User Manual

605M-D1 GPRS Data Modem

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Thank you for your selection of the ELPRO 605M-D1 GPRS Modem. We trust it will give you many years of valuable service.

ATTENTION!

Incorrect termination of supply wires may

cause internal damage and will void warranty.

To ensure your 605M-D1 enjoys a long life,

double check ALL your connections with

the user's manual

before turning the power on.

All equipment must be properly grounded for safe operations. All equipment should be serviced only by a qualified technician.

Important Notice

ELPRO products are designed to be used in industrial environments, by experienced industrial engineering personnel with adequate knowledge of safety design considerations.

ELPRO products are designed to operate in the presence of noise and interference, however in an extreme case, noise and interference could cause product operation delays or operation failure. Like all industrial electronic products, ELPRO products can fail in a variety of modes due to misuse, age, or malfunction. We recommend that users and designers design systems using design techniques intended to prevent personal injury or damage during product operation, and provide failure tolerant systems to prevent personal injury or damage in the event of product failure. Designers must warn users of the equipment or systems if adequate protection against failure has not been included in the system design. Designers must include this Important Notice in operating procedures and system manuals.

These products should not be used in non-industrial applications, or life-support systems, without consulting ELPRO Technologies first.

As a license free, quad band capable product, the 605M-D1 GSM/GPRS modem must used in accordance with local regulatory and communications authority guidelines. This includes the use of antenna and other radio communications accessories which form part of the communications between points in the network.

To avoid the risk of electrocution, The antenna, coaxial, and serial cables and all terminals of the 605M-D1 module should be electrically protected. To provide maximum surge protection, the module should be connected to a suitable earth and the module should be installed as recommended in the Installation Guide.

To avoid accidents during maintenance or adjustment of remotely controlled equipment, all equipment should be first disconnected from the 605M-D1 module during these adjustments. Equipment should carry clear markings to indicate remote or automatic operation. E.g. "This equipment is remotely controlled and may start without warning. Isolate at the switchboard before attempting adjustments."

The 605M-D1 module is not suitable for use in explosive environments without additional protection.

To minimise any implementation problems, prior to commissioning in the field it is strongly recommended that:

- A check is performed to ensure reliable signal strength is available at the proposed installation site.
- The configuration/operation of the modem is tested on a work bench.

Repairs to the 605M-D1 GSM/GPRS modem should only be attempted by ELPRO personnel or upon consultation with ELPRO, its nominated representative and/or qualified technical personnel.

DO NOT:

- Operate the equipment near electrical blasting caps or in an explosive atmosphere
- Operate the transmitter when someone is within 20 cm (~ 8 inches) of the antenna.
- Operate the transmitter unless all RF connectors are secure and any open connectors are correctly terminated.

Limited Lifetime Warranty, Disclaimer and Limitation of Remedies

ELPRO products are warranted to be free from manufacturing defects for the "serviceable lifetime" of the product. The "serviceable lifetime" is limited to the availability of electronic components. If the serviceable life is reached in less than three years following the original purchase from ELPRO, ELPRO will replace the product with an equivalent product if an equivalent product is available.

This warranty does not extend to:

- failures caused by the operation of the equipment outside the particular product's specification, or

- use of the module not in accordance with this User Manual, or

- abuse, misuse, neglect or damage by external causes, or

- repairs, alterations, or modifications undertaken other than by an authorized Service Agent.

ELPRO's liability under this warranty is limited to the replacement or repair of the product. This warranty is in lieu of and exclusive of all other warranties. This warranty does not indemnify the purchaser of products for any consequential claim for damages or loss of operations or profits and ELPRO is not liable for any consequential damages or loss of operations or profits resulting from the use of these products. ELPRO is not liable for damages, losses, costs, injury or harm incurred as a consequence of any representations, warranties or conditions made by ELPRO or its representatives or by any other party, except as expressed solely in this document.

CONTENTS

Chapter One   INTRODUCTION

This user manual outlines the features, mounting, operating parameters, connection, safe use and configuration of the 605M-D1 modem. When used in conjunction with the ELPRO 605M-R1 Router, the user manual for the 605M-R1 must be consulted prior to configuration and commissioning. Failure to consult with the 605M-R1 manual may result in the warranty being voided.

The ELPRO 605M-D1 is a GSM Mobile Stations (MS class B) device capable of using GSM Circuit Switched Data (CSD), Fax and Short Message Services (SMS) communications and output. The 605M-D1 is a quad band, GPRS device communicating at GSM-850 / EGSM-900 / DCS-1800 / PCS-1900 MHz, Class 10 GPRS data packet transfer. It has an embedded TCP/IP stack and DNS query protocol supporting static and dynamic IP address allocation, PPP, UDP and FTP functionality.

Programming of the 605M-D1 modem in use is either via the ELPRO provided configuration utility, or via AT Commands (GSM 07.07 and 07.05) listed later in this user manual. Connection to the host controller (Data Terminal Equipment DTE) is established through one RS232 standard port which also performs serial bi-directional Data and Fax transfer. Use of the 605M-D1 will require third party products and/or services such as telecommunications access.

The 605M-D1 AT command set listed later in this manual also features:

Network quality Detection - allowing scanning of all GSM (without SIM) channels to ascertain which provider has the best signal, most channels and/or transceiver base stations in optimizing service provision.

Jam Detect and Reporting - reporting attempts at interfering with the GSM radio signal (reported as an unsolicited message on the RS232 port).

Chapter Two   INSTALLATION

2.1   General

The 605M-D1 module is housed in an rugged aluminium case, suitable for DIN-rail mounting..

All connections to the module must be SELV. Normal 110-250V mains supply should not be connected to any terminal of the 605M-R1 module. Refer to Section 2.2 Power Supply.

Before installing a new system, it is preferable to bench test the complete system. Configuration problems are easier to recognize when the system units are adjacent.

The foldout sheet 605M-D1 *Installation Guide* provides an installation drawing appropriate to most applications. Further information is detailed below.

Each 605M-D1 module should be effectively earthed via the "GND" terminal on the 605M-D1 module - this is to ensure that the surge protection circuits inside the 605M-R1 module are effective.

2.2   Power Supply

The 605M-R1 module can be powered from a 12 - 24VDC power supply. The positive side of the supply <u>must not be connected to earth.</u> The supply negative is connected to the unit case internally. The DC supply may be a floating supply or negatively grounded.

The power requirements of the 605M-R1 unit are 1200mA @ 12V or 900mA @ 24VDC.

Power connection is made by the included cable. Connect the Green "GND" and Black "GND / A" wires to the supply negative, and connect the Red "POWER+" to the supply positive.

The white "SENSE / B" wire is available for sensing modem connection status, but is not required for power supply connection.

Supplied Power Cable
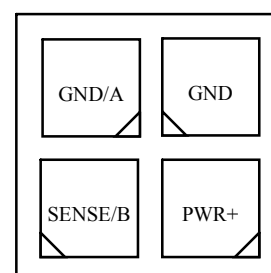
Power connector Pin assignment

2.3 RS-232 Serial Port

The serial port is a 9 pin DB9 female and provides for connection to a host device as well as a laptop computer for configuration, field testing and for factory testing. Communication is via standard RS232 signals. The 605M-D1 is configured as DCE equipment with the pinouts detailed below.

DB9 Connector Pinouts

Pin	Name	Direction	Function
1	DCD	Out	Data carrier detect –
2	RD	Out	**Transmit Data** – Serial Data Output
3	TD	In	**Receive Data** – Serial Data Input
4	DTR	In	Data Terminal Ready -
5	SG		Signal Ground
6	DSR	Out	**Data Set Ready** - always high when unit is powered on.
7	RTS	In	Request to Send -
8	CTS	Out	Clear to send -
9	RI	Out	Ring indicator -
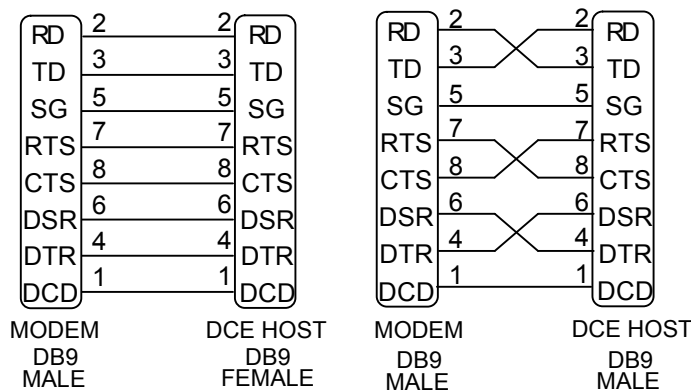
Hardware handshaking using the CTS/RTS lines or using XON/XOFF protocol is provided.

Example cable drawings for connection to a DTE host (a PC) or another DCE hosts (or modem) are detailed above.

When operating In Automatic Connect mode, the DCD signal goes high when the modem has established a connection to the remote device.

2.4 Antenna Port

The ELPRO 605M-D1includes a SMA bulkhead female, class 4 (2W) co-axial connector for the external antenna.

NOTE: BEFORE connecting the ELPRO 605M-D1 to a Power Supply source, a suitable Antenna shall be connected and properly installed.

The antenna has to be installed with care in order to avoid any interference with other electronic devices and has to guarantee a minimum distance from persons (20 cm). In case this requirement cannot be satisfied, the system integrator has to assess the final product against applicable SAR regulations.

For good efficiency of the antenna and minimum interference with other electronic systems, a space of min. 40 cm around the radiating part should be free, at least of electrically conducting materials (except the ground plane on which it is attached).

Less distance and less obstacles there are between the antenna connected to the ELPRO 605M-D1and the antenna of the GSM/GPRS network base station, the less power is radiated by the Terminal under normal conditions and the higher is the safety margin in case of disturbances.

A check of eventual interferences can be made when the ELPRO 605M-D1transmits at maximum power level to register to a GSM 900 network (see frequency channel numbers), immediately after being switched on.

Antenna Type

For best performance, ensure the antenna is of the correct type.

Frequency range Standard Dual Band GSM/DCS frequency range or Standard Quad Band GSM/DCS/PCS frequency range if used for all four bands

ELPRO provides the CFD890-EL antenna for this application.

2.5 Ground Terminal

A Ground Terminal is provided on the back of the module. This Terminal should be connected to the Main Ground point of the installation in order to provide efficient surge protection for the module (refer to the Installation Diagram).

Chapter Three   OPERATION

3.1   Operating Modes

The 605M-D1 operates in one of two modes, **Automatic Connect Mode** or **AT Command Mode.**

Automatic Connect Mode allows the modem to operate with host equipment that is not designed to operate with modems. The modem makes a connection to a pre-configured TCP port and location, then transparently transfers data over the configured connection.

AT Command Mode is used when the host equipment is designed to operate with a modem. The host equipment needs to support AT commands to command the modem to make the required connections.

3.2   Automatic Connect Mode

In this mode, the modem automatically make a connection between the onboard RS-232 serial port and a TCP connection point (port) on a remote device which is connected to the internet. This socket may be either an internal connection point (TCP port) on a 605M-R1 Device Server, to a virtual serial port on a PC, or any other TCP socket with access to the internet.

Automatic Connect mode is configured with the supplied 605M-D1 Configuration utility. Refer to the Configuration Manual (man_605M-D1-Config) for detail on how to use the configuration utility to test, diagnose, and configure the modem.

At power-up, the modem waits 10 seconds to allow access by the configuration utility. If the modem receives any configuration commands during this time, it will abort the start up sequence and wait for further commands.

Note: Because of this behavior, it is important to ensure that any host equipment does not send any data containing the sequence "AT" within 10 seconds of power-on. The RS-232 DCD pin will be low until the modem makes a connection to the remote TCP device. The "SENSE" wire on the power connector will go active low when the modem makes a connection to the remote TCP device.

After 10 seconds, the modem attempts to connect to the cellular network. On connection, the modem optionally sends an SMS message to report that it has connected. Once it is connected to the cellular network, it attempts to connect to a TCP port on a remote device. If the connection is lost, or if the connection cannot be made, the modem may be configured to attempt to connect to a redundant secondary socket location. If both the primary and redundant secondary socket are unavailable, the modem can be configured to send an alarm message via SMS. At this stage, the modem may be configured to either wait for an SMS message commanding it to restart, or can be configured to re-try the connection to the primary and secondary connection locations.

3.3   AT Command Mode

In this mode, the modem waits for AT Commands from the host device. The host device must be able to issue the appropriate AT commands to force the modem to perform the required behavior. This mode provides full access to all of the features of the modem, including SMS, TCP-IP connection, and FAX data.

At power up, the modem issues the prompt "OK", and then waits for commands from the host. At this point the host can issue AT commands to:

- Send an SMS Message

- Make a TCP-IP connection to a remote device

- Make a serial data connection to a remote device

- Transfer data to a remote FTP server

- Refer to Appendix A for a full list of supported AT commands.

Chapter Four   CONFIGURATION

Configuration of the 605M-D1 modem is performed using the AT Command set. ELPRO provides a configuration utility to simplify the configuration of modems operating in Automatic Connect mode.. A simple and intuitive interface allows easy selection of the required functionality, then the configuration utility sends the AT commands to the modem to set up the requested configuration.

4.1   Configuration using Configuration Utility Software

The configuration utility allows you to configure the modem for operation in **Automatic Connect mode.** The configuration utility is available on the CD supplied with your modem, or the latest version may be downloaded from ELPRO's web-Site (www.elprotech.com). To install, download the file "inst_605M-D1_v1-0.exe" and run this file.

The following sections describe how to use the configuration utility.

The configuration software allows for the easy setup and configuration of ELPRO's 605M-D1. It is Microsoft Windows based software that lets a user easily configure the modem without the need to remember complex AT command sequences.

The configuration software also enables a user to save/read configuration data to a file which can be used for quick backup or mass deployment of the 605M-D1 modem settings.

Another handy feature of the configuration software is that it comes with a built-in terminal emulator which eliminates the need to use external terminal software. It is especially useful for people who want to use advanced AT command set for configuring the modem and provides a unified compact solution.

The configuration software allows for redundant connection setup where the 605M-D1 modems can connect to a secondary address in case the primary becomes unavailable. This feature is especially useful in high availability scenarios.

In addition to the easy to use GUI for configuring the 605M-D1 modems, the configuration software also enables the user to get advanced diagnostics information like signal strength, available providers, IMEI number, SIM PIN status etc.
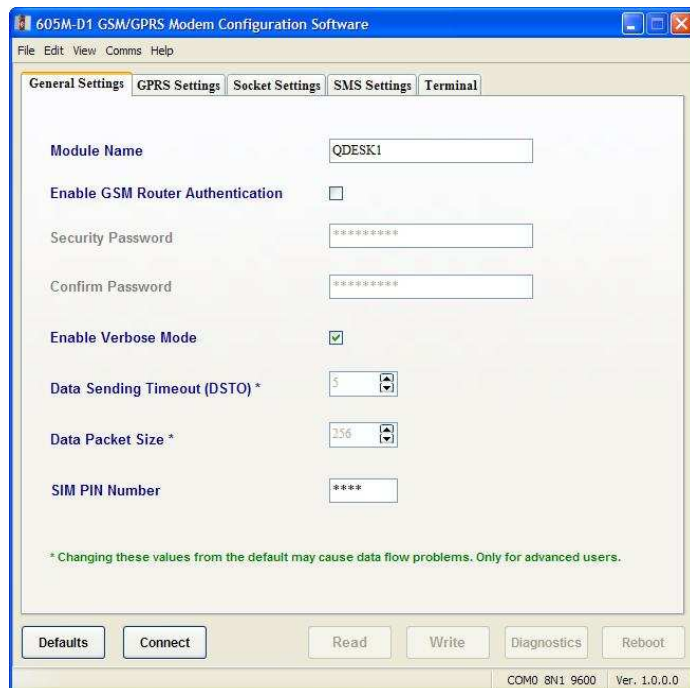
4.1.1   Installing Configuration Utility Software

System Requirements,

OS: Windows 98/2000/XP/Vista (Although it's been tested to work with older windows operating systems. It is designed to work best with XP and over.)

