

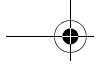
**APPENDIX I**  
**USER MANUAL FINAL DRAFT (PART 3)**



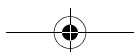
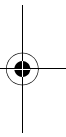
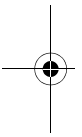


# 5

## Troubleshooting



*LifeBook T Series Tablet PC - Section Five*



## Troubleshooting

Your LifeBook T Series Tablet PC 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 Tablet PC.
2. Make sure the AC adapter is plugged into your Tablet PC 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 Tablet PC. 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.
8. If you still have the problem after taking all of the above approaches, please check our Web site at [us.fujitsu.com/computers](http://us.fujitsu.com/computers) for possible known support issues.



- 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 Tablet PC to your supplier until you have talked to a support representative.

8. If you have tried the solutions suggested in the Troubleshooting Table and checked our Web site for possible solutions without success, contact your support representative:

Toll free: 1-800-8Fujitsu

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
- Type of device connected, if any

See the Configuration Label on the bottom of your Tablet PC for configuration and serial numbers. (See *figure 2-8 on page 16 for location*)

### SPECIFIC PROBLEMS

#### Using the Troubleshooting Table

When you have problems with your Tablet PC, 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 Tablet PC.

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**TROUBLESHOOTING TABLE**

<b>Problem</b>	<b>Page</b>	<b>Problem</b>	<b>Page</b>
Audio Problems .....	page 58	Modem Problems .....	page 59
Docking Problems .....	page 58	USB Device Problems .....	page 60
Hard Drive Problems .....	page 58	PC Card Problems .....	page 60
Keyboard or Mouse Problems .....	page 58	Power Failures .....	page 60
Pen Input Problems .....	page 59	Shutdown and Startup Problems .....	page 62
Infrared Problems .....	page 59	Video Problems .....	page 63
Memory Problems .....	page 59	Miscellaneous Problems .....	page 64

Problem	Possible Cause	Possible Solutions
<b>Audio Problems</b>		
There is no sound coming from the built-in speakers.	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 Tablet PC.	Plugging in headphones disables the built-in speakers, remove the headphones.
	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>		
Tablet PC does not turn on when installed in optional Port Replicator	Port Replicator AC adapter is not plugged in.	Provide power to the Port Replicator.
	Tablet PC is not properly seated in the Port Replicator.	Remove and re-dock your Tablet PC.
<b>Hard Drive Problems</b>		
You cannot access your hard drive.	The setup utility is incorrectly set for your internal (Primary Master) hard drive.	Revise BIOS settings to set the Primary Master correctly. See "BIOS Setup Utility" on page 34.
	The wrong drive designator was used by an application when a bootable CD-ROM was used to start the Tablet PC.	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 Tablet PC has gone into Standby mode.	Push the Suspend/Resume button.
	Your application has locked out your keyboard.	Try to use your integrated pointing device to restart your system. If this fails, turn your Tablet PC off by pressing the suspend/resume button for 10 seconds or more, and then turn it back on.

## Troubleshooting

Problem	Possible Cause	Possible Solutions
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 "Device Ports" on page 52.
	Your operating system software is not set up with the correct driver for that device.	Check your device and operating system documentation and activate the proper driver.
You have connected an external keyboard or a mouse and it seems to be locking up the system.	Your operating system software is not set up with the correct driver for that device.	Check your device and operating system documentation and activate the proper driver.
	Your system has crashed.	Try to restart your Tablet PC. If that fails, turn off the power by pressing the suspend/resume button for at least 10 seconds, and then power back on.
<b>Pen Input Problems</b>		
Cursor is not tracking the pen	The system may be uncalibrated	If the cursor on the screen appears to be misaligned with the pen or is not accurately tracking the pen, calibrate the pen. See "Calibrating the Pen" on page 27.
<b>Infrared Problems</b>		
Infrared data transfer is not working	The IrDA port on the system can't "see" the IrDA port on the other device.	Move the system so that there is a direct line-of-sight path between the two ports.
	The system and the other device are too far from each other.	Move the system and the device so that they are three feet or less from each other.
	The viewing angle between the devices is too great.	The viewing angle between the system port and the device port cannot be more than 15 degrees from a center line between the IrDA port on the Tablet PC and the IrDA port on the other device.
	You are using an old version of IrDA.	The device with which you are trying to communicate must be compliant with IrDA standard 1.1.
	There are possibly problems in one or both devices.	Go to Start -> (All) Programs -> Accessories -> Communications -> New Connection Wizard. Verify that "Set up an advanced connection" is checked and follow the on-screen instructions.
<b>Memory Problems</b>		
Your Power On screen, or Info 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 Tablet PC. Remove and re-install your memory upgrade module. See "Memory Upgrade Module" on page 43.
	You have a memory failure.	Check for Power On Self Test (POST) messages. See "Power On Self Test Messages" on page 65.
<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.

