



Troubleshooting and Maintenance

This chapter provides information that can assist you in troubleshooting problems with your Cisco Unified IP Phone or with your IP telephony network. It also explains how to clean and maintain your phone.

For additional troubleshooting information, refer to the *Using the 79xx Status Information For Troubleshooting* tech note. That document is available to registered Cisco.com users at this URL:

http://www.cisco.com/warp/customer/788/AVVID/telecaster_trouble.html

If you need additional assistance to resolve an issue, see the “[Obtaining Technical Assistance](#)” section on page xx.

This chapter includes these topics:

- [Resolving Startup Problems](#), page 9-2
- [Cisco Unified IP Phone Resets Unexpectedly](#), page 9-8
- [Troubleshooting Cisco Unified IP Phone Security](#), page 9-12
- [General Troubleshooting Tips](#), page 9-14
- [General Troubleshooting Tips for the Cisco Unified IP Phone Expansion Module 7914](#), page 9-17
- [Resetting or Restoring the Cisco Unified IP Phone](#), page 9-17
- [Using the Quality Report Tool](#), page 9-21
- [Monitoring the Voice Quality of Calls](#), page 9-21
- [Where to Go for More Troubleshooting Information](#), page 9-25
- [Cleaning the Cisco Unified IP Phone](#), page 9-25

Resolving Startup Problems

After installing a Cisco Unified IP Phone into your network and adding it to Cisco Unified CallManager, the phone should start up as described in the [“Verifying the Phone Startup Process” section on page 3-17](#). If the phone does not start up properly, see the following sections for troubleshooting information:

- [Symptom: The Cisco Unified IP Phone Does Not Go Through its Normal Startup Process, page 9-2](#)
- [Symptom: The Cisco Unified IP Phone Does Not Register with Cisco Unified CallManager, page 9-3](#)
- [Symptom: Cisco Unified IP Phone Unable to Obtain IP Address, page 9-8](#)

Symptom: The Cisco Unified IP Phone Does Not Go Through its Normal Startup Process

When you connect a Cisco Unified IP Phone into the network port, the phone should go through its normal startup process as described in [“Verifying the Phone Startup Process” section on page 3-17](#) and the LCD screen should display information. If the phone does not go through the startup process, the cause may be faulty cables, bad connections, network outages, lack of power, and so on. Or, the phone may not be functional.

To determine whether the phone is functional, follow these suggestions to systematically eliminate these other potential problems:

1. Verify that the network port is functional:
 - Exchange the Ethernet cables with cables that you know are functional.
 - Disconnect a functioning Cisco Unified IP Phone from another port and connect it to this network port to verify the port is active.
 - Connect the Cisco Unified IP Phone that will not start up to a different network port that is known to be good.
 - Connect the Cisco Unified IP Phone that will not start up directly to the port on the switch, eliminating the patch panel connection in the office.

2. Verify that the phone is receiving power:
 - If you are using external power, verify that the electrical outlet is functional.
 - If you are using in-line power, use the external power supply instead.
 - If you are using the external power supply, switch with a unit that you know to be functional.
3. If the phone still does not start up properly, power up the phone with the handset off-hook. When the phone is powered up in this way, it attempts to launch a backup software image.
4. If the phone still does not start up properly, perform a factory reset of the phone. For instructions, see the [“Performing a Factory Reset”](#) section on page 9-19.

If after attempting these solutions, the LCD screen on the Cisco Unified IP Phone does not display any characters after at least five minutes, contact a Cisco technical support representative for additional assistance.

Symptom: The Cisco Unified IP Phone Does Not Register with Cisco Unified CallManager

If the phone proceeds past the first stage of the startup process (LED buttons flashing on and off) but continues to cycle through the messages displaying on the LCD screen, the phone is not starting up properly. The phone cannot successfully start up unless it is connected to the Ethernet network and it has registered with a Cisco Unified CallManager server.

These sections can assist you in determining the reason the phone is unable to start up properly:

- [Identifying Error Messages, page 9-4](#)
- [Checking Network Connectivity, page 9-4](#)
- [Verifying TFTP Server Settings, page 9-4](#)
- [Verifying IP Addressing and Routing, page 9-5](#)
- [Verifying DNS Settings, page 9-5](#)
- [Verifying Cisco Unified CallManager Settings, page 9-5](#)
- [Cisco Unified CallManager and TFTP Services Are Not Running, page 9-6](#)

- [Creating a New Configuration File, page 9-7](#)
- [Checking Network Connectivity, page 9-4](#)

In addition, problems with security may prevent the phone from starting up properly. See the [“Troubleshooting Cisco Unified IP Phone Security” section on page 9-12](#) for more information.

