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SBG1000 Wireless Cable Modem Gateway User Guide

SURFboard®
Cable Modem

Next page

WARNING: TO PREVENT FIRE OR SHOCK HAZARD, DO NOT EXPOSE THIS PRODUCT TO RAIN OR MOISTURE. THE UNIT MUST NOT BE EXPOSED TO DRIPPING OR SPLASHING. DO NOT PLACE OBJECTS FILLED WITH LIQUIDS, SUCH AS VASES, ON THE UNIT.

CAUTION: TO PREVENT ELECTRICAL SHOCK, THIS EQUIPMENT REQUIRES A GROUNDING CONDUCTOR IN THE LINE CORD. THE LINE CORD PROVIDED WITH THE EQUIPMENT IS ACCEPTABLE FOR USE WITH NEMA STYLE 5-15R AC RECEPTACLE SUPPLYING NOMINAL 120 VOLTS. DO NOT CONNECT THE PLUG INTO AN EXTENSION CORD, RECEPTACLE, OR OTHER OUTLET UNLESS THE PLUG CAN BE FULLY INSERTED WITH NO PART OF THE BLADES EXPOSED.

CAUTION: TO ENSURE REGULATORY AND SAFETY COMPLIANCE, USE ONLY THE PROVIDED POWER AND INTERFACE CABLES.

CAUTION: DO NOT OPEN THE UNIT. DO NOT PERFORM ANY SERVICING OTHER THAN THAT CONTAINED IN THE INSTALLATION AND TROUBLESHOOTING INSTRUCTIONS. REFER ALL SERVICING TO QUALIFIED SERVICE PERSONNEL.

CAUTION: CHANGES AND MODIFICATIONS NOT EXPRESSLY APPROVED BY MOTOROLA FOR COMPLIANCE COULD VOID USER'S AUTHORITY TO OPERATE THE EQUIPMENT.

CAUTION: Exposure to Radio Frequency Radiation. To comply with the FCC RF exposure compliance requirements, the separation distance between the antenna and any person's body (including hands, wrists, feet and ankles) must be at least 20 cm (8 inches).

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.

Note: 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 or more 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 must be installed and used in strict accordance with the manufacturer's instructions as described in the user documentation that comes with the product.

Postpone cable modem installation until there is no risk of thunderstorm or lightning activity in the area.

Do not overload outlets or extension cords, as this can result in a risk of fire or electric shock. Overloaded AC outlets, extension cords, frayed power cords, damaged or cracked wire insulation, and broken plugs are dangerous. They may result in a shock or fire hazard.

Route power supply cords so that they are not likely to be walked on or pinched by items placed upon or against them. Pay particular attention to cords where they are attached to plugs and convenience receptacles, and examine the point where they exit from the product.

Place this equipment in a location that is close enough to an electrical outlet to accommodate the length of the power cord.

Place this equipment on a stable surface.

Be sure that the outside cable system is grounded, so as to provide some protection against voltage surges and built-up static charges. Article 820-20 of the NEC (Section 54, Part I of the Canadian Electrical Code) provides guidelines for proper grounding and, in particular, specifies the CATV cable ground shall be connected in the grounding system of the building, as close to the point of cable entry as practical.

When using this device, basic safety precautions should always be followed to reduce the risk of fire, electric shock and injury to persons, including the following:

- Read all of the instructions {listed here and/or in the user manual} before you operate this equipment. Give particular attention to all safety precautions. Retain the instructions for future reference.
- Comply with all warning and caution statements in the instructions. Observe all warning and caution symbols that are affixed to this equipment.
- Comply with all instructions that accompany this equipment.
- *Avoid using this product during an electrical storm.* There may be a risk of electric shock from lightning. For added protection for this product during a lightning storm, or when it is left unattended and unused for long periods of time, unplug it from the wall outlet, and disconnect the cable system. This will prevent damage to the product due to lightning and power surges.
- Avoid damaging the cable modem with static by touching the coaxial cable when it is attached to the earth grounded coaxial cable TV wall outlet.
- Always first touch the coaxial cable connector on the cable modem when disconnecting or re-connecting USB or Ethernet cable from the cable modem or the user's PC.
- Operate this product only from the type of power source indicated on the product's marking label. If you are not sure of the type of power supplied to your home, consult your dealer or local power company.
- Upon completion of any service or repairs to this products, ask the service technician to perform safety checks to determine that the product is in safe operating condition.

It is recommended that the customer install an AC surge protector in the AC outlet to which this device is connected. This is to avoid damaging the equipment by local lightning strikes and other electrical surges.

Different types of cord sets may be used for connections to the main supply circuit. Use only a main line cord that complies with all applicable product safety requirements of the country of use.

Installation of this product must be in accordance with national wiring codes.

Place unit to allow for easy access when disconnecting the power cord/adapter of the device from the AC wall outlet.

Wipe the unit with a clean, dry cloth. Never use cleaning fluid or similar chemicals. Do not spray cleaners directly on the unit or use forced air to remove dust.

This product was qualified under test conditions that included the use of the supplied cables between system components. To be in compliance with regulations, the user must use these cables and install them properly. Connect the unit to a grounding type AC wall outlet (100-240 V AC) using the standard power cord/adapter as supplied with the unit.

Do not cover the device, or block the airflow to the device with any other objects. Keep the device away from excessive heat and humidity and keep the device free from vibration and dust.

Installation must at all times conform to local regulations.

This product is provided with a separate *Regulatory, Safety, Software License, and Warranty Information* card. If one is not provided with this product, please ask your service provider or point-of-purchase representative, as the case may be.

- THIS PRODUCT IS IN COMPLIANCE WITH ONE OR MORE OF THE STANDARDS LISTED ON THE *REGULATORY, SAFETY, SOFTWARE LICENSE, AND WARRANTY INFORMATION* CARD. NOT ALL STANDARDS APPLY TO ALL MODELS.
- NO WARRANTIES OF ANY KIND ARE PROVIDED BY MOTOROLA WITH RESPECT TO THIS PRODUCT, EXCEPT AS STATED ON THE *REGULATORY, SAFETY, SOFTWARE LICENSE, AND WARRANTY INFORMATION* CARD. MOTOROLA'S WARRANTIES DO NOT APPLY TO PRODUCT THAT HAS BEEN REFURBISHED OR REISSUED BY YOUR SERVICE PROVIDER.

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--Reorient or relocate the receiving antenna.

--Increase the separation between the equipment and the 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.

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Overview

Thank you for purchasing the Motorola® SBG1000 Wireless Cable Modem Gateway. The SBG1000 combines a SURFboard™ cable modem, IEEE 802.11b wireless access point, router with five-port 10/100Base-T switch, print server, and an advanced firewall into one compact product. It is the perfect networking solution for the home, home office, or small business/enterprise. You can create a custom network to share a single broadband connection, files, printers, and other peripherals like scanners, with or without wires.

The SBG1000:

- Eliminates the need for five separate products, enabling you to maximize the potential of your existing resources
- Offers enhanced network security for wired and wireless users
- Enables operators to add future value-added services

The features and physical appearance of your SBG1000 may differ slightly from the picture.

This product is subject to change. Not all features described in this *User Guide* are available on all SBG1000 models. For the most recent documentation, visit the Product Documentation page on www.motorola.com/broadband.

Powerful Features in a Single Unit

The Motorola SBG1000 Wireless Cable Modem Gateway combines high-speed Internet access, networking, and computer security for a home or small-office local area network (LAN). It provides:

- An integrated high-speed SURFboard cable modem for continuous broadband access to the Internet and other online services, with much faster data transfer than traditional dial-up or ISDN modems.
- A router with a five-port 10/100Base-T Ethernet switch, supporting:
  - Half- or full-duplex connections
  - Five dual-purpose switch/uplink ports
  - Auto-MDIX
- An IEEE 802.11b Wi-Fi certified wireless access point to enable laptop users to remain connected while moving around the home or small office or to connect desktop computers without installing network wiring. Depending on distance, wireless connection speeds can match that of Ethernet at 11 Mbps.
- An HPNA connection to connect computers to the LAN over existing telephone wiring — this provides the advantage of using your existing phone lines for network wiring with up to 10 Mbps throughput.
- A USB connection for a single PC.
- A single broadband connection for up to 253 computers to surf the web; all computers on the Ethernet, wireless, HPNA LAN, and USB communicate as if they were connected to the same physical network.
- A built-in DHCP server to easily configure a combined wired and/or wireless Class C private LAN.
- An advanced firewall, supporting:
  - stateful-inspection
  - Intrusion detection
  - DMZ
  - Denial-of-service attack prevention
  - Network Address Translation (NAT)
- Virtual private network (VPN) pass-through operation supporting IPSec, PPTP, or L2TP to securely connect remote computers over the Internet.
- A print server to enable Windows®, Macintosh®, UNIX®, and Linux® computers to share one or more printers.

Easy Setup

It is much easier to configure a LAN using the Motorola SBG1000 Wireless Cable Modem Gateway than it is using typical networking equipment:

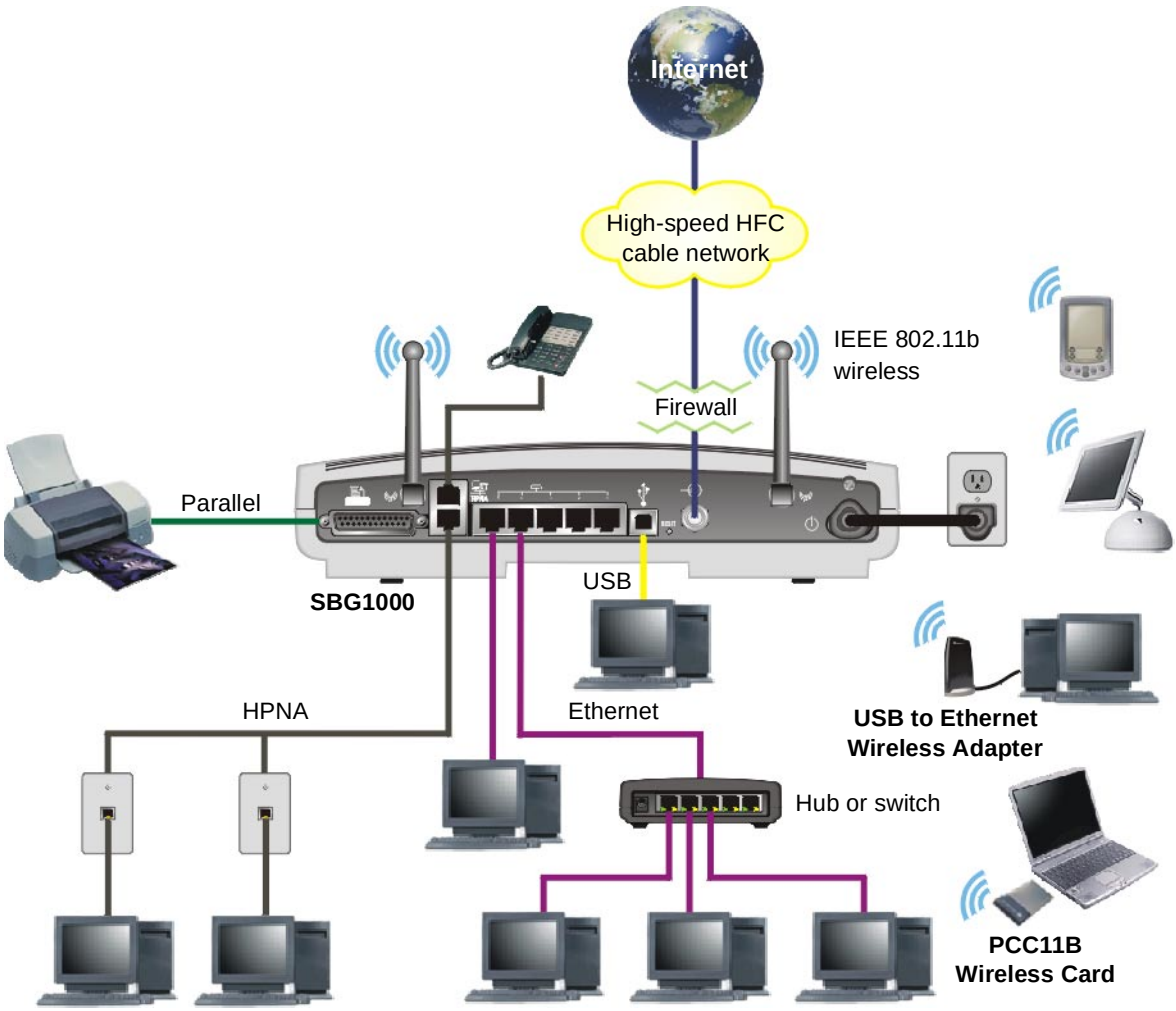
- The Installation Assistant application on the *Motorola SBG1000 Wireless Cable Modem Gateway* CD-ROM enables easy connection to the cable network.
- For basic operation, most default settings require no modification.
- The Setup Program provides a graphical user interface (GUI) for easy configuration of necessary wireless, Ethernet, router, DHCP, and security settings. For a list of important issues, see “Configuring the SBG1000” on page 31.

Sample LAN

The sample LAN shown in the figure contains the following devices, all protected by the SBG1000 firewall:

- A printer connected to the print server through the parallel connection
- A PDA connected through the wireless IEEE 802.11b connection
- One desktop Macintosh on a wireless connection
- One desktop PC on a wireless connection using a Motorola USB Adapter
- A laptop PC on a wireless connection connected using a Motorola PC Card
- One computer connected directly to Ethernet port one
- Three computers connected to Ethernet port two using a hub or switch
- Two computers connected over telephone wiring through HPNA
- One PC connected to the USB port

Sample SBG1000 hybrid network



Optional Accessories

Accessories available for the Motorola SBG1000 Wireless Cable Modem Gateway include wireless adapters and an external high-gain diversity antenna.

You can use the Motorola PCC11b wireless card or the USB11b wireless adapter, which comply with the IEEE 802.11b wireless standard, to connect a PC to the wireless LAN:

USB11b Wireless Adapter

Connects a desktop, laptop, printer, or other peripheral device to the wireless LAN. It has a built-in antenna and a two meter (six feet) long cable that connects to the PC USB port. Its light indicates:

- Off — Not connected to a USB port or not receiving power from the PC
- Yellow — Not installed or initializing
- Green — Installed and operational
- Flashing Green — Receiving data from another wireless LAN device
- Flashing Yellow — Transmitting data to another wireless LAN device

PCC11Bb Wireless Card

A credit-card sized adapter that connects a laptop to the wireless LAN. You can roam in, or around, the home or small office and remain connected. It fits in a PCMCIA Type II standard slot on the laptop supporting 3.3 Volt PC card. The PCC11b has also has a built-in antenna.

Motorola USB11b Wireless Adapter (left) and PCC11b Wireless Card

For installation instructions, see the documentation provided with each product.

The Motorola External Diversity Antenna connects to the Motorola SBG1000 Wireless Cable Modem Gateway, providing higher gain to increase wireless LAN performance and coverage, even in obstructed locations. The External Diversity Antenna specifications are:

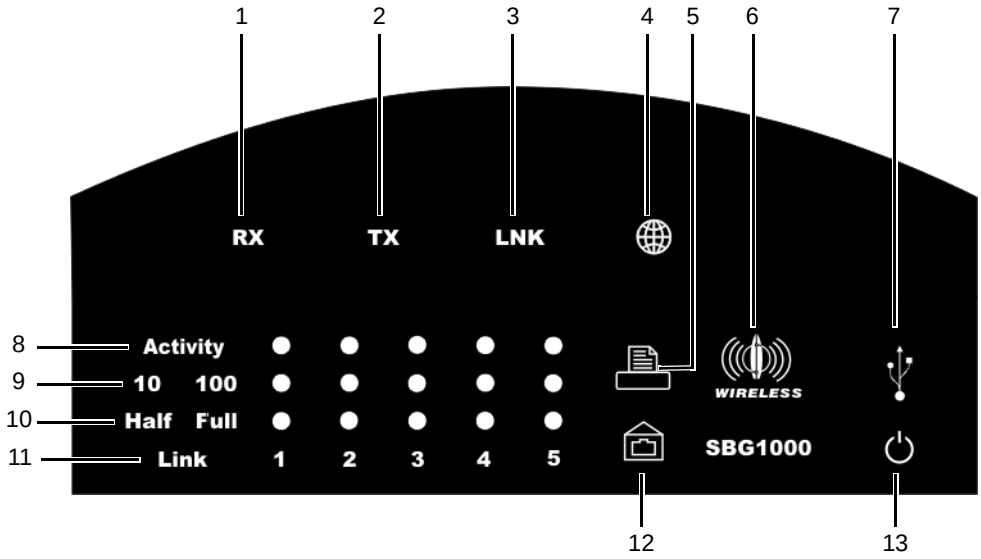
Frequency	2400 to 2500 MHz
Gain	5 dBi peak gain, nominal
Pattern Type	Directional, vertically polarized
Connection	Reverse-polarity TNC male, RG-142 cable

For information about connecting the external antenna, see "Installing the Optional External Diversity Antenna" on page 28.

