APPENDIX J: MANUAL

Please see the following pages.

INSTRUCTION MANUAL

WIRELESS ACCESS POINT

AP-12

CONTENTS

Icom Inc.

ABOUT WIRELESS COMMUNICATION CHANNELS

The wireless communication channel for the unit is referred to as “the DS Channel” (see page 25).

FCC INFORMATION

AP–12

Tested to comply with FCC standards

FOR HOME OR OFFICE USE

CAUTION: Changes or modifications not expressly approved by Icom Inc. could void the user’s authority to operate this Access Point.

Class B digital device users;
This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

RF EXPOSURE SAFETY INFORMATION:

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

For CANADA only

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

INTRODUCTION

Thank you for purchasing an ICOM 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 the product to its fullest potential. Read this manual carefully before using the product.

FEATURES OF THE PRODUCT

◎ All settings can be adjusted using the provided utility program, AP-12 Manager.

◎ Up to 256 wireless terminals can be connected through the product.

◎ **Windows 98/SE**, **ME, 2000 and Windows**^{XP} are supported.

◎ Networks combining wireless LAN and wired LAN components can be constructed with ease.

◎ The roaming function is provided in addition to the wireless access point function.

◎ **11-Mbps** wireless access point communications and 10BASE-T wired LAN communications are allowed.

◎ Applicable ICOM wireless LAN cards include the following: (As of March 2002)

SL-11

◎ Security in communications is ensured by **ESS ID** settings and **WEP** encryption.

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Other product and company names mentioned herein are trademarks or registered trademarks of their respective owners.

GENERAL PRECAUTIONS

- 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 LAN unit drivers and the settings utility supplied with this unit are dedicated to the unit. Do not use them for other devices
- Icom Inc. assumes no responsibility whatsoever for any damages or lost profits resulting from opportunities for voice or signal communications being missed because of the modifications, disassembly, failure, malfunctions, defects or data loss of the LAN unit, or because of such external causes as power failure; nor will Icom Inc. assume any responsibility for demands made by a third party.
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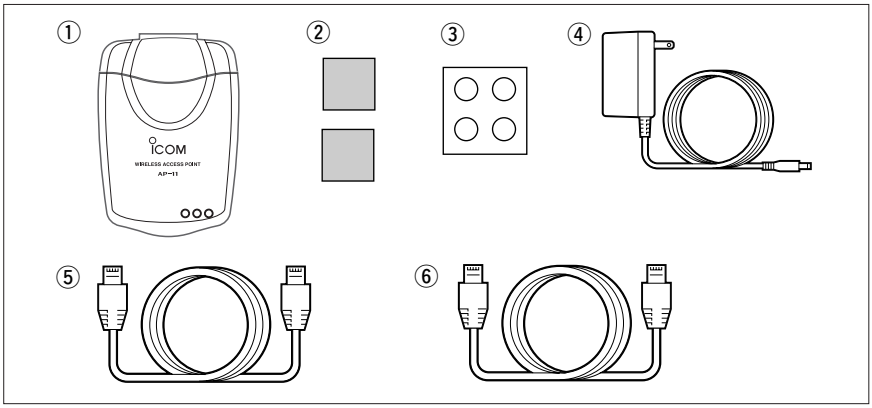
CONTENTS

CONTENTS

ACCESSORIES

The AP-12 package includes the following items:



① AP-12 Main unit 1

Accessories

② Fixing sheets 2
③ Pad sheet 1
④ AC Adaptor 1
⑤ Ethernet cable (straight connection cable, 3 m) 1
*For network connection between AP-12 and hub
⑥ Ethernet cable (cross connection cable, 1 m) 1
*For connection between AP-12 and PC
◎ Utility CD 1
◎ Instruction Manual

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 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.
- **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.

⚠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.

■ 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 230V**
  Otherwise fire, electric shock, or equipment failure may result.
- **Do not use with any device other than the AP-12.**
  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 DC output 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 adapter body when plugging in and unplugging the AC adapter. Do not yank the cord.**
  Otherwise fire, electric shock, or equipment failure may result.
- **Do not handle the AC adapter plug or other devices with wet hands.**
  Otherwise electric shock may result.
- **Do not use the AC adapter if the DC output 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.

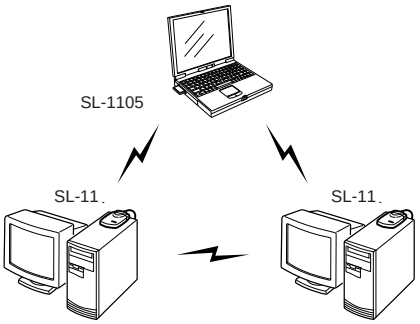
■ Wireless access point

[Infrastructure mode]

There are two communication modes for wireless LAN: adhoc mode and infrastructure mode. The adhoc mode means that the network consists of wireless LAN terminals only. This mode allows pear-to-pear communications among computers that are equipped with ICOM wireless LAN card (See the figure shown to the right).

The other mode, infrastructure mode, uses a repeater called the access point such as AP-12.

Ex.: Adhoc mode

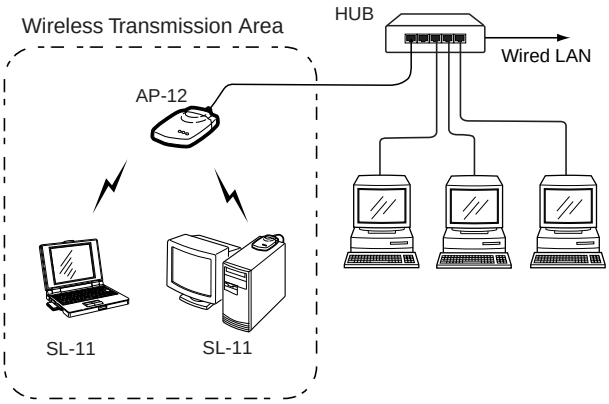


The infrastructure mode allows wireless LAN terminals to communicate with each other via the access point, or with wired LAN terminals via access point at which Ethernet connection is made. (See the figure shown below).

In this mode, a router connected to the wired LAN permits wireless LAN terminals to have access to the Internet.

* Up to 256 wireless terminals can be connected through the AP-12.

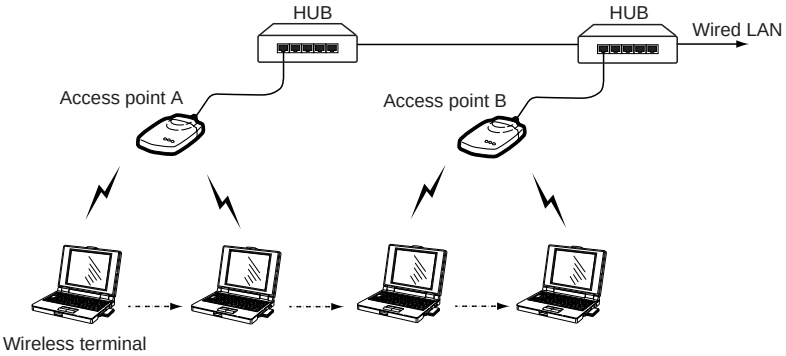
[Ex.: Infrastructure mode]



[Multi-channel roaming function]

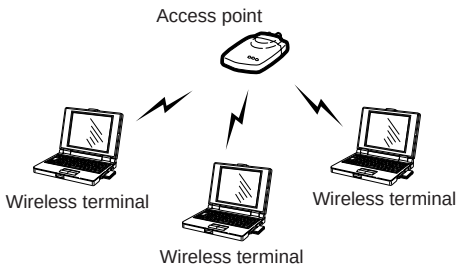
Connecting two or more access points to a wired LAN allows the most suitable access point to be automatically selected depending on the radio communication conditions when the wireless terminal is moving.
This function will enable you to have access to the network while you are moving in a wide area, for example, in a large factory or warehouse.

