CalAmp

819-GPRS-XXX

GSM GPRS Serial Cellular Data Modem

User Manual
001-0003-829
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SECTION 1 — PREFACE

Copyright Notice

Modem Use

The 819-GPRS modem is designed and intended for use in fixed and mobile applications. "Fixed" assumes the device is physically secured at one location and not easily moved to another location. Please keep the cellular antenna of the 819-GPRS at a safe distance from your head and body while the modem is in use (see below).

Important

Maintain a distance of at least 20 cm (8 inches) between the transmitter's antenna and any person while in use. This modem is designed for use in applications that observe the 20 cm separation distance.

Interference Issues

Avoid possible radio frequency (RF) interference by following these guidelines:

- The use of cellular telephones or devices in aircraft is illegal. Use in aircraft may endanger operation and disrupt the cellular network. Failure to observe this restriction may result in suspension or denial of cellular services to the offender, legal action or both.

- Do not operate in the vicinity of gasoline or diesel-fuel pumps unless use has been approved and authorized.

- Do not operate in locations where medical equipment that the device could interfere with may be in use.

- Do not operate in fuel depots, chemical plants, or blasting areas unless use has been approved and authorized.

- Use care if operating in the vicinity of protected personal medical devices, i.e., hearing aids and pacemakers.

- Operation in the presence of other electronic equipment may cause interference if equipment is incorrectly protected. Follow recommendations for installation from equipment manufacturers.

Mobile Application Safety

- Do not change parameters or perform other maintenance of the 819-GPRS while driving.

- Road safety is crucial. Observe National Regulations for cellular telephones and devices in vehicles.

- Avoid potential interference with vehicle electronics by correctly installing the 819-GPRS. CalAmp DataCom recommends installation by a professional.

SECTION 2 – PRODUCT OVERVIEW

Module Identification

Label Information
The label contains the CalAmp DataCom part number, serial number, FCC ID, and the IMEI number.

IMEI Dec: The International Mobile Equipment Identifier of the cellular module in decimal format.

General Description

The 819-GPRS Cellular Data Modem from CalAmp is the ideal solution for a wide range of cellular data network serial connectivity requirements.

The 819-GPRS version features GSM GPRS speeds. The 819-GPRS supports both circuit-switched and packet-switched services.

Features and Benefits

- Supports GPRS
- RS-232 connector
- Quad Band GSM
- TCP/IP stack access via AT commands
- Circuit Switch Data Origination and Termination
- PPP Originated Tethered Data Calls for TCP/IP capable devices
- Packet Data transmission at speeds up to 86 kbps
- JAVA Application Development Platform (J2ME)
- Optimized for OEM applications

Catalog Part Number Breakdown

819-GPRS-XXX **(XXX** = Carrier Identifier)

GEN = Generic

External Connections

Front panel connections

Fig. 2.1 819-GPRS Front Panel

819-GPRS front panel indicators include:

PWR: Green LED indicating power to unit.

Tx: Red LED indicating Transmit activity.

DCD: Amber LED indicating Data Carrier Detect from cellular network.

Rx: Green LED indicating Receive activity.

RF (antenna): SMA female, primary antenna connection.

SIM: SIM Card Slot (SIM card purchased separately).

Back panel connections

Fig. 2.2 819-GPRS Back Panel

819-GPRS back panel connections include:

Power connector: 2.1mm x 5.5mm DC Barrel Jack (Center Positive)

RS-232 port: Standard DE-9 female

RS-232 Serial Port Integration Parameters

Table 2.1 provides the serial cable design information to integrate the 819-GPRS into your system.

Table 2.1 Standard RS-232 DE-9 Pin out

Pin	Name	Direction	Description
1	CD	«—	Carrier Detect
2	RX	«—	Receive Data
3	TX	—»	Transmit Data
4	DTR	—»	Data Terminal Ready
5	GND		System Ground
6	DSR	«—	Data Set Ready
7	RTS	—»	Request to Send
8	CTS	«—	Clear to Send
9	RI	«—	Ring Indicator

Note: Direction is DTE relative DCE.

Male   Female
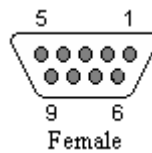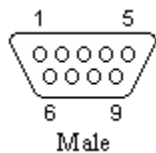
Table 2.2 Default RS-232 Communication Parameters

Bits Per Second	115,200
Data Bits	8
Parity	None
Stop Bits	1
Flow Control	None

Accessories

Antenna	4" Rubber Duck Antenna 3" Mag Mount Antenna	L2-ANT0001 L2-ANT0003
Power Supply	110 VAC input DC Power Cable	L2-PWR0001 L2-PWR0002
Interface Cable	Serial Cable	L2-CAB0002

Primary Antenna

The primary antenna connection on the 819-GPRS is a female connector, therefore you must purchase an antenna with a SMA male connector. Do not select a SMA antenna with "reverse polarity" or RP-Male. When using a direct mount or "rubber duck" antenna, choose the antenna specific to your band requirements. Mounting options and cable lengths are user's choice and application specific.

SECTION 3 – GETTING STARTED

Package Contents

- 819-GPRS cellular data modem
- Information Card

Setting up the 819-GPRS Modem using the GPRS 819S Driver:

You may download all necessary modem driver files from our website at *http://www.calamp.com.* If you are installing the modem using the drivers from the website, refer to these steps:

1. Click on Start --> Settings --> Control Panel. Select "*Phone and Modem Options*".

2. Select the "*Modem*" tab. Select "*Add…*" and follow the Wizard. Check "*Don't Detect My Modem*".

Phone and Modem Options

Dialing Rules | Modems | Advanced

The following modems are installed:

Modem	Attached To

Add… | Remove | Properties

OK | Cancel | Apply

Add Hardware Wizard

Install New Modem
Do you want Windows to detect your modem?

Windows will now try to detect your modem. Before continuing, you should:

1. If the modem is attached to your computer, make sure it is turned on.

2. Quit any programs that may be using the modem.

Click Next when you are ready to continue.

☑ Don't detect my modem; I will select it from a list.

< Back | Next > | Cancel

3. Select "*Have Disk...*" Click "*Next*".
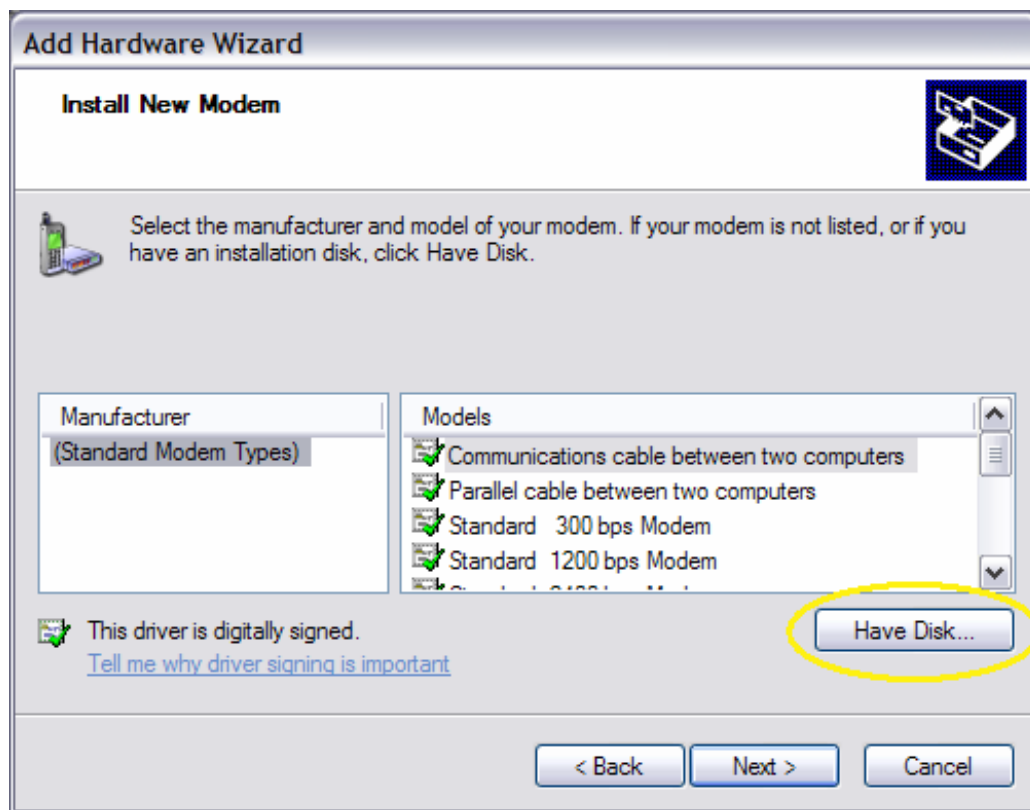
4. Browse to the file location where the GPRS 819S modem driver was downloaded.
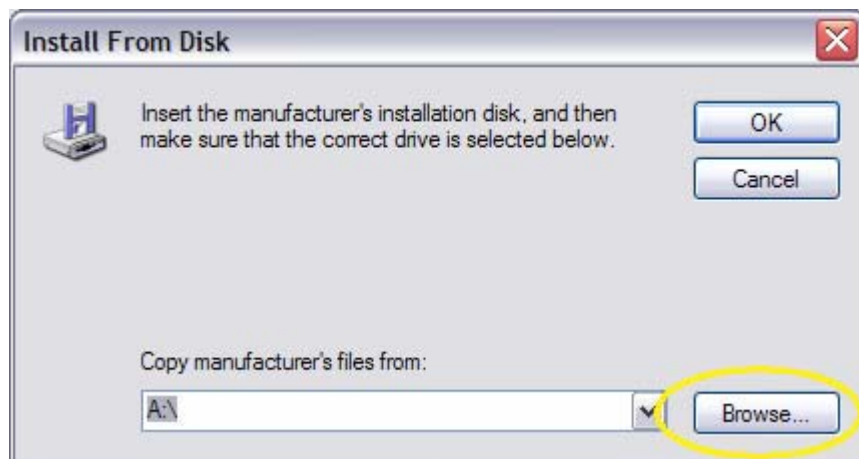
5. Select the **Siemens AG**. manufacturer and **MC75 Modem (GPRS)** model then click "*Next*".
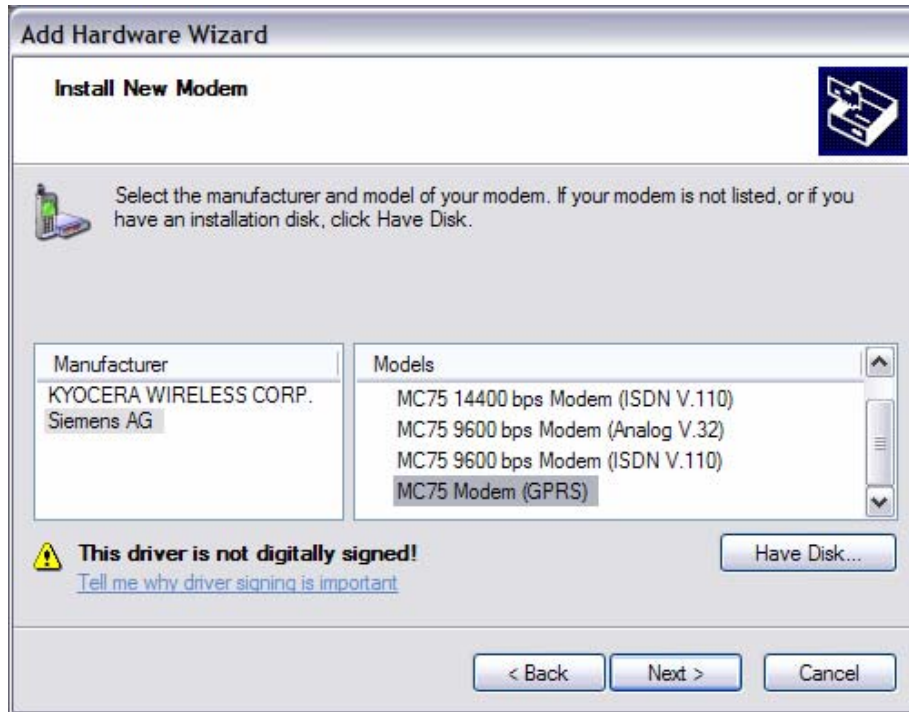
6. Assign the modem to the COM port connected to the modem. Click "*Next*".

7. Click "*Finish*".

Setting up the 819-GPRS using native Windows drivers:

1. Click on Start --> Settings --> Control Panel. Select "*Phone and Modem Options*".
2. Select the "*Modem*" tab. Select "*Add…*" and follow the Wizard. Check "*Don't Detect My Modem*".
3. Select "*Standard 19200 bps Modem.*" Click "*Next*".
4. Assign the modem to the COM port connected to the modem. Click "*Next*".
5. Click "*Finish*".

Configuring the Modem

1. Click on Start --> Settings --> Control Panel. Select "Phone and Modem Options".
2. Click "*New*" or "*Edit*" to add or modify a location name.
3. In "*Location Name*", enter a name to distinguish this connection as the 819-GPRS modem. Type your area code in the Area Code box.
4. Click "*Apply*" and "*OK*". The window should exit out to the Phone and Modem Options box.
5. Click the tab at the top titled "*Modems*". Select the "*MC75 Modem (GPRS)*" (or the "*Standard 19200 bps Modem*" if you're using the driver from the website) and click "*Properties*".
6. Click the "*Modem*" tab at the top of this new box. The box titled "*Maximum Port Speed*" should read: 115200. If not, scroll down to select 115200. Click "*OK*". Click "*Apply*".
7. Click "*OK*".

