Avaya Aura® Communication Manager Hardware Description and Reference

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Avaya Toll Fraud intervention

If You suspect that You are being victimized by Toll Fraud and You need technical assistance or support, call Technical Service Center Toll Fraud Intervention Hotline at +1-800-643-2353 for the United States and Canada. For additional support telephone numbers, see the Avaya Support website: http://support.avaya.com or such successor site as designated by Avaya. Suspected security vulnerabilities with Avaya products should be reported to Avaya by sending mail to: securityalerts@avaya.com.

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Virtualization

Each virtual appliance has its own ordering code. Note that each instance of a virtual appliance must be ordered separately. If the end-user customer or Business Partner wants to install two of the same type of virtual appliances, then two virtual appliances of that type must be ordered.

How to Get Help

For additional support telephone numbers, go to the Avaya support Website: http://www.avaya.com/support. If you are:

- Within the United States, click the Escalation Contacts link that is located under the Support Tools heading. Then click the appropriate link for the type of support that you need.
- Outside the United States, click the Escalation Contacts link that is located under the Support Tools heading. Then click the International Services link that includes telephone numbers for the international Centers of Excellence.

Providing Telecommunications Security

Telecommunications security (of voice, data, and/or video communications) is the prevention of any type of intrusion to (that is, either unauthorized or malicious access to or use of) your company's telecommunications equipment by some party.

Your company's "telecommunications equipment" includes both this Avaya product and any other voice/data/video equipment that could be accessed via this Avaya product (that is, "networked equipment").

An "outside party" is anyone who is not a corporate employee, agent, subcontractor, or is not working on your company's behalf. Whereas, a "malicious party" is anyone (including someone who may be otherwise authorized) who accesses your telecommunications equipment with either malicious or mischievous intent.

Such intrusions may be either to/through synchronous (time-multiplexed and/or circuit-based), or asynchronous (character-, message-, or packet-based) equipment, or interfaces for reasons of:

- Utilization (of capabilities special to the accessed equipment)
- Theft (such as, of intellectual property, financial assets, or toll facility access)
- Eavesdropping (privacy invasions to humans)
- Mischief (troubling, but apparently innocuous, tampering)
- Harm (such as harmful tampering, data loss or alteration, regardless of motive or intent)

Be aware that there may be a risk of unauthorized intrusions associated with your system and/or its networked equipment. Also realize that, if such an intrusion should occur, it could result in a variety of losses to your company (including but not limited to, human/data privacy, intellectual property, material assets, financial resources, labor costs, and/or legal costs).

Responsibility for Your Company's Telecommunications Security

The final responsibility for securing both this system and its networked equipment rests with you - Avaya's customer system administrator, your telecommunications peers, and your managers. Base the fulfillment of your responsibility on acquired knowledge and resources from a variety of sources including but not limited to:

- Installation documents
- System administration documents
- Security documents
- Hardware-/software-based security tools
- Shared information between you and your peers
- Telecommunications security experts

To prevent intrusions to your telecommunications equipment, you and your peers should carefully program and configure:

- Your Avaya-provided telecommunications systems and their interfaces
- Your Avaya-provided software applications, as well as their underlying hardware/software platforms and interfaces
- Any other equipment networked to your Avaya products

TCP/IP Facilities

Customers may experience differences in product performance, reliability and security depending upon network configurations/design and topologies, even when the product performs as warranted.

Product Safety Standards

This product complies with and conforms to the following international Product Safety standards as applicable:

- IEC 60950-1 latest edition, including all relevant national deviations as listed in the IECEE Bulletin—Product Category OFF: IT and Office Equipment.
- CAN/CSA-C22.2 No. 60950-1 / UL 60950-1 latest edition.

This product may contain Class 1 laser devices.

- Class 1 Laser Product
- Luokan 1 Laserlaite

- Klass 1 Laser Apparat

Electromagnetic Compatibility (EMC) Standards

This product complies with and conforms to the following international EMC standards, as applicable:

- CISPR 22, including all national standards based on CISPR 22.
- CISPR 24, including all national standards based on CISPR 24.
- IEC 61000-3-2 and IEC 61000-3-3.

Avaya Inc. is not responsible for any radio or television interference caused by unauthorized modifications of this equipment or the substitution or attachment of connecting cables and equipment other than those specified by Avaya Inc. The correction of interference caused by such unauthorized modifications, substitution or attachment will be the responsibility of the user. Pursuant to Part 15 of the Federal Communications Commission (FCC) Rules, the user is cautioned that changes or modifications not expressly approved by Avaya Inc. could void the user's authority to operate this equipment.

Federal Communications Commission Part 15 Statement:

For a Class A digital device or peripheral:

Note:

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

For a Class B digital device or peripheral:

Note:

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.

Equipment With Direct Inward Dialing ("DID"):

Allowing this equipment to be operated in such a manner as to not provide proper answer supervision is a violation of Part 68 of the FCC's rules.

Proper Answer Supervision is when:

1. This equipment returns answer supervision to the public switched telephone network (PSTN) when DID calls are:
   - answered by the called station,
   - answered by the attendant,
   - routed to a recorded announcement that can be administered by the customer premises equipment (CPE) user
   - routed to a dial prompt
2. This equipment returns answer supervision signals on all (DID) calls forwarded back to the PSTN.

Permissible exceptions are:

- A call is unanswered
- A busy tone is received
- A reorder tone is received

Avaya attests that this registered equipment is capable of providing users access to interstate providers of operator services through the use of access codes. Modification of this equipment by call aggregators to block access dialing codes is a violation of the Telephone Operator Consumers Act of 1990.

Automatic Dialers:

When programming emergency numbers and (or) making test calls to emergency numbers:

- Remain on the line and briefly explain to the dispatcher the reason for the call.
- Perform such activities in the off-peak hours, such as early morning or late evenings.

Toll Restriction and least Cost Routing Equipment:

The software contained in this equipment to allow user access to the network must be upgraded to recognize newly established network area codes and exchange codes as they are placed into service.

Failure to upgrade the premises systems or peripheral equipment to recognize the new codes as they are established will restrict the customer and the customer's employees from gaining access to the network and to these codes.

For equipment approved prior to July 23, 2001:

This equipment complies with Part 68 of the FCC rules. On either the rear or inside the front cover of this equipment is a label that contains, among other information, the FCC registration number, and ringer equivalence number (REN) for this equipment. If requested, this information must be provided to the telephone company.

For equipment approved after July 23, 2001:

This equipment complies with Part 68 of the FCC rules and the requirements adopted by the Administrative Council on Terminal Attachments (ACTA). On the rear of this equipment is a label that contains, among other information, a product identifier in the format US:AAAEQ##TXXX. If requested, this number must be provided to the telephone company.

The REN is used to determine the quantity of devices that may be connected to the telephone line. Excessive RENs on the telephone line may result in devices not ringing in response to an incoming call. In most, but not all areas, the sum of RENs should not exceed 5.0.

L'indice d'équivalence de la sonnerie (IES) sert à indiquer le nombre maximal de terminaux qui peuvent être raccordés à une interface téléphonique. La terminaison d'une interface peut consister en une combinaison quelconque de dispositifs, à la seule condition que la somme d'indices d'équivalence de la sonnerie de tous les dispositifs n'excède pas cinq.

To be certain of the number of devices that may be connected to a line, as determined by the total RENs, contact the local telephone company. For products approved after July 23, 2001, the REN for this product is part of the product identifier that has the format US:AAAEQ##TXXX. The digits represented by ## are the REN without a decimal point (for example, 03 is a REN of 0.3). For earlier products, the REN is separately shown on the label.

Means of Connection:

Connection of this equipment to the telephone network is shown in the following table:

Manufacturer's Port Identifier	FIC Code	SOC/ REN/ A.S. Code	Network Jacks
Off premises station	OL13C	9.0F	RJ2GX, RJ21X, RJ11C
DID trunk	02RV2.T	AS.2	RJ2GX, RJ21X, RJ11C
CO trunk	02GS2	0.3A	RJ21X, RJ11C
	02LS2	0.3A	RJ21X, RJ11C
Tie trunk	TL31M	9.0F	RJ2GX
Basic Rate Interface	02IS5	6.0F, 6.0Y	RJ49C
1.544 digital interface	04DU9.BN	6.0F	RJ48C, RJ48M
	04DU9.1KN	6.0F	RJ48C, RJ48M
	04DU9.1SN	6.0F	RJ48C, RJ48M
120A4 channel service unit	04DU9.DN	6.0Y	RJ48C

If this equipment causes harm to the telephone network, the telephone company will notify you in advance that temporary discontinuance of service may be required. But if advance notice is not practical, the telephone company will notify the customer as soon as possible. Also, you will be advised of your right to file a complaint with the FCC if you believe it is necessary.

The telephone company may make changes in its facilities, equipment, operations or procedures that could affect the operation of the equipment. If this happens, the telephone company will provide advance notice in order for you to make necessary modifications to maintain uninterrupted service.

If trouble is experienced with this equipment, for repair or warranty information, please contact the Technical Service Center at 1-800-242- 2121 or contact your local Avaya representative. If the equipment is causing harm to the telephone network, the telephone company may request that you disconnect the equipment until the problem is resolved.

A plug and jack used to connect this equipment to the premises wiring and telephone network must comply with the applicable FCC Part 68 rules and requirements adopted by the ACTA. A compliant telephone cord and modular plug is provided with this product. It is designed to be connected to a compatible modular jack that is also compliant.

Connection to party line service is subject to state tariffs. Contact the state public utility commission, public service commission or corporation commission for information.

Installation and Repairs

Before installing this equipment, users should ensure that it is permissible to be connected to the facilities of the local telecommunications company. The equipment must also be installed using an acceptable method of connection. The customer should be aware that compliance with the above conditions may not prevent degradation of service in some situations.

Repairs to certified equipment should be coordinated by a representative designated by the supplier. It is recommended that repairs be performed by Avaya certified technicians.

FCC Part 68 Supplier's Declarations of Conformity

Avaya Inc. in the United States of America hereby certifies that the equipment described in this document and bearing a TIA TSB-168 label identification number complies with the FCC's Rules and Regulations 47 CFR Part 68, and the Administrative Council on Terminal Attachments (ACTA) adopted technical criteria.

Avaya further asserts that Avaya handset-equipped terminal equipment described in this document complies with Paragraph 68.316 of the FCC Rules and Regulations defining Hearing Aid Compatibility and is deemed compatible with hearing aids.

Copies of SDoCs signed by the Responsible Party in the U. S. can be obtained by contacting your local sales representative and are available on the following Web site: http://support.avaya.com/DoC.

Canadian Conformity Information

This Class A (or B) digital apparatus complies with Canadian ICES-003.

Cet appareil numérique de la classe A (ou B) est conforme à la norme NMB-003 du Canada.

This product meets the applicable Industry Canada technical specifications/Le présent materiel est conforme aux specifications techniques applicables d'Industrie Canada.

European Union Declarations of Conformity

CE

Avaya Inc. declares that the equipment specified in this document bearing the "CE" (Conformité Europeénne) mark conforms to the European Union Radio and Telecommunications Terminal Equipment Directive (1999/5/EC), including the Electromagnetic Compatibility Directive (2004/108/EC) and Low Voltage Directive (2006/95/EC).

Copies of these Declarations of Conformity (DoCs) can be obtained by contacting your local sales representative and are available on the following Web site: http://support.avaya.com/DoC.

European Union Battery Directive

Avaya Inc. supports European Union Battery Directive 2006/66/EC. Certain Avaya Inc. products contain lithium batteries. These batteries are not customer or field replaceable parts. Do not disassemble. Batteries may pose a hazard if mishandled.

Japan

The power cord set included in the shipment or associated with the product is meant to be used with the said product only. Do not use the cord set for any other purpose. Any non-recommended usage could lead to hazardous incidents like fire disaster, electric shock, and faulty operation.

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If this is a Class A device:

This is a Class A product based on the standard of the Voluntary Control Council for Interference by Information Technology Equipment (VCCI). If this equipment is used in a domestic environment, radio disturbance may occur, in which case, the user may be required to take corrective actions.

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If this is a Class B device:

This is a Class B product based on the standard of the Voluntary Control Council for Interference from Information Technology Equipment (VCCI). If this is used near a radio or television receiver in a domestic environment, it may cause radio interference. Install and use the equipment according to the instruction manual.

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Contents

Chapter 1: Introduction

Purpose

This guide provides information about hardware that Avaya Aura® Communication Manager supports.

Intended audience

This document is intended for anyone who wants to gain a high-level understanding of the Communication Manager-supported hardware, including the hardware capacities, specifications, and limitations.

Related resources

Documentation

The following table lists the documents related to this product. Download the documents from the Avaya Support website at http://support.avaya.com.

Document number	Title	Description	Audience
Understanding			
03-300468	*Avaya Aura® Communication Manager Overview*	This document provides an overview of Communication Manager.	Sales Engineers, Solution Architects
03-300511	*Avaya Aura® Communication Manager System Capacities Table*	This document contains the system software-defined capacities information for all templates of Communication Manager, ASAI, Messaging, and Call Center.	Implementation Engineers, Support Personnel

Table continues…

Document number	Title	Description	Audience
03-602804	*LED Descriptions for Avaya Aura® Communication Manager Hardware Components*	This document describes the purpose of LEDs of the hardware components used for Communication Manager.	Implementation Engineers, Support Personnel
03-300435	*Overview for the Avaya G250 and G350 Branch Gateways*	This documents provides an overview for the Avaya Avaya G250 and G350 Branch Gateways.	Sales Engineers, Solution Architects, Implementation Engineers, Support Personnel
03-603235	*Overview for the Avaya G430 Branch Gateway*	This documents provides an overview for the Avaya Avaya G450 Branch Gateway.	Sales Engineers, Solution Architects, Implementation Engineers, Support Personnel
03-601548	*Overview of the IG550 Integrated Gateway*	This document provides an overview of the Avaya IG550 Integrated Gateway.	Sales Engineers, Solution Architects, Implementation Engineers, Support Personnel
555-301-708	*Wireless AP-4, AP-5, and AP-6 User Guide*	This document provides instructions to use the AP-4, AP-5, AP-6.	Sales Engineers, Solution Architects, Implementation Engineers, Support Personnel
21-300041	*Seamless Communications Total Solution Guide*	This document provides information about Seamless Communications.	Sales Engineers, Solution Architects
Implementation			
03-603793	*Installing the Dell™ PowerEdge™ R610 Server*	Describes the steps to install the Dell R610 server.	Implementation Engineers, Support Personnel
03-603799	*Installing the HP ProLiant DL360 G7 Server*	Describes the steps to install the HP DL360 G7 server.	Implementation Engineers, Support Personnel

Table continues…

Document number	Title	Description	Audience
	Installing the Dell™ PowerEdge™ R620 Server	Describes the steps to install the Dell R620 server.	Implementation Engineers, Support Personnel
	Installing the HP ProLiant DL360p G8 Server	Describes the steps to install the HP DL360 G8 server.	Implementation Engineers, Support Personnel
03-300684	*Adding New Hardware for Avaya Servers and Media Gateways*	Describes the steps to add new hardware for the different Avaya servers and Branch Gateways.	Implementation Engineers, Support Personnel
	Installing the Avaya G650 Media Gateway	Describes the steps to install the Avaya G650 Media Gateway.	Implementation Engineers, Support Personnel
03-601918	*Installing and Operating the G860 Media Gateway*	Describes the steps to install and use the G860 media Gateway.	Implementation Engineers, Support Personnel
21-300041	*Avaya W310 WLAN Gateway Installation and Configuration Guide*	Describes the steps to install and configure the Avaya W310 WLAN Gateway.	Implementation Engineers, Support Personnel
21-300178	*Avaya W310/W110 Quick Setup Guide Using the CLI*	Describes the steps to set up the Avaya W310/W110 using the command line	Implementation Engineers, Support Personnel
21-300179	*Avaya W310/W110 Quick Setup Guide Using the W310 Device Manager*	Describes the steps to set up the Avaya W310/W110 using the W310 Device Manager.	Implementation Engineers, Support Personnel
Maintenance and Troubleshooting			
03-300528	*Job Aids for Field Replacements for the Avaya S8300D Server with the G450 and G430 Branch Gateway*	Describes procedures for replacing the S8300D server with G430 and G450 Gateway.	Implementation Engineers, Support Personnel
	Job Aids for Field Replacements (FRUs) for the S8300 Media Server with the G700 Media Gateway	Describes procedures for replacing the S8300D server with G700 Gateway.	Implementation Engineers, Support Personnel

Table continues…

Document number	Title	Description	Audience
555-245-753	*Job Aid: Replacing the S8300 Server or its Hard Drive*	Describes procedures to replace the S8300 server or the hard drive of the server.	Implementation Engineers, Support Personnel
03-603103	*Job Aid: Replacing the Avaya G700 Media Gateway with the Avaya G450 Media Gateway*	Describes procedures to replace the Avaya G700 Media Gateway with the Avaya G450 Branch Gateway.	Implementation Engineers, Support Personnel
03-602953	*Job Aids for Field Replacements Units (FRUs) for the Avaya S8510-Series Server*	Describes procedures for replacing field replacement units for the Avaya S8510 series of servers.	Implementation Engineers, Support Personnel
03-603446	*Maintaining the Avaya S8800 Server for Avaya Aura® Communication Manager*	Describes the steps to maintain the Avaya S8800 server.	Implementation Engineers, Support Personnel
03-603804	*Maintaining and Troubleshooting the Dell™ PowerEdge™ R610 Server*	Describes the steps to maintain and troubleshoot the Dell server.	Implementation Engineers, Support Personnel
03-603803	*Maintaining and Troubleshooting the HP ProLiant DL360 G7 Server*	Describes the steps to maintain and troubleshoot the HP server.	Implementation Engineers, Support Personnel
03-300430	*Gateway Traps for the G250/ G350/G450/G700 Avaya Media Gateways*	Describes gateway traps for G250/ G350/G430/G450/G700 Avaya Branch gateways.	Implementation Engineers, Support Personnel
Administration			
555-233-504	*Administering Network Connectivity on Avaya Aura® Communication Manager*	Describes procedures to connect different networks or network segments for Communication Manager.	Implementation Engineers, Support Personnel
	Seamless Communications Configuration Guide	This document provides information to configure Seamless Communications.	Implementation Engineers, Support Personnel

Finding documents on the Avaya Support website

About this task

Use this procedure to find product documentation on the Avaya Support website.

Procedure

1. Use a browser to navigate to the Avaya Support website at http://support.avaya.com/.

2. At the top of the screen, enter your username and password and click **Login**.
3. Put your cursor over **Support by Product**.
4. Click **Documents**.
5. In the **Enter your Product Here** search box, type the product name and then select the product from the drop-down list.
6. If there is more than one release, select the appropriate release number from the **Choose Release** drop-down list.
7. Use the **Content Type** filter on the left to select the type of document you are looking for, or click **Select All** to see a list of all available documents.

   For example, if you are looking for user guides, select **User Guides** in the **Content Type** filter. Only documents in the selected category will appear in the list of documents.
8. Click **Enter**.

Training

The following courses are available on https://www.avaya-learning.com. To search for the course, in the **Search** field, enter the course code and click **Go**.

Course code	Course title
Understanding	
1A00234E	Avaya Aura® Fundamental Technology
AVA00383WEN	Avaya Aura® Communication Manager Overview
ATI01672VEN, AVA00832WEN, AVA00832VEN	Avaya Aura® Communication Manager Fundamentals
Docu00158	Whats New in Avaya Aura® Release 6.2 Feature Pack 2
5U00060E	Knowledge Access: ACSS - Avaya Aura® Communication Manager and CM Messaging Embedded Support (6 months)
Implementation and Upgrading	
4U00030E	Avaya Aura® Communication Manager and CM Messaging Implementation
ATC00838VEN	Avaya Media Servers and Implementation Workshop Labs
4U00115V	Avaya Aura® Communication Manager Implementation Upgrade (R5.X to 6.X)
4U00115I, 4U00115V	Avaya Aura® Communication Manager Implementation Upgrade (R5.X to 6.X)
AVA00838H00	Avaya Media Servers and Media Gateways Implementation Workshop
ATC00838VEN	Avaya Media Servers and Gateways Implementation Workshop Labs
Administration	

Table continues…

Course code	Course title
AVA00279WEN	Communication Manager - Configuring Basic Features
AVA00836H00	Communication Manager Basic Administration
AVA00835WEN	Avaya Communication Manager Trunk and Routing Administration
5U0041I	Avaya Aura® Communication Manager Administration
AVA00833WEN	Avaya Communication Manager - Call Permissions
AVA00834WEN	Avaya Communication Manager - System Features and Administration
5U00051E	Knowledge Access: Avaya Aura® Communication Manager Administration

Viewing Avaya Mentor videos

Avaya Mentor videos provide technical content on how to install, configure, and troubleshoot Avaya products.

About this task

Videos are available on the Avaya Support web site, listed under the video document type, and on the Avaya-run channel on YouTube.

Procedure

- To find videos on the Avaya Support web site, go to http://support.avaya.com, select the product name, and select the *videos* checkbox to see a list of available videos.
- To find the Avaya Mentor videos on YouTube, go to http://www.youtube.com/AvayaMentor and perform one of the following actions:
  - Enter a key word or key words in the Search Channel to search for a specific product or topic.
  - Scroll down Playlists, and click the name of a topic to see the available list of videos posted on the site.

Note:

Videos are not available for all products.

Support

Visit the Avaya Support website at http://support.avaya.com for the most up-to-date documentation, product notices, and knowledge articles. You can also search for release notes, downloads, and resolutions to issues. Use the online service request system to create a service request. Chat with live agents to get answers to questions, or request an agent to connect you to a support team if an issue requires additional expertise.

Related links

Overview on page 22

Warranty

Avaya provides a 90-day limited warranty on Communication Manager. To understand the terms of the limited warranty, see the sales agreement or other applicable documentation. In addition, the standard warranty of Avaya and the details regarding support for Communication Manager in the warranty period is available on the Avaya Support website at http://support.avaya.com/ under **Help & Policies** > **Policies & Legal** > **Warranty & Product Lifecycle**. See also **Help & Policies** > **Policies & Legal** > **License Terms**.

Chapter 2: Overview

Use this book to find information on Avaya servers and Branch Gateways, as well as circuit packs, media modules, telephones, and other hardware used with Communication Manager.

This book contains information on the following hardware:

- Linux-based servers
- Other servers
- Branch gateways integrated gateways and trunk gateways
- Circuit packs, channel service units, and power supplies
- Media modules
- Telephones and speakerphones
- UPS units
- Ethernet switches

For each hardware component, an overview and description is provided. Where appropriate, information is also provided on models, configurations, components, LEDs, specifications, supported and related hardware, reliability and survivability, and high-level capacities.

Related links

Communication Manager on page 22
Port networks on page 26
Support on page 20

Communication Manager

Communication Manager is an open, scalable, reliable, and secure telephony application. Communication Manager provides call-processing solutions, user and system-management functionality, intelligent call routing, application integration and extensibility, and enterprise communications networking for large and small customer environments. The standard edition ofCommunication Manager also uses H.248 for gateway control.

Communication Manager offers various features in the following categories:

- Call center
- Telephony

- Localization
- Collaboration
- Mobility
- Messaging
- Telecommuting
- System management
- Reliability
- Security, privacy, and safety
- Hospitality
- Attendant features
- Networking
- Intelligent call routing
- Application programming interfaces

For more information about these features, see *Avaya Aura® Communication Manager Overview*, 03-300468.

Communication Manager runs on the following Linux-based servers:

- S8300D Server
- S8510 Server
- S8800 Server
- HP ProLiant DL360 G7 1U Server
- Dell™ PowerEdge™ R610 1U Server
- HP ProLiant DL360p G8 1U Server
- Dell™ PowerEdge™ R620 1U Server

Related links

Overview on page 22

Avaya servers and gateways

Avaya servers and gateways provide smart ways to rethink networking. They add top-tier scalability and reliability, while supporting critical applications in a distributed, yet secure, multivendor environment. To provide businesses with maximum flexibility, the server and gateway components in Communication Manager follow a modular mix-and-match approach. A wide range of custom configurations can be deployed to meet a broad spectrum of business needs:

- From a single location, upgrading to a converged IP network for 200 employees

- To a complex multinational converged network that is capable of supporting 10,000-plus voice and data users

Note:

Some of Avaya servers and gateways were tested against extreme physical and environmental requirements such as shock, vibration, and Electromagnetic Interference (EMI). These tests were performed by the United States Navy for server and gateway use on their ships. The Navy uses specialized racks and reinforcements although no physical changes have been made to the servers and gateways themselves. For more information on design and implementation of a similar ruggedized solution, go to the Avaya Support website at http://support.avaya.com and check related documentation and knowledge articles.

Servers

Avaya line of servers provides a robust application platform based on industry-standard operating systems. This platform supports distributed IP networking and centralized call processing across multiprotocol networks. These servers are available as an integrated solution with other servers or independently.

Avaya servers have the following features and benefits:

- Redundant, survivable call processing and media processing supports crucial business continuity.
- Standard-based computing supports Linux operating system.
- Distributed survivable IP networking supports campus, global multisite, and branch environments.

Gateways

Avaya Branch Gateways connect to an Avaya server, either directly or indirectly through other gateways. Gateways are the stackable and modular hardware elements of your communication system. They deliver connectivity to a variety of endpoint and trunk types to provide data, voice, fax, video, and messaging capabilities on your network. The connections between gateways that allow the passage of these media types are called the bearer networks. The connections between the server and the gateways for call control signaling are called the control networks.

Avaya Branch Gateways support both bearer and signaling traffic that is routed between packet-switched and circuit-switched networks. Avaya Branch Gateways provide a variety of flexible deployment options. These options include 100% Internet Protocol (IP) environments and blended environments such as IP and Time Division Multiplexing (TDM).

Avaya Branch Gateways have the following benefits:

- Interoperable with standard-based data networks
- Stackable, modular, and configurable component solutions

- Provision of redundant equipment and capabilities
- Provision of distributed networking
- Compatible with cabinets in traditional Avaya systems

Categories of gateways

Gateways are divided into two broad categories:

1. Gateways that use media modules to connect to endpoints and trunks. Office branches and smaller locations use the following gateways:
   - G450 Branch Gateway
   - G430 Branch Gateway
   - G350 Branch Gateway
   - G250 Branch Gateway
2. Gateways that use circuit packs to connect to endpoints and trunks. Central offices and offices with large locations use G650 Media Gateway.

Note:

To upgrade Media Gateways and Media Modules, run the Media Gateway CLI commands to upgrade the firmware.

For information about the firmware management commands, see *CLI Reference Avaya Branch Gateway G430* and *CLI Reference Avaya Branch Gateway G450*.

G650 Media Gateway

The G650 Media Gateway provides card slots for up to 14 TN-type circuit packs, redundant, hot-swappable power supplies, and AC or DC power. The backplane can support 14 circuit packs and 2 power supplies and provides monitoring of system fans, power supplies, and temperature. Up to five G650 Media Gateways can be mounted in an EIA-310 standard 19-inch (48 cm) rack.

Common architectural aspects of G650 Media Gateway

A gateway consists of the following architectural components:

- TDM bus: The TDM bus has 512 time slots. The TDM bus runs internally throughout each gateway and terminates on each end. The TDM bus consists of two 8-bit parallel buses, bus A and bus B. Bus A and bus B carry circuit-switched digitized voice and data signals. Bus A and Bus B can also carry control signals to all port circuits and between port circuits and the server. The port circuits place digitized voice signals and data signals on a TDM bus. Bus A and bus B are usually active simultaneously. However, only one bus is active at any one time for control signaling.

