



# Fujitsu LifeBook B Series

## User's Guide

LifeBook B Series Model:  
B3020/B3020D

Document Date: 04/26/2004

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**FUJITSU COMPUTER SYSTEMS**

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## Warning



Handling the cord on this product will expose you to lead, a chemical known to the State of California to cause birth defects or other reproductive harm.

***Wash hands after handling.***

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This device complies with Part 15 of the FCC rules. Operations are subject to the following two conditions:

(1) This device must not be allowed to cause harmful interference, (2) This device must accept any interference received, including interference that may cause undesired operation.



# Fujitsu LifeBook B Series Notebook

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# Preface

## ABOUT THIS GUIDE

The LifeBook® B Series notebook from Fujitsu Computer Systems is a powerful mini-notebook computer. It is powered by an Intel® Pentium® M microprocessor, has a built-in color touch screen display, and brings the computing power of desktop personal computers (PCs) to a portable environment.

This manual explains how to operate your LifeBook notebook's hardware and built-in system software. Your LifeBook notebook is compatible with the IBM® PC AT.

It comes with Windows® 2000 Professional, Windows XP Home, or Windows XP Professional pre-installed.

Your notebook is a completely self-contained unit with an active-matrix (TFT) color LCD display. It has a powerful interface that enables it to support a variety of optional features.

## Conventions Used in the Guide

Keyboard keys appear in brackets.

Example: [Fn], [F1], [Esc], [Enter] and [Ctrl].

Pages with additional information about a specific topic are cross-referenced within the text.

Example: (See page xx.)

On screen buttons or menu items appear in bold

Example: Click **OK** to restart your notebook.

DOS commands you enter appear in Courier type.

Example: Shutdown the computer?



The point icon highlights information that will enhance your understanding of the subject material.



The caution icon highlights information that is important to the safe operation of your computer, or to the integrity of your files. Please read all caution information carefully.



The warning icon highlights information that can be hazardous to either you, your LifeBook notebook, or your files. Please read all warning information carefully.

## FUJITSU CONTACT INFORMATION

### Service and Support

You can contact Fujitsu Computer Systems Service and Support the following ways:

- Toll free: 1-800-8Fujitsu (1-800-838-5487)
- Fax: 408-764-2724
- E-mail: 8fujitsu@us.fujitsu.com
- Web site: <http://us.fujitsu.com/computers>

Before you place the call, you should have the following information ready so that the customer support representative can provide you with the fastest possible solution:

- Product name
- Product configuration number
- Product serial number
- Purchase date
- Conditions under which the problem occurred
- Any error messages that have occurred
- Type of device connected, if any

### Fujitsu Online

You can go directly to the online Fujitsu Product catalog for your notebook by clicking on the LifeBook Accessories Web site URL link, located in the Windows Start menu.

You can also reach Fujitsu Service and Support online by clicking on the Fujitsu Service and Support Web site URL link, located in the Service and Support Software folder of the Windows Start menu.



You must have an active internet connection to use the online URL links.

## WARRANTY

Your LifeBook notebook is backed by an International Limited Warranty and includes toll-free technical support. Check the service kit that came with your notebook for warranty terms and conditions.





# **2**

## **Getting to Know Your LifeBook**



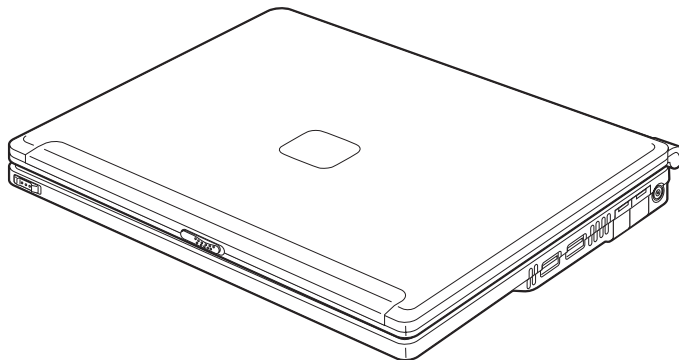


Figure 2-1. Fujitsu LifeBook B Series notebook

## Overview

This section describes the components of your Fujitsu LifeBook B Series notebook. We strongly recommend that you read it before using your LifeBook notebook, even if you are already familiar with notebook computers.

### UNPACKING

When you receive your LifeBook notebook, unpack it carefully, and compare the parts you have received with the items listed below.

For a pre-configured model you should have:

- LifeBook B Series notebook (*Figure 2-1*)
- AC adapter with AC power cord (*Figure 2-2*)
- Phone/Modem (RJ-11) telephone cable
- Stylus (located in stylus holder)
- Driver and Application Restore CD
- Getting Started Guide
- User's Guide (this document)
- International Limited Warranty Brochure
- Microsoft Windows Manual and Certificate of Authenticity
- Premium Care Registration card and envelope

Depending upon the configuration of your notebook, you will have one of the following battery configurations:

- One main high-capacity Lithium ion battery (pre-installed),  
or,
- One main Lithium ion battery pre-installed and one spare main high-capacity Lithium ion battery

You may also have one or more of the following devices in the box:

- External USB Floppy Disk Drive (*Figure 2-4*),  
and/or,
- Port Replicator (*Figure 2-3*)

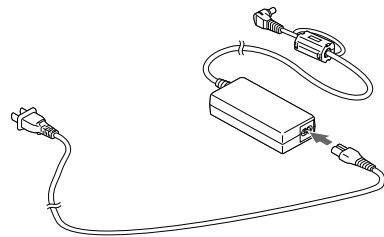


Figure 2-2. AC Adapter

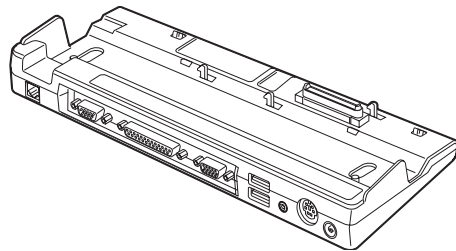


Figure 2-3. Optional Port Replicator

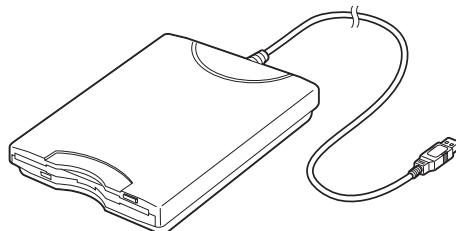


Figure 2-4. Optional External USB Floppy Disk Drive

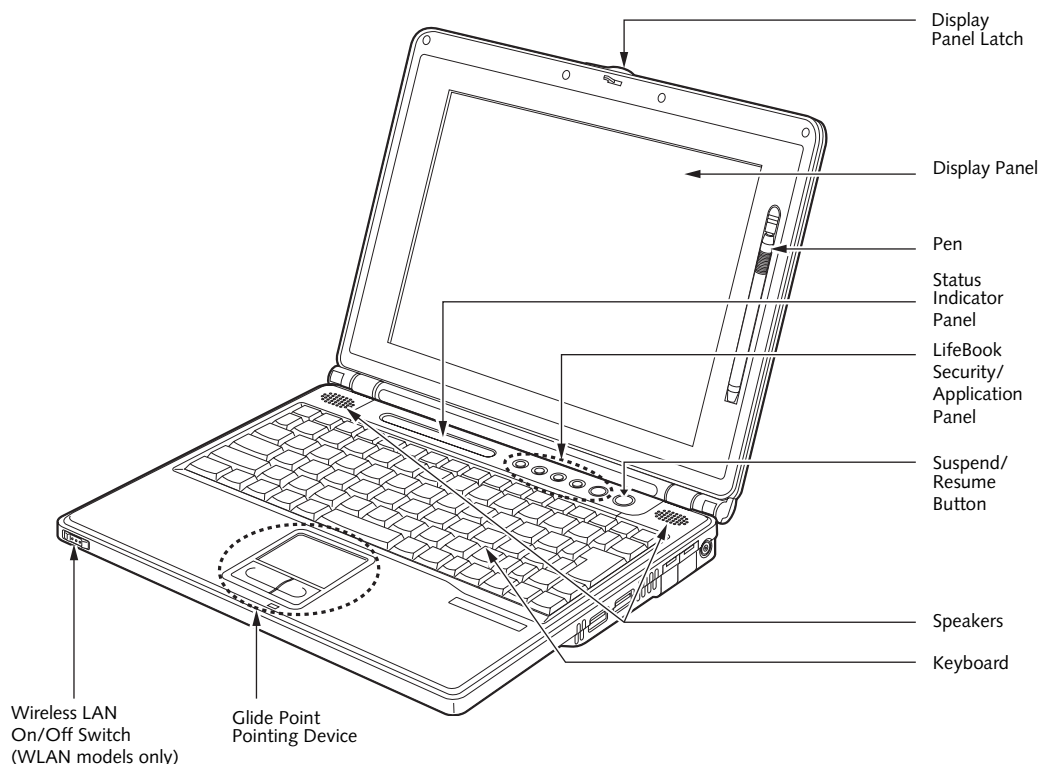


Figure 2-5. LifeBook notebook with display open

## Locating the Controls and Connectors

### TOP AND FRONT COMPONENTS

The following is a brief description of your LifeBook notebook's top and front components. (Figure 2-5)

#### Display Panel Latch

The display panel latch locks and releases the display panel.

#### Display Panel

The display panel is a color LCD panel with back lighting for the display of text and graphics and touch screen functionality.

#### Pen

The stylus is used as the pointing device for the touch screen.

#### Status Indicator Panel

The Status Indicator Panel displays symbols that correspond with a specific component of your LifeBook notebook. See "Status Indicator Panel" on page 13.

#### LifeBook Security/Application Panel

The LifeBook Security/Application Panel provides hardware security and one-touch application launch

capability. See "LifeBook Security/ Application Panel" on page 21.

#### Suspend/Resume Button

The Suspend/Resume button allows you to suspend notebook activity without powering off, resume your notebook from standby mode, and power on your notebook when it has been shut down from the Windows operating system. See "Suspend/Resume Button" on page 32.

#### Stereo Speakers

The built-in dual speakers allow for stereo sound.

#### Keyboard

A full-function keyboard with dedicated Windows keys. See "Keyboard" on page 15.

#### Glide Point Pointing Device

The Glide Point pointing device consists of two mouse-like buttons and one cursor control button. See "Touchpad Pointing Device" on page 17.

#### Wireless LAN On/Off Switch

Allows you to turn the optional Wireless LAN device on and off. This is present only on systems with optional wireless LAN device installed.

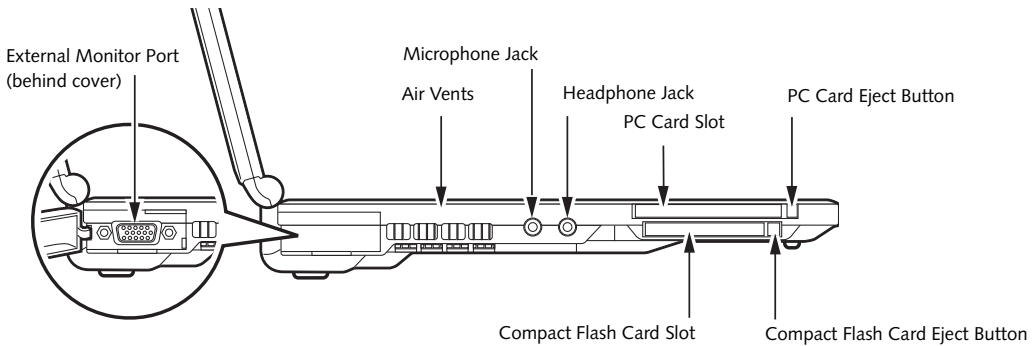


Figure 2-6. LifeBook notebook left-side panel

## LEFT-SIDE PANEL COMPONENTS

Following is a brief description of your LifeBook notebook's left-side components. (Figure 2-6)

### External Monitor Port

The external monitor port allows you to connect an external VGA or SVGA CRT monitor. Note that when the optional Port Replicator is attached to the system, you must use the external monitor port on the Port Replicator rather than the port on the system. See "External Monitor Port" on page 49.

### Headphone Jack

The headphone jack allows you to connect headphones or powered external speakers. See "Headphone Jack" on page 49.

### Microphone Jack

The microphone jack allows you to connect an external mono microphone. See "Microphone Jack" on page 49.

### Air Vents

The air vents allow for proper cooling of the system while it is operating.

### PC Card Slot

The PC Card Slot allows you to install a Type I or Type II PC Card. See "PC Cards" on page 41.

### PC Card Eject Button

The PC Card eject button allows you to remove PC Cards from the PC Card slot. See "PC Cards" on page 41.

### Compact Flash Card Slot

Allows you to insert a compact flash (CF) card. See "Compact Flash Cards" on page 42.

### Compact Flash Card Eject Button

Allows you to eject a compact flash card. See "Compact Flash Cards" on page 42.



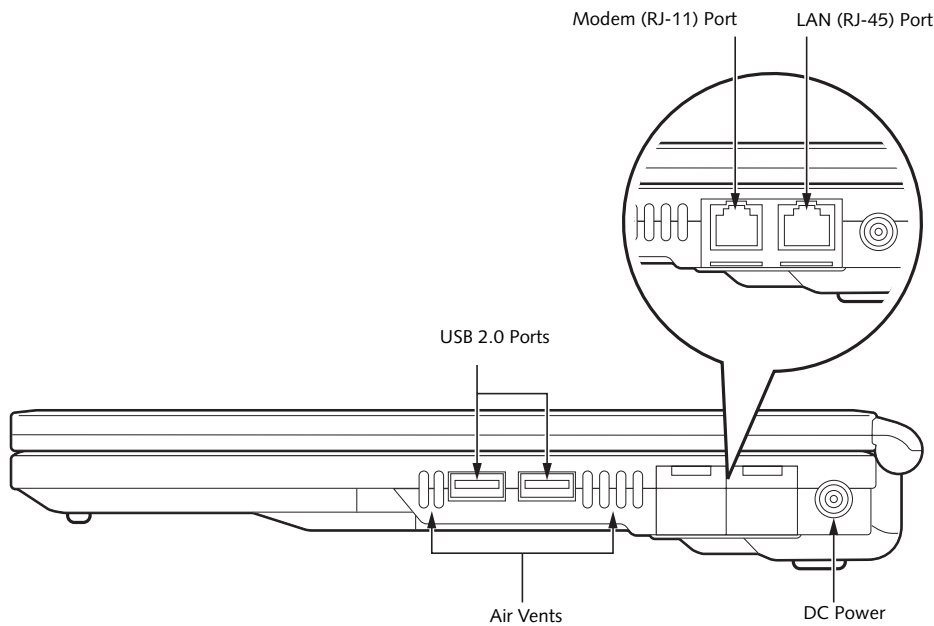


Figure 2-7. LifeBook notebook right-side panel

## RIGHT-SIDE PANEL COMPONENTS

Following is a brief description of your LifeBook notebook's right-side components. (Figure 2-7)

### USB 2.0 Ports

The two Universal Serial Bus (USB) 2.0 ports allow you to connect Universal Serial Bus devices. See "Universal Serial Bus 2.0 Ports" on page 49.

### Modem (RJ-11) Telephone Port

The Modem (RJ-11) telephone port is for attaching a telephone line to the internal multinational 56K modem.



The internal multinational modem is not intended for use with Digital PBX systems. Do not connect the internal modem to a Digital PBX as it may cause serious damage to the internal modem or your entire LifeBook notebook. Consult your PBX manufacturer's documentation for details. Some hotels have Digital PBX systems. Be sure to find out BEFORE you connect your modem.



The internal modem is designed to the ITU-T V.90 standard. Its maximum speed of 53000bps is the highest allowed by FCC, and its actual connection rate depends on the line conditions. The maximum upload speed is 33600bps.

### LAN (RJ-45) Jack

The optional internal LAN (RJ-45) port is used for an internal Fast Ethernet (10/100 Base-T/Tx) connection. See "Internal LAN (RJ-45) jack" on page 48.

### DC Power Jack

The DC power jack allows you to plug in the AC adapter or the optional Auto/Airline adapter to power your notebook and charge the internal Lithium ion Battery.

### Air Vents

The air vents allow for proper cooling of the system while it is operating.

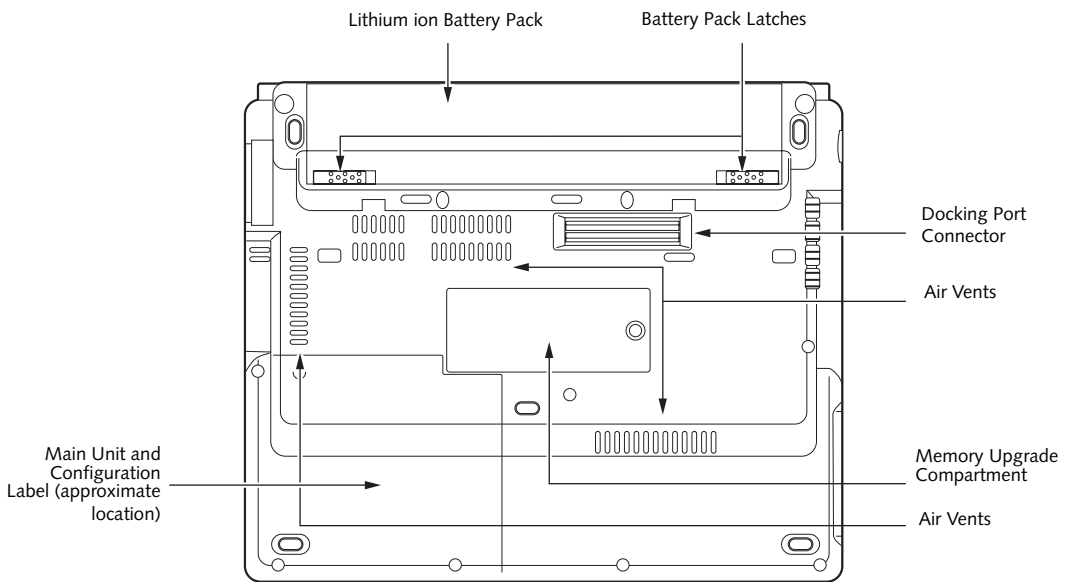


Figure 2-8. LifeBook notebook bottom panel

## BOTTOM COMPONENTS

Following is a brief description of your LifeBook notebook's bottom panel components.

### Lithium ion Battery Pack

The battery bay contains the internal Lithium ion battery. It can be opened for the removal of the battery when stored over a long period of time or for swapping a discharged battery with a charged Lithium ion battery. See "Lithium ion Battery" on page 37.

### Battery Pack Latches

The battery pack latches are used to secure and release the Lithium ion battery pack. See "Lithium ion Battery" on page 37.

### Docking Port Connector

This connector allows you to connect the optional Port Replicator.

### Air Vents

The air vents allow for proper cooling of the system while it is operating.

### Main Unit and Configuration Label

The configuration label shows the model number and other information about your LifeBook notebook. In addition, the configuration portion of the label has the serial number and manufacturer information that you will need to give your support representative. It identifies the exact version of various components of your notebook.

### Memory Upgrade Compartment

Your LifeBook notebook comes with high speed Synchronous Dynamic RAM (SDRAM). The memory upgrade compartment allows you to expand the system memory capacity of your notebook, hence improving overall performance. See "Memory Upgrade Module" on page 44.

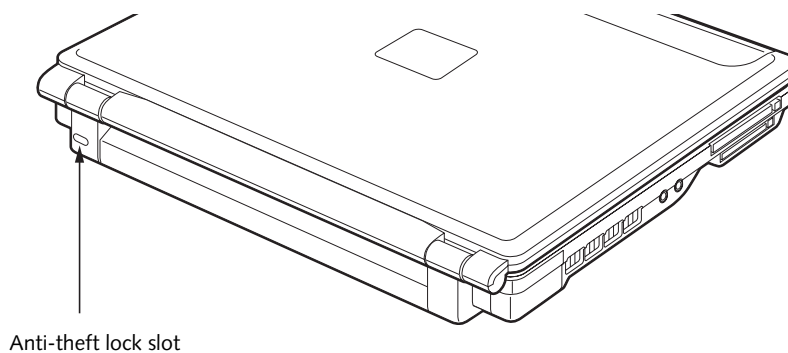


Figure 2-9. LifeBook notebook rear panel

## REAR PANEL COMPONENTS

Following is a brief description of your LifeBook notebook's right-side components. (*Figure 2-7*)

### Anti-theft Lock Slot

The anti-theft lock slot allows you to attach an optional physical locking device.

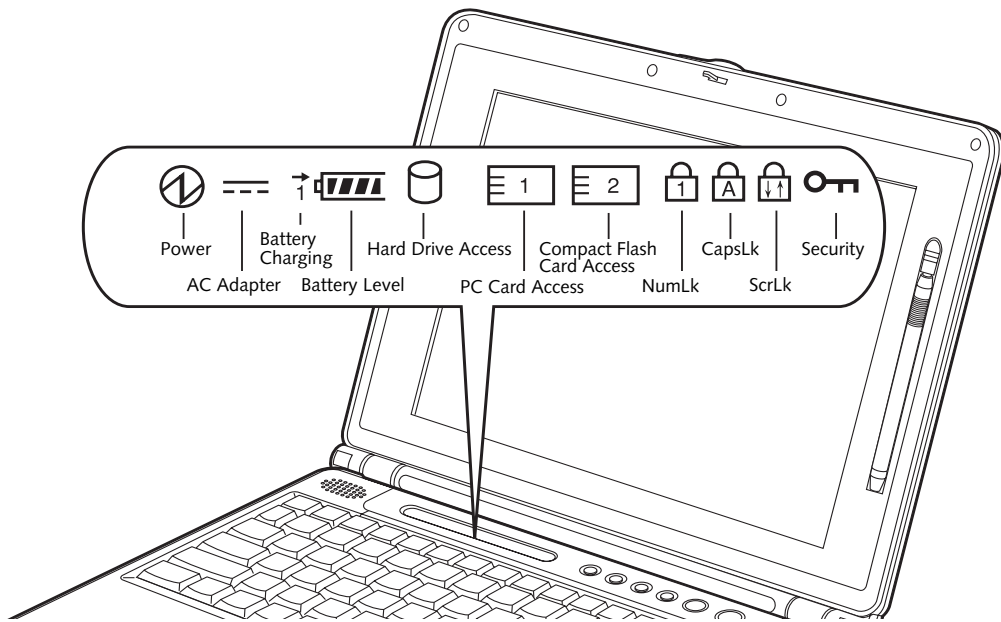


Figure 2-10. Status Indicator Panel

## Status Indicator Panel

The Status Indicator displays symbols that correspond with a specific component of your LifeBook notebook. These symbols tell you how each of those components are operating. (Figure 2-10)



### POWER INDICATOR

The Power indicator symbol states whether your system is operational. It has several different states, each of which tells you what mode your notebook is in at that time.

- **Steady On:** This means that there is power to your notebook and that it is ready for use.
- **Flashing:** This means that your notebook is in Standby mode.
- **Steady Off:** This means that your system is either in Hibernate mode, or that your notebook has been turned off.

If you are charging your battery, the Power indicator symbol will remain on even if your LifeBook notebook is shut off. The Power indicator symbol will also remain on if you have either adapter connected.

### AC ADAPTER INDICATOR

The AC Adapter indicator states whether your notebook is operating from the AC adapter, the Auto/Airline adapter or the batteries. This icon has two different states that can tell you what power source your notebook is using.

- **On:** This means that either of the adapters are currently in use.
- **Off:** Power is only coming from the batteries, and you do not have an adapter connected.



### BATTERY LEVEL INDICATORS

The Battery Level indicators state whether or not the primary Lithium ion battery is installed. In addition, this symbol states how much charge is available within the installed battery. The symbol will only be displayed for a battery that is currently installed in your notebook. (Figure 2-11)

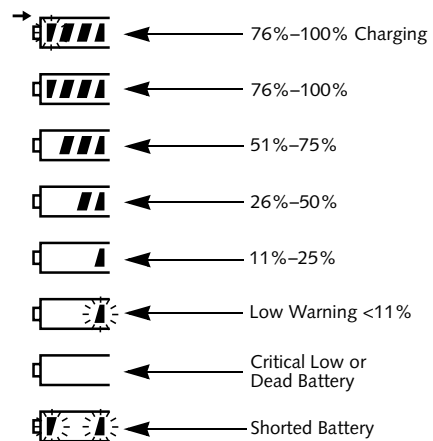


Figure 2-11. Battery Level Indicator



A shorted battery is damaged and must be replaced. (Figure 2-11)



If there is no battery activity, the power adapters are not connected, and the power is Off, the Battery Level indicators will also be off.

## ➔ BATTERY CHARGING INDICATOR

Located to the left of the Battery Level indicator is a small arrow symbol. This symbol states whether the battery is charging. This indicator will flash if the battery is too hot or cold to charge.



Batteries subjected to shocks, vibration or extreme temperatures can be permanently damaged.



## HARD DRIVE OR REMOVABLE MEDIA DRIVE ACCESS INDICATOR

The Hard Drive Access indicator states whether your internal hard drive is being accessed.



## PC CARD ACCESS INDICATORS

The PC Card Access indicator states whether or not your notebook is accessing a PC Card. The indicator will flash if your software tries to access a PC Card even if there is no card installed. See “PC Cards” on page 41.



## COMPACT FLASH (CF) CARD ACCESS INDICATORS

The Compact Flash Card Access indicator states whether or not your notebook is accessing a Compact Flash Card. The indicator will flash if your software tries to access a Compact Flash Card even if there is no card installed. See “Compact Flash Cards” on page 42.



## NUMLK INDICATOR

The NumLk indicator states that the integral keyboard is set in ten-key numeric keypad mode.



## CAPSLOCK INDICATOR

The CapsLock indicator states that your keyboard is set to type in all capital letters.



## SCRLK INDICATOR

The ScrLk indicator states that your scroll lock is active.



## SECURITY INDICATOR

The Security Indicator flashes (if a password was set) when the system resumes from Off or Standby modes. You must enter the password that was set in the Security Panel before your system will resume operation.

