New Rock Technologies, Inc.

MX100G SIP-ISDN Gateway Series

User Manual

MX100G-1E1/T1
MX100G-2E1/T1
MX100G-4E1/T1

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1 Overview

1.1 Product Introduction

The MX100G SIP-ISDN trunking gateway (hereinafter referred to as the MX100G) is one of VoIP product series developed by New Rock Technologies Inc. It uses the SIP and T1/E1 interfaces for the inter-conversion of IP packets and PCM signals, allowing the interworking of the IP-based new-generation voice network to legacy Public Switched Telephone Network (PSTN), and the private branch exchange (PBX) of an enterprise.

As a carrier-class VoIP gateway, the MX100G is designed under the requirements of telecom operators, integrators, value-added service providers as well as large and medium-sized enterprises for VoIP services. The MX100G has distinctive advantages over other similar products in terms of performance, system reliability, compatibility and cost performance. In addition, the MX100G has efficient software/hardware architecture and powerful DSP processing capabilities, ensuring the realization of major functions (including the conversion between PCM signals and IP packets, G.711 or G.729A encoding and decoding of voice signal, and echo cancellation, etc.) even under full load conditions.

By supporting the ISDN PRI signalling, the MX100G can control its calls with the PSTN or PBX. The call control between the MX100G and media gateway controller (softswitch) is carried out through Session Initiation Protocol (SIP). By now, the MX100G has successfully passed the interoperability test with various popular softswitch platforms and IP PBX products.

1.2 Features

The MX100G has the following characteristics:

High performance

The DSP chip with powerful voice processing used by the MX100G is developed by the TI Company. Its DSP daughter card ensures a 6000 MIPS processing capability for each gateway, enabling the MX100G to provide functions of voice signal processing (G.711, G.729A, and G.723.1), echo cancellation, and fax relay (T.38) under full load conditions (120 calls).

High security

The network security of the MX100G has been confirmed by NSFOCUS, a proven global leader in providing enterprise-level network security solutions and services. To ensure a better security, the MX100G supports Secure Shell (SSH) and provides functions including automatic password strength test, password change notification, password anti-crack, cipher text data storage, external network access control, blacklist/whitelist, and system log backup.

High reliability and maintainability

To meet the requirements of telecom operators on the gateway reliability, the hardware design of the MX100G, from architecture to component selection, takes full consideration of improving the mean time between failures (MTBF), including features such as redundant power supply option and dual Ethernet ports. In addition, the MX100G uses a Web-based graphical management interface to facilitate user configuration and routine maintenance.

Low cost and high reward

How to reduce cost and investment risk is one of the major challenges a user faces when choosing an IP-based new generation of voice device. The MX100G helps reducing users' cost by increasing new functions and applications to follow the ongoing evolution of VoIP technologies. This can be realized through New Rock's software upgrade free of charge policy within the life cycle of the MX100G.

In support of multiple protocols

The MX100G supports different kinds of protocols including Session Initiation Protocol (SIP), Real-time Transport Protocol (RTP), Trivial File Transfer Protocol (TFTP), File Transfer Protocol (FTP), Hypertext Transfer Protocol (HTTP), Session Traversal Utilities for NAT (STUN), Also, the MX100G supports different technologies including ISDN PRI signalling, G.711, G.729A, or G.723.1 encoding and decoding, G.168 echo cancellation, Dual-Tone Multi-frequency (DTMF) message transmission (RFC 2833), and fax relay (T.38).

High interoperability

By now, the MX100G has successfully passed the interoperability test with various softswitch platforms and IP PBX products.

1.3 Equipment Structure

1.3.1 Front & Back Panel

Figure 1-1 Front Panel

Table 1-1 Front Panel

#	Mark	Description
①	RST	Pressing the RST button for less than three seconds: no action will be taken. Pressing the RST button for more than three seconds: the factory settings will be restored.

#	Mark	Description
②	PWR	Indicators for power supply, system status and alarm, respectively.
③	STU	
④	ALM	
⑤	CON	A configuration interface.
⑥	ETH	Specifies an RJ45 module interface. Interfaces ETH1 and ETH2 share the same IP address for allowing access to the external network. Dual-LAN redundancy is supported.
⑦	AUX	An RJ45 interface. Interfaces AUX1 and AUX2 share the same IP address for local management and configuration.
⑧	T1/E1	An RJ45 interface, in support of 1 T1/E1, 2 T1/E1, and 4 T1/E1. Each T1 interface supports the maximum 24 voice channels; each E1 interface supports the maximum 30 voice channels with ISDN PRI signalling.
⑨	SD	A SD card socket.

Table 1-2 Indicators

Mark	Function	Status	Description
PWR	Power Indication	Green	Power on
		Off	Power off
STU	Status Indication	Off	System failed and inactive
		Red Flash	System is in a diagnostic mode and you can execute limited operation (e.g. Log in to system through Telnet)
		Steady Red	System is powered up and not operating normally yet.
		Green Flash	System is operating normally
ALM	Alarm Indication	Green	No alarms
		Red Flash	New alarms occurred
		Red	Alarms existed
ETH	Interface state indicator	Green on	The transmit speed is 1000M bit/s.
		Green off	The transmit speed is 10M bit/s or 100M bit/s.
		Yellow on	The link has been established but no service traffic is transmitted.
		Yellow flashing	Service traffic is being transmitted on the link.
		Yellow off	The link is not established.
AUX	Interface state indicator	Green on	The transmit speed is 1000M bit/s.
		Green off	The transmit speed is 10M bit/s or 100M bit/s.
		Yellow on	The link has been established but no service traffic is transmitted.
		Yellow flashing	Service traffic is being transmitted on the link.
		Yellow off	The link is not established.
T1/E1	Interface state indicator	Long green	The connection works normally.
		Blinking red	A remote alarm is generated.
		Long red	A local alarm is generated.
		Off	No connection is established.

Table 1-3 Pinouts of Ethernet Ports

RJ45 Pin-out	1	2	3	6
Description	TX+	TX-	RX+	RX-

Table 1-4 Pinouts of T1/E1 Module

RJ45 Pin-out	1	2	3	4	5	6	7	8
Description	RXRing	RXTip	NC	TXRing	TXTip	NC	NC	NC

Figure 1-2 Back Panel (AC)

Table 1-5 Description of Back Panel

#	Description
①	AC power socket, 100-240 VAC voltage input.
②	Ground pole.

Figure 1-3 Back Panel (DC)

Table 1-6 Description of Back Panel

#	Description
①	DC power socket, -36 to -72 VDC voltage input.
②	Ground pole.

1.3.2 CON Port

The MX100G provides one configuration interface (CON) of RJ45 interface for local management and debugging.

Table 1-7 Standard Table for Lead Wire of Pin at Configuration Port (CON)

Pin number of RJ45 plug	1	2	3	4	5	6	7	8
Description	NC	NC	TXD	GND	GND	RXD	NC	NC
Pairing connection with DB9 female plug			2		5	3		
Pairing connection with DB25 male plug			3		7	2		

The configured interface is connected to the RS232 port on the PC, allowing the PC to establish the connection with the MX100G by configuring a terminal emulator. The configured interface of MX100G is in a 3-wire configuration: one TXD (data transmission terminal), one RXD (data reception terminal), and one GND (ground terminal).

Please use a RJ45 to RS232 serial cable as shown in Figure 1-3 for connecting the CON port on MX100G side and the RS232 port on PC side. If the connection is established between MX100G and the mobile PC with no RS232 ports, please use the cable together with USB to RS232 converter cable as shown in Figure 1-4.

Figure 1-3 RJ45 to RS232 serial cable

Figure 1-4 USB to RS232 converter cable

Table 1-8 Attributes of CON Port

Attributes	Description
Connector	RJ45
Interface count	1
Interface standard	RS232
Baud rate	115200
Data bit	8
Parity	No
Stop bit	1
Traffic control	No

1.3.3 Specifications

Table 1-9 Specifications

Item	Description
Basic	
Ethernet	RJ45, 4×10/100/1000M Base-T, self-adaptive
E1/T1Interface	4, 120 simultaneous VoIP calls
SD Interface	1
CON Interface	RJ45
System Memory	256MB
System Flash	32MB
Processor	TI AM3352
DSP	TI C5509
Single/Dual AC power supplies	~100 to 240V, 50/60Hz, 1A
Single/Dual DC power supplies	-36 to -72 VDC, 2.5A
Power Consumption	18 W (Max)
Size (H×W×D)	44×440×300 mm,1Uformfactor
Weight	net weight:3 kg gross weight(with box):5 kg
Environment Requirements	
Operating Environment	0 to 40oC, Non-Condensing Humidity 10 to 95%
Storage Environment	-10 to 60oC, Non-Condensing Humidity 10 to 95%

2 Installation Preparation

For avoidance of personal injury and device damage, please read this chapter carefully before installation.

2.1 Installation Precautions

For your safety, please follow the precautions when MX100G is installed and used.

- Keep the site far from the heat and humidity
- Take precautions with use of high-voltage electricity
- Please let the experienced or trained operator to install and maintain MX100G
- Wear static discharge wrist strap
- Ensure the proper electric ground of installed equipment
- Properly connect the power cable to MX100G
- Do not plug the power cable when in use
- UPS is advised

2.2 Site Requirements

2.2.1 Temperature and Humidity

Check the temperature and humidity of equipment room. To ensure the normal operation and long service life of the gateway, the temperature and humidity in the room should be kept at the proper range.

The humidity in the equipment room should be kept between 10% and 90% (non-condensing). Abnormal humidity condition may cause problems to the gateway:

- Long term high humidity may lead to bad insulation and even cause electricity leakage, mechanical property change and corrosion.
- Low humidity is likely to leave captive screws to loose due to static electricity built up and the insulation washer shrunk.

The temperature in the equipment room should be kept between 0℃ and 40℃. Abnormal temperature condition may cause problems to the gateway:

- High temperature acceralets aging of electrical parts and insulation materials.
- Low temperature, however, may destabilize the operation of gateway.

2.2.2 Cleanliness

Dust is very harmful to the safe operation of the gateway. Dust that is adsorbed by static electricity acts as insulator, which not only affects the service life of the gateway but also leads to communication failure. Therefore, the room for the gateway must be kept clean.

To ensure adequate ventilation to keep the gateway from overheating, there should be adequate clearance for the air intake and the air exhaust vents. Keep at least 6 cm clearance at the left and right side of the chassis where the air intake is and at least 15 cm clearance at the rear of the chassis where the exhaust vents located.

The rack for MX100G should have a good ventilation system.

2.2.3 Power Supplier

Check the power supply system against the electrical specification of the gateway.

2.2.4 Grounding

For AC power supply system

To maintain good voice quality, proper grounding of the AC supply is critical to minimize the noise from the AC interference. Therefore, the following conditions must be ensured:

- The AC power outlet has a protection ground contact.
- The ground contact of AC supplier must be grounded properly.
- Avoid sharing the multi-outlet power strip with other devices that may generate electrical interference.

MX100G is chassis based with ground tab.

In a site that can provide ground for the chassis, the ground tab at the rear panel of chassis for MX100G must be properly grounded.

For DC power supply system

The DC power working ground (the positive pole of the -48 V DC power supply or negative pole of the 24 V DC power supply) of the communications site should be connected with the indoor collective grounding cables nearby. The grounding cables should meet the requirement for the maximum load of the equipment.

The power supply equipment of the communications site should be connected with from the collective ground cable in the communications building (or from the protection grounding bar of the equipment) to the DC working ground cable.

2.2.5 Electromagnetic Environment

Any possible interference source, wherever it is from, impacts the gateway negatively. To resist the interference, make sure that:

- Keeping the gateway far from radio transimitting station, radar station, and high-frequency devices. Use electromagnetic shielding when necessary.
- The gateway is capable for secondary lighten protection on wires and cables that connected to outside buildings.The site must provide the primary lighten protection.
- The power supply system should be used independently as much as possible and effective measures of preventing electric grid from interference should be adopted.
- Ensure a good power grounding effect of equipment or add a lightning protector.

2.2.6 Other Facilities

- **Rack/Workbench**

MX100G is designed to be installed in a standard 19-inch rack, which should provide adequate air-flow to cool down the gateway, and should be firm enough to support the weight of the gateway. It is also recommended the rack is earth grounded properly.

- **PSTN Line**

  If the gateway is equipped with T1/E1 interface, be sure to subscribe PSTN lines from local telephone company and activate the lines prior to the installation.

- **IP Network**

  The gateway is connected to IP network through its 10/100/1000 base-T Ethernet port and communicate with other equipments through the network. Inspect IP network on the site, including router, switch, cable wiring and etc, and make sure they are ready for the gateway.

- **AC Power Outlets**

  The gateway needs AC power supply, and sometimes the power is provided through a power strip with extension cord. Verify that each socket outlet on the power strip is equipped with protective earth contact and the protective action is not negated by using extension power cord.

2.3 Opening Inspection

After the completion of installation preparation, you should open the box for inspection. Make sure the gateway and all in-box accessories match the description below.

An MX100G with basic configuration should include components as shown in fowling table.

Table 2-1 Standard Configuration

Description	Quantity	Unit
MX100G	1	Set
Power Cord	1	Set
Grounding Cable	1	Set
Rack Mounting Kits	1	Set
T1/E1Cable	1~4	Set

The package list is only for reference. Changes may be made without notification. The detailed inclusions are on the shipping list enclosed in the device package. Please contact your supplier if you have any question.

3 Installation

3.1 Tools and Meters

- Screwdriver
- Antistatic wrist strap
- Ethernet and console port cables
- Power cable
- Terminals (a PC running terminal program can be used)
- Universal electric meter
- Multimeter

3.2 Rack Mounting

The MX100G series chassis are designed to be mounted on a standard 19-inch rack with 1U height.

3.2.1 Attaching the Brackets

Place the MX100G series chassis on the workbench, take two L-shape rack mounting brackets and screws, install the brackets at the left and right sides of the equipment, as shown in the fowling figure.

The L-shape brackets are used to secure the gateway to the rack. The brackets cannot support the weight of the equipment alone. Prior to install the MX100G series chassis into rack, a supporting shelf must be installed in place where the gateway will sit.

Figure 3-1 Installation of MX100G Series L-shape Brackets

3.2.2 Mounting the Gateway

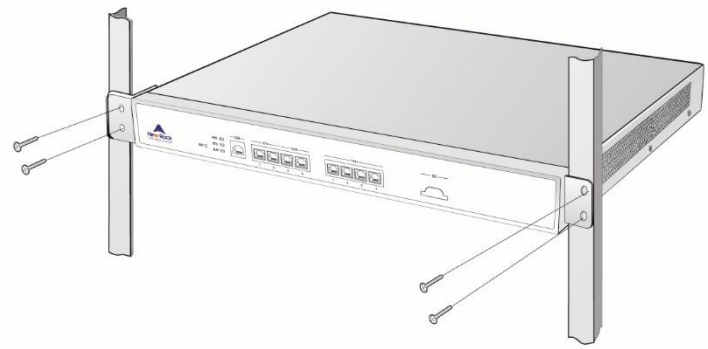
Attention should be paid during the installation:

- Ensure that the rack is firmly attached to the ground and stable.
- If the gateway is installed in a closed cabinet shelf, the cabinet must provide adequate air-flow so the equipments inside can be well ventilated.
- If multiple gateways are installed in a rack, it is recommended to keep at lease 1/2U space between gateways for heat dissipation.

Follow the steps to install the gateway:

- Place the gateway on a shelf in the rack.
- Slide it to a proper position along the guide rails.
- Fix the rack-mount brackets to the rack posts with supplied Phillips screws. Make sure that the gateway is in level position and securely fixed as shown in fowling figure.

Figure 3-2 Mount MX100G to Rack



3.3 Installing Cables

3.3.1 Connecting Console Port

A CON should be provided by MX100G to check errors of the device. Connect the CON with computer's RS232 serial ports, then local computers can interwork with the device through simulating terminal program.

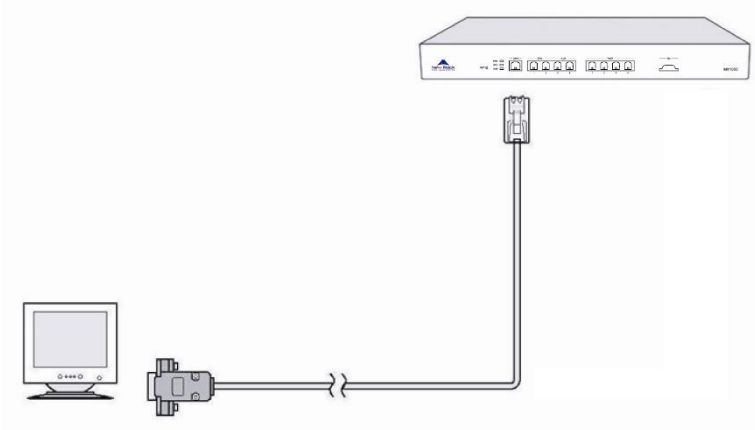
As to MX100G, RJ45 Plug is used. One port is applied for connecting CON, while the other is applied for DB9 Adapter to insert serial ports of configuration terminal. CON Ratio: 115200.

