

CelluLine CGW-TS
GSM Cellular Gateway

Installation and
Programming Manual



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CGWTS-M001A

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1 Introduction

Your new ITS CelluLine CGW-TS is a cellular gateway that connects your PBX (Private Branch eXchange) directly to a GSM network, bypassing the landline carrier. By routing your outgoing calls made to cellular numbers through your new CGW-TS, you will be able to eliminate excessive interconnection fees charged by the landline carrier, thus cutting your telephone costs significantly.

Setting up the CGW-TS requires a simple connection from the analog trunk interface of your PBX-fxo to your new CGW-TS unit. Once connected, you insert the SIM card for your GSM cellular provider's network into the unit, attach the antenna and plug in the power. You are now ready to make your first call from your phone extension directly through your GSM network. A detailed explanation of how to set up the CGW-TS can be found on page 5.

The CGW-TS has 6 LEDs that show the received signal level and other useful call progress information. A detailed explanation of the LED status indicators can be found on page 9.

You can program additional CGW-TS parameters, such as Audio volume control, Conversion Time-out and Restricted Digits, via DTMF commands. A detailed explanation of these parameters and others can be found on page 15.

1.1 Main Features

The CGW-TS has the following main features:

- Integrated dual-band GSM module (900/1800, 850/1900 MHz)
- 6 LEDs
 - Power indication (1)
 - Operational status (1)
 - Received signal level indicator (4)
- DTMF Programming
 - Prefix blocking (up to 10)
 - Conversation time-out
 - Reverse polarity signaling support
 - Audio volume control
- Supports DTMF dialing
- Line interface, 2-wire (RJ-11 connector)
- Plug & Play installation
- High quality audio
- Maintenance free

1.2 Physical Description

The Front panel of the CGW-TS contains:

- Power LED (Green)
- Status LED (Red)
- 4 Received Signal Level LEDs (Yellow)

The Bottom to the CGW-TS contains:

- Antenna connector
- Trunk interface connector
- Power Supply connector
- SIM release lever
- SIM card tray



2 Installation

Please read the following sections carefully before installing the CGW-TS. Improper installation of the unit can cause it damage and may invalidate its warranty.

2.1 Pre-Installation

Your CGW-TS contains a GSM engine, which requires a SIM card from a local GSM network operator. You register the SIM card with the GSM operator the same way you normally register a new mobile GSM phone with the network operator.

The PIN code request must be OFF. You can set it to OFF by inserting it into any GSM mobile phone, or bring it to your local GSM Service Center.

Before you install the SIM card, disable all Call Forwarding modes (in the event of busy signal, absence, unavailability, etc.) and Call Waiting from the GSM operator.

2.2 Inserting the SIM Card

Follow these steps to properly insert the SIM card into your CGW-TS:

1. Hold the unit with the LEDs pointed *down* and the SIM insertion slot at the bottom of the unit *facing you*.
2. Use a pointed screwdriver to push the yellow SIM release lever, so that the SIM card tray moves towards you.
3. Remove the tray and place the SIM card inside (it will only fit in the tray one way).
4. Carefully replace the tray with the SIM card in the slot with *contacts facing up* and slide it back inside.

2.3 Installing the CGW-TS

Follow these steps to properly install the CGW-TS:

1. On the bottom of the unit, insert the antenna in the “Ant.” Connector.
2. Mount the CGW-TS on the wall as a stand-alone unit.

The best location of the antenna is in an unrestricted high location. The LEDs indicate the level of GSM reception. The signal strength is updated every 15 seconds. Experiment to find the strongest signal. For more tips on where to place the antenna, see page 14.

3. Connect the analog trunk interface of the PBX to the “TRUNK” line connector on the bottom of the unit.
4. Connect the supplied 9V DC adaptor to the unit. Plug it in the power supply.
5. The CGW-TS will begin initialization and registration. At the end of the process, the LEDs will display the GSM signal status.

For details on programming the CGW-TS, see Chapter 4.

3 LED Status Indicators and Diagnostics

When you power-up the CGW-TS, the LEDs provide you with the first diagnostics. In most cases further diagnostics are not needed.

To perform further diagnostics, connect an analog telephone with an RJ-11 connector to the trunk connector in the unit. For details on how to perform further diagnostics, see page 13.

Note that LED 1 is located at the bottom of the Signal Level column and LED 4 is located at the top.