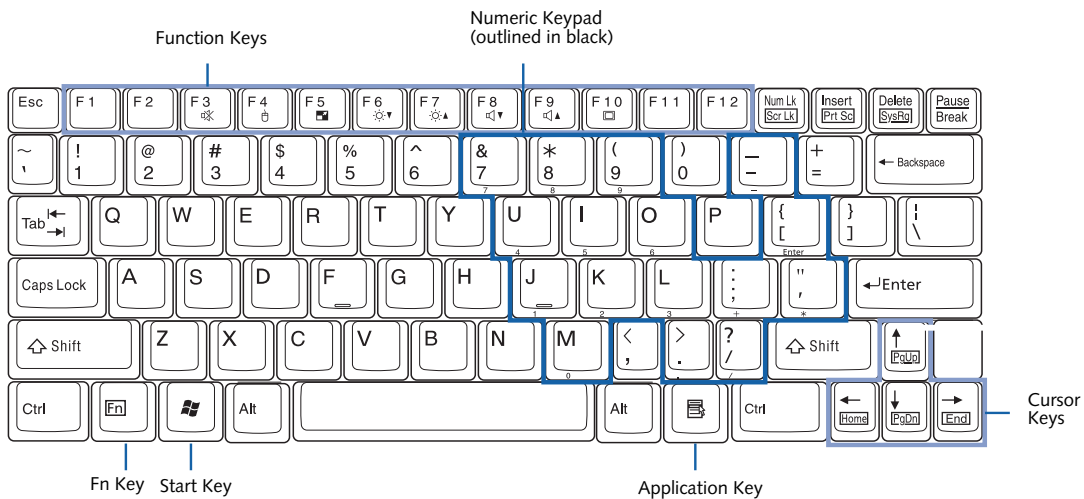


Figure 2-12. Keyboard

# Keyboard

## USING THE KEYBOARD

Your LifeBook notebook has an integral 83-key keyboard. The keys perform all the standard functions of a 101-key keyboard, including the Windows keys and other special function keys. This section describes the following keys. (Figure 2-12)

- **Numeric keypad:** Your notebook allows certain keys to serve dual purposes, both as standard characters and as numeric and mathematical keys. The ability to toggle between the standard character and numeric keys is controlled through the [NumLk] key.
- **Cursor keys:** Your keyboard contains four arrow keys for moving the cursor or insertion point to the right, left, up, or down within windows, applications and documents.
- **Function keys:** The keys labeled [F1] through [F12], are used in conjunction with the [Fn] key to produce special actions that vary depending on what program is running.
- **Windows keys:** These keys work with your Windows operating system and function the same as the onscreen Start menu button, or the right button on your pointing device.

## NUMERIC KEYPAD

Certain keys on the keyboard perform dual functions as both standard character keys and numeric keypad keys. NumLk can be activated by pressing the [NumLk] keys. Turning off the NumLk feature is done the same way. Once this feature is activated you can enter numerals 0 through 9, perform addition ( + ), subtraction ( - ), multiplication ( \* ), or division ( / ), and enter decimal

points ( . ) using the keys designated as ten-key function keys. The keys in the numeric keypad are marked on the front edge of the key to indicate their secondary functions. (Figure 2-12)

## WINDOWS KEYS

Your LifeBook notebook has two Windows keys: a Start keys and an Application key. The Start key displays the Start menu. This button functions the same as your onscreen Start menu button. The Application key functions the same as your right mouse button and displays shortcut menus for the selected item. (Please refer to your Windows documentation for additional information regarding the Windows keys.) (Figure 2-12)

## CURSOR KEYS

The cursor keys are the four arrow keys on the keyboard which allow you to move the cursor up, down, left and right in applications. In programs such as Windows Explorer, it moves the "focus" (selects the next item up, down, left, or right). (Figure 2-12)

## FUNCTION KEYS

Your LifeBook notebook has 12 function keys, F1 through F12. The functions assigned to these keys differ for each application. You should refer to your software documentation to find out how these keys are used. (Figure 2-12)

### [Fn] Key

The [Fn] key provides extended functions for the notebook and is always used in conjunction with another key.

- **[Fn+F3]:** Pressing [F3] while holding [Fn] will toggle the Audio Mute on and off.

- [Fn+F4]: Pressing [F4] while holding [Fn] will toggle the Quick Point feature on and off. Note that the [Fn+F4] combination only works if Manual Setting is selected in the BIOS. (See “Entering the BIOS Setup Utility” on page 29)
- [Fn +F5]: Pressing [F5] while holding [Fn] allows you to toggle between video compensation and no compensation. (Video compensation controls spacing on the display. When it is enabled, displays with less than 1024 x 768 or 800 x 600 pixel resolution will still cover the entire screen.)
- [Fn+F6]: Pressing [F6] repeatedly while holding [Fn] will lower the brightness of your display.
- [Fn+F7]: Pressing [F7] repeatedly while holding [Fn] will increase the brightness of the display.
- [Fn+F8]: Pressing [F8] repeatedly while holding [Fn] will decrease the volume of your LifeBook notebook.
- [Fn+F9]: Pressing [F9] repeatedly while holding [Fn] will increase the volume of your LifeBook notebook.
- [Fn+F10]: Pressing [F10] while holding [Fn] allows you to change your selection of where to send your display video. Each time you press the combination of keys you will step to the next choice. The choices, in order, are: built-in display panel only, both built-in display panel and external monitor or external monitor only.

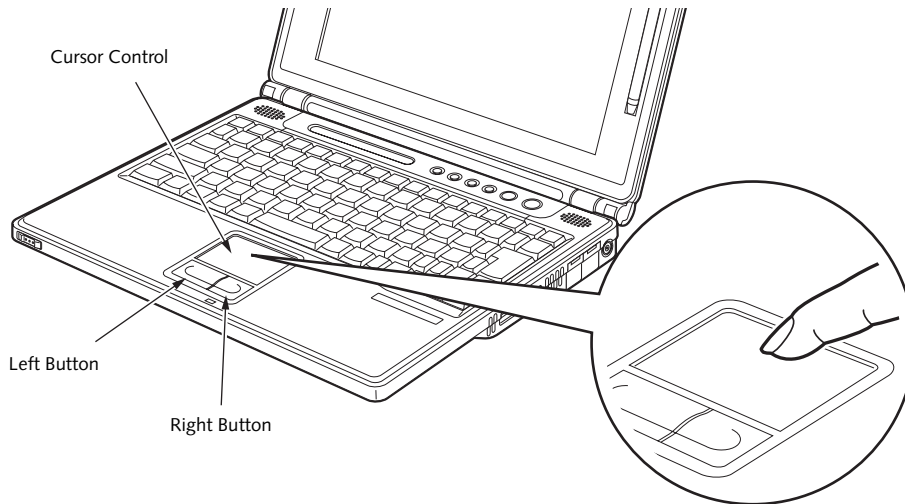


Figure 2-13. Touchpad pointing device

## Touchpad Pointing Device

The Touchpad pointing device comes built into your LifeBook notebook. It is used to control the movement of the pointer to select items on your display panel. The Touchpad is composed of a cursor control and left and right buttons. The cursor control works the same way a mouse does, and moves the cursor around the display. It only requires light pressure with the tip of your finger. The left and right buttons function the same as mouse buttons. The actual functionality of the buttons may vary depending on the application that is being used. (Figure 2-13)

### CLICKING

Clicking means pushing and releasing a button. To left-click, move the cursor to the item you wish to select, press the left button once, and then immediately release it. (Figure 2-14) To right-click, move the mouse cursor to the item you wish to select, press the right button once, and then immediately release it. You can also perform the clicking operation by tapping lightly on the Touchpad once.

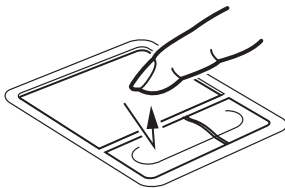


Figure 2-14. Clicking

### DOUBLE-CLICKING

Double-clicking means pushing and releasing the left button twice in rapid succession. This procedure does not function with the right button. (Figure 2-15) To double-click, move the cursor to the item you wish to select, press the left button twice, and then immediately release it. You can also perform the double-click operation by tapping lightly on the Touchpad twice.

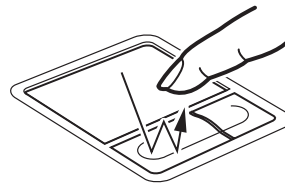


Figure 2-15. Double-clicking



- If the interval between clicks is too long, the double-click will not be executed.
- Parameters for the Touchpad can be adjusted from the Mouse Properties dialog box located in the Windows Control Panel.

### DRAWING

Dragging means pressing and holding the left button, while moving the cursor. To drag, move the cursor to the item you wish to move. Press and hold the left button while moving the item to its new location and then release it. Dragging can also be done using the Touchpad. First, tap the Touchpad twice over the item you wish to move making sure to leave your finger on



the pad after the final tap. Next, move the object to its new location by moving your finger across the Touchpad, and then releasing your finger. (Figure 2-16)

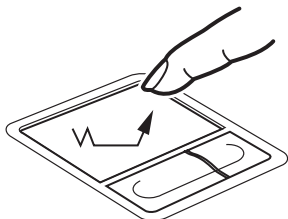


Figure 2-16. Dragging

### TOUCHPAD CONTROL ADJUSTMENT

If you need to change or adjust any of the touchpad control functions, you can customize them from the Mouse properties dialog box in the Control Panel. Click on Start, select Settings > Control Panel, then double-click Mouse.

### TOUCH SCREEN

The integrated touch screen allows you to use either the included stylus, or your fingertip, as a pointing device. You can use the stylus to click, double-click, drag items and icons, or to draw like a pen or pencil in applications that support this behavior, such as drawing or painting programs. See the documentation that came with your application for details. (Figure 2-17)

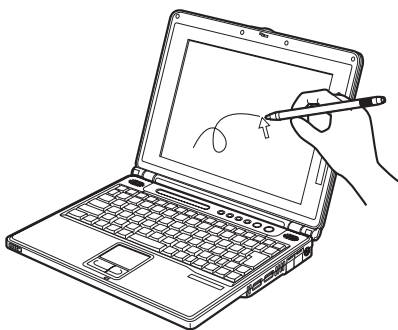


Figure 2-17. Using the Stylus with the Touch Screen



To purchase additional or replacement styluses, visit Fujitsu's accessories web site at: <http://us.fujitsu.com/computers>.



To avoid potential scratching and damage, never use anything but the included stylus or your finger with the touch screen.

### Clicking

To left-click, touch the object you wish to select and then lift the stylus tip immediately. You also have the option to perform the left-click operation by tapping lightly with your finger on the touch screen once. (Figure 2-18)

To right-click, go to Start --> Programs --> Fujitsu Touch Panel. From that window, you can specify a right button tool by using the Touch Panel Configuration Control button prior to the desired right mouse click. It can be used two ways: by holding down the key or by pressing the key once.

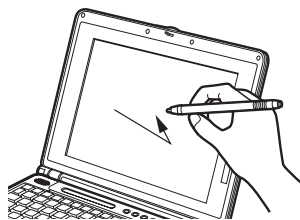


Figure 2-18. Clicking the Touch Screen

### Double-Clicking

To double-click, touch the item twice, and then immediately remove the stylus tip. You also have the option to perform the double-click operation by tapping lightly with your finger on the touch screen twice. (Figure 2-19)



Figure 2-19. Double-clicking the Touch Screen



If the interval between taps is too long, the double-click will not be executed.

### Dragging

Dragging means touching the screen with the stylus, moving and then lifting the stylus. To drag, tap the touch screen twice with your stylus over the item you wish to move, making sure to leave the stylus on the screen after the final tap. Next, move the item to its new location by moving the stylus across the screen, and then lifting the stylus to release it. Dragging can also be done using your fingertip. (Figure 2-20)

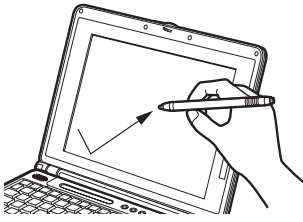


Figure 2-20. Dragging on the Touch Screen

### Right-clicking

It is possible for you to perform right-click functions with the stylus.

1. Click Start -> Programs -> Fujitsu Touch Panel -> Touch Panel Configuration.
2. When the Right Button Tool screen appears, select either "Hold [Ctl] key down and touch the screen" or "Press [Ctl] key and touch the screen".

When you select "Hold [Ctl]...", the stylus will act as a right mouse button when you hold down the control key while touching the screen.

When you select "Press [Ctl]...", pressing the control key before touching the screen will cause the stylus to act as a right mouse button.

3. Click [Apply] to complete your selection.

### Calibrating the Touch Screen

In order to ensure accurate tracking between the stylus and cursor, you should run the Touch Screen Calibration Utility before you use the touch screen for the first time, or after you change the display resolution.

To run the calibration utility:

1. Go to [Start] -> Control Panel, and double-click on the Touch Panel icon. This will open the Touch Panel Settings window.
2. Select the Calibration tab and click the [Calibrate Now] button.
3. Adjust the display of your notebook to a comfortable angle and find the red (+) symbol in the upper-left corner of the display.
4. Using the stylus, touch the screen directly on the (+) symbol, then lift the stylus. When you lift the stylus tip, the (+) symbol will move to the next location.
4. Repeat step 4 until you have selected a total of nine symbols. This is the minimum number of points necessary to calibrate your touch screen.
5. Once you have selected the nine symbols, click the [Update] button to return to the Touch Panel Settings screen.

## Volume Control

Your Fujitsu LifeBook notebook has multiple volume controls which interact with each other.



Any software that contains audio files will also contain a volume control of its own. If you install an external audio device that has an independent volume control, the hardware volume control and the software volume control will interact with each other. It should be noted that if you set your software volume to Off, you will override the external volume control setting.

### CONTROLLING THE VOLUME

The volume can be controlled in several different ways:

- Volume can be set from within the Volume Control on the Taskbar.
- Volume can be controlled from the Control Panel by selecting the Sounds and Audio Devices icon. Select the Volume tab and move the slider bar to the desired volume level.
- Volume can be controlled with the F8 and F9 functions keys. Pressing [F8] repeatedly while holding [Fn] will decrease the volume of your notebook. Pressing [F9] repeatedly while holding [Fn] will increase the volume of your notebook. Volume can be controlled by many volume controls that are set within individual applications.



There are twenty-six levels through which the function keys cycle.

- Certain external audio devices you might connect to your system may have hardware volume controls.

Each source discussed above puts an upper limit on the volume level that must then be followed by the other sources.

We recommend that you experiment with the various volume controls to discover the optimal sound level.

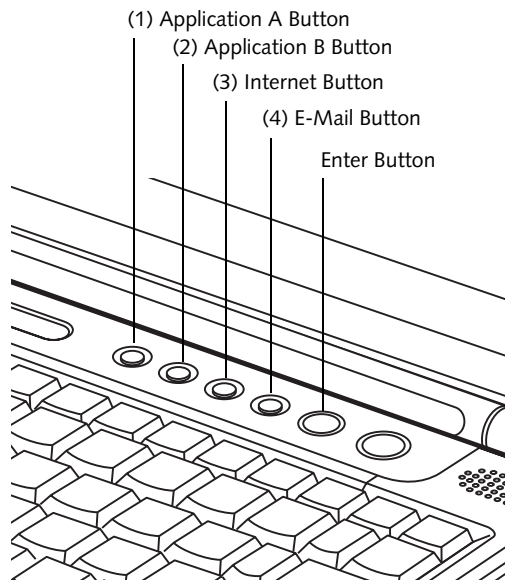


Figure 2-21. LifeBook Security/Application Panel

## LifeBook Security/ Application Panel

A unique feature of your LifeBook notebook is the Security/Application Panel that allows you to secure your notebook from unauthorized use. The Security/Application Panel also allows you to launch applications with the touch of a button when your system is on.

If the security system is activated, upon starting your notebook or resuming from Standby mode the security system requires you to enter a password code using the buttons on the Security/Application Panel. After entering a correct password, your notebook resumes system operation. (Figure 2-21)

### SETTING UP YOUR LIFEBOOK SECURITY PANEL

When you receive your LifeBook notebook, the security panel application is pre-installed without any passwords. The following sections provide detailed information on your security panel, how to set, change or remove passwords.

#### Numbered Buttons

Use these buttons to enter your password.

#### Enter Button

After entering the button strokes, push this button to enter the password into the LifeBook notebook.

### PASSWORDS

The user and supervisor password may be set on this notebook. A supervisor password is typically the same for all LifeBook notebooks in a working group, office, or company to allow for system management. Individual LifeBook notebooks in a group environment should not use a common password. A password consists of one to five button strokes plus the enter button. A valid stroke consists of pushing one or up to four buttons simultaneously. The following are valid button strokes:

- Pushing [4] by itself
- Pushing [2] and [3] at the same time
- Pushing [1], [2], and [4] at the same time
- Pushing [1], [2], [3], and [4] at the same time

The following are valid passwords. The numbers within braces ( { } ) are button strokes using more than one button.

- {[2]+[3]}, [1], [enter]
- [4], [enter]
- {[1]+[3]}, {[2]+[3]+[4]}, [1], [4], [2], [enter]

#### Setting Passwords

When shipped from the factory, no passwords are set. You have a choice of having no password or setting a supervisor and user password. You must set the supervisor password before the user password.



- The purpose of supervisor password is to be able to bypass the user password in case the user password is forgotten. The supervisor password alone will not lock the system.
- You have to set both the supervisor and user passwords for the security panel to work.

### Setting Supervisor Password

You must have set a supervisor password before setting any user passwords. The supervisor password can bypass the user password.

1. Go to the **Start** menu.
2. Click on **Run**.
3. Type in:  
`C:\Program Files\Fujitsu\`  
`Security Panel Application\`  
`Supervisor\FJSECS.EXE,`  
then press [Enter]
4. Follow the on-screen instructions to set the Supervisor password.

### Setting User Password

1. Go to the **Start** menu.
2. Click on **Programs**.
3. Click on **Security Panel Application** and **Set User Password**.
4. Follow the on-screen instructions to set the user password.



You may change or remove the supervisor or user password by repeating the steps defined above.

## OPERATING YOUR LIFEBOOK SECURITY/ APPLICATION PANEL

The security lock feature is in effect both when the system resumes from Off or Standby state. You always need to push the Suspend /Resume button to input the user password. Your system will not begin the boot sequence without entering your supervisor/user password.

### From Off State

1. Turn on your system.
2. When the Security Indicator flashes, enter the password and press Enter button.

For example, if the password is 22222, Press Button Number 2 five times and press Enter button.

The LifeBook notebook will boot to normal operation.

### From Standby State

1. Press your Suspend/Resume button.
  2. When the Security Indicator flashes, enter the password and press Enter button.
- The notebook should resume normal operation.

### Incorrect Password Entry

If an invalid supervisor or user password is entered three times in succession, the system will “beep” for about one minute. If a valid password is entered within a minute (while system beeps), the beeping will stop and the notebook will resume normal operation. If no or an invalid password is entered while the system beeps, the system will return to its previous locked state (standby or off) and the Security Indicator will go off. To reactivate the notebook after a password failure, you must press the Suspend/Resume button, then enter a correct password.



Remember the user password you specified on the Security Panel Application. If you forget the password you will not be able to use your computer. The supervisor password can override the user password.

## PRECAUTIONS

### Opening and Closing the Cover

Closing the cover automatically places the notebook into Standby mode. Opening the cover does not automatically place the notebook into normal operation. Instead, you must enter the proper security password after pushing the Suspend/Resume button.

### Low Battery Operations

If your LifeBook notebook has low battery, pushing the suspend/resume button only turns on the Security Indicator. Your notebook does not unlock, the Security Indicator turns off after one minute. To resume normal operation, first attach a power supply to the notebook. Then you may unlock the notebook.

## UNINSTALLING THE SECURITY PANEL APPLICATION

You have two options when uninstalling the security panel application:

- Uninstall the security panel application software. This will disable all security feature.
- Uninstall the security panel application with password still active. This will not allow any changes to the password.

### Uninstalling the Security Panel Application Software

Remove passwords when User wants no password protection whatsoever and doesn't want to give anybody the utility to set a password on their computer. In this

case, if passwords (supervisor, user, or both) are set, the passwords must first be cleared before removing the application. To clear passwords, follow same procedure in setting the passwords, except this time, check the “Remove Supervisor (and/or) User Password” box, as appropriate. Click [Next]. Enter the password. When asked to confirm that you want to remove the password, click [OK], then click [Finish].

### Removing Security Panel Application with Passwords Still Active

Using this feature will not allow any changes to the password.



Removing the applications does not remove the password. It simply removes the utility to change/add/remove passwords. To change your password you must reinstall the application.

#### User:

1. Go to **Start Menu**, Click on **Control Panel**.
2. Open **Add/Remove Programs Properties** in the Control Panel.
3. Select the **Security Panel Application** in the list, and click **Add/Remove**.
4. When the **Confirm File Deletion** box appears, click **Yes**.

#### Supervisor:

1. Go to **Start Menu**, Click on **Control Panel**.
2. Open **Add/Remove Programs Properties** in the Control Panel.
3. Select the **Security Panel Application for Supervisor** in the list, and click **Add/Remove**.
4. When the **Confirm File Deletion** box appears, click **Yes**.

### Reinstalling the Security/Application Panel

To reinstall supervisor or user security application, you will need your Drivers and Applications CD. The **Utilities\Security Application Panel** folder contains two separate folders: **Supervisor** and **User**. The setup files for supervisor and user security applications are contained in those folders.

1. Go to the **Utilities\Security Application Panel\Supervisor** folder on the CD and double-click the **setup.exe** file. The **Installing Security Panel Application** window will appear. Follow the instructions on the screen.
2. Go to the **Utilities\Security Application Panel\User** folder on the CD and double-click the **setup.exe** file. The **Installing Security Panel Application** window will appear. Follow the instructions on the screen.

Supervisor and user passwords can be set via Windows software using the **FJSECS.exe** and **FJSECU.exe** files, respectively. **FJSECU.exe** for the user password cannot run without first setting a supervisor password. You need to run **FJSECS.exe** first to set the supervisor password. Follow instructions under **Setting Passwords** on page 21.

If you forget both passwords, please contact Fujitsu Computer Systems Service and Support at 1-800-8FUJITSU (1-800-838-5487). Fujitsu Computer Systems Corporation charges a service fee for unlocking a password restricted LifeBook notebook. When calling please have a valid credit card and provide proof of ownership. You will then be given instructions on where to ship your notebook.

### LAUNCHING APPLICATIONS WITH THE SECURITY/APPLICATION PANEL

The security panel also enables you to launch applications with the touch of a button when your system is on. Pressing any of the buttons will launch a user-defined application. Your notebook is pre-installed with software utilities that let you operate and configure your LifeBook Security /Application Panel. These utilities are found under the Start menu, under Programs, then under LifeBook Application Panel. They include Application Panel Setup, Application Panel Guide, Activate Panel and Deactivate Panel.

#### Configuring your LifeBook Application Panel

When you start Windows, the LifeBook Application Panel is automatically activated. An icon resembling a finger pressing a button will appear in the system Control Panel. When you see this icon you will know that LifeBook Application Panel is active.

As an application launcher, the LifeBook Application Panel is very flexible, giving you a variety of options. To set up the Panel to best suit your needs, we have provided the Application Panel Setup utility that quickly and easily helps you make the most of this valuable feature.

#### To configure your LifeBook Application Panel with Application Panel Setup:

1. Click on [Start].
2. Click on Control Panel.
3. Click on the Application Panel icon.

The Application Panel setup utility will appear. There are tabs that correspond to the application buttons on the LifeBook Application Panel. When you receive your notebook, these buttons are pre-configured to launch specific programs, as referenced in Chapter 7 of this document.



The tabs in Application Panel Setup may not be in the same order as the buttons on your LifeBook notebook, please select the tab you wish to change carefully.

To change an application associated with the Application buttons, click on the tab for the button you would like to reconfigure – for example, Application A. Click on [Browse] or [Go to Start Menu...], scroll down the list of applications, click on the application you wish to launch with this button, and then click OK. The button will now launch the new application.

The Internet tab is different. It comes set to launch your Windows default Internet browser (Internet Explorer), unless you have changed this in Windows. In order to reconfigure it to launch another program follow these easy steps:

1. Select “Start Other Program” from the “Specify the button action:” box.
2. Click on [Browse] or [Go to Start Menu...].
3. Scroll down the list of applications, and then click on the application you wish to launch with this button.
4. Click [OK].

The button will now launch the new application. If you want to return to launching your Windows default Internet browser with this button, you need only click on “Default Internet Browser” from the Internet browser box. Be aware that you will erase the settings for the “other application”. If you wish to go back to launching the “other application” from this button, you will need to reconfigure it as described above.



If your system has dedicated one of the application launcher buttons to be an Internet launcher, the button can still be configured to launch any application you wish, not just an Internet browser.

When you have finished with Application Panel Setup click OK, and the new settings will take effect. You can reconfigure your LifeBook Application Panel as often as you like.

### **Deactivating and Activating the LifeBook Application Panel**

To deactivate the LifeBook Application Panel, follow these easy steps:

1. Click on [Start].
2. Click on Programs.
3. Click on LifeBook Application Panel.
4. Click on Stop Application Panel.

To reactivate, follow the same procedure, except for step 4. Click on Restart Application Panel instead.



Every time you start Windows the LifeBook Application Panel is activated, even if you deactivated it before you shut down.



# **3**

## **Getting Started**





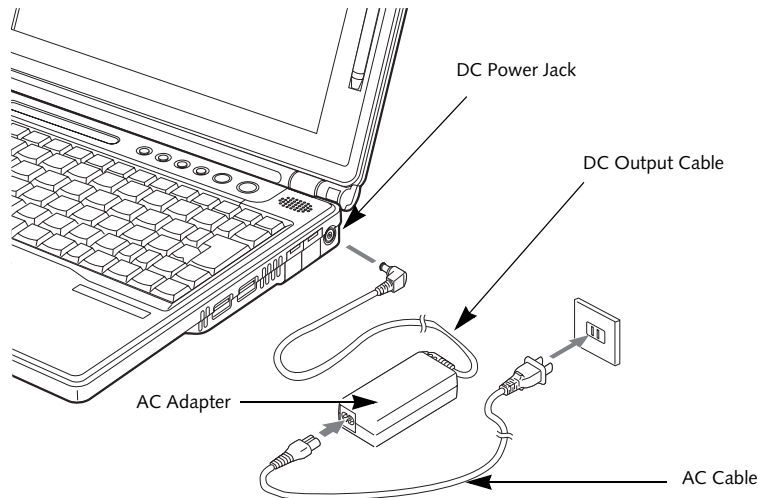


Figure 3-1. Connecting the AC Adapter

## Power Sources

Your LifeBook notebook has three possible power sources: a primary Lithium ion battery, an AC adapter or an optional Auto/Airline adapter.

### CONNECTING THE POWER ADAPTERS

The AC adapter or optional Auto/Airline adapter provides power for operating your notebook and charging the batteries.

#### Connecting the AC Adapter

1. Plug the DC output cable into the DC power jack of your notebook.
2. Plug the AC adapter into an AC electrical outlet. (Figure 3-1)

#### Connecting the Optional Auto/Airline Adapter

1. Plug the DC output cable into the DC power jack on your notebook.
  2. Plug the Auto/Airline adapter into the cigarette lighter of an automobile with the ignition key in the On or Accessories position.
- OR
3. Plug the Auto/Airline adapter into the DC power jack on an airplane seat.

#### Switching from AC Adapter Power or the Auto/Airline Adapter to Battery Power

1. Be sure that you have at least one charged battery installed.
2. Remove the AC adapter or the Auto/Airline adapter.



The Lithium ion battery is not charged upon purchase. Initially, you will need to connect either the AC adapter or the Auto/Airline adapter to use your notebook.

