



INSTRUCTION MANUAL

WIRELESS LAN BRIDGE **SB-110**



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Icom Inc.

INTRODUCTION

Thank you for purchasing Icom Wireless LAN Bridge SB-110.

This product is a wireless LAN bridging device connecting LAN system of two or more buildings up to 11 Mbps for 800 m (0.5 mile) wirelessly. Each LAN system needs at least one unit of SB-110 for bridging. One single unit may work as a wireless LAN access point alternatively.

Please read this instruction manual before using SB-110. We hope our products serve you years of reliable operation.

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PRODUCT OVERVIEW

Two or more SB-110s bridge LAN systems of buildings or rooms while eliminating wiring between them. Single SB-110 unit works as access point for wireless LAN clients at alternative setting.

SB-110 can be easily configured with common web browser software.

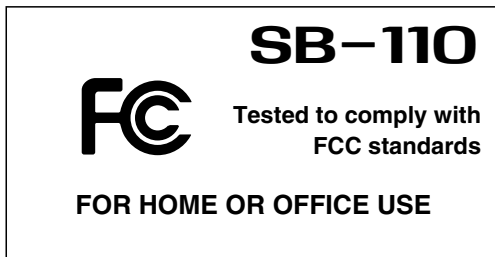
Communication speed between SB-110s is automatically adjusted to 11, 5.5, 2 or 1 Mbps to maintain network connections according to communicating conditions. (bridging mode only).

Data can be protected by high-level security functions such as MAC address registration, encryption with WEP function, etc.

SB-110 uses direct sequence spread spectrum modulation which ensures stabilized communication under influence of noise and interference.

INTRODUCTION

FCC INFORMATION



CAUTION: Changes or modifications not expressly approved by Icom Inc. could void the user's authority to operate this SB-110.

Class B digital device users;

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 and, if not installed and used in accordance with the instruction manual, 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 on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

RF EXPOSURE SAFETY INFORMATION:

CAUTION: To comply with the FCC RF exposure requirements, this transmitter (built-in antenna) must be fixed-mounted on permanent structures with a separation distance of at least 8 inches (20cm) from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter.

For CANADA only

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 the device.

NOTES ON HANDLING

If a connection cable is disconnected or loose connection during an operation, an error may occur. Connect the connectors completely and do not touch the connectors during an operation.

For the operating of Computer and any peripheral devices, follow the instructions provided in the manuals which come with the Computer and other peripheral devices.

SB-110 may cause the signal interference when it is used in your house. When the interference occurs, move SB-110 as far as possible away from the affected household electric appliance.

The CD-ROM (except Acrobat Reader) which comes with SB-110 is for SB-110 only. Do not use it for any other devices.

Icom Inc. is not responsible for any interference arisen by incorporating a configuration file for SB-110 or a firmware update data file, which is available in our home page, into any device other than SB-110. Moreover, Icom Inc. is not responsible for any interference arisen by modifying or disassembling SB-110. Furthermore, Icom Inc. is not responsible for any damages, lost profits or third party's claim resulting from any missed communication or telephone call due to SB-110's fault, error, malfunction, breakage, data loss or any other external factor such as power failure.

All copyrights associated with this manual and all intellectual property rights associated with the hardware and software of SB-110 are held by Icom Inc.

Unauthorized diversion of this manual, in part or in whole, is prohibited.

The content of this manual, the hardware and software associated with SB-110, and the appearance of SB-110 are all subject to change without notice or obligation.

Notational Conventions

The following notational conventions are used in this manual:


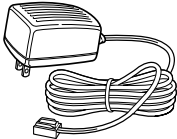
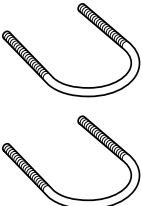
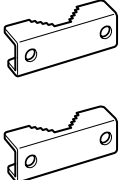
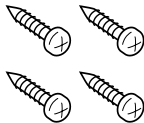
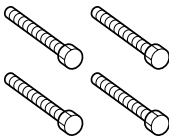
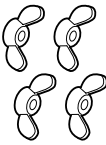
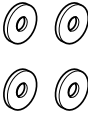



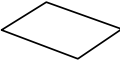
- The names of utilities, menus, windows, tabs, icons, text boxes, and check boxes are enclosed in square brackets ([]).
- The names of command buttons within dialog boxes are enclosed in less-than and greater-than signs (< >).
- The description of this manual is based on the firmware version 1.00 (See 6-6).
- Windows 98 SE represents the Windows 98 Second Edition.
Windows Me represents the Windows Millennium Edition.
- The contents of windows appearing in this manual may vary depending on the operating system installed on your computer.

ACCESSORIES AND OPTIONS

Contents of a SB-110 package

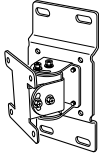

A SB-110 package should contain following accessories.
Before using SB-110, check whether all of those accessories are contained completely in the package.

If any of the accessories is not contained in the package, please contact your dealer.

 SB-110 Main Unit (Cable length: 3m)	 AC Adapter*1	 U Bolt	 Mast Clamp	
 Tapping Screw A0 6 x 30	 Hexagonal Head Bolt M6 x 50	 Wing Nut M6	 Flat Washer M6	 S Washer M6
 CD-ROM	 Instruction Manual (This Manual)	 User Registration/ Warranty Card*2	*1 AC adapter may differ depends on version *2 USA version only	

Seperately sold optional accessories

(As of May 2002)

 <p>MB-89: Elevation Angle Bracket Adjustable Range: Upper 30/Lower 30 degrees Left 30/Right 30 degrees</p>	<p>OPC-1172: Extension Cable (20 m) OPC-1173: Extension Cable (50 m)</p>  <p>For the extension of Ethernet cable and power cable.</p>
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SAFETY PRECAUTIONS

Be sure to read these precautions in order to use SB-110 safely.

- These precautions are intended to ensure that SB-110 is operated safely and correctly. Follow these instructions to avoid property damage and prevent personal injury to yourself (user) or others in the vicinity.
- Before reading the rest of this manual, read and understand the precautions listed under [⚠ Warning] and [⚠ Caution] below.
- After reading this manual, store it in a convenient place for future review.

SB-110



Warning

Failure to observe the precautions listed here could result in death of or serious injury to the user or those near the user.

Do not install SB-110 at an unsuitable place where the structural strength is insufficient.

Otherwise, SB-110 may drop and become out of order due to vibration or wind and people may be injured.

Do not install SB-110 at any crowded area.

Otherwise, people may contact SB-110, may fall to the ground or may be injured.

Do not install SB-110 near the power line or distribution line.

Otherwise, SB-110 cable may contact the power line or distribution line, may be short-circuited or heated. Moreover, people may get an electric shock or a it may catch fire.

Do not touch SB-110, antenna cable or power cable when it thunders.

Otherwise, you may get an electric shock.

Use the specified articles and accessories only.

Otherwise, a it may catch fire, you may get an electric shock and SB-110 may become out of order.

Be sure to connect the power supply to the DC connector only.

Otherwise, a it may catch fire, you may get an electric shock and SB-110 may become out of order.

Do not touch SB-110 with moistened hands.

Otherwise, you may get an electric shock.

Do not put any heavy thing on the connecting cable or pinch it.

Otherwise, the cable may be damaged, a it may catch fire, you may get an electric shock and SB-110 may become out of order.

Do not machine, bend by force, twist, pull or heat the connecting cable.

Otherwise, the cable may be damaged, a it may catch fire, you may get an electric shock and SB-110 may become out of order.

SB-110 is adjusted fully. Do not disassemble or remodel SB-110. Do not repair SB-110 by yourself.

Otherwise, a it may catch fire, you may get an electric shock and SB-110 may become out of order.

Discontinue use immediately if SB-110 emits smoke, an abnormal odor, or an abnormal noise.

Otherwise, a it may catch fire, you may get an electric shock and SB-110 may become out of order. Remove the AC adapter and all the cables from SB-110 immediately. Confirm the smoke disappears and contact the shop or our service section.

SAFETY PRECAUTIONS

SB-110 (continued from the previous page)



Caution

Failure to observe the precautions listed here could result in personal injury or property damage.

Do not disassemble SB-110.

Otherwise, you may be injured or get an electric shock, SB-110 may become out of order or the radio disturbance may occur.

Do not perform the installation work at an unstable site.

Otherwise, you may fall to the ground or may be injured.

Do not drop the device or give a considerable shock to it.

Otherwise, you may be injured or SB-110 may become out of order.

Do not use SB-110 near the TV set or radio.

Otherwise, the radio disturbance may occur in SB-110, TV set or radio.

Do not expose SB-110 to the direct sunlight, the air from the air conditioner or any unsuitable places where the temperature varies considerably.

Otherwise, SB-110 may be deformed or discolored, a it may catch fire or SB-110 may become out of order.

Follow instructions on manuals and make right connections described in this manual. Do not make a mistake in connection to SB-110.

Otherwise, Unrecoverable permanent damage may occur.

If SB-110 is not used for a long time, remove the AC adapter from SB-110 for safety.

Otherwise, SB-110 may overheat, catch fire or become out of order.

Do not put SB-110 on any unstable place where is shaky or not level.

Otherwise, SB-110 may drop and become out of order or you may fall to the ground and may be injured.

Do not use any unsuitable material of which strength is insufficient (antenna mast, bracket, etc.) or corrosive material.

Otherwise, SB-110 may drop and become out of order or you may be injured.

Do not use SB-110 in the site where strong magnetic fields or static electricity is generated or where is exposed to the temperature or humidity exceeding the specifications prescribed in the instruction manual.

Otherwise, Unrecoverable permanent damage may occur.

When it thunders, remove the AC adapter from the outlet to stop operation. Do not install, service, connect or disconnect cables.

Otherwise, a it may catch fire or you may get an electric shock.

Do not use paint thinner or solvent to clean SB-110.

Otherwise, the case material may degrade and the paint may peel. Usually, clean SB-110 with a soft cloth. If the case is stained considerably, wipe the case using a cloth dampened with detergent that has been diluted with water.

SAFETY PRECAUTIONS

AC Adapter (Accessory)



Warning

Failure to observe the precautions listed here could result in death of or serious injury to the user or those near the user.

Do not use the AC adapter for any other devices.

Otherwise, a it may catch fire, you may get an electric shock and SB-110 may become out of order.

Use the AC adapter in AC 120 V power supply only.

Otherwise, a it may catch fire, you may get an electric shock and SB-110 may become out of order.

Be sure to hold the plug body when you plug and unplug the AC cable.

Otherwise, a it may catch fire, you may get an electric shock and SB-110 may become out of order.

Use AC outlet with enough capacity to accomodate the AC adapter of SB-110.

Otherwise, a it may catch fire, you may get an electric shock and SB-110 may become out of order.

Do not tie the AC cables in a bundle.

Otherwise, the cables is heated and a it may catch fire.

Do not touch the AC plug and devices with moistened hands.

Otherwise, you may get an electric shock.

Insert the AC plug into the outlet completely.

If the plug is not inserted completely, a it may catch fire or you may get an electric shock.

Do not modify, bend illegally, twist or heat cables.

Otherwise, the cable may be damaged, a it may catch fire, you may get an electric shock and SB-110 may become out of order.

Do not put any heavy thing on the AC cable or pinch it.

Otherwise, the cable may be damaged, a it may catch fire, you may get an electric shock and SB-110 may become out of order.

If a metal part of the AC plug and its surroundings are covered with dust, wipe it with a dry cloth completely.

Otherwise, a it may catch fire.

If the AC cable is damaged or if the AC cable cannot be inserted completely, do not use such cable.

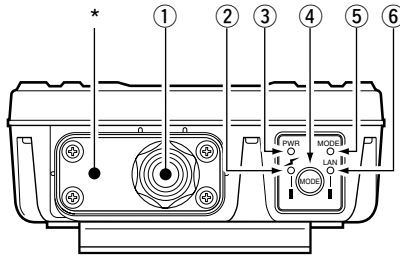
Otherwise, a it may catch fire, you may get an electric shock, SB-110 may become out of order, data may be lost. Please contact the shop or our service section.

This chapter describes what you should consider and prepare when you installing SB-110.

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1 BEFORE INSTALLATIONS

1-1 Panel description



① Ethernet/DC power cables

Ethernet cable

Connect to LAN (Hub)(Straight connection).

DC power cable

Connects the supplied AC adapter.

② [⚡] (Red) indicator

Lights when the connection to SB-110 has been established.

Lights goes off when:

- All the wireless LAN devices is in no-communication state for one or two minutes.
- All the wireless LAN devices is out of radio transmission area for one or two minutes.

③ [PWR] (Green) indicator

Lights when SB-110 turns on.

Blinks alternately with the [MODE] indicator in the [UTILITY SOFTWARE] mode operation.

Blinks simultaneously with the [MODE] indicator in the [INITIALIZATION] mode operation.

④ <MODE> button

Use for an operation in the [UTILITY SOFTWARE] mode and [INITIALIZATION] mode.

⑤ [MODE] (Green) indicator

Blinks in the [UTILITY SOFTWARE] mode and [INITIALIZATION] mode.

Blinks alternately with the [PWR] indicator in the [UTILITY SOFTWARE] mode operation.

Blinks simultaneously with the [PWR] indicator in the [INITIALIZATION] mode operation.

⑥ [LAN] (Red) indicator

Turns on when the connection to LAN has been established normally.

Turns off when the Ethernet cable is not connected.

Blinks when data is communicated.

* A plate to fix SB-110 cable. If you connect a commercial ground cable, fix it with the screws for this plate.

1-2 Wireless Communication Function

The SB-110 has three connection methods (two modes and one function) to form wireless networking systems.

LAN to LAN bridge (Wireless Bridge) mode (See 1-3)

Access Point mode (See 1-4)

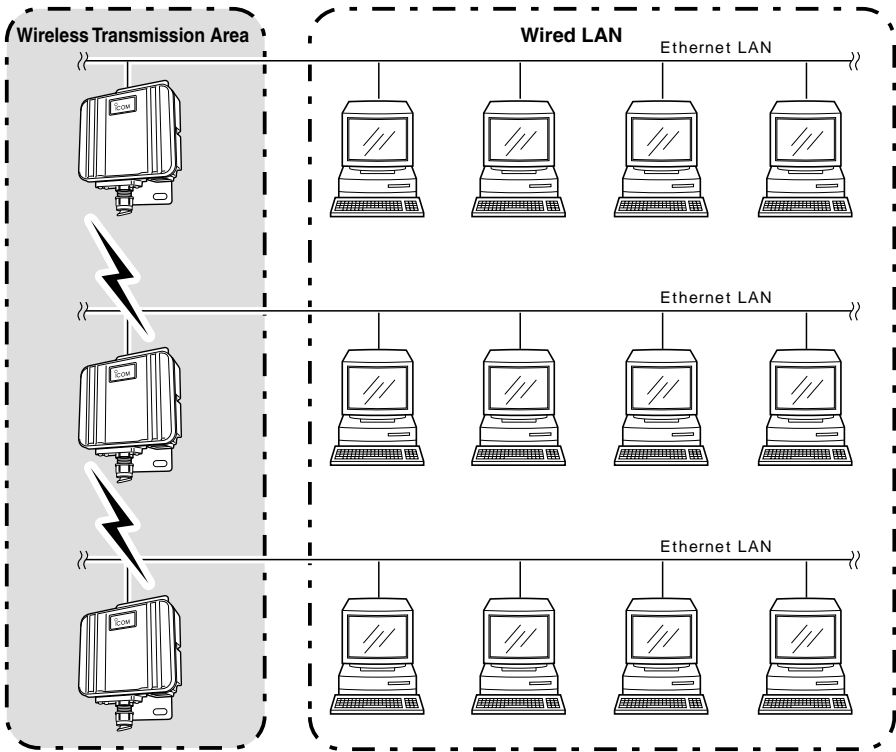
Roaming function (See 1-5)

SB-110 operates in the LAN to LAN bridge mode by default or when all the settings are initialized. Those two modes cannot be used simultaneously.

1-3 Using in LAN to LAN Bridge mode

SB-110s in LAN to LAN bridge mode connect separated LAN systems. All wired LAN clients on each LAN system can communicate each other through SB-110s.

Recommendation: Up to 256 of SB-110 may be used simultaneously. However, we recommend you to use less than 10 SB-110s for satisfactory performance.



UP to 256 SB-110

Up to 1,024 units — The maximum number of the usable units is acceptable.

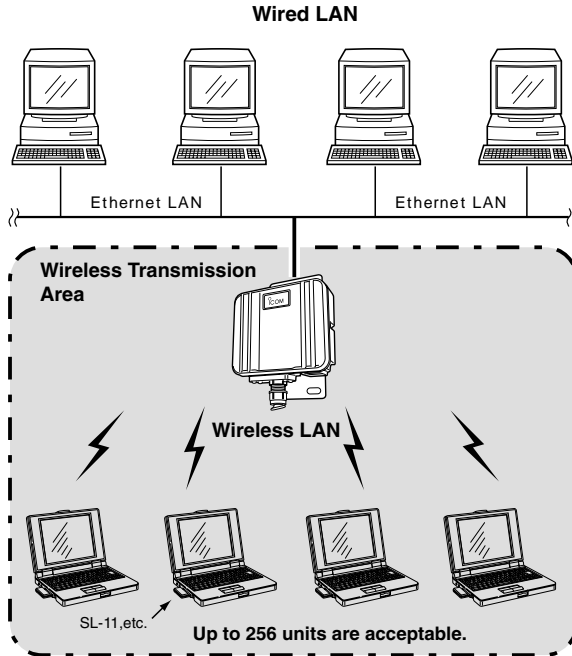
1 BEFORE INSTALLATIONS

1-4 Using in Access Point Mode

A SB-110 in Access Point mode connects wireless LAN clients to the wired LAN system. Setting is necessary to use SB-110s in this mode.

It can be done through a PC directly wire-connected (or via a Hub) to the SB-110. (See 4-3).

Logically, up to 256 wireless LAN clients can be connected to a SB-110 simultaneously, however, we recommend you to use less than 10 wireless LAN clients for satisfactory performance.



Notes on use of Access Point Mode

SB-110 cannot be operated in the Accesspoint and LAN to LAN bridge mode simultaneously.

For best results, please use compatible Icom wireless LAN products as clients to SB-110s. Any Wi-Fi(R) certified products may be used as well, however, Icom is not responsible for any incompatibility or problems.