Creating a Dial-Up Networking (DUN) connection

1. Click on Start --> Settings --> Control Panel. Select "*Network Connections*".
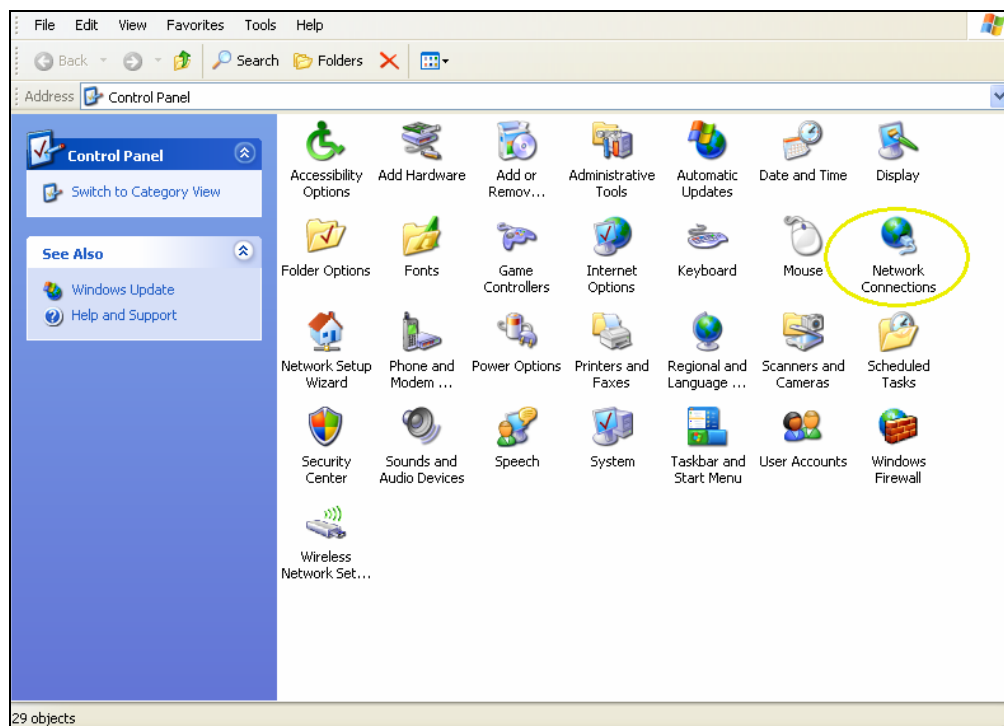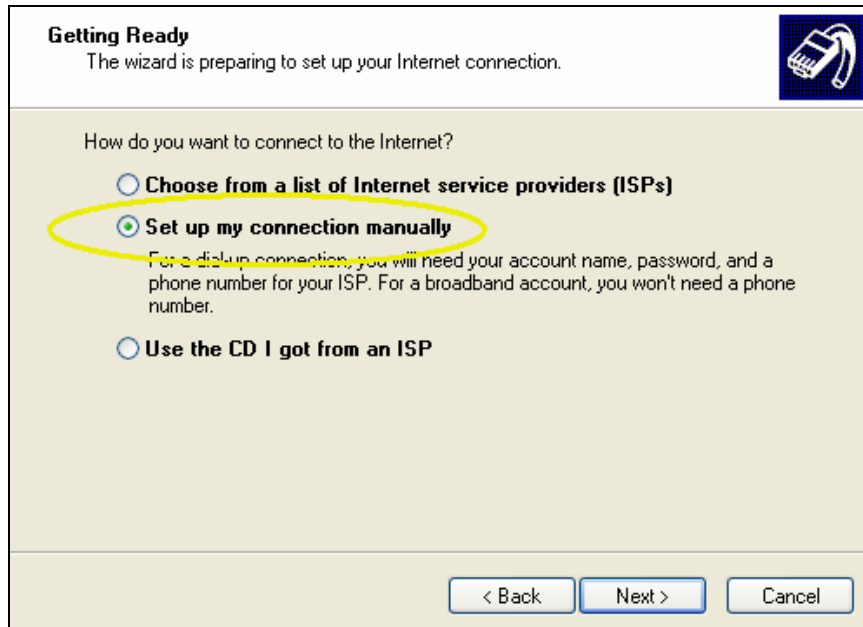
2. From the Network Connections screen, select "*Create a new connection*". Follow the Wizard as it goes through the steps to create a dial-up connection by selecting "*Next*".
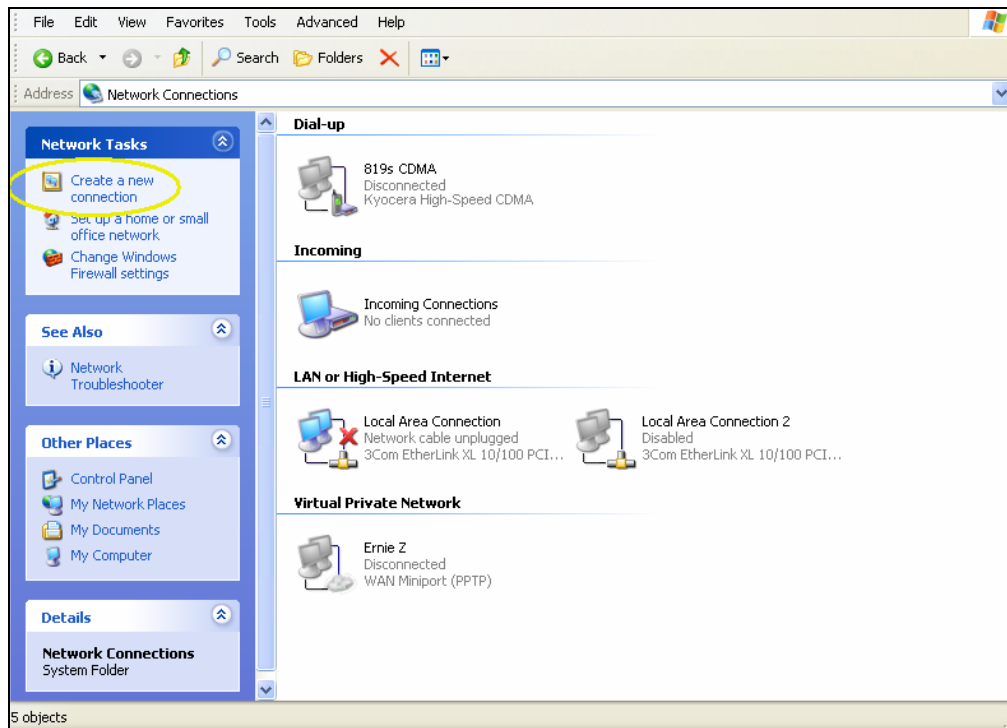
3. For the connection type, select "*Connect to the Internet*", then click "*Next*".
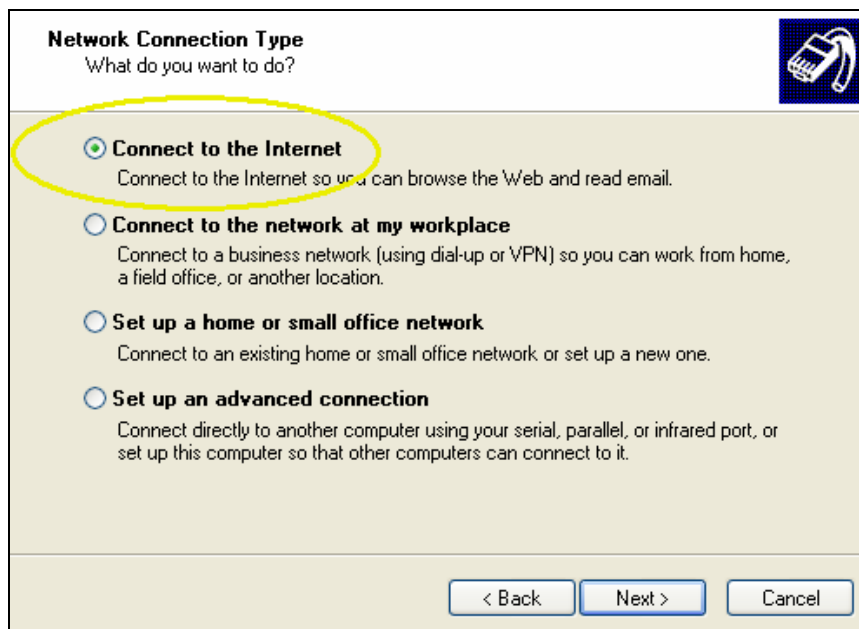
4. Select "*Set up my connection manually*", then click "*Next*".

Getting Ready
The wizard is preparing to set up your Internet connection.

How do you want to connect to the Internet?
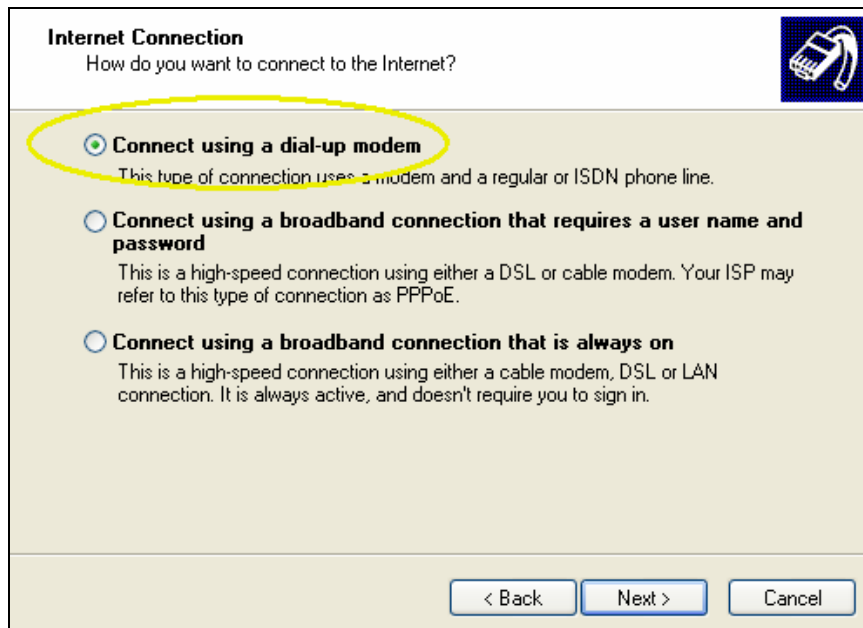
○ **Choose from a list of Internet service providers (ISPs)**

⊙ **Set up my connection manually**
For a dial-up connection, you will need your account name, password, and a phone number for your ISP. For a broadband account, you won't need a phone number.

○ **Use the CD I got from an ISP**

[< Back] [Next >] [Cancel]

5. For the internet connection, select "*Connect using a dial-up modem*", then click "*Next*".

Internet Connection
How do you want to connect to the Internet?

⊙ **Connect using a dial-up modem**
This type of connection uses a modem and a regular or ISDN phone line.
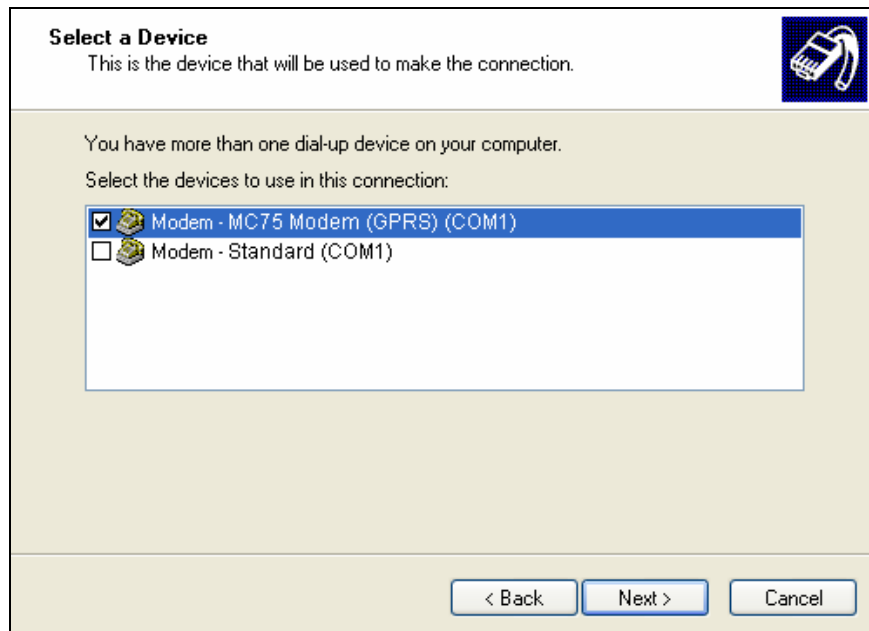
○ **Connect using a broadband connection that requires a user name and password**
This is a high-speed connection using either a DSL or cable modem. Your ISP may refer to this type of connection as PPPoE.

○ **Connect using a broadband connection that is always on**
This is a high-speed connection using either a cable modem, DSL or LAN connection. It is always active, and doesn't require you to sign in.

[< Back] [Next >] [Cancel]

6. Check the box by the Modem for the GPRS device, then click "*Next*".
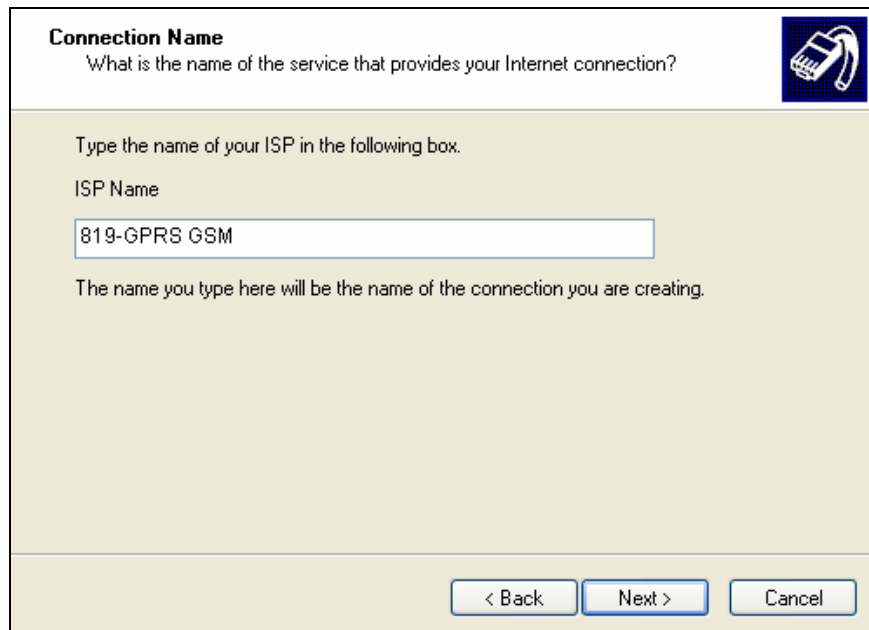
Select a Device
This is the device that will be used to make the connection.

You have more than one dial-up device on your computer.

Select the devices to use in this connection:

☑ Modem - MC75 Modem (GPRS) (COM1)
☐ Modem - Standard (COM1)

< Back   Next >   Cancel

7. Type in a connection name, then click "*Next*".

Connection Name
What is the name of the service that provides your Internet connection?

Type the name of your ISP in the following box.
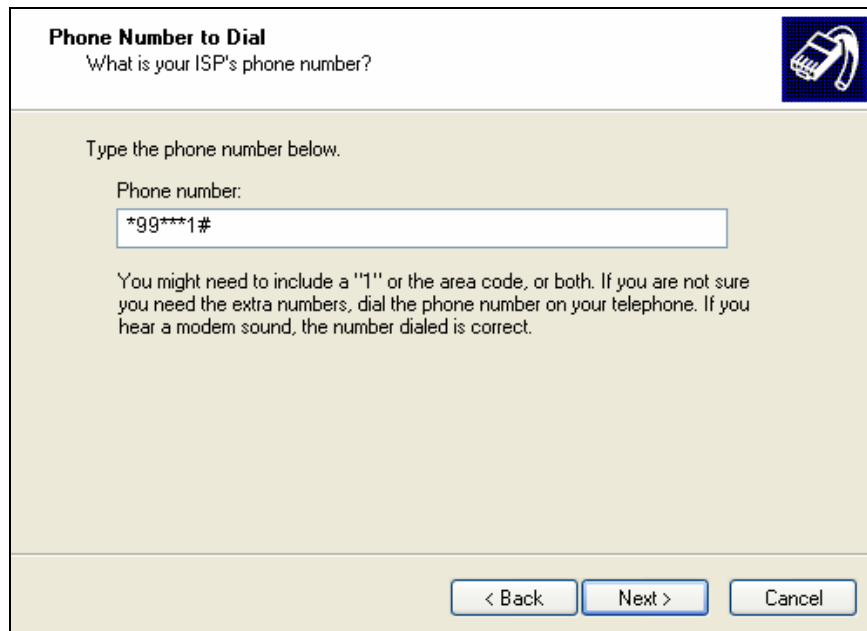
ISP Name

819-GPRS GSM

The name you type here will be the name of the connection you are creating.

< Back   Next >   Cancel

8. Type in ***99***1#** for the phone number to dial, this is the number for GPRS packet data calls.

Phone Number to Dial
What is your ISP's phone number?
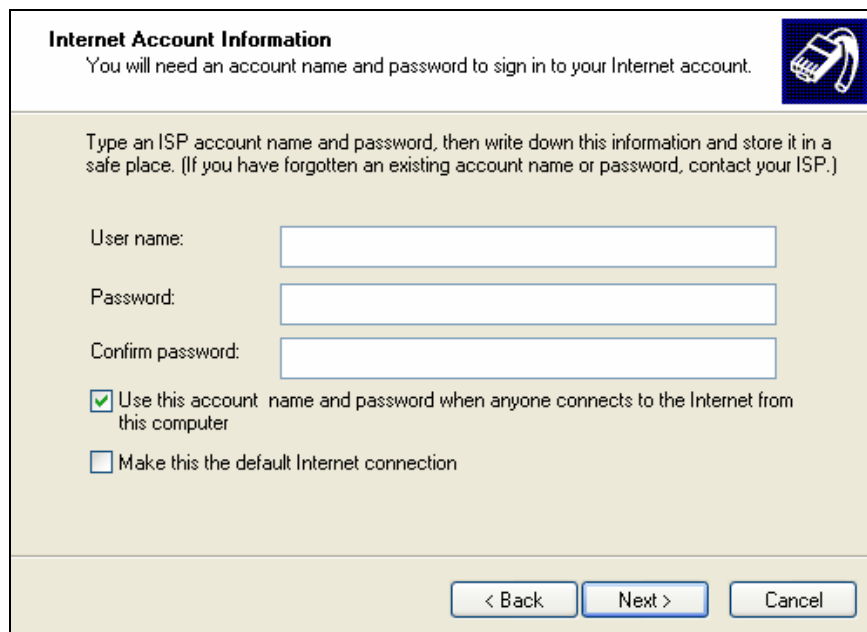
Type the phone number below.

Phone number:

*99***1#

You might need to include a "1" or the area code, or both. If you are not sure you need the extra numbers, dial the phone number on your telephone. If you hear a modem sound, the number dialed is correct.

< Back   Next >   Cancel

9. Typically the username and password are left blank. Click "Next"

Internet Account Information
You will need an account name and password to sign in to your Internet account.

Type an ISP account name and password, then write down this information and store it in a safe place. (If you have forgotten an existing account name or password, contact your ISP.)

