



Cisco ATA 190 Analog Telephone Adapter Overview

This section describes the hardware and software features of the Cisco ATA 190 Analog Telephone Adapter (ATA 190). The section includes a brief overview of the Session Initiation Protocol (SIP).

The ATA 190 analog telephone adapters are handset-to-Ethernet adapters that allow regular analog phones to operate on IP-based telephony networks. The ATA 190 support two voice ports, each with an independent phone number. The ATA 190 also has an RJ-45 10/100BASE-T data port.

This section covers these topics:

- [Session Initiation Protocol Overview, page 1-2](#)
- [Hardware Overview, page 1-4](#)
- [Software Features, page 1-5](#)
- [Installation and Configuration Overview, page 1-9](#)

Figure 1-1 Cisco Analog Telephone Adapter



Session Initiation Protocol Overview

Session Initiation Protocol (SIP) is the Internet Engineering Task Force (IETF) standard for real-time calls and conferencing over Internet Protocol (IP). SIP is an ASCII-based, application-layer control protocol (defined in RFC3261) that can be used to establish, maintain, and terminate multimedia sessions or calls between two or more endpoints.

Like other Voice over IP (VoIP) protocols, SIP 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.

**Note**

SIP for the ATA 190 is compliant with RFC2543.

This section contains these topics:

- [SIP Capabilities, page 1-2](#)
- [Components of SIP, page 1-2](#)

SIP Capabilities

SIP provides these capabilities:

- Determines the availability of the target endpoint. If a call cannot be completed because the target endpoint is unavailable, SIP determines whether the called party is already on the phone or did not answer in the allotted number of rings. SIP then returns a message indicating why the target endpoint was unavailable.
- Determines the location of the target endpoint. SIP supports address resolution, name mapping, and call redirection.
- Determines the media capabilities of the target endpoint. Using the Session Description Protocol (SDP), SIP determines the lowest level of common services between endpoints. Conferences are established using only the media capabilities that all endpoints support.
- Establishes a session between the originating and target endpoint. If the call can be completed, SIP establishes a session between the endpoints. SIP also supports midcall changes, such as adding another endpoint to the conference or changing the media characteristic or codec.
- Handles the transfer and termination of calls. SIP supports the transfer of calls from one endpoint to another. During a call transfer, SIP establishes a session between the transferee and a new endpoint (specified by the transferring party). SIP also terminates the session between the transferee and the transferring party. At the end of a call, SIP terminates the sessions between all parties. Conferences can consist of two or more users and can be established using multicast or multiple unicast sessions.

Components of SIP

SIP is a peer-to-peer protocol. The peers in a session are called User Agents (UAs). A user agent can function in one of these roles:

- User agent client (UAC)—A client application that initiates the SIP request.

- User agent server (UAS)—A server application that contacts the user when a SIP request is received and returns a response on behalf of the user.

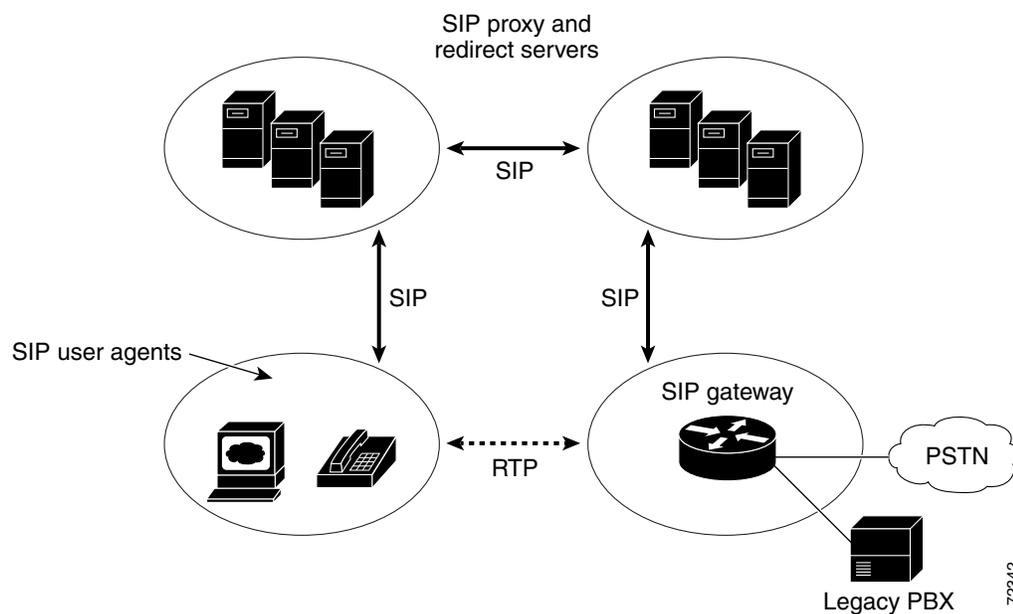
Typically, a SIP endpoint is capable of functioning as both a UAC and a UAS, but functions only as one or the other per transaction. Whether the endpoint functions as a UAC or a UAS depends on the UA that initiated the request.