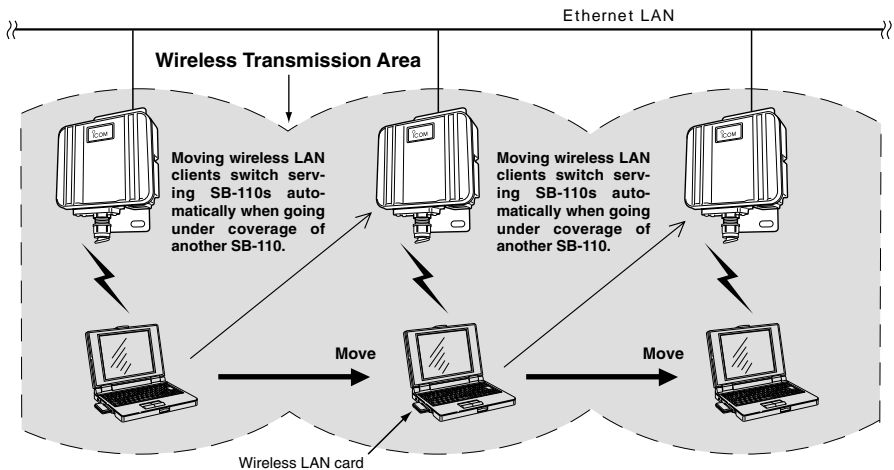
Please be sure to configure wireless LAN clients to the same [ESS ID](See 5-1) and [WEP](See 5-2) settings with the mating SB-110(s). Clients with different settings are not recognized by SB-110(s).

1-5 Using Roaming Function (Access Point Mode)

Wireless LAN coverage area can be expanded with several SB-110s connected to the wired LAN system, placing their wireless coverage areas overlapped. Overlapped coverage areas keep wireless LAN clients seamlessly connected to the LAN while they are moving back and forth within the coverage areas.

Roaming Function needs to be turned on to use. Setting can be done through a PC directly wire-connected (or via a Hub) to the SB-110. (See 4-3).

* SB-110s are connected to wired LAN system as other Ethernet devices with patch cable/connectors. The picture below does NOT mean several SB-110s can be connected directly a wire.



Notes on use of Roaming Function (Continued on next page)

1 BEFORE INSTALLATIONS

1-5 Using Roaming Function (continued from the previous page)

Notes on use of Roaming Function

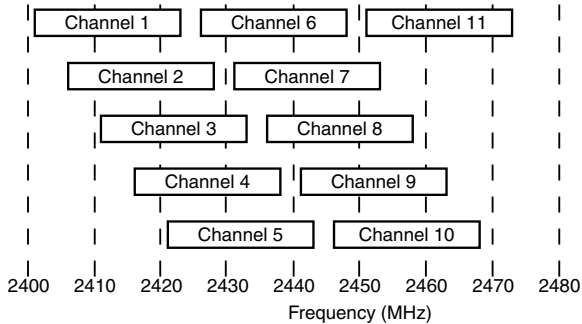
Roaming function is only applicable for Apccess Point mode, fuction not available under LAN to LAN brdge mode.

For best results, please use compatible lcom wireless LAN products as clients to SB-110s. Any Wi-Fi(R) certified products may be used as well, however, lcom is not responsible for any incompatibility or problems.

Please be sure to configure wireless LAN clients to the same [ESS ID](See 5-1) and [WEP](See 5-2) settings with the mating SB-110(s). Clients with different settings are not recognized by SB-110(s).

Do not use Roaming Function together with Routing Mode(See 5-3). Network address of wireless LAN clients are set to the same as wired LAN part of the connected SB-110. Rounting mode makes wireless LAN clients unable to communicate because it is impossible to route networks with the same network address.

To avoid co-channel and near-channel interferences, neighbouring access points should use non-overlapping channels for best results. Several channels share the same spectrum partly overlapping each other. Channel 1, 6 and 11 are not overlapping each other.



1-6 Notes on Installation

For best performance, protection and warranty, please install SB-110s at locations meeting conditions provided below.

Located at high place of wide-open, good visibility where nobody can tamper the SB-110. Protected from direct sunlight and the weather. (SB-110 is rated JIS4 water-resistant, however, this rating does not ensures prolonged direct exposure to the environment.) Rigid and stable enough to accomodate a SB-110 without causing vibration, drop or damage. No other SB-110s or any devices located closer.

Any large-sized obstruction must not be located between the installation sites even temporarily. If any obstruction is located between them, the communication may be interfered.

Do not install SB-110 near a radio tower which transmits strong radio signal.

Do not install SB-110 near a metal wall. Metal walls cause radio wave reflections which may deteriorate communication performance.

Wireless LAN communications across floors may be impossible or unstable if floors contain thick steel plates, beams or any material which reflect or absorb radio wave transmit from wireless LAN devices.

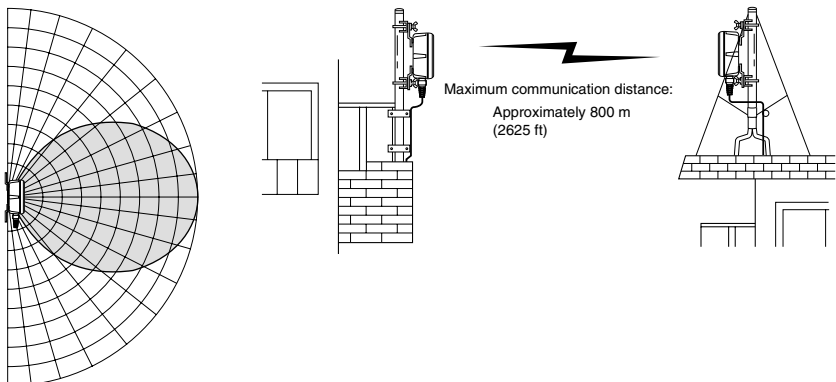
Total Ethernet cable length between SB-110 and the a Hub must be **within 100 m (328 ft)**. The distance between two SB-110s (internal antenna) in LAN to LAN bridge mode must be **within approximately 800 m (2625 ft)**.

Distance between a SB-110 and wireless LAN clients under Access Point mode is approximately 70m(21ft).

Two SB-110s (built-in antenna type) must be faced to each other.

Directional Characteristics of Antenna

SB-110 (internal antenna) has the directionality shown below. When you install two SB-110s, those antennas must be faced to each other at the same position horizontally and vertically.



This chapter describes how to install SB-110 and how to connect it to peripheral devices.

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⚠DANGER SB-110 is intended for professional installation only. Icom Incorporated or any other third parties are not responsible for any building breakage, any damage resulting from a drop of SB-110 from a high place or unstable site or resulting from any personal injury nor any accident in any other cases. If SB-110 is must be installed at such high place or unstable site, be sure to consult an expert engineer.

NOTE

Do not paint the case of SB-110.

Otherwise, radio wave is attenuated by metal composition contained in the paint and SB-110 cannot work as designed, or may cause permanent damage.

Fix cables properly to a suitable position to avoid injuries or damage.

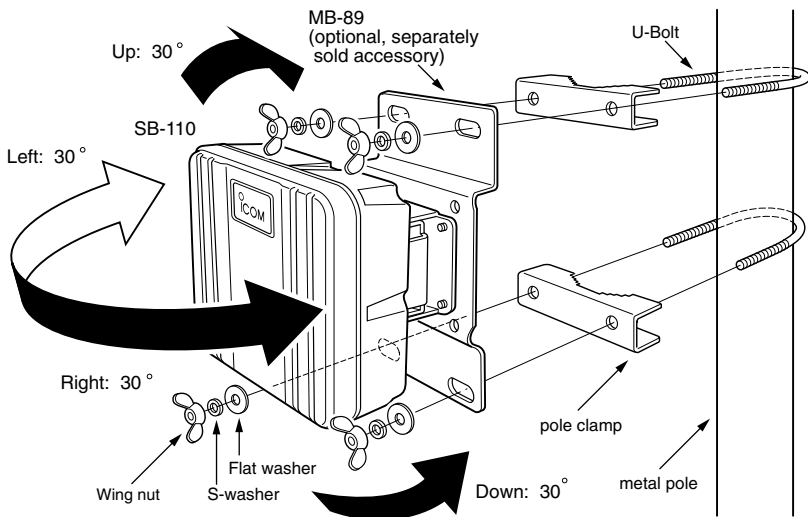
2 INSTALLATION AND CONNECTIONS

2-1 Installation on a metal pole

Carefully select and prepare installation sites where SB-110s can face each other line-of-sight with no obstructions in-between.

-The picture below is an example of SB-110 installation on a metal pole with separately sold optional MB-89 elevation angle bracket.

* Properly adjust angle of MB-89 to avoid contacting U-bolts and SB-110 case otherwise the case may be cracked and ruin the unit. Please be sure not to let U-bolts contact the SB-110 case when installed with angled MB-89 on to a small diameter metal pole of less than 50mm(1³¹/₃₂ inch) diameter.

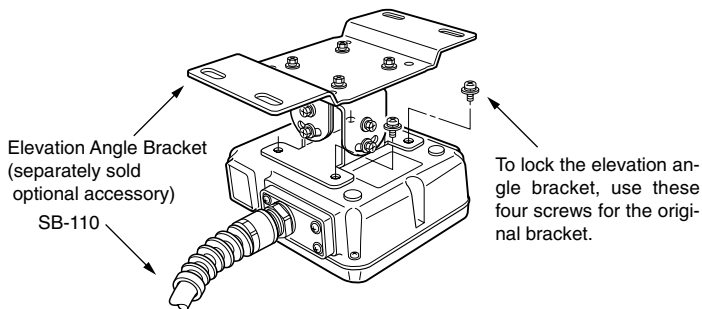


MB-89 Elevation Angle Bracket installation

(separately sold optional accessory)

Remove the original bracket from SB-110 and replace it with MB-89.

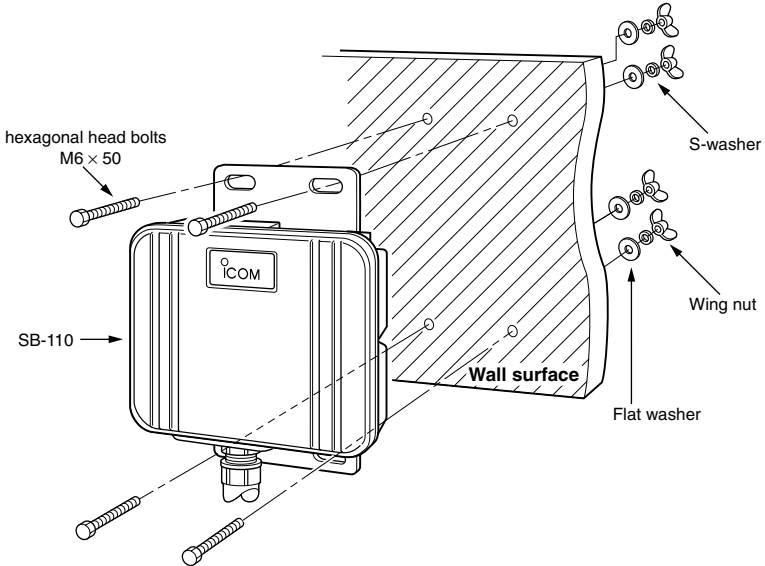
To install MB-89, use the screws for the original bracket.



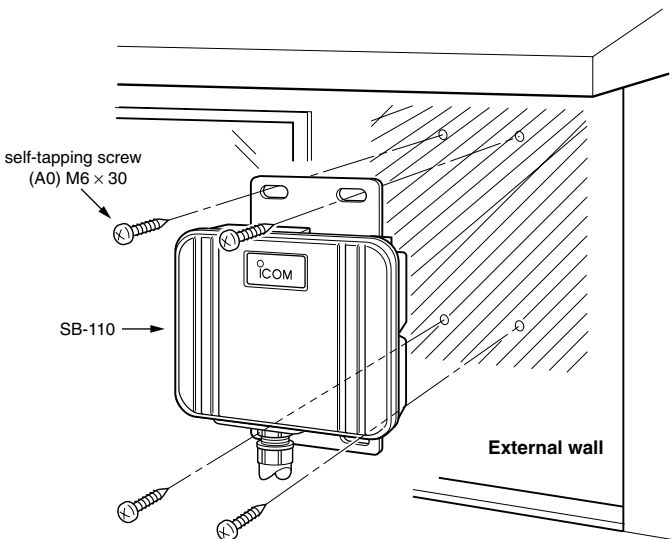
2-2 Installing on a Wall

To install SB-110 on a wall, use the self-tapping screws or hexagonal head bolts supplied with SB-110.

[Installing with hexagonal head bolts]



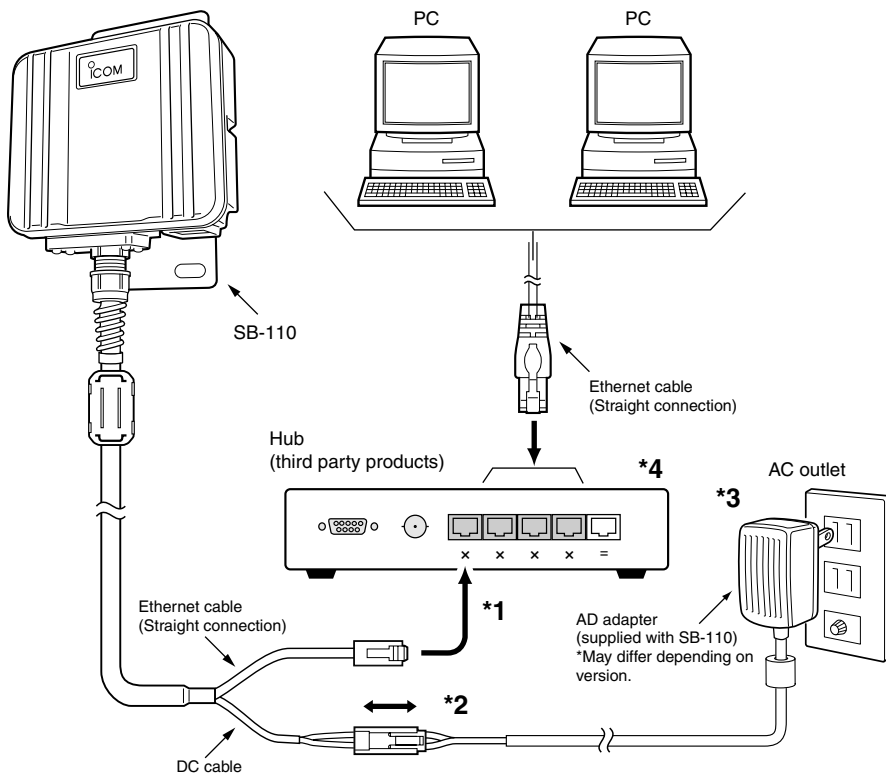
[Installing with self-tapping screws]



2 INSTALLATION AND CONNECTIONS

2-3 Connections

Do not connect an SB-110 to your existing network without proper configuration. Conflicted IP addresses, improperly enabled server functions and other unexpected network interferences may cause severe problems for the network.(see Chapter 4 Setting SB-110 for setup details)



- * 1.Ethernet cable of an SB-110 is for straight connection. Total length of the Ethernet cable should be within 100m. The extended Ethernet cable should be Category 5 or higher.
- * 2.NEVER expose DC connectors to rain, they are not waterresistant. Protect with adhesive tapes to avoid water intrusion if necessary.
- * 3.The AC adapter is IN DOOR USE ONLY.
- * 4.Ethernet port of an SB-110 is compatible with 10BASE-T and 100BASE-TX strait connection.

2-4 Before connecting to a working wired network

An SB-110 needs one unique IP address assigned from free IP addresses of the network. See 4-5 How to change IP Address for details.

[Connection to a network using static IP address allocations]

Assign a fixed unique IP address to the SB-110.

[Connection to a network using dynamically assigned IP addresses by a DHCP server]

Configure the DHCP server present on the network to assign a fixed IP address and set the SB-110 have the IP address. (SB-110s do not support DHCP client function).

Checking Network Status

Please pay attention before an SB-110 is installed additionally to a working network.

[IP addresses of computers and other devices on the network]

If there is IP address conflict with an SB-110 and another device such as a PC, the SB-110 is unable to communicate with other devices or the entire network may fail. If there is a device with IP address of [192.168.0.1] which is the same as factory default setting of an SB-110, either of them must be assigned another IP address to avoid conflict before an SB-110 is installed(See 4-5). If the IP address is automatically assigned by a DHCP server in the network, it must be configured to assign unique fixed IP address to the SB-110. Do not assign an unused free IP address unless it is already reserved and secured by the DHCP server. As common to Ethernet LAN systems, broadcast addresses cannot be assigned to any devices.

Setting IP Address

Please change IP address of the SB-110 if another device on the network has the same IP address of the SB-110's.

-See 4-5 How to change UP address for details

Connecting to a working wired network

See 2-3 Connections for deetails.

This chapter describes how to set computers which communicate with or through an SB-110. Please read applicable sections as necessary.

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3 COMPUTER SETTING

3-1 Setting computers to work with an SB-110 in LAN to LAN bridge mode

This section explains how to configure computers on a wired network to work with an SB-110 in LAN to LAN bridge mode. Information available for Windows Millenium Edition(ME), Windows2000 and MAC operating systems.

Step 1	Connecting Your Computer to SB-11012, 16
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Step 3	Preparing web brower software. 28
Step 4	Checking IP Address Assigned by SB-110. 29

Connecting to Ethernet cable of an SB-110

Connect the Ethernet cable of an SB-110 to a computer through a Hub as described in 2-3. If no Ethernet port is available in the computer, an Ethernet card which is separately sold from third parties must be installed. Refer to the instruction manuals of the computer and the Ethernet card for installation details.

Setting TCP/IP protocol

Install the network protocol module (driver), called "TCP/IP" in all Computers which communicates with SB-110.

Refer to the instruction manual for the Ethernet card for the driver installation details.

- If your network uses stastically fixed IP addresses, please ask your network manager to obtain a fixed IP address and other network setting information. An SB-110 also needs such information.

