



Touchstone TM1602G Telephony Modem

User Guide

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Other patents pending.

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Overview

Introduction

Get ready to experience the Internet's express lane! Whether you're checking out streaming media, downloading new software, checking your email, or talking with friends on the phone, the Touchstone TM1602G Telephony Modem brings it all to you faster and more reliably. All while providing toll quality Voice over IP telephone service. It also provides Lithium-Ion battery backup capability to provide continued telephone service during power outages.

The Touchstone TM1602G Telephony Modem provides an Ethernet connection for use with either a single computer or home/office Local Area Network (LAN). In addition, the TM1602G provides for up to two separate lines of telephone service.



Installation is simple and your service provider will provide assistance to you for any special requirements.

Safety Requirements

The ARRIS Telephony Modem complies with the applicable requirements for performance, construction, labeling, and information when used as outlined below:

**CAUTION****Potential equipment damage****Potential loss of service**

Connecting the Telephony Modem to existing telephone wiring should only be performed by a professional installer. Physical connections to the previous telephone provider must be removed and the wiring must be checked; there must not be any voltages. Cancellation of telephone service is not adequate. Failure to do so may result in loss of service and/or permanent damage to the Telephony Modem.

**CAUTION****Risk of shock**

Mains voltages inside this unit. No user serviceable parts inside. Refer service to qualified personnel only!

**CAUTION****Risk of explosion**

Replacing the battery with an incorrect type, heating a battery above 75°C, or incinerating a battery, can cause product failure and a risk of fire or battery explosion. Do not dispose of in fire. Recycle or dispose of used batteries responsibly and in accordance with local ordinances.

- The Telephony Modem is designed to be connected directly to a telephone.
- Connecting the Telephony Modem to the home's existing telephone wiring should only be performed by a professional installer.
- Do not use product near water (i.e. wet basement, bathtub, sink or near a swimming pool, etc.), to avoid risk of electrocution.
- Do not use the telephone to report a gas leak in the vicinity of the leak.
- The product shall be cleaned using only a damp, lint-free, cloth. No solvents or cleaning agents shall be used.
- Do not use spray cleaners or aerosols on the device.
- Avoid using and/or connecting the equipment during an electrical storm, to avoid risk of electrocution.
- Do not locate the equipment within 6 feet (1.9 m) of a flame or ignition source (i.e. heat registers, space heaters, fireplaces, etc.).

- Use only the AC power adapter (if provided) and power cord included with the equipment.
- Equipment should be installed near the power outlet and should be easily accessible.
- The shield of the coaxial cable must be connected to earth (grounded) at the entrance to the building in accordance with applicable national electrical installation codes. In the U.S., this is required by NFPA 70 (National Electrical Code) Article 820. In the European Union and in certain other countries, CATV installation equipotential bonding requirements are specified in IEC 60728-11, *Cable networks for television signals, sound signals and interactive services*, Part 11: Safety. This equipment is intended to be installed in accordance with the requirements of IEC 60728-11 for safe operation.
- If the equipment is to be installed in an area serviced by an IT power line network, as is found in many areas of Norway, special attention should be given that the installation is in accordance with IEC 60728-11, in particular Annex B and Figure B.4.
- In areas of high surge events or poor grounding situations and areas prone to lightning strikes, additional surge protection may be required (i.e. PF11VNT3 from American Power Conversion) on the AC, RF, Ethernet and Phone lines.
- When the Telephony Modem is connected to a local computer through Ethernet cables, the computer must be properly grounded to the building/residence AC ground network. All plug-in cards within the computer must be properly installed and grounded to the computer frame per the manufacturer's specifications.
- Ensure proper ventilation. Position the Telephony Modem so that air flows freely around it and the ventilation holes on the unit are not blocked.
- Do not mount the Telephony Modem on surfaces that are sensitive to heat and/or which may be damaged by the heat generated by the modem, its power supply, or other accessories.

FCC Part 15

This equipment has been tested and found to comply with the requirements for a Class B digital device under Part 15 of the Federal Communications Commission (FCC) rules. These requirements are intended 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.



WARNING

Changes or modifications to this equipment not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

RF Exposure

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment. This equipment should be installed and operated with minimum distance of 11.8 inches (30 cm) between the radiator and your body. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.

Industry Canada Compliance

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions: (1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

For Mexico

The operation of this equipment is subject to the following two conditions: (1) This equipment or device cannot cause harmful interference and (2) this equipment or device must accept any interference, including interference that may cause some unwanted operation of the equipment.

Getting Started

About Your New Telephony Modem

The Touchstone TM1602G Telephony Modem is DOCSIS 3.0 or Euro-DOCSIS 3.0 compliant with the following features:

- **Speed:** much faster than dialup or ISDN service; up to sixteen times faster than DOCSIS 2.0 cable modems.
- **Connectivity:** supports Ethernet connection
- **Flexibility:** provides two independent lines of telephone service as well as high speed data
- **Compatibility:**
 - **Data services:** DOCSIS or Euro-DOCSIS 3.0 compliant and backward-compatible with DOCSIS 2.0 or 1.1; supports tiered data services (if offered by your service provider)
 - **Telephony services:** PacketCable™ and Euro-PacketCable 2.0, 1.5, or 1.0 compliant

What's in the Box?

Make sure you have the following items before proceeding. Call your service provider for assistance if anything is missing.

- Telephony Modem
- Power Cord
- Battery (not included with all models)
- Ethernet Cable (CAT5e)
- End User License Agreement

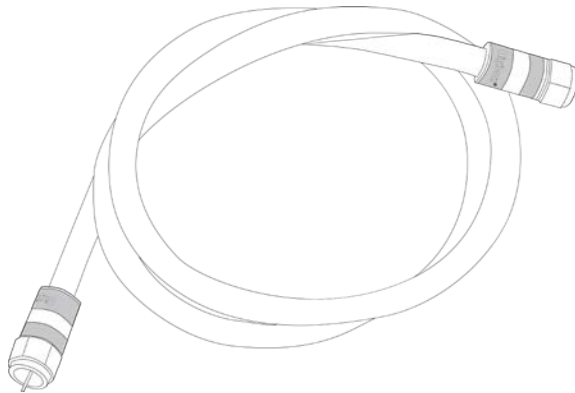
Items You Need

If you are installing the Telephony Modem yourself, make sure you have the following items on hand before continuing:

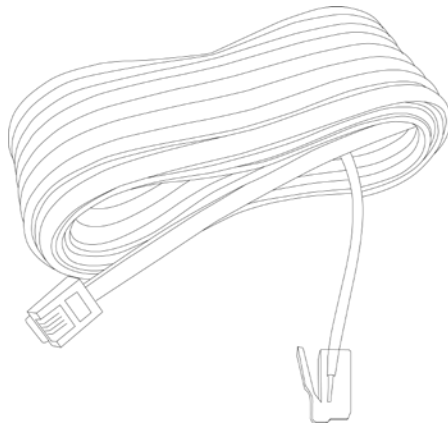
- **Telephony Modem package:** see [What's in the Box?](#) (page 10) for a list of items in the package.
- **Coaxial cable (coax):** This is a round cable with a connector on each end. It is the same kind of wire used to connect to your television for cable TV. You can buy coax from any electronics retailer and many discount stores; make sure it has connectors on both ends. There are two types of connectors, slip-on and screw-on; the screw-on connectors are best for use with your Telephony Modem. The coax should be long enough to reach from your Telephony Modem to the nearest cable outlet.



