communications

Global Network Solutions

USER GUIDE

GSM TERMINAL • MODEL 6000

GSM Terminal

Wireless Subscriber Unit
Model 6000

User Guide

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THE GSM TERMINAL

Congratulations on your selection of the GSM Terminal from L3 Communications, Global Network Solutions! The GSM Terminal is a GSM-compatible wireless Terminal that provides fixed access for customers to either standard GSM mobile cellular networks or GSM Wireless Local Loop networks.

The GSM Terminal is a full duplex radio transceiver, which contains radio communications and telephone circuitry. It can serve at least 3 telephony devices connected simultaneously such as:

- standard telephone set
- speaker phones
- answering machines
- facsimile machines
- analog modems
- computers (through serial port)

You can use the GSM Terminal to place standard voice calls, fax or modem calls, as well as make connection to PC either through modem or digital serial interface. The GSM Terminal can be used as a desk-top or wall-mounted device. A variety of optional antennas are available, from small attachable antennas to wall or roof-mounted directional antennas that ensure high coverage and high reliability.

You should find the following components included in your GSM packaging:

Figure 1. GSM Terminal package contents

GSM TERMINAL CONFIGURATIONS

The GSM Terminal can be configured with a combination of telephones, faxes, modems, or other telephony devices.

There are several methods of connecting the GSM Terminal to the various peripherals.

(i) Single peripheral device might be connected directly to Terminal's telephone (RJ-11) or Serial (RS-232) connector.

(ii) Multiple devices may be connected to Terminal via splitter. (See Figure 2)

(iii) If you want to use house telephony through GSM Terminal instead of wire-line telephony and your home/office has house wiring, you may disconnect wire-line telephone connection from your house/office wiring and connect GSM Terminal to one of the phone jacks in the home/office. This allows all home/office telephony devices connected to wall-jacks to operate through the GSM Terminal. (See Figure 3)

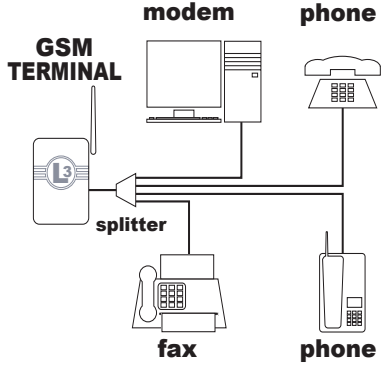


Figure 2. Configuration with Terminal connected to telephony devices through splitter.

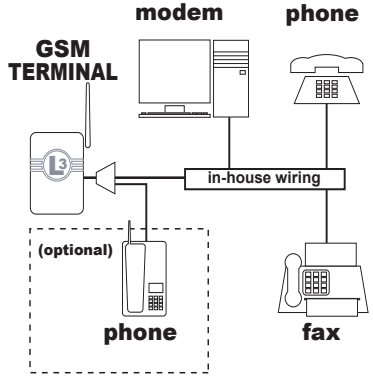


Figure 3. Configuration with Terminal connected to telephony devices through house wiring.

Standard phone service must be deactivated before connecting the GSM Terminal in this configuration.

ⓘ In any configuration you should keep the distance between telephones and GSM Terminal under 200 meters. If you need to span longer distances, you will need a high-quality wire.

QUICK SETUP GUIDE

This section provides you with information on how to quickly set up and operate the GSM Terminal. Refer to Figures 4 and 5 for the location of the various Terminal inputs and indicators.

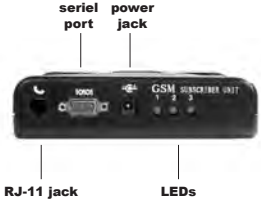


Figure 4. Front view with labels

Figure 5. Side view with antenna jack

1. Install Antenna

Figure 6. Connecting and tightening the antenna.

- Install the antenna onto the threaded connector on the side of the GSM Terminal.
- Tighten the connector by hand only.
- Turn the antenna to a vertical or near-vertical orientation.

2. Install internal back-up battery

- Locate the battery door on the top rear of the subscriber unit and remove it by pressing in and then up on the arrows. The door will "hinge" open for removal (Figure 7).

Figure 7. Battery cover removal

- Press the battery (velcro-tape side down) to hold the battery in place within the case.

Figure 8. Battery placement

- Connect the socket of the battery wire to the plug located inside the battery compartment. Note: The included battery may be partially charged. The terminal must still be connected

to the power supply to ensure proper operation and recharging of the battery.

- Reinstall the battery door and close it completely by pushing down on the arrows and using slight pressure until the door is in place.

3. Install SIM Card

The SIM card is not included with the Terminal and must be acquired from the service provider. Terminal is designed to interface with 3V SIMs only.

! Make sure the power is OFF before inserting the SIM card!

- Locate the SIM slot on the left side of the GSM Terminal (Fig. 6).

Figure 9. SIM compartment location

- Using a pen or other pointed object, depress the button inside the slot and pop out the SIM card tray (Fig 7).

Figure 10. Opening SIM compartment

- Install the SIM in the tray, and carefully insert the tray back into the slot. (The SIM will be flat within the tray.)

4. Connect Telephone Set

- Connect a standard analog telephone set into the RJ-11 connector.

Figure 11. Terminal with telephone connected

The GSM Terminal can handle a combination of multiple phones, faxes, modems, or similar devices in various configurations. See Section 4 for details.

5. Connect Power Supply

- Insert the power supply into the power socket of GSM Terminal.
- Connect the power supply to a standard wall outlet.

6. Check the LEDs

- LED 1 will initially be red, then should turn green if the battery is installed, or blink green with no battery installed.
- LED 2 will be amber for up to 30 seconds immediately after power up, then turn green if the GSM Terminal finds a GSM service provider and registers to it.
- LED 3 will blink red if the SIM card requires a PIN code, or be a steady green if it does not. (See Step 7 for how to enter the PIN code.)
- If any of these conditions are not met, refer to Table 1 for explanations.

7. Using the Terminal

- You may be required to enter a personal identification (PIN) code to activate the SIM card. Do so by dialing #** PIN. LED 3 will turn a steady green.

ⓘ For best performance, the GSM Terminal should be at least 4 feet away from any device connected to the unit's telephone jack.

	LED 1	LED 2	LED 3
POWER SUPPLY			
Power OK	●		
Power OK/No battery	✳		
Battery Operation	●		
Battery Low	✳		
Initializing	●		
Input Voltage Low	✳		
SERVICE			
In Service		●	
In Service/Signal Low		✳	
Registering		●	
Registering/Signal low		✳	
No service		●	
No service/Signal low		✳	
SIM			
No SIM			●
Input PIN Required			✳
SIM locked			✳
OPERATING MODE			
Voice Mode			●
Incoming Data Mode			●
Incoming Fax Mode			✳
Serial Data Connection		●	✳

✳ Indicates blinking ● Indicates [OFF]

Table 1. Front panel LED Status

• LED 2 on the Terminal indicates signal strength. See Table 1 for a color code of signal strengths.

ⓘ You may need to reposition the Terminal to select the best location. Try doing so with the unit powered on while looking at LED 2 to confirm reception.

ⓘ To operate without an external power source, the battery should be charged for at least 48 hours.

8. Testing the Terminal

You can test the Terminal either by simply placing a phone call or by performing the "Ring Back Test" described below. (To place a phone call, do not forget to unlock the SIM card using your PIN. See the next section below for instructions).

ⓘ The GSM Terminal will start dialing 3-5 seconds after the last digit of the phone number is entered.

Ring Back Test -

- On any telephone connected to the Terminal, dial #*26 and wait for confirmation tone.
- Hang up. All connected telephones should start ringing. (If some connected telephones do not ring check your wiring to ensure that all devices are connected properly).
- End the Ring Back Test by lifting any connected telephone and hanging it up.