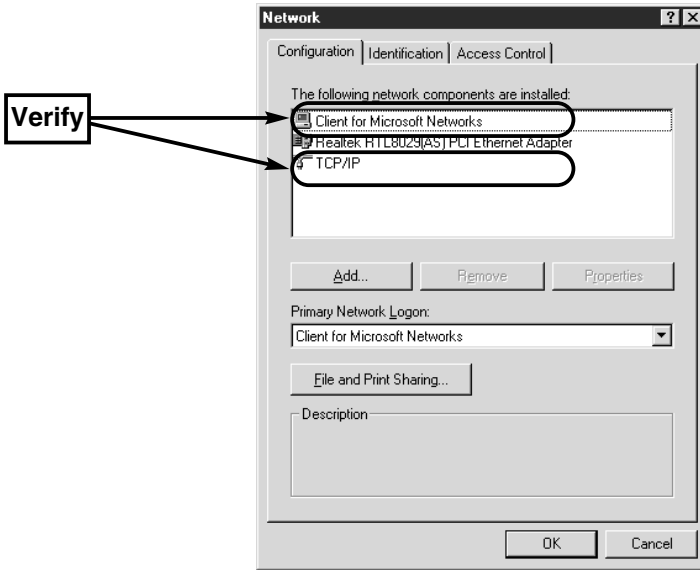
[Windows Me]

1. Select [Start] [Setting (S)] [Control Panel (C)] [Network] icon.

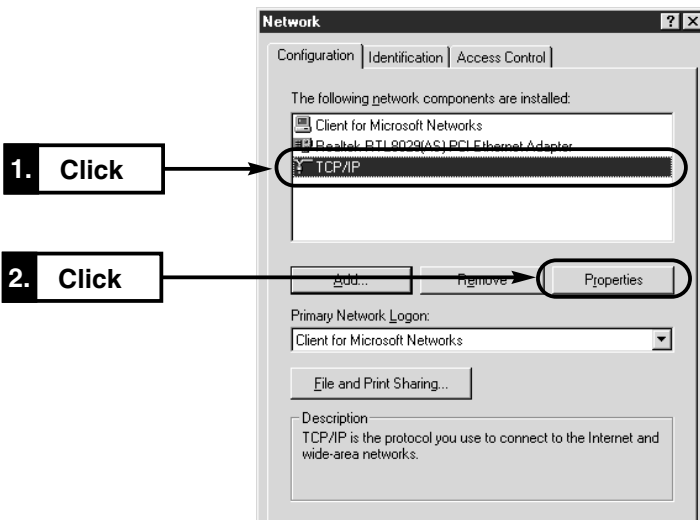
[Windows Me] (continued from the previous page)

- Verify that [TCP/IP Name of your Ethernet card] and [Microsoft Network Client] are displayed in the [Network] screen.

If they are not displayed, TCP/IP may not be properly installed. Please refer to instruction manuals of the Ethernet card and computer to install.



- Click [TCP/IP] and then [Properties (R)].

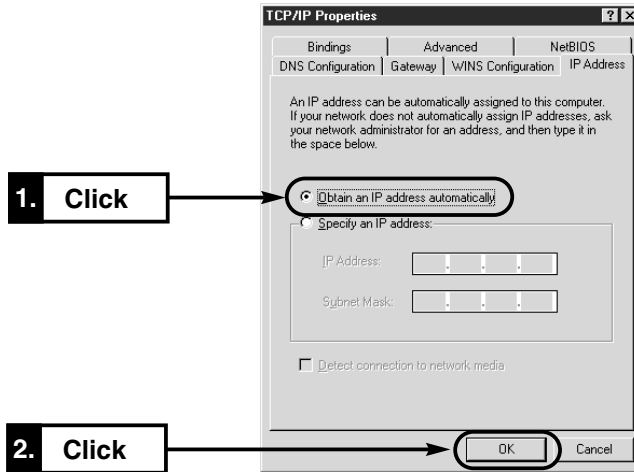


3 COMPUTER SETTING

3-1 Setting computers to work with an SB-110 in LAN to LAN bridge mode

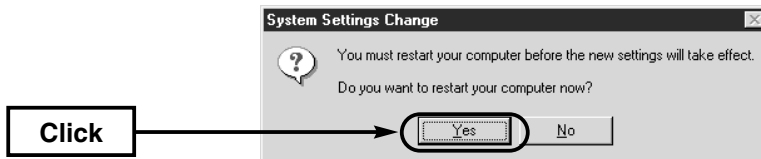
Setting TCP/IP protocol [Windows Me] (continued from the previous page)

4. Click the [Obtain an IP address automatically (O)] radio button and then [OK].



5. When you are prompted to restart your Computer, click [Yes].

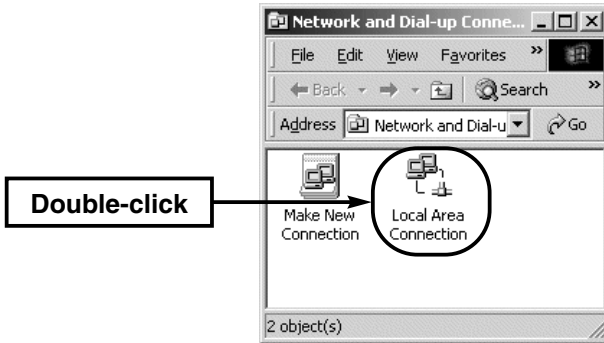
After restarting, the Computer is operatable with the specified setting.



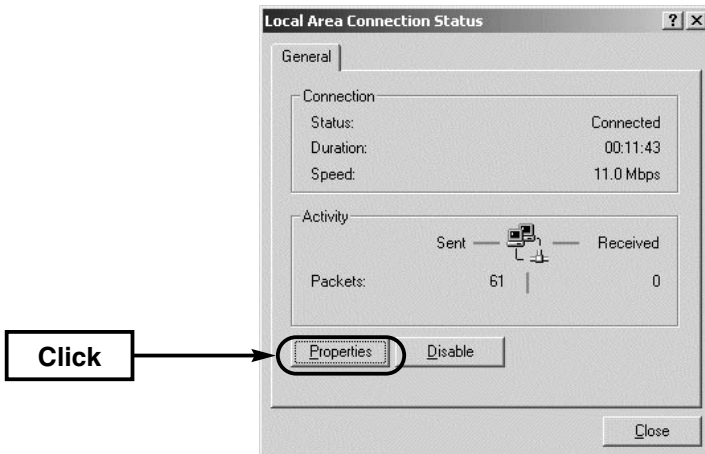
Setting TCP/IP protocol (continued from the previous page)

[Windows 2000]

1. Start your Computer.
 - The Windows 2000 log-on screen appears.
2. Log on as the Administrator.
3. When the Windows 2000 desktop has been shown, select [Start] [Setting (S)] [Network and Dial-up Connections (N)] [Local Area Connection] icon which shows your Ethernet card name.



4. Click [Properties (P)].

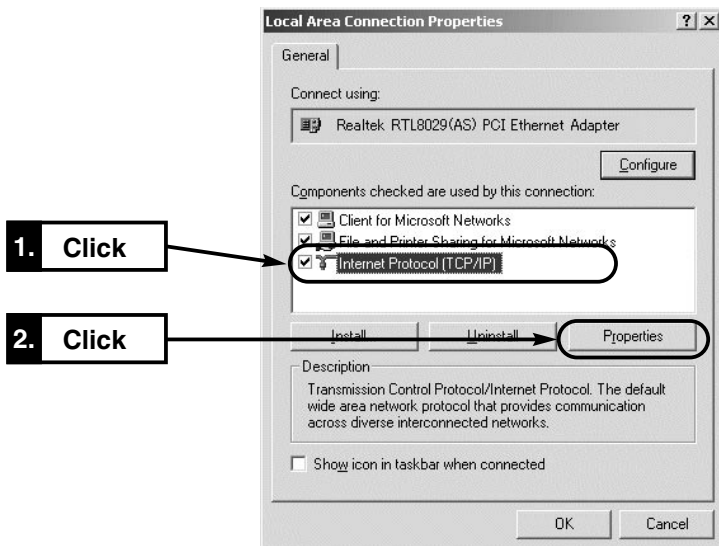


3 COMPUTER SETTING

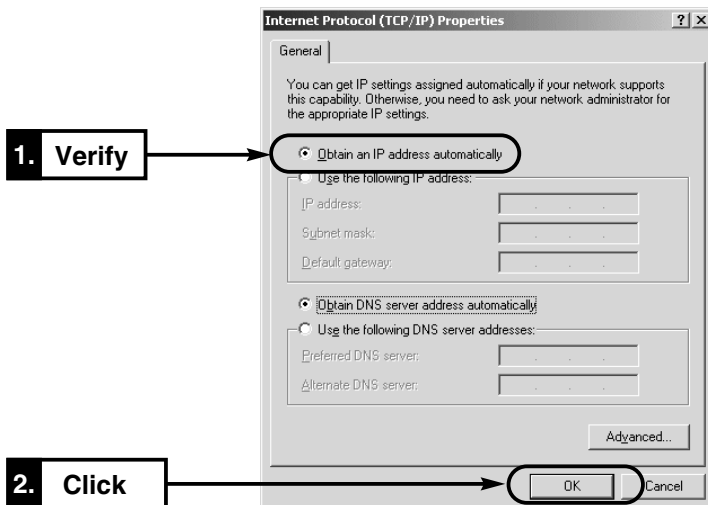
3-1 Setting computers to work with an SB-110 in LAN to LAN bridge mode

Setting TCP/IP protocol [Windows 2000] (continued from the previous page)

5. Click [Internet Protocol (TCP/IP)] and then [Properties (R)].

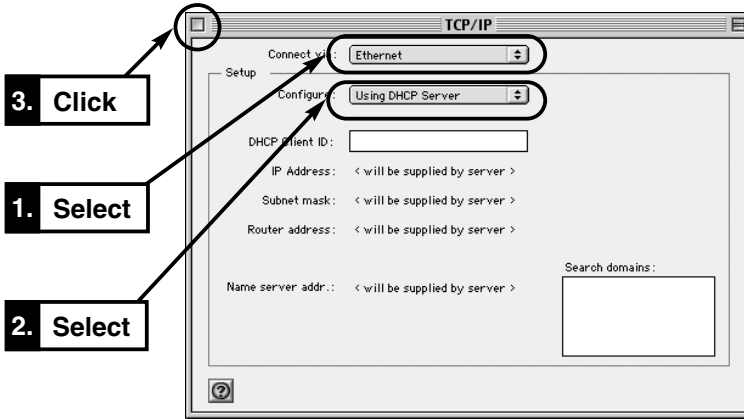


6. Verify that [Obtain an IP address automatically (O)] is selected and click [OK] to enable the specified setting.



[Mac OS]

1. Start your Computer.
2. After the Computer has started up, select [Apple Menu] [Control Panel] [TCP/IP].
3. Select “Ethernet” as [Connect to] and “Using DHCP Server” as [Configure].
4. Click the Close Box on the title bar.
 - The screen is closed and the setting screen is saved.



3 COMPUTER SETTING

3-2 Setting computers to connect wirelessly to a wired LAN through a SB-110 in wirele

This section explains how to configure computers to connect wirelessly to a wired LAN through an SB-110 in wireless access point mode. Information available for Windows Millennium Edition(ME), Windows2000 and MAC operating systems.

Step 1	Preparing Wireless LAN Card	22
Step 2	Setting TCP/IP	22
Step 3	Setting Wireless LAN Card	27
Step 4	Preparing web browser software	28
Step 5	Checking IP Address Assigned by SB-110	29

Preparing Wireless LAN Card

An SB-110 must be working in access point mode to work with wireless LAN cards. Icom Wireless PCMCIA LAN cards, Icom USB LAN cards and other Icom compatible wireless LAN cards can be used with an SB-110. Install wireless LAN devices to computers according to instruction manuals.

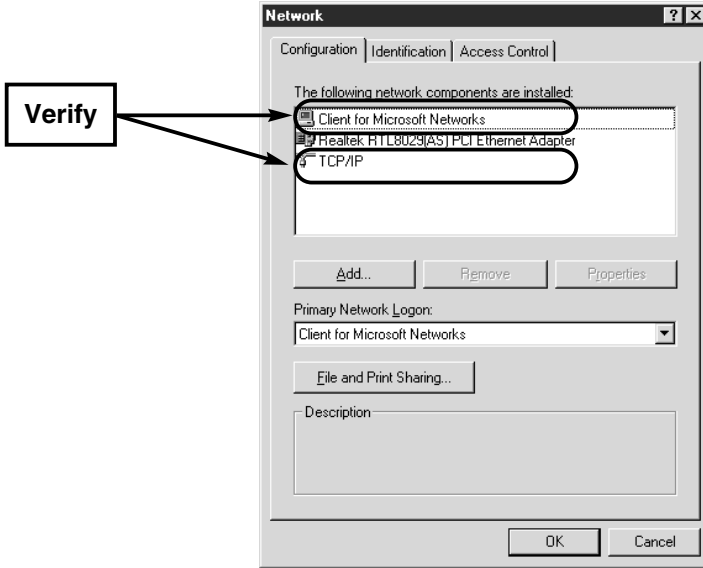
Setting TCP/IP protocol

You need to install a network protocol module (driver) called "TCP/IP" in every Computer which communicates with SB-110. Install the driver referring to the instruction manual of your wireless LAN card.

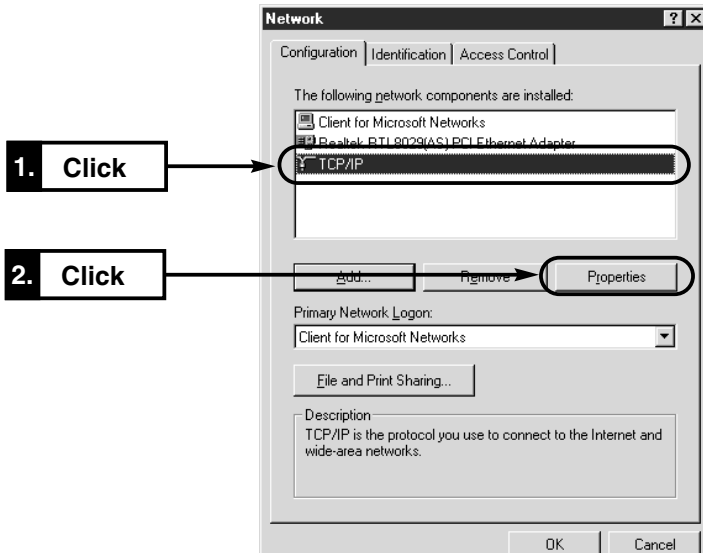
[Windows Me]

1. Select [Start] [Setting (S)] [Control Panel (C)] [Network] icon.

- Check that [TCP/IP Name of your wireless LAN card] and [Microsoft Network Client] are displayed in the [Network] screen. If those are not displayed, TCP/IP installation may fail. Check the installation referring to the instruction manual of your wireless LAN card.



- Click [TCP/IP] and then [Properties (R)].

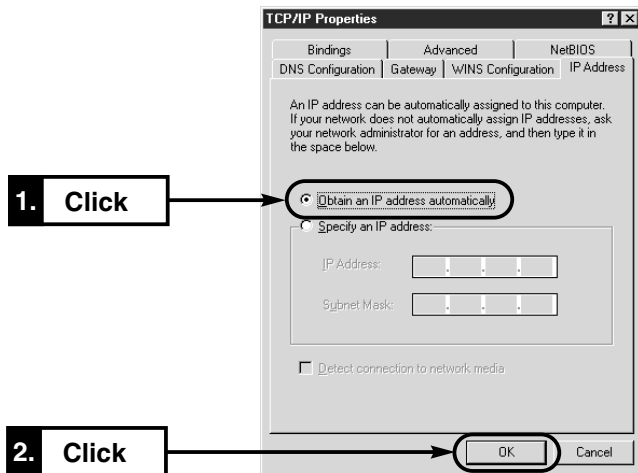


3 COMPUTER SETTING

3-2 Setting computers to connect wirelessly to a wired LAN through a SB-110 in wirele

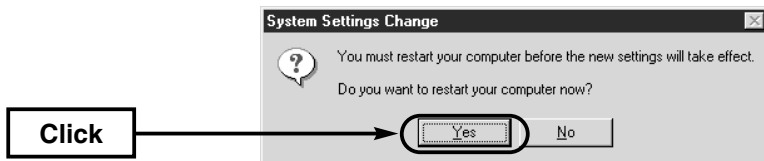
Setting TCP/IP protocol [Windows Me] (continued from the previous page)

4. Click the [Obtain an IP address automatically (O)] radio button and then [OK].



5. When you are prompted to restart your Computer, click[Yes].

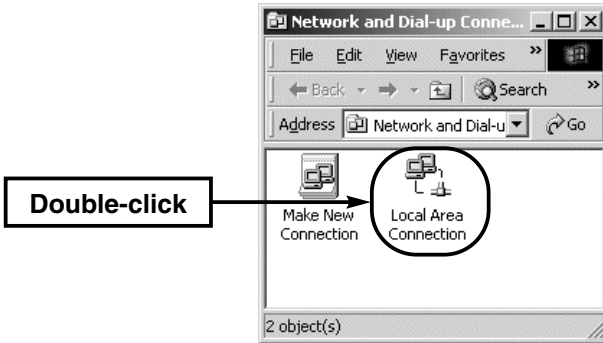
After restarting, the Computer is operatable with the specified setting.



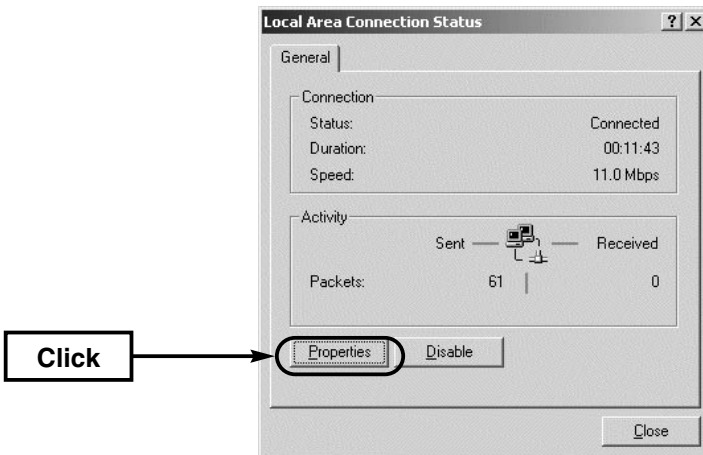
Setting TCP/IP protocol (continued from the previous page)

[Windows 2000]

1. Start your Computer.
 - The Windows 2000 log-on screen appears.
2. Log on as the Administrator.
3. When the Windows 2000 desktop has been shown, select [Start] [Setting (S)] [Network and Dial-up Connections (N)] [Local Area Connection] (which shows your Ethernet card name).

