EMC Technologies Report Number: M041106_Cert_Eton_BT_Cal2_11abg

APPENDIX O – User Manual Pt3

7

Specifications

LifeBook E8000 Notebook

Specifications

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

CONFIGURATION LABEL

There is a configuration label located on the bottom of your LifeBook notebook. (See Figure 2-7 on page 10 for location) This label contains specific information regarding the options you've chosen for your notebook. Following is an example label and information on how to read your own configuration label.
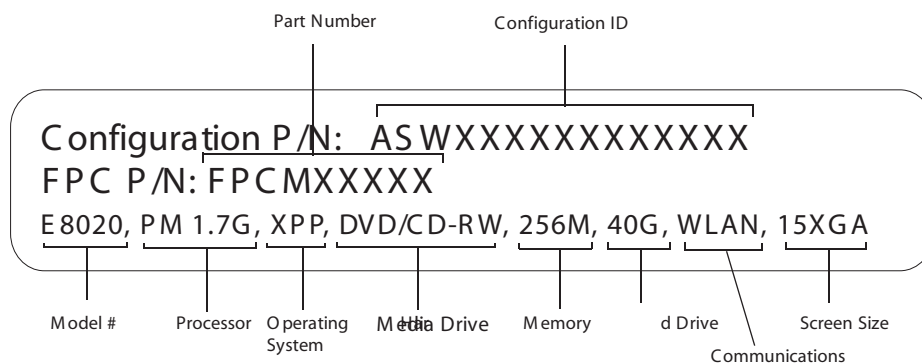
Part Number   Configuration ID

Configuration P/N: ASWXXXXXXXXXXXX
FPC P/N: FPCMXXXXX
E8020, PM 1.7G, XPP, DVD/CD-RW, 256M, 40G, WLAN, 15XGA

Model #   Processor   Operating System   Media Drive   Memory   d Drive   Screen Size

Communications

Figure 7-1 Configuration Label

MICROPROCESSOR

Intel Pentium M processor (Refer to the system label to determine the speed of your processor).

CHIPSET

Intel 855GME

I/O Controller Hub 4 Mobile (ICH4-M)

MEMORY

System Memory
DDR 333 MHz SDRAM memory module.
Two DIMM slots; upgradeable to 2 GB of total memory (1 GB x 2)

Cache Memory
L2 on-die, 1 MB or 2 MB depending upon system configuration

VIDEO

Built-in color flat-panel TFT active matrix LCD display with simultaneous display capability

Video Color and Resolution
15" TFT XGA model:
Internal: 1024 x 768 pixel resolution, 16M colors
External: 1600 x 1200 pixel resolution, 16M colors
Simultaneous Video: 1024 x 768, 16M colors. XGA, SVGA and VGA compatible

15" SXGA+ model:
Internal: 1400 x 1050 pixel resolution, 16M colors
External: 1600 x 1200 pixel resolution, 16M colors
Simultaneous Video: 1400 x 1050 pixel resolution, 16M colors

Video RAM
Intel® 855GME video graphics chip with integrated 32-bit 3D/2D gfx core with Accelerated Graphics Port (AGP) support. Up to 64 MB shared video memory using Dynamic Video Memory Technology (DVMT).

AUDIO

Sigmatel ST9751T codec
Stereo headphone jack, 3.5 mm, 1 V_{rms} or less, minimum impedance 32 Ohms
Mono microphone jack, 3.5 mm, 100 mV_{p-p} or less, minimum impedance 10K Ohms
Two built-in stereo speakers, 20 mm diameter

MASS STORAGE DEVICE OPTIONS

Hard Drive
5400 rpm: 40 GB, 60 GB, or 80 GB fixed hard drive, Ultra DMA 100, 2.5", 9.5 mm

4200 rpm: 40 GB or 30 GB fixed hard drive, Ultra DMA 100, 2.5", 9.5 mm

Media Player
Depending upon the configuration of your system, one of the following is installed.
CD Drive (modular 24x maximum), or,
Combo DVD/CD-RW Drive (modular 8x maximum DVD/24x maximum write, 10x maximum rewrite, 24x maximum read CD-RW combo drive), or,
Super-Multi DVD Drive (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)

FEATURES

Integrated Pointing Device
Touchpad pointing device with scroll button
Optional Quick Point cursor control button

Communications
Modem: Internal V.92 standard 56K fax/modem
(ITU V.90, 56K data, 14.4K fax)

Gigabit LAN: Internal wired 10Base-T/100Base-Tx/
1000Base-T/Tx Ethernet LAN

Wireless LAN:
Certain configurations of the Lifebook E8000 notebook
have an optional Wireless LAN device installed. If you have
an IntelPRO device installed, your system is classified as a
Centrino product. If you have no wireless device or a
Wireless LAN device other than IntelPRO, your system is
classified as a Pentium M product. (For additional infor-
mation about the Wireless LAN device, refer to the Wireless
LAN User's Guide on page 93).