User name:

Password:

Confirm password:

☑ Use this account name and password when anyone connects to the Internet from this computer

☐ Make this the default Internet connection

< Back   Next >   Cancel

10. Finish off the Wizard. The network connection should now be available on the Network Connections screen.

To check that the DUN connection is configured properly, go to the Network Connections screen and double click on the Dial-up connection for the 819-GPRS GSM modem. The connection screen should appear as shown below. Selecting *Dial* would initiate the Dial Up Connection, however, to check the settings, select *Properties*.
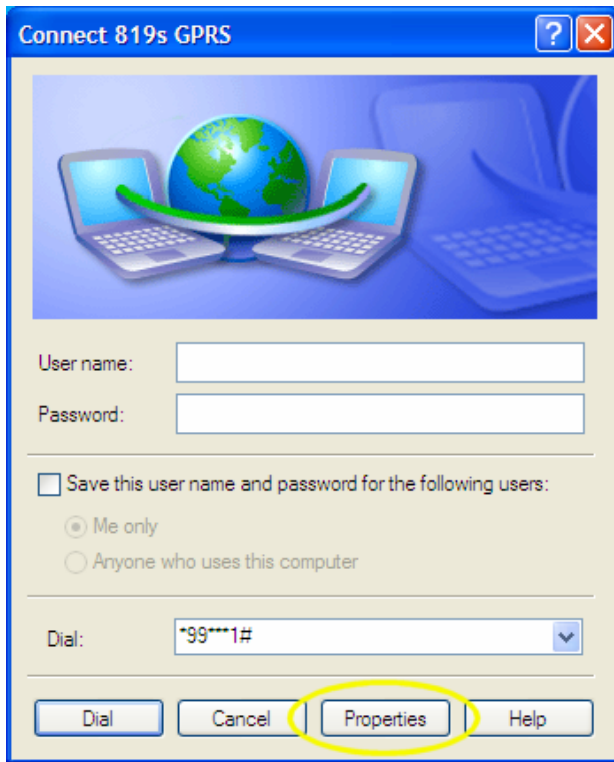
From the Properties window, confirm that the correct modem driver is checked under "Connect using:" and select *Configure...*
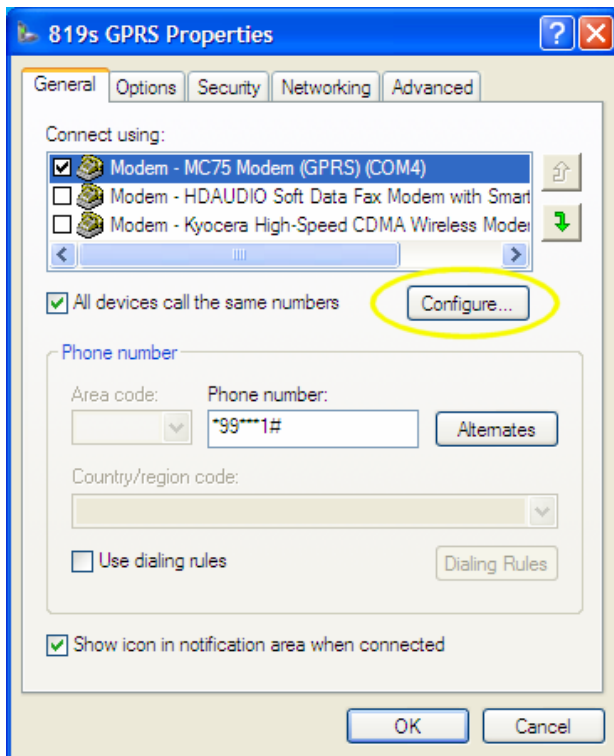
In the Configuration window, confirm that the Maximum speed (bps) is set to 115200, as shown below. Click *OK* to exit out of each screen.
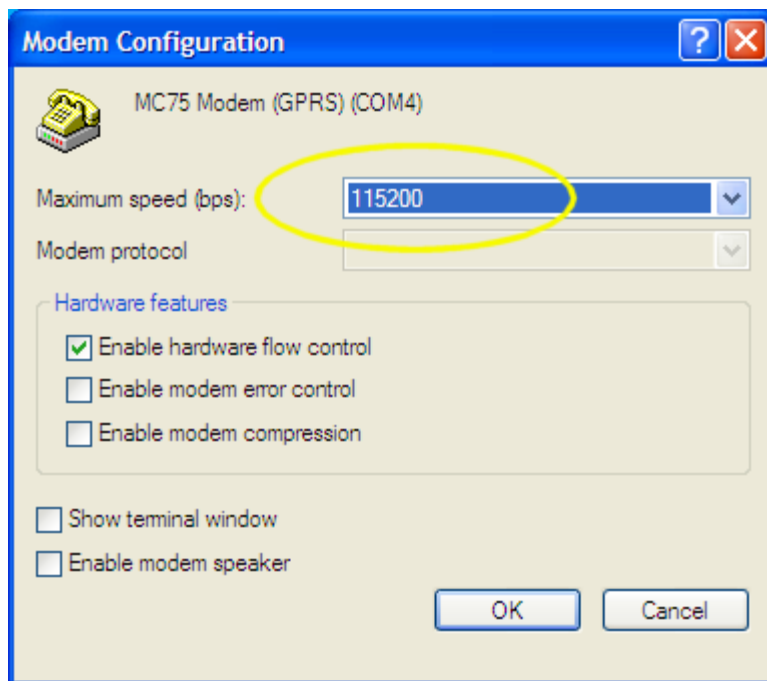
Refer to *Packet Data Call Setup* in Section 4 for further information on call setup procedures.

Operational States

The modem has three operational states:

- Command State
- Online State
- Online Command State

When first powered on, the modem is in the Command State where it is able to accept AT commands. When instructed to dial out or to answer a data call, the phone is in the Online State.

Activating your Modem

1. Connect the modem to an active COM port on a PC with an RS-232, 9 pin straight through cable.

2. Insert a SIM card with an activated account, gold contact side up. Refer to Figure 2.1, Section 2, for card orientation.

3. Attach the antenna and power connector.

4. Connect with a Hyper-Terminal session set to 115,200, 8 Bits, No Parity, 1 Stop Bit, and Hardware Flow Control enabled. Refer to Figure 3.1.
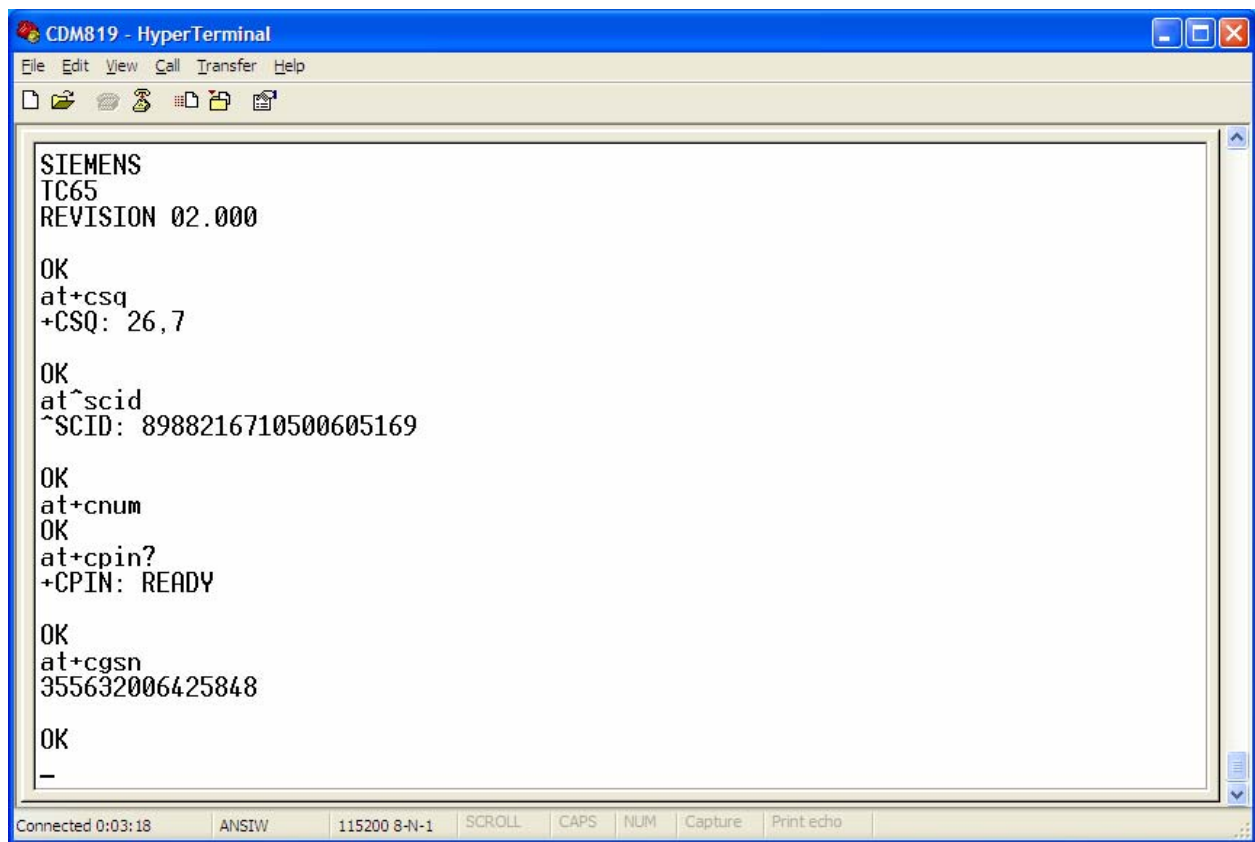
Figure 3.1: 819-GPRS HyperTerminal Port Settings

5. Confirm contact with the modem with the **ATI** command. This prints the cell module product information. If you get an Error or no communication, verify the modem is connected to the proper COM port and powered on. Refer to Figure 3.2.

6. Verify good signal strength with the **AT+CSQ** command. A typical reply is +CSQ 26, 0. The first number is signal strength and ranges from 0 to 31 (the higher the number, the stronger the signal.)

7. Confirm your SIM card is properly installed with the **AT^SCID** command. A reply of ^SCID:<20 digit CID number> indicates the modem recognizes the SIM card and displays it's ID number.

8. Confirm the phone number currently in the modem with the **AT+CNUM** command. It should be 11 digits i.e. 15553331234. For some carriers the phone number may not display but will respond with "OK". If the SIM card is not in the unit or not activated properly, the modem will reply with "ERROR".

9. Confirm that the SIM's PIN has been authenticated by the network using the **AT+CPIN?** command. The reply should read "+CPIN: READY". See **Section 5** for SIM related information if "READY" does not display.

10. Verify the modems International Mobile Equipment Identity (IMEI) number with the **AT+CGSN** command. The IMEI is used to identify GSM mobile equipment to the GSM network.

Figure 3.2: 819-GPRS HyperTerminal Modem Activation

If your account supports voice, you can confirm modem activation by performing a voice call to another phone with the **ATD**<Cell Phone Number>; command (for example **ATD15553331234**; the semicolon is required for voice calls). Your other phone should ring and the Caller ID should display the modem's phone number.

Configuration and test of a Circuit Switch Data (CSD) call, and Packet Data Call (TCP/IP) as well as other internet related connections are discussed in **Section 4** next.

SECTION 4 – CALL SETUP INFORMATION

Circuit Switch Data (CSD) Call Setup Steps

1. Connect the modem to an active COM port on a PC with an RS-232 9 pin straight through cable.

2. Insert the SIM card into the unit. Be sure your account can support CSD calls.

3. Attach the antenna and power connector.

4. Connect with a Hyper-Terminal session set to 115,200, 8 Bits, No Parity, 1 Stop Bit, and Hardware Flow Control enabled, the default speed of the modem.

5. Confirm contact with modem using **AT+CGSN** this prints out the IMEI of the modem (i.e. **355632004037819**). If you get an Error or no communication, go to Section 7 on Troubleshooting.

6. To auto-answer calls set **ATS0=1** A value of **ATS0=1** sets the modem to answer on the first ring, where **ATS0=0** disables the auto-answer feature. (NOTE: this is a letter S followed by a Zero)

7. Specify the bearer service type, i.e. **AT+CBST=7** will set type to 9600 V.32.

8. To set the Carrier Detect (DCD) to follow its connection state to the Cellular Network, set **AT&C1.** The yellow DCD LED will turn on when connected to the Carrier, and turn off when not connected. A value of **AT&C0** sets CD to always be on, a value of **AT&C2** sets CD to be always on, but to wink when there is a change in the connection state.

9. Ensure that DTR is set to terminate the call and return the modem to command state on an ON-to-OFF transition of DTR with **AT&D2**. A value of **AT&D0** ignores DTR, a value of **AT&D1** enters online command state upon an ON-to-OFF transition of DTR while retaining the connected call.

10. Save the new settings in user profile with **AT&W**.

11. To confirm your settings, perform an **AT&V**. This will print out several lines of text with all the register values.
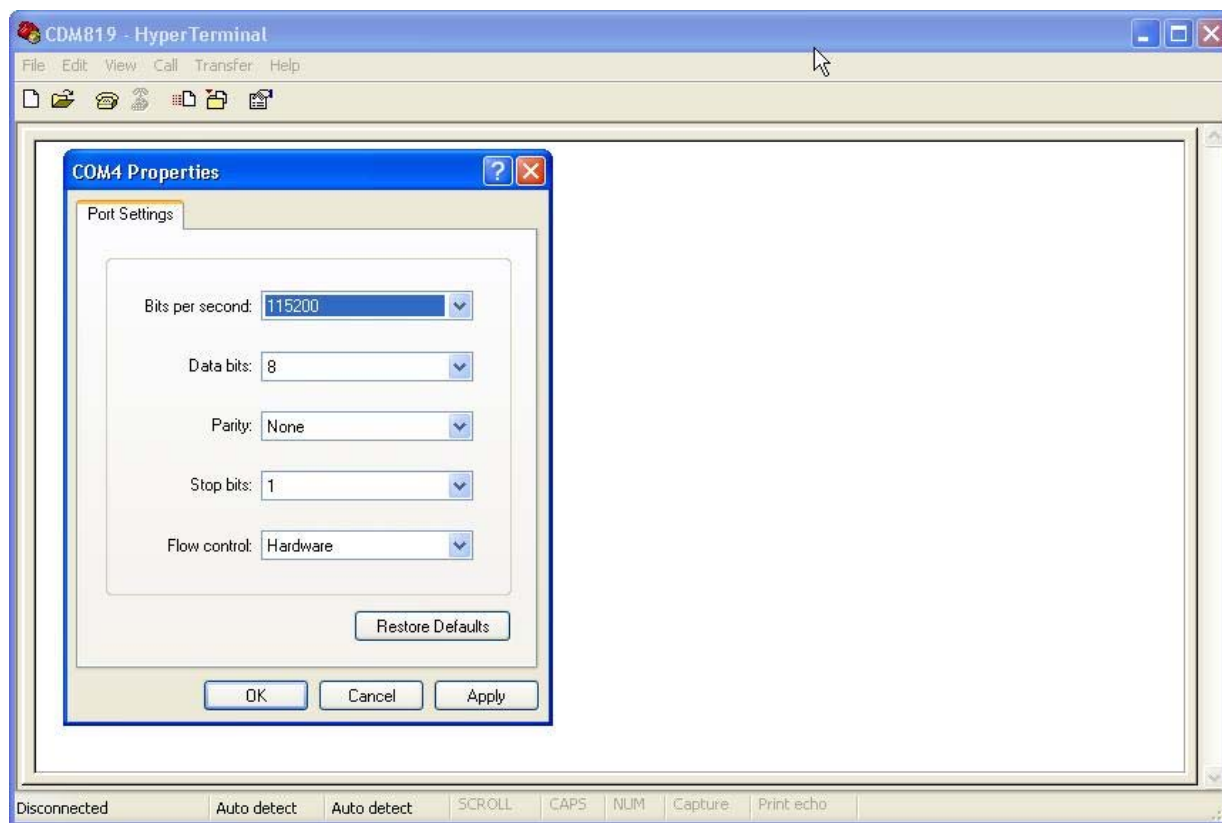
12. Verify that you have good signal strength, **AT+CSQ**. A typical reply is +CSQ? 21, 0. The signal strength (first number) ranges from 0 to 31, the higher the number the better the signal.

13. Set the modem for verbose result codes, with **ATV1**, this displays result codes as words, **ATV0** displays result codes as numbers.

14. Confirm and that you are registered on the cellular network. Enable URC to report status of network registration including location information using the command **AT+CREG=2**. Type **AT+CREG?**. The reply should be similar to +CREG: 2, 1, "7D0A", "7E4D", where the 1 indicates registration on the home network, 7D0A is the location area code in hex, and 7E4D is the cell ID in hex.

15. Test CSD Origination by calling your cell phone with **ATD<phone number>;** (for example, **ATD15075551234;**). Once the phone rings and you answer the phone, you should hear sounds similar to a fax negotiation.

16. Test CSD Termination by calling the phone number of your modem. Once it answers you should hear sounds similar to a fax negotiation. Hang up to terminate the connection.

17. To further test CSD termination connect another modem, (landline or cellular) to another available COM port on a PC. Configure that modem and the COM port to your required speed, i.e. 9600, with **AT+IPR=9600**.

18. Start HyperTerminal on the second PC's COM port and call the LandCell modem from this terminal window with the following command. **ATD**<Phone number of second 819 Modem>.

19. The terminal window connected to the 819-GPRS modem, will say "RING" and then once the modems have negotiated a connection it should say "CONNECT 9600/RPL" for a 9600 baud connection.

