Cisco ATA 186 and Cisco ATA 188 Analog Telephone Adaptor Administrator's Guide for MGCP (version 3.0)

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- Move the equipment farther away from the television or radio.

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Objectives

This guide describes how to install, cable, and configure the Cisco ATA 186 and Cisco ATA 188 for use on a Media Gateway Control Protocol (MGCP) network. Included are configuration steps for network parameters, standard services, supplementary services, and MGCP protocol-specific services. This guide also includes reference information for all configuration methods, call-flows, and safety.

This guide does not cover information related to the implementation of an MGCP Voice over IP (VoIP) network.

Audience

This guide is intended for service providers and network administrators who administer VoIP services using the Cisco ATA 186 and Cisco ATA 188. The tasks described in this guide are not intended for end users of the Cisco ATA 186 and Cisco ATA 188. Many of these tasks impact the ability of the Cisco ATA 186 and Cisco ATA 188 to function on the network, and require an understanding of IP networking and telephony concepts.

Organization and Use

Organization

Table 1 provides an overview of the organization of this guide.

Table 1 Cisco ATA 186 and Cisco ATA 188 Analog Telephone Administrator's Guide (MGCP) Organization

Chapter	Description
Chapter 1, "Cisco Analog Telephone Adaptor Overview"	Provides descriptions of hardware and software features of the Cisco ATA Analog Telephone Adaptor along with a brief overview of the Media Gateway Control Protocol (MGCP).
Chapter 2, "Installing the Cisco ATA"	Provides information about installing the Cisco ATA.
Chapter 3, "Configuring the Cisco ATA for MGCP"	Provides information about how to configure the Cisco ATA and about the different configuration methods you can use.
Chapter 4, "Cisco ATA-Supported MGCP Services"	Provides a list of required parameters and information about MGCP-specific services that the Cisco ATA supports.
Chapter 5, "Parameters and Defaults"	Provides information on the parameters and defaults that you can use to configure the Cisco ATA.
Chapter 6, "Configuring and Debugging Fax Services"	Provides instructions for configuring both ports of the Cisco ATA to support fax transmission.
Chapter 7, "Upgrading the Cisco ATA Signaling Image"	Provides instructions for remotely upgrading the Cisco ATA signaling image.
Chapter 8, "Troubleshooting"	Provides basic testing and troubleshooting procedures for the Cisco ATA.
Appendix A, "Voice Configuration Menu Codes"	Provides a quick-reference list of the voice configuration menu options for the Cisco ATA.
Appendix B, "Cisco ATA Specifications"	Provides physical specifications for the Cisco ATA.
Appendix C, "MGCP Call Flows"	Provides Cisco ATA call flows for MGCP scenarios.
Appendix D, "Recommended Cisco ATA Tone Parameter Values by Country"	Provides tone parameters for various countries.
Index	Provides reference information.
Glossary	Provides definitions of commonly used terms.

Conventions

This document uses the following conventions:

- Alternative keywords are grouped in braces and separated by vertical bars (for example, {**x** | **y** | **z**}).
- Arguments for which you supply values are in *italic* font.
- Commands and keywords are in **boldface** font.
- Elements in square brackets ([ ]) are optional.
- Information you must enter is in **`boldface screen`** font.

- Optional alternative keywords are grouped in brackets and separated by vertical bars (for example, [**x** | **y** | **z**]).
- Terminal sessions and information the system displays are in `screen` font.

Note Means *reader take note*. Notes contain helpful suggestions or references to material not covered in the publication.

Timesaver Means *the described action saves time*. You can save time by performing the action described in the paragraph.

Tip Means *the following information will help you solve a problem*. The tips information might not be troubleshooting or even an action, but could be useful information, similar to a Timesaver.

Caution Means *reader be careful*. In this situation, you might do something that could result in equipment damage or loss of data.

Warning **IMPORTANT SAFETY INSTRUCTIONS**

This warning symbol means danger. You are in a situation that could cause bodily injury. Before you work on any equipment, be aware of the hazards involved with electrical circuitry and be familiar with standard practices for preventing accidents. Use the statement number provided at the end of each warning to locate its translation in the translated safety warnings that accompanied this device. Statement 1071

SAVE THESE INSTRUCTIONS

Waarschuwing **BELANGRIJKE VEILIGHEIDSINSTRUCTIES**

Dit waarschuwingssymbool betekent gevaar. U verkeert in een situatie die lichamelijk letsel kan veroorzaken. Voordat u aan enige apparatuur gaat werken, dient u zich bewust te zijn van de bij elektrische schakelingen betrokken risico's en dient u op de hoogte te zijn van de standaard praktijken om ongelukken te voorkomen. Gebruik het nummer van de verklaring onderaan de waarschuwing als u een vertaling van de waarschuwing die bij het apparaat wordt geleverd, wilt raadplegen.

BEWAAR DEZE INSTRUCTIES

Varoitus **TÄRKEITÄ TURVALLISUUSOHJEITA**

Tämä varoitusmerkki merkitsee vaaraa. Tilanne voi aiheuttaa ruumiillisia vammoja. Ennen kuin käsittelet laitteistoa, huomioi sähköpiirien käsittelemiseen liittyvät riskit ja tutustu onnettomuuksien yleisiin ehkäisytapoihin. Turvallisuusvaroitusten käännökset löytyvät laitteen mukana toimitettujen käännettyjen turvallisuusvaroitusten joukosta varoitusten lopussa näkyvien lausuntonumeroiden avulla.

SÄILYTÄ NÄMÄ OHJEET

Attention **IMPORTANTES INFORMATIONS DE SÉCURITÉ**

Ce symbole d'avertissement indique un danger. Vous vous trouvez dans une situation pouvant entraîner des blessures ou des dommages corporels. Avant de travailler sur un équipement, soyez conscient des dangers liés aux circuits électriques et familiarisez-vous avec les procédures couramment utilisées pour éviter les accidents. Pour prendre connaissance des traductions des avertissements figurant dans les consignes de sécurité traduites qui accompagnent cet appareil, référez-vous au numéro de l'instruction situé à la fin de chaque avertissement.

CONSERVEZ CES INFORMATIONS

Warnung **WICHTIGE SICHERHEITSHINWEISE**

Dieses Warnsymbol bedeutet Gefahr. Sie befinden sich in einer Situation, die zu Verletzungen führen kann. Machen Sie sich vor der Arbeit mit Geräten mit den Gefahren elektrischer Schaltungen und den üblichen Verfahren zur Vorbeugung vor Unfällen vertraut. Suchen Sie mit der am Ende jeder Warnung angegebenen Anweisungsnummer nach der jeweiligen Übersetzung in den übersetzten Sicherheitshinweisen, die zusammen mit diesem Gerät ausgeliefert wurden.

BEWAHREN SIE DIESE HINWEISE GUT AUF.

Avvertenza **IMPORTANTI ISTRUZIONI SULLA SICUREZZA**

Questo simbolo di avvertenza indica un pericolo. La situazione potrebbe causare infortuni alle persone. Prima di intervenire su qualsiasi apparecchiatura, occorre essere al corrente dei pericoli relativi ai circuiti elettrici e conoscere le procedure standard per la prevenzione di incidenti. Utilizzare il numero di istruzione presente alla fine di ciascuna avvertenza per individuare le traduzioni delle avvertenze riportate in questo documento.

CONSERVARE QUESTE ISTRUZIONI

Advarsel **VIKTIGE SIKKERHETSINSTRUKSJONER**

Dette advarselssymbolet betyr fare. Du er i en situasjon som kan føre til skade på person. Før du begynner å arbeide med noe av utstyret, må du være oppmerksom på farene forbundet med elektriske kretser, og kjenne til standardprosedyrer for å forhindre ulykker. Bruk nummeret i slutten av hver advarsel for å finne oversettelsen i de oversatte sikkerhetsadvarslene som fulgte med denne enheten.

TA VARE PÅ DISSE INSTRUKSJONENE

Aviso **INSTRUÇÕES IMPORTANTES DE SEGURANÇA**

Este símbolo de aviso significa perigo. Você está em uma situação que poderá ser causadora de lesões corporais. Antes de iniciar a utilização de qualquer equipamento, tenha conhecimento dos perigos envolvidos no manuseio de circuitos elétricos e familiarize-se com as práticas habituais de prevenção de acidentes. Utilize o número da instrução fornecido ao final de cada aviso para localizar sua tradução nos avisos de segurança traduzidos que acompanham este dispositivo.

GUARDE ESTAS INSTRUÇÕES

¡Advertencia! **INSTRUCCIONES IMPORTANTES DE SEGURIDAD**

Este símbolo de aviso indica peligro. Existe riesgo para su integridad física. Antes de manipular cualquier equipo, considere los riesgos de la corriente eléctrica y familiarícese con los procedimientos estándar de prevención de accidentes. Al final de cada advertencia encontrará el número que le ayudará a encontrar el texto traducido en el apartado de traducciones que acompaña a este dispositivo.

GUARDE ESTAS INSTRUCCIONES

Varning! **VIKTIGA SÄKERHETSANVISNINGAR**

Denna varningssignal signalerar fara. Du befinner dig i en situation som kan leda till personskada. Innan du utför arbete på någon utrustning måste du vara medveten om farorna med elkretsar och känna till vanliga förfaranden för att förebygga olyckor. Använd det nummer som finns i slutet av varje varning för att hitta dess översättning i de översatta säkerhetsvarningar som medföljer denna anordning.

SPARA DESSA ANVISNINGAR

Figyelem **FONTOS BIZTONSÁGI ELOÍRÁSOK**

Ez a figyelmezeto jel veszélyre utal. Sérülésveszélyt rejto helyzetben van. Mielott bármely berendezésen munkát végezte, legyen figyelemmel az elektromos áramkörök okozta kockázatokra, és ismerkedjen meg a szokásos balesetvédelmi eljárásokkal. A kiadványban szereplo figyelmeztetések fordítása a készülékhez mellékelt biztonsági figyelmeztetések között található; a fordítás az egyes figyelmeztetések végén látható szám alapján keresheto meg.

ORIZZE MEG EZEKET AZ UTASÍTÁSOKAT!

Предупреждение **ВАЖНЫЕ ИНСТРУКЦИИ ПО СОБЛЮДЕНИЮ ТЕХНИКИ БЕЗОПАСНОСТИ**

Этот символ предупреждения обозначает опасность. То есть имеет место ситуация, в которой следует опасаться телесных повреждений. Перед эксплуатацией оборудования выясните, каким опасностям может подвергаться пользователь при использовании электрических цепей, и ознакомьтесь с правилами техники безопасности для предотвращения возможных несчастных случаев. Воспользуйтесь номером заявления, приведенным в конце каждого предупреждения, чтобы найти его переведенный вариант в переводе предупреждений по безопасности, прилагаемом к данному устройству.

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これらの注意事項を保管しておいてください。

Related Documentation

Use this guide in conjunction with these documents:

- *Cisco ATA 186 and Cisco ATA 188 Analog Telephone Adaptor At a Glance*
- *Regulatory Compliance and Safety Information for the Cisco ATA 186 and Cisco 188*
- *Cisco ATA Release Notes*

For information about setting up your Call Agent, see your Call Agent documentation.

For information about configuring the gateway for use with MGCP, see the documentation for Cisco IOS Release 12.2 or later releases.

Applicable RFCs

- RFC768 (*User Datagram Protocol*)
- RFC971 (*Survey of Data Representation Standards*)
- RFC1350 (*The TFTP Protocol* (*Revision 2*))
- RFC1890 (*RTP Profile for Audio and Video Conferences with Minimal Control*)
- RFC2131 (*Dynamic Host Configuration Protocol*)
- RFC2198 (*RTP Payload for Redundant Audio Data*)
- RFC2327 (*Session Description Protocol*)
- RFC2705 (*Media Gateway Control Protocol (MGCP) Version 1.0*)
- RFC2833 (*RTP Payload for DTMF Digits, Telephony Tones and Telephony Signals*)

Obtaining Documentation

Cisco provides several ways to obtain documentation, technical assistance, and other technical resources. These sections explain how to obtain technical information from Cisco Systems.

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http://www.cisco.com/univercd/home/home.htm

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Cisco Systems
Attn: Customer Document Ordering
170 West Tasman Drive
San Jose, CA 95134-9883

We appreciate your comments.

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Cisco.com provides a broad range of features and services to help you with these tasks:

- Streamline business processes and improve productivity
- Resolve technical issues with online support
- Download and test software packages
- Order Cisco learning materials and merchandise
- Register for online skill assessment, training, and certification programs

To obtain customized information and service, you can self-register on Cisco.com at this URL:

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Technical Assistance Center

The Cisco TAC is available to all customers who need technical assistance with a Cisco product, technology, or solution. Two levels of support are available: the Cisco TAC website and the Cisco TAC Escalation Center. The avenue of support that you choose depends on the priority of the problem and the conditions stated in service contracts, when applicable.

We categorize Cisco TAC inquiries according to urgency:

- Priority level 4 (P4)—You need information or assistance concerning Cisco product capabilities, product installation, or basic product configuration.
- Priority level 3 (P3)—Your network performance is degraded. Network functionality is noticeably impaired, but most business operations continue.
- Priority level 2 (P2)—Your production network is severely degraded, affecting significant aspects of business operations. No workaround is available.
- Priority level 1 (P1)—Your production network is down, and a critical impact to business operations will occur if service is not restored quickly. No workaround is available.

Cisco TAC Website

You can use the Cisco TAC website to resolve P3 and P4 issues yourself, saving both cost and time. The site provides around-the-clock access to online tools, knowledge bases, and software. To access the Cisco TAC website, go to this URL:

http://www.cisco.com/tac

All customers, partners, and resellers who have a valid Cisco service contract have complete access to the technical support resources on the Cisco TAC website. Some services on the Cisco TAC website require a Cisco.com login ID and password. If you have a valid service contract but do not have a login ID or password, go to this URL to register:

http://tools.cisco.com/RPF/register/register.do

If you are a Cisco.com registered user, and you cannot resolve your technical issues by using the Cisco TAC website, you can open a case online at this URL:

http://www.cisco.com/en/US/support/index.html

If you have Internet access, we recommend that you open P3 and P4 cases through the Cisco TAC website so that you can describe the situation in your own words and attach any necessary files.

Cisco TAC Escalation Center

The Cisco TAC Escalation Center addresses priority level 1 or priority level 2 issues. These classifications are assigned when severe network degradation significantly impacts business operations. When you contact the TAC Escalation Center with a P1 or P2 problem, a Cisco TAC engineer automatically opens a case.

To obtain a directory of toll-free Cisco TAC telephone numbers for your country, go to this URL:

http://www.cisco.com/warp/public/687/Directory/DirTAC.shtml

Before calling, please check with your network operations center to determine the level of Cisco support services to which your company is entitled: for example, SMARTnet, SMARTnet Onsite, or Network Supported Accounts (NSA). When you call the center, please have available your service agreement number and your product serial number.

Obtaining Additional Publications and Information

Information about Cisco products, technologies, and network solutions is available from various online and printed sources.

- The *Cisco Product Catalog* describes the networking products offered by Cisco Systems as well as ordering and customer support services. Access the *Cisco Product Catalog* at this URL:

  http://www.cisco.com/en/US/products/products_catalog_links_launch.html

- Cisco Press publishes a wide range of networking publications. Cisco suggests these titles for new and experienced users: *Internetworking Terms and Acronyms Dictionary, Internetworking Technology Handbook, Internetworking Troubleshooting Guide,* and the *Internetworking Design Guide.* For current Cisco Press titles and other information, go to Cisco Press online at this URL:

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- *Packet* magazine is the Cisco monthly periodical that provides industry professionals with the latest information about the field of networking. You can access *Packet* magazine at this URL:

  http://www.cisco.com/en/US/about/ac123/ac114/about_cisco_packet_magazine.html

- *iQ Magazine* is the Cisco monthly periodical that provides business leaders and decision makers with the latest information about the networking industry. You can access *iQ Magazine* at this URL:

  http://business.cisco.com/prod/tree.taf%3fasset_id=44699&public_view=true&kbns=1.html

- *Internet Protocol Journal* is a quarterly journal published by Cisco Systems for engineering professionals involved in the design, development, and operation of public and private internets and intranets. You can access the *Internet Protocol Journal* at this URL:

  http://www.cisco.com/en/US/about/ac123/ac147/about_cisco_the_internet_protocol_journal.html

- Training—Cisco offers world-class networking training, with current offerings in network training listed at this URL:

  http://www.cisco.com/en/US/learning/le31/learning_recommended_training_list.html

CHAPTER 1

Cisco Analog Telephone Adaptor Overview

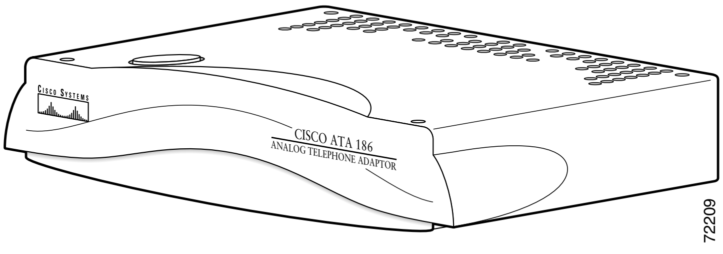
This section describes the hardware and software features of the Cisco Analog Telephone Adaptor (Cisco ATA) and includes a brief overview of the Media Gateway Control Protocol (MGCP).

Cisco ATA analog telephone adaptors are handset-to-Ethernet adaptors which allow regular analog telephones to operate on IP-based telephony networks. Cisco ATAs support two voice ports, each with an independent telephone number. The Cisco ATA 188 also has an RJ-45 10/100BASE-T data port.

This section covers the following topics:

- Overview of Media Gateway Control Protocol, page 1-2
- Hardware Overview, page 1-3
- Software Features, page 1-5
- Installation and Configuration Overview, page 1-9

Figure 1-1 Cisco ATA Analog Telephone Adaptor



The Cisco ATA, which operates with Cisco voice-packet gateways, makes use of broadband pipes that are deployed by means of a digital subscriber line (DSL), fixed wireless cable modem, and other Ethernet connections.

Note The term Cisco ATA refers to both the Cisco ATA 186 and the Cisco ATA 188, unless otherwise stated.

Figure 1-2 The Cisco ATA 186 as an Endpoint in an MGCP Network

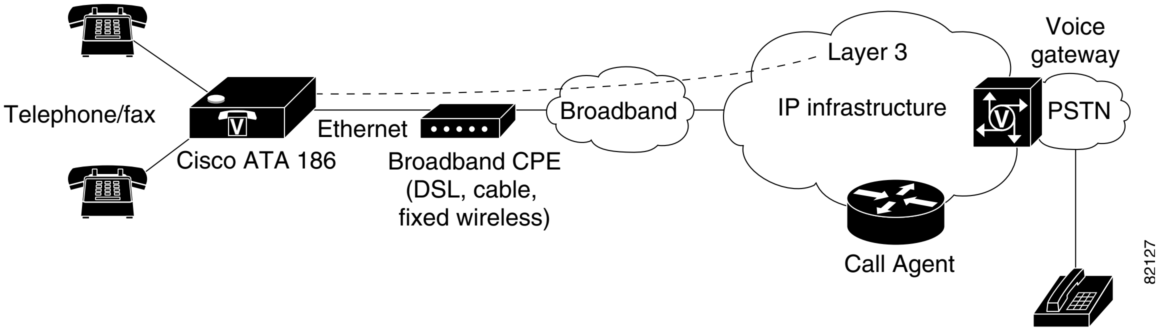
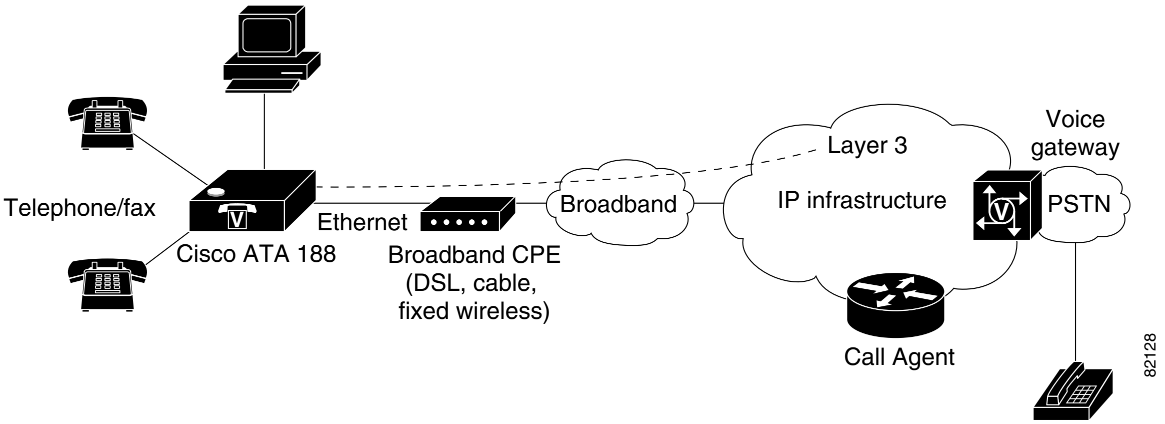


Figure 1-3 The Cisco ATA 188 as an Endpoint in an MGCP Network



Overview of Media Gateway Control Protocol

The Media Gateway Control Protocol (MGCP) is the Internet Engineering Task Force (IETF) standard for multimedia conferencing over IP. MGCP is an ASCII-based, application-layer control protocol (defined in RFC2705) that can be used to establish, maintain, and terminate calls between two or more endpoints.

Like other VoIP protocols, MGCP is designed to address the functions of signaling and session management within a packet telephony network.

Signaling allows call information to be carried across network boundaries. Session management provides the ability to control the attributes of an end-to-end call.

One aspect of MGCP that differs from other VoIP protocols is that MGCP endpoints rely on instructions from a Call Agent to control call progression, call tones, and call characteristics.

MGCP provides the following capabilities to the control server:

- Determines the location of the target endpoint.
- Determines the media capabilities of the target endpoint. Using Session Description Protocol (SDP), MGCP determines the lowest level of common service between the endpoints. Conferences are established using only the media capabilities that can be supported by all endpoints.

- Determines the availability of the target endpoint.
- Establishes a session between the originating and target endpoint if a call can be completed. MGCP also supports mid-call changes, such as adding another endpoint to the conference or changing a media characteristic or codec.
- Each MGCP endpoint supports up to two connections per device. Each connection has a fixed ID—0, 1, 2, or 3. Connection IDs 0 and 2 are assigned to MGCP Endpoint 0, and connection IDs 1 and 3 are assigned to MGCP Endpoint 1.

MGCP is a client-server protocol. The Call Agent handles all aspects of setting up calls to and from endpoints. Call Agents or control servers provide the feature capabilities that a particular endpoint uses. Endpoints connected to different Call Agents likely will have a different set of features.

Each control-server vendor determines its own set of features.

Hardware Overview

The Cisco ATA 186 and Cisco ATA 188 are compact, easy-to-install devices. Figure 1-4 shows the rear panel of the Cisco ATA 186. Figure 1-5 shows the rear panel of the Cisco ATA 188.

Figure 1-4 Cisco ATA 186—Rear View

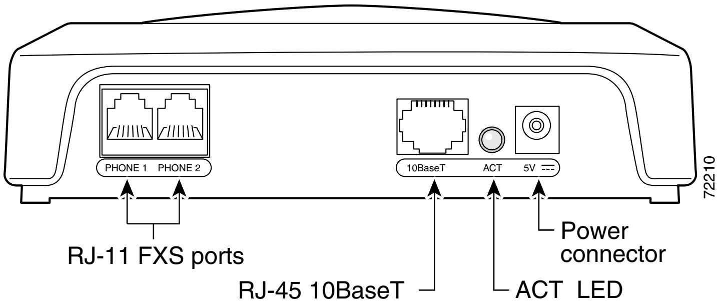
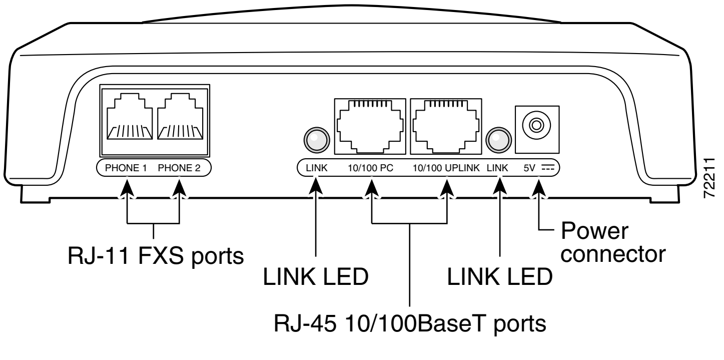


Figure 1-5 Cisco ATA 188—Rear View



The unit provides the following connectors and indicators:

- 5V power connector.
- Two RJ-11 FXS (Foreign Exchange Station) ports—The Cisco ATA supports two independent RJ-11 telephone ports that can connect to any standard analog telephone device. Each port supports either voice calls or fax sessions, and both ports can be used simultaneously.

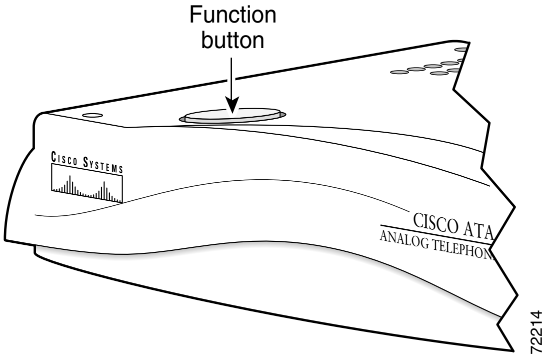
Note The Cisco ATA186-I1 and Cisco ATA188-I1 provide 600-ohm resistive impedance. The Cisco ATA186-I2 and Cisco ATA188-I2 provide 270 ohm + 750 ohm // 150-nF complex impedance. The impedance option is requested when you place your order and should match your specific application. If you are not sure of the applicable configuration, check your country or regional telephone impedance requirements.

- Ethernet ports
  - The Cisco ATA 186 has one RJ-45 10BASE-T uplink Ethernet port to connect the Cisco ATA 186 to a 10/100BASE-T hub or another Ethernet device.
  - The Cisco ATA 188 has two Ethernet ports: an RJ-45 10/100BASE-T uplink port to connect the Cisco ATA 188 to a 10/100BASE-T hub or another Ethernet device and an RJ-45 10/100BASE-T data port to connect an Ethernet-capable device, such as a computer, to the network.

  Note The Cisco ATA 188 performs auto-negotiation for duplexity and speed and is capable of 10/100 Mbps, full-duplex operation. The Cisco ATA 186 is fixed at 10 Mbps, half-duplex operation.

- The Cisco ATA 188 RJ-45 LED shows network link and activity. The LED blinks twice when the Cisco ATA is first powered on, then turns off if there is no link or activity. The LED blinks to show network activity and is solid when there is a link.
- The Cisco ATA 186 RJ-45 LED is solid when the Cisco ATA is powered on and blinks to show network activity.
- Function button—The function button is located on the top panel of the unit (see Figure 1-6).

Figure 1-6 Function Button



The function button lights when you pick up the handset of a telephone attached to the Cisco ATA. The button blinks quickly when the Cisco ATA is upgrading its configuration.

Note If the function button blinks slowly, the Cisco ATA cannot find the DHCP server. Check your Ethernet connections and make sure the DHCP server is available.

Pressing the function button allows you to access to the voice configuration menu. For additional information about the voice configuration menu, see the "Voice Configuration Menu" section on page 3-20.

Caution Never press the function button during an upgrade process. Doing so may interfere with the process.

Software Features

The Cisco ATA supports the following protocols and services:

- MGCP Versions, page 1-5
- Voice Codecs Supported, page 1-5
- Additional Supported Signaling Protocols, page 1-6
- Other Supported Protocols, page 1-6
- Cisco ATA MGCP Services, page 1-6
- Fax Services, page 1-7
- Supplementary Services that the Cisco ATA Provides, page 1-7
- Supplementary Services that the Call Agent Provides, page 1-8

MGCP Versions

The Cisco ATA supports the following MGCP versions:

- MGCP 0.1
- MGCP 1.0
- NCS 1.0

Voice Codecs Supported

The Cisco ATA supports the following voice codecs (check your other network devices for the codecs they support):

- G.711µ-law
- G.711A-law
- G.723.1
- G.729

- G.729A
- G.729B
- G.729.AB

Additional Supported Signaling Protocols

In addition to MGCP, the Cisco ATA supports the following signaling protocols:

- Skinny Client Control Protocol (SCCP)
- H.323
- Session Initiation Protocol (SIP)

If you wish to perform a cross-protocol upgrade from MGCP to another signaling image, see the "Upgrading the Signaling Image from a TFTP Server" section on page 7-1.

Other Supported Protocols

Other protocols that the Cisco ATA supports include the following:

- 802.1Q VLAN tagging
- Cisco Discovery Protocol (CDP)
- Domain Name System (DNS)
- Dynamic Host Configuration Protocol (DHCP)
- Internet Control Message Protocol (ICMP)
- Internet Protocol (IP)
- Real-Time Transport Protocol (RTP)
- Transmission Control Protocol (TCP)
- Trivial File Transfer Protocol (TFTP)
- User Datagram Protocol (UDP)

Cisco ATA MGCP Services

For a list of required MGCP parameters as well as descriptions of all supported Cisco ATA MGCP services and cross references to the parameters for configuring these services, see Chapter 4, "Cisco ATA-Supported MGCP Services."

These services include the following features:

- Two MGCP endpoints per Cisco ATA
- Two connections per MGCP endpoint
- Multiple audio codecs
- Events and signals available in MGCP software packages
- Automatic MGCP version detection
- Caller ID generation

- Configurable tone (dial tone, busy tone, confirm tone, reorder tone, call waiting tone)
- IP address assignment—DHCP-provided or statically configured
- Cisco ATA configuration by means of a TFTP server, web browser, or voice configuration menu.
- VLAN configuration
- Caller ID format
- Ring cadence format
- Silence suppression
- Low-bit-rate codec selection
- RTP media port configuration
- Hook-flash detection timing configuration
- Cisco Discovery Protocol (CDP)
- User interface password
- Type of Service (ToS) configuration for audio and signaling ethernet packets
- Debugging and diagnostic tools

Fax Services

The Cisco ATA supports two modes of fax services, in which fax signals are transmitted using the G.711 codec:

- Fax pass-through mode—Receiver-side Called Station Identification (CED) tone detection with automatic G.711A-law or G.711µ-law switching.
- Fax mode—The Cisco ATA is configured as a G.711-only device.

How you set Cisco ATA fax parameters depends on what network gateways are being used. You may need to modify the default fax parameter values (see Chapter 6, “Configuring and Debugging Fax Services”).

Note Success of fax transmission depends on network conditions and fax modem response to these conditions. The network must have reasonably low network jitter, network delay, and packet loss rate.

Supplementary Services that the Cisco ATA Provides

Table 1-1 lists the supplementary phone services that the Cisco ATA provides for MGCP. Table 1-1 includes links to the corresponding parameters that allow you to configure these services.

Table 1-1 Supplementary Services that Require Configuration on the Cisco ATA

Service	Parameter
Caller ID	CallerIdMethod, page 5-21
Call Waiting	SigTimer, page 5-26
Call-Waiting-Caller ID	CallerIdMethod, page 5-21, SigTimer, page 5-26
Three-way Conference	ConnectMode, page 5-24—Bit 23

Supplementary Services that the Call Agent Provides

The Cisco ATA supports the following services that are provided by the Call Agent:

Note For end-user information on how these services work, consult the documentation from the MGCP Call Agent service provider.

- Anonymous Call Rejection
- Call forward—on busy
- Call forward—on no answer
- Call forward—unconditional
- Call hold
- Caller ID
- Calling Line Identification Presentation
- Calling Line Identification Restriction
- Call return
- Call transfer—Blind
- Call transfer—Consultation
- Call waiting
- Call waiting Caller ID
- Distinctive ringing
- Message-waiting-indication (stuttering dial tone)
- Speed dial
- Three-way conference
- Voice mail

Installation and Configuration Overview

Table 1-2 provides the basic steps required to install and configure the Cisco ATA to make it operational in a typical MGCP environment.

Table 1-2 Overview of the Steps Required to Install and Configure the Cisco ATA and Make it Operational

Action	Reference
1. Plan the network and Cisco ATA configuration.	
2. Install the Ethernet connection.	
3. Install and configure the other network devices.	
4. Install the Cisco ATA but do not power up the Cisco ATA yet.	What the Cisco ATA Package Includes, page 2-2
5. Download the desired Cisco ATA release software zip file from the Cisco web site, then configure the Cisco ATA.	Chapter 3, "Configuring the Cisco ATA for MGCP"
6. Power up the Cisco ATA.	
7. Periodically, you can upgrade the Cisco ATA to a new signaling image by using the TFTP server-upgrade method or the manual-upgrade method.	Chapter 7, "Upgrading the Cisco ATA Signaling Image"

Installing the Cisco ATA

This section provides instructions for installing the Cisco ATA 186 and Cisco ATA 188. Before you perform the installation, make sure you have met the following prerequisites:

- Planned the network and Cisco ATA configuration.
- Installed the Ethernet connection.
- Installed and configured the other network devices.

This section contains the following topics:

- Network Requirements, page 2-2
- Safety Recommendations, page 2-2
- What the Cisco ATA Package Includes, page 2-2
- What You Need, page 2-3
- Installation Procedure, page 2-3
- Power-Down Procedure, page 2-6

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Network Requirements

The Cisco ATA acts as an endpoint in an IP telephony network. The following equipment is required:

- Call Control system
- Voice packet gateway—Required if you are connecting to the Public Switched Telephone Network (PSTN).
- Ethernet connection

Safety Recommendations

To ensure general safety, follow these guidelines:

- Do not get this product wet or pour liquids into this device.
- Do not open or disassemble this product.
- Do not perform any action that creates a potential hazard to people or makes the equipment unsafe.
- Use only the power supply that comes with the Cisco ATA.

Warning **Ultimate disposal of this product should be handled according to all national laws and regulations.**

Warning **Read the installation instructions before you connect the system to its power source.**

Warning **The plug-socket combination must be accessible at all times because it serves as the main disconnecting device.**

Warning **Do not work on the system or connect or disconnect cables during periods of lightning activity.**

Warning **To avoid electric shock, do not connect safety extra-low voltage (SELV) circuits to telephone-network voltage (TNV) circuits. LAN ports contain SELV circuits, and WAN ports contain TNV circuits. Some LAN and WAN ports both use RJ-45 connectors. Use caution when connecting cables.**

For translated warnings, see the *Regulatory Compliance and Safety Information for the Cisco ATA 186 and Cisco ATA 188* manual.

What the Cisco ATA Package Includes

The Cisco ATA package contains the following items:

- Cisco ATA 186 or Cisco ATA 188 Analog Telephone Adaptor
- *Read Me First - ATA Boot Load Information*
- *Cisco ATA 186 and Cisco ATA 188 Analog Telephone Adaptor at a Glance*

- *Regulatory Compliance and Safety Information for the Cisco ATA 186 and Cisco ATA 188*
- 5V power adaptor
- Power cord

Note The Cisco ATA is intended for use only with the 5V DC power adaptor that comes with the unit.

What You Need

You also need the following items:

- Category-3 10BASE-T or 100BASE-T (or better) Ethernet cable. One cable is needed for each Ethernet connection.

  A Category-3 Ethernet cable supports 10BASE-T for up to 100 meters without quality degradation, and a Category-3 Ethernet cable supports 100BASE-T for up to 10 meters without quality degradation.

  For uplink connections, use a crossover Ethernet cable to connect the Cisco ATA to another Ethernet device (such as a router or PC) without using a hub. Otherwise, use straight-through Ethernet cables for both uplink and data port connections.
- Access to an IP network
- One or two analog touch-tone telephones or fax machines, or one of each

Installation Procedure

After the equipment is in place, see Figure 2-1 (for Cisco ATA 186) or Figure 2-2 (for Cisco ATA 188) and follow the next procedure to install the Cisco ATA.