Identifying Error Messages

As the phone cycles through the startup process, you can access status messages that might provide you with information about the cause of a problem. See the [“Status Messages Screen” section on page 7-4](#) for instructions about accessing status messages and for a list of potential errors, their explanations, and their solutions.

Checking Network Connectivity

If the network is down between the phone and the TFTP server or Cisco Unified CallManager, the phone cannot start up properly. Ensure that the network is currently running.

Verifying TFTP Server Settings

You can determine the IP address of the TFTP server used by the phone by pressing the **Settings** button on the phone, choosing **Network Configuration**, and scrolling to the **TFTP Server 1** option.

If you have assigned a static IP address to the phone, you must manually enter a setting for the TFTP Server 1 option. See the [“Network Configuration Menu” section on page 4-7](#).

If you are using DHCP, the phone obtains the address for the TFTP server from the DHCP server. Check the IP address configured in Option 150.

You can also enable the phone to use an alternate TFTP server. Such a setting is particularly useful if the phone was recently moved from a from one location to another. See the [“Network Configuration Menu” section on page 4-7](#) for instructions.

Verifying IP Addressing and Routing

You should verify the IP addressing and routing settings on the phone. If you are using DHCP, the DHCP server should provide these values. If you have assigned a static IP address to the phone, you must enter these values manually.

On the Cisco Unified IP Phone, press the **Settings** button, choose **Network Configuration**, and look at the following options:

- DHCP Server—If you have assigned a static IP address to the phone, you do not need to enter a value for the DHCP Server option. However, if you are using a DHCP server, this option must have a value. If it does not, check your IP routing and VLAN configuration. Refer to the *Troubleshooting Switch Port and Interface Problems* document, available at this URL:
<http://www.cisco.com/warp/customer/473/53.shtml>
- IP Address, Subnet Mask, Default Router—If you have assigned a static IP address to the phone, you must manually enter settings for these options. See the “**Network Configuration Menu**” section on page 4-7 for instructions.

If you are using DHCP, check the IP addresses distributed by your DHCP server. Refer to the *Understanding and Troubleshooting DHCP in Catalyst Switch or Enterprise Networks* document, available at this URL:
<http://www.cisco.com/warp/customer/473/100.html#41>

Verifying DNS Settings

If you are using DNS to refer to the TFTP server or to Cisco Unified CallManager, you must ensure that you have specified a DNS server. Verify this setting by pressing the **Settings** button on the phone, choosing **Network Configuration**, and scrolling to the **DNS Server 1** option. You should also verify that there is a CNAME entry in the DNS server for the TFTP server and for the Cisco Unified CallManager system.

You must also ensure that DNS is configured to do reverse look-ups.

Verifying Cisco Unified CallManager Settings

On the Cisco Unified IP Phone, press the **Settings** button, choose **Network Configuration**, and look at the **CallManager 1–5** options. The Cisco Unified IP Phone attempts to open a TCP connection to all the Cisco Unified CallManager servers that are part of the assigned Cisco Unified CallManager group. If none of

these options contain IP addresses or show Active or Standby, the phone is not properly registered with Cisco Unified CallManager. See the [“Checking Network Connectivity” section on page 9-4](#) for tips on resolving this problem.

Cisco Unified CallManager and TFTP Services Are Not Running

If the Cisco Unified CallManager or TFTP services are not running, phones may not be able to start up properly. However, in such a situation, it is likely that you are experiencing a system-wide failure and that other phones and devices are unable to start up properly.

If the Cisco Unified CallManager service is not running, all devices on the network that rely on it to make phone calls will be affected. If the TFTP service is not running, many devices will not be able to start up successfully.

To start a service, follow these steps:

Procedure

- Step 1** From Cisco Unified CallManager Administration, choose **Serviceability** from the Navigation drop-down list.
 - Step 2** Choose **Tools > Control Center - Network Services**.
 - Step 3** Choose the primary Cisco Unified CallManager server from the Server drop-down list.