Console Port cable installation procedure is as followed:

Step1 Choose a terminal (PC).

Step2 Power off the terminal and connect RS232 port with the Console port.

Figure 3-3 Cable of Connecting MX100G CON



3.3.2 Connecting the Ethernet Cable

The MX100G has the dual-network-interface redundancy function. When one of the network interfaces is disconnected or does not work well, traffic services can be switched seamlessly to the other one.

The MX100G has two service interfaces, namely ETH1 and ETH2 for your choice. These two interfaces need to be connected to the same hub, LAN, or WAN. Only one of them works at a time. After Ethernet cables are inserted, check the indicator state of the interface that is connected first. If the indicator is long green or blinking green, it indicates that the connection is established properly.

The MX100G has two auxiliary interfaces, namely AUX1 and AUX2. In most cases, no connection is required for auxiliary interfaces.

3.3.3 Connecting the T1/E1 Cable

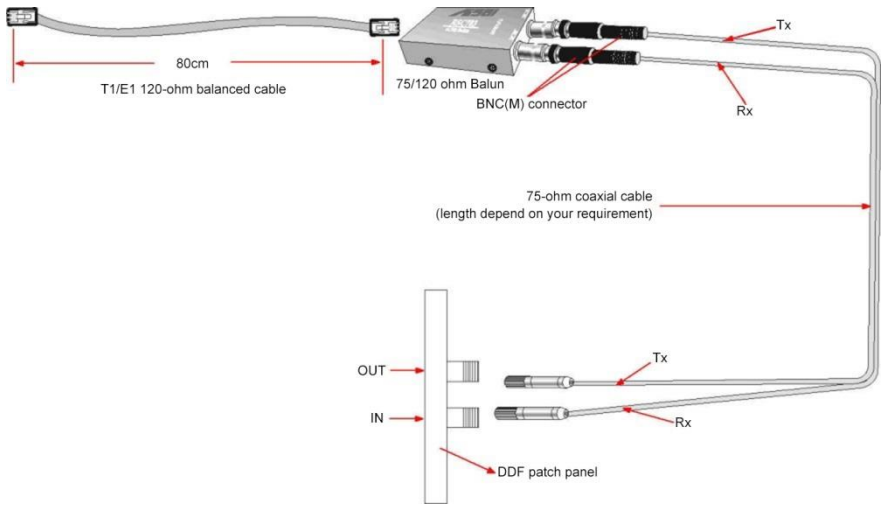
MX100G offers RJ45 jack as T1/E1 connector for making ISDN connection with PBX or PSTN.

Please identify the connector type and interface impedance of the other side equipment before making T1/E1 connection.

If the other side equipment offers same RJ45 jack, use CAT5 cable with RJ45 plugs on both side to make T1/E1 cable connection. Be sure to match TX and RX pair according to the PIN specification when making the CAT5 cable.

If the other side equipment offers separate TX/RX coax connectors for T1/E1connection, use RJ45-Balun-Coax cable sets and follow the figure to make the connection.

Figure 3-4 Connecting the T1/E1Cable



Note

The T1/E1 ports are numbered 1 to 4 from left to right. If the hardware configuration is 1 T1/E1, insert one end of the T1/E1 cable to the leftmost T1/E1 port on the MX100G.

3.3.4 Connecting the Grounding Cable

When install in equipment room facility providing independent grounding, it is required to connect the chassis ground tab on MX100G with the protective grounding system in this environment. Proper

grounding not only provides a guarantee for safe operation of the equipment but also enhances the capacity of the equipment to resist disturbance and ensures the quality of voice communication.

The MX100G series main chassis and expansion chassis are equipped with a M4 grounding screw with a mark in their backs. Please use the M4 screw to connect the grounding wire.

3.3.5 Connecting the Power Cord

Before connect the power cord, make sure the AC power outlet is provided with a protective earth contact and the earth contact of the AC power source is proper grounded.


Note

Please contact the gateway supplier if the power LED does not light up after the power is turned on. Never install and uninstall the gateway or plug and unplug any cable on the gateway when the power is turned on.

Follow the steps to connect AC power cord:

Turn the switch of AC power outlet to OFF position.

MX100G use the shipped power cord to connect between the AC input at rear of the chassis and the AC power outlet.

Follow the steps to connect DC power cord:

Turn the switch of DC power outlet to OFF position.

Insert power cords to the socket shipped with the MX100G and fasten the cables. Then insert the socket to the device and fasten it.

3.3.6 Verifying Installation

Installation verification is extremely important, because operations of the gateway depend on its stability, grounding, and power supply.

Each time you turn on the power during the installation, verify that:

- Enough clearance has been reserved around the ventilation openings of the gateway and the workbench/rack is stable enough.
- The protection ground is connected properly.
- Proper power is used as specified.
- The gateway is correctly connected to console terminal and other devices.

4 Powering up the Gateway

4.1 Verification before Power-up

4.1.1 Checking Appearance

This is a review process of the installation work, including the chassis, wiring, connectors, ports, labels and site as described in the subsections.

Gateway

- Check whether there is adequate clearance around the gateway for thermal, and whether the workbench or rack for the mounting of the gateway is firm enough.
- Check whether the gateway is correctly connected to the configuration terminal and other devices.

Cable

- Check whether the Ethernet cable, the T1/E1 cables are connected properly.
- Check whether the grounding cable is connected properly.
- Check whether the power cord is connected to the proper power supply as required.

Port and Connector

- Check whether the ports and connectors are secured.

Equipment Room

- Check whether the temperature and humidity in the equipment room are within the proper range. The humidity should be kept at 10% to 90% non-condensing and the temperature should be kept at 0-4^{o}C.

4.1.2 Checking Power Supply

Check whether the power supply is in normal operation with a multimeter.

4.1.3 Powering up the Gateway

Turn the power switch to ON position. Check the status of PWR LED, and if it is lit the gateway is powered properly.

5 Parameter Setting

5.1 Login

Double-click the icon to open IE browser, and enter the gateway IP address in the browser address bar (eg. 192.168.2.240), you can enter the login interface for gateway configuration by entering a password on the login interface.

Figure 5-1 Login Interface for MX100G Gateway Configuration

Both Chinese and English Languages are provided for the Web interface.

Logon users are classified into **administrator** and **operator**. The default passwords are **mx100** (lowercase letters required) and **operator**. The password is shown in a cipher for safety.

- The administrator can browse and modify all configuration parameters, and modify login passwords.
- The operator can browse and modify part of configuration parameters.

The gateways allow multiple users to log in:

- The administrator has permission for modification and the operator has permission for browsing;
- When multiple users with same level of permission log in, the first has permission for modification, while the others only have permission for browsing.

Note

- The system will confirm timeout if users do not conduct any operation within 10 minutes after login. They are required to log in again for continuing operations.
- Upon completion of configuration, click the **Logout** button to return to the login page, so as not to affect the login permission of other users.

5.2 Buttons Used on Gateway Management Interface

Submit buttons are at the bottom of the configuration screens. It is used to **s**ubmit configuration information. Users click **Submit** button after completion of parameter configuration on a page. A success prompt will appear if configuration information is accepted by the system; if a "The configuration takes effect after the system is restarted" dialog box appears, it means that the parameters are valid only after a system restart; it is recommended that users press the **Restart** button on the Tool page to enable the configuration after changing all parameters to be modified.

5.3 Basic Configuration

5.3.1 Network Configuration

Click **Basic** > **Network** tab to open the configuration interface.

Figure 5-2 Network Configuration Interface

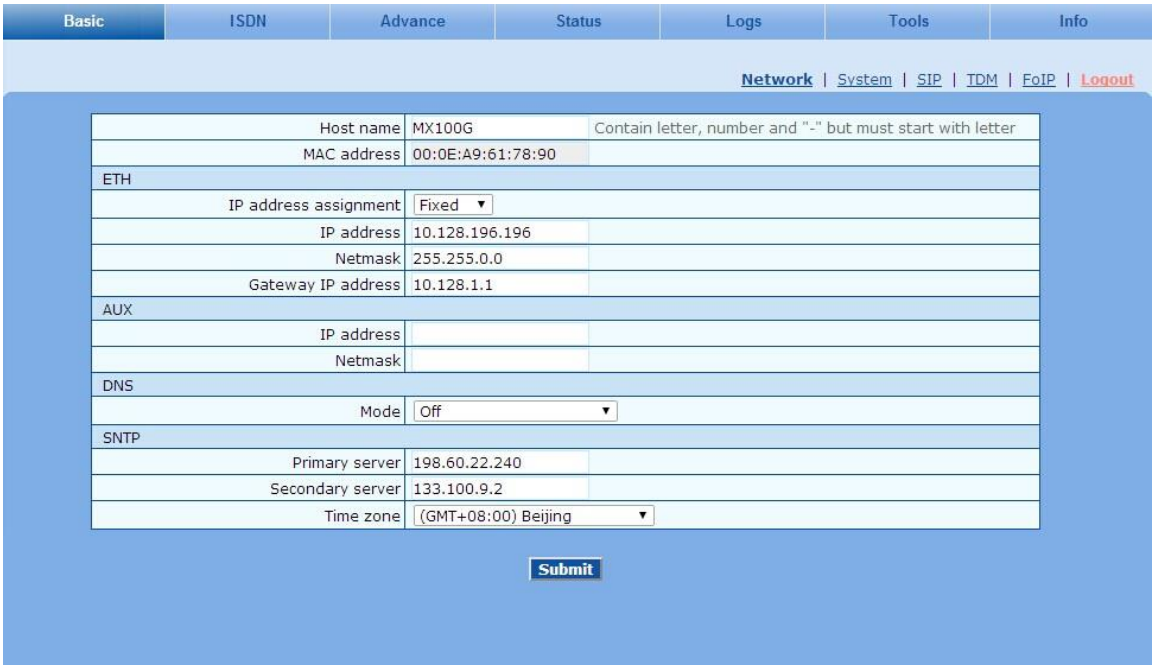


Table 5-1 Network Configuration Interface

Name	Description
Host name	This is the equipment name of a configuration gateway. The default value is MX100G. Users can set a different name for each gateway to distinguish from each other according to the deployment plan. A host name can be a maximum of 48 characters, either letters (A-Z or a-z), numbers (0-9) and minus sign (-). It may not be null or space and it must start with a letter.
MAC address	Display the MAC address of gateway.
ETH	
IP address assignment	Methods for obtaining an IP address: • Fixed: use the static IP address specified manually. • DHCP: use the DHCP to obtain an IP address and other network parameters. • PPPoE: use the PPPoE protocol to obtain an IP address and other network parameters.

Name	Description
IP address	The IP address used by an ETH interface to access the network gateway.
Netmask	The subnet mask is used with an IP address. When the gateways use a static IP address of ETH, this parameter must be entered.
Gateway IP address	LAN gateway IP address where the gateways are located.
AUX	
IP address	The IP address used by an AUX interface to access the network gateway, which must be in different network segment with the IP address of the ETH interface.
Netmask	The subnet mask is used with an IP address. When the gateways use a static IP address of AUX, this parameter must be entered.
DNS	When the device accesses a site using domain name, you need to enable the DNS function and specify a DNS server to resolve the domain name to the IP address.
Mode	● Off: disable the DNS function. ● Specified manually: enable the DNS function and use the DNS server specified manually. ● Obtained automatically: enable the DNS function and use the DNS server obtained through DHCP or PPPoE.
Primary Server	If the mode is set to **Specified manually**, the IP address of primary DNS server must be entered, and there is no default value.
Secondary Server	If the mode is set to **Specified manually**, the IP address of secondary DNS server can be entered here. It is optional and there is no default value.
SNTP	
Primary Server	Enter the IP address of preferred time server here. This parameter must be set due to no default value.
Secondary Server	Enter the IP address of standby time server here. This parameter must be set due to no default value.

Name	Description
Time Zone	Select a time zone, and the parameter values include: • (GMT-11:00) Midway Island • (GMT-10:00) Honolulu. Hawaii • (GMT-09:00) Anchorage, Alaska • (GMT-08:00) Tijuana • (GMT-06:00) Denver • (GMT-06:00) Mexico City • (GMT-05:00) Indianapolis • (GMT-04:00) Glace_Bay • (GMT-04:00) South Georgia • (GMT-03:30) Newfoundland • (GMT-03:00) Buenos Aires • (GMT-02:00) Cape_Verde • (GMT) London • (GMT+01:00)Amsterdam • (GMT+02:00) Cairo • (GMT+03:00) Moscow • (GMT+03:30) Teheran • (GMT+04:00) Muscat • (GMT+04:30) Kabul • (GMT+05:30) Calcutta • (GMT+05:00) Karachi • (GMT+06:00) Almaty • (GMT+07:00) Bangkok • (GMT+08:00) Beijing • (GMT+09:00) Tokyo • (GMT+10:00) Canberra • (GMT+10:00) Adelaide • (GMT+11:00) Magadan • (GMT+12:00) Auckland

5.3.2 System Configuration

Click **Basic** > **System** tab to open the system configuration interface.

Figure 5-3 System Configuration Interface

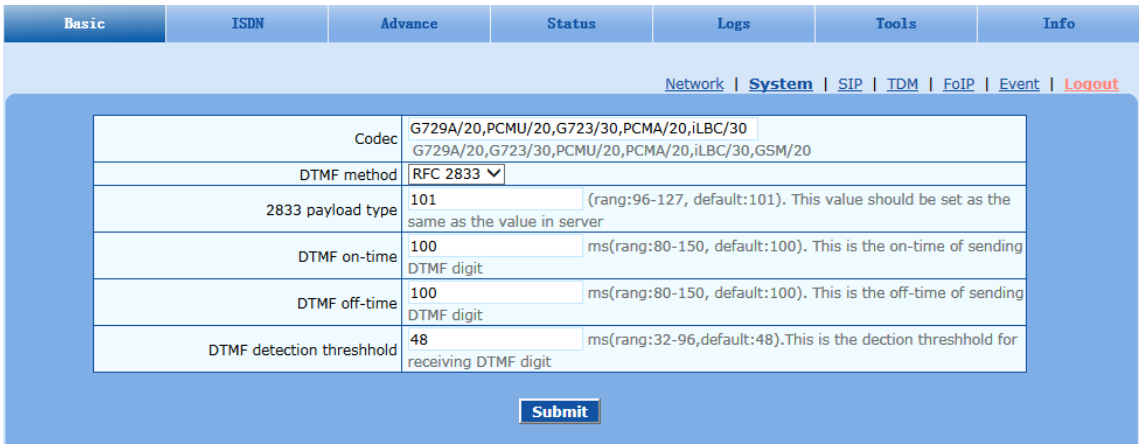


Table 5-2 System Configuration Parameters

Name	Description
Codec	Codecs methods supported by the gateways include G729A/20, G723/30, PCMU/20, PCMA/20, iLBC/30 and GSM/20 (as shown in table 2-5). This parameter must be set due to no default value. Several encoding methods can configure in this item at the same time, separated with "," in the middle; the gateways will negotiate with the platform in the order from front to back when configuring the codec methods
DTMF method	Transmission modes of DTMF signal supported by the gateways include Audio, RFC 2833 and SIP INFO. The default value is Audio. • Audio: DTMF signal is transmitted to the platform with sessions; • SIP INFO: Separate DTMF signal from sessions and transmit it to the platform in the form of SIP INFO messages; • RFC 2833: Separate DTMF signal from sessions and transmit it to the platform through RTP data package in the format of RFC2833. • RFC 2833&SIP INFO: DTMF signal is transmitted simultaneously via RFC 2833 and SIP INFO.
2833 payload type	Used with **RFC 2833** in the DTMF transmission modes. The default value of 2833 payload type is 101. The effective range available: 96-127. This parameter should match the setting of far-end device (e.g. platform).
DTMF on-time	This parameter sets the on time (in ms) of DTMF signal sent from FXO port. The default value is 100 ms. Generally, the duration time should be set in the range of 80-150 ms.
DTMF off-time	This parameter sets the off time (ms) of DTMF signal sent from FXO port. The default value is 100 ms. Generally, the interval time should be set in the range of 80-150 ms.
DTMF detection threshold	Minimum duration time of effective DTMF signal. Its effective range is 32-96 ms and the default value is 48 ms. The greater the value is set, the more stringent the detection is.