## LifeBook T Series Tablet PC - Section Five

Problem	Possible Cause	Possible Solutions
Modem does not appear to work.	Modem may not have been initialized.	Verify that the modem has been initialized by the operating system. TO do so, right-click on My Computer and select the Hardware tab. Click [Device Manager] and click on the "+" symbol that appears next to Modems. Verify that your device is listed as installed.
<b>USB Device Problems</b>		
You have installed a USB device, but your Tablet PC 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 52.
	The device may have been installed while an application was running, so your Tablet PC is not aware of its installation.	Close the application and restart your Tablet PC.
	Your software may not have the correct software driver active.	See your software documentation and activate the correct driver.
	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.
<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 47.
	The card may have been installed while an application was running, so your Tablet PC is not aware of its installation.	Close the application and restart your Tablet PC.
	Your software may not have the correct software driver active.	See your software documentation and activate the correct driver.
	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.
<b>Power Failures</b>		
You turn on your Tablet PC 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 15. Install a charged battery or a Power adapter.
	The 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 15. If a battery is indicating a short, remove that battery and operate from another power source or replace that battery.

## Troubleshooting

Problem	Possible Cause	Possible Solutions
You turn on your Tablet PC and nothing seems to happen.  (continued)	The battery is low.	Check the Status Indicator Panel to determine the presence and condition of the battery. See "Status Indicator Panel" on page 15. Use a Power adapter until the battery is charged.
	The AC or auto/airline adapter is not plugged in properly.	Verify that your adapter is connected correctly. See "Power Sources" on page 33.
	The Power adapter (AC or auto/airline) is faulty.	Try a different Power adapter or install a charged optional second battery.
	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.
Your Tablet PC 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 only 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 33.
	You have a battery failure.	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 15.
	Your power adapter has failed or lost its power source.	Make sure the adapter is plugged in and the outlet has power.
Your Tablet PC will not work on battery alone.	The 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.
	Your battery is faulty.	Verify the battery condition using the Status Indicator panel and replace or remove any battery that is shorted. See "Status Indicator Panel" on page 15.
The battery seems to discharge too quickly.	You are running an application that uses a great deal of power due to frequent hard drive or CD-ROM access, or use of a modem or LAN PC card.	Use a power adapter for this application when at all possible.



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Problem	Possible Cause	Possible Solutions
The battery seems to discharge too quickly. (continued)	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 Tablet PC to normal operating temperature. The Charging icon on the Status Indicator panel will flash when the battery is outside its operating range.
	The AC Adapter is defective.	Replace with another AC Adapter to see if the problem persists. Replace any defective AC Adapters.
<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 [F2] key while the Fujitsu logo is on screen, entering the setup utility and adjusting the source settings from the Boot menu. See "BIOS Setup Utility" on page 34.
	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 34.
An error message is displayed on the screen during the Tablet PC 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 65.
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.

## Troubleshooting

Problem	Possible Cause	Possible Solutions
Your Tablet PC appears to change setup parameters when you start it.	BIOS setup changes were not saved when you made them and exited the BIOS setup utility returning it to previous settings.	Make sure you select Save Changes And Exit 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.
<b>Video Problems</b>		
The built-in display is blank when you turn on your Tablet PC.	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 optional Port Replicator is attached, an external monitor is plugged in, and the Tablet PC 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 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 Tablet PC 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 Tablet PC has gone into Video Timeout, Standby Mode, or Hibernate Mode because you have not used it for a period of time.	Press a 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 34.
	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 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 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.

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Problem	Possible Cause	Possible Solutions
The 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.	The display needs technical diagnosis; 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.	When compensation is disabled, a clearer but smaller display for applications that do not support 800 x 600/1024 x 768 pixel resolution will result. You can fill the screen but have less resolution by changing your compensation setting. (See the Video Features submenu, located within the Advanced menu of the BIOS. See "BIOS Setup Utility" on page 34.
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 34.
	Your external monitor is not properly installed.	Reinstall your device. See "External VGA Monitor Port" on page 53.
	Your operating system software is not set up 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 may not be compatible with your Tablet PC.	See your monitor documentation and the External Monitor Support portions of the Specifications section. See "Specifications" on page 77.
<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.)

### \*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.

### \*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.

### \*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 Tablet PC.

**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) DVD contains:

- Sets of device drivers and Fujitsu utilities (in specific directories) that are unique to your Tablet PC configuration for use as documented below.
- Read-me files that provide additional use information for items on this DVD-ROM.



In order to install applications and/or drivers from the DAR DVD, you will need to connect an external DVD drive to your system.



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.

### RE-INSTALLING INDIVIDUAL DRIVERS AND APPLICATIONS

The Drivers and Application DVD 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 DVD after Windows has started. A Fujitsu Welcome screen is displayed after the DVD is inserted.
2. From the left frame of the Welcome screen, "System Components" and "3rd Party Applications" can be selected. System Components are those drivers and utilities that have been developed by Fujitsu; 3rd Party Applications are applications developed by other vendors.

