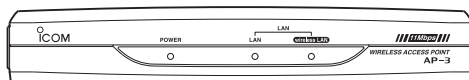




INSTRUCTION MANUAL

WIRELESS ACCESS POINT **AP-3**



This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference and (2) this device must accept any interference received, including interference that may cause undesired operation.

INTRODUCTION

Thank you for purchasing an ICOM WAVEMASTER wireless access point.

This wireless access point is provided with the functions necessary for supporting a wireless LAN.

This manual is designed to help you use your new wireless access point to its fullest potential. Read this manual carefully before using the wireless access point.

TRADEMARK CREDITS

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The screen shots that appear within this text are used with permission of Microsoft Corporation.

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INTRODUCTION

SUMMARY OF FEATURES

- All settings can be adjusted using a web browser.
- Networks combining wireless LAN and wired LAN components can be constructed with ease.
- Includes both wireless access point functions (including roaming) and wireless bridge functions.
- Supports 11-Mbps wireless access point communications and 100BASE-TX wired LAN communications.
- Supports all ICOM wireless LAN cards (as of May 2000).
- Includes such advanced security functions as ESS ID settings, MAC address registration, and WEP encryption.

USER REGISTRATION

**Be sure to fill out the user registration card and return it to us.
You must return the card to be eligible for technical support and service.**

INTRODUCTION

WIRELESS LAN CARD

This wireless access point is designed for use with an 11-Mbps wireless LAN card. When setting the wireless access point to a channel (see p. 47) other than channel 11, be sure to read "Precautions Regarding Radio Interference."

PRECAUTIONS REGARDING RADIO INTERFERENCE

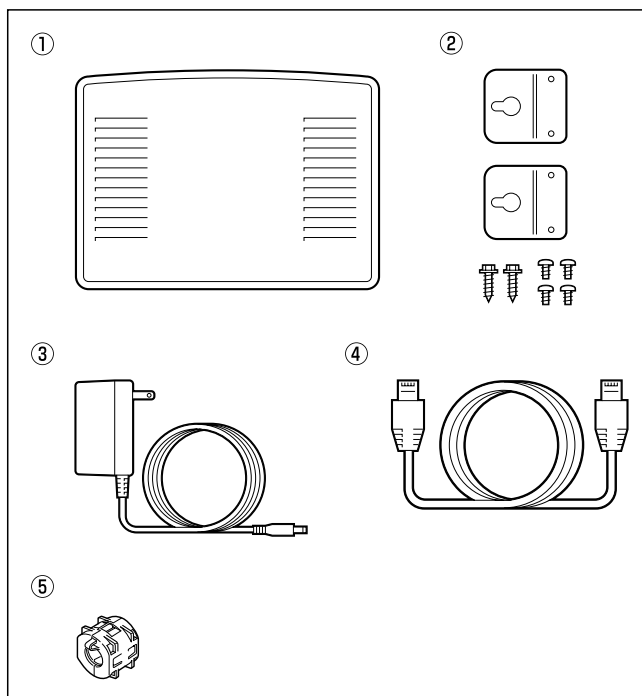
The frequency band used by this wireless access point is also used by microwave ovens and other industrial, scientific, and medical devices, as well as the indoor wireless stations (requiring a license) used for identifying the mobile devices utilized on factory production lines and designated low-power wireless stations (not requiring a license).

1. Before using this access point, make sure no indoor wireless stations for mobile device identification or designated low-power wireless stations are being operated nearby.
2. If this access point interferes with the operation of an indoor wireless stations for mobile device identification, change the operating frequency of the access point immediately or stop the signal transmission and contact your dealer or our service department to discuss measures for preventing signal interference (such as installing a partition).
3. If this access point interferes with the operation of a designated low-power wireless station or causes any other problems, contact your dealer or our service department at the telephone number indicated below.

Service Department, ICOM AMERICA, INC.

INTRODUCTION

STANDARD PACKING LIST



- ① AP-31 unit
- ② Main unit mounting hardware1 set
- ③ AC adapter (BC-123A).....1 piece
- ④ Ethernet cable1 piece
* (For connecting to Ethernet port)
- ⑤ Ferrite core (Be sure to install this item. (☞ p. 9))...1 piece
- Utility Software disks (for AP-3)2 disks
- User registration card.....1 piece
- Instruction manual
- Warranty sheets (for both AP-3 and SL-1100)

★ SL-1100 or SL-1105 wireless LAN card is an option

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Be sure to read these precautions in order to use the wireless access point safely.

- * These precautions are intended to ensure that the access point 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.

■ Wireless Access Point

△WARNING

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

- **Do not use any AC adapter other than the one provided with this product.**
Otherwise fire, electric shock, or equipment failure may result.
- **Use only the specified parts and accessories.**
Otherwise fire, electric shock, or equipment failure may result.
- **Do not connect the power supply to any terminal other than the DC jack.**
Otherwise fire, electric shock, or equipment failure may result.
- **Do not modify, excessively bend, twist, pull, or heat the connecting cables.**
Otherwise the cables may be damaged and cause a fire, electric shock, or equipment failure.
- **Do not place heavy objects on top of the connecting cables or allow the cables to be pinched.**
Otherwise the cables may be damaged and cause a fire, electric shock, or equipment failure.
- **Install and use in a location where children cannot reach the power cord and cables.**
Pulled cables could result in electric shock or personal injury.
- **This unit does not require adjustment. Do not disassemble or modify the unit or attempt to repair it yourself.**
Otherwise fire, electric shock, or equipment failure may result.
- **Do not block the ventilation port.**
Otherwise fire, electric shock, or equipment failure may result.
- **Do not install in a location where the unit can easily become wet (such as adjacent to a humidifier).**
Otherwise fire, electric shock, or equipment failure may result.
- **Do not handle the unit with wet hands.**
Otherwise electric shock may result.
- **Be sure to ground the unit when installing. Do not connect the grounding wire to a gas or water line.**
Otherwise fire or electric shock may result.
- **Discontinue use immediately and unplug the power cable from the AC receptacle if the unit emits smoke, an abnormal odor, or an abnormal noise or if water enters the unit.**
Otherwise fire, electric shock, or equipment failure may result.
Disconnect the plug of the AC adapter and all other cables from the unit.
Confirm that the smoke, odor, or noise stops and contact your dealer or the service staff at one of our sales offices.

1 SAFETY PRECAUTIONS



CAUTION

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

- **Do not install the unit outdoors.**
Otherwise equipment failure may result.
- **Do not place on a slanted or unstable surface.**
Otherwise the unit may tilt over or fall, resulting in personal injury or equipment failure.
- **Avoid installing in humid, dusty, or poorly ventilated locations.**
Otherwise equipment failure may result.
- **Do not use in locations exposed to direct sunlight, close to heating or cooling ducts, or otherwise subject to severe fluctuations in temperature.**
Otherwise the unit may become deformed or discolored. Also, fire or equipment failure may result.
- **Be sure to connect the cables correctly as explained in this manual. Do not use any other connection arrangement.**
Otherwise equipment failure may result.
- **Avoid locations exposed to strong magnetic fields or static electricity and locations exposed to temperatures or humidity levels that exceed the specifications listed in the manual.**
Otherwise equipment failure may result.
- **Do not use close to radios or televisions.**
Otherwise signal interference may occur.
- **Do not drop or the unit or otherwise subject it to strong physical shock.**
Otherwise personal injury or equipment failure may result.
- **Do not stand, sit, or place heavy objects on the unit. Do not pinch the unit.**
Otherwise the unit may be damaged.
- **When thunder and/or lightning occur nearby, disconnect the AC adapter from the wall socket and do not use the unit. Also, discontinue such work as connecting cables, disconnecting cables, installation, or maintenance.**
Otherwise fire or electric shock may result.
- **Do not use in locations where condensation is likely to occur. Avoid hastily moving the unit to a location where the humidity level is very different because condensation may occur.**
Otherwise the unit may become deformed or discolored. Also, fire or equipment failure may result.
If condensation occurs, dry the unit or allow the unit to remain in the same environment until it is completely dry before using.
- **Disconnect the AC adapter from the unit when the unit will not be used for a long time.**
Otherwise the unit may become hot and fire or equipment failure may result.
- **Do not clean with paint thinner or benzene.**
Otherwise the case material may degrade or the paint may peel. Clean with a soft cloth. When particularly dirty, dampen the cloth slightly with a neutral cleaning agent that has been diluted with water.

■ Wireless LAN card



WARNING

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

- **Do not touch the LAN card with wet hands while it is in use.**
Otherwise electric shock may result.
- **Turn off the power to the wireless access point before inserting or removing the LAN card.**
Otherwise fire, electric shock, or equipment failure may result.
- **Keep the LAN card out of the reach of children when inserting, removing, or storing the LAN card.**
Otherwise personal injury or electric shock may result.
- **Do not disassemble or modify the LAN card or attempt to repair it yourself.**
Otherwise fire, electric shock, or equipment failure may result.
- **Do not allow the LAN card to become wet.**
Otherwise fire, electric shock, or equipment failure may result.
- **Do not insert wire or other metal parts into the connector portion of the LAN card.**
Otherwise fire, electric shock, or equipment failure may result.



CAUTION

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

- **Be sure the correct side of the LAN card is facing upward when inserting the card into the PCMCIA slot.**
Equipment failure may result if the card is inserted incorrectly.
- **Do not stand, sit, or place heavy objects on the LAN card. Do not pinch the LAN card.**
Otherwise the LAN card may be damaged.
- **Do not drop, apply severe physical shock to, or twist the LAN card.**
Otherwise personal injury may result or the LAN card may be damaged.
- **Do not place the LAN card in humid, dusty, or poorly ventilated locations.**
Otherwise fire, electric shock, or equipment failure may result.
- **Do not use near televisions or radios.**
The LAN card may disrupt the signal reception of such devices and such devices may disrupt the signal reception of the LAN card.
- **Do not remove the LAN card from the card slot while the wireless access point is running.**
Otherwise equipment failure may result and data may be lost or damaged.
- **Avoid locations exposed to strong magnetic fields or static electricity and locations exposed to temperatures or humidity levels that exceed the specifications listed in the manual. Also, do not use in locations where condensation is likely to occur.**
Otherwise equipment failure may result.
- **Do not use paint thinner or benzene to clean the LAN card.**
Otherwise the case material may degrade and the paint may peel. Use a soft cloth to clean the LAN card. If particularly dirty, dampen the cloth slightly with a neutral cleaning agent that has been diluted with water.

1 SAFETY PRECAUTIONS

■ AC adapter



WARNING

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

- **Do not use with an AC supply voltage other than 120V**
Otherwise fire, electric shock, or equipment failure may result.
- **Do not use with any device other than the AP-3.**
Otherwise fire, electric shock, or equipment failure may result.
- **Do not modify, excessively bend, twist, pull, or heat the AC power cord.**
Otherwise the cord may be damaged and cause a fire, electric shock, or equipment failure.
- **Do not place heavy objects on top of the AC power cord or allow the cord to be pinched.**
Otherwise the cord may be damaged and cause a fire, electric shock, or equipment failure.
- **Hold the plug portion when plugging in and unplugging the AC power cord. Do not yank the cord.**
Otherwise fire, electric shock, or equipment failure may result.
- **Do not handle the AC power plug or other devices with wet hands.**
Otherwise electric shock may result.
- **Do not use the AC adapter if the AC power cord is damaged or the plug does not fit securely into the receptacle.**
Otherwise fire, electric shock, equipment failure, or data loss may result. Consult with your dealer or the service staff at one of our sales offices regarding how to handle the problem or obtain a new AC adapter.

General Precautions

- The unit may malfunction if the connecting cables become disconnected or the connection is unstable while the unit is in operation. Be sure all connectors are securely fastened and do not touch them while the unit is in operation.
- Observe the instructions provided in the manuals included with the computer and other peripheral devices.
- This device may cause signal interference when used in a domestic setting. When interference occurs, move this unit as far as possible away from the affected device.
- The disks entitled "Utility Software" (utility for updating the firmware) is specifically intended for this unit. Do not use the disks with any other device.
- ICOM Inc. assumes no responsibility whatsoever for any trouble resulting from using the data files originally provided with this unit or the firmware update data files provided on our web site in a device other than this unit, or modifying or disassembling this unit. Nor does ICOM Inc. assume any responsibility whatsoever for any damages or lost profits resulting from opportunities for voice or signal communications being lost because of the failure, malfunction, poor condition, damage, or data loss of this unit or because of such external causes as power failure. ICOM also dismisses all responsibility for demands made by a third party.
- All copyrights associated with this manual and all intellectual property rights associated with the hardware and software of this product are held by ICOM Inc.
- Unauthorized reproduction or transmission of this manual, or any part hereof, is prohibited.
- The content of this manual, the hardware and software associated with this product, and the appearance of this product are all subject to change without notice.

General Precautions

- Be sure to create a backup for the ACCESS POINT utilities disk and use this for normal operation.
- Refer to the operating instructions accompanying the computer and other peripherals used in conjunction with the AP-3 regarding the proper operation of those items.
- When installing software or otherwise making changes to the environment of your computer, be sure to create a backup for all critical data stored in your computer. Doing so will hold the resulting damage to a minimum if something goes wrong.
- Icom will not be held responsible for lost or damaged data under any circumstances.

AP-3**Tested to comply with
FCC standards****FOR HOME OR OFFICE USE**

The antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provided with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

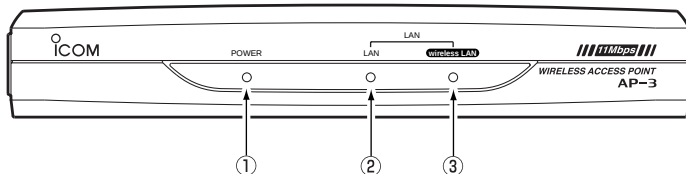
Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate 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.

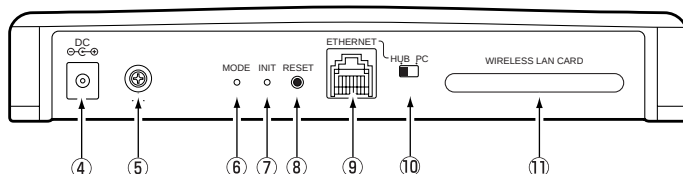
Warning: Changes or modifications not expressly approved by Icom could void the user's authority to operate the equipment.

■ Front and rear panels

■ Front panel



■ Rear panel



① [POWER] lamp

This lamp illuminates when the power to the AP-3 unit is on.

This lamp flashes slowly when the unit is in [Initialize mode] (☞ p. 63) and rapidly when the unit is in [Update Mode] (☞ p.68).

② [LAN] lamp

This lamp illuminates when the wired LAN (Ethernet) connection is normal.

This lamp flashes when the AP-3 unit is communicating with a wired LAN or wireless LAN.

This lamp goes out if the [ETHERNET] port on the rear panel can not recognize the LAN connection. In this case, check the connection of the Ethernet cable and the setting of the [HUB/PC] switch. (☞ p. 8, 14, 15)

③ [wireless LAN] lamp....

This lamp illuminates when the wireless connection to the AP-3 unit is normal.

This lamp goes out if a wireless communication abnormality occurs. The lamp will also go out if all wireless terminals are inactive for more than one or two minutes or move out of the wireless communication area for more than one or two minutes.

If this lamp does not illuminate, check such items as the IP address of the wireless terminal, the [Network Mode] and [ESS ID] (☞ p. 38) of the wireless LAN card installed in the wireless terminal, and the [MAC Address Security] settings (if used).

* This lamp cannot be used to determine whether or not the LAN card is installed into the PCMCIA slot.

- ④ **DC jack** Connect the AC adapter (BC-123A) to this jack. Be sure the ferrite core (☞ p. 9) is attached to the AC adapter cord.
- ⑤ **Ground terminal** Connect a grounding wire to this terminal.
Use a commercially available grounding wire.
- ⑥ **[MODE] button** This button is used to put the AP-3 unit into [Utility Use Data Update Mode], which is the mode used for using the Utility to update the firmware or initialize the setting data.
* See “12 Utility Software” (☞ p. 67) for instructions regarding how to operate the Utility.
- ⑦ **[INIT] button** This button is used to put the AP-3 unit into [Setting Initialization Mode], which is a mode used for initializing the setting data to the original factory settings.
* See “10 Setting Data Initialization” (☞ p. 63) for instructions regarding how to use [Setting Initialization Mode] mode.
- ⑧ **[RESET] button** This button is used to restart the AP-3 unit (i.e. initialize its hardware).
* The result is the same as turning off the power and turning it back on.
- ⑨ **[ETHERNET] port** This is an RJ-45 type Ethernet port.
Connect a computer or a hub to the AP-3 unit using the provided Ethernet cable (straight cable).
* This port can also be used for 100BASE-TX (high-speed wired LAN) communications.
* Use a Class 5 cable (such as the provided Ethernet cable) or higher level cable when conducting 100BASE-TX communications. Avoid lower grade cables.
If a lower grade of cable is used, the grade of the entire network will be pulled down to the same level.
* If the [LAN] lamp does not illuminate when the power is on and the AP-3 unit is connected to the wired LAN, change the setting of the [HUB/PC] switch (☞ p. 8).

