MobileBridge Gateway Series

MB6000

Wireless Cellular Data Gateway

User Guide

Version 0.5

2005-9-14

Federal Communication Commission Interference Statement

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

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

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

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

IMPORTANT NOTE:

FCC Radiation Exposure Statement:

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

This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Top Global declares that MB6000 (FCC ID: SUMMB6000) is limited in CH1~CH11 for 2.4GHz by specified firmware controlled in U.S.A.

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FOREWORD

This section describes the objectives, audience and conventions of the Top Global MB6000 User Guide.

Objectives

This document explains the steps for initial setup and basic configuration of the MB6000. This document also provides troubleshooting information and detailed specifications.

Audience

This document is for the person installing and configuring the MB6000 for the first time. The installer should be familiar with network structures, terms, and concepts.

Conventions

This document uses the following conventions to convey instructions and information:

■ Tools and keywords are in boldface type.

Note — Means reader take note. Notes contain helpful suggestions or references to materials not contained in this manual.

Warning — **The warning symbol means danger.** You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents.

Obtaining Documentation

The following sections explain how to obtain documentation from Top Global.

World Wide Web

You can access the latest Top Global documentation on the World Wide Web at the following URL: http://www.topglobalusa.com.com/support1.asp

Special comment

This device is general Wireless router, and can act as WWAN router only after inserting WWAN pc card.

1 Introduction

MB6000 is the industrial first and the most integrated WLAN and 3rd generation cellular (3G) solution for Home, Small Office and Home Office (SOHO).The products are simple to use and easily scalable. MB6000 is a 3G router for consumer market based on our MobileBridge™ platform technology.

MB6000 combines the best of Wi-Fi and 3G mobile communications technologies including CDMA 1x, EV-DO, EDGE, and UMTS and can be easily upgraded to support EV-DO Release A and HSDPA.

MB6000 bridges wireless networks of 802.11b/g standards and wired networks, allowing them to communicate with each other. MB6000 allows authorized and welcome users to share the Internet access.

Use the instructions in this guide to help you connect the MB6000, set it up, and configure it to work.

2 Installing the MB6000

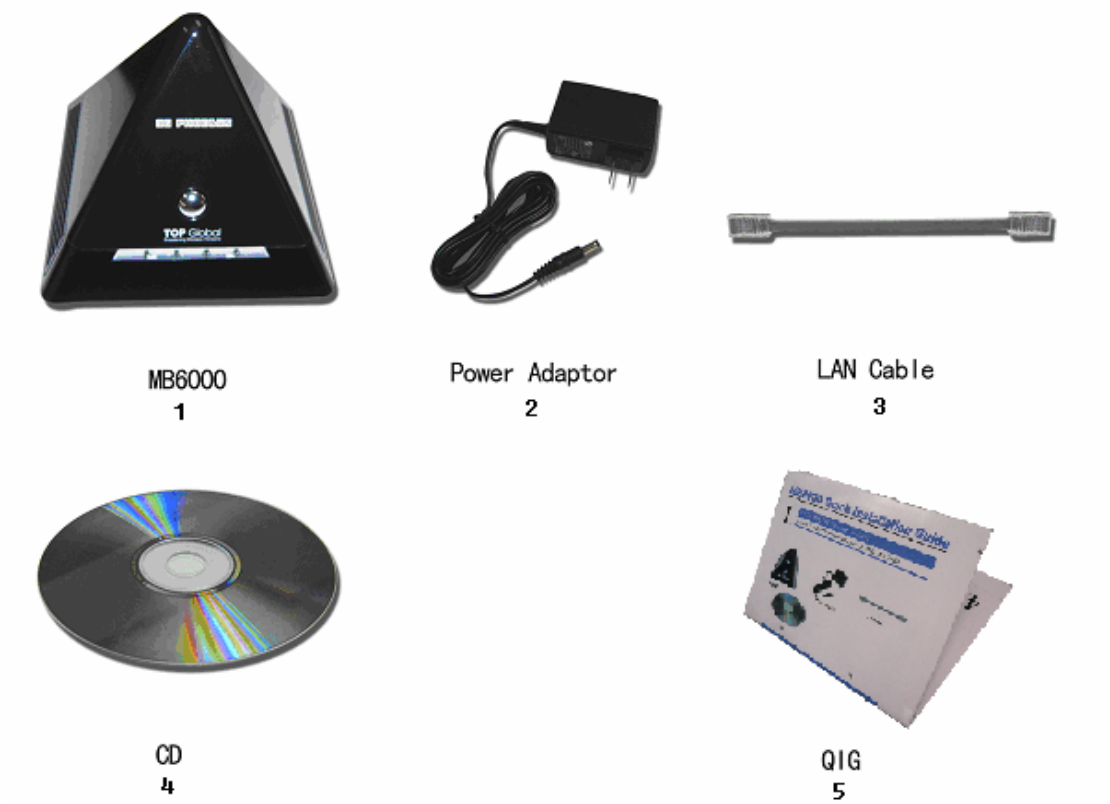
Installing the MB6000 is easy. Follow the quick steps below to power up your wireless network:

- Verify kit content;
- Write down product ID;
- Power up the MB6000;
- LED Indicators;
- Initialize the MB6000 unit

2.1 Verify Kit Contents

MB6000 kit includes the following components, similar to those depicted in Figure 2-1.

Figure2-1 ***MB6000 Kit Contents***



1. MB6000 router (Top View）
2. Power supply
3. Ethernet cable

4. CD
5. QIG (Quick Installation Guide)

2.2 Write Product Identification

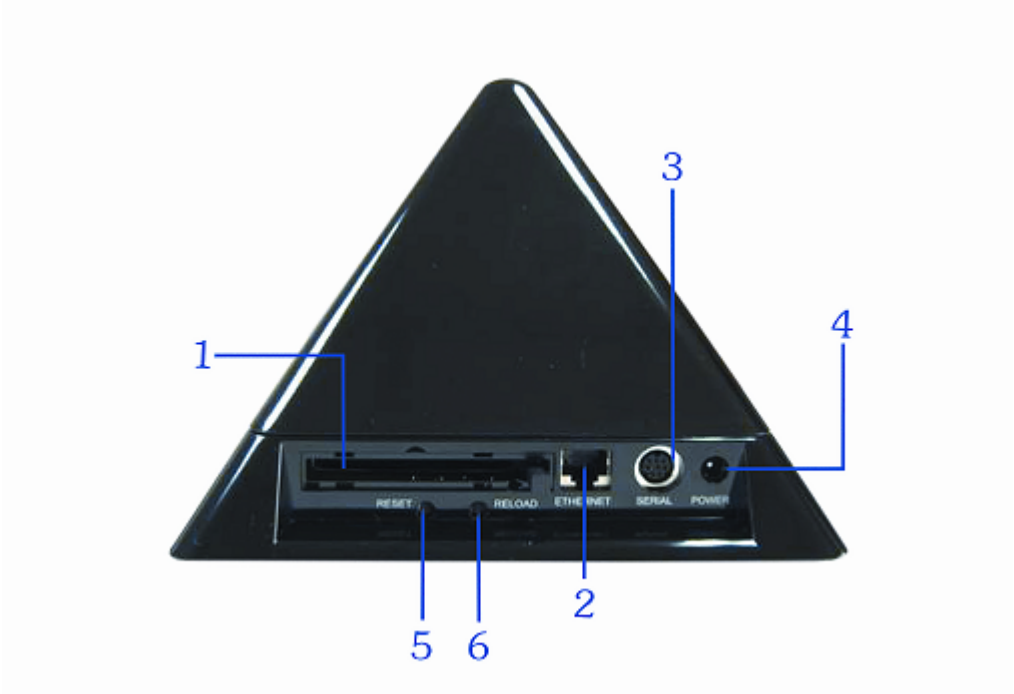
Before you proceed with your MB6000 installation, please write down and keep the following MB6000 information on the MB6000 label:

- Serial Number
- MAC address

2.3 Power up the MB6000

Connect the MB6000 power supply (refer to Figure 2-2) and press the power switch down.

Figure2-2 ***Ports description***



1. PC Card Slot
2. Ethernet LAN Interface
3. Console Port (RS232)
4. Power jack

5. Reset Button

6. Reloader Button

The MB6000 power supply accepts any input AC voltage in the range of 100-240 VAC.

2.4 LED Indicators

MB6000 has four two-color LEDs to indicate the working status. The following table shows the status when the MB6000 is configured successfully and running properly.

Table 2-1 ***Normal LED Indications***

	Power	**WLAN**	**WWAN**	**Ethernet**
Off	Power off	Disabled	Card inserted; No Internet connection	No cable
Green	Power on and normal	Enabled	Card inserted; Internet connection	100Mbps mode
Green Blink	N/A	Enabled and data transmission	Card inserted; Internet connecting	100Mbps mode, and data transmission
Red	N/A	N/A	No card	10Mbps mode
Red Blink	N/A	N/A	N/A	10Mbps mode, and data transmission
Amber	System boot and error	N/A	N/A	N/A
Amber Blink	Upgrading firmware	Enabled and data transmission error	N/A	N/A

2.5 Initialize the MB6000 Unit

1. Connect MB6000 with your computer, there are two ways to connect MB6000 with your computer:

I. Connect your computer to MB6000 using attached Ethernet cable or a hub and your computer is set with “Automatic IP” configuration.

II. Alternatively, you can connect your computer to MB6000 with wireless LAN.

a) Install an 802.11b/g wireless LAN PC card in a laptop or other computer, including the driver and the Client Manager Application software if available. If you are using Centrino laptop, the wireless LAN module is already embedded. There is no need to install extra Wireless LAN card.

b) Configure the Wireless LAN card to match the network name and encryption key of Wireless LAN card installed in the MB6000. The default network name is the SN of this device, and “Automatic IP” configuration is also needed.

2. Validate that your computer has got IP address from the MB6000, then open the web browser and enter http://172.16.0.1. Press Enter then the MB6000 login screen appears (Figure 2-1 login window). Enter the username/password (default is admin/admin), and click OK, the home web page appears (Figure 2-4 home page).

Figure2-3 login window – English window

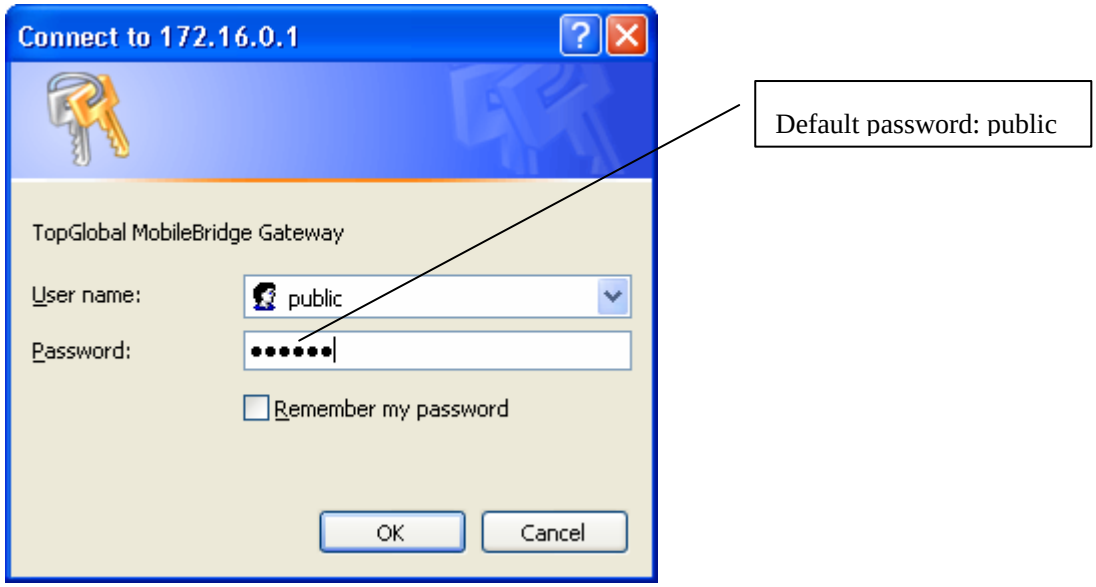
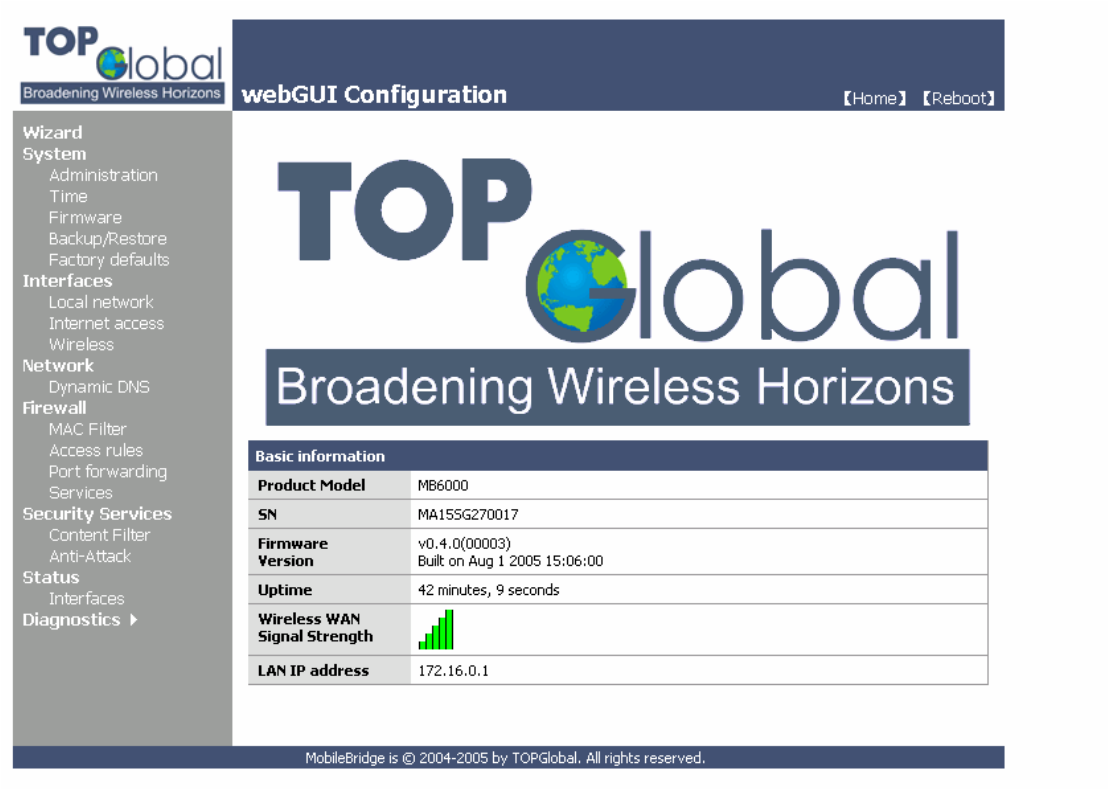


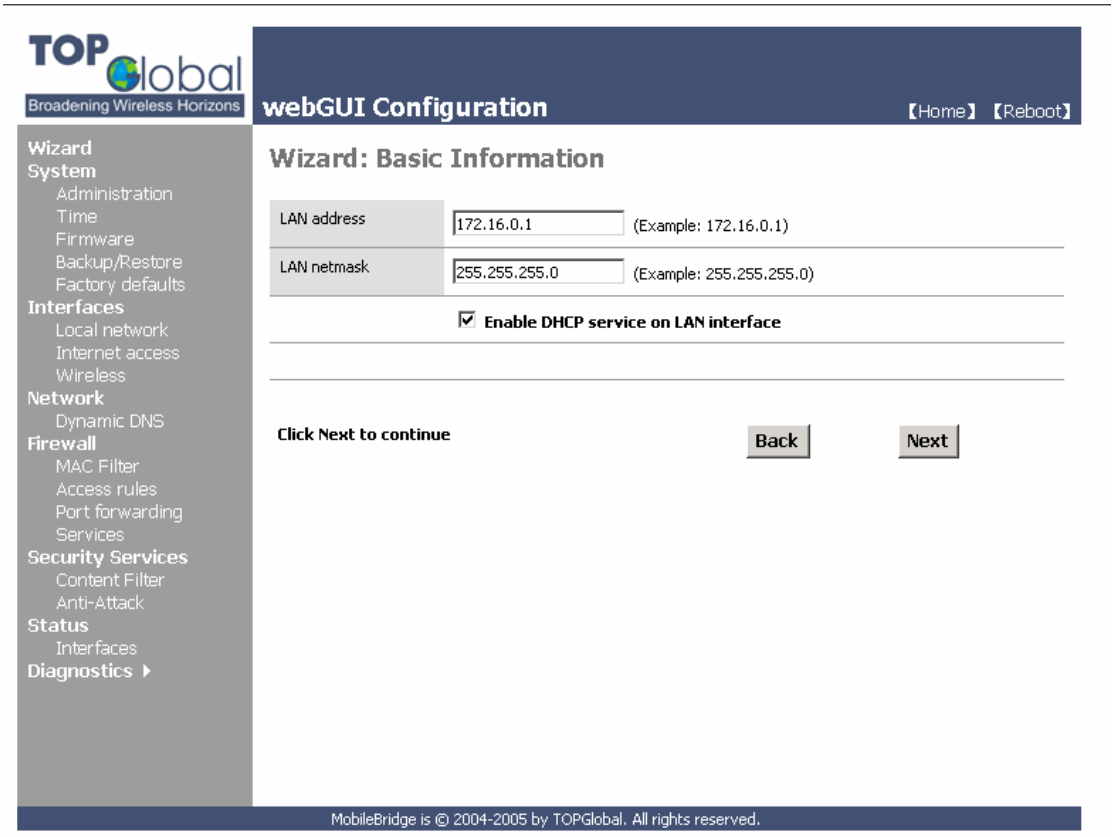
Figure2-4 ***home page***



If you want to do a quick installation, you can continue to read the content in this chapter. Otherwise, you want to make a custom installation, please go to Chapter 3 directly.

