InnoMedia MTA8328
Administrative Guide

March, 2017

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About This Document

This document provides details of the features available on the InnoMedia MTA8328 as well as feature descriptions and the configurations required.

Revision History

Date	Version	Notes
2016/10/25	V1.0	Based on firmware V1.0.0.19
2016/11/08	V1.1	Based on firmware V1.0.0.23
2016/11/23	V1.1	Based on firmware V1.0.0.27
2017/03/10	V1.2	Based on firmware V1.0.4.4

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1 INTRODUCTION

1.1 Product Overview

The InnoMedia MTA8328 is an integrated device providing telephony service over a broadband network. It allows the connection of your device to your Home Router through either a wired Ethernet connection or through WiFi[1]. This guide will help you to quickly install and configure your unit so that you can start placing calls right away.

1.2 Package Contents

1.2.1 MTA8328-1 Models and Packaging

The MTA 8328-1N supports an Ethernet interface connected to the Home Router or a LAN network.

Item List	Quantity
MTA8328-1N device	1
12V Power Adapter	1
Phone Cable	1
Ethernet Cable	1

Figure 1. MTA8328-1N top view and Packaging for MTA8328-1 Series

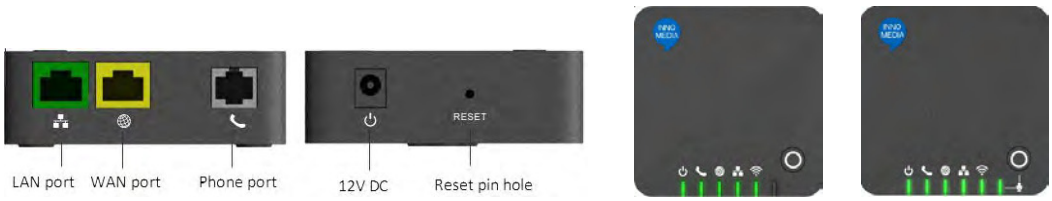

Figure 2. MTA8328-1 series Front and back panel, and MTA8328-1W/V Top views.

[1] WiFi functionality is supported on certain models only.

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1.3 MTA8328 Out of the Box Setup

1.3.1 MTA8328-1N or MTA8328-1W/V Setup

This section provides a step-by-step guide to install the MTA8328 and setup the system for connecting to a broadband network. Before starting the Installation, make sure your broadband Internet access device is powered on and your connection is up (check your Internet service provider's documentation).

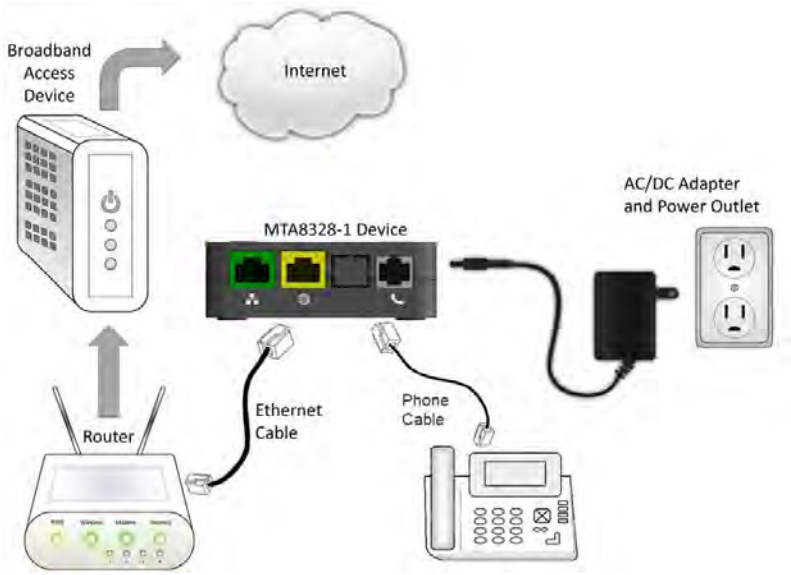

Figure 3. Setup the MTA device to connect to the router or network switch

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1. Plug the supplied power adapter into the MTA8328. The power LED will show steady green.
2. Connect your phone into the PHONE port on the MTA using the supplied Phone Cable.
3. Setup the MTA to connect to your Home Router. Connect the yellow Ethernet cable (supplied) into the WAN port on the MTA and connect the other end into an available Ethernet port on your router or LAN network.
4. If you have a device with Wifi, use the Captive Portal method to configure the the Wifi portion of the device and connect it to you home router.
    a. Press the round button on the device for more than 5 secs
    b. Use your mobile device or laptop to discover the SSID “MTA8328xxxx” where the xxxx are last 4 digits of your device MAC address
    c. Connect to that SSID and configure your device with the appropriate pass phrase and complete the Wifi setup of your device
5. Confirm that the MTA is successfully connected to the router and has acquired an IP address by checking that the WAN LED shows green for a 100BT connection, or amber for 10BT.
6. Once the MTA connects to the voice service provider network, and completes the registration and service provision process, you should see a solid green PHONE LED light displayed.

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2 HOME –DEVICE STATES

Login Screen

The MTA can be managed via a Web Browser interface. Once the MTA is connected as outlined in Figure 3~~Figure 3Figure 3~~, proceed to access and configure the MTA8328 via a Web Browser from a PC connected to the same router as the MTA WAN interface, or directly connect to the MTA LAN interface.

Press ***1 on the phone which connects to the MTA and get the IP address of the MTA.
The default Admin Username is: ***admin***
The default Password is: ***password***

The default end user Username is: ***user***
The default Password is: ***welcome***

Note: The default username and password could be different if changed by the service provider.

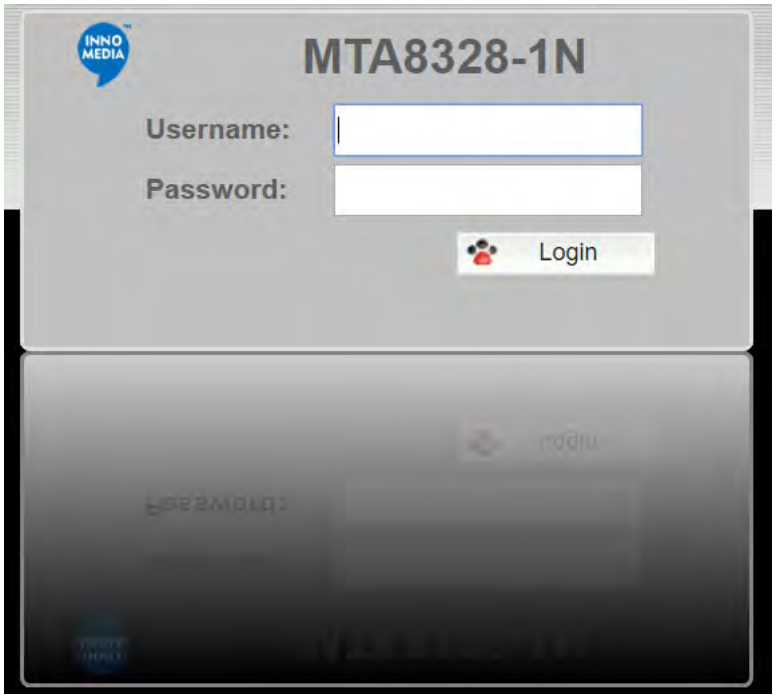

Figure 4. Login Screen (Username and Password). MTA8328-1N login screen example.

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Home Page

The Home page displays the device's current status of MTA8328-1N, as an example.

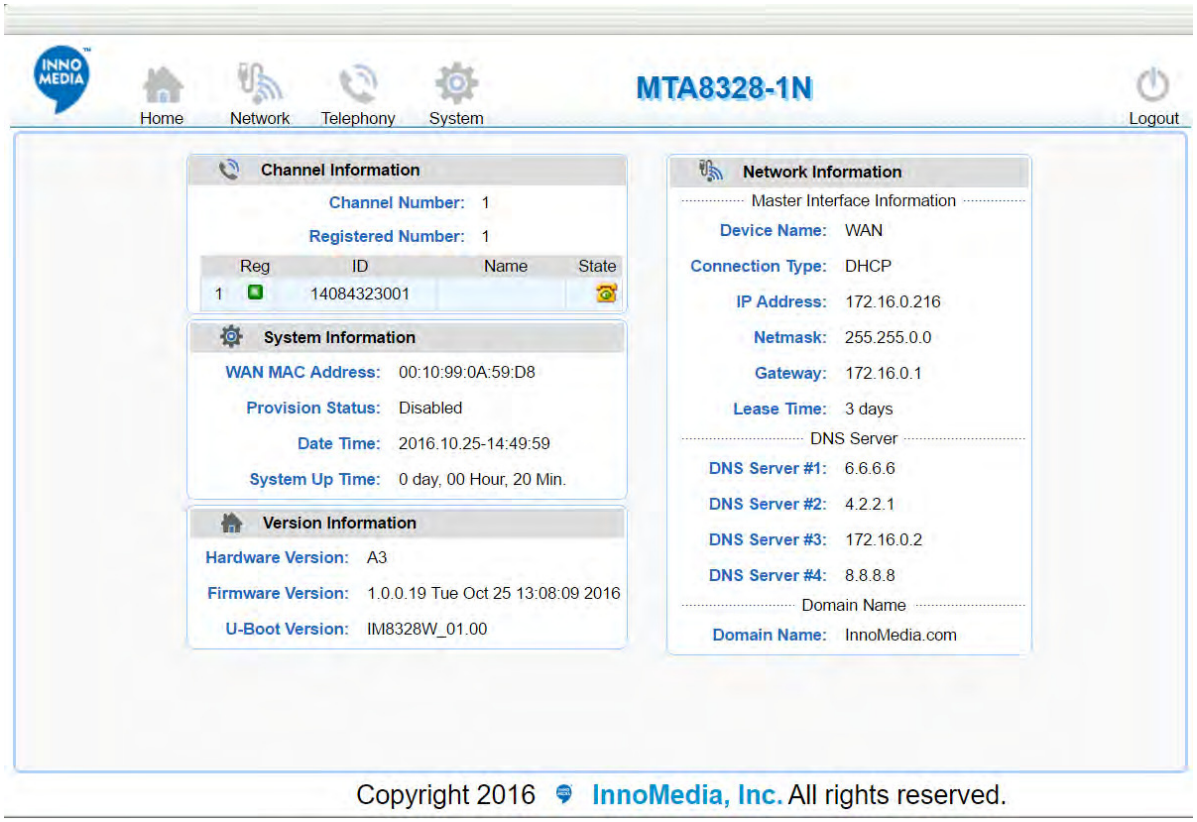

Figure 5. Current status of MTA8328-1N

Field Name	Description
Channel Information	Number of phone lines provisioned Number of SIP accounts provisioned
Reg Status	Successfully REGISTERED with SIP proxy Not REGISTERED with SIP proxy Account disabled
State	Phone on hook Phone off hook
System Information	• MAC address of Ethernet WAN • Provision Status: last provisioning date-time and status • Date Time: current date and time • System Up Time: up time since last power up.
Version Information	• Hardware Version • Firmware Version • Boot Loader Version
Network Information	• Master Information: Current active (in use) network. • DNS Server: all DNS server IP addresses

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	configured on the MTA devices. The priority order of DNS servers (in order of decreasing priority) used is: Master DNS server(s) > those obtained from the DHCP server > user configured DNS server(s). See section 3.1.3 for details on Master DNS. • Domain Name: the domain name obtained from DHCP Option 15 or the configured value described in section 3.1.2. The value obtained from DHCP has higher priority than any manually configured domain name.

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3 NETWORK

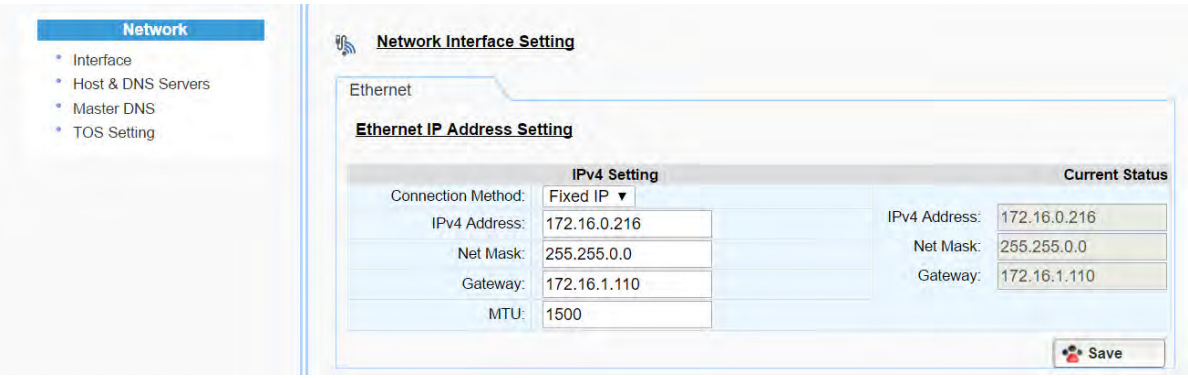
The Network pages allow the configuration of the MTA8328 network parameters.