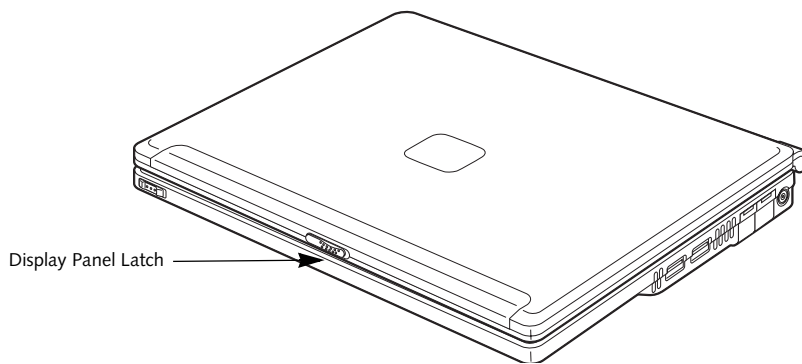


Figure 3-2. Opening the Display Panel

## Display Panel

Your LifeBook notebook contains a display panel that is backlit for easier viewing in bright environments and maintains top resolution through the use of active-matrix technology.

### OPENING THE DISPLAY PANEL

1. Slide the Display Panel latch. This releases the locking mechanism and raises the display slightly.
2. Lift the display backwards, being careful not to touch the screen, until it is at a comfortable viewing angle.

### ADJUSTING DISPLAY PANEL BRIGHTNESS

Once you have turned on your notebook, you may want to adjust the brightness level of the screen to a more comfortable viewing level. There are two ways to adjust the brightness, keyboard and power management utility.

#### Keyboard

Adjusting the brightness using the keyboard changes the setting only temporarily.

- [Fn+F6]: Pressing repeatedly will lower the brightness of your display.
- [Fn+F7]: Pressing repeatedly will increase the brightness of the display.



If using AC power your brightness setting is set to its highest level by default. If using battery power your brightness settings is set to approximately mid-level by default.

### Power Management Utility (Windows 2000 models only)

Adjusting the brightness using the Power Management Utility changes the setting permanently.

1. Double-click the BatteryAid icon in the lower right corner of your display. This will open the BatteryAid Properties dialog box.
2. Select the Fujitsu BatteryAid (2/2) tab and adjust your LCD Backlighting to the desired level.
3. Click OK or Apply to permanently change the settings.

You may need to readjust the brightness level periodically depending on your operating environment.



The higher the brightness level, the more power the LifeBook notebook will consume and the faster your batteries will discharge. For maximum battery life, make sure that the brightness is set as low as possible.

### CLOSING THE DISPLAY PANEL

1. Holding the edge of your display panel, pull it forward until it is flush with the body of your notebook.
2. Push down until you hear a click. This will engage the locking mechanism and prevent your display panel from opening unexpectedly.

# Starting Your LifeBook Notebook

## POWER ON

### Suspend/Resume On button

The Suspend/Resume button is used to turn on your LifeBook notebook from its off state. Once you have connected your AC adapter or charged the internal Lithium ion Battery, you can power on your notebook.



When you turn on your LifeBook notebook be sure you have a battery installed and charged, or that the AC or Auto/Air-line adapter is connected and has power.

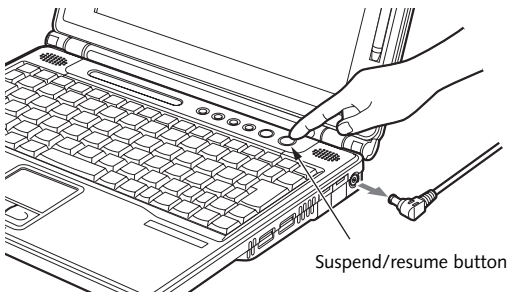


Figure 3-3. Pressing the suspend/resume button

Press the Suspend/Resume button (Figure 3-3). When you are done working you can either leave your LifeBook notebook in Suspend mode (See “Suspend Mode” on page 27.), or you can turn it off (See “Power Off” on page 28.)



Do not carry your LifeBook notebook around with the power on or subject it to shocks or vibration, as you risk damaging your notebook.

When you turn on your LifeBook notebook, it will perform a Power On Self Test (POST) to check the internal parts and configuration for correct functionality. If a fault is found, your LifeBook notebook will emit an audio warning and/or an error message will be displayed. See “Power On Self Test Messages” on page 84. Depending on the nature of the problem, you may be able to continue by starting the operating system or by entering the BIOS setup utility and revising the settings.

After satisfactory completion of the Power On Self Test (POST), your notebook will load your operating system.



Never turn off your LifeBook notebook during the Power On Self Test (POST) or it will cause an error message to be displayed the next time you turn on your LifeBook notebook. See “Power On Self Test Messages” on page 84.

## BOOT SEQUENCE

The procedure for starting-up your notebook is termed the Bootup sequence and involves your LifeBook notebook’s BIOS. When your notebook is first turned on, the main system memory is empty, and it needs to find instructions to start up your notebook. This information is in the BIOS program. Each time you power up or restart your notebook, it goes through a boot sequence which displays a Fujitsu logo until your operating system is loaded. During booting, your notebook is performing a standard boot sequence including a Power On Self Test (POST). When the boot sequence is completed without a failure and without a request for the BIOS Setup Utility, the system displays the operating system’s opening screen.

The boot sequence is executed when:

- You turn on the power to your notebook.
- You restart your notebook from the Windows Shut Down dialog box.
- The software initiates a system restart. Example: When you install a new application.
- You reset the system by pressing the three keys [CTRL+ALT+DEL].

## BIOS SETUP UTILITY

The BIOS Setup Utility is a program that sets up the operating environment for your notebook. Your BIOS is set at the factory for normal operating conditions, therefore there is no need to set or change the BIOS’ environment to operate your notebook.

The BIOS Setup Utility configures:

- Device control feature parameters, such as changing I/O addresses and boot devices.
- System Data Security feature parameters, such as passwords.

### Entering the BIOS Setup Utility

To enter the BIOS Setup Utility do the following:

1. Turn on or restart your notebook.
2. Press the [F2] key once the Fujitsu logo appears on the screen. This will open the main menu of the BIOS Setup Utility with the current settings displayed.
3. Press the [RIGHT ARROW] or [LEFT ARROW] key to scroll through the other setup menus to review or alter the current settings.

## BIOS Guide

A guide to your notebook's BIOS is available online. Please visit our service and support Web site at <http://us.fujitsu.com/computers>. Once there, select Support, then select Notebooks under User's Guides. Select LifeBook BIOS Guides from the pull-down menu for your LifeBook series. If you are unsure of your notebook's BIOS number, refer to your packing slip.



If your data security settings require it, you may be asked for a password before the BIOS main menu will appear.

## BOOTING THE SYSTEM

We strongly recommend that you not attach any external devices until you have gone through the initial power-on sequence.

When you turn on your LifeBook notebook for the first time, it will display a Fujitsu logo on the screen. If you do nothing the system will load the operating system, and then the Windows Welcome will begin.

Designed to accommodate the needs of many users, in many different countries, Windows needs to be configured the first time you use them. Windows has three parts:

- **Getting Started:** You have the opportunity to enter custom information for your configuration file and setup your modem so that your LifeBook notebook will be prepared to dial out.
- **Windows License Agreement and Final Settings:** You have the opportunity to review the Windows License Agreement.



- If you reject the terms of the license agreement you will be asked to review the license agreement for information on returning Windows or to shut down your LifeBook notebook.
- You cannot use your LifeBook notebook until you have accepted the License Agreement. If you stop the process your notebook will return to the beginning of the Windows Welcome Process.

## Getting Started

Read the instructions on the screens carefully and fill in the information as directed. You will be asked for such items as the language you wish to use, the country in which you live, your first and last name, and about how you dial out from where you will be using your LifeBook notebook. For the modem settings, enter your current location information where you will be using your LifeBook notebook. If you are not connected to a phone line and plan to register at a later time, you may

click the **Skip** button, and you will go directly to the condition of use page.

Once you have set up your LifeBook notebook to dial out, Windows will make a free telephone call to test the settings. If the call is unsuccessful, you will be returned to the phone settings page where you may try to fix them. If you are unable to fix the settings, contact Fujitsu Service and Support. See *"Fujitsu Contact Information"* on page 3. If you would simply like to move on, and register at a later time, you may click the **Skip** button, and you will go directly to the Condition of Use page.

## Registration

If your connection is successful, you will go to the Registration Confirmation page. On this page simply enter the requested information, and then check the box at the bottom to register your copy of Windows with Microsoft. Once you have finished, click the **Next** button to continue.



If you do not register at this time you can do it later simply by double-clicking on the **LifeBook Registration** icon on your desktop and following the instructions.

You will then go through the Fujitsu registration process. Follow the instructions on the screens, and enter all of the necessary information. Be as specific as possible so that if you need help the service and support team will be able to serve you better.

## Final Settings

The first part of your final settings is the Windows End User License Agreement. Read the agreement carefully. When you finish reading you must accept or reject the terms of the agreement and then click on the **Next** button.



If you do not register at this time you can do it later simply by double-clicking on the **LifeBook Registration** icon on your desktop and following the instructions.

## ACTIVATING ADDITIONAL UTILITIES

The first time you boot up a Windows 2000 system, you will see an icon on the desktop called Click Me! In Windows XP systems, the Click Me! icon is in the Start menu.

When you click the Click Me! icon, your system will automatically build the icon tray in the bottom right of the screen. These icons provide links to utilities that you will frequently access.

Although the icon remains on the screen, you need invoke it only once.

## REGISTERING YOUR LIFEBOOK NOTEBOOK

### What are the benefits of registering?

You will receive an identification label for your LifeBook notebook, which, if your notebook is ever lost, may help in getting it returned to you. You will also receive technical support access and useful product mailings.

### How do I register?

With Windows, just follow the on-screen instructions during the Welcome process. If you do not register during the Welcome process you can double-click on the LifeBook Registration icon on your desktop at any time and follow the instructions.



Make sure you have connected a phone line to your modem before you use E-Registration.

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You may also complete the pre-printed registration form and either:

- Fax to 408-764-2724
- Mail to:  
Fujitsu Computer Systems Corporation  
750 139th Ave.  
San Leandro, CA 94578  
Attn: Warranty Department

You may also register on our Web site:

- <http://us.fujitsu.com/computers>

You will need to be set up with an Internet Service Provider (ISP) to use this option.

## Power Management

Your LifeBook notebook has many options and features for conserving battery power. Some of these features are automatic and need no user intervention, such as those for the internal modem. However, others depend on the parameters you set to best suit your operating conditions, such as those for the display brightness. Internal power management for your notebook may be controlled from settings made in your operating system, pre-bundled power management application, or from settings made in BIOS setup utility.

Besides the options available for conserving battery power, there are also some things that you can do to prevent your notebook battery from running down as quickly. For example, you can create an appropriate power saving profile, put your notebook into Standby mode when it is not performing an operation, and you can limit the use of high power devices. As with all mobile, battery powered computers, there is a trade-off between performance and power savings.

Power Mode	System Activity	Events causing system to enter mode state
Fully On Mode	System is running. CPU, system bus, and all other interfaces operate at full speed.	<ul style="list-style-type: none"> <li>From Standby mode: System operation resumed (Suspend/Resume button pressed, resume on modem ring, resume on time).</li> <li>From Hibernation mode: Suspend/Resume button pressed.</li> <li>From Off mode: Suspend/Resume button pressed.</li> </ul>
Standby Mode (Suspend-to-RAM)	Resume system logic remains powered and RAM remains powered to maintain active data. All other devices are turned off.	<ul style="list-style-type: none"> <li>Standby timeout occurs.</li> <li>Suspend request issued by software or by pressing the Suspend/Resume button.</li> <li>Low battery.</li> </ul>
Hibernation Mode (Suspend-to-Disk)	Windows saves desktop state (including open files and documents) to hard disk. CPU stops. All other devices are turned off.	<ul style="list-style-type: none"> <li>Suspend timeout occurs.</li> <li>Clicking Start -&gt; Shut Down -&gt; Hibernate (It may be necessary to Enable Hibernate Support from Windows Power Options.)</li> <li>Low battery condition</li> </ul>
Power Off	System is fully powered off except for logic components required for Suspend/Resume button and real-time clock operation.	<ul style="list-style-type: none"> <li>System shutdown.</li> <li>Low battery condition</li> </ul>

**Table 3-1. System Power States**

### SUSPEND/RESUME BUTTON

When your LifeBook notebook is active, the Suspend/Resume button can be used to manually put your LifeBook into Standby mode. Push the Suspend/Resume button when your notebook is active, but not actively accessing anything, and immediately release the button. You will hear two short beeps and your system will enter Standby mode. (See figure 2-5 on page 8 for location).

If your notebook is suspended, pushing the Suspend/Resume button will return your notebook to active operation. You can tell whether or not your system is in Standby mode by looking at the Power indicator. See “Power Indicator” on page 13. If the indicator is visible and not flashing, your notebook is fully operational. If the indicator is both visible and flashing, your notebook is in Standby mode. If the indicator is not visible at all, the power is off or your notebook is in Hibernate mode.

### STANDBY MODE

Standby mode in Windows saves the contents of your notebook’s system memory during periods of inactivity by maintaining power to critical parts. This mode will turn off the CPU, the display, the hard drive, and all of the other internal components except those necessary to maintain system memory and allow for restarting. Your notebook can be put in Standby mode by:

- Pressing the Suspend/Resume button when your system is turned on.
- Selecting Standby from Windows Shut Down menu.
- Timing out from lack of activity.
- Allowing the battery to reach the Dead Battery Warning condition.

Your notebook’s system memory typically stores the file(s) on which you are working, open application(s) information, and any other data required to support the

operation(s) in progress. When you resume operation from Standby mode, your notebook will return to the point where it left off. To resume operation, you must use the Suspend/Resume button to resume operation, and there must be an adequate power source available, or your notebook will not resume.



If you are running your LifeBook notebook on battery power, be aware that the battery continues to discharge while your notebook is in Standby mode, though not as fast as when fully operational.

## HIBERNATE MODE

Hibernate mode saves the contents of your notebook's system memory to the hard drive as a part of the Suspend/Resume mode. Your notebook is pre-configured to perform this function. The Hibernate mode can also be configured through the system BIOS to run in other ways depending on what you need to accomplish. See *"BIOS Setup Utility"* on page 29.



- The Standby or Hibernate modes should not be used with certain PC Cards. Check your PC Card documentation for more information.
- Disabling the Suspend/Resume button prevents it from being used to put your notebook in Standby or Hibernate mode. The resume function of the button cannot be disabled.
- If your notebook is actively accessing information when you enter the Standby or Hibernate mode, changes to open files are not lost. The files are left open and memory is kept active during Standby mode or the memory is transferred to the internal hard drive during Hibernate mode.
- When PC Cards or external devices are in use, Save-to-Disk mode cannot return to the exact state prior to suspension, because all of the peripheral devices will be re-initialized when the system restarts.
- The main advantage of using the Hibernate function is that power is not required to maintain your data. This is particularly important if you will be leaving your notebook in a suspended state for a prolonged period of time. The drawback of using Hibernate mode is that it lengthens the power down and power up sequences and resets peripheral devices.

## Using Hibernate Mode

The Hibernate default setting is enabled for Windows XP and disabled for Windows 2000.

To enable or disable the Hibernation feature follow these easy steps:

1. From the **Start** menu, select **Settings**, and then select **Control Panel --> Power Management**.
2. Select **Hibernation**, and then select the box to enable or disable this feature.

To use **Hibernate mode** with Windows 2000 and Windows XP systems:

1. Click on the **Start** button, click **Shut Down**.
2. Select **Hibernate** option from the "What do you want the computer to do" list.

## DISPLAY TIMEOUT

The display timeout is a power management feature. This feature saves power by turning off the display if there is no keyboard or pointer activity for the user selected timeout period. Any keyboard or pointer activity will cause the display to restart automatically. This feature is independent of the Suspend/Resume button and can be enabled and disabled in Windows Power Management and BIOS setup utility (APM only). See *"BIOS Setup Utility"* on page 29.

## HARD DISK TIMEOUT

The hard disk timeout is another one of the power management parameters. This feature saves power by turning off the hard drive if there is no hard drive activity for the user selected timeout period. Any attempt to access the hard drive will cause it to restart automatically. This feature is independent of the Suspend/Resume button and can be enabled and disabled in Windows and BIOS setup utility (APM only). See *"BIOS Setup Utility"* on page 29.

## WINDOWS POWER MANAGEMENT

The Power Management icon located in the Windows Control Panel allows you to configure some of the power management settings. For example, you can use the Power Management to set the timeout values for turning off the display and hard disks whether you are running the notebook on battery power or one of the adapters. The settings may also be changed in the BIOS (APM only). See *"BIOS Setup Utility"* on page 29.

## RESTARTING THE SYSTEM

If your system is on and you need to restart it, be sure that you use the following procedure.

1. Click the **Start** button, and then click **Shut Down**.
2. Select the **Restart** option from within the Windows Shut Down dialog box.



3. Click **OK**. Your notebook will shut down and then reboot.



Turning off your LifeBook notebook without exiting Windows or turning on your notebook within 10 seconds of the notebook being shut off may cause an error when you start the next time.

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## POWER OFF

Before turning off the power by choosing Shut Down from the Windows Start menu, check that the Hard Drive, CD-ROM, PC Card and the Floppy Disk Drive Access indicators are all Off. (See Figure 2-5 on page 8) If you turn off the power while accessing a disk or PC Card there is a risk of data loss. To assure that your notebook shuts down without error, use the Windows shut down procedure.



Be sure to close all files, exit all applications, and shut down your operating system prior to turning off the power. If files are open when you turn the power off, you will lose any changes that have not been saved, and may cause disk errors.

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Using the correct procedure to shut down from Windows, allows your notebook to complete its operations and turn off power in the proper sequence to avoid errors. The proper sequence is:

1. Click the **Start** button, and then click **Shut Down**.
2. Select the **Shut Down** option from within the Windows Shut Down dialog box.
3. Click **OK**.

If you are going to store your notebook for a month or more see the Care and Maintenance section.



**4**

## **User-Installable Features**



## Lithium ion Battery

Your LifeBook notebook has a Lithium ion battery that provides power for operating your notebook when no external power source is available. The battery is durable and long lasting, but should not be exposed to extreme temperatures, high voltages, chemicals or other hazards.

The Lithium ion battery operating time may become shorter if it is used under the following conditions:

- When used at temperatures that exceed a low of 40°F (5°C) or a high of 95°F (35°C). Extreme temperatures not only reduce charging efficiency, but can also cause battery deterioration. The Charging icon on the Status Indicator panel will flash when you try to charge a battery that is outside its operating temperature range. See “Battery Charging Indicator” on page 14.
- When using a high current device such as a modem, CD-ROM drive, or the hard drive. Using the AC adapter when operating such devices will help to conserve your battery life.



- Do not leave a faulty battery in your notebook. It may damage your AC adapter, optional Auto/Airline adapter, another battery or your notebook itself. It may also prevent operation of your notebook by draining all available current into the bad battery.
- Under federal, state, or local law it may be illegal to dispose of batteries by putting them in the trash. Please take care of our environment and dispose of batteries properly. Check with your local government authority for details regarding recycling or disposing of old batteries. If you cannot find this information elsewhere, contact your support representative at 1-800-8Fujitsu.



Actual battery life will vary based on screen brightness, applications, features, power management settings, battery condition and other customer preferences. CD-ROM drive or hard drive usage may also have a significant impact on battery life. The battery charging capacity is reduced as the battery ages. If your battery is running low quickly, you should replace it with a new one.



Make sure that the Battery Charging indicator and the percentage charge is shown inside the Battery Level icon on the Status Indicator Panel.

There is no memory effect on the Lithium ion battery therefore you do not need to discharge the battery completely before recharging. The charge times will be significantly longer if your notebook is in use while the battery is charging. If you want to charge the battery more quickly, put your notebook into Standby mode, or turn it off while the adapter is charging the battery. See “Power Management” on page 32.



Using heavy current devices such as a modem or frequent CD-ROM and PCMCIA powered external devices accesses may prevent charging completely.

### Low Battery State

When the battery is running low, your notebook will beep every 15 seconds and the Battery Level indicator will flash. If you do not respond to the low battery alarm, the batteries will continue to discharge until they are too low to operate. When this happens there will be a multiple beep alarm and the Battery Level indicator will show a dead battery. Your LifeBook will then go into Standby mode to try and protect your data for as long as possible. There is no guarantee that your data will not be lost once the notebook reaches this point.



- You may not be able to hear the audio alarm if the volume control is set too low or is turned off by either the hardware or software. However, you will still be able to see the Battery Level indicator flash. Once the low battery alarm occurs you must save all your active data and put your notebook into Standby mode until you can provide a new power source. You should provide a charged battery, an AC power adapter, or Auto/Airline as soon as possible.
- When you are in Standby mode there must always be at least one power source active. If you remove all power sources while your notebook is in Standby mode, any data that has not been saved to the hard drive will be lost.

### RECHARGING THE BATTERIES

If you want to know the condition of the primary Lithium ion battery, check the Battery Level indicator located on the Status Indicator panel. The indicator changes as the battery level changes.

Dead Battery Suspend mode shows on the Status indicator just like the normal Standby mode. Once your notebook goes into Dead Battery Suspend mode you will be unable to resume operation until you provide a source of power either from an adapter, or a charged battery. Once you have provided power, you will need to press the Suspend/Resume button to resume operation. In the Dead Battery Suspend mode, your data can be maintained for some time, but if a power source is not provided promptly, the Power indicator will stop flashing and go out, meaning that you have lost the data that was not stored. Once you provide power, you can continue to use your notebook while an adapter is charging the battery.

### Shorted Batteries

The Status Indicator panel uses a symbol inside the battery outline of the Battery Level indicator to display the operating level available in that battery. (See figure 2-11 on page 13) If this display shows a Shorted Battery, it means that the battery is damaged and must be replaced so it does not damage any other parts of your notebook.

## REPLACING THE BATTERY

Your LifeBook B Series notebook comes with one battery pack, but it's a good idea to purchase a second one. By keeping a spare battery fully charged, you can immediately swap with one that is not charged. The battery can only be replaced by cold-swapping; doing otherwise could result in loss of data. (Cold swapping means swapping batteries when the system has been powered down.)

### Cold-swapping Batteries

To cold-swap batteries in your battery bay follow these easy steps: (Figure 4-1)

1. Have a charged battery ready to install.
2. Shut down your notebook and disconnect the AC adapter.

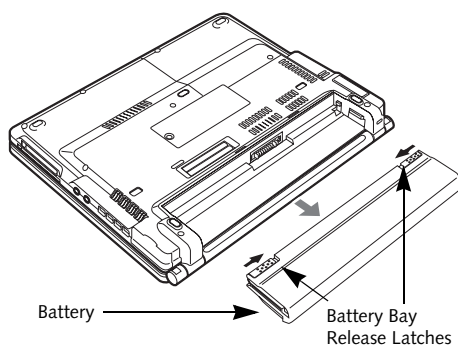


Figure 4-1. Removing the Battery

3. Slide the Battery Bay Latches inward, then slide the battery away from the battery bay and remove it from the bay.
4. Position the new battery on the tray slides and carefully slide it fully into the tray. (Figure 4-2) The latches will click into place to secure the battery.
5. Turn the power on.

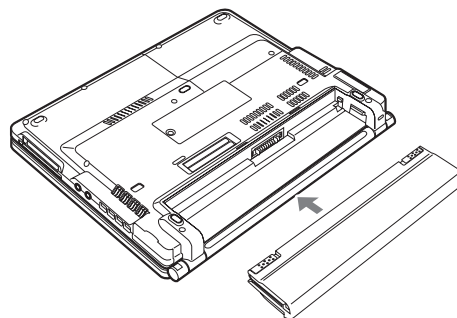


Figure 4-2. Installing the Battery



If the Lithium ion battery connector is not fully seated, you may not be able to use your notebook or charge your battery.

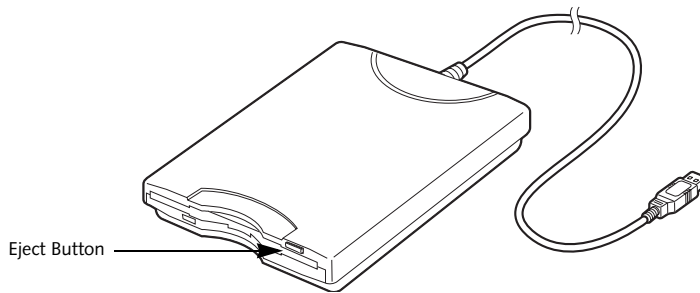


Figure 4-3. Loading/Ejecting a 3.5" Floppy Disk

## External Floppy Disk Drive\*

\*Optional device

### CONNECTING AN OPTIONAL EXTERNAL FLOPPY DISK DRIVE

Your LifeBook notebook may have an optional external floppy disk drive which can read and write information on removable 1.44MB and 720KB floppy disks.

The USB floppy disk drive can be installed while your system is in a suspended state ("warm" connection), while the system is running ("hot" connection), or when the system is off ("cold" connection).

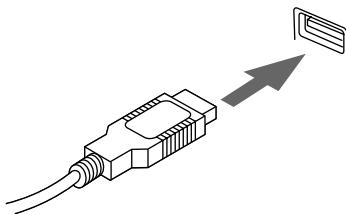


Figure 4-4. USB floppy disk drive cable and connection

Attach the external USB floppy disk drive by inserting the end of the cable connector into the USB port. See the figure above.

See your computer's User's Guide to determine the location of the USB floppy disk drive port.

Your computer will automatically detect the floppy disk drive and activate it within your system. The drive letters associated with the floppy disk drive will be created and listed under My Computer and Windows Explorer.

### LOADING A DISK

To load a disk into your disk drive, follow these easy steps:

1. Orient the disk so that its label is facing upwards and the shutter side is pointing towards the drive. (Figure 4-3)

2. Push the disk into the drive until the Eject button pops out and you hear a click.



When there is no disk in the drive, the Eject button is flush with your LifeBook notebook.

### EJECTING A DISK

To eject a disk from the disk drive, follow these easy steps:

1. Check that the Floppy Disk Drive Access indicator is inactive.
2. Press the Eject button. This will push your disk partially out of the drive.
3. Remove the disk.

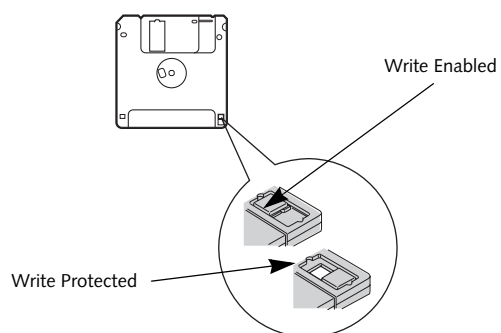


If you eject the disk while the Floppy Disk Drive Access indicator is active, there is a risk of damaging the data on the disk, the disk itself or even the disk drive.