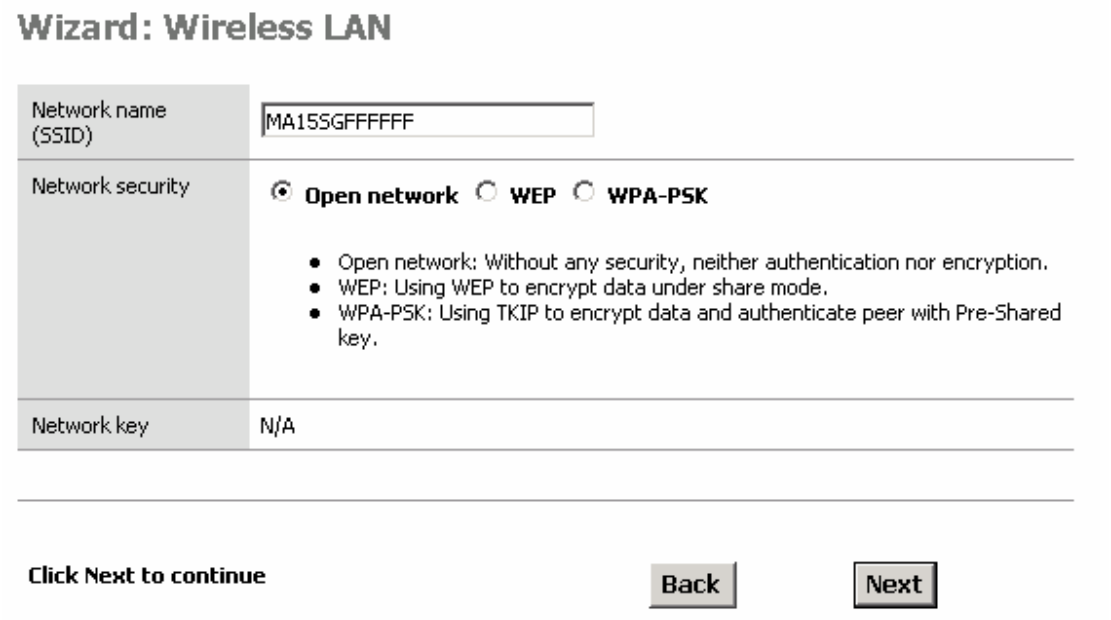
3. Click "**Wizard**" on the home page. And click "Enter". The "Step 1" page appears (Figure 2-5 Wizard - Basic Information).

Figure2-5 ***Wizard - Basic Information***



You can change the IP of MB6000 or use the default values. Then click “Next”. Go to “Step 2” page (Figure 2-6 Wizard – Wireless LAN).

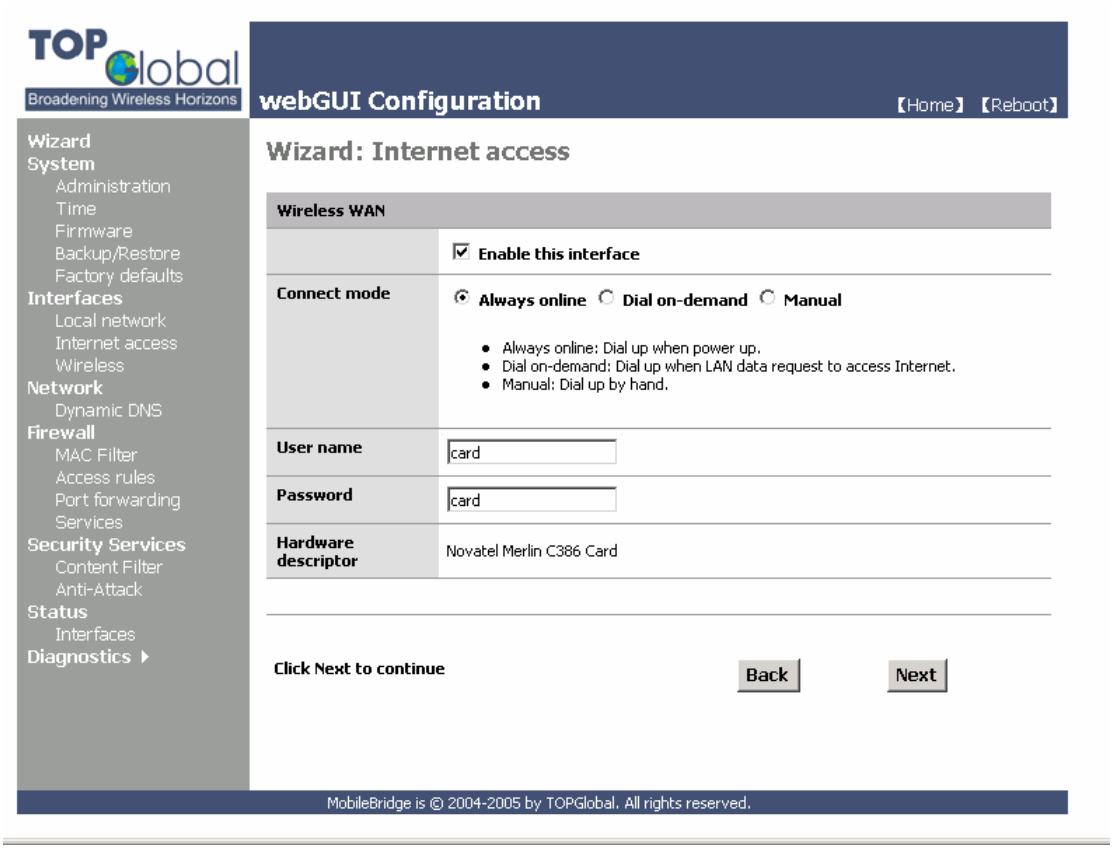
Figure2-6 ***Wizard—Wireless LAN***



You can set the “Network name”, “Association Security” and related “Network Key” with the values you prefer. Then click “Next”, go to “Step 3” page (Figure 2-7 Wizard - Internet

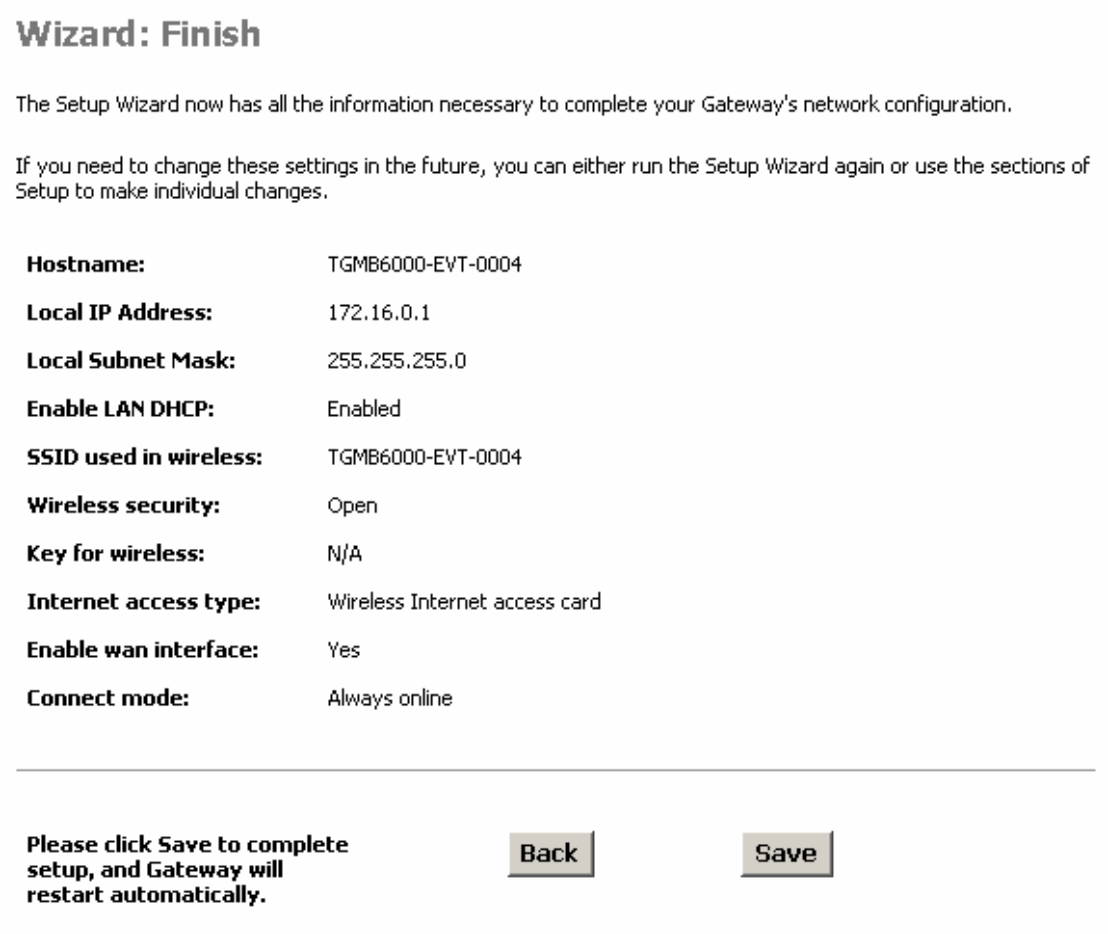
Access).

Figure2-7 ***Wizard - Internet access***



Change “Card Status” to “Enable”, type correct “Phone Number”, “User Name” and “Password” (If you are using a GPRS/UMTS/EDGE network, you will need to input “CID”, “APN”), then click button “**Next**”, the following configuration page appears (Figure 2-8 Wizard - Finish).

Figure2-8 ***Wizard - Finish***



Check the settings and Click “Save”, MB6000 will reboot automatically.

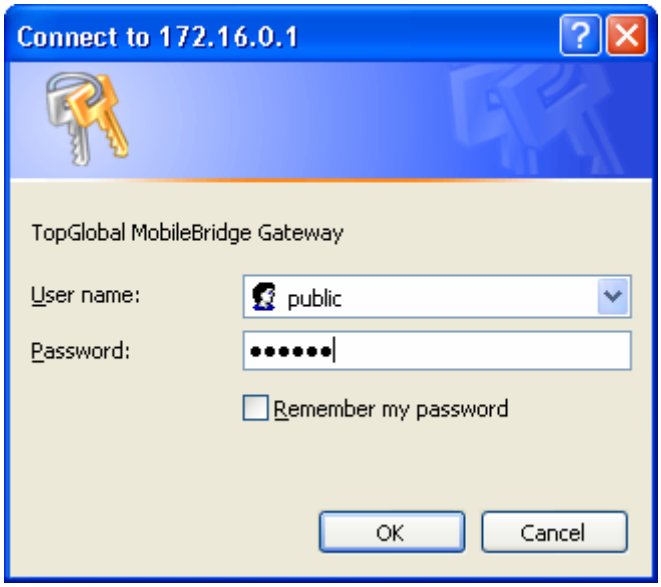
3 Management

3.1 Overview

MB6000 embeds a web server for web-based management. This section will show you how to visit MB6000's web site.

1. Open your browser and enter the MB6000's IP address in the address bar.
2. Press the **ENTER** key. The MB6000 ***Login*** dialog box appears.

Figure 3-9 Login Dialog Box – English page



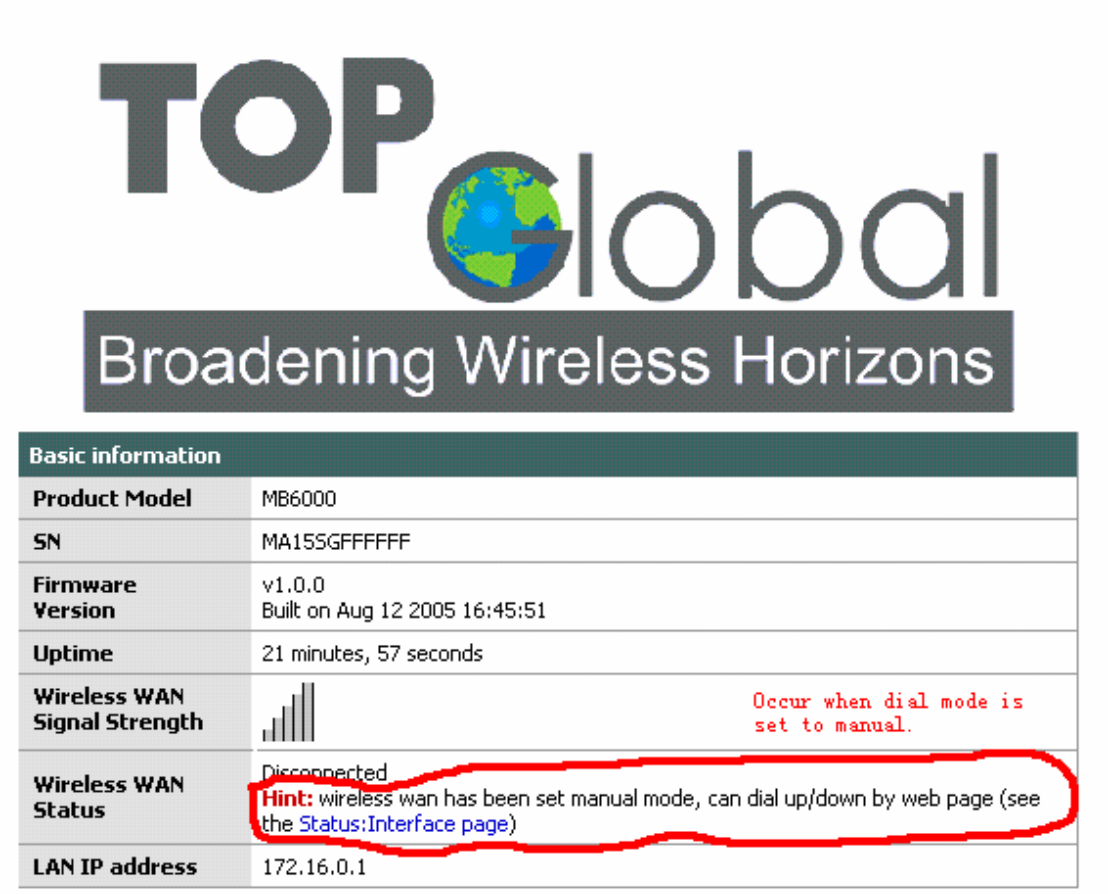
Note:

Default user name: public

Default password: public

3. After you input the right username and password, the home page of MB6000 web site will appear (Figure 3-2).

Figure 3-10 ***MB6000's home page***



There are **eight** main categories of MB6000's web site:

- Wizard;
- System;
- Interfaces;
- Network;
- Firewall;
- Security Services;
- Status;
- Diagnostics.

The following sections will explain each of them in detail.

