

# MG700 Global Router

**3G / 4G Gateway + VPN + Serial to WiFi + Relay + GNSS**

## User's Manual



### Features

**Robust All-in-One Design with Cellular, WiFi & GPS**  
**Bluetooth or Zigbee is optional**  
**2G/3G/4G (Optional LTE)**  
**Supports WiFi 802.11 b/g/n and WiFi AP/WISP**  
**Optional internal battery**  
**Support Dual SIM**  
**Micro SD Card/SIM Card Slot**  
**Mini-PCle Expansion**  
**GPIO/Relay Contact Available**  
**Remote Control Management**  
**User-friendly GUI**

### Description

**The MG700 is a high performance global router for M2M applications. It is 3G/4G/WiFi gateway which supports three serial ports and functions to expand a user's M2M application. A user can easily configure settings from the GUI interface and record data on a micro SD card or USB storage device. An optional internal battery provides backup power which allows for an alert to be sent in the event of a power failure.**

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## Firmware Revision History

Version	Content	Author
1.0.0	Initial Version.	Dean Lin
1.1.0	Add Ublox LISA-C200 Module.	Dean Lin
1.2.0	Add Spreadwin G3A Module.	Dean Lin
1.3.0	Add Gemalto PXS8 Module.	Dean Lin
1.3.1	Add WISP mode.	Dean Lin
1.3.2	Add Relay direct control On/Off.	Dean Lin
1.3.3	Add USB storage for SMB.	Dean Lin
1.4.0	1. Support SD 32G/64G 2. Fix Serial status information	Dean Lin
1.4.1	Fix RSSI of Cellular without display	Dean Lin
1.4.2	Fix PPPOE mode	Dean Lin
1.4.3	Fix Relay On/Off time bug	Dean Lin
1.5.0	1. Add Gemalto PHS8 Module 2. Support 4 LAN	Dean Lin
1.5.1	Fix DDNS update bug	Dean Lin
1.5.2	PXS8 support CDMA/WCDMA failover	Dean Lin
1.5.3	Add 4G LTE PLS8-E	Dean Lin
1.5.4	Support GPS Output Time Function	Dean Lin
1.5.5	1. Add Heart beat function 2. Record File size	Dean Lin
1.5.6	Add 4G LTE PLS8-X Dual SIM	Dean Lin

# 1 Introduction

The MG700 is a mobile router. By simply connecting it to a 3G/4G modem, a user can create a mobile broadband anytime anywhere for a group of users and devices to share. Since MG700 also supports 802.11n technology, a user can enjoy the fastest and most advanced wireless coverage. Higher-end models are equipped with additional functions such as VPN, DDNS, Serial port and Relay functional, providing smooth bandwidth sharing and ease of network management.

The MG700 is loaded with security features including VPN, firewall and access control. The MG700 adds improved throughput, support for 3G cellular modems, bandwidth management, NAT, WISP (Wireless Internet Service Provider), port forwarding, DHCP server and many other powerful features required for complex and demanding applications.

The MG700 also has a built-in 802.11 b/g/n WiFi radio that functions as both an access point and a WAN bridge. This allows WiFi devices to securely communicate with the MG700 and access a wired network or the internet. It also enables the MG700 to use available WiFi networks for even higher speed internet access.

The MG700's all metal construction coupled with its unique Multi-Function Mounting method makes it the perfect choice for applications where a high-performance, secure, reliable and rugged cellular router is required.

Model	Vin	W i F i	Cellular				Interface			Storage		GPS/GNSS type			S M A B A y	R E L A y
			2G/3G Dual Mode	3G	4G	Dual SIM	WAN	LAN	Serial Port	USB	SD	NMEA	Precision GGNS	Precision Dual GNSS		
MG700	7~24V	√	-	√	-	-	1	1	3	√	√	O	O	O	√	√
MG701	7~38V	√	-	√	-	-	1	4	-	O	O	-	-	-	√	O
MG711	7~24V	√	-	-	-	-	1	4	-	√	√	O	O	O	√	√
MG720	7~24V	√	√	-	-	-	1	1	3	√	√	O	O	O	√	√
MG740	7~24V	√	-	-	√	O	1	1	3	√	√	O	O	O	√	√
MG741	7~38V	√	-	-	√	O	1	4	-	√	√	O	O	O	√	√

\*The GPS will be used 1 serial port. O= Option, √=support

## 2 Panel Indicators

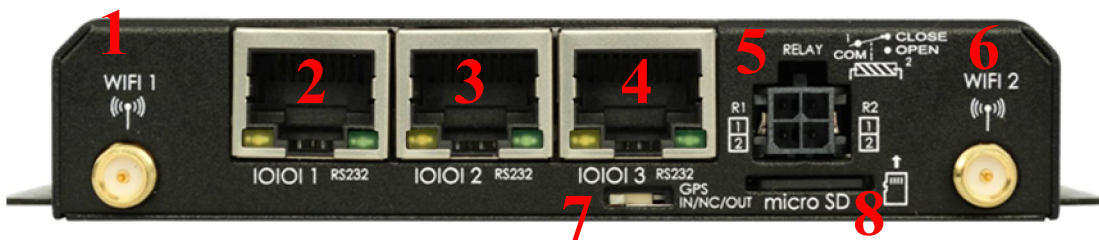
- Top Panel



LED indicators on top

Item	Description
1	WiFi indicator. LED on when WiFi AP is ready. LED flashes when data is transmitting.
2	Cellular indicator. LED on when the cellular function is ready. If Cellular led is flashing, it means searching Service Provider.
3	Power indicator. LED on when the power is on.
4	Optional battery charging indicator. LED on when the battery is charging.

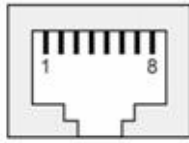
- Front Panel



Front side

Item	Description	
	MG700/MG720	MG701
1	WiFi1 antenna connector	WiFi1 antenna connector
2	Serial port1	LAN2
3	Serial port2	LAN3
4	Serial port3	LAN4
5	Relay (R1, R2).	Vin
6	WiFi2 antenna connector.	WiFi2 antenna connector.
7	For optional GPS output or Input switch.	N.A.
8	Micro SD slot	Micro SD slot

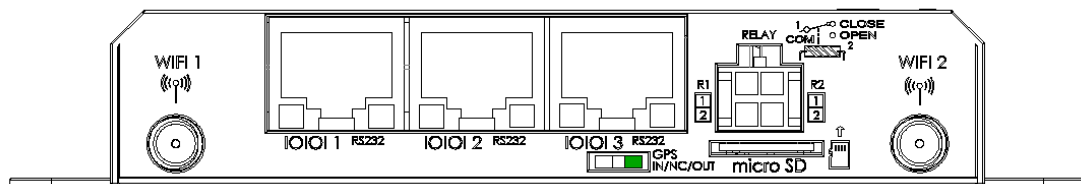
## ■ MG700/MG720 RS232 Serial port Port1/Port2 pin definition



Pin	1	2	3	4	5	6	7	8
Function	NC	NC	NC/GND	RS232 TX	RS232 RX	NC	GND	NC

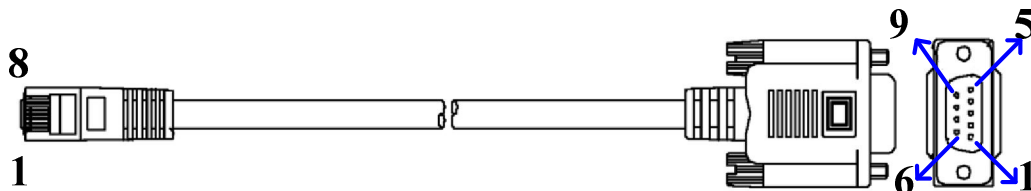
## ■ MG700/MG720 RS232 Serial port Port3 pin definition

If MG700 with GPS module, Port 3 could send GPS data out to Port3 by GPS switch.



## ■ RJ45 to DB9 pin definition(RS232 interface)

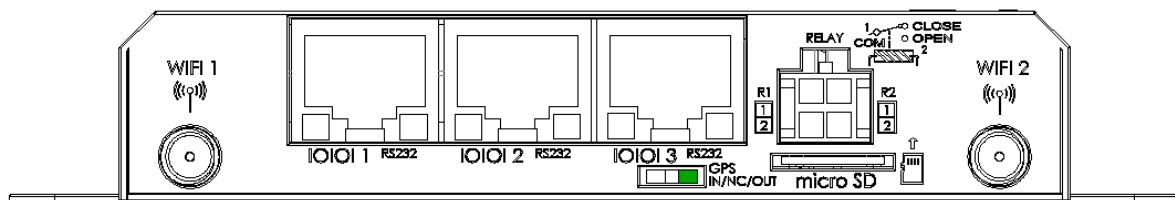
RJ45 Pin	1	2	3	4	5	6	7	8
Function	NC	NC	NC	RS232 TX	RS232 RX	NC	GND	NC



DB9 Pin	1	2	3	4	5	6	7	8	9
Function	NC	RS232 TX	RS232 RX	NC	GND	NC	NC	NC	NC

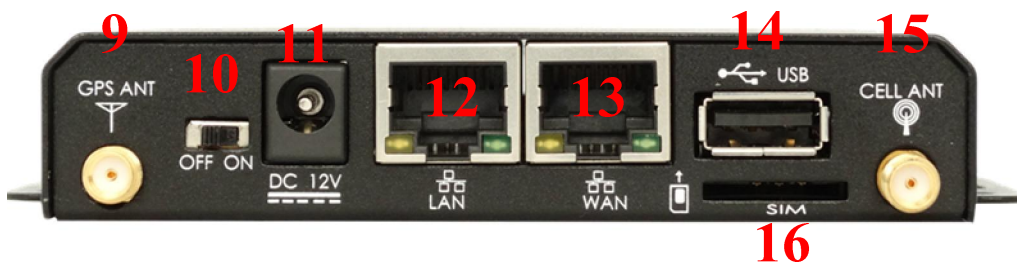
## ■ MG701 LAN2/LAN3/LAN4 pin definition

The Port1/Port2/Port3 will be LAN interface on MG701. User could use LAN port to connect MG701.



\*The GPS switch is not available on MG701 version.

- Back Panel



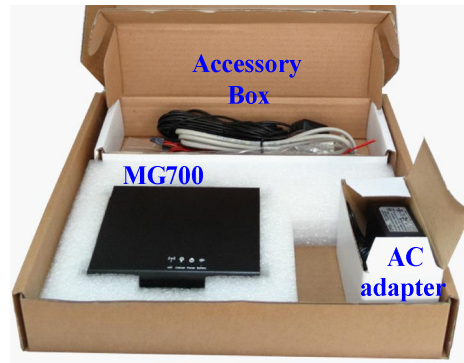
Back side

Item	Description
9	Optional GPS antenna connector.
10	On/Off Switch
11	12VDC power input
12	LAN Port
13	WAN Port
14	External USB device, only for USB storage.
15	Cellular antenna connector
16	SIM card slot



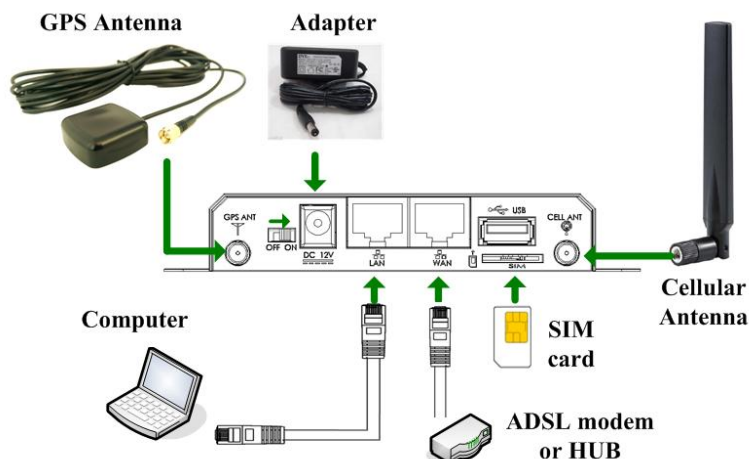
### 3 Installation Guide

Open the MG700's Box, there are include MG700 body 、 AC adapter box and accessory box on MG700's Box. User can login the MG700's web GUI by three steps.

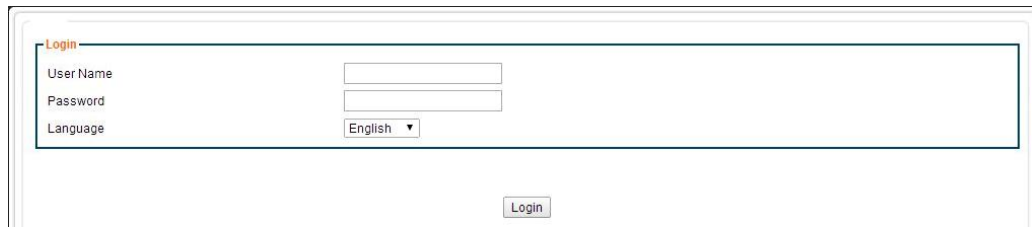


Step 1: Install the WiFi Antenna 、 SD card 、 Micro Fit Cable and RJ45 to DB9 Cable.

Step 2: Install Cellular Antenna、SIM Card、Adapter、GPS Antenna and LAN cable to Computer. Then Turn the Switch on.



Step 3: Input <http://192.168.60.1:8080> to login page on browser.



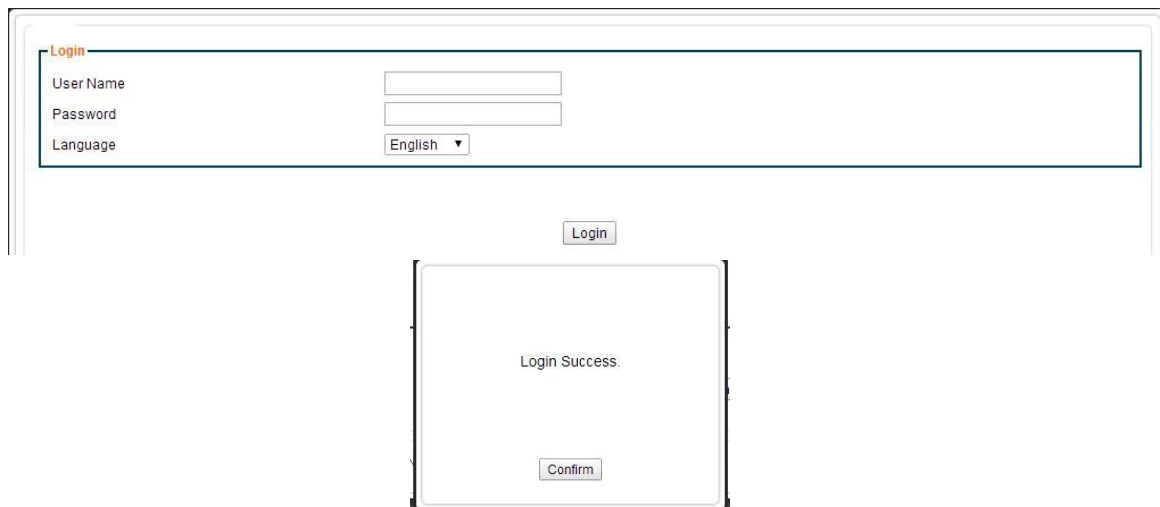
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Note:

1. SD card 、 SIM card 、 Micro Fit Cable 、 Cellular Antenna 、 GPS Antenna 、 RJ45 to DB9 Cable depend on different MG700's model.
  2. WiFi Antenna and Adaptor are necessary.
  3. If user uses the ADSL or Static IP, please connect the WAN port.
-

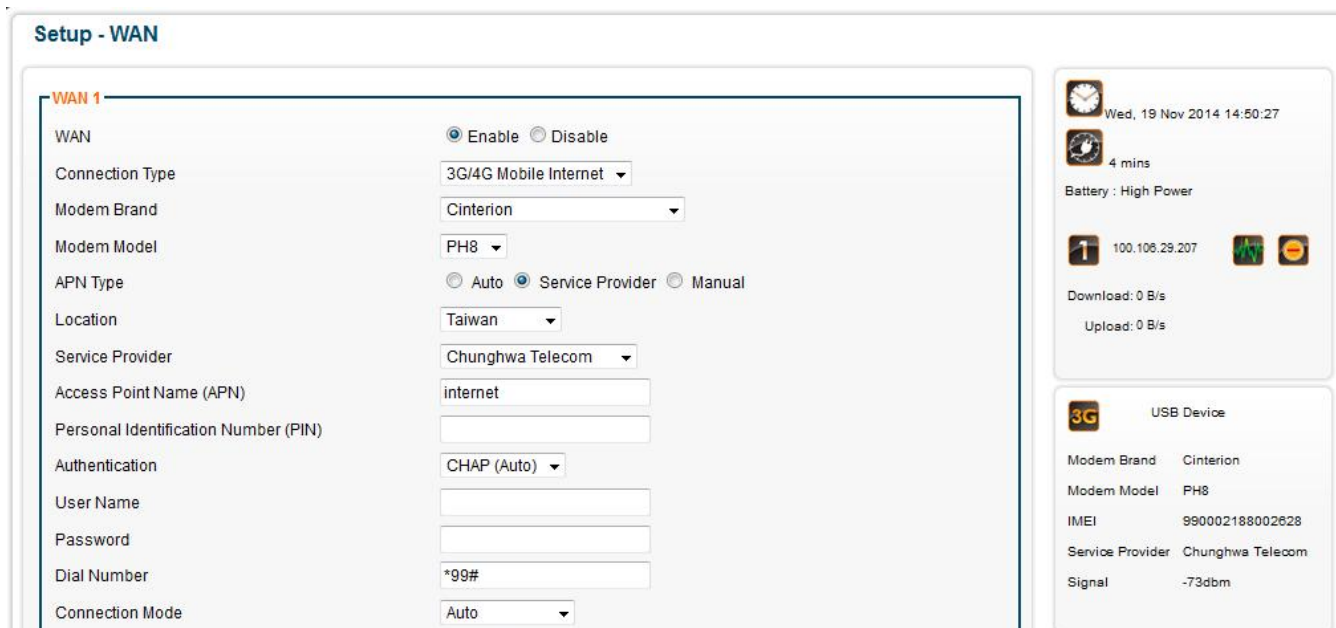
## 4 Login Page

For the initial setup of a MG700, a user will use an Ethernet cable to connect to a computer. Using a web browser, enter the default IP address and port (192.168.60.1:8080) into the address bar. The Login page will appear. Enter “admin” into the User Name and Password fields. The User Name and Password can be changed during initial setup. If you logged in successfully, then you will see the Login Success page. Press the “Confirm” button to enter into the configuration page.