3.1 IP Address Configuration for MTA8328

Configure IP address parameters for this device.

3.1.1 Ethernet or WiFi IP Address Setting

Configure the IPv4 IP address for the device. Click the “Interface” menu from the left panel.



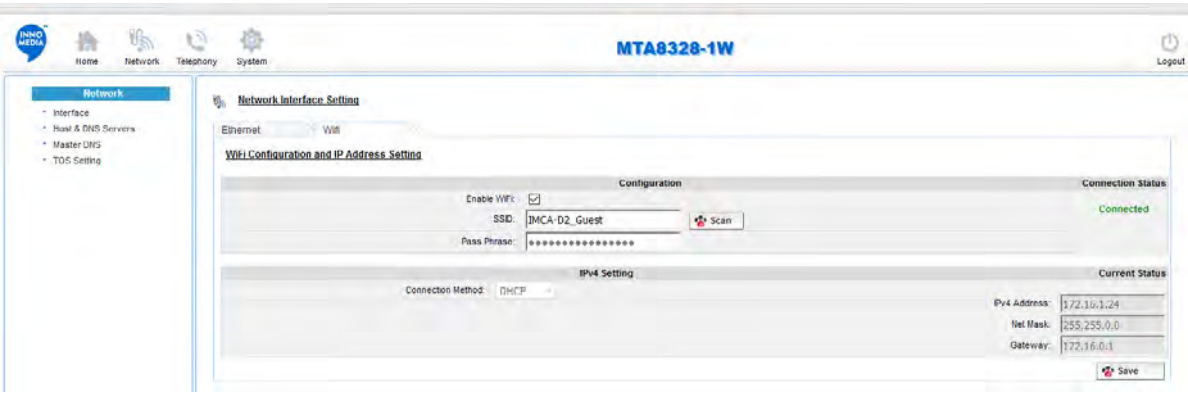


Figure 6. Configuring the IP Address on the Ethernet or WifiInterface

Field Name	Description
Connection Method	• DHCP: Automatically acquires IP address from the Home Router. • Fixed IP: Need to configure the following parameters according to the Home Router network settings. IPv4 IP address | Netmask | Gateway | MTU (maximum size of a IP packet, in bytes).

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	Note that default value of MTU is 1500, and its valid value ranges from 150 to 1500. Do not change MTU value unless necessary.

3.1.2 Host and DNS Servers

Configure the host and the DNS server information provided by your network operator.

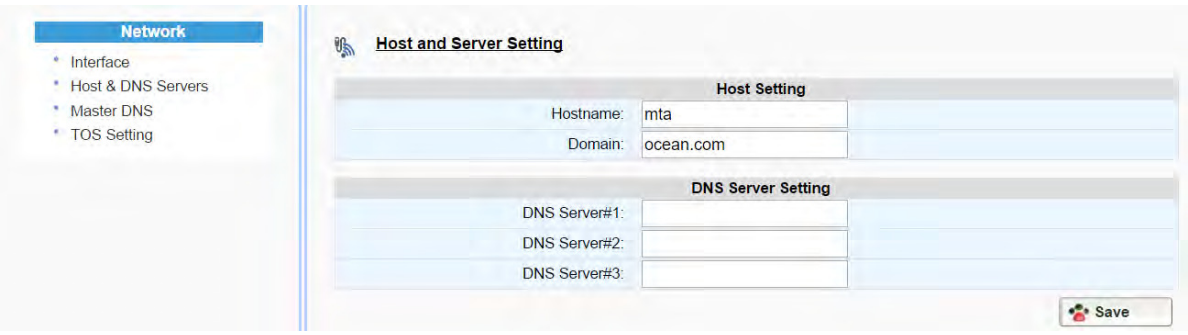

Figure 7. Configuring the host information on the device

Field Name	Description
Host Name	Configure the host name for the device.
Domain	Configure the domain name for the device.
DNS Server Setting	Allows configuration of up to three DNS servers.

3.1.3 Master DNS

"Master DNS" is the IP address of the domain name server specified by the telephony service provider rather than the internet service provider. If "Master DNS" is configured, the MTA gets related DNS services from this configured server to perform voice communication functions. The MTA acquires DNS server information from the following servers in the priority shown (in order of decreasing priority).

1. Master DNS
2. DHCP Option (Ethernet or WiFi IP Address Setting~~Ethernet or WiFi IP Address Setting~~~~Ethernet IP Address Setting~~)
3. Manually configured DNS (see section 3.1.2)

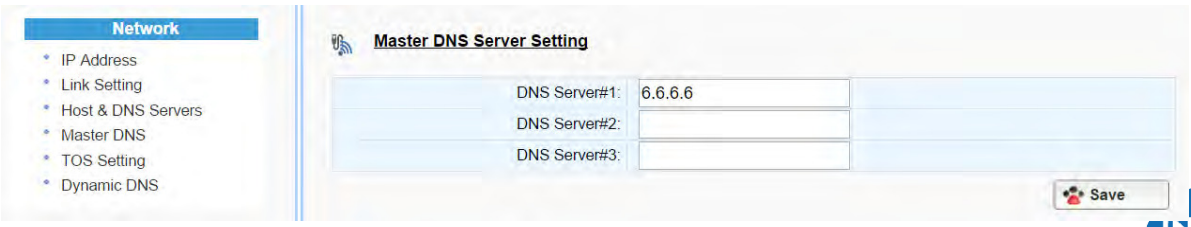

Figure 8. Configuring the Master DNS Information

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Field Name	Description
DNS Server	Configure the DNS server information specified by the VoIP service provider.

3.1.4 TOS Setting

TOS (Type of Service) is a part of the IPv4 header which is used for precedence, or in other words categorizing traffic classes. The higher the value of the IP Precedence field, the higher the priority of the IP packet.

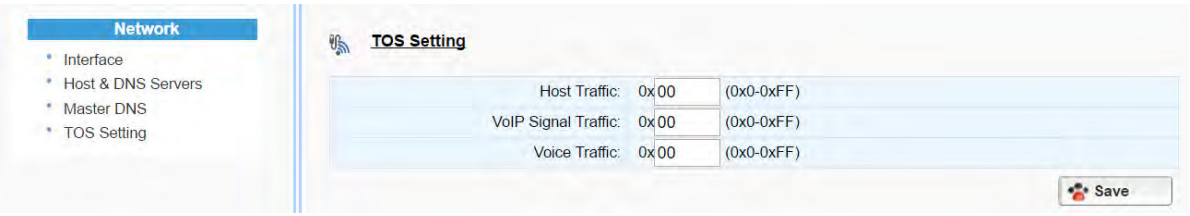

Figure 9. ToS Setting

Field Name	Description
TOS Setting	Host Traffic: Use the configured TOS value to tag data traffic other than SIP or RTP packets.
	VoIP Signal Traffic: Use the configured TOS value to tag SIP signaling packets.
	Voice Traffic: Use the configured TOS value to tag voice RTP packets.

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4 TELEPHONY

The Telephony section is used to configure SIP Parameters, telephony settings (including regional settings) and line diagnostics.

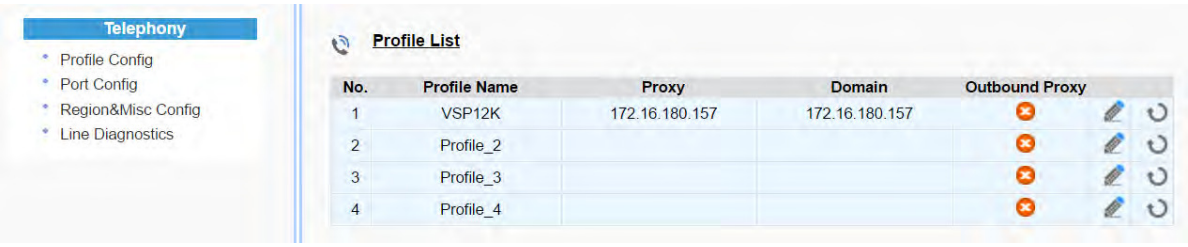

Figure 10 Configuring Telephony options

4.1 Profile Config

Profiles include SIP Server/Proxy Settings, Codec Settings, SIP Timer Settings, Digitmap Settings, FXS Settings, Feature and Service Code Settings, Fax Settings and Regional Settings which are described in the following sections.

Click on the Edit icon of a particular profile to display the profile setting screen.

4.1.1 SIP Server Setting

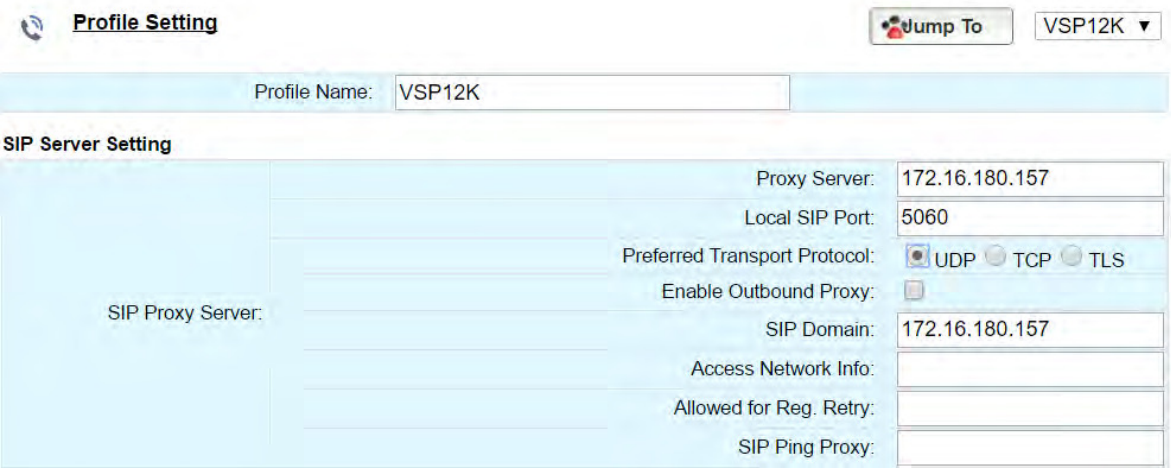

Figure 11. SIP Server Settings—SIP Proxy Server

Field Name	Description
Profile Name	Up to 4 profiles can be created. (The profile ID corresponds to the No. in the Profile List.)
Proxy Server	The FQDN or IP address of the SIP proxy server
Local SIP Port	The SIP port used on the MTA
Preferred	If there are no queried NAPTR records specifying the transport protocols to be

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Transport Protocol	used, the MTA uses this configured setting to set up proceed VoIP calls setup with the SIP server. UDP | TCP | TLS
Enable Outbound Proxy	If enabled, the MTA uses the value configured in "Proxy Server" as the outbound proxy server setting.
SIP Domain	The MTA uses this setting to (1) compose the host part of SIP request URI strings (2) perform NAPTR/SRV queries.
Access Network Info	This header is useful in SIP-based networks that also provide layer 2/layer 3 connectivity through different access technologies. SIP User Agents may use this header to relay information about the access technology to proxies that are providing services.
Allowed for Reg. Retry	Treat the configured return SIP error codes as successful SIP OPTIONS responses. If multiple error codes are allowed, use a comma (,) to separate them.
SIP Ping Proxy	MTA sends SIP OPTION ping messages to an assigned server as a keep-alive message.