Note: For best performance, use high-quality RG-6 type coax cable and minimize or eliminate splitters between the cable jack and the Telephony Modem.



- **Phone Cable:** This is a standard phone cable with standard phone connectors (RJ11 type) on both ends. You can buy phone cables from any electronics retailer and many discount stores.



- **Splitter (optional):** provides an extra cable connection by splitting a single outlet into two. You may need a splitter if you have a TV already connected to the cable outlet that you want to use. You can buy a splitter from any electronics retailer and most discount stores; you may also need a short piece of coax cable (with connectors); use it to connect the splitter to the cable outlet and then connect the Telephony Modem and TV to the splitter.



Note: A splitter effectively cuts the signal in half and sends each half to its two outputs. Using several splitters in a line may deteriorate the quality of your television, telephone, and/or internet connection.

- **Wall-mounting hardware (optional):** if you want to wall-mount your Telephony Modem, you need to obtain two drywall anchors or wood screws.
- **Information packet:** your service provider should furnish you with a packet containing information about your service and how to set it up. Read this information carefully and contact your service provider if you have any questions.

Getting Service

Before trying to use your new Telephony Modem, contact your local service provider to establish an Internet account and telephone service. When you call, have the following information ready:

- the Telephony Modem serial number and cable MAC addresses of the unit (printed on a sticker on the bottom of the Telephony Modem)
- the model number of the Telephony Modem

If the Telephony Modem was provided by your service provider, they already have the required information.

In addition, you should ask your service provider the following questions:

- Do you have any special system requirements or files that I need to download after I am connected?
- When can I start using my Telephony Modem?
- Do I need a user ID or password to access the Internet or my e-mail?
- Will my phone number(s) change?
- What new calling features will I have and how do I use them?

System Requirements

The Touchstone Telephony Modem operates with most computers. The following describes requirements for each operating system; see the documentation for your system for details on enabling and configuring networking.

To use the Telephony Modem, you need DOCSIS or Euro-DOCSIS high-speed Internet service from your service provider, as appropriate. Telephone service requires that the service provider has PacketCable or Euro-PacketCable support.

Recommended Hardware

The following hardware configuration is recommended. Computers not meeting this configuration can still work with the TM1602G, but may not be able to make maximum use of TM1602G throughput.

- CPU: P4, 3GHz or faster
- RAM: 1GB or greater
- Hard drive: 7200 RPM or faster
- Ethernet: Gig-E (1000BaseT)

Windows

Windows Vista, Windows 7, Windows 8, or Windows 10. A supported Ethernet or wireless LAN connection must be available.

Mac OS

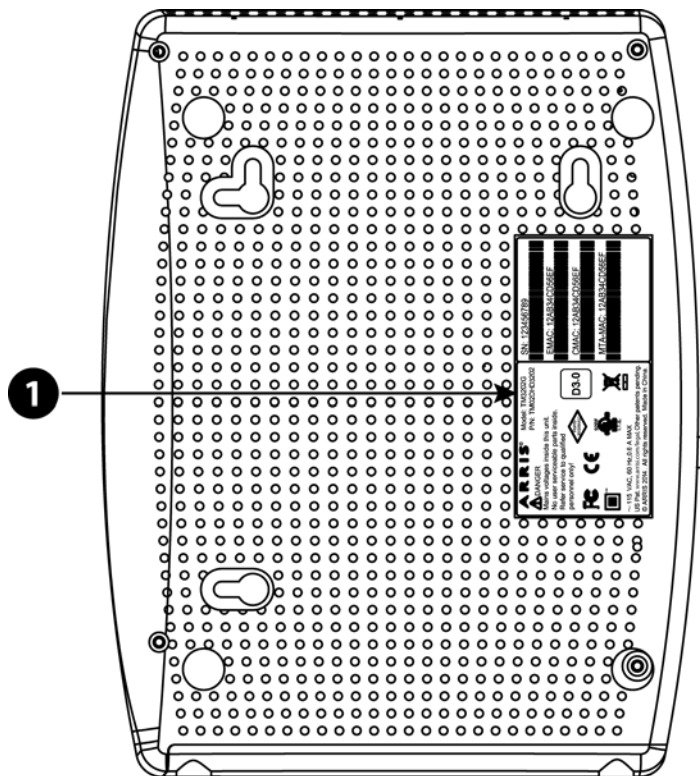
System 7.5 to Mac OS 9.2 (Open Transport recommended) or Mac OS X. A supported Ethernet or wireless LAN connection must be available.

Linux/Unix

Hardware drivers, TCP/IP, and DHCP must be enabled in the kernel. A supported Ethernet or wireless LAN connection must be available.

About this Manual

This manual covers the Touchstone TM1602G Telephony Modem. The model number is on the label affixed to the Telephony Modem.



1. Model Number

What About Security?

Having a high-speed, always-on connection to the Internet requires a certain amount of responsibility to other Internet users—including the need to maintain a reasonably secure system. While no system is 100% secure, you can use the following tips to enhance your system's security:

- Keep the operating system of your computer updated with the latest security patches. Run the system update utility at least weekly.
- Keep your email program updated with the latest security patches. In addition, avoid opening email containing attachments, or opening files sent through chat rooms, whenever possible.
- Install a virus checker and keep it updated.
- Avoid providing web or file-sharing services over your Telephony Modem. Besides certain vulnerability problems, most cable companies prohibit running servers on consumer-level accounts and may suspend your account for violating your terms of service.
- Use the service provider's mail servers for sending email.
- Avoid using proxy software unless you are certain that it is not open for abuse by other Internet users (some are shipped open by default). Criminals can take advantage of open proxies to hide their identity when breaking into other computers or sending spam. If you have an open proxy, your service provider may suspend your account to protect the rest of the network.

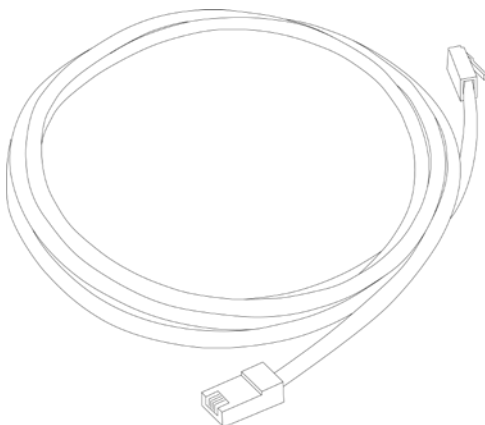
Ethernet Connection

Ethernet is a standard method of connecting two or more computers into a Local Area Network (LAN). You can use the Ethernet connection if your computer has built-in Ethernet hardware.



Note: To connect more than one computer to the TM1602G through the Ethernet port, you need an Ethernet hub (available at computer retailers).

The Telephony Modem package comes with one Ethernet cable (the connectors look like wide telephone connectors); you can purchase more cables if necessary at a computer retailer. If you are connecting the Telephony Modem directly to a computer, or to an Ethernet hub with a cross-over switch, ask for Category 5e (CAT5e) straight-through cable. CAT5e cable is required for gigabit Ethernet (Gig-E), not regular CAT5 cable.