[Ex.: Multi-channel roaming]



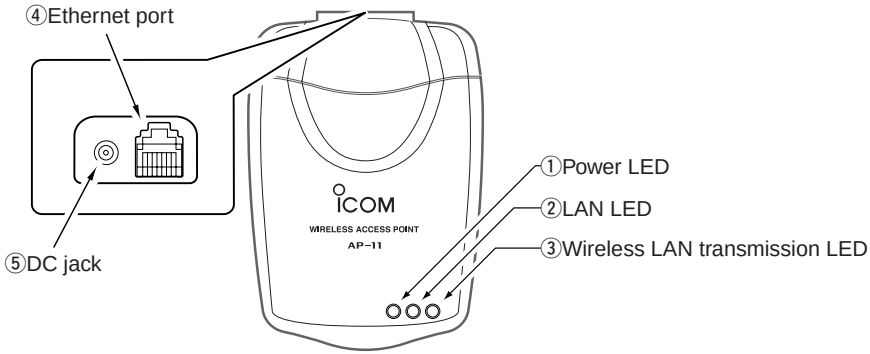
As in the figure below, a standalone access point can also be used for infrastructure mode. This network arrangement, however, disables the multi-channel roaming function even if two or more access points are used.

[Ex.: Infrastructure mode]



3 NOMENCLATURE

■ Front and rear panels



① **Power LED**

This lamp illuminates when the power to the AP-12 is on.

② **LAN LED**

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

This lamp flashes when the AP-12 is communicating with a wired LAN.

It does not illuminate if the AP-12 does not recognize the Ethernet port connection. Make sure the LAN cable is connected to the Ethernet port.

③ **Wireless LAN transmission LED**

This lamp flashed during data transmission.

④ **Ethernet port**

This is an RJ-45 type Ethernet port.

Connect a hub to the AP-12 using the provided Ethernet cable (straight connection cable).

Connect a computer to the AP-12 unit using the provided Ethernet cable (cross connection cable). Use the utilities “AP-12 Manager” and “Quick Setup Wizard” to set up the computer.

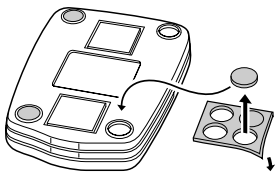
* Avoid lower grade Ethernet cables. If a lower grade of cable is used, the grade of the entire network will be pulled down to the same level.

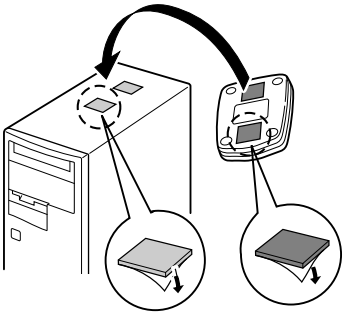
⑤ **DC jack**

Connect the provided AC adapter to the AP-12.

■ Installation method and location

Attach the four rubber cushion pads to all the four corners on the bottom of the product to place the product on a flat, level surface, or use the fixing sheets to secure the product to a wall or shelf. (See the figures below).

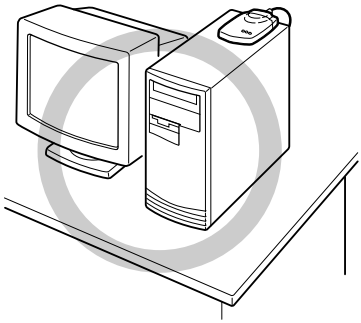




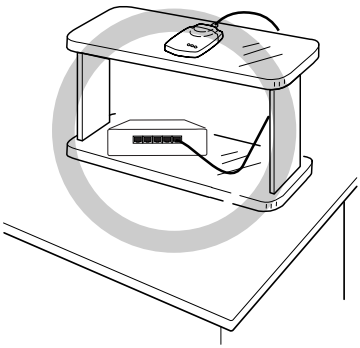
Peel off the protective paper before attaching the sheet.

[Good installation]

On a desktop PC

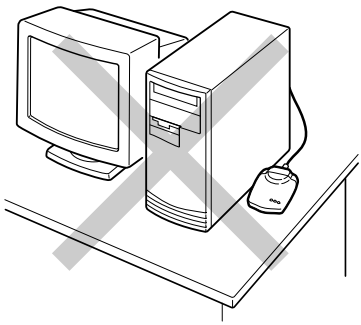


On a shelf

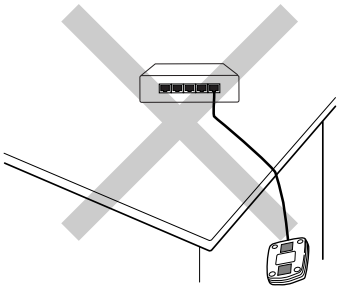


[Bad installation] (a decrease in transmission speed and range may result)

Do not install close to metal obstacles.



Do not install in unstable positions.



4 INSTALLING THE PRODUCT

[Installation precautions]

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.

* Select a location with as clear a line of sight as possible (i.e., as high as possible).
* Locate the product near the center of the wireless terminal group as far as possible.
* Select a stable, level surface that is free of vibrations and the danger of the unit falling.
* Others:
  - Do not place objects on top of the product nor stack products on top of one another.
  - Do not install the product 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).
  - Floors generally have steel girders and are installed with metal fire protection material. Consequently, communication between different floors is often not possible.
  - 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.
  - 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.
  - Use the straight connection Ethernet cable (3 m long) to connect the product to a hub. Note that the cross connection Ethernet cable (1 m long) cannot be used for the connection to a hub.
  - If the provided straight connection cable is insufficient in length, use a straight connection cable commercially available.

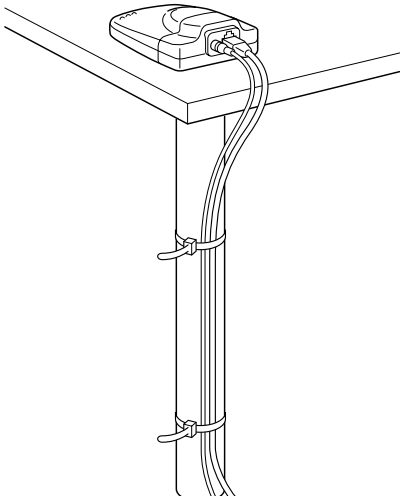
[Transmission range]

The transmission range varies somewhat depending on the installation location. Use the line-of-sight distances indicated below as guidelines when using our wireless LAN card (unit) SL-11.

When transmission speed is 11 Mbps
Indoors: approx. 30m

[Mounting to a shelf]

Even if the product is correctly secured with the fixing sheets, there is the possibility that the product will fall or the DC cord or Ethernet cable will disjoin from the product connectors due to the weight of the cables or because of people coming into contact with the cables. When mounting the product high on a shelf, wall or the like, secure it with a commercially available fasteners or ties to prevent the product from falling.



