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2 & 4 Port VoIP Gateway User's Manual

FCC Notice

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed in accordance with the instruction manual, may cause harmful interference to radio communication. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at the user's own expense.

CE Declaration of conformity

This equipment complies with the requirements relating to electromagnetic compatibility, EN 55022 class A for ITE and EN 50082-1. This meets the essential protection requirements of the European Council Directive 89/336/EEC on the approximation of the laws of the Member States relating to electromagnetic compatibility.

Trademarks

All brand, company and product names are trademarks or registered trademarks of their respective companies.

How to Use This Manual

This manual was designed for the technical and non-technical users of the Internet telephony gateway (ITG). It contains information about the functions of the ITG and instructions for its installation, basic configuration and operation in Part I, and Part II introduces more advanced command line interface, firmware upgrade and appendix information. Read this section carefully for important information about the manual's organization.

Part I

Chapter 1: Overview

This chapter provides conceptual overview and description of the ITG, explanation of how the ITG interacts with each for enabling VoIP services, and an overview of the required tasks

Chapter 2: Installing the ITG

This chapter describes required steps to properly and safely install and configure the ITG on your network

Chapter 3: ITG Concepts

This chapter gives information about the ITG technology and describes basic concepts using ITG for providing telephony services over IP network

Chapter 4: Configuring ITG from Web Browser

This chapter explains procedures for configuring the ITG from a web browser

Chapter 5: Making a Call with ITG

This chapter explains how to make Internet calls from telephony devices connected to the ITG directly or indirectly.

Chapter 6: Application Samples

This chapter provides some application examples and information on how to configure the ITG under these samples.

Chapter 7: Troubleshooting Tips

This chapter provides troubleshooting information in case the user has problems installing or maintaining the ITG.

Part II

Chapter 8: Command Line Interface

This chapter describes how to access the command line interface. It also contains information about the commands used to configure the ITG.

Chapter 9: Upgrading the ITG

This chapter explains how to download new revision software and upgrade the ITG.

Appendix A: Technical Specifications

This appendix lists the ITG specifications and the assignment of pins of all the interface ports.

Appendix B: CLI Commands

This appendix provides a short description of each CLI command with a reference to the pages that contain detailed information on the command.

Appendix C: Factory Default Settings

This appendix lists factory settings of the ITG.

Appendix D: Worksheets

This appendix provides some work sheets that you may use before configuring the ITG.

Important Safety Instructions

Before you plug the ITG into an electrical outlet, carefully read all the installation instructions in Chapter 2.

For your own safety and the safety of your equipment, always take the following precautions:

- Follow instructions and warnings in the documentation.
- Never push any object through the fan vent or other openings in the equipment. Such action may produce a short circuit, causing fire, electric shock, or equipment damage.
- Keep the ITG away from all chemicals and sources of liquids.

Warning

- Connection of the RJ45 connector from an ITG to TNV circuits can cause permanent damage to the ITG.
- Incorrectly connecting telephony devices to the RJ11 port on the Telephony Interface Module can cause permanent damage to the module.

Documentation Abbreviations

Throughout this guide, the user will come across a number of abbreviations that are common throughout the industry. The user should be familiar with the following abbreviations:

ATPM	Address Translation and Parsing Manager
CLI	Command Line Interface
DSP	Digital Signal Processor
DTMF	Dual Tone Multi-Frequency
FXO	Foreign Exchange Office
FXS	Foreign Exchange Subscriber
H.323	ITU specification for multimedia transmission over IP networks
ICMP	Internet Control Message Protocol
IMTC	International Multimedia Telecommunications Consortium
IP	Internet Protocol
ITG	Internet Telephony Gateway
KTS	Key Telephone System
LAN	Local Area Network
NVS	Non-Volatile Storage
LED	Light Emitting Diode
PBX	Private Branch Exchange
PSTN	Public Switched Telephone Network
RTP	Real-Time Transport
TCID	Telephony Channel Identifier
TFTP	Trivial File Transfer Protocol
TIM	Telephony Interface Modules
TNV	Telephone Network Voltage
UDP	User Datagram Protocol
UTP	Unshielded Twisted Pair
VAD	Voice Activity Detection
WAN	Wide Area Network

Notation Conventions

Throughout this guide, different type styles and characters are used. These serve a variety of purposes as described below:

Convention	Description
boldface	Commands and keywords are in **boldface.**
italic	Arguments for which you supply values are in italics.
courier	Messages that the ITG CLI displays are in plain courier font.
[ ]	Elements in square brackets are optional.
{ x | y | z }	Alternative but required elements are grouped in braces ({ }) and separated by vertical bars (|).
[x | y | z]	Optional alternative keywords are grouped in brackets ([ ]) and separated by vertical bars (|).
string	A nonquoted set of characters. Do not use quotation marks around the string or the string will include the quotation marks.

Table of Contents

Part I

List of Figures

Chapter 1 Overview

This chapter gives an overview of the 2 ports & 4 ports desktop version Internet Telephony Gateway (ITG) and a detailed description of its front panel and rear panel.

1.1 Features

The ITG is a cost-effective and highly reliable analog Voice over IP (VoIP) Gateway that offers toll quality voice and real-time fax data over IP networks. With its embedded architecture, the gateway is ideal for VoIP applications associated with Remote Office and Branch Office (ROBO) environments. With its built-in user-friendly interface, the gateway may be installed easily and conveniently to yield immediate cost savings. One Internet Telephony Gateway supports up to eight voice or Fax communications simultaneously.

Implemented with an efficient Real-Time Operating System (RTOS) and flash memory, the ITG provides upgradeable capabilities, so it may be programmed with updated firmware locally or via the network at any time. It comes equipped with remote management capabilities, configurable signaling to work with PBX, KTS, and/or telephone. The ITG utilizes advanced VoIP related technology. It includes various voice coders and fax algorithms, echo cancellation, Voice Activity Detection (VAD) , Comfort Noise Generation (CNG) , and lost packet recovery algorithms.

1.2 Networking Protocols

The ITG supports several industry-standard networking protocols required for voice communication. The following table describes these protocols.

Networking Protocol	Description
Internet Protocol (IP)	IP is a messaging protocol that addresses and sends packets across the network. To enable IP protocol, the ITG must have a static IP address, subnet, and gateway assigned to it.
Voice over IP Protocol (VoIP)	VoIP enables the ITG to transfer voice communications over an IP network. The ITG employs ITU-T H.323 protocol for setting up call with one another.
Trivial File Transfer Protocol (TFTP)	TFTP allows you to transfer files over the network. The ITG implements a TFTP client allowing you to download new revision firmware from a TFTP server. The TFTP client requires a TFTP server in your network.
Real-Time Transport (RTP)	RTP is a standard for transporting real-time data over IP network. The ITG uses RTP protocol to send digitized and compressed voice packets.

1.3 Package Contents

The contents of your product should contain the following items:

- Internet Telephony Gateway 2 port or 4 port desk top version
- 100-240V Power Adapter
- 9-pin straight through RS-232 cable
- User's guide

1.4 Front Panel

The front panel of the ITG contains a push button and LED indicators. The following figure illustrates the front panel of the ITG.

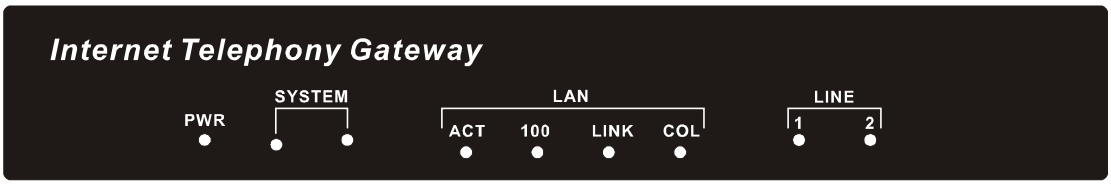


Figure 1-1 2 ports ITG Front Panel

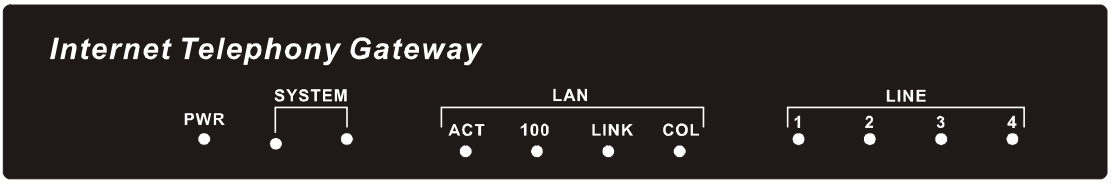


Figure 1-2 4 ports ITG Front Panel

LED Indicators

When the ITG powers on, it switches the state of COL, LNK, 100 and ACT LED indicators in red color per 200 ms in a manner shown in the following table

ACT	100	LNK	COL	Boot loader State
soild on	soild on	soild on	soild on	Execution start
blink	off	off	soild on	Memory test
blink	blink	off	soild on	Loading application code
blink	blink	blink	soild on	Loading TFTP loader code
blink	blink	blink	blink	Failed loading application code and TFTP loader
off	off	blink	off	Memory test fail

The LED indicators on the front panel display the current status of the ITG as described in the following table:

Indicator	Color	Activity	Indication
PWR	Green	On	Power is supplied to the gateway.
SYSTEM	Green	Blinking	The system is running. (Heartbeat LED)
LAN			
• ACT	Green	On	Data is presented on LAN.
• 100M	Green	On	The gateway is connected to LAN at 100Mb/s.
		Off	The gateway is connected to LAN at 10Mb/s.
• LNK	Green	On	The gateway is connected to LAN.
• COL	Green	On	Data collision is occurring on the network connection.
LINE Channels 1-4	Green	Off	The line is idle.
		On	The line is being used.
		Blinking	The line is ringing.

Reset Button

There is a push button located behind a small hole next to the SYSTEM LED. This button allows you to reset the ITG or force the ITG to enter firmware upgrade mode.

To reset the gateway, push a small, stiff object into the hole until the SYSTEM LED stops blinking, then release the button.

Powering on the gateway while pressing down the button for 5 seconds forces the ITG to enter download mode

1.5 Rear Panel

The rear panel of the ITG has two FXS ports for 2 ports ITG and four ports with two FXO and two FXS ports for 4 ports ITG. Depending on the type of the telephony interface. The telephony interface ports may be connected to telephony devices, such as PBX, KTS, and telephone sets of central office. In addition to the telephony interface ports, there is an power adapter connection hole on the rear panel.

LAN / Console Ports

The ITG is equipped with an Ethernet interface with 10/100 Mbps auto-negotiation capability. The Ethernet interface port is located on the rear panel. In addition to the Ethernet interface port, there is a 9-pin RS-232 interface port on the rear panel. Their functions are described below:

Port	Label	Function
RJ45	LAN	Connecting the ITG to a 10/100 Mbps Ethernet network
9-pin RS-232	User Console	Connecting the ITG to a VT-100 terminal or terminal emulator for configuring the ITG

Chapter 2 Installing the ITG

This chapter gives information on how to install the ITG.

2.1 Network Requirements

For the ITG to successfully operate in your network, your network must meet the following requirements:

1. A working 10/100 Base-T Ethernet. The ITG connects to Internet via an Ethernet LAN.
2. IP network that supports gateway, and subnet mask. You'll need a static IP address to assign the ITG.

2.2 Installing the ITG

Due to the ITG is used in a desktop configuration. Ensure that the ITG is placed in a clean, well-ventilated, and vibration-free environment.

When the ITG is used, be certain that the unit is placed on a sturdy, flat surface, near a grounded power outlet. At least three inches of clearance must be provided on both sides of the ITG for good ventilation.

2.3 Connecting to the telephony devices

The ITG supports two types of TIM. One is FXO and the other is FXS. 2 ports ITG supports FXS only, and 4 ports ITG supports 2 FXO and 2 FXS. Each port has RJ11 ports for connecting to telephony devices.

The FXO module is designed for connecting to PBXs or central office switches.

The FXS module is designed for connecting to analog telephone sets or G3 fax machines. Connecting the telephony devices to the appropriate RJ11 ports on the TIM.

Warning: *connection of incorrect telephony devices to the ports on the TIM can cause permanent damage to the TIM and/or the ITG.*

2.4 Connecting to the Network

The RJ45 network port on the rear panel supports 10/100 Mbps half-duplex connections to Ethernet. You can use either Category 3 or 5 straight-through UTP cable for 10 Mbps connections, but use Category 5 for 100 Mbps connections. To connect to Ethernet, insert one end of the Ethernet cable to the RJ45 port on the rear panel of the ITG and other end of the cable to an Ethernet switching hub or repeater hub.

2.5 Providing Power to the ITG

To provide power to the ITG complete the following steps:

1. Connect one end of the power cord that came with the ITG to the power receptacle on the rear panel.
2. Connect the other end of the power cord to an AC power outlet.
3. The ITG will execute the memory testing and application code automatically..

2.6 Assigning IP address to the ITG

The IP address is the unique logical address identifying each IP node, such as the ITG, on an IP network. An IP address is a 32-bit number expressed as four decimal numbers from 0 to 255 separated by periods. The ITG needs a static IP address and be aware of the subnet mask and default gateway (typically a router) of your network to be able to send to and receive data from the IP network. Consult your network manager to obtain a unique and static IP address for the ITG, the IP subnet mask and default gateway of your network, and fill out the work sheet in Appendix D before configuring the gateway. Procedures for assigning IP address, default gateway and subnet mask is available in Chapter 4.

Chapter 3 ITG Concepts

The ITG enables the transmission of voice and fax traffic over any IP network by digitizing voice and fax signals, encapsulating the information within IP packets, and then sending the packets across the IP network

3.1 How the ITG Operates

1. The TIM inside the ITG digitizes analog voice signals at 8 Kbps.
2. ITG system software handles the:
   - Capture of telephone number presented as DTMF tones.
   - Mapping the telephone number to the IP address of remote ITG.
   - Setting up calls with remote ITGs utilizing H.323 call control protocol.
   - Digitizing, compressing and encapsulating the voice into IP packets and transmission of the IP packets onto the Ethernet LAN.
3. A router attached to the LAN forwards the IP packets across the WAN, where they will be received by another ITG at the remote.
4. The process is reversed at the remote ITG.

3.2 ATPM

To allow you to easily dial a telephone or fax on the network, the ITG maps a series of dialed digits to the IP address of the remote ITG whose phone or fax you are calling. This mapping information is contained in a database inside each ITG called the dial plan.

Based on the dial plan the Address Translation and Parsing Manager (ATPM) inside the ITG translates telephony numbers to IP addresses of remote ITGs. The ATPM collects telephone number dialed by users, decides whether the dial string is part of the dial plan and, if it is, maps it a remote ITG. When the call is set up to the destination, a substring of the original dial string will be sent along to the remote ITG.

3.3 Destination

The destination is where a call is terminated. Typically, for inbound calls from IP network, the ITG terminals the call at one of the telephony ports. The destination for the call is the telephony port where the call terminated. For calls initiated from telephony ports, the ITG forward the call to a remote ITG via IP network, and the remote ITG terminal the call. The destination of the call is the remote ITG.

3.4 Hunt Group

Instead of directly mapping a phone number to a destination, the ATPM first maps the phone number to a group of destinations known as a Hunt Group. A hunt group is a group of destinations that are equivalent. For example, the customer support group of a company might have 20 people who can handle support calls. Access to customer support is through a single phone number but the next available support person is actually connected upon each incoming call. These 20 phones would be configured as a hunt group. A hunt group consists of a phone number and a list of destinations (members of the group). When an incoming phone number matches the phone number of the hunt group, the ITG attempts to terminate the call at each of the destinations in the hunt group, one at a time until a call is successfully completed.

Every destination that can be reached by dialing a phone number is a member of at least one hunt group. When an address is presented to ATPM for lookup, the output is a hunt group ID number. As a second step, the hunt group ID is presented to ATPM to get the list of members. To effectively bypass the hunt group feature, simply make a unique hunt group for each destination and one member in each hunt group.

3.5 Dial Plan

The dial plan is a database inside the ITG for the ATPM to map telephony numbers users dialed to the IP address of remote ITGs. The dial plan consists of the destination table, hunt group table and the address table. Users need to setup these tables, so that the ITG knows how to setup calls with remote ITGs.

Address Table

The address table maps a phone number to a hunt group. The table contains entries that specify the following information:

- Telephone number
- The hunt group the phone number maps to.
- The minimum number of digits to collect before the ATPM starting address lookup.
- The maximum number of digits the ATPM collects before it considers the dial string is complete.
- Number of digits forward to the destination.

Address table sample:

Address Entry	Hunt Grp_Id	Min. Digits	Max. Digits	Prefix strip	Prefix Address
200	1	3	3	0	None
201	3	3	3	0	None
899	11	3	3	0	None
8	12	3	3	0	None
0	5	1	1	0	None
03	5	10	10	2	"0"

Hunt Group Table

The hunt group table maps a hunt group to a list of destinations. Hunt group sample

Group id	Type	#Members	Member ids
1	2	1	1
3	2	1	2
5	2	1	4
11	2	1	11
12	2	1	12

Destination Table

The destination table maps a destination to a telephony port or the IP address of a remote ITG.

Destination table sample

Dest id	Mode	Destination
1	Local	PORT = 0
3	Local	PORT = 2
5	Local	PORT = 4
11	H.323	Dest = 192.168.0.55/1720 TCP
12	DNS	Dest = abc0021.dyndns.org /1720 TCP

3.6 DTMF Relay

Voice from PSTN is compressed by the ITG before sending across the IP network and then decompressed by the destination ITG. The voice coders supported by the ITG are designed for ideally compressing and decompressing human voice. If the compression / decompression process is performed on DTMF tone which needs to be conveyed across IP network, distortion might be too significant to be not cognizable in the receiving end. To overcome the shortcoming that the voice coders can not perfectly encode DTMF tone, the ITG encodes DTMF tone into special packets. The packets are then sent to the destination ITG via a separate IP connection. The destination ITG decodes the packets, generates the DTMF tone, and then sends the tone to the PSTN. The way the ITG handles DTMF tone is so called DTMF relay.

The ITG handles DTMF relay per H.323 specifications. Certain third party VoIP devices may handle DTMF relay per IMTC standard. For the ITG to interoperate with those VoIP devices, users need to specify which remote VoIP devices uses IMTC conforming DTMF relay technique. Refer to CLI command set h323 imtc_dtmf {add|del} *ip_addr* on Chapter 8 for detailed information on how to select DTMF relay mode.

3.7 Voice Codecs

Voice codecs supported by the ITG include G.711, G.723.1 5.3kbps, G.723.1 6.3kbps and G.729 AB. When setting up a call, two ITG automatically negotiate with each other until an agreed upon codec is determined.

Chapter 4 Configuring ITG from a Web Browser

This chapter explains procedures for configuring the ITG from the web browser.

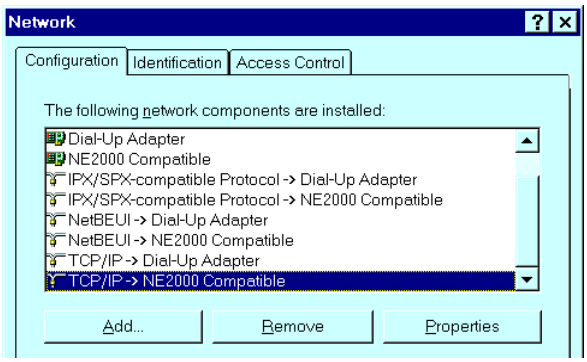
4.1 Http setting mode

This section describes the processes for setting up Internet Telephony Gateway once it has been installed. Microsoft Explorer version 4 or higher, or Navigator version 4.5 or higher can be used in this section to view and change parameters.

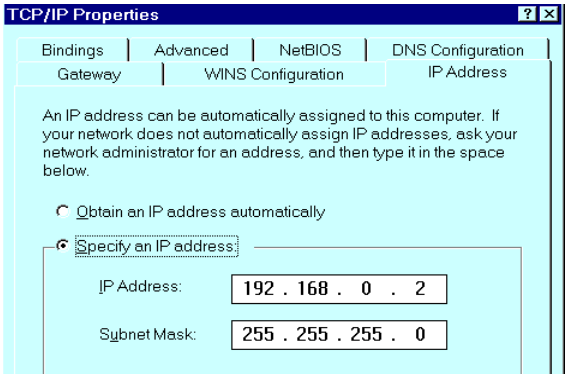
PC Setup

In order to configure the ITG, PC needs to have TCP/IP protocol and a compatible IP Address.