- Packet bus: The packet bus runs internally throughout each gateway and terminates on each end. The packet bus carries logical links and control messages from the server. The links and messages are carried through port circuits to endpoints such as terminals and adjuncts. The packet bus carries logical links for both on-switch and off-switch control between some specific port circuits in the system. These circuits include, for example, IPSI, expansion interface, and IP Media Resource 320 circuit packs, control D-channels, and remote management terminals.
- Port circuits: The port circuits form analog or digital interfaces between the gateway and external trunks and linking devices. These linking devices provide links between the gateway and external trunk and the TDM bus and the packet bus. Incoming analog signals are converted to pulse-code modulated (PCM) digital signals and placed on the TDM bus by port circuits. Port circuits convert outgoing signals from PCM to analog for external analog devices. All port circuits connect to the TDM bus. Only specific ports connect to the packet bus.
- Service circuits: For traditional servers, S8300D Servers, S8510 Servers, and S8800 Servers, service circuits provide tone production and detection, call classification, recorded announcements, and speech synthesis. The embedded S8300 Server uses built-in service circuits in the G250, G350, G430, G450, and G700 Branch Gateways.

Port networks

The architectures for the S8510 Server and S8800 Server use an entity called a port network (PN). A PN uses combinations of gateways to provide physical ports and interfaces for handling calls. A port network can be one of the following:

- One G650 Media Gateway
- A stack of G650 Media Gateways that is connected with a TDM bus cable and shares connections with the server or port circuit packs

Note:

The G700, G450, G430, G350, and G250 Branch Gateways are controlled by a Communication Manager server through H.248 and are not considered port networks. However, they may reside within a configuration including port networks.

For information on port network connectivity, see *Administering Network Connectivity on Avaya Aura® Communication Manager*, 555-233-504.

Related links

Overview on page 22

System Management

Avaya Integrated Management

Avaya Integrated Management offers a comprehensive set of Web-based network management solutions and system management solutions that support the Avaya converged voice solutions. Integrated Management combines individual applications into the following offers:

- Administration Tools
- System Management
- Enterprise Network Management

For detailed information on Avaya Integrated Management suite, see Products and Services on Avaya Web site.

Related links

Overview on page 22

System Management Interface

Using the System Management Interface (SMI), you can perform the server administration tasks, such as:

- Viewing current alarms
- Maintaining the server including:
  - Checking the servers status
  - Busying out and releasing busy out the server
  - Shutting down the server
- Executing security commands to:
  - enable and disable the modem
  - start and stop the FTP server
  - view the license
- Accessing SNMP to configure trap destinations and to stop and start the master agent
- Accessing the server to acquire configuration information

The SMI contains an extensive Help system that describes each Web screen and the procedures associated with the screen.

Related links

Overview on page 22

Avaya communications devices

Avaya provides new mobility opportunities and devices that are innovative and standards based. Avaya offers a wide selection of flexible, intelligent, mobile, and easy-to-use communication devices to meet your company's unique needs. With analog, digital, and IP telephones, the spectrum is covered. The highlights of the portfolio include:

- Avaya Softconsole: A software attendant console that brings the features and functionality of a high-end attendant console to your converged network.
- Avaya IP Softphone: A collection of computer telephony integration (CTI) applications. With this you can control telephone calls, both incoming and outgoing, directly from your personal computer (PC).
- Avaya IP Agent: An advanced PC-based application. With IP agent you can access the contact center agent functionality of Communication Manager over the private network or public network. You can also use IP Agent to handle calls associated with an IP telephone or Callmaster VI telephone.
- Avaya 4630 Screenphone: A full-color touch-screen phone with Web access.
- Avaya IP Wireless Phones: Provides access to conferencing and corporate directories.
- Avaya Conference Phone: Provides full-duplex technology to enhance sound quality.
- Avaya IP Deskphone: Designed for various business communication needs.

Avaya IP communication devices are supported without special power requirements.

For more information about communication devices, see the www.avaya.com/support.

Related links

Overview on page 22

Adjuncts

The following list contains some of the adjuncts from Avaya that the Avaya servers support:

- Call Detail Recording (CDR) when a terminal server is used
- Avaya Aura® Messaging
- Modular Messaging system
- Avaya Basic Call Management System (BCMS)
- Avaya Call Management System, which is available in three packages:
  - Avaya Call Center Basic
  - Avaya Call Center Deluxe
  - Avaya Call Center Elite
- Avaya Interactive Response system

- Call Accounting Systems supported with the United States of a terminal server.

Related links

Overview on page 22

Support

Visit the Avaya Support website at http://support.avaya.com for the most up-to-date documentation, product notices, and knowledge articles. You can also search for release notes, downloads, and resolutions to issues. Use the online service request system to create a service request. Chat with live agents to get answers to questions, or request an agent to connect you to a support team if an issue requires additional expertise.

Related links

Overview on page 22

Chapter 3: Servers

Avaya S8300 Server

S8300D Server

Communication Manager Release 5.2 and later support S8300D Server. S8300D Server is an Intel Celeron processor that runs on the Linux operating system and resides in one of the following gateways:

- G250 Branch Gateway
- G350 Branch Gateway
- G430 Branch Gateway
- G450 Branch Gateway
- G650 Media Gateway

Detailed description of S8300D Server

S8300D Server software

In addition to Communication Manager software for applications, the S8300D Server runs the following software:

- A Web server that is used for:
  - Backing up and restoring customer data
  - Viewing current alarms
  - Server maintenance, including busy out, shutdown, and status of an S8300D Server
  - Security commands to enable and disable the modem
  - Security commands to start and stop the FTP server

  - Security commands to view the software license
  - SNMP access to configure trap destinations and to stop and start the master agent
  - Configuration information about the S8300D Server
  - Upgrading access to the S8300D Server
- Maintenance software
- Linux operating system
- Trivial File Transfer Protocol (TFTP) server
- Secure HTTP server for IP phone file downloads
- H.248 Branch Gateway Signaling Protocol
- Control messages tunneled over H.323 Signaling Protocol

S8300D Server configurations

The Avaya S8300D Server has the following basic hardware configurations:

- S8300D Server/G700 Media Gateway configuration on page 31
- S8300D Server/G430 Media Gateway configuration on page 33
- S8300D Server/G450 Media Gateway configuration on page 32
- S8300D Server/G350 Media Gateway configuration on page 33
- S8300D Server/G250 Media Gateway configuration on page 34

An Avaya S8300D Server with a gateway and the gateways media modules converge voice and data into one infrastructure. The S8300D Server is an Intel Celeron-based processor that resides in the gateway. The server has the same dimensions and shape as a media module.

In addition, an S8300D Server can serve as a survivable remote server (Local Survivable Server). See S8300D Server in a Survivable Remote Server configuration on page 38.

Note:

The S8300D Server must be version D to operate Communication Manager Release 6.0 software.

S8300D Server/G700 Branch Gateway configuration

The S8300D Server resides in Slot V1 of a G700 Branch Gateway.

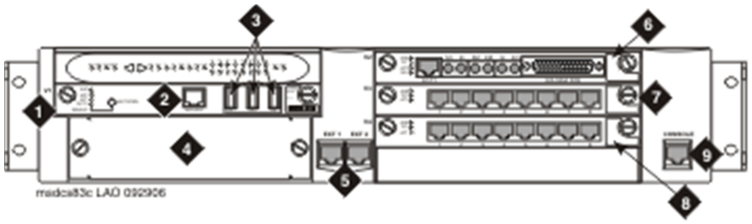
A G700 Branch Gateway, which is architecturally based on the Avaya C360 switches, contains VoIP resources and modular interface connectivity. The media modules provide analog, digital, T1/E1, BRI, and additional VoIP capabilities.

An S8300D Server with a G700 Branch Gateway has the following components:

- Survivability on page 38
- Avaya G700 Media Gateway on page 127, which can include:
  - Media modules
  - X330 WAN Access routing module on page 137
- S8300D Server in a Survivable Remote Server configuration on page 38
- System Management

For more details on the G700 Branch Gateway, see Avaya G700 Media Gateway on page 127. For more details on the S8300D Server, see Survivability on page 38.

S8300D Server in a G700 Branch Gateway



Number	Description
1	S8300D Server in Slot V1
2	Services port
3	USB ports
4	Slot
5	Dual 10/100 Base-T Ethernet switch ports
6	Media module, Slot V2
7	Media module, Slot V3
8	Media module, Slot V4
9	Console connection for on-site administration

S8300D Server/G450 Branch Gateway configuration

The G450 Branch Gateway features a VoIP engine, an optional WAN router, and Ethernet LAN connectivity. G450 provides full support for Avaya IP and digital telephones, as well as analog devices such as modems, fax machines, and telephones. The media modules in a G450 Branch Gateway provide analog, digital, T1/E1, BRI, and additional VoIP capabilities.

G450 supports the S8300D from version S8300B onward. The S8300D runs Communication Manager to provide call control services to the G450. G450 is compatible with Communication Manager starting with Release 5.0.

The S8300D server resides in slot V1. See G450 physical description for the configuration of an S8300D Server in a G450 Branch Gateway.

S8300D Server/G430 Branch Gateway configuration

The Branch Gateway G430 features a VoIP engine, an optional WAN router, and Ethernet LAN connectivity. The G430 provides full support for Avaya IP and digital telephones, as well as analog devices such as modems, fax machines, and telephones.

The G430 supports the S8300 from version S8300C onwards. The S8300 runs Communication Manager to provide call control services to the G430. G430 is compatible with Avaya Communication Manager from Release 5.2.

The S8300 server resides in slot V1. See G430 physical description for the configuration of an S8300 Server in a G430 Branch Gateway.

S8300D Server/G350 Branch Gateway configuration

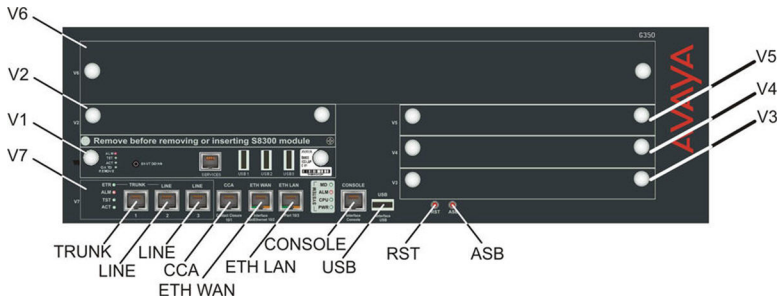
The G350 Branch Gateway features a VoIP engine and WAN router and provides full support for legacy digital and analog telephones. Like the G700 Branch Gateway, the media modules in a G350 Branch Gateway provide analog, digital, T1/E1, BRI, and additional VoIP capabilities. The following figure shows an S8300D Server and media modules in a G350 Branch Gateway.

An S8300D Server and a G350 Branch Gateway configuration has the following components:

- Survivability on page 38
- Avaya G350 Branch Gateway on page 74, which includes Related hardware
- Communication Manager on page 22
- System Management

For more information on the G350 Branch Gateway, see Avaya G350 Branch Gateway on page 74. For more information on the S8300D Server, see Survivability on page 38.

S8300D Server in a G350 Branch Gateway



Port	Description
TRK	An analog trunk port. Part of an integrated analog media module.
LINE 1, LINE 2	Analog telephone ports of the integrated analog media module. An analog relay between TRK and LINE 1 provides Emergency Transfer Relay (ETR) feature.
CCA	RJ-45 port for ACS (308) contact closure adjunct box.
WAN 1	RJ-45 10/100 Base TX Ethernet port.
LAN 1	RJ-45 Ethernet LAN switch port.
CON	Console port for direct connection of CLI console. RJ-45s connector.
USB	USB port for remote access modem.
RST	Reset button. Resets chassis configuration.
ASB	Alternate Software Bank button. Reboots the G350 with the software image in the alternate bank.

S8300D Server/G250 Branch Gateway configuration

The G250 Branch Gateway features a VoIP engine, WAN router, and Power over Ethernet switch. The G250 Branch Gateway is available in four models; analog, BRI, DCP, and 1. The G250 Branch Gateway supports analog and IP telephones. The G250 Branch Gateway has built-in media modules. The G250 Branch Gateway has two slots available for optional modules; slot V1 houses an optional S8300D Server and slot V2 houses one of two optional WAN media modules.

An S8300D Server and a G250 Branch Gateway configuration has the following components:

- Survivability on page 38
- Avaya G250 Branch Gateway on page 65
- Communication Manager on page 22
- System Management

For more information on the G250 Branch Gateway, see Avaya G250 Branch Gateway on page 65. For information on the S8300D Server, see Survivability on page 38.

S8300D Server in a G250 Branch Gateway (analog version)

Number	Description
1	V1: S8300D/Survivable Remote Server Slot
2	V2: WAN Media Module Slot
3	Analog port LEDs
4	Analog trunks
5	Analog line ports
6	System LEDs
7	Console port
8	USB port
9	Contact Closure (CCA) port
10	Ethernet WAN (ETH WAN) port
11	PoE LAN (ETH LAN PoE) ports
12	Reset (RST) button
13	Alternate Software Bank (ASB) button

S8300D Server components

For a list of S8300D components used in each S8300D configuration, see the S8300D Server configuration section.

UPS or power backup

For the S8300D Server, any of the available UPS units can instantly supply power during a power outage.

RAM disk

RAM disk is a portion of memory used as a disk partition. In the event of a hard disk failure, the S8300D Server uses only RAM disk to provide call processing for up to 72 hours. Administration and backups are prohibited. Also, Communication Manager Messaging is unavailable when operating in RAM disk mode, so secondary call coverage points for users should be administered even with RAM disk enabled.

S8300D Server specifications

Component	Minimum specification
Processor	An S8300D Server is an Intel Core 2 Duo U5700 processor that runs on the Linux operating system. The S8300D Server resides in Slot V1 of a gateway.
Memory	250-GB hard disk 8-GB DRAM (with one 1 GB DIMM) 4-GB Internal Solid State Drive (SSD)
Connectors	One USB ports and a 10/100 Base-T port • One USB port supports a readable DVD/CD-ROM drive, which is used for system installations and upgrades. One services port
Flash drive	One internal Compact Flash drive, which is used as the primary reboot device.
Modem	Modem support for alarming.

Related hardware and adjuncts

Communication Manager Messaging

Note:

The IA770 INTUITY AUDIX messaging is called Communication Manager Messaging, starting with Communication Manager Release 5.2 and later releases.

Communication Manager Messaging is an optional voice mail system used with an S8300D Server. Communication Manager Messaging is a software-only version of messaging that uses a QSIG-MWI H.323 virtual trunk for communication between Communication Manager and Communication Manager Messaging software. This version is available on the G700, G450, G430, G350, and G250 Gateway configurations. Without the need for additional hardware, Communication Manager Messaging software processes touchtone signals, converts messages to the G.711 format, and converts text to speech.

Note:

The Communication Manager Messaging application is included with Communication Manager Release 6.0 and later with many of the Communication Manager templates.

The Communication Manager Messaging application can be a solution for one location in a stand-alone S8300D configuration. The application can also be integrated with other voice mail systems using TCP/IP and Avaya Message Networking.

Communication Manager Messaging uses many resources of the S8300D Server and the gateway where it resides. The following list outlines the shared resources of S8300 used by Communication Manager Messaging application:

- Hardware for data storage and retrieval
- TFTP server for:
  - Downloading and updating the license file for feature activation
  - Backing up and restoring data over a LAN or a WAN, including translations and messages
  - Updating and upgrading software
- IP address for administration access
- General Alarm Manager for alarm display
- Web interface to start and stop the application

The Communication Manager Messaging application also shares the same switch-tone parameters established for the S8300D Server. The S8300D Server handles switch tones on behalf of Communication Manager Messaging application and passes on the control information to Communication Manager Messaging application using QSIG signaling.

Call center

An S8300D Server provides an excellent solution for a small call center by offering the following call center capabilities:

- A maximum of 16 ASAI links
- Announcement software

G430 supports call center features with large announcement storage, including optional compact flash, large voice trunk capacity, and 16 announcement ports for announcement record and playback.

Printers

The S8300D Server is connected to the customer LAN. Therefore, you can send print requests to any printer within the LAN and IP region of the S8300D Server.

A system printer is supported when a terminal server is used. In this case, the printer is connected to an adjunct PC such as a CDR system, CMS, or Call Accounting System.

A journal printer is supported when a terminal server is used.

Survivability

S8300D Server in a survivable remote server configuration

S8300D Server in a survivable remote server configuration uses the S8300D hardware component and a software license to activate a standby feature. Use this software to allow the survivable remote server with a gateway to function as a survivable call processing server for remote locations and branch locations.

The branch locations can have the following servers as their primary controllers:

- S8300D
- HP ProLiant DL360 G7
- Dell™ PowerEdge™ R610
- Dell™ PowerEdge™ R620

S8300D Server and the survivable remote server cannot reside in the same gateway.

If, for any reason, communication between a gateway and the primary controller stops, a survivable remote server is activated. This *failover* from the primary controller to the survivable remote server is an automatic process. The survivable remote server controls IP telephones that have the survivable remote server configured in the list of controllers.

The survivable remote server can support calls as the primary controller for 30 days. After 30 days in the license-error mode, the survivable remote server administration is blocked and the telephones display `License Error` on the screens. Telephone operations can continue even after the first 30 days.

Automatic fallback to primary controller

Based on administration of Communication Manager, the G250/G350/G430/G450/G700 Survivable Remote Server can return control of the G250/G350/G430/G450/G700 Branch Gateway to the primary controller (server) automatically when the connection is restored between the gateway and the primary controller. By returning control of the gateways to the primary controller automatically, Communication Manager software easily and quickly eliminates the fragmentation between remote gateways in the network created by LAN/WAN communication failures with the primary controller.

Gateway preserves stable calls when control changes from the Survivable Remote Server to the primary controller. Stable calls are calls that are carrying active two-way or multiparty conversations. Other calls such as those that are on hold are not preserved.

Note:

The fall-back from the Survivable Remote Server to the primary controller may also be manual using a reset on the Survivable Remote Server. This reset breaks the communication between

the Survivable Remote Server and each registered endpoint. This break causes the endpoints to register with the primary controller. However, most active calls are preserved.

Number of survivable remote servers supported

The number of survivable remote servers that a configuration can support depends on the controlling server. The HP ProLiant DL360 G7, Dell™ PowerEdge™ R610, and Dell™ PowerEdge™ R620 servers can support up to 250 Survivable Remote Servers. S8300D Server can support up to 50 survivable remote servers.

Translations

An automatic process copies translation changes when customers make changes on the primary controller to each Survivable Remote Server.

S8300D Server hardware requirements

The hardware for S8300D Server as a primary controller is identical to the hardware for S8300D Server as a survivable remote server. The difference between the two configurations is only in software.

IP addressing of the primary controller, the Survivable Remote Server, and IP telephones

A Survivable Remote Server is administered with a different IP address than the IP address of the primary controller. In addition, IP telephones obtain their own IP address from a DHCP server. The DHCP server also sends a list of controllers, Survivable Remote Servers, and their associated IP addresses. The IP telephone then registers with the controller corresponding to the first IP address in this list. When connectivity is lost between the controller and the endpoint, the endpoint registers with the second IP address in the list, and so on. This list can be administered for telephones on the DHCP server.

S8300D Server high-level capacities

The S8300D Server supports:

- 900 ports by a combination of trunks and stations
  - 450 IP stations, 450 non-IP stations, or a combination of 450 IP and non-IP stations

- 450 trunks

- 50 G250/G350/G430/G450/G650/G700 Gateways

Capability	S8300D Server
Call processing feature set	Communication Manager Release 3.0
Maximum number of stations	450 (IP or TDM)
Maximum number of trunks	450
Reliability options	Single server
Port-network connectivity	Not applicable
Supported Gateways	G250, G350, G430, G450, G650, G700
Maximum number of supported gateways	50 (supported by one S8300D Server)
Survivability options	G250, G350, G430, G450, G650, and G700 with S8300D Survivable Remote Server
Number of Survivable Remote Servers in one configuration	Maximum of 50 when supported by an S8300D. Maximum of 250 when supported by an S8510 or S8800 Servers
Port networks	Not applicable

For more detailed system capacity information, see *Avaya Aura® Communication Manager System Capacities Table,*03-300511.

S8300E server

The S8300E server is based on a 2.0 GHz, dual core Intel Ivy Bridge processor. The S8300E server is supported in the G430 Branch Gateway and G450 Media Gateway. The S8300E server supports System Platform Release 6.3.7, and Communication Manager Release 6.3.8 and later. The S8300E server is certified by VMware as VMware Ready.

Related links

S8300E server software on page 40
S8300E server specifications on page 41
S8300E server high-level capacities on page 42
S8300E server environmental specifications on page 43

S8300E server software

S8300E server supports the following:

- A web server that is used for:
  - Backing up and restoring customer data
  - Viewing current alarms

- Maintaining the server
- Enabling and disabling the modem
- Starting and stopping the FTP server
- Viewing the software license
- Accessing SNMP to configure trap destinations and to start and stop the master agent
- Viewing the configuration information
- Upgrading

- Linux operating system
- Trivial File Transfer Protocol (TFTP)
- Secure HTTP server for IP phone file downloads
- H.248 branch gateway signaling protocol
- Control messages over H.323 and SIP signaling protocol

Related links

S8300E server on page 40

S8300E server configurations

You can configure the S8300E server with the following gateways:

- G430 Branch Gateway
- G450 Branch Gateway

G450 Branch Gateway and G430 Branch Gateway comprise a VoIP engine, an optional WAN router, and an Ethernet LAN connectivity. G450 Branch Gateway and G430 Branch Gateway support IP telephones, digital telephones, and analog devices such as modems, fax machines, and analog telephones. The S8300E server and the media modules converge voice and data into one infrastructure. The media modules provide analog, digital, T1/E1, BRI, and additional VoIP capabilities.

Communication Manager runs on the S8300E server to provide call control services to G450 Branch Gateway and G430 Branch Gateway.

S8300E server specifications

Component	Minimum specification
Processor	The S8300E server is based on a 2.0 GHz, dual core Intel Ivy Bridge processor. The S8300E server

Table continues…

Component	Minimum specification
	resides in Slot V1 of G450 Branch Gateway or G430 Branch Gateway.
Memory	• 320-GB hard disk • Two 8-GB of DDR3 SDRAM
Connectors	• Three USB 2.0 ports • One services Ethernet port

Related links

S8300E server on page 40

S8300E server high-level capacities

Capability	S8300E server
Call processing feature set	Communication Manager Release 6.3.8 and later
Maximum number of stations	Communication Manager Release 6.3.x supports: • 1000 H.323 stations • 700 SIP stations for LSP • 700 SIP stations for Branch Session Manager Communication Manager Release 7.0 supports: • 1000 H.323 stations • 1000 SIP stations for LSP • 1000 SIP stations for Branch Session Manager
Maximum number of trunks	450
Reliability options	Single server
Port-network connectivity	—
Supported gateways	G430 Branch Gateway and G450 Branch Gateway
Maximum number of supported gateways	50
Survivability options	G430 Branch Gateway or G450 Branch Gateway with an S8300E server
Number of survivable remote servers in one configuration	50
Port networks	—

Related links

S8300E server on page 40

S8300E server environmental specifications

Name	Minimum specification
Operating temperature	5 °C to 40 °C
Operating relative humidity	10% to 90% noncondensing humidity
Operating altitude	300 m to 3048 m above sea level

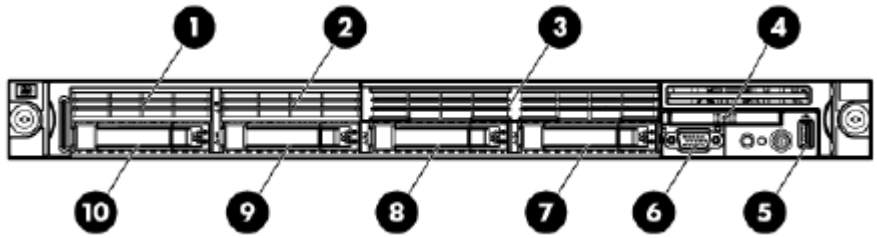
Related links

S8300E server on page 40

HP ProLiant DL360 G7 1U Server

The Avaya Common Servers category includes the HP ProLiant DL360 G7 1U server that supports several Avaya software solutions, some requiring additional hardware and memory requirements beyond the standard configuration.

Front view of HP DL360 G7 Server



Note:

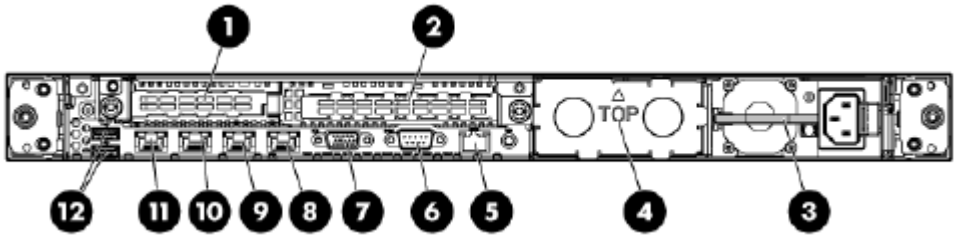
Servers ship with 2–4 hard disk drives, depending upon product requirements.

No.	Description
1	Not present
2	Not present
3	DVD-RW
4	HP Systems Insight Display
5	Front USB connector
6	Video connector

Table continues…

No.	Description
7	Hard drive bay 4
8	Hard drive bay 3
9	Hard drive bay 2
10	Hard drive bay 1

Back view of HP DL360 G7 Server



No.	Description
1	Slot 1 PCIe2 x8 (8, 4, 2, 1) **Note:** Servers might ship with a PCI card installed, depending upon product requirements.
2	Slot 2 PCIe2 x16 (16, 8, 4, 2, 1), 75W +EXT 75W* **Note:** Servers might ship with a PCI card installed, depending upon product requirements.
3	Power supply bay 1 (populated)
4	Power supply bay 2
5	iLO 3 connector
6	Serial connector
7	Video connector
8	NIC 4 connector
9	NIC 3 connector
10	NIC 2 connector
11	NIC 1 connector
12	USB connectors (2)

*This expansion slot provides 75 W of power to an adapter, with an additional 75 W of power supplied by external power.