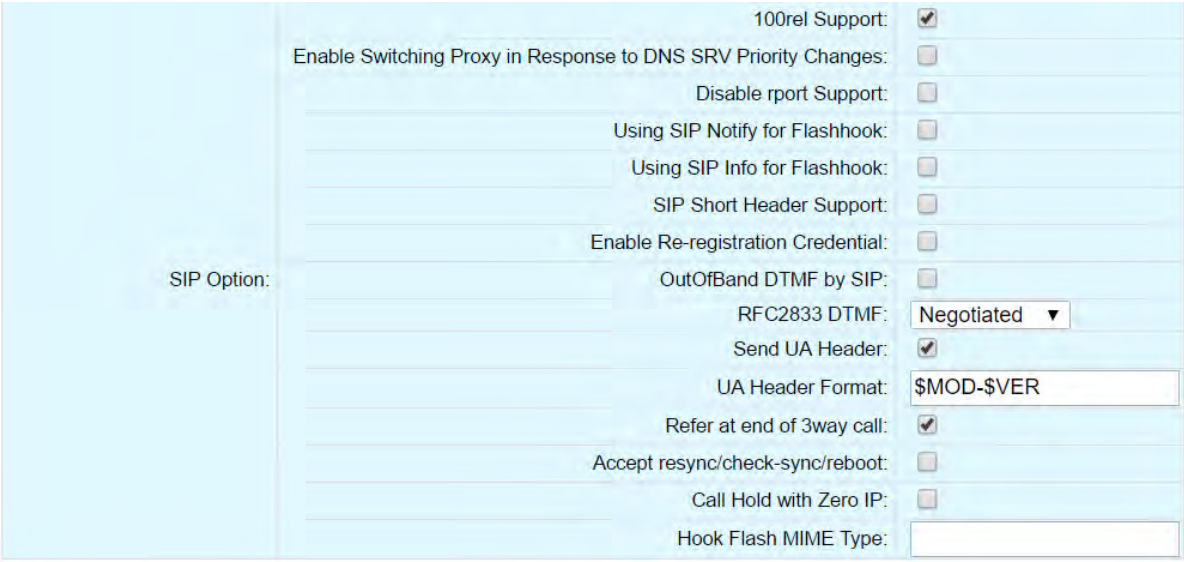

Figure 12. SIP Server Settings – SIP Option

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Field Name	Description
100rel Support	Enable 100rel response support.
Enable Switching Proxy in Response to DNS SRV Priority Change	When this item is enabled, whenever the MTA is ready to send a REGISTER request and the SRV TTL has expired, it performs an SRV query and the MTA will switch to the most preferred SIP server (lowest priority) in the SRV query response. If this item is disabled, the MTA stays with the currently registered SIP proxy and only saves the SRV query results. However, if the current SIP proxy is unreachable, or the MTA reboots and starts a new DNS query process, the MTA will then register to the most preferred SIP server (lowest priority) in the SRV query response.
Disable rport Support	Do not append rport (response port number) in the Via header.
Using Notify for Flash Support	Send a SIP NOTIFY hook flash event message during the call when a hook flash is detected.
Using Info Flash Support	Send a SIP INFO hook-flash event message during the call when a hook flash is detected.
Short header Support	Send SIP Headers in short format (compact form) to reduce message packet size.
Enable Re-registration Credential	Enable Re-registrations to carry the previous successful authentication credentials.
OutOfBand DTMF by SIP	Use SIP INFO to send DTMF.
RFC2833 DTMF	Use RFC2833 for sending DTMF digits. Available options: • Negotiated – MTA and SIP Server negotiate if 2833 is enabled or not. • Always off – 2833 is never used. • Always on – 2833 is always used.
Send UA Header	Allow MTA to send User-Agent Header in SIP message.
UA Header Format	User-Agent Header sent out is modifiable. (Note: If “Short header Support” is enabled,

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	there will be no UA Header in SIP messages.) Available parameters: • Model name ($MOD) • MAC ($MAC) • Version ($VER) • Config file last loaded ($CFG) Example Syntax: $MOD $MAC $VER $CFG. Output: SIP User-Agent: MTA-8328-1E 001099112233 V1.0.0.0
Refer at End of 3way Call	Send REFER when mixer (local MTA) hangs up, so the other two parties can continue the conversation.
Accept resync/check-sync/reboot	When enabled, the MTA device supports events triggered by SIP NOTIFY messages sent to the MTA from the SIP server. Event types include: (1) check-sync. MTA reboots itself and starts provisioning process. (2) reboot. MTA reboots itself and starts provisioning process. (3) resync. MTA starts provisioning process only.
Call Hold with Zero IP	Use 0.0.0.0 in SDP for call hold.
Hook Flash MIME Type	Input the MIME type string for Flash hook events.

4.1.2 Security Setting

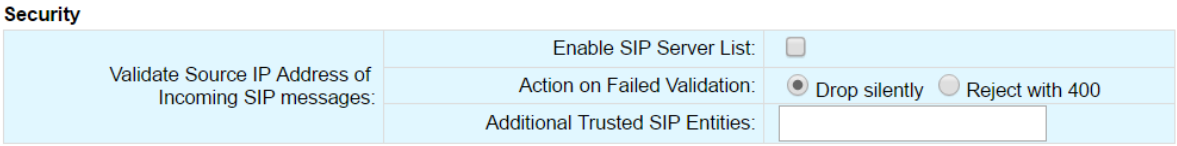

Figure 13. MTA Security Settings

Field Name	Description
Enable SIP Server List	When this feature is enabled, the MTA checks all incoming SIP request messages for their source IP addresses. If the source IP is not in the “SIP Server list”, the MTA rejects or drops this message. The MTA creates a “SIP Server list” which

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	contains the IP addresses resolved from the settings of “Proxy Server”, “SIP Domain” and the “EMS Server”.
Action on Failed Validation	Drop silently. The MTA simply drops the incoming SIP request messages. Reject with 400. The MTA replies with an error SIP response code of 400 to the sender.
Additional Trusted SIP Entities	Input one or more addresses (IP or FQDN) for additional servers from which the MTA will accept incoming SIP messages. These servers are in addition to those in the “SIP Server List” which the MTA automatically creates (see above).

4.1.3 Codec Setting

Configure voice codecs allowed by service providers for telephony services.

Codec Setting

		Codec	Ptime	Payload	Option	Param
Preferred Codec List:	Hi:	PCMU/8000	20 ms	0		
		G729/8000	10 ms	18	annexb=no	
		G722/8000	10 ms	9		
		PCMA/8000	10 ms	8		
		iLBC/8000	30 ms	104	mode=30	
	Lo:	Opus/48000/2	10 ms	107	WB	vbr
		Telephone Event		101		

Figure 14. Codec Setting

Field Name	Description
Preferred Codec List	List the Codecs to be enabled for this profile and their order of importance. Available Codecs: • PCMU/8000 – Set Ptime • PCMA/8000 – Set Ptime • G729/8000 – Set Ptime and annexb on or off • G722/8000 – Set Ptime • iLBC/8000 – Set Ptime, dynamic payload type, and mode (codec frame size, 20ms or 30ms) • Opus/48000/2 - Set Ptime, dynamic payload type, wideband|narrow band

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	mode , and vbr (variable bit rate)|cbr (constant bit rate).
Telephone Event	2833 payload type

4.1.4 SIP Timer Setting

SIP timers define transaction expiration timers, retransmission intervals when UDP is used as a transport, and the lifetime of dynamic TCP connections. The retransmission and expiration timers correspond to the timers defined in RFC 3261.

SIP Timer Setting

Basic Timer:	Round Trip Time Estimate(T1):	500	ms.
	Max Retransmit Interval(T2)	2000	ms.
	Invite Retry Times:	4	times
	Non Invite Retry Times:	4	times
	Register Expiration Time:	3600	sec.
	Register Retry Interval:	30	sec.
Session Timer:	Signal bullet Interval:	0	sec.
	Min Session Timeout:	0	sec.
	SIP Ping Interval:	0	sec.
	RTP bullet Interval:	0	sec.

Figure 15. SIP Timer Setting

Basic Timer	Description
Round Trip Time Estimate (T1)	Estimated time it takes for a packet to make a round trip from the device to the far end and back.
Max Retransmit Interval (T2)	The maximum retransmit interval for non-INVITE requests and INVITE responses.
Invite Retry Times	The maximum number of times the device will send an INVITE if no response is received to the initial INVITE.
Non Invite Retry Times	The maximum number of times that a SIP message other than an INVITE request gets retransmitted. According to RFC3261, Non-INVITE requests are retransmitted at an interval which starts at T1 and doubles until it hits T2, and then repeats at interval T2.
Register Expiration Time	Time to wait after a registration before it expires. • Generic SIP version: If the timer is set to be x seconds, the MTA re-registers at 90% of the expiration time (e.g., x*0.9 seconds).

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	• IMS version: If value is greater than 1200 sec, the MTA will re-register 600 seconds before registration time expires. If less than or equal to 1200 seconds, it will re-register when half of the expiration time expires.
Register Retry Interval	The time interval in seconds in which the SIP Device will retry registration when the retry interval expires, after a SIP Registration failure. This is also dependent on the "Allowed for Registration Retry" configuration if it will try again or not.
Session Timer	**Description**
Signal Bullet Interval	Time between sending a blank keep-alive UDP packet. Set to 0 to disable sending out signal bullet packets
Min Session Timeout	Enable session Audit.
SIP Ping Interval	Time interval to send SIP OPTIONS ping messages.
RTP Bullet Interval	Time between sending an empty keep-alive RTP packet to keep a port open. Set to 0 to disable sending out RTP bullet packets.

4.1.5 DigitMap Setting

Digitmaps are templates that match different sequences of digits that users dial as part of their interaction with their phone system. After the user dials, when there is a match between the digits dialed and the digitmap, the MTA device sends the digits to the server to initiate the call. If there is no match, the system waits for the user to enter more digits or press the send key to indicate dialing is complete.

Load the SIP device with the digitmap pattern which corresponds to the dial plan selected by the service operator. The digitmap is expressed in a format derived from the UNIX system command, "egrep." You must build the digit map based on the dialing plan which you wish to support.

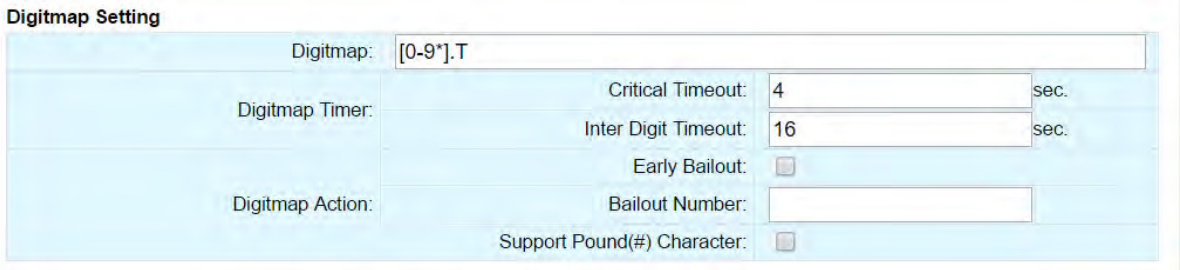

Figure 16. DigitMap Setting

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Digitmap	Description
Digitmap	Define patterns of dial strings that the MTA can send to the SIP server when the pattern has been met, and not have to wait for the InterDigit Time out or the Critical Timeout. This helps improve call completion times.
Digitmap Timer	
Critical Timeout	Short timeout if match digitmap T pattern.
Inter Digit Timeout	Time to wait between digits being dialed before assuming no more entries are to be made. This is required to ensure a pause in dialing does not trigger an incomplete number to be sent to the SIP server.
Digitmap Action	
Early Bailout	If a dialed number does not match any digitmap pattern, call a predefined bailout number. This number may be configured as an announcement to inform the user that this is an invalid number.
BailOut Number	The outgoing number when early bailout is enabled.
Support Pound Char	If this feature is enabled, pressing pound (#) after dialing numbers will cause the MTA to dial out immediately without waiting for the expirations of associated timers, e.g., “Critical Timeout” and “Inter Digit Timeout”.

4.1.5.1 A Digitmap Example

0	Local operator
00	Long distance operator
[1-7]xxx	Local extension number
8xxxxxxx	Local number
#xxxxxxx	Shortcut to local number at other corporate sites
[0-9*].#	Any dialed numbers followed by a “#” sign
*xx	Star services
91xxxxxxxxxx	Long distance number
9011 + up to 15 digits	International number

The dial plan described above results in the following digit map:

(0| 00|[1-7]xxx|8xxxxxxx|#xxxxxxx|*xx|91xxxxxxxxxx|9011x.T|[0-9*].#)

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4.1.5.2 Digitmap syntax

A DigitMap, according to this syntax, is defined either by a (case insensitive) “String” or by a “list of strings” over which the SIP Device will attempt to find a shortest possible match. Regardless of the above syntax, a timer is currently only allowed if it appears in the last position in a string. Each string in the list is an alternate numbering scheme.

The formal syntax of the digit map is described by the following notation:

Digit ::= “0” | “1” | “2” | “3” | “4” | “5” | “6” | “7” | “8” | “9”

Timer ::= “T” | “t” -- matches the detection of a timer

Letter ::= Digit | Timer | “#” | “*” | “A” | “a” | “B” | “b” | “C” | “c” | “D” | “d”

Range ::= “X” | “x” -- matches any single digit

| “[“ Letters “]” -- matches any of the specified letters

Letters ::= Subrange | Subrange Letters

Subrange ::= Letter -- matches the specified letter

| Digit “-” Digit -- matches any digit between first and last

Position ::= Letter | Range

StringElement ::= Position -- matches an occurrence of the position

| Position “.” -- matches an arbitrary number of occurrences of the position, including 0

String ::= StringElement | StringElement String

StringList ::= String | String “|” StringList

DigitMap ::= String | “(“ StringList “)"

4.1.5.3 FXS Setting

FXS port configuration allows you to set parameters based on the requirements of the telephony connection. You can alter the default settings and fine-tune the parameters for specific needs. For example, you might need to configure the ring timeout duration dependent on your needs. You can set the following configuration parameters for an FXS port:

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Figure 17. FXS Setting

Field Name	Description
Basic Setting	
Polarity Reversal	Enable Polarity Reversal – Tip and Ring are reversed when a call is answered.
Max Flash Hook Timer	The maximum flash hook cannot last more than X ms for the MTA to treat it as a Flash Hook.
Min Flash Hook Timer	The minimum flash hook needs to last at least X ms before MTA treats it as a Flash Hook.
DTMF Level	The level of Dual Tone Multi Frequency tones.
Tone Timer	
Busy Tone Timeout	Busy Tone will play for xx seconds and then drop the call.
Delay Busy Tone	If the phone is in an off hook state, the time duration that the MTA waits before playing busy tone.
Warning Tone Timeout	When the remote side hangs up, after the busy tone time out, the device will start to play warning tone for this period of time.
Ring Timeout	Will ring a line for this period of time and then drop the call.