1. Connect the ITG to network with a RJ-45 UTP cable. Power it on.
2. Find a PC, for example, Windows 95/98. Under Windows 95/98, select the *Network Neighborhood* icon on the desktop, then select *Properties*. We will see a screen like below:



3. If a line like the one highlighted ("TCP/IP -> Network Card") is not listed , select *Add-Protocol-Microsoft-TCP/IP-OK* to add it.
4. Select *Properties* for the "TCP / IP -> Network card" entry. You will see a screen like the following:

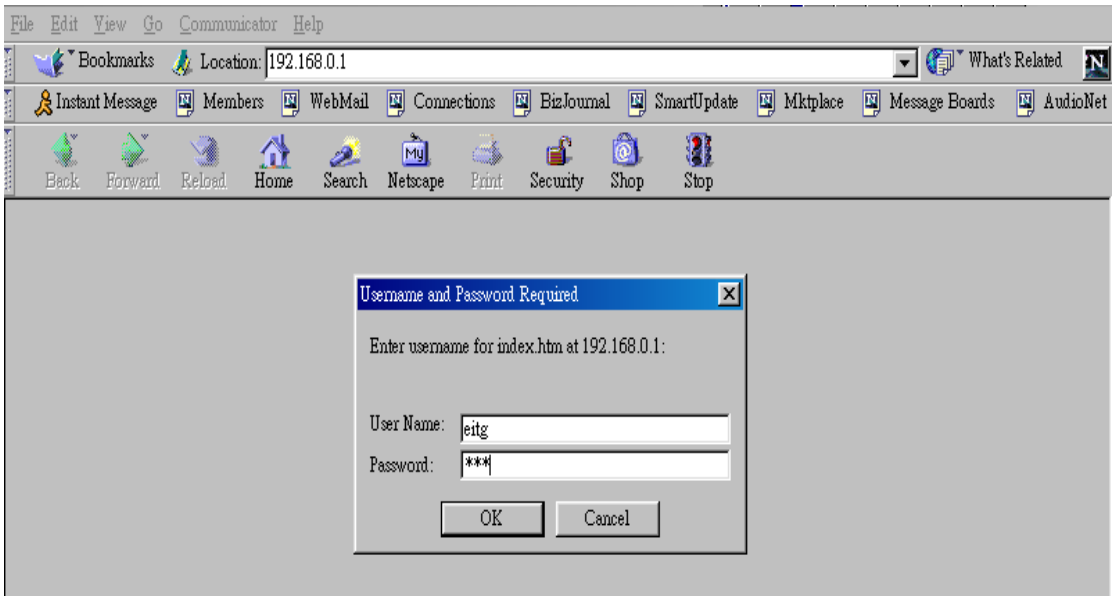


5. On the *IP Address* table, enter values as follows:

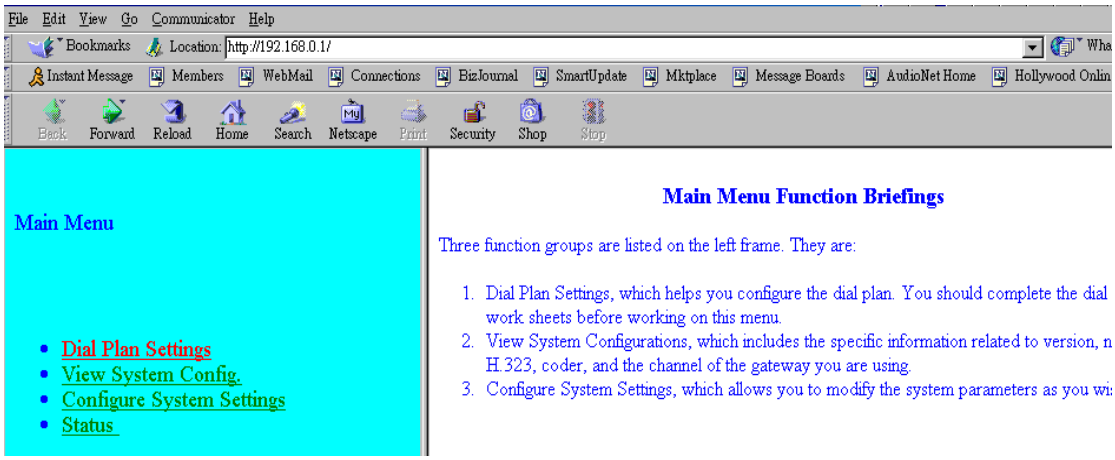
- *Specify an IP address* set ON.
- *IP Address*: 192.168.0.2
- *Subnet Mask*: 255.255.255.0

Restart your PC and Start your WEB browser.

6. In the *Address* box, enter the following:
   HTTP://192.168.0.1 (This is a default IP in the gateway from factory)
7. Press enter to confirm and you should find the screen below.



8. The User Name is **eitg** (all lower case). Password is **123**. Both **eitg** and **123** are default strings from factory. For security reasons, please change and memorize the new password after this first setup.
9. Click "OK". The main screen will appear as below.

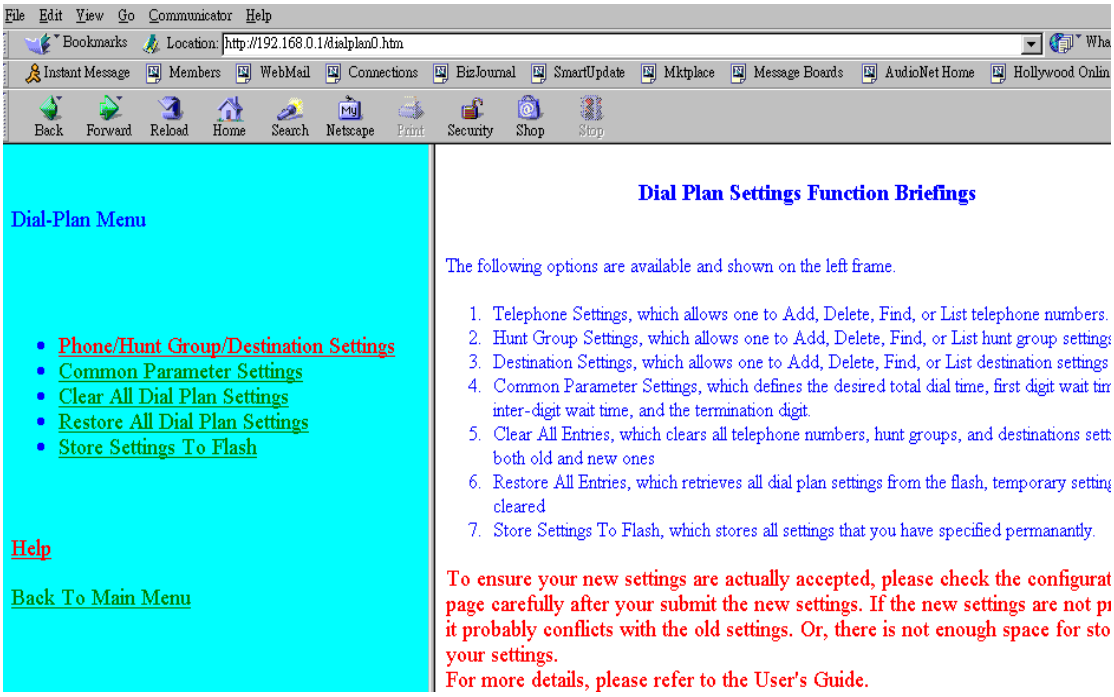


Main Menu Function Briefings

1.Dial Plan Settings, which helps you configure the dial plan. You should complete the dial plan work sheets before working on this menu.

2.View System Configurations, which includes the specific information related to version, network, H.323, coder, and the channel of the gateway you are using.
3.Configure System Settings, which allows you to modify the system parameters as you wish.

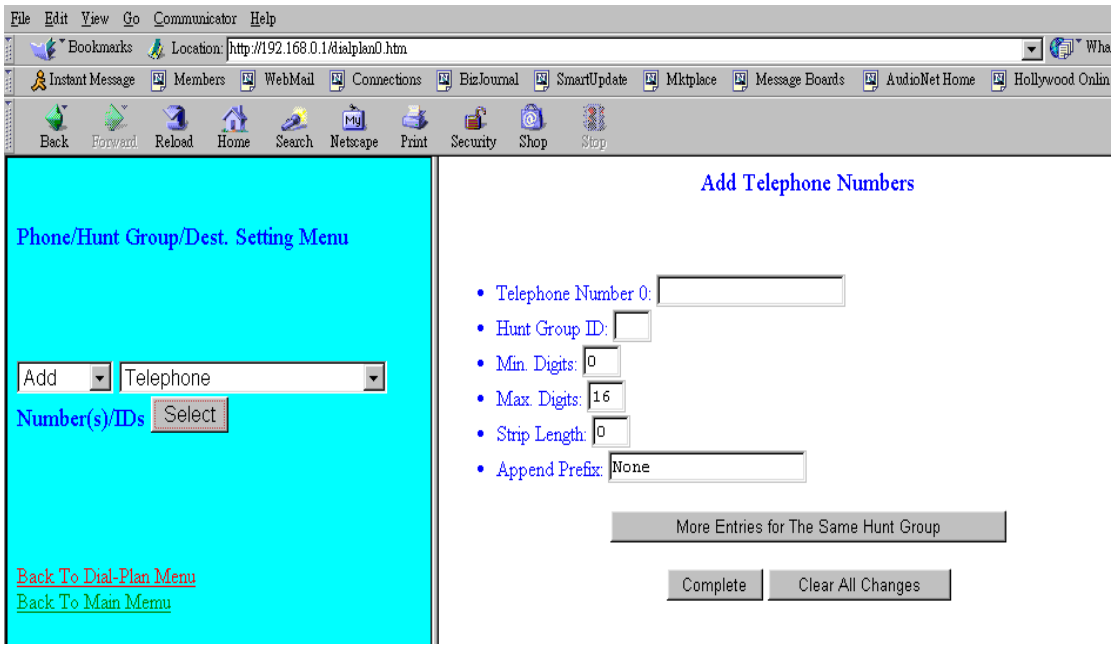
Select Main Menu\Dial Plan Settings, we can find the following Dial Plan Menu.



Dial Plan Settings Function Briefings
1.Telephone Settings, which allows one to Add, Delete, Find, or List telephone numbers.
2.Hunt Group Settings, which allows one to Add, Delete, Find, or List hunt group settings
3.Destination Settings, which allows one to Add, Delete, Find, or List destination settings
4.Common Parameter Settings, which defines the desired total dial time, first digit wait time, inter-digit wait time, and the termination digit.
5.Clear All Entries, which clears all telephone numbers, hunt groups, and destinations settings, for both old and new ones
6.Restore All Entries, which retrieves all dial plan settings from the flash, temporary settings will be cleared
7.Store Settings To Flash, which stores all settings that you have specified permanently.

To ensure your new settings are actually accepted, please check the configuration page carefully after your submit the new settings. If the new settings are not present, it probably conflicts with the old settings. Or, there is not enough space for storing your settings.

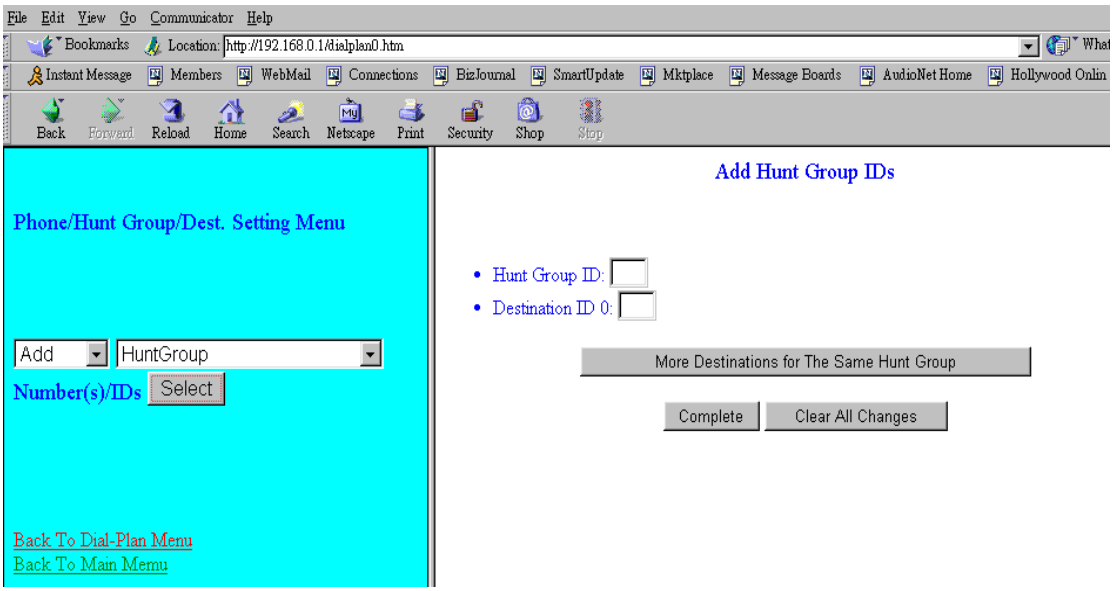
Please select Main Menu\Dial Plan\Phone/Hunt Group/Destination Settings, we can find Phone/Hunt Group/Dest. Setting Menu. We are doing ITG telephone address table management.



We can add (delete, find or list) desired telephone number mapping to hunt group at this menu.

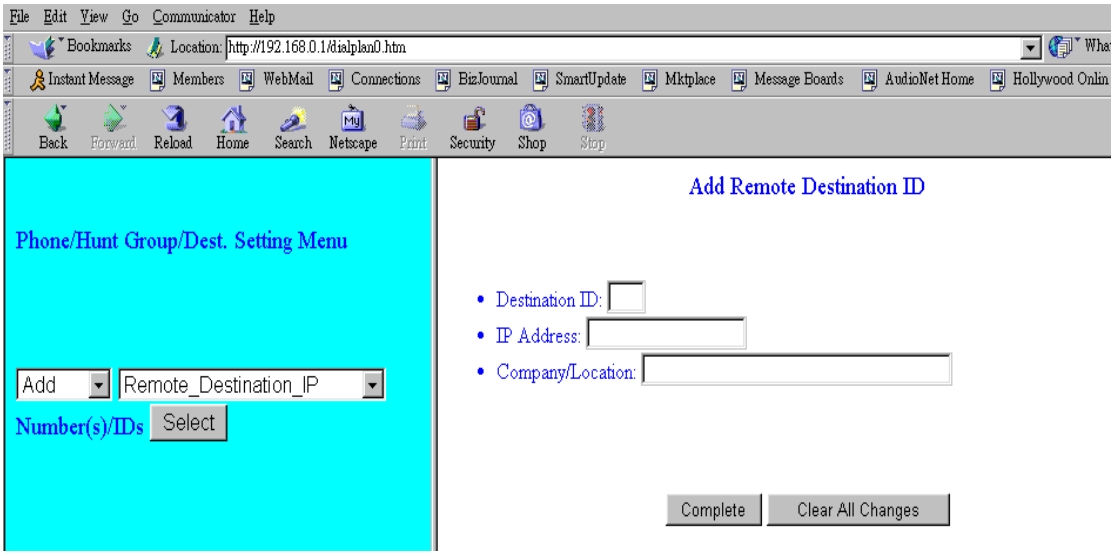
Telephone Number	Telephone number to match. This is only part of the total dialed string.
Hunt Group ID	For each hunt group ID, you need to assign it a unique identifier between 0 and 99.
Min. Digits	Minimum number of digits to be collected before the ATPM starting matching the dial string with entries in the address table.
Max. Digits	Maximum number of digits to be collected before the ATPM starting matching the dialed string with entries in the address table.
Strip Length	The number of digits to be stripped at the beginning of the collected dial string before forwarding the string to the destination.
Append Prefix	(Optional) Digit to be added before the beginning of the collected dial string before forwarding it to the destination.

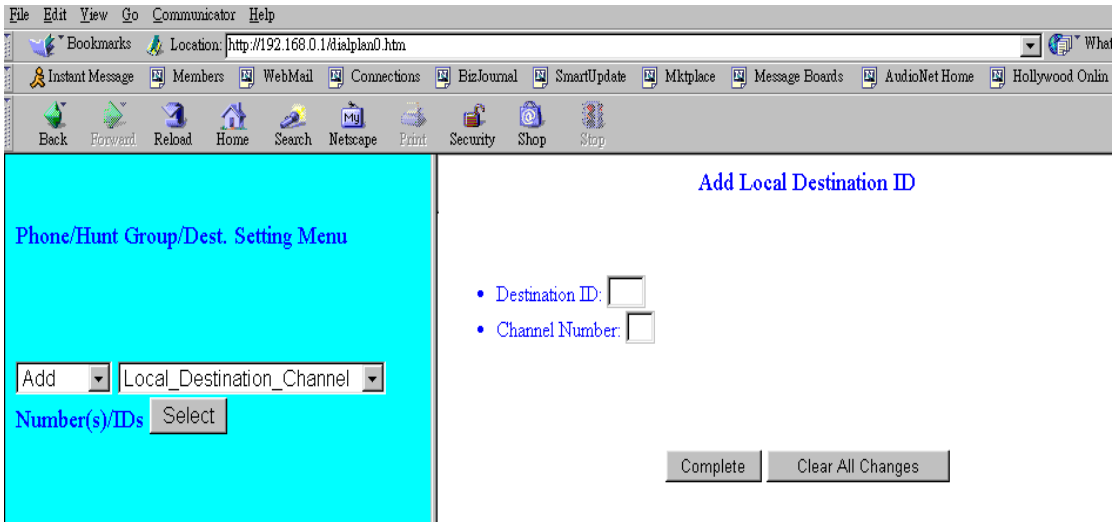
Please select Main Menu\Dial Plan\Phone/Hunt Group/Destination Settings, we can find Phone/Hunt Group/Dest. Setting Menu. We are doing the ITG hunt group table management.



We can add (delete, find or list) desired hunt group ID mapping to destination ID at this menu.

Please select Main Menu\Dial Plan\Phone/Hunt Group/Destination Settings, we can find Phone/Hunt Group/Dest. Setting Menu. We are doing the ITG destination table management. One is Remote Destination IP and the other is Local Destination Channel.

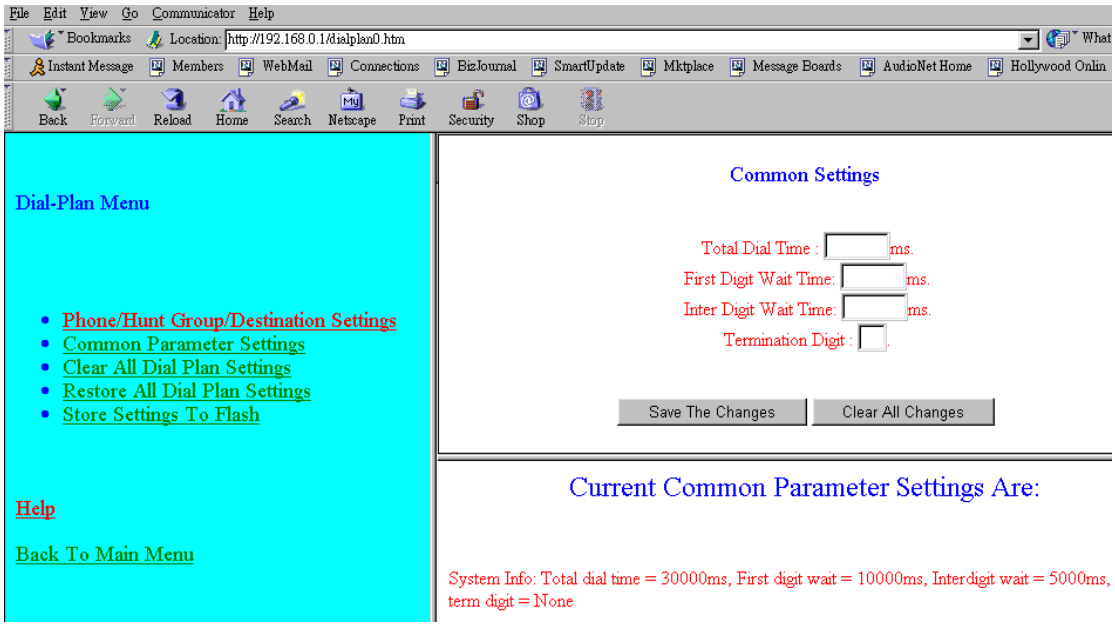




We can add (delete, find or list) desired destination ID mapping to Remote Destination IP or Local Destination Channel at this menu.