Motorola External Diversity Antenna

Front Panel

The front panel provides indicator lights. *The model number on your SBG may be different than in some illustrations and screen images.*



Front-panel top section lights

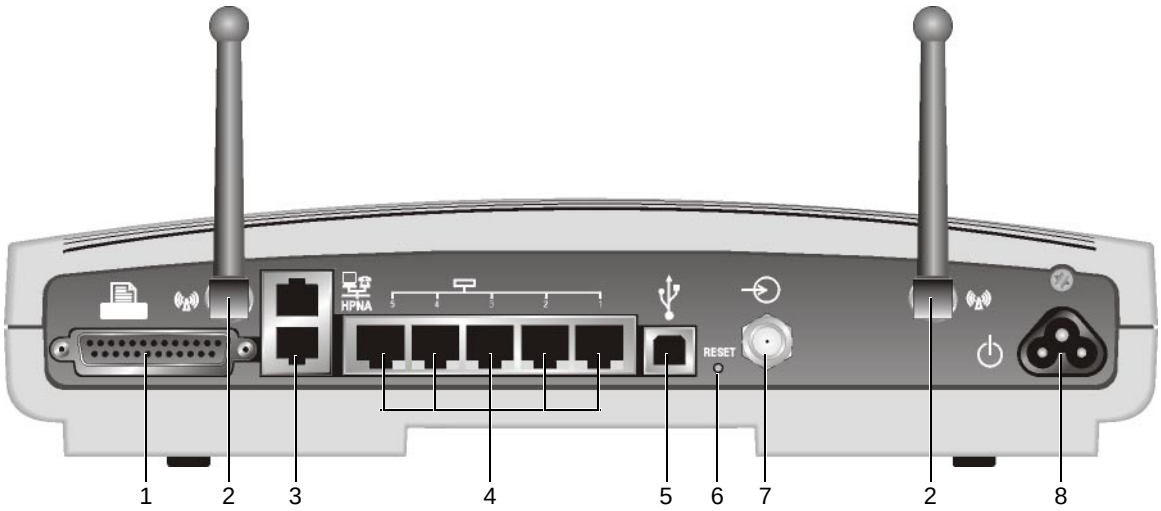
Key	Light	Flashing	On
1	**RX (Receive)**	Scanning for a receive (downstream) channel connection	The downstream channel is connected
2	**TX (Transmit)**	Scanning for a send (upstream) channel connection	The upstream channel is connected
3	**LNK (Link)**	Scanning for a network connection	The startup process is complete and the SBG1000 is online
4		Transmitting or receiving data	There is no solid on state

Front-panel bottom section lights

Key	Light	Flashing	On
5		Data transfer to printer	Printer is connected
6		Wireless activity	Wireless feature is functioning normally
7		USB activity	There is a proper USB connection
8	**Activity**	Ethernet activity on the port	
9	**10 100**	none	Indicates the LAN connection speed: • **Amber** for a 10Base-T connection • **Green** for a 100Base-T connection
10	**Half Full**	none	Indicates the LAN port duplex mode • **Amber** for half duplex • **Green** for full duplex
11	**Link 1 to 5**	No flashing mode	There is a proper Ethernet connection to the port
12		Data transfer over phone line using HPNA	There is no solid on state
13	**Power**	No flashing mode	The SBG1000 power supply is working properly

Rear Panel

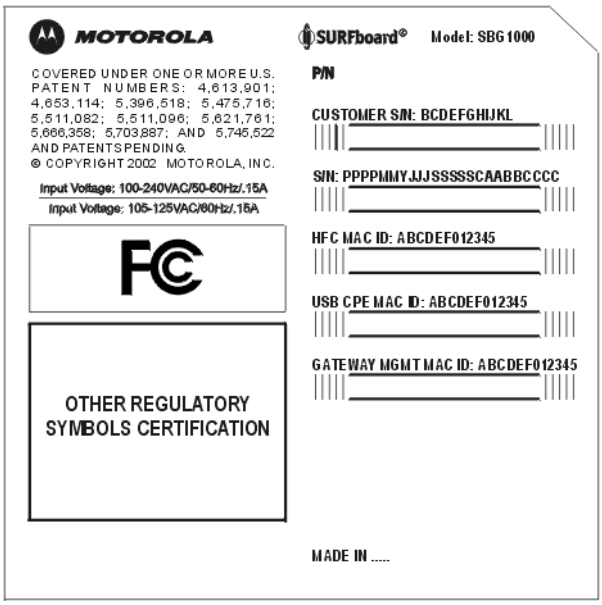
The rear panel provides cabling connectors, status lights, and the power receptacle:



Key	Item	Description
1		The printer port provides a connection for one printer.
2		The Motorola SBG1000 Wireless Cable Modem Gateway includes two antennas. The optional Motorola External Diversity Antenna provides higher gain to increase wireless LAN performance and coverage. For information about the External Diversity Antenna, see "Optional Accessories" on page 4.
3	HPNA	Use the HPNA ports to connect an HPNA LAN: • Connect the bottom HPNA port to the telephone jack using the supplied telephone wire terminated with RJ-11 connectors. • You can connect a telephone to the top HPNA port.
4	5 ··· 1	Use Ethernet ports 1 to 5 to connect an Ethernet LAN cable with RJ-45 connectors. You can connect Ethernet-equipped computers, hubs, bridges, or switches.
5		Use the USB port for Connecting a PC to the USB Port (see page 24).
6	•	If you experience a problem, you can push this recessed button to restart the SBG1000 (see "Troubleshooting" on page 117). To reset all values to their defaults, hold down the button for more than five seconds. Resetting may take 5 to 30 minutes because the SBG1000 must find and lock on the appropriate communications channels.
7		The cable port provides a connection to the coaxial cable outlet.
8		The power connector provides power to the SBG1000.

Label on the Bottom of the Unit

To receive data service, you need to provide the MAC address marked ***HFC MAC ID*** to your cable service provider*:*



Wiring the SBG1000 LAN

The Motorola SBG1000 Wireless Cable Modem Gateway enables connection of a Class C network with up to 253 client computers and other IEEE 802.11b compliant devices on a combination of:

- 10/100Base-T Ethernet
- IEEE 802.11b wireless networking
- HPNA V2.0
- USB V1.1

Each computer needs appropriate network adapter hardware and driver software. The clients on the Ethernet, wireless, HPNA, or USB interfaces can share:

- Internet access with a single cable service provider account
  (subject to network operator terms and conditions)
- Files, printers, storage devices, multi-user software applications, games, and video conferencing

Wireless and wired network connections use Windows networking to share files and peripheral devices such as printers, CD-ROM drives, floppy disk drives, and Iomega® Zip Drives.

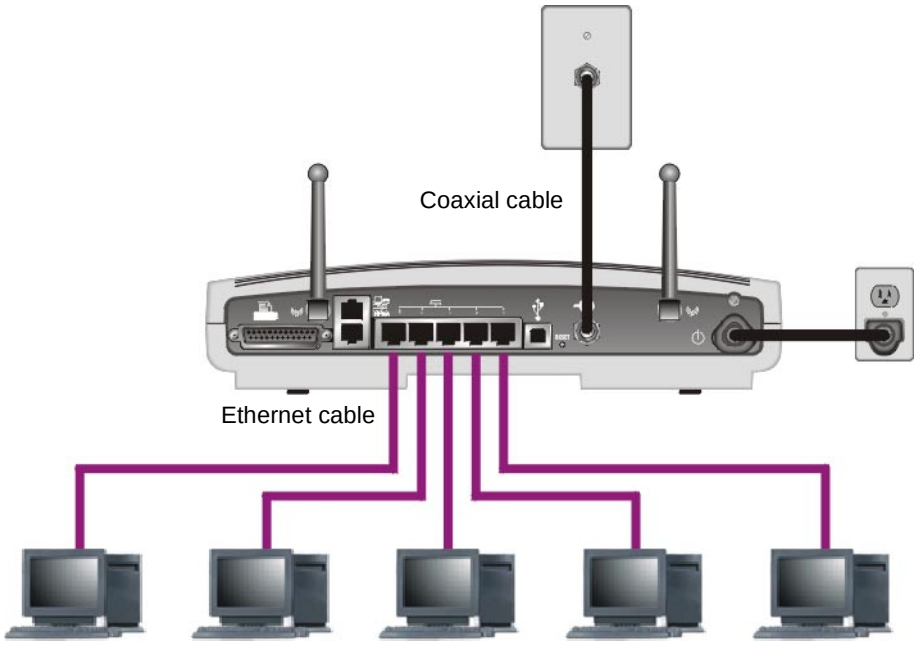
Wired Ethernet LAN

Each computer on the Ethernet LAN requires an Ethernet network interface card (NIC) and driver software installed.

Because the Motorola SBG1000 Wireless Cable Modem Gateway Ethernet ports support auto-MDIX, you can use either straight-through or cross-over cable to connect a hub, switch, or computer. Use category 5 cabling for all Ethernet connections.

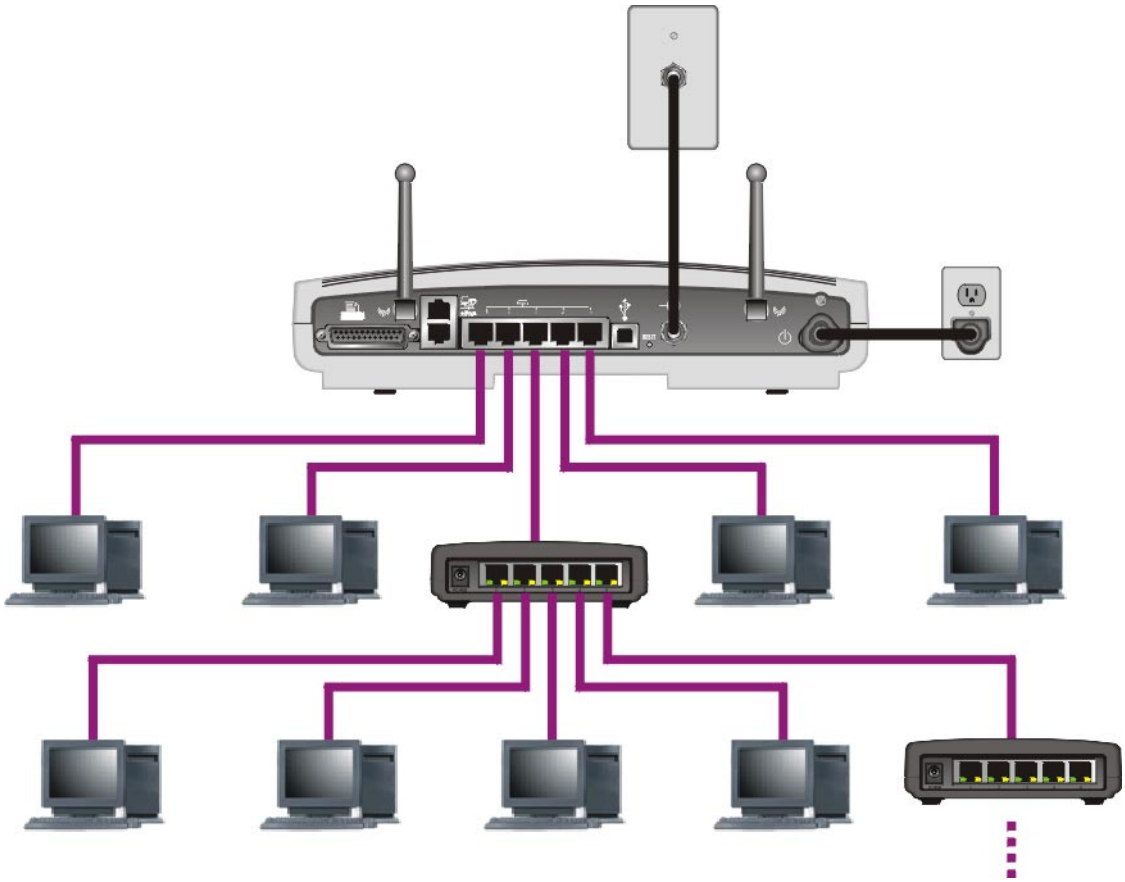
The physical wiring arrangement has no connection to the logical network allocation of IP addresses.

Sample SBG1000 Ethernet network connections



A wired Ethernet LAN with more than five computers requires one or more hubs or switches. You can connect a hub or switch to any Ethernet port on the Motorola SBG1000 Wireless Cable Modem Gateway.

The following illustration is an example of an Ethernet LAN you can set up using the Motorola SBG1000 Wireless Cable Modem Gateway. You should cable the Ethernet LAN in an appropriate manner for the site. A complete discussion of Ethernet cabling is beyond the scope of this document.



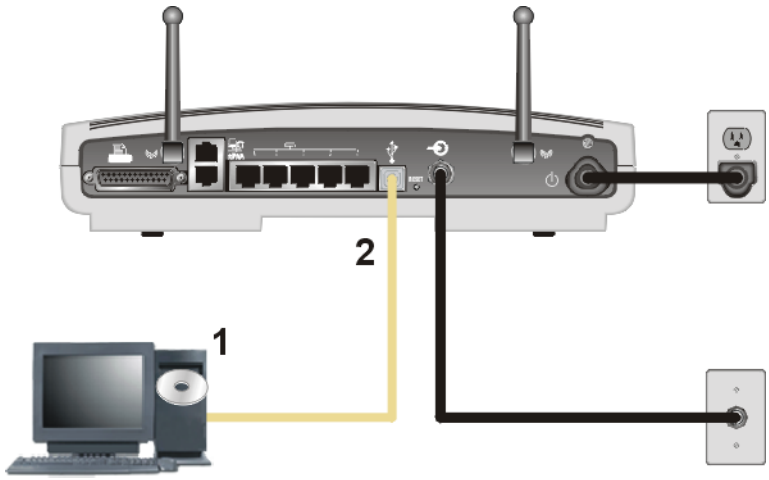
Add additional hubs or switches for further expansion

You can connect a hub or switch to any Ethernet port on the Motorola SBG1000 Wireless Cable Modem Gateway.

USB Connection

You can connect a single PC running Windows® 98, Windows XP™, Windows Me®, or Windows® 2000 to the Motorola SBG1000 Wireless Cable Modem Gateway USB port. For cabling instructions, see "Connecting a PC to the USB Port" on page 24.

Sample USB connection.



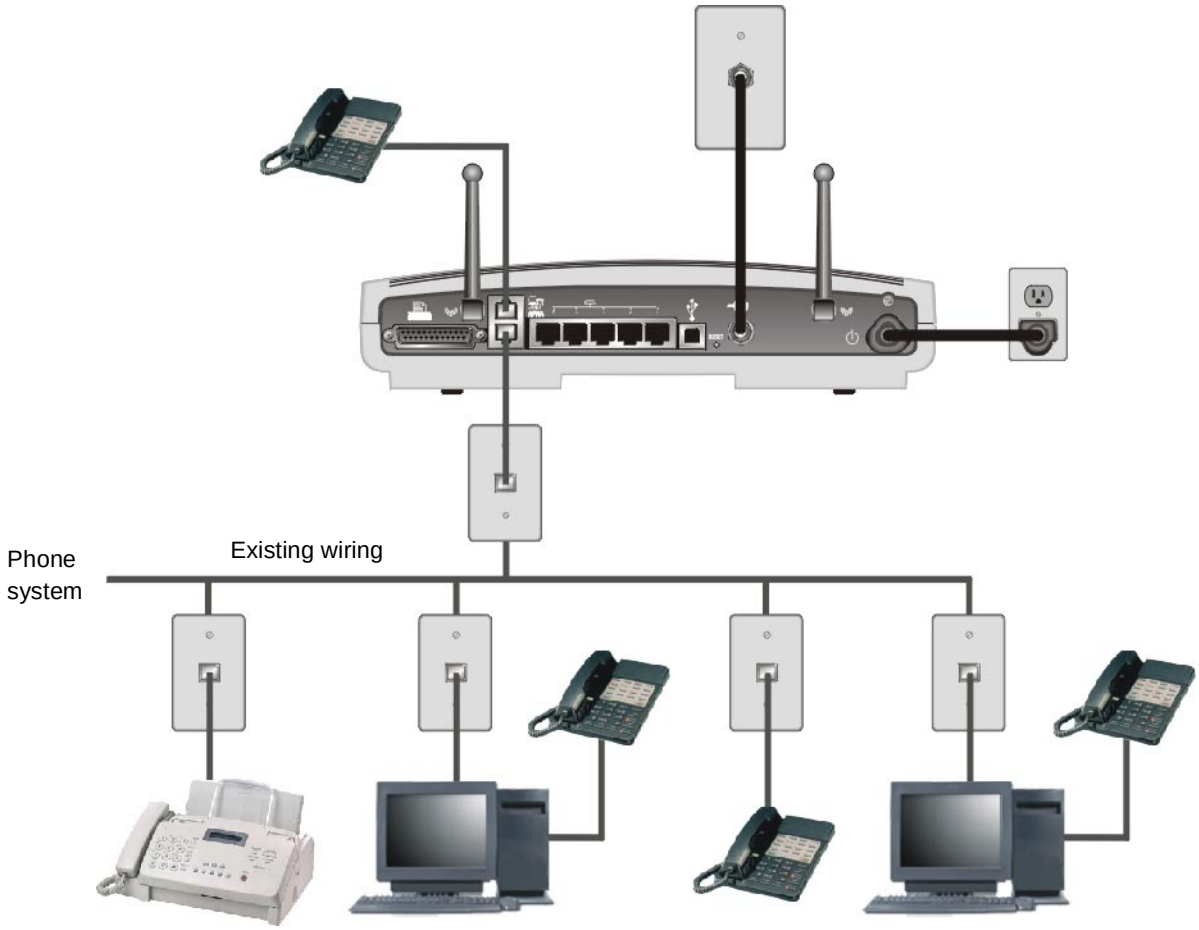
Caution!

Before plugging in the USB cable, be sure the Motorola SBG1000 Wireless Cable Modem Gateway CD-ROM is inserted in the PC CD-ROM drive.

HPNA LAN

To eliminate the need to install network wiring, the Motorola SBG1000 Wireless Cable Modem Gateway provides a Home Phoneline Network Alliance (HPNA or HomePNA) connection. HPNA networks use existing telephone lines to connect the computers without interfering with telephone voice service, DSL, ISDN, modems, or fax machines. HPNA networks can extend up to 300 meters (1000 feet).

Sample HPNA network connections



Each computer requires an HPNA adapter to connect to the HPNA network. HPNA adapters (sold elsewhere) are available for PCI or USB. After installing the HPNA adapter, you must install HPNA driver software on the computer following the instructions provided with the HPNA adapter.

HPNA 2.0 supports 10 Mbps data transfer similar to Ethernet 10Base-T.

If there is more than one telephone line, you must make all HPNA connections to the same line. You can connect a telephone to the top HPNA port on the SBG1000 (see "Front Panel" on page 6).