.....Continued on following page

2 PANEL DESCRIPTION

■ Front and rear panels (continued)

⑩ [HUB/PC] switch

This switch is used to switch the polarity of the [ETHERNET] port.

The switch has the following two positions based on differences in Ethernet cable type and the hub port being used.

[PC]: This position sets the [ETHERNET] port to cross-over mode (symbol: X).

Use this setting when an Ethernet cable (straight cable) is used to connect the AP-3 unit to the straight port (symbol: =) of a hub or the port (symbol: =) on the Ethernet card side of a computer. (☞ p. 14)

[HUB]: This position sets the [ETHERNET] port to straight mode (symbol: =).

Use this setting when an Ethernet cable (straight connection) is used to connect the AP-3 unit to the cross-over port (symbol: X) of a hub. (☞ p. 15)

⑪ PCMCIA slot

This is a slot for inserting an ICOM wireless LAN card. (☞ p. 10)

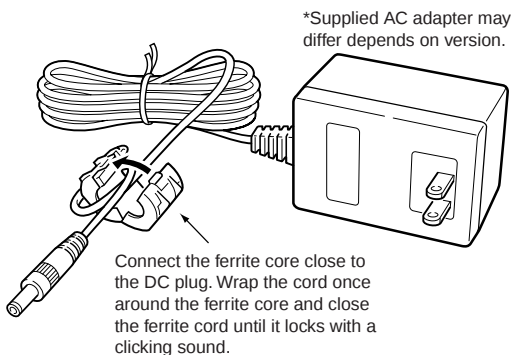
* Turn off the power to the AP-3 unit before inserting or removing the LAN card.

* This slot is compatible with any ICOM wireless LAN card. (as of May 2000).

* When the SL-1100 LAN card is used with the AP-3 unit, use the same model of LAN card with the client as well.

3-1 Attaching the Ferrite Core

Before using the AC adapter, attach the provided ferrite core to the cord in the position shown below. Otherwise the AC adapter may cause signal interference.



3-2 Selecting an Installation Site

[NOTE]

The transmission range varies somewhat depending on the installation location. Use the line-of-sight distances indicated below as guidelines when using an SL-1100 or SL-1105 wireless LAN card.

Indoors : approx. 50 m

Outdoors : approx. 150 m

When transmission speed is 11 Mbps

Indoors : approx. 30 m

Outdoors : approx. 70 m

The installation site for the wireless access point must be selected carefully in order to avoid signal interference and reductions in transmission speed and range.

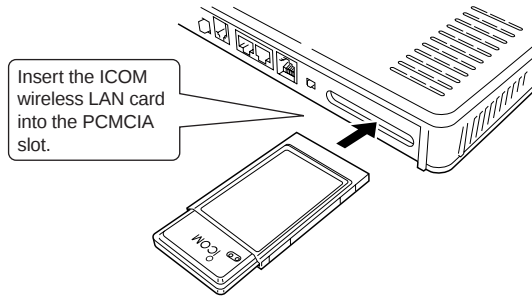
Observe the following guidelines when selecting the location.

- Select a location with as clear a line of sight as possible (i.e., as high as possible).
- Select a stable, level surface that is free of vibrations and the danger of the unit falling.
- Also observe the following:
 - Do not place objects on top of the unit or stack units on top of one another.
 - Radio signals will pass through walls and glass but not through metal. Concrete walls may be reinforced with steel or other metal material that will block the signal.
 - The transmission range is widest in an open space. However, the signal may be reflected from the large metal walls in such a location as a warehouse.
 - Floors generally have steel girders and are installed with metal fire protection material. Consequently, communication between different floors is often not possible.
 - Do not install in a location exposed to intense radio waves (such as near a wireless station) or intense electromagnetic radiation (such as near a radio transmission tower).

3 BEFORE CONNECTING CABLES

3-3 Inserting the Wireless LAN Card

Turn off the power to AP-3 unit and insert the wireless LAN card as shown in the figure. To remove the card, turn off the power and pull the card out.



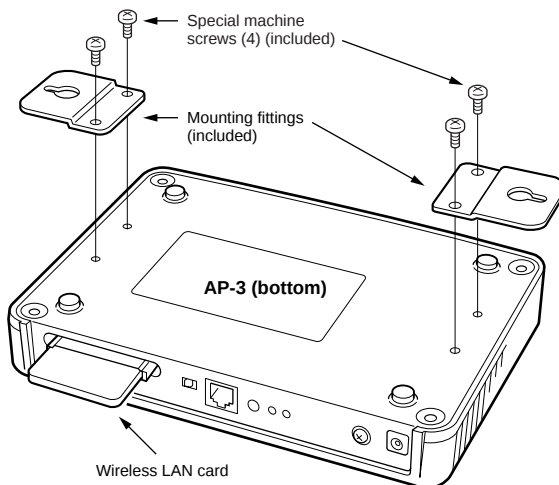
■ Precautions

- Be sure to turn the AP-3 unit off before inserting or removing the LAN card. Equipment failure may result if the power is left on.
- There is no need to install special drivers into the AP-3 unit for the wireless LAN card.
- Use only the specified ICOM wireless LAN card. Otherwise equipment failure may result.

3-4 Mounting the AP-3 Unit

To mount the AP-3 unit to a wall or shelf, refer to the figure below and use the provided metal fittings.

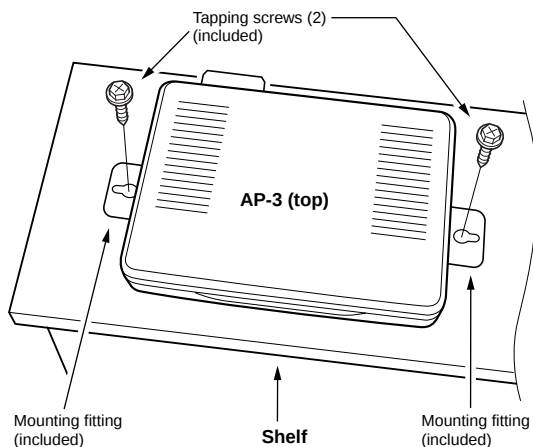
1. Attach the mounting fittings to the unit.



2. Mount the AP-3 unit.

[Mounting to a shelf]

When there is the possibility that people will come into contact with the cables and power cord, secure the AP-3 with the mounting fittings as shown in the figure to prevent the unit from falling.

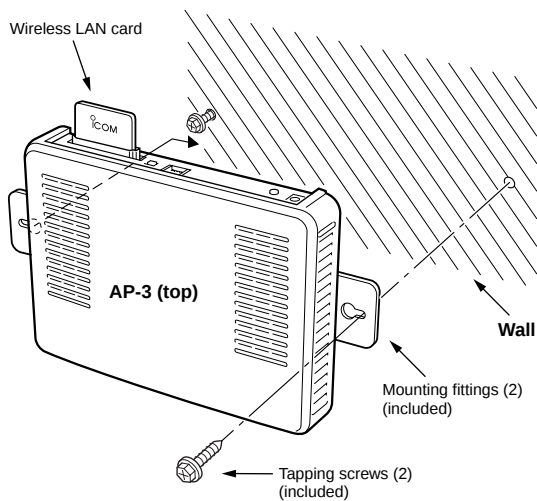


3 BEFORE CONNECTING CABLES

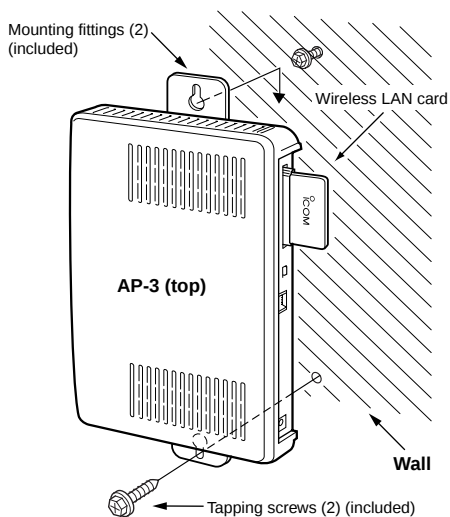
3-4 Mounting the AP-3 Unit (continued)

2. Mount the AP-3 unit. (continued)

[Mounting horizontally to a wall]



[Mounting vertically to a wall]



3-5 Connection Precautions

- Use the [ETHERNET] port to connect the AP-3 unit to the hub or computer.

When connecting the [ETHERNET] port to a computer using a straight Ethernet cable, set the [HUB/PC] switch to "PC." (☞ pp. 8 and 16)

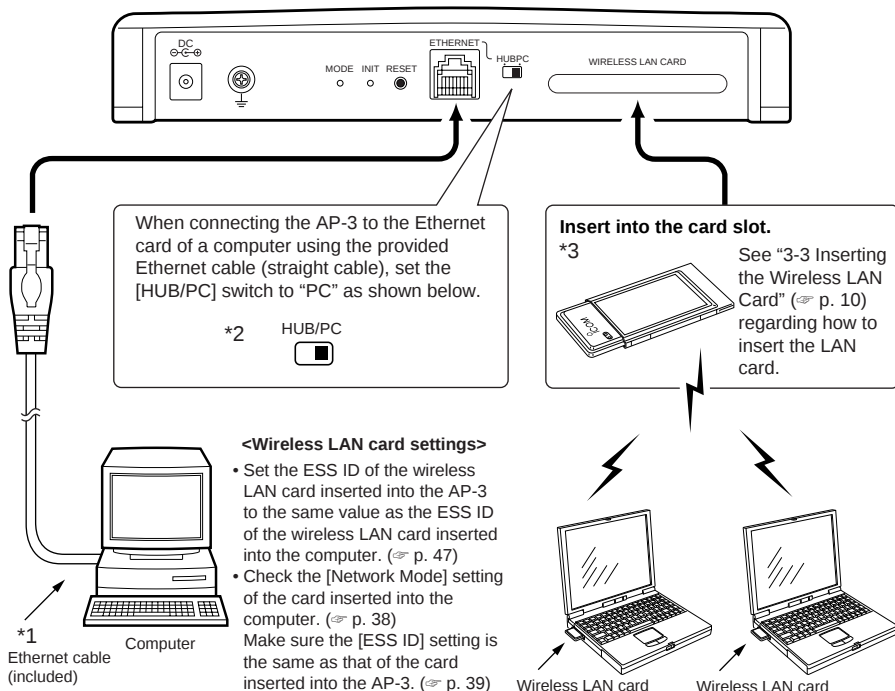
- Computers connected to the [ETHERNET] port or the hub will require an Ethernet card (board).
- Be sure to turn the AP-3 power off before inserting or removing the LAN card.
- Do not connect the AP-3 to a working network using the original factory settings.

Also, turn off all computers except the one being used to change the settings when adjusting the settings while the AP-3 is connected via a cable or wireless connection to computers in a network.

Otherwise IP address conflicts or other network problems may occur.

- ICOM wireless LAN cards do not support Macintosh.
- This unit cannot communicate with any wireless LAN card other than the specified ICOM wireless LAN card.
- Hold the connector when connecting and disconnecting the Ethernet cable.

4-1 Connecting to a Computer



* The following models of ICOM wireless LAN card can be used: SL1100 or SL-1105.

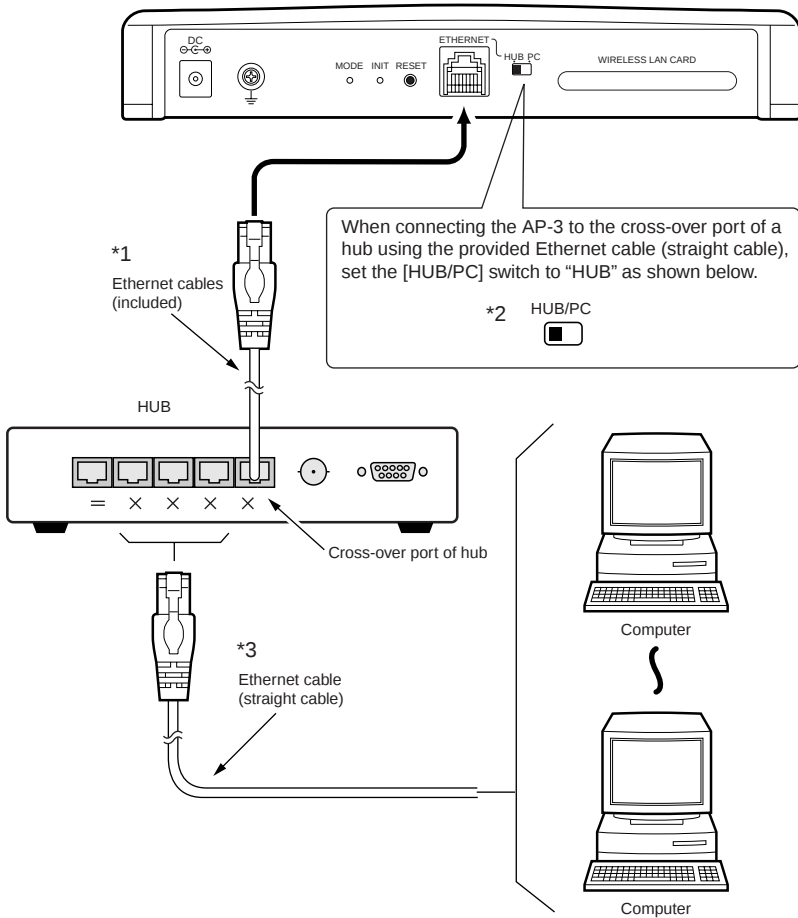
*1. The provided Ethernet cable is a straight-through cable.

*2. Turn the power off before changing the position of the [HUB/PC] switch.

Set the switch to "HUB" when using a cross-over cable to connect to the Ethernet card of a computer.

*3. ICOM wireless LAN cards do not support Macintosh.

4-2 Connecting to a HUB



***1.** The provided Ethernet cable is a straight-through cable.

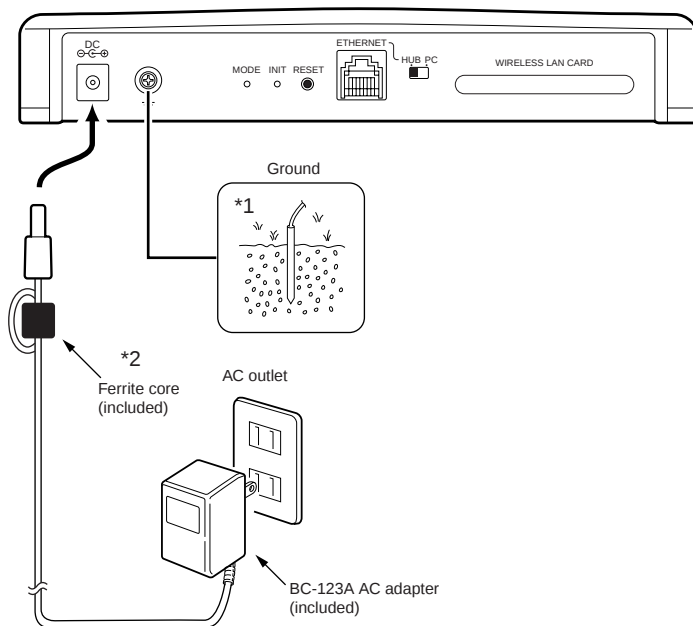
***2.** Turn the power off before changing the position of the [HUB/PC] switch.

Set the switch to "PC" when using a cross-over cable to connect to the cross-over port of a hub.