#### Installing System Components

1. To install system components, click on "System Components" in the left frame of the Welcome screen. A list of utilities and drivers will be displayed. Select one or more items from the list, or click [Select All] to select all items in the list. (To de-select your choices, click the [Clear All] button.
2. Click [Install Selected Subsystems] to install the selected items.

#### Installing 3rd Party Applications

1. To install 3rd party applications, click on "3rd Party Applications" in the left frame of the Welcome screen. A list of applications will be displayed.

2. Select one of the items from the list, and follow the instructions that appear on the screen. Note that only one application may be installed at a time.
3. Repeat step 2 to install additional applications.

### RESTORING THE FACTORY IMAGE

The Restore Disc that came with your system contains two utilities:

- The Recovery utility allows you to restore the original contents of the C: drive.
- The Hard Disk Data Delete utility on this disc is used to delete all data on your hard disk and prevent it from being reused. Do not use the Hard Disk Data Delete utility unless you are absolutely certain that you want to erase your entire hard disk, including all partitions.



- The use of this disc requires that you have a device capable of reading DVDs attached to your system. If you do not have a built-in DVD player, you will need to attach an external player. For more information on available external devices, visit our Web site at: [us.fujitsu.com/computers](http://us.fujitsu.com/computers).

- This disc can only be used with the system with which it was purchased.

### BOOT Priority Change

Before restoring an image, you must first verify that your system is set up to boot from the DVD drive. To verify/change the boot-up priority (rather than booting-up from the hard drive or an external floppy disk drive), perform the following steps:

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. Press [Enter].
4. If "Optical Media Drive" or "CD-ROM Drive" is not at the top of the list, arrow down to the drive in the list, and press the space bar (or the + key) to move it to the top of the list. (The system attempts to boot from the devices in the order in which they are listed.) Note that the BIOS for some systems will indicate "CD-ROM Drive", even when a DVD drive is connected.
5. If you have an *external* DVD drive connected, proceed to the next step; otherwise, proceed to step 7.
6. If you have an external DVD drive connected:
  - Select the Advanced menu in the BIOS window.

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- Scroll down to the USB Features submenu and press the Enter key to open it.
- If Legacy USB Support is disabled, press the space bar to enable it.
- Scroll down to SCSI SubClass Support and press the space bar to enable it.

7. 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 restore a backup image when you are booting up.

**Procedure**

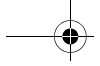
1. Turn on the power to your system.
2. Ensure that you have a device that can read DVDs either installed in your system or attached externally to it.
3. Insert the Restore Disc into the drive tray.
4. Reboot your system.
5. After the system reboots, follow the instructions that appear to either restore your system image or erase all data from your hard disk.



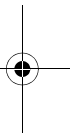
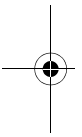
# 6

## Care and Maintenance





*LifeBook T Series Tablet PC - Section Six*



## Care and Maintenance

If you use your LifeBook T Series Tablet PC carefully, you will increase its life and reliability. This section provides some tips for looking after the Tablet PC 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 T SERIES TABLET PC

#### Caring for your Tablet PC

- Your Tablet PC 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. Any unauthorized service performed on the computer will void the warranty.
- Always follow installation instructions closely.
- Keep it away from food and beverages.
- If you accidentally spill liquid on your Tablet PC:
  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 Tablet PC will not boot after it has dried out, call your support representative.
- Do not use your Tablet PC in a wet environment (near a bathtub, swimming pool).
- Always use the AC adapter and batteries that are approved for your Tablet PC.
- Avoid exposure to sand, dust and other environmental hazards.
- Do not expose your Tablet PC to direct sunlight for long periods of time as temperatures above 140° F (60° C) may damage your Tablet PC.
- 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 Tablet PC 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 Tablet PC.
- Do not touch the screen with any sharp objects.

#### Cleaning your Tablet PC

- Always disconnect the power plug. (Pull the plug, not the cord.)

- Clean your Tablet PC 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 Tablet PC

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

#### Traveling with your Tablet PC

- Do not transport your Tablet PC while it is turned on.
- Do not check your Tablet PC 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

Figure 6-1. Outlet types

## 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 Tablet PC. 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.

To clean the keyboard, use a rag dampened slightly 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 six months without recharging it.

### Increasing Battery Life

- Keep brightness to the lowest comfortable level.
- Set the power management for maximum battery life.
- Put your Tablet PC 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.

## OPTIONAL FLOPPY DISK DRIVE AND FLOPPY DISKS

### Caring for your Floppy Disks

- Avoid using 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 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.

## OPTIONAL CD DRIVE AND 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.

## Care and Maintenance

- 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 Optional 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.