HP DL360 G7 Server specifications

Component	Minimum specification	Upgrade options based on product requirements
DL360 G7	1U chassis, dual socket	No additional options supported.
Processor	Simplex configuration: Intel E5620 Quad Core / 2.4 GHz (Westmere), 1 CPU, 3 memory channels per CPU with up to 3 RDIMMs per channel **Note:** Simplex server with the single E5620 2.4 GHz processor can be used in a duplex server configuration. Servers with this configuration are also known as the mid-performance duplex servers. In this configuration, you cannot pair 2.4 GHz and 2.93 GHz processors, or HP DL360 G7 and Dell R610 servers, for main or survivable core server. Duplex configuration: Intel X5670 six Core / 2.93 GHz (Westmere), 1 CPU, 3 memory channels per CPU with up to 3 RDIMMs per channel **Note:** HP DL360 G7 and Dell R610 are available with a 6 core 2.93 GHz processor for duplex configurations. Servers with this configuration are also known as the duplex high-performance servers. In this configuration, you can pair duplex high-performance main server only with a duplex high-performance survivable core server as a backup server.	N/A
Memory	6 x 2GB DDR3 RDIMMs (1333 MHz) for a total of 12GB	N/A
HW RAID 1	P410i RAID controller with 256MB cache and battery backup. Optioned as RAID 5	N/A
Disk drive	146GB SAS 2.5" 10K RPM 6G DP Hard Drive. Base configuration: • 272 total: RAID 5, 3 x 146GB drives	N/A
NICs	6 NIC ports — HP NC382T PCI Express Dual Port Gigabit NIC expansion card (Broadcom 5709 silicon) in addition 4 integrated ENET Gigabit NIC ports	N/A

Table continues…

Component	Minimum specification	Upgrade options based on product requirements
PCI slots	Two PCI-Express Gen 2 expansion slots: (1) full-length, full-height slot and (1) low-profile slot (1-FL/FH x 16 PCIe & 1-LP x 8 PCIe Riser	N/A
Removable media	Slim line SATA DVD-RW optical drive (used in all Avaya configurations)	No additional options supported.
Power supply	Single 460 W hotplug AC power supply	Redundant 460 W power supply available.
Fans	6 Fan modules in 1 processor model	No additional options supported.
Additional items	1 front USB, 2 back USB, 1 internal USB	

HP DL360 G7 Server environmental specifications

Specification	Value
Temperature range	**Note:** All temperature ratings shown are for sea level. An altitude derating of 1°C per 300 m (1.8° per 1,000 ft.) to 3048 m (10,000 ft.) is applicable. No direct sunlight allowed.
Operating	10°C to 35°C (50°F to 95°F)
Shipping	-40°C to 70°C (-40°F to 158°F)
Maximum wet bulb temperature	28°C (82.4°F)
Relative humidity (noncondensing)	**Note:** Storage maximum humidity of 95% is based on a maximum temperature of 45° C (113°F). Altitude maximum for storage corresponds to a pressure minimum of 70 kPa.
Operating	10% to 90%
Non-operating	5% to 95%

HP DL360 G7 Server physical specifications

Type	Description
Dimensions	Height: 4.32 cm (1.70 in)
	Width: 42.62 cm (16.78 in)
	Depth: 69.53 cm (27.38 in)

Table continues…

Type	Description
Weight (maximum; two processors, two power supplies, eight hard disk drives)	15.97 kg (35.20 lb)
Weight (minimum; one processor, one power supply, no hard drives)	14.51 kg (32.00 lb)
Weight (no drives installed)	14.06 kg (31.00 lb)

HP DL360 G7 Server power specifications

Specification	Value
Power rating	Simplex: 611.03 BTU/h (179 W) Duplex: 755.92 BTU/h (222 W)
Voltage	120 VAC
Plug Type	NEMA 5-15P
Circuit Breaker	15 amp
Pole	1
AMP Draw	Simplex: 1.51 A Duplex: 1.87 A

HP DL360 G7 Server Field Replaceable Units

- HP DL360 G7 Server
- Hard Disk Drives
- Power Supply(s) and (Optional) Redundant Power Supply Hot Pluggable
- Memory
- Dual NIC

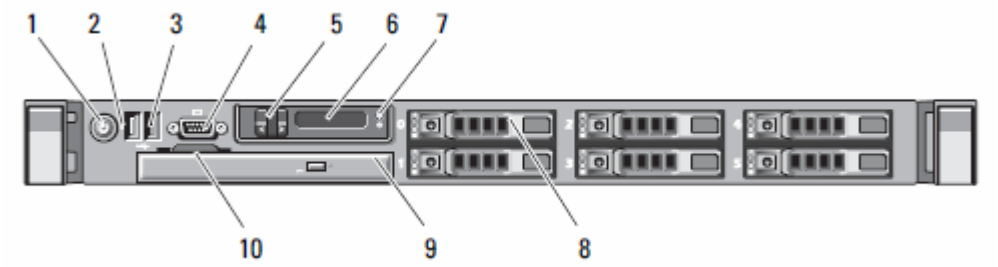
HP DL360 G7 Server related documents

- *Installing the HP ProLiant DL360 G7 Server*, 03-603799.
- *Maintaining and Troubleshooting the HP ProLiant DL360 G7 Server*, 03-603803.

Dell™ PowerEdge™ R610 1U Server

The Avaya Common Servers category includes the Dell™ PowerEdge™ R610 1U server that supports several Avaya software solutions, some requiring additional hardware and memory requirements beyond the standard configuration.

Front view of Dell R610 Server

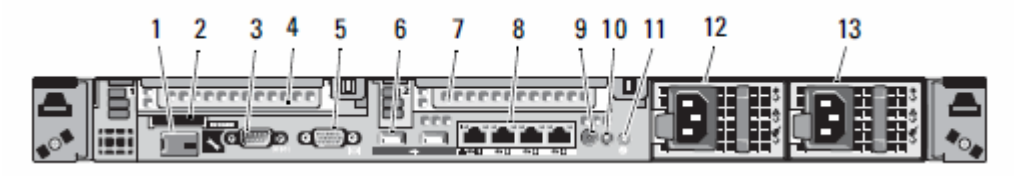


Note:

Servers ship with 2–4 hard disk drives, depending upon product requirements.

No.	Description
1	power button
2	NMI button
3	USB connectors (2)
4	Video connector
5	LCD menu buttons
6	LCD panel
7	System identification button
8	Hard drives (maximum 4)
9	DVD-RW
10	System identification panel

Back view of Dell R610 Server



No.	Description
1	iDRAC6 Enterprise port (optional)
2	VFlash media slot (optional)
3	Serial connector
4	PCIe slot 1 **Note:** Servers might ship with a PCI card installed, depending upon product requirements.
5	Video connector
6	USB connectors (2)
7	PCIe slot 2 **Note:** Servers might ship with a PCI card installed, depending upon product requirements.
8	Ethernet connectors (4)
9	System status indicator connector
10	System status indicator
11	System identification button
12	Power supply 1 (PS1)
13	Power supply 2 (PS2)

Dell R610 Server specifications

Component	Minimum specification	Upgrade options based on product requirements
R610	1U chassis, dual socket	Listed below
Processor	Simplex configuration: Intel E5620 Quad Core / 2.4 GHz (Westmere), 1 CPU, 3 memory channels per CPU with up to 2 RDIMMs per channel **Note:** Simplex server with the single E5620 2.4 GHz processor can be used in a duplex server configuration. Servers with this configuration are also known as the mid-performance duplex servers. In this configuration, you cannot pair 2.4 GHz and 2.93 GHz processors, or HP DL360 G7 and	N/A

Table continues…

Component	Minimum specification	Upgrade options based on product requirements
	Dell R610 servers, for main or survivable core server. Duplex configuration: Intel X5670 six Core / 2.93 GHz (Westmere), 1 CPU, 3 memory channels per CPU with up to 2 RDIMMs per channel **Note:** HP DL360 G7 and Dell R610 servers are available with a 6 core 2.93 GHz processor for duplex configurations. Servers with this configuration are also known as the duplex high-performance servers. In this configuration, you can pair duplex high-performance main server only with a duplex high-performance survivable core server as a backup server.	
Memory	6 x 2GB DDR3 RDIMMs (1333 MHz) for a total of 12GB	N/A
HW RAID 1	H700 RAID controller with 512MB cache and battery backup. Optioned as RAID 5.	N/A
Disk drive	146GB SAS 2.5" 10K RPM 6G DP Hard Drive. Base configuration: • 272 total: RAID 5, 3 x 146GB drives	N/A
NICs	6 NIC ports — Broadcom 5709 Dual Port 1GbE NIC (430-3261) in addition 4 integrated ENET gigabit NIC ports	N/A
PCI slots	2 PCIe risers (left and center) provide: • Two x 8 PCIe Gen2 slots • One x 4 PCIe Gen 1 slot • FH/HL PCIe card support	No additional options supported.
Removable media	DVD+/-RW SATA internal	No additional options supported.
Power supply	Single 502 W Hotplug AC power supply	Redundant 502 W power supply available.
Fans	Redundant Speed Adjusting Fans standard (5 for single processor)	No additional options supported. (2nd processor includes 1 additional fan)
Additional items	2 front USB, 2 back USB, 1 internal USB	

Dell R610 Server environmental specifications

Specification	Value
Temperature	
Operating	10° to 35°C (50° to 95°F) with a maximum temperature gradation of 10°C per hour **Note:** For altitudes above 2,950 feet, the maximum operating temperature is de-rated 1°F per 550 ft.
Storage	-40° to 65°C (-40° to 149°F) with a maximum temperature gradation of 20°C per hour
Relative Humidity	
Operating	20% to 80% (non-condensing) with a maximum humidity gradation of 10% per hour
Storage	5% to 95% (non-condensing) with a maximum humidity gradation of 10% per hour
Altitude	
Operating	-16 to 3,048 m (-50 to 10,000 ft.) **Note:** For altitudes above 2,950 ft, the maximum operating temperature is de-rated 1°F per 550 ft.
Storage	-16 to 10,600 m (-50 to 35,000 ft.)

Dell R610 Server physical specifications

Type	Description
Dimensions	Height: 4.26 cm (1.68 in)
	Width: • 48.24 cm (18.99 in) with rack latches • 42.4 cm (16.99 in) without rack latches
	Depth: • 77.2 cm (30.39 in) with power supplies and bezel • 73.73 cm (29.02 in) without power supplies and bezel
Weight (maximum configuration)	17.69 kg (39 lb)
Weight (empty)	13.25 kg (29.2 lb)

Dell R610 Server power specifications

Specification	Value
BTU	Simplex: 737 Duplex: 788.2
Voltage	120 VAC
Plug Type	NEMA 5-15P
Circuit Breaker	15 amp
Pole	1
AMP Draw	Simplex: 1.8 A Duplex: 1.925 A

Dell R610 Server Field Replaceable Units

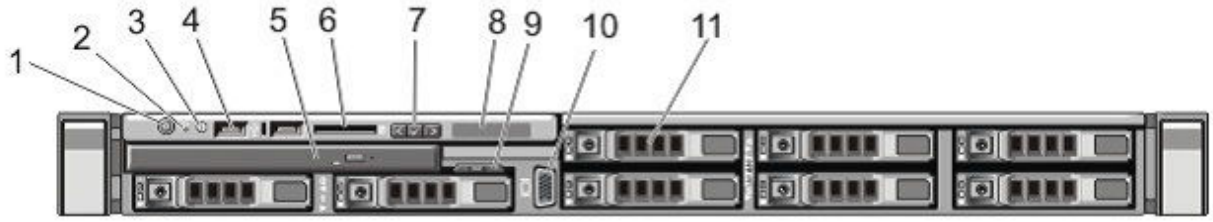
- Dell R610 Server
- Hard Disk Drives
- Power Supply(s) and (Optional) Redundant Power Supply Hot Pluggable
- Memory
- Dual NIC

Dell R610 Server related documents

- *Installing the Dell™ PowerEdge™ R610 Server*, 03-603793.
- *Maintaining and Troubleshooting the Dell™ PowerEdge™ R610 Server*, 03-603804.

Dell™ PowerEdge™ R620 1U Server

Front view of Dell R620 Server



Note:

Most Avaya servers ship with 2–4 hard disk drives, depending upon product requirements. The remaining hard drive bays (slots 4–7) will not be operable. A plate will be covering the 4 slots on the right side of the server.

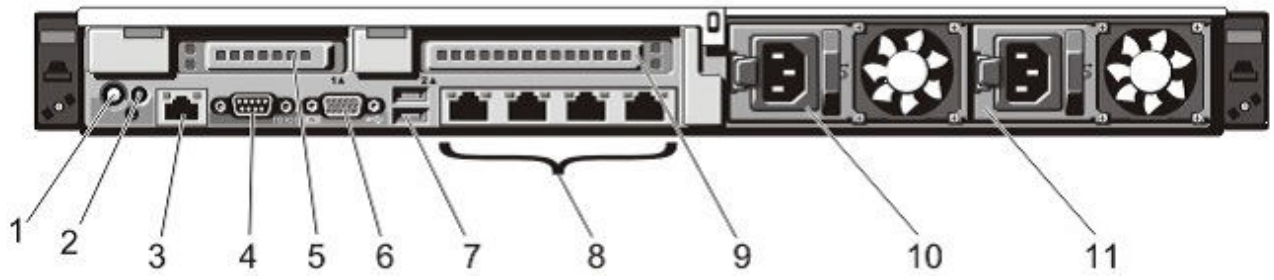
No.	Item	Icon	Description
1	Power-On Indicator, Power Button		The power-on indicator lights when the system power is on. The power button controls the power supply output to the system. **Note:** On ACPI-compliant operating systems, turning off the system using the power button causes the system to perform a graceful shutdown before power to the system is turned off.
2	NMI Button		Used to troubleshoot software and device driver errors when running certain operating systems. This button can be pressed using the end of a paper clip. Use this button only if directed to do so by qualified support personnel or by the operating system's documentation.
3	System Identification Button		The identification buttons on the front and back panels can be used to locate a particular system within a rack. When one of these buttons is pressed, the LCD panel on the front and the system status indicator on the back flashes blue until one of the buttons are pressed again. Press to toggle the system ID on and off. If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter BIOS progress mode.

Table continues…

4	USB Connectors (2)		Allows you to insert USB devices to the system. The ports are USB 2.0-compliant.
5	Optical Drive		One optional SATA DVD-ROM drive or DVD+/-RW drive. **Note:** DVD devices are data only.
6	vFlash Media Card Slot (Not populated for Avaya)		Allows you to insert a vFlash media card.
7	LCD Menu Buttons		Allows you to navigate the control panel LCD menu.
8	LCD Panel		Displays system ID, status information, and system error messages. The LCD lights blue during normal system operation. The LCD lights amber when the system needs attention, and the LCD panel displays an error code followed by descriptive text. **Note:** If the system is connected to AC power and an error is detected, the LCD lights amber regardless of whether the system is turned on or off.
9	Information Tag		A slide-out label panel, which allows you to record system information, such as Service Tag, NIC, MAC address, and so on as per your need.
10	Video Connector		Allows you to connect a VGA display to the system.
11	Hard Drives		A typical Avaya configuration has up to four 2.5 inch hot-swappable hard drives. The other hard drive bays will not be operable. High density HDD Avaya products will ship with 8 slots.

More information can be found in the Dell Owner's Manual, in the Front Panel Features and Indicators section.

Back view of Dell R620 Server



No.	Item	Icon	Description
1	System Identification Button		The identification buttons on the front and back panels can be used to locate a particular system within a rack. When one of these buttons is pressed, the LCD panel on the front and the system status indicator on the back blink until one of the buttons are pressed again. Press to toggle the system ID on and off. If the system stops responding during POST, press and hold the system ID button for more than five seconds to enter BIOS progress mode. To reset iDRAC (if not disabled in F2 iDRAC setup) press and hold for more than 15 seconds.
2	System Identification Connector		Allows you to connect the optional system status indicator assembly through the optional cable management arm.
3	iDRAC Enterprise Port		Dedicated management port. **Note:** The port is available for use only if the iDRAC7 Enterprise license is installed on your system. (Not normally used in Avaya systems)
4	Serial Connector		Allows you to connect a serial device to the system.
5	PCIe Expansion Card Slot 1 (riser 2)		Allows you to connect a PCIe expansion card.
6	Video Connector		Allows you to connect a VGA display to the system.
7	USB Connectors (2)		Allows you to connect USB devices to the system. The ports are USB 2.0-compliant.
8	Ethernet Connectors (4)		Four integrated 10/100/1000 Mbps NIC connectors (Avaya Standard) **Note:** Dell R620 NIC port numbers are read from **left to right**, starting with Port 1, then continuing 2, 3 and port 4.
9	PCIe expansion card slot 2 (riser 3)		Allows you to connect a PCIe expansion card.
10	Power Supply (PSU1)		AC 495W, 750W
11	Power Supply (PSU2)		AC 495W, 750W

More information can be found in the Dell Owner's Manual, in the Back Panel Features and Indicators section.

Dell R620 Server specifications

Base unit	Baseline	Options
R620	1U chassis, dual socket	Listed below
Processor	Intel E5-2630, Six Core 2.3GHz (Sandybridge) 4 memory channels per CPU with up to 3 DIMMs per channel (most applications use 1 or 2 DIMMs per channel to optimize memory speed)	• Intel E5–2667 six Core/2.9 GHz (Sandybridge) • Upgradable to dual processors for either E5-2630 or E5–2667
Memory	4GB DDR3 RDIMMs	Max Capacity for memory: RDIMM – up to 96GB (2 cpus)
HW RAID	H710 RAID controller with 512MB Cache and battery backup. Optioned as RAID 1 or 5	Other RAID configurations available
Hot-Plug disk drive cage	8 Small Form Factor 2.5” hot-plug hard drive bays are available when an optical drive is installed. A typical Avaya configuration has up to four 2.5 inch hot-swappable hard drives.	High density HDD Avaya products will ship with 8 slots.
Disk drive	300GB SAS 2.5" 10K RPM 6G DP Hard Drive. Two base configurations: • 299.96GB total: RAID 1, 2 x 300GB drives • 599.93GB total: RAID 5, 3 x 300GB drives	• Additional 300GB 10K RPM SAS drive • High performance 300GB 15K SAS drives • High capacity 600GB 10K SAS drives
NICs	4 integrated ENET Gigabit NIC ports with TCP offload engine (included on motherboard)	Broadcom 5720 Dual Port 1GbE NIC (430-3261)
PCI slots	2 PCIe risers (left and center)	(Riser 2, Slot 1) One half-height, half-length x8 link or one half-height, half-length x16 link **Note:** Both processors must be installed to use the slots on the x16 link on riser 2. (Riser 3, Slot 2) One full-height, three fourth-length x16 link or one half-height, half-length x16 link
Removable media	Slim line SATA DVD-RW optical drive (used in all Avaya configurations)	No additional options supported.
Power supply	495W AC Hot Plug Power Supplies	• 750W AC power supply

Table continues…

Base unit	Baseline	Options
		• Single and dual power supply configurations
Fans	7 Fan modules	7 Fan modules
Additional items	2 front USB, 4 back USB, and 1 internal USB port Front Video Connector	

Dell R620 Server environmental specifications

Dell R620 altitude and air pressure requirements

A table listing the altitude and air pressure requirements for the Dell R620 server.

Specification	Altitude
Operating	–15.2 m to 3048 m (–50 to 10,000 ft) **Note:** For altitudes above 2,950 ft, the maximum operating temperature is de-rated 1°F per 550 ft.
Storage	–15.2 m to 10,668 m (–50 ft to 35,000 ft)

Dell R620 temperature and humidity requirements

This is a table of the temperature and humidity requirements for the Dell R620 server.

Specification	Value
Temperature range	
Operating	10° to 35 °C (50° to 95 °F) with no direct sunlight on the equipment. **Note:** For altitudes above 2950 ft, the maximum operating temperature is derated 1° F / 550 ft.
Storage	-40° to 65° C (-40° to 149° F) with a maximum temperature gradation of 20 °C per hour
Relative humidity	
Operating	20% to 80% (non-condensing) at a maximum wet bulb temperature of 29 °C (84.2° F)
Non-operating	5% to 95% at a maximum wet bulb temperature of 38 °C (100.4° F)

Dell R620 Server physical specifications

Type	Description
Dimensions	Height: 42.8 mm (1.68 inch)
	Width: • 48.24 cm (18.99 in) with rack latches • 43.4 cm (17.08 in) without rack latches
	Depth: • 700.5 mm (27.58 inch)
Weight (maximum configuration)	18.58 kg (40.96 lb.)
Weight (empty)	8.58 kg (18.92 lb)

Dell R620 Server power specifications

Specification	Value
BTU	1057.8 BTU/hr
Voltage	110 VAC (100–240 VAC auto-ranging 50/60 Hz)
Plug Type	NEMA 5-15P
Circuit Breaker	15 amp
Pole	1
AMP Draw	2.8 amps (based on 110 voltage)

Note:

The above power configuration is based on the following example:

- 2qty – E5-2630 Processors
- 2qty – 495W power supplies
- 2qty – 300GB HDDs
- CPU load 100%
- 8qty – 4GB 1600mHz RDIMMs

Installing the server in the rack

About this task

Note:

Although not used frequently, Avaya customers are required to have a monitor, USB keyboard, and USB mouse available for use by installation and/or servicing technicians.

Procedure

1. Examine contents of shipping container (Avaya provided equipment), and ensure that the 6-digit material code on the order matches the 6-digit material code on the shipping container.
2. Verify that the rack is installed according to the manufacturer's instructions and in accordance with all local codes and laws. Verify that the rack is grounded in accordance with local electrical code.

   See the *Rack Installation Instructions* that are shipped with the hardware for more information.
3. Remove the cabinet doors, if necessary.
4. Attach the rails to the rack

   The rails included with the server will accommodate most square-hole racks. If these rails do not fit the rack, the customer must provide rails or a shelf for rack installation. Also, the rails included with the server might not work with round-hole racks. The customer can obtain rails and/or a shelf from any distributor, for example http://www.racksolutions.com/. The customer-provided rails and rack must be on site prior to the first day of installation.

   Note:

   The customer is responsible for any rack screws.
5. Attach the server to the rack.
6. Connect the power cord(s).

   See the *Getting Started Guide* sections: “connecting the power cables” and “securing the power cord” for more information.

Common Server support for new installations

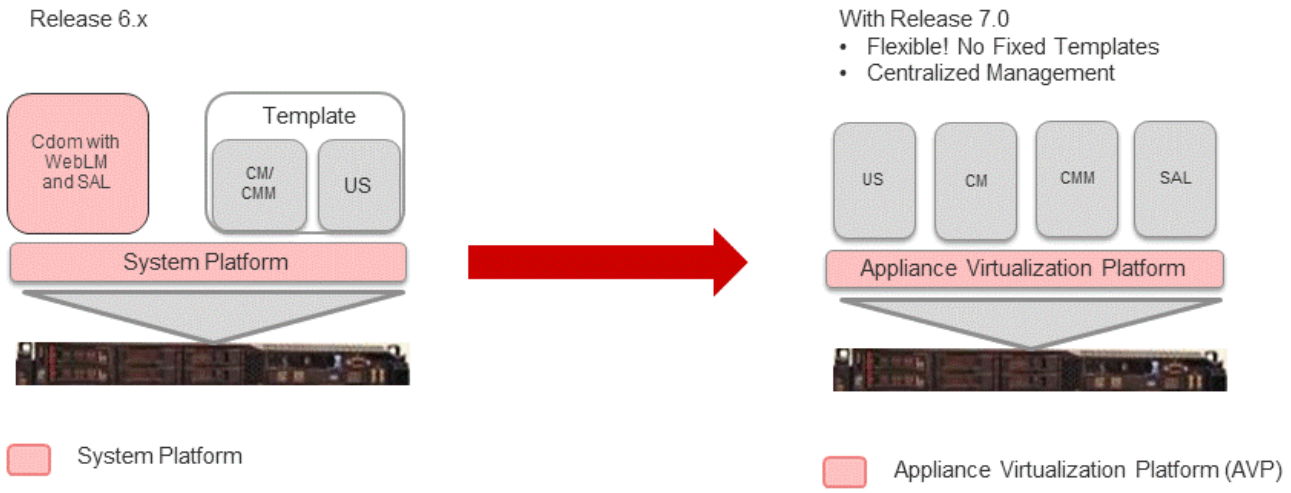
Server component	DL360PG8 SRVR LARGE AVP	DL360PG8 SRVR MEDIUM AVP	DL360PG8 SRVR SMALL AVP	DL360PG8 SERVER CM HIGH DUPLX AVP
Form factor	1U	1U	1U	1U

Table continues…

Server component	DL360PG8 SRVR LARGE AVP	DL360PG8 SRVR MEDIUM AVP	DL360PG8 SRVR SMALL AVP	DL360PG8 SERVER CM HIGH DUPLX AVP
Processor Family	Intel (2.9 GHz - E5-2667)	Intel (2.3 GHz - E5-2630)	Intel (2.3 GHz - E5-2630)	Intel (2.9 GHz - E5-2667)
Number of processors	2	2	1	1
Memory type	4 GB RDIMM (16)	4 GB RDIMM (8)	4 GB RDIMM (4)	4 GB RDIMM (4)
Total memory	64GB	32GB	16GB	16GB
Hard Disk Drive	300GB Drives	300GB Drives	300GB Drives	300GB Drives
Number of Hard Disk Drive	4	3	2	2
RAID Level	5	3	1	1
Network interface	4	4	4	4
Optical drive	DVD+/-RW, SATA, INTERNAL	DVD+/-RW, SATA, INTERNAL	DVD+/-RW, SATA, INTERNAL	DVD+/-RW, SATA, INTERNAL
Power supply	750W AC	460W AC	460W AC	460W AC
Number of power supplies	2	2	1	1

Common Server Release 2

In the Avaya Aura® 7.0, Common Servers remove the need for fixed templates and provide customers with the ability to run any combination of supported applications on Avaya supplied servers, providing them with greater flexibility in scaling their solutions to individual requirements. Appliance Virtualization Platform (AVP) is an Avaya offer, and does not require the customer to have any VMware infrastructure or knowledge. As such, vCenter and the vSphere Client are not required, nor are they supported with AVP in Avaya Aura® 7.0. AVP configuration and management is performed with the Solution Deployment Manager (SDM) that is part of System Manager, or through the SDM Client.



