IG601 Intelligent Gateway User Manual

InHand Networks
www.inhandnetworks.com

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Preface

Welcome to the IG601 series industrial gateway user manual. This manual will guide you on how to configure the IG601.

This preface includes the following contents:

- Intended Users
- Conventions in the Manual
- Obtaining Documentation
- Technical Support
- Feedback

Intended Users

This manual is intended for the following users:

- Network architects
- On-site technical support
- Network administrators
- Any other network staff

Conventions in the Manual

- To help guide the reader, the manual will use the following conventions.

Format	Description
< >	Content in angle brackets "< >" indicates a button name. For example, the <OK> button.
""	"" indicates a window name or menu name. For example, the pop-up window "**New User.**"
>>	A multi-level menu is separated by the double brackets " **>>.**" For example, the multi-level menu **File >> New >>Folder** indicates the menu item [Folder] under the sub-menu [**New**], which is under the menu [**File**].

- Various Signs

The manual also uses a variety of eye-catching signs to indicate the places where special attention should be paid. The significances of these signs are as follows:

⚠ **Attention**	Attention indicates something very important. Improper operation may cause data loss or damage to the device.

Instruction	Detailed description of certain features.

Obtaining Documentation

The latest product information is available on the InHand website, www.inhandnetworks.com .

Specific documentation can be found in these areas:

- **Support** >> **Technical Support:** Product information on hardware installation, software upgrade, configuration, manuals and more are available.

- **Products** >> **Industrial Intelligent** >> **IG601:** An introduction to the Intelligent Gateway, along with manuals, data sheets, a quick guide, and other support documentation. Other products can be found by browsing through the products menu.
- **Support** >> **Software Download:** Software updates, webinars and technical papers are available for download.

Technical Support

InHand is invested in supporting our products with fast and reliable customer service. Feel free to email.

E-mail: support@inhandneworks.com

Website: www.inhandnetworks.com

Feedback

If you have any comments or questions on your products, please send us feedback via email.

E-mail：info@inhandnetworks.com
Your feedback is vital to improving our products.

Contents

IG601 Introduction

This chapter includes the following parts：

- Overview
- Product Features

1.1 Overview

The InGateway601 (IG601) combines 3G networks, intelligent protocol conversion, and VPN technology to create a product designed for remote maintenance and management. The IG601 features remote communication between the controller and data center, which provides an ingress (or gateway) for the remote diagnosis and maintenance of the machines. The controller technicians can construct large-scale networks for remote maintenance of equipment. The IG601 can also be employed as a communication gateway for equipment to coordinate with each other.

With the IG601, technicians in the office can remotely program field PLCs, monitor variables and receive alerts in real time. The IG601 supports both communications via the PLCs Ethernet port and via the serial port. IG601 also supports status queries, PLC controls and alarm message via SMS. The IG601 series utilizes the ubiquitous cellular network to the fullest and opens new horizons in remote management and machine to machine communication.

1.2 Product Features

- **Designed for the Communication of Industrial Equipment**
  - **SMS Function**：

    SMS Alarm: users can receive timely alarm message when PLC exception occur in field.

    SMS Check and Control: users can remotely monitor and control PLC.

    PLC Collaboration: PLCs can communicate with each other via SMS, ensuring more PLCs work collaboratively.
  - **Remote Maintenance**

    Users can achieve PLC’s remote programming via secure channel (serial/Ethernet pot)
  - **Remote Monitoring**：

IG601 can check real-time operating status (variable) and send it to data center regularly through 3G/2G network. Users can check PLC's operation and alarm messages anywhere via internet.

- **Industrial Design**
  - In the aspects of EMC, anti-static grade, anti-surge level and wide temperature range, IG601 meet the requirements of industrial and operate easily under harsh environments.
  - Metal enclosure. IP30.
  - All EMC grade reach level 3.
  - Ethernet port supports 1.5kv isolation transformer protection
  - Serial port support 15kv ESD protection.
  - Wide temperature range: -30℃~70℃.
  - Wide voltage range: DC: 12-24V.
- **Complete Security**
  - **Data Transmission Security**

    InGateway 601 uses encrypted channel to communicate with remote controller, enabling the process of updating PLC program enjoys high level of encryption, which is comparable to that of the financial industry.
  - **Network Protection Security**

    With powerful firewall features, InGateway601 supports SPI State Inspection, Secure Shell (SSH), Intrusion Protection, DDoS Defense, Attack Defense, IP-MAC binding, etc, protecting the equipment against external network attack.
  - **Equipment Management Security**

Multi-level authorization security mechanism realizes centralized authentication and authorization management of equipment.

Login Gateway

This chapter covers the following:

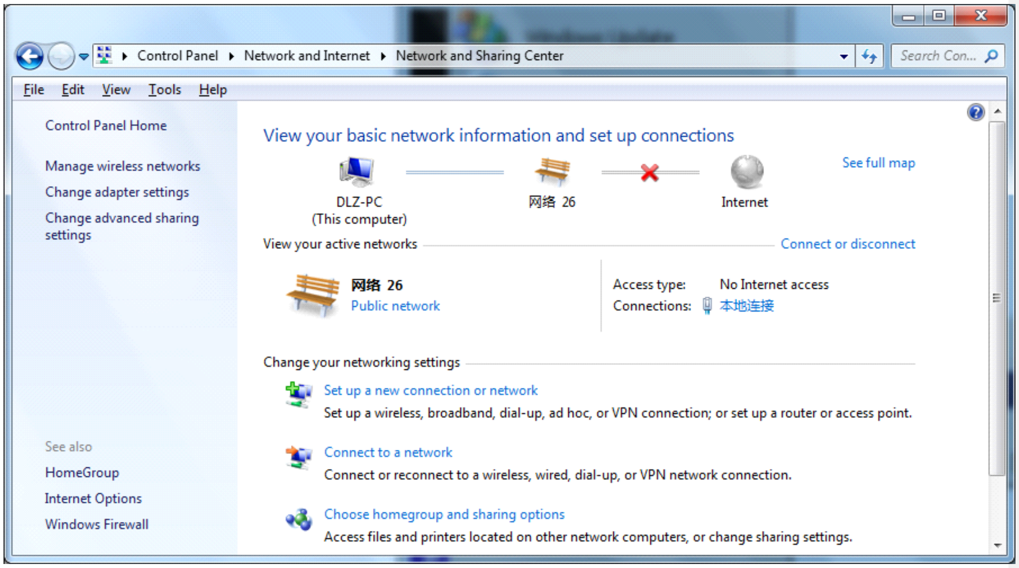
- Establish Network Connection
- Test the connection between supervisory PC and InGateway
- Cancel the Proxy Server

2.1 Establish Network Connection

2.1.1 Automatic acquisition of IP address

Please set the supervisory PC to “**automatic acquisition of IP address**” and “**automatic acquisition of DNS server address**,” which is the default configuration of Windows. This way, the InGateway automatically assign an IP address to the supervisory PC using DHCP.

Open “**Control Panel**”, double click “Network and Internet” icon, and enter “**Network and Sharing Centers**”



View your basic network information and set up connections

View your active networks

网络 26

Access type: No Internet access

Connections: 本地连接

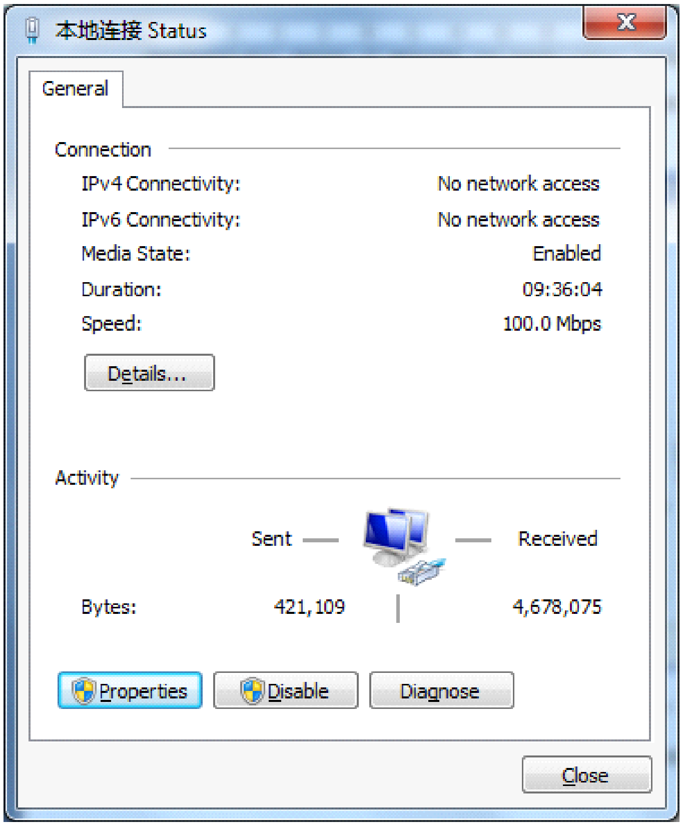
Change your networking settings

Set up a new connection or network
Set up a wireless, broadband, dial-up, ad hoc, or VPN connection; or set up a router or access point.

Connect to a network
Connect or reconnect to a wireless, wired, dial-up, or VPN network connection.

Choose homegroup and sharing options
Access files and printers located on other network computers, or change sharing settings.

Click the button <Local Connection> to enter the window “**Local Connection Status**”



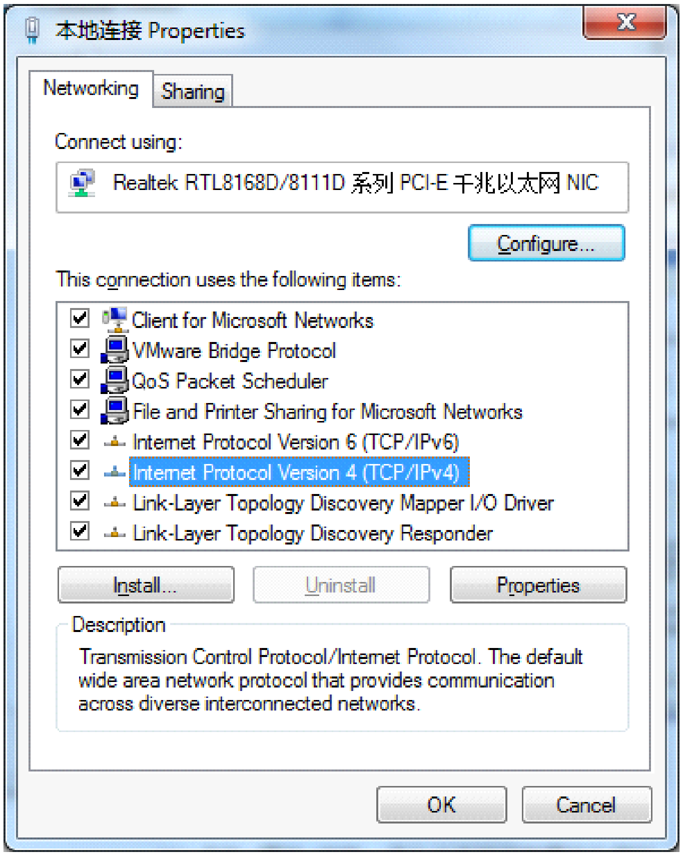
Connection

IPv4 Connectivity: No network access
IPv6 Connectivity: No network access
Media State: Enabled
Duration: 09:36:04
Speed: 100.0 Mbps

Activity

	Sent	Received
Bytes:	421,109	4,678,075

Click <Properties> to enter the window “**Local Connection Properties**”, as shown below.



本地连接 Properties

Connect using:

Realtek RTL8168D/8111D 系列 PCI-E 千兆以太网 NIC

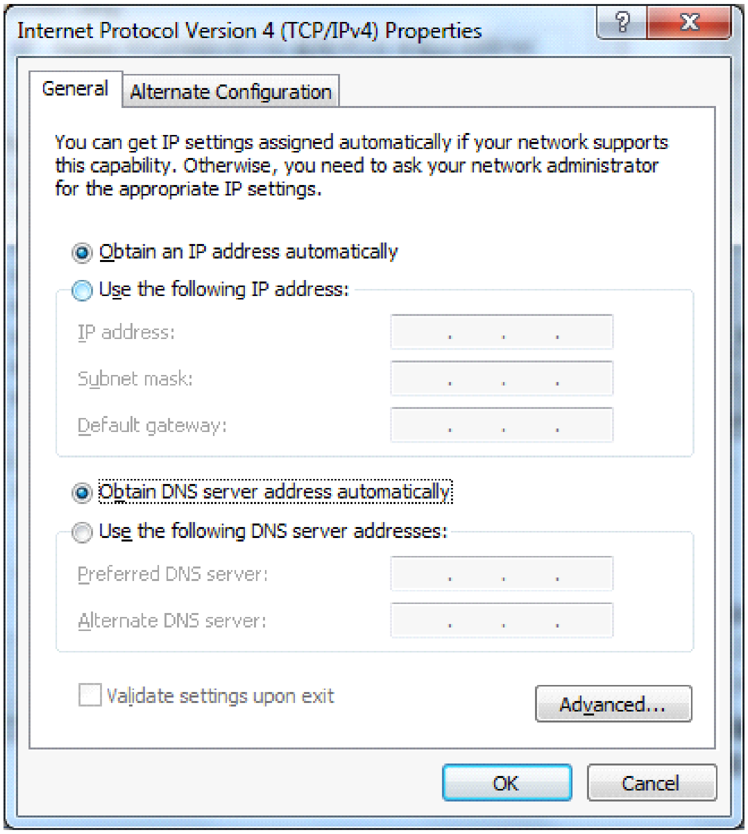
This connection uses the following items:

- ☑ Client for Microsoft Networks
- ☑ VMware Bridge Protocol
- ☑ QoS Packet Scheduler
- ☑ File and Printer Sharing for Microsoft Networks
- ☑ Internet Protocol Version 6 (TCP/IPv6)
- ☑ Internet Protocol Version 4 (TCP/IPv4)
- ☑ Link-Layer Topology Discovery Mapper I/O Driver
- ☑ Link-Layer Topology Discovery Responder

Description

Transmission Control Protocol/Internet Protocol. The default wide area network protocol that provides communication across diverse interconnected networks.

Select “**Internet Protocol Version 4 (TCP/IPv4)**.” Click <Properties> to enter “**Internet Protocol Version 4（TCP/IPv4） Properties.**” Select “**Obtain an IP address automatically**” and “**Obtain DNS Server address automatically**,” then click <OK> to complete the process, as shown below.



Internet Protocol Version 4 (TCP/IPv4) Properties

General | Alternate Configuration

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

● Obtain an IP address automatically

○ Use the following IP address:

IP address: . . .

Subnet mask: . . .

Default gateway: . . .

● Obtain DNS server address automatically

○ Use the following DNS server addresses:

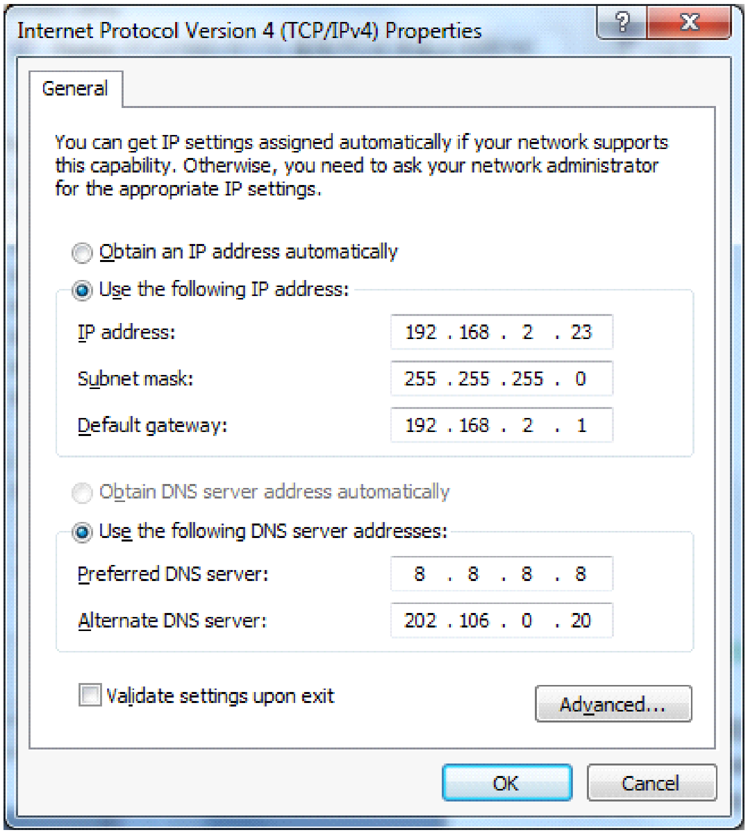
Preferred DNS server: . . .

Alternate DNS server: . . .

□ Validate settings upon exit

2.1.2 Set a static IP address

Please set the supervisory PC's IP address in the same subnet as the gateway FE (or fast Ethernet) port. In this example, the default IP address of gateway FE port is 192.168.2.1, and the subnet mask is 255.255.255.0. Enter the "**Internet Protocol Version 4（TCP/IPv4） Properties**" window. Then, select "Use the following IP address", type the IP address (arbitrary value between 192.168.2.2 – 192.168.2.254), subnet mask (255.255.255.0), and default gateway (192.168.2.1) into the text boxes. Finally, click <OK> to finish setting a static IP, as shown below.



Internet Protocol Version 4 (TCP/IPv4) Properties

General

You can get IP settings assigned automatically if your network supports this capability. Otherwise, you need to ask your network administrator for the appropriate IP settings.

○ Obtain an IP address automatically

● Use the following IP address:

IP address: 192 . 168 . 2 . 23

Subnet mask: 255 . 255 . 255 . 0

Default gateway: 192 . 168 . 2 . 1

○ Obtain DNS server address automatically

● Use the following DNS server addresses:

Preferred DNS server: 8 . 8 . 8 . 8

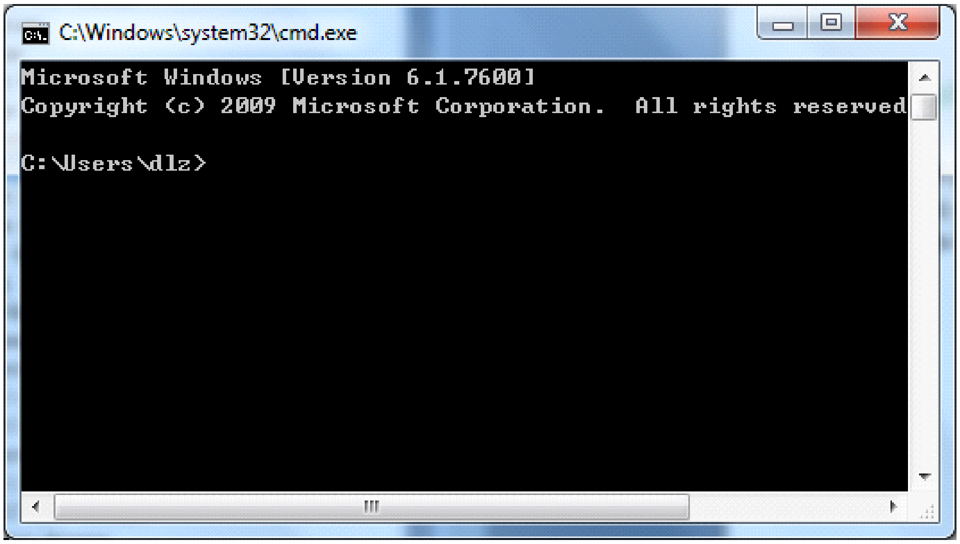
Alternate DNS server: 202 . 106 . 0 . 20

□ Validate settings upon exit

2.2 Test the network connection between the supervisory PC and InGateway.

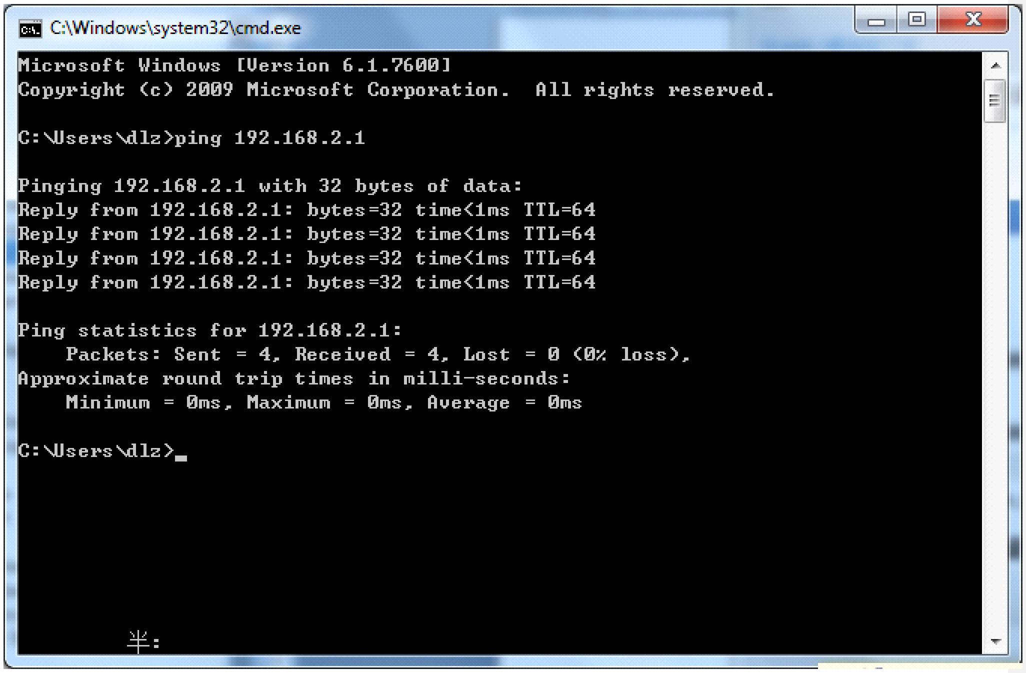
1) Click the button <Start> at the lower left corner. Type “cmd” into the field, and run cmd.exe.

批注 [Unknown A1]: More inconsistent font.



```
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved

C:\Users\dlz>
```

2) Enter "ping 192.168.2.1" and click the <OK> button. (192.168.2.1 is the default IP address of the InGateway). If the connection is good, you will see four returned packets. If there is no response, be sure to check your connection and your supervisory PC's network settings.

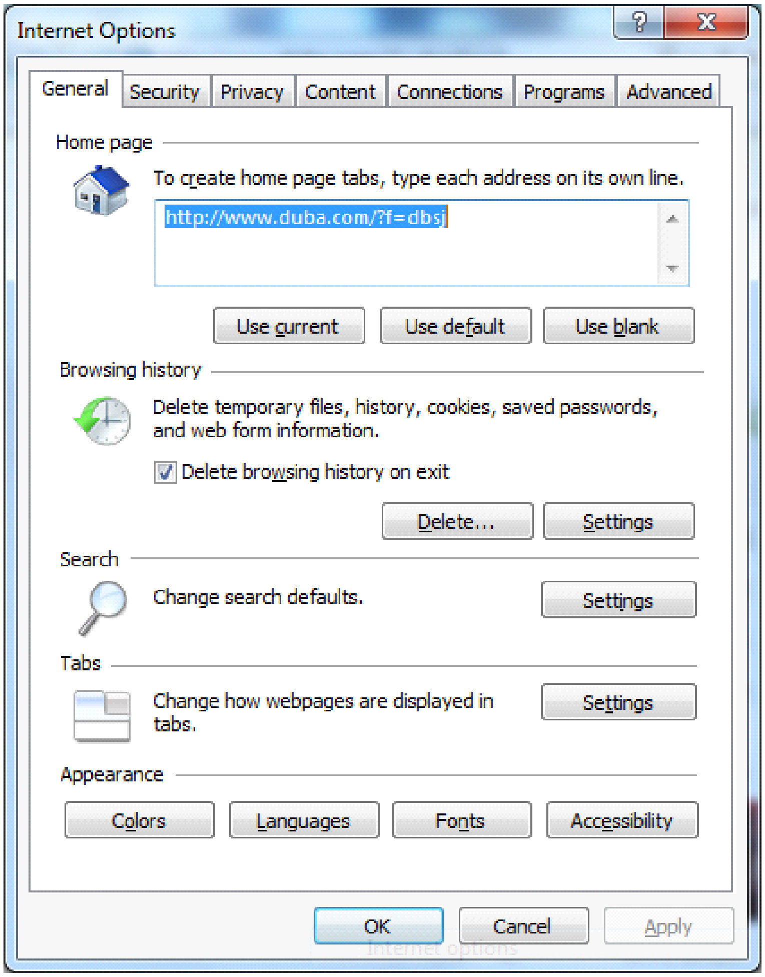


```
Microsoft Windows [Version 6.1.7600]
Copyright (c) 2009 Microsoft Corporation.  All rights reserved.

C:\Users\dlz>ping 192.168.2.1

Pinging 192.168.2.1 with 32 bytes of data:
Reply from 192.168.2.1: bytes=32 time<1ms TTL=64
Reply from 192.168.2.1: bytes=32 time<1ms TTL=64
Reply from 192.168.2.1: bytes=32 time<1ms TTL=64
Reply from 192.168.2.1: bytes=32 time<1ms TTL=64

Ping statistics for 192.168.2.1:
    Packets: Sent = 4, Received = 4, Lost = 0 (0% loss),
Approximate round trip times in milli-seconds:
    Minimum = 0ms, Maximum = 0ms, Average = 0ms

C:\Users\dlz>_
```

2.3 Disconnect from the Proxy Server.

If the supervisory PC uses a proxy server to access the Internet, it is necessary to disconnect from the proxy and remove any proxy settings. The operating steps are as follows:

- Open Internet Explorer.
- Select **Tools>>Internet Options** to enter the window “**Internet Options**”.