20. You can now type in text in either terminal window and it will appear in the other terminal window. This means that your modem is now answering incoming CSD data calls.

21. Type in **+++** (do not hit Enter key) to enter command mode and then type **ATH** to disconnect the call.

22. Once you can originate and terminate CSD calls with the modem you are ready to connect the modem to your equipment. Please ensure that your equipment is configured to your required data rate, i.e. 9600 bps.

Packet Data Call Setup Steps

1. Create a 19,200 Generic Modem or, use the Network Connection created in Section 3 using the GPRS 819S Driver, and configure it for 115,200, 8 bits, no parity, 1 stop bit. Attach the modem to an active COM port on the PC, i.e. COM1.

2. Configure the selected COM port to a maximum speed of 115,200 in the Hardware device manager.

3. Insert the SIM card into the unit.

4. Attach the antenna and power to the 819-GPRS modem.

5. Connect it to the COM port with a 9 pin RS-232 straight through serial cable.

6. Use HyperTerminal on the COM port to set the Carrier Detect (DCD) to follow its connection state to the Cellular Network, set **AT&C1**. The yellow LED will turn on when connected to the Carrier, and turn off when not connected. A value of **AT&CO** sets CD to always be on, and a value of **AT&C2** sets CD to be always on, but to wink when there is a change in the connection state.

7. Ensure that DTR is set to terminate the call and return the modem to command state on an ON-to-OFF transition of DTR with **AT&D2.** A value of AT&D0 ignores DTR, a value of **AT&D1** enters online command state upon an ON-to-OFF transition of DTR but retains the current call.

8. Set the GPRS persistent context definitions to non-volatile by issuing the command **AT^SCFG=GPRS/persistentcontexts,1**. GPRS persistent context will not be reset by AT&F.

   Define the Access Point Name (APN) for the cellular provider by issuing the **AT+CGDCONT=1, IP, <APN>** command (example; AT+CGDCONT=1, IP, ISP.CINGULAR).

   Save the new configuration with the **AT^SMSO** command. This will save settings and shutdown the module. The modem should re-start and display "^SYSSTART".

9. To confirm your settings, perform an **AT&V**. This will print out several lines of text with all the register values.

10. Confirm that you are registered on the cellular network. Enable URC to report status of network registration including location information using the command **AT+CREG=2**. Type **AT+CREG?**. The reply should be similar to +CREG: 2, 1, "7D0A", "7E4D", where the 1 indicates registration on the home network, 7D0A is the location area code in hex, and 7E4D is the cell ID in hex.

11. Exit HyperTerminal.

12. Create a Dial-Up Networking (DUN) connection using the modem that you created with the active COM port, i.e. COM1 in Network and Dial-up Connections. Configure it to 115,200 bps and set Security to Typical. Refer to Section 3.

13. Start a DUN session by double clicking on the DUN icon that was created.

14. Set the username and password as defined for your carrier (usually blank).

15. Enter the phone number as ***99***1#** with no area code and click on Dial.

16. The modem will dial out and attempt to connect.

17. If the configured baud rate for the modem, the COM port, the modem and the DUN do not match, the DUN will not be able to talk to the modem properly and you will get a hardware error message. Otherwise the DUN will contact the cellular network and authenticate the user on the network.

18. Once connected you will be able to browse the Internet through the DUN session. To confirm this, disable any other network connection you may have running.

GPRS Internet Connection Set Up

Make sure that your SIM is provisioned with GPRS data services. Insert the SIM card, attach the antenna and serial cable, and power on the unit. Start a HyperTerminal session as described earlier.

The AT^SICS command is used to setup the Internet Connection profile. For a generic setup type the following commands:

AT^SICS=0,alphabet,1
AT^SICS=0,contype,gprs0

Different carriers may require a specific username, password, or apn to be configured as well. Check the settings by typing, **AT^SICS?**. An example output response is shown below;

```
^SICS: 0,"conType","GPRS0"
^SICS: 0,"alphabet","1"
^SICS: 0,"user",""
^SICS: 0,"passwd","*****"
^SICS: 0,"authMode","PAP"
^SICS: 0,"apn",""
^SICS: 0,"inactTO","20"
^SICS: 1,"conType",""
^SICS: 2,"conType",""
^SICS: 3,"conType",""
^SICS: 4,"conType",""
^SICS: 5,"conType",""
OK
```

The GPRS connection can be tested with a PING service and the inactivity timer <InactTo> deactivated (by default, it is set to 20 seconds as shown in the example output). The timer can be disabled by sending **AT^SICS=0,"inactTO",0**. Open only the GPRS connection without an associated service. The connection won't be closed until **AT^SICC=0** or closed by the network because of inactivity (4 hours on Cingular in coverage). Once the connection is open with AT^SICO, you cannot use AT^SISO or AT^SISC. Services defined with AT^SISS using connection profile 0 will be immediately opened by typing;

Open the connection by typing, **AT^SICO=0**

Wait for the "OK" response.

Start the ping test using the AT^SISX command. The example pings google.com 4 times with a timeout of 2000 ms.

AT^SISX="Ping",0,"google.com",4,2000

The response output example is shown below (the output may differ, but should show a successful ping response);

```
 ^SISX: "Ping",1,0,"64.233.187.99",798
 ^SISX: "Ping",1,0,"64.233.187.99",526
 ^SISX: "Ping",1,0,"64.233.187.99",475
 ^SISX: "Ping",1,0,"64.233.187.99",471


 ^SISX: "Ping",2,0,4,4,0,0
 ^SISX: "Ping",3,0,471,798,567
OK
```

To close the connection type **AT^SICC=0**.

Internet Service Information: HTTP receive data

Once the GPRS Internet Connection profile has been setup using the AT^SICS commands, the AT^SISS command is used to setup the Internet Service Information profile. For an HTTP service test, type the following commands to setup a connection to receive data from yahoo.com:

AT^SISS=0,alphabet,1
AT^SISS=0,srvType,HTTP
AT^SISS=0,address,"http://www.yahoo.com"
AT^SISS=0,conId,0

Check the settings by typing, **AT^SISS?**. An example output response is shown below;

```
^SISS: 0,"srvType","Http"
^SISS: 0,"conId","0"
^SISS: 0,"alphabet","1"
^SISS: 0,"hcMethod","0"
^SISS: 0,"hcContLen","0"
^SISS: 0,"hcAuth","0"
^SISS: 0,"hcRedir","1"
^SISS: 0,"address","http://www.yahoo.com"
^SISS: 0,"hcContent",""
^SISS: 0,"hcProp","Accept-Encoding: identity"
^SISS: 0,"user",""
^SISS: 0,"passwd","*****"
^SISS: 0,"hcUsrAgent","MC75/4.1"
^SISS: 0,"tcpMR","10"
^SISS: 0,"tcpOT","6000"
^SISS: 1,"srvType",""
^SISS: 2,"srvType",""
^SISS: 3,"srvType",""
^SISS: 4,"srvType",""
^SISS: 5,"srvType",""
^SISS: 6,"srvType",""
^SISS: 7,"srvType",""
^SISS: 8,"srvType",""
^SISS: 9,"srvType",""
OK
```

Open the connection by typing **AT^SISO=0**. A response should display showing that the connection was successful, as shown below;

```
^SIS: 0, 3, 2201, "HTTP Response:HTTP/1.1 200 OK"
^SISR: 0, 1
```

The ^SISR: 0, 1 response indicates that there is data available and can be read by sending the AT^SISR command. Send the AT^SISR commend requesting 1500 bytes of data.

```
AT^SISR=0,1500
```

The response will produce 1500 bytes of data (mostly html text) and another ^SISR: 0, 1 at the end, indicating more data is available. Send the AT^SISR=0,1500 command until the response reads ^SISR: 0, 2, indicating the data transfer is complete.

Check the connection state by typing **AT^SISO?**. An example output response is shown below;

```
^SISO: 0, "Http","6","1","9533","0","10.192.72.82:0","209.131.36.158:80"
^SISO: 1, ""
^SISO: 2, ""
^SISO: 3, ""
^SISO: 4, ""
^SISO: 5, ""
^SISO: 6, ""
^SISO: 7, ""
^SISO: 8, ""
^SISO: 9, ""
OK
```

To close the connection, type **AT^SISC=0**.

Internet Service Information: HTTP send data

In this example, HTTP data is sent to a fictitious server located at http://myserver.com/mydir/myfile. Use the AT^SISS command to configure the connection profile.

```
AT^SISS=0,alphabet,1
AT^SISS=0,srvType,HTTP
AT^SISS=0,conId,0
AT^SISS=0,address,"http://myserver.com/mydir/myfile"
AT^SISS=0,hcMethod,1
AT^SISS=0,hcProp,"Content-Type: application/x-www-form-urlencoded" (or any other HTTP
properties)
```

To send data less than 128 bytes the **AT^SISS=0,hcContent,"**your data**"** can be used to send data without using the AT^SISW command.

To send data larger than 128 bytes, first specify the size of the data by typing the following command:

```
AT^SISS=0,hcContLen,xx  where xx specifies the total amount of data to be sent.
```

Open the connection by typing, **AT^SISO=0**.

Check the connection state by typing, **AT^SISO?**.

Send the data (if size > 128 bytes) by typing **AT^SISW=0,<size>**

Enter the data to be sent, you will get OK when all the bytes are transmitted. A response will be sent something like:

```
^SIS: 0, 0, 2201, "HTTP/1.1 200 OK"
```

```
^SISR: 0, 1
```

Read the HTTP Answer by typing the command, **AT^SISR=0,1500**. This closes the connection and give a response somewhat like the following;

```
^SISR: 0, 102
<the answer from the server>
OK
```

TCP Client Socket Setup

This example describes commands to setup the modem as a TCP Socket Client. To check that data is received by the server, you can launch a TCP socket server on a computer with a public IP address.

Configure the modem using the following AT commands:

AT^SISS=0,srvtype,socket
AT^SISS=0,address,socktcp://'host':'remote tcpPort'[;disnagle='0|1']

For example:
AT^SISS=0,srvtype,socket
AT^SISS=0,address,socktcp://66.94.234.13:80
AT^SISS=0,conid,0

Check the configuration settings by typing, **AT^SISS?**.

Open the connection by typing, **AT^SISO=0**.

A response of "^SISW: 0,1" will indicate that you can write (or send) data on this socket. Write some data using the **AT^SISW=0,x** command, where x is the number of bytes, up to 1500.

A response of "^SISR: 0,1" will indicate that you have some data to be read. The **AT^SISR=0,1500** command will read up to 1500 bytes of data.

Close the upstream data with <EodFlag> at the end of the AT^SISW command by typing, **AT^SISW=0,0,1**. The upload data direction needs to be closed for the latest firmware revision when the GSM module is done sending data.

Close connection by typing, **AT^SISC=0**.

TCP Socket Server Setup

This example describes commands to setup the modem as a TCP Socket Server. Configure the modem using the following AT commands:

AT^SISS=0,alphabet,1
AT^SISS=0,srvtype,socket
AT^SISS=0,address,"socktcp://listener:2000"
AT^SISS=0,conid,0

Open the connection by typing, **AT^SISO=0**.

Close connection by typing, **AT^SISC=0**.

UDP Client Socket Setup

This example describes commands to setup the modem as a UDP Socket Client. To check that data is received by the server, you can launch a UDP socket server on a computer with a public IP address.

Configure the modem using the following AT commands:

AT^SISS=0,srvtype,socket
AT^SISS= 0,address,"sockudp://<REMOTE_IP>:<REMOTE_PORT>"

For example:
AT^SISS=0,srvtype,socket
AT^SISS=0,address,"sockudp://10.48.132.11:2000"

Open the connection by typing, **AT^SISO=0**.

Close connection by typing, **AT^SISC=0**.

UDP Socket Listener Setup

This example describes the commands to setup the modem as a TCP Socket Server. Configure the modem using the following AT commands:

AT^SISS=0,alphabet,1
AT^SISS=0,srvtype,socket
AT^SISS=0,address,"sockudp://listener:2000"
AT^SISS=0,conid,0

Open the connection by typing, **AT^SISO=0**.

A response of "^SISR: 0, 1" will be displayed for incoming UDP data. Type, **AT^SISR=0,1500** to read data. An example response is shown below;

```
^SISR: 0, 20, 0, 10.40.236.159:1024
Hello from UDP client
```

Replying directly using 20 bytes by typing, **AT^SISW=0,20,,,10.40.236.159:1024**. After receiving the "^SISW: 0, 20, 0" type your reply and hit enter.

Close connection by typing, **AT^SISC=0**.

POP3 Generic Settings

This example describes commands to setup the modem as a POP3 Server. Configure the modem using the following AT commands:

AT^SISS=0,srvtype,pop3
AT^SISS=0,user,<USER>
AT^SISS=0,passwd,<PASSWORD>
AT^SISS=0,address,<POP3 server IP address>
AT^SISS=0,pcmd,1   (this is the Status Command)
AT^SISS=0,conid,0

Open the connection by typing, **AT^SISO=0**.

Close connection by typing, **AT^SISC=0**.

SMTP Generic Settings

This example describes commands to setup the modem for SMTP. Configure the modem using the following AT commands:

AT^SISS=0,alphabet,1
AT^SISS=0,srvType,Smtp
AT^SISS=0,address,<mail.email.com>
AT^SISS=0,user,<username>
AT^SISS=0,passwd,<password>
AT^SISS=0,smFrom,<sender@email.com>
AT^SISS=0,smRcpt,<receiver@email.com>
AT^SISS=0,smSubj,<Email Subject>
AT^SISS=0,smAuth,1
AT^SISS=0,conid,0

Check the profile settings by typing, **AT^SISS?**

Open the connection by typing, **AT^SISO=0**.

Write the email text using the AT^SISW command, for example, to write 24 bytes of data send the following:

AT^SISW=0,24
<enter 24 bytes of text here>

Close the upstream data with <EodFlag> at the end of the AT^SISW command by typing, **AT^SISW=0,0,1**. The upload data direction needs to be closed for the latest firmware revision when the GSM module is done sending data.

Close connection by typing, **AT^SISC=0**.

FTP Upload (PUT) Setup

This example describes commands to setup the modem to upload to an FTP server. The module will support only passive mode for FTP transfers. Configure the modem using the following AT commands:

AT^SISS=0,srvType,ftp
AT^SISS=0,conId,0
AT^SISS=0,address,"ftpput://myname:mypasswd@192.168.1.2/upload/example.bin;type=i"

The file "example.bin" will be created on the FTP server at IP 192.168.1.2.

Open the connection by typing, **AT^SISO=0**.

FTP service is ready for upload when "^SISW: 0, 1" is displayed.

Typing At^SISW=0,100 will request to send 100 bytes. The write command response confirms that 100 bytes must be transferred now.

```
^SISW: 0,100,100
```

Data can now be transferred. For example:

```
012345678901234567890123456789012345678901234567890123456789012345678901234
567890123456789
```

A response of "^SISW: 0, 1" indicates that the FTP service is ready to transfer more data. Data from the last AT^SISW command is transferred to the remote host.

Close the upstream data with <EodFlag> at the end of the AT^SISW command by typing, **AT^SISW=0,0,1**.

Close connection by typing, **AT^SISC=0**.

FTP Download (GET) Setup

This example describes commands to setup the modem to download from an FTP server. The module will support only passive mode for FTP transfers. Configure the modem using the following AT commands:

AT^SISS=0,srvType,ftp
AT^SISS=0,conId,0
AT^SISS=0,address,"ftp://login:password:@<IP address of server>/example.txt"

Open the connection by typing, **AT^SISO=0**.

Read the file by typing **AT^SISR=0,1500** to get the first 1500 bytes of data. After "^SISR: 0,2" is displayed, all data has been received and the connection can be closed.

Close connection by typing, **AT^SISC=0**.

For more information on Internet related AT commands and specifically the AT^SISS Internet Service Setup Profile command, consult the Siemens TC65/MC75 AT Command Set document available from Siemens.

SECTION 5 – SIM CARD SPECIFIC INFORMATION

The **AT+CPIN** command controls network authentication of the TC65.

The read command (AT+CPIN?) returns an alphanumeric string indicating whether or not network authentication is required.

The write command allows the modem to store the entered password. This may be for example the SIM PIN1 to register to the GSM network, or the SIM PUK1 to replace a disabled SIM PIN1 with a new one, or the PH-SIM PIN if the client has taken precautions for preventing damage in the event of loss or theft etc. If no PIN1 request is pending (for example if PIN1 authentication has been done and the same PIN1 is entered again) the modem responds "+CME ERROR: operation not allowed"; no further action is required.

Each time a password is entered with AT+CPIN the module starts reading data from the SIM. The duration of reading varies with the SIM card. This may cause a delay of several seconds before all commands which need access to SIM data are effective.

Users should be aware that when using a phonebook, SMS or Remote SAT command quickly after SIM PIN authentication the SIM data may not yet be accessible, resulting in a short delay before the requested AT command response is returned. This delay is due to the initial process of loading SIM data once after SIM PIN authentication. The duration of loading SIM data is dependent on the SIM card used and may take a couple of seconds.