The image shows two overlapping screenshots of the device's web interface. The top screenshot is the 'Login' page, which contains three input fields: 'User Name', 'Password', and a 'Language' dropdown menu set to 'English'. Below these fields is a 'Login' button. The bottom screenshot is the 'Login Success' page, which displays the text 'Login Success.' and a 'Confirm' button at the bottom.

To expand a drop-down menu, click on the menu title. Then select the desired sub-menu. Configuration parameters are entered on the main panel of each screen.



The image shows the 'Setup - WAN' configuration page. On the left, under the 'WAN 1' tab, there is a list of configuration items: WAN (with Enable/Disable radio buttons), Connection Type (3G/4G Mobile Internet), Modem Brand (Cinterion), Modem Model (PH8), APN Type (Auto/Service Provider/Manual), Location (Taiwan), Service Provider (Chunghwa Telecom), Access Point Name (APN) (internet), Personal Identification Number (PIN), Authentication (CHAP (Auto)), User Name, Password, Dial Number (\*99#), and Connection Mode (Auto). On the right, there are two status panels. The top panel shows system status: a clock icon with 'Wed, 19 Nov 2014 14:50:27', a battery icon with '4 mins' and 'Battery : High Power', and a network icon with '100.106.29.207', 'Download: 0 B/s', and 'Upload: 0 B/s'. The bottom panel shows 'USB Device' status: 'Modem Brand Cinterion', 'Modem Model PH8', 'IMEI 990002188002628', 'Service Provider Chunghwa Telecom', and 'Signal -73dbm'.

## 5 Status Page

Under the Status tab, information for the Router, User/DHCP and User/Current can be selected through the drop-down menu.



### 5.1 Router

On the Router Page, the router information will be shown in four sections: Router Information, WAN 1, LAN 1, and Wireless Network 1.

Router Information includes model name, firmware version, license, and current and running times.

Router Information	
Model Name	MG700
Firmware Version	1.5.2
License	Unauthorized(-29935)
Current Time	Thu, 02 Jul 2015 10:00:41
Running Time	5 days, 9 hours, 3 mins

The WAN 1 information shows MAC address, connection type, IP address, subnet mask, and gateway.

WAN 1	
MAC Address	No MAC Address
Connection Type	wwan
IP Address	100.106.29.207
Subnet Mask	32
Gateway	10.64.64.64

The LAN 1 page shows MAC address, IP address, subnet mask, DHCP service, DHCP start IP address, DHCP end IP address, and max DHCP clients.

<b>LAN 1</b>	
MAC Address	5C:B8:CB:00:04:0C
IP Address	192.168.60.1
Subnet Mask	24
DHCP Service	Enabled
DHCP Start IP Address	192.168.60.20
DHCP End IP Address	192.168.60.69
Max DHCP Clients	50

The Wireless Network 1 includes the wireless channel, wireless SSIDs, and MAC addresses.

<b>Wireless Network 1</b>	
Wireless Channel	6
Wireless SSID 1	PXS8-A1
MAC Address	5C:B8:CB:00:04:08
Wireless SSID 2	PXS8-A2
MAC Address	5C:B8:CB:00:04:09

## 5.2 User / DHCP

### Status - User/DHCP

Name	IP Address	MAC Address	Expiration Time
android-c1e6603a97c1564f	192.168.60.37	a8:26:d9:30:d1:6c	49709 day(s), 15:34:47
android-979375f9f3a1dda	192.168.60.38	50:2e:5c:e7:fd:ac	49709 day(s), 15:34:37

Refresh

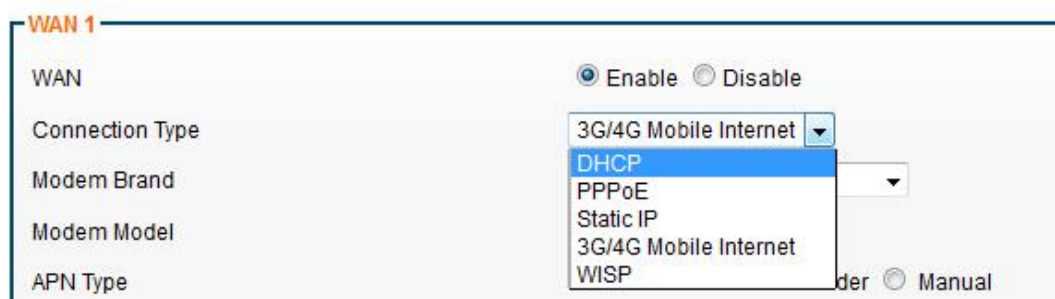
## 6 Setup Page

On the Setup – WAN page, a user can set up the WAN, LAN, DHCP, DDNS, Time, and Relay.



### 6.1 WAN

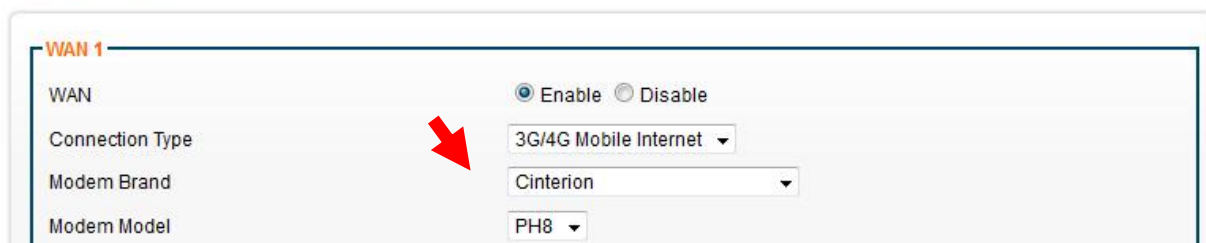
In the WAN 1 section of the WAN page, select Enable and Connection Type. The connection types to choose from are DHCP, PPPoE, Static IP, 3G/4G Mobile Internet, and WISP. For most Ethernet connections, the default DHCP client mode is sufficient. If your WAN interface has been assigned a static IP address, then select “Static IP” and enter the appropriate TCP/IP setting value. If your Ethernet connection uses the PPPoE protocol, then select “PPPoE” and enter your login information. The MG700’s WiFi radio can also be used in place of the wired Ethernet WAN connect.



- 3G/4G Mobile Internet setting

If 3G/4G Mobile Internet is selected, then a user must confirm the APN configuration including user name, password, and dial number.

#### Setup - WAN



Location	Taiwan
Service Provider	Chunghwa Telecom
Access Point Name (APN)	internet
Personal Identification Number (PIN)	
Authentication	CHAP (Auto)
User Name	
Password	
Dial Number	*99#
Connection Mode	Auto

Important: APN 、PIN and Authentication depends on the Service Provider.

## • Failover

In MG700 support failover function. The failover is switching to a redundant Service Provider between Verizon and T-Mobile network. If Service Provider is selected Verizon, the MG700 will select Verizon network to be the main Service Provider. MG700 will connect internet by Verizon network first. If Verizon network cannot connect internet, MG700 will change to T-mobile network automatically.

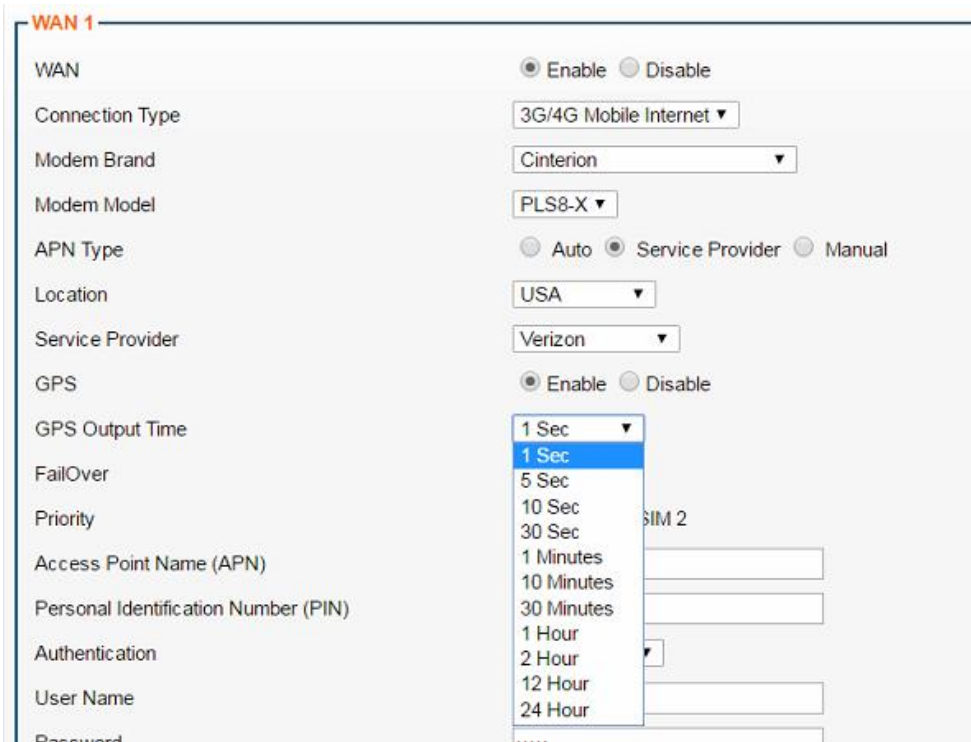
Location	USA
Service Provider	Verizon
FailOver	<input checked="" type="checkbox"/>
Access Point Name (APN)	
Personal Identification Number (PIN)	
Authentication	CHAP (Auto)
User Name	
Password	*****
Dial Number	#777

Location	USA
Service Provider	T-Mobile(new)
FailOver	<input checked="" type="checkbox"/>
Access Point Name (APN)	epc.tmobile.com
Personal Identification Number (PIN)	
Authentication	CHAP (Auto)
User Name	
Password	*****
Dial Number	*99#

Important: The Failover function is only support Verizon and T-mobile network system switch automatically.

- GPS Function

As user select GPS enable, then use could setting the GPS output time by user need to save the data streaming. The default is one second per time.



The screenshot shows the 'WAN 1' configuration page. The 'GPS' section has 'Enable' selected. The 'GPS Output Time' dropdown menu is open, showing options: 1 Sec (selected), 1 Sec, 5 Sec, 10 Sec, 30 Sec, 1 Minutes, 10 Minutes, 30 Minutes, 1 Hour, 2 Hour, 12 Hour, and 24 Hour. Other settings visible include Connection Type (3G/4G Mobile Internet), Modem Brand (Cinterion), Modem Model (PLS8-X), APN Type (Service Provider), Location (USA), and Service Provider (Verizon).

- Dual SIM Support

The MG740/MG741 support Dual SIM function on PLS8-X. If user have 2 SIM card, then user can management which SIM you will use first. The SIM1 slot is Mini Card type, SIM2 slot is Nano card type on MG740/MG741 inside. Also, the priority is SIM1 & Verizon if user selects Failover and SIM1. As SIM1 fail connect to internet, the MG740/MG740 will change to T-mobile on SIM2 automatically. On the other hand, MG740/MG741 will change to Verizon as T-Moblle cannot connect to internet.



**WAN 1**

WAN ☒ Enable ☐ Disable

Connection Type

Modem Brand

Modem Model

APN Type ☐ Auto ☒ Service Provider ☐ Manual

Location

Service Provider

GPS ☐ Enable ☒ Disable

GPS Output Time

FailOver ☐

Priority ☒ SIM 1 ☐ SIM 2

Access Point Name (APN)

Personal Identification Number (PIN)

Authentication

User Name

Password

Dial Number

- DHCP mode

If DHCP is selected, then the MG700 will be assigned an IP address from the server. The IP address is automatically assigned to you by your ISP (most common Ethernet WAN option).

**Setup - WAN**

**WAN 1**

WAN ☒ Enable ☐ Disable

Connection Type

Host Name

MTU  Bytes

Bigpond Login ☐ Enable ☒ Disable

Bigpond Login Server

Bigpond Login User Name

Bigpond Login Password

VPN Client ☐ Enable ☒ Disable

- PPPoE mode

In PPPoE mode, a user needs to key in the User Name and Password. If your ISP provides the username and password, then please enter the information accordingly.

**WAN 1**

WAN ☒ Enable ☐ Disable

Connection Type

Authentication

User Name

Password

PPP Echo Interval  Seconds (20 ~ 180)

PPP Retry Threshold  Time(s) (3 ~ 50)

PPP MTU  Bytes (592-1492)

MTU  Bytes (600~1500)

VPN Client ☐ Enable ☒ Disable

- Static IP mode

For Static IP connections, enter the IP address, netmask, gateway and DNS information. The IP address, subnet mask, gateway and DNS server are provided by your ISP. The IP address cannot be the same as the LAN's IP address.

**WAN 1**

WAN ☒ Enable ☐ Disable

Connection Type

External IP Address

Netmask

Gateway

Static DNS 1

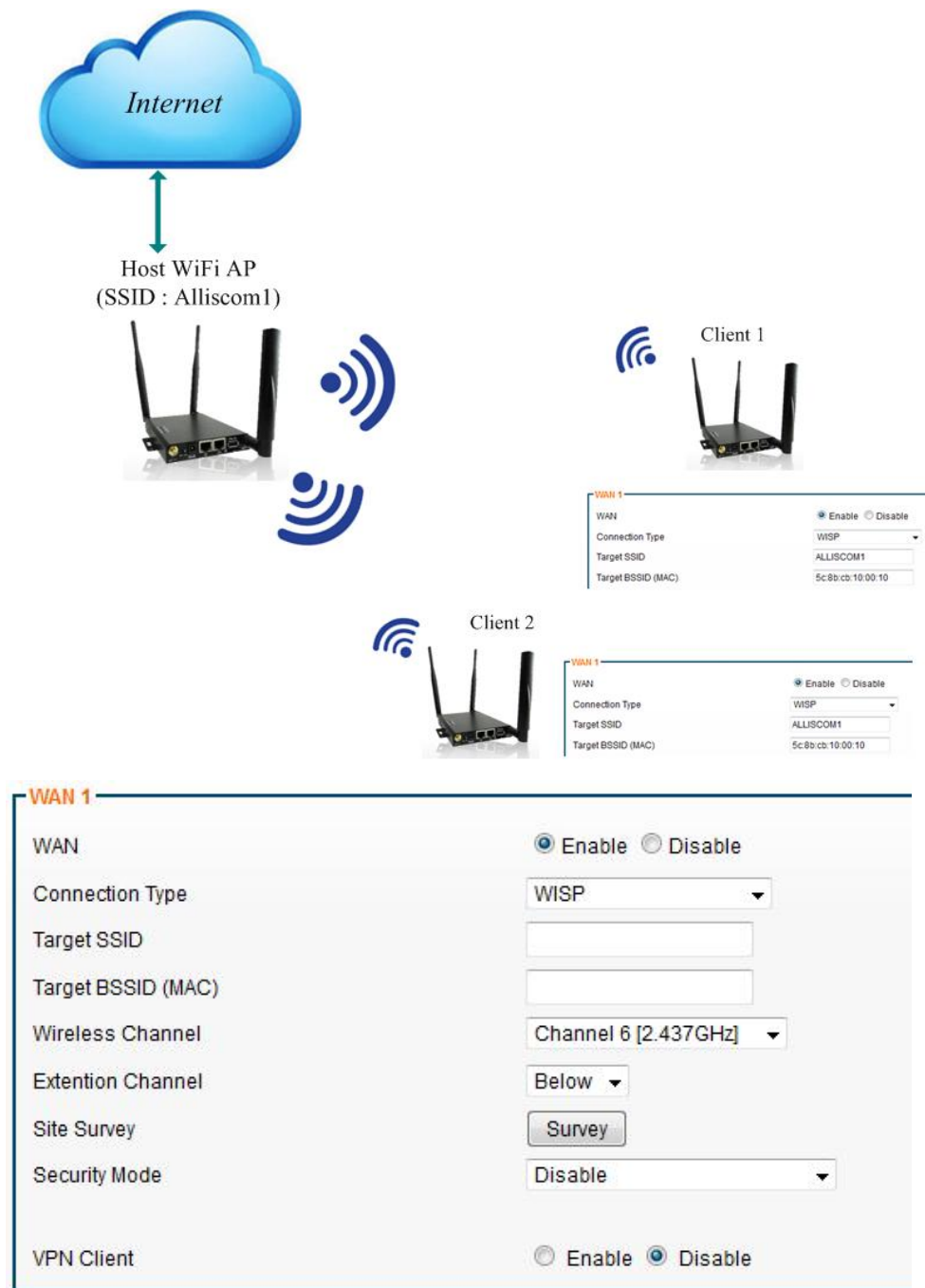
Static DNS 2

MTU  Bytes

VPN Client ☐ Enable ☒ Disable

- WISP mode

The built-in WiFi radio can be used as a WAN interface to establish a connection to an external WiFi network. The MG700 supports both AP mode and WiFi Client mode. Whenever the MG700 detects the target WiFi network, it will automatically try to make a connection to this network. This option can be disabled at the Ethernet WAN interface, but the MG700 can still function as a local WiFi access point while connected to the remote WiFi network. A user can also set the MG700 to connect to other WiFi AP. In the WISP mode, press the Survey button and the MG700 will search for WiFi AP. For example, the Client1 and Client2 can connect internet by WISP setting through Host WiFi AP.



