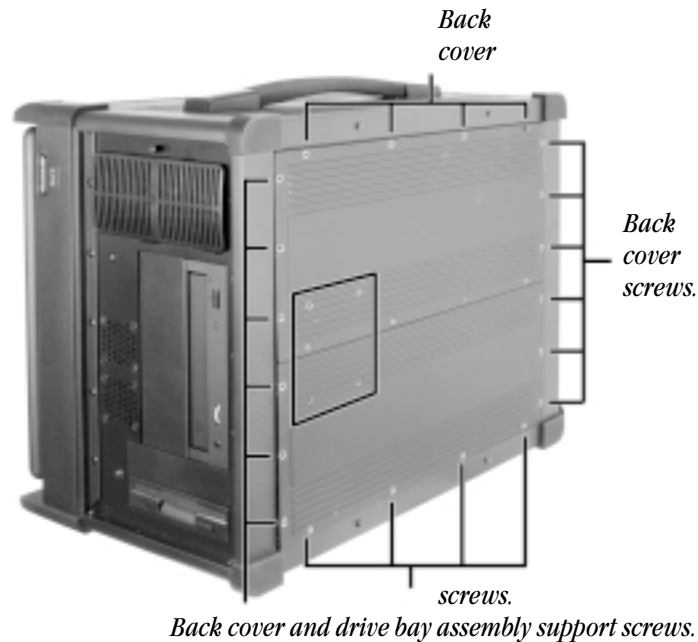
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Removing the Drive Cage	6

Removing the Back Cover

To work on the interior of the chassis, you must first remove the back cover. Before removing the back cover for any reason, observe these safety guidelines:

- Always power down the system.
- Always turn off any peripheral device connected to the system.
- Always unplug the AC power cord from the chassis.

Face the back of the chassis. Remove all the release screws as shown. There are 10 screws along the perimeter of the back cover that secures it to the chassis. Four more screws are used to support the drive assembly.



Removing the Card Stabilizer

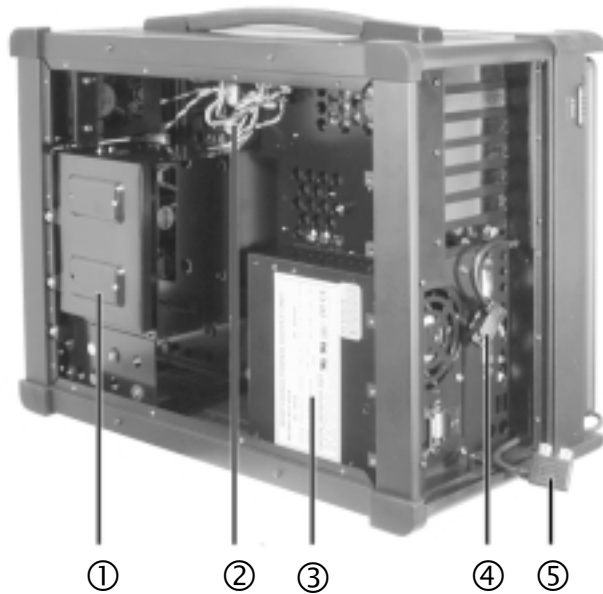
There is a card stabilizer designed to securely hold down add-on cards in their expansion slots with plastic hold-down clips. The stabilizer must be removed prior to adding your system board and add-on cards.

Step 1. Remove the card stabilizer release screws as shown.

Step 2. Remove the stabilizer and set it aside.



Identifying the Internal Parts



1. Drive assembly supporting two 5.25" and two 3.5" half-height drives.
2. Wire bundle consisting of connectors for system status LEDs, system reset switch, internal speaker, chassis fan controller.
3. Power supply.
4. Video cable and connector.
5. Keyboard/mouse cable and connectors.

Removing the Power Supply

Removing the power supply gives you access to the chassis backplane where you install the motherboard.

- Step 1. Unplug all components still connected to the power supply.
- Step 2. The power supply is secured to the chassis by four screws. Remove them and pull out the power supply.



Power supply retaining screws.