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Dial Tone Timeout	Will play Dial Tone for this period of time and then play fast busy.
Reorder (Fast Busy) Tone Time Out	Will play fast busy tone for this period of time and then play Howler tone.
Howler Tone (ROH) Time out	Will play Howler tone for this period of time and then become silent.
OSI/PolarityReversal Interval	When a call is terminated and OSI is enabled, Reverse Tip and Ring for X ms.
Jitter Buffer Setting	
Jitter Buffer Mode	• Adaptive – Jitter Buffer Size changes during the call in response to network conditions. • Fixed – Jitter Buffer Size stays at the programmed value.
Initial jitter buffer size	The initial jitter buffer size in ms.
Adaption Min Depth	If network conditions are good, and no late packets are detected, the jitter buffer will continue to decrease until it meets the configured size.

4.1.6 Feature and Service Code Setting

Feature and Service Code Setting

Feature Setting:	Emergency Number:	911
	Allow BYE at End of Emergency Call:	☐
	Enable Caller ID of Emergency Call:	☐
Service Code:	Cancel Call Waiting:	*70
	Call Transfer:	*90
	Caller ID Display:	*82
	Caller ID Block:	*67
	Do Not Disturb ON:	*74#
	Do Not Disturb OFF:	#74#
	Play My IP Address:	***1
	Speed Dialing:	*75

Figure 18. Feature and Service Code Setting

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Field Name	Description
Feature Setting	
Emergency Number	If the entered number is dialed, all call features are disabled. (Call Waiting, Call Transfer, etc…)
Allow Bye at End of Emergency Call.	If enabled, when you hang up a call to an emergency number, treat this as a normal call hang-up. If it is disabled, we will ring the phone when you hang-up instead of terminating the call.
Enable Caller ID of Emergency Call	If Caller ID is enabled, on an outbound call to the Emergency Number, Caller ID will be sent.
Service Code	The following settings are applicable to device based call features.
Cancel Call Waiting	The service code to cancel/resume receiving and answering an incoming call when this line is engaged.
Call Transfer	The service code to transfer the current call to another destination.
Caller ID Display	The service code to display the incoming caller phone number and its display name.
Caller ID Block	The service code to hide the outbound caller phone number and its display name.
Do Not Disturb On	The service code of “Do Not Disturb-On,” prevents incoming calls from ringing the phone.
Do Not Disturb Off	The service code of “Do Not Disturb-Off” allows incoming calls to ring the phone.
Play My IP Addr	When a phone is connected to the MTA, and this service code is dialed, the current IP address will be played out to the phone handset.
Speed Dialing	Enter a prefix to use with the Speed Dialing Settings under the Port Config section. For example, if you configure a #9 in this setting, to dial the phone number for Speed Dialing Settings 0, simply dial a #90. Ensure the Prefix and Speed Dialing Settings don't cause a dialing conflict with other features such as Call Transfer and Caller ID Display.

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4.1.7 Fax Setting

Configure the parameters for sending and receiving a fax over the VoIP channel. Two major approaches are adopted for fax over IP.

- G.711, sending fax signals in-band using the coding method used in regular voice transmissions, or
- T.38, a protocol that describes how to send fax image data over the IP network. T38 is designed for more efficient and robust transmission compared to using the same method as voice communications.

There are pros and cons of both approaches described above. Consult your service provider for the appropriate configuration when needed.

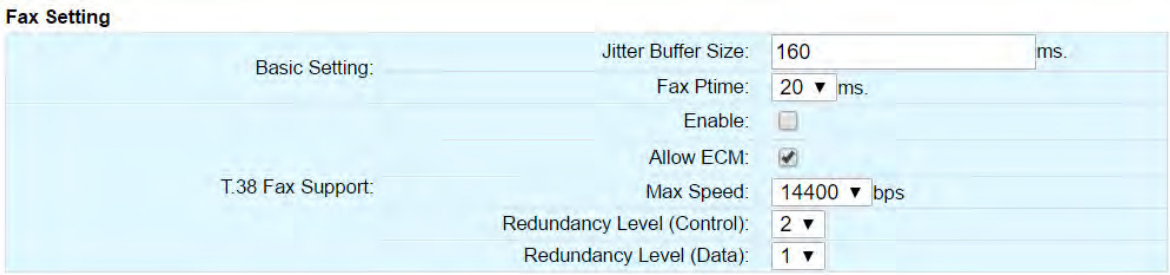

Figure 19. Fax Setting

Field Name	Description
Basic Setting	
Jitter Buffer Size	A jitter buffer temporarily stores arriving packets in order to minimize the impact of delay variations. If a jitter buffer size is too small, then an excessive number of fax packets may be discarded. If a jitter buffer is too large then it introduces additional delay.
Fax PTime	Available Options: 10, 20, 30, 40, 50, 60 (ms).
T38 Setting	
Enable T38	Enable/Disable T.38 Fax feature.
Allow ECM	Enable Error Correction Mode (ECM) for the MTA.
Max Speed	Bit Rate. Choose a maximum fax transmission speed to be attempted: 2400, 4800, 9600, or 14400.
Redundancy Level	Low Speed Redundancy. Number of

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(Control)	redundant T.38 fax packets to be sent for the low speed V.21-based T.30 fax machine protocol. Default value is 2. Do not change the default value unless necessary.
Redundancy Level (Data)	High Speed Redundancy. Number of redundant T.38 fax packets to be sent for high-speed V.17, V.27ter and V.29 fax machine image data. Default value is 1. Do not change the default value unless necessary.

4.1.8 Call Report Setting

Configure Call Detail report setting. When a call terminates, the MTA will generate the details of the terminated phone call.

Figure 20. CDR Setting

Field Name	Description
CDR Server	Send call detail records to (1) syslog server or (2) EMS server or (3) none.
Enable RTCP/RTCP-XR Report	Check this item to enable the MTA to send RTCP & RTCP-XR sender reports. The RTCP-XR reports will include voice quality analysis (such as R-Factor & MOS).

4.2 Port Config

SIP Port Setting – List of current SIP user accounts. You may configure your user account on this device.

Figure 21. Phone port status overview

Click on the Edit icon of a particular user account to display the account setting screen.

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4.2.1 SIP Account Setting

Figure 22. SIP Account Setting

Field Name	Description
Enable	Enable/Disable SIP User Account.
Profile	Choose which Profile Name created under Profile Config should be used for this account.
User ID	Account User ID/Name.
Password	Account Password.
Display Name	Name to be displayed for Caller ID.
Authentication ID	Authentication ID if needed.

4.2.2 Features Setting

Figure 23. Call Feature Setting

Field Name	Description The following call features use “Service Codes” for device based call features defined in the “Profile Setting” page section.
Call Waiting	To receive and answer an incoming call when this line is engaged in an active call.
Blind Transfer	Blind transfer is when a call is routed to a third party and the original call is transferred

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	without any check being made to determine whether the transferred call is answered or if the number is busy.
Consulted Transfer	Consulted Call Transfer is used for transferring a call to another destination without releasing the call from the voice platform until after the call is successfully transferred.
Three Way Calls	3-Way Calling connects a third person to the current two-way conversation.
Display Remote Caller ID	Display of Caller ID (the caller phone number and display name) for inbound calls from a remote party.
Reject Anonymous Call	Rejection of Anonymous inbound calls.
VMWI Display	To enable/disable MTA to display voice mail waiting indicator.
Hot Phone	
Enable Hot Phone	Hot Phone feature that automatically dials the Hot Phone Number when the phone is taken off hook.
Hot Phone Number	Enter the phone number that the MTA dials automatically when the phone is taken off hook.

4.2.3 Line Setting

Line setting page includes input-MIC/output-speaker volume controls (gain controls) and the way silence suppression is performed.

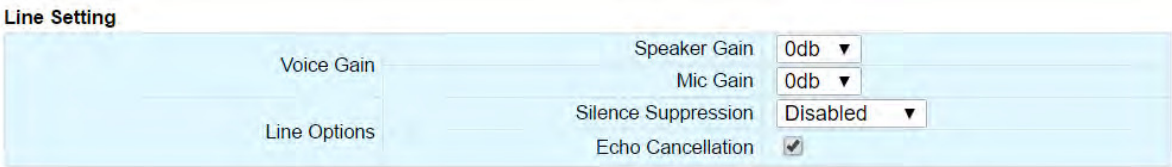

Figure 24. Line Setting

Field Name	Description
Voice Gain	
Speaker Gain	Incoming volume control.
Mic Gain	Outgoing volume control.

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Line Options	
Silence Suppression	Silence Suppression involves not transmitting voice packets when one of the parties involved in a call is not speaking. Available options: • Negotiated • Disabled
Echo Cancellation	Enable or disable line echo cancellation.

4.2.4 Speed Dial

Speed dial is a function to place a call by pressing a reduced number of keys. This function is particularly useful for phone users who dial certain numbers on a regular basis. Please refer to section 4.1.6 for more details on using speed dials.

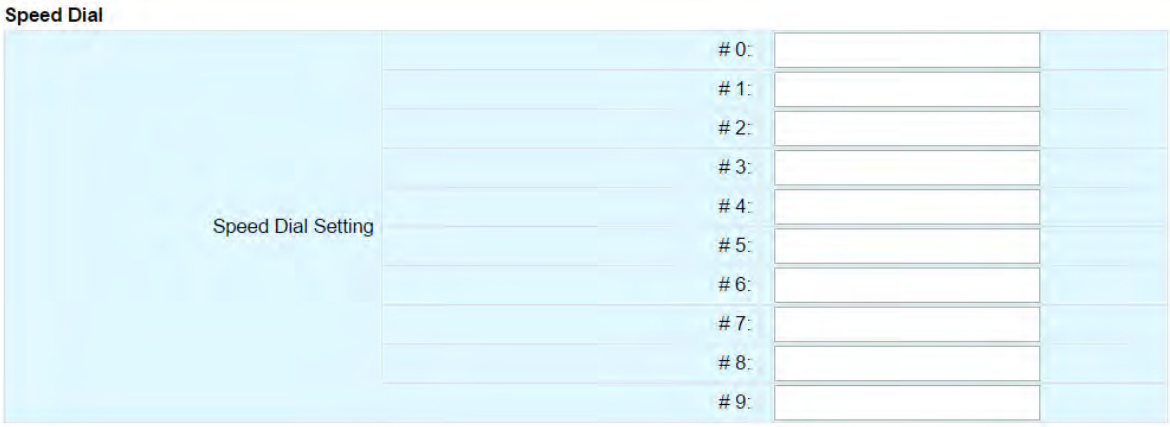

Figure 25. Speed Dial

Field Name	Description
Speed Dial Testing	0-9

4.2.5 IMS related SIP settings

Only available on IMS firmware versions.

Figure 26. IMS Settings

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IMS Setting	Description
Enable Reg Subscribe	The MTA subscribes to the registration event, and responds to IMS server NOTIFY messages which includes AOR related information in XML format.
Enable MWI Subscribe	The MTA subscribes to the "Message Waiting Indicator" event package, as defined by 3GPP.
MWI Subscribe URI	Specify the URI of the message waiting indicator subscription server.
Authentication and Key Agreement	
Permanent Subscriber Key (K)	ISIM specific service.
Operator Key (OP)	ISIM specific service
Auth. Management Field (AMF)	ISIM specific service

4.3 Telephony Region and Misc Setting

Figure 27. Media Port Setting

4.3.1 Media Port Setting

Media port starting value should fall within the range 10 to 65535 and should be an even number. Care should be taken as these settings can significantly impact voice performance or result in no voice path if configured incorrectly. Consult your telephony service provider for configuration guidelines.

Field Name	Description
Media Port Start	The lowest RTP port number to be used when sending RTP/RTCP traffic – It must be an even number.
Media Port End	The highest RTP port number to be used when sending RTP/RTCP traffic – It must be an odd number.

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4.3.2 Tone Cadence Setting

Configures the tone cadence for an FXS port. When shipped from the factory, the MTA tone cadences are set to match country requirements. You can manually set the tone cadence if you wish to override the default country values.

