

InstantWave™

High Speed Access Point

User's Guide

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FCC WARNING

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 instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

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

You are cautioned that changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

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

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Packing List

The package should contain the following items:

- One Access Point
- One Antenna
- Three InstantWave High Speed Access Point System Manager Diskettes
- One AC Power Adapter
- This User's Guide
- One Wall-fixing Template and Screws

Introduction

Congratulations on choosing one of NDC's InstantWave High Speed wireless networking products family. InstantWave High Speed was one of the first IEEE 802.11b wireless standard compliant products in the industry and was designed with a “*Maximizing the Convenience of Networking*” philosophy in mind. You will find InstantWave High Speed products very easy to setup and use.

The User's Guide gives comprehensive instructions on installing and using the InstantWave High Speed Access Point (AP). The AP provides a transparent bridged connection between a wired network and a wireless network and allows your wireless stations to communicate with devices attached to your wired network. It manages the flow of data packets from the wired LAN to the wireless LAN, and vice versa. The Access Point Management System (APMS) performs wireless network configuration management and diagnostic functions.

InstantWave High Speed Family

The InstantWave High Speed Access Point is part of a family of easy to use high performance wireless communication products. The family products include:

- InstantWave High Speed Access Point (NWH660, NWH650)
- InstantWave High Speed PCI card (NWH630)
- InstantWave High Speed PC card (NWH610)

System Requirements

System requirements to install and operate the InstantWave High Speed Access Point are:

- A RS-232 cable
- An Ethernet drop (UTP)
- A PC (only used when the configuration of AP's Network properties is necessary)

Cabling

Connecting the AP to an Ethernet network requires an Unshielded Twisted-Pair cable. The AP fits into the network just as any other node would do. An LED will light to indicate a connection (UTP cable). The cable length should follow Ethernet standards in each case.

Glossary

Group ID/BSSID

A Group ID (the 802.11 standard uses the term BSSID) is the ID of a wireless cell. A wireless cell is usually made up of stations in an area that the radio signal can comfortably cover. In other words, any wireless station in the cell can communicate with any other within reach of the radio signal.

Domain Name/ESSID

A “Domain” is most commonly used to refer to a group of computers whose hostnames share a common suffix. The domain is usually defined by the network administrator as a segment/subnet of a large network and may be made up of overlapping wireless cells. Wireless nodes can roam freely within the same domain without disconnecting from the network.

Roaming

The convenience of a mobile PC is the ability to move freely. The concept is similar to that of a cellular phone moving from one base station to another. InstantWave High Speed offers built-in high performance and seamless roaming capabilities.

Carrier Set

InstantWave High Speed products use the unlicensed ISM (Industrial, Scientific, Medical) band to communicate through radio waves. Different countries offer different radio frequencies to be used as the ISM band. There are four frequency bands defined by 802.11: Japan (2.471GHz – 2.497 GHz), USA, Extended Japan, Canada, and Europe (2.4 GHz – 2.4835 GHz), Spain (2.445 GHz) and France (2.4465 GHz – 2.4835 GHz). If a user wants to use InstantWave High Speed in a country not listed above, he/she needs to check with their government regulating body to find the correct frequency band to use. All InstantWave High Speed products are supplied preset to the country of sale's frequency band.

How to Use this Guide

InstantWave High Speed is extremely versatile in providing varying levels of network management. For Small Office/Home Office users, setup and configuration is a quick, four-step process. For these users the Access Point Hardware Installation Access Point Hardware Installation Access Point Hardware Installation section, on page 9, provides simple instructions to get your network up and running within minutes. Go to the Access Point Hardware Installation section if your network will meet the following criteria:

- You will accept all default values
- Your network will have only one Access Point

The AP COMFig Tool, see page 13, permits AP configuration from a PC via a COM port connection. The program enables the user to change the default Access Point IP configuration settings before introducing a new AP to an already established wireless network.

For System Administrators, with advanced networking requirements, the AP Management System (APMS) section, on page 23, covers configuring for advanced management and explains how to make a network management connection. The APMS program is a simple to use, yet extremely powerful, network management tool.

Whichever setup method you intend to use, you should read through the next section “Planning Your Network,” in order to get the best possible performance from your InstantWave High Speed wireless network.

Planning Your Network

Infrastructure Network Types

An Infrastructure network is formed by several stations and one or more Access Points (APs), with the stations within a set distance from the AP. **Figure 1** depicts a typical Infrastructure network topology.

There are three infrastructure network setups that are commonly used. It is a good idea to understand the possible network setups and configuration requirements before planning your wireless network.

- Type 1. The simplest wireless infrastructure network is composed of one Access Point (AP) and a few wireless Stations communicating via radio waves (**Figure 1**). This setup enables mobile stations to communicate with each other. The main benefit of this type of network is to extend the range of the network. If an AP is placed between Station-1 and Station-2, the radio transmission distance is effectively doubled since Station-1 can talk to Station-2 through the AP. The drawback of this configuration is that the effective bandwidth is halved since all communication is relayed by the AP.



Figure 1. Simple Wireless Infrastructure Network

- Type 2. The next simplest wireless network is very similar to the Type 1 network. This time the AP is connected to a wired Ethernet network as a node. In this configuration the AP is effectively performing as a bridge between the wired Ethernet and the wireless networks (**Figure 2**).

Wireless users have the same access to the network resources as they would have if they were wired. This type of network is usually used to extend an existing network into a difficult to wire or a roaming environment.

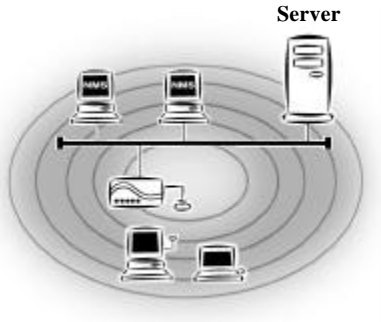


Figure 2. AP to Wired Ethernet Bridge

Type 3. The third type of network is composed of multiple APs and multiple Stations (**Figure 3**). The APs could also be connected to servers on the wired Ethernet network. The shadowed area represents signal overlap between subnet1 (AP-1) and subnet2 (AP-3).