To create home page tabs, type each address on its own line.

http://www.duba.com/?f=dbsj

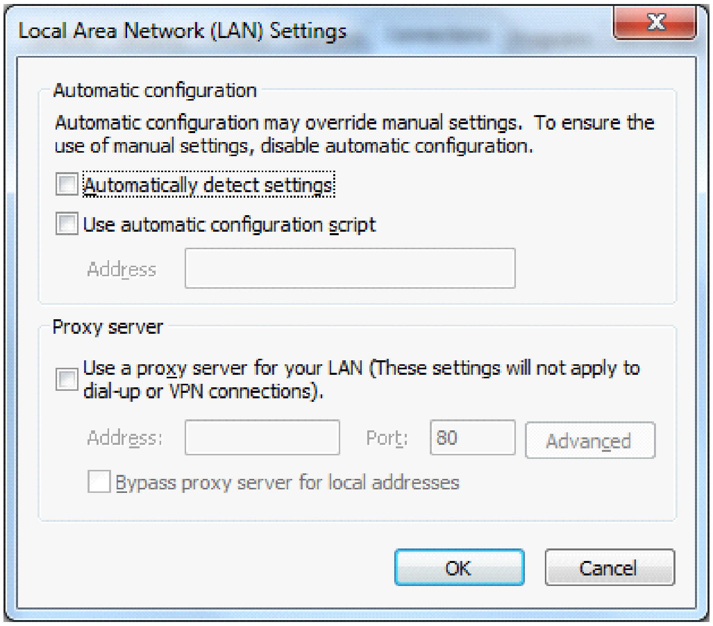
Delete temporary files, history, cookies, saved passwords, and web form information.

☑ Delete browsing history on exit

Change search defaults.

Change how webpages are displayed in tabs.

- Select the tab "Connect" and click the button <LAN Setting(L)> to enter the window "**LAN Setting**." If the option "**Use a Proxy Server for LAN**" is checked, *uncheck* it. Click the <OK> button and continue to the web configuration section of the manual.



Local Area Network (LAN) Settings

Automatic configuration

Automatic configuration may override manual settings. To ensure the use of manual settings, disable automatic configuration.

□ Automatically detect settings

□ Use automatic configuration script

Address

Proxy server

□ Use a proxy server for your LAN (These settings will not apply to dial-up or VPN connections).

Address: Port: 80

□ Bypass proxy server for local addresses

Web Configuration

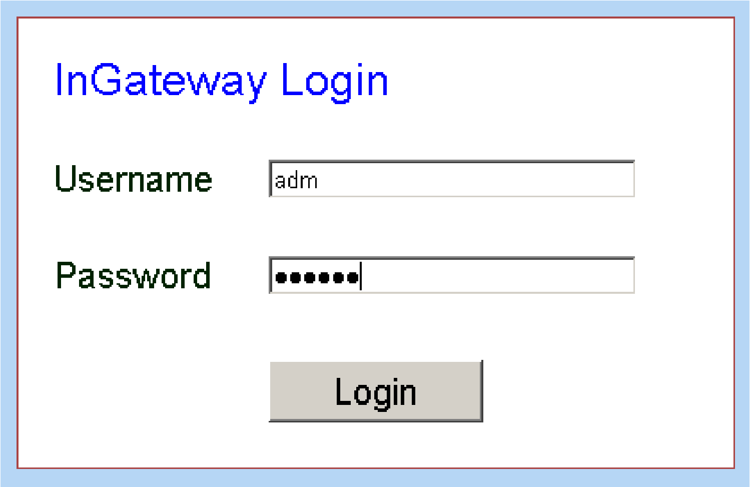
This chapter covers the following contents:

批注 [Unknown A2]: This section seems like it has been localized already. It only needed light editing.

- Logging in the Browser Interface
- System
- Network
- Service
- Firewall
- QoS
- Tools
- Status

3.1 Login the Web Configuration Page of Gateway

Run the Web browser, enter "http://192.168.2.1" in the address bar, and press Enter to skip to the Web login page, as shown below. Enter the "User Name" (default: adm) and "Password" (default: 123456).

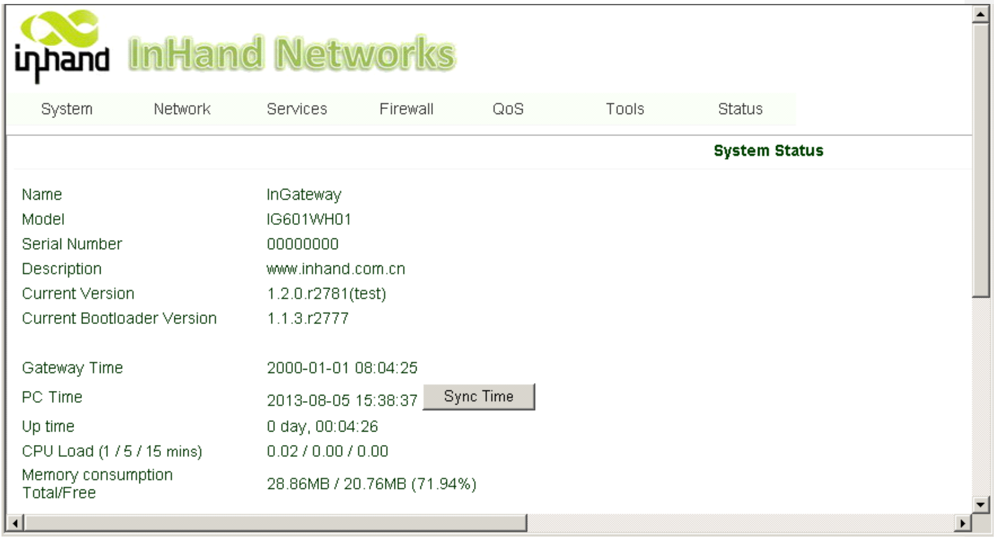


InGateway Login

Username: adm

Password: ●●●●●●

Click button <Login> or directly press Enter to enter the Web configuration page, as shown below.



System Status

Name	InGateway
Model	IG601WH01
Serial Number	00000000
Description	www.inhand.com.cn
Current Version	1.2.0.r2781(test)
Current Bootloader Version	1.1.3.r2777
Gateway Time	2000-01-01 08:04:25
PC Time	2013-08-05 15:38:37
Up time	0 day, 00:04:26
CPU Load (1 / 5 / 15 mins)	0.02 / 0.00 / 0.00
Memory consumption Total/Free	28.86MB / 20.76MB (71.94%)

Click <Sync Time> to synchronize the gateway's clock with the system time of the host.

Instruction

For security, it is highly recommended that you modify the default password after your first login. Store the password information in a secure location.

3.2 System

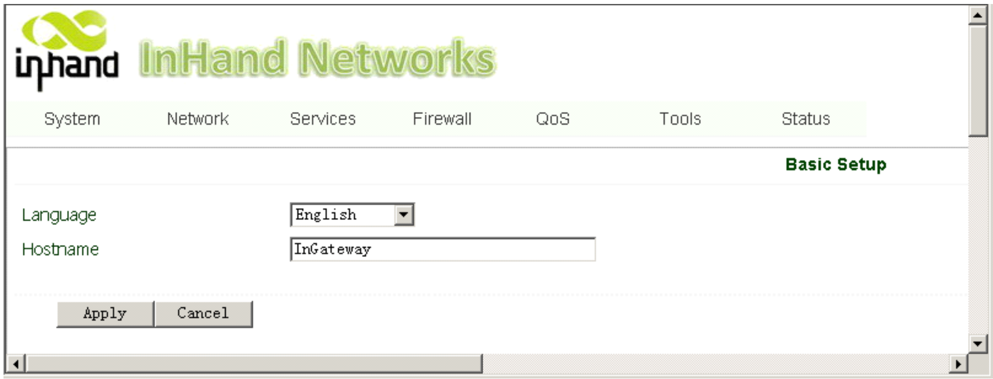
The system configuration process involves nine steps:

- Basic Setup
- Time
- Serial Port
- Admin Access
- System Log
- Configuration Management
- Update
- Reboot
- Logout

3.2.1 Basic Setup

From the navigation panel, select **System** >> **Basic Setup**, then enter the "**Basic Setup**" page, as shown below.

批注 [Unknown A3]: This is inconsistent with the previous part of the document, but it actually is much cleaner looking.



Language: English

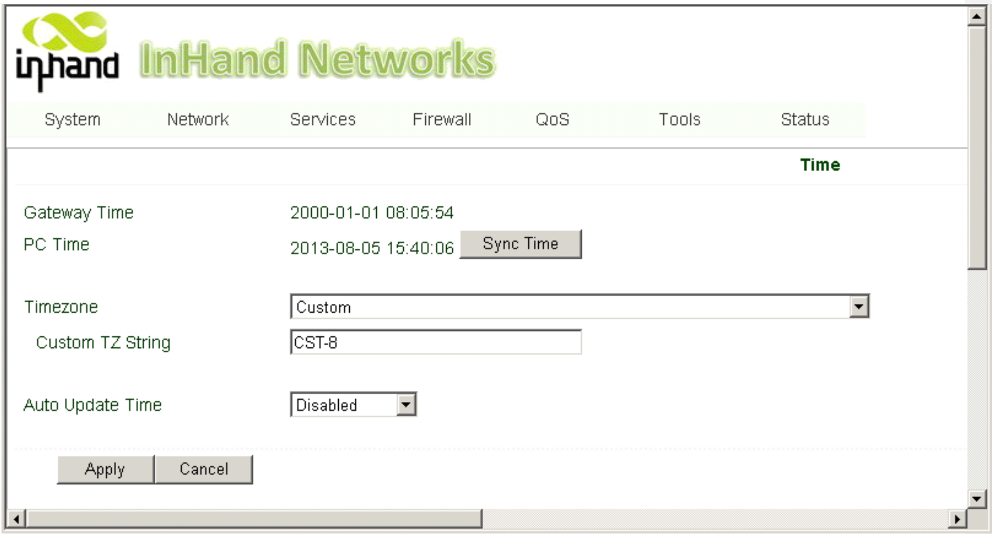
Hostname: InGateway

Page description is shown below:

Parameters	Description	Default
Language	Select the language of configuration page	English
Hostname	Set the name of InGateway	Gateway

3.2.2 Time

In order to ensure the coordination of the gateway and other devices, users need to set the system time and time zone correctly. From the navigation panel, select **System** >> **Time** then enter the "**Time**" webpage, as shown below. Click <Sync Time> to synchronize the time of the gateway with the system time of the host.



Time

Gateway Time 2000-01-01 08:05:54

PC Time 2013-08-05 15:40:06

Timezone Custom

Custom TZ String CST-8

Auto Update Time Disabled

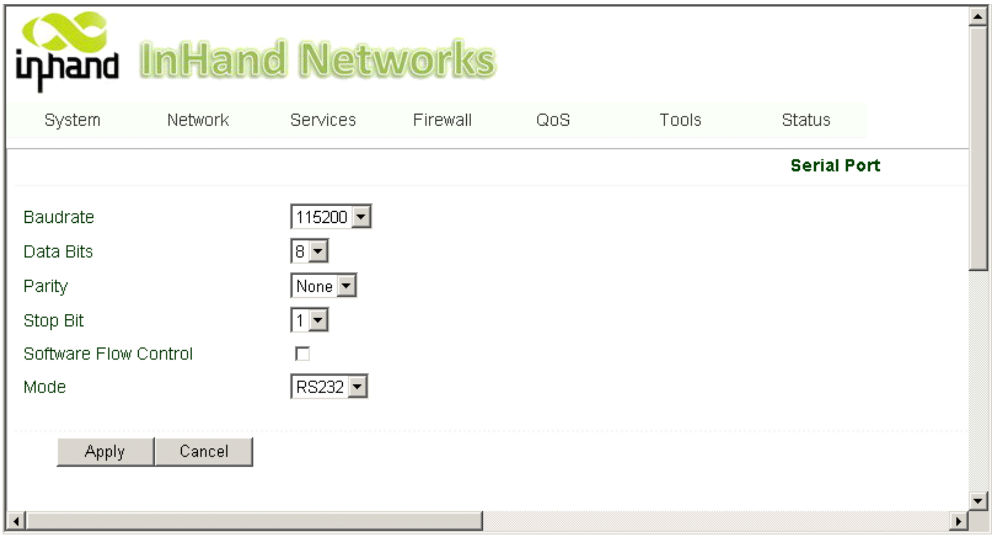
The terms are explained below:

Parameters	Description	Default
Gateway Time	Display the system time of Gateway	2000-01-01 08：16：47
PC Time Timezone	The current time of supervisory PC Set time zone	N/A Custom
Custom TZ String	Set the time zone of the Gateway	CST-8
Auto update Time	Time Update Interval	Disabled

3.2.3 Serial Port

On the serial port settings config page, users need set the serial configuration of the gateway with the same parameters as the connected device. If users are using software similar to PuTTY, users should set their serial configs the same as the settings below.

From the navigation panel, select **System** >> **Serial Port**, then enter “**Serial Port**” page, as shown below.



Baudrate 115200
Data Bits 8
Parity None
Stop Bit 1
Software Flow Control ☐
Mode RS232

Page description is shown below:

Parameters	Description	Default
Baud Rate	Serial baud rate	115200
Data Bit	Serial data bits	8
Parity	Set parity bit of serial data	None
Stop Bit	Set stop bit of serial data	1
Software Flow Control	Enable Software Flow Control	Disable
Mode	Select serial type	RS232

3.2.4 Admin Access

HTTP

HTTP (Hypertext Transfer Protocol) is used for transferring web pages on Internet. After enabling HTTP service on device, users can log on via HTTP and access the device using a web browser.

HTTPS

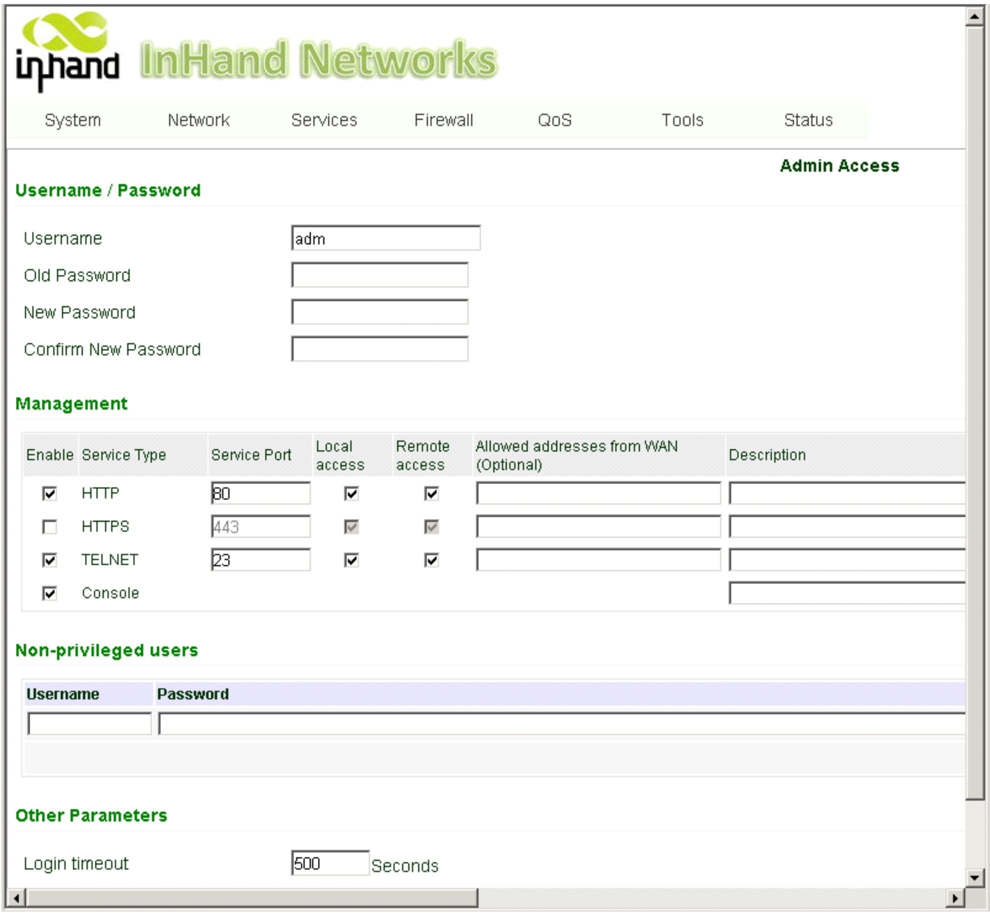
HTTPS (Secure Hypertext Transfer Protocol) supports SSL (Security Socket Layer) and encrypts data transfers. This prevents man-in-the-middle attacks when data passes either through the local network or across the internet.

TELNET

Telnet protocol provides telnet and virtual terminal functions through a network. The device supports both a client mode and a server mode. In client mode, the telnet client sends request to the telnet server, creating a session. While in server mode, the device supports Telnet connections for incoming clients, allowing for remote access.

Console

The console port, also called the access or serial port, refers for initial configuration and subsequent management of a device. It has the same terminal as the telnet client. From the navigation panel, select **System >> Admin Access**, then enter "**Admin Access**" page, as shown below.



Admin Access

Username / Password

Username	adm
Old Password	
New Password	
Confirm New Password	

Management

Enable	Service Type	Service Port	Local access	Remote access	Allowed addresses from WAN (Optional)	Description
☑	HTTP	80	☑	☑		
□	HTTPS	443	☑	☑		
☑	TELNET	23	☑	☑		
☑	Console					

Non-privileged users

Username	Password

Other Parameters

Login timeout 500 Seconds

Page description is shown below:

Parameters	Description	Default
Username	Username for configuration web login .	adm
Old Password	To change the password, users must input the old one.	N/A
New Password	Input new password.	N/A
Confirm New Password	Input the new password again.	N/A
Management：HTTP/HTTPS/TELNET/Console		
Enable	Select to enable HTTP.	Enabled
Service Port	Select management port.	80/443/23/N/A
Local Access	Enable—allow management of the IG601 over the local network,	Enabled

	or LAN. Disable—forbid management of the IG601 over LAN.	
Remote Access	Enable—allow management of the IG601 over the WAN, or internet. Disable—forbid management on a WAN connection.	Enabled
Allowed Access from WAN (Optional)	Set the range of IP address that is allowed access over a WAN connection. For example 192.168.2.1/30 or 192.168.2.1 - 192.168.2.10. (HTTP/HTTPS/TELNET)	N/A
Description	Describe the parameters of management (non-influence to IG601)	N/A
Parameters	**Description**	**Default**
Non-priviledged Users(Console login)		
Username Password	Technician defines a new username. User define the password	N/A N/A
Other Parameters		
Log Timeout	Log Timeout	Log Timeout

Instruction

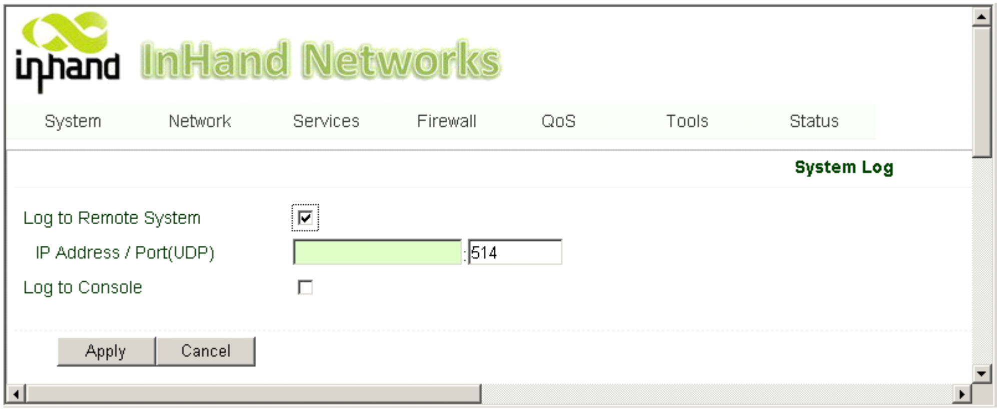
□ In "Username/Password" section users can modify username and password. However, these accounts will be non-privileged, meaning the new users cannot create new username. A non-privileged account may only do web logins.

□ In "Non-privileged Users" section, we can create multiple usernames. Technicians can utilize multiple usernames while logging on a IG601 via serial port or Telnet.

3.2.5 System Log

A remote log server can be set through "System Log Settings," and all system logs will be uploaded to the remote log server through the gateway. This makes remote log software, such as Kiwi Syslog Daemon, is a necessity on the host.

Kiwi Syslog Daemon is free log server software for Windows, which can receive, record and display logs from host (such as gateway, exchange board and Unix host). After downloading and installing Kiwi Syslog Daemon, it mus be configured through the menus "**File** >> **Setup** >> **Input** >> **UDP**." From the navigation panel, select **System** >> **System Log**, then enter "**System Log**" page, as shown below.



Log to Remote System ☑
IP Address / Port(UDP) : 514
Log to Console □

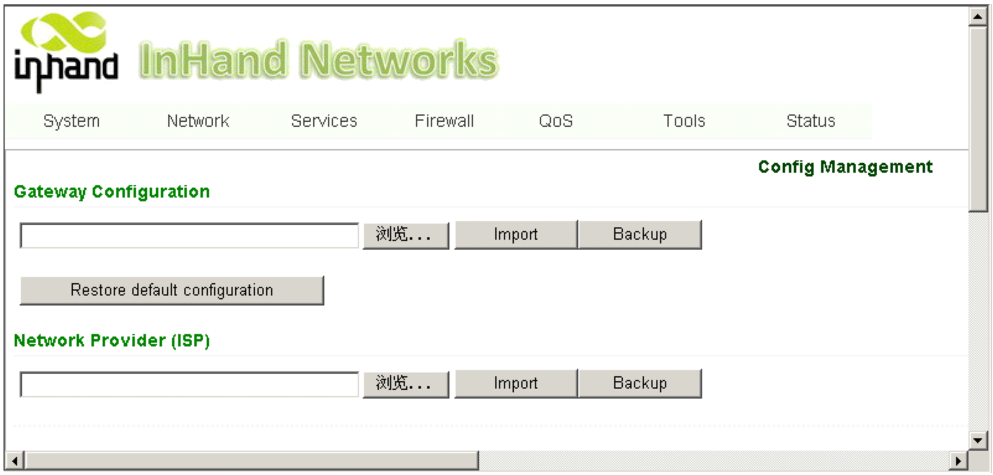
Page description is shown below:

Parameters	Description	Default
Log to Remote System	Enable remote log server	Disable
IP address/Port (UDP)	Set the IP and Port of remote log server	N/A/Port: 514
Log to Console	Print the log to console.	Disable

3.2.6 Config Management

Users may import an old configuration or backup the current configuration.

From the navigation panel, select **System** >> **Config Management**, then enter the "**Config Management**" page, as shown below.



Page description is shown below:

Parameters	Description	Default
Gateway Configuration	Import/Backup configuration	N/A
Restore default configuration	Click to reset IG601. To complete the reset, users need to reboot the IG601.	N/A
Network Provider (ISP)	The technician must configure the local APN, username, password, and other configs the same as their ISP.	N/A

Attention

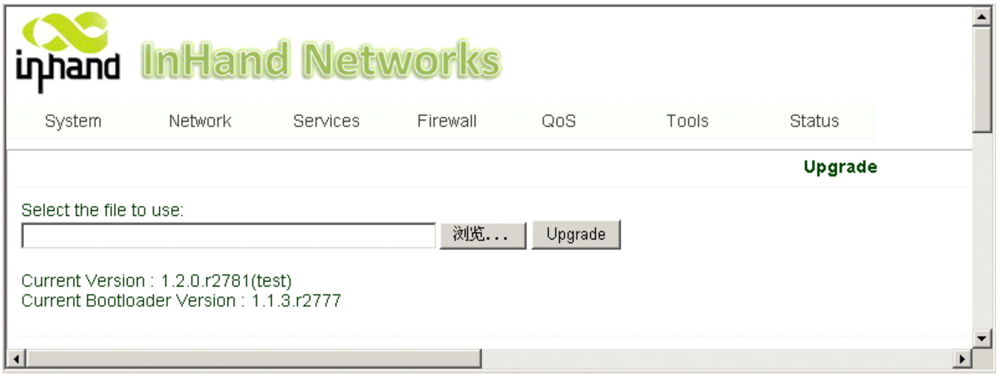
Be sure to check imported configs for incorrect formats and completeness. When importing, the system will filter the improperly formatted commands and save the correct configuration. The good configs will later be serially executed in order after system reboot. The system will not get into expected state in the case that the imported configuration is not arranged according to an effective order.