3.2 Page Structure

Figure 1-11 ***MB6000's home page***

The whole page consists of 3 main spaces:

- Upper title and shortcut space: display the most common used function page shortcuts
- Left menu space: display MB6000 main 8 categories function menu;
- Right working space: display the detailed configuration pages for the function menu

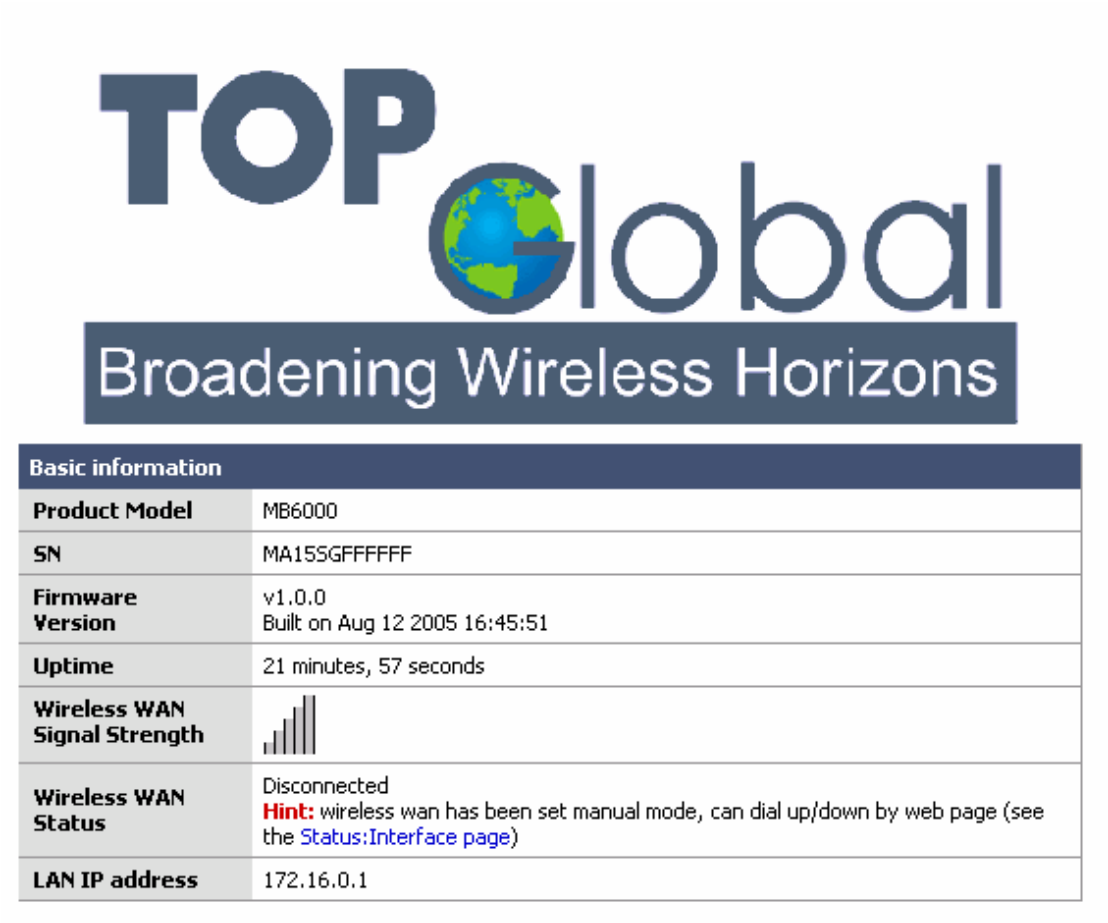
3.2.1 Shortcut

There are two main categories in this setting:

- Home
- Reboot

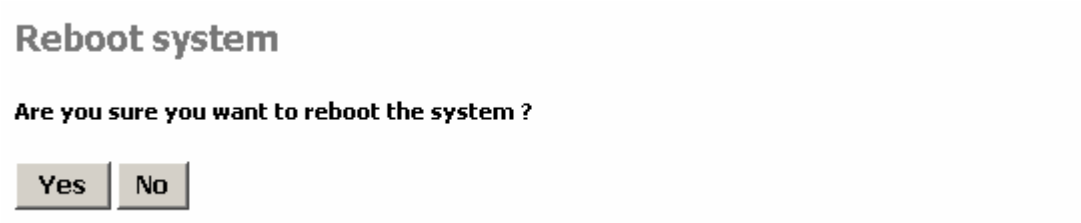
3.2.1.1 Home

Figure 3-12 ***MB6000's home page***



3.2.1.2 Reboot

Figure 3-13 ***Reboot system***



Reboot operation saves configuration changes (if any) before reboot the MB6000. Click Yes, the device will be reboot. During the reboot process, the power LED will blink with amber color.

Note:

After configured all the parameters you need, reboot the MB6000. Then the new configurations will become effective.

Figure 3-14 ***MB6000's restarting page***

3.3 Page Operation

- ✓ All of the MB6000 functions can be configured and become effective by going through the following 3 steps: page content editing → submit → reboot;
- ✓ Once every page is submitted, the system will confirm the page content, then notify the user to reboot the MB6000 to make the configuration effective;

3.4 Configuration Pages Description

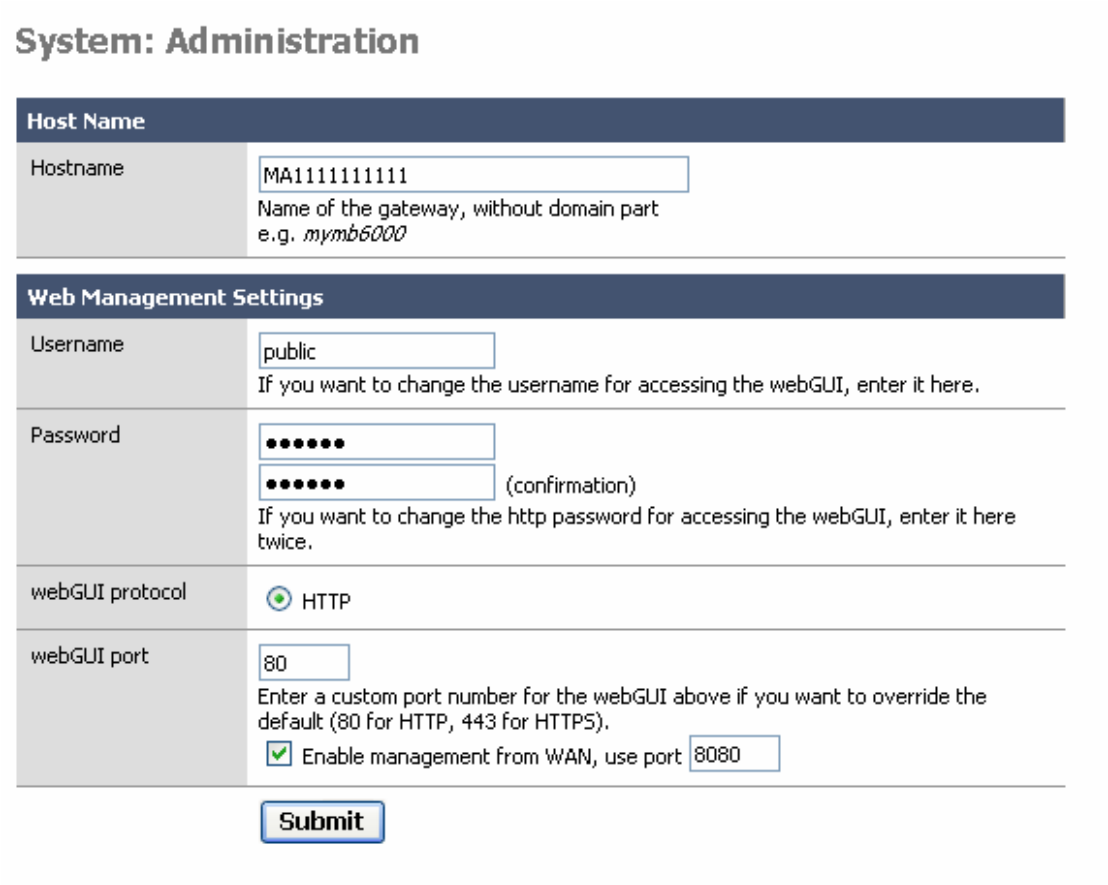
3.4.1 System

There are six main categories in this setting:

- Administration
- Time
- Firmware
- Backup/Restore
- Factory defaults

3.4.1.1 Administration

Figure 3-15 ***Administration***



- **Host Name:** up to 64 characters name to represent MB6000. The device default name is the product SN.
- **Username:** username for MB6000's web administration. The default username is public.
- **Password:** password for MB6000's web administration. The default password is public.
- **WebGUI Protocol:** the protocol web configuration used. HTTP is the only Current choice.
- **WebGUI port:** the service port for HTTP. User normally need not modify this value. If want allow someone mange the MB6000 from WAN, you can check Enable management from WAN , and modify the port value by need .
- **Save:** after all of the input is ok, click SAVE to submit the configuration.

Note:

SAVE is not equal to keep the configuration information permanently in the

device. User must reboot the system, then the configuration will be saved. So if user saves the configuration, and doesn't reboot the device through web page, the configuration information will be lost

Normally, MB6000 can't be configured through WAN interface because of security and other concerns. If user wishes to remotely configure the MB6000 through WAN interface, there is one box to select to enable this feature.

Note:

Each time when the user modifies the username and password, the system will request the user to re-authenticate using the new user name and password.

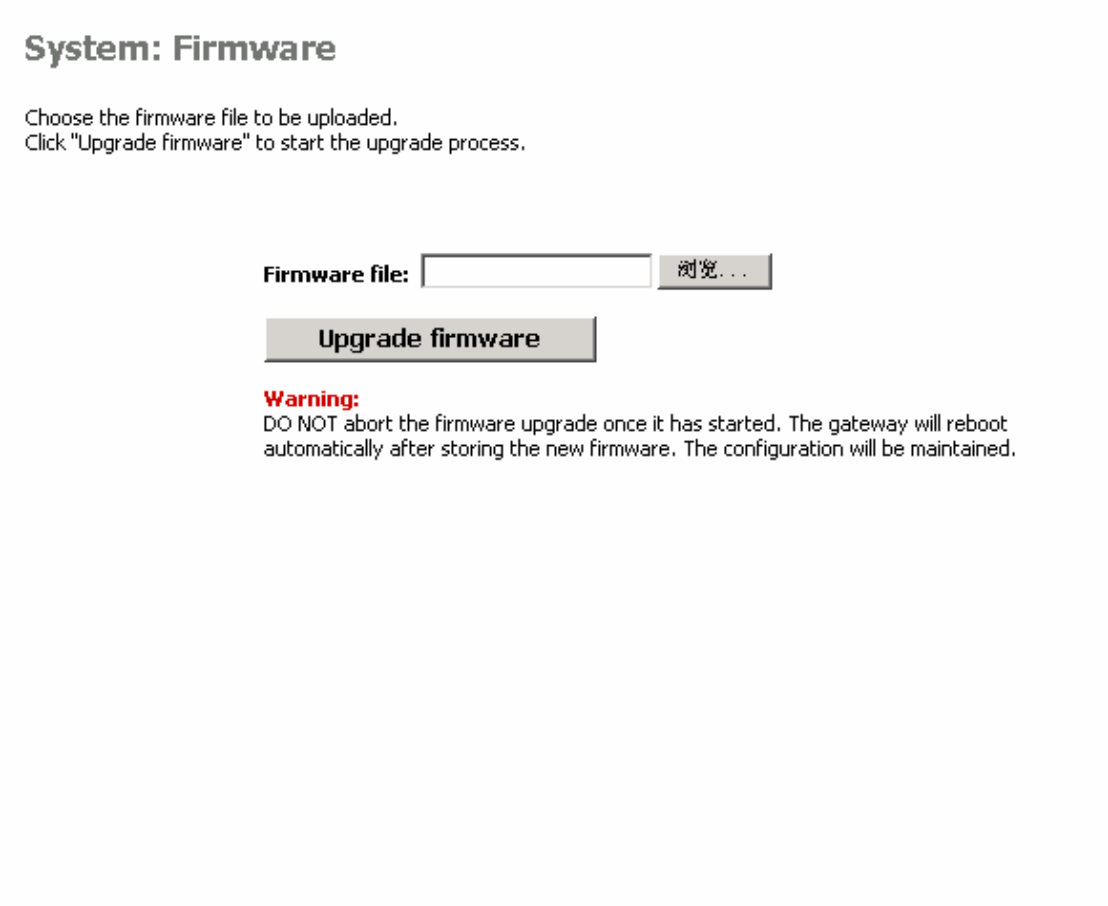
3.4.1.2 Time

Figure 3-16 ***Time***

- **Time zone:** Current country time zone.
- **NTP time server:** NTP server IP address, the default value is 207.46.130.100;

3.4.1.3 Firmware

Figure 3-17 ***Firmware***



MB6000's firmware is upgraded through this tab. Follow these instructions:

1. Download the firmware from Top Global website **www. topglobalusa.com** to your host PC. User can also get technical support from Top Global USA, Inc. by email or phone.

2. Enter the location of the firmware file or click the **Browse** button to find the file;

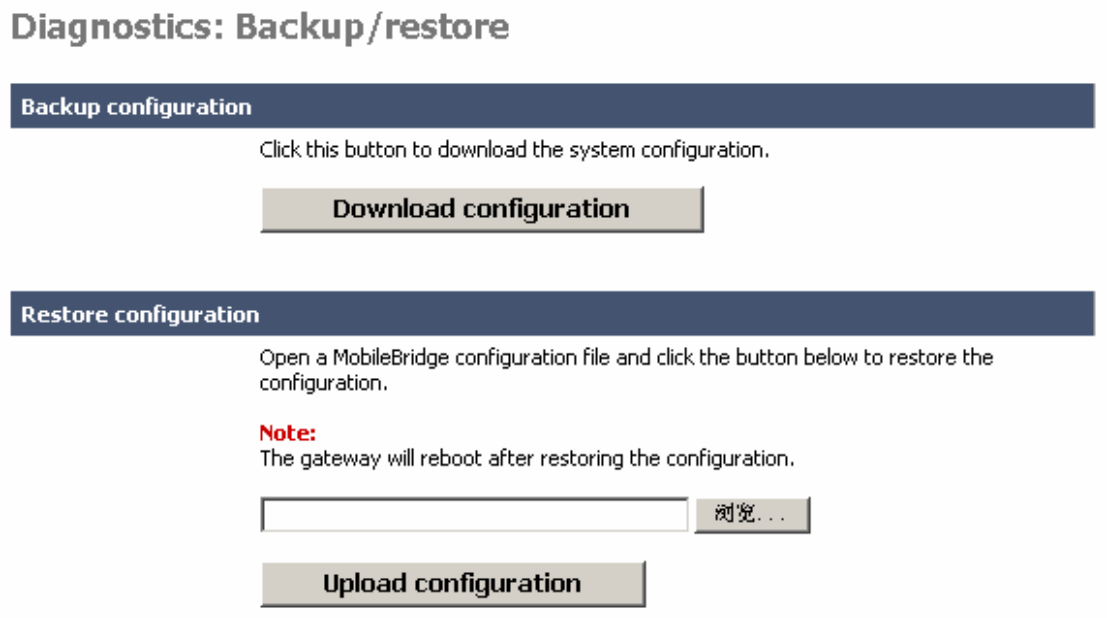
3. Click the **Upgrade Firmware** button to upgrade the firmware.

Note:

During the upgrade process, the Power LED is blinking with amber color. The device will reboot after the firmware upgrade is completed.

3.4.1.4 Backup/Restore

Figure 3-18 ***Backup/Restore***



Download Configurations: user can download current device configurations to save in the local PC for later uploading and restoring.

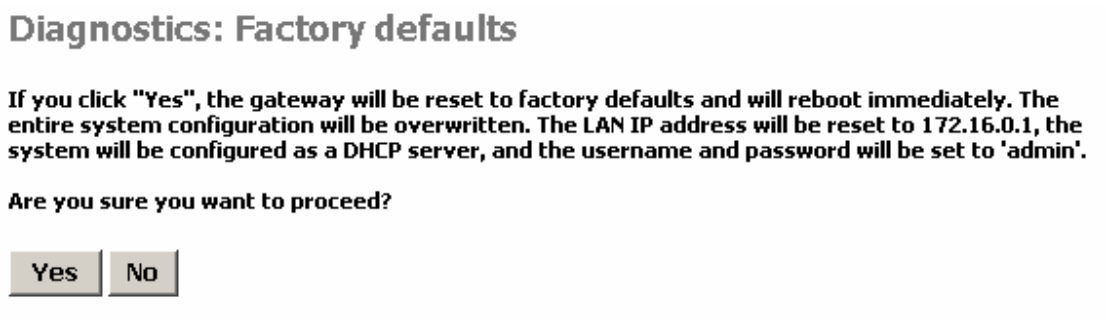
Upload Configurations: user can use previous downloaded and saved device configurations to restore the device configuration to some previous configuration status. Note that this function erases the current configuration before restoring a previous back up configuration; please do not attempt to restore unless you have a backup configuration file stored on your local disk.