Table 5-3 Codec Methods Supported by Gateway

Codec Supported	Bit Rate (Kbit/s)	Time Intervals of RTP Package Sending (ms)
iLBC	13.3/15.2	20/30
GSM	13	20
G729A	8	10/20/30/40
G723	5.3/6.3	30/60
PCMU/PCMA	64	10/20/30/40

5.3.3 SIP Configuration

Click **Basic> SIP** tab to open the SIP configuration interface.

Figure 5-4 SIP Configuration Interace

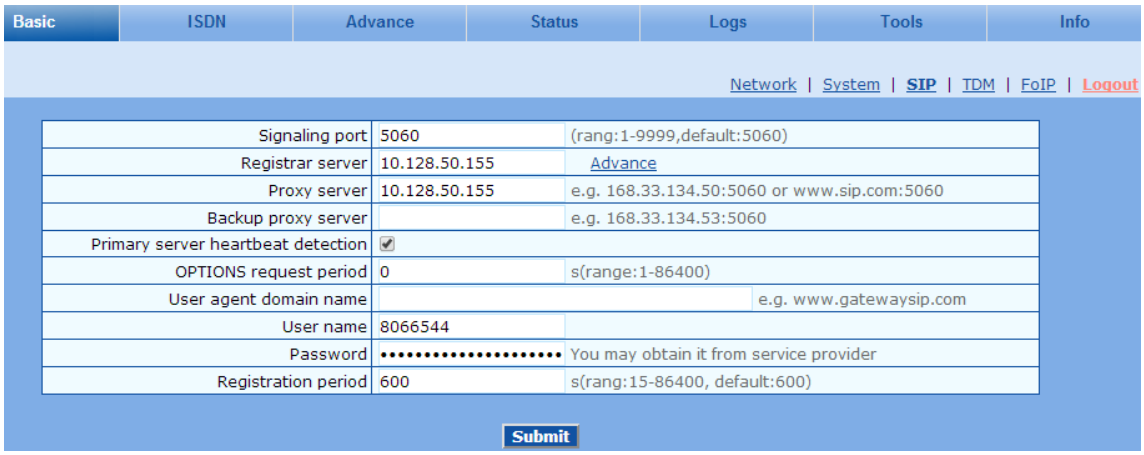


Table 5-4 SIP Configuration Parameters

Name	Description
Signaling port	Configure the UDP port for transmitting and receiving SIP messages, with its default value 5060. If the MX100G is connected directly to the Internet, it's recommended to change the default port value to prevent hacker attacks. Note: The signaling port number can be set in the range of 1-9999, but cannot conflict with the other port numbers used by the equipment.
Register server	Configure the address and port number of SIP register server, and the address and port number are separated by ":". The register server address can be an IP address or a domain name. For example: 201.30.170.38:5060, register.com:5060. When a domain name is used, it is required to activate DNS service and configure DNS server parameters on the page of configuring network parameters.
Proxy server	Configure the IP address and port number of SIP proxy server, and the address and port number are separated by ":". The proxy server address can be set to an IP address or a domain name. When a domain name is used, it is required to activate DNS service and configure DNS server parameters on the page of configuring network parameters. Examples of complete and effective configuration: 201.30.170.38:5060, softswitch.com:5060.
Backup proxy server	Configure the IP address and port number of backup proxy server.
Primary server heartbeat detect	Select the check box to enable and set the parameter OPTIONS request period, the device detects the failure condition of the proxy server (primary server) by periodically sending OPTIONS request to it. If the gateway does not receive the response to OPTIONS request, it will failover to the backup proxy server. After failover to the backup server, the gateway will still send OPTIONS to the primary server all the same. It switches back to the primary server once the response to the OPTIONS request is received.
OPTIONS request period	Set the period of sending OPTIONS request to the primary server.
User name	Configure the user name as part of the account for registration.
Password	Password as part of account information is used for authentication by platform.
Registration period	Valid time of SIP re-registration in second. Its default value 3600.

5.3.4 TDM Configuration

In case of full configurations, the MX100G has one 4T1/E1 card, with four interfaces numbering TDM1 to TDM4 from left to right. You are recommended to set parameters corresponding to the interface configured. Parameters for each interface are identical. You can set different parameter values for each interface as needed. For parameter setting, take the TDM1 as an example:

Click **Basic** > **TDM** tab to open the configuration interface.

Figure 5-5 TDM Configuration Interface

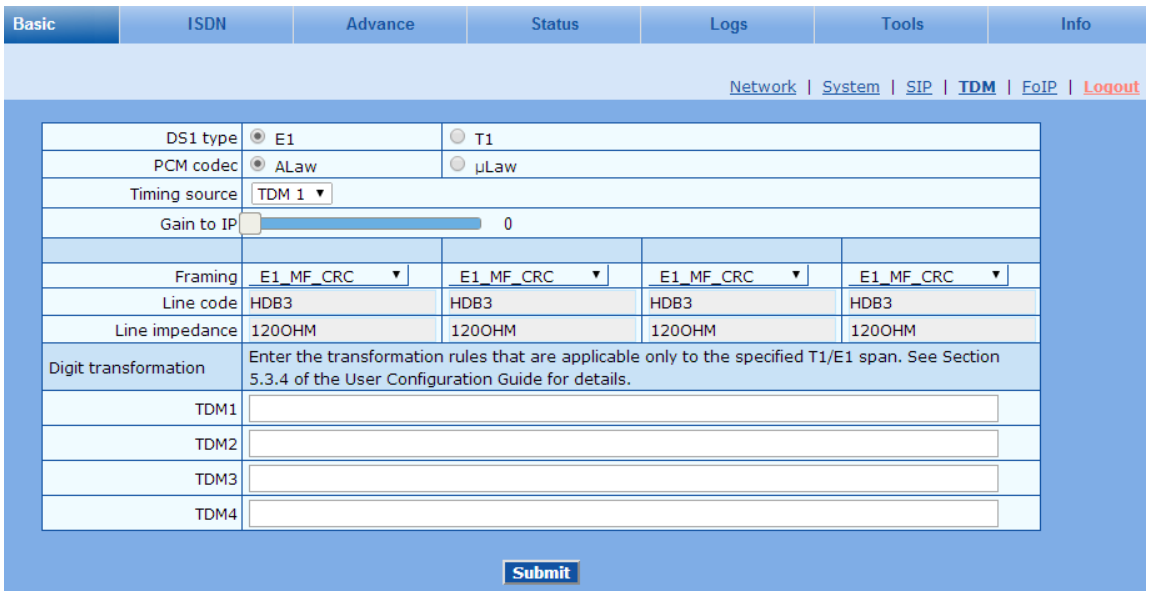


Table 5-5 TDM Configuration Parameters

Name	Description
DS1 type	DS1 Type configures if the T1/E1 interface operates as a T1 or E1 interface.
PCM codec	Allows configuring the PCM encoding type. Allowed settings are ULaw and ALaw.
Timing source	Set the clock synchronization source. It is TDM1 by default. • If the TDM1/2/3/4 is chosen, it indicates that the MX100G synchronizes its clock with the opposite device connected to the first/second/third/forth TDM interface. • If the Local is chosen, it indicates that the MX100G synchronizes with the local device.
Gain to IP	You can increase the value of this parameter to increase the voice volume received from ISDN network and sent to IP network.
Framing	If the MX100G DS1 Type is set to T1 then Line Framing can be set to D4, SF (Superframe), ESF (Extended Superframe) mode. If the MX100G DS1 Type is set to E1 then Line Framing can be set to E1_MF_CRC mode.
Line code	If the MX100G DS1 Type is set to T1 then Line Code can be set to B8ZS or AMI. If the MX100G DS1 Type is set to E1 then Line Code can be set to HDB3.
Line impedance	The configuration is displayed when E1 is chosen, with the value of 120 OHM.
Line length	The configuration is displayed when T1 is chosen, with 0 dB and 7.5 dB for long haul and 36.67 m for short haul.
Digit adjust	Its configuration process is complicated. If necessary, please contact the technical support.
Number Transformation	Number Transformation on each T1/E1 link. Rule format for number transformation on a single T1/E1 link: Operated number: Operation rule set/Operated number: Operation rule set For details about operated numbers and translation rules, see Table 5-6.

Table 5-6 Operated Numbers and Translation Rules

Operated Number	The four following types of operated numbers exist: • InCPN: Operates the calling numbers of calls from ISDN. • InCDPN: Operates the called numbers of calls from ISDN. • OutCPN: Operates the calling numbers of calls to ISDN. • OutCDPN: Operates the called numbers of calls to ISDN.
Operation Rue Set	There are four types of operation rules: matching rules, substitution rules, insertion rules, and deletion rules. The operation rule set is a combination of the four types of rules. If the user does not set a matching rule in the operation rule set, the operation applies to all numbers corresponding to the operated number. Different types of rules are separated by a slash. Rules are executed in sequence from left to right.
Matching Rule	Matching rule CnSmmm or C-nSmmm, where n is an integer greater than or equal to 1, and mmm is a number string. • CnSmmm: Matches the number string mmm behind S from left to right, starting from the nth digit of the number on the left. • C-nSmmm: Matches the number string mmm behind S from right to left, starting from the nth digit of the number on the right.
Replacing Rule	Replacing rule RnSmmm or R-nSmmm, where n is an integer greater than or equal to 1, mmm is a number string, and Y is assumed to be the length of mmm. • RnSmmm: Replaces the number string of the Y^{th} digit starting from the left nth digit of the number with the number string mmm behind S from left to right. • R-nSmmm: Replaces the number string of the Y^{th} digit starting from the right nth digit with the number string mmm behind S from right to left.
Inserting Rule	Inserting rule InSmmm or I-nSmmm, where n is an integer greater than or equal to 1, and mmm is a number string. • InSmmm: Inserts the number string mmm behind S from left to right into the number of the Y^{th} digit starting from the left nth digit. • I-nSmmm: Inserts the number string mmm behind S from right to left into the number of the Y^{th} digit starting from the right nth digit.
Deleting Rule	Deleting rule DnSy or D-nSy, where n is an integer greater than or equal to 1, and y is the number of digits of the number string. • DnSy: Deletes the number of the Y^{th} digit, starting from the nth digit on the left. • D-nSy: Deletes the number of the Y^{th} digit, starting from the nth digit on the right.

Requirements

- Substitute the prefix 66 in the called numbers of calls to ISDN1 with the prefix 71.
- For calls from ISDN1, delete the first two digits of the calling numbers that start with the prefix 88.

The TDM1 rule is as follows:

OutCDPN:C1S66/R1S71/InCPN:C1S88/D1S2

Description

- In this rule, OutCDPN:C1S66/R1S71 is used to operate the called numbers of calls to ISDN1.

  If the called number of a call is 6602, it conforms to the matching rule C1S66. Then, the substitution rule R1S71 is applicable; that is, the called number 6602 is substituted by 7102.
- In this rule, InCPN:C1S88/D1S2 is used to operate the calling numbers of calls from ISDN1.

If the calling number of a call is 88123, it conforms to the matching rule C1S88. Then, the deletion rule D1S2 is applicable; that is, the first two digits of 88123 are deleted so that the calling number 88123 is translated to 123.

5.3.5 FoIP

Click **Basic >FoIP** tab to open the configuration interface.

Figure 5-6 FoIP Configuration Interface

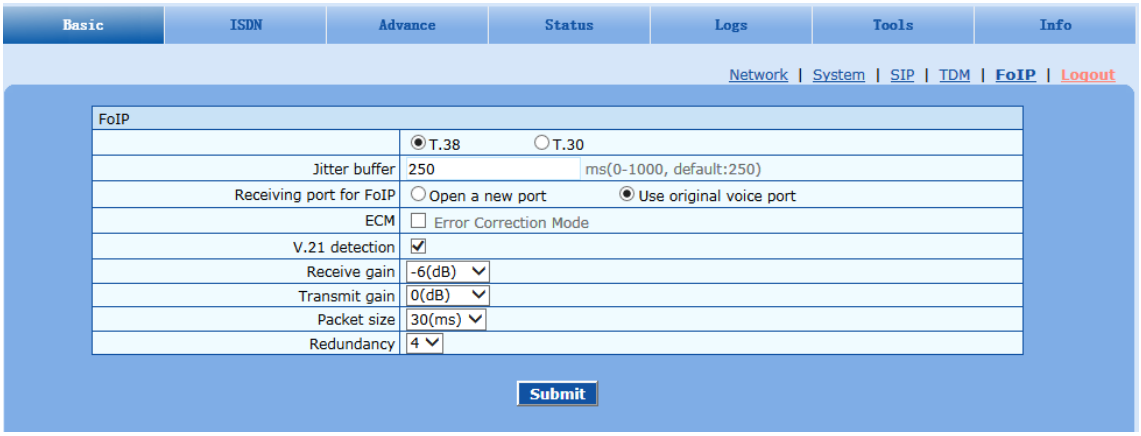


Table 5-7 FoIP Configuration Parameters

Name	Description
	Both T.38 and T.30 fax services are supported. It's recommended to use T.38 fax services. • For T.30, no other parameters need to be configured. • For T.38, parameters available are as follows
Jitter buffer	Set the extent of T.38 jitter buffer, and the default is 250. The valid range is 0 ~ 1000 in milliseconds.
Receiving port for FoIP	Set whether to open a new port when the gateway is switching to T.38 mode, and by default, original voice port will be used. • Open a new port: Use the new RTP port; • Use original voice port: Use the original RTP port that created on call set.
ECM	Determine whether to use corrective mode of fax. By default, it is not selected.
V.21 detection	Choose whether to enable V.21 signal detection. The function is enabled by default.
Receive gain	Set the receiving gain of T.38 fax, with the default of -6dB.
Transmit gain	Set the transmission gain of T.38 fax, with the default of 0dB.
Packet size	Set the packet size of T.38. 30 milliseconds is the default value.
Redundancy	Set the number of the redundant frames in T.38 data package, default is 4.

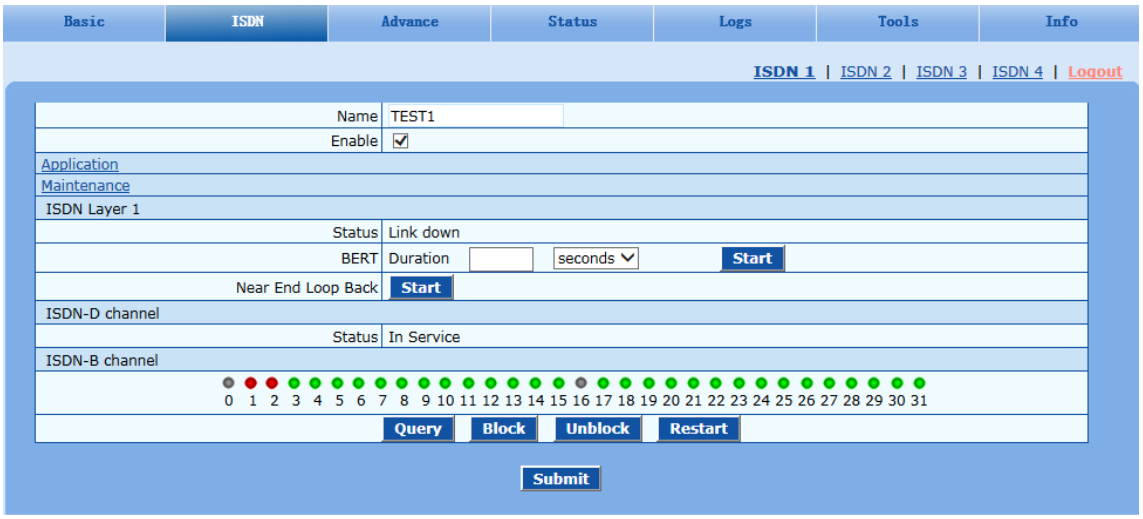
5.4 ISDN

In case of full configurations, the MX100G has one 4T1/E1 card, with four interfaces numbering ISDN1 to ISDN4 from left to right. You are recommended to set parameters corresponding to the interface

configured. Parameters for each interface are identical. You can set different parameter values for each interface as needed. For parameter setting, take the ISDN1 as an example.

Click **ISDN > ISDN1** tab to open the configuration interface.

