ITS Telecom

CGW-T4

Installation and Operation Guide

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CGW-T4

Installation and Programming Manual

Pre-Release 1, Revision 1, September 2008 (Preliminary version)

NOTICE

This manual describes the CGW-T4 Analog GSM/CDMA Cellular Gateway.

ITS reserves the right to modify the hardware and software described in the manual without prior notice. However, changes made to the hardware or software described does not necessarily render this publication invalid.

WARRANTY

In the event that the product proves to be defective in workmanship or materials within a period of one year from date of shipment, ITS shall repair or replace the product at its discretion. Transportation will be the responsibility of the dealer/distributor.

Under no circumstances shall ITS be liable for consequential or special damages, loss of revenue or user/dealer expenses arising out of or in connection with the use or performance of the product, whether based on contract, tort, or any other legal agreement.

The following shall void the above warranty: malfunctions resulting from fire, accident, neglect, abuse, or acts of God; use of improper electrical power; or repair of, tampering with or alteration of the product by anyone other than ITS authorized personnel.

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1 Introduction

Your new CGW-T4 is an analog 4 ports GSM/CDMA Cellular Gateway, a cost reduction tool for mobile-to-landline and landline-to-mobile calls. It connects from the trunk interface (analog FXO) of your PBX to a GSM network (via the inserted SIM card) or to a CDMA network (by the built-in CDMA engine), eliminating the excessive interconnection fees and significantly cutting your telephone costs.

The Automatic Route Select table (ARS) in the PBX defines which calls will be automatically routed via the CGW-T4 to the predefined GSM/CDMA network. In doing so, the CGW-T4 gateway reduces the company's telephone costs.

Integrated with the PBX analog trunk interface CGW-T4 provides Reverse Polarity and Loop disconnection signaling for to release disconnected call.

Installation of the CGW-T4 does not require special skills. Simply insert the SIM card (GSM networks only), connect the unit to the PBX trunk interfaces, attach the antennas and power supply, and your CGW-T4 can immediately start saving money for you. The unit has an LCD display for each channel, which shows the GSM/CDMA operator's name, the signal strength and other useful call progress information.

A number of additional parameters for the CGW-T4, such as Output Audio Volume level setting, Conversion time-out and Restricted Digits, can be programmed via DTMF separately for each channel.

The CGW-T4 unit displayed in Figure 1.

Figure 1. CGW-T4 Devices

1.1 Main Features

The following is a list of Main Features of the CGW-T4 GSM/CDMA gateway:

- Integrated dual-band GSM module (900/1800, 850/1900 MHz) or Integrated dual-band CDMA module (800/1900 MHz)
- 4 Built-in LCD's for each cellular channel
  - Signal strength indicator
  - Cellular operator name indicator
  - Operational status
- DTMF programming
  - Administrator password protection
  - Call Barring (Toll Restriction)
  - Maximum number of digits allowed to dial
  - Conversation Time-Out
  - Reverse polarity signaling support
  - Audio Volume control
  - Roaming Control (GSM only)
  - CLIR/CLIP (GSM only)
- Supports DTMF dialing
- 4 Line interfaces, 2-wire (RJ-11 connectors)
- Plug & Play installation
- High voice quality
- Maintenance free

1.2 Contents

The contents of your CGW-T4 package are as follows:

No.	Item	Qty.
1.	CGW-T4 device	1
2.	CD with Installation and Operation Manual	1
3.	Power Supply (Input: 110VAC, 60Hz or 220VAC, 50Hz) (Output: 9VDC, 5A)	1
4.	SMA Cellular 2,5 dB Antenna (with cable)	4
5.	RJ-11 telephone cable	4
6.	Metal brackets for the 19-inch rack or wall mounting	2
7.	Screws and plugs for mounting	4

2 Physical Description

The physical features of the CGW-T4 are detailed in Figure 2.