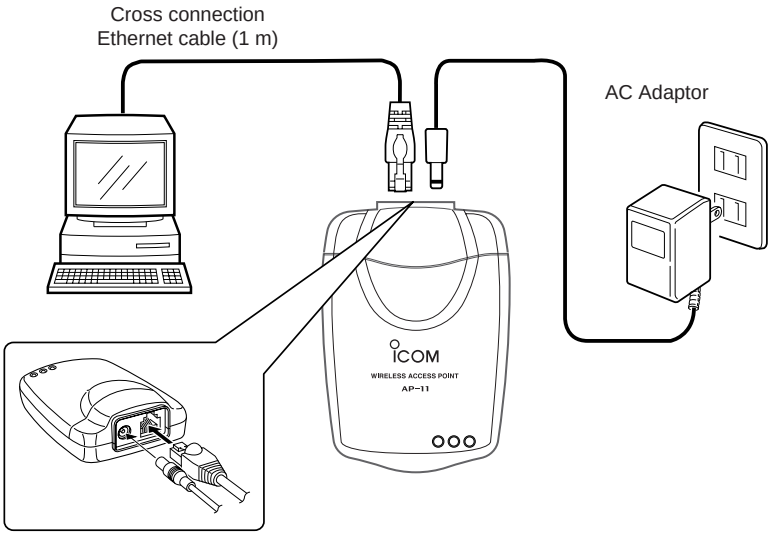
[Connection precautions]

Before installing the product and setting up the computer, read the following instructions carefully to ensure proper installation and setup.

- *** When setting the product, use a standalone computer or disconnect the computer from an existing network.**
- *** Do not connect the product to a working network without changing the original factory settings.Doing so may cause IP address conflicts or other network problems.**
- * Make sure the computer used for setting the product is equipped with an Ethernet card (adapter). If not, install an Ethernet card (adapter) and its driver into the computer according to the card instruction manual and check that the card works properly before installing and setting the product.
- * The settings utility is stored in the provided CD-ROM. The computer must have been equipped with or connected to a CD-ROM drive.
- *** Install the driver for the wireless LAN card (unit) into the computer according the card instruction manual and check that the card works properly before installing and setting the product.**
- * Be sure to set the operation mode of all wireless terminals to "**Infrastructure**" before installing and setting the product.
- *** Assign the same values for ESS ID and WEP key of the product as those of the wireless terminals that communicate with each other via the product. Failure to do so will does not permit the product to communicate with the wireless terminals.**

5 CONNECTING THE PRODUCT

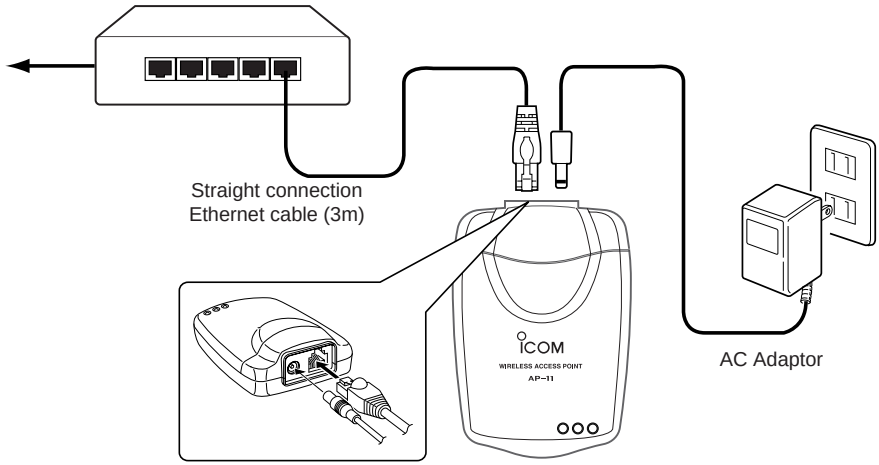
5-1 Connecting to the computer for product setting



* The above example shows a connection arrangement for setting the product or adjusting the settings.
* Be sure to use the provided utility, AP-12 Manager, when adjusting the settings.
* The utility supports Microsoft Windows 98/SE, ME, 2000 and Windows^{XP}. (Apple's operating systems are not supported).
  - Provided Ethernet cables include a straight connection type for hub connection (3 m) and a cross connection type for product setting (1 m).
  - The straight connection cable (3 m) cannot be used for product setting. The cross connection cable cannot be used for hub connection. Take care not to confuse between the cables.

◎ Hold the connector when connecting and disconnecting the Ethernet cables.

5-2 Connecting to a hub



* The above example shows a connection arrangement for connecting the product to a network. After setting the product, use the straight connection Ethernet cable (3 m) to connect the product to a networking hub.
* Provided Ethernet cables include a straight connection type for hub connection (3m) and a cross connection type for product setting (1 m). Be sure to use the straight connection Ethernet cable (3 m long) to connect the product to the hub.
  The cross connection cable cannot be used for hub connection. The straight connection cable (3 m) cannot be used for product setting. Take care not to confuse between the cables.

◎ Hold the connector when connecting and disconnecting the Ethernet cables.

6 COMPUTER SETUP

6-1 Using the setup wizard

The IP address (TCP/IP) must be changed to allow connection of the product to the computer before setting the product. The Quick Setup Wizard contained in the provided utility CD will make it easy to change the IP address.

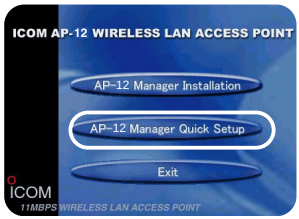
[Before starting the quick setup wizard]

Connect the product to the computer using the cross connection Ethernet cable (1 m). Plug the AC adaptor cable in the DC jack of the product and connect the AC adaptor to the wall outlet.

• The POWER LED on the front panel of the product will illuminate.

[Starting the quick setup wizard and setting the IP address]

1. Close all applications that are running on the computer.
2. Insert the utility CD into the CD-ROM drive.
3. The Auto Run will be activated and the main menu will appear on the screen.
   * If Auto Run is not activated, click <Start> and select "Run". Enter "D:\AP-12\AutoRun.exe" in the command line box (when the CD is in drive D) and click <OK>.

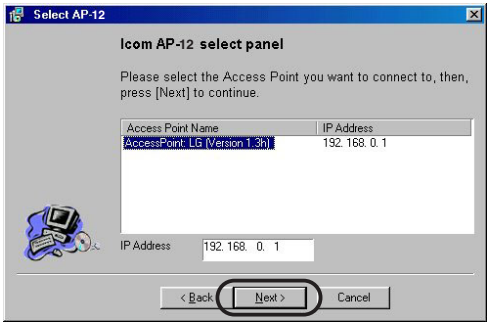


4. Click "Quick Setup Wizard".
   The message "Welcome to AP-12 setup wizard" will appear on the screen.
5. Click <Next>.
   * Instead of clicking <Next>, you may press the N key while holding down the Alt key.