Instruction

In order not to affect the operation of the current system, when performing an import configuration and restore default configuration, users need to restart the gateway to make the new configuration to take effect

3.2.7 System Upgrade

From the navigation panel, select **System** >> **Upgrade**, then enter the "**Upgrade**" page, as shown below.

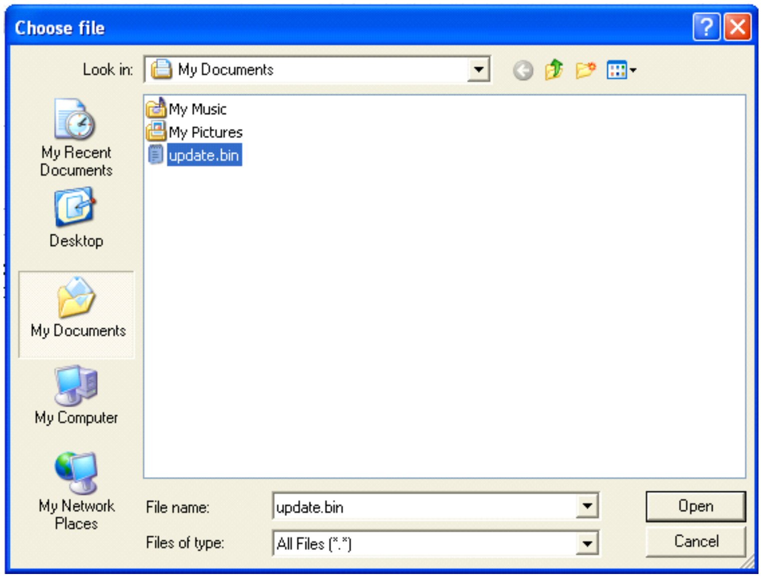


Select the file to use:

Current Version : 1.2.0.r2781(test)
Current Bootloader Version : 1.1.3.r2777

To upgrade the system, click the **System**, tab then <**System upgrade**> to enter upgrade page, then follow the steps below:

Step one: Click <**Browse**> choose the upgrade file, and then click <Open>, as shown below:

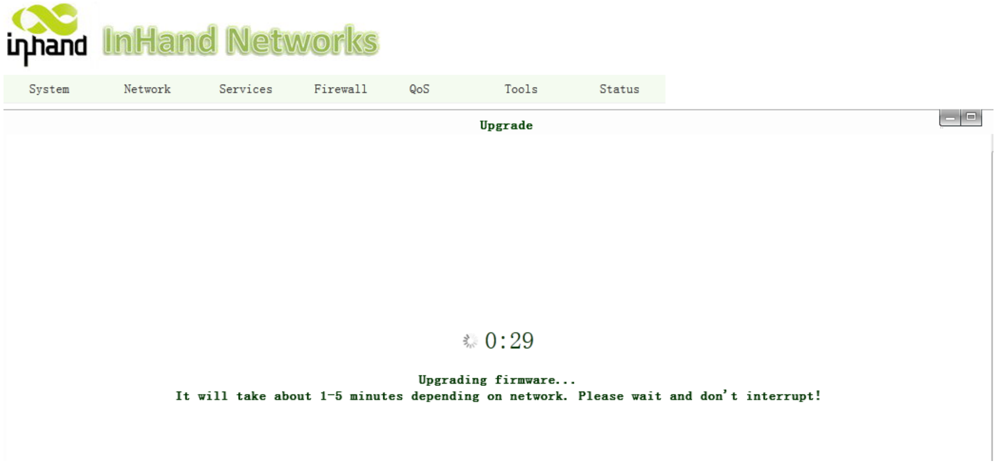


Look in: My Documents

File name: update.bin

Files of type: All Files (*.*)

Step Two: Click <Update> and then click <OK> to begin updating. Make sure your screen matches the picture below.



Upgrade

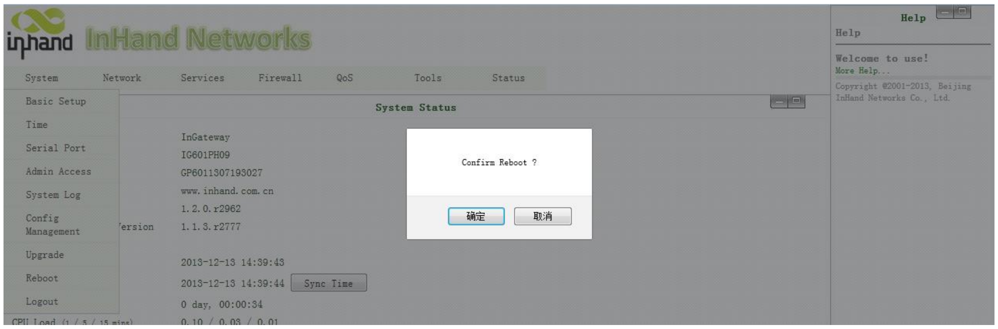
0:29

Upgrading firmware...
It will take about 1-5 minutes depending on network. Please wait and don't interrupt!

Step Three: Upgrade firmware succeed, and click <**Reboot**> to restart the IG601.

3.2.8 Reboot

If users need to reboot system, please click the System tab, then <Reboot> and click <OK> to restart the system.



System Status

InGateway
IG601PH09
GP6011307193027
www.inhand.com.cn
1.2.0.r2962
ersion 1.1.3.r2777
2013-12-13 14:39:43
2013-12-13 14:39:44
0 day, 00:00:34
CPU Load (1 / 5 / 15 mins) 0.10 / 0.03 / 0.01

Confirm Reboot ?

Help

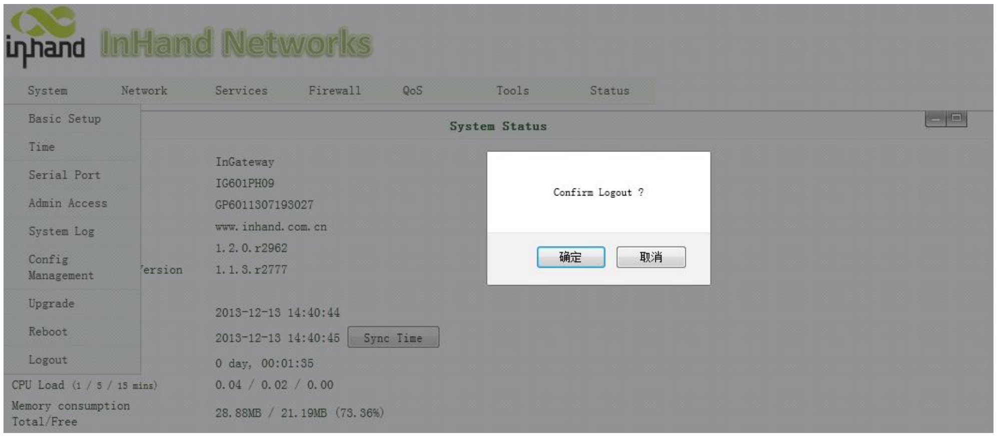
Help

Welcome to use!

Copyright @2001-2013, Beijing InHand Networks Co., Ltd.

3.2.9 Logout

If users want to logout, click **System >> Logout**, and then click <OK>.



System Status

InGateway
IG601PH09
GP6011307193027
www.inhand.com.cn
1.2.0.r2962
'ersion 1.1.3.r2777
2013-12-13 14:40:44
2013-12-13 14:40:45
0 day, 00:01:35
CPU Load (1 / 5 / 15 mins) 0.04 / 0.02 / 0.00
Memory consumption Total/Free 28.88MB / 21.19MB (73.36%)

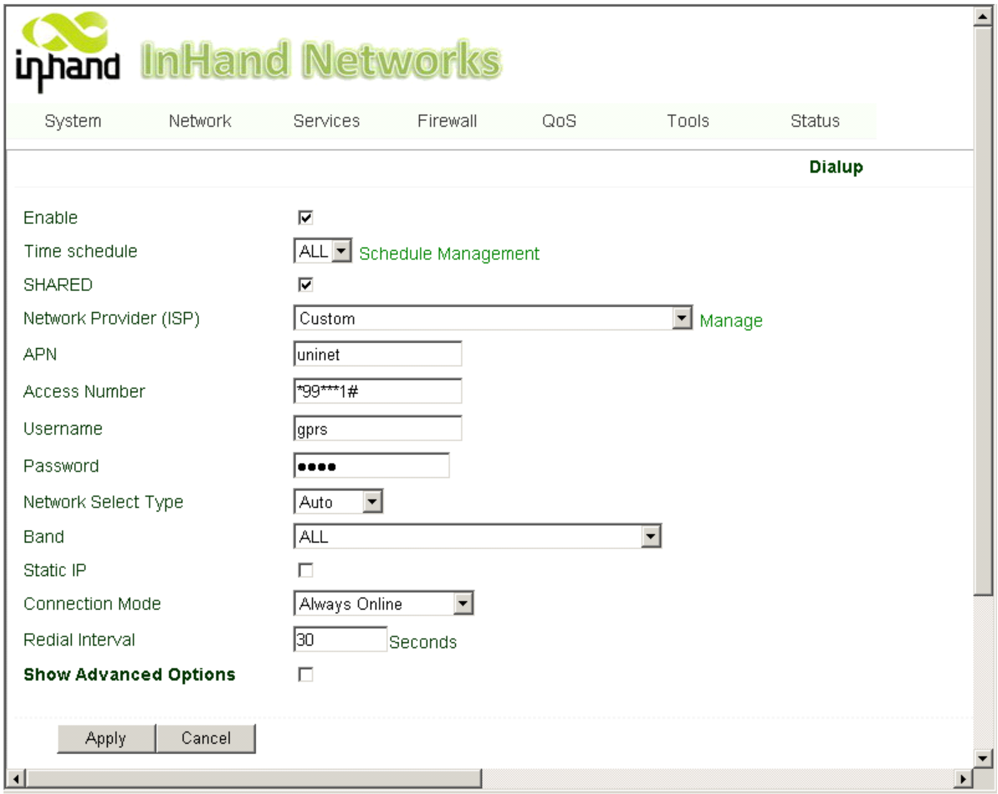
Confirm Logout ?

3.3 Network

This section covers network settings include Dialup/Cellular, LAN, DNS, DDNS, and Static Routes.

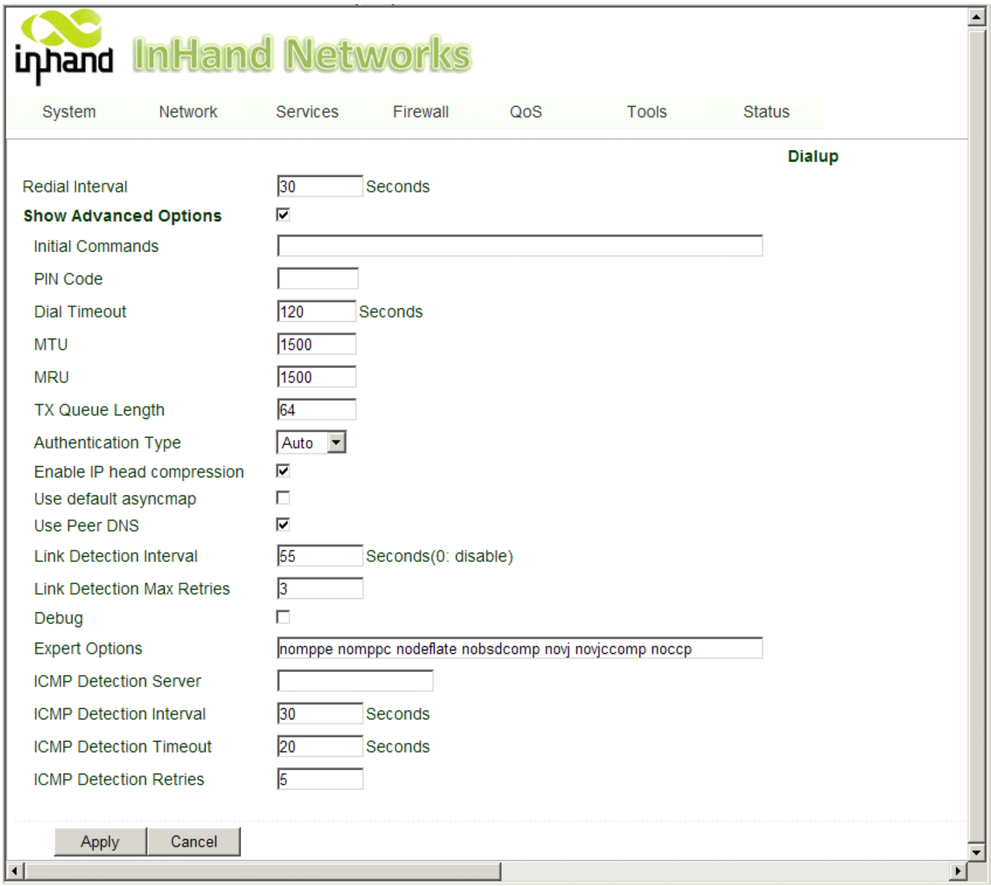
3.3.1 Dialup/Cellular Connection

With following configuration, IG601 can access the internet through the wireless cellular network. From the navigation panel, select **Network >> Dialup,** then enter the "**Dialup**" tab, as shown below.



Dialup

Enable	☑
Time schedule	ALL Schedule Management
SHARED	☑
Network Provider (ISP)	Custom Manage
APN	uninet
Access Number	*99***1#
Username	gprs
Password	●●●●
Network Select Type	Auto
Band	ALL
Static IP	□
Connection Mode	Always Online
Redial Interval	30 Seconds
Show Advanced Options	□



Dialup

Redial Interval 30 Seconds

Show Advanced Options ☑

Initial Commands

PIN Code

Dial Timeout 120 Seconds

MTU 1500

MRU 1500

TX Queue Length 64

Authentication Type Auto

Enable IP head compression ☑

Use default asyncmap □

Use Peer DNS ☑

Link Detection Interval 55 Seconds(0: disable)

Link Detection Max Retries 3

Debug □

Expert Options nomppe nomppc nodeflate nobsdcomp novj novjccomp noccp

ICMP Detection Server

ICMP Detection Interval 30 Seconds

ICMP Detection Timeout 20 Seconds

ICMP Detection Retries 5

Terminology is listed below:

Parameters	Description	Default
	Basic Config	
Enable	Enable PPP dialup.	Enable
Time Schedule	Select timetable for online and offline. We need defined timetable through “Schedule Management” in advance.	ALL
SHARED	Enabled—enable “NAT,” or network address translation. Local addresses can be translated to global WAN address on a one-to-many basis. Disable—disable “NAT.”	Enable
ISP	Select local ISP, if not listed here,	Customer

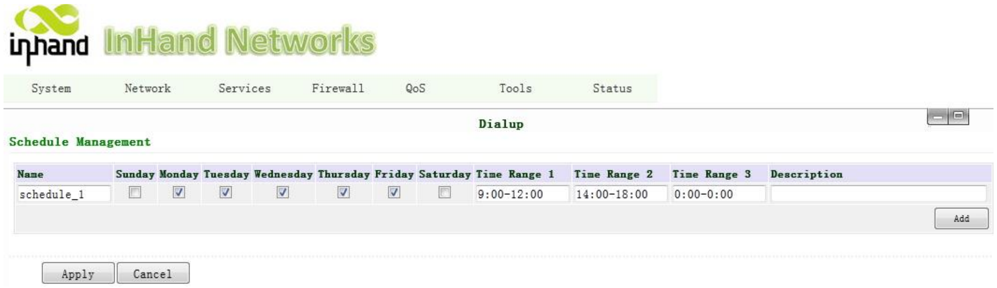
	please select “Customer.”	
APN	APN provided by your **Local ISP**	Uninet
Access Number	Dialup phone number provided by your **Local ISP.**	*99#/*99***1# / #777
Username	Some APNs need a username and password to complete the PPP connection, but not every APN needs a username.	GPRS
Password	Some APNs need a username and password to do the PPP connection, but not every APN needs a password.	GPRS
Network Select Type	Choose mobile network type. The available options are “auto”, “2G only” and “3G only.”	Auto/ 2G only / 3G only
Static IP	Enable a static IP if your SIM card can get a static IP address.	Disable
Connection Mode	It may be set to either “Always Online,” “Connect On Demand,” or “Manual.”	Always Online
Redial Interval	When a dialup fails, InGateway will redial after an interval.	30 seconds
Advanced Options		
Initial Commands	Used for advanced parameters.	N/A
PIN code	Set the use of the SIM card PIN code.	N/A
Dial Timeout	Set dialup timeout. The IG601 will reboot after timeout.	120 seconds
MTU	Set max transmit unit, or max frame size. Set this number to 1500 for normal frames and larger for little big frames.	1500
MRU	Set max receive units.	1500
TX Queue Length	Set length of transmit queue.	64
Authentication Type	Select either Auto, PAP or CHAP. This is nessecary for some ISP connections.	Auto
Enable IP header compression	Enable IP header compression	Enable
Use default asyncmap	Enable default asyncmap, and PPP advanced option.	Disabled
Use Peer DNS	Use the assigned DNS server.	Enable
Link Detection Interval	Set the Link Detection Interval.	55 seconds
Link Detection Max Retries	Set the max retries if a link detection failed.	3
Debug	Enable debug mode.	Disable
Expert Option	Provide extra PPP parameters, normally user don't need to set these. Options include: nomppe nomppc nodeflate nobsdcomp novj novjccomp	N/A

	noccp.	
ICMP Detection Server	Set the ICMP Detection Server. Blank represents none.	Blank
ICMP Detection Interval	Set the ICMP Detection Interval.	30 seconds
ICMP Detection Timeout	Set ICMP Detection Timeout (IR6X1 will reboot if ICMP time out)	20 seconds
ICMP Detection Max Retries	Set the max number of retries if ICMP failed	5

Attention

Configure the device's schedule to set any downtime.

To set the devices schedule, go into the “**Dialup**” window, enter the “**Schedule Management**” page.

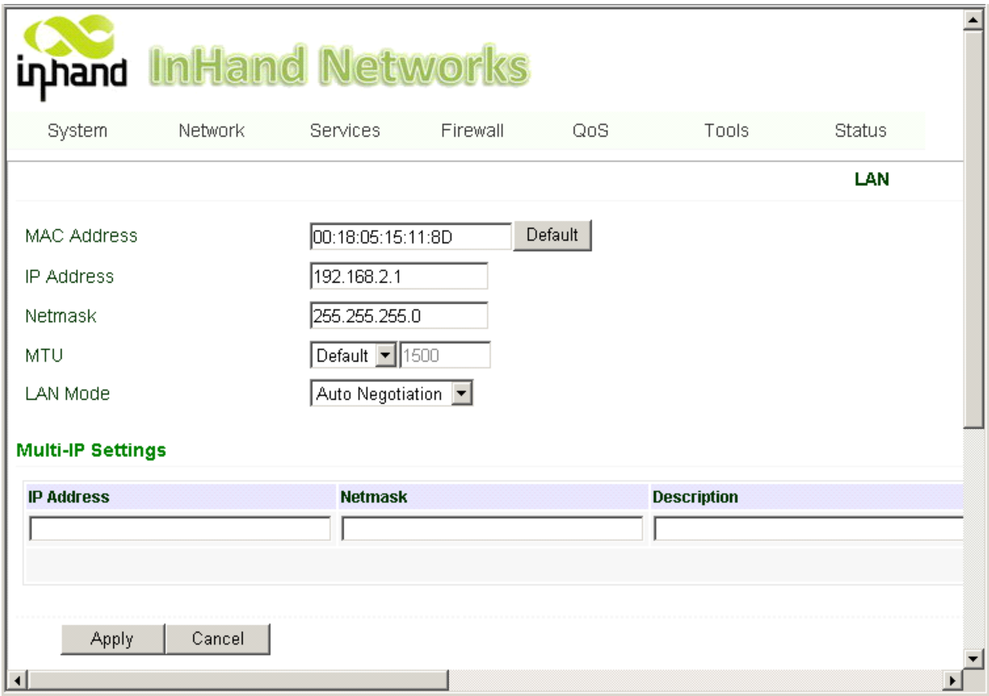


Schedule Management

Name	Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Time Range 1	Time Range 2	Time Range 3	Description
schedule_1	□	☑	☑	☑	☑	☑	□	9:00-12:00	14:00-18:00	0:00-0:00	

3.3.2 LAN

To create a static LAN connection, go into the navigation panel, select **Network >> LAN,** then enter the “**LAN**” page, as shown below.



MAC Address: 00:18:05:15:11:8D [Default]
IP Address: 192.168.2.1
Netmask: 255.255.255.0
MTU: Default 1500
LAN Mode: Auto Negotiation

Multi-IP Settings

IP Address	Netmask	Description

The settings are explained below:

Parameters	Description	Default
MAC Address	The host MAC address in LAN, which is provided by the manufacturers.	00:18:05:15:11:8D
IP Address	Set the IP Address in LAN	192.168.2.1
Net mask	Set the subnet mask of a local network.	255.255.255.0
MTU	Set MTU length options to either Default or Manual. 1500 is the normal frame size for Ethernet v2.	1500
LAN Mode	100M Full/duplex,100M Half/duplex.	Auto Negotiation
Multi-IP Settings		
IP Address	Set additional IP Address of LAN	N/A
Netmask	Set netmask of LAN	N/A
Description	Description about this IP address	N/A

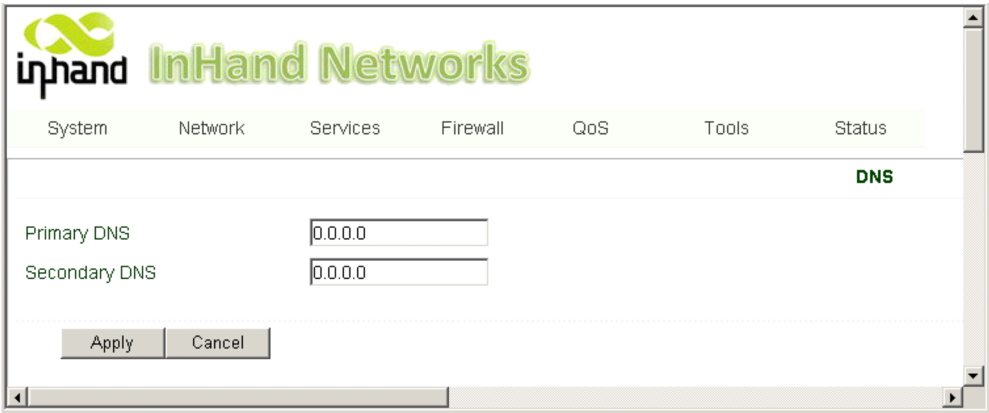
3.3.3 DNS

At the core of the internet lies DNS or the domain-name system. It employs a distributed database (DDB) to map domain names and IP addresses across the web. DNS makes it convenient to access the internet, so that instead of memorizing IP numbers, people can use words to make domain-names.

The device supports the following two functions through the domain name configuration service:

- DNS Server: the device can function as a local DNS Server.
- DNS relay: as a DNS agent, the device can transfer DNS request and response messages between the DNS client and server, while and executing domain name analysis in place of the DNS Client.

To begin setting up the DNS client, find the navigation panel, select **Network**>>**DNS** to enter into the "**DNS**" window and manually set the DNS information. If the DNS information is empty, it can be found via dialup. Generally, users will only need to set the dialup DNS settings if they have static routes on the gateway.