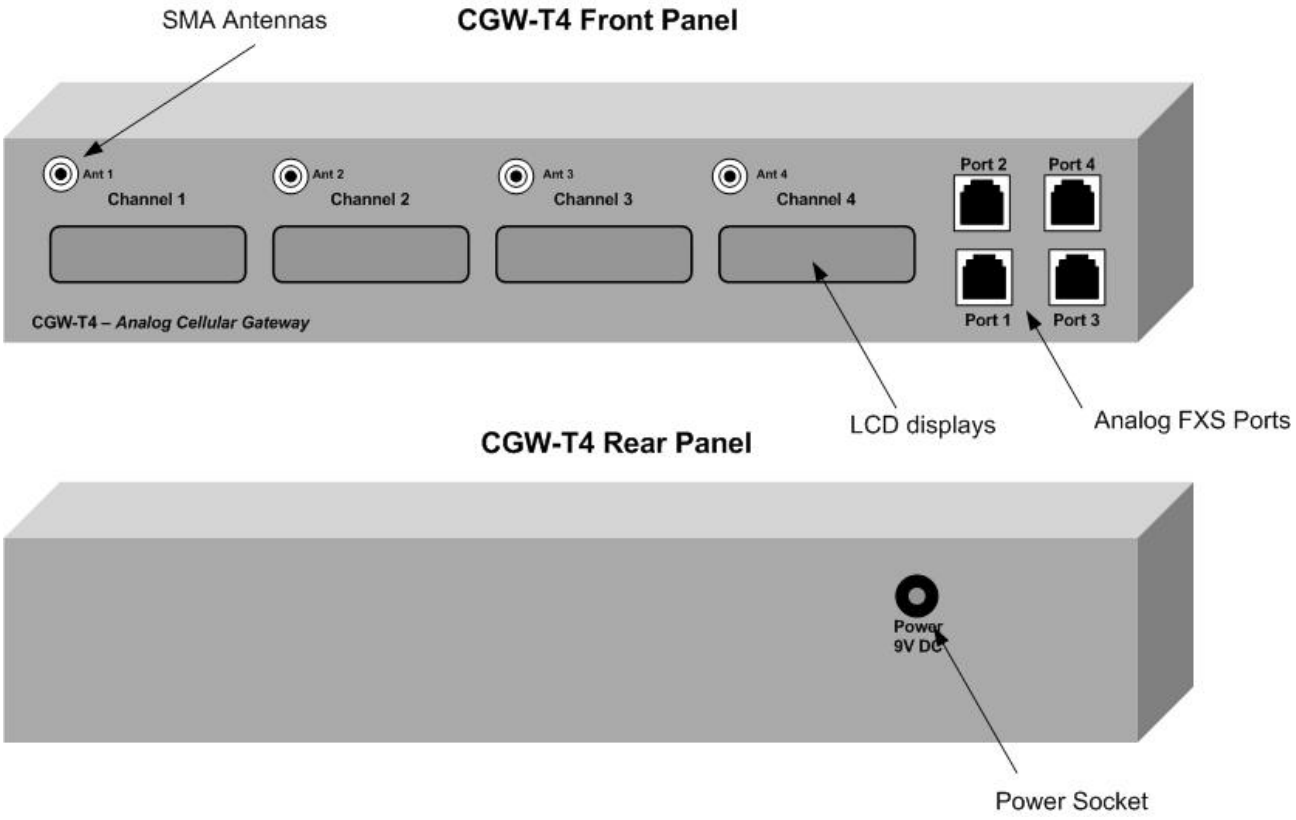

Figure 2. CGW-T4 Physical Description

CGW-T4 front panel includes :

- FXS analog telephone interfaces RJ-11 sockets
- LCD displays for each cellular channel
- Cellular Channel's SMA antennas

CGW-T4 rear panel includes:

- The Power supply socket

CGW-T4 side panel's includes 2 pairs SIM card holders.