ⓘ If you have a Caller ID device attached to the Terminal, you should see the number "1234567890" appear during the Ring Back Test

9. Mounting the GSM Terminal on a wall

Refer to the figure below for wall mounting.

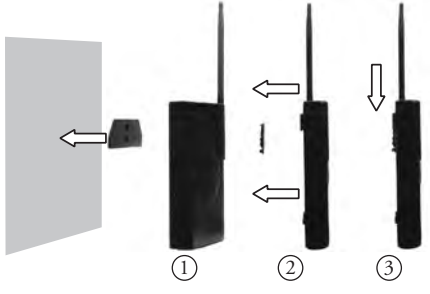


Figure 12. Wall mounting

1. Fasten the supplied wall-mounting bracket onto the wall.
2. Press Terminal flat against wall.
3. Slide Terminal down onto the bracket

SIM CARD

The presence of a SIM Card inside GSM Terminal is detected during the power on process. If there is no SIM card in the unit, LED 3 (the right-most one) will be red. Also, a slow busy tone in the telephone set will indicate the absence of the SIM card while it is off-hook.

After power on, if the SIM card is protected by a PIN and you have not yet entered it, the LED 3 will blink red (once per second). Enter the PIN using the following sequence from the telephone set:

PIN**

If the PIN is entered correctly, LED 3 will change from red to green and you will hear a short audible confirmation tone through the connected phone set.

ⓘ If AUTOPIN feature is activated (see table 2 on page 6), then once you enter a correct PIN the Terminal will remember it unless you change your PIN or your SIM card.

In the case of a wrong PIN entered, LED 3 will continue blinking red and you will hear a multi-frequency rejection tone.

ⓘ In accordance with GSM standard, three wrong PIN number trials will lock the SIM card. In such a case you will need to call your operator to receive a special number -- called a Personal Unblocking Key, or PUK -- to unlock the SIM using the following sequence:

PUK_NUMBER * NEW_PIN**

To change PIN number, use the following sequence:

**** 04 * OLD_PIN * NEW_PIN * NEW_PIN #**

See also Table 2, *Codes Related to Standard GSM Service* on page 12.

CALL RELATED SUPPLEMENTARY SERVICES

The GSM Terminal allows you to handle more than one call simultaneously. You can put a call on hold, then make another call, switch between the calls or transfer calls.

Call Waiting

The GSM Terminal allows you to accept a call from a second party (or dial a second party) while you are in an existing call.

If you receive a call from a second party while you are in a call you will hear a audible "Call Waiting" indication tone on your telephone set. If you do not respond to this indication in 10 seconds, you will receive a second tone.

If Caller ID service is available from the network and a Caller ID box is connected to the Terminal, the waiting number will be appear on the Caller ID display.

After receiving a Call Waiting indication you can put the first call on hold and accept the second call by pressing the Flash button (or making hook-flash) and then pressing key "**2"** on the telephone set. (Note: the key "**2"** must be pressed within 5 seconds). After that the waiting call will be put through. To go back to the original call, press the **FLASH** and "**2"** keys again.

Call Hold (Making second call)

To make a second call while a call is in progress, put the active call on hold by pressing the Flash button (or making hook-flash) and then key "**2"** on the telephone set. You will hear 3 short beeps followed by a dial tone to indicate that a new number can be dialed for the second call.

Successively pressing the **FLASH** and "**2"** keys will switch between two established calls.

Multi Party Call (Conference Call)

To link two established calls together into a conference call press **FLASH** and key "**3"** This

service must be supported by the service provider. If your service provider does not support this service, see below the instructions on explicit call transfer.

ⓘ You can put all parties on hold by entering **FLASH** and key "**2**".

Explicit Call Transfer

With the presence of two established calls, pressing FLASH "**4**" keys connects the two distant parties and disconnets the GSM Terminal from both calls. However, some service providers implement a proprietary solution for explicit call transfer using special service codes. You can use special explicit call transfer service codes between two established calls by following these steps:

- Put the calls in conference call by pressing **FLASH** and the key "**3**".
- Put the calls on hold by pressing **FLASH** and the key "**2**". You should get a dial tone.
- Dial the explicit call transfer code to complete the explicit call transfer operation.

GSM RELATED SUPPLEMENTARY SERVICES

The GSM Terminal provides transparent access to all standard GSM Supplementary services. Since some of the services need an extra subscription, consult your service provider for the availability of these services.

Table 2 on page 12 lists the services supported by the GSM Terminal and instructions on how to activate and deactivate them, as well as on how to query the status of each service.

ⓘ Successfully completed actions are indicated by a single acceptance tone while incomplete or unsuccessful supplementary Service requests are indicated by three monotonically increasing failure tones.

ⓘ Status queries will provide a single tone indicating an activated service and two monotonically decreasing tones ("negative acknowledgement tone") indicting a deactivated service.

SUPPLEMENTARY SERVICE	TO ACTIVATE	TO DEACTIVATE	TO CHECK STATUS
PIN			
Enter PIN	**#** <PIN>**	--	--
Change PIN	** 04 * <OLD_PIN> * <NEW_PIN> * <NEW_PIN> #	--	--
Unlock PIN	#** <PUK> * <NEW_PIN>		--
Auto PIN	#* 12 * 1	#* 12 * 0	--
CALL FORWARDING		--	
Unconditional	** 21 * <NUMBER> #	## 21 #	*# 21 #
If no answer	** 61 * <NUMBER> #	## 61 #	*# 61 #
If not accessible	** 62 * <NUMBER> #	## 62 #	*# 62 #
If busy	** 67 * <NUMBER> #	## 67 #	*# 67 #
Deactivate all temporarily	--	# 002 #	--
Reactivate all	* 002 #	--	--
Deactivate temporarily - conditional	--	# 004 #	--
Reactivate temporarily - conditional	* 004 #	--	--
CALL WAITING			
Activate/deactivate call waiting	* 43 #	# 43 #	*# 43 #
CALL BARRING			
Set password (PW)	** 03 ** <OLD_PW> * <NEW_PW>*<NEW_PW> #	--	--
Outgoing - all	* 33 * <PW> #	# 33 * <PW> #	*# 33 #
Outgoing - international only	* 331 * <PW> #	# 331 * <PW> #	*# 331 #
Incoming - all	* 35 * <PW> #	# 35 * <PW> #	*# 35 #
Incoming - if roaming	* 351 * <PW> #	# 351 * <PW> #	*# 351 #

Table 2. Codes related to GSM supplementary services
For detailed syntax and additional information codes for Call Forwarding supplementary services, refer to Appendix E.

EMERGENCY NUMBER

Both '911' and '112' Emergency number dialing is supported with or without SIM Card.

VOICE / FAX/ MODEM MODE

NOTE

FAX transmission across a GSM network is inherently sensitive to instabilities and variances in both the GSM network and the radio transmission path (air interface). Certain machines may also not support some fax commands (Such as Retrain Negative- RTN) that provide retransmission of corrupted data, thus allowing corrupted faxes to be resent. Most importantly, timing and other variations between different fax machines can also greatly affect transmission/reception of facsimile messages. The end result is that certain fax machines may not perform well within GSM.

Making Calls

With the GSM Terminal you can make both voice as well as data calls.

Voice Calls

Voice calls on the GSM Terminal are made the same way you would on a standard wire-line.

Data Calls

Since the GSM Terminal is set in voice mode by default, you need to notify the network before sending a data transmission such as a fax or modem call. To do so, you must add a prefix to the telephone number being dialed.

