NOKIA
A032


# Wireless LAN Access Point
# Getting Started

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CONNECTING PEOPLE

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ISSUE 1

# Welcome

Congratulations on purchasing the Nokia A032 Wireless LAN Access Point.

This guide tells you how to set up and operate the Access Point. Please see the *Advanced User Guide* for information about configuration options, management and performance tuning.

## How to use this guide

If you're a first-time user, familiarize yourself with the capabilities of your Access Point by reading the *Overview* section, then get up and running by following the instructions in *Installing* and *Setting up* sections.

- *Overview* – gives an overview of the Access Point and the role it plays in a network. It then provides a detailed description of available operating modes.
- *Installing the Nokia A032* – tells you what items should have been supplied, and lists the main features of the unit, it also explains how to connect your Access Point to a LAN.
- *Setting up and testing* – explains how to use Learn mode to get your Access Point quickly up and running.
- *Supplementary information* – describes special start-up modes, LED functions, and error codes.

## Conventions used in this guide

*Notes*

*Your Access Point can transfer information between a wired LAN and a wireless LAN.*

You'll find tips or other useful facts in side notes throughout the manual. Pay particular attention to notes that start with **Note** or WARNING.

*Text conventions*

The following conventions are used throughout this manual:

- `courier` is used for file names, or to denote text that appears on your screen.
- **`courier bold`** is used to denote text that you should type in.
- new terms are shown in *italic* text the first time they appear.
- **bold** text denotes the name of a physical button or LED on the unit (e.g. the **alert** LED) or a button on screen that you need to click (e.g. "click **Restart**").

# Related documents

The *Advanced User Guide* is for more experienced users and system managers who want to customize and fine-tune the Access Point's performance.

# Table of contents

# 1. Overview

The Nokia A032 is a versatile network device that offers wireless network access, Internet access and automatic network configuration in a single unit.

This chapter contains useful background information. You can skip this chapter if you're familiar with the principles of wireless networking, WEP security and Internet access, and go straight to *Installing the Nokia A032* on page 7.

In this chapter, you'll find information on:

- Wireless networking
- WEP security and encryption
- Dial-up internet access sharing.

## Wireless networking

*The Nokia A032 acts as a network 'Access Point', connecting IEEE802.11 compatible wireless devices to each other, to a wired LAN and to the Internet.*

In normal operation, the Access Point simply acts as a go-between, transferring information between devices on a local area network (LAN), rather like a hub. The difference is that some of the devices are wireless, rather than being physically connected to the LAN.

The wireless LAN system offers all the same functions as a wired Ethernet LAN.

## IEEE802.11 standard

*In this manual, a computer fitted with an IEEE802.11 compatible adapter card is referred to as a wireless station.*

The Access Point conforms to IEEE802.11B – the industry standard for wireless LANs. Not only will it communicate with computers equipped with Nokia wireless LAN adapter cards – it will communicate with any IEEE802.11 compatible adapter card, using DSSS (see below), from any vendor.

The Nokia Access Point supports *direct sequence spread spectrum* (DSSS) wireless LAN cards (also known as radio cards). DSSS is a radio technique which scrambles the data prior to transmission to improve the communication quality and range.

### Frequency channels and roaming

*Some countries have slightly different or more restricted frequency ranges.*

Wireless LAN systems are allocated a radio frequency *band*. IEEE802.11 specifies operation in a frequency band of approximately 2.4GHz to 2.48GHz. Within that band a number of *channels* can be used to transfer data. The number of channels available varies from country to country.

*A wireless station can switch between different Access Points by changing channels (a technique known as roaming).*

- If you're only using one Access Point, you don't need to worry about channels.
- If you have many Access Points covering a large area, you can set them to use different channels to allow wireless stations in neighboring areas to operate independently.

## Scanning and network names

When a wireless station starts up it needs to find and communicate with the Access Point. The wireless station will search all the available frequency bands – a process called *scanning*.

Each wireless network has a network name which can be assigned by the network manager. Generally this name will define a logical group of wireless stations. If you have multiple Access Points you will normally assign them all the same network name. However you could use additional Access Points to create new wireless networks by assigning a new name. The *Network Name* is a string of up to 32 characters which you can choose.