Primary DNS 0.0.0.0
Secondary DNS 0.0.0.0

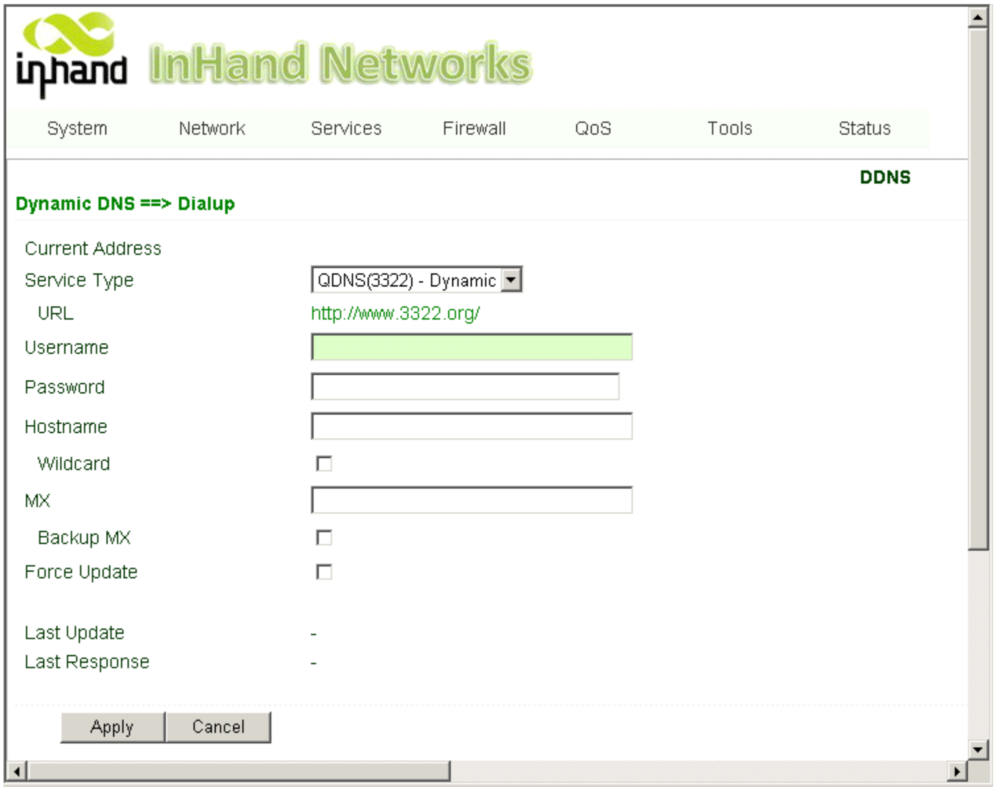
Page description is shown below:

Parameters	Description	Default
Primary DNS	Set Primary DNS	N/A
Secondary DNS	Set Secondary DNS	N/A

3.3.4 DDNS

DDNS (Dynamic Domain Name Server) automatically adds DNS entries to a server in real time. DDNS automatically logs IP addresses and host-names to its database when hosts connect to the network. When hostnames have been recorded, they may be used in the place of IP addresses. DDNS will be particularly useful in an IPv6 environment.

To set up DDNS, go into the navigation panel, select **Network >> DDNS,** then enter "**DDNS**" page, as shown below.



Dynamic DNS ==> Dialup

Current Address	
Service Type	QDNS(3322) - Dynamic
URL	http://www.3322.org/
Username	
Password	
Hostname	
Wildcard	□
MX	
Backup MX	□
Force Update	□
Last Update	-
Last Response	-

Page description is shown below:

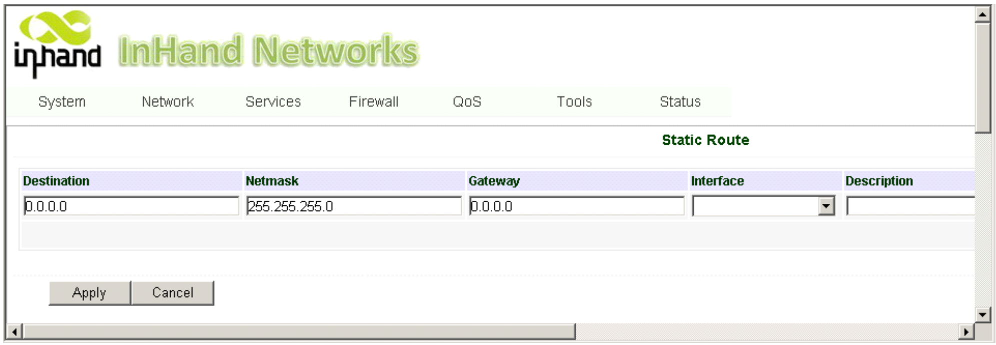
Parameters	Description	Default
Current Address	Show the current IP address	Blank
Service Type	Select DDNS Provider	Disabled
URL	Automatically generate, users do not need to set	http://www.3322.org/
Username	Registered username for DDNS	N/A
Password	Registered password for DDNS	N/A
Hostname	Registered hostname for DDNS	N/A
Wildcard	Set whether the server supports wildcards	Disabled

MX	Whether to update the mailbox record	N/A
Backup MX	Whether to update the mailbox record	Disabled
Force Update	Force update records after modifying the settings	Disabled

3.3.5 Static Routes

Static routes are created manually and have many different uses. After the static route is set, packets will be transferred to appointed routes. Engineers can create simpler networks by using static routes in place of RIP or OSPF, and ensure greater network reliability. The proper setting and use of static routing can also improve the performance of a network and guarantee bandwidth for important network applications.

From the navigation panel, select **Network >> Static Route,** then enter "**Static Route**" page, as shown below.



Destination	Netmask	Gateway	Interface	Description
0.0.0.0	255.255.255.0	0.0.0.0		

Page description is shown below:

Parameters	Description	Default
Destination	Set IP address of the destination	0.0.0.0
Net Mask	Set subnet mask of the destination	255.255.255.0
Gateway	Set the gateway of the destination	N/A
Interface	Users can select which interface accesses the destination	N/A
Description	Describe a static route	N/A

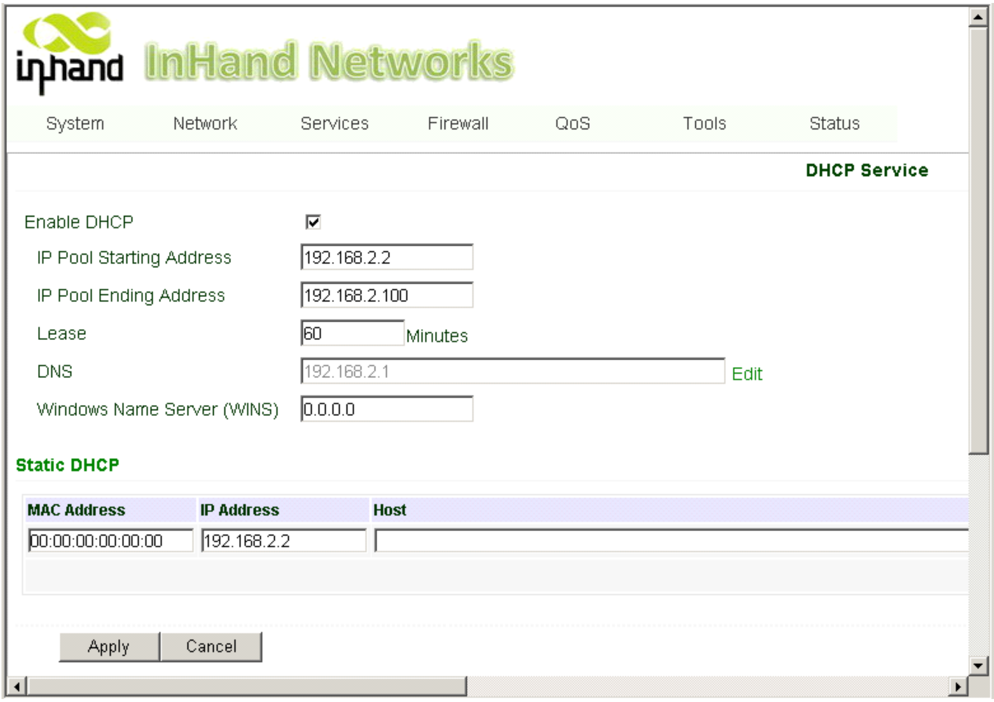
3.4 Service

In the service section, this manual covers nine configurations, including DHCP service, DNS relay, VRRP, Device Manager, DTU, Modbus to SMS, SMS alarm rules, and Mbsms variable template.

3.4.1 DHCP Service

DHCP (Dynamic Host Configuration Protocol) is a network protocol for LAN utilizing UDP and TCP. DHCP automatically distributes IP addresses for either a local network or network service provider, and can aid network administrators in managing all the computers on a network. A DHCP server refers to a computer managing DHCP standard in a network. It distributes IP addresses once the work station logs on and ensures that no duplicate IP addresses are assigned. DHCP Server dramatically simplifies network management tasks, and is a necessity in today's network.

To enable the DHCP server, find the navigation panel, select **Services** >> **DHCP Service,** then enter “**DHCP Service**” page, as shown below.



DHCP Service

Enable DHCP	☑
IP Pool Starting Address	192.168.2.2
IP Pool Ending Address	192.168.2.100
Lease	60 Minutes
DNS	192.168.2.1 Edit
Windows Name Server (WINS)	0.0.0.0

Static DHCP

MAC Address	IP Address	Host
00:00:00:00:00:00	192.168.2.2	

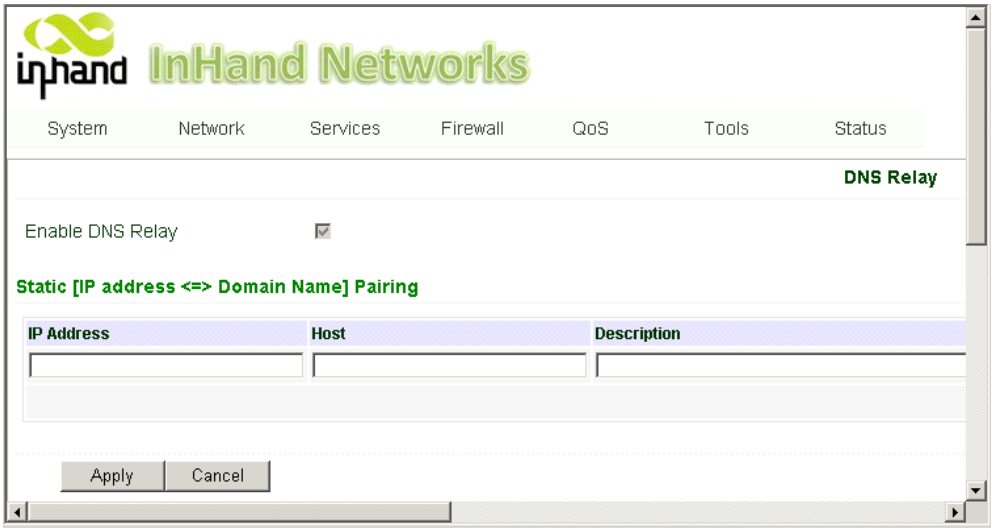
The page is described below:

Parameters	Description	Default
Enable DHCP	Check to enable DHCP.	Enable
IP Pool Starting Address	Set the starting IP address of DHCP pool.	192.168.2.2
IP Pool Ending Address	Set the ending IP address of DHCP pool.	192.168.2.100
Lease	Set the valid time lease of IP address obtained by DHCP	60 minutes
DNS	Set DNS Server	192.168.2.1
Windows Name Server (WINS)	Set the WINS binding.	0.0.0.0
Static DHCP		
MAC Address	Set the MAC address of a designated IP address.	00：00：00：00：00：00
IP address	Set the static IP address of the host.	192.168.2.2
Host	Set the hostname.	N/A

3.4.2 DNS Relay

DNS forwarding: DNS forwarding is open by default. You can set the specified [Domain Name <=> IP Address] to let IP address match with the domain name, thus allowing access to the appropriate IP through accessing to the domain name.

From navigation panel, select **Network >>DNS,** then enter “**DNS Relay**” page, as shown below.



DNS Relay

Enable DNS Relay ☑

Static [IP address <=> Domain Name] Pairing

IP Address	Host	Description

The page description is shown below:

Parameters	Description	Default
IP Address	Map an IP to a hostname.	N/A
Host	Set the name of DNS entries.	N/A
Description	Describe DNS entry.	N/A

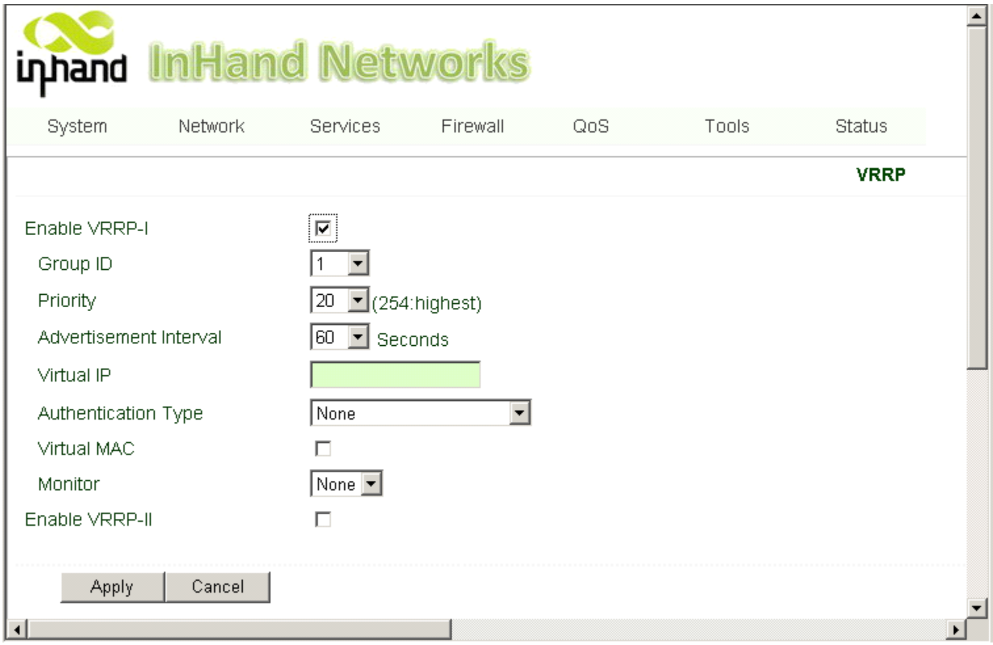
Attention

- When enabling DHCP, the DHCP relay is also enabled automatically. Relay cannot be disabled without disabling DHCP.
- While using dynamic DNS, the DNS relay service should be turned on.
- A maximum of twenty IP to domain-name pairs may be configured.

3.4.3 VRRP: Virtual Router Redundancy Protocol

VRRP is a protocol for allowing automatic failover and redundancy in routers. It creates a “virtual router,” meaning multiple physical routers can be assigned to one gateway or one host. The main gateway controls the IP of the virtual gateway and routes packets to virtual IP addresses. If the main gateway drops, a dynamic failover process elects a new gateway. The IP address of the virtual gateway can be set as the default gateway for hosts, because it is the first hop. The benefit of using VRRP is serviceability. The network administrator can avoid the configuration of dynamic routing or routing discovery protocol on each host. VRRP packet is sent encapsulated in IP packet.

To enable VRRP, go to the navigation panel, select **Services** >> **VRRP,** then enter "**VRRP**" page, as shown below.



Enable VRRP-I ☑
Group ID 1
Priority 20 (254:highest)
Advertisement Interval 60 Seconds
Virtual IP
Authentication Type None
Virtual MAC □
Monitor None
Enable VRRP-II □

The page description is shown below:

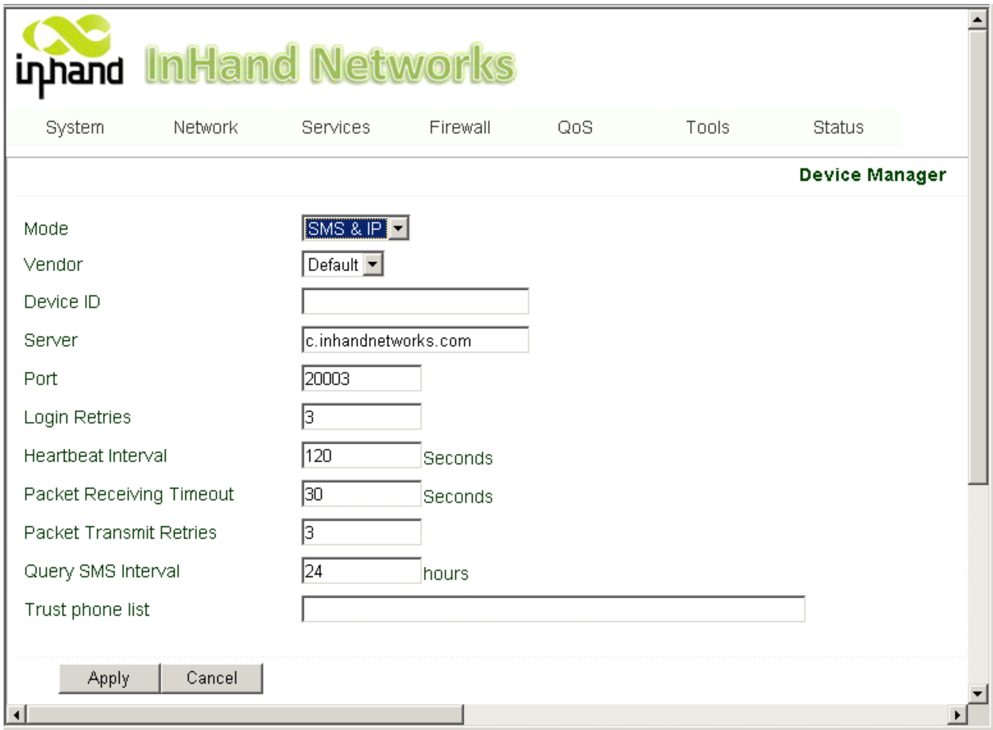
Parameters	Description	Default
Enable	Check to enable VRRP.	Disable
Group ID	Select a group id of gateway (range 1-255).	1
Priority	Select a priority for the gateway (range 1 - 254).	20 (bigger number stands for higher priority)
Advertisement Interval Virtual IP	Set an advertisement interval. Set a Virtual IP address.	60 sec N/A
Authentication Type	Choose between "None" or Password type.	None
Virtual MAC	Select to enable.	Disable
Monitor	Select WAN to start monitoring WAN interface traffic; select None do not monitor.	None

3.4.4 Device Manager

The device manager, or DM, is the InHand intelligent cloud platform for network management service.

You can remotely manage your IG601, find the current status and so on.

To configure the device manager, go to the navigation panel, select **Services** >> **Device Manager,** then enter "**Device Manager**" page, as shown below.



Mode: SMS & IP
Vendor: Default
Device ID:
Server: c.inhandnetworks.com
Port: 20003
Login Retries: 3
Heartbeat Interval: 120 Seconds
Packet Receiving Timeout: 30 Seconds
Packet Transmit Retries: 3
Query SMS Interval: 24 hours
Trust phone list:

Terms are described below:

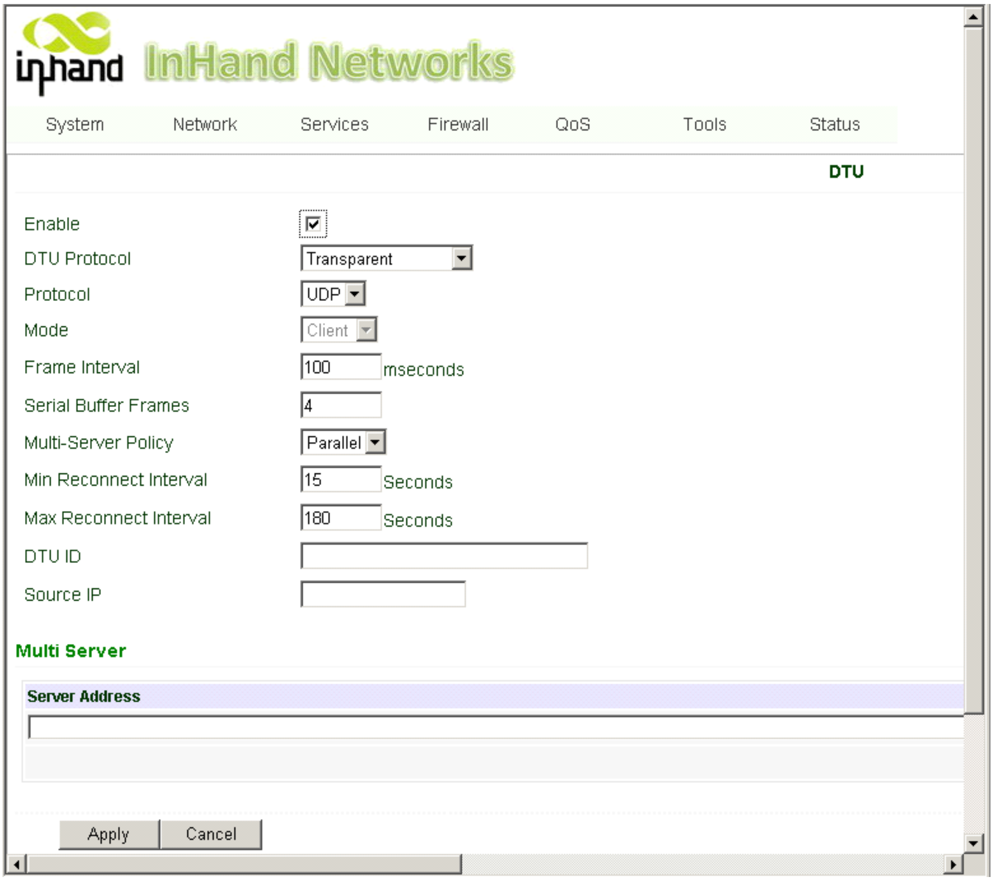
Parameters	Description	Default
Mode	SMS+IP is recommended.	Disable
Only SMS		
Query SMS Interval	Set how frequently to check SMS.	24 hours
Trust Phone List	Add trusted cell phone list, also known as a white list.	N/A
SMS+IP		
Vendor	Set a vendor name.	Default
Device ID	Set a device ID.	N/A
Server	Set a device manager server IP: g.inhandnetworks.com	c.inhandnetworks.com
Port	Set a port for device	20003

	manager.	
Login Retries	Set login retries	3
Heartbeat Interval	Set interval of heartbeats.	120 seconds
Packet Receiving Timeout	Set the timeout for dropped packets.	30 seconds
Packet Transmit Retries	Set packet transmit retries.	3
Query SMS Interval	Set how long to check SMS.	24 hours
Trust phone list	Set a trusted cell phone list.	

3.4.5 DTU

If you connect a serial device to IG601, you need enable the DTU converter. IG601 can support a multi-protocol uplink to allow conversion of serial data and IP data. Users must select the correct serial mode on the window “**Serial Port**” from the navigation tab “**System.**”

To enable the DTU, go into top navigation panel, select **Services** >> **DTU,** then enter “**DTU**” page, as shown below.



DTU

Enable	☑
DTU Protocol	Transparent
Protocol	UDP
Mode	Client
Frame Interval	100 mseconds
Serial Buffer Frames	4
Multi-Server Policy	Parallel
Min Reconnect Interval	15 Seconds
Max Reconnect Interval	180 Seconds
DTU ID	
Source IP	

Multi Server

Server Address

The page is described below:

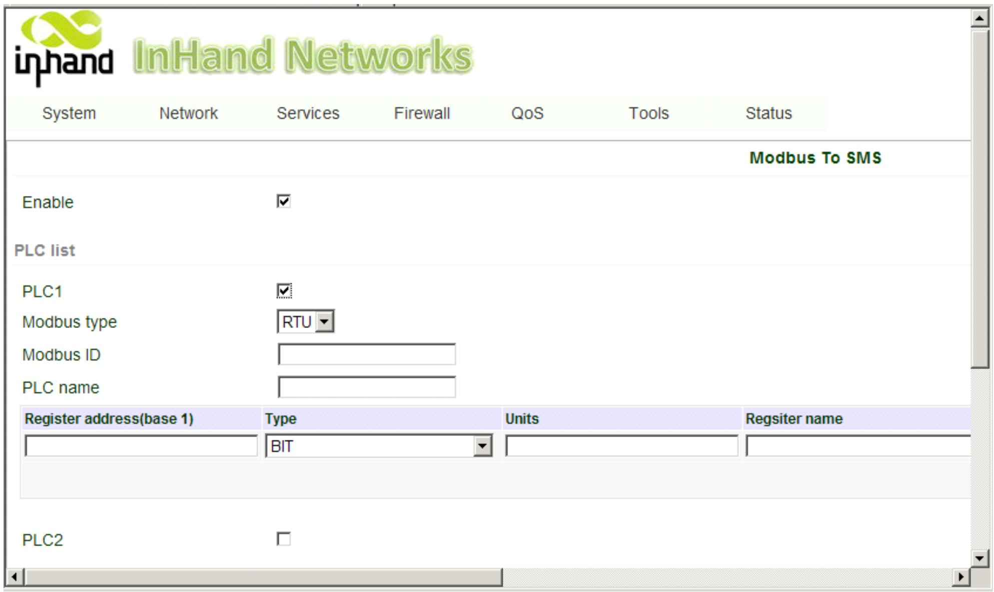
Parameters	Description	Default
Enable	Check to enable the DTU.	Disable
DTU Protocol	Set the DTU protocol. Please see more in related Quick Guide.	Transparent
Protocol	TCP and UDP are both options.	UDP
Mode	Set the DTU as a client or server.	Client
Frame Interval	Set the frame interval.	100 mseconds
Serial Buffer Frames	Set the number of serial buffer frames.	4
Multi-Server Policy	Choose either parallel or poll options.	Parallel
Min Reconnect interval	Set the minimum reconnect interval.	15s

Max Reconnect interval	Set the maximum reconnect interval.	180s
DTU ID	Set the ID of the DTU. It's only available when using DC protocol.	N/A
Source IP	Set the Source IP.	N/A

3.4.6 Modbus to SMS

InGateway inquires the variables status of the PLC every ten seconds and saves them into RAM. These variables will be the SMS response sent after a query. After receiving a control SMS, InGateway sends the control command to the PLC and waits for a response. The response is sent from the PLC and then InGateway sends the response to the user.