Common Server support for new installations

Server component	DL360PG8 SRVR LARGE AVP	DL360PG8 SRVR MEDIUM AVP	DL360PG8 SRVR SMALL AVP	DL360PG8 SERVER CM HIGH DUPLX AVP
Form factor	1U	1U	1U	1U
Processor Family	Intel (2.9 GHz - E5-2667)	Intel (2.3 GHz - E5-2630)	Intel (2.3 GHz - E5-2630)	Intel (2.9 GHz - E5-2667)
Number of processors	2	2	1	1
Memory type	4 GB RDIMM (16)	4 GB RDIMM (8)	4 GB RDIMM (4)	4 GB RDIMM (4)
Total memory	64GB	32GB	16GB	16GB
Hard Disk Drive	300GB Drives	300GB Drives	300GB Drives	300GB Drives
Number of Hard Disk Drive	4	3	2	2
RAID Level	5	3	1	1
Network interface	4	4	4	4
Optical drive	DVD+/-RW, SATA, INTERNAL	DVD+/-RW, SATA, INTERNAL	DVD+/-RW, SATA, INTERNAL	DVD+/-RW, SATA, INTERNAL
Power supply	750W AC	460W AC	460W AC	460W AC
Number of power supplies	2	2	1	1

Common Server support for upgrades

Adopting Application (Main & Alternate if applicable)	Server	Size	Processor (Intel Xeon)	Number of CPU	Dynamic RAM	Hard Disk Drive	RAID	Number of Ports	Power Supply
Communication Manager Simplex / Mid-Performance Duplex (303518, Main)	CS Rel2 HP DL360PG8	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	2 x 300 GB 10K 1x DVD R/W	RAID 1 P420i / 512 MB	6	1x 460 WAC
Communication Manager Simplex / Mid-Performance Duplex (303516, Alternate)	CS Rel2 Dell R620	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	2 x 300 GB 10K 1x DVD R/W	RAID 1 P710i / 512 MB	6	1x 495 WAC
Communication Manager — High Performance Duplex (303519 — 2 servers, Main)	CS Rel2 HP DL360PG8	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	2 x 300 GB 10K 1x DVD R/W	RAID 1 P420i / 512 MB	6	1x 460 WAC
Communication Manager — High Performance Duplex (303517 — 2 servers, Alternate)	CS Rel2 Dell R620	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	2 x 300 GB 10K 1x DVD R/W	RAID 1 P710i / 512 MB	6	1x 495 WAC
Session Manager (303563, NTL 303564, Main)	CS Rel2 HP DL360PG8	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	2 x 300 GB 10K 1x DVD R/W	RAID 1 P420i / 512 MB	4	1x 460 WAC
System Manager (303566, NTL303566, Alternate)	CS Rel2 Dell R620	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	2 x 300 GB 10K 1x DVD R/W	RAID 1 P710i / 512 MB	4	1x 495 WAC
System Manager (303565, NTL303566, Main)	CS Rel2 HP DL360PG8	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	2 x 300 GB 10K 1x DVD R/W	RAID 1 P420i / 512 MB	4	1x 460 WAC

Table continues…

Adopting Application (Main & Alternate if applicable)	Server	Size	Processor (Intel Xeon)	Number of CPU	Dynamic RAM	Hard Disk Drive	RAID	Number of Ports	Power Supply
System Manager (303565, NTL303565, Alternate)	CS Rel2 Dell R620	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	2 x 300 GB 10 K 1x DVD R/W	RAID 1 P710i / 512 MB	4	1x 495 WAC
Presence Services (303565, NTL303561, Main)	CS Rel2 HP DL360P G8	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	3x 300 GB 10 K 1x DVD R/W	RAID 1 P420i / 512 MB	4	2x 750 WAC
Presence Services (303562, NTL303562, Alternate)	CS Rel2 Dell R620	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	3x 300 GB 10 K 1x DVD R/W	RAID 1 P710i / 512 MB	4	2x 750 WAC
Application Enablement Services (303580)	CS Rel2 HP DL360P G8	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	2 x 300 GB 10 K 1x DVD R/W	RAID 1 P420i / 512 MB	4	1x 495 WAC
Solution for Midsize Enterprise / Collaboration (303560)	CS Rel2 Dell R620	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	4x 300 GB 10 K 1x DVD R/W	RAID 1 P710i / 512 MB	8	2x 750 WAC
Communication Manager Messaging — Federal Market (304210, Main)	CS Rel2 HP DL360P G8	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	3x 300 GB 10 K 1x DVD R/W	RAID 1 P420i / 512 MB	4	1x 460 WAC
Communication Manager Messaging — Federal Market (304211, Alternate)	CS Rel2 Dell R620	1U	E5–2630 2.3 Ghz 6–core Sandy Bridge	1	16 GB (4 GB RDIMM)	3x 300 GB 10 K 1x DVD R/W	RAID 1 P710i / 512 MB	4	1x 495 WAC

Common Server Release 2 specifications

Component	HP ProLiant DL360 PG8	Dell Power Edge R620
Form factor	1U	1U
Processor family	Intel (2.3 GHz - E5-2630)	Intel (2.3 GHz - E5-2630)
Number of processors	2	2
Memory type	4 GB RDIMM	4 GB RDIMM
Total memory	32GB	32GB
Hard Disk Drive	300GB Drives	300GB Drives
Number of Hard Disk Drive	2	2
RAID Level	1	1
Network interface	4	4
Optical drive	DVD+/-RW, SATA, INTERNAL	DVD+/-RW, SATA, INTERNAL
Power supply	495W	495W
Number of power supplies	2	2

Chapter 4: Branch gateways and integrated gateways

Avaya G250 Branch Gateway

The Avaya G250 Branch Gateway is an H.248 Branch Gateway managed by a server that has Communication Manager software installed on it. The Communication Manager Branch Gateways form part of Avaya solution for extending communication capabilities from the headquarters of an organization to all collaborative branch locations. The Communication Manager Branch Gateways help you provide the same high quality services to all organization members, regardless of their location.

Note:

The G250 Branch Gateway is no longer being sold.

Detailed description of G250 Branch Gateway

G250 Branch Gateway is a high-performance converged telephony and networking device that is located in small branch locations, providing all infrastructure needs such as telephone exchange and data networking in one box. You can use G250 Branch Gateway in small branch offices with two to eight stations. G250 Branch Gateway supports a maximum of two to 12 users. G250 Branch Gateway includes a VoIP engine, WAN router, and Power over Ethernet (PoE) LAN connectivity and supports legacy IP and analog telephones. In addition, the G250-DCP model supports DCP telephones.

G250 Branch Gateway integrates seamlessly with the following servers:

- S8800
- S8510
- S8300D
- HP ProLiant DL360 G7
- Dell™ PowerEdge™ R610
- HP ProLiant DL360p G8
- Dell™ PowerEdge™ R620

These servers run the Communication Manager call-processing software and provide to the small branch offices the same quality telephony services provided to the headquarters of the organization. The servers are installed at the headquarters and serve G250 Branch Gateway remotely.

G250 Branch Gateway can include an internal S8300D Server as a survivable remote server or as the main server for standalone deployment. As a survivable remote server, S8300D Server provides full Communication Manager functionality even when the connection with the server is lost.

If you do not want to use S8300D Serveras a survivable remote server, you can configure G250 Branch Gateway for standard local survivability (SLS). For more information, see Survivability on page 105.

You can connect personal computers, LAN switches, IP telephones, analog telephones, and trunks to G250 Branch Gateway through fixed analog and PoE ports on the chassis. A media module slot supports either of two WAN media modules for connection to a WAN.

G250 Branch Gateway has four models with different port combinations to support analog, BRI, T1/E1 trunks, or DCP telephones. For more information, see Models on page 66.

For more information about the features of G250 Branch Gateway, see *Overview of the Avaya G250 and G350 Media Gateways*, 03-300435.

G250 models

The G250 Branch Gateway is available in the following models:

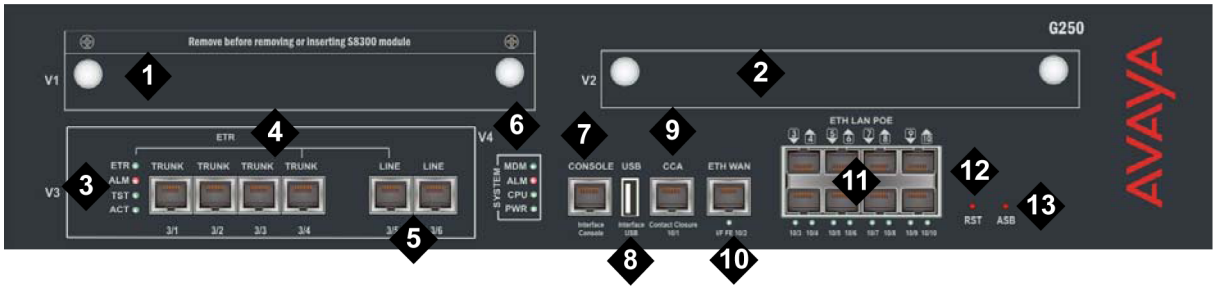
- Analog model (G250-Analog). The G250-Analog includes four analog trunk ports, two analog line ports, a Fast Ethernet WAN port, and eight PoE LAN ports.
- BRI model (G250-BRI). The G250-BRI includes two ISDN BRI trunk ports, one analog trunk port, two analog line ports, a Fast Ethernet WAN port, and eight PoE LAN ports.
- DCP model (G250-DCP). The G250-DCP provides 12 DCP (Digital Communications Protocol) ports, as well as four analog trunk ports, two analog line ports, a Fast Ethernet WAN port, and two LAN ports.

  Caution:

  The DCP ports on the G250-DCP are intended for in-building use only. Telephone lines connected to DCP ports are not to be routed out of the building. Failure to comply with this restriction could cause harm to personnel or equipment.
- DS-1 model (G250-DS-1). The G250-DS-1 provides a T1/E1 and a PRI trunk port that supports fractional T1/E1 and PRI. The G250-DS-1 also includes one analog trunk port, two analog line ports, a Fast Ethernet WAN port, and eight PoE LAN ports.

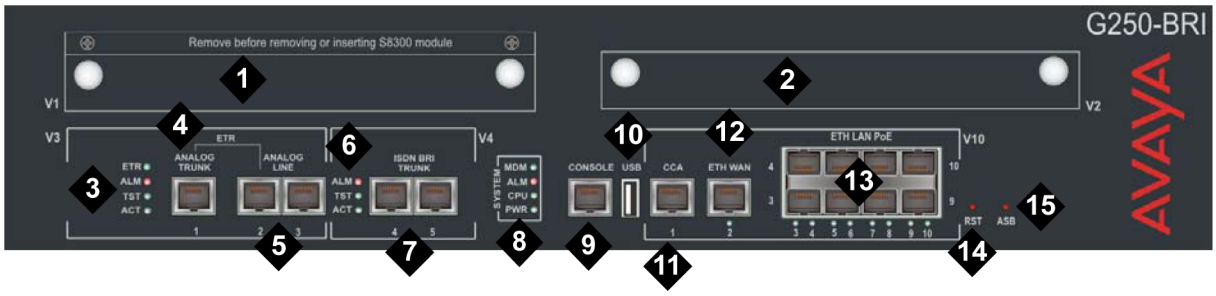
G250 components

Front panel of the Avaya G250 Analog Branch Gateway



Number	Description
1	V1 - ICC/LSP Slot
2	V2 - WAN Media Module Slot
3	Analog port LEDs
4	Analog trunks
5	Analog line ports
6	System LEDs
7	Console port
8	USB port
9	Contact Closure (CCA) port
10	Ethernet WAN (ETH WAN) port
11	PoE LAN (ETH LAN PoE) ports
12	Reset (RST) button
13	Alternate Software Bank (ASB) button

Front panel of the Avaya G250-BRI Branch Gateway

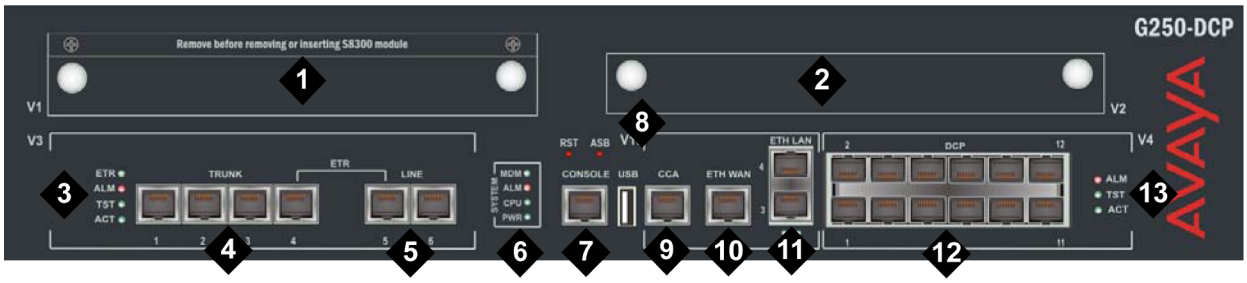


Number	Description
1	V1 - ICC/LSP Slot

Table continues…

Number	Description
2	V2 - WAN Media Module Slot
3	Analog port LEDs
4	Analog trunk
5	Analog line ports
6	ISDN BRI LEDs
7	ISDN BRI trunks
8	System LEDs
9	Console port
10	USB port
11	Contact Closure (CCA) port
12	Ethernet WAN (ETH WAN) port
13	PoE LAN (ETH LAN PoE) ports
14	Reset (RST) button
15	Alternate Software Bank (ASB) button

Front panel of the Avaya G250-DCP Branch Gateway

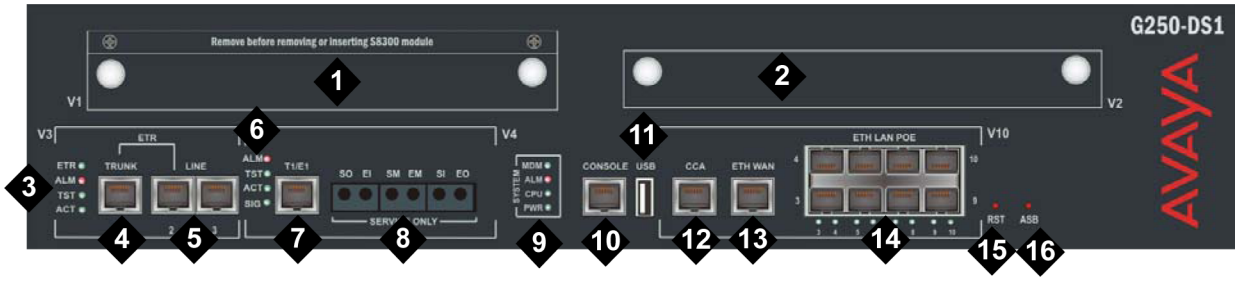


Number	Description
1	V1 - ICC/LSP Slot
2	V2 — WAN Media Module Slot
3	Analog port LEDs
4	Analog trunks
5	Analog line ports
6	System LEDs
7	Console port
8	USB port
9	Contact Closure (CCA) port
10	Ethernet WAN (ETH WAN) port
11	ETH LAN ports

Table continues…

Number	Description
12	DCP ports
13	DCP port LEDs

Front panel of the Avaya G250-DS1 Branch Gateway



Number	Description
1	V1 — ICC/LSP Slot
2	V2 — WAN Media Module Slot
3	Analog port LEDs
4	Analog trunk
5	Analog line ports
6	T1/E1/PRI trunk interface LEDs
7	T1/E1 interface
8	Service
9	System LEDs
10	Console port
11	USB port
12	Contact Closure (CCA) port
13	Ethernet WAN (ETH WAN) port
14	PoE LAN (ETH LAN PoE) ports
15	Reset (RST) button
16	Alternate Software Bank (ASB) button

G250 fixed ports and buttons

Port/Button	Description
TRUNK	Four analog trunk ports (G250-Analog Branch Gateway, G250-DCP Branch Gateway) or one analog trunk port (G250-BRI Branch Gateway, G250-DS-1 Branch Gateway). These fixed trunk

Table continues…

Port/Button	Description
	ports support loop-start, DIOD (for Japan only) trunks and caller ID detection.
LINE	Two analog telephone ports. An analog relay provides Emergency Transfer Relay (ETR) feature. For the G250-Analog and G250-DCP, the relay is between TRUNK port 3/4 and LINE port 3/5. For the G250-BRI and G250-DS-1, the relay is between TRUNK port 3/1 and LINE port 3/2. Also used for incoming analog DID trunks with either wink-start or immediate start. The G250 integrated analog line ports support three ringer loads, which is the ringer equivalency number (REN), for the following loop lengths: • 20,000 feet (6096 meters) over 0.65 mm (.025 in.) wire (22 AWG) • 16,000 feet (4877 meters) over 0.5 mm (.02 in.) wire (24 AWG) • 10,000 feet (3048 meters) over 0.4 mm (.016 in.) wire (26 AWG) At .1 or less REN ringer loads, the supported loop length is 20,000 feet (6096 meters) at 22, 24, and 26 AWG.
ISDN BRI TRUNK (G250-BRI Branch Gateway)	Two 4 wire S/T ISDN BRI (Basic Rate Interface) 2B +D access ports with RJ-45 jacks. Each port interfaces to the central office at the ISDN T reference point. The ISDN BRI trunk ports do not support: • BRI stations • Combining both B channels together to form a 128-kbps channel
CONSOLE	Console RS-232 interface port for direct connection of CLI console. RJ-45 connector.
USB	USB port. Supports the connection of • USB flash drive • USB externally powered hub • The Multitech MultiModemUSB MT5634ZBA-USB-V92 USB modem.
CCA	RJ-45 port for ACS (308) contact closure adjunct box.

Table continues…

Port/Button	Description
ETH WAN	RJ-45 10/100 Base TX Ethernet port for connection to a cable or DSL broadband modem/router.
ETH LAN POE (G250-Analog, G250-BRI, and G250-DS-1)	Eight Power over Ethernet (PoE) LAN ports with 80 watts (aggregated for all ports) for connecting IP phones or any Ethernet devices, such as PCs.
RST	Reset button. Resets chassis configuration.
ASB	Alternate Software Bank button. Reboots the G250 with the software image in the alternate bank.
DCP (G250-DCP)	12 DCP ports. These DCP ports are intended for in-building use only. The G250-DCP ports support a loop length as follows: • 5500 feet (1676 meters) over 0.65 mm (.025 in.) wire (22 AWG) • 3500 feet (1067 meters) over 0.5 mm (.02 in.) wire (24 AWG) • 2200 (671 meters) over 0.4 mm (.016 in.) wire (26 AWG
T1/E1 port (G250-DS-1)	For T1, this port is capable of supporting inband signalling across all 24 channels (supports a maximum bandwidth of 1.536 mbps). For E1, this port is capable of supporting R2MFC signalling across all 30 channels (supports a maximum bandwidth of 1.92 mbps).
PRI ports (G250-DS-1)	The PRI ports are capable of supporting PRI signalling for 23 or 30 bearer channels. NFAS signalling is not supported.

G250 specifications

G250 Branch Gateway Specifications

Table 1: Avaya Branch Gateway G250 specifications

Description	Value
Height	3.5 in. (88 mm, 2U)
Width	17.3 in. (440 mm)
Depth	13.4 in. (340 mm)
Weight of empty chassis	22 lb. (10 kg)
Ambient working temperature	32° to 104°F (0° to 40°C)
Operation altitude	up to 10,000 ft. (3,048 m)

Table continues…

Description	Value
Front clearance	2.5 in. (6.4 cm)
Rear clearance	2.5 in. (6.4 cm)
Humidity	10 to 90% relative humidity
Voltage	90 to 264 VAC, 47-63 Hz
Power rating	823 BTU/h (241 W)
Max current	2.4 A

Power cord specifications

Following are specifications for power cords suitable for use with the gateway:

For North America:

The cord set must be UL Listed/CSA Certified, 18 AWG, 3-conductor (3rd wire ground), type SJT. One end is to be terminated to an IEC 60320, sheet C13 type connector rated 10A, 250V. The other end is to be terminated to either a NEMA 5-15P attachment plug for nominal 125V applications or a NEMA 6-15P attachment plug for nominal 250V applications.

For Outside North America:

The cord must be VDE Certified or Harmonized (HAR), rated 250V, 3-conductor (3rd wire ground), or 0.75 mm^2 minimum conductor size. The cord is to be terminated at one end to a VDE Certified/CE Marked IEC 60320, sheet C13 type connector rated 10A, 250V and the other end to a 3-conductor grounding type attachment plug rated at a minimum of 10A, 250V and a configuration specific for the region/country in which it is used. The attachment plug must bear the safety agency certifications mark(s) for the region/country of installation..

Note that the G250 Branch Gateway relies on two ground connections. These connections are a mains plug with an earth contact and a permanent Supplementary Ground Conductor. Because of unreliable earthing concerns in Finland, Norway, and Sweden, the G250 Branch Gateway must be installed in a Restricted Access Location (RAL). Only trained service personnel or customers can access the RAL. Trained service personnel are aware of the reasons for the restricted access and any safety precautions that must be taken. In these scenarios, the personnel or customers must use a lock and key or other means of security when they access the G250 Branch Gateway.

Supported modules

The gateway supports the following modules only:

- S8300 gateway in slot V1
- MM340 in slot V2
- MM342 in slot V2

Survivability for G250 Branch Gateway

The G250 Branch Gateway supports Standard Local Survivability (SLS) that is a configurable software module. With SLS, a local G250 can provide a core set of gateway Controller functions when no link is available to the server, a Survivable Remote Server, or a Survivable Core Server

(Enterprise Survivable Server). SLS is configured on a system-wide basis using the new Provisioning and Installation Manager (PIM), or an individual G250 using the command line interface (CLI).

SLS is supported as follows on the G250 Branch Gateway:

- G250-Analog: SLS supported for all analog interfaces, IP phone, and IP Softphone
- G250-BRI: SLS supported for all analog interfaces, ISDN BRI trunk interfaces, IP phone, and IP Softphone
- G250-DCP: SLS supported for all analog and DCP interfaces, IP phone, IP Softphone, and DCP phone
- G250-DS-1: SLS supported for all analog interfaces, ISDN PRI trunk interfaces, non-ISDN digital DS-1 trunk interfaces, IP phone, and IP Softphone

G250 Branch Gateway high-level capacities

The following table outlines the capacities of various G250 services.

Note:

Some capacities might change. For the most up-to-date list, see *Avaya Aura® Communication Manager System Capacities Table*, 03-300511.

Description	Capacity	Comments
Gateway Limits		
Maximum number of G250 Branch Gateways controlled by an external S8510 or S8800 Server	250	This number also applies if a combination of Avaya G250/G350/G430/G450/G650/G700 gateways are controlled by the same external S8xxx server.
Maximum number of G250 Branch Gateways controlled by an external S8300D Server housed in a G430/ G450/G650/G700 gateway	50	
Servers registered as Branch Gateway Controllers. If an MGC becomes unavailable, the G250 uses the next MGC on the list.	4	The built-in SLS module can be considered a fifth MGC, although its functionality is more limited than that of a full scale server.
Media module slots	2	One S8300D Server slot (V1) for insertion of S8300D only. One WAN media module slot (V2) for insertion of a WAN media module only.
Maximum number of WAN media modules	1	Always in slot V2.
Maximum number of voice media modules	0	

Table continues…

Description	Capacity	Comments
Maximum total number of telephones supported by the G250	14	
Maximum number of IP phones	12	Limited by the number of VoIP resources used and the calling patterns (VoIP to VoIP conferencing, VoIP to non-VoIP etc.)
Maximum number of analog phones	2	
Maximum number of DCP phones	12	G250-DCP only. None in the other G250 models.
Maximum number of BRI endpoints	0	
1 facilities	1 T1/E1	G250 DS-1 only. None in the other G250 models.
Maximum number of all trunks of any type	4 (5 on G250-BRI, 10 on G250-DS-1)	
Maximum number of G250 analog trunks	4 (Analog, G250-DCP)1 (G250-BRI, G250-DS-1)	All ports are fixed.
Maximum number of BRI trunks	2 (G-250 BRI only)	Four voice channels, two D-channels.
Maximum number of E1/T1 voice trunks	1	G250-DS-1 only. None in the other G250 models.
Simultaneous two-way conversations from IP phone to legacy telephone or trunk	10 (Analog, G250-BRI) 16 (G250-DCP, G250-DS-1)	True for all codecs (G.711, G.729a, G.726, G.723), and all encryption combinations.
Miscellaneous		
Fax capacity	4	Simultaneous fax transmissions using VoIP resources
Touch-tone recognition (TTR)	8	Receivers
Tone Generation	As much as necessary for all TDM calls	
Announcements (VAL)	6 playback channels for playing announcements. 15 minutes for either G711-quality stored announcements or music-on-hold.	

Avaya G350 Branch Gateway

The Avaya G350 Branch Gateway is an Avaya solution for extending high-quality communication capabilities from the headquarters of an organization to all collaborative branch locations.

Note:

The G350 Branch Gateway is no longer being sold.

Detailed description of G350 Branch Gateway

G350 Branch Gateway is a high-performance converged telephony and networking device located at a small branch office that provides all infrastructure needs in one box including telephone exchange and data networking. G350 Branch Gateway is designed for use in an 8 to 72 user environment, aimed at branch offices with 16 to 40 stations. G350 Branch Gateway features a VoIP engine, a WAN router, and a Power over Ethernet LAN switch and provides full support for IP, DCP, and analog telephones.

G350 Branch Gateway integrates seamlessly with the following servers:

- S8800
- S8510
- S8300D
- HP ProLiant DL360 G7
- Dell™ PowerEdge™ R610
- HP ProLiant DL360p G8
- Dell™ PowerEdge™ R620

These servers run Communication Manager call processing software to provide the same quality telephony services to the small branch office as to the headquarters of the organization. The server can be located at the headquarters and serve G350 Branch Gateway remotely.

Alternatively, G350 Branch Gateway can house S8300D Server as a survivable remote server or as the main server for standalone deployment. As an alternative to the survivable remote server, G350 Branch Gateway can instead be configured for standard local survivability (SLS). See Survivability on page 105.

In addition to advanced and comprehensive telephony services, G350 Branch Gatewayprovides full data networking services, precluding the need for a WAN router or LAN switch.

G350 Branch Gateway is a modular device, adaptable to support different combinations of endpoint devices. Pluggable media modules provide interfaces for different types of telephones and trunks. A combination is selected to suit the needs of the branch office.

A LAN media module with Ethernet ports that are PoE standard compliant provides support for IP telephones as well as all other types of data devices. A range of telephony modules provides full support for legacy equipment such as analog and digital telephones.

For more information about features of G350 Branch Gateway, see *Overview of the Avaya G250 and G350 Media Gateways*, 03-300435.

G350 configurations

Deployment modes

The G350 Branch Gateway is a modular device with multiple configuration possibilities to meet specific individual needs. Six slots in the G350 Branch Gateway chassis house a customized selection of media modules. These media modules connect to different types of circuit switched phones, trunks, and data devices. One of the slots can house an internal server. A major configuration option is of which type of server to deploy. The server can be a media module or a stand-alone device.

The G350 Branch Gateway can be deployed in one of two basic working modes:

- Distributed Communication Manager Branch Gateways. In this mode, an external server controls the G350 Branch Gateway. This can be a stand-alone server, such as the S8510 or the S8800 server, or a separate gateway in a stand-alone configuration.

  The G350 Branch Gateway can also house an S8300D Server module to function as a Survivable Remote Server (Local Survivable Processor). This Survivable Remote Server can take over control of the G350 Branch Gateway if the external server stops serving the G350 Branch Gateway. For a summary of how the Survivable Remote Server in a G350 works, see S8300D Server in a Survivable Remote Server configuration on page 38.

- Stand-alone. In this mode, an internally housed S8300D Server module controls the G350 Branch Gateway. See Avaya S8300 Server on page 30.

Multiple G350 Branch Gateways can be deployed in many remote branches of a large organization. Large branches or main offices can deploy an Avaya G450 or G700 Branch Gateway, which provides similar functionality to the G350 for a larger number of users. Up to 50 G350, G430, G450, and G700 Branch Gateways can be controlled by a single S8300D Server housed in a G450 or G700 Branch Gateway. Up to 250 G250, G350, G430, G450, and G700 Branch Gateways can be controlled by a single S8510 or S8800 Server.

Expanded capacity and multiple G350 gateways in a branch

You can deploy multiple G350 Branch Gateways in branch offices and benefit from increased capacities and additional configuration options. Beginning with Communication Manager Release 3.1, the advanced mode in Avaya Solution Designer reflects these additional capacities. Using the Solution Designer, you can build a G350 configuration and verify that it meets system resource limitations.

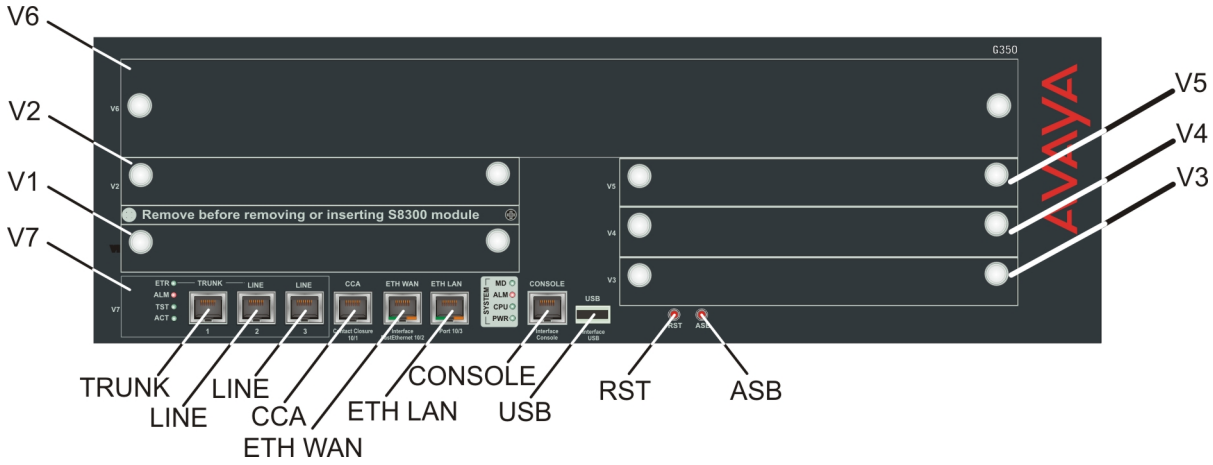
You can use the G350 Branch Gateway with a S8300B as a primary server for up to five G250 or G350 Branch Gateways. You can install any combination of media modules. These configurations are subject to traffic engineering rules. For more information, see the G350 Branch Gateway high-level capacities section.