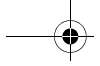
When you don't have a PC Card installed in your system, you should be sure to install the PC Card slot inserts that came with your system. These will help to keep dust and dirt out of your system.

*LifeBook T Series Tablet PC - Section Six*

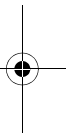
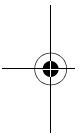


# 7

## Specifications



*LifeBook T Series Tablet PC - Section Seven*



**Specifications**

# Specifications

This section provides the hardware and environmental specifications for your LifeBook T Series Tablet PC. Specifications of particular configurations will vary.

## CONFIGURATION LABEL

Your LifeBook T Series Tablet PC has a configuration label located on the bottom. (See figure 2-8 on page 16 for location). This label contains specific information regarding the options you've chosen for your Tablet PC. Following is an example label and information on how to read your own configuration label.

### New Label

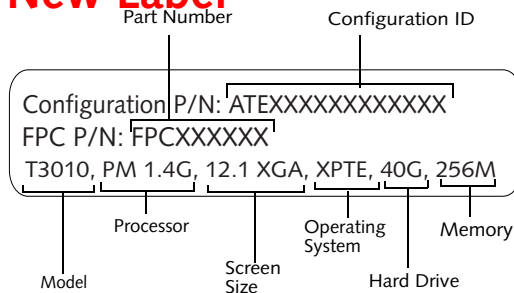


Figure 7-1. Configuration Label

LifeBook T Series Tablet PC Specifications	
The specifications for your particular model may vary. To determine the specifications for your system, please visit our Web site at: <a href="http://us.fujitsu.com/computers">us.fujitsu.com/computers</a> .	
Physical Specifications	
Dimensions	11.54" w x 9.61" d x 1.38" / 1.48" (293 mm x 244 mm x 35 / 37.5 mm)
Processing Specifications	
CPU/Speed	Intel® Pentium® M Processor 725/745*
Chip set	Intel 855GME - 400 MHz
Memory/Storage Specifications	
Main RAM	<ul style="list-style-type: none"> <li>• 256 MB SDRAM (DDR 333 MHz)</li> <li>• 144-pin SO DIMM slots x 2</li> </ul> 256 MB, 512 MB, and 1.0 GB modules available, with a system maximum of 2.0 GB.
L1 cache (CPU)	64 KB on-die
L2 cache	2 MB on-die

LifeBook T Series Tablet PC Specifications (Continued)	
BIOS ROM	1 MB (Boot Block Type Flash ROM)
Hard disk drive	<ul style="list-style-type: none"> <li>• 2.5" HDD</li> <li>• Minimum 40 GB IDE (4200 rpm) Also available: 60 GB (4200 rpm) 80 GB (5400 rpm)</li> <li>• ATA 100</li> <li>• Shock-mounted</li> <li>• SMART Support</li> </ul>
Display Specifications	
Display	<p><b>12.1" TFT XGA (1024 x 768), 16M colors:</b></p> <ul style="list-style-type: none"> <li>• Color LCD</li> <li>• Active Digitizer</li> <li>• 32-bit color</li> <li>• External monitor support: VGA (1024 x 768 maximum)</li> <li>• Brightness: 8 levels</li> <li>• Dot pitch: 0.240 x 0.240 mm</li> <li>• Viewing Angle: Horizontal: 80 degrees (min.) Vertical: 80 degrees (min.)</li> </ul> <p><b>12.1" TFT SXGA+ (1400 x 1050), 16M colors:</b></p> <ul style="list-style-type: none"> <li>• Color LCD</li> <li>• Active Digitizer</li> <li>• 32-bit color</li> <li>• External monitor support: (TBD maximum)</li> <li>• Brightness: 8 levels</li> <li>• Dot pitch: 0.1755 x 0.1755 mm</li> <li>• Viewing Angle: Horizontal: 45 degrees (min.) Vertical: 50 degrees (min.)</li> </ul>
VRAM	Intel 855GME chipset with 8 MB shared memory using Dynamic Video Memory Technology (DVMT) delivers low-power, high-performance 3D/2D graphics, video, and display capabilities. Dynamic Video Memory Technology (DVMT) dynamically responds to application requirements and efficiently allocates the proper amount of memory (maximum is 64 MB) for optimal graphics and system performance.