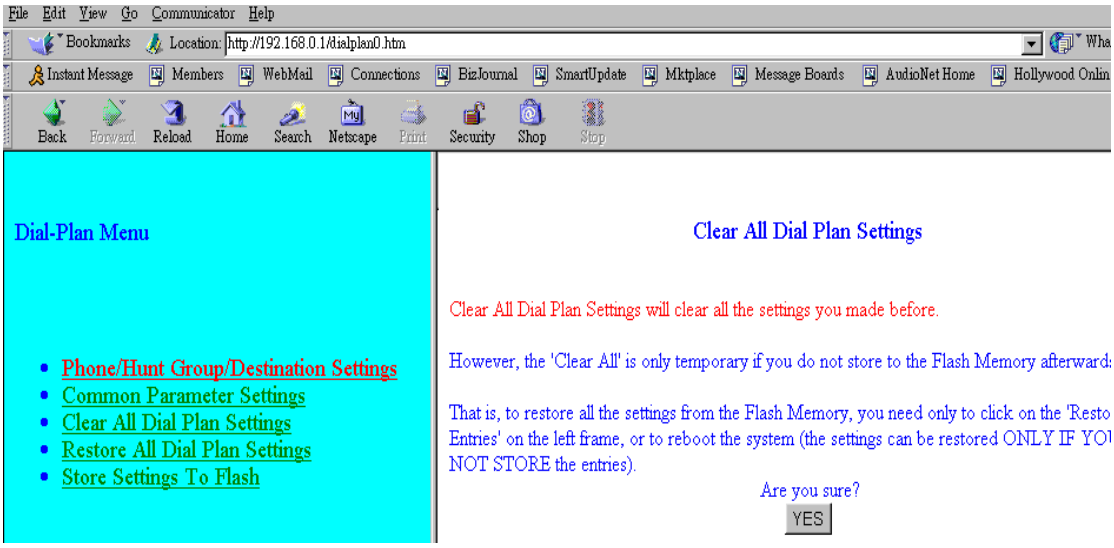
Please back to Dial Plan Menu.

Please select Main Menu\Dial Plan\Common Parameter Settings



This Common Parameter Settings is the same as previous ATPM system parameters description. .

Please select Main Menu\Dial Plan\Clear All Dial Plan Settings



Clear All Dial Plan Settings will clear all the settings you made before. However, the 'Clear All' is only temporary if you do not store to the Flash Memory afterwards.

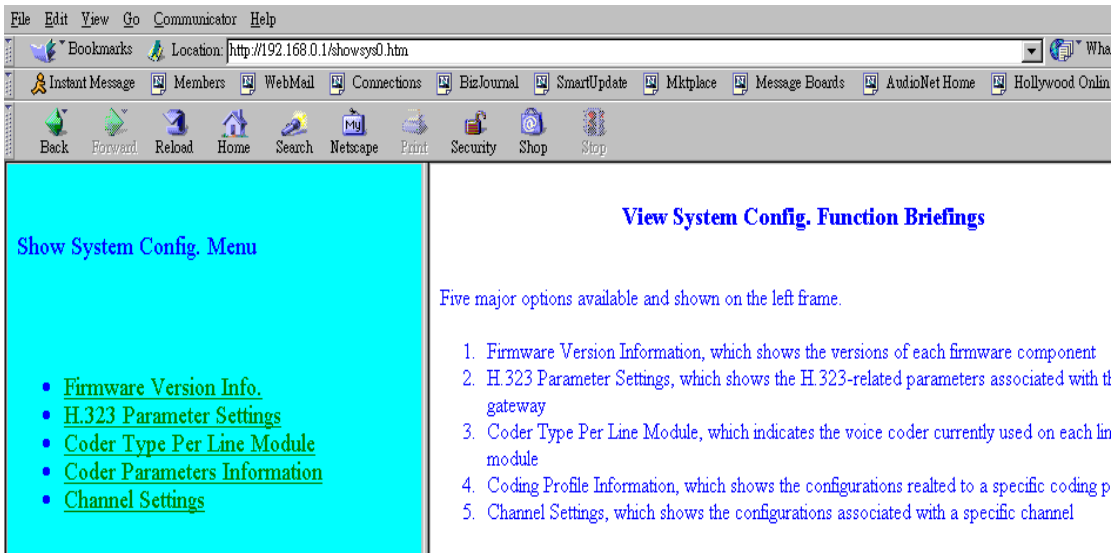
That is, to restore all the settings from the Flash Memory, you need only to click on the 'Restore All Entries' on the left frame, or to reboot the system (the settings can be restored ONLY IF YOU DID NOT STORE the entries).

Please select Main Menu\Dial Plan\Restore All Dial Plan Settings
Retrieve all dial plan settings from the flash memory. All temporary settings will be cleared.

Please select Main Menu\Dial Plan\Store Settings To Flash.
Ready to store Dial Plan settings to Flash Memory

Please Back To Main Menu

Please select Main Menu\View System Config.



View System Config. Function Briefings. Five options available

1.Firmware Version Information, which shows the versions of each firmware component
2.Network Settings, which shows the IP-related settings, and the status of associated management tools
3.H.323 Parameter Settings, which shows the H.323-related parameters associated with the gateway
4.Coding Profile Information, which shows the configurations related to a specific coding profile
5.Channel Settings, which shows the configurations associated with a specific channel

Please select Main Menu\View System Config.\Firmware Version Info.

This will show current ITG firmware version information.

FirmWare Informaton:

Internet Telephony Gateway Version: 2.20
TFTP Loader Version: 4.00
pSOSystem Version: 2.3.0 for ARM/BE
RADVision Stack Version: 2.6.5.0
DSP image Version: 7.0.2.0.
TSG Version: R7.01(Build 1)
BASIC ACCESS Build, 500 Ticks/Sec Clock
8 Voice TCIDS, 0 Data TCIDS
DSP Configuration:
DSPs = 1
Channels per DSP = 2 for 2 ports ITG and 4 for 4 ports ITG
HPI Mapping = 1 (FIXED)
Clock Mult = 13
Fsx Fsr = 4

Please select Main Menu\View System Config.\H.323 Parameter Settings

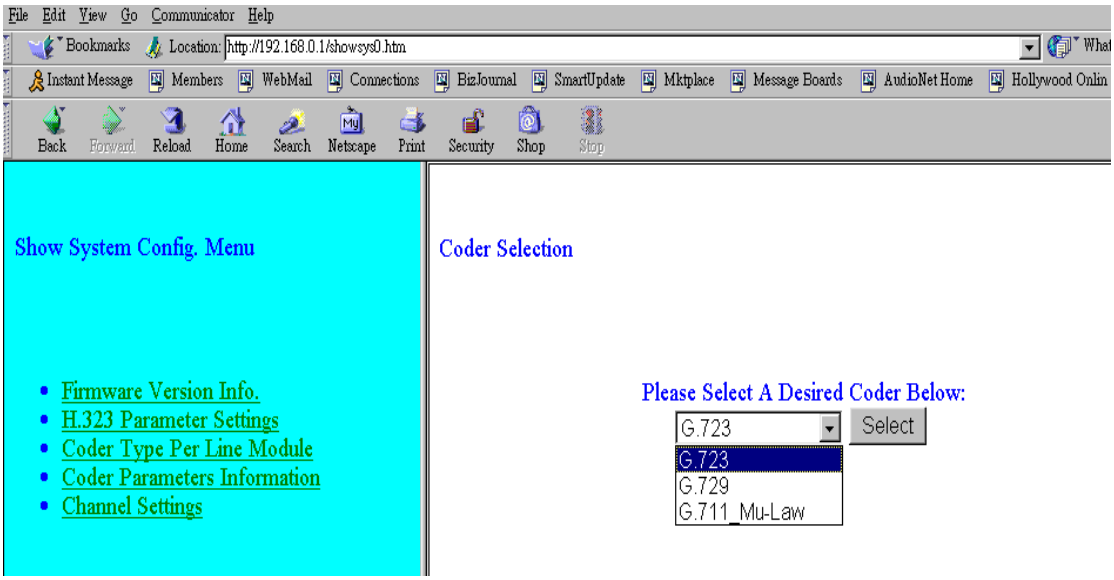
The H.323 Parameters Settings:

h323 display_name = 'Customer'
h323 h245_term_type = 60

h323 rtp_port_base = 30000
h323 out_fast_start = off
h323 in_fast_start = off
h323 auto_answer = on Call is connected automatically.
h323 nat_call = off
h323 frame_rate = 2
h323 default_dtmf = H323 V2 Signal
h323 dtmf_duration = 300 ms
No Alternate IP Defined!
h323 dns_ip = 0
h323 h245_timeout = 30000
h323 term_id =

Please select Main Menu\View System Config.\Coder Type Selected
Voice Coder Selected is G.723

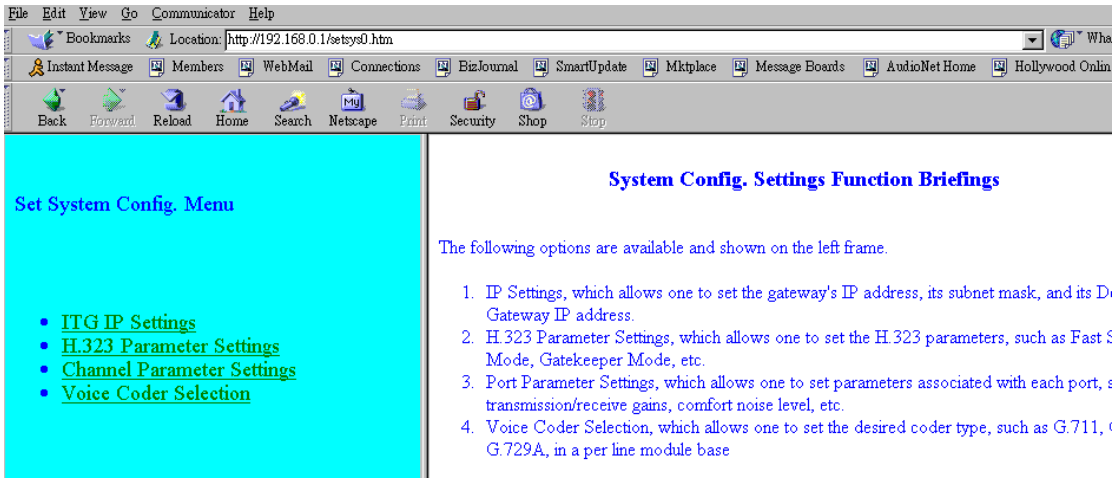
Please select Main Menu\View System Config.\Coder Parameters Information



Please select Main Menu\View System Config.\Channel Settings
This command can show the desired TCID setting of ITG, value is from 0 to 1 for 2 ports ITG and 0 to 3 for 4 ports ITG. Please refer the appendix C to find the factory default setting.

Please Back To Main Menu

Please select Main Menu\Configure System Settings



System Config. Settings Function Briefings

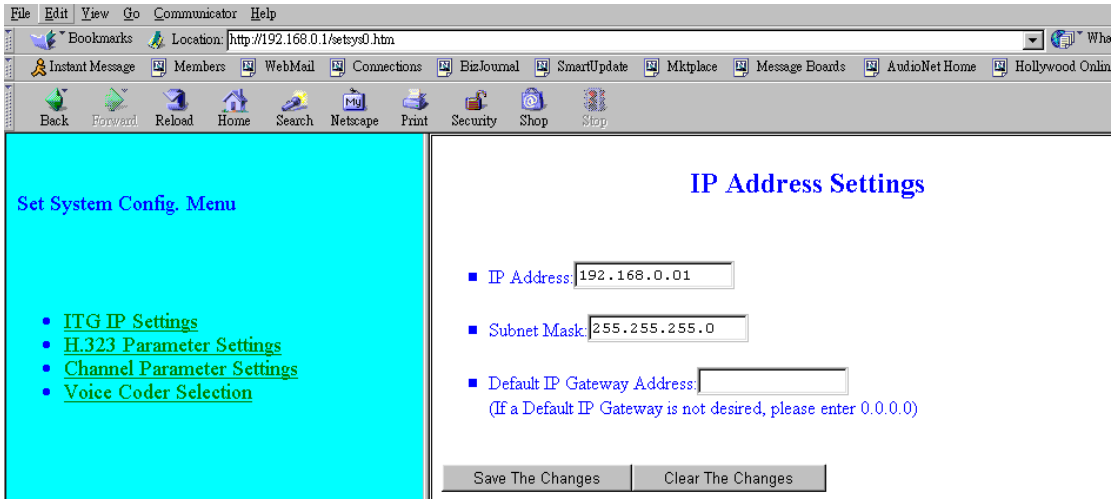
1.IP Settings, which allows one to set the gateway's IP address, its subnet mask, and its Default Gateway IP address.

2.H.323 Parameter Settings, which allows one to set the H.323 parameters, such as Fast Start Mode, Gatekeeper Mode, etc.

3.Port Parameter Settings, which allows one to set parameters associated with each port, such as transmission/receive gains, comfort noise level, etc.

4.Voice Coder Selection, which allows one to set the desired coder type, such as G.711, G.723 or G.729A, in a per line module base.

Please select Main Menu\Configure System Settings\ITG IP Settings

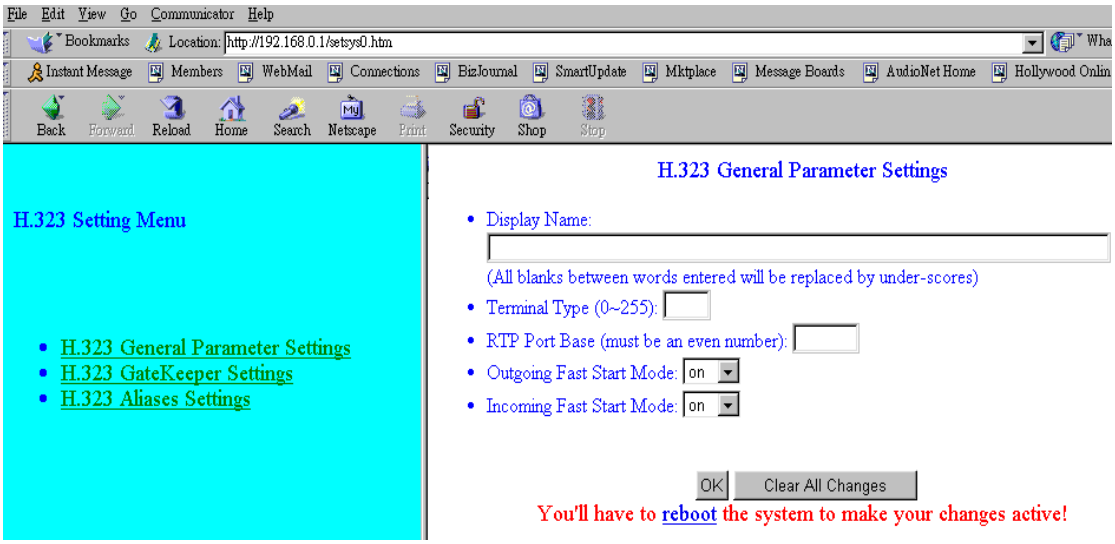


This screen can setup your ITG IP Address, Subnet Mask and Default IP Gateway Address. These values will be valid after ITG reboot.

Please select Main Menu\Configure System Settings\H.323 Parameter Settings

There are H.323 General Parameter Settings, H.323 GateKeeper Settings, H.323 Aliases Settings.

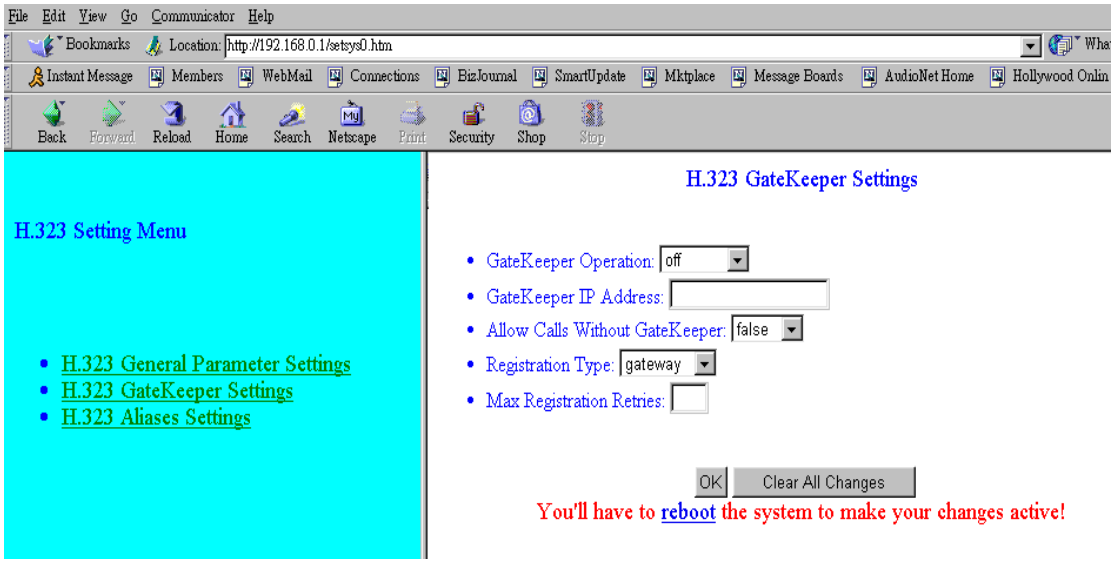
Please select Main Menu\Configure System Settings\H.323 Parameter Settings\H.323 General Parameter Settings



1. Display Name: The default string is "Customer".
   This field is to set the display name information that is carried in the H.323 setup messages. Up to 48 characters can be entered.
2. Terminal Type: The default value is 60.
   This field is to set the H.245 terminal type, which is used as part of the master/slave determination process of H.245. Typically, setting a value of less than 50 will force slave operation, and a value of greater than 200 will force the master operation. For more details, please refer to H.323-related standard documents.
3. RTP Port Base: The default value is 30000.
   This field is to select the starting port number for assignment of RTP and RTCP ports. According to the H.323 specification, RTP port number should be even in value, and the RTCP port number should be one greater than the RTP port. Typically, numbers from 0 to 1023 are reserved on most systems.
4. Outgoing Fast Start: The default setting is off.
   This field is to enable or disable the Faststart mode on the outgoing side of the link.
5. Incoming Fast Start: The default setting is off.
   This field is to enable or disable the Faststart mode on the incoming side of the link.
   You'll have to reboot the system to make your changes active!
6. Frame Rate = 2 frames/packet
7. Auto-Answer: Enables quick H.225 to H.245 transition without waiting for receiver picking up the phone, default is on
8. NAT_Call Mode: Enables calls from remote sites which use NAT routers with private IP networks behind, default is off:
9. Default DTMF Mode: H323 V2 Signal or IMTC. The default is H323 V2 Signal
10. DNS IP Address

Please select Main Menu\Configure System Settings\H.323 Parameter Settings\H.323

GateKeeper Settings



Gate Keeper Mode: The default setting is off. This field is to select the co-operation mode with some gatekeeper(s). Three options available:

- off: disables gatekeeper co-operation,
- auto: enables auto-discovery of the gatekeeper, and
- manual: enables gatekeeper co-operation in manual operation (the gatekeeper address must be properly assigned).

The following fields must be filled up when the Gate Keeper Mode is set to either auto or manual.

Gate Keeper Address: Specify the gatekeeper address when configured to manual mode. When auto mode is desired, this field should be set to auto.

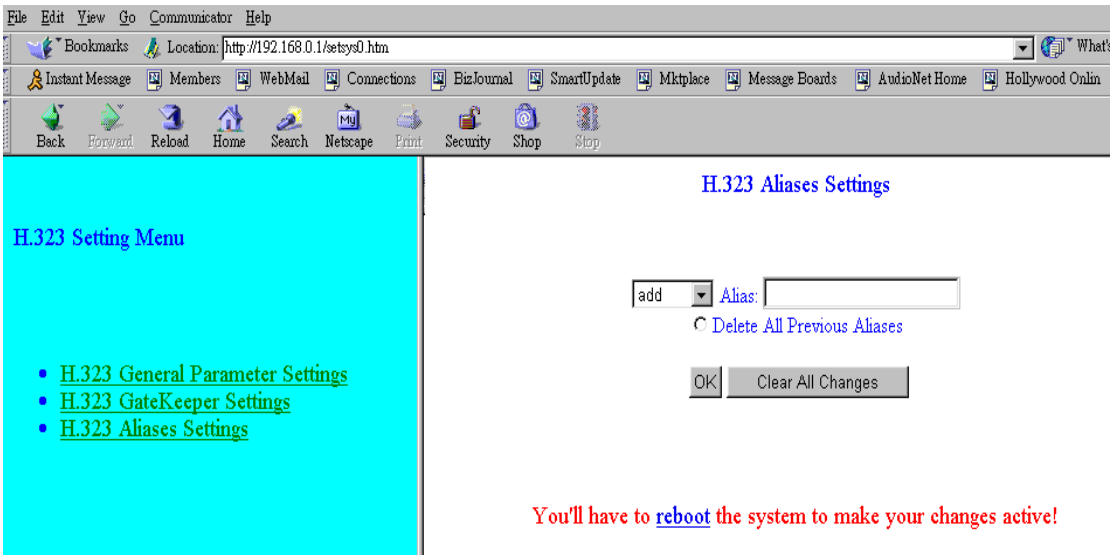
Allow Calls Without Gate Keeper: This field is to inform the H.323 stack to allow calls when the endpoint is not registered with a gatekeeper.