The page displays the service names for the server that you chose, the status of the services, and a service control panel to start or stop a service.
 - Step 4** If a service has stopped, click its radio button and then click the **Start** button.

The Service Status symbol changes from a square to an arrow.
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Creating a New Configuration File

If you continue to have problems with a particular phone that other suggestions in this chapter do not resolve, the configuration file may be corrupted.

To create a new configuration file, follow these steps:

Procedure

- Step 1** From Cisco Unified CallManager, choose **Device > Phone > Find** to locate the phone experiencing problems.
- Step 2** Choose **Delete** to remove the phone from the Cisco Unified CallManager database.
- Step 3** Add the phone back to the Cisco Unified CallManager database. See the [“Adding Phones to the Cisco Unified CallManager Database”](#) section on page 2-12 for details.
- Step 4** Power cycle the phone.



Note

- When you remove a phone from the Cisco Unified CallManager database, its configuration file is deleted from the Cisco Unified CallManager TFTP server. The phone’s directory number or numbers remain in the Cisco Unified CallManager database. They are called “unassigned DNs” and can be used for other devices. If unassigned DNs are not used by other devices, delete them from the Cisco Unified CallManager database. You can use the Route Plan Report to view and delete unassigned reference numbers. Refer to *Cisco Unified CallManager Administration Guide* for more information.
 - Changing the buttons on a phone button template, or assigning a different phone button template to a phone, may result in directory numbers that are no longer accessible from the phone. The directory numbers are still assigned to the phone in the Cisco Unified CallManager database, but there is no button on the phone with which calls can be answered. These directory numbers should be removed from the phone and deleted if necessary.
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Registering the Phone with Cisco Unified CallManager

A Cisco Unified IP Phone can register with a Cisco Unified CallManager server only if the phone has been added to the server or if auto-registration is enabled. Review the information and procedures in the [“Adding Phones to the Cisco Unified CallManager Database” section on page 2-12](#) to ensure that the phone has been added to the Cisco Unified CallManager database.

To verify that the phone is in the Cisco Unified CallManager database, choose **Device > Phone > Find** from Cisco Unified CallManager Administration to search for the phone based on its MAC Address. For information about determining a MAC address, see the [“Determining the MAC Address for a Cisco Unified IP Phone” section on page 2-19](#).

If the phone is already in the Cisco Unified CallManager database, its configuration file may be damaged. See the [“Creating a New Configuration File” section on page 9-7](#) for assistance.

Symptom: Cisco Unified IP Phone Unable to Obtain IP Address

If a phone is unable to obtain an IP address when it starts up, the phone may be not be on the same network or VLAN as the DHCP server, or the switch port to which the phone is connected may be disabled. Make sure that the network or VLAN to which the phone is connected has access to the DHCP server, and make sure that the switch port is enabled.

Cisco Unified IP Phone Resets Unexpectedly

If users report that their phones are resetting during calls or while idle on their desk, you should investigate the cause. If the network connection and Cisco Unified CallManager connection are stable, a Cisco Unified IP Phone should not reset on its own.

Typically, a phone resets if it has problems connecting to the Ethernet network or to Cisco Unified CallManager. These sections can help you identify the cause of a phone resetting in your network:

- [Verifying the Physical Connection, page 9-9](#)
- [Identifying Intermittent Network Outages, page 9-9](#)

- [Verifying DHCP Settings, page 9-9](#)
- [Checking Static IP Address Settings, page 9-10](#)
- [Verifying the Voice VLAN Configuration, page 9-10](#)
- [Verifying that the Phones Have Not Been Intentionally Reset, page 9-10](#)
- [Eliminating DNS or Other Connectivity Errors, page 9-11](#)

Verifying the Physical Connection

Verify that the Ethernet connection to which the Cisco Unified IP Phone is connected is up. For example, check if the particular port or switch to which the phone is connected is down and that the switch is not rebooting. Also make sure that there are no cable breaks.

Identifying Intermittent Network Outages

Intermittent network outages affect data and voice traffic differently. Your network might have been experiencing intermittent outages without detection. If so, data traffic can resend lost packets and verify that packets are received and transmitted. However, voice traffic cannot recapture lost packets. Rather than retransmitting a lost network connection, the phone resets and attempts to reconnect its network connection.

If you are experiencing problems with the voice network, you should investigate whether an existing problem is simply being exposed.