Figure 5-7 ISDN Configuration Interface 1



If it's necessary to configure link data, click **Application** to display the following configuration page:

Figure 5-8 ISDN Configuration Interface 2

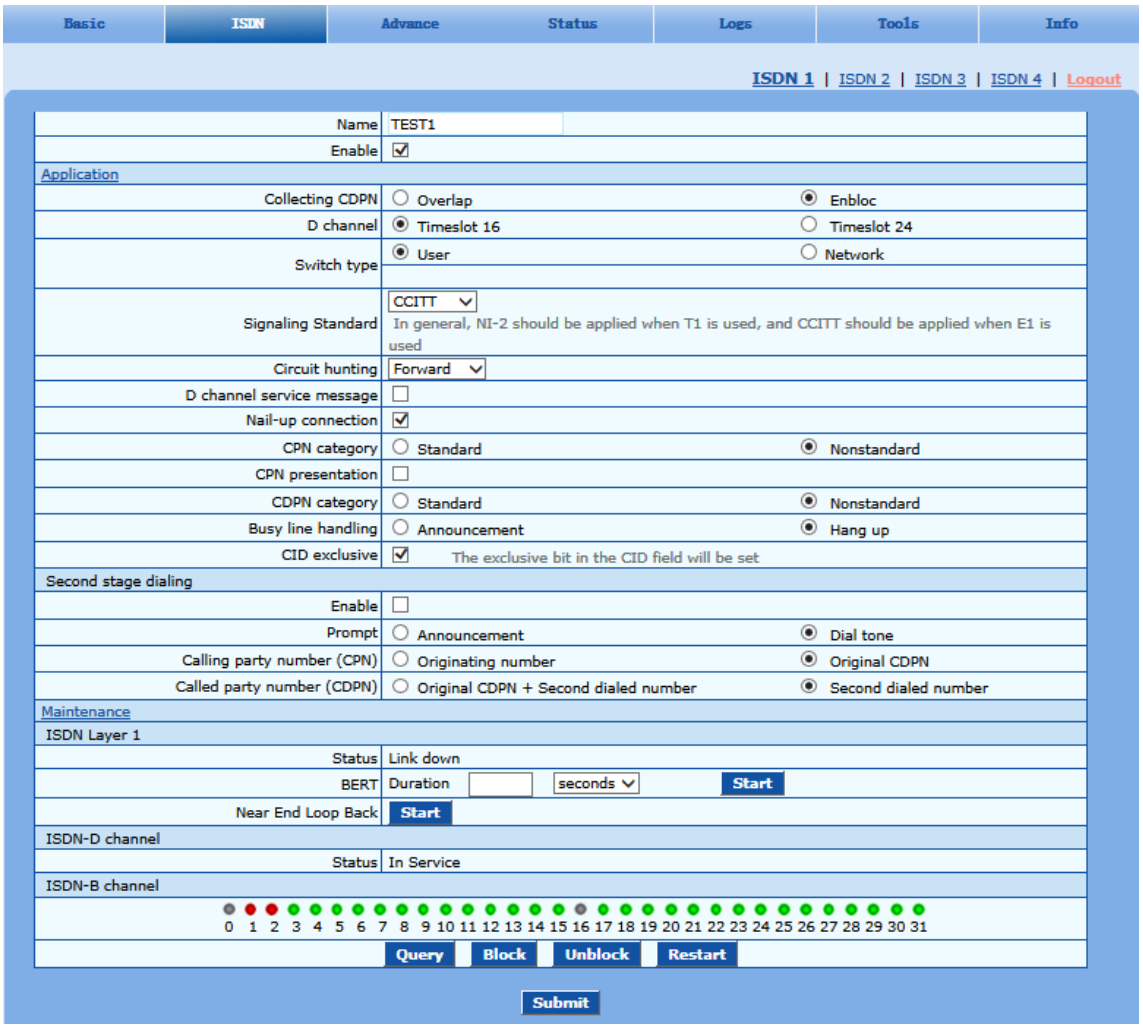


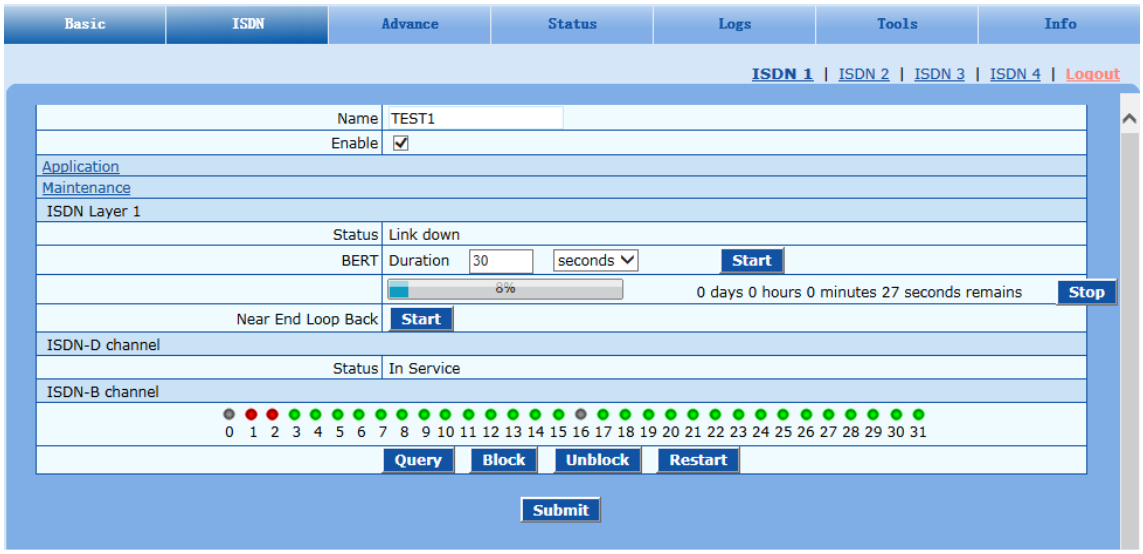
Table 5-8 ISDN Configuration Parameters

Name	Description
Name	Display the name of an ISDN interface.
Enable	Enable an ISDN interface.
Application	
Collecting CDPN	Choose a collecting mode: Overlap or En-bloc.
D channel	A signalling channel. The default value is timeslot 16 for E1 services and timeslot 24 for T1 services.
Switch type	Set the interface protocol on the user side or network side. If the opposite terminal uses network side, the local terminal should choose user side.
Signaling Standard	The variation of ISDN PRI signalling standards: CCITT, NI-2, DMS100, DMS250 and 5ESS. You are recommended to select NI-2 for T1 card and CCITT for E1 card.

Name	Description
Circuit hunting	Search mode of idle timeslot: Forward, Backward and Cycle. Users can choose from the drop-down box. • Forward: In the case of an incoming call, the MX100G first checks whether timeslot 1 is idle. If not, the MX100G checks whether timeslot 2 is idle. The process proceeds in the ascending order until an idle timeslot is found. • Backward: The MX100G searches for an idle timeslot in the descending order. • Cycle: The MX100G searches for the next idle timeslot from left to right.
D channel service message	Setting for enabling the D channel service message.
Nail-up connection	Setting for enabling P2P connection (the called party number and channel ID are not required).
CPN category	Setting the Standard CPN calling party number category subfield. For the details, please refer to the ITU-T Q.931 protocol.
CPN presentation	Setting CPN calling party number presentation subfield. For the details, please refer to the ITU-T Q.931 protocol.
CDPN category	Setting the Standard CDPN called party number category subfield.
Busy line handing	The call processing mode for busy line is Announcement or Hang up.
CID exclusive	For the opposite terminal to change the line, choose Exclusive in CID.
Second stage dialing	
Enable	Enable the second dial tone and detect the DTMF number.
Prompt	Set the mode of second dial tone: Announcement or Dial tone.
Calling party number(CPN)	Set the display mode of calling party number: Originating number or Original CDPN.
Called party number (CDPN)	Set the display mode of called party number: Original CDPN + Second dialled number or Second dialled number.
Maintenance	
BERT	Set the duration, in the unit of seconds, minutes, hours, or days. After that, you can click Start to view the progress bar and the Stop button, as shown in the following figure. You can click Stop to cancel the testing process.
Near End Loop Back	Enable the loop back function for the remote device by clicking **Start**.
ISDN-D channel	Display the state of the ISDN-D channel: In service or Out of service.

Name	Description
ISDN-B channel	Displays the indicator state of a specific ISDN-B channel. • If you click the channel in green, the indicator turns yellow and the call from IP to ISDN on the T1/E1 line is prohibited. The call from ISDN is not affected. • If you click **Block** and choose a specific channel, the indicator of the chosen channel turns red. • If you click **Unblock** and choose a blocked channel, the indicator of the chosen indicator turns green. • If you click **Query** and choose a channel, the channel state is refreshed. • If you click **Restart** and choose a channel, the choose channel restarts.

Figure 5-9 ISDN configuration Interface 3

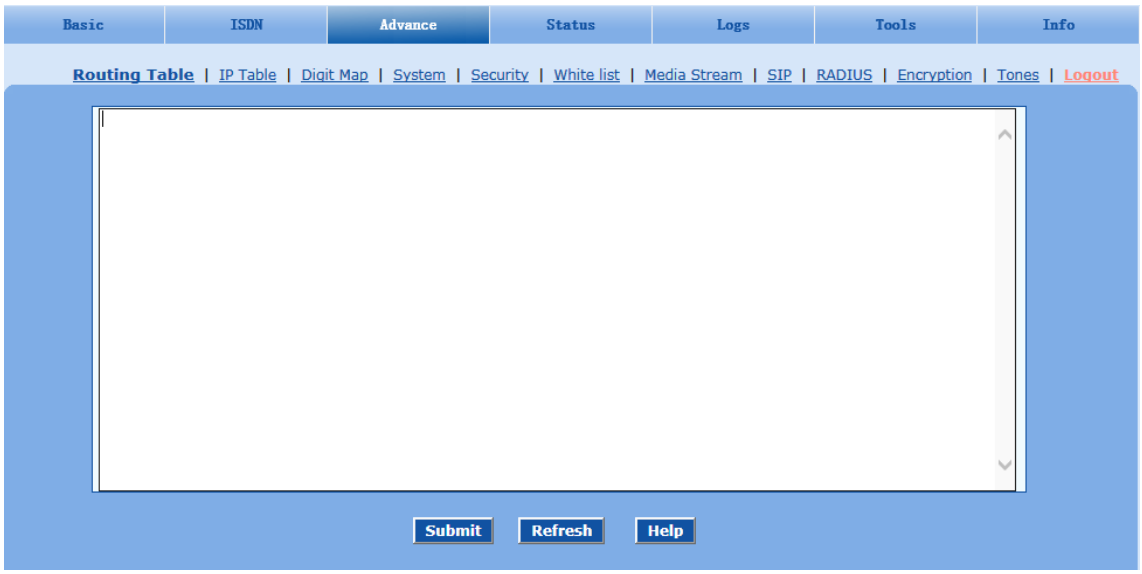


5.5 Advanced Configuration

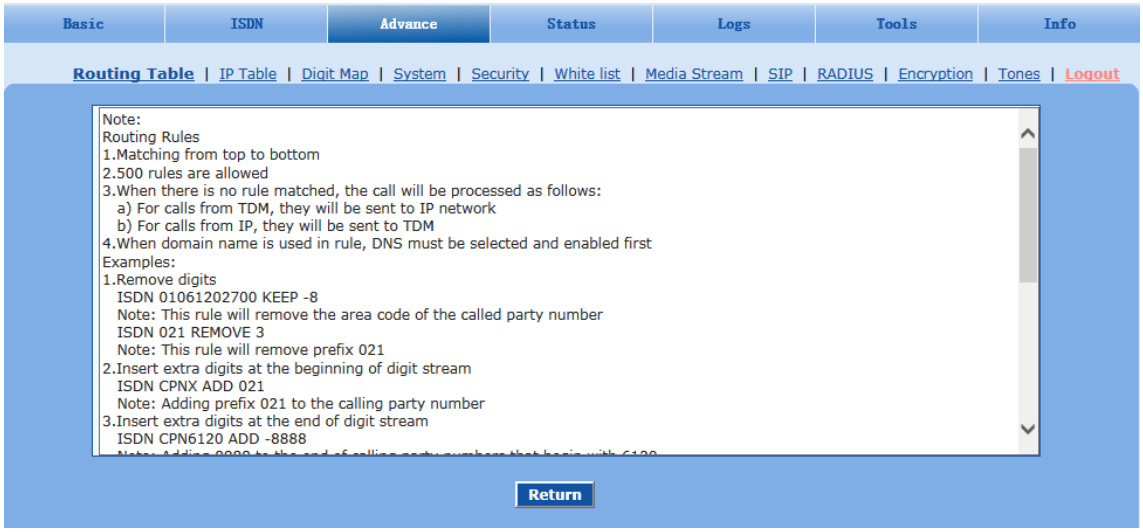
5.5.1 Routing Table

Click **Advanced** > **Routing Table** tab to open the configuration interface.

Figure 5-10 Configuration Interface for Routing Table



Click **Help** to open the illustrative interface for routing configuration



The routing table with 500 rules in capacity provides two functions including digit transformation and call routing assignment. Here are the general rules applied by gateways when executing the routing table.

Note

- Rules must be filled out without any blank at the beginning of each line; otherwise the data can't be validated even if the system prompts successful submittal.
- The routing table is empty by default. The gateways will point a call to the SIP proxy server when there is no matched rule for the call.

The format of number transformation is

Source Number Handle [Parameter]

Or

Source Number ROUTE Destination [Parameter]

The format of number transformation is

Source Number Replacement Method

For example: **FXS 021 REMOVE 3**means remove the prefix 021 of the called number for calls from the IP.

The format of routing rules is:

Source Number ROUTE Destination

For example:

IP 8621 ROUTE ISDN 1

Indicates that the call with the called party number starting with 8621 is sent from the IP network to the first E1 interface.

Detailed definitions of source and number, number transformation methods and routing destination are shown below.

Table 5-9 Routing Table Format

Name	Description
Source	Source can be ISDN or IP. When source is IP, an address can optionally be specified, e.g., [xxx.xxx.xxx.xxx] or [xxx.xxx.xxx.xxx:port]. There are two source types: IP and ISDN. The IP source can be any of the following: • Any IP address, represented by IP. • A specified IP address, represented by IP[xxx.xxx.xxx.xxx]. • A specified IP address and port number, represented by IP[xxx.xxx.xxx.xxx:port] (port specifies a source port number, such as 5060).
Number	It could be a calling party number with the form of CPN + number, such as CPN6034340633 or a called party number with the form of number. The number may be denoted with digit 0-9, "*","."."#","x", etc., and uses the same regular expression as that of dialing rules. Here are examples of the form of number: • Designate a specific number: eg.114, 61202700 • Designate a number matching a prefix: such as 61xxxxxx. Note: the matching effect of 61xxxxxx is different from that of 61x or 61. Number matching follows the principle of minimum priority matching • Specify a number scope. For example, 268[0-1, 3-9] specifies any 4-digit number starting with 268 and followed by a digit between 0-1or 3-9 Note: Number matching follows the principle of minimum matching. For example: x matches any number with at least one digit; xx matches any number with at least two-digit; 12x matches any number with at least 3-digit starting with 12.

Table 5-10 Number Transformations

Processing Mode	Description and Example
KEEP	Keep number. The positive number behind KEEP means to keep several digits in front of the number; the negative number means to keep several digits at the end of the number. Example: IP 02161202700 KEEP -8 Keep the last 8 digits of the called number 02161202700 for calls from IP. The transformed called number is 61202700.
REMOVE	Remove number. The positive number behind REMOVE means to remove several digits in the front of the number; the negative number means to remove several digits at the end of the number. For example: IP 021 REMOVE 3 Any number start with 021, the 021 prefix is removed.
ADD	Add prefix or suffix to number. The positive number behind ADD is the prefix; the negative number is suffix. Example 1: IP CPN6120 ADD 021 CPN number start with 6120, prefix 021 is added. Example 2: IP CPN6120 ADD -8888 CPN number start with 6120, 8888 is appended.
REPLACE	Number replacement. The replaced number is behind REPLACE. Example: ISDN CPN88 REPLACE 2682000 CPN number started with 88, the prefix "88" is replaced with 2682000. Other use of REPLACE is to replace the specific number based on other number associated with the call. For example, replacing the calling party number according to the called party number. Examples: ISDN 12345 REPLACE CPN-1 Indicates that the tail digit is deleted from the caller number in correspondence with the called party number 12345 from ISDN.
END or ROUTE	End of number transformation. From top to bottom, number transformation will be stopped when END or ROUTE is encountered; the gateways will route the call to the default routing after meeting END, or route the call to the designed routing after meeting ROUTE. Example 1: IP 12345 ADD -8001 IP 12345 REMOVE 4 IP 12345 END Indicates that the called party number from an IP network starting with 12345. The first order indicates it is suffixed with 8001, the second order indicates it removes 4 digits and the third order indicates it ends the previous operations. Example 2: IP[222.34.55.1] CPNX REPLACE 2680000 IP[222.34.55.1] CPNX HIDE IP[222.34.55.1] CPNX ROUTE ISDN 2 Indicates that any calling party number from the IP address 222.34.55.1 is replaced by 2680000. The calling party number is hidden and the call is sent to the second E1. Note: The hiding of the calling party number can be enabled only when the operator can provide the corresponding support as well.