***3.** Use straight Ethernet cable to connect computers to the cross-over port of the hub.

4 CABLE CONNECTIONS

4-3 Other Connections



***1 Use a commercially available ground wire to connect to the grounding terminal.**

***2 Be sure to attach the ferrite core (➡ p. 9) to the cord before connecting the AC adapter.**

[About wireless LAN settings]

See the instruction manual provided with the ICOM wireless LAN card for instructions regarding how to set the protocol (TCP/IP) settings of the computer (Windows) into which the wireless LAN card will be inserted and used for the wireless connection with the AP-3.

5-1 Network Settings

When adjusting the settings of the AP-3 unit (☞ p. 37), it is better to connect the computer to the AP-3 unit with a cable. This chapter is written under the assumption of a cable connection between the computer and the AP-3 unit.

Before connecting the computer to the AP-3 unit, adjust the protocol (TCP/IP) settings of the computer.

- Proceed to Chapter 6 (☞ p. 37) for instructions regarding how to connect a computer that is already being used in the LAN and use it to adjust the settings of the AP-3. In such a case, delete all the currently allocated IP addresses and the default gateway.
- When using a computer that has never been used in a LAN environment, check the items listed below.

A Check Ethernet card

Make sure the computer to be used is installed with an Ethernet card (Ethernet board) and the provided AP-3 driver is installed on the Ethernet card.

See the instruction manual provided with the Ethernet card regarding how to install the driver (if necessary).

B Check protocol

Make sure TCP/IP is installed in all of the computers.

If installation is required, refer to the Help screen of the operating system or the instruction manual provided with the Ethernet card.

C Check TCP/IP settings

Windows 95 and 98, Windows NT 4.0, Windows 2000, and Open Transport of the Mac OS all support DHCP client.

* If the computer does not support DHCP client, set the following four items manually.

- Local IP address
- Subnet mask
- Gateway address
- DNS server address

5 COMPUTER SETTINGS

5-1 Network Settings (continued)

-1 Windows 95 and 98

You will make the following settings during the procedure to the right:

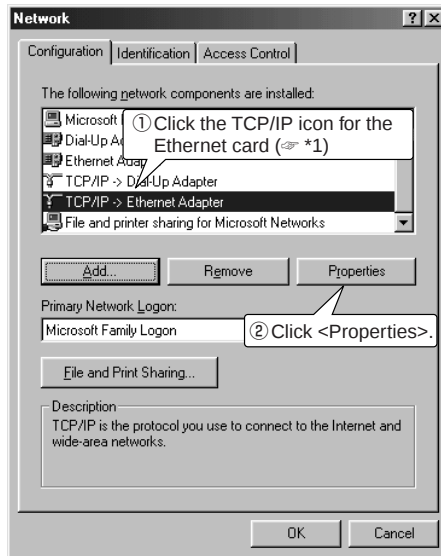
- IP Address
Setting: "Obtain an IP address automatically"
- WINS Configuration
Setting: "Disable WINS Resolution"
- Gateway
Setting: leave blank
- DNS Configuration
Setting: "Disable DNS"

[NOTE]

When the network settings are changed, the previous setting values will be erased.

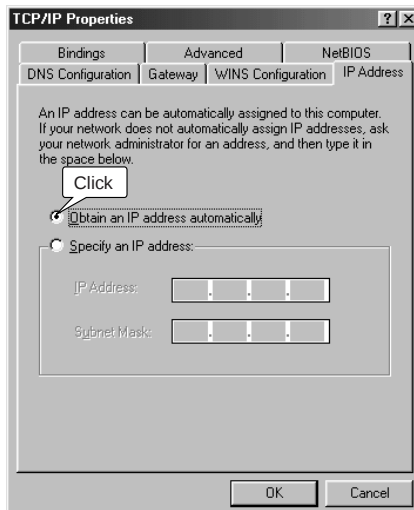
When using Windows 95 or 98, adjust the TCP/IP settings according to the following procedure:

1. Start up the computer.
2. Click <Start> and select [Control Panel] from the [Settings] menu. Then click the [Network] icon. The screen shown below is displayed.
 - Follow the instructions (1 and 2) indicated on the screen shot below.

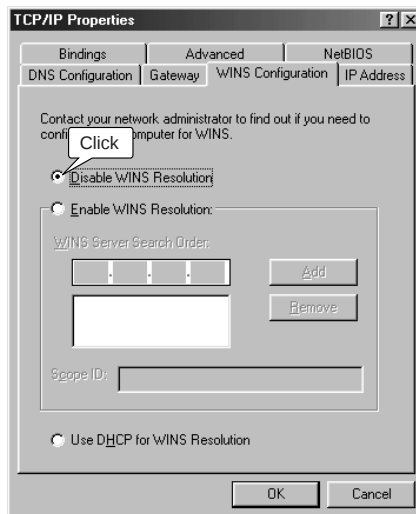


- *1. If there are multiple TCP/IP icons ①, select the one with the corresponding adapter name.
If only one adapter is installed, simply click "TCP/IP."
- *2. If a TCP/IP icon is not included in the list of installed components, refer to the Help screen of the operating system or the instruction manual provided with the Ethernet card for instructions regarding how to install the TCP/IP protocol.

3. Select "Obtain an IP address automatically."



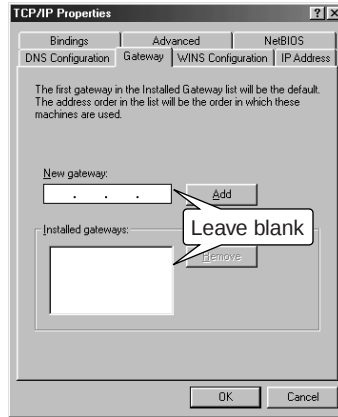
4. Click the [WINS Configuration] tab and select "Disable WINS Resolution."



5 COMPUTER SETTINGS

-1 Windows 95 and 98 (continued)

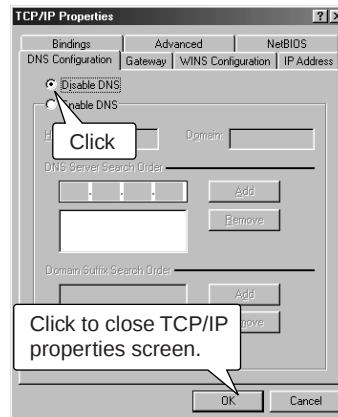
5. Click the [Gateway] tab and make sure there are no installed gateways.



6. Click the [DNS Configuration] tab and select "Disable DNS." Then click <OK>.

[NOTE]

When the IP address of the LAN computer was set manually (i.e., not using DHCP), enter the IP address of the AP-3 unit as the address of the DNS server.



7. Click <OK> on the [Network] screen ( Step 2, p. 18).
8. A message offering to restart the computer is displayed. Select <No> because you will shut down the computer instead.
9. Click <Start> and select [Shut Down]. Then select "Shut down" and click <OK>.
10. After the computer shuts down, proceed to Chapter 6 ( p. 37).

5-1 Network Settings (continued)

**C-2 Windows NT 4.0
(WorkStation)**

You will set the following items during the procedure to the right:

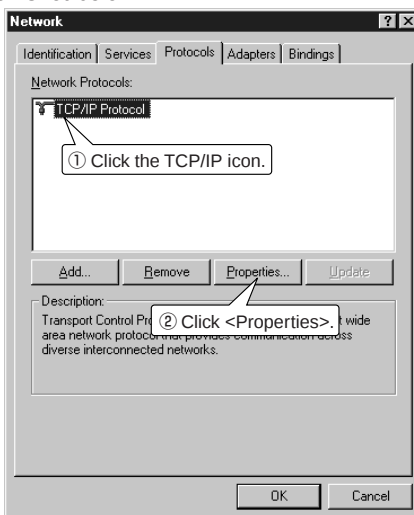
- IP Address
- DNS
- WINS Address
- Routing

[NOTE]

When the network settings are changed, the previous setting values will be erased.

When using Windows NT 4.0, adjust the TCP/IP settings according to the following procedure:

1. Start up the computer.
 - The Windows NT 4.0 [Log on] screen is displayed.
2. Log on as an Administrator.
3. Click <Start> and select [Control Panel] from the [Settings] menu. Then click the [Network] icon. The screen shown below is displayed.
4. Follow the instructions (1 and 2) indicated on the screen shot below.

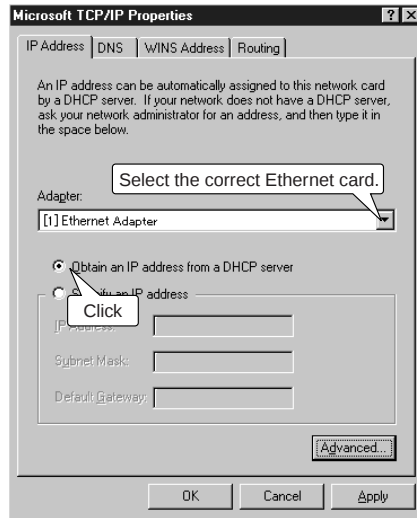


* If a TCP/IP icon is not included in the list of network protocols, refer to the Help screen of the operating system or the instruction manual provided with the Ethernet card for instructions regarding how to install the TCP/IP protocol.

5 COMPUTER SETTINGS

-2 Windows NT 4.0 (WorkStation) (continued)

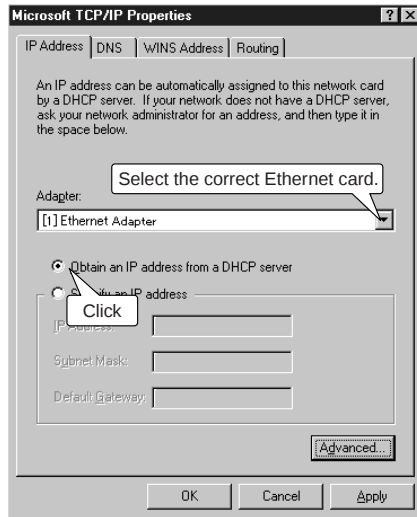
5. Follow the instructions indicated on the screen shot below.



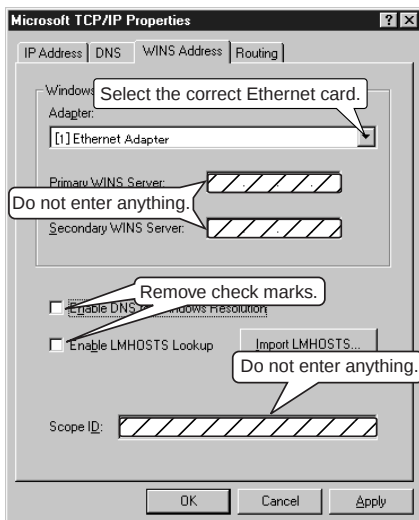
6. Click the [DNS] tab and follow the instructions indicated on the screen shot below.

[NOTE]

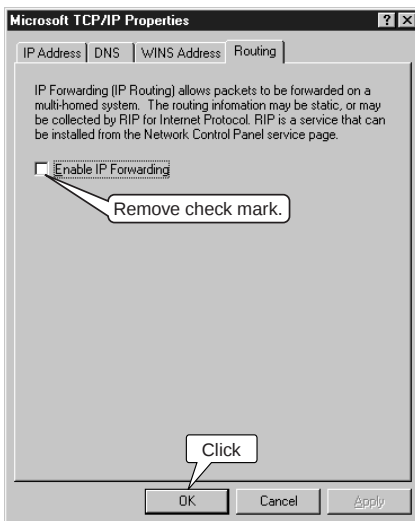
When the IP address of the LAN computer was set manually (i.e., not using DHCP), enter the IP address of the AP-3 unit as the address of the DNS server.



7. Click the [WINS Address] tab and follow the instructions indicated on the screen shot below.



8. Click the [Routing] tab and follow the instructions indicated on the screen shot below.



5 COMPUTER SETTINGS

C-2 Windows NT 4.0 (WorkStation) (continued)

9. Click <OK>.



10. Click <No>.



11. Click <Start> and select [Shut Down]. Then select "Shut down" and click <OK>.

12. After the computer shuts down, proceed to Chapter 6 (p. 37).

5-1 Network Settings (continued)

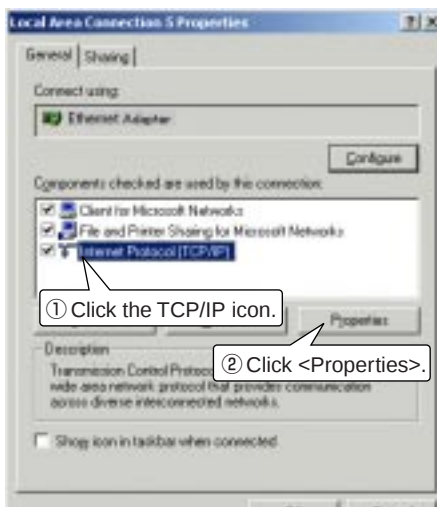
C-3 Windows 2000
(Professional)

When using Windows 2000, adjust the TCP/IP settings according to the following procedure:

1. Start up the computer.
 - The Windows 2000[Log on] screen is displayed.
2. Log on as an Administrator.
3. Click <Start> and select [Dial-Up Networking] from the [Settings] menu. The screen shown below is displayed.



4. Right-click the [Local Area Connection] icon and select [Properties]. The screen shown below is displayed.
 - Follow the instructions indicated on the screen shot below.



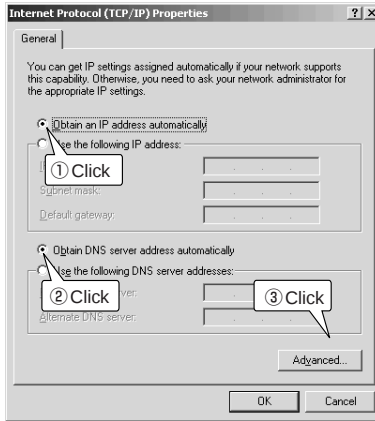
5 COMPUTER SETTINGS

C-3 Windows 2000 (Professional) (continued)

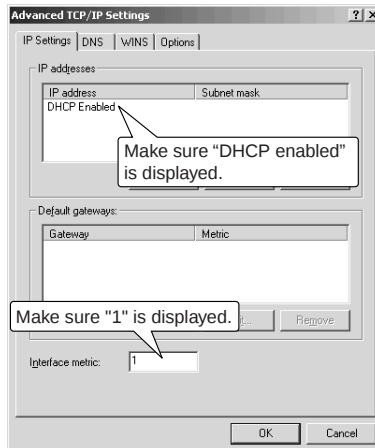
[NOTE]

When the IP address of the LAN computer was set manually (i.e., not using DHCP), enter the IP address of the AP-3 unit as the address of the DNS server.

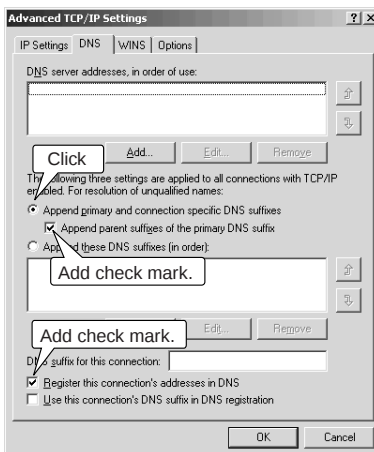
5. Follow the instructions indicated on the screen shot below.



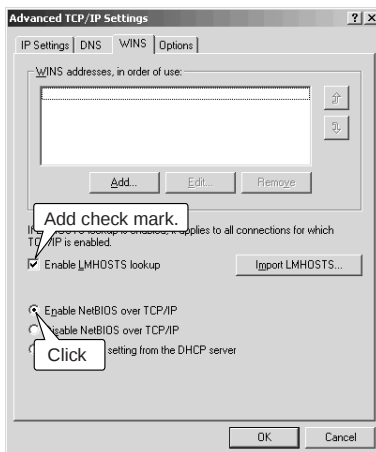
6. Follow the instructions indicated on the screen shot below.



7. Click the [DNS] tab and follow the instructions indicated on the screen shot below.



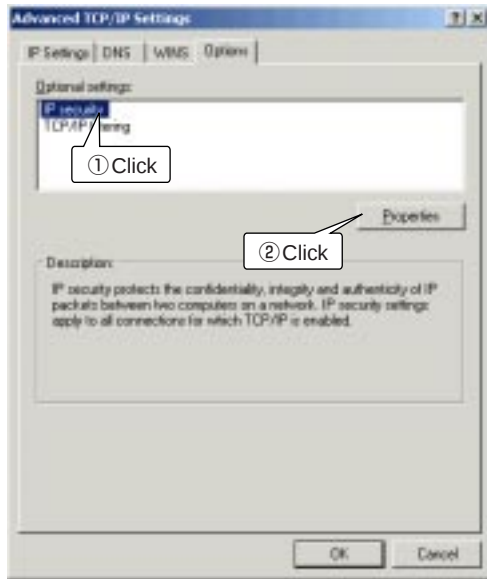
8. Click the [WINS] tab and follow the instructions indicated on the screen shot below.