3.1 LED Activity Status Indicators

LED Status Indicators						
Description	LED1 <i>Yellow</i>	LED2 <i>Yellow</i>	LED3 <i>Yellow</i>	LED4 <i>Yellow</i>	Power <i>Green</i>	Status <i>Red</i>
Standby Mode	On	On	On	On	On	On
Conversation	On	On	On	On	On	Flashing fast
Incoming Call	On	On	On	On	On	Flashing fast
Outgoing Call	On	On	On	On	On	Flashing fast
Programming Mode	Off	Off	Off	Off	Flashing	Off

3.2 LED Error Status Indicators

LED Status Indicators						
Description	LED1 <i>Yellow</i>	LED2 <i>Yellow</i>	LED3 <i>Yellow</i>	LED4 <i>Yellow</i>	Power <i>Green</i>	Status <i>Red</i>
GSM engine problem	Flashing	Flashing	Flashing	Flashing	Flashing	Flashing
Solution	Refer to your local supplier					
No Signal or Signal low (less than 25%)	Flashing	Off	Off	Off	On	Off
Solution	Check your antenna connection or move your antenna to a location with a better reception or enable your roaming parameter (See Diagnostics)					
Registration denied	Flashing	Off	Off	Flashing	On	Off
Solution	Contact your local GSM operator or enable your roaming parameter (See Diagnostics)					

LED Status Indicators						
Description	LED1 <i>Yellow</i>	LED2 <i>Yellow</i>	LED3 <i>Yellow</i>	LED4 <i>Yellow</i>	Power <i>Green</i>	Status <i>Red</i>
PIN error	Off	Flashing	Off	Off	On	Off
Solution	Dial your SIM card's PIN code using your phone extension. Once entered using the phone, the unit will remember the PIN code. Alternatively, you can remove the SIM card from the CGW-TS and disable the PIN number using your mobile phone, then put it back inside the unit.					
SIM card is not readable	Off	Off	Flashing	Off	On	Off
Solution	Check the SIM position or replace the SIM card or contact your local operator					
No SIM card inserted	Off	Off	Off	Flashing	On	Off
Solution	Insert the SIM card					

3.3 Diagnostics

You can perform additional diagnostics by connecting a 4-pin RJ-11 connector from the analog telephone to the trunk connector of your CGW-TS.

To begin diagnostics, pick up the phone's receiver. If you hear:

- **Continuous dial tone:** the unit is working correctly and you can now start to program it.
- **Busy tone:** Check which LEDs are lit and find the error in Section 3.2. You cannot program the unit until you get a continuous dial tone.
- **No dial tone:** The GSM network signal is too low to complete registration. Remove your SIM card and replace it with a card from a GSM network that provides a higher signal level. Enable the roaming parameter (see page 18), then replace the SIM card with your original SIM card.

Note that all cellular calls you now make from your CGW-TS will be routed through the alternate GSM network that you used to complete your registration.

3.4 Antenna

Some locations that you set up your CGW-TS can provide only a low signal level. To improve the signal level, the technician should try the following:

- Put the antenna near a window.
- Replace the supplied antenna with one having a better Gain (7 dB).
- Replace the supplied antenna with an outdoor one and place it outside the building.
- Place a metal plate under the foot of the antenna (minimum size: 10 x 20 cm – maximum size: 40 x 55 cm).
- Place the antenna on a different floor. If you do this, you may also want to move the unit with the antenna and connect a cable between the unit and the PBX.
- Verify that the distance between the antenna and any surrounding antennas is at least 35 cm.
- Position the antenna vertically and pointing upwards.

4 DTMF Programming

You can program your CGW-TS via DTMF as follows:

1. If the unit is connected to the PBX, remove the cable from the “Trunk” interface connector of the unit.
2. Connect an analog telephone directly to the “Line” interface connector of the unit.
3. Verify that the SIM card is properly installed and the power supply is connected.
4. Pick up the phone, wait for the dial tone to make sure the unit is working correctly, then dial *900.
5. After you hear the confirmation tone, enter the password (default=1234).

- To exit from the Programming mode, dial *900 or hang up the telephone.
- If you do not enter digits for 45 seconds, the unit will automatically exit the Programming mode.
- When you enter an *incorrect* command, the CGW-TS will “beep” an alert **one time**.
- When you enter a *correct* command, the CGW-TS will “beep” an alert **two times**.