A site survey list will appear. After selecting the proper WiFi AP, the target SSID and MAC address will fill in automatically.

- VPN Client

MG700 Specifications Rev:1.5.6

VPN Client	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
VPN Client Type	PPTP ▼
User Name	<input type="text"/>
Password	<input type="password"/>
VPN Host	<input type="text"/>
MPPE128	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

## 6.2 LAN

If a user needs to change the MG700 default LAN subnet, then go to the Setup - LAN page and enter the IP address assigned to the MG700 and select the desired subnet mask from the drop-down list. The MG700 DHCP server will automatically adjust to serve addresses from the new subnet.

### Setup - LAN

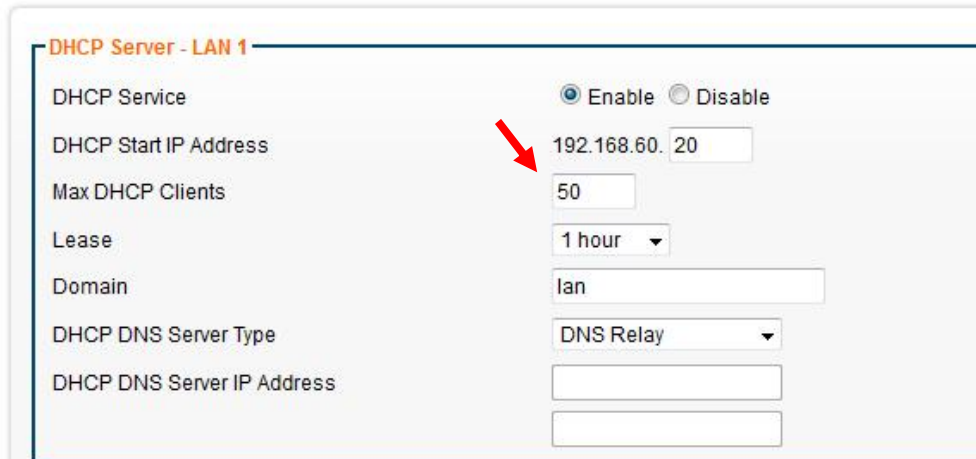
LAN 1	
Internal IP Address	<input type="text" value="192.168.60.1"/>
Netmask	<input type="text" value="255.255.255.0"/> ▼
Spanning Tree Protocol (STP)	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
MTU	<input type="text" value="1500"/> Bytes

Setup - LAN	
LAN 1	
Internal IP Address	<input type="text" value="192.168.60.1"/>
Netmask	<input type="text" value="255.255.255.0"/> ▼ <div>             255.255.0.0              255.255.128.0              255.255.192.0              255.255.224.0              255.255.240.0              255.255.248.0              255.255.252.0              255.255.254.0  <b>255.255.255.0</b>              255.255.255.128              255.255.255.192           </div>
Spanning Tree Protocol (STP)	
MTU	
<input type="button" value="Save"/>	<input type="button" value="Apply changes"/>

## 6.3 DHCP Server

The DHCP service is enabled by default, a user can set the Start IP address and Max DHCP Clients number.

## Setup - DHCP Server



**DHCP Server - LAN 1**

DHCP Service	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
DHCP Start IP Address	192.168.60.20
Max DHCP Clients	50
Lease	1 hour
Domain	lan
DHCP DNS Server Type	DNS Relay
DHCP DNS Server IP Address	

## 6.4 DDNS

DDNS (Dynamic Domain Name Service) allows an “internet domain name” to be assigned to a computer /router which has a dynamic IP address. This makes it possible for other internet devices to connect to the computer/router without needing to trace the changing IP addresses themselves. To enable DDNS, you will first need to sign up for DDNS services from one of the supported DDNS service providers such as DynDNS.org, TZO.com or ZoneEdit.com...etc. The MG700 supports the unique DDNS server for free. DDNS is useful when combined with the virtual host and/or port-forwarding features. It allows internet users to connect to your virtual host by using a domain name rather than an IP address. The DDNS service helps users to locate the correct IP address through the domain name.

For example, assume that you wish to remotely access a web server embedded in one of your LAN devices, but you obtain a different IP address from your ISP each time you connect to the internet. In this case, you will need to enable DDNS, so users can connect to your web server through a fixed domain name without regard for the changing IP address of your WAN connection. The DDNS service is disabled by default. A user can configure the host name and password.

As a service to its customers, MGDDNS operates a Dynamic DNS service which is automatically updated each time a MG700 IP changes. The DDNS host name is the MAC address of the MG700 in the “mgddns.com” domain. For example: 5CB8CB000500.mgddns.com. This “permanent” DDNS names is always available but cannot be changed. To create your own hostname, register with one of the supported DDNS service providers before configuring the MG700’s DDNS settings.



#### Dynamic Domain Name Service - WAN 1

DDNS Service	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
DDNS Type	Mgddns.com ▼
User Name	6f39e97e73ded4f7e8cd286cbc59bd
Password	*****
Host Name	alvin.mgddns.com
Update Time	10 (Min)

DDNS Service	Select Enable to enable DDNS service. Select Disable to disable DDNS service.
DDNS Type	Mgddns.com
Host Name	Enter the name (such as “alvin”) assigned by DDNS service for MG700, e.g: alvin.mgddns.com, the DDNS service will be updated the hostname on MG700. The hostname must match exactly on both the DDNS account.
Update Time	Update DDNS IP period.

Remote Management needs to be enabled if a user wants get the MG700 by a DDNS server.

#### Administration Interface

Language	English ▼
Administrator Password	*****
Re-type Password	*****
Remote Management	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Management Port	HTTP 8080

Important:

1. The DDNS should be public IP address.
2. Remote Management need to Enable

## 6.5 Time

The MG700 supports NTP client to update the time. A user can set up the Time Server Area, Time Zone and synchronization interval. A user can also set up the automatic reboot time on this page.

## Setup - Time

Time Synchronization	
Time Synchronization	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Time Server Type	<input checked="" type="radio"/> Time Server Pool <input type="radio"/> Manual
Time Server Area	Asia ▼
Time Server IP Address	<input type="text"/>
Time Zone	UTC+08:00 Taiwan, China, Hong Kong, Western Australia, Singapore ▼
Periodic Synchronization	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Daylight Saving Support	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Synchronization Interval	Every Day ▼
Action	<input type="button" value="Update"/>

Automatic Reboot	
Reboot Interval	<input type="text"/> (5 ~ 43200 min(s))
Daily Reboot	NONE ▼

## 6.6 Relay

MG700 support the 2 channel GPIO Relay Function. User can see and control the Relay status on this page.



**Setup - Relay**

**Status**

Relay 1 ON

Relay 2 ON

**Control**

☐ Schedule ☒ Manually

**Direct**

Relay 1 : ☒ ON ☐ OFF

Relay 2 : ☒ ON ☐ OFF

**Relay 1 Schedule**

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Sunday																								
Monday																								
Tuesday																								
Wednesday																								
Thursday																								
Friday																								
Saturday																								

Select ALL Clean ALL

**Relay 2 Schedule**

	00	01	02	03	04	05	06	07	08	09	10	11	12	13	14	15	16	17	18	19	20	21	22	23
Sunday																								
Monday																								
Tuesday																								
Wednesday																								
Thursday																								
Friday																								
Saturday																								

Select ALL Clean ALL

Relay Status

Control Mode Select

Manually Direct setting

Relay Schedule setting

In control block, MG700 support Schedule and Manually mode. If User select Manually mode, user can setting the Relay is On or Off immediately. If User select Schedule mode, MG700 will set Relay On/Off by schedule.

**Control**

☐ Schedule ☒ Manually

**Direct**

Relay 1 : ☒ ON ☐ OFF

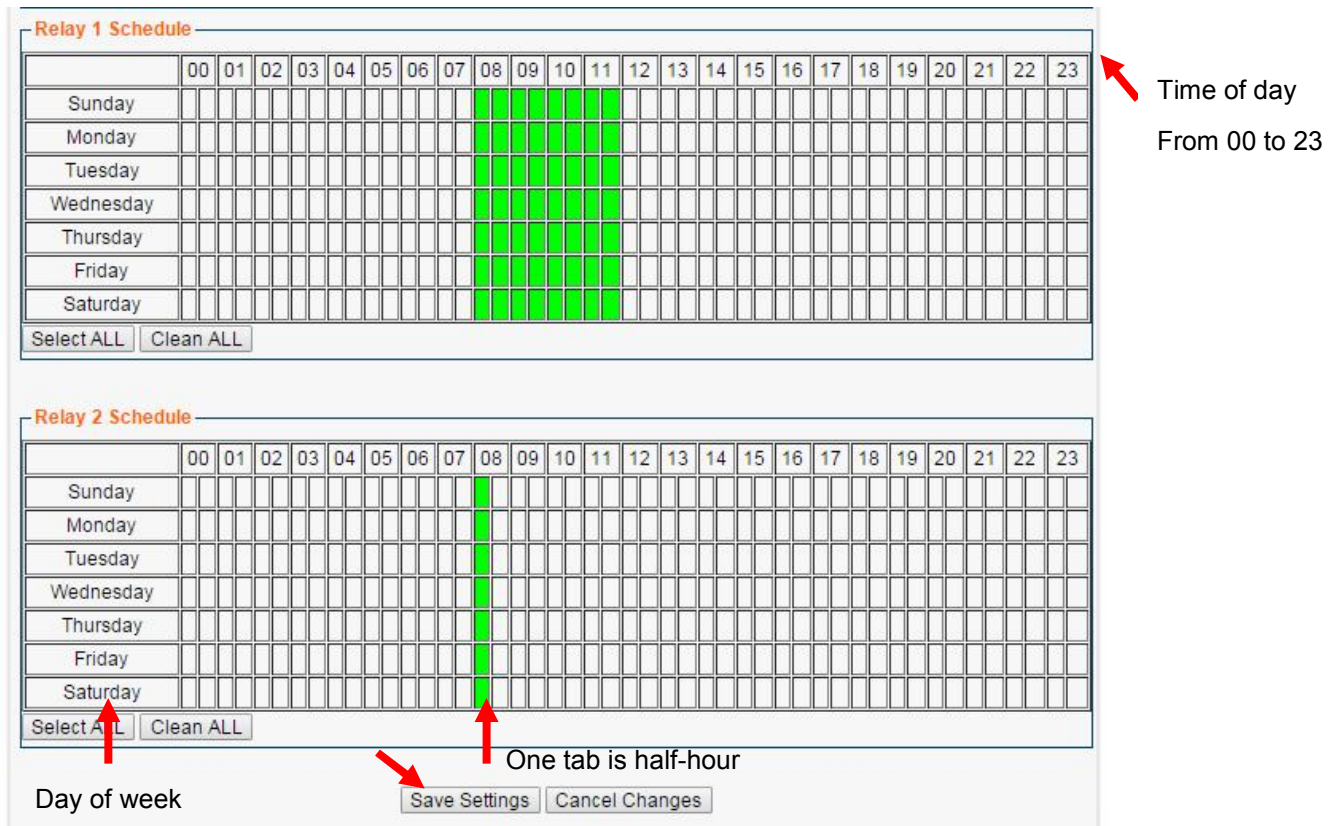
Relay 2 : ☒ ON ☐ OFF

As the control mode change to Schedule, user can setting the Relay1/Relay2 Schedule time is on or off status.

**Control**

☒ Schedule ☐ Manually

As Schedule selected on Control block, the Relay schedule table will be enabled. User can select the Relay on or off time, the MG700 will turn relay on or off by schedule table automatically. There are 2 tabs in an hour row. After setup done, press “Save settings” button to update the newest configuration.

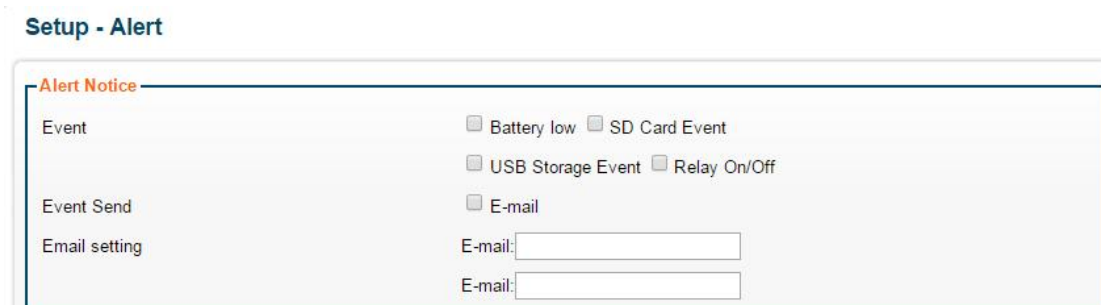


Note:

1. Relay Schedule tab could be selected as in schedule mode.
2. The time of day depends on MG700’s time.

## 6.7 Alert

In this Page, MG700 support 2 E-mail Alert notice. When the Event trigger, it will send the mail to notice user. The Event include SD card full 、USB storage Full 、Relay On and Relay Off.



**Email setting**

E-Mail

SMTP Server

Send Mail

SMTP Account

SMTP Password

Save Settings

Cancel Changes

E-Mail	User e-mail address
SMTP Server	SMTP mail server : Port, such as smtp.gmail.com:465
Send Mail	User e-mail address name
SMTP Account	SMTP user's account name
SMTP Password	SMTP user's password

---

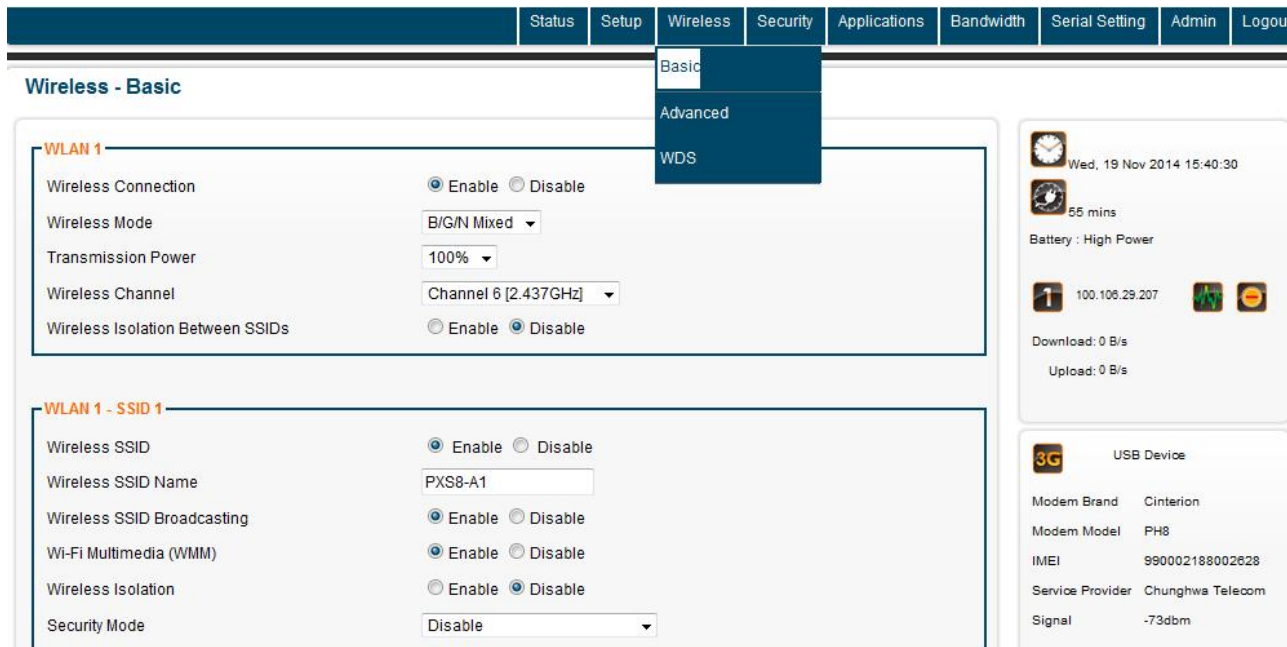
Note: The Battery notice low event is for option.

---

## 7 Wireless Page

The MG700's multiple simultaneous SSIDs provide the ability to create separate security mode and key settings for both convenience and increased protection. For example, users can configure their network devices to access the first SSID with the WPA2 PSK (Pre-Shared Key), while guests can be assigned to the second SSID with a WEP key that changes periodically. In addition, the SSIDs can be isolated to prevent malicious attacks and local area network access for guests using the second SSID. This provides an extremely convenient approach to providing internet access for guests while maintaining strong security protection at all times.

The Wireless Page has the WiFi Basic and WDS settings. The MG700's internal 802.11 b/g/n WiFi radio is disabled by default as a security precaution. To provide laptops, tablets and other WiFi devices with internet connectivity through the MG700, go to the Wireless - Basic page and enable the wireless connection.