To enable SMS, find the navigation panel, select **Services** >> **Modbus to SMS** to enter into the "**Modbus to SMS**" page. After you add your PLC here, the daemon of IG601 periodically queries the PLC variables and cache to memory.



Modbus To SMS

Enable ☑

PLC list

PLC1 ☑

Modbus type RTU

Modbus ID

PLC name

Register address(base 1)	Type	Units	Regsiter name
	BIT		

PLC2 ☐

Follow the five steps below to configure the PLC parameters:

Step 1: Click 'Enable' in 'Service>>Modbus to SMS'

Step 2: Unfold configuration item of "PLC List" and click the PLC to be used, and configure one by one. 8 PLCs could be added on this page.

Step 3: Configure the specific parameters of PLC, each PLC can be added to 32 variables.

1) Set the Modbus type: RTU and TCP are available.
2) Under RTU type, configure the slave address of each PLC, namely the 'Modbus ID.' It may be assigned a value from 1 to 247. Under TCP mode, configure the IP address and port number of PLC.
3) Configure name of the PLC, using a maximal length of 16 bytes. Specific PLC name will be used in SMS.
4) PLC Authen: set authentication password to ensure the PLC is tamper-evident. As the password is saved to register 40100-40103, the register 40100-40103 cannot be used when configuring register.
5) New Variables:
   - First column is register address (from 1). 0xxxxx is for discrete inputs. 1xxxxx is for a coil. 3xxxxx is for the incoming register, and 4xxxxx indicates a holding register.
   - Second column is the variable type, supporting BIT, WORD, DWORD, FLOAT, INT16, INT32 and INT64.
   - Third column is the units of variable with maximum length of 8 bytes. This value will appear in SMS, and you can leave this field empty. The unit of BIT variables should be configured according to HH/LL format, HH represents the corresponding unit of "1," LL represents the corresponding unit of "0." The units of other types of variables will appear directly in SMS.
   - Fourth column is register name with a maximum length of eight bytes. Users can define names for each variable and this field must be filled. The variable address will be replaced by variable name in SMS.

Instruction

- PLC ID in IG601 cannot be repeated, neither can PLC names.
- Variable names cannot be repeated in one PLC variable list.
- Each PLC should be defined with ID, name and at least one variable.
- Click "Add" to add new variables.

Step 4: Repeat step 3 and add more PLCs.

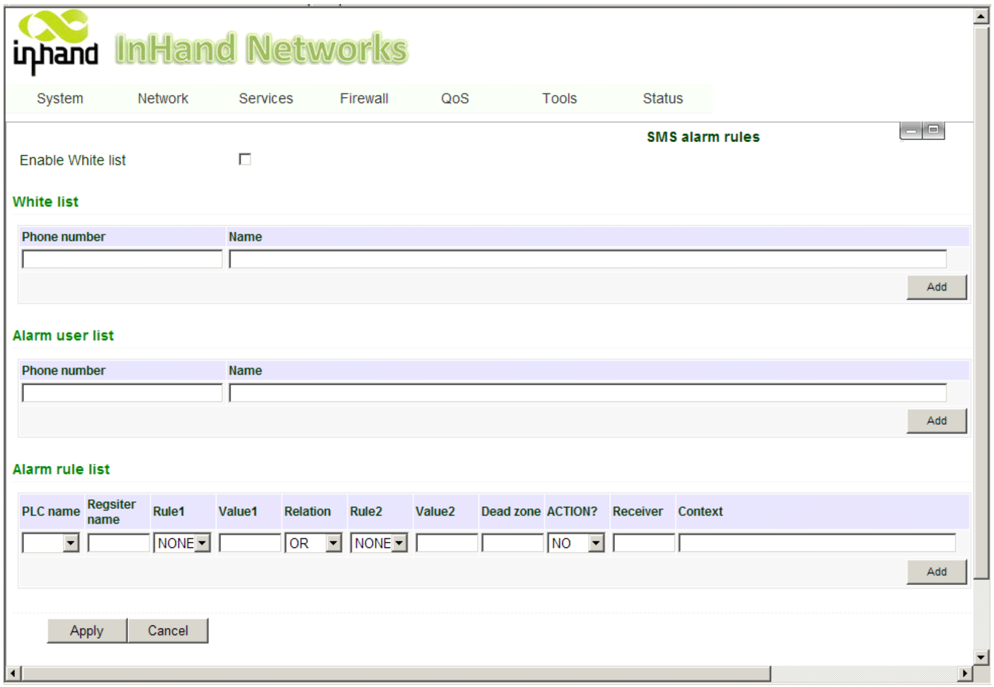
Step 5: Click <Apply> button, save and apply the new configuration.

3.4.7 SMS Alarm Rules

IG601 supports the configuration of up to one-hundred alarm rules, that when triggered send an alarm message to user's mobile phone. User can set the alarm rules, and adjust the SMS receiver in the alarm menu. The IG601 will collect different variables depending on the alarm rules set by the user. When a variable matches the rules, IG601 will send an SMS alarm to all users on the "alarm user list". IG601 can also send user-defined SMS to designated users.

There is timestamp and WAN IP settings, users can define SMS contents.

From the navigation panel, select **Services >> SMS Alarm Rules,** then enter the "**SMS Alarm Rules**" window, as shown below. After setting SMS, click the **<Apply>** to save and apply the configuration.



Enable White list ☐

White list

Phone number	Name

Alarm user list

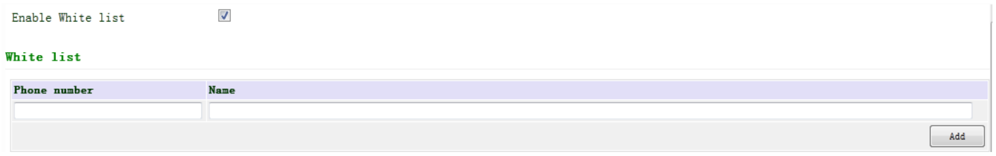
Phone number	Name

Alarm rule list

PLC name	Regsiter name	Rule1	Value1	Relation	Rule2	Value2	Dead zone	ACTION?	Receiver	Context
		NONE		OR	NONE			NO		

3.4.7.1 Enable White list

The IG601 is capable of receiving a control and inquiry SMS from any user. In order to improve security, users can enable the white list function. After the white list is set, the IG601 only processes SMS from users on the white list, meaning any other SMS will be dropped.



Enable White list ☑

White list

Phone number	Name

- Up to 10 users may be whitelisted.
- The first column is a telephone number, with a length ranging from 1 to 16 bytes, and is mandatory.
- The second column is the user name, with a length ranging from 0 to 16 bytes, and is optional.

After enabling the “Modbus to SMS” function, IG601 can identify two types of SMS commands sent by the users on the white list. The IG601 performs an action corresponding to different commands and then sends a response to the SMS user.

Instruction

Users can send SMS to IG601 via mobile phone or SMS modem. Two types of SMS formats and response message are as follows:

The SMS to inquire state

Users can send the following SMS command to inquire the IG601 operating status and the register values of the PLC.

Request	Response Message	Description
GET	plc1 connected plc2 disconnected	Inquire about the name and status of all PLCs connected to the IG601.
GET plc1_name, plc2_name…	plc1 OUTPUT1=on OUTPUT2=off plc2 OUTPUT3=on OUTPUT4=on	Inquire about the PLC variables with names of plc1_name, plc2_name. The plcX_names are parameter. Users can query different PLC variables by modifying the plcX_name. Different PLCs are separated by a comma.
GET plc1_name register1 register2， plc2_name register3 register4,⋯	Plc1 register1=5 register2=6 plc2 register3=1.8 register4=2.2	This command finds the value of a variables under a PLC named plcX_name. The plcX_name and registerX are parameters. Users can find the name of corresponding variables by trying different

		perameter commands. By entering multiple registers, multiple variables can be found at the same time. Different PLCs are separated by comma.

Request	Response Message	Description
ALARM	Alarm total: 55, #53 date-time context1, #54 date-time context2, #55 date-time context3	Find a count of historical alarm records and return the latest three historical alarms.
ALARM 2-3	Alarm total: 55, #2 date-time context1, #3 date-time context2, #4 date-time context3	Inquire about historical records within the appointed number range. It can request maximum of five historical records each time.
NETSATUS	Signal strength(dBm):xx, Network status: Registered to home network	Learn the network status.
MSGSTATUS	Received message: 10, Sent message: 15, Failed sent message: 0, Unauthorized message: 7	Inquire about the SMS statistics.
WHITELIST	WHITELIST ON|OFF	Inquire about the startup status of the white list.

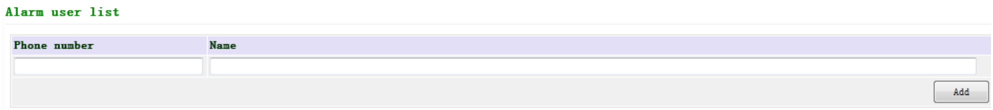
The SMS to perform actions

User can send the following SMS command to do the configuration via SMS.

Request	Response Message	Description
SET plc1_name register1=xxx register2=xxx，plc2_name register3=xxx register4=xxx···	Succeed: Set register1 to xxx set register2 to xxx set register3 to xxx set register4 to xxx	For a PLC named plc1_name, set the register value to xxx. The plcX_name and registerX are both parameters. User can set the corresponding variables by configuring these parameters in the command line. Such commands can set multiple variables synchronously. Different PLCs are separated by comma.
ALARM CLEAN ALL	Delete 1-55 alarm SUCCESS	Delete all the historical alarm records.

ALARM CLEAN xx-xx	Delete xx-xx alarm SUCCESS	Delete the historical records within the a range.
WHITELIST ON|OFF	WHITELIST ON|OFF	Start or stop using a white list.
ADD 13812345678	ADD 13812345678 OK	Add users to the alarm list.
DELETE 13812345678	DELETE 13812345678 OK	Delete users on an alarm list.

3.4.7.2 Alarm User List

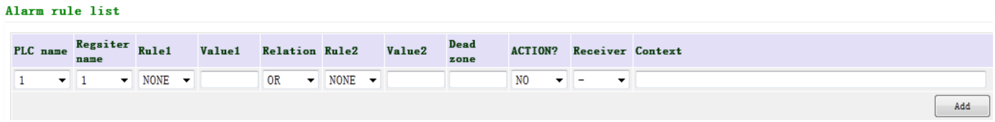


Alarm user list

Phone number	Name

- Up to ten alarm recipients can be added to the “alarm user list.”
- Mobile phone numbers are filled in the first column, and may range from 1 to 16 bytes long. This column must be filled; otherwise users cannot be added.
- User names are filled in the second column, and may range from 0 to 16 bytes long. This column may be left empty.
- Telephone numbers cannot be repeated.

3.4.7.3 Alarm Rule List



Alarm rule list

PLC name	Regsiter name	Rule1	Value1	Relation	Rule2	Value2	Dead zone	ACTION?	Receiver	Context
1	1	NONE		OR	NONE			NO	-	

In this section of interface, the technician will create an "alarm rule list.” Each line defines an alarm rule and a maximum of one-hundred alarm rules can be configured. The technician will match mathematical expressions and compare values to a variable in each rule. To set an alarm rule follow these steps:

- Select a PLC in the first column. Any PLC previously setup in the “Modbus to SMS” chapter of this manual will appear in a drop-down menu.
- Select a variable name in the second column, and the corresponding variable of the PLC will appear above it. The technician will compare values to this variable.
- Compare the variable to a value by selecting an operator in the third column. The available options are: NONE, >, >=, <, <=, = and !=.
- Define the first value in the fourth column. This value will be compared to the main variable. For

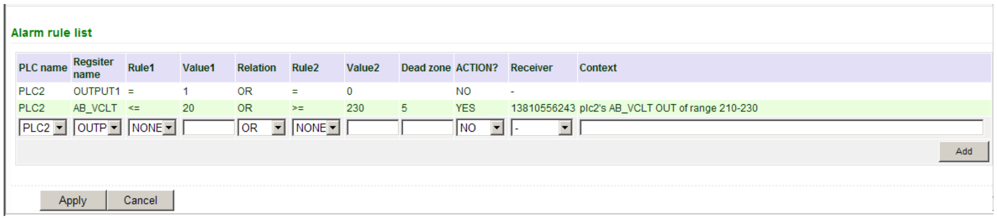
example, temperature >= 200 means that when the temperature is greater than or equal to 200, an alarm will be sent.

- Define the relationship between the first expression and the second expression in the fifth column by selecting OR, AND or XOR.
- Select a second operator in the sixth column. The options that can be selected are: NONE, >, >=, <, <=, = and !=.
- Define a second value in the seventh column.
- In the eighth column, the user must define a dead zone, which acts as a buffer. After the alarm is trigger, it will not be sent until the variable exceeds the dead zone value. It is only effective for numerical, non BIT values. Set the value to zero to eliminate the dead zone.
- In the ninth column titled "**ACTION?,**" users may select "**YES**" to enable user-defined alarm message, user need define the alarm message on "Context" in the eleventh column. Otherwise, the default alarm message will be sent. The maximum length for a short message is 140 bytes.
- The mobile phone number of a recipient is input in the tenth column.
- A user-defined alarm message may be set in the eleventh column. When triggered, this message will be sent in the form of an SMS.

The alarm SMS are divided into two types:

- If the selection for "ACTION?" in the ninth column is NO, the system will send the automatically generated defaulted alarm short message. The message will be defined by the variable, for example: "Alarm plc2 OUPUT=on," or "Alarm plc AB_VOLT=238V."
- If the selection of "ACTION?" is YES, the system will send a user-defined alarm.

Below is an example of an alarm rule:



Alarm rule list

PLC name	Regsiter name	Rule1	Value1	Relation	Rule2	Value2	Dead zone	ACTION?	Receiver	Context
PLC2	OUTPUT1	=	1	OR	=	0		NO	-	
PLC2	AB_VCLT	<=	20	OR	>=	230	5	YES	13810556243	plc2's AB_VCLT OUT of range 210-230
PLC2	OUTP	NONE		OR	NONE			NO	-	

Instruction

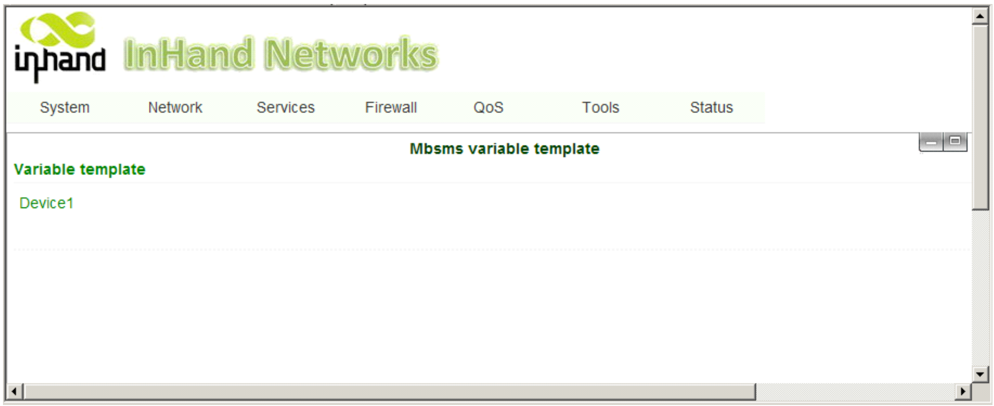
The first rule states that when the OUTPUT1 of plc2 changes from 1 to 0 or from 0 to 1, trigger the alarm and send the alarm SMS to all users in the "alarm user list."

The second rule states that when the variable value of AB_VOLT in plc2 is less than or equal to 20 or greater than or equal to 230, trigger the alarm and send the user-define SMS to the user '13810556243.' In other words, when AB_VOLT is between 20 and 230, plc2 is in normal operating conditions.

3.4.8 Mbsms Variable Template

Users can download a PLC variable template file which you might have added in section 3.3 "Modbus to SMS." A template file is composed of all the variables in a PLC, and the IG601 supports up to eight templates.

To configure the Mbsms template, go into the navigation panel, select **Services** >> **Mbsms Variable Template,** then enter "**Variable Template**" page, which is shown below.



Mbsms variable template

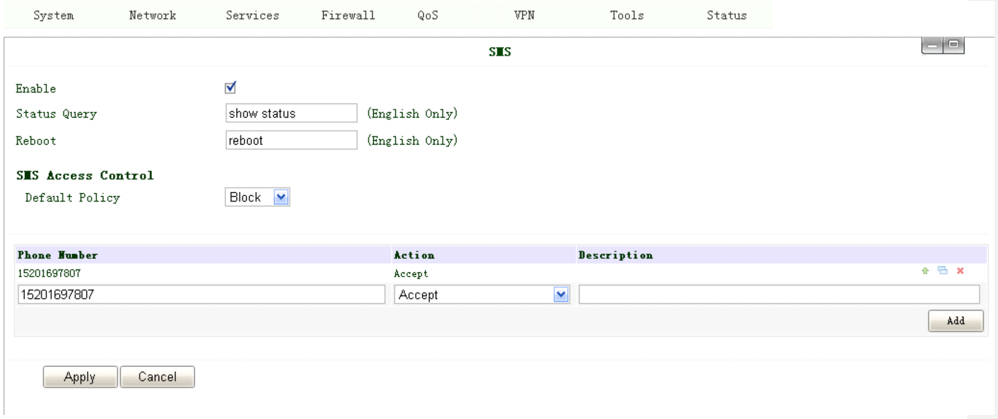
Variable template

Device1

3.4.9 SMS

User can do a status check and reboot the IG601 through SMS. After setting a user-defined message in the SMS config window, users can see the device's status or reboot the device. Statistics like signal strength, IP address, and uptime, among others, may be used to analyze the device.

To configure SMS, find the navigation panel, select **Services** >> **SMS,** then enter "**SMS**" page, as shown below.



Enable ☑

Status Query: show status (English Only)

Reboot: reboot (English Only)

SMS Access Control

Default Policy: Block

Phone Number	Action	Description
15201697807	Accept	

The page description is shown below:

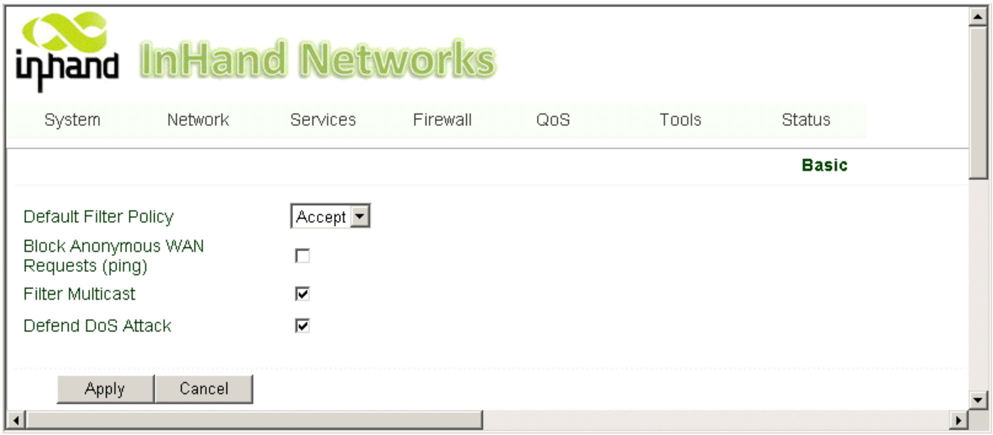
Parameters	Description	Default
Enable	Click to enable SMS.	Disable
Status Query	This is user defined. After configuration, the user sends the predetermined message to IG601, which will send status information to user's mobile phone. The information include :Host: (SN); Uptime: (the uptime of router for this time of reboot); State: (Online/Offline); LAN: (Up) (LAN IP)	N/A
Reboot	This is user defined as well. After configuration, the user will send a user-defined message to the IG601 which will then restart.	N/A
Default Policy	This accepts by default. If the mobile phone number is empty, the IG601 will execute the SMS command from any mobile phone number. If a phone number is entered into the field, the IG601 will execute SMS commands from the configured mobile phone number.	Accept

3.5 Firewall

3.5.1 Basic

A firewall is necessary for blocking out malicious packets from the internet. On today's internet, security is more important than ever, which is why the IG601 is well equipped to protecting the local network and provide a security barrier from external threats.

To configure the firewall, go to the navigation panel, select **Firewall** >> **Basic,** then enter the "**Basic**" config page, as shown below.



Default Filter Policy: Accept
Block Anonymous WAN Requests (ping) □
Filter Multicast ☑
Defend DoS Attack ☑

The page description is shown below:

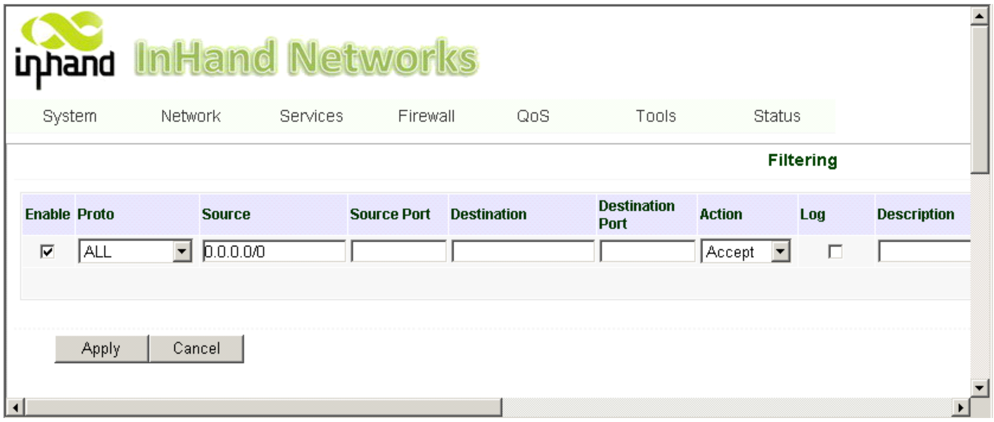
Parameters	Description	Default
Default Filter Policy	Choose to either "Accept" or "Block" filtering.	Accept
Block Anonymous WAN Request (ping)	Check to deny anonymous ICMP ping requests.	Disable
Filter Multicast	Check to filter multicast packets.	Enable
Defend DoS Attack	Select to enable DoS attack prevention.	Enable

3.5.2 Filtering

Access control has the following functions:

- Prevent unwanted users from accessing network resources.
- Permitting staff to access network resources.
- Preventing staff from accessing the wrong network resources.

To enable Access Control From the navigation panel, select **Firewall** >> **Filtering,** then enter "**Filtering**" page, as shown below.



Filtering

Enable	Proto	Source	Source Port	Destination	Destination Port	Action	Log	Description
☑	ALL	0.0.0.0/0				Accept	□	

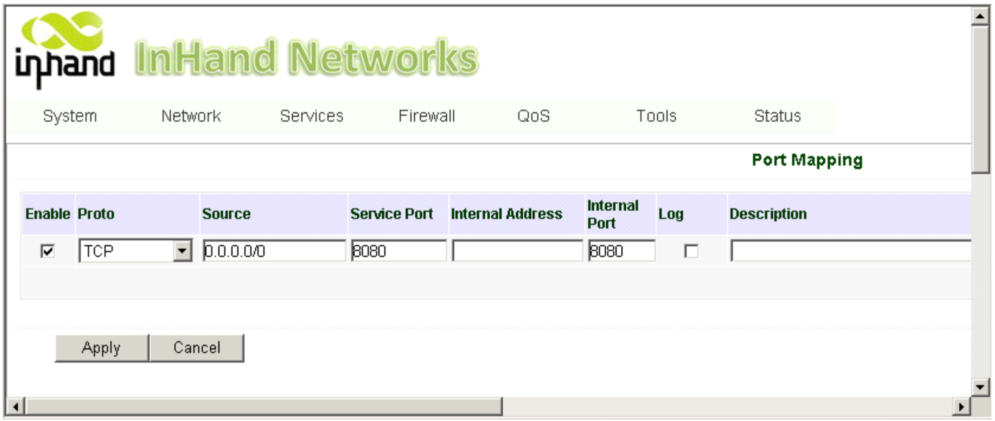
Page description is shown below:

Parameters	Description	Default
Enable	Check to enable filtering.	Enable
Protocol	The available options are: TCP, UDP, ICMP, and all.	All
Source IP address	Set the source IP address.	0.0.0.0/0
Source Port Destination IP	Set the source port. Set the destination IP address.	N/A N/A
Destination Port	Set the destination port.	N/A
Action	Select either accept or block.	Accept
Log	log can print the access IP address	Disable
Description	Describe your configuration.	N/A

3.5.3 Port Mapping

The IG601 support Network Address and Port Translation. It allows remote computers (for example, computers on the Internet) to connect to the local device that linked to LAN interface.

To configure port mapping, go into the navigation panel, select **Firewall >> Port Mapping,** then enter “**Port Mapping**” page, as shown below.