To place a fax call, enter the sequence

#* 81 *

followed by the number

Fax services must be registered with your network operator in order for you to be able to transmit faxes.

To place a modem call, enter the sequence

#* 82 *

followed by the number.

❗ After completion of the fax or modem call the GSM Terminal will automatically return to voice mode.

Receiving Calls

Voice Calls

You receive voice calls the same way as you would with a fixed line setup.

Data Calls (Fax or Modem)...

...originating from within the GSM network:

You receive fax or data calls made to you from within the GSM network in the same way as with a standard fixed line service.

...originating from outside the GSM network:

If the SIM card provided by the Operator has a multi-numbered scheme for voice/fax then two telephone numbers will be assigned to your Terminal -- one for voice and one for fax calls.

If the SIM card has only one assigned number for both voice and fax, then before accepting a fax or modem call, you must switch the GSM Terminal into fax or modem mode using one of the following key sequences:

#* 91 (incoming fax call)

#* 92 (incoming data call)

#* 90 (to switch back to voice mode)

ⓘ LED 3 (rightmost LED) will indicate the operating mode of the GSM Terminal -- green for voice, amber blinking for fax and amber steady for modem data.

Using a PC with the GSM Terminal

You can connect an analog modem to the GSM Terminal the same way as to a fixed line setup. This allows you to make dial up connections with your PC for internet browsing, email, etc. If your PC does not have a modem, or you want to use the digital connection, you may connect your PC serial port to a serial port of the GSM Terminal. This way, the GSM Terminal will act like a

modem (To configure the Terminal as a modem you should use standard Windows modem configuration procedure).

There are two data connection methods available:

GPRS DATA - With GPRS you are not charged for the connection time but for your bandwidth usage (amount of data tranferred). GPRS allows you to make only outgoing calls, such as an internet connection. See Appendices A & B for instructions on how so set up a GPRS connection on your PC.

! GPRS services must be registered with your network operator in order to function.

GSM DATA - With GSM Data you are charged for your time online. GSM allows both incoming and outgoing calls. GSM Data connections are made the same way as with a standard modem with your PC configured for a fixed-line connection.

Since the GSM Terminal supports auto-bauding up to 57,600 bps, make sure that maximum speed of the PC modem is set to 57,600.

Also, you may need to use the following initialization string, "AT+CSNS=4", to accept calls coming from outside of GSM network using single numbering scheme.

! Your SIM card must support GSM Data in order to use this method.

Data Bearer Type Selection

The data bearer type selection dialing sequence selects the bearer service with a data rate and a service type to be used when making outgoing data calls. Service type selection also applies to mobile terminated (incoming) calls if the Single Numbering Scheme is used. For incoming calls, bearer type selection should match the network proposed service type. If the unit is set to Transparent only and the network proposes Non-Transparent only or vice versa, then the call is released.

The default setting is Data Circuit Asynchronous with Autobauding and Non-transparent only. This dialing sequence updates the default bearer type values stored in the GSM Terminal and the selected

bearer type becomes active for the subsequent data calls.

The default bearer type setting matches most of the GSM networks settings. Therefore, this feature should not be used unless GSM operator requires different settings.

To manually set the data bearer type selection, use the following sequence:

 # * 93 * SPEED * CONNECTION_TYPE * SERVICE_TYPE

Refer to Table 3 for help in selecting the appropriate values to use for each field.

SPEED	MODEM TYPE	KEY CODE
Autobauding	none	0
1200 bps	V.22	2
2400 bps	V.22bis	4
4800 bps	V.32	6
9600 bps	V.32	7
CONNECTION TYPE		
Data Circuit Asynchronous		0
SERVICE TYPE		
Transparent only		0
Non-transparent only		1
Transparent preferred		2
Non-transparent preferred		3

Table 3. Key codes for bearer type selection

SUPPLEMENTARY SERVICE	TO ACTIVATE	TO DEACTIVATE	TO CHECK STATUS
SYSTEM INFORMATION			
Signal strength display	**#* 20 * 1**	**#* 20 * 0**	**--**
VOICE/FAX/MODEM			
Fax mode - outgoing	**#* 81 * FAX_NUMBER**	***- automatically -***	**--**
Modem mode - outgoing	**#* 82 * DATA_NUMBER**	***- automatically -***	**--**
Voice mode - incoming	**#* 90**	**--**	**--**
Fax mode - incoming	**#* 91**	**#* 90**	**--**
Modem mode - incoming	**#* 92**	**#* 90**	**--**
SMS			
Incoming SMS notification	**#* 30 * 1**	**#* 30 * 0**	**#* 30 * 2**
Read message number **INDEX**	**#* 31 * INDEX**	**--**	**--**
Delete message number **INDEX**	**#* 32 * INDEX**	**--**	**--**
Delete all SMS messages	**#* 32 * 1 * 4**	**--**	**--**
List all received messages	**#* 33 * 1**	**--**	**--**

Table 4 - Supplementary Services Codes

SUPPLEMENTARY SERVICE	TO ACTIVATE	TO DEACTIVATE	TO CHECK STATUS
CLIR			
Prevent ID presentation to called party	**#* 13 * 1**	**#* 13 * 2**	***# 31 #**
Set CLIR to service operator default setting	**#* 13 * 0**	--	--
Set CLIR on per-call basis	**# 31 # PHN_NUMBER**	*** 31 # PHN_NUMBER**	--
CURRENT CALL METERING			
Display number, call direction and call duration	**#* 14 *1**	**#* 14 * 0**	***# 14 * 2**
CALL LOGS			
Display number, call direction and call duration	**#* 15**	--	--
Display cumulative call time (ACM)	**#* 16**	--	--
Reset cumulative call timer	**#* 17**	--	--
SETTING DATA RATE			
Set data rate to a DATA_RATE	**#* 23 * DATA_RATE**	--	--

Table 4 - Supplementary Services Codes (continued)

EXTENDED SERVICES

In addition to the standard GSM supplementary services, the following optional/extended services are provided by the GSM Terminal.

ⓘ Extended Services dialing sequence starts with key entry # * prefix and complies with the following setup rules:

 # * SERVICE_CODE * OPTIONAL_PARAMETER1 * OPTIONAL_PARAMETER2…

Security Services

If the SIM card used in the GSM Terminal is programmed with a PIN, then after power up you must enter the PIN number:

PIN**

After 3 unsuccessful attempts the SIM card will be locked. To unlock it you will need to input a special unlocking code (called a PUK) that is obtained from the service provider.

PUK * NEW_PIN**

To disable PIN check at startup enter the following sequence:

#* 11 * 0 * PIN

To enable PIN check at startup enter the following sequence:

#* 11 * 1 * PIN

You can also program the GSM Terminal to enter the PIN automatically at the startup or after the SIM insertion. If this feature is enabled the Terminal uses the last correctly entered PIN when it is required. If it is not the correct PIN for the specific SIM card, then you will need to enter the correct PIN manually.

To enable auto PIN entry, enter the following sequence:

#* 12 * 1

To disable auto PIN entry, enter the following sequence:

#* 12 * 0

System Information Services

To display RF signal strength on the display of a Caller ID device enter the following sequence:

#* 20 * 1

To hide display of RF signal strength enter the following sequence:

#* 20 * 0

Calling Line Identification Restriction (CLIR)

Calling Line Identification Restriction supplementary service allows a calling subscriber to enable or disable the presentation of the Calling Line Identification (CLI) to the called party when making an outgoing call.

Enabling CLI Restriction in effect instructs the GSM Network not to send Caller ID information to the called party. This allows you to make anonymous calls.

To use this service according to the subscription of the CLIR service, enter the following sequence:

#* 13 * 0

This is the default setting of CLIR and the behavior of the CLI presentation will be determined by the network based on the user subscription settings.