E8020 Model: Integrated Intel PRO Set Wireless LAN
(802.11a+b/g), Wi-Fi-compliant
E8020D Model: Optional integrated Atheros Wireless
LAN (802.11a+b/g), Wi-Fi-compliant
Optional Bluetooth device for wireless personal area
network communication

LifeBook Security/Application Panel
The Application Launcher buttons on your LifeBook
notebook default to the following applications:

Table 7-1 Application Launcher Defaults

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

Theft Prevention Lock
Lock slot for use with security restraint systems. The
Kensington locking system is recommended.

DEVICE PORTS

On the LifeBook notebook:
PC Card slots for two Type I or Type II cards or one
Type III card: PCMCIA Standard 2.1 with CardBus
support
Memory Stick/SD Card slot
One 15-pin D-SUB connector for VGA external
monitor (see Display specifications)
Three USB 2.0 (Universal Serial Bus) connectors for
input/output devices
One serial port (RS-232, D-Sub 9-pin)
One parallel port (ECP, D-Sub 25-pin)

One IEEE 1394 (4-pin type) jack
One SPDIF jack
Infrared port (IrDA1.1, 4 Mbps max.)
One 7-pin video out jack
One modular modem (RJ-11) connector
One LAN (RJ-45) connector
Docking port (100-pin, to dock with port replicator)
One stereo headphone jack. (See Audio specifications)
One mono microphone jack. (See Audio specifications)
Embedded Smart Card Reader (requires third-party
application)
Wireless LAN antenna with pre-installed on/off switch
Optional Bluetooth module with antenna

On the Optional Port Replicator:
One 6-pin mini DIN PS/2 compatible connectors for
external keyboard or mouse
One 25-pin D-SUB connector for parallel input/
output devices; Bi-directional, output only or ECP
One 15-pin D-SUB connector for VGA external
monitor (see Display specifications)
One 9-pin D-SUB connector for RS-232C serial
input/output devices
Four USB 2.0 (Universal Serial Bus) connectors for
input/output devices
One LAN (RJ-45) connector
One DC In connector
One microphone In jack
One headphone jack
One Digital Video (DVI-D) 24-pin, female interface
One power/suspend/resume button

KEYBOARD
Built-in keyboard with all functions of 101 key PS/2
compatible keyboards.
Total number of keys: 84
Function keys: F1 through F12
Feature extension key: Fn
Two Windows keys: one Start key, one application key
Key pitch: 19 mm
Key stroke: 2.7 mm
Built-in Touchpad pointing device with left and right
buttons and scroll button.
Built-in Palm Rest
Optional Quick Point cursor control button

External Keyboard Support
USB or PS/2-compatible (PS/2 compatible with Port
Replicator only)

External Mouse Support
USB or PS/2-compatible (PS/2 compatible with Port
Replicator only)

POWER
Batteries
One 8-cell Lithium ion battery, rechargeable, 14.4V,
4800 mAh, 69.1 Wh

Optional Flexible Bay battery: 6-cell Lithium ion battery, rechargeable, 10.8V, 3400 mAh, 41 Wh

AC Adapter
Autosensing 100-240V AC, supplying 19V DC, 4.22A, 80W to the LifeBook notebook, Fujitsu Model FPCAC33AP, which includes an AC cable.

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

DIMENSIONS AND WEIGHT
Overall Dimensions
Approximately 13.11"(w) x 11.22"(d) x 1.27"/1.44"(h) (333 mm x 285 mm x 32.2/36.5 mm)

Weights
Approximately TBD with battery and weight saver.
Approximately TBD with battery and DVD/CD-RW Combo drive.

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

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

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

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

Memory Upgrades
▪ 256 MB SDRAM
▪ 512 MB SDRAM
▪ 1GB SDRAM

Docking
▪ Port Replicator

Power
▪ Main Lithium ion battery
▪ Battery Charger
▪ Auto/Airline Adapter
▪ AC Adapter

PC Cards
▪ Wireless PC Card
▪ 4-in-1 Media Card Adapter
▪ Compact Flash Media Card Adapter

Additional Accessories
▪ Wireless Keyboard and Mouse
▪ External USB Floppy Disk Drive
▪ Presentation Audio System

