



nano3GAP Installation Manual

N3G_INST_300 2.0

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Revision History

Version	Change Summary	Date	Author
0.1	First draft	29 Apr 09	ZN1
0.2	Updated from feedback	06 May 09	ZN1
0.3	Updated from further feedback	07 May 09	ZN1
0.4	Updated from review comments	08 May 09	ZN1
0.5	Added license texts, updated with minor comments	12 May 09	ZN1
0.6	Updated the instructions on deployment commissioning	05 Jun 09	ZN1
0.7	Updated with input from System Testing	24 Jul 09	ZN1
0.8	Updated from feedback from System Testing	27 Jul 09	ZN1
0.9	Added instructions to changing the IP configuration of the commissioning PC	27 Jul 09	ZN1
0.10	Implemented review comments	28 Jul 09	ZN1
0.11	Minor corrections before approval	29 Jul 09	ZN1
1.0	Released for N3G_1.1	29 Jul 09	ZN1
1.1	Added information on type approval and EMC standards Updated information on electrical ratings and PSUs	28 Aug 09	ZN1
1.2	Implemented review comments	28 Aug 09	ZN1
2.0	Released for N3G_1.1_UPGRADE	28 Aug 09	ZN1

Approved by e-mail.

The information contained in this manual is commercially confidential and must not be disclosed to third parties without prior consent.

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1 Introduction

The ip.access nano3GAP-4 is an indoor pico-class base station.

This document provides the reader with all the necessary information required to install the ip.access nano3GAP-4. The document provides step-by-step instructions for hardware installation, PSU Installation, and configuration steps required to bring the nano3GAP-4 into service.

The AP can be configured with a static IP address or it can obtain its IP address dynamically via DHCP. The AP-AC connection can be configured to be secure (via IPsec) or unsecured.

1.1 Installation Overview

The principal activities for installing and commissioning a nano3GAP are:

- 1) Install the nano3GAP hardware and power it up (installation engineer on site, section 3).
- 2) Commission the nano3GAP for connecting to an AC and OMC-R (installation engineer on site, section 4).
- 3) Configure the nano3GAP from the OMC-R to bring it into service (OAM engineer remotely from the NOC, section 5).

1.2 Related Information

[GST_100]	nano3G System Overview Manual (N3G_GST_100)
[GST_120]	nano3G System Planning and Provisioning Manual (N3G_GST_120)
[GST_300]	nano3GAP Product Description (N3G_GST_300)
[GST_400]	nano3G OMC-R Product Description (N3G_GST_400)
[INST_200]	Nano3G AC Installation Manual (N3G_INST_200)
[INST_400]	nano3G OMC-R Installation Manual (N3G_INST_400)
[OPM_300]	nano3GAP Operations Manual (N3G_OPM_300)
[OPM_410]	nano3G OMC-R Client Operations Manual (N3G_OPM_410)
[OPM_430]	nano3G OAM File Server Operations Manual (N3G_OPM_430)
[REF_105]	nano3G System Glossary (N3G_REF_105)
[REF_150]	lu+ Networking Reference Manual (N3G_REF_150)
[21.905]	Vocabulary for 3GPP Specifications, 3rd Generation Partnership Project

1.3 Terminology

For standard nano3G System terminology, see [REF_105].

For additional standard GSM terminology, see [21.905].

2 *Installation Requirements*

2.1 nano3GAP Site Requirements

2.1.1 nano3GAP-4 Site Requirements

The nano3GAPs are installed in retail or small office environments. In summary, each AP will require:

- One of:
 - A suitable mains power supply point within [1.5] metres of the intended AP site.
 - Power over Ethernet (where mains power is remote).
- An Ethernet connection that provides an IP address (via static addressing or via DHCP) and a route to the public Internet. A DNS service is also required to resolve symbolic addresses.
- Site for wall mounting or a stable free-standing position.
- Cat5 cable.

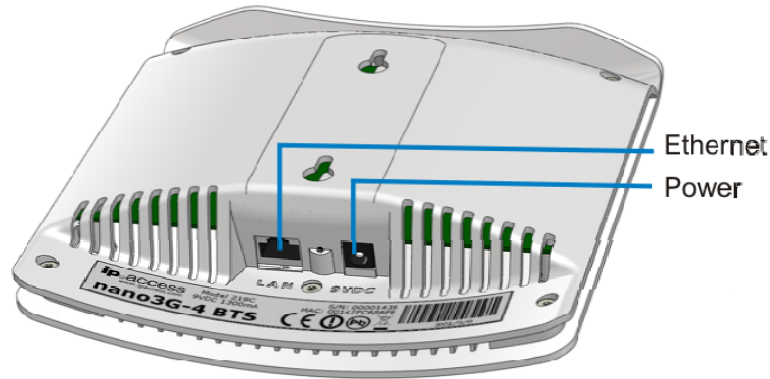
2.1.1.1 Power

Maximum expected power consumption: 13 Watts (Rated 9VDC 1450mA)

The nano3GAP-4 supports the following power and Ethernet cabling options at a site:

- Direct power from a power adapter
- Power-over-Ethernet
 - from a POE switch
 - from a POE inserter

The connections are shown in the figure below.



nano3GAP-4 Ethernet and power connections

The power adapter, as well as the POE inserter and splitter supplied by ip.access comply with LPS requirements in accordance with IEC/EN 60950-1.