Tone Cadence Setting	
Dial Tone:	350,440,-13,[65535]
Busy Tone:	480,620,-24,+[500,500]
Ringback Tone:	440,480,-19,+[2000,4000]
Reorder Tone:	480,620,-24,+[250,250]
Stutter Tone:	350,440,-13,[250,250,250,250,250,250,65535]
VMWI Tone:	350,440,-13,[100,100,100,100,100,100,100,100,65535]
Confirmation Tone:	350,440,-13,[100,100,300]
Call Waiting Tone 1:	440,0,-13,+[300,9700]
Call Waiting Tone 2:	440,0,-13,+[100,100,100,9700]
Call Waiting Tone 3:	440,0,-13,+[100,100,100,100,100,9700]
Call Waiting Tone 4:	440,0,-13,[100,100,300,100]
Howler (ROH) Tone:	2060,2450,0,+[100,100]
Format:	freq1,freq2,vol,+[on1,off1,on2,off2,...]

Figure 28. Tone Cadence Setting

Tone Cadence Setting

Format – freq1, freq2,vol,+[on1,off1,on2,off2,…]

- frequency 1, frequency 2, volume level in dBm
- + : loop the tone(s) forever
- [on1 duration in ms, off1 duration in ms…]. If the duration value is 65535, keep playing the last tone.

Field Name	Description
Dial Tone	A dial tone indicates that the telephone exchange is ready to accept calls.
Busy Tone	A busy signal indicates a failure to complete the requested call. Reasons could be: • The called number is occupied, or • The other party has hung up at the end of a call.
Ringback Tone	A ring back tone (or ringing tone) is heard by the caller while the phone they are calling is being rung.
Reorder Tone	Reorder tone, also known as fast busy tone, is the congestion tone or all trunks busy tone of a PSTN network. It varies from country to country.

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Stutter Tone	A "stuttered" or interrupted dial tone is often used to indicate a Calling feature such as Call forwarding has been activated. (The voice mail waiting tone is represented by VMWI Tone below.)
VMWI Tone	Voice Mail Waiting Indication, indicating that voice mail is waiting.
Confirmation Tone	Confirmation Tone is used to acknowledge receipt for special services, such as: • Speed dialing, dial number has been recorded. • Call forwarding activation and de-activation, etc.
Call Waiting Tone 1-4	Call waiting tones used to provide call waiting conditions.
Howler (ROH) Tone	Receiver off hook tone

4.3.3 Ring Cadence Setting

For a telephone receiving an incoming call, the timing of the incoming ring-signal. This varies from country to country and may consist, for instance, of the ring voltage being applied for two seconds, followed by four seconds off, then back on for two seconds, and so on, until the phone is answered or the calling party hangs up, or a maximum number of rings is reached. Note that MTA8328 supports multiple ring cadence profiles for different countries.

When shipped from the factory, the MTA the ring cadence is set to match country requirements. You can manually set the ring cadence if you wish to override the default country values.

Ring Cadence Setting (Format +[on1,off1,on2,off2,…])

Format – freq1, freq2,vol,+[on1,off1,on2,off2,…]

- frequency 1, frequency 2, volume level in dBm
- + : loop the tone(s) forever
- [on1 duration in ms, off1 duration in ms…]. If the duration value is 65535, keep playing the last tone.

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Ring Cadence Setting	
Default Ring Cadence:	+[2000,4000]
Ring 1 Cadence:	+[2000,4000]
Ring 2 Cadence:	+[800,400,800,4000]
Ring 3 Cadence:	+[400,200,400,200,800,4000]
Ring 4 Cadence:	+[300,200,1000,200,300,4000]
Ring 5 Cadence:	[500]
Splash Ring:	[500]
Format:	+[on1,off1,on2,off2,...]

Figure 29. Ring Cadence Setting

Field Name	Description
Default Ring Cadence	For a telephone receiving an incoming call, the default timing pattern of the incoming ring-signal.
Ring Cadence, 1-5	Different Ring Cadence settings for distinctive rings.
Splash Ring	A short ring to notify that some specified call features are processed. For instance, a short ring (splash tone) can be used to notify each time a call is forwarded.

4.4 Line Diagnostics

4.4.1 GR909 Tests: triggered from the WEB Administrative Console

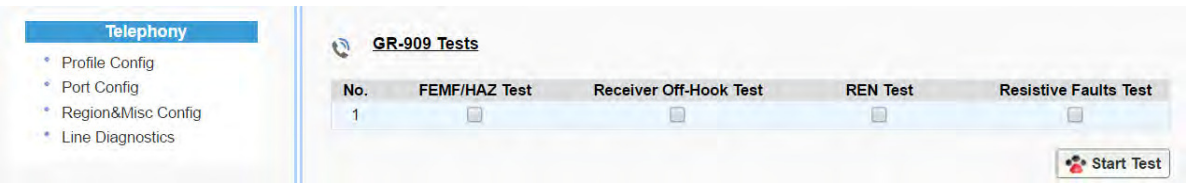

Figure 30. GR909 Test Line Test

MTA8328 supports GR-909 test items which use a suite of standards-based electrical tests. NOTE: If Receiver is Off-hook, the REN Test and the Resistive Faults Test will also show failures.

Field Name	Description
GR909 Line Diagnostic Test	A suite of standards-based electrical tests which detect physical problems with the phone line.
FEMF/HAZ Test	This procedure tests for hazardous electromotive force (HEMF) and foreign electromotive force (FEMF) between the TIP-GROUND and RING-GROUND leads. It

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	reports a failure if the following limits are exceeded: – Foreign DC HEMF limit = 135V. – Foreign AC HEMF limit = 50Vrms. – Foreign DC EMF limit = 6V. – Foreign AC EMF limit = 10Vrms. NOTE: Once this test is initiated and if a failure is detected, the test will automatically run periodically, e.g., every 30 sec till the foreign voltage is removed.
Receiver Off-Hook Test	This procedure discriminates between resistive fault and a receiver off-hook condition by checking for a non-linear DC resistance.
REN Test	This procedure measures REN (Ringer Equivalence Number) loading by measuring the load impedance at 20 Hz. An REN loading of less than 0.175 REN or greater than 5 REN is reported as a failure.
Resistive Faults Test	This procedure measures TIP to RING on-hook DC resistance. A DC resistance less than 150 kΩ is reported as a failure.

4.4.2 GR909 Tests: triggered from SIP NOTIFY Message

The MTA supports server-initiated GR909 tests triggered by an incoming SIP NOTIFY Message with "**Event: gr909**". Example trace as follows:

```
NOTIFY sip:2148298788@172.16.0.119;user=phone SIP/2.0
Via: SIP/2.0/UDP 172.16.200.212:5060;branch=z9hG4bKac101ead5060-
76517495;rport
From: <sip:GR909@172.16.200.212>;tag=rebootapp_tag
To: <sip:2148298788@172.16.0.119;user=phone>
Event: gr909
Call-ID: 3-75ff0490-4bdccd8@ac101ead
CSeq: 1401 NOTIFY
Max-Forwards: 70
Contact: <sip:GR909@172.16.200.212>
Content-Length: 0
```

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4.5 Wireless Location Optimizer

This test can be used to find the optimum location for your device to for its WiFi connectivity.

You can invoke the test using various methods. You can invoke the test with the telephone hand set by dialing ***8 and then listening to the results. You can also press the round button on the device twice quickly and let it complete the test and observe the WiFi LED for the test result. Or, you can also login into the device GUI and perform this test.

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5 SYSTEM

5.1 Account Settings

5.1.1 Administrator Account Setting

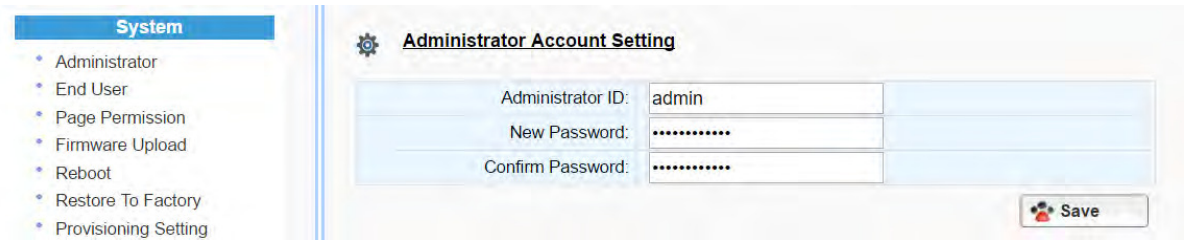

Figure 31. Administrator account setting

Field Name	Description
Administrator Account Setting	This allows you to configure an Administrator ID and Password. Default ID is 'admin'. Default Password is 'password'. However, the default values are service provider dependent.

5.1.2 End User Account Setting

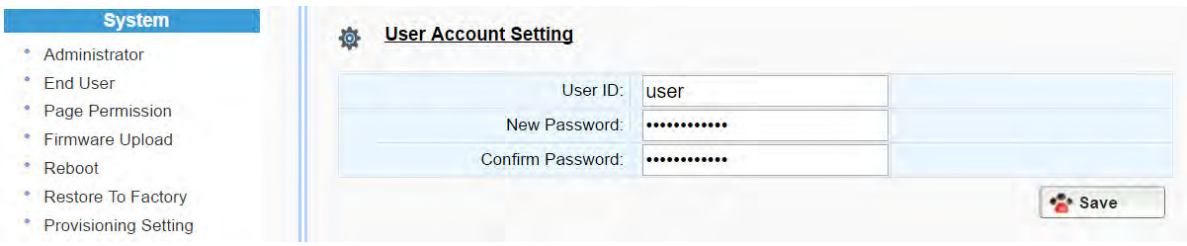

Figure 32. User Account Setting

Field Name	Description
User Account Setting	This allows you to configure a user's user ID and password. Default ID is 'user'. Default Password is 'welcome'. However, the default values are service provider dependent.

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5.2 Page Permission

The administrator may specify which features are available for subscribers to configure.

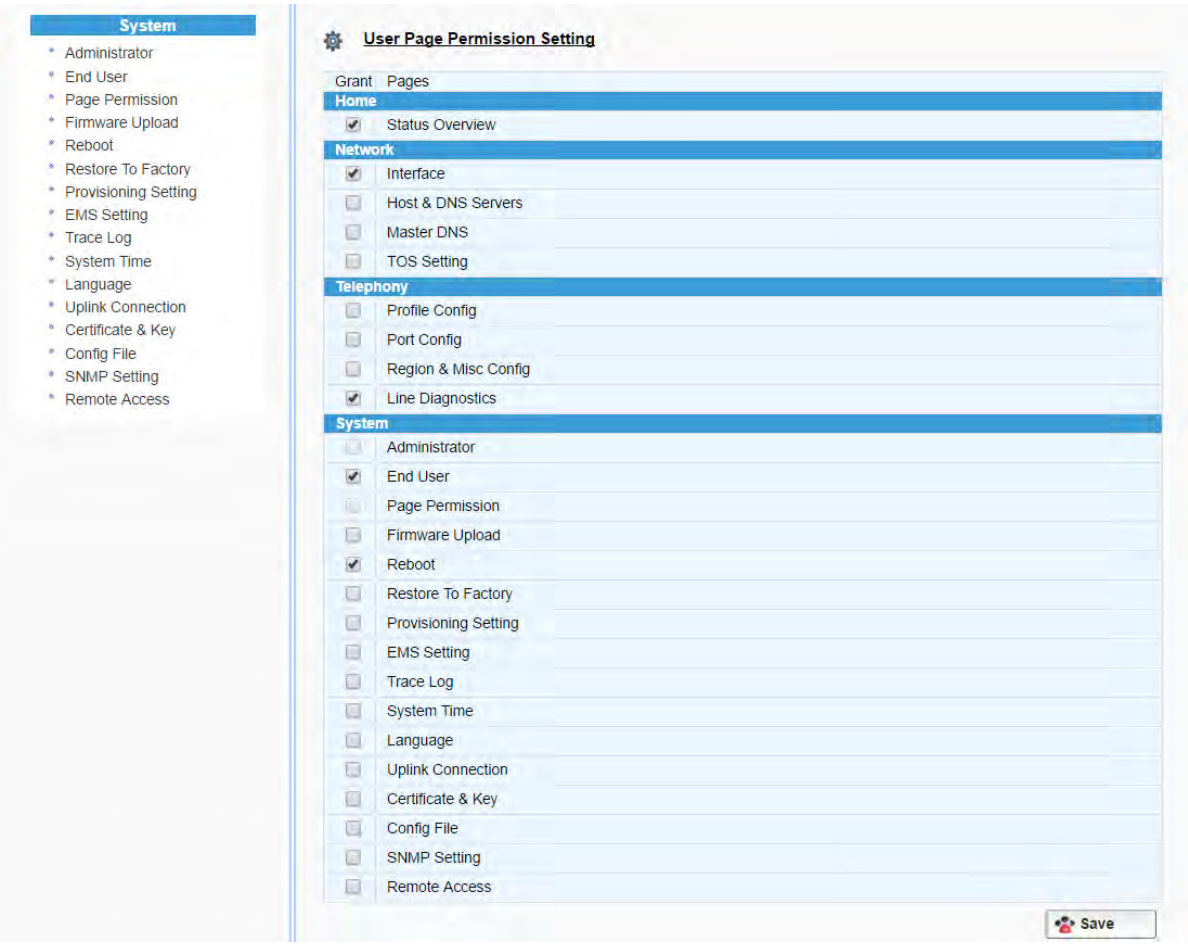

Figure 33. User Page Permission Setting

Field Name	Description
User Page Permission Setting	Configure which pages the User Login can access and also if this login can be used to write to the page.