LifeBook T Series Tablet PC - Section Seven

LifeBook T Series Tablet PC Specifications (Continued)	
Interface Specifications	
Integrated Interfaces	<ul style="list-style-type: none"> <li>• Modem (RJ-11)</li> <li>• LAN (RJ-45)</li> <li>• USB 2.0 x 2</li> <li>• DC-In</li> <li>• IrDA</li> <li>• IEEE1394</li> <li>• 15-pin D-SUB connector for external VGA monitor</li> <li>• Docking connector</li> </ul>
Interfaces on Optional Port Replicator	<ul style="list-style-type: none"> <li>• DC Power</li> <li>• Pass-through LAN Port</li> <li>• External Monitor</li> <li>• USB 2.0 x 4</li> <li>• Line Out</li> <li>• Docking Port</li> </ul>
PC Card Slots	<ul style="list-style-type: none"> <li>• One Type I or Type II</li> <li>• PCMCIA CardBus version 3.0</li> </ul>
SD/Memory Stick Slot	<ul style="list-style-type: none"> <li>• One slot for SD/Memory Stick card</li> </ul>
Smart Card Slot	<ul style="list-style-type: none"> <li>• Dedicated slot for SmartCard</li> </ul>
Modular Bay Devices	<p>One of the following devices is pre-installed:</p> <ul style="list-style-type: none"> <li>• <b>Super-Multi DVD Drive:</b> (modular 4x DVD-R, 2x DVD-RW, 2.4x DVD+R, 2.4x DVD+RW, 2x DVD-RAM, 8x DVD-ROM, 16x CD-R, 8x CD-RW, 24x CD-ROM)</li> <li>• <b>DVD-RW Drive:</b> 1x (DVD-R) / 1x (DVD-RW) / 8x (DVD-ROM) / 16x (CD-R) / 10x (CD-RW) / 24x (CD-ROM)</li> <li>• <b>DVD/CD-RW Combo Drive:</b> 16x (CD-R) / 10x (CD-RW) / 24x (CD) / plus 8x DVD</li> <li>• Modular Bay Battery</li> <li>• Weight Saver</li> </ul>
Infrared	<ul style="list-style-type: none"> <li>• System IR Port</li> <li>• IrDA version 1.1 (FIR, 4 Mbps)</li> </ul>
User Interface support	<ul style="list-style-type: none"> <li>• Keyboard Pitch: 19 mm, Stroke: 2.7 mm</li> <li>• TouchPad pointing device with scroll button</li> <li>• Active digitizer with pen input</li> <li>• On-screen keyboard</li> </ul>

LifeBook T Series Tablet PC Specifications (Continued)	
Audio	<ul style="list-style-type: none"> <li>• Sigmatel STAC9753A</li> <li>• Internal mono microphone x 2</li> <li>• Stereo speaker x 2</li> <li>• Mono microphone and stereo headphone jacks</li> </ul>
User Controls	<ul style="list-style-type: none"> <li>• Programmable Application Buttons, each with primary and secondary functions (default applications: Microsoft Journal and Calculator)</li> <li>• Security button support</li> <li>• Trusted Platform Module (TPM) support (on some models)</li> <li>• Suspend/Resume button</li> </ul>
Status Indicators (LCDs)	<ul style="list-style-type: none"> <li>• Power</li> <li>• Charge/DC-In</li> <li>• Battery level</li> <li>• TBD - SECOND BATTERY?</li> <li>• HDD</li> <li>• PC Card</li> <li>• Caps Lock</li> <li>• Num Lock</li> <li>• Scroll Lock</li> <li>• TBD - Security?</li> </ul>
Power Specifications	
Main Battery	<ul style="list-style-type: none"> <li>• 6-cell</li> <li>• Removable, Lithium ion</li> <li>• 10.8 V @4800 mAh, 51.8 Wh</li> <li>• Warm-swappable</li> <li>• TBD - Recharge Time: Approximately 3.2 hours</li> <li>• Suspend Life: Minimum 3 days Off State: Approximately 20 days</li> </ul>
Optional Bay Battery	<ul style="list-style-type: none"> <li>• 6-cell</li> <li>• Removable, Lithium ion</li> <li>• 10.8V @ 3800 mAh, 41.0 Wh</li> </ul>
Bridge Battery	<ul style="list-style-type: none"> <li>• 6-cell NiMH, 35 mAh</li> <li>• Life (with Suspend-to-RAM on bridge battery only): 5 minutes from full charge</li> </ul>
AC Adapter	Autosensing 100 - 240V, supplying 19 VDC, with a current of 3.15 A
Environmental Specifications	
Temperature	<p>Operating: 41° to 95° F (5° to 35° C)                      Non-operating: 5° to 140° F (-15° to 60° C)</p>

**Specifications**

<b>LifeBook T Series Tablet PC Specifications (Continued)</b>	
Humidity	Operating: 20 to 85% non-condensing Non-operating: 8 to 85% non-condensing
<b>Agency Approval Specifications</b>	
Emissions	<b>TBD - VERIFY ALL</b> <ul style="list-style-type: none"><li>• EN55022 (CISPR22) Class B</li><li>• FCC 15, Class B</li><li>• FCC 15C, 15.247</li><li>• ETSI EN 300-328</li><li>• ICES-003</li><li>• Canada RSS-210</li></ul>
Immunity	<ul style="list-style-type: none"><li>• EN55024 (1998)</li><li>• ETSI EN 301-489-17 V.1.1.1 (2000-9)</li></ul>
Safety	<ul style="list-style-type: none"><li>• UL and cUL Listed, UL 60950</li><li>• TuV T-Mark, EN60950</li></ul>
Telecom	<ul style="list-style-type: none"><li>• FCC Part 68</li><li>• IC CS-03</li></ul>
<b>Additional Specifications</b>	
Operating systems	<ul style="list-style-type: none"><li>• Microsoft® Windows® XP Tablet PC Edition</li></ul>