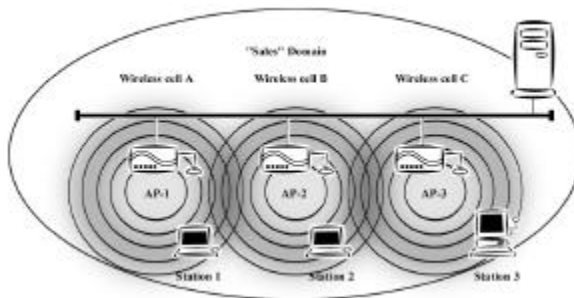


Figure 3. Multiple AP Network

The reasons for having multiple APs installed are:

1. To increase bandwidth in order to boost overall network performance
2. To extend the coverage range

Any other type of configuration is usually a mix of these commonly used types.

configuration.

Adding a new Station to an existing Infrastructure Network is easy. Again, all you need to do is to set the newly added Station to be the same as

Multiple APs Installation

Install multiple APs in the same network (or Domain) with an overlapping signal (Figure 3)

- Use the same Domain Name
- The roaming function in the Station if roaming is desired.

Note: A Station will automatically connect to whichever AP in the same domain is offering the best signal

Roaming

InstantWave High Speed products are equipped with seamless roaming capabilities. Roaming is necessary to prevent mobile Stations from being disconnected from the network as they move around.

InstantWave High Speed is designed to allow wireless Stations to roam freely within an infrastructure domain composed of multiple APs with overlapping signal coverage (as in the Type-3 network configuration described in the previous section). For example, roaming enables Station-1 to move from the AP-1 signal coverage area to the AP-2 signal coverage area without disconnecting from the network. The handover is achieved transparently; the Station-1 user would not realize he had moved from AP-1 to AP-2.

The requirements for a roaming environment are:

- a) Multiple APs with overlapping signal coverage (see Multiple APs Installation, page 6)
- b) The APs must be configured to have the same Domain name (see AP Setting, page 30)
- c) The mobile Stations must have the same Domain name as the APs
- d) *It is advisable that APs on different TCP/IP subnets be given different Domain names to avoid roaming confusion (see AP Setting, page 30)

Note: If you want to move your mobile PC between different APs without terminating the existing networking link, you need to enable the roaming function on the Mobile Station. The APs that a Mobile Station will roam to must also be configured with the same domain name (reference page 2). If a Station detects that the signal quality with the current linked AP is weak, it will search for an AP in the same domain with a better signal quality and automatically establishes a new connection with it. "When a Station is roaming, it will always use the same IP address. The TCP/IP router will not route information packets to a Mobile Station if it re-associates with a AP that is in a different TCP/IP subnet. In other words, if your network consists of two subnets connected by a router, a Mobile Station may roam to a different subnet with the same domain name and then fails to communicate with other network devices in TCP/IP. To avoid running into such an awkward situation, you must assign different domain names to different TCP/IP subnets."

problem. Radio is receptive to interference. Therefore, the more interference you can avoid, the better performance you will get from wireless products. The following section describes how the InstantWave High Speed AP should be placed to reduce possible interference.

A few tips to mention that are particularly significant in a radio wave communications system:

1. Radio waves reflect or refract from buildings, walls, metal furniture, or other objects. This could result in performance degradation due to the fluctuation of the received signal
2. Microwave ovens use the 2.45 GHz frequency band. InstantWave High Speed also functions in the 2.4 ~ 2.5 GHz band, and therefore shares some of the band with microwave ovens. This means that when a nearby microwave oven is in use it may interfere with InstantWave High Speed, resulting in performance degradation on the wireless network

Placing For Performance

For the best performance, it is advisable that users follow the guidelines below in placing the product:

- Place the AP as high as possible, in as open an area as possible
- Avoid placing the AP (especially the antenna) close to metal objects (e.g., file cabinets, metal cubicles, ..etc.)
- Keep APs and Stations as far away as possible from microwave ovens (10 meters min. is advisable)

Placement Tools

InstantWave High Speed includes a Station utility program to help users find the best location in which to place the AP relative to the location of the Stations.

1. Start the AP
2. Allow a wireless Station to connect with the AP
3. From the Station, run the InstantWave High Speed Station Monitor RF Signal Quality Program
4. Move the AP and the APs antenna to find the best signal quality

Mounting the AP

The AP may be either freestanding or wall-mounted. Screws and a paper template are provided for easy installation.

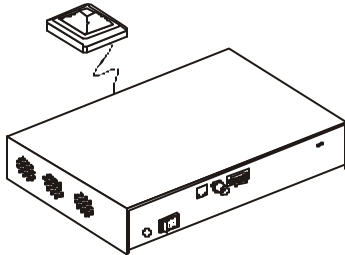


Figure 4. Access Point

- Step1** . Screw the antenna into the back of the AP (see **Figure 5**). Placing the antenna in a higher location may result in better signal transmission/reception to/from the wireless stations (see Placing For Performance, page 8)

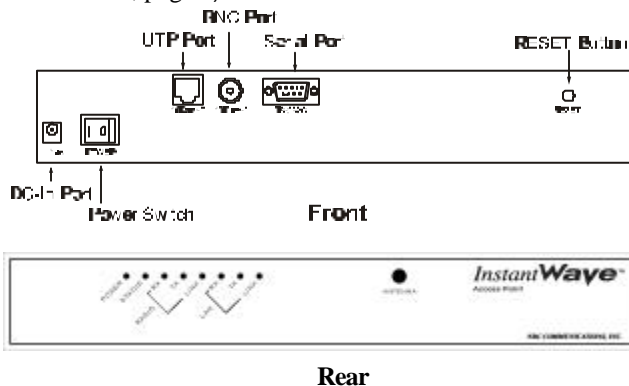


Figure 5. Access Point

- Step2** . Connect the Ethernet network cable to either the UTP port (see **Figure 5**). If both types of cables are connected at the same time, the AP will only utilize the UTP connection first
- Step3** . Connect the power adapter to the electricity outlet and then to the Access Point DC-In port (see **Figure 5**)
- Step4** . Turn on the AP power switch

The Access Point is now ready to communicate with the wireless stations using its factory default settings. Refer to the InstantWave High Speed PCI/PC Card User Guide for card setup instructions.