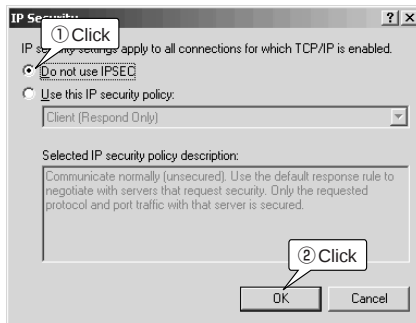
5 COMPUTER SETTINGS

-3 Windows 2000 (Professional) (continued)

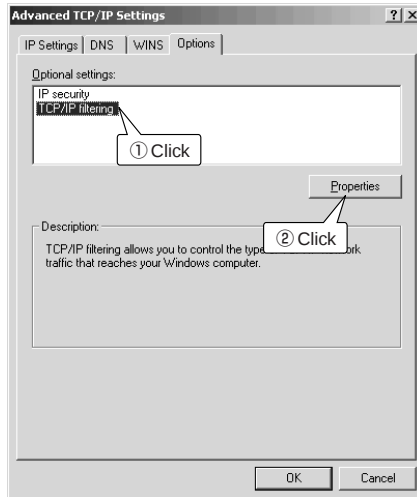
9. Click the [Options] tab and follow the instructions indicated on the screen shot below.



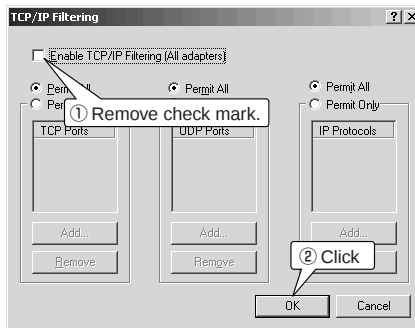
10. Follow the instructions indicated on the screen shot below.



11. Follow the instructions indicated on the screen shot below.



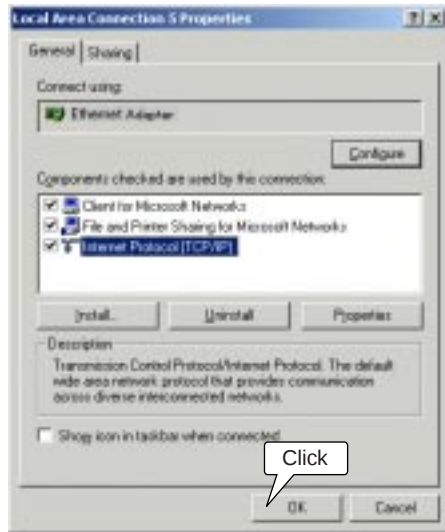
12. Follow the instructions indicated on the screen shot below.



5 COMPUTER SETTINGS

-3 Windows 2000 (Professional) (continued)

13. Click <OK> on the [Advanced TCP/IP Settings] screen (Step 11). The screen shown below is displayed.
 - Follow the instructions indicated on the screen shot below.



14. A message offering to restart the computer is displayed. Click <No>.



- * Select <No> because you will shut the computer down instead.

15. Click <Start> and select [Shut Down]. The following screen is displayed.
- Follow the instructions indicated on the screen shot below.



16. After shutting down the computer, proceed to Chapter 6 (☞ p. 37).

5 COMPUTER SETTINGS

5-1 Network Settings (continued)

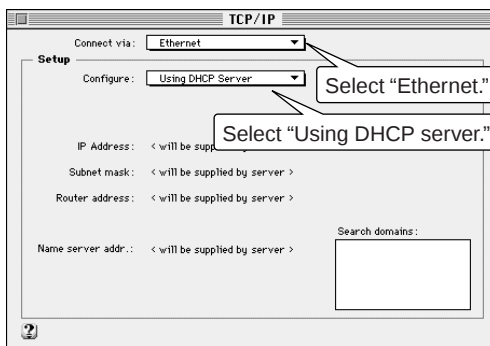
C-4 Macintosh Operating System

[NOTE]

- * When the network settings are changed, the previous setting values will be erased.
- * This procedure is based on Mac OS J1-8.6. The order of the steps and the screens themselves may vary if a different version is used. Consult the Help files of your Macintosh operating system for assistance.

When using a Macintosh operating system, adjust the TCP/IP settings according to the procedure below. Since ICOM wireless LAN cards cannot be used with Macintosh computers, the settings explained here are to prepare for a cable connection with the AP-3 unit.

1. Start up the computer.
2. Open the [Apple Menu] and select [Control Panel]. Then open the [TCP/IP] screen.
 - Follow the instructions indicated on the screen shot below.



- * If a TCP/IP item is not included on the [Control Panel], refer to the Help screen of the operating system or the instruction manual provided with the Ethernet card for instructions regarding how to install the TCP/IP protocol.
3. Click the close-box button on the title bar.
 - The settings are saved and the [TCP/IP] screen closes.
 4. After the computer shuts down, proceed to Chapter 6 (p. 37).

5-2 Setting Tips

- Complete the settings described in this chapter and shut down the computer before proceeding to Chapter 6 (☞ p. 37).
- Complete the settings described in Chapter 6 (☞ p. 37) before connecting the AP-3 to a working LAN.
- When constructing a TCP/IP network, it is necessary to set the IP addresses of the computers that will be connected to the network. (☞ p. 17).
- A computer running Windows will acquire the local IP address from the AP-3 when Windows is started up and a computer using a Macintosh operating system will acquire the local IP address each time network communications are begun (e.g., when the computer accesses the internet or email).
Make sure the AP-3 unit is turned on and "Use DHCP server function" is set to "Yes" on the screen shown on page 52.
- When the AP-3 unit attempts to allocate a local IP address to a computer and another computer (non-DHCP client for which local IP address was set manually) is already using the same local IP address, the AP-3 unit will not detect the existence of the address used by the other computer.
- When [Routing Mode] (☞ p. 51) is not used, the total number of IP addresses that the AP-3 unit can allocate automatically to both wireless and wired LAN computers is a 5 to 128. When [Routing Mode] is used, the AP-3 unit can allocate 5 to 128 IP addresses to wireless LAN computers and the same number to wired LAN computers. The original factory setting for the number of allocations is 30 for both wired and wireless LAN. (☞ p. 53)

Avoid overlapping between the IP addresses of clients (including clients having a wireless connection) connected to the same network and the range of IP addresses that the AP-3 unit can automatically allocate to computers.

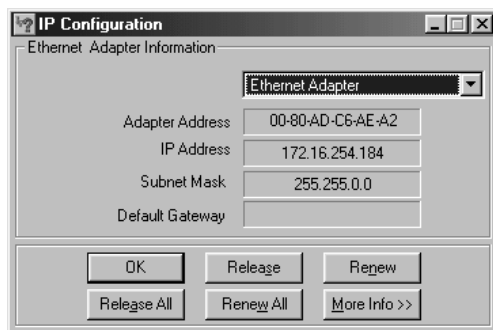
5 COMPUTER SETTINGS

5-3 Checking the Network Settings

Use one of the following procedures (depending on the operating system) to check, release, or reacquire IP address settings that were obtained auto-

matically.

■ Windows 95 and 98



For Windows 95 and 98, use the winipcfg.exe file in the Windows folder.

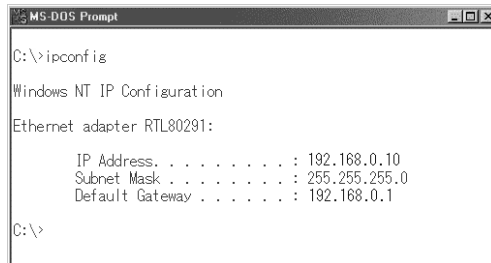
[Steps]

1. Click <Start> and select [Run].
2. Type "winipcfg" into the text box and press the [Enter] key.
 - The following screen will appear when the application starts up:
3. Click the ▼ button on the right side of the text box and select the name of the Ethernet card being used. Check or release the setting values, or reacquire the settings.
 - **Adapter address** : MAC address of Ethernet card

■ Windows NT 4.0 (Work Station) or Windows 2000 (Professional)**[NOTE]**

For more information, run [ipconfig/?] and read the help information displayed.

Run [ipconfig] from the command prompt screen.



```
MS-DOS Prompt
C:\>ipconfig

Windows NT IP Configuration

Ethernet adapter RTL80291:

    IP Address. . . . . : 192.168.0.10
    Subnet Mask . . . . . : 255.255.255.0
    Default Gateway . . . . . : 192.168.0.1

C:\>
```

Windows NT 4.0 or Windows 2000 will prepare an IP address and display the [Command Prompt] screen when the IP address has continuously failed to be obtained from the DHCP server for a certain amount of time. When this occurs, the computer does not have a proper connection with the AP-3. Check the connection with the AP-3 and the TCP/IP settings of the computer.

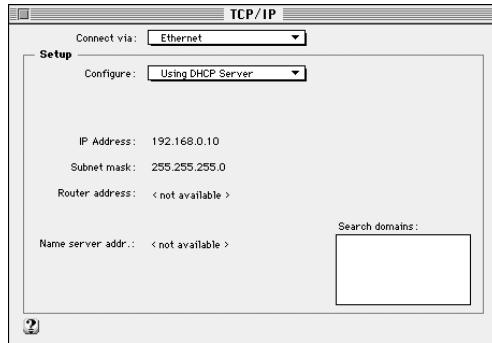
5 COMPUTER SETTINGS

■ Macintosh Operating System

[NOTE]

The computer will not obtain the network setting values from the DHCP server until network communications (e.g., accessing the internet or email) have actually been conducted. Conduct some sort of network communications before checking the network settings.

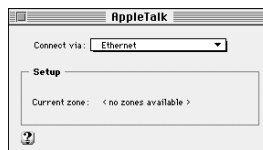
The network settings can be checked from the TCP/IP settings screen (☞ p. 32). The screen shown below is displayed when the [Setting Method] is set to “Browse DHCP server.”



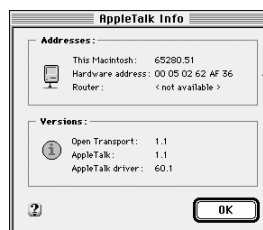
[Checking the Mac address]

1. Select [Control Panel] from the [Apple Menu]. The open [Apple Talk] window is displayed.

* To arrange for the screen on the right to be shown, select [User Modes] from the [Edit] menu (on the menu bar) and select the [Specify details] option.



2. Select [Ethernet] for the [Passageway].
3. Display the screen shown below by selecting [Show Information] from the [File] menu when working with the left-hand screen shown above or by clicking the <Information> button when working with the right-hand screen shown above.



MAC address

6-1 Before Getting Started

Disconnect the network computers from the AP-3 unit if you are starting up the AP-3 unit for the first time after purchasing it or after initializing all setting data. Connect only the computer than will be used for to adjust the settings. The connection can be wired or wireless.

If the AP-3 unit is connected to a working network without changing the original factory settings, IP address conflicts and other network problems may occur.

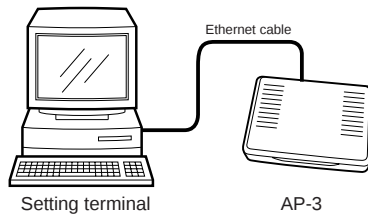
[NOTE]

If possible, use a cable connection between the AP-3 and the computer used to adjust the settings.

6-2 Preparing to Adjust the Settings with a Cable Connection

A Connections

See “4-1 Connecting to a Computer” (☞ p. 14) regarding how to connect the computer to the AP-3.



B Starting the AP-3 and computer

1. After connecting the cable, connect the provided AC adapter to the DC jack of the AP-3 and plug it into an outlet. The AP-3 unit will power on. (☞ section 4-3, p. 16)
 - At first all lamps on the front panel will illuminate, then only the [POWER] lamp will remain on.
2. Start up the computer.
 - If the connection is established normally, the [LAN] lamp (☞ p. 6) on the front panel of the AP-3 will illuminate.
 - * If the [LAN] lamp does not illuminate set the [HUB/PC] switch to [PC]. (☞ pp. 6 and 14)

[IMPORTANT]

When the computer is connected to the AP-3 through a hub, do not start up any computer other than the computer being used to adjust the settings (setting terminal) until the settings are completed.

6 AP-3 SETTINGS

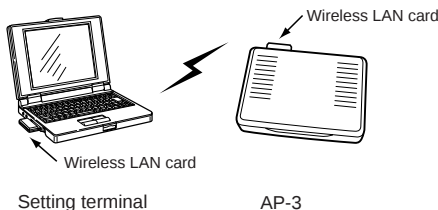
6-3 Preparing to Adjust the Settings with a Wireless Connection

A Connections

[NOTE]

- If an ICOM SL-1100 wireless LAN card is used with the AP-3, the same model of wireless LAN card (SL-1100) must be used with the computer being used to adjust the settings.
- A Macintosh computer cannot be used as a wireless terminal.

See “4-1 Connecting to a Computer” (p. 14) regarding how to set up the wireless connection between the computer and the AP-3.



B Setting terminal settings

The items listed below need to be confirmed in order to establish a wireless connection between the setting terminal and the AP-3 unit. See the instruction manual provided with your ICOM wireless LAN card for details.

- Make sure the driver for the ICOM wireless LAN card is installed.
- Check the [ESS ID] and [Network Mode] of the wireless LAN card.
- Check the TCP/IP protocol settings.

When the AP-3 will be connected to a working network, check the following items in addition to those listed above:

- Check the Microsoft Network Sharing Service.
- Check the identification information (work group).
- Check the shared folders.

[NOTE]

If you are using Windows 2000, “Microsoft Network Sharing Service” will be expressed as “Microsoft Network File and Printer Sharing”

B-1 Network Mode

[NOTE]

If you are using an ICOM SL-1100 wireless LAN card, [Network Mode] will be called [Wireless station type].

The [Network Mode] of the AP-3 is factory set to support the kind of wireless access point function (p. 45) illustrated above. Make sure the wireless LAN card used with the setting computer is also set to the correct mode (e.g., “Infrastructure” if using an SL-1100 or SL-1105 LAN card) for connecting to an access point. (p. 39)

The computer will not be able to establish a wireless connection with the AP-3 unit if the wireless LAN card used with the setting terminal is set to the mode for communication between wireless terminals (e.g., “Adhoc” mode if using an SL-1100 or SL-1105 LAN card).

B-2 ESS ID

[NOTE]

If you are using an ICOM SL-100 wireless LAN card, [ESS ID] will be called [Net key].

The [ESS ID] is used to prevent unauthorized access to the wireless network group.

The [ESS ID] of both AP-3 unit and the wireless LAN card are factory set to "LG" (upper gas letters).

The computers that will have a wireless connection with the AP-3 and the other computers in the same network group must have the same [ESS ID]. Otherwise the devices will not be able to communicate.

B-3 Checking the settings

Check the [Network Mode] and [ESS ID] settings using the setting screen.

Be sure to restart the computer if you change any setting values. Otherwise the new settings will not be effective and the computer will not be able to make the wireless connection with the AP-3 unit.

However, restarting is not necessary if the Utility provided with the LAN card is used to change the settings.

See the instruction manual provided with the wireless LAN card for more information.

[Windows 98]

Click <Start> and select [Control Panel] from the [Settings] menu. Double click the [Network] icon. Then double click "Icom SL-1100 Wireless LAN Adapter (PCMCIA 3V)" in the list of installed components.

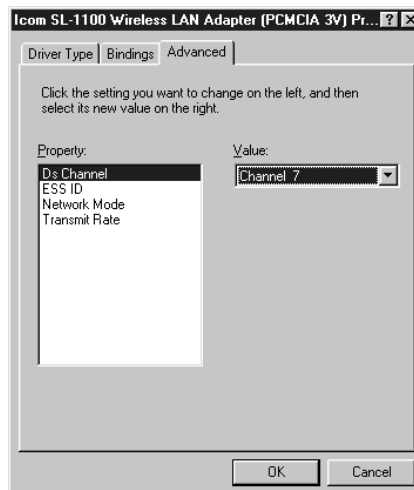
Select the [Advanced] tab on the adapter properties screen. The screen will appear as shown below.