## 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 contains an internal modem (Fujitsu Media Devices, MBH 7MD33) that 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 (Fujitsu Media Devices modem, MBH 7MD33) meets the applicable Industry Canada Terminal Equipment Technical Specifications. This is confirmed by the registration number. The abbreviation, IC, before the registration number (4061A-8687) 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 (4061A-8687), 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.

*LifeBook T Series Tablet PC - Section Seven*

**UL Notice**

This unit requires an AC adapter to operate. Use only UL Listed Class 2 Adapters with an output rating of 19 VDC, with a current of 3.15 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**

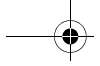


- <sup>n</sup> For continued protection against risk of fire, replace only with the same type and rating fuse.
- <sup>n</sup> Danger of explosion if Lithium (clock) battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries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

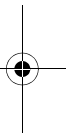
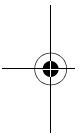


# 8

## Glossary



*LifeBook T Series Tablet PC - Section Eight*



## Glossary

### AC Adapter

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

### 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 designation for wireless LAN network configuration. It indicates a form of communication limited to those personal computers which have wireless LAN function. For details, refer to "Ad hoc connection" on page 90.

### 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 Tablet PC.

### BIOS

Basic Input-Output System. A program and set of default parameters stored in ROM which tests and operates your Tablet PC 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 Tablet PC.

### 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

The frequency band of wireless LAN to be used in communications over wireless LAN or at the access point.

### 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.

### 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 for automatically fetching communication parameters such as IP addresses. The side which assigns IP address is called DHCP server and the side that is assigned it is called 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 that controls the correspondence of IP addresses assigned to a computer with the name. Even for those computers whose IP addresses are unknown, if their names are known, it is possible to communicate with them.

**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 Tablet PC in electronic form.

**I/O Port**

The connector and associated control circuits for data entering and leaving your Tablet PC 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 Tablet PC and a peripheral device such as a digital camera. Also known as "Firewire" or "iLINK".

**IEEE802.11a**

One of the wireless LAN standards prescribed by the 802 committee in charge of establishing standards of LAN technology in IEEE (Institute of Electrical and Electronic Engineers). This standard allows communications at the maximum speed of 54 Mbps by using a 5 GHz band which can freely be used without radio communication license.

**IEEE802.11b**

One of the wireless LAN standards prescribed by 802 committee in charge of establishing standards of LAN technology in IEEE (Institute of Electrical and Electronic Engineers). It allows communications at the maximum speed of 11 Mbps by a band of 2.4 GHz (ISM band) which can freely be used without radio communication license.

**IEEE802.11g**

One of the wireless LAN standards prescribed by 802 committee in charge of establishing standards of LAN technology in IEEE (Institute of Electrical and Electronic Engineers). It allows communications at the maximum speed of 54 Mbps by a band of 2.4 GHz (ISM band) which can freely be used without radio communication license.

**Infrared**

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

**Infrastructure**

A designation of Wireless LAN network configurations. It indicates a form of communication using an Access Point. For details, refer to "Infrastructure connection" on page 90.

**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 Tablet PC'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.

**Network authentication**

The method of authentication performed by wireless LAN clients to connect with the access point. There are two types: open system authentication and shared key authentication. The type of authentication must be set to each client and also coincide with the setting of access point with which to communicate. Network authentication is sometimes called authentication mode.

**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.

**NTSC**

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

**Open system authentication**

One of network authentication types for wireless LAN. Since there is no check of network key upon authentication, clients can connect to the access point without submitting correct network keys. However, in case of actual communications, the same network key must be set. Open system authentication is sometimes called Open key authentication.

**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 Tablet PC. 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 Tablet PC 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 Tablet PC 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 Tablet PC 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.

#### **Shared key authentication**

One of the network authentication types for wireless LAN. Upon authentication, the access point checks whether the same network key is set to the client. If the client uses a wrong network key or the network key itself is not set, authentication is unsuccessful, allowing no communications with the access point.

#### **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 Tablet PC 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 Tablet PC 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 Tablet PC this is an LCD screen just above the keyboard.

#### **Stereo (audio)**

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

#### **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.

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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.