The screenshot shows the 'Wireless - Basic' configuration page. At the top, there is a navigation bar with tabs: Status, Setup, Wireless, Security, Applications, Bandwidth, Serial Setting, Admin, and Logout. Below the navigation bar, the 'Wireless - Basic' section is active. It contains two main configuration areas: 'WLAN 1' and 'WLAN 1 - SSID 1'. The 'WLAN 1' section has settings for 'Wireless Connection' (radio buttons for Enable and Disable), 'Wireless Mode' (a dropdown menu set to 'B/G/N Mixed'), 'Transmission Power' (a dropdown menu set to '100%'), 'Wireless Channel' (a dropdown menu set to 'Channel 6 [2.437GHz]'), and 'Wireless Isolation Between SSIDs' (radio buttons for Enable and Disable). The 'WLAN 1 - SSID 1' section has settings for 'Wireless SSID' (radio buttons for Enable and Disable), 'Wireless SSID Name' (a text input field containing 'PXS8-A1'), 'Wireless SSID Broadcasting' (radio buttons for Enable and Disable), 'Wi-Fi Multimedia (WMM)' (radio buttons for Enable and Disable), 'Wireless Isolation' (radio buttons for Enable and Disable), and 'Security Mode' (a dropdown menu set to 'Disable'). On the right side of the page, there is a sidebar with system status information, including the date and time (Wed, 19 Nov 2014 15:40:30), battery status (55 mins, High Power), IP address (100.108.29.207), and USB device information (Modem Brand: Cinterion, Modem Model: PH8, IMEI: 990002188002628, Service Provider: Chunghwa Telecom, Signal: -73dbm).

### 7.1 Basic

On the Basic Page, a user can select to enable or disable wireless connection. A user can also change the wireless mode, WiFi power and channel. Only SSID1 will be enabled by default. You may change the SSID name to suit your preference. We strongly recommend that you change the security mode to prevent unauthorized access to your internet connection. The MG700 also supports a second SSID. This is most often used when you wish to provide “guest” access to your internet service and maintain guest devices on a LAN subnet different than your other devices.

## Wireless - Basic

### WLAN 1

Wireless Connection	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Wireless Mode	B/G/N Mixed ▼
Transmission Power	100% ▼
Wireless Channel	Channel 6 [2.437GHz] ▼
Wireless Isolation Between SSIDs	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

### WLAN 1 - SSID 1

Wireless SSID	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Wireless SSID Name	PXS8-A1
Wireless SSID Broadcasting	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Wi-Fi Multimedia (WMM)	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Wireless Isolation	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Security Mode	Disable ▼

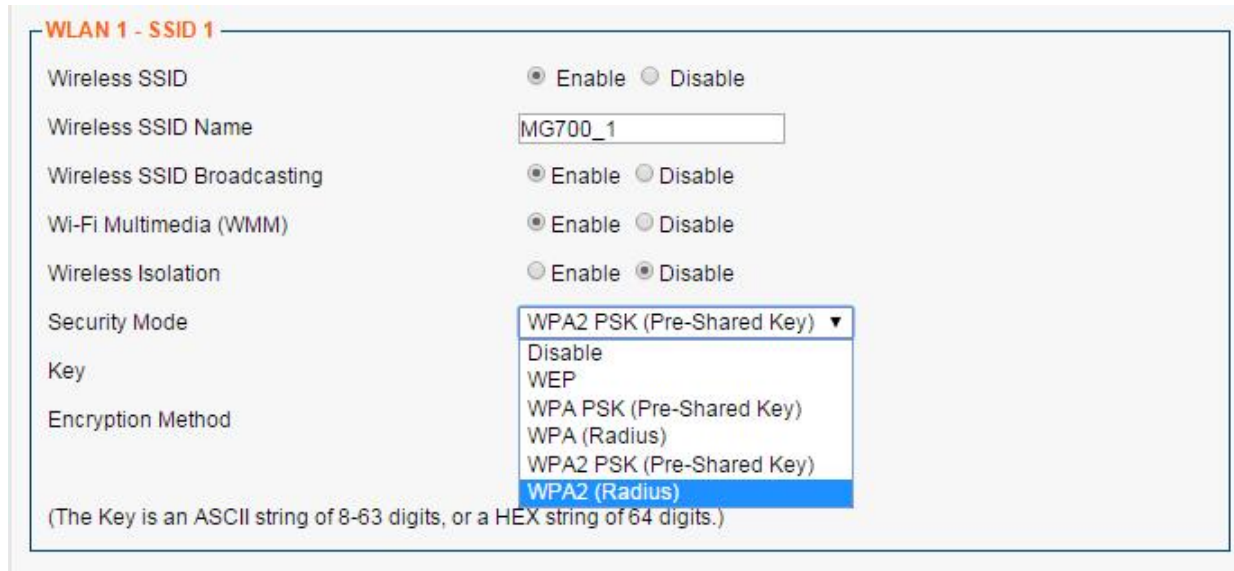
Users connecting to SSID2 can be segregated into their own local area network to provide Internet service while preventing access to other device on the primary LAN. Enter the Guest LAN starting IP Address which will be assigned to the MG700, and the corresponding subnet mark. Guest WiFi devices will be assigned a DHCP address in this subnet. For more flexibility in controlling guest WiFi access.

### WLAN 1 - SSID 2

Wireless SSID	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Wireless SSID Name	PXS8-A2
Wireless SSID Broadcasting	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Wi-Fi Multimedia (WMM)	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Wireless Isolation	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Security Mode	Disable ▼
Guest LAN	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
Guest LAN IP Address	192.168.2.1
Guest LAN Netmask	255.255.255.0 ▼

- **WiFi Security Mode**

The choice for WiFi security mode include: Disable, WEP, WPA PSK(Pre-Shared Key), WPA (Radius), WPA2 PSK(Pre-Shared Key), and WPA2 (Radius) mode.



**WLAN 1 - SSID 1**

Wireless SSID ☒ Enable ☐ Disable

Wireless SSID Name

Wireless SSID Broadcasting ☒ Enable ☐ Disable

Wi-Fi Multimedia (WMM) ☒ Enable ☐ Disable

Wireless Isolation ☐ Enable ☒ Disable

Security Mode

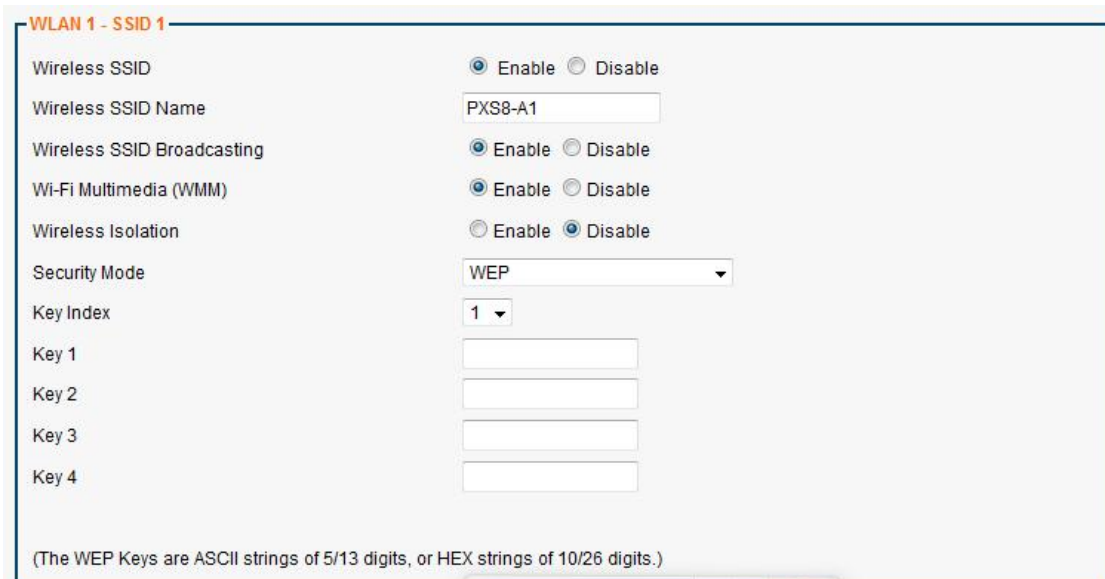
Key

Encryption Method

(The Key is an ASCII string of 8-63 digits, or a HEX string of 64 digits.)

- **WEP Mode**

Users can setup the WEP key index indicates which WEP key is used for data encryption. The WEP Key(1~4), for 64-bit WEP mode, type 10 hexadecimal digits or 5 ASCII characters. For 128-bit WEP, type 26 hexadecimal digits or 13 ASCII characters.



**WLAN 1 - SSID 1**

Wireless SSID ☒ Enable ☐ Disable

Wireless SSID Name

Wireless SSID Broadcasting ☒ Enable ☐ Disable

Wi-Fi Multimedia (WMM) ☒ Enable ☐ Disable

Wireless Isolation ☐ Enable ☒ Disable

Security Mode

Key Index

Key 1

Key 2

Key 3

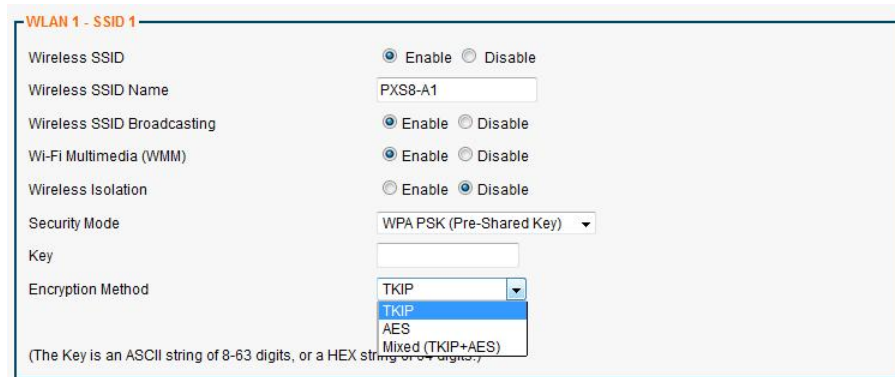
Key 4

(The WEP Keys are ASCII strings of 5/13 digits, or HEX strings of 10/26 digits.)



- WPA PSK mode

Setup the Pre-shared Key index as the credential for the packet encryption. This same value must be entered in all WiFi devices connecting to this SSID. In Encryption Mode, TKIP & AES are supported.

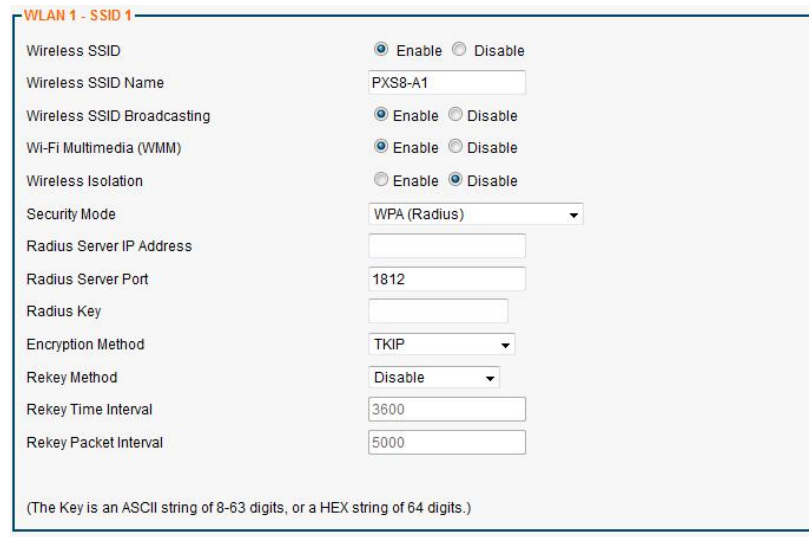


The screenshot shows the configuration page for WLAN 1 - SSID 1. The settings are as follows:

- Wireless SSID: ☒ Enable ☐ Disable
- Wireless SSID Name: PXS8-A1
- Wireless SSID Broadcasting: ☒ Enable ☐ Disable
- Wi-Fi Multimedia (WMM): ☒ Enable ☐ Disable
- Wireless Isolation: ☐ Enable ☒ Disable
- Security Mode: WPA PSK (Pre-Shared Key)
- Key:
- Encryption Method: TKIP (selected), TKIP, AES, Mixed (TKIP+AES)

(The Key is an ASCII string of 8-63 digits, or a HEX string of 64 digits.)

- WPA (Radius)



The screenshot shows the configuration page for WLAN 1 - SSID 1. The settings are as follows:

- Wireless SSID: ☒ Enable ☐ Disable
- Wireless SSID Name: PXS8-A1
- Wireless SSID Broadcasting: ☒ Enable ☐ Disable
- Wi-Fi Multimedia (WMM): ☒ Enable ☐ Disable
- Wireless Isolation: ☐ Enable ☒ Disable
- Security Mode: WPA (Radius)
- Radius Server IP Address:
- Radius Server Port: 1812
- Radius Key:
- Encryption Method: TKIP
- Rekey Method: Disable
- Rekey Time Interval: 3600
- Rekey Packet Interval: 5000

(The Key is an ASCII string of 8-63 digits, or a HEX string of 64 digits.)

In WPA mode, the list as below:

Radius Server IP Address	Input the RADIUS server's IP address
Radius Server Port	Input the RADIUS server's port number. The default port is 1812.
Radius Key	Input the RADIUS server's Key
Encryption Method	Select TKIP or AER for the packet encryption.
Rekey Method	Select method for determining when new key is required.
Rekey Time Interval	Input the frequency of key renewals in seconds.
Rekey Packet Interval	Input the frequency of key renewals in number of packets.

## 7.2 Advanced

On the Advanced Page, a user can set the Region and other WLAN settings.

Wireless - Advanced

Region Setting

Region
US, Canada and Taiwan (channel 1 - 11)

WLAN 1

Fragmentation
2346
Bytes (256 ~ 2346)

RTS
2347
Seconds (1 ~ 2347)

DTim
1
(1 ~ 255)

Beacon Interval
100
Milliseconds (20 ~ 1024)

Header Preamble
Long

TxMode
None

MPDU
4
Microseconds

MSDU Aggregate
☒ Enable ☐ Disable

Tx Burst
☒ Enable ☐ Disable

Packet Aggregate
☒ Enable ☐ Disable

HT Control Field
☒ Enable ☐ Disable

Reverse Direction Grant
☒ Enable ☐ Disable

Link Adapt
☐ Enable ☒ Disable

Short Guard Interval(GI)
☒ Enable ☐ Disable

Operation Mode
Mixed Mode

HT Band Width
20/40
MHz

Block Ack Setup Automatically
☒ Enable ☐ Disable

Block Ack Window Size
64
x16 Bits (1 ~ 64)

Reject Block Ack
☐ Enable ☒ Disable



Region	Choose the region in which the MG700 is currently operating (sets channels).
Fragmentation	Enter the fragmentation bytes. The default value is 2346 bytes.
RTS	Enter the RTS seconds. The default value is 2347 seconds.
DTim	Enter the DTim seconds. The default value is 1.
Beacon Interval	Enter the interval to send a beacon. The default value is 100 milliseconds.
Header Preamble	Choose Long or Short header preamble.
TxMode	Choose different transmission mode.
MPDU	MPDU data length. The transmission rate is increased when you choose a larger number, but usually the max value will be 4 in the wireless card
MSDU Aggregate	A kind of packet aggregation method, it can improve the transmission efficiency. Please make sure you Wireless card has this function supported.
Tx Burst	Some 802.11g wireless cards support this mode. The transmission rate can be increased when this function is enabled.
Packet Aggregate	An aggregation method like A-MSDU(MAC Service Data Unit), it can improve the transmission efficiency. Please make sure you Wireless card has this function supported.
HT Control Field	Choose Enable/Disable. It is useful when you need to debug the wireless network.
Reverse Direction Grant	Choose Enable/Disable. The response time can be shorter enable this function is enabled.
Link Adapt	Choose Enable/Disable. The function is used to dynamically change the modulation and encoding mechanism between wireless devices.
Short Guard Interval (SGI)	Choose Enable/Disable. Short GI can improve the transmission rate, but with less immunity when interference exists.
Operation Mode	Choose Mixed mode or Greenfield. You may choose Greenfield mode to increase the transmission rate when you using 802.11n wireless network only.
HT Band Width	Using HT20MHz or HT20/40MHz
Block Ack Setup Automatically	Choose Enable/Disable. If your Wi-Fi Card supports the Block Ack mechanism, it can improve the data transmission efficiency when this function is enabled.
Block Ack Window Size	Specify a Block Ack window size.
Reject Block Ack	Choose Enable to reject the request of BA from another other Wireless device.
MCS	Select transmission (connection) speed.

## 7.3 WDS

A wireless distribution system (WDS) is a system which enables the wireless interconnection of access points in an 802.11 network. It allows a wireless network's coverage area to be expanded using multiple access points without a wired backbone to link the APs. A user can set the WDS settings in this page.

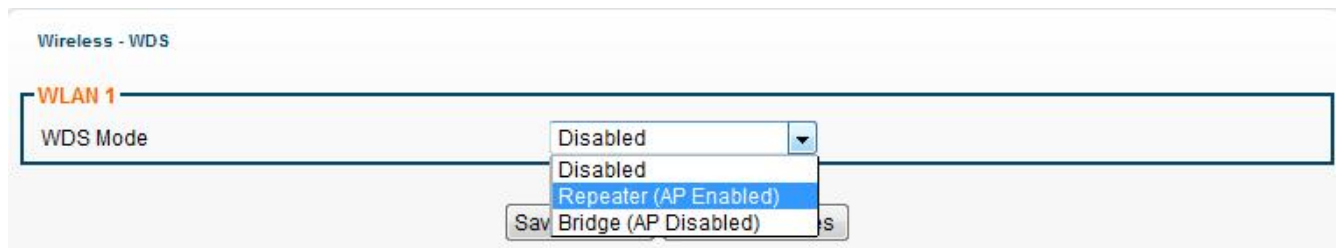
The MG700 supports two modes of WDS operation:

- Repeating: APs communicate with each other and with wireless clients.
- Bridging: APs only communicate with each other and don't allow wireless clients to access them.