Remember that the wireless stations should be configured with the same Network Name as the Access Point to ensure that they connect to the correct logical network.

There may be several Access Points with the same Network Name, in which case a station will choose between the available Access Points automatically – this is called *roaming*.

## Beaconing

At startup, a wireless station listens for *beacons* sent by an Access Point. A beacon is a short message containing the Network Name that is broadcast roughly ten times a second.

If the wireless station receives a beacon with an Network Name matching its own, it knows that an Access Point is available and it may attempt to make a connection.

## Operating modes

IEEE802.11 defines two operating modes:

- *Infrastructure mode*
- *Ad hoc mode* – (This is not applicable to Access Points).

### Infrastructure mode

This is the default mode of operation for your Nokia Access Point.

Each wireless station associates with a single Access Point. That Access Point is responsible for receiving and sending all data to the station. A station cannot be associated with more than one Access Point at a time.

This mode provides a high degree of control over connections because they pass through a single Access Point. Also, a station can change radio channels when switching from one Access Point to another. This is known as *multi-channel roaming.*

# WEP security and encryption

The Nokia A032 can provide access security and eavesdropping protection using a method called *wire equivalent privacy* (WEP). WEP is specified as an option under the IEEE802.11 standard. It is designed to protect the wireless portion of a network.

WEP provides:

- Secure data encryption, using a secret *key* (or password) which is known only by a specific group of users.
- Sophisticated network access control, to restrict access to a specific group of wireless users, or be applied on a per-user basis.

## Using WEP

*You can use the Nokia A032 in conjunction with other vendors' wireless LAN clients which adhere to the IEEE802.11 standard.*

A wireless client must go through an authentication process before the access point will allow any connection to occur.

This is done using a *challenge-response* method, which means that outsiders cannot find out the value of the encryption key.

## Encryption keys

The Nokia A032 provides two basic approaches for encryption key management:

- Shared WEP keys – All wireless clients in a group use the same key.
- Personal WEP keys – Each wireless client has an individual key.

# Internet access sharing

*A PC can dial up and connect to most internet service providers (ISPs) using point-to-point protocol (PPP)*

You can use your Nokia A032 with a modem to connect a wireless station to the Internet.

*Getting started* explains how to configure your Nokia A032 to connect automatically. All you need is the phone number of your Internet Service Provider (ISP) and your log-on information, and you're all set. The Nokia A032 connects automatically and invisibly when a station requests access to the Internet.

This means that you don't need to connect the modem to your PC, and you only need one modem even if there are several users accessing the Internet. This can result in significant savings compared to using a phone line and an ISP account for each user. Furthermore, when you add another computer to the network it can immediately share the connection as soon as it joins the LAN.

*A NAT firewall converts all the IP addresses on your local network into a single IP address for use on the Internet.*

The Nokia A032 can also provide *firewall* security, preventing unwanted access to your network from external Internet users. See *NAT setup* in the *Advanced User Guide* for details.

# 2. Installing the Nokia A032

This chapter describes the connectors, buttons and LEDs on the front and rear panels of your Nokia Access Point.

It then explains how to install the Nokia A032 prior to testing.

## Features

### Checklist

After unpacking your Nokia A032, check the contents against the packing list. The components listed below are included:

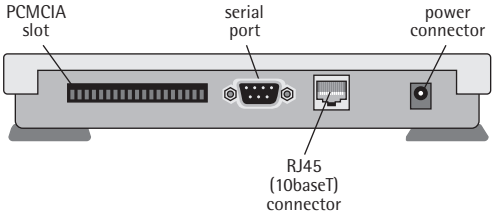
- This User Guide
- Advanced User Guide
- Nokia A032 Wireless LAN Access Point (often referred to simply as the *Access Point*)
- Power supply
- Nokia A032 System Utilities CD-ROM
- Nokia C111 Wireless LAN Card, referred to simply as the *wireless LAN card* (other manufacturers may use the term *radio card*)
- Nokia C950 Omnidirectional Antenna for the Nokia C111 Wireless LAN Card.

  *One* of these is supplied. You can actually fit two (see *Installing the external antenna* on page 13). Extra antennas are available from your Nokia supplier – ask for item AWC-1.