**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.

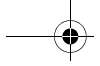
**Zip Drive**

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

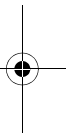
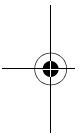
# Appendix A

## Integrated Wireless LAN\* User's Guide

**\*Optional Device**



*LifeBook T Series Tablet PC - Appendix A*



## 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 Wireless LAN radio device has been evaluated under FCC Bulletin OET 65C and found compliant with the requirements as set forth in CFR 47 Sections 2.1091, 2.1093, and 15.247 (b) (4) addressing RF Exposure from radio frequency devices. The radiated output power of this Wireless LAN device is far below the FCC radio frequency exposure limits.

The maximum SAR values measured from the devices are:

Intel PROSet Wireless LAN (WM3B2915ABG): 1.55 W/kg  
Atheros Wireless LAN (WLL4070): 1.49 W/kg

Intel PROSet Wireless LAN (WM3B2915ABG) + Bluetooth Simultaneous: 1.28 W/kg  
Atheros Wireless LAN (WLL4070) + Bluetooth Simultaneous: 1.39 W/kg

#### 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 Computer Systems 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. High power radars are allocated as primary users of 5250 - 5350 MHz and 5650 - 5850 MHz and these radars could cause interference and/or damage to LELAN (license exempt LAN) devices operating in these bands.



## 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 PROSet Wireless LAN card (WM3B2915ABG)

Atheros Wireless LAN card (WLL4070)

### 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 2.4 GHz Industrial, Scientific, and Medical (ISM) RF band. Additionally, the Atheros device operates in the lower and middle bands of the 5 GHz Unlicensed National Information Infrastructure (UNII) bands (for IEEE802.11a).

The Atheros and Intel(WM3B2915ABG) WLANs are 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(WM3B2200GB) and Broadcom WLANs are capable of two operating modes, IEEE802.11b and IEEE802.11g. The Intel(WM3B2100) is capable of one operating mode, IEEE802.11b.

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 specific WLAN devices support some or all of the following encryption methods - WEP, TKIP, AES, LEAP, EAP-TLS and PEAP encryption.

### WIRELESS LAN MODES USING THIS DEVICE

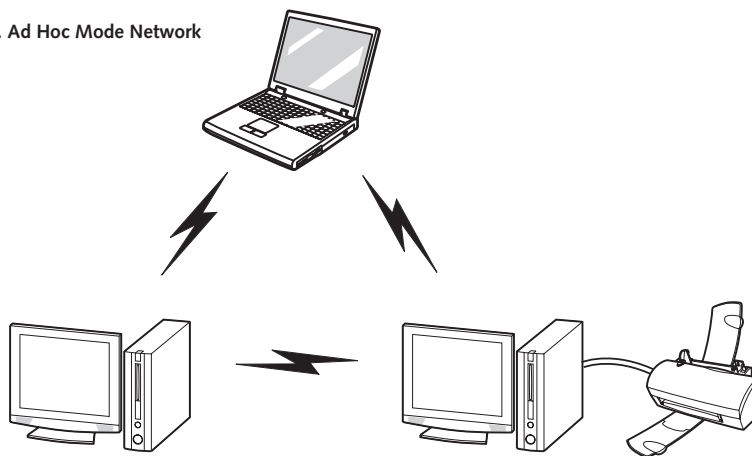
#### Ad Hoc Mode

(See Figure 5-1)

"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 5-1. Ad Hoc Mode Network



### Access Point (Infrastructure) Mode

(See Figure 5-2)

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 (WM3B2200BG) and Broadcom WLAN devices are dual-mode wireless network cards (supports IEEE802.11b/g); the Atheros and Intel (WM3B2915ABG) WLAN devices support IEEE802.11a/b/g; the Intel(WM3B2100) WLAN device supports 802.11b.

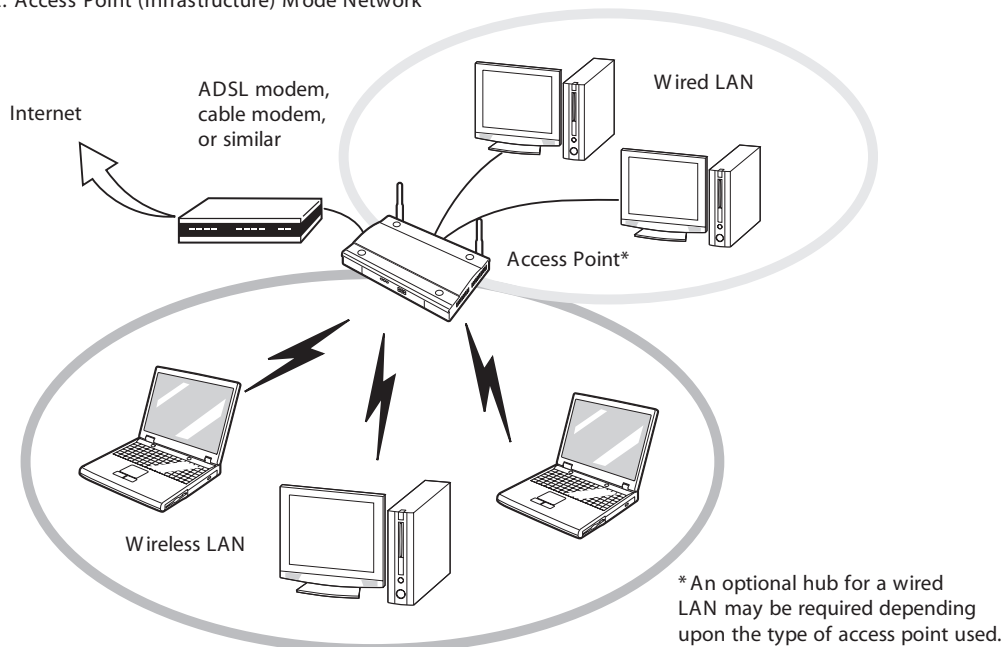
The Intel and Broadcom WLAN devices operate in the 2.4GHz ISM band; the Atheros WLAN device also operates in the 5 GHz lower and middle UNII bands.