Power Adapter

A suitable mains power supply point into which the power adapter for the AP can be plugged. This should be within [1.5] metres of the intended installation position of the AP.

Only use the power adapter supplied by ip.access to power the AP:

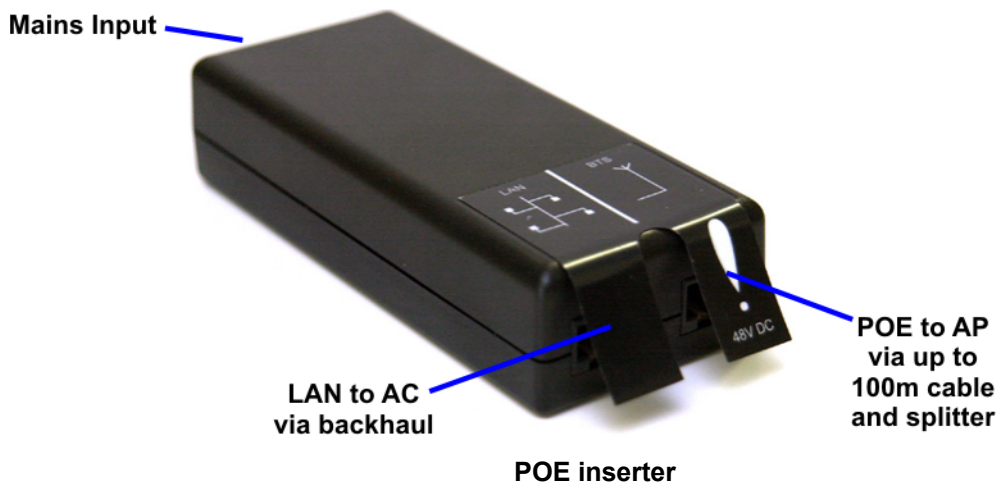
ip.access part number	EPS1173R
manufactured by	Dee Van Enterprise Co Ltd.
model	DSA-20P-10
input	100-240V ~ 50/60Hz 0.7A
output	+9VDC 1.67A

Power over Ethernet

POE comprises of a power inserter and a splitter. The power inserter is positioned close to the Internet connection, while the splitter is positioned close to the AP.

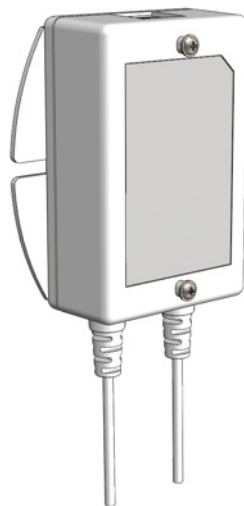
Only use the POE inserter supplied by ip.access:

ip.access part number	109A
manufactured by	PPI Co Ltd
model	ILA1711112
input	100/230V ~ 60/50Hz 0.5/0.25A
output	48VDC 0.38A



Only use the POE splitter supplied by ip.access:

ip.access part number	222A
manufactured by	MIT
model	MIT-061-1209-IP
input	48VDC 0.35A
output	9VDC 1.33A



POE splitter

2.1.1.2 Physical

The nano3GAP may be installed in the following ways:

- free-standing on a flat stable surface (section 3.2.2.1)
- attached to a wall or partition using the two screws which engage in keyhole slots in the rear surface of the AP (section 3.2.2.2)
- attached to a POE splitter using the two screws which engage in keyhole slots in the rear surface of the AP; the POE splitter in turn attaches to a wall or partition using two screws (section 3.2.2.3)

Attention should also be paid to ensuring free air circulation around the unit. The unit must be vertical.

It is recommended that the AP is installed with its front surface facing the area requiring cellular coverage, unobscured by walls or partitions that may have significant RF attenuation.

Dimensions and Weight	Height	176 mm (without stand) 193mm (with stand)
	Width	170 mm
	Depth	51 mm
	Approximate Weight	0.42 Kg (AP only)
Environmental	Cooling	Vents on the back at top and bottom
	Operating Temperature	0°C to 40°C
	Operating Humidity	10 to 70% non-condensing

2.1.1.3 IP Bandwidth Requirements

At maximum capacity, a 4-Channel nano3GAP will require:

- downlink: at least 5Mbps
- uplink: 512kbps

This will deliver up to 4 voice calls and HSDPA services up to 3.6Mbps.