## Rear panel

**Note**: *The Nokia A032 has no integral power switch – switch on and off at the wall outlet or by removing the power connector from the rear of the unit.*

After unpacking the unit, look at the rear panel and identify the various connectors:

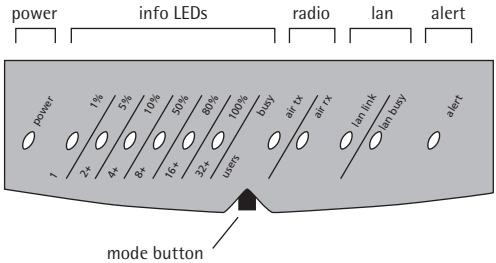



**WARNING**: *Use of a power unit other than that supplied with the Nokia A032 may result in unreliable operation or permanent damage to the unit and will void the warrantee.*

- **Power connector** – This is where you connect the power unit. Only use the power unit supplied with the Nokia A032.
- **RJ45 (10baseT) connector** – Use this to make the LAN connection.
- **PCMCIA slot** – This is where you insert the Nokia C111 Wireless LAN Card.
- **Serial port** – The serial port can be used for a number of functions depending on the application:
  - Modem connection for Internet access
  - Management functions
  - Diagnostics
  - Downloading new firmware.

## Front panel

The diagram below shows the Nokia A032 viewed from the top:




- **mode** button – This controls Access Point start-up modes, and affects the information displayed in the **info** LEDs.
- **power** LED – This illuminates when power is applied to the unit.
- **info (users/busy)** LEDs – These six LEDs provide information depending on the state of the unit and the **mode** button (see *Operating modes and LED status* on page 29).
- **radio (air tx/air rx)** – These indicate activity on the wireless LAN connection:
  **air rx** illuminates when data is received.
  **air tx** illuminates when data is transmitted.

**lan busy** *indicates any activity on the wired LAN regardless of whether the information is used by the wireless LAN. The LED may flicker even when there are no wireless stations turned on in the area.*

- **lan (lan link/lan busy)** – These indicate the state of the wired LAN connection. **lan link** is illuminated when there is a good connection to the LAN hub.
  **lan busy** illuminates when there is data on the wired LAN.
- **alert** – This indicates special operations such as initialization or updates to the unit flash memory. If the **alert** LED remains illuminated this indicates an error condition (see *Troubleshooting* in the *Advanced User Guide*).

## Wireless LAN card and external antenna

The Nokia A032 is supplied with a Nokia C111 Wireless LAN Card. This has two internal antennas, so for most purposes you should not need to fit an external antenna.

However, should you experience radio coverage problems, the Nokia C111 Wireless LAN Card comes supplied with one external antenna, the Nokia C950 Omnidirectional Antenna:

See *Installing the external antenna* on page 13 for fitting instructions.

# Performing the installation

**Note**: *You'll need a working wireless station and LAN connection to test that your Access Point is working properly.*

This chapter shows you how to set up your Nokia A032 on an isolated LAN segment and test it with a wireless station.

In brief, the steps you'll need to take to install your Nokia A032 are as follows (these are explained in detail in the following sections):

1 Make sure your Nokia A032 is positioned for good wireless coverage.

*The Nokia C111 Wireless LAN Card is referred to as the wireless LAN card.*

2 Insert the Nokia C111 Wireless LAN Card into the Nokia A032.

3 Attach the Nokia A032 to a wired 10baseT LAN.

4 Switch on the Nokia A032.

The following chapter explains how to configure and test the Nokia A032.

## Installing the Nokia A032

Consider the following when positioning your Nokia A032:

- Radio waves will pass through walls and glass but not metal. Metal reinforcing in some walls may block the signal.
- You will get the most range in open spaces but large metal walls, such as in a warehouse may cause unwanted reflections and reduce the data rate.
- Steel girders and metal fire block materials in floors may stop radio waves travelling from floor to floor.
- Install as high as possible, and away from metal objects (such as filing cabinets).

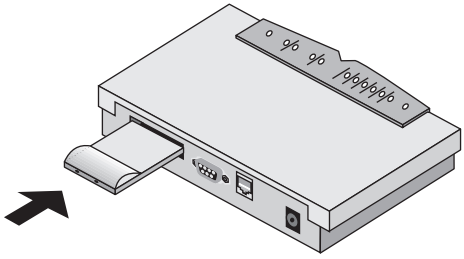
If you are not getting good coverage try moving the Nokia A032 to a new location or fitting an external antenna.