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, cordless phones, and wireless cameras may interfere with the operation of WLAN device as microwave ovens operate in the same 2.4 GHz 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 2.4 GHz 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.

Figure 5-2. Access Point (Infrastructure) Mode Network



## 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 (e.g., 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, Atheros Client Utility, or Broadcom Wireless 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 5-3)

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

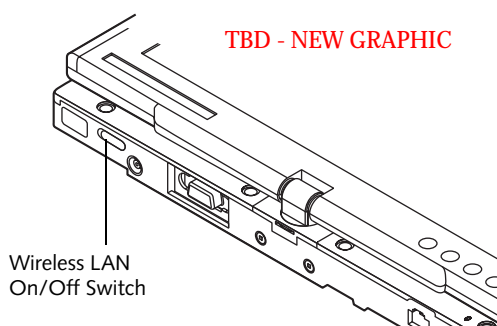


Figure 5-3. Wireless LAN On/Off Switch Location

### 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. 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.

### Deactivation using Broadcom Wireless Utility

1. Click [Start] --> [Control Panel] --> [Broadcom Wireless Utility]. The Broadcom Wireless Configuration Utility window will be displayed.
2. Click the Wireless Networks tab.

Click the [Enable Radio] box to clear it, then click the [OK] button. Wireless communications on/off switching will be deactivated and the transmission of radio waves from the wireless LAN will be stopped

## 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, Atheros, or Broadcom 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. This configuration should be used for the Broadcom WLAN device.
- **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 96 for more information).
2. Configure the Wireless Network parameters (See *Configure Wireless Network Parameters* on page 98 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 98 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 eXtentions 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 eXtentions 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.

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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 5 GHz 54 Mbps, 5 GHz 108 Mbps, 2.4 GHz 11 Mbps, 2.4 GHz 54 Mbps, or 2.4 GHz 108 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 107 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 102 will be displayed.
5. Double-click the folder to be accessed.

## 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 98.</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>
	<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 96.
	<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 101.</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 94.

## 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 and Intel WLAN(WM3B2915ABG) devices conforms to IEEE 802.11a/802.11b/g (Wi-Fi based)*  Intel WLAN (WM3B2200BG) device conforms to IEEE 802.11b/g (Wi-Fi based)*  Intel WLAN (WM3B2100) conforms to IEEE 802.11b (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.

## Using the Bluetooth Device

The integrated Bluetooth module is an optional device available for Fujitsu mobile computers.

### WHAT IS BLUETOOTH?

Bluetooth technology is designed as a short-range wireless link between mobile devices, such as laptop computers, phones, printers, and cameras. Bluetooth technology is used to create Personal Area Networks (PANs) between devices in short-range of each other.

### WHERE TO FIND INFORMATION ABOUT BLUETOOTH

The Bluetooth module contains a robust Help user's guide to assist you in learning about operation of the Bluetooth device.

To access the Help file, click [Start] -> All Programs, and click on Toshiba. Select Bluetooth, then select User's Guide.

For additional information about Bluetooth Technology, visit the Bluetooth Web site at: [www.bluetooth.com](http://www.bluetooth.com).

### FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. The maximum power output is less than 20mW and meets the exemption criteria for radiation exposure limits.

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

### Canadian Notice

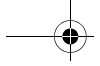
To prevent radio interference to the licensed service, this device is intended to be operated indoors and away from windows to provide maximum shielding. Equipment (or its transmit antenna) that is installed outdoors is subject to licensing.

### Warranty

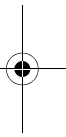
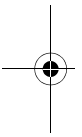
Users are not authorized to modify this product. Any modifications invalidate the warranty.

This equipment may not be modified, altered, or changed in any way without signed written permission from Fujitsu. Unauthorized modification will void the equipment authorization from the FCC and Industry Canada and the warranty.





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