[NOTE]

• If the driver for the ICOM wireless LAN card has not been installed in the computer, "Icom SL-1100 Wireless LAN Adapter (PCMCIA 3V)" will not be included in the list of network components and it will not be possible to display the screen shown to the right (illustrating Windows 98).

See the instruction manual provided with the wireless LAN card for more information about the setting screen and installing the driver.

• If you are using Windows 95, the items displayed under [Property] will be different.



6 AP-3 SETTINGS

6-3 Preparing to Adjust the Settings with a Wireless Connection (continued)

6-3 Checking the settings (continued)

[NOTE]

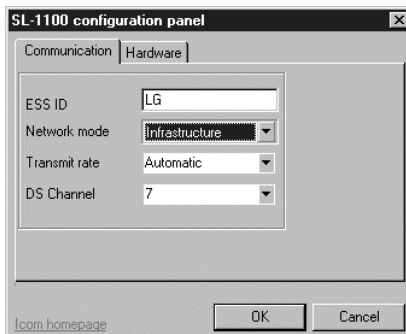
If the driver for the ICOM wireless LAN card has not been installed in the computer, "Icom SL-1100 Wireless LAN Adapter (PCMCIA 3V)" will not be included in the list of network adapters and it will not be possible to display the screen shown to the right.

See the instruction manual provided with the wireless LAN card for more information regarding installing the driver.

[Windows NT 4.0]

Click <Start> and select [Control Panel] from the [Settings] menu. Then double click the [Network] icon and select the [Adapters] tab. Finally, double click "Icom SL-1100 Wireless LAN Adapter (PCMCIA 3V)" in the list under [Network adapters].

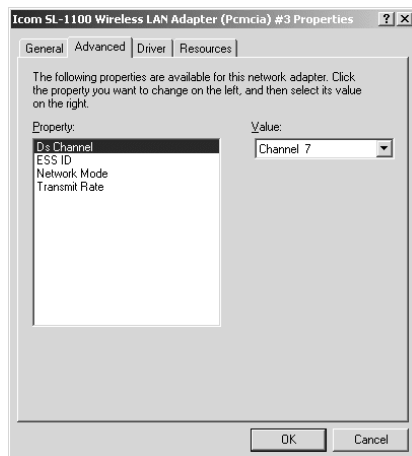
The screen will appear as shown below.



[Windows 2000]

Click <Start> and select [Dial-Up Networking] from the [Settings] menu. Double click the appropriate [Local Area Connection] icon on the [Dial-Up Networking] screen and then click <Properties>. Click <Configuration> and select the [Advanced] tab.

The screen will appear as shown below.



C Starting the AP-3 and computer

1. After completing the setting terminal settings (➡ p. 38), insert the wireless LAN card into the PCMCIA slot of the AP-3 unit.
2. Connect the provided AC adapter to the DC jack of the AP-3 and plug it into an AC outlet (➡ section 4-3, p. 16). The AP-3 will power on.
 - At first all lamps on the front panel will illuminate, then only the [POWER] lamp will remain on.
3. Start up the computer (setting terminal). Do not start any other computers in the network.
 - * If the connection is established normally, the **wireless LAN** lamp (➡ p. 6) on the front panel of the AP-3 will illuminate.
 - * The green lamp of the wireless LAN card inserted into card slot of the computer (setting terminal) will flash continuously. The red lamp will flash when the computer accesses the AP-3 unit.
 - * If the **wireless LAN** lamp on the front panel does not illuminate, check the [Network Mode] and [ESS ID] settings of the computer or restart computer. (➡ pp. 38, 39 and 40)
 - * If the lamps of the wireless LAN card inserted into the card slot of the computer do not illuminate or do not behave as described above, check if the driver is installed properly.

[IMPORTANT]

When the computer is connected to the AP-3 through a hub, do not start up any computer other than the computer (setting terminal) being used to adjust the settings until the settings are completed.

6-4 Accessing the Setting Screen

After connecting the computer (setting terminal) to the AP-3 unit according to the instructions in section 6-2 or 6-3, make sure you can access the setting screen of the AP-3 using the web browser of the computer.

Install a web browser into the computer if it does not already have one.

- 1. Open the web browser of the setting terminal.
- 2. Designate the IP address of the AP-3 unit as the URL.
 - **http://192.168.0.1 (original factory setting)**
- 3. When the setting terminal gains access to the AP-3 unit, the [Wireless LAN Setting] screen is displayed.
 - * If the setting screen is not displayed, check the settings, connections, and IP address settings (p. 34) of the setting terminal. Restart the setting terminal and try to access the AP-3 again.

[Wireless LAN Setting Screen]



- ① **Setting screen selection area**
- ② **Setting screen display area**
- ③ **<Save> button**

This area displays the titles of all AP-3 setting screens. Click the title of the desired setting screen to open it.

This area displays the selected setting screen.

Click this button to save changes made to the data displayed on the setting screen.

④ **<Cancel> button**

Click this button to cancel any changes and return the setting data to its original state (i.e., state before changes were made). If the <Save> button has been pressed, the settings will not return to their original state.

⑤ **<Save and Restart> button**

Click this button to save the setting changes and restart the AP-3 unit.

* After the settings have been saved, a message suggesting restarting the unit will be displayed next to this button if restarting is required. Be sure to click this button when this occurs.

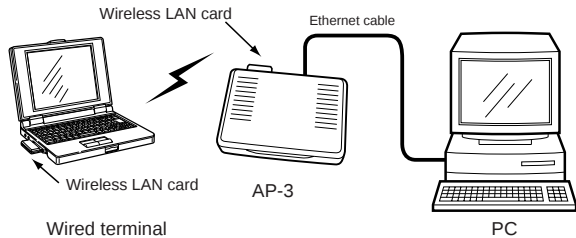
⑥ **Version information**

This area shows the version of the firmware (☞ p. 66). This manual assumes Version 1.0 is being used.

6-5 Testing the Operation

Set up the connection arrangement shown below and check if a wireless connection with the AP-3 can be made.

* The settings of the AP-3 unit are assumed to be original factory settings.



1. Insert the wireless LAN card into the AP-3 unit. (☞ p. 10)
2. Connect the provided AC adapter to the AP-3 unit.
 - At first all lamps on the front panel will illuminate, then only the [POWER] lamp will remain on.
3. Start up the wired terminal (connected with an Ethernet cable).
 - The [LAN] lamp (☞ p. 6) on the front panel of the AP-3 will illuminate.
4. Make sure you can access the setting screen of the AP-3 from the wired terminal. (☞ p. 42)
5. Create a test folder and set the shared folder permission so that the folder can be shared.

.....Continued on following page

6 AP-3 SETTINGS

6-5 Testing the Operation (continued)

6. Start up the wireless terminal (in which a wireless LAN card has been inserted). (☞ 6-3, p. 38).
 - If the connection is normal, the **wireless LAN** lamp (☞ p. 6) on the front panel will illuminate.
7. Make sure you can access the setting screen of the AP-3 from the wireless terminal (☞ p. 42).
8. Create a test folder and set the shared folder permission so that the folder can be shared.
9. Double click the [Network Computer] icon on both the wired terminal and the wireless terminal. The wireless access point is functioning properly if both computers display an icon for the other computer.
 - * If using Windows 2000, [Network Computer] is called [My Network].
10. From each computer (wired and wireless), double click the icon for the other computer. The newly created test folder should appear.
11. After completing these steps, refer to Chapter 8 and set up the AP-3 so it can be used in the working network. Then connect the AP-3 to the network.

The AP-3 unit can function in the following two ways to construct a wireless network:

- Wireless access point function (☞ section 7-1 below)
- Roaming function for roaming with a wireless terminal (☞ section 7-2, p. 46)

* When a wireless transmission speed of 11 Mbps is used, the transmission range is roughly 30 m indoors and 70 m outdoors (line of sight).

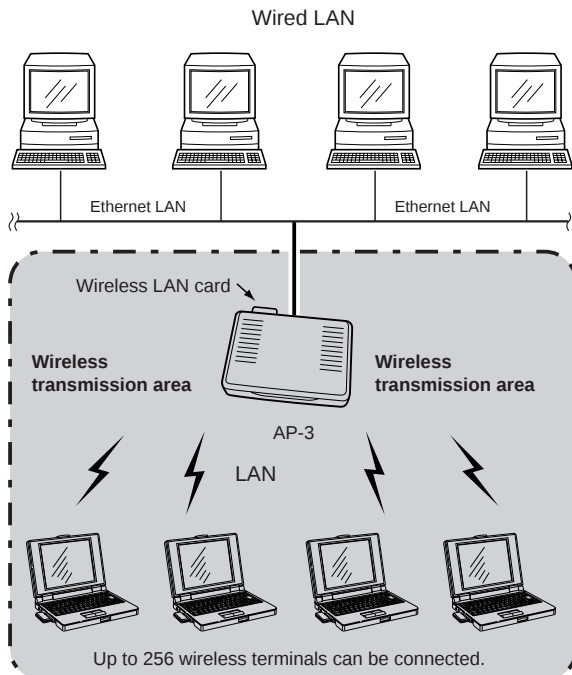
[NOTE]

A Macintosh computer cannot be used as a wireless terminal.

7-1 Wireless Access Point Function

The wireless access point function refers to using the AP-3 unit to construct a local area network wherein wireless terminals can communicate with each other as well as with wired terminals connected to the AP-3 via an Ethernet cable.

■ Schematic illustration

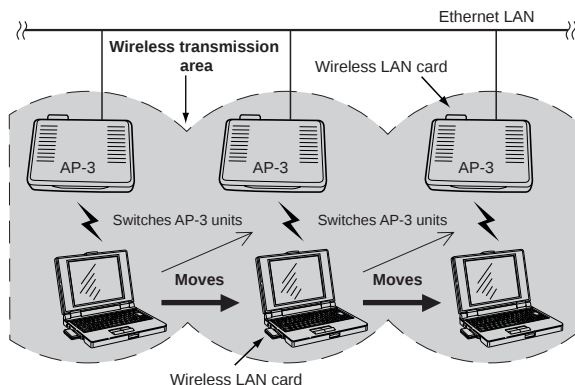


7 WIRELESS FUNCTIONS

7-2 Roaming Function

The roaming function refers to installing multiple AP-3 units along an Ethernet LAN so that the wireless transmission areas overlap. This arrangement allows wireless terminal to maintain communications with the Ethernet LAN while moving among the wireless transmission areas. In short, this function allows the wireless transmission area to be expanded.

■ Schematic illustration

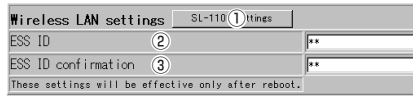


■ Roaming function precautions

- Overlapping of IP addresses can be avoided by setting up only one of the AP-3 units so that the DHCP server function is enabled.
- Within the mobile wireless transmission area (roaming area), all wireless terminals and AP-3 units for which the roaming function will be used must use the same [ESS ID] setting.
Wireless terminals set to a different [ESS ID] will not be able to communicate with the AP-3 units.
- The wireless LAN terminals, including those in the roaming area, will operate as part of the same network group as wired LAN terminals. Therefore, routing mode (p. 51) cannot be used when the roaming function is used.
- When SL-1100 or SL-1105 LAN cards are used and roaming is conducted using the same channel for all LAN cards, the transmission speed may decline in the interference areas where the signals from two wireless access points (i.e., AP-3 units) can be received simultaneously. To avoid interference completely, set the channels of the AP-3 units at least four channels apart.
- Connect the AP-3 units in a cascade arrangement by connecting them through a hub using Ethernet cable.

8-1 [Wireless LAN Settings] Screen

■ Wireless LAN settings



① <SL-1100 or SL-1105 advanced settings> button

Click this button to open an advanced LAN card setting screen when an SL-1100 or SL-1105 wireless LAN card is used with the AP-3.

② ESS ID.....

This setting item is used to establish an ID to prevent unauthorized access to the wireless LAN connected to the AP-3 unit. A wireless connection can only be made between AP-3 units having the same ESS ID or between an AP-3 unit and a wireless terminal having the same ESS ID.

Setting changes will not take effect until the AP-3 unit is restarted.

When entering the ESS ID, use up to 31 arbitrary alphanumeric characters. Upper and lower case are distinguished. (Default setting: LG)

Typed characters are displayed as asterisks (*).

(Display example: **)

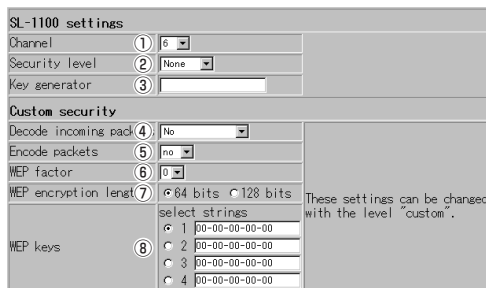
③ ESS ID Confirmation Reentry

This setting item is for reentering the ESS ID to make sure it is entered correctly with no typographical errors. Be careful to distinguish between upper and lower case letters. (Display example: **)

■ SL-1100 or SL-1105 advanced settings

[NOTE]

Only when the channel setting is changed does the AP-3 unit need to be restarted.



e.g. SL-1100

① Channel

This setting item is used to set the wireless transmission channel used for the wireless connection of the AP-3.

(default value: 14)

* Wireless terminals using an SL-1100 or SL-1105 wireless LAN card will automatically detect the channel setting of the AP-3.

.....Continued on following page

8 SETTING SCREENS

8-1 [Wireless LAN Settings] Screen (continued)

■ SL-1100 or SL-1105 advanced settings (continued)

② Security Level

This setting item is used to set the degree of data encryption used to protect the data transmitted over the wireless network. (default setting: None)

The AP-3 uses WEP (wired equivalent privacy) encryption.

Except for [WEP Key], all setting items under [Security Level Custom Settings] are set automatically according to the security level (Low, Medium, or High) selected here. When this setting item is set to "Custom" the setting items (except WEP Key) under [Security Level Custom Settings] can be set arbitrarily.

* We recommend using the same security level for devices that will be communicating with each other. However, a wireless terminal with a security setting of "Medium" can communicate with another wireless or wired terminal through an AP-3 unit with a security setting of "Low."

③ Key Generator

This setting item is used to enter a character string for generating the key used for encryption and decryption.

Typed characters are displayed as asterisks (*).

(Display example: **)

The keys generated from the entered character string are displayed in the WEP Key text boxes under [Security Level Custom Settings].

* Enter the same character string (arbitrary combination of alphanumeric characters and symbols for which upper and lower case letters are distinguished) as the other devices with which AP-3 will be communicating. If different character strings are used, the encrypted data cannot be decrypted.

④ Decryption of Received Packets

This setting item is related to the decryption of received packets. Select from among "Yes", "No" and "Yes (destroy unencrypted packets)" (default value: No)

⑤ Encryption of Trans- mitted Packets

This setting item is related to the encryption of received packets. Select "Yes" or "No." (default value: No)

.....Continued on following page

⑥ WEP Factor

This setting item is used to establish the security level. "0" indicates the highest degree of security.

(default value: 0)

The encryption levels are as follows:

"0"= updates internal encryption key for every packet

"1"= updates internal encryption key every five packets

"2"= updates internal encryption key every ten packets

"3"= updates internal encryption key every fifty packets

⑦ Number of Encryption Bits

This setting item is used to select the number of encryption bits. (default value: 64)

When "64 bits" is selected, the last 40 bits of the keys are shown in the [WEP Key] text boxes.

When "128 bits" is selected, the last 104 bits of the keys are shown in the [WEP Key] text boxes.

(The leading 24 bits are not displayed.

⑧ WEP Key

When 64-bit encryption is selected, the keys generated from the character string entered into the [Key Generator] text box are displayed in text boxes 1, 2, 3, and 4 in 40-bit segments. When 128-bit encryption is selected, the keys are displayed in 104-bit segments.

Only the selected key (1, 2, 3, or 4) is used for encryption. Select a key by putting a check in the adjacent check box. The other device can only decrypt the signal from the AP-3 when it is encrypting with one of the four keys (1, 2, 3, or 4) shown here.

* The keys can also be entered directly into the WEP key text boxes (1, 2, 3, and 4). When this is done, a character string will not be displayed in the [Key Generator] text box.