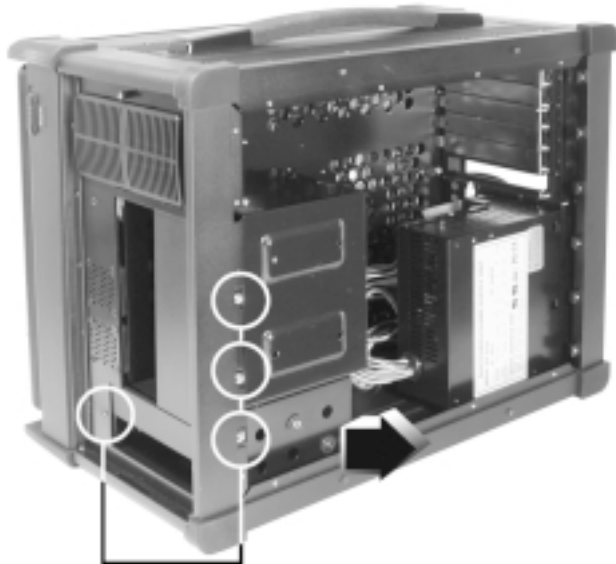
Removing the Drive Carrier

The drive carrier supports two 5.25" and two 3.5" half-height drives. These drives are accessible externally. To install or remove drives, you must first take out the entire drive assembly.

After you've removed the card stabilizer, power supply and drive carrier you're ready to install the drives and the mother board.

Removing the Drive Carrier

- Step 1. Put the chassis on your work area and remove the back and drive bay side covers.
- Step 2. Remove four retaining screws as shown and then pull out the drive carrier.



Drive carrier retaining screws.

3 Assemble The ATX System

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Installing the Motherboard

Setting the Motherboard Jumpers

Before installing the motherboard in the chassis, install the CPU, memory modules and set dip-switches or jumpers on the motherboard as required by the manufacturer. Since jumper and dip-switch settings are board-specific, consult the manual that comes with the motherboard and carefully follow the directions to configure your motherboard.

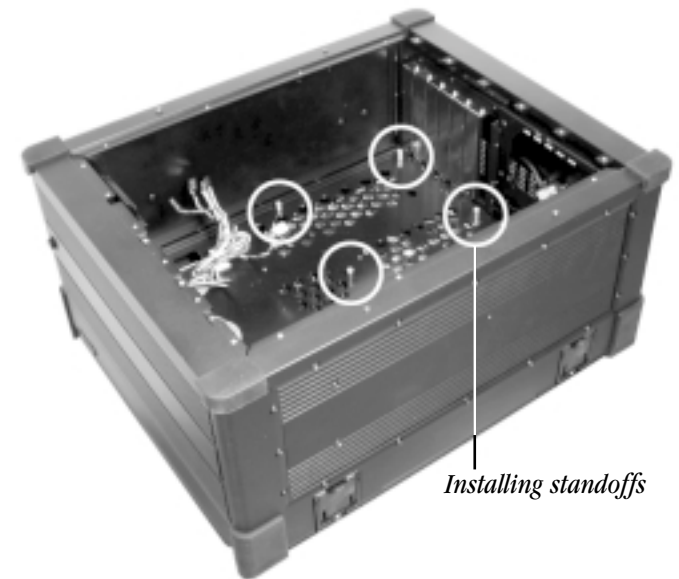


Make sure that at no time you are working on any electrical or electronic components while any part of the system is energized. Always disconnect the power! Use caution to protect the delicate electronic components. Ground yourself during the installation of the motherboard and other components.

Installing the Standoffs

Take a moment to study the inside of the chassis, making note of the location of the keyboard and input/output connector knockouts.

- Step 1. Lower the motherboard into the chassis and position it in the area it will be installed, making sure the alignment of the slots and connectors is correct.
- Step 2. Note where the motherboard mounting points are. You are going to install standoffs at those mounting points.



Your package comes with metal standoffs threaded on one end and tapped on the opposite end to receive a mounting screw.

Step 3. Now carefully withdraw the motherboard and thread the standoffs into the mounting holes in the chassis.



Mounting the Motherboard

Step 1. Carefully lower the motherboard.

Step 2. Align the mounting points. Put an insulating washer between the motherboard mounting hole and the mounting screw.