▪ TeleAdapt 16' TeleCord
▪ Notebook Guardian Lock
▪ IBM Modem Saver

Carrying Cases
▪ Diplomat
▪ Backpack
▪ Director
▪ MobileMax Wheeled Case

PRE-INSTALLED SOFTWARE
Depending on your pre-installed operating system, your Fujitsu LifeBook notebook comes with pre-installed software for playing audio and video files of various formats. In addition there is file transfer software, virus protection software and Power Management software. The following list indicates the pre-installed software associated with your system.
▪ Adobe Acrobat Reader
▪ Drive Image Special Edition (DISE)
▪ EarthLink 5.0
▪ Fujitsu HotKey
▪ LifeBook Security/Application Panel
▪ Symantec Norton AntiVirus 2004 (90-day free trial)
▪ Netscape 7.0
▪ Quicken 2004 New User Edition
▪ Microsoft Works 7.0

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

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

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

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

Earthlink 5.0
Software suite that allows you to connect with the Internet.

Fujitsu HotKey
Fujitsu HotKey allows you to control the display brightness of your notebook in order to maximize battery life.

Quicken 2004 New User Edition
Quicken 2004 New User Edition by Intuit is a personal money management program. It has features such as portfolio management, account registries, on-line banking and bill paying features. This application is for new users who are using Quicken software for the first time. Full version upgrade information is available on line.

LifeBook Security/Application Panel Software
Your LifeBook notebook is pre-installed with software utilities that let you operate and configure your LifeBook Security/Application Panel.

The Security Panel portion allows for password protection while the system is off or in Suspend mode. The Security Panel utilities are found under the Start menu, under Programs, then under LifeBook Security Panel.

The Application Panel utilities are found under the Start menu, Settings/Control Panel, then Application Panel. To open the CD Player and Application Panel Help, select Start, Programs, LifeBook Application Panel.

Norton AntiVirus 2004
Your system is preinstalled with a free 90-day trial version of Symantec's Norton AntiVirus™ 2003. Norton AntiVirus is a program designed to protect your LifeBook notebook from computer viruses. It assists in the protection of the data currently residing on your hard disk from destruction or contamination. The 90-day trial version is activated upon your acceptance of software license agreement. After 90 days, it will be necessary to purchase a subscription from Symantec to download latest virus definitions.

Netscape 7.0
Browser suite, including integrated E-mail accounts, instant messaging, address book, search, and other tools and plug-ins.
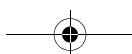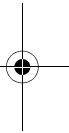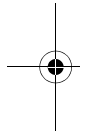
Fujitsu Driver Update Utility
The Fujitsu Driver Update (FDU) utility is pre-installed on your system. With FDU, you can choose to automatically or manually go to the Fujitsu site to check for new updates for your system. *(See Automatically Downloading Driver Updates on page 67 for more information).*

8

Glossary

LifeBook E8000 Notebook

Glossary

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

ACPI
Advanced Configuration and Power Interface

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

AdHoc
A name of a wireless LAN configuration.

It is a type of communication using wireless cards only.

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

ADSL
Asymmetric Digital Subscriber Line
Technology for transporting high bit-rate services over ordinary phone lines.

AGP
Accelerated Graphics Port

Graphics port specifically designed for graphics-intensive devices, such as video cards and 3D accelerators.

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

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

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

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

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

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

Byte
8 bits of parallel binary information.

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

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

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

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

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

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

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

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

CRT
Cathode Ray Tube. A display device which uses a beam of electronic particles striking a luminescent screen. It

produces a visual image by varying the position and intensity of the beam.

Data
The information a system stores and processes.

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

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

DHCP
Dynamic Host Configuration Protocol

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

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

DIMM
Dual-in-line memory module.

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

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

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

Diskette
A floppy disk in a hard housing with a shutter.

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

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

DNS
Domain Name System

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

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

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

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

DVMT
Dynamic Video Memory Technology

A video memory architecture that increases the efficiency of the motherboard by using innovative memory utilization and direct AGP.

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

Encryption Key (Network Key)
Data encryption key used to encrypt message text and for computing message integrity checks. Data encryption protects data from unauthorized viewing.

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

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

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

FCC
Federal Communication Commission.

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

GB
Gigabyte.

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

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

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

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

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

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

Another type of communication is called AdHoc.

IP Address
An identifier for a computer or device on a TCP/IP network. Networks using the TCP/IP protocol route messages based on the IP address of the destination. The format of an IP address is a 32-bit numeric address written as four numbers separated by periods. Each number can be zero to 255. For example, 1.160.10.240 could be an IP address.

Within an isolated network, you can assign IP addresses at random as long as each one is unique. However, connecting a private network to the Internet requires using registered IP addresses (called Internet addresses) to avoid duplicates.

The four numbers in an IP address are used in different ways to identify a particular network and a host on that network. Three regional Internet registries -- ARIN, RIPE NCC and APNIC -- assign Internet addresses from the following three classes.