4.1 DTMF Programming Commands

Operation	Command	Default
Enter Programming Mode	*900 + XXXX where: XXXX = Password (1234 default)	1234
Exit Programming Mode	*900	
Maximum number of digits to be dialed by the CGW-TS Notes: When dialing a number: If you enter Less than XX digits, the CGW-TS will time-out for 3 seconds (default) before the dialing starts If you enter exactly XX digits, the CGW-TS immediately dials the number If you enter more than XX digits, the CGW-TS will cut off the number after it reaches XX.	*300 + XX where: XX = 05-20 (digits)	Default Max#=11 Tip: Set the default to your country's maximum cellular telephone length.

Operation	Command	Default
<p>Time-out value</p> <p>This defines how long the CGW-TS waits before dialing a number that is shorter than the Maximum Number of Digits defined with *300.</p>	<p>*310 + X where: X = 2 – 9 (seconds)</p>	3 seconds
<p>Reverse Polarity</p> <p>The CGW-TS may be setup to send a "reverse polarity" signal to the PBX, in case a "call answer" is detected. This parameter is useful if call accounting software is active on the PBX.</p>	<p>*320 + X where: X = 0 – 2 0 = No reverse polarity 1 = Reverse polarity only on Outgoing calls 2 = Reverse polarity for Incoming and Outgoing calls</p>	2
<p>Audio Volume Control</p> <p>The higher the Audio Volume Control parameter, the louder the audio will be.</p>	<p>*330 + X where: X = 0 – 9 (9 is highest)</p>	5
<p>Conversation Time-Out</p> <p>The telephone conversation will be automatically terminated after this time-out.</p>	<p>*390 + XX where: XX = number of minutes 00 = unlimited</p>	00 (unlimited)

Operation	Command	Default
<p>Prefix Blocking List</p> <p>The CGW-TS will disconnect the line if the user dials a restricted area code/country code. Up to 10 prefixes with a maximum of 4 digits can be defined.</p>	<p>*400 + XX + YYYY + # where: XX = 01 – 10 (list number of restricted prefixes) YYYY = Restricted digits (0 – 9, *, #)</p>	None
<p>Delete Prefix Blocking List</p>	<p>*400 + XX + # (delete a specific list number) or *400 + # (delete the whole restricted number list)</p>	None
<p>Roaming</p> <p>When roaming is ON, the CGW-TS can register with another GSM operator. When roaming is OFF, the CGW-TS can only register with the predefined GSM operator.</p>	<p>*500 + X where: X = 0, off X = 1, on</p>	0

Operation	Command	Default
<p>CLIR (Calling Line Identification Restriction)</p> <p>When this parameter is 0 (OFF), the CGW-TS shows its SIM telephone number to the called number. When the parameter is 1 (ON), the number will not be shown.</p>	<p>*550 + X where: X = 0, off X = 1, on</p>	<p>0</p>
<p>Change Programming Password</p>	<p>*600 + new password where: password must be 4 digits (only digits 0-9)</p>	<p>1234</p>
<p>Reset Unit with Default Values</p>	<p>*151</p>	

5 Technical Data

Model	CelluLine CGW-TS GSM Gateway
GSM Network Type	GSM Phase II
GSM Module	Integrated dual-band (900/1800, 850/1900 MHz)
SIM Card	Plug-in, 3V, small
Transmission Power	Max. 2W / 900MHz Max. 2W / 850MHz Max. 1W / 1800MHz Max. 1W / 1900MHz
Receiver Sensitivity	-104 dBm
Connections	To analog trunk interface of PBX – RJ-11 (Trunk) (operational mode) To analog telephone – RJ-11 (Trunk) Power Supply Antenna – SMA Female
Off-hook AC Impedance	600Ω
On-hook Line Voltage	48VDC
Off-hook Line Current	Maximum 25mA

Off-hook Loop Resistance Threshold	800Ω
Dial Tone Frequency	400Hz
Ringing Voltage	48Vrms, 25Hz
Supported Dialing Type	DTMF
Antenna	50Ω Impedance, connected via SMA connector Frequency 800-1900MHz-2.5dB
Antenna Cable Length	3m (9.8ft)
Power Supply	Input: 110VAC, 60Hz 220VAC, 50Hz Output: 9VDC, 800mA
Temperature Range	0°C-45°C 32°F-113°F
Maximum Relative Humidity	95%
Dimensions (HxWxD)	160x145x30mm / 6.3x5.7x1.2inch



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