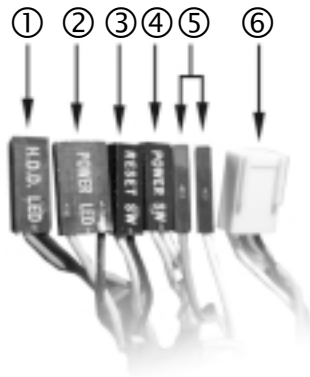
Step 3. Insert the screws into the metal standoffs and tighten the screws.



Connecting the Chassis Cables

The last step in the installation of the motherboard is the connection of the small cables from the chassis.

The cables are color coded and labeled according to their functions. You should find terminal pins on the motherboard with similar names.



1. IDE hard disk activity LED (blue and black wires)
2. Power-on indicator LED (orange and black wires).
3. System reset switch (white and black wires).
4. ATX power switch (yellow and white wires).
5. Internal PC speaker (blue and white wires).
6. Chassis ventilation fans.

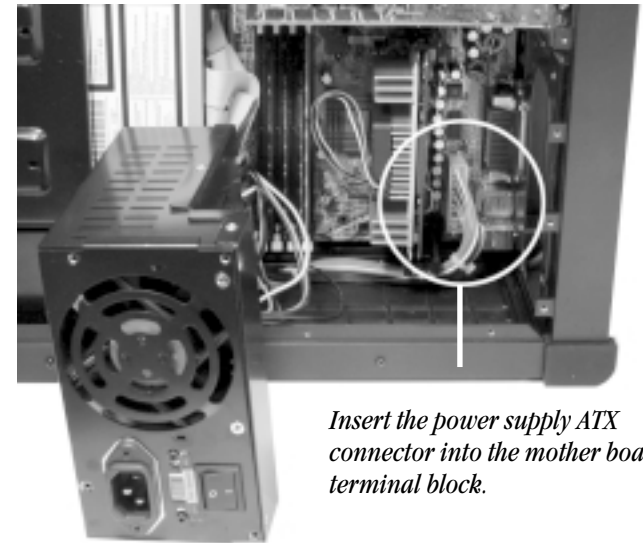
Consult your motherboard manual to connect these cables to the correct set of terminal pins.



It may be difficult to know for sure that the polarity of the LED connections is correct. If an LED fails to light when it should during the test phase, you will be able to shut down and reverse connections as needed.

Connecting the Power Supply to the Motherboard

Find the wire bundle that has the ATX plug from the power supply and insert it into the ATX terminal block on the motherboard. The terminal block is usually located near the keyboard connector.



Insert the power supply ATX connector into the motherboard terminal block.



The plug from the power supply will only insert in one orientation. Push down firmly making sure the hook on the terminal block clips onto the plug.

Installing the Power Supply

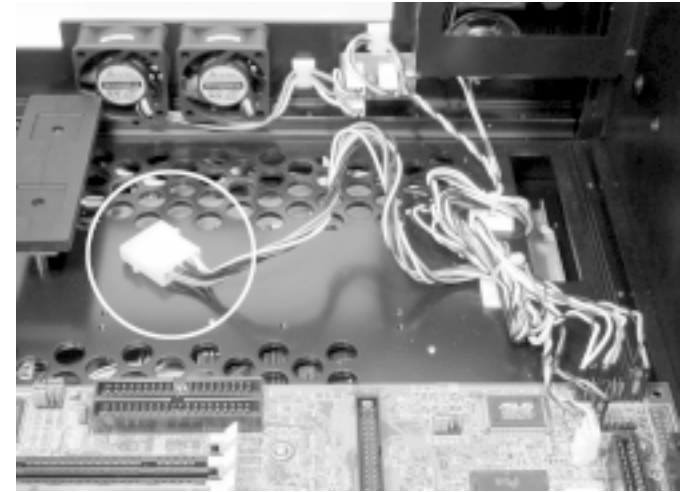
Align the power supply mounting holes with those on the chassis. Insert the screws and tighten them.



Power supply mounting points.

Connecting the Chassis Cables

The LCD, LCD controller and chassis ventilation fans receive power from the power supply. Find the wire bundle from the chassis side that ends in a 4-pin power connector and plug it into one of the power supply connectors.