Figure 2-1 Cisco ATA 186 Rear Panel Connections

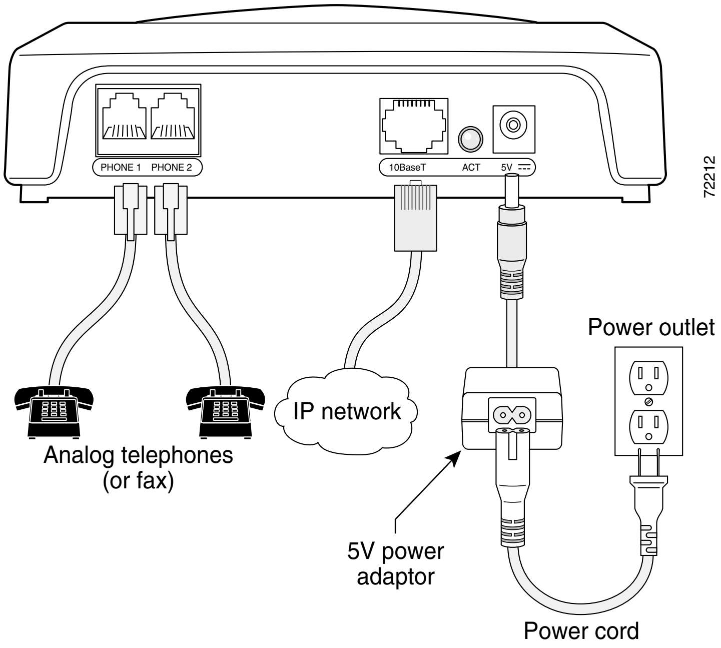
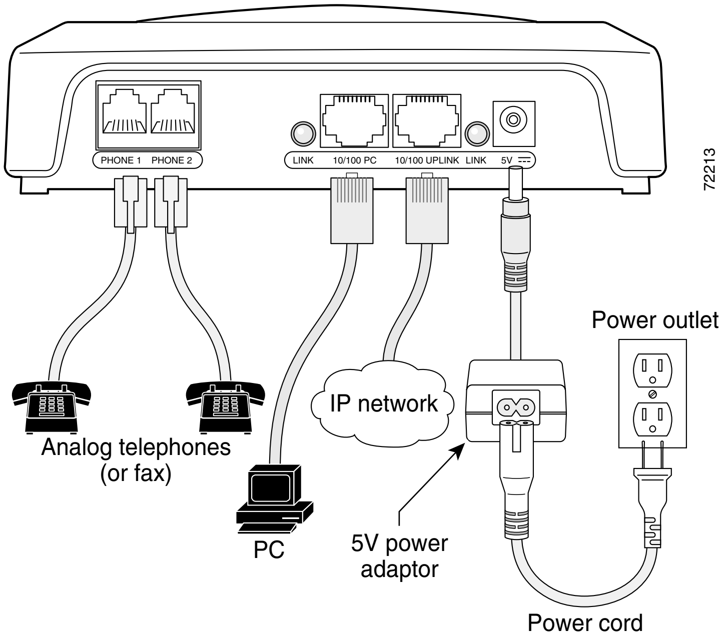


Figure 2-2 Cisco ATA 188 Rear Panel Connections



Procedure

Step 1 Place the Cisco ATA near an electrical power outlet.

Step 2 Connect one end of a telephone line cord to the **Phone 1** input port on the rear panel of the Cisco ATA. Connect the other end to an analog telephone set.

If you are connecting a telephone set that was previously connected to an active telephone line, unplug the telephone line cord from the wall jack and plug it into the **Phone 1** input.

Warning **To reduce the risk of fire, use only No. 26 AWG or larger telecommunication line cord.**

Caution Do not connect the **Phone** input ports to a telephone wall jack. To avoid damaging the Cisco ATA or telephone wiring in the building, do not connect the Cisco ATA to the telecommunications network. Connect the **Phone** port to a telephone only, never to a telephone wall jack.

Note The telephone must be switched to tone setting (not pulse) for the Cisco ATA to operate properly.

Step 3 (Optional) Connect the telephone line cord of a second telephone to the **Phone 2** input port.

Note If you are connecting only one telephone to the Cisco ATA, you must use the **Phone 1** input port.

Step 4 Connect an Ethernet cable to the uplink RJ-45 connector on the Cisco ATA. For the Cisco ATA 186, this is the 10BASE-T connector; for the Cisco ATA 188, this is the 10/100UPLINK connector.

Note Use a crossover Ethernet cable to connect the Cisco ATA to another Ethernet device (such as a router or PC) without using a hub. Otherwise, use a straight-through Ethernet cable.

Step 5 (Cisco ATA 188 only—optional) Connect a straight-through Ethernet cable from your PC to the 10/100 PC RJ-45 connector on the Cisco ATA.

Step 6 Connect the socket end of the power cord to the Cisco-supplied 5V DC power adaptor.

Step 7 Insert the power adaptor cable into the power connector on the Cisco ATA.

Caution Use only the Cisco-supplied power adaptor.

Warning **This product relies on the building's installation for short-circuit (overcurrent) protection. Ensure that a fuse or circuit breaker no larger than 120 VAC, 15A U.S. (240VAC, 10A international) is used on the phase conductors (all current-carrying conductors).**

Step 8 Connect the plug end of the 5V DC power adaptor cord into an electrical power outlet.

When the Cisco ATA is properly connected and powered up, the green activity LED flashes to indicate network activity. This LED is labeled **ACT** on the rear panel of the Cisco ATA 186 and is labeled **LINK** on the rear panel of the Cisco ATA 188.

Caution Do not cover or block the air vents on either the top or the bottom surface of the Cisco ATA. Overheating can cause permanent damage to the unit.

For more information about LEDs and the function button, see the "Hardware Overview" section on page 1-3.

Power-Down Procedure

Caution If you need to power down the Cisco ATA 186 or Cisco 188 at any time, use the following power-down procedure to prevent damage to the unit.

Procedure

Step 1 Unplug the RJ45 Ethernet cable

Step 2 Wait for 20 seconds.

Step 3 Unplug the power cable.

Warning **This equipment contains a ring signal generator (ringer), which is a source of hazardous voltage. Do not touch the RJ-11 (phone) port wires (conductors), the conductors of a cable connected to the RJ-11 port, or the associated circuit-board when the ringer is active. The ringer is activated by an incoming call.**

CHAPTER 3

Configuring the Cisco ATA for MGCP

This section describes how to configure the Cisco ATA to operate with the MGCP signaling image and how the Cisco ATA obtains the latest signaling image.

You can configure the Cisco ATA for use with MGCP with any of the following methods:

- By using a TFTP server—This is the Cisco-recommended method for deploying a large number of Cisco ATAs. This method allows you to set up a unique Cisco ATA configuration file or a configuration file that is common to all Cisco ATAs. The Cisco ATA can automatically download its latest configuration file from the TFTP server when the Cisco ATA powers up, is refreshed or reset, or when the specified TFTP query interval expires.
- By using manual configuration:
  - Voice configuration menu—This is the method you must use if the process of establishing IP connectivity for the Cisco ATA requires changing the default network configuration settings. These settings are CDP, VLAN, and DHCP. You also can use the voice configuration menu to review all IP connectivity settings. The voice configuration menu can also be used when Web access is not available.
  - Web-based configuration—This method is convenient if you plan to deploy a small number of Cisco ATAs in your network. To use this method, the Cisco ATA must first obtain IP connectivity, either through the use of a DHCP server or by using the voice configuration menu to statically configure IP addresses.

This section contains the following topics:

- Default Boot Load Behavior, page 3-2—This section describes the process that the Cisco ATA follows by default when it boots up. It is very important to understand this process because, if your network environment is not set up to follow this default behavior, you need to make the applicable configuration changes. For example, by default, the Cisco ATA attempts to contact a DHCP server for the necessary IP addresses to achieve network connectivity. However, if your network does not use a DHCP server, you must manually configure various IP settings as described in this section.
- Specifying a Preconfigured VLAN ID or Disabling VLAN IP Encapsulation, page 3-3—This section includes a table of the parameters you can configure for VLAN and CDP settings.
- Steps Needed to Configure the Cisco ATA, page 3-5—This section provides tables that summarize the general configuration steps you must follow to configure the Cisco ATA.
- Configuring the Cisco ATA Using a TFTP Server, page 3-8—This section describes procedures for configuring the Cisco ATA by using a TFTP server, which is the recommended configuration method for the deployment of a large number of Cisco ATAs.
- Voice Configuration Menu, page 3-20—This section includes information on how to obtain basic network connectivity for the Cisco ATA and how to perform a factory reset if necessary.

- Cisco ATA Web Configuration Page, page 3-23—This section shows the Cisco ATA Web configuration page and contains a procedure for how to configure Cisco ATA parameters using this interface.
- Refreshing or Resetting the Cisco ATA, page 3-25—This section gives the procedure (via the Web configuration page) for refreshing or resetting the Cisco ATA so that your most recent configuration changes take effect immediately.
- Obtaining Cisco ATA Configuration File After Failed Attempt, page 3-26—This section gives the formula for how soon the Cisco ATA attempts to fetch its configuration file from the TFTP server after a failed attempt.
- Upgrading the MGCP Signaling Image, page 3-26—This section provides references to the various means of upgrading your Cisco ATA signaling image.

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Default Boot Load Behavior

Before configuring the Cisco ATA, you need to know how the default Cisco ATA boot load process works. Once you understand this process, you will be able to configure the Cisco ATA by following the instructions provided in this section and in the sections that follow.

All Cisco ATAs are shipped with a bootload signaling-protocol image. However, because this image is not a fully functional signaling image, the image must be upgraded. The image is designed to be automatically upgraded by a properly configured TFTP server. To configure the Cisco ATA to automatically upgrade to the latest signaling image, see the “Upgrading the Signaling Image from a TFTP Server” section on page 7-1.

In addition, the Cisco ATA obtains its configuration file during the bootload process.

The following list summarizes the default Cisco ATA behavior during its boot-up process:

1. The Cisco ATA uses the Cisco Discovery Protocol (CDP) to discover which VLAN to enter. If the Cisco ATA receives a VLAN ID response from the network switch, the Cisco ATA enters that VLAN and adds 802.1Q VLAN tags to its IP packets. If the Cisco ATA does not receive a response with a VLAN ID from the network switch, then the Cisco ATA assumes it is not operating in a VLAN environment and does not perform VLAN tagging on its packets.

   Note If your network environment is not set up to handle this default behavior, make the necessary configuration changes by referring to the “Specifying a Preconfigured VLAN ID or Disabling VLAN IP Encapsulation” section on page 3-3.

2. The Cisco ATA contacts the DHCP server to request its own IP address.

   Note If your network environment does not contain a DHCP server, you need to statically configure various IP addresses so that the Cisco ATA can obtain network connectivity. For a list of parameters that you must configure to obtain network connectivity, see Table 3-6 on page 3-21. For instructions on how to use the voice configuration menu, which you must use to perform this configuration, see the “Voice Configuration Menu” section on page 3-20.

3. Also from the DHCP server, the Cisco ATA requests the IP address of the TFTP server.
4. The Cisco ATA contacts the TFTP server and downloads the Cisco ATA release software that contains the correct signaling image for the Cisco ATA to function properly.

Note If you are not using a TFTP server, you need to manually upgrade the Cisco ATA to the correct signaling image. For information on this procedure, see the "Upgrading the Signaling Image Manually" section on page 7-2.

5. The Cisco ATA looks for a Cisco ATA-specific configuration file (designated by the MAC address of the Cisco ATA and named ata<*macaddress*> with a possible file extension) on the TFTP server and downloads this file if it exists. For information about configuration file names, see the "Configuration Files that the cfgfmt Tool Creates" section on page 3-13.
6. If the Cisco ATA does not find an ata<*macaddress*> configuration file, it looks for an atadefault.cfg configuration file and downloads this file if it exists. This file can contain default values for the Cisco ATA to use.

Note When the Cisco ATA is downloading its DHCP configuration, the function button on the top panel blinks.

Specifying a Preconfigured VLAN ID or Disabling VLAN IP Encapsulation

If you want the Cisco ATA to use a preconfigured VLAN ID instead of using the Cisco Discovery Protocol to locate a VLAN, or if you want to disable VLAN IP encapsulation, refer to Table 3-1 for a reference to the parameters and bits you may need to configure. Use the voice configuration menu to configure these parameters. (See the "Voice Configuration Menu" section on page 3-20 for instructions on using this menu.) Also, refer to Table 3-2 for a matrix that indicates which VLAN-related parameters and bits to configure depending on your network environment.

Note Bits are numbered from right to left, starting with bit 0.

Table 3-1 Parameters and Bits for Preconfiguring a VLAN ID

Parameter and Bits	Reference
OpFlags: • Bit 4—Enable the use of user-specified voice VLAN ID. • Bit 5—Disable VLAN encapsulation • Bit 6—Disable CDP discovery.	OpFlags, page 5-27
VLANSetting: • Bits 0-2—Specify VLAN CoS bit value (802.1P priority) for TCP packets. • Bits 3-5—Specify VLAN CoS bit value (802.1P priority) for Voice IP packets • Bits 18-29—User-specified 802.1Q VLAN ID	VLAN Setting, page 5-11

Table 3-2 VLAN-Related Features and Corresponding Configuration Parameters

Feature	OpFlags Bit 4	OpFlags Bit 5	OpFlags Bit 6	VLANSetting Bits 18-29
Static VLAN	1	0	1	VLAN ID
CDP-acquired VLAN	0	0	0	N/A
No VLAN	N/A	1	N/A	N/A
No CDP	N/A	N/A	1	N/A
No CDP and no VLAN	0	1	1	N/A

N/A indicates that the variable is not applicable to the feature and the setting of this varaible does not affect the feature.

Example

The following procedure shows you how to configure the OpFlags and VLANSetting parameters to allow the Cisco ATA to use a user-specified VLAN ID. In this example, the voice VLAN ID is 115 (in decimal format).

Step 1 Set bits 4-6 of the OpFlags parameter to 1, 0, and 1, respectively. This setting translates to the following bitmap:

```
xxxx xxxx xxxx xxxx xxxx xxxx x101 xxxx
```

The remaining bits of the OpFlags parameter, using all default values, make up the following bitmap representation:

```
0000 0000 0000 0000 0000 0000 0xxx 0010
```

Therefore, the resulting value of the OpFlags parameter becomes the following bitmap representation:

```
0000 0000 0000 0000 0000 0000 0101 0010
```

In hexadecimal format, this value is 0x00000052.

Step 2 Set bits 18-29 of the VLANSetting parameter to to voice VLAN ID 115. This setting translates to the following bitmap

```
xx00 0001 1100 11xx xxxx xxxx xxxx xxxx
```

where 000001110011 is the binary representation of the demical value 115.

The remaining bits of the VLANSetting parameter, using all default values, make up the following representation:

```
00xx xxxx xxxx xx00 0000 0000 0010 1011
```

Therefore, the resulting value of the VLANSetting parameter becomes the following bitmap representation:

```
0000 0001 1100 1100 0000 0000 0010 1011
```

In hexadecimal format, this value is 0x01cc002b.

Note If you are using the voice configuration menu to set the parameters, you must convert hexadecimal values to decimal values. For example, the OpFlags setting of 0x00000052 is equivalent to 82 in decimal format, and the VLANSetting of 0x01cc002b is equivalent to 30146603 in decimal format.

Steps Needed to Configure the Cisco ATA

This section contains the following topics:

- Basic Configuration Steps in a TFTP Server Environment, page 3-5
- Basic Configuration Steps in a Non-TFTP Server Environment, page 3-7

Basic Configuration Steps in a TFTP Server Environment

Table 3-3 shows the basic steps for configuring the Cisco ATA and making it operational in a typical MGCP environment, which includes a TFTP server.

Table 3-3 Basic Steps to Configure the Cisco ATA in a TFTP Environment

Action	Reference
1. Download the desired Cisco ATA release software zip file from the Cisco web site and store it on the TFTP server.	Setting Up the TFTP Server with Cisco ATA Software, page 3-8
2. Follow these basic steps to create a unique Cisco ATA configuration file, which actually entails creating two files: **a.** Create a Cisco ATA configuration text file that contains parameters that are common to all Cisco ATAs in your network. **b.** Create a unique Cisco ATA configuration text file that contains parameters that are specific to a Cisco ATA. Make sure to use an **include** command in the unique configuration file to pull in values from the common configuration file. **c.** Convert the unique configuration file to binary format. **d.** Place the unique binary configuration file on the TFTP server.	Creating Unique and Common Cisco ATA Configuration Files, page 3-9
3. Optionally, create a default configuration file called atadefault.cfg, which the Cisco ATA will download from the TFTP server only if the unique Cisco ATA file called ata<*macaddress*> (with a possible file extension) does not exist on the TFTP server. For information about possible configuration file names, see the "Configuration Files that the cfgfmt Tool Creates" section on page 3-13.	atadefault.cfg Configuration File, page 3-17
4. Configure the upgradecode parameter so that the Cisco ATA will obtain the correct signaling image from the TFTP server when the Cisco ATA powers up.	Upgrading the Signaling Image from a TFTP Server, page 7-1
5. Configure the desired interval for the Cisco ATA to contact the TFTP server to check for a configuration-file update or an upgrade of the signaling image file.	Configuring Refresh Interval, page 4-2
6. Configure the method with which the Cisco ATA will locate the TFTP server at boot up time.	Configuring the Cisco ATA to Obtain its Configuration File from the TFTP Server, page 3-18
7. Power up the Cisco ATA.	
8. If you make configuration changes to the Cisco ATA or upgrade the signaling image on the TFTP server, you can refresh the Cisco ATA so that these changes take effect immediately. Otherwise, these changes will take effect when the specified interval (CfgInterval parameter value) for the TFTP query expires.	Refreshing or Resetting the Cisco ATA, page 3-25

Basic Configuration Steps in a Non-TFTP Server Environment

Table 3-4 shows the basic steps for configuring the Cisco ATA without using the TFTP server method.

Table 3-4 Basic Steps to Configure the Cisco ATA Without Using the TFTP Server Method

Action	Reference
1. Download the desired Cisco ATA release software zip file from the Cisco web site: **a.** If you are a registered CCO user. go to the following URL: http://www.cisco.com/cgi-bin/tablebuild.pl/ata186 **b.** Download the zip file that contains the software for the applicable release and signaling image you are using. The contents of each file are described next to the file name. **c.** Extract the files to the desired location on your PC. **Note** The file that contains the protocol signaling image has an extension of .zup.	
2. Manually upgrade the Cisco ATA to the correct signaling image.	Upgrading the Signaling Image Manually, page 7-2
3. Configure the Cisco ATA by using either one of the manual-configuration methods.	• Voice Configuration Menu, page 3-20 • Cisco ATA Web Configuration Page, page 3-23
4. Power up the Cisco ATA.	

Configuring the Cisco ATA Using a TFTP Server

The TFTP method of configuration is useful when you have many Cisco ATA because you can use a TFTP server for remote, batch configuration of Cisco ATAs. A TFTP server can host one unique configuration file for each Cisco ATA.

This section contains the following topics:

- Setting Up the TFTP Server with Cisco ATA Software, page 3-8
- Configurable Features and Related Parameters, page 3-8
- Creating Unique and Common Cisco ATA Configuration Files, page 3-9
- atadefault.cfg Configuration File, page 3-17
- Configuring the Cisco ATA to Obtain its Configuration File from the TFTP Server, page 3-18

Setting Up the TFTP Server with Cisco ATA Software

This section provides the procedure for the Cisco ATA administrator to obtain the correct Cisco ATA software and set up the TFTP server with this software.

Procedure

Step 1 If you are a registered CCO user. go to the following URL:
http://www.cisco.com/cgi-bin/tablebuild.pl/ata186

Step 2 Download the zip file that contains the software for the applicable release and signaling image you are using. The contents of each file are described next to the file name. Save the zip file onto a floppy disc.

Note The file that contains the protocol signaling image has an extension of .zup.

Step 3 Extract the signaling files onto the TFTP server. This should be the same TFTP server that will contain the binary Cisco ATA configuration file that you create (either ata<*macaddress*> with a possible file extension or atadefault.cfg). For information about possible configuration file names, see the "Configuration Files that the cfgfmt Tool Creates" section on page 3-13.

Configurable Features and Related Parameters

For a list of all required MGCP parameters, see the "Required Parameters" section on page 4-2. These parameters must be properly configured for the Cisco ATA to work.

For descriptions of important Cisco ATA MGCP services that you can configure, and references to their configuration parameters, see the "Important Basic MGCP Services" section on page 4-2 and the "Additional MGCP Services" section on page 4-3.

Table 4-1 on page 4-5 lists, in alphabetical order, various features that you can configure for the Cisco ATA. Table 4-1 on page 4-5 also includes links to the related parameter that allows you to configure each of these features. Each link takes you to a detailed description of the parameter that includes its default values.

For an example of how to configure parameters for the TFTP Server configuration method, see the "Creating Unique and Common Cisco ATA Configuration Files" section on page 3-9.

Creating Unique and Common Cisco ATA Configuration Files

If you have many Cisco ATAs to configure, a good approach is to create two configuration files:

- One file that will contain only parameter values unique to a specific Cisco ATA.
- One file for parameters that will be configured with values common to a group of Cisco ATAs. If this file is updated, all Cisco ATA devices in this common group can obtain the new configuration data in a batch-mode environment.

The following procedure demonstrates the steps needed to create these configuration files.

Note The parameters used in this section help illustrate the process of creating a unique Cisco ATA configuration file, and do not include all required MGCP parameters in the examples. See Chapter 4, "Cisco ATA-Supported MGCP Services," for complete listings and descriptions of required parameters and additional configurable features. Also, refer back to Table 3-3 on page 3-6 for all main configuration steps.

Procedure

Step 1 Use the mgcp_example.txt file as a template for creating a text file of values that are common to one group of Cisco ATAs. The mgcp_example.txt file is included in the software-release zip file and contains all default values. This file is shown without its annotations in the "Configuration Text File Template" section on page 5-2.

Copy the mgcp_example.txt file and save it with a meaningful name, such as *common.txt*.

Step 2 Configure all common parameters by editing the text file as desired. For example, you might configure the following parameters:

```
UseTftp:1
DHCP:1
TFtpURL:10.10.10.1
```

The settings in this example indicate that a group of Cisco ATAs is using the TFTP server with an IP address of 10.10.10.1 to obtain their configuration files. These Cisco ATAs will use a DHCP server to obtain their own IP addresses but not to obtain the TFTP server IP address (because the TftpURL parameter has a configured value).

Step 3 Save your changes.

Step 4 Use the mgcp_example.txt file again, this time as a template for creating a text file of values that are specific to one Cisco ATA. For example, you might configure the following parameters:

```
UserID:8530709
GkorProxy:192.168.1.1
```

Save this file of Cisco ATA-specific parameters as:

ata<*macaddress*>.txt

where *macaddress* is the non-dotted hexadecimal version of the MAC address of the Cisco ATA you are configuring. This non-dotted hexadecimal MAC address is labeled on the bottom of most Cisco ATAs next to the word “MAC.” The file name must be exactly 15 characters long. (However, if this filename is supplied by the DHCP server, the name can be as long as 31 characters and can be any name with printable ASCII characters.)

If necessary, you can obtain the non-dotted hexadecimal MAC address by using the atapname.exe command. For information on using the atapname.exe command, see the “Using atapname.exe Tool to Obtain MAC Address” section on page 3-11. That section includes an example of a dotted decimal MAC address and its corresponding non-dotted hexadecimal address.

Note The ata<*macaddress*>.txt file should contain only those parameters whose values are different from the file of common parameters. Parameter values in the ata<*macaddress*> configuration file will overwrite any manually configured values (values configured through the web or voice configuration menu) when the Cisco ATA powers up or refreshes.

Step 5 On the top line of the ata<*macaddress*>.txt file, add an **include** command to include the name of the common-parameters file, and save the file.

```
include:common.txt
UserID:8530709
GkorProxy:192.168.1.1
```

Step 6 Run the cfgfmt.exe tool, which is bundled with the Cisco ATA software, on the ata<*macaddress*>.txt text file to generate the binary configuration file. If you wish to encrypt the binary file, see the “Using Encryption With the cfgfmt Tool” section on page 3-12.

The syntax of the cfgfmt program follows:

Syntax

```
cfgfmt [Encryption options] -mgcp -tptag.dat input-text-file output-binary-file
```

- Encryption options are described in the “Using Encryption With the cfgfmt Tool” section on page 3-12.
- `mgcp` (for MGCP) is the protocol you are using, which you must specify so that the cfgfmt tool will include only the applicable protocol in the converted output binary file.
- The *ptag*.dat file, provided with the Cisco ATA software version you are running, is used by cfgfmt.exe to format a text input representation of the parameter/value pairs to its output binary representation. Be sure this file resides in the same directory from which you are running the cfgfmt program.
- `input-text-file` is the input text file representation of the Cisco ATA configuration file.
- `output-binary-file` is the final output binary file that Cisco ATA uses as the TFTP configuration file.

Example

`cfgfmt -mgcp` **-tptag.dat** **`ata0a141e28323c.txt`** ***`ata0a141e28323c`***

This example is based on a Cisco ATA MAC address of 10.20.30.40.50.60, which converts to the two-digit, lower-case hexadecimal representation of each integer as 0a141e28323c.

When you convert the ata<*macaddress*>.txt file to a binary file, the binary file will merge the two text files to form one Cisco ATA-specific binary configuration file for your Cisco ATA.

If the same parameter is configured with different values in these two files, the value in the ata<*macaddress*>.txt file takes precedence over the value in the common.txt file.

Step 7 Store all binary configuration file(s) in the TFTP server root directory. For information about possible configuration file names, see the "Configuration Files that the cfgfmt Tool Creates" section on page 3-13.

When the Cisco ATA powers up, it will retrieve its configuration file(s) from the TFTP server.

Step 8 If you want to make configuration changes after boot up, repeat the process of creating or editing the text files containing the desired parameters, then converting the ata<*macaddress*>.txt text file to the binary file(s) and storing the binary file(s) on the TFTP server. For the configuration changes to take effect immediately, refresh the Cisco ATA. (See the "Refreshing or Resetting the Cisco ATA" section on page 3-25.)

After being refreshed, the Cisco ATA will download the updated ata<*macaddress*> configuration file(s).

Note If you do not perform a refresh procedure, the Cisco ATA will update its configuration the next time it contacts the TFTP server, which is based on the configured value of the CfgInterval parameter.

Using atapname.exe Tool to Obtain MAC Address

This bundled tool is useful for converting the dotted decimal version of the Cisco ATA MAC address (available on the Cisco ATA Web configuration page or from the voice configuration menu code **24#**) to its default Cisco ATA profile name. This name has the following format:

`ata`*`xxxxxxxxxxxx`*

where each *xx* is the two-digit, lower-case hexadecimal representation of each integer in the dotted, decimal version of the Cisco ATA MAC address. This is the name you use for the unique Cisco ATA binary configuration file.

The following command and output show an example of this command.

Command Example

```
atapname.exe 10.20.30.40.50.60
```

Command Output

```
ata0a141e28323c
```

Note The same functionality is available from the voice configuration menu (voice menu code **84#)**, which will announce the Cisco ATA profile name.

Using Encryption With the cfgfmt Tool

The EncryptKey or EncryptKeyEx parameter can be used to encrypt binary files that are transferred over TFTP. You can change encryption keys for each Cisco ATA so that only one specific Cisco ATA can decode the information.

Cisco strongly recommends using the EncryptKeyEx parameter for encryption because this parameter provides a stronger encryption than the EncryptKey parameter that was used in Cisco ATA software releases prior to release 2.16.

You must use version 2.3 of the *cfgfmt* configuration-file generation tool to use the new EncryptKeyEx parameter. This tools comes bundled with Cisco ATA software version 3.0. To verify that you have version 2.3 of the cfgfmt tool type the following command:

```
cfgfmt
```

The version number of the cfgfmt tool will be returned.

You can configure the EncryptKeyEx parameter by using the Cisco ATA Web configuration page or by using the TFTP configuration method. (For more information, see the “EncryptKeyEx” section on page 5-7.)

You can configure the EncryptKey parameter by using the Cisco ATA Web configuration page, the voice configuration menu, or by using the TFTP configuration method. (For more information, see the “EncryptKey” section on page 5-6.)

By default, the Cisco ATA-specific ata<*macaddress*> configuration file(s) are not encrypted. If encryption is required, however, you must manually configure the EncryptKeyEx or EncryptKey parameter before you boot up the Cisco ATA so that the TFTP method is secure. The Cisco ATA uses the RC4 cipher algorithm for encryption.

Note Because the factory-fresh ATA cannot accept encrypted configuration files, the first unencrypted file, if intercepted, can easily be read. (You would still have to know the data structure format in order to decode the binary information from the unencrypted file.) Therefore, the new encryption key in the unencrypted file can be compromised.

Note For security reasons, Cisco recommends that you set the UIPassword parameter (if desired) in the configuration file and not by using one of the manual configuration methods.

This section contains the following topics:

- Configuration Files that the cfgfmt Tool Creates, page 3-13
- cfgfmt Tool Syntax and Examples, page 3-14

Configuration Files that the cfgfmt Tool Creates

The number of output binary configuration files that the Cisco ATA produces is dependent on two factors:

- Which encryption key parameter is used—EncryptKey or EncryptKeyEx
- The total size of the binary output

Table 3-5 shows the names of the binary files that can be generated. One, two or four files can be generated.

Note <*macaddress*> in Table 3-5 is the MAC address of the Cisco ATA.

Note If you are creating an *atadefault* configuration file, the generated binary file name will be *atadefault.cfg.x* if you encrypt the text file with the EncryptKeyEx parameter; the binary file name will be *atadefault.cfg* if you do not use the EncryptKeyEx parameter to encrypt the text file. For information on creating an *atadefault* configuration file, see the "atadefault.cfg Configuration File" section on page 3-17.

Table 3-5 Configuration Files that the Cisco ATA May Generate

Value of EncryptKeyEx Parameter	Total Binary Output Size Less Than or Equal to 2,000 Bytes	Total Binary Output Size Greater Than 2,000 Bytes
0	ata<*macaddress*>	ata<*macaddress*> ata<*macaddress*>.ex
Non-zero	ata<*macaddress*> ata<*macaddress*>.x	ata<*macaddress*> ata<*macaddress*>.ex ata<*macaddress*>.x ata<*macaddress*>.xex

Note Place all generated binary configuration files onto the TFTP server.

cfgfmt Tool Syntax and Examples

The syntax of the cfgfmt tool follows:

Syntax

```
cfgfmt [options] input output
```

Syntax Definitions—Options

- -eRc4Passwd—This option directs the Cisco ATA to use *Rc4Passwd* as the key (up to eight hexadecimal characters) to encrypt or decrypt the input text file. However, if the Cisco ATA EncryptKey parameter in the input text file is not 0, then the value of that parameter is used to encrypt the output binary file, and *Rc4Passwd* is ignored. The *-e* portion of this option means that the Cisco ATA will use the *weaker* encryption method.
- -E—This option directs the Cisco ATA to *not* use the value of the EncryptKey parameter, as set in the input text file, to encrypt the output binary configuration file.
- -xRc4Passwd—This option directs the Cisco ATA to use *Rc4Passwd,* which must be a hexadecimal string of as many as 64 characters, as the key to encrypt or decrypt the input text file. However, if the Cisco ATA EncryptKeyEx parameter in the input text file is not 0, then the value of that parameter is used to encrypt the output binary file, and *Rc4Passwd* is ignored. The *-x* portion of this option means that the Cisco ATA will use the *stronger* encryption method.
- -X—This option directs the Cisco ATA to *not* use the value of the EncryptKeyEx parameter, as set in the input text file, to encrypt the output binary configuration file.
- -tPtag.dat—This file, provided with the Cisco ATA software version you are running, is used by the cfgfmt tool to format a text input representation of the parameter/value pairs to its output binary representation. Be sure this file resides in the same directory from which you are running the cfgfmt program.
- -sip—Specify this tag if you are using the SIP protocol so that the cfgfmt tool will include only the SIP protocol parameters in the converted output binary file.
- -h323—Specify this tag if you are using the H.323 protocol so that the cfgfmt tool will include only the H.323 protocol parameters in the converted output binary file.
- -mgcp—Specify this tag if you are using the MGCP protocol so that the cfgfmt tool will include only the MGCP protocol parameters in the converted output binary file.
- -sccp—Specify this tag if you are using the SCCP protocol so that the cfgfmt tool will include only the SCCP protocol parameters in the converted output binary file.
- -g—This tag omits sensitive parameters in an ata<*macaddress*> file that was created with a version of the cfgfmt tool prior to version 2.3.

  Some parameters, specified in the ptag.dat file used by the *cfgfmt* tool, are marked as sensitive information (these parameters could include UIPassword, UID, PWD0). These parameters are not included in the output binary file if the *-g switch* is specified in the cfgfmt syntax.

Syntax Definitions—Required Parameters

- Input—This is the input text file representation of the Cisco ATA configuration file.
- Output—This is the final output binary file that Cisco ATA uses as the TFTP configuration file.

Syntax examples

The cfgfmt.exe syntax affects how the EncryptKeyEx or EncryptKey parameters are used, as shown in the following examples. In these examples, input-text-file is the ata<*macaddress*>.txt file that you will convert to binary to create the ata<*macaddress*> configuration file(s) for the Cisco ATA; output-binary-file is that binary ata<*macaddress*> file, and *Secret* is the encryption key.

- `cfgfmt -mgcp -tptag.dat input-text-file output-binary-file`

  If input-text-file sets the Cisco ATA EncryptKey parameter to 0, then output-binary-file is not encrypted. If the input-text-file sets EncryptKey to a non-zero value, then output-binary-file is encrypted with that value.

- `cfgfmt -X -mgcp -tptag.dat input-text-file output-binary-file`

  This is an example of how you might perform encryption on a first-time Cisco ATA.

  The -X (uppercase) option means that any value specified for the Cisco ATA EncryptKeyEx parameter in input-text-file is ignored. However, because *Secret* is not specified in this example, output-binary-file is not encrypted. Nevertheless, the EncryptKeyEx parameter and its value, if specified in input-file-text, will be included in output-binary-file for possible encryption at a later time. The next time the Cisco ATA fetches the configuration file from the TFTP server, the file will be encrypted with *Secret*.

-
  ```
  cfgfmt -X -xSecret -mgcp -tptag.dat input-text-file
  output-binary-file
  ```

  This is an example of changing the encryption key from one key to another key.

  The -X (uppercase) option means that any value specified for the Cisco ATA EncryptKeyEx parameter in input-text-file is ignored and the output-binary-file is encrypted with the *Secret* key. However, the EncryptKeyEx parameter and its value, if specified in input-text-file, will be included in output-binary-file.

Examples of Upgrading to Stronger Encryption Key

This section contains two examples of how you would upgrade your Cisco ATA configuration to use the stronger encyrption method if the current Cisco ATA firmware version was a version earlier than version 2.16.2. Versions earlier than 2.16.2 do not support the stronger EncryptKeyEx parameter.

Example 1

In this example, the Cisco ATA has not yet been deployed, but its firmware version is earlier than 2.16.2. Therefore, the Cisco ATA will upgrade to to firmware version 3.0 to use the EncryptKeyEx parameter as its encryption key.

The Cisco ATA in this example has a MAC address of 102030405060.

Perform the following steps:

Procedure

Step 1 Create a file called *ata102030405060.txt* by using the applicable *example.txt* file provided with the Cisco ATA software. (For example, for MGCP, the example.txt file is called mgcp_example.txt.)

Step 2 Modify the *ata102030405060.txt* file with desired parameter values. The value of the EncryptKey parameter should be 0.

Step 3 Set the value of the EncryptKeyEx parameter to the chosen encryption key with which you want the output binary file to be encrypted. In the EncryptKeyEx parameter specified in the configuration file, you can also restrict the EncryptKeyEx value to apply only to the Cisco ATA with a particular MAC address. For example, if the chosen key value is 231e2a7f10bd7fe, you can specify EncryptKeyEx as:

```
EncryptKeyEx:231e2a7f10bd7fe/102030405060
```

This means that only the Cisco ATA with the MAC address 102030405060 will be allowed to apply this EncryptKeyEx value to its internal configuration.

Step 4 Update the *upgradecode* parameter to instruct the Cisco ATA to upgrade to firmware version 3.0 by means of TFTP configuration. The *upgradecode* parameter is described in Chapter 7, “Upgrading the Cisco ATA Signaling Image.”

Step 5 Run the *cfgfmt* tool as follows:

```
cfgfmt -g ata102030405060.txt ata102030405060
```

This will generate the following two binary configuration files:

- ata102030405060
- ata102030405060.x

ata102030405060 is unencrypted.

ata102030405060.x is encrypted with EncryptKeyEx value.

Step 6 Place these two files on the TFTP server that the Cisco ATA will contact for its configuration files.