Registration Type: This field is to set the endpoint registration type. This specifies how the endpoint will register itself with the gatekeeper.

Max Registration Retries: This field is to control how many registration attempts will be made before the endpoint considers itself to have failed registration.

You'll have to reboot the system to make your changes active!

Please select Main Menu\Configure System Settings\H.323 Parameter Settings\H.323 Aliases Settings



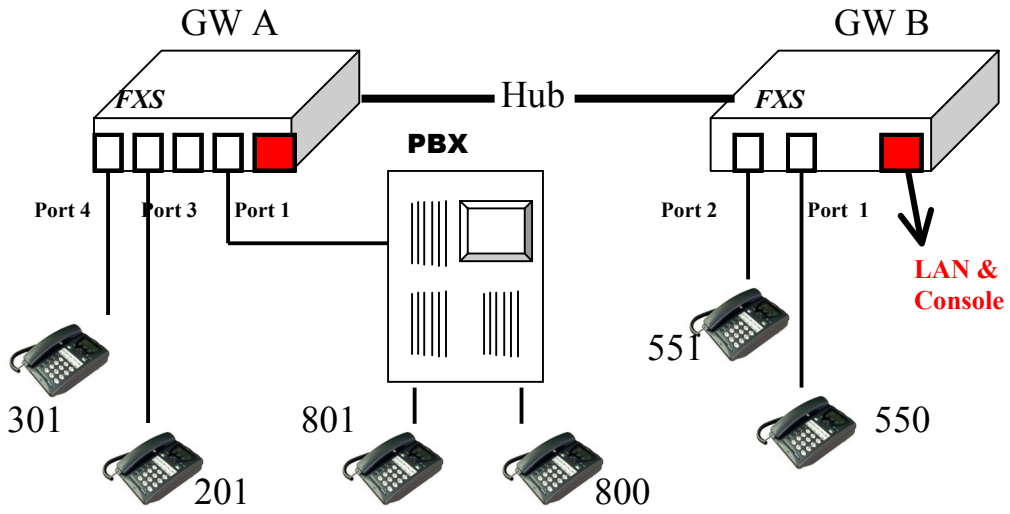
Alias: This field is to create or delete aliases that are registered with the gatekeeper.

4.2 Web Browser setting sample

This section describes how to use web browser to build a sample scenario dial plan in ITG. We suggest some steps to setup dial plan at web browser setting,

1. Please draw down scenario to have a VoIP call application
2. Local gateway: IP setup
3. Local gateway: local telephone number setup
4. Local gateway: remote gateway IP & remote telephone number setup

Please draw down scenario to have a VoIP call application
In order to describe the dial plan of Internet Telephony Gateway, we would like to have the following scenario to step by step the gateway setting by web browser. In case, you don't have PBX on hand, please ignore GW A Port 1 setting.

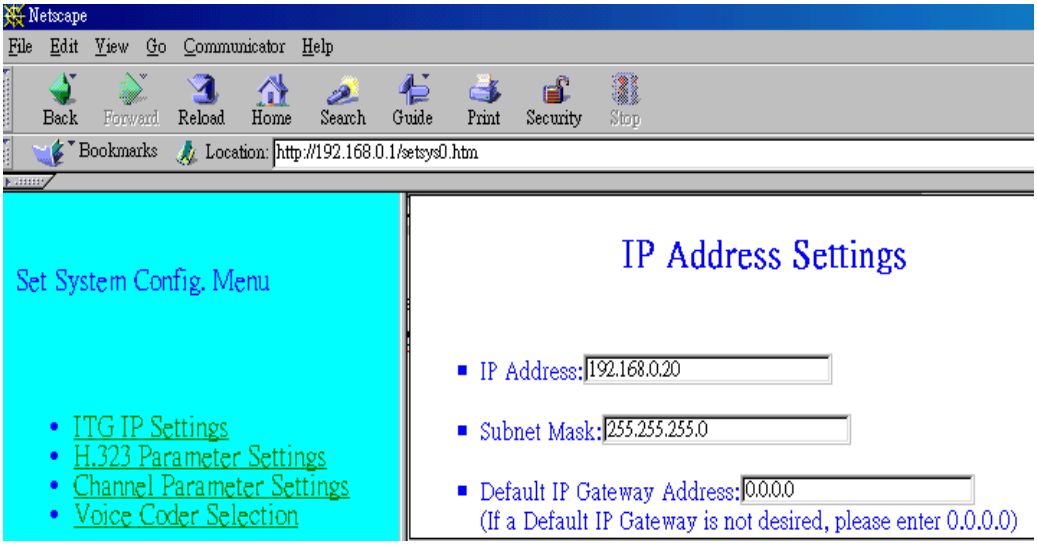


Scenario description: There are two gateways connected by a Hub.
Gateway A, 4 ports ITG, is configured as following:
1. Gateway A IP: 192.168.0.20, mask IP: 255.255.255.0, gateway IP 0.0.0.0 (virtual IP)
2. Port 1 of FXO is connected to PBX. There are two telephone sets connected by PBX, their phone numbers are 800 and 801.
3. Port 3 of FXS has a telephone set connected, its phone number is 201
4. Port 4 of FXS has a telephone set connected, its phone number is 301

Gateway B, 2 ports ITG, is configured as following:
1. Gateway B IP: 192.168.0.55, mask IP: 255.255.255.0, gateway IP 0.0.0.0 (virtual IP)
2. Port 1 of FXS has a telephone set connected, its phone number is 550
3. Port 2 of FXS has a telephone set connected, its phone number is 551

Local gateway: IP setup, we are setting gateway A.
1. Please select Main Menu\ Configure System Settings\ ITG IP Settings from Main Menu

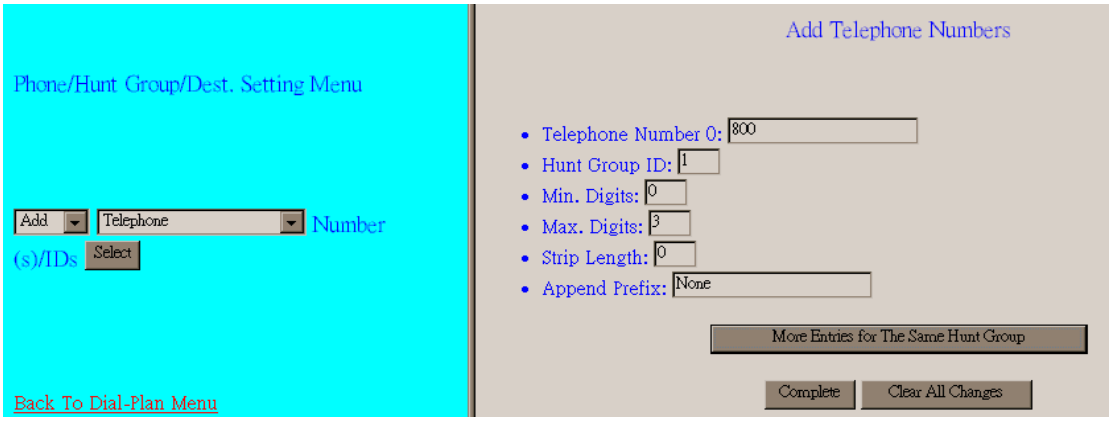
2. Key-in IP Address: 192.168.0.20, Subnet Mask: 255.255.255.0 and Default IP Gateway Address: 0.0.0.0 in the related fields.
3. And push "Save The Change" button



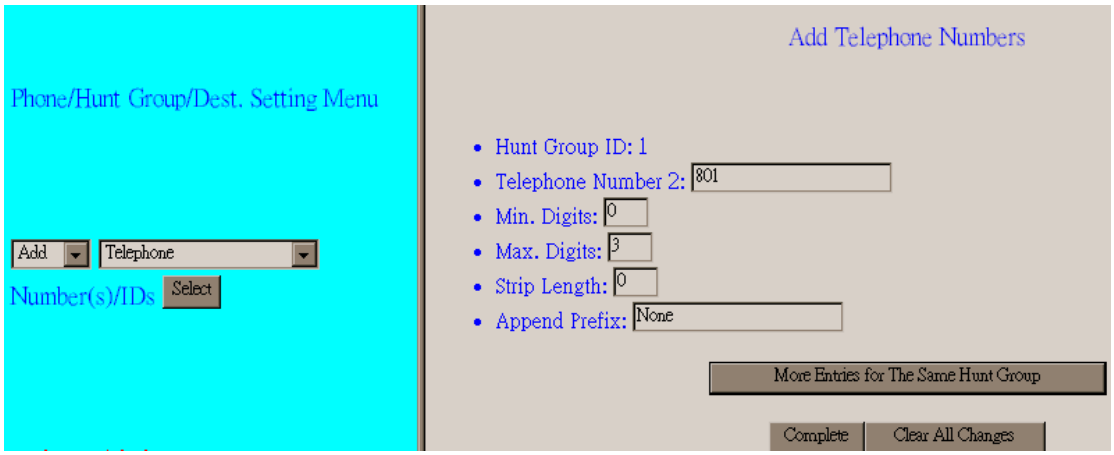
Local gateway: local telephone number setup

Gateway A's telephone number 800 setting. 800 locates at Port 1 of FXO

1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add telephone" from Main Menu



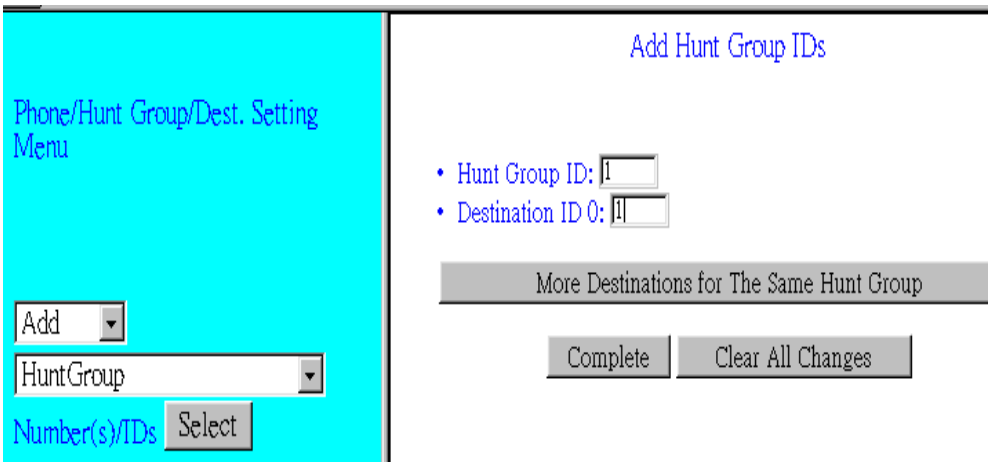
2. Push "More Entries for The Same Hunt Group" button.



3. Push "Complete" button. And screen will show "Telephone Number Added 800, 801 OK" table. Telephone number 800, 801 are added in gateway dial plan.
4. Purpose: add telephone address to hunt group mapping table of phone number 200 into dial plan

Back To Dial-Plan Menu

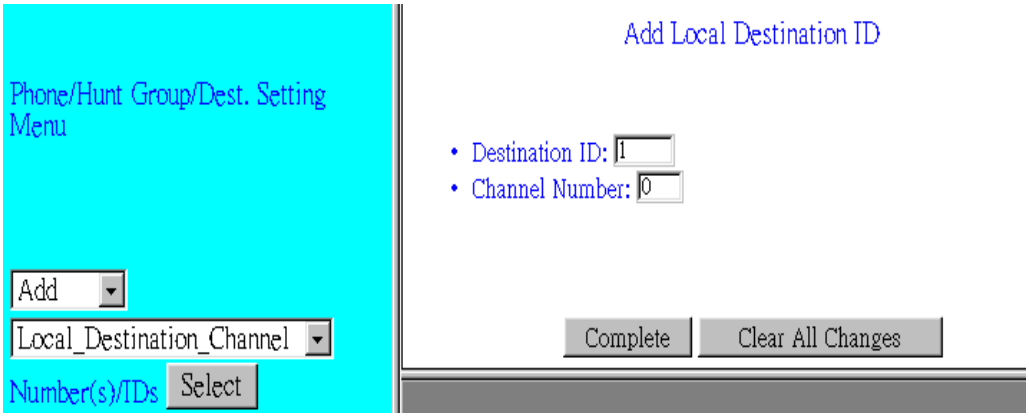
1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Hunt Group" from Main Menu



2. Push "Complete" button. And screen will show "List All Hunt Group IDs Result:" table.
3. Purpose: add hunt group to destination ID mapping table of phone number 200 into dial plan

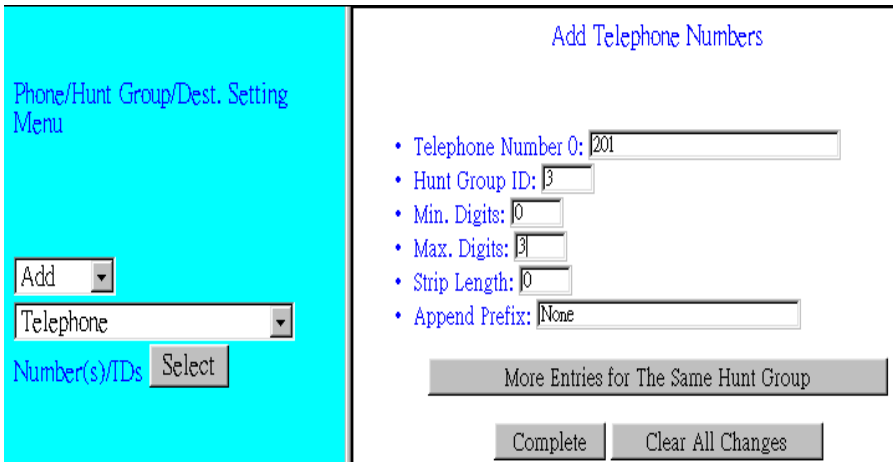
Back To Dial-Plan Menu

1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Local_Destination_Channel" from Main Menu



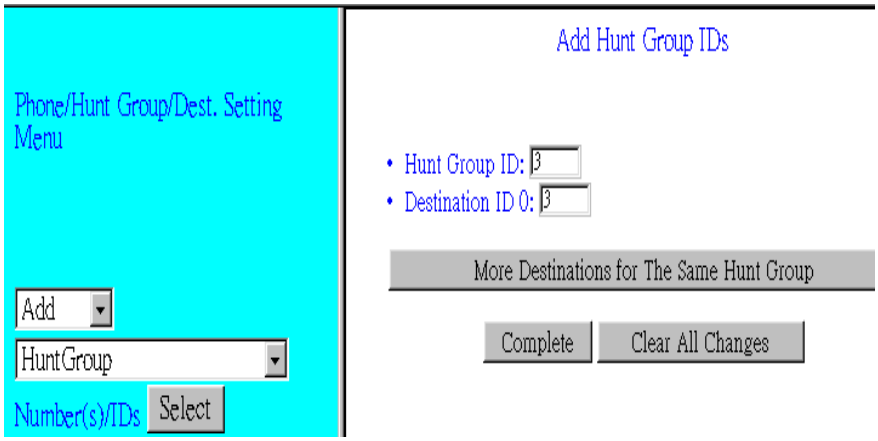
2. Push "Complete" button. And screen will show "Add Destination ID Result:" table The Destination ID 1 is bound to local channel 0.
3. Purpose: add destination ID to destination IP mapping table of phone number 200 into dial plan. Channel Number can have values from 0 to (number of ports –1)

Back To Dial-Plan Menu
Gateway A's telephone number 201 setting. 201 locates at Port 3 of FXS
1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add telephone" from Main Menu



2. Push "Complete" button. And screen will show "Telephone Number Added 201 OK" table. Telephone number 201 is added in gateway dial plan.
3. Purpose: add telephone address to hunt group mapping table of phone number 201 into dial plan

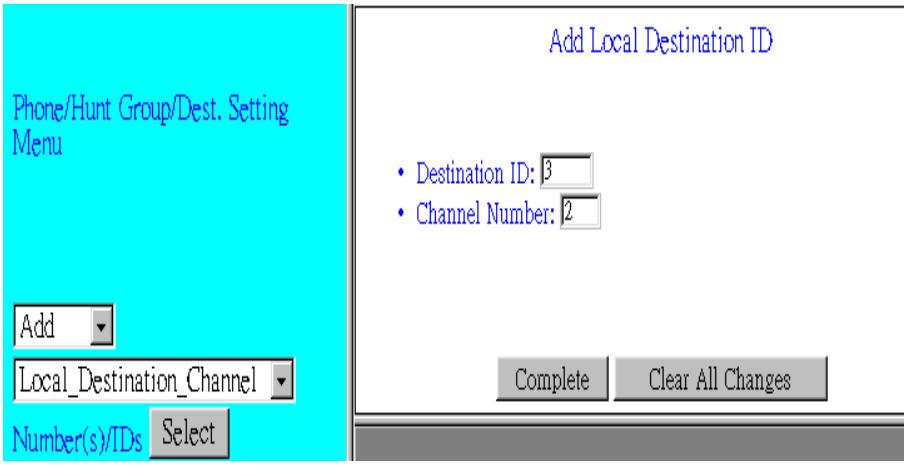
Back To Dial-Plan Menu
1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Hunt Group" from Main Menu



2. Push "Complete" button. And screen will show "List All Hunt Group IDs Result:" table.
3. Purpose: add hunt group to destination ID mapping table of phone number 201 into dial plan

Back To Dial-Plan Menu

1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Local_Destination_Channel" from Main Menu



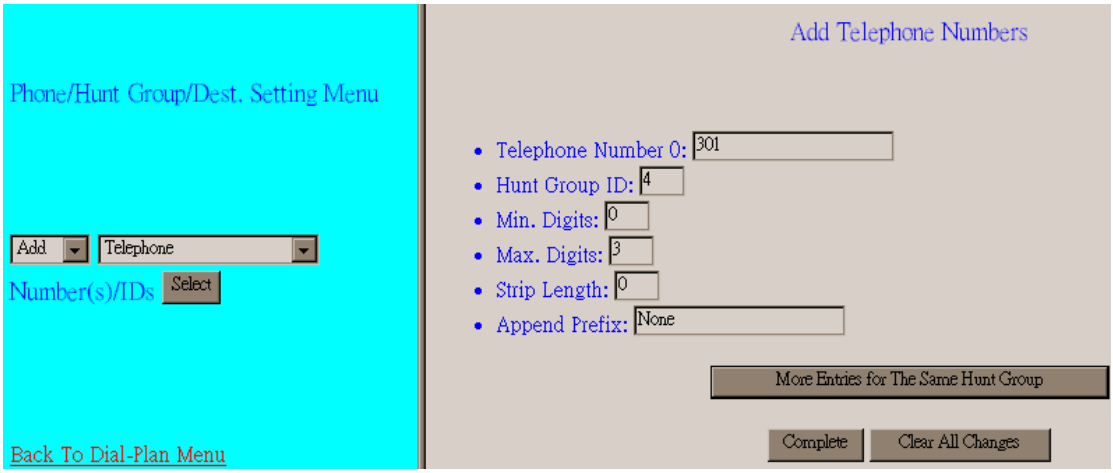
2. Push "Complete" button. And screen will show "Add Destination ID Result:" table
   The Destination ID 3 is bound to local channel 2.
3. Purpose: add destination ID to destination IP mapping table of phone number 201 into dial plan

Back To Dial-Plan Menu

Gateway A's telephone number 301 setting. 301 locate in Port 4.

1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Telephone" from Main Menu
2. Push "Complete" button. And screen will show "Telephone Number Added 301 OK" table.
   Telephone number 301 is added in gateway dial plan.