2.2 Installation Tool Requirements

- To mount the POE splitter or the AP onto the wall:
 - 2 self tapping pan head screws, size No. 6 (approx 3.5mm (0.14in) in diameter)
 - suitable drills, screwdriver, etc.
- Provisioning laptop:
 - OS: Windows XP
 - web browser: Microsoft Internet Explorer 7

- JavaScript enabled in the web browser

2.3 Information Needed for Installation

2.3.1 Network Information

Installation Engineer:

- subnet information: the installation laptop and the nano3GAP-4 to be configured must be on the same subnet
- username and password for the AP web server
- address of the security gateway
- address of the serving 3G AC
- ID of this AP on the serving 3G AC
- CRL and NTP server addresses
- DHCP or static IP
- if IPsec is used: Traffic Selector information (IP address and subnet mask)

NOC Engineer:

- Username and password to the OMC-R
- The valid URL to the latest AP software image on the OAM File Server
- Configuration file to be used in the OMC-R Load Attributes Wizard (nano3GAP-4s hold the master copy of their own configuration and are not pre-provisioned via the OMC-R)

- Configuration data for the AP:
 - MCC
 - MNC
 - LAC
 - SAI
 - SAC/LAC
 - UARFCN
 - Scrambling code
 - RNC ID
 - RAC

2.3.2 AP Configuration File

Create a separate attributes file for each AP to commission (section 5.3).

3 nano3GAP Hardware Installation

This section documents the procedure used to install the nano3GAP-4 hardware and physical connections together with applying the base software configuration.

3.1 Warnings and Regulatory Information

For all warnings and regulatory information, refer to section 7.

3.2 Hardware Installation - nano3GAP-4

3.2.1 Unpacking the nano3GAP-4

- 1) Unpack the nano3GAP-4, the stand and the POE splitter unit.
Note: No screws are supplied to mount the AP or the splitter unit.
- 2) Check that the items have not been damaged in transit.
Any damaged units should be returned to the supplier.

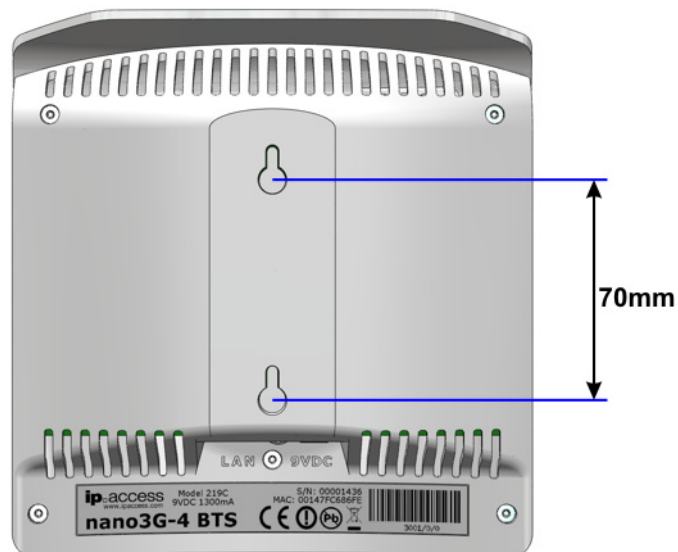
3.2.2 Mounting the nano3GAP-4

Note: The nano3GAP-4 should be installed in a position so that it is at least 2m away from the area where handsets are normally used.

The nano3GAP-4 can be mounted in the following ways:

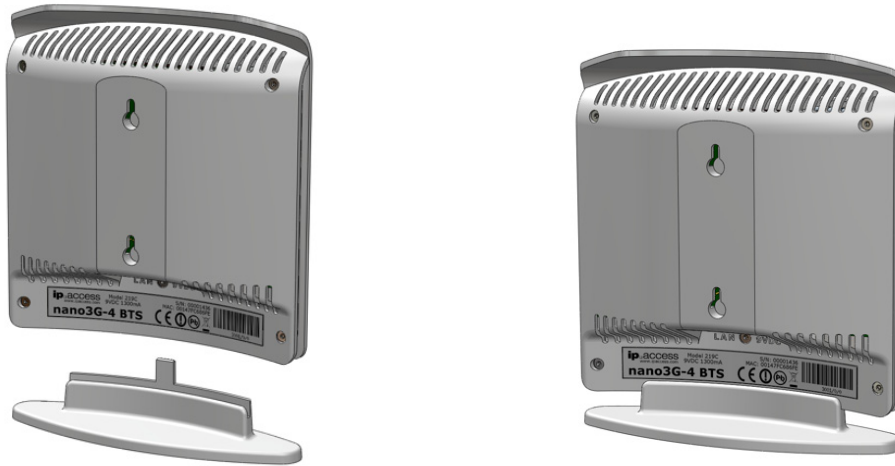
- on a stand
- directly onto the wall at or above head height
- onto the splitter unit at or above head height

The nano3GAP-4 has 2 holes at the back for the latter two mounting options:



3.2.2.1 Mounting the nano3GAP-4 on a Stand

- 1) Plug the Ethernet cable and the power cable into the AP.
- 2) Slide the AP onto the stand.
- 3) Place the stand with the AP onto a stable flat surface.