8 SETTING SCREENS

8-1 [Wireless LAN Settings] Screen

■ MAC address security settings

MAC address security

MAC address security ① ☐ No ☐ Yes These settings will be effective only after reboot.

MAC address (wireless card on AP-3) ② No card.

Additional settings

MAC address ③ Add

Current settings

Registered stations Receiving stations Status ④

① Use MAC Address Security

This setting item is used to select whether or not to limit wireless connections with this AP-3 unit to those wireless terminals having one of the MAC addresses registered here. (default value: No)
Setting changes will not take effect until the AP-3 unit is restarted.

② MAC Address on the Wireless LAN card...

When the wireless LAN card inserted into the AP-3 is properly recognized, the MAC address registered on the wireless LAN card is displayed here.

③ MAC Address

When the MAC Address Security function is used, the AP-3 unit can communicate with other ICOM network devices fitted with a wireless LAN card whose MAC address setting matches one of the MAC addresses registered here.

- * A maximum of 256 different MAC addresses can be registered.
- * Enter 12 alphanumeric characters for each address.
- * After entering the address, click <Add>. Then make sure the new address appears in the [Current Registry].
- * Hyphens are not recognized as part of the address. Thus, the following two entries represent identical address values:
11-11-11-22-33-33 111111223333
- * See section 5-3 (p. 34) for instructions on how to check the MAC address of a wireless LAN card.

④ <Delete> button

This button is used to delete a previously registered MAC address. When no MAC addresses are registered, this button is not displayed.

8-2 [AP-3 Network Settings] Screen

■ Routing mode setting

Routing function	
Routing function	☒ no ☐ yes

Using Routing Mode

This setting item is used to set whether or not routing will be used between the wired LAN and the wireless LAN.

(default setting: No)

It is necessary to restart the AP-3 unit to activate any setting changes.

* When "No" is selected, the wired LAN and the wireless LAN are handled as though they are in the same subnet (i.e., same network) and, therefore, the roaming function (☞ p. 46) can be used. In this case, the IP address and subnet mask settings under [Wired LAN] on the [AP-3 Network Settings] screen are used for the wireless LAN.

When "Yes" is selected, the wired LAN and the wireless LAN are handled as though they are in different subnets (i.e., separate networks). In this case, the IP address and subnet mask settings under [Wireless LAN] on the [AP-3 Network Settings] screen are used for the wireless LAN.

■ AP-3 IP address settings

IP address		
	Wired LAN	Wireless LAN
IP address ①	192.168.0.1	192.168.1.1
Subnet mask ②	255.255.255.0	255.255.255.0
Wireless side settings work only with the routing function.		

① IP address

This setting item is used to set the wired LAN and wireless LAN IP addresses.

● Wired LAN default setting : 192.168.0.1

● Wireless LAN default setting : 192.168.1.1

Setting changes will not take effect until the AP-3 unit is restarted.

② Subnet mask

This setting item is used to set the wired LAN and wireless LAN subnet masks.

● Wired LAN default setting : 255.255.255.0

● Wireless LAN default setting : 255.255.255.0

Setting changes will not take effect until the AP-3 unit is restarted.

When the [Routing Mode Setting] is set to "No" (default), the AP-3 unit will operate using the IP address and subnet mask entered under [Wired LAN] for the wireless LAN.

8 SETTING SCREENS

8-2 [AP-3 Network Settings] Screen (continued)

■ DHCP server settings

[NOTE]
The AP-3 unit must be restarted before any of the settings on this screen will take effect.

DHCP server		
DHCP server	☐ no ☒ yes	
	Wired LAN	Wireless LAN
Beginning IP Address	192.168.0.10	192.168.1.10
Subnet mask	255.255.255.0	255.255.255.0
Assignment numbers	30	30
Default gateway		
Primary DNS server		
Secondary DNS server		
Primary WINS server		
Secondary WINS server		
Domain name		
Lease time	3 days	
Wireless side settings work only with the routing function.		

① **Use DHCP Server Function**

This setting item is used to set whether the AP-3 unit will be used as a DHCP server or not. (default value: Yes)
When the AP-3 is used as a DHCP server, the following information regarding the DHCP server clients can be set automatically:

- IP address
- Subnet mask
- Default gateway
- DNS server
- WINS server
- Domain name

② **Initial Allocation IP Address**

This setting item is for setting the initial IP address that will be used when the AP-3 unit allocates IP addresses to computers connected with either a wired or a wireless connection.

- Default value for wired LAN side :192.168.0.10
- Default value for wireless LAN side :192.168.1.10

③ **Subnet Mask**

This setting item is the subnet mask corresponding to the allocation starting IP address.
(default value: 255.255.255.0)

.....Continued on following page

- ④ **Number of Allocations**

This setting item establishes the maximum number of IP addresses that can be automatically allocated in succession starting with the initial allocation address.
(default value: 30)
Setting values from 5 to 128 are allowed.
- ⑤ **Default Gateway**

This setting item establishes the default gateway that will be reported to the client. Enter values for both the wired LAN and the wireless LAN.
- ⑥ **Primary DNS Server**

This setting item establishes the primary DNS address for both the wired LAN and the wireless LAN.
- ⑦ **Secondary DNS Server**

This setting item establishes the secondary DNS address for both the wired LAN and the wireless LAN.
- ⑧ **Primary WINS Server**

This setting item establishes the primary WINS address for both the wired LAN and the wireless LAN.
- ⑨ **Secondary WINS Server**

This setting item establishes the secondary WINS address for both the wired LAN and the wireless LAN.
- ⑩ **Domain Name.....**

This setting item establishes the domain name of the network address reported to the client by the DHCP server. Enter values for both the wired LAN and the wireless LAN.
- ⑪ **Lease Period**

This setting item establishes the frequency (in days) at which the DHCP server will automatically reallocate a new local IP address to the client. Enter values for both the wired LAN and the wireless LAN. (default value: 3)

8 SETTING SCREENS

8-2 [AP-3 Network Settings] Screen (continued)

■ Static DHCP server settings

[NOTE]

The AP-3 unit must be restarted before any of the settings on this screen will take effect.

Static DHCP server		
Additional settings		
MAC address	IP address	Wired LAN / Wireless LAN
		Add / Add
Wireless side settings work only with the routing function.		
Current settings		
MAC address	IP address	Wired LAN / Wireless LAN

This section of the [AP-3 Network Settings] screen is used to specify the wired and wireless terminals to which IP addresses will be automatically allocated using the DHCP server function. The computers are registered according to MAC address and IP address.

* Enter 12 alphanumeric characters for each MAC address.

* Hyphens are not recognized as part of the address. Thus, the following two entries represent identical MAC addresses:

11-11-11-22-33-33 111111223333

* Up to 16 wired and wireless terminals can be registered. The IP addresses registered here must be outside the range of IP addresses that can be allocated by the DHCP server function.

* After typing the MAC address and IP address, click <Add> under "Wired" or "Wireless" and make sure the new addresses have been registered under [Current Registry].

8-3 [Routing Settings] Screen

■ RIP setting



When RIP is used, the AP-3 exchanges routing information with nearby routers and access points to dynamically create a communication path. RIP packets are broadcast approximately every 30 seconds using the broadcast addresses of those routers and access points.

(default value: Yes)

A setting change will not take effect until the AP-3 unit is restarted.

■ IP routing information

This table displays information regarding which terminal, access point, or router the packet should be distributed to when the AP-3 transmits a packet. Paths added using the [Static Routing Settings] (p. 57) are also displayed here.

Network interface lists		
Interface	IP address	Subnet mask
local	192.168.0.1	255.255.255.0

IP routing information						
Dest ^① tion	Net ^② Mask	Gateway ^③	Interface ^④	Protocol ^⑤	Mode ^⑥	Cost
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.....

This column shows the destination IP address of the packet being routed.

② Net Mask.....

This column shows the net mask corresponding to the destination IP address of the packet being routed.

③ Gateway.....

This column shows the gateway corresponding to the destination IP address of the packet being routed.

.....Continued on following page

8 SETTING SCREENS

8-3 [Routing Settings] Screen (continued)

■ IP routing information (continued)

④ Net	This item displays added IP routing information in the [Network Interface List]. • Interface This column shows the transfer destination interface corresponding to the destination IP address of the packet being routed. • IP Address This column shows the IP address of the transfer destination. • Net Mask This column shows the net mask of the transfer destination.
⑤ Creation Type	This column shows how the routing information was made. • static Indicates that the routing information was created using a static (defined) route. • rip Indicates that the routing information was created using a dynamic (automatically generated) route. • misc Indicates that the routing information is related to the broadcast.
⑥ Metric	This column displays the number of routers and access points (or gateways) that the packet will pass through before reaching its destination.

8-3 [Routing Settings] Screen (continued)

■ Static routing settings

This table is used to specifically define the routing path of a packet. Up to 20 paths can be registered.

* After entering a path, click <Add> and make sure the path is displayed in the [Current Registry]. The setting data should also appear on the [IP Routing Information] screen.

Static route

Additional settings

Int ① ace Dest ② tion M ③ Ga ④ y M ⑤ c

local Add

Current settings

Interface	Destination	Mask	Gateway	Metric
-----------	-------------	------	---------	--------

- ① Path.....
- local
Select “local” when the [Routing Mode] (p. 51) is not used. Indicates that the routing information to be registered is for the LAN.
 - ethernet
Select “ethernet” when the [Routing Mode] is used. Indicates that the routing information to be registered is for the wired LAN.
 - wireless
Select “wireless” when the [Routing Mode] is used. Indicates that the routing information to be registered is for the wireless LAN.
- ② Destination
- Enter the IP address of the target destination in accordance with the selected path (ethernet, wireless, or local).
- ③ Net Mask.....
- Enter the net mask corresponding to the IP address of the target destination in accordance with the selected path (ethernet, wireless, or local).
- ④ Gateway.....
- Enter the gateway for the transfer destination (router or access point) of the packet to be routed.
- ⑤ Metric Value.....
- Enter the number of routers and access points (or gateways) that the packet will pass through before reaching its destination.
Values from 0 to 16 may be entered.
The AP-3 interprets a small number as indicating that the circuit has a high transfer capacity.

8-4 [AP-3 Management Settings] Screen

■ Manager ID settings

Administrator		
Name	①	
Password	②	
Password confirmat	③	

① Manager ID

Enter an arbitrary name for the network manager using up to 31 alphanumeric characters. Upper and lower case letters are distinguished. (Example ID: AP-3)
A user name will be requested the next time the AP-3 unit is accessed after completing this setting. Enter this manager ID.

② Manager Password..

Enter an arbitrary password using up to 31 alphanumeric characters. Upper and lower case letters are distinguished. (Display example: ****)
Typed characters will appear as asterisks (*).
A password will be requested the next time the AP-3 unit is accessed after completing this setting. Enter this manager password.

③ Password Confirmation Reentry

This setting item is for reentering the manager password to make sure it is entered correctly with no typographical errors. (Display example: ****)

■ SYSLOG settings

When log information and the like is managed using SYSLOG host, the information can be managed collectively as a file using the SYSLOG function. These SYSLOG settings are used to select what information will be output as part of the SYSLOG.

SYSLOG	
DEBUG ①	☐ no ☒ yes
INFO ②	☐ no ☒ yes
NOTICE ③	☒ no ☐ yes
Host addr ④	
Facility ⑤	1

① Use DEBUG

This setting item is for selecting whether or not debug information will be output as part of the SYSLOG.
(default value: Yes)

② Use INFO

This setting item is for selecting whether or not INFO type messages will be output as part of the SYSLOG.
(default value: Yes)

③ Use NOTICE

This setting item is for selecting whether or not NOTICE type messages will be output as part of the SYSLOG.
(default value: No)

④ Host Address

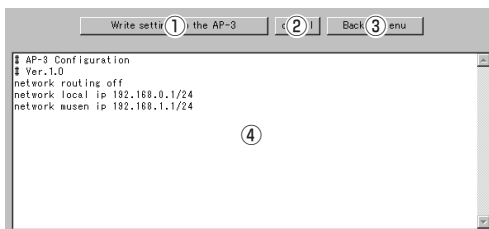
When the SYSLOG function will be used, enter the address of the host that will receive the SYSLOG.
The host must support SYSLOG server functions.

⑤ Facility

Enter the SYSLOG facility. (default value: 1)
Set to a value from 0 to 23.
This setting item is normally set to "1."

9-1 [Save Settings] Screen

The [Save Settings] screen is used to copy setting data from the AP-3 to a floppy disk or the hard disk of a computer and to upload setting data from a computer to the AP-3.



① **<Register to AP-3>**
button

This button is used to copy the setting data shown on the [Save Settings] screen to the setting screen of the AP-3.

② **<Undo>** button

This button is used to undo any changes made to the setting data shown on the [Save Settings] screen and return the data to the state it was in when the file was first opened.

③ **<Return to Menu>**
button

This button is used to return to the [Wireless LAN Settings] screen.

④ **Display area**

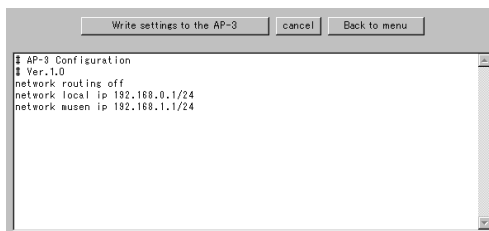
When the [Save Settings] screen is opened from the AP-3 setting screen, the current setting data is displayed in this area.

When the [Save Settings] screen is opened from a data file according to the procedure in “9-3 Uploading Setting Data” (p. 62), the setting data stored in the data file is displayed.

9-2 Saving Setting Data

Follow the procedure below to save the current setting data as an HTML file onto a floppy disk or the hard disk of the computer being used to access the AP-3.

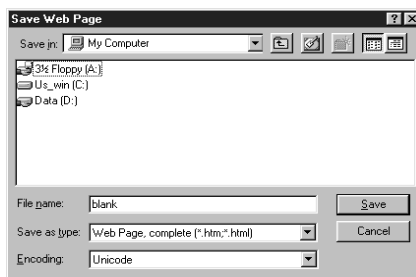
1. Connect a setting terminal (wired or wireless) to the AP-3.
2. Start up the web browser of the setting terminal.
3. Access the setting screen of the AP-3.
4. Click [Save Settings] in the setting screen selection area.
 - The [Save Settings] screen is displayed as shown below.



5. Select [Save as] from the [File] menu of the web browser.

[Note]

This explanation is based on Internet Explorer 5.0 for Windows.



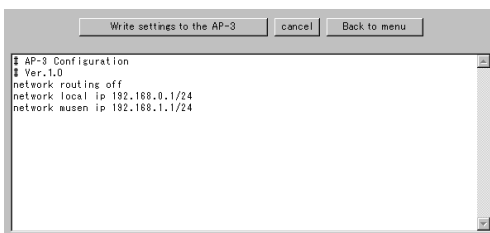
6. Designate the directory in the [Save in] text box and enter a filename in the text box.
7. Select [HTML file] under [Save as type].
 - * Select JIS if your browser offers a selection of kanji codes for the file.
8. Click the <Save> button.
 - The setting data is stored in the designated location.
 - The file extension will be htm or html.
 - The file will not have an extension if saved on a Macintosh.

9 SAVING AND UPLOADING SETTING DATA

9-3 Uploading Setting Data

Follow the procedure below to upload setting data from a computer to the AP-3.

1. Connect a setting terminal (wired or wireless) to the AP-3.
2. From the setting terminal, double click the icon of the stored data file.
 - The [Save Settings] screen is displayed as shown below.



3. Click the <Register to AP-3> button.
 - The setting data is uploaded and the AP-3 restarts.
4. Check that the correct setting data has been uploaded and close the setting screen.

■ Precautions regarding editing

When editing the network IP address or other setting in the display area, change the other related setting values at the same time.

* Read "General Precautions" (☞ p. 4) regarding editing the setting data. Bear in mind that the results of any setting changes will be on your own responsibility.

There may be times when you wish to readjust the settings from the beginning or delete existing setting data, such as when changing the network configuration. The setting data can be returned to the original factory settings using one of the three methods (A, B, or C) listed below.

This chapter explains A and B only.

A Use the <INIT> button (☞ p. 63)

B Use the setting screen (☞ p. 65).