Note:

After upload configuration, the device will reboot.

3.4.1.5 Factory Defaults

*Figure 3-19**Factory defaults***



Click the **Yes** button to reset all configurations to their factory default values.

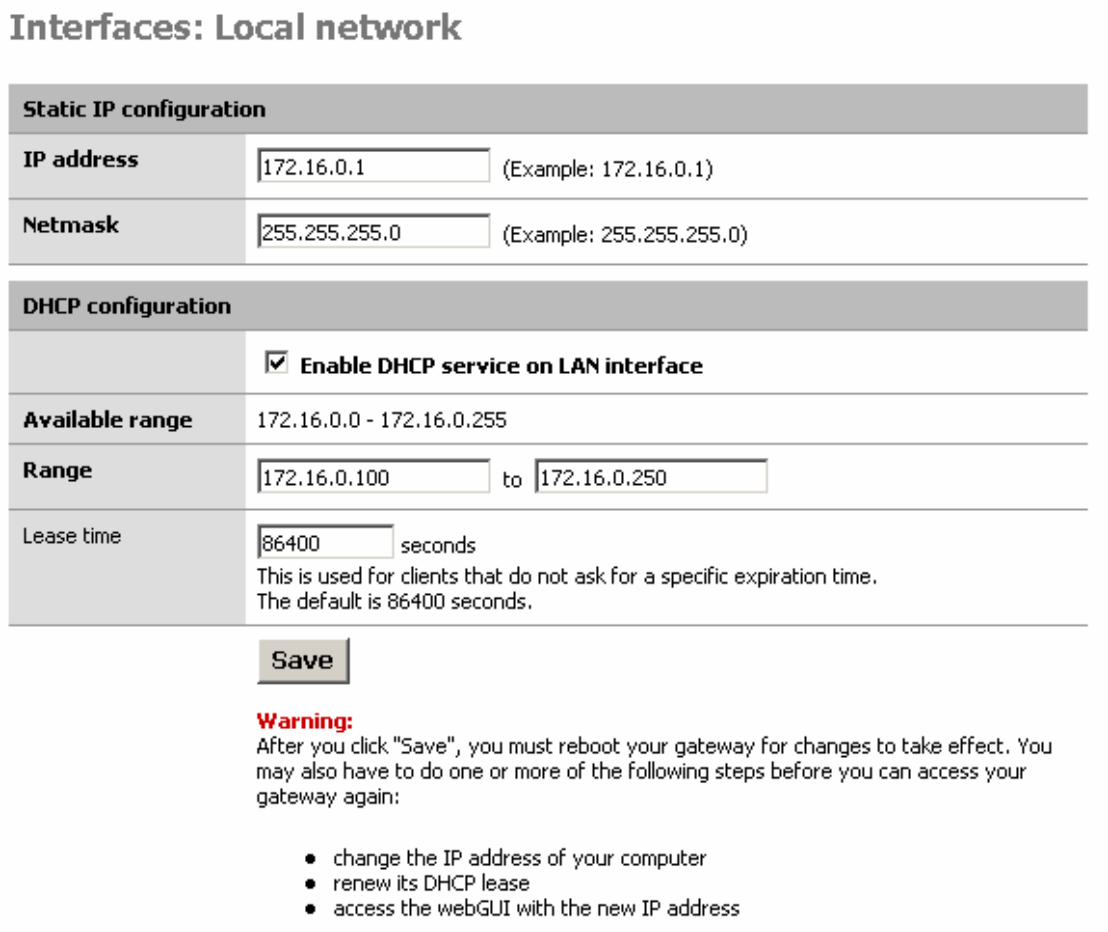
3.4.2 Interfaces

There are three main categories in this setting:

- Local Network
- Internet Access
- Wireless

3.4.2.1 Local Network

Figure 3-20 ***Local network***



◆ Function Summary

The LAN interface is used to connect internal LAN and PCs in the LAN. The LAN interface includes Wired LAN RJ45 interface and Wireless LAN interface. This configuration page is used to set some basic parameters for LAN and the service provided on the LAN interface: DHCP.

◆ Detailed Configurations

✓ IP Configuration

- **IP Address:** the IP Address of the LAN & WLAN. The default IP address is 172.16.0.1.

- **Netmask:** the subnet mask of the LAN & WLAN. The default subnet mask is 255.255.255.0.

✓ DHCP Configuration

This setting is used to configure MB6000's Dynamic Host Configuration Protocol (DHCP) server function. MB6000 can be used as a DHCP server for the internal LAN network. The DHCP server automatically assigns an IP address to each computer in the LAN network. If you choose to enable MB6000's DHCP server option, you must configure all of PCs in the LAN network to connect to this DHCP server (MB6000), and make sure there is no other DHCP server on your network.

DHCP is enabled by factory default. If there is already a DHCP server in the LAN network, or a DHCP server is not necessary for the LAN network, the **Enable DHCP Server on LAN Interface** can be un-checked. (Other DHCP features will be disabled).

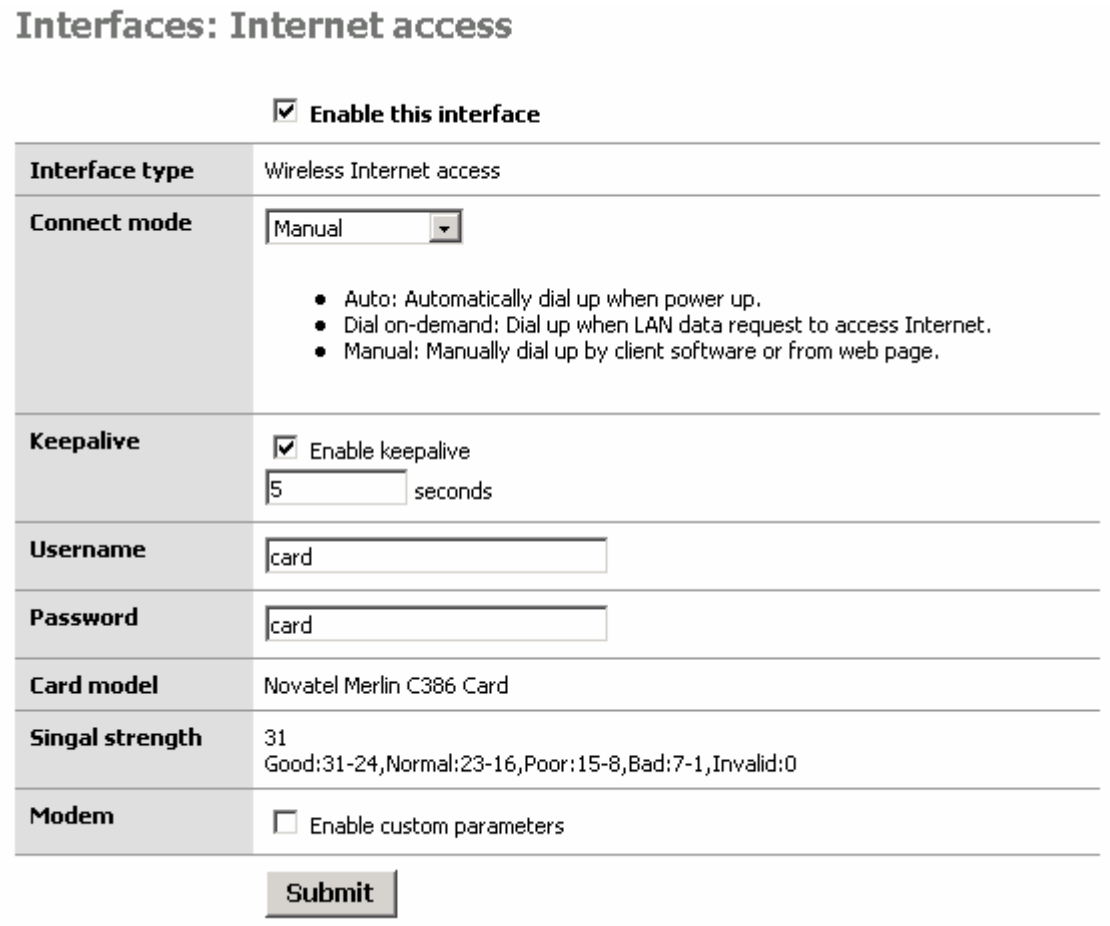
- **Range:** Enter the values for start IP address and end IP address, the default start IP address is 172.16.0.2, the end IP address is 172.16.0.100.
- **Lease Time:** the amount of time in second a network user will be allowed to connect to MB6000 with their current dynamic IP address got from the DHCP server. After the time is up, the user will be automatically assigned a new dynamic IP address. The default is 86400 second, which means one day.

Note:

When the DHCP server IP address range is set, it must be assured that there is no other device in the network to use the IP address located in this address range, such as printer server, file server, etc. otherwise there is risk for address conflict.

3.4.2.2 Internet Access

Figure 3-21 ***Internet access***



◆ Function Summary

The WAN interface of MB6000 is used to connect Internet, wireless WAN. This configuration page is used to set some wireless WAN card basic parameters.

◆ Detailed Configurations

If **Enable this Interface** is not checked, no other parameters in this page are available.

- **Connect mode:** indicate which wireless WAN connection policy is used.
  - **Auto:** this option enable MB6000 to automatically make the internet connection each time when it powers on. It keeps the MB6000 always connected to the Internet, even when the connection is idle. To select this option, click the radio button next to Keep Alive. The default Redial Period is 30 seconds (in other

words, the Device will check the Internet connection every 30 seconds).

- **Dial-On-Demand:** MB6000 can be configured to disconnect from Internet connection after a specified period of inactivity (Max Idle Time). If the Internet connection has been terminated due to inactivity, Dial on Demand enables MB6000 to automatically re-establish the Internet connection as soon as you attempt to access the Internet again. If you want your Internet connection to remain active at all times, enter 0 in the Max Idle Time field. Otherwise, enter the number of seconds you want to have elapsed before your Internet connection terminates.
- **Manual:** If you choose the Manual mode , so the MB6000 will not make the internet connection when you power up the MB6000.. You must manually make the Cellular connection using the client software which can be found in the CD and though web configuration page.

- **User Name:** provide a user name assign to the subscriber by the cellular mobile operator. Please consult your mobile operator for your user names and password;
- **Password:** provide a password for your wireless modem. Again consult your mobile operator for the correct password;
- **Card model:** When a cellular PC Card is inserted into the MB6000 correctly. It will automatically detect the WAN card type. If the Cellular modem card is supported and recognized by the MB6000, the name and model of the wireless WAN card will appear. Contact Top Global for a list of all supported PC Cards.
- **Signal strength:** indicate current wireless WAN signal strength. Value 31 is the best signal strength indication. The less value, the worse signal strength. If this value is 0, you do not have a signal, please check the wireless WAN card carefully to make sure it is inserted correctly and you may need to call your mobile operator to make sure your area is covered within their network;
- **Modem: i**f **Enable custom parameters** is not checked, the following parameters in this page are unavailable:

  Phone Number: provide a phone number for wireless WAN modem;

  Init string: provide an initializing string for wireless WAN modem.

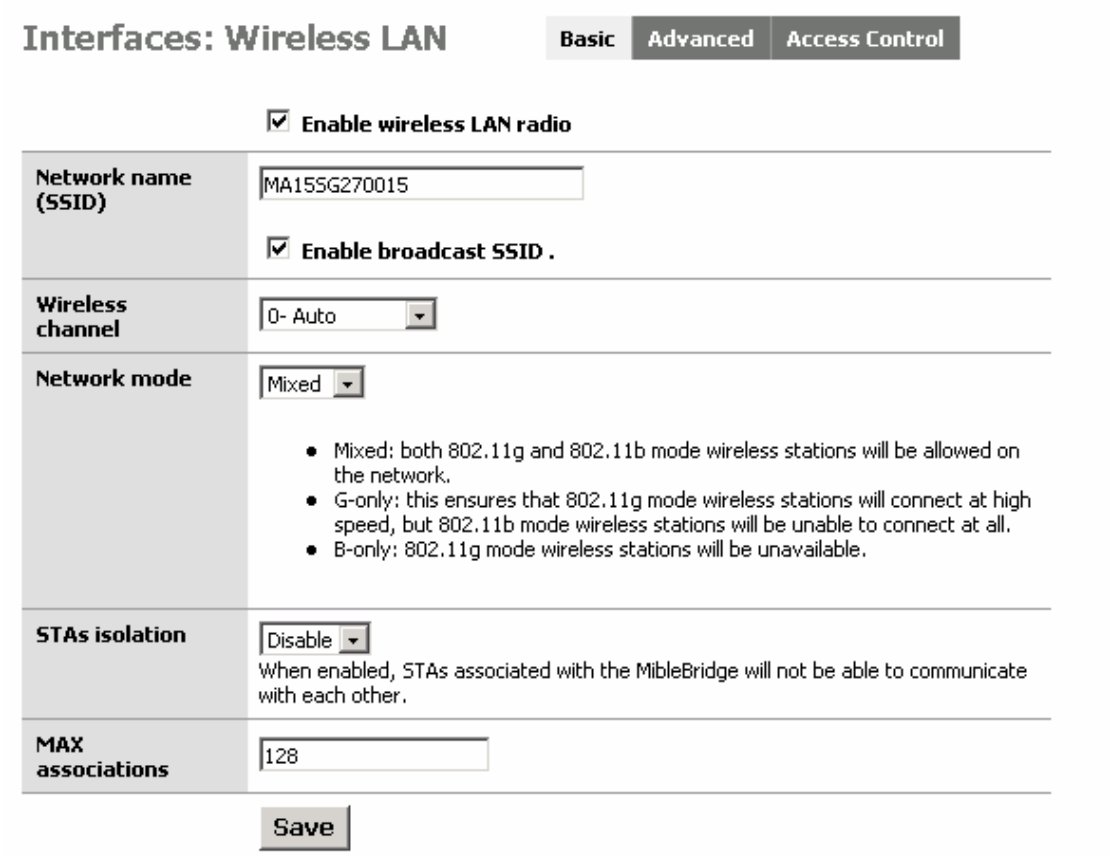
3.4.2.3 Wireless LAN

There are three main tabs in this setting:

- Basic
- Advanced
- Access Control

3.4.2.3.1 Basic

Figure 3-22 ***Wireless - basic***



◆ Function Summary

This configuration page is used to set the wireless LAN basic parameters.