All base stations in a wireless distribution system must be configured to use the same radio channel, method of encryption (none, WEP or WPA) and the same encryption keys. They may be configured to different service set identifiers (SSIDs). WDS also requires every base station to be configured to forward to others in the system.



WDS has three selections: Disabled, Repeater and Bridge modes. By default, WDS Mode is disabled. If a user selects Repeater mode, then the WiFi AP function still support and a user can still connect to the MG700's AP. If a user selects Bridge mode, then the MG700 will only be in bridge mode and the WiFi AP function will be disabled.



WDS supports four WDS points. Press the Survey button to search for WiFi AP.

Make sure of the following in order for WDS to work correctly:

- All WDS devices must use the same radio channel.
- All WDS devices must use the same encryption mode and encryption keys.

Wireless - WDS

**WLAN 1**

WDS Mode: Repeater (AP Enabled) ▼

---

**WDS 1**

WDS MAC Address:  Survey

Security Mode: Disable ▼

---

**WDS 2**

WDS MAC Address:  Survey

Security Mode: Disable ▼

---

**WDS 3**

WDS MAC Address:  Survey

Security Mode: Disable ▼

---

**WDS 4**

WDS MAC Address:  Survey

Security Mode: Disable ▼

Press Survey button, it shows the wireless AP. Then, click the SSID that user want to connect and press “Select” button.

Site Survey

Channel	SSID	BSSID	Security Mode	Signal	ExtCH	Wireless Mo..
1	DSL-6740C	78:54:2e:e9:06:af	WPA2PSK/AES	15	BELOW	11b/g/n
3	TennVac-WIFI	c0:a0:bb:d2:04:f4	WPA1PSKWPA2...	81	BELOW	11b/g/n
4	TennVac-Office	c0:a0:bb:d2:07:78	WPA1PSKWPA2...	34	BELOW	11b/g/n
4	USER-HP_ASUS	00:1a:2b:3c:ff:02	WPAPSK/TKIP	20	ABOVE	11b/g/n
6	ACC-GPS-Client1	5c:b8:cb:10:00:20	WPA2PSK/TKIP...	86	BELOW	11b/g/n
6	ACC-GPS-Client2	5c:b8:cb:10:00:21	WPA2PSK/TKIP...	86	BELOW	11b/g/n
6	ALLISCOM1	5c:8b:cb:10:00:10	NONE	100	BELOW	11b/g/n
7	GlyconexAP	84:c9:b2:6f:0e:ff	WPA1PSKWPA2...	15	BELOW	11b/g/n
9	GNIntAP	50:67:f0:45:7f:68	WPA2PSK/AES	70	BELOW	11b/g/n

Select Refresh

Choose the WiFi AP and press the Select button. The WDS MAC Address will fill in automatically.

**Wireless - WDS**

**WLAN 1**

WDS Mode

Repeater (AP Enabled) ▼

**WDS 1**

WDS MAC Address

5c:b8:cb:10:00:00

Survey

Security Mode

Disable ▼

**WDS 2**

WDS MAC Address

00:0c:43:76:20:08

Survey

Security Mode

Disable ▼

**WDS 3**

WDS MAC Address

Survey

Security Mode

Disable ▼

**WDS 4**

WDS MAC Address

Survey

Security Mode

Disable ▼

Save Settings

Cancel Changes

---

**Important:**

1. If WDS mode is Bridge mode, user cannot see the SSID
  2. Setup WDS system suggest use the same devices (MG700 series).
-

## 8 Security Page

Security mode include: Firewall, IP Access Control, Outbound MAC ACL, Web Filtering, VPN/PPTP and VPN/IPsec mode.

Status	Setup	Wireless	Security	Applications	Bandwidth
			<b>Security - Firewall</b> <ul style="list-style-type: none"> <li>Firewall</li> <li>IP Access Control</li> <li>Outbound MAC ACL</li> <li>Web Filtering</li> <li>VPN / PPTP</li> <li>VPN / IPsec</li> </ul>		
<b>Security - Firewall</b>					
<b>Firewall Protection</b>					
SPI Firewall Protection		<input checked="" type="radio"/> Enable <input type="radio"/> Disable			
TCP SYN DoS Protection		<input checked="" type="radio"/> Enable <input type="radio"/> Disable			
ICMP Broadcasting Protection		<input checked="" type="radio"/> Enable <input type="radio"/> Disable			
ICMP Redirect Protection		<input checked="" type="radio"/> Enable <input type="radio"/> Disable			
Broadcast Storming		<input type="radio"/> Enable <input checked="" type="radio"/> Disable			

### 8.1 Firewall

The Firewall page allows the enabling/disabling of SPI Firewall protection, TCP SYN DoS Protection, ICMP Broadcasting Protection, ICMP Redirect Protection and Broadcast Storming method.

#### Security - Firewall

<b>Firewall Protection</b>	
SPI Firewall Protection	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
TCP SYN DoS Protection	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Broadcasting Protection	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP Redirect Protection	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Broadcast Storming	<input type="radio"/> Enable <input checked="" type="radio"/> Disable

### 8.2 IP Access Control

The IP Access Control page lets a user control access to the MG700 from a specific IP address.

## Security - Access Control

**Access Control List (ACL)**

Access Control ☒ Enable ☐ Disable  
 Default Access Control Action ☒ ALLOW ☐ DENY

**Access Control List (ACL) Rule**

Rule Name	Rule Enable	External Inte	Internal IP Range	External IP Range	Protocol	Service Port Rai	Action
+ Add    - Delete    ✎ Modify    ⬆ Up    ⬇ Down							

A user can add rules by setting up a Rule Name, Internal and External IP ranges, and Action (Allow or Deny).

**ACL Data**

Rule Name: Webcam1  
 Enable: ☒  
 External Interface: WAN1  
 Internal IP Range: From: 192.168.60.20 To:   
 External IP Range: From: 220.133.29.222 To:   
 Protocol: TCP  
 Service Port Range: From: 33 To: 33  
 Action: ALLOW

Rule Name	Webcam1
Rule Enable	Enable
External Interface	WAN1
Internal IP Range	If assign, it applies to specific IP. If blank, it applies to all LAN devices.
External IP Range	Assign external IP address range
Protocol	TCP/UDP
Service Port Range	33
Action	ALLOW

### 8.3 Outbound MAC ACL

The MG700 can allow a specific MAC address to log in. The MAC Access Control of MG700 is used to either allow or deny specific devices identified by their MAC address from making “outbound”



connections. The MAC rules also enable you to “statically” assign an IP address from MG700’s DHCP pool to a specific MAC address.



For example, user press “Add” and set the specific MAC address to assign IP address.



Rule Name	Name of the MAC access rule. Spaces are not allowed. For example :“Rule1”
MAC	Set up the MAC Address to which you would like to enable the MAC ACL action. For example, the MAC address as: 00:00:00:00:00:09
Action	Select whether the MG700 should ALLOW / DENY packets matching this rule.
ACL Enabled	Enable/Disable this MAC access rule.
Static ARP Enabled	Enable/Disable this Static ARP rule.
Static DHCP Enabled	Enable/Disable this Static DHCP rule.
IP	The IP address to assign via static ARP or static DHCP. The address must be within the DHCP pool configured for the MG700 and the DHCP Server feature must be enabled. For example : 192.168.60.30

## 8.4 Web Filtering

The MG700 can set web filtering, include ActiveX, Java Scripting and Proxy filtering.

### Security - Web Filtering

**Web Filtering**

Web Filtering
☐ Enable
☒ Disable

**Web Content Filtering**

Activex Filtering
☐ Enable
☒ Disable

Java/JavaScript Filtering
☐ Enable
☒ Disable

Proxy Filtering
☐ Enable
☒ Disable

**Web Filtering Rule**

Rule Enable	Filter Keyword	Filter Type	Action
<a href="#">Add</a> <a href="#">Delete</a> <a href="#">Modify</a> <a href="#">Up</a> <a href="#">Down</a>			

## 8.5 VPN/PPTP Page

The MG700 supports VPN server. Add rule enable, if VPN PPTP enable. User can set rule to connect MG700 by VPN and VPN start IP address. The Point-to-Point Tunneling Protocol (PPTP) is a method for implementing virtual private networks. PPTP uses a control channel over TCP and GRE tunnel operating to encapsulate PPP packets. The PPTP settings in this section define the parameters and user access rules when the MG700 is acting as a PPTP “server” allow connections from remote PPTP clients such as Windows PC’s.



**PPTP**

PPTP	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
MTU	1482 Bytes
VPN Start IP Address	192.168.39.1
Max VPN Clients	10
Auto DNS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
DNS	
CHAP Enable	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
MSCHAP Enable	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
MSCHAP v2 Enable	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
MPPE128 Enable	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Proxy ARP Enable	<input type="radio"/> Enable <input checked="" type="radio"/> Disable
NAT Enable	<input checked="" type="radio"/> Enable <input type="radio"/> Disable

Press “Add”, setup the rule enable, User Name and password.

**User Rule**

Rule Enable	User Name	Password
<a href="#">+ Add</a>	<a href="#">Delete</a>	<a href="#">Modify</a>

**PPTP Data**

Rule Enable: ☐

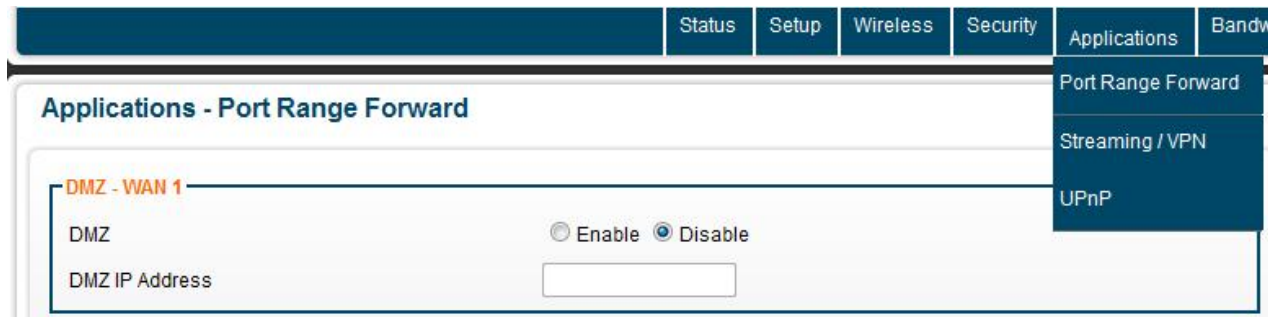
User Name:

Password:

[Confirm](#) [Cancel](#)

## 9 Applications Page

Application function includes Port Range Forward, Streaming VPN and UPnP. By enabling the DMZ Host Function, you can set up a Demilitarized Zone (DMZ) host, that is, a particular computer which is fully exposed to the Internet. This may be necessary for certain applications that use random ports or when you do not know the specific ports required for remote access.



### 9.1 Port Range Forward

The MG700 provides Network Address Translation (NAT) services to protect private LAN IP addresses from access by users on the external WAN. Port-Forwarding is a technique to selectively allow remote users to access selected devices and services on the private LAN.

The MG700 supports both Port Forwarding and Port Translation features. These features are integrated with the MG700's firewall feature. Creating new port forwarding/translation rules automatically opens the corresponding ports in the firewall – no other configuration is necessary.

The port forwarding function gives remote users access to devices on the local network via the public WAN IP address. Users can assign a specific external port range to a local server (or IP address).

Furthermore, users can specify a different internal port range to be associated with external ports in a port forwarding rule. When the MG700 receives an external request to access any one of the configured external ports, it will redirect the request to the corresponding internal server and change its destination port to one of the internal ports specified. This allows multiple LAN devices with the same port (e.g. port 80) to be accessed remotely without having to change their settings.

**Applications - Port Range Forward**

**DMZ - WAN 1**

DMZ ☐ Enable ☐ Disable

DMZ IP Address

**Port Range Forwarding**

Port Forwarding ☐ Enable ☐ Disable

**Port Range Forwarding Rule**

Rule Name	Rule Enable	External Interfa	Protocol	External Port R	Internal IP	Internal Port Ra
<a href="#">+ Add</a> <a href="#">Delete</a> <a href="#">Modify</a> <a href="#">Up</a> <a href="#">Down</a>						
<a href="#">Add</a>	<a href="#">Delete</a>	<a href="#">Modify</a>	<a href="#">Up</a>	<a href="#">Down</a>		

[Save Settings](#) [Cancel Changes](#)

Press Add, then shows the Forward Data page to setting the forward IP and Port.

**Forward Data** ✕

Rule Name:

Enable: ☒

External Interface:

Protocol:

External Port Range: From:  To:

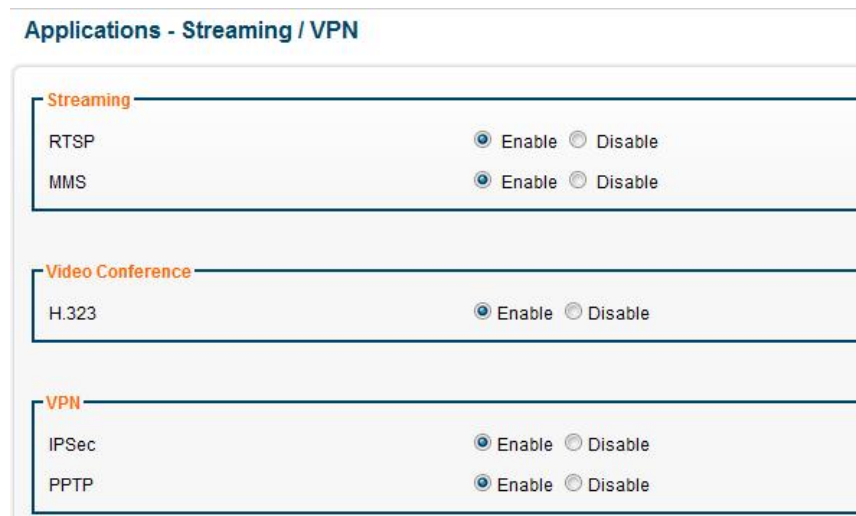
Internal IP:

Internal Port Range: From:  To:

Rule Name	Enter the name of the port forwarding rule. Do not contain spaces.
Rule Enabled	Check/Uncheck to enable/disable this port forwarding rule.
External Interface	Choose USB or Ethernet WAN as the External port forwarding interface. Each WAN interface must have its own port forwarding rules, so duplicate rules if using the MG700 in a WAN fail-over configuration.
Protocol	Choose TCP, UDP or TCP/UDP for the rule to be applied.
External Port Range	Set up the External Port Range for the rule to capture.
Internal IP	Set up the Internal IP (single address) where incoming packets will be directed when the rule is matched.
Internal Port Range	Set up the Internal Port Range where the rule will send matched packets. The internal and external port ranges must contain the same number of ports, but can be different to enable port translation.

## 9.2 Streaming/VPN

MG700 can enhance media streaming quality by enabling RTSP, MSS and H.323 protocols. Also, the MG700's VPN Pass-through functionality can also be enabled on this page. All of these features are enabled by default. User could set the Streaming/Video and VPN enable or disable.



The screenshot shows the 'Applications - Streaming / VPN' configuration page. It is divided into three sections: Streaming, Video Conference, and VPN. Each section contains a list of protocols with 'Enable' and 'Disable' radio buttons. In the Streaming section, RTSP and MMS are both enabled. In the Video Conference section, H.323 is enabled. In the VPN section, IPsec and PPTP are both enabled.

Section	Protocol	Enable	Disable
Streaming	RTSP	<input checked="" type="radio"/>	<input type="radio"/>
	MMS	<input checked="" type="radio"/>	<input type="radio"/>
Video Conference	H.323	<input checked="" type="radio"/>	<input type="radio"/>
VPN	IPSec	<input checked="" type="radio"/>	<input type="radio"/>
	PPTP	<input checked="" type="radio"/>	<input type="radio"/>

## 9.3 UPnP

Universal Plug and Play (UPnP) is a set of networking protocols that permits networked devices, such as personal computers, printers, Internet gateways, Wi-Fi access points and mobile devices to seamlessly discover each other's presence on the network and establish functional network services for communications.

### Applications - UPnP



The screenshot shows the 'Applications - UPnP' configuration page. It contains two fields: 'UPnP' with 'Enable' and 'Disable' radio buttons, and 'UPnP Port' with a text input field containing the value '49152'.

Field	Value
UPnP	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
UPnP Port	49152

## 10 Bandwidth Page

The MG700 bandwidth management feature provides powerful and unique mechanism to manage bandwidth – Static Bandwidth Management (SBM) and Dynamic Bandwidth Management (DBM). SBM provide user with the option to allocate a fixed amount of bandwidth for a specific computer or a particular application, while DBM intellectually manages to rest of the bandwidth while all the time satisfying the complicated bandwidth requirements/settings of SBM. The MG700 allow user manage the bandwidth. The bandwidth include: Throughput Optimizer, TurboNAT and Session Manager.

### 10.1 Throughput Optimize

User can set the throughput optimizer enable and choice the application priority to manage bandwidth automatically.

**Bandwidth - Throughput Optimizer**

**Throughput Optimizer** ☒ Enable ☐ Disable

---

**Application Priority**

TCP ACK	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
ICMP	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
DNS	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
SSH	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
Telnet (BBS)	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
TCP Max Segment Size	<input checked="" type="radio"/> Enable <input type="radio"/> Disable

### 10.2 TurboNAT

Network Address Translation (NAT) is often a performance bottleneck in routers and firewalls. Generic routers are generally insufficient when dealing with a high-speed broadband network. TurboNAT is designed to solve this problem by accelerating NAT performance allowing the MG700 to maximize the higher speed networks and to reserve system performance for other features such as ACL and VPN servers.