LED Indicators

The Access Point LEDs show the status of the connections. **Figure 6** shows the LEDs, and

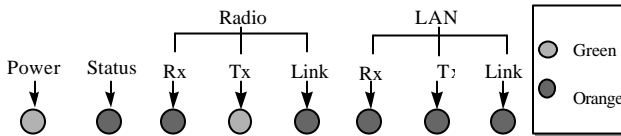


Figure 6. Access Point LEDs

The Access Point LEDs show the status of the connections.

| <i>General</i> | <i>Color</i> | <i>Function</i> |
|----------------|--------------|---------------------------------------------------------------------------------------------|
| Power | Green | Unlighted: Power OFF LED blinking: Diagnostic test LED steady ON: Healthful condition |
| Status | Red | LED steady ON: sick condition LED steady OFF: Normal working |

| <i>Radio</i> | <i>Color</i> | <i>Function</i> |
|--------------|--------------|----------------------------------------------------------------------|
| Active | Green | Indicates wireless data active |
| Link | Orange | Indicates a wireless link. If the radio fails, this LED will be OFF. |

| <i>Ethernet</i> | <i>Color</i> | <i>Function</i> |
|-----------------|--------------|-------------------------------------------------------------------------|
| Active | Green | Indicates Ethernet data active |
| Link | Orange | Indicates a Ethernet link. If the Ethernet fails, this LED will be OFF. |

Figure 7. LED Functions

AP Management Software Installation / Uninstallation

Installation

- step1.** Insert the first InstantWave High Speed setup disk into drive A:
- step2.** From the *Start* menu select *Run*, and type **A:\SETUP.EXE**
- step3.** Click the *OK* button to start the setup program. Setup will prepare the InstallShield High Speed Wizard and show the InstantWave High Speed setup screen
- step4.** To install the full program, choose *Typical*. Choosing *Custom* opens another screen with the option to install only selected parts of the management program. Click the *Next* button to advance to the *Choose Destination Location* screen
- step5.** From the *Choose Destination Location* dialog box accept the program files default location, C:\Program Files\InstantWave High Speed AP\, or click *Browse* to choose another location. Then click *Next*. The setup program will copy the necessary files into the specified directory. The setup program will ask you to insert the diskettes as required. File copying progress will be displayed in the setup screen. You can stop the process anytime by clicking *Cancel*
- step6.** After the program files have been copied, click *Start/ Programs/InstantWave AP*. If you selected a full installation, you will find the AP COMFig program, the AP Management System (APMS) Program, and the Trap Server program on the menu
 - **The AP COMFig Tool.** A simple Windows 95/98/NT/2000-based AP configuration tool working through a direct COM port connection to the AP. The AP COMFig tool is intended for simple first time configuration of AP parameters, or to be used as a last resort to communicate with an AP (see AP COMFig Tool, page 13)
 - **AP Management System (APMS).** The APMS is a Windows 95/98/NT/2000, SNMP based management tool, allowing users to configure and monitor APs through an Ethernet, wireless connection. The APMS management tool is intended for performing full-blown wireless network configuration and management (see AP Management System (APMS), page23)

Uninstallation

Should you wish to uninstall InstantWave from a Windows environment, click *Start/ Programs/InstantWave High Speed AP*.

Click *Uninstall InstantWave High Speed AP*. A confirmation box will ask if you are sure you wish to remove the program(s). Click *Yes*.

AP COMFig Tool

The AP COMFig tool is a Windows 95/98/NT/2000 based utility that is used via a COM port connection between the AP and a PC.

It provides the following functions:

- Sets necessary AP parameters (e.g., IP address, Domain name, etc.)
- Diagnoses the AP hardware and shows the diagnostic results
- Updates the AP firmware
- Reset AP Configurations
- Manages the APMS Host table

Click *Start/Programs/InstantWave AP/AP COMFig Tool* to start the program. The program opens with the AP COMFig Tool *Connect* screen.

- step1.** Connect the null modem cable to the serial port on the AP and connect the other end to a serial port on the PC
- step2.** Select the COM port
- step3.** Power on the AP and the AP COMFig program will connect with the AP automatically

Using the AP COMFig Tool

AP COMFig Password

Click on the *Password* tab to open the *Password* screen. Here you may set a password if so desired. Setting a password prevents unauthorized changes to the AP configuration settings.

Note: The password will be shared with the APMS program on the same PC.

AP COMFig Service

Click on the *Service* tab to open the *Service* screen. The *Service* screen provides access to the basic management features.

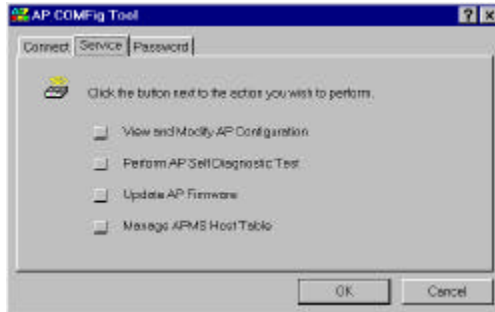


Figure 8. AP COMFig Tool/Service

Click the *View and Modify AP Configuration* button. The *Configuration* screen will open.

General

The *General* card (Figure 9) is the first card on the *Configuration* Screen.



Figure 9. Configuration/General

Here you may:

| | |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Add an alias name for the AP | Assign the AP a unique name |
| Change the Domain Name (Extended Service Set ID) | This is more commonly called the Domain Name but is defined in the 802.11 Wireless Standard as ESSID. Stations and APs in the same group must use the same Domain Name |
| Regulatory Domains | Identify the country where the AP is used (see Glossary, page 2). Read-only |
| Change the Channel | You can change the channel number. Channels supported on every carrier set as below table |
| AP Firmware Version | Read-only |
| BSS ID | Read-only |
| Transmit Rate | The transmission rate at which the data packets are transmitted by the AP. You can set this to Auto select 1 or 2 Mbps, Fixed 1 Mbps, Fixed 2 Mbps, Fixed 5.5 Mbps, Fixed 11Mbps or Full Auto(1 to 11 Mbps). |

Channels supported on every carrier set:

| Channel Number | Center Frequency (MHz) | FCC/ Canada | ETSI | Spain | France | Japan |
|----------------|------------------------|-------------|------|-------|--------|-------|
| 1 | 2412 | O | O | | | O |
| 2 | 2417 | O | O | | | O |
| 3 | 2422 | O | O | | | O |
| 4 | 2427 | O | O | | | O |
| 5 | 2432 | O | O | | | O |
| 6 | 2437 | O | O | | | O |
| 7 | 2442 | O | O | | | O |
| 8 | 2447 | O | O | | | O |
| 9 | 2452 | O | O | | | O |
| 10 | 2457 | O | O | O | O | O |
| 11 | 2462 | O | O | O | O | O |
| 12 | 2467 | | O | | O | O |
| 13 | 2472 | | O | | O | O |
| 14 | 2484 | | | | | O |

Important:

In a multiple cell network topology, overlapping and/or adjacent cells using different channels can operate simultaneously without interference if the frequency distance between the center frequencies is at least 30MHz. For example **channel 1, 7 and 13** are non-overlapping frequency channels.