### PREPARING A DISK FOR USE

Before you can use a new disk, it needs to be prepared so your notebook knows where to store information. This preparation is called formatting or initializing a disk. You will need to format new disks, unless they are preformatted. *(Please refer to your operating system manual for step-by-step instructions on formatting a disk)*

To prevent accidental erasure of the data stored on a disk, slide the "write protect" tab until a small hole is exposed. This sets the disk into a protected state where nothing can be added or removed. If you want to add or remove data on a protected disk, slide the "write protect" tab to close the small hole. (Figure 4-5)



**Figure 4-5. Floppy Disk Write Protect**



Formatting a floppy disk that already contains data will erase all of the information on the disk.

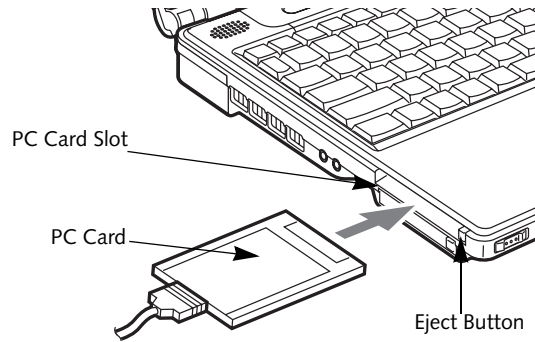


Figure 4-6. Installing/Removing PC Cards

## PC Cards

Your LifeBook notebook supports Type I and Type II PC Cards, which can perform a variety of functions.

Some available PC Cards:

- Fax/data modem cards.
- Local area network (LAN) cards.
- IDE solid-state disk cards.
- SCSI cards.
- Other PC Cards that conform to PCMCIA 2.1 or CardBus standards.
- Optional SmartCard adapter

For further information, refer to the instructions supplied with your PC Card.

### INSTALLING PC CARDS

PC Cards are installed in the PC Card slot. To install a PC Card, follow these easy steps: (Figure 4-6)



- Installing or removing a PC Card during your notebook's shutdown or bootup process may damage the card and/or your notebook.
- Do not insert a PC Card into a slot if there is water or any other substance on the card as you may permanently damage the card, your notebook, or both.

1. See your PC Card manual for specific instructions on the installation of your card. Some PC Cards may require your notebook to be Off while installing them.
2. Make sure there is no PC Card currently in the slot. If there is, see Removing PC Cards.
3. Insert your PC Card into the slot, with the product label facing up.
4. Push the card into the slot firmly until it is seated in the opening.



Windows has a shutdown procedure for PC Cards that must be followed before removing a card. (Review your operating system manual for the correct procedure)

### REMOVING PC CARDS

To remove a PC Card, follow these easy steps:

1. See your PC Card manual for specific instructions on removing your card. Some PC Cards may require your notebook to be in Standby Mode or Off while removing them.



If the dialog box states that the device cannot be removed, you must save all of your open files, close any open applications and shut down your LifeBook.

2. Push the Eject button until it pops out, and then push it in to eject the card. This will allow you to remove the card.



If the PC Card has an external connector and cable, do not pull the cable when removing the card.

### SMART CARD READER

An embedded Smart Card Reader is provided on your LifeBook notebook. Smart Cards are the same size and shape as credit cards, but they contain an integrated microprocessor chip. The chip can hold a variety of information, and provides the user with many possible options, such as allowing them to make secure purchases, pay for phone calls, store security information, and provide identification and information.

In order to use the embedded Smart Card Reader, you must purchase an optional Smart Card holder for installation into an available Type II PC Card slot.



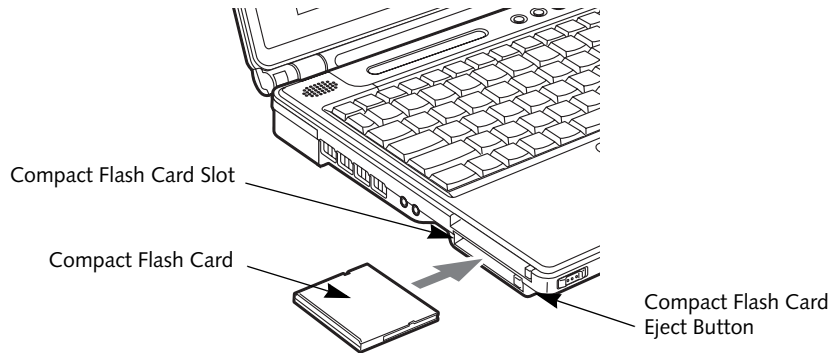


Figure 4-7. Compact Flash Card Slot

## Compact Flash Cards

Your Fujitsu LifeBook notebook supports Compact Flash (CF) cards, which can perform a variety of functions.

Some available Compact Flash Cards:

- Memory cards
- Fax/data modem cards
- Local area network (LAN) cards

For further information, refer to the instructions supplied with your PC Card.

### INSTALLING COMPACT FLASH CARDS

Compact Flash Cards are installed in the Compact Flash Card slot. To install a Compact Flash Card, follow these steps: (Figure 4-7)



- Installing or removing a Compact Flash Card during your LifeBook notebook's shutdown or bootup process may damage the card and/or your notebook.
- Do not insert a Compact Flash Card into a slot if there is water or any other substance on the card as you may permanently damage the card, your LifeBook notebook, or both.

1. See your Compact Flash Card manual for specific instructions on the installation of your card. Some Compact Flash Cards may require your notebook to be Off while installing them.
2. When you receive your LifeBook, there will be a protective plug installed in the slot. Whenever you don't have a Compact Flash Card installed, be sure to replace the plug to prevent system contamination. To remove the plug, press the Compact Flash Card eject button. (Figure 4-8)

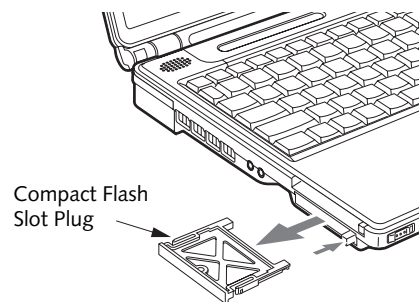


Figure 4-8. Removing Compact Flash Slot plug

3. When the Compact Flash Slot plug is ejected, remove it from the slot.
4. Insert your Compact Flash Card into the slot, with the product label facing up.

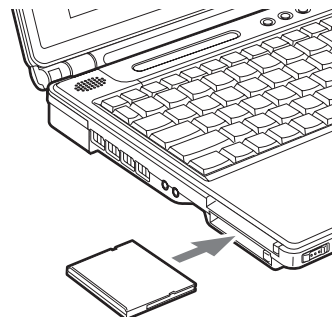


Figure 4-9. Installing a Compact Flash Card

5. Push the card into the slot firmly until it is seated in the opening. You will hear a click and the Eject button will pop away from your notebook.

## REMOVING COMPACT FLASH CARDS

To remove a Compact Flash Card, follow these easy steps:



Windows has a shutdown procedure for Compact Flash Cards that must be followed before removing a card. (Please review your operating system manual for the correct procedure).

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1. See your Compact Flash Card manual for specific instructions on removing your card. Some Compact Flash Cards may require your notebook to be in Suspend Mode or Off while removing them.
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- 



If the dialog box states that the device cannot be removed, you must save all of your open files, close any open applications and shut down your notebook.

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2. Push the Eject button in until it is flush with the notebook. This will push the Compact Flash Card slightly out of the slot allowing you to remove the card.

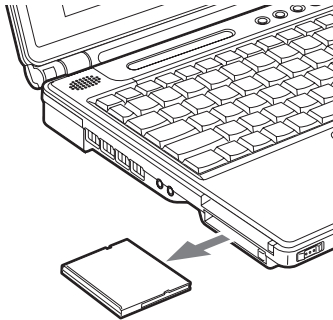


Figure 4-10. Removing a Compact Flash Card

## Memory Upgrade Module

Your notebook has been configured with 256 MB, 512 MB, or 1 GB of high speed Synchronous Dynamic RAM (SDRAM) factory installed. If you have 256 MB or 512 MB of memory installed, you can increase your notebook's memory capacity by replacing the original module with a higher capacity module. The memory upgrade must be a dual-in-line (DIMM) 100 MHz SDRAM module. (To be certain the correct module is used, you should only use Fujitsu memory modules. To order, go to the Fujitsu Web site: <http://us.fujitsu.com/computers>).

### REMOVING A MEMORY UPGRADE MODULE

1. Turn off power to your notebook and remove any attached power adapter (AC or auto/airline).



The memory upgrade module can be severely damaged by electrostatic discharge (ESD). Be sure you are properly grounded when handling and installing the module.

2. Make sure that all connector covers are closed.
3. Turn the notebook bottom side up, with the battery toward you.
4. Remove the memory upgrade compartment screw. (Figure 4-11)



Do not remove any screws from the memory upgrade module compartment except those specifically shown in the directions for installing and removing the memory upgrade module.

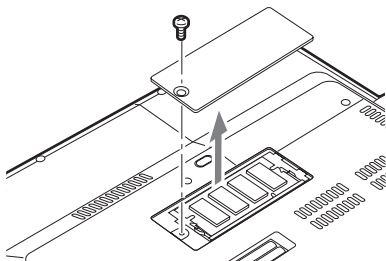


Figure 4-11. Removing a Memory Module Cover

5. Remove the cover.
6. Pull the clips sideways away from each side of the memory upgrade module at the same time.
7. While holding the clips out, remove the module from the slot by lifting it up and pulling towards the rear of your notebook. (Figure 4-12)
8. Store the memory upgrade module in a static guarded sleeve.

9. Install a new memory module as instructed in "Installing a Memory Upgrade Module".

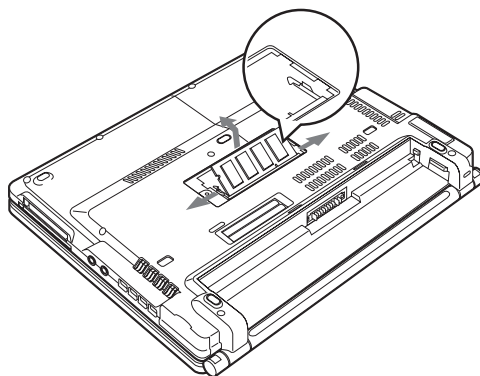


Figure 4-12. Removing the Memory Upgrade Module

### INSTALLING A MEMORY UPGRADE MODULE

1. Turn off power to your notebook and remove any attached power adapter (AC or auto/airline).
2. Make sure you are properly grounded.
3. Make sure that all connector covers are closed.
4. Turn the notebook bottom side up, with the battery toward you.
5. Remove the memory upgrade module compartment screw. (Figure )
6. Remove the cover.
7. Remove the new memory upgrade module from the static guarded sleeve.
8. Align the memory upgrade module with the part side up. Align the connector edge of the memory upgrade module with the connector slot in the compartment. The connector will be pointing toward the rear of the notebook.
9. Insert the memory upgrade module at a 45° angle. Press the connector edge of the module firmly down and into the connector until it lodges under the retaining clip. You will hear a click when it is properly in place. (Figure 4-13)

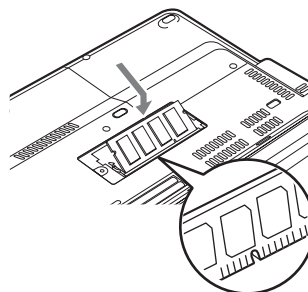


Figure 4-13. Installing a Memory Upgrade Module

10. Replace the cover.
11. Replace the screw.



The memory upgrade module is not something you routinely remove from your notebook. Once it is installed, you should leave it in place unless you want to change system memory capacity.

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## CHECKING THE COMPUTER RECOGNITION OF NEW MEMORY CAPACITY

Once you have changed the system memory capacity, be sure to check that your notebook has recognized the change.

You can check the memory capacity by looking at the main menu of the BIOS setup:

1. Turn on the power to your notebook.
2. Allow the system to start booting and press the [F2] key once the Fujitsu logo appears on the screen. This will open the main menu of the BIOS setup. Go to the Info tab to view the current settings. See “*BIOS Setup Utility*” on page 29.

The System Memory and the Extended Memory capacity, as detected by your notebook during the Power On Self Test (POST), are displayed at the bottom of the main menu screen.



If the total memory displayed is incorrect, check that your memory upgrade module is properly installed. If the module is properly installed and the capacity is still not correctly recognized, see “*Troubleshooting*” on page 53.

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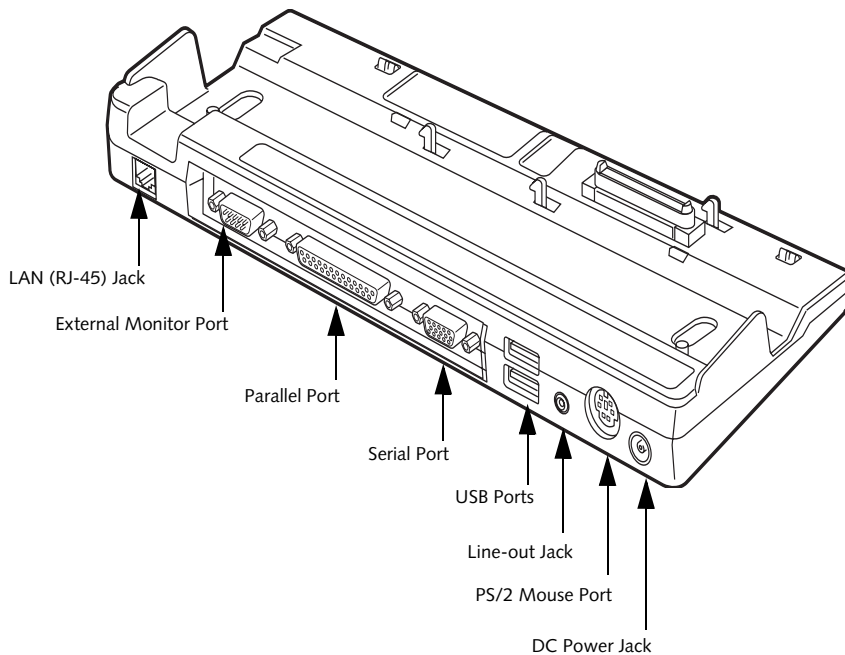


Figure 4-14. Port Replicator rear panel (LAN model shown)

## Port Replicator

An optional Port Replicator is available from Fujitsu to support your LifeBook notebook. The Port Replicator extends the functionality of your notebook by providing ports to connect PS/2 devices, a parallel device, a serial device, and an external floppy disk drive. The Port Replicator connects to the bottom of your notebook. See “Device Ports” on page 48.

### REAR PANEL COMPONENTS

Following is a brief description of the optional Port Replicator’s rear panel components.

#### LAN (RJ-45) Jack (LAN model only)

The LAN jack allows you to connect a LAN to the Port Replicator. Note that when the system is attached to the Port Replicator, the LAN Jack on the Port Replicator should be used, not the one on the system.

#### External Monitor Port

The external monitor port allows you to connect an external VGA or SVGA monitor. Note that if a Port Replicator is attached, you must use the external monitor port on the Port Replicator.

#### Parallel Port

The parallel port allows you to connect parallel devices. (This is also sometimes referred to as an LPT port.)

#### Serial Port

The serial port allows you to connect serial (RS-232C) devices. (This is also sometimes referred to as a COM port.)

#### USB 2.0 Ports

The two Universal Serial Bus 2.0 ports allow you to connect USB devices such as external game pads, pointing devices, keyboards and/or speakers. USB 2.0 ports are backward-compatible to work with USB 1.1 devices.

#### Line-Out Jack

The analog output jack allows you to connect an external audio device to your system.

#### PS/2 Mouse Port

The PS/2 mouse port allows you to connect an external PS/2 Mouse.

#### DC Power Jack

The DC power jack allows you to plug in the AC adapter to power your notebook and charge the internal Lithium ion battery.

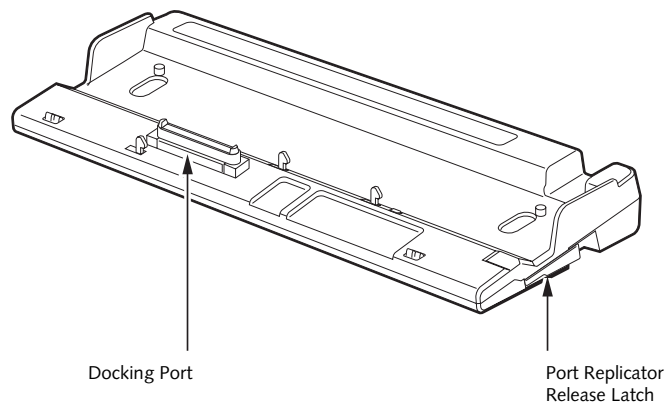


Figure 4-15. Port Replicator front panel

## FRONT PANEL COMPONENTS

Following is a brief description of the optional Port Replicator's front panel components

### Docking Port

The docking port connects the Port Replicator to your LifeBook notebook. (Figure 4-15)

### Port Replicator Release Latch

Pull the Port Replicator Release latch away from the Port Replicator to remove the Port Replicator from your notebook. (Figure 4-15)

## ATTACHING THE PORT REPLICATOR

To attach the Port Replicator follow these easy steps:

1. Power off your notebook.
2. Align the Port Replicator connector on the bottom of your notebook with the connector on the Port Replicator and push together at the two corners. (Figure 4-16)

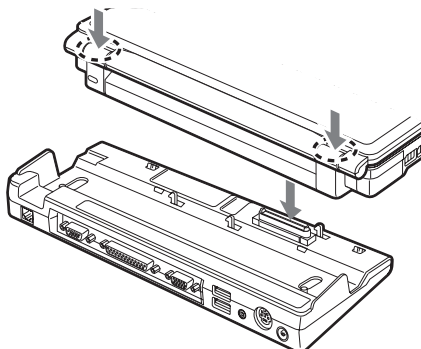


Figure 4-16. Attaching the Port Replicator

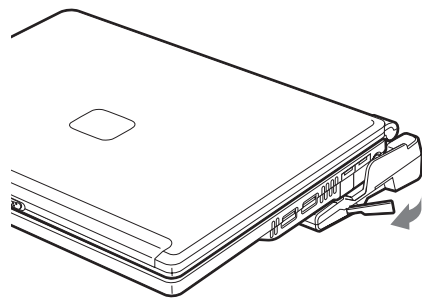


Figure 4-17. Unlatching the Port Replicator

## DETACHING THE PORT REPLICATOR

To detach the Port Replicator follow these easy steps:

1. Power off your notebook.
2. Pull the Port Replicator's release latch away from the Port Replicator to release it from your notebook. (Figure 4-17)
3. Pull away the Port Replicator to detach it from your notebook. (Figure 4-18)

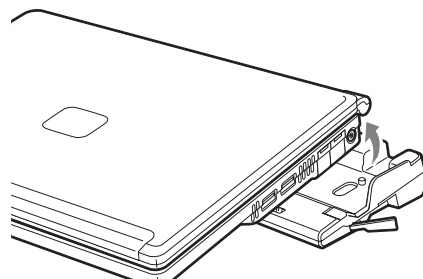


Figure 4-18. Removing the Port Replicator

## Device Ports

Your LifeBook notebook and the optional Port Replicator come equipped with multiple ports to which you can connect an external device including: disk drives, keyboards, modems, printers, etc.

### MODEM (RJ-11) JACK

The modem (RJ-11) jack is used for an internal modem. To connect the telephone cable follow these easy steps: (See figure 2-7 on page 10 for location)

1. Align the connector with the jack opening.
2. Push the connector into the jack until it is seated.
3. Plug the other end of the telephone cable into a telephone outlet.



- The internal modem is designed to the ITU V.90 standard. Its maximum speed of 53000bps is the highest allowed by FCC, and its actual connection rate depends on the line conditions. The maximum speed is 33600bps at upload.
- The internal modem on all LifeBook notebooks from Fujitsu Computer Systems Corporation are certified for use in the United States and Canada.
- Depending upon the configuration of your system, your LifeBook notebook may have either a LAN jack or an IEEE 1394 jack.



The internal modem is not intended for use with Digital PBX systems. Do not connect the internal modem to a Digital PBX as it may cause serious damage to the internal modem or your entire LifeBook notebook. Consult your PBX manufacturer's documentation for details. Some hotels have Digital PBX systems. Be sure to find out BEFORE you connect your modem.

### INTERNAL LAN (RJ-45) JACK

The internal LAN (RJ-45) jack is used for an internal Fast Ethernet (10/100 Base-T/Tx) connection. If your notebook has been configured with internal LAN capability you will need to configure your notebook to work with your particular network. (Please refer to your network administrator for information on your network configuration.) To connect the LAN cable follow these easy steps: (See figure 2-7 on page 10 for location)



Note that the optional Port Replicator is designed to cover the LAN jack located on the system. This design ensures that the LAN jack on the Port Replicator is the only one used when the Port Replicator is installed.

1. Align the connector with the jack opening.
2. Push the connector into the jack until it is seated.
3. Plug the other end of the cable into a LAN outlet.

### PARALLEL PORT

The parallel port, or LPT port, located on the optional Port Replicator allows you to connect parallel devices, such as a printer to your notebook. In order to connect a parallel interface device follow these easy steps: (See figure 4-14 on page 46 for location)

1. Align the connector with the port opening.
2. Push the connector into the port until it is seated.
3. Tighten the two hold-down screws, located on each end of the connector.

### SERIAL PORT

The serial port, or COM port, located on the optional Port Replicator allows you to connect serial devices, such as printers or scanners. In order to connect a serial interface device follow these easy steps: (See figure 4-14 on page 46 for location)

1. Align the connector with the port opening.
2. Push the connector into the port until it is seated.
3. Tighten the two hold-down screws, located on each end of the connector.

### PS/2 PORT

The PS/2 port located on the optional Port Replicator allows you to connect an external keyboard and/or mouse. In order to connect a PS/2 interface device follow these easy steps: (See figure 4-14 on page 46 for location)

1. Align the connector with the port opening.
2. Push the connector into the port until it is seated.



- A mouse, keyboard, or keypad may be installed and automatically recognized by your notebook without restarting or changing setups.
- The use of two PS/2 devices simultaneously from the port requires a PS/2 splitter.

## DOCKING PORT

The docking port is used for the connection of your LifeBook notebook to an optional port replicator. In order to connect your notebook to one of these devices follow the instructions that came with your docking port. (See figure 2-8 on page 11 for location)

## UNIVERSAL SERIAL BUS 2.0 PORTS

The two Universal Serial Bus (USB) 2.0 ports allow you to connect USB devices such as external floppy disk drives, game pads, pointing devices, keyboards and/or speakers. In order to connect a USB device follow these easy steps: (See figure 2-7 on page 10 for location)

1. Align the connector with the port opening.
2. Push the connector into the port until it is seated.

## MICROPHONE JACK

The microphone jack allows you to connect an external mono microphone. Your microphone must be equipped with a 1/8" (3.5 mm) mono mini-plug in order to fit into the microphone jack of your notebook. In order to connect a microphone follow these easy steps: (See figure 2-7 on page 10 for location)

1. Align the connector with the port opening.
2. Push the connector into the port until it is seated.

## HEADPHONE JACK

The headphone jack allows you to connect headphones or powered external speakers to your notebook. Your headphones or speakers must be equipped with a 1/8" (3.5 mm) stereo mini-plug. In order to connect head-

phones or speakers follow these easy steps: (See figure 2-7 on page 10 for location)

1. Align the connector with the port opening.
2. Push the connector into the port until it is seated.



If you plug headphones into the headphone jack, the built-in stereo speakers will be disabled.

## EXTERNAL MONITOR PORT

The external monitor port allows you to connect an external monitor. In order to connect an external monitor follow these easy steps: (See figure 2-6 on page 9 for location)

1. Remove the cover from the port opening, if present.
2. Align the connector with the port opening.
3. Push the connector into the port until it is seated.
4. Tighten the two hold-down screws, located on each end of the connector.



When a Port Replicator is attached and an external monitor is plugged in, pressing the [Fn] + [F10] keys allows you to change your selection of where to send your display video. Each time you press the key combination, you will step to the next choice, starting with the built-in display panel only, moving to the external monitor only, finally moving to both the built-in display panel and an external monitor.







# **5**

## **Troubleshooting**



# Troubleshooting

Your LifeBook notebook is sturdy and subject to few problems in the field. However, you may encounter simple setup or operating problems that you can solve on the spot, or problems with peripheral devices, that you can solve by replacing the device. The information in this section helps you isolate and resolve some of these straightforward problems and identify failures that require service.

## IDENTIFYING THE PROBLEM

If you encounter a problem that you are having difficulty in solving, go through the following procedure before pursuing further troubleshooting:

1. Turn off your LifeBook notebook.
2. Make sure the AC adapter is plugged into your notebook and to an active AC power source.
3. Make sure that any card installed in the PC Card slot is seated properly. You can also remove the card from the slot, thus eliminating it as a possible cause of failure.
4. Make sure that any devices connected to the external connectors are plugged in properly. You can also disconnect such devices, thus eliminating them as possible causes of failure.
5. Turn on your notebook. Make sure it has been off at least 10 seconds before you turn it on.
6. Go through the boot sequence.
7. If the problem has not been resolved, refer to the Troubleshooting Table, that follows, for more detailed troubleshooting information.



- If you keep notes about what you have tried, your support representative may be able to help you more quickly by giving additional suggestions over the phone.
- Do not return a failed LifeBook notebook to your supplier until you have talked to a support representative.

8. If you have tried the solutions suggested in the Troubleshooting Table without success, contact your support representative:

Toll free: 1-800-8Fujitsu

Fax: 408-764-2724

E-mail: [8fujitsu@us.fujitsu.com](mailto:8fujitsu@us.fujitsu.com)

Web site: <http://us.fujitsu.com/computers>.

Before you place the call, you should have the following information ready so that the customer support representative can provide you with the fastest possible solution:

- Product name
- Product configuration number
- Product serial number
- Purchase date
- Conditions under which the problem occurred
- Any error messages that have occurred
- Hardware configuration
- Type of device connected, if any

See the Configuration Label on the bottom of your LifeBook notebook for configuration and serial numbers. (See figure 2-8 on page 11 for location)

## SPECIFIC PROBLEMS

### Using the Troubleshooting Table

When you have problems with your notebook, try to find the symptoms under the Problem column of the troubleshooting table for the feature giving you difficulty.

You will find a description of common causes for that symptom under the column Possible Cause and what, if anything, you can do to correct the condition under Possible Solutions. All possible causes or solutions may not apply to your notebook.