Verifying DHCP Settings

The following suggestions can help you determine if the phone has been properly configured to use DHCP:

1. Verify that you have properly configured the phone to use DHCP. See the [“Network Configuration Menu” section on page 4-7](#) for more information.
2. Verify that the DHCP server has been set up properly.

3. Verify the DHCP lease duration. Cisco recommends that you set it to 8 days. Cisco Unified IP Phones send messages with request type 151 to renew their DHCP address leases. If the DHCP server expects messages with request type 150, the lease will be denied, forcing the phone to restart and request a new IP address from the DHCP server.

Checking Static IP Address Settings

If the phone has been assigned a static IP address, verify that you have entered the correct settings. See the [“Network Configuration Menu” section on page 4-7](#) for more information.

Verifying the Voice VLAN Configuration

If the Cisco Unified IP Phone appears to reset during heavy network usage (for example, following extensive web surfing on a computer connected to the same switch as the phone), it is likely that you do not have a voice VLAN configured.

Isolating the phones on a separate auxiliary VLAN increases the quality of the voice traffic. See the [“Understanding How the Cisco Unified IP Phone Interacts with the VLAN” section on page 2-3](#) for details.

Verifying that the Phones Have Not Been Intentionally Reset

If you are not the only administrator with access to Cisco Unified CallManager, you should verify that no one else has intentionally reset the phones.

You can check whether a Cisco Unified IP Phone received a command from Cisco Unified CallManager to reset by pressing the **Settings** button on the phone and choosing **Status > Network Statistics**. If the phone was recently reset one of these messages appears:

- Reset-Reset—Phone closed due to receiving a Reset/Reset from Cisco Unified CallManager Administration.
- Reset-Restart—Phone closed due to receiving a Reset/Restart from Cisco Unified CallManager Administration.

Eliminating DNS or Other Connectivity Errors

If the phone continues to reset, follow these steps to eliminate DNS or other connectivity errors:

Procedure

- Step 1** Use the **Erase** softkey to reset phone settings to their default values. See the [“Resetting or Restoring the Cisco Unified IP Phone”](#) section on page 9-17 for details.
- Step 2** Modify DHCP and IP settings:
- Disable DHCP. See the [“Network Configuration Menu”](#) section on page 4-7 for instructions.
 - Assign static IP values to the phone. See the [“Network Configuration Menu”](#) section on page 4-7 for instructions. Use the same default router setting used for other functioning Cisco Unified IP Phones.
 - Assign a TFTP server. See the [“Network Configuration Menu”](#) section on page 4-7 for instructions. Use the same TFTP server used for other functioning Cisco Unified IP Phones.
- Step 3** On the Cisco Unified CallManager server, verify that the local host files have the correct Cisco Unified CallManager server name mapped to the correct IP address.
- Step 4** From Cisco Unified CallManager, choose **System > Server** and verify that the server is referred to by its IP address and not by its DNS name.
- Step 5** From Cisco Unified CallManager, choose **Device > Phone > Find** and verify that you have assigned the correct MAC address to this Cisco Unified IP Phone. For information about determining a MAC address, see the [“Determining the MAC Address for a Cisco Unified IP Phone”](#) section on page 2-19.
- Step 6** Power cycle the phone.
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Troubleshooting Cisco Unified IP Phone Security

[Table 9-1](#) provides troubleshooting information for the security features on the Cisco Unified IP Phone. For information relating to the solutions for any of these issues, and for additional troubleshooting information about security and encryption, refer to *Cisco Unified CallManager Security Guide*.

Table 9-1 **Cisco Unified IP Phone Security Troubleshooting**

Problem	Possible Cause
Device authentication error.	CTL file does not have a Cisco Unified CallManager certificate or has an incorrect certificate.
Phone cannot authenticate CTL file.	The security token that signed the updated CTL file does not exist in the CTL file on the phone.
Phone cannot authenticate any of the configuration files other than the CTL file.	Bad TFTP record.
Phone reports TFTP authorization failure.	<ul style="list-style-type: none"> • The TFTP address for the phone does not exist in the CTL file. • If you created a new CTL file with a new TFTP record, the existing CTL file on the phone may not contain a record for the new TFTP server.
Phone does not register with Cisco Unified CallManager.	The CTL file does not contain the correct information for the Cisco Unified CallManager server.
Phone does not request signed configuration files.	The CTL file does not contain any TFTP entries with certificates.