Successful PIN authentication only confirms that the entered PIN was recognized and correct. The output of the result code OK does not necessarily imply that the mobile is registered to the desired network. Typical example: PIN was entered and accepted with OK, but the ME fails to register to the network. This may be due to missing network coverage, denied network access with currently used SIM card, no valid roaming agreement between home network and currently available operators etc. The modem offers various options to verify the present status of network registration: For example, the AT+COPS? command indicates the currently used network. With AT+CREG you can also check the current status and activate an unsolicited result code which appears whenever the status of the network registration changes (e.g. when the ME is powered up, or when the network cell changes).

The <pin> and <new pin> can also be entered in quotation marks (e.g. "1234").

To check the number of remaining attempts to enter the passwords use the AT^SPIC command.

See AT+CPWD and AT^SPWD for information on passwords, **Section 9,** Table 9.6.

See AT+CLCK and AT^SLCK for information on lock types, **Section 9**, Table 9.6.

To query and change the status of the SIM's PIN enter the following AT commands:

```
AT+CMEE=2            Will enable error messages to be displayed as text.
AT+CLCK="SC",2       Will display the status of the PIN, 0=lock is inactive, 1=lock is active
AT+CPIN=xxxx         Will verify that PIN xxxx is valid.
AT+CLCK="SC",0,xxxx  Will set the PIN to "lock inactive", where xxxx is the current active PIN
```

What to do if PIN or password authentication fails?

PIN1 / PUK1:
After three failures to enter PIN 1, the SIM card is blocked (except for emergency calls). +CME ERROR: 12 will prompt the client to unblock the SIM card by entering the associated PUK (= PIN Unblocking Key / Personal Unblocking Key). After ten failed attempts to enter the PUK, the SIM card will be invalidated and no longer operable (the device will respond with: +CME ERROR: 770, which stands for: SIM invalid - network reject). In such a case, the card needs to be replaced. PIN1 consists of 4 to 8 digits, PUK1 is an 8-digit code only.

To unblock a disabled PIN1 you have two options:

- You can enter AT+CPIN=PUK1,new PIN1.
- You can use the ATD command followed by the GSM code **05*PUK*newPIN*newPIN#;.

Phone lock:
If the mobile was locked to a specific SIM card (= "PS" lock or phone lock), the PUK that came with the SIM card cannot be used to remove the lock. After three failed attempts to enter the correct password, ME returns +CPIN: PH-SIM PUK (= response to read command AT+CPIN?), i.e. it is now waiting for the Master Phone Code. This is an 8-digit device code associated to the IMEI number of the mobile which can only by obtained from the manufacturer or provider. When needed, contact Siemens AG and request the Master Phone Code of the specific module.

There are two ways to enter the Master Phone code:

- You can enter AT+CPIN=Master Phone Code
- You can use the ATD command followed by the GSM code *#0003*Master Phone Code#;.

Usually, the Master Phone Code will be supplied by mail or e-mail. If the received number is enclosed in the *# codes typically used for the ATD option, it is important to crop the preceding *#0003* characters and the appended #.

Example: You may be given the string *#0003*12345678#. When prompted for the PH-SIM PUK simply enter 12345678. If incorrectly input, the Master Phone Code is governed by a specific timing algorithm: $(n-1)*256$ seconds. The timing should be considered by system integrators when designing an individual MMI.

Refer to **Section 9**, Security Commands, for more information.

For more detailed information, refer to the Siemens TC65/MC75 AT Command Set document available from Siemens.

SECTION 6 – TROUBLESHOOTING

In this section, you will find important information relating to the setup and diagnosis of your 819-GPRS modem. If you are having trouble communicating with the modem, please read this "Troubleshooting" section in full. If, after reviewing this section, you are still having problems connecting, call our Technical Support line at: 507-833-8819 for more assistance. Toll charges may apply.

Helpful Hints

Only assign one device to any given COM port on your system.

The 819-GPRS data modem has a default COM port speed of 115,200 bps. This is the data rate at which your modem connects to your computer. The modem's COM port speed can be lowered to 300bps or raised to 230,400 bps. *Warning:* Please ensure your COM port is capable of 230,400 data rates before changing the modem to this speed. As this setting adjusts the communications speed that the modem utilizes to speak to the computer, altering this parameter must be performed in a very specific way, otherwise, you may lose communication with the modem. To alter the default speed of 115,200 bps, first, connect via your terminal emulation software (settings: 115200bps, 8, N, 1, Hardware). Now, you may issue the **AT+IPR** command to query or change the default speed. After adjusting the port speed, disconnect from the modem and reconnect using the new data rate. Refer to Table 9.5: Serial Interface Control Commands in Section 9 for more information pertaining to the **AT+IPR** command.

Make certain the serial cable is firmly connected to an enabled COM port with no hardware resource conflicts. Make sure that you have properly added the "MC75 Modem (GPRS)" (or the "Standard 19200 bps Modem") to your system (see Section 3 above). Also, check to see if you have an infrared (IR) port assigned to your modem's COM port. Disable it if you are not using this function. Often, an IR port can interfere with the COM port even after you successfully connect. Device Manager may indicate that there is no conflict between the two, but disabling the IR port may still help.

If your system's COM port appears to be locked, you may have to shut down and reboot your system.

Do not use "Disable Call Waiting" (commonly referred to as *70) when configuring Dialing Properties.

Make certain that you are using the proper RS-232 serial cable. For most applications, you must use a straight-through RS-232 serial cable. For certain types of equipment, you may be required to use a null modem cable.

Diagnosing COM Port Problems Using HyperTerminal

If you are experiencing problems connecting to the cellular network, you can verify if the issue is between the computer and the modem or between the modem and the cellular network. To test, open your terminal emulation software, such as Hyperterminal. Once the modem is ready to accept commands, type: **ATI** and press enter. The product information of the modem should print out on the screen (for example: SIEMENS, TC65, REVISION 02.000). This will confirm that you are communicating with the LandCell modem and not some other device connected to or inside the PC. If the product information does not print out, please confirm that you have selected the COM port that the modem is attached to, and not some other port, internal modems typically show up as COM3.

To test the link between your modem and the cellular network try to call your cell phone. Type in: **ATD**<phone number to call>; (for example **ATD15075551234;)** and press enter. This command will perform a voice call similar to the type a standard home phone would make and if your modem has been activated correctly your cell phone should ring and display the number of the modem. Answer the incoming call on your cell phone and then hang-up your cell phone. If you are properly communicating with the modem using the steps above and still cannot connect through the cellular network, here are a few items to check:

- Call the phone number of the modem. If the phone number is not active, the cellular service will inform you of this.
- Confirm that the IMEI on the Label matches the IMEI in the module with **AT+CGSN** This will print out the IMEI of the Modem in Decimal format, ie 355632004037819. This rarely happens, but if the numbers do not match, the wrong IMEI may be in your Account.
- Contact your cellular provider and make certain that the International Mobile Electronic Identity (IMEI) of the modem is active in their system.
- Check the signal strength reaching the modem using the following command: **AT+CSQ** A typical reply is +CSQ? 19,99. The signal strength (first number) ranges from 0 to 31, the higher the number the better the signal.
- Issue the command: **AT^SCID** to verify that the SIM card is in the modem and installed properly. The number should match the ICCID of the issued SIM card.
- Attempt to relocate the modem and/or antenna to receive a stronger signal.

NOTE: Running diagnostics from Modem Properties may not work if the computer attempts to communicate with the modem at an improper baud rate.

SECTION 7 – PROFILES

In addition to the default profile, you can store an individual one with AT&W. To alternate between the two profiles enter either ATZ (loads user profile) or AT&F (restores factory profile).

NOTE: Every ongoing or incoming call will be terminated.

Table 7.1: Profile Commands

AT&V	Returns the current parameter setting. The configuration varies depending on whether or not PIN authentication has been done.
AT&W	Stores the currently set parameters to a user defined profile in the non-volatile memory. The user defined profile will be restored automatically after power-up. Use **ATZ** to restore user profile and **AT&F** to restore factory settings. Until the first use of **AT&W**, **ATZ** works as **AT&F**. **AT&W** stores all global settings and the current local settings of the interface, on which the command is executed.
AT&F	Sets all current parameters to the manufacturer defined profile. Refer to Section 8, Table 8.1.
ATZ	Sets all current parameters to the user profile stored with **AT&W**. If a connection is in progress, it will be terminated.

SECTION 8 – COMMON AT COMMAND REFERENCE GUIDE

Below you will find a reference guide of the AT commands most commonly used in day-to-day operation of the modem.

Table 8.1: Common AT Commands

Command	Description
Configuration Commands	
AT&F	Set all current parameters to manufacturer defaults
AT&V	Display current configuration
AT&W	Stores current configuration to user defined profile
AT^SCFG	Extended Configuration Settings Example to enable Persistent Context when setting APN: **AT^SCFG=GPRS/PersistentContexts, 1**
ATZ	Sets all current parameters to the user profile stored with AT&W. If a connection is in progress, it will be terminated.
Serial Interface Control Commands	
AT+IPR	Set fixed local baud rate The write command specifies the bit rate to be used for the interface. When you set a fixed-rate, make sure that both TE (DTE) and TA (DCE) are configured to the same rate. Example**: AT+IPR=19200** sets the modem baud rate to 19200.
Security Commands	
AT+CPIN?	PIN Authentication status. Example response; +CPIN: READY
Identification Commands	
ATI	Display product identification Example: SIEMENS TC65 REVISION 02.000
AT+CGSN	Request International Mobile Equipment Identity (IMEI) This is the module IMEI number located on the top label.
AT+CNUM	Read own numbers Example response; +CNUM: "My Number", "18052054436", 129
AT^SCID	Display SIM card identification number Example response; ^SCID: 89014104211640012345
Call Related Commands	
ATA	Answer a Call
ATD	Mobile originated call to specified number ATD<phone number>; for voice call test. Example: **ATD15075551234;** ATD<phone number> for data call. Example: **ATD15075551234**
ATD*99***1#	Establish a GPRS connection by service code 99 and using CID 1.
ATH	Disconnect exsiting connection
ATO	Switch from command mode (ie AT commands) to data mode/PPP online mode. This command is only available during a CSD call or a GPRS connection. The +++ character sequence causes the TA to cancel the data flow over the AT interface and switch to command mode. This allows you to enter AT commands while maintaining the data connection to the remote device or, accordingly, the GPRS connection. To prevent the +++ escape sequence from being misinterpreted as data, it must be preceded and followed by a pause of at least 1000 ms. The +++ characters must be entered in quick succession, all within 1000 ms.
+++	Switch from data mode to command mode

Network Service Commands	
AT+CSQ	Signal Quality Example response; +CSQ: 25,0 has an RSSI of -63 dBm

At^SMONG	Cell Info Table
	Example response:
	  GPRS Monitor
	  BCCH G PBCCH PAT MCC MNC NOM TA RAC # Cell #
	  0637 1 – 4 234 05 2 00 0B
	BCCH - ARFCN of BCCH carrier
	G - GPRS status:
	     0 GPRS not available in currently used cell
	     1 GPRS available in currently used cell
	     2 GPRS attached
	PBCCH - If PBCCH is present, indication of ARFCN, else ''-''
	PAT - Priority Access Threshold (GSM Rec. 04.08 / 10.5.2.37b)
	     0 Packet access is not allowed in the cell
	     1 Spare, shall be interpreted as "000" (packet access not allowed)
	     2 Spare, shall be interpreted as "000" (packet access not allowed)
	     3 Packet access is allowed for priority level 1
	     4 Packet access is allowed for priority level 1 to 2
	MCC - Mobile Country Code
	MNC - Mobile Network Code
	NOM - Network Operation Mode (1…3)
	TA - Timing Advance Value
	RAC - Routing Area Code (as hexadecimal value)

GPRS Service Commands	
AT+CGACT	PDP context activate or dactivate ? - Read command returns the current activation states for all the defined PDP contexts. =0 – Write command is used to deactivate the specified PDP context. =1 - Write command is used to activate the specified PDP context.
AT+CGATT	GPRS attach or detach ? - Read command returns the current GPRS service state. =0 – Write command is used to detach the MT to the GPRS service. =1 - Write command is used to attach the MT to the GPRS service.
AT+CGDATA	Enter GPRS data state =? - List of supported <L2P>s =<L2P>,<cid>, Example: **AT+CGDATA="PPP",1**
AT+CGDCONT	Define PDP Context =? - Read command returns the current settings for each defined PDP context. =<cid>, "IP",<APN>,<PDP Address>,0,<PDP Header Commpression> Example: **AT+CGDCONT=1,"IP",isp.cingular** sets 'isp.cingular' as the APN
AT+CGPADDR	Show PDP address =<cid>, Example response; +CGPADDR: 1, "15.144.187.50"
Miscellaneous Commands	
A/	Repeat previous command line

SECTION 9 – AT COMMAND REFERENCE

All modem functions are controlled using the same industry-standard AT commands that are used to control landline modems. A knowledge of all these commands is not required by most users, but are provided here as a reference.

AT Command Types

There are several types of AT commands as defined in the following list;

- Configuration Commands
- Status Control Commands
- Serial Interface Control Commands
- Security Commands
- Identification Commands
- Call Related Commands
- Network Service Commands
- Internet Service Commands
- GPRS Commands
- Short Message Service (SMS) Commands
- SIM Related Commands
- Hardware Related Commands

The parameters set by the various AT commands in this section are applied to all subsequent calls and will be used each time you place a call. As such, your custom settings (if not saved in a profile) will be available until you power down the modem. These settings are lost upon powerdown if not saved. For further information, refer to the Siemens TC65/MC75 AT Command Set document available from Siemens.

Command Line Syntax

The "AT" or "at" prefix must be set at the beginning of each command line. To terminate a command line enter <CR>. Commands are usually followed by a response or, result codes, that includes "<CR><LF><response><CR><LF>".

Table: 9.1 Command Syntax

AT command type	Syntax	Function
Test command	AT+CXXX=?	The mobile equipment returns the list of parameters and value ranges set with the corresponding Write command or by internal processes.
Read command	AT+CXXX?	This command returns the currently set value of the parameter or parameters.
Write command	AT+CXXX=<...>	This command sets user-definable parameter values.
Exec(ution) command	AT+CXXX	The execution command reads non-variable parameters determined by internal processes in the GSM engine.

Commands may be edited using the backspace key, but the backspace will not delete the AT attention command at the beginning of the command line.

Result Codes

After issuing a command, a result code will typically be displayed on the screen to inform you if the command was successful, unsuccessful, improperly formatted, etc. When in the command mode, thirteen possible result codes may be returned. The result codes can be set to display as either digits or words by accessing the Verbose command, **ATV**. The digit code is returned when the Verbose mode is OFF (ATV0); the word code is returned when Verbose is ON (ATV1). See table 9.2 for more information on Verbose format.

Table: 9.2 Result Codes

Numeric	Verbose	Description
0	OK	Command executed without errors.
1	CONNECT	Link established.
2	RING	Ring detected.
3	NO CARRIER	Link not established or disconnected.
4	ERROR	Invalid command or command line too long.
6	NO DIALTONE	No dial tone, dialling impossible, wrong mode.
7	BUSY	Remote station busy.
47	CONNECT 2400/RLP	Link with 2400 bps and Radio Link Protocol.
48	CONNECT 4800/RLP	Link with 4800 bps and Radio Link Protocol.
49	CONNECT 9600/RLP	Link with 9600 bps and Radio Link Protocol.
50	CONNECT 14400/RLP	Link with 14400 bps and Radio Link Protocol.
	ALERTING	Alerting at called phone
	DIALING	Mobile phone is dialing

Configuration Commands

These commands control the basic configuration of the modem. The parameters can only be read back by the AT&V command when in command state. The following table shows the command format.

Table 9.3: Configuration Commands

Command	Description
AT&F	Sets all current parameters to the manufacturer defined profile.
AT&V	Returns the current parameter setting. The configuration varies depending on whether or not PIN authentication has been done and whether or not Multiplex mode is enabled
AT&W	Stores the currently set parameters to a user defined profile in the non-volatile memory.
ATQ	Set result code presentaion mode: 0 - DCE transmits result code 1 - Result codes are suppressed and not transmitted
ATV	This command determines the contents of header and trailer transmitted with AT command result codes and information responses. 0 – Numeric Result Code information response 1 – Verbose Result Code information response
ATX	Set CONNECT result code format and call monitoring: 0 - CONNECT result code only returned, dial tone and busy detection are both disabled. 1 - CONNECT <text> result code only returned, dial tone and busy detection are both disabled.

