

# Nokia 31 GSM Connectivity Terminal User's Guide for Modem Use



Issue 6 – Final Draft

## LEGAL INFORMATION

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Includes RSA BSAFE cryptographic or security protocol software from RSA Security.

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### EXPORT CONTROLS

This product contains commodities, technology or software exported from the United States in accordance with the Export Administration regulations. Diversion contrary to U.S. law is prohibited.

**FCC/INDUSTRY CANADA NOTICE**

Your terminal may cause TV or radio interference (for example, when using a terminal in close proximity to receiving equipment). The FCC or Industry Canada can require you to stop using your terminal if such interference cannot be eliminated. If you require assistance, contact your local service facility. 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.

**OEM LABELING**

A label must be affixed to the outside of the end product into which the authorized terminal is incorporated, with a statement similar to the following: This device contains TX FCC ID: P4JTME-4"

# FOR YOUR SAFETY

Please read and follow these simple guidelines. Breaking these rules may be dangerous or illegal.



## Switch off terminal where prohibited

Do not switch the wireless terminal on when wireless device use is prohibited or when it may cause interference or danger.



## Be aware of interference

All wireless devices may get interference that could affect performance.



## Switch off in hospitals

Follow any regulations or rules.



## Switch off when refueling

Do not use this wireless device at a refueling point. Do not use it near fuel or chemicals.



## Switch off near blasting

Do not use your wireless terminal where blasting is in progress. Observe restrictions and follow any regulations or rules.



## Keep out of water

Your wireless terminal is not water-resistant. Keep it dry.



## Use your terminal sensibly

Do not touch the antenna unnecessarily.



## Use only qualified service personnel

Only qualified personnel may install or repair equipment.



## Use approved accessories

Use only approved accessories. Do not connect incompatible products.



## Backup copies

Remember to make backup copies of all important data.



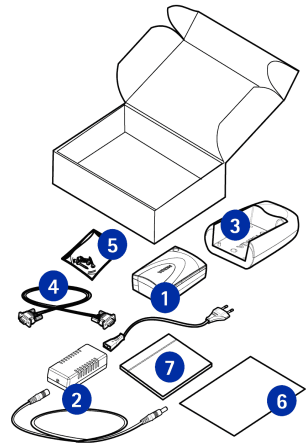
## Connecting to other devices

When connecting to any other device, read its user's guide for detailed safety instructions. Do not connect incompatible products.

# 1 Introduction

The Nokia 31 is a GSM Connectivity Terminal which offers high speed wireless connections over GSM 850/1900 MHz networks. The contents of the "Complete" Terminal package include:

- 1 Nokia 31 GSM Connectivity Terminal
- 2 Power supply ACW-5A
- 3 Data adapter RS-232
- 4 Data cable RS-232
- 5 Installation kit
- 6 Product note
- 7 Nokia 31 CD-ROM
- 8 Installation pad (not shown)



## OPERATION MODES

### M2M

M2M stands for "machine-to-machine, man-to-machine or machine-to-man" communication. M2M is a simple way to use wireless data transmission as a link between systems, remote devices or locations and individuals.

The Nokia 31 terminal can be combined with the Nokia M2M Gateway to provide wireless connections (Text Messaging, USSD, GPRS, CSD) for machine-to-machine communications. This combination forms part of an application solution which can remotely monitor or control a pool of devices or to connect them with existing systems.

With the Nokia 31 terminal connected to a machine through a control application, you can remotely control a pool of devices and receive status information. The Nokia 31 terminal can be easily integrated into various applications such as vending, security and meter control.

As an M2M communications device, the Nokia 31 terminal can be used in three operation modes:

- AT command mode

- M2M system mode

- User control mode

## AT command mode

In the AT command mode, the Nokia 31 terminal operates as a wireless modem. The wireless connection is established and data is sent using AT commands. The AT commands which are used to control the Nokia 31 terminal can be found in the AT Command Guide found on the Nokia 31 CD-ROM or [www.americas.forum.nokia.com](http://www.americas.forum.nokia.com).

By physically connecting the Nokia 31 terminal to the RS-232 data adapter, the terminal can be connected to a compatible PC and used as a stand-alone GSM wireless modem. The modem uses normal communication applications such as e-mail, fax and Internet browsers.