Table 9-1 Cisco Unified IP Phone Security Troubleshooting (continued)

Problem	Possible Cause
802.1X Enabled on Phone but Not Authenticating	
Phone cannot obtain a DHCP-assigned IP address	These errors typically indicate that 802.1X is enabled on the phone, but the phone is unable to authenticate.
Phone does not register with Cisco Unified CallManager	1. Verify that you have properly configured the required components “Supporting 802.1X Authentication on Cisco Unified IP Phones” section on page 1-18.
Phone status display as “Configuring IP” or “Registering”	2. Confirm that the shared secret is configured on the phone (see the “Security Configuration Menu” section on page 4-25 for more information).
802.1X Authentication Status displays as “Held” (see the “802.1X Authentication and Status” section on page 4-34).	<ul style="list-style-type: none"> – If the shared secret is configured, verify that you have the same shared secret entered on the authentication server.
Status menu displays 802.1x status as “Failed” (see the “Call Statistics Screen” section on page 7-17).	<ul style="list-style-type: none"> – If the shared secret is not configured, enter it and ensure that it matches the one on the authentication server.
802.1X Not Enabled	
Phone cannot obtain a DHCP-assigned IP address	These errors typically indicate that 802.1X is not enabled on the phone. To enable it, see the “Security Configuration Menu” section on page 4-25 for information on enabling 802.1X on the phone.
Phone does not register with Cisco Unified CallManager	
Phone status display as “Configuring IP” or “Registering”	
802.1X Authentication Status displays as “Disabled” (see the “802.1X Authentication and Status” section on page 4-34).	
Status menu displays DHCP status as timing out (see the “Call Statistics Screen” section on page 7-17).	

Table 9-1 Cisco Unified IP Phone Security Troubleshooting (continued)

Problem	Possible Cause
Factory Reset Deleted 802.1X Shared Secret	
Phone cannot obtain a DHCP-assigned IP address	<p>These errors typically indicate that the phone has completed a factory reset while 802.1X was enabled. A factory reset deletes the shared secret, which is required for 802.1X authentication and network access. To resolve this, you have two options:</p> <ul style="list-style-type: none"> • Temporarily disable 802.1X on the switch. • Temporarily move the phone to a network environment that is not using 802.1X authentication. <p>Once the phone starts up normally in one of these conditions, you can access the 802.1X configuration menus and re-enter the shared secret.</p>
Phone does not register with Cisco Unified CallManager	
Phone status display as “Configuring IP” or “Registering”	
Cannot access phone menus to verify 802.1X status	

General Troubleshooting Tips

[Table 9-2](#) provides general troubleshooting information for the Cisco Unified IP Phone.

Table 9-2 Cisco Unified IP Phone Troubleshooting

Summary	Explanation
Daisy-chaining IP phones.	Do not connect an IP phone to another IP phone through the access port. Each IP phone should directly connect to a switch port. If you connect IP phones together in a line (daisy-chaining), a problem with one phone can affect all subsequent phones in the line. Also, all phones on the line share bandwidth.
Poor quality when calling digital cell phones using the G.729 protocol.	In Cisco Unified CallManager, you can configure the network to use the G.729 protocol (the default is G.711). When using G.729, calls between an IP phone and a digital cellular phone will have poor voice quality. Use G.729 only when absolutely necessary.

Table 9-2 Cisco Unified IP Phone Troubleshooting (continued)


Summary	Explanation
Prolonged broadcast storms cause IP phones to reset, or be unable to make or answer a call.	A prolonged Layer 2 broadcast storm (lasting several minutes) on the voice VLAN may cause IP phones to reset, lose an active call, or be unable to initiate or answer a call. Phones may not come up until a broadcast storm ends.
Moving a network connection from the phone to a workstation.	If you are powering your phone through the network connection, you must be careful if you decide to unplug the phone's network connection and plug the cable into a desktop computer.
	<div style="text-align: center;"></div> <p>Caution The computer's network card cannot receive power through the network connection; if power comes through the connection, the network card can be destroyed. To protect a network card, wait 10 seconds or longer after unplugging the cable from the phone before plugging it into a computer. This delay gives the switch enough time to recognize that there is no longer a phone on the line and to stop providing power to the cable.</p>
Changing the telephone configuration.	By default, the network configuration options are locked to prevent users from making changes that could impact their network connectivity. You must unlock the network configuration options before you can configure them. See the “Unlocking and Locking Options” section on page 4-4 for details.
Phone resetting.	The phone resets when it loses contact with the Cisco Unified CallManager software. This lost connection can be due to any network connectivity disruption, including cable breaks, switch outages, and switch reboots.
LCD display issues.	If the display appears to have rolling lines or a wavy pattern, it might be interacting with certain types of older fluorescent lights in the building. Moving the phone away from the lights, or replacing the lights, should resolve the problem.
Dual-Tone Multi-Frequency (DTMF) delay.	When you are on a call that requires keypad input, if you press the keys too quickly, some of them might not be recognized.