## Installing the wireless LAN card

**Note**: *Install the wireless LAN card before powering the unit up, otherwise the unit will not initialize properly, and you'll have to restart it.*

The Nokia C111 Wireless LAN Card conforms to the PCMCIA type II specification.

1 Insert the card into the PCMCIA slot at the rear of the unit:



2 Take care to ensure that the card is aligned correctly and pressed all the way into the slot.

After you've installed the wireless LAN card, you shouldn't need to remove it again.

If you do want to remove the card, switch off the power and pull gently on the end of the card which protrudes from the unit.

# Installing the external antenna

**Note**: *You only need to install an antenna if you are getting insufficient radio coverage.*

In most operational situations, the two internal antennas in the Nokia C111 Wireless LAN Card will give adequate radio coverage. However, if necessary you can fit one or two external antennas to improve transmission and reception.

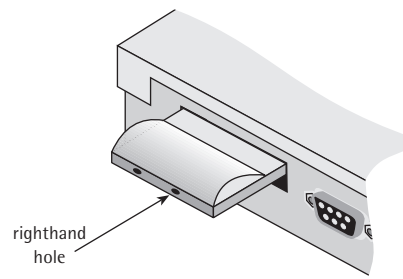
The Nokia C111 Wireless LAN Card comes supplied with one external antenna, the Nokia C950 Omnidirectional Antenna. Additional antennas are available from your Nokia supplier as item AWC-1.

## Fitting a single antenna

**Note**: *Fitting one external antenna disables an internal antenna. Fitting two disables both.*

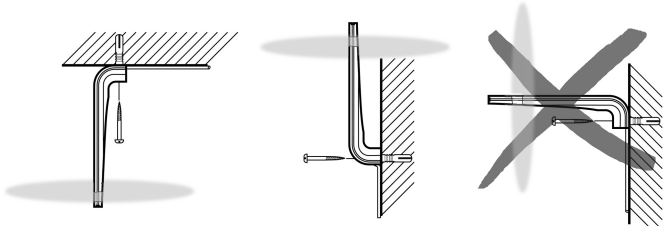
If you're only going to fit **one** external antenna, it needs to go into the correct socket on the Nokia C111 Wireless LAN Card.

1 Plug the antenna's cable into the righthand socket on the Nokia C111 Wireless LAN Card (looking at it from the back):



## Positioning the antenna

The Nokia C950 Omnidirectional Antenna radiates radio frequency energy in a 360 degree pattern around its axis. The Nokia C950 has been designed for indoor use – it can be mounted vertically on a ceiling, wall, or on a table with a mounting screw:



Do not mount the antenna in a horizontal position, unless you intend to create a vertical coverage area that will have as much height as possible, for example in a stairwell.

## Connecting to an existing 10baseT LAN

If you have an existing 10baseT wired Ethernet LAN, you can connect the Nokia A032 to it now:

1. Connect a twisted pair 10baseT cable to the RJ45 connector in the rear of the unit.
2. Connect the other end of the cable to a local hub or a wall jack.

In the next chapter, you'll test the Nokia A032 by using a wireless station to communicate with a station on the wired LAN.

## Powering up the Nokia A032

1. Insert the power unit's plug into the power connector on the rear panel of the Nokia A032.
2. Connect the power unit to an AC wall outlet.

   The unit will start up, and some of the LEDs will flash (see page 29). When the unit is initialized and functioning correctly, the **alert** LED will go out.
3. If the **alert** LED still does not go out, an error code may be displayed on the **info** LEDs. Please see *Initialization error codes* on page 34.

*The* **lan link** *LED indicates a good 10base-T connection.*

# 3. Setting up and testing

This chapter explains how to switch on the Nokia A032 and configure its TCP/IP and WEP settings.

*Learn mode is a special mode of operation – it is a convenient way you can configure the Nokia A032 in its factory default state. You can also use a serial cable – this is explained in the Advanced User Guide.*

You can get up and running very quickly by configuring your Nokia A032 from a wireless station, using a standard Web browser interface (this does not require an external Internet connection) and by setting the Nokia A032 into *Learn mode*.