After making any changes, click the **Apply** button to make the changes effective immediately, without closing the dialog box, or click **OK** to accept the changes and close the box. Clicking **Add to APMS Host Table** will add the information to the host table referred to by the APMS program.

WEP

Click the *Encryption* tab to view the Adapter WEP Properties (錯誤! 找不到參照來源。).

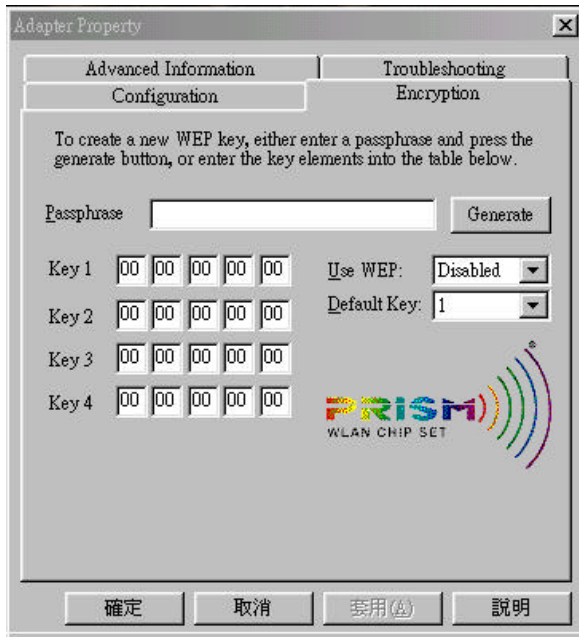


Figure 10. WEP Security

- **Use WEP** - The WEP stands for Wired Equivalent Privacy. WEP is an encryption scheme that provides the secure wireless data communications to the users. WEP uses a 40-bits key to control the network access. In order to decode the data transmission, each wireless client on the network must use the identical 40-bits key.
- **WEP Key Generation** - There are two ways of generating the WEP key.

The first is by entering any text in the **Passphrase**. And click on **Generate**. It will generate four WEP keys as **Key 1**, **Key 2**, **Key 3** and **Key 4**. You can select any key for the security. If you do not select any key, key 1 is selected, as it is default key. Then click on Write and it will update the AP NVRAM.

configure its subnet mask, or add a default gateway (see the note below).

Note: An AP will transfer SNMP respond packets (confirmation packets) to its APMS PC directly if it is within the same LAN (the same subnet mask). If a SNMP respond packet from an AP is destined for an APMS PC on another LAN, then the SNMP respond packet needs to go through a router-gateway. The default gateway is the path to that router. If you set the correct default gateway, then you can use an APMS manager (i.e. the PC running APMS) physically located in a different subnet to manage this AP.

After making any changes, click the **Apply** button to make the changes effective immediately, without closing the dialog box, or click **OK** to accept the changes and close the box. Clicking **Add to APMS Host Table** will add the information to the host table referred to by the APMS program.

Filter:

The next tab on the dialog box is *Filter* (**Figure 12**). This is a one-way protocol filtering mechanism that prevents the AP from transmitting certain protocols from the Wired Ethernet LAN into the Wireless zone. If you do not require particular protocols on the wireless part of your network you can save bandwidth by enabling the protocol filter.

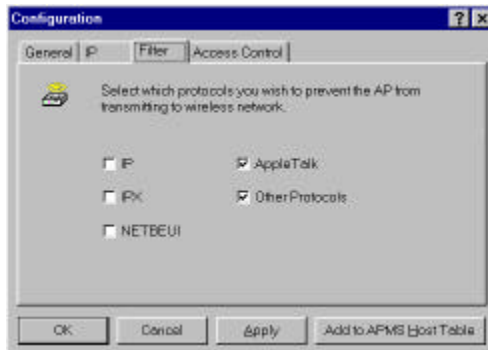


Figure 12. Configuration/Filter

From the *Filter* tab, some, all, or none of the protocols listed may be selected for filtering out:

- IP protocol
- IPX protocol
- NetBEUI protocol
- AppleTalk protocol
- Other protocols

After selecting a protocol for filtering, click the **Apply** button to make the changes effective immediately, without closing the dialog box, or click **OK** to accept the changes and close the box. Clicking **Add to APMS Host Table** will add the information to the host table referred to by the APMS program.

Access Control:

Access Control is the next tab on the box (**Figure 13**). The AP's access control is managed by a control table on the Access Point (AP).

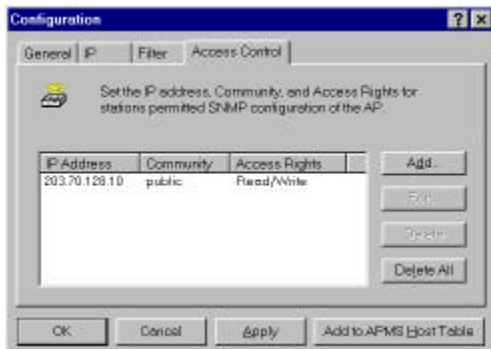


Figure 13. Configuration/Access Control

The first time this box is opened the table will be empty. This means that there are no restrictions on who can access and reconfigure the AP and any user may modify its operation. This is like going on vacation and leaving your front door open. To avoid chaos on the network, access to the AP configuration should be restricted to only those for whom it is absolutely necessary.

First click **Add** to open the *New Entry* dialog box (**Figure 14**).