- CPU 1 GHz or over (P4 2 GHz or more recommended)
- 128 Mb RAM (at least 256 Mb recommended)
- 10 Mb free disk space
- 800 x 600 screen resolution (recommended 1024 x 768 or more)
- 1 RS-232 serial port

Double click on the "inst_605M-D1.exe" file to start the installation
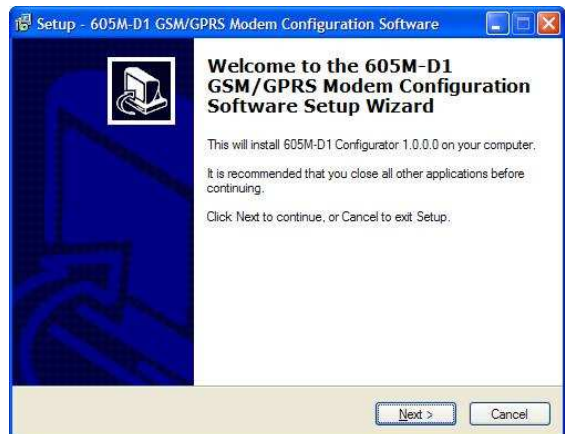
Click Next to see the License Agreement. Read it and accept it if you wish to proceed.
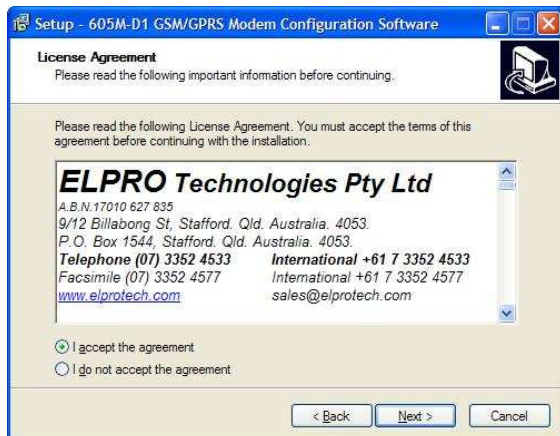
Select a different location or click Next to proceed
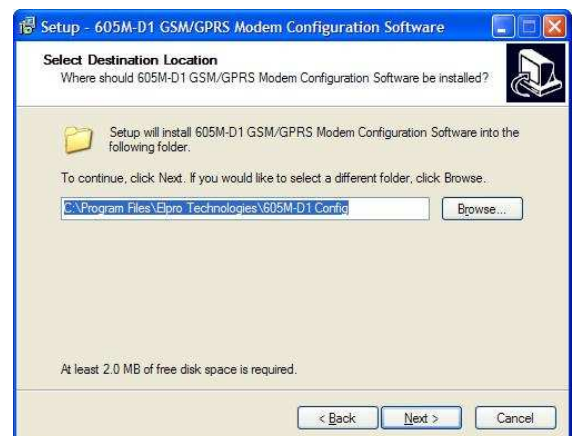
Click Next to proceed

Check "Create a desktop icon" if you wish to have a desktop shortcut installed. Click Next to proceed
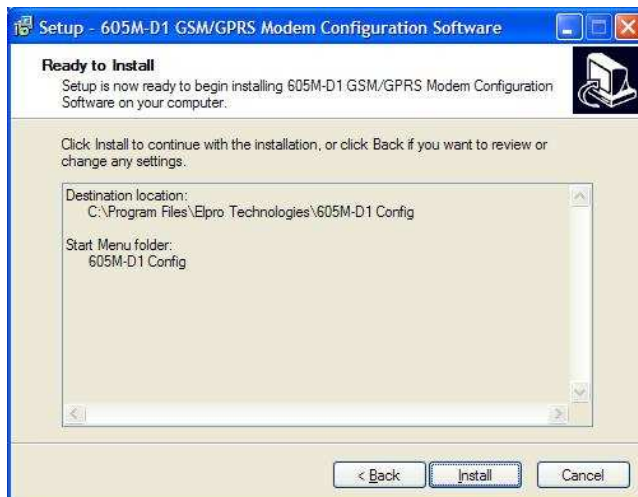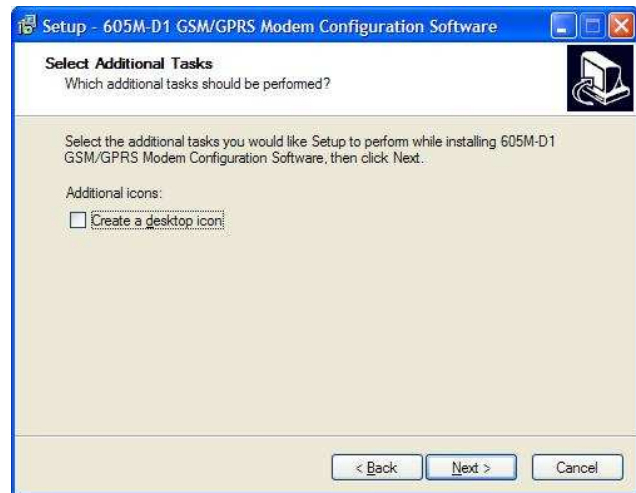
Click Install

Click Finish to complete the installation. The configuration software is now successfully installed and ready to be used.
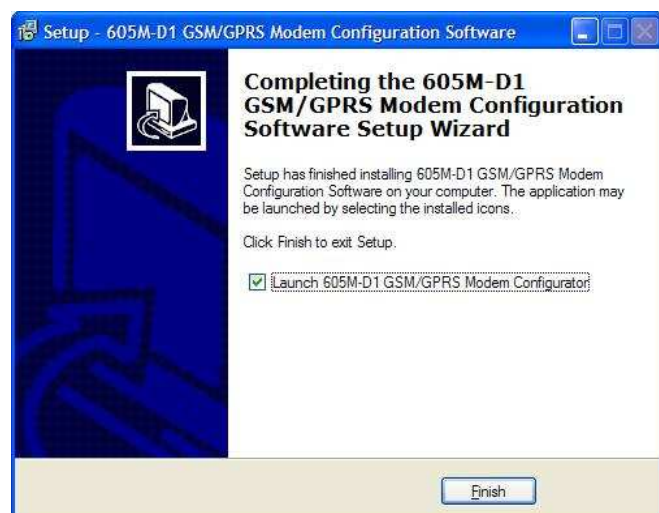
4.1.2   Startup and Connection

Launch the 605M-D1 GSM/GPRS Configuration Software by clicking on Start > Programs > 605M-D1 Config > 605M-D1 Configurator. If the configuration software is used for the first time it will display factory default values for all the settings. On subsequent uses it will automatically load the most recent configuration data that was entered.

Command Menu   Tabular Settings Page and Terminal Window
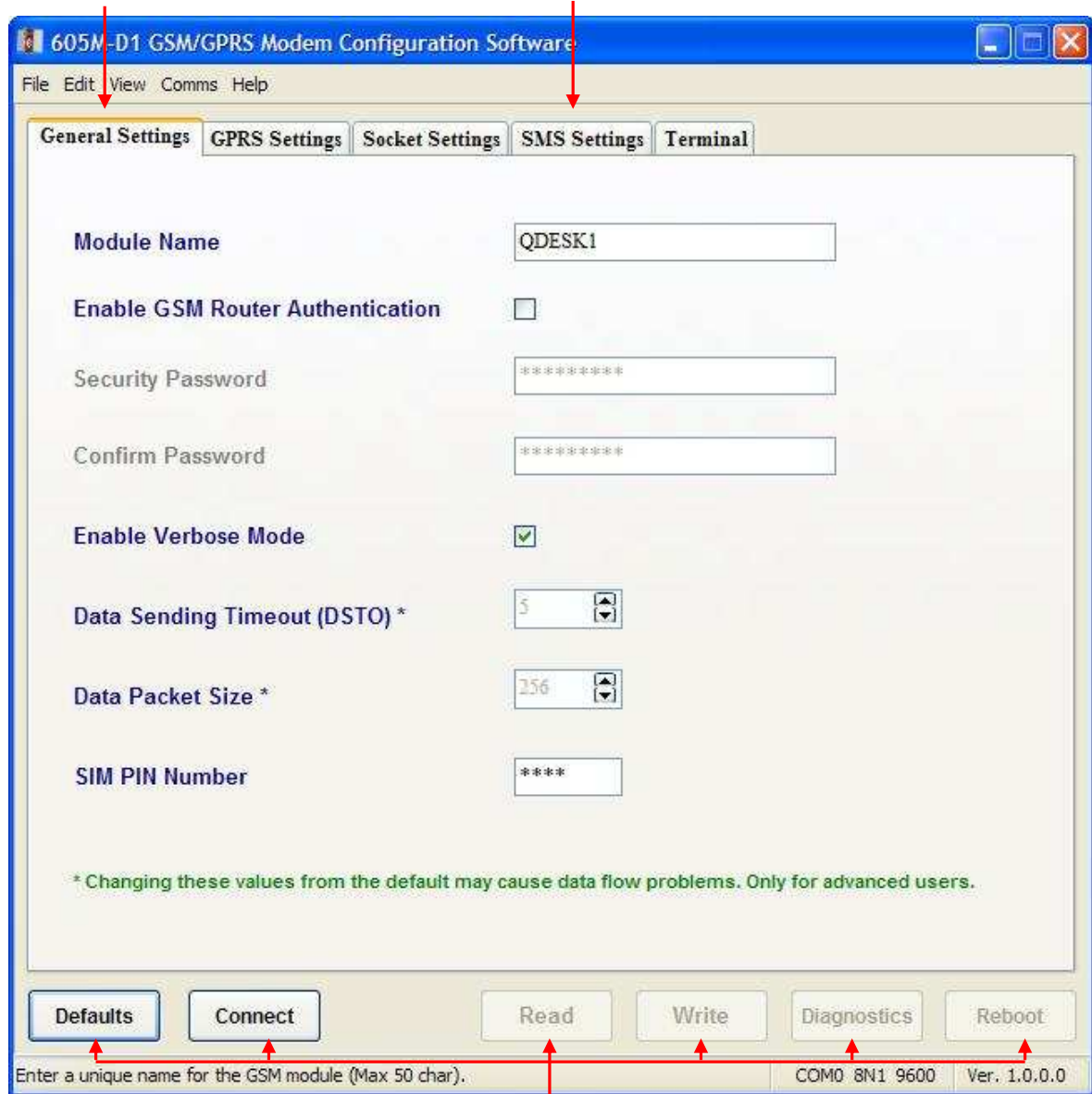
Context Sensitive Help Messages   Easy Access Command Buttons   Serial Port Settings   Software Version Number

Serial Port Settings:

All 605M-D1 modems have a fixed factory default serial baud rate of 9600. Any changes to this speed should be reflected in the serial port settings while establishing the connection to the modem.

If a com port is not already selected then the serial port settings window is automatically displayed when you hit the Connect button. Alternatively, it can be displayed by clicking on the command menu, Comms > Serial Port Setup

The default comm. port settings for connecting to a 605M-D1 modem are,

Baud Rate	:	9600
Data Bits	:	8
Parity	:	None
Stop Bits	:	1
Flow Control:		None

As you may notice that these fields are disabled by default and don't need to be changed. However, if you do need to change these settings then you have to select "Advanced Config" which is discussed later under the section Configuration > Advanced Config.
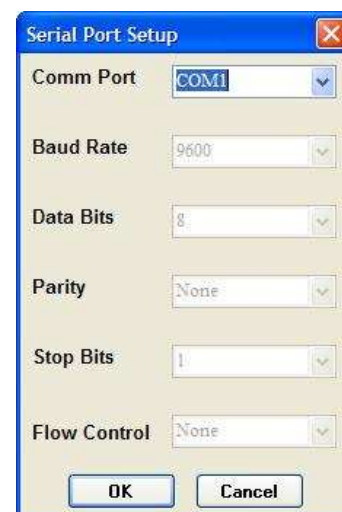
NOTE: Setting the serial baud rate of the 605M-D1 modem to auto (AT+IPR=0) may cause problems while performing diagnostics. Therefore, it is recommended to keep the serial baud rate to a fixed value.

Serial Connection:

Connect the 605M-D1 modem's RS-232 port to the serial port of the host PC and power it up. Once the modem is powered up it can go into two modes,

Automated Connection Mode: This is an ELPRO proprietary design and lets the 605M-D1 modems establish a M2M connection in conjunction with the 605M-R1 GSM/GPRS Routers. The 605M-D1 modem is programmed to go into the automated connection mode based on the stored configuration data if it does not receive an AT command on its RS232 port within 10 seconds of power up (booting). Refer to Appendix D for the automated connection mode flow diagram.

AT Command Mode: This is the mode we need to be in for talking to the modem through the configuration software. The easiest method is to initiate connection from the configuration software within 10 seconds of power up. The configuration software automatically sends an AT and you should get an OK back on successful connection. Failure to get an OK reply means you don't have the AT command mode or there is some other problem in communication with the modem (check serial connection and/or power cycle the modem).
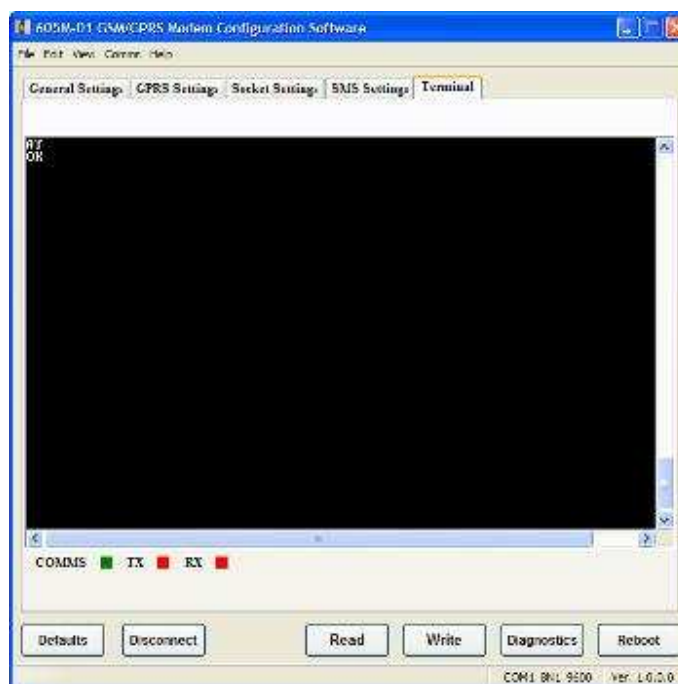
Alternatively, you can remove the SIM card from the 605M-D1 modem on startup which aborts the automated connection and returns to the AT command mode.

NOTE: Once the modem goes into the automated connection mode it takes control of the RS232 port and you are not able to communicate to it using AT commands. The modem will need to be power cycled to get back the AT command mode.
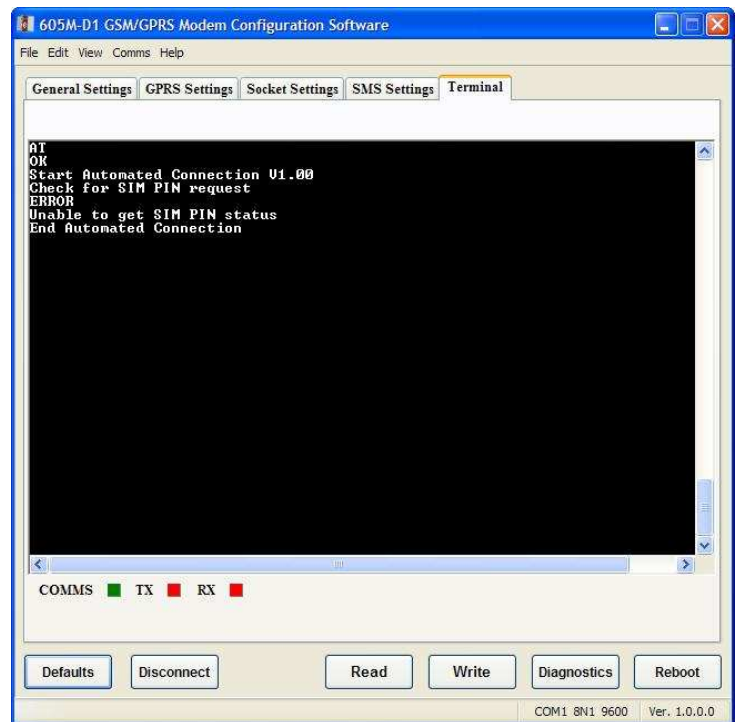
4.1.3   Configuration

The configuration software lets users configure the automated connection mode for the ELPRO 605M-D1 modems through an easy to use graphical user interface. It eliminates the need for the user to remember complex AT commands.

The configuration software can also be used to conveniently Save/Load configuration data To/From a file on a storage medium. This is very handy to quickly deploy a configuration profile to multiple modems or for backup purposes.

We don't actually need to be connected to the 605M-D1 modem while modifying the various configuration settings. The modem needs to be connected only while performing a modem Read/Write operation or while running diagnostics.

Various configuration settings are required by the 605M-D1 modems to successfully enable the M2M automated connection mode. The different configuration settings and other features are discussed in detail in the following sections.

Advanced Config:

Some settings in the configuration software are disabled by default. These settings are generally not meant to be changed and are only for advanced users. Any such advanced settings are highlighted throughout this document.

In case you need to enable these advanced settings, from the command menu click on View > Advanced Config or use the shortcut key Ctrl+F12.

WARNING: Advanced settings are only meant for advanced users. Changing these from defaults may cause connection and data flow problems.

General Settings:

Module Name: It is used to define a name for the 605M-D1 modem (max. 20 chars). This name is prepended to any outgoing SMS messages from the modem. Please try to use a name that is unique and easily identifiable by the operators.

Enable GSM router Authentication: This setting needs to be enabled only if you use password authentication while connecting through an ELPRO 605M-R1 router. It provides an extra level of security on the 605M-R1 router side to drop any unsolicited TCP connections. The password fields (max 32 chars) are enabled once this setting is enabled and the proper password needs to be entered.

Enable Verbose Mode: Check this if you need to see verbose messages in the terminal window while the 605M-D1 modem is running in the automated connection mode. This setting is great for debugging any connection problems.

An operator has to just look at the terminal window and identify the problem point. However, it is advised to disable verbose mode once the connection has been tested. This prevents unnecessary recording of these debug messages by the attached devices upon deployment.

Data Sending Timeout (DSTO): This sets the maximum time that the modem waits before sending anyway a packet whose size is less than the one defined by the Data Packet Size field. It is defined in 100ms units (10 = 1 sec). A value of 0 means that it waits forever for the defined packet size to arrive. The timeout starts when the beginning of the data packet arrives at the modem

The default timeout value is 5 (500ms). This is an advanced setting and does not need to be changed for normal operations. The time out begins from the time the first character in the data packet arrives at the modem.

Data Packet Size: This is an advanced setting that sets the packet size in bytes to be used by the TCP/IP stack for sending data. The default value is 256 (max value = 1500).

SIM PIN Number: This field is used to define the SIM card PIN number (max 8 chars) in case SIM PIN security is enabled on the 605M-D1 modem. It provides a great level of security against SIM card theft. If SIM PIN security is enabled then the modem will try to automatically enter this PIN on startup. If the PIN number is incorrect then it will immediately abort any further process of the automated connection mode. Exercise care while using this setting. Please refer to the section Diagnostics > PIN Code Request for more information.
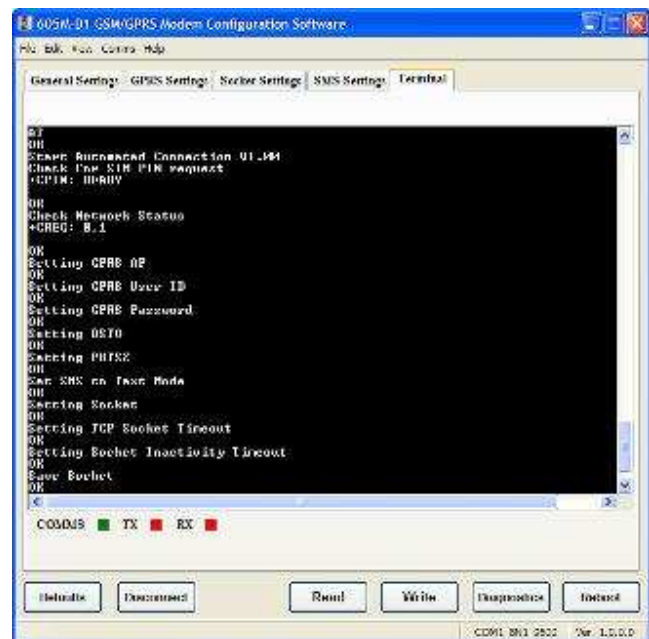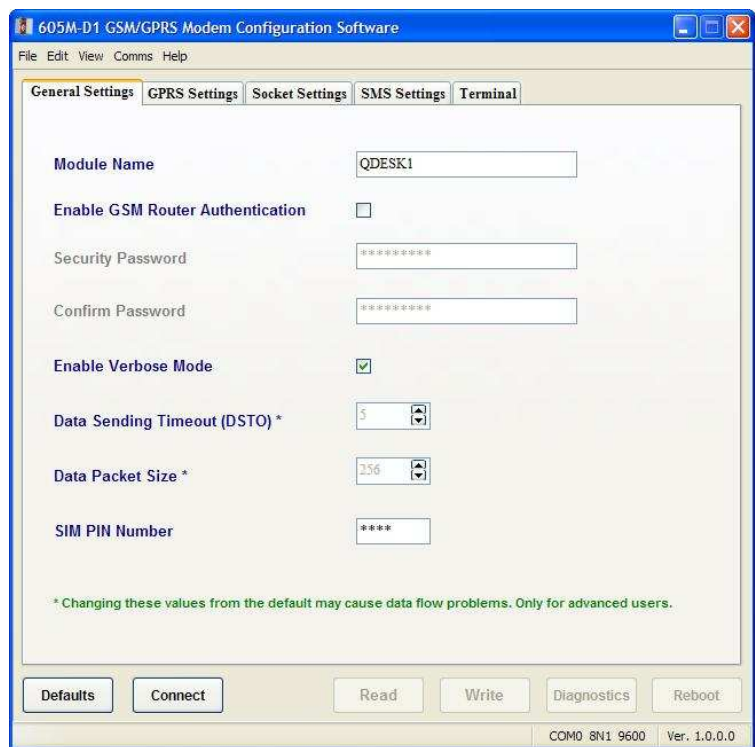
GPRS Settings:

This defines the various settings for successfully opening a GPRS connection. GPRS settings differ between mobile service providers around the world (refer to Appendix 3 for a non exhaustive list). Please consult your service provider for the proper GPRS settings.