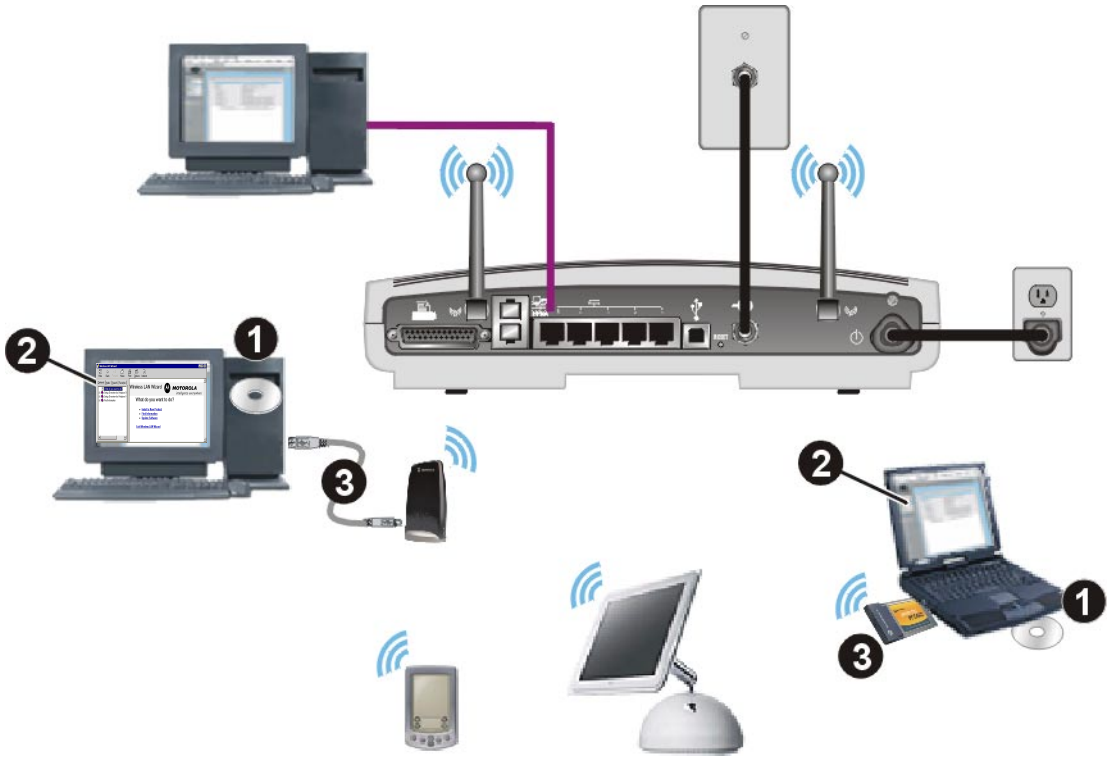
IEEE 802.11b Wireless LAN

Wireless communication occurs over radio waves rather than a wire. Like a cordless telephone, a wireless LAN uses radio signals instead of wires to exchange data. A wireless network eliminates the need for expensive and intrusive wiring to connect computers throughout the home or office. Mobile users can remain connected to the network even when carrying their laptop to different locations in the home or office.

Each computer on a wireless LAN requires an adapter described in "Optional Accessories" on page 4:

- For wireless laptops connections, use a Motorola PCC11b Wireless Card in the PCMCIA slot.
- For wireless desktop connections, use a Motorola USB11b Wireless Adapter to connect your PC USB port.

Sample wireless network connections



To set up the SBG1000, on a computer wired to the SBG1000 over Ethernet or USB, perform the procedures in "Setting Up the Wireless LAN" on page 67.

To set up each wireless client (station):

1. Insert the *PCC11b and USB11b Wireless Adapter* CD-ROM in the CD-ROM drive on the client.
2. Install the device software from the CD.
3. Connect the Motorola PCC11b wireless card or USB11b wireless adapter following the instructions supplied with the card or adapter

Security

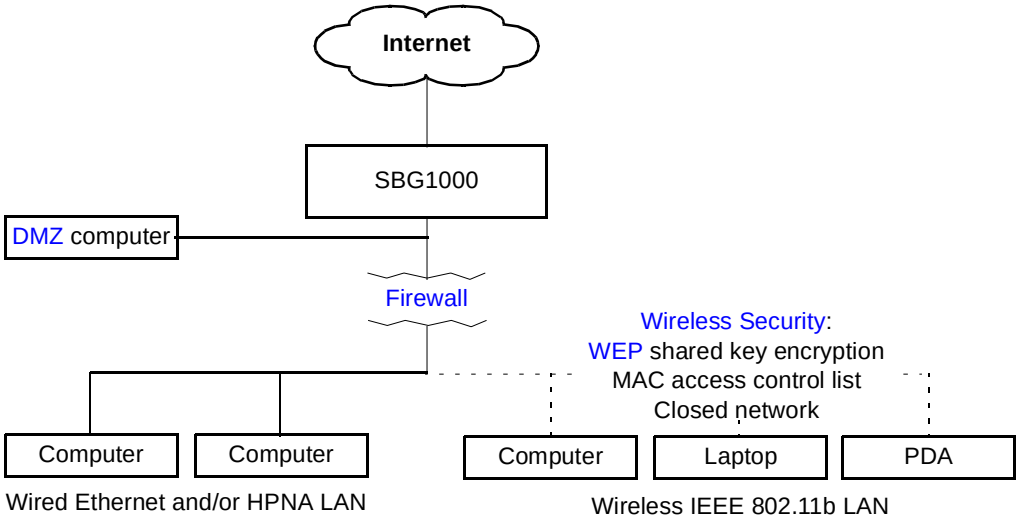
The Motorola SBG1000 Wireless Cable Modem Gateway provides:

- A firewall to protect the SBG1000 LAN from undesired attacks over the Internet
- Security measures to prevent eavesdropping of wireless data

Network Address Translation (NAT) provides some security because the IP addresses of SBG1000 LAN computers are not visible on the Internet.

The logical network diagram does not necessarily correspond to the network cabling. A full discussion of network security is beyond the scope of this document.

SBG1000 security measures shown in a logical network diagram



Firewall

The SBG1000 firewall protects the SBG1000 LAN from undesired attacks and other intrusions from the Internet. It provides an advanced integrated stateful-inspection firewall supporting intrusion detection, session tracking, and denial-of-service attack prevention. The firewall:

- Maintains state data for every TCP/IP session on the OSI network and transport layers
- Monitors all incoming and outgoing packets, applies the firewall policy to each one, and screens for improper packets and intrusion attempts
- Provides comprehensive logging for all:
  - User authentications
  - Rejected internal and external connection requests
  - Session creation and termination
  - Outside attacks (intrusion detection)

You can configure the firewall filters to set rules for port usage and to block specific IP domains and networks. For information about choosing a default firewall policy, see "Setting the Firewall Policy" on page 36.

DMZ

A de-militarized zone (DMZ) is one or more computers logically located outside the firewall between an SBG1000 LAN and the Internet. A DMZ prevents direct access by outside users to private data. You can use a DMZ to set up a web server without exposing confidential data on your network. A DMZ is also useful for gamers that have a problem running a computer game's protocol through a firewall. DMZ provides the gamer a way to expose a single host directly to the Internet and thus overcome any firewall issues.

Wireless Security

To prevent unauthorized eavesdropping of data transmitted over the wireless LAN, you must enable wireless security. *The default Open authentication setting provides no security for transmitted data.*

You can encrypt data transmitted over the IEEE 802.11b wireless interface by configuring a WEP key on the Motorola SBG1000 Wireless Cable Modem Gateway and wireless LAN clients (stations).

You can also define a MAC access control list to restrict wireless LAN access to specified clients based on the client MAC address.

If you enable closed network operation, the network name (ESSID) is not transmitted in the IEEE 802.11b beacon frame. This provides additional network protection because only IEEE 802.11b stations that are configured with your network name can associate with the SBG1000. Closed network operation is not part of the IEEE 802.11b standard

For information about configuring a WEP key, see "Configuring Basic Wireless LAN Security" on page 69.

Virtual Private Networks

The SBG1000 allows multiple tunnel VPN pass-through operation to securely connect remote computers over the Internet through the SBG1000. The SBG1000:

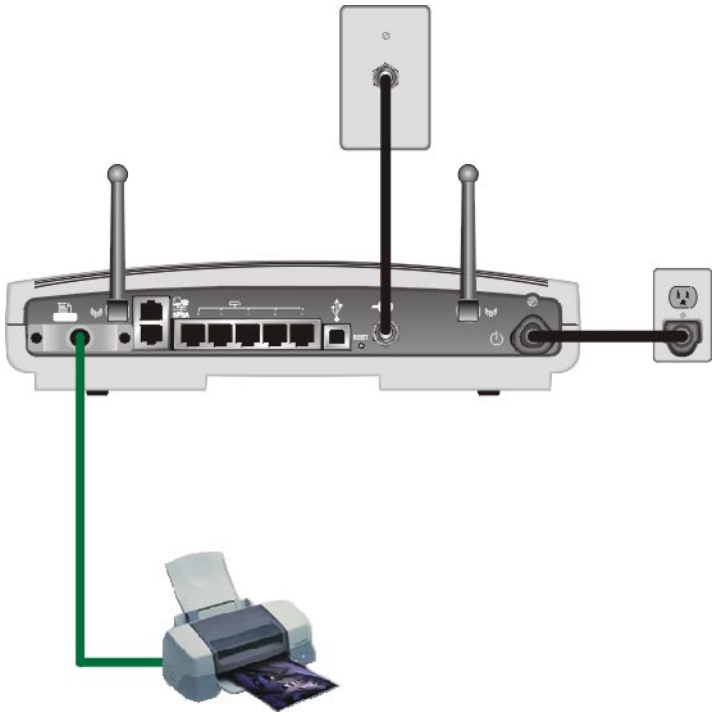
- Is compatible with Point to Point Tunneling Protocol (PPTP) and Layer 2 Tunneling Protocol (L2TP)
- Is fully interoperable with any IPSec client or gateway and ANX certified IPSec stacks

Print Server

You can connect a printer to the Motorola SBG1000 Wireless Cable Modem Gateway back panel using a standard DB-25 connector. The print server:

- Enables Windows, UNIX, Linux, or Macintosh computers on the wired or wireless SBG1000 LAN to share a printer
- Supports the SMB, LPR, AppleTalk® printing protocols

Printer connection



For information about configuring the print server, see "Configuring the Print Server" on page 77.

Related Documentation

The following documents also provide information you can use with the Motorola SBG1000 Wireless Cable Modem Gateway:

- *Motorola SBG1000 Wireless Cable Modem Gateway Quick Start Guide*
- *Motorola PCC11b Wireless Card Quick Start Guide and on-line help on the PCC11b and USB11b Wireless Adapter CD-ROM*
- *Motorola USB11b Wireless Adapter Quick Start Guide and on-line help on the PCC11b and USB11b Wireless Adapter CD-ROM*
- *Motorola Diversity Antenna Installation Instructions*

For the most recent documentation, visit the Product Documentation page on www.motorola.com/broadband.

Installation

To install the Motorola SBG1000 Wireless Cable Modem Gateway hardware:

- Determine the type of connections you will make to the SBG1000 — Ethernet, HPNA, wireless, USB, and/or printer
- Check that you have the proper cables, adapters, and adapter software to connect to your SBG1000:
  - For Ethernet, you'll need Ethernet cables and network interface cards (NICs) with accompanying installation software.
  - For HPNA, you'll need telephone jumper cables, HPNA interface cards, and the installation software.
  - For wireless connections, you'll need wireless adapters and the installation software for the adapters.
  - For USB, you'll need a USB cable and the *Motorola SBG1000 Wireless Cable Modem Gateway* CD-ROM which contains the software for USB installation.
  - For the printer, you'll need a printer cable.

Before You Begin

Before you begin the installation, check that you received the following items with the Motorola SBG1000 Wireless Cable Modem Gateway:

Item	Description
Power cord	Connects the SBG1000 to the AC electrical outlet
10/100Base-T Ethernet cable	Connects to the Ethernet port
USB cable	Connects to the USB port
Phone wire jumper with RJ-11 connectors	Connects to a telephone line used for the HPNA network
***Motorola SBG1000 Wireless Cable Modem Gateway* CD-ROM**	Contains this *User Guide* and USB drivers

You will need 75-ohm coaxial cable with F-type connectors to connect the SBG1000 to the nearest cable outlet. If a TV is connected to the cable outlet, you may need a 5-900 MHz RF splitter and two additional coaxial cables to use both the TV and the SBG1000.

You may need:

To Set Up	You Will Need
A wired Ethernet LAN with more than five computers	One or more Ethernet hubs or switches
An HPNA LAN	An HPNA adapter and driver software for each computer connected using HPNA
An IEEE 802.11b wireless LAN	An IEEE 802.11b adapter and driver software for each computer having a wireless connection (see "Optional Accessories" on page 4)

If you are installing the optional Motorola External Diversity Antenna, you may need a pair of needle nose pliers.

Coaxial cable, RF splitters, hubs, and switches are available at consumer electronic stores.

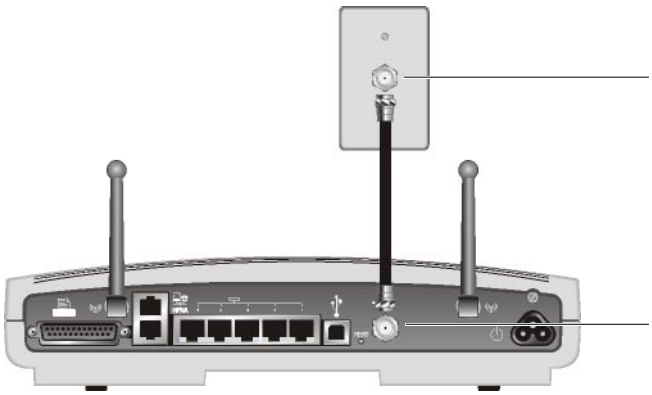
Precautions

Postpone SBG1000 installation until there is no risk of thunderstorm or lightning activity in the area.

To avoid damaging the SBG1000 with static electricity:

- Always first connect the coaxial cable to the grounded cable TV wall outlet.
- Before you connect or disconnect the USB or Ethernet cable from the SBG1000 or PC, always touch the coaxial cable connector on the SBG1000 to release any static charges.

To avoid damaging the SBG1000 or computers with static electricity:



To avoid potential shock, always unplug the power cord from the wall outlet or other power source before disconnecting it from the SBG1000 rear panel.

To prevent overheating the SBG1000, do not block the ventilation holes on the bottom of the unit.

Do not open the unit. Refer all service to your cable service provider.

Wipe the unit with a clean, dry cloth. Never use cleaning fluid or similar chemicals. Do not spray cleaners directly on the unit or use forced air to remove dust.

Signing Up for Service

You must sign up with a cable service provider to access the Internet and other online services.

To activate your service, call your local cable service provider.

You need to provide the MAC address printed on the bar code label marked HFC MAC ID on the Motorola SBG1000 Wireless Cable Modem Gateway rear panel. You can record it here:

00 : _____ : _____ : _____ : _____ : _____

You should ask your cable service provider the following questions:

- Do you have any special system requirements?
- When can I begin to use my SBG1000?
- Are there any files I need to download after I am connected?
- Do I need a user name or password to access the Internet or use e-mail?

Computer System Requirements

You can connect Microsoft Windows, Macintosh, UNIX, or Linux computers equipped as follows to the SBG1000 LAN:

- *One* of the following:

Ethernet	10Base-T or 10/100Base-T Ethernet adapter with proper NIC driver software installed
IEEE 802.11b	Any IEEE 802.11b device For information about the Motorola PCC11b Wireless Card (PCMCIA type II 3.3 V slot) or USB11b Wireless Adapter, see "Optional Accessories" on page 4.
HPNA	HPNA phone line adapter installed with proper HPNA driver software installed

- PC with Pentium class or better processor
- Windows 98, Windows 98 SE, Windows Me, Windows 2000, Windows XP, Windows NT, Macintosh, or Linux operating system with operating system CD-ROM available
- Minimum 16 MB RAM recommended
- 10 MB available hard disk space

You can use any web browser such as Microsoft® Internet Explorer or Netscape Navigator® with the Motorola SBG1000 Wireless Cable Modem Gateway*.*

You can use the USB connection with any PC running Windows 98, Windows 2000, Windows Me, or Windows XP that has a USB interface. The USB connection requires special USB driver software that is supplied on the *Motorola SBG1000 Wireless Cable Modem Gateway* CD-ROM. You can upgrade the USB drivers from the Internet. For information, check our website http://www.motorola.com/broadband.

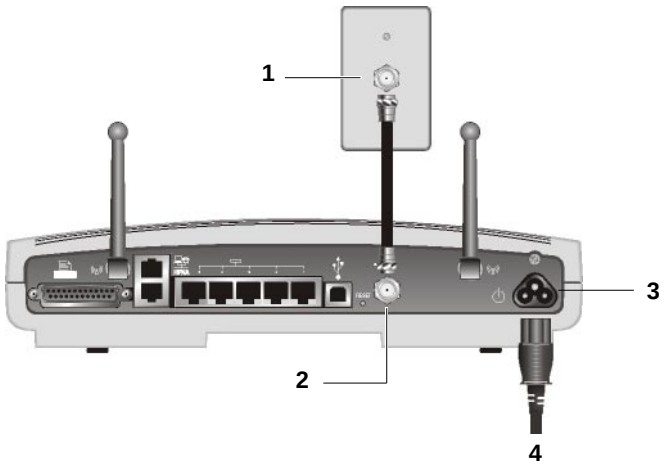
Connecting the SBG1000 to the Cable System

Allow 5 to 30 minutes the first time you turn on the SBG1000 to find and lock on the appropriate communications channels.

1. Be sure the computer is on and the SBG1000 is unplugged.
2. Connect one end of the coaxial cable to the cable outlet or splitter.
3. Connect the other end of the coaxial cable to the cable connector on the SBG1000.