5.3 Firmware Upload

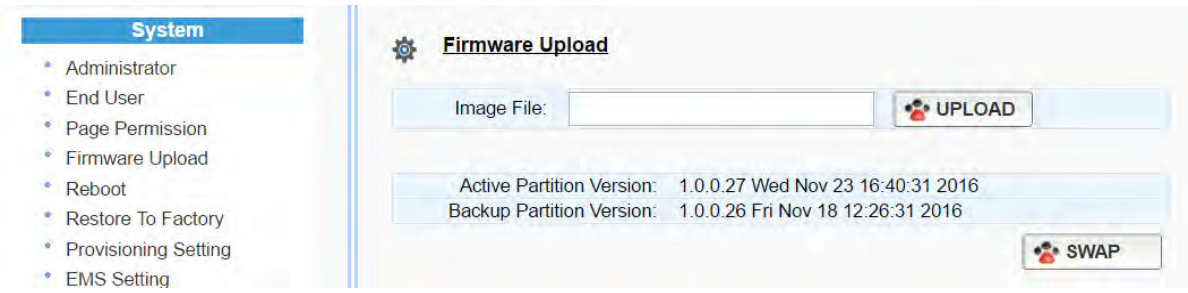

Figure 34. Firmware Upload

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Field Name	Description
Firmware Upload	Browse to a new firmware image file to upload to the unit.
SWAP	Click “SWAP” to switch the backup system firmware to be active.

5.4 Reboot

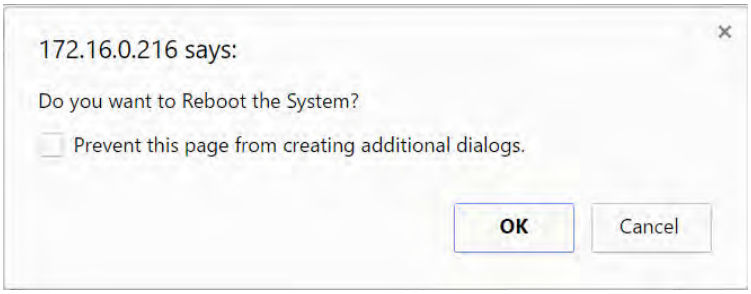

Figure 35. Reboot Dialog

Field Name	Description
Reboot	Reboot opens a dialog box, and asks for confirmation to “Reboot the System”.

5.5 Restore To Factory

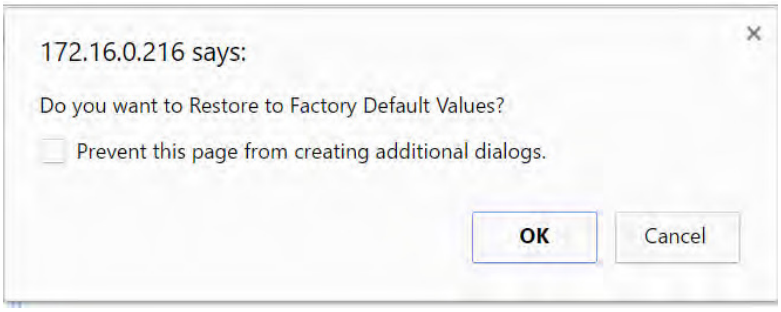

Figure 36. Restore To Factory Dialog

Field Name	Description
Restore To Factory	Opens a dialog box, and asks for confirmation to “Restore to Factory Default Values”. The factory default values are service provider dependent.

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5.6 Provisioning Setting

5.6.1 Provision Server Setting

Provisioning Setting – Configure provisioning server and associated settings to this MTA device. Provisioning is a powerful feature that allows you to automatically configure the unit with all of its parameters. Therefore, if the unit is configured from the Factory with the desired Provisioning information, you will not need to manually configure the MTA with its SIP Profile and User Information, since the desired information can be entered into the Configuration File for that unit. Subsequently, when the device is powered on and obtains its IP address, it will go to the provisioning server and be configured.

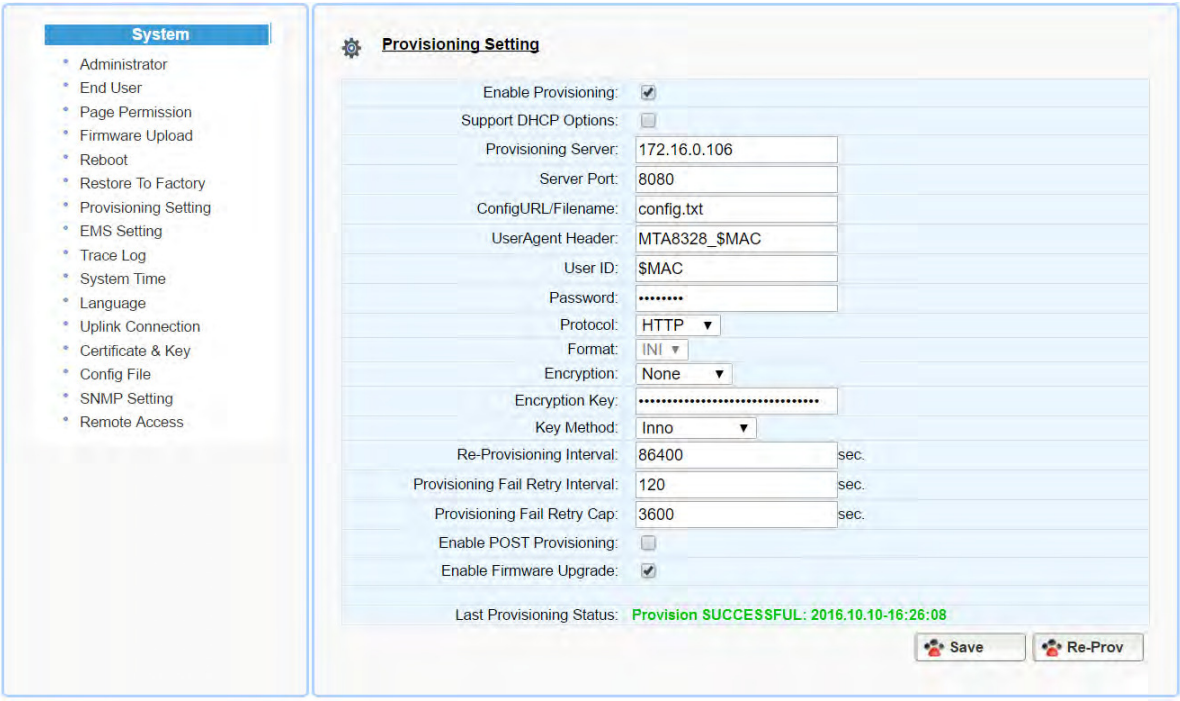

Figure 37. Provisioning Server Setting

Field Name	Description
Enable Provisioning	Turns provisioning on/off.
Support DHCP Options	If enabled, the device will use the string (including the provisioning server FQDN and config file path) obtained from DHCP options 66 and 67 to compose the request URI for provisioning. The request URI obtained from the DHCP Options will override any manually configured provisioning fields.
Provisioning Server	IP or FQDN of the Provisioning Server.
Server Port	Port to be used to connect to the Provisioning Server.

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ConfigURL/Filename	Specify the complete path and the config file name to download.
UserAgent Header	User Agent Header sent out is modifiable. Available parameters: • Model name ($MOD) • MAC ($MAC) • Version ($VER) • Config file last loaded ($CFG) Example Syntax: $MOD $MAC $VER $CFG. Output: MTA-8328-1E 001099112233 V1.0.0.0 /Provisioning/Config/xyz.cfg
User ID	The User ID used for HTTP, FTP, and HTTPS authentication purposes
Password	The Password used for HTTP, FTP, and HTTPS authentication purposes.
Protocol	The Protocol to connect to the server. The supported protocols are: HTTP, HTTPS, FTP, and TFTP.
Encryption	The Encryption Format of the config file to be sent to the MTA. Supported formats are: None, RC4, and AES-256.
Encryption Key	The encryption key to be used for encryption. Below is a table of the number of characters for each Encryption Type and Key Method. [illegible]
Key Method	The following utilities (or approaches) can be used to encrypt the provisioning config file: Inno and Openssl. • Inno – InnoMedia proprietary hash key encryption utility. This method can only be applied when "RC4" is selected from the Encryption menu. Provisioning config file should be encrypted using the utility – rc4_102 See section 8.1 for the use of rc4_102. • Openssl – the open source toolkit. This method can be applied when either RC4 or AES256 is selected from the Encryption menu. Provisioning file

	RC4	AES-256
Inno	32 chars	N/A
Openssl	32 chars	64 chars

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	should be encrypted using Openssl. See section 8.2 for examples of the use of the Openssl utility.
Re-Provisioning Interval	Time to next Re-Provision after a successful Provision.
Provisioning Fail Retry Interval/Cap	There are 2 associated timers: Provisioning Fail Retry Interval : T1 Provisioning Fail Retry Cap: T2 If provisioning fails, the MTA initially retries at T1 interval, and then doubles T1 each time until it reaches T2, and then continues at this interval until the system reboots or there is a successful provisioning.
Enable POST Provisioning	Send post HTTP messages to inform the provisioning server of provisioning success or failure. This setting only applies when using InnoMedia's EMS provisioning server.
Enable Firmware Upgrade	When enabled, firmware will be downloaded when a new version is available. When disabled, firmware will not download even if a new version is available.

5.7 EMS Setting

5.7.1 EMS Server

The InnoMedia EMS server is a powerful provisioning and management platform for service providers to be able to see Call Statistics, Voice Quality information, and to provide the ability to connect to devices behind NAT routers for diagnostics purposes.

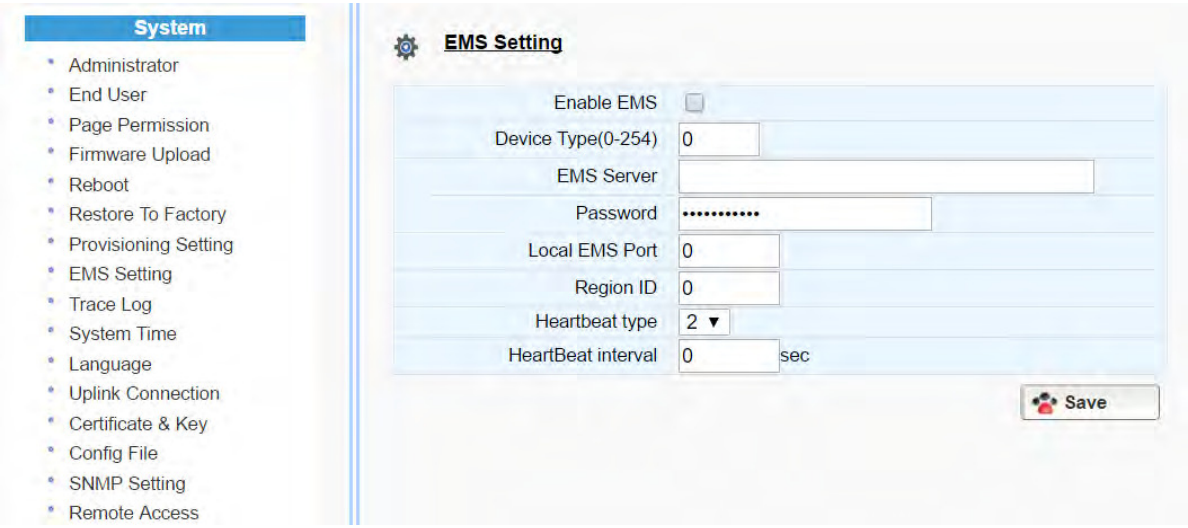

Figure 38. Configuring EMS Server Information

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Field Name	Description
Enable EMS	This enables the EMS feature.
Device Type (0-254)	This is the device type configured on the EMS Server, so that a user of the EMS server will see the device by name (such as 8328-1) in the device list. The type is also important for what options/features will be seen when a device is queried by the EMS.
EMS Server	The IP or FQDN address of the EMS Server and port. Default is to use port 5200 for connection to the EMS server.
Password	The authentication password to connect to the EMS server.
Local EMS Port	The port number used at MTA device in order to connect to EMS server.
Region ID	The Region to which the device is assigned. This is a number value that has to be entered, so a good example of region configuration might be based on Area Codes. Another example might be time zones. When the EMS Server is set up, careful consideration should be given to how the regions are defined.
Heartbeat type	The MTA will send a heartbeat to the EMS Server to let it know it is up and running. A Data Tunnel between the EMS and MTA is used, and this can be encrypted or not, depending on the Option type chosen. Below are the current Heartbeat types: 2 = Plain text tunnel formatted. 3 = Encrypted text using a shared secret key 4 = Plain text and carrying SIP registration status 5= Encrypted text and carrying SIP registration status Heartbeat type must be configured the same between the EMS and MTA.
Heartbeat interval	The interval at which to send heartbeat packets to the EMS server, in seconds.