Note:

Maximum capacities depend on the specific configuration of the branch gateway. Verify your planned configuration with Avaya Solution Designer.

G350 components

G350 chassis



The chassis features:

- Six media module slots, V1 to V6
- Fixed ports and buttons, including embedded analog media module V7.

G350 fixed ports and buttons

Port/Button	Description
TRUNK	An analog trunk port. Part of an integrated analog media module. The fixed trunk port supports loop-start, ground-start, CAMA, and DIOD (for Japan only) trunks.
LINE	Two analog telephone ports of the integrated analog media module. An analog relay between TRUNK port 7/1 and the furthest left LINE port 7/2 provides Emergency Transfer Relay (ETR) feature. Also used for incoming analog DID trunks. The G350 integrated analog line ports support three ringer loads, which is the ringer equivalency number (REN), for the following loop lengths: • 20,000 feet (6096 meters) over 0.65 mm (.025 in.) wire (22 AWG) • 16,000 feet (4877 meters) over 0.5 mm (.02 in.) wire (24 AWG) • 10,000 feet (3048 meters) over 0.4 mm (.016 in.) wire (26 AWG)

Table continues…

Port/Button	Description
	At .1 or less REN ringer loads, the supported loop length is 20,000 feet (6096 meters) at 22, 24, and 26 AWG.
CCA	RJ-45 port for ACS (308) contact closure adjunct box.
ETH WAN 1	RJ-45 10/100 Base TX Ethernet WAN port.
ETH LAN 1	RJ-45 10/100 Base TX Ethernet LAN port.
CONSOLE	Console port for direct connection of CLI console. RJ-45 connector.
USB	USB port. Supports the connection of • USB flash drive • USB externally powered hub • The Multitech MultiModemUSB MT5634ZBA-USB-V92 USB modem.
RST	Reset button. Resets chassis.
ASB	Alternate Software Bank button. Reboots the G350 with the software image in the alternate bank.

G350 specifications

G350 Branch Gateway specifications

Table 2: Avaya Branch Gateway G350 specifications

Description	Value
Height	5.25 in. (133.3 mm)
Width	19 in. (482.6 mm)
Depth	15.75 in. (400 mm)
Weight of empty chassis	19.8 to 22.1 lb. (9 to 10 kg)
Ambient working temperature	32° to 104°F (0° to 40°C)
Operation altitude	up to 6,560 ft. (2000 m)
Front clearance	12 in. (30 cm)
Rear clearance	18 in. (45 cm)
Humidity	10-90% relative humidity
Voltage	90 to 264 VAC, 47-63 Hz, 7 A Max
Power rating	1038 BTU/h (304 W)
Max current	6 A

Power cord specifications

Following are specifications for power cords suitable for use with the gateway.

For North America:

The cordset must be UL Listed/CSA Certified, 16 AWG, 3-conductor (3rd wire ground), type SJT. One end is to be terminated to an IEC 60320, sheet C13 type connector rated 10A, 250V. The other end is to be terminated to either a NEMA 5-15P attachment plug for nominal 125V applications or a NEMA 6-15P attachment plug for nominal 250V applications.

For Outside North America:

The cord must be VDE Certified or Harmonized (HAR), rated 250V, 3-conductor (3rd wire ground), 1.0 mm^2 minimum conductor size. The cord terminates at one end to a VDE Certified/CE Marked IEC 60320, sheet C13 type connector rated 10A, 250V. The cord's other end terminates to a 3-conductor grounding type attachment plug rated at a minimum of 10A, 250V. The configuration is specific for the region/country in which the cord is used. The attachment plug must bear the safety agency certifications mark(s) for the region/country of installation.

The G350 Branch Gateway relies on two ground connections. These connections are a mains plug with an earth contact and a permanent Supplementary Ground Conductor. Because of unreliable earthing concerns in Finland, Norway, and Sweden, the G350 Branch Gateway must be installed in a Restricted Access Location (RAL). Only trained service personnel or customers can access the RAL. They know the reasons for the restricted access and any safety precautions that must be taken. In these cases, these personnel or customers must use a lock and key or other means of security when they access the G350 Branch Gateway.

G350 related hardware

Supported media modules in the G350

Avaya media modules convert the voice path of the traditional circuits, such as analog trunk, T1/E1, and DCP to a TDM bus. The VOIP engine then converts the voice path from the TDM bus to packetized VoIP, compressed or uncompressed, on an Ethernet connection.

The media modules reside in the G350 Branch Gateway and interact with the motherboard and backplane.

Note:

For stand-alone mode, the S8300D Server is inserted into slot V1. See Avaya S8300 Server on page 30.

There are nine telephony media modules:

- MM710 T1/E1 ISDN PRI – For information, see BROKEN LINK: MM710 T1/E1 Media Module.
- MM711 Analog – For information, see BROKEN LINK: MM711 Analog Media Module.
- MM712 DCP – For information, see MM712 DCP Media Module on page 198.
- MM714 Analog – For information, see BROKEN LINK: MM714 Analog Media Module.

- MM716 Analog – For information, see BROKEN LINK: MM716 Analog Media Module
- MM717 DCP – For information, see BROKEN LINK: MM717 DCP Media Module.
- MM720 BRI – For information, see BROKEN LINK: MM720 BRI Media Module.
- MM722 BRI – For information, see BROKEN LINK: MM722 BRI Media Module.
- MM312 DCP – For information, see MM312 DCP Media Module on page 195.

There are two WAN media modules:

- MM340 T1/E1 WAN – For information, see MM340 E1/T1 data WAN Media Module on page 204.
- MM342 USP WAN – For information, see MM342 USP data WAN Media Module on page 205.

There are two LAN media modules:

- MM314 – For information, see MM314 LAN Media Module on page 196.
- MM316 – For information, see MM316 LAN Media Module on page 196

For more information about the G350 Branch Gateway, see *Overview of the Avaya G250 and G350 Media Gateways*, 03-300435.

Survivability for G350 Branch Gateway

The G350 Branch Gateway supports Standard Local Survivability (SLS) that is a configurable software module. With SLS, a local G350 can provide a core set of Media Gateway Controller functions when no link is available to the server, a Survivable Remote Server, or a Survivable Core Server (Enterprise Survivable Server). SLS is configured on a system-wide basis using the new Provisioning and Installation Manager (PIM), or an individual G350 using the command line interface (CLI).

SLS is supported as follows on the G350 Branch Gateway:

- G350 with C/S (hardware vintage) 3.0 and up: SLS supported for all analog interfaces, ISDN BRI/PRI trunk interfaces, non-ISDN digital DS-1 trunk interfaces, IP phone, IP Softphone, and DCP phone.

G350 Branch Gateway high-level capacities

The following table outlines the capacities of various G350 services.

Note:

Some capacities might change. For the most up-to-date list, see *Avaya Aura® Communication Manager System Capacities Table*, 03-300511.

Description	Standard Configuration	Enhanced Configuration	Comments
Gateway Limits			
Maximum number of G350 Branch Gateways controlled by an S8510 or S8800 Server	250		This number also applies if the same external S8xxx server controls a combination of Avaya G700/G650/ G450/G430/G350/G250 gateways.
Maximum number of G350 Branch Gateways controlled by an S8300D Server housed in a G450/ G700 Branch Gateway	50		
Maximum number of G350 or G250 Branch Gateways controlled by an S8300D Server housed in a G350 Branch Gateway.	5		An S8300D housed in a G350 can also control Multitech gateways.
Maximum number of telephones supported by the G350	40	72	Limited by the physical hardware resources and what is supported in Avaya Solution Designer
Maximum number of IP telephones per G350 Branch Gateway	40	72 (using an external switch)	Limited by the physical hardware resources and what is supported in Avaya Solution Designer
Maximum number of analog phones per G350 Branch Gateway	40	72	
Maximum number of DCP phones per G350 Branch Gateway	40	72	
Maximum number of BRI endpoints per G350 Branch Gateway	16	64	Up to three MM720 BRI Media Modules can be inserted in any standard media module slots.
Simultaneous two-way conversations from IP phone to legacy telephone or trunk.	32 – G.711 16 – G.729a, G. 726		Simultaneous two-way conversations limited by the VoIP engine, including call progress tones.
Transcoding from G.711 to G.729 IP phones	16		Simultaneous two-way conversations.
Transcoding from TDM phones to G.729 IP phones	16		Simultaneous 2-way conversations. For TDM transcoding, the number of 16 applies to conversations where one end of each conversation is on a G350 and transcoding occurs for that endpoint on the G350. If transcoding must occur on both ends of the

Table continues…

Description	Standard Configuration	Enhanced Configuration	Comments
			conversation, the number of conversations is 10.
Maximum number of BRI trunks	16	32	Up to three MM720 BRI Media Modules can be inserted in any G350 media module slots.
Maximum number of PSTN trunks	24 (T1) 30 (E1)	48 (T1) 60 (E1)	Up to three MM711 Media Modules can be inserted into standard media module slots and used as trunks. The base unit has one analog trunk port. A full E1/T1 trunk group is supported for PSTN. An additional 15 IP trunks are also supported.
Miscellaneous			
Fax capacity	8		Simultaneous fax transmissions using VoIP resources
Touch-tone recognition (TTR)	15		
Tone Generation	15		
Announcements (VAL)	6 Playback 1 Record		

Avaya G430 Branch Gateway

The Avaya G430 Branch Gateway is a multipurpose branch gateway targeting small and medium branches of 1 to 150 users. The G430 Branch Gateway supports two expansion modules to support varying branch office sizes. It works in conjunction with IP telephony Communication Manager software running on Avaya S8xxx Servers to help deliver intelligent communications to enterprises of all sizes.

The G430 Branch Gateway combines telephone exchange and data networking by providing PSTN toll bypass and routing data and VoIP traffic over WAN. The G430 Branch Gateway features a VoIP engine, an optional WAN router, and Ethernet LAN connectivity. The G430 Branch Gateway provides full support for Avaya IP and digital telephones as well as analog devices such as modems, fax machines, and telephones.

Detailed description of G430 Branch Gateway

G430 Branch Gateway can support up to 150 users in a medium or large branch office of a large enterprise or a call center. The configuration requires the Communication Manager IP telephony

software running on one or more Avaya S8xxx servers. G430 Branch Gatewaywith S8300D Server supports 150 users.

An S8xxx server operating either as an External Call Controller (ECC) or as an Internal Call Controller (ICC) supports telephone services on G430 Branch Gateway. G430 Branch Gateway supports S8300D Server as an ICC or as an ECC when S8300D Server is installed in another G430 Branch Gateway. G430 Branch Gateway also supports S8800 Server, duplex, and S8510 Server as ECCs.

You can use an ICC and an ECC with the ICC installed as a survivable remote server (Local Survivable Processor) to take over call control if the ECC fails or the WAN link between the branch office and main location breaks. The survivable remote server provides full-featured telephone service survivability for the branch office. G430 Branch Gateway also includes standard local survivability (SLS), which provides basic telephone services when the connection with the primary ECC is lost.

G430 Branch Gateway is a scalable device with a basic configuration consisting of one power supply unit (PSU), 256 MB RAM, and a single on-board DSP that has the capacity of supporting 25 VoIP channels for G.711 or G.726, 20 VoIP channels for G.729, or a combination of both. You can enhance this configuration by adding a MP10, MP20, or MP80 VoIP module. You can also replace the 256 MB of RAM with 512 MB of RAM and use an external compact flash to increase the number of announcement files from 256 to 1024.

G430 Branch Gateway is a modular device that can support different combinations of endpoint devices. While fixed front panel ports support the connection to external LAN switches, network data ports, Ethernet WAN lines, and external routers, three slots are available for plugging in optional media modules. You can connect two EM200 expansion modules to G430 Branch Gateway, providing two media module slots each, increasing the number of available media module slots to seven.

Pluggable media modules provide interfaces for different types of telephones and trunks. You can select a combination to suit the needs of the branch office. A range of telephony modules provides full support for legacy equipment such as analog and digital telephones. IP telephones are supported through an external LAN switch.

G430 Branch Gateway includes a field replaceable RAM memory card and a DSP childboard.

G430 Branch Gateway chassis includes field replaceable RAM, DSPs, PSUs, fan tray, and main board module for enhanced reliability.

For more information on G430 Branch Gateway, *Overview for the Avaya G430 Branch Gateway*.

Minimum firmware requirements for G430

		v1a	v2a (MP120 Preinstalled)	Comments	Recommended CM Version - Older versions of CM will work
BGW 5.0	27.31.0	Yes	No		CM 5.0 (SP)
BGW 5.1	28.27.0	Yes	No		CM 5.1 (SP)
BGW 5.2	29.24.0	Yes	No	No BGW support MP120	CM 5.2 (SP)
BGW 5.2.1	30.28.0	Yes	No	No BGW support MP120	CM 5.2.1(SP 16) or higher (CM blocks more than 105 channels)
BGW 6.1	31.26.0	Yes	No	No BGW support MP120	CM 6.0.1 (CM blocks more than 105 channels)
BGW 6.2.1	32.26.0	Yes	No	No BGW support MP120	AA 6.2 FP1 CM 6.2 sp 4 — Dec 2012 (CM blocks more than 105 channels)
BGW 6.3	33.13.0	Yes	No	No BGW support MP120	AA 6.2 FP2 CM 6.3 — May 2013 (CM supports all 120 channels)
BGW 6.3.1	34.6.0	Yes	No	No BGW support MP120	AA6.2 FP3 CM6.3.2 — Oct 2013 (CM supports all 120 channels)
BGW 6.3.5	35.x.y	Yes	Yes	MP120 Support V150.1 Features	AA 6.2 FP3 CM 6.3.2 + (CM supports all 120 channels)
BGW 6.3.6 JITC	36.x.y	Yes	Yes		AA 6.2 FP 4 CM 6.3.6 AA 6.2 FP3 CM 6.3.2 + (CM supports all 120 channels)

G430 Branch Gateway features

Note:

Certain features are supported in IPv4 only.

- Hardware features:
  - 3-slot chassis (three slots for media modules)
  - Two EM200 expansion modules, each providing two slots each for media modules

- Hot-swappable media modules
- Support for hot-swappable external compact flash
- VoIP DSPs (up to 105 channels)
- Memory SoDIMMs

- Voice features:
  - H.248 gateway
  - Voice line interfaces:
    - IP phones
    - Analog phones
    - Avaya DCP phones
    - BRI Phones
    - FXS/Fax
    - VoIP
    - Fax and modem over IP
  - Voice trunk interfaces:
    - FXO
    - BRI
    - T1/E1
  - Supported CODECs: G.711A/µLaw, G.729a, G.726
  - Survivability features for continuous voice services:
    - Local Survivable Processor (LSP) (with S8300)
    - Standard Local Survivability (SLS) (IPv4 only)
    - Emergency Transfer Relay (ETR)
    - Modem Dial Backup
    - Dynamic Call Admission Control (CAC) for Fast Ethernet and GRE tunnel interfaces
    - Inter-Gateway Alternate Routing (IGAR)
  - DHCP and TFTP server to support IP phones images and configuration (IPv4 only)
  - Announcements support
  - Contact Closure support
- Routing and WAN features:

  Note:

  IPv6 is not supported on the WAN.

  - One WAN 10/100 Ethernet port with traffic shaping capabilities

  - PPPoE (IPv4 only) and PPP (IPv4 only)
  - Routing Protocols: Static, OSPF, RIP
  - VRRP (IPv4 only)
  - Equal Cost Multi Path routing (ECMP)
  - IPSec VPN
  - cRTP
  - WAN Quality of Service (QoS)
  - Policy-based routing
  - DHCP relay
  - GRE tunneling
  - Dynamic IP addressing (DHCP client/PPPoE)
  - Object tracking
  - Backup Interface
- LAN features:
  - Two LAN 10/100 RJ-45 Ethernet ports (w/o POE)
  - Auto-negotiation
  - 2K MAC table with aging
  - 8 VLANs
  - Multi-VLAN binding, 802.1Q support
  - Ingress VLAN Security
  - Broadcast/Multicast storm control
  - Automatic MAC address aging
  - Rapid Spanning Tree
  - Port mirroring
  - RMON statistics
  - Port redundancy
  - LLDP (IPv4 only)
- Security hardened gateway features:
  - Media and signaling encryption
  - Secured management
  - Digitally signed gateway firmware
  - Managed security service support
  - Access list support

- Management features:
  - Avaya Device Manager
  - Embedded Web Manager (IPv4 only)
  - RADIUS Authentication support (IPv4 only)
  - SNMPv1 traps and SNMPv3 notifications
  - SNMPv1 and SNMPv3 servers support
  - Telnet (IPv4 only) and SSHv2 support
  - SCP, TFTP, and FTP clients
  - Syslog client
  - Modem access for remote administration
  - Packet Sniffing
  - RTP-MIB
  - Backup and Restore on USB Flash drive

G430 components

Front panel of G430

Number	Description
1	System LEDs
2	RST button
3	ASB button
4	USB ports
5	CCA (Contact Closure) port
6	Services port
7	ETH WAN port
8	ETH LAN ports
9	Compact Flash slot

Table continues…

Number	Description
10	V1 — slot for standard media module or S8300D Server
11	V2 — slot for standard media module
12	V3 — slot for standard media module

G430 fixed ports and buttons

Port/Button	Description
CCA	RJ-45 port for ACS (308) contact closure adjunct box.
ETH WAN	One 10/100 Base TX Ethernet WAN port. RJ-45 connectors.
ETH LAN	Two 10/100 Base TX Ethernet LAN ports. RJ-45 connectors.
SERVICES	Ethernet 10/100 port for services and maintenance access. RJ-45 connector.
USB	Two USB ports with USB connectors.. Supports the connection of • USB flash drive (no more than one USB flash drive can be connected) • The Multitech MultiModemUSB MT5634ZBA-USB-V92 USB modem (no more than one USB modem can be connected) •
RST	Reset button. Resets chassis configuration.
ASB	Alternate Software Bank button. Reboots the G430 with the software image in the alternate bank.

Front panel of EM200

Figure 1: EM200 front panel

G430 specifications

G430 Branch Gateway specifications

Table 3: Avaya Branch Gateway G430 specifications

Description	Value
Height	2.62 in. (66.5 mm)
Width	19 in. (482.6 mm)
Depth	12.8 in. (325 mm)
Weight of empty chassis	under 11 pounds (under 5 Kg)
Weight of chassis with basic configuration	between 13 and 14 pounds (between 6 and 7 Kg)
Ambient working temperature	32° to 104°F (0° to 40°C)
Storage temperature	–40°F to 150°F (–40°C to 66°C)
Operation altitude	up to 10,000 ft. (3000 m)
Front clearance	12 in. (30 cm)
Rear clearance	18 in. (45 cm)
Humidity	10-90% relative humidity, non-condensing
Voltage	90V to 264V AC, 48 to 63 Hz
Power rating	800 BTU/h (234 W)
Max current	2.4 A

Power cord specifications

Following are specifications for power cords suitable for use with the gateway.

For North America:

The cordset must be UL Listed/CSA Certified, 16 AWG, 3-conductor (3rd wire ground), type SJT. One end is to be terminated to an IEC 60320, sheet C13 type connector rated 10A, 250V. The other end is to be terminated to either a NEMA 5-15P attachment plug for nominal 125V applications or a NEMA 6-15P attachment plug for nominal 250V applications.

For Outside North America:

The cord must be VDE Certified or Harmonized (HAR), rated 250V, 3-conductor (3rd wire ground), 1.0 mm^2 minimum conductor size. The cord is to be terminated at one end to a VDE Certified/CE Marked IEC 60320, sheet C13 type connector rated 10A, 250V and the other end to a 3-conductor grounding type attachment plug rated at a minimum of 10A, 250V and a configuration specific for the region/country in which it will be used. The attachment plug must bear the safety agency certifications mark(s) for the region/country of installation.

G430 Media module specifications

Description	Value
Height	0.79 in. (2 cm)
Width	6.69 in. (17 cm)
Depth	12.20 in. (31 cm)
Weight	0.7-0.9 lb. (300-400 grams)

Supported media modules in the G430

Media module	Description	Comment
S8300 C/D	Communication Manager server	In slot V1 only
Telephony media modules		
MM711	8 universal analog ports	
MM714	4 analog telephone ports and 4 analog trunk ports	
MM714B	4 analog telephone ports, 4 analog trunk ports, and an emergency transfer relay	
MM716	24 analog ports	
MM712	8 DCP telephone ports	
MM717	24 DCP telephone ports	
MM710 MM710B	1 T1/E1 ISDN PRI trunk port	
MM720	8 ISDN BRI trunk or endpoint (telephone or data) ports	
MM721	8 ISDN BRI trunk or endpoint (telephone or data) ports	
MM722	2 ISDN BRI trunk ports	

Media module slot configurations in G430

When choosing a combination of media modules to install in the G430 chassis and EM200 expansion modules, consider the slots in which each module type can be inserted and the limitations and recommendations regarding combinations of media modules.

The G430 chassis has three media module slots marked V1, V2, and V3 (see G430 physical description). The two optional EM200 expansion modules have two media module slots each (see EM200 physical description). The slots of the EM200 connected to the EXPANSION OUT 1 connector on the rear of the G430 are slots V5 and V6, and the slots of the EM200 connected to the EXPANSION OUT 2 connector on the rear of the G430 are slots V7 and V8. Each media module is restricted to certain slots:

Table 4: Permitted slots for media modules

Media Module	Permitted slots
MM710, MM710B	Any media module slot V1-V3, V5-V8
MM711	Any media module slot V1-V3, V5-V8
MM712	Any media module slot V1-V3, V5-V8
MM714, MM714B	Any media module slot V1-V3, V5-V8
MM716	Any media module slot V1-V3, V5-V8
MM717	Any media module slot V1-V3, V5-V8
MM720	Any media module slot V1-V3, V5-V8
MM721	Any media module slot V1-V3, V5-V8
MM722	Any media module slot V1-V3, V5-V8
S8300D C/D	V1

VOIP Modules in G430

A media processor or a VOIP module provides the resources/channels to support voice, modem, fax calls over IP.

G430 supports the VOIP modules listed in the table below:

VOIP Modules	Description
MP10	Supports a maximum of 10 channels.
MP20	Supports a maximum of 20 channels • Provides 25 VOIP channels for G.711 and G.726 • Provides 20 VOIP channels for G.729
MP80	Supports a maximum of 80 channels
MP120	Supports a maximum of 120 channels. The MP120 is capable of supporting new media services such as V.150.1. In the past, all DSP cards were capable of supporting all codec types, albeit with various performance differences in terms of point costs. However, the V.150.1 protocol is not supported on the older media processors. G430 supports a maximum of 120 channels. If an MP120 is installed on a G430 v1, the onboard VoIP module will be disabled.

G430 and EM200 media module capacity

The G430 chassis is designed to accommodate:

- Up to three of the following telephony media modules: MM710, MM710B, MM711, MM712, MM714, MM714B, MM720, MM721, MM722
- Up to two of the following telephony modules: MM716, MM717

- Up to one S8300 server (in slot V1 only)

Each EM200 chassis is designed to accommodate:

- Up to two of the following telephony media modules: MM710, MM711, MM712, MM714, MM714B, MM716, MM717, MM720, MM721, MM722

  Note:

  Although you can insert a total of seven MM710 media modules in the extended G430 (a G430 with two EM200 expansion modules), the optimum number is four MM710 media modules, since the G430 can support up to 120 VoIP channels.

  Note:

  Although you can insert a total of seven MM721 media modules in the extended G430 (a G430 with two EM200 expansion modules), the maximum number allowed is four MM721 media modules.

Survivability for G430 Branch Gateway

You can configure Standard Local Survivability (SLS) to enable a local G430, G250, or G350 to provide a degree of MGC functionality when no link is available to an external MGC. SLS is configured from the individual G430 itself using the command line interface. SLS is supported for all analog interfaces, ISDN BRI/PRI trunk interfaces, non-ISDN digital DS-1 trunk interfaces (T1 Robbed Bit and E1-CAS), IP phones, IP softphones, and DCP phones.as follows in the various Branch Gateway models:

- G350 with C/S (hardware vintage) 2.0 and up: SLS supported for all analog interfaces, ISDN BRI/PRI trunk interfaces, non-ISDN digital DS1 trunk interfaces, IP phones, IP Softphone, and DCP phones.
- G250-Analog: SLS supported for all analog interfaces, IP phones, and IP Softphone.
- G250-BRI: SLS supported for all analog interfaces, ISDN BRI trunk interfaces, IP phones, and IP Softphone.
- G250-DCP: SLS supported for all analog and DCP interfaces, IP phones, IP Softphone, and DCP phone.
- G250-DS1: SLS supported for all analog interfaces, ISDN PRI trunk interfaces, non-ISDN digital DS1 trunk interfaces, IP phones, and IP Softphone.

You can configure Enhanced Local Survivability (ELS) by installing an S8300D with G430, G250, or G350 as a Survivable Remote Server (Local Survivable Processor). In this configuration, the S8300D is not the primary MGC but takes over to provide continuous telephone service if all external MGCs become unavailable. Calls in progress continue without interruption when the S8300D takes over.

G430 Branch Gateway high-level capacities

The following table outlines the capacities of various G430 services.

Note:

Some capacities might change. For the most up-to-date list, see *Avaya Aura® Communication Manager System Capacities Table*, 03-300511.