Table 9-2 Cisco Unified IP Phone Troubleshooting (continued)

Summary	Explanation
Codec mismatch between the phone and another device.	<p>The RxType and the TxType statistics show the codec that is being used for a conversation between this Cisco Unified IP phone and the other device. The values of these statistics should match. If they do not, verify that the other device can handle the codec conversation or that a transcoder is in place to handle the service.</p> <p>See the “Call Statistics Screen” section on page 7-17 for information about displaying these statistics.</p>
Sound sample mismatch between the phone and another device.	<p>The RxSize and the TxSize statistics show the size of the voice packets that are being used in a conversation between this Cisco Unified IP phone and the other device. The values of these statistics should match.</p> <p>See the “Call Statistics Screen” section on page 7-17 for information about displaying these statistics.</p>
Gaps in voice calls.	<p>Check the AvgJtr and the MaxJtr statistics. A large variance between these statistics might indicate a problem with jitter on the network or periodic high rates of network activity.</p> <p>See the “Call Statistics Screen” section on page 7-17 for information about displaying these statistics.</p>
Loopback condition.	<p>A loopback condition can occur when the following conditions are met:</p> <ul style="list-style-type: none"> • The SW Port Configuration option in the Network Configuration menu on the phone is set to 10 Half (10-BaseT / half duplex) • The phone receives power from an external power supply • The phone is powered down (the power supply is disconnected) <p>In this case, the switch port on the phone can become disabled and the following message will appear in the switch console log:</p> <pre>HALF_DUX_COLLISION_EXCEED_THRESHOLD</pre> <p>To resolve this problem, re-enable the port from the switch.</p>

Table 9-2 Cisco Unified IP Phone Troubleshooting (continued)

Summary	Explanation
One-way audio.	When at least one person in a call does not receive audio, IP connectivity between phones is not established. Check the configurations in routers and switches to ensure that IP connectivity is properly configured.

General Troubleshooting Tips for the Cisco Unified IP Phone Expansion Module 7914

[Table 9-3](#) provides general troubleshooting information for the Cisco Unified IP Phone Expansion Module 7914.

Table 9-3 Cisco Unified IP Phone Expansion Module 7914 Troubleshooting

Problem	Solution
No display on the Cisco Unified IP Phone Expansion Module 7914.	Verify that all of the cable connections are correct. Verify that you have power to the Cisco Unified IP Phone Expansion Module 7914
Lighted buttons on the first Cisco Unified IP Phone Expansion Module 7914 are all red.	Verify that the Cisco Unified IP Phone Expansion Module 7914 is defined in Cisco Unified CallManager.
Lighted buttons on the second Cisco Unified IP Phone Expansion Module 7914 are all amber.	Verify that the Cisco Unified IP Phone Expansion Module 7914 is defined in Cisco Unified CallManager.

Resetting or Restoring the Cisco Unified IP Phone

There are two general methods for resetting or restoring the Cisco Unified IP Phone:

- [Performing a Basic Reset, page 9-18](#)
- [Performing a Factory Reset, page 9-19](#)

Performing a Basic Reset

Performing a basic reset of a Cisco Unified IP Phone provides a way to recover if the phone experiences an error and provides a way to reset or restore various configuration and security settings.

Table 9-4 describes the ways to perform a basic reset. You can reset a phone with any of these operations after the phone has started up. Choose the operation that is appropriate for your situation.