nano3GAP-4 mounted on a stand

3.2.2.2 Mounting the nano3GAP-4 directly onto the wall

- 1) Drill two holes 70mm (2.76in) apart vertically for the two screws.
- 2) Insert wall plugs (if required) and secure the screws leaving approximately 3mm (0.12in) clearance between the screw heads and the wall.
- 3) Plug the Ethernet cable and the power cable into the AP.
- 4) Slide the AP onto the 2 screws.



nano3GAP-4 mounted directly on the wall

3.2.2.3 Mounting the nano3GAP-4 onto the splitter unit on the wall

- 1) Secure the splitter unit to the wall using two screws.
Ensure that the Ethernet socket is at the top.
- 2) Plug the Ethernet cable into the splitter unit.
- 3) Plug the Ethernet cable and the power cable coming from the splitter unit into the AP.
- 4) Mount the AP onto the 2 screws that are already fixed onto the splitter unit.



nano3GAP-4 mounted on the POE splitter

4 Deployment Commissioning of the nano3GAP

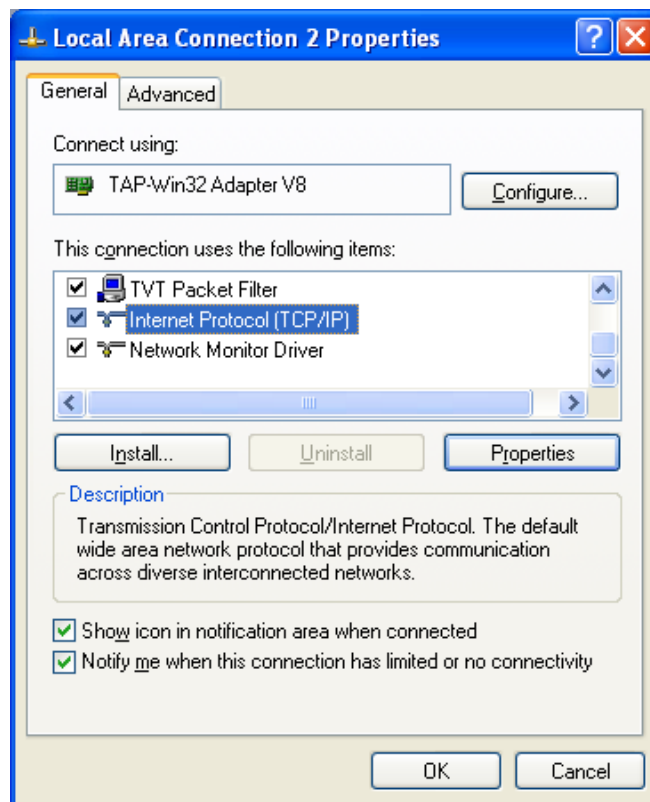
Deployment commissioning is performed typically on site, with a provisioning laptop.

The nano3GAP-4 must be in factory reset status for the commissioning. For instructions on performing a factory reset, see section 6.3.

4.1 Configure the IP Settings of the Provisioning Laptop

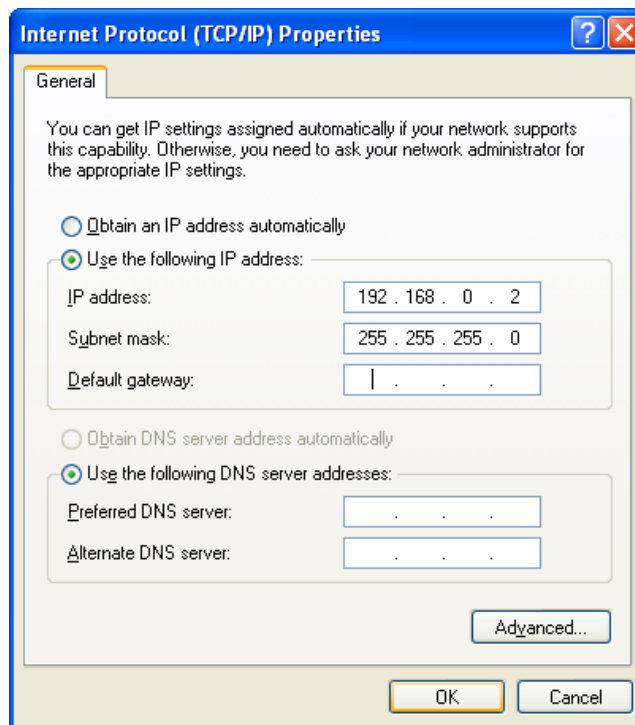
- 1) Open the control panel on the laptop.
- 2) Select **Network Connections**, select the relevant **Local Area Connection**, then right-click **Properties**.

The following Dialog box appears:



- 3) Select **Internet Protocol (TCP/IP)** and then click **Properties**.

The following Dialog box appears:



- 4) Change the properties to **Use the following IP address**.
- 5) Set the IP Address to **192.168.0.2**.
- 6) Set the Subnet Mask to **255.255.255.0**.

Note: The provisioning laptop and the AP must be in the same subnet.

- 7) Click **OK** and close the two dialog boxes.

4.2 Configure the Connection to the AP

- 8) Connect the AP to the Ethernet interface of the provisioning laptop via an Ethernet cable.
- 9) Apply power to the AP.
- 10) Start a web browser on the laptop.
- 11) Enter the pre-defined static IP address for the web server: **192.168.0.1**.