Battery Installation and Removal

Introduction

The TM1602G Telephony Modem supports a Lithium-Ion backup battery to provide continued telephone service during power outages. The battery backup is not intended to take the place of AC power.



Note: The battery is intended *only* to provide emergency telephone service in the case of a power outage. LED operation is reduced when the Telephony Modem is operating on battery power.



Note: For safety and regulatory purposes, batteries are shipped outside of the Telephony Modem and must be installed.

The TM1602G supports the following battery models:

- **Basic backup battery:** provides up to 4 hours of backup time, depending on your Telephony Modem model and usage. It may be green or black.



Basic Backup Battery (Green)



Basic Backup Battery (Black)

Refer to [Basic Battery Installation and Replacement](#) (page 17).

- **Extended backup battery:** provides up to 8 hours of backup time, depending on model and usage. It has a strap between the battery guides. It may be light gray or black.



Extended Backup Battery

Refer to *Extended Battery Installation and Replacement* (page 18).

- **Maximum backup battery:** provides up to 12 hours (6-cell) or 16 hours (8-cell) of backup time, depending on model and usage. It replaces the battery door, and increases the height of the Telephony Modem by about 5/8" (16 mm).



Maximum Backup Battery

Refer to *Maximum Battery Installation and Replacement* (page 20)

Your service provider may include a backup battery with your Telephony Modem. If you wish, you can purchase an additional battery at <http://shop.surfboard.com/>. The website will list the recommended battery type for your Telephony Modem.

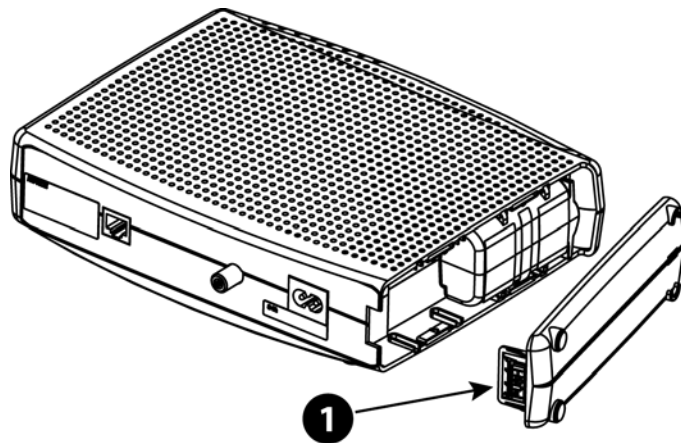
Note: The backup times shown here are only an estimate and assume that your battery is fully charged. If your battery is partially discharged (for example, if it is in the middle of a self-test or is not yet fully charged), then your backup time will be reduced.

Basic Battery Installation and Replacement

This model of the Telephony Modem has the ability to provide continued telephone service during power outages. The battery backup is not intended to take the place of AC power.

Use this procedure to install and to replace the backup battery.

1. Press down and pull back on the latch holding the battery door (on the bottom of the Telephony Modem). Pull the door toward you. Set the door aside in a safe place.



1 - Latch End

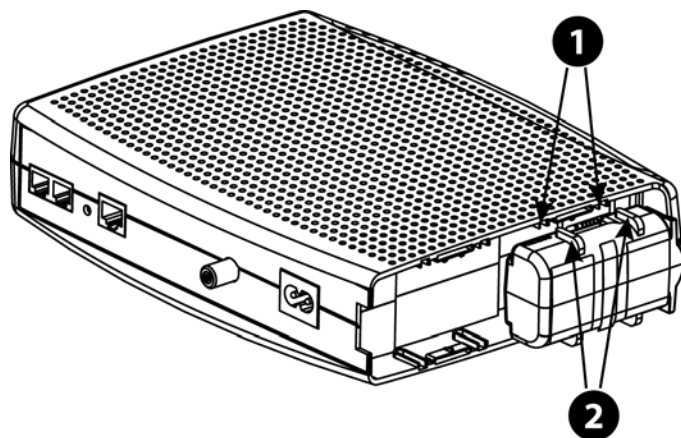


CAUTION

Risk of equipment damage

Improperly inserting the battery may damage the battery connector in the Telephony Modem. Carefully follow the instructions in the next step to avoid damage.

2. Hold the battery pack so that the guides on the battery align with the slots on the Telephony Modem and slide the battery into the bay.



1 - Battery Slots

2 - Battery Guides



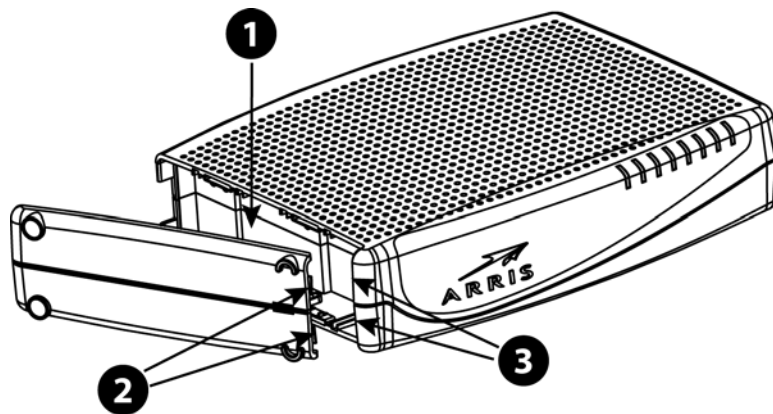
Note: Batteries will not insert completely into the Telephony Modem if not oriented correctly. The battery should slide into the bay without significant force. Line up the guides on the battery with the slots in the battery bay.

3. Push the battery pack into the bay until it seats into place. **If you are taking the battery out of the Telephony Modem, position your finger in the battery opening area and use leverage to dislodge the battery while pulling it straight back.**



Note: The Telephony Modem will not begin operating until you apply AC power.

4. Replace the door. To do so, place the hinge tabs of the battery door into the receiver slots inside the Telephony Modem battery compartment on the -opposite end of the battery opening. Rotate the door toward the unit until the latch snaps back into place.



- 1 - Battery Compartment
- 2 - Hinge Tabs
- 3 - Receiver Slots



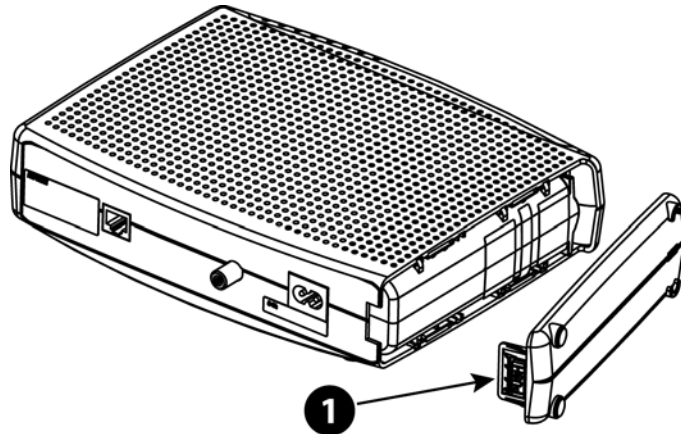
Note: Telephony Modems use a Lithium-Ion battery pack. Please recycle or dispose of the battery responsibly and in accordance with local ordinances.