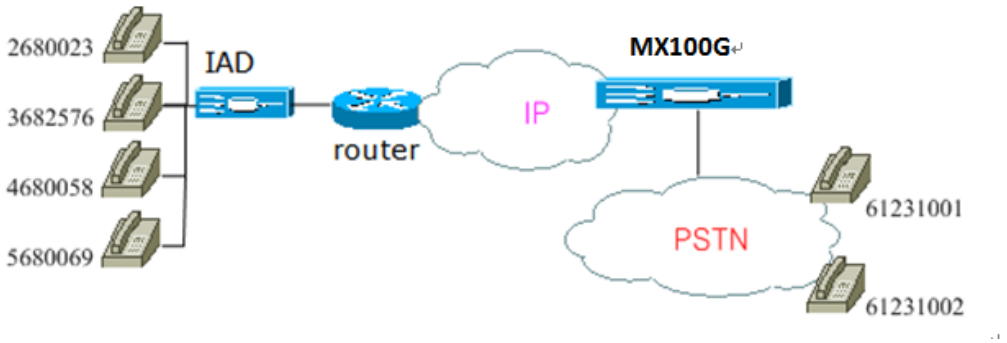
Processing Mode	Description and Example
CODEC	Designate the use of codec, such as PCMU/20/16, where PCMU denotes G.711, /20 denotes RTP package interval of 20 milliseconds, and /16 denotes echo cancellation with 16 milliseconds window. PCMU/20/0 should be used if echo cancellation is not required to activate. Example: IP 6120 CODEC PCMU/20/16 PCMU/20/16 codec will be applied to calls from IP with called party number starting with 6120.
RELAY	Insert prefix of called party number when calling out. The inserted prefix number follows behind REPLAY. Example: IP 010 RELAY 17909 For calls from IP with called party number starting with 010, digit stream 17909 will be outpulsed before the original called party number is being sending out.
SEND180	Force send 180 on ring back Example: IP CPN2 SEND180 CPN number start with 2, always send 180 on ring back.
SEND183	Force send 183 on ring back. Example: IP CPN3 SEND183 CPN number start with 3, always send 183 on ring back (voice cut through).
HIDE	Calling party number presentation. Example: IP[61.2.44.53:5060] CPNX HIDE Any call from 61.2.44.53:5060, calling party number presentation restriction is applied. Note: The hiding of the calling party number can be enabled only when the operator can provide the corresponding support as well.

Table 5-11 Routing Destination

Destination	Description and Example
ROUTE NONE	Calling barring. Example: IP CPN[1,3-5] ROUTE NONE Bar all calls from IP, of which the calling numbers start with 1, 3, 4, 5.
ROUTE ISDN	Route a call to ISDN. IP 8621 ROUTE ISDN 1 IP CPN8620 ROUTE ISDN 2 call has 8621 prefix, route to ISDN span 1 calling party number started with 8620, route to ISDN span 2
ROUTE IP	Route a call to the IP platform. Example: FXS 021 ROUTE IP 228.167.22.34:5060 228.167.22.34:5060 is the IP address of the platform. ISDN 021 ROUTE IP 228.167.22.34:5060 ISDN 020 ROUTE IP 61.234.67.89:5060 Indicates that the call from the PSTN, with the called party number starting with 021 will be sent to the platform with the IP address of 228.167.22.34; the call with the called party number starting with 020 will be sent to the platform with the IP address of 61.234.67.89.

5.5.2 Application Examples of Routing Table

Application requirements



- Selecting an E1 line based on calls from the IP network.
- Replacing the calling party number section of an IP call with a shared number.
- Permitting the IP call with the number only in the calling party number section, not other ID sections.
- Hiding the calling party number of an IP call by replacing the entire calling party number section with one digit number.
- Specifying a voice coding for a certain kind of clients.

Routing setting

IP CPNX REPLACE 18710095 (B)

IP CPN2 CODEC PCMU/20/64 (E)

IP CPNX HIDE (D)

IP[221.38.112.26] CPN2 ROUTE ISDN 3 (A)

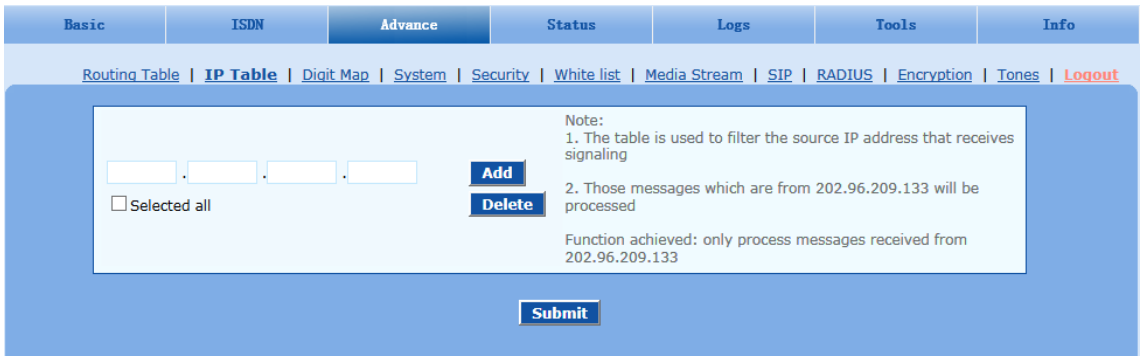
IP CPN[1,4-5] ROUTE NONE (C)

- Calls from 2680023 to 61231001 are matched with configurations of (B), (E), (D), and (A). The calling party number 2680023 is replaced with 18710095, with the codec of pcmu/20/64. The calling party number is hidden and the call is sent to the third E1 line.
- Calls from 3682576 calls 61231002 are matched with configurations of (B) and (D). The calling party number 3682576 is replaced with 18710095 and is then hidden. Configurations (A), (E), and (C) are not matched.
- Calls from 4680058 and 5680069 to 61231001 are matched with the configuration (C), and calls are prohibited.

5.5.3 IP Table

Click **Advanced > IP Table** tab to open the configuration interface.

Figure 5-11 Configuration Interface for IP Table



This table is designed to ensure the safe use of gateways. Administrators can add the authorized IP addresses to this table, and the gateways will only process the information from authorized IP addresses. If the IP table is empty, the gateways will not perform IP address-based message filtering.

For example: the gateway will only process the messages from 202.96.209.133 after adding 202.96.209.133 to its IP table.

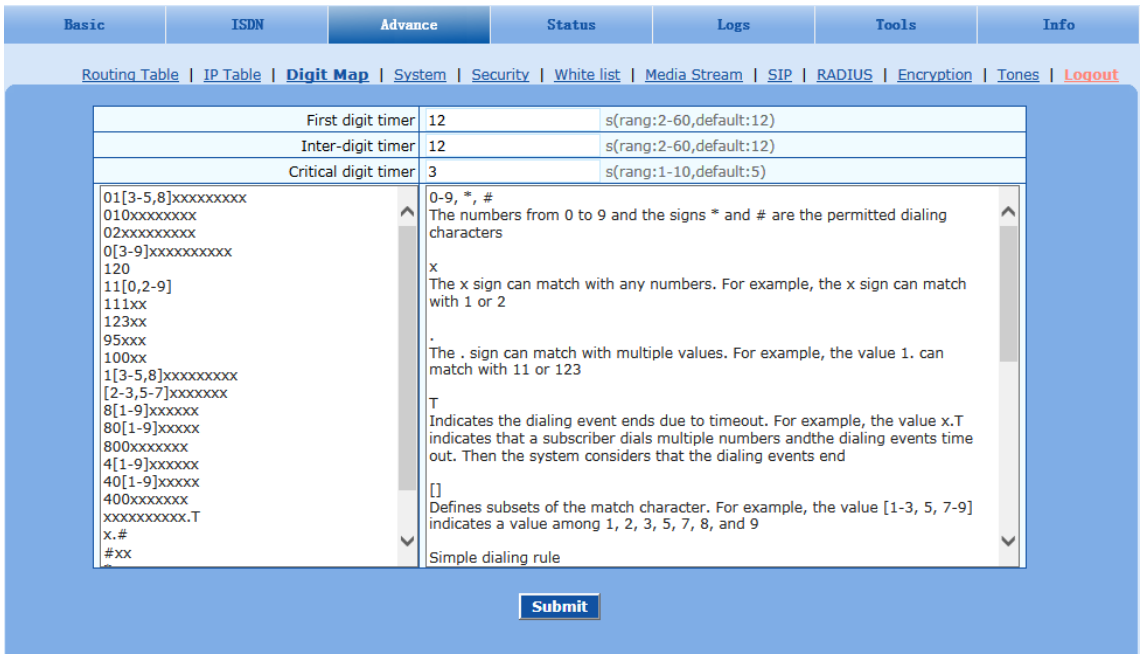
5.5.4 Digit Map

Note

In most situations, dialing rules need to be configured only for second dial on the MX100G.

Click **Advanced** > **DigitMap** tab to open the dialing rules interface.

Figure 5-12 Configuration Interface for Digit Map



Dialing rules are used to effectively judge if the received number sequence is completed, for the purpose of ending up receiving numbers and sending out the received numbers. The proper use of dialing rules can help to reduce the connection time of telephone calls.

The maximum number of rules that can be stored in gateways is 520. The total length of dialing rules table (the total length of all dialing rules) cannot be more than 3000 bytes.

The following provides a description of typical rules:

Table 5-12 Description of Digit map

Digit map	Description
First digit timer	If a subscriber hasn't dialed any number within a specified time by this parameter after offhook, the gateways will consider that the subscriber has given up the call and prompt to hang up in busy tone. Unit: second, default value: 12 seconds.
Inter-digit timer	If a subscriber hasn't dialed the next number key from the time of dialing the last number key to the set time by this parameter, the gateways will consider that the subscriber has ended dial-up and call out the dialed number. The default value is 12 seconds, unit: second.
Critical digit timer	This parameter is used with the "x.T" rule set in dialing rules. For example, there is "021.T" in the dialing rules table. When a subscriber has dialed 021 and hasn't dialed the next number within a set time by this parameter (e.g. 5 seconds), the gateways will consider that the subscriber has ended dial-up and call out the dialed number 021. The default value is 5 seconds, unit: second.
x	Represents any number between 0-9. The x sign can match with any numbers. For example, the x sign can match with 1 or 2.
.	Represents more than one digit between 0-9. The sign can match with number with any length. For example, the value 1 can match with 11 or 123.
##	End after receiving two-digit dialing "##". "##" is a special dialing for users to receive gateway IP address and version number of firmware by default.
x.T	The gateways will detect any length of telephone number starting with any number between 0-9. The gateways will send the detected number when it has exceeded the dialing end time set in system parameter configuration and hasn't received a new number.
x.#	Any length of telephone number starting with any number between 0-9. If subscribers press # key after dial-up, the gateways will immediately end up receiving numbers and send all the numbers before # key.
*xx	End after receiving * and any two-digit number. "* xx" is primarily used to activate function keys for supplementary services, such as CRBT, Call Transfer, Do not Disturb, etc.
#xx	End after receiving # and any two-digit number. "#xx" is primarily used to stop function keys for supplementary services, such as CRBT, Call Transfer, Do not Disturb, etc.
[2-8]xxxxxx	A 7-digit number starting with of any number between 2-8, used to end the dialing.
02xxxxxxxx	A 11-digit number starting with 02, used to end the dialings starting with "02".
13xxxxxxxx	A 11-digit number starting with 13, used to end the dialings.
11x	A 3-digit number starting with 11, used to end the special service calls.
9xxxx	A 5-digit number starting with 9, used to end special service calls.
17911 (used as an example)	The MX100G sends out the call with a specified number (such as 17911) immediately after receiving it. This example is used to demonstrate how the MX100G handles calls with a specified number.

Dial rules by default as follows:

01[3, 5, 8] xxxxxxxxx

010xxxxxxxx

02xxxxxxxxx

0[3-9] xxxxxxxxxx

120

11[0, 2-9]

111xx

123xx

95xxx

100xx

1[3-5, 8] xxxxxxxxx

[2-3, 5-7] xxxxxxx

8[1-9] xxxxxx

80[1-9] xxxxx

800xxxxxxx

4[1-9] xxxxxx

40[1-9] xxxxx

400xxxxxxx

xxxxxxxxxx.T

x.#

#xx

*xx

##

5.5.5 System

Click the label of **Advanced** > **System** to open this interface.

Figure 5-13 System Advanced Configuraiton Interface

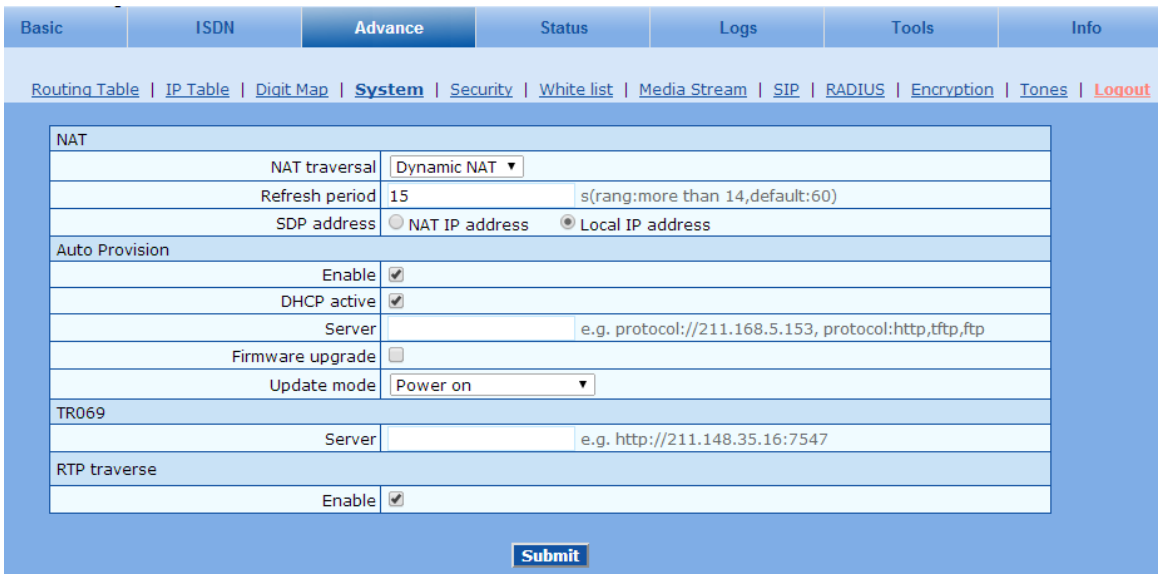


Table 5-13 Advanced System Configuration Parameters

Name	Description
NAT	

Name	Description
NAT traversal	Gateways support several mechanisms for NAT traversal. Usually, static NAT is used when fixed public IP address is available. It's necessary to perform port mapping or DMZ function on router when choosing dynamic or static NAT.
Refresh period	The refresh time must be filled in here when choosing dynamic NAT or STUN traversal. Besides, refresh time interval shall be determined by giving consideration into the NAT refresh time of the LAN router which the gateway is located. Gateway's NAT holding function and STUN function will carry out periodically operation according to this parameter. With second as its unit, default value of 60 seconds.
SDP Address	This parameter determines the IP address used in transmitted SDP. • NAT IP Address: Apply NAT address into the transmitted SDP; • Local IP Address: Apply the gateway's IP address into the transmitted SDP. Note: The parameter should come into effect only on condition that gateway successfully obtained NAT address.
NAT IP address	This parameter must be filled when using static NAT traversal, in which IAD works under LAN and the WAN address is fixed. The WAN address should be filled in this field, which will be used in SDP. This parameter can be set in IP address format or hostname format (note: DNS service should be activated when hostname format is used). There is no default value for this field.
STUN server	Set the IP or domain name of STUN server. No default value. If the set is empty, the gateway will adopt the STUN server address configured at factory. When choosing STUN for NAT traversal, the gateway will carry out STUN operation periodically according to the configured interval time of NAT refresh.
RTPReceivingPort	The gateways will send the RTP receiving port selected here to the remote side. • NAT port: Use NAT mapped port, which is obtained through STUN, for example; • Local port: Use local SIP and RTP port.
Auto Provision	Note: For detailed configurations, refer to the *MX Gateway Auto Provisioning Configuration Manual*.
Enable	Tick it to use the auto provision function.
DHCP	ACS (Auto Provisioning Server) address is obtained by using DHCPoption66.
Server	Manually configure the ACS address, which can be the TFTP, FTP, or HTTP server. • *tftp://ACS address* • *ftp:// ACS address* • *http:// ACS address*
Firmware upgrade	Supports firmware download and update using ACS.
Update mode	The following modes are available. • Power on: the gateway detects whether there are configurations and firmware to be updated when the device is powered on. • Power on + Periodical: when the device is powered on, the gateway first checks whether there are configurations and firmware to be updated, and then periodically performs checking based on the set times.
Interval(minutes)	When **Power on+Periodical** is set, this parameter specifies the interval for periodic automatic upgrades.
TR069	
Server	To use the TR069 network management, you have to enter the IP address of ACS here.
RTP Traverse	
Enable	Select to to enable the RTP traverse function.
Remote management	

The gateways support EMS which is a centralized gateway management server provided by New Rock, and Auto-provision.