When the Cisco ATA powers up, it will obtain its IP address from the DHCP server. If the DHCP server specifies the TFTP server address, the Cisco ATA will contact the TFTP server obtained from DHCP because the Cisco ATA is not preconfigured with a TFTP server address. The boot process is as follows:

a. The Cisco ATA downloads the configuration file ata102030405060 from the TFTP server.

b. The Cisco ATA applies parameter values in the file *ata102030405060* to its internal configuration while ignoring the EncryptKeyEx parameter (because the older version of the Cisco ATA does not yet recognize the EncryptKeyEx parameter).

c. The Cisco ATA upgrades to the 3.0 firmware load.

d. The Cisco ATA reboots.

e. The Cisco ATA again downloads the configuration file *ata102030405060*.

f. The Cisco ATA applies the value of the EncryptKeyEx parameter to its internal configuration.

g. The Cisco ATA reboots.

h. The Cisco ATA EncryptKeyEx value is in effect, so from this point forward the Cisco ATA will download the *ata102030405060.x* file at each reboot and each time the value configured in the *CfgInterval* parameter expires.

Note Although *EncryptKeyEx* is encrypted in the ata<*macaddress*> file, and the ata<*macaddress*> file does not contain other sensitive information, Cisco recommends that for absolute security you pre-configure the Cisco ATA as described in this example for a private network. Alternatively, you should remove ata<*macaddress*> once *EncryptKeyEx* takes effect.

Example 2

In this example, a new Cisco ATA has already b een deployed (with the *EncryptKey* value set) with a firmware version earlier than 2.16.2. The Cisco ATA needs to be upgraded to version 2.16.2 firmware or greater to use *EncryptKeyEx* parameter to encrypt its configuration file.

In this scenario, you would follow the same procedure as in Example 1, except that you would need to set the *EncryptKey* value to the previously configured *EncryptKey* value. The difference is that the ata<*macaddress*> file is now encrypted with *EncryptKey* because the Cisco ATA expects the ata<*macaddress*> file to be encrypted with *EncryptKey.T*he Cisco ATA can then begin using the ata<*macaddress*>.x file that is encrypted with the Enc*ryptKeyEx* parameter.

atadefault.cfg Configuration File

You can create a configuration file, called atadefault.cfg, that is common to all Cisco ATAs. This configuration file is applied to a Cisco ATA only if a unique configuration file (such as ata<*macaddress*>) does not exist for the Cisco ATA on the TFTP server during the Cisco ATA power-up procedure.

You can use the atadefault.cfg file to provide limited functionality for when you first install the Cisco ATA. For example, if your service provider provides the ethernet connection and VoIP telephony service, you may need to call customer service to activate the service. If the atadefault.cfg file is configured to provide a direct connection to the customer service center, you can simply pick up the telephone and wait to be connected without using your regular phone.

The following procedure illustrates how to create the Cisco ATA default configuration file, convert it to the required binary format that the Cisco ATA can read, and store it on the TFTP server so that the Cisco ATA will download it during the boot-up process:

Procedure

Step 1 Make a copy of the mgcp_example.txt file and rename it atadefault.txt.

Step 2 Make the desired configuration changes by editing the atadefault.txt file, then save the file.

Step 3 Convert the atadefault.txt file to a binary file by running the cfgfmt.exe tool, which is bundled with the Cisco ATA software.

Note If you wish to encrypt the binary file for security reasons, see the "Using Encryption With the cfgfmt Tool" section on page 3-12. If you encrypt the file using the EncryptKeyEx parameter, the resulting binary file will be called atadefault.cfg.x; if not encrypted with the EncryptKeyEx parameter the resulting binary file name will be atadefault.cfg.

Step 4 Store the binary atadefault.cfg (or atadefault.cfg.x) configuration file in the TFTP server root directory.

During the boot-up process, the Cisco ATA will download this file as its configuration file unless it first finds a Cisco ATA-specific configuration file named for the MAC address of the Cisco ATA.

Configuring the Cisco ATA to Obtain its Configuration File from the TFTP Server

This section describes three methods for how the Cisco ATA contacts the TFTP server to obtain its configuration file:

- Using a DHCP Server, page 3-18
  - The Cisco ATA contacts the DHCP server, which provides the IP address of the TFTP server
  - The Cisco ATA uses the DHCP server but the DHCP server does not know about the TFTP server
- Without Using a DHCP Server, page 3-20

Using a DHCP Server

When using a DHCP server, configuration settings vary depending on whether or not the DHCP server is under the control of the Cisco ATA system administrator or the service provider. The simplest configuration is when the DHCP server is under the control of the Cisco ATA administrator, in which case the DHCP server provides the IP address of the TFTP server. Depending on who controls the DHCP server, follow the applicable configuration procedure:

- Procedure if DHCP Server is Under Control of Cisco ATA Administrator, page 3-18
- Procedure if DHCP Server is not Under Control of Cisco ATA Administrator, page 3-19

This section also includes the topic:

- Other DHCP Options You Can Set, page 3-19

Note If no DHCP server is found and the Cisco ATA is programmed to find one, the function button continues to blink.

Procedure if DHCP Server is Under Control of Cisco ATA Administrator

Procedure

Step 1 On the DHCP server, set one of the following two options:

- DHCP option 150 (TFTP server IP address)
- Standard DHCP option 66 (TFTP server name)

If you use DHCP option 150, the Cisco ATA will ignore DHCP option 66. However, if you use DHCP option 66, you must turn off DHCP option 150 or set its value to 0.

Note You can turn off the DHCP option 150 request by using the Cisco ATA OpFlags parameter (see the “OpFlags” section on page 5-27).

Step 2 Make sure to use default values for the following Cisco ATA parameters:

- TftpURL=0
- UseTftp=1
- DHCP=1

This completes the parameter settings and DHCP options you need to configure for this procedure. The Cisco ATA will contact the DHCP server for the IP address of the TFTP server that contains the Cisco ATA configuration file.

Procedure if DHCP Server is not Under Control of Cisco ATA Administrator

This is the procedure to use if the DHCP server is not under the control of the Cisco ATA administrator, which means that the URL of the TFTP server must be manually configured.

Procedure

Step 1 Using the voice configuration menu, set the parameter TftpURL to the IP address or URL of the TFTP server. For more information on setting the TftpURL parameter, see the "TftpURL" section on page 5-5. For information about using the Cisco ATA voice configuration menu, see the "Voice Configuration Menu" section on page 3-20.

Note If you are not using a DHCP server to provide the TFTP server location, you *must* manually configure the TftfURL. You can do this by using the voice configuration menu without first obtaining network connectivity for the Cisco ATA. If you want to configure this value using the Web configuration page, you first must obtain network connectivity by using the voice configuration menu to statically configure IP address information (see the "Voice Configuration Menu" section on page 3-20).

Step 2 Use the default value of 1 for the Cisco ATA parameter DHCP.

Step 3 Use the default value of 1 for the Cisco ATA parameter UseTftp.

This completes the parameter settings you need to configure for this procedure. The Cisco ATA will contact the manually configured TFTP server that contains the Cisco ATA configuration file.

Other DHCP Options You Can Set

The following parameters can also be configured with DHCP:

- Boot file name of DHCP header—The ata<*macaddress*> binary Cisco ATA configuration file, which can have a maximum of 31 characters and can be any name with printable ASCII characters
- Client PC address
- DHCP option 1—Client Subnet Mask
- DHCP option 3—Routers on the client's subnet
- DHCP option 6—One or two Domain Name servers
- DHCP option 42—One or two Network Time Protocol servers

Note DHCP options 43 and 60 are set by the Cisco ATA. Option 43 specifies the protocol and option 60 identifies the vendor class of the Cisco ATA box.

Without Using a DHCP Server

Use the following procedure if you are not using a DHCP server in your environment but are still using a TFTP server to obtain the Cisco ATA configuration file:

Procedure

Step 1 Set the DHCP parameter to 0.

Step 2 Set the UseTFTP parameter to 1.

Step 3 Set the Cisco ATA parameter TftpURL to the IP address or URL of the TFTP server. For more information on setting the TftpURL parameter, see the "TftpURL" section on page 5-5.

> **Note** If you are not using a DHCP server to provide the TFTP server location, you must manually enter the TftpUrl using either the voice configuration menu or the Web configuration page.

Step 4 If you have done already done so, statically configure the following parameters using the voice configuration menu (see the "Voice Configuration Menu" section on page 3-20). These are the parameters you need to configure for the Cisco ATA to obtain network connectivity:

- StaticIP
- StaticRoute
- StaticNetMask

Other parameters that are normally supplied by DHCP may be provided statically by configuring their values. These parameters are:

- DNS1IP
- DNS2IP
- NTPIP
- AltNTPIP
- Domain

This completes the parameter settings you need to configure in order for the Cisco ATA to contact the TFTP server (without using DHCP) that will contain the configuration file for the Cisco ATA.

Voice Configuration Menu

The main reasons to use the voice configuration menu are to establish IP connectivity for the Cisco ATA if a DHCP server is not being used in your network environment, and to reset the Cisco ATA to its factory values if necessary. You can also use the voice configuration menu if you need to configure a small number of parameters or if the web interface and TFTP configuration are not available.

Note Do not use the voice configuration menu to attempt to change any values that you configured by means of the TFTP configuration file method. Whenever the Cisco ATA refreshes, it downloads its ata<*macaddress*> configuration file or atadefault.cfg default configuration file from the TFTP server, and the values in either of these files will overwrite the values of any corresponding parameters configured with the voice configuration menu.

See Chapter 5, "Parameters and Defaults," for a complete list of parameters and their definitions. Also see Table 4-1 on page 4-5 for an alphabetical listing of configurable features and references to their corresponding parameters.

This section contains the following topics:

- Using the Voice Configuration Menu, page 3-21
- Entering Alphanumeric Values, page 3-22
- Resetting the Cisco ATA to Factory Default Values, page 3-23

Using the Voice Configuration Menu

To manually configure the Cisco ATA by using the voice configuration menu and the telephone keypad, perform the following steps:

Procedure

Step 1 Connect an analog touch-tone phone to the port labeled **Phone 1** on the back of the Cisco ATA.

Step 2 Lift the handset and press the function button located on the top of the Cisco ATA. You should receive the initial voice configuration menu voice prompt.

Step 3 Using the telephone keypad, enter the voice menu code for the parameter that you want to configure or the command that you want to execute, then press #. For a list of voice menu codes, see Appendix A, "Voice Configuration Menu Codes."

Table 3-6 lists the menu options that you need to configure basic IP connectivity for the Cisco ATA, after which you can use the Cisco ATA web configuration page to configure additional parameters.

Note If you are using the voice configuration menu to statically configure the Cisco ATA IP address, you must disable DHCP by setting its value to 0.

Table 3-6 Parameters that Provide Basic IP Connectivity for the Cisco ATA

Voice Menu Number	Features
1	StaticIP—IP address of the Cisco ATA.
2	StaticRoute—Default gateway for the Cisco ATA to use.
10	StaticNetMask—Subnet mask of the Cisco ATA.
20	DHCP—Set value to 0 to disable the use of a DHCP server; set value to 1 to enable DHCP.
21	Review the IP address of the Cisco ATA.

Table 3-6 Parameters that Provide Basic IP Connectivity for the Cisco ATA (continued)

Voice Menu Number	Features
22	Review the default router for the Cisco ATA to use.
23	Review subnet mask of the Cisco ATA.

Step 4 Follow the voice prompts and enter the appropriate values, then press the # key.

Note Use the * key to indicate a delimiter (dot). For example, to enter an IP address of 192.168.3.1, you would enter 192*168*3*1 on your telephone keypad.

Note When entering values for a field that contains a hexadecimal value, you must convert the hexadecimal value to a decimal value in order to enter it into the voice configuration menu system. For example, to enter the hexadecimal value 0x6A, you would enter the number 106 on the telephone keypad.

The voice configuration menu repeats the value you entered, then prompts you to press one of the following keys:

- 1=Change your entered value
- 2=Review your entered value
- 3=Save your entered value
- 4=Review the current saved value

Step 5 Cisco strongly recommends that you set a password. Use the voice menu code 7387277 (SETPASS) to configure a password through the voice configuration menu, after which you are prompted for the password whenever you attempt to change a parameter value.

Step 6 After completing the configuration through the voice configuration menu, press the # key to exit.

Step 7 Hang up the telephone. The Cisco ATA configuration refreshes. The function button fast-blinks when the refresh completes.

Entering Alphanumeric Values

Some voice configuration menu options require you to enter alphanumeric characters. Alphanumeric entry differs from numeric entry because you must press # after each character selected.

If you need to enter an alphanumeric value, the voice prompt tells you to enter an alphanumeric value; otherwise, enter a numeric value (0 to 9).

Table 3-7 lists the keys on a telephone keypad and their respective alphanumeric characters.

Using Table 3-7 as a guide, enter the appropriate number key on the telephone keypad as many times as needed to select the number, letter, or symbol required. For example, to enter 58sQ, you would enter:

```
5 # 8 # 7 7 7 7 7 # 7 7 7 7 7 7 7 # #
```

Table 3-7 Alphanumeric Characters

Key	Alphanumeric Characters
1	1 ./_\ @*space return +-!,?|~^#=$”‘’%<>[] :;{ }()&
2	2 a b c A B C
3	3 d e f D E F
4	4 g h i G H I
5	5 j k l J K L
6	6 m n o M N O
7	7 p q r s P Q R S
8	8 t u v T U V
9	9 w x y z W X Y Z
0	0

Resetting the Cisco ATA to Factory Default Values

It is possible that you may, under some circumstances, want to reset the Cisco ATA to its factory default values. For example, this is the only way to recover a forgotten password without contacting your Cisco representative.

To perform a factory reset, you must use the voice configuration menu and follow these steps:

Procedure

Step 1 Press the function button on the Cisco ATA.

Step 2 Press the digits **322873738** (**FACTRESET**) then press **#** on your telephone keypad.

Step 3 Press * on your telephone keypad to confirm that you want to reset the Cisco ATA, then hang up the phone.

Cisco ATA Web Configuration Page

You can use the Cisco ATA web configuration page in a non-TFTP configuration environment, or in a TFTP configuration environment as a read-only record of individual customer parameters.

You can display the most recent Cisco ATA configuration file from the TFTP server by opening your web browser and typing the following:

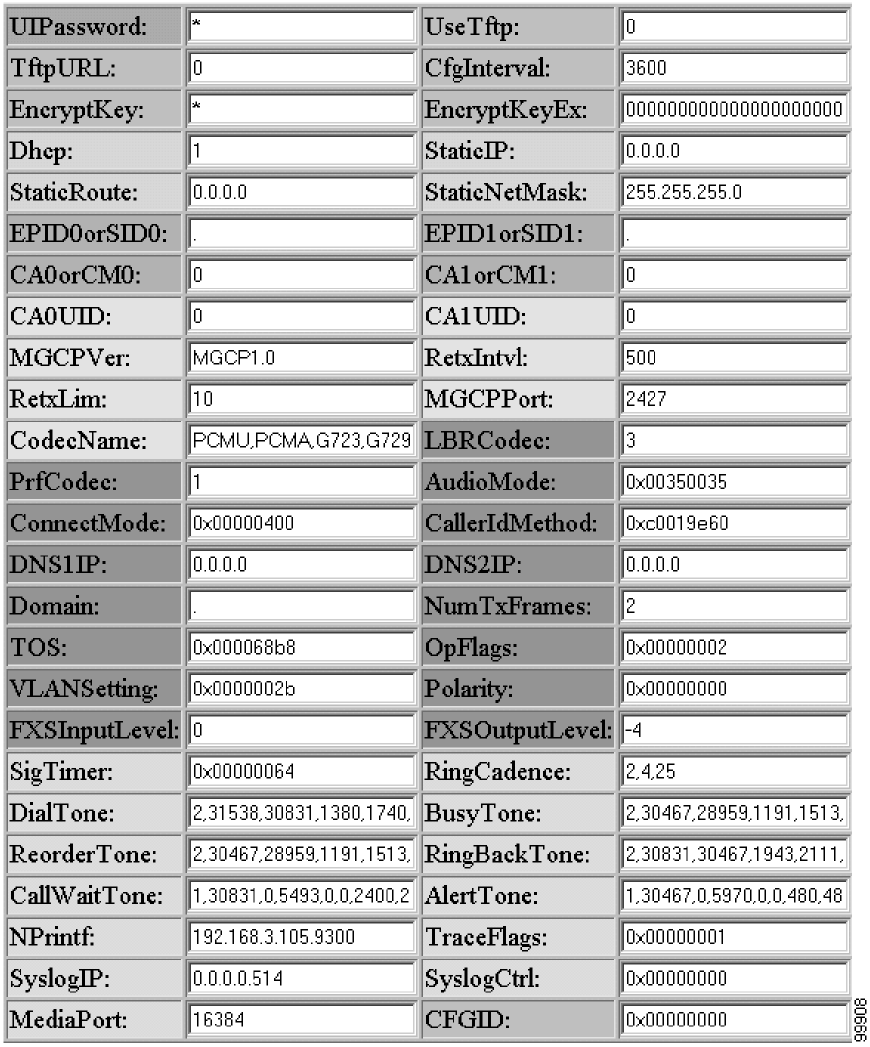
http://<ipaddress>/refresh

where *ipaddress* is the IP address of the Cisco ATA.

Figure 3-1 shows and example of the Cisco ATA web configuration page, which displays all configurable parameters.

Note Do not use the web configuration page to attempt to change any values that you configured by means of the TFTP configuration file method. Whenever the Cisco ATA refreshes, it downloads its ata<*macaddress*> configuration file(s) or atadefault.cfg default configuration file from the TFTP server, and the values in either of these files will overwrite the values of any corresponding parameters configured with the web configuration method.

Figure 3-1 Cisco ATA Web Configuration Page



UIPassword:	*	UseTftp:	0
TftpURL:	0	CfgInterval:	3600
EncryptKey:	*	EncryptKeyEx:	0000000000000000000000
Dhcp:	1	StaticIP:	0.0.0.0
StaticRoute:	0.0.0.0	StaticNetMask:	255.255.255.0
EPID0orSID0:	.	EPID1orSID1:	.
CA0orCM0:	0	CA1orCM1:	0
CA0UID:	0	CA1UID:	0
MGCPVer:	MGCP1.0	RetxIntvl:	500
RetxLim:	10	MGCPPort:	2427
CodecName:	PCMU,PCMA,G723,G729	LBRCodec:	3
PrfCodec:	1	AudioMode:	0x00350035
ConnectMode:	0x00000400	CallerIdMethod:	0xc0019e60
DNS1IP:	0.0.0.0	DNS2IP:	0.0.0.0
Domain:	.	NumTxFrames:	2
TOS:	0x000068b8	OpFlags:	0x00000002
VLANSetting:	0x0000002b	Polarity:	0x00000000
FXSInputLevel:	0	FXSOutputLevel:	-4
SigTimer:	0x00000064	RingCadence:	2,4,25
DialTone:	2,31538,30831,1380,1740,	BusyTone:	2,30467,28959,1191,1513,
ReorderTone:	2,30467,28959,1191,1513,	RingBackTone:	2,30831,30467,1943,2111,
CallWaitTone:	1,30831,0,5493,0,0,2400,2	AlertTone:	1,30467,0,5970,0,0,480,48
NPrintf:	192.168.3.105.9300	TraceFlags:	0x00000001
SyslogIP:	0.0.0.0.514	SyslogCtrl:	0x00000000
MediaPort:	16384	CFGID:	0x00000000

You can access the web configuration page from any graphics-capable browser, such as Microsoft Internet Explorer or Netscape. This provides easy initial access to the Cisco ATA configuration within the administrator's private network.

Follow these steps to set parameters using the web configuration page:

Procedure

Step 1 Make sure that your PC and the Cisco ATA are already networked and visible to each another.

Step 2 Open your web browser.

Step 3 Enter the URL for your configuration page. The default URL for the web server is:

`http://IP Address/dev`

For example, the configuration page for a Cisco ATA with the IP address 192.168.3.225 is:

```
http://192.168.3.225/dev
```

Step 4 Select the values for the items that you want to configure. See Chapter 5, "Parameters and Defaults," for a complete list of parameters and their definitions. Also see Table 4-1 on page 4-5 for an alphabetical listing of configurable features and references to their corresponding parameters.

Note Cisco strongly recommends that you set a password. Use the UIPassword parameter to configure a password, after which you are prompted for the password whenever you attempt to change a parameter value. Configuration parameters cannot be accessed through the voice configuration menu if the password contains one or more letters and can be changed only by using the web interface or the TFTP configuration method.

Step 5 Click **apply** to save your changes.

The Cisco ATA automatically refreshes its configuration.

Step 6 Close your web browser.

Refreshing or Resetting the Cisco ATA

Whenever you make configuration changes to your Cisco ATA configuration file, you can refresh or reset the Cisco ATA for these configuration changes to immediately take effect. If you do not refresh or reset the Cisco ATA, the configuration changes will take effect the next time the Cisco ATA contacts the TFTP server, which occurs based on the configured value of the CfgInterval parameter.

Note A refresh procedure will update the Cisco ATA configuration file. A reset procedure will also update the Cisco ATA configuration file, and will additionally power-down and power-up the Cisco ATA. A reset should not be necessary if your only goal is to update the configuration file.

Procedure to Refresh the Cisco ATA

To refresh the Cisco ATA, enter the following command from your web browser:

http://<*ipaddress*>/refresh

where ***ipaddress*** is the IP address of the Cisco ATA that you are refreshing.

Procedure to Reset the Cisco ATA

To reset the Cisco ATA, enter the following command from your web browser:

http://<*ipaddress*>/reset

where ***ipaddress*** is the IP address of the Cisco ATA that you are resetting.

Obtaining Cisco ATA Configuration File After Failed Attempt

The Cisco ATA uses the following formula for determining how soon to contact the TFTP server for the Cisco ATA configuration file after a failed attempt at getting the file. The result of the formula is called the *random back-off amount*.

```
random back-off amount = CfgInterval + random(min(1800, CfgInterval))
```

where

- *CfgInterval* is the value of the CfgInterval configuration parameter (in seconds). For more information about this parameter, see the “CfgInterval” section on page 5-5.
- random(x) function yields a value between 0 and x-1.
- min(x,y) function yields the smaller value of x and y.

Upgrading the MGCP Signaling Image

For instructions on how to upgrade the Cisco ATA to the most recent MGCP signaling image, refer to the following list:

- To use the recommended TFTP method of upgrading the Cisco ATA, see the “Upgrading the Signaling Image from a TFTP Server” section on page 7-1.
- In the rare instance that you are not using the TFTP server to configure the Cisco ATA and to obtain software upgrades, you must manually upgrade to the latest signaling image immediately after the Cisco ATA boots up. In this case, see the “Upgrading the Signaling Image Manually” section on page 7-2.

Cisco ATA-Supported MGCP Services

This section provides information about basic and additional MGCP services that the Cisco ATA supports:

- Important Basic MGCP Services, page 4-2—This section includes a list of parameters that you must configure in order for the Cisco ATA to function in a MGCP environment.
- Additional MGCP Services, page 4-3—This section contains information about additional, commonly used MGCP features, with references to the parameters for configuring these services.
- Complete Reference Table of all Cisco ATA MGCP Services, page 4-5—This section contains a complete listing of Cisco ATA services supported for MGCP, and includes cross references to the parameters for configuring these services. This section includes services not described in the sections about the key basic MGCP services and the commonly used additional MGCP services.
- Supported MGCP Connection Modes, page 4-7—This section provides a list of MGCP connection modes that the Cisco ATA supports.
- Supported Local Connection Options, page 4-7—This section provides a list of local connection options that the Cisco ATA supports for the MGCP LocalConnectionOption parameter.
- Supported Signals and Events, page 4-7—This section lists MGCP software packages that the Cisco ATA supports.
- Commands Supported with MGCP, page 4-10—This section lists the commands that the Cisco ATA supports for communication with the MGCP Call Agent.
- MGCP Embedded Events, page 4-12—This section describes how to use embedded events to reduce response time and increase bandwith efficiency of MGCP signaling.

Note For detailed information about these MGCP features and commands, refer to the MGCP Call Agent documentation from the service provider.

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Important Basic MGCP Services

This section provides descriptions and cross references for configuring required MGCP parameters and also for configuring other MGCP services:

- Required Parameters, page 4-2
- Setting the Codec, page 4-2
- Configuring Refresh Interval, page 4-2

Required Parameters

You must configure the following parameters for the Cisco ATA to work properly in MGCP mode:

- EPID0orSID0 and EPID1orSID1, page 5-14—Use these parameters to specify the alphanumeric endpoint identifiers assigned to the port 0 (called **Phone 1** on the Cisco ATA) and port 1 (**Phone 2**) Cisco ATA FXS ports, respectively. The default dot (.) value of these parameters means that the Cisco ATA uses the standard MGCP naming convention for endpoints. For EPID0orSID0, the default endpoint name is *aaln/0;* for EPID1orSID1, the default endpoint name is *aaln/1*.

  The complete endpoint identifier sent to the Call Agent has the format:

  <EPID*x*>@<ip_addr>

  where *x* is port 0 or port 1 of the Cisco ATA, and ip_addr is the IP address of the MGCP endpoint.

  For more information about endpoints and connections, see the "Endpoints and Connections" section on page 4-3.

  Note Setting the EPID0orSID0 and EPID1orSID1 parameters to 0 will not disable the phone lines.

- CA0UID, page 5-13—Set this parameter to the IP address or URL of the primary Call Agent. This parameter can also include a port number (default port is 2727). Separate the IP address from the port with a colon (:).

Note See Chapter 5, "Parameters and Defaults," for additional information about all Cisco ATA parameters.

Setting the Codec

The LBRCodec (low-bit-rate codec) parameter determines whether the G.723 or G.729A codec, in addition to G.711A-law and G.711µ-law, can be used for receiving and transmitting. For configuration information, see the "LBRCodec" section on page 5-15.

Configuring Refresh Interval

When the value specified in the CfgInterval parameter is reached, the Cisco ATA attempts to refresh its configuration file from the TFTP server. By opening a web page for the Cisco ATA, you can perform a refresh before the scheduled refresh. Set the CfgInterval parameter to an interval value (in seconds) for refreshing the Cisco ATA configuration file. Cisco recommends that the interval be semi-random to prevent many simultaneous contacts with the TFTP server. For more information, see the "CfgInterval" section on page 5-5.

When the Cisco ATA contacts the TFTP server, it also checks to see if an upgrade signaling image has been placed on the TFTP server. If such an image exists, the Cisco ATA will download this image.

Additional MGCP Services

This section provides information about MGCP features that the Cisco ATA supports as well as descriptions of Cisco ATA behavior in an MGCP environment. This section contains the following topics:

- Endpoints and Connections, page 4-3
- MGCP Endpoint Device Type, page 4-4
- Call Agent Redundancy with Configuration Parameters, page 4-4
- Cisco ATA Registration Process with MGCP, page 4-4

Endpoints and Connections

The Cisco ATA has two telephone Foreign Exchange Station (FXS) ports. These ports are called port 0 and port 1. Port 0 is labeled **Phone 1** on the Cisco ATA and port 1 is labeled **Phone 2**. Each port is an MGCP endpoint: Port 0 is MGCP endpoint 0, and port 1 is MGCP endpoint 1. The configurable parameters for MCGP endpoints are as follows:

- EPID0orSID0—for MGCP endpoint 0 (see the "EPID0orSID0 and EPID1orSID1" section on page 5-14).
- EPID1orSID1—for MGCP endpoint 1 (see the "EPID0orSID0 and EPID1orSID1" section on page 5-14).

Each MGCP endpoint supports one device, either an analog phone set or a fax machine, and up to two connections per device are allowed.

Each connection has a fixed ID, either 0, 1, 2, or 3. Connection IDs 0 and are 2 assigned to MGCP endpoint 0, and connection IDs 1 and 3 are assigned to MGCP endpoint 1.

The IP address of each MGCP endpoint identifier can be enclosed by square brackets by setting Bit 20 of the ConnectMode, enabling the use of square brackets. The use of brackets is disabled by default. (For more information, see the "ConnectMode" section on page 5-24.)

Example

This example shows an EPID1orSID1 parameter value with brackets around the IP address of the endpoint:

```
aaln/1@[128.107.139.111]
```

MGCP Endpoint Device Type

To request the device type from the Cisco ATA, the Call Agent must use the following syntax in the RequestedInfo (F:) parameter line of an AUEP command:

```
F: X-UA
```

The Cisco ATA responds with the following device-type:

```
X-UA: Cisco/ATA186
```

Call Agent Redundancy with Configuration Parameters

Call Agent (CA) redundancy is supported in two ways. You can use the following sets of parameters to configure the primary and secondary CA IP addresses or URLs:

- CA0orCM0, page 5-12, and CA0UID, page 5-13
- CA1orCM1, page 5-13, and CA1UID, page 5-14

If the CA is identified with the format CallAgentName@HostName, enter the CA name in the CAxUID parameter and enter the HostName in the CAxorCMx parameter (x is 0 or 1).

If the CA is identified using a URL, enter the URL in the CAxorCMx parameter. An optional port number can also be entered in the format CAxorCMx:Port# (x is 0 or 1).

When the Cisco ATA power ups or performs a configuration update, it tries to contact the primary CA at CA0orCM0. If there is no response or the address is not reachable, the Cisco ATA then tries to contact the secondary CA. The Cisco ATA continues to alternate attempts to contact the primary and secondary CAs until it gets a response.

If the CAxorCMx parameter is configured with a URL, the Cisco ATA contacts the DNS server to resolve the name. The Cisco ATA accepts up to four IP addresses from the DNS server. During operation, if contact is lost between the Cisco ATA and its CA, the Cisco ATA uses an exponential timeout period on each attempt to reach the CA at the IP addresses. The Cisco ATA cycles through the IP addresses until it gets a response.

Cisco ATA Registration Process with MGCP

When the Cisco ATA powers up, each MGCP endpoint is in a *disconnected* state. The Cisco ATA sends a Restart in Progress (RSIP) command for each MGCP endpoint to the preconfigured Call Agent using one of the following syntax definitions, selected by using Bit 24 in the ConnectMode parameter (see the “ConnectMode” section on page 5-24):

Syntax Type 1

```
RSIP EPID0@ip_address MGCPVersion
RM: restart
```

and

```
RSIP EPID1@ip_address MGCPVersion
RM: restart
```

Syntax Type 2

```
RSIP *@ip_address MGCPVersion
RM: restart
```

Upon a successful response from the Call Agent to the RSIP command, the Cisco ATA places each MGCP endpoint into the *connected* state and resumes normal operation. Destinations of subsequent Cisco ATA commands to the Call Agent are set according to the NotifyEntity header. Call Agent responses are always sent to the source address of the origin of the command.

If the Cisco ATA does not receive a Call Agent response to a subsequent command when the maximum number of retransmissions of the command times out, the Cisco ATA puts both Call Agent endpoints back into the *disconnected* state. The Cisco ATA then sends RSIP messages to the destinations indicated in the NotifyEntity header. This is shown in the following example:

RSIP Message for Disconnect State

```
RSIP *@ip_address MGCPVersion
RM: disconnected
```

Complete Reference Table of all Cisco ATA MGCP Services

Table 4-1 is a reference table that lists all configurable features for the Cisco ATA (using MGCP), and includes links to the detailed descriptions of the parameters used for configuring these features.

Table 4-1 Configurable Features and Related Parameters for MGCP

Configurable Feature	Related Parameter
Caller ID format	CallerIdMethod, page 5-21
Call waiting	SigTimer, page 5-26
Cisco Discovery Protocol—disabling	OpFlags, page 5-27
Codec—Specify default preferred codec	PrfCodec, page 5-15
Codec names to use in LocalConnectionOption command	CodecName, page 5-19
Configuration-update interval	CfgInterval, page 5-5
DHCP usage—disabling	DHCP, page 5-8
Debug messages—configuring host	NPrintf, page 5-40
DNS name resolution	OpFlags, page 5-27
Domain name server	DNS1IP, page 5-10
Domain name of endpoint ID	Domain, page 5-18
Dual Tone Multi-frequency (DTMF) method	AudioMode, page 5-20
Encryption	EncryptKey, page 5-6, EncryptKeyEx, page 5-7
Endpoint-identifier specification	EPID0orSID0 and EPID1orSID1, page 5-14 (Also see the "Endpoints and Connections" section on page 4-3.)
Fax CED tone detection Fax CNG tone detection	AudioMode, page 5-20

Table 4-1 Configurable Features and Related Parameters for MGCP (continued)

Configurable Feature	Related Parameter
Fax pass-through	AudioMode, page 5-20 ConnectMode, page 5-24
G.711 codec	AudioMode, page 5-20
G.711 silence suppression	AudioMode, page 5-20
Hook-flash event time requirements	SigTimer, page 5-26
ID of primary Call Agent	CA0orCM0, page 5-12
ID of secondary Call Agent	CA1orCM1, page 5-13
Listening port for MGCP commands	MGCPPort, page 5-16
Low bit-rate codec selection	LBRCodec, page 5-15
MGCP version string identifier	MGCPVer, page 5-18
Mid-call service style—Bellcore, Cisco VG248 or Cisco ATA	ConnectMode, page 5-24
Named Signaling Event (NSE) payload number	ConnectMode, page 5-24
Registration	ConnectMode, page 5-24 (Also see the “Endpoints and Connections” section on page 4-3 and the “Cisco ATA Registration Process with MGCP” section on page 4-4.)
Ring-cadence pattern	RingCadence, page 5-40
Real-Time Transfer Protocol (RTP) media port	MediaPort, page 5-17
Real-Time Transfer Protocol (RTP) packet size	NumTxFrames, page 5-21
Retransmission interval for MGCP commands	RetxIntvl, page 5-17
Retransmission of commands—Maximum number of times to retransmit	RetxLim, page 5-17
Secondary domain name server	DNS2IP, page 5-11
Static network router probe	OpFlags, page 5-27
TFTP file—Set to not use internally generated name	OpFlags, page 5-27
Tones: BusyTone, CallWaitTone ConfirmTone, DialTone, ReorderTone, and RingBackTone parameters	Tone Configuration Parameters, page 5-29
Tracing	TraceFlags, page 5-41
Type of Service (TOS) bits	TOS, page 5-29
VLAN encapsulation	OpFlags, page 5-27
VLAN 802.1Qtags VLAN UDP and TCP COS fields	OpFlags, page 5-27
VLAN mode	OpFlags, page 5-27
Web configuration—disallowing	OpFlags, page 5-27

Supported MGCP Connection Modes

The Cisco ATA supports the following MGCP connection modes:

- SendOnly
- RecvOnly
- SendRecv
- Inactive
- Confrnce

Supported Local Connection Options

The Cisco ATA supports the following local connection options for the MGCP LocalConnectionOption parameter:

- Codec type: a
- TOS: t
- Packet size: p
- Echo canceller: e
- Silence suppression: s

The LocalConnectionOption parameter is used as "L:" in an MGCP message. The "L:" parameter provides information for the connection, such as packetization period, codec to use, turning echo cancellation on and off, and turning silence suppression on and off.

Related CIsco ATA Parameter

CodecName, page 5-19—Use this parameter to specify the encoders and decoders to use in the LocalConnectionOption parameter.

Supported Signals and Events

The Cisco ATA supports the following persistent events:

- On-hook transition (hu)
- Off-hook transition (hd)
- Hookflash (hf)

The Call Agent must request all other notified events:

- E: Event
- ES: Event with auditable event state
- BR: Brief signal
- OO: On/off signal
- TO: Timeout signal
- C: Event or signal applicable to a connection

Note By default, hu, hd, and hf are set as persistent events. These events can be disabled by setting bits 18 and 19 in the Cisco ATA ConnectMode parameter. For more information, see the "ConnectMode" section on page 5-24.