Extended Battery Installation and Replacement

This model of the Telephony Modem has the ability to provide continued telephone service during power outages. The battery backup is not intended to take the place of AC power.

Use this procedure to install or replace the backup battery.

1. Press down and pull back on the latch holding the battery door (on the bottom of the Telephony Modem). Pull the door toward you. Set the door aside in a safe place.



1 - Latch End

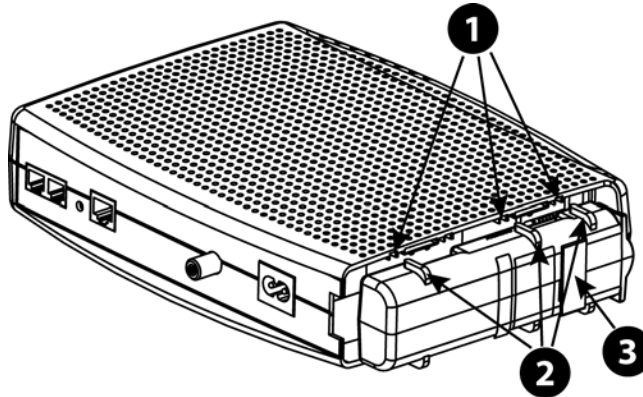


CAUTION

Risk of equipment damage

Improperly inserting the battery may damage the battery connector in the Telephony Modem. Carefully follow the instructions in the next step to avoid damage.

2. Hold the battery pack so that the guides on the battery align with the slots on the Telephony Modem and slide the battery into the bay.



- 1 - Battery Slots
- 2 - Battery Guides
- 3 - Battery Pull Strap



Note: Batteries will not insert completely into the Telephony Modem if not oriented correctly. The battery should slide into the bay without significant force. Line up the slots in the battery bay with the guides on the battery and apply even pressure on both ends of the battery.

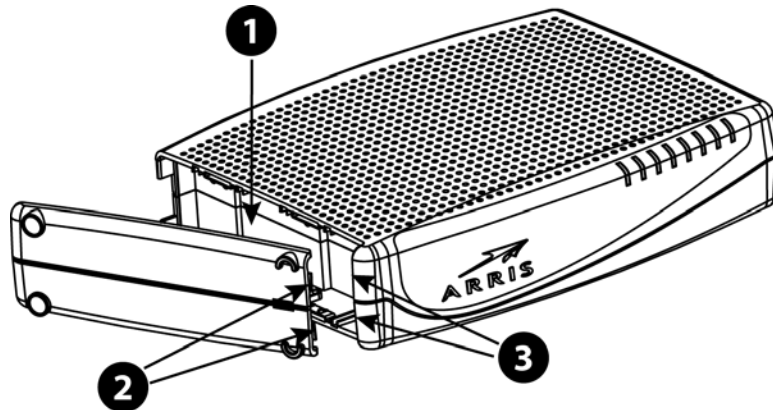


3. Push the battery pack into the bay until it latches into place. **If you are taking the battery out of the Telephony Modem, use the battery pull strap to dislodge the battery.**



Note: The Telephony Modem will not begin operating until you apply AC power.

4. Replace the door. To do so, place the tabs of the battery door into the slot inside the Telephony Modem battery compartment. Rotate the door toward the front of the Telephony Modem until the latch snaps back into place.



- 1 - Battery Compartment
- 2 - Hinge Tabs
- 3 - Receiver Slots



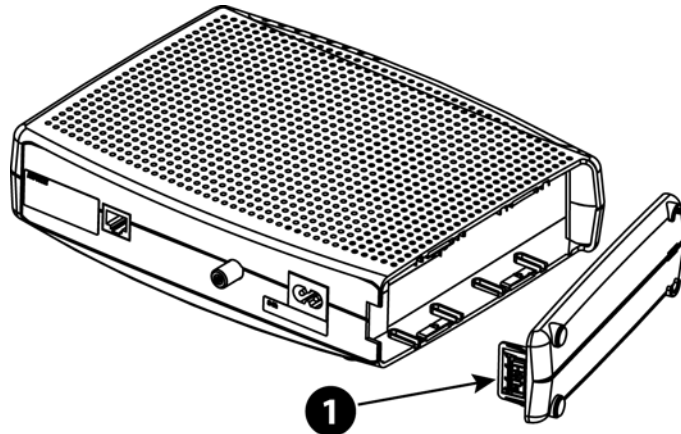
Note: Telephony Modems use a Lithium-Ion battery pack. Please recycle or dispose of the battery responsibly and in accordance with local ordinances.

Maximum Battery Installation and Replacement

This model of the Telephony Modem has the ability to provide continued telephone service during power outages. The battery backup is not intended to take the place of AC power.

Use this procedure to install and to replace the backup battery.

1. Press down and pull back on the latch holding the battery door (on the bottom of the Telephony Modem). Pull the door toward you. Set the door aside in a safe place.

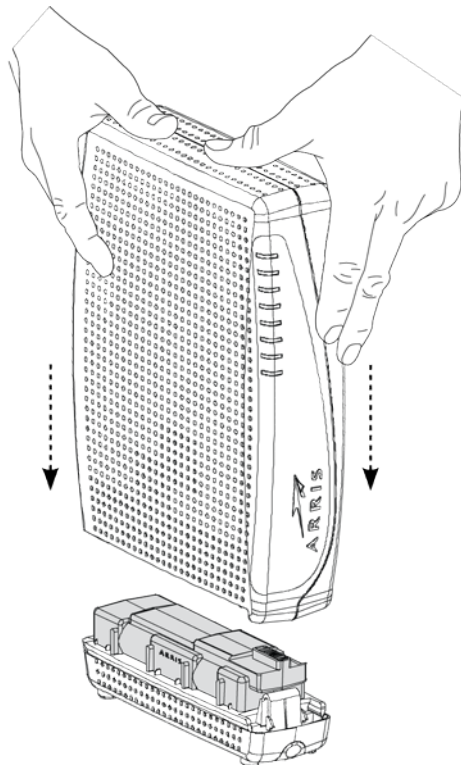


1 - Latch End

2. Place the battery on a firm horizontal surface.
3. Position the Telephony Modem over the battery, aligning the slots on the battery bay with the tabs on the battery. Push straight down on the Telephony Modem until the battery latch clicks into place.



Note: You may need to push down gently on the front of the Telephony Modem to latch the battery into place. The Telephony Modem will not begin operating until you apply AC power.



4. To remove the battery, grasp the battery and pull back on the latch at the front of the battery. Then gently rock the battery out of the bay.



Note: Telephony Modems use a Lithium-Ion battery pack. Please recycle or dispose of the battery responsibly and in accordance with local ordinances.

Battery Usage and Storage Conditions

- The life expectancy of your battery should be several years, provided that it was purchased from an approved source.
- Your battery goes through a calibration procedure when it is first installed or replaced. This procedure can take up to 72 hours to complete and is repeated every six months.
- If your battery becomes fully drained during a power outage, the calibration procedure will need to be repeated.
- Your battery should be installed in your Telephony Modem and kept there at all times. Do not store the battery separately from the Telephony Modem for any prolonged period of time.