5.5.6 Security

Click **Advanced** > **Security** tab to open this interface.

Figure 5-14 Security Configuration Interface

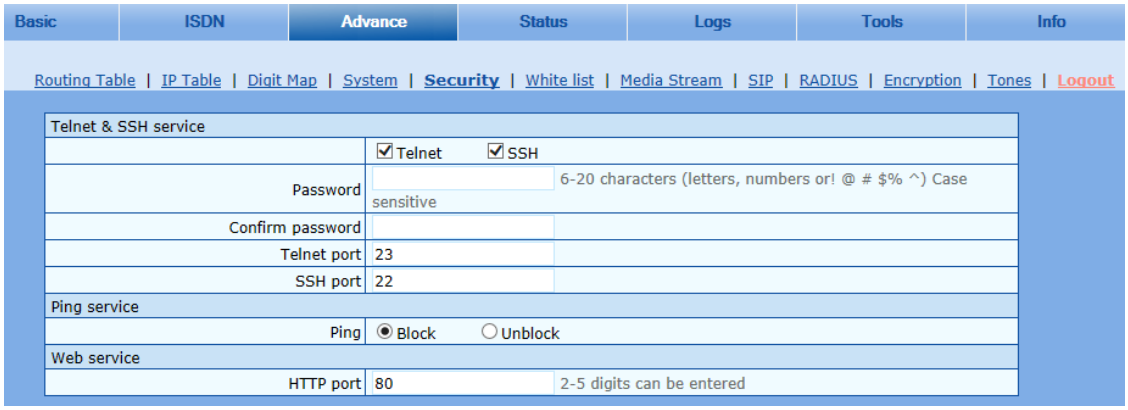


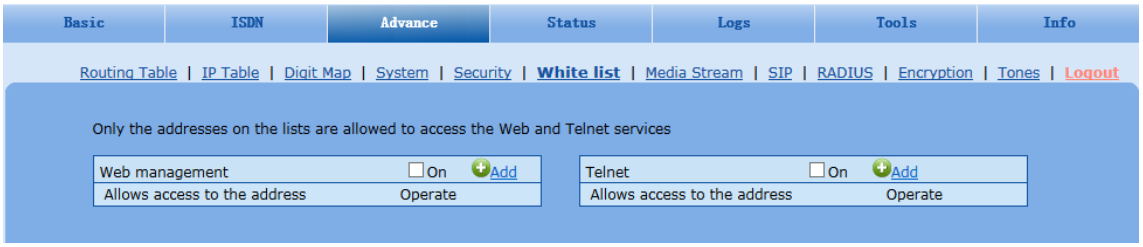
Table 5-14 Security Configuration Parameters

Name	Description
Telnet&SSH service	
Telnet	Select the check box to enable the Telnet service. The terminals can access the device through Telnet.
SSH	Select the check box to enable the SSH service. The terminals can access the device through SSH.
Password	The Telnet or SSH password consists of 6 to 20 bit case-sensitive characters (letters, digits, or marks such as !, @, #, $, %, and ^).
Confirm password	Re-input the Telnet password.
Telnet port	The port used to access the device through Telnet. The value is 23 by default.
SSH port	The port used to access the device through SSH. The value is 22 by default.
Ping service	
Ping	Block: the device does not respond to any Ping requests. Unblock: the device responds to Ping requests.
Web service	
HTTP port	The HTTP port used to access the device's Web GUI. The value is 80 by default.

5.5.7 White List

Click **Advanced** > **White list** tab to open this interface.

Figure 5-15 White List Configuration Interface



Procedures for configuring the whitelist are as follows:

Step1 Click **Add**.

Step2 Enter the address allowed to access in the dialog box displayed, and click **OK**.

Step3 Tick off **On**.

Note

- This function takes effect after the system reboots.
- The maximum 20 entries can be added to the whitelist on the MX100G.

5.5.8 Media Stream

Click the label of **Advanced** > **Media Stream** to open this interface.

Figure 5-16 Media Stream Configuration Interface

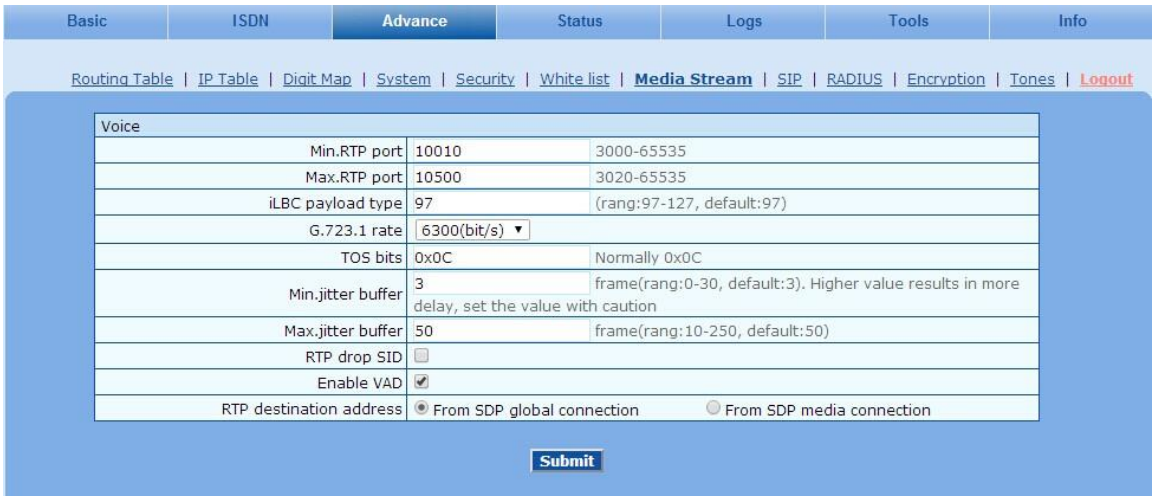


Table 5-15 Media Stream Configuration Parameters

Name	Description
Min. RTP port	The minimum value of UDP ports for RTP transmission and receiving, and the parameter must be greater than or equal to 3000. The value is recommended to be equal or greater than 10000. Note: each phone call will occupy RTP and RTCP ports.
Max. RTP port	The maximum values of UDP ports for RTP's transmission and receiving. It's advisable to be greater than or equal to "2× number of lines + min. RTP port".
iLBC payload type	Set the RTP payload type of iLBC, and the default value is 97. Accepted value is 97-127. The parameter shall be configured in conformity to that of platform.
G.723.1 rate	Set G.723.1 coding rate, the default value is 6300. The optional parameters are followings: • 5300: the Bit rate is 5.3k per second; • 6300: the Bit rate is 6.3k per second
TOS bits	This parameter specifies the quality assurance of services with different priorities. The factory setting is 0x0C. For example, TOS=0xB8 indicates that the priority of the service quality is 5, with a requirement on low delay and high throughput. There is no requirement on the reliability.

Name	Description
Min. Jitter buffer	RTP Jitter Buffer is constructed to reduce the influence brought by network jitter. This default value is 3.
Max. Jitter buffer	RTP Jitter Buffer helps to reduce the influence brought by network jitter. The default value is 50.
RTP drop SID	Determine whether to discard received RTP SID voice packets. By default, SID voice packets will not be dropped. Note: RTP SID packets should be dropped only when they are in unconformity to the specifications. Nonstandard RTP SID data could generate noise for calls.
Enable VAD	Only applicable to G.723, GSM, iLBC. In case of selecting this parameter, it will not send any voice packet during mute period. By default, this is selected.
RTP destination address	This parameter determines where to obtain the IP address of the receiving side for RTP packets. By default, the IP address is obtained "From SDP global connection". • From SDP global connection: Obtain the IP address from SDP global connection; • From SDP media connection: Obtain the IP address from SDP Media Description.

5.5.9 SIP Related Configuration

Click the label of **Advanced** > **SIP** to open this interface.

Figure 5-17 SIP Related Configuration Interface

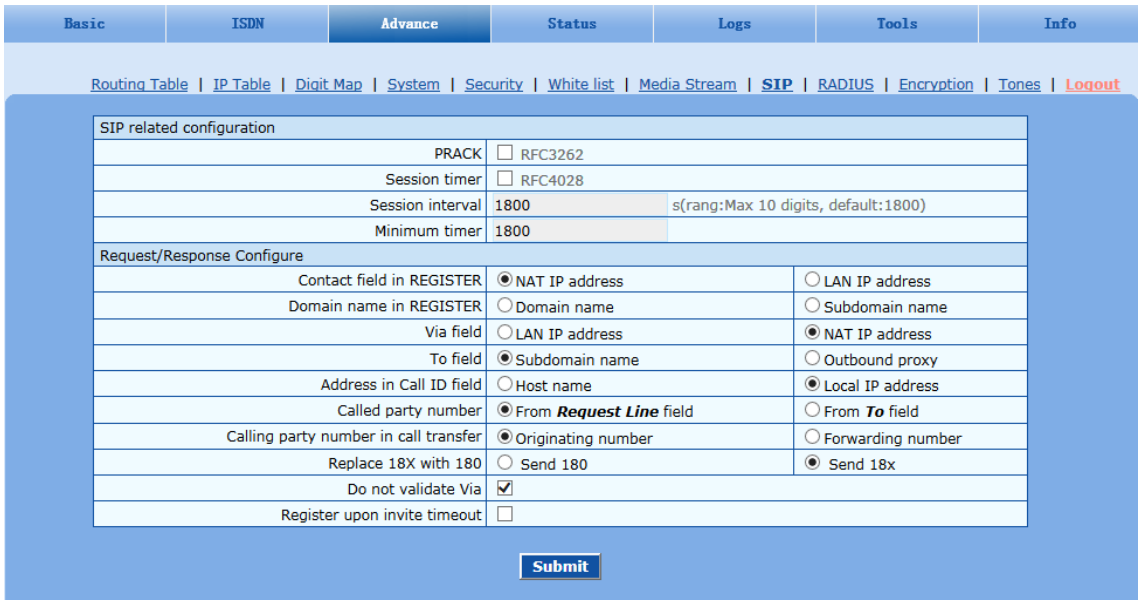


Table 5-16 SIP Related Configuration Parameter

Name	Description
SIP related configuration	
PRACK	Determine whether to activate Reliable Provisional Responses. (RFC 3262)
Session timer	Choose to activate session refresh (Session Timer, RFC 4028). By default, session timer is not activated.
Session interval	Set the session refresh interval, the gateway will enclose the value of Session-Expires into INVITE or UPDATE messages. Default value is 1800 in second.
Minimum timer	Set the minimum value of session refresh interval.
Request/Response Configure	

Name	Description
Contact field in REGISTER	Choose the registration mode of gateway under LAN traversal circumstance, the default is **NAT IP Address**. • LAN IP address: Keep original content of **Contact** when register; • NAT IP address: Use the NAT information returned by registration server.
Domain name in REGISTER	The default is **Domain name**. • Domain name: Complete domain name used for registration (for example: 8801@registrar.newrock.com); • Subdomain name: Only use the common part of the name of domain (for example: 8801@newrock.com).
Via field	Choose whether to use NAT IP address or LAN IP address for "Via" header field value, the default is **NAT IP address**.
To field	Choose whether to apply Domain name or Outbound proxy to "To" header field, the default is **Domain name**.
Address in Call ID field	Choose whether to fill Call ID field with host name or local IP, the default is **local IP address**.
Called party number	Choose whether the gateway acquires the called number from Request Line header field or To header field. The default is **from Request Line**.
Calling party number in call transfer	Under call forwarding, the calling party number sent can be choose from Originating number or Forwarding number being set for sending, the default is **Forwarding number**. For example: the subscriber line 2551111 on the gateway activates call forwarding feature and set the destination to 3224422. When caller with 13055553333 calls 2551111, the call will be forwarded to 3224422: • If choose **Originating number**, the number 13055553333 will be sent to 3224422 as calling party number. • If choose **Forwarding number**, the number 2551111 will be sent to 3224422 as calling party number.
Replace 18X with 180	• Send 180: If this parameter is set to enable, the gateway will map all alerting messages (ALERTING with and without in-band indicator) to 180. An example of when this parameter would be enabled is when an IAD does not support a 183 message. • Send 18x: If this parameter is set to enable, the 18x message will be sent.
Do not validate Via	Set whether to ignore Via field, By default, Via is ignored.
Register upon INVITE timeout	Set whether to activate registration when SIP message of INVITE is failed or time expired, and by default, re-registration is not selected.

5.5.10 RADIUS

Click the label of **Advanced > RADIUS** to open this interface.

Figure 5-18 RADIUSConfiguration Interface

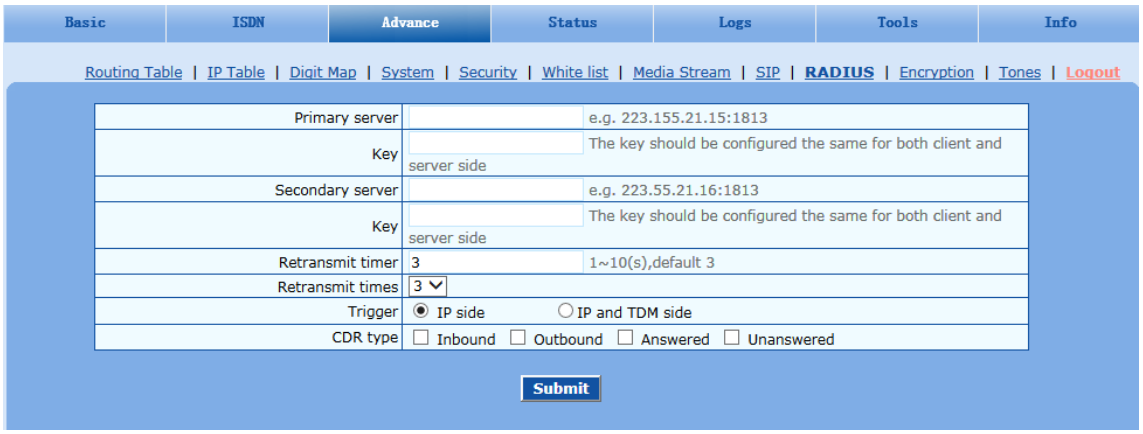


Table 5-17 RADIUS Configuration Parameter

Name	Description
Primary server	Set IP address and port number of preferred Radius server. Note: if the port number is not configured yet, please use Radius default port number of 1813.
Key	Set the share key to be used for encrypted communications between Radius client and server. Note: the share key should be configured the same for both client and server side
Secondary server	Set the IP address and port number of standby Radius server. When the fault appears in communications between gateway and preferred Radius server, the gateway will automatically activate standby Radius server. Note: in case of no configuration of port number, use default port number of 1813.
Key	The share key for communications between Radius client and standby Radius server. Note: the key should be configured the same for both client and server side
Retransmit timer	Set the amount of overtime on response after transmission of Radius message, the default is 3 seconds. The retransmission will be performed If no response is given after the timeout.
Retransmit times	Set the times of retransmission of Radius message when no response is received default is 3 times.
Trigger	• IP side: when this is selected the call information on the SIP side will be sent to the Radius server. • IP and TDM side: when this is selected the call information on the SIP side as well as on the ISDN side will be sent to the Radius server.
CDR type	• Outbound: Set whether to send RADIUS charge message for outbound calls; • Inbound: Set whether to send RADIUS charge message for inbound calls; • Answered: Set whether to send RADIUS charge message when calls are connected; • Unanswered: Set whether to send RADIUS charge message for unanswered calls.