Description	Capacity	Comments
Branch Gateway Limits		
Maximum number of G430 Branch Gateways controlled by an S8510 or S8800 Server	250	This number also applies if the same external server controls a combination of Avaya G430, G450, G350, G250, G650, and G700 gateways.
Maximum number of G430 Branch Gateways controlled by an S8300D Server housed in another G430 (G450 or G700) Branch Gateway	50	This number also applies if the same external server controls a combination of Avaya G430, G450, G350, G250, G650, and G700 gateways.
Maximum total number of telephones supported by the G430	150	Assumes that the MGC is an S8300D installed in the G430 as an ICC. Otherwise, the capacity is greater.
Maximum number of IP telephones per G430 Branch Gateway	150	Assumes that the MGC is an S8300D installed in the G430 as an ICC. Otherwise, the capacity is greater.
Maximum number of analog phones per G430 Branch Gateway	56 104 for a G430 with one EM200 152 for a G430 with two EM200s	
Maximum number of DCP phones per G430 Branch Gateway	56 104 for a G430 with one EM200 152 for a G430 with two EM200s	
Maximum number of BRI endpoints per G430 Branch Gateway	48 80 for a G430 with one EM200 112 for a G430 with two EM200s	
Simultaneous two-way conversations with TDM transcoding from IP phone to legacy telephone or trunk.	100	
Simultaneous two-way conversations with TDM transcoding from TDM phones to IP phones	100	
Maximum number of BRI trunks	24	

Table continues…

Description	Capacity	Comments
	40 for a G430 with one EM200 56 for a G430 with two EM200s	
Maximum number of PSTN trunks	4 (T1) 3 (E1)	For E1/T1 trunks: 7 channels are supported in Tandem mode.
Miscellaneous		
Simultaneous fax transmissions	100	Fax transmissions using VoIP resources
Touch-tone recognition (TTR)	32	
Tone Generation	unlimited	
Announcements ports	15 ports for playback 1 for record	

Maximum Branch Gateway G430 capacities

Table 5: Branch Gateway G430 capacities

Description	Capacity	Comments
Maximum number of G430s controlled by an S8500 or S8700-series server	250	This number also applies if the same external server controls a combination of Avaya Branch Gateways G430, G450, G350, G250, and G700.
Maximum number of G430s controlled by an S8300 server housed in another Branch Gateway G430 (or G450 or G700) .	50	This number also applies if the same external server controls a combination of Avaya Branch Gateways G430, G450, G350, G250, and G700.
Maximum total number of telephones supported by the G430	150	This number can be higher, depending on traffic needs.
Maximum number of IP telephones per Branch Gateway G430	150	This number can be higher, depending on traffic needs.
Maximum number of analog phones per Branch Gateway G430	56 104 for a G430 with one EM200 152 for a G430 with two EM200s	
Maximum number of DCP phones per Branch Gateway G430	56	

Table continues…

Description	Capacity	Comments
	104 for a G430 with one EM200 152 for a G430 with two EM200s	
Maximum number of BRI endpoints per Branch Gateway G430	48 80 for a G430 with one EM200 112 for a G430 with two EM200s	Maximum of 64 when the BRI modules are MM721
Simultaneous two-way conversations with TDM transcoding from IP phone to legacy telephone or trunk.	120	
Simultaneous two-way conversations with TDM transcoding from TDM phones to IP phones	120	
Maximum number of BRI trunks	24 40 for a G430 with one EM200 56 for a G430 with two EM200s	Maximum of 32 when the BRI modules are MM721
Maximum number of PSTN trunks	4 T1 3 E1	7 E1/T1 can be supported in tandem mode
Miscellaneous		
Simultaneous fax transmissions	120	Fax transmissions using VoIP resources
Touch-tone recognition (TTR)	32	
Tone Generation	unlimited	
Announcements ports	15 ports for playback 1 for record	

Avaya G450 Branch Gateway

The Avaya G450 Branch Gateway is a multipurpose Branch Gateway that can be deployed in medium to large sized branch locations or in wiring-closets servicing buildings and floors in a campus environment. The Avaya G450 Branch Gateway works in conjunction with the Communication Manager IP telephony software running on Avaya S8xxx Servers to help deliver intelligent communications to enterprises of all sizes.

The G450 Branch Gateway combines telephone exchange and data networking by providing PSTN toll bypass and routing data and VoIP traffic over WAN. The G450 Branch Gateway features a VoIP engine, an optional WAN router, and Ethernet LAN connectivity. The G450 Branch Gateway provides full support for Avaya IP and digital telephones as well as analog devices such as modems, fax machines, and telephones.

Detailed description of G450 Branch Gateway

The G450 can support up to 450 users when deployed as a branch gateway in a mid-to-large branch office of a large enterprise or a call center and can serve up to 2400 users when deployed as a campus gateway. Both configurations require Communication Manager IP telephony software running on one or more Avaya S8xxx Servers. The Avaya S8300D server provides a capacity of 450 users, and the Avaya S8510 Server provides a capacity of 2400 users

Telephone services on a G450 are controlled by an Avaya S8xxx Server operating either as an External Call Controller (ECC) or as an Internal Call Controller (ICC). The G450 supports the Avaya S8300D Server as an ICC or as an ECC when the S8300D is installed in another Branch Gateway. The G450 also supports the Avaya 8800, duplex, and S8510 Servers as ECCs.

In addition to an ECC, an ICC can be installed as a Survivable Remote Server (Local Survivable Processor) designed to take over call control when the ECC fails or WAN link between the branch office and main location breaks. The Survivable Remote Server provides full featured telephone service survivability for the branch office. G450 also features Standard Local Survivability (SLS) which provides basic telephone services when the connection with the primary ECC is lost.

The G450 is a scalable device with a basic configuration consisting of one power supply unit (PSU), 256 MB RAM, and a single DSP childboard supporting either 20, 80, or 160 VoIP channels. This configuration can be enhanced by adding a redundant PSU, up to two RAM modules of 1 GB each, and up to four additional DSP childboards, increasing the number of VoIP channels to 320 channels. The G450 main board has four slots for VoIP engines. You can install up to two MP160 (Media Processor 160). An MP160 provides 160 channels for voice transport. For more information about installing MP160, see *Configuring V.150.1 on the Avaya G450 Branch Gateway*.

The G450 Branch Gateway is a modular device, adaptable to support different combinations of endpoint devices. While fixed front panel ports support the connection of external LAN switches, network data ports, Ethernet WAN lines and external routers, eight slots are provided for plugging in optional media modules. Pluggable media modules provide interfaces for different types of telephones, trunks, and WAN links. A combination is selected to suit the needs of the branch. A range of telephony modules provides full support for legacy equipment such as analog and digital telephones. A range of WAN modules provide support for Universal Serial Port and E1/T1 WAN links. IP phones are supported through an external LAN switch.

The G450 chassis features field replaceable RAM, DSPs, PSUs, fan tray, and main board module for enhanced reliability.

For more information about features of the G450 Branch Gateway, see *Overview for the Avaya G450 Branch Gateway*, 03-602058.

Minimum firmware requirements for G450

		v1a	v2b	v2d	v3b	Recommended CM Version
BGW 5.0	27.31.0	Yes	Yes	Yes	No - require new FW (base not supported)	CM 5.0 (SP)
BGW 5.1	28.27.0	Yes	Yes	Yes	No - require new FW (base not supported)	CM 5.1 (SP)
BGW 5.2	29.24.0	Yes	Yes	Yes	No - require new FW (base not supported)	CM5.2 (SP)
BGW 5.2.1	30.28.0 +	Yes	Yes	Yes	Yes (min FW load 30.28.0)	CM 5.2.1 (SP 16) or higher AA 6.3 FP3 CM6.3 .2 +
BGW 6.1	31.26.0	Yes	Yes	Yes	No - require new FW (base not supported)	CM 6.0.1 - Nov 2010
BGW 6.2.1	32.26.0	Yes	Yes	Yes	No - require new FW (base not supported)	AA 6.2 FP1-CM 6.2 sp4 - Dec 2012
BGW 6.3	33.13.0	Yes	Yes	Yes	No - require new FW (base not supported)	AA 6.2 FP2-CM 6.3 - May 2013
BGW 6.1 JITC	33.13.1	Yes	Yes	Yes	Would require JITC request	CM 6.3.1.1 (JITC SP)
BGW 6.3.1	34.6.0 +	Yes	Yes	Yes	Yes (min FW load 34.6.0)	AA 6.2 FP3 CM 6.3.2 + (Oct 2013) AA 6.2 FP 2 CM 6.3 & CM 5.2.1 SP 16+
BGW 6.3.5	35.x.y	Yes	Yes	Yes	Yes	AA 6.2 FP3 CM 6.3.2 + AA 6.2 FP 2 CM 6.3 & CM 5.2.1 SP 16+
BGW 6.3.6 JITC	36.x.y	Yes	Yes	Yes	Yes	AA 6.2 FP 4 CM 6.3.6 AA 6.2 FP3 CM 6.3.2 &CM 5.2.1 SP 16+

G450 Branch Gateway features

Note:

Certain features are supported in IPv4 only.

- Hardware features:
  - 9-slot chassis (one slot for main board and eight slots for media modules)
  - Swappable main board module
  - Hot-swappable media modules
  - Support for hot-swappable external compact flash
  - Support for two load sharing hot-swappable power supply units
  - Hot-swappable fan tray
  - VoIP DSPs (up to 320 channels)
  - Memory SIMMs
- Voice features:
  - H.248 gateway
  - Voice line interfaces:
    - IP phones
    - Analog phones
    - Avaya DCP phones
    - BRI Phones
    - FXS/Fax
    - VoIP
    - Fax and modem over IP
  - Voice trunk interfaces:
    - FXO
    - BRI
    - T1/E1
  - Supported CODECs: G.711A/µLaw, G.729a, G.726
  - Survivability features for continuous voice services:
    - Local Survivable Processor (LSP) (with S8300)
    - Standard Local Survivability (SLS) (IPv4 only)
    - Emergency Transfer Relay (ETR)

    - Modem Dial Backup
    - Dynamic Call Admission Control (CAC) for Fast Ethernet, Serial, and GRE tunnel interfaces
    - Inter-Gateway Alternate Routing (IGAR)
  - DHCP and TFTP server to support IP phones images and configuration (IPv4 only)
  - Announcements support
  - Contact Closure support
- Routing and WAN features:

  Note:

  IPv6 is not supported on the WAN.

  - Two WAN 10/100 Ethernet ports with traffic shaping capabilities
  - T1/E1 and USP interfaces
  - PPPoE (IPv4 only), Frame-relay, and PPP (IPv4 only)
  - Routing Protocols: Static, OSPF, RIP
  - VRRP (IPv4 only)
  - Equal Cost Multi Path routing (ECMP)
  - IPSec VPN
  - cRTP
  - WAN Quality of Service (QoS)
  - Policy-based routing
  - DHCP relay
  - GRE tunneling
  - Dynamic IP addressing (DHCP client/PPPoE)
  - Object tracking
  - Backup Interface
- LAN features:
  - Two LAN 10/100/1000 RJ-45 Ethernet ports (w/o POE)
  - Auto-negotiation
  - 4K MAC table with aging
  - 64 VLANs
  - Multi-VLAN binding, 802.1Q support
  - Ingress VLAN Security

  - Broadcast/Multicast storm control
  - Automatic MAC address aging
  - Rapid Spanning Tree
  - Port mirroring
  - RMON statistics
  - Port redundancy
  - LLDP (IPv4 only)
- Security hardened gateway features:
  - Media and signaling encryption
  - Secured management
  - Digitally signed gateway firmware
  - Managed security service support
  - Access list support
- Management features:
  - Avaya Device Manager
  - Embedded Web Manager (IPv4 only)
  - RADIUS Authentication support (IPv4 only)
  - SNMPv1 traps and SNMPv3 notifications
  - Telnet (IPv4 only) and SSHv2 support
  - SCP, TFTP, and FTP clients
  - Syslog client
  - Modem access for remote administration
  - Packet Sniffing
  - RTP-MIB
  - Backup and Restore on USB Flash drive

G450 components

G450 physical description

There are two hardware versions of the G450, referred to as *G450 1.x* and *G450 2.x*. 1.x and 2.x refer to the hardware suffix of the G450, which is printed on the label displayed on the rear of the chassis. The differences between the two versions are minor, and include slightly different front panels, and different placement of components on the main boards.

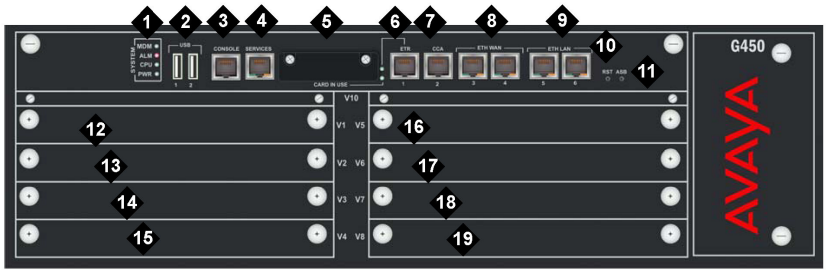


Figure 2: The Branch Gateway G450 1.x Chassis

Figure Notes:

1. System LEDs
2. USB ports
3. Console port
4. Services port
5. Compact flash slot
6. ETR (Emergency Transfer Relay) port
7. CCA (Contact Closure Adjunct) port
8. ETH WAN ports
9. ETH LAN ports
10. RST button
11. ASB button
12. V1 — slot for standard media module or S8300 Server
13. V2 — standard media module slot
14. V3 — standard media module slot
15. V4 — standard media module slot
16. V5 — standard media module slot
17. V6 — standard media module slot
18. V7 — standard media module slot
19. V8 — standard media module slot

For information about the different media modules that can be housed in the G450 media module slots, see BROKEN LINK: Chapter 2: Optional components.

Name	Description
CCA	RJ-45 port for ACS (308) contact closure adjunct box.

Table continues…

Name	Description
ETH WAN	Two 10/100 Base TX Ethernet WAN ports. RJ-45 connectors.
ETH LAN	Two 10/100/1000 Base TX Ethernet LAN ports. RJ-45 connectors.
CONSOLE	RS-232 port for services and maintenance access. RJ-45 connector.
SERVICES	Ethernet 10/100 port for services and maintenance access. RJ-45 connector.
ETR	Emergency Transfer Relay port. Controls two external 808A emergency transfer panels. RJ-45 connector.
USB	Two USB ports with USB connectors. Supports the connection of: • USB flash drive. No more than one USB flash drive can be connected. • USB modem: Multitech MultiModemUSB MT5634ZBA-USB-V92, or USRobotics USB modem model 5637. No more than one USB modem can be connected.
RST	Reset button. Resets chassis configuration.
ASB	Alternate Software Bank button. Reboots the G450 with the software image in the alternate bank.

G450 specifications

G450 Branch Gateway specifications

Table 6: Avaya Branch Gateway G450 specifications

Description	Value
Height	5.25 in. (3U, 133.3 mm)
Width	19 in. (482.6 mm)
Depth	18 in. (460 mm)
Weight of empty chassis	16.5 pounds (7.5 kg)
Weight of chassis with basic configuration, including main board, power supply unit, fan tray, one DSP, and blank panels on the media module slots	31 pounds (14 kg)
Ambient working temperature	32° to 104°F (0° to 40°C)

Table continues…

Description	Value
Storage temperature	–40°F to 150°F (–40°C to 66°C)
Left air inlet	up to 104°F (40°C)
Operation altitude	up to 10,000 ft. (3000 m)
Front clearance	2 in (5 cm)
Rear clearance	4 in (10 cm)
Side clearance	3 in (7.6 cm)
Humidity	10 to 90% relative humidity, non-condensing
Voltage	90-264 VAC, 47-63 Hz
Power rating	1780 BTU/h (522 W)
Max current	7 A

Power cord specifications

For North America

The cord set must be UL Listed/CSA Certified, 16 AWG, 3-conductor (3rd wire ground), type SJT. One end is to be terminated to an IEC 60320, sheet C13 type connector rated 10A, 250V. The other end is to be terminated to either a NEMA 5-15P attachment plug for nominal 125V applications or a NEMA 6-15P attachment plug for nominal 250V applications.

For outside North America

The cord must be VDE Certified or Harmonized (HAR), rated 250V, 3-conductor (3rd wire ground), 1.0 mm^2 minimum conductor size. The cord is to be terminated at one end to a VDE Certified/CE Marked IEC 60320, sheet C13 type connector rated 10A, 250V and the other end to a 3-conductor grounding type attachment plug rated at a minimum of 10A, 250V and a configuration specific for the region/country in which it will be used. The attachment plug must bear the safety agency certifications mark(s) for the region/country of installation.

G450 Media module specifications

Description	Value
Height	0.79 in. (2 cm)
Width	6.69 in. (17 cm)
Depth	12.20 in. (31 cm)
Weight	0.7-0.9 lb. (300-400 grams)

Supported media modules in the G450

Media module	Description
S8300	Communication Manager server
Telephony media modules	
MM711	8 universal analog ports

Table continues…

Media module	Description
MM714	4 analog telephone ports and 4 analog trunk ports
MM714B	4 analog telephone ports, 4 analog trunk ports, and an emergency transfer relay
MM716	24 analog ports
MM712	8 DCP telephone ports
MM717	24 DCP telephone ports
MM710 MM710B	1 T1/E1 ISDN PRI trunk port
MM720	8 ISDN BRI trunk or endpoint (telephone or data) ports
MM721	8 ISDN BRI trunk or endpoint (telephone or data) ports
MM722	2 ISDN BRI trunk ports
WAN media modules	
MM340	1 E1/T1 data WAN port
MM342	1 universal serial data WAN port

Media Module slot configurations in the G450

When choosing a combination of media modules to install in G450 chassis, consider the slots in which each module type can be inserted, and the limitations and recommendations regarding combinations of media modules.

The G450 chassis has eight media module slots marked V1, V2, V3, V4, V5, V6, V7, and V8 (see G450 physical description). Each medial module is restricted to certain slots:

Table 7: Permitted slots for media modules

Media Module	Permitted slots
MM340	V3, V4, V8
MM342	V3, V4, V8
MM710	Any media module slot V1-V8
MM711	Any media module slot V1-V8
MM712	Any media module slot V1-V8
MM714	Any media module slot V1-V8
MM716	Any media module slot V1-V8
MM717	Any media module slot V1-V8
MM720	Any media module slot V1-V8
MM722	Any media module slot V1-V8
S8300	V1

VOIP Modules in G450

A media processor or a VOIP module provides the resources/channels to support a voice call.

A G450 has four VOIP slots. It supports the VOIP modules listed in the table below.

VOIP Modules	Description
MP20	Supports a maximum of 20 channels • Provides 25 VOIP channels for G.711 and G.726 • Provides 20 VOIP channels for G.729
MP80	Supports a maximum of 80 channels
MP160	Supports a maximum of 160 channels The MP160 is capable of supporting new media services such as V.150.1. In the past, all DSP cards were capable of supporting all codec types, albeit with various performance differences in terms of point costs. However, the V.150.1 protocol is not supported on the older VOIP modules.

Configuration matrix

A G450 can support MP20 and MP80 in any configuration for the 4 slots. G450 supports a maximum of 320 channels.

The following are permitted combinations of optional VoIP (MP) modules on G450 Branch Gateway only.

Combination of Cards	MP80 Card	MP20 Card	MP160 Card
Combination # 1	-	-	2
Combination # 2	-	2	1
Combination # 3	2	-	1
Combination # 4	1	1	1

Note:

Once the installation for MP160 is determined, the MP80/20s can be installed in any of the remaining slots.

Survivability for G450 Branch Gateway

You can configure Standard Local Survivability (SLS) to enable a local G450, G250, or G350 to provide a degree of MGC functionality when no link is available to an external MGC. SLS is configured from the individual G450 itself using the command line interface. SLS is supported for all analog interfaces, ISDN BRI/PRI trunk interfaces, non-ISDN digital DS-1 trunk interfaces (T1

Robbed Bit and E1-CAS), IP phones, IP softphones, and DCP phones as follows in the various Branch Gateway models:

- G350 with C/S (hardware vintage) 2.0 and up: SLS supported for all analog interfaces, ISDN BRI/PRI trunk interfaces, non-ISDN digital DS1 trunk interfaces, IP phones, IP Softphone, and DCP phones.
- G250-Analog: SLS supported for all analog interfaces, IP phones, and IP Softphone.
- G250-BRI: SLS supported for all analog interfaces, ISDN BRI trunk interfaces, IP phones, and IP Softphone.
- G250-DCP: SLS supported for all analog and DCP interfaces, IP phones, IP Softphone, and DCP phone.
- G250-DS1: SLS supported for all analog interfaces, ISDN PRI trunk interfaces, non-ISDN digital DS1 trunk interfaces, IP phones, and IP Softphone.

You can configure Enhanced Local Survivability (ELS) by installing an S8300D with G450, G250, or G350 as a Survivable Remote Server (Local Survivable Processor). In this configuration, the S8300D is not the primary MGC but takes over to provide continuous telephone service if all external MGCs become unavailable. Calls in progress continue without interruption when the S8300D takes over.

G450 maximum Branch Gateway capacities

Table 8: G450 Branch Gateway capacities

Description	Capacity	Comments
Maximum number of G450 Branch Gateways controlled by an S85XX or S87XX server	250	This number also applies if the same external server controls a combination of Avaya G450, G430, G350, G250, and G700 Branch Gateways.
Maximum number of G450 Branch Gateways controlled by an S8300 server housed in another G450 Branch Gateway.	50	This number also applies if the same external server controls a combination of Avaya G450, G430, G350, G250, and G700 Branch Gateways.
Maximum number of G450 Branch Gateways controlled by an S8300 server housed in a G700 Branch Gateway. **Note:** The G700 is no longer sold.	50	This number also applies if the same external server controls a combination of Avaya G450, G430, G350, G250, and G700 Branch Gateways.
Maximum total number of telephones supported by the G450	450	Assumes that the MGC is an S8300 installed in the G450 as an ICC. Otherwise, the capacity is greater.

Table continues…

Description	Capacity	Comments
Maximum number of IP telephones per G450 Branch Gateway	450	Assumes that the MGC is an S8300 installed in the G450 as an ICC. Otherwise, the capacity is greater.
Maximum number of analog phones per G450 Branch Gateway	192	
Maximum number of DCP phones G450 Branch Gateway	192	
Maximum number of BRI endpoints per G450 Branch Gateway	128	
Simultaneous two-way conversations with TDM transcoding from IP phone to legacy telephone or trunk.	206	
Simultaneous two-way conversations with TDM transcoding from TDM phones to IP phones	206	
Maximum number of BRI trunks	64	
Maximum number of PSTN trunks	184 (T1) 240 (E1)	For E1 trunks: 240 channels are supported in Tandem mode; 206 channels are supported for IP to PSTN
Miscellaneous		
Simultaneous fax transmissions	240	Fax transmissions using VoIP resources
Touch-tone recognition (TTR)	64	
Tone Generation	unlimited	
Announcements ports	63 ports for playback 1 for record	

IG550 Integrated Gateway

The IG550 Integrated Gateway is a part of Avaya growing solutions for extending Communication Manager communication capabilities from the headquarters of an organization to all collaborative branch locations. The IG550 Integrated Gateway is a Branch Gateway that combines Avaya high-performance telephony and Voice over IP (VoIP) communications with the sophisticated routing capabilities of the Juniper J-Series Services Routers.

Detailed description of IG550 Branch Gateway

The IG550 consists of the TGM550 Telephony Gateway Module (TGM550) and Telephony Interface Modules (TIMs). The IG550 is inserted into a Juniper J2320, J2350, J4350, or J6350 Services

Router. The IG550 is also connected over a LAN or WAN to an Avaya server running Communication Manager. Therefore, Avaya S8800, S8510, and S8300D Servers are able to provide the same top quality telephony services to the small branch office as to the headquarters of the organization. As a result, IG550 provides full feature support for IP and analog telephones.

The IG550 is designed for use in a 2-to-100 user environment. The IG550 can be appropriately configured and priced to more precisely match the number of users.

The IG550 features Standard Local Survivability (SLS). SLS provides partial backup gateway controller functionality in the event that the connection with the primary MGC is lost.

In addition to advanced and comprehensive telephony services that are provided by the TGM550, the Juniper J-series Router, the J2320, J2350, J4350 or J6350 provides full data networking services, precluding the need for a WAN router. The J-series routers use Juniper Physical Interface Modules (PIMs) for the hardware components to support network and routing features. The J-series routers also provide Ethernet connections to a separate Ethernet switch that IP phones connect to.

For more information on the features of IG550 Integrated Gateway and the J-series Service Routers, see *Overview of the Avaya IG550 Integrated Gateway*, 03-601548.

IG550 Branch Gateway configurations

The IG550 Integrated Gateway is available with three capacity levels depending on which version of the TGM550 is used. The versions of the TGM550 are:

- TGM550 MP20 supports up to 20 concurrent VoIP calls, depending on the types of calls
- TGM550 MP80 supports up to 80 concurrent VoIP calls
- TGM550 MP10 supports up to 10 concurrent VoIP calls

Any J-series router can house a single TGM550 of any of the three versions.

Components

IG550 and J4350 Services Router

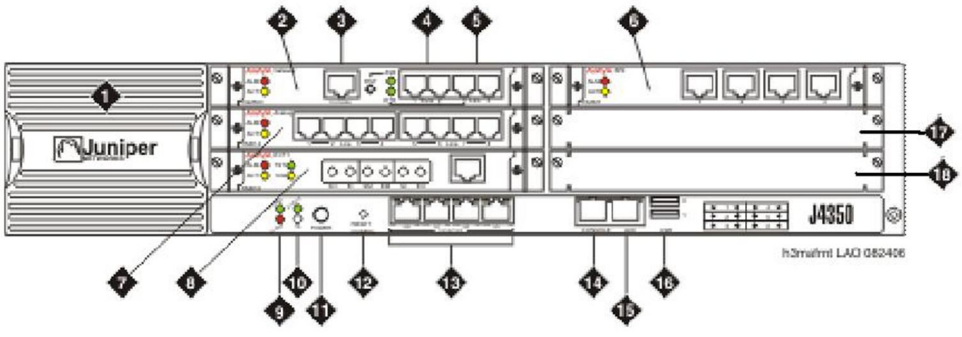
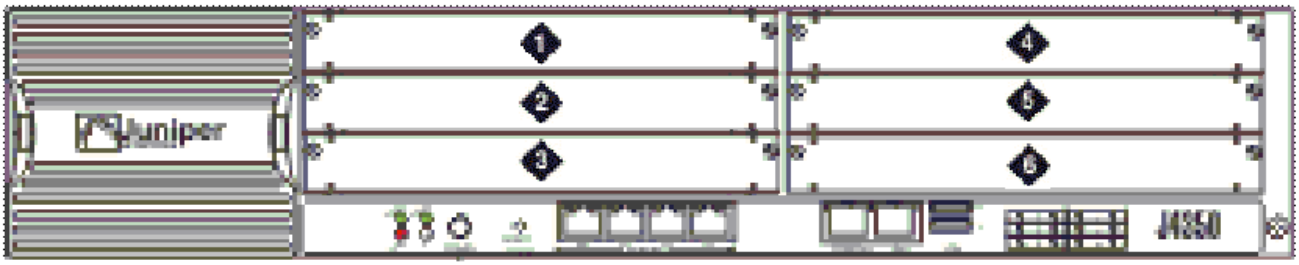


Figure 3: IG550 Integrated Gateway in a J4350 Services Router

Number	Description
1	Juniper Services Router, J4350 shown
2	TGM550 Telephony Gateway Module (in slot V1)
3	TGM550 console port
4	TGM550 analog trunk ports
5	TGM550 analog line ports
6	TIM521 BRI telephony interface module (in slot V4)
7	TIM514 analog telephony interface module (in slot V2)
8	TIM510 E1/T1 telephony interface module (in slot V3)
9	J-series Router Alarm LEDs
10	J-series Router Power LEDs
11	Power button
12	Reset button
13	Gigabit Ethernet ports
14	Console port
15	Aux port
16	USB ports
17	Slot V5 (empty in illustration)
18	Slot V6 (empty in illustration)

Slot locations on J4350 Services Router

The slots on the J4350 Services Router are identified as follows:



The J4350 Services router chassis has six slots. Modules can be inserted into the slots according to the following guidelines:

- The TGM550 and TIMs can be housed in any of the six router slots.
- Fast Ethernet and Gigabit Ethernet ePIMs and the 16-port GigaE uPIM can be housed only in slots 3 or 6.
- The 16-port GigaE uPIM can be housed in slot 2, 3, 5 or 6.
- Other PIMs, including all other uPIMs, can be housed in any slots.

Fixed ports and buttons on the Juniper J4350 Services Router

Port/Button	Description
Gigabit Ethernet	Four Gigabit Ethernet ports. The JUNOS software identifies the port locations, from left to right, as ge-0/0/0, ge-0/0/1, ge-0/0/2, and ge-0/0/3. One port can serve as a management interface, typically ge-0/0/0.
Alarm LED	Lights yellow for a minor alarm condition, red for a major alarm condition, or is off when no alarm conditions exist. Alarm notification applies only to the J-series router, not to the TGM550.
Power LED	Green light that lights steadily, blinks, or is off to show the power on or power off status.
Status LED	Blinks to show startup of the router, lights steadily to show normal operation after startup, and red to indicate an error condition upon startup.
Console	Console RS-232 interface port for direct connection of CLI console. RJ-45 connector.
USB	Two USB ports. Support the connection of • Disk on Key USB memory stick • USB flash drive • The Multitech MT5634ZBA-USB-V92 USB modem.
Power button	Turns on power to the router and TGM550.
Reset button	Resets chassis configuration to either rescue configuration or factory default, if rescue not available. Resends configuration data to the TGM550. If the button is held 12 or more seconds, the root password is also reset.
Aux	Not activated.