Table 9-4 Basic Reset Methods

Operation	Performing	Explanation
Restart phone	Press the Services, Settings, or Directories button and then press **#** .	Resets any user and network configuration changes that you have made, but that the phone has not written to its Flash memory, to previously-saved settings, then restarts the phone.
Erase softkey	From the Settings menu, unlock phone options (see the “ Unlocking and Locking Options ” section on page 4-4). Then press the Erase softkey.	Resets user and network configuration settings to their default values, deletes the CTL file from the phone, and restarts the phone.
	From the Network Configuration menu, unlock phone options (see the “ Unlocking and Locking Options ” section on page 4-4). Then press the Erase softkey.	Resets network configuration settings to their default values and resets the phone. (This method causes DHCP to reconfigure the IP address of the phone.)
	From the Security Configuration menu, unlock phone options (see the “ Unlocking and Locking Options ” section on page 4-4). Then press the Erase softkey.	Deletes the CTL file from the phone and restarts the phone.

Performing a Factory Reset

When you perform a factory reset of the Cisco Unified IP Phone, the following information is erased or reset to its default value:

- CTL file—Erased
- LSC—Erased
- User configuration settings—Reset to default values
- Network configuration settings—Reset to default values
- Call histories—Erased

- Locale information—Reset to default values
- Phone application—Erased (phone recovers by loading the term61.default.loads file or the term41.default.loads file, depending on the phone model)

Before you perform a factory reset, ensure that the following conditions are met:

- The phone must be on a DHCP-enabled network.
- A valid TFTP server must be set in DHCP option 150 or option 66 on the DHCP server.
- The term61.default.loads file or the term41.default.loads and the files specified in that file should be available on the TFTP server that is specified by the DHCP packet.

To perform a factory reset of a phone, perform the following steps:

Procedure

- Step 1** Unplug the power cable from the phone and then plug it back in.
The phone begins its power up cycle.
- Step 2** While the phone is powering up, and before the Speaker button flashes on and off, press and hold #.
Continue to hold # until each line button flashes on and off in sequence in amber.
- Step 3** Release # and press **123456789*0#**.
You can press a key twice in a row, but if you press the keys out of sequence, the factory reset will not take place.
After you press these keys, the line buttons on the phone flash red and the phone goes through the factory reset process.
Do not power down the phone until it completes the factory reset process and the main screen appears.
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Using the Quality Report Tool

The Quality Report Tool (QRT) is a voice quality and general problem-reporting tool for the Cisco Unified IP Phone. The QRT feature is installed as part of the Cisco Unified CallManager installation.

You can configure users' Cisco Unified IP Phones with QRT. When you do so, users can report problems with phone calls by pressing the QRT softkey. This softkey is available only when the Cisco Unified IP Phone is in the Connected, Connected Conference, Connected Transfer, and/or OnHook states.

When a user presses the **QRT** softkey, a list of problem categories appears. The user selects the appropriate problem category and this feedback is logged in an XML file. Actual information logged depends on the user selection and whether the destination device is a Cisco Unified IP Phone.

For more information about using QRT, refer to *Cisco Unified CallManager Serviceability Administration Guide*, *Cisco Unified CallManager Serviceability System Guide*, and *Cisco CallManager Features and Services Guide*.

Monitoring the Voice Quality of Calls

To measure the voice quality of calls that are sent and received within the network, Cisco Unified IP Phones use these statistical metrics that are based on concealment events. The DSP plays concealment frames to mask frame loss in the voice packet stream.

- Concealment Ratio metrics—Show the ratio of concealment frames over total speech frames. An interval conceal ratio is calculated every 3 seconds.
- Concealed Second metrics—Show the number of seconds in which the DSP plays concealment frames due to lost frames. A severely “concealed second” is a second in which the DSP plays more than five percent concealment frames.
- MOS-LQK metrics—Use a numeric score to estimate the relative voice listening quality. The Cisco Unified IP Phone calculates the mean opinion score (MOS) for listening quality (LQK) based audible concealment events due to frame loss in the preceding 8 seconds, and includes perceptual weighting factors such as codec type and frame size.

MOS LQK scores are produced by a Cisco proprietary algorithm, Cisco Voice Transmission Quality (CVTQ) index. Depending on the MOS LQK version number, these scores might be compliant with the International Telecommunications Union (ITU) standard P.564. This standard defines evaluation methods and performance accuracy targets that predict listening quality scores based on observation of actual network impairment.

**Note**

Concealment ratio and concealment seconds are primary measurements based on frame loss while MOS LQK scores project a “human-weighted” version of the same information on a scale from 5 (excellent) to 1 (bad) for measuring listening quality.