To enable CLIR, enter the following sequence:

#* 13 * 1

To disable CLIR, enter the following sequence:

#* 13 * 2

To retrieve status information about the CLIR service enter:

***# 31 #**

You will hear a confirmation tone if CLIR service is enabled, and a negative acknowledgment tone if the CLIR service is either disabled or if its setting are defined by the network.

You can also change the CLIR settings temporarily on a per call basis without updating the CLIR settings for all outgoing calls.

To disable CLIR on per call basis, enter the following sequence:

*** 31 # PHONE_NUMBER**

To re-enable CLIR on per call basis, enter the following sequence:

#31 # PHONE_NUMBER

Current Call Metering Services (CCM)

Current Call Metering service (CCM) allows you to enable or disable the presentation of the phone number, the direction (incoming or outgoing), and the duration of the last completed call. When enabled, the phone number, the call direction and the call duration information will be sent automatically to a Caller ID box after the receiver is placed on the hook.

❗ This service is intended to inform users about their network usage. It is not intended to be an accurate measure for billing purposes.

ⓘ In Call Waiting / Call Hold / Multi Party/ Explicit Transfer call scenarios, CCM service displays information about the last call session only.

To enable CCM enter:

#* 14 * 1

Wait for the confirmation tone before placing the receiver on hook.

To disable CCM enter:

#* 14 * 0

Wait for the confirmation tone before placing the receiver on hook.

To query the status of CCM, enter:

#* 14 * 2

You will hear a confirmation tone if CCM service is enabled, and a negative acknowledgment tone if the CCM service is disabled.

The information displayed on the CallerID box will have the following form:

Phone_Number
CCM: *Direction Duration*

The following symbols are used for direction information:

"**>**" Mobile originated call

"**<**" Mobile terminated call

Duration information format:

hours : *minutes* : *seconds*

Call Logs

You can query the call log and have the information displayed on a Caller ID display using the following dialing sequences. After dialing the proper sequence, be sure to wait for a confirmation tone before putting the receiver on hook. (After a short delay, the requested information will be displayed on the Caller ID screen.)

To retrieve the phone number, direction and duration of the last call enter the following sequence:

#*15

Wait for the confirmation tone before placing the receiver on hook. The phone number, direction of call and its duration will be displayed in the same format as the CCM service display.

To retrieve the total call time since the last timer reset, enter the following sequence:

#* 16

Wait for the confirmation tone before placing the receiver on hook. Duration of all calls made since the last rest of total call timers will be displayed in following format:

ACM: *hours* : *minutes* : *seconds*

If duration of all calls exceeds 10000 hours, the display format will be updated to show days and hours in the following format:

ACM: *days* : *hours*

To reset the total call timer, enter:

<#*>17

Wait for the confirmation tone before placing the receiver on hook.

Setting the Serial Port Data Rate

The data rate at which the GSM Terminal will accept commands on the serial port (RA-232 interface) can be changed via the phone interface with the following dialing string:

#* 23 * DATA_RATE

Wait for the confirmation tone before placing the receiver on hook.

Available Data Rates (bps) : 0, 300, 600, 1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200.

ⓘ Setting the data rate to a 0 activates the autobauding feature. The GSM Terminal is capable of detecting the connected terminal speed in 300 to 57600 bits/s range when it is set to autobauding.

CLI Protocol Selection

The default GSM Terminal setting for Calling Line Identification (CLI) presentation protocol for Caller ID display devices is the ETSI V.23 standard. User can change the CLI presentation protocol setting to Bellcore or ETSI DTMF by using the following dialing sequences:

To choose Bellcore, enter the following sequence:

#* 24 * 1

To choose ETSI DTMF, enter the following sequence:

#* 24 * 2

To reset back to ETSI V.23, enter the following sequence:

#* 24 * 0

ⓘ Due to the limitation of ETSI DTMF standard only the phone number of the calling party will be displayed on DTMF-type Caller ID devices if ETSI DTMF protocol is selected. Other information display capabilities, such as SMS messaging, RSSI display and call metering information will not be available using DTMF-type Caller ID devices.

System Time

You can set the system time of the GSM Terminal. This allows the incoming call time to be presented to Caller ID devices connected to the GSM Terminal along with the number of the incoming call. In the case when the Terminal is powered down, you will need to reset the time. If the time is not set, the Terminal will not present the time with the Caller ID message. In this case, time presentation is Caller ID box dependant.

To set the system time, enter the follwing sequence:

#* 25 * YYMMDDhhmm

YY: Two-digit year

MM: Two-digit month

DD Two-digit day

hh: Two-digit 24-hour clock

mm: Two-digit minute

For example, March 6, 2003 5:24 PM is entered as follows: #* 25 * 0303061724

SMS MESSAGING

SMS via the GSM AT Commands

SMS messaging is supported through the RS-232 interface via the standard GSM AT Commands. Most common GSM AT commands used to handle SMS are given in Table 5. PC-based "SMS client" programs can also be used to make a SMS session user-friendly.

ⓘ See your "Windows" manual under "HyperTerminal Setup" in order to set up a terminal connection to GSM Terminal to issue AT Commands.

SMS COMMANDS	DESCRIPTION
+CMGF	Message format
+CMGR	Read message
+CMGL	List message
+CMGD	Delete message
+CMGS	Send message
+CNMI	New message indication
+CSCA	Service center address

Table 5. SMS commands and descriptions

Read SMS

AT+CMGF=1 Set text mode to a 'Short Message'

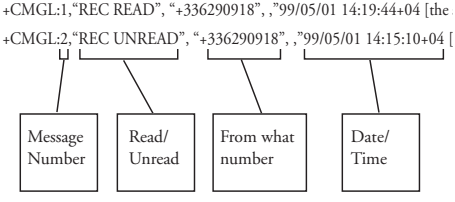
AT+CMGL='ALL' List all stored messages

The following text will be returned:

OK

AT+CMGR=1 Read the first message

The following will be returned:



OK

AT+CMGR=1 Read the first message

The following will be returned:

+CMGR: "REC READ", "+336290918", , "99/05/01 14:19:44+04" "MESSAGE BODY"
OK

Delete Message

AT+CMGD=1 Delete the first message

Set Service Center Number

AT+CSCA= "12063030004"

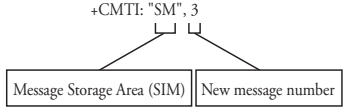
Set service center number to1-206-303-0004

New Message Indication

AT+CNMI=0,1,0,0,0

Set unsolicited message indication

When a new SMS message is received, the following will be displayed on the terminal indicating message number and message storage area, which is the SIM card (SM) by default.



Send SMS

AT+CMGF=1 Set text mode to a 'Short Message'

AT+CMGS=<telephone number> Send a SMS-SUBMIT to mobile phone

> Module sends ">" prompt for SMS message entry

<First text line><CR> Edit the first line and press carriage return (<CR>)

<Last text line><ctrl-Z> Edit the last line and send message by pressing <ctrl-Z>

SMS messaging over a CallerID

The GSM Terminal supports SMS read, list and delete features using standard Caller ID boxes or phones with Caller ID displays that support number and name features. With this feature enabled, you will be notified of incoming SMS messages by a short ring and accompanying Caller ID transmission showing the newly received SMS message index. This SMS message index number is used when reading and deleting the SMS messages from the SIM card. You can also query the existing messages in their SIM card using the message listing feature to get the index numbers.