From an architectural standpoint, the physical components of a SIP network can also be grouped into two categories—Clients and servers. [Figure 1-2](#) illustrates the architecture of a SIP network.

**Note**

SIP servers can interact with other application services, such as Lightweight Directory Access Protocol (LDAP) servers, a database application, or an extensible markup language (XML) application. These application services provide back-end services such as directory, authentication, and billable services.

Figure 1-2 SIP Architecture



SIP Clients

SIP clients include:

- Gateways—Provide call control. Gateways provide many services, the most common being a translation function between SIP conferencing endpoints and other terminal types. This function includes translation between transmission formats and between communications procedures. In addition, the gateway also translates between audio and video codecs and performs call setup and clearing on both the LAN side and the switched-circuit network side.
- Phones—Can act as either a UAS or UAC. The ATA 190 can initiate SIP requests and respond to requests.

SIP Servers

SIP servers include:

- Proxy server—The proxy server is an intermediate device that receives SIP requests from a client and then forwards the requests on the client's behalf. Proxy servers receive SIP messages and forward them to the next SIP server in the network. Proxy servers can provide functions such as authentication, authorization, network access control, routing, reliable request retransmission, and security.
- Redirect server—Receives SIP requests, strips out the address in the request, checks its address tables for any other addresses that may be mapped to the address in the request, and then returns the results of the address mapping to the client. Redirect servers provide the client with information about the next hop or hops that a message should take, then the client contacts the next hop server or UAS directly.
- Registrar server—Processes requests from UACs for registration of their current location. Registrar servers are often colocated with a redirect or proxy server.

Hardware Overview

The ATA 190 is a compact, easy to install device. [Figure 1-3](#) shows the rear panel of the ATA 190.

Figure 1-3 ATA 190—Rear View



The unit provides these connectors:

- 5V DC power connector.
- Two RJ-11 FXS (Foreign Exchange Station) ports—The ATA 190 supports two independent RJ-11 phone ports that can connect to any standard analog phone device. Each port supports either voice calls or fax sessions, and both ports can be used simultaneously.
- The ATA 190 has one network port—An RJ-45 10/100BASE-T data port to connect an Ethernet-capable device, such as a computer, to the network.



Note

The ATA 190 network port performs autonegotiation for duplex and speed. It supports speed of 10/100 Mbps and full-duplex.

Software Features

The ATA 190 supports these protocols, services, and methods:

- [Secure Real-Time Transport Protocol, page 1-5](#)
- [Fax Passthrough, page 1-5](#)
- [Transport Layer Security Protocol, page 1-5](#)
- [T.38 Fax Relay, page 1-5](#)
- [Voice Codecs Supported, page 1-6](#)
- [Other Supported Protocols, page 1-6](#)
- [ATA 190 SIP Services, page 1-6](#)
- [Modem Standards, page 1-7](#)
- [Fax Services, page 1-7](#)
- [Methods Supported, page 1-8](#)
- [Supplementary Services, page 1-8](#)

Secure Real-Time Transport Protocol

Secure Real-Time Transport Protocol secures voice conversations on the network and provides protection against replay attacks.



Note

Currently, ATA 190 does not support secure conference call. A 2-way secure call is supported.

Fax Passthrough

Name Signaling Event (NSE) -based and re-INVITE-based passthrough are simply transport of fax communications using the G.711a/u codec.

Transport Layer Security Protocol

Transport Layer Security (TLS) is a cryptographic protocol that secures data communications such as email on the Internet. TLS is functionally equivalent to Secure Sockets Layer (SSL).