Enable	Proto	Source	Service Port	Internal Address	Internal Port	Log	Description
☑	TCP	0.0.0.0/0	8080		8080	☐	

Page description is shown below:

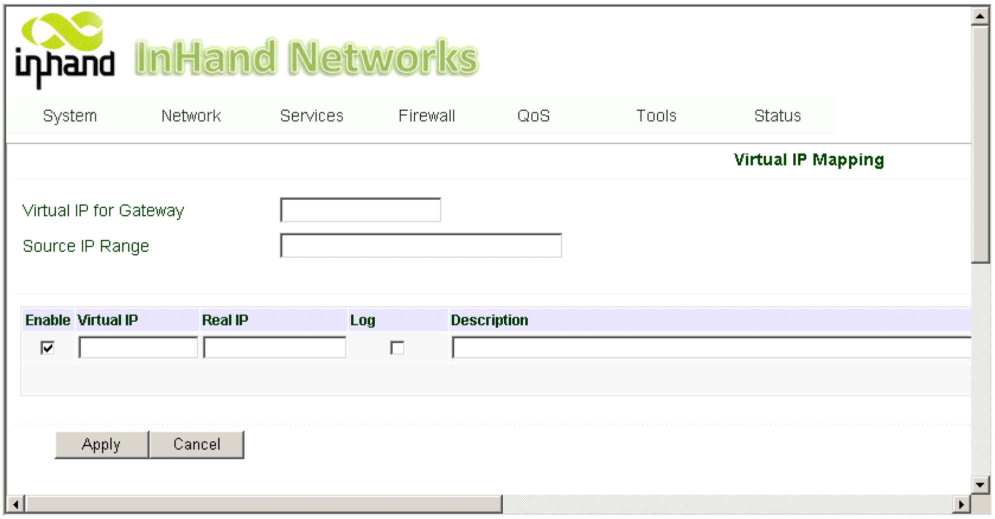
Parameters	Description	Default
Enable	Check to enable port mapping.	Enable
Protocol	Select either TCP or UDP.	TCP
Source	Set an external source IP.	0.0.0.0/0
Service Port	Set the external port of service.	8080
Internal Address	Set the internal IP for mapping.	Blank
Internal Port	Set the mapping port.	8080
Log	Click to enable a log about port mapping.	Disable
Description	Write a description to avoid future confusion.	Blank

3.5.4 Virtual IP Mapping

After a PC in LAN has been assigned a virtual IP, external hosts can access it via a virtual IP.

The functions usually work with VPN.

To enable virtual IP mapping, go into the navigation panel, select **Firewall** >> **Virtual IP Mapping,** then enter the "**Virtual IP Mapping**" page, as shown below.



Virtual IP Mapping

Virtual IP for Gateway	
Source IP Range	

Enable	Virtual IP	Real IP	Log	Description
☑			□	

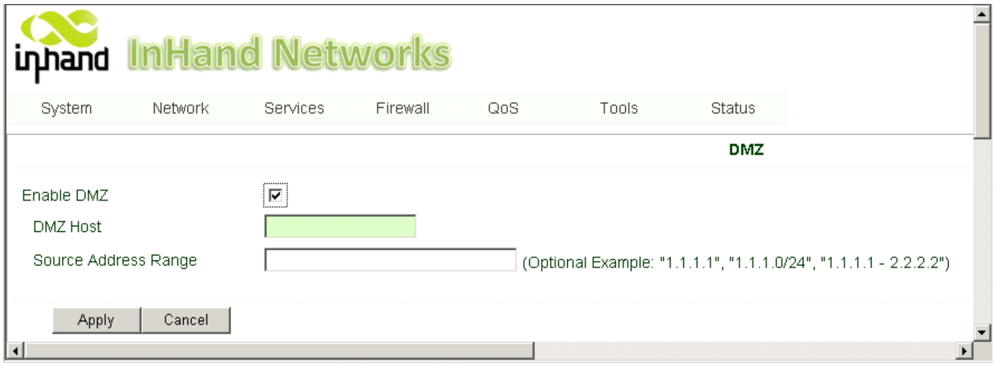
Page description is shown below:

Parameters	Description	Default
Virtual IP for Gateway	Set a virtual IP for the InGateway.	Blank
Source IP Range	Set range of the external source IP addresses.	Blank
Virtual IP	Set an external virtual IP.	Blank
Real IP	Set a real IP.	Blank
Log	Enable a log of virtual IP events.	Disable
Description	Describe this configuration.	Blank

3.5.5 DMZ (All Port Mapping)

DMZ is like a virtual server, the all port of router map to the DMZ host

From the navigation panel, select **Firewall >> DMZ,** then enter “**DMZ**” page, as shown below.



Enable DMZ ☑

DMZ Host

Source Address Range (Optional Example: "1.1.1.1", "1.1.1.0/24", "1.1.1.1 - 2.2.2.2")

The page description is shown below:

Parameters	Description	Default
Enable DMZ	Check to enable the DMZ.	Disabled
DMZ Host	Set the host IP of a DMZ.	Blank
Source Address Range	Set a range of restricted source IP addresses.	Blank

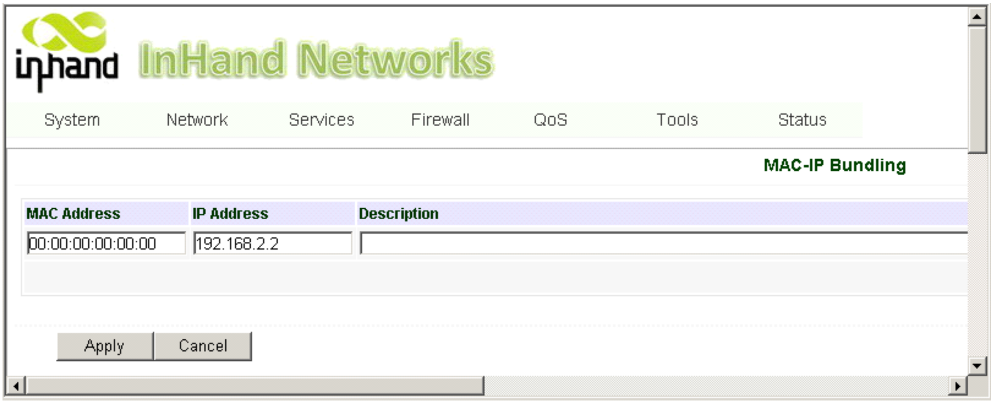
⚠ **Attention**

The IG601's management port should never be mapped to a DMZ.

3.5.6 MAC-IP Bundling

When a firewall denies all access to the external network, only a PC with MAC-IP bundling can access the internet.

From the navigation panel, select **Firewall >> MAC-IP Bundling,** then enter the "**MAC-IP Bundling**" page, as shown below.



MAC-IP Bundling

MAC Address	IP Address	Description
00:00:00:00:00:00	192.168.2.2	

The page description is shown below:

Parameters	Description	Default
MAC Address	Set the bundling PC's mac address.	00:00:00:00:00:00
IP Address	Set the bundling PC's IP address.	192.168.2.2
Description	Describe this configuration.	Blank

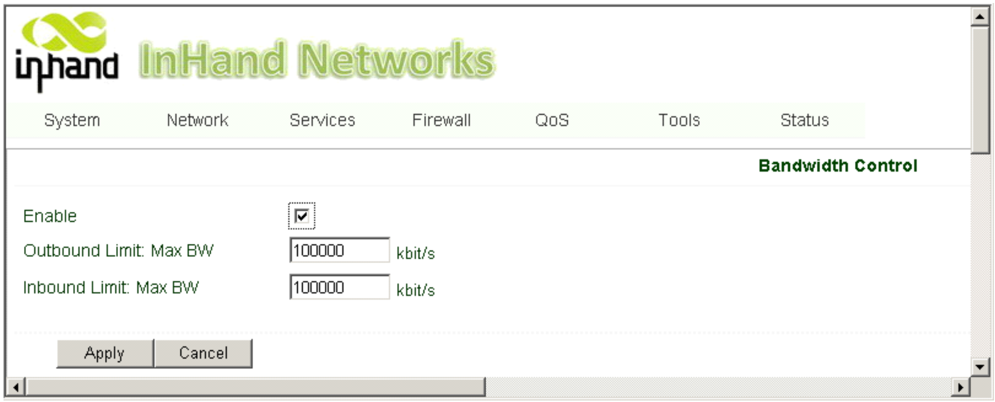
3.6 QoS

This chapter covers QoS, or Quality of Service. QoS is a set of services that ensures bandwidth availability for sensitive applications. These services includes bandwidth control and IP bandwidth limits.

3.6.1 Bandwidth Control

Bandwidth control set a limit on the upload and dowload speeds when accessing external networks.

To configure bandwidth control, go into the navigation panel, select **QoS >> Bandwidth Control,** then enter “**Bandwidth Control**” page, as shown below.



Bandwidth Control

Enable ☑

Outbound Limit: Max BW 100000 kbit/s

Inbound Limit: Max BW 100000 kbit/s

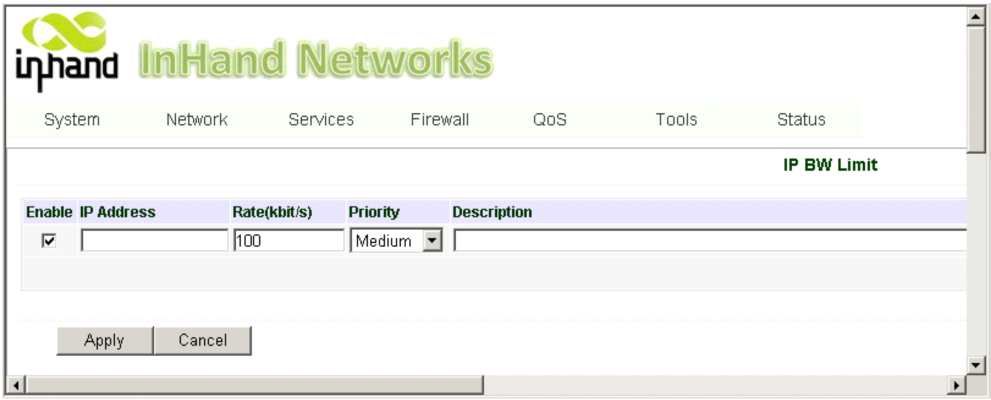
The page description is shown below:

Parameters	Description	Default
Enable	Check to enable.	Disable
Outbound Limit Max Bandwidth	Set the maximum upload rate.	100000kbit/s
Inbound Limit Max Bandwidth	Set the download bandwidth limit.	100000kbit/s

3.6.2 IP Bandwidth Limit

Technicians may limit the bandwidth on individual hosts and devices by setting IP based bandwidth limits.

To configure the IP bandwidth limit, go to the navigation panel, select **Firewall** >> **IP BW Limit,** and then enter the “**IP BW Limit**” page, as shown below.



IP BW Limit

Enable	IP Address	Rate(kbit/s)	Priority	Description
☑		100	Medium	

The page description is shown below:

Parameters	Description	Default
Enable	Check to enable an IP bandwidth limiter.	Enable
IP Address	Set the IP address to be limited.	N/A
Rate（kbit/s)	Set the bandwidth limit or rate.	100kbit/s
Priority	Set the priority.	Medium
Description	Describe the configuration.	N/A

3.7 Tools

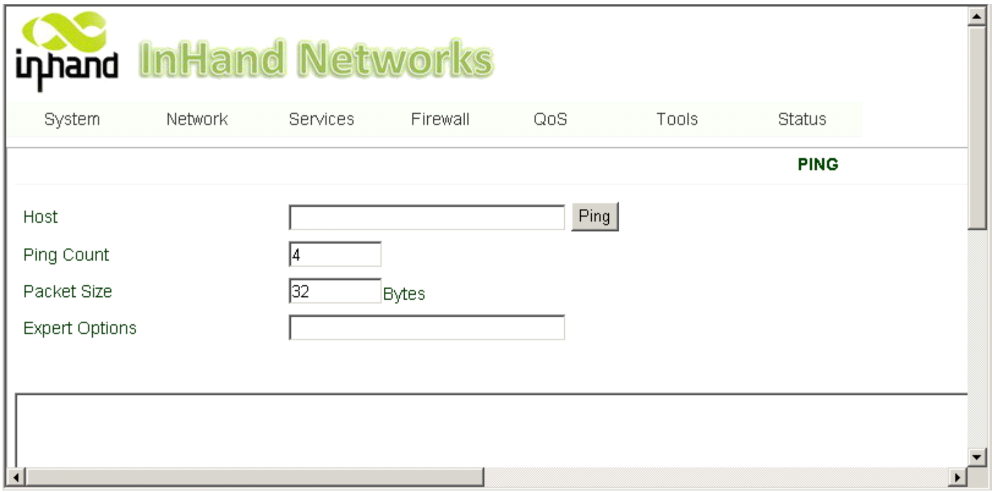
The IG601 comes with several tools to help admins diagnose network problems, including:

- Ping
- Trace route
- Link Speed Test

3.7.1 Ping

Ping a tool many technicians are familiar with. It simply sends ICMP packets across the network to a remote host, and then retransmits an ICMP packet back to the original sender.

To do a ping, enter the navigation panel, select **Tools>>Ping,** then enter the "**Ping**" page, as shown below.



PING

Host	
Ping Count	4
Packet Size	32 Bytes
Expert Options	

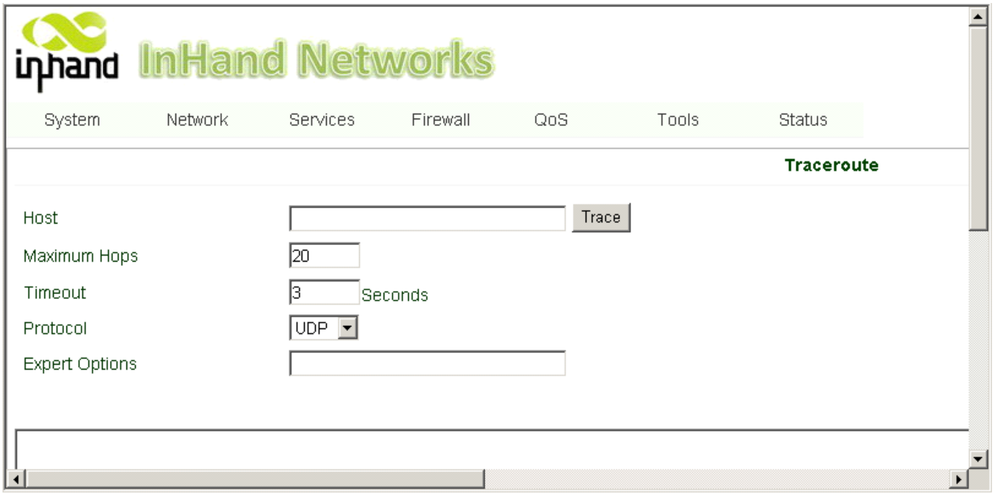
Page description is shown below:

Parameters	Description	Default
Host	Destination IP for the ping.	N/A
Ping Count	Number of pings sent.	4 times
Packet Size	The size of the ping packet sent. 32B is recommended.	32 Bytes
Expert Options	Advanced parameters	N/A

3.7.2 Trace Route

The trace route tool sends an ICMP or UDP packet to a remote host. Each time the packet is routed onto a different network, that router will return a response. Trace route allows network engineers to diagnose routing problems.

To preform a trace route, go to the navigation panel, select **Tools>>Traceroute,** then scroll down to the "**Traceroute**" page, as shown below.



Host:
Maximum Hops: 20
Timeout: 3 Seconds
Protocol: UDP
Expert Options:

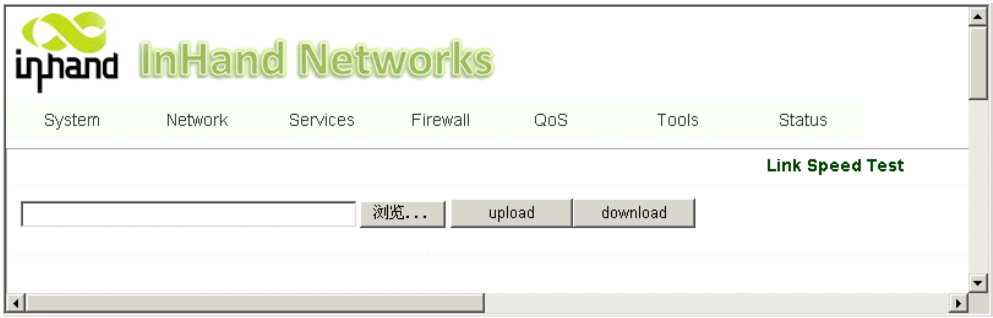
The page description is shown below:

Parameters	Description	Default
Host Max Hops	The destination for trace route. Set the maximum number of hops.	N/A 20
Time Out	Set the timeout for dropped packets.	3 sec
Protocol	Choose between ICMP and UDP protocol. ICMP may be blocked on some networks.	UDP
Expert Options	Advanced parameters	N/A

3.7.3 Link Speed Test

The IG601 uses a simple upload and download to test the link speed.

To start the speed test, enter the navigation panel, select **Tools>>Link Speed Test,** then enter "**Link Speed Test**" page, as shown below.



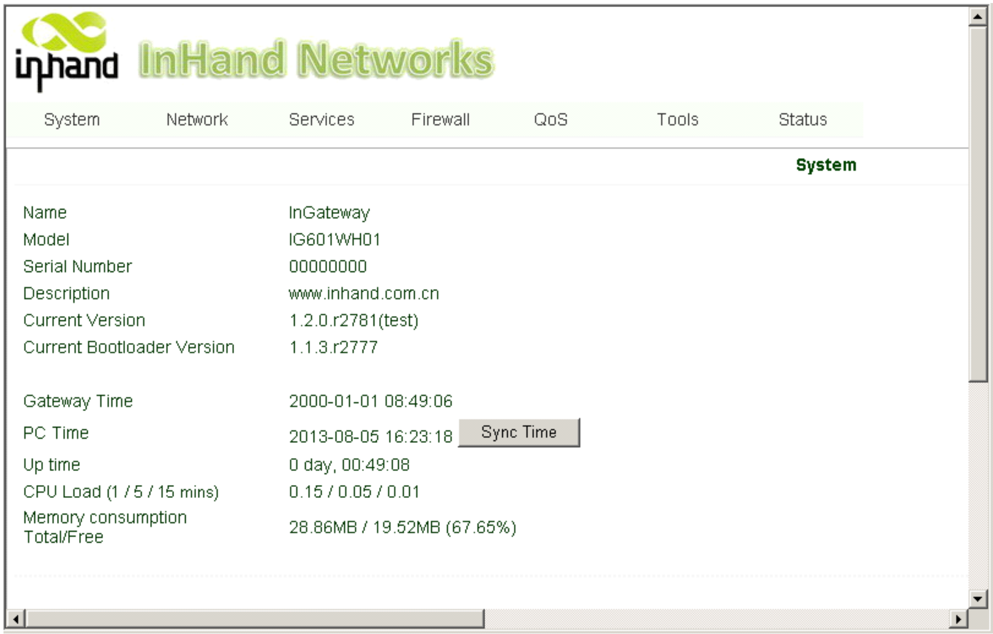
3.8 Status

The status chapter covers the following:

- System
- Modem
- Network Connections
- Routing Table
- Device List
- ModbusPLC
- Event Logs

3.8.1 System

From navigation panel, select **Status >> System,** then enter the “**System**” page, as shown below. This page displays system statistics, including Name, Model, Current Version, Gateway Time, PC Time, UP Time, CPU Load, Memory Consumption, etc. Technicians may click the <**Sync Time**> button to synchronize the gateway with the system time of the host, as covered in the set-up chapter.

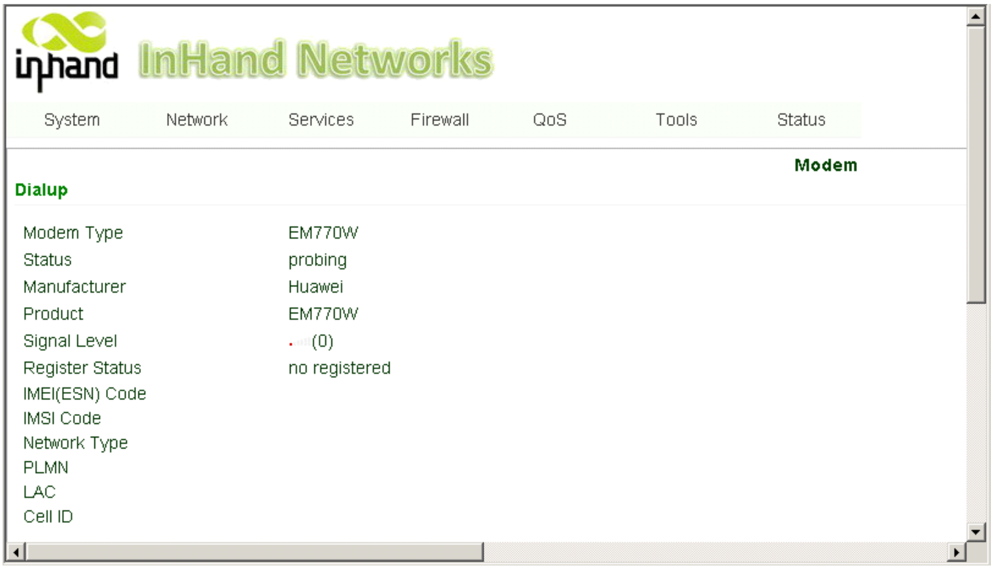


System

Name	InGateway
Model	IG601WH01
Serial Number	00000000
Description	www.inhand.com.cn
Current Version	1.2.0.r2781(test)
Current Bootloader Version	1.1.3.r2777
Gateway Time	2000-01-01 08:49:06
PC Time	2013-08-05 16:23:18
Up time	0 day, 00:49:08
CPU Load (1 / 5 / 15 mins)	0.15 / 0.05 / 0.01
Memory consumption Total/Free	28.86MB / 19.52MB (67.65%)

3.8.2 Modem

From navigation panel, select **Status** >> **Modem,** then enter “**Modem**” page, as shown below. This page shows Modem status, including Signal Level, Register status, etc.



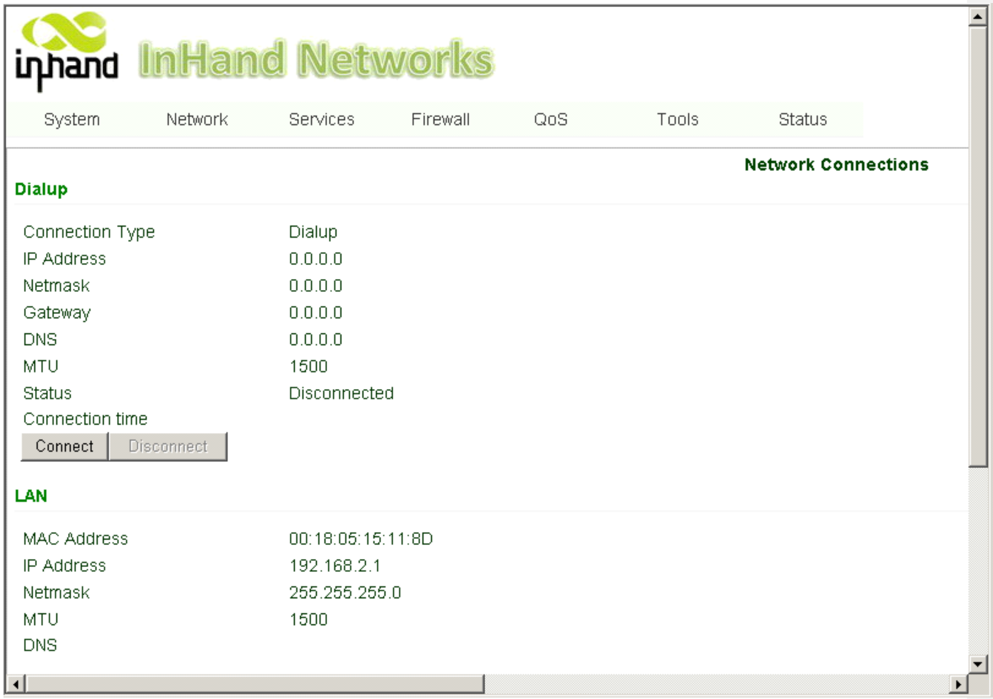
Modem

Dialup

Modem Type	EM770W
Status	probing
Manufacturer	Huawei
Product	EM770W
Signal Level	(0)
Register Status	no registered
IMEI(ESN) Code	
IMSI Code	
Network Type	
PLMN	
LAC	
Cell ID	

3.8.3 Network Connections

From navigation panel, select **Status >> Network Connections,** then enter "**Network Connections**" page, as shown below. This page shows the connection status of Dialup and LAN.