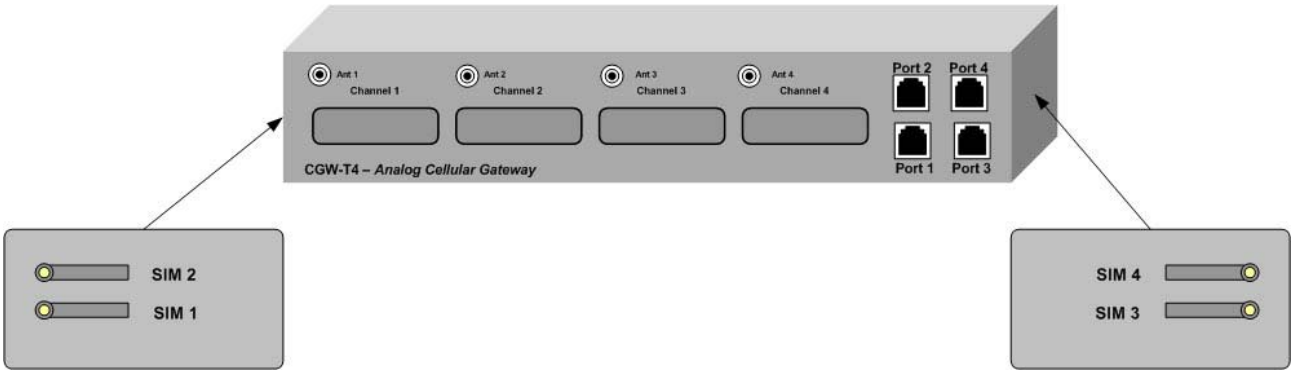

Figure 3. SIM cards holders

3 Pre-Installation

3.1 GSM Cellular Channels

The CGW-T4 unit contains a GSM engines. It therefore needs a SIM cards from the local GSM network providers. Its registration to the GSM operator is similar to the registration of a mobile GSM phone.

3.2 CDMA Cellular Channels

The CGW-T4 (CDMA) contains a CDMA engine that needs to be activated via a local CDMA network provider. You register the engine the way you would normally register a mobile CDMA phone.

NOTE

It is recommended that you disable all call forwarding modes (in the events of busy, absence, unavailability, etc.) and Call Waiting from the GSM/CDMA operator, before installing the SIM card (GSM network), or activating the CDMA unit.

4 Installation

4.1 SIM Card Insertion into the Unit (GSM channels only)

CAUTION

To avoid damage to the CGW-T4 unit, disconnect the 9V adapter from the electric power outlet.

The physical description of the unit can be used as guideline for the following steps:

SIM card's holders can be found on the right and left lateral surfaces (See Figure 3). Each SIM card holder marked with the corresponded cellular channel's number

Using a screwdriver, push the yellow SIM release lever, so that the SIM card tray moves towards you.

Take out the tray. You will see that the SIM card fits in the tray in one way only.

Carefully place the tray with the SIM card in the slot and slide it in with the SIM card contacts facing down.

4.2 CGW-T4 Installation

To install the CGW-T4 unit, perform the steps as follows:

- Mount the CGW-T4 unit in the 19-inch rack or on the wall by using installation brackets or place the unit on the horizontal surface.
- Connect the antennas into the 'Ant.' SMA connectors on the front panel of the CGW-4 unit.
- Connect the analog trunk interface of the PBX to the port sockets on the front panel of the CGW-T4 unit.
- Connect the power supply to the CGW-T4 unit. The unit will start the initialization and registration. At the end of the process, the LCD's will display the signal status of each cellular channel.

NOTE

Adjust the antenna location until an optimal signal level is received. The signal level indicates on the LCD display.

Figure 4. CGW-T4 Schematic Setup displays the schematic setup of the CGW-T4 unit.