Figure 14. New Entry

Enter your IP address and then set your own access rights to Read/Write (see the following note). Two levels of access are available. To set access rights, enter a station's IP address and community string (community string is used as the password to access the AP) and choose *Read* or *Read/Write*.

Note: Do not set all the stations in the Access Control table to Read-only. Once this is set and enabled, it will be difficult to modify the AP. Should this situation occur, refer to Troubleshooting, page 38

| | |
|------------|--------------------------------------------------------------------------------------------------------------|
| Read | Read-only rights. The user may read everything except the Access Control settings, but cannot alter anything |
| Read/Write | The user may read and alter all settings |

When all the settings are made, click **OK** to return to the *Access Control* card. On the Access Control card, click the **Apply** button to make the changes effective immediately, without closing the dialog box, or click **OK** to accept the changes and close the box. Clicking **Add to APMS Host Table** will add the information to the host table referred to by the APMS program.

Perform AP Self Diagnostic Test

On the *Service* card, click *Perform AP Self Diagnostic Test*. The *Hardware Diagnosis* screen will open (**Figure 15**)

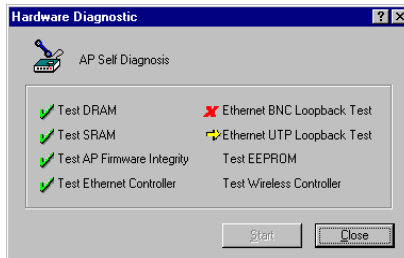


Figure 15. Hardware Diagnosis

Click **Start** and the tests will commence. As each item is tested a yellow arrow will appear alongside it. If the test is successful, the arrow will change to a green tick. You can click **Cancel** at any time to stop the tests. Whenever a failure has occurred, an “X” will appear alongside it. When the tests have completed, the **Cancel** button changes to a **Close** button. Click **Close** to return to the *Service* card.

Update AP Firmware

The Access Point’s (AP’s) embedded software is burned into the flash ROM. However, an updated AP code may be installed via a COM port using the AP COMFig program. Click on *Update AP Firmware* (**Figure 8**). The *Update AP Firmware* dialog box will open.

Use the **Browse** button to choose the file to be uploaded to the AP, or type the file location and name in the *File Name* field.

The **Update** button will then become enabled. Click **Update** to start loading the file to the Access Point. The AP COMFig tool will upload the new executable into the AP’s flash memory area.

When the file transfer is complete, click **Close** to close the window.

Reset AP Configurations

To restore the factory default configurations.

Manage APMS Host Table

Click the *Manage APMS Host Table* button to open the *APMS Table* dialog box (Figure 16)

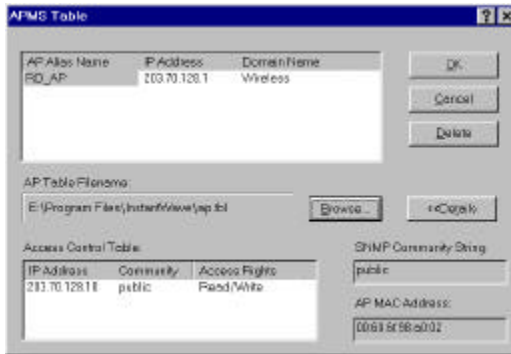


Figure 16. APMS Table

From here you can view/delete all host tables. Click the *Details* button to change from a simplified to a detailed view. After making any changes click **OK** to return to the *Service* card.

- Data Rate: Auto select 1 or 2 Mbps, Fixed 1 Mbps, Fixed 2 Mbps, Fixed 5.5 Mbps, Fixed 11Mbps or Full Auto
- WEP: The WEP stands for Wired Equivalent Privacy
- Set the management access permission to configure or monitor the APs through the *Access Control* menu item. This protection prevents unauthorized access to the AP's configuration parameters
- Monitor and diagnose network problems
- View the number of wireless Stations that are connected to a particular AP
- View the wireless traffic statistics of an AP
- Save or load a specific AP's configuration parameters to/from a file
- Set a password for the APMS program

Configuration Requirements for APMS

In order to setup an InstantWave High Speed Access Point Management System (APMS) terminal, you need the following:

- A PC running Windows 95/98/NT/2000
- The APMS program An Ethernet card with a UTP Ethernet connection

You need to complete the following steps to install the APMS tool to the PC:

- step1.** Assign an IP address to the PC and bind the TCP/IP protocol to the Network adapter (refer to
step2. TCP/IP Setup, page 25, for details)

Note: Step 1 is not required if the PC already has TCP/IP set up on the network

- step3.** Install the APMS package to the PC (see AP Management Software Installation, page 11)
step4. Click *Start/Programs/InstantWave AP/AP Management System* and you are ready to go
step5. Power on and configure the APs in sequence in the first time setup of a multiple AP environment

Network Management Connection to the AP

To manage the wireless LAN with the Access Point Network Management tool (APMS), we strongly recommend the System Administrator makes an APMS connection to the AP through a wired Ethernet connection (UTP port).

step9. Assigning a Subnet Mask to the AP, page 27). Otherwise, the AP's subnet mask will prevent the station from accessing it (see Managing InstantWave High Speed Configurations, page 29)
Click **OK** to go back through the dialog boxes. In the *System Settings Change* dialog box, choose **Yes** to restart the computer and make the changes effective

Detailed instructions on changing the IP address of the AP are given in AP Setting, on page 30.

Assigning a Network ID to the AP

An IP address contains two pieces of information: the network ID and the host ID.

Network ID

The network ID identifies a group of devices, located on the same logical network, which are connected by routers.

Host ID

A host ID identifies a single device within a particular network ID and corresponds to the numbers in the last block of the IP address.

To be able to communicate with each other under TCP/IP Network, the AP and the stations must be in the same domain. To put them in the same domain, make the first three blocks of the stations IP address the same as the Access Point IP address and change only the figures in the last block, i.e., 192.168.1.n (where n = a number from 1 to 254 which is not already in use in this domain). Detailed instructions on changing the IP address of the AP are given in AP Setting, on page 30.