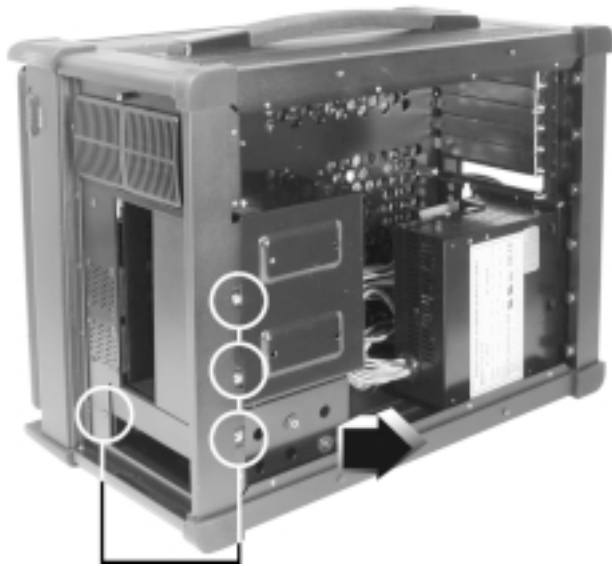
Chassis fan and LCD power connector

Installing Drives

Your subassembly is designed to support four half-height drives. The drives are installed in a metal drive carrier. To install or remove drives from the chassis, you must first take out the drive carrier.

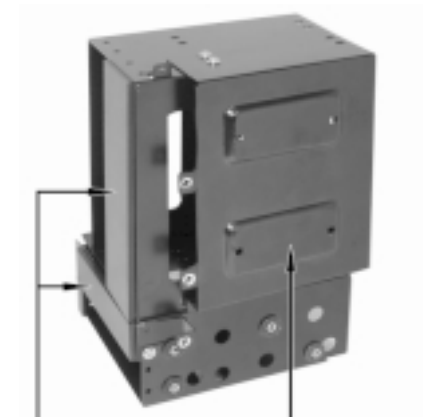
Removing the Drive Carrier

Four screws secure the drive carrier to the chassis. Remove them and gently pull the drive cage out of the chassis.



Drive carrier mounting screws.

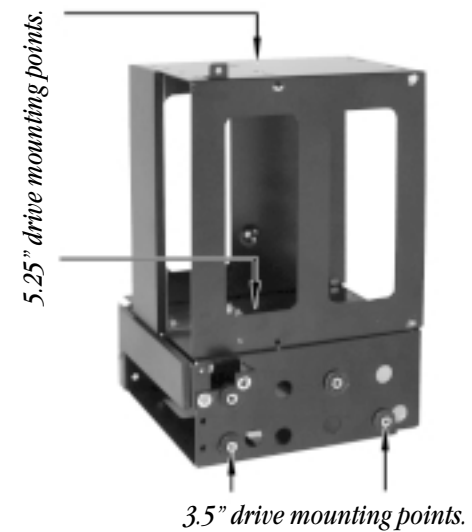
Take a moment to familiarize yourself with the construction of the drive carrier.



Drive bay covers.

Drive carrier support bracket.

Note that the 5.25" drives are mounted vertically. Note also that the bottom mounting points for the 5.25" drives are accessible only when the 3.5" drive bays are empty. Therefore, before you can add or remove any 5.25" drives you must first remove all 3.5" drives from the drive bays.



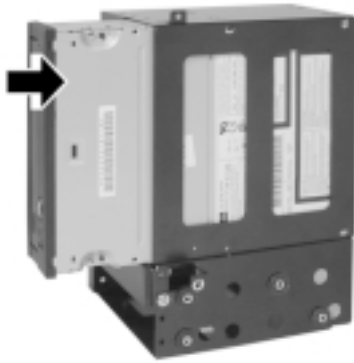
5.25" drive mounting points.

3.5" drive mounting points.

Installing 5.25" Drives

The drive carrier supports two 5.25" half-height drives.

Step 1. Remove the spare drive bay cover if you need to install two 5.25" drives. Insert the drives.