◆ **Detailed configurations**

Enable Wireless radio: if this box is not checked, no other parameters in this page are available;

Wireless Network Name (SSID): the wireless LAN network name shared among all access points in a wireless network. The SSID must be identical for all access points in the wireless network. It is case-sensitive and must not exceed 32 characters (use any of the characters on the keyboard). For added security, you should change the default SSID to a unique name;

Enable SSID Broadcast: When wireless clients survey the local area for wireless networks, they will detect the SSID broadcast by the Router. To broadcast MB6000's SSID, keep the default setting checked. If you do not want to broadcast MB6000's SSID, then select Disable;

Wireless Channel: select the appropriate channel from the list provided to correspond with your network settings. All client devices in your wireless network must be broadcast on the same channel in order to function correctly;

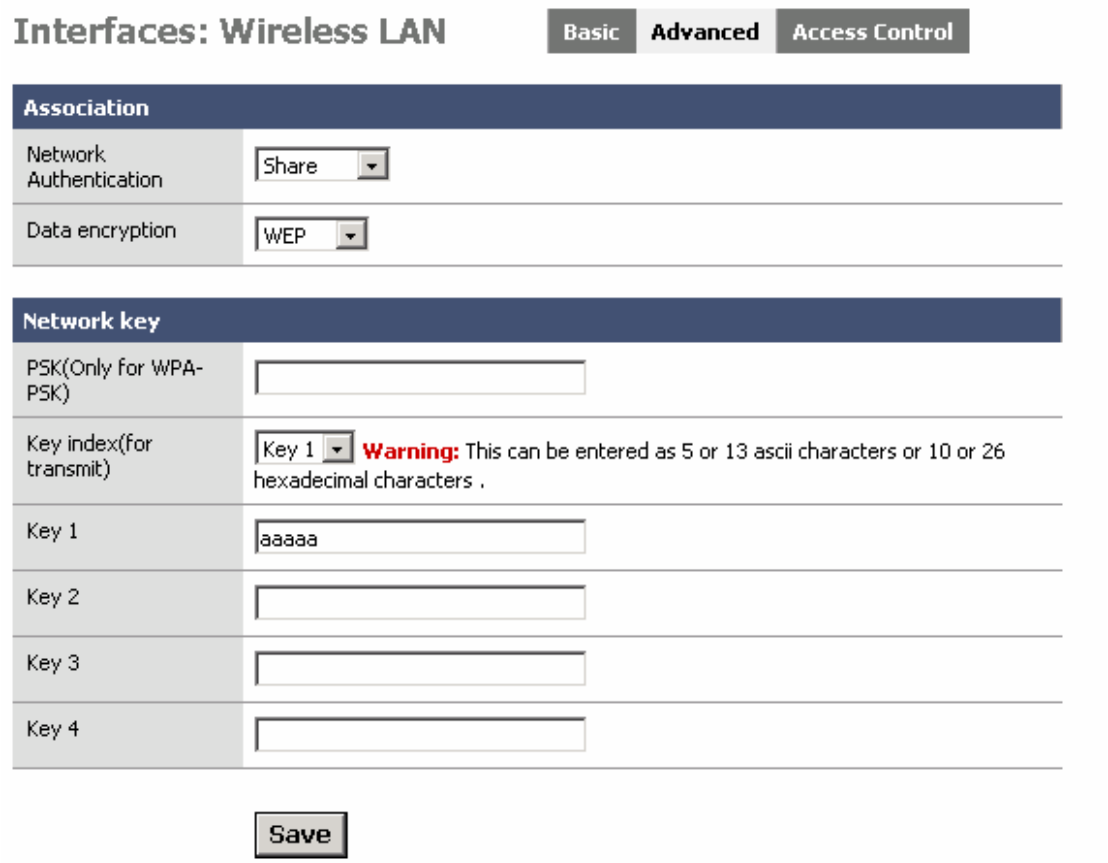
Network Mode: from this drop-down menu, you can select the wireless standards running on your network. If you have both Wireless-g and Wireless-b devices in your network, you can keep the default setting as **Mix**. If you have only Wireless-g devices, select **g-Only**. If you have only Wireless-b devices, select **b-Only**;

STAs isolation: if you don't want different client stations connected to the device communicate with each other, **Enable** this option;

Max associations: the max client station number allowed to be connected to the MB6000.

3.4.2.3.2 Advanced

Figure 3-23 ***Wireless – advanced***



◆ Function Summary

This configuration page is used to set wireless LAN security parameters. MB6000 supports two different types of security settings for your wireless LAN network: Wi-Fi Protected Access (WPA) Pre-Shared key (PSK) and Wire Equivalence Protection (WEP).

◆ Detailed configurations

Share: is selected from the dropdown menu of **Network Authentication**, which will enable the WEP sections;

WEP: There are two levels of WEP encryption security, 64-bit and 128-bit. The bigger encryption bit number, the more secure your wireless network. However, the transmission speed is sacrificed at higher bit levels WEP security;

Key Index (for transmit): select WEP key (1-4) to decide which key will be used during the data transmission;

Enter the WEP Key into the appropriate Key field. All access points in your wireless network must use the same WEP key to utilize WEP encryption;

WPA Pre-Shared Key - There are two encryption options for WPA Pre-Shared Key, TKIP and AES. TKIP stands for Temporal Key Integrity Protocol. TKIP utilizes a stronger encryption method and incorporates Message Integrity Code (MIC) to provide protection against hackers. AES stands for Advanced Encryption System, which utilizes a symmetric 128-Bit block data encryption. To use WPA Pre-Shared Key, enter a password in the **PSK(Only for WPA-PSK)** field between 8 and 63 characters long;

You can also configure the MB6000 as other security mode to be compatible for other station security settings. Such as:

Mode 1: no security, no authentication

Network Authentication: OPEN

Data Encryption: Disabled

Mode 2: enable security, no authentication

Network Authentication: OPEN

Data Encryption: WEP

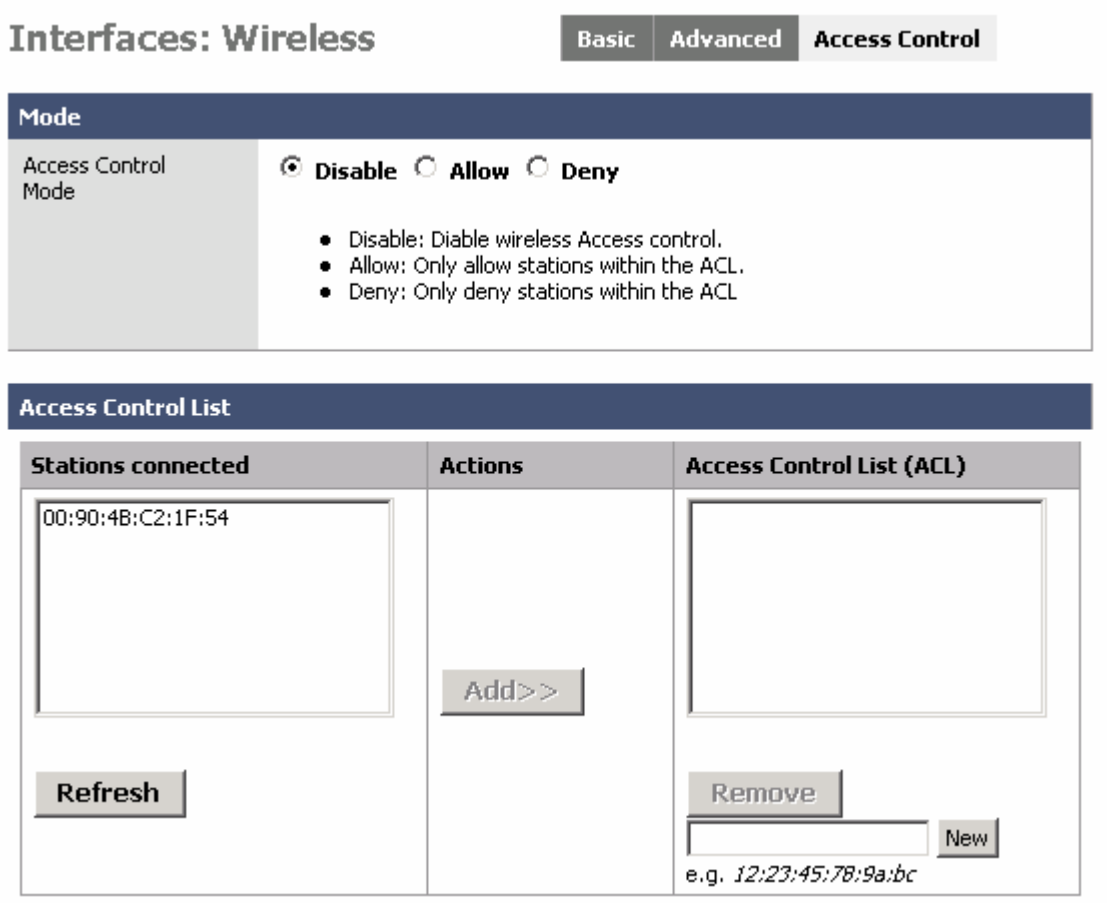
Mode 3: no security, enable authentication

Network Authentication: Share

Data Encryption: Disabled

3.4.2.3.3 Access Control

Figure 3-24 ***Wireless LAN – Access Control***



◆ Function Summary

Besides assure the communication security in Wi-Fi network through encryption and authentication, allowing or denying some special stations connection in the Wi-Fi network is also an option to guarantee the wireless network security. This page configuration is used to set the station connection control to assure the wireless network security.

◆ Detailed configurations

Access Control Mode: MB6000 supports 3 type access control modes:

Disable: indicates no access control function, allow all of the stations connect to MB6000;

Allow: indicates only allow the stations which have the MAC address listed in the table to access the MB6000;

Deny: indicate only deny the stations which have the MAC address listed in the table to access the MB6000;

Stations connected: in order to add the ACL conveniently, the MAC addresses of stations which have already connected to MB6000 appear in this domain. Click the ***Refresh*** button, this list will be updated.

Access Control List: the MAC addresses of stations which have been allowed or denied to connect to MB6000 are saved in this list box.

There are 2 methods to input the MAC address: one is to select the station item in the Station Connected list, then click ***Add***; the other is to input the station MAC address through MAC address edit box on the page (below the ACL), the input MAC address format must be XX:XX:XX:XX:XX:XX.

Note:

Don't forget to click ***Save*** button to save the settings.

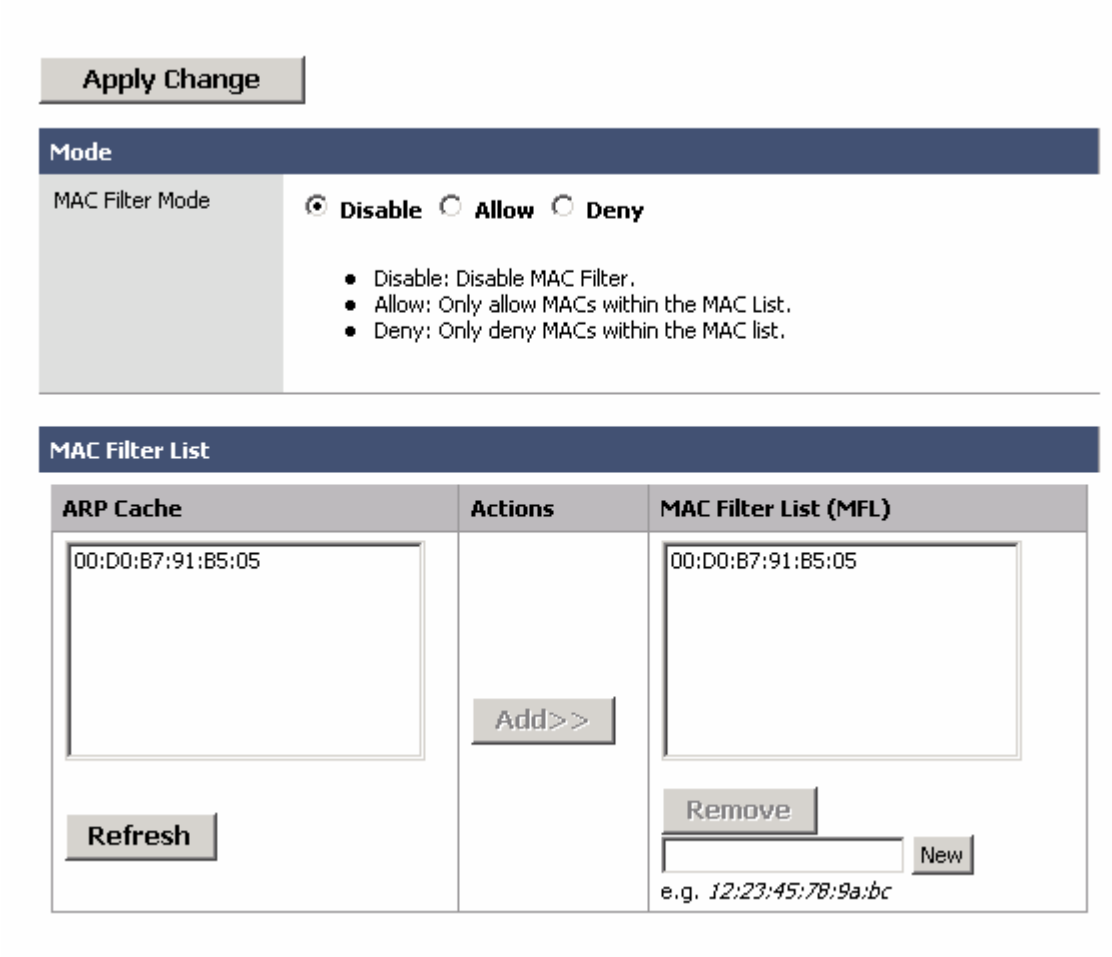
3.4.3 Firewall

There are four main categories in this setting:

- MAC Filter
- Access rules
- Port forwarding
- Services

3.4.3.1 MAC Filter

Figure 3-25 MAC Filter



◆ Function Summary

The MAC address is a unique value associated with a network adapter. MAC addresses are also known as hardware addresses or physical addresses. They uniquely identify an adapter on a LAN. MAC addresses are 12-digit hexadecimal numbers (48 bits in length). MAC Filter can control the hosts in LAN to allow or deny their Internet access based on their MAC addresses.

◆ Detailed Configurations

- **MAC Filter Mode:**
  - ◆ Disable means no MAC Filter is implemented
  - ◆ Allow means only the hosts with the MAC address in the list can access the Internet.

- ◆ Deny means only the hosts with the MAC address in the list can't access the Internet.

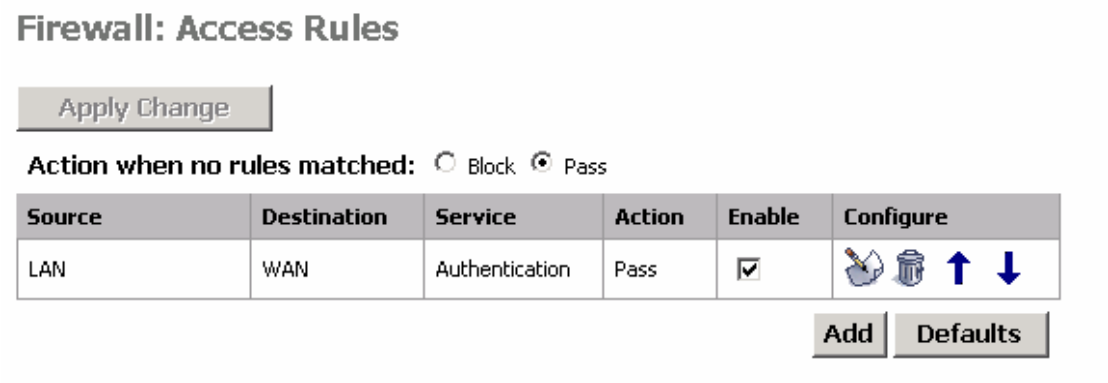
- **ARP Cache:** MB6000 collects the MAC addresses information of all the hosts that communicated with MB6000 and display the information here. You can easily add the MAC addresses you select to the MAC Filter List by click the ***Add*** button. You can refresh the ARP cache by click the ***Refresh*** button.
- **Access Control List:** This is the MAC addresses list of all the selected hosts. You can add items with two methods: Select from the ARP Cache or type the MAC address manually in the MAC address edit box at the lower right hand side.

Note:

Both MAC Filter and Wireless LAN MAC Access Control List can realize the access control based on MAC addresses, but they are different：MAC filter controls the access to the Internet however Wireless LAN Access Control List controls the access to the MB6000 via Wireless LAN.

3.4.3.2 Access rules

Figure 3-26 Access Rules



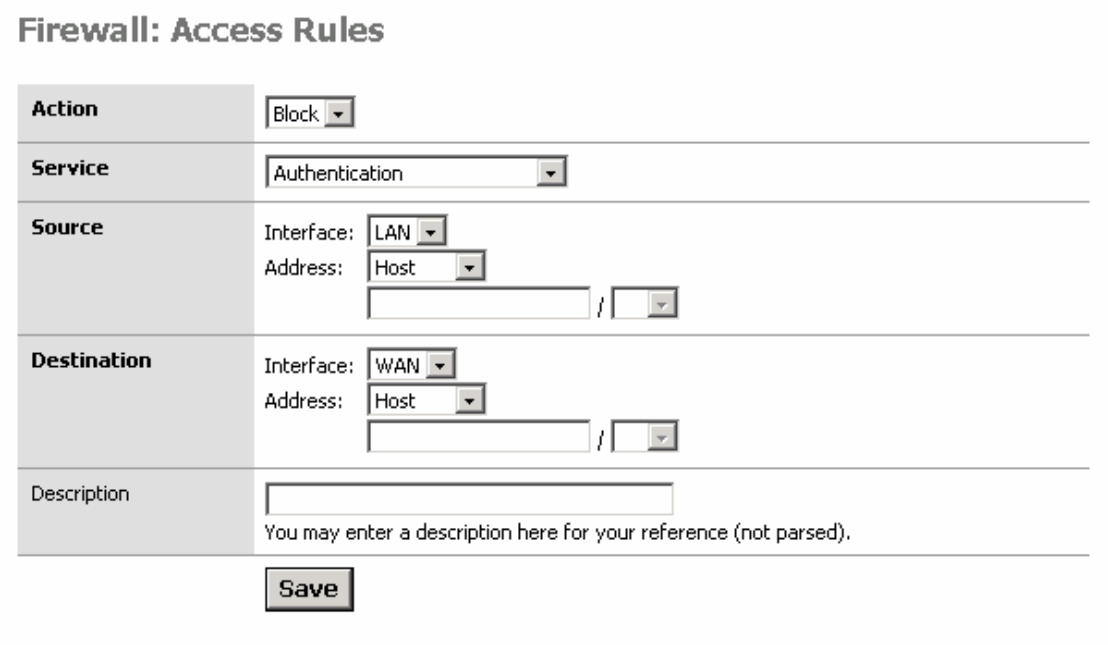
◆ **Function Summary**

Access Rules is one of the most important functions of MB6000 firewall. Access Rules utilize stateful package filter technology. All the access rules in firewall are set here.