Network Connections

Dialup

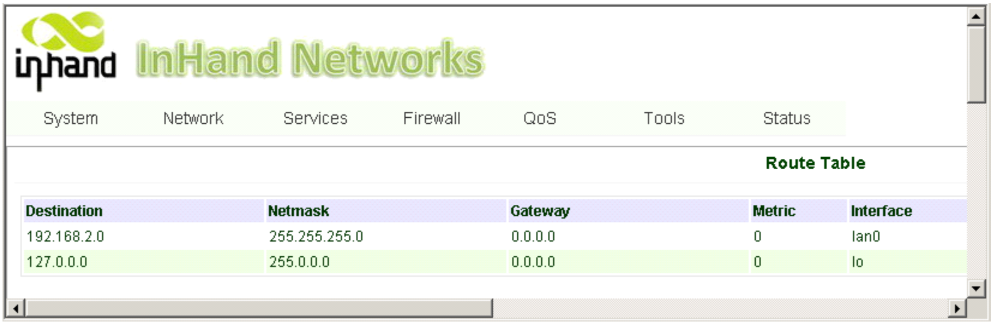
Connection Type	Dialup
IP Address	0.0.0.0
Netmask	0.0.0.0
Gateway	0.0.0.0
DNS	0.0.0.0
MTU	1500
Status	Disconnected
Connection time	

LAN

MAC Address	00:18:05:15:11:8D
IP Address	192.168.2.1
Netmask	255.255.255.0
MTU	1500
DNS	

3.8.4 Route Table

From navigation panel, select **Status** >> **Route Table,** then enter “**Route Table**” page, as shown below. This page shows the route table of IG601.

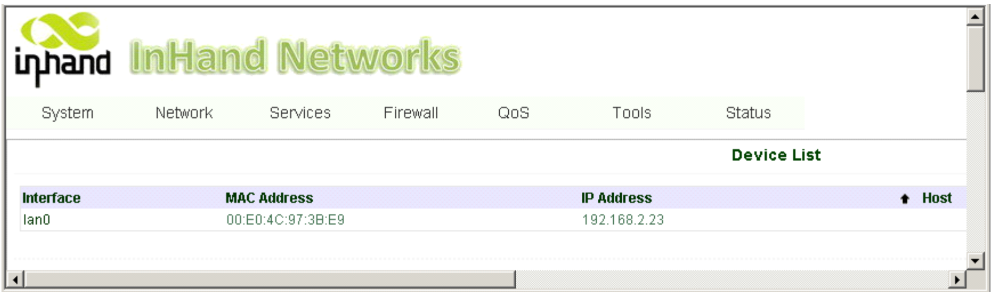


Route Table

Destination	Netmask	Gateway	Metric	Interface
192.168.2.0	255.255.255.0	0.0.0.0	0	lan0
127.0.0.0	255.0.0.0	0.0.0.0	0	lo

3.8.5 Device List

From navigation panel, select **Status** >> **Device List,** then enter “**Device List**” page, as shown below. This page shows the device link of IG601.

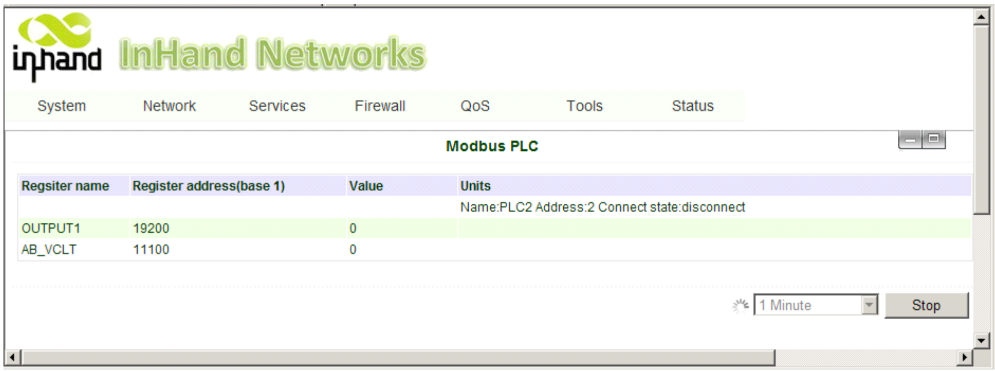


Device List

Interface	MAC Address	IP Address	Host
lan0	00:E0:4C:97:3B:E9	192.168.2.23	

3.8.6 Modbus PLC

From navigation panel, select **Status** >> **Modbus PLC,** then enter “**Modbus PLC**” page, as shown below. This page shows the parameters of Modbus PLC linked with IG601.

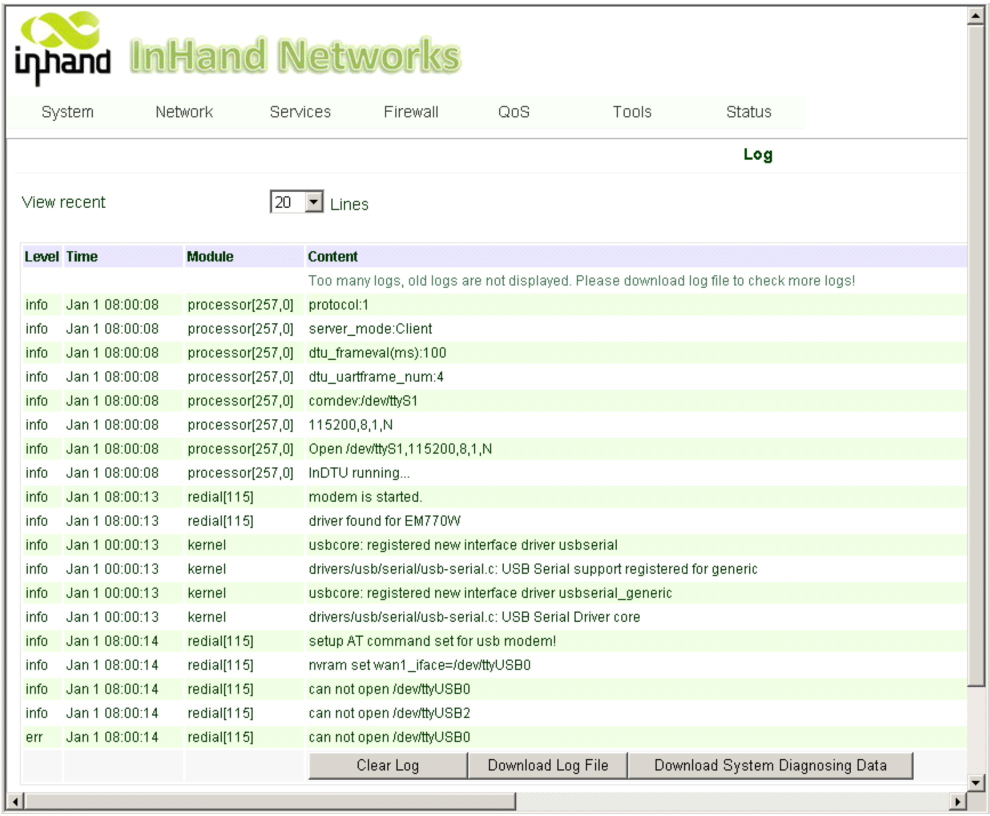


Modbus PLC

Regsiter name	Register address(base 1)	Value	Units
			Name:PLC2 Address:2 Connect state:disconnect
OUTPUT1	19200	0	
AB_VCLT	11100	0	

3.8.7 Log

From navigation panel, select **Status** >> **Log,** then enter “**Log**” page, as shown below. This page show system log, including Download Log File.



Log

View recent 20 Lines

Level	Time	Module	Content
			Too many logs, old logs are not displayed. Please download log file to check more logs!
info	Jan 1 08:00:08	processor[257,0]	protocol:1
info	Jan 1 08:00:08	processor[257,0]	server_mode:Client
info	Jan 1 08:00:08	processor[257,0]	dtu_frameval(ms):100
info	Jan 1 08:00:08	processor[257,0]	dtu_uartframe_num:4
info	Jan 1 08:00:08	processor[257,0]	comdev:/dev/ttyS1
info	Jan 1 08:00:08	processor[257,0]	115200,8,1,N
info	Jan 1 08:00:08	processor[257,0]	Open /dev/ttyS1,115200,8,1,N
info	Jan 1 08:00:08	processor[257,0]	InDTU running...
info	Jan 1 08:00:13	redial[115]	modem is started.
info	Jan 1 08:00:13	redial[115]	driver found for EM770W
info	Jan 1 00:00:13	kernel	usbcore: registered new interface driver usbserial
info	Jan 1 00:00:13	kernel	drivers/usb/serial/usb-serial.c: USB Serial support registered for generic
info	Jan 1 00:00:13	kernel	usbcore: registered new interface driver usbserial_generic
info	Jan 1 00:00:13	kernel	drivers/usb/serial/usb-serial.c: USB Serial Driver core
info	Jan 1 08:00:14	redial[115]	setup AT command set for usb modem!
info	Jan 1 08:00:14	redial[115]	nvram set wan1_iface=/dev/ttyUSB0
info	Jan 1 08:00:14	redial[115]	can not open /dev/ttyUSB0
info	Jan 1 08:00:14	redial[115]	can not open /dev/ttyUSB2
err	Jan 1 08:00:14	redial[115]	can not open /dev/ttyUSB0

3.9 VPN

VPN is a new technology that rapidly developed in recent years with the extensive application of Internet. It is for building a private dedicated network on a public network. 'Virtuality" mainly refers to that the network is a logical network.

Two Basic Features of VPN:

- Private: the resources of VPN are unavailable to unauthorized VPN users on the internet; VPN can ensure and protect its internal information from external intrusion.
- Virtual: the communication among VPN users is realized via public network which, meanwhile can be used by unauthorized VPN users so that what VPN users obtained is only a logistic private network. This public network is regarded as VPN Backbone.

Fundamental Principle of VPN

The fundamental principle of VPN indicates to enclose VPN message into tunnel with tunneling technology and to establish a private data transmission channel utilizing VPN Backbone so as to realize the transparent message transmission.

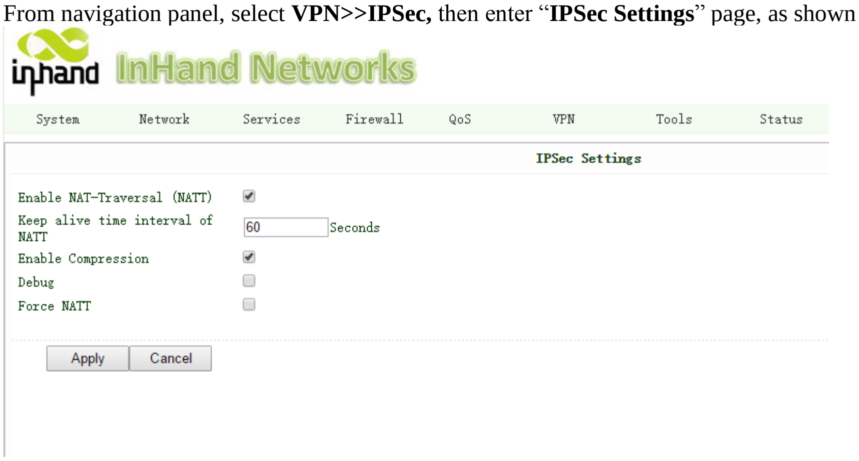
Tunneling technology encloses the other protocol message with one protocol. Also, encapsulation protocol itself can be enclosed or carried by other encapsulation protocols. To the users, tunnel is logical extension of PSTN/link of ISDN, which is similar to the operation of actual physical link.

3.9.1 IPSec

To build IPSec VPN tunnels, users need to set up IPSec and then add VPN tunnels.

3.9.1.1 IPSec Settings

From navigation panel, select **VPN>>IPSec,** then enter "**IPSec Settings**" page, as shown below.



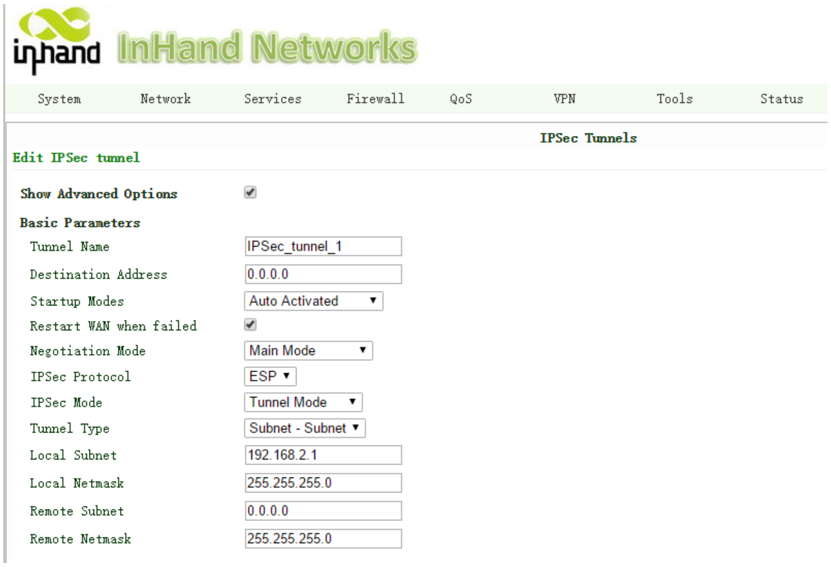
Enable NAT-Traversal (NATT) ☑
Keep alive time interval of NATT 60 Seconds
Enable Compression ☑
Debug □
Force NATT □

Page description is shown below:

Parameters	Description	Default
Enable NAT-Traversal (NATT)	Normally enable NATT; unless there is no NAT routing	Enable
Keep alive time interval of NATT	Set alive time interval	60 seconds
Enable Compression	Click to enable	Enable
Debug	Click to enable	Disable
Force NATT	Click to enable	Disable

3.9.1.2 IPSec Tunnels

From navigation panel, select **VPN>>IPSec Tunnels,** click <add>, as shown below.



Edit IPSec tunnel

Show Advanced Options ☑

Basic Parameters

Tunnel Name	IPSec_tunnel_1
Destination Address	0.0.0.0
Startup Modes	Auto Activated ▾
Restart WAN when failed	☑
Negotiation Mode	Main Mode ▾
IPSec Protocol	ESP ▾
IPSec Mode	Tunnel Mode ▾
Tunnel Type	Subnet - Subnet ▾
Local Subnet	192.168.2.1
Local Netmask	255.255.255.0
Remote Subnet	0.0.0.0
Remote Netmask	255.255.255.0

Page description is shown below:

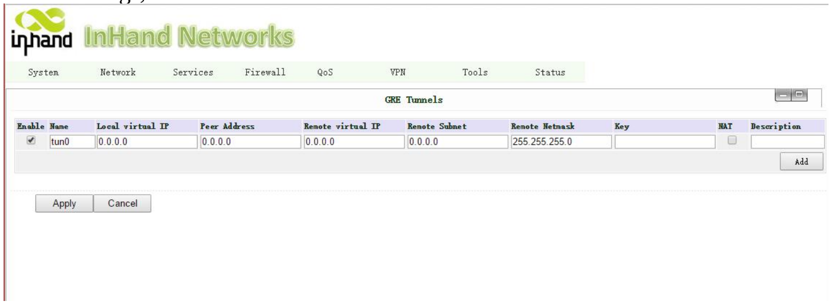
Parameters	Description	Default
Show Advanced Options	Advanced Options	Disable
	Basic Parameters	
Tunnel Name	Name the tunnel	IPSec_tunnel_1
Destination Address	Set the destination address of IPSec VPN server	0.0.0.0
Startup Modes	Auto Activated/Triggered by Data/Passive/Manually Activated	Auto Activated
Restart WAN when failed	Click to enable	Enable
Negotiation Mode	**Main mode**: as an exchange method of IKE, main mode shall be established in the situation where stricter identity protection is required. **Aggressive mode**: as an exchange method of IKE, aggressive mode exchanging fewer message, can accelerate negotiation in the situation where there is no strict requirement on identity protection.	Main Mode
IPSec Protocol (Enable	**AH:** protect integrity and	ESP

Advanced Options)	authenticity of data packet from hacker intercepting data packet or inserting false data packet on the internet. **ESP:** encrypt the user data needing protection, and then enclose into IP packet for the purpose of confidentiality of data.	
IPSec Mode (Enable Advanced Options)	**Tunnel Mode:** besides source host and destination host, special gateway will be operated with password to ensure the safety from gateway to gateway. **Transmission Mode**: source host and destination host must directly execute all passwords operations for the purpose of higher work efficiency, but comparing with tunnel mode the security will be inferior.	Tunnel Mode
Tunnel Type	Host-Host, Host-Subnet, Subnet-Host, Subnet-Subnet	Subnet-Subnet
Local Subnet	Set local subnet	192.168.2.1
Local Netmask	Set local netmask	255.255.255.0
Remote Subnet	Set remote subnet	0.0.0.0
Remote Netmask	Set remote netmask	255.255.255.0
Phase 1 Parameters		
IKE Policy	Select IKE policy	3DES-MD5-DH2
IKE Lifetime	Set IKE lifetime	86400 seconds
Local ID Type	FQDN/ User FQDN/IP	IP address
Remote ID Type	FQDN/User FQDN/ IP	IP address
Authentication Type	Shared Key or Certificate	Shared Key
Key (only for Shared Key)	Set IPSec VPN key	N/A
Phase 2Parameters		
IPSec Policy	Select IKE policy	3DES-MD5-96
IPSec Lifetime	Set IKE lifetime	3600 seconds
Perfect Forward Secrecy (PFS)	The exposure of one key will not affect the data security protected by other keys.	Disable
Link Detection Parameters		
DPD Interval	Used for detection interval of IPSec neighbor state. After initiating DPD, If receiving	60 seconds

	end can not receive IPSec cryptographic message sent by peer end within interval of triggering DPD, receiving end can make DPD check, send request message to opposite end automatically, detect whether IKE peer pair exists.	
DPD Timeout	Receiving end will make DPD check and send request message automatically to opposite end for check. If it does not receive IPSec cryptographic message from peer end beyond timeout, ISAKMP Profile will be deleted.	180 seconds
ICMP Detection Server	Set ICMP detection derver	N/A
ICMP Detection Local IP	Set ICMP detection local IP	N/A
ICMP Detection Interval	Set ICMP detection interval	60 seconds
ICMP Detection Timeout	Set ICMP detection timeout	5 seconds
ICMP Detection Max Retries	Set the max number of retries if ICMP failed	10

3.9.2 GRE Tunnels

From navigation panel, select **VPN>>GRE** then enter “**GRE Tunnels**” page, as shown below. After basic settings, click <Add>.



GRE Tunnels

Enable	Name	Local virtual IP	Peer Address	Remote virtual IP	Remote Subnet	Remote Netmask	Key	NAT	Description
☑	tun0	0.0.0.0	0.0.0.0	0.0.0.0	0.0.0.0	255.255.255.0		□	

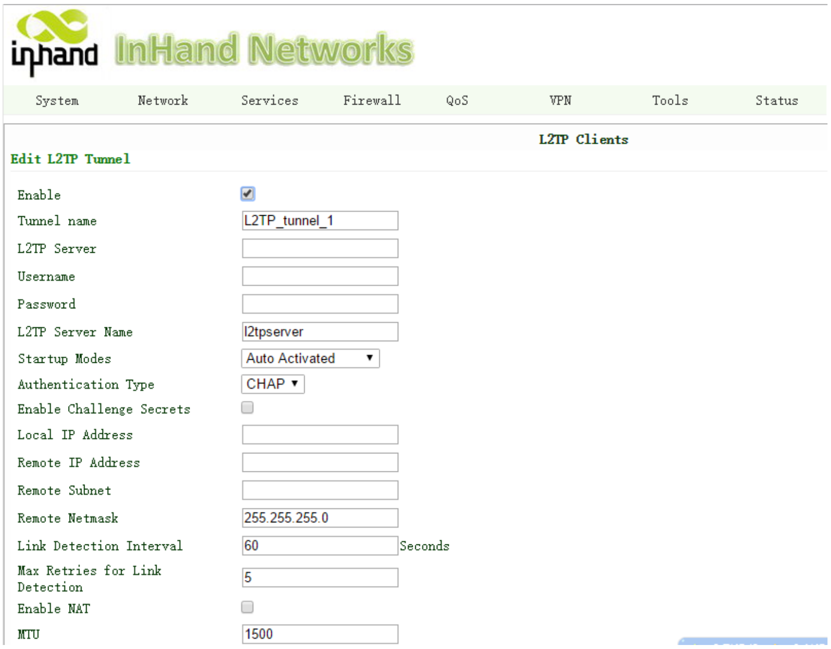
Page description is shown below:

Parameters	Description	Default
Enable	Click to enable	Enable
Name	Set GRE tunnel name	tun0
Local virtual IP	Set local virtual IP	0.0.0.0
Peer address	Set peer address	0.0.0.0
Remote virtual IP	Set remote virtual IP	0.0.0.0
Remote Subnet	Set remote subnet	0.0.0.0

Remote Netmask	Set remote netmask	255.255.255.0
Key	Set tunnel key	N/A
NAT	Click to enable NAT	Disable
Description	Add description	N/A

3.9.3 L2TP Client

From navigation panel, select **VPN>>L2TP,** then enter "**L2TP Clients**" page, click <Add> and enter "Edit L2TP Tunnel" page, as shown below.



Edit L2TP Tunnel

Enable	☑
Tunnel name	L2TP_tunnel_1
L2TP Server	
Username	
Password	
L2TP Server Name	l2tpserver
Startup Modes	Auto Activated ▼
Authentication Type	CHAP ▼
Enable Challenge Secrets	□
Local IP Address	
Remote IP Address	
Remote Subnet	
Remote Netmask	255.255.255.0
Link Detection Interval	60 Seconds
Max Retries for Link Detection	5
Enable NAT	□
MTU	1500

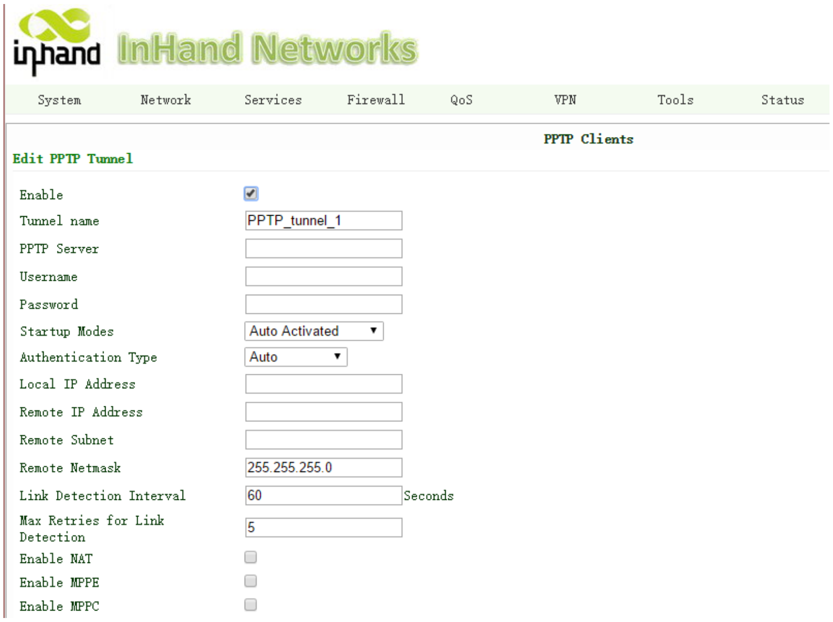
Page description is shown below:

Parameters	Description	Default
Tunnel name	Set tunnel name	L2TP_TUNNEL_1
L2TP Server	Set server address	N/A
Username	Set username	N/A
Password	Set password	N/A
L2TP Server Name	Set server name	l2tpserver
Startup Mode	Auto Activated/Triggered by Data/Manually Activated	Auto Activated

Authentication Type	CHAP or PAP	CHAP
Enable Challenge secrets	Click to enable	Disable
Local IP Address	Set local IP address	N/A
Remote IP Address	Set remote IP address	N/A
Remote Subnet	Set remote subnet	N/A
Remote Netmask	Set remote netmask	255.255.255.0
Link Detection Interval	Set link detection interval	60
Max Retries for Link Detection	Set the max number of retries	5
Enable NAT	Click to enable	Disable
MTU	Set maximal transmission unit, unit in byte	1500
MRU	Set maximal receiving unit, unit in byte	1500
Enable Debug	Click to enable	Disable
Expert Options	Set expert options	N/A

3.9.4 PPTP Client

From navigation panel, select **VPN>>PPTP,** then enter "**PPTP Clients**" page, click <Add> and enter "Edit PPTP Tunnel" page, as shown below.