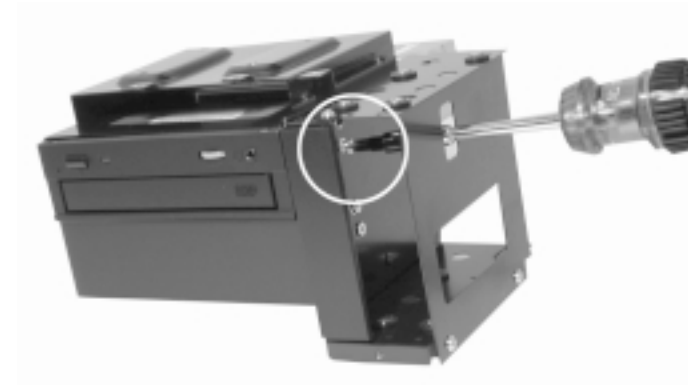


Step 2. Attach the drive carrier support bracket and align the mounting holes.



Step 3. Insert round head screws in the mounting holes as shown and tighten them.

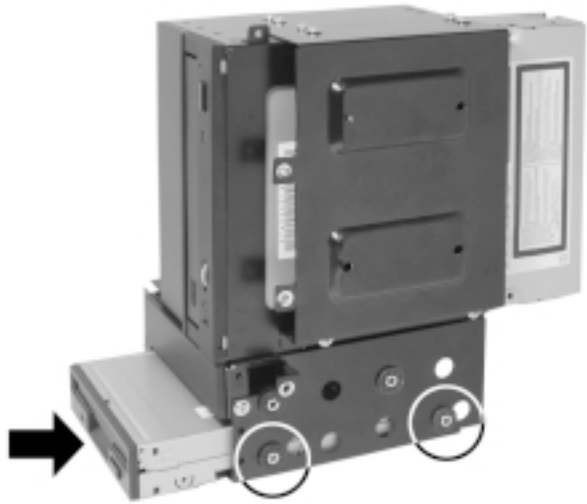
Step 4. Insert flat head screws in the bottom mounting holes and tighten the screws.



Use flat head screws for the bottom mounting holes of the 5.25" drives. Round head screws will obstruct installation of the 3.5" drive on top.

Installing 3.5" Drives

Two shock-mounted drive bays let you install two 3.5" half-height drives.



- Step 1. Insert the drive and align the mounting holes.
- Step 2. Put a metal washer on each of the screws and insert them into the mounting holes.
- Step 3. Tighten the screws.

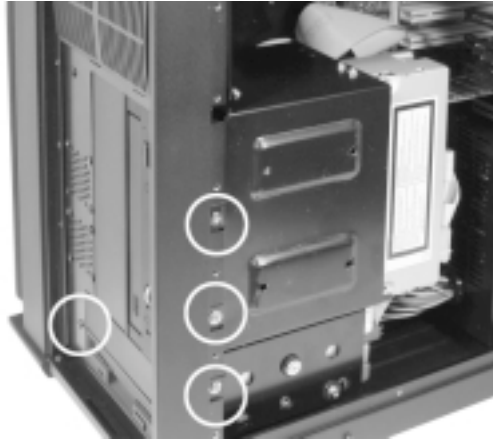
Installing the Drive Assembly

Interior space is going to be tight. While you have the drive assembly outside the chassis, plug in all the cables.



*Power supply plugs will only insert in one orientation.
Ribbon cables should always be connected with the colored stripe to Pin 1 on the connectors.*

- Step 1. Carefully put the drive cage back into the chassis, routing the cables carefully to avoid tangles.
- Step 2. Align the mounting holes.



- Step 3. Insert the screws and tighten them.

There are four more mounting holes on the support bracket for attaching the drive assembly to the back cover of the chassis. You can wait until you're ready to close your system to install them.

Installing Add-on Cards

The chassis has seven slot openings supporting up to seven add-on cards. Follow these steps to install an add-on card.

- Step 1. Remove the chassis back cover and the card stabilizer bar if you have not already done so.
- Step 2. Locate the slot on the motherboard you wish to use. Remove the slot cover screw and then remove the slot cover.
- Step 3. Set the card jumpers or switches according to the manufacturer's requirements if necessary.
- Step 4. Hold the card and align the edge connectors with the slot. Firmly push the card into the slot.