Class A - supports 16 million hosts on each of 126 networks

Class B - supports 65,000 hosts on each of 16,000 networks

Class C - supports 254 hosts on each of 2 million networks

The number of unassigned Internet addresses is running out, so a new classless scheme called CIDR is gradually replacing the system based on classes A, B, and C and is tied to adoption of IPv6. (credit: webopedia.com)

IR
An abbreviation for infrared.

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

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

KB
Kilobyte.

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

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

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

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

MAC Address
Media Access Control Address

A unique physical address of a network card. For Ethernet, the first three bytes are used as the vendor code, controlled and assigned by IEEE. The remaining three bytes are controlled by each vendor (preventing

overlap), therefore, every Ethernet card is given a unique physical address in the world, being assigned with a different address from other cards. For Ethernet, frames are sent and received based on this address.

MB
Megabyte.

Megahertz
1,000,000 cycles per second.

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

MHz
Megahertz.

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

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

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

MPU-401
A standard for MIDI interfaces and connectors.

MTU
Maximum Transmission Unit

The maximum data size that can be transferred at a time through the Internet or other networks. You can set a smaller MTU size to obtain successful communication, if you have difficulty transferring data due to the fact that the maximum size is too large.

Norton AntiVirus
Web-based software that protects you email, instant messages, and other files by removing viruses, worms, and Trojan horses.

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

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

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

PCI
Peripheral Component Interconnect

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

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

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

Pitch (keyboard)
The distance between the centers of the letter keys of a keyboard.

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

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

PPPoE
Point to Point Protocol over Ethernet.

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

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

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

- Method of sending and receiving data

- Process used to handle communication errors

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

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

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

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

Restart
See Reset.

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

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

SDRAM
Synchronous Dynamic Random Access Memory.

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

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

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

SSID
Service Set Identifier

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

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

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

Stereo (audio)
A system using two channels to process sound from two different sources.

SVGA
Super VGA.

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

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

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

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

UL
Underwriters Laboratories – An independent organiza-tion 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 guar-antees the interoperability of wireless IEEE 802.11 LAN products. For more information on the Wi-Fi standard, go to the WECA Web site at: 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 direc-tory of floppy diskette or hard drive.

XGA
Extended VGA.

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

Regulatory Information

NOTICE

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

FCC NOTICES
Notice to Users of Radios and Television

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

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

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

Notice to Users of the US Telephone Network

This equipment complies with Part 68 of the FCC rules, and the requirements adopted by ACTA. 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; or a product identifier in the format US:AAAEQ##TXXXX. If requested, this information or number 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 an 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 exigence du Réglement sur le matériel brouilleur du Canada.

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

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

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

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

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

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

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

Les réparations de l'équipement de télécommunications doivent être eVectuées 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 télphoniques et les conduites d'eau métalliques sont connectées ensemble. Les utilisateurs NE doivent PAS tenter d'établir ces connexions eux-mêmes, mais doivent contacter les services d'inspection d'installations électriques appropriés ou un électricien. Ceci peut être particulièrement important en régions rurales.

UL Notice

This unit requires an AC adapter to operate. Use only UL Listed Class 2 Adapters with an output rating of 19 VDC, with a current of 3.16 A.

AC Adapter output polarity:

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

For Authorized Repair Technicians Only

- For continued protection against risk of fire, replace only with the same type and rating fuse.

- Danger of explosion if Lithium (clock) battery is incorrectly replaced. Replace only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instruction.

System Disposal

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

Appendix

Integrated Wireless LAN* User's Guide

* Optional device

FCC REGULATORY INFORMATION

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

Regulatory Notes and Statements
Wireless LAN, Health and Authorization for use

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

On board an airplane, or

In an explosive environment, or

In situations where the interference risk to other devices or services is perceived or identified as harmful.

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

Regulatory Information/Disclaimers

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

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

For Atheros and Intel PRO Set Wireless LAN:

For operation within 5.15~5.25 GHz frequency range, it is restricted to indoor environments, and the antenna of this device must be integral.

Federal Communications Commission statement
This device complies with Part 15 of FCC Rules.

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

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

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

1. Reorient or relocate the receiving antenna.

2. Increase the distance between the equipment and the receiver.

3. Connect the equipment to an outlet on a circuit different from the one the receiver is connected to.

4. Consult the dealer or an experienced radio/TV technician for help.

FCC Radio Frequency Exposure statement
This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with a minimum distance of 20 cms from the WLAN antennas located on the top edge of the LCD screen. The Bluetooth antenna is located on the right hinge of the LCD screen and is exempt from minimum distance criteria due to its low power. The transmitters in this device must not be co-located or operated in conjunction with any other antenna or transmitter.