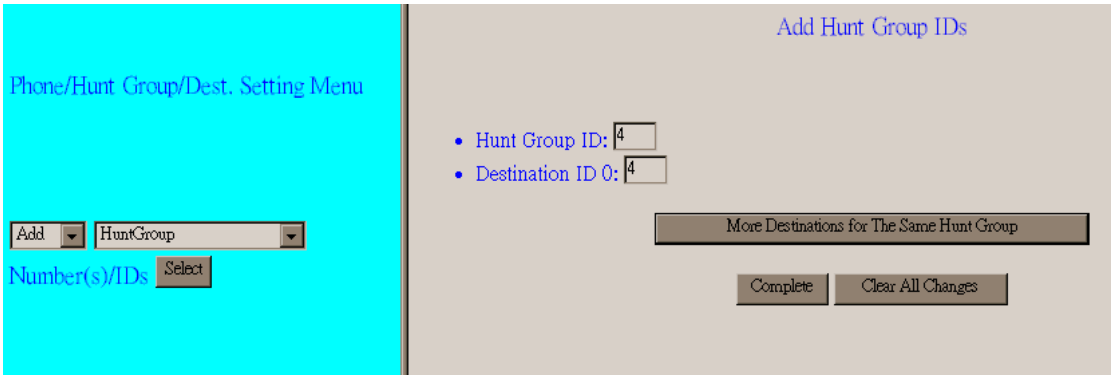
3. Purpose: add telephone address to hunt group mapping table of phone number 301 into dial plan



4. Purpose: add telephone address to hunt group mapping table of phone number 301 into dial plan

Back To Dial-Plan Menu

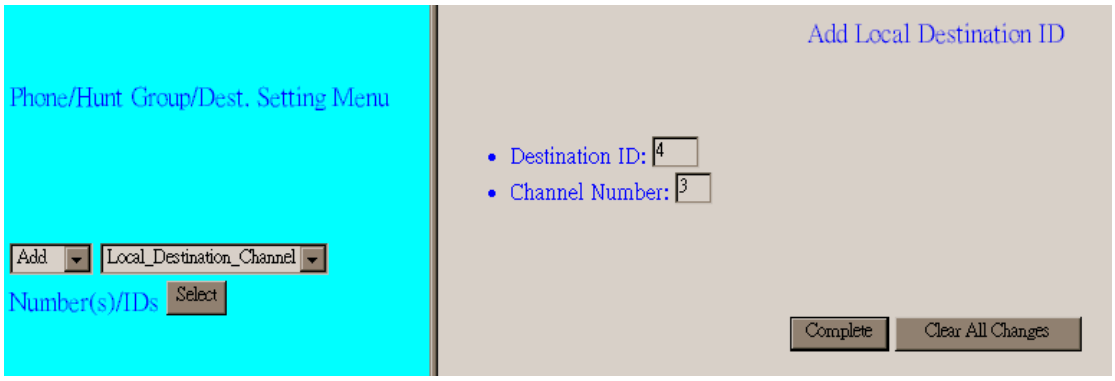
1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Hunt Group" from Main Menu



2. Push "Complete" button. And screen will show "List All Hunt Group IDs Result:" table.
3. Purpose: add hunt group to destination ID mapping table of phone number 301 into dial plan

Back To Dial-Plan Menu

1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Local_Destination_Channel" from Main Menu
2. Push "Complete" button. And screen will show "Add Destination ID Result:" table
   The Destination ID 4 is bound to local channel 3.
3. Purpose: add destination ID to destination IP mapping table of phone number 301 into dial plan



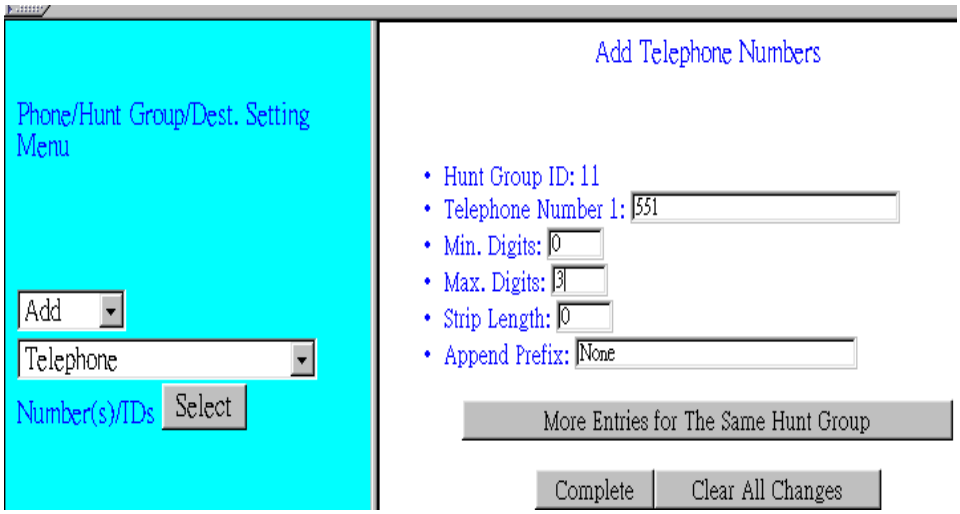
Local gateway: remote gateway IP & remote telephone number setup

Gateway A's remote gateway IP & remote telephone number 550 & 551 setting

Back To Dial-Plan Menu

Gateway A's remote telephone number 550 & 551 setting. Due to 550 & 551 locate in remote gateway, we usually define its hunt group number is beginning at number 11 at this dial plan setting.

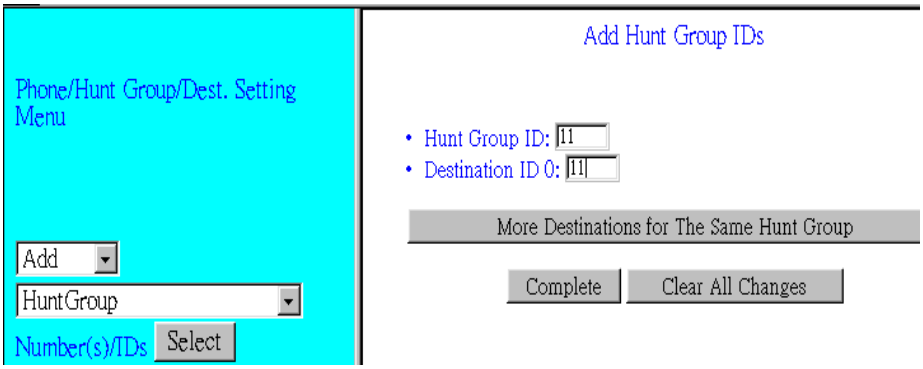
1. Please select "Main Menu\Dial Plan\Phone/Hunt Group/Destination Settings\Phone/Hunt Group/Dest. Setting Menu" from Main Menu



2. Key-in 550 firstly, and push "More Entries for The Same Hunt Group" button and key-in 551.
3. Push "Complete" button. And screen will show "Telephone Number Added 550 & 551 OK" table. Telephone number 550 & 551 are stored in gateway dial plan.
4. Purpose: add telephone address to hunt group mapping table of phone number 550 & 551 into dial plan

Back To Dial-Plan Menu

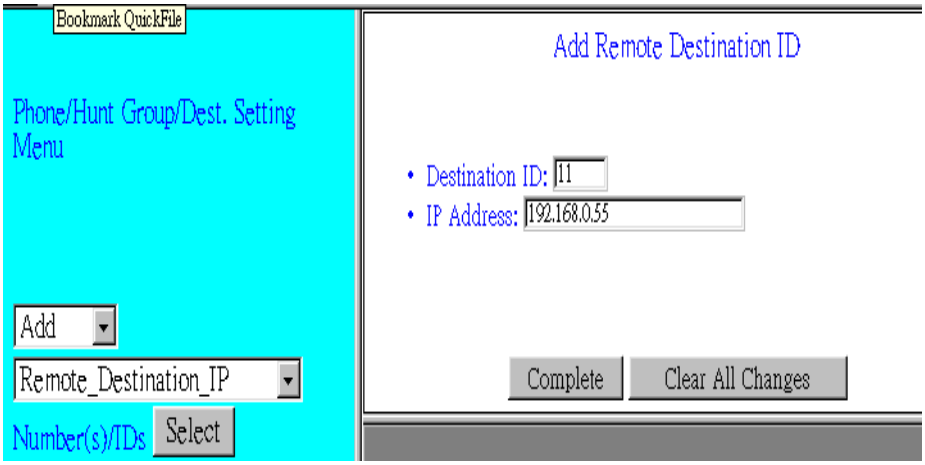
1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Hunt Group" from Main Menu



2. Push "Complete" button. And screen will show "List All Hunt Group IDs Result:" table.
3. Purpose: add hunt group to destination ID mapping table of phone number 550 & 551 into dial plan

Back To Dial-Plan Menu

1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Remote_Destination_IP" from Main Menu



2. Push "Complete" button. And screen will show "Add Destination ID Result: The Destination ID 11 is bound to IP address 192.168.0.55 for H.323 VoIP application."
3. Purpose: add destination ID to destination IP mapping table of phone number 550 & 551 into dial plan

Back To Dial-Plan Menu

Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ List Telephone" from Main Menu, we can list the above telephone number setting.

Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ List Hunt Group" from Main Menu, we can list the above hunt group setting.

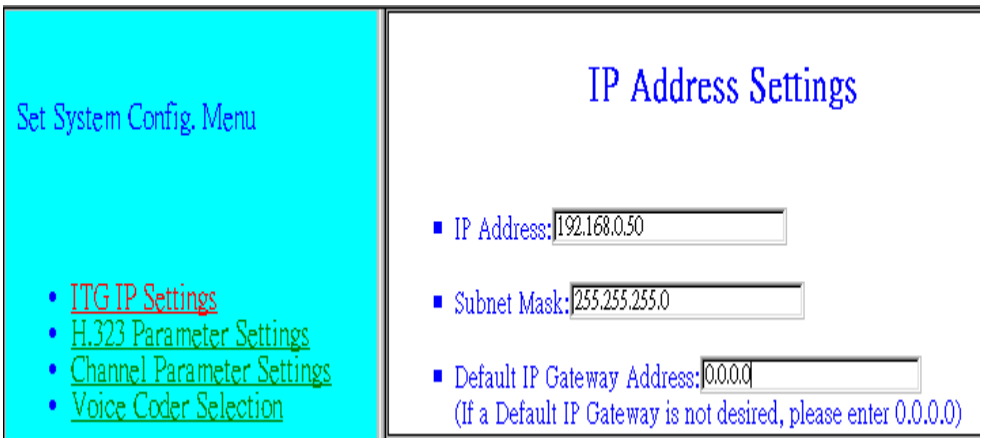
Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu" from Main Menu and select List Remote_Destination_IP or Local_Destination_Channel, we can list the above destination ID setting.

Please select Main Menu\Dial Plan\Store Settings To Flash. The above setting will be stored to flash memory.

At this moment we have finished gateway A VoIP call application setting. We are going to have the same process to setup gateway B.

Local gateway: IP setup, we are setting gateway B.

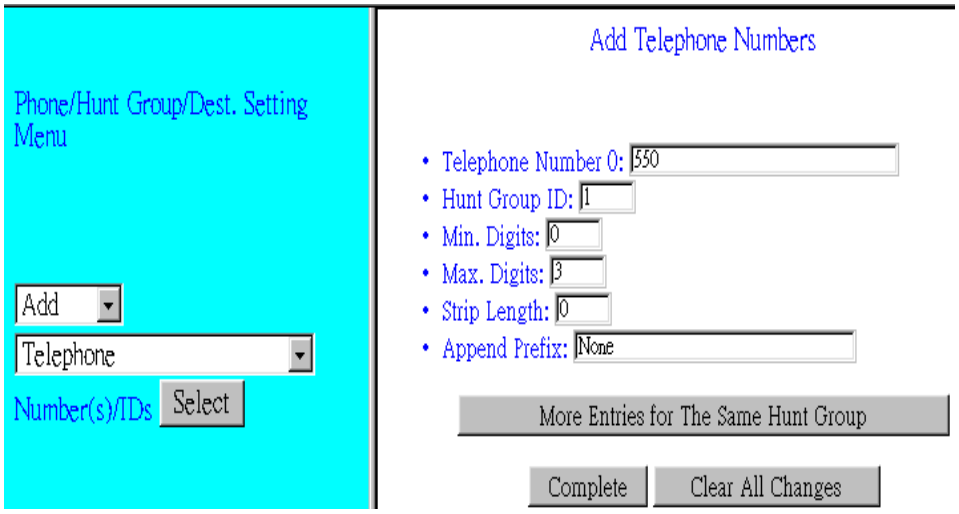
1. Please select Main Menu\ Configure System Settings\ ITG IP Settings from Main Menu
2. Key-in IP Address: 192.168.0.50, Subnet Mask: 255.255.255.0 and Default IP Gateway Address: 0.0.0.0 in the related fields.
3. And push "Save The Change" button



Local gateway: local telephone number setup

Gateway B's telephone number 550 setting. 550 locates at Port 1 of 2 ports ITG

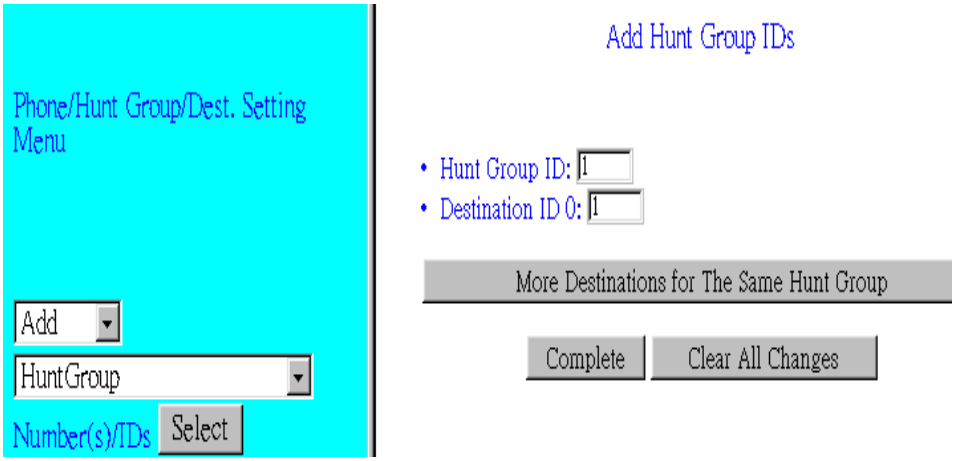
1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Telephone" from Main Menu



2. Push "Complete" button. And screen will show "Telephone Number Added 550 OK" table. Telephone number 550 is stored in gateway dial plan.
3. Purpose: add telephone address to hunt group mapping table of phone number 550 into dial plan

Back To Dial-Plan Menu

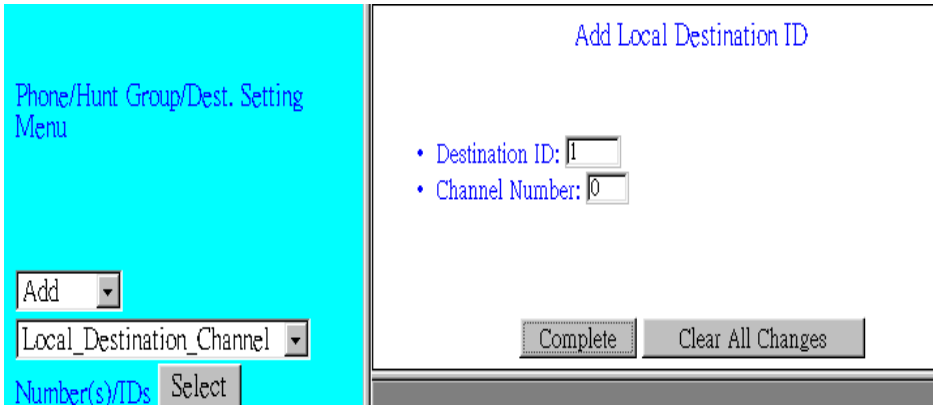
1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Hunt Group" from Main Menu



2. Push "Complete" button. And screen will show "List All Hunt Group IDs Result:" table.
3. Purpose: add hunt group to destination ID mapping table of phone number 550 into dial plan

Back To Dial-Plan Menu

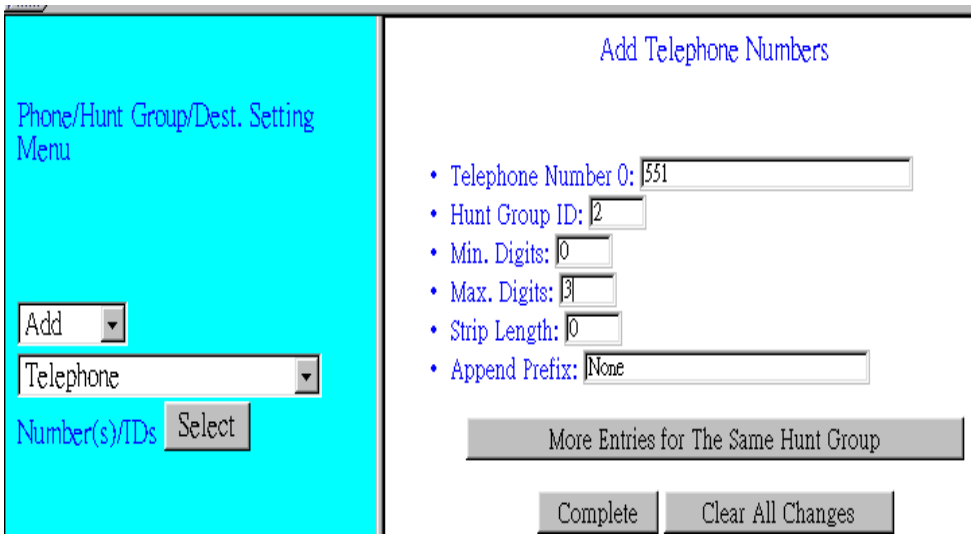
1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Local_Destination_Channel" from Main Menu



2. Push "Complete" button. And screen will show "Add Destination ID Result:" table
   The Destination ID 1 is bound to local channel 0.
3. Purpose: add destination ID to destination IP mapping table of phone number 550 into dial plan

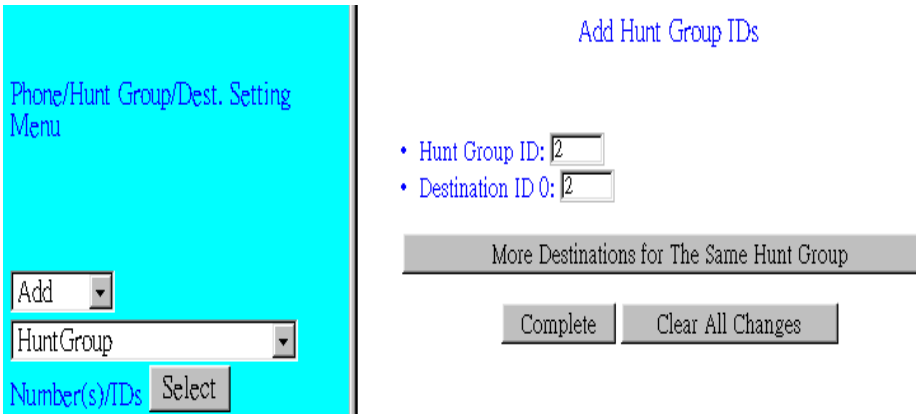
Gateway B's telephone number 551 setting. 551 locates at Port 2

1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings \ Phone/Hunt Group/Dest. Setting Menu\ Add Telephone" from Main Menu
2. Push "Complete" button. And screen will show "Telephone Number Added 551 OK" table. Telephone number 551 is stored in gateway dial plan.
3. Purpose: add telephone address to hunt group mapping table of phone number 551 into dial plan



Back To Dial-Plan Menu

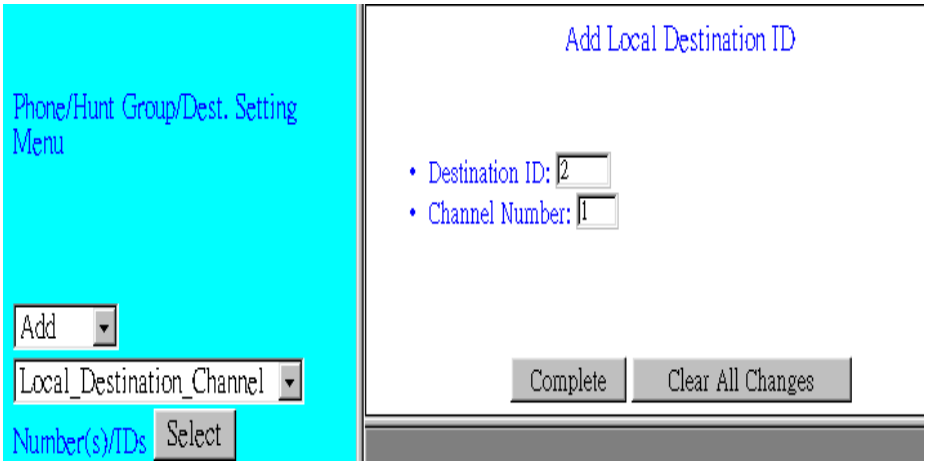
1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Hunt Group" from Main Menu



2. Push "Complete" button. And screen will show "List All Hunt Group IDs Result:" table.
3. Purpose: add hunt group to destination ID mapping table of phone number 551 into dial plan

Back To Dial-Plan Menu

1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Local_Destination_Channel" from Main Menu
2. Push "Complete" button. And screen will show "Add Destination ID Result:" table
   The Destination ID 2 is bound to local channel 1.
3. Purpose: add destination ID to destination IP mapping table of phone number 551 into dial plan



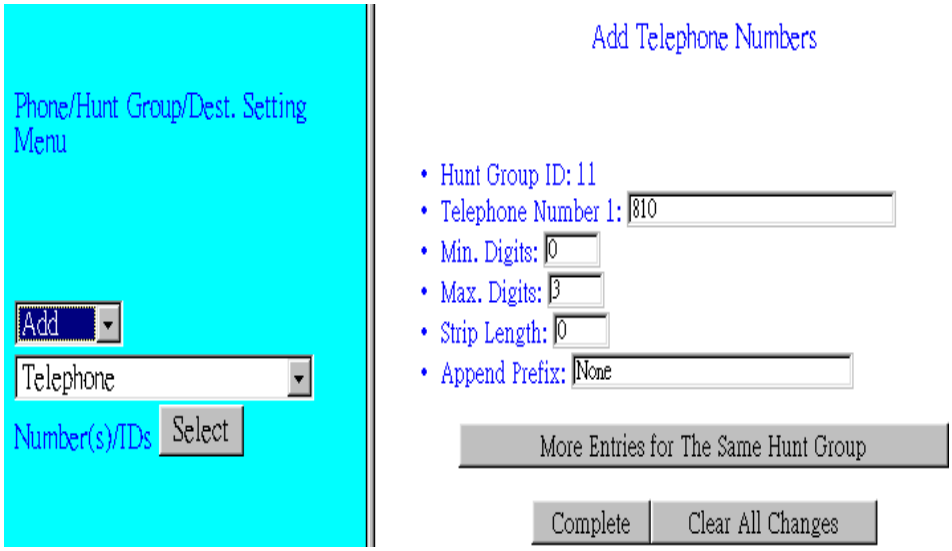
Local gateway: remote gateway IP & remote telephone number setup

Gateway B's remote gateway IP & remote telephone number 301 & 201 & 800 & 801 setting

Back To Dial-Plan Menu

Gateway B's remote telephone number 301 & 201 & 800 & 810 setting. Due to 301 & 201 & 800 & 801 locate in remote gateway, we usually define its hunt group number is beginning at number 11 at this dial plan setting.