◆ Detailed Configurations

The access rules of the firewall in MB6000 have many access rule items. You can maintain these rules with the operations of: Add, Delete, Move up, Move down, Apply.

- **Default Policy:** Factory default rules;
- **Enable Checkbox:** You can enable or disable a rule by check or uncheck this checkbox;
- **Move up, Move down:** The sequence of the rules in the list is very important for the firewall. When the firewall deals with a data packet, it will check the rules from top to bottom in sequentially and execute the first rule which matches the character of this packet. So please pay attention to the rules sequence when you are using multiple rules;
- **Apply Change:** click the ***Apply Change*** button to validate the change immediately. No reboot is required here;
- **Add:** Click the ***Add*** button, a pop up window for inputting an access rule will appear:



Each rule is consisted of the following parameters:

Action: You have two options here: Block or Pass. Block means the data packet which matches this rule will be blocked by firewall; Pass means the data packet which matches

this rule will be passed by firewall;

Service: This parameter indicates the service type of this rule. The possible type includes the system default services and also user defined services;

Source: This parameter indicates the IP addresses range of data source;

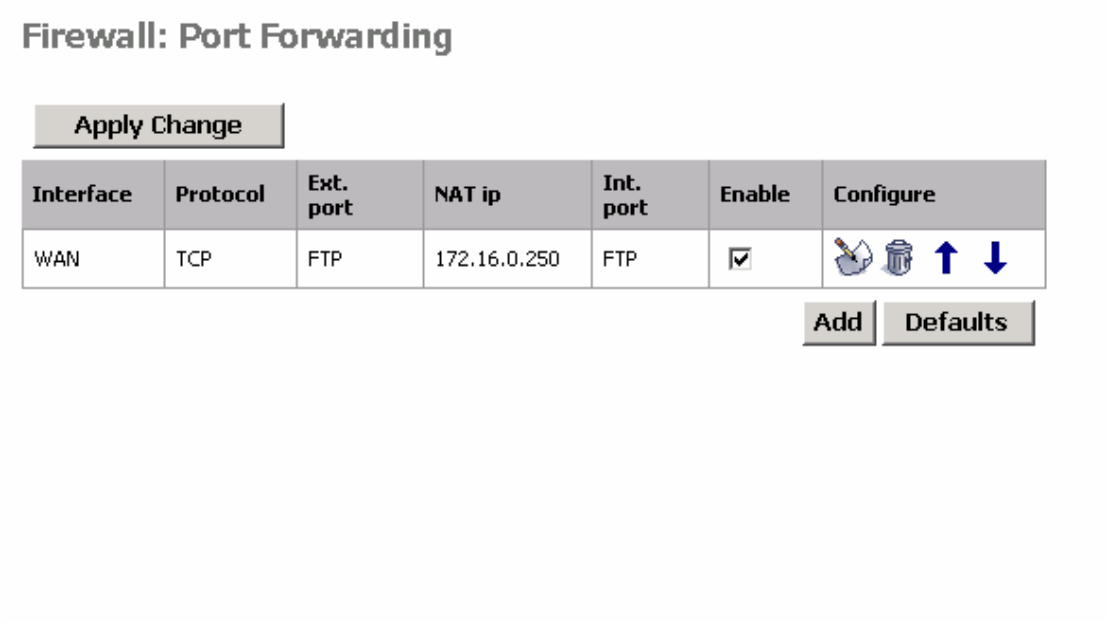
Destination: This parameter indicates the IP addresses range of destination;

Description (optional): Type your comments for this rule here.

Note:

3.4.3.3 Port forwarding

Figure 3-27 ***Port forwarding***



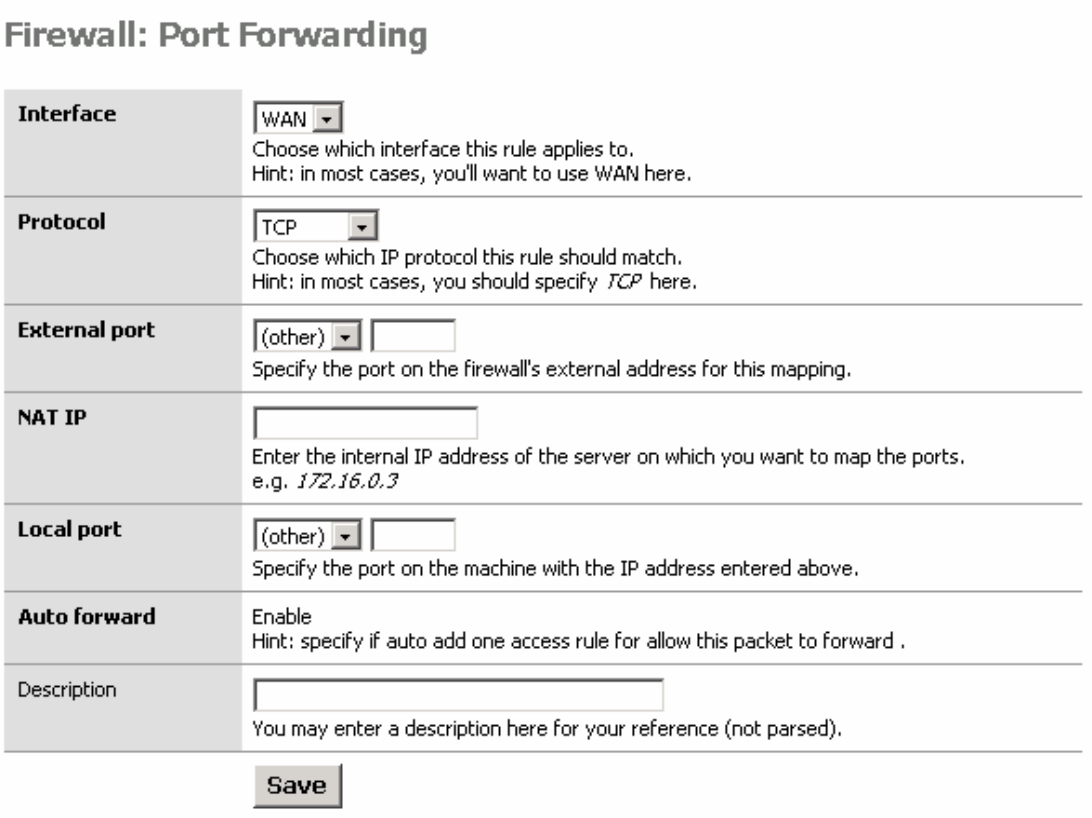
◆ **Function Summary**

This feature allows you to forward incoming traffic on certain ports in order to access servers behind the NAT. This feature can let you setup a web server, mail server, FTP server, DNS, etc on your LAN so it can be accessed from the Internet.

◆ Detailed Configurations

The port forwarding table in MB6000 is consisted of many port forwarding items.

- **Enable Checkbox：** You can enable or disable a port forwarding item by check or uncheck this checkbox;
- **Move up, Move down:** Re-arrange the order of each item in the list;
- **Apply Change:** click the ***Apply Change*** button to validate the change immediately. No reboot is needed here;
- **Add:** Click the ***Add*** button, a pop up window for inputting port forwarding item will appear:



Each item is consisted of the following parameters:

Interface: This parameter indicates which interface of MB6000 will implement this port forwarding rule. In most cases the interface should be WAN;

Protocol: This parameter indicates which protocol will implement this port forwarding rule. Possible protocols are: TCP, UDP, TCP/UDP;

External port: This parameter indicates the port for public access;

NAP IP: This parameter indicates the IP address of the internal host which wants to provide service for the outside.

Local port: This parameter indicates the port of internal service;

Auto forward: This parameter will be Enable always, which means MB6000 will enable this forward automatically;

Description (optional): Type your comments for this rule here.

3.4.3.4 Services

Figure 3-28 ***Services***

Custom Services

Name	Port Start	Port End	Protocol	Configure

Add

Default Services

Name	Port Start	Port End	Protocol
Authentication	113	113	TCP
Chat (IRC)	194	194	TCP/UDP
Citrix	1494	1494	TCP/UDP
Echo	7	7	TCP/UDP
Enhanced TV	9000	9000	TCP
File Transfer (FTP)	21	21	TCP
Filemaker	5003	5003	TCP/UDP
Gatekeeper (H323)	1718	1719	UDP
Gopher	70	70	TCP
HTTP Management	80	80	TCP
HTTPS	443	443	TCP
HTTPS Management	443	443	TCP
Web (HTTP)	80	80	TCP
IMAP3	220	220	TCP

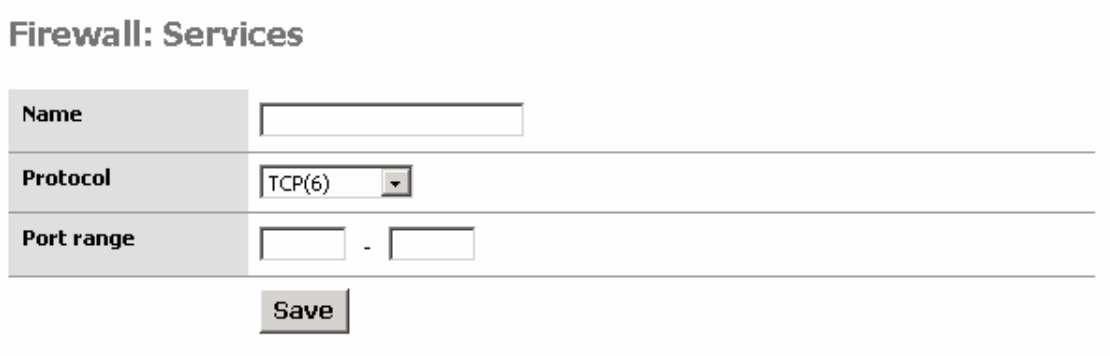
◆ **Function Summary**

You can define fire wall services here and select the defined services in the Access Rules to configure the fire wall.

◆ **Detailed Configurations**

The service set is consisted of many service items. You can manage the service set by create and delete service item. Service set can be divided into two parts, one is system default part, and you can't delete them; another one is user defined part, and you can delete them as you wish.

- **Add:** Click the ***Add*** button, a pop up window for inputting a service item will appear:



Name: the service name. Assign a meaningful name for a service so that you can remember it by the name.

Protocol: This parameter indicates which protocol will implement this service. Possible protocols are: TCP, UDP, TCP/UDP;

Port range: This parameter indicates which port or port range will implement this service. If only one port will implement this service, type this port in both boxes. If a port range will implement this service, type the start port in the left box and the end port in the right box.

3.4.4 Security Services

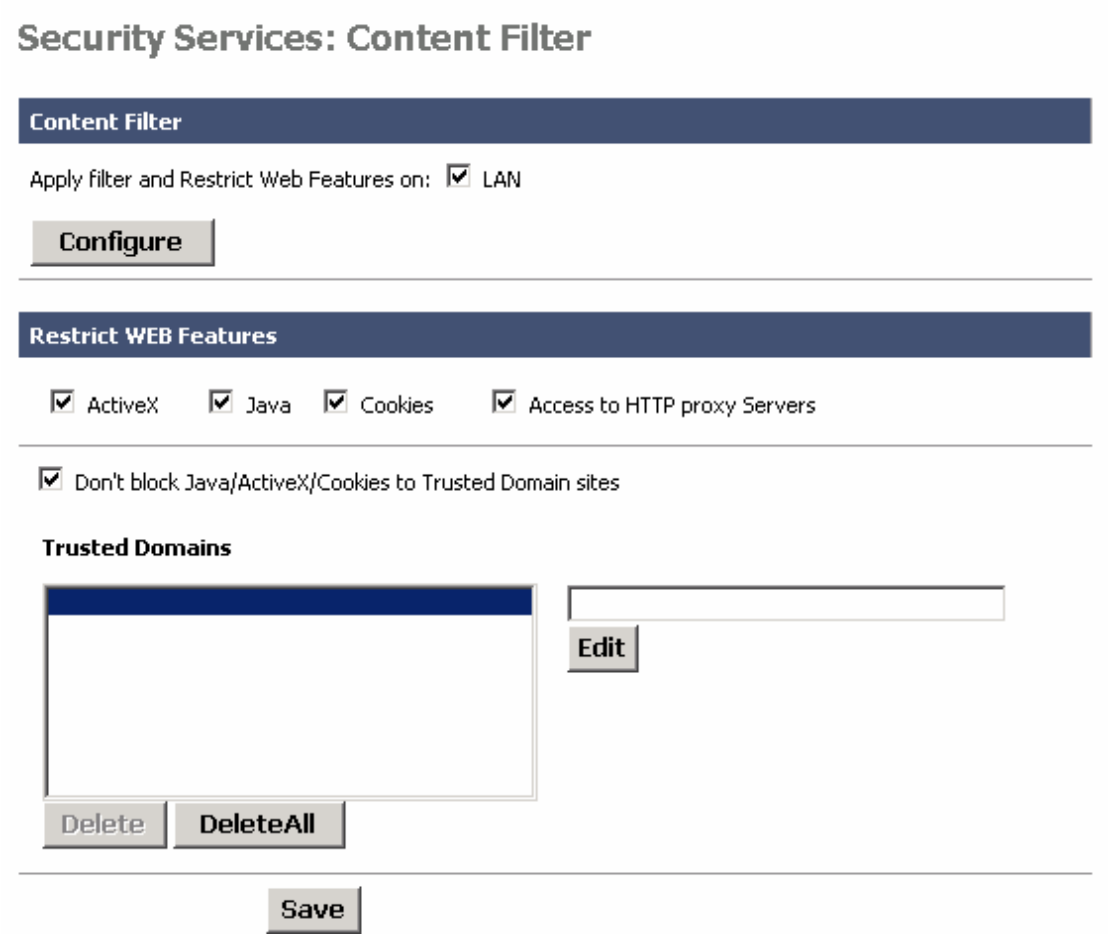
There are two main categories in this setting:

- Content Filter

- Anti-Attack

3.4.4.1 Content Filter

Figure 3-29 ***Content Filter***



◆ **Function Summary**

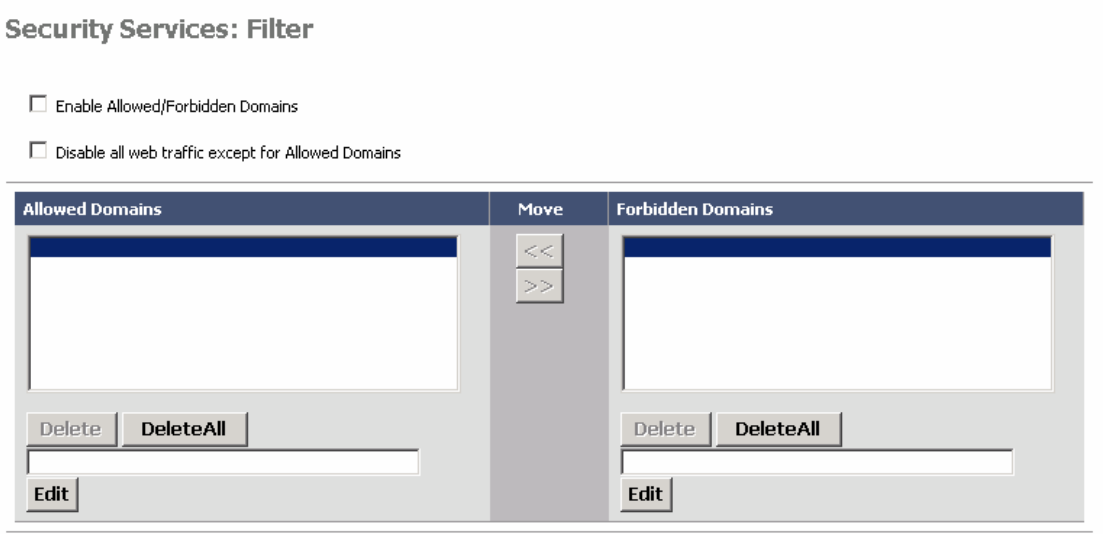
Content Filter is an advance security feature, it can filter the HTTP sessions according to the contents.