Battery Disposal Guidelines

To ensure compliance with current and future rechargeable battery take-back laws, ARRIS has joined Call2Recycle, a collection program for rechargeable batteries throughout North America. US and Canadian customers should visit <http://www.call2recycle.org> to properly recycle your lithium-ion battery backup units (BBUs).

Getting Battery Status

To assess whether the battery needs to be replaced, the Telephony Modem charges, discharges, and recharges the battery pack as part of a battery test. The Telephony Modem re-tests the battery periodically afterwards, usually every 180 days. The Battery LED and the Registration Status screen indicate the status of the battery.

To view the Registration Status screen:

1. Using a web browser, access **<http://192.168.100.1/>** You may have to manually adjust your computer's IP address to (for example) 192.168.100.6 to access the HSD pages.
2. Click the **CM State** link below the ARRIS banner.
3. Scroll down, if necessary, to see the Power Supply Telemetry and Battery Test State information at the bottom of the page. The expected states are:
 - Power Supply Telemetry: **TELEMETRY NORMAL**
 - Battery Test State: **Not Currently Under Battery Test**

Installing and Connecting your Telephony Modem

Before you start, make sure that:

- You have contacted your service provider and verified that they provide data and telephone service using standard DOCSIS technology.
- You have all the *Items You Need* (page 10).
- Cable, phone, and power outlets are available near the computer. If a cable outlet is not conveniently located, your service provider can install a new one.

If you have ordered service, your service provider should configure the Telephony Modem automatically. You need only follow the instructions in this section to install and connect the Telephony Modem.



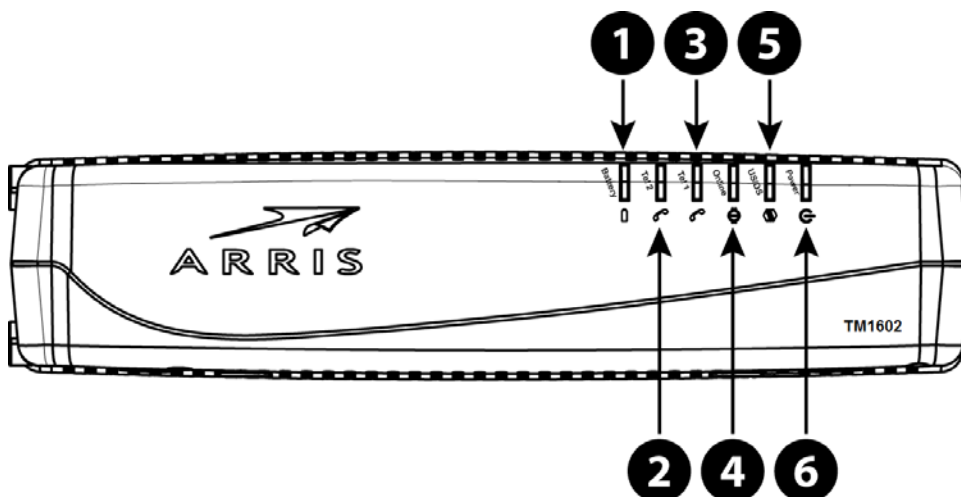
CAUTION

Risk of equipment damage

Only qualified installation technicians should connect the Telephony Modem to house wiring. Incumbent telephone service must be physically disconnected at the outside interface box before making any connections.

Front Panel

The front of the Telephony Modem has the following indicators.

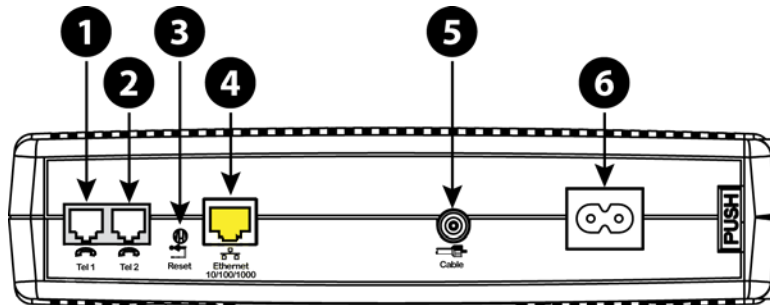


1. **Battery:** indicates the battery status.

2. **Tel 2:** indicates the status of telephone line 2.
3. **Tel 1:** indicates the status of telephone line 1.
4. **Online:** indicates internet data transmission status.
5. **US/DS:** indicates upstream/downstream connectivity.
6. **Power:** indicates whether AC power is available to the unit.

Rear Panel

The rear of the Telephony Modem has the following connectors and controls.



1. **Tel 1:** connector for the first phone line.
2. **Tel 2:** connector for the second phone line.
3. **Reset button:** resets the Telephony Modem as if you power cycled the unit. Use a pointed non-metallic object to press this button.
4. **Ethernet:** connector for use with a computer LAN port.
5. **Cable:** connector for the coaxial cable.
6. **Power:** connector for the power cord.

Selecting an Installation Location

There are a number of factors to consider when choosing a location to install your Telephony Modem:

- Is an AC outlet available nearby? For best results, the outlet should not be switched and should be close enough to the Telephony Modem that extension cords are not required.
- Is a cable jack available? For best performance, keep the number of splitters between the jack and cable drop to a minimum. Each splitter attenuates (reduces) the signal available to the Telephony Modem. A large number of splitters can slow down the Internet connection and even affect your telephone service.
- Can you easily run cables between the Telephony Modem's location and the phones?
- If you are connecting devices to an Ethernet port, can you easily run cables between the Telephony Modem's location and those devices?
- If you want to mount the Telephony Modem on a wall, does the location provide a solid surface for secure attachment? For best results when mounting the Telephony Modem on drywall, position the Telephony Modem so at least one of the screws are fastened to a stud. This may prevent the Telephony Modem from pulling out of the wall in the future.

- If you want to install the Telephony Modem on a desktop, is there enough space on either side to keep the vents clear? Blocking the vents may cause overheating.

Mounting the Telephony Modem

You can either mount the Telephony Modem on a wall or place it on a desktop. For wall-mount applications, you can mount the Telephony Modem with the indicators facing upward (vertical) or to the side (horizontal).

Tools and Materials

For wall-mounted installations, make sure you have the following tools and materials before proceeding:

- for mounting on drywall: Two 1/4" (6mm) drywall anchors (not included), two #6 x 1.5" (38.1 mm) self-tapping panhead screws (not included), and a drill with 1/4" (6mm) bit (not included)
- for mounting on plywood or studs: two #6 x 1.5" (38.1 mm) self-tapping panhead wood screws (not included)
- screwdriver (flat-blade or Phillips, depending on what kind of screws you use)
- wall-mount template (included with the Telephony Modem Quick Installation Guide)
- transparent tape: for temporarily securing the mounting template to the wall (not included)

Location

Always position the Telephony Modem:

- within reach of an AC outlet. The power cord must reach the outlet without stretching and without adding extension cords.
- near a cable outlet (to avoid long cable runs).

Wall Mounting Instructions



Note: When mounting the Telephony Modem on drywall, try to position the Telephony Modem so at least one of the screws is fastened to a stud. This may prevent the Telephony Modem from pulling out of the wall in the future. To prevent overheating of the Telephony Modem, do not block the ventilation holes on the sides of the unit.

1. Position the Telephony Modem on the surface where you intend to mount it. Orient the Telephony Modem with the indicator lights facing up or right, as desired.