## M2M system mode

In the M2M system mode, the Nokia 31 terminal is combined with the Nokia M2M Gateway to form a complete, wireless end-to-end solution for machine communication.

Some of the enhanced M2M features incorporated into the Nokia 31 terminal include:

- enhanced reliability and security

- automatic reset if the connection between the Nokia 31 terminal and the application module is found to be broken

- mutual authentication between the Nokia 31 terminal and the Nokia M2M Gateway

- data can be exchanged using CORBA method calls integrated in the application module

## User control mode

User control mode enables simple applications to be controlled by mobile handsets with text messages (Short Message Service). The control or monitoring is through general-purpose inputs and outputs of the M2M System connector of the Nokia 31 terminal. Text message templates that are sent from the mobile to the Nokia 31 terminal instruct the terminal, which in turn controls a device or system, attached to it through the M2M System connector.

## DATA CONNECTIONS AND MESSAGING

The Nokia 31 terminal supports four GSM wireless network data protocols.



## GPRS

With General Packet Radio Service (GPRS), data is transferred over the network in small, efficient, standardized packets. The Nokia 31 terminal supports GPRS multi-slot class 6 protocol which provides multiple timeslots for data transfer. The use of GPRS services requires that your network service provider supports GPRS (General Packet Radio Service) technology and you must have subscribed to this service. The pricing of GPRS services may differ from that of normal GSM data services. Please contact your network service provider for more information.

## CSD

Circuit Switched Data (CSD) offers wireless data transfer at rates of up to 14.4 kilobits/sec.

## Text Messaging

Text messaging (also called "Short Message Service") is used to send and receive messages containing a maximum of 160 characters. Text messaging is a convenient way to pass data quickly and easily among Nokia 31 terminals.

## USSD

Unstructured Supplementary Services Data (USSD) offers reliable, interactive messaging services. USSD can be used to send and receive messages containing a maximum of 182 characters. With USSD, the session is established for the duration of the connection. This increases data transfer reliability and shortens response times. The use of USSD services requires that your network service provider supports USSD technology and you must have subscribed to this service.



**Note:** USSD messages can only be sent to the network, not directly to another mobile terminal.

## SUPPLEMENTARY SERVICES

The Nokia 31 terminal also supports additional network dependent services such as:

Call forwarding – forwards your calls to another number which you specify.

Call restriction – restricts outgoing and incoming calls.

Call transfer – connects two different callers with each other then disconnects one's own call without disturbing the other two callers.

Call waiting – alerts you to an incoming call during a phone call.

In-call handling – switches between incoming and active calls.

Multiparty call – connects several callers in a single conversation.

Security option – allows restrictions such as call barring.

## SECURITY

By default, the Nokia 31 terminal uses a standard PIN request. For additional security, there is an "AutoPIN" feature which can be configured to relay the PIN code to the terminal's memory and make the SIM card useless to any unauthorized user. The AutoPIN feature is activated by connecting the Nokia 31 terminal to a PC and running the Nokia 31 Configurator software located on the Nokia 31 CD-ROM or downloadable from [www.americas.forum.nokia.com](http://www.americas.forum.nokia.com). The Nokia 31 terminal also includes security-related features such as GSM security codes and GSM encryption.

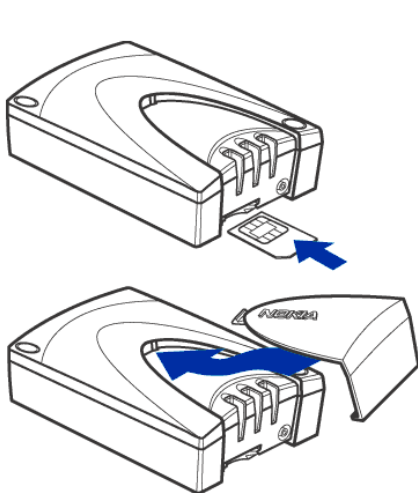
## 2 Set up

### Install the SIM card

The terminal uses small-size, 3V SIM cards. If another type of SIM card is installed the terminal will not be able to recognize the card.

To install a SIM card in the Nokia 31 terminal:

- 1 Remove the SIM card cover by lifting the wide end of the cover out and upwards.
- 2 Insert your SIM card into the slot. Make sure that the golden contact area is facing up and the bevelled corner is on the left (see illustration).
- 3 Replace the terminal cover by pushing the narrow end back into the terminal, then snapping the cover closed.