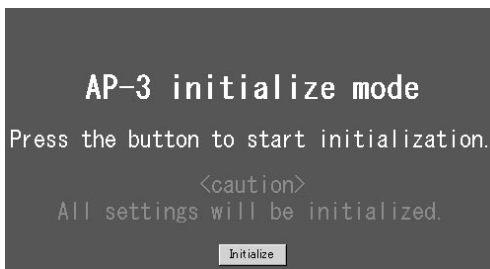
C Use the Utility (☞ p. 67).

* To use the Utility, install it from the included Utility Software disks. See “12 Utility Software” (☞ p. 67) for instructions regarding how to install the Utility.

A Using the <INIT> button

Use the following procedure to initialize the setting data in situations where you cannot access the AP-3 setting screen, such as when the current IP address setting of the AP-3 is unknown.

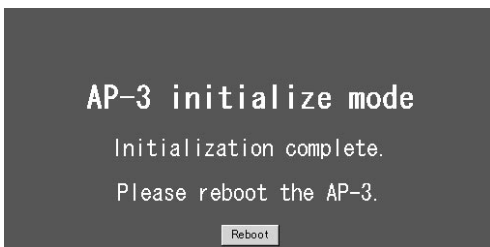
1. Disconnect all network devices except the AP-3 unit and the setting terminal (wired or wireless) that will be used to conduct the initialization.
2. Hold down the <INIT> button. Then supply power to the AP-3 unit or lightly press and release the <RESET> button.
 - The [LAN] lamp and the **wireless LAN** lamp will flash in unison.
3. Release the <INIT> button when the <POWER> indicator lamp starts flashing.
 - The <POWER> lamp will continue to flash slowly while operating in [Setting Initialization Mode].
4. Start up the setting terminal.
5. Open the web browser of the setting terminal and designate the original factory-set IP address (☞ p. 42) of the AP-3 in the URL text box.
 - The [Initialize mode] screen is displayed.



10 SETTING DATA INITIALIZATION

A *Using the [INIT] button (continued)*

6. Click the <Initialize> button on the [Setting Initialization Mode] screen.
 - The following screen is displayed:



7. Click the <Restart> button.
 - While the AP-3 unit is restarting, the following message is displayed:

Now rebooting...

8. The initialization is complete when the <POWER> lamp stops flashing and the [Wireless LAN Settings] screen is displayed.

B Using the setting screen

Use the initialization procedure described below when the current IP address is known and the AP-3 setting screen can be accessed. This procedure is conducted from the [Initialize Settings] screen and allows the scope of the initialization to be selected.

1. Disconnect all network devices except the AP-3 unit and the setting terminal (wired or wireless) that will be used to conduct the initialization.
2. Start up the setting terminal.
3. Open the web browser of the setting terminal.
4. Designate the original factory-set IP address (☞ p. 42) in the URL text box and access the AP-3 setting screen.
5. Click [Initialize Settings] in the setting screen selection area (☞ p. 42).
 - The [Initialize Settings] screen is displayed.

Initialize AP-3.

☐ ALL (All settings will be initialized)

☐ Wireless LAN (Wireless LAN settings will be initialized)

6. Select the radio button next to the desired initialization option (see below for details).
7. Click the [Initialize] button.
 - While the AP-3 unit is restarting, the following message is displayed.

Now rebooting...

8. The initialization is complete when AP-3 unit has restarted and the [Wireless LAN Settings] screen is displayed.

■ Regarding initialization options

• Initialize all settings

This option initializes all setting data adjusted from the setting screen.

• Initialize wireless settings

This option initializes all settings that can be adjusted from the [Wireless LAN Settings] screens (☞ section 8-1, pp. 47 to 50). Access the [Wireless LAN Settings] screens by clicking [Wireless LAN Settings] in the setting screen selection area (☞ p. 42).

11 UPDATING THE FIRMWARE

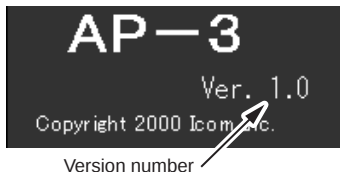
■ About firmware

“Firmware” refers to programs written into the flash memory of the AP-3 at the factory. These programs help the AP-3 operate.

New versions of these programs are sometimes created to expand or improve the functions of the product. By updating these programs, you can add functions and keep the AP-3 operating at its peak potential.

Before updating the firmware, confirm which version you are currently using by accessing the AP-3 setting screen.

The firmware version number is displayed in the setting screen selection area (☞ p. 42).



■ About the latest version

Our homepage provides information about firmware updates.

Check our homepage regularly at

<http://www.icom.co.jp/>

■ Downloading precautions

- Before downloading, read the license agreement for using our homepage.
- Firmware for other products cannot be used. Be sure to download the correct firmware.
- Depending on the content of the update, installing the latest version of the firmware may require initializing the setting data. When such is the case, use the Utility (☞ p. 68) to initialize the data after updating the firmware.
- Conduct the download procedure with the setting terminal connected to the AP-3 unit one-on-one (i.e., all other network devices disconnected) so that the data can be transferred in a stable environment.

■ How to update

- Use the Utility provided on the Utility Software disks to update the firmware.
- See “12 Utility Software” (☞ p. 67) for instructions on how to install and operate the software.

This chapter explains how to use the Utility software provided on the Utility Software disks, which are included in the AP-3 package.

12-1 About the Utility

The Utility is a software application used to initialize the setting data and update the firmware of the AP-3 unit.

Install the Utility software in a computer having one of the following operating systems.

- Windows 95, Windows 98
- Windows NT 4.0, Windows 2000

12-2 Installing the Utility

1. Start Windows.
If Windows is already running, close all open applications.
2. Insert the floppy disk labeled "Utility Software (1/2)" into the floppy disk drive.
3. Click <Start> and select [Run].
4. Type the name of the floppy disk drive and the filename Setup.exe. Then click <OK> or press the [Enter] key.
 - If the floppy disk drive is drive A, for example, type "A:\Setup."
5. Follow the instructions on the screen and inserted the floppy disk labeled "Utility Software (2/2)" when requested to do so.
6. Click <OK> and continue following the instructions on the screen.
7. After completing the installation, remove the floppy disk from the floppy disk drive.

12 UTILITY SOFTWARE

12-3 Using the Utility

A Start up the AP-3 in [Update Mode]

[NOTE]

When the AP-3 is started up in [Update Mode], the WEP function (i.e., wireless LAN security level) will become ineffective automatically.

B Connect the setting terminal (computer)

C Start up the utility

In order to communicate with the Utility, the AP-3 must be started up in [Update Mode] according to the following procedure:

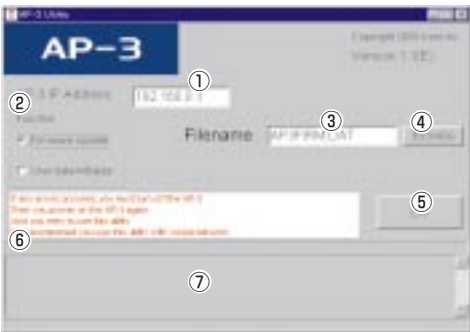
1. Hold down the <MODE> button. Then supply power to the AP-3 unit or lightly press and release the <RESET> button.
 - The [LAN] lamp and the **wireless LAN** lamp will flash in unison.
2. Release the <MODE> button when the <POWER> indicator lamp starts flashing.
 - The <POWER> lamp will continue to flash rapidly while operating in [Setting Initialization Mode].

After the AP-3 has been started up in [Update Mode], connect the setting terminal (wired or wireless) containing the Utility software to the AP-3 unit one-on-one (i.e., all other network devices disconnected).

- The [LAN] lamp will illuminate if the setting terminal has a wired connection with the AP-3.
 - The **wireless LAN** lamp will illuminate if the setting terminal has a wireless connection with the AP-3.
- * IP address conflicts and other network disruptions may occur if the setting data is initialized or the firmware is updated from a terminal connected to an operating network.

From Windows, click <Start> and select this Utility from the [Program] menu. The [AP-3 Utility] screen is displayed.

[AP-3 Utility] screen



D Operate the utility

The procedures for operating the [AP-3 Utility] screen are explained below. Encircled numbers refer to the reference numbers shown in the screen shot on page 68.

[EXTREMELY IMPORTANT]

Never turn off the power to the AP-3 unit while it is restarting after initializing the user data (setting data) or updating the firmware (☞ p. 70 and 71).

If the power is turned off before the restart process is completed, the data in the AP-3 unit will be lost and the AP-3 will no longer function.

After "Processing completed. Restarting system..." is displayed in area ⑦ of the [AP-3 Utility] screen, wait until the lamps on the front panel return to the state they were in before the restart process began.

D-1 Initializing the setting data**[Scope of initialization]**

When the initialization is executed from the Utility, all setting data are initialized.

[Procedure]

1. Enter the IP address of the AP-3 unit in the [AP-3 IP Address ①] text box. (default value: 192.168.0.1)
2. Click the radio button next to [Initialize User Data] under [Function ②].
3. Click the <Execute ⑤> button.
 - The status of the initialization is indicated in the area ⑦ at the bottom of the screen. During restart, all front panel lamps will be illuminated. When restart is completed, the lamps will return to their original state (i.e., how they were before the initialization was executed).
 - * The message "AP-3 not found" will be displayed if communication between the setting terminal and the AP-3 unit fails. Check the following:
 - Is the AP-3 unit in [Update Mode] (☞ p. 68)?
 - Did you enter the correct AP-3 IP address (☞ p. 42) into the [AP-3 IP Address ①] textbox?
4. Close the Utility.

12 UTILITY SOFTWARE

12-3 Using the Utility (continued)

2 Updating the firmware

Be sure to read “General Precautions” (p. 4) regarding updating the firmware. Bear in mind that the results of updating the firmware will be on your own responsibility.

[Time requirements]

The approximate times required for the setting terminal (wired or wireless) to transfer the firmware data file to the AP-3 and for the AP-3 to restart are as follows:

- **Transfer time= 10 seconds for a wired terminal, 30 seconds for a wireless terminal**
- **Restart time = 1 minute (wired or wireless)**

[Precautions] (IMPORTANT)

Conduct the firmware transfer using a wired or wireless terminal (setting terminal) in which the Utility software has been installed. Connect the setting terminal to the AP-3 unit one on one (i.e., with all other network devices disconnected) to prevent the occurrence of errors during the transfer. Checking the following items regarding the working environment before updating the firmware according to the procedure below:

◆ Regarding a wired setting terminal

- Remove the wireless LAN card from the card slot of the AP-3 unit.
- Connect only the wired setting terminal to the AP-3 unit.

◆ Regarding a wireless setting terminal

- * If possible, it is recommended that a wired connection be used between the setting terminal and the AP-3 unit when updating the firmware.
- Disconnect the Ethernet cable from the AP-3 unit.
- Connect only the wireless setting terminal to the AP-3 unit.
- Position the wireless setting terminal within 1 m of the AP-3 unit.

[Procedure]

1. Enter the IP address of the AP-3 unit in the [AP-3 IP Address ①] text box.
(default value: 192.168.0.1)
2. Click the radio button next to [Update firmware] under [Function ②].
3. Type the name of the data file (extension: dat) in the [Firmware file name ③] text box or click <Browse ④> and select the data file from the directory where it was downloaded onto the hard disk.

.....Continued on following page

4. Click the <Execute ⑤> button.

- The status of the data file transfer is indicated in the area ⑥⑦ at the bottom of the screen.

During restart, all lamps on the front panel will be illuminated. When restart is completed, the lamps will return to their original state (i.e., how they were before the file transfer was executed).

- * The message “AP-3 not found” will be displayed if communication between the setting terminal and the AP-3 unit fails. Check the following:

- Is the AP-3 unit in [Update Mode] (☞ p. 68)?
- Did you enter the correct AP-3 IP address (☞ p. 42) into the [AP-3 IP Address ①] textbox?

5. Close the Utility.

[Transfer failure]

The data file transfer may have failed if the [AP-3 Utility] screen and AP-3 unit lamps are found to be in any of the states described below.

- The bar that indicates the transfer status in the section ⑥ at the bottom of the Utility screen (☞ p. 68) either was not displayed at all or ceased to be displayed before the transfer finished.
- While the message “Transferring data...” was displayed at the very bottom of the Utility screen, the [LAN] lamp of the AP-3 unit continued to flash without changing.
- The message “Data transfer failed...Restart AP-3” was displayed.

The above situations indicate that a problem occurred in the communication with the AP-3. Check the items listed below. Then restart the AP-3 and repeat the transfer.

- * Regarding a wired setting terminal

- Check the condition of the Ethernet cable connected between the setting terminal and the AP-3.
- Check if the [LAN] lamp is illuminated.

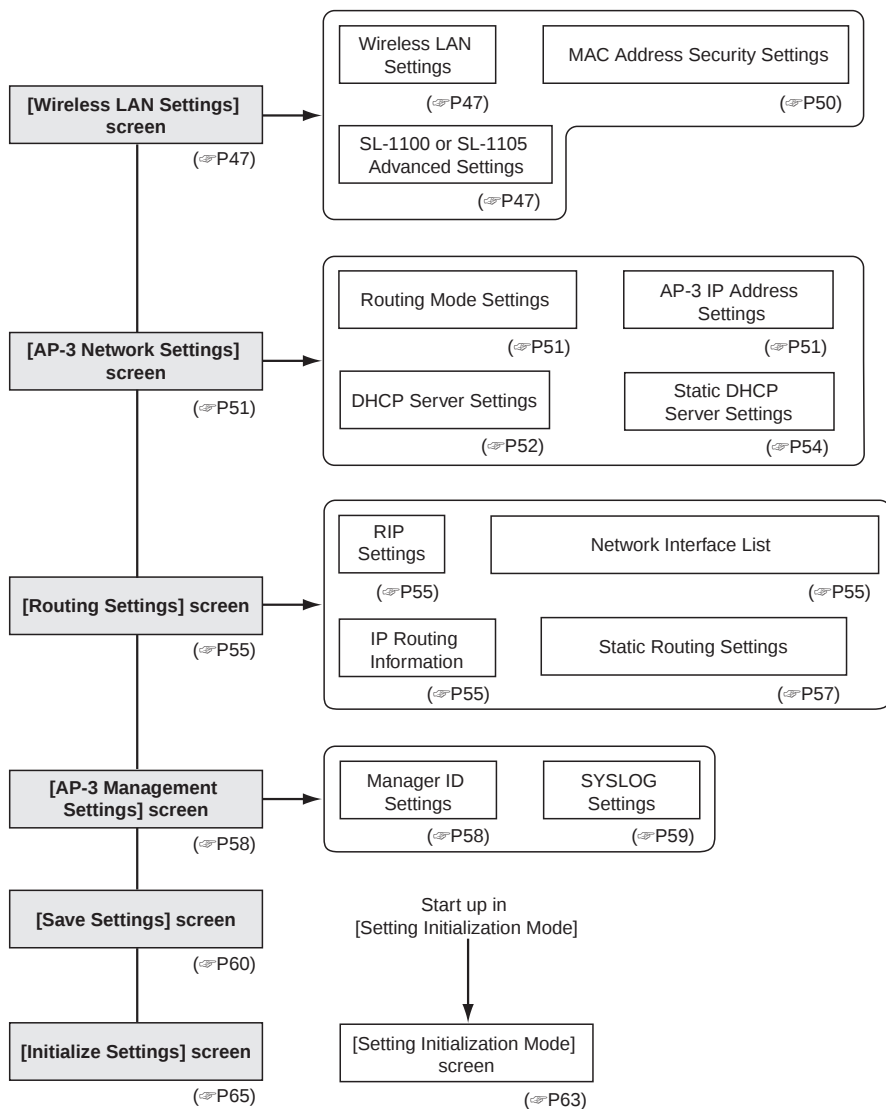
- * Regarding a wireless setting terminal

- Check the transmission distance between the wireless terminal and the AP-3 unit.
- Check if the **wireless LAN** lamp is illuminated.

13

SETTING SCREEN CONFIGURATION MAP

The figure below illustrates the configuration of the setting screen.



14-1 Default Setting Values

The original factory setting values are listed below for each setting screen of the AP-3 unit.