A login screen appears.

- Enter the commissioning username and the password (supplied separately).
The default page (**Connection Configuration**) appears.

ip.access

3G AP

- [Connection Config](#)
- [IP Config](#)

Connection Configuration

IPSec Disabled
 IPSec Enabled

Traffic Selector - IP Address:

Traffic Selector - Subnet Mask:

IPSec Gateway:

3G AC IP Address:

3G AP ID (decimal):

CRL Server Base URL:

NTP Server Address:

- Edit the configuration information:

It is recommended to leave the default NTP server address as default.

Note: The CRL Server Base URL is embedded in the IPSec Gateway address in the current release. Therefore, this field will be left empty.

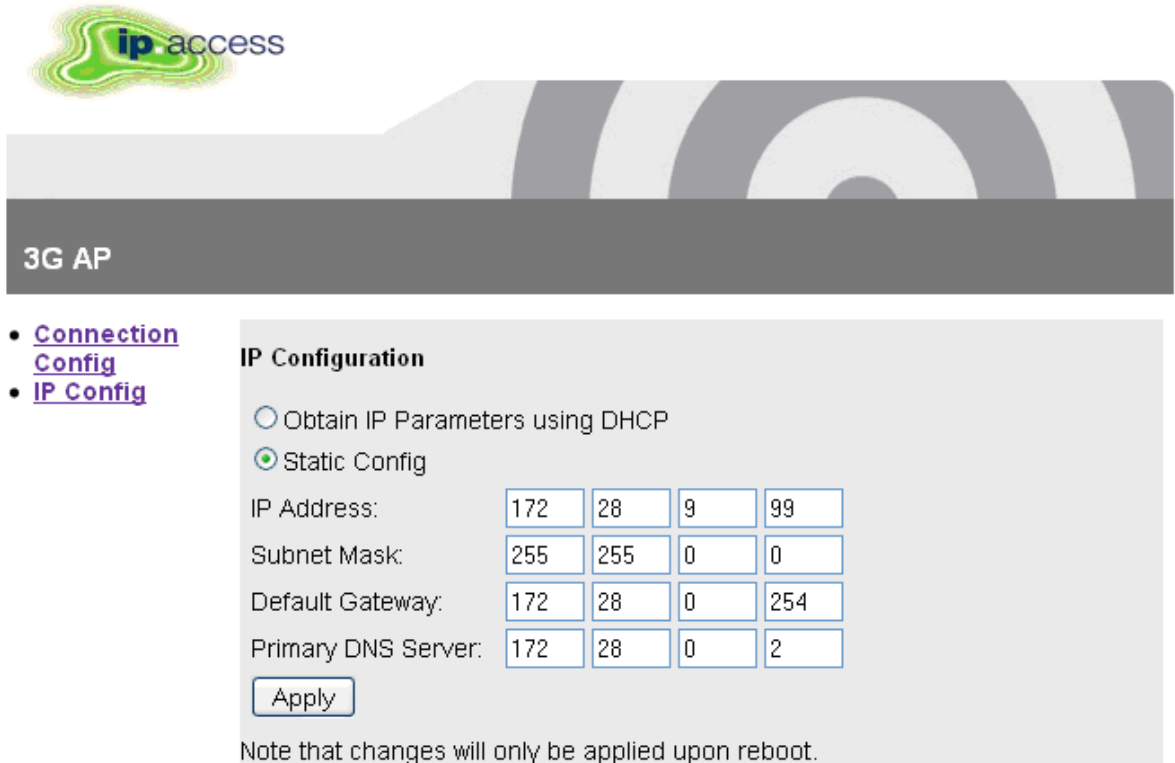
- Save the configuration by clicking **Apply Changes**.
- Start the AP in normal operation mode by clicking **Complete Commissioning**.
- When the initial configuration is completed, power off the AP and disconnect it from the laptop.
- Mount the AP at its intended location, see section 3.2.2.
- Connect the AP to the operator network and apply power.

The AP performs its normal, deployed mode start-up and connects to its host AC: During this procedure, the nano3GAP-4 obtains network time and day information from the NTP server and – if IPSec is in use – it establishes an IPSec tunnel to the Security Gateway.

From this point on, the AP can be managed from the OMC-R. It is now ready for initial configuration by NOC engineers, see section 5.

4.3 Set the IP Configuration of the AP

- 19) Click the **IP Config** link on the left of the screen.



The screenshot shows the configuration interface for a 3G AP. At the top left is the 'ip access' logo. Below it is a header bar with '3G AP'. On the left side, there is a navigation menu with two items: 'Connection Config' and 'IP Config', both underlined. The main content area is titled 'IP Configuration'. It contains two radio buttons: 'Obtain IP Parameters using DHCP' (unselected) and 'Static Config' (selected). Below these are four rows of input fields for IP Address, Subnet Mask, Default Gateway, and Primary DNS Server. Each row has four individual input boxes. An 'Apply' button is located below the input fields. At the bottom of the configuration area, there is a note: 'Note that changes will only be applied upon reboot.'