Inserting the add-on card into an open slot.

Step 5. Use the screw removed earlier. Insert it into the threaded hole and tighten it.



Add-on card can be extremely sensitive to electrostatic discharge. Always handle the cards with care. Hold the card by the metal slot cover or upper corners. Be careful not to touch the components or gold edge connectors.

Installing the Card Stabilizers

The card stabilizer is designed to hold down the add-on cards securely in their slots by pressing the card edges with plastic clips. After you've install all the add-on cards, reinstall the stabilizers using the following steps.

Step 1. Loosen the screws that hold the plastic clips in their brackets. The clips should be able to slide freely inside the brackets.

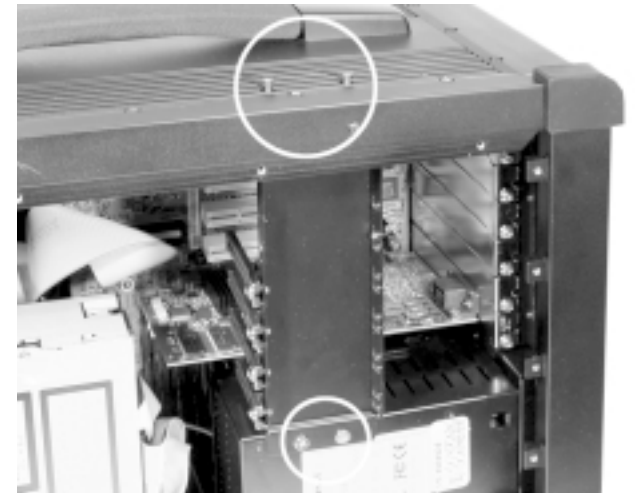


Step 2. Align the stabilizer bar with their mounting holes on the chassis. Insert the mounting screws and tighten them. You may have to pull up some of the clips to leave enough space between the clip and the card edge.

Step 3. Slide each clip so they come in contact with the top edge of the add-on cards. While holding the clip firmly against the card edge, tighten the bracket screws.

Step 4. Cut off any excessive part of the plastic clip.

Step 5. Repeat these steps for the other stabilizer.



Press the plastic extender firmly against the card edge and tighten screw.

Preparing to Start the System

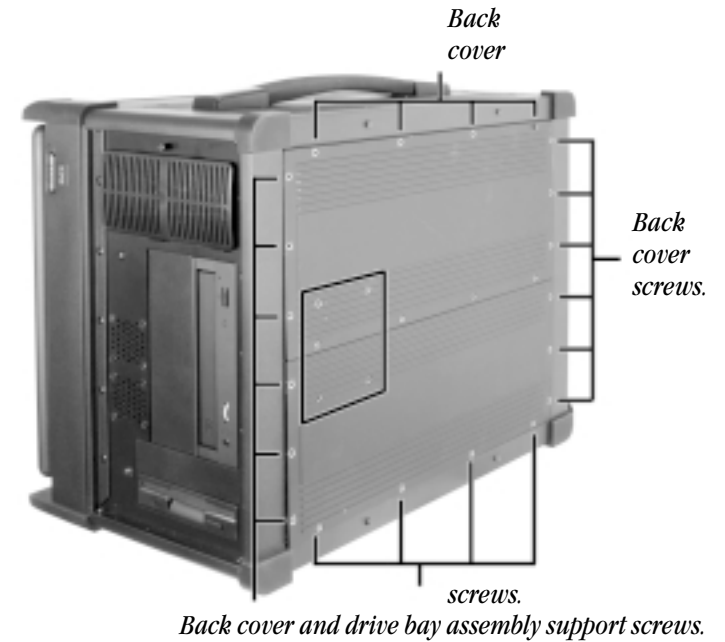
Connecting the Video and Input Devices

Connect the 15-pin video connector to the video card. Align the PS/2 type keyboard and pointing device connectors with their sockets and firmly push them into the sockets.



Closing the Back Cover

Reinstall the back cover and insert the retaining screws. Insert the four screws that will fasten the drive assembly to the back cover. Tighten all the screws.