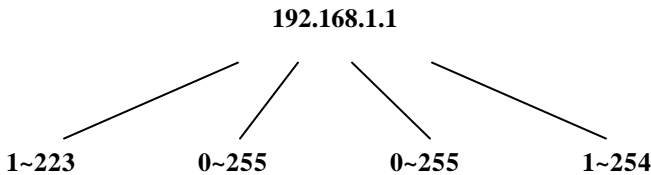


Figure 17. IP Address Restrictions

Assigning a Subnet Mask to the AP

The AP and stations on the same local network must be assigned the same subnet mask. The AP default subnet mask is 255.255.255.0. Detailed instructions on changing the subnet mask of the AP are given in AP Setting, on page 30.

Using the APMS Tool

Click *Start/Programs/InstantWave AP/AP Management System*. The program opens with the InstantWave Access Point Management System screen (**Figure 18**).

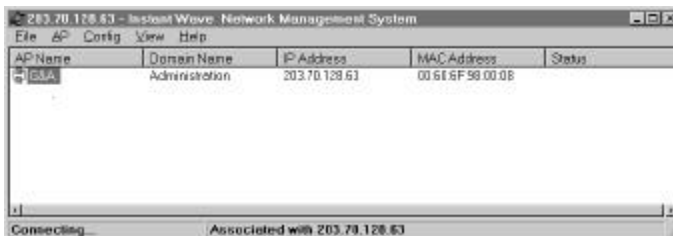


Figure 18. InstantWave APMS

Adding an AP(s)

The APMS window is equivalent to an address book of Access Points (APs). The first time the program starts, the screen will be blank (if you are using the default settings the screen will appear with the defaults as in **Figure 18**). Only existing AP icons will be shown in the AP icon window. At least one AP must be entered in the table to allow the local adapter to connect to it. The next section explains how to add to/edit the Host Table.

Note: Right-clicking anywhere in the main window provides fast access to most of the main-menu items

Create New AP

Click the *AP* main menu item to open its sub-menu and then click the *Create New AP* sub-menu item.

Input the AP's IP Address and its Community string (a string used for access control: if Access Control to the AP is to be set up in the APMS program, you must enter the correct community string to allow permitted stations to connect). When the information has been entered, the *OK* button will become active. Click **OK**.

Repeat the process to add more APs. To delete an AP icon from the AP icon window, first select it in the AP icon window and then press the **Delete** key.

Connecting to an AP

Once a Host Table has been created, a connection can be made by double-clicking an AP's icon in the AP icon window. Alternatively, click *AP* on the main menu and then click **Connect AP**.

In the *Connect AP* dialog box, click on the down arrow of the AP entry field to open the drop-down AP list. Each AP will be shown on the list. Select an AP and complete the selection by clicking **OK** (the only difference between double-clicking the icon and opening the *Connect* dialog box is that opening the *Connect AP* dialog box provides access to on-line help). If the connection is successful the current connected AP's IP Address will appear on the InstantWave Network Management System title bar (**Figure 19**).

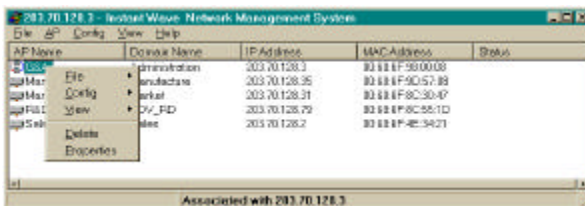


Figure 19. APMS with Connection Made

After connecting, right-clicking on a connected AP's icon will open a menu (**Figure 19**). Click **Properties** to open the *AP Properties* dialog box (**Figure 20**).

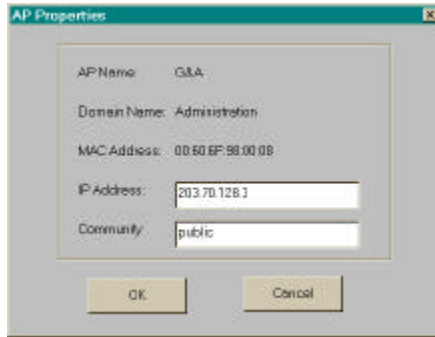


Figure 20. AP Properties

Here you may modify the IP address and Community strings in the Host Table. Changes made here will be immediately effective.

If the connection attempt was unsuccessful, a message box will appear informing you that the request has no response. Click **OK** to close the message box and return to the main screen. Go through the procedure again to retry. If you cannot connect to the AP by the third attempt, check that the AP information has been correctly entered in the Host Table and that the Access Point (AP) is functioning. If you are still experiencing problems, turn to Troubleshooting, on page 38.

Managing InstantWave High Speed Configurations

Config

If the AP selection is successful, the *Config* and *View* main menu items will be enabled. Click the *Config* main menu item (or right-click on the AP name in the APMS window) to open a sub-menu.

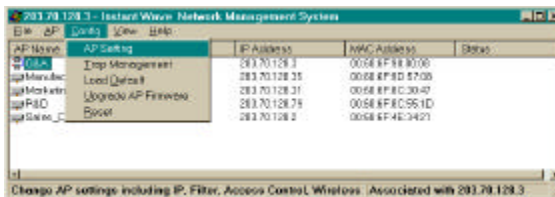


Figure 21. Config/AP Setting

configure its subnet mask, or add a default gateway (see the note below). After making changes click **OK** to return to the *Config* sub-menu and click the *Reset* menu item to make the changes effective.

Note: An AP will transfer SNMP respond packets (confirmation packets) to its APMS PC directly if it is within the same LAN (the same subnet mask). If a SNMP respond packet from an AP is destined for an APMS PC on another LAN, then the SNMP respond packet needs to go through a router-gateway. The default gateway is the path to that router. If you set the correct default gateway, then you can use an APMS manager (i.e. the PC running APMS) physically located in a different subnet to manage this AP.

Filter:

The second tab on the dialog box is Filter. This is a one-way protocol filtering mechanism that prevents the AP from transmitting certain protocols from the Wired Ethernet LAN into the Wireless zone. If you do not require particular protocols on the wireless part of your network, you can save bandwidth by enabling the protocol filter.

From the *Filter* tab, some, all, or none of the protocols listed may be selected for filtering out:

- IP protocol
- IPX protocol
- NetBEUI protocol
- AppleTalk protocol
- Other protocol

Selecting a protocol for filtering will activate the AP's protocol filtering immediately on clicking *OK*. Clicking on *Reset* is not required. If, after filtering a protocol, your network is not functioning as before, it's likely the protocol is required on the network and you should disable the filter for that protocol.