[Starting the quick setup wizard and setting the IP address] (continued)

6. Click <Next> to search for the AP-12.

7. Select the access point you want to set and then click <Next>.

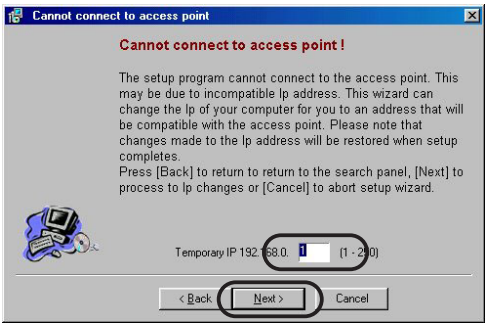


* If the current IP address of the computer does not permit connection to the product, the window shown in step 9 will appear on the screen. In this case, set the IP address according to steps 9 and later.
  • If the current IP address permits connection to the product, the window shown in step 14 will appear on the screen. In this case, skip steps 9 to 13 and proceed to step 14.
* The IP address of the product is factory set to 192.168.0.1 and the subnet mask to 255.255.255.0.
  Accordingly, if the IP address of the computer has been set to, e.g., 192.168.0.10 and the subnet mask to 255.255.255.0, allowing connection to the product, the windows shown in step 9 will not appear and the display will go to the window shown in step 14. Continue setting according to the instructions in the window displayed.

[Starting the quick setup wizard and setting the IP address] (continued)

8. If the computer cannot establish connection with the product, you will see the window that allows adjustment of the IP address. Set a unique IP address for the computer and click <Next>.

* The IP address of the product is factory set to“192.168.0.1”. Enter a value other than ”1” in the address box.
* The following description assumes that the IP address setting of the computer is “172.20.11.1” and the subnet mask setting is “255.255.0.0”.



9. Select “Restart now” and click <Finish>.

* The computer will restart.

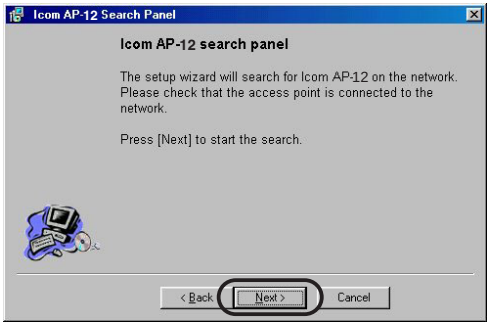
[Starting the quick setup wizard and setting the IP address] (continued)

10. The setup wizard will restart automatically.

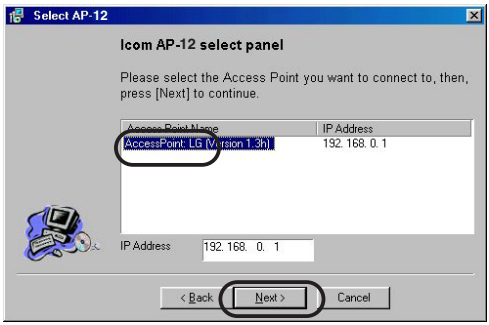
* If the setup wizard does not restart automatically, start the wizard according to step 3.

Click <Next>.

11. Click <Next>.



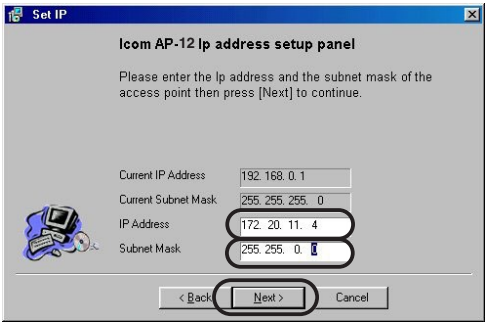
12. Select the access point you selected in step 8 and click <Next>.



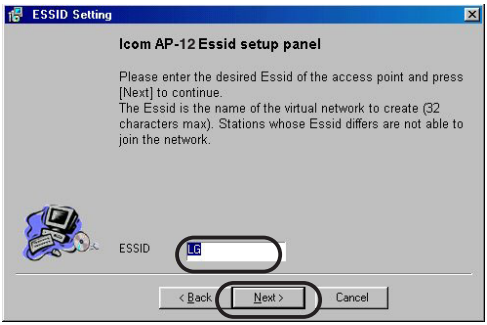
[Starting the quick setup wizard and setting the IP address] (continued)

13. Set the IP address and subnet mask of the product to the same as those of the computer. Note that the IP address must be unique within the network.

- In this example, the IP address is set to 172.20.11.4 and the subnet mask to 255.255.0.0. Click <Next>.



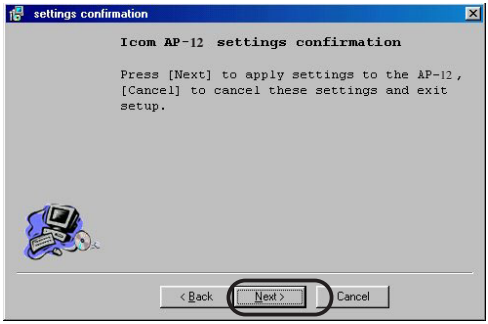
14. Enter an ESS ID. In this example, the default ID (LG) is used. Click <Next>.



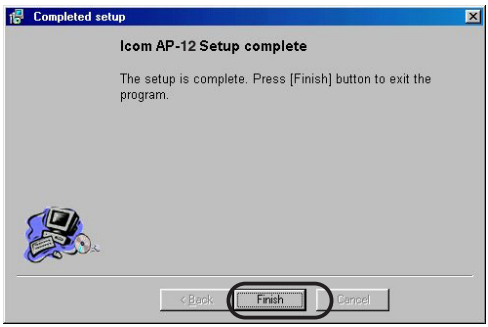
15. Select a communication channel. In this example, the default channel (11) is used. Click <Next>.

[Starting the quick setup wizard and setting the IP address] (continued)

16. Click <Next>.



17. Click <Finish>.



18. When the message “Restart computer now?” appears on the screen, click Yes.

* If the computer can be connected to the product in step 8, this message will not appear on the screen. In this case, the computer does not need to be restarted.

19. The computer will restart.

- The setting of the IP address and subnet mask is now complete. You can use the AP-12 Manager to connect the computer to the product.
- If you want to use advanced security functions or adjust the IP address and subnet mask of the product, use the utility software, AP-12 Manager. See chapter 7 for details.

[Note]
The setup wizard program is not loaded into the computer. When using the wizard, start it from the CD.
The setup wizard and the AP-12 Manger (see chapter 7) cannot be run simultaneously. When starting the setup wizard, be sure to quit the AP-12 Manager in advance. (For details on how to quit the AP-12 Manager, see page 21).

6-2 Installing the utility software

This section describes how to install the settings utility, AP-12 Manager.

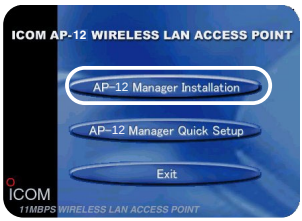
[Before installing the utility]

Connect the product to the computer using the cross connection Ethernet cable. Plug the AC adaptor cable in the DC jack of the product and connect the AC adaptor to the wall outlet.

• The POWER LED on the front panel of the product will illuminate.