**TROUBLESHOOTING TABLE**

Problem	Page	Problem	Page
Audio Problems . . . . .	page 54	Modem Problems. . . . .	page 56
Docking Problems . . . . .	page 54	Parallel, Serial and USB Device Problems . . . . .	page 56
Floppy Disk Drive Problems . . . . .	page 54	PC Card Problems . . . . .	page 56
Hard Drive Problems . . . . .	page 55	Power Failures . . . . .	page 57
Keyboard or Mouse Problems . . . . .	page 55	Shutdown and Startup Problems . . . . .	page 58
Memory Problems . . . . .	page 55	Video Problems . . . . .	page 59
		Miscellaneous Problems . . . . .	page 60

Problem	Possible Cause	Possible Solutions
<b>Audio Problems</b>		
There is no sound coming from the built-in speakers.	The volume is turned too low.	Adjust the volume control on your notebook.
	The software volume control is set too low.	Adjust the sound volume control settings in your software, operating system and applications.
	Headphones are plugged into your notebook.	Plugging in headphones disables the built-in speakers, remove the headphones.
	BIOS audio settings are incorrect.	Set the BIOS setup utility to the default values within the Multimedia Device Configuration menu. See “BIOS Setup Utility” on page 29.
	Software driver is not configured correctly.	Refer to your application and operating system documentation for help.
	Sound could have been muted with function keys.	Press [F3] while holding the [Fn] key to toggle the sound on and off.
<b>Port Replicator Problems</b>		
LifeBook notebook does not turn on when installed in optional Port Replicator	Port Replicator AC adapter is not plugged in.	Provide power to the Port Replicator.
	Notebook is not properly seated in the Port Replicator.	Remove and re-dock your notebook.
<b>Floppy Disk Drive Problems</b>		
You cannot access your floppy disk.	You tried to write to a write protected floppy disk.	Eject the floppy disk and set it to write enable. See “Preparing a Disk for Use” on page 39.
	Floppy disk is not loaded correctly.	Eject floppy disk, check orientation and re-insert. See “Ejecting a Disk” on page 39.
	BIOS setup utility states Diskette Controller: Disabled.	Revise the setup utility Main menu settings to enable Diskette Controller. See “BIOS Setup Utility” on page 29.
	The floppy disk drive may not be properly installed.	Remove and re-install your floppy disk drive.
	Security is set to protect access to floppy disk data.	Verify your password and security settings.
	The USB floppy disk drive is not selected in the BIOS.	Verify that the USB Support is enabled in the BIOS Advanced menu. See “BIOS Setup Utility” on page 29.

Problem	Possible Cause	Possible Solutions
<b>Hard Drive Problems</b>		
You cannot access your hard drive.	The setup utility is incorrectly set for your internal (Primary Master) or optional second hard drive (Primary Slave).	Revise BIOS settings to set both Primary Master and Primary Slave correctly. See “ <i>BIOS Setup Utility</i> ” on page 29.
	The wrong drive designator was used by an application when a bootable CD-ROM was used to start the notebook.	Verify drive designator used by application is in use by the operating system. When the operating system is booted from a CD, drive designations are automatically adjusted.
	Security is set so your operating system cannot be started without a password.	Verify your password and security settings.
<b>Keyboard or Mouse Problems</b>		
The built-in keyboard does not seem to work.	The notebook has gone into Standby mode.	Push the <b>Suspend/Resume</b> button.
	Your application has locked out your keyboard.	Try to use your integrated pointing device to restart your system. If this fails, turn your notebook off, wait 10 seconds or more, and then turn it back on.
You have installed an external keyboard or mouse, and it does not seem to work.	Your external device is not properly installed.	Re-install your device. See “ <i>Device Ports</i> ” on page 48.
	Your operating system software is not setup with the correct software driver for that device.	Check your device and operating system documentation and activate the proper driver.
	Your mouse or keyboard is connected to the wrong PS/2 port on the LAN dock.	Plug the mouse into the PS/2 Mouse port and the external keyboard into the PS/2 Keyboard port. See “ <i>PS/2 Port</i> ” on page 48.
	The external mouse is disabled in the BIOS.	Revise the setup utility Advanced menu settings to disable the Internal Pointing Device, thus enabling the external pointing device. See “ <i>BIOS Setup Utility</i> ” on page 29.
You have connected an external keyboard or a mouse and it seems to be locking up the system.	Your operating system software is not setup with the correct software driver for that device.	Check your device and operating system documentation and activate the proper driver.
	Your system has crashed.	Try to restart your notebook. If that fails, turn off power, wait at least 10 seconds, then re-apply power.
<b>Memory Problems</b>		
Your Power On screen, or Main menu of the BIOS setup utility information, does not show the correct amount of installed memory.	Your memory upgrade module is not properly installed.	Turn off your notebook. Remove and re-install your memory upgrade module. See “ <i>Memory Upgrade Module</i> ” on page 44.
	You have a memory failure.	Check for Power On Self Test (POST) messages. If you are unclear on the message, contact your support representative. See “ <i>Power On Self Test Messages</i> ” on page 61.

Problem	Possible Cause	Possible Solutions
<b>Modem Problems</b>		
Messages about modem operation.	Messages about modem operation are generated by whichever modem application is in use.	See your application software documentation for additional information.
	The modem driver has not been properly initialized.	Go to Start -> Control Panel -> System. Select the Hardware tab and click the [Device Manager] button. Click on Modems and verify that your modem is listed.
<b>Parallel, Serial, and USB Device Problems</b>		
You have installed a parallel port device, a serial port device or a USB device. Your LifeBook notebook does not recognize the device, or the device does not seem to work properly.	The device is not properly installed.	Remove and re-install the device. See “Device Ports” on page 48.
	The device may have been installed while an application was running, so your notebook is not aware of its installation.	Close the application and restart your notebook.
	Your software may not have the correct software driver active.	See your software documentation and activate the correct driver.
	You may have the wrong I/O address selected for your device.	See your device documentation and software documentation to determine the required I/O address. Change the settings in the BIOS setup utility. See “BIOS Setup Utility” on page 29.
	Your device and another device are assigned the same I/O address.	Check all I/O addresses located within the BIOS setup utility and any other installed hardware or software to make sure there are no duplications.
	Parallel port is set to output only.	Check parallel port setting in the BIOS and set to bi-directional or ECP.
<b>PC Card Problems</b>		
A card inserted in the PC Card slot does not work or is locking up the system.	The card is not properly installed.	Remove and re-install the card. See “PC Cards” on page 41.
	The card may have been installed while an application was running, so your notebook is not aware of its installation.	Close the application and restart your notebook.
	Your software may not have the correct software driver active.	See your software documentation and activate the correct driver.
	You may have the wrong I/O address selected for your PC Card device.	See your PC Card documentation to determine the required I/O address. Change the settings in the BIOS. See “BIOS Setup Utility” on page 29.
	Your PC Card device and another device are assigned the same I/O address.	Check all I/O addresses located within the BIOS setup utility and any other installed hardware or software to make sure there are no duplications.

Problem	Possible Cause	Possible Solutions
<b>Power Failures</b>		
You turn on your LifeBook notebook and nothing seems to happen.	The installed battery is completely discharged or there is no power adapter (AC or Auto/Airline) installed.	Check the Status Indicator Panel to determine the presence and condition of the battery. See "Status Indicator Panel" on page 13. Install a charged battery or a power adapter.
	The primary battery is installed but is faulty.	Use the Status Indicator Panel to verify the presence and condition of the battery. See "Status Indicator Panel" on page 13. If a battery is indicating a short, remove that battery and operate from another power source or replace that battery.
	The battery is low.	Check the Status Indicator Panel to determine the presence and condition of the battery. See "Status Indicator Panel" on page 13. Use a power adapter until a battery is charged or install a charged battery.
	The AC or auto/airline adapter is not plugged in properly.	Verify that your adapter is connected correctly. See "Power Sources" on page 27.
	The Power adapter (AC or auto/airline) has no power from the AC outlet, airplane seat jack, or the car's cigarette lighter.	Move the AC cord to a different outlet, check for a line switch or tripped circuit breaker for the AC outlet. If you are using an auto/airline adapter in a car make sure the ignition switch is in the On or Accessories position.
	The Power adapter (AC or auto/airline) is faulty.	Try a different Power adapter.
Your LifeBook notebook turns off all by itself.	The power management parameters are set for auto timeouts which are too short for your operating needs.	Press any button on the keyboard, or move the mouse to restore operation. If that fails, push the Suspend/Resume button. Check your power management settings, or close your applications and go to the Power Savings menu of the setup utility to adjust the timeout values to better suit your operation needs.
	You are operating on battery power and have ignored a low battery alarm until the battery is at the dead battery state and your machine has gone into Dead Battery Suspend mode.	Install a power adapter and then push the Suspend/Resume button. See "Power Sources" on page 27.
	You have a battery failure.	Verify the condition of the battery using the Status Indicator panel, and replace or remove any shorted battery. See "Status Indicator Panel" on page 13.
	Your power adapter has failed or lost its power source.	Make sure the adapter is plugged in and the outlet has power.
Your notebook will not work on battery alone.	The installed battery is dead.	Replace the battery with a charged one or install a power adapter.
	No battery is installed.	Install a charged battery.
	The battery is improperly installed.	Verify that the battery is properly connected by re-installing them.



Problem	Possible Cause	Possible Solutions
Your notebook will not work on battery alone. (continued)	Your installed battery is faulty.	Verify the condition of the battery using the Status Indicator panel and replace or remove any battery that is shorted. See “Status Indicator Panel” on page 13.
The battery seems to discharge too quickly.	You are running an application that uses a great deal of power due to frequent hard drive access or CD-ROM access, use of a modem or a LAN PC card.	Use a power adapter for this application when at all possible.
	The power savings features may be disabled.	Check the power management and/or setup utility settings in the Power Savings menu and adjust according to your operating needs.
	The brightness is turned all the way up.	Turn down the brightness adjustment. The higher the brightness the more power your display uses.
	The battery is very old.	Replace the battery.
	The battery has been exposed to high temperatures.	Replace the battery.
	The battery is too hot or too cold.	Restore the notebook to normal operating temperature. The Charging icon on the Status Indicator panel will flash when the battery is outside its operating range.
<b>Shutdown and Startup Problems</b>		
The Suspend/Resume button does not work.	The Suspend/Resume button is disabled from the Advanced submenu of the Power menu of the setup utility.	Enable the button from the setup utility.
	You did not hold the button in long enough.	Hold the button longer. This may need to be a few seconds if your application is preventing the CPU from checking for button pushes.
	There may be a conflict with the application software.	Close all applications and try the button again.
The system powers up, and displays power on information, but fails to load the operating system.	The boot sequence settings of the setup utility are not compatible with your configuration.	Set the operating source by pressing the [ESC] key while the Fujitsu logo is on screen or use the [F2] key and enter the setup utility and adjust the source settings from the Boot menu. See “BIOS Setup Utility” on page 29.
	You have a secured system requiring a password to load your operating system.	Make sure you have the right password. Enter the setup utility and verify the Security settings and modify them as accordingly. See “BIOS Setup Utility” on page 29.
An error message is displayed on the screen during the LifeBook notebook boot sequence.	Power On Self Test (POST) has detected a problem.	See the Power On Self Test (POST) messages to determine the meaning and severity of the problem. Not all messages are errors; some are simply status indicators. See “Power On Self Test Messages” on page 61.

Problem	Possible Cause	Possible Solutions
Your system display won't turn on when the system is turned on or when the system has resumed.	The system may be password-protected.	Check the status indicator panel to verify that the Security icon is blinking. If it is blinking, enter your password.
Your notebook appears to change setup parameters when you start it.	BIOS setup changes were not saved when you exited the BIOS setup utility, returning it to previous settings.	Make sure you select <b>Save Changes And Exit</b> when exiting the BIOS setup utility.
	The BIOS CMOS back-up battery has failed.	Contact your support representative for repairs. This is not a user serviceable part but has a normal life of 3 to 5 years.
<b>Video Problems</b>		
The built-in display is blank when you turn on your notebook.	Something is pushing on the Closed Cover switch.	Clear the Closed Cover switch. (See figure 2-5 on page 8 for location)
	The optional Port Replicator is attached, an external monitor is plugged in, and the notebook is set for an external monitor only.	Pressing [F10] while holding down the [Fn] key allows you to change your selection of where to send your display video. Each time you press the combination of keys you will step to the next choice. The choices, in order are: built-in display only, external monitor only, both built-in display and external monitor.
	The angle of the display and the brightness settings are not adequate for your lighting conditions.	Move the display and the brightness control until you have adequate visibility.
	The power management timeouts may be set for very short intervals and you failed to notice the display come on and go off again.	Press any button the keyboard, or move the mouse to restore operation. If that fails, push the Suspend/Resume button. (The display may be shut off by Standby mode, Auto Suspend or Video Timeout)
The notebook turned on with a series of beeps and your built-in display is blank.	Power On Self Test (POST) has detected a failure which does not allow the display to operate.	Contact your support representative.
Your system display won't turn on when the system is turned on or when the system has resumed.	The system may be password-protected.	Check the status indicator panel to verify that the Security icon is blinking. If it is blinking, enter your password.
The display goes blank by itself after you have been using it.	The notebook has gone into Video Timeout, Standby Mode, or Hibernate Mode because you have not used it for a period of time.	Press any button on the keyboard, or move the mouse to restore operation. If that fails, push the Suspend/Resume button. Check your power management settings, or close your applications and go to the Power Savings menu of the setup utility to adjust the timeout values to better suit your operation needs. See "BIOS Setup Utility" on page 29.
	Something is pushing on the Closed Cover switch.	Check the Closed Cover switch. (See figure 2-5 on page 8 for location)

Problem	Possible Cause	Possible Solutions
The display goes blank by itself after you have been using it. (continued)	The power management time-outs may be set for very short intervals and you failed to notice the display come on and go off again.	Press any button on the keyboard, or move the mouse to restore operation. If that fails, push the Suspend/Resume button. (The display may be shut off by Standby Mode, Auto Suspend or Video Timeout)
The Built-in Display does not close.	A foreign object, such as a paper clip, is stuck between the display and the keyboard.	Remove all foreign objects from the keyboard.
The Built-in Display has bright or dark spots.	If the spots are very tiny and few in number, this is normal for a large LCD display.	This is normal; do nothing.
	If the spots are numerous or large enough to interfere with your operation needs.	Display is faulty; contact your support representative.
The application display uses only a portion of your screen and is surrounded by a dark frame.	You are running an application that does not support 800 x 600/1024 x 768 pixel resolution display and display compression is enabled.	Display compression gives a clearer but smaller display for applications that do not support 800 x 600/1024 x 768 pixel resolution. You can fill the screen but have less resolution by changing your display compression setting, (See the Video Features submenu, located within the Advanced menu of the BIOS. See “BIOS Setup Utility” on page 29.
The Display is dark when on battery power.	The BatteryAid default is set on low brightness to conserve power.	Press [Fn] + [F7] to increase brightness or double-click on BatteryAid battery gauge and adjust Power Control under battery settings.
You have connected an external monitor and it does not display any information.	Your BIOS setup is not set to enable your external monitor.	Try toggling the video destination by pressing [Fn] and [F10] together, or check your BIOS setup and enable your external monitor. (See the Video Features submenu, located within the Advanced Menu of the BIOS. See “BIOS Setup Utility” on page 29.
	Your external monitor is not properly installed.	Reinstall your device. See “External Monitor Port” on page 49.
	Your operating system software is not setup with the correct software driver for that device.	Check your device and operating system documentation and activate the proper driver.
You have connected an external monitor and it does not come on.	Your external monitor is not compatible with your notebook.	See your monitor documentation and the External Monitor Support portions of the Specifications section. See “Specifications” on page 73.
<b>Miscellaneous Problems</b>		
An error message is displayed on the screen during the operation of an application.	Application software often has its own set of error message displays.	See your application manual and help displays screens for more information. Not all messages are errors some may simply be status.

## POWER ON SELF TEST MESSAGES

The following is an alphabetic list of error-and-status messages that Phoenix BIOS and/or your operating system can generate and an explanation of each message. Error messages are marked with an \*. If an error message is displayed that is not in this list, write it down and check your operating system documentation both on screen and in the manual. If you can find no reference to the message and its meaning is not clear, contact your support representative for assistance.

### **nnnn Cache SRAM Passed**

Where nnnn is the amount of system cache in kilobytes successfully tested by the Power On Self Test. (This can only appear if you have an SRAM PC Card installed.)

### **\*Diskette drive A error or Diskette drive B error**

Drive A: or B: is present but fails the BIOS Power On Self Test diskette tests. Check to see that the drive is defined with the proper diskette type in the Setup Utility, See "BIOS Setup Utility" on page 29. and that the diskette drive is installed correctly. If the disk drive is properly defined and installed, avoid using it and contact your support representative.

### **\*Extended RAM Failed at offset: nnnn**

Extended memory not working or not configured properly. If you have an installed memory upgrade module, verify that the module is properly installed. If it is properly installed, you may want to check your Windows Setup to be sure it is not using unavailable memory until you can contact your support representative.

### **nnnn Extended RAM Passed**

Where nnnn is the amount of memory in kilobytes successfully tested.

### **\*Failing Bits: nnnn The hex number nnnn**

This is a map of the bits at the memory address (in System, Extended, or Shadow memory) which failed the memory test. Each 1 (one) in the map indicates a failed bit. This is a serious fault that may cause you to lose data if you continue. Contact your support representative.

### **\*Fixed Disk x Failure or Fixed Disk Controller Failure (where x = 1-4)**

The fixed disk is not working or not configured properly. This may mean that the hard drive type identified in your setup utility does not agree with the type detected by the Power On Self Test. Run the setup utility to check for the hard drive type settings and correct them if necessary. If the settings are OK and the message appears when you restart the system, there may be a serious fault which might cause you to lose data if you continue. Contact your support representative.

### **\*Incorrect Drive A type – run SETUP**

Type of floppy drive A: not correctly identified in Setup. This means that the floppy disk drive type identified in your setup utility does not agree with the type detected by the Power On Self Test. Run the setup utility to correct the inconsistency.

### **\*Incorrect Drive B type – run SETUP**

Type of floppy drive B: not correctly identified in Setup. This means that the floppy disk drive type identified in your setup utility does not agree with the type detected by the Power On Self Test. Run the setup utility to correct the inconsistency.

### **\*Invalid NVRAM media type**

Problem with NVRAM access. In the unlikely case that you see this message you may have some display problems. You can continue operating but should contact your support representative for more information.

### **\*Keyboard controller error**

The keyboard controller test failed. You may have to replace your keyboard or keyboard controller but may be able to use an external keyboard until then. Contact your support representative.

### **\*Keyboard error**

Keyboard not working. You may have to replace your keyboard or keyboard controller but may be able to use an external keyboard until then. Contact your support representative.

### **\*Keyboard error nn**

BIOS discovered a stuck key and displays the scan code for the stuck key. You may have to replace your keyboard but may be able to use an external keyboard until then. Contact your support representative.

### **\*Monitor type does not match CMOS – Run SETUP**

Monitor type not correctly identified in Setup. This error probably means your BIOS is corrupted, run the setup utility and set all settings to the default conditions. If you still get this error, contact your support representative.

### **\*Operating system not found**

Operating system cannot be located on either drive A: or drive C: Enter the setup utility and see if both the fixed disk, and drive A: are properly identified and that the boot sequence is set correctly. Unless you have changed your installation greatly, the operating system should be on drive C:. If the setup utility is correctly set, your hard drive may be corrupted and your system may have to be re-installed from your back up media.

### **\*Parity Check 1 nnnn**

Parity error found in the system bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays?????. This is a potentially data destroying failure. Contact your support representative.

### **\*Parity Check 2 nnnn**

Parity error found in the I/O bus. BIOS attempts to locate the address and display it on the screen. If it cannot locate the address, it displays?????. This is a potentially data destroying failure. Contact your support representative.

### **\*Press <F1> to resume, <F2> to SETUP**

Displayed after any recoverable error message. Press the [F1] key to continue the boot process or the [F2] key to enter Setup and change any settings.

### **\*Previous boot incomplete – Default configuration used**

Previous Power On Self Test did not complete successfully. The Power On Self Test will load default values and offer to run Setup. If the previous failure was caused by incorrect values and they are not corrected, the next boot will likely fail also. If using the default settings does not allow you to complete a successful boot sequence, you should turn off the power and contact your support representative.

### **\*Real time clock error**

Real-time clock fails BIOS test. May require board repair. Contact your support representative.

### **\*Shadow RAM Failed at offset: nnnn**

Shadow RAM failed at offset nnnn of the 64k block at which the error was detected. You are risking data corruption if you continue. Contact your support representative.

### **nnnn Shadow RAM Passed**

Where nnnn is the amount of shadow RAM in kilobytes successfully tested.

### **\*System battery is dead – Replace and run SETUP**

The BIOS CMOS RAM memory hold up battery is dead. This is part of your BIOS and is a board mounted battery which requires a support representative to change. You can continue operating but you will have to use setup utility default values or reconfigure your setup utility every time you turn off your notebook. This battery has an expected life of 2 to 3 years.

### **System BIOS shadowed**

System BIOS copied to shadow RAM.

### **\*System CMOS checksum bad – run SETUP**

BIOS CMOS RAM has been corrupted or modified incorrectly, perhaps by an application program that

changes data stored in BIOS memory. Run Setup and reconfigure the system.

### **\*System RAM Failed at offset: nnnn**

System memory failed at offset nnnn of in the 64k block at which the error was detected. This means that there is a fault in your built-in memory. If you continue to operate, you risk corrupting your data. Contact your support representative for repairs.

### **nnnn System RAM Passed**

Where nnnn is the amount of system memory in kilobytes successfully tested.

### **\*System timer error**

The timer test failed. The main clock that operates the computer is faulty. Requires repair of system board. Contact your support representative for repairs.

### **UMB upper limit segment address: nnnn**

Displays the address of the upper limit of Upper Memory Blocks, indicating released segments of the BIOS memory which may be reclaimed by a virtual memory manager.

### **Video BIOS shadowed**

Video BIOS successfully copied to shadow RAM.

## **MODEM RESULT CODES**

The operating system and application software that is factory installed detects the modem characteristics and provides the necessary command strings to operate the modem. The internal modem operation is controlled by generic AT commands from the operating system and application software. The standard long form result codes may, in some cases, be displayed on your screen to keep you informed of the actions of your modem. The operating system and application software may suppress display of the result codes.

Examples of result codes are:

- OK
- NO CARRIER
- NO DIALTONE
- CONNECT 53000 (Connection complete at 53,000 bps.)
- ERROR
- FAX
- RING (This means an incoming call.)
- BUSY
- NO ANSWER

When using the internal modem with applications that are not factory installed refer to the application documentation.

# Restoring Your Pre-installed Software

The Drivers and Applications Restore (DAR) CD contains:

- Sets of device drivers and Fujitsu utilities (in specific directories) that are unique to your LifeBook notebook configuration for use as documented below.
- A link to the Drive Image Special Edition (DISE) utility on your hard disk drive.
- Read-me files that provide additional use information for items on this CD-ROM.



- In order to install applications and/or drivers from the DAR CD, you will need to connect an external CD drive to your system.
- If the DAR CD is in the drive when you boot up the system, and the Boot Sequence is set in the BIOS to boot from the CD drive first (see "Creating a backup image when booting up" on page 63), a message will appear informing you that if you proceed, you will have a choice of: creating a new backup of drive C:, restoring a previous backup, or restoring the original factory image.

Note that creating a new backup will overwrite any previous backups, and restoring a backup or factory image will overwrite all information on the hard drive, including saved files. If you wish to install drivers or applications **only** from the CD, remove the disk from the drive, reboot the system, and insert the CD after Windows has started.



If you have access to the internet, visit the Fujitsu Support web site at <http://us.fujitsu.com/computers> to check for the most current information, drivers and hints on how to perform recovery and system updates.

## DRIVE IMAGE SPECIAL EDITION (DISE)

PowerQuest Drive Image Special Edition (DISE) provides a way to restore your computer if you experience a hard disk crash or other system failure. Fujitsu has used DISE to create an image of everything installed on the computer at the time you purchased it. The image is saved on a separate partition on the hard disk. You can use DISE to restore the factory image and return your computer to the state in which it was shipped from Fujitsu.

Although it is not necessary, you can use DISE to store additional image files that you create. For example, if you install several applications and save data files on your hard disk, you can create a new image file that includes them and then save that image file on the hard disk. Then, in the event of a hard disk failure, you can restore the image that includes the applications and data files you use.



Using the DISE feature will reduce the amount of usable disk space on your hard disk drive.

## Creating a Backup Image

You can create a backup image of your C:\ drive at any time. The C:\ partition must be a FAT, FAT32, or NTFS partition, and it must be directly before the backup partition on your hard disk.

There are two ways to implement the DISE utility: When booting up the system, or from the desktop.

### Creating a backup image when booting up

Before creating an image at boot-up, you must first change the boot-up priority in the BIOS so that the system will go to the media drive first, rather than trying to boot-up from the hard drive or an external floppy disk drive.

To change the boot-up priority:

1. Start your system and press the [F2] key when the Fujitsu logo appears. You will enter the BIOS Setup Utility.
2. Using the arrow keys, go to the Boot menu.
3. Arrow down to the Boot Device Priority submenu and press [Enter].
4. Arrow down to the CD-ROM drive in the list, and press the space bar (or the + key) to move the CD-ROM drive to the top of the list. (The system attempts to boot from the devices in the order in which they are listed.)
5. Press [F10], then click on [Yes] to exit the BIOS Setup Utility and return to the boot process.

After you have changed the boot priority, you can create a backup image when you are booting up:

1. Install the DAR CD in the drive prior to booting up. When bootup begins, a message appears informing you that if you proceed, you will be able to:
  - Create a new backup of drive C
  - Restore a previous backup, or,
  - Restore the original factory image.

Note that creating a new backup will overwrite any previous backups, and restoring a backup or factory

image will overwrite all information on the hard drive, including saved files.

2. After you click [Y]es. You will be presented with two options: [Create New Backup] and [Restore Backup].

After you click [Create New Backup], follow the on-screen instructions. By selecting [Create New Backup], a new image will be written to your backup partition. This will overwrite any previously created image.

#### Creating a backup image from the desktop

To create a backup image from the desktop, select Drive Image SE from the Program list. You will initially be prompted to create a backup diskette. It is not necessary to create the backup diskette, since the DAR CD performs the same function.

1. At the Drive Image Special Edition main screen, click **Options > Create New Backup**. DISE displays a warning that it must go to DOS to create the image.
3. Click **Yes**.

DISE creates an image file in the backup partition. If you created a backup image previously, the new image overwrites the old one.

#### Enlarging the Backup Partition

If there is not enough unused space in the backup partition on your hard disk, DISE will resize the partition. DISE will display the minimum, maximum, and recommended sizes for the backup partition. You choose the size you want.

DISE takes the space from the FAT, FAT32, or NTFS partition that you are backing up. If there is not enough unused space in that partition to take, you will not be able to resize the backup partition and create an image file. You can delete files from the FAT, FAT32, or NTFS partition to create more unused space on the hard disk.