	2 - CONNECT <text> result code returned, dial tone detection is enabled, busy detection is disabled. 3 - CONNECT <text> result code returned, dial tone detection is disabled, busy detection is enabled. 4 - CONNECT <text> result code returned, dial tone and busy detection are both enabled.
AT\V	Set CONNECT result code format: 0 - CONNECT <text> result code returned without RLP trailer. 1 - CONNECT <text> result code returned with RLP trailer.
ATZ	Sets all current parameters to the user profile stored with **AT&W**. If a connection is in progress, it will be terminated.
AT+CFUN	Sets phone functionality: **AT+CFUN=0** NON-CYCLIC SLEEP mode **AT+CFUN=1** Full functionality **AT+CFUN=7** CYCLIC SLEEP mode, In this mode, the serial interface is shortly enabled while CTS is active. If characters are recognized on the serial interface, the ME stays active for 2 seconds after the last character was sent or received. ME exits SLEEP mode only, if AT+CFUN=1 is entered. **AT+CFUN=9** CYCLIC SLEEP mode, In this mode, the serial interface is shortly enabled while CTS is active. If characters are recognized on the serial interface, the ME stays active after the last character was sent or received for at least the time, which can be configured by AT^SCFG="PowerSaver/Mode9/Timeout",<psm9to> (temporary wakeup). In contrast to SLEEP mode 7 assertion of RTS can also be used to temporarily wake up the ME.
AT^SMSO	Initiates the power-off procedure.
AT+GCAP	Request complete TA capabilities list.
AT+CMEE	Mobile Equipment Error Message Format: **AT+CMEE=0** Disable result code, i.e. only "ERROR" will be displayed. **AT+CMEE=1** Enable error result code with numeric values. **AT+CMEE=2** Enable error result code with verbose (string) values.
AT+CSCS	Select TE character set: **AT+CSCS="GSM"** GSM default alphabet (GSM 03.38 subclause 6.2.1); Note: This setting may cause software flow control problems since the codes used to stop and resume data flow (XOFF = decimal 19, XON = decimal 17) are interpreted as normal characters. **AT+CSCS="UCS2"** 16-bit universal multiple-octet coded character set (ISO/IEC10646 [32]); UCS2 character strings are converted to hexadecimal numbers from 0000 to FFFF; e.g. "004100620063" equals three 16-bit characters with decimal values 65, 98 and 99, $(AT R97)$
AT^SCFG	Extended Configuration Settings: The **AT^SCFG?** read command returns a list of all supported parameters and their current values. The **AT^SCFG=** write command queries a configuration parameter (if no value is entered) or sets its value(s). Input of parameter names is always coded in GSM character set, parameter values are expected to be given as specified via AT+CSCS.
AT^SM20	Sets M20 compatibility mode: **AT^SM20=**<CallMode>, <CmgwMode> 0 - Set compatibility to Siemens mobile phones. 1 - Default mode

Status Control Commands

The AT Commands described in this section allow the external application to obtain various status information from the modems cellular module.

Table 9.4: Status Control Commands

Command	Description
AT+CMER	Mobile Equipment Event Reporting: **AT+CMER=**<mode>,0,0,<ind>,0 *Mode:* 0 - Discard "+CIEV" and "^SLCC" URCs. 1 - Discard "+CIEV" and "^SLCC" URCs when TA-TE link is reserved, e.g. in online data mode. Otherwise they are forwarded directly to the TE. 2 - Buffer "+CIEV" and "^SLCC" URCs in the TA while TA-TE link is reserved, e.g. in online data mode, and flush them to the TE afterwards. Otherwise they are forwarded directly to the TE. 3 - Forward "+CIEV" and "^SLCC" URCs directly to the TE. If TC65 is in online data mode, URCs are signaled via sending BREAK (100ms) and stored in a buffer. Once it is back in command mode e.g. after +++ was entered, all URCs stored in the buffer will be output. *Ind:* 0 - Disable indicator event reporting. 2 - Enable indicator event reporting.
AT+CIND	The command controls the presentation of Indicator Event Reports related to various functions such as battery charge level, signal quality, service availability, sound generation, indication of unread short messages, full SMS storage, call in progress or roaming activities.
AT^SIND	The read command provides a list of all indicators supported by AT+CIND and AT^SIND. Each indicator is represented with its registration mode and current value. The write command can be used to select a single indicator in order to modify its registration and to view the current value.
AT+CEER	The command returns an extended error report regarding the reason of the last; • call release • failure to set up a call (both mobile originated or terminated) • failure to modify a call by using Supplementary Services • failed attempt to activate, register, query, deactivate or deregister a Supplementary Service • unsuccessful GPRS attach or unsuccessful PDP context activation • GPRS detach or PDP context deactivation
ATS18	Controls the presentation of extended call release reports for circuit switched fax and data calls. Extended call release reports related to voice calls are controlled via AT+CEER.
AT+CPAS	Mobile equipment activity status: 0 - Ready 3 - Incoming call (ringing) 4 - Call in progress or call hold

Serial Interface Control Commands

The AT Commands described in this section allow the external application to determine various settings related to the modems's serial interface.

Table 9.5: Serial Interface Control Commands

Command	Description
AT\Q	Flow control: 0 - Disable flow control 1 - XON/XOFF software flow control 2 - Only CTS by DCE (TA) 3 - RTS/CTS hardware flow control Recommended for the following procedures: incoming or outgoing data calls, fax calls, MUX mode. Often, the initialization routine of Fax programs includes enabling RTS/CTS handshake, eliminating the need to issue AT\Q3 once again.
AT&C	Set circuit Data Carrier Detect (DCD) function mode: 0 - DCD line is always ON 1 - DCD line is ON in the presence of data carrier only
AT&D	Set circuit Data Terminal Ready (DTR) function mode: 0 - TA ignores status of DTR. 1 - ON->OFF on DTR: Change to command mode while retaining the connected call. 2 - ON->OFF on DTR: Disconnect data call, change to command mode. During state DTR = OFF auto-answer is off.
AT&S	Set circuit Data Set Ready (DSR) function mode: 0 - DSR line is always ON 1 - TA in command mode: DSR is OFF. TA in data mode: DSR is ON.
ATE	Enable command echo: 0 - Echo mode off 1 - Echo mode on
AT+ICF	Serial Interface Character Framing: =5,1 7 bits, even parity, 1 stop bit =5,0 7 bits, odd parity, 1 stop bit =2,1 8 bits, even parity, 1 stop bit =3 8 bits, no parity, 1 stop bit =2,0 8 bits, odd parity, 1 stop bit =1 8 bits, no parity, 2 stop bits
AT+IFC	Set Flow Control separately for data directions: **AT+IFC=**<TEflowcontrol>, <TAflowcontrol> *TEflowcontrol:* 0 - none 1 - XON/XOFF, terminate flow control in the Cellular Engine 2 - RTS line 3 - XON/XOFF, evaluate flow control in the Cellular Engine and pass it through (over the air) to the opposite TE *TAflowcontrol:* 0 - none 1 - XON/XOFF 2 - CTS line

AT+ILRR	Set TE-TA local rate reporting: 0 - Disables reporting of local port rate 1 - Enables reporting of local port rate 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200, 230400, 460800 rates supported
AT+IPR	Set fixed local rate: 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 28800, 38400, 57600, 115200, 230400, 460800 rates supported
AT^STPB	Transmit Parity Bit (for 7E1 and 7O1 only): 0 - The parity bit will not be transmitted over the air and will be replaced with 0. This mode is the default setting if 7E1 or 7O1 is activated with AT+ICF. 1 - In a data connection 8 bits will be transmitted, including the parity bit, i.e. the parity bit will be properly transmitted over the air. The setting shall be used if problems are encountered when TC65 is running in the default 7E1 or 7O1 mode enabled with AT+ICF. In this case, AT^STPB=1 shall be set in addition to the 7E1 or 7O1 settings selected with AT+ICF.

Security Commands

The AT Commands described in this section allow the external application to determine various security related settings.

Table 9.6: Security Commands

Command	Description
AT+CPIN	PIN Authentication: **AT+CPIN?** command returns an alphanumeric string indicating whether or not network authentication is required. **AT+CPIN=**<pin>,<new pin> command allows the modem to store the entered password.
AT+SPIC	Display PIN counter: Command used to find out whether the ME is waiting for a password and, if so, how many attempts are left to enter the password.
AT+CLCK	Facility lock: Command can be used to lock, unlock or interrogate a network or ME <facility>. The command can be aborted when network facilities are being set or interrogated. The facility for the SIM PIN is "**SC**".
AT+CPWD	Change Password: **AT+CPWD=**<facility>, <old password>, <new password> Command allows user to define a new password for a password protected <facility> lock function. Each password is a string of digits, the length of which varies with the associated <facility>. The test command returns a list of pairs which represent the available facilities and the maximum length of the associated password. The facility for the SIM PIN is "**SC**".

Identification Commands

The AT Commands described in this section allow the external application to obtain various identification information related to the modem and linked entities.

Table 9.7: Identification Commands

Command	Description
ATI	The execute command delivers product information text. The 'Revision' information consists of the following parts: Version xx and variant yy of software release.
AT+CGMI	Request manufacturer identification (GSM 07.07)
AT+GMI	Request manufacturer identification (V.250)
AT+CGMM	Request model identification (GSM 07.07)
AT+GMM	Request model identification (V.250)
AT+CGMR	Request revision identification of software status (GSM 07.07)
AT+GMR	Request revision identification of software status (V.250)
AT+CGSN	Request International Mobile Equipment Identity (IMEI) (GSM 07.07)
AT+GSN	Request International Mobile Equipment Identity (IMEI) (V.250)
AT+CIMI	Request International Mobile Subscriber Identity (IMSI) (GSM 07.07)

Call Related Commands

The AT Commands described in this section are related to Mobile Originated (MOC, i.e. outgoing) Calls and Mobile Terminated (MTC, i.e. incoming) Calls.

Table 9.8: Call Related Commands

Command	Description
ATA	Answer a call: TA causes remote station to go off-hook (e.g. answer call).
ATD	Mobile originated call to specified number: This command can be used to set up outgoing voice, data or fax calls. **ATD**<n><mgsm> *n:* String of dialing digits and optional V.250 modifiers: 0-9, *, #, +, A, B, C The following V.250 modifiers are ignored: ,(comma), T, P, !, W ,@ Emergency call : <n> = 112, 911 or 08, standardized GSM emergency number (no SIM needed). *mgsm(optional):* String of GSM modifiers: I - Activates CLIR (disables presentation of own phone number to called party) i - Deactivates CLIR (enables presentation of own phone number to called party) G - Activate Closed User Group explicit invocation for this call only. g - Deactivate Closed User Group explicit invocation for this call only.
ATDI	Mobile originated call to ISDN number: ISDN number: String with maximum length of 20 characters. Allowed characters: +, 0-9, A, B, C.
ATDL	Redial last number used in the ATD command.
ATH	Disconnect existing connection
AT+CHUP	Cancels all active and held calls. (Hang up call)
AT+SHUP	Hang up call(s) indicating a specific GSM04.08 release cause.
ATS0	Set number of rings before automatically answering a call: =000 Automatic answer mode is disabled. =001-255 Enable automatic answering after specified number of rings.
ATS6	Set pause before blind dialing: =000 to 255

ATS7	Set number of seconds to wait for connection completion: =000 to 060
ATS8	Set number of seconds to wait for comma dialing modifier: =0 DCE does not pause when "," encountered in dial string =1 to 255 Number of seconds to pause
ATS10	Set disconnect delay after indicating the absence of data carrier: =001 to 254 Number of tenths of seconds of delay
ATO	Switch from command mode to data mode / PPP online mode: ATO is the corresponding command to the +++ escape sequence: When you have established a CSD call or a GPRS connection and TA is in command mode, ATO causes the TA to resume the data or GPRS connection and takes you back to data mode or PPP online mode.
+++	Switch from data mode to command mode: This command is only available during a CSD call or a GPRS connection. The +++ character sequence causes the TA to cancel the data flow over the AT interface and switch to command mode. This allows you to enter AT commands while maintaining the data connection to the remote device or, accordingly, the GPRS connection. To prevent the +++ escape sequence from being misinterpreted as data, it must be preceded and followed by a pause of at least 1000 ms. The +++ characters must be entered in quick succession, all within 1000 ms.
AT+CBST	Select bearer service type: **AT+CBST=**<speed> *speed:* =1 300 bps (V.21) =2 1200 bps (V.22) =4 2400 bps (V.22bis) =6 4800 bps (V.32) =7 9600 bps (V.32) =14 14400 bps (V.34) =65 300 bps (V.110) =66 1200 bps (V.110) =68 2400 bps (V.110) =70 4800 bps (V.110) =71 9600 bps (V.110) =75 14400 bps (V.110)
AT+CRLP	Select radio link protocol parameters for originated non-transparent data calls.
AT+CLCC	List current calls of ME: The execute command returns a list of current calls of ME. If command is successful, but no calls are available, no information response is sent to TE.
AT+CR	Service reporting control: Configures the TA whether or not to transmit an intermediate result code +CR: <serv> to TE when a call is being set up. =0 Disable =1 Enable Setting the value to 1 may lead to connection failure, if the application (e.g. WinFax) waits for default result code/URC.
At+CRC	Set Cellular Result Codes for incoming call indication: The command controls whether or not to use the extended format of incoming call indication. =0 Disable extended format =1 Enable extended format Setting the value to 1 may lead to connection failure, if the application (e.g. WinFax) waits for default result code/URC.

AT+CSNS	Single Numbering Scheme: The command enables the ME to accept incoming calls when no bearer capability information is provided with the call, e.g. single numbering scheme calls or calls originitating from analog devices. =0 Voice: Each call received without bearer element is assumed to be speech =2 Fax: Each call received without bearer element is assumed to be an incoming fax. =4 Data: Each call received without bearer element is assumed to be a data call. Please take into account that the bearer service parameters set with AT+CBST applies to all data calls including those received without bearer capability.
AT^SCNI	List Call Number Information: TA returns a list of current calls of ME.
AT^SLCD	Display Last Call Duration: TA returns last call duration or current call duration.
AT^STCD	Display Total Call Duration: TA returns total call duration (accumulated duration of all calls).
ATP	Select pulse dialing.
ATT	Select tone dialing.

Network Service Commands

The AT Commands described in this section are related to various network services. For futher information, refer to the Siemens TC65/MC75 AT Command Set document available from Siemens.

Table 9.9: Network Service Commands

Command	Description
AT+COPN	Read operator names: The command returns the list of operator names from the ME.
AT+COPS	Operator Selection: The command queries (?) the present status of the modem's network registration and sets whether automatic or manual network selection shall be used. **AT+COPS=**<mode>, <format>, <oper> *mode:* 0 - Automatic mode; <oper> field is ignored. 1 - Manual operator selection Write command requires <oper> in numeric format, i.e. <format> shall be 2. Read command returns the current <mode> and the currently selected <oper>. If no operator is selected, <format> and <oper> are omitted. 2 - Manually deregister from network and remain unregistered until <mode>=0 or 1 or 4 is selected. 3 - Set only <format> (for AT+COPS read command). 4 - Automatic / manual selection; if manual selection fails, automatic mode (<mode>=0) is entered (<oper> field will be present). *format:* 0 - Long alphanumeric format of <oper>. Can be up to 16 characters long. 2 - Numeric format of <oper>. This is the GSM Location Area Identification (LAI) number, which consists of the 3-digit Mobile Country Code (MCC) plus the 2- or 3-digit Mobile Network Code (MNC). *oper:* Name in numeric format

AT^SOPS	Extended Operator Selection similar to At^COPS.
AT+CREG	Network registration: The read (?) command serves to verify the network registration status of the ME. 0 - Not registered, ME is currently not searching for new operator and user intervention is required. Yet, emergency calls can be made if any network is available. 1 - Registered to home network 2 - Not registered, but ME is currently searching for a new operator 3 - Registration denied, Either the SIM or the MS or the ME are unable to log into any network. No further attempt is made to search or log into a network. User intervention is required. Emergency calls can be made, if any network is available. 4 - Unknown (not used) 5 - Registered, roaming. The ME is registered at a foreign network (national or international network) The write command is as follows: =0 Disable +CREG Unsolicited Result Codes (URC) =1 Enable URC +CREG:<stat> to report status of network registration =2 Enable URC +CREG:<stat>[,<lac>,<ci>] to report status of network registration including location information. Optional parameters <lac> and <ci> will not be displayed during calls or if these values have not changed since last AT+CREG read command or since last indication by +CREG URC
AT+CSQ	Signal quality: The execute command indicates the received signal strength <rssi> and the channel bit error rate <ber>. *rssi:* 0 -113 dBm or less 1 -111 dBm 2..30 -109... -53 dBm 31 -51 dBm or greater 99 not known or not detectable *ber:* 0..7 as RXQUAL values 99 not known or not detectable
AT^SMONC	Cell Monitoring: The execute command delivers cell information containing 9 values from a maximum of 7 base stations. The first base station is the serving cell.
AT^SMOND	Cell Monitoring: The execute command can be used to obtain status information of the service cell and up to six neighbour cells. The advantage over other cell monitoring commands is that AT^SMOND delivers more detailed information about the received signal strength.
AT^MONI	Monitor idle mode and dedicated mode: The command supplies information of the serving/dedicated cell. There are two ways to retrieve the information: once on request by using the execute command or automatically every <period> seconds by using the write command. To stop the periodic presentation type "AT" or "at". =1 to 254 periods in seconds

AT^MONP	Monitor neighbour cells: The command supplies information of up to six neighbour cells. There are two ways to retrieve the information: once on request by using the execute command or automatically every <period> seconds by using the write command. To stop the periodic presentation type "AT" or "at". =1 to 254 periods in seconds
AT^SMONG	GPRS Monitor: The command supplies GPRS specific cell information. There are two ways to retrieve the information: once on request by using the execute command or automatically every <period> seconds by using the write command. To stop the periodic presentation type "AT" or "at". =1,1 to 100 periods in seconds
AT^SHOM	Display Homezone: The returns the homezone state. The result is valid only, if network registration state <stat> is 1 (registered) (see AT+CREG). 0 - ME is out of Homezone 1 - ME is within the Homezone
AT^SPLM	Read the PLMN list: The execute command returns the list of operators from the ME.
AT+CPOL	Preferred Operator List: The read command returns the list of the preferred operators. The write command allows user to edit the list of the preferred operators. If <index> is given but <operator> is left out, the entry is deleted. An operator can be only once in the list. **AT+CPOL=**<index>, 2, <operator> *index:* The order number of the operator in the SIM preferred operator list. *operator:* Operator in numeric format (GSM Location Area Identification number which consists of a 3-digit country code plus a 2- or 3-digit network code).
AT^SPLR	Read entry from the preferred operators list: The write command returns used entries from the SIM list of preferred operators with <indexa> between <index1> and <index2>. If <index2> is not given, only entry at <index1> is returned. The test command returns the whole index range supported by the SIM. **AT^SPLR=**<index1>, <index2> *index1:* Location number to start reading from *index2:* Location number where to stop reading
AT^SPLW	Write an entry to the preferred operators list: The write command writes an entry to the SIM list of preferred operators at location number <index>. If <index> is given but <oper> is left out, the entry is deleted. An operator can be only once in the list. Test command returns the whole index range supported by the SIM. **AT^SPLW=**<index>, <oper> *index:* location number *oper:* Operator in numeric format (GSM Location Area Identification number which consists of a 3-digit country code plus a 2- or 3-digit network code).