The applicable signals and events are included in the following sections, which show the software packages of commands that the Cisco ATA supports:

- NCS 1.0 L-Package Supported by the Cisco ATA with MGCP, page 4-8
- MGCP 0.1-1.0 L-Package Supported by the Cisco ATA with MGCP, page 4-9
- MGCP 0.1-1.0 G-Package Supported by the Cisco ATA with MGCP, page 4-9
- MGCP 0.1-1.0 D-Package Supported by the Cisco ATA with MGCP, page 4-10

NCS 1.0 L-Package Supported by the Cisco ATA with MGCP

Table 4-2 Network-Based Call Signaling (NCS) 1.0 L-Package

Code	Description	Type
0-9,*,#, A, B, C, D	Dual tone multifrequency (DTMF) tones	E, BR
bz	Busy tone	TO
cf	Confirmation tone	BR
ci (ti, nu, na)	Caller ID (on-hook or off-hook)	BR
dl	Dial tone	TO
ft	Fax answer tone (2100 Hz)	E
hd	Off-hook transition	ES
hf	Hookflash	E
hu	On-hook transition	ES
l	DTMF long-duration	E
ld	Long-duration connection	E, C
mwi	Message-waiting indication tone	TO
oc	Operation complete	E
of	Operation failed	E
ot	Off-hook warning	TO
r0-r7	Distinctive ringing	TO
rg	Ringing	TO
ro	Reorder tone	TO
rs	Ring splash	BR
rt	Ringback tone	TO, C
sl	Intermittent dial tone	TO
t	Timer (DTMF input)	E

Table 4-2 Network-Based Call Signaling (NCS) 1.0 L-Package (continued)

Code	Description	Type
wt1, wt2, wt3, wt4	Call-waiting tone	TO
x	DTMF tones wildcard	E

MGCP 0.1-1.0 L-Package Supported by the Cisco ATA with MGCP

Table 4-3 MGCP 0.1-1.0 L-Package

Code	Description	Type
bz	Busy tone	TO
ci (ti, nu, na)	Caller ID (on-hook or off-hook)	BR
dl	Dial tone	TO
hd	Off-hook transition	ES
hf	Hook flash	E
hu	On-hook transition	ES
mwi	Message-waiting indication tone	BR
nbz	Network busy tone	TO
oc	Operation complete	E
of	Operation failed	E
ot	Off-hook warning	TO
r0-r7	Distinctive ringing	TO
rg	Ringing	TO
ro	Reorder tone	TO
rs	Ring splash	BR
sl, sdl	Intermittent dial tone	TO
wt	Call-waiting tone	TO
wt1, wt2, wt3, wt4	Alternative call-waiting tone	TO

MGCP 0.1-1.0 G-Package Supported by the Cisco ATA with MGCP

Table 4-4 MGCP 0.1-1.0 G-Package

Code	Description	Type
cf	Confirmation tone	BR
cg	Network congestion tone	TO
ft	Fax answer tone (2100 Hz)	E
ld	Long-duration connection	E, C
oc	Operation complete	E

Table 4-4 MGCP 0.1-1.0 G-Package (continued)

Code	Description	Type
of	Operation failed	E
rbk(###)	rt@connection id	TO, C
rt	Ringback tone	TO, C

MGCP 0.1-1.0 D-Package Supported by the Cisco ATA with MGCP

Table 4-5 MGCP 0.1-1.0 D-Package

Code	Description	Type
0-9, *, #, A, B, C, D	DTMF tones	E, BR
l	DTMF long-duration	E
of	Operation failed	E
t	Timer (DTMF input)	E
x	DTMF tones 0-9 wildcard	E

Commands Supported with MGCP

The Cisco ATA supports the following commands for communication with the Call Agent:

- CRCX (Create Connection)
- MDCX (Modify Connection)
- DLCX (Delete Connection)
- RQNT (Notification Request)
- AUEP (Audit Endpoint)
- AUCX (Audit Connection)
- NTFY (Notify)
- RSIP (Restart in Progress)

These commands are included in the following sections, which list various categories of parameters and the commands in which they are used:

- Parameters in Commands Sent to the Call Agent, page 4-11
- Parameters in Responses Sent to the Call Agent, page 4-11
- Parameters in Commands Received from the Call Agent Processed by the Cisco ATA, page 4-12
- Parameters in Responses Received from the Call Agent Processed by the Cisco ATA, page 4-12

Parameters in Commands Sent to the Call Agent

Table 4-6 Parameters in Commands Sent to the Call Agent

Parameter	Usage
ResponseAck	NTFY (notify). Supported for 1.0 and NCS.
RequestIdentifier	NTFY, RQNT
ObservedEvents	NTFY
RestartMethod	RSIP

Parameters in Responses Sent to the Call Agent

Table 4-7 Parameters in Responses Sent to the Call Agent

Parameter	Usage
ConnectionID	CRCX
LocalConnectionDescriptor	CRCX, MDCX
DeviceType	AUEP
CallId	AUCX
Connection Mode	AUCX
Request Identifier	AUEP
Requested Events	AUEP
Signal Requests	AUEP
Notified Entity	AUEP
Digit Map	AUEP
Detect Events	AUEP
Event State	AUEP
Capability	AUEP

Parameters in Commands Received from the Call Agent Processed by the Cisco ATA

Table 4-8 Parameters in Commands Received from the Call Agent Processed by the Cisco ATA

Parameter	Usage
ResponseAck	CRCX, MDCX, DLCX, RQNT, AUEP, AUCX
CallId	CRCX, MDCX, DLCX
ConnectionID	MDCX, DLCX, AUCX
RequestIdentifier	CRCX, MDCX, DLCX, RQNT
LocalConnectionOption	CRCX, MDCX
ConnectionMode	CRCX, MDCX
RequestedEvents	CRCX, MDCX, DLCX, RQNT
SignalRequests	CRCX, MDCX, DLCX, RQNT
NotifiedEntity	CRCX, MDCX, DLCX, RQNT
DigitMap	CRCX, MDCX, DLCX, RQNT
RequestedInfo	AUEP, AUCX
QuarantineHandling	CRCX, MDCX, DLCX, RQNT
DetectEvents	CRCX, MDCX, DLCX, RQNT
RemoteConnectionDescriptor	CRCX, MDCX

Parameters in Responses Received from the Call Agent Processed by the Cisco ATA

Table 4-9 Parameters in Responses Received from the Call Agent Processed by the Cisco ATA

Parameter	Usage
ResponseAck	DLCX, NTFY (1.0, NCS)
NotifiedEntity	RSIP

MGCP Embedded Events

The embedded event action (E) can be used to reduce response time and increase bandwidth efficiency of MGCP signaling.

Without embedded events, multiple MGCP messages would be required to achieve the same behavior that one message with embedded events can achieve. Also, the time for a dial tone to sound after the user goes off-hook is delayed when embedded events are not used in MGCP messages.

The Cisco ATA supports one level of embedded commands that are compliant with the MGCP 1.0 and MGCP 1.0 NCS profiles. An embedded NotificationRequest that adheres to this limitation must not contain another embedded NotificationRequest.

The service provider has the responsibility of configuring the MGCP Call Agent.

```
Example
R: hd(A, E(S(dl), R(oc, [0-9#T](D)), D((1xxxxxxxxxx|9011x.T))))
```

In this example, the Cisco ATA requests to be notified of an off-hook event, at which time the Cisco ATA directs the end-point device to play a dial tone and to collect DTMF digits on such event.

Note The Cisco ATA does not need to be configured to handle MGCP embedded events.

CHAPTER 5

Parameters and Defaults

This section provides information on the parameters and defaults that you can use to create your own Cisco ATA configuration file. This section also includes the voice configuration menu code for each parameter that has such a code.

Parameters are divided into categories based on their functionality. The following categories of parameters are covered in this section:

- User Interface (UI) Security Parameter, page 5-3
- Parameters for Configuration Method and Encryption, page 5-4
- Network Configuration Parameters, page 5-8
- MGCP Configuration Parameters, page 5-12
- Audio Configuration Parameters, page 5-19
- Operational Parameters, page 5-21
- Tone Configuration Parameters, page 5-29
- Diagnostic Parameters, page 5-40
- CFGID—Version Parameter for Cisco ATA Configuration File, page 5-43

The following list contains general configuration information:

- Your configuration file must begin with **#txt**.
- The Cisco ATA uses the following parameter types:
  - Alphanumeric string
  - Array of short integers separated by commas
  - Boolean (1 or 0)
  - Bitmap value—unsigned hexadecimal integer (for specifying bits in a 32-bit integer)

    Note Bits are numbered from right to left, starting with bit 0.

    Note A tool called bitaid.exe is bundled with your Cisco ATA software. You can use this tool to help you configure values of Cisco ATA bitmap parameters. The tool prompts you for the necessary information.

  - Extended IP address—IP address followed by port number (for example, 192.168.2.170.9001)

- IP address (e.g. 192.168.2.170)
- Integer (32-bit integer)
- Numeric digit string

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Note This section contains recommended values for the United States and other countries as configuration examples for certain parameters. For detailed recommendations of tone-parameter values by country, see Appendix D, "Recommended Cisco ATA Tone Parameter Values by Country."

Configuration Text File Template

This is a listing of the mgcp_example.txt text file, without its annotations, that comes bundled with the Cisco ATA software.

You can make a copy of this file and use it as a template for creating your own default configuration file or Cisco ATA-specific configuration file. For instructions on how to create these configuration files, see the "Creating Unique and Common Cisco ATA Configuration Files" section on page 3-9.

The mgcp_example.txt file contains all the Cisco ATA default values. A configuration file must begin with **#txt** so that the formatting tool, cfgfmt.exe, treats the file as a text file. The sections that follow this listing describe all the parameters in this file.

```
#txt
UIPassword:0
UseTftp:1
TftpURL:0
CfgInterval:3600
EncryptKey:0
upgradecode:0,0x301,0x0400,0x0200,0.0.0.0,69,0,none
upgradelang:0,0x301,0x0400,0x0200,0.0.0.0,69,0,none
Dhcp:1
StaticIp:0
StaticRoute:0
StaticNetMask:0
DNS1IP:0.0.0.0
DNS2IP:0.0.0.0
VLANSetting:0x0000002b
CA0orCM0:0
CA1orCM1:0
CA0UID:0
CA1UID:0
EPID0orSID0:.
EPID1orSID1:.
PrfCodec:1
LBRCodec:3
MGCPPort:2427
MediaPort:16384
RetxIntvl:500
RetxLim:10
MGCPVer:MGCP1.0
Domain:.
```

```
CodecName:PCMU,PCMA,G723,G729
AudioMode:0x00350035
NumTxFrames:2
CallerIdMethod:0x00019e60
Polarity:0
FXSInputLevel:-1
FXSOutputLevel:-4
ConnectMode:0x00000400
SigTimer:0x00000064
OpFlags:0x00000002
TOS:0x000068B8
DialTone:2,31538,30831,1380,1740,1,0,0,1000
BusyTone:2,30467,28959,1191,1513,0,4000,4000,0
ReorderTone:2,30467,28959,1191,1513,0,2000,2000,0
RingBackTone:2,30831,30467,1943,2111,0,16000,32000,0
CallWaitTone:1,30831,0,5493,0,0,2400,2400,4800
AlertTone:1,30467,0,5970,0,0,480,480,1920
RingCadence:2,4,25
NPrintf:0
TraceFlags:0x00000000
SyslogIP:0.0.0.0.514
SyslogCtrl:0x00000000
```

User Interface (UI) Security Parameter

This parameter type contains one parameter—UIPassword.

UIPassword

Description

This parameter controls access to web page or voice configuration menu interface. To set a password, enter a value other than 0.

To clear a password, change the value to 0.

You cannot recover a forgotten password unless you reset the entire configuration of the Cisco ATA (see the "Resetting the Cisco ATA to Factory Default Values" section on page 3-23).

Note When UIPassword contains letters, you cannot enter the password from the telephone keypad.

Value Type

Alphanumeric string

Range

Maximum nine characters

Default

0

Voice Configuration Menu Access Code

7387277

Parameters for Configuration Method and Encryption

This section describes parameters for instructing the Cisco ATA how to locate its TFTP server and how to encrypt its configuration file. These parameters are:

- UseTFTP, page 5-4
- TftpURL, page 5-5
- CfgInterval, page 5-5
- EncryptKey, page 5-6
- EncryptKeyEx, page 5-7

UseTFTP

Settings

1—Use the TFTP server for Cisco ATA configuration.

0—Do not use the TFTP server for Cisco ATA configuration.

Value Type

Boolean

Range

0 or 1

Default

1

Voice Configuration Menu Access Code

305

Related Parameters

- TftpURL, page 5-5
- EncryptKey, page 5-6
- OpFlags, page 5-27—Bits 0 and 3

TftpURL

Description

Use this parameter to specify the IP address or URL of the TFTP server. This string is needed if the DHCP server does not provide the TFTP server IP address. When the TftpURL parameter is set to a non-zero value, this parameter has priority over the TFTP server IP address supplied by the DHCP server.

Optionally, you can include the path prefix on the TFTP server from which the Cisco ATA will download its configuration file.

For example, if the TFTP server IP address is 192.168.2.170 or www.cisco.com, and the path prefix for the configuration file on the TFTP server is in /ata186, you can specify the URL as 192.168.2.170/ata186 or www.cisco.com/ata186.

Note From the voice configuration menu, you can only enter the IP address; from the Web configuration page, you can enter the actual URL.

Value Type

Alphanumeric string

Range

Maximum 31 characters

Default

0

Voice Configuration Menu Access Code

905

Related Parameters

- UseTFTP, page 5-4
- CfgInterval, page 5-5

CfgInterval

Description

Use this parameter to specify the number of seconds between each configuration update. The Cisco ATA will also upgrade its signaling image it it detects that the TFTP server contains an upgraded image.

When using TFTP for configuration, the Cisco ATA contacts TFTP each time the interval expires to get its configuration file.

You can set CfgInterval to a random value to achieve random contact intervals from the Cisco ATA to the TFTP server.

Value Type

Decimal

Range

60 to 4294967295

Default

3600

Voice Configuration Menu Access Code

80002

EncryptKey

Description

This parameter specifies the encryption key that is used to encrypt the Cisco ATA configuration file on the TFTP server.

The cfgfmt tool, which is used to create a Cisco ATA binary configuration file (see the), automatically encrypts the binary file when the EncryptKey parameter has a value other than 0. The cfgfmt tool uses the rc4 encryption algorithm.

If this parameter value is set to 0, the Cisco ATA configuration file on the TFTP server is not encrypted.

Note Cisco recommends using the stronger Cisco ATA encryption method, which requires the use of the EncryptKeyEx parameter. For more information, see the "EncryptKeyEx" section on page 5-7.

For examples on how to upgrade from the EncryptKey parameter to the stronger encryption method that uses the EncryptKeyEx parameter, see the "Examples of Upgrading to Stronger Encryption Key" section on page 3-15.

Value Type

Hexadecimal string

Range

Maximum number of characters: 8

Default

0

Voice Configuration Menu Access Code

320

Related Parameters

- UseTFTP, page 5-4
- TftpURL, page 5-5
- EncryptKeyEx, page 5-7

EncryptKeyEx

Description

This parameter specifies an encryption key that is stronger than the key specified with the EncryptKey parameter. This stronger key is used to encrypt the Cisco ATA configuration file on the TFTP server.

Note Cisco recommends using the EncrpytKeyEx parameter instead of the EncryptKey parameter for the strongest possible encryption of the Cisco ATA configuration file.

When the EncryptKeyEx parameter is set to a non-zero value, the Cisco ATA uses this value as the encryption key and ignores any value that has been set for the EncryptKey parameter. The cfgfmt tool, which is used to create a Cisco ATA binary configuration file (see the "Using Encryption With the cfgfmt Tool" section on page 3-12), automatically encrypts the binary file using the stronger rc4 encryption algorithm.

When EncryptKeyEx is used for encryption, the Cisco ATA searches for the configuration file with the format ata<*macaddress*>.x. on the TFTP server.

If the value of the EncryptKeyEx parameter is 0, then the Cisco ATA uses the value of the EncryptKey parameter for encryption.

Note The cfgfmt tool (version 2.3) program generate an ata<*macaddress*>.x file in addition to an ata<*macaddress*> file if the EncryptKeyEx parameter is specified. You should place both such configuration files on the TFTP server.

For examples on how to upgrade from the EncryptKey parameter to the stronger encryption method that uses the EncryptKeyEx parameter, see the "Examples of Upgrading to Stronger Encryption Key" section on page 3-15.

Value Type

Hexadecimal string of the form:

Rc4PasswdInHex/macinHex_*12*

- rc4KeyInHex_n is a hexadecimal string of one to 64 characters.
- /macInHex_12 is the optional extension consisting of a forward slash (**/**) followed by the six-byte MAC address of the Cisco ATA to which the configuration file will be downloaded.

Range

Maximum number of characters: 64

Default

0

Voice Configuration Menu Access Code

Not applicable for this parameter.

Related Parameters

- UseTFTP, page 5-4
- TftpURL, page 5-5
- EncryptKey, page 5-6

Network Configuration Parameters

This section includes the parameters for enabling or disabling the use of a DHCP server to obtain IP address information, and parameters that you need to statically configure if you disable DHCP:

- DHCP, page 5-8
- StaticIp, page 5-9
- StaticRoute, page 5-9
- StaticNetMask, page 5-10
- DNS1IP, page 5-10
- TOS, page 5-29
- VLAN Setting, page 5-11

DHCP

Description

This parameter can be used to automatically set the IP address of the Cisco ATA, the network route IP address, the subnet mask, DNS, NTP, TFTP, and other parameters.

- 1—Enable DHCP
- 0—Disable DHCP

Value Type

Boolean

Range

0 or 1

Default

1

Voice Configuration Menu Access Code

20

Related Parameters

- StaticIp, page 5-9
- StaticRoute, page 5-9
- StaticNetMask, page 5-10
- OpFlags, page 5-27 (bits 3 and 11)

StaticIp

Description

Configure the Cisco ATA IP address using this parameter if the DHCP parameter is set to 0.

Value Type

IP address

Default

0.0.0.0

Voice Configuration Menu Access Code

1

Related Parameters

- DHCP, page 5-8
- StaticRoute, page 5-9
- StaticNetMask, page 5-10

StaticRoute

Description

Configure the Cisco ATA statically assigned route in this parameter if the DHCP parameter is set to 0.

Value Type

IP address

Default

0.0.0.0

Voice Configuration Menu Access Code

2

Related Parameters

- DHCP, page 5-8
- StaticIp, page 5-9
- StaticNetMask, page 5-10

StaticNetMask

Description

Configure the statically assigned subnet mask using this parameter if the DHCP parameter is set to 0.

Value Type

IP address

Default

255.255.255.0

Voice Configuration Menu Access Code

10

Related Parameters

- DHCP, page 5-8
- StaticIp, page 5-9
- StaticRoute, page 5-9

DNS1IP

Description

This parameter is for setting the primary domain name server (DNS) IP address, if the DHCP server does not provide one. If DHCP provides DNS1IP (and if it is non-zero), this parameter overwrites the DHCP-supplied value. You *cannot* specify a port parameter. The Cisco ATA uses the default DNS port only.

Value Type

IP address

Default

0.0.0.0

Voice Configuration Menu Access Code

916

DNS2IP

Description

This parameter is for setting the secondary domain name server (DNS) IP address, if the DHCP server does not provide one. If DHCP provides DNS2IP (if it is non-zero), this parameter overwrites the DHCP-supplied value. You cannot specify a port parameter. The Cisco ATA uses the default DNS port only.

Value Type

IP address

Default

0.0.0.0

Voice Configuration Menu Access Code

917

VLAN Setting

Description

This parameter is for software versions 2.14.ms, 2.15.ms, and later.

Bitmap definitions are as follows for the VLAN Setting parameter:

- Bits 0-2—Specify VLAN Class of Service (CoS) bit value (802.1P priority) for signaling IP packets.
- Bits 3-5—Specify VLAN CoS bit value (802.1P priority) for voice IP packets.
- Bits 6-17—Reserved.
- Bits 18-29—User-specified 802.1Q VLAN ID.
- Bits 30-31—Reserved.

Value Type

Bitmap

Default

0x0000002b

Voice Configuration Menu Access Code

324

Related parameter

OpFlags, page 5-27

MGCP Configuration Parameters

This section describes the following parameters, which include Call Agent parameters:

CA0orCM0

Description

Specify the primary Call Agent in this parameter. This parameter must be an IP address or URL and may include a port parameter. The default port number is 2727.

If you specify a port, you must separate the port number from the host IP address with a colon (:).

Examples

Examples of CA0orCM0 values follow:

- 192.168.1.2:2727
- ca.cisco.com.

Value Type

Alphanumeric string

Range

Maximum 31 characters

Default

0

Voice Configuration Menu Access Code

5

CA1orCM1

Description

Specify the alternate Call Agent in this parameter. This parameter must be an IP address or URL and may include a port parameter. The default port number is 2727.

If you specify a port, you must separate the port number from the host IP address with a colon (:).

Note If no alternate Call Agent exists, this parameter value must be 0.

Examples

Examples of CA1orCM1 values follow:

- 192.168.1.2:2727
- ca.cisco.com.

Value Type

Alphanumeric string

Range

Maximum 31 characters

Default

0

Voice Configuration Menu Access Code

6

CA0UID

Description

Specify the ID of the primary Call Agent in this parameter.

Value Type

Alphanumeric string

Range

Maximum 31 characters

CA1UID

Description

Specify the ID of the secondary Call Agent in this parameter.

Value Type

Alphanumeric string

Range

Maximum 31 characters

EPID0orSID0 and EPID1orSID1

Description

EPID*x* (for MGCP only) specifies the alphanumeric Endpoint Identifier assigned to line *x* of the Cisco ATA, where *x*=0 or 1. The complete Endpoint Identifier sent to the Call Agent has the format <EPID*x*>@<ip_addr>. (SID*x* does not apply to MGCP.) To enable the usage of square brackets around the IP address of the endpoint, enable Bit 20 of the ConnectMode parameter. (See the "ConnectMode" section on page 5-24.)

Note Setting the EPID0orSID0 or EPID1orSID1 parameter to 0 does not disable the respective line.

Value Types

Alphanumeric string for each parameter

Default

.—The dot is the default and means that the value of aaln/1 is used as the MGCP endpoint ID for EPID1 and aaln/2 is used as the MGCP endpoint name for EPID2.

Range

Maximum 51 characters for each parameter

Voice Configuration Menu Access Codes

46 and 47 for EPID0orSID0 and EPID1orSID1, respectively

PrfCodec

Description

This parameter specifies the default preferred codec. The preferred codec is used only when the Call Agent does not provide a list of preferred codecs in the Local Connection Options 'a' parameter and when the remote party does not include a codec preference in its SDP.

The following values are valid:

0=G.723.1 (only if LBRCodec=0)

1=G.711A-law

2=G.711u-law

3=G.729a (only if LBRCodec=3)

Value Type

Integer

Range

0 to 3

Default

1

Voice Configuration Menu Access Code

36

LBRCodec

Description

This parameter is used for selecting the low-bit-rate codec. The following values are valid:

- 0—Select G.723.1 as the low-bit-rate codec (available only for connections 0 and 2).
- 3—Select G.729A as the low-bit-rate codec (available only for connection 0).

If LBRCodec=0, then both Cisco ATA FXS ports can operate with the following codecs:

- Number of codecs=3
- Codec[0]=G.711µ -law
- Codec[1]=G.711A-law
- Codec[2]=G.723.1

If LBRCodec=3, check the setting of bit 21 in the ConnectMode parameter (see the "ConnectMode" section on page 5-24) to determine if G.729 is enabled for the **Phone 1** or **Phone 2** FXS port.

If LBRCodec=3, then the **Phone 1** FXS port can operate with the following codecs:

- Number of codecs=4
- Codec[0]=G.711µ-law
- Codec[1]=G.711A-law

- Codec[2]=G.729 (only if Bit 21 of the ConnectMode parameter is set to 0)
- Codec[3]=G.729A

If LBRCodec=3, then the **Phone 2** FXS port can operate with the following codecs:

- Number of codecs=3
- Codec[0]=G.711µ-law
- Codec[1]=G.711A-law
- Codec[2]=G.729 (only if Bit 21 of the ConnectMode parameter is set to 1)

Value Type

Integer

Range

0 or 3

Default

3

Voice Configuration Menu Access Code

300

MGCPPort

Description

This parameter specifies the listening port for Media Gateway Control (MGCP) messages on the Cisco ATA. The Cisco ATA also sends MGCP messages from this port. Using the same port for sending and receiving messages may facilitate passage through Network Address Translation (NAT).

Value Type

Integer

Range

1 to 65535

Default

2427

Voice Configuration Menu Access Code

201

MediaPort

Description

Use this parameter to specify the base port where the Cisco ATA transmits and receives RTP media. This parameter *must* be an even number. Each connection uses the next available even-numbered port for RTP.

Value Type

Integer

Range

1 to 65535

Default

16384

Voice Configuration Menu Access Code

202

RetxIntvl

Description

This parameter specifies the first retransmission interval of MGCP commands (in milliseconds). Subsequent retransmission periods double the previous interval (exponential backoff).

Value Type

Integer

Range

1 to 20000

Default

500

Voice Configuration Menu Access Code

203

RetxLim

Description

This parameter specifies the maximum number of times the Cisco ATA retransmits commands. When this value is exceeded, the Cisco ATA terminates its connection to the Call Agent and restarts.

Value Type

Integer

Range

1 to 4294967295

Default

10

Voice Configuration Menu Access Code

205

MGCPVer

Description

Enter the MGCP version string that the Cisco ATA should use when it powers on. The following values are valid:

- MGCP0.1
- MGCP1.0
- NCS1.0

Note Spaces are not permitted in the MGCPVer parameter. The protocol string is case insensitive.

Value Type

Alphanumeric

Default

MGCP1.0

Voice Configuration Menu Access Code

206

Domain

Description

The Cisco ATA uses this parameter to determine how the domain-name portion of the endpoint identifier is constructed. The following values are valid:

- Dot (.) or blank—Uses DHCP-provided IP address if available; otherwise use static IP address.
- +—Uses combination of Host Name and Domain Name returned by the DHCP server. If no HostName is returned, uses the IP address with brackets.
- 0—Uses DHCP-provided domain name if available; otherwise use static IP address.
- *—Uses Cisco ATA MAC address.
- String—Uses specified string.

Value Type

Alphanumeric string

Range

Maximum 31 characters

Default

.

Voice Configuration Menu Access Code

931

Audio Configuration Parameters

:This section contains information about the following parameters:

- CodecName, page 5-19
- AudioMode, page 5-20
- NumTxFrames, page 5-21

CodecName

Description

This parameter specifies the names of the encoder/decoders to use in the LocalConnectionOption parameter. You must list the names in the following order:

- G.711µ-law
- G.711A-law
- G.723.1
- G.729

Note All codec names must be separated by commas with no white space in between. If a name is empty, the default standard-based name is used.

Value Type

Alphanumeric string

Range

The following list shows the maximum number of characters allowed for the respective codec names:

- PCMU—six characters
- PCMA—six characters
- G.723—10 characters
- G.729—eight characters

If a codec name is longer than the maximum, the default standard-based name is used.

Default Names

- PCMU for G.711µ-law
- PCMA for G.711A-law
- G723 for G.723.1
- G729 for G.729

Voice Configuration Menu Access Code

Not applicable

AudioMode

Description

This parameter represents the audio operating mode. The lower 16 bits are for the **Phone 1** port, and the upper 16 bits are for the **Phone 2** port. Table 5-1 provides definitions for each bit.

Value Type

Bitmap

Default

0x00350035

Voice Configuration Menu Access Code

312

Table 5-1 AudioMode Parameter Bit Definitions

Bit Number	Definition
0 and 16	0/1—Disable/enable G.711 silence suppression. This is enabled by default.
1 and 17	0—Enable selected low-bit-rate codec in addition to G.711. This setting is the default. 1—Enable G.711 only.
2 and 18	0/1—Disable/enable fax CED tone detection. This is enabled by default.
3 and 19	Reserved.
4-5 and 20-21:DtmfMethod	0—Always in band. 1—By negotiation 2—Always out of band. 3—Disabled; no DTMF is sent. This is the default setting.
6-15 and 22-31	Reserved.

NumTxFrames

Description

Use this parameter to select the default RTP packet size in number of frames per packet. The Cisco ATA default frame sizes are as follows:

- G.711 and G.729—10 ms
- G.723.1—30 ms

For example, to receive 20 ms of G.729 packets, set the parameter to 2.

Value Type

Integer

Range

1-6

Default

2

Voice Configuration Menu Access Code

35

Operational Parameters

This section includes parameters that are used for configuring the connection mode of the Cisco ATA as well as for disabling or enabling various operational features:

- CallerIdMethod, page 5-21
- FXSInputLevel, page 5-23
- FXSOutputLevel, page 5-23
- ConnectMode, page 5-24
- SigTimer, page 5-26
- OpFlags, page 5-27
- TOS, page 5-29

CallerIdMethod

Description

This 32-bit parameter specifies the signal format to use for both FXS lines for generating Caller ID format. The following values are allowed:

- Bits 0-1 (method)—0=Bellcore (FSK), 1=DTMF, 2=ETSI, and 3 is reserved.

If *method=0*, set the following bits:

- Bit 3 to 8—Maximum number of digits in phone number part (valid values are 1 to 20)
- Bit 9 to 14—Maximum number of digits in name number part (valid values are 1 to 20)

- Bit 15—Use special character **O**.
- Bit 16—Use special character **P**.

Note The Cisco ATA supports the Bellcore FSK method to turn on/off the visual message waiting indicator (VMWI) on a phone when the Cisco ATA receives MWI messages from a server. The Bellcore FSK VMWI is enabled automatically if the CallerIdMethod parameter is configured to use the Bellcore method.

If *method=1*, set the following bits:

- Bit 2—Reserved.
- Bits 3-6—Start digit (valid values are **12** for "A," **13** for "B," **14** for "C," and **15** for "D.")
- Bits 7-10—End digit (valid values are **11** for "#," **12** for "A," **13** for "B," **14** for "C," and **15** for "D.")
- Bits 11—Polarity reversal before and after Caller ID signal (value of 0/1 disables/enables polarity reversal)
- Bits 12-16—Maximum number of digits in phone number (valid values are 1 to 20; default is 15)
- Bits 17-19—These bits are for the Start digit for unknown or restricted telephone numbers (valid values are **4** for "A," **5** for "B," **6** for "C," and **7** for "D.").
- Bits 20-22—These bits are for the End digit for unknown or restricted telephone numbers (valid values are **3** for "#," **4** for "A," **5** for "B," **6** for "C," and **7** for "D.").
- Bits 23-24—These bits are for the code that the Cisco ATA should send to the CID device if the telephone number is unknown (valid values are **0** for "00", **1** for "0000000000", and **2** for "2"). The value of 3 is reserved and should not be used.
- Bits 25-26—These bits are for the code that the Cisco ATA should send to the CID device if the telephone number is restricted (valid values are **0** for "10", and **1** for "1"). The values of 2 and 3 are reserved and should not be used.
- Bit 27—Reserved.
- Bit 28—Set to 1 to disable call-waiting caller ID on the **Phone 1** port of the Cisco ATA.
- Bit 29—Set to 1 to disable call-waiting caller ID on the **Phone 2** port of the Cisco ATA.
- Bit 30—Set to 1 to disable the callee-ID feature on the **Phone 1** port of the Cisco ATA.
- Bit 31—Set to 1 to disable the callee-ID feature on the **Phone 2** port of the Cisco ATA.

If *method=2*, set the following bits:

- Bit 2—Set to 0 to have the Cisco ATA transmit data prior to ringing by using the Ring-Pulse Alerting Signal (RP-AS); set to 1 to have the Cisco ATA transmit data after the firsr ring.
- Bits 3-8—Maximum number of digits in a phone number (valid values are 1 to 20; default is 12).
- Bits 9-14—Maximum number of characters in a name (valid values are 1 to 20; default is 15).
- Bit 15—If this bit is enabled (it is enabled by default), send special character **O** (out of area) to CID device if telephone number is unknown.
- Bit 16—If this bit is enabled (it is enabled by default), send special character **P** (private) to CID device if telephone number is restricted.
- Bits 17-27 are reserved.

Examples

The following examples are recommended values for the CallerID Method parameter:

- Sweden = 0x0000ff61 or 0x006aff61
- Denmark = 0x0000fde1 or 0x033efde1
- USA = 0x00019e60

Value Type

Bitmap

Default

0x00019e60

Voice Configuration Menu Access Code

316

FXSInputLevel

Description

Use this parameter to specify the input level control (analog-to-digital path) of the Cisco ATA FXS ports.

Value Type

Integer

Range

-9 to 2 dB

Default

-1

Voice Configuration Menu Access Code

370

Related Parameter

FXSOutputLevel, page 5-23

FXSOutputLevel

Description

Use this parameter to specify the output level control (digital-to-analog path) of the Cisco ATA FXS ports.

Value Type

Integer

Range

-9 to 2 dB

Default

-4

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Related Parameter

FXSInputLevel, page 5-23

ConnectMode

Description

This parameter is a 32-bit bitmap to control the connection mode of the selected call signaling protocol. Table 5-2 provides bit definitions for this parameter.

Value Type

Bitmap

Default

0x90000400

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Table 5-2 ConnectMode Parameter Bit Definitions

Bit Number	Definition
0-1	Reserved.
2	0—Use the dynamic payload type 126/127 as the RTP payload type (fax pass-through mode) for G.711 µ-law/G.711 A-law. 1—Use the standard payload type 0/8 as the RTP payload type (fax pass-through mode) for G.711 µ-law/G.711 A-law. Default: 0
3-6	Reserved.
7	0/1—Disable/enable fax pass-through redundancy. Default: 0
8-12	Specifiy the fax pass-through NSE payload type with these bits. The value is the offset to the NSE payload base number of 96. The valid range is 0-23; the default is 4. For example, if the offset is 4, the NSE payload type is 100.

Table 5-2 ConnectMode Parameter Bit Definitions (continued)

Bit Number	Definition
13	0—Use G.711µ-law for fax pass-through codec. 1—Use G.711A-law for fax pass-through codec. Default: 0
14-15	0—Use fax pass-through. 1—Use codec negotiation in sending fax. 2,3—Reserved. Default: 0
16	0—Use non-NCS-compliant Session Description Protocol (SDP). 1—Use NCS-compliant SDP. Default: 0
17	0/1—Disable/enable automatic MGCP-version detection. Default: 0
18	0/1—Enable/disable persistent on-hook and off-hook events. Default: 0
19	0/1—Enable/disable persistent hook-flash events. Default: 0
20	0/1—Disable/enable using a pair of brackets to enclose the IP address of an endpoint identifier. For more information, see the "Endpoints and Connections" section on page 4-3. Default: 0
21	0—Enables G.729 codec on the **Phone 1** port. 1—Enables G.729 codec on the **Phone 2** port. Default: 0
22	0—Use loop mode for quarantine handling. 1—Use step mode for quarantine handling. Default: 0
23	0/1—Disable/enable conference connection mode. Default: 0
24	0/1—Enable/disable support for RSIP*@ipaddress syntax. For more information, see the "Cisco ATA Registration Process with MGCP" section on page 4-4. Default: 0
25-31	Reserved.

SigTimer

Description

This parameter controls various timeouts. Table 5-3 contains bit definitions of this parameter.

Value Type

Bitmap

Default

0x00000064

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Table 5-3 SigTimer Parameter Bit Definitions

Bit Number	Definition
0-7	Call waiting period—The period between each burst of call-waiting tone. Range: 0 to 255 in 0.1 seconds Default: 100 (0x64=100 seconds)
8-15	PING period—Period in idle state before the Cisco ATA sends a NTFY command with observed event "O: X-NET/ping" to the call agent. Idle state is defined as the state when the Cisco ATA is not sending or receiving any MGCP request or response; the Cisco ATA does not process any response to the PING from the Call Agent. Range: 0 to 255 seconds Default: 0 (disables this feature)
16-25	Reserved—Should be set to 0.
26-27	Minimum hook flash time—The minimum on-hook time required for a hook flash event. Range: 0 to 3 Default: 0 (60 ms) Other possible values: 1=100 ms, 2=200 ms, 3=300 ms.
28-31	Maximum hook flash time—The maximum on-hook time allowed for a hook flash event. Range: 0 to 15 Default: 0 (1000 ms) Other possible values: 1=100 ms, 2=200 ms, 3=300 ms, 4=400 ms, 5=500 ms, 6=600 ms, 7=700 ms, 8=800 ms, 9=900 ms, 10=1000 ms, 11=1100 ms, 12=1200 ms, 13=1300 ms, 14=1400 ms, 15=1500 ms.

OpFlags

Description

Enables/disables various operational features.

See Table 5-4 for bit definitions of this parameter.

Value Type

Bitmap

Default

0x2

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Table 5-4 OpFlags Parameter Operational Features to Turn On or Off

Bit Number	Definition
0	If Bit 0 = 0, the TFTP configuration filename supplied by the DHCP server overwrites the default filename for each Cisco ATA. If Bit 0 = 1, the default Cisco ATA filename is always used. Default: 0
1	If Bit 1 = 0, the Cisco ATA probes the static network router during the power-up process. If Bit 1 = 1, static network router probing is disabled. Default: 1
2	Reserved.
3	If Bit 3=1, the Cisco ATA does not request DHCP option 150 in the DHCP discovery message; some DHCP server do not respond if option 150 is requested. Default: 0
4	If Bit 4 = 1, the Cisco ATA uses the VLAN ID specified in the VLANSetting parameter for VLAN IP encapsulation (see the "VLAN Setting" section on page 5-11). Default: 0
5	If Bit 5=1, the Cisco ATA does not use VLAN IP encapsulation. Default: 0
6	If Bit 6=1, the Cisco ATA does not perform CDP discovery. Default: 0
7	If Bit 7=1, the Cisco ATA does not allow web-based configuration. Default: 0
8	If Bit 8=1, the Cisco ATA does not allow HTTP refresh access with the http://ip/refresh command. Default: 0
9	If Bit 9=1, the Cisco ATA does not allow HTTP reset access with the http://ip/reset command. Default: 0

Table 5-4 OpFlags Parameter Operational Features to Turn On or Off (continued)

Bit Number	Definition
10	Reserved.
11	If Bit 11=0, the Cisco ATA requests the device hostname from the DHCP server. If Bit 11=1, the Cisco ATA uses the device hostname that is specified in DHCP option 12. Default: 0
12	Reserved.
13	If Bit 13=0 (default), use statically configured DNS IP addresses, if available, for name resolution. If statically configured DNS servers are not available, use DHCP-provided DNS IP addresses for name resolution. If Bit 13=1, use both statically configured DNS IP addresses and as many as two DHCP-provided DNS IP addresses. Therefore, the Cisco ATA can query as many as four DNS IP addresses in one DNS query. For more information about statically configured DNS IP addresses, see the “DNS1IP” section on page 5-10 section and the “DNS2IP” section on page 5-11 section. Default: 0
14-31	Reserved.