**ALLISCOM**  
ALLIS COMMUNICATIONS

Status Setup Wireless Security Application

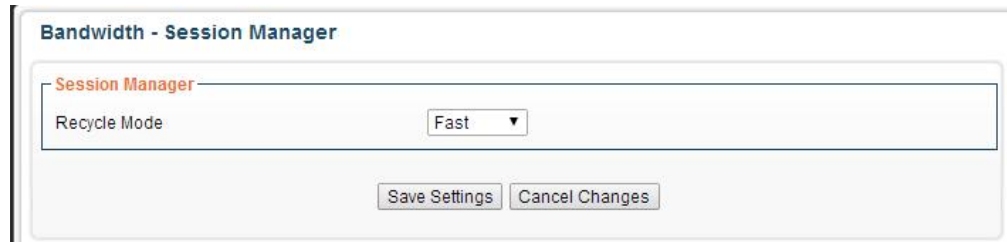
**Bandwidth - TurboNAT**

**TurboNAT** ☒ Enable ☐ Disable

Save Settings Cancel Changes

### 10.3 Session Manager

Session manager will automatically recycle old/dead sessions to get better connection efficiency. Users can choose the re-cycle rate to optimize the connection efficiency especially for applications which rapidly open and close many ports.



Bandwidth - Session Manager

Session Manager

Recycle Mode: Fast

Save Settings Cancel Changes

## 11 Serial Setting Page

In this page, MG700 shows the Port1/Port2/Port3 Operating Mode, data count and listening status. The MG700 supports serial port to user serial device. The serial port data will be change to internet packet data. User can get the data by IP address and Port.

Status	Setup	Wireless	Security	Applications	Bandwidth	Serial Setting	Adm
Serial - Status							Status
Port 1							Port 1
Port 2							Port 2
Port 3							Port 3
File Mode							File Mode

LINE						
Port	OP Mode	Data	ISP1	ISP2	ISP3	ISP4
Port 1	TCP Server	0	Listen	Listen	Listen	Listen
Port 2	TCP Server	0	Listen	Listen	Listen	Listen
Port 3	TCP Server	0	Listen	Listen	Listen	Listen

### 11.1 Status Page

In Status Page, user can monitoring the serial port setting mode and login information.

#### Serial - Status

LINE						
Port	OP Mode	Data	ISP1	ISP2	ISP3	ISP4
Port 1	TCP Server	494341506	Listen	Listen	Listen	Listen
Port 2	TCP Server	467538394	220.133.29.222	Listen	Listen	Listen
Port 3	TCP Server	0	Listen	Listen	Listen	Listen

### 11.2 Port1/2/3 Page

In Port1/2/3 page, user can set the serial port alias name, baud rate, hardware flow control...etc. The Port alias name will create the same directory in SD/USB storage.

#### Serial setting - Port 1

**Serial Setting**

Port alias:

Baud Rate:

Data bits:

Stop bits:

Parity:

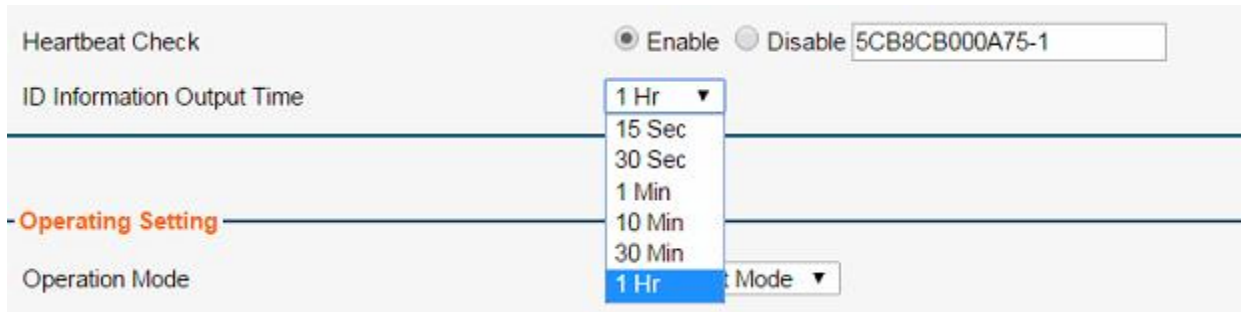
Flow Control:

FIFO: ☐ Enable ☐ Disable

MG700 support Heartbeat check. MG700 can send the specify ID to connection by operation mode( TCP Server 、 TCP Client and UDP Client mode), the output data is include

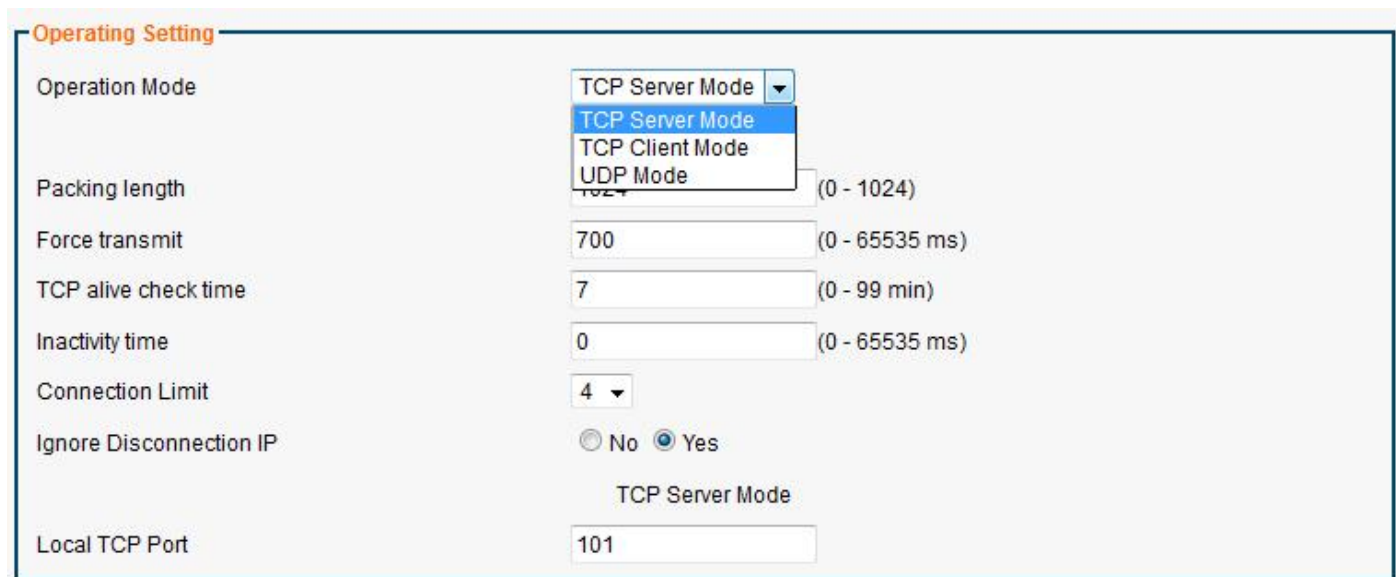


ID、firmware version、WAN port and LAN port status. Such like {"id": "5CB8CB000A75-1", "Firmware Ver": "1.5.7", "WAN": "Link-down", "LAN1": "Link-down", "LAN2": "Link-down", "LAN3": "Link-down", "LAN4": "Link-up"}. The “Link-down” means the port is without device connected. The “Link-up” means the port is connected device.



The operation mode could be set to TCP Server Mode, TCP Client mode and UDP mode. The TCP Server Mode allow user login the MG700's specific port to get the serial port 1 data. The specific port set into local port.

In TCP Server mode, user MG700 will keep listening for TCP connection.



Operation Mode	TCP Server Mode
Packing length (Byte)	MG700 will force out as data length meet the parameter.
Force transmit (ms)	MG700 will Force transmit serial data to the Ethernet port.
TCP alive check time(min)	MG700 will check the TCP connection is alive or not, if not, MG700 will close the connection.
Inactivity time(ms)	If TCP connection is no response with MG700, MG700 will close the connection.

Connection Limit	Allow TCP connection request data in the same time. The maximum is 4.
Ignore Disconnection IP	If select Yes, the TCP connection is not responding will be ignored.
Local TCP Port	Setting the proper Local TCP Port, MG700 will listen Local TCP Port to connection. Note: Do NOT set the same Local TCP Port on Port1/Port2/Port3.

The Client Mode, user can send serial port data out to Destination IP address and Port.

**Operating Setting**

Operation Mode

TCP Client Mode

Data Packing

Packing length

1024

(0 - 1024)

Force transmit

700

(0 - 65535 ms)

TCP alive check time

7

(0 - 99 min)

Inactivity time

0

(0 - 65535 ms)

Ignore Disconnection IP

☒ Yes
☐ No

TCP Client Mode

Destination IP Address

Port

Destination IP address 1

:

4001

Destination IP address 2

:

4001

Destination IP address 3

:

4001

Destination IP address 4

:

4001

Destination Local Port 1

5011

( 0 - 65535)( 0 represents assigned automatically.)

Destination Local Port 2

5012

( 0 - 65535)

Destination Local Port 3

5013

( 0 - 65535)

Destination Local Port 4

5014

( 0 - 65535)

### 11.3 File Mode Page

In this page, user can set the serial data save to SD card or/and USB storage. The SD card is default.

## Serial - File Mode

### Global Setting

File Mode ☒ Enable ☐ Disable  
 Destination ☒ SD (Default) ☒ USB Storage

Before user remove the SD card or USB storage, please select File Mode to Disable. It will protect the record data. It is because of the FAT/FAT32 format. If the SD/USB is EXT3/EXT4 format, the data will be performance and reliability. Please see the Appendix II: Ext3/Ext4 Format.

---

Important: Select File mode to disable before remove the SD card or USB storage.

---

The record method means if the storage space is full, the serial data will be re-cycle record or stop record.

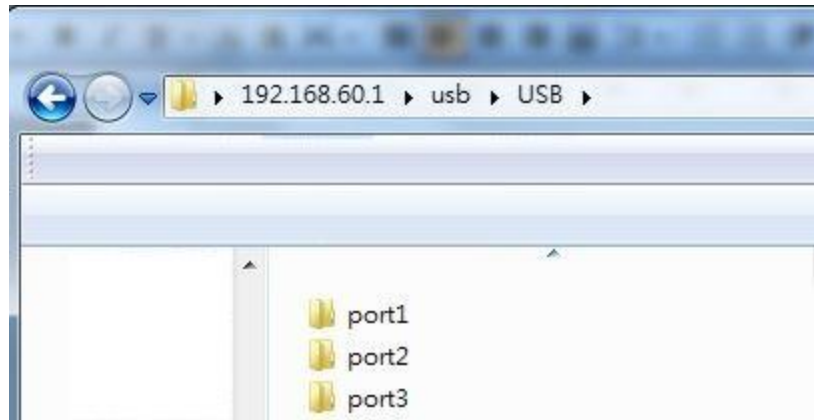
### Signal Setting

UART Source	Record Method
Port 1	<input type="radio"/> Re Cycle <input checked="" type="radio"/> Full Stop
Port 2	<input type="radio"/> Re Cycle <input checked="" type="radio"/> Full Stop
Port 3	<input type="radio"/> Re Cycle <input checked="" type="radio"/> Full Stop

User can login MG700 to download the record data. In the windows system, user input the “\\192.168.60.1” to login. In the Linux system, user input the “SMB://192.168.60.1/” to login.



The port1/port2/port3 directory depends on device alias name.



The DDNS with File Mode, user can enter the “[\\alvin.mgddns.com](http://alvin.mgddns.com)” on file explore to login the MG700 and upload/download the file by remote.

**Dynamic Domain Name Service - WAN 1**

DDNS Service	<input checked="" type="radio"/> Enable <input type="radio"/> Disable
DDNS Type	Mgddns.com ▼
User Name	6f39e97e73ded4f7e8cd286cbc59bd
Password	.....
Host Name	alvin.mgddns.com




---

**Important:**

1. Use “xxxx.mgddns.com” have to public IP address.
  2. SAMBA port will be locked by Firewall. If user use SAMBA File mode, the SAMBA port need to unlocked. The SAMBA port is from 135 ~ 139 and port 445.
-



## 12 GPS/GNSS Application

The GNSS default port of MG700 is on Port103, user could get the GNSS data by IP address and port, such as “192.168.60.1:103”. On Web GUI, user will see the GNSS data is increase on Port3.

### Serial - Status

LINE						
Port	OP Mode	Data	ISP1	ISP2	ISP3	ISP4
Port 1	TCP Server	0	Listen	Listen	Listen	Listen
Port 2	TCP Server	0	Listen	Listen	Listen	Listen
Port 3	TCP Server	333835134	Listen	Listen	Listen	Listen

### Serial setting - Port 3

#### Serial Setting

Port alias

Baud Rate

Data bits

Stop bits

Parity

Flow Control

FIFO ☒ Enable ☐ Disable

#### Operating Setting

Operation Mode

Data Packing

Packing length  (0 - 1024)

Force transmit  (0 - 65535 ms)

TCP alive check time  (0 - 99 min)

Inactivity time  (0 - 65535 ms)

Connection Limit

Ignore Disconnection IP ☐ No ☒ Yes

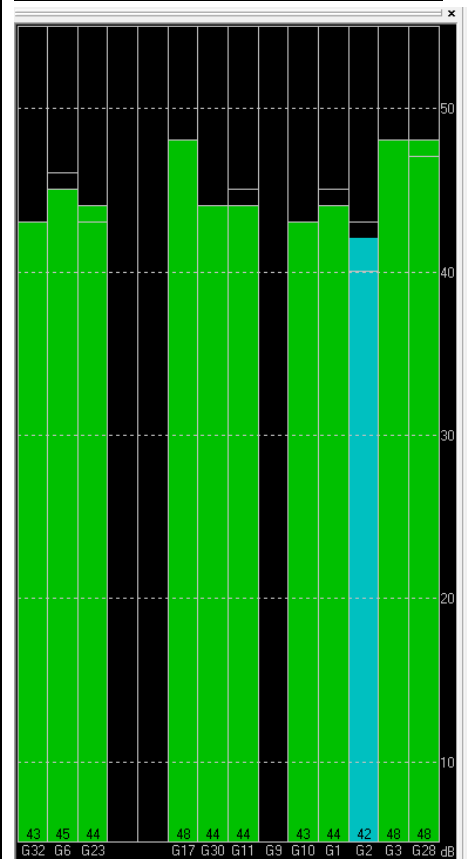
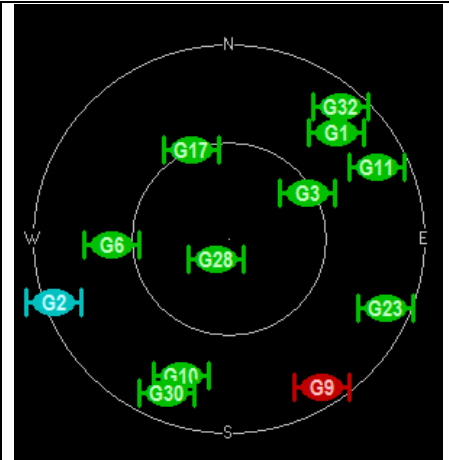
TCP Server Mode

Local TCP Port

## 12.1 GPS/GNSS NMEA data

MG700 support NMEA data, user can get the GPS data by IP address and Port, such as 192.168.60.1:103.