IP Configuration

Obtain IP Parameters using DHCP

Static Config

IP Address:

Subnet Mask:

Default Gateway:

Primary DNS Server:

Note that changes will only be applied upon reboot.

- 20) Edit the parameters as needed and then click **Apply**.
- 21) Click the **Connection Config** link on the left of the screen and then click **Complete Commissioning**.
- 22) Read the warning and click **OK** to complete commissioning.

5 Configuration of the nano3GAP-4 from the OMC-R

The nano3GAP-4 needs to be configured before it is brought into service. The NOC engineer must perform the configuration via the OMC-R Client.

5.1 Start the OMC-R Client

The OMC-R Server provides a web page to start the OMC-R Client.

- 1) Start a web browser application.
- 2) Enter the URL for the OMC-R server's web page as:

```
http://<server-hostname>/omcr
```

Where <server-hostname> is the fully qualified hostname of the OMC-R server.

Note: This assumes that DNS is correctly configured on the management network: the OMC-R server can be found by using its host name from client computers on the same network.

Note: If a redundant configuration is used, the IP address entered here is a virtual IP address that will ensure that the connection to the active OMC-R Server can be set up without further actions from the client.

- 3) Press the Enter key and the OMC-R web page will appear.



- 4) If it has not been installed on the client computer, click the link to download and install the Java runtime (JRE version 1.5) for Windows®. This will allow a Windows® client computer to run the OMC-R Client.

Note: When installed on Windows®, the JRE may automatically update to version 1.6. The OMC-R Client will operate correctly with JRE 1.6. However, do not install any version later than 1.6 (or allow JRE to be automatically updated; for example, decline the update if prompted). The Java Control Panel may be used to disable automatic updates and/or disable usage of JRE versions later than 1.6.

- 5) The OMC-R Client is automatically installed when it is started. Click the link or icon for Start 3G OMC-R Client.

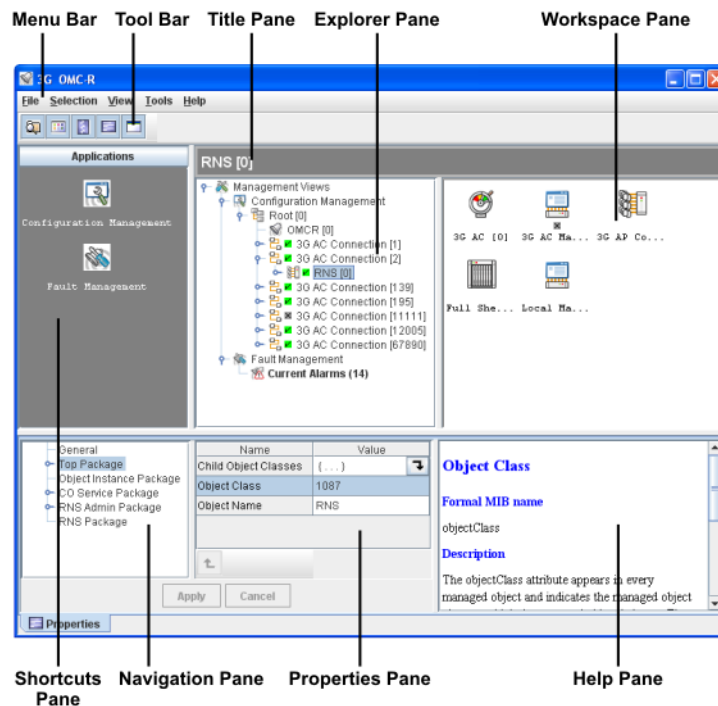
If this is the first time the OMC-R Client has been started from this client computer, or if the client version on the OMC-R Server has been updated, the client application will download (which also installs the application).

If a security warning appears about verification of the digital signature for the application, click the Run button.

- 6) The OMC-R Client will initialize and connect to the OMC-R Server. A login prompt will appear. The first time the client is used from a particular computer, the User name will be set to the log in ID used for the current session on the client computer.

- 7) Enter the username and password, then click OK. The user name will be remembered at the next login.

- 8) The OMC-R Client will initialize and connect to the OMC-R Server. The following screen appears:



- 9) Double-click through the tree (Management Views > Configuration Management) to navigate to the AP to configure.

5.2 Download the Latest nano3GAP-4 Software Image

If the AP already has the latest software version, skip this section.

The latest software image is downloaded to the AP from the OAM File Server. For instructions about how the software images are uploaded to the OAM File Server, see [OPM_430].