   Hand-tighten the connectors to avoid damaging them.
4. If you are using the optional Motorola External Diversity Antenna, install it now. Follow the instructions in "Installing the Optional External Diversity Antenna" on page 28.
5. Insert the *Motorola SBG1000 Wireless Cable Modem Gateway* CD-ROM into the CD-ROM drive.
6. Plug the power cord into the power connector on the SBG1000.
7. Plug the power cord into the electrical outlet. *This turns the Motorola SBG1000 Wireless Cable Modem Gateway on. You do not need to unplug it when not in use.*
8. Check that the lights on the Front Panel cycle through this sequence:
   - Power icon turns on when AC power is connected to the SBG1000 and indicates that the power supply is working properly.
   - RX (receive) light flashes while scanning for the receive channel and changes to solid green when the receive channel is locked.
   - TX (transmit) light flashes while scanning for the send channel and changes to solid green when the send channel is locked.
   - LNK (link) light flashes during SBG1000 registration and configuration and changes to solid green when the cable modem wireless gateway is registered.
   - Globe icon flashes when the SBG1000 is transmitting or receiving data.

Connecting the SBG1000 to the cable system



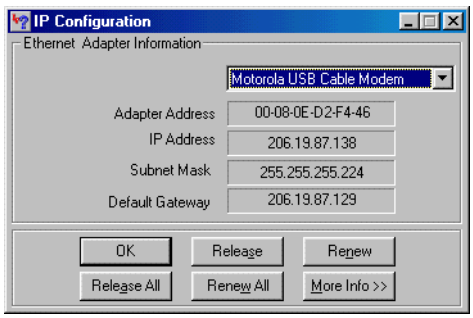
Cabling the Ethernet or HPNA LAN

After connecting to the cable system, you can connect your wired Ethernet and/or HPNA LAN. Some samples are shown in "Wired Ethernet LAN" on page 10 and "HPNA LAN" on page 13. Detailed information about network cabling is beyond the scope of this document. You must install proper drivers for the Ethernet NIC or HPNA adapter.

Obtaining an IP address in Windows 98, Windows 98 SE, or Windows Me

You must do the following on each Ethernet client PC running Windows 98, Windows 98 SE, or Windows Me:

1. On the Windows Desktop, click **Start**.
2. Select **Run**. The Run window is displayed.
3. Type **winipcfg.exe** and click **OK.** The IP Configuration window is displayed:



4. Click the **Renew** button to obtain an IP address for the PC from the DHCP server on the SBG1000.

Obtaining an IP address in Windows 2000 or Windows XP

You must do the following on each Ethernet client PC running Windows 2000 or Windows XP:

1. On the Windows Desktop, click **Start**.
2. Select **Run**. The Run window is displayed.
3. Type **cmd** and click **OK** to display a command prompt window.
4. Type **ipconfig /renew** and press ENTER to obtain an IP address for the PC from the DHCP server on the SBG1000.
5. Type **exit** and press ENTER to return to Windows.

Obtaining an IP address on Macintosh or UNIX Systems

Follow the instructions in your user manual.

Connecting a PC to the USB Port

You can connect a single PC running Windows 98, Windows XP, Windows Me, or Windows 2000 to the Motorola SBG1000 Wireless Cable Modem Gateway USB port.

Caution!

Before plugging in the USB cable, be sure the Motorola SBG1000 Wireless Cable Modem Gateway CD-ROM is inserted in the PC CD-ROM drive.

To connect a PC to the USB port:

1. Connect the USB cable to the USB port on the SBG1000.
2. Connect the other end to the USB port on the computer.
3. Install the USB driver following the appropriate procedure for "Setting Up a USB Driver" on page 95.

Setting Up the Wireless LAN

For information about wireless LAN setup, see "Setting Up the Wireless LAN" on page 67.

Connecting the Printer

Connect the printer to the Motorola SBG1000 Wireless Cable Modem Gateway printer port. If a cable was supplied with the printer, use that cable. Consult your printer documentation to determine cabling requirements from the SBG1000 to the printer.

After connecting the printer, power it on and follow the instructions for "Configuring the Print Server" on page 77.

Wall Mounting the Wireless Gateway

If you mount the SBG1000 on the wall, you must:

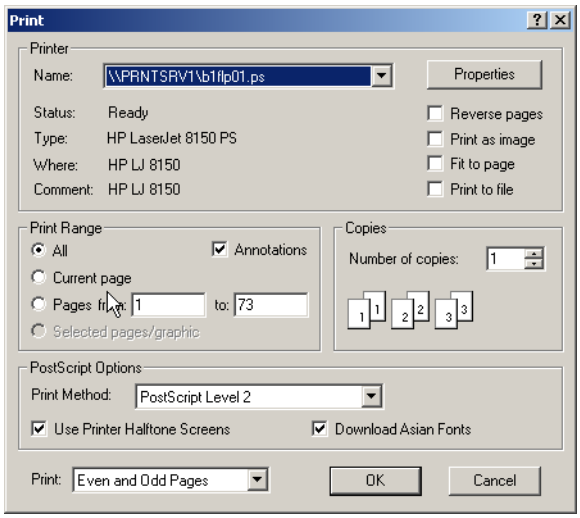
- Locate the unit as specified by the local or national codes governing residential or business cable TV and communications services.
- Follow all local standards for installing a network interface unit/network interface device (NIU/NID).

If possible, mount the SBG1000 to concrete, masonry, a wooden stud, or other very solid wall material. Use anchors if necessary; for example if you must mount the unit on drywall.

To mount your SBG1000 on the wall:

1 Print the Wall Mounting Template on page 27:

Click the Print icon or choose Print from the File menu to display the Print dialog box. (The following image is from Adobe Acrobat Reader® running on Windows 2000; there may be slight differences in your version.)



Be sure you print the template at 100% scale. Be sure Fit to page is not checked in the Print dialog box.

Click the OK button to print the template.

2 *Measure the printed template with a ruler to ensure that it is the correct size.*

3 Use a center punch to mark the center of the holes.

4 On the wall, locate the marks for the mounting holes.

Caution!

> *Before drilling holes, check the structure for potential damage to water, gas, or electric lines.*

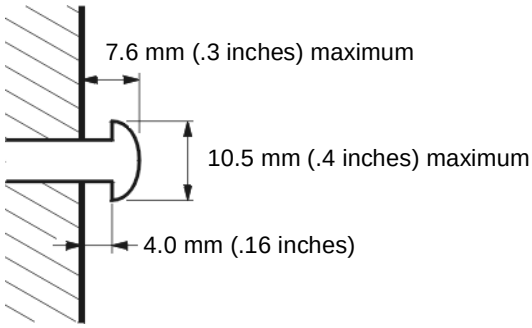
5 Drill the holes to a depth of at least 3.8 cm ($1^1/_2$ inches).

6 If necessary, seat an anchor in each hole.

Use M5 x 38 mm (#10-16 x $1^1/_2$ inch) screws with a flat underside and maximum screw head diameter of 10.5 mm to mount the SBG1000.

7 Using a screwdriver, turn each screw until part of it protrudes from the wall, as shown:

- There must be 4.0 mm (.16 inches) between the wall and the underside of the screw head.
- The maximum distance from the wall to the top of the screw head is 7.6 mm (.3 in).



8 Place the SBG1000 so the keyholes are above the mounting screws.

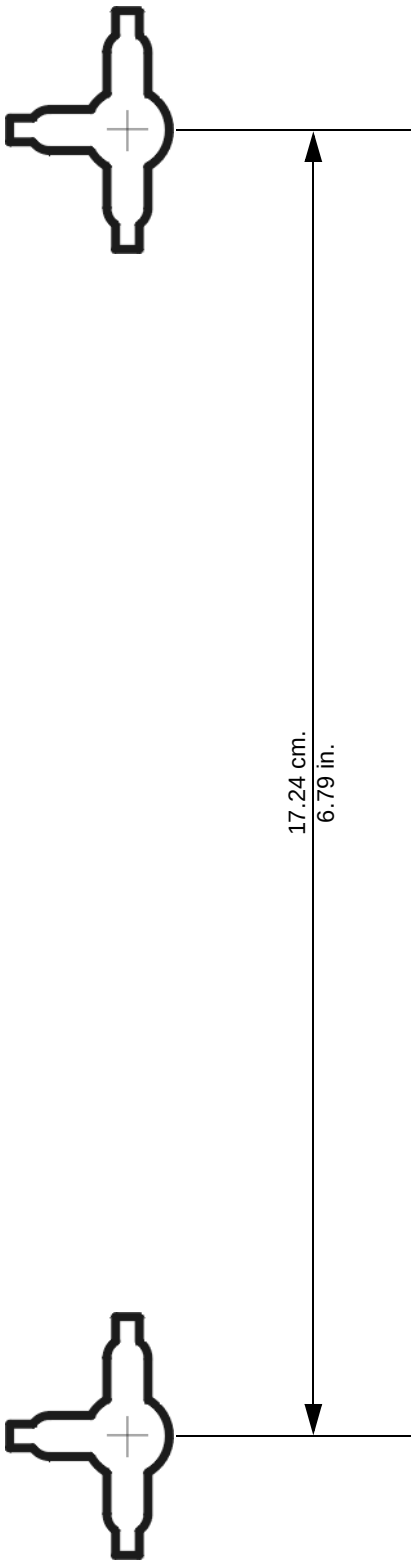
9 Slide the SBG1000 down so it stops against the top of the keyhole opening.

Wall Mounting Template

You can print this page to use as a wall mounting template.

Be sure you print it at 100% scale. In Acrobat Reader, be sure that Fit To Page is not checked in the Print dialog box.

Measure the printed template with a ruler to ensure that it is the correct size.



Installing the Optional External Diversity Antenna

The optional Motorola External Diversity Antennas are designed to provide an indoor operating range with WEP enabled of at least:

Distance	Data Transfer Rate
30 meters (100 feet)	11 Mbps
50 meters (165 feet)	5.5 Mbps
75 meters (230 feet)	2 Mbps
95 meters (300 feet)	1 Mbps

The maximum wireless operation distance depends on the type of materials through which the signal must pass and the location of the diversity antennas and clients (stations). *Motorola cannot guarantee wireless operation for all supported distances in all environments.*

To install the optional Motorola External Diversity Antenna:

1. Be sure the SBG1000 is unplugged. As with all electronic equipment, avoid potential shock by always unplugging the power cord from the wall outlet or other power source before disconnecting it from the SBG1000 rear panel.
2. Remove the antennas on the SBG1000 by unscrewing the connectors. You may need a pair of needle nose pliers to loosen them.

   Store the antennas supplied on the SBG1000 in a safe place.

Disconnecting the antennas provided with the SBG1000

3 Connect the cables from the Motorola External Diversity Antenna to the connectors on the Motorola SBG1000 Wireless Cable Modem Gateway Front Panel. *Hand-tighten the connectors to avoid damaging them. Using excessive force may damage the connectors.*

Connecting the Optional External Diversity Antenna to the SBG1000

4 Position or mount the External Diversity Antenna in a suitable location away from the computer and monitor. *Follow the instructions provided with the External Diversity Antenna. Do not twist the antenna cables.*

To obtain optimum results, try moving the External Diversity Antennas to slightly different locations.

Configuring the SBG1000

Configuring the SBG1000 includes:

- Starting the SBG1000 Setup Program (see page 32)
- Changing the Default Password (see page 34)
- Getting Help (see page 35)
- Setting the Firewall Policy (see page 36)

For more information about configuration, see "Configuring TCP/IP" on page 53, "Setting Up the Wireless LAN" on page 67, "Configuring the Print Server" on page 77, or "Setting Up a USB Driver" on page 95.

For normal operation, you do not need to change most default settings. The following caution statements summarize the issues you must be aware of:

Caution!

To prevent unauthorized configuration, change the default password *immediately* when you first configure the Motorola SBG1000 Wireless Cable Modem Gateway. See "Changing the Default Password" on page 34

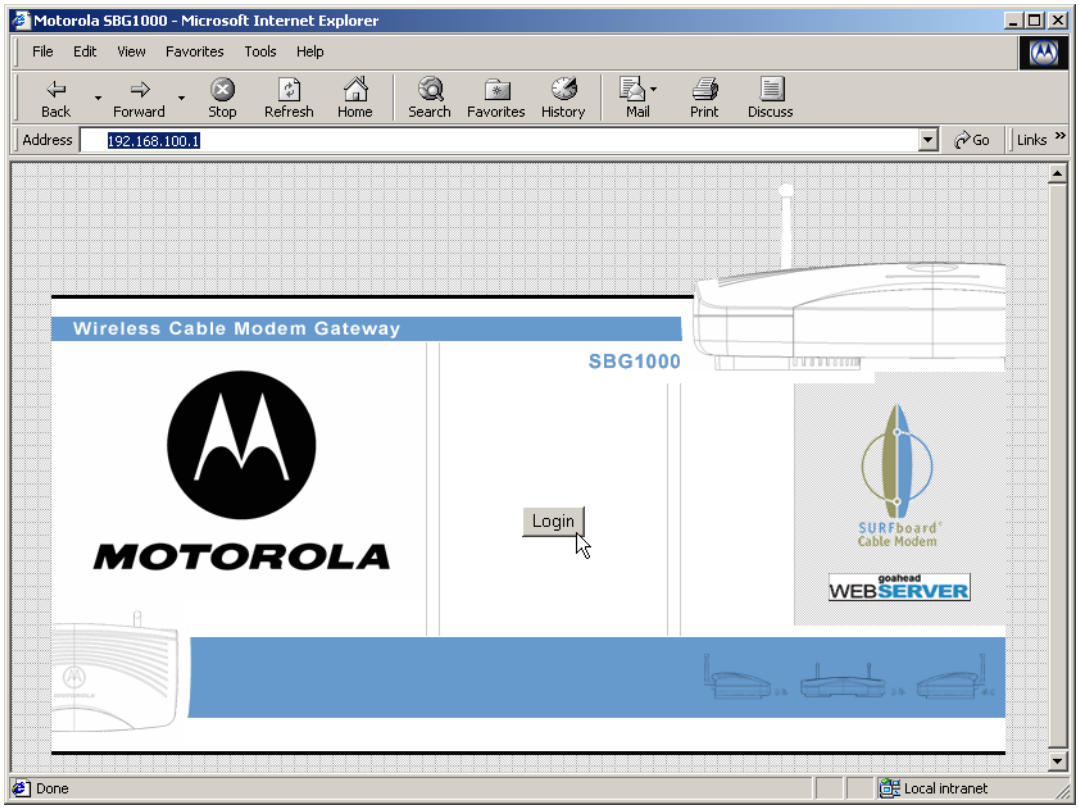
Firewalls are not foolproof. Choose the most secure firewall policy you can. See "Setting the Firewall Policy" on page 36.

For a wireless LAN only, be sure you follow the instructions in "Setting Up the Wireless LAN" on page 67.

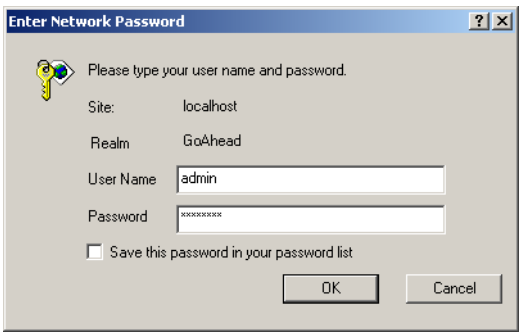
Starting the SBG1000 Setup Program

1 On a computer on the LAN, open a web browser.

2 In the Address or Location field, type **192.168.100.1** and press ENTER to display the Login window:



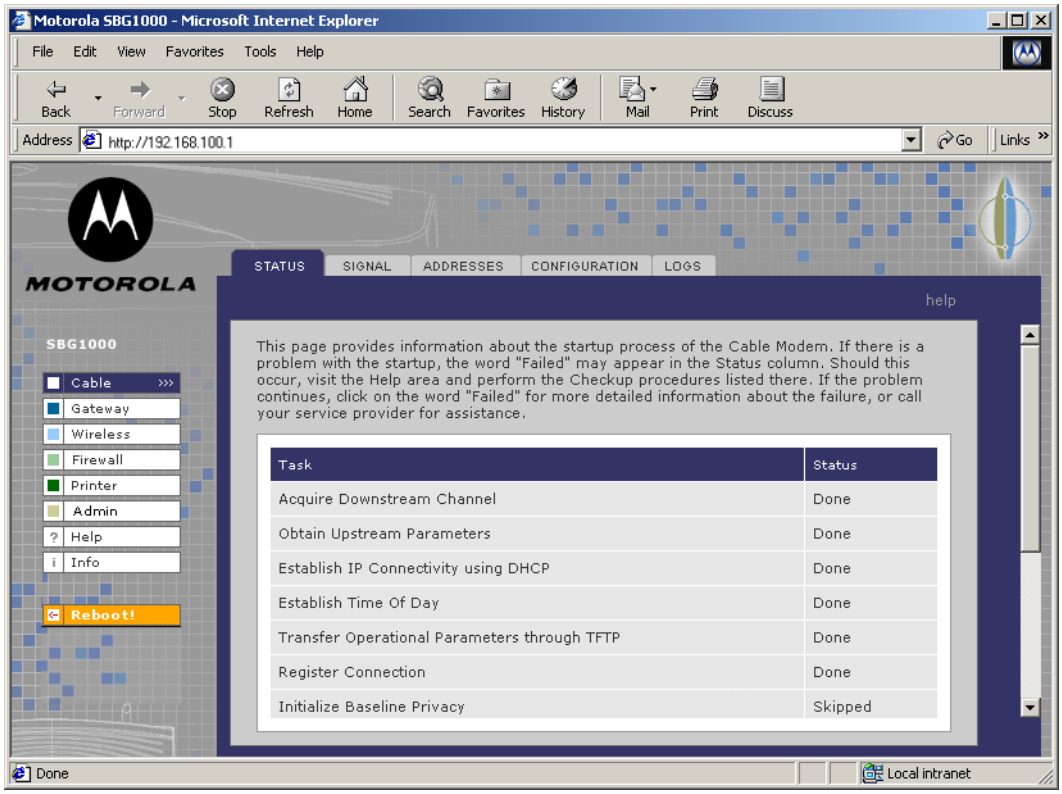
3 Click **Login** to display the Enter Network Password window:



4 In the User Name field, type the *User Name* (the default is “admin”).

5 In the Password field, type the *Password* (the default is “motorola”).

6 Click **OK** to display the SBG1000 Setup Program:



Click	To Perform
Cable	Configure and monitor the cable system connection
Gateway	Configure and monitor the gateway preferences (see "Configuring the Gateway" on page 43)
Wireless	Configure and monitor the wireless interface (see "Setting Up the Wireless LAN" on page 67)
Firewall	Configure and monitor the firewall (see "Setting the Firewall Policy" on page 36)
Printer	Configure the SBG1000 print server (see "Configuring the Print Server" on page 77)
Admin	Changing the Default Password (see page 34)
Help	Display information about the SBG1000 (see "Getting Help" on page 35)
Info	Display information about the SBG1000 Setup Program
Reboot	Restart the SBG1000. It is the same as pressing the reset button on the Rear Panel for less than five seconds.