[Installing the utility software]

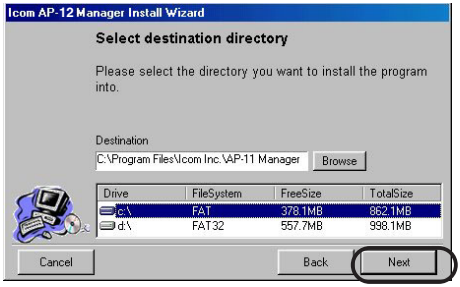
1. Close all applications that are running on the computer.
2. Insert the utility CD into the CD-ROM drive.
3. The Auto Run will be activated and the main menu will appear on the screen.
   * If Auto Run is not activated, click <Start> and select "Run". Enter "D:\AP-12\AutoRun.exe" in the command line box (when the CD is in drive D) and click <OK>.



4. Click "Utility Install".
   Click <Next>.
5. Click <Next>.

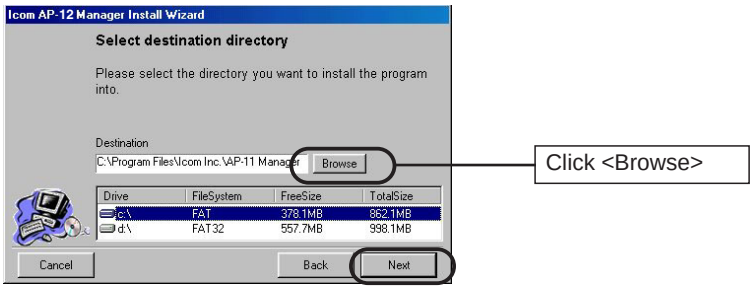
[Installing the utility software] (continued)

6. Click <Next>.



7. Specify the folder in which you want to install the utility and click <Next>.

* If you want to change the default folder that will appear in the text box as shown below, click <Browse> and select the desired folder.

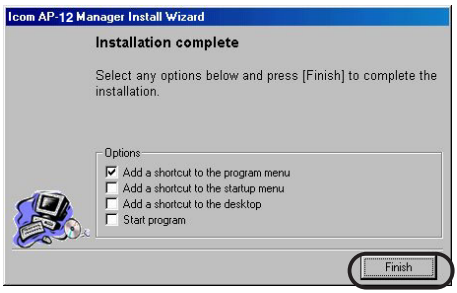


8. When the message “Create New Folder” appears on the screen, click <OK>.

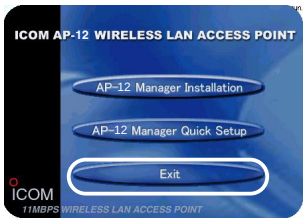
[Installing the utility software] (continued)

9. Click <Install>.

10. Click <Finish>. The installation is now complete.



11. Click <Finish> to close the menu.



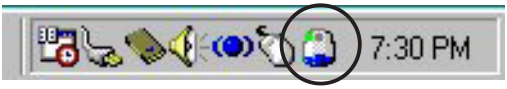
[Note]
To uninstall the AP-12 Manager, see chapter 8 Operation Tips.

■ Starting the AP-12 Manager

This section describes how to start and quit the AP-12 Manager installed in the computer.

[How to start]

1. Connect the Ethernet port of the product with the Ethernet adaptor (card) port of the computer using the cross connection Ethernet cable (1 m).
   * Be sure to use the provided cross connection Ethernet cable (1 m).
2. Click <Start> and select “AP-12 Manager” from the Program menu. An icon indicating that the AP-12 Manager is running is displayed on the task bar.



[How to quit]

1. To quit the AP-12 Manager, right-click the AP-12 Manager icon on the task bar and then select Exit from the pop-up menu that appears.

■ Connecting an access point

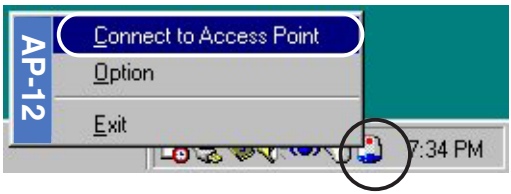
Using the AP-12 Manager allows you to perform setting required for using the product and advanced WEP-based security setting.

[How to connect]

Connect the Ethernet port of the product with the Ethernet adaptor (card) port of the computer using the cross connection Ethernet cable (1 m).

* Product setting with the AP-12 Manager cannot be done unless the ports are connected.
* Do not use the straight connection Ethernet cable (3m) to connect the ports.

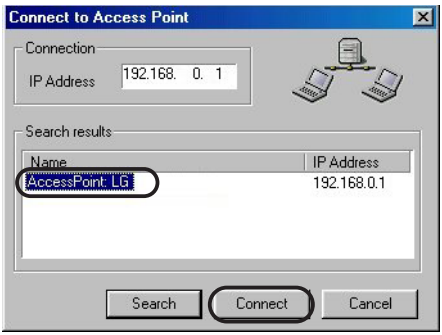
1. Right-click the AP-12 Manger icon on the task bar. Select “Connect to Access Point” from the pop-up menu that appears.
2. Click the “Connect to Access Point” tab.



3. Click <Search> on the “Connect to Access Point” tab.

[How to connect] (continued)

4. All the available access points and their current addresses will be displayed in the Search Results box,
5. Select the access point you want to access and then click <Connect>.



6. The AP-12 Manager setting menu for the selected access point will appear on the screen.
   This menu includes the “Setting”, “IP Configuration”, “Security”, “Show Station”, “Option” and “About” tabs.

(AP-12 Manager setting menu)

[Error]

If the error message “Connection to access point has failed” appear on the screen, the Quick Setup Wizard may have failed in setting the IP address or subnet mask. In such a case, consult chapter **8 Operation Tips** to set the IP address and subnet mask of the computer manually.

■ Setting

This tab allows setting about wireless communications between the access point and the wireless LAN card (unit).

● MAC address

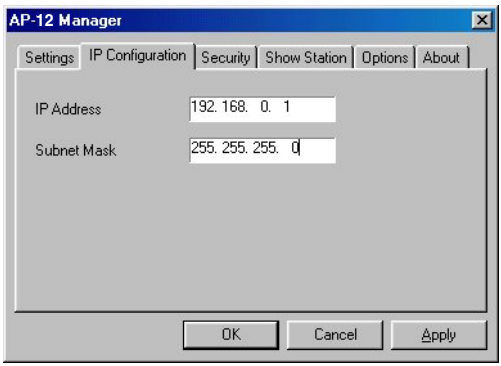
This field shows the MAC address. The setting in this field cannot be changed.

* The MAC address is a unique address that is assigned to each device in the network.

● Network setting

The ESS ID is specified in this field. **(Default: LG)**

* This setting item serves as an arbitrary name for identifying a group within the wireless network.
* It is used when multiple wireless workgroups are configured within the wireless transmission area and there is network information that should not be viewed by other wireless workgroups. The ESS ID must be the same as the other computers of your workgroup. Specifying a different ESS ID disables your computer to communicate with other computers within the group.
* The ESS ID is case sensitive and must be up to 32 alphanumeric characters long.



[Procedure] (continued)

● **Domain name**

This field shows the domain name of the product. The domain name cannot be changed.