If you *don't* set up TCP/IP, you will *only* ever be able to configure your Nokia A032 using Learn mode, as described in this chapter, or via the serial port (as described in the *Advanced User Guide*); assigning the Nokia A032 an IP address will enable you to use any of the methods described in the *Advanced User Guide* to configure the Nokia A032 from suitably privileged wired and wireless LAN stations.

You'll need to:

*If you want to use Learn mode from a wired LAN station, see page 31.*

- Establish a connection with the Nokia A032 from a wireless station.
- Make some simple configuration changes.

# Before you begin

Before you follow the instructions in this chapter, you'll need:

- A wireless station with a compatible wireless LAN card installed. The wireless station needs to be configured as follows:
  - The station's Network Name should match that of the Nokia A032 (the default is **`Nokia WLAN`**).
  - The station should have a standard Web browser installed (such as Microsoft Internet Explorer or Netscape Navigator).
  - The station must be running the TCP/IP networking protocol.
  - The station **must** have any WEP security features disabled. Please see the manual supplied with your wireless station for instructions.

**Important note on IP addresses**

- A suitable IP address which you can assign to the Nokia A032.

  You'll need the above information when you get to *Configuring TCP/IP settings* on page 22.
- The IP address of a computer on your wired LAN, so that you can test the Nokia A032 is working properly.

If you're not sure about any of the above, please ask your network administrator for advice.

# Preparing a wireless station

You use the wireless station to configure and test the Nokia A032:

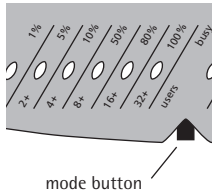
*If your wireless station uses the Nokia C110 Wireless LAN Card and drivers, the default settings of the driver when first installed will be correct to access the Nokia A032.*

1. If you use a third-party wireless LAN card, or your Nokia driver does not have default settings, reconfigure your wireless station with the following parameters:
   Mode: **`Infrastructure`**
   Network Name: **`Nokia WLAN`**
   (please see the manual that came with your wireless LAN card for instructions).
2. Ensure that any WEP security measures are switched off (please see the manual that came with your wireless station for instructions).
3. Shut down the wireless station.

# Starting the Nokia A032 in Learn mode

Learn mode allows you to configure the Nokia A032 from its default (factory) state.

1. Remove the power connector from the rear panel of the Nokia A032, or switch off the power at the wall outlet.
2. Press and hold the **mode** button and, while still holding it, power the unit on again. Continue to hold the **mode** button while the **info** LEDs all switch on, then go off. This takes about three seconds.
3. Release the **mode** button. The **info** LEDs display a 'chasing' pattern, with one LED moving rapidly from right to left.



At this stage, the Nokia A032 is in Learn mode – the LAN port is disabled and all access occurs via the wireless interface.

## Connecting to the Nokia A032

To access the Nokia A032 from the wireless station:

1 While the Nokia A032 is in Learn mode, start up the wireless station.

After it has started up, the wireless station should associate with the Nokia A032.

Please refer to the manual that came with your wireless LAN card for a description of how the wireless station shows that it has associated with the Nokia A032.

2 If there is a task bar icon, click it to confirm that the wireless client has connected to the Nokia A032.

# Configuring the Nokia A032

## Displaying the Learn mode Web page

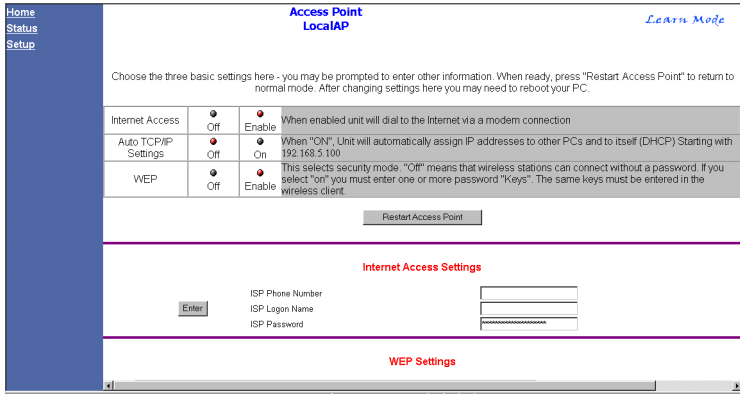
**Note**: *You* **must** *power up the Nokia A032* **before** *the wireless station for this procedure to work. Also it must have the correct network name (*`Nokia WLAN`*).*