The telephone number of the sender, and date and time of the message, is displayed in CallerID box number and date field. The message itself is displayed in the name field. If the SMS message is longer then 15 characters (maximum number of character supported by standard Caller ID boxes), the message is sent in multiple Caller ID sessions, with the message index and page number of the message displayed on the number field of Caller ID display. Since each Caller ID manufacturer implements number formatting differently, the format of the message index and page number may vary.

You can control various SMS commands through your connected telephone keypad using following dialing sequences:

KEY SEQUENCE	DESCRIPTION
#* 30 * 0	Disable incoming SMS message notification
#* 30 * 1	Enable incoming SMS message notification
#* 30 * 2	Check status of message notification setting
#* 31 * INDEX	Read SMS message number
#* 32 * INDEX	Delete SMS message number
#* 33 * 1	List all received SMS messages

Table 6. SMS messaging with Caller ID box

After entering a dialing sequence wait for the confirmation tone and then hang-up.

ⓘ The Caller ID transmission will take place while the receiver is on hook.

GSM TERMINAL TECHNICAL DATA

GSM AIR INTERFACES

Frequency Bands: Dual-Band EGSM 850/GSM 1900 or Dual-Band EGSM 900/GSM 1800

GSM 900

Frequencies: TX 880-915 MHz, RX 925-960 MHz

RF power: Maximum 2 W (33 dBm)
Power class 4

GSM 1800

Frequencies: TX 1710-1785 MHz,
RX 1805-1880 MHz

RF power: Maximum 1 W (30 dBm)
Power class 1

GSM 1900

Frequencies: TX 1850-1910 MHz,
RX 1930-1990 MHz

RF power: Maximum 1 W (30 dBm)
Power class 1

GSM 850

Frequencies: TX 824-840 MHz,
RX 869-896 MHz

RF power: Maximum 2 W (33 dBm)
Power class 4

Data Capabilities: multislot GPRS Class B and circuit switched GMS Data

Speech Codecs: Full Rate, Enhanced Full Rate and Half Rate

EXTERNAL INTERFACES

Telephone: RJ11 (a/b 2-wire line); fixed telephone interface

RS232 port: DB-9 Serial COM interface

GSM antenna: TNC plug- female (50 W)

SIM card: Small plug-in type, 3V

Input Vdc: 12.7 Vdc, 0.4 A (connector: EIAJ RC-5320A class 4, male)

TELEPHONE INTERFACES

Telephone: Speech

Analog Fax: Group 3 Fax transmission

Analog Data: V.32, V.22bis, V.22

CLI: ETSI DTMF and V.23; Belcore FSK

Line impedence: 600 ohm (default)

Loop current: 25 mA (off-hook)

Open loop voltage: 48 V (on-hook)

Loop resistance < 650 ohm (off-hook)

Ringing voltage: 45 Vrms

Ring load: 3 REN

RS232 INTERFACES

Data services: all applicable GSM 07.07 AT commands

SMS: all applicable GSM 07.05 AT commands

INCLUDED ANTENNA

Frequency Bands: Dual-Band EGSM 900/GSM 1800 or EGSM 850/GMS1900

Characteristics: Omnidirectional

INCLUDED POWER SUPPLY

AC input: 100-240 Vac; 47-63 Hz, 3-pole AC inlet connector (IEC 320 power inlet)

Available plugs: EU, UK, USA and AU

ENVIROMENTAL

Operating temperature: -10°C to +55°C

Operating humidity: 5-95% (non-condensing)

Storage temperature: -40°C to +85°C

Storagte humidity: 5-95% (non-condensing)

GSM TERMINAL PACKAGING

GSM SU unit, power supply, wall-mounting bracket, internal antenna, user guide

Dimensions: 9.25" x 6.0" x 1.63"

Weight: 1.8 lbs

APPENDIX A

ESTABLISHING A GPRS CONNECTION

Setting Up and Establishing a GPRS Connection (Windows 98)

GPRS service can only be used on subscriber units that have GPRS software installed.

Initial Setup of the Terminal

1. Turn off the Subscriber Unit.
2. Install a valid SIM, if not already installed.

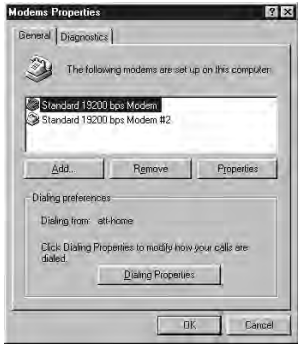
The SIM must have GPRS operation enabled.

3. Connect the serial port of the PC to the serial port of the GSM Terminal (9-pin "D" connector) using straight-through serial cable.
4. Power up the GSM Terminal. Wait for LED#3 to blink amber/green. LED#2 will be off and LED#1 will indicate the power supply status as in table 1.

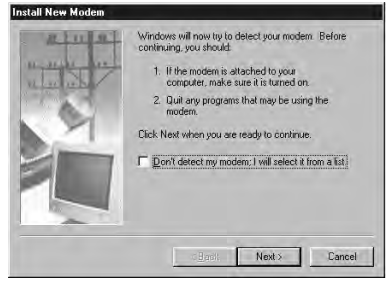
Modem Installation

1. Start the Control Panel program by selecting Start->Settings->Control Panel

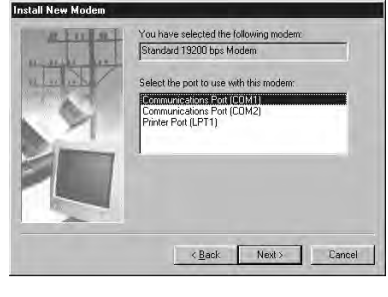
1. Double-click "Modems". Click the "General" tab. Click "Add"



2. Uncheck “Don’t detect my modem; I will select from a list”. Click “Next >”.



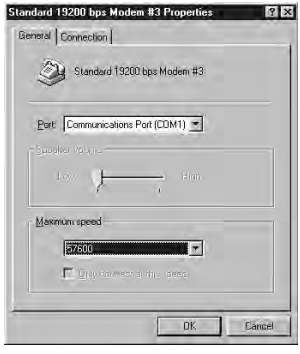
3. The GSM Terminal should be detected automatically. Click “Next >”



4. Click “Finish”.

5. Select “Standard Modem” installed in previous step. Click “Properties”:

   • Set “Maximum Speed” combo box value to 57600.

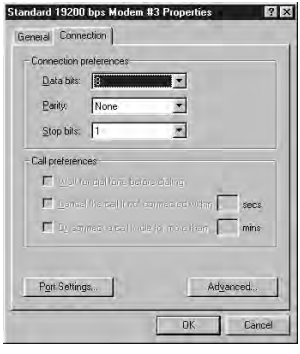


6. Under the “Connection” tab:

   • Set “Data Bits:” combo box to “8”

   • “Parity:” combo box to “None”

   • “Stop bits:” combo box to “1”.



   • Click “Advanced…”

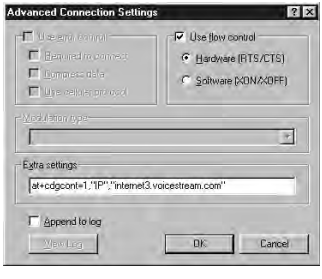
   • Check the “Use flow control” checkbox.

   • Click “Hardware (RTS/CTS)” radio button.

   • In the “Extra settings” field, type at+cdgcont=1,“IP”, “APN”

ⓘ APN is the access point address obtained from the service provider. For example, if the APN is internet.GPRSprovider.com, type:

at+cdgcont=1, “IP”,”internet.GPRSprovider.com”



- Click the “OK” button

If the string is too long to type into the field, then open a hyperterminal. Type the same string into the hyperterminal window.