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5.8 Trace Log

5.8.1 Trace Log Setting

Configure the MTA device to display debugging messages according to the level parameters. Note: Trace Level "LOG_DEBUG" will have performance impacts on the MTA device. It is recommended to use this feature only when debugging is needed.

An example is described as follows.

On WEB GUI:

1. Check "Enable Trace Log"
2. Trace Level menu, choose "LOG_DEBUG"
3. Check "Trace Verbose"
4. Configure "Trace Channel" to be "0" to monitor all ports of the system.
5. Check whatever items to be monitored from the "Trace Group Setting" table.

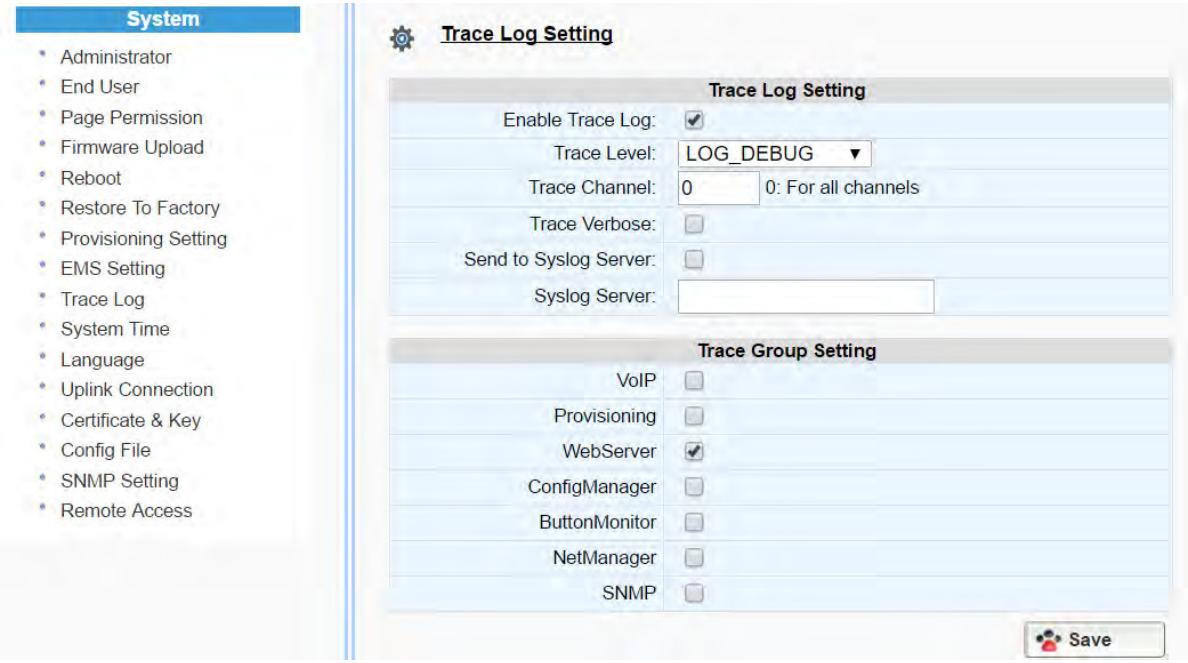

Figure 39. Trace Log Setting

Trace Log Setting	Description
Enable Trace Log	Enables the trace log.
Trace Level	Follows RFC 5424 syslog message severities. 1 Alert: Action must be taken immediately 2 Critical: Critical conditions. 3 Error: Error conditions.

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	4 Warning: Warning conditions. 5 Notice: Normal but significant condition. 6 Informational: Informational messages. 7 Debug: Debug-level messages. Additional Messages available: LOG_STACK -- Network protocol related messages. LOG_DSP -- RTP traffic related messages.
Trace Channel	The ports (lines) you wish to monitor/debug. 0 covers all ports.
Trace Verbose	Enable Trace logs to be displayed in a Telnet session.
Send to Syslog Server	When checked, will send out messages to a configured Syslog Server.
Syslog Server	Syslog server IP address or FQDN.

Trace Group Setting	Description
Item list	Select items to monitor and display associated messages. These messages can be displayed on the CLI console or the specified syslog server. Note that some particular items will only be displayed on the GUI when they are enabled.

5.9 System Time

5.9.1 Time Setting

Configure the SNTP time server IP/FQDN and time zone with which the MTA device synchronizes. Accurate time information is important for ensuring reliable telephony services.

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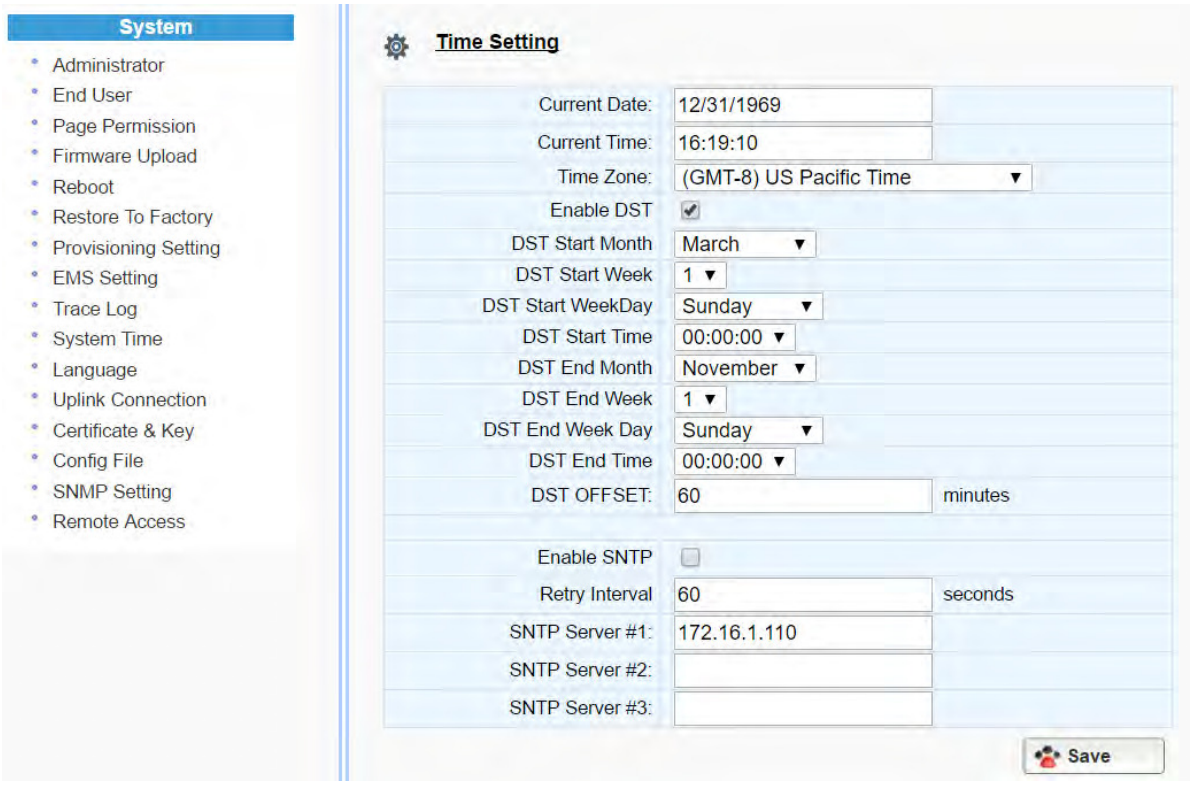

Figure 40. Time Setting

Field Name	Description
Current Date	The current date, which can be modified.
Current Time	The current time, which can be modified.
Time Zone	The current Time Zone configured, which can be modified through the pull down list. Note a reboot is needed for this setting to become effective.
Enable DST	Enable or disable daylight saving time.
DST Start Month | Week | WeekDay |Time	Configure the DST starting date/time each year.
DST End Month | Week | WeekDay |Time	Configure the DST ending date/time each year.
DST Offset	Most of the regions where DST is deployed have an offset of 60 minutes; however, a few regions have an offset of 30 minutes. Check the MTA deployment region for this requirement.

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Enable SNTP	Enable the SNTP service.
Retry Interval	The time interval at which to synchronize with the time server, in seconds.
SNTP Server #1, #2, and #3	FQDN or IP of SNTP time servers to synchronize with. (Note: MTA8328 tries all the configured servers, and bases its calculation on RFC 2030 and the delay. It then uses the lowest delay as the peer updates and sets the local time.)

5.10 Language

The MTA device supports English, Spanish for Interactive Voice Response (IVR) services. Select the desired language for your needs.

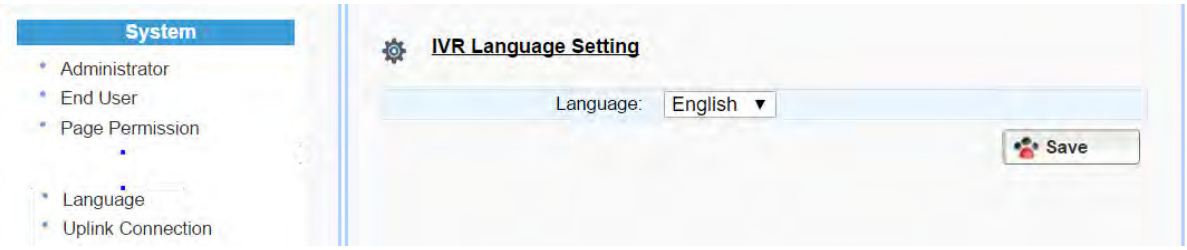

Figure 41. Language Selection for IVR system

Field Name	Description
IVR Language Setting	The language of IVR announcements.

5.11 Uplink Connection

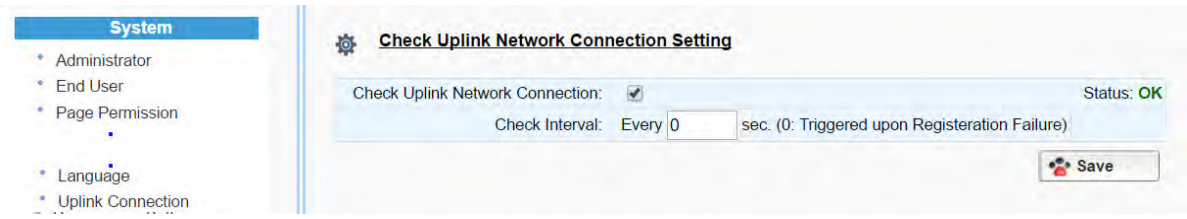

Figure 42. Uplink Detection Settings

Field Name	Description
Check Uplink Network Connection	Enable or disable the MTA to probe the internet connection status.
Check Interval	How often device will send a 'probe'

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	message out to determine whether the Internet connection is active. Set value to 0 to trigger 'probe' message being sent when SIP registration fails.

5.12 Certificate & Key

This page allows you to upload the encrypted keys or certificate for transporting signaling data through a secured TLS tunnel.

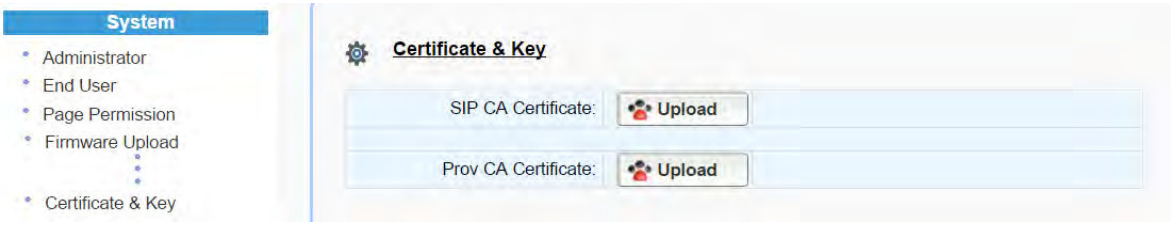

Figure 43. Certification & Key

Field Name	Description
SIP CA Cert	Root certificate for verifying the SIP server TLS Certificate.
Prov CA Cert	Root certificate for verifying the Provisioning server Certificate.