**Warning:** Do not install, move or remove the SIM card if the terminal's power supply is connected to an AC wall outlet. Insert the SIM card and attach the terminal to the data adapter *before* connecting the power supply.

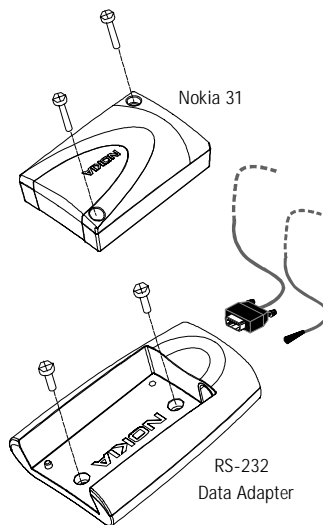
## ATTACH THE DATA ADAPTER

There is a special M2M system connector located at the bottom of the Nokia 31 terminal. When mounting the terminal for modem use, this connector attaches to a matching connector on the data adapter.

If you plan to mount the terminal on a wall, attach the data adapter to the wall and then mount the terminal onto it.

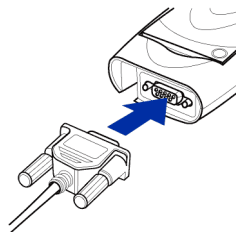
For more details on installing the Nokia 31 terminal, see [www.americas.forum.nokia.com](http://www.americas.forum.nokia.com).

Please note that the SIM card cannot be removed from the Nokia 31 terminal if it is connected to the data adapter.



## CONNECT THE DATA CABLE

- 1 Attach the Nokia 31 terminal data cable to the data adapter.
- 2 Connect the other end of the data cable to the serial port of a PC or other compatible device.

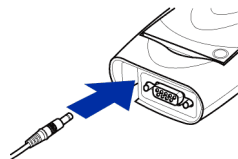


**Note:** You should only use the data cable (RS-232) supplied by Nokia.

## CONNECT THE POWER

The power connector for the Nokia 31 terminal is located at the back end of the terminal, next to the data cable connector. When the Nokia 31 terminal is mounted into the data adapter, the power interface is found under the edge of the data adapter.

- 1 Connect the power cord from the power supply to the terminal.
- 2 Connect the power supply to an AC wall outlet.



## MOUNT THE TERMINAL

The Nokia 31 terminal can be mounted either horizontally or vertically on a suitable flat surface.

To find the best installation location, you can use the Intensity of Field strength (IoF) function through the terminal's light indicators (LEDs) to find the strongest signal (see "Signal Strength" on page 17). For more detailed information on placing the terminal, refer to the information at [www.americas.forum.nokia.com](http://www.americas.forum.nokia.com).



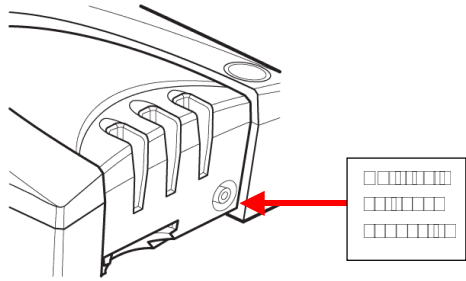
**Note:** All radio transmitting devices send signals which may cause interference in different electronic devices ( PC, television etc.). To avoid interference, place the terminal as far as possible from other electronic devices.

## ANTENNAS

The Nokia 31 terminal is equipped with an efficient internal dual-band antenna; however, depending on the installation location and surrounding materials, the signal strength reaching the Nokia 31 terminal may not be sufficient.

The Nokia 31 terminal has an external antenna connector which allows you to connect an external antenna adapter (XRM-1). The adapter allows you to connect an external GSM antenna (with standard FME connector) and improve signal reception. Once the external antenna is connected, the internal antenna of the Nokia 31 terminal is not in use.

In order to properly fit the antenna cable adapter to the Nokia 31 terminal, you need to cut out a small piece of the terminal cover which normally covers the external antenna connector.





**Caution:** In order to comply with FCC RF exposure requirements, install the Nokia 31 terminal or external antenna so that a minimum distance of 8 inches (20cm) can be maintained between the antenna in use and all persons, with external antenna (if used) gain not exceeding 3 dBi.