Access Point Name: This is the default GPRS internet access point name of your mobile service provider.

GPRS User ID: This is the User ID to be used for the GPRS connection.

GPRS Password: This is the password to be used for the GPRS connection.

IP Address: This can be used to define an IP address for your GPRS connection. The default value is 0.0.0.0 which indicates that the 605M-D1 modem will get a dynamic IP from the service provider. This is an advanced setting and does not need to be changed. You will only change this if you have a static public IP assignment from your service provider.

Socket Settings:

These are the settings needed to successfully establish a TCP socket connection with the end device. The 605M-D1 is designed to work best with a 605M-R1 GSM/GPRS Router. All the 605M-D1 modems connect to the TCP port of 605M-R1 router over the GPRS network, which is then responsible for intelligently routing data between the modems (Please refer to Appendix 2 for connection scenarios).

Primary Host Address: Enter the IP address or domain name of the primary device the 605M-D1 modem will connect to.

Primary TCP Port Number: Enter the TCP port number of the primary device the 605M-D1 modem will connect to.

Enable Secondary Address: Check this box if you have a secondary device for the 605M-D1 modems to connect to incase the primary is unavailable. This provides redundancy in high availability scenario for continued operation.

Secondary Host Address: Similar to primary this defines the secondary host IP address or domain name when the secondary address is enabled.

Secondary TCP Port Number: Similar to primary this defines the secondary TCP port number when the secondary address is enabled.

Primary/Secondary Address Retry: This defines the number of times the primary and secondary addresses will be tried before the modem decides that something is wrong and sends out a warning SMS to operators. Default value is 3. You can increase this to a higher value. However, please note that no warning SMS will be sent out till it has tried that number of times. A better option is to use a moderate value in conjunction with "Remote SMS Reboot", and/or "Total Number of SMS sent" discussed later.
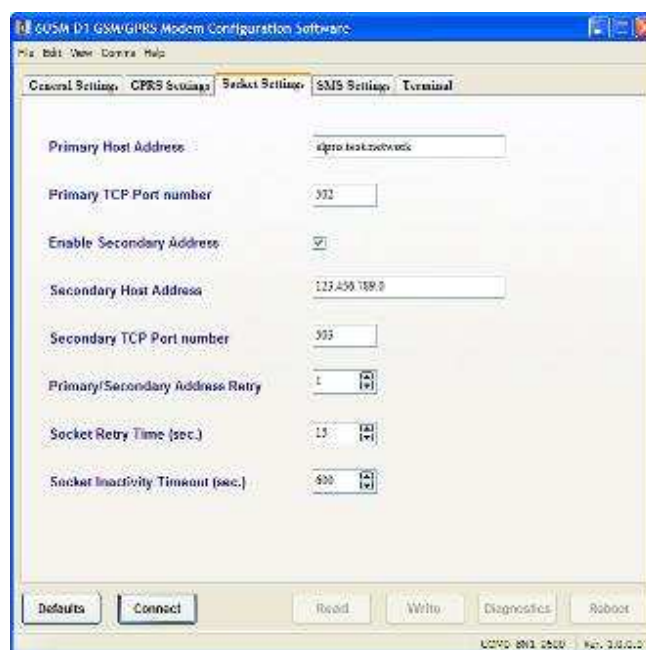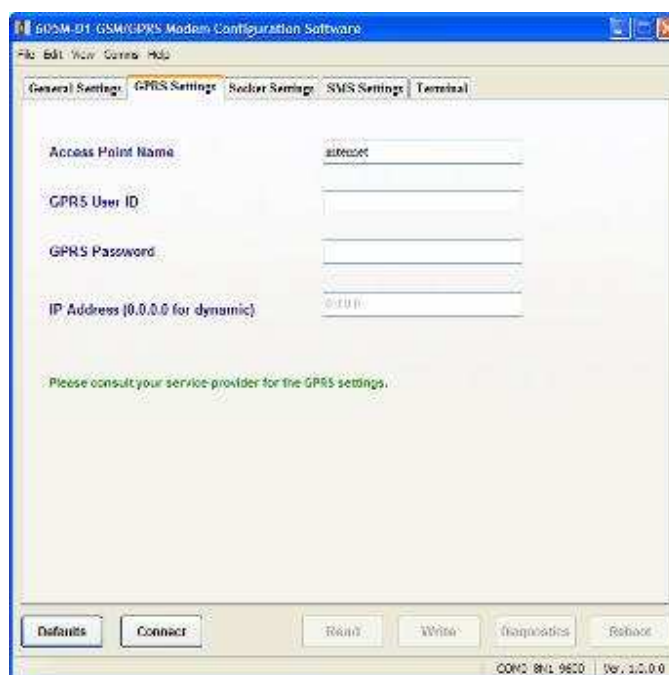
Socket Retry Time: This is the time in seconds to wait between address retries to open a TCP socket connection. The default value is 15 seconds. This gives the modem sufficient time to recover in case of signal drops or other temporary connection problems.

Socket Inactivity Timeout: This is the time in seconds to retry socket connection in case of data inactivity over the socket connection. The default value is 600 seconds = 10 minutes. You may want to modify it to a higher or lower value according to the polling period of the attached device (maximum 18 hours). For example, if an attached slave device is polled every 15 minutes by a master device then you need to set the socket inactivity timeout to a value greater than that (say 910 seconds). To disable, set to Zero.

Note: Each time the inactivity timeout occurs, the modem will disconnect and re-connect the socket in an attempt to recover the connection. This may incur a service charge from your operator, so it is important to ensure that you do not leave the modem powered with no activity when the inactivity timeout is enabled.

SMS Settings:

This is where all messaging related setting like phone numbers, short messages etc are defined.

SMS on successful Initialization: Enable this setting if an SMS is needed on the successful initialization of the 605M-D1 modem when it gets into the automated connection mode. The text box can be used to modify the default outgoing message. The module name is automatically appended to the message for easy identification by the operator. For example, this setting is very useful when "Remote SMS Reboot" is enabled to get an indicative SMS that the modem has actually rebooted and commenced automated connection.

SMS on socket Failure: This setting is used to enable/disable SMS warning after the set number of socket connection retries have failed. It is enabled by default (recommended). If it is disabled then no SMS will be sent out to the operators on connection failures. The text box can be used to modify the default outgoing message. The module name is automatically appended to the message for easy identification by the operator.
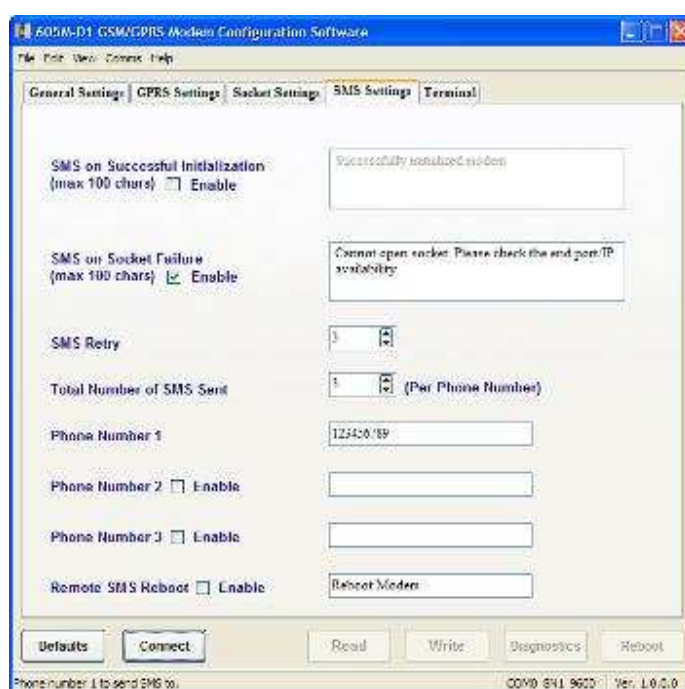
SMS Retry: The number of times the 605M-D1 modem will retry to send the messages in case of failures.

Total Number of SMS Sent: If Remote SMS Reboot is not enabled then the 605M-D1 modem is designed to repeatedly retry connection after the failure SMS has been sent. This setting is used to set the maximum number of SMS that will be sent out per phone number after which any further SMS sending is stopped. This avoids sending out endless SMS messages to the operators on every repeated failed connection attempt and provides a SMS capping mechanism for significant cost savings.

Phone Number 1: Enter the phone number of the operator that gets the enabled SMS messages. Please follow the same numbering format as you would use to send SMS through any other GSM device (mobile) in that area.

Phone Number 2: Same as phone number 1 this setting can be enabled to send SMS to a second operator.

Phone Number 3: Same as phone number 1 this setting can be enabled to send SMS to a third operator.

Remote SMS Reboot: This setting can be used to enable/disable the remote rebooting of the 605M-D1 via an SMS message. The text box can be used to modify the trigger string (case insensitive). When this setting is enabled, the modem will wait for an SMS message containing the reboot trigger string indefinitely once the number of socket connection retry has failed. If the SMS on Socket Failure is enabled then an indicative string "SMS reboot enabled" is also appended to the outgoing SMS message. This is useful to remind operators on connection failures that the 605M-D1 modem can be rebooted by sending an SMS to it. As an example, this setting is especially useful in

planned downtime scenarios where the operators don't want the modem to continuously retry connection but rather wait for the reboot SMS to resume connection.

Default Settings:

Sometimes it may be required by the user to quickly return all the settings in the configuration software to their factory default values. This can be easily done by clicking on the "Defaults" easy access command button.

WARNING: Using this button will clear all the fields to default values. Please make sure you save any custom configuration to avoid entering it all again.
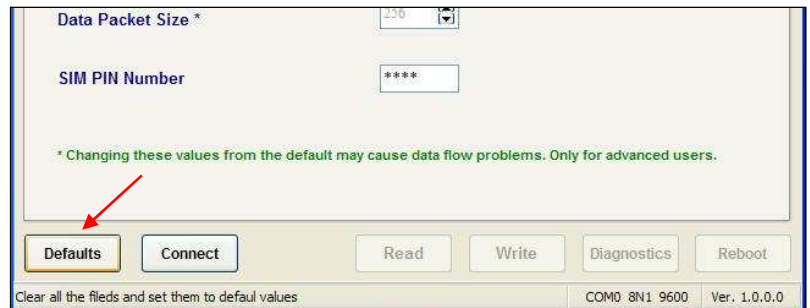
Write Configuration Data to Modem:

Any settings entered in the configuration software are not actually written to the 605M-D1 modem until you click on the "Write" command button. Please make sure that the modem is connected and you have AT command mode before doing this.

A progress bar is displayed indicating the amount of configuration data written to the modem. Once the transfer is complete you should get a message indicating the successful completion of the process.
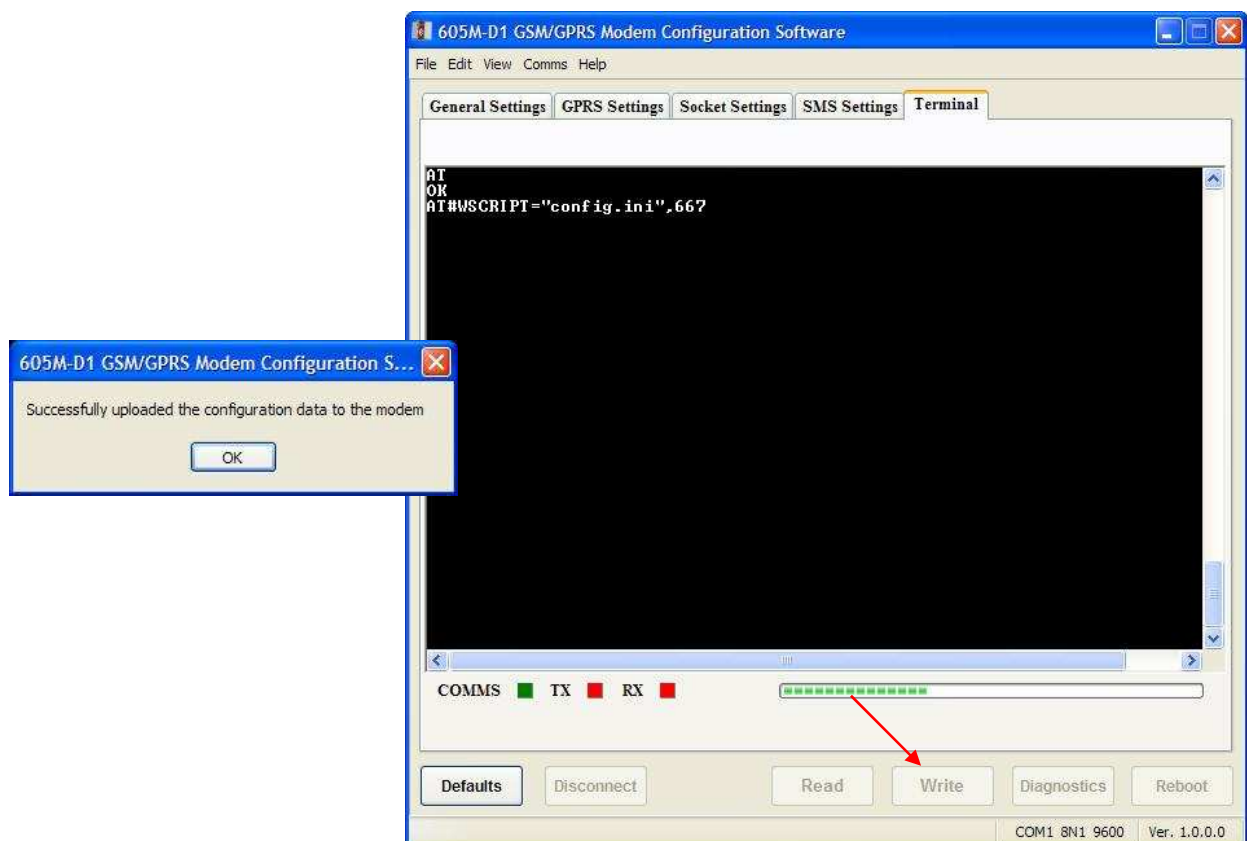
Read Configuration Data from Modem:

The configuration software settings can be easily populated by reading values from a pre configured modem. This is very handy to replicate or verify configuration data written on the 605M-D1 modem.

To read data from the modem click on the "Read" command button.

The cursor changes into an hourglass during the read operation. In case there is no configuration data present on the modem (fresh out of box) the configuration software will indicate that with an error message.

NOTE: The easiest way to verify read operation is to set the configuration software to default values and then read from the modem. This should repopulate all the fields with the values as read from the modem.
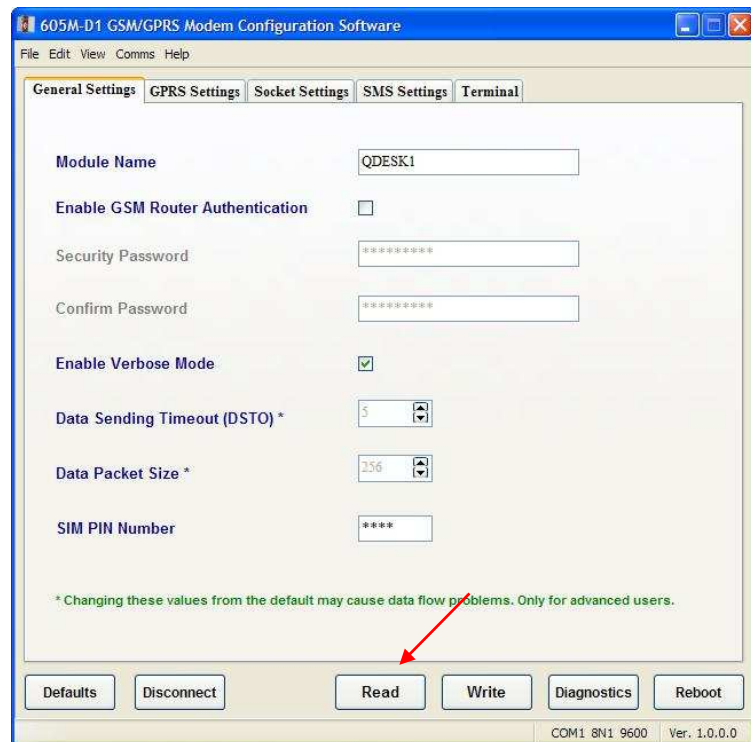
Save Configuration Data to File:

Data from the configuration software can be easily saved to a file on a storage medium. This feature is very useful for making backups of the configuration data.

To save configuration data to a file click on, File > Save Config File from the command menu. Alternatively you can also press the shortcut key Ctrl+S.

Now browse to the desired path and choose a suitable filename from the Save As popup dialog box.
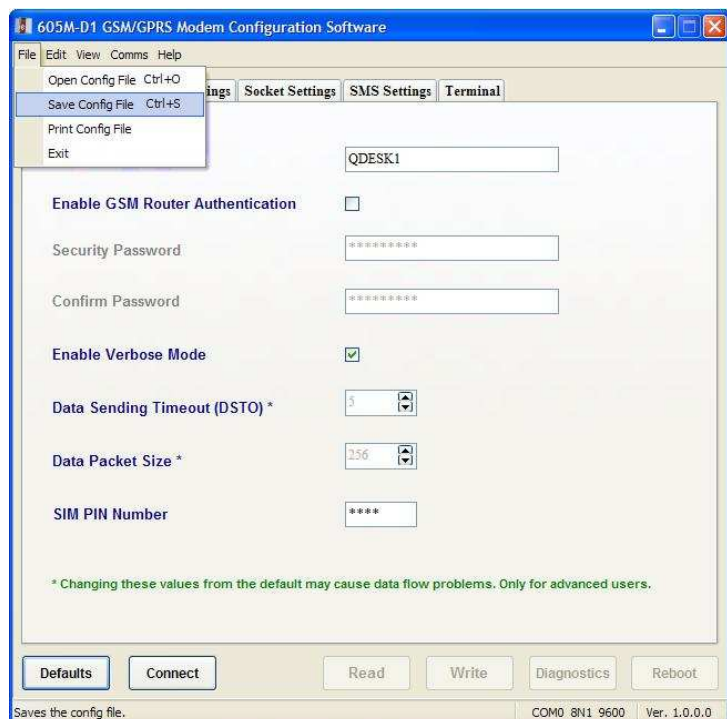
Load Configuration Data from File:

Saved configuration data files can be easily loaded back into the configuration software for quick restoration. This feature also greatly reduces the time for mass deployment of 605M-D1 modems with similar configuration settings.