Now the wireless station is communicating with the Nokia A032, proceed as follows:

1. On the wireless station, start a standard Web browser, such as Internet Explorer.
2. In the browser's URL field, enter:

   `manage.ap`

   The browser displays the following page:



## Configuring TCP/IP settings

**Note**: *If you modify the IP address settings, you may need to renew the client IP information in your wireless station – see the appendix entitled Troubleshooting in the Advanced User Guide.*

When programming from the default state the first thing to decide is whether you want to enter a specific IP address or choose the auto-TCP/IP mode. It's more likely that you'll want to use the Nokia A032 on an established network, so:

1 Enter a fixed IP address and subnet for the Nokia A032 into the **IP Address Settings** boxes on the screen.

2 Click **Enter**.

Alternatively, if you want the Nokia A032 to act as a DHCP server using its own defaults, click **On** in the **Auto TCP/IP Settings** field. Make sure the default DHCP settings do not conflict with your existing network. If in doubt, ask your network administrator.

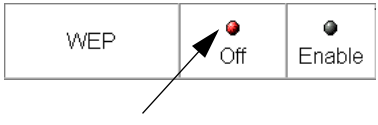
## Setting access control (WEP security)

You need to make sure that, after you restart the Nokia A032, you'll still be able to communicate with it using your wireless station.

### Setting WEP off

The simplest approach to get started (assuming WEP is disabled on your wireless station) is to switch the Nokia A032's WEP security off:

1 Click **Off** in the WEP field:



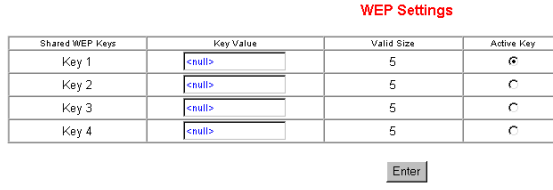
## Enabling WEP

**Note**: *Only do this if you know that the wireless station uses shared WEP keys. If it doesn't, you can ignore this section.*

If, on the other hand, you do need to enable WEP security:

1 Click **Enable** in the WEP field.

The screen will automatically scroll down to the WEP Settings section:




2 Enter one or more shared WEP keys in the **Key Value** fields.

3 Click the appropriate radio button to specify the **Active Key**.

4 Click **Enter**.

Notes:

- If you don't specify any shared WEP keys, WEP will actually be reset to **Off** when you restart.
- Key values are not automatically deleted from the WEP Settings fields if you switch WEP off in Learn mode. This makes it easy to switch WEP on again without having to re-enter your shared WEP keys – next time you're in Learn mode, just click **Enter** before you restart the Nokia A032 (you don't even need to click **Enable** in the WEP field at the top of the Learn mode screen).

## Enabling dial-up networking

If you are going to be using the Nokia A032 to provide automatic dial-up Internet access via a modem:

1 Click **Enable** the **Internet Access** field.

**Note**: *Entering these details carefully could save you problems later on!*

2 Fill in the following fields:
**ISP Phone Number**
**ISP Logon Name** (case-sensitive)
**ISP Password** (case-sensitive)

3 Click **Enter**.

Don't worry if you miss out this step now. You can always switch on dial-up networking later (see *Basic Access Point setup* and *Basic Internet Access setup* in the *Advanced User Guide*).

# Restarting the Nokia A032 in Normal mode

To restart the Nokia A032:

1 Click **Restart Access Point** in the web configuration page to update the configuration and return to Normal mode.

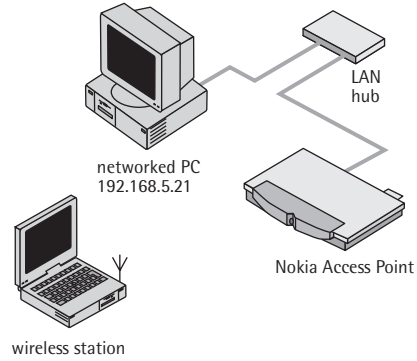
2 Wait until the Nokia A032 has restarted and the LEDs have stopped flashing.