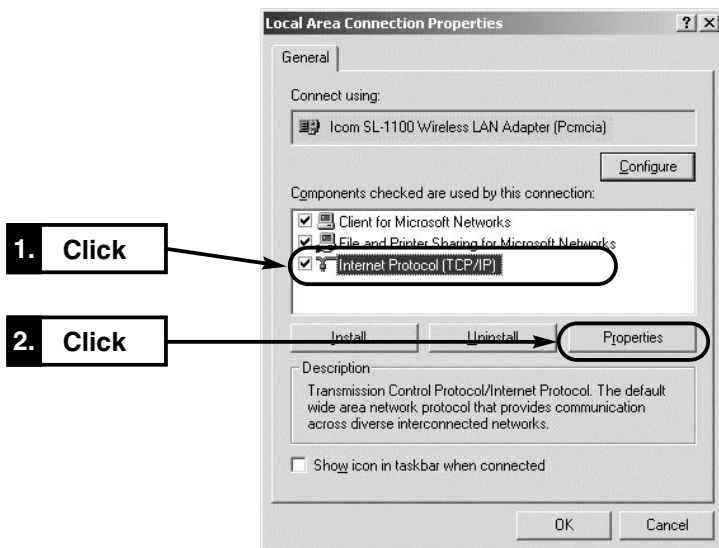


4. Click [Local Area Connection] which shows your wireless LAN card connecting SB-110.

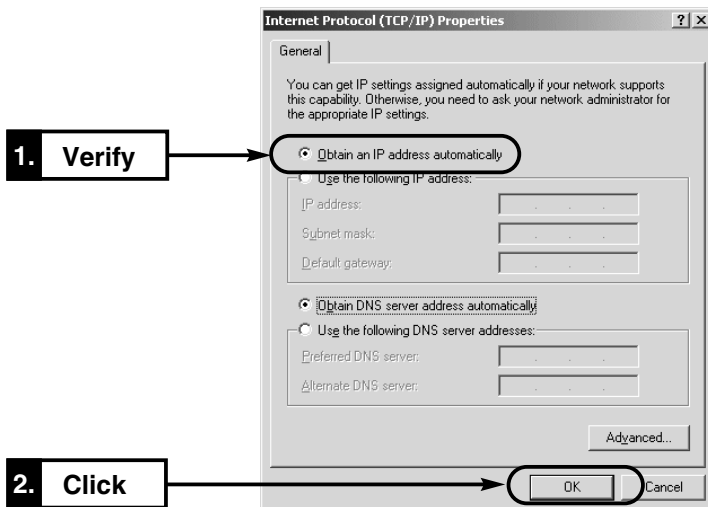


3 COMPUTER SETTING

- 3-2 Setting computers to connect wirelessly to a wired LAN through a SB-110 in wirele
Setting TCP/IP protocol [Windows 2000] (continued from the previous page)
5. Click [Internet Protocol (TCP/IP)] and then [Properties (R)].



6. Verify that [Obtain an IP address automatically (O)] is selected and click [OK] to enable the specified setting.



3-2 Setting computers to connect wirelessly to a wired LAN through a SB-110 in wirele Setting Wireless LAN Card

Wireless LAN setting of a computer connecting through an SB-110 must have matched conditions or values to the SB-110's settings. Following article explains how to configure wireless LAN card settings according to the SB-110's settings provided that the computer is adjusted to the SB-110(not adjusting the SB-110 to the computer). Please refer to manuals of computer and wireless LAN cards to change conditions and values.

[Network Mode]

This must be set as "Infrastructure mode". Another option "Adhoc" is only used for peer to peer networks where no access points are available.

The SB-110 should be configured as "access point mode". Its factory default set is "LAN to LAN bridge mode" (See 4-3).

[ESS ID]

Change ESS ID of the wireless LAN card as "LG."

Factory default setting of SB-110 is "LG."

[Communication Channel]

This setting is insignificant in "infrastructure mode" for wireless LAN card, which follows SB-110's settings(See 5-2).

[WEP Function]

WEP or Wire-Equivalent-Privacy function enable data encryption. This should be deactivated on wireless LAN card for the first time. Factory default setting of an SB-110 is "Not UseE WEP Key"

IMPORTANT!

- Compatibility with Macintosh or non-Icom wireless LAN devices are not guaranteed
- Be sure to set conditions and values of wireless LAN cards exactly matching to the SB-110 setting for wireless communication.
- While changing SB-110's [Communication Channel], [ESS ID] or [WEP] settings from a computer wirelessly connected to the SB-110, communication between the SB-110 and the computer will be temporarily disconnected after applying settings alteration to the SB-110 as a result of unmatched settings due to the settings changes made from the computer. Wireless LAN settings of the computer must be set to match SB-110 again.
- Though WEP functions do not protect the network completely, it provides fair protection against unauthorized access. To ensure WEP compatibility and security, use Icom wireless LAN devices only. If the entire network must be protected completely, additional measures should be used in addition to WEP.
- Move or change the direction of SB-110 or the Computer when the wireless communication becomes unstable.
- We recommend ten or less wireless devices for one SB-110 for satisfactory performance. Up to 256 wireless devices can be connected to an SB-110 theoretically, however, considerable communication deterioration is inevitable.

3 COMPUTER SETTING

3-3 Preparing web browser software

To set SB-110 through a web browser software, Microsoft Internet Explorer 4.0 or later or Netscape Navigator 4.0 or later is required. Verify "proxy server function" is not used in the browser setting when accessing setting screen of an SB-110. If this function is enabled, it not be accessible. You may put an exclusion entry for an SB-110 as follows.

To use the proxy server, exclude SB-110 from the proxy server scope as following procedure;

[Microsoft Internet Explorer 5.0]

1. Select [Internet Options (O)] in the [Tool (T)] menu.
2. Click the [Connections] tab and then [LAN Settings (L)].
3. Check the [Use a proxy server (X)] check box and click [Advanced (C)].
4. Enter an address of the proxy server of your provider in the [HTTP (H)] text box in the [Servers] field.
5. Enter the IP address of SB-110 in the [Do not use proxy server for addresses beginning with (N):] text box in the [Exceptions] field. (Example: 192.168.0.1)

[Netscape 6.0]

1. Select [Preferences (E)] in the [Edit (E)] menu.
2. Click [Advanced] and then [Proxies] in the [Category:] field of the [Preferences] dialog box.
3. Check the [Manual proxy configuration] radio button.
4. Enter an address of the proxy server of your provider in the [HTTP (H)] text box.
5. Enter the IP address of SB-110 in the [Do not use proxy server for domains beginning with (N):] text box. (Example: 192.168.0.1)

3-4 Checking automatically assigned IP address

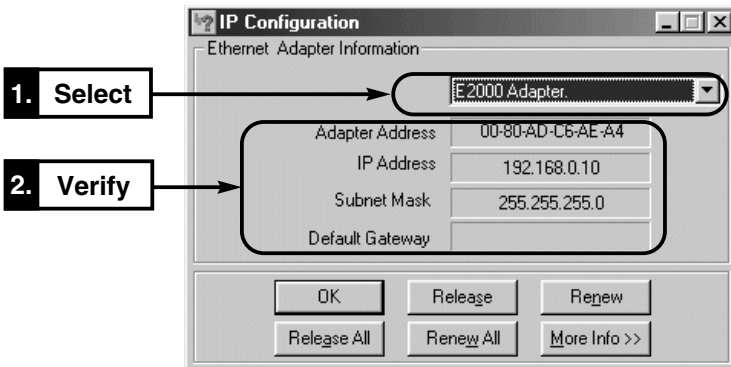
This section describes how to verify an IP address assigned to a Computer automatically by the DHCP server function of the SB-110. Refer to the suitable instruction depending on the operating system to verify the address as follows;

[Windows Me]

Verify the IP address with a program called “winipcfg.exe” contained in the Windows folder of the installed operating system.

<How to check>

1. Select [Start] [Run (R)].
2. Type “winipcfg” in the [RUN] dialog box and press the [Enter] key.
3. Click in the text box and select a name of the Ethernet card or wireless LAN card.
 - When any IP address has been assigned to the Computer by the DHCP server, it is displayed in the [IP Address] field.



<Items displayed on the screen>

Adapter Address: MAC address of Ethernet card or wireless LAN card.

IP Address: IP address of Computer.

Subnet Mask: Subnet mask of Computer

Default Gateway: IP address of network device specified as the default gateway.

When IP address assignment fails

If network address part of the IP address shown by the above mentioned utility software is not the same as supposed (192.168.0 at factory default), automatic IP assignment might be failed. Verify TCP/IP protocol settings of the Ethernet or wireless LAN card and physical connections. Then restart the computer and verify IP settings again.

3 COMPUTER SETTING

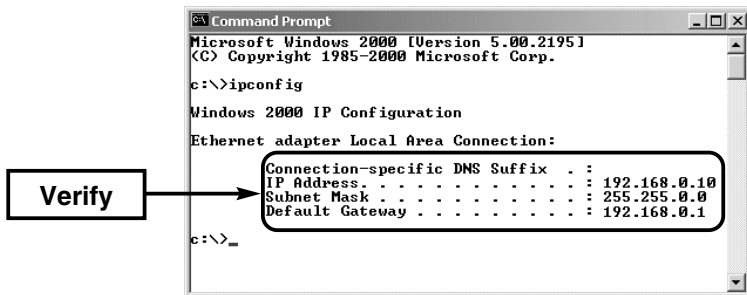
3-4 Checking automatically assigned IP address (continued from the previous page)

[Windows 2000]

Execute "ipconfig" in the Command Prompt screen.

<How to check>

1. Select [Start] [Programs (P)] [Accessories] [Command Prompt].
2. Type "ipconfig" in the Command Prompt screen and press the [Enter] key.
 - Refer the description shown by typing "ipconfig /?" for the command line options detail.
3. The IP address assigned to the Computer is displayed on the screen.



[Mac OS]

Even when the computer has started up, MAC OS will not try to get an IP address from the DHCP server until it actually needs one to communicate others such as other computers, Internet web servers or mail servers etc.

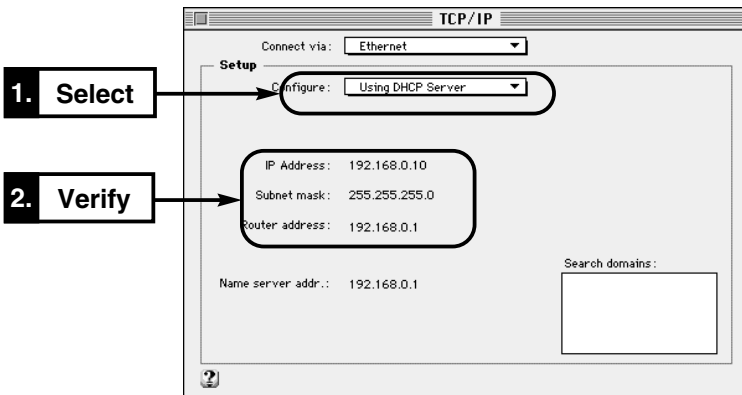
When <Using DHCP Server> is displayed on each item in the screen shown as the following procedure, verify IP settings after accessing others.

* The operating screen (including details) may differ according to the operating system version.

<How to check>

1. Select [Apple Menu] [Control Panel] [TCP/IP].

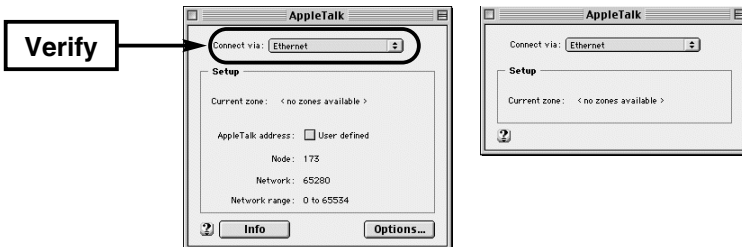
- These IP settings are displayed in the screen when the DHCP server assigns an IP address.



2. To verify the MAC address, select [Apple Menu] [Control Panel] [AppleTalk]. Then, either screen below appears.

Select "Ethernet" in the [Connect via:] field.

- To display the left screen when the right screens appears with the above procedure, select [Edit] in the menu bar, [User Mode] and then [Advanced].



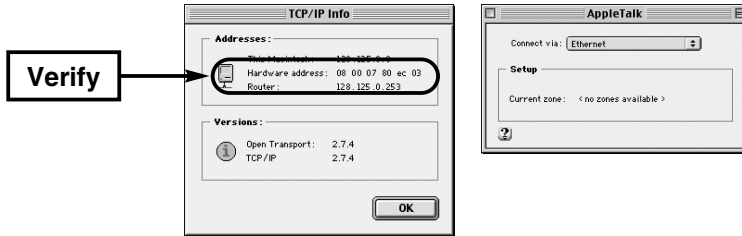
3 COMPUTER SETTING

3-4 Checking automatically assigned IP address

[Mac OS] (continued from the previous page)

3. Click [Info].

- To display the left screen when the right screens appears, select [File] in the menu bar and then [Get Info].



This chapter describes the setting procedure to use an SB-110 for the first time or to initialize the entire configuration.

Wired Ethernet connection between a computer and an SB-110 via a Hub is first necessary to enable SB-110's "access point mode" (see 4-3) to be configured through wireless LAN connection. Wireless LAN settings of a computer must match with the SB-110's (see page 27).

4-1. Turning on SB-110 and Computer34
4-2. Showing Setting Screen35
4-3. Changing Wireless Communication Mode36
4-4. Deactivating DHCP Server37
4-5. Changing IP Address Of SB-11038
4-6. Changing Automatic Assignment Start IP Address39

4 SETTING SB-110

4-1 Turning on SB-110 and Computer

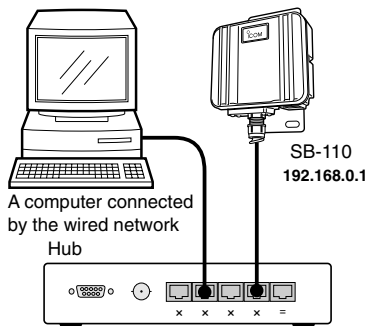
Connect an SB-110 and a computer for setting through a Hub.

[IMPORTANT]

Wireless LAN devices cannot access an SB-110 in factory default settings(see 4-3).

Connect one computer to one SB-110 through a Hub only to make a temporary network where no other devices present.

The computer used for configuration should be set according to “LAN to LAN bridge mode” (see 3-1), in which the computer get IP settings from the SB-110 automatically.



1. Turn on the SB-110 and the hub.
2. Check both of the green[PWR] and red [LAN] LEDs of SB-110 lit. If no or only one either LED is on, verify cable connections.
3. Turn on the computer connected to the temporary network.
4. Check IP address of the computer assigned by the SB-110 (see3-4). If the computer is not provided with proper IP address, verify TCP/IP settings and others described in “3-1 Connecting LAN to LAN bridge mode” again.

4-2 Showing Setting Screen

<How to operate>

1. Start a web browser software.
 - This Internet Explorer 5.0. web browser software is used in this manual.
2. Enter "http://192.168.0.1" (SB-110 default address) into the address bar.
 - The [Wireless LAN Settings] screen appears.

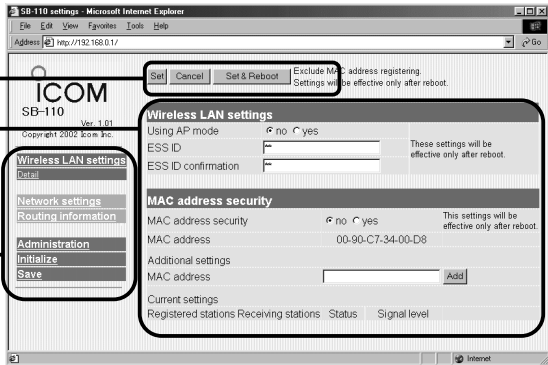
[Wireless LAN Settings] Screen

[Set] / [Cancel] /

[Set & Reboot] Buttons

Setting Screen Display Area

Setting Screen Selection



Setting Screen Selection

All the Setting Screen titles are shown. When you click the desired titles, the corresponding screen appears.

- **Wireless LAN settings (Detail settings)**
For wireless LAN settings, communication mode selection, WEP and MAC address security settings.
- **Network settings**
For routing mode functions, IP settings and DHCP server settings.
- **Routing information**
For manual static routing entries and routing information.
- **Administration**
Set manager ID and pass word, SYS-LOG functions and for firmware update preparation.

- **Initialize**
For initialization and resetting the SB-110 to factory default.
- **Save**
For checking SB-110 setting details and saving settings as a configuration file.
- **[Set] / [Cancel] / [Set & Reboot]**
For saving setting alterations made on the screen or cancel them, and [Set & Reboot].
- **Setting Screen Display Area**
A screen selected in the Setting Screen Selection menu appears.

4 SETTING SB-110

4-3 Changing Wireless Communication Mode

An SB-110 can be also used as wireless access point. Take following steps to change its settings.

IMPORTANT!

Compatibility with Macintosh or any other non-Icom products are not guaranteed. Use only compatible Icom wireless products.

An SB-110 must be turned on and working properly before any wireless devices connect.

<How to change>

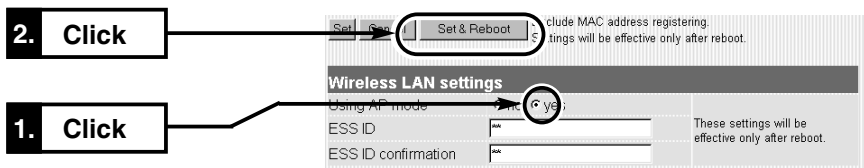
1. Access the SB-110 setting screen as described in 4-1 and 4-2.

- The [Wireless LAN Settings] screen appears.

2. Operate as follows:

Following instructions are written provided that every changeable value has factory default one.

- "LG" is factory default setting of SB-110's ESS ID. ESS ID of SB-110 and wireless LAN devices must have the same ESS ID to communicate.



3. The SB-110 restarts and works in Access Point mode.

4. Prepare a computer with compatible Icom wireless LAN card configured according to the article 3-2.

5. Turn on the computer. An IP address is automatically assigned by the SB-110.

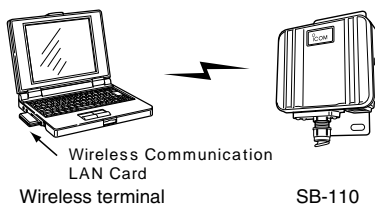
- An IP address is assigned from SB-110 automatically.

•[⚡] indicator SB-110 light red.

6. Open WWW browser on the computer and

enter "http://192.168.0.1"(default IP address of an SB-110) into the address bar.

- The [Wireless LAN Settings] screen appears.



In Wireless Access Point Mode

If an SB-110 is working in routing mode(see 5-3), factory default IP address of SB-110's setting screen has two IP addresses. One for access from wired LAN and the another is for access from wireless LAN.

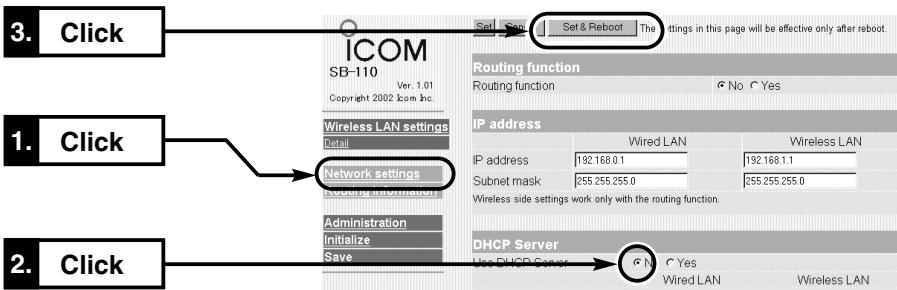
- Wired LAN : http://192.168.0.1 (default setting)
- Wireless LAN: http://192.168.1.1 (default setting)

4-4 Deactivating DHCP Server

DHCP server function of an SB-110 must be disabled if connected to a wired network on which another DHCP server works.