◆ **Detailed Configurations**

Content Filter includes URL filter list and WEB features restriction. The default configuration of content filter is off. You can enable it by check the check box "*Apply filter and Restrict Web Features on: □LAN* ", then click the button ***Save***.

- **Configure:** Click the button ***Configure*** to define the URL filter list:

Figure 3-30 ***URL Filter***

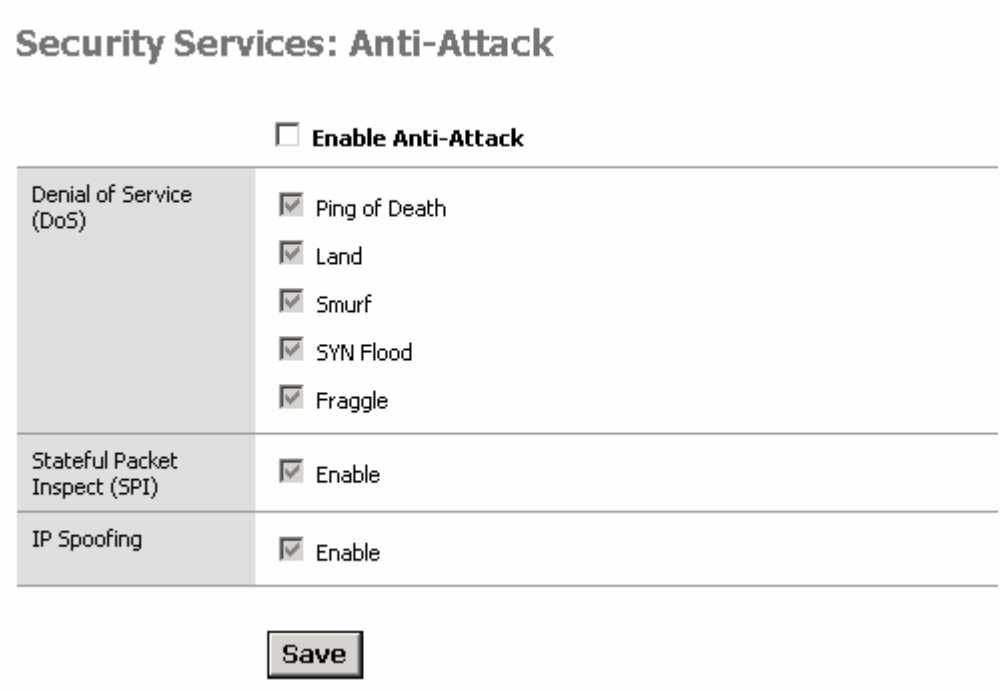


Enable Allowed/Forbidden Domains indicates enable URL Filter or not;

Disable All web traffic expect Allowed Domains indicates URL Filter mode. URL Filter has two modes: Allow means to allow the URL in the Allowed Domains only; Forbidden means to forbid the URL in the Forbidden Domains only. Checking this checkbox means the "allow" mode is adopt.

3.4.4.2 Anti-Attack

Figure 3-31 ***Anti-Attack***



◆ **Function Summary**

Anti-Attack function can block the attack from LAN/WAN and the stateful packet inspect (SPI). MB6000 can block the following attack:

Dos: Ping of Death, Land, Smurf, SYN Flood, Fraggle;

IP Spoofing.

◆ **Detailed Configurations**

Enable Anti-Attack: Check this checkbox to enable the Anti-Attack function. Select the attack you want to block after you enabled the Anti-Attack function.

3.4.5 Status

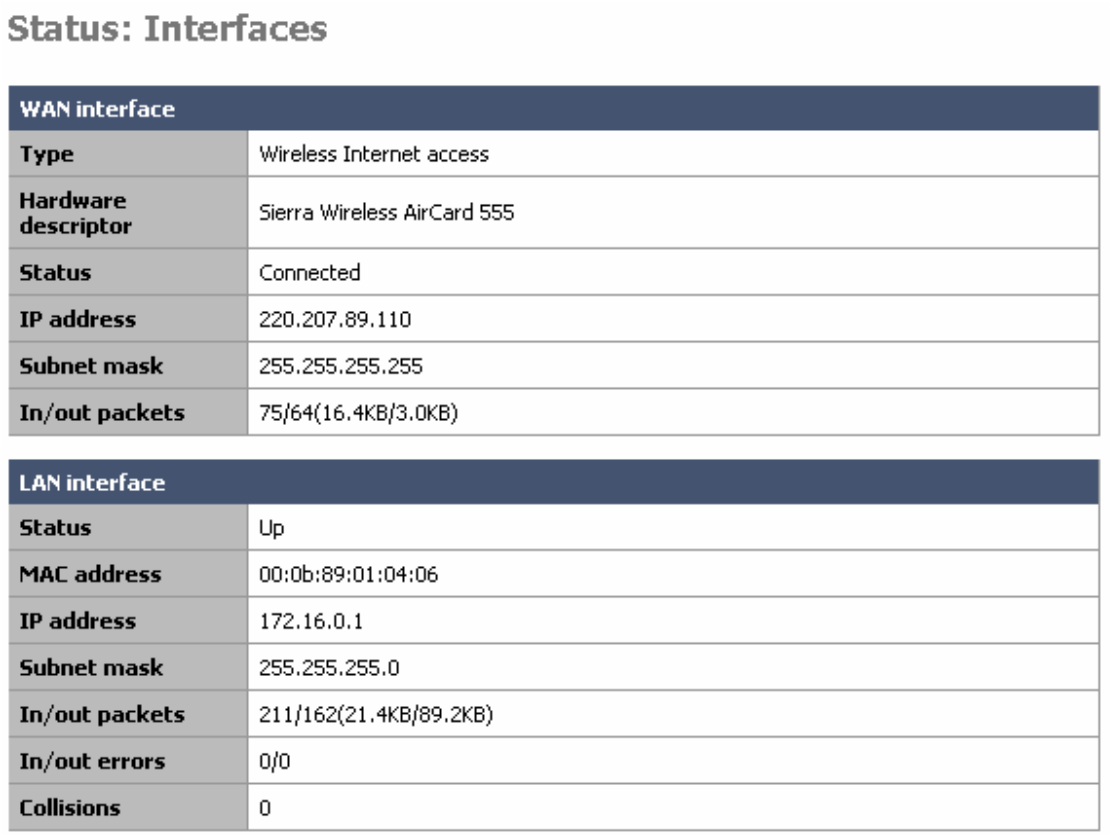
There is one category in this setting:

- Interfaces

3.4.5.1 Interfaces

This tab displays the current information LAN interface, as well as the WAN interface.

Figure 3-32 ***Interfaces***

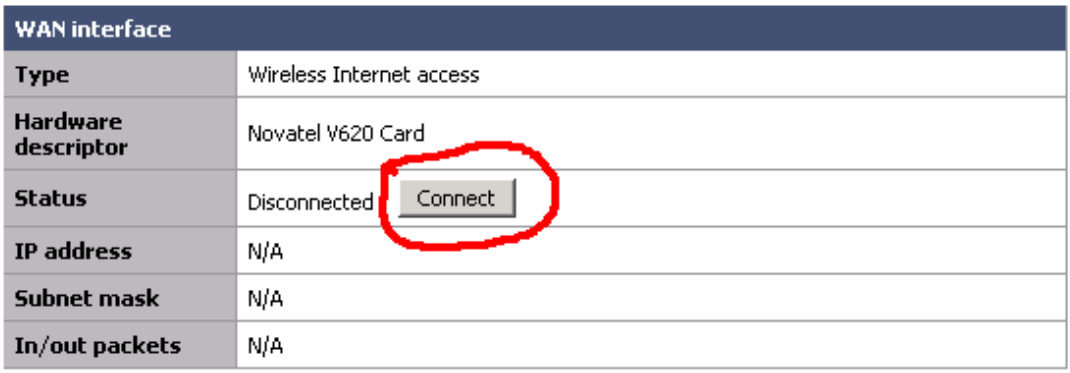


◆ Function Summary

The interfaces status display all the network interfaces information of MB6000. You can also do the dial up and hang off WAN connection here.

◆ Detailed Configurations

WAN displays the information of Wireless WAN data card inserted in MB6000. If no data card exists, the information "*No data card was found.*" will be displayed. When a data card is inserted and user selects "Manual" as the Wireless WAN dial mode, the WAN displays as below



User can click the button ***Connect/Disconnect*** to do dial up and hang off.

3.4.6 Diagnostics

There are two main categories in this setting:

- System logs
- DHCP leases

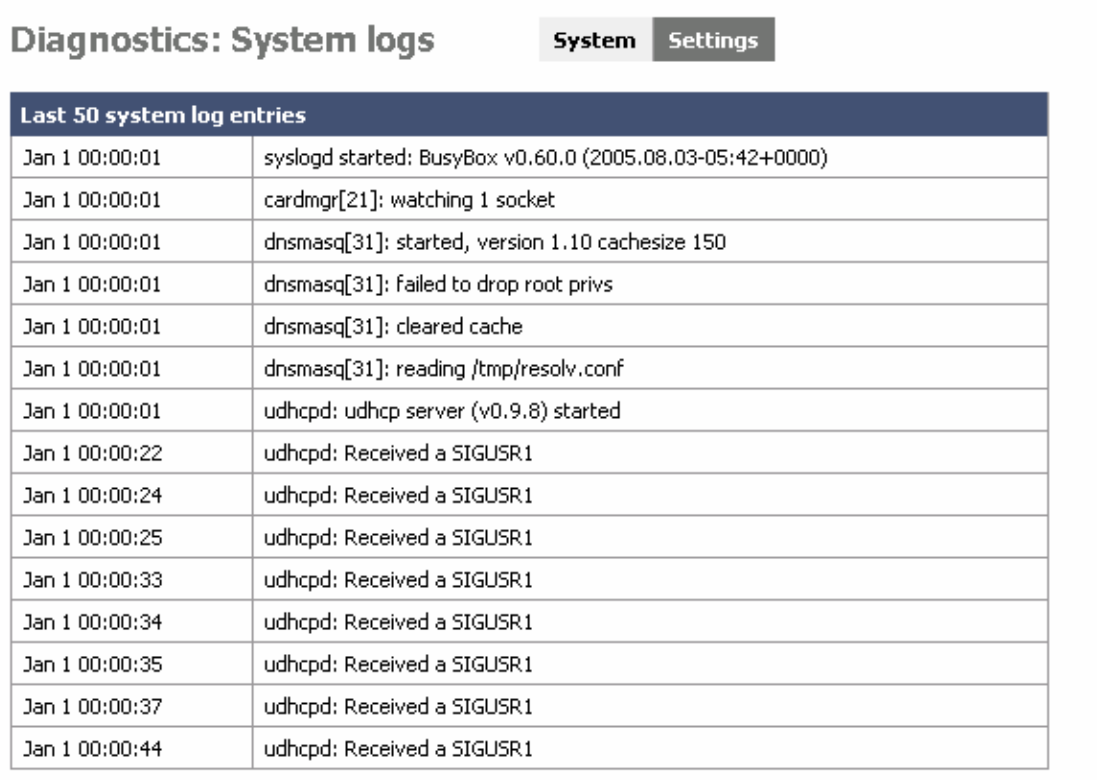
3.4.6.1 System Logs

There are two main tabs in this setting:

- Logs of System
- Settings

3.4.6.1.1 System Log

Figure 3-33 ***System logs***



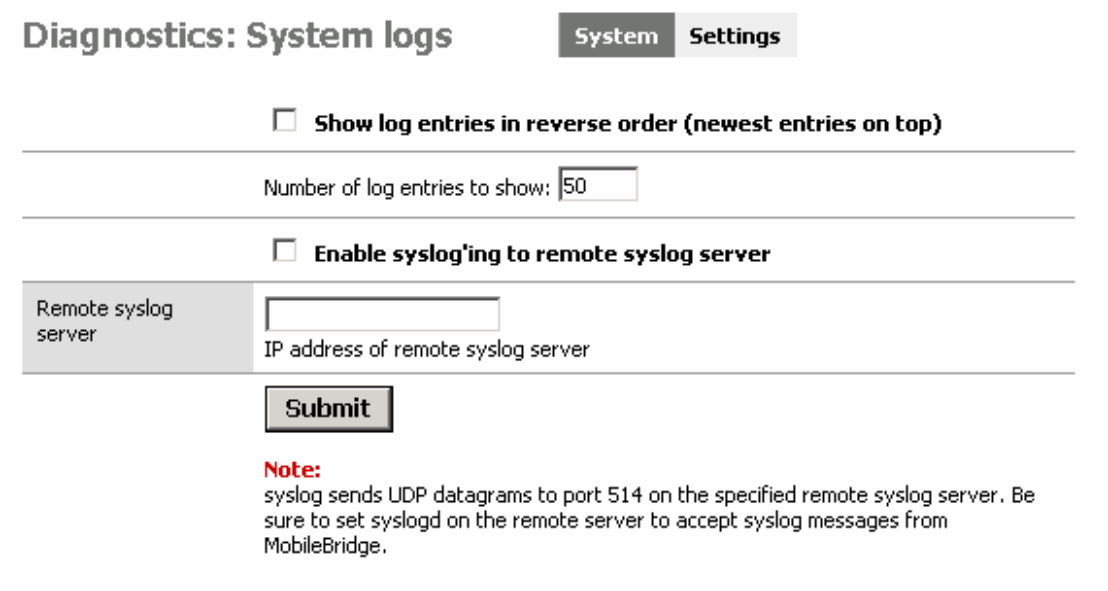
Last 50 system log entries	
Jan 1 00:00:01	syslogd started: BusyBox v0.60.0 (2005.08.03-05:42+0000)
Jan 1 00:00:01	cardmgr[21]: watching 1 socket
Jan 1 00:00:01	dnsmasq[31]: started, version 1.10 cachesize 150
Jan 1 00:00:01	dnsmasq[31]: failed to drop root privs
Jan 1 00:00:01	dnsmasq[31]: cleared cache
Jan 1 00:00:01	dnsmasq[31]: reading /tmp/resolv.conf
Jan 1 00:00:01	udhcpd: udhcp server (v0.9.8) started
Jan 1 00:00:22	udhcpd: Received a SIGUSR1
Jan 1 00:00:24	udhcpd: Received a SIGUSR1
Jan 1 00:00:25	udhcpd: Received a SIGUSR1
Jan 1 00:00:33	udhcpd: Received a SIGUSR1
Jan 1 00:00:34	udhcpd: Received a SIGUSR1
Jan 1 00:00:35	udhcpd: Received a SIGUSR1
Jan 1 00:00:37	udhcpd: Received a SIGUSR1
Jan 1 00:00:44	udhcpd: Received a SIGUSR1

◆ **Function Summary**

The System Log displays a list of the most recent activity that has taken place on MB6000.The **System** tab shows the last 50 system log entries.

3.4.6.1.2 Settings

Figure 3-34 ***System log settings***

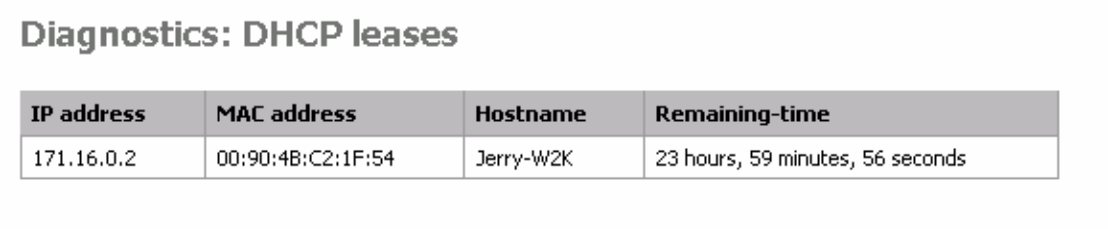


◆ **Function Summary**

You can configure the Log method here. MB6000 can display the Syslog entries in the Web GUI; it can also send the Syslog entries to a remote syslog server. To send the Syslog to the syslog server, you need to check the "*Enable sysloging to remote syslog server*" checkbox and assign the IP address of remote syslog server in the bottom box.