Internal Internet Service Commands

The modem has an embedded TCP/IP stack that is driven by AT commands and enables the host application to easily access the Internet. The advantage of this solution is that it eliminates the need for the application manufacturer to implement their own TCP/IP and PPP stacks, thus minimizing cost and time to integrate Internet connectivity into a new or existing host application. This Section is a reference guide to all the AT commands and responses defined for use with the TCP/IP stack. Access is provided to the following Internet Services:

1. Socket Client and Server for TCP, Client for UDP
2. FTP Client
3. HTTP Client
4. SMTP Client
5. POP3 Client

Step-by-step instructions on how to configure and use TCP/IP communications:

- First of all, create a connection profile with AT^SICS. The connection profile is a set of basic parameters which determines the type of connection to use for an Internet service. Up to 6 connection profiles can be defined, each identified by the <conProfileId>.

- Secondly, use AT^SISS to create a service profile based on one of the connection profiles. Up to 10 service profiles can be defined, each identified by the <srvProfileId>. The service profile specifies the type of Internet service to use, i.e. Socket, FTP, HTTP, or one of the email services SMTP or POP3. To assign a connection profile to a service profile, the <conProfileId> of AT^SICS must be entered as "conId" value of the AT^SISS parameter <srvParmTag>. This offers great flexibility to combine connection profiles and service profiles. For example, you may have one connection profile (CSD or GPRS) specified with AT^SICS which can be associated with an SMTP service profile for sending emails and a POP3 service profile for retrieving emails.

- Once the connection profile and the service profile are created, an Internet session can be opened by entering the AT^SISO write command and the desired <srvProfileId>. Wait for the resulting URC.

- The next command determines the action to be performed, for example reading data with AT^SISR or writing data with AT^SISW. Wait for the resulting URC.

- Finally, to end a session, enter the AT^SISC write command and the <srvProfileId>.

Maximum number of profiles defined / used:

- Up to 6 connection profiles can be created (with AT^SICS).

- Up to 10 service profiles can be created (with AT^SISS), but the number of parallel profiles of the same service type is limited as listed below. If the maximum number of a service profile type is already defined, any attempt to set up another profile for the same type will be denied with "+CME ERROR: unknown".

  - Maximum 3 HTTP profiles

  - Maximum 6 socket profiles: Only 2 instances can be opened for listener, meaning that if 2 listeners are established another 4 instances can be opened for clients. Also, the socket service can accept an incoming connection only when at least one service profile is still free (not yet created with AT^SISS), otherwise the incoming connection will be rejected from the listener. If there is no listener established all 6 socket profiles can be configured as client.

  - 1 FTP profile

  - 1 POP3 profile

  - 1 SMTP profile

- The TCP/IP stack of TC65 supports using several service profiles at the same time, provided all of them are running on the same connection profile. For example, it is possible to download files from an FTP server, while sending and receiving emails at the same time.

- GPRS connections established over the Dial-Up Network do not use the embedded TCP/IP stack of TC65 and can be active at the same time. This allows the user to have two parallel GPRS connections: for example, for sending or receiving emails over a GPRS connection enabled by the TCP/IP stack while, at the same time, surfing the Internet over a Dial-Up Network GPRS connection.

Address notation
Server addresses must be provided as IP addresses in standard dot-format (e.g. "192.168.1.2") or as server address names resolvable by a DNS server (e.g. "smtp.myserver.de" or "pop3.myserver.de").

Inactivity timeouts
Inactivity timeouts are not part of the Internet AT command functionality implemented in the modem and, if desired, are the responsibility of the host application. It is recommended that the host application validates URCs and AT command responses and reacts adequately, for example by sending a close message or starting a timer.

A brief description of the internet service commands are provided in Table 9.10. For futher information, refer to the Siemens TC65/MC75 AT Command Set document available from Siemens.

Table 9.10: Internet Service Commands

Command	Description
AT^SICS	Internet Connection Setup Profile: The command serves to create and edit Internet connection profiles.
AT^SISS	Internet Service Setup Profile: The command serves to set up the necessary parameters in the Internet service profiles.
AT^SISO	Internet Service Open: The write command starts the Internet session configured by the service profile.
AT^SISC	Internet Service Close: The write command performs all necessary action to release all properties activated by AT^SISO.
AT^SISR	Internet Service Read Data: The write command triggers reading data via the Internet service configured with AT^SISS.
AT^SISW	Internet Service Write Data: The write command triggers writing data via the Internet service configured configured with AT^SISS.
At^SISX	Internet Service Execution: The write command sends ICMP (Internet Control Message Protocol) Echo Requests to a target IP address or host name (also referred to as Ping command). AT^SISX="Ping",0,<host name or IP address>

GPRS Commands

This Section describes AT Commands that a TE (Terminal Equipment, e.g. an application running on a controlling PC) may use to control the modem acting as a GPRS Mobile Termination (MT).

A brief description of the GPRS commands are provided in Table 9.11. For futher information, refer to the Siemens TC65/MC75 AT Command Set document available from Siemens.

Table 9.11: GPRS Commands

Command	Description
AT+CGACT	PDP context activate or deactivate: The test command is used for requesting information on the supported PDP context activation states. The read command returns the current activation states for all the defined PDP contexts. The write command is used to activate or deactivate the specified PDP context(s). After the command has completed, the MT remains in V.250 command state. If any PDP context is already in the requested state, the state for that context remains unchanged. If the MT is not GPRS attached when the activation form of the command is executed, the MT first performs a GPRS attach and then attempts to activate the specified contexts. If no <cid>s are specified the activation/deactivation form of the command activates/deactivates all defined contexts. =0 deactivated =1 activated
AT+CGANS	Manual response to a network request for PDP context activation: The write command requests the MT to respond to a network request for GPRS PDP context activation which has been signaled to the TE by the RING or CRING unsolicited result code. The <response> parameter allows the TE to accept or reject the request. =0 the request is rejected and the MT returns OK to the TE =1 accept and request that the PDP context be activated
AT+CGATT	GPRS attach or detach: The test command is used for requesting information on the supported GPRS service states. The read command returns the current GPRS service state. The write command is used to attach the MT to, or detach the MT from the GPRS service. After the command has completed, the MT remains in V.250 command state. If the MT is already in the requested state, the command is ignored and the OK response is returned. Any active PDP contexts will be automatically deactivated when the attachment state changes to detached. =0 detached =1 attached

AT+CGAUTO	Automatic response to a network request for PDP context activation: The test command returns the values of <n> supported by the MT as a compound value. The write command disables or enables an automatic positive response (auto-answer) to the receipt of a Request PDP Context Activation message from the network. It also provides control over the use of the V.250 basic commands ATS0, ATA and ATH for handling network requests for PDP context activation. =0 Disable automatic response for network requests for GPRS PDP context activation. GPRS network requests are manually accepted or rejected by the AT+CGANS command. =1 Enable automatic response for network requests for GPRS PDP context activation. GPRS requests are automatically accepted according to the description below. =3 Modem compatibility mode. The automatic acceptance of both GPRS and incoming CSD calls is controlled by the ATS0 command. Manual control uses the ATA and ATH commands, respectively, to accept or reject GPRS network requests or incoming CSD calls.
AT+CGDATA	Enter data state: The test command is used for requesting information on the supported layer 2 protocols to be used between the TE and MT. The write command causes the MT to perform all actions which are necessary to establish communication between the TE and the network using one or more GPRS PDP types. This may include performing a GPRS attach and one or more PDP context activations. Commands following the AT+CGDATA command in the AT command line will not be processed by the MT. ="PPP" layer 2 protocol PPP supported
AT+CGDCONT	Define PDP Context: The test command returns supported values as a compound value. The read command returns the current settings for each defined PDP context. The write command specifies the parameters for a PDP context identified by the context identifier <cid>. The number of contexts that may be in a defined state at the same time is given by the range returned by the test command. A special form of the write command (AT+CGDCONT=<cid>) causes the values for context <cid> to become undefined. **AT+CGDCONT=**<cid>,"IP",<APN>,<PDP_addr>,0,<h_comp> *cid:* PDP Context Identifier, 1 or 2 *APN:* Access Point Name *PDP_addr:* Packet Data Protocol address *h_comp:* 0 - header compression off 1 - header compression on
AT+CGEQMIN	3G Quality of Service Profile (Minimum acceptable)
AT+CGEQREQ	3G Quality of Service Profile (Requested)
AT+CGPADDR	Show PDP address
AT+CGQMIN	Quality of Service Profile (Minimum acceptable)
AT+CGQREG	Quality of Service Profile (Requested)

AT+CGREG	GPRS network registration status: The read command returns the status of result code presentation and an integer <stat> which shows whether the network has currently indicated the registration of the MT. The write command controls the presentation of an unsolicited result code "+CGREG: <stat>" when <n>=1 and there is a change in the MT's GPRS network registration status.
AT+CGSMS	Select service for MO SMS messages: The test command is used for requesting information on which services and service preferences can be set by using the AT+CGSMS write command The read command returns the currently selected service or service preference. The write command is used to specify the service or service preference that the MT will use to send MO SMS messages. If parameter <service> is not given, the current value remains unchanged. =0 GPRS =1 Circuit switched =2 GPRS preferred (use circuit switched SMS transfer if GPRS SMS transfer is not possible, for example when the mobile is not GPRS attached or the network does not support SMS over GPRS) =3 Circuit switched preferred (use GPRS if circuit switched is not available)
AT^SGACT	Query all PDP context activations: The test command returns supported interfaces and states. The read command lists the activation states for all activated PDP contexts of the ME. Contexts, which are created internally by the GPRS modem compatibility commands, will displayed only, if they are activated. The Output of this command is unsorted. The exec command returns the sum of all activated PDP contexts of the ME.
AT^SGAUTH	Set type of authentication for PPP connection: =0 none =1 PAP =2 CHAP =3 PAP and CHAP
AT^SGCONF	Configuration of GPRS related Parameters: **AT^SGCONF=**<llc_pdu_length_U>,<llc_pdu_length_I>,<GPRS msclass> *llc_pdu_length_U:* 0 - no negotiation with network (500 will be used) 140...1520 - lower values diminish performance *llc_pdu_length_I:* 0 - no negotiation with network (500 will be used) 140...1520 - lower values diminish performance *GPRS msclass:* GPRS Multislot Class. The parameter can be changed only when the MT is detached, otherwise ''CME ERROR: operation temporary not allowed'' will be returned. The value can be one of the classes indicated with the Test command. The value set is volatile and powerup value is the maximum allowed.
ATA	Manual response to a network request for PDP context activation: The command may be used to accept a network request for a PDP context activation announced by the unsolicited result codes "RING" or "+CRING: GPRS".

ATD	Request GPRS or GPRS IP service: This command causes the MT to perform whatever actions are necessary to establish a communication between the TE and the external PDN. Request GPRS service: **ATD*99****<L2P>*****<cid>**#** *L2P:* blank – non PPP "PPP" - layer 2 protocol PPP "1" - layer 2 protocol PPP *cid:* 1 – typically, set by AT+CGDCONT command. Request GPRS IP service: **ATD*98***<cid>**#** *cid:* 1 – typically, CID defined by AT+CGDCONT command.
ATH	Manual rejection of a network request for PDP context activation: The command may be used to deactivate all PDP contexts which are active or online on the same interface.
ATS0	Automatic response to a network request for PDP context activation: The Automatic answer command may be used to turn off (n=0) and on (n>0) the automatic response to a network request for a PDP context activation. =000 Disables automatic answer mode. =001-255 Enables automatic answering after specified number of rings.

Short Message Service (SMS) Commands

The AT Commands described in this section allow an external application to use the Short Message Service with the modem.

A brief description of the GPRS commands are provided in Table 9.12. For futher information, refer to the Siemens TC65/MC75 AT Command Set document available from Siemens.

Table 9.12: SMS Command Reference

Command	Description
AT+CMGC	Send an SMS command
AT+CMGD	Delete SMS message
AT+CMGF	Select SMS message format
AT+CMGL	List SMS messages from preferred store
AT+CMGR	Read SMS messages
AT+CMGS	Send SMS message
AT+CMGW	Write SMS messages to memory
AT+CMSS	Send SMS messages from storage
AT+CNMA	New SMS message acknowledge to ME/TE, only phase 2+
AT+CNMI	New SMS message indications
AT+CPMS	Preferred SMS message storage
AT+CSCA	SMS service centre address
AT+CSCB	Select Cell Broadcast Message Indication
AT+CSDH	Show SMS text mode parameters
AT+CSMP	Set SMS text mode parameters
AT+CSMS	Select Message Service
AT^SCML	List Concatenated SMS messages from preferred store

AT^SCMR	Read concatenated SMS messages
AT^SCMS	Send concatenated SMS messages
AT^SCMW	Write concatenated SMS messages to memory
AT^SLMS	List SMS Memory Storage
AT^SMGL	List SMS messages from preferred store without setting status to REC READ
AT^SMGO	Set or query SMS overflow presentation mode or query SMS overflow
AT^SMGR	Read SMS message without setting status to REC READ
AT^SSCONF	SMS Command Configuration
AT^SSDA	Set SMS Display Availability
AT^SSMSS	Set Short Message Storage Sequence

SIM Related Commands

The AT commands described in this section are related to the Subscriber Identity Module (SIM) connected to the modem.

A brief description of the SIM related commands are provided in Table 9.13. For futher information, refer to the Siemens TC65/MC75 AT Command Set document available from Siemens.

Table 9.13: SIM Related Commands

Command	Description
AT+CRSM	Restricted SIM Access: The command offers easy access of the Elementary Files on the SIM. Access to the SIM database is restricted to the commands which are listed; 176　READ BINARY 178　READ RECORD 192　GET RESPONSE 214　UPDATE BINARY 220　UPDATE RECORD 242　STATUS
AT^SXSM	Extended SIM Access: AT^SXSM extends AT+CRSM with additional SIM commands; 136　RUN GSM ALGORITHM Start the authentication mechanism and cipher key generation on the SIM. It runs the algorithms A3 and A8 using a 16 byte random number and the subscriber authentication key Ki, which is stored in the SIM.
AT^SCKS	Query SIM and Chip Card Holder Status: This command controls the SIM connection presentation mode and queries the connection status of the SIM and the card holder tray of the modem.
AT^SSET	Indicate SIM data ready: After power-up and personalization (PIN entry if required) the ME starts reading data from SIM. The AT^SSET command controls the presentation of the "^SSIM READY" URC which indicates, on the corresponding serial channel, when the ME has finished reading SIM data. Afterwards all commands that depend on SIM data fields can be used.
AT^SCID	Display SIM card identification number: TA returns the card identification number in SIM as string type.
AT+CXXCID	Display card ID: TA returns the card identification number in SIM as string type.