7. In the “Standard Modem Properties” window, click “OK”
8. Close all other open windows.

Installing a Network Connection

1. Double-click “My Computer” icon on the computer’s desktop.

3. Double-click “Dial-Up Networking”.

4. Double-click “Make New Connection”.

   • In the “Type a name for the computer you are dialing” textbox type the connection name, for example “GSM Terminal-Internet”.

5. Click “Configure…”

   In the “General” tab, for “Port:”

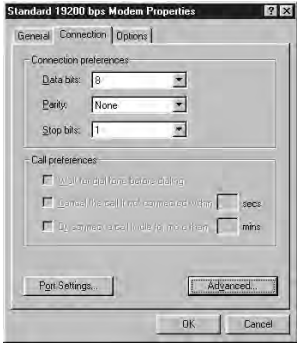
   • select the communications port that is connected to the GSM Terminal; the “Maximum speed” should be 57600.

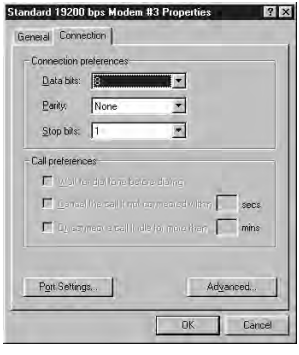
   In the “Connection” tab:

   • Set “Data Bits:” combo box to “8”

   • “Parity:” combo box to “None”

   • “Stop bits:” combo box to “1”.





- Click “Advanced…”
- Check the “Use flow control” checkbox.
- Click “Hardware (RTS/CTS)” radio button.

6. Click the “Options” tab, under “Status Control”, select (check) “Display modem status”. Click “OK”

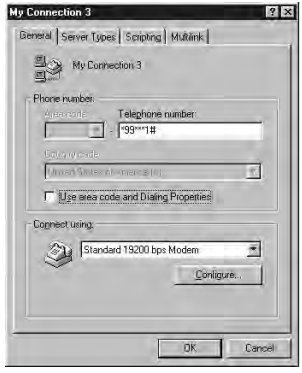
7. Click “Next >”

8. Leave the Area code blank. For the telephone number, put in *99***1#. Click “Next >”

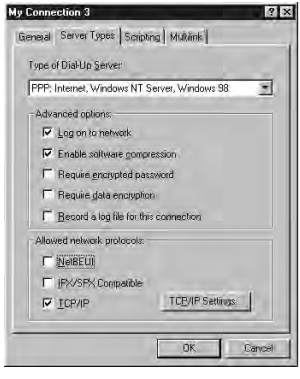
A new connection has been created which should have the same connection name as in step 4. Click "Finish".

Configuring the Network Connection

1. Right-click on the new connection icon of the connection just added and select "Properties".
2. Click the General tab:
   - Confirm that the telephone number is "*99***1#"
   - Uncheck "Use area code and Dialing Properties".



3. Click the "Server Types" tab.
   - In "Type of Dial-Up Server" select "PPP: Internet, Windows NT Server, Windows 98".
   - Select "Log on to network"
   - Select "Enable software compression"
   - Select "TCP/IP".

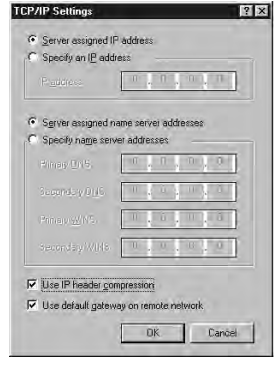


4. Select “TCP/IP Settings…”.
   - Select “Server assigned IP address”, “Server assigned name server address”, “Use default gateway on remote network”.

ⓘ If your GSM/GPRS provider requires you to enter the IP address and DNS server address manually, enter them into the previous dialog box.

   - Uncheck “Use IP header compression”

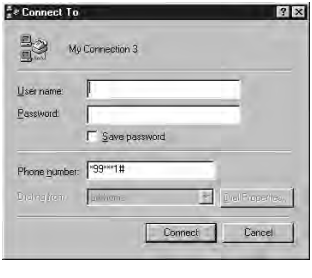
5. Click the “OK” button.



6. In the properties window, click “OK” and close all other open windows.

Using GPRS to Connect to the Internet (Windows 98)

1. Open the “My Computer” icon -> “Dial-Up Networking”.
2. Double click on the GPRS connection icon you created in. “Install and Configure Network Connection”.
3. When the window titled “Connect to” opens, the “User name:” and “Password” fields must be blank.
4. Fill in the username and password dialog boxes if your GSM/GPRS provider requires you to enter them. Otherwise, click the “Connect” button.



5. After a GPRS connection is made (the “Connection Established” window opens), open your Internet browser.

APPENDIX B

GPRS CONNECTION ON WINDOWS 2000

Setting up and establishing a GPRS connection on Windows 2000

GPRS service can only be used on subscriber units that have GPRS software installed.

Initial Setup of the Terminal

1. Turn off the Subscriber Unit.
2. Install a valid SIM, if not already installed.

The SIM must have GPRS operation enabled.

3. Connect the serial port of the PC to the serial port of the GSM Terminal (9-pin "D" connector) using straight-through serial cable.
4. Power up the GSM Terminal. Wait for LED#3 to blink amber/green. LED#2 will be off and LED#1 will indicate the power supply status as in table 1.

Installing and Configuring the Modem

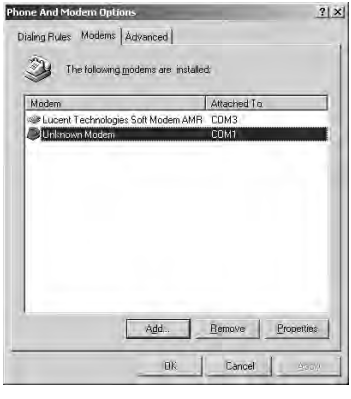
1. Open the "Control Panel" by selecting "Start" -> "Settings" -> "Control Panel"

2. Double-click the "Phone and Modem Options" icon

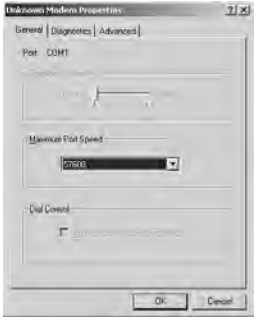
3. Under the "Modems" tab, click "Add…".
   - Uncheck "Don't detect my modem; I will select from a list
   - Click "Next >".
   - In the box under the heading "Detected Modems", the modem should be listed as "Unknown Modem".

   - Click "Next >"
   - The contents of the Add/Remove Hardware Wizard will change telling you that your modem has been set up successfully.
   - Click "Finish"

4. Select "Unknown Modem" installed in previous step by clicking on it.



5. Click "Properties".
   - Set "Maximum Port speed" value to "57600".



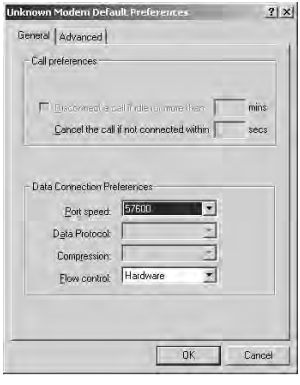
6. Under the “Advanced” tab in the “Unknown Modem Properties” window:
   - In the “Extra settings” field, type at+cdgcont=1, “IP”, “APN”, where APN is the access point address obtained from the service provider. For example, if the APN is internet.GPRSprovider.com, type:

at+cdgcont=1, “IP”, “internet.GPRSprovider.com”

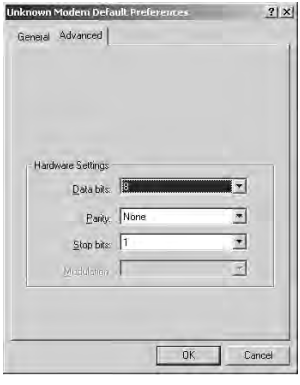
   - Click “OK”

Note: If the string is too long to type into the field, then open a hyperterminal. Type the same string into the hyperterminal window

7. Click “Change Default Preferences” button.
   - In the “General” tab, the “Port Speed:” should be “57600”. Set the “Flow Control:” to “Hardware”.