- 10) Make sure that you have the URL to the latest software image file (SDP file) stored on the OAM File Server.
- 11) Select the AP in the OMC-R Client.
- 12) Right-click the AP, select **Actions** and then **Perform Software Download**.
- 13) In the Perform Software Download Actions window, enter the URL of the latest SDP file.
- 14) Select whether the image file should be downloaded only, or it should be swapped with the older image file, and whether the older image file should be removed from the standby folder on the AP.
- 15) Click **Finish**.
The download in progress is indicated by the flashing network LED on the AP.
- 16) Monitor the 3G AP Admin Package of the AP object in the OMC-R Client.
- 17) When the standby software version is the version of the downloaded image, right-click the AP, select **Action**, and then select **Swap Default Software**.
- 18) Right-click the AP object again and then select **Reinitialize**.
- 19) Wait for the AP to be shown as connected to the OMC-R.
- 20) In the 3G AP Admin Package of the AP object, check that the Active Software Version is that of the new SDP.

5.3 Create an Attribute Configuration File for the AP

The attributes to configure a nano3G-4 AP are stored in a text file. The file can be created and edited manually in any text editor. For a sample file, see section 8.1.

To create the configuration file by using an existing one:

- 21) Log in to the OMC-R (see section 5.1).
- 22) Start the OMC-R Load Attributes Wizard: right-click on any existing AP object in the OMC-R Client and then select **Save Attributes to File**.
- 23) Save the file under a new name.
- 24) Edit the file in a text editor.

5.4 Download the Attribute Configuration to the AP

- 25) Ensure that the attribute configuration file is available on the configuration PC or at a location reachable from the configuration PC. For information on the AP configuration file, see section 8.1.
- 26) Log in to the OMC-R (see section 5.1).
- 27) Start the OMC-R Load Attributes Wizard: right-click on the AP object in the OMC-R Client and then select **Load Attributes From File**.
- 28) Browse to the configuration file and click **Apply** to load and apply the configuration settings.

If any of the loaded values are inconsistent with the current state of the AP or if any of the values are illegal, the wizard displays a warning.

5.5 Perform AP-specific Configuration

- 29) Perform any AP-specific configurations. In particular, check and modify the attributes of the following packages as needed:
 - o Network Listen Control Package

Note: Ensure that the **Neighbour List Population** attribute is set to **Static Only**.

Note: Ensure that the **Scan Interval** attribute in the package **RF Scan Control** is set so that the NWL scan does not disrupt the service. Scheduled NWL scans should be timed for low-usage time slots. NWL scans can be also disabled by setting the **Scan Interval** attribute to 0. In this case, the NWL scan can be run manually at any time, see the next step.

 - o Cell Package
 - o NAS Package
 - o Location Package
- 30) Run a Network Listen scan: right-click the AP object, select **Actions** and then select **Start Sequential NWL Scan**.
- 31) Ensure that the oscillator frequency is correct: select **Actions** and then select **Apply Frequency Correction**.

5.6 Bring the AP into Service

- 32) Unlock the AP to bring it into service.

The AP now has the latest software image and is ready for service.




6 Troubleshooting

6.1 Internet Connection Problems

If static IP addressing is disabled and DHCP is in use, the nano3GAP-4 expects to be automatically provided with an IP address by the broadband router every time it starts. Ensure that the DHCP service is enabled on the broadband router.

6.2 LED Status Indicators

The following table shows the meaning of the state LED under normal and fault conditions.

 Power	Off	The nano3GAP-4 is not switched on.
	Green	The nano3GAP-4 is powered up normally.
	Flashing green	Self-test is running.
	Red	There is a fault with the nano3GAP-4. Note: At power-up, this LED will light solid red by default.
 Network	Off	Unable to detect a network. This is usually because there is no network cable connected, or there is no network connection at the other end of the cable (for example, the router or broadband modem may have failed or may not be switched on).
	Green	The 100Mbps connection is OK.
	Flashing green	Indicates activity on the network at 100Mbps speed (that is, the nano3GAP-4 is sending and/or receiving data across the LAN).
	Amber	The 10Mbps connection is OK.
	Flashing amber	Indicates activity on the network at 10Mbps speed (that is, the nano3GAP-4 is sending and/or receiving data across the LAN).
	Note: This LED is driven by Ethernet hardware.	
 Service	Off	The nano3GAP-4 is not provisioned, it has no IP address. This may be a temporary condition when you switch on the AP for the first time, or after you have performed a factory reset.
	Green	The nano3GAP-4 is provisioned and unlocked.
	Flashing green (slow)	The nano3GAP-4 is provisioned and locked.
	Flashing green (fast)	Software download is in progress to the nano3GAP-4.

6.3 Factory Reset

Factory reset can help in case the AP does not connect. The AP configuration will need to be redone manually, see section 4.2.

To perform factory reset, press the factory reset button and hold it for more than 10 seconds.

When the button is initially pressed, the LED will blink fast (50ms on:50ms off) for 5 seconds, then it will start to blink slowly (200ms on: 200ms off). When the factory restore process has completed, the LED will extinguish and the AP will automatically reboot, take the fixed IP address and enable the web interface for configuration (see section 4).

7 nano3GAP and PSU Regulatory Information

This chapter provides the customer with safety and regulatory warnings, cautions and information for the ip.access Ltd range of products.

7.1 Warnings and Cautions

Electrical Safety



CAUTION

The nano3GAP-4 is intended for dry indoor applications only. If evidence of condensation is present do not apply power to the nano3GAP-4.