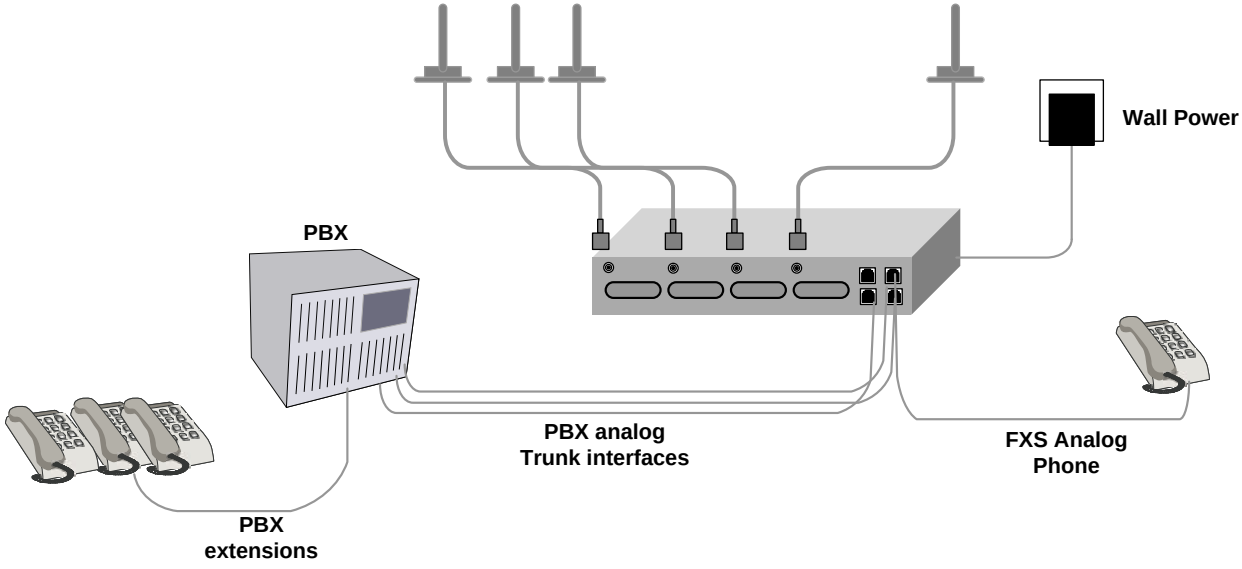

Figure 4. CGW-T4 Schematic Setup

5 LCD Status Indicators and Diagnostics

5.1 CGW-T4 LCD Status Indicators and Diagnostics

The CGW-T4 Gateway can be connected to the analog trunks interface of the PBX or directly to the analog home phone. At power-up of the CGW-T4 unit, the information on the LCD will provide the first diagnostics. In many cases further diagnostics is not needed. By connecting an analog telephone with the RJ-11 connector to the appropriate port's socket in the unit, you are able to perform further diagnostics.

5.1.1 LCD Status Indicators

The following table shows the messages appearing on the LCD, their description and the action to be taken (if any).

LCD Message	Description	Action
Searching Network…	Searching for the mobile network.	No action needed.
Ver:CGWT4_XX	Displays the firmware number	No action needed.
Enter PIN code (GSM only)	CGW-T4 needs the PIN code to activate the SIM card.	1. Connect an analog telephone to the unit and enter the code. (4-8 digits. Add a # to the code when using less than 8 digits) 2. Alternatively, insert the SIM into your mobile phone and disable the security option.
Enter PUK code (GSM only)	CGW-T4 received 3 times an incorrect PIN code.	Request the PUK code from your local GSM operator and enter it into the CGW-T4.
Registration…	Registration process after the mobile network has been found.	Wait till registration phase is finished.
S=X %	LCD shows signal level in intervals of 20% (20%, 40%, 60%, 80%, 100%).	If 20% or No signal, move the antenna to another location with a better reception.
Name operator	Name of Operator (read from mobile network).	No action is needed.
Calling…	CGW-T4 dials to destination.	Wait.
Connected	When called party answers.	No action needed.
Disconnected	End of call.	No action needed.
Incoming Call	CGW-T4 gets a call from network.	No action needed.