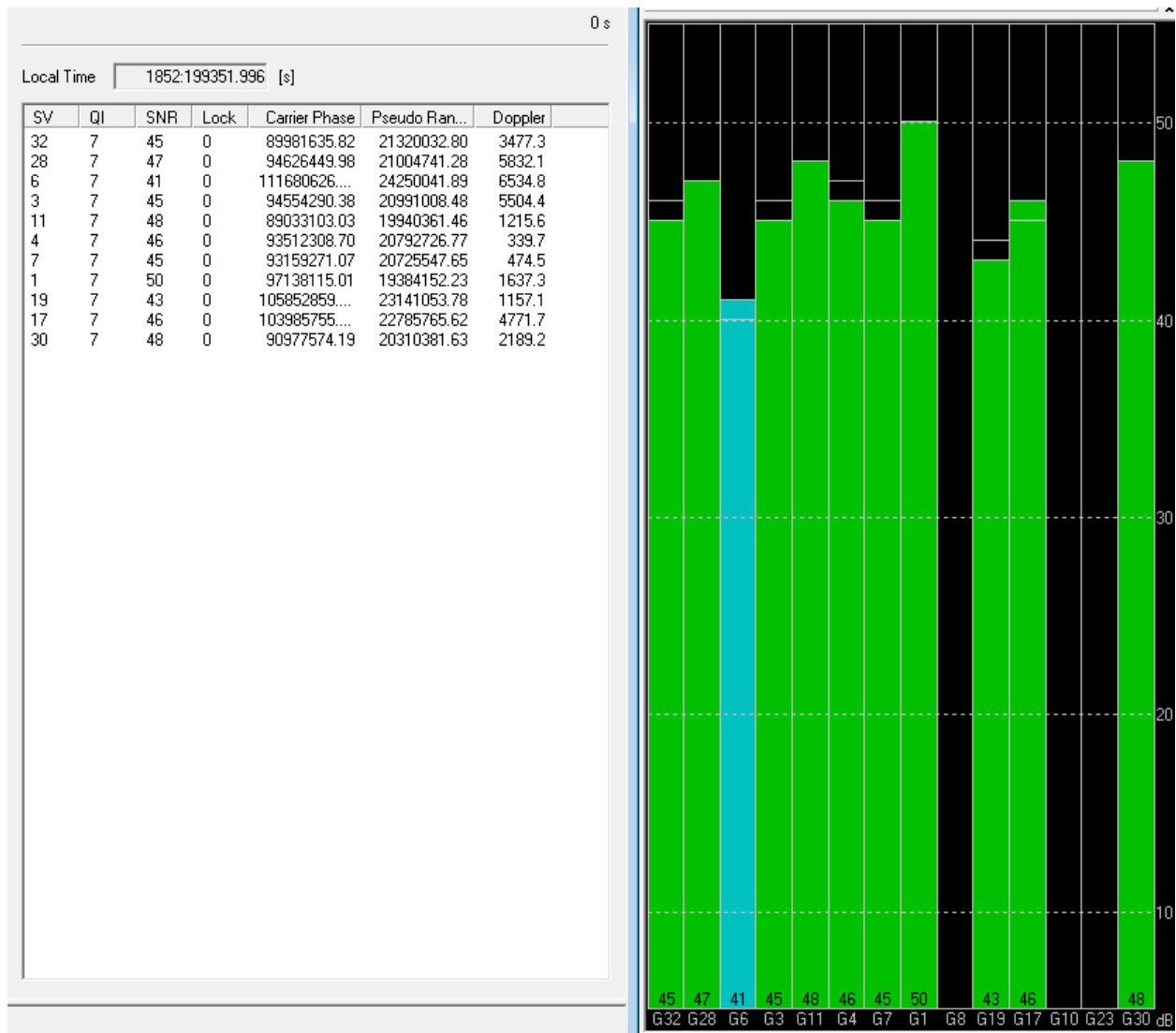
```
$GPGGA,084155.00,2504.18507,N,12137.31827,E,1,10,0.95,94.0,M,15.3,M,,*67
$GPGSA,A,3,32,06,23,17,30,11,10,01,03,28,,,1.71,0.95,1.42*04
$GPGSV,3,1,12,32,11,041,44,06,35,265,46,23,10,115,43,17,44,335,48*72
$GPGSV,3,2,12,30,14,203,44,11,15,063,44,09,08,149,,10,21,199,43*74
$GPGSV,3,3,12,01,21,044,43,02,03,249,38,03,49,061,48,28,81,224,48*74
$GPGLL,2504.18507,N,12137.31827,E,084155.00,A,A*65
$GPGGA,084156.00,2504.18509,N,12137.31828,E,1,10,0.95,93.9,M,15.3,M,,*6B
$GPGSA,A,3,32,06,23,17,30,11,10,01,03,28,,,1.71,0.95,1.42*04
$GPGSV,3,1,12,32,11,041,44,06,35,265,46,23,10,115,43,17,44,335,48*72
$GPGSV,3,2,12,30,14,203,44,11,15,063,44,09,08,149,,10,22,199,43*77
$GPGSV,3,3,12,01,21,044,43,02,03,249,38,03,49,061,49,28,81,224,48*75
$GPGLL,2504.18509,N,12137.31828,E,084156.00,A,A*67
$GPGGA,084157.00,2504.18510,N,12137.31830,E,1,10,0.95,93.9,M,15.3,M,,*6B
$GPGSA,A,3,32,06,23,17,30,11,10,01,03,28,,,1.71,0.95,1.42*04
$GPGSV,3,1,12,32,11,041,44,06,35,265,46,23,10,115,44,17,44,335,48*75
$GPGSV,3,2,12,30,14,203,45,11,14,063,44,09,08,149,,10,22,199,43*77
$GPGSV,3,3,12,01,21,044,44,02,03,249,38,03,49,061,49,28,81,224,48*72
$GPGLL,2504.18510,N,12137.31830,E,084157.00,A,A*67
$GPGGA,084158.00,2504.18510,N,12137.31832,E,1,10,0.95,93.9,M,15.3,M,,*66
$GPGSA,A,3,32,06,23,17,30,11,10,01,03,28,,,1.71,0.95,1.42*04
$GPGSV,3,1,12,32,11,041,43,06,35,265,46,23,10,115,44,17,44,335,48*72
$GPGSV,3,2,12,30,14,203,45,11,14,063,44,09,08,149,,10,22,199,43*77
$GPGSV,3,3,12,01,21,044,44,02,03,249,38,03,49,061,49,28,81,224,48*72
$GPGLL,2504.18510,N,12137.31832,E,084158.00,A,A*6A
$GPGGA,084159.00,2504.18511,N,12137.31834,E,1,10,0.95,93.9,M,15.3,M,,*60
$GPGSA,A,3,32,06,23,17,30,11,10,01,03,28,,,1.71,0.95,1.42*04
$GPGSV,3,1,12,32,11,041,43,06,35,265,46,23,10,115,44,17,44,335,48*72
$GPGSV,3,2,12,30,14,203,44,11,14,063,44,09,08,149,,10,22,199,43*76
$GPGSV,3,3,12,01,21,044,43,02,03,249,38,03,49,061,48,28,81,224,48*74
$GPGLL,2504.18511,N,12137.31834,E,084159.00,A,A*6C
```





## 12.2 GPS/GNSS RAW Data

MG700 support GNSS data, user can get the GNSS data by IP address and Port, such as 192.168.60.1:103.



Important: GPS NMEA /GNSS RAW data depend on GPS Module type.

## 13 Admin Application

The management screen is used to perform various administrative task on the MG700 such as changing the login password, saving and restoring system settings, scheduling a reboot, and performing firmware upgrade.

### Admin - Management

**Administration Interface**

Language English

Administrator Password .....

Re-type Password .....

Remote Management ☐ Enable ☒ Disable

Management Port HTTP 8080

**Reboot**

Reboot Reboot Router

**Configuration**

Configuration Export Export

Default Configuration Restore Default

Configuration Import Browse... No file selected. Import

**Firmware**

Firmware Upgrade Browse... No file selected. Upgrade

### 13.1 Management

User can set the login password in this page.

### Admin - Management

**Administration Interface**

Language English

Administrator Password .....

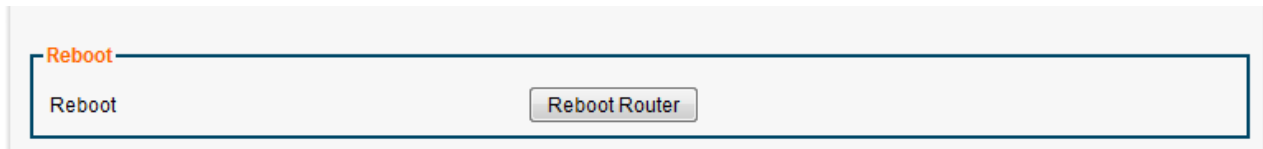
Re-type Password .....

Remote Management ☐ Enable ☒ Disable

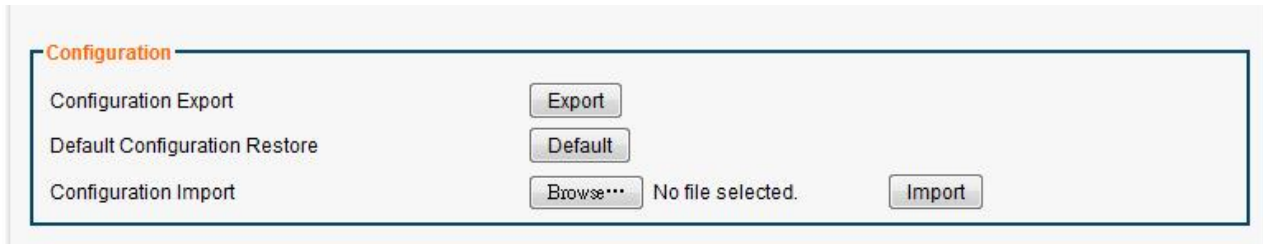
Management Port HTTP 8080

If user needs to reboot the MG700, press “Reboot Router” button. Then the MG700 will reboot

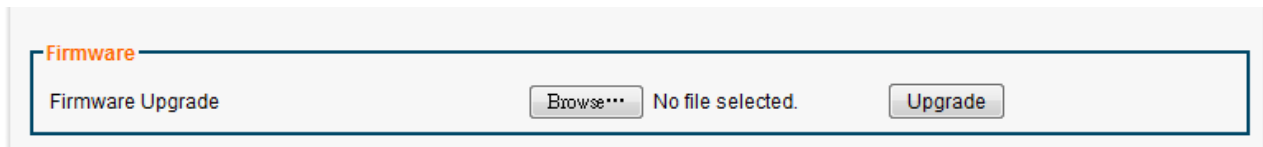
immediately.



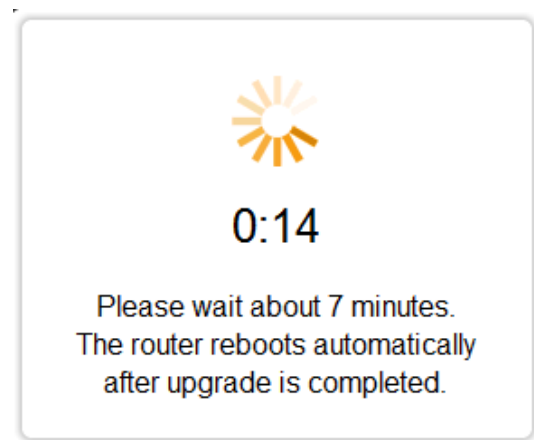
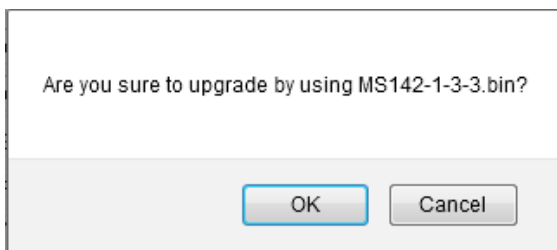
User can export/import the configuration of MG700.



If user need upgrade firmware, press Browser button and choice firmware file.



After press “Upgrade” button, MG700v ask again. If press OK, it will start to upgrade firmware. Upgrade firmware should spent about 7 minutes.



## 13.2 System Utilities

The System Utilities screen provides several useful tools for network and device diagnostics. MG700 include Ping, ARP tracing and Trace Route function

The Ping utility sends a series of ICMP packets to a designated IP address to test communications with that IP.

**Admin - System Utilities**

**Ping**

Interface: \*

Target Host:

Number of Packets: 4 Packets (1 ~ 10)

Ping:

The ARPing similar to “ping”, used to discover hosts on a network. The utility tests whether a given IP address is in use on the local network, and can get additional information about the device using that address. ARPing operates at layer 2(or the link layer of the OSI model) – using the Address Resolution Protocol (ARP) for probing hosts.

**ARPing (Within the same broadcasting domain)**

Interface: WAN1

Target Host:

Number of Packets: 4 Packets (1 ~ 10)

ARPing:

Trace Route is a network diagnostic tool for displaying the route and measuring transit delays of packets across and IP network. Trace Route sends a sequence of ICMP echo request packets addressed to a destination host. Trace Route uses the returned ICMP messages to produce a list of that the packets have traversed. The time stamp values returned for each router along the path are the delay (latency) values measured in milliseconds for each packet. The Trace Route results are displayed in the result window.

**Trace Route**

Interface: \*

Target Host:

Hop Count: 30 Counts (1 ~ 15)

Trace route:

### 13.3 Log

The system log records various events that have occurred during the MG700 operation. Events are divided into classes to make it easier to review specific event chains. The MG700 has a limited amount of space available for log events the oldest events are overwritten when the log is full.

**Admin - Log**

Sys Log

Type	Content
	{success: true, msJan 29 16:50:14 Using Default DNS 208.67.220.220 208.67.222.222\r\n< DNS >

Page 1 of 1

20

View 1 - 1 of 1

**Log Server Setting**

Syslog Server

☐ Enable ☒ Disable

Remote IP Address

Protocol

UDP

Remote Port

514

Save Settings

Cancel Changes

## 14 MG700 M2M Application



## 15 Hardware Specifications

Hardware Specifications				
Main Chip				
Core	MIPS24KEc,580MHz			
RAM	1G bit DDR2 RAM			
Flash Memory	128M Bit Flash			
Wireless	802.11 b/g/n			
Antenna	2T2R			
Linux OS	Linux 2.6.3			
Cellular System				
Cellular Module (Option)	WCDMA/CDMA- <b>USA</b> Combo, (Option)	CDMA 1xRTT - <b>USA</b> (Option)	WCDMA/UMTS (Default)	4G LTE (Option)
Frequency (*See Appendix I)	WCDMA: 800/850/900/1900/2100MHz) CDMA : 850/900/1800/1900MHz	Band 2/Band5 (800/1900 MHz)	Band 2/Band1 (850/2100 MHz)	Band 1/3/7/8/20 (800/900/1800/2100/2600 MHz)
Uplink/Downlink	WCDMA: 5.76M/14.4 Mbps CDMA 1xRTT: 307.2/307.2 Kbps	153/153 Kbps	5.76/7.2 Mbps	50/100 Mbps
Connector				
RJ45	2 Ethernet port(LAN and WAN) + 3 Serial Port or 3 LAN(option)			
TFlash/Micro SD	1			
USB Port	1			
SIM Card	1			
WiFi Antenna	2			
GSM Antenna	1			
GPIO/Relay	2( Relay Normal Open)			
Specific				
Battery	1100mAH(Option)			
Reset Button	1			
Switch	2(1 for Power on/off, 1 for GPS Select)			
Temperature	-20℃ ~ 65℃			
Dimension	90 x 130 x 20mm			
DC Power				
Power In	12V			
Power consumption	Max. 2A			
AC Adaptor				
Power In	Input : 110~260VAC Output : 12VDC			
Power consumption	Max. 2A			
Temperature	0℃ ~ 40℃			

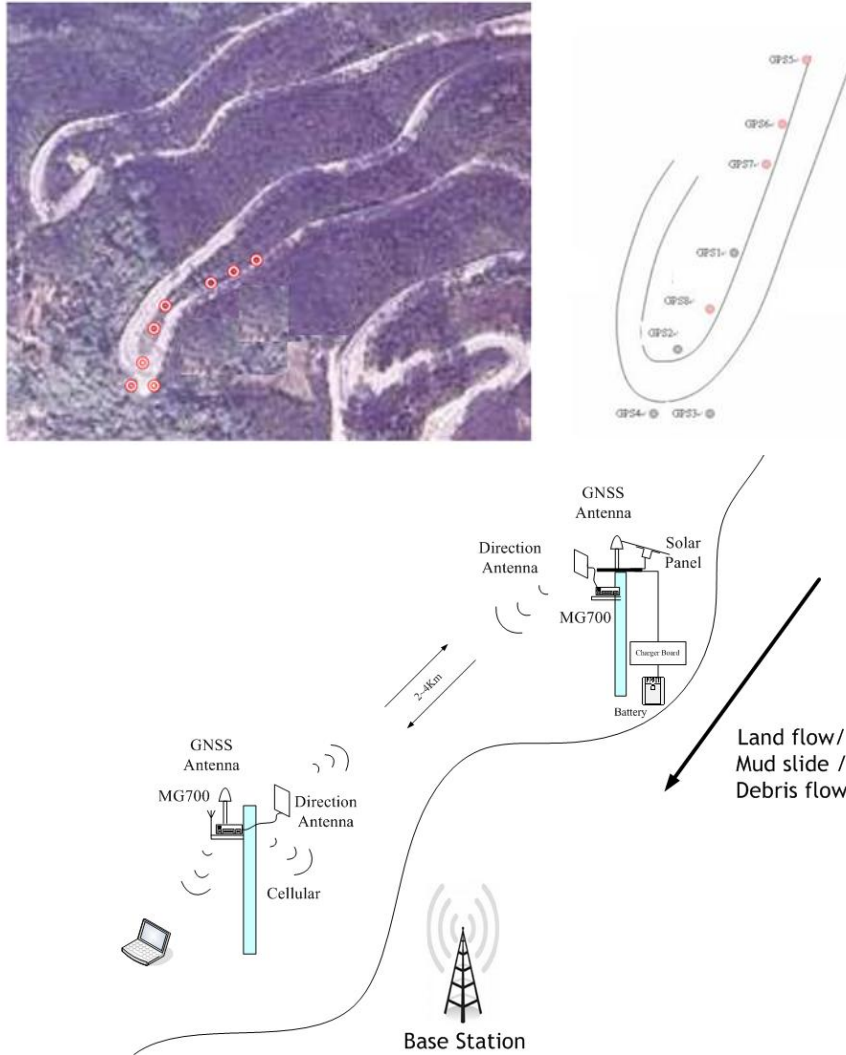


## 16 Software Application

Item	Description		
1	Wireless Interface	Standard Compliance	IEEE 802.11 b/g/n
		Transceiver Type	2T2R
		Mode	Activity (AP / Client mode)
		Antenna	PIFA Antenna x 2
		Range	Up to 50 meters
		Speed	Up to 300 Mbps
		Wireless Security	1. WEP 64 bit, WEP 128 bit, WPA, WPA2 2. Password protected access
2	Network	WAN	DDNS DHCP Static IP PPPOE 3G/4G Router WISP(Client WiFi)
		LAN	Ethernet LAN ports DHCP server on LAN Static routing rules
		VPN	IPSEC NAT-T and PPTP VPN pass-through. IPSEC Server supports 5-VPN client connection. VPN pass through Site-to-Site VPN
		Events Reporting	• Event Types: Power • Report/Action Types: SMS, Email, SNMP Trap, Relay Output
3	SSID x 2		
4	WDS support 4 point		
5	Serial to WiFi ( TCP server/TCP Client/UDP mode)		
6	Relay for GPIO control		
7	Show 3G Signal strength on Web		
8	System log		

## Application Note – GNSS Application

In GNSS(Global Navigation Satellite System) Application, MG700 with GNSS module, user receive the GNSS data for long term. The GNSS data can record in SD card or USB Storage. Also, the GNSS data point to specific IP address and Port by internet or 3G/4G Provider. In this application, user can setup several station and real time monitoring the land flow 、mud slide or debris flow situation by GIS software.