#### Restoring a Backup Image

You can restore either a factory image or a backup image you created. Be aware that restoring a backup image will replace the contents of the C:\ partition with the image you restore.

1. Disable virus protection software. If virus protection software is enabled, DISE will hang.
2. From the DISE main window, click **Options > Restore Backup** to restore an image you created, or click **Options > Restore Factory Backup** to restore the factory image.

DISE shuts down to DOS and restores the image file.

#### Re-Installing Individual Drivers and Applications

The Drivers and Application CD can be used to selectively re-install drivers and/or applications that may have been un-installed or corrupted.

To re-install drivers and/or applications:

1. Boot up the system and insert the DAR CD after Windows has started. The LifeBook Easy Installation screen appears.
2. Select the drivers and applications you want to install from the list that is displayed.
3. Click [Start]. Follow the prompts that appear to complete installation of the selected drivers and/or applications.

#### AUTOMATICALLY DOWNLOADING DRIVER UPDATES

Your system has a convenient tool called the Fujitsu Driver Update (FDU) utility. With FDU, you can choose to automatically or manually go to the Fujitsu site to check for new updates for your system.

The FDU icon should appear in the system tray at the bottom right of your screen (roll the cursor over the icons to find the correct one). If the FDU icon does not appear in the system tray, it can be started by going to [Start] -> All Programs, and clicking on Fujitsu Driver Update; this will create the icon automatically.

To invoke the FDU menu, you can either right-click on the FDU icon or hold the pen on the icon for a couple of seconds until the menu appears. The menu contains the following items:

- **Check for updates now**  
Allows for manual driver update search. The first time it is used, you are prompted to agree to a user agreement. After clicking on the icon, the FDU automatically connects with the Fujitsu site to check for updates and downloads them. While downloading, the icon has a red bar through it, indicating that it cannot be used while the download is in process. When the update is complete, a message appears informing you of the fact.
- **Enable Automatic Update Notifications**  
Automatically searches for new updates on a regular basis (approximately every 3 days).
- **Show update history**  
Brings up a screen that displays a history of updates that have been made via the FDU.
- **About Fujitsu Driver Update**  
Displays the FDU version number and copyright information
- **Fujitsu Driver Update Readme**  
Displays the FDU readme.



# **6**

## **Care and Maintenance**





# Care and Maintenance

If you use your LifeBook notebook carefully, you will increase its life and reliability. This section provides some tips for looking after the notebook and its devices.



Electrical equipment may be hazardous if misused. Operations of this product or similar products, must always be supervised by an adult. Do not allow children access to the interior of any electrical products and do not permit them to handle any cables.

## LIFEBOOK NOTEBOOK

### Caring for your LifeBook notebook

- Your LifeBook notebook is a durable but sensitive electronic device. Treat it with care.
- Make a habit of transporting it in a suitable carrying case.
- Do not attempt to service the computer yourself. Always follow installation instructions closely.
- Keep it away from food and beverages.
- If you accidentally spill liquid on your notebook:
  1. Turn it off.
  2. Position it so that the liquid can run out.
  3. Let it dry out for 24 hours, or longer if needed.
  4. If your notebook will not boot after it has dried out, call your support representative.
- Do not use your notebook in a wet environment (near a bathtub, swimming pool).
- Always use the AC adapter and batteries that are approved for your notebook.
- Avoid exposure to sand, dust and other environmental hazards.
- Do not expose your notebook to direct sunlight for long periods of time as temperatures above 140° F (60° C) may damage your notebook.
- Keep the covers closed on the connectors and slots when they are not in use.
- Do not put heavy or sharp objects on the computer.
- If you are carrying your notebook in a briefcase, or any other carrying case, make sure that there are no objects in the case pressing on the lid.
- Do not drop your notebook.
- Do not touch the screen with any sharp objects.

### Cleaning your LifeBook notebook





- Always disconnect the power plug. (Pull the plug, not the cord.)
- Clean your notebook with a damp, lint-free cloth. Do not use abrasives or solvents.
- Use a soft cloth to remove dust from the screen. Never use glass cleaners.

### Storing your LifeBook notebook

- If storing your notebook for a month or longer, turn the notebook off, fully charge the battery, then remove and store all Lithium ion batteries.
- Store your notebook and batteries separately. If you store your notebook with a battery installed, the battery will discharge, and battery life will be reduced. In addition, a faulty battery might damage the notebook.
- Store your notebook in a cool, dry location. Temperatures should remain between -25°C (13°F) and 60°C (140°F).

### Traveling with your LifeBook notebook

- Do not transport your notebook while it is turned on.
- Do not check your notebook as baggage. Carry it with you.
- When traveling with the hard drive removed, wrap the drive in a non-conducting materials (cloth or paper). If you have the drive checked by hand, be ready to install the drive if needed. Never put your hard drive through a metal detector. Have your hard drive hand-inspected by security personnel. You can however, put your hard drive through a properly tuned X-ray machine.
- Take the necessary plug adapters if you're traveling overseas. Check the following diagram to determine which adapter you'll need or ask your travel agent.

Outlet Type	Location
	United States, Canada, Mexico, parts of Latin America, Japan, Korea, the Philippines, Taiwan
	Russia and the Commonwealth of Independent States (CIS), most of Europe, parts of Latin America, the Middle East, parts of Africa, Hong Kong, India, most of South Asia
	United Kingdom, Ireland, Malaysia, Singapore, parts of Africa
	China, Australia, New Zealand

## KEYBOARD

### Caring for your Keyboard

The keyboard of your computer is a very sensitive instrument. It is made up of many switches that are activated when you press on the keys. The keyboard is a major component of the heat dissipation system in a notebook. Due to heat and size considerations the keyboard is not sealed. Because the keys are so close

together, it is not easy for the user to see when liquids have fallen onto the circuitry below the keys.

Attempting to clean the keyboard with a spray on cleaner or rag soaked with cleaner the liquid can drip onto the circuitry sight unseen. Once the liquid seeps between the layers of circuitry, it can cause corrosion or other damage to the circuits. This can result in keys which no longer operate, or which, when pressed, record the wrong characters and other similar failures.

There is no repair for this problem other than replacement. The solution is to become aware of the issue and take appropriate steps to protect your keyboard.

Cleaning should be done with a rag dampened (but not soaking) with cleaning solution. Use extreme care to prevent liquid from dripping between the keys. Spraying directly on the keys should be avoided. The spray should be applied first to the cloth, and then the cloth wiped over the keys.

## BATTERIES

### Caring for your Batteries

- Always handle batteries carefully.
- Do not short-circuit the battery terminals (that is, do not touch both terminals with a metal object). Do not carry loose batteries in a pocket or purse where they may mix with coins, keys, or other metal objects. Doing so may cause an explosion or fire.
- Do not drop, puncture, disassemble, mutilate or incinerate the battery.
- Recharge batteries only as described in this manual and only in ventilated areas.
- Do not leave batteries in hot locations for more than a day or two. Intense heat can shorten battery life.
- Do not leave a battery in storage for longer than 6 months without recharging it.

### Increasing Battery Life

- Keep brightness to the lowest level comfortable.
- Set the power management for maximum battery life.
- Put your notebook in Standby mode when it is turned on and you are not actually using it.
- Limit your CD-ROM access.
- Disable the Windows CD auto insert function.
- Always use fully charged batteries.
- Eject PCMCIA cards when not in use.

## FLOPPY DISKS AND DRIVES

### Caring for your Floppy Disks

- Avoid using the floppy disks in damp and dusty locations.
- Never store a floppy disk near a magnet or magnetic field.
- Do not use a pencil or an eraser on a disk or disk label.
- Avoid storing the floppy disks in extremely hot or cold locations, or in locations subject to severe temperature changes. Store at temperatures between 50° F (10°C) and 125°F (52°C).
- Do not touch the exposed part of the disk behind the metal shutter.

### Caring for your optional Floppy Disk Drive

- To clean, wipe the floppy disk drive clean with a dry soft cloth, or with a soft cloth dampened with water or a solution of neutral detergent. Never use benzene, paint thinner or other volatile material.
- Avoid storing the floppy disk drive in extremely hot or cold locations, or in locations subject to severe temperature changes. Store at temperatures between 50° F (10°C) and 125°F (52°C).
- Keep the floppy disk drive out of direct sunlight and away from heating equipment.
- Avoid storing the floppy disk drive in locations subject to shock and vibration.
- Never use the floppy disk drive with any liquid, metal, or other foreign matter inside the floppy disk drive or disk.
- Never disassemble or dismantle your floppy disk drive.

## CDs

### Caring for your CDs

CDs are precision devices and will function reliably if given reasonable care.

- Always store your CDs in its case when it is not in use.
- Always handle CDs by the edges and avoid touching the surface.
- Avoid storing any CDs in extreme temperatures.
- Do not bend CDs or set heavy objects on them.
- Do not spill liquids on CDs.
- Do not scratch CDs.
- Do not put a label on CDs.
- Do not get dust on CDs.
- Never write on the label surface with a ballpoint pen or pencil. Always use a felt pen.
- If a CD is subjected to a sudden change in temperature, cold to warm condensation may form on the surface. Wipe the moisture off with a clean, soft, lint free

cloth and let it dry at room temperature. DO NOT use a hair dryer or heater to dry CDs.

- If a CD is dirty, use only a CD cleaner or wipe it with a clean, soft, lint free cloth starting from the inner edge and wiping to the outer edge.

### **Caring for your CD-ROM Drive**

Your CD-ROM drive is durable but you must treat it with care. Please pay attention to the following points:

- The drive rotates the compact disk at a very high speed. Do not carry it around or subject it to shock or vibration with the power on.
- Avoid using or storing the drive where it will be exposed to extreme temperatures.
- Avoid using or storing the drive where it is damp or dusty.
- Use of a commercially-available lens cleaner kit is recommended to maintain the drive lens.
- Avoid using or storing the drive near magnets or devices that generate strong magnetic fields.
- Avoid using or storing the drive where it will be subjected to shock or vibration.
- Do not disassemble or dismantle the CD-ROM drive.

## **PC CARDS**

### **Caring for your PC Card Slots**

PC Cards are durable, but you must treat them with care. The documentation supplied with your PC Cards provides specific information for caring for the cards.

When you don't have a PC Card installed in your system, you should be sure to install the PC Card slot inserts that came with your system. These will help to keep dust and dirt out of your system.





# **7**

## **Specifications**



## Specifications

This section provides the hardware and environmental specifications for your Fujitsu LifeBook B Series notebook. Specifications of particular configurations will vary.

### CONFIGURATION LABEL

Your LifeBook notebook contains a configuration label located on the bottom. (See figure 2-8 on page 11 for location) This label contains specific information regarding the options you've chosen for your notebook. Following is an example label and information on how to read your own configuration label.

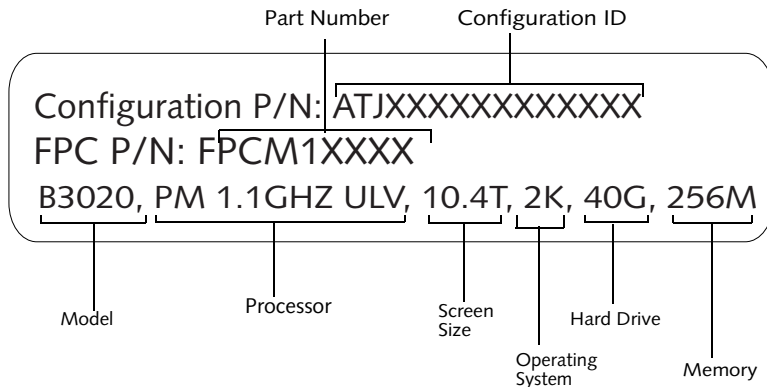


Figure 7-1. Configuration Label

### MICROPROCESSOR

1.1 GHz ultra-low-voltage Pentium M processor featuring Intel SpeedStep technology

### MEMORY

#### System Memory

256 MB, 512 MB, or 1 GB SDRAM (one slot)

#### Cache Memory

1MB on-die L2

#### BIOS Memory

512KB Flash ROM

256 Bytes CMOS RAM with back-up battery

### VIDEO

Built-in color flat-panel TFT active matrix LCD display with touch screen capability.

#### Graphics Card

Integrated Intel® 855GM chipset

#### Video Color and Resolution

10.4" XGA TFT

- Internal: 1024 x 768 pixel resolution, 16M colors.
- External: 1600 x 1200 pixel resolution, 16M colors. Simultaneous Video = Yes (1024 x 768, 16M colors) XGA, SVGA and VGA compatible.

#### Video RAM

Up to 64 MB of shared memory using Unified Memory Architecture (UMA). Dynamically responds to application requirements and allocates the proper amount of memory for optimal graphics and performance.

### AUDIO

- Realtek ALC202 codec
- Stereo headphone jack, 1 V<sub>rms</sub>, or less, minimum impedance 32 Ohms.
- Mono microphone jack, 125 mV<sub>p-p</sub> or less, minimum impedance 10K Ohms.
- Two built-in speakers, 28 mm diameter (Stereo).
- One built-in monaural microphone.

### MASS STORAGE DEVICE OPTIONS

#### Floppy Disk Drive

Optional external USB 3.5" Floppy Disk Drive, which accommodates 1.44MB or 720KB floppy disks.

#### Hard Disk Drive

40 GB or 60 GB fixed hard drive, Ultra ATA/100 type.

### INTEGRATED POINTING DEVICE

Touch Pad pointing device.

### LIFEBOOK SECURITY/APPLICATION PANEL

Application Launcher buttons default to the following:

Label	Button Function	Default Application
1	Application A	Notepad
2	Application B	Calculator
3	Internet	Internet Explorer
4	E-Mail	Netscape Messenger



## THEFT PREVENTION LOCK SLOT

Lock slot for use with physical restraining security systems. The locking system by Kensington is recommended.

## COMMUNICATIONS

Modem: Internal Multinational V.90 standard 56K fax/modem (ITU V.90, 56K data, 14.4K fax.), and  
LAN: 10/100 base-Tx Ethernet.

\* Actual data transfer rate over U.S. telephone lines varies and is less than 56Kbps due to the current FCC regulations and line conditions.

## DEVICE PORTS

### On the LifeBook notebook:

- PC Card slot for Type I or Type II cards: PCMCIA Standard 2.1 with CardBus support
- Compact Flash Card slot
- One 15-pin D-SUB connector for VGA external monitor (see Video specifications)
- Two USB 2.0 (Universal Serial Bus) connectors for input/output devices.
- One modem (RJ-11) connector.
- One LAN (RJ-45) jack (option with LAN models only)
- One stereo headphone jack. (See Audio specifications)
- One mono microphone jack. (See Audio specifications)
- One 100-pin connector for docking devices.
- One embedded SmartCard Reader (requires an optional SmartCard holder and a third-party application)

### On the Optional Port Replicator:

- One 6-pin mini DIN PS/2 compatible connector for external keyboard or external mouse.
- One 15-pin D-SUB connector for VGA external monitor (see Video specifications).
- One 25-pin D-SUB connector for parallel input/output devices; Bi-directional, output only or ECP.
- One 9-pin D-SUB connector for RS-232C serial input/output devices.
- One RJ-45 port for LAN connectivity (LAN model only).

## KEYBOARD

Built-in keyboard with all functions of 101 key PS/2 compatible keyboards.

- Total number of keys: 83.
- Function keys: F1 through F12.
- Feature extension key: Fn.
- Two Windows keys: one Start key and one application key
- Key pitch: 17.5 mm.
- Key stroke: 2 mm.

- Built-in Touch Pad pointing device with left and right buttons.
- Built-in Palm Rest.

### External Keyboard Support

PS/2-compatible (on optional port replicator only).

### External Mouse Support

PS/2-compatible (on optional port replicator only).

## POWER

### Batteries

One 6-cell Lithium ion battery, rechargeable, 10.8V, 4400mAh.

### AC Adapter

Autosensing 100-240V AC, 60W, supplying 16V DC, 3.75A, to the LifeBook notebook, Fujitsu Model FPCAC37AP, which includes an AC cable.

### Power Management

Conforms to ACPI (Advanced Configuration and Power Interface) standards.

## DIMENSIONS AND WEIGHT

### Overall Dimensions

Approximately 10.55"(w) x 8.86"(d) x 0.94/1.5"(h) (268 mm x 225 mm x 23.9/38.7 mm).

### Weights

Approximately 3.28 lbs (1.49 kg) with 6-cell battery.  
Optional Port Replicator approximately 0.6 lbs.

## ENVIRONMENTAL REQUIREMENTS

### Temperature

Operating: 41° to 95° F (5° to 35° C)  
Non-operating: 5° to 140° F (–15° to 60° C)

### Humidity

Operating: 20% to 85%, relative, non-condensing.  
Non-operating: 8% to 85%, relative, non-condensing.

### Altitude

Operating: 10,000 feet (3,048 m) maximum.

## POPULAR ACCESSORIES

For ordering or additional information on Fujitsu accessories please visit our Web site at <http://us.fujitsu.com/computers> or call 1-877-372-3473.

### Memory Upgrades

- 512 MB SDRAM
- 1 GB SDRAM

### Docking/Expansions

- Port Replicator

**Power**

- 6-cell Lithium ion battery pack
- Battery Charger
- Auto/Airline Adapter
- AC Adapter

**Storage**

- External CD-ROM drive

**PC Cards**

- SmartCard holder

**Additional Accessories**

- Wireless Keyboard and Mouse
- Presentation Audio system
- TeleAdapt 16' TeleCord
- IBM Modem Saver
- Notebook Guardian Lock
- Stylus Five Pack

**Carrying Cases**

- Duo Carrying Case
- Diplomat Carrying Case

**PRE-INSTALLED SOFTWARE**

Your LifeBook comes with pre-installed software for playing audio and video files of various formats. The software configuration installed is dependent upon the operating system that is pre-installed on your system. In addition, there is file transfer software, virus protection software and Power Management software.

**LEARNING ABOUT YOUR APPLICATION SOFTWARE****Tutorials**

All operating systems and most application software have tutorials built-into them upon installation. We highly recommend that you step through the tutorial before you use an application.

**Manuals**

Included with your LifeBook notebook you will find manuals for your operating system and other pre-installed software. Manuals that are not included are available online through the help system of the software. We recommend that you review these manuals for general information on the use of these applications.

**Microsoft Windows**

Depending upon the configuration of your notebook, Microsoft Windows 2000 Professional, Microsoft Windows XP Home, or Microsoft Windows XP Professional is installed as your operating system.

**Drive Image Special Edition (DISE) by PowerQuest**

DISE by PowerQuest provides a way to restore your computer if you experience a hard disk crash or other system failure. DISE is used to restore the factory image and restore the system to its original state.

**BatteryAid by Fujitsu Limited (Windows 2000 Professional only)**

BatteryAid allows you to control the display brightness of your notebook in order to maximize battery life. (See your *BatteryAid online help for more information on the correct way to use this program*)



Since your notebook does not support the CPU Clock control, the option is not active within the Power Control menu of BatteryAid.

**Fujitsu HotKey Utility (Windows XP only)**

Utility for displaying the brightness and volume levels on your LifeBook screen.

**Microsoft Internet Explorer**

Internet Explorer is installed as your default internet browser.

**Netscape 7.0**

Browser suite, including integrated E-mail accounts, instant messaging, address book, search, and other tools and plug-ins.

**Adobe Reader**

The Adobe Reader, located in the Service and Support Software folder, allows you to view, navigate, and print PDF files from across all major computing platforms.

**LifeBook Security/Application Panel Software**

Your LifeBook notebook is pre-installed with software utilities that let you operate and configure your LifeBook Application Panel. These utilities are found under the Start menu, under Programs, then under LifeBook Application panel. They include a CD Player, Application Panel Setup, Application Panel Guide, Activate Panel and Deactivate Panel.

**Intel SpeedStep**

*(This utility is a separate utility for Windows 2000 systems; it is built into the Windows XP operating system.)*

Intel SpeedStep allows your Lifebook notebook to operate in dual mode by default. When connected to AC source, the system operates in Maximum Performance mode. When powered by battery, the system switches to Battery Optimized mode to conserve battery life. SpeedStep software is automatically loaded when you start your system and appears on the system tray as one of the two flags. A checker flag indicates that the system is set for Maximum Performance mode. A blue flag with a green center square indicates that the system is set for Battery Optimized mode. You can change the setting or disable the software by double-clicking the flag icon and changing the settings in the Intel SpeedStep Technology window.





# **8**

## **Glossary**



# Glossary

## AC Adapter

A device which converts the AC voltage from a wall outlet to the DC voltage needed to power your LifeBook notebook.

## ACPI

Advanced Configuration and Power Interface

## Active-Matrix Display

A type of technology for making flat-panel displays which has a transistor or similar device for every pixel on the screen.

## AdHoc

A name of a wireless LAN configuration.

It is a type of communication using wireless cards only.

Another type of communication is called Infrastructure (using a wireless card and an access point).

## ADSL

### Asymmetric Digital Subscriber Line

Technology for transporting high bit-rate services over ordinary phone lines.

## Auto/Airline Adapter

A device which converts the DC voltage from an automobile cigarette lighter or aircraft DC power outlet to the DC voltage needed to power your LifeBook notebook.

## BIOS

Basic Input-Output System. A program and set of default parameters stored in ROM which tests and operates your LifeBook notebook when you turn it on until it loads your installed operating system from disk. Information from the BIOS is transferred to the installed operating system to provide it with information on the configuration and status of the hardware.

## Bit

An abbreviation for binary digit. A single piece of information which is either a one (1) or a zero (0).

## bps

An abbreviation for bits per second. Used to describe data transfer rates.

## Boot

To start-up a computer and load its operating system from disk, ROM or other storage media into RAM.

## Bus

An electrical circuit which passes data between the CPU and the sub-assemblies inside your LifeBook notebook.

## Byte

8 bits of parallel binary information.

## Cache Memory

A block of memory built into the micro-processor which is much faster to access than your system RAM and used in specially structured ways to make your overall data handling time faster.

## CardBus

A faster, 32-bit version of the PC Card interface which offers performance similar to the 32-bit PCI architecture.

## CD-ROM

Compact disk read only memory. This is a form of digital data storage which is read optically with a laser rather than a magnetic head. A typical CD-ROM can contain about 600MB of data and is not subject to heads crashing into the surface and destroying the data when there is a failure nor to wear from reading.

## Channel

A radio frequency band used for communication between wireless cards and access points.

## CMOS RAM

Complementary metal oxide semiconductor random access memory. This is a technology for manufacturing random access memory which requires very low levels of power to operate.

## COM Port

Abbreviation for communication port. This is your serial interface connection.

## Command

An instruction which you give your operating system. Example: run a particular application or format a floppy disk.

## Configuration

The combination of hardware and software that makes up your system and how it is allocated for use.

## CRT

Cathode Ray Tube. A display device which uses a beam of electronic particles striking a luminescent screen. It produces a visual image by varying the position and intensity of the beam.

## Data

The information a system stores and processes.

## DC

Direct current. A voltage or current that does not fluctuate periodically with time.

**Default Value**

A pre programmed value to be used if you fail to set your own.

**DHCP**

Dynamic Host Configuration Protocol

A protocol used to automatically acquire parameters required for the communication, such as IP address.

The sender of IP address is called a DHCP server, and the receiver is called a DHCP client.

**DIMM**

Dual-in-line memory module.

**DISE**

Drive Image Special Edition.

A utility that allows you to restore the original factory image on your hard drive in the event of corruption or accidental erasure of files or applications.

**Disk**

A spinning platter of magnetic data storage media. If the platter is very stiff it is a hard drive, if it is highly flexible it is a floppy disk, if it is a floppy disk in a hard housing with a shutter it is commonly called a diskette.

**Disk Drive**

The hardware which spins the disk and has the heads and control circuitry for reading and writing the data on the disk.

**Diskette**

A floppy disk in a hard housing with a shutter.

**DMA**

Direct Memory Access. Special circuitry for memory to memory transfers of data which do not require CPU action.

**DMI**

Desktop Management Interface. A standard that provides PC management applications with a common method of locally or remotely querying and configuring PC computer systems, hardware and software components, and peripherals.

**DNS**

Domain Name System

A function to control the association between the IP address and the name assigned to the computer.

If you do not know the IP address but if you know the computer name, you can still communicate to that computer.

**DOS**

Disk Operating System (MS-DOS is a Microsoft Disk Operating System).

**Driver**

A computer program which converts application and operating system commands to external devices into the exact form required by a specific brand and model of device in order to produce the desired results from that particular equipment.

**ECP**

Extended Capability Port. A set of standards for high speed data communication and interconnection between electronic devices.

**Encryption Key (Network Key)**

Key information used to encode data for data transfer.

This device uses the same encryption key to encode and decode the data, and the identical encryption key is required between the sender and receiver.

**ESD**

Electro-Static Discharge. The sudden discharge of electricity from a static charge which has built-up slowly. Example: the shock you get from a doorknob on a dry day or the sparks you get from brushing hair on a dry day.

**Extended Memory**

All memory more than the 640KB recognized by MS-DOS as system memory.

**FCC**

Federal Communication Commission.

**Floppy Disk**

A spinning platter of magnetic data storage media which is highly flexible.

**GB**

Gigabyte.

**Hard drive**

A spinning platter of magnetic data storage media where the platter is very stiff.

**I/O**

Input/Output. Data entering and leaving your notebook in electronic form.

**I/O Port**

The connector and associated control circuits for data entering and leaving your notebook in electronic form.

**IDE**

Intelligent Drive Electronics. A type of control interface for a hard drive which is inside the hard drive unit.

**IEEE 1394**

Industry standard that allows you to connect between your notebook and a peripheral device such as a digital camera. Also known as “Firewire” or “iLINK”.

**Infrared**

Light just beyond the red portion of the visible light spectrum which is invisible to humans.

**Infrastructure**

A name of a wireless LAN configuration. This type of communication uses an access point.

Another type of communication is called AdHoc.

**IP Address**

An address used for computers to communicate in the TCP/IP environment.

Current IPv4 (version 4) uses four values in the range between 1 and 255. (Example: 192.168.100.123).

There are two types of IP address: global address and private address.

The global address is an only address in the world. It is controlled by JPNIC (Japan Network Information Center). A private address is an only address in the closed network.

**IR**

An abbreviation for infrared.

**IrDA**

Infrared Data Association. An organization which produces standards for communication using infrared as the carrier.

**IRQ**

Interrupt Request. An acronym for the hardware signal to the CPU that an external event has occurred which needs to be processed.

**KB**

Kilobyte.

**LAN**

Local Area Network. An interconnection of computers and peripherals within a single limited geographic location which can pass programs and data amongst themselves.

**LCD**

Liquid Crystal Display. A type of display which makes images by controlling the orientation of crystals in a crystalline liquid.