TOS

Description

This parameter allows you to configure Type of Service (ToS) bits by specifying the precedence and delay of audio and signaling IP packets, as follows:

- Bits 0-7—These bits are for the ToS value for voice data packets.
  - Range: 0-255
  - Default: 184
- Bits 8-15—These bits are for the ToS value for signaling-data packets
  - Range: 0-255
  - Default: 168
- Bits 16-31—Reserved.

Value Type

Bitmap

Default

0x000068B8

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255

Note This parameter is called UDPTOS in previous Cisco ATA releases. If you are performing a Cisco ATA upgrade, the previous value of the UDPTOS parameter is carried forward to the TOS parameter.

Tone Configuration Parameters

The Cisco ATA supports the following tone parameters:

- DialTone
- BusyTone
- ReorderTone
- RingBackTone
- CallWaitTone
- AlertTone

The Cisco ATA supports two types of tone-parameter syntax—basic format and extended format. Basic format is used in most countries; use the extended format only if the country in which the Cisco ATA is used requires this format.

This section covers all the call-progress tones that the Cisco ATA supports, and contains the following topics:

- Tone Parameter Syntax—Basic Format, page 5-30
- Tone Parameter Syntax—Extended Formats, page 5-31

- Recommended Values, page 5-36
- Specific Tone Parameter Information, page 5-36

This section also covers the following parameter, which is for configuring phone-ringing characteristics:

- RingCadence, page 5-40

Note For detailed recommendations of tone-parameter values by country, see Appendix D, "Recommended Cisco ATA Tone Parameter Values by Country."

Tone Parameter Syntax—Basic Format

Each tone is specified by nine integers, as follows:

```
parametername: NumOfFreqs,Tfreq1,Tfreq2,Tamp1,Tamp2,Steady,OnTime,OffTime, TotalToneTime
```

- *parametername* is the name of the tone.
- *NumOfFreqs* is the number of frequency components (0, 1 or 2).
- *Tfreq1* and *Tfreq2* are the transformed frequencies of the first and second frequencies, respectively. Their values are calculated with the following formula:

  32767 * cos (2*pi*F/8000)

  where ***F*** is the desired frequency in Hz. Set this value to **0** if the frequency does not exist.

  The range of each value is –32768 to 32767.

  For negative values, use the 16-bit 2's complement value. For example, enter **–1** as 65535 or as 0xffff.
- *Tamp1* and *Tamp2* are the transformed amplitudes of the first and second frequencies, respectively. Their values are calculated with the following formulas:

  32767 * A * sin(2*pi*F/8000)

  A (amplitude factor) = 0.5 * 10^((k+10-(n-1)*3)/20)

  where ***F*** is the desired frequency in Hz, ***k*** is the desired volume in *dBm*, and ***n*** is the number of frequencies. The ^ symbol means *to the order of*.
- *Steady* controls whether the tone is constant or intermittent. A value of **1** indicates a steady tone and causes the Cisco ATA to ignore the on-time and off-time parameters. A value of **0** indicates an on/off tone pattern and causes the Cisco ATA to use the on-time and off-time parameters.
- *OnTime* controls the length of time the tone is played in milliseconds (ms).

  Specify each value as a number of samples with a sampling rate of 8 kHz. The range of each value is 0 to 0xffff. For example, for a length of 0.3 seconds, set the value to 2400.
- *OffTime* controls the length of time between audible tones in milliseconds (ms).

  Specify each value as a number of samples with a sampling rate of 8 kHz. The range of each value is 0 to 0xffff. For example, for a length of 0.3 seconds, set the value to 2400.
- *TotalToneTime* controls the length of time the tone is played. If this value is set to 0, the tone will play until another call event stops the tone. For DialTone, DialTone2, BusyTone, ReorderTone, and RingBackTone, the configurable value is the number of 10 ms (100 = 1 second) units.

  For the remaining tones, the configurable value is the number of samples with a sampling rate of 8 kHz.

Note All tones are persistent (until the Cisco ATA changes state) except for the call-waiting tone and the confirm tone. The call-waiting tone, however, repeats automatically once every 10 seconds while the call-waiting condition exists.

Tone Parameter Syntax—Extended Formats

Two types of extended format exist for the Cisco ATA tone parameters:

- Extended Format A, page 5-31—This format can be used for the following tone parameters:
  - DialTone
  - BusyTone
  - RingbackTone
  - CallWaitTone
  - AlertTone
- Extended Format B, page 5-32—This format can be used only for the ReorderTone parameter.

Extended Format A

Each tone is specified by 11 integers, as follows:

```
parametername:NumOfFreqs,Tfreq1,Tamp1,Tfreq2,Tamp2,NumOfOnOffPairs,OnTime1,
OffTime1,OnTime2,OffTime2,TotalToneTime
```

- *parametername* is the name of the tone.
- *NumOfFreqs* = 100 + the number of frequencies in the tone. (Therefore, *NumOfFreqs* = 101 for one frequency, and 102 for two frequencies.)
- *Tfreq1* and *Tfreq2* are the transformed frequencies of the first and second frequencies, respectively. Their values are calculated with the following formula:

  32767 * cos (2*pi*F/8000)

  where ***F*** is the desired frequency in Hz. Set this value to **0** if the frequency does not exist.

  The range of each value is –32768 to 32767.

  For negative values, use the 16-bit 2's complement value. For example, enter **–1** as 65535 or as 0xffff.
- *Tamp1* and *Tamp2* are the transformed amplitudes of the first and second frequencies, respectively. Their values are calculated with the following formula:

  32767 * A * sin(2*pi*F/8000)

  A (amplitude factor) = 0.5 * 10^((k+10-(n-1)*3)/20)

  where ***F*** is the desired frequency in Hz, ***k*** is the desired volume in *dBm*, and ***n*** is the number of frequencies. The ^ symbol means *to the order of*.
- *NumOfOnOffPairs* is the number of on-off pairs in the cadence of the tone.

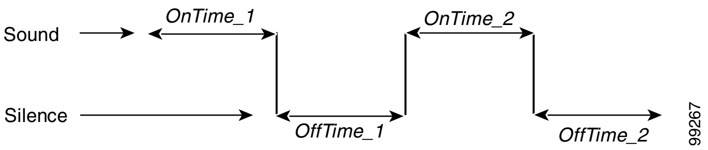
  Valid values are 0, 1 and 2. Use 0 if the tone is steady.
- *OnTime1* and *OnTime2* values are the lengths of time the tone is played for the first and second on-off pairs of a cadence, respectively. (See Figure 5-1 for a graphical representation.)

Specify each value as a number of samples with a sampling rate of 8 kHz. The range of each value is 0 to 0xffff. For example, for a length of 0.3 seconds, set the value to 2400.

- *OffTime1* and *OffTime2* values are the lengths of time that silence is played for the first and second on-off pairs of a cadence, respectively. (See Figure 5-1 for a graphical representation.)

  Specify each value as a number of samples with a sampling rate of 8 kHz. The range of each value is 0 to 0xffff. For example, for a length of 0.3 seconds, set the value to 2400.

Figure 5-1 Cadence With Two On-Off Pairs



- *TotalToneTime* controls the length of time the tone is played. If this value is set to 0, the tone will play until another call event stops the tone. For DialTone, DialTone2, BusyTone, ReorderTone, and RingBackTone, the configurable value is the number of 10 ms (100 = 1 second) units.

  For the remaining tones, the configurable value is the number of samples with a sampling rate of 8 kHz.

Note All tones are persistent (until the Cisco ATA changes state) except for the call-waiting tone and the confirm tone. The call-waiting tone, however, repeats automatically once every 10 seconds while the call-waiting condition exists.

Extended Format B

The ReorderTone parameter specifies the tone that the Cisco ATA plays when the called number is not available or the external circuit is busy. This tones can consist of:

- Up to three frequencies played simultaneously and a cadence of up to three on-off pairs. The first on-off pair can repeat multiple times before the second on-off pair plays.

  For example, a 400 Hz frequency plays four times for 0.75 second followed by 0.1 second of silence after each play and then plays one time for 0.75 second followed by 0.4 second of silence. This pattern can be set to repeat until another call event stops the pattern.

- Up to three frequencies played sequentially with a cadence of up to three on-off pairs

  For example, the frequencies 900 Hz, 1400 Hz, and 1800 Hz play sequentially for 0.33 seconds each with no silence after the first and second frequencies but one second of silence after the third frequency.

The syntax of the ReorderTone parameter is specified by 17 integers, as follows:

```
ReorderTone:Sequential,NumOfFreqs,TFreq1,Tamp1,TFreq2,
Tamp2,TFreq3,Tamp3,NumOfOnOffPairs,OnTime1,OffTime1,
OnTime2,OffTime2,OnTime3,OffTime3,NumOfRepeats,TotalToneTime
```

where:

- *Sequential* specifies whether multiple frequencies in a tone play simultaneously (100) or sequentially (101). Set to 100 for a tone with one frequency. If *Sequential* is 101, the number of frequencies (*NumOfFreqs*) has to be the same value as the number of on-off pairs in a cadence (*NumOfOnOffPairs*).

- *NumOfFreqs* is the number of frequencies in the tone (1, 2, or 3). The frequencies can play simultaneously or sequentially, depending on the *Sequential* setting.
- *TFreq1*, *TFreq2*, and *TFreq3* are the transformed frequencies of the first, second, and third frequencies, respectively. Calculate each value with the following formula:

  32767 * cos (2 * pi * F/8000)

  where ***F*** is the desired frequency in Hz. Set this value to **0** if the frequency does not exist.

  The range of each value is –32768 to 32767.

  For negative values, use the 16-bit 2’s complement value. For example, enter –1 as 65535 or as 0xffff.
- *Tamp1*, *Tamp2* and *Tamp3* are the transformed amplitudes of the first, second and third frequencies, respectively. Their values are calculated with the following formula:

  32767 * A * sin(2*pi*F/8000)

  A (amplitude factor) = 0.5 * 10^((k+10-(n-1)*3)/20)

  where ***F*** is the desired frequency in Hz, ***k*** is the desired volume in dBm, and **n** is the number of frequencies (If *Sequential* is set to 101, n is equal to 1). The ^ symbol means *to the order of.*
- *NumOfOnOffPairs* is the number of on-off pairs in the cadences of the tone (0, 1, 2, or 3). For a steady tone, use 0.

  If this value is 0, the *OnTime1*, *OnTime2*, *OnTime 3, OffTime1*, *OffTime2*, and *OffTime3* values must also be 0.
- *OnTime1*, *OnTime2*, and *OnTime3* are the lengths of time that the first, second, and third on-off pairs of a cadence play a sound, respectively. (See Figure 5-2 for a graphical representation.)

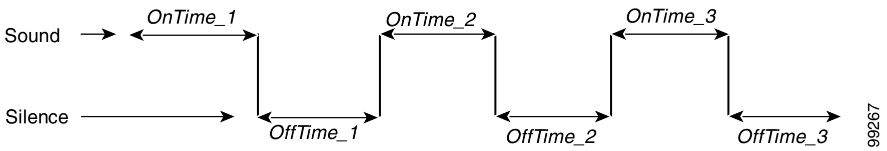
  Specify each value as a number of samples with the sampling rate of 8 kHz. The range of each value is 0 to 0xffff.

  For example, for a length of 0.3 seconds, set a value to 2400.
- *OffTime1*, *OffTime2*, and *OffTime3* are the lengths of silence after the sound of the first, second, and third on-off pairs of a cadence, respectively.

  Specify each value as a number of samples with the sampling rate of 8 kHz. The range of each value is 0 to 0xffff.

  For example, for a length of 0.3 seconds, set a value to 2400. (See Figure 5-2 for a graphical representation.)

Figure 5-2 Cadence with Three On-Off Pairs



- *NumOfRepeats* is the number of times that the first on-off pair of the cadence (specified by *OnTime1*, *OffTime1*) repeats before the second on-off pair (specified by *OnTime2*, *OffTime2*) plays.

  For example, if *NumOfRepeats* is 2, the first on-off pair will play three times (it will play once and then repeat two times), then the second on-off pair will play.

- *TotalToneTime* is the total length of time that the tone plays. If this value is 0, the tone will play until another call event stops the tone.

  This value is in 10 ms units (100 ms = 1 second).

Two examples of Extended Format B, both using the Reorder tone, follow.

ReorderTone Parameter Example1

Assume that you want a reorder tone in which:

- The frequencies 900 Hz, 1400 Hz, and 1800 Hz play sequentially.
- Each frequency plays once for 0.33 seconds.
- There is no silence after the first and the second frequencies.
- There is 1 second of silence after the third frequency (before the first frequency starts again)
- The volume of each frequency is –19 dBm.
- The tone plays until another call event stops the tone.

For this reorder tone, make the following setting. See Table 5-5 for a detailed explanation.

```
ReorderTone:101,3,24917,3405,14876,4671,5126,5178,3,2640,0,2640,0,
2640,8000,0,0
```

Table 5-5 Reorder Tone Parameter Example 1 Explanation

Component	Setting	Explanation
Sequential	101	Frequencies play sequentially
NumOfFreqs	3	Three frequencies in the tone
TFreq1	24917	First frequency is 900 Hz
TAmpl1	3405	First frequency volume is –19 dBm
TFreq2	14876	Second frequency is 1400 Hz
TAmp2	4671	Second frequency volume is –19 dBm
TFreq3	5126	Third frequency is 1800 Hz
TAmp3	5178	Third frequency volume is –19 dBm
NumOfOnOffPairs	3	Three on-off pairs in the cadence of the tone
OnTime1	2640	Sound in first on-off pair plays for 0.33 seconds
OffTime	0	No silence after the first sound (the second sound plays immediately)
OnTime2	2640	Sound in second on-off pair plays for 0.33 seconds
OffTime2	0	No silence after the second sound (the third sound plays immediately)
OnTime3	2640	Sound in third on-off pair plays for 0.33 seconds
OffTime3	8000	1 second of silence after the sound in the third on-off pair (before the pattern repeats, beginning with the first on-off pair)

Table 5-5 Reorder Tone Parameter Example 1 Explanation (continued)

Component	Setting	Explanation
NumOfRepeats	0	First on-off pair of the cadence plays once (does not repeat), then the second on-off pair plays
TotalToneTime	0	Tone plays continuously (set of three on-off pairs of the cadence repeat continuously) until another call event stops the tone

ReorderTone Parameter Example 2

Assume that you want a reorder tone in which:

- The only frequency is 400 Hz.
- The frequency plays six times, each time for 0.1 second followed by 0.9 second of silence.
- The frequency then plays once for 0.3 second followed by 0.7 second of silence.
- The volume of the frequency is –19 dBm.
- The tone plays until another call event stops the tone.

For this reorder tone, make the following setting. See Table 5-6 for a detailed explanation.

```
ReorderTone:100,1,31164,1620,0,0,0,0,2,800,7200,2400,5600, 0,0,5,0
```

Table 5-6 Reorder Tone Parameter Example 2 Explanation

Component	Setting	Explanation
Sequential	100	Required setting for a tone with one frequency
NumOfFreqs	1	One frequency in the tone
TFreq1	31164	First frequency is 400 Hz
TAmp1	1620	First frequency volume is –19 dBm
TFreq2	0	No second frequency
TAmp2	0	No second frequency
TFreq3	0	No third frequency
TAmp3	0	No third frequency
NumOfOnOffPairs	2	Two on-off pairs in the cadence of the tone
OnTime1	800	Sound in first on-off pair plays for 0.1 second
OffTime1	7200	Sound in first on-off pair is followed by 0.9 second of silence
OnTime2	2400	Sound in second on-off pair plays for 0.3 seconds
OffTime2	5600	Sound in second on-off pair is followed by 0.7 second of silence
OnTime3	0	No third on-off pair in the cadence
OffTime3	0	No third on-off pair in the cadence

Table 5-6 Reorder Tone Parameter Example 2 Explanation (continued)

Component	Setting	Explanation
NumOfRepeats	5	First on-off pair of the cadence plays six times (plays once and then repeats five times), then the second on-off pair plays
TotalToneTime	0	Tone plays continuously (set of two on-off pairs of the cadence repeat continuously) until another call event stops the tone

Recommended Values

The following settings are recommended for the US:

- DialTone = "2,31538,30831,1380,1740,1,0,0,1000" (approximately -17 dBm)
- BusyTone = "2,30467,28959,1191,1513,0,4000,4000,0" (approximately -21 dBm)
- ReorderTone = "2,30467,28959,1191,1513,0,2000,2000,0" (approximately -21 dBm)
- RingBackTone = "2,30831,30467,1943,2111,0,16000,32000,0" (approximately -16 dBm)
- CallWaitTone = "1,30831,0,5493,0,0,2400,2400,4800" (approximately -10 dBm)
- AlertTone = “1,30467,0,5970,0,0,480,480,1920”

Note For detailed recommendations of tone-parameter values by country, see Appendix D, “Recommended Cisco ATA Tone Parameter Values by Country.”

Specific Tone Parameter Information

Brief descriptions, and lists of default values and the voice configuration menu code for each Cisco ATA tone parameter, appear in the following sections:

- DialTone, page 5-36
- BusyTone, page 5-37
- ReorderTone, page 5-37
- RingbackTone, page 5-38
- CallWaitTone, page 5-38
- AlertTone, page 5-39

DialTone

Description

The Cisco ATA plays the dial tone when it is ready to accept the first digit of a remote address to make an outgoing call.

Default values (using the Basic format)

- NumOfFreqs—2

- Tfreq1—31538
- Tfreq2—30831
- Tamp1—1380
- Tamp2—1740
- Steady—1
- OnTime—0
- OffTime—0
- TotalToneTime—1000

Voice Configuration Menu Access Code

920

BusyTone

Description

The Cisco ATA plays the busy tone when the callee is busy.

Default values (using the Basic format)

- NumOfFreqs—2
- Treq1—30467
- Tfreq2—28959
- Tamp1—1191
- Tamp2—1513
- Steady—0
- OnTime—4000
- OffTime—4000
- TotalToneTime—0

Voice Configuration Menu Access Code

921

ReorderTone

Description

The Cisco ATA plays the reorder tone (also known as congestion tone) if the outgoing call failed for reasons other than busy. This is a fast-busy tone.

Default values (using the Basic format)

- NumOfFreqs—2
- Treq1—30467
- Treq2—28959
- Tamp1—1191

- Tamp2—1513
- Steady—0
- OnTime—2000
- OffTime—2000
- TotalToneTime—0

Voice Configuration Menu Access Code

922

RingbackTone

Description

The Cisco ATA plays the ring-back tone when the callee is being alerted by the called device.

Default values (using the Basic format)

- NumOfFreqs—2
- Tfreq1—30831
- Tfreq2—30467
- Tamp1—1943
- Tamp2—2111
- Steady—0
- OnTime—16000
- OffTime—32000
- TotalToneTime—0

Voice Configuration Menu Access Code

923

CallWaitTone

Description

The Cisco ATA plays the call-waiting tone when an incoming call arrives while the user is connected to another party.

Default values (using the Basic format)

- NumOfFreqs—1
- Tfreq1—30831
- Tfreq2—0
- Tamp1—5493
- Tamp2—0
- Steady—0
- OnTime—2400

- OffTime—2400
- TotalToneTime—4800

Voice Configuration Menu Access Code

924

AlertTone

Description

The Cisco ATA plays the alert tone as a confirmation tone that a special event, such as call forwarding, is in effect.

Default values (using the Basic format)

- NumOfFreqs—1
- Tfreq1—30467
- Treq2—0
- Tamp1—5970
- Tamp2—0
- Steady—0
- OnTime—480
- OffTime—480
- TotalToneTime—1920

Voice Configuration Menu Access Code

925

RingCadence

Description

Use this parameter to specify the internal and external ringer cadence pattern, expressed as a triplet of integers “a,b, and c”.

- a—Number of seconds to turn the ring ON.
- b—Number of seconds to turn the ring OFF.
- c—The ring frequency, fixed at 25.

Value Type

List of three integer values, separated by commas

Range

1-65535

Default

2, 4, 25

Recommended Values:

- United States —2,4,25
- Sweden — 1,5,25

Voice Configuration Menu Access Code

929

Diagnostic Parameters

This section describes the following parameters, which are used for diagnostic purposes

- NPrintf, page 5-40
- TraceFlags, page 5-41
- SyslogIP, page 5-41
- SyslogCtrl, page 5-42

NPrintf

Description

Use this parameter to specify the IP address and port of a host to which all Cisco ATA debug messages are sent. The program *prserv.exe,* which comes bundled with the Cisco ATA software, is needed to capture the debug information.

Syntax

```
<HOST_IP>,<HOST_PORT>
```

Example

If the program *prserv.exe* is running on a host with IP address 192.168.2.170 and listening port 9001, set NPrintf to 192.168.2.170.9001. This causes the Cisco ATA to send all debug traces to that IP address.

Value Type

Extended IP address

Default

0

Voice Configuration Menu Access Code

81

TraceFlags

Description

This parameter is reserved in MGCP. The Cisco ATA will output all MGCP messages regardless of this parameter value.

Value Type

Bitmap

Default

0x00000000

Voice Configuration Menu Access Code

313

SyslogIP

Description

Use this parameter for diagnostic purposes; specify the IP address and port number to which the Cisco ATA should send its *syslog* output information.

The program *prserv.exe*, which is included in all Cisco ATA software upgrade packages, can be used to capture syslog information if you do not have a syslog server.

Syntax

<*HOST_IPaddress*>.<*HOST_PORT*>

Example

If you want to send syslog information to the host at IP address 192.168.2.170 and port number 514, do the following:

- Configure the value of this parameter as 192.168.2.170.514
- On your PC, run the command:

```
prserv 514
```

Value Type

Extended IP address

Default

0.0.0.0.514

Voice Configuration Menu Access Code

7975640

Related Parameter

SyslogCtrl, page 5-42

SyslogCtrl

Description

Use this parameter to turn on specific syslog traces. All traces are sent to the syslog server specified in the SyslogIP parameter.

See Table 5-7 for bit values and the corresponding types of messages to turn on for tracing.

Value Type

Bitmap

Default

0x00000000

Voice Configuration Menu Access Code

7975641

Related Parameter

SyslogIP, page 5-41

Table 5-7 SyslogCtrl Parameter Definitions

Bit Number	Type of Messages to Trace
0	ARP messages.
1	DHCP messages
2	TFTP messages
3	Cisco ATA configuration-update messages.
4	System reboot messages
5-7	Reserved.
8	SCCP messages
9	Cisco ATA event messages.
10	FAX messages.
11-15	Reserved.

Table 5-7 SyslogCtrl Parameter Definitions (continued)

Bit Number	Type of Messages to Trace
16	RTP statistics messages.
17-31	Reserved.

CFGID—Version Parameter for Cisco ATA Configuration File

Description

CFGID is a 32-bit unsigned-value parameter whose purpose is to allow the local administrator to track the version of the Cisco ATA configuration file. This parameter-value assignment is entirely the responsibility of the local administrator, and has no significance to the operation of the Cisco ATA.

Value Type

Bitmap

Default

0x00000000

CHAPTER 6

Configuring and Debugging Fax Services

The Cisco ATA provides two modes of fax services that are capable of internetworking with Cisco IOS gateways over IP networks. These modes are called *fax pass-through mode* and *fax mode*.

With *fax pass-through mode*, the Cisco ATA encodes fax traffic within the G.711 voice codec and passes it through the Voice Over IP (VoIP) network as though the fax were a voice call. This mode uses the Cisco proprietary *fax upspeed* method.

With *fax mode*, the Cisco ATA presents itself as a device capable of using only G.711 codecs; therefore, no codec renegotiation or switchover is required. This places minimum functionality and configuration requirements on remote gateways. *Fax mode* is recommended for environments in which G.711 fax upspeed is not available for the supporting Cisco gateways.

This section contains the following topics:

- Using Fax Pass-through Mode, page 6-1
- Using FAX Mode, page 6-6
- Debugging the Cisco ATA 186/188 Fax Services, page 6-7

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Using Fax Pass-through Mode

Fax pass-through mode allows for maximum codec flexibility because users may set up a voice call using any voice codec, then renegotiate to a G.711 codec for the fax session. To use *fax pass-through mode*, first configure the Cisco ATA and supporting Cisco gateways to support the Cisco-proprietary G.711fax upspeed method. Then, disable fax relay on the far-end gateway—either for the entire gateway or for the dial peer engaged in the fax call with the Cisco ATA.

The fax upspeed method allows you to use low bit-rate codecs such as G.723 and G.729 for voice calls, and G.711 codecs for fax calls. With a fax call, the Cisco ATA detects a 2100-Hz CED tone or V.21 preamble flag, then informs the remote gateway of its intent to switchover to G.711 via a peer-to-peer message. This type of message, carried as a Named Signaling Event (NSE) within the RTP stream, is used for all fax event signaling. The Cisco ATA can initiate and respond to NSEs and can function as either an originating or terminating gateway.

Note The Cisco ATA can also accept standard-based protocol-level codec switch requests, but cannot send such requests. Therefore, to interoperate with a Cisco gateway, use the Cisco-proprietary codec switch.

This section contains the following topics:

- Configuring the Cisco ATA for Fax Pass-through mode, page 6-2
- Configuring Cisco IOS Gateways to Enable Fax Pass-through, page 6-3

Configuring the Cisco ATA for Fax Pass-through mode

Fax Pass-through mode requires configuring two parameters:

AudioMode, page 6-2

ConnectMode, page 6-3

AudioMode

Description

The AudioMode parameter is a 32-bit value. The lower 16 bits apply to the **Phone 1** port of the Cisco ATA and the upper 16 bits apply to the **Phone 2** port of the Cisco ATA.

Example

The following is an example of how to configure the **Phone 1** port of the Cisco ATA for *fax pass-through mode*:

```
0xXXXX0015
```

Translation

This setting translates to the following bitmap:

```
xxxx xxxx xxxx xxxx 0000 0000 0001 0101
```

- Bit 0 = 1—Enables G.711 silence suppression (VAD)
- Bit 2 = 1—Enables Fax CED tone detection and switchover upon detection
- Bit 4 = 1, Bit 5 = 0—DTMF transmission method = out-of-band through negotiation
- Bit 6 = Bit 7 = 0—Hookflash transmission method = disable sending out hookflash

Note The values xxxx in the example apply to the **Phone 2** port of the Cisco ATA.

To configure the same value for the **Phone 2** port of the Cisco ATA, the value would be `0x0015XXXX`. The configuration of one port is independent from the configuration of the other port.

ConnectMode

Description

The ConnectMode parameter is a 32-bit value. The parameter settings apply to both lines of the Cisco ATA. Configure ConnectMode after configuring AudioMode for *fax pass-through mode*. Cisco recommends you use the following ConnectMode setting to interoperate with a Cisco IOS gateway.

Recommended Setting

```
0x90000400
```

Translation

This setting translates to the bitmap:

```
1001 0000 0000 0000 0000 0100 0000 0000
```

Bit 2 and bits 7 through 15 are the only relevant bits for *fax pass-through mode*. These bits from the example are isolated below:

```
xxxx xxxx xxxx xxxx 0000 0100 0xxx x0xx
```

- Bit 2 = 0—Uses RTP payload number 126/127 for fax upspeed to G.711µ-law/G.711A-law. Set this value to 1 if you want to use RTP payload number 0/8 for fax upspeed.
- Bit 7 = 0—Disables fax pass-through redundancy. Set this bit to 1 to enable redundancy. With redundancy enabled, the Cisco ATA sends each packet twice. Because of bandwidth and transmission time costs, use this option only if network quality is poor and all other gateways used in the network support this feature.
- Bits {12, 11, 10, 9, 8} = {0, 0, 1, 0, 0}—Sets the offset to NSE payload-type number 96 to 4. Setting the offset to 4 results in the Cisco ATA sending an NSE payload-type value of 100 by default. Valid offset values range from 2 to 23 (NSE payload type value of 98 to 119). Set this value to match the value for your Cisco gateways.

  Most Cisco MGCP-based gateways, such as Cisco 6608, use NSE payload type 101 by default. Most Cisco H.323/SIP-based gateways use NSE payload type 100 by default.
- Bit 13 = 0—Uses G.711µ-law for fax pass-through upspeed. Set this bit to 1 to use G.711A for fax pass-through upspeed.
- Bit 14 = Bit 15 = 0—Enables *fax pass-through mode* using the Cisco proprietary method (recommended). Set both of these bits to 1 to disable *fax pass-through mode*.

Configuring Cisco IOS Gateways to Enable Fax Pass-through

To configure your IOS gateways to network with Cisco ATA, do the following:

Procedure

Step 1 Enable Fax Pass-through Mode, page 6-4

Step 2 Disable Fax Relay Feature, page 6-5

Note For detailed information on setting up your IOS gateways and on feature availability, refer to the document *Cisco Fax Services over IP*.

Enable Fax Pass-through Mode

The supporting Cisco gateway can enable *fax pass-through mode* using system-level or dial-peer-level commands.

System Level commands

Enable the fax pass-through feature using the following system-level commands:

Procedure

Step 1 Run the following command:

voice service voip

Step 2 Run the following command:

modem passthrough NSE [payload-type *number*] codec {g711µ/law | g711alaw} [redundancy] [maximum-sessions *value*]

The definitions of the command parameters are as follows:

- The **payload-type** parameter default is 100. Valid values are from 98 to 119.

  The NSE payload number must be the same on both the Cisco ATA and the Cisco gateway.
- The **codec** parameter must be G.711µ-law for faxes sent over a T1 trunk or G.711A-law for faxes sent over an E1 trunk.
- The **redundancy** parameter enables RFC 2198 packet redundancy. It is disabled by default.
- The **maximum sessions** parameter defines the number of simultaneous fax pass-through calls with redundancy. The default is 16. Valid values are 1 to 26.

Step 3 Turn off bits 14 and 15 of the Cisco ATA ConnectMode parameter. This enables the sending of fax pass-through signals and the detection of incoming fax pass-through signals using the Cisco proprietary method.

Note The NSE payload-type number, fax pass-through codec (G.711µ-law or G.711A-law) and redundancy parameters must have the same settings for the Cisco ATA that they have for supporting Cisco gateways.

Dial-Peer Level Commands

You can enable *fax pass-through mode* for communication between a Cisco IOS gateway and the specified Cisco ATA using the following dial-peer level commands:

Procedure

Step 1 Perform the command:

dial-peer voice ***tag*** **voip**

Step 2 Perform the command:

modem passthrough {NSE [payload-type *numbe*r**] codec {g711µlaw | g711alaw} [redundancy] | system}**

a. The default of this command is:

modem passthrough system

When using the default configuration, the dial-peer fax pass-through configuration is defined by the **voice service voip** command. When the **system** option is used, no other parameters are available.

When the NSE is configured in the fax pass-through command at the dial-peer level, the fax pass-through definition in the **dial-peer** command takes priority over the definition in the **voice service voip** command.

b. The **payload-type** ***number***, **codec**, and **redundancy** parameters can also be used.

For example, the command:

modem passthrough NSE codec g711µlaw

means that the Cisco ATA will use the NSE payload-type number 100, G.711µ-law codec, and no redundancy in *fax pass-through mode*.

Step 3 When setting up dial-peer for fax pass-through, it is necessary to set up a pair of dial-peers for inbound and outbound calls between the Cisco ATA and Cisco IOS gateways. You do this by specifying the **destination-pattern** and **incoming-called number**. The **destination-pattern** should point to the Cisco ATA, while the incoming-called number should apply to all numbers that the Cisco ATA is allowed to dial.

Disable Fax Relay Feature

Fax relay may be enabled by default for some IOS gateways. If you do not disable the fax relay feature, it may override the precedence of fax/modem pass-through and cause the fax transmission to fail. It is necessary to disable fax relay at the dial-peer or system level with the following command:

fax rate disable

Using FAX Mode

Use *fax mode* when the gateways in the network do not support *fax pass-through mode* or dial-peer configuration.

You can set one or both lines of the Cisco ATA to G.711-only *fax mode*. This mode allows the fax machine connected to the Cisco ATA to communicate directly with the far endpoint with no fax signaling event occurring between the two gateways.

This section contains the following topics:

- Configuring the Cisco ATA for Fax Mode, page 6-6
- Configuring the Cisco IOS Gateway for Fax Mode, page 6-7

Configuring the Cisco ATA for Fax Mode

G.711-only *fax mode* operation requires configuration of one parameter—**AudioMode**.

Description

The AudioMode parameter is a 32-bit value. The lower 16 bits apply to the **Phone 1** port of the Cisco ATA, and the upper 16 bits to the **Phone 2** port. The following is an example of the **Phone 1** port of the Cisco ATA configured for G.711-only *fax mode*:

Example

```
0xXXXX0012
```

Translation

This setting translates to the bitmap:

```
xxxx xxxx xxxx xxxx 0000 0000 0001 0010
```

- Bit 0 = 0—Disables G.711 silence suppression (VAD).
- Bit 1 = 1—Uses G.711 only, does not user the low bit-rate codec.
- Bit 2 = 0—Disables Fax CED tone detection.
- Bit 4 = 1, Bit 5 = 0—DTMF transmission method: out-of-band through negotiation
- Bit 6 = Bit 7 = 0—Hookflash transmission method: disables sending out hookflash

Note The values xxxx in the example do not apply to the **Phone 1** port of the Cisco ATA.

To configure the same value for the **Phone 2** port of the Cisco ATA, the value would be `0x0012XXXX`. The configuration of one port is independent from the configuration of the other port.

Note The AudioMode configuration overrides the values of the following three parameters: RxCodec, TxCodec, and LBRCodec. For example, if these three parameters are each set to 0 (for G.723), the Cisco ATA would still use G.711 if AudioMode is set to 0x00120012. With this configuration, the Cisco ATA sends both G.711µ-law and G.711A-law as preferred codecs to a peer voice gateway.

Configuring the Cisco IOS Gateway for Fax Mode

On the Cisco gateway, disable both fax relay and fax pass-through at the dial-peer level or system level with the following commands:

Procedure

Step 1 Run the command:

fax rate disable

Step 2 Run the command:

no modem passthrough

Debugging the Cisco ATA 186/188 Fax Services

This section includes the following debugging topics for fax services:

- Common Problems When Using IOS Gateways, page 6-7
- Using prserv for Diagnosing Fax Problems, page 6-8
- Using rtpcatch for Diagnosing Fax Problems, page 6-12

Common Problems When Using IOS Gateways

Table 6-1 lists typical problems and actions that might solve these problems for situations in which the Cisco ATA is using fax over a Cisco IOS gateway.

Table 6-1 Solving Common Fax Problems

Problem	Action
The far-end gateway is not loaded with correct software image.	Cisco recommends IOS version 12.2 (11)T or higher for the Cisco 2600 and Cisco 3600, and IOS version 12.1 (3)T or higher for Cisco AS5300. The Cisco 6608 supports both the NSE and NTE methods of *fax pass-through mode*, beginning with software version D004030145S16608. To use *fax pass-through mode* with the Cisco 6608, the user must select 6608 NSE mode, and the NSE payload type must be reconfigured to match the Cisco ATA.

The Cisco IOS gateway is not configured using the external T1 clock.	Perform these steps:
	1. Enter the following CLI commands:
	`Controller T1 0`
	`clock source line`
	2. On the Cisco CallManager Gateway Configuration page, choose the T1 line connection port. Set the clock as "external primary."