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

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

High power radars are allocated as primary users of 5250 - 5350 MHz and 5650 - 5850 MHz and these radars 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 prop-
erly 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 (WM3B2915ABG)
Atheros Wireless LAN (WLL4030)

If your system is an E8020, your wireless module is the
Intel PROSet wireless LAN; if your system is an E8020D,
your wireless module is the Atheros wireless LAN.

Characteristics of the WLAN Device

The WLAN device is a Mini-PCI card attached to the
mainboard of the mobile computer.

It is a dual-band radio that operates in two license-free
RF bands, therefore eliminating the need to procure an
FCC license to operate. It operates in the 2.4GHz
Industrial, Scientific, and Medical (ISM) RF band.
Additionally, the Atheros device operates in the lower
and middle bands of the 5GHz Unlicensed National
Information Infrastructure (UNII) bands.

The Atheros WLAN is capable of three operating
modes, IEEE802.11a, IEEE802.11b and IEEE802.11g,
wireless LAN standards governed by the IEEE (Insti-
tute of Electronics and Electrical Engineers). The Intel
WLAN is capable of two operating modes,
IEEE802.11b and IEEE802.11g.

Encoding of data is modulated using Direct Sequence
Spread Spectrum (DSSS) and Complementary Code
Keying (CCK) when the WLAN device is operating in
IEEE 802.11b mode and Orthogonal Frequency Divi-
sion 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 inter-
ference from external RF sources.

The WLAN device supports the following encryption
methods - WEP, TKIP, and AES encryption.

WIRELESS LAN MODES USING THIS DEVICE

Ad Hoc Mode
(See Figure 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 authenti-
cation, and encryption key settings are identically
configured on all computers in the Ad Hoc network.

Figure 5-1. Ad Hoc Mode Network
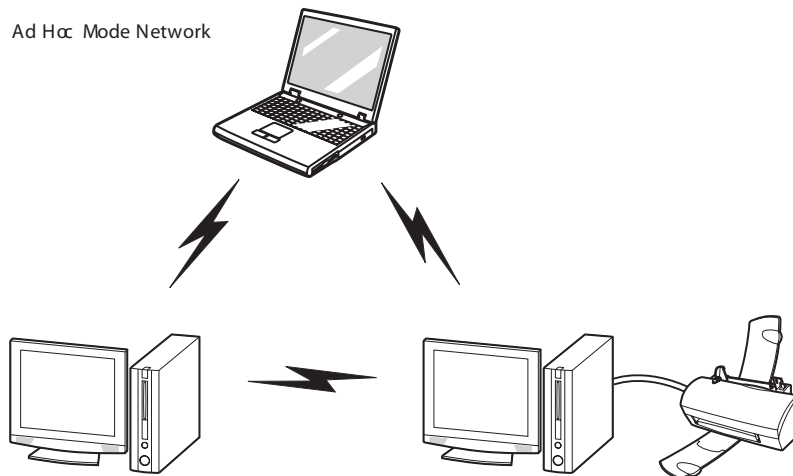
Access Point (Infrastructure) Mode

(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 WLAN device is a dual-mode wireless network card (supports IEEE802.11b/g); the Atheros device supports IEEE802.11a/b/g.

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

- The maximum range of the WLAN device indoors is typically 80 feet (25 meters). Please note that the maximum range you achieve may be shorter or longer than 80 feet, depending on factors such as access point transmit power, number and density of obstructions, or external RF interference.

- Microwave ovens will interfere with the operation of WLAN device as microwave ovens operate in the same 2.4GHz frequency range that IEEE802.11b/g devices operate in. Interference by microwaves does not occur with IEEE802.11a radio which operates in the 5 GHz RF band.

- Wireless devices that transmit in the 2.4GHz frequency range may interfere with the operation of WLAN devices in IEEE802.11b/g modes. Symptoms of interference include reduced throughput, intermittent disconnects, and large amounts of frame errors. It is HIGHLY recommended that these interfering devices be powered off to ensure the proper operation of the WLAN device.