**Lithium ion Battery**

A type of rechargeable battery which has a high power-time life for its size and is not subject to the memory effect as Nickel Cadmium batteries.

**LPT Port**

Line Printer Port. A way of referring to parallel interface ports because historically line printers were the first and latter the most common device connected to parallel ports.

**MAC Address**

Media Access Control Address

A unique physical address of a network card. For Ethernet, the first three bytes are used as the vendor code, controlled and assigned by IEEE. The remaining three bytes are controlled by each vendor (preventing overlap), therefore, every Ethernet card is given a unique physical address in the world, being assigned with a different address from other cards. For Ethernet, frames are sent and received based on this address.

**MB**

Megabyte.

**Megahertz**

1,000,000 cycles per second.

**Memory**

A repository for data and applications which is readily accessible to your LifeBook notebook's CPU.

**MHz**

Megahertz.

**MIDI**

Musical Instrument Digital Interface. A standard communication protocol for exchange of information between computers and sound producers such as synthesizers.

**Modem**

A contraction for MODulator-DEModulator. The equipment which connects a computer or other data terminal to a communication line.

**Monaural**

A system using one channel to process sound from all sources.

**MPU-401**

A standard for MIDI interfaces and connectors.

**MTU**

Maximum Transmission Unit

The maximum data size that can be transferred at a time through the Internet or other networks. You can set a



smaller MTU size to obtain successful communication, if you have difficulty transferring data due to the fact that the maximum size is too large.

### **NTSC**

National TV Standards Commission. The standard for TV broadcast and reception for the USA.

### **Operating System**

A group of control programs that convert application commands, including driver programs, into the exact form required by a specific brand and model of micro-processor in order to produce the desired results from that particular equipment.

### **Partition**

A block of space on a hard drive which is set aside and made to appear to the operating system as if it were a separate disk, and addressed by the operating system accordingly.

### **PCI**

Peripheral Component Interconnect

Self-configuring PC local bus. Designed by Intel, PCI has gained wide acceptance as a standard bus design.

### **PCMCIA**

PCMCIA is a trademark of the Personal Computer Memory Card International Association. The Personal Computer Memory Card International Association is an organization that sets standards for add-in cards for personal computers.

### **Peripheral Device**

A piece of equipment which performs a specific function associated with but not integral to a computer. Examples: a printer, a modem, a CD-ROM.

### **Pitch (keyboard)**

The distance between the centers of the letter keys of a keyboard.

### **Pixel**

The smallest element of a display, a dot of color on your display screen. The more pixels per area the clearer your image will appear.

### **POST**

Power On Self Test. A program which is part of the BIOS which checks the configuration and operating condition of your hardware whenever power is applied to your notebook. Status and error messages may be displayed before the operating system is loaded. If the self test detects failures that are so serious that operation can not continue, the operating system will not be loaded.

### **PPPoE**

Point to Point Protocol over Ethernet.

A protocol for Ethernet, using a Point-to-Point Protocol (PPP), which is used for connection on the phone line.

### **Program**

An integrated set of coded commands to your computers telling your hardware what to do and how and when to do it.

### **Protocol**

Procedures and rules use to send and receive data between computers.

- Method of sending and receiving data

- Process used to handle communication errors

Conditions required for communication are organized in procedures for correct transfer of information.

### **RAM**

Random Access Memory. A hardware component of your LifeBook notebook that holds binary information (both program and data) as long as it has the proper power applied to it.

### **RAM Module**

A printed circuit card with memory and associated circuitry which allows the user to add additional memory to the computer without special tools.

### **Reset**

The act of reloading the operating system. A reset erases all information stored in RAM.

### **Restart**

See Reset.

### **Resume**

To proceed after interruption. In your notebook this refers to returning to active operation after having been in one of the suspension states.

### **ROM**

Read Only Memory. A form of memory in which information is stored by physically altering the material. Data stored in this way can not be changed by your notebook and does not require power to maintain it.

### **SDRAM**

Synchronous Dynamic Random Access Memory.

### **Serial Port**

A connection to another device through which data is transferred one bit at a time on a single wire with any other wires only for control of the device not for transfer of data.

**SMART**

Self-Monitoring, Analysis and Reporting Technology (SMART) is an emerging technology that provides near-term failure predictions for hard drives. When SMART is enabled the hard drive monitors pre-determined drive attributes that are susceptible to degradation over time. If a failure is likely to occur, SMART makes a status report available so that the LifeBook notebook can prompt the user to back up the data on the drive. Naturally not all failures are predictable. SMART predictability is limited to those attributes which the drive can self-monitor. In those cases where SMART can give advance warning, a considerable amount of precious data can be saved.

**SRAM**

Static random access memory. A specific technology of making RAM which does not require periodic data refreshing.

**SSID**

Service Set Identifier

Specifies which network you are joining. Some systems allow you to specify any SSID as an option so you can join any network.

**Standby**

To make inoperative for a period of time. Your LifeBook notebook uses various suspension states to reduce power consumption and prolong the charge of your battery.

**Status Indicator**

A display which reports the condition of some portion of your hardware. On your LifeBook notebook this is an LCD screen just above the keyboard.

**Stereo (audio)**

A system using two channels to process sound from two different sources.

**SVGA**

Super VGA.

**S-Video**

Super Video. A component video system for driving a TV or computer monitor.

**System Clock**

An oscillator of fixed precise frequency which synchronizes the operation of the system and is counted to provide time of day and date.

**TCP/IP**

Transmission Control Protocol/Internet Protocol. A standard Internet protocol that is most widely used.

**TFT**

Thin Film Transistor – A technology for flat display panels which uses a thin film matrix of transistors to control each pixel of the display screen individually.

**UL**

Underwriters Laboratories – An independent organization that tests and certifies the electrical safety of devices.

**USB**

Universal Serial Bus.

Standard that allows you to simultaneously connect up to 127 USB devices such as game pads, pointing devices, printers, and keyboards to your computer.

**VGA**

Video Graphics Array. A video display standard originally introduced by IBM with the PS/2 series of personal computers.

**VRAM**

Video Random Access Memory. A memory dedicated to video display data and control.

**WFM**

Wired for Management is Intel's broad-based initiative to reduce the total cost of ownership (TCO) of business computing without sacrificing power and flexibility.

**Wi-Fi Compatible**

Wi-Fi (Wireless Fidelity) Identifies that the product has passed the interoperability test, supplied by the WECA (Wireless Ethernet Compatibility Alliance), which guarantees the interoperability of wireless IEEE 802.11 LAN products. For more information on the Wi-Fi standard, go to the WECA website at: [www.wirelessethernet.com](http://www.wirelessethernet.com).

**WLAN**

Wireless Local Area Network. A wireless interconnection of computers and peripherals within a single limited geographic location which can pass programs and data amongst themselves.

**Write Protect**

Prevent alteration of the binary state of all bits in a storage media. Example: all information on a device such as a floppy diskette; a block of space in a storage media such as a partition of a hard drive; a file or directory of floppy diskette or hard drive.

**XGA**

Extended VGA.

**Zip Drive**

A 100MB or 250MB read/write removable media disk drive.

## Regulatory Information



Changes or modifications not expressly approved by Fujitsu could void this user's authority to operate the equipment.

### FCC NOTICES

#### Notice to Users of Radios and Television

These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet that is on a different circuit than the receiver.
- Consult the dealer or an experienced radio/TV technician for help.

Shielded interconnect cables must be employed with this equipment to ensure compliance with the pertinent RF emission limits governing this device.

#### Notice to Users of the US Telephone Network

This equipment complies with Part 68 of the FCC rules. On the bottom of this equipment is a label that contains, among other information, the FCC registration number and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company.

This equipment is designed to be connected to the telephone network or premises wiring using a standard jack type USOC RJ11C. A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant.

The ringer equivalent number (REN) of this equipment is 0.0B as shown on the label. The REN is used to determine the number of devices that may be connected to a telephone line. Excessive RENs on a telephone may

result in the devices not ringing in response to an incoming call. In most but not all areas, the sum of RENs should not exceed five (5.0). To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company.

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice isn't practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could effect the operation of the equipment. If this happens the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please refer to the manual or contact Fujitsu Computer Systems Corporation, Customer Service. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

The equipment cannot be used on public coin service provided by the telephone company. Connection to party line service is subject to state tariffs. (Contact the state public utility commission, public service commission or corporation commission for information).

If your home has specially wired alarm equipment connected to the telephone line, ensure the installation of this computer does not disable your alarm equipment. If you have any questions about what will disable alarm equipment, consult your telephone company or a qualified installer.

The Telephone Consumer Protection Act of 1991 makes it unlawful for any person to use a computer or other electronic device to send any message via a telephone fax machine unless such message clearly contains in a margin at the top or bottom of each transmitted page or on the first page of the transmission, the date and time it is sent and an identification of the business or other entity, or other individual sending the message and the telephone number of the sending machine or such business, other entity, or individual.

## DOC (INDUSTRY CANADA) NOTICES

### Notice to Users of Radios and Television

This Class B digital apparatus meets all requirements of Canadian Interference-Causing Equipment Regulations.

CET appareil numérique de la class B respecte toutes les exigences du Règlement sur le matériel brouilleur du Canada.

### Notice to Users of the Canadian Telephone Network

**NOTICE:** This equipment meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number signifies that registration was performed based on a Declaration of Conformity indicating that Industry Canada technical specifications were met. It does not imply that Industry Canada approved the equipment.

Before connecting this equipment to a telephone line the user should ensure that it is permissible to connect this equipment to the local telecommunication facilities. The user should be aware that compliance with the certification standards does not prevent service degradation in some situations.

Repairs to telecommunication equipment should be made by a Canadian authorized maintenance facility. Any repairs or alterations not expressly approved by Fujitsu or any equipment failures may give the telecommunication company cause to request the user to disconnect the equipment from the telephone line.

**NOTICE:** The Ringer Equivalence Number (REN) for this terminal equipment is 0.0. The REN assigned to each terminal equipment provides an indication of the maximum number of terminals allowed to be connected to a telephone interface. The termination on an interface may consist of any combination of devices subject only to the requirement that the sum of the Ringer Equivalence Numbers of all the devices does not exceed five.



For safety, users should ensure that the electrical ground of the power utility, the telephone lines and the metallic water pipes are connected together. Users should NOT attempt to make such connections themselves but should contact the appropriate electric inspection authority or electrician. This may be particularly important in rural areas.

## Avis Aux Utilisateurs Du Réseau Téléphonique Canadien

**AVIS:** Le présent matériel est conforme aux spécifications techniques d'Industrie Canada applicables au matériel terminal. Cette conformité est confirmée par le numéro d'enregistrement. Le sigle IC, placé devant le numéro d'enregistrement, signifie que l'enregistrement s'est effectué conformément à une déclaration de conformité et indique que les spécifications techniques d'Industrie Canada ont été respectées. Il n'implique pas qu'Industrie Canada a approuvé le matériel.

Avant de connecter cet équipement à une ligne téléphonique, l'utilisateur doit vérifier s'il est permis de connecter cet équipement aux installations de télécommunications locales. L'utilisateur est averti que même la conformité aux normes de certification ne peut dans certains cas empêcher la dégradation du service.

Les réparations de l'équipement de télécommunications doivent être effectuées par un service de maintenance agréé au Canada. Toute réparation ou modification, qui n'est pas expressément approuvée par Fujitsu, ou toute défaillance de l'équipement peut entraîner la compagnie de télécommunications à exiger que l'utilisateur déconnecte l'équipement de la ligne téléphonique.

**AVIS:** L'indice d'équivalence de la sonnerie (IES) du présent matériel est de 0.0. L'IES assigné à chaque dispositif terminal indique le nombre maximal de terminaux qui peuvent être raccordés à une interface téléphonique. La terminaison d'une interface peut consister en une combinaison quelconque de dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas 5.



Pour assurer la sécurité, les utilisateurs doivent vérifier que la prise de terre du service d'électricité, les lignes téléphoniques et les conduites d'eau métalliques sont connectées ensemble. Les utilisateurs NE doivent PAS tenter d'établir ces connexions eux-mêmes, mais doivent contacter les services d'inspection d'installations électriques appropriés ou un électricien. Ceci peut être particulièrement important en régions rurales.

**UL Notice**

This unit requires an AC adapter to operate. Use only UL Listed Class 2 Adapters with an output rating of 16 Vdc, with a current of 3.75 A.

**AC Adapter output polarity**

The modem-to-telephone network connection must be a line cord using a minimum #26 AWG wire.

**For Authorized Repair Technicians Only**

- For continued protection against risk of fire, replace only with the same type and rating fuse.
- Danger of explosion if Lithium (clock) battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instruction.

**System Disposal**

LAMP(S) INSIDE THIS PRODUCT CONTAIN MERCURY AND MUST BE RECYCLED OR DISPOSED OF ACCORDING TO LOCAL, STATE, OR FEDERAL LAWS.



# **Appendix**

## **Integrated Wireless LAN\* User's Guide**

**\*Optional Device**



## FCC REGULATORY INFORMATION

Please note the following regulatory information related to the wireless LAN device.

### Regulatory Notes and Statements

#### Wireless LAN, Health and Authorization for use

Radio frequency electromagnetic energy is emitted from Wireless LAN devices. The energy levels of these emissions, however, are far much less than the electromagnetic energy emissions from wireless devices such as mobile phones. Wireless LAN devices are safe for use by consumers because they operate within the guidelines found in radio frequency safety standards and recommendations. The use of Wireless LAN devices may be restricted in some situations or environments, such as:

- On board an airplane, or
- In an explosive environment, or
- In situations where the interference risk to other devices or services is perceived or identified as harmful.

In cases in which the policy regarding use of Wireless LAN devices in specific environments is not clear (e.g., airports, hospitals, chemical/oil/gas industrial plants, private buildings), obtain authorization to use these devices prior to operating the equipment.

#### Regulatory Information/Disclaimers

Installation and use of this Wireless LAN device must be in strict accordance with the instructions included in the user documentation provided with the product. Any changes or modifications made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment. The manufacturer is not responsible for any radio or television interference caused by unauthorized modification of this device, or the substitution or attachment of connecting cables and equipment other than those specified by the manufacturer. It is the responsibility of the user to correct any interference caused by such unauthorized modification, substitution or attachment. The manufacturer and its authorized resellers or distributors will assume no liability for any damage or violation of government regulations arising from failure to comply with these guidelines.

This device must not be co-located or operating in conjunction with any other antenna or transmitter.

#### Federal Communications Commission statement

This device complies with Part 15 of FCC Rules.

Operation is subject to the following two conditions: (1) This device may not cause interference, and, (2) This device must accept any interference, including interference that may cause undesired operation of this device.

### FCC Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation.

If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try and correct the interference by one or more of the following measures:

1. Reorient or relocate the receiving antenna.
2. Increase the distance between the equipment and the receiver.
3. Connect the equipment to an outlet on a circuit different from the one the receiver is connected to.
4. Consult the dealer or an experienced radio/TV technician for help.

### FCC Radio Frequency Exposure statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 centimeters between the Wireless LAN/Bluetooth antenna (located on the top edge of the LCD screen) and your body.

The transmitters in this device must not be co-located or operated in conjunction with any other antenna or transmitter.

### Export restrictions

This product or software contains encryption code which may not be exported or transferred from the US or Canada without an approved US Department of Commerce export license. This device complies with Part 15 of FCC Rules., as well as ICES 003 B / NMB 003 B. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesirable operation. Modifications not expressly authorized by Fujitsu PC Corporation may invalidate the user's right to operate this equipment.

### Canadian Notice

To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.



## Before Using the Wireless LAN

This manual describes the procedures required to properly setup and configure the integrated Wireless LAN Mini-PCI device (referred to as "WLAN device" in the rest of the manual). Before using the WLAN device, read this manual carefully to ensure it's correct operation. Keep this manual in a safe place for future reference.

### Wireless LAN Devices Covered by this Document

This document is applicable to systems containing one of the following two devices. Most of the procedures are identical. Sections that differ between the two devices have been noted in the text:

- Intel PRO/Wireless 2200BG Mini-PCI wireless network card
- Atheros AR5002x or AR5002g Mini-PCI wireless network card

### Characteristics of the WLAN Device

- The WLAN device is a Mini-PCI card attached to the mainboard of the mobile computer.
- It is a dual-band radio that operates in two license-free RF bands, therefore eliminating the need to procure an FCC license to operate. It operates in the 2.4GHz Industrial, Scientific, and Medical (ISM) RF band. Additionally, the Atheros device operates in the lower and middle bands of the 5GHz Unlicensed National Information Infrastructure (UNII) bands.
- The Atheros WLAN is capable of three operating modes, IEEE802.11a, IEEE802.11b and IEEE802.11g, wireless LAN standards governed by the IEEE (Institute of Electronics and Electrical Engineers). The Intel WLAN is capable of two operating modes, IEEE802.11b and IEEE802.11g.

- Encoding of data is modulated using Direct Sequence Spread Spectrum (DSSS) and Complementary Code Keying (CCK) when the WLAN device is operating in IEEE 802.11b mode and Orthogonal Frequency Division Multiplexing (OFDM) when operating in IEEE802.11a or IEEE802.11g mode.
- The WLAN device is Wi-Fi certified and operates at the maximum data transfer rate of 54 Mbps in IEEE802.11a or IEEE802.11g mode and 11 Mbps in IEEE802.11b mode.
- The maximum communication range indoors is approximately 80 feet (25 meters). However, that range will increase or decrease depending on factors such as number of walls, reflective material, or interference from external RF sources.
- The WLAN device supports the following encryption methods - WEP, TKIP, and AES encryption.

## WIRELESS LAN MODES USING THIS DEVICE

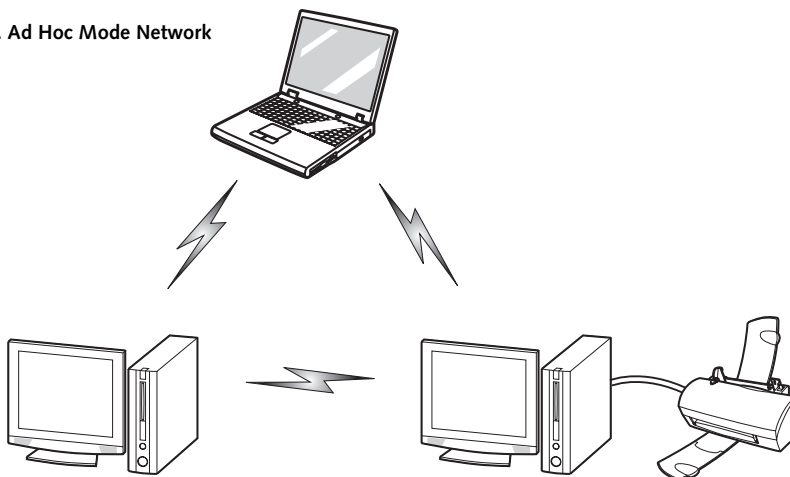
### Ad Hoc Mode

(See Figure A-1)

"Ad Hoc Mode" refers to a wireless network architecture where wireless network connectivity between multiple computers is established without a central wireless network device, typically known as Access Point(s). Connectivity is accomplished using only client devices in a peer-to-peer fashion. That is why Ad Hoc networks are also known as peer-to-peer networks. Ad Hoc networks are an easy and inexpensive method for establishing network connectivity between multiple computers.

Ad Hoc mode requires that the SSID, network authentication, and encryption key settings are identically configured on all computers in the Ad Hoc network.

Figure A-1. Ad Hoc Mode Network



## Access Point (Infrastructure) Mode

(See Figure A-2)

Infrastructure mode refers to a wireless network architecture in which devices communicate with wireless or wired network devices by communicating through an Access Point. In infrastructure mode, wireless devices can communicate with each other or can communicate with a wired network. Corporate wireless networks operate in infrastructure mode because they require access to the wired LAN in order to access computers, devices, and services such as file servers, printers, and databases.

### How to Handle This Device

The WLAN device comes pre-installed in your mobile computer. Under normal circumstances, it should not be necessary for you to remove or re-install it. The Operating System that your mobile computer comes with has been pre-configured to support the WLAN device.

## WIRELESS NETWORK CONSIDERATIONS

- The Intel WLAN device is a dual-mode wireless network card (supports IEEE802.11b/g); the Atheros device supports IEEE802.11a/b/g.
- The Intel WLAN device operates in the 2.4GHz ISM band; the Atheros WLAN device also operates in the 5 GHz lower and middle UNII bands.
- The maximum range of the WLAN device indoors is typically 80 feet (25 meters). Please note that the maximum range you achieve may be shorter or longer than

80 feet, depending on factors such as access point transmit power, number and density of obstructions, or external RF interference.

- Microwave ovens will interfere with the operation of WLAN device as microwave ovens operate in the same 2.4GHz frequency range that IEEE802.11b/g devices operate in. Interference by microwaves does not occur with IEEE802.11a radio which operates in the 5 GHz RF band.
- Wireless devices that transmit in the 2.4GHz frequency range may interfere with the operation of WLAN devices in IEEE802.11b/g modes. Symptoms of interference include reduced throughput, intermittent disconnects, and large amounts of frame errors. It is **HIGHLY** recommended that these interfering devices be powered off to ensure the proper operation of the WLAN device.

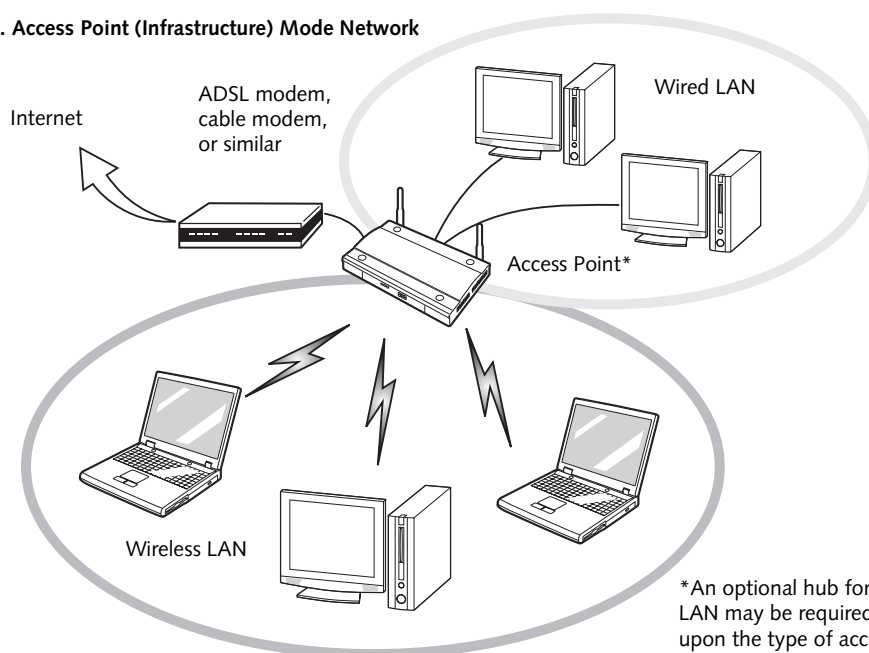
## DEACTIVATING THE WLAN DEVICE

Deactivation of the WLAN device may be desired in certain circumstances (to extend battery life) or where certain environments require it (i.e. hospitals, clinics, airplanes, etc.). Fujitsu mobile computers employ two methods with which to deactivate the WLAN device, 1) the Wireless On/Off Switch and 2) in Windows using the Intel PROSet Software or Atheros Client Utility software.

### Deactivation using the Wireless On/Off Switch

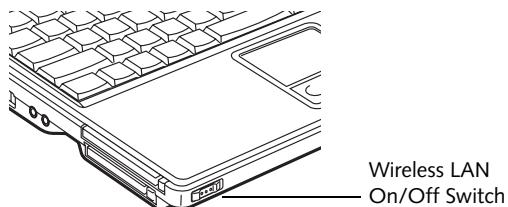
The WLAN device can be deactivated quickly and efficiently by toggling the Wireless On/Off Switch to the Off position. (Figure A-3)

Figure A-2. Access Point (Infrastructure) Mode Network



\*An optional hub for a wired LAN may be required depending upon the type of access point used.

The Wireless On/Off switch has no effect on non-Wireless LAN models.



**Figure A-3. Wireless LAN On/Off Switch Location**

### **Deactivation using the Intel PROSet Software**

The WLAN device can also be deactivated in Windows using the Intel PROSet Software. The procedure to accomplish this:

1. Click [Start]-> [Control Panel].
2. If the Control Panel is in Category view, switch to Classic view by clicking "Switch to Classic View" which can be found in the left frame of the Control Panel window.
3. Double-click on the Intel PROSet for Wireless icon which will execute the Intel PROSet application.
4. Select the General tab if it is not already selected.
5. Check the Off radio button next to "Switch radio:" then click the [OK] button.

### **Deactivation using Atheros Client Utility software**

1. Click [Start] -> [Program Files] -> [Atheros] -> Atheros Client Utility.
2. Choose Action and click Disable Radio.

## **ACTIVATING THE WLAN DEVICE**

Activation of the WLAN device can be accomplished using the same methods as the deactivation process

- Using the Wireless On/Off Switch
- In Windows using the Intel PROSet Software or Atheros Software

# Configuration of the WLAN Device

The WLAN Device can be configured to establish wireless network connectivity using one of the following tools:

- Windows XP Wireless Zero Configuration (WZC) - The WZC allows for multiple profile setup and support for most industry standard security solutions.
- Intel PROSet Software - The Intel PROSet Software allows for multiple profile setup and supports automatic profile switching. Support for most industry standard security solutions as well as Cisco Compatible Extensions (CCX) is contained in this software.
- Atheros Client Utility - The Atheros Client Utility software allows for multiple profile setups and supports automatic profile switching. Support for most industry standard security solutions, as well as Cisco Compatible Extensions (CCX), is contained in this software.

## FLOW OF OPERATIONS

1. Activate the WLAN Device (See Activating the WLAN Device on page 92 for more information).
2. Configure the Wireless Network parameters (See Configure Wireless Network Parameters on page 94 for more information).
  - Enter the network name (SSID)
  - Choose the appropriate WLAN architecture (Ad Hoc or Infrastructure)
  - Choose Authentication method: Open, Shared, WPA, or WPA-PSK
  - If using static WEP keys, enter static WEP key and choose key index.
3. Configure network settings (See Configure Network Parameters on page 94 for more information)
  - TCP/IP settings
  - Workgroup or Domain settings.