# 3 User interface

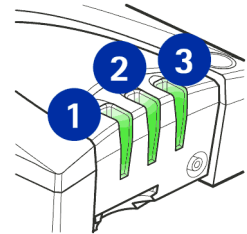
The Nokia 31 terminal has three light emitting diode (LED) indicators which form the terminal's user interface. The LEDs appear in various combinations of red and green indicating the state of the terminal in three different conditions:

Start-up

Normal operation

Special operation

All three LEDs can also be configured, using the Nokia 31 Configurator software application, to remain unlit during operation.



## START-UP

LED 1	LED 2	LED 3	Description
-	-	-	Power off / silent mode
Green (scan)	Green (scan)	Green (scan)	Power on, connecting to network
-	Red (blink)	-	PIN query / new PIN query; see Enter the PIN code, p. 20
-	Red (blink)	Red (blink)	PUK query



## SIGNAL STRENGTH

The Intensity of Field (signal) strength indicators are visible during the start-up for approximately 10 seconds before the terminal shifts to Normal operation mode.

LED 1	LED 2	LED 3	Signal Strength	
Red (blink)	-	-	< -105 dBm	Non-acceptable
Green (blink)	-	-	-105 ... -100 dBm	
Green	-	-	-100...-95 dBm	Weak
Green	Green (blink)	-	-95... -90 dBm	
Green	Green	-	-90... -85 dBm	Moderate
Green	Green	Green (blink)	-85... -80 dBm	
Green	Green	Green	> -80 dBm	Good



**Note:** These signal strength recommendations are especially critical for data transmission.

## NORMAL OPERATION

LED 1*	LED 2*	LED 3	Description
-	-	Green	In service
-	-	Green (blink)	Call on
-	-	Green (blink)	Incoming call
-	-	Green/Red (blink)	Message received / Voice mail in box
-	-	Red (blink)	Message arriving and memory is full
* Controlled by using the application module in M2M System mode.			



**Note:** If the terminal's LEDs indicate that you have received messages, you can use a communication application such as HyperTerminal and type in the command **AT+CMGR** to read the received messages. For more detailed information, see the List of AT commands on the Nokia 31 CD-ROM or [www.americas.forum.nokia.com](http://www.americas.forum.nokia.com).

## SPECIAL OPERATION

LED 1	LED 2	LED 3	Description
Green/Red (blink)	Green/Red (blink)	Green/Red (blink)	Insert SIM card.
Red (blink)	Red (blink)	Red (blink)	Failure, contact service.
Yellow	Yellow	Yellow	Initializing.

## 4 Modem operation

After you have properly connected the Nokia 31 terminal to the data adapter, data cable and a PC, you must enter an access code and install the proper software drivers for your operating system.

### ACCESS CODES

You can use the access codes described in this section to avoid unauthorized use of the SIM card in your Nokia 31 terminal. These access codes can be changed using the Nokia 31 Configurator software or using specific AT commands via an appropriate software application such as HyperTerminal.

#### PIN code

The Personal Identification Number (PIN) code protects your SIM card against unauthorized use. The PIN code is usually supplied with the SIM card. When the PIN code request is enabled, the code is requested each time the Nokia 31 terminal is switched on.

If the AutoPIN feature is enabled, the PIN code will only be requested the first time you configure the Nokia 31 terminal.

#### PIN2 code

The PIN2 code, supplied with some SIM cards, is required to access certain functions, such as charging unit counters. These functions are only available if supported by your SIM card.

## PUK code

The Personal Unblocking Key (PUK) code is required to change a blocked PIN code. The PUK code may be supplied with the SIM card. If not, contact your local service provider for the code. If you lose the code, contact your service provider.

## PUK2 code

The PUK2 code, supplied with some SIM cards, is required to change a blocked PIN2 code. If you lose the code, contact your service provider.

## Security code

The security code can be used to avoid unauthorized use of your Nokia 31 terminal. The factory setting for the security code is 12345. You can change the security code using the Nokia 31 Configurator software. Keep the new code secret and in a safe place.

## Call Barring password

The barring password is needed when using the Call Barring function. You must contact your service provider to get this password.

## ENTER THE PIN CODE

The PIN code, issued by the SIM card provider, protects the SIM card against unauthorized use. If the SIM card requires a PIN code, you must enter this code before you can use the Nokia 31 terminal.