*For some settings, after you edit the field and click Apply, you are warned that you must **Reboot** for your change to take effect. Rebooting takes 10 to 15 seconds. After rebooting, you must log-in again.*

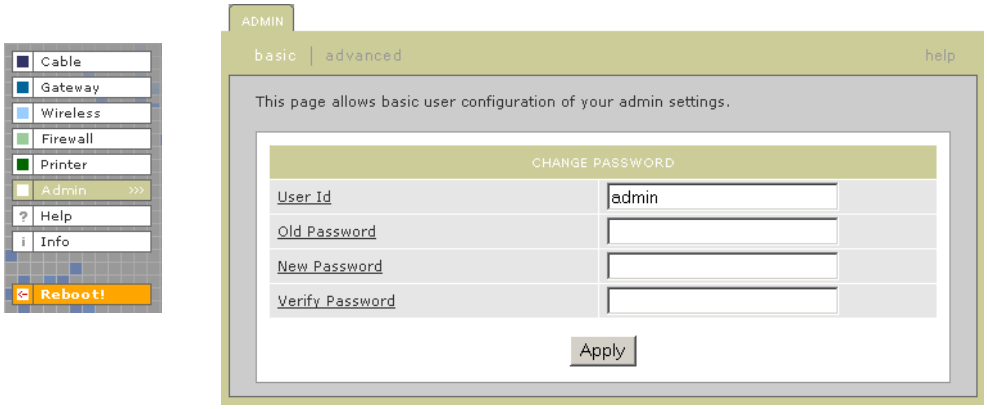
Changing the Default Password

Caution!

To prevent unauthorized configuration, change the default password *immediately* when you first configure the Motorola SBG1000 Wireless Cable Modem Gateway.

To change the default password:

1 On the SBG1000 Setup Program screen, click **Admin** to display the ADMIN — basic page:



2 Type the old *password* in the **Old Password** field. (The default password is “motorola.”)

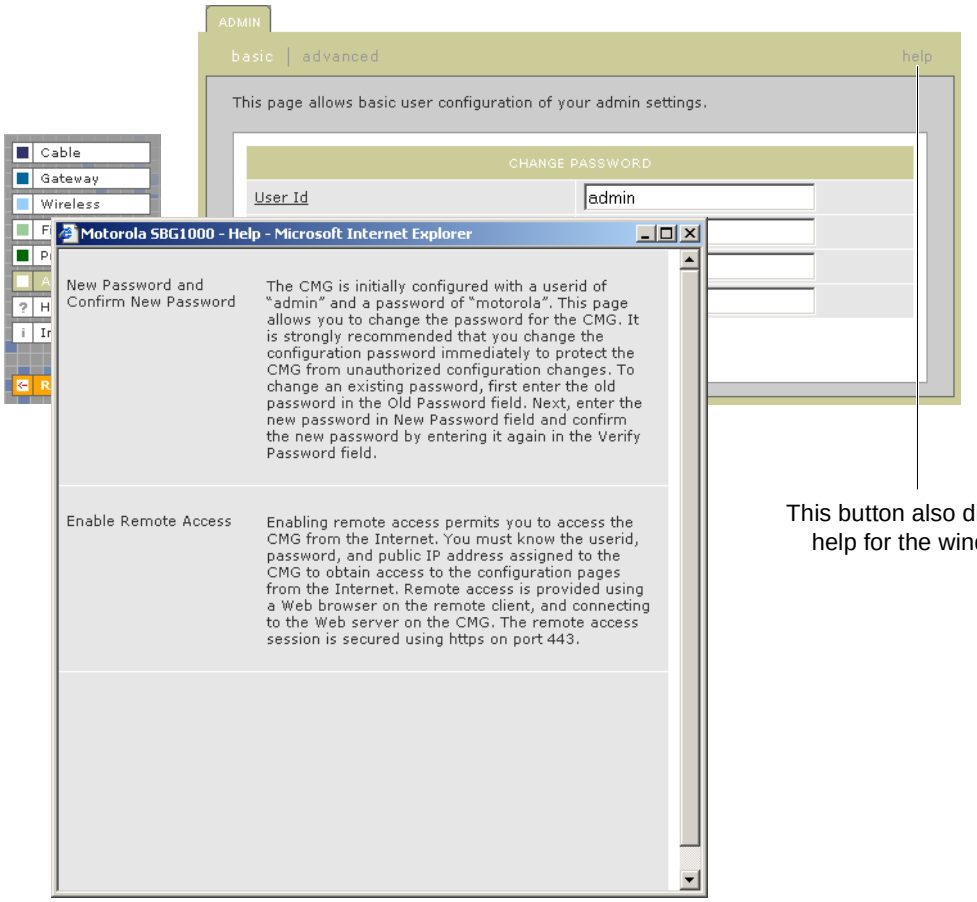
3 Type the new *password* in the **New Password** field.

4 Type the new *password* again in the **Verify Password** field.

5 Click **Apply** to apply your changes.

Getting Help

To get help on any underlined item, field, click the text. For example, if you click a field or the help button on the ADMIN — basic page, the following help is displayed:



You can scroll to browse the help, or click another item to display help for that item.

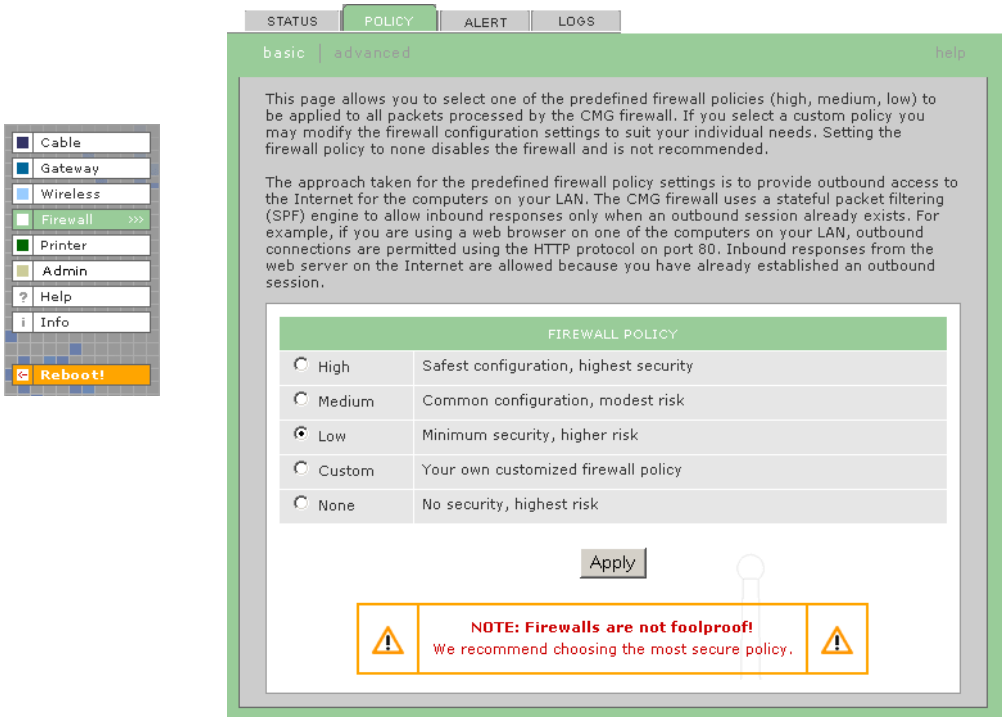
Setting the Firewall Policy

Caution!

> Firewalls are not foolproof. Choose the most secure firewall policy you can. To enable easy network setup, the default firewall policy is Low, which provides minimum security.

To select a predefined policy for all packets processed by the firewall:

1. On the SBG1000 Setup Program left panel, click **Firewall**.
2. Click **POLICY**.
3. Click **basic** to display the options for firewall policy:



4. Select *one* of the following. *Unless you have the necessary expertise and need to setup a custom firewall, use High, Medium, or Low*:

   High Safest configuration, highest security. *We recommend this setting.*

   Medium Common configuration, modest risk

   Low Minimum security, higher risk

   Custom You can create a custom firewall policy on the Firewall > POLICY — advanced Page (see page 39). *Do not create a custom policy unless you have the necessary expertise and the need to do so.*

   None This setting disables the firewall and provides no security. *We do not recommend this setting.*

5. Click **Apply** to apply your changes.

Firewall Pages in the SBG1000 Setup Program

Use the following pages to configure the firewall:

- Firewall > POLICY — basic Page (see page 38)
- Firewall > POLICY — advanced Page (see page 39)
- Firewall > ALERT — basic Page (see page 40)
- Firewall > ALERT — email Page (see page 41)
- Firewall > LOGS Page (see page 42)

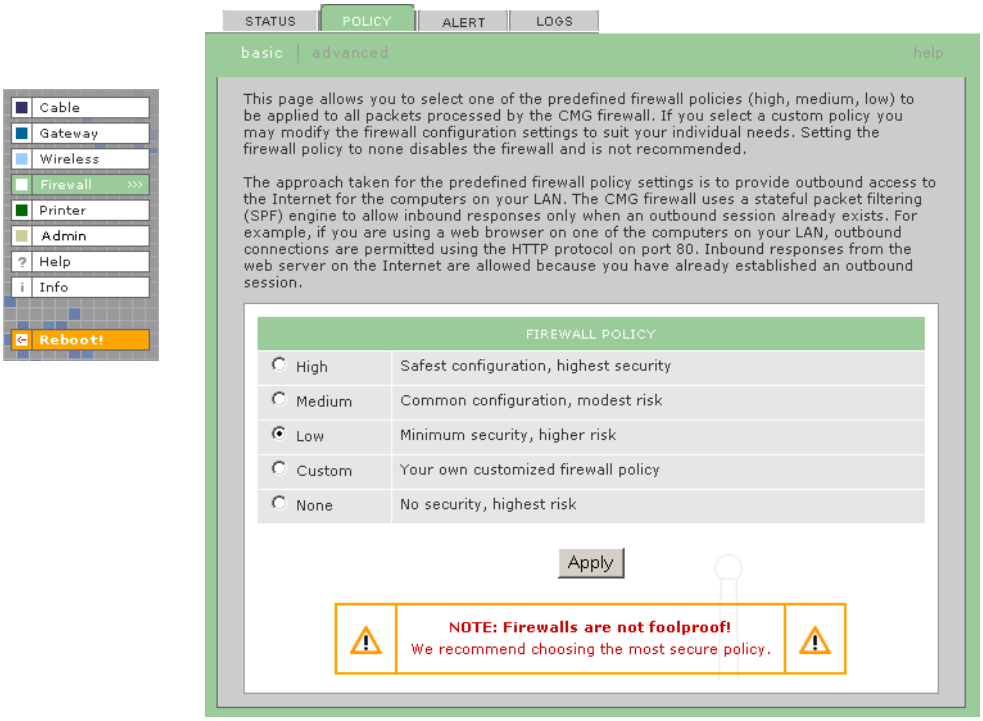
*For some settings, after you edit the field and click Apply, you are warned that you must **Reboot** for your change to take effect. Rebooting takes 10 to 15 seconds. After rebooting, you must log-in again.*

Firewall > POLICY — basic Page

Use this page to select a predefined firewall policy for all packets processed by the SBG1000 firewall, as described in "Setting the Firewall Policy" on page 36. Advanced users *only* can create a custom policy on the Firewall > POLICY — advanced Page (see page 39). The FIREWALL POLICY setting None disables the firewall and provides no security. *We do not recommend this setting.*

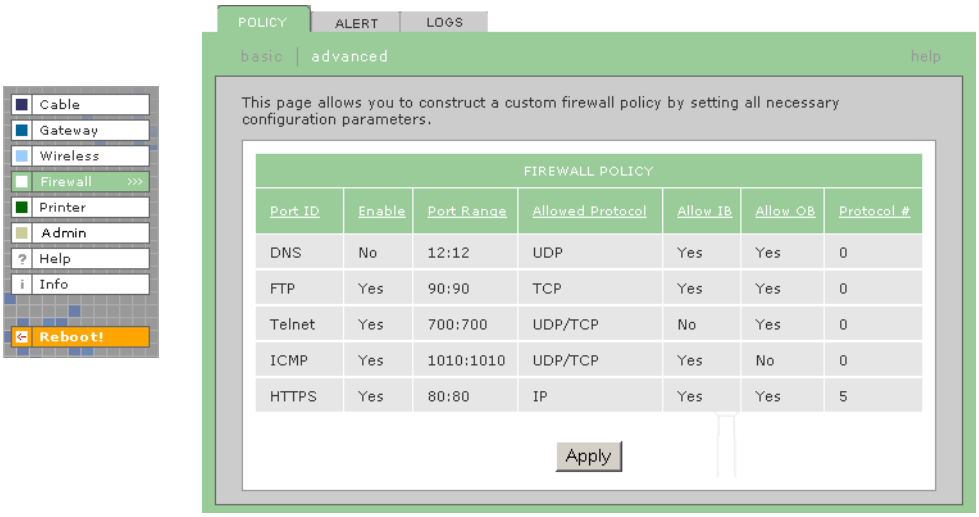
The predefined policies provide outbound Internet access for computers on the SBG1000 LAN.

The SBG1000 firewall uses stateful inspection to allow inbound responses when there already is an outbound session running corresponding to the data flow. For example, if you use a web browser, outbound HTTP connections are permitted on port 80. Inbound responses from the Internet are allowed because an outbound session is established. When required, the SBG1000 firewall can be configured to allow inbound packets without first establishing an outbound session.



Firewall > POLICY — advanced Page

Use this page to construct a custom firewall policy.

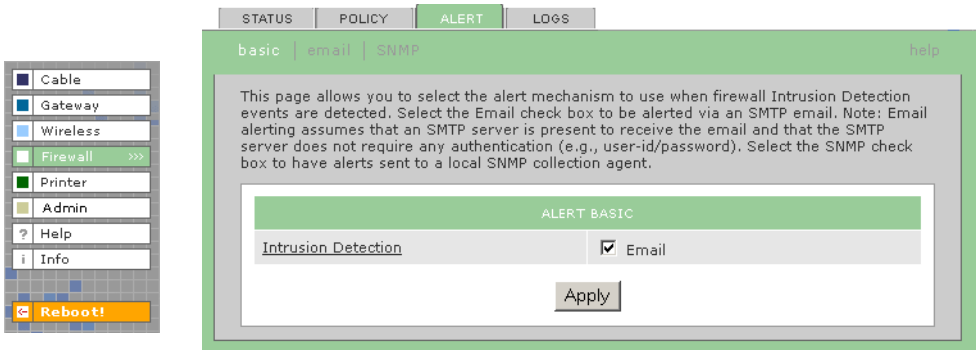


Firewall > POLICY — advanced page fields

Field	Description
Port ID	The name of the protocol being filtered.
Enable	Check this box to enable firewall policy filtering for the port.
Port Range (From:To)	Sets the from and to port range, which must contain all ports required by the protocol.
Allowed Protocol	The allowed protocols.
Allow IB (Inbound)	Filters inbound data from the Internet on the specified ports.
Allow OB (Outbound)	Filters outbound data to the Internet on the specified ports. Stateful inspection ensures appropriate responses for outbound sessions.
Protocol #	The protocol number associated with the IP packets to allow in the firewall policy.

Firewall > ALERT — basic Page

Use this page to set the alert mechanism for firewall intrusion detection events.

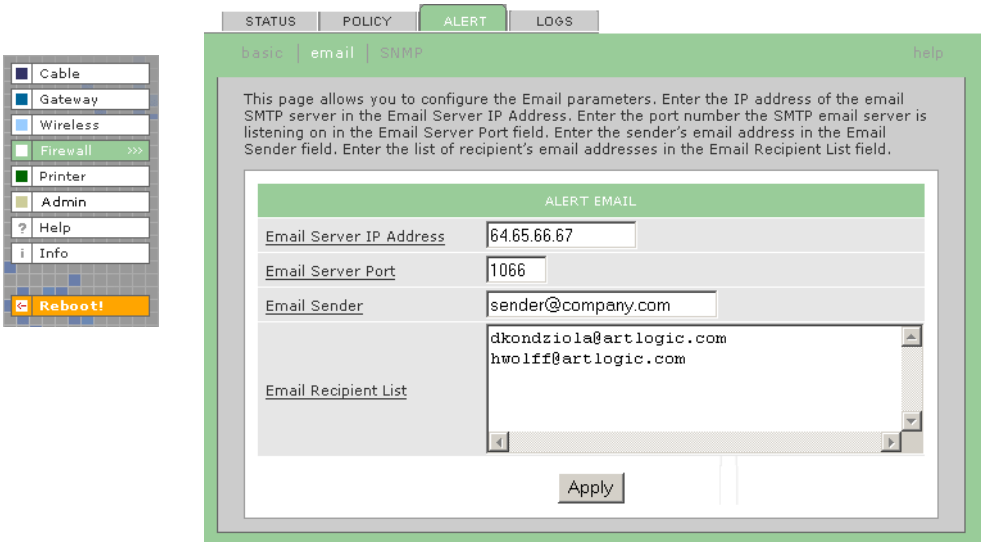


Firewall > ALERT — basic page fields

Field or Button	Description
Intrusion Detection	Check Email to be alerted through SMTP e-mail. An SMTP server that does not require any authentication such as a user name or password must be present to receive the e-mail.
Apply	Click to apply your changes.