Access Control:

Access Control is the next tab on the box (**Figure 23**). The AP's access control is managed by a control table on the Access Point (AP).

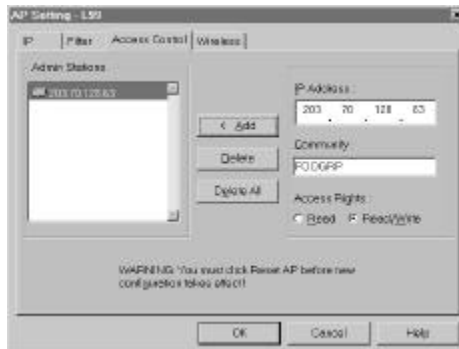


Figure 23. AP Setting/Access Control

The first time this box is opened, the table will be empty. This means that there are no restrictions on who can access and reconfigure the AP and any user may modify the AP's operation. This is like going on vacation and leaving your front door open. To avoid chaos on the network, access to the AP configurations should be restricted to only those for whom it is absolutely necessary. First enter your IP address and then set your own access rights to *Read/Write* (see the note below).

Host Table of the APMS manager terminal (<i.e.>the PC running APMS>), see Create New AP, page 28 and choose *Read* or *Read/Write*.

| | |
|------------|--------------------------------------------------------------------------------------------------------------|
| Read | Read-only rights. The user may read everything except the Access Control settings, but cannot alter anything |
| Read/Write | The user may read and alter all settings |

The ***Add*** button will become active. Click ***Add*** to add the information to the AP Access Control table. Click another tab to continue configuration setting or click ***OK*** to complete the AP setting. Click the *Config/Reset AP* menu item to make the changes effective.

Wireless:

Clicking on the *Wireless* tab opens the Wireless card. The Wireless card groups all the user configurable wireless Access Point (AP) functions. Here you may:

| | |
|--------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Add an alias name for the AP | Assign the AP a unique name |
| Change the Domain Name (Extended Service Set ID) | This is more commonly called the Domain Name but is defined in the 802.11 Wireless Standard as ESSID. Stations and APs in the same group must use the same Domain Name |
| Regulatory Domains | Identify the country where the AP is used (see Glossary, page 2). Read-only |
| Change the Channel | You can change the channel number. Channels supported on every carrier set as below table |
| AP Firmware Version | Read-only |
| BSS ID | Read-only |
| Transmit Rate | The transmission rate at which the data packets are transmitted by the AP. You can set this to Auto select 1 or 2 Mbps, Fixed 1 Mbps, Fixed 2 Mbps, Fixed 5.5 Mbps, Fixed 11Mbps or Full Auto(1 to 11 Mbps). |

After making any changes click **OK** and then click the *Reset* menu item.

Update AP Firmware

The Access Point's (AP's) embedded software is burned into the flash ROM. However, an updated AP code can be installed over your LAN via the APMS program. Click on *Update AP Firmware*. The Update AP Firmware dialog box will open.

Use the *Browse* button to choose the file to be uploaded to the AP, or type the file name in the *Local File* field.

The **Upload** button will then become enabled. Click **Upload** to start uploading the file to the Access Point. The APMS and the AP's built-in Trivial File Transfer Protocol (TFTP) command will upload the new executable into the AP memory area.

Resetting the AP will take about 30 seconds. During this time, the APMS program will not be able to query the AP via its SNMP protocol and the AP will not be

available to other stations. If you try to access it, the APMS program will display a “No response from the AP” message.

When the file transfer is complete, click **OK** to close the window.

Reset

After changing the AP’s IP, Access Control, Trap Server, or Wireless options, the AP needs to be reset to enable the new settings. Prior to exiting the APMS program, or selecting a different AP, click the *Reset* menu item. A Reset confirmation window will be displayed.

Click **OK** to reset the AP or **Cancel** to abort the reset command.

WEP

Specify the WEP parameters.

Viewing InstantWave High Speed Information and Statistics

View

The menu items under *View* provide read-only information and statistics. To customize the screen view, right-click in the main screen to open a context sensitive menu. Select your preferred view, i.e. Icons, List, Details, etc.

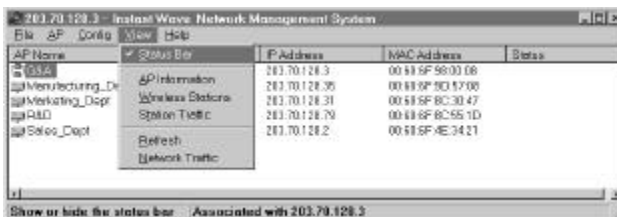


Figure 24. View Menu

The Status bar at the bottom of the screen shows the connecting status. When the bar shows *Ready*, *Associated* will appear on the bar along with the IP of the associated AP.

AP Information

Clicking *AP Information* opens a window displaying the Access Point system information (**Figure 25**). The information shown is read-only.

More information about the hardware can be obtained by clicking the *Debug* button. The debug information is a useful diagnostic item for technical support. (see How to reach our technical support)



Figure 25. AP Information

When finished viewing AP information, click **OK** to close the window.

Wireless Stations

Clicking *Wireless Stations* opens the *Connected Wireless Stations* window (Figure 26).



Figure 26. Connected Wireless Stations

The *Connected Wireless Stations* window lists all the currently associated wireless station's Media Access Control (MAC) addresses.

When finished viewing, click **OK** to close the window.

Saving and Loading AP Configuration

Saving the AP's Configuration to File

After the targeted AP has connected successfully, the AP's configuration can be saved as an ASCII file. To do this, first click on the File main menu item. From the sub-menu (**Figure 27**) click **Save AP Configuration**. A standard Windows' Save As dialog box will appear. Enter a file name, choose a location for the file, and click **OK**. The APMS program performs a Simple Network Management Protocol (SNMP) command to get the configuration from the AP and write it into the configuration file.