LCD Message	Description	Action
Failed	CGW-T4 receives incorrect operation information from the mobile network.	Try again.
Engine Problem	GSM/CDMA engine problem.	Power off and on the unit. If error is repeated, the unit is faulty.
No Signal	No Signal or Signal low (less than 20%).	1. Check your antenna connection. 2. Move your antenna to a location with a better reception. 3. Check with your GSM operator.
Reg. Denied	Registration denied and/or SIM card is not readable.	Replace the SIM card. Contact your GSM operator.
Insert SIM Card (GSM only)	No SIM card inserted.	Insert SIM card.

5.1.2 CGW-T4 Diagnostics

Perform the diagnostic procedure as follows:

- Connect an analog telephone directly to the required port socket (RJ-11) on the unit front panel.
- Pick up the handset and listen to the dial tone:
- A continuous dial tone indicates that the unit is working correctly and ready for programming.
- A busy dial tone indicates that there is a fault. Check the appropriate LCD display for a message.

6 DTMF Programming

The CGW-T4 Gateway can be programmed via DTMF commands.

NOTE

Each Analog-Cellular channel required the separate programming procedure.

To program the cellular channel perform the steps as follows:

- If the unit is connected to the PBX, remove the cable from the appropriate RJ-11 port socket on the unit front panel.
- Connect an analog telephone directly to the required RJ-11 port . (1,2,3 or 4)
- Pick up the handset, hear the dialtone and Dial *900 then enter the password (1234 by default).
- Use the commands in the following table for programming.

NOTE

The CGW-T4 cellular channel will not answer incoming calls when programming mode is active.

Exit from the programming mode by *900 (Recommended) or hanging up the telephone.

If you do not enter digits for 45 seconds, the channel will automatically exit the programming mode.

When entering an incorrect command, you will hear a beep.

When entering a correct command, you will hear two beeps.

6.1 DTMF Programming Commands

Operation	Command	Default
Enter the Programming mode	*900 + XXXX where: XXXX = Password (1234 default)	1234
Exit the Programming mode	*900	
Maximum number of digits to be dialed by the CGW-T4 Note: Less than XX digits – there will be a time-out of 3 seconds (default), before the dialing starts. Exactly XX digits – the number will be dialed directly. More than XX digits – the number will be cut off after XX has been reached.	*300 + XX where: XX = 05-20 (digits)	11 (Tip: set the default to country's max. telephone number length.)
Time-out value in seconds. This defines how much time the unit waits before dialing the number shorter than the maximum number of digits defined with *300).	*310 + X where: X = 2 - 9	3 (sec.)
Reverse Polarity The unit may be set up to send a "reverse polarity" command to the PBX, in case a "call answer" is detected. This parameter is useful if call accounting software is active.	*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	2
Output Volume Control	*330 + X where: X = 0 – 7 (CDMA) X = 0 – 9 (GSM)	5
CGW-T4 Telephone Number Enter the SIM telephone number to be displayed on the LCD during power-up of the unit. (GSM only)	*350 + Number + # where: Number = SIM Telephone number (up to 15 digits)	None