To load configuration data from a file click on, File > Open Config File from the command menu. Alternatively you can also press the shortcut key Ctrl+O.

Now browse to the path and choose the desired configuration data file from the Open popup dialog box.
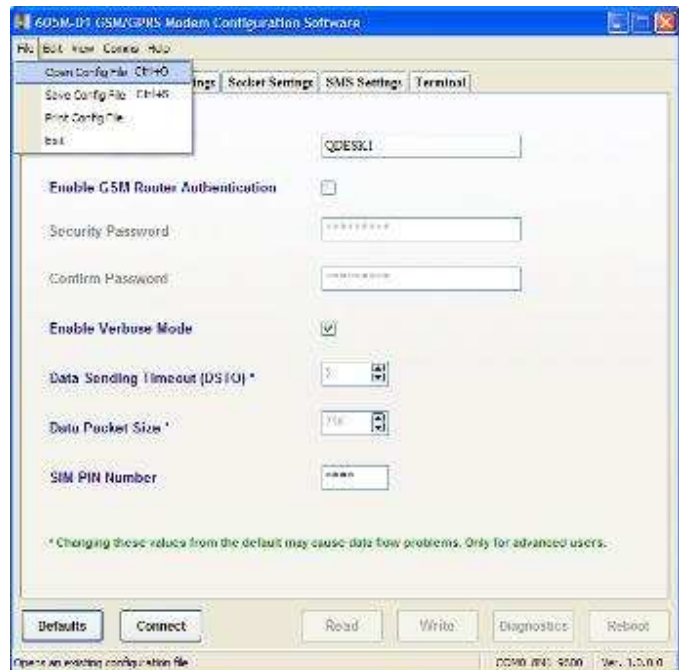
4.1.4 Diagnostics Using Configuration Utility

The configuration software can be used to easily get basic diagnostics information out of the 605M-D1 modem. The diagnostics screen can also be used to enable/disable SIM PIN security.

Connect to the 605M-D1 modem and click on the "Diagnostics" command button to get the diagnostics screen.

The configuration software will prompt you to make sure that the SIM card is inserted. The SIM card needs to be inserted into the 605M-D1 modem to successfully retrieve all the diagnostics information.
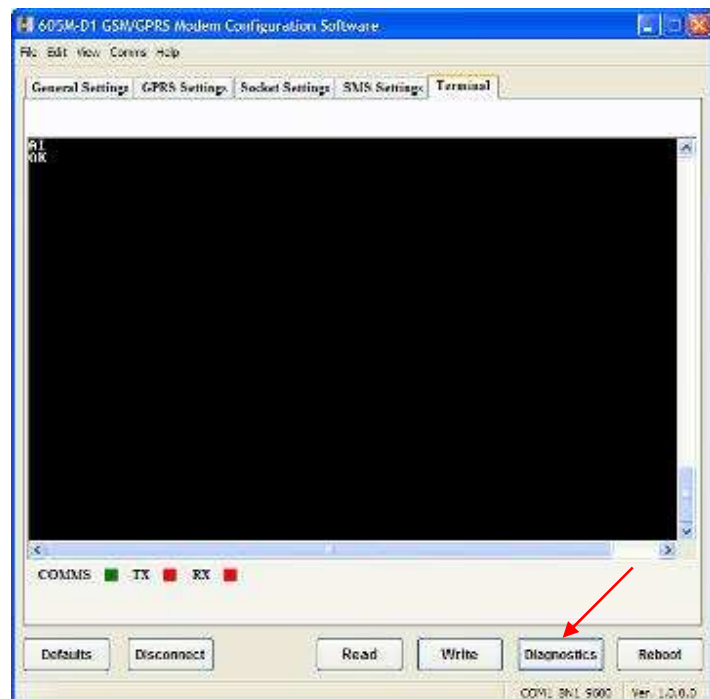
You will to get to the following diagnostics screen,

Click on the "Get Data" button to retrieve the diagnostics information and populate the fields. More detailed information about the each option is presented in the following sections.

Signal Strength:

The green bar indicates the received signal strength by the 605M-D1 modem. One bar indicates low signal strength and all four bars indicate a very good signal reception. For the advanced users the exact signal strength value in dBm is also indicated.

There is also provision to automatically refresh the signal strength at set repeated intervals in seconds. This is especially useful to perform a site signal survey to find the best installation location for the 605M-D1 modems.

IMEI Number:

This retrieves the International Mobile Equipment Identity serial number. The IMEI number is used by the GSM network to identify valid devices and therefore can be used to stop a stolen device from accessing the network. It is also a useful identifier for maintaining an asset register.

SMS SCN:

This indicates the Service Center Number for sending out SMS. Mobile service providers usually have multiple service center numbers in case one has a problem. In most cases this number does not need to be changed.

However, if there ever is a need to change it to an alternate number then you can click on the "Change SCN" button to easily modify it.

WARNING: Entering the wrong SMS Service Center Number will disable any outgoing message. Please use caution while changing this number.

PIN Code Request:

This indicates if SIM PIN security is enabled or not. It can also be used to actually turn on/off the SIM PIN code request on startup. SIM PIN security is very useful if you want to protect the SIM card from unauthorized use.

Once the PIN code request is turned ON the PIN number can also be modified by clicking on the "Change PIN" button.

If the PIN code request is turned ON then we also need to specify this SIM PIN number under the general settings of the configuration software. Otherwise the 605M-D1 modem will fail to enter the automated connection mode.

In most cases the default SIM PIN number is 0000. However, please double check with your mobile service provider.

WARNING: Please exercise caution while using SIM PIN security and changing the PIN number. Don't forget to specify the correct SIM PIN number under the general settings. Always remember the PIN number and if possible write it down and store it in a safe place. Repeated failed attempts to enter the correct PIN number will lock the SIM card

permanently. You will have to contact your mobile service provider to get it unlocked and in some cases it may even by rendered useless and need to be replaced.

Available Providers:

The 605M-D1 modem scans and displays the name of all the mobile network operators servicing the area. It may take a few seconds to display this information as the modem does a network scan. Operator names are displayed in separate lines in the following format.

> +COPS: (<operator availability>, <operator name>,"", <operator number>)

Where Operator Availability,

> 0 = unknown

> 1 = available

> 2 = current

> 3 = forbidden

For Example,

+COPS: (2,"AUS OPTUS","","50502")

+COPS: (3,"AUS VODAFONE","","50503")

For more detailed information please refer to AT+COPS in the AT commands guide.

When the 605M-D1 modem starts up it automatically selects the service provider based on the SIM card. In case of connection problems this information can be used to verify the mobile operator network the modem is actually connected to. This information is also useful if a person needs to find any other alternate mobile network operators servicing the area.

4.1.5   Configuration Utility Terminal

The configuration software comes built-in with a terminal emulator that can be used to interact with the 605M-D1 modems using AT commands. There is no need to have separate terminal software (like hyper terminal, procomm etc) for basic usage and provides an easy unified solution.
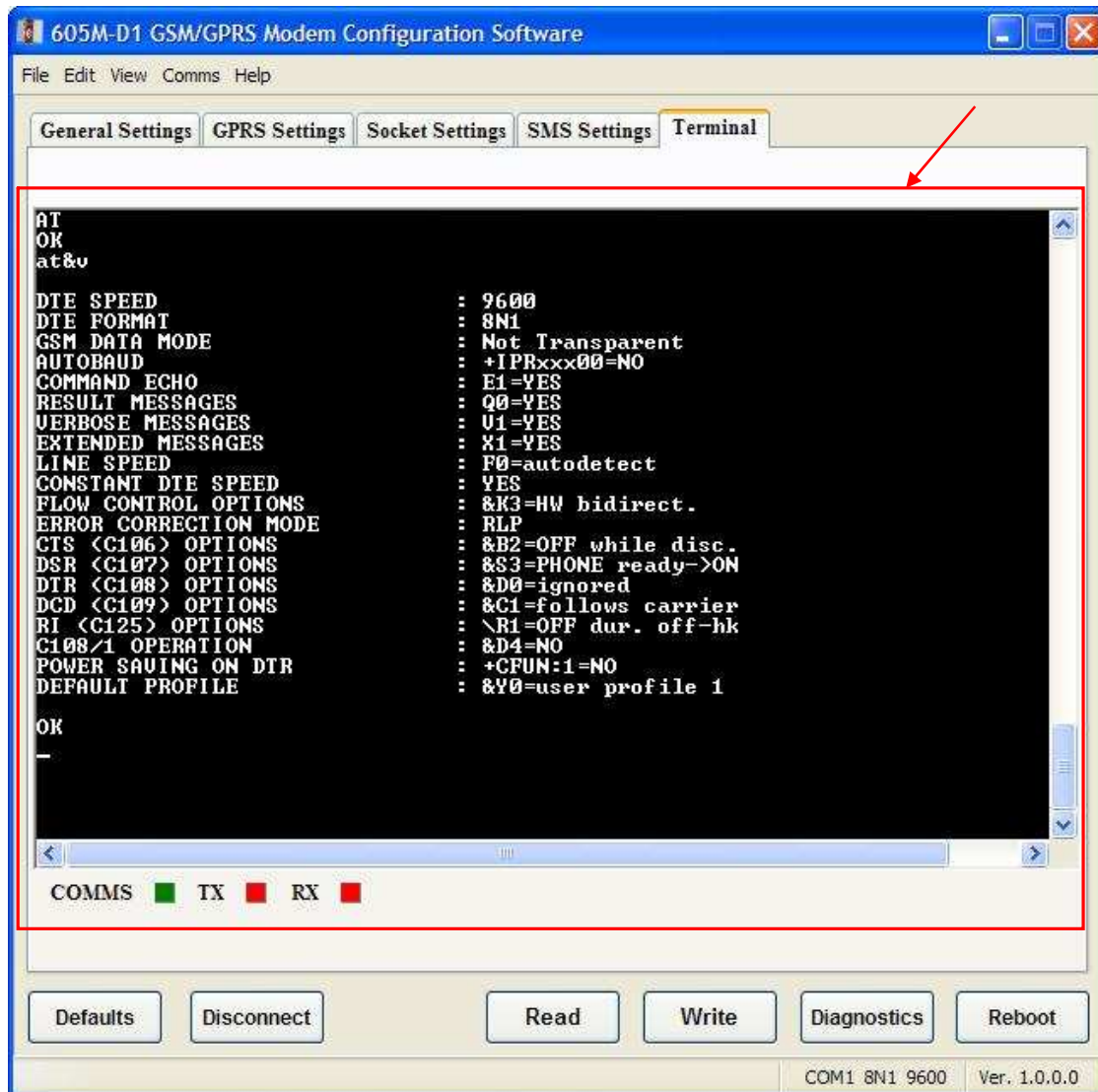
The Terminal window also has 3 status lights for easy visual inspection of the status of the serial connection.

> **COMMS:** Green when connected to a modem. Red when disconnected.
>
> **TX:** Green when data is being transmitted. Red when idle.
>
> **RX:** Green when data is being received. Red when idle.

NOTE: The built-in terminal emulator is designed to work exclusively with ELPRO's 605M-D1 GSM/GPRS modems. Usage with any other product is not supported and may cause undesirable effects.

4.2   Configuration using AT Commands

Depending on the application, it may be necessary to access the full functionality of the 605M-D1 using the AT Command set. A list of supported AT commands is provided in Appendix A of this manual. The following sections describe how to:

- configure the modem for GPRS access

- connect via FTP

- send and receive SMS messages

- and how to check and monitor network status.

NOTE When using Host equipment that controls the modem using AT commands you may want to disable the Automatic connection mode of operation. To do this, you need to enter the command

```
AT#ESCRIPT=""
```

This command only needs to be entered once to disable the automatic connection mode. If automatic connection mode is **not** disabled, the host equipment must send AT commands to the modem within 10 seconds after power up to ensure the modem doesn't attempt to connect automatically.

4.2.1   FTP File Transfer

A set of AT commands is available to support the FTP activities.

Setting up the FTP Timeout

The first command is called #FTPTO (FTP Time-Out) which defines the time-out for FTP operations. The module has already a factory default time defined that is 10s.

If it is needed to be modified, the syntax is:

AT#FTPTO[=<tout>]

Parameter:

<tout> - time-out in 100 ms units

100..5000 - hundreds of ms (factory default is 100)

NOTE: The parameter is not saved in NVM.

NOTE: if parameter **<tout>** is omitted the behavior of Set command is the same as Read command.

Example:

AT#FTPTO=1000<cr> (set the timeout to 100sec)

OK

Opening and Closing an FTP Connection

With the command **AT#FTPOPEN=<server:port>,<username>,<password>,<mode>** is possible to open the FTP connection. The parameters are:

<server:port> - string type, address and port of FTP server (factory default port 21).

<username> - string type, authentication user identification string for FTP.

<password> - string type, authentication password for FTP.

<mode>

0 - active mode (default)

1 - passive mode

In order to close the FTP connection the AT command **AT#FTPCLOSE** should be used.

Setting the FTP Transfer Type

With the command **AT#FTPTYPE[=<type>]** is possible to configure the file transfer type. The command must be provided during an FTP connection.

Parameter:

<type> - file transfer type:

0 - binary

1 - ASCII

NOTE: The command causes an **ERROR** result code to be returned if no FTP connection has been

opened yet.

NOTE: If the parameter is omitted then the behaviour of Set command is the same of Read command.

FTP File Transfer to the server

With the command **AT#FTPPUT=<filename> ,** to issued during an FTP connection, is possible to open a data connection and starts sending **<filename>** file to the FTP server.

If the data connection succeeds, a **CONNECT** indication is sent, otherwise a **NO CARRIER** indication is sent.

Parameter:

<filename> - string type, name under which you choose to save the file on the server (must have the

right extension: es. if the file you're sending is .txt then the **<filename>** can be test.txt)

NOTE: use the escape sequence **+++** to close the data connection.

NOTE: The command causes an **ERROR** result code to be returned if no FTP connection has been

opened yet.

Example of an FTP file transfer to the server:

Define PDP contest:

AT+CGDCONT=1,"IP", "internet.wind.biz"<cr>

OK

GPRS Context Activation, as response gives IP of the module:

AT#SGACT=1,1 <cr>

#SGACT: 193.199.234.255

OK

Opening of FTP connection:

AT#FTPTO=1000<cr> (FTP settings of time-out)

OK

AT#FTPOPEN="199.188.25.77","user","pass",0<cr>

OK

In this case port of FTP server is not specified, which means that it has the default value: 21

AT#FTPTYPE=0<cr> (FTP settings of file type)

OK

FTP file transfer to the server in the file named "file.txt":

AT#FTPPUT="file.txt"<cr>

CONNECT

(send the file)

+++ (escape sequence **+++** to close the data connection)

NOCARRIER

AT#FTPCLOSE<cr> (closing FTP connection)

OK

Deactivation of GPRS context if required:

AT#SGACT=1,0<cr>

OK

FTP File download from the server

With the command **AT#FTPGET=<filename> ,** to issued during an FTP connection, opens a data connection and starts getting a file **<filename>** from the FTP server.

If the data connection succeeds, a **CONNECT** indication is sent, otherwise a **NO CARRIER** indication is sent. The file is received on the serial port.

Parameter:

<filename> - file name, string type.

NOTE: The command causes an **ERROR** result code to be returned if no FTP connection has been opened yet.

Example of an FTP file download from the server:

Define PDP contest:

AT+CGDCONT=1,"IP", "internet.wind.biz"<cr>

OK

GPRS Context Activation, as response gives IP of the module:

AT#SGACT=1,1 <cr>

#SGACT: 193.199.234.255

OK

Opening of FTP connection:

AT#FTPTO=1000<cr> (FTP settings of time-out)

OK

AT#FTPOPEN="199.188.25.77","user","pass",0<cr>

OK

In this case port of FTP server is not specified, which means that it has the default value: 21

AT#FTPTYPE=0<cr> (FTP settings of file type)

OK

AT#FTPCWD="incoming" (change working directory if requiered)

OK

In order to get the list of files on the working directory from the server AT command AT#FTPLIST

should be used.

Downloading FTP file "file.txt" from the server:

AT#FTPGET="file.txt"<cr>

CONNECT

(receive the file)

Data connection will be closed automatically when the file sending is terminated:

NO CARRIER

AT#FTPCLOSE<cr> (closing FTP connection)

OK

Deactivation of GPRS context if required:

AT#SGACT=0<cr>

OK

4.2.2   SMS Messsaging

The Modem supports transmission and reception of SMS messaging. To use SMS messaging, you need to configure a service center address (Phone number). This is done with the AT+CSCA command. To send SMS messages, use the AT+CMGS command. To receive SMS messages, use the AT+CMGR command. To control the way the modem reports the arrival of new SMS messages, us the AT+CNMI command.

Note: SMS Messaging is a highly configurable system in the 605M-D1. The following examples assume that all settings are at their defaults, except for message format which is set to text mode. For more detail on how to use SMS messaging, refer to ELPRO support for a detailed AT command summary.

Setting the message format

The following descriptions assume text mode for SMS messages. To set text mode, issue the following:

AT+CGMF=1

Setting the service center address

Set the service center address with the AT+CSCA command.

AT+CSCA=<*number*>,129

Where <*number*> is the phone number for the service center. To specify the number in international format (leading "+" for international numbers,

AT+CSCA=<*number*>,145

Sending an SMS message.

Send an SMS message with the AT+CMGS command.

AT+CMGS=<*number*>,129

Where <*number*> is the phone number to send the message to. To specify the number in international format (leading "+" for international numbers,

AT+CMGS=<*number*>,145.

at this stage, the modem will respond with a string requesting the text message to send. This is <carriage return>, <line feed>, greater-than-symbol ">", and a space " ".

Enter the message to send, followed by Ctrl-Z (0x1A) to send the message.

Receiving an SMS message.

Receive SMS messages with the AT+CMGR command.

AT+CMGR=<message index>

<*message index*> is set to 0 for the most recently received message.