5.13 Config File

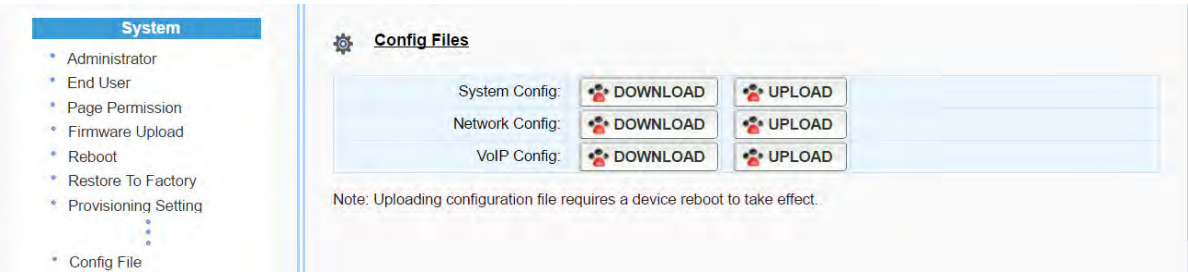

Figure 44. System Config

Field Name	Description
Config File	Upload: upload a config file to the MTA. Download: Store the config file from the MTA to a local drive. System Config: settings from the "System" category. Network Config: settings from the "Network" category. VoIP Config: settings from the "Telephony" category.

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5.14 SNMP Setting

Configure the SNMP server information for the MTA to send traps to or to get commands from the SNMP server.

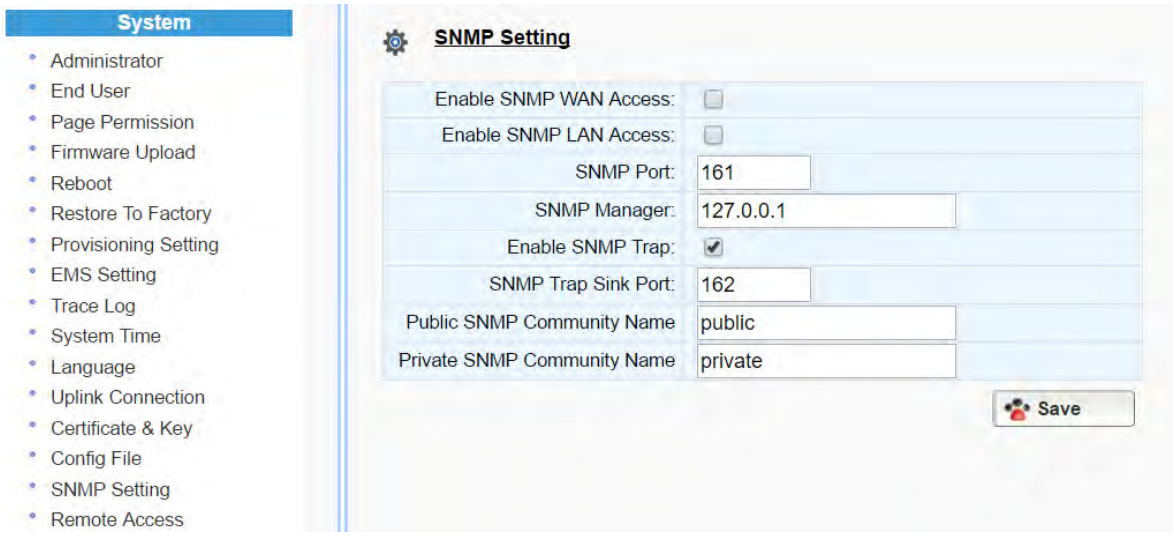

Figure 45. SNMP Setting

Field Name	Description
Enable SNMP WAN Access Enable SNMP LAN Access	Enable|Disable SNMP access from LAN or WAN interface(s).
SNMP Port	The port for SNMP communications.
SNMP Manager	IP address or FQDN of the SNMP Manager system.
Enable SNMP Trap	Enable|Disable sending traps to the SNMP server. Refer to the MTA8328 MIB file for the list of supported traps.
SNMP Trap Sink Port	Define an SNMP trap receiver.
Public SNMP Community Name	Read only community string. The string is used with an SNMP GET to access the MTA.
Private SNMP Community Name	Read-write community string. This string is used with an SNMP SET to set a certain SNMP MIB variable (OID) to a specified value.

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5.15 Remote Access

5.15.1 Remote Access Setting

Configure the designated protocols and ports for a system to access the MTA device remotely.

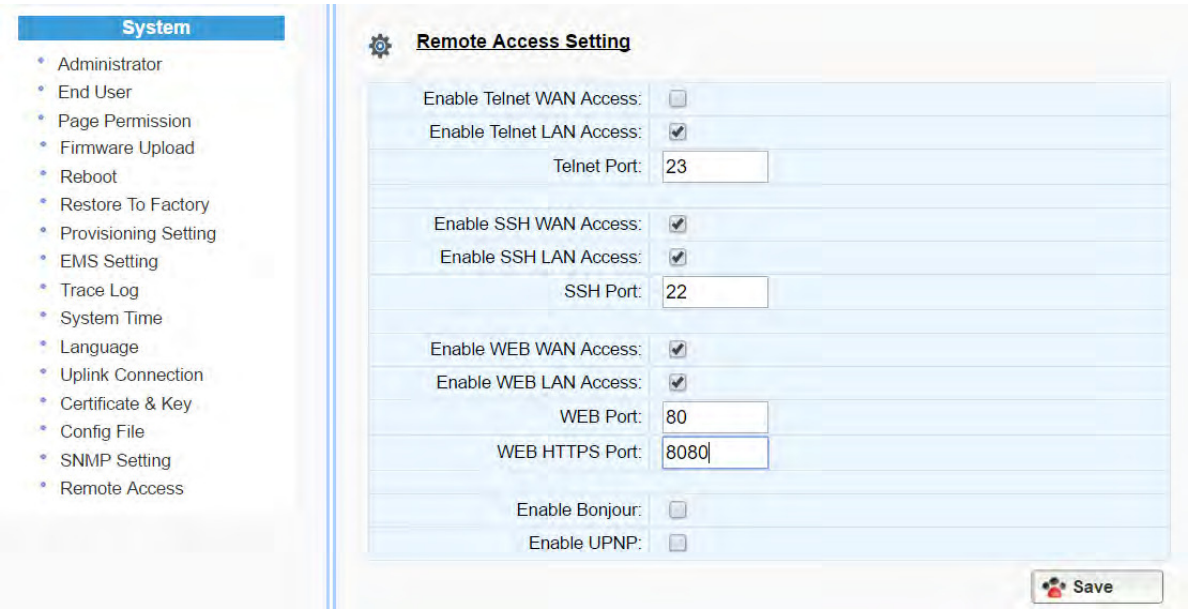

Figure 46. Protocol and Port Settings for Remote Access

Field Name	Description
Telnet WAN|LAN Access	Enable/Disable WAN/LAN access via Telnet and configure what port Telnet will be allowed in on.
SSH WAN|LAN Access	Enable/Disable WAN/LAN access via SSH and configure what port SSH will be allowed in on.
WEB WAN|LAN Access	Enable/Disable WAN/LAN access via HTTP or HTTPS and configure what ports will be used for each.
Bonjour	Enable Bonjour – allows Apple devices to discover the MTA8328 on the Home network.
UPnP	Enable UPnP – allows devices which supports UPnP to discover the MTA8328 on the Home Network.

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6 CLI COMMAND REFERENCES

Only the Administrator user is allowed to access the MTA CLI console. The login ID and password are identical to those for WEB console login. The CLI command hierarchy is designed similarly to that of the WEB console.

- Once logged in successfully, the command menu is displayed.

```
[v]voip                 VoIP Configuration
[n]net                  Network Configuration
[s]system               System
[f]factory              Factory
[d]restore              Restore to Default Setting
```

- Type the char enclosed in the square bracket [] to enter that particular section.
- Type question mark "?" at any level to display available commands.
- Type "`cd ..`" to go back to the upper level.
- [f] factory sub-menu is password protected.

Under any level, to show debug messages on the CLI console, type "debug on"; to stop debug messages being displayed, simply type "debug off".

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7 APPENDIX A LED STATES

7.1 Model MTA8328-1N

LEDs	Blinking State	MTA8328 State
PWR	Steady Green	Powered ON.
	Off	Powered OFF.
WAN	Solid or Blinking Green	WAN Ethernet 100BT link is active, blinks with activity.
	Solid or Blinking Yellow	WAN Ethernet 10BT link is active, blinks with activity.
	Off	WAN Ethernet link is not connected.
	Fast Blinking Green (0.25 secs on, 0.25 secs off)	WAN Ethernet 100BT link is active but is unable to reach the Internet.
	Fast Blinking Yellow (0.25 secs on, 0.25 secs off)	WAN Ethernet 10BT link is active but is unable to reach the Internet.
	Medium-Slow Blinking Green (1 sec on, 1 sec off)	Device firmware is being upgraded. The PHONE LED blinks in unison with the WAN LED.
LAN	Solid Green	LAN Ethernet 100BT link is active.
	Solid Yellow	LAN Ethernet 10BT link is active.
	Off	LAN Ethernet link is not connected.
PHONE	Off	- No power, OR - Device is initializing, OR - Failed to register for voice services, OR - Line is disabled.
	Steady Green	The device is ready to make calls.
	Slow Blinking Green (3 secs on, 1 sec off)	There are new voicemail messages.
	Medium-Fast Blinking Green (0.5 secs on, 0.5 secs off)	The device is registered and ready to make calls, and the line is in use.
	Fast Blinking Red (0.25 secs on, 0.25 secs off)	One or more line diagnostics tests (GR909) failed. This state is cleared when the GR-909 tests are run again and all tests pass, or when the device is rebooted.
	Medium-Slow Blinking Green (1 sec on, 1 sec off)	Device firmware is being upgraded. The PHONE LED blinks in unison with the WAN LED.

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8 APPENDIX B THE USE OF ENCRYPTION KEY METHODS

8.1 Inno rc4_102

Use utility "rc4_102" to encrypt the plaintext config file (e.g., MTA6328_$MAC.cfg) with a 32-char-long key.

Syntax:

rc4_102 ***mac key input-file*** *['**out-prefix**'] [logfile]*

Example:

rc4_102 ***001099001122 1234567890qwertyuiop1234567890as MTA_sample_config.txt MTA***

Output:

Encrypted config file: ***MTA001099001122.cfg*** is created.

8.2 Openssl command example

Provisioning config file should be encrypted using the following command at the provisioning server when AES-256 is selected from the encryption menu.

```
$ openssl enc -aes-256-cbc -k password -in infile -out outfile
```

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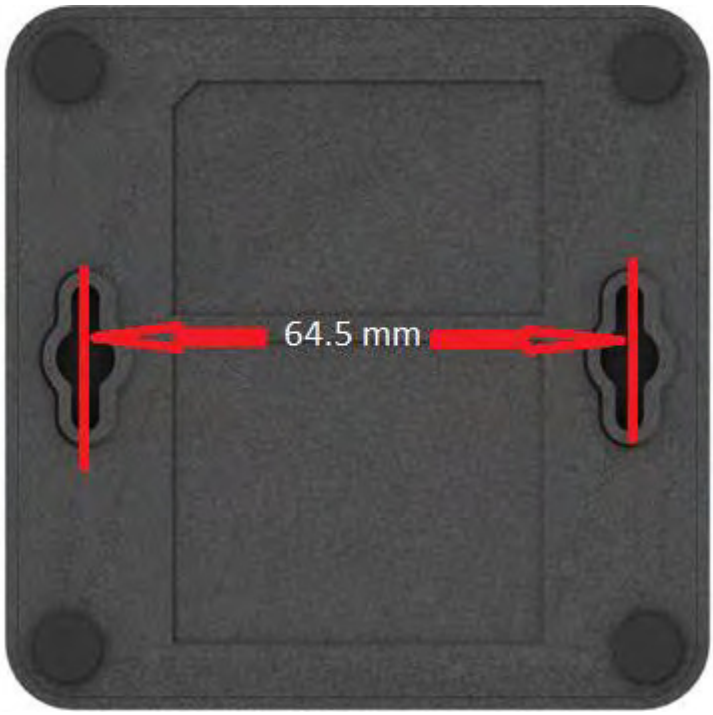
9 APPENDIX C WALL INSTALLATION OF DEVICE

MTA8328-1N can be wall mounted if desired by the end user.

- Mark on the wall horizontally with 2 points 64.5mm apart. Tap and mount two screws leaving the screw head 4mm away from the wall.
    - Use pan head sheet meta screwsl or wood screws. The head size should be no larger than 4mm
- Center the mounting holes of the unit with the heads of the wall mounted screws, and insert the unit to the screws
- Gently pull down the unit so it slides 5 to 7 mm and tightens itself and fits snugly to the wall
- Now attach the cables in the order as mentioned in Section 1.3 of this manual
- **Note:** The unit can be mounted where the Ethernet and phone cables appear towards the bottom side, or where they appear to the top side.



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10 APPENDIX D FCC STATEMENT

Federal Communication Commission Interference Statement

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

FCC Caution: Any changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance 20cm between the radiator & your body.

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