● **Channel**

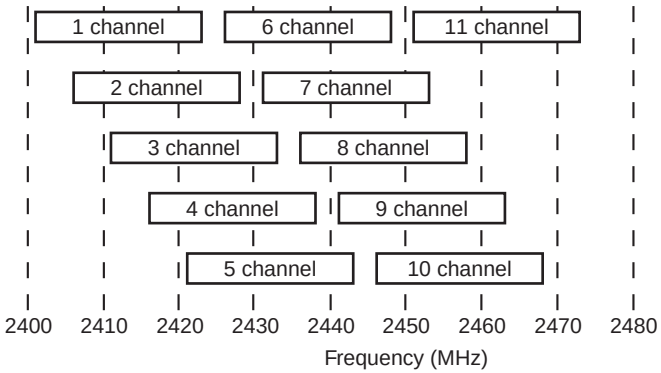
The wireless communication channel is specified in this field. **(Default: 11)**

When multiple access points are used, refer to the following note to set the channels.

■ **Communication channels**

If two or mote access points are placed within the wireless transmission area, it is recommended to set the communication channels of network groups at least four channels apart to avoid interference.

Otherwise, interference may occur due to partial overlap in bandwidth as shown below. Channel settings of 1-6-11, for example, eliminates the possibility of interference.



■ IP Configuration

● Setting the IP address and subnet mask

This tab is used to set the IP address and subnet mask so as to allow the product to be connected to a working network.

IP address: Specify the IP address of the product in this field. **(Default: 192.168.0.1)**

Subnet mask: Specify the subnet mask in this field. **(Default: 255.255.255.0)**

[Note]

* The AP-12 cannot be used as a DHCP server. This means the IP address and the subnet mask of the product must be set manually. The IP address of terminals may be assigned automatically depending on the network environment. (See the setting examples shown below).
* The IP address for each computer within a network group must be unique.
* The subnet masks of all the computers within a network group must be the same.

(IP Address setting examples)

The following shows addressing examples where the network comprises three computers.

AP-12: 192.168.0.40*1 (subnet mask: 255.255.255.0)

Wireless terminal A: 192.168.0.41*2 (subnet mask: 255.255.255.0)

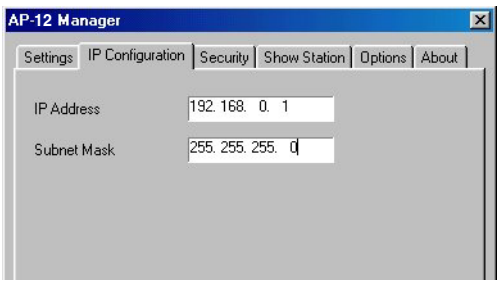
Wireless terminal B: 192.168.0.42*2 (subnet mask: 255.255.255.0)

Wireless terminal C: 192.168.0.43*2 (subnet mask: 255.255.255.0)

*1: In case a DHCP server automatically assigns IP addresses to other access points, it is recommended to specify the IP address of the product as large as practicable in order to avoid address collision.

*2: If the network contains a DHCP server (such as dialup router) that is capable of automatically assigning IP addresses, the server capability may be utilized to assign IP addresses to wireless terminals. In this case, “Obtain an IP address automatically” is selected during computer setup for networking.

** For details on network settings, see the instruction manuals for the DHCP server and wireless terminals.



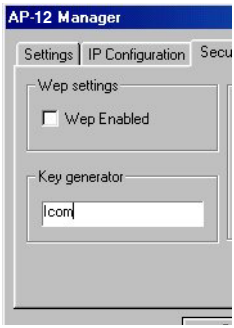
■ Security

This tab is used to set the degree of WEP (Wired Equivalent Privacy) based encryption used to protect the data transmitted over the network.
Communications is not permitted unless this field setting is the same for all of the computers with which you wan to communicate.

[Note]
* WEP setting should be made for the AP-12 and then for each wireless terminal.

● WEP enable

If “WEP Enabled” is not selected, no WEP key is used and therefore no data is encrypted during transmission.



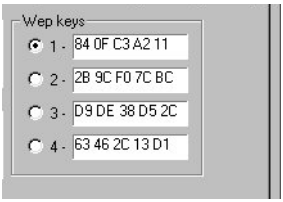
● Key generator

Enter a character string for generating the key used for encryption and decryption. When a character sting is entered in this field, 4 keys are created automatically and displayed in the text boxes.

* The same character sting entered in the Key Generator field will result in the same WEP keys created in the text bopxes.
* Selecting a key number in the WEP Key area allows proper reception of encrypted data.

The key is case sensitive and must be up to 30 alphanumeric characters long. Enter the same key for all of the computers with which you are communicating.

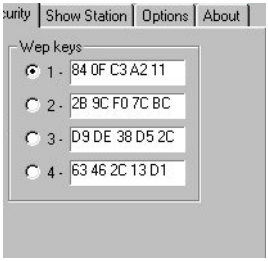
* If different character strings are used, the encrypted data cannot be decrypted.
* Instead of specifying a key for encryption/decryption, you may enter hexadecimal numerals directly in the WEP key text boxes. (See “WEP key” on the next page).



[Security] (continued)

● **WEP key**

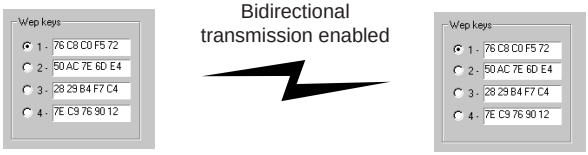
- The [WEP key] text boxes contains lower 40 bits (10 hexadecimal numerals) generated from the character string entered in the [Key Generator] box.
- Select check box 1, 2, 3 or 4 that you want to use for encryption.
- The hexadecimal alphanumerics in the selected text box are used for encryption. The destination computer cannot decrypt transmitted data unless it is using the same hexadecimal alphanumerics for decryption.



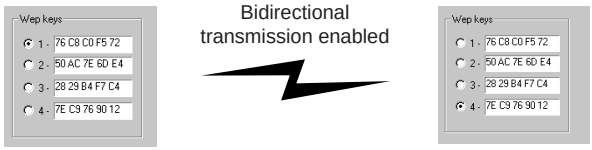
[Customizing the WEP keys]

- Instead of entering a key in the Key Generator box, you may enter up to hexadecimal alphanumerics directly in the WEP key text boxes.
- When this is done, any character sting in the Key Generator box is ignored.
- Enter the same alphanumerics in each text boxes as other terminals in the network group. (See examples 1 and 2).
- Otherwise, data communications will fail. (See example 3).
- When the Mask option is selected, the contents in the WEP key text boxes are displayed as "***".

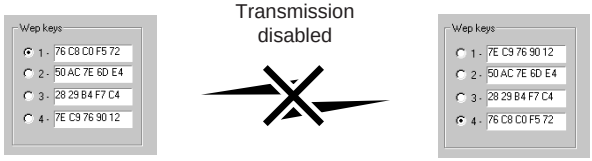
Example 1



Example 2

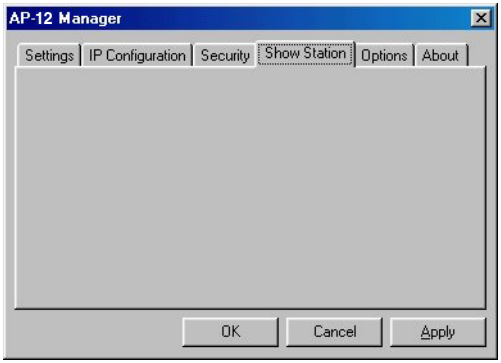


Example 3



■ Show Station

The current version does not support this feature.