If <message index> refers to a valid message, output will be the string

+CMGR: <status>,<sender number>,<arrival time>,[optional other parameters]<CR><LF><data>

The <*status*> is one of "REC UNREAD" or "REC READ"

<*sender number*> is the sender's phone number.

<*arrival time*> is the time the message was received at the modem.

Refer to the detailed command reference for [*optional other paramters*].

<*data*> is the message data.

If there is no message available at this index, the output is the string

ERROR.

4.2.3   Network Signal Survey

As an aid to network planning, the 605M-D1 provides a feature to scan all available network channels, and report the signal quality and network name of any detected signals.

To perform a network survey, Issue the command:

AT#CSURV

The modem will respond with the message:

Network Survey Started …

A short time later, the modem will list all detected stations, along with information about each station.

The important values reported are:

rxLev: - This is the received signal level in dBm. A smaller number (less negative) indicates a better signal.

mcc, **mnc** – These are the Mobile country code and mobile network code. These can be used to identify the network that the detected base station is a part of.

Some useful country codes and network codes are listed in Appendix C.

4.2.4   Jamming Detection and Reporting

The Jamming Detect & Report feature allows a **ELPRO 605M-D1**to detect the presence of a disturbing device such as a Communication Jammer and give indication to the user and/or send a report of that to the network.

This feature is accessed via the #JDR command.

This feature can be very important in alarm, security and safety applications that rely on the module for the communications. In these applications, the presence of a Jammer device can compromise the whole system reliability and functionality and therefore shall be recognized and reported either to the local system for countermeasure actions or to the network providing remote actions.

When Jamming Detection is enabled, the modem will issue a message from it's RS-232 serial port whenever a jamming signal is detected. This message will be "#JDR JAMMED". If the jamming signal is no longer detected, the modem issues the message "#JDR OPERATIVE". The modem may also be configured to report the status a jamming signal on a regular (3 –second) time period.

To disable Jamming detection, issue the command "AT#JDR=0"

To enable Jamming detection with status reporting on change of status, "AT#JDR=2"

To enable Jamming detection with 3-second status reporting, "AT#JDR=4"

4.2.5   Configuring the GPRS Access

The GPRS access configuration is done by setting:

• the GPRS context number 1 parameters (see +CGDCONT command)

• the Authentication parameters: User Name and Password (see commands #USERID, #PASSW)

Configuring the Embedded TCP/IP Stack

The TCP/IP stack behaviour must be configured by setting:

• the packet default packet size (see command #PKTSZ)

• the data sending timeout (see command #DSTO)

• the socket inactivity timeout (see command #SKTTO)

Defining the Internet Peer to be Contacted

As last setting definition, the host to be contacted and on which port/protocol must be set:

• the socket definition (see command #SKTSET)

This command permits also to specify the host name instead of its IP address, if a host name is given to the set command, then the module stores it as a host nick name. It is care of the module user to guarantee that the host nick name provided corresponds to an existing internet peer.

If a host nick name has been given then, while opening the connection in response to the AT#SKTOP command, the module will autonomously activate a GPRS connection and query its DNS to obtain the IP address relative to the host nick name provided. This process of context activation and DNS query may require a bit more time and requires that the GPRS network coverage is good enough to permit data transfers.

Open the Connection with the Internet Host

With the AT#SKTOP all the process required to connect with the internet host starts:

• ELPRO 605M-D1activates the first context

• ELPRO 605M-D1proceeds to the authentication

• Eventually does the DNS query to resolve the IP address of the host name internet peer

• ELPRO 605M-D1establishes a TCP/UDP (depending on the parameter request) connection with the given internet host

• Once the connection is up the module reports the code: CONNECT

From this moment the data incoming in the serial port is packet and sent to the Internet host, while the data received from the host is serialized and flushed to the Terminal Equipment.

Close the Socket and Deactivate the Context

The connection can be closed because of:

• remote host TCP connection close

• socket inactivity timeout

• Terminal Equipment by issuing the escape sequence "+++"

• Network deactivation

NOTE: if in the raw data to be sent there's an escape sequence, then the TE must work it out and sent it in a different fashion to guarantee that the connection is not closed.

The pause time is defined in the parameter S12.

On the reception of an escape sequence the ELPRO 605M-D1closes the connection, deactivates the GPRS context returning to command mode and issuing the NO CARRIER code.

4.2.6   EASY GPRS Outgoing Connection

The EASY GPRS feature provides a way to place outgoing TCP/UDP connections and keep the same IP address after a connection, leaving the GPRS context active.

The steps that will be required open a socket and close it without closing the GRPS context are:

• configuring the GPRS Access

• configuring the embedded TCP/IP stack behaviour

• defining the Internet Peer to be contacted

• request the GPRS context to be activated

• request the socket connection to be opened

• exchange data

• close the TCP connection while keeping the GPRS active

All these steps are achieved through AT commands. As for common modem interface, two logical status are involved: command mode and data traffic mode.

• In Command Mode (CM), some AT commands are provided to configure the Data Module

Internet stack and to start up the data traffic.

• In data traffic mode (Socket Mode, SKTM), the client can send/receive a raw data stream which will be encapsulated in the previously configured TCP / IP packets which will be sent to the other side of the network and vice versa. Control plane of ongoing socket connection is deployed internally to the module.

Configuring the GPRS Access

The GPRS access configuration is done by setting:

• the GPRS context number 1 parameters (see +CGDCONT command)

• the Authentication parameters: User Name and Password (see commands #USERID, #PASSW)

Configuring the Embedded TCP/IP Stack

The TCP/IP stack behaviour must be configured by setting:

• the packet default packet size (see command #PKTSZ)

• the data sending timeout (see command #DSTO)

• the socket inactivity timeout (see command #SKTTO)

Defining the Internet Peer to be Contacted

As last setting definition, the host to be contacted and on which port/protocol must be set:

• the socket definition (see command #SKTSET)

This command permits also to specify the host name instead of its IP address, if a host name is given to the set command, then the module stores it as a host nick name. It is care of the module user to guarantee that the host nick name provided corresponds to an existing internet peer.

If a host nick name has been given then, while opening the connection in response to the AT#SKTOP command, the module will autonomously activate a GPRS connection and query its DNS to obtain the

IP address relative to the host nick name provided. This process of context activation and DNS query may require a bit more time and requires that the GPRS network coverage is good enough to permit data transfers.

Note that this setting command is not needed if the new #SKTD command is used.

4.2.7   Request the GPRS context to be Activated

With the new command #GPRS you can activate or deactivate a GPRS context INDEPENDENTLY

from the TCP socket opening,

AT#GPRS=1 activates the context,

AT#GPRS=0 deactivates the context

Therefore with the AT#GPRS=1 command the module

• ELPRO 605M-D1activates the context previously defined with AT+CGDCONT

• ELPRO 605M-D1proceeds to the authentication

• Note that activating a context implies getting an IP address from the network and this will be

maintained throughout the session.

The response code to the AT#GPRS=1 command reports the IP address obtained from the network, allowing the user to report it to his server or application.

Deactivating the context implies freeing the network resources previously allocated to the device.

Open the Connection with the Internet Host

With the command #SKTD (socket Dial) the TCP/UDP request to connect with the internet host starts:

• Eventually does the DNS query to resolve the IP address of the host name internet peer

• ELPRO 605M-D1establishes a TCP/UDP (depending on the parameter request) connection with the given internet host

• Once the connection is up the module reports the code: CONNECT

Note that the peer specifications of this socket Dial are within the command and not the one stored with #SKTSET command.

From this moment the data incoming in the serial port is packet and sent to the Internet host, while the data received from the host is serialized and flushed to the Terminal Equipment.

NOTE: this command differently from the AT#SKTOP DOES NOT automate all the process of

activating the GPRS, if no GPRS is active the command reports ERROR; therefore before issuing this command the GPRS shall be activated with AT#GPRS=1 command.

In the same manner, when disconnecting the #SKTD command does not close the GPRS context, leaving it active for next connections until an AT#GPRS=0 command is issued or the network requests a context closing.

Close the Socket without deactivating the context

The connection can be closed because of:

• remote host TCP connection close

• socket inactivity timeout

• Terminal Equipment by issuing the escape sequence "+++"

• Network deactivation

NOTE: if in the raw data to be sent there's an escape sequence, then the TE must work it out and sent it in a different fashion to guarantee that the connection is not closed.

The pause time is defined in the parameter S12.

On the reception of an escape sequence if the socket was opened with the AT#SKTD command, the ELPRO 605M-D1 closes the connection, does not deactivate the GPRS context and returns to command mode issuing the NO CARRIER code.

4.2.8 EASY GPRS Incoming Connection

The EASY GPRS feature provides a way to accept incoming TCP/UDP connections and keep the same IP address after a connection, leaving the GPRS context active.

The steps that will be required to open a socket in listen, waiting for connection requests from remote hosts and accept these request connections only from a selected set of hosts, then close it without closing the GRPS context are:

• configuring the GPRS Access

• configuring the embedded TCP/IP stack behaviour

• defining the Internet Peer that can contact this device (firewall settings)

• request the GPRS context to be activated

• request the socket connection to be opened in listen

• receive connection requests

• exchange data

• close the TCP connection while keeping the GPRS active

All these steps are achieved through AT commands.

As for common modem interface, two logical status are involved: command mode and data traffic mode.

• In Command Mode (CM), some AT commands are provided to configure the Data Module

Internet stack and to start up the data traffic.

• In data traffic mode (Socket Mode, SKTM), the client can send/receive a raw data stream which will be encapsulated in the previously configured TCP / IP packets which will be sent to the other side of the network and vice versa. Control plane of ongoing socket connection is

deployed internally to the module.

Defining the Internet Peer that can contact this device (firewall settings)

The ELPRO 605M-D1 has an internal Firewall that controls the behaviour of the incoming connections to the module.

The firewall applies for INCOMING (listening) connections, OUTGOING connections will be always done regardless of the firewall settings.

Firewall General policy is DROP, therefore all packets that are not included into an ACCEPT chain rule will be silently discarded.

When packet incomes from the IP address <incoming IP>, the firewall chain rules will be scanned for matching with the following criteria:

<incoming IP> & <net mask> = <ip_address> ?

if the result is yes, then the packet is accepted and the rule scan is finished, otherwise the next chain is taken into account until the end of the rules when the packet is silently dropped if no matching was found.

For example, let assume we want to accept connections only from our devices which are on the IP addresses ranging from:

197.158.1.1 to 197.158.255.255

We need to add the following chain to the firewall:

AT#FRWL=1,"197.158.1.1","255.255.0.0"

Request the socket connection to be opened in listen

With the command #SKTL (socket Listen) the TCP request to start listening for connection

requests is executed:

- ELPRO 605M-D1opens a listening socket on the port specified, waiting for incoming TCP

connections (depending on the parameter request) with the internet hosts

The parameters that shall be specified are the local port where packets shall be received, the type of socket and the closing behaviour.

Receiving connection requests

Once the connection request is received, the module reports an indication of connection with an

unsolicited code +CONN FROM: <remote address>

- then connection is accepted and once it is up the module reports the code:

CONNECT From this moment the data incoming in the serial port is packet and sent to the Internet host, while the data received from the host is serialized and flushed to the Terminal Equipment.

Note that the connections request are FIRST screened in the firewall, then if they are accepted they pass to the listening socket; therefore only hosts that are in the ACCEPT chain rules of the firewall can induce a connection request, the other host requests will be silently discarded without any indication to the remote host (for security reasons).

Once the connection is received and closed, the socket is not anymore in listen. If the application needs again to be in listen, then it shall send again the socket listen #SKTL command.

NOTE: this command differently from the AT#SKTOP DOES NOT automate all the process of

activating the GPRS, if no GPRS is active the command reports ERROR; therefore before issuing this command the GPRS shall be activated with AT#GPRS=1 command.

In the same manner, when disconnecting the #SKTL command does not close the GPRS context, leaving it active for next connections until an AT#GPRS=0 command is issued or the network requests a context closing.

Chapter Five   SPECIFICATIONS
5.1   Module Dimensions
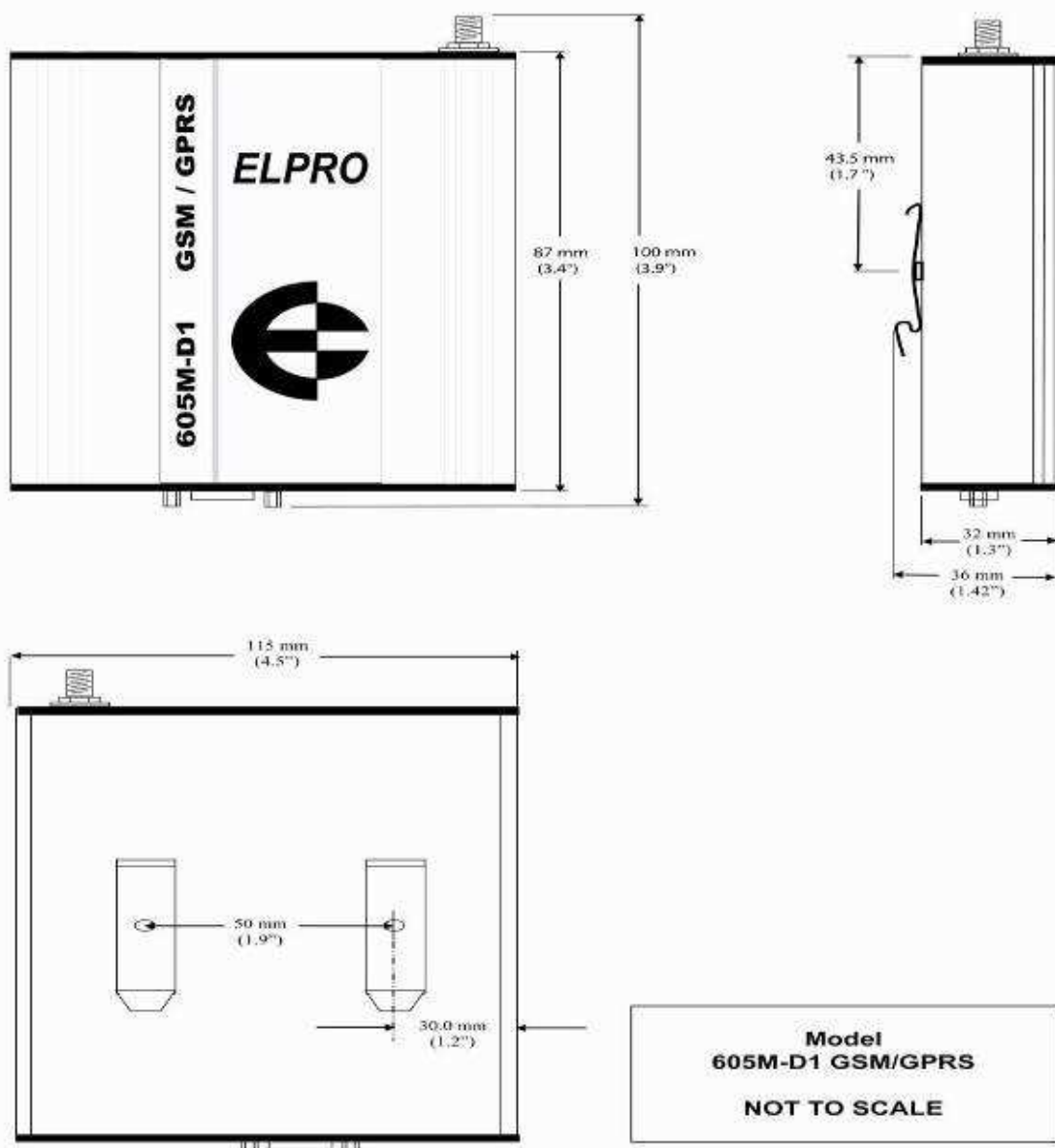
5.2   Module Specifications

Power - supply	12-24VDC: nominal 12VDC 1.2A (max ripple 120mV)				
Power - draw	Quiescent 8mA @12VDC: transmission 110mA @ 12VDC (average)				
SIM type	GSM 11.14, Phase 2, 3V, push-push, 'hot removal' while operating				
Supported Protcols	Packet Data Transfer GPRS Class B, Multi-slot classes 8 and 10 Data transmission at GSM 07.07, 07.05 standards Circuit Switched Data (CSD) to 14.4 Kbps Fax service to Class 1, Group 3 SMS - MT/MO Cell Broadcast new SMS signaling				
Transmitter output power	Mode	Class	Nom RF Power	Gain	Impedance
	GSM-850/900	4	2W (peak)	+33dBm	50 ohm
	DCS-1800/PCS-1900	1	1W (peak)	+30dBm	50 ohm
Operating Frequencies	Mode	Freq Tx(MHz)	Freq Rx(MHz)	Channels	Tx-Rx offset
	E-GSM-900	890.0 - 914.8 880.2 - 889.8	935.0 - 959.8 925.2 - 934.8	0 - 124 975-1023	45 45
	GSM-850	824.2 - 848.8	969.2 - 893.8	128 - 251	45
	DCS1800	1710.2 - 1784.8	1805.2 - 1879.8	512 - 885	95
Receiver sensitivity (normal operating temperature)	Mode	Class	Sensitivity	Impedance	
	GSM-850/900	4	-107dBm	50 ohm	
	DCS-1800/PCS-1900	1	-106dBm	50 ohm	
User Interface and cable	RS232 D9 pin female : cable RS232 D9 male to RS232 D9 male (3m max)				
Antenna connector type	SMA Female Class 4 (2W)				
Antenna compliance specifications	Bandwidth	EGSM 900 band 80MHz GSM 850 band 70 MHz DCS 1800 band 170 MHz PCS 1900 band 140 MHz			
	Gain	VSWR absolute max <= 10:1 VSWR recommended <= 2:1 Gain minimum 1.5DbI			
	Impedance	50 Ohm			
	power	2W peak			
Approvals	RoHS, GSM				
Environmental compliance	ETSI reference document GSM 05.05 Release 1999 ETSI EN300910 V8.4.1				
Temperature range	-20°C - +55°C (operation below -10 ^{o}C may affect receiver sensitivity)				
Mounting	Din-rail				
Weight	0.2 kg (7 ounces)				

Appendix A   AT Command Summary

The ELPRO 605M-D1 supports the following AT Commands. The following list provides a summary of the supported AT commands. For a detailed list of the AT command functionality, contact ELPRO support.