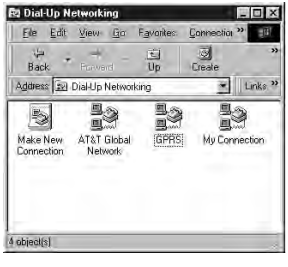
8. Click the “Advanced” tab.
   - Set the “Data Bits:” to “8”, “Parity:” to “None”, “Stop bits:” to “1”.
   - Click “OK”.



9. In the “Unknown Modem Properties” window, click “OK”.
10. Close all other open windows.

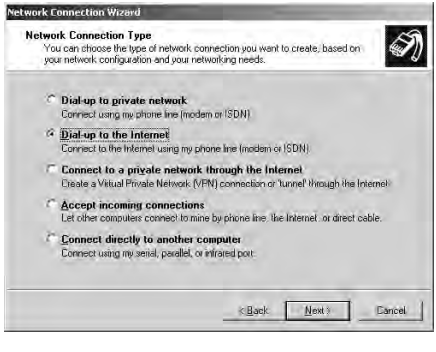
Installing and Configuring a Network Connection

1. Open the “Start” -> “Settings” -> “Network and Dial-Up Connections” icon.

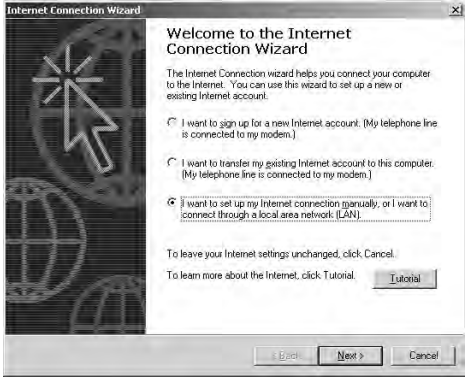


2. Open the “Make New Connection” icon.
   - Click “Next >”

3. Select “Dial-up to the Internet”. Click “Next >”.

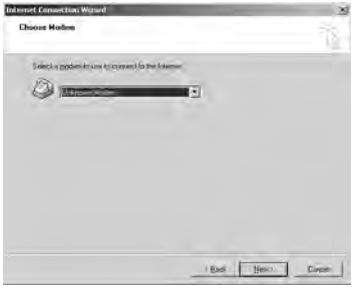


4. Select “I want to set up my Internet connection manually, or I want to connect through a local area network (LAN).” Click “Next >”.

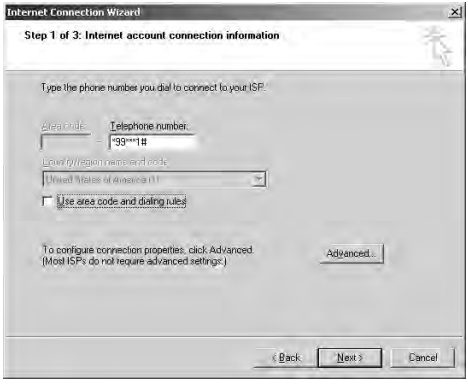


5. Select “I connect through a phone line and a modem”. Click “Next >”.

6. Select the modem device just created. Click “Next >”.



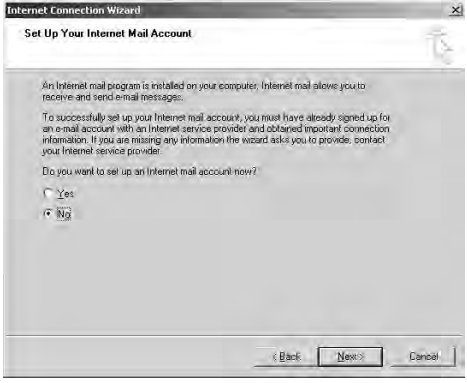
7. Leave the Area code blank. For the telephone number, put in *99***1# and uncheck “Use area code and dialing rules”. Click “Next >”.



8. Fill the “User name” and “Password” fields as required by your GPRS service provider. Click “Next >”.

9. Choose a name for your connection. Click “Next >”.

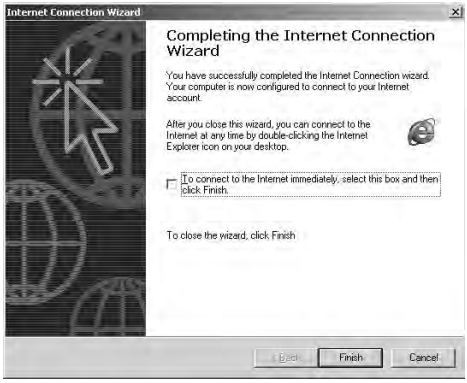
10. If you have the required information from your service provider, you may configure the Internet Mail Account. Otherwise, choose “No” and click “Next >”.



11. Un-check ‘Connect to the Internet immediately…’.

12. Click “Finish”.

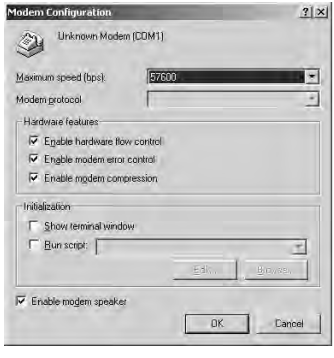
The new connection has been created which should have the same connection name as in step 9.



12. Right-click on the new connection icon of the connection just added and select “Properties”.

- Check the modem device you created for this connection in the “Connect Using” list. Click “Configure…”.
- Under the General tab, the telephone number should be “*99***1#” and the “Use dialing rules” box should be unchecked.

- Set “Maximum speed (bps):” field to “57600”.
- Check “Enable hardware flow control”, “Enable modem error control” and “Enable modem compression”. Click “OK”.

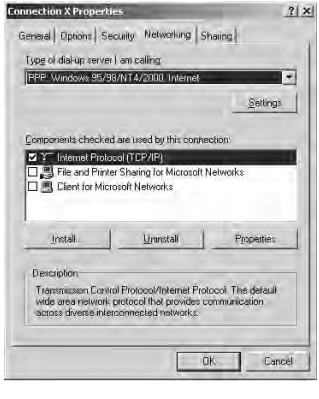


13. Click the “Networking” tab.

    Under “Type of Dial-Up Server”:

    - Select “PPP: Windows 95/98/NT4/2000, Network”
    - Check “Log on to network”
    - Check “Enable software compression”
    - Check “TCP/IP”
    - Uncheck all others.

ⓘ If your GSM/GPRS provider requires you to enter the IP address and DNS server address manually, enter them into the provided dialog box in the “Internet Protocol (TCP/IP) Properties” window by selecting “Internet Protocol (TCP/IP)” and clicking the “Properties” button.



- Click “OK” button. Close all other open windows.

Using GPRS to Connect to the Internet

1. To connect to Internet double-click the select and open the “Start” -> “Settings” -> “Network and Dial-Up Connections” icon.
2. Double click on the GPRS connection icon you created in Step X. “Install and Configure Network Connection”.
2. When the window titled “Connect to” opens, the “User name:” and “Password” fields must be blank. Leave them blank if information is not required or enter the information provided during setup.
3. Click on the “Dial” button.