■ Option

[General]

● Display banner

The banner of the AP-12 Manager can be OFF when the utility starts. **(Default: ON)**

● Icon animation

The animated icon on the task bar shows the operation status of the AP-12. This icon animation can be OFF. The icon itself remains on the task bar. **(Default: ON)**

[Security]

● Set a password

Clicking this check box allows you to set a password required for starting the AP-12 Manager. Setting a password will provides protection against theft or unauthorized changes of access point data or settings. Passwords should be changed periodically.

• Passwords must be up to 32 characters long, and is case sensitive.
• To change passwords, deselect the check box and the click <Apply>.

● Mask setting data

The WEP key and key generator data can masked. Masked data is displayed as "***··".

These functions are activated by clicking <Apply>.

■ About AP-12 Manager

This tab shows the version information of the utility software, AP-12 Manager.

Go to Icom home page: If the network containing the AP-12 is connected to the Internet, clicking here allows you to go to the ICOM home page.

■ Connection to the AP-12 failed

If connection to the desired access point failed even though the AP-12 Manager is used, the possible causes include the following:

(1) The Ethernet adaptor does not work normally, or

(2) The quick setup wizard has failed in setting the IP address.

[Note]

The following description assumes the 10BASE-T Ethernet card (adaptor) has been installed in the computer. It the Ethernet card (adaptor) has not yet installed in the computer, install the card and its driver according to the instruction manual for the card.

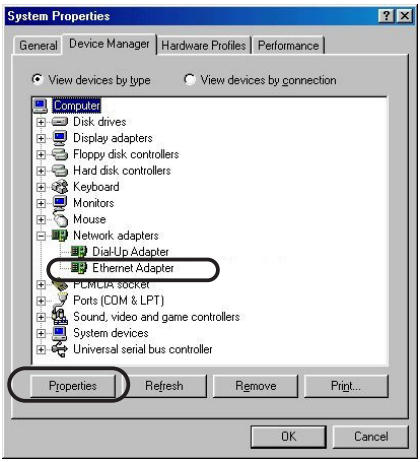
* The following procedure applies to a Windows 98 machine.

● Checking the Ethernet adaptor

Check if the Ethernet card (adaptor) in the computer works normally as follows:

[Procedure]

1. Click <Start> and select “Control Panel” from the “Settings” menu.
2. Double-click the “System” icon on the “Control Pane” screen.
3. Select the “Device Managers” tab and click “+” for the “Network Adapters” icon.

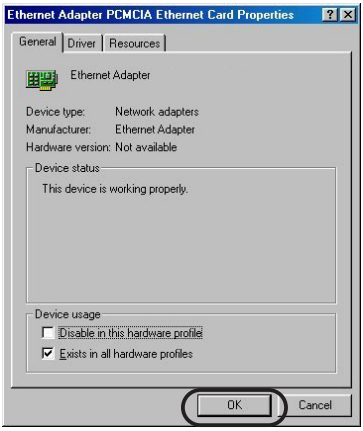


4. Select the “Ethernet Adapter” tab and click <Properties>.
   If the driver has been installed properly, the window shown on the next page will appear on the screen.
   * The adaptor name indicated on the screen will vary depending on the adaptor used.

[Procedure] (continued)

* If the “Ethernet adaptor” icon are marked with “!” or “×”, or “Ethernet adaptor” are located under “Other Devices”, the installation of the driver unit driver may have failed.In such a case, uninstall the driver and then install again.

5. Make sure “This device is working properly” appears in the “Device status” field on the “General” tab of the Properties window.
Click <OK>. The display will return to the window shown in Step 3.



6. Click <OK> on the window shown in step 3.

7. If the Ethernet card (adaptor) works normally, proceed to “Manual setting of IP address” on the next page.

● **Manual setting of the IP address**

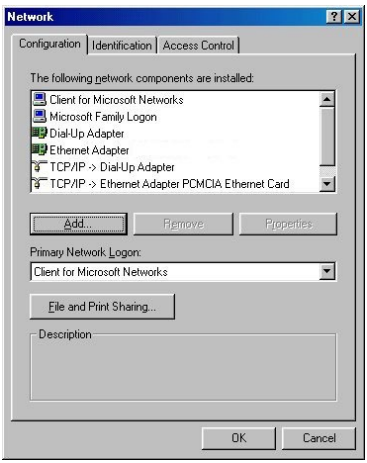
This section describes how to set the IP address of the computer without using the setup wizard.

[Note]

Before setting or changing the IP address manually, note the present address value so as to restore the address to the original value when necessary.

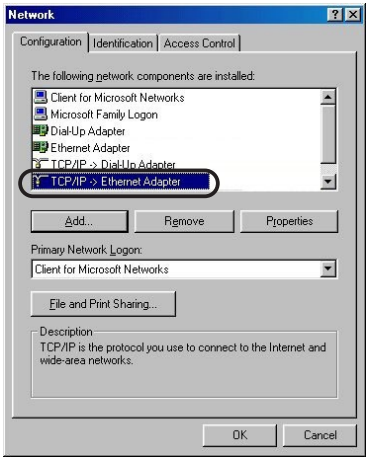
[Procedure]

1. Click <Start> and select “Control Panel” from the “Settings” menu. Double-click the “Network” icon.
2. Make sure “TCP/IP” and “Client for Microsoft Networks” are displayed on the “Network Configuration” tab.
   If these network components are not displayed on the “Network Configuration” tab, the installation of these components may have failed.
   * Make sure “Client for Microsoft Networks” is displayed in the “Primary Network Logon” field.
   * Make sure the “TCP/IP –> name of LAN card (adaptor) currently used” is displayed in the “The following network components are installed” field on the “Network Configuration” tab.



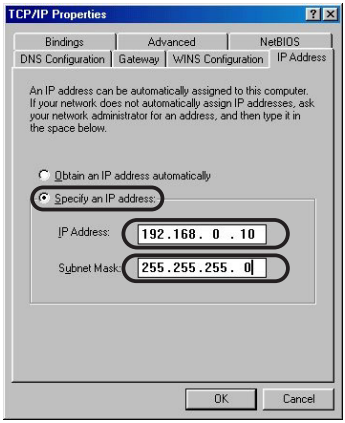
3. Select “TCP/IP” and click <Properties>.
   * If multiple network adaptors have been installed, select “TCP/IP –> name of LAN card (adaptor) currently used”.

[Procedure] (continued)



4. Click the “IP Address” tab.

5. Select “Specify an IP address” and enter “192.168.0.10” in the “IP Address” field and “255.255.255.0” in the “Subnet Mask” field. Then click <OK>.
* The IP address of the product is factory set to 192.168.0.1.



6. The display will return to the window shown in step 3. Click <OK>.

7. When the message “Restart computer now?” is displayed, click <OK>.
After the computer restarts, use the AP-12 Manager to set the product.

■ Checking the connection with the AP-12

If the IP address of each station (terminal) is set correctly, then you can check if the IP packets are arriving correctly at their destination by pinging the station of the other computer.

To troubleshoot by pinging, 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-12.