Operation	Command	Default
DTMF support option (CDMA only)	*350 + X, where: X = 1 enabled; X = 0 disabled	
Verification of the Telephone Number Display the SIM telephone number on the LCD for 5 seconds when in programming mode. (GSM only)	*360	
Conversation Time-Out The telephone conversation will be automatically terminated after this time-out.	*390 + XX where: XX = number of minutes 00 = unlimited	00 (unlimited)
End Dialing Digit Define "#" as the digit that indicates the end of a dialed number, causing the unit to immediately start dialing. (GSM only)	*370 + X where: X = 0 End dialing digit disabled X = 1 End dialing digit enabled ("#" indicates end of number)	1
Pulse drop (Loop Disconnect) Activate the pulse drop feature by defining time for loop disconnect for conversation end state signaling to PBX.	*380 + XX where: XX = time in tenth of seconds. For example: X = 10=1000 milliseconds = 1 second X = 01 = 100 milliseconds Legal values: 00-99 Note: If this feature is activated together with reverse polarity (*320) 'Pulse drop' occurs after polarity is reversed.	00 (Feature disabled)
Call barring (number of restricted numbers reduced to 8).	*400 + XX + YYYY + # where: XX = 01 to 08 (list number of restricted numbers) YYYY – up to 4 digits (0-9) restricted prefix	None

Operation	Command	Default
Delete Call Barring (Toll Restriction).	*400 + XX + # (delete a specific list number) or *400 + # (delete the whole restricted number list)	None
Cellular Engine Reset Interval Define the interval, in hours, between cellular channel resets. Reset is always performed when the unit is in Idle mode. Reset affects the GSM engine only, and does not affect any of the parameters.	*450 + XX where: XX = number of hours between resets (01 to 99; 00 indicates no reset at all)	00 (reset disabled)
Roaming The unit will be able to register with another GSM operator. (GSM only)	*500 + X where: X = 0, off X = 1, on	0
CLIR (Calling Line Interface Restriction) The CGW-T4 can be restricted to show its SIM telephone number. (GSM only)	*550 + X where: X = 0, off X = 1, on	1 – Basic version. In some types the default is 0 – contact your local distributor.
Change programming password	*600 + new password where: password must be 4 digits (only digits 0-9)	1234
Reset the unit and set to default values	*151	

7 Technical Data

7.1 CGW-T4 Channels for GSM Network

Model	CGW-T4 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
Connectors	▪ RJ-11 (Trunk) – to analog trunk interface of PBX ▪ Power Supply ▪ SMA female - Antenna
Off-hook AC impedance	600 Ω
On-hook line voltage	48 VDC
Off-hook line current	Maximum 25 mA
Off-hook loop resistance threshold	800 •
Dial tone frequency	400Hz
Ringing voltage	48Vrms, 25Hz
Supported dialing type	DTMF
Antenna	50 Ω Impedance, connected via SMA connector frequency 800 - 2000MHz
Antenna cable length	3m 9.8ft
Power supply	Input: 110VAC, 60Hz 220VAC, 50Hz Output: 9VDC, 5A
Temperature range	0˚C-45˚C 32˚F-113˚F
Maximum relative humidity	95%

Dimensions	L x W x H 433 x 174 x 64 mm / 17,0 x 6,85 x 2,51 inch
Weight	2,8 kg

7.2 CGW-T4 Channels for CDMA Network

Model	CGW-T4 CDMA Channel
CDMA Network Type	CDMA, CDMA 1X
CDMA Module	Integrated dual-band Tri-Mode (CDMA 1X 800/1900MHz, AMPS 800MHz)
Transmission Power	Max 800MHz = 1/4W
Receiver sensitivity	Digital <-104 dBm Analog <-116 dBm
Connections	▪ To analog trunk interface of PBX – RJ-11 (Trunk) (operational mode) ▪ To analog telephone – RJ-11 (Trunk) (programming mode) ▪ Power Supply ▪ Antenna
Off-hook AC impedance	600 Ω
On-hook line voltage	48VDC
Off-hook line current	Maximum 25mA
Off-hook loop resistance threshold	800 Ω
Dial tone frequency	400Hz
Ringing voltage	48Vrms, 25Hz
Supported dialing type	DTMF
Antenna	50 Ω Impedance, connected via SMA connector frequency 800/1800/1900MHz
Antenna cable length	2m
Temperature range	0˚C-45˚C 32˚F-113˚F
Maximum relative humidity	95%