5.5.11 Encryption

Click the label of **Advanced** > **Encryption** to open this interface.

Figure 5-19 Encryption Configuration Interface

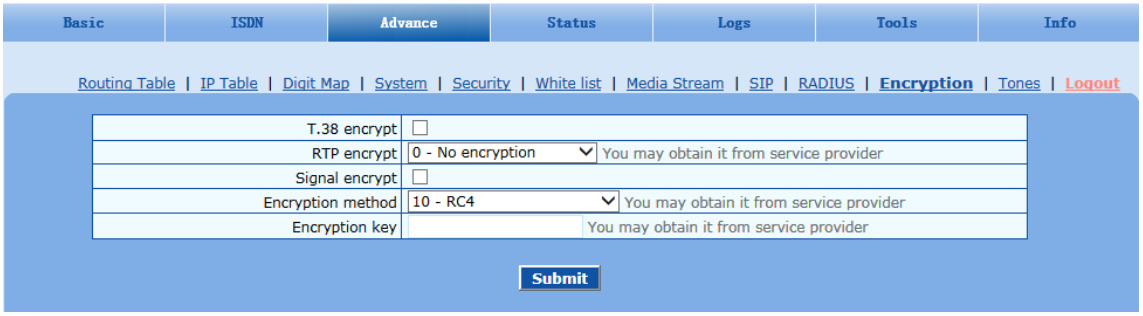


Table 5-18 Encryption Configuration Interface

Name	Description
T.38 encrypt	Choose whether to encrypt T38 data. By default, this is not selected.
RTP encrypt	Choose whether to encrypt RTP voice pack, the default is **0**. • 0: No encryption • 1: Entire message • 2: Header only • 3: The data body only
Signal encrypt	Choose whether to encrypt signaling. By default, this is not selected.
Encryption method	Set the gateway encryption method, default is 8. The optional parameters as below: • 10: RC4 • 14: Encrypt14 • 16: Word reverse(263) • 17: Word exchange(263) • 18: Byte reverse(263) • 19: Byte exchange(263) • 20:VOS
Encryption key	You may obtain it from service provider.

5.5.12 Tones

Click the label of **Advanced** > **Tones** to open this interface.

Figure 5-20 Tones Configuration Interface

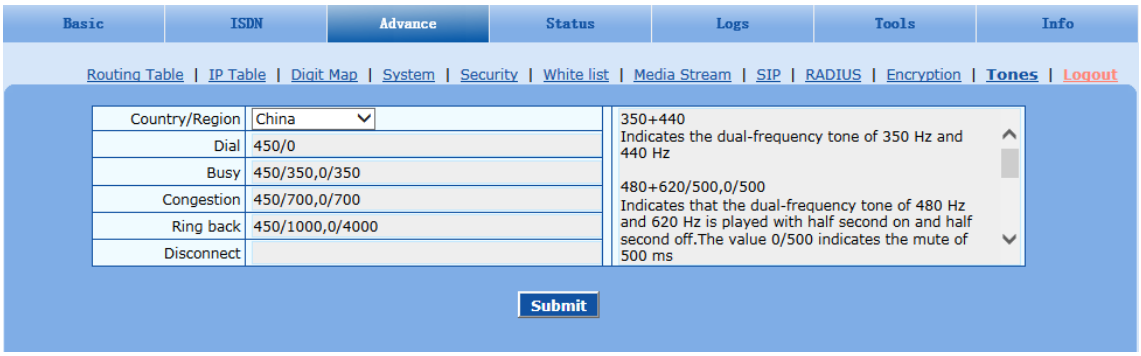


Table 5-19 Tones Configuration Parameters

Name	Description
Country/region	There are progress tone plans for several countries and regions which are pre-programmed in gateways. Users may also specify the tone plan according to the national standard. Gateways provide tone plan for the following countries and regions: China; the United States; France; Italy; Germany; Mexico; Chile; Russia; Japan; South Korea; Hong Kong; Taiwan; India; Sudan; Iran; Algeria; Pakistan; Philippines; Kazakhstan;
Dial	Prompt tone of off-hook dialup
Busy	Used for busy line prompt
Congestion	Used for notification of call set up failure due to resource limit
Ring back	The prompt tone sent to caller when ring
Disconnect	Used for reminding the subscriber of off-hook and no dialup status of the phone

Here are examples that illustrate the various call-progress tones

- 350+440 (dial tone)

  Indicates the dual–frequency tone consisting of 350 and 440 Hz

- 480+620/500,0/500 (busy)

  Indicates the dual–frequency tone consisting of 480 and 620 Hz, repeated playing with 500 milliseconds on and 500 milliseconds off.

  Note: 0/500 indicates 500 milliseconds mute.

- 440/300,0/10000,440/300,0/10000

  Indicates 440 Hz single frequency tone, repeated twice in terms of 300 milliseconds on and 10 seconds off.

- 950/333,1400/333,1800/333,0/1000

  Indicates repeated playing 333 milliseconds of 950 Hz, 333 milliseconds of 1400 Hz, 333 milliseconds of 1800 Hz, and mute of 1 second.

5.6 Status

In case of full configurations, the MX100G has one 4T1/E1 card, with four interfaces numbering ISDN1 to ISDN4 from left to right. Users can view the ISDN calling state on the interface in usage. The calling information about ISDN (1) is used as an example.

Click **Status** > **ISDN1** tab to open the interface.

Figure 5-21 ISDN Status Interface

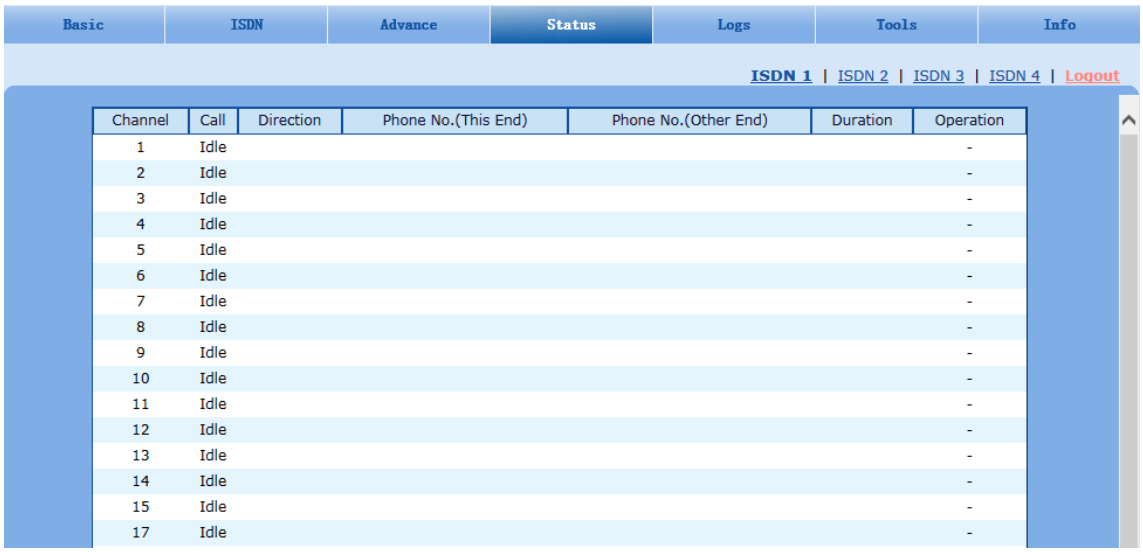


Table 5-20 Status Parameters

Name	Description
Call	The call state involves idle, outpulsing, ringing, dialling, initiating a call, ring back, talking, on-hook on the local end, and on-hook on the opposite terminal.

5.7 Log Management

5.7.1 System Status

Critical runtime information of gateways can be obtained in this interface, including:

- The information about login interface (including IP address and permissions of the user)
- SIP registration status
- Call-related signaling and media (RTP) information

Click the label of **Logs> System Status** to open this interface.

Figure 5-22 System Status Interface

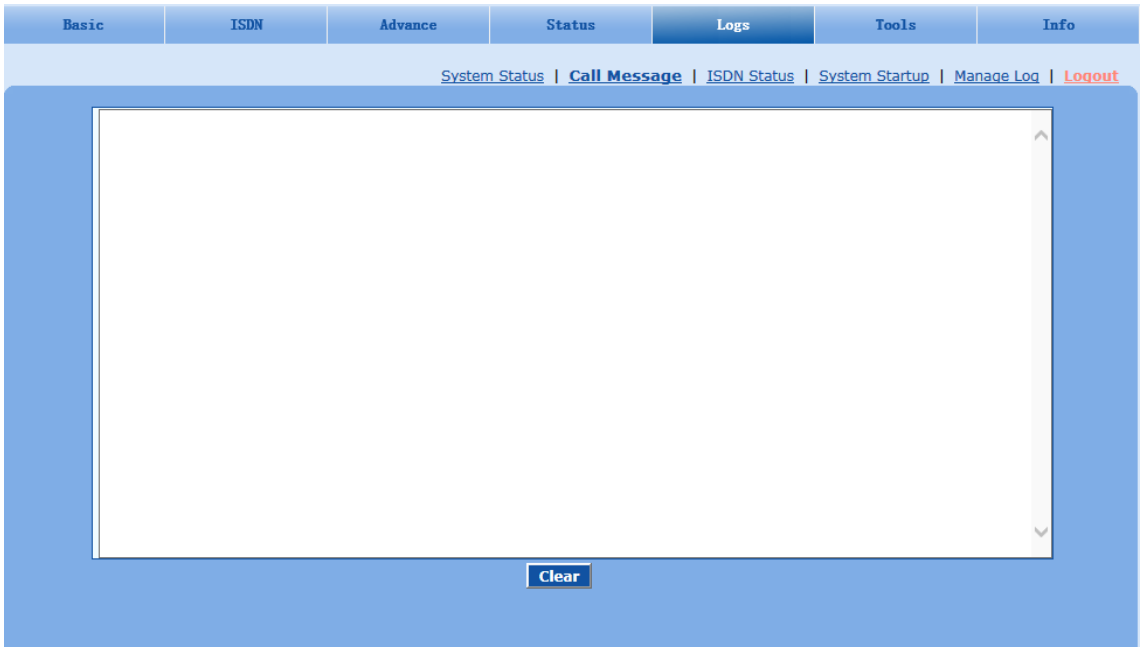
Table 5-21 System Status Parameters

Name	Description
Login User Info	Show the IP address and jurisdiction of login user. The numbers following the IP address show the online jurisdiction of the user: 1- administrator; 2 - operator; 3 – viewer. The viewer can only read the configuration, but is not allowed to modify it. When more than one administrator log in at the same time, the first login's jurisdiction is 1, others are 3; also, when more than one operators log in at the same time, the first one's jurisdiction is 2, others are 3.
SIP Registration Info	Show registration status: • Not enabled: The registration server's address is not entered yet; • Latest response: The latest response message for the registration. 200 means registered successfully; • No response: No response from registration server. The cause may contribute to 1) incorrect address for the registration server; 2) IP network fault; or, 3) the registration server is not reachable.
Call Context Info	Show the call status.
Rtp Context Info	Show the voice channel related to the calls.
Ann Context Info	Display the playing voice message.

5.7.2 Call Message

Click the label of **Logs** > **Call Message** to open this interface.

Figure 5-23 Call Message Interface



5.7.3 ISDN Status

Click **Logs** > **ISDN Status** tab to open this interface.

Figure 5-24 ISDN Status Interface

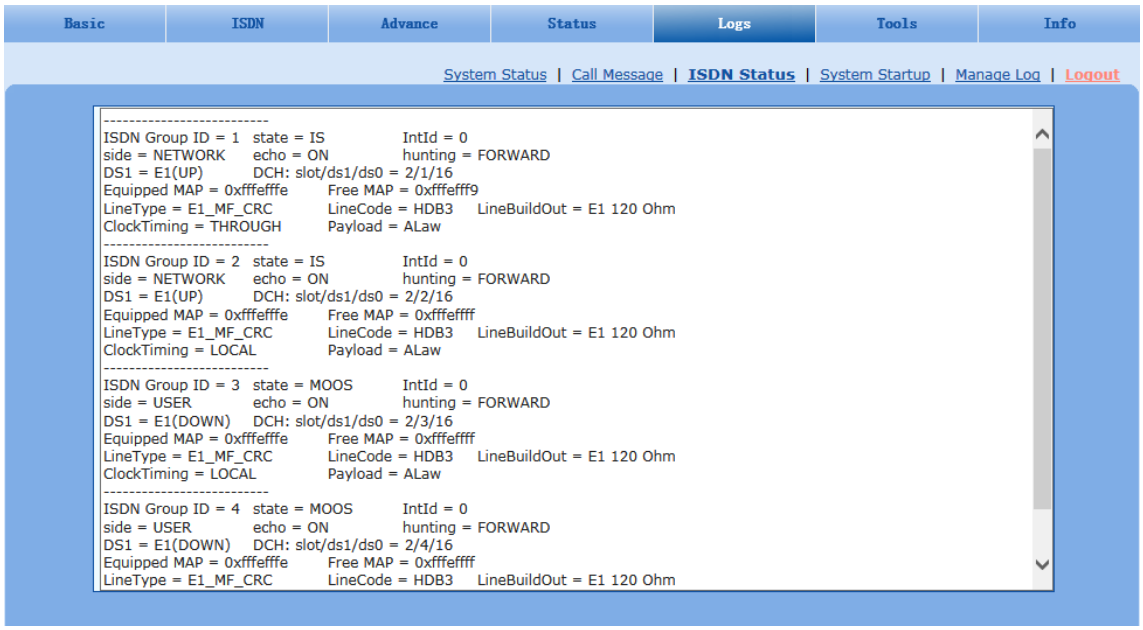


Table 5-22 ISDN Status Parameters

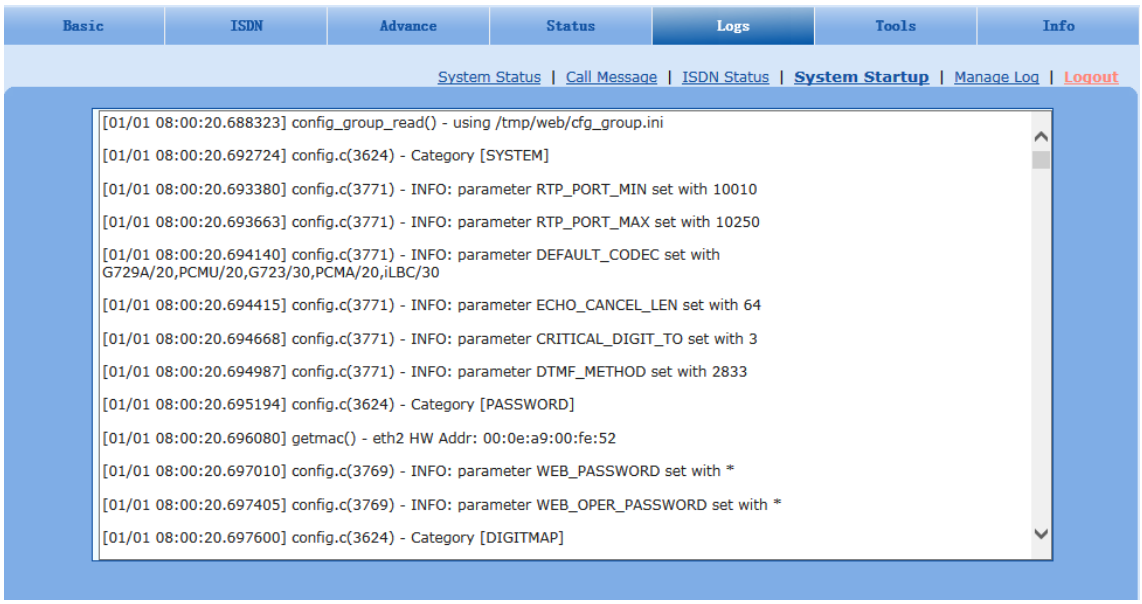
Name	Description
ISDN Group ID	The ID of an ISDN group.