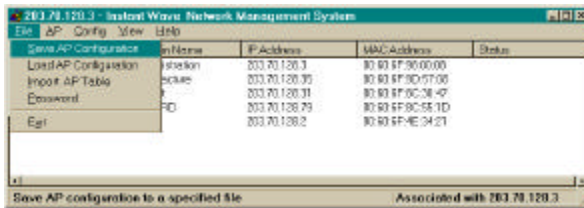


Figure 27. Save AP Configuration

Opening an AP's Configuration File for Loading

If an AP's configuration has previously been saved, it may be easily viewed using the following procedure. Click on the File main menu item. From the sub-menu click Load AP Configuration. A standard Windows Open dialog box will appear. Choose the file you wish to open and click **OK**. Click the **Load Now** button to load the displayed configuration to the current AP.

Import Host Table

Click **Import Host Table** (**Figure 28**) to import a previously saved host table, e.g. a file saved using the AP COMFig tool

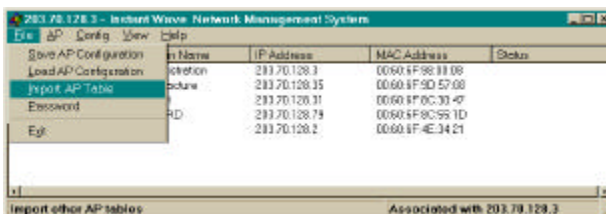


Figure 28. Import Host Table

Password

Clicking Password opens a Change Password configuration box. Enter your new password and then enter it again to confirm. Click **OK** to close the box. Once a password is set you will be asked for it each time the APMS program is opened.

Note: The password is shared between the APMS and the COMFig program on the same PC

Troubleshooting

The Troubleshooting section offers possible solutions to basic problems that may be experienced when attempting to connect to the AP with the Access Point Management System (APMS).

Via an Ethernet Connection:

- Is the AP switched on and functioning?
- Is the network cable properly connected between the AP and the Ethernet PC? If not, connect the cable and reboot the AP
- Has the AP's IP address or subnet mask been changed? If you have used the Config/IP or the Config/Load default AP functions, they may have been. If they have, you must also reset the IP address and subnet mask of any stations wishing to connect to that AP so as to put them in the same domain (see Assigning an IP Address to the AP, page 26)
- Has this PC's IP address or subnet mask been changed? The AP and the station must be in the same domain (see Assigning a Network ID to the AP, page 26)
- Does this station have access rights to configure the AP? If yes, is the Community setting of the station different from the AP's? It must be the same (see Create New AP, page 28)
- Check that all the stations in the Access Control table (including this Ethernet PC) have not been set to Read-only. If they have, use the AP COMFig tool to reconfigure the AP

How to Reach Our Technical Support

If you are having a problem using an NDC product and cannot resolve it, please note the following information and contact NDC Technical Support:

- What you were doing when the error occurred
- What error messages you saw
- Whether the problem can be reproduced
- The serial number of your product
- The firmware version number and the debug information

NDC Technical Support is available via e-mail at:
support@ndclan.com (US only)
techsupt@ndc.com.tw (Europe and Asia Pacific)

For other information about NDC, please visit us at:
www.ndclan.com

without warranty as to their performance, merchantability, or fitness for any particular purpose. However, the diskette media containing the software are covered by a 90-day warranty which protects the purchaser against failure within that period.

Limited Warranty Service Procedures

Any product (1) received in error, (2) in a defective or non-functioning condition, or (3) exhibiting a defect under normal working conditions, can be returned to NDC by following these steps:

You must prepare:

- dated proof of purchase
 - product model number & quantity
 - product serial number
 - precise reason for return
 - your name/address/email address/telephone/fax
1. Inform the distributor or retailer
 2. Ship the product back to the distributor/retailer with prepaid freight. The purchaser must pay the shipping freight from the distributor/retailer to NDC. Any package sent C.O.D. (Cash On Delivery) will be refused
 3. Charges: Usually RMA (Returned Material Authorization) items will be returned to the purchaser via AIR MAIL, prepaid by NDC. If returned by another carrier, the purchaser will pay the difference. A return freight and handling fee will be charged to the purchaser if NDC determines that there was “No Problem Found” or that the damage was caused by the user

Warning

NDC is not responsible for the integrity of any data on storage equipment (hard drives, tape drives, floppy diskettes, etc.). We **STRONGLY** recommend that our customers back their data up before sending such equipment in for diagnosis or repair.

Services after Warranty Period

After the warranty period expires, all products can be repaired for a reasonable service charge. The shipping charges to and from the NDC facility will be borne by the purchaser.

Return for Credit

In the case of a DOA (Dead on Arrival) or a shipping error, a return for credit will automatically be applied to the purchaser's account, unless otherwise requested.

Limitation of Liability

All expressed and implied warranties of a product's merchantability, or of its fitness for a particular purpose, are limited in duration to the applicable period as set forth in this limited warranty, and no warranty will be considered valid after its expiration date.

If this product does not function as warranted, your sole remedy shall be repair or replacement as provided for above. In no case shall NDC be liable for any incidental, consequential, special, or indirect damages resulting from loss of data, loss of profits, or loss of use, even if NDC or an authorized NDC distributor/dealer has been advised of the possibility of such damages, or for any claim by any other party.

| |
|-------------------------------------|
| EC DECLARATION OF CONFORMITY |
|-------------------------------------|

For the following equipment:

Product Name: : InstantWave Wireless Access Point
Model Number: : NWH660

Produced by:

Manufacturer Name : NATIONAL DATACOMM CORPORATION
Manufacturer : 2F, NO. 28, INDUSTRY EAST 9TH ROAD
Address : SCIENCE PARK, HSINCHU, TAIWAN,
R.O.C.

is hereby confirmed to comply with the requirements set out in the Council Directive on the Approximation of the Laws of the Member States relating to R&TTE Directive(99/ 5/ EC). For the evaluation regarding the electromagnetic compatibility, the following standards were applied:

EN 300 328 (November 1996/A1 (July 1997))

EN 300 826 (November 1997)

En 60950:1992 + A1:1993 + A2:1993 + A3:1995 + A4:1996 + A11:1997

The manufacturer/importer is responsible for this declaration:

Company Name : NDC (EUROPE) CO., LTD
Company : 1, EARLSFORT CENTRE, HATCH STREET,
Address : DUBLIN 2, IRELAND

Person authorized to make this declaration:

Name : CHIN-TU WU
Position/Title : MANAGING DIRECTOR

Date

Legal Signature

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