IG550 and J6350 Services Router

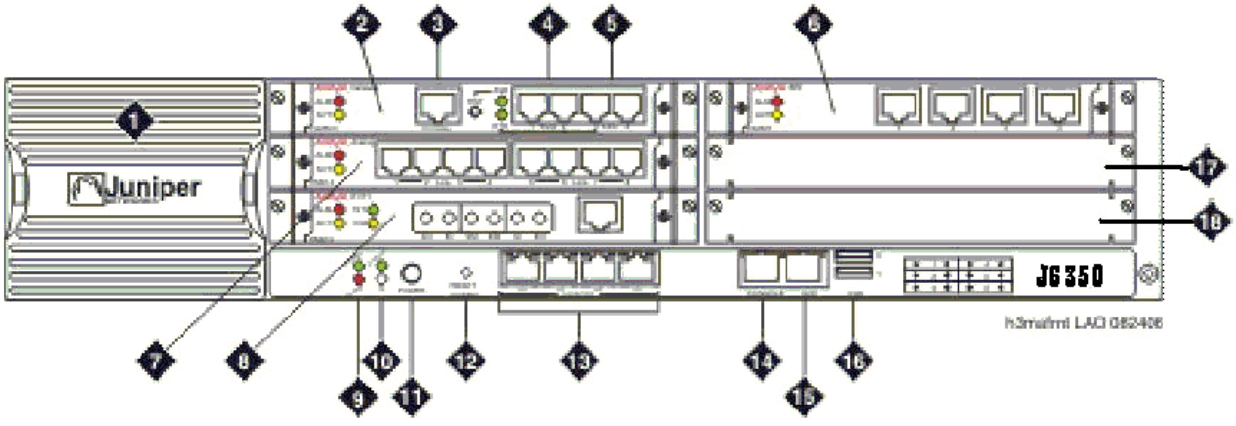
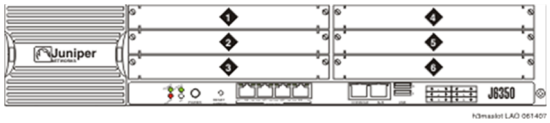


Figure 4: IG550 Integrated Gateway in a J6350 Services Router

Number	Description
1	Juniper Services Router, J4350 shown
2	TGM550 Telephone Gateway Module (in slot V1)
3	TGM550 console port
4	TGM550 analog trunk ports
5	TGM550 analog line ports
6	TIM521 BRI telephony interface module (in slot V2)
7	TIM514 analog telephony interface module (in slot V2)
8	TIM510 E1/T1 telephony interface module (in slot V4)
9	J-series Router Alarm LEDs
10	J-series Router Power LEDs
11	Power button
12	Reset button
13	Gigabit Ethernet ports
14	Console port
15	Aux port
16	USB ports
17	Slot V5 (empty)
18	Slot V6 (empty)

Slot locations on J6350 Services Router

The slots on the J6350 Services Router are identified as follows:



The J6350 Services router chassis has six slots. Modules can be inserted into the slots according to the following guidelines:

- The TGM550 and TIMs can be housed in any of the six router slots.
- Fast Ethernet and Gigabit Ethernet ePIMs and the 16-port GigaE uPIM can be housed only in slots 2, 3, 5, or 6.

Other PIMs, including all other uPIMs, can be housed in any slot.

Fixed ports and buttons on the Juniper J6350 Services Router

Port/Button	Description
Gigabit Ethernet	Four Gigabit Ethernet ports. The JUNOS software identifies the port locations, from left to right, as ge-0/0/0, ge-0/0/1, ge-0/0/2, and ge-0/0/3. One port can serve as a management interface, typically ge-0/0/0.
Alarm LED	Lights yellow for a minor alarm condition, red for a major alarm condition, or is off when no alarm conditions exist. Alarm notification applies only to the J-series router, not to the TGM550.
Power LED	Green light that lights steadily, blinks, or is off to show the power on or power off status.
Status LED	Blinks to show startup of the router, lights steadily to show normal operation after startup, and red to indicate an error condition upon startup.
Console	Console RS-232 interface port for direct connection of CLI console. RJ-45 connector.
USB	Two USB ports. Supports the connection of • Disk-on-Key USB memory stick • USB flash drive • Multitech MultiModemUSB MT5634ZBA-USB-V92 USB modem.
Power button	Turns on power to the router and TGM550.
Reset button	Resets chassis configuration to either rescue configuration or factory default, if rescue not available. Resends configuration data to TGM550. If the button is held 12 or more seconds, the root password is also reset.
Aux	Not activated.

IG550 and J2320 Services Router

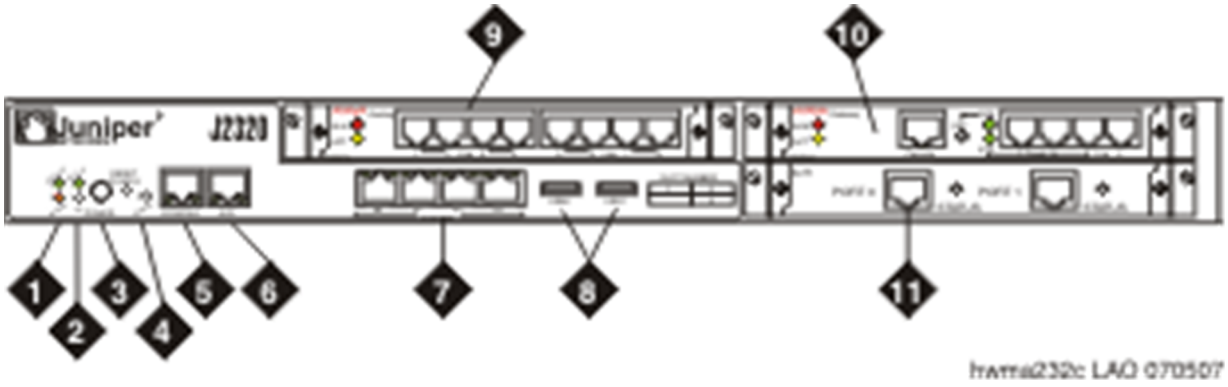


Figure 5: IG550 Integrated Gateway in a J2320 Services Router

Number	Description
1	J-series Router Alarm LEDs
2	J-series Router Power LEDs
3	Power button

Table continues…

Number	Description
4	Reset button
5	Console port
6	Aux port
7	Gigabit Ethernet ports
8	USB ports
9	TIM514 analog telephony interface module (in slot V1)
10	TGM550 Telephony Gateway Module (in slot V2)
11	Dual port T1 PIM (in slot V3)

Slot locations on J2320 Services Router

The slots on the J2320 Services Router are identified as follows:

The J2320 Services router chassis has three slots. Modules can be inserted into the slots according to the following guidelines:

- The TGM550 and TIMs can be housed in any of the three router slots.
- The 16-port GigaE uPIM must be inserted into slot 3.
- All other supported PIMs, including all other uPIMs, can be housed in any slots.

Note:

J2320 does *not* support the following PIMs:

- Any of the ePIMs
- T3/E3 PIMs
- The four-port fast Ethernet PIM

Fixed ports and buttons on the Juniper J2320 Services Router

Port/Button	Description
Gigabit Ethernet	Four Gigabit Ethernet ports. The JUNOS software identifies the port locations, from left to right, as ge-0/0/0, ge-0/0/1, ge-0/0/2, and ge-0/0/3. One port can serve as a management interface, typically ge-0/0/0.
Alarm LED	Lights yellow for a minor alarm condition, red for a major alarm condition, or is off when no alarm conditions exist. Alarm notification applies only to the J-series router, not to the TGM550.
Power LED	Green light that lights steadily, blinks, or is off to show the power on or power off status.
Status LED	Blinks to show startup of the router, lights steadily to show normal operation after startup, and red to indicate an error condition upon startup.

Table continues…

Port/Button	Description
Console	Console RS-232 interface port for direct connection of CLI console. RJ-45 connector.
USB	Two USB ports. Supports the connection of • Disk on Key USB memory stick • USB flash drive • Multitech MultiModemUSB MT5634ZBA-USB-V92 USB modem.
Power button	Turns on power to the router and TGM550.
Reset button	Resets chassis configuration to either rescue configuration or factory default, if rescue not available. Resends configuration data to TGM550. If the button is held 12 or more seconds, the root password is also reset.
Aux	Not activated.

IG550 and J2350 Services Router

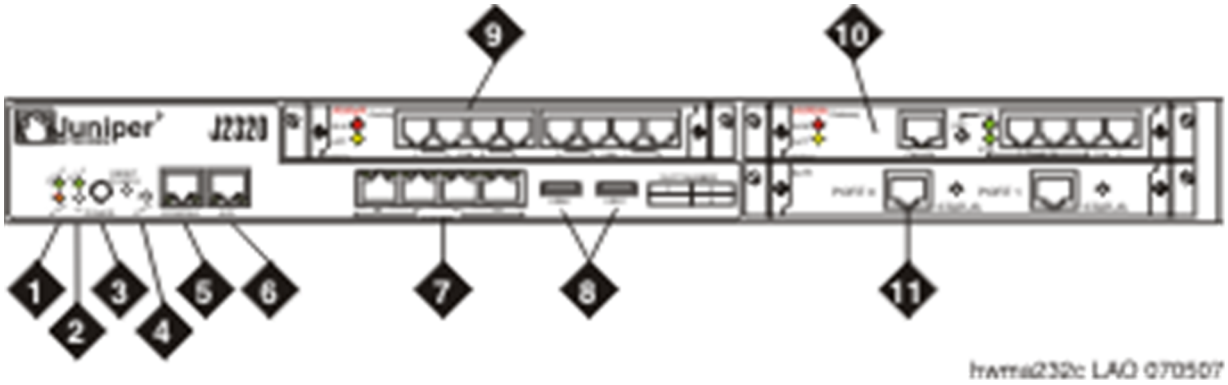


Figure 6: IG550 Integrated Gateway in a J2350 Services Router

Number	Description
1	J-series Router Alarm LEDs
2	J-series Router Power LEDs
3	Power button
4	Reset button
5	Console port
6	Aux port
7	Gigabit Ethernet ports
8	USB ports
9	TIM514 analog telephony interface module (in slot V1)
10	TIM508 (in slot V2
11	TGM550 Telephony Gateway Module (in slot V3)

Table continues…

Number	Description
12	Dual port T1 PIM (in slot V4)
13	TIM510 (in slot V5)

Slot locations on J2350 Services Router

The slots on the J2350 Services Router are identified as follows:

The J2350 Services router chassis has five slots. Modules can be inserted into the slots according to the following guidelines:

- The TGM550 and TIMs can be housed in any of the five router slots.
- The 16-port GigaE uPIM must be inserted into slot 2, 4, or 5.
- All other supported PIMs, including all other uPIMs, can be housed in any slots.

The J2350 does *not* support the following PIMs:

- Any of the ePIMs
- T3/E3 PIMs
- The Dual-port fast Ethernet PIM

Fixed ports and buttons on the Juniper J2350 Services Router

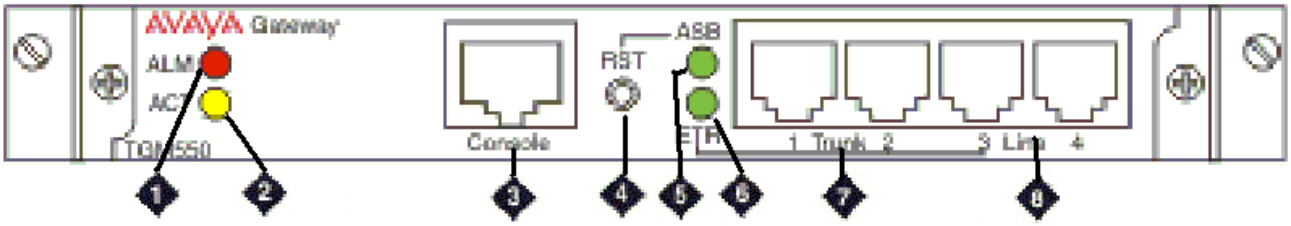
Port/Button	Description
Gigabit Ethernet	Four Gigabit Ethernet ports. The JUNOS software identifies the port locations, from left to right, as ge-0/0/0, ge-0/0/1, ge-0/0/2, and ge-0/0/3. One port can serve as a management interface, typically ge-0/0/0.
Alarm LED	Lights yellow for a minor alarm condition, red for a major alarm condition, or is off when no alarm conditions exist. Alarm notification applies only to the J-series router, not to the TGM550.
Power LED	Green light that lights steadily, blinks, or is off to show the power on or power off status.
Status LED	Blinks to show startup of the router, lights steadily to show normal operation after startup, and red to indicate an error condition upon startup.
Console	Console RS-232 interface port for direct connection of CLI console. RJ-45 connector.
USB	Two USB ports. Support the connection of • Disk on Key USB memory stick • USB flash drive • The Multitech MultiModemUSB MT5634ZBA-USB-V92 USB modem.
Power button	Turns on power to the router and TGM550.

Table continues…

Port/Button	Description
Reset button	Resets chassis configuration to either rescue configuration or factory default, if rescue not available. Resends configuration data to TGM550. If the button is held 12 or more seconds, the root password is also reset.
Aux	Not activated.

TGM550 Gateway Module

All versions of the TGM550, including MP20, MP80, and MP10, have the same faceplate, ports, buttons, and LEDs. The customer can upgrade the capacity of the TGM550 by ordering a field replacement of the Digital Signal Processor (DSP), versions of which are identified as MP20, MP80, and MP10.



Number	Description
1	Alarm LED
2	ACT LED
3	Console port
4	RST button
5	ASB LED
6	ETR LED
7	Analog trunk ports
8	Analog line ports

Fixed ports and buttons on the TGM550 Gateway Module

Port/Button	Description
ALM LED	Lights red to indicate an alarm on the TGM550 or a reboot.
ACT LED	Lights yellow to show activity of trunk or line ports. Also lights yellow during a reboot.
CONSOLE	Console port for direct connection of TGM550 CLI console. RJ-45 connector.
RST	Reset button. Resets the TGM550 configuration. It also reboots the TGM550 with the software image in the alternate bank.
ASB	Alternate Software Bank LED. Lights green if the software is not running from the selected boot bank.

Table continues…

Port/Button	Description
ETR	Lights green if the Emergency Transfer Relay is active or the TGM550 reboots. ETR uses trunk port 2 and line port 3.
Analog Trunk	Two analog trunk ports
Analog Line	Two analog trunk lines

IG550 Branch Gateway specifications

The IG550 technical specifications include physical dimensions and tolerances of the Juniper J-series Services Router, power cord specifications, and TGM550 Gateway Module specifications.

J2320 Services Router specifications

Description	Value
Height	1.75 in. (44.45 mm)
Width	17.5 in. (44.5 cm)
Depth	15.1 in. (38.4 cm)
Weight of empty chassis	14.8 lb (6.7 kg)
Ambient working temperature	32°F to 104°F (0° to 40°C)
Operation altitude	up to 10,000 ft. (3,048 m)
Front Clearance	6 in. (15 cm)
Rear Clearance	6 in. (15 cm)
Humidity	5-90% relative humidity
Power rating	AC: 100-240 VAC, 50 to 60 Hz, 6 to 8 A, 350 Watts; DC: -48 to -60 VDC, 420 Watts

J2350 Services Router specifications

Description	Value
Height	2.61 in. (66.22 mm)
Width	17.5 in. (44.5 cm)
Depth	15.1 in. (38.4 cm)
Weight of empty chassis	16.3 lb (7.4 kg) 0
Ambient working temperature	32° to 104°F (0° to 40°C)
Operation altitude	up to 10,000 ft. (3,048 m)
Front Clearance	6 in. (15 cm)
Rear Clearance	6 in. (15 cm)
Humidity	5-90% relative humidity
Power rating	AC: 100-240 VAC, 50 to 60 Hz, 6 to 8 A, 350 Watts; DC: -48 to -60 VDC, 420 Watts

J4350/J6350 Services Router specifications

The table of technical specifications provides detailed information on the physical dimensions and tolerances of the J4350/J6350 Services Router:

Description	Value
Height	3.5 in. (8.9 cm)
Width	17.5 in. (44.5 cm)
Depth	21.5 in. (54.6 cm)
Weight of empty chassis	23.0 lb (10.4 kg) — J4350; 25.0 lb (11.3 kg) — J6350
Ambient working temperature	32° to 104°F (0° to 40°C)
Operation altitude	up to 10,000 ft. (3,048 m)
Front Clearance	6 in. (15 cm)
Rear Clearance	6 in. (15 cm)
Humidity	5-90% relative humidity
Power rating	AC: 100-240 VAC, 50 to 60 Hz, 6 to 8 A, 350 Watts; DC: -48 to -60 VDC, 420 watts

J-series Services Router power cord specifications

AC power cord

Detachable AC power cords, each 2.5 m (approximately 8 ft) long, are supplied with the Services Router. The appliance coupler at the female end of the cord inserts into the appliance inlet on the faceplate of the AC power supply. The coupler is type C19 as described by International Electrotechnical Commission (IEC) standard 60320. The plug at the male end of the power cord fits into the power source receptacle that is standard for your geographical location.

Note:

In North America, AC power cords must not exceed 4.5 m (approximately 14.75 ft) in length to comply with National Electrical Code (NEC) Sections 400-8 (NFPA 75, 5-2.2) and 210-52 and Canadian Electrical Code (CEC) Section 4-010(3). The cords supplied with the router are in compliance.

Country	Electrical Specifications	Plug Standards
Australia	250 VAC, 10 A, 50 Hz	AS/NZ 3112 1- 993
China	250 VAC, 10 A, 50 Hz	GB2099.1 1996 and GB1002 1996 (CH1-10P)
Europe (except Italy and United Kingdom)	250 VAC, 10 A, 50 Hz	CEE (7) VII
Italy	250 VAC, 10 A, 50 Hz	CEI 23 - 16/VII
Japan	125 VAC, 12 A, 50 Hz or 60 Hz	JIS 8303
North America	125 VAC, 10 A, 60 Hz	NEMA 5-15
United Kingdom	250 VAC, 10 A, 50 Hz	BS 1363A

DC power cord

Each DC power supply has a single DC input (-48 VDC and return) that requires a dedicated 15 A (-48 VDC) circuit breaker. If the J6350 router contains redundant DC power supplies, one power supply must be powered by a dedicated power feed derived from feed A, and the other power supply must be powered by a dedicated power feed derived from feed B. This configuration provides the commonly deployed A/B feed redundancy for the system.

Most sites distribute DC power through a main conduit that leads to frame-mounted DC power distribution panels, one of which might be located at the top of the rack that houses the router. A pair of cables (one input and one return) connects each set of terminal studs to the power distribution panel.

Each DC power cable (ñ48 VDC and return) must be 14 AWG single-strand wire cable or as permitted by the local code. Each lug attached to the power cables must be a ring-type, vinyl-insulated TV14-6R lug, or equivalent.

TGM 550 Gateway Module specifications

Description	Value
Ambient working temperature	32°F to 158°F (0°C to 70°C)
Operation altitude	up to 10,000 ft. (3,048 m)

Grounding cable for IG550 specifications

When housing a TGM550, the J-series router must use a grounding cable that meets the following specifications:

- 10 AWG
- Able to handle up to 8 Amp current
- Have a ring-type, vinyl-insulated TV14-6R lug, or equivalent, to accommodate the 10 AWG cable

Caution:

The original grounding cable for Juniper Services Routers is 14 AWG only and must be replaced with a 10 AWG cable.

IG550 Branch Gateway related hardware

The IG550 Gateway Module supports a variety of optional internal boards called Telephony Interface Modules (TIMs). In addition, the Juniper J-series Services Routers support swappable internal components called Physical Interface Modules (PIMs).

Supported optional modules in IG550

Note:

The list of PIMs for J-series routers is a sample only. For a complete list of PIMs, see Juniper J-series Router documentation at http://juniper.net.

Modules	Description
Telephony Interface Modules	
TM508	8 analog line or station ports, which can be administered as DID trunk ports
TIM514	4 analog line or station ports and 4 analog trunk ports
TM516	16 analog line or station ports. Off-Premise Stations are not supported.
TM518	8 analog line or station ports and 8 analog trunks
TIM510	1 E1/T1 trunk port, a DS-1 level port that provides a wide variety of E1 or T1 circuit support. Can provide up to 30 E1 or 24 T1 channels
TIM521	4 ISDN BRI trunk ports providing up to 8 bearer channels
J-series Router Physical Interface Modules	
Dual-Port Serial PIM	2 serial ports
Dual-Port T1 or E1 PIM	2 E1/T1 ports, each providing up to 30 E1 or 24 T1 data channels for WAN connections
Dual-Port Channelized T1 or E1 PIM	2 T1 or E1 ports
T3 or E3 PIM	1 E3/T3 port for WAN connections
Gigabit Ethernet SFP ePIM	One Gigabit port. Supported on the J4350 and J6350 Services routers only.
Gigabit Ethernet copper ePIM	One Gigabit port. Supported on the J4350 and J6350 Services routers only.
Dual-Port Fast Ethernet PIM	2 Fast Ethernet ports. Supported on the J4350 and J6350 Services routers only.
Four-Port Fast Ethernet ePIM	4 Fast Ethernet ports. Supported on the J4350 and J6350 Services routers only.
4-Port ISDN BRI S/T PIM	4 ISDN BRI data-only ports
4-Port ISDN BRI U PIM	4 ISDN BRI data-only ports
1-, 6-, 8-, or 16-Port GigaE uPIM	6-, 8-, or 16-Gigabit Ethernet ports **Note:** The 16-port GigaE uPIM requires two slots in the router.
ADSL PIM (Annex A)	One port for DSL over an analog trunk
ADSL PIM (Annex B)	One port for ADSL over ISDN providing up to 32 virtual channels
G.SHDSL PIM	Two ports for 32 virtual channels of ATM over SHDSL connections

TIM combination limitations in IG550

This table lists the maximum limits of TIM combination in IG550.

	J2320 slots 1-3	J2350 slots 1-5	J4350/J6350 slots 1-6
Maximum number of interface TIMs (excluding TGM)	2	4	4
Maximum number of TIM516s (Analog)	1	2	3

Table continues…

	J2320 slots 1-3	J2350 slots 1-5	J4350/J6350 slots 1-6
Maximum number of TIM514s (Analog)	2	4	4
Maximum number of TIM508s (Analog)	1	3	3
Maximum number of TIM518s (Analog)	1	3	3
Maximum number of TIM521s (BRI)	2	4	4
Maximum number of TIM510s (E1/T1)	2	4	4

Note:

The limitations listed in this section are recommended maximums. You must also calculate the power requirements and heat generation for the specific TIM and PIM combination the customer wants to ensure the J-series router can support that combination. See the information on limits based on heat and power used by IG550 in *Overview of the Avaya IG550 Integrated Gateway*, 03-601548.

For more information on each of TIMs, see Telephony Interface Modules on page 208.

Survivability for IG550 Branch Gateway

You can configure Standard Local Survivability (SLS) to enable a local IG550 to provide a degree of MGC functionality when no link is available to an external MGC. SLS is configured on a system-wide basis using the Provisioning and Installation Manager (PIM). Alternatively, SLS can be configured from the individual IG550 itself using the CLI. SLS supports all analog interfaces, ISDN BRI/PRI trunk interfaces, non-ISDN digital DS-1 trunk interfaces, IP phones, and IP Softphones.

IG550 Branch Gateway high-level capacities

For information on system capacities of IG550 Integrated Gateway, see *Overview of the Avaya IG550 Integrated Gateway* (03-601548), *Avaya Aura® Communication Manager System Capacities Table* (03-300511), and other related documents at www.avaya.com/support.

G650 Media Gateway overview

G650 Media Gateway is a 14-slot, rack-mounted carrier configured for TN circuit packs. The media gateway has redundant, hot-swappable power supplies and provides AC and DC power. The backplane supports 14 circuit packs and two power supplies and monitors system fans, power supplies, and temperature. You can mount up to five G650 Media Gateways in an EIA-310 standard 19-inch (48 cm) rack.

G650 Media Gateways are used as port networks and work with standalone servers, such as S8300D, HP ProLiant DL360 G7, Dell™ PowerEdge™ R610, HP ProLiant DL360p G8, and Dell™ PowerEdge™ R620.

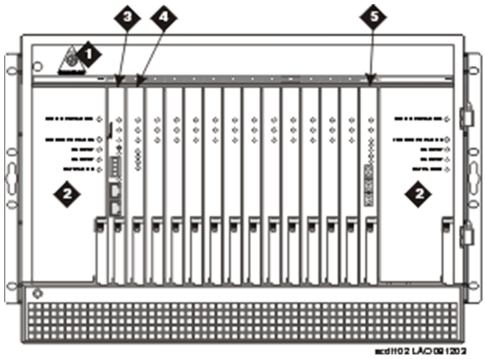
Detailed description of G650 Media Gateway

The G650 Media Gateway is 8U or 14-inche (35.6 centimeters) high can be mounted on a standard 19-inch (48.3 centimeters) data rack. G650 Media Gateway uses one or two 655A power supply ports, operating on AC and/or DC input power. Either power supply can provide all the power needed by G650 Media Gateway. When two power supplies exist, they share the power load. One power supply can operate on AC power and the other on DC power. However, each power supply has its own AC power cord so that both power sources can supply power to the gateway simultaneously. Both power supplies can take input power from the DC input cable if their AC power fails.

The system will always use AC power if available.

See the figure on page 122 for an example of the G650 Media Gateway.

G650 Media Gateway chassis



Number	Description
1	Wrist strap for ESD (electrostatic discharge)
2	655A power supply
3	TN2312BP IP server interface (IPSI)
4	TN799DP CLAN
5	TN2302AP IP Media Processor or TN2602AP IP Media Resource 320

G650 Media Gateway configuration

The G650 Media Gateway can be rack mounted or, in single G650 configurations, table or floor mounted. Multiple G650 Media Gateways, up to five, can be mounted in a rack and connected by TDM/LAN cables to create a G650 stack.

The G650 Media Gateway is mounted in industry standard EIA-310 19-inch (48.3 centimeters) open racks. The G650 Media Gateway provides options for front or mid mounting. Although the G650 can be mounted in a 19-inch (48.3 centimeters) four-post data rack, the G650 Media Gateway does not mount simultaneously to all four posts. When mounted in a four-post rack, the G650 Media Gateway uses the front mounting position.

Single G650

A single G650, equipped with feet, can be table or floor mounted. Side-by-side G650s, connected by TDM/LAN cables, are not supported. In a single configuration, the G650 always has an A carrier address.

Multiple G650s

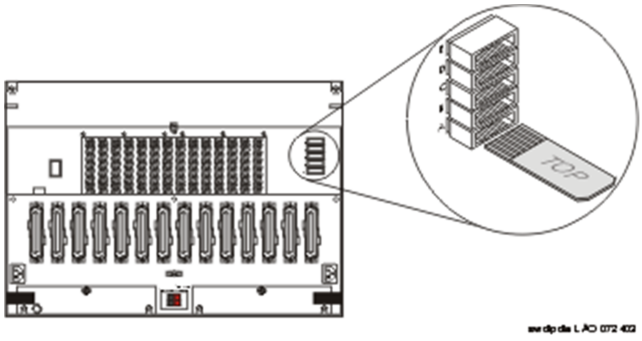
Up to five G650 Media Gateways, can be mounted in a rack and connected by TDM/LAN cables to create a G650 stack. Multiple G650 Media Gateways must be vertically adjacent and their front panels must align in the same vertical plane. For example, carrier A is always below carrier B, which is always below carrier C, and so on through carrier E. Note that existing TDM/LAN cables used for the G600 cabinets are not compatible with G650.