T.38 Fax Relay

The T.38 fax relay feature enables devices to use fax machines to send files over the IP network. In general, when a fax is received, it is converted to an image, then sent to the T.38 fax device. When the target T.38 fax device receives this image, the device converts the image back to an analog fax signal.

T.38 fax relays configured with voice gateways decode or demodulate the fax signals before they are transported over IP. With the SIP call control protocol, the T.38 fax relay is indicated by Session Description Protocol (SDP) entries in the initial SIP INVITE message. After the initial SIP INVITE message, the call is established to switch from voice mode to T.38 mode. Cisco Unified Communications Administration allows you to configure a SIP profile that supports T.38 fax communication.

The ATA 191 only supports T38 Fax Relay Version 0 (G3).

Voice Codecs Supported

The ATA 190 supports these voice codecs (check your other network devices for the codecs they support):

- G.711 mu-law
- G.711 A-law
- G.729a
- G.729ab

Other Supported Protocols

The ATA 190 supports these additional protocols:

- 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)
- Secure Real-Time Transport Protocol (SRTP)
- Transmission Control Protocol (TCP)
- Trivial File Transfer Protocol (TFTP)
- User Datagram Protocol (UDP)
- Transport Layer Security (TLS)

ATA 190 SIP Services

These services include these features:

- IP address assignment—DHCP-provided or statically configured
- ATA 190 configuration by Cisco Unified Communications Manager configuration interface
- VLAN configuration
- Cisco Discovery Protocol (CDP)
- Low-bit-rate codec selection
- User authentication

- Configurable tones (ringback tone, reorder tone, dialing tone, outside dialing tone, busy tone, call waiting tone)
- Dial plan and PLAR
- SIP proxy server redundancy
- Privacy features
- User-configurable, call waiting, permanent default setting
- Comfort noise during silent period when using G.711u/a and G.729ab
- Caller ID format
- Ring frequency/voltage adjustment
- Hookflash detection timing configuration
- Type of Service (ToS) configuration for audio and signaling Ethernet packets
- Debugging and diagnostic tools

Modem Standards

The ATA 190 supports the following modem standards:

- V.90
- V.92
- V.44
- K56Flex
- ITU-T V.34 Annex 12
- ITU-T V.34
- V.32bis
- V.32
- V.21
- V.22
- V.23

Fax Services

The ATA 190 supports two modes of fax services:

- Fax pass-through mode: Receiver-side Called Station Identification (CED) tone detection with automatic G.711A-law or G.711 μ -law switching.
- T.38 Fax Relay mode: The T.38 fax relay feature enables devices to use fax machines to send files over the IP network. In general, when a fax is received, it is converted to an image, then sent to the T.38 fax device. When the target T.38 fax device receives this image, the device converts the image back to an analog fax signal. T.38 fax relays configured with voice gateways decode or demodulate the fax signals before they are transported over IP.

**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.

Methods Supported

The ATA 190 supports these methods. For more information, see RFC3261 (*SIP: Session Initiation Protocol*).

- REGISTER
- REFER
- INVITE
- BYE
- CANCEL
- NOTIFY
- OPTIONS
- ACK
- SUBSCRIBE

Supplementary Services

SIP supplementary services are services that you can use to enhance your phone service. For information on how to use these services, see [Chapter 6, “Using SIP Supplementary Services.”](#)

The ATA 190 supports these SIP supplementary services:

- Caller ID
- Call-waiting caller ID
- Voice mail indication
- Making a conference call
- Call waiting
- Call forwarding
- Calling-line identification
- Unattended transfer
- Attended transfer
- Shared Line
- SpeedDial
- Meet-Me Conference
- Call Pickup/Group Call Pickup
- Redial
- Secure Call
- C-Barge

Installation and Configuration Overview

[Table 1-1](#) provides the basic steps required to install and configure the ATA 190 to make it operational in a typical SIP environment where many ATA 190s must be deployed.

Table 1-1 *Overview of the Steps Required to Install and Configure the ATA 190 and Make it Operational*

Action	Reference
1. Plan the network and ATA 190 configuration.	
2. Install the Ethernet connection.	
3. Install and configure the other network devices.	
4. Install the ATA 190 but do not power up the ATA 190 yet.	Install the ATA 190, page 3-3
5. Power up the ATA 190.	