Table 6-1 Solving Common Fax Problems (continued)

Problem	Action
The Cisco ATA is not loaded with the proper software.	Cisco recommends using software version 2.14 or higher.
User is operating Cisco ATA software on an outdated model.	Cisco recommends using Cisco ATA models 186-I1, 186-I2, 188-I1, or 188-I2 (hardware platforms).
The Cisco ATA is not configured for *fax mode* or *fax pass-through mode*.	For *fax mode*, the AudioMode configuration parameter should be set to 0xXXXX0012 (X = value not applicable) for the **Phone 1** port of the Cisco ATA, and 0x0012XXXX for the **Phone 2** port. For *fax pass-through mode*, AudioMode should be set to 0xXXXX0015 for the **Phone 1** port of the Cisco ATA, and 0x0015XXXX for the **Phone 2** port.
The remote gateway is not configured for modem/*fax pass-through mode*.	When the Cisco ATA is configured for *fax pass-through mode*, all remote gateways must be configured with modem/*fax pass-through mode* either on a dial-peer level or system level.
Fax relay is not disabled on the remote gateway.	Fax relay is enabled by default on some Cisco gateways. When fax relay is enabled, it can override *fax pass-through mode* and cause fax failure. Examples of the CLI commands to disable fax relay for IOS gateways are as follows: • **fax rate disable** for H.323/SIP gateways • **mgcp fax t38 inhibit** for MGCP gateways
Fax/modem pass-through method on the remote gateway is not compatible with the Cisco NSE-based method.	Some Cisco gateways (such as Cisco VG248, and Cisco 6608) may use signaling messages based on RFC2833 for G.711 upspeed when loaded with older software images. This method is incompatible with the Cisco NSE-based method. You must check to make sure that the image on your gateway supports the Cisco NSE-based fax/modem pass-through. Otherwise, you must configure the Cisco ATA to use *fax mode*.
NSE payload types differ between gateways.	The Cisco ATA has a configurable NSE packet payload-type value whose default is 100. This value is compatible with the implementations of most Cisco gateways. However, some Cisco gateways use 101 as the NSE payload type. Ensure that all gateways in your environment use the same NSE payload type if you wish to successfully use *fax pass-through mode*.

Using prserv for Diagnosing Fax Problems

This section contains the following topics:

- prserv Overview, page 6-9
- Analyzing prserv Output for Fax Sessions, page 6-9

prserv Overview

prserv is a tool that runs on a Microsoft Windows-based PC and serves as a log server that captures debug information that the Cisco ATA sends to your PC IP address/port. The debug information is saved into a readable text file.

To enable your Cisco ATA to send debug information, you need to set the **NPrintf** configuration parameter to your PC IP address and an available port, as shown in the following procedure:

Procedure

Step 1

```
<IP address>.<port>
```

<IP address> is the IP address of your PC.

<port> is any unused port (any number from 1024 to 65535) on your PC.

Note You can configure the Nprintf parameter on the Cisco ATA Web configuration page or with the TFTP-based configuration method.

Step 2 To operate the debug capture program prserv.exe, place the prserv program in a folder on your PC. At the DOS prompt, enter:

```
C:>prserv <port>
```

<port> is the port number you have selected. If <port> is omitted, the default port number is 9001.

As prserv receives debug information from the Cisco ATA, it displays the information on the DOS screen and saves it to the output file <port>.log.

Once you are finished capturing debug information, you can stop prserv by entering Ctrl-C at the DOS prompt. If you restart the process without changing the name of the log file, any new debug information is appended to the end of the original file.

Analyzing prserv Output for Fax Sessions

The debug log obtained from **prserv** is for detecting simple configuration problems.

Note A comprehensive understanding of the fax events requires the use of the **rtpcatch** tool (see the “Using rtpcatch for Diagnosing Fax Problems” section on page 6-12).

Table 6-2 lists log events relevant to analyzing a fax session.

Table 6-2 Debug Log Examples

Log event	Description
[*ch*] Enable encoder <*pt*>	Voice encoder type *pt* is enabled for the channel *ch,* where *pt* can be 0 for G.711µ-law, 4 for G.723.1, 8 for G.711A-law, and 18 for G.729. For example, `[0]Enable encoder 4` indicates that the Cisco ATA transmitted G.723.1-encoded voice packets.
[*ch*] DPKT 1st: <*timestamp1*> <*timestamp2*>, pt <*pt*>	The first voice packet that the Cisco ATA received was of RTP payload type *pt* for the channel *ch* with timestamp of *timestamp1,* and the local decoding timestamp was set to *timestamp2*. For example, `[0]DPKT 1st: 1491513359 1491512639, pt 4` indicates that the first RTP packet that the Cisco ATA received was G.723.1-encoded for channel 0.
[*ch*] codec: <*pt1*> => <*pt2*>	Voice codec switchover occurred. The voice encoder type switched from *pt1* to *pt2* for the channel *ch*. For example, `[0]codec: 4 => 0` indicates that the local voice encoder on the Cisco ATA switched from G.723.1 to G.711µ-law.
[*ch*] Rx MPT PT=<*NSEpt*> NSE pkt <*event*>	Channel *ch* received an NSE packet of *event* with payload type of *NSEpt*. For *event*, c0XXXXXX indicates a CED tone event, and c1XXXXXX indicates a phase reversal event. For example, `[0]Rx MPT PT=100 NSE pkt c0000000` indicates that the Cisco ATA received a CED tone event NSE packet with payload type of 100.
[*ch*] Tx MPT PT=<*pt*> NSE pkt <*event*>	Channel *ch* transmitted an NSE packet of *event* with payload type of *NSEpt*. For *event*, c0XXXXXX indicates a CED tone event, and c1XXXXXX indicates a phase reversal event. For example, `[0]Tx MPT PT=100 NSE pkt c0000000` indicates that the ATA transmitted a CED tone event NSE packet with payload type of 100.

Debugging FAX Pass-through Mode

When the Cisco ATA is configured to use *fax pass-through mode*, the fax call session can be established with an arbitrary voice codec. Once the voice call has been established, fax machines can signal their presence by means of a CED tone or V.21 preamble flag, after which the gateways send NSE packets to initiate switchover.

Note For *fax pass-through mode*, check the Cisco ATA debug log to verify that it is acting as an originating gateway as well as a terminating gateway.

Terminating-Gateway Example

When the Cisco ATA is used as a terminating gateway for a fax session, make sure the following conditions are true:

- The Cisco ATA transmits CED-tone-event NSE packets.
- The encoder switchover to G.711 occurs during the NSE-packet transaction.

An example debug log for a terminating gateway scenario is show below:

```
[0]Tx MPT PT=100 NSE pkt c0000000
[0]codec: 4 => 0
[0]Rx MPT PT=100 NSE pkt c0000000
```

Note The NSE response to the CED tone event is not mandatory; some gateways may not send back an NSE response.

Originating-Gateway Example

When the Cisco ATA is used as an originating gateway for a fax session, make sure that the following conditions are true:

- The Cisco ATA receives and responds to CED-tone-event NSE packets.
- The NSE payload type is the same for the received and transmitted NSE packets.
- The encoder switchover to G.711 occurs during NSE-packet transaction.

An example debug log for an originating gateway scenario is shown below:

```
[0]Rx MPT PT=100 NSE pkt c0000000
[0]Tx MPT PT=100 NSE pkt c0000000
[0]codec: 4 => 0
[0]Rx MPT PT=100 NSE pkt c0000000
[0]Rx MPT PT=100 NSE pkt c0000000
```

Note If your gateway is using a legacy IOS software image, it may not send NSE packets but instead may rely on a straightforward codec switchover mechanism. In this case, a codec switchover event occurs rather than an NSE packet transaction.

Possible Reasons for Failure

If your Cisco ATA does not receive CED-tone-event NSE packets and codec switchover does not occur, the failure may be due to the following reasons:

- The terminating gateway is not configured with fax/modem pass-through.
- The *fax pass-through mode* used by the terminating gateway may not be compatible with the Cisco NSE method.

If the log shows proper NSE packet transaction and G.711 upspeed for your fax session but the session still fails, check that the following conditions are true:

- The Cisco ATA software image version is 2.14 or above.
- The Cisco ATA model number is ATA186-I1, ATA186-I2, ATA188-I1, or ATA188-I2.
- The fax relay option for the remote gateways has been disabled.

Debugging FAX Mode

When the Cisco ATA is configured with *fax mode*, only G.711 codecs are used. You must confirm that only 0 (for G.711µ-law) or 8 (for G.711A-law) appear in the `Enable encoder` and `DPKT 1st` debug lines. The following example of a debug log shows that G.711µ-law is used:

```
[0]Enable encoder 0
[0]DPKT 1st: 1491513359 1491512639, pt 0
```

If the numeric codes for the G.711 codecs do not appear in the log, you need to check your **AudioMode** parameter setting on the Cisco ATA.

If the correct G.711 codecs appear in the log but your fax sessions still fail, check that the following conditions are true:

- The Cisco ATA software image version is 2.14 or above.
- The Cisco ATA model number is ATA186-I1, ATA186-I2, ATA 188-I1, or ATA188-I2.
- The fax relay option for the remote gateways has been disabled.

Using rtpcatch for Diagnosing Fax Problems

This section contains the following topics:

- rtpcatch Overview, page 6-12
- Example of rtpcatch, page 6-13
- Analyzing rtpcatch Output for Fax Sessions, page 6-16
- Using rtpcatch to Analyze Common Causes of Failure, page 6-17
- rtpcatch Limitations, page 6-20

rtpcatch Overview

rtpcatch is a tool that provides comprehensive information for a VoIP connection. The tool runs on a Microsoft Windows-based PC and is capable of parsing an output capture file from Network Associates (NAI) Sniffer Pro and identifies significant fax pass-through and fax relay events.

Major functions

rtpcatch includes the following major functions:

- Reads session data from Sniffer Pro capture files.
- Analyzes media streams.
- Stores media streams to files.
- Reports RTP statistics such as the number of RTP packets, the number of RTP frames, the number of lost packets, the number of filler packets during silence suppression periods, and the number of erased packets.

How to Use

To use **rtpcatch**, follow these steps:

Procedure

Step 1 Create a working directory for **rtpcatch** and place the executable file rtpcatch.exe in this directory.

Step 2 Copy your Network Associates Sniffer Pro capture files into this directory.

Step 3 At the DOS prompt of this directory, enter the following command:

```
:>rtpcatch <cap_file> [<prefix>] [options]
```

- **<cap_file>** is the NAI Sniffer capture file.
- **<prefix>** is the prefix prepended to the output filenames.

Output Files

The output files of **rtpcatch** include a summary file and audio stream files.

The summary file is ***<prefix>.sum*** if **<prefix>** is specified, otherwise it is ***file.sum***.

Stream files are labeled with an integer tag beginning with 00. Stream files are also tagged with the extension ***pcm*** for G.711A/G.711µ-law, ***723*** for G723.1, ***729*** for G729, ***t38*** for T.38, and ***cfr*** for Cisco Fax Relay.

Options

rtpcatch options include:

- `-fax`—to output the fax events for a connection.

  The output includes "`FAX summary 1`" as the interleaved event list for all directions, and "`FAX summary 2`" as the event list for each direction. The reported events include voice codec change, NSE signalling, and fax relay events.

- `-port <port0> <port1>`—to discard any packets sent from/to this port.

  If the NAI Sniffer capture file includes Cisco ATA **prserv** packets, these packets can interfere with **rtpcatch** analysis. Some **prserv** packets might be interpreted as NTE or NSE events. To prevent such interference, you can either disable debugging output on the Cisco ATA (do this by setting the **Nprintf** configuration parameter to 0), configure your NAI Sniffer to filter out the **prserv** packets, or run **rtpcatch** with the -port options.

Note **rtpcatch** works best for analyzing a single VoIP session. Command-line options can be entered in any order.

Example of rtpcatch

The section contains an example of using **rtpcatch** and includes an explanation of its output:

Output

```
C:\>rtpcatch faxpassthru -fax

[   25]open file: 00.723, (G723) 2.213:10000 => 2.116:10002
[   26]open file: 01.723, (G723) 2.116:10002 => 2.213:10000
[   29] <00>  1 silence pkts from TS 1760 (seq# 3)
[   42] <00>  2 silence pkts from TS 4400 (seq# 9)
[   47] <00>  2 silence pkts from TS 5600 (seq# 11)
[   55] <00>  2 silence pkts from TS 7760 (seq# 15)
[  101]open file: 02.pcm, (G711u) 2.116:10002 => 2.213:10000
[  106] <02>  2    lost pkts from seq# 39
[  107]open file: 03.pcm, (G711u) 2.213:10000 => 2.116:10002
[  110] <03>  1 silence pkts from TS 19440 (seq# 41)
```

```
------------ Summary --------------

Input file: faxpassthru.cap

<00.723>: (G723) 2.213:10000 => 2.116:10002
     total 38 pkts(70 frames), lost 0 pkts, fill 7 silence pkts

<01.723>: (G723) 2.116:10002 => 2.213:10000
     total 38 pkts(76 frames), lost 0 pkts, fill 0 silence pkts

<02.pcm>: (G711u) 2.116:10002 => 2.213:10000
     total 2181 pkts(2181 frames), lost 2 pkts, fill 0 silence pkts

<03.pcm>: (G711u) 2.213:10000 => 2.116:10002
     total 2179 pkts(2179 frames), lost 0 pkts, fill 1 silence pkts


---------- FAX Summary 1 ----------

[   25]<2.213=>2.116> Codec G723
[   26]<2.116=>2.213> Codec G723
[  101]<2.116=>2.213> Codec G711u/D
[  102]<2.116=>2.213> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  103]<2.116=>2.213> NSE PT 100, EVT 193: ECAN OFF, Phase Reversal Detected
[  105]<2.213=>2.116> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  107]<2.213=>2.116> Codec G711u/D

---------- FAX Summary 2 ----------

PATH: 2.213:10000 => 2.116:10002
[   25]Codec G723
[  105]NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  107]Codec G711u/D

PATH: 2.116:10002 => 2.213:10000
[   26]Codec G723
[  101]Codec G711u/D
[  102]NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  103]NSE PT 100, EVT 193: ECAN OFF, Phase Reversal Detected
```

Explanation

The output is printed on screen and saved in the file file.sum.

The following lines are described:

- `[   25]open file: 00.723, (G723) 2.213:10000 => 2.116:10002`

  This indicates that **rtpcatch** reached NAI Sniffer packet number 25 and opened a new file named 00.723 to store an audio stream consisting of G.723-compressed data. The audio path originates from the IP address ending with 2.213 and port 10000 (written as <2.213:1000>) and terminates at the IP address ending with 2.116 and port 10002.

- `[   29] <00>  1 silence pkts from TS 1760 (seq# 3)`

  This indicates that **rtpcatch** detected one silence RTP packet in the audio path <00> and the silence packet began at timestamp 1760. This occurred at packet number 29 with the RTP sequence number 3.

- `[  106] <02>  2    lost pkts from seq# 39`

This indicates that **rtpcatch** detected two lost RTP packets in the audio path <02>. The missing packets began with sequence number 39. This occurred at packet number 106.

-
  ```
  ------------ Summary --------------
  ```

  ```
  Input file: faxpassthru.cap
  ```

  ```
  <00.723>: (G723) 2.213:10000 => 2.116:10002
  total 38 pkts(70 frames), lost 0 pkts, fill 7 silence pkts
  ```

  This indicates that the input filename is faxpassthru.cap. The output file 00.723 contains the G.723-compressed stream from <2.123:10000> to <2.116:10002>; 38 packets (70 frames) were processed by **rtpcatch**. No lost packets were detected and seven silence packets were found.

- ---------- FAX Summary 1 ----------

  ```
  [   25]<2.213=>2.116> Codec G723
  [   26]<2.116=>2.213> Codec G723
  [  101]<2.116=>2.213> Codec G711u/D
  [  102]<2.116=>2.213> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
  [  103]<2.116=>2.213> NSE PT 100, EVT 193: ECAN OFF, Phase Reversal Detected
  [  105]<2.213=>2.116> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
  [  107]<2.213=>2.116> Codec G711u/D
  ```

  This indicates that the audio streams originating at <2.213> and <2.216> are G.723-compressed. The audio stream from <2.116> was then up-sped to G.711µ-law at packet number 101. The NSE signaling packets were sent at packet number 102, 103 and 105. Finally, the audio stream from <2.113> was up-sped to G.711µ-law.

- ---------- FAX Summary 2 ----------

  ```
  PATH: 2.213:10000 => 2.116:10002
  [   25]Codec G723
  [  105]NSE PT 100, EVT 192: Up-Speed, CED tone Detected
  [  107]Codec G711u/D
  ```

  ```
  PATH: 2.116:10002 => 2.213:10000
  [   26]Codec G723
  [  101]Codec G711u/D
  [  102]NSE PT 100, EVT 192: Up-Speed, CED tone Detected
  [  103]NSE PT 100, EVT 193: ECAN OFF, Phase Reversal Detected
  ```

  This summarizes the fax events for each path.

  The audio stream events reported by **rtpcatch** include:

  - beginning of new audio codec
  - silence packets
  - lost packets
  - erased packets (as in G.729)

  The NSE events reported by **rtpcatch** include:

  - event 32, Fax Mode, CED tone Detected (RFC2833)
  - event 34, Modem Mode, ANSam tone Detected (RFC2833)
  - event 192, Up-Speed, CED tone Detected
  - event 193, ECAN OFF, Phase Reversal Detected
  - event 194, ECAN ON, Silence Detected
  - event 200, T38 Fax Mode, V.21 Detected

- – event 201, T38 Fax Mode ACK
- – event 202, T38 Fax Mode NACK
- – event 203, Modem Relay Mode, CM Tone Detected
- – event Cisco Fax Relay (with RTP payload type 96)
- – event Cisco Fax Relay ACK (with RTP payload type 97)

Analyzing rtpcatch Output for Fax Sessions

The following examples show the proper fax events when gateways are configured to operate in the following modes:

- Cisco ATA *fax mode*
- Cisco ATA *fax pass-through mode*
- T.38 fax relay mode
- Cisco fax relay mode

Example 6-1 Fax Mode

```
---------- FAX Summary 1 ----------
[   25]<2.131=>3.200> Codec G711u
[   26]<3.200=>2.131> Codec G711u
```

Analysis

Both sides use G.711 for the entire fax session.

Example 6-2 Fax Pass-through Mode

```
---------- FAX Summary 1 ----------
[   25]<2.213=>2.116> Codec G723
[   26]<2.116=>2.213> Codec G723
[  101]<2.116=>2.213> Codec G711u/D
[  102]<2.116=>2.213> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  103]<2.116=>2.213> NSE PT 100, EVT 193: ECAN OFF, Phase Reversal Detected
[  105]<2.213=>2.116> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  107]<2.213=>2.116> Codec G711u/D
```

Analysis

- Both sides initially use G.723.
- <2.116> switches to G.711μ-law using a dynamic payload type.
- NSE signaling packets are sent from <2.116>.
- An optional NE signaling packet is sent from <2.213>.
- <2.113> switches to G.711μ-law using a dynamic payload type.

Note EVT 193 may not appear for some fax transmission.

Example 6-3 Fax Pass-through Mode

```
---------- FAX Summary 1 ----------
[   37]<3.200=>2.53> Codec G723
[   41]<2.53=>3.200> Codec G723
[  136]<3.200=>2.53> Codec G711u/D
[  137]<3.200=>2.53> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[  140]<2.53=>3.200> Codec G711u/D
```

Analysis

- Both sides initially use G.723.
- <3.200> switches to G.711µ-law using a dynamic payload type.
- NSE signaling packets are sent from <3.200>.
- <2.53> switches to G.711µ-law using a dynamic payload type.

Example 6-4 T38 Fax Relay Mode

```
---------- FAX Summary 1 ----------
[   15]<2.53=>3.99> Codec G711u
[  486]<3.99=>2.53> Codec G711u
[ 1277]<3.99=>2.53> Codec T38
[ 1278]<2.53=>3.99> Codec T38
```

Analysis

- Both sides initially use G.711µ-law.
- Both sides switch to T.38

Example 6-5 Cisco Fax Relay

```
---------- FAX Summary 1 ----------
[    8]<2.53=>3.99> Codec G711u
[  248]<3.99=>2.53> Codec G711u
[  798]<2.53=>3.99> NSE PT 96, Cisco Fax Relay
[  799]<3.99=>2.53> NSE PT 97, EVT 192: Up-Speed, CED tone Detected
[  800]<2.53=>3.99> NSE PT 97, Cisco Fax Relay ACK
[  801]<2.53=>3.99> Codec C_FxRly
[  803]<3.99=>2.53> NSE PT 96, EVT 192: Up-Speed, CED tone Detected
[  804]<2.53=>3.99> NSE PT 97, Cisco Fax Relay ACK
[  805]<3.99=>2.53> Codec C_FxRly
```

Analysis

- Both sides initially use G.711µ-law.
- NSE signaling packets are sent between <2.53> and <3.99>.
- Both sides switch to Cisco fax relay.

Using rtpcatch to Analyze Common Causes of Failure

The following examples show the **rtpcatch** output of failed fax sessions. <3.200> is ATA; <2.53> is a Cisco gateway.

Example 6-6 Cisco ATA Configuration Failure

```
---------- FAX Summary 1 ----------
[   37]<2.53=>3.200> Codec G723
[   39]<3.200=>2.53> Codec G723
```

Analysis

- <2.53> is the originating gateway and <3.200> is the terminating Cisco ATA.
- The Cisco ATA and the <2.53> gateway use G.723 codec.

Possible Causes for Failure

- The Cisco ATA is not configured with *fax mode* or *fax pass-through mode*.
- If the Cisco ATA is the gateway for a fax sender, the remote gateway is not configured with *fax pass-through mode*.

Example 6-7 Fax Mode Failure

```
---------- FAX Summary 1 ----------
[   37]<2.53=>3.200> Codec G711
[   39]<3.200=>2.53> Codec G711
[ 1820]<2.53=>3.200> NSE PT  96, Cisco Fax Relay
[ 1966]<2.53=>3.200> NSE PT  96, Cisco Fax Relay
```

Analysis

- <2.53> is the originating gateway and <3.200> is the terminating Cisco ATA.
- The Cisco ATA and the <2.53> gateway begin with G.711 codec.
- The <2.53> gateway sends Cisco fax relay event packets.

Possible Cause for Failure

- Cisco fax relay option is not disabled on the gateway.

Example 6-8 Fax Pass-through Mode Failure

```
---------- FAX Summary 1 ----------
[    2]<2.53=>3.200> Codec G723
[    4]<3.200=>2.53> Codec G723
[  106]<3.200=>2.53> Codec G711u/D
[  107]<3.200=>2.53> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[ 1436]<3.200=>2.53> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
```

Analysis

- <2.53> is the originating gateway, and <3.200> is the terminating Cisco ATA.
- The Cisco ATA upspeeds to G.711µ-law and sends G.711 upspeed NSE signaling packets.
- The <2.53> gateway does not respond to the NSE signaling packets.

Possible Causes for Failure

- Fax/modem pass-through option is not enabled on the gateway.
- Fax/modem pass-through NSE payload type are configured differently on the Cisco ATA and the gateway.

Example 6-9 Fax Pass-through Mode Failure

```
---------- FAX Summary 1 ----------
[   37]<2.53=>3.200> Codec G723
[   39]<3.200=>2.53> Codec G723
[  143]<3.200=>2.53> Codec G711u/D
[  144]<3.200=>2.53> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[ 1602]<3.200=>2.53> NSE PT 100, EVT 192: Up-Speed, CED tone Detected
[ 1604]<2.53=>3.200> Codec G711u/D
[ 1820]<2.53=>3.200> NSE PT  96, Cisco Fax Relay
[ 1966]<2.53=>3.200> NSE PT  96, Cisco Fax Relay
```

Analysis

- <2.53> is the originating gateway, and <3.200> is the terminating Cisco ATA.
- The Cisco ATA upspeeds to G.711µ-law and sends G.711 upspeed NSE signaling packets.
- The <2.53> gateway upspeeds to G.711µ-law and then sends Cisco fax relay event packets.

Possible Cause for Failure

- Cisco fax relay option is not disabled on the gateway.

Example 6-10 Fax Pass-through Mode Failure

```
---------- FAX Summary 1 ----------
[   33]<3.200=>2.53> Codec G729
[   39]<2.53=>3.200> Codec G729
[  562]<2.53=>3.200> NTE PT 101, EVT  34: Modem Mode, ANSam tone Detected (RFC2833)
[  563]<2.53=>3.200> NTE PT 101, EVT  34: Modem Mode, ANSam tone Detected (RFC2833)
[  565]<2.53=>3.200> NTE PT 101, EVT  34: Modem Mode, ANSam tone Detected (RFC2833)
[  566]<2.53=>3.200> Codec G711u/D
[  568]<2.53=>3.200> NTE PT 101, EVT  34: Modem Mode, ANSam tone Detected (RFC2833)
[  580]<3.200=>2.53> Codec G711u/D
```

Analysis

- <3.200> is the originating Cisco ATA, and <2.53> is the terminating gateway.
- Both sides initially use G.729.
- <2.53> gateway sends NTE signaling packets, then upspeeds to G.711µ-law.
- <3.200>The Cisco ATA switches to G.711µ-law also, but never sends NTE signaling packets.
- Fax transmission fails because <2.53> gateway does not receive any NTE packets, and it drops the fax call.

Possible Cause for Failure

- The Cisco ATA does not support the NTE signaling method and requires that the gateways use the NSE signaling method.

rtpcatch Limitations

- **rtpcatch** performs optimally when analyzing capture files containing only one VoIP session.
- **rtpcatch** detects only G.711A, G.711µ-law, G.723, G.729, T.38, Cisco fax relay, modem pass-through with or without redundancy packets, RTCP packets and NSE packets.
- **rtpcatch** can handle a maximum of 20 prserv ports using the -port option.
- **rtpcatch** may not detect T.38 packets correctly.

CHAPTER 7

Upgrading the Cisco ATA Signaling Image

This section describes two methods for upgrading the Cisco ATA software for the MGCP protocol:

- Upgrading the Signaling Image from a TFTP Server, page 7-1—This is the Cisco-recommended method for the MGCP protocol. This is the most efficient method and requires only a one-time configuration change.
- Upgrading the Signaling Image Manually, page 7-2—This method can be used if you must manually upgrade the image of one Cisco ATA. However, this is not the recommended upgrade method because it is not as simple as the TFTP upgrade method.

This section also describes procedures for verifying a successful image upgrade:

- Confirming a Successful Signaling Image Upgrade, page 7-5—Procedures for using your Web browser or the voice configuration menu are included.

Caution Do not unplug the Cisco ATA while the function button is blinking. Doing so can cause permanent damage to the device. The function button blinks during an upgrade.

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Upgrading the Signaling Image from a TFTP Server

You can configure the Cisco ATA to automatically download the latest signaling image from the TFTP server. You do this by configuring the parameter *upgradecode* in your Cisco ATA configuration file. (You also would use this procedure if you wanted to perform a cross-protocol signaling image upgrade.) For more information about setting up the configuration file, see the “Creating Unique and Common Cisco ATA Configuration Files” section on page 3-9.

Syntax of upgradecode Parameter

```
upgradecode:3,0x301,0x0400,0x0200,tftp_server_ip,69,image_id,image_file_name
```

Definitions

- The hexadecimal values that precede the tftp_server_ip variable must always be the values shown in the syntax.

- `tftp_server_ip` is the TFTP server that contains the latest signaling image file.
- `image_id` is a unique 32-bit integer that differs with each upgrade. You can determine this 32-bit integer value by using the build date on the image file name and prepending it with "0x". For example, if the image_file_name is ata186-v2-14-020514a.kxz, then the build date is 020508a, and the image_id is 0x020508a).
- `image_file_name` is the firmware upgrade-image file name. The image_file_name format is:

  `ata186-v{M}-{N}-{yymmdd}{a-f}{ext}`

  - `- M` is the major version number
  - `- N` is the minor version number (always two digits)
  - `- yymmdd` is a two-digit year, two-digit month, and two-digit day
  - `- a-f` is the build letter (**- yymmdd** and **a-f** together form the build date of the image)
  - `- ext` must be ".kxz" for upgrading from version 2.11 and below, and can be ".zup" for upgrading from version 2.12 and up for the Cisco ATA186, but it *must* be ".zup" for upgrading the Cisco ATA188.

Process

Whenever the Cisco ATA administrator stores a new signaling image (denoted by a change to the image_id), the Cisco ATA upgrades its firmware with the new image_file. To contact the TFTP server, the Cisco ATA uses the TFTP server IP address that is contained within the value of the *upgradecode* parameter.

Example

The upgradecode parameter value could be:

```
upgradecode:3,0x301,0x0400,0x0200,192.168.2.170,69,0x020723a,ata186-v2-15-020
723a.zup
```

This instructs the Cisco ATA to upgrade its firmware to ata186-v2-15-020723a.zup by downloading the ata186-v2-15-020723a.zup file from the TFTP server IP address of 192.168.2.170. This download occurs after the Cisco ATA downloads its configuration file that contains the directive from the upgradecode parameter. Also, the upgrade occurs only if the internally cached image_id in Cisco ATA is different from the value 0x020723a.

Upgrading the Signaling Image Manually

This section describes how to manually upgrade the Cisco ATA with the most recent signaling image. The executable file that you need is called ata186us.exe, and is bundled in the Cisco ATA release-software zip file.

This section contains the following topics:

- Preliminary Steps, page 7-3
- Running the Executable File, page 7-3

Preliminary Steps

Before you run the executable file, be sure to complete the following procedure:

Procedure

Step 1 If you are a registered CCO user. go to the following URL: http://www.cisco.com/cgi-bin/tablebuild.pl/ata186

Step 2 Locate the zip file that contains the software for the applicable release and signaling image you are using. The contents of each file are described next to the file name. Extract the signaling image file (this file has an extension of .zup—For example, ata186-v2-15-020723a.zup) and store it on the PC that has connectivity with the Cisco ATA.

Step 3 Set the Cisco ATA parameter UseTftp to 0.

Note Remember to set this parameter back to 1 before you use the TFTP upgrade method at a later time.

Step 4 Follow the instructions in the "Running the Executable File" section on page 7-3.

Running the Executable File

This section includes the procedure for running the executable file and using the voice configuration menu to complete the upgrade process. First check to make sure the upgrade requirements are met and determine the syntax to use when running the program.

This section contains the following topics:

- "Upgrade Requirements" section on page 7-3
- "Syntax" section on page 7-3
- "Upgrade Procedure" section on page 7-4

Upgrade Requirements

The following list contains the requirements for using the ata186us.exe file and the voice configuration menu to upgrade the Cisco ATA to the latest signaling image:

- A network connection between the PC from which you will invoke the executable file and the Cisco ATA
- A PC running Microsoft Windows 9X/ME/NT/2000

Syntax

```
ata186us [-any] {-h[host_ip]} {-p[port]} {-quiet} [-d1 -d2 -d3] <image file>
```

Definitions

- `-any`—Allow upgrade regardless of software and build versions (recommended).
- `-h[host_ip]`–Set the upgrade server to a specific IP address in cases where there may be more than one IP address for the host. The default behavior is that the program will use the first IP address it obtains when it runs the **gethostbyname** command.
- `-p[port]`–Set the server port to a specific port number (the default port number is 8000; use a different port number only if you are setting up an upgrade server other than the default).
- `-quiet`—Quiet mode; send all output to log file named as [port].log (useful when running the upgrade server as a daemon).
- `-d1,-d2,-d3`—Choose a verbosity level for debugging, with -d3 being the most verbose.
- image file—This is the name of the signaling image file to which the Cisco ATA will upgrade.

Example

To upgrade the Cisco ATA to the signaling image ata186-v2-15-020723a.zup, you can use the following syntax:

```
ata186us -any -d1 ata186-v2-15-020723a.zup
```

Upgrade Procedure

To perform the upgrade, follow these steps:

Procedure

Step 1 Run the executable file (see the “Syntax” section on page 7-3) from the Microsoft Windows DOS or command prompt. You will receive instructions on how to upgrade.

Step 2 On the Cisco ATA, press the function button to invoke the voice configuration menu.

Step 3 Using the telephone keypad, enter the following:

100# ***ip_address_of_PC*** *** port #**

This is the IP address of the PC and the port number at the DOS prompt where you invoked the ata186us.exe file.

For example, if the IP address is 192.168.1.10, and the port number is 8000 (the default), then enter:

100#192*168*1*10*8000#

When the upgrade is complete, the "Upgrade Successful" prompt will sound.

Note When upgrading many Cisco ATAs manually, you can save the software-upgrade dial-pad sequence in your telephone's speed-dial, and use this sequence repeatedly.

Confirming a Successful Signaling Image Upgrade

You can verify that you have successfully upgraded the Cisco ATA signaling image by using one of the following methods:

- Using a Web Browser, page 7-5
- Using the Voice Configuration Menu, page 7-5

Using a Web Browser

To use your web browser to verify a successful image upgrade, perform the following steps:

Procedure

Step 1 Open your web browser.

Step 2 Enter the IP address of your Cisco ATA Web configuration page:

http://<*IP address*>/dev

Step 3 Refresh the page to clear the cache.

The image version number and its build date should appear at the bottom-left corner of the Cisco ATA Web configuration page.

Using the Voice Configuration Menu

To use the voice configuration menu to verify a successful image upgrade, perform the following steps:

Procedure

Step 1 Pick up the telephone handset attached to the **Phone1** port of the Cisco ATA.

Step 2 Press the function button on the Cisco ATA.

Step 3 Press **123#** on the telephone keypad to play out the image version number.

Press **123123#** on the telephone keypad to play out the image build date.

CHAPTER 8

Troubleshooting

This section describes troubleshooting procedures for the Cisco ATA:

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

General Troubleshooting Tips

The suggestions in this section are general troubleshooting tips.

- Make sure that the DHCP server is operating correctly. Note that the function button blinks slowly when the Cisco ATA attempts to acquire the DHCP configuration.
- If the green activity LED is not flashing after you connect the Ethernet cable, make sure that both the power cord and the Ethernet connection are secure.
- If there is no dial tone, make sure that the telephone line cord from the telephone is plugged into the appropriate port on the Cisco ATA. Make sure that your Cisco ATA is properly registered on your Call Control system. Test another phone; if this phone does not work either, there may be a problem with the current configuration or with the Cisco ATA.

- A busy tone indicates that the party you called is not available. Try your call again later. A fast-busy tone indicates that you dialed an invalid number.
- After power up, if the function button continues to blink slowly, the Cisco ATA cannot locate the DHCP server. Check the Ethernet connection and the availability of the DHCP server.
- The DHCP server should show an incoming request from the MAC address listed on the product label or given by the voice prompt.
- If you place a call to another IP telephone, detect ringing, and the called party answers but you cannot detect the speaker's voice, verify that the Cisco ATA and the other IP telephone support at least one common audio codec: G.711A-law, G.711μ-law, G.723.1, or G.729A.

Symptoms and Actions

Symptom Parameters with values set using the web server interface or voice configuration menu revert to their original settings.

Possible Cause You are using TFTP for configuration (the UseTFTP parameter is set to 1). The Cisco ATA has a cached version of its configuration file stored in its flash memory; this is what displayed or played through the web server interface or voice configuration menu. If UseTFTP is set to 1, then the cached value of the Cisco ATA configuration file is synchronized with its configuration file located at the TFTP server. This synchronization update of the cached value occurs at approximate intervals determined by the CFGInterval parameter value as well as when the Cisco ATA powers up or resets.

Recommended Action If you are using TFTP for configuration, do not use the web server interface or voice configuration menu to modify the value of the Cisco ATA configuration file. Use the web server interface or voice configuration menu only to initially configure the Cisco ATA to contact the TFTP server for the Cisco ATA configuration file.

Symptom Unable to access the web configuration page.

Possible Cause Software versions earlier than 2.0 require the web configuration page to be enabled using option 80# on the voice configuration menu.

Recommended Action Upgrade the software.

Symptom The Cisco ATA does not seem to be configured using the TFTP server.

Possible Cause The TFTP server address is not properly set.

Recommended Action Ensure that the TftpURL is correctly set to the URL or IP address of the TFTP server that is hosting the configuration file for the Cisco ATA. If you are using DHCP to supply the TFTP server IP address, make sure that the TftpURL is set to 0. Also, unless the TftpURL is an IP address, be sure that the DNS1IP and DNS2IP values are properly set to resolve the TftpURL supplied by DHCP.

Symptom The Cisco ATA contacts the TFTP server more often than specified in the CfgInterval parameter.

Possible Cause The ToConfig parameter is not set to 0.

Recommended Action After the Cisco ATA has a valid configuration file, the ToConfig parameter must be set to 0. If it is not set to 0, the Cisco ATA will attempt to contact the TFTP server too frequently.

Symptom Cannot place call.

Possible Cause Equipment failure on the network.

Recommended Action Replace defective network equipment.

Possible Cause Recipient has not registered the IP phone.

Recommended Action Register the IP phone.

Possible Cause Ethernet cable is not connected.

Recommended Action Make sure that all cables are connected.

Symptom Fast busy tone.

Possible Cause Authentication credential is incorrect.

Recommended Action Verify authentication credential, and revise if necessary.

Possible Cause Recipient has not registered the IP phone.

Recommended Action Register the IP phone.