General Configuration Commands - AT Interface Backward Compatibility

#SELINT   Select Interface Style

Hayes AT Commands - Generic Modem Control

&F   Set To Factory-Defined Configuration

Z   Soft Reset

+FCLASS   Select Active Service Class

&Y   Designate A Default Reset Basic Profile

&P   Designate A Default Reset Full Profile

&W   Store Current Configuration

&Z   Store Telephone Number In The Module

Internal Phonebook

&N   Display Internal Phonebook Stored Numbers

+GMI   Manufacturer Identification

+GMM Model Identification

+GMR Revision Identification

+GCAP   Capabilities List

+GSN Serial Number

&V   Display Current Base Configuration And Profile

&V0   Display Current Configuration And Profile

&V1   S Registers Display

&V3   Extended S Registers Display

&V2   Display Last Connection Statistics

\V   Single Line Connect Message

+GCI   Country Of Installation

%L   Line Signal Level

%Q   Line Quality

L   Speaker Loudness

M   Speaker Mode

Hayes AT Commands - DTE-Modem Interface Control

E   Command Echo

Q   Quiet Result Codes

V   Response Format

X   Extended Result Codes

I   Identification Information

&C   Data Carrier Detect (DCD) Control

&D   Data Terminal Ready (DTR) Control

\Q   Standard Flow Control

&K   Flow Control

&S   Data Set Ready (DSR) Control

\R   Ring (RI) Control

+IPR   Fixed DTE Interface Rate

+IFC   DTE-Modem Local Flow Control

+ILRR   DTE-Modem Local Rate Reporting

+ICF   DTE-Modem Character Framing

Hayes AT Commands - Call Control

D   Dial

T   Tone Dial

P   Pulse Dial

A   Answer

H   Disconnect

O   Return To On Line Mode

&G   Guard Tone

&Q   Sync/Async Mode

Hayes AT Commands - Modulation Control

+MS   Modulation Selection

%E   Line Quality Monitor And Auto Retrain Or Fallback/Fallforward

Hayes AT Commands - Compression Control

+DS   Data Compression

+DR   Data Compression Reporting

Hayes AT Commands - Break Control

\B   Transmit Break To Remote

\K   Break Handling

\N   Operating Mode

Hayes AT Commands - S Parameters

S0   Number Of Rings To Auto Answer

S1   Ring Counter

S2   Escape Character

S3   Command Line Termination Character

S4   Response Formatting Character

S5   Command Line Editing Character

S7   Connection Completion Time-Out

S12   Escape Prompt Delay

S25   Delay To DTR Off

S30   Disconnect Inactivity Timer

S38   Delay Before Forced Hang Up

ETSI GSM 07.07 - General

+CGMI   Request Manufacturer Identification

+CGMM   Request Model Identification

+CGMR   Request Revision Identification

+CGSN   Request Product Serial Number Identification

+CSCS   Select TE Character Set

+CIMI Request International Mobile Subscriber

Identity (IMSI)

+CMUX   Multiplexing Mode

+WS   PCCA STD-101 Select Wireless Network

ETSI GSM 07.07 - Call Control

+CHUP   Hang Up Call

+CBST   Select Bearer Service Type

+CRLP   Radio Link Protocol

+CR   Service Reporting Control

+CEER   Extended Error Report

+CRC Cellular Result Codes

+CSNS   Single Numbering Scheme

+CVHU   Voice Hang Up Control

ETSI GSM 07.07 - Network Service Handling

+CNUM   Subscriber Number

+COPN   Read Operator Names

+CREG   Network Registration Report

+COPS   Operator Selection

+CLCK   Facility Lock/Unlock

@CLCK   Facility Improved Lock/Unlock

+CPWD   Change Facility Password

+CLIP Calling Line Identification Presentation

+CLIR Calling Line Identification Restriction

+CCFC   Call Forwarding Number And Conditions

+CCWA   Call Waiting

+CHLD   Call Holding Services

+CUSD   Unstructured Supplementary Service Data

+CAOC   Advice Of Charge

+CLCC   List Current Calls

+CSSN   SS Notification

+CCUG   Closed User Group Supplementary Service Control

+CPOL   Preferred Operator List

ETSI GSM 07.07 - Mobile Equipment Control

+CPAS   Phone Activity Status

+CFUN   Set Phone Functionality

+CPIN Enter PIN

+CSQ Signal Quality

+CIND Indicator Control

+CMER   Mobile Equipment Event Reporting

+CPBS   Select Phonebook Memory Storage

+CPBR   Read Phonebook Entries

+CPBF   Find Phonebook Entries

+CPBW   Write Phonebook Entry

+CCLK   Clock Management

+CALA   Alarm Management

+CRSM   Restricted SIM Access

+CALM   Alert Sound Mode

+CRSL   Ringer Sound Level

+CLVL Loudspeaker Volume Level

+CMUT   Microphone Mute Control

+CACM   Accumulated Call Meter

+CAMM   Accumulated Call Meter Maximum

+CPUC   Price Per Unit And Currency Table

+CLAC   Available AT commands

+CALD   Delete Alarm

+CCID Read ICCID (Integrated Circuit Card Identification)

ETSI GSM 07.07 - Mobile Equipment Errors

+CMEE   Report Mobile Equipment Error

ETSI GSM 07.07 - Voice Control

+VTS DTMF Tones Transmission

+VTD Tone Duration

ETSI GSM 07.07 - Commands For GPRS

+CGCLASS   GPRS Mobile Station Class

+CGATT   GPRS Attach Or Detach

+CGREG   GPRS Network Registration Status

+CGDCONT Define PDP Context

+CGQMIN   Quality Of Service Profile (Minimum Acceptable)

+CGQREQ   Quality Of Service Profile (Requested)

+CGACT   PDP Context Activate Or Deactivate

+CGPADDR Show PDP Address

+CGDATA   Enter Data State

ETSI GSM 07.07 - Commands For Battery Charger

+CBC Battery Charge

ETSI GSM 07.05 - General Configuration

+CSMS   Select Message Service

+CPMS   Preferred Message Storage

+CMGF   Message Format

ETSI GSM 07.05 - Message Configuration

+CSCA   Service Center Address

+CSMP   Set Text Mode Parameters

+CSDH   Show Text Mode Parameters

+CSCB   Select Cell Broadcast Message Types

+CSAS   Save Settings

+CRES   Restore Settings

ETSI GSM 07.05 - Message Receiving And Reading

+CNMINew Message Indications To Terminal Equipment

+CMGL   List Messages

@CMGL   List Messages Improved

+CMGR   Read Message

@CMGR   Read Message Improved

ETSI GSM 07.05 - Message Sending And Writing

+CMGS   Send Message

+CMSS   Send Message From Storage

+CMGW   Write Message To Memory

+CMGD   Delete Message

FAX AT Commands - General Configuration

+FMI   Manufacturer ID

+FMM Model ID

+FMR Revision ID

FAX AT Commands - Transmission/Reception Control

+FTS Stop Transmission And Pause

+FRS Wait For Receive Silence

+FTM Transmit Data Modulation

+FRM Receive Data Modulation

+FTH Transmit Data With HDLC Framing

+FRH Receive Data With HDLC Framing

FAX AT Commands - Serial Port Control

+FLO Select Flow Control Specified By Type

+FPR Select Serial Port Rate

+FDD Double Escape Character Replacement Control

Custom AT Commands - General Configuration

+PACSP   Network Selection Menu Availability

#CGMI   Manufacturer Identification

#CGMM   Model Identification

#CGMR   Revision Identification

#CGSN   Product Serial Number Identification

#CIMI International Mobile Subscriber Identity (IMSI)

#CCID Read ICCID (Integrated Circuit Card Identification)

#SPN Service Provider Name

#CAP Change Audio Path

#CEER   Extended Numeric Error Report

#SRS Select Ringer Sound

#SRP Select Ringer Path

#STM Signaling Tones Mode

#TONE   Tone Playback

#SMSMODE SMS Commands Operation Mode

#PLMNMODE   PLMN List Selection

#PCT Display PIN Counter

#SHDN   Software Shut Down

#Z   Extended Reset

#WAKE   Wake From Alarm Mode

#QTEMP   Query Temperature Overflow

#TEMPMON Temperature Monitor

#SGPO   Set General Purpose Output

#GGPI General Purpose Input

#GPIO General Purpose Input/Output Pin Control

#SLED   STAT_LED GPIO Setting

#SLEDSAV   Save STAT_LED GPIO Setting

#DVI   Digital Voiceband Interface

#E2SMSRI   SMS Ring Indicator

#ADC Analog/Digital Converter Input

#DAC Digital/Analog Converter Control

#VAUX   Auxiliary Voltage Output Control

#VAUXSAV   VAUX Saving

#V24CFG   V24 Output Pins Configuration

#V   V24 Output Pins Control

#AXE   AXE Pin Reading

#CBC Battery and Charger Status

#AUTOATT   GPRS Auto-Attach Property

#MSCLASS   Multislot Class Control

#MONI   Cell Monitor

#SERVINFO Serving Cell Information

#COPSMODE   COPS Mode

#QSS Query SIM Status

#DIALMODE ATD Dialing Mode

#ACAL   Automatic Call

#ACALEXT   Extended Automatic Call

#ECAM   Extended Call Monitoring

#SMOV   SMS Overflow

#MBN Mailbox Numbers

#MWI Message Waiting Indicator

#CODEC   Audio Codec

#SHFEC   Handsfree Echo Canceller

#HFMICG   Handsfree Microphone Gain

#HSMICG   Handset Microphone Gain

#SHFSD   Set Headset Sidetone

#SPKMUT   Speaker Mute Control

#HFRECG   Handsfree Receiver Gain

#HSRECG   Handset Receiver Gain

#PRST   Audio Profile Factory Configuration

#PSAV   Audio Profile Configuration Save

#PSELAudio Profile Selection

#PSET   Audio Profile Setting

#SHFAGC   Handsfree Automatic Gain Control

#SHFNR   Handsfree Noise Reduction

#SHSAGC   Handset Automatic Gain

#SHSEC   Handset Echo Canceller

#SHSNR   Handset Noise Reduction

#SHSSD   Set Handset Sidetone

        Repeat Last Command

#NITZ Network Timezone

#ENS Enhanced Network Selection

#BND Select Band

#AUTOBND   Automatic Band Selection

#SKIPESC   Skip Escape Sequence

#E2ESC   Escape Sequence Guard Time

#GAUTH   PPP-GPRS Connection Authentication Type

#GPPPCFG   PPP-GPRS Parameters Configuration

#RTCSTAT   RTC Status

#GSMAD   GSM Antenna Detection

Custom AT Commands - Multisocket

#SS   Socket Status

#SGACT   Context Activation

#SH   Socket Shutdown

#SCFG   Socket Configuration

#SD   Socket Dial

#SA   Socket Accept

#SO   Socket Restore

#SL   Socket Listen

Custom AT Commands - FTP

#FTPTO   FTP Time-Out

#FTPOPEN   FTP Open

#FTPCLOSE FTP Close

#FTPPUT   FTP Put

#FTPGET   FTP Get

#FTPTYPE   FTP Type

#FTPMSG   FTP Read Message

#FTPDELE   FTP Delete

#FTPPWD   FTP Print Working Directory

#FTPCWD   FTP Change Working Directory

#FTPLIST   FTP List

Custom AT Commands - Enhanced Easy GPRS® Extension

#USERID   Authentication User ID

#PASSW   Authentication Password

#PKTSZ   Packet Size

#DSTO   Data Sending Time-Out

#SKTTO   Socket Inactivity Time-Out

#SKTSET   Socket Definition

#SKTOP   Socket Open

#QDNS   Query DNS

#SKTCT   Socket TCP Connection Time-Out

#SKTSAV   Socket Parameters Save

#SKTRST   Socket Parameters Reset

#GPRS   GPRS Context Activation

#SKTD   Socket Dial

#SKTL Socket Listen

@SKTL   Socket Listen Improved

#E2SLRI   Socket Listen Ring Indicator

#FRWL   Firewall Setup

#GDATAVOL GPRS Data Volume

Custom AT Commands - E-Mail Management

#ESMTP   E-mail SMTP Server

#EADDR   E-mail Sender Address

#EUSER   E-mail Authentication User Name

#EPASSW   E-mail Authentication Password

#SEMAIL   E-mail Sending With GPRS Context

Activation

#EMAILACT E-mail GPRS Context Activation

#EMAILD   E-mail Sending

#ESAV   E-mail Parameters Save

#ERST   E-mail Parameters Reset

#EMAILMSG SMTP Read Message

Custom AT Commands - Easy Scan Extension

#CSURV   Network Survey

#CSURVC   Network Survey (Numeric Format)

#CSURVU   Network Survey Of User Defined Channels

#CSURVUC Network Survey Of User Defined Channels (Numeric Format)

#CSURVB   BCCH Network Survey

#CSURVBC BCCH Network Survey (Numeric Format)

#CSURVF   Network Survey Format

#CSURVNLF <CR><LF> Removing On Easy Scan®

Commands Family

#CSURVEXT Extended Network Survey

#CSURVP   PLMN Network Survey

#CSURVPC PLMN Network Survey (Numeric Format)

Custom AT Commands - SIM Toolkit

#STIA SIM Toolkit Interface Activation

#STGI SIM Toolkit Get Information

#STSR   SIM Toolkit Send Response

Jammed Detect & Report AT commands

#JDR Jammed Detect & Report

Custom AT Commands - Easy Script® Extension - Python Interpreter

#WSCRIPT   Write Script

#ESCRIPT   Select Active Script

#STARTMODESCR   Script Execution Start Mode

#EXECSCR   Execute Active Script

#RSCRIPT   Read Script

#LSCRIPT   List Script Names

#DSCRIPT   Delete Script

#REBOOT   Reboot

#CMUXSCR   CMUX Interface Enable

#RSEN   Remote SIM Enable

Custom AT Commands

#OGCFG   OG Protocol Parameters Configuration

#OGPLATCFG   OG Platform Parameters Configuration

#OGBEGINMSG OG Total Message Creation Start

#OGBEGINOGMSG   OGMessage Creation Start

#OGADDPAROGMessage Parameter Insertion

#OGBEGINARRYOGMessage Array Insertion Start

#OGADDARRY   OGMessage Array Parameter Insertion

#OGENDARRAY OGMessage Array Parameter Insertion End

#OGENDOGMSG   OGMessage Creation End

#OGABORTMSG Message Creation Abort

#OGENDMSG   Message Creation End

#OGSENDMSG   Send OG Total Message

#OGMSGSTATUS   Get Pending OGMessage's Status

#OGRETOGMSGDecode Received OGMessage

#OGERASEALL   Erase OGMessage's Status List

#OGMSG   OGMessage Received Indication

#OGMSGTOUT   OGMessage Sending Timeout Indication

Appendix B   Glossary

ACM Accumulated Call Meter

ASCII American Standard Code for Information Interchange

AT Attention commands

CB Cell Broadcast

CBS Cell Broadcasting Service

CCM Call Control Meter

CLIP Calling Line Identification Presentation

CLIR Calling Line Identification Restriction

CMOS Complementary Metal-Oxide Semiconductor

CR Carriage Return

CSD Circuit Switched Data

CTS Clear To Send

DAI Digital Audio Interface

DCD Data Carrier Detected

DCE Data Communications Equipment

DRX Data Receive

DSR Data Set Ready

DTA Data Terminal Adaptor

DTE Data Terminal Equipment

DTMF Dual Tone Multi Frequency

DTR Data Terminal Ready

EMC Electromagnetic Compatibility

ETSI European Telecommunications Equipment Institute

FTA Full Type Approval (ETSI)

GPRS General Radio Packet Service

GSM Global System for Mobile communication

HF Hands Free

I2C, IIC Inter IC Bus

IMEI International Mobile Equipment Identity

IMSI International Mobile Subscriber Identity

IRA Internationale Reference Alphabet

ITU International Telecommunications Union

IWF Inter-Working Function

LCD Liquid Crystal Display

LED Light Emitting Diode

LF Linefeed

ME Mobile Equipment

MMI Man Machine Interface

MO Mobile Originated

MS Mobile Station

MT Mobile Terminated

OEM Other Equipment Manufacturer

PB Phone Book

PDU Protocol Data Unit

PH Packet Handler

PIN Personal Identity Number

PLMN Public Land Mobile Network

PUCT Price per Unit Currency Table

PUK PIN Unblocking Code

RACH Random Access Channel

RLP Radio Link Protocol

RMS Root Mean Square

RTS Ready To Send

RI Ring Indicator

SAR Specific Absorption Rate (e.g. of the body of a person in an electromagnetic field)

SCA Service Center Address

SIM Subscriber Identity Module

SMD Surface Mounted Device

SMS Short Message Service

SMSC Short Message Service Center

SPI Serial Protocol Interface

SS Supplementary Service

TIA Telecommunications Industry Association

UDUB User Determined User Busy

USSD Unstructured Supplementary Service Data

Appendix C   Mobile Network Codes

The Mobile network codes and Mobile country codes listed below correspond to the numbers displayed for the network survey command AT#CSURV.

Australia – mcc = 505

mnc	operator
01	Telstra
02	Optus
03	Vodafone
06	Hutchinson 3G
38	Crazy John's

United Kingdom – mcc = 234

mnc	Operator
00	Virgin 3510i
02	O$_2$
03	Jersey Telenet / Bharti / AirTel
10	Cellnet / O2
11	O2
12	Railtrack
15	Vodafone
18	Cloud9
20	3 / Hutchison 3G
30	T-Mobile
31	Virgin
32	Virgin
33	Orange
34	Orange
50	Jersey Telecom / Wave (Guernsey)
55	Cable & Wireless Guernsey / Sure Mobile (Jersey)
58	Manx Telecom

United States of America – mcc = 310, 311, 316

mcc	mnc	operator
310	000	Mid-Tex Celular
310	010	MCI
310	012	Verizon Wireless
310	013	MobileTel
310	014	Testing
310	016	Cricket Communications
310	017	North Sight Communications Inc.