<How to Deactivate>

1. Access the SB-110 setting screen according to the procedure described in 4-1 and 4-2.
 - The [Wireless LAN Settings] screen appears.
2. Click [Network setting] in the left frame.
 - The [Network settings] Screen appears.
3. Click the [No] radio button in the [Use DHCP Server] field in the [DHCP Server] (in the right frame). Then click [Set & Reboot].
 - "Now rebooting" is displayed on the screen and activate with the specified settings.



4. Change IP settings for the SB-110 and computers according to the wired network configuration(see4-5) and restart devices to take effect.

4 SETTING SB-110

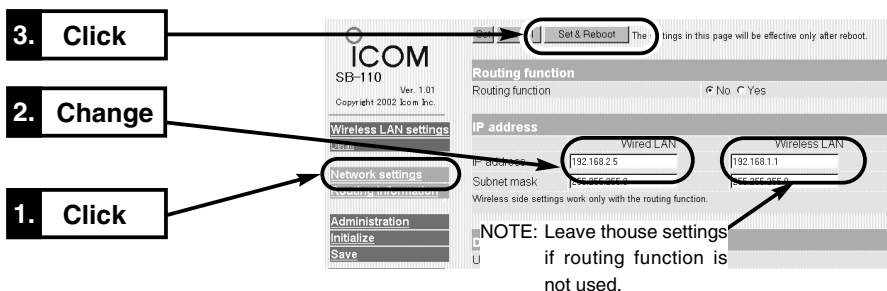
4-5 Changing IP Address Of SB-110

This section explains how to change IP address of an SB-110 to avoid conflicted IP address when connected to a working wired network with a device of the same IP address as a factory default SB-110 has.

* If SB-110's DHCP server function is used and network address of the SB-110 is to be changed, network address settings of initial application IP address must be also matched as described in 5-9 Changing assignment start IP address.

<How to change>

1. Access the SB-110 setting screen according to the procedure described in 4-1 and 4-2.
 - The [Wireless LAN Settings] screen appears.
2. Click [Network setting] in the left frame.
 - The [Network settings] Screen appears.
3. Enter the desired IP address into the [Wired LAN].
 - “The IP address has been changed. Change the computer setting.” is displayed on the screen.



4. If DHCP server function is working on the SB-110, refresh the computer's IP address using "winipcfg.exe" or "Ipconfig" command(see 3-4) or reboot the computer. If statically fixed IP address is used, change the network settings manually.

How to Assign IP Address

IP Addresses consist of two elements, network address part and host address. For example, "192.168.0.1" (default IP address of SB-110) have network address "192.168.0" and host address "1". Network devices such as computers with the same network address are recognized as connected on the same network system. Each network device is distinguished by its host address. Please pay close attention for rules below.

- All network devices on the same network must have the same network address.
- All network devices on the same network must have a unique host address.
- Never assign a "network address" to a network device(host address 0 or smallest number available).
- Never assign a "broadcast address" to a network device(host address 255 or largest number available).

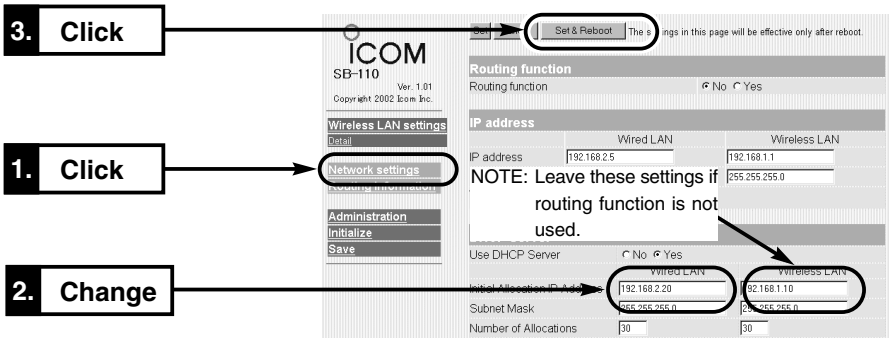
4-6 Changing Automatic Assignment Start IP Address

When SB-110's DHCP server function is enabled and network address is going to be changed, network address of initial allocation IP address setting must be also set the same as network address.

This section describes how to change the automatic assignment start IP address.

<How to change>

1. Access the SB-110 setting screen according to the procedure described in 4-1 and 4-2.
 - The [Wireless LAN Settings] screen appears.
2. Click [Network settings] in the left frame.
 - The [Network settings] Screen appears.
3. Enter the desired automatic assignment start IP address into the [Initial Allocation IP Address].
 - "Now rebooting" is displayed on the screen.



4. If DHCP server function is working on the SB-110, refresh the computer's IP address using "winipcfg.exe" or "Ipconfig" command(see 3-4) or reboot the computer.

DHCP Server Function

When SB-110's DHCP server function is enabled(as factory default), IP address of computers and other devices with DHCP client function will automatically get IP setting from the SB-110. SB-110's DHCP server settings must be configured correctly so that any automatically assigned IP address is not conflicted with another network device and assigned network address is the same as other network devices.

The Number of IP Addresses Assigned Automatically

UP to 128 (minimum 5) IP addresses can be assigned automatically.

Upto 254 IP host addresses can be assigned for the default network address, however, network devices beyond first 127sets need to be manually configured because of the DHCP server's technical limitation.

This chapter describes each item in the SB-110 setting screen.

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5 SETTING SCREEN

5-1 [Wireless LAN settings] Screen Wireless LAN settings

Setting for wireless section of SB-110.

Wireless LAN settings	
Using AP mode ①	<input checked="" type="radio"/> no <input type="radio"/> yes
ESS ID ②	<input type="text" value="* * * * *"/>
ESS ID confirmation ③	<input type="text" value="* * * * *"/>

These settings will be effective only after reboot.

① Using AP mode

Enable or disable access point mode (default setting: no).

- [no]: Select for the LAN to LAN bridge mode.
- [yes]: Select for the Access Point mode.

② ESS ID

Enter an ID to differentiate network groups and reduce risks of unauthorized access. Up to 31 alphanumeric characters can be used (default ID: LG). Entered characters are all shown as asterisks for additional security. When an SB-110 is working in LAN to LAN bridge mode (see 1-3), every SB-110 must have the same ESS ID to communicate each other. For access point mode (see 1-4), wireless devices must have the same ID of the SB-110's. An SB-110 must be rebooted after setting changes to take effect.

③ ESS ID confirmation

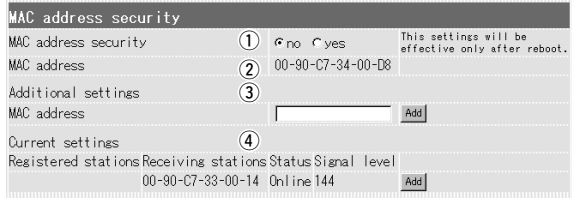
Enter the same ESS ID again here to prevent typing errors. Entered characters are all shown as asterisks for additional security.

(The entered ID is expressed as an asterisk, e.g., **.)

5-1 [Wireless LAN settings] Screen (continued from the previous page)

MAC Address security

Enable and disable MAC address security function, display MAC address of the SB-110, register MAC address of wireless LAN devices access permitted to the SB-110.



① **MAC address security**

If “yes” is selected, only wireless devices which MAC address is registered can access the SB-110 (default setting: no) -click [Set & reboot] to reboot and changes to take effect.

② **MAC address**

MAC address of the SB-110 is shown here. - in case if nothing is displayed here, contact your dealer.

③ **Additional settings**

Enter MAC address of access permitted wireless devices (or other SB-110's for LAN to LAN bridge mode).
 - Up to 256 MAC addresses can be registered.
 - Enter valid MAC address of 12-digit number
 - Click [Add] to register the entered MAC address, which will be shown in [Registered Stations] field below. All other registered entries are also shown.
 - You may or may not put “-” between two-digit numbers for MAC address entry. Both of below numbers are considered the same.
 11-11-11-22-33-33, 1111112233

5 SETTING SCREEN

5-1 [Wireless LAN settings] Screen

MAC Address security (continued from the previous page)

MAC address security			
MAC address security	①	<input checked="" type="radio"/> no <input type="radio"/> yes	This settings will be effective only after reboot.
MAC address	②	00-90-C7-34-00-D8	
Additional settings	③		
MAC address		<input type="text"/>	<input type="button" value="Add"/>
Current settings	④		
Registered stations		00-90-C7-33-00-14	
Receiving stations		Online 144	<input type="button" value="Add"/>
Status			
Signal level			

④ Current settings ...

Access permitted MAC address entries are shown below of [Registered stations]. Status of wireless LAN devices found by the SB-110 are shown below of [Receiving Stations]. Registered MAC address entries can be removed by clicking [Delete]. Click [Add] to register the receiving station as new access permitted entry. [Signal level] shows how strong signal from the wireless device is. Better than or equal to 110 means good communication status.

IMPORTANT!

Compatibility with Macintosh or any other non-Icom products are not guaranteed. Use only compatible Icom wireless products.

An SB-110 must be turned on and working properly before any wireless devices connect.

5-2 [Detail] Screen
Detail settings

Set the details of the wireless section of SB-110.

Detail settings (Version:P40003CD/110003C7)		
Channel	①	11
Transmit Rate	②	Automatic
Rts/Cts Threshold	③	None
Security Level	④	None
Key Generator	⑤	

Rate setting is ineffectual in the AP-MODE.

① Channel

Select a channel to be used for the wireless communication of SB-110 (default setting: 11).

Select a same channel for SB-110s to be used in LAN to LAN bridge mode(see 1-3).

If an SB-110 in working as Access Point, wireless LAN devices will detect automatically the channel of SB-110 and adjust themselves(see 1-4).

② Transmit Rate

Manually select wireless transmission rate of the SB-110 woking in LAN to LAN bridge mode (default setting: Automatic).

This setting is required for LAN to LAN bridge mode only.

- Regardless of this setting, any data can be received in the wireless transmission rate of 1 to 11 Mbps.

③ Rts/Cts Threshold ...

Select “500 bytes” or “1000 bytes” as the size of packet sent for communication rate negotiation (default setting: None).

When the Rts/Cts (Request to send/Clear to send) Threshold is set, communication speed deterioration caused by “hidden wireless devices” may be improved.(See Page 50 for hidden wireless devices details).

5 SETTING SCREEN

5-2 [Detail settings] Screen

Detail settings (continued from the previous page)

Detail settings (Version:P40003CD/T10003C7)	
Channel	① 11 ▾
Transmit Rate	② Automatic ▾
Rts/Cts Threshold	③ None ▾
Security Level	④ None ▾
Key Generator	⑤ <input type="text"/>

Rate setting is ineffectual in the AP-MODE.

④ Security Level

Select an encryption level for wireless data communication of an SB-110(default setting: None). WEP(Wired Equivalent Privacy) is used for encryption method. Select "Low", "Middle" or "High" to adjust encryption factors in [Custom Security] section, in which every factor can also be manually configured independently by selecting [Custom]. [WEP key] always need to be entered - Setting the same security level or custom security factor settings for all wireless devices is recommended.

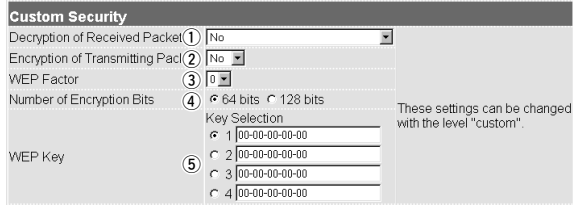
⑤ Key Generator

WEP keys can be automatically generated from character string manually entered. All the characters entered will be shown as asterisks. Generated four WEP keys will be automatically put in WEP key boxes in [Custom Security] screen. - Entering the same character string --automatically making exactly the same four WEP keys-- for all wireless devices allows every wireless LAN device to communicate each other. Wireless devices with no WEP functions used, different character strings or WEP keys are unable to communicate.

5-2 [Detail settings] Screen (continued from the previous page)

Custom Security

When “Custom” is selected in Security Level selection. Following security factors can be set manually.



① **Decryption of Received Packet**

Setting for decryption of received packet. Select one of “No”, “Yes” and “Yes (discard unencrypted packets)” (default setting: No).

② **Encryption of Transmitting Packet**

Setting for encryption of transmitting packets. Select “Yes” or “No” (default setting: No).

③ **WEP Factor**

Item to specify a security level. The value [0] means the highest security level (initial value: 0).

The values means as follows:

[0] = Changes an internal encryption key per packet.

[1] = Changes an internal encryption key at every 10 packets.

[2] = Changes an internal encryption key at every 50 packets.

[3] = Changes an internal encryption key at every 100 packets.

5 SETTING SCREEN

5-2 [Detail settings] Screen

Custom Security (continued from the previous page)

④ Number of Encryption Bits

For WEP key length selection (default: 64bit).

When “64bits” is selected, lower 40-bit(10-digit hexadecimal number) of four WEP keys generated from character string entered in [Key Generator] will be used. Alternatively, a 10-digit hexadecimal number can be manually entered in a text box.

When “128bits” is selected, lower 104-bit(26-digit hexadecimal number) of four WEP keys generated from character string entered in [Key Generator] will be used. Alternatively, a 26-digit hexadecimal number can be manually entered in a text box.

- When hexadecimal numbers are entered manually, no strings will be shown in [Key Generator] text box.
- First 24bits will not be displayed(i.e. only 40bits shown when 64bits key is selected).

5-2 [Detail settings] Screen

Custom Security (continued from the previous page)

- ⑤ **WEP Key**..... Select a WEP key from four selections to be actually used for encryption(default setting :1).
Click a radio button to select a key shown right for encryption. Only wireless LAN devices with the same WEP key entry in the same location(i.e. 1,2,3 or 4) can decrypt. Encryption key selection is irrelevant for decryption. Sharing exactly the same four WEP key entries in every wireless LAN device is recommended because regardless of encryption key selection, they can communicate each other.
- See 5-2 detail settings for more encryption related information.
 - See WEP key selection examples on page 52.

5 SETTING SCREEN

5-2 [Detail settings] Screen (continued from the previous page)

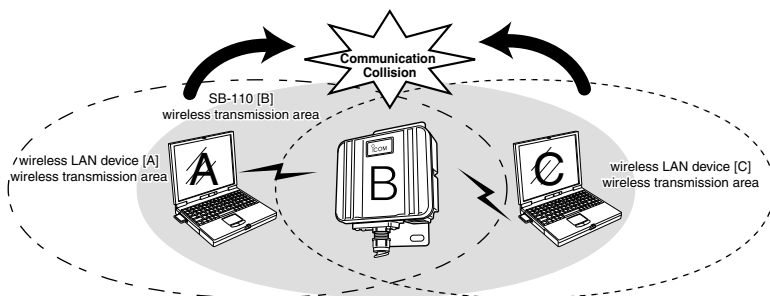
Wireless LAN Devices (information only)

During Access Point mode communication as shown below, even when wireless LAN device [A] and [C] can communicate with SB-110 [B], wireless LAN device [A] and [C] cannot communicate with each other. In this case, wireless LAN device [A] is referred to as “hidden wireless LAN device” to [C] and the terminal [C] is also referred to as “hidden wireless LAN device” to [A].

When there is any hidden wireless LAN device, carrier sense does not function effectively to those wireless LAN devices. So, communication collision happens frequently in SB-110 [B] and the throughput (the amount of information transmitted within a specified period) decreases.

To prevent the communication collision, SB-110 [B] which received the request-to-send (Rts) signal sends the Clear-to-send (Cts) signal repeatedly to the wireless LAN devices [A] and [C]. Then, either of those two wireless LAN devices, which does not send Rts, can recognize that SB-110 [B] is communicating with the a hidden wireless LAN device.

Now, the wireless terminal [A] or [C], which does not send Rts, forbears access to SB-110 [B] and communication collision can be prevented.



5-2 [Detail settings] Screen (continued from the previous page)

Relation between [Security Level] and [Custom Security]

		WEP Setting			WEP Factor	Number of Encryption Bits
		Decrypt received packet	Discard unencrypted packets	Encrypt transmitting packet		
Security Level	No	Not decrypt	Setting disabled	Not encrypt	Disabled	Disabled
	Low	Decrypt	will not discard	Encrypt	3	64-bit encryption
	Middle	Decrypt	discard	Encrypt	0	64-bit encryption
	High	Decrypt	discard	Encrypt	0	128-bit encryption

[Security Level] Setting

The table below shows compatibility between wireless LAN devices of variety of security level selections.

(: Communication can be made. x : No communication can be made.)

If WEP keys are different from each other, wireless LAN devices cannot communicate even if their security level is set at the same.

Security Level	No	Low	Middle	High
No		x	x	x
Low	x			x
Middle	x			x
High	x	x	x	

5 SETTING SCREEN

5-2 [Detail settings] Screen (continued from the previous page)

Example of [WEP Key] Setting

When the WEP key is set for 64-bit encryption:

Key Selection	
<input type="radio"/>	1 8F-E0-7B-D2-2A
<input checked="" type="radio"/>	2 35-8B-80-45-94
<input type="radio"/>	3 FD-99-76-BC-8B
<input type="radio"/>	4 EF-04-9D-48-67

Two-way
communication
available



Key Selection	
<input type="radio"/>	1 EF-04-9D-48-67
<input checked="" type="radio"/>	2 35-8B-80-45-94
<input type="radio"/>	3 FD-99-76-BC-8B
<input type="radio"/>	4 8F-E0-7B-D2-2A

Key Selection	
<input type="radio"/>	1 8F-E0-7B-D2-2A
<input checked="" type="radio"/>	2 35-8B-80-45-94
<input type="radio"/>	3 FD-99-76-BC-8B
<input type="radio"/>	4 EF-04-9D-48-67

Two-way
communication
available



Key Selection	
<input type="radio"/>	1 EF-04-9D-48-67
<input type="radio"/>	2 35-8B-80-45-94
<input checked="" type="radio"/>	3 FD-99-76-BC-8B
<input type="radio"/>	4 8F-E0-7B-D2-2A

Key Selection	
<input checked="" type="radio"/>	1 8F-E0-7B-D2-2A
<input type="radio"/>	2 35-8B-80-45-94
<input type="radio"/>	3 FD-99-76-BC-8B
<input type="radio"/>	4 EF-04-9D-48-67

Communication
unavailable



Key Selection	
<input type="radio"/>	1 EF-04-9D-48-67
<input type="radio"/>	2 35-8B-80-45-94
<input type="radio"/>	3 FD-99-76-BC-8B
<input checked="" type="radio"/>	4 8F-E0-7B-D2-2A

5-3 [Network settings] Screen

Routing function

Detailed settings for Routing Function. LAN to LAN bridge mode can use this function to control packet flows across wired and wireless network segments.