Possible Cause No common codec between the Cisco ATA and remote end.

Recommended Action Change codec to one that is common with the Cisco ATA and the remote end.

Possible Cause Recipient is in a call with call waiting disabled.

Recommended Action Attempt to place the call at a later time.

Installation and Upgrade Issues

Note The following issues apply to the manual image-upgrade process only. Image upgrades must be performed separately.

Symptom The red LED is flashing slowly on the function button.

Possible Cause The Cisco ATA is trying to obtain the DHCP address or the software image is being upgraded.

Possible Cause The Ethernet cable is unplugged.

Recommended Action Plug in the Ethernet cable.

Symptom Voice prompt returns *Upgrade not available* message. This can only occur if you are using the executable-file upgrade method.

Possible Cause You are attempting to upgrade to the existing version.

Recommended Action You do not need to upgrade.

Symptom Voice prompt returns *Upgrade failed* message. This can only occur if you are using the executable-file upgrade method.

Possible Cause You have entered an incorrect IP address.

Recommended Action Enter the correct IP address.

Possible Cause Software image is corrupted.

Recommended Action Upgrade software image.

Symptom No dial tone.

Possible Cause No user ID was entered.

Recommended Action Enter the correct user ID.

Symptom Incorrect dial tone.

Possible Cause Check the web interface for your DialTone setting. The default is *U.S.*

Recommended Action Set the correct country DialTone value.

Debugging

The MS-DOS Windows-based debugging program tool, prserv.exe, is included in every software upgrade package. The tool is also available from Cisco TAC. The prserv program is used in conjunction with the NPrintf configuration parameter. This file serves as an upgrade server that captures debug information sent by the Cisco ATA software to your PC's IP address and port number. This debug file (prserv.exe) compiles the information from the Cisco ATA into a readable log file. To capture this "NPRINTF" information, you must know the IP address of the PC using the prserv program, illustrated as follows:

```
IP address.port
```

where *IP address* is the IP address of your PC, and *port* is 9001. If another process on your PC already uses port 9001, you may use some other value (legal values are from 1024 to 65535). If no port value is entered, the default value is 9001.

To enter the IP address and port number, use voice menu option 81#. You must enter the IP address and port number in alphanumeric format, which requires entering the * key after every character entered. To enter the "." character, you must enter the sequence 1 1#.

For example, for a computer with the IP address 172.28.78.90 and port number 9001 (172.28.78.90.9001), you would enter the following on your telephone handset:

1* 7* 2* 1 1* 2* 8* 1 1* 7* 8* 1 1* 9* 0* 1 1* 9* 0* 0* 1* *

To operate the debug capture program *prserv.exe*, place the prserv program in a folder on your PC; then at the DOS prompt of the folder where you have placed it, enter:

```
C:> prserv [-t] port.log
```

where *port* is the port number you have selected, and *-t*, which is optional, means that a time stamp will be included with each message in the form *yy:mm:dd:hh* (two-digit years, two-digit months, two-digit days, two-digit hours). If you do not enter *port*.**log**, debug information still appears on your screen, but it is not saved to a log file.

After you finish capturing debug information, you can stop the log program by entering Ctrl-C at the DOS prompt. The log file created is named ***port*.log**. If you restart the process without changing the name of the log file, any new debug information is appended to the end of the original file.

Contact Cisco TAC for more information. See the "Obtaining Technical Assistance" section on page xvi for instructions.

You should also have access to a sniffer or LAN analyzer.

Caution For security reasons, Cisco recommends that you do not use the web interface over the public network. Disable the web interface, using the UIPassword parameter, before the Cisco ATA is moved from the service provider site.

Using System Diagnostics

The Cisco ATA uses functionality of the syslog protocol for system diagnostics. For detailed information on syslog, see *RFC-3164*.

Note Because the Cisco ATA does not have an internal clock, syslog messages provide the time offset from the most recent Cisco ATA reset. The system administrator should make sure that the syslog relay or syslog server adds the local timestamps upon receiving syslog messages.

Message Syntax

<Priority>Time_Offset ATA_IP [tag] : [ch]Message

Syntax Definitions

- Priority means the facility and severity values for a specific syslog message.

  Priority = (facility value) * 8 + (severity value). Facility and severity definitions and values are supplied in RFC-3164; these values can be calculated if you know the priority value.

- Time_offset means the time elapsed since the most recent Cisco ATA reset.

  If the time offset is less than 24 hours, this value is shown as:

  ```
  hh:mm:ss
  ```

  If the time offset is more than 24 hours, this value is shown as:

  ```
  dd hh:mm:ss
  ```

  where the first *d* is the number of days elapsed since the most recent reset, and the second *d* is the letter *d*.

- ATA_IP means the IP address of ATA.
- tag means the tag number of the syslog message. Each tag number corresponds to a particular type of message, such as an ARP message. You can turn on tracing for each type of message you want captured by configuring the Cisco ATA parameter syslogCtrl. For more information about the syslogCtrl parameter and for a complete listing of tag numbers and their corresponding message types, see the “SyslogCtrl” section on page 5-42.

  Syslog information is sent to the syslog server that you configure by means of the Cisco ATA syslogIP parameter. For more information, see the “SyslogIP” section on page 5-41.

- *ch* means the active line of the Cisco ATA.

  System-level messages do not contain a *ch* field.

- Message means the syslog message. (See RFC-3164 for message formats and how to interpret the meaning of each syslog message.)

The following examples show some of the different types of messages that syslog reports.

Example—ARP Message

```
<62>00:00:51 192.168.3.169 [00]:ARP Update: MAC:080017014e00, IP:192.168.2.81
```

This message includes the following information:

- Priority=62, which means that the facility value is 7 (network new subsystem) and the severity value is 6 (informational messages). You can derive this information from RFC-3164.
- The time offset is 00:00:51, which means that the most recent Cisco ATA reset was 51 seconds earlier.
- The IP address of the Cisco ATA is 192.168.3.169
- The tag value is 00, which corresponds to ARP messages. This is derived from Table 5-7 on page 5-42.
- The message itself begins with *ARP Update* and can be interpreted by means of RFC-3164.

Example—DHCP Messages

```
<62>00:04:00 192.168.3.140 [01]:DHCP Reg: Srv:192.168.2.1 lease:120
<62>00:02:31 192.168.2.253 [01]:DHCP's sm: 255.255.254.0
<62>00:02:31 192.168.2.253 [01]:DHCP's rt: 192.168.3.254
```

These messages include the following information:

- Priority=62, which means that the facility value is 7 (network new subsystem) and the severity value is 6 (informational messages). You can derive this information from RFC-3164.
- The time offset of the first message is 00:04:00, which means that the most recent Cisco ATA reset was four minutes earlier.
- The tag value is 01, which corresponds to DHCP messages. This is derived from Table 5-7 on page 5-42.
- The messages include the DHCP server IP, lease time, subnet mask and router.

Example—TFTP messages

```
<94>00:04:35 192.168.3.237 [02]:Rx TFTP file:ata00012d010828(684) ok
<94>00:00:02 192.168.3.237 [02]:Rx TFTP file:ata00012d010828(-10) fail
```

These messages include the following information:

- Priority=94, which means that the facility value is 11 (FTP daemon) and the severity value is 6 (informational messages). You can derive this information from RFC-3164.
- The time offset of the first message is 00:04:35, which means that the most recent Cisco ATA reset was four minutes and 35 seconds earlier.
- The tag value is 02, which corresponds to TFTP messages. This is derived from Table 5-7 on page 5-42.
- The messages include TFTP filename, file size and transmission result.

Example—Cisco ATA Configuration Update Message

```
<30>00:00:01 192.168.3.237 [03]:ATA Config Update OK
```

This message includes the following information:

- Priority=30, which means that the facility value is 3 (system daemon) and the severity value is 6 (informational messages). You can derive this information from RFC-3164.
- The time offset of the message is 00:00:01, which means that the most recent Cisco ATA reset was one second earlier.
- The tag value is 03, which corresponds to Cisco ATA configuration-update messages. This is derived from Table 5-7 on page 5-42.
- This message shows indicates the status of the Cisco ATA configuration-file update.

Example—System Reboot Message

```
<31>00:00:00 192.168.3.220 [04]:Reboot from ata00012d010829(HWVersion1)
@192.168.3.220 (warmStart:0)
```

This message includes the following information:

- Priority=31, which means that the facility value is 3 (system daemon) and the severity value is 7 (debug-level messages). You can derive this information from RFC-3164.
- The time offset of the message is 0.
- The tag value is 04, which corresponds to system-reboot messages. This is derived from Table 5-7 on page 5-42.
- This message includes the MAC address, hardware version and IP address of the Cisco ATA, and the reason for the reboot.

Example—Cisco ATA Event Messages

```
<142>00:00:40 192.168.3.169 [09]:[0]OFFHOOK
<142>00:00:43 192.168.3.169 [09]:[0]ONHOOK
<142>00:01:35 192.168.3.169 [09]:[0]OFFHOOK
<142>00:01:50 192.168.3.169 [09]:[0]DTMF 2 , insum:830200
<142>00:01:50 192.168.3.169 [09]:[0]DTMF 2 , insum:854313
<142>00:01:50 192.168.3.169 [09]:[0]DTMF 1 , insum:868411
<142>00:01:50 192.168.3.169 [09]:[0]DTMF 2 , insum:861215
<142>00:01:50 192.168.3.169 [09]:[0]DTMF 0 , insum:858638
<142>00:01:51 192.168.3.169 [09]:[0]DTMF # , insum:845590
<142>00:01:51 192.168.3.169 [09]:[0]CLIP 22120
```

These messages include the following information:

- Priority=142, which means that the facility value is 17 (local use 1) and the severity value is 6 (informational messages). You can derive this information from RFC-3164.
- The time offset of the first message is 40 seconds.
- The tag value is 09, which corresponds to Cisco ATA event messages. This is derived from Table 5-7 on page 5-42.
- The *ch* (active line of the Cisco ATA) is line 0, which is the **Phone 1** port of the Cisco ATA.
- The messages include DTMF debugging (showing the key and the insum number), on/off hook, Caller ID (CLIP/CLIR) and the callee number.

Example—Fax Event Messages

```
<150>00:00:11 192.168.3.169 [10]:[1]MPT mode 0
<150>01:07:27 192.168.3.169 [10]:[1:0]Rx FAX
<150>01:07:27 192.168.3.169 [10]:[1]Tx MPT PT=100 NSE pkt c0000000
<150>01:07:27 192.168.3.169 [10]:[1]MPT mode 2
<150>01:07:27 192.168.3.169 [10]:[1]codec: 0 => 0
<150>01:07:27 192.168.3.169 [10]:[1]MPT mode 3
<150>01:07:27 192.168.3.169 [10]:[1]Rx MPT PT=100 NSE pkt c0000000
```

These messages include the following information:

- Priority=150, which means that the facility value is 18 (local use 2) and the severity value is 6 (informational messages). You can derive this information from RFC-3164.
- The time offset of the first message is 11 seconds.
- The tag value is 10, which corresponds to Cisco ATA event messages. This is derived from Table 5-7 on page 5-42.
- The *ch* (active line of the Cisco ATA) is line 1, which is the **Phone 2** port of the Cisco ATA..
- The messages include fax detection, transmit/receive NSE packet status and Fax codec switch information.

Example—RTP Statistic Messages

```
<182>00:01:58 192.168.3.169 [16]:[0]RTP Tx dur:5, pkt:275, byte:44000
<182>00:01:58 192.168.3.169 [16]:[0]RTP Rx dur:7, pkt:226, byte:35921, latePkt:0 lostPkt:0
avgJitter:0
```

These messages include the following information:

- Priority=182, which means that the facility value is 22 (local use 6) and the severity value is 6 (informational messages). You can derive this information from RFC-3164.
- The time offset of the first message is one minute and 58 seconds.
- The tag value is 16, which corresponds to RTP statistics messages. This is derived from Table 5-7 on page 5-42.
- The *ch* (active line of the Cisco ATA) is line 0, which is the **Phone 1** port of the Cisco ATA.
- The transmission statistics include the duration, packet count and byte count. The receiving statistics include the duration, packet count, byte count, last packet count, lost packet count and average jitter.

Local Tone Playout Reporting

Local tones are tones that the Cisco ATA plays to its FXS port. Each of these tones corresponds to an identifier, and these *tone type identifiers* are placed into the *prserv* debug log. These identifiers supply information that administrators can use to help analyze call flows for debugging purposes.

Local tones are different from other tones because local tones are not carried within the inband audio. Instead, the Cisco ATA is prompted by a network event to play the tone, and the Cisco ATA generates the tone for the exclusive purpose of playing it to the attached telephone handset. For example, during a call between the Cisco ATA and a far-end phone, the far-end user might press a digit on the dial pad, thus sending an AVT Named Signaling Event to the Cisco ATA. This event prompts the Cisco ATA to generate a DTMF tone and to play the tone locally to the Cisco ATA phone.

Table 8-1 lists the tone type identifier and its description for local tone reporting.

Table 8-1 Tone Type Identifiers

Tone Type ID	Description
0	Dial tone
1	Busy tone
2	Reorder tone
3	Ringback tone
4	Call-waiting tone
5	Warning or confirmation tone
6	DTMF digit 0
7	DTMF digit 1
8	DTMF digit 2
9	DTMF digit 3
10	DTMF digit 4
11	DTMF digit 5
12	DTMF digit 6
13	DTMF digit 7
14	DTMF digit 8
15	DTMF digit 9
16	DTMF digit A
17	DTMF digit B
18	DTMF digit C
19	DTMF digit D
20	DTMF digit *
21	DTMF digit #
22	CPE alert signal (for off-hook Caller ID generation)
23	Outside dial tone
24	Prompt tone
25	Beep tone

Obtaining Network Status Prior to Getting IP Connectivity

Using voice configuration menu code **3123#,** you can obtain basic network status to use for diagnostic purposes. After you enter this code, the Cisco ATA announces a message in the following format:

```
e123.D.0xX
```

where:

- D is the VLAN ID (this is a non-zero value if the Cisco ATA has entered a VLAN)
- 0xX is a bitmap value in hexadecimal format. The definition of each bit is shown in Table 8-2.

Table 8-2 Voice Configuration Menu Network Status Bitmap

Bit Number	Description
0	Cisco ATA sent CDP request
1	VLAN ID acquired via CDP
2	Cisco ATA sent DHCP request
3	DHCP server offered IP address
4	Cisco ATA obtained IP address from DHCP server
5	Cisco ATA web server is ready

Example

If the hexadecimal value provided by the voice configuration menu is 0x1d, the network status of the Cisco ATA is shown in Table 8-3.

Table 8-3 Voice Configuration Menu Example Network Status

Bit Number	Description	Boolean Value
0	Cisco ATA sent CDP request	True
1	VLAN ID acquired via CDP	False
2	Cisco ATA sent DHCP request	True
3	DHCP server offered IP address	True
4	Cisco ATA obtained IP address from DHCP server	True
5	Cisco ATA web server is ready	False

Obtaining Network Status After Getting IP Connectivity

Use the Cisco ATA Stats Web page `(http://<Cisco ATA IP address>/stats)`to display the following information:

- `VLAN ID: D0`
- `tftpFile: S`

- `NTP: D1,D2,D3`
- `tftp: 0xX`

  where:

  - D0 is the VLAN ID. It should be non-zero if the Cisco ATA has entered a VLAN.
  - S is the tftp filename, which can be either ata<*macaddress*> or the filename supplied by the DHCP server.
  - D1 is the local time on the Cisco ATA.
  - D2 is the last NTP contact time.
  - D3 is the last successful NTP contact time.

    D1, D2, D3 values are shown in number of seconds since 00:00:00 **UTC**, **1970**-01-01. If no NTP response has been received from the NTP server, the values of D1, D2, and D3 are 0.
  - 0xX is a bitmap value in hexadecimal format. The definition of each bit is shown in Table 8-4.

Table 8-4 Web Configuration Menu Network Status Bitmap

Bit Number	Description
0	Cisco ATA sent request for configuration file, ata<*macaddress*>, to TFTP server
1	Cisco ATA sent request for configuration file, atadefault.cfg, to TFTP server
4	Cisco ATA sent request for image file to TFTP server
5	Cisco ATA failed to upgrade to the downloaded image file
8	Configuration file is not found
9	Bad configuration file
10	Checksum error for configuration file
11	Decode error for configuration file (encryption related)
12	Configuration file is processed successfully

Example

If the hexadecimal value provided by the web configuration menu is 0x1011, the network status of the Cisco ATA is shown in Table 8-5.

Table 8-5 Web Configuration Menu Example Network Status

Bit Number	Description	Boolean Value
0	Cisco ATA sent request for configuration file, ata<*macaddress*>, to TFTP server	True
1	Cisco ATA sent request for configuration file, atadefault.cfg, to TFTP server	False
4	Cisco ATA sent request for image file to TFTP server	True
5	Cisco ATA failed to upgrade to the downloaded image file	False
8	Configuration file is not found	False
9	Bad configuration file	False
10	Checksum error for configuration file	False

Table 8-5 Web Configuration Menu Example Network Status (continued)

Bit Number	Description	Boolean Value
0	Cisco ATA sent request for configuration file, ata<*macaddress*>, to TFTP server	True
11	Decode error for configuration file (encryption related)	False
12	Configuration file is processed successfully	True

DHCP Status HTML Page

You can use the following command to check the status DHCP-related information:

http://*ipaddress*/stats/

where *ipaddress* is the IP address of the Cisco ATA.

The information you receive includes the following:

- Elapsed time since most recent renewal of Cisco ATA IP address.
- Elapsed time since most recent successful Cisco ATA registration.
- IP address of the proxy to which the Cisco ATA is registered.

Real-Time Transport Protocol (RTP) Statistics Reporting

To monitor the quality of service for the media stream, you can access RTP packet statistics of the two voice ports and their channels by opening the following page on the Cisco ATA Web server:

```
<Cisco ATA IP address>/rtps
```

The following RTP packet statistics are reported:

- rxDuration—the number of seconds since the beginning of reception
- rxPktCnt—the total number of RTP packets received
- rxOctet—the total number of RTP payload octets received (not including RTP header)
- latePktCnt—the total number of late RTP packets received
- totalLostPktCnt—the total number of lost RTP packets received (not including late RTP packets)
- avgJitter—an estimate of statistical variance of the RTP packet inter-arrival time, measured in timestamp unit. (Calculation is based on the formula in RFC1889.)
- txDuration—the number of seconds since the beginning of transmission
- txPktCnt—the total number of RTP packets transmitted
- txOctet—the total number of RTP payload octets transmitted

Using the refresh feature on the RTP Statistics page, you can obtain updated, real-time RTP statistics during a call.

Resetting Cisco ATA counters

To reset the Cisco ATA counters, do the following:

- Click the [Refresh] link to refresh the current counter values.
- Click the [Line 0] link to reset line 0 counter values.
- Click the [Line 1] link to reset line 1 counter values.

Note Inactive lines will be indicated as such.

Frequently Asked Questions

Q. How can I recover the box if I forgot the password?

A. There are two important passwords. One is the UIPassword, which protects access to the Cisco ATA Web Server interface; the other is the EncryptKey, which protects access to the TFTP configuration file. If you forget the value for the UIPassword but still have access to TFTP-stored configuration file, you can modify the UIPassword via TFTP. However, if you are not configuring the Cisco ATA via TFTP, or if you forget both passwords, the only way you can recover the box is to have physical access to the box and do a factory reset on the box via the box voice configuration menu interface (Access Code: FACTRESET#).

Q. What is the maximum distance from which I can drive an analog device with a Cisco ATA?

A. Table 8-6 provides maximum distances for this question.

Table 8-6 Ring Loads and Distances

Ring Load (per RJ-11 FXS Port)	Maximum Distance
5 REN	200 feet (61 m)
4 REN	1000 feet (305 m)
3 REN	1700 feet (518 m)
2 REN	2500 feet (762 m)
1 REN	3200 feet (975 m)

The Cisco ATA, however, is not designed for long distance. The simple test is to determine if the phone or phones that are connected to the Cisco ATA work properly in their environment.

Pay attention to the following questions:

1. Can the Cisco ATA detect on/off hook from the analog phone?
2. Can the Cisco ATA detect the DTMF signal?
3. Can you dial the remote side?
4. Can the Cisco ATA ring the phone?
5. Is voice quality satisfactory?

If you answered no to any of the preceding questions, you may have a loop impedance greater than 400 ohm. In this case, perform the following procedure.

Procedure

Step 1 Increase the wire gauge to reduce the impedance until the Cisco ATA can detect on/off hook and DTMF signal.

Step 2 If the Cisco ATA cannot ring the phone, find a phone that can ring at a lower ringing voltage. Also, try to use only one phone instead of multiple phones in parallel.

Contacting TAC

Qualified customers who need to contact the Cisco Technical Assistance Center (TAC) must provide the following information:

- Product codes.
- Software version number—To identify the software revision number, use the configuration menu number **123**.
- Hardware version number—To identify the hardware revision number, use the serial number and MAC address found on the label on the bottom of the Cisco ATA. The MAC address can also be obtained using voice menu option 24.
- Software build information—To identify the software build information, use the voice menu option **123123**.
- Cisco ATA serial number.

See the "Obtaining Technical Assistance" section on page xvi for instructions on contacting TAC.

Note Customers who obtained their equipment through service providers, independent dealers and other third parties must contact their equipment provider for technical assistance.

APPENDIX A

Voice Configuration Menu Codes

This section contains a quick-reference list of the voice configuration menu options for the Cisco ATA. For information on using the voice configuration menu codes, see Chapter 3, "Configuring the Cisco ATA for MGCP."

This section contains the following tables:

- Table A-1Cisco ATA Voice Menu Codes—Information Options, page A-1
- Table A-2Cisco ATA Voice Menu Codes—Configuration Parameters, page A-2
- Table A-3Cisco ATA Voice Menu Codes—Software Upgrade, page A-3

Note Follow each voice menu code with #.

Note The term *Cisco ATA* refers to both the Cisco ATA 186 and the Cisco ATA 188, unless otherwise stated.

Table A-1 lists codes to return basic Cisco ATA information.

Table A-1 Cisco ATA Voice Menu Codes—Information Options

Option	Voice Menu Code	Description
Build information	123123	Build date of the Cisco ATA software
Review IP address	21	Returns IP address of the Cisco ATA
Review MAC address	24	Returns MAC address of the Cisco ATA
Review network route IP address	22	Returns IP address of the network route
Review subnet mask	23	Returns subnet mask of the network route
Version number	123	Returns version number of the Cisco ATA software

Table A-2 lists configuration codes. For additional information about these parameters, see "Chapter 5, "Parameters and Defaults."

Table A-2 Cisco ATA Voice Menu Codes—Configuration Parameters

Option	Voice Menu Code	Description
Audio mode	312	Allows finer control of the audio component to suit certain user applications
Caller ID method	316	Specifies the signal format when generating the Caller ID format to use
CA0orCM0	5	Primary call agent
CA1orCM1	6	Alternate call agent
Connection mode	311	Controls the connection mode of the call signaling protocol
Dynamic Host Configuration Protocol (DHCP)	20	Controls whether the Cisco ATA can automatically obtain configuration parameters from a server over the network
DNS 1 IP	916	IP address of the primary DNS server
DNS 2 IP	917	IP address of the secondary DNS server
Domain	931	Determines how the domain name portion of the endpoint identifier is constructed.
EPID0or SID0	46	MGCP endpoint ID for line 0 (**Phone 1** port)
EPID1or SID1	47	MGCP endpoint ID for line 1 (**Phone 2** port)
Static IP address	1	IP address of the Cisco ATA
LBR codec	300	Low-bit-rate codec selection
Media port	202	Specifies which base port the Cisco ATA uses to receive RTP media streams.
MGCPPort	201	The listening port for MGCP messages on the Cisco ATA
MGCP protocol	38	Selects the signaling protocol
MGCPVer	206	MGCP version string
NPrintf address	81	IP address of a host to which all Cisco ATA debug messages are sent
NumTXFrames	35	Sets the default RTP packet size
OpFlags	323	Enables operational features
PrfCodec	36	Specifies the preferred default codec
RetxIntv	203	First retransmission interval
RetxLim	205	Maximum number or times the Cisco ATA retransmits commands
Set password	7387277	Configuration interface password
Signal timers	318	Timeout values controlling the starting or stopping of a signaling event

Table A-2 Cisco ATA Voice Menu Codes—Configuration Parameters (continued)

Option	Voice Menu Code	Description
Static network route address	2	Network router address
Static subnet mask	10	Specifies the subnet mask for the Cisco ATA.
TFTP URL	905	IP address of the TFTP server when TFTP configuration is used
UDP ToS bits	255	Determines the precedence and delay of UDP IP packets
Use TFTP	305	Enables TFTP as configuration method
VLANSetting	324	Enables VLAN ID and 802.1Q priority for Voice Audio IP packet and Signaling IP packet

Table A-3 lists codes used in the software upgrade process. For information about these codes, see Chapter 7, “Upgrading the Cisco ATA Signaling Image.”

Table A-3 Cisco ATA Voice Menu Codes—Software Upgrade

Option	Voice Menu Code	Description
Upgrade software	100	Used in the software process to enter the IP address of the PC
Upgrade language to English	101	Changes or upgrades the voice prompt language to English when upgrading software

APPENDIX B

Cisco ATA Specifications

This section describes Cisco ATA specifications:

- Physical Specifications, page B-1
- Electrical Specifications for Cisco ATA, page B-2
- Environmental Specifications, page B-2
- Physical Interfaces, page B-2
- Ringing Characteristics, page B-3
- Software Specifications, page B-3

Note The term *Cisco ATA* is used throughout this manual to refer to both the Cisco ATA 186 and the Cisco ATA 188, unless differences between the Cisco ATA 186 and Cisco ATA 188 are explicitly stated.

Physical Specifications

Table B-1 Physical Specifications

Description	**Specification**
Dimensions	1.5 x 6.5 x 5.75 in. (3.8 x 16.5 x 14.6 cm) (H x W x D)
Weight	15 oz (425 g)

Electrical Specifications for Cisco ATA

Table B-2 Electrical Specifications

Description	Specification
Power	3.5 to 7.5W (idle to peak)
DC input voltage	+5.0 VDC at 1.5A maximum
Power adaptor	Universal AC/DC ~3.3 x 2.0 x 1.3 in. (~8.5 x 5.0 x 3.2 cm) ~4.8 oz (135 g) for the AC-input external power adaptor ~4 ft (1.2 m) DC cord 6 ft (1.8 m) cord

Environmental Specifications

Table B-3 Environmental Specifications

Description	Specification
Operating temperature	41 to 104° F (5 to 40° C)
Storage temperature	–4 to 140° F (–20 to 65° C)
Relative humidity	10 to 90% noncondensing, operating, and nonoperating/storage

Physical Interfaces

Table B-4 Physical Interfaces

Description	Specification
Ethernet	Two RJ-45, IEEE 802.3 10BaseT standard
Analog telephone	Two RJ-11 FXS voice ports
Power	5 VDC power connector
Indicators	Function button with integrated status indicator Link and activity LED indicating network activity

Ringing Characteristics

Table B-5 Ringing Characteristics

Description	Specification
Tip/ring interfaces for each RJ-11 FXS port (SLIC)	
Ring voltage	$40V_{RMS}$ (typical, balanced ringing only)
Ring frequency	25 Hz
Ring waveform	Trapezoidal with 1.2 to 1.6 crest factor
Ring load	1400 ohm + 40 microF (per line)
Ringer equivalence number (REN)	Up to 5 REN per RJ-11 FXS port
Loop impedance	Up to 200 ohms (plus 430-ohm maximum telephone DC resistance)
On-hook/off-hook characteristics	
On-hook voltage (tip/ring)	–50V
Off-hook current	25 mA (nominal)
RJ-11 FXS port terminating impedance option	The Cisco ATA186-I1 and Cisco ATA188-I1 provide 600-ohm resistive impedance. The Cisco ATA186-I2 and Cisco ATA188-I2 provide 270 ohm + 750 ohm // 150-nF complex impedance.

Software Specifications

Table B-6 Software Specifications (All Protocols)

Description	Specification
Call progress tones	Configurable for two sets of frequencies and single set of on/off cadence
Dual-tone multifrequency (DTMF)	DTMF tone detection and generation
Fax	G.711 fax pass-through and G.711 fax mode. Enhanced fax pass-through is supported on the Cisco ATA. Success of fax transmissions up to 14.4 kbps depends on network conditions, and fax modem/fax machine tolerance to those conditions. The network must have reasonably low network jitter, network delay, and packet-loss rate.

Table B-6 Software Specifications (All Protocols) (continued)

Description	Specification
Line-echo cancellation	• Echo canceller for each port • 8 ms echo length • Nonlinear echo suppression (ERL > 28 dB for frequency = 300 to 2400 Hz) • Convergence time = 250 ms • ERLE = 10 to 20 dB • Double-talk detection
Out-of-band DTMF	• H.245 out-of-band DTMF for H.323 • RFC 2833 AVT tones for SIP, MGCP, SCCP
Configuration	• DHCP (RFC 2131) • Web configuration via built-in Web server • Touch-tone telephone keypad configuration with voice prompt • Basic boot configuration (RFC 1350 TFTP Profiling) • Dial plan configuration • Cisco Discovery Protocol for SCCP
Quality of Service	• Class-of-service (CoS) bit-tagging (802.1P) • Type-of-service (ToS) bit-tagging
Security	• H.235 for H.323 • RC4 encryption for TFTP configuration files
Voice coder-decoders (codecs)	**Note** In simultaneous dual-port operation, the second port is limited to G.711 when using G.729. • G.723.1 • G.729, G.729A, G.729AB • G.723.1 • G.711A-law • G.711µ-law

Table B-6 Software Specifications (All Protocols) (continued)

Description	Specification
Voice features	• Voice activity detection (VAD) • Comfort noise generation (CNG) • Dynamic jitter buffer (adaptive)
Voice-over-IP (VoIP) protocols	• H.323 v2 • SIP (RFC 2543 bis) • MGCP 1.0 (RFC 2705) • MGCP 1.0/network-based call signalling (NCS) 1.0 profile • MGCP 0.1 • SCCP

APPENDIX C

MGCP Call Flows

This section shows and describes a call flow for a successful call using the Cisco ATA and MGCP.

Note The term *Cisco ATA* refers to both the Cisco ATA 186 and the Cisco ATA 188, unless otherwise stated.

Figure C-1 on page C-2 illustrates a basic call flow between two Cisco ATAs through a VocalData Call Agent.

Table C-1 on page C-3 describes the action the Cisco ATA takes for each step in the call flow illustration and includes the log created by each step.

Figure C-1 Cisco ATA-to-Cisco ATA Through VocalData Call Agent

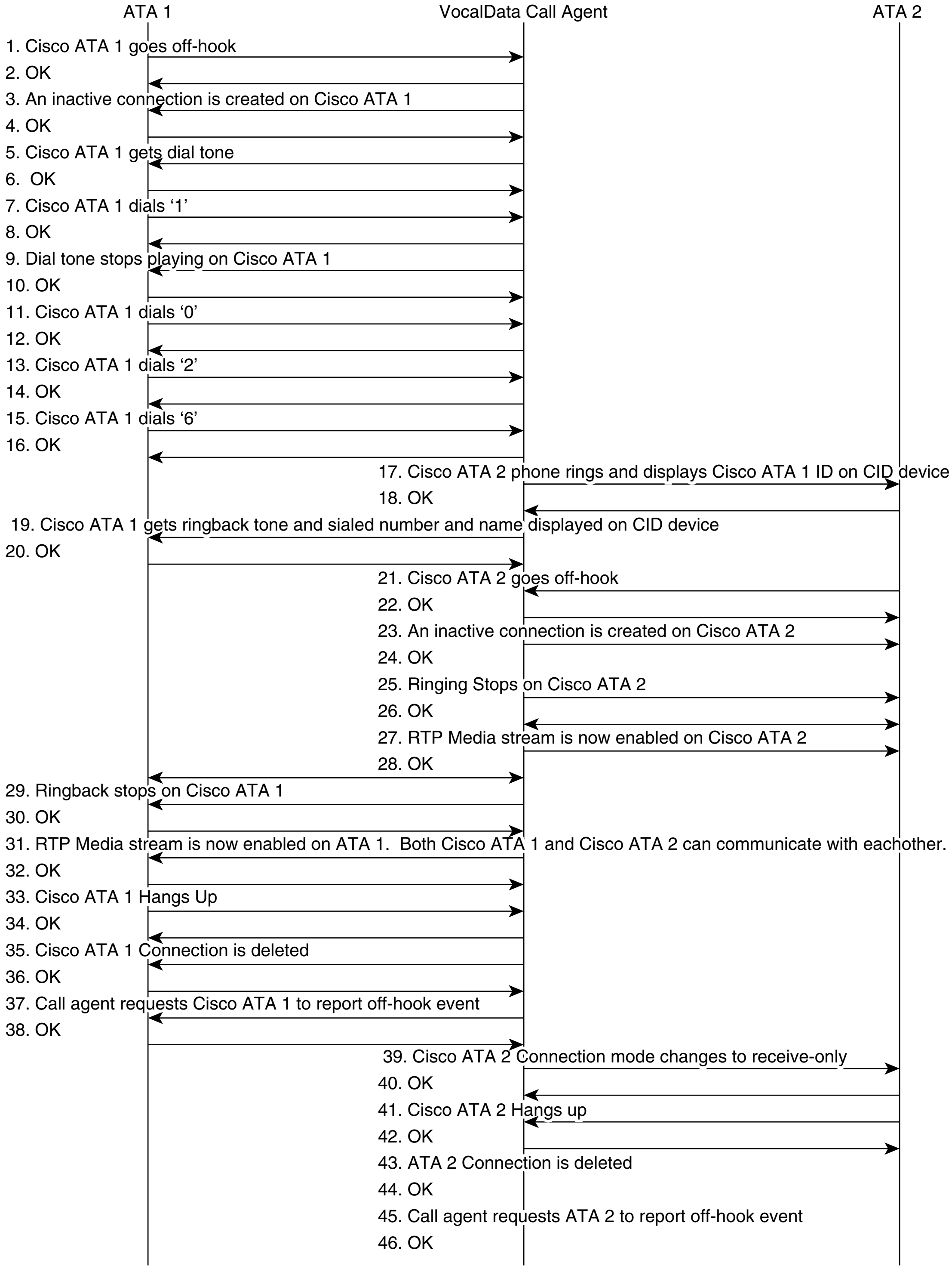

ATA 1
VocalData Call Agent
ATA 2
1. Cisco ATA 1 goes off-hook
2. OK
3. An inactive connection is created on Cisco ATA 1
4. OK
5. Cisco ATA 1 gets dial tone
6. OK
7. Cisco ATA 1 dials '1'
8. OK
9. Dial tone stops playing on Cisco ATA 1
10. OK
11. Cisco ATA 1 dials '0'
12. OK
13. Cisco ATA 1 dials '2'
14. OK
15. Cisco ATA 1 dials '6'
16. OK
17. Cisco ATA 2 phone rings and displays Cisco ATA 1 ID on CID device
18. OK
19. Cisco ATA 1 gets ringback tone and sialed number and name displayed on CID device
20. OK
21. Cisco ATA 2 goes off-hook
22. OK
23. An inactive connection is created on Cisco ATA 2
24. OK
25. Ringing Stops on Cisco ATA 2
26. OK
27. RTP Media stream is now enabled on Cisco ATA 2
28. OK
29. Ringback stops on Cisco ATA 1
30. OK
31. RTP Media stream is now enabled on ATA 1. Both Cisco ATA 1 and Cisco ATA 2 can communicate with eachother.
32. OK
33. Cisco ATA 1 Hangs Up
34. OK
35. Cisco ATA 1 Connection is deleted
36. OK
37. Call agent requests Cisco ATA 1 to report off-hook event
38. OK
39. Cisco ATA 2 Connection mode changes to receive-only
40. OK
41. Cisco ATA 2 Hangs up
42. OK
43. ATA 2 Connection is deleted
44. OK
45. Call agent requests ATA 2 to report off-hook event
46. OK

Table C-1 Action Log

Step	Action	Log

1.	Cisco ATA 1 goes off-hook—Cisco ATA 1 to Call Agent	`NTFY 16 aaln/1@[192.168.2.45] MGCP 1.0`
		`N: 192.168.3.76:2427`
		`X: 10`
		`O: L/hd`
		`K: 15`

2.	OK—Call Agent to Cisco ATA 1	`200 16 OK`

3.	An inactive connection is created on Cisco ATA 1—Call Agent to Cisco ATA 1	`crcx 57698 aaln/1@[192.168.2.45] MGCP 1.0`
		`K: 57687`
		`C: 26962`
		`X: 29620`
		`N: 192.168.3.76:2427`
		`L: p:10-20, a:PCMU;G729`
		`M: inactive`