310	020	APC Sprint Spectrum / Union Telephone Company
310	030	Centennial Communications
310	032	IT&E Overseas, Inc.
310	033	Guam Telephone Authority
310	034	Nevada Wireless LLC
310	040	Concho Cellular Telephone Co., Inc.
310	060	Consolidated Telcom
310	070	Highland Cellular, Inc.
310	080	Corr Wireless Communications LLC
310	090	Edge Wireless
310	100	New Mexico RSA 4 East Ltd. Partnership
310	110	Wireless 2000 Telephone
310	150	Cingular / Bell South / BellSouth Mobility DCS
310	160	T-Mobile / Omnipoint Communications
310	170	Cingular / Pacific Bell Wireless / T-Mobile
310	180	Cingular / West Central Wireless
310	190	Alaska Telecom Mobile / Alaska Wireless Communications
310	200	T-Mobile / T-Mobile Idaho / Oregon / Washington State
310	210	T-Mobile / T-Mobile Iowa
310	220	T-Mobile / T-Mobile Kansas / Oklahoma
310	230	T-Mobile / T-Mobile Utah
310	240	T-Mobile / T-Mobile New Mexico / Texas / Arizona
310	250	T-Mobile / T-Mobile Hawaii
310	260	T-Mobile / Western Wireless / Voicestream
310	270	T-Mobile / Powertel
310	280	T-Mobile
310	290	T-Mobile
310	300	T-Mobile
310	340	High Plains Midwest LLC (Westlink Communications)
310	310	T-Mobile / T-Mobile Florida / Aerial Communications
310	380	AT&T Wireless / Cingular
310	410	AT&T
310	420	Cincinnati Bell Wireless
310	430	Alaska Digitel
310	450	North East Cellular
310	460	TMP Corporation
310	470	Guam Wireless Telephone Company
310	480	Choice Phone
310	490	Triton PCS
310	500	Public Service Cellular
310	510	Airtel Wireless

310	520	VeriSign
310	530	West Virginia Wireless
310	540	Oklahoma Western Telephone Company
310	560	Dobson Cellular Systems dba Cellular One
310	570	MTPCS, LLC / Chinook Wireless
310	580	PCS ONE
310	590	Western Wireless Corporation / Alltel
310	610	Elkhart Telephone Co. / Epic Touch Co.
310	620	Coleman County Telecommunications / Trans Texas PCS
310	630	Comtel PCS Mainstreet LP
310	640	Airadigm Communications
310	660	T-Mobile
310	670	Northstar
310	680	Dobson Cellular Systems dba Cellular One
310	690	Conestoga Wireless Company
310	730	SeaMobile
310	740	Telemetrix Technologies
310	760	Panhandle Telecommunications Systems Inc.
310	770	Iowa Wireless Services
310	780	Message Express Company dba Airlink PCS
310	790	PinPoint Communications
310	800	T-Mobile
310	830	Caprock Cellular
310	850	Aeris Communications, Inc.
310	870	Kaplan Telephone Company
310	880	Advantage Cellular Systems
310	890	Rural Cellular Corporation
310	900	Taylor Telecommunications
310	910	Southern IL RSA Partnership / First Cellular of Southern Illinois
310	940	Poka Lambro Telecommunications
310	950	Texas RSA 1 dba XIT Cellular (XIT Wireless)
310	970	Globalstar
310	980	AT&T Wireless Services
311	000	Mid-Tex Cellular
311	010	Chariton Valley Communications
311	020	Missouri RSA 5 Partnership
311	030	Indigo Wireless
311	040	Commet Wireless
311	050	Farmers Cellular Telephone
311	060	Farmers Cellular Telephone

311	070	Easterbrooke Cellular Corporation
311	080	Pine Cellular / Pine Telephone Company
311	090	Siouxland PCS
311	100	High Plains Wireless
311	110	High Plains Wireless
311	120	Choice Phone
311	130	Amarillo License
311	140	MBO Wireless / Cross Telephone Company
311	150	Wilkes Cellular
311	160	Endless Mountains Wireless
311	180	Cingular Wireless / Licensee Pacific Telesis Mobile Services
311	210	Farmers Cellular Telephone
316	010	Nextel Communications
316	011	Southern Communications Services

Appendix D   Automated Connection Flow
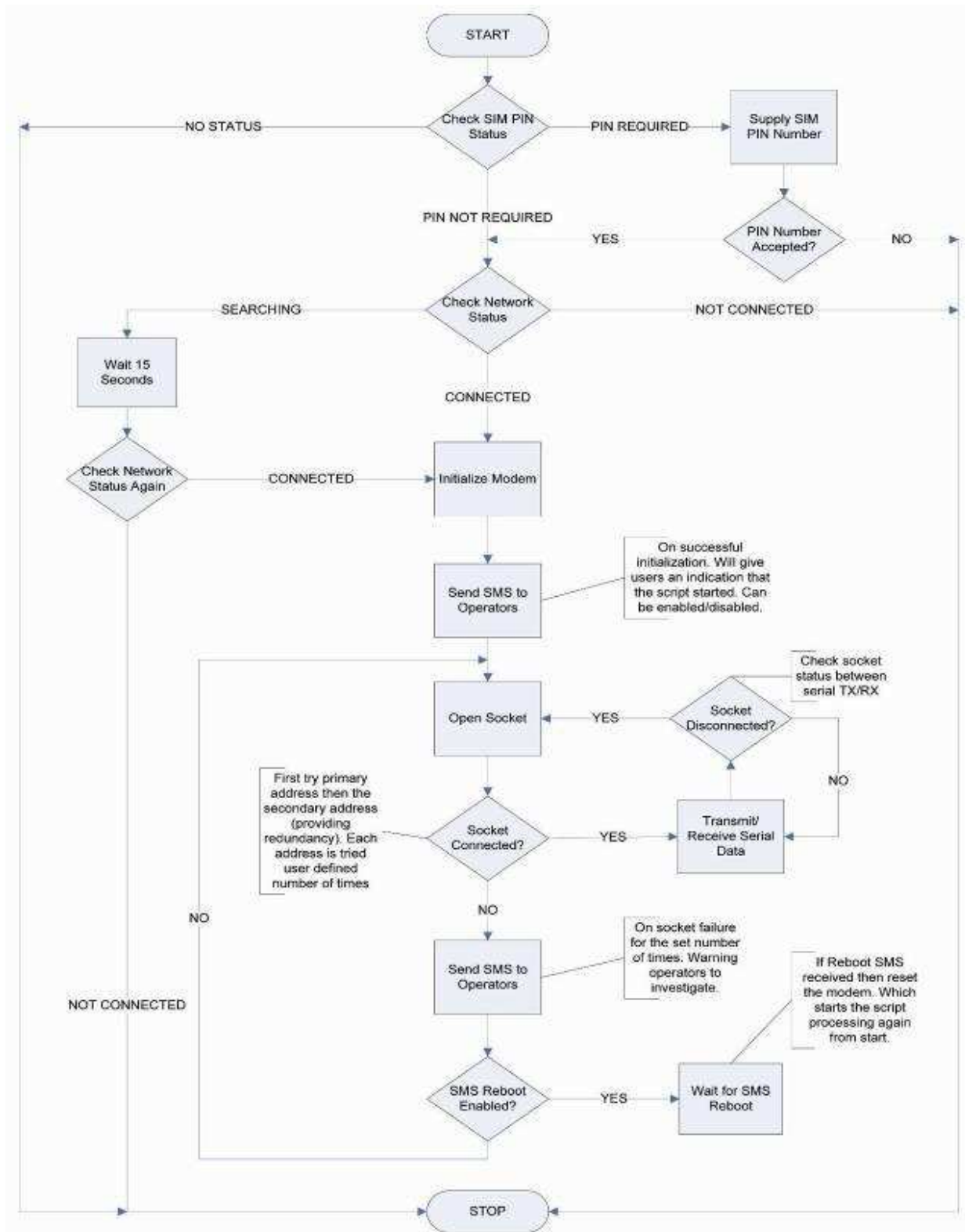
Appendix E   Connection Scenarios

SCENARIO 2:
Devices connected to the 605M-D1 modems talking to each other through one 605M-R1 router over the GPRS network

SCENARIO 3:
Devices connected to the 605M-D1 modems monitored from a central server (SCADA System). There are two 605M-R1 installed. One is primary and the other is secondary which provides redundancy in case connection to the primary fails.
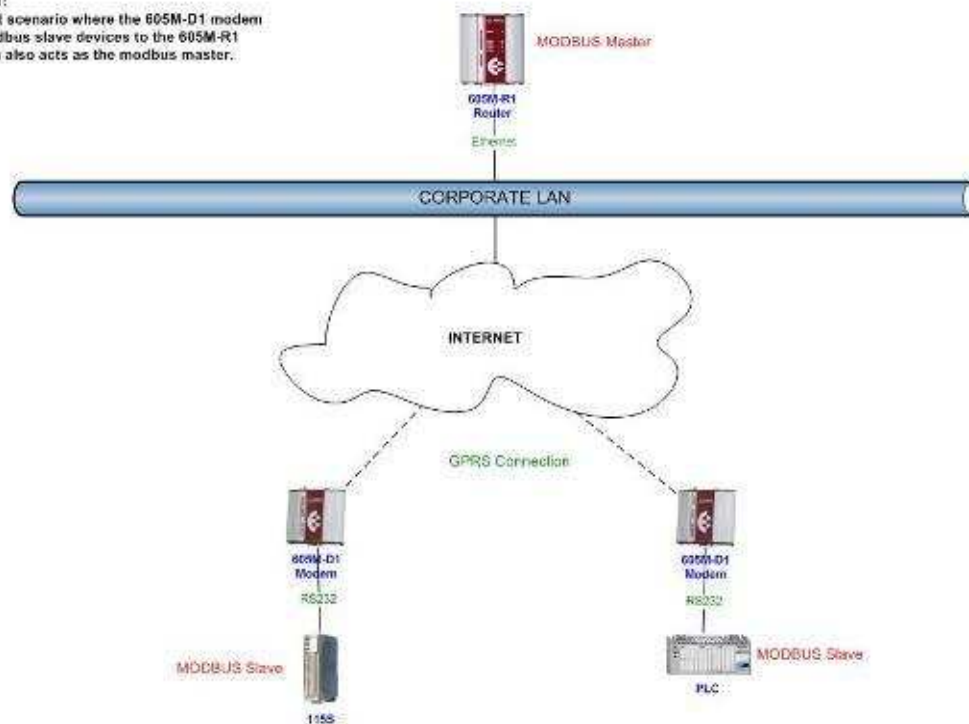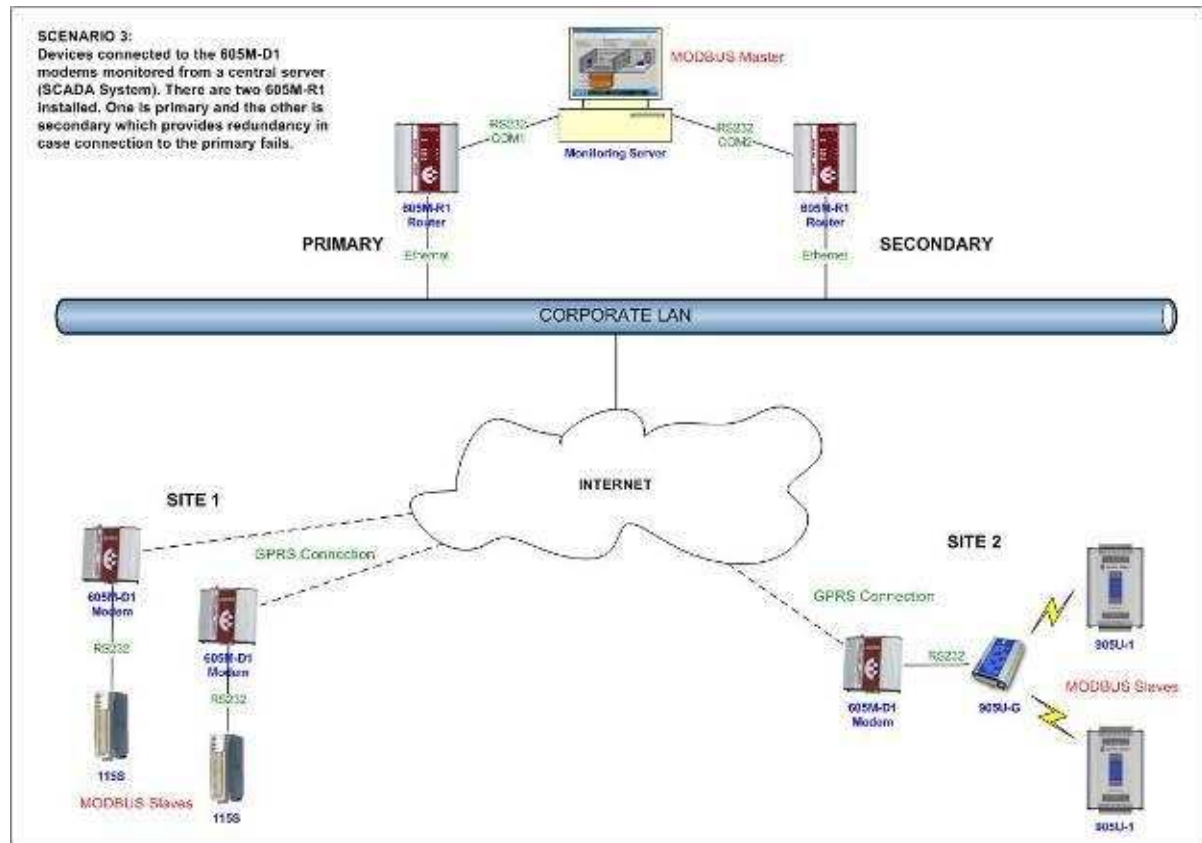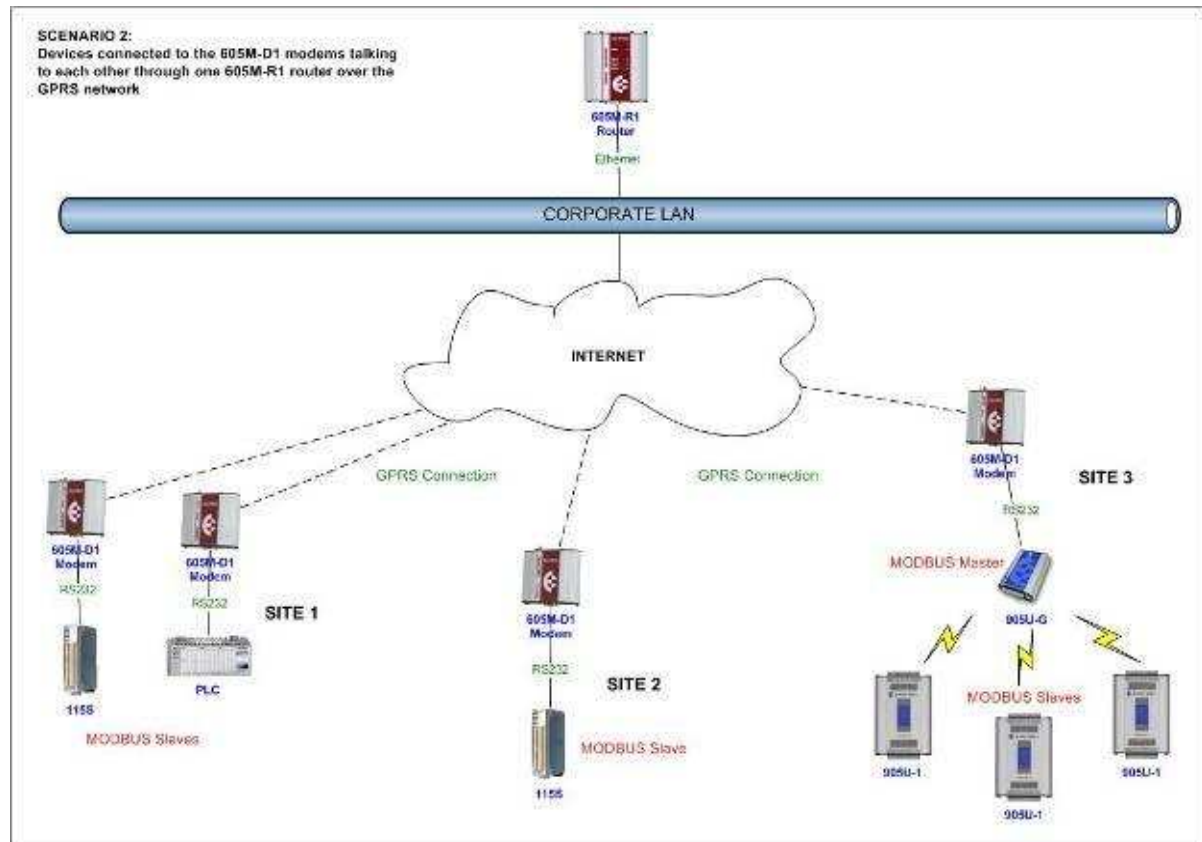
Appendix F   World GPRS Settings

This is a non exhaustive GPRS settings list of mobile providers around the world sourced from Ross Barkman's GPRS info page (http://www.taniwha.org.uk/gprs.html). ELPRO does not guarantee the accuracy of this list and it is provided only as a reference. Please contact your mobile service provider for exact settings.