2. Drill holes, 4" (102 mm) apart, in the correct locations for the mounting screws.



3. If using drywall anchors, set them into the wall. Then, drive the screws into the wall leaving a gap of about 1/8" (3 mm) between the screw head and the wall. If not using anchors, just drive the screws.



- Slip both mounting slots in the back of the Telephony Modem over the screws, then slide the case down until the narrow end of the keyhole slot contacts the screw shaft.



- Proceed to [Connecting the Telephony Modem](#) (page 27).

Desktop Mounting Instructions

- Position the Telephony Modem so that:
 - air flows freely around it
 - the back faces the nearest wall
 - it will not fall to the floor if bumped or moved
 - the ventilation holes on the sides of the unit are not blocked
- Proceed to [Connecting the Telephony Modem](#) (page 27).

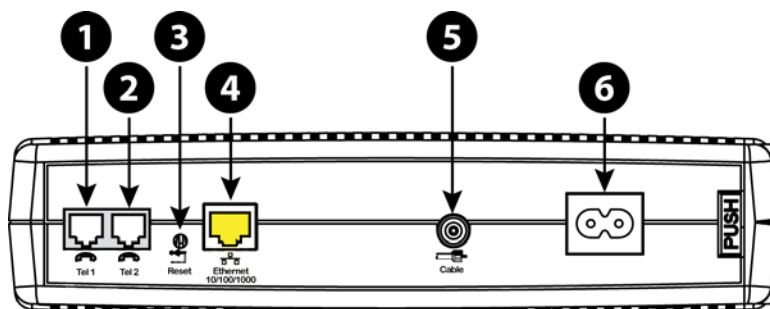
Connecting the Telephony Modem



WARNING

Risk of injury or equipment damage

Connecting the Telephony Modem to the home's existing telephone wiring should only be performed by a professional installer. Physical connections to the previous telephone provider must be removed and the wiring must be checked; there must not be any voltage. Cancellation of telephone service is not adequate. Failure to do so may result in loss of service and/or permanent damage to the Telephony Modem.



1. Connect one end of the coax cable to the cable outlet or splitter, and the other end to the Telephony Modem's Cable connector (5). Tighten the connections by hand, then tighten an additional 1/8 turn with a wrench.



Note: For best performance, use high-quality coax cable and minimize or eliminate splitters between the cable jack and the Telephony Modem.

2. Insert the plug from the power cord into the Power connector on the back of the Telephony Modem (6) and insert the power cord into a convenient AC outlet.
The Power light on the front of the Telephony Modem lights up, then flashes once (refer to the LED tables shown in *Using the Telephony Modem* (page 32)). See *Troubleshooting* (page 37) if the Power light does not turn on.
3. Connect one end of the Ethernet cable to the Ethernet port on the back of the Telephony Modem, (4) and the other end to the Ethernet port on a computer, hub, or broadband router.



Note: If you are connecting to a computer, use the Ethernet cable included in the Telephony Modem package.

4. Connect one end of the telephone cable to the telephone port on the back of the Telephony Modem (1 or 2). Connect the other end to the telephone.

Configuring Your Ethernet Connection

If your computer is equipped with a LAN card providing an Ethernet connection, you may have to configure your computer's TCP/IP settings. The steps that follow will guide you through setting your computer's TCP/IP settings to work with the Telephony Modem.

Requirements

Make sure you have the following before attempting to configure your Ethernet connection:

- Computer with Ethernet interface
- Ethernet cable (supplied)
- IP address, subnet, gateway, and DNS information for installations not using DHCP

How to use this Chapter

The following list shows the procedures for modifying the TCP/IP settings on the computer. The procedure is slightly different depending on the operating system that you are using. Please ensure you are using the correct steps for the operating system on your computer. Follow the links below for instructions to configure your Ethernet connection on your operating system.

- [TCP/IP Configuration for Windows Vista](#) (page 29)
- [TCP/IP Configuration for Windows 7, Windows 8, or Windows 10](#) (page 30)
- [TCP/IP Configuration for Mac OS X](#) (page 30)

TCP/IP Configuration for Windows Vista

Follow these steps to configure the Ethernet interface on a Windows Vista operating system.

1. Open the Vista Control Panel.
2. Double-click **Network and Sharing Center** to display the Network and Sharing Center Window.
3. Click **Manage network connections**. If prompted for a connection, choose **Local Area Connection**.

The Network Connections window displays.

4. Double-click the **Local Area Connection** to open the Properties window:



Note: If Windows requests permission to continue, click **Continue**.

5. Double-click **Internet Protocol Version 4 (TCP/IPv4)** to configure TCP/IPv4.



Note: If your cable provider requires TCP/IP version 6, double-click **Internet Protocol Version 6 (TCP/IPv6)** to configure TCP/IPv6.

The TCP/IP properties window for the version you selected displays.

6. For either TCP/IPv4 or TCP/IPv6, select **Obtain an IP address automatically** and **Obtain DNS server address automatically**, unless instructed otherwise by your cable provider.
7. Click **OK** to accept the new settings and close the Properties window.

TCP/IP Configuration for Windows 7, Windows 8, or Windows 10

Follow these steps to configure the Ethernet interface on a Windows 7, Windows 8, or Windows 10 operating system.

1. Click the **Start** menu and type **network and sharing** into the Search box.
2. Select **Network and Sharing Center** when it appears.
3. Click **Change adapter settings** from the left-side menu.
4. Right-click on your local area connection icon and select **Properties** to open the Properties window.
5. Select **Internet Protocol Version 4 (TCP/IPv4)** and click **Properties** to configure TCP/IPv4.



Note: If your cable provider requires TCP/IP version 6, select **Internet Protocol Version 6 (TCP/IPv6)** and click **Properties** to configure TCP/IPv6.

The TCP/IP properties window for the version you selected displays.

6. For either TCP/IPv4 or TCP/IPv6, select **Obtain an IP address automatically** and **Obtain DNS server address automatically**, unless instructed otherwise by your cable provider.
7. Click **OK** to accept the new settings and close the Properties window. Then click **Close** to back out of the remaining setup screens.

TCP/IP Configuration for Mac OS X

Follow these steps to configure the Ethernet interface on a Mac OS X operating system.

1. Open System Preferences, either by choosing **System Preferences** from the Apple menu or by clicking the System Preferences icon in the dock.
2. Click the **Network** icon.
3. Choose **Automatic** from the Location drop-down menu, and **Built-in Ethernet** from the Show menu.

4. Choose the TCP/IP tab, if necessary.
If you are using **TCP/IPv4**, go to **step 5**.
If your cable provider requires **TCP/IPv6**, go to **step 8**.
5. Choose **Using DHCP** from the Configure IPv4 menu.
6. If necessary, click the **Renew DHCP Lease** button.
7. Close the System Properties application.
TCP/IPv4 configuration is completed.
8. If you are using TCP/IPv6, click **Configure IPv6** near the bottom of the previous window.
9. Choose **Automatically** from the Configure IPv6 drop-down menu and click **OK**.
10. Close the System Properties application.

Using the Telephony Modem

This chapter describes the controls and features available on the Telephony Modem, and covers basic troubleshooting procedures.