4.	OK—Cisco ATA 1 to Call Agent	`200 57698 OK`
		`I: 0`
		`v=0`
		`c=IN IP4 192.168.2.45`
		`m=audio 10000 RTP/AVP 0 18`

5.	Cisco ATA 1 gets dial tone—Call Agent to Cisco ATA 1	`rqnt 57699 aaln/1@[192.168.2.45] MGCP 1.0`
		`K: 57698`
		`X: 29621`
		`R: L/hu(N),L/hf(N),D/[0-9*#](N)`
		`S: L/dl`
		`D: x`

6.	OK—Cisco ATA 1 to Call Agent	`200 57699 OK`

7.	Cisco ATA 1 dials ‘1’—Cisco ATA 1 to Call Agent	`NTFY 17 aaln/1@[192.168.2.45] MGCP 1.0`
		`N: 192.168.3.76:2427`
		`X: 29623`
		`O: D/1`
		`K: 16`

8.	OK—Call Agent to Cisco ATA 1	`200 17 OK`

9.	Dial tone stops playing on ATA 1—Call Agent to Cisco ATA 1	`rqnt 57707 aaln/1@[192.168.2.45] MGCP 1.0`
		`K: 57700-57701`
		`X: 29629`
		`R: L/hu(N),L/hf(N),D/[0-9*#](N)`
		`S:`
		`D: x`

10.	OK—Cisco ATA 1 to Call Agent	`200 57707 OK`

11.	Cisco ATA 1 dials ‘0’—Cisco ATA 1 to Call Agent	`NTFY 18 aaln/1@[192.168.2.45] MGCP 1.0`
		`N: 192.168.3.76:2427`
		`X: 29629`
		`O: D/0`
		`K: 17`

12.	OK—Call Agent to Cisco ATA 1	`200 18 OK`

13.	Cisco ATA 1 dials ‘2’—Cisco ATA 1 to Call Agent	`NTFY 19 aaln/1@[192.168.2.45] MGCP 1.0`
		`N: 192.168.3.76:2427`
		`X: 29629`
		`O: D/2`
		`K: 18`

14.	OK—Call Agent to Cisco ATA 1	`200 19 OK`

Step	Action	Log

15.	Cisco ATA 1 dials “6”—Cisco ATA 1 to Call Agent	`NTFY 20 aaln/1@[192.168.2.45] MGCP 1.0`
		`N: 192.168.3.76:2427`
		`X: 29629`
		`O: D/6`
		`K: 19`

16.	OK—Call Agent to Cisco ATA 1	`200 20 OK`

17.	Cisco ATA 2 phone rings and displays Cisco ATA 1 ID on CID device—Call Agent to Cisco ATA 2	`rqnt 57713 aaln/1@[192.168.3.33] MGCP 1.0`
		`K: 57676`
		`X: 10`
		`S:`
		`L/rg,L/ci(11/13/12/42,9723301011,ATA-2-45`
		`-USER1)`

18.	OK—Cisco ATA 2 to Call Agent	`200 57713 OK`

19.	Cisco ATA 1 gets ringback tone and dialed number and name displayed on CID device—Call Agent to Cisco ATA 1	`rqnt 57714 aaln/1@[192.168.2.45] MGCP 1.0`
		`K: 57707`
		`X: 29630`
		`R: L/hu(N),L/hf(N),D/[0-9*#](N)`
		`S:`
		`G/rt,L/ci(11/13/12/42,9723301026,ATA-3-33`
		`-USER1)`
		`D: x`

20.	OK—Cisco ATA 1 to Call Agent	`200 57714 OK`

21.	Cisco ATA 2 goes off-hook—Cisco ATA 2 to Call Agent	`NTFY 18 aaln/1@[192.168.3.33] MGCP 1.0`
		`N: 192.168.3.76:2427`
		`X: 10`
		`O: L/hd`
		`K: 17`

22.	OK—Call Agent to Cisco ATA 2	`200 18 OK`

23.	An inactive connection is created on Cisco ATA 2—Call Agent to Cisco ATA 2	`crcx 57722 aaln/1@[192.168.3.33] MGCP 1.0`
		`K: 57713`
		`C: 26962`
		`X: 29640`
		`N: 192.168.3.76:2427`
		`L: p:10-20, a:PCMU;G729`
		`M: inactive`

24.	OK—Cisco ATA to Call Agent	`200 57722 OK`
		`I: 0`
		`v=0`
		`c=IN IP4 192.168.3.33`
		`m=audio 10000 RTP/AVP 18 0`

25.	Ringing stops on Cisco ATA 2—Call Agent to Cisco ATA 2	`rqnt 57723 aaln/1@[192.168.3.33] MGCP 1.0`
		`X: 29641`
		`R: L/hu(N),L/hf(N),D/[0-9*#](N)`
		`S:`
		`D: x`

26.	OK—Cisco ATA 2 to Call Agent	`200 57723 OK`

Step	Action	Log

27.	Routing Update Protocol (RTP) Media stream is now enabled on Cisco ATA 2—Call Agent to Cisco ATA 2	`mdcx 57724 aaln/1@[192.168.3.33] MGCP 1.0`
		`C: 26962`
		`I: 0`
		`X: 29642`
		`R: L/hu(N),L/hf(N),D/[0-9*#](N)`
		`S:`
		`D: x`
		`N: 192.168.3.76:2427`
		`L: p:20, a:PCMU, t:00`
		`M: sendrecv`
		
		`v=0`
		`c=IN IP4 192.168.2.45`
		`m=audio 10000 RTP/AVP 0`

28.	OK—Cisco ATA 2 to Call Agent	`200 57724 OK`

29.	Ringback stops on Cisco ATA 1—Call Agent to Cisco ATA 1	`rqnt 57725 aaln/1@[192.168.2.45] MGCP 1.0`
		`K: 57714`
		`X: 29643`
		`R: L/hu(N),L/hf(N),D/[0-9*#](N)`
		`S:`
		`D: x`

30.	OK—Cisco ATA 1 to Call Agent	`200 57725 OK`

31.	RTP Media stream is now enabled on Cisco ATA 1. Both Cisco ATA 1 and Cisco ATA 2 can communicate with each other—Call Agent to Cisco ATA 1	`mdcx 57726 aaln/1@[192.168.2.45] MGCP 1.0`
		`C: 26962`
		`I: 0`
		`X: 29644`
		`R: L/hu(N),L/hf(N),D/[0-9*#](N)`
		`S:`
		`D: x`
		`N: 192.168.3.76:2427`
		`L: p:20, a:PCMU, t:00`
		`M: sendrecv`
		
		`v=0`
		`c=IN IP4 192.168.3.33`
		`m=audio 10000 RTP/AVP 0`

32.	OK—Cisco ATA1 to Call Agent	`200 57726 OK`

33.	Cisco ATA 1 hangs Up—Cisco ATA 1 to Call Agent	`NTFY 21 aaln/1@[192.168.2.45] MGCP 1.0`
		`N: 192.168.3.76:2427`
		`X: 29644`
		`O: L/hu`
		`K: 20`

34.	OK—Call Agent to Cisco ATA 1	`200 21 OK`

35.	Cisco ATA 1 Connection is deleted—Call Agent to Cisco ATA 1	`dlcx 57735 aaln/1@[192.168.2.45] MGCP 1.0`
		`K: 57725-57726`
		`C: 26962`
		`I: 0`
		`X: 29651`
		`S:`
		`N: 192.168.3.76:2427`

36.	OK—Cisco ATA 1 to Call Agent	`200 57735 OK`

37.	Call Agent requests Cisco ATA 2 to report off-hook event—Call Agent to Cisco ATA2	`rqnt 57736 aaln/1@[192.168.2.45] MGCP 1.0`
		`X: 29652`
		`R: L/hd(N)`
		`N: 192.168.3.76:2427`

Step	Action	Log
38.	OK—Cisco ATA 1 to Call Agent	`200 57736 OK`

39.	ATA 2 Connection mode changes to receive-only—Call Agent to Cisco ATA 2	`mdcx 57737 aaln/1@[192.168.3.33] MGCP 1.0`
		`K: 57722-57724`
		`C: 26962`
		`I: 0`
		`X: 29653`
		`R: L/hu(N),L/hf(N),D/[0-9*#](N)`
		`S:`
		`D: x`
		`N: 192.168.3.76:2427`
		`L: p:20, a:PCMU, t:00`
		`M: recvonly`
		
		`v=0`
		`c=IN IP4 192.168.3.33`
		`m=audio 10000 RTP/AVP 0`

40.	OK—Cisco ATA 2 to Call Agent	`200 57737 OK`

41.	Cisco ATA 2 hangs up—Cisco ATA 2 to Call Agent	`NTFY 19 aaln/1@[192.168.3.33] MGCP 1.0`
		`N: 192.168.3.76:2427`
		`X: 29653`
		`O: L/hu`
		`K: 18`

42.	OK—Call Agent to Cisco ATA 2	`200 19 OK`

43.	Cisco ATA 2 Connection is deleted—Call Agent to Cisco ATA 2	`dlcx 57740 aaln/1@[192.168.3.33] MGCP 1.0`
		`K: 57737`
		`C: 26962`
		`I: 0`
		`X: 29654`
		`S:`
		`N: 192.168.3.76:2427`

44.	OK—Cisco ATA 2 to Call Agent	`200 57740 OK`

45.	Call Agent requests Cisco ATA 2 to report off-hook event—Call agent to Cisco ATA 2	`rqnt 57741 aaln/1@[192.168.3.33] MGCP 1.0`
		`X: 29655`
		`R: L/hd(N)`
		`N: 192.168.3.76:2427`

46.	OK—Cisco ATA 2 to Call Agent	`200 57741 OK`

APPENDIX D

Recommended Cisco ATA Tone Parameter Values by Country

This section provides tables of recommended tone parameters for the followings countries, listed alphabetically:

Note The extended tone format used by some countries is available only with Cisco ATA software version 3.0 or later. For more information about tone parameter syntax and formats, see the "Tone Configuration Parameters" section on page 5-29.

Note The *SITTone* parameter applies only to the SIP protocol.

- Argentina
- Australia
- Austria
- Belgium
- Brazil
- Canada
- China
- Columbia
- Czech Republic
- Denmark
- Egypt
- Finland
- France
- Germany
- Greece
- Hong Kong
- Hungary
- Iceland

- India
- Indonesia
- Ireland
- Israel
- Italy
- Japan
- Korea
- Luxembourg
- Malaysia
- Mexico
- Netherlands
- New Zealand
- Norway
- Pakistan
- Panama
- Peru
- Phillippines
- Poland
- Portugal
- Russia
- Saudi Arabia
- Singapore
- Slovakia
- Slovenia
- South Africa
- Spain
- Sweden
- Switzerland
- Taiwan
- Thailand
- Turkey
- United Kingdom
- United States
- Venezuela

Table D-1 Argentina

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2400,1600,0
ReorderTone	1,30958,0,1757,0,0,2400,3200,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,2400,1600,0

Table D-2 Australia

Parameter	Recommended Values
DialTone	2,31163,30958,1477,1566,1,0,0,0
BusyTone	1,30958,0,2212,0,0,3000,3000,0
ReorderTone	1,31163,0,2086,0,0,3000,3000,0
RingbackTone	102,31163,1477,30742,1654,2,3200,1600,3200,16000,0
SITTone	1,30958,0,2212,0,0,20000,4000,0

Table D-3 Austria

Parameter	Recommended Values
DialTone	1,31000,0,3089,0,1,0,0,0
BusyTone	1,31000,0,1737,0,0,3200,3200,0
ReorderTone	1,31000,0,1737,0,0,1600,1600,0
RingbackTone	1,31000,0,1949,0,0,8000,40000,0
SITTone	101,3,24062,3640,14876,4778,5126,5297,3,2664,0,2664,0,2664,8000,0,0

Table D-4 Belgium

Parameter	Recommended Values
DialTone	1,30958,0,4952,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,1336,1336,0
RingbackTone	1,30958,0,1971,0,0,8000,24000,0
SITTone	1,30958,0,1757,0,0,1336,1336,0

Table D-5 Brazil

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2000,2000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	100,1,30958,1757,0,0,0,0,2,6000,2000,2000,2000,0,0,0,0

Table D-6 Canada

Parameter	Recommended Values
DialTone	2,31537,30830,1490,1859,1,0,0,0
BusyTone	2,30466,28958,1246,1583,0,4000,4000,0
ReorderTone	2,30466,28958,1246,1583,0,2000,2000,0
RingbackTone	2,30830,30466,793,862,0,8000,24000,0
SITTone	2,30466,28958,1246,1583,0,2000,2000,0

Table D-7 China

Parameter	Recommended Values
DialTone	1,30742,0,5870,0,1,0,0,0
BusyTone	1,30742,0,5870,0,0,2800,2800,0
ReorderTone	1,30742,0,5870,0,0,5600,5600,0
RingbackTone	1,30742,0,5870,0,0,8000,32000,0
SITTone	100,1,30742,1856,0,0,0,0,2,800,800,3200,3200,0,0,2,0

Table D-8 Columbia

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2000,2000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,2000,2000,0

Table D-9 Czech Republic

Parametter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2664,2664,0
ReorderTone	1,30958,0,1757,0,0,1336,1336,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,1336,1336,0

Table D-10 Denmark

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2000,2000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,30958,0,1757,0,0,8000,32000,0
SITTone	101,3,24062,3640,14876,4778,5126,5297,3,2664,0,2664,0,2664,8000,0,0

Table D-11 Egypt

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	2,31356,30513,1102,1384,0,8000,32000,0
ReorderTone	1,30742,0,1856,0,0,4000,4000,0
RingbackTone	2,31356,31356,1237,1237,0,16000,8000,0
SITTone	1,30742,0,1856,0,0,4000,4000,0

Table D-12 Finland

Parameter	Recommended Values
DialTone	1,30958,0,4952,0,1,0,0,0
BusyTone	1,30958,0,4952,0,0,2400,2400,0
ReorderTone	1,30958,0,5556,0,0,1600,2000,0
RingbackTone	1,30958,0,9545,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,1600,1600,0

Table D-13 France

Parameter	Recommended Values
DialTone	1,30830,0,3231,0,1,0,0,0
BusyTone	1,30830,0,1817,0,0,4000,4000,0
ReorderTone	1,30830,0,1817,0,0,4000,4000,0
RingbackTone	1,30830,0,2038,0,0,12000,28000,0
SITTone	1,30830,0,1817,0,0,4000,4000,0

Table D-14 Germany

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,3840,3840,0
ReorderTone	1,30958,0,1757,0,0,1920,1920,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,1920,1920,0

Table D-15 Greece

Parameter	Recommended Values
DialTone	101,30958,3587,0,0,2,1600,2400,5600,6400,0
BusyTone	1,30958,0,1757,0,0,2400,2400,0
ReorderTone	1,30958,0,1757,0,0,2400,2400,0
RingbackTone	1,30958,0,3426,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,2400,2400,0

Table D-16 Hong Kong

Parameter	Recommended Values
DialTone	2,31537,30830,1833,2287,1,0,0,0
BusyTone	2,30466,28958,2215,2816,0,4000,4000,0
ReorderTone	2,30466,28958,2215,2816,0,2000,2000,0
RingbackTone	102,30830,2038,30466,2215,2,3200,1600,3200,24000,0
SITTone	2,30466,28958,1398,1777,1,0,0,0

Table D-17 Hungary

Parameter	Recommended Values
DialTone	1,30958,0,3197,0,1,0,0,0
BusyTone	1,30958,0,1737,0,0,2400,2400,0
ReorderTone	1,30958,0,1737,0,0,2400,2400,0
RingbackTone	1,30958,0,1927,0,0,9600,29600,0
SITTone	1,30958,0,1737,0,0,2400,2400,0

Table D-18 Iceland

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2000,2000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,30958,0,1971,0,0,9600,37600,0
SITTone	1,30958,0,1757,0,0,2000,2000,0

Table D-19 India

Parameter	Recommended Values
DialTone	2,31356,30958,5336,6023,1,0,0,0
BusyTone	1,31163,0,9003,0,0,6000,6000,0
ReorderTone	1,31163,0,1657,0,0,2000,4000,0
RingbackTone	102,31356,3485,30958,3934,2,3200,1600,3200,16000,0
SITTone	1,31163,0,1657,0,0,20000,4000,0

Table D-20 Indonesia

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,20000,4000,0

Table D-21 Ireland

Parameter	Recommended Values
DialTone	1,30958,0,7582,0,1,0,0,0
BusyTone	1,30958,0,6758,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,48000,8000,0
RingbackTone	102,31163,3194,30742,3578,2,3200,1600,3200,16000,0
SITTone	1,30958,0,1757,0,0,48000,8000,0

Table D-22 Israel

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,31163,0,1859,0,0,8000,24000,0
SITTone	101,3,23620,3717,14876,4778,5126,5297,3,2664,0,2664,0,2664,8000,0,0

Table D-23 Italy

Parameter	Recommended Values
DialTone	101,30958,3125,0,0,2,1600,1600,4800,8000,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,1600,1600,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,4000,4000,0

Table D-24 Japan

Parameter	Recommended Values
DialTone	1,31163,0,1657,0,1,0,0,0
BusyTone	1,31163,0,1859,0,0,4000,4000,0
ReorderTone	1,31163,0,1859,0,0,4000,4000,0
RingbackTone	2,31318,31000,1769,1949,0,8000,16000,0
SITTone	1,31163,0,1859,0,0,4000,4000,0

Table D-25 Korea

Parameter	Recommended Values
DialTone	2,31537,30830,1833,2287,1,0,0,0
BusyTone	2,30466,28958,1398,1777,0,4000,4000,0
ReorderTone	2,30466,28958,1398,1777,0,2400,1600,0
RingbackTone	2,30830,30466,1443,1568,0,8000,16000,0
SITTone	100,1,30742,1856,0,0,0,0,2,1600,800,1600,12000,0,0,0,0

Table D-26 Luxembourg

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,2000,2000,0

Table D-27 Malaysia

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,3840,3840,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	101,30958,1971,0,0,2,3200,1600,3200,16000,0
SITTone	1,30958,0,1757,0,0,20000,4000,0

Table D-28 Mexico

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2000,2000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,2000,2000,0

Table D-29 Netherlands

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,30958,0,4839,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,2000,2000,0

Table D-30 New Zealand

Parameter	Recommended Values
DialTone	1,31163,0,3307,0,1,0,0,0
BusyTone	1,31163,0,1657,0,0,4000,4000,0
ReorderTone	1,24916,0,3483,0,0,4000,4000,0
RingbackTone	102,31163,1316,30742,1474,2,3200,1600,3200,16000,0
SITTone	100,1,31163,1657,0,0,0,0,2,6000,800,6000,3200,0,0,2,0

Table D-31 Norway

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,30958,0,3053,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,2000,2000,0

Table D-32 Pakistan

Parameter	Recommended Values
DialTone	1,31163,0,2947,0,1,0,0,0
BusyTone	1,31163,0,1657,0,0,6000,6000,0
ReorderTone	1,31163,0,1657,0,0,6000,6000,0
RingbackTone	1,30742,0,2083,0,0,8000,32000,0
SITTone	1,31163,0,1657,0,0,6000,6000,0

Table D-33 Panama

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2560,37200,0
ReorderTone	1,30958,0,1757,0,0,2560,37200,0
RingbackTone	1,30958,0,1971,0,0,8000,37200,0
SITTone	100,1,30958,3125,0,0,0,0,2,1440,1440,4000,1440,0,0,0,0

Table D-34 Peru

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2000,2000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,2000,2000,0

Table D-35 Phillippines

Parameter	Recommended Values
DialTone	1,30958,0,3125,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	2,30466,28958,1398,1777,0,2000,2000,0
RingbackTone	1,30742,0,2083,0,0,8000,32000,0
SITTone	2,30466,27666,1398,2034,0,2000,2000,0

Table D-36 Poland

Parameter	Recommended Values
DialTone	1,30958,0,3889,0,1,0,0,0
BusyTone	1,30958,0,5368,0,0,4000,4000,0
ReorderTone	1,30958,0,1697,0,0,4000,4000,0
RingbackTone	1,30742,0,8010,0,0,8000,32000,0
SITTone	1,30958,0,1697,0,0,4000,4000,0

Table D-37 Portugal

Parameter	Recommended Values
DialTone	1,30958,0,3889,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,1600,1600,0
RingbackTone	1,30742,0,2083,0,0,8000,40000,0
SITTone	1,30958,0,1757,0,0,1600,1600,0

Table D-38 Russia

Parameter	Recommended Values
DialTone	1,30958,0,3889,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,3200,3200,0
ReorderTone	1,30958,0,1757,0,0,1600,1600,0
RingbackTone	1,30742,0,2083,0,0,6400,25600,0
SITTone	1,30958,0,1757,0,0,1600,1600,0

Table D-39 Saudi Arabia

Parameter	Recommended Values
DialTone	1,30958,0,3889,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,4000,4000,0
RingbackTone	1,30958,0,1971,0,0,9600,36800,0
SITTone	1,30958,0,1757,0,0,4000,4000,0

Table D-40 Singapore

Parameter	Recommended Values
DialTone	1,30958,0,3506,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,6000,6000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	102,31163,3710,30742,4156,2,3200,1600,3200,16000,0
SITTone	1,30958,0,1757,0,0,20000,4000,0

Table D-41 Slovakia

Parameter	Recommended Values
DialTone	1,30958,0,3889,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2640,2640,0
ReorderTone	1,30958,0,1757,0,0,1320,1320,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,1320,1320,0

Table D-42 Slovenia

Parameter	Recommended Values
DialTone	101,30958,3125,0,0,2,1600,2400,5600,6400,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,1600,1600,0
RingbackTone	1,30958,0,1971,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,1600,1600,0

Table D-43 South Africa

Parameter	Recommended Values
DialTone	2,31415,30890,1919,2252,1,0,0,0
BusyTone	1,31163,0,1657,0,0,4000,4000,0
ReorderTone	1,31163,0,1657,0,0,2000,2000,0
RingbackTone	102,31415,1079,30890,1266,2,3200,1600,3200,16000,0
SITTone	1,31163,0,1657,0,0,20000,4000,0

Table D-44 Spain

Parameter	Recommended Values
DialTone	1,30958,0,4895,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,1600,1600,0
ReorderTone	100,1,30958,1757,0,0,0,0,2,1600,1600,1600,4800,0,0,1,0
RingbackTone	1,30958,0,1757,0,0,12000,24000,0
SITTone	100,1,30958,1757,0,0,0,0,2,1600,1600,1600,4800,0,0,0,0

Table D-45 Sweden

Parameter	Recommended Values
DialTone	1,30958,0,3889,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2000,2000,0
ReorderTone	1,30958,0,1757,0,0,2000,6000,0
RingbackTone	1,30958,0,1927,0,0,8000,40000,0
SITTone	101,3,24062,3640,14876,4778,5126,5297,3,2664,0,2664,0,2664,8000,0,0
CallWaitTone	1,30958,0,1757,0,0,1600,4000,11200
AlertTone	1,30467,0,4385,0,0,480,480,1920

Table D-46 Switzerland

Parameter	Recommended Values
DialTone	1,30958,0,3506,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,4000,4000,0
ReorderTone	1,30958,0,1757,0,0,1600,1600,0
RingbackTone	1,30958,0,1927,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,1600,1600,0

Table D-47 Taiwan

Parameter	Recommended Values
DialTone	2,31537,30830,1833,2287,1,0,0,0
BusyTone	2,30466,28958,1398,1777,0,4000,4000,0
ReorderTone	2,30466,28958,1398,1777,0,2000,2000,0
RingbackTone	102,30830,1443,30466,1568,2,3200,1600,3200,16000,0
SITTone	2,30466,28958,1398,1777,0,2000,2000,0

Table D-48 Thailand

Parameter	Recommended Values
DialTone	1,31163,0,2947,0,1,0,0,0
BusyTone	1,31163,0,1657,0,0,4000,4000,0
ReorderTone	1,30742,0,1856,0,0,2640,2640,0
RingbackTone	1,31163,0,1657,0,0,8000,32000,0
SITTone	100,1,31163,1657,0,0,0,0,2,800,7200,2400,5600,0,0,5,0

Table D-49 Turkey

Parameter	Recommended Values
DialTone	1,30742,0,3301,0,1,0,0,0
BusyTone	1,30742,0,1856,0,0,4000,4000,0
ReorderTone	100,1,30742,1856,0,0,0,0,2,1600,1600,4800,1600,0,0,2,0
RingbackTone	1,30742,0,2083,0,0,16000,32000,0
SITTone	1,30742,0,1856,0,0,1600,1600,0

Table D-50 United Kingdom

Parameter	Recommended Values
DialTone	2,31537,30830,1833,2287,1,0,0,0
BusyTone	1,31163,0,1657,0,0,3000,3000,0
ReorderTone	100,1,31163,1657,0,0,0,0,2,3200,2800,1800,4200,0,0,0,0
RingbackTone	102,31163,1173,30742,1314,2,3200,1600,3200,16000,0
SITTone	1,31163,0,2947,0,1,0,0,0

Table D-51 United States

Parameter	Recommended Values
DialTone	2,31537,30830,1490,1859,1,0,0,0
BusyTone	2,30466,28958,1246,1583,0,4000,4000,0
ReorderTone	2,30466,28958,1246,1583,0,2000,2000,0
RingbackTone	2,30830,30466,793,862,0,8000,24000,0
SITTone	2,30466,28958,1246,1583,0,2000,2000,0

Table D-52 Venezuela

Parameter	Recommended Values
DialTone	1,30958,0,3506,0,1,0,0,0
BusyTone	1,30958,0,1757,0,0,2000,2000,0
ReorderTone	1,30958,0,1757,0,0,2000,2000,0
RingbackTone	1,30958,0,1757,0,0,8000,32000,0
SITTone	1,30958,0,1757,0,0,2000,2000,0

GLOSSARY

Numerics

10BaseT 10-Mbps baseband Ethernet specification using two pairs of twisted-pair cabling (Categories 3, 4, or 5): one pair for transmitting data and the other for receiving data. 10BaseT, which is part of the IEEE 802.3 specification, has a distance limit of approximately 328 feet (100 meters) per segment.

A

A-law ITU-T companding standard used in the conversion between analog and digital signals in PCM systems. A-law is used primarily in European telephone networks and is similar to the North American µ-law standard. See also companding and µ-law.

AVT tones Out-of-bound signaling as defined in RFC 2833.

C

category-3 cable One of five grades of UTP cabling described in the EIA/TIA-586 standard. Category 3 cabling is used in 10BaseT networks and can transmit data at speeds up to 10 Mbps.

CED tone detection Called station identification. A three-second, 2100 Hz tone generated by a fax machine answering a call, which is used in the hand-shaking used to set the call; the response from a called fax machine to a CNG tone.

CELP code excited linear prediction compression. Compression algorithm used in low bit-rate voice encoding. Used in ITU-T Recommendations G.728, G.729, G.723.1.

CLIP Calling Line Identification Presentation. Shows your identity to callers with Caller ID.

CLIR Calling Line Identification Restriction. Hides your identity from callers with Caller ID.

CNG Comfort Noise Generation.

codec coder/decoder. In Voice over IP, Voice over Frame Relay, and Voice over ATM, a DSP software algorithm used to compress/decompress speech or audio signals.

companding Contraction derived from the opposite processes of compression and expansion. Part of the PCM process whereby analog signal values are rounded logically to discrete scale-step values on a nonlinear scale. The decimal step number then is coded in its binary equivalent prior to transmission. The process is reversed at the receiving terminal using the same nonlinear scale. Compare with compression and expansion. See also a-law and µ-law.

compression The running of a data set through an algorithm that reduces the space required to store or the bandwidth required to transmit the data set. Compare with companding and expansion.

CoS Class of service. An indication of how an upper-layer protocol requires a lower-layer protocol to treat its messages. In SNA subarea routing, CoS definitions are used by subarea nodes to determine the optimal route to establish a given session. A CoS definition comprises a virtual route number and a transmission priority field.

D

DHCP Dynamic Host Configuration Protocol. Provides a mechanism for allocating IP addresses dynamically so that addresses can be reused when hosts no longer need them.

dial peer An addressable call endpoint. In Voice over IP (VoIP), there are two types of dial peers: POTS and VoIP.

DNS Domain Name System. System used on the Internet for translating names of network nodes into addresses.

DSP digital signal processor. A DSP segments the voice signal into frames and stores them in voice packets.

DTMF dual tone multifrequency. Tones generated when a button is pressed on a telephone, primarily used in the U.S. and Canada.

E

E.164 The international public telecommunications numbering plan. A standard set by the ITU-T which addresses telephone numbers.

endpoint A SIP terminal or gateway. An endpoint can call and be called. It generates and/or terminates the information stream.

expansion The process of running a compressed data set through an algorithm that restores the data set to its original size. Compare with companding and compression.

F

firewall Router or access server, or several routers or access servers, designated as a buffer between any connected public networks and a private network. A firewall router uses access lists and other methods to ensure the security of the private network.

FoIP Fax over IP

FQDN Fully Qualified Domain (FQDN) format “mydomain.com” or “company.mydomain.com.”

FSK Frequency shift key.

FXO Foreign Exchange Office. An FXO interface connects to the public switched telephone network (PSTN) central office and is the interface offered on a standard telephone. Cisco FXO interface is an RJ-11 connector that allows an analog connection at the PSTN central office or to a station interface on a PBX.

FXS Foreign Exchange Station. An FXS interface connects directly to a standard telephone and supplies ring, voltage, and dial tone. Cisco's FXS interface is an RJ-11 connector that allows connections to basic telephone service equipment, keysets, and PBXs.

G

G.711 Describes the 64-kbps PCM voice coding technique. In G.711, encoded voice is already in the correct format for digital voice delivery in the PSTN or through PBXs. Described in the ITU-T standard in its G-series recommendations.

G.723.1 Describes a compression technique that can be used for compressing speech or audio signal components at a very low bit rate as part of the H.324 family of standards. This Codec has two bit rates associated with it: 5.3 and 6.3 kbps. The higher bit rate is based on ML-MLQ technology and provides a somewhat higher quality of sound. The lower bit rate is based on CELP and provides system designers with additional flexibility. Described in the ITU-T standard in its G-series recommendations.

G.729A Describes CELP compression where voice is coded into 8-kbps streams. There are two variations of this standard (G.729 and G.729 Annex A) that differ mainly in computational complexity; both provide speech quality similar to 32-kbps ADPCM. Described in the ITU-T standard in its G-series recommendations.

gateway A gateway allows SIP or H.323 terminals to communicate with terminals configured to other protocols by converting protocols. A gateway is the point where a circuit-switched call is encoded and repackaged into IP packets.

H

H.245 An ITU standard that governs H.245 endpoint control.

H.323 H.323 allows dissimilar communication devices to communicate with each other by using a standard communication protocol. H.323 defines a common set of CODECs, call setup and negotiating procedures, and basic data transport methods.

I

ICMP Internet Control Message Protocol

IP Internet Protocol. Network layer protocol in the TCP/IP stack offering a connectionless internetwork service. IP provides features for addressing, type-of-service specification, fragmentation and reassembly, and security. Defined in RFC 791.

IVR Interactive voice response. Term used to describe systems that provide information in the form of recorded messages over telephone lines in response to user input in the form of spoken words or, more commonly, DTMF signaling.

L

LDAP Lightweight DirectoryAccess Protocol

LEC local exchange carrier.

Location Server A SIP redirect or proxy server uses a location server to get information about a caller's location. Location services are offered by location servers.

M

MGCP Media Gateway Control Protocol.

MWI message waiting indication.

µ-law North American companding standard used in conversion between analog and digital signals in PCM systems. Similar to the European a-law. See also a-law and companding.

N

NAT Network Address Translation. Mechanism for reducing the need for globally unique IP addresses. NAT allows an organization with addresses that are not globally unique to connect to the Internet by translating those addresses into globally routable address spaces. Also known as Network Address Translator.

NSE packets Real-Time Transport Protocol (RTP) digit events are encoded using the Named Signaling Event (NSE) format specified in RFC 2833, Section 3.0.

NAT Server Network Address Translation. an Internet standard that enables a local-area network (LAN) to use one set of IP addresses for internal traffic and a second set of addresses for external traffic.

NTP Network Time Protocol. Protocol built on top of TCP that assures accurate local time-keeping with reference to radio and atomic clocks located on the Internet. This protocol is capable of synchronizing distributed clocks within milliseconds over long time periods.

P

POTS Plain old telephone service. Basic telephone service supplying standard single-line telephones, telephone lines, and access to the PSTN.

Proxy Server An intermediary program that acts as both a server and a client for the purpose of making requests on behalf of other clients. Requests are serviced internally or by passing them on, possibly after translation, to other servers. A proxy interprets, and, if necessary, rewrites a request message before forwarding it.

PSTN Public switched telephone network.

Q

QoS Quality of Service. The capability of a network to provide better service to selected network traffic over various technologies, including Frame Relay, Asynchronous Transfer Mode (ATM), Ethernet and 802.1 networks, SONET, and IP-routed networks that may use any or all of these underlying technologies. The primary goal of QoS is to provide priority including dedicated bandwidth, controlled jitter and latency (required by some real-time and interactive traffic), and improved loss characteristics.

R

Redirect Server A redirect server is a server that accepts a SIP request, maps the address into zero or more new addresses, and returns these addresses to the client. It does not initiate its own SIP request nor accept calls.

Registrar Server A registrar server is a server that accepts Register requests. A registrar is typically co-located with a proxy or redirect server and may offer location services.

router Network layer device that uses one or more metrics to determine the optimal path along which network traffic should be forwarded. Routers forward packets from one network to another based on network layer information. Occasionally called a gateway (although this definition of gateway is becoming increasingly outdated). Compare with gateway.

RTP Real-Time Transport Protocol. One of the IPv6 protocols. RTP is designed to provide end-to-end network transport functions for applications transmitting real-time data, such as audio, video, or simulation data, over multicast or unicast network services. RTP provides services such as payload type identification, sequence numbering, timestamping, and delivery monitoring to real-time applications.

S

SCCP Signaling connection control part.

SDP Session Definition Protocol. An IETF protocol for the definition of Multimedia Services. SDP messages can be part of SGCP and MGCP messages.

SIP Session Initiation Protocol. Protocol developed by the IETF MMUSIC Working Group as an alternative to H.323. SIP features are compliant with IETF RFC 2543, published in March 1999. SIP equips platforms to signal the setup of voice and multimedia calls over IP networks.

SIP endpoint A terminal or gateway that acts as a source or sink of Session Initiation Protocol (SIP) voice data. An endpoint can call or be called, and it generates or terminates the information stream.

SLIC Subscriber Line Interface Circuit. An integrated circuit (IC) providing central office-like telephone interface functionality.

SOHO Small office, home office. Networking solutions and access technologies for offices that are not directly connected to large corporate networks.

T

TCP Transmission Control Protocol. Connection-oriented transport layer protocol that provides reliable full-duplex data transmission. TCP is part of the TCP/IP protocol stack.

TFTP Trivial File Transfer Protocol. Simplified version of FTP that allows files to be transferred from one computer to another over a network, usually without the use of client authentication (for example, username and password).

TN power systems A TN power system is a power distribution system with one point connected directly to earth (ground). The exposed conductive parts of the installation are connected to that point by protective earth conductors.

TOS Type of service. See CoS.

U

UAC User agent client. A client application that initiates the SIP request.

UAS User agent server (or user agent). A server application that contacts the user when a SIP request is received, and then returns a response on behalf of the user. The response accepts, rejects, or redirects the request.

UDP User Datagram Protocol. Connectionless transport layer protocol in the TCP/IP protocol stack. UDP is a simple protocol that exchanges datagrams without acknowledgments or guaranteed delivery, requiring that error processing and retransmission be handled by other protocols. UDP is defined in RFC 768.

user agent See UAS.

V

VAD Voice activity detection. When enabled on a voice port or a dial peer, silence is not transmitted over the network, only audible speech. When VAD is enabled, the sound quality is slightly degraded but the connection monopolizes much less bandwidth.

voice packet gateway Gateway platforms that enable Internet telephony service providers to offer residential and business-class services for Internet telephony.

VoIP Voice over IP. The capability to carry normal telephony-style voice over an IP-based Internet with POTS-like functionality, reliability, and voice quality. VoIP enables a router to carry voice traffic (for example, telephone calls and faxes) over an IP network. In VoIP, the DSP segments the voice signal into frames, which then are coupled in groups of two and stored in voice packets. VoIP is a blanket term, which generally refers to Cisco's standard-based (for example H.323) approach to IP voice traffic.

X

XML eXtensible Markup Language. Designed to enable the use of SGML on the World-Wide Web. XML allow you to define your own customized markup language.

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