DEACTIVATING THE WLAN DEVICE

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

Deactivation using the Wireless On/Off Switch

The WLAN device can be deactivated quickly and efficiently by toggling the Wireless On/Off Switch to the Off position. *(Figure 5-3)*

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

Internet

ADSL modem, cable modem, or similar

Wired LAN

Access Point*

Wireless LAN

*An optional hub for a wired LAN may be required depending upon the type of access point used.
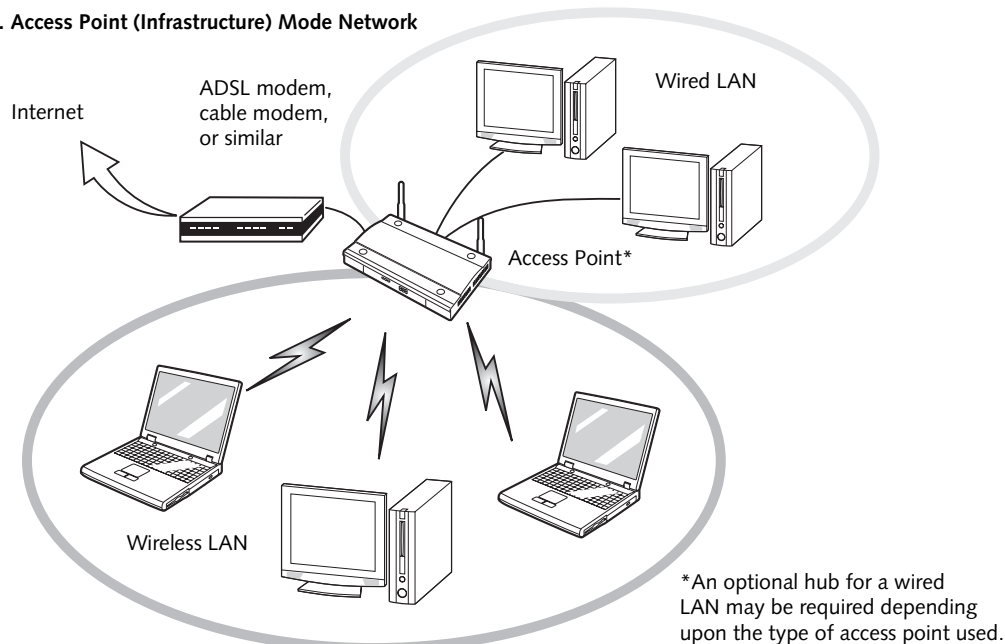
The Wireless On/Off switch has no effect on non-Wireless LAN models.
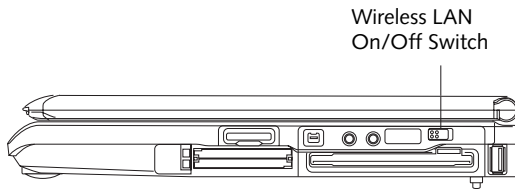
Wireless LAN
On/Off Switch

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. Double-click on the Intel PROSet for Wireless icon which will execute the Intel PROSet application.

4. Select the General tab if it is not already selected.

5. Check the Off radio button next to "Switch radio:" then click the [OK] button.

Deactivation using Atheros Client Utility software

1. Click [Start] -> [Program Files] -> [Atheros] -> Atheros Client Utility.

2. Choose Action and click Disable Radio.

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

§ Using the Wireless On/Off Switch

§ In Windows using the Intel PROSet Software or Atheros Software

Configuration of the WLAN Device

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

- Windows XP Wireless Zero Configuration (WZC) - The WZC allows for multiple profile setup and support for most industry standard security solutions.

- Intel PROSet Software - The Intel PROSet Software allows for multiple profile setup and supports automatic profile switching. Support for most industry standard security solutions as well as Cisco Compatible Extensions (CCX) is contained in this software.

- Atheros Client Utility - The Atheros Client Utility software allows for multiple profile setups and supports automatic profile switching. Support for most industry standard security solutions, as well as Cisco Compatible Extensions (CCX), is contained in this software.

FLOW OF OPERATIONS

1. Activate the WLAN Device (See Activating the WLAN Device on page 98 for more information).

2. Configure the Wireless Network parameters (See Configure Wireless Network Parameters on page 100 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 100 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 net-work 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 Infra-structure mode is selected. Use this option to con-nect 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 Cli-ent 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 configura-tion 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 certifi-cation server.

24. Click Close to save the settings.

25. From the General settings page, click the new pro-file 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 con-nection preferences.

27. Click the Connect button to connect to the net-work.

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 adminis-trator 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 Set-tings dialog displays.

7. From the General page, enter a profile name in the Profile Name field.

8. Enter the network SSID, in the SSID1 field. If you wish to create a profile that can connect to up to 3 different wireless networks, SSID's can be entered in the SSID2 and SSID3 fields as well.

9. Click the Security tab.

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

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

11. Click OK

12. Click the Advanced tab

13. The Advanced tab allows for the configuration of the options detailed in the table below.

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

14. Click OK

15. If the profile you just created does not activate immediately, click the Profile Management tab, highlight the desired Profile, and click Activate.

16. Click OK to close the Atheros Client Utility.

CONNECTION TO THE NETWORK
This section explains connection to the network.