Firewall > ALERT — email Page

Use this page to configure the e-mail alert parameters:

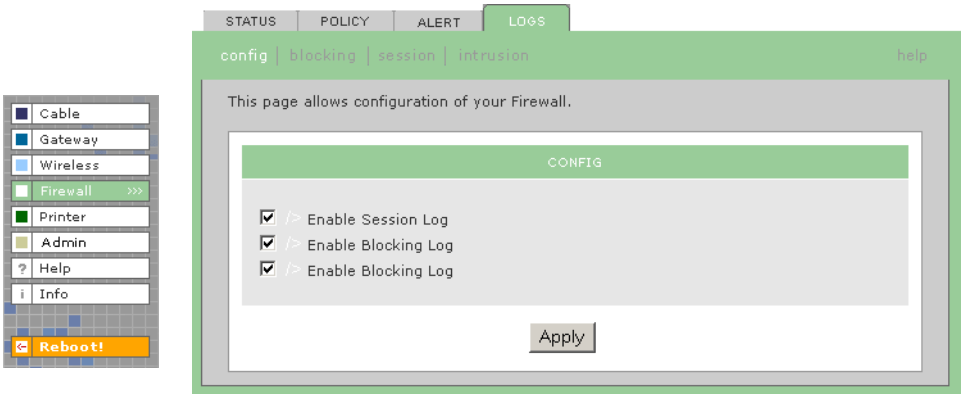


Firewall > ALERT — email page fields

Field or Button	Description
E-mail Server IP Address	Sets the e-mail server IP address, in dotted-decimal format.
E-mail Server Port	Sets the e-mail server port number.
E-mail Sender	Sets the sender e-mail address.
E-mail Recipient List	Sets the list of e-mail addresses that receive alerts from the SBG1000 firewall.
Apply	Click to apply your changes.

Firewall > LOGS Page

Use this page to set which firewall events are logged.



Firewall > LOGS page fields

Field or Button	Description
Enable Session Log	Check this box to log session events.
Enable Blocking Log	Check this box to log blocking events.
Enable Intrusion Log	Check this box to log intrusions.
Apply	Click to apply your changes.

Configuring the Gateway

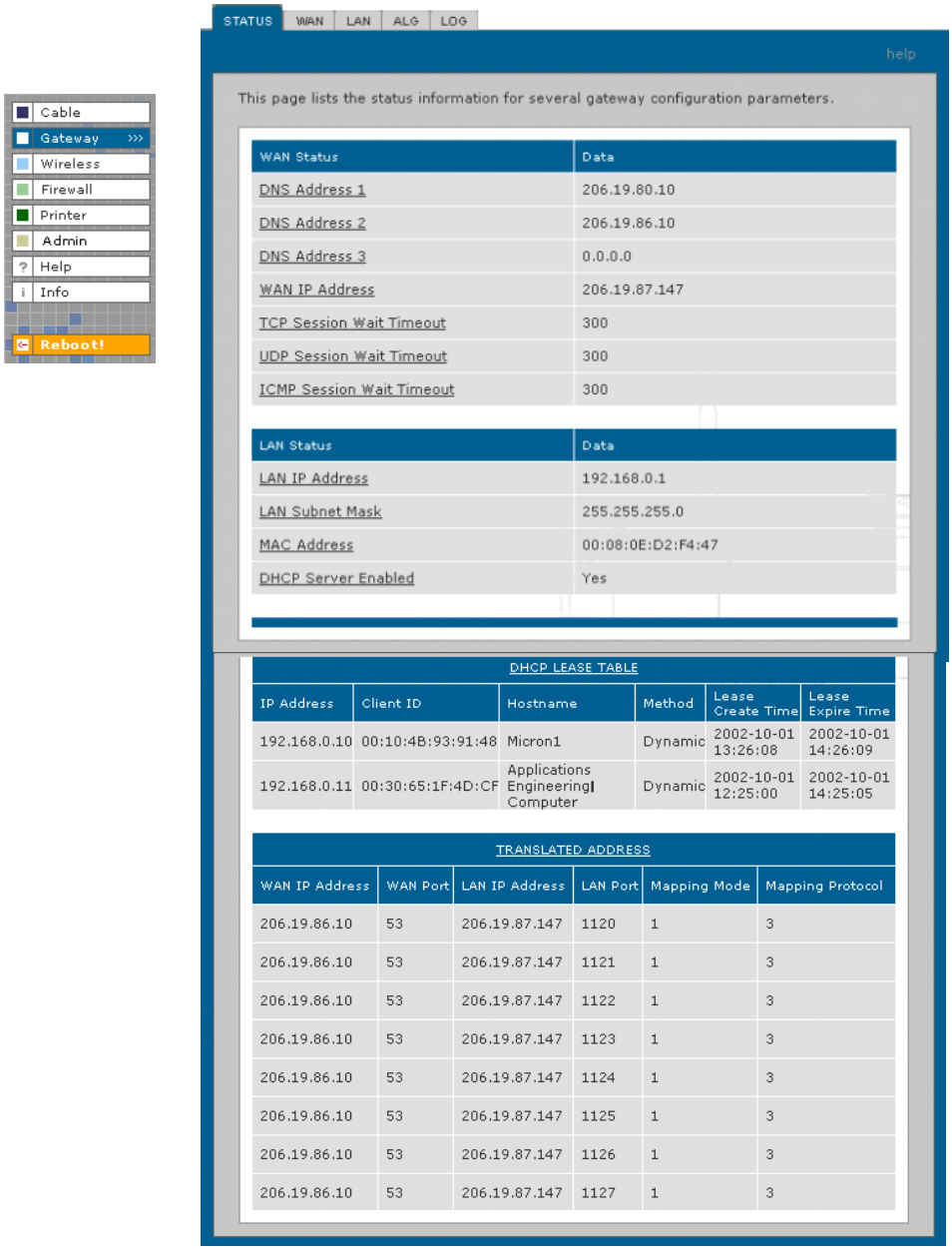
This section describes the Gateway configuration pages in the SBG1000 Setup Program:

- Gateway > STATUS Page (see page 44)
- Gateway > WAN Page (see page 45)
- Gateway > LAN — nat config Page (see page 47)
- Gateway > LAN — dhcp server config Page (see page 48)
- Gateway > LAN — dhcp reservations Page (see page 49)
- Gateway > LOG Page (see page 51)

*For some settings, after you edit the field and click Apply, you are warned that you must **Reboot** for your change to take effect. Rebooting takes 10 to 15 seconds. After rebooting, you must log-in again.*

Gateway > STATUS Page

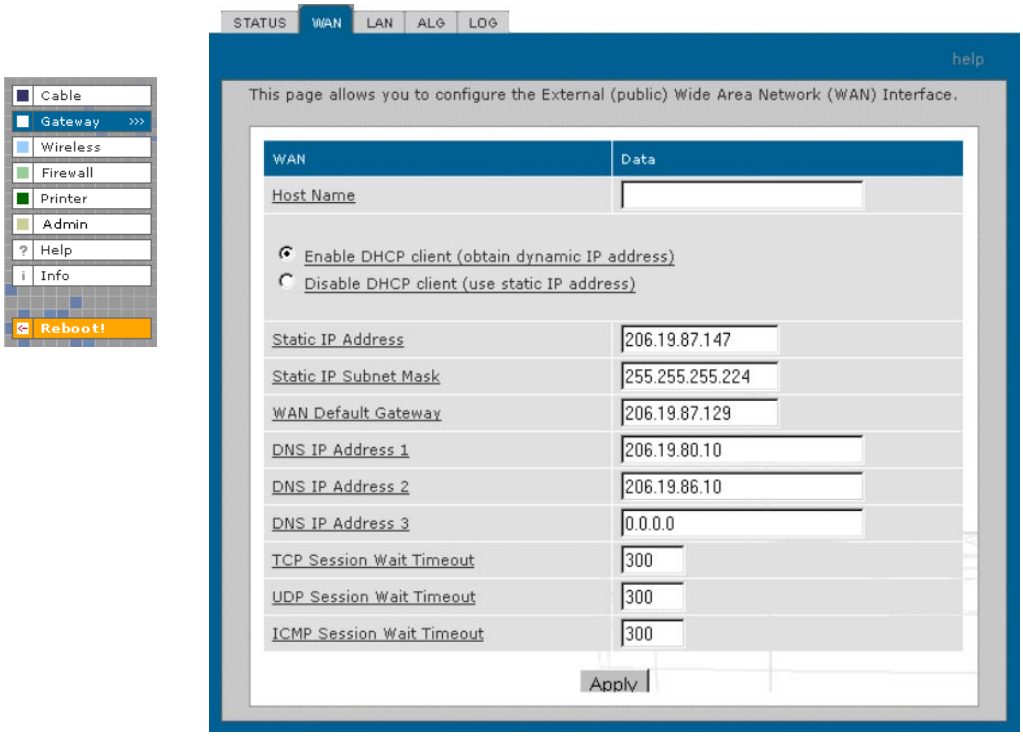
This page displays the gateway status information:



These fields display settings that are set on the other Gateway pages. For descriptions, see the sections about those pages.

Gateway > WAN Page

Use this page to configure the external (public) wide area network (WAN) interface:



Gateway > WAN page fields

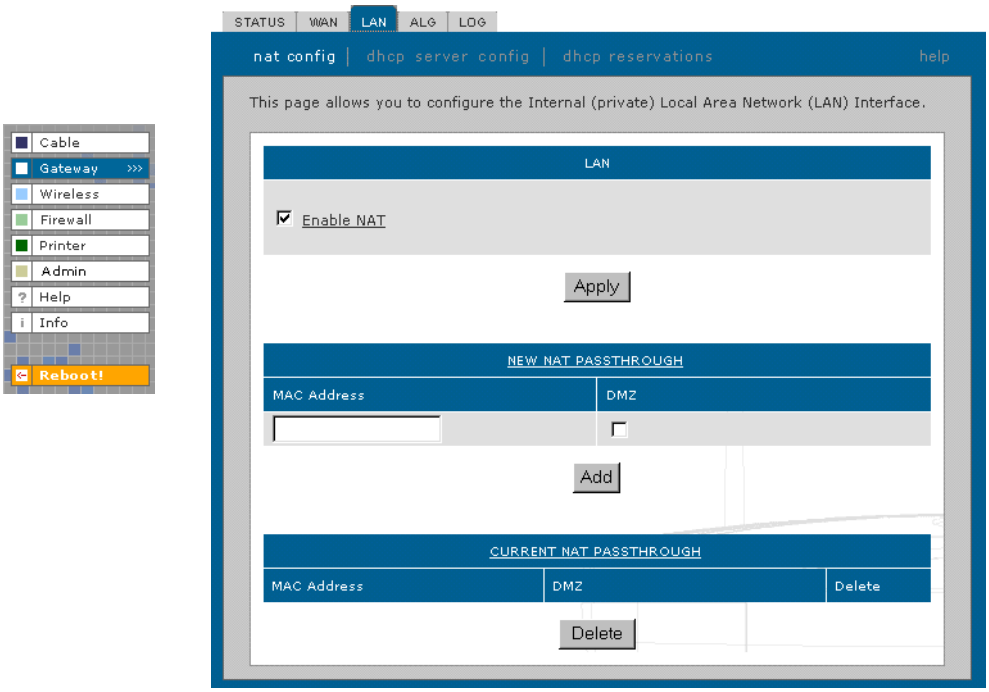
Field	Description
Host Name	If the cable service provider requires a hostname to access to their network, type the *hostname* they provided in this field. The default is None.
Enable DHCP Client	Enabling the DHCP client causes the wireless gateway to automatically obtain the public IP address, subnet mask, domain name, and DNS server(s). Most commonly, the DHCP client is enabled if the cable service provider automatically assigns a public IP address from their DHCP server. Enable DHCP Client is on by default.
Disable DHCP Client	If the cable service provider does not automatically assign a public IP address using DHCP, they must provide a static IP address. Select Disable DHCP Client. When you disable the DHCP client, you must type the static IP address, subnet mask, DNS server(s), and domain name (if necessary) in the fields provided. Disable DHCP Client is off by default.
Static IP Address	If Disable DHCP Client is on, type the static IP address provided by the cable service provider, in dotted-decimal format. The default is None.
Static IP Address Subnet Mask	If Disable DHCP Client is on, type the subnet mask associated with the static IP address, in dotted-decimal format. The default is None.
Domain Name	If the cable service provider requires a domain name, type the domain name they provided you in this field. The default is None.

Gateway > WAN page fields (continued)

Field	Description
DNS IP Address 1 **DNS IP Address 2** **DNS IP Address 3**	The cable service provider DNS server provides name-to-IP address resolution. If the cable service provider does not automatically assign DNS addresses from their DHCP server, they must provide at least one DNS server IP address to enter in these fields, in dotted-decimal format. The default is None.
TCP Session Wait Timeout	Sets the maximum time in minutes to wait before assuming a TCP session has timed out. The default is 5 minutes.
UDP Session Wait Timeout	Sets the maximum time in minutes to wait before assuming a UDP session has timed out. The default is 5 minutes.
ICMP Session Wait Timeout	Sets the maximum time in minutes to wait before assuming an ICMP session has timed out. The default is 5 minutes.
Apply	Click to apply your changes.

Gateway > LAN — nat config Page

Use this page to configure NAT:

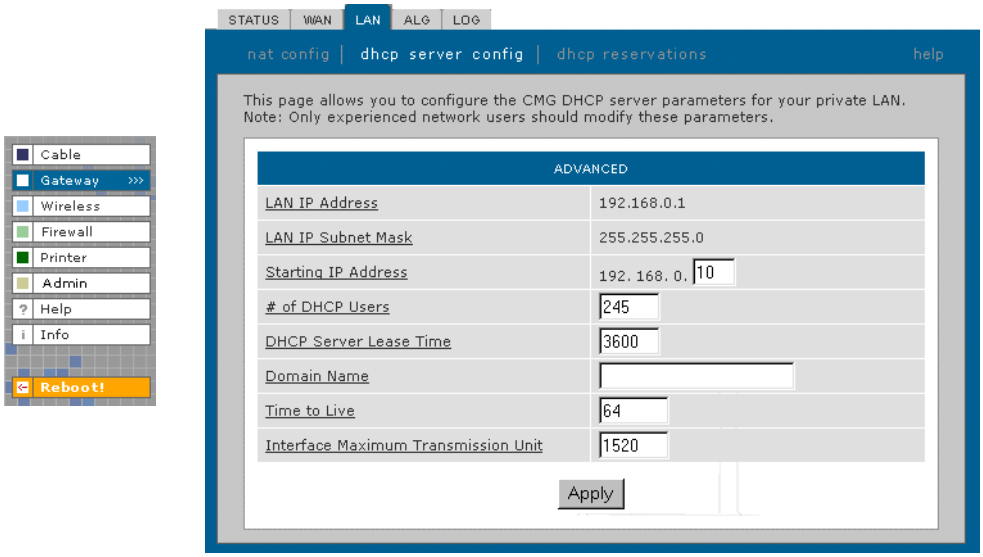


Gateway > LAN — nat config page fields

Field or Button	Description
LAN	
Enable NAT	If enabled, the single HFC IP Address (public IP address) assigned by the cable service provider is mapped to many private IP addresses on the SBG1000 LAN.
Apply	Click to apply your changes. You must reboot the SBG1000.
NEW NAT PASSTHROUGH	NAT Passthrough is used to identify which CPEs are passthrough devices, not subject to network address translation. Up to 32 NAT passthrough CPEs can be entered using the CPE MAC address. When configuring a CPE as a NAT passthrough device, you may also identify whether the CPE should be treated as a de-militarized zone (DMZ) host. A DMZ host is a CPE device that is completely exposed to the Internet. Any CPE device configured as a DMZ is open to Internet hackers and should be used with extreme caution.
MAC Address	Sets the MAC address of the passthrough client. The format is 16 hexadecimal numerals.
DMZ	Check the box to set the MAC address as a de-militarized zone (DMZ) client. A DMZ is a computer on the LAN that can be accessed from the public Internet.
Add	Click to add the IP address to the reserved IP address table.
CURRENT NAT PASSTHROUGH	Displays the NAT passthrough list.
Delete	Click to delete the MAC address from the NAT passthrough list.

Gateway > LAN — dhcp server config Page

Experienced network administrators *only* can use this page to perform advanced DHCP server configuration:



CAUTION!

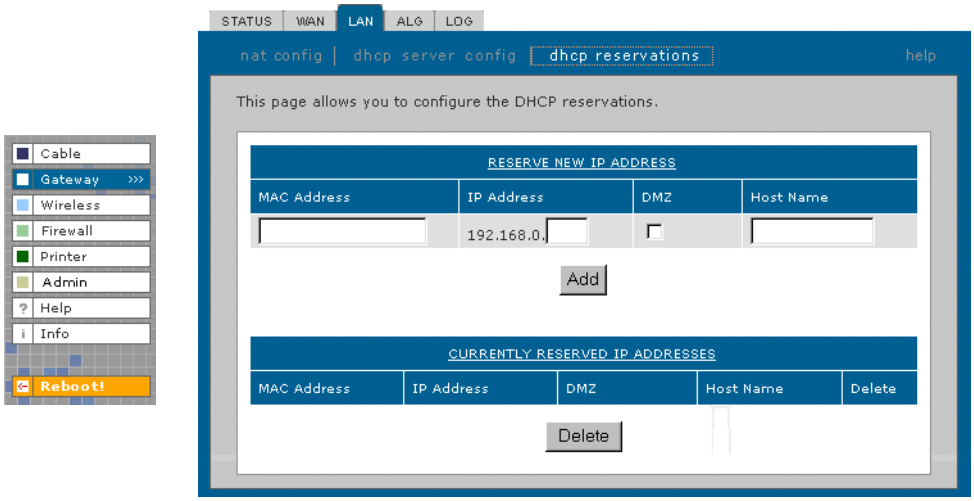
Do not modify these settings unless you are an experienced network administrator with strong knowledge of IP addressing, subnetting, and DHCP.