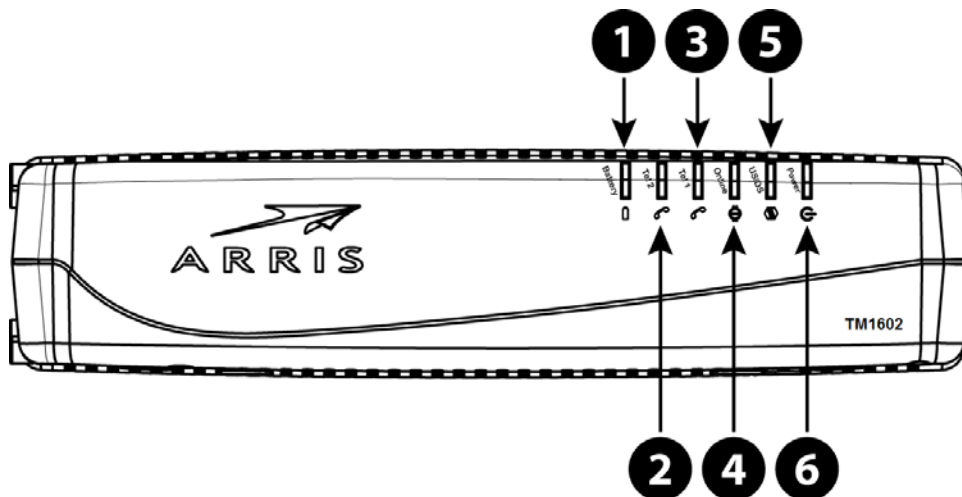
- [Setting up Your Computer to Use the Telephony Modem](#) (page 32)
- [Indicator Lights for the TM1602G](#) (page 32)
- [Using the Reset Button](#) (page 35)
- [Booting from Battery](#) (page 35)

Setting up Your Computer to Use the Telephony Modem

Follow the instructions in the information packet supplied by your service provider. Contact your service provider if you need help setting up your computer.

Indicator Lights for the TM1602G

The Telephony Modem has LED indicator lights to assist in troubleshooting.



1. Battery
2. Tel 1
3. Tel 2

4. Online
5. US/DS
6. Power

Battery Mismatch

If the Telephony Modem alternates flashing the Battery light and all other lights, the installed battery is incompatible with the Telephony Modem. Remove the battery and install one of the batteries described in [Battery Installation and Removal](#) (page 15).

Wiring Problems

If the Telephony Modem begins flashing all its lights for more than 10 seconds, this indicates a problem with the telephone wiring — the red and green wires may be shorted (touching), or there may be undesired voltage on the lines. If this pattern persists for more than 10 seconds, disconnect the telephone lines from the Telephony Modem, then call a wiring technician for assistance.

Patterns: Normal Operation

The following table shows light patterns during normal operation.

Mode	Power	Ethernet (LEDs on rear panel connector)	US/DS	Online	Tel 1 / Tel 2	Battery
AC Power	On	<p>Green LED On = Computer with 1Gbps port connected</p> <p>Amber LED On = Computer with 100 Mbps/10Mbps port connected</p> <p>Amber/Green LED Flash = Computer activity</p> <p>Both LEDs Off = Computer not connected</p>	<p>On = Connected to the Internet</p> <p>Flash = Not connected to the Internet</p>	<p>On = Internet available</p> <p>Off = Internet not available</p>	<p>On = On-hook</p> <p>Flash = Off-hook</p> <p>Off = disabled</p>	<p>On = Battery good or low</p> <p>Off = Battery missing or MTA not registered</p> <p>Flash = Battery bad</p>
No AC Power Battery Installed	Flash	Off	Off	Off	<p>On = On-hook</p> <p>Flash = Off-hook</p> <p>Off = disabled</p>	<p>Off = Battery power</p> <p>Flash = Battery bad of low</p>

Mode	Power	Ethernet (LEDs on rear panel connector)	US/DS	Online	Tel 1 / Tel 2	Battery
No AC Power No Battery	Off	Off	Off	Off	Off	Off
Firmware Upgrade	On	(normal operation)	Flash	On	(normal operation)	(normal operation)

Patterns: Startup Sequence

The following tables show the Telephony Modem light patterns during each phase of the startup sequence. There are two phases of startup; the telephony phase and the cable modem phase. Both are outlined below.

Telephony Startup Sequence

Power, US/DS, Online	Telephone 1	Telephone 2	Description
Off	Off	Off	No power to modem
Flash	Flash	Flash	Power-on Self Test
See Cable Modem Startup Sequence (page 34)			
On	Flash	Off	Retrieving telephone network information
On	Off	Flash	Retrieving telephone line information
On	Flash	Flash	Activating telephone service
Normal Operation			



Note: The **US/DS** indicator flashes yellow during startup and turns green if the Telephony Modem establishes an ultra-high speed connection. For some service providers, these colors may be reversed.

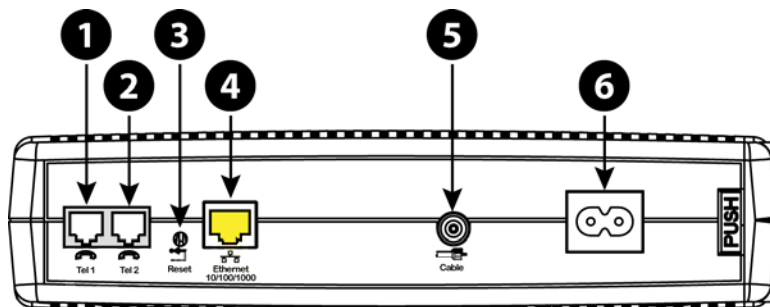
Cable Modem Startup Sequence

US/DS	Online	Description
Slow Flash (1/second)	Off	Downstream acquisition in progress
On (until Upstream acquisition starts)	Off	Downstream acquisition completed
Fast Flash (3/second)	Off	Upstream acquisition in progress
On	Slow Flash (during acquisition) On (when modem IP address obtained)	Upstream acquisition completed, ready for service

Using the Reset Button

Use the **Reset** button, on the back of the Telephony Modem, to reset the modem and perform initialization as if you power cycled the unit. You may need to reset the Telephony Modem if you are having problems connecting to the Internet. Using this button will be rare.

Use a pointed **non-metallic** object to press this button. The **Reset** button is recessed to prevent accidental resets.



- | | |
|-----------------|-------------|
| 1. Tel 1 | 4. Ethernet |
| 2. Tel 2 | 5. Cable |
| 3. Reset button | 6. Power |

Booting from Battery

The TM1602G supports a “Boot from Battery” feature that allows the Telephony Modem to provide continued telephone service during power outages.

To start the TM1602G from its battery, follow these steps:

1. If a battery is already installed in the Telephony Modem, remove it.
2. Re-insert the battery into the Telephony Modem. See [Battery Installation and Removal](#) (page 15) for details.
3. Press the **Reset** button; the Power light should turn on immediately.



Note: If the Telephony Modem does not turn on, the battery may not be charged.

Troubleshooting

The Telephony Modem is plugged in, but the Power light is Off

Check all power connections. Is the power cord plugged in firmly at both ends?

If you plugged the power cord into a power strip, make sure the strip is switched on.

Try to plug the power cord into a different outlet. If the outlet is controlled by a wall switch, make sure the switch is on.

Finally, check the fuse or circuit breaker panel.