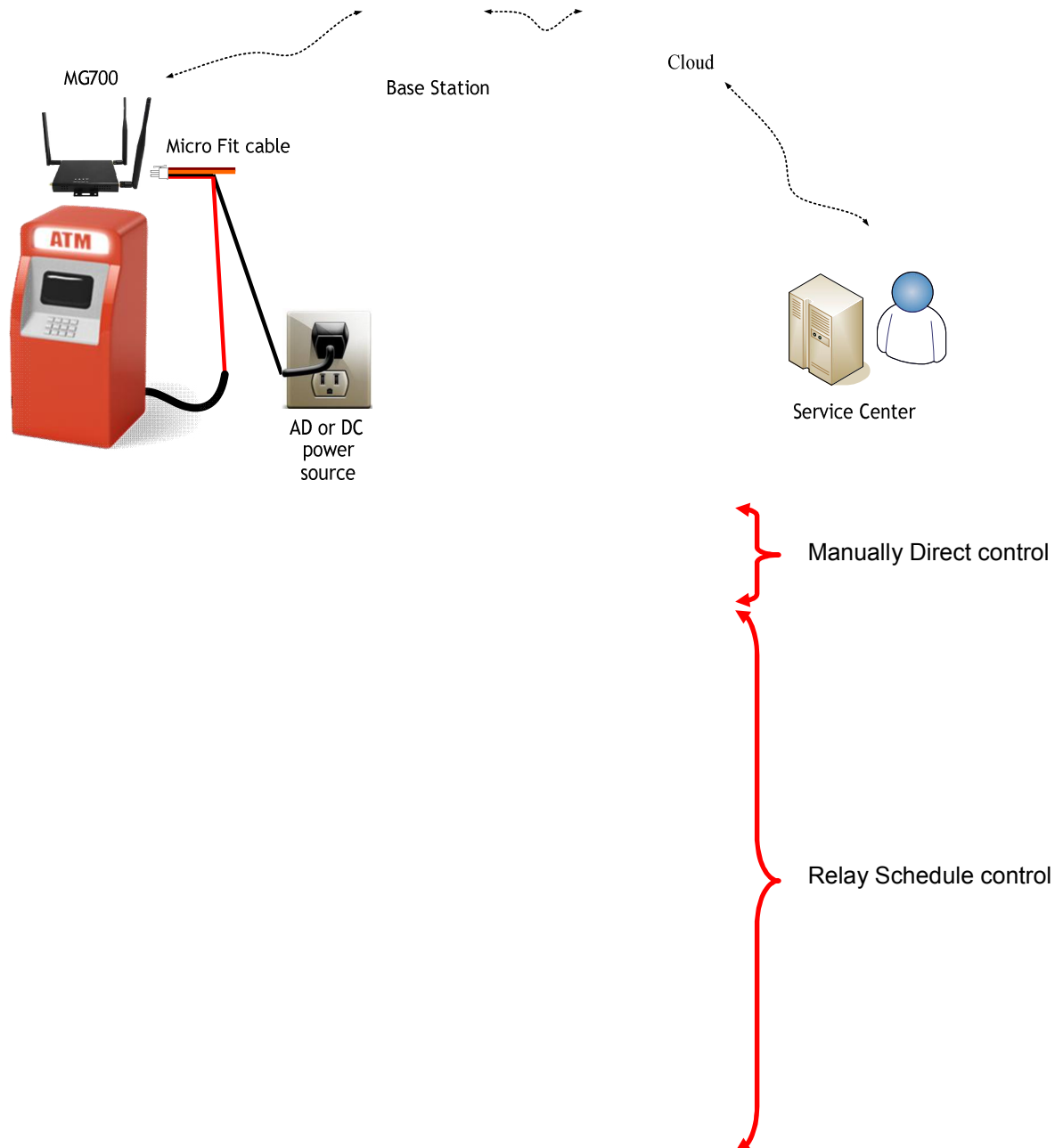


Important :

1. To monitoring land flow/mud slide/ debris flow needs specific software or algorithm.
2. The measurement distance depends on directional antenna.

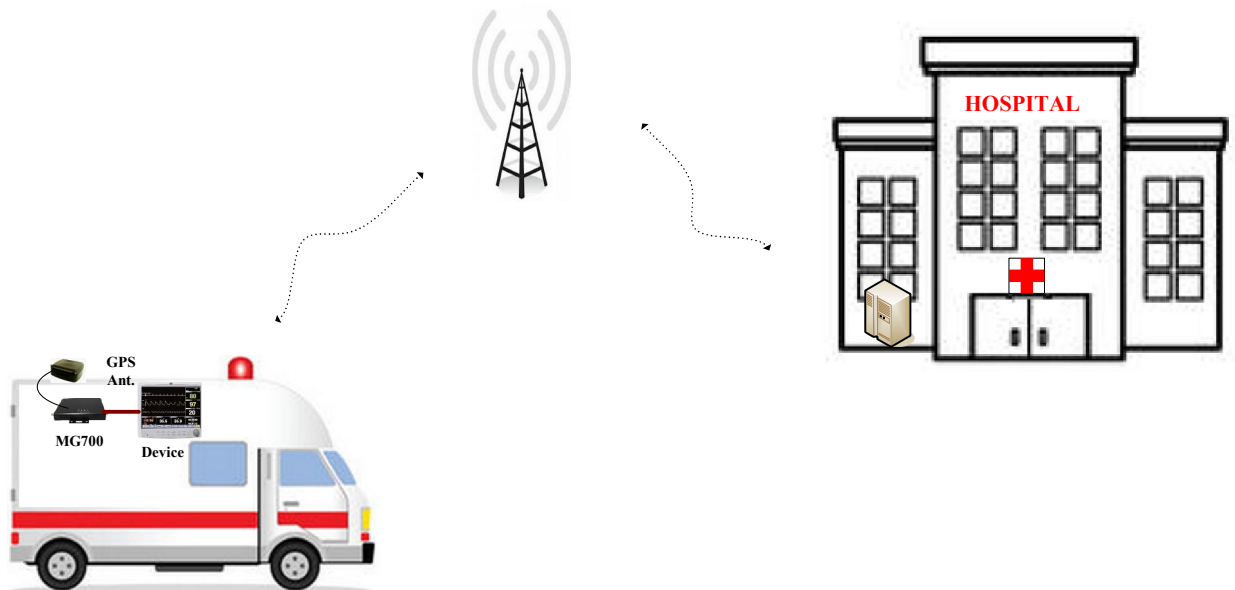
## Application Note – ATM remote control Application

In the ATM remote control power application, If ATM occur the shutdown or stop, the Service Center could reset the ATM's power by MG700 through Manually control or Schedule mode.



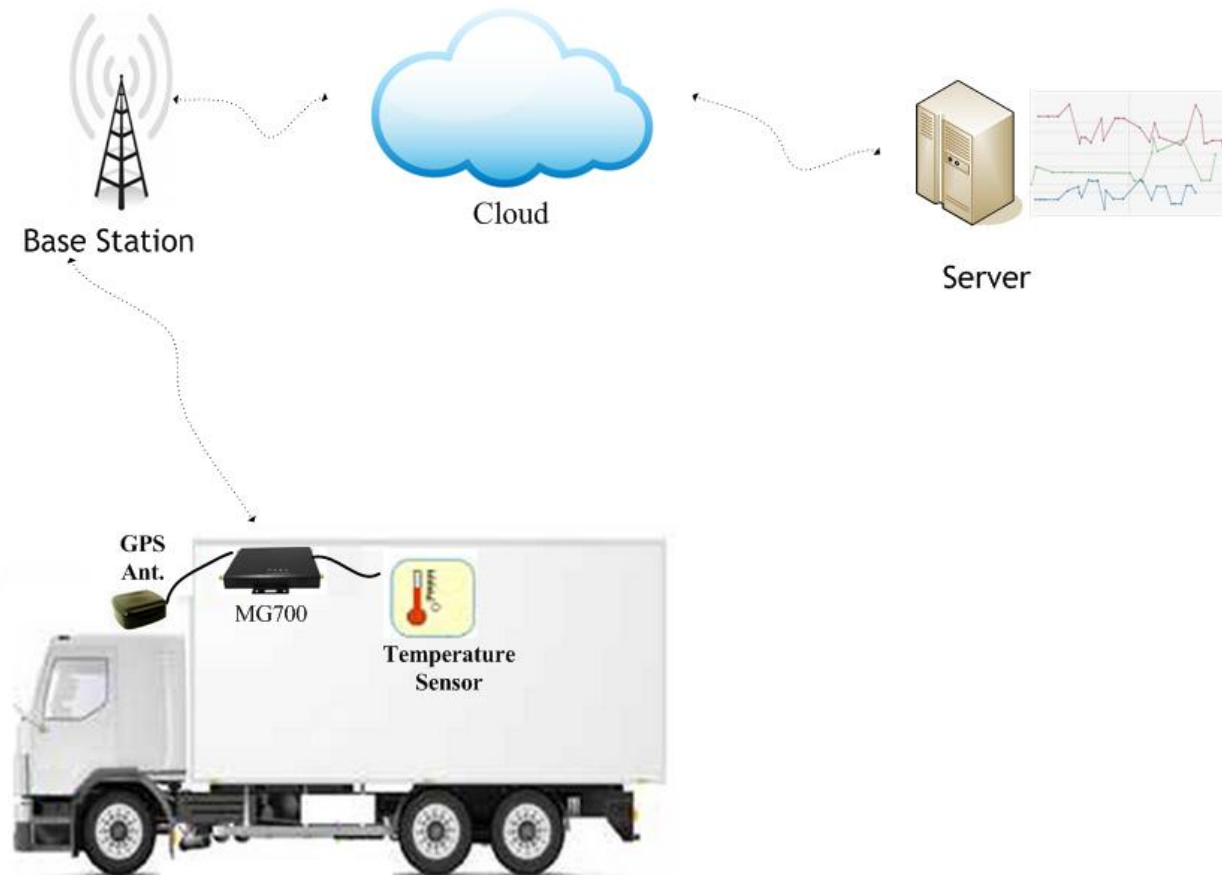
## Application Note – AMBULANCE Application

When someone with accident, the ambulance arrived at the scene. The MG700 could send the patient's physiological data, heart rate, blood pressure and other information sent to the hospital immediately. Then, the emergency center will provide the best solution for patient quickly . Also, if MG700 with GPS, Hospital will show the ambulance's position.



## Application Note – Tracker/Car Management Application

User can the temperature sensor(RS232 interface) connect with the MG700, then, the Server center will receive the temperature data and monitoring the temperature with Tracker. If MG700 with GPS, the Server can also monitor the Tracker Position.



## Appendix I – Frequency Band List

### 1. WCDMA/UMTS Bands

Band	System	Uplink(MHz)	Downlink(MHz)
1	2100	1920 - 1980	2110 – 2170
2	1900	1850 – 1910	1930 – 1990
3	1800	1710 – 1785	1805 – 1880
4	1700	1710 – 1755	2110 – 2155
5	850	824 – 849	869 – 894
6	800	830 – 840	875 – 885
7	2600	2500 – 2570	2620 – 2690
8	900	880 – 915	925 – 960
9	1700	1749.9 – 1784.9	1844.9 – 1879.9
10	1700	1710 – 1770	2110 – 2170
11	1500	1427.9 – 1447.9	1475.9 – 1495.9
12	700	699 – 716	729 – 746
13	700	777 – 787	746 – 756
14	700	788 – 798	758 – 768
15	Reserved		
16	Reserved		
17	Reserved		
18	Reserved		
19	800	832.4 – 842.6	877.4 – 887.6
20	800	832 – 862	791 – 821
21	1500	1447.9 – 1462.9	1495.9 – 1510.9
22	3500	3410 – 3490	3510 – 3590
23	Reserved		
24	Reserved		
25	1900	1850 – 1915	1930 – 1995
26	850	814 – 849	859 – 894

## 2. GSM Bands

Band	System	Uplink (MHz)	Downlink (MHz)
1	T-GSM-380	380.2–389.8	390.2–399.8
2	T-GSM-410	410.2–419.8	420.2–429.8
3	GSM-450	450.6–457.6	460.6–467.6
4	GSM-480	479.0–486.0	489.0–496.0
5	GSM-710	698.2–716.2	728.2–746.2
6	GSM-750	747.2–762.2	777.2–792.2
7	T-GSM-810	806.2–821.2	851.2–866.2
8	GSM-850	824.2–849.2	869.2–894.2
9	P-GSM-900	890.0–915.0	935.0–960.0
10	E-GSM-900	880.0–915.0	925.0–960.0
11	R-GSM-900	876.0–915.0	921.0–960.0
12	T-GSM-900	870.4–876.0	915.4–921.0
13	DCS-1800	1,710.2–1,784.8	1,805.2–1,879.8
14	PCS-1900	1,850.2–1,909.8	1,930.2–1,989.8

## 3. LTE Bands

### ● FDD LTE bands

Band	Uplink(MHz)	Downlink(MHz)
1	1920 - 1980	2110 - 2170
2	1850 - 1910	1930 - 1990
3	1710 - 1785	1805 -1880
4	1710 - 1755	2110 - 2155
5	824 - 849	869 - 894
6	830 - 840	875 - 885
7	2500 - 2570	2620 - 2690
8	880 - 915	925 - 960
9	1749.9 - 1784.9	1844.9 - 1879.9
10	1710 - 1770	2110 - 2170
11	1427.9 - 1452.9	1475.9 - 1500.9
12	698 - 716	728 - 746
13	777 - 787	746 - 756
14	788 - 798	758 - 768



15	1900 - 1920	2600 - 2620
16	2010 - 2025	2585 - 2600
17	704 - 716	734 - 746
18	815 - 830	860 - 875
19	830 - 845	875 - 890
20	832 - 862	791 - 821
21	1447.9 - 1462.9	1495.5 - 1510.9
22	3410 - 3500	3510 - 3600
23	2000 - 2020	2180 - 2200
24	1625.5 - 1660.5	1525 - 1559
25	1850 - 1915	1930 - 1995
26	814 - 849	859 - 894
27	807 - 824	852 - 869
28	703 - 748	758 - 803
29	n/a	717 - 728
30	2305 - 2315	2350 - 2360
31	452.5 - 457.5	462.5 - 467.5

- **TDD LTE bands**

<b>Band</b>	<b>Frequency(MHz)</b>	<b>Bandwidth(MHz)</b>
33	1900 - 1920	20
34	2010 - 2025	15
35	1850 - 1910	60
36	1930 - 1990	60
37	1910 - 1930	20
38	2570 - 2620	50
39	1880 - 1920	40
40	2300 - 2400	100
41	2496 - 2690	194
42	3400 - 3600	200
43	3600 - 3800	200
44	703 - 803	100

## Appendix II – Ext3/Ext4 Format

- Ext3

Ext3, or third extended file system, is a journaled file system that is commonly used by the Linux kernel. It is the default file system for many popular Linux distributions. Stephen Tweedie first revealed that he was working on extending ext2 in Journaling the Linux ext2fs File system in a 1998 paper, and later in a February 1999 kernel mailing list posting. The file system was merged with the mainline Linux kernel in November 2001 from 2.4.15 onward. Its main advantage over ext2 is journaling, which improves reliability and eliminates the need to check the file system after an unclean shutdown. Its successor is ext4.

- Ext4

Ext4 is the evolution of the most used Linux file system, Ext3. In many ways, Ext4 is a deeper improvement over Ext3 than Ext3 was over Ext2. Ext3 was mostly about adding journaling to Ext2, but Ext4 modifies important data structures of the file system such as the ones destined to store the file data. The result is a file system with an improved design, better performance, reliability and features.

Any existing Ext3 file system can be migrated to Ext4 with an easy procedure which consists in running a couple of commands in read-only mode (described in the next section). This means that you can improve the performance, storage limits and features of your current file systems without reformatting and/or reinstalling your OS and software environment. If you need the advantages of Ext4 on a production system, you can upgrade the file system. The procedure is safe and doesn't risk your data (obviously, backup of critical data is recommended, even if you aren't updating your file system :). Ext4 will use the new data structures only on new data, the old structures will remain untouched and it will be possible to read/modify them when needed. This means, of course, that once you convert your file system to Ext4 you won't be able to go back to Ext3 again (although there's a possibility, described in the next section, of mounting an Ext3 file system with Ext4 without using the new disk format and you'll be able to mount it with Ext3 again, but you lose many of the advantages of Ext4).

Currently, Ext3 support 16 TB of maximum file system size, and 2 TB of maximum file size. Ext4 adds 48-bit block addressing, so it will have 1 EB of maximum file system size and 16 TB of maximum file size. 1 EB = 1,048,576 TB (1 EB = 1024 PB, 1 PB = 1024 TB, 1 TB = 1024 GB). Why 48-bit and not 64-bit? There are some limitations that would need to be fixed before making Ext4 fully 64-bit capable, which have not been addressed in Ext4. The Ext4 data structures have been designed keeping this in mind, so a future update to Ext4 will implement full 64-bit support at some point. 1 EB will be enough (really until that happens. (Note: The code to create file systems bigger than 16 TB is -at the time of writing this article- not in any stable release of e2fsprogs. It will be in future releases.)