Gateway > LAN — advanced page fields

Field	Description
LAN IP Address	Sets the SBG1000 LAN IP address, in dotted-decimal format. The default is 192.168.0.1.
LAN IP Subnet Mask	Sets the subnet mask, in dotted-decimal format. The default is 255.255.255.0
Starting IP Address	Sets the starting IP address assigned by the SBG1000 DHCP server to clients, in dotted-decimal format. The default is 192.168.0.2.
# of DHCP Users	Sets the number of clients for the SBG1000 DHCP server to assign a private IP address. There are 253 possible client addresses. The default is 253.
DHCP Server Lease Time	Sets the time in seconds that the SBG1000 DHCP server leases an IP address to a client. The default is 60 seconds.
Domain Name	Sets the domain name for the SBG1000 LAN. The default is None.
Time To Live	Sets the TTL (hop limit) for outbound packets. The default is 64.
Interface Maximum Transmission Unit	Sets the SBG1000 LAN MTU, in bytes. The minimum is 68 bytes. The default is 1500 bytes.
Apply	Click to apply your changes. You must reboot the SBG1000.

Gateway > LAN — dhcp reservations Page

Use this page to configure DHCP reservations:



Gateway > LAN — dhcp reservations page fields

Field	Description
RESERVE NEW IP ADDRESS	You can reserve up to 32 IP addresses assigned by the SBG1000 DHCP server for specific LAN clients. For example, you can reserve an IP address for a private FTP server to ensure that it always receives the same private IP address.
MAC Address	Type the MAC address of the DHCP client for which a reserved IP address is required. The format is 16 hexadecimal numerals.
IP Address	Sets the host portion of the reserved IP address for the LAN client having the specified MAC address. When the LAN client requests an IP address, the SBG1000 DHCP server assigns the client this IP address.
DMZ	Check this box if you want the host to bypass NAT and be exposed directly to the Internet. When configuring a client as a NAT passthrough device, you can specify whether it should be a de-militarized zone (DMZ) host. A DMZ host is completely exposed to the Internet. *Any device configured as a DMZ is open to Internet hackers and should be used with extreme caution*.
Host Name	If your ISP requires a hostname to access their network, enter the hostname provided to you in the Host Name field.
Add	Click Add to reserve a new IP address.

Gateway > LAN — dhcp reservations page fields (continued)

Field	Description
CURRENTLY RESERVED IP ADDRESSES	Displays all DHCP clients that have specific IP addresses reserved for their use by MAC and IP address.
MAC Address	Displays the reserved MAC addresses.
IP Address	Displays the reserved IP addresses.
DMZ	Displays whether the client is configured as a DMZ.
Host Name	Displays the host name.
Delete	Click this box to remove the reserved IP address for the client.
Delete	Click this button to remove the reserved IP addresses for clients designated by the Delete box.

Gateway > ALG — basic Page

This may not be supported in your code release. For the most recent documentation, visit the Product Documentation page on www.motorola.com/broadband.

Gateway > ALG — advanced Page

This may not be supported in your code release. For the most recent documentation, visit the Product Documentation page on www.motorola.com/broadband.

Gateway > LOG Page

Use this page to:

Gateway > LOG page fields

Field	Description
Time	The data and time in the format yyyy-mm-dd hh:mm:ss (hours hh are 00 to 23)
Priority	Indicates the importance of the message.
Code	
Message	Describes the event.

Configuring TCP/IP

You must be sure all client computers are configured for TCP/IP (a protocol for communication between computers). Perform *one* of:

- “Configuring TCP/IP in Windows 95, Windows 98, or Windows Me” on page 54
- “Configuring TCP/IP in Windows 2000” on page 56
- “Configuring TCP/IP in Windows XP” on page 60
- Follow the instructions in your Macintosh or UNIX user manual

After configuring TCP/IP, perform *one* of the following to verify the IP address:

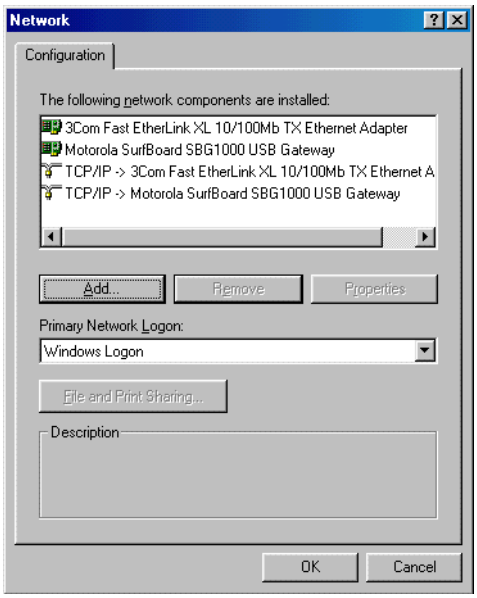
- “Verifying the IP Address in Windows 95, Windows 98, or Windows Me” on page 64
- “Verifying the IP Address in Windows 2000 or Windows XP” on page 65
- Follow the instructions in your Macintosh or UNIX user manual

Configuring TCP/IP in Windows 95, Windows 98, or Windows Me

1 On the Windows Desktop, click **Start**.

2 Select **Settings** and then **Control Panel** from the pop-up menus to display the Control Panel window.

3 Double-click the **Network** icon to display the Network window:

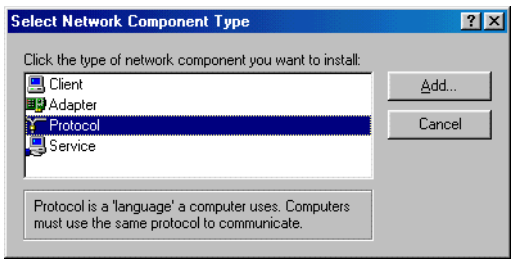


> Although your SBG model number may be different than in the images in this guide, the procedure is the same.

4 Select the **Configuration** tab.

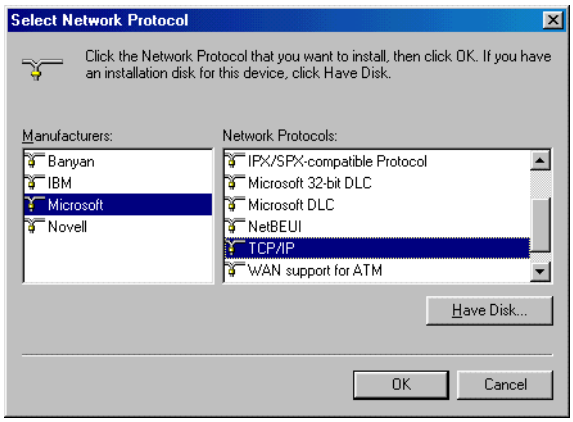
5 Verify that TCP/IP is installed for the adapter used to connect to the SBG1000. If TCP/IP is installed, skip to step 10. If TCP/IP is not installed for the adapter, continue with step 6.

6 Select the adapter to use for the SBG1000 connection and click **Add**. The Select Network Component Type window is displayed:



7 Click **Protocol** and click the **Add** button.

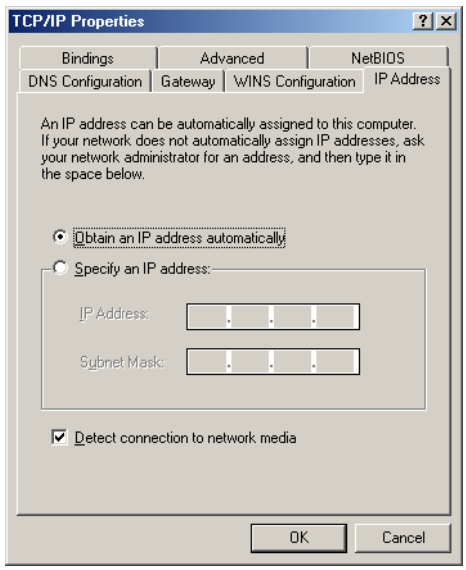
8 Click **Microsoft** in the Manufacturers section and click **TCP/IP** in the Network Protocol section of Select Network Protocol window:



9 Click **OK**.

10 Click **TCP/IP** on the Network window. If there is more than one TCP/IP entry, choose the one for the Ethernet card or USB port connected to the SBG1000.

11 Click **Properties**. The TCP/IP Properties window is displayed:



12 Click the **IP Address** tab.

13 Click **Obtain an IP address automatically**.

14 Click **OK** to accept the TCP/IP settings.

15 Click **OK** to close the Network window.

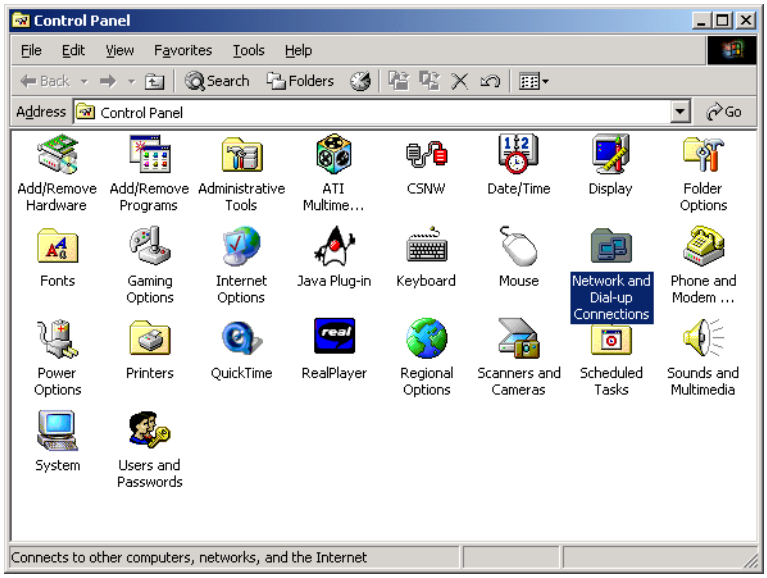
16 Click **OK** when prompted to restart the computer and click **OK** again.

When you complete TCP/IP configuration, go to "Verifying the IP Address in Windows 95, Windows 98, or Windows Me" on page 64.

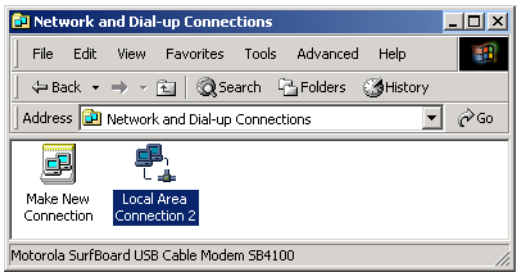
Configuring TCP/IP in Windows 2000

1 On the Windows Desktop, click **Start**.

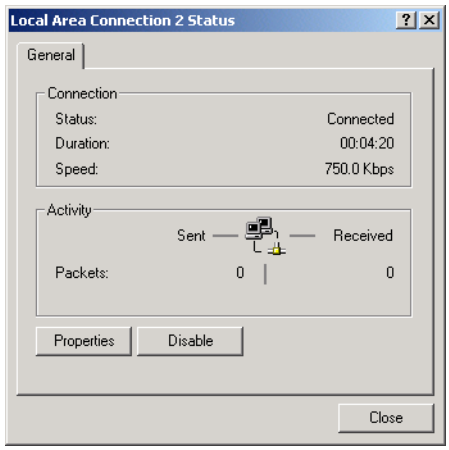
2 Select **Settings** and then **Control Panel** from the pop-up menus to display the Control Panel window:



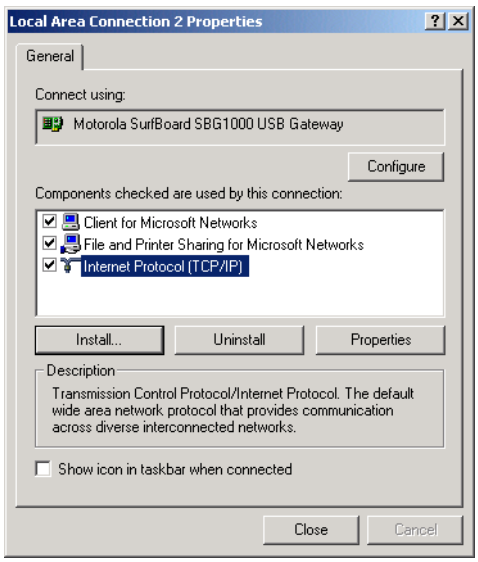
3 Double-click the **Network and Dial-up Connections** icon to display the Network and Dial-up Connections window:



4 Click **Local Area Connection** *number*. The value of *number* varies from system to system. The Local Area Connection *number* Status window is displayed:

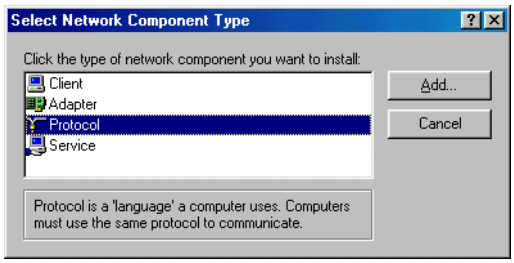


5 Click **Properties**. Information similar to the following window is displayed:

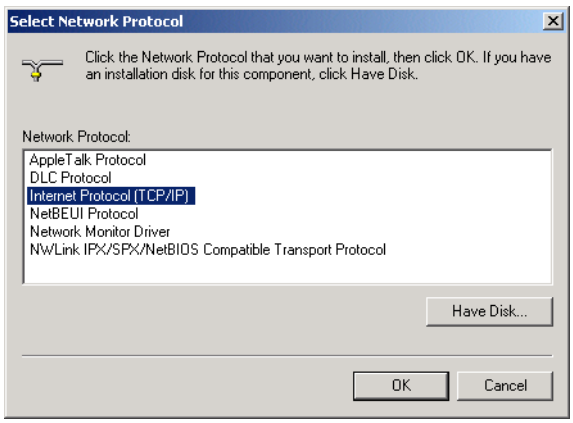


6 If Internet Protocol (TCP/IP) is in the list of components, TCP/IP is installed. You can skip to step 10.

If Internet Protocol (TCP/IP) is not in the list, click **Install**. The Select Network Component Type window is displayed:

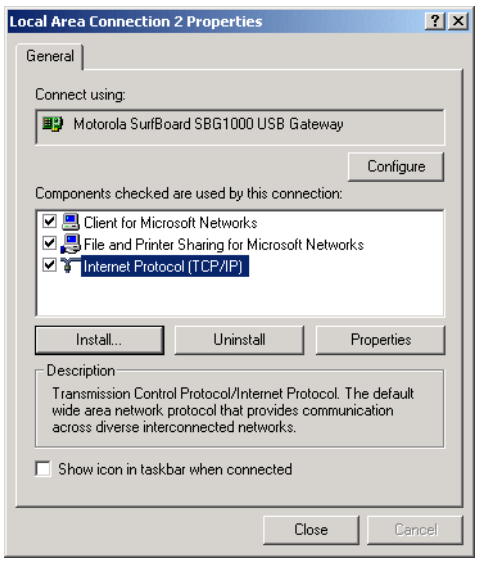


7 Click **Protocol** on the Select Network Component Type window and click **Add**. The Select Network Protocol window is displayed:



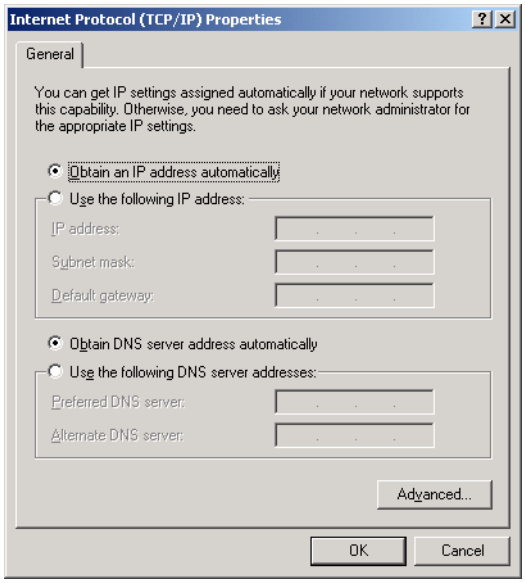
8 Click **Internet Protocol (TCP/IP)**.

9 Click **OK**. The Local Area Connection *number* Properties window is re-displayed.



10 Be sure the box next to Internet Protocol (TCP/IP) is checked.

11 Click **Properties**. The Internet Protocol (TCP/IP) Properties window is displayed:



12 Be sure **Obtain IP address automatically** and **Obtain DNS server address automatically** are selected.

13 Click **OK** to accept the TCP/IP settings.

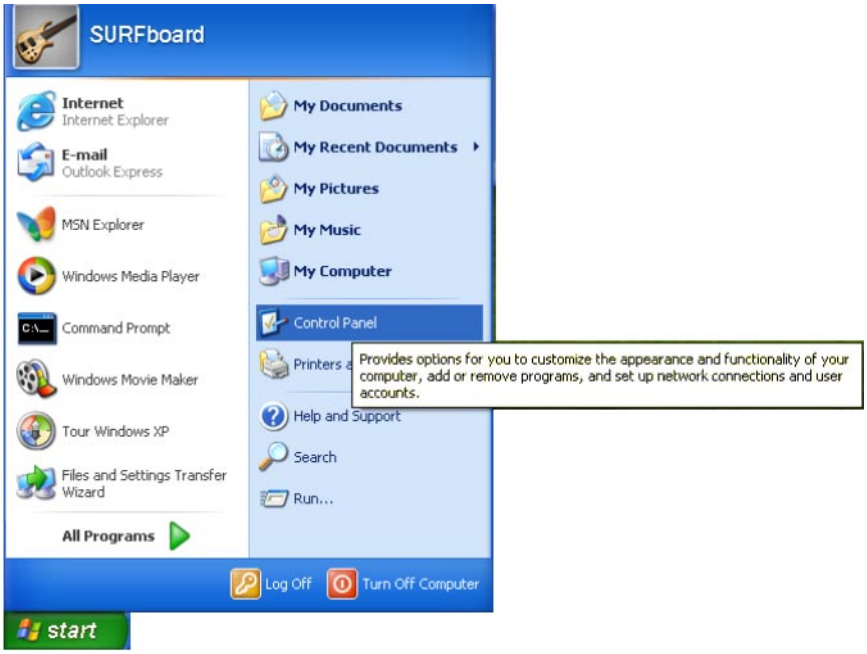
14 Click **OK** to close the Local Area Connection *number* Properties window.