Multiple G650 Media Gateways, up to five, can be mounted in a rack but not connected by TDM/LAN cables. In this case, each G650 is defined as a port network. Each gateway requires its own interface hardware (EI, ATM-EI, TN2312BP IPSI). Note that with this configuration, all the G650 Media Gateways have a carrier address of A.

Carrier addressing

The carrier position, A through E, must be set on all G650 Media Gateways. The carrier address is set using a small printed circuit card that is plugged into one of five, A through E, connectors inside the carrier.

For an example and location of the printed circuit card, see the following figure.

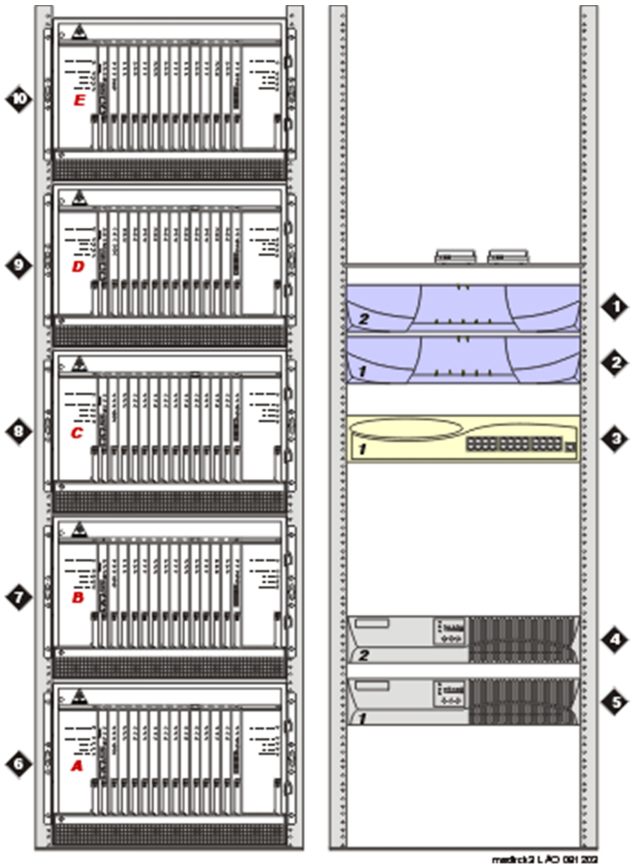


G650 stack

Multiple G650 Media Gateways can be rack mounted with some connected by TDM/LAN cables, and others not connected by TDM/LAN cables. For example, a customer can request that the G650 Media Gateway in the bottom of the rack not be connected to another G650. The carrier address of the G650 Media Gateway in the bottom of the rack is A. The customer can request that the next two G650 Media Gateways in the rack be connected together by a TDM/LAN cable. The carrier address of the lower of these two G650 Media Gateways is A, and the address of the upper G650 is B. And the customer can request that two additional G650 Media Gateways be placed in the rack and connected by a TDM/LAN cable. The carrier address of the lower of these two G650 Media Gateways is A and the address of the upper G650 is B. In this example, the G650s in the stack form three independent port networks:

- PN 1 has one G650 with an A carrier address
- PN 2 has two G650s with an A and B carrier address
- PN 3 has two G650s with an A and B carrier address

The carrier address of an individual rack mounted, table mounted, or floor mounted G650 is A.



Number	Description
1 & 2	S8800 Servers
3	Ethernet switch

Table continues…

Number	Description
4 & 5	UPS units: one for each server
6	G650 Media Gateway: Carrier position A
7	G650 Media Gateway: Carrier position B
8	G650 Media Gateway: Carrier position C
9	G650 Media Gateway: Carrier position D
10	G650 Media Gateway: Carrier position E

G650 Media Gateway components

Required circuit packs

The G650 Media Gateway requires the following circuit pack:

655A power supply on page 147

If the G650 Media Gateway or G650 stack is connected as a port network (PN) to the S8800 or S8510 Server for the control network, the following circuit pack is also required in the PN:

TN2312BP IP server interface on page 179

If the G650 PN is connected by fiber to other PNs, one of the following circuit pack type is required:

For more information about ATM-connect PNs, see *Administering Network Connectivity on Avaya Aura® Communication Manager*, 555-233-504.

If the G650 PN uses the IP-PNC method for connections to other PNs, connects to branch location gateways in the network, supports IP endpoints, or serves as a gateway between fiber-PNC PNs and IP-PNC PNs in the PN configuration, the following circuit packs are required:

TN2302AP IP media processor on page 178 or TN2602AP IP Media Resource 320 on page 187

If the G650 PN connects to branch location gateways or adjuncts in the network, supports IP endpoints, or uses IP trunks, the following circuit pack is also required:

TN799DP control LAN (C-LAN) interface on page 168

For each physical location of a PN or group of PNs, the following circuit pack is also required:

TN771DP maintenance and test on page 162

Optional circuit packs

Additional circuit packs can be used with the G650 Media Gateway. Their use depends on which server is using the G650 Media Gateway, the S8510 Server or the S8800 Server. See Appendix B: Optional components for servers.

I/O connections

The 14-slots of the G650 are equipped with twisted pair cables. These cables run from the backplane to the 25-pair type D, metal shelled I/O connector panel mounted on the rear of the carrier. The power supply slots (0 and 15) do not provide external I/O connections.

I/O adapters

You can use any existing adapter for input and output if the associated TN circuit pack is supported in the G650.

Fan assembly

The three-fan unit can operate at two different speeds:

- Mid speed for normal cooling
- High speed when a temperature threshold is exceeded or a fan failure is detected

Avaya G650 specifications

Power requirements

AC power

Commercial AC is the primary input power source. Both, slot 0 and slot 15 have dedicated AC input. The 655A power supply can operate on 90 - 264VAC AC input at 47 - 63Hz. The nominal ranges for AC power are:

- 100 - 120VAC at 50 or 60Hz
- 200 - 240VAC at 50 or 60Hz

DC power

Minus 48VDC power can be supplied simultaneously as backup power. One -48VDC power input point is provided on the G650 backplane and is distributed through the backplane to each power supply.

Power output

Power supply output voltage measurements are +5VDC, -5VDC, and -48VDC

See the following table for power source information.

Chassis style and power-distribution unit	Power source options	Power input receptacles
• AC or DC power supply. Apparatus Code 655A • A 655A power supply is required in slot 0. • A 655A power supply is optional in slot 15.	• Single phase 120 VAC with neutral wire • Single phase 240 VAC with neutral wire • 48VDC	• 120 VAC, 60 Hz NEMA 5-15R • 240 VAC, 50 Hz IEC 320 • When you install G650s in Japan, use country-specific receptacles for 100 and 200 VAC, 50/60 Hz. • When you install G650s in Mexico, use country-specific receptacles for 127 VAC.

See the following table for circuit breaker information for AC-powered chassis.

Table 9: Circuit breakers for AC-powered chassis

Chassis type	Circuit breaker size
Rack mount chassis (120 VAC) 60 Hz	15 A
Rack mount chassis (240 VAC) 50 Hz	10 A

G650 Media Gateway dimensions

The G650 Media Gateway has the following dimensions:

- 14h x 17.5w x 22d (inches)
- 35.6h x 44w x 56d (centimeters)
- height in rack: 8 U
- weight: 35 - 39 pounds or 16 - 18 kilograms

The G650 requires 12-inches or 30 centimeters of clearance in the rear and 18-inches or 45 centimeters of clearance in the front. This clearance allows for adequate ventilation and conforms with standards for the EIA3 10D data rack. In a multiple G650 configuration, the G650s are placed in a rack without any space between them. If G650s are not correctly placed in the rack, the TDM/LAN cables cannot connect them.

Operating conditions

The normal operating conditions for the G650 are:

- 41º Fahrenheit (5º Celsius) to 104º Fahrenheit (40º Celsius)
- 10 percent to 90 percent relative humidity, not condensing below 10,617 feet (3,236 meters.

Avaya G700 Branch Gateway

The Avaya G700 Branch Gateway is an H.248 Branch Gateway. The G700 Branch Gateway with a server supports the entire range of adjuncts and peripheral equipment supported by Communication Manager.

Each G700 is associated with a primary call controller. The primary controller may be an S8300D, S8510, or S8800 Server. The S8300D is on a circuit pack that is always installed in slot V1 of a G700. The S8510 or S8800 Server is housed in a separate box that connects to the G700 Branch Gateway over a network through a C-LAN circuit pack. Both servers can support multiple G700 Branch Gateways.

The S8300D Servers can be configured as either a primary server or a Survivable Remote Server (Local Survivable Processor).

Note:

The G700 Branch Gateway is no longer being sold.

Detailed description of G700 Branch Gateway

The G700 Branch Gateway is scalable and offers options. It is functional on its own or with other G700 Branch Gateways. The G700 Branch Gateway is also functional in a stack that is mixed with Avaya C360 devices.

A maximum of 50 G700 Branch Gateways can be supported using the S8300D Server. A maximum of 250 G700 Branch Gateways can be supported using the S8800 Server or the S8510 Server.

To power IP telephones without additional cables, stack the G700 Branch Gateways with the Avaya C363T-PWR or C364T-PWR.

The following list describes the basic architecture of the G700 Branch Gateway:

- Intel i960 controller that hosts all the base switch-control and management software.
- Fits in an EIA-310-D standard 19-inch rack.
- Supports 15 ports of tone detection.
- Contains four media module slots.
- One P330 expansion-module slot.
- One slot for the Octaplane stacking fabric.
- Can sit on a desktop or be rack-mounted.
- Contains an internal motherboard. For more information, see Motherboard on page 132.
- Standard based 10/100 Ethernet Interface connection types. A wall field or breakout panel is not required.
- Internal global AC/DC power supply that provides low-voltage DC power to the fans, motherboard, and media modules.
- Four internal fans that provide cooling for the internal components.
- An LED board that indicates system-level status.
- A serial port for command-line access.
- An eight-port layer-2 switch or two 10/100BaseT external ports.

  Note:

  An expansion module can be ordered for additional 10/100T, 100FX, ATM, or Gigabit Ethernet ports.

- A VoIP engine that supports up to 64 G.711 single-channel calls, or 32 compression codec, G. 729, G.726, or G.723, TDM/IP simultaneous calls. In addition to voice calls, it supports transport of the following information:
  - Fax, Teletypewriter device (TTY), and modem calls over a corporate IP intranet using pass-through mode
  - Fax and TTY calls using proprietary relay mode

Note:

The path between endpoints for fax transmissions must use Avaya telecommunications and networking equipment.

Security alert:

Faxes sent to nonAvaya endpoints cannot be encrypted.

- 64kbps clear channel transport in support of BRI Secure Phone and data appliances (includes support for H.320 video over IP-connected Port Networks)
- T.38 Fax over the Internet (including endpoints connected to nonAvaya systems)
- Modem tones over a corporate IP intranet

Note:

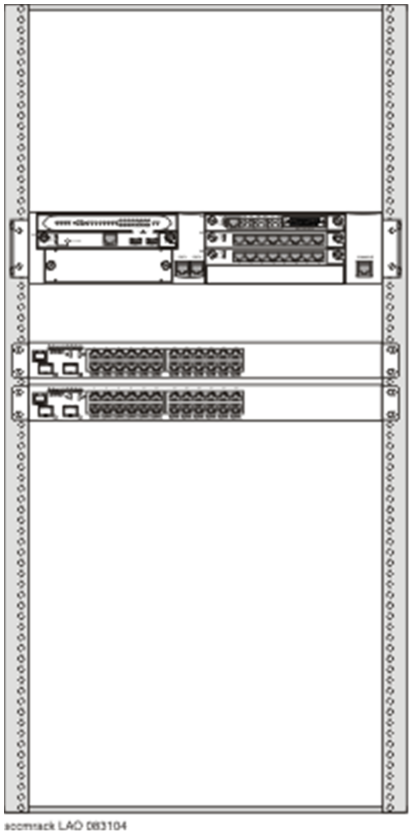
The path between endpoints for modem tone transmissions must use Avaya telecommunications and networking equipment.

For more information, see *Administering Network Connectivity on Avaya Aura® Communication Manager*, 555-233-504.

The G700 Branch Gateway supports SRTP media encryption.

G700 with two C360 switches

The G700 Branch Gateway has an architectural design that is similar to the Avaya stackable switching products. The following figure shows the G700 Branch Gateway with two Avaya C360 switches. The G700 Branch Gateway is shown at the top of the stack.



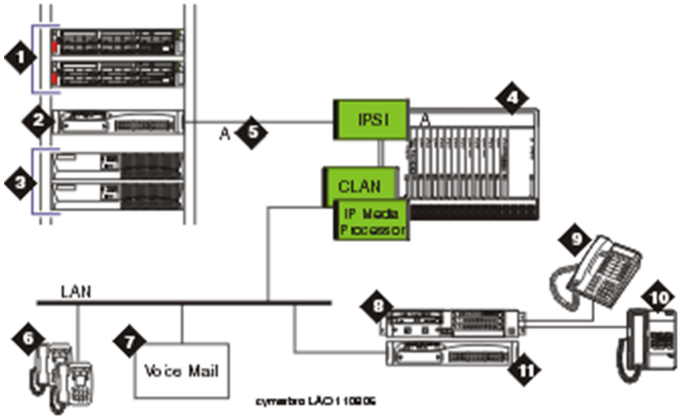
G700 configurations

G700 Branch Gateway with an S8800 Server

G700 with an S8800 Server as its primary controller connects through a LAN to a TN799DP C-LAN circuit pack. This circuit pack is mounted in a gateway. This configuration is basically the same whether the G700 has an S8300D Server as a Survivable Remote Server or does not have a Survivable Remote Server.

G700/S8800 Server configuration

The following figure is an example of G700 Branch Gateway connectivity to the S8800 server.



Name	Description
1	Two S8800 Servers
2	An Ethernet switch, must be provided by Avaya
3	Two uninterruptible power supplies (UPSs), one for each server
4	G650 Media Gateway
5	Dedicated LAN connectivity to the gateway's IPSI circuit pack
6	IP telephones connected through the customer's LAN
7	Voice mail. INTUITY AUDIX is shown connected through IP
8	A G700 Branch Gateway is connected by the LAN to the C-LAN circuit pack that is located in a G650 Media Gateway. The S8300D Server in a Survivable Remote Server configuration is located in the G700 Branch Gateway. In the event of a loss in communication between the S8800 Server and the G700, the Survivable Remote Server provides a backup for its registered endpoints
9	DCP telephones — Avaya multifunction digital telephones
10	Analog connectivity, such as analog telephones, lines, and trunks
11	Ethernet switch (optional)

G700 components

G700 octaplane stacking fabric

Octaplane is a name for an Avaya hardware capability to bundle stackable components using 4-Gbps communication in each direction. This technology combines separate units into a larger logical switch using different lengths of cables. These cables connect to the expansion slots in the rear of the units. These cables are wired in a ring configuration, which provides redundancy to the stack. If a single unit fails, the stack integrity is maintained. You can remove or replace any single unit without disrupting operation or performing stack-level reconfiguration.

G700 octaplane cabling specifications

The Octaplane cabling specifications table lists the cables available to create an Octaplane stack.

Cable	Description and function	Length	Length (metric)
X330SC short	A light-colored cable used to connect adjacent switches	12-inches	30 cm
X330LC long	A light-colored cable used to connect switches from two different physical stacks	6 feet	2 m
X330RC redundant	A black cable used to connect the top and the bottom switches of a stack.	6 feet	2 m
X330L-LC extra long	A light-colored cable used to connect switches from two different physical stacks	24 feet	8 m
X330L-RC long redundant	A black cable used to connect the top and the bottom switches of a stack	24 feet	8 m

G700 power supply

G700 uses an AC/DC power supply. A power supply located in G700 converts AC or DC input power to voltages needed by the system.

G700 motherboard

The motherboard resides in G700 and controls the following elements:

- The VoIP Engine, which supports up to 64 channels. If more than 64 channels are needed, a VoIP media module is required. The VoIP Engine performs the following functions:
  - IP/UDP/RTP processing
  - Echo cancellation
  - G.711 A-/μ-Law
  - G.729, G.726, and G723.1 encode/decode
  - T.38 and Avaya Proprietary FAX relay
  - FAX pass-through

- Modem pass-through
- Modem relay
- Clear channel
- Teletypewriter device (TTY) tone relay
- Silence suppression
- Jitter buffer management
- Packet loss concealment
- Avaya Encryption Algorithm (AEA) and Advanced Encryption Standard (AES) encryption of VoIP audio
- Packet reorder

- The gateway processor complex controls all the resources that are inside the gateway. The gateway processor functions include the Media Module Manager, tone clock, and H.248 signaling to the gateway controller.
- An Avaya P330 processor complex, which is based on the Avaya P330 data-switch architecture. This complex provides an 8-port Layer-2 switch function and manages the Expansion and Cascade modules.
- The electrical connectivity and the physical connectivity for the four media module slots.

Note:

The motherboard cannot be replaced in the field.

For more information about the VoIP Media Module, see MM760 VoIP Media Module on page 205.

G700 fans

G700 contains four 12-volt fans. These fans are monitored and SNMP can provide reports to a management station.

G700 Branch Gateway LEDs

The G700 Branch Gateway uses two types of LEDs:

- Media module
- System level

Although some media modules have additional LEDs, a standard 3-LED pattern on each of their faceplates indicates the following conditions:

- Red: Fault condition

  This LED also lights when the media module is physically inserted and turns off when the board initializes.

- Green: Test condition

- Yellow: In-use condition

G700 media module LEDs

See the following figure for the LEDs on the G700 media module.

Name	Description
1	ALM – Alarm LED
2	TST – Test LED
3	ACT – Active LED

G700 media module LEDs specifications

G700 media module LEDs have the following characteristics:

- Each media module has at least three LEDs to indicate module and port status or maintenance and administration modes.
- The location, spacing, and labeling is fixed for all LEDs on all media modules.
- The LEDs are mounted on the media module's printed wiring board and placed so the LEDs show through an opening.

G700 system-level LEDs

The system-level LED board:

- Provides visual indication of both system and Ethernet-port status and allow customers to change between these status-indication modes.
- Resides in the upper-left front of the G700 Branch Gateway. The LEDs themselves reside in the board's oblong fascia panel.

You must insert or remove the LED board when you insert or remove the S8300D Server.

The LED panel is not the same size as a standard media module. You cannot insert a media module into the LED board slot or vice versa.

G700 Branch Gateway specifications

The following table lists environmental considerations for the G700 Branch Gateway.

Consideration	Description
Heat dissipation	The G700 Branch Gateway uses global AC, 100 VAC to 240 VAC, 50/60 Hz, 1.5 to 4.9 A, which translates to 360 to 400 Watts. However, some heat is passed out the front, by -48 VDC (up to 32 ports at 1.5 watts each for a total of 48 watts).
Altitude	Functions at altitudes of minus 197 feet (60 meters) to 10,000 feet (3,048 meters).
Air pressure	Air pressure is not specified.
Temperature and humidity	Long term operation at 41 ˚F (+5 ˚C) to 104 ˚F (+40 ˚C) at 5% to 85% humidity. Short term operation at 23 ˚F (-5 ˚C) to 122 ˚F (50 ˚C), at 5% to 90% humidity, noncondensing.
Air purity	Requires an indoor environment that is suitable for continuous human occupancy.
Lightning	The user is protected under the UL codes against overvoltage in the system. However, the system itself is susceptible to overvoltage, such as lightning, depending on the configuration. The loss of service because of an overvoltage condition can result in the loss of one or more of the following elements: • Terminal loss • Port loss • Media Module loss • Power supply within the G700
Acoustic noise generated	50 dBA maximum
Electromagnetic compatibility standards	Conforms to the electromagnetic compatibility standards for the countries in which it operates.
European Union standards	Approved to Safety Standard EN60950.
Air flow with a single fan failure	In front of the backplane, airflow is 264 linear feet per minute average. If a fan fails in front of the backplane, airflow becomes 174 lfpm average, with a range from 42 to 340 lfpm.
Air flow with the power supply fan failure	Minimal air flow at power supply if power supply fan fails.

G700 Branch Gateway power requirements

The power supply complies with FCC Part 15, Subpart B Class B and EN55022 Class B requirements for conducted and radiated electromagnetic interferences (EMI). You can use the power supply in single or multiple G700 Branch Gateways. The power supply must allow the system to comply with Class B requirements with +6 dB of margin.

This power unit can be a single power supply or multiple modules that are sized and scalable for the load. The Avaya Ethernet switches have a power unit that meets the 802.3 AF standard and provides remote power for the telephone. The power supply meets all applicable global standards for safety, immunity, and emissions and is verified by in-country testing.

Thermal protection

Thermal protection shuts down the power supply if the internal temperature exceeds the maximum rated safe operating temperature. The minimum thermal shutdown point is at an ambient temperature of 122 ˚F (50˚ C) at 10,000 feet (3,048 meters) altitude or 140 ˚F (60˚ C) at sea level. These temperature minimums are constant under all input and load conditions. You must consider the effects of component tolerances when you define the shutdown point. This consideration ensures that the supply does not shut down at ambient temperatures that are less than those previously specified. This ambient temperature is measured with a forced air flow from input to output at a nominal rate of 46 cubic feet (1.3 cubic meters) per minute (CFM) or 300 linear feet (91.4 linear meters) per minute (LFM).

Manual reset

The power supply requires a manual reset after the power supply shuts down because of overvoltage or overheating. To reset the power supply, recycle the AC input power.

AC and load center circuit breakers

For AC power, each of G700 has a detachable AC power cord. This cord plugs into a wall socket or into a power strip on the rack. A circuit breaker for the panel that serves the outlet protects this circuit.

As a result, G700 itself does not have circuit breakers or on/off switches. However, any customer AC load center must have circuit breakers that protect the power feeds to G700 as required by electrical codes.

AC power distribution

AC power distribution is plugged into an outlet or a power strip and can be backed up by an optional uninterruptible power supply (UPS).

AC grounding

G700 contains a grounding screw on the back of the chassis. You must maintain ground connection whether you connect G700 directly to the branch circuit or to a power distribution strip. G700 also requires a cabinet ground connection directly to an approved ground.

G700 related hardware and adjuncts

Expansion modules

G700 is architecturally based on the Avaya P330 and C360 switches. Therefore, customers can use selected P330 expansion modules with G700. The P330 local-area network (LAN) and wide-area network (WAN) expansion modules connect directly to G700 without requiring additional hardware. Two types of expansion modules are available from Avaya:

- X330 WAN Access routing modules
- P330 LAN expansion modules

X330 WAN access routing module

Customers with multiple branch offices need network solutions that are simple, flexible, and scalable. You can use the Avaya X330 WAN Access routing module to deploy a unified, high-performance LAN/WAN infrastructure in one data stack.

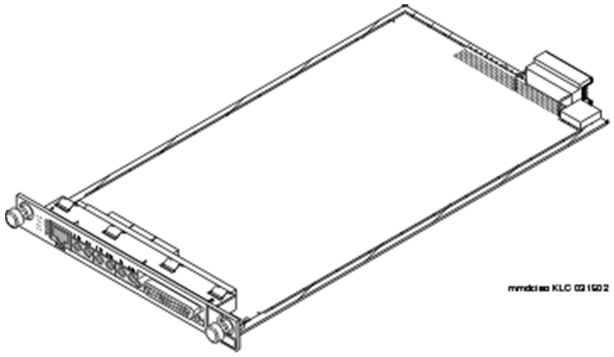
Highlights of the Avaya X330 WAN Access Router:

- Provides integrated WAN access that can be used with external firewalls or VPN Gateways
- Works with the following WAN and routing protocols
  - Point-to-Point (PPP) over channeled E1/T1
  - Frame Relay
  - Routing Information Protocol (RIP) v1/v2
  - Single-Area Open Shortest Path First (OSPF)
  - VRRP Redundancy
  - Throughput: wire-speed WAN routing

Supported media modules in the G700

Avaya media modules convert the voice path of the traditional circuits, such as analog trunk, T1/E1, and DCP to a TDM bus. The VoIP engine then converts the voice path from the TDM bus to packetized compressed or uncompressed VoIP on an Ethernet connection.

The media modules reside in the G700 Branch Gateway and interact with the motherboard and backplane. The following figure shows a top view of a media module.



There are nine media modules supported by the G700 Branch Gateway:

- MM710 T1/E1 ISDN PRI – For information, see BROKEN LINK: MM710 T1/E1 Media Module.
- MM711 Analog – For information, see BROKEN LINK: MM711 Analog Media Module.
- MM712 DCP – For information, see MM712 DCP Media Module on page 198.
- MM714 Analog – For information, see BROKEN LINK: MM714 Analog Media Module.
- MM716 Analog – For information, see BROKEN LINK: MM716 Analog Media Module

- MM717 DCP – For information, see BROKEN LINK: MM717 DCP Media Module.
- MM720 BRI – For information, see BROKEN LINK: MM720 BRI Media Module.
- MM722 BRI – For information, see BROKEN LINK: MM722 BRI Media Module.
- MM760 VoIP – For information, see MM760 VoIP Media Module on page 205.

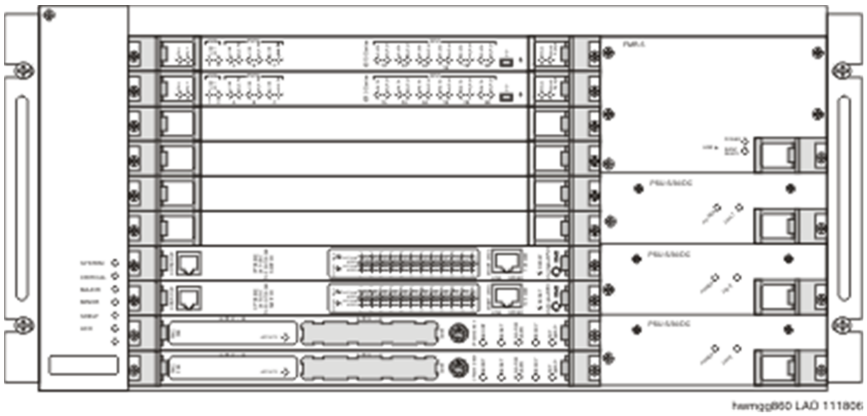
G860 Branch Gateway

The Avaya G860 Branch Gateway is a high channel density, standard compliant, VoIP gateway. It provides a robust, scalable, and modular solution designed for a large campus or call center with high availability and reliability. For maximum reliability, the G860 Branch Gateway features protection switching and full redundancy of all common equipment.

The G860 Branch Gateway works with the duplex servers, and is supported by Communication Manager Release 4.0 and later.

Note:

The G860 Branch Gateway is no longer being sold.



G860 Branch Gateway configuration

The G860 Branch Gateway chassis is only available in a redundant configuration, providing full duplication. The Trunk Processing Module can be used either in a single server configuration or in a N+1 redundant configuration.

Channels can be configured for one of the following:

- Protected: backup capability for the gateway boards in which voice and signaling trunks are guaranteed constant service.
- Non-protected: no backup capability provided.

Configurations may vary according to the precise needs of the customer.

G860 Branch Gateway components

Component	Redundant configuration
Chassis	1
System Controller (SC)	2
Synchronization and Alarm Rear Transition Module (SA/RTM)	2
ES/6600 (