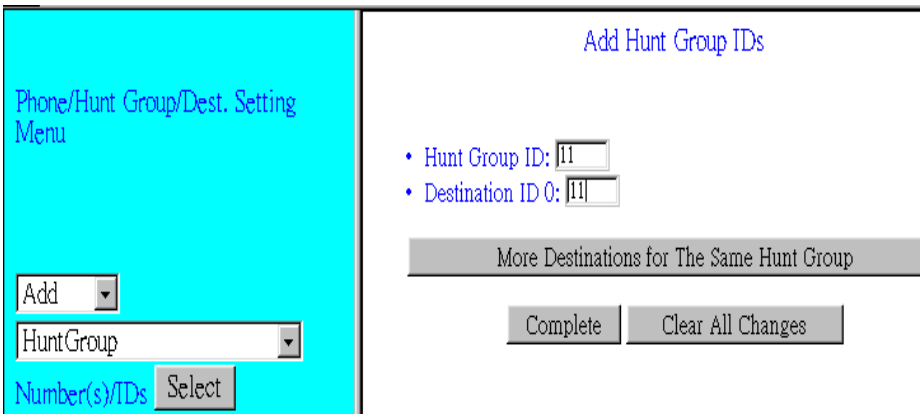
1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Telephone" from Main Menu



2. Key-in 301 firstly, and push "More Entries for The Same Hunt Group" button and key-in 201, and push "More Entries for The Same Hunt Group" button and key-in 800, and push "More Entries for The Same Hunt Group" button and key-in 801.
3. Push "Complete" button. And screen will show "Telephone Number Added 301 & 201 & 800 & 801 OK" table. Telephone number 301 & 201 & 800 & 801 are stored in gateway dial plan.
4. Purpose: add telephone address to hunt group mapping table of phone number 301 & 201 & 800 & 801 into dial plan

Back To Dial-Plan Menu

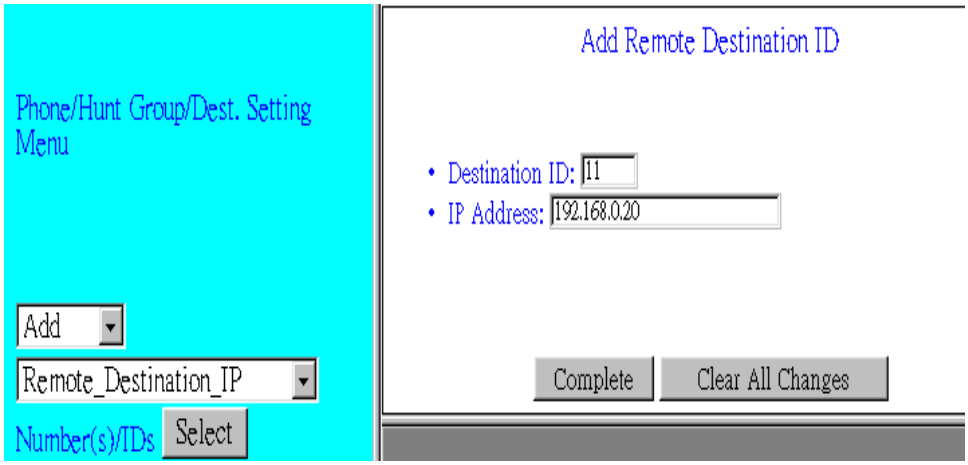
1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Hunt Group" from Main Menu



2. Push "Complete" button. And screen will show "List All Hunt Group IDs Result:" table.
3. Purpose: add hunt group to destination ID mapping table of phone number 301 & 201 & 800 & 801 into dial plan

Back To Dial-Plan Menu

1. Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ Add Remote_Destination_IP" from Main Menu



2. Push "Complete" button. And screen will show "Add Destination ID Result: The Destination ID 11 is bound to IP address 192.168.0.20 for H.323 VoIP application."
3. Purpose: add destination ID to destination IP mapping table of phone number 301 & 201 & 800 & 801 into dial plan

Back To Dial-Plan Menu

Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ List Telephone" from Main Menu, we can list the above telephone number setting.

Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu\ List Hunt Group" from Main Menu, we can list the above hunt group setting.

Please select "Main Menu\ Dial Plan\ Phone/Hunt Group/Destination Settings\ Phone/Hunt Group/Dest. Setting Menu" from Main Menu and select List Remote_Destination_IP or Local_Destination_Channel, we can list the above destination ID setting.

Please select Main Menu\Dial Plan\Store Settings To Flash. The above setting will be stored to flash memory.

We have finished gateway B VoIP call application setting. We can enjoy VoIP call between gateway A and gateway B application now.

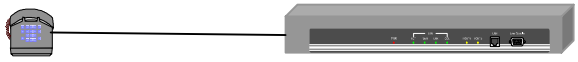
Chapter 5 Making a Call with ITG

This chapter how to make phone calls from telephony devices connected to the ITG directly or indirectly.

5.1 Making a call with ITG FXS Module

ITG has two slide-in modules. FXS module can connect to analogue phone directly, and FXO module can connect to PBX.

Connection: analogue telephone set connects to FXS module port



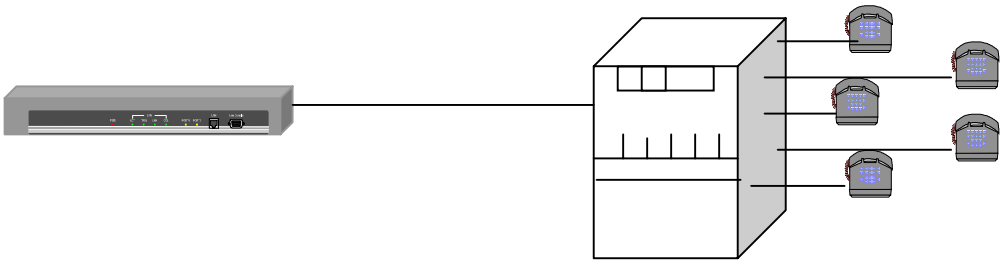
Operation:

1. Pick up this analogue telephone set, you can hear the ITG dial tone at the telephone set
2. The related LED will be lighted at the green color when the telephone set is pick up.

   For Example: If the telephone set is connected to the second port of FXS. When you pick up the telephone set, the second LED will be lighted at the green color.
3. We can dial the desired destination phone number at the telephone set. If the desired destination phone number is legal, the ITG will play two quick address ack tones, Du Du, to destination. If the desired destination phone number is illegal, the ITG will play three quick out of service tones, please check the dial plan and your desired destination phone number.

5.2 Making a call with ITG FXO Module

Connection: analogue telephone set connects to FXO module port



Operation:

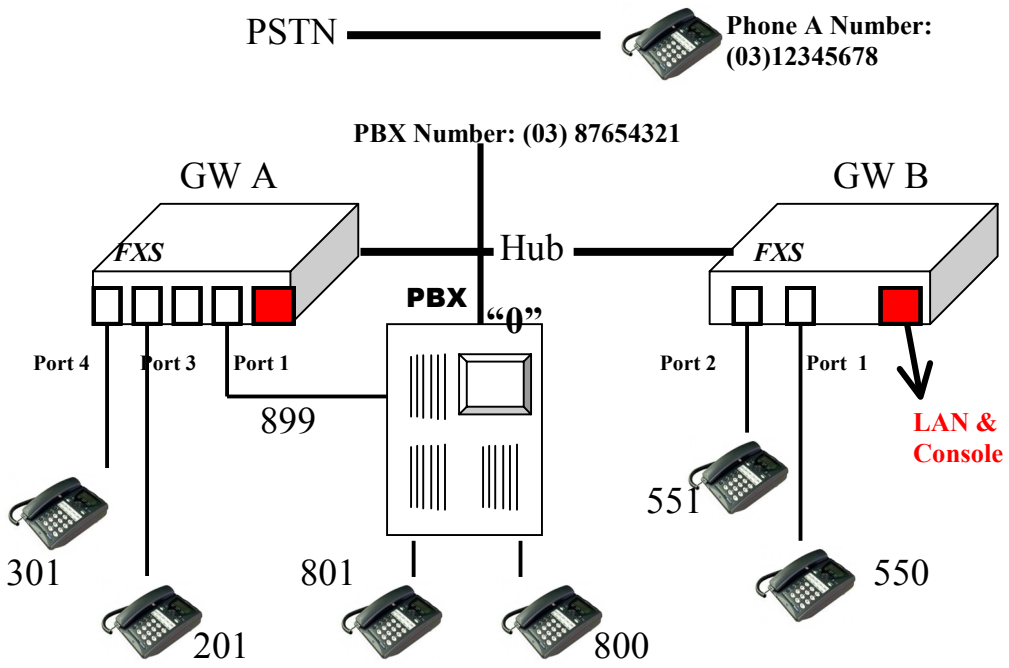
1. Pick up this analogue telephone set, you can hear the PBX dial tone at the telephone set. In some cases, you have to dial a specific number to get the connection between telephone set and PBX.
2. Dial the phone number which is connected between PBX and ITG FXO module port.

3. When the ITG is connected, the related LED will be lighted green.

   For Example: If the telephone set is connected to the second port of FXO. When the PBX is connected to ITG FXO port, the second LED will be green.

4. We can dial the desired destination phone number on the telephone set. If the desired destination phone number is legal, the ITG will plan two quick sounds, "Du Du", to destination. If the desired destination phone number is illegal, the ITG will plan out of service sound, please check the dial plan and your desired destination phone number.

5.3 Making a call with ITG Application Sample



Scenario description:

There are two gateways connected by a Hub.
Gateway A, 4 ports ITG, is configured as following:

1. Gateway A IP: 192.168.0.20, mask IP: 255.255.255.0, gateway IP 0.0.0.0 (virtual IP)
2. Port 1 of FXO is connected to PBX. There are two telephone sets connected by PBX, their phone numbers are 800 and 801.
3. PBX has a number, 899, is connected to Port 1.
4. PBX has an outside call to PSTN. Digit 0 is connected to outside call.
5. Phone number: (03) 87654321 is an PBX representative number. 03 is an area code.
6. There is telephone set, define phone A, its number is (03) 12345678.
7. Port 3 of FXS has a telephone set connected, its phone number is 201
8. Port 4 of FXS has a telephone set connected, its phone number is 301

Gateway B, 2 ports ITG, is configured as following:

1. Gateway B IP: 192.168.0.55, mask IP: 255.255.255.0, gateway IP 0.0.0.0 (virtual IP)
2. Port 1 of FXS has a telephone set connected, its phone number is 550
3. Port 2 of FXS has a telephone set connected, its phone number is 551

Gateway A and Gateway B dial plan setting

Gateway A address translation table

Address Entry	Hunt Grp_Id	Min. Digits	Max. Digits	Prefix strip	Prefix Address
201	3	3	3	0	None
301	4	3	3	0	None
8	1	3	3	0	None
899	1	3	3	0	None
0	1	1	1	0	None
03	1	0	10	2	"0"
5	11	3	3	0	None

Gateway A hunt group table

Group id	Type	#Members	Member ids
1	2	1	1
3	2	1	3
4	2	1	4
11	2	1	11

Gateway A destination table

Dest id	Mode	Destination
1	Local	PORT = 0
3	Local	PORT = 2
4	Local	PORT = 3
11	H.323	Dest = 192.168.0.55/1720 TCP

ITGB address translation table

Address Entry	Hunt Grp_Id	Min. Digits	Max. Digits	Prefix strip	Prefix Address
550	1	3	3	0	None
551	2	3	3	0	None
2	11	3	3	0	None
3	11	3	3	0	"0"
8	11	3	3	0	None
899	1	3	3	0	None
0	11	1	1	0	None
03	11	0	10	0	None

ITGB hunt group table

Group id	Type	#Members	Member ids
1	2	1	1
2	2	1	2
11	2	1	11

ITGB destination table

Dest id	Mode	Destination
1	Local	PORT = 0
2	Local	PORT = 1
11	H.323	Dest = 192.168.0.20/1720 TCP

Making a call between gateway A and Gateway B

Case 1: Gateway Phone to Gateway Phone,

Gateway B phone 550 calls to Gateway A phone 201

Human operation at GW B Caller side	Equipment operation	Human operation at GW A Called Side
Pick up phone 550	1.ITG dial tone is heard. 2.the first LED will be green at GW B.	
Dial 201	1.Du Du is heard 2.VoIP communication is going	
Ring back tone is heard	1.The third LED is lighting at GW A.	Phone 201 is ringing
		Pick up phone 201
Enjoy VoIP		Enjoy VoIP

The above process is the same as Gateway B phone 550 calls to Gateway A phone 301, 800 and 801.

Case 2: Gateway Phone to PSTN Phone,

Gateway B phone 550 calls to phone A number (03) 12345678

Human operation at GW B Caller side	Equipment operation	Human operation at Phone A Receiver Side
Pick up phone 550	1.ITG dial tone is heard. 2. the first LED will be green at GW B	
Dial 889	1.Du Du is heard 2.VoIP Communication is going	
Ring back tone is heard	1. The first LED is lighting at GW A.	
Dial 0	1.Gateway A is connected to	

	PBX outside call	
PSTN dial tone is heard	1.Gateway B is connected to gateway A by Hub 2.Gateway A is connected to PSTN	
Dial 12345678	1.PSTN communication is going	Phone 12345678 is ringing
Ring back tone is heard		Phone 12345678 is ringing
		Phone 12345678 picks up
Enjoy VoIP		Enjoy VoIP

The above process is the same as Gateway A phone 200 (201, 800,801) calls to phone A number (03) 12345678

Case 3: PSTN Phone to Gateway Phone,

Phone A number (03) 12345678 calls to Gateway B phone 551

Human operation at Phone A, Caller side	Equipment operation	Human operation at Gateway B phone 551, Receiver Side
Pick up phone A	1.PSTN dial tone is heard.	
Dial 87654321	1.Communication is going 2.PBX plays voice greeting	
Dial 889		
	1. The first LED is green at GWA 2.ITG dial tone is heard	
Dial 551	1.Du Du is heard 2.VoIP Communication is going	
Ring back tone is heard		
	1. The second LED is on at GWB	Phone 551 is ringing
		Pick up phone 551
Enjoy VoIP		Enjoy VoIP

The above process is the same as Phone A calls to phone numbers 200, 201, 800, 801 or 550

Chapter 6 Application Samples

This section discusses the various environments and situations where you can use the Internet Telephony Gateway.

6.1 Module Configuration

Internet Telephony Gateway supports FXS and FXO modules.

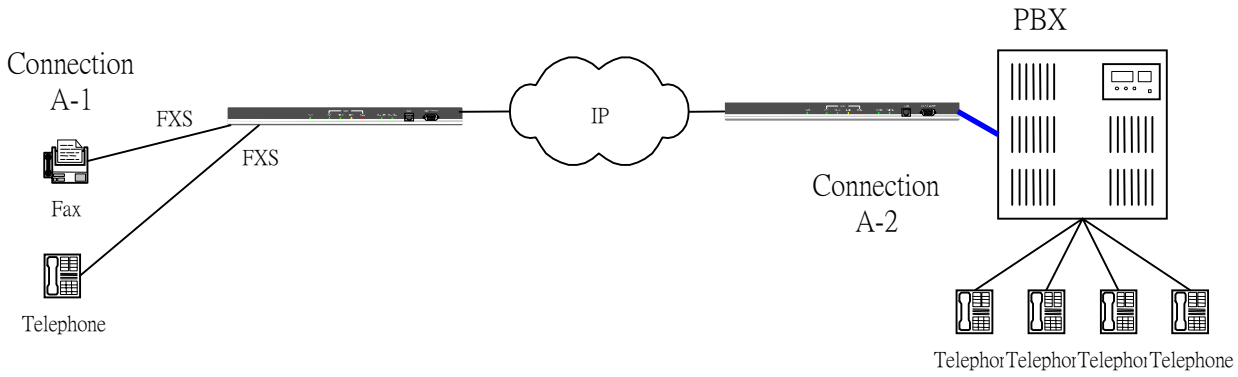
FXS (Foreign Exchange Station)
FXS provides power and ringing signals to its interfacing equipment. It is ***not*** intended for connection to the Public Switched Telephone Network. It is a station loop start operation that provides a connection to:
1. a standard, single-line analog telephone system
2. the line circuit of a key telephone system
3. a loop start trunk circuit of a Private Branch Exchange (PBX) that normally connects to incoming Central Office circuits

FXO (Foreign Exchange Office)
FXO recognizes signals and draws current to indicate an active state. It is a trunk loop start operation that emulates a single-line telephone to:
1. Central Office lines
2. PBX station

There are three basic environments that the ITG can be applied to. They are described in the following sections.

Application A: FXS

Application-A has two possible connections. The A-1 connection shows the connection between the gateway to telephone set (POTS) or FAX machine. The FXS module is used in the A-1 connection. The other connection A-2, on the right hand side, is used to connect the gateway and PBX that has the CO trunk interface. FXS is also used in this connection. The telephone sets connected to PBX can be either POTS or digital telephone depending upon the PBX capability.



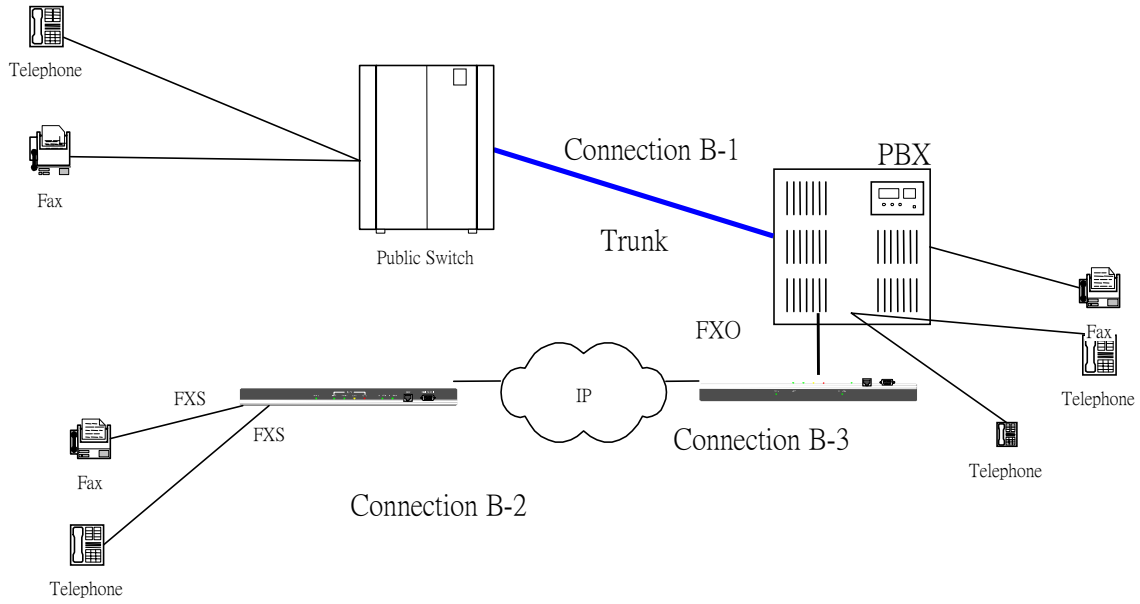
Application B: FXS / FXO combination

Application-B has three possible connections. The B-1 connection is a normal trunk connection between the CO switch and PBX. The B-2 connection is identical to the A-1 connection mentioned in Application A. The B-3 connection is used to connect the PBX and gateway through the internal analogue lines provided by the PBX. In this case, the FXO module has to be used, and the FXO ports will serve the same roles as the analogue telephone sets.