IMPORTANT!

Routing function cannot be used in Access Point mode. This function is only intended for use in LAN to LAN bridge mode.

Routing function	
Routing function	<input checked="" type="radio"/> No <input type="radio"/> Yes

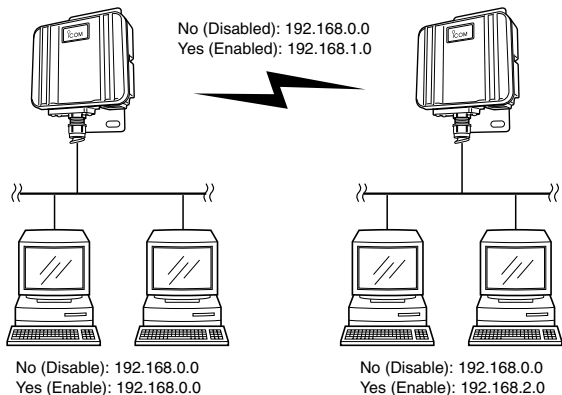
Select Yes to enable Routing Function(Default:No). The SB-110 must be rebooted to take effect changes. Routing Function will improve network efficiency by reducing broadcast packets, which will not reach beyond routers.

- "No" setting means the entire network, including both wired and wireless devices(=SB-110s in LAN to LAN bridge mode), will have the same network address.
- "Yes" setting applies different network addresses for wired network devices and wireless devices(=SB-110s in LAN to LAN bridge mode).

Conceptual Diagram

An upper part of the diagram shows an example of the address of each network when routing function is not used.

A lower part of the diagram shows an example of the address of each network when routing function is used.



5 SETTING SCREEN

5-3 [Network settings] Screen (continued from the previous page)

IP address

Setting for the IP address and subnet mask of SB-110.

IP address		
	① Wired LAN	Wireless LAN
IP address	② 192.168.0.1	192.168.1.1
Subnet mask	③ 255.255.255.0	255.255.255.0

Wireless side settings work only with the routing function.

① Wired LAN / Wireless LAN.....

The IP address and subnet mask set in the wired LAN are enabled only when the [Yes] radio button of [Routing function] is checked. When the [No] radio button of [Routing function] is checked (default setting), the IP address and subnet mask set in the wired LAN apply to the wireless LAN also.

② IP address

Enter the IP address of wired LAN and wireless LAN of SB-110.

To activate with the changed setting, restart SB-110.

Wired LAN: 192.168.0.1 (default setting)

Wireless LAN: 192.168.1.1 (default setting)

③ Subnet mask

Enter the subnet mask of wired LAN and wireless LAN of SB-110.

To activate with the changed setting, restart SB-110.

Wired LAN: 255.255.255.0 (default setting)

Wireless LAN: 255.255.255.0 (default setting)

5-3 [Network settings] Screen (continued from the previous page)

DHCP Server

Setting for the DHCP server function of SB-110.

DHCP Server		
Use DHCP Server	① <input type="radio"/> No <input checked="" type="radio"/> Yes	
	② <input type="checkbox"/> Wired LAN <input type="checkbox"/> Wireless LAN	
Initial Allocation IP Address	③ 192.168.0.10	192.168.1.10
Subnet Mask	④ 255.255.255.0	255.255.255.0
Number of Allocations	⑤ 30	30
Default Gateway	⑥	
Primary DNS Server	⑦	
Secondary DNS Server	⑧	
Primary WINS Server	⑨	
Secondary WINS Server	⑩	
Domain Name	⑪	
Lease Period	⑫ 3 days	

Wireless side settings work only in the routing mode.

① **Use DHCP Server ...**

Select whether SB-110 is used as the DHCP server or not (default setting: Yes).

When TCP/IP of network devices connected to SB-110 through cable or by wireless is set to [Obtain an IP address automatically], those Computers become the DHCP client of SB-110. By this function, the IP address/subnet mask and the IP address/domain name of router and DNS server(s) obtained dynamically from SB-110 which is the DHCP server.

② **Wired LAN / Wireless LAN.....**

Every item set in the wired LAN in the [DHCP Server] screen is enabled only when the [Yes] radio button of [Routing function] is checked. When the [No] radio button of [Routing function] is checked (default setting), the values set in the wired LAN apply to the wireless LAN also.

③ **Initial Allocation IP Address**

Enter the initial IP address allocated automatically to the clients connected directly to SB-110 through cable or by wireless.

Wired LAN: 192.168.0.10 (default setting)

Wireless LAN: 192.168.1.10 (default setting)

5 SETTING SCREEN

5-3 [Network settings] Screen

DHCP Server (continued from the previous page)

DHCP Server		
Use DHCP Server <input type="radio"/> No <input checked="" type="radio"/> Yes		
	Wired LAN	Wireless LAN
Initial Allocation IP Address	192.168.0.10	192.168.1.10
Subnet Mask	255.255.255.0	255.255.255.0
Number of Allocations	30	30
Default Gateway		
Primary DNS Server		
Secondary DNS Server		
Primary WINS Server		
Secondary WINS Server		
Domain Name		
Lease Period	3 days	

Wireless side settings work only in the routing mode.

④ Subnet Mask

Subnet mask to [Initial Allocation IP Address].

Wired LAN: 255.255.255.0 (default setting)

Wireless LAN: 255.255.255.0 (default setting)

⑤ Number of Allocations

The maximum number of addresses which can be assigned continuously from the IP address specified in [Initial Allocation IP Address] is 5 to 128 (default setting: 30). In logically, up to 254 IP can be assigned with the default Initial Allocation IP Address and Subnet Mask values. However, any network devices beyond 128 need to be manually configured.

⑥ Default Gateway

Default gateway announced to clients.

⑦ Primary DNS Server

DHCP clients will be announced of the IP address entered here as primary Domain Name server. If only one DNS is available on the network, enter IP address of the DNS here. If two DNSs are available, enter the IP address of a DNS server for primary use.

5-3 [Network settings] Screen

DHCP Server (continued from the previous page)

DHCP Server																								
Use DHCP Server	① <input type="radio"/> No <input checked="" type="radio"/> Yes																							
	② <table border="1"> <tr> <th>Wired LAN</th> <th>Wireless LAN</th> </tr> <tr> <td>Initial Allocation IP Addr</td> <td>③ 192.168.0.10</td> </tr> <tr> <td>Subnet Mask</td> <td>④ 255.255.255.0</td> </tr> <tr> <td>Number of Allocations</td> <td>⑤ 30</td> </tr> <tr> <td>Default Gateway</td> <td>⑥</td> </tr> <tr> <td>Primary DNS Server</td> <td>⑦</td> </tr> <tr> <td>Secondary DNS Server</td> <td>⑧</td> </tr> <tr> <td>Primary WINS Server</td> <td>⑨</td> </tr> <tr> <td>Secondary WINS Server</td> <td>⑩</td> </tr> <tr> <td>Domain Name</td> <td>⑪</td> </tr> <tr> <td>Lease Period</td> <td>⑫ 3 days</td> </tr> </table>		Wired LAN	Wireless LAN	Initial Allocation IP Addr	③ 192.168.0.10	Subnet Mask	④ 255.255.255.0	Number of Allocations	⑤ 30	Default Gateway	⑥	Primary DNS Server	⑦	Secondary DNS Server	⑧	Primary WINS Server	⑨	Secondary WINS Server	⑩	Domain Name	⑪	Lease Period	⑫ 3 days
Wired LAN	Wireless LAN																							
Initial Allocation IP Addr	③ 192.168.0.10																							
Subnet Mask	④ 255.255.255.0																							
Number of Allocations	⑤ 30																							
Default Gateway	⑥																							
Primary DNS Server	⑦																							
Secondary DNS Server	⑧																							
Primary WINS Server	⑨																							
Secondary WINS Server	⑩																							
Domain Name	⑪																							
Lease Period	⑫ 3 days																							
Wireless side settings work only in the routing mode.																								

⑧ **Secondary DNS Server**

If another DNS is available on the network, enter IP address of the server here.

⑨ **Primary WINS Server**

When using a WINS server in the Microsoft network, enter the WINS server address in this field. When there are two WINS server addresses, enter the either one as necessary.

⑩ **Secondary WINS Server**

Similarly with [Primary WINS Server] as above, when there are two WINS server addresses, enter the either one in this field as necessary.

⑪ **Domain Name**

Enter the domain name of the network to be announced for DHCP clients if necessary.

⑫ **Lease Period**

Enter the number of days (1 to 99) as intervals that the DHCP server automatically updates IP address of clients(default setting:3).

5 SETTING SCREEN

5-3 [Network settings] Screen (continued from the previous page)

Static DHCP Server Setting to fix the IP address assigned to a specific client.

Static DHCP Server		
Additional settings		
MAC Address	IP Address	Wired LAN / Wireless LAN
<input type="text"/>	<input type="text"/>	<input type="button" value="Add"/> / <input type="button" value="Add"/>
Wireless side settings work only in the routing mode.		
Current settings		
MAC Address	IP Address	Wired LAN / Wireless LAN

Fields to enter MAC address and IP address combination for a DHCP client to be always announced of the IP address.

- Up to 16 combinations can be registered. The client IP address to be registered must be out of the address range assigned by the DHCP server function.
- To register the details of wired terminal, click [Add] of Wired LAN. To register the details of wireless LAN devices, click [Add] of Wireless LAN.
- The registration of wireless LAN devices is enabled only when the [Yes] radio button of [Routing function] is checked.

Example of Registration

•When the [Yes] radio button of [Routing function] is checked.

To cancel the registration, click [Delete] in an applicable field.

Current settings		
MAC Address	IP Address	Wired LAN / Wireless LAN
00-80-AD-C6-AE-A4	192.168.0.60	<input type="button" value="Delete"/>
00-90-C7-11-11-11	192.168.1.60	<input type="button" value="Delete"/>

5-4 [Routing information] Screen

RIP

Enable RIP function to exchange routing information with neighboring routers and access points for dynamically configured automatic routing entries.

RIP	
Use RIP	<input type="radio"/> No <input checked="" type="radio"/> Yes

Select whether the RIP function is used or not (default setting Yes).

When the RIP is used, an RIP packet is broadcasted at every 30 seconds(approx.) using the broadcast address of the access point.

* Click [Set & Reboot] for changes to take effect.

Network Interface List

Refer to the description of [Path] of [IP Routing Information] (See page 60).

Network Interface List		
Interface	IP Address	Subnet Mask
local	192.168.0.1	255.255.255.0

5 SETTING SCREEN

5-4 [Routing information] Screen (continued from the previous page)

IP Routing Information

This screen shows routing information entries of the router function. It also shows manual entries added in [Static Route].

Destination	Net Mask	Gateway	Path	Creation Type	Metric
192.168.0.0	255.255.255.0	192.168.0.1	local	static	0
192.168.0.0	255.255.255.255	255.255.255.255	local	misc	0
192.168.0.1	255.255.255.255	192.168.0.1	local	static	0
192.168.0.255	255.255.255.255	255.255.255.255	local	misc	0

- ① **Destination** Shows the destination IP address of packet routing.
- ② **Subnet mask** Shows the subnet mask to the destination IP address of packet routing.
- ③ **Gateway** Shows the gateway to the destination IP address of packet routing.
- ④ **Path** Shows the transfer destination interface to the destination IP address of packet routing. Details of interfaces are shown in the [Network Interface List] screen (See page 59).
- ⑤ **Creation Type** Shows how routing information was created.
- static : Created according to a static route (which was defined).
 - rip : Created according to a dynamic route (which was generated automatically).
 - misc : Created by a frame operation related to broadcast.
- ⑥ **Metric** Shows the cost of path.

5-4 [Routing information] Screen (continued from the previous page)

Static Route

Manual entry of static routing paths for the routing table. Upto 20 entries can be entered.

- When you have entered data, click [Add] to check that the data has been registered in the [Current setting] field. The details of registered data are displayed also in the [IP Routing Information] screen.

Static Route						
Add	①	nal setting	②	③	④	⑤
	Path	Destination	Net Mask	Gateway	Metric	
	ethernet					Add
Current settings						
	Path	Destination	Net Mask	Gateway	Metric	

① **Path**

- local : “local” is shown when Routing Function is disabled and not controlled by the SB-110.
- ethernet : “Ethernet” means this entry is for wired LAN side.
- wireless : “wireless” means this entry is for wireless LAN side.

② **Destination**

According to a selected path (local/ethernet/wireless), enter the IP address of the destination.

③ **Subnet mask**

According to a selected path (local/ethernet/wireless), enter the net mask to the IP address of the destination.

④ **Gateway**

Enter a gateway of packet transfer destination (router or access point) to be routed.

⑤ **Metric**

Enter abstractive number between 0 and 15 of routing priority or how many times of being routed by networking devices before reaching the destination. Smaller number means shorter path or higher capacity.

5 SETTING SCREEN

5-5 [Administration] Screen

Manager ID

Setting for restriction of access to the setting screen of SB-110.

Manager ID		
Manager ID	①	<input type="text"/>
Manager Password	②	<input type="text"/>
Password Confirmation Reentry	③	<input type="text"/>

① Manager ID

To password protect setting screens of an SB-110, enter desired ID of 31 or less alphanumeric characters. Password for the ID can be entered below.

When the Manager ID has been set, prompted to enter a user name from the next access.

Then, enter the Manager ID.

② Manager Password

To password protect, enter desired password of 31 or less alphanumeric characters here for the manager ID entered above box. When the Manager ID and password have been set, you will be prompted to enter valid combination of ID and password. Entered characters will shown as asterisks (e.g., ****).

When the Manager Password has been set, prompted to enter such password from the next access. Then, enter the Manager Password.

③ Password Confirmation Reentry

To avoid typing errors in the password, exactly the same password must be entered here as confirmation. Entered characters will shown as asterisks. (e.g., ****).

5-5 [Administration] Screen (continued from the previous page)

SYSLOG

Settings for SYSLOG log output function, etc. to a specified host address.

SYSLOG	
Use DEBUG	① <input type="radio"/> No <input checked="" type="radio"/> Yes
Use INFO	② <input type="radio"/> No <input checked="" type="radio"/> Yes
Use NOTICE	③ <input checked="" type="radio"/> No <input type="radio"/> Yes
Host Address	④ <input type="text"/>
Facility	⑤ <input type="text"/>

- ① **Use DEBUG** Select whether debug information is output to SYSLOG or not (default setting: Yes).

- ② **Use INFO** Select whether a message of INFO type is output to SYSLOG or not (default setting: Yes).

- ③ **Use NOTICE** Select whether a message of NOTICE type is output to SYSLOG or not (default setting: No).

- ④ **Host Address** When the SYSLOG function is in used, enter an address of a host which receives SYSLOG.
The host must be able to support the SYSLOG server function.

- ⑤ **Facility** Enter a numerical value in a range between 0 and 23 as a facility of SYSLOG.
Usually, enter "1" (default setting: 1).

5 SETTING SCREEN

5-5 [Administration] Screen (continued from the previous page)

Use utility software (Firmware Update Mode)

To reset the SB-110 to factory default settings or update the firmware by a utility software software comes with.

Use utility.	
<Notice>	It will stop the normal operation.
<input type="button" value="Go"/>	<input type="checkbox"/> Check

Check the box and click [Go] to reboot the SB-110 and start in utility software mode. This utiliti mode is the same mode which can be activated by [Mode] button on the body of SB-110. See “Operation” in chapter 6 for more information.

This chapter describes the procedure for access inhibition to the setting screen, to save or initialize the details, and to update the firmware. Read this chapter as necessary.

6-1 SB-110 CD-ROM66
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Required OS66
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6 MAINTENANCE

6-1 SB-110 CD-ROM

The supplied CD contains SB-110 utility software for Windows and this instruction manual in PDF format. This CD-ROM contains the instruction manual (of PDF file) and Utility software.

Contents

- Instruction Manual of PDF file (this document)
Describes SB-110 in detail.
- Acrobat Reader 5.0 (for Windows)
Software to view the PDF files contained the CD-ROM. (Follow the instruction screen of the installer.)
- SB-110 Utility software (for Windows)
Use to initialize (See 6-6) the entire configuration of SB-110 or update (See 6-6) it.

Auto Run Function

Insert the CD-ROM disc. The menu screen appears automatically.

Required OS

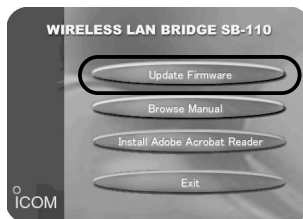
Compatible operating systems:

Windows XP, Windows Me, Windows 2000, Windows 98 and Windows 98SE.

To Start SB-110 Utility software

SB-110 Utility software is contained in the SB-110 CD-ROM.

1. Insert the SB-110 CD-ROM, into a CD-ROM drive of your Computer.
 - The Auto Run function of the SB-110 CD-ROM starts and a menu screen appears automatically.
2. Click [SB-110 Utility software].
 - SB-110 Utility software starts.



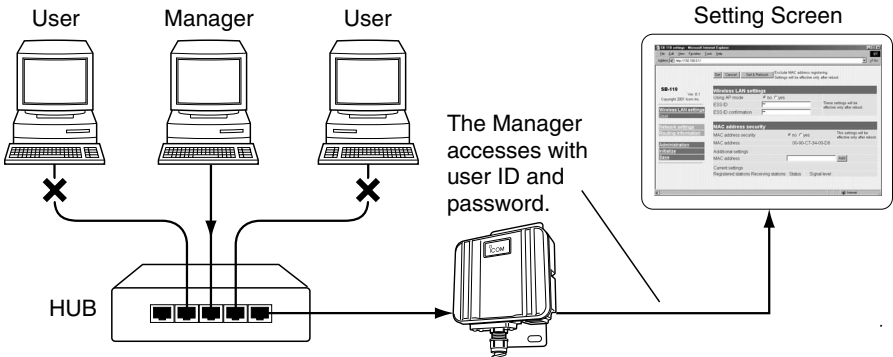
[When Auto Run function does not start]

Double-click the "AutoRun.exe" in the [CD-ROM Drive] icon through the Explorer, and the menu screen above is appears.

6-2 Access inhibition to Setting Screen

If you set Manager ID and Manager password, you can prevent any unauthorized person from changing the setting of SB-110 through a web browser software.

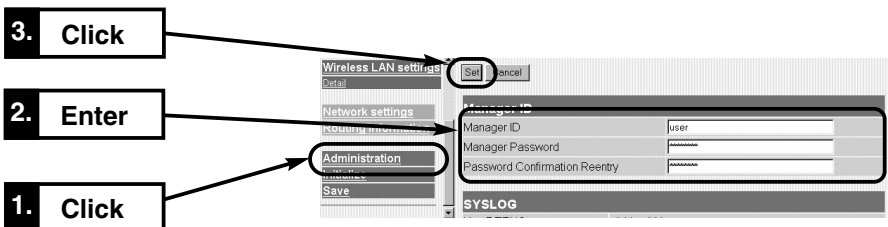
If the Manager ID and Manager Password are set, a screen will prompt an the operator to enter the user name [User Name (U)] and password [Password (P)] when a user accesses.