3.4.6.2 DHCP leases

Figure 3-13 ***DHCP leases***



◆ **Function Summary**

This tab shows the information of MB6000's DHCP server.

4 Troubleshooting

4.1 Overview

- Introduction
- Reset to Factory Default procedure
- Force Reload Procedure
- Firmware Upgrade Procedure through Web
- Common Problems and solutions
- Frequently Asked Questions
- LED Indication status

4.2 Introduction

This section helps you to locate problems related to MB6000 setup. The most common installation problems are related to the IP address. For example, without the TFTP server IP address, you will not be able to download the firmware to the MB6000.

IP address management is critical and we suggest you to create a chart to document and validate the IP addresses of your system.

If the password is lost or forgotten, you will need to reset the MB6000 to default values. The **Reset to Factory Default** procedure resets the MB6000 configuration settings, but does not change the current firmware. The **Forced Reload** procedure will erase the current firmware and configurations, please use it with caution when you need to download new software.

Reset to Factory Default Procedure

Use this procedure to reset the network configuration values, including the MB6000 IP Address, Subnet Mask, and so on. The current MB6000 Software will not be erased. This

procedure may be required if the password is forgotten or the configurations are forgotten.

When MB6000 is working in normal status, press and holds the **RELOAD** button for about 20 seconds, until all the indicator lights change to amber. Then release **RELOAD** button, and press reset button to reboot MB6000,he factory default network values are restored. Please refer Table 6-1 for the factory default value.

Warning:

If you press and hold the **RELOAD** button for more than 10 seconds immediately after the MB6000 is power on or reset, the MB6000 will enter into Force Reload Procedure. The software in the MB6000 will be erased. You will have to download software into MB6000 to make it work again.

Forced Reload Procedure

Use this procedure to force the MB6000 back to default network configuration values and download new MB6000 software. This procedure may be required when the current MB6000 software is missing, corrupted or needs to be upgraded.

Download procedure

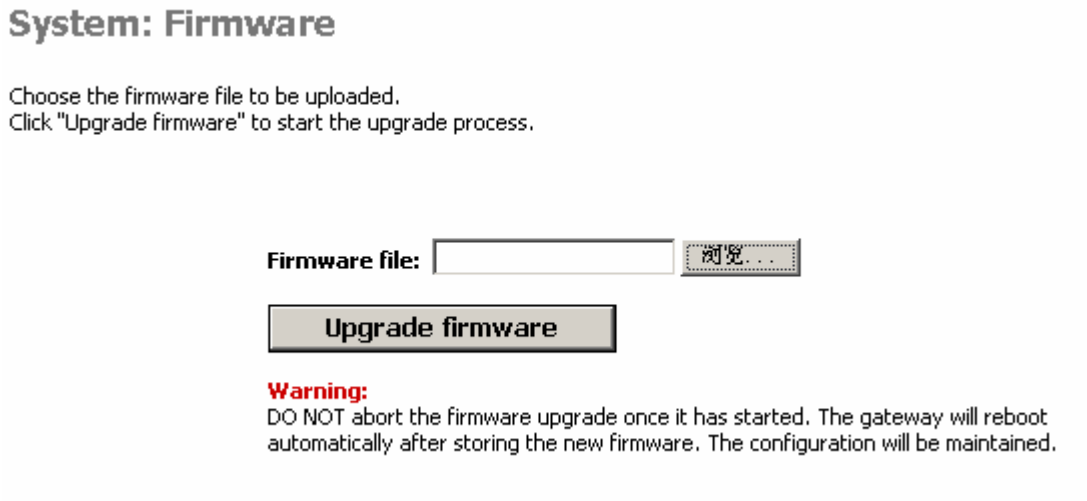
1. Prepare you TFTP server. TFTP server is a computer with TFTP server software running. TFTP server can be freely downloaded from www.solarwinds.net. You can also search other TFTP servers from the Internet if you like.
2. To download the MB6000 Software, you will need an Ethernet connection to the computer on which the TFTP server resides. This can be any computer on the LAN, or connected to the MB6000's "LAN" port with a "crossover" Ethernet cable.
3. After force reload, MB6000's IP will be set to 172.16.0.1 by default, and MB6000 will login the TFTP server with IP address "172.16.0.2" to download software named "firmware.bin" by default. So please change the IP address of TFTP server to 172.16.0.2, and change the MB6000 software name to **firmware.bin**, put it in the directory of TFTP server root.
4. After finishing this preparation, power on the MB6000.

5. Press the RESET button.
6. Press and hold the RELOAD button for about 10 seconds immediately after you press and release the RESET button until the POWER LED turns amber and the WWAN LED turns off. Result: The MB6000 deletes the current MB6000 software and Configuration files. Then MB6000 will download the software you have prepared in the step 3. Observe the TFTP display and you should see downloading activity begin after a few seconds.
7. After finished this procedure, MB6000 will boot automatically. and you can see the POWER LED turns amber and blinks
8. MB6000 will be configured to the factory default value. Please refer Table 6-1 for the factory default value.

Firmware Upgrade Procedure through Web

Use this procedure to upgrade the newest version firmware for MB6000 through Web interface on user client. This procedure may be necessary when a new version firmware is released(Figure 4-1).

Figure 4-1 ***Firmware upgrade***



MB6000's firmware is upgraded through **Firmware** tab. Follow these instructions:

1. Download the firmware from Top Global's website at **www.topglobalusa.com** to your host PC.

2. Enter the location of the firmware file or click the **Browse** button to find the file.

3. Then, click the **Upgrade Firmware** button to upgrade the firmware.

Common Problems and Solutions

1. How to set a static IP address on a PC ?

You can assign a static IP address to a PC by performing the following steps:

• ***For Windows 98 and Me:***

a. Click Start, Settings, and Control Panel. Double-click Network.

b. In “The following network components are installed” box, select the TCP/IP-> associated with your Ethernet adapter. If you only have one Ethernet adapter installed, you will only see one TCP/IP line with no association to an Ethernet adapter. Highlight it then click the Properties button.

c.

d. In the TCP/IP properties window, select the IP address tab, and select Specify an IP address. Enter a unique IP address that is not used by any other computer on the network connected to MB6000. Make sure that each IP address is unique for each PC or network device.

e. Click the Gateway tab, and in the New Gateway prompt, enter 172.16.0.1, which is the default IP address MB6000. Click the Add button to accept the entry.

f. Click the DNS tab, and make sure the DNS Enabled option is selected. Enter the DNS entry provided by your ISP. If your ISP has not provided the DNS IP address, contact your ISP to get that information or go to its website for the information.

g. Click the OK button in the TCP/IP properties window, and click Close or the OK button for the Network window.

h. Restart the computer when asked.

• ***For Windows 2000:***

a. Click Start, Settings, and Control Panel. Double-click Network and Dial-Up connections.

b. Right-click the Local Area Connection that is associated with the Ethernet adapter you are using, and select the Properties option.

c. In the Components checked are used by this connection box, highlight Internet Protocol (TCP/IP), and click the Properties button. Select Use the following IP address option.

d. Enter a unique IP address that is not used by any other computer on the network connected to MB6000.
e. Enter the Subnet Mask, 255.255.0.0.
f. Enter the Default Gateway, 172.16.0.1 (MB6000's default IP address).
g. Toward the bottom of the window, select Use the following DNS server addresses, and enter the Preferred DNS server and Alternative DNS server (provided by your ISP). Contact your ISP or go on its website to find the information.
h. Click the OK button in the Internet Protocol (TCP/IP) Properties window, and click the OK button in the Local Area Connection Properties window.
i. Restart the computer if asked.

• For Windows XP:

The following instructions assume you are running Windows XP with the default interface. If you are using the Classic interface (where the icons and menus look like previous Windows versions), please follow the instructions for Windows 2000.

a. Click Start and Control Panel.
b. Click the Network and Internet Connections icon and then the Network Connections icon.
c. Right-click the Local Area Connection that is associated with the Ethernet adapter you are using, and select the Properties option.
d. In the This connection uses the following items box, highlight Internet Protocol (TCP/IP). Click the Properties button.
e. Enter a unique IP address that is not used by any other computer on the network connected to MB6000.
f. Enter the Subnet Mask, 255.255.0.0.
g. Enter the Default Gateway, 172.16.0.1 (Router's default IP address).
h. Toward the bottom of the window, select Use the following DNS server addresses, and enter the Preferred DNS server and Alternative DNS server (provided by your ISP). Contact your ISP or go on its website to find the information.
i. Click the OK button in the Internet Protocol (TCP/IP) Properties window. Click the OK button in the Local Area Connection Properties window.

2. How to test my Internet connection ?

a. Check your TCP/IP settings.

For Windows 98, Me, 2000, and XP:

• Make sure Obtain IP address automatically is selected in the settings.

b. Open a command prompt.

For Windows 98 and Me:

• Click Start and Run. In the Open field, type “command”. Press the Enter key or click the OK button.

For Windows 2000 and XP:

• Click **Start** and **Run**. In the Open field, type “cmd”. Press the **Enter** key or click the **OK** button. In the command prompt, type “ping 172.16.0.1” and press the **Enter** key.

• If you get a reply, the computer is communicating with MB6000.

• If you do NOT get a reply, please check the cable, and make sure ***Obtain an IP address automatically*** is selected in the TCP/IP settings for your Ethernet adapter.

c. In the command prompt, type ping followed by your WWAN IP address and press the Enter key. The WAN IP Address can be found on the Status screen of MB6000’s web-based utility. For example, if WWAN IP address is 1.2.3.4, you would enter ping 1.2.3.4 and press the Enter key.

• If you get a reply, the computer is connected to MB6000.

• If you do NOT get a reply, try the ping command from a different computer to verify that your original computer is not the cause of the problem.

d. In the command prompt, type ping www.yahoo.com and press the Enter key.

• If you get a reply, the computer is connected to the Internet. If you cannot open a webpage, try the ping command from a different computer to verify that your original computer is not the cause of the problem.

• If you do NOT get a reply, there may be a problem with the connection. Try the ping command from a different computer to verify that your original computer is not the cause of the problem.

3.When I enter a URL or IP address, I get a time-out error or am prompted to retry.

• Check if other PCs work. If they do, ensure that your workstation's IP settings are correct (IP Address, Subnet Mask, Default Gateway, and DNS). Restart the computer that is having a problem.

• If the PCs are configured correctly, but still not working, check MB6000. Ensure that it is connected and powered on. Connect to it and check its settings. (If you cannot connect to it, check the LAN and power connections.)

• If MB6000 is configured correctly, check your Internet connection (WWAN card) to see if it is working correctly.

• Manually configure the TCP/IP settings with a DNS address provided by your ISP.

• Make sure that your browser is set to connect directly and that any dial-up is disabled. For Internet Explorer, click Tools, Internet Options, and then the Connection tab. Make sure that Internet Explorer is set to Never dial a connection. For Netscape Navigator, click Edit, Preferences, Advanced, and Proxy. Make sure that Netscape Navigator is set to Direct connection to the Internet.

Frequently Asked Questions

What is the maximum number of IP addresses that MB6000 will support?

MB6000 will support up to 253 IP addresses.

Is IPSec Pass-Through supported by MB6000?

Yes, it is a built-in feature that MB6000 automatically enables.

Does MB6000 support IPX or AppleTalk?

No. TCP/IP is the only protocol supported.

What is Network Address Translation and what is it used for?

Network Address Translation (NAT) translates multiple IP addresses on the private LAN to one public address that is sent out to the Internet. This adds a level of security since the address of a PC connected to the private LAN is never transmitted on the Internet.

Furthermore, NAT allows MB6000 to be used with low cost Internet accounts. The user may have many private addresses behind this single address provided by the ISP.

Does MB6000 support any operating system other than Windows 98, Windows Millennium, Windows 2000, or Windows XP?

Yes.

Does MB6000 support ICQ send file?

Yes, with the following fix: click ICQ menu -> preference -> connections tab->, and check I am behind a firewall or proxy. Then set the firewall time-out to 80 seconds in the firewall setting. The Internet user can then send a file to a user behind MB6000.

Can multiple gamers on the LAN get on one game server and play simultaneously with just one public IP address?

It depends on which network game or what kind of game server you are using. It will work if the game server supports multi-user with one public IP address.

Will MB6000 function in a Macintosh environment?

Yes, but MB6000's setup pages are accessible only through Internet Explorer 4.0 or Netscape Navigator 4.0 or higher for Macintosh.

I am not able to get the web configuration screen for MB6000. What can I do?

You may have to remove the proxy settings on your Internet browser, e.g., Netscape Navigator or Internet Explorer. Or remove the dial-up settings on your browser. Check with your browser documentation, and make sure that your browser is set to connect directly and that any dial-up is disabled. For Internet Explorer, click Tools, Internet Options, then the Connection tab. Make sure that Internet Explorer is set to Never dial a connection. For Netscape Navigator, click Edit, Preferences, Advanced, and Proxy. Make sure that Netscape Navigator is set to Direct connection to the Internet.

Does MB6000 pass PPTP packets or actively route PPTP sessions?

MB6000 allows PPTP packets to pass through.

Is MB6000 cross-platform compatible?

Any platform that supports Ethernet and TCP/IP is compatible with MB6000.

Can MB6000 act as my DHCP server?

Yes. MB6000 has DHCP server software built-in.

What is the IEEE 802.11g standard?

It is one of the IEEE standards for wireless networks. The 802.11g standards allow wireless networking hardware from different manufacturers to communicate, provided that the hardware complies with the 802.11g standards. The 802.11g standards state a maximum data transfer rate of 54Mbps and an operating frequency of 2.4GHz. The 802.11g is downward compatible with 802.11b.

What IEEE 802.11b features are supported?

The product supports the following IEEE 802.11b functions:

• CSMA/CA plus Acknowledge protocol

• Multi-Channel Roaming

• Automatic Rate Selection

• RTS/CTS feature

• Fragmentation

• Power Management

Will the information be intercepted while it is being transmitted through the air?

WLAN features two-fold protection in security. On the hardware side, as with Direct Sequence Spread Spectrum technology, it has the inherent security feature of scrambling. On the software side, WLAN offers the encryption function (WEP or WPA) to enhance security and access control.

What is WEP?

WEP is Wired Equivalent Privacy, a data privacy mechanism based on a 64-bit or 128-bit shared key algorithm, as described in the IEEE 802.11 standard.

What is WPA-PSK?

WPA-PSK means Wi-Fi Protected Access - Pre-Shared Key. It is an enhanced wireless encryption standards defined by the WiFi Alliances.

What is a MAC Address?

The Media Access Control (MAC) address is a unique number assigned by the manufacturer to any Ethernet networking device, such as a network adapter, that allows the network to identify it at the hardware level. For all practical purposes, this number is usually permanent. Unlike IP addresses, which can change every time a computer logs onto the network, the MAC address of a device stays the same, making it a valuable identifier for the network.

How do I reset MB6000 to factory default?

When MB6000 is working in normal status, press and holds the **RELOAD** button for about 5~7 seconds, until all the indicator lights turn off. Then release **RELOAD** button, press the **RESET** button to set up the device again.. This will reset MB6000 to its default settings.

How do I resolve issues with signal loss?

There is no way to know the exact range of your wireless network without testing. Every obstacle placed between MB6000 and a wireless PC will create signal loss. Lead glass, metal, concrete floors, water and walls will inhibit the signal and reduce range. Start with MB6000 and your wireless PC in the same room and move it away in small increments to determine the maximum range in your environment. You may also try using different channels, as this may eliminate interference affecting only one channel.

I have excellent signal strength, but I cannot see my network.

WEP or WPA-PSK is probably enabled on MB6000, but not on your wireless client. Verify that the same keys are being used on all nodes of your wireless network.

How many channels/frequencies are available with MB6000?

There are eleven available channels, ranging from 1 to 11 (in North America).

5 Default MB6000 Settings

The following table lists the settings defined at the factory for all MB6000 units, and provides a place to enter the values for your system if you have changed them.

Table 6-1 ***Default Setting***

Item	Default Value	My System Value
Local IP Address	172.16.0.1	
Local IP Mask	255.255.255.0	
Network Name(SSID)	(Same with SN)	
Frequency Channel	6	
DHCP Server Status	Enabled	
DHCP Lease Range	172.16.0.2-172.16.0.100	
TFTP Server IP Address	172.16.0.2	
TFTP File Name	firmware.bin	
Http Username	public	
Http Password	public	

Wireless WAN default setting:	phone number	"#777"	
	username	"card"	
	password	"card"	
	Init string	"AT&F"	