4

Using The System Controls

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Starting your System

Before starting your system, plug in the power cord and make sure the video and input device connectors are plugged in. Release the keyboard latches and lay it flat on your work area.

Systems with ATX Power Supply

If you have an ATX power supply, power up your system by pressing the ATX power switch push button on the front panel of your chassis.



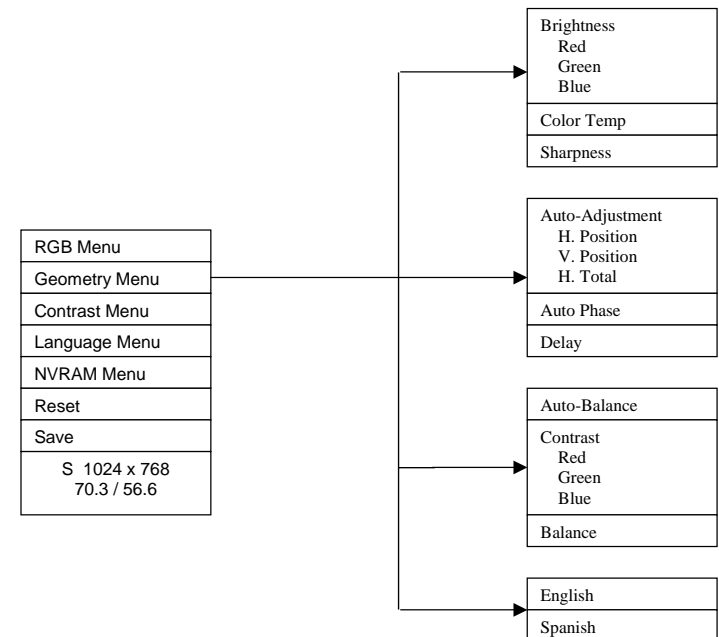
Press the ATX power switch to power up your system.

Systems with AT Power Supply

If your system is passive backplane-based using an AT power supply, the front push button power switch is disabled. Power up your system by pressing the power switch on the power supply.

OSD Controls

The LCD controller includes an integrated RAM-based OSD controller. Through four front panel controls you can view adjustable features of the LCD through the On-Screen Display.



Follow these steps to activate the on-screen display and make any adjustments to suit your preference:

- Step 1. Power up the system.
- Step 2. Press MENU▲ to invoke the on-screen menu.
- Step 3. Press SEL▼ to step through the main options.
- Step 4. Press either + or - button to bring up sub-menus of the highlighted option.
- Step 5. Press SEL▼ to step through the sub-menu options.
- Step 6. Press either + or - to modify the selected parameter value. Pressing a button once increases or decreases the numerical value by a single digit. Holding down a button increases the rate of change. Press MENU▲ to return to the previous screen.
- Step 7. After you've made your adjustments press MENU▲ repeatedly until the OSD is turned off.

Adjusting the OSD Parameters

The OSD consists of a main menu and sub-menus with the following selections:

1. RGB MENU

BRIGHTNESS: Adjusts the black level of the Red, Green and Blue channels.

COLOR TEMP: The settings let you set white point reference.

SHARPNESS: Adjusts image sharpness.

2. GEOMETRY MENU

AUTO-ADJUSTMENT: Performs automatic adjustment of the vertical and horizontal image positions within the display area of the LCD.

H.POSITION: Adjusts the horizontal image position within the display area of the LCD.

V.POSITION: Adjusts the vertical image position within the display area of the LCD.

AUTO PHASE: Performs automatic adjustment of the ADC sample pixel clock.

DELAY: Manual adjustment of the sample pixel clock phase.

3. CONTRAST MENU

AUTO-BALANCE: Performs automatic adjustment of color brightness in relation to the background.

CONTRAST: Manual adjustment of individual RGB channel contrast.

4. LANGUAGE MENU

Selects English or Spanish language OSD.

5. RESET

Reloads all parameters to factory settings.

6. SAVE

Saves current parameters.