Edit PPTP Tunnel

Enable	☑
Tunnel name	PPTP_tunnel_1
PPTP Server	
Username	
Password	
Startup Modes	Auto Activated ▾
Authentication Type	Auto ▾
Local IP Address	
Remote IP Address	
Remote Subnet	
Remote Netmask	255.255.255.0
Link Detection Interval	60 Seconds
Max Retries for Link Detection	5
Enable NAT	□
Enable MPPE	□
Enable MPPC	□

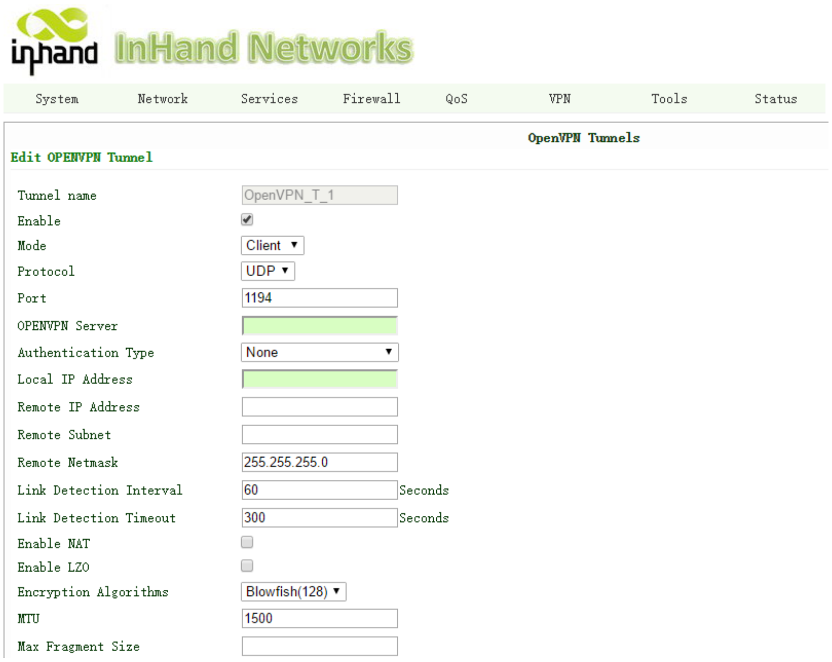
Page description is shown below:

Parameters	Description	Default
Tunnel name	Set tunnel name	PPTP_tunnel_1
PPTP Server	Set PPTP server address	N/A
Username	Set username	N/A
Password	Set password	N/A
Startup Mode	Auto Activated/Triggered by Data/Manually Activated	Auto Activated
Authentication Type	Auto/CHAP/PAP/ MS-CHAPv1/ MS-CHAPv2	Auto
Local IP Address	Set local IP address	N/A
Remote IP Address	Set remote IP address	N/A
Remote Subnet	Set remote subnet	N/A
Remote Netmask	Set remote netmask	255.255.255.0
Link Detection Interval	Set link detection interval	60 seconds
Max Retries for Link Detection	Set the max number of retries	5
Enable NAT	Click to enable	N/A
Enable MPPE	Click to enable	N/A
Enable MPPC	Click to enable	N/A
MTU	Set maximal transmission unit, unit in byte	1500
MRU	Set maximal receiving unit, unit in byte	1500
Enable Debug	Click to enable	N/A
Expert Options	For InHand R&D team	N/A

3.9.5 OpenVPN

3.9.5.1 OpenVPN

From navigation panel, select **VPN>>OpenVPN,** then enter “**OpenVPN Tunnels**” page, click <Add> and enter “Edit OpenVPN Tunnel” page, as shown below.



Edit OPENVPN Tunnel

Tunnel name	OpenVPN_T_1
Enable	☑
Mode	Client ▾
Protocol	UDP ▾
Port	1194
OPENVPN Server	
Authentication Type	None ▾
Local IP Address	
Remote IP Address	
Remote Subnet	
Remote Netmask	255.255.255.0
Link Detection Interval	60 Seconds
Link Detection Timeout	300 Seconds
Enable NAT	□
Enable LZO	□
Encryption Algorithms	Blowfish(128) ▾
MTU	1500
Max Fragment Size	

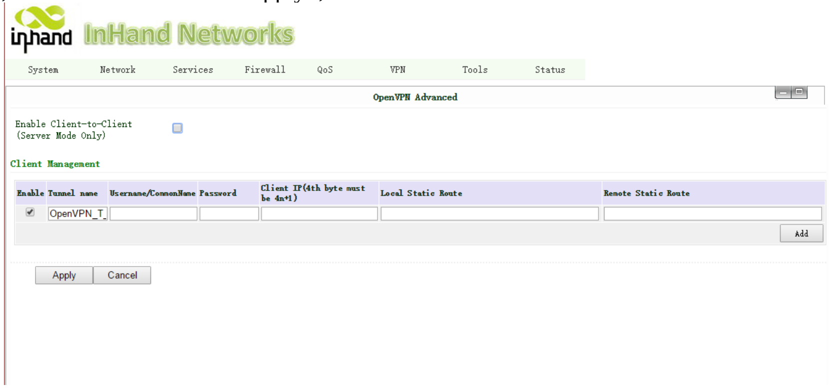
Page description is shown below:

Parameters	Description	Default
Tunnel name	Set tunnel name	OpenVPN_T_1
Enable	Click to enable	Enable
Mode	Client or Server	Client
Protocol	Same with the protocol of remote server	UDP
Port	Input port	1194
OPENVPN Server	Input remote server IP address	N/A
Authentication Type	Select type	None
Local IP Address	Set local IP address	N/A
Remote IP Address	Set remote IP address	N/A
Remote Subnet	Set remote subnet	N/A
Remote Netmask	Set remote netmask	255.255.255.0
Link Detection Interval	Set link detection interval	60 seconds
ICMP Detection Timeout	Set ICMP detection timeout	300 seconds
Enable NAT	Click to enable	Disable
Enable LZO	Click to enable	Disable
Encryption Algorithms	Same with the server	Blowfish(128)
MTU	Set maximal transmission unit, unit in byte	1500
Max Fragment Size	Set max fragment size	N/A
Debug Level	Set debug level	Warn

Interface Type	TUN-data packet, TAP-data frame	TUN
Expert Options	For InHand R&D team	N/A

3.9.5.2 OpenVPN Advanced

From navigation panel, select **VPN>>OpenVPN Advanced,** then enter "**OpenVPN Advanced**" page, click <Add> and click <Apply>, as shown below.



Enable Client-to-Client (Server Mode Only) □

Client Management

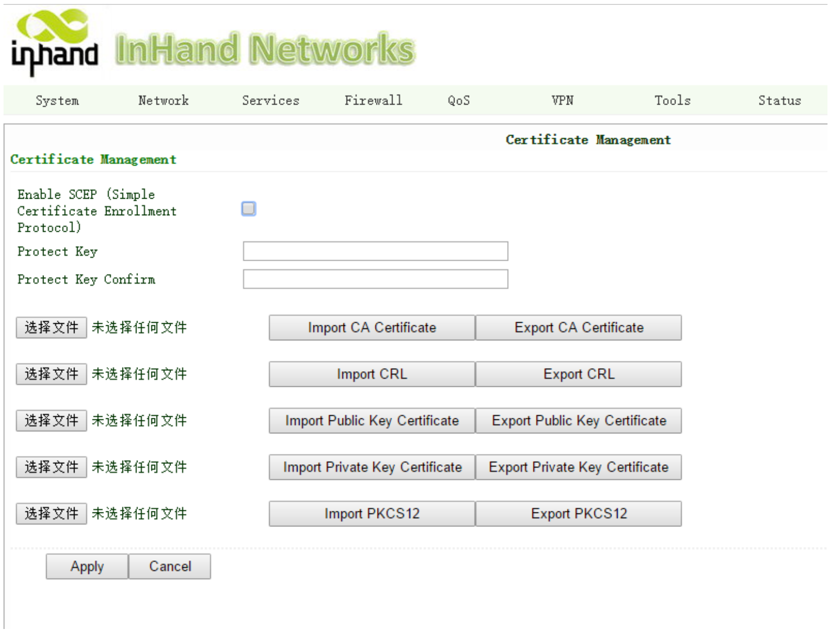
Enable	Tunnel name	Username/CommonName	Password	Client IP(4th byte must be 4n+1)	Local Static Route	Remote Static Route
☑	OpenVPN_T_					

Page description is shown below:

Parameters	Description	Default
Enable Client-Client (Server Mode Only)	Available only user server mode	Disable
Tunnel Name	Set tunnel name	OpenVPN_T_1
Username/CommonName	User define	N/A
Password	User define	N/A
Client IP (4th byte must be 4n+1)	Set client IP	N/A
Local Static Route	Set static route from server to client	N/A
Remote Static Route	Set static route from client to server	N/A

3.9.6 Certificate Management

From navigation panel, select **VPN>> Certificate Management,** then enter "**Certificate Management**" page, as shown below.



Certificate Management

Certificate Management

Enable SCEP (Simple Certificate Enrollment Protocol) □

Protect Key

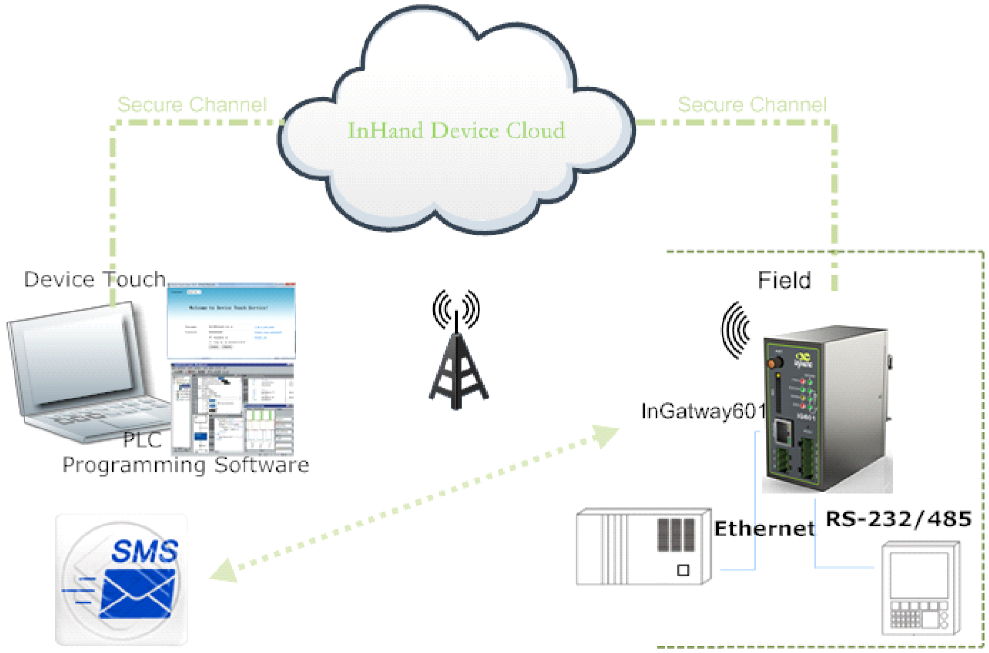
Protect Key Confirm

Page description is shown below:

Parameters	Description	Default
Protect Key	Set protect key	N/A
Protect Key Confirm	Confirm protect key	N/A
Enable SCEP (Simple Certificate Enrollment Protocol)	Click to enable	Disable
SCEP Parameters		
Force to re-enroll	Click to enable	Disable
Server URL	Set sever URL	N/A
Common Name	Set common name	N/A
FQDN	Set FQDN	N/A
Unit 1	Set unit 1	N/A
Unit 2	Set unit 2	N/A
Domain	Set domain	N/A
Serial Number	Set serial number	N/A
Challenge	Set challenge	N/A
Challenge Confirm	Challenge confirm	N/A
Unstructured address	Set unstructured address	N/A
RSA Key Length	Set RSA key length	1024
Poll Interval	Poll interval	60 seconds
Poll Timeout	Poll timeout	3600 seconds

4. Applications

With the development of industry and the popularity of automated equipment, equipment manufacturers are now facing increasingly large amount of maintenance work and other problems like: How to prevent unexpected downtime of automation equipment? How to monitor the operating status of the device? How to reduce engineer's travel for maintenance? InHand Networks, combining market and user’s needs, provides complete remote maintenance solutions for automation equipment. As a gateway, IG601 build a secure channel between remote equipment, device cloud platform and maintenance engineers. Please see the network diagram below:



Appendix I FAQ

1, InGateway is powered on, but can`t access Internet through it?

Please check：

□ Whether the InGateway is inserted with a SIM card.

□ Whether the SIM card is enabled with data service, whether the service of the SIM card is suspended because of an overdue charge.

□ Whether the dialup parameters, e.g. APN, dialup number, username and password are correctly configured.

□ Whether the IP Address of your computer is the same subnet with InGateway and the gateway address is InGateway LAN address.

2, InGateway is powered on, have a ping to detect InGateway from your PC and find packet loss?

Please check if the network crossover cable is in good condition.

3, Forget the setting after revising IP address and can`t configure InGateway?

Method 1: connect InGateway with serial cable, configure it through console port.

Method 2: Locate the RESET button on the device; Turn on the device's power; within 10 seconds, press and hold RESET button; When ERR LED is on, release the RESET button; Within a few seconds, ERR LED should go off; then press and hold the RESET button again; When the ERR LED blinks, release the RESET button; If the ERR LED goes off, that means InGateway601 is now restoring to factory default settings; You can log in using the 192.168.2.1.

4, After InGateway is powered on, it frequently auto restarts. Why does this happen?

Please check:

□ Whether the module works normally.

□ Whether the InGateway is inserted with a SIM card.

□ Whether the SIM card is enabled with data service, whether the service of the SIM card is suspended because of an overdue charge.

□ Whether the dialup parameters, e.g. APN, dialup number, username and password are correctly configured.

□ Whether the signal is normal.

□ Whether the power supply voltage is normal.

5, Why does upgrading the firmware of my InGateway always fail?

Please check:

□ When upgrading locally, check if the local PC and InGateway are in the same network segment.

□ When upgrading remotely, please first make sure the InGateway can access Internet.

6, After InGateway establishes VPN with the VPN server, your PC under InGateway can connect to the server, but the center can`t connect to your PC under InGateway?

Please make sure the firewall of your computer is disabled.

7, After InGateway establishes VPN with the VPN server, Your PC can`t connect to the server?

Please make sure “Shared Connection” on “Network=>WAN” or “Network=>Dialup” is enabled in the configuration of InGateway.

8, InGateway is powered on, but the Power LED is not on?

□ Check if the protective tube is burn out.

□ Check the power supply voltage range and if the positive and negative electrodes are correctly connected.

9, InGateway is powered on, but the Network LED is not on when connected to PC?

□ When the PC and InGateway are connected with a network cable, please check whether a network crossover cable is used.

□ Check if the network cable is in good condition.

□ Please set the network card of the PC to 10/100M and full duplex.

10, InGateway is powered on, when connected with PC, the Network LED is normal but can`t have a ping detection to the InGateway?

□ Check if the IP Address of the PC and InGateway are in the same subnet and the gateway address is InGateway LAN address.

11, InGateway is powered on, but can`t configure through the web interface?

□ Whether the IP Address of your computer is the same subnet with InGateway and the gateway address is InGateway LAN address.

□ Check the firewall settings of the PC used to configure InGateway, whether this function is shielded by the firewall.

12, The InGateway dialup always fails, I can`t find out why?

Please restore InGateway to factory default settings and configure the parameters again.

13, How to restore InGateway to factory default settings?

1. Locate the RESET button on the device;
2. Turn on the device’s power; within 10 seconds, press and hold RESET button;

3. When ERR LED is on, release the RESET button;

4. Within a few seconds, ERR LED should go off; then press and hold the RESET button again;

5. When the ERR LED blinks, release the RESET button; If the ERR LED goes off, that means InGateway601 is now restoring to factory default settings;

6. You can log in using the 192.168.2.1.

Appendix II Command Lines

1 Help Command

Help command can be obtained after entering help or "?" into console, "?" can be entered at any time during the process of command input to obtain the current command or help from command parameters, and command or parameters can be automatically complemented in case of only command or command parameter.

1.1 Help command

[Command] help [<cmd>]
[Function] get help from command
[View] all views
[Parameter]<cmd> command name
[Example]

enter: help

Get the list of all current available command.

enter: help show

Display all the parameters of show command and using instructions thereof.

2 View Switchover Command

2.1 enable
[Command] enable [15 [<*password*>]]
[Function] Switchover to privileged user level.
[View] Ordinary user view.
[Parameter]15 User right limit level, only supports right limit 15 (super users) at current.

<*password*> Password corresponded to privileged user limit level, hint of password inputting will be given in case of no entering.

[Example] Enterenable adm in ordinary user view

Switchover to super users and the password 123456

2.2 disable
[Command] disable
[Function] Exit the privileged user level.
[View] Super user view, configure view
[Parameter] No
[Example] Enter disable in super user view

Return to ordinary user view.

2.3 end and !
[Command]end or !
[Function] Exit the current view and return to the last view.
[View] Configure view.
[Parameter] No

[Example] Enter end in configured view

Return to super user view.

2.4 exit

[Command]exit

[Function] Exit the current view and return to the last view (exit console in case that it is ordinary user)

[View] all views

[Parameter] No

[Example]

enter exit in configured view

Return to super user view.

enter exit in ordinary user view

Exit console.

3 Check system state command

3.1 show version

[Command] show version

[Function] Display the type and version of software of the gateway

[View] all views

[Parameter] No

[Example] enter: show version

Display the following information:

Type : display the current factory type of IG601
Serial number : display the current factory serial number of IG601
Description : www.inhandnetworks.com
Current version : display the current version of IG601
Current version of Bootloader: display the current version of IG601

3.2 show system

[Command] show system

[Function] display the system information of IG601

[View] all views

[Parameter] No

[Example] enter: show system

Display the following information

Example: 00:00:38 up 0 min, load average: 0.00, 0.00, 0.00

3.3 show clock

[Command] show clock

[Function] display the system time of IG601

[View] all views

[Parameter] No

[Example] enter: show clock

Display the following information:

For example Sat Jan 1 00:01:28 UTC 2000

3.4 show modem

[Command] show modem

[Function] Display the MODEM state of IG601

[View] all views

[Parameter] No

[Example] Enter: show modem

Display the following information:

Modem type
state
manufacturer
product name
signal level
register state
IMSI number
Internet state

3.5 show log

[Command] show log [lines <n>]

[Function] display the system log of IG601 and display the latest 100 logs in default.

[View] all views

[Parameter]lines <*n*> limits the log numbers displayed, wherein, n indicates the latest n logs in case that it is positive integer and indicates the earliest n logs in case that it is negative integer and indicates all the logs in case that it is 0.

[Example] enter: show log

Display the latest 100 log records.

3.6 show users

[Command] show users

[Function] display the user list of IG601.

[View] all views

[Parameter] No

[Example] input: show users

Displayed user list of system is as follows:

```
    User:
--------------------------------------------------
* adm
------
```

Wherein, user marked with * is super user.

3.7 show startup-config

[Command]show startup-config

[Function] Display the startup-config of IG601

[View] super user view and configuration view

[Parameter] No

[Example] enter: show startup-config

Display the starting configuration of system.

3.8 show running-config

[Command] show running-config

[Function] display the operational configuration of IG601

[View] super user view, configuration view

[Parameter] No

[Example] Enter: show running-config

Display the operational configuration of system.

4 Check the Command of Internet State

4.1 show interface

[Command] show interface

[Function] Display the information of port state of IG601

[View] all views
[Parameter] No
[Example]enter: show interface
Display the state of all ports.

4.2show ip
[Command] Show ip
[Function] Display the IP status of IG601
[View] all views
[Parameter] No
[Example] enter: Show ip
Display system ip status

4.3 show route
[Command] Show route
[Function] Display the routing list of IG601
[View] all views
[Parameter] No
[Example] enter: Show route
Display system routing list

4.4 show arp
[Command] show arp
[Function] Display the ARP list of IG601
[View] all views
[Parameter] No
[Example] enter: show arp
Display the ARP list of system

5 Internet Testing Command

IG601 has provided ping, telnet and traceroute for internet testing.

5.1 ping
[Command]ping <*hostname*> [count <*n*>] [size <*n*>] [source <*ip*>]
[Function] apply ICMP testing for appointed mainframe.
[View] all views
[Parameter]<*hostname*> tests the address or domain name of mainframe.
count <*n*> testing times
size <*n*> tests the size of data package (byte)
source <*ip*> IP address of appointed testing
[Example] enter: ping www.g.cn
Test www.g.cn and display the testing results

5.2 telnet
[Command] telnet <*hostname*> [<*port*>] [source <*ip*>]
[Function] telnet logs in the appointed mainframe
[View] all views
[Parameter]<*hostname*> in need of the address or domain name of mainframe logged in.
<*port*>telnet port
source <*ip*> appoints the IP address of telnet logged in.
[Example] enter: telnet 192.168.2.2
telnet logs in 192.168.2.2

5.3 traceroute

[Command] traceroute <*hostname*> [maxhops <*n*>] [timeout <*n*>]
[Function] test the acting routing of appointed mainframe.
[View] all views
[Parameter]<*hostname*> tests the address or domain name of mainframe
maxhops <*n*> tests the maximum routing jumps
timeout <*n*> timeout of each jumping testing (sec)
[Example] enter: traceroute www.g.cn
Apply the routing of www.g.cn and display the testing results.

6 Configuration Command

In super user view, IG601 can use configure command to switch it over configure view for management. Some setting command can support no and default, wherein, no indicates the setting of cancelling some parameter and default indicates the recovery of default setting of some parameter.

6.1 configure

[Command] configure terminal
[Function] switchover to configuration view and input the configuration at the terminal end.
[View] super user view
[Parameter] No
[Example] enter configure terminal in super user view
Switchover to configuration view.

6.2 hostname

[Command] hostname [<*hostname*>]
default hostname
[Function] Display or set the mainframe name of IG601
[View] Configuration view
[Parameter]<*hostname*> new mainframe name
[Example]
enter hostname in configuration view
Display the hostname name of IG601.
enter hostname MyGateway in configuration view
Set the IG601 hostname to MyGateway.
enter default hostname in configuration view
Recover the IG601 hostname to the factory setting.

6.3 clock timezone

[Command] clock timezone <*timezone*><*n*>
default clock timezone
[Function] set the time zone information of IG601.
[View] Configuration view
[Parameter]<*timezone*> timezone name, 3 capitalized English letters
<*n*> time zone deviation value, -12~+12
[Example]
enter clock timezone CST -8 in configuration view
The time zone of IG601is east eighth area and the name is CST (China’s standard time).
enter default clock timezone in configuration view
The time zone of IG601 is recovered to the factory setting.

6.4 clock set

[Command]clock set <*YEAR/MONTH/DAY*> [<*HH:MM:SS*>]
[Function] set the date and time of IG601.
[View] Configuration view
[Parameter]<*YEAR/MONTH/DAY*> date, format: Y-M-D
<*HH:MM:SS* > time, format: H-M-S
[Example] enter clock set 2009-10-5 10:01:02 in configuration view
The time of router set is 10:01:02 of Oct. 5th, 2009 morning.

6.5 ntp server

[Command]ntp server <*hostname*>
no ntp server
default ntp server
[Function] set the customer end of internet time server
[View] configuration view
[Parameter]<*hostname*> address or domain name of mainframe of time server
[Example] enter sntp-client server pool.ntp.org in configuration view
Set the address of internet time server pool.ntp.org.

6.6 config export

[Command]config export
[Function] export config
[View] Configuration view
[Parameter] N/A
[Example]
enter config export in configuration view
The current config.is exported.

6.7 config import

[Command]config import
[Function] import config
[View] Configuration view
[Parameter] N/A
[Example]
enter config import in configuration view
The config.is imported

7 System Management Command

7.1 reboot

[Command] reboot
[Function] System restarts.
[View] super user view, configuration view
[Parameter] No
[Example] enter reboot in super user view
System restarts.

7.2 enable username

[Command] enable password [<*name*>]
[Function] modify the username of super user.
[View] configuration view
[Parameter]<*name*> new super user username
[Example] enter enable username admin in configuration view
The username of super user is changed to admin.

7.3 enable password

[Command] enable password [<*password*>]

[Function] modify the password of super user.

[View] configuration view

[Parameter]<*password*> new super user password

[Example] enter enable password in configuration view

Enter password according to the reminder.

7.4 username

[Command] username <*name*> [password [<*password*>]]

no username <*name*>

default username

[Function] set user name, password

[View] configuration view

[Parameter] No

[Example]

enter username abc password 123 in configuration view

Add an ordinary user, the name is abc and the password is 123.

enter no username abc in configuration view

Delete the ordinary user with the name of abc.

enter default username in configuration view.

Delete all the ordinary users.

Appendix III Description of LED

Operation Status:

STATUS	WARN	ERROR	Description
Green	Yellow	Red	
On	On	Off	Power on
Blink	On	Off	Power on succeed
Blink	Blink	Off	Dialing
Blink	Off	Off	Dialing succeed
Blink	Blink	Blink	Upgrading
Blink	On	Blink	Reset Succeed

Signal Status:

Green LED 1	Green LED 2	Green LED 3	Description
Off	Off	Off	No signal detected
On	Off	Off	Signal strength 1-9(signal weak, please check antenna)
On	On	Off	Signal strength 10-19(signal medium)
On	On	On	Signal strength 20-31(signal strong)

Ethernet Port Status:

Yellow LED	Green LED	Description
On	On	ETH 100M, normal, no data transmission
Blinking	On	ETH 100M, normal, with data transmission
On	Off	ETH 10M, normal, no data transmission
Blinking	Off	ETH 10M, normal, with data transmission

POWER Status:

POWER Red LED	Description
On	Power connected
Off	No power connection

MODEM Status:

MODEM Green LED	Description
On	Modem in normal status
Off	Modem abnormal