**Important**: *Don't miss out this step.*

3 Re-boot your wireless station prior to accessing the Nokia A032 again.

# Testing the Nokia A032

To test the Nokia A032, you're going to check communication between a computer on the wired LAN and the wireless station.




For test purposes, you need:

- A working wired LAN connection
- The wireless station from which you configured the Nokia A032
- The IP address of a computer on the wired LAN.

To test the Nokia A032:

1 On the wireless station, open an MS-DOS console window.

2 At the prompt, issue a 'ping' command to a station on the same wired LAN as the Nokia A032. Using the example above, you would enter:

```
ping 192.168.5.21
```

- If the ‘ping’ is successful, you should see an output of the following form:

```
C:\> ping 192.168.5.21

Pinging 192.168.5.21 with 32 bytes of data:

Reply from 192.168.5.21: bytes=32 time=1ms TTL=32
Reply from 192.168.5.21: bytes=32 time<10ms TTL=32
Reply from 192.168.5.21: bytes=32 time<10ms TTL=32
Reply from 192.168.5.21: bytes=32 time<10ms TTL=32

C:\>
```

- If there is a problem, you’ll see the following output:

```
C:\> ping 192.168.5.21

Pinging 192.168.5.21 with 32 bytes of data:

Request timed out.
Request timed out.
Request timed out.
Request timed out.

C:\>
```

Either the Nokia A032 is not configured properly (check the Access Control setting is **Open** in Learn mode), or you have not entered the IP address correctly.

- If you see the following output:

```
C:\> ping 192.168.5.21

Pinging 192.168.5.21 with 32 bytes of data:

Destination host unreachable.
Destination host unreachable.
Destination host unreachable.
Destination host unreachable.

C:\>
```

This indicates that your wireless station is set to use Auto TCP/IP settings but there is no DHCP server available. In this case, you need to assign a fixed IP address to the wireless station or enable DHCP.

# What next?

Now that your Nokia A032 is working correctly, you can customize your network to use the Nokia A032's features to full effect. For example, you can:

- Use WEP and NID security measures to safeguard your network
- Specify which computers on your network can reconfigure the Nokia A032
- Monitor the Nokia A032's performance
- Set up a NAT firewall to control external Internet access to your network
- Use multiple Nokia A032s as network bridges.

All these subjects are covered in detail in the *Advanced User Guide*.

# 4. Supplementary information

## Operating modes and LED status

### Startup mode

**Notes**:

*The* **alert** *LED also flashes during internal flash memory updates.*

*Do not power off while the* **alert** *LED is flashing.*

*Don't press the* **mode** *button during startup unless you have read and understood Special modes on page 30.*

Startup mode occurs from the time power is applied until the unit is operating normally. During the startup mode the **alert** LED will be on or flashing. The info LEDs reflect the three phases of startup mode:

- **Self test phase–** The **info** LEDs all come on and then go off.
- **Initialization phase –** The **info** LEDs go on and off in sequence.
- **Diagnostics phase –** The Access Point runs diagnostics during initialization. If an error is found during this phase the initialization stops and an error code is displayed on the **info** LEDs (see *Initialization error codes* on page 34). If no errors are found, the unit will enter Normal mode.

### Normal mode

During normal operation, the **info** LEDs show the percentage utilization of the wireless LAN connection. In this mode the upper row of symbols (**busy**) applies.

*Displaying the number of users*

While in Normal mode, press and hold in the **mode** button. The **info** LEDs now display the number of wireless **users** – the lower row of symbols applies.

For example, if the **1+**, **2+** and **4+** LEDs are lit, there are between 4 and **7** stations associated with the Access Point.

## Special modes

Use the **mode** button to start in special modes:

- Learn mode – Use this to perform initial configuration on your Access Point, as described in *Setting up and testing* on page 17.
- BIOS mode – Use this to load new firmware. See the *Upgrading* in the *Advanced User Guide* for more details.

### Starting in Learn mode

To start in Learn mode:

1 Switch off the unit.

2 Press and hold the **mode** button while switching on again.

3 Release the **mode** button one second after all the **info** LEDs go off.

The unit should then follow what appears to be a normal initialization sequence. However, at the end of the sequence the **info** LEDs will display a 'chasing' pattern in which one LED rapidly circulates around the panel.