15 Click **OK** when prompted to restart the computer and click **OK** again.

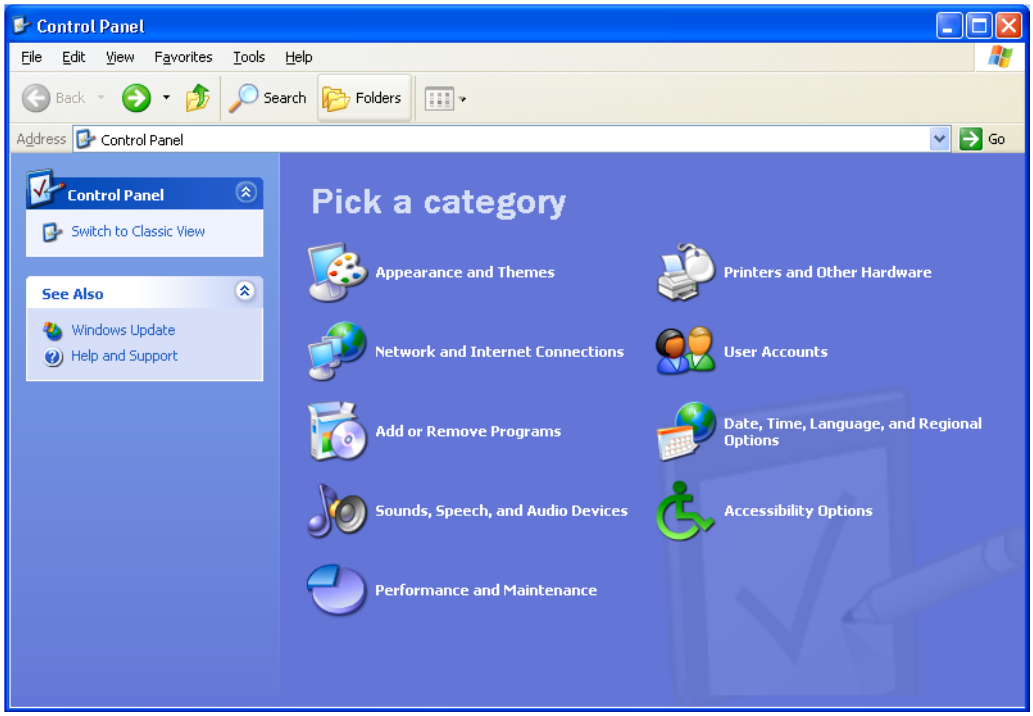
When you complete the TCP/IP configuration, go to "Verifying the IP Address in Windows 2000 or Windows XP" on page 65.

Configuring TCP/IP in Windows XP

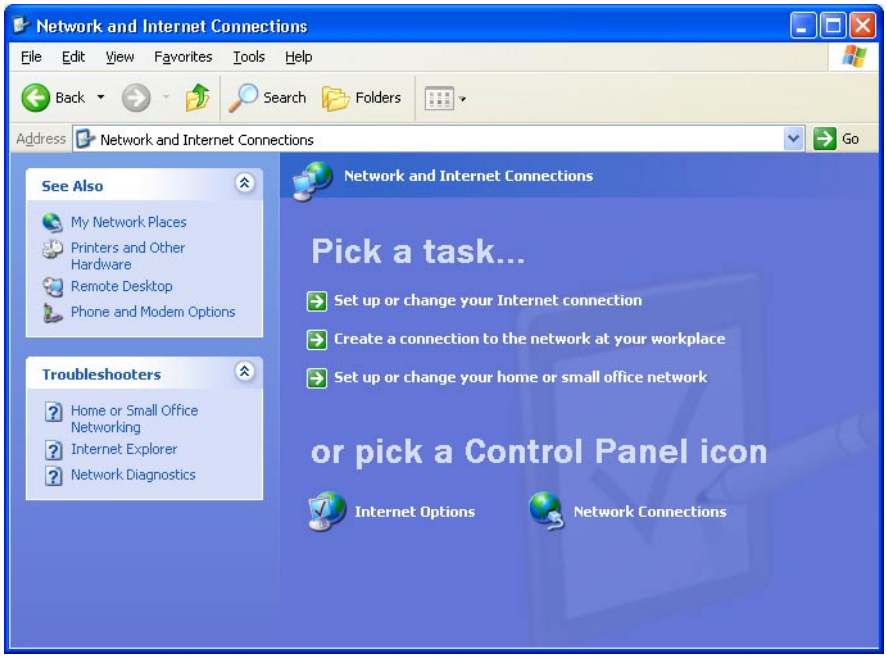
1 On the Windows desktop, click **Start** to display the Start window:



2 Click **Control Panel** to display the Control Panel window. The display varies, depending on the Windows XP view options. If the display is a Category view as shown below, continue with step 3. Otherwise, skip to step 5.

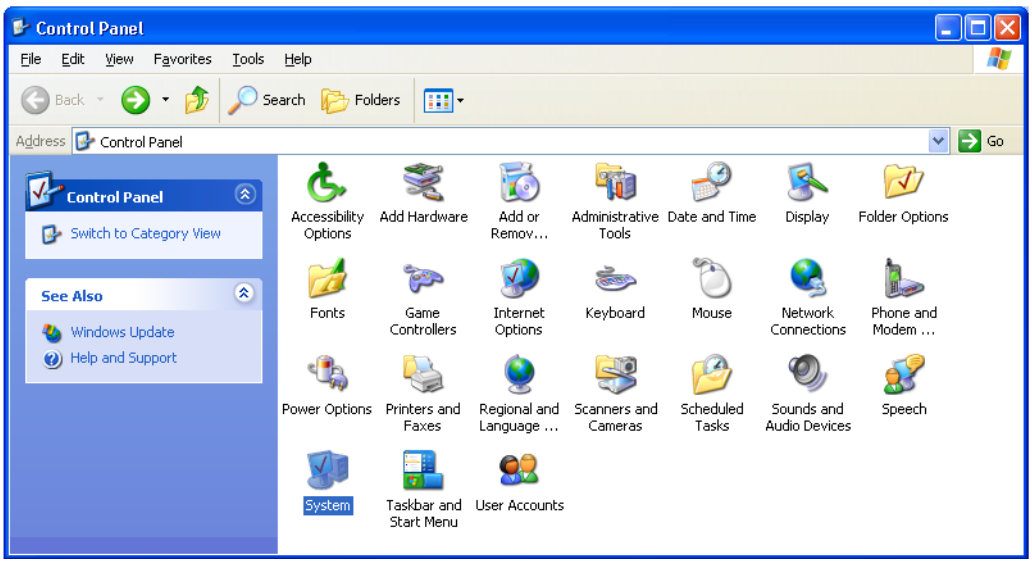


3 Click **Network and Internet Connections** to display the Network and Internet Connections window:

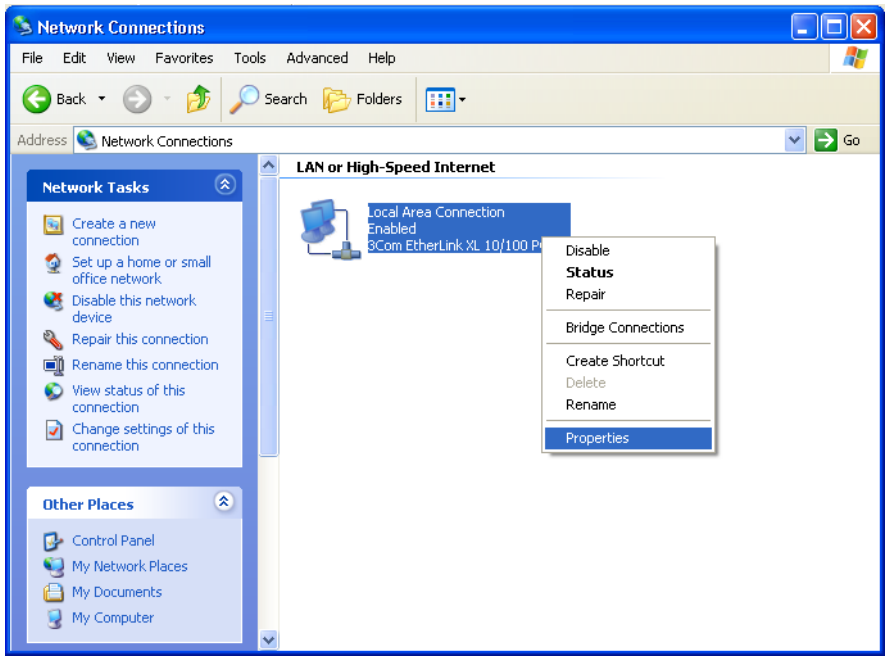


4 On the Network and Internet Connections window in the “or pick a Control Panel icon, click **Network Connections** to display the LAN or High-speed Internet connections. Skip to step 6.

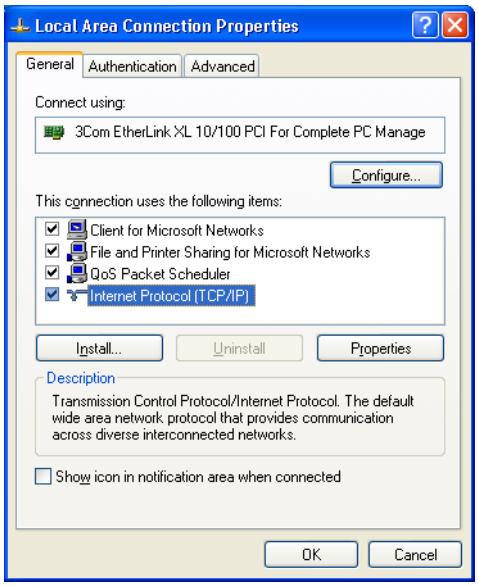
5 If a classic view similar to below is displayed, click **Network Connections** to display the LAN or High-speed Internet connections:



6 Right-click on the network connection. If more than one connection is displayed, be sure to select the one for your network interface:

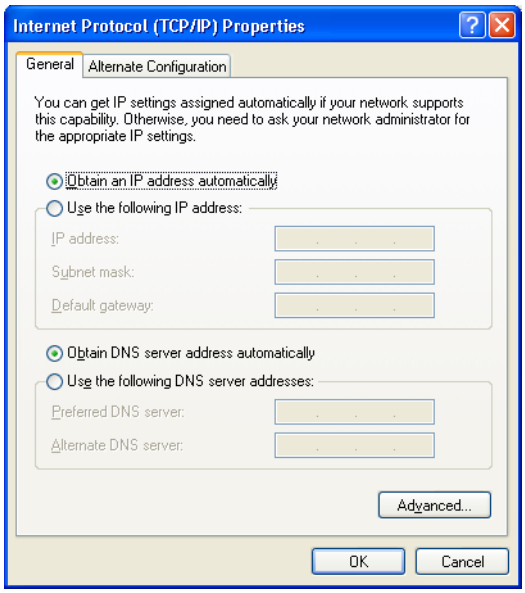


7 Select **Properties** from the pop-up menu to display the Local Area Connection Properties window:



8 On the Local Area Connection Properties window, be sure Internet Protocol (TCP/IP) is checked. If it is not checked, check it.

9 Select **Internet Protocol (TCP/IP)** and click **Properties** to display the Internet Protocol (TCP/IP) Properties window:



10 On the Internet Protocol (TCP/IP) Properties window, verify that the settings are correct, as shown above.

11 Click **OK** to close the TCP/IP Properties window.

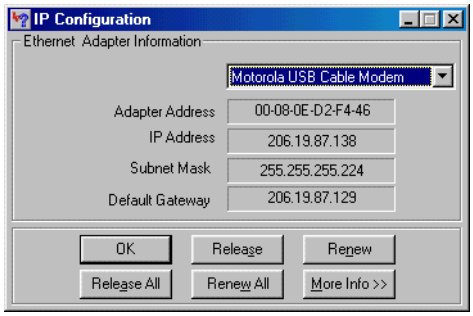
12 Click **OK** to close the Local Area Connection Properties window.

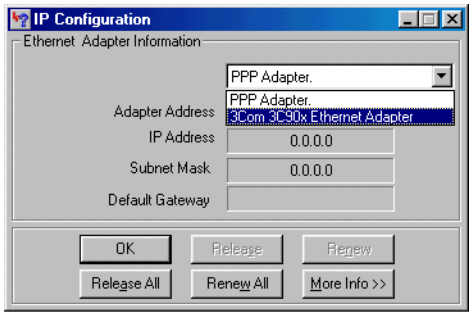
When you complete the TCP/IP configuration, go to "Verifying the IP Address in Windows 2000 or Windows XP" on page 65.

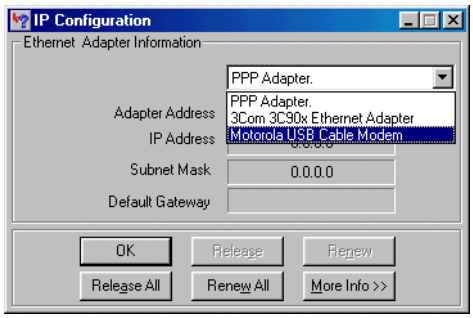
Verifying the IP Address in Windows 95, Windows 98, or Windows Me

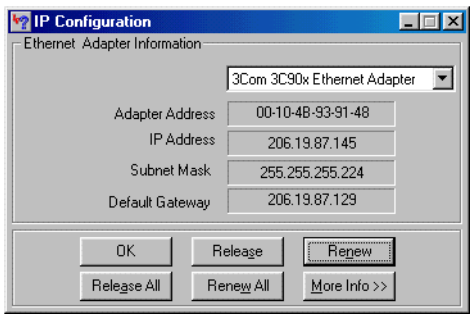
To check the IP address:

1. On the Windows Desktop, click **Start**.
2. Select **Run**. The Run window is displayed.
3. Type **winipcfg.exe** and click **OK.** The IP Configuration window is displayed. The Ethernet Adpater Information field will vary depending on the system, as shown in the following examples:



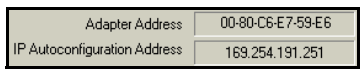






The values for Adapter Address, IP Address, Subnet Mask, and Default Gateway on the PC will be different than in the image.

In Windows 98, if "Autoconfiguration" is displayed before the IP Address as in the following image, call your service provider.



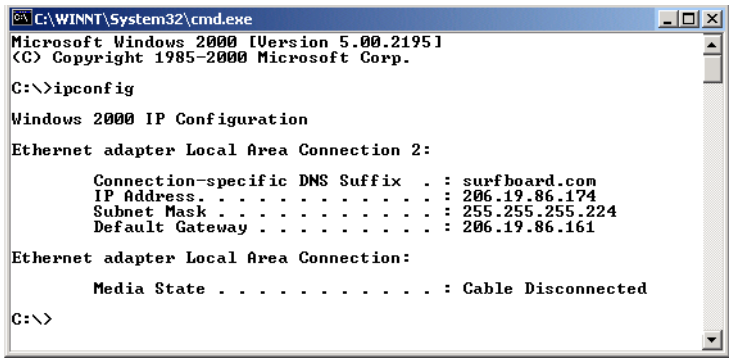
4. Select the adapter name — the Ethernet card or USB device.
5. Click **Renew**.
6. Click **OK** after the system displays an IP address.

If after performing this procedure the computer cannot access the Internet, call your cable service provider for help.

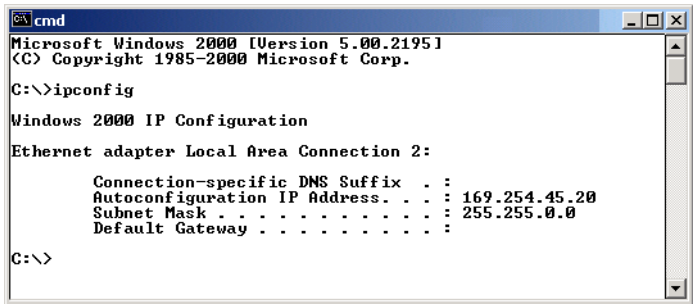
Verifying the IP Address in Windows 2000 or Windows XP

To check the IP address:

1. On the Windows Desktop, click **Start**.
2. Select **Run**. The Run window is displayed.
3. Type **cmd** and click **OK** to display a command prompt window.
4. Type **ipconfig** and press ENTER to display the IP configuration. A display similar to the following indicates a normal configuration:



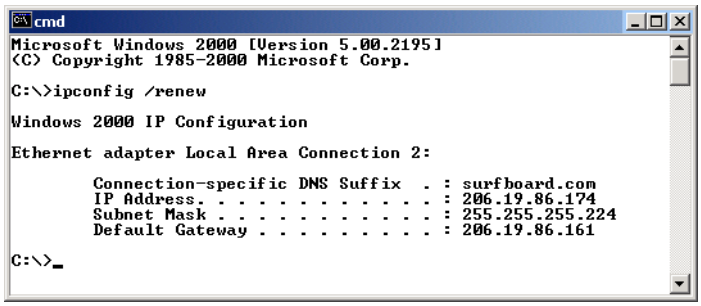
If an Autoconfiguration IP Address is displayed as in the following window, there is an incorrect connection between the PC and the SBG1000 or there are cable network problems. Check the cable connections and determine if you can view cable-TV channels on your television:



After verifying the cable connections and proper cable-TV operation, renew the IP address.

To renew the IP address:

1 Type **ipconfig /renew** and press ENTER. If a valid IP address is displayed as shown, Internet access should be available.



2 Type **exit** and press ENTER to return to Windows.

If after performing this procedure the computer cannot access the Internet, call your cable service provider for help.