Name	Description
state	State. • IS indicates the in-service state. • OOS indicates the out-of-service state. • MOOS indicates the manually taken-out-of service state, i.e. the backup signaling channel is disabled.
Int Id	The ID of an interface card, which is 0.
side	Two sides of the ISDN: user and network side, which must be set in pairs, with one side being User and the other side being Network.
echo	The echo cancellation function. On: indicates that the echo cancellation is enabled. Off: indicates that the echo cancellation is disabled.
hunting	Two search modes of idle timeslot: • FORWARD • BACKWARD
DS1	The type of an interface card: T1 or E1. The connection state of the interface card can be: • UP • DOWN
slot/ds1/ds0	One of interfaces (represented by ds1) on a certain slot (represented by slot) into which the T1 or E1 interface card is inserted. ds0 specifies a signaling channel. The signaling channel for the E1 card is 16 timeslots and the signaling channel for the T1 card is 24 timeslots.
Equipped MAP	The available state of the remaining 30 timeslots on the E1 card, except timeslots 0 and 16. If the binary value in 0xfffefffe is 1, the timeslot is available.
Free MAP	The state of an idle timeslot.
LineType	The frame format, including SF, D4, T1_UNFRAMED, SF, E1, E1_MF, E1_CRC and E1_UNFRAMED.
LineCode	The line code, including B8ZS, AMI, JBZS, HDB3, ZBTSI, B6ZS, JBZS, etc.
LineBuildOut	The line build-out, which is 120 or 75 Ohm.
ClockTiming	The clock source: Local or Through.
Payload	The PCM encoding type: ALAW or ULAW.

5.7.4 System Startup

Click **Logs > System Startup** tab to open this interface. The gateway boot up information is available in this page, including the hardware configuration.

Figure 5-25 System Startup Interface



5.7.5 Manage Log

Click the label of **Logs** > **Manage Log** to open this interface. Log files can be downloaded through this interface.

Figure 5-26 Manage Log Interface

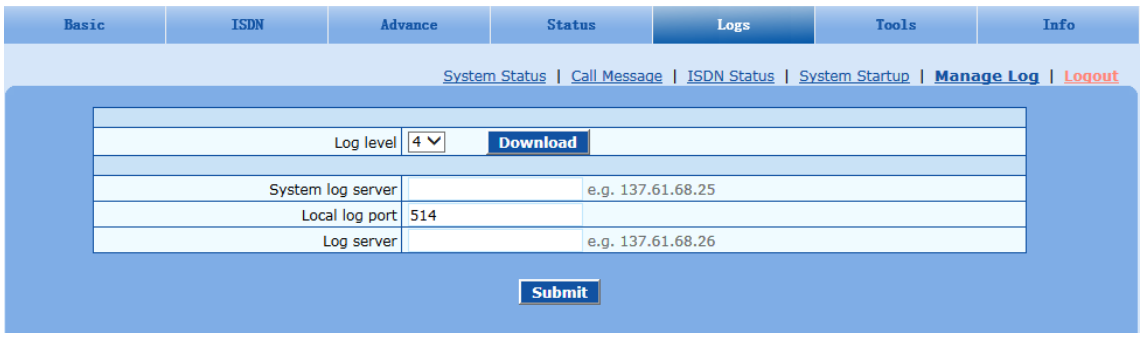


Table 5-23 Manage Log Parameters

Name	Description
Log level	Select the log file level of gateway, default is 4. The higher the level goes, the more details the log file will be. Note: log level should be set to be 4 or lower when gateway is used in normal operation, avoiding influencing the system performance.
System log server	Set the IP address of system log server.
Local log port	The port for sending system logs.
Log server	IP address of debugging log server.

Procedure for downloading the log:

Step1 Click **Download**, the gateway begins to assemble the logs.

Step2 After a few seconds, the interface of log saving will appear.

Step3 Click **Save**, and select path to save.

Step4 The user may review the log from the server.

5.8 System Tool

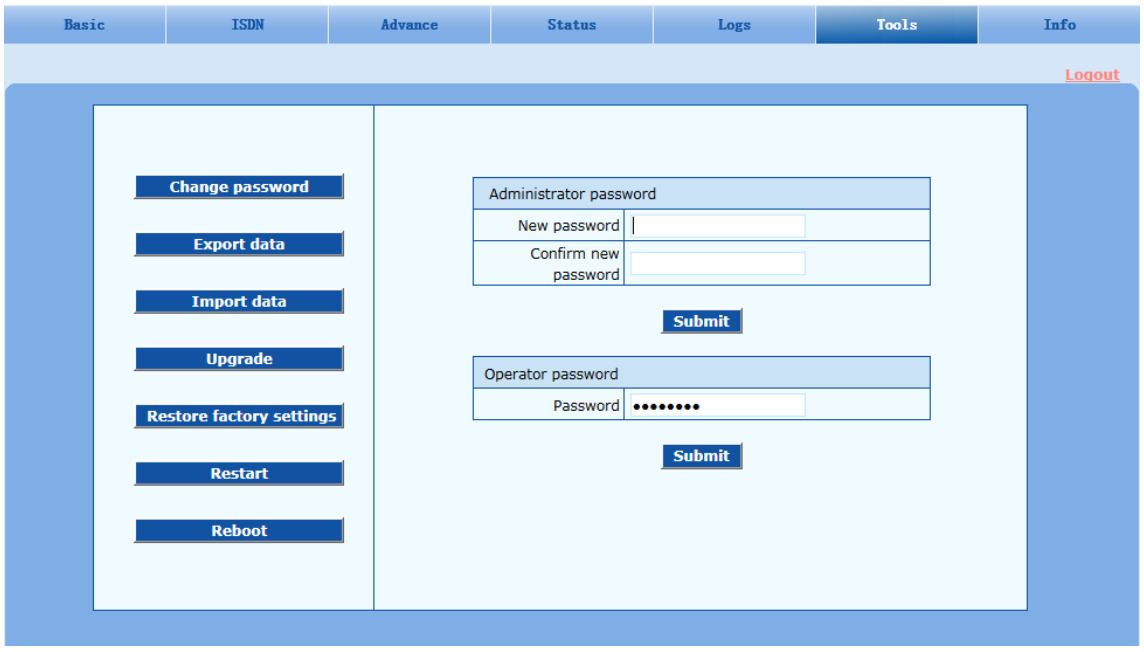
5.8.1 Change Password

Click **Tools** to open this interface. Only administrator is entitled to change the password of login.

For changing administrator password, it's required to enter new password into **New password** field and **Confirm new password** field, then click **Submit**.

The password being used by the operator will be displayed as hidden codes, which could be changed by the administrator at any time. The administrator is allowed to change the operator's password by entering the new password into **Operator password>password**.

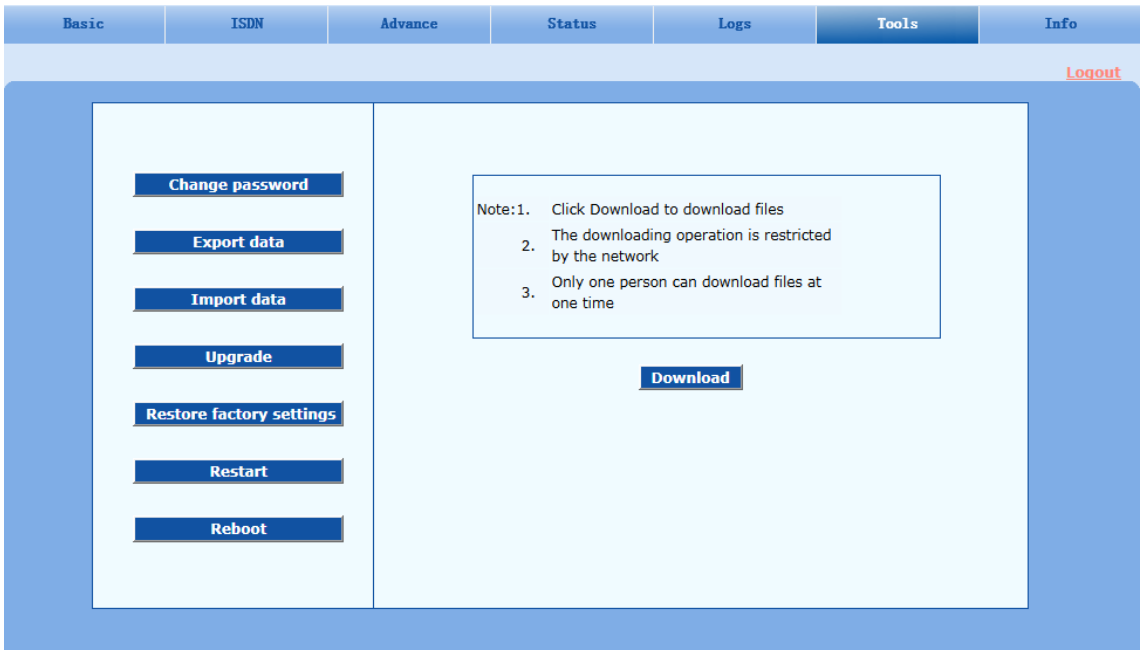
Figure 5-27 Change Password Interface



5.8.2 Configuration Export

Click **Tools > Export data** tab to open this interface. It's allowed to download the configuration files from the gateway through this interface. The downloading procedure is similar to the downloading procedure of log files.

Figure 5-28 Configuration Export Interface



5.8.3 Configuration Import

Click **Tools>Import data** tab to open this interface. Operating procedure is the same as that of software upgrade.

Figure 5-29 Configuration Import Interface

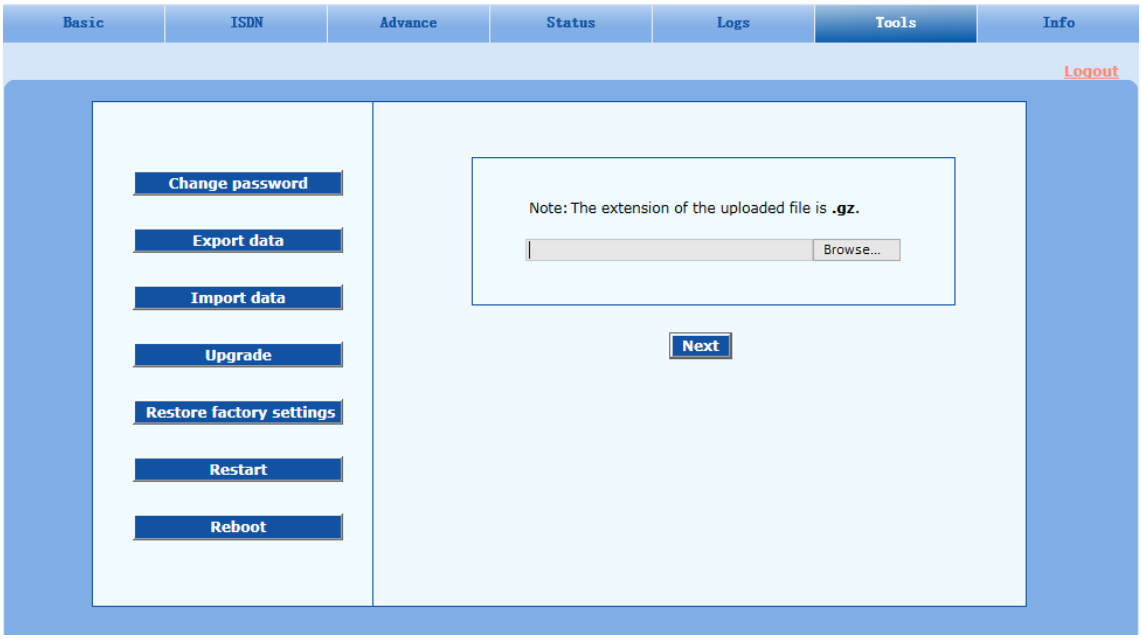
5.8.4 Software Upgrade

Click **Tools > Upgrade** to open this interface. The software upgrading procedure is presented as below:

Step1 Obtain the upgrade files (tar.gz file), and save the file onto a local computer.

Step2 Click **Tools>Upgrade** to access to the page of software upgrade.

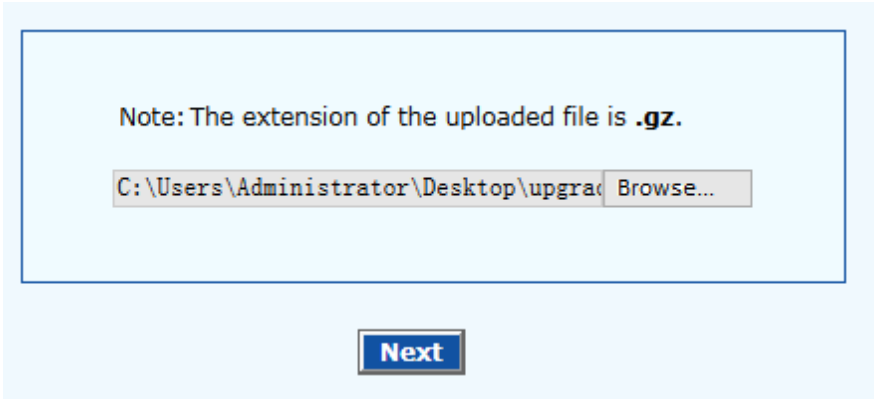
Figure 5-30 Interface of Upgrade



Step3 Click **Browse** to select the upgrade files.

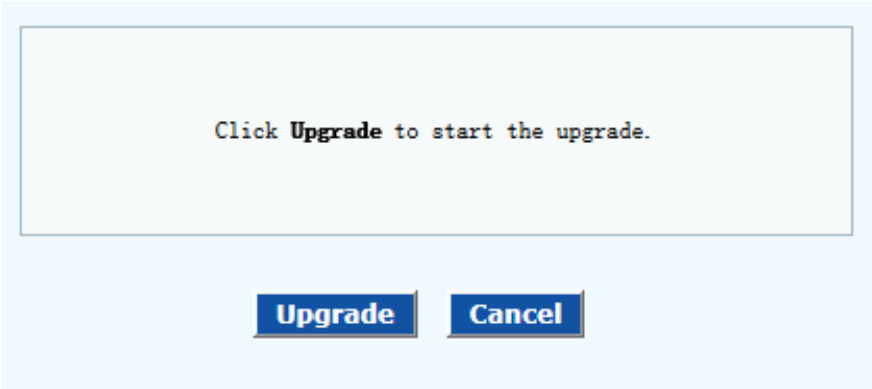
Step4 Click **Next** when the following interface appears, and start uploading the upgrade files to the gateway.

Figure 5-31 File Upload Interface



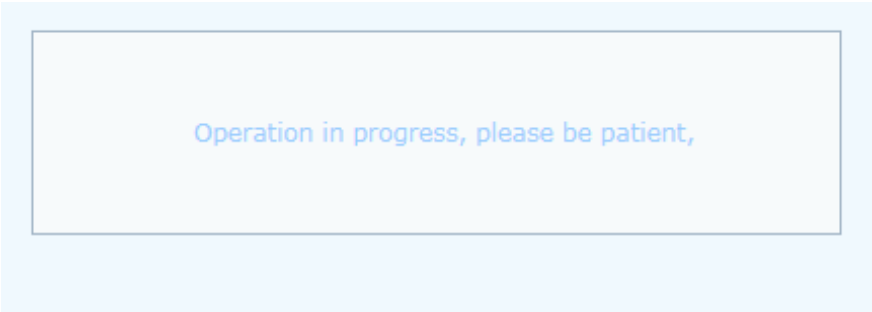
Step5 Uploading will be completed in about 30 seconds, and click **Upgrade** on following dialog.

Figure 5-32 Upgrade Interface



Step6 The following prompt appears during the upgrade.

Figure 5-33 Prompt of Upgrade Process



Note

A few minutes are needed to upgrade the gateway. Don't operate the gateway during this period.

Step7 After success in upgrade, the following dialog will appear, click **OK**.

Figure 5-34 Interface of Successful Upgrade

Step8 The gateway will reboot, and the interface will be disappeared.

Step9 Wait for about 2 minutes, and access to the interface of gateway management system, click **Info** and check the software version.

5.8.5 Restore Factory Settings

Click **Tools> Restore factory settings** to restore the parameters of gateway into the factory settings.

The factory settings are designed based on common applications, and therefore, no need to modify

them in many deployment situations.

5.8.6 Software Restart

Click **Tools**> **Restart** to restart the gateway, making modified configuration come into effect.

5.8.7 System Reboot

Click **Tools** >**Reboot** to restart the gateway. As this is a system wide reset, it takes longer time.

Note

Generally, it's sufficient to restart software when the gateway confirms to reset; the system reboot will be required only when network settings of the gateway are changed.

5.9 Version Information

Click **Info** to view the gateway hardware and software version information.

Figure 5-35 Version Information Interface

5.10 Logout

Click the **Logout** at top right to exit the gateway management system and return to the login interface.