I'm not getting on the Internet

It may take over 30 minutes to establish a connection the first time you power up your Telephony Modem, especially when many people are online. Always leave your Telephony Modem plugged into AC power and connected to the cable system.

Check the front panel lights:

- The **Power** and **Online** lights should be on.
- If the **Power** light blinks for more than 30 minutes, call your service provider for assistance.

Check your cable connections. Connectors should be tight. The coax cable should not be pinched, kinked, or bent sharply—any of these can cause a break or short in the cable (you may have to replace the cable). If you have one or more splitters between the Telephony Modem and CATV outlet, remove the splitters and connect the Telephony Modem directly to the outlet.

Proceed to the Ethernet solution if necessary.

I'm not getting on the Internet (Ethernet)

If you are using a hub, is the hub turned on?

Are you using the right type of Ethernet cable? Use the supplied cable for direct connection to a computer; use a cross-over cable for connection to a hub.

Press the **Reset** button on the back of the Telephony Modem.

I can get on the Internet, but everything is slow

If the Web site you are visiting is very popular, that site may be having trouble servicing all the requests. If other sites download quickly, wait for a few minutes and try again. Usage during peak hours may also affect the connection speed.

Other communications on the LAN, or interference with wireless connections, may slow down the connection.

I don't have a dial tone when I pick up the phone - why?

In order for telephone service to be functional on the Telephony Modem, telephone service must have been purchased from the service provider and configured on your Telephony Modem. The following steps should help in identifying the source of the problem.

1. Is the Power LED lit?
 - If not, check to make sure the Telephony Modem is plugged in and the outlet has power. Use only the external AC power adapter (if provided) and power cord included with the equipment.
 - If the LED is lit, go to the next step.
2. Is the Online LED lit?
 - If not, check the coax connection at the Telephony Modem and the wall. Ensure they are connected and tight. If they are and you do not have dial tone, contact your service provider.
 - If the Online LED is lit, go to the next step.
3. Is the Telephone (Tel 1 or Tel 2) LED lit?
 - If not, phone service has not been set up on that line. Contact your service provider.
 - If it is blinking, there is a phone off hook somewhere in the house. Find that phone and hang it up.
 - If it is lit, go to the next step.
4. Is the phone plugged directly into the Telephony Modem?
 - Make sure the phone is plugged into the port on the back of the Telephony Modem labeled "Tel 1" for line 1, and "Tel 2" for line 2.
 - If so, try a different phone. Make sure the new phone is a working phone.
 - If a known good phone is used and you still don't have dial tone, try a different phone cable. If a new phone and cable do not restore dial tone, call your service provider.
5. Is the Telephony Modem plugged into a wall outlet?
 - If so, unplug the phone connector at the back of the Telephony Modem and plug in a known working phone. If you now have dial tone, the problem is with the house wiring. Contact your service provider or a qualified wiring technician to correct the house wiring. If you still do not have dial tone, contact your service provider.

Glossary

A

Amp-Hour

A measure of battery capacity. For example, a 1.0Ah battery can nominally supply one Ampere of current for one hour.

C

Category 5e (Cat5e)

A high-quality type of cable, used for gigabit Ethernet (1000BaseT) connections. When purchasing Ethernet cables, always look for Category 5e cable.

Coaxial cable (coax)

A thin wire, used to connect your television and Telephony Modem to the cable TV system. You can buy coax from any electronics retailer and many discount stores.

CPE

Customer Premise Equipment. This is the equipment that is plugged in to the Telephony Modem; typically a computer or hub.

Cross-over

An Ethernet cable used to connect two hubs (or a hub and a cable modem) together. Also, some Ethernet hubs may have built-in cross-over on one or more ports (which eliminates the need for a cross-over cable).

D

DHCP

Dynamic Host Configuration Protocol. An IP protocol used to provide an IP address and location of services (such as DNS and TFTP) needed by a device connecting to the network. DHCP allows the cable company to configure your computer's networking software for you.

DNS

Domain Name Service (Server). An IP service that associates a domain name (such as www.example.com) with an IP address.

DOCSIS

Data Over Cable System Interface Specification. The interoperability standards used for data communications equipment on an HFC network.

Downstream

In an HFC network, the direction from the head-end to the subscriber. Some older cable documentation may refer to this as the forward path.

E

EMTA

Embedded Multimedia Terminal Adapter. An MTA device that is integrated with a cable modem.

Ethernet

A standard method of connecting two or more computers into a Local Area Network (LAN).

EuroDOCSIS

The European version of DOCSIS.

Event

An informational message used for monitoring network status.

F

F-connector

The type of connector used on coax cable. There are two common types of F-connector, slip-on and screw-on. Use coax with screw-on connectors for connecting your Telephony Modem.

Firewall

A hardware or software device that prevents unauthorized access to a private network from the Internet. The TM1602G provides a built-in firewall.

G

Gateway

The device, usually a router, that connects devices on a given IP subnet to other IP subnets.

H

Headend

The “central office” in an HFC network. The headend houses both video and data equipment. In larger cable networks, a “master” headend often feeds several “remote” headends to provide distributed services.

HTTP

HyperText Transfer Protocol.

Hub

A box with several Ethernet connectors. Ethernet hubs provide a common point of contact for all connected devices.

I

IP address

A number assigned to your computer by your service provider, used to identify your computer to other systems on the Internet.

ISDN

Integrated Services Digital Network. A digital telephony standard that provides communication speeds about twice as fast as standard dialup.

L

LAN

Local Area Network. A network that allows computers in a single location (such as a building) to communicate with one another.

LED

Light Emitting Diode. A semi-conductor diode that emits light when current is passed through it.

M

MAC address

A number that uniquely identifies any device connected to a network. Your service provider uses your Telephony Modem’s MAC address to authorize access to the Internet. The MAC address is printed on a label on the bottom of your Telephony Modem.

P

Protocol

A set of rules and formats that determines the communication behavior of network entities at a given layer.

Proxy

A device or program that stands in between a server (for example, a web site) and a client (your browser), providing a way to relieve some of the burden from the server. For example, your service provider may have a web proxy that keeps copies of popular web pages; the proxy can send you those pages instead of fetching them directly from the web site, resulting in faster page loading and less network congestion.

R

RF

Abbreviation for Radio Frequency. Some literature refers to coax as "RF cable" and the connectors as "RF connectors."

RJ-11

A standard 2-conductor modular connector, commonly used in North America for connecting telephones.

RJ-45

A standard 8-conductor modular connector, commonly used on Ethernet cable. An RJ-45 connector looks like a wide RJ-11 (telephone) connector.

S

Splitter

A small box with three cable connectors: one input and two outputs. You may need a splitter if you have a TV already

connected to the cable outlet that you want to use for your Telephony Modem. You can buy a splitter from any electronics retailer and most discount stores.

Switched outlet

A power outlet that may be turned on and off using a wall switch. Usually intended for lamps. Avoid plugging your computer or Telephony Modem into a switched outlet to avoid disruptions.

T

TCP/IP

Transmission Control Protocol/Internet Protocol. The protocols used to facilitate communications across one or more connected networks.

TDMA

Time Division Multiple Access. A method used by DOCSIS-compliant cable modems for sending upstream data with minimal interference.

U

Upstream

The path from a subscriber device to the headend. Some older cable documentation may refer to this as the return path or reverse path.

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