<How to set>

The manager can enter up to 31 alphanumeric characters for ID and password. Capital and small letters are distinguished.

1. Start a web browser software and access the SB-110 setting screen (See 4-2).
 - The [Wireless LAN Settings] screen appears.
2. Click [Administration] in the left frame.
 - The [Administration] screen appears.
3. Enter the manager ID in the [Manager ID] field (e.g., "user").
4. Enter the manager password in the [Manager Password] and [Password Confirmation Reentry] fields (e.g., userpass).
The all entered characters are displayed as a asterisk (e.g., *****).
5. Click [Set], and a screen appears to prompt you to enter the user name [User Name (U)] and password [Password (P)].
Then, enter the specified manager ID and manager password.



6 MAINTENANCE

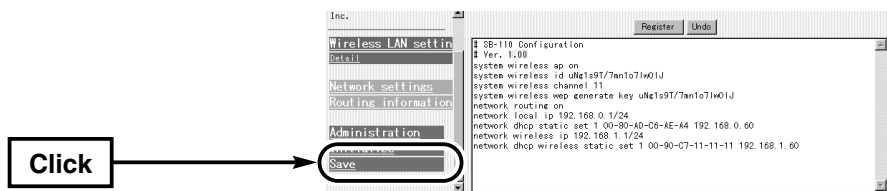
6-3 Verifying and Saving settings

Here you can verify settings and save them as a HTML file which can be used later for settings restoration.

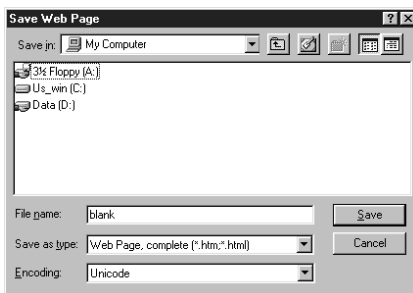
You can use the saved settings when they have been lost by accident.

<How to verify and save>

1. Start a web browser software and access the SB-110 setting screen (See 4-2).
 - The [Wireless LAN Settings] screen appears.
2. Click [Save] in the left frame.
 - The details of settings are listed in the [Save] screen.
 - Do not delete nor rewrite any description in the text box directly.



3. When the [Save] screen appears, click [Save As (A)] in the [File (E)] menu of the web browser software.



4. Select the location from [Save in (I)] and enter a file name in the [File Name (N)] box.
 - * If you use Netscape Navigator, change “.htm” or “.html” as the file extension.
5. Select “Web Page, complete (*.htm;*.html)” from [File Types(T)]. (Internet Explorer)
6. Click [Save (S)], and the configuration file is saved in the specified location.

Password displayed in [Save] screen

The details of the manager password and the generator key (from which WEP keys are generated) displayed in the [Save] screen are encrypted. So, the password in the saved configuration file is never revealed.

6-4 Transferring Saved Settings

This section describes the procedure to transfer the details of a saved configuration file (See 6-3) into the SB-110 setting.

<How to write>

1. On a Computer connected with an SB-110, move the mouse pointer to a saved configuration file (with the extension “.htm”), then double-click it.
 - The [Save] screen appears.



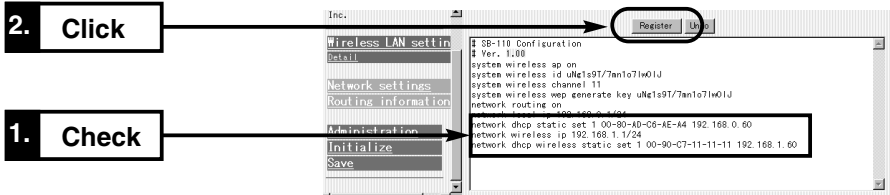
SB-110setting page.htm

2. Check the IP address of SB-110 in the text box.

If the displayed IP address is different from the setting SB-110 IP address, change the IP address in the configuration file according to the current address.

Do not change any other items.

3. Click [Register].



4. When you click [Register], the details of the configuration file are transferred into the SB-110.

* If you want transferring set anything after you write the details of the configuration file, close the screen first. Otherwise, an error may occur. Second, start the web browser software then access the setting screen.

[△ Note]
 Don't use any configuration file created by other SB-110 or other products.

6 MAINTENANCE

6-5 Restore factory default settings

If you need to restore factory default settings to clear configurations and data, there are three methods.

- A Use the [MODE] button.
- B Use the setting screen (See page 72).
- C Use Utility software (See page 73).

- To restore factory default settings with the software, you need the supplied CD-ROM in which the software contained. See 6-1 “To Start Utility” for more information.

A Use the [MODE] button.

When the initialization is executed in this way, all the setting items are returned to the default state. If the IP address set in SB-110 is unknown or the SB-110 setting screen cannot appears, you can perform the initialization according to the procedure below:

<How to initialize>

1. Disconnect the AC adapter from SB-110.
2. Disconnect all the network devices from SB-110.
3. Connect the AC Adapter to the SB-110 while push and hold [Mode] button.
4. [PWR] indicator and [MODE] indicator start blinking green alternatively. Release [Mode] button when both the indicators start blinking simultaneously after alternative blinks to enter [Initialization] mode.
5. Connect a computer to the SB-110 through Ethernet cable (See 4-1) and start the computer.
6. Start a web browser software and set the default IP address (192.168.0.1) of SB-110.

[INITIALIZATION] mode

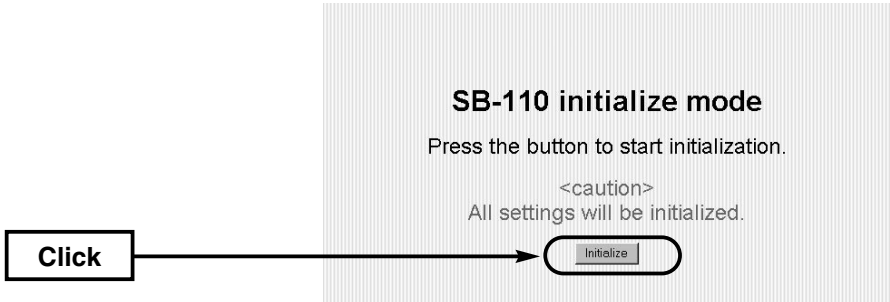
When the [INITIALIZATION] mode is enabled by using the [MODE] button, the IP address and ESS ID of SB-110 are replaced with the factory default settings temporarily until the initialization (the procedure after the step 7 above) has been completed. If you turn off and on the SB-110 without performing the procedure after the step 7, there will no changes in any settings, which remain as exactly the same as before the initialization mode enabled.

6-5 Restore factory default settings

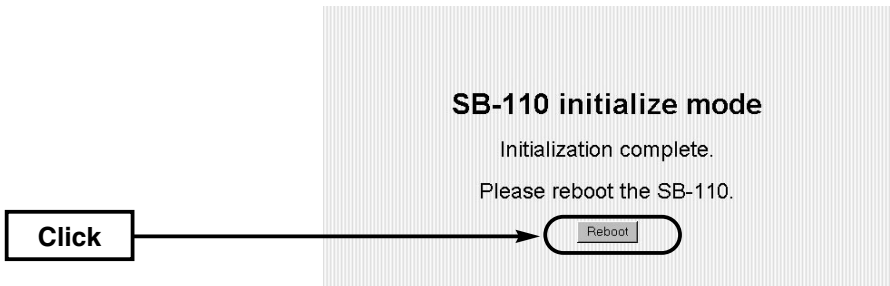
B Use the [MODE] button.

<How to initialize> (continued from the previous page)

7. When the [INITIALIZATION] mode screen appears, click [Initialize].



8. Click [Reboot].



9. When the indicators returned to the state before the [INITIALIZATION] mode and the [Wireless LAN Settings] screen appears, the initialization completes.

- During rebooting, the below screen appears.



6 MAINTENANCE

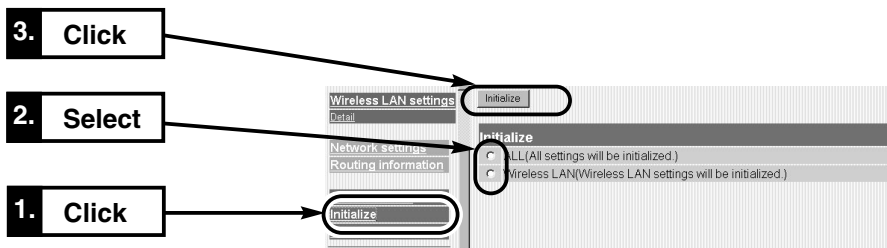
6-5 Restore factory default settings (continued from the previous page)

B Use the setting screen

If you know the IP address set of the SB-110 and can access the setting screen, you can initialize all the settings or a certain part of the settings (e.g., the wireless section) through the SB-110 setting screen.

<How to initialize>

1. Start a web browser software and access the SB-110 setting screen (See 4-2).
 - The [Wireless LAN Settings] screen appears.
2. Click [Initialize] in the left frame.
 - The [Initialize] screen appears.
3. Click a desired radio button.
4. Click [Initialize].
 - Return the setting of the selected condition to the factory default state and enter the [Wireless LAN Settings] screen.



Type of Initialization

- ALL** All the settings specified in SB-110 are returned to the factory default state.
- Wireless LAN** The items in the [Wireless LAN Settings] screen and [Detail Settings] screen are returned to the factory default state.

6-5 Restore factory default settings (continued from the previous page)**C Use Utility software**

Utility software is supplied in the SB-110 CD-ROM. This section describes the procedure to initialize the settings using Utility software.

Before using Utility software

To restore factory default setting of SB-110, the SB-110 must be working in [Use Utility] mode. Otherwise, the utility software cannot change the settings. Prepare a computer with valid network settings.

<How to enter [Use utility software] mode>

This section describes the procedure to enter the [Use utility software] mode using the [MODE] button. You may also enter the [Use utility] mode through the [Administration] screen (See 5-5).

1. Disconnect the AC adapter from SB-110.
2. Disconnect all the network devices from SB-110.
3. Pushing and holding the [MODE] button, and then connect the AC adapter to SB-110.
4. Release the [MODE] button before the [PWR] indicator and [MODE] indicator, which start blinking (in green) simultaneously from blinking (in green) alternately.
 - Enter the [Use utility software] mode and start an operation.

<How to initialize>

1. Verify that SB-110 is operating in the [Use utility software] mode. Connect a computer to the SB-110 by wired network or by wireless and turn on.
2. Start [SB-110 Utility software].

See and follow 6-1 "To start utility" in the "SB-110 CD-ROM" to start the utility software.

 - The operation screen of Utility software appears. (Refer to the screen at the next page.)
3. Click the [User Data Initialization] radio button.

Enter the IP address of SB-110 in the [SB-110 IP address] text box and click [Start].
4. When the message "User data initialization has been completed." appears on the [SB-110 Utility software] screen, the initialization of SB-110 completed.

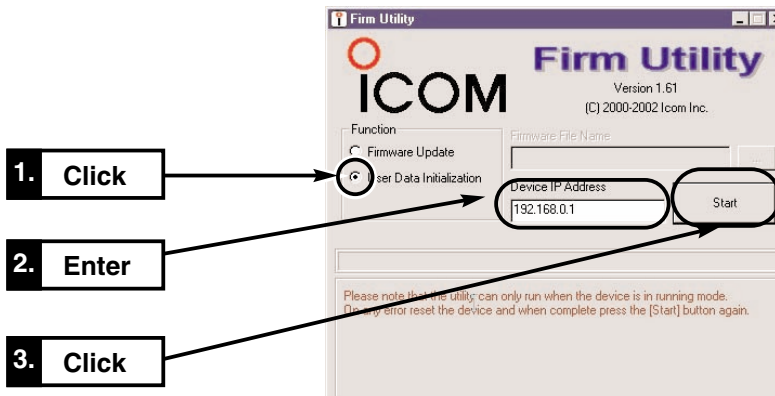
[Use utility software] mode

When the [Use utility software] mode is enabled by operating the [MODE] button, the wireless LAN security setting (WEP function) of SB-110 is disabled temporarily until Utility software operation has been completed. When Utility software is used in a wireless terminal, disable the WEP function on a Computer.

6 MAINTENANCE

6-5 Restore factory default settings (continued from the previous page)

<How to initialize> (Step 3)



[△ Note]

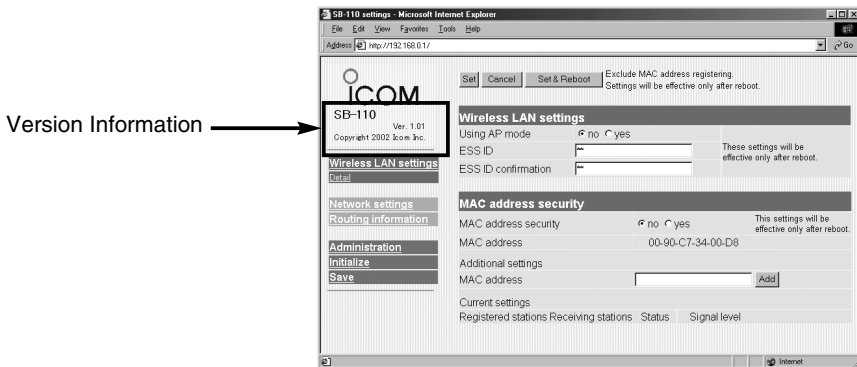
Do not quit Utility software nor turn off SB-110 during the execution of Utility software. Otherwise, data may be lost or an error may occur in an operation. Wait until "initialization successful." appears.

6-6 Upgrading SB-110

Use Utility software contained in the SB-110 CD-ROM. This section describes the procedure to upgrade SB-110 (firmware) using Utility software.

Firmware

Firmware is the internal program of an SB-110 stored in flash memory inside. Firmware can be upgraded to add functions or improve performance. To see program version of the SB-110 firmware, access SB-110 setting screen. If newer version is available from us, you may upgrade and keep the product in the best condition.



6-6 Upgrading SB-110

Firmware (continued from the previous page)

Before using Utility software

To restore factory default setting of SB-110 using Utility software, the SB-110 must be working in [Use Utility] mode. Otherwise, the utility software cannot change the settings. Prepare a computer with valid network settings.

<How to enter [Use utility software] mode>

This section describes the procedure to enter the [Use utility software] mode using the [MODE] button. You may also enter the [Use utility] mode through the [Administration] screen (See 5-5).

1. Disconnect the AC adapter from SB-110.
2. Disconnect all the network devices from SB-110.
3. Pushing and holding the [MODE] button, and then connect the AC adapter to SB-110.
4. Release the [MODE] button before the [PWR] indicator and [MODE] indicator, which start blinking (in green) simultaneously from blinking (in green) alternately.
 - Enter the [Use utility software] mode and start an operation.

Notes on Updating

To prevent accidental firmware transfer errors, connect only one computer with Utility software installed to an SB-110 by wired Ethernet connection or wireless in short range. It is strongly recommended that the computer and SB-110 are wire-connected through a hub(see 4-1).

- If you connect a computer and an SB-110, follow the instruction below.
 - Enable Access Point mode(see4-3).
 - Disable wireless LAN security settings on the computer.
 - Disconnect SB-110's Ethernet cable.
 - Keep the distance between SB-110 and the computer less than 1m.

[Use utility software] mode

When the [Use utility software] mode is enabled by operating the [MODE] button, the wireless LAN security setting (WEP function) of SB-110 is disabled temporarily until Utility software operation has been completed actually. If Utility software is used in a wireless terminal, disable the WEP function on the Computer.

You are responsible for the result of operation described herein. So, please follow the instructions below when you start an operation.

The supplied CD-ROM (except Acrobat Reader) is for SB-110 only.

NEVER use it for any other devices.

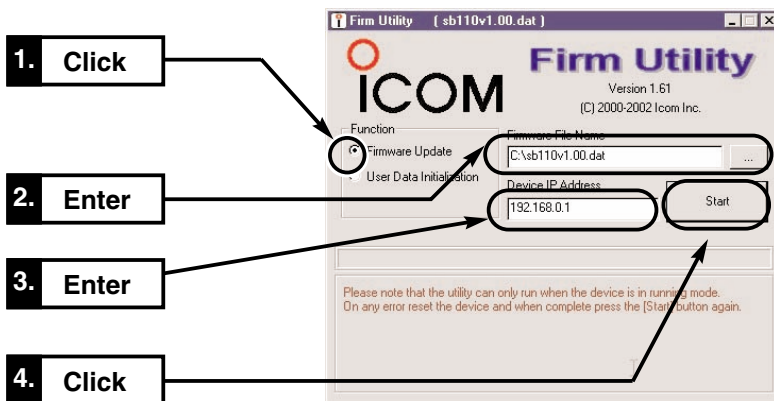
Icom Inc. is not responsible for any interference arisen by incorporating a configuration file for SB-110 or a firmware update data file, which is available in our home page, into any device other than SB-110. Moreover, Icom Inc. is not responsible for any interference arisen by modifying or disassembling SB-110. Furthermore, Icom Inc. is not responsible for any damages, lost profits or third party's claim resulting from any missed communication or telephone call due to SB-110's fault, error, malfunction, breakage, data loss or any other external factor such as power failure.

6 MAINTENANCE

6-6 Upgrading SB-110 (continued from the previous page)

How to Update

1. Verify that SB-110 is operating in the [Use utility software] mode. Then, connect a computer to the SB-110 through through wired LAN or by wireless and start the operating system.
2. Start [SB-110 Utility software].
See "To Start Utility" in "SB-110 CD-ROM"(see6-1) for more information to start.
 - The operation screen of Utility software appears. (Refer to the screen.)
3. Click the [Firmware Update] radio button.
Enter file name of a downloaded new firmware file(extension: *.dat) of SB-110 in [Firmware File Name] box directly or ckick [...] to select the file.



4. When the message "update successful." appears on the [SB-110 Utility software] screen, the update of SB-110 completes. Turn off the SB-110 and turn on again to work with the new firmware.

[Required time for updating]

An SB-110 needs below mentioned time for finishing firmware transfer and reboot.:

- Transfer: 30 to 60 seconds
- Reboot: 30 seconds

This chapter describes the examples of routing setting, setting screen overview, initial value of setting item and specifications.