Note: If the PBX used in the B-3 connection is a digital type, a certain analog terminal adapter is needed to provide an analog interface to the FXO module.

In this application, The caller in the B-2 connection can use the Gateway through its FXS module to communicate with the party on the other end in the B-3 connection. The phone call is forwarded through the FXS module in the B-2 Gateway and is received by the FXO module in the B-3 gateway, which is connected to the PBX, which will then switch to the dedicated terminal.

The same caller can also use the feature that the Gateway provides to redial the local number through the PBX, to the public switch, in order to reach the person inside the region that the public switch serves.



Chapter 7 Troubleshooting Tips

This section provides solutions for problems you may possibly encounter while installing and connecting your Internet Telephony Gateway.

Power (PWR) LED is not illuminate

1. Check the power adapter connection.
2. If the power adapter or power cord is connected to the gateway, check that the cord is securely plugged into the power socket on the rear of the console.
3. Check that the other end of the power adapter or power cord is securely plugged into the power outlet.
4. If both ends of the power cord are properly connected and there is still no power, the gateway might have a faulty power outlet, power adapter, or power cord.
5. Change to another power outlet or obtain another power adapter or power cord.

LNK LED is not illuminate

1. Check the ITG was connected correctly:
   a. Powered on
   b. Correctly connected
2. Check if the cable connect to an end device is a standard straight through network Ethernet cable.
3. Make sure connectors at both end are securely seated.
4. Check the ITG IP setting is correct

Line module port LED is not illuminate when pick up the phone

1. Check the RJ11 telephone line is connected correctly between phone set and line module port

There is no dial tone when pick up the phone

1. Check line module port LED illuminate
2. Check the RJ11 telephone line is connected correctly between phone set and line module port

There is an out-of-service tone when dialing destination phone number

1. Check the dial plan setting (address table, hunt group table and destination table) at the destination phone number

There is no connected tone when dialing destination phone number

1. Check the IP network (Ethernet cable, Ethernet port and GW IP setting) is connected correctly
2. Check the destination ITG and phone is available

Final Steps

If the procedures in this section have not solved the problem, reset the gateway several times by turning the power on and off. If the problem still exists, contact customer support.

Part II

Chapter 8 Command Line Interface

The ITG has a built-in command line interpreter and provides users a Command Line Interface (CLI). You can configure ITG by entering commands from the CLI.

You can access the CLI from a VT-100 terminal or terminal emulator connected to the RS-232 port on the front panel or through a Telnet session.

8.1 Connection through Serial Port

The serial port of the ITG is fixed at the following settings:

Baud rate	19,200
Number of data bit	8
Parity check	None
Number of stop bit	1
Flow control	None

To access the ITG through the RS-232 serial port, follow the steps below:

1. Insert one end of the serial cable that came with the ITG into the 9-pin RS-232 port (labeled User Console) on the front panel.
2. Insert the other end of the cable into your terminal's serial port.
3. Configure the terminal so that settings for baud rate, number of data bit, parity check, number of stop bit and flow control capability exactly match ITG's serial interface. (Refer to you terminal documentation for more information about setting up these features).
4. Press <Return> from the terminal.
5. The ITG displays the following prompts on the terminal and you are ready to access the CLI then.

   EITG>

8.2 Connection through Telnet

To use Telnet, you must have previously set the IP address using the **net set ip** command for the ITG. Refer to the section describing the **net set** command later in this chapter for information about setting the IP address. Up to two sessions through Telnet are possible. To access the ITG from a remote host with Telnet, perform the following tasks:

Task	Prompt	Type
From the remote host, enter the **telnet** command followed by the IP address of the ITG you want to access.	None	**telnet *ip_addr***
When the ITG prompts "**Login:**", enter the user name "eitg"	Login:	eitg
When the ITG prompts "Password:", enter the password. The default password is "123" unless a password was previously established using the **net set user_pw** command (Refer to the section describing **net set user_pw** command later in this chapter for details about the setting password).	Password:	*password*

Upon successfully entered the password, the ITG displays greeting message and the following prompts and you are ready to access the CLI commands.

EITG>

8.3 Command Help

Help for commands is provided by the CLI. Type **help** to see a listing of the top-level commands. On most cases, if you enter a command using the wrong number of arguments or inappropriate arguments, the CLI will give further usage.

8.4 Designating IP Address

Some commands require an IP address, which must be designated in a standard format. The IP address format is 32 bits, written as four octets separated by periods (dotted decimal format) that are made up of a network section, an optional subnet section, and a host section, as shown in the following example:

192.168.0.1

8.5 Designating Port Number

Some commands require a telephony port number. The ITG designates the first port as port number 0, the 2nd port as port number 1 and so on.

8.6 Command Reference

The following table list the CLI command in alphabetic order.

Command	Description
atpm	Dial plan management command

clrscr	Clear screen
config	Configuration management command
download	Download new revision code image from TFTP server
help	Display help screen
net	Set or display network parameters
ping	Ping another Internet host
set	Set system configuration
tel	Set or display telephony port options

For the ease of understanding and explaining these commands, the commands are categorized into the following command sets and the following sections explaining each set of the commands.

Command Set	Commands	Function
Utility	clrscr download help ping	General purpose utility commands
Network	net	Commands for setting or displaying network related parameters
Configuration management	config show set	Commands for configuring the ITG or displaying configuration
Dial plan menagement	atpm	Commands for setting or displaying dial plan
Telephony	tel	Commands for setting or displaying telephony related options

8.7 Utility Commands

clrscr

The **clrscr** command to clear the screen

Syntax Description

This command has no arguments or keywords

download

Use the **download** command to enter download mode for reading code image from a TFTP server and program it to flash memory. Refer to 0 for detailed information on how to upgrade the system software.

Syntax Description

This command has no arguments or keywords

Note

This command in available from serial interface. It is not available from Telnet unless the TFTP loader is version 3.00 or higher.

help

The **help** command lists the top-level commands.

Syntax Description

This command has no arguments or keywords

ping

The **ping** command sends Internet Control Message Protocol (ICMP) echo request packets to another node on the network.

ping ***host_ip_addr***

ping -s ***host_ip_addr count/timeout***

Syntax description

-s	Causes ping to send one datagram per second, printing one line of output for every response received.
host_ip_addr	The IP address or IP alias of the host.
count	(Optional) The number of packets to send
timeout	(Optional) Timeout value for the ping in millisecond

8.8 Network Commands

net reset

Use the **net reset** command to reset the ITG. The CLI will prompt you to confirm the command before resetting the ITG.

Syntax Description

This command has no arguments or keywords

net set gateway *ip_addr*

Use the **net set gateway** command to assign a default gateway (router) for the ITG. The default gateway routes packet data outside or your IP subnet.

Syntax description

ip_addr	The IP address of the default gateway. IP address of 0.0.0.0 stands for no default gateway.

Note

The new setting will not take effect until the ITG is reset.

net set http {on|off}

The ITG allows you enable of disable its built-in HTTP server. Use the **net set http** command to enable or disable the HTTP server.

Syntax description

on	Enable HTTP server. This allows users to access the ITG from web browser.
off	Disable HTTP server.

net set ip ip_addr

Use the **net set ip** command to assign an static IP address to the ITG.

Syntax description

ip_addr	The IP address of the ITG.

Note

The new IP address will not take effect until the ITG is reset.

net set ip_preced *ip_preced*

The ITG allows you to set the 3-bit IP precedence field in the IP header for all the voice packets it sends out. Use the **net set ip_preced** to set the IP precedence field.

Syntax description

ip_preced	The IP precedence to be assigned to all the voice packets sent by the ITG. The IP precedence must be in the range of 0 through 7.

Note

The new setting will not take effect until the ITG is reset.

net set mask *ip_mask*

Use the **net set mask** command to set the IP subnet mask for the ITG.

Syntax description

ip_mask	The subnet mask of your network.

Note

The new setting will not take effect until the ITG is reset.

net set speed {10|100|auto}

The ITG allows you set the link speed for its Ethernet interface. Use the **net set speed** command to set the Ethernet link speed.

Syntax description

10	Fixed the Ethernet speed at 10 Mbps
100	Fixed the Ethernet speed at 100 Mbps
auto	Enable the 10/100 Mbps auto-negoriation capablity.

net set user_pw *password password*

Use the **net set user_pw** command to change the password for Telnet user.

Syntax description

password	The new password. The password must be equal to or less than 7 alphanumeric characters. It must be identically typed twice for the ITG to be certain about the new password.

net show

The **net show** command displays all the network settings.

Syntax Description

This command has no arguments or keywords

Example

The following example shows how to display network settings:

```
EITG> net show  <Enter>
****************** Net Parameters ******************
IP address =                  210.243.230.173.
IP sub net mask =             255.255.255.192.
Default gateway IP address = 210.243.230.129.
IP precedence =               1
Ethernet MAC address =        00-50-2d-00-08-9d
Ethernet speed setting =      10/100 Mbps auto-negotiation
USER password =               123
HTTP server state =           on
****************************************************
EITG>
```

net show hwstat

The **net show hwstat** command displays the hardware configuration of the ITG.

Syntax Description

This command has no arguments or keywords

Example

The following example shows how to display hardware configuration:

```
EITG>net show hwstat  <Enter>
****************** Hardware Configuration ******************
  Flash EEPROM type:  MX29L1611
  Flash EEPROM size:  64 sectors,  64 KB/sector
  DRAM size:          8 MB
  LAN interface:      100 Mbps half duplex.  Link UP
  Line card 1 type:   FXS
  Line card 2 type:   FXS
************************************************************
EITG>
```

8.9 Configuration Management Commands

The configuration management commands allow the user to set values for system configuration parameters. In addition, it provides mechanisms to allow a user to control when new parameter values are put in use.

The CLI maintains three areas where the parameters are stored:

- Temporary
- Active
- Non-volatile Storage (NVS)

When a **set** command is entered and processed, it changes the parameter value in the Temporary area. This does not affect current operation of the ITG, which is using the values in the Active area. The **config activate** command moves configuration data from the Temporary area to the Active area, where it can actually be used. Thus a user can make multiple changes in the Temporary area using **set** commands, then put them into use with a single **config activate** command. (Note that the **config activate** command may only be used between calls, and will usually tear down any in-progress calls when invoked.)

Configuration data in the Active area is only available while the ITG remains in operation. If the ITG is reset, the Active area is reloaded from the data stored in NVS. Data in the Active area may be saved to NVS by entering the **config store** command.

For most of the H.323 parameter, settings won't take effect until the ITG reset. To ensure the H.323 setting to take effect, it is recommended to reset the ITG after changing the settings using the **set** command.

In summary:

- Use **set** commands to make configuration parameters changes in the Temporary area
- Use the **config activate** command to move the new values into the Active area, available for use
- Use the **config store** command to save the new Active values in NVS
- Reset the ITG after changing H.323 settings and storing the setting to NVS.

config {activate|store|erase}

Use the **activate** command to manage the configuration data. A sequence of **set** command is typically preceded by and/or followed by the **config** command for the **set** command to become active.

Syntax description

activate	Move the configuration from temporary area to active area.
store	Store the active configuration data into non-volatile storage.
erase	Erase the configuration from non-volatile storage.

show h323

The **show h323** command displays the settings of the parameter that are related to H323 signaling protocol.

Syntax Description

This command has no arguments or keywords

Example

The following example shows how to display the H323 parameters:

```
EITG>show h323  <Enter>
h323 display_name   = 'Customer'
h323 h245_term_type = 60
h323 rtp_port_base  = 30000
h323 out_fast_start = on
h323 in_fast_start  = on
h323 auto_answer    = on   Call is connected automatically.
h323 nat_call       = off
dtmf duration       = 300 ms
No IMTC IP Defined!
h323 gk_mode        = off
EITG>
```

show version

The **show version** command displays the version of various software components of the ITG.

Syntax Description

This command has no arguments or keywords

set h323 alias {add | del} {*alias*|all}

The **set h323 endpoint_prefix** command is used to create and delete aliases that are registered with the Gatekeeper.

Syntax Description

add	Create an alias *alias*
del	Delete a previously created alias *alias*
alias	Alias to be created or deleted
all	Delete all previously created alias. This optional applies to **del** only

set h323 allow_call_wo_gk {true|false}

The **set h323 allow_call_wo_gk** command is used to inform the H.323 stack to allow imcoming calls from a remote ITG which is not registered with a gatekeeper.

Syntax Description

true	Allow calls from ITG that is not registered with a gatekeeper.
false	Do not allow calls from ITG that is not registered with a gatekeeper.

Default

The ITG allows calls from ITG that is not registered with a gatekeeper.

set h323 auto_answer {on|off}

The **set h323 auto_answer** command is used to enable or disable early call setup connection. If disabled, the call is not set up until the user initiates the connection.

Syntax Description

on	Enable H323 early call setup connection.
off	Disable H323 early call setup connection.

set h323 display_name *display_name*

The **set h323 display_name** command is used to set the display name information that is carried in the H.323 setup messages.

Syntax Description

display_name	The string to be is inserted into the Q.931 display information field and in the sourceAddress field 2 of the H.323 setup-UUIE .

Example

The following example sets the h323 display name as "my gateway".

```
EITG> set h323 display_name my gateway
```

set h323 dtmf_duration *duration*

When sending dtmf, by default, the gateway will use H323 Version II standard dtmf signal except other specified (ex: IMTC_dtmf). User may specify the duration of the dtmf tone.

Syntax Description

duration	Duration for the DTMF tone in millisecond.

Default

The default setting is 300 milliseconds.

set h323 endpoint_reg_type {gw | terminal}

The **set h323 endpoint_reg_type** command is used to set the H.323 registration type. This should not be confused with the H.245 terminal type, although the two parameters should be programmed consistently. This parameter specifies how the ITG will register itself with the gatekeeper, and has nothing to do with master/slave determination.

Syntax Description

gw	The ITG registers itself to gatekeeper as a H.323 Gateway
terminal	The ITG registers itself to gatekeeper as a H.323 Terminal

Default

The ITG registers to gatekeeper as a H.323 Gateway.

set h323 gk_addr *ip_addr*

The **set h323 gk_addr** command is used to specify the address of the gatekeeper when configured for manual mode.

Syntax Description

ip_addr	IP address of the H.323 gatekeeper

set h323 gk_max_tries *count*

The **set h323 allow_call_wo_gk** command is used to control how many registration attempts will be made before the ITG considers itself to have failed registration. Once this number of unsuccessful attempts have been made, the ITG will only be able to place calls if **allow_calls_wo_gk** is true.

Syntax Description

count	Number of registration attempt

Default

The default number of registration attempt is 2.

set h323 gk_mode {off | manual | auto}

The H.323 protocol allows calls to be established through H.323 gatekeeper. The **set h323 gk_mode** command is used to specify if call is establishmet through a gatekeeper.

Syntax Description

off	Disables gatekeeper operation
manual	Enables gatekeeper in manual discovery mode. The gk_addr must be set appropriately.

auto Enables auto-discovery of the gatekeeper

Default

The gatekeeper operation is disabled.

set h323 h245_term_type *terminal_type*

The **set h323 h245_term_type** command is used to set the H.245 terminal type. The terminal type is used as part of the master/slave determination process of H.245.

Syntax Description

termmal_type A numerical value designating the H245 terminal type. Typically, setting the H.245 terminal type to a value less than 50 will force slave operation, and a value greater than 200 will force master operation

Example

The following example sets the h245 terminal type to 60.

```
EITG> set h323 h245_term_type 60
```

set h323 imtc_dtmf {add|del} *ip_addr*

There are two ways VoIP gateway handles DTMF relay, per H.323 and IMTC specifications. By default, the ITG conveys DTMF digits in H.323 format. The **set h323 imtc_dtmf** command is used to specify how DTMF digits are to be conveyed to a remote VoIP device.

Syntax Description

add ITG sends DTMF digit to the remote VoIP device designated by IP address *ip_addr* in IMTC conforming format.

del ITG sends DTMF digit to the remote VoIP device designated by IP address *ip_addr* in H.323 format.

ip_addr IP address of the remote ITG

Default

The ITG sends DTMF digits in H.323 format, unless the call is destined for a remote VoIP device whose IP address has been **set h323 imtc_dtmf add**ed.

set h323 in_fast_start {on|off}

The **set h323 in_fast_start** command is used to select the H.323 Faststart mode on for calls initiated from remote ITGs.

Syntax Description

on Set H323 Faststart mode on

off Set H323 Faststart mode off

set h323 nat_call {on|off}

When the ITG is installed in a network that connects to WAN via a router with Network Address Translation (NAT) feature, the NAT might block calls. The **set h323 nat_call** command is used to enables the ITG to connect to remote ITGs connecting to WAN via NAT capable router.

Syntax Description

on	Enable.
off	Disable.

set h323 out_fast_start {on|off}

The **set h323 out_fast_start** command is used to select the H.323 Faststart mode on for calls making toward remote ITGs.

Syntax Description

on	Set H323 Faststart mode on
off	Set H323 Faststart mode off

set h323 rtp_port_base *port_base*

The **set h323 rtp_port_base** command is used to select the starting port number for assignment of RTP ports. When a calls are made to remote ITGs, an RTP port is opened for each call. The ITG uses the *port_base* as the RTP port number for the first call, the next call uses the next successive port, and so on.

Syntax Description

port_base	The starting port number for the assignment of RTP port. If rtp_port_base is assigned a value of 0, the assignment of port number will be dynamic. The port number can be specified from 0 to 32767. Typically, numbers from 0 to 1023 are reserved on most systems. The recommended value is 30000.

Example

The following example sets RTP base port number to 30000.

```
EITG> set h323 rtp_port_Base 30000
```

8.10 Dial Plan Management Commands

Among the command sets supported by the CLI, the dial plan management commands are the most sophisticated. Some of the dial plan management commands are only allowed when

the ITG is in the atpm table update state. For ease of explaining, this command set is further categorized into several sub command sets.

Sub command set	Purposes	Commands	atpm table update state required?
Database update control	• Instruct the ITG to start or stop atpm table update state. • Store/restore atpm tables to/from non-volatile storage • Purge atpm tables • Erase dial plan database from non-volatile storage	atpm req atpm done atpm restore atpm store atpm purge atpm erase	No No Yes No Yes No
Destination table management	Manage atpm destination table	atpm dadd atpm ddel atpm dfind atpm dlist	Yes Yes No No
Hunt group table management	Manage atpm hunt group table	atpm hadd atom hdel atpm hfind atpm hlist	Yes Yes No No
Address table management	Manage atpm address table	atpm aadd atpm adel atpm afind atpm alist	Yes Yes No No
System	Manage atpm system configuration	atpm slist atpm sys	No Yes

The following sections describe each sub command set and the commands.

Database Update Control Commands

atpm done

The **atpm done** command ends the atpm table update session and re-enables the address translation.

Syntax description

This command has no arguments or keywords

atpm erase

The **atpm erase** command erases the dial plan database from the non-volatile memory.

Syntax description

This command has no arguments or keywords

atpm purge {all|addr|dest|hunt}

Use the **atpm purge** command to delete all entries from the atpm tables.

Syntax description

all	Delete all entries from atpm ddress, destination and hunt group tables.
addr	Delete all entries from atpm address table.
dest	Delete all entries from atpm destination table.
hunt	Delete all entries from atpm hunt group table.

atpm req

The **atpm req** command starts the atpm table update session. Upon starting the atpm table update session, the ATPM address translation is disabled, hence no phone call can be made, until a **atpm done** command is issued.

Syntax description

This command has no arguments or keywords

atpm restore

The **atpm restore** command restores the whole dial plan from non-volatile storage to the atpm address, destination and hung group tables.

Syntax description

This command has no arguments or keywords

atpm store [erase]

The **atpm store** command store all atpm tables into non-volatile memory.

Syntax description

erase	(Optional) Erase the non-volatile before storing the dial plan database. This option is not recommended except the very first time you use the **atpm store** command.

Destination Table Management Commands

atpm dadd *dest_id* port *port#*

The **atpm dadd *dest_id* port** command adds an local destination entry into the atpm destination table. A local destination entry is one of the telephony ports on the ITG.

Syntax description

dest_id	Destination ID. For each destination, you need to assign it a unique identifier between 1 and 65536.
port#	The number of the telephony port.

Example

The following example shows how to assign ID 1 to the first telephone port and add an entry in the destination table designating it.

```
EITG>atpm dadd 1 port 0 <Enter>
```

atpm dadd *dest_id* h323 *dest_ip_addr* [*ip_port*]

The **atpm dadd *dest_id* h323** command adds a h323 type remote destination entry into the atpm destination table. A remote destination entry is typically another ITG or H323 gateway.