Hardware Related Commands

The AT Commands described in this section are related to the modems's hardware interface.

A brief description of hardware related commands are provided in Table 9.14. For futher information, refer to the Siemens TC65/MC75 AT Command Set document available from Siemens.

Table 9.14: Hardware Related Commands

Command	Description
AT+CCLK	Real Time Clock: Format is "yy/mm/dd,hh:mm:ss", where the characters indicate the two last digits of the year, followed by month, day, hour, minutes, seconds; for example 6th of July 2005, 22:10:00 hours equals to "05/07/06,22:10:00" Factory default is "02/01/01,00:00:00" Write command: =<time> • <time> is retained if the device enters the Power Down mode via AT^SMSO. • <time> will be reset to its factory default if power is totally disconnected. In this case, the clock starts with <time>= "02/01/01,00:00:00" upon next power-up. • Each time TC65 is restarted it takes 2s to re-initialize the RTC and to update the current time. Therefore, it is recommended to wait 2s before using the commands AT+CCLK and AT+CALA (for example 2s after ^SYSSTART has been output).
AT+CALA	Set alarm time: The write command can be used to set an alarm time in the ME or to clear a programmed alarm. When the alarm time is reached and the alarm is executed the ME returns an Unsolicited Result Code (URC) and the alarm time is reset to "00/01/01,00:00:00".
AT^SCTM	Set critical operating temperature presentation mode or query temperature: Use this command to monitor the temperature range of the module. The write command enables or disables the presentation of URCs to report critical temperature limits. Write command: =0 Presentation of URCs is disabled (except for <m> equal to -2 or +2). =1 Presentation of URCs is enabled. Read command: -2 Below lowest temperature limit (causes immediate switch-off) -1 Below low temperature alert limit 0 Normal operating temperature 1 Above upper temperature alert limit 2 Above uppermost temperature limit (causes immediate switch-off)

Factory Default AT Command values

Table 9.15: AT Command Factory Defaults

Configuration Commands	
ATQ	<n>=0
ATV	<value>=1
ATX	<value>=4
AT\V	<value>=1
AT+CFUN	<fun>=1
AT+CMEE	<errMode>=0
AT+CSCS	<chset>="GSM"
AT^SM20	<CallMode>=1, <CmgwMode>=1
Status Control Commands	
AT+CMER	<mode>=0, <keyp>=0, <disp>=0, <ind>=0, <bfr>=0
AT+CIND	<mode>=1
ATS18	<n>=0
Serial Interface Control Commands	
AT\Q	<n>=0
AT&C	<value>=1
AT&D	<value>=2
AT&S	<value>=0
ATE	<value>=1
AT+ILRR	<value>=0
AT^STPB	<n>=0
Call related Commands	
ATS0	<n>=000
ATS6	<n>=000
ATS7	<n>=060
ATS8	<n>=0
ATS10	<n>=002
AT+CBST	<speed>=7, <name>=0, <ce>=1
AT+CRLP	<iws>=61,<mws>=61,<T1>=78,<N2>=6
AT^SLCC	<n>=0
AT+CR	<mode>=0
AT+CRC	<mode>=0
Network Service Commands	
AT+COPS	<format>=0
AT+CREG	<n>=0
AT^SALS	<view>=0, <line>=1
GPRS Commands	
AT+CGAUTO	<n>=3
AT+CGSMS	<service>=3
AT^SGAUTH	<auth>=3
ATS0	<n>=000

Short Message Service (SMS) Commands	
AT+CMGF	\<mode\>=0
AT+CNMI	\<mode\>=0, \<mt\>=0, \<bm\>=0, \<ds\>=0, \<bfr\>=1
AT+CSDH	\<show\>=0
AT+CSMP	\<fo\>=17, \<vp\>=167, \<dcs\>=0, \<pid\>=0
AT+CSMS	\<service\>=0
AT^SMGO	\<n\>=0
AT^SSCONF	\<ra\>=0
AT^SSDA	\<da\>=0
AT^SSMSS	\<seq\>=0
SIM related Commands	
AT^SCKS	\<mode\>=0
AT^SSET	\<n\>=0
Hardware related Commands	
AT^SCTM	\<n\>=0
AT^SSPI	\<connectionState\>=0, \<delayOne\>=0, \<delayTwo\>=0
Miscellaneous Commands	
ATS3	\<n\>=013 Command Line termination character
ATS4	\<n\>=010 Response Formatting character
ATS5	\<n\>=008 Command Line Editing character

SECTION 10 – SPECIFICATIONS

Product specifications are subject to change without notice.

General Specifications

|	
Interface Connectors:	RS-232 DE-9S Connector (DCE)
Power Connector:	2.1mm/5.5mm DC Barrel Jack (Center Positive)
LED Indicators:	Power, Tx, DCD, Rx
Antenna Interface:	Primary Antenna: SMA female 50 Ohm
Size:	4.10 x 2.61 x 1.10 in.
Weight:	6.0 oz.
Power Input:	9.0 – 28VDC 0.5 W; 45 ma @ 12 VDC (Idle - average)
	9.0 – 28VDC 4.0 W; 335 ma @ 12 VDC (Active - peak)
Maximum TX Power:	GSM/GPRS: +33 dBm min. / +30 dBm min (1900MHz)
Rx Sensitivity:	GSM/GPRS: -108 dBm typical, -102 dBm min.
Frequencies:	Cellular: TX: 824-849 MHz Rx: 869-894 MHz
	PCS: TX: 1850-1910 MHz Rx: 1930-1990 MHz
Temperature:	Operating: -30°C to +60°C (-22° to 140°F) 100% Duty Cycle
	Storage: -55°C to +85°C (-67° to 185°F)
Operating Humidity	0 – 85% non-condensing
Transport Protocols:	Serial
Command Protocol:	AT Command set
Certifications:	FCC ID: QIP-TC65
	Industry Canada ID: 267W-TC65
	PTCRB, Carrier Approvals Pending

NOTE: Power consumption while transmitting is dependant on the TX power level of the cellular module. The TX power level of the module is controlled by the cellular base station.

Data Transmission Specifications

Internet Services	TCP, UDP, HTTP, FTP, SMTP, POP3
GPRS Data Transmission	GPRS Class 12: Up to 86 kbps Mobile Station Class B PBCCH support Coding scheme CS 1-4
CSD Data Transmission	Up to 14.4 kbps V.110 Non-transparent mode USSD support
Specifications for SMS	Point-to-point MO and MT SMS cell broadcast Text and PDU mode
JAVA^{TM} Features	CLDC 1.1 HI J2ME^{TM} profile IMP-NG Secure data transmission with HTTPS, SSL, & PKI

Mechanical Specifications

The following section describes in detail the exterior dimensions of the 819-GPRS and how to utilize the mounting flanges to secure the modem to any surface, which can be drilled for such a purpose. All of the drawings below are the approximate actual size. The drawings may be used as layout reference, but it is advised that a physical comparison be made to the modem before proceeding with the mounting process.
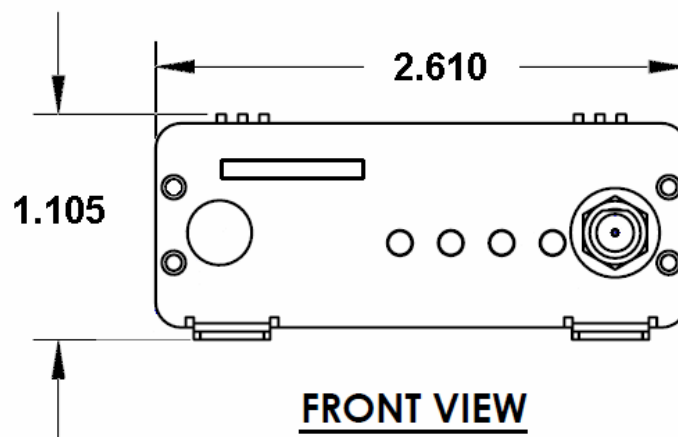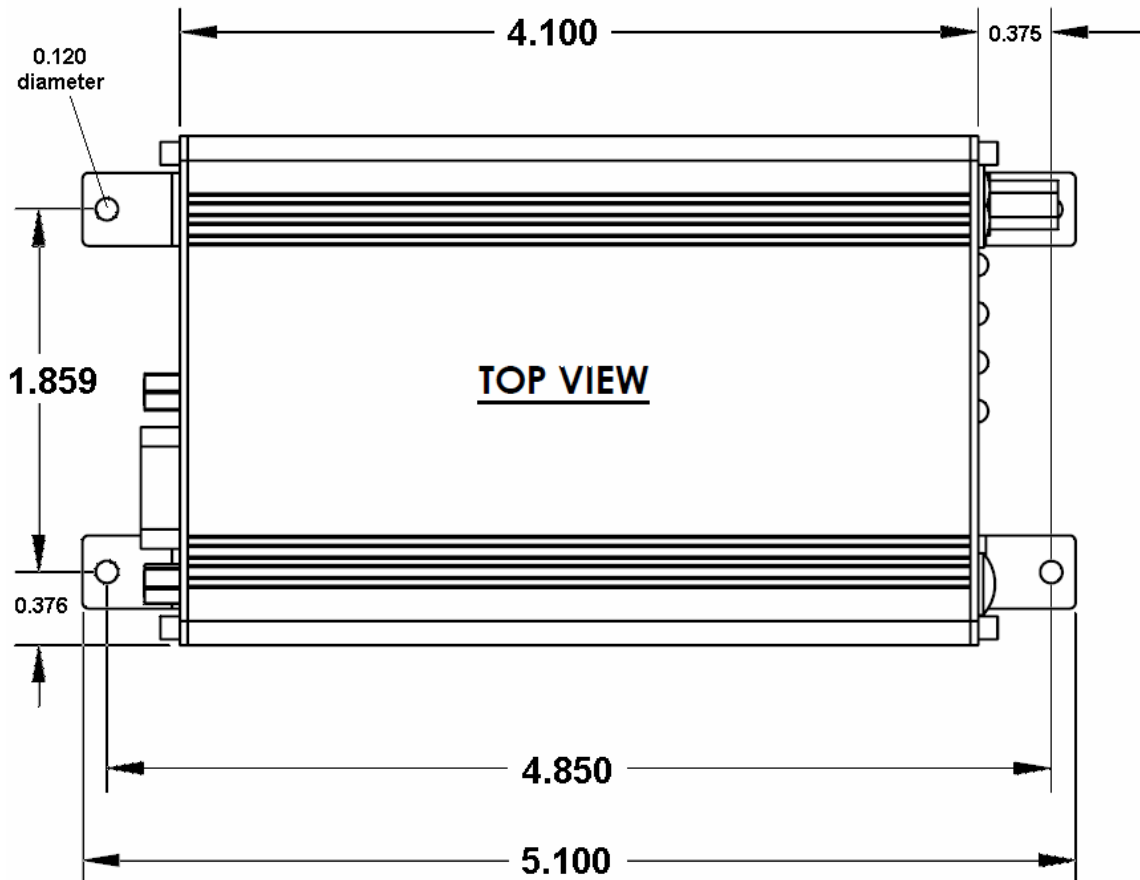
All dimensions in inches.

SECTION 11 – ABBREVIATIONS

Abbreviation	Description
APN	Access Point Name
CDMA	Code Division Multiple Access
CSD	Circuit Switched Data
CTS	Clear to Send
DCD	Data Carrier Detect
DCE	Data Communication Equipment
DTE	Data Terminal Equipment
EDGE	Enhanced Data rates for Global Evolution
GPRS	General Packet Radio Service
GPS	Global Positioning System
GSM	Global System for Mobile communication
IMEI	International Mobile Electronic Identity
LED	Light Emitting Diode
ME	Mobile Equipment
MS	Mobile Station
OTA	Over the Air
PDP	Packet Data Protocol
PPP	Point to Point Protocol
PRL	Preferred Roaming List
RSSI	Receive Signal Strength Indication
Rx	Receive
TA	Terminal Adapter
TE	Terminal Equipment
Tx	Transmit

SECTION 12 – SERVICE AND SUPPORT

Product Warranty, RMA and Contact Information

CalAmp guarantees that every 819-GPRS Cellular Modem will be free from physical defects in material and workmanship for one (1) year from the date of purchase when used within the limits set forth in the Specifications section of this manual.

The manufacturer's warranty statement is available in Appendix 1. If the product proves defective during the warranty period, contact CalAmp DataCom Customer Service to obtain a Return Material Authorization (RMA).

RMA Request

Contact Customer Service:
Dataradio dba CalAmp Wireless DataCom
299 Johnson Avenue, Ste.110
Waseca, MN 56093
Tel: 507-833-8819 ext. 6707
Fax: 507-833-6748

BE SURE TO HAVE THE EQUIPMENT MODEL AND SERIAL NUMBER, AND BILLING AND SHIPPING ADDRESSES ON HAND WHEN CALLING.

When returning a product, mark the RMA clearly on the outside of the package. Include a complete description of the problem and the name and telephone number of a contact person. RETURN REQUESTS WILL NOT BE PROCESSED WITHOUT THIS INFORMATION.

For units in warranty, customers are responsible for shipping charges to CalAmp Wireless DataCom. For units returned out of warranty, customers are responsible for all shipping charges. Return shipping instructions are the responsibility of the customer.

Product Documentation

CalAmp reserves the right to update its products, software, or documentation without obligation to notify any individual or entity. Product updates may result in differences between the information provided in this manual and the product shipped. For the most current product documentation, visit www.calamp.com for datasheets, programming software and user manuals.

Technical Support

M-F 7:30 AM to 4:30 PM CDT

CalAmp Wireless DataCom
299 Johnson Avenue, Ste.110
Waseca, MN 56093
Tel: 507-833-8819
E-mail: supportIMC@calamp.com

APPENDIX 1 – WARRANTY STATEMENT

CalAmp DataCom warrants to the original purchaser for use ("Buyer") that data telemetry products manufactured by DRL ("Products") are free from defects in material and workmanship and will conform to DRL's published technical specifications for a period of, except as noted below, one (1) year from the date of shipment to Buyer. DRL makes no warranty with respect to any equipment not manufactured by DRL, and any such equipment shall carry the original equipment manufacturer's warranty only. DRL further makes no warranty as to and specifically disclaims liability for, availability, range, coverage, grade of service or operation of the repeater system provided by the carrier or repeater operator. Any return shipping charges for third party equipment to their respective repair facilities are chargeable and will be passed on to the Buyer.

If any Product fails to meet the warranty set forth above during the applicable warranty period and is returned to a location designated by DRL. DRL, at its option, shall either repair or replace such defective Product, directly or through an authorized service agent, within thirty (30) days of receipt of same. No Products may be returned without prior authorization from DRL. Any repaired or replaced Products shall be warranted for the remainder of the original warranty period. Buyer shall pay all shipping charges, handling charges, fees and duties for returning defective Products to DRL or DRL's authorized service agent. DRL will pay the return shipping charges if the Product is repaired or replaced under warranty, exclusive of fees and duties. Repair or replacement of defective Products as set forth in this paragraph fulfills any and all warranty obligations on the part of DRL.

This warranty is void and DRL shall not be obligated to replace or repair any Products if (i) the Product has been used in other than its normal and customary manner; (ii) the Product has been subject to misuse, accident, neglect or damage or has been used other than with DRL approved accessories and equipment; (iii) unauthorized alteration or repairs have been made or unapproved parts have been used in or with the Product; or (iv) Buyer failed to notify DRL or DRL's authorized service agent of the defect during the applicable warranty period. DRL is the final arbiter of such claims.

THE AFORESAID WARRANTIES ARE IN LIEU OF ALL OTHER WARRANTIES, EXPRESSED AND IMPLIED, INCLUDING BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. DRL AND BUYER AGREE THAT BUYER'S EXCLUSIVE REMEDY FOR ANY BREACH OF ANY OF SAID WARRANTIES IT AS SET FORTH ABOVE. BUYER AGREES THAT IN NO EVENT SHALL DRL BE LIABLE FOR INCIDENTAL, CONSEQUENTIAL, SPECIAL, INDIRECT OR EXEMPLARY DAMAGES WHETHER ON THE BASIS OF NEGLIGENCE, STRICT LIABILITY OR OTHERWISE. The purpose of the exclusive remedies set forth above shall be to provide Buyer with repair or replacement of non-complying Products in the manner provided above. These exclusive remedies shall not be deemed to have failed of their essential purpose so long as DRL is willing and able to repair or replace non-complying Products in the manner set forth above.

This warranty applies to all Products sold worldwide. Some states do not allow limitations on implied warranties so the above limitations may not be applicable. You may also have other rights, which vary from state to state.

EXCEPTIONS

ONE YEAR: Labor to replace defective parts in repeaters or base stations
THIRTY DAY: Tuning and adjustment of telemetry radios
NO WARRANTY: Fuses, lamps and other expendable parts

Effective 1/2008