7-1	Examples of Routing Setting	.80
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7-5	Specifications	.85
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7-7	Glossary	.87

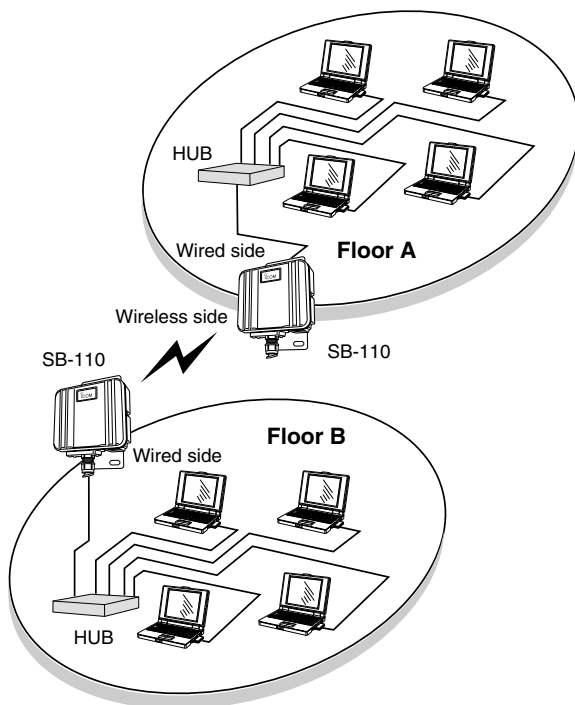
7 FOR YOUR REFERENCE

7-1 Examples of Routing Setting

This section describes two examples of settings in a network. One is for the RIP function enabled and another one is for manual routing table entries.

[Setting conditions of floor A]

- IP address of SB-110
[Wired side]
192.168.0.1.
[Wireless side]
192.168.1.1.
- IP address of wired LAN devices
192.168.0.10 to
192.168.0.13
(4 addresses)



[Setting conditions of floor B]

- IP address of SB-110
[Wired side]
192.168.2.1.
[Wireless side]
192.168.1.2.
- IP address of wired LAN devices
192.168.2.10 to
192.168.2.13
(4 addresses)

Setting RIP Function

[SB-110: Floor A side]

- Specify the IP address at the wired side of SB-110 as a default gateway for wired LAN devices.

[Network settings] Screen (See 5-3)

Routing function	
Routing function	<input checked="" type="radio"/> Yes
IP address	
IP address	<input type="text" value="192.168.0.1"/> (Wired LAN) <input type="text" value="192.168.1.1"/> (Wireless LAN)
Subnet mask	<input type="text" value="255.255.255.0"/> (Wired LAN) <input type="text" value="255.255.255.0"/> (Wireless LAN)

Wireless side settings work only with the routing function.

[Routing information] Screen (See 5-4)

RIP	
Use RIP	<input checked="" type="radio"/> Yes

7-1 Examples of Routing Setting

Setting RIP Function (continued from the previous page)

[SB-110: Floor B side]

- Specify the IP address at the wired side of SB-110 as a default gateway for wired LAN devices.

[Network settings] Screen (See 5-3)

Routing function
 Routing function No Yes

IP address

	Wired LAN	Wireless LAN
IP address	192.168.2.1	192.168.1.2
Subnet mask	255.255.255.0	255.255.255.0

Wireless side settings work only with the routing function.

[Routing information] Screen (See 5-4)

RIP
 Use RIP No Yes

Setting Routing Table

[SB-110: Floor A side]

Communication can be made similarly also by checking the [NO] radio button of [Routing function] if you enter routing table entries manually.

[Network settings] Screen (See 5-3)

Routing function
 Routing function No Yes

[Routing information] Screen (See 5-4)

RIP
 Use RIP No Yes

Static Route
 Additional settings

Path	Destination	Net Mask	Gateway	Metric	
ethernet					Add
Current settings					
wireless	192.168.2.0	255.255.255.0	192.168.1.2	1	Delete

[SB-110: Floor B side]

Continued on next page.

7 FOR YOUR REFERENCE

7-1 Examples of Routing Setting

Setting Routing Table (continued from the previous page)

[SB-110: Floor B side]

[Network settings] Screen (See 5-3)

Routing function	
Routing function	<input type="radio"/> No <input checked="" type="radio"/> Yes

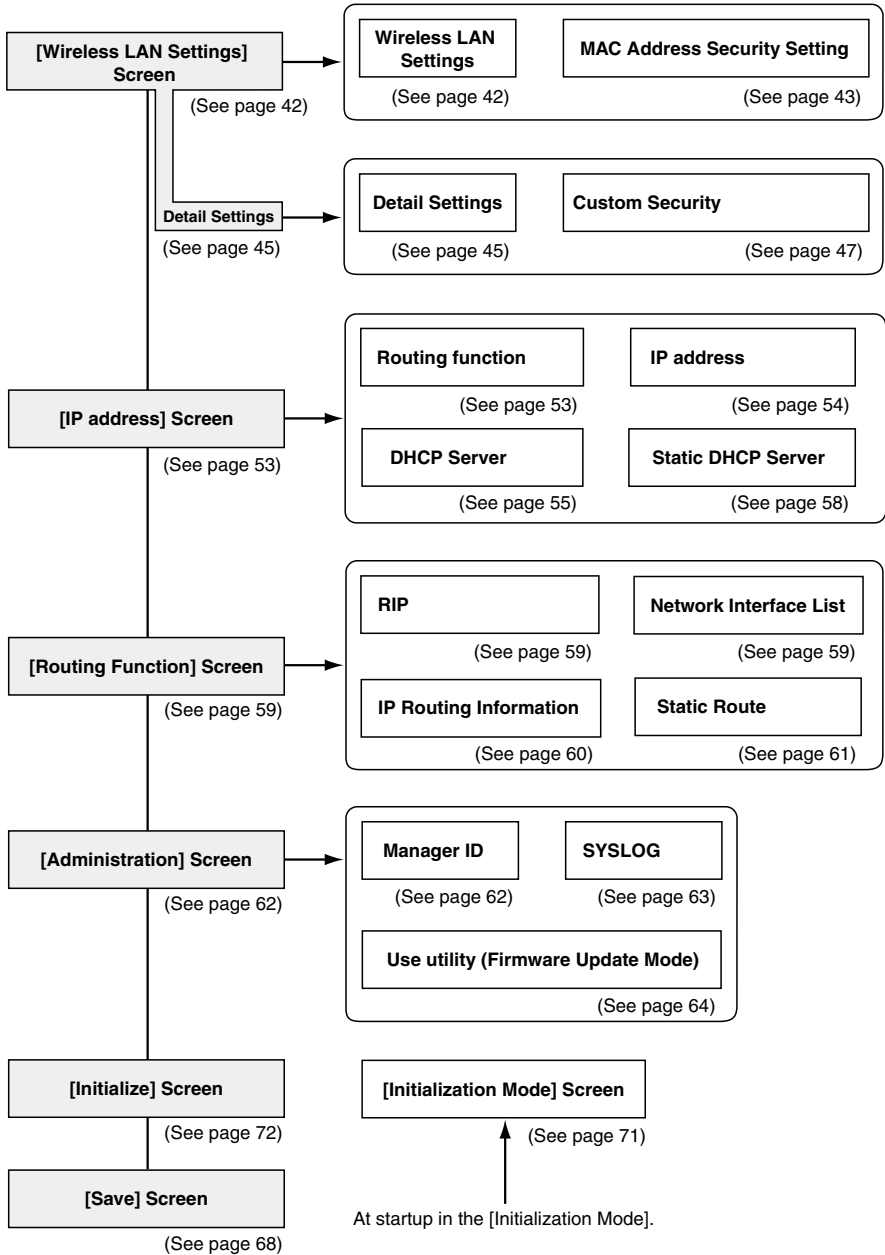
[Routing information] Screen (See 5-4)

RIP	
Use RIP	<input checked="" type="radio"/> No <input type="radio"/> Yes

Static Route					
Additional settings					
Path	Destination	Net Mask	Gateway	Metric	
ethernet					Add
Current settings					
Path	Destination	Net Mask	Gateway	Metric	
wireless	192.168.0.0	255.255.255.0	192.168.1.1	1	Delete

7-2 Setting Screen Overview

The overview of SB-110 setting screen displayed on a web browser software appears below.



7 FOR YOUR REFERENCE

7-3 Initial Values of Setting Items

The section lists the initial values in the web browser software setting screen of SB-110.

[Wireless LAN Settings] Screen

Wireless LAN Settings

- Using AP mode : No
- ESS ID : ** (LG)
- Confirmation reentry of ESS ID : ** (LG)

MAC Address Security Setting

- MAC address security : no

[Detail Settings] Screen

Detail Settings

- Channel : 11
- Transmit Rate : Automatic
- Rts/Cts Threshold : None
- Security Level : None

Custom Security

- WEP Key - Selection: 1
- WEP Key - Character string : 00-00-00-00-00

[Network settings] Screen

Routing function

- Routing function : No

IP address

Wired LAN

- IP address : 192.168.0.1
- Subnet mask : 255.255.255.0

Wireless LAN

- IP address : 192.168.1.1
- Subnet mask : 255.255.255.0

DHPC Server

- Use DHPC Server : Yes
- Lease Period : 3

Wired LAN

- Initial Allocation IP Address : 192.168.0.10
- Subnet mask : 255.255.255.0
- Number of Allocations : 30

Wireless LAN

- Initial Allocation IP Address : 192.168.1.10
- Subnet mask : 255.255.255.0
- Number of Allocations : 30

[Routing information] Screen

RIP

- Use RIP : Yes

[Administration] Screen

SYSLOG

- Use DEBUG : Yes
- Use INFO : Yes
- Use NOTICE : No
- Facility : 1

7-4 Available Functions

Wireless LAN Functions

- LAN to LAN bridge (Bridge) mode
- Access Point mode
- Roaming function
- MAC address security
- WEP (Wired Equivalent Privacy)
- ESS ID (Extended Service Set Identifier)

Router Functions

- Routing protocol TCP/IP (RIP static)
- Static routing
- RIP function
- DHCP server function
- DHCP static function
- SYSLOG

Others

- WWW maintenance
- Firmware update


7-5 Specifications

- **Input voltage** : 12 V DC $\pm 5\%$
With supplied AC adapter is 120 V AC $\pm 5\%$.
- **Current drain** : 400 mA (typ.)
- **Polarity** : Negative ground
- **Usable temperature range** : 0°C to +45°C ; 32°F to +113°F
- **Outside Dimension** : 140.0 (W) \times 120.0 (H) \times 50.0 (D) mm
5 $\frac{1}{2}$ (W) \times 4 $\frac{23}{32}$ (H) \times 1 $\frac{31}{32}$ (D) in
(projections are excluded)
- **Weight** : Approx. 960 g; 2.1 lb. (Including Cables)

- **Standard** : IEEE802.11b
- **Compliance** : FCC Part 15, Canada RSS-139
- **Communication method** : Simplex system
- **Spreading system** : Direct spread-spectrum communication system
- **Modulation** : DPSK, DQPSK
- **Usable frequency range** : 2400 to 2472 MHz
- **Number of channels** : 11
- **Communication distance** : LAN to LAN bridge mode
Approx. 800 m; 2600 ft
Access Point mode
Approx. 70 m; 21 ft
- **Security** : WEP (Wired Equivalent Privacy),
ESS ID (Extended Service Set Identifier) and
MAC (Media Access Control Address)
- **Output power** : 100 mW or less
- **Receiver sensitivity** : -76 dBm or better (Frame error rate=8%)
- **Demodulation system** : Digital demodulation (Matched filter system)

7 FOR YOUR REFERENCE

7-5 Specifications (continued from the previous page)

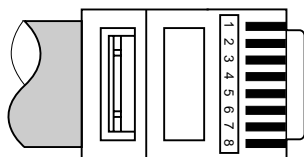
- **LAN interface** : Ethernet plug (Type RJ-45)
 - Based on IEEE802.3/10BASE-T
 - Based on IEEE802.3u/100BASE-TX
- **Transmission rate** : 10/100 Mbps (switched automatically/half-duplex)
- **Routing system** : Static/Dynamic (RIP)
- **User interface** : Status indicator (PWR <Green>, MODE <Green>, LAN <Red>,  <Red>), [MODE] button.

- **Antenna type** : Pattern antenna
- **Antenna gain** : 5.5 dBi
- **Directional Characteristics of Antenna**
 - : Horizontal : $\pm 30^\circ$ (attenuation 3 dB)
 - Vertical : $\pm 30^\circ$ (attenuation 3 dB)
- **Impedance** : 50 Ω
- **Standing wave ratio** : 1:1.6 or better

* All stated specifications, appearance are subject to change without notice or obligation.

* The transmission range varies depending on the communication speed and environment.

7-6 Specifications for Ethernet Plug



Modular plug type RJ-45

- | | |
|------------------|------------------|
| 1. Sending (+) | 2. Sending (-) |
| 3. Receiving (+) | 4. Not used |
| 5. Not used | 6. Receiving (-) |
| 7. Not used | 8. Not used |

7-7 Glossary

Access Point

A generic name of devices or points to connect a wired LAN and wireless LAN.

Authentication

To check whether a user who is accessing a network through an internet has the right to access and verify whether his/her password and ID are valid.

Bridge

A generic name of network devices which relay packets at a MAC address level.

Broadcast

To send several packets to all the devices in the same network at a time.

Browser

An application to obtain an HTML document from a WWW server and to view it. This instruction manual assume that Internet Explorer, a typical browser, is used.

Client

A generic name of terminals or applications which request a server to send information and receive the reply in a network.

DHCP server

DHCP (Dynamic Host Configuration Protocol) is a protocol for a client to obtain necessary information automatically from a server on the TCP/IP network. The DHCP server controls IP address, default gateway, domain name, etc. as network information. SB-110, which has the DHCP server function, assigned the IP address, default gateway, DNS address, etc. when the DHCP client (Computer) has started.

DNS (Domain Name System)

A name resolution service in the TCP/IP network. According to DNS, computer names and domain names are registered in the domain name server and the domain name service is offered. By using the domain name service, a user can specify a target site with an easy-to-understand domain name or host name instead of an IP address which consists of numerical character string only.

Domain Name

The IP address is not easy to understand because it consists of numerical character string only. So, a domain name is used. The domain name shows a group to which the IP address belongs. For example, the domain name of an e-mail address "icom@bbb.co.jp" is "bbb.co.jp".

ESS-ID (Extended Service Set-Identifier)

A name for identification to create several network groups in a communication area in a wireless LAN. In the wireless network group which communicates to SB-110, the identifier of wireless terminal must be the same as that of SB-110.

ETHERNET

A LAN communication system developed by Xerox, DEC and Intel. 10BASE-T, 100BASE-TX, 10BASE-5, 10BASE-2, etc. are available depending on the cable type.

Flash Memory

Writable memory of SB-110. Information stored in the flash memory is not erased even when the power supply turns off.

Global IP Address

A unique address assigned to a device. One global IP address is assigned to only one device in the world.

7 FOR YOUR REFERENCE

7-7 Glossary (continued from the previous page)

HTML (Hyper Text Markup Language)

A language to describe a document in a WWW server. Tags are embedded in the HTML document. HTML is used to describe WWW pages.

HTTP (Hyper Text Transfer Protocol)

A protocol used to transfer HTML file. When URL is entered in a web browser software, the HTML document is transferred from a WWW server to the web browser software of a Computer with HTTP. The transferred document is interpreted by the web browser software and displayed on the screen.

Hub

A devices required when a network is configured using SB-110. Connect SB-110 to the Hub through 10BASE-T or 100BASE-TX cable. For the communication in 100 Mbps, the twisted pair cable of Category 5 must be used and, moreover, the Hub also must support 100BASE-TX.

Internet Explorer

A browsing software which comes with Windows or Mac OS.

IP

A protocol used in the internet. The IP is positioned at the center of the structure of internet, some protocols aiming at application are located above the IP and some protocols for communication line are laminated under the IP.

IP (Internet Protocol) Address

32-Bit address to identify all the devices connected to a network in which the TCP/IP protocol is used. Usually, the IP address consists of four 8-bit numerical character strings of decimal notation (e.g., 192.168.0.1). A private IP address is specified by a network administrator. In this case, the network administrator does not need to apply to an address administration agency nor internet service provider. However, the network administrator must assign the private address according to the rules below. The private address must be converted into a global IP address when connecting to an external network. The IP addresses below can be used as the private IP address.

Class A: 10.0.0.0 to 10.255.255.255

Class B: 172.160.0.0 to 172.31.255.255

Class C: 192.168.0.0 to 192.168.255.255

LAN (Local Area Network)

A relatively small-sized network in the same floor or the same site.

MAC Address (Media Access Control Address)

A physical address specified in individual wired or wireless product. The network device manufacturers control this address so that a unique number can be assigned to only one product in the world. Ethernet equipment and wireless LAN product send and receive a frame according to this MAC address.

Network

The state that some devices such as server, workstation, Computer, etc. are connected to a communication system through cable or ADSL line to transmit data.

7-7 Glossary (continued from the previous page)

Packet

A unit to send/receive data. The packet consists of a header, which contains information necessary for sending/receiving, and data section which is data itself.

Password

Character string which must be entered by a user who is accessing a network because of network security. If any password is set, the user cannot access unless the user enter the valid password correctly.

Protocol

Definition of procedure to executed to send/receive data in the communication.

RIP (Routing Information Protocol)

A protocol used in a TCP/IP network that routing information is exchanged between routers. The router sends a packet to a correct party according to this routing information.

Subnet Mask

Subnet mask is used to one IP address as a network address and host address. Assuming that the IP address of a host is "192.168.0.1" and the subnet mask is "255.255.255.0", multiply the IP address of binary notation and subnet mask of binary notation together, and the network address "192.168.0.0" is obtained. Then, the remainder "1" is the host address.

SYSLOG

A function to output a system message to a network. If this function is supported, log information can be controlled by the SYSLOG server of UNIX etc.

TCP/IP

The most popular basic internet protocol supported by Windows 98, Windows 2000 and any other major operating systems. SMTP, FTP, etc uses this protocol. TCP/IP Control Panel is installed in Macintosh equipped with Open Transport.

Traffic

Flow of packets on the network or load applied to the network line (e.g., data transmitted through the network line). As the traffic increases, the data transmission rate may decrease or data may be lost.

URL (Uniform Resource Locator)

Specify when you access a home page on the network. Our URL is <http://www.icom.co.jp/>.

WEP (Wired Equivalent Privacy)

A function to encrypt, send and receive a wireless LAN signal. This function can prevent the wireless LAN communication intercept. SB-110 supports 64/128-bit encryption.

web browser software

An application to view a WWW page or to use a WWW server for search. Typical browser is "Internet Explorer" and "Netscape Navigator".

10BASE-T

One of the Ethernet standards. 10BASE-T achieves the transmission rate of 10 Mbit/s with twisted pair cable. SB-110's Ethernet port supports this standard.

100BASE-TX

One of the Ethernet standards. 100BASE-TX achieves the transmission rate of 100 Mbit/s with twisted pair cable of Category 5. SB-110's Ethernet port for LAN supports this standard.

Count on us!