5

Appendix

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Specifications

General Features

- Support ATX or 7-Slot passive backplane form factor platforms.
- Supports Slot-1 and Socket-370 type processors.
- All aluminum constructed chassis.
- Rubber bumper protected corners.
- Dual points add-on card retention system.
- Shock-mounted drive cage.
- Dual intake fans with washable filters.
- 3mm Impact-resistant LCD screen protect glass.
- Detachable 104/105-keys keyboard (weather proof optional).
- Built-in keyboard pointing device.
- Nylon carrying bag.

Display Selection

Model	12	13/ 14
Display Type:	active matrix TFT	active matrix TFT
Display Colors:	16.7 Million	16.7 Million
Size:	12.1"	13.3"/ 14.1"
Resolution:	800x600	1024x768
Brightness:	120 (cd/m ²)	120 (cd/m ²)
Response Time:	40ms	40ms
Contrast Ratio:	150 :1	150 :1

Power Supply, Drives & Slots Arrangement

Platform	ATX	Backplane
Free Slots:	4 full length	6 full, 1 half length
5.25" Drive:	2 bays	1 bay
3.5" Drive:	1bay	1 bay
Power supply:	AC 300W ATX	AC 300W Std. PS/2
Options:	AC/DC Battery 160W	Built-in UPS 250W

Environment

Operating temperature: 5C to 40C, 10-80% humidity
Storage temperature: -20C to 60C, 5-95% humidity

Dimensions & Weight

Dimensions:	16.6"/421mm (W)
	11.1"/282mm (H)
	9.1"/ 230mm (D)
Weight:	21lbs SKD; approx. 26lbs system

Trouble Shooting Techniques

No screen after pressing front power switch

Power supply fan not spinning:

- ✓ Check power source.
- ✓ Check power cord connection.
- ✓ Check if all power connectors inside the chassis have been properly connected.
- ✓ Check main power switch on power supply (PS-2 power supply for backplane model).
- ✓ Check voltage selection if there is one on the power supply unit.

Power supply fan is spinning and LCD has no backlight

(backlight can be observed along the top and bottom edge of the LCD screen.)

- ✓ Check if the power supply to the LCD screen is connected. See page 11 on section "Assemble the ATX system"

Power supply fan is spinning and LCD has backlight and power LED is on:

- ✓ Check if the video cable is properly connected. See page 19 on section "Assemble the ATX system".
- ✓ If the system seems to be booting up (hard disk drive cranking up) then detach the video cable to the internal LCD screen and attach to an external good CRT type monitor. If external monitor has video then it is a bad LCD screen or bad internal cabling.
- ✓ If the system does not seem to be booting up (no hard disk activity) and no video when connected to external good CRT monitor, then check system for shorts, reseat video and all other add-on cards. Check memory module installation. Listen for error beeps from the

motherboard. If all failed then remove system from the enclosure and check motherboard subassembly with an external set of power supply and display to isolate the problem. If the motherboard subassembly is working properly then re-assemble the motherboard subassembly into the chassis and make sure the cables in the enclosure are not pressed. Check if the motherboard is not shorted to the stand-off. If all failed, call your vendor for support where this enclosure was purchased.

LCD screen shows garbage or bad characters or vertical/horizontal color lines or bar:

- ✓ Detach the video connection to the LCD screen and attach to a good external CRT type monitor. If the external CRT monitor shows normal video then it could be a compatibility issue. Replace the VGA card and use a different VGA card and try it again with the LCD screen. If it still failed then it could be a bad conversion board or loose cable inside the LCD subassembly.
- ✓ If the external CRT monitor shows similar garbage character then it is a bad video card.

LCD SCREEN works fine in Windows but acted funny when running certain programs or games:

- ✓ The built-in Intelligent Analog-Digital conversion board (AD board) should adjust the screen to the proper resolution to fill the entire display. However, certain programs or display modes might cause the AD board to not align or sync properly. Check if the program that you are running is running under supported resolution. You can also try adjusting the OSD to manually adjust the resolution (see Section 6 on Using The Systems Controls).

Keyboard and pointing device not responding

- ✓ Remove both the PS-2 connections on the motherboard and try using an external regular keyboard and mouse. See page 19 on section "Assemble the ATX system". If an external keyboard or pointing device are working properly then you have a bad keyboard or keyboard cable assembly.