Listening quality scores (MOS LQK) relate to the clarity or sound of the received voice signal. Conversational quality scores (MOS CQ such as G.107) include impairment factors, such as delay, that degrade the natural flow of conversation.

For information about configuring voice quality metrics for phones, refer to the “Phone Features” section in the “Cisco Unified IP Phone” chapter in the *Cisco Unified CallManager System Guide*.

You can access voice quality metrics from the Cisco Unified IP Phone by using the Call Statistics screen (see the “[Call Statistics Screen](#)” section on page 7-17) or remotely by using Streaming Statistics (see [Chapter 8, “Monitoring the Cisco Unified IP Phone Remotely”](#)).

Using Voice Quality Metrics

To use the metrics for monitoring voice quality, note the typical scores under normal conditions of zero packet loss, and use the metrics as a baseline for comparison.

It is important to distinguish significant changes from random changes in metrics. Significant changes are scores that change about 0.2 MOS or greater and persist in calls that last longer than 30 seconds. Conceal Ratio changes should indicate greater than 3 percent frame loss.

MOS LQK scores can vary based on the codec that the Cisco Unified IP Phone uses. The following codecs provide these maximum MOS LQK scores under normal conditions with zero frame loss:

- G.711 codec gives 4.5 score
- G.719A/ AB gives 3.7 score

**Note**

- CVTQ does not support wideband (7 kHz) speech codecs, as ITU has not defined the extension of the technique to wideband. Therefore, MOS scores that correspond to G.711 performance are reported for G.722 calls to allow basic quality monitoring, rather than not reporting an MOS score.
- Reporting G.711-scale MOS scores for wideband calls through the use of CVTQ allows basic quality classifications to be indicated as good/normal or bad/abnormal. Calls with high scores (approximately 4.5) indicate high quality/low packet loss, and lower scores (approximately 3.5) indicate low quality/high packet loss.
- Unlike MOS, the Conceal Ratio and Concealed Seconds metrics remain valid and useful for both wideband and narrowband calls.

A Conceal Ratio of zero indicates that the IP network is delivering frames and packets on time with no loss.

Troubleshooting Tips

When you observe significant and persistent changes to metrics, use [Table 9-5](#) for general troubleshooting information:

Table 9-5 Changes to Voice Quality Metrics

Metric Change	Condition
MOS LQK scores decrease significantly	<p>Network impairment from packet loss or high jitter:</p> <ul style="list-style-type: none"> • Average MOS LQK decreases could indicate widespread and uniform impairment. • Individual MOS LQK decreases indicate bursty impairment. <p>Cross-check with Conceal Ratio and Conceal Seconds for evidence of packet loss and jitter.</p>
MOS LQK scores decrease significantly	<ul style="list-style-type: none"> • Check to see if the phone is using a different codec than expected (RxType and TxType). • Check to see if the MOS LQK version changed after a firmware upgrade.
Conceal Ratio and Conceal Seconds increase significantly	<ul style="list-style-type: none"> • Network impairment from packet loss or high jitter.
Conceal Ratio is near or at zero, but the voice quality is poor	<ul style="list-style-type: none"> • Noise or distortion in the audio channel such as echo or audio levels. • Tandem calls that undergo multiple encode/decode such as calls to a cellular network or calling card network. • Acoustic problems coming from a speaker-phone, handsfree cellular phone or wireless headset. <p>Check packet transmit (TxCnt) and packet receive (RxCnt) counters to verify that voice packets are flowing.</p>

Voice quality metrics do not account for noise or distortion, only frame loss.

Where to Go for More Troubleshooting Information

If you have additional questions about troubleshooting the Cisco Unified IP Phones, several Cisco.com web sites can provide you with more tips. Choose from the sites available for your access level.

- Cisco Unified IP Phone Troubleshooting Resources:
http://www.cisco.com/en/US/products/hw/phones/ps379/tsd_products_support_series_home.html
- Cisco Products and Services (Technical Support and Documentation):
http://www.cisco.com/en/US/products/sw/voicesw/tsd_products_support_category_home.html

Cleaning the Cisco Unified IP Phone

To clean your Cisco Unified IP phone, use only a dry soft cloth to gently wipe the phone and the LCD screen. Do not apply liquids or powders directly on the phone. As with all non-weather-proof electronics, liquids and powders can damage the components and cause failures.