Syntax description

dest_id	Destination ID. For each destination, you need to assign it a unique identifier between 1 and 65536.
dest_ip_addr	The IP address of the remote destination.
ip_port	(Optional) Base port number the ITG uses to establish voice with that remote destination.

Example

The following example shows how to add a remote destination whole IP address is 192.168.0.3 to the destination table and assign an ID 200 to that destination.

```
EITG>atpm dadd 200 h323 192.168.0.3 <Enter>
```

atpm ddel *dest_id*

The **atpm ddel** command deletes an entry from the atpm destination table.

Syntax description

dest_id	ID of a previously added destination entry to be deleted from destination table.

atpm dfind *dest_id*

The **atpm dfind** finds and display an entry in the destination table.

Syntax description

dest_id ID of a previously added destination entry to be displayed.

Example

The following example shows how to display a destination whose ID is 200.

```
EITG>atpm dfine 200 <Enter>
Dest id    Mode   Destination
------------------------------------------------------------
  200   H.323    Dest = 192.168.0.3/1720 TCP
OK
EITG>
```

atpm dlist

The **atpm dlist** displays all entries in the destination table.

Syntax description

This command has no arguments or keywords

Example

```
EITG>atpm dlist
Dest id    Mode   Destination
------------------------------------------------------
      1   Local   PORT = 0
      2   Local   PORT = 1
      3   Local   PORT = 2
      4   Local   PORT = 3
      5   Local   PORT = 4
      6   Local   PORT = 5
      7   Local   PORT = 6
      8   Local   PORT = 7
     11   H.323   Dest = 210.243.230.167/1720 TCP
OK
EITG>
```

Hunt Group Table Management Commands

atpm hadd *hunt_group_id* {1|2} *dest_id* [*desi_id2*] …

Use the **atpm hadd** command to add an entry into the atpm hunt group table.

Syntax description

hunt_group_id	Hunt group ID. For each hunt group, you need to assign it a unique identifier between 1 and 65536.
1	Hunt type 1. Hunt type 1 hunts destination within a hunt group starting from the destination member just after the last used member.
2	Hunt type 2. Hunt type 2 hunts destination within a hunt group starting from the first destination member.
dest_id1	ID of the first destination member in the hunt group.
dest_id2	(Optional)List of ID's of additional destination members in the hunt group.
dest_id3 …	

Example

The following example shows how to group destination 1, 2, 3 and 4 into a hunt group, assign it hunt group ID 10, and specify hunt type 2 for this hunt group.

```
EITG>atpm hadd 10 2 1 2 3 4<Enter>
```

atpm hdel *hunt_group_id*

The **atpm hdel** command deletes an entry from the atpm hunt group table.

Syntax description

hunt_group_id	ID of the hunt group to be deleted from the hunt group table.

atpm hfind *hunt_group_id*

The **atpm hfind** finds and display an entry in the hunt group table.

Syntax description

hunt_group_id	ID of the hunt group to be displayed.

atpm hlist

The **atpm hlist** display all entries in the hunt group table.

Syntax description

This command has no arguments or keywords

Example

```
EITG>atpm hlist
Group id   Type  #Members    Member ids
-------------------------------------------------------------------
--------
       1      2          1    1
       2      2          1    2
       3      2          1    3
       4      2          1    4
       5      2          1    5
       6      2          1    6
       7      2          1    7
       8      2          1    8
      11      2          1    11
OK
EITG>
```

Address Table Management Commands

atpm aadd *tel# min_digits max_digits hunt_group_id prefix_strip_len* [*prefix#*]

Use the **atpm aadd** command to add an entry into the atpm address table.

Syntax description

tel#	Telephone number to match. This is only part of the total dialed string.
min_digits	Minimum number of digits to be collected before the ATPM starting matching the dialed string with entries in the address table.
max_digits	Maximum number of digits to be collected before the ATPM starting matching the dialed string with entries in the address table.
hunt_group_id	Hung group ID for this telephone number
prefix_strip_len	The number of digits to be stripped at the beginning of the collected dial string before forwarding the string to the destination.
prefix#	(Optional) Digit to be added before the beginning of the collected dial string before forwarding it to the destination.

atpm adel *tel#*

The **atpm adel** command deletes an entry from the atpm address table.

Syntax description

tel#	Number of a previously added entry to be deleted from the atpm address table.

atpm afind *tel#*

The **atpm afind** finds and display an entry in the address table.

Syntax description

tel#	Number of a previously added entry in the atpm table to be displayed.

atpm alist

The **atpm alist** displays all entries in the address table.

Syntax description

This command has no arguments or keywords

Example

```
EITG>atpm alist
  Address                Hunt    Min     Max     Prefix Prefix
  Entry                  Grp_Id  Digits  Digits  strip  Address
  103                    3       0       16      0      None
  104                    4       0       16      0      None
  201                    1       1       3       3      None
  202                    2       1       3       3      None
  203                    3       1       3       3      None
  204                    4       1       3       3      None
  205                    5       1       3       3      None
  206                    6       1       3       3      None
  207                    7       1       3       3      None
  208                    8       1       3       3      None
  666                    11      3       3       0      None
OK
EITG>atpm done
OK
EITG>
```

System Commands

atpm slist

The **atpm slist** displays the atpm system table.

Syntax description

This command has no arguments or keywords

Example

```
EITG>atpm slist
System Info: Total dial time = 30000ms, First digit wait = 10000ms,
             Interdigit wait = 5000ms, Dial term digit = None
OK
EITG>
```

atpm sys *dial_time 1st_digit_wait inter_digit_wait* [*dial_term_digit*]

Use the **atpm sys** command to set the time constraints for collection of dial digits.

Syntax description

dial_time	The maximum time, in millisecond, allowed for entry of the entire string of dial digits. At expiration, ATPM starts address lookup.
1st_digit_wait	The maximum time, in millisecond, allowed between off-hook and when the first dial digit is entered. At expiration, ATPM considers address lookup to fail.
inter_digit_wait	The maximum time allowed between entry of each digit after the previous digit. At expiration, ATPM starts address lookup.
dial_term_digitr	(Optional) End of the dial string is declared when the digit is entered.

8.11 Tel Commands

tel show pcm_gain_level

The **tel show pcm_gain_leve**l command to display the gain level setting of the PCM codec's receive channel.

Syntax Description

This command has no arguments or keywords

tel show port [*port#*]

The **tel show port** command displays the hook state of a telephony port.

Syntax Description

port# Number of the port.

Default

If the port number is not specified, the CLI displays hook state of all telephony ports.

tel show ring_freq

The **tel show ring_freq** command to displays the frequency of the ring signal that the ITG sends to FXS ports..

Syntax Description

This command has no arguments or keywords

tel set pcm_gain_level {1|2|3|4|5}

The FXO ports might be connected to central office switch or PBX via local loop which may of as long as several miles. For compensating signal distortion in the local loop, the ITG's PCM codec is designed in such a way that users might adjust its gain level before transmitting analog signal to the local loop. The **tel set pcm_gain_leve**l command is used to set the gain level for the PCM codec for compensating signal loss in the local loop.

Syntax Description

1	Set gain level to –1 dB
2	Set gain level to 0 dB
3	Set gain level to +1 dB
4	Set gain level to +2 dB
5	Set gain level to +3 dB

Default

The default setting is -1 dB.

Note

The PCM gain level setting is only meaningful to FXO ports. It is not applicable to FXS ports.

tel set ring_freq {1|2|3|4}

Use the **tel set ring_freq** command to set the frequency of the ringer ITG uses to ring a FXS port.

Syntax Description

1	Set ring freq to 17 Hz
2	Set ring freq to 20 Hz
3	Set ring freq to 25 Hz
4	Set ring freq to 50 Hz

8.12 Obsoleted Commands

Some of the CLI commands previously supported by version 2.0x software or older versions are no longer supported. The following table lists the obsoleted commands and commands CLI current supports that serve the equivalent functions:

Obsoleted Command	New Command
activate	config activate
commit	config store
flash clean config	config erase
flash clean dial_plan	atpm erase

Chapter 9 Upgrading the ITG

This chapter explains how to upgrade your ITG when new revision software becomes available. Upgrades may improve system functionality or add new features to your ITG.

The ITG offers two operation modes. Under normal conditions, the ITG operates in regular operational mode. When software upgrade is required, the ITG may be operated in download mode. Under download mode, the CLI will support limited commands allowing users to read new revision codes from a remote TFTP server and write it to the built-in flash non-volatile storage.

The CLI under download differs from normal in the prompts and that it supports less commands.

9.1 Entering Download Mode

To switch from normal operation mode to download mode, use the **download** CLI command.

```
EITG> download <Enter>
```

Note: To be able to switch to download mode from Telnet session, the TFTP loader on the ITG must be version 3.00 or higher.

The ITG will terminate all on-going calls, shut down itself, reset and enter download mode. If you enter download mode from Telnet session. The Telnet session will be terminated too. You need to connect to the ITG from Telnet client again to be able to access the CLI commands. Refer to Section Connection through Telnet in Chapter 8 for detailed information on how to connect to ITG from Telnet client.

Upon entering the download mode, the CLI will show the following prompt.

```
EITGLoader>
```

9.2 CLI Commands in Download Mode

Under download mode, the CLI supports the following commands:

Command	Description
help	Display help screen
quit	Terminate download mode, switch to normal operation mode.
set	Change IP parameter
start	Start downloading code from TFTP server

The following section describes each of the commands.

help

The **help** command lists the top-level commands.

Syntax Description

This command has no arguments or keywords

quit

The **quit** command is used to terminate the download mode and return to normal operation mode.

Syntax Description

This command has no arguments or keywords

Note

Switching mode from Telnet session will terminate current active session. You'll need to connect to ITG again to be able to access the CLI.

set ip *ip_addr*

Use the **set ip** command to assign an static IP address to the ITG.

Syntax description

ip_addr The IP address of the ITG.

Note

The new IP address will not take effect until the ITG is reset.

set gateway *ip_addr*

Use the **set gateway** command to assign a default gateway (router) for the ITG. The default gateway routes packet data outside or your IP subnet.

Syntax description

ip_addr	The IP address of the default gateway. IP address of 0.0.0.0 stands for no default gateway.

Note

The new setting will not take effect until the ITG is reset.

set mask *ip_mask*

Use the **set mask** command to set the IP subnet mask for the ITG.

Syntax description

ip_mask	The subnet mask of your network.

Note

The new setting will not take effect until the ITG is reset.

start

Use the **start** command to start downloading code from TFTP server. The ITG will prompt you for the IP address of the TFTP server and the file to download.

Syntax description

This command has no arguments or keywords

Appendix A Technical Specifications

A.1 ITG Technical Specifications

Telephony Interface Module support	2 ports loop start FXO, 2 ports loop start FXS for 4 ports desk top version. And 2 ports loop start FXS for 2 ports desk top version.
Network Interface Ports	1 10/100Base-T, auto sensing, RJ45
Voice codec support	G.711 PCM 64kbps (A-law and μ-law) G.723.1A ACELP/M-MLQ (5.3, 6.3kbps) G.729AB CS-ACELP (8kbps)
Fax	ITU-T V.21, V.27ter, V.29, V.33 and V.17
Fax over IP protocol	T.38 Proprietary low bandwidth protocol
Echo cancellation	G.168 compliant, 16 ms tail length
Voice processing	Voice activity detection DTMF detection/generation Echo cancellation Comfort noise generation Call progress detection Gain control
Call control	H.323
Management	Built HTTP server allowing management from web browser Command line interface allowing management from VT-100 terminal or Telnet client
Software upgrade	Flash memory and built-in TFTP allowing software upgrade via network
Power	AC-to-DC power supply, 90-260 VAC, 50-60 Hz
Environmental	Operating temperature: 0^o to 45^o C (32^o to 113^o F) Storage temperature: -10^o to 60^o C (-4^o to 149^o F) Humidity: 10% to 85% (non-condensing)
Dimension (H x W x D)	2.6 x 17.5 x 10.8 in (44 x 445 x 275 mm)

Weight	4.2 kg (9.3 lb) 5.1 kg (11.2 lb) with two modules installed
Compliances	FCC Part 15 Class B CE UL

A.2 FXO Card Technical Specifications

Signaling:	Loop Start / DTMF
No. of channels:	2
Interface Connectors:	2 RJ-11 2-pin modular jacks.
Line Impedance :	600 Ω 900 Ω
Insertion Loss:	2 dB nominal.
Frequency Response:	300Hz ~ 3400Hz +/- 2dB w.r.t. 1004Hz.
Return Loss:	≥ 18 dB
Input Level adjustment:	-6 dB to +6 dB
Output Attenuation:	0 dB to 13 dB
Longitudinal Balance:	≥ 45 dB

A.3 FXS Card Technical Specifications

Signaling:	Loop Start / DTMF
No. of channels:	2
Interface Connectors:	2 RJ-11 2-pin modular jacks.
Line Impedance :	600 Ω 900 Ω
Insertion Loss:	2 dB nominal.
Frequency Response:	300Hz ~ 3400Hz +/- 2dB w.r.t. 1004Hz.
Return Loss:	≥ 18 dB
Input Level adjustment:	-6 dB to +6 dB
Output Attenuation:	0 dB to 13 dB
Longitudinal Balance:	≥ 45 dB
Loop Current:	25mA nominal
Ring Voltage:	50Vrms Nominal
Ringing Tone:	16.67Hz, 20Hz(default), 25Hz or 50Hz

A.4 Console Port

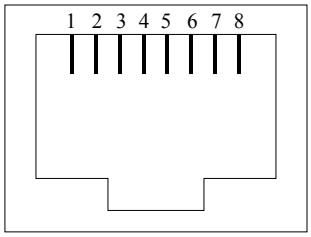
The console port uses a DB-9 RS-232 connector. The supplied straight-through RS-232 cable connects the console port of the ITG to a console PC or terminal. Pinout for the port is described in the following table.

DB-9 pin	Signal
1	Not connected
2	TxD
3	RxD
4	Not connected
5	Ground
6	Not connected
7	Not connected
8	Not connected
9	Not connected

A.5 LAN Port

The 10/100 LAN port use standard RJ-45 connector and Ethernet pinouts. The following diagram and table show the pinout on the port connector. When connecting the LAN port to switches or repeaters, you must use a straight-through cable.

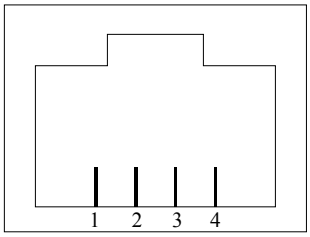
RJ45 pin	Signal
1	RxD+
2	RxD-
3	TxD+
4	Not connected
5	Not connected
6	TxD-
7	Not connected
8	Not connected



A.6 FXO Port Pin Assignments

The FXO Telephony Interface Module has 2 RJ11C/W modular jacks. The following diagram and table show the assignments of the pin for the RJ11 port.

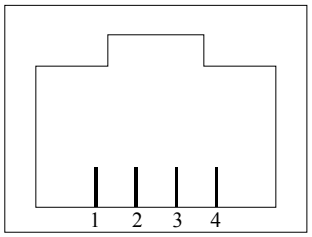
RJ-11 pin	Signal
1	Not connected
2	Tip
3	Ring
4	Not connected



A.7 FXS Port Pin Assignments

The FXS Telephony Interface Module has 2 RJ11C/W modular jacks. The following diagram and table show the assignments of the pin for the RJ11 port.

RJ-11 pin	Signal
1	Not connected
2	Tip
3	Ring
4	Not connected



Appendix B CLI Commands

B.1 Normal Mode Commands

Command	Description	Page
atpm aadd	Add an entry to the address table	75
atpm adel	Delete an entry from the address table	75
atpm afind	Find and display an entry in the address table	75
atpm alist	Display all entries in the address table	76
atpm dadd	Add an entry to the destination table	71
atpm ddel	Delete an entry from the destination table	71
atpm dfind	Find and display an entry in the destination table	72
atpm dlist	Display all entries in the address table	72
atpm hadd	Add an entry to the hunt group table	73
atpm hdel	Delete an entry from the hunt group table	73
atpm hfind	Find and display an entry in the hunt group table	73
atpm hlist	Display all entries in the hunt group table	73
atpm done	End the atpm table update session	69
atpm erase	Erase all atpm tables from NVS	69
atpm purge	Purge entries from atpm table(s)	69
atpm req	Start atpm table update session	69
atpm restore	Restore atpm tables from NVS	69
atpm store	Store atpm tables into NVS	70
atpm slist	Display atpm system parameters	77
atpm sys	Set atpm system parameters	77
config activate	Move the configuration from temporary area to active area.	62
config erase	Erase the configuration from NVS	62
config store	Store the active configuration data into NVS	62
clrscr	Clear screen	57
download	Switch to download mode	58
help	Display help screen	58

B.2 Download Mode Commands

Appendix C Factory Default Settings

The following table lists the settings of certain parameters before the ITG is shipped.

Parameter	Default Setting
Network	
IP address	192.168.0.1
IP subnet mask	255.255.255.0
Default gateway	0.0.0.0
IP precedence	0
Ethernet link speed	10/100 auto-negotiation
User ID for HTTP browser and Telnet client login	eitg
Password for HTTP browser and Telnet access login	123
HTTP server	On
Serial port (Fixed)	
Baud rate	19,200
Number of data bit	8
Parity check	None
Number of stop bit	1
Flow control	None
H.323	
h323 display_name	customer
h323 h245_term_type	60
h323 rtp_port_bas	30,000
h323 out_fast_star	Off
h323 in_fast_star	Off
h323 auto_answer	On
h323 nat_cal	Off
dtmf duration	300 ms
h323 gk_mode	Off

Voice codec

Preferred voice codec	G.723 6.3kbps

Telephony

PCM codec receiver gain for FXO ports	-1 dB
Ringer frequency for FXS ports	17 Hz

Appendix D Worksheets

D.1 IP Parameters

Consult your network manager to obtain a static IP address for the ITG, and the information about the IP subnet mask and the default gateway for your network. Fill out the following work sheet before configuring the ITG.

IP address _____

IP subnet mask _____

Default gateway _____

D.2 ATPM Destination Table

Local Destinations

Each telephony port of the ITG must be assigned a unique destination ID. Fill out the worksheet for local destinations by designating each port a unique destination ID, then use the CLI command **atpm dadd *dest_id* port *port#*** for each entry in the worksheet to add it to the destination table. The *dest_id* in the command corresponds to the Destination ID in the worksheet, while the *port#* corresponds to the Port#. You may alternatively use the web browser to add local destinations to the destination table.

Port#	Mode	Destionation ID
0	port	
1	port	
2	port	
3	port	

Remote Destinations

Each remote ITG to be reached must be assigned a unique destination ID. Obtain the IP addresses of the ITG at remote sites and fill out the worksheet for remote destinations by designating each remote ITG a unique destination ID, then use the CLI command **atpm dadd *dest_id* h323 *ip_addr* [*ip_port*]** for each entry in the worksheet to add it to the destination table. The *dest_id* in the command corresponds to the Destination ID in the worksheet, the *ip_addr* corresponds to the Port#, the optional *ip_port* corresponds to the IP port. You may alternatively use the web browser to add remote destinations to the destination table.

IP address	IP port (optional)	Mode	Destination ID
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	
. . .		H323	

D.3 ATPM Hunt Group Table

Several destinations may be grouped together to form a hunt group. When an incoming phone number matches the phone number of the hunt group, the ITG attempts to terminate the call at each of the destinations in the hunt group one at a time until a call is successfully completed. Plan how destinations are to be grouped and fill out the hunt table worksheet, then use the CLI command **atpm hadd *hunt_group_id hunt_type dest_id …*** for each entry in the worksheet to add it to the hunt group table. The *hunt_group_id* in the command corresponds to the Hunt Group ID in the worksheet, the *hunt_type* corresponds to the Hunt Type (1 or 2), the *dest_id ...* corresponds to the List of Destination IDs. You may alternatively use the web browser to add hunt groups to the hunt group table.

Hunt Group ID	Hunt Type		List of Destination IDs
	1	2	

D.4 ATPM Address Table

Each phone number to be recognized by the ITG must have its first digits match an entry in the address table. Fill out the address table worksheet and use the CLI command

atpm aadd *tel# min_digits max_digits* *hunt_group_id prefix_strip_len* [*prefix#*] to add each entry in the worksheet to the address table. The *tel#* in the command corresponds to the Digits to Match in the worksheet, the *min_digits* corresponds to the Min. # of Digits to Collect, the *max_digits* corresponds to Max. # of Digits to Collect, the *hunt_group_id* corresponds to the Hunt Group, the *prefix_strip_len* correspond to No. of Digits to Strip and the *prefix#* corresponds to the Prefix String. You may alternatively use the web browser to add telephone numbers to the address table.

Digits to Match	Min. # of Digits to Collect	Max. # of Digits to Collect	Hunt Group	No. of Digits to Strip	Prefix String

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