**Note**: *The Nokia A032 has no integral power switch – switch on and off at the wall outlet or by removing the power connector from the rear of the unit.*

### Starting in BIOS mode

1 Switch off the unit.

2 Press and hold the **mode** button while switching on again.

3 Keep holding the **mode** button.
After one second, all the **info** LEDs will go off. After a further five seconds, all the **info** LEDs will come on again.

4 Release the **mode** button.

### Using Learn mode over a wired LAN

Once the Access Point has an IP address you can configure in Normal mode using a web browser from either the wired or wireless LAN. Learn mode is especially useful before the IP address is defined.

Normally in learn mode, the LAN is disconnected and configuration occurs only via a wireless station. In some circumstances you might need to assign an IP address over the wired LAN. In this case follow the procedure described in this section. Note that when in normal mode (not Learn mode) configuration can be performed either by wireless or LAN connection at any time.

1 Remove the wireless LAN card from the Access Point.

2 Switch off the Access Point.

3 Start the Access Point in Learn mode.

Follow the instructions on page 19 if you're unsure. In this instance, while in Learn mode the **air tx** and **air rx** LEDs will slowly alternate to indicate that the radio is not present.

*In its factory default state the unit does not have an IP address, so it needs to be taught one. This must be an IP address which is not in use by another station on the LAN.*

4 From any station on the wired LAN, start an MS-DOS window and enter the following command:

**`ping xxx.xxx.xxx.xxx`**

where *xxx.xxx.xxx.xxx* is the IP address you want to assign to the Access Point.

On the fourth ping you should see that the chasing pattern stops and that the Access Point responds to the ping.

The Access Point will 'learn' the address to which you issued the ping command.

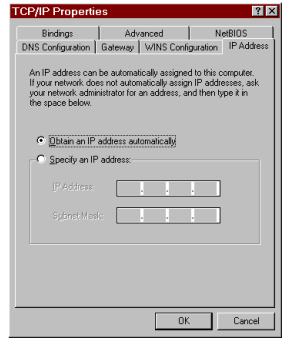
5 Restart the Access Point in normal mode.

You can now configure the unit using the normal Web based configuration utility (see *Using the Web manager* in the *Advanced User Guide*).

# Configuring devices to accept automatic IP addresses

By default, Windows clients are set to accept IP addresses automatically. However, if a station has subsequently been configured with IP information, you'll need to reset the defaults before the Access Point DHCP server can provide the correct configuration:

1 Use the Windows Network control panel to set **Obtain an IP address automatically:**




2 If necessary, delete any entries under the Gateway and DNS Configuration tabs (although DNS should still be enabled).

# Initialization error codes

**Note**: *If the unit fails to perform the initialization sequence, it may need to be repaired. In this case contact your supplier for support.*

If the initialization procedure fails an error code will be displayed on the **info** LEDs and the **alert** LED will remain on.

The code reads from left to right. To identify the code write down each LED as a '1' or '0' (on = 1). For example the pattern:

```
on on off off on off
```

would be written:

```
110010
```

The following table shows the error codes.

| Code | Meaning | Log text |
|---|---|---|
| 100001 | Bad code image | <none> |
| 110000 | Bad PCMCIA hardware | PCMCIA hardware failure |
| 110001 | No PCMCIA | No PCMCIA card detected |
| 110010 | Bad PCMCIA card | Non-compatible PCMCIA card |
| 110011 | Bad radio (does not initialize) | Cannot initialize radio |
| 110100 | Bad firmware version | Incorrect firmware version |
| 001000 | Bad DRAM (stuck address) | Memory error type 1 |
| 001001 | Bad Ethernet RAM (stuck address) | Memory error type 2 |
| 001010 | Bad CMOS Memory | Config. error – default loaded |
| 101000 | LAN controller error | LAN Interface Error |
| 011000 | Bad configuration | Configuration error |
| 011001 | Bad Manufacturer's info | Bad unit checksum |
| 011010 | Bad log sector | Log sector bad – recovered |
| 011011 | System error | System fault |

*Troubleshooting* in the *Advanced User Guide* gives a more detailed explanation of the above error messages.

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