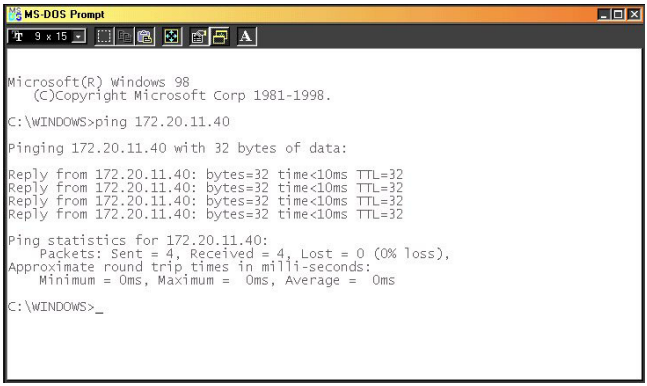
By executing the ping command, four pings (echo requests) are transmitted and a reply message should be received for each ping.

If a reply is not received, check the protocol settings of the station, 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 source and destination stations are not set correctly.

◎ **Example of ping command execution (normal case)**

Windows 98



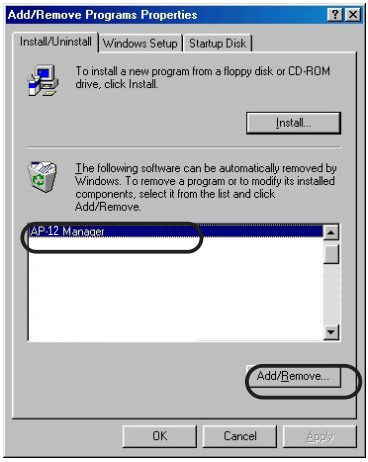
■ Uninstalling the AP-12 Manager

This section describes how to uninstall the utility, AP-12 Manager, from a Windows 98 machine.

When your computer uses an operating system other than Windows 98, follow the on-screen messages or instructions to uninstall the utility.

[Procedure]

1. Click <Start> and select “Control Panel” from the “Settings” menu. Double-click “Add/Remove Programs”.
2. Select “AP-12 Manager” and click <Add/Remove>.

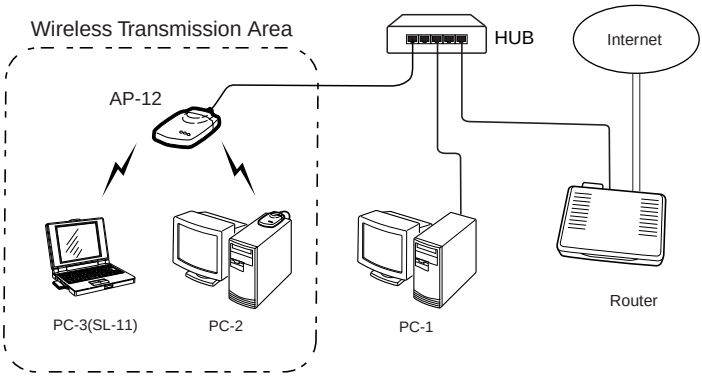


3. The AP-12 Manager Uninstall Wizard will start. Click <Uninstall>.

9 SETTING EXAMPLES

■ Network arrangement

This chapter shows IP address setting examples for the following network arrangement. This network consists of the product (ICOM access point AP-12), wireless ISDN Router, wireless LAN card SL-11 and wired and wireless terminals (PCs).



[Router settings]
IP address: 192.168.0.1
Subnet mask: 255.255.255.0
DHCP server function: Enable
Initial allocation IP address: 192.168.0.10
Number of allocations: 30

[PC1 (Desktop PC)]
* An Ethernet card is required.
The IP address of this terminal is assigned by the DHCP server function of the Router automatically. Select "TCP/IP" from the installed network components on the "Network Configuration" tab and click <Properties>; and then select "Obtain an IP address automatically".

*** For setting items not shown here, see the instruction manuals for respective devices.**

[AP-12 settings (manual)]
Channel: 11
IP address: 192.168.0.40
Subnet mask: 255.255.255.0
* The value subsequent to the last dot should be set to "40" or more. Otherwise, the IP address may collide with an IP address that is automatically assigned by the Router.

[PC3 (SL-11)*1]
IP address: 192.168.0.42*2
Subnet mask: 255.255.255.0*2

*1 Operation mode: **Infrastructure**
*2 If the network contains a DHCP server, the "Obtain an IP address automatically" option can be selected.

* **ESS ID** and **WEP**-related settings must be the **same** between the AP-12 and each wireless terminal (PC2, PC3).

10-1 Default Setting Values

The original factory setting values are listed below for each AP-12 setting window.

[Wireless setting]
- ESS ID: LG (alphanumeric characters, upper case)
- Channel: 11

[IP setting]
- IP address: 192.168.0.1
- Subnet mask: 255.255.255.0

[Security]
- WEP security: Disable
- Key generator: Non

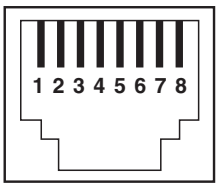
[Option]
- Display banner: ON
- Icon animation: ON
- Password protection: OFF
- Setting data mask: OFF

10-2 Function List

- Wireless access point function
- Wireless roaming function
- Wireless security
  (ESS ID, WEP)

10-3 Ethernet port

Type RJ-45 8-pin modular jack: 1



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

11 AFTER SERVICE

■ When the product 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 store). 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-12. If you cannot solve the problem, request servicing according to the following terms:

During the warranty period

Contact the store 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 store 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.

- **Applicable international standards** : IEEE 802.11/IEEE 802.11b
- **Communication method** : Simplex
- **Radio communication type** : Direct Sequence Spread Spectrum (DSSS)
- **Modulation method** : DPSK/DQPSK (Burger/CKK code)
- **Frequency band** : 2.4 GHz band (2400 – 2472 MHz)
- **Available channels** : 1 – 11
- **Data transmission rates** : Max. 11 Mbps
- **Transmission range** : Approx. 30m (indoor) at 11 Mbps
- **Security** : WEP (Wired Equivalent Privacy)
  ESSID (Extended Service Set IDentifier)
- **Built-in antenna** : Diversity slot antenna
- **Transmission power** : Less than 1 W
- **Reception sensitivity** : –76 dBm max. (frame error rate: 8%)
- **Demodulation method** : Digital demodulation (matched filter type)
- **Operating temperature range** : 0 – +55°C
- **Input power** : 7.5 V DC ±5% (using supplied AC adaptor)
- **Power consumption** : Transmit 450 mA (typical)
  Receive 400 mA (typical)
- **Outline dimensions** : 100 (W) × 30.5 (H) × 70 (D) mm (excluding projections)
- **Mass** : Approx. 90 g (excluding accessories)
- **Supported machines** : PC/AT compatible machine,
- **Supported OS** : Windows 98, Windows 98 Second Edition, Windows Millennium Edition, Windows 2000 Windows XP

*** The specifications may be subject to change without notice.**

*** The transmission range may vary depending on the transmission speed and the environmental conditions.**

13 TERMINOLOGY

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.
ICOM DR-1WL or other devices with DHCP server capability allocate an IP address, default gateway, DNS address, etc., to the DHCP clients (computers) when the DHCP clients start up.

ESS ID (Extended Service Set-IDentifier)
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-12 are set to the same value as the ESS ID of the AP-12.

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 administrator.
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.

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
10BASE-T is a connection scheme 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.

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 sent 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-12 and other devices are used construct a network. The hub is connected to the AP-3 using 10BASE-T cable.

Flash memory
The flash memory is a memory device in the AP-12 to which data can be written.
Information stored in the flash memory is not erased when the power to the AP-12 is turned off.

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

Count on us!

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