[Wireless LAN Settings] screen

Wireless LAN Settings

- ESS ID: LG (alphanumeric characters, upper case)

SL-1100 Advanced Settings

SL-1100 Settings

- Channel: 11
- Security level: None

MAC Address Security Setting

- Use MAC Address Security: No

[AP-3 Network Settings] screen

Routing Mode Setting

- Use Routing Mode: No

AP-3 IP Address Settings

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

DHCP Server Settings

- Use DHCP Server Function: Yes
- Lease Time: 3 days

Wired LAN

- Initial Allocation IP Address: 192.168.0.10
- Subnet mask: 225.225.225.0
- Number of Allocations : 30

Wireless LAN

- Initial Allocation IP Address: 192.168.1.10
- Subnet mask: 225.225.225.0
- Number of Allocations: 30

[Routing Settings] screen

RIP Setting

- Use RIP: Yes

[AP-3 Management Settings] screen

SYSLOG Settings

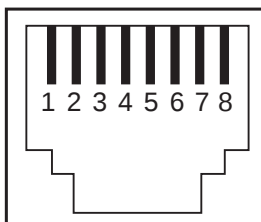
- Use DEBUG: Yes
- Use INFO: Yes
- Use NOTICE: No
- Facility: 1

14-2 Function List

- Wireless access point function
- Wireless roaming function
- Wireless security (ESS ID, MAC address, WEP)
- Routing protocol TCP/IP (RIP static)
- DHCP server function
- DHCP static function
- Supports SYSLOG
- Remote setup (web browser)
- Firmware Update

14-3 [ETHERNET] Port

One RJ-45 modular jack (8-pin)



1. Send (+)
2. Send (-)
3. Receive (+)
4. Not used
5. Not used
6. Receive (-)
7. Not used
8. Not used

14 REFERENCE INFORMATION

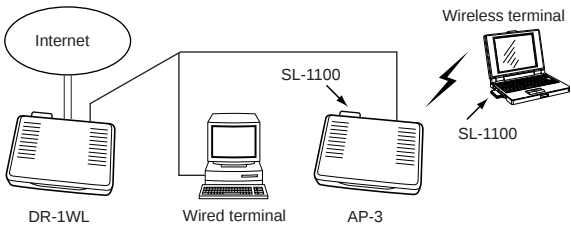
14-4 Basic Setting Example

This section presents some of the setting values entered when the AP-3 unit is used in the network configuration illustrated below.

For setting items not shown here, enter values that are appropriate for the particular network configuration.

**[DR-1 WL:
Required Settings]**

- Use DHCP server function.
- DR-1WL IP address: 192.168.0.1



■ Using the same subnet for both the wired and wireless LAN

**[AP-3:
Required Settings]**

- Use DHCP server function.
- AP-3 IP address: 192.168.0.2
- Initial allocation IP address: 192.168.0.50
- Do not use routing mode.

[AP-3 Network Settings] screen

Routing function	
Routing function	☒ no ☐ yes

	Wired LAN	Wireless LAN
IP address	192.168.0.2	192.168.1.1
Subnet mask	255.255.255.0	255.255.255.0

Wireless side settings work only with the routing function.

[Setting Tips]

Only change the values in the "Wired LAN" column of the [DHCP Server Settings] screen.

Set the initial allocation IP address so that the range of IP addresses over which the AP-3 can allocate does not overlap the range of IP addresses over which the DR-1WL (router) can allocate.

Set the [Default Gateway] and the [Primary DNS Server] to the same value as the IP address of the DR-1WL.

Although the [RIP Setting] does not have a direct influence on the performance of the network, unnecessary traffic can be avoided by not using RIP.

DHCP server		
DHCP server	☒ no ☐ yes	
	Wired LAN	Wireless LAN
Beginning IP Address	192.168.0.50	192.168.1.10
Subnet mask	255.255.255.0	255.255.255.0
Assignment numbers	30	30
Default gateway	192.168.0.1	
Primary DNS server	192.168.0.1	
Secondary DNS server		

[Routing Setting] screen

RIP	
RIP	☒ no ☐ yes

- * The wired terminal will obtain an IP address from either the DR-1WL or the AP-3.
- * The wireless terminal will obtain an IP address from the AP-3.

14-5 Practical Setting Example

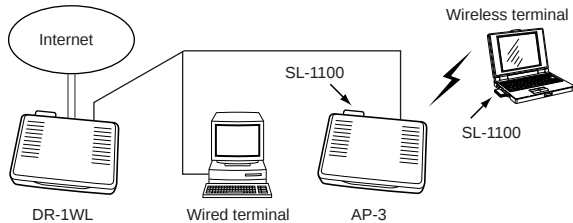
[DR-1 WL:

Required Settings]

- Use DHCP server function.
- DR-1WL IP address: 192.168.0.1
- Use RIP on the LAN side.
- Use substitute response function of DNS server.

This section presents some of the setting values entered when the AP-3 unit is used in the network configuration illustrated below.

For setting items not shown here, enter values that are appropriate for the particular network configuration.



■ Using the different subnets for the wired LAN and the wireless LAN

[AP-3:

Required Settings]

- Use DHCP server function.
- AP-3 IP address: 192.168.0.2
- Initial allocation IP address: 192.168.0.50
- Use RIP.
- Use routing mode.

[AP-3 Network Settings] screen

Routing function	
Routing function	☐ no ☒ yes

IP address		
	Wired LAN	Wireless LAN
IP address	192.168.0.2	192.168.1.1
Subnet mask	255.255.255.0	255.255.255.0
Wireless side settings work only with the routing function.		

[Setting Tips]

Change the values in both the "Wired LAN" and "Wireless LAN" columns of the [DHCP Server Settings] screen.

Set the initial allocation IP address so that the range of IP addresses over which the AP-3 can allocate does not overlap the range of IP addresses over which the DR-1WL (router) can allocate.

Set the [Default Gateway] to the same value as the IP address of the AP-3 unit.

Set the [Primary DNS Server] to the same value as the IP address of the DR-1WL.

DHCP server		
DHCP server	☐ no ☒ yes	
	Wired LAN	Wireless LAN
Beginning IP Address	192.168.0.50	192.168.1.10
Subnet mask	255.255.255.0	255.255.255.0
Assignment numbers	30	30
Default gateway	192.168.0.2	192.168.0.2
Primary DNS server	192.168.0.1	192.168.0.1
DNS server		

[Routing Setting] screen

RIP	
RIP	☐ no ☒ yes

- * The wired terminal will obtain an IP address from either the DR-1WL or the AP-3.
- * The wireless terminal will obtain an IP address from the AP-3.
- * The routing information created using RIP is displayed on the [IP Routing Information] screen.

■ Checking the connection with the AP-3

If the IP address of each station (terminal group) is set correctly, you can easily test whether or not IP packets are reaching their proper destination by using the “ping” command.

To conduct the test, open the MS-DOS window and enter the following command:

ping xxx.xxx.xxx.xxx

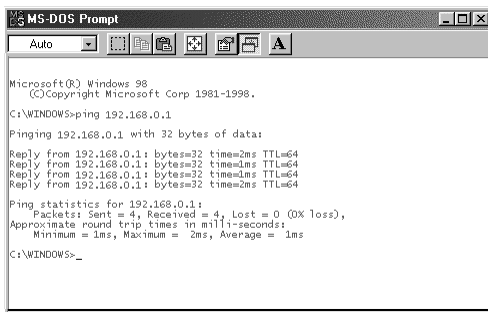
where “xxx.xxx.xxx.xxx” is the IP address of the AP-3 unit.

By executing the ping command, four pings (echo requests) are transmitted and a reply message should be received for each ping. If a reply is not received, check the protocol settings of the station and the AP-3 unit, as well as the settings of the respective wireless LAN cards (Network Mode, ESS ID, etc.).

The message “destination unreachable” will be displayed if the IP address and subnet mask of the station and AP-3 unit are not set correctly.

● [Example of ping command execution] (normal case)

Windows 98



```
MS-DOS Prompt
Auto
Microsoft(R) Windows 98
(C) Copyright Microsoft Corp 1981-1998.
C:\WINDOWS>ping 192.168.0.1
Pinging 192.168.0.1 with 32 bytes of data:
Reply from 192.168.0.1: bytes=32 time=2ms TTL=64
Reply from 192.168.0.1: bytes=32 time=1ms TTL=64
Reply from 192.168.0.1: bytes=32 time=1ms TTL=64
Reply from 192.168.0.1: bytes=32 time=2ms TTL=64
Ping statistics for 192.168.0.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
    Approximate round trip times in milliseconds:
        Minimum = 1ms, Maximum = 2ms, Average = 1ms
C:\WINDOWS>
```

■ When the unit fails

• Warranty

At the time of purchase, the retailer will provide a warranty sheet complete with the details of the purchase (date of purchase, name of local dealer, etc.). Make sure the information is correct and keep the warranty in a safe place for future use.

• Requesting servicing

Refer to the instruction manual and check the settings of both the computer and the AP-3 unit. If you cannot solve the problem, request servicing according to the following terms:

During the warranty period

Contact the local dealer where you purchased the product.

The retailer will service the product in accordance with the warranty. Have your warranty ready at the time of request.

After the warranty period

Contact the local dealer where you purchased the product.

If the product is serviceable, the retailer will repair the product for a fee.

• Questions Regarding Service

If you have any questions regarding service, contact the local dealer where you purchased the product or contact the service staff at one of our sales offices.

17 SPECIFICATION

- Power supply requirement : 12 V DC (11 to 16 V DC • negative ground)
- Current drain : Max. 600 mA
- Dimensions (projections not included) : 230 (W) x 38 (H) x 167 (D) mm; 9¹/₁₆ (W) x 1¹/₂ (H) x 6⁹/₁₆ (D) in
- Weight : Approx. 650 g; 22¹⁵/₁₆ oz
- Usable temperature range : 0°C to +40°C; +32°F to +104°F

■ Wired

- LAN interface : Ethernet port–RJ-45 Type modular jack
*Polarity inversion switch is equipped.
IEEE802.3/10 BASE-T equivalent
IEEE802.3u/100 BASE-TX equivalent
: Insert ICOM LAN card to the PCMCIA slot
PCMCIS Type II equivalent (3.3 V acceptable)
- Transmission speed : Ethernet port–10/100 Mbps auto select
Wireless LAN–11 Mbps (Max.)*
*When SL-1100/1105 is connected.
- Rooting Type : Static/Dynamic(RIP)
- Interface : POWER, LAN and Wireless LAN LED

■ Applicable LAN card

- SL-1100 and SL-1105

■ **LAN card (SL-1100 and SL-1105)**

• Wireless Medium	: Direct Sequence Spread Spectrum (DSSS)
• Network Standard	: Based on IEEE 802.11b
• Frequency Band	: 2400 – 2483.5 MHz
• Number of channels	: 11
• Modulation	: DBPSK at 1 Mbps DQPSK at 2 Mbps CCK at 5.5 and 11 Mbps
• Encryption	: 64-bit or 128-bit WEP
• Output Power	: ±20 mW
• Frequency Stability	: 20 ppm (0°C to +50°C; +32°F to +122°F)
• Antenna	: Dual pattern antenna with diversity support
• Sensitivity	: More than –76 dBm (FER 8% at 1024 octets data)
• Power supply requirement	: (SL-1100) 5 V DC ±5% (negative ground) (SL-1105) 3 V DC ±5% (negative ground)
• Current drain	: Transmit 290 mA Receive 210 mA
• Usable temperature range	: 0°C to +50°C; +32°F to +122°F
• Dimensions (projections not included)	:
• Weight	: Approx. 40 g; 14 oz
• Approval standard	: FCC Part 15, Sub Part B, Class B, Part 15.247
• Media Access Protocol	: Carrier Sense Multiple Access with Collision Avoidance (CSMA/CA)
• Host interface	: PCMCIA Type II slot
• Network operating system	: Microsoft® Windows® 2000/NT/98/95

18 GLOSSARY

DHCP server

DHCP (Dynamic Host Configuration Protocol) is a protocol that allows a client in a TCP/IP network to automatically obtain required information from a server.

The DHCP server manages such network information as the IP Address, Default Gateway, and Domain Name.

The AP-3 is provided with a DHCP server that allocates an IP address, default gateway, DNS address, etc., to the DHCP clients (computers) when the DHCP clients start up.

DNS (Domain Name System)

DNS is a name resolution service for TCP/IP networks.

The AP-3 provides a domain name service, in accordance with DNS, that allows computer names and domain names to be registered in a domain name server.

By using the domain name service, the IP address of the desired site can be designated not as numbers but as easy-to-understand domain names and host names.

ESS ID

An ESS ID is a name used for identification when multiple network groups are formed within the transmission area of a wireless network. The ESS IDs of the wireless terminals in a wireless network group communicating with the AP-3 are set to the same value as the ESS ID of the AP-3.

ETHERNET

Ethernet is a set of standards and protocols for LAN communications developed by Xerox, Digital Equipment Corporation, and Intel. Types of Ethernet include 10BASE-T, 10BASE-5, and 10BASE-2, each requiring a different cable specification.

IP (Internet Protocol) address

The IP address is a 32-bit address used to distinguish the devices in a network constructed using TCP/IP protocol. Each network device has a unique IP address.

The IP address is usually expressed as a base-10 numeral string made up of four 8-bit sections (Example: 192.168.0.1).

A private IP address is an IP address set independently by the network manager. It is not necessary to petition an address management institution or a provider, but a private IP address must be allocated according to the following rule: When connecting with an external network, the private address must be converted into a global IP address.

The following IP addresses can be used freely as private IP addresses:

Class A: 10.0.0.0 to 10.255.255.255

Class B: 172.16.0.0 to 172.31.255.255

Class C: 192.168.0.0 to 192.168.255.255

LAN (Local Area Network)

A network that is relatively small in scale. A typical LAN occupies a single office or a single floor of a building.

MAC address (Media Access Control Address)

A MAC address is a physical address (number) uniquely set into each wired or wireless LAN card. LAN card manufacturers manage MAC addresses so that no two LAN cards in the world have the same MAC address. Ethernet uses the MAC address to send and receive frames.

RIP (Routing Information Protocol)

RIP is a protocol used in a TCP/IP network to exchange routing information between routers.

Routers use RIP to send packets to the correct destination.

SYSLOG

SYSLOG is a function for sending system messages to destinations within a network.

Log information can be managed using a UNIX or other SYSLOG server if the network supports this function.

TCP/IP

TCP/IP is the basic protocol of the internet and is currently the most popular protocol in the world. It is supported by Windows 95/98, Windows NT, and the other major operating systems.

SMTP and FTP use this protocol.

A TCP/IP control panel is a standard item in Macintosh computers provided with Open Transport.

URL (Uniform Resource Locator)

URLs are used to access home pages and other sites on the internet.

Our URL is <http://www.icom.co.jp>.

Web browser

A web browser is a software application used for searching web servers and viewing web pages. Common applications include Internet Explorer and Netscape Navigator.

10BASE-T and 100BASE-TX

10BASE-T and 100BASE-TX are connection specifications for Ethernet configurations using twisted pair cable.

The "10" in 10BASE-T represents an Ethernet transmission speed of 10 Mbps and the "T" represents twisted pair cable.

Category 5 twisted pair cable supports 100BASE-TX as well as 10BASE-T.

Access point

An access point is any device used to connect a wired LAN to a wireless LAN.

Client

A client is any terminal or application in a network that requests information or a service from a server and receives the corresponding response.

Global IP address

A global address is a globally unique address that held by only one device on the entire internet.

Subnet mask

A subnet mask is used to allow on IP address represent both the network address and the host address.

Assuming the IP address of a certain host is 192.168.0.1 and the subnet mask is 255.255.255.0, if the IP address and subnet mask are multiplied as binary numbers the network address will be 192.168.0.0 and the remaining 1 will be the host address.

Traffic

Traffic refers to the flow of packets over a network or the load (amount of data) born by the network circuits. When the traffic is high, data transfers may be delayed and data may be lost.

Network

An arrangement wherein servers, work stations, computers, and other devices are connected via cable or a telephone circuit for the purpose of exchanging data.

Packet

The unit by which data is send and received in a network. A packet comprises a header portion containing information required for sending and receiving and a data portion containing the data being sent.

Password

A character string that a user must enter in order to access a network. The password provides network security because, once established, the password must be entered correctly by the user or access will be denied.

Hub

A hub is required when the AP-3 and other devices are used construct a network.

The hub is connected to the AP-3 using 10BASE-T or 100BASE-TX cable.

In order to achieve transmission speeds of 100 Mbps, Category 5 twisted pair cable must be used and the hub must support 100BASE-TX.

Flash memory

The flash memory is a memory device in the AP-3 to which data can be written. Information stored in the flash memory is not erased when the power to the unit is turned off.

Protocol

A protocol is a defined set of steps that is followed when data is sent and received.

Count on us!