Network	APN	User ID	Password
Albania			
Vodafone	Twa	guest	guest
Argentina			
CTI	internet.ctimovil.com.ar	ctigprs	[blank]
Movistar	internet.gprs.unifon.com.ar internet.unifon	wap	wap
Personal	gprs.personal.com	gprs	adgj
Australia			
Optus (2G)	internet	guest	guest
Optus (3G)	connect	guest	guest
Telstra (2G)	telstra.internet	guest	guest
Telstra (3G data bundles)	telstra.datapack	[blank]	Telstra
Telstra (3G pay by time)	telstra.pcpack	[blank]	Telstra
Telstra (3G prepay)	telstra.wap	[blank]	Telstra
Three	3netaccess	guest	guest
Virgin Mobile	VirginInternet	guest	guest
Vodafone	vfinternet.au	guest	guest
Austria			
Drei	drei.at	guest	guest
Max Online	gprsinternet	GPRS	[blank]
Max Online (Business)	business.gprsinternet	GPRS	[blank]
Max Online (Metro)	gprsmetro	GPRS	[blank]
Mobilkom A1	a1.net	ppp@a1plus.at	ppp
OneNet	web.one.at	web	web

tele.ring	web	web@telering.at	web
Azerbaijan			
Azercell	internet	guest	guest
Bakcell	mms	guest	guest
Bangladesh			
AKTel	atmmms	guest	guest
	atmwap		
Banglalink	blweb	guest	guest
Grameen Phone	gpinternet	[blank]	[blank]
Grameen Phone	gpwap	[blank]	[blank]
Belarus			
MTS	internet.mts.by	mts	mts
Velcom (Simple GPRS)	web.velcom.by	web	web
Velcom (Plus plan)	plus.velcom.by	plus	plus
Velcom (Privet plan)	privet.velcom.by	privet	privet
Velcom (WAP plan)	wap.velcom.by	wap	wap
Belgium			
BASE	gprs.base.be	base	base
Mobistar (personal)	internet.be	mobistar	mobistar
Mobistar (business)	web.pro.be	mobistar	mobistar
Orange	orangeinternet	guest	guest
Proximus (Internet)	internet.proximus.be	guest	guest
Proximus (intranet)	intraprox.be	guest	guest
Botswana			
Mascom Wireless	internet.mascom	guest	guest
Brazil			
Claro	claro.com.br	claro	claro
Oi	gprs.oi.com.br	guest	guest
Oi (WAP)	wapgprs.oi.com.br	oiwap	oioioi
TIM	tim.br	tim	tim
Velox	wap.telcel.com	iesgprs	iesgprs2002
Bulgaria			
GloBul	internet.globul.bg	globul	[none]
M-Tel	inet-gprs.mtel.bg	mtel	mtel

Cameroon			
MTN Cameroon	INTERNET	guest	guest
Orange	orangecmgprs	orange	orange
Canada			
Microcell (Fido)	internet.fido.ca	fido	fido
Rogers AT&T	internet.com	wapuser1	wap
Chile			
Claro	wap.clarochile.cl	clarochile	clarochile
Entel PCS	imovil.entelpcs.cl	entelpcs	entelpcs
Movistar	wap.tmovil.cl	wap	wap
Telefonica Movil	web.tmovil.cl	web	web
China			
China Mobile	cmnet	guest	guest
China Unicom	[none]	guest	guest
Congo			
Vodacom	vodanet	vodalive	[blank]
Costa Rica			
IceCelular	icecelular	guest	guest
Croatia			
HT Mobile	web.htgpr	38591	38591
VIPNET START	gprs0.vipnet.hr	38591	38591
VIPNET PRO	gprs5.vipnet.hr	38591	38591
VIPNET 3G	3g.vip.hr	38591	38591
Czech Republic			
Cesky Mobil (contract)	internet	guest	guest
Cesky Mobil (CM Prepay)	cinternet	guest	guest
T-Mobile	internet.t-mobile.cz	guest	guest
Telefonica (contract)	internet	guest	guest
Telefonica (Go)	gointernet	guest	guest
Vodafone (contract)	internet	guest	guest
Vodafone (prepay)	ointernet	guest	guest
Denmark			
3	[none]	guest	guest
Orange	web.orange.dk	guest	guest
Sonofon	internet	guest	guest

TDC	internet	guest	guest
Telia	www.internet.mtelia.dk	guest	guest
Dominican Republic			
Orange	orangenet.com.do	guest	guest
Egypt			
Click Vodafone	internet.vodafone.net	internet	internet
Etisalat	etisalat	guest	guest
MobiNil	mobinilweb	guest	guest
Estonia			
EMT	internet.emt.ee	guest	guest
RLE	internet	guest	guest
Fiji			
Vodafone	vfinternet.fj	guest	guest
Finland			
Dna	internet	guest	guest
Elisa (Kolumbus)	internet	rlnet	internet
Saunalahti	internet.saunalahti	guest	guest
Sonera	internet	[blank]	[blank]
Song	internet.song.fi	song@internet	songnet
France			
Bouygues	ebouygtel.com	guest	guest
Bouygues (B2Bouygtel)	b2bouygtel.com	guest	guest
Orange (contract)	orange.fr	orange	orange
Orange (business)	internet-entreprise	orange	orange
Orange MIB	orange-mib	mportail	mib
Orange Mobicarte	orange-acte	orange	orange
SFR	websfr	guest	guest
TEN (unlimited)	ao.fr	orange	orange
TEN (pay by MByte)	ofnew.fr	orange	orange
French Polynesia			
Vini	wap	i-vini	[blank]
Germany			

AldiTalk/ MedionMobile	internet.eplus.de	eplus	gprs
E-Plus	internet.eplus.de	eplus	gprs
O2 (time-based plans)	surfo2	guest	guest
O2 (volume-based plans)	internet	guest	guest
Quam	quam.de	quam	quam
T-Mobile D1	internet.t-mobile internet.t-d1.de	t-mobile	tm
Vodafone	web.vodafone.de	guest	guest
Ghana			
Areeba	internet.areeba.com.gh	guest	guest
ONETouch	browse	guest	guest
Tigo (WWW)	web.tigo.com.gh	web	[blank]
Tigo (WAP)	wap.tigo.com.gh	wap	wappost
Greece			
Cosmote	internet 3g-internet	guest	guest
Telestet	gnet.b-online.gr	MSISDN e.g. 3093XXXXXXX	24680
TIM	gint.b-online.gr	web	web
Vodafone	internet.vodafone.gr	guest	guest
Grenada			
Cable & Wireless	wap	guest	guest
Guatemala			
PCS Digital	ideasalo	guest	guest
Tigo (Internet)	internet.tigo.gt	guest	guest
Tigo (WAP)	Wap.tigo.gt	Wap	Wap
Guyana			
GT&T Cellink Plus	wap.cellinkgy.com	test	test
Honduras			
Tigo	internet.tigo.hn	guest	guest
Hong Kong			
CSL	hkcsl or internet	guest	guest
New World	internet	guest	guest

Orange	web.orangehk.com	guest	guest
People	internet	guest	guest
SmarTone	internet	guest	guest
Sunday	internet	guest	guest
Three	mobile.three.com.hk	guest	guest
Hungary			
Pannon (normal)	net	guest	guest
Pannon (flat rate)	netx	guest	guest
Pannon (compressed)	snet	guest	guest
T-Mobile (subscription)	internet	[supplied]	[supplied]
T-Mobile (non-sub.)	internet	wap	Wap
T-Mobile (MMS)	mms-westel	mms	[supplied]
Vodafone (contract)	internet.vodafone.net	guest	guest
Vodafone (contract)	standardnet.vodafone.net	guest	guest
Vodafone (prepay)	vitamax.internet.vodafone.net	guest	guest
Vodafone (prepay)	vitamax.snet.vodafone.net	guest	guest
India			
AirTel	airtelgprs.com	guest	guest
BPL Mobile	bplgprs.com	bplmobile	[blank]
BSNL	celloneportal	guest	guest
BSNL (prepay)	www.e.pr	guest	guest
Hutch (normal)	www	guest	guest
Hutch (Gujarat)	web	guest	guest
Idea Cellular	internet	guest	guest
MTNL Delhi	gprsmtnldel	mtnl	mtnl123
MTNL Mumbai (contract)	gprsmtnlmum	mtnl	mtnl123
MTNL Mumbai (pre-pay)	gprsppsmum	mtnl	mtnl123
Spice Telecom	simplydownload	guest	guest
Vodafone	www	guest	guest
Indonesia			
Excelcomindo	www.xlgprs.net	xlgprs	proxl

IM3	www.indosat-m3.net wap.indosat-m3.net	gprs	im3
Indosat (Matrix)	satelindogprs.com indosatgprs	guest	guest
Telkomsel	internet telkomsel	wap	wap123
Ireland			
Meteor	isp.mymeteor.ie	my	meteor
O2 (contract)	open.internet	gprs	gprs
O2 (prepay)	pp.internet	gprs	gprs
Vodafone (contract)	isp.vodafone.ie	vodafone	vodafone
Vodafone (prepay)	live.vodafone.com	vodafone	vodafone
Israel			
CellCom	etecsa	etecsa	[blank]
MTC-Vodafone	apn01	guest	guest
Orange	orangeinternet	guest	guest
Italy			
Blu	INTERNET	guest	guest
H3G	tre.it	guest	guest
H3G (Naviga3)	naviga.tre.it	guest	guest
H3G (prepay)	pre.tre.it	guest	guest
TIM	ibox.tim.it	guest	guest
Vodafone (Omnitel)	web.omnitel.it	guest	guest
Wind	internet.wind internet.wind.biz	Wind	Wind
Jamaica			
Cable & Wireless	wap	guest	guest
Digicel	web.digiceljamaica.com	wapuser	wap03jam
Japan			
Vodafone (JPhone)	vodafone	ai@vodafone	vodafone
Kazakhstan			

Beeline	internet.beeline.kz	@internet.beeline	[blank]
Kenya			
Celtel	ke.celtel.com	guest	guest
Safaricom	web.safaricom.com	web	web
Kosovo			
Vala	vala900-int	guest	guest
Laos			
ETL	etlnet	guest	guest
Latvia			
LMT	internet.lmt.lv	[blank]	[blank]
Tele2	internet.tele2.lv	gprs	internet
Lebannon			
Cellis FTML	internet.ftml.com.lb	plugged	plugged
MTC Touch	gprs.mtctouch.com.lb	guest	guest
Lithuania			
Bite GSM	banga	bite	[blank]
Omnitel (contract)	gprs.omnitel.net	guest	guest
Omnitel (no contract)	gprs.startas.lt	omni	omni
Luxembourg			
LUXGSM	webp.pt.lu	guest	guest
Tango	internet	tango	tango
VOXmobile	vox.lu	guest	guest
Macau			
CTM	ctm-mobile	guest	guest
Macau Hutchison Telecom (Internet)	web.hutchisonmacau.com	hutchison	1234
Macau Hutchison Telecom (MMS)	mms.hutchisonmacau.com	hutchison	1234
Malaysia			
DIGI	diginet	guest	guest
Celcom	celcom.net.my	guest	guest
Maxis 2G (contract)	internet.gprs.maxis	guest	guest
Maxis 3G (contract)	unet	maxis	wap
Maxis (prepay)	net	maxis	net
Timecel	timenett.com.my (timenet.com.my?)	guest	guest

TM Touch	internet	guest	guest
Maldives			
Dhiraagu	internet.dhimobile	guest	guest
Malta			
Go Mobile (contract)	gosurfing	guest	guest
Go Mobile (prepay)	rtgsurfing	guest	guest
Vodafone	Internet	Internet	Internet
Mexico			
Telcel	internet.itelcel.com	webgprs	webgprs2002
Moldavia			
Moldcell	internet	gprs	gprs
Mongolia			
MobiCom	internet	guest	guest
Montenegro			
T-Mobile (contract)	internet-postpaid	38167	38167
Morocco			
Maroc Telecom	iam	wac	1987
Medi Telecom	wap.meditel.ma	MEDIWAP	MEDIWAP
Nepal			
Mero Mobile	mero	guest	guest
Netherlands			
KPN Mobile	internet	KPN	gprs
O2	internet	guest	guest
T-Mobile active	internet	tmobile	tmobile
Telfort	internet	telfortnl	password
Vodafone Live	live.vodafone.com	vodafone	vodafone
Vodafone (business)	office.vodafone.nl	vodafone	vodafone
New Zealand			
Vodafone Live	live.vodafone.com	guest	guest
Vodafone (unrestricted)	internet	guest	guest
Vodafone (restricted)	www.vodafone.net.nz	guest	guest
Nicaragua			

Alo Pcs	internet.ideasalo.ni	internet	internet
Movistar	internet.movistar.ni	internet	internet
	wap.movistar.ni	wap	wap
Nigeria			
Celtel	internet.ng.celtel.com	internet	internet
Globacom (contract)	glodirect	gprs	gprs
Globacom (Prepay)	glogwap	wap	wap
MTN Nigeria	web.gprs.mtnnigeria.net	wap	gprs
Norway			
Netcom	internet.netcom.no	netcom	netcom
TalkMore	internet.netcom.no	netcom	netcom
Telenor Mobile	internet.telenor.no	guest	guest
Ventelo	internet.ventelo.no	[blank]	1111
Oman			
Nawras	isp.nawras.com.om	guest	guest
Pakistan			
Djuice	internet	telenor	telenor
Mobilink GSM	connect.mobilinkworld.com	guest	guest
Telenor	internet	telenor	telenor
UFone	ufone.internet	ufone	ufone
Panama			
Cable & Wireless	apn01.cwpanama.com.pa	xxx	xxx
Movistar	internet.movistar.pa	movistarpa	movistarpa
Paraguy			
CTI	internet.ctimovil.com.py	ctigprs	ctigprs999
Peru			
Claro (TIM)	tim.pe	tim	tulibertad
Philippines			
Globe Telecoms (Web)	internet.globe.com.ph	globe	globe
Globe Telecoms (WAP)	www.globe.com.ph	globe	globe
Smart	internet	witsductoor	banonoy
Sun Cellular	minternet	guest	guest
Poland			
ERA	erainternet	erainternet	erainternet

605M-D1 GPRS Modem

User Manual

Heyah	heyah.pl	heyah	heyah
Idea	www.idea.pl	idea	idea
iPlus	www.plusgsm.pl	guest	guest
Orange	internet	internet	internet
Polkomtel	www.plusgsm.pl	guest	guest
Portugal			
Optimus (GPRS)	internet	guest	guest
Optimus (3G/HSDPA)	umts	guest	guest
TMN	internet	guest	guest
Vodafone (Telecel)	internet.vodafone.pt	guest	guest
Romania			
Orange	internet	guest	guest
Vodafone	internet.vodafone.ro	internet.vodafone.ro	vodafone
Russia			
Baikal WestCom	inet.bwc.ru	bwc	bwc
BeeLine	internet.beeline.ru	beeline	beeline
Enisey TeleCom	internet.etk.ru	etk	[supplied]
Megafon (Dalniy Vostok)	internet	guest	guest
Megafon (kvk)	internet	guest	guest
Megafon (ltmsk)	internet	guest	guest
Megafon (Moscow)	internet	gdata	gdata
Megafon (mc)	internet	guest	guest
Megafon (NWGSM)	internet	guest	guest
Megafon (Siberia)	internet	guest	guest
Megafon (UGSM)	internet	guest	guest

Megafon (usi)	internet	guest	guest
Megafon (Volga)	internet	guest	guest
Motiv	inet.ycc.ru	motiv	[supplied]
MTS	internet.mts.ru internet.kuban	mts	mts
NCC	internet	ncc	[supplied]
NTC	internet.ntc	guest	guest
PrimTel	internet.primtel.ru	guest	guest
Tatincom	internet.tatincom.ru	tatincom	tatincom
Tele2	wap.tele2.ru	gprs	[blank]
Saint Lucia			
Cable & Wireless	internet	guest	guest
Saint Vincent & the Grenadines			
Digicel	wap.digiceloecs.com	wapoecs	wap03oecs
Saudi Arabia			
STC	jawalnet.com.sa	guest	guest
Sénégal			
Tigo	wap.sentelgsm.com	guest	guest
Serbia-Montenegro			
Mobtel Srbija	internet	mobtel	gprs
Telekom Srbija	gprsinternet	mts	64
Telekom Srbija (MMS service)	mms	mts	64
Telekom Srbija (WAP service)	gprswap	mts	64
Singapore			
M1	sunsurf	65	user123
SingTel	internet	guest	guest
Starhub	shwap	star	hub
Slovakia			
Eurotel	internet	guest	guest
Globtel	internet	guest	guest
Orange	internet	jusernejm	pasvord

Slovenia			
Mobitel (Internet)	internet	mobitel	internet
Mobitel (Internet Pro)	internetpro	mobitel	internet
Simobil	[none]	guest	guest
South Africa			
Cell-C	internet	guest	guest
MTN	internet	guest	guest
Vodacom	internet	guest	guest
Vodacom (VPN)	internetvpn	guest	guest
Virgin Mobile	vdata	guest	guest
Spain			
Amena	internet	CLIENTE	AMENA
Telefonica (Movistar)	movistar.es	movistar	movistar
Vodafone (Airtel)	airtelnet.es	vodafone	vodafone
Sri Lanka			
Cellterl [FTD]	wap	guest	guest
Dialog GSM (contract)	www.dialogsl.com	guest	guest
Dialog GSM (prepay)	ppinternet	guest	guest
Mobitel	isp	guest	guest
Sweden			
Tele2 (Comviq)	internet.tele2.se	gprs	internet
Tele2 (3G)	internet.tele2.se	wap	wap
Telenor (GPRS)	internet.vodafone.net	guest	guest
Telenor (3G)	services.vodafone.net	guest	guest
Telia	online.telia.se	guest	guest
Tre (3G)	internet.djuice.se	guest	guest
Switzerland			
Orange	click	guest	guest
Sunrise	internet	internet	internet
Swisscom	gprs.swisscom.ch	guest	guest

Taiwan			
Chunghwa Telecom	emome	guest	guest
Far EasTone	fetnet01	guest	guest
Hinet	internet	guest	guest
KG Telecom	internet	guest	guest
Taiwan Cellular	internet	guest	guest
TransAsia	internet	guest	guest
Tanzania			
Celtel Tz	internet.tz.celtel.com	guest	guest
Thailand			
AIS	[none]	ais	ais
DTAC	www.dtac.co.th	guest	guest
TRUE	internet	TRUE	TRUE
Trinidad & Tobago			
Digicel	wap.digiceltt.com	wap	wap
TSTT	internet	wap	wap
Turkey			
Aria	internet	guest	guest
Aycell	aycell	guest	guest
Telsim (Contract)	telsim	telsim	telsim
Telsim (Prepay)	prepaidgprs	guest	guest
Türkcell	internet	gprs	gprs
UAE			
Etisalat	etisalat.ae	etisalat.ae	etisalat.ae
Uganda			
MTN	yellopix.mtn.co.ug	guest	guest
UK			
3	three.co.uk	guest	guest
Jersey Telecom	pepper	abc	abc
O2 (contract)	mobile.o2.co.uk	faster	web
O2 (contract)	mobile.o2.co.uk	bypass	web
O2 (prepay)	payandgo.o2.co.uk	payandgo	payandgo
Orange (Pay Monthly)	orangeinternet	orange	multimedia
Orange (JustTalk)	orangeinternet	wap	wap
T-Mobile	general.t-mobile.uk	user	pass

Tesco Mobile	prepay.tesco-mobile.com	tescowap	password
Virgin Mobile	goto.virginmobile.uk	user	[space]
Vodafone (contract)	internet	web	web
Vodafone (prepay)	pp.vodafone.co.uk	wap	wap
Ukraine			
Ace&Base	www.ab.kyivstar.net	igprs	internet
Beeline	internet.beeline.ua	guest	guest
Djuice	www.djuice.com.ua	igprs	igprs
Jeans	www.jeans.ua	guest	guest
Jeans (Hyper)	hyper.net	guest	guest
Kyivstar	www.kyivstar.net	igprs	internet
Life (standard)	internet	guest	guest
Life (faster)	speed	guest	guest
Mobi-GSM	internet.urs	guest	guest
UMC (Internet)	internet	internet	[supplied]
UMC	www.umc.ua	guest	guest
Wellcome	internet.urs	guest	guest
Uruguay			
ANCEL	gprs.ancel	guest	guest
CTI	internet.ctimovil.com.uy	ctiweb	ctiweb999
Movistar	webapn.movistar.com.uy	movistar	movistar
USA			
Cingular (AT&T)	proxy	guest	guest
Cingular	ISP.CINGULAR	ISPDA@CINGULARGPRS.COM	CINGULAR1
Cingular	ISP.CINGULAR	ISP@CINGULARGPRS.COM	CINGULAR1
Cingular	WAP.CINGULAR	WAP@CINGULARGPRS.COM	CINGULAR1
Edge Wireless	ISP	guest	guest
T-Mobile (Internet)	internet2.voicestream.com	guest	guest
T-Mobile (VPN)	internet3.voicestream.com	guest	guest
T-Mobile (non-contract)	wap.voicestream.com	guest	guest

Uzbekistan			
Uzdunrobita	net.urd.uz	user	pass
Venezuela			
Digitel TIM	gprsweb.digitel.ve	guest	guest

Table Key:

[blank] = Leave field blank - if that doesn't work, try putting guest in the field.

[space] = Enter a single space.

[none] = No APN.

[supplied] = Details will be supplied to each user by their network provider.