4. After a GPRS connection is made, open your Internet browser.

APPENDIX C

TROUBLESHOOTING GPRS CONNECTION

WINDOWS 98 AND WINDOWS 2000

If the PC reports an error attempting to make a connection to the GPRS network or communicating with the GSM Terminal, perform the following steps to set the unit's serial communication settings to the factory defaults:

1. Disconnect the serial cable from the GSM Terminal.
2. Connect the telephone to the GSM Terminal.
3. Lift the handset and dial #*22.
4. Wait for the confirmation tone and hang up.

ⓘ The factory default settings are: Autobaud, 8 Data bits, No Parity, and 1 Stop bit

APPENDIX D

USING YOUR PC AS A FAX

Using GSM Terminal with PC to send and receive Fax.

GSM Terminal can be configured as a modem to be used with PC based fax client software. After installing GSM Terminal as a modem to your PC, install your favorite fax software. During installation, make sure to set your modem descriptor to CLASS 1 (Hardware Flow Control).

Also, you may need to change default initialization string assigned by your fax software to "AT+CSNS=2" to accept fax calls coming from outside of GSM network when single numbering scheme is used.

APPENDIX E

CALL FORWARDING SUPPLEMENTARY SERVICE CODES

Procedure for using Call Forwarding supplementary services are defined as follows:

Activate	*** SC #**
Register and activate	**** SC * PHONE_NUMBER # or** **** SC * PHONE_NUMBER * BS # or** **** SC * PHONE_NUMBER * BS * T #**
Check status	***# SC # or *# SC ** BS #**
Deactivate	**# SC #**
Unregistered and deactivate	**## SC # or ## SC ** BS #**

SC : Service Code
BS: Network Service Code
T: No replay condition timer

The Service Codes (SC) are:

002	**All call forwarding**
004	**All conditional call forwarding**
21	**Unconditional call forwarding**
61	**No replay call forwarding**
62	**Not reachable call forwarding**
67	**Busy call forwarding**

The Network Service Codes (BS) are:

No code	**All tele and bearer services**
10	**All teleservices**
11	**Telephony**
12	**All data teleservices**
13	**Fax services**
16	**SMS**
19	**All teleservices except SMS**
20	**All bearer services**
21	**All asynchronous services**
25	**All data circuit asynchronous**
26	**All dedicated packet access**

The no replay condition timer (T), is only used for SC= 002, 004 or 61.

Examples:

61*215555000025# - Register and activates call forwarding on no reply, with no reply timer fixed at 25 seconds for all tele- and bearer service.

**62*2155550000*13# - Register and activates call forwarding for fax services when the subscriber is not reachable.

SAFETY & PERFORMANCE ISSUES

Please read this section before using the GSM Terminal.

Care of the GSM Terminal

• Do not expose the Terminal to moisture or liquid

• Do not expose the Terminal to exremely low or high tempuratures or extreme tempurature ranges

• Keep the Terminal away from lit candles and cigarettes or from open flames

• Do not attempt to dissasemble the Terminal as a broken warranty seal will void the product warranty. The Terminal contains no user servicable parts.

• Use only L3, GNS-approved accessories. Use of non-approved accessories may result in loss of performance or damage to unit, fire, electric shock or injury. The waranty does not cover use of non-approved accessories

• Keep the Terminal clean and free of dust and debris.

Care of Indoor Antenna

• Use only an antenna specified for the Terminal. Use of unapporoved antenna or modifications could damage the Terminal and may void the warranty.

• Refrain from touching the antenna while the Terminal is in use. Any contact with the antenna could affect performance.

• Do not use the antenna if it is damaged.

• Keep other cords, such as power or telephone cables away from the antenna.

• Do not obstruct or cover the antenna.

Radio Frequency Energy

The Terminal is a radio transmitter/receiver. When it is turned on, the Terminal transmits and receives radio frequency (RF) energy.

The GSM Terminal is designed to not exceed RF energy exposure limits set by governing authorities and international health agencies.

Since the Specific Absorption Rate (SAR) measurement is inteded for products that are usually placed by the ear, it does not apply to the GSM Terminal. Therefore, the Terminal should not be used near the human ear and should be kept at least 20 cm away from telephone devices.

Device Interference

Although most electronic equipment is shielded from RF energy, the RF energy from the Terminal may affect some electronic equipment.

Consequently:

- Do not use the Terminal near medical equipment without permission.
- Do not use the Terminal in airplanes.
- Pacemakers could malfunction if used very near to the Terminal.
- Some hearing aid devices could be affected, if used very near the Terminal.

Some electronic devices, if connected to the same power outlet as the Terminal could generate excessive interference in the Terminal.

Explosive Atmospheres

Do not use the Terminal near a gas leak. If you suspect a leak, use a telephone away from the area of the leak to report it.

Although it is rare, the Terminal could generate a spark. As a result turn off the Terminal in areas with potentially explosive materials, such as gas stations, and in areas where the air may contain explosive chemicals or particles, such as grain, dust or metal powders. Do not install the Terminal in areas where flammable materials are stored or transported.

Power Supply Safety & Use

- Ensure that the AC outlet is properly grounded.
- Connect the power supply cord only to AC outlets that meet the Terminal specifications
- Never alter the AC cord or plug.
- To prevent damage to the AC cord, always remove the plug from the outlet by grasping onto the AC adapter or plug rather than the cord and make sure the cord is positioned out of the way of traffic.

Children

Children should not be allowed to play with the Terminal, as it contains small parts that could become detached and create a chocking hazard.

Disposing of the Terminal
Refer to local regulations for disposal of electronic products.

REGULATORY INFORMATION

FCC Statement

The FCC ID for the device is T22-6000-85019.

This devices generates, uses, and can radiate radio frequency energy. If not installed and used in accordance with the instructions, it may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this computer does cause harmful interference to radio or television reception (which can be determined by removing the unit's batteries and AC adapter), try the following:
• Reorienting or relocating the receiving antenna.
• Relocating the computer with respect to the receiver.
• Connecting the computer's AC adapter to another power outlet.

To comply with RF safety requirements please follow the installation instructions and maintain a minimum separation distance of 20 cm from the antenna to any human body.

WARRANTY INFORMATION

L-3 Communications Global Network Solutions warrants that for a period of one (1) year from the date of shipment, equipment delivered by L-3 Communications Global Network Solutions shall be free from defects in material or workmanship under normal use and service.

Any claim of defect in material or workmanship shall be submitted promptly in writing and shall include an explanation of the circumstances leading to such claim. Upon receipt and verification of such claim, L-3 Communications Global Network Solutions shall take reasonable and prompt action to correct such defect, in its exclusive discretion, by repair, replacement or both. L-3 Communications Global Network Solutions liability under this warranty is limited to repair or replacement of the defective parts and its liability shall in no case exceed the purchase price of the equipment under the warranty. L-3 Communications Global Network Solutions shall at its exclusive option, repair or replace defective parts and shall have the exclusive option to effect such repair at the installation or at its plant.

If a defect is determined by L-3 Communications Global Network Solutions to be the responsibility of or caused by the buyer, the buyer's agent or customer or by other equipment under the control of the buyer, buyer shall pay all repair or replacement costs incurred by L-3 Communications Global Network Solutions. This warranty does not cover expendable items such as lamps, batteries, light bulbs, fuses, etc. or other items carrying a Separate Vendor Warranty. The buyer shall be responsible for return transportation and the safe arrival of all items returned to L-3 Communications Global Network Solutions under this warranty.

It is understood and agreed that there are no warranties made by L-3 Communications Global Network Solutions of merchantability or fitness for a particular purpose and that there are no warranties whatsoever, either expressed or implied, except as to title other than those warranties which are specifically set forth herein.

For further information, please refer to L-3 Communications Global Network Solutions Return Authorization Procedure.

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