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

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

Setting TCP/IP

i	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 109 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

i	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.

i	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.

i	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.

i	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.

i	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.

i	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.

> **i** 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 dis-played.

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 func-tion" on page 104 will be displayed.

5. Double-click the folder to be accessed.

Confirming the status of the radio

1. Right-click the Intel PRO Wireless icon in the lower right corner of the screen.

2. Click [Open Intel PROSet for Wireless]. The Intel PROSet for Wireless window opens.

3. Contained within the General tab and the Details section (accessed by pressing the [Details] button), you will find the current operating status of the radio. (When the radio is turned off or the com-puter is not yet connected, some of the conditions will not be displayed.)

    ■ **Network Name (SSID)**
    Displays the Network Name (SSID) currently used by the radio.

■ **Profile Name**
The current configuration profile is displayed.

■ **Mode**
Displays the current operating mode. [Infra-structure (AP)] or [Ad Hoc] will be displayed.

■ **Security**
Displays the current security status of the profile being used:
None: No encryption used.
WEP: WEP encryption algorithm used.
CKIP: WEP encryption algorithm used.
TKIP: WEP encryption algorithm used.

■ **Speed**
Displays the highest data rate of the associated access point in mega-bits-per-second (Mbps) until data transfer occurs.
802.11g: 1, 2, 5.5, 6, 9, 11, 12, 18, 24, 36, 48, or 54.
802.11b: 1, 2, 5.5, or 11.

■ **Band (Frequency)**
Displays the current band and frequency being used. Displays Out of Range if no band and frequency is displayed. Displays:
802.11g (2.4 GHz) or 802.11b (2.4 GHz)

■ **Channel**
Displays the current transmit and receive channel being used.

■ **802.1x Protocol**
Displays Enabled if the profile uses 802.1x authentication. Default is Disabled.

Troubleshooting

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

Problem	Possible Cause	Possible Solution
Unavailable network connection	**Incorrect network name (SSID) or network key**	**Ad hoc connection:** 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. **Access Point (Infrastructure) connection:** set the network name (SSID) and network key to the same values as those of the access point. Set the Network Authentication value identically to that of the Access Point. Please consult your network administrator for this value, if necessary. For the method of setting network authentication, refer to the following page:·"Assigning parameters" on page 100·
	Weak received signal strength and/or link quality	Ad hoc connection: Retry connection after shortening the distance to the destination computer or removing any obstacles for better sight. Access Point (Infrastructure) connection: Retry connection after shortening the distance to the access point or removing any obstacles for better sight. To check the wave condition, refer to the following page:· "Confirming the status of the radio waves" on page 105.
	The WLAN device has been deactivated or disabled	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 98.
	The computer to be connected is turned off	Check if the computer to be connected is turned ON.
	RF interference from Access Points or other wireless networks	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.
	Wireless network authentication has failed	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.
	Incorrectly configured network settings	Recheck the configuration of your network settings. For the method of checking, refer to the following page:·"Connection to the Network" on page 103.
	Incorrect IP address configuration	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 96.

Channel

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

DHCP (Dynamic Host Configuration Protocol)

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

DNS (Domain Name System)

A data query service that provides a mechanism with which to translate host names into Internet addresses.

IEEE802.11a

Wireless LAN standard that supports a maximum data rate of 54 Mbps. 802.11a devices operate in the 5 GHz lower and middle UNII bands.

IEEE802.11b

Wireless LAN standard that supports a maximum data rate of 11 Mbps. 802.11b devices operate in the 2.4 GHz ISM band.

Access point

Wireless network device used to bridge wireless and wired network traffic.

IP address

The logical 32-bit host address defined by the Internet Protocol that uniquely identifies a computer on a network. The IP address is usually expressed in dotted decimal notation.

LAN (Local Area Network)

A LAN or Local Area Network is a computer network (or data communications network) which is confined to a limited geographical area.

MAC address (Media Access Control Address)

A MAC address (also called an Ethernet address or IEEE MAC address) is the 48-bit address (typically written as twelve hexadecimal digits, 0 through 9 and A through F, or as six hexadecimal numbers separated by periods or colons, e.g., 0080002012ef, 0:80:0:2:20:ef) which uniquely identifies a computer that has an Ethernet interface.

MTU (Maximum Transmission Unit)

The maximum size of data which can be transmitted at one time in networks including the Internet. In an environment whose maximum size of data is too large to correctly receive data, normal communications can be restored by setting the size of MTU to a smaller value.

Network key

Data that is used for encrypting data in data communication. The personal computer uses the same network key both for data encryption and decryption, therefore, it is necessary to set the same network key as the other side of communication.