WARNING

Do not immerse any part of the nano3GAP-4 or its power supply in water or any other liquid. Do not install or use the nano3GAP-4 or its power supply near open water. Do not spill liquids of any type on the nano3GAP-4 or its power supply.



WARNING

Do not use liquid, solvent or aerosol cleaning agents on or near the nano3GAP-4 or its power supply.



CAUTION

To avoid the risk of fire and/or electrical shock, do not push objects through openings into the nano3GAP-4 or its power supply (except when operating the Reset switch on the nano3GAP-4).



CAUTION

Do not disassemble the nano3GAP-4 or its power supply.



CAUTION

The nano3GAP-4 must only be powered using the ip.access power supply provided for use with the nano3GAP-4.



CAUTION

Before using the power supply, verify that the mains voltage is within the range specified by the voltage printed on the power supply.



CAUTION

The PSU supplied with the nano3GAP-4 must not be used for powering any other equipment.



CAUTION

To avoid the risk of fire and/or electrical shock, do not overload power outlets or extension cables.



CAUTION

When disconnecting the power supply from the mains, pull the plug. Pulling the cable may result in damage to the cable.

Interference with Electronic Devices



CAUTION

If using a pacemaker, ensure you are using the device in accordance with its safety requirements with respect to RF devices. Consult your doctor if you have questions about RF signals and your pacemaker.



CAUTION

If using a hearing aid, RF devices may cause interference.



CAUTION

Unshielded electronic devices should not be used near the nano3GAP-4. Conversely, the nano3GAP-4 should not be installed adjacent to unshielded electrical or electronic devices (such as unshielded speakers).

Other Warnings and Cautions



WARNING

Do not install the nano3GAP-4 in a position where the power supply cable or network cable may cause a tripping or choking hazard.



WARNING

Do not install the nano3GAP-4 or the power supply on an unstable surface. All caution must be observed to prevent the device from falling and causing injury to a person and/or damage to the device.



WARNING

The nano3GAP-4 should not be disposed of in household waste bins. Please follow local regulations for disposal of electronic devices.



CAUTION

Do not install the nano3GAP-4 in a position where the power supply cable or network cable may be damaged by walking on the cables.



CAUTION

Do not attempt to fit an external antenna or antenna cabling to the nano3GAP-4.

7.2 Regulatory Statements

7.2.1 Type Approval and EMC Standards

- FCC CFR47 Parts 15B, 27

Note: Changes or modifications not expressly approved by the party responsible for compliance may void the user's authority to operate this equipment.

Model nano3G 219C has FCC ID QGGIPA219C



WARNING

This is a class B product. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

Federal Communications Commission

Note: This equipment has been tested and found to comply with the limits for a class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. 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. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

7.2.2 Safety Standards

- IEC 60950-1:2005 (2nd Edition) and EN 60950-1:2006

The power adapter, as well as the POE inserter and splitter supplied by ip.access comply with LPS requirements in accordance with IEC/EN 60950-1.

8 Appendices

8.1 Appendix A - Example AP Configuration File

A configuration file with the object name and the objects instance (relative distinguished name) must be created for each AP to be commissioned. For instructions to use the configuration file, see section 5.3.

The file has to conform to the following syntax:

- all non-comment lines are of the form <name>=<value>
- comment lines begin with the hash character (#)
- attribute types are as follows:
 - integer tos=0
 - enumeration t300=T300_4000_MSEC
 - array ascPersistenceScalingFactors=[6,6,6,6,6,6]
 - boolean soipHeartbeatEnabled=true
 - structure cellBroadcastMessage={50,GSM_DEFAULT,"oyster 3G"}
 - string "HMAC-SHA1"
 - set alarmFilter=()

```
# Instance for the AP to be modified
Object=apNano_001
ObjectInstance=ROOT#0;AC_CONNECTION#12007;RNS#0;AP_CONTROLLER#
0;AP_CONNECTION#31;AP#0
# Cell Package
rncIdentity=139
# NAS Package
mcc="159"
mnc="12"
sac=1
saiLac=1
# Network Listen Control Package
lacRacCandidateList=({15912,(99)})
rfParamsCandidateList=({1062,437,1})
rssiScanBands=({BAND_NAME_UMTS_BAND_04_NO_SPOT,()})
# end of file
```

Parameter	Description
Object	ID of the AP

ObjectInstance	Relative Distinguished Name
rncIdentity	ID of the AC
Mcc	Mobile Country Code
Mnc	Mobile Network Code
Sac	Service Access Code
saiLac	SAC Location Area Code
lacRacCandidateList	LAC and RAC list
rfParamsCandidateList	Radio Frequency parameter list
rssiScanBands	Scanning frequency bands for received signal strength indication

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The basic library functions are written in C and are freestanding. Also included in the distribution is a set of C++ wrapper functions.

THE BASIC LIBRARY FUNCTIONS

Written by: Philip Hazel

Email local part: ph10

Email domain: cam.ac.uk

University of Cambridge Computing Service,
Cambridge, England.

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