## CONFIGURATION USING WIRELESS ZERO CONFIGURATION TOOL

This section explains the procedure to properly configure the WLAN device using the WZC. Pre-defined parameters will be required for this procedure. Please consult with your network administrator for these parameters:

**Network Name** - Also known as the SSID

**Network Key (WEP)** - Required if using static WEP keys.

**Authentication Type** - Open, Shared, WPA, or WPA-PSK

## Procedure

1. Activate the WLAN device using the Wireless On/Off Switch, the Intel PROSet software, or the Atheros Client Utility.
2. Click the [Start] button first and then [Control Panel].
3. If the Control Panel is in Category view, switch to Classic view by clicking "Switch to Classic View" which can be found in the left frame of the Control Panel window.
4. Double-click the Network Connections icon. A list of previously configured networks will be displayed.
5. Right-click [Wireless Network Connection] in the list, and then click [Properties] in the menu displayed.
6. Click the [Wireless Networks] tab.
7. Click [Refresh], then choose the correct SSID from the [Available Networks] window. Click [Configure] and proceed to step 8. Please note that only wireless networks that broadcast their SSID will be displayed. If the SSID of the wireless network is not visible, you must manually add it. This can be accomplished by clicking [Add]
8. From within the Association tab configure the appropriate WLAN parameters. Please have ready the following parameters:
  - Network name (SSID) - ASCII string of up to 33 characters used by the WLAN to logically separate wireless networks.
  - Authentication Type - Options include Open, Shared, WPA, or WPA-PSK
  - Network Key - If Authentication Type is Open or Shared, choices are None or WEP. If Authentication Type is WPA or WPA-PSK, choices are WEP or TKIP.

**Ad Hoc Networks:** All computers in an Ad Hoc network must be assigned with the same SSID and the checkbox for the field [This is a computer to computer (ad hoc) network, wireless access points are not used.] must be checked.

**Access Point (Infrastructure) Networks:** The SSID must be identical to the SSID of the access point(s) and the checkbox for the following field must be unchecked [This is a computer to computer (ad hoc) network wireless access points are not used.] Refer to the access point manual, or contact your network administrator

9. Configure Wireless Network Key parameters (Network Authentication and Encryption).
  - a. Choose the Network Authentication method appropriate for your wireless LAN. Options include Open, Shared, WPA, and WPA-PSK.
 

**Ad Hoc Networks:** Network Authentication settings must be identical for all computers in the Ad Hoc network.

**Access Point (Infrastructure Networks):** Network Authentication setting must be configured to match the setting of the Access Point(s). Please contact your network administrator for this information.
  - b. Choose the Encryption method appropriate for your wireless LAN. Options for Open or Shared Authentication are None or WEP. Options for WPA or WPA-PSK are WEP or TKIP.
  - c. If using static WEP keys, clear the check mark from the [The key is provided for me automatically] check box. If using an authentication method that uses dynamic WEP (e.g., WPA, WPA-PSK, 802.1x/EAP), the check box should remain checked. Please contact your network administrator for the correct settings.
  - d. Static WEP keys (if applicable) are entered in the [Network Key] box. Configuration of the [Network Key] is not required if the [The key is provided for me automatically] check box is checked.

- Static WEP keys entered in ASCII code format will be either five characters (40-bit) or thirteen characters (104-bit) in length. Valid characters are 0 - 9, A - Z.
- Static WEP keys entered in hexadecimal code format will be either ten characters (40-bit) or twenty-six characters (104-bit) in length. Valid characters are 0 - 9, A - F.

**Ad Hoc Networks:** Assign the same network key to all the personal computers to be connected.

**Access Point (Infrastructure) Networks:** Assign the identical network key that is programmed into the access point. Please

contact your network administrator for this information.

- e. If using static WEP keys, confirm the Network key by re-entering the same data in the [Confirm network key:] field.
  - f. The Key index used must be identical to the transmit key used in the Access Point or other wireless device. This is only applicable when static WEP keys are used. Please contact your network administrator for this information.
10. **Access Point (Infrastructure) Networks Only:** If the wireless network you are establishing connectivity to implements an access control security mechanism, configuration of 802.1x parameters may be necessary. Please contact your network administrator for these settings. Configuration of these parameters is not applicable to home users.
  11. Click [OK] to close the [Wireless Network] window which will cause the WLAN device to re-establish wireless network connectivity using the recently configured parameters.

## CONFIGURATION USING INTEL PROSET SOFTWARE

This section explains the procedure to properly configure the WLAN device using the Intel PROSet Software. Pre-defined parameters will be required for this procedure. Please consult with your network administrator for these parameters:

**Network Name** - Also known as the SSID

**Network Key (WEP)** - Required if using static WEP keys.

**Authentication Type** - Open, Shared, WPA, or WPA-PSK

### Procedure

1. Activate the WLAN device using either the Wireless On/Off Switch or the Intel PROSet software.
2. Click the [Start] button first and then [Control Panel].
3. If the Control Panel is in Category view, switch to Classic view by clicking "Switch to Classic View" which can be found in the left frame of the Control Panel window.
4. Double-click the icon [Intel PROSet] to execute the Intel PROSet Software.
5. From the General page, click the Networks tab.
6. Click the [Add] button. The General Settings dialog displays.

7. From the General page, click the Networks tab.
8. Click the [Add] button. The General Settings dialog displays.
9. Enter a profile name in the Profile Name field.
10. Enter the network SSID, in the Network Name (SSID) field.
11. Click Infrastructure or Ad Hoc for the operating mode.
12. The Mandatory AP option is only used if Infrastructure mode is selected. Use this option to connect to a specific access point. Click the Mandatory AP button, enter the MAC address for the access point. Click OK to save the setting and return to the General Settings page.
13. If you are using Cisco CCX, click the Enable Cisco Client eXtensions option to enable Cisco CKIP data encryption on the Security Settings page. If you have checked the Cisco's "Mixed-Cell" box in the Advanced Setting, this option must also be checked.
14. Click Next.
15. Click the Security tab
16. Select Open, Shared, WPA, or WPA-PSK in the Network Authentication options.
17. Select either None, WEP, CKIP (if Enable Cisco Client eXtensions is enabled on the General Settings page), or TKIP for the data encryption.
18. If WEP is selected, select either 64 or 128-bit for the Encryption Level.
19. Select the key index 1, 2, 3 or 4.
20. Enter the WEP key if required. If your network does not employ a 802.1x/EAP security mechanism, please skip to step 24.
21. Click the 802.1x Enabled checkbox to enable the 802.1x security option. Please contact your network administrator if configuration of this setting is required.
22. Select the appropriate 802.1x/EAP Type. Please contact your network administrator if configuration of this setting is required.
23. After selecting your authentication type, click the Configure button to open the Settings dialog. Enter the user name and password of the user you have created on the authentication server. The user name and password do not have to be the same as name and password of your current Windows user login. The "Server Identity" can be use the default setting. The "Client Certificate" should be the one

obtained from your RADIUS server or other certification server.

24. Click Close to save the settings.
25. From the General settings page, click the new profile name shown in the Profile List. Use the up and down arrows to position the priority of the new profile in the priority list.
26. Click the Advanced button to set the network connection preferences.
27. Click the Connect button to connect to the network.
28. Click OK to close the Intel(R) PROSet for Wireless utility

## CONFIGURATION USING ATHEROS CLIENT UTILITY SOFTWARE

This section explains the procedure to properly configure the WLAN device using the Atheros Client Utility. Pre-defined parameters will be required for this procedure. Please consult with your network administrator for these parameters:

**Network Name** - Also known as the SSID

**Network Key (WEP)** - Required if using static WEP keys.

**Authentication Type** - Open, Shared, WPA, or WPA-PSK

### Procedure

1. Activate the WLAN device using either the Wireless On/Off Switch or the Atheros Client Utility
2. Click the [Start] button first and then [Control Panel].
3. If the Control Panel is in Category view, switch to Classic view by clicking "Switch to Classic View" which can be found in the left frame of the Control Panel window.
4. Double-click the icon [Atheros Client Utility] to execute the Atheros Client Utility.
5. From the Current Status page, click the Profile Management tab.
6. If this is your first time using this utility, highlight the profile [Default] and Click the [Modify] button, otherwise Click the [New] button. The General Settings dialog displays.
7. From the General page, enter a profile name in the Profile Name field.
8. Enter the network SSID, in the SSID1 field. If you wish to create a profile that can connect to up to 3

different wireless networks, SSID's can be entered in the SSID2 and SSID3 fields as well.

9. Click the Security tab.
10. The Security tab allows for the configuration of the Security modes listed in the table below. Please select the radio button of the desired security mode. If these settings are not known to you, please consult with your network administrator for the correct settings.

Field Name	Description
WPA	Enables the use of Wi-Fi Protected Access. Choosing WPA opens the WPA EAP drop-down menu. Options include TLS and PEAP. If these settings are not known to you, please consult with your network administrator for the correct settings.
WPA-PSK	Enables WPA-Pre-Shared Key. Click on the Configure button to enter the WPA Passphrase. If these settings are not known to you, please consult with your network administrator for the correct settings.
802.1x	Enables 802.1x security. If these settings are not known to you, please consult with your network administrator for the correct settings. Choosing this option opens the 802.1x EAP type drop-down menu. Options include TLS, PEAP, and LEAP
Pre-Shared Key	Enables the use of pre-shared keys that are defined on both the access point and the station. This is where static WEP keys are entered. Click the Configure button to fill in the Define Pre-Shared Keys window.
None	No security

11. Click OK
12. Click the Advanced tab
13. The Advanced tab allows for the configuration of the options detailed in the table below.

Field Name	Description
Power Save Mode	Options are Maximum, Normal, or Off
Network Type	Options are AP (Infrastructure) or Ad Hoc
802.11b Preamble	Specifies the preamble setting in 802.11b. The default setting is Short and Long (Access Point mode), which allows both short and long headers in the 802.11b frames. Set to Long Only to override allowing short frames.
Transmit Power Level	Options are 100%, 50%, 25%, 12.5% or Lowest transmit power (0mW)
Wireless Mode	Specifies 5 GHz 54 Mbps, 5 GHz 108 Mbps, 2.4 GHz 11 Mbps, or 2.4 GHz 54 Mbps operation in an access point network.
Wireless Mode when Starting Ad Hoc Network	Specifies 5GHz 54 Mbps, 5 GHz 108 Mbps, 2.4 GHz 11 Mbps, or 2.4 GHz 54 Mbps to start an Ad Hoc network if no matching network name is found after scanning all available modes.

14. Click OK
15. If the profile you just created does not activate immediately, click the Profile Management tab, highlight the desired Profile, and click Activate.
16. Click OK to close the Atheros Client Utility.

## CONNECTION TO THE NETWORK

This section explains connection to the network.

If there is an administrator of the network, contact the network administrator for data settings.

### Setting the network

*Perform the "Setting TCP/IP" and "Confirming the computer and work group names" operations required for network connection.*

### Setting TCP/IP



To change the setting of the IP address, you need to be logged in from Windows as an administrator.

1. Click the [Start] button first and then [Control Panel].
2. If the Control Panel is in Category view, switch to Classic view by clicking "Switch to Classic View" under Control Panel the left frame. (If you are already in Classic view, "Switch to Category View" will be displayed.)
3. Double-click [Network Connections]. A list of currently installed networks will be displayed.
4. Right-click [Wireless Network Connection] in the list, and then click [Properties] in the menu displayed. The [Wireless Network Connection Properties] window will be displayed.
5. Click the [General] tab if it is not already selected.
6. Click [Internet Protocol (TCP/IP)] and then click [Properties]. The [Internet Protocol (TCP/IP) Properties] window will be displayed.
7. Set the IP address as follows:
  - **For ad hoc connection:** Select [Use the following IP address:] and then enter data for [IP address] and [Subnet mask]. See page 103 for IP address setting.
  - **For access point (infrastructure) connection:** If your network uses DHCP, select [Obtain an IP address automatically] and [Obtain DNS server address automatically]. If your network uses static IP addresses, consult with your network administrator for the correct IP address settings.
8. Click the [OK] button. Processing will return to the [Wireless Network Connection Properties] window.
9. Click the [OK] button.
10. Close the [Network Connection] window.

Following this operation, confirm the names of the computer and the workgroup as follows.

### Confirming the computer and work group names



To modify the computer name and/or the work group name, you need to be logged in from Windows as an administrator.

1. Click the [Start] button, then [Control Panel].
2. If the Control Panel is in Category view, switch to Classic view by clicking "Switch to Classic View" under Control Panel the left frame. (If you are already in Classic view, "Switch to Category View" will be displayed.)
3. Double-click the [System] icon. The [System Properties] window will be displayed.
4. Click the [Computer Name] tab.
5. Confirm the settings of [Full computer name:] and [Workgroup:].
  - a. The setting of [Full computer name:] denotes the name for identifying the computer. Any name can be assigned for each personal computer.



To change the name, click [Change] and then proceed in accordance with the instruction messages displayed on the screen.

Enter the desired name in less than 15 ASCII character code format. Identifiability can be enhanced by entering the model number, the user name, and other factors.

- b. [Workgroup name] is the group name of the network. Enter the desired name in less than 15 ASCII character code format.

**For ad hoc connection:** Assign the same network name to all personal computers existing on the network.

**For access point (infrastructure) connection:** Assign the name of the work group to be accessed.

6. Click the [OK] button. If a message is displayed that requests you to restart the personal computer, click [Yes] to restart the computer.

### Setting the sharing function

*Set the sharing function to make file and/or printer sharing with other network-connected personal computers valid.*

This operation is not required unless the sharing function is to be used.



The folder and printer for which the sharing function has been set will be usable from any personal computer present on the network.



To share a file and/or the connected printer, you need to be logged in as an administrator.

### Setting the Microsoft network-sharing service

1. Click the [Start] button first and then [Control Panel].
2. If the Control Panel is in Category view, switch to Classic view by clicking “Switch to Classic View” under Control Panel the left frame. (If you are already in Classic view, “Switch to Category View” will be displayed.)
3. Double-click [Network Connections]. A list of currently installed networks will be displayed.
4. Right-click [Wireless Network Connection] in the list, and then click [Properties] in the menu displayed. The [Wireless Network Connection Properties] window will be displayed.
5. If [File and Printer Sharing for Microsoft Networks] is displayed, proceed to step 6. If [File and Printer Sharing for Microsoft Networks] is not displayed, skip to step 7.
6. Make sure that the [File and Printer Sharing for Microsoft Networks] check box is checked, and then click the [OK] button. Skip to “Setting file-sharing function”.
7. Click [Install]. The [Select Network Component Type] window will be displayed.
8. Click [Service], then click the [Add] button. The [Select Network Service] window will be displayed.
9. Click [File and Printer Sharing for Microsoft Networks] and then click the [OK] button. Processing will return to the [Wireless Network Connection Properties] window, and [File and Printer Sharing for Microsoft Networks] will be added to the list.
10. Click the [Close] button.

### Setting the file-sharing function

The procedure for setting the file-sharing function follows, with the “work” folder in drive C: as an example.

1. Click the [Start] button first and then [My Computer].
2. Double-click [Local disk (C:)].

3. Right-click the “work” folder (or whichever folder you want to share), and then click [Sharing and Security...] in the menu displayed. The [Folder Name Properties] window will be displayed.



Setting the file-sharing function for the file which has been used to execute Network Setup Wizard is suggested on the screen. For the wireless LAN, however, since security is guaranteed by entry of the network name (SSID) and the network key, the steps to be taken to set the file-sharing function easily without using Network Setup Wizard are given below.

4. Click [Sharing] if it isn't already selected.
5. Click the link stating “If you understand the security risks, but want to share files without running the wizard, click here”.
6. Click “Just enable file sharing” and click [OK].
7. Check the [Share this folder on the network] check box.



To specify the corresponding folder as a read-only folder, select the [Read only] checkbox under the General tab.

8. Click the [OK] button. The folder will be set as a sharable folder, and the display of the icon for the “work.” folder will change.

### Setting the printer-sharing function

1. Click the [Start] button first and then [Printers and FAX]. A list of connected printers will be displayed.
2. Right-click the printer for which the sharing function is to be set, and then click [Sharing] in the menu displayed. The property window corresponding to the selected printer will be displayed.



Setting the printer-sharing function when Network Setup Wizard has been executed is suggested on the screen. For the wireless LAN, however, since security is guaranteed by entry of the network name (SSID) and the network key, the steps to be taken to set the printer-sharing function without using Network Setup Wizard are laid down below.

3. Click the [Sharing] tab.
4. Click [Share this printer].
5. Enter the sharing printer name in [Share name].
6. Click the [OK] button.

### Confirming connection

After you have finished the network setup operations, access the folder whose sharing has been set for other personal computers. Also, confirm the status of the radio waves in case of trouble such as a network connection failure.



In the case of access point (infrastructure) connection, enter the necessary data for the access point before confirming connection. Refer to the manual of the access point for the access point setup procedure.

### Connecting your personal computer to another personal computer

1. Click [Start] first and then [My Computer]. The [My Computer] window will be displayed in the left frame.
2. Click [My Network Places] in the "Other Places" list. The window [My Network Places] will be displayed.
3. Click [View workgroup computers] under Network Tasks in the left frame.
4. Double-click the personal computer to which your personal computer is to be connected. The folder that was specified in "Setting the file-sharing function" on page 98 will be displayed.
5. Double-click the folder to be accessed.

### Confirming the status of the radio

1. Right-click the Intel PRO Wireless icon in the lower right corner of the screen.
2. Click [Open Intel PROSet for Wireless]. The Intel PROSet for Wireless window opens.
3. Contained within the General tab and the Details section (accessed by pressing the [Details] button), you will find the current operating status of the radio. (When the radio is turned off or the computer is not yet connected, some of the conditions will not be displayed.)
  - **Network Name (SSID)**  
Displays the Network Name (SSID) currently used by the radio.

- **Profile Name**  
The current configuration profile is displayed.
- **Mode**  
Displays the current operating mode. [Infrastructure (AP)] or [Ad Hoc] will be displayed.
- **Security**  
Displays the current security status of the profile being used:  
 None: No encryption used.  
 WEP: WEP encryption algorithm used.  
 CKIP: WEP encryption algorithm used.  
 TKIP: WEP encryption algorithm used.
- **Speed**  
Displays the highest data rate of the associated access point in mega-bits-per-second (Mbps) until data transfer occurs.  
 802.11g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, or 54.  
 802.11b: 1, 2, 5.5, or 11.
- **Band (Frequency)**  
Displays the current band and frequency being used. Displays Out of Range if no band and frequency is displayed. Displays:  
 802.11g (2.4 GHz) or 802.11b (2.4 GHz)
- **Channel**  
Displays the current transmit and receive channel being used.
- **802.1x Protocol**  
Displays Enabled if the profile uses 802.1x authentication. Default is Disabled.

# Troubleshooting

Causes and countermeasures for troubles you may encounter while using your wireless LAN are described in the following table.

Problem	Possible Cause	Possible Solution
<b>Unavailable network connection</b>	<b>Incorrect network name (SSID) or network key</b>	<p><b>Ad hoc connection:</b> verify that the network names (SSID's) and network keys (WEP) of all computers to be connected have been configured correctly. SSID's and WEP key values must be identical on each machine.</p> <p><b>Access Point (Infrastructure) connection:</b> set the network name (SSID) and network key to the same values as those of the access point.</p> <p>Set the Network Authentication value identically to that of the Access Point. Please consult your network administrator for this value, if necessary.</p> <p>For the method of setting network authentication, refer to the following page:- "Assigning parameters" on page 94.</p>
	<b>Weak received signal strength and/or link quality</b>	<p>Ad hoc connection: Retry connection after shortening the distance to the destination computer or removing any obstacles for better sight.</p> <p>Access Point (Infrastructure) connection: Retry connection after shortening the distance to the access point or removing any obstacles for better sight.</p> <p>To check the wave condition, refer to the following page:- "Confirming the status of the radio waves" on page 99.</p>
	<b>The WLAN device has been deactivated or disabled</b>	Check if the wireless switch is turned ON. Also verify "Disable Radio" is not checked in "Network setting" window. Refer to "Starting Transmission" on page 92.
	<b>The computer to be connected is turned off</b>	Check if the computer to be connected is turned ON.
	<b>RF interference from Access Points or other wireless networks</b>	The use of identical or overlapping RF channels can cause interference with the operation of the WLAN device. Change the channel of your Access Point to a channel that does not overlap with the interfering device.
	<b>Wireless network authentication has failed</b>	Re-check your Network Authentication, Encryption, and Security settings. Incorrectly configured security settings such as an incorrectly typed WEP key, a mis-configured LEAP username, or an incorrectly chosen authentication method will cause the LAN device to associate but not authenticate to the wireless network.
	<b>Incorrectly configured network settings</b>	<p>Recheck the configuration of your network settings.</p> <p>For the method of checking, refer to the following page:- "Connection to the Network" on page 97.</p>
	<b>Incorrect IP address configuration</b>	This only applies to networks using static IP addresses. Please contact your network administrator for the correct settings.

# Wireless LAN Glossary

## Ad Hoc Mode

Ad Hoc Mode refers to a wireless network architecture where wireless network connectivity between multiple computers is established without a central wireless network device, typically known as Access Points. Connectivity is accomplished using only client devices in a peer-to-peer fashion. For details, refer to “Ad hoc connection” on page 90.

## Channel

Range of narrow-band frequencies used by the WLAN device to transmit data. IEEE802.11b/g - 11 channels, 22 MHz wide channels.

## DHCP (Dynamic Host Configuration Protocol)

A protocol that provides a means to dynamically allocate IP addresses to computers on a local area network.

## DNS (Domain Name System)

A data query service that provides a mechanism with which to translate host names into Internet addresses.

## IEEE802.11a

Wireless LAN standard that supports a maximum data rate of 54 Mbps. 802.11a devices operate in the 5 GHz lower and middle UNII bands.

## IEEE802.11b

Wireless LAN standard that supports a maximum data rate of 11 Mbps. 802.11b devices operate in the 2.4 GHz ISM band.

## Access point

Wireless network device used to bridge wireless and wired network traffic.

## IP address

The logical 32-bit host address defined by the Internet Protocol that uniquely identifies a computer on a network. The IP address is usually expressed in dotted decimal notation.

## LAN (Local Area Network)

A LAN or Local Area Network is a computer network (or data communications network) which is confined to a limited geographical area.

## MAC address (Media Access Control Address)

A MAC address (also called an Ethernet address or IEEE MAC address) is the 48-bit address (typically written as twelve hexadecimal digits, 0 through 9 and A through F, or as six hexadecimal numbers separated by periods or colons, e.g., 0080002012ef, 0:80:0:2:20:ef) which uniquely identifies a computer that has an Ethernet interface.

## MTU (Maximum Transmission Unit)

The maximum size of data which can be transmitted at one time in networks including the Internet. In an environment whose maximum size of data is too large to correctly receive data, normal communications can be restored by setting the size of MTU to a smaller value.

## Network key

Data that is used for encrypting data in data communication. The personal computer uses the same network key both for data encryption and decryption, therefore, it is necessary to set the same network key as the other side of communication.

## Network name (SSID: Security Set Identifier)

When a wireless LAN network is configured, grouping is performed to avoid interference or data theft. This grouping is performed with “Network name (SSID)”. In order to improve security, the network key is set allowing no communication unless “Network name (SSID)” coincides with the network key.

## Open system authentication

Null authentication method specified in the 802.11 standard that performs no authentication checks on a wireless client before allowing it to associate.

## PPPoE (Point to Point Protocol over Ethernet)

A method of allowing the authentication protocol adopted in telephone line connection (PPP) to be used over an Ethernet.

## Protocol

A procedure or rule of delivering data among computers. Ordered data communication is allowed by making all conditions required for communication including the method of data transmission/reception and actions upon communication errors into procedures.

### **Shared key authentication**

802.11 network authentication method in which the AP sends the client device a challenge text packet that the client must then encrypt with the correct WEP key and return to the AP. If the client has the wrong key or no key, authentication will fail and the client will not be allowed to associate with the AP. Shared key authentication is not considered secure, because a hacker who detects both the clear-text challenge and the same challenge encrypted with a WEP key can decipher the WEP key.

### **SSID (Service Set Identifier)**

Service Set Identifier, a 32-character unique identifier attached to the header of packets sent over a WLAN that acts as a password when a mobile device tries to connect to the BSS. The SSID differentiates one WLAN from another, so all access points and all devices attempting to connect to a specific WLAN must use the same SSID. A device will not be permitted to join the BSS unless it can provide the unique SSID. Because the SSID is broadcast in plain text, it does not supply any security to the network.

### **Subnet mask**

TCP-IP network is controlled by being divided into multiple smaller networks (subnets). IP address consists of the subnet address and the address of each computer. Subnet mask defines how many bits of IP address comprise the subnet address. The same value shall be set among computers communicating with each other.

### **TCP/IP (Transmission Control Protocol/Internet Protocol)**

A standard protocol of the Internet.

### **Wi-Fi**

Wi-Fi, or Wireless Fidelity, is a set of standards for wireless local area networks (WLAN) based on the IEEE 802.11 specifications. Certified products can use the official Wi-Fi logo, which indicates that the product is interoperable with any other product also showing that logo.

## IP address information



IP addressing is much more complicated than can be briefly explained in this document. You are advised to consult with your network administrator for additional information.

If IP address is unknown, set IP address as follows:

If you have an access point (DHCP server) on the network, set the IP address as follows:

[Obtain an IP address automatically]



A DHCP server is a server that automatically assigns IP addresses to computers or other devices in the network. There is no DHCP server for the AdHoc network.

If the IP address is already assigned to the computer in the network, ask the network administrator to check the IP address to be set for the computer.

If no access point is found in the network:

An IP address is expressed with four values in the range between 1 and 255.

Set the each computer as follows: The value in parentheses is a subnet mask.

<Example>

Computer A: 192.168.100.2 (255.255.255.0)

Computer B: 192.168.100.3 (255.255.255.0)

Computer C: 192.168.100.4 (255.255.255.0)

:

:

Computer X: 192.168.100.254 (255.255.255.0)

## Specifications

Item	Specification
Type of network	Atheros WLAN device conforms to IEEE 802.11a/802.11b/g (Wi-Fi based)* Intel WLAN device conforms to IEEE 802.11b/g (Wi-Fi based)*
Transfer rate	(Automatic switching) IEEE 802.11a/g: 54 Mbps maximum data rate IEEE 802.11b: 11 Mbps maximum data rate
Active frequency	802.11b/g: 2400~2473 MHz 802.11a: 4900 ~ 5850 MHz
Number of channels	802.11a: 8 independent channels 802.11b/g: 11 channels, 3 non-overlapping channels
Security	Encryption Types - WEP, TKIP, AES** WPA 1.0 compliant  Encryption Keylengths Supported: 64 bits, 128 bits, and 152 bits (Atheros module using AES encryption only)  802.1x/EAP  CCX 1.0 compliant
Maximum recommended number of computers to be connected over wireless LAN (during ad hoc connection)	10 units or less ***

\* “Wi-Fi based” indicates that the interconnectivity test of the organization which guarantees the interconnectivity of wireless LAN (Wi-Fi Alliance) has been passed.

\*\* Encryption with network key (WEP) is performed using the above number of bits, however, users can set 40 bits/104 bits after subtracting the fixed length of 24 bits.

\*\*\* Depending on practical environments, the allowable number of computers to be connected may be decreased.

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