Network name (SSID: Security Set Identifier)

When a wireless LAN network is configured, grouping is performed to avoid interference or data theft. This grouping is performed with "Network name (SSID)". In order to improve security, the network key is set allowing no communication unless "Network name (SSID)" coincides with the network key.

Open system authentication

Null authentication method specified in the 802.11 standard that performs no authentication checks on a wireless client before allowing it to associate.

PPPoE (Point to Point Protocol over Ethernet)

A method of allowing the authentication protocol adopted in telephone line connection (PPP) to be used over an Ethernet.

Protocol

A procedure or rule of delivering data among computers. Ordered data communication is allowed by making all conditions required for communication including the method of data transmission/reception and actions upon communication errors into procedures.

Shared key authentication

802.11 network authentication method in which the AP sends the client device a challenge text packet that the client must then encrypt with the correct WEP key and return to the AP. If the client has the wrong key or no key, authentication will fail and the client will not be allowed to associate with the AP. Shared key authentication is not considered secure, because a hacker who detects both the clear-text challenge and the same challenge encrypted with a WEP key can decipher the WEP key.

SSID (Service Set Identifier)

Service Set Identifier, a 32-character unique identifier attached to the header of packets sent over a WLAN that acts as a password when a mobile device tries to connect to the BSS. The SSID differentiates one WLAN from another, so all access points and all devices attempting to connect to a specific WLAN must use the same SSID. A device will not be permitted to join the BSS unless it can provide the unique SSID. Because the SSID is broadcast in plain text, it does not supply any security to the network.

Subnet mask

TCP-IP network is controlled by being divided into multiple smaller networks (subnets). IP address consists of the subnet address and the address of each computer. Subnet mask defines how many bits of IP address comprise the subnet address. The same value shall be set among computers communicating with each other.

TCP/IP (Transmission Control Protocol/Internet Protocol)

A standard protocol of the Internet.

Wi-Fi

Wi-Fi, or Wireless Fidelity, is a set of standards for wireless local area networks (WLAN) based on the IEEE 802.11 specifications. Certified products can use the official Wi-Fi logo, which indicates that the product is interoperable with any other product also showing that logo.

IP address information

IP addressing is much more complicated than can be briefly explained in this document. You are advised to consult with your network administrator for additional information.

If IP address is unknown, set IP address as follows:

If you have an access point (DHCP server) on the network, set the IP address as follows:

[Obtain an IP address automatically]

A DHCP server is a server that automatically assigns IP addresses to computers or other devices in the network. There is no DHCP server for the AdHoc network.

If the IP address is already assigned to the computer in the network, ask the network administrator to check the IP address to be set for the computer.

If no access point is found in the network:

An IP address is expressed with four values in the range between 1 and 255.

Set the each computer as follows: The value in parentheses is a subnet mask.

<Example>

Computer A: 192.168.100.2 (255.255.255.0)

Computer B: 192.168.100.3 (255.255.255.0)

Computer C: 192.168.100.4 (255.255.255.0)

:

:

Computer X: 192.168.100.254 (255.255.255.0)

Specifications

Item	Specification
Type of network	Atheros WLAN device conforms to IEEE 802.11a/802.11b/g (Wi-Fi based)* Intel PRO Set WLAN device conforms to IEEE 802.11a/802.11b/g (Wi-Fi based)*
Transfer rate	(Automatic switching) IEEE 802.11a/g: 54 Mbps maximum data rate IEEE 802.11b: 11 Mbps maximum data rate
Active frequency	802.11b/g: 2400~2473 MHz 802.11a: 4900 ~ 5850 MHz
Number of channels	802.11a: 8 independent channels 802.11b/g: 11 channels, 3 non-overlapping channels
Security	Encryption Types - WEP, TKIP, AES** WPA 1.0 compliant Encryption Keylengths Supported: 64 bits, 128 bits, and 152 bits (Atheros module using AES encryption only) 802.1x/EAP CCX 1.0 compliant
Maximum recommended number of computers to be connected over wireless LAN (during ad hoc connection)	10 units or less ***

* "Wi-Fi based" indicates that the interconnectivity test of the organization which guarantees the interconnectivity of wireless LAN (Wi-Fi Alliance) has been passed.

** Encryption with network key (WEP) is performed using the above number of bits, however, users can set 40 bits/104 bits after subtracting the fixed length of 24 bits.

*** Depending on practical environments, the allowable number of computers to be connected may be decreased.

Using the Bluetooth Device

The Integrated Bluetooth module (UGXZ5-102A) is an optional device available for Fujitsu mobile computers.

WHAT IS BLUETOOTH

Bluetooth technology is designed as a short-range wire-less 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.

FCC Radiation Exposure Statement

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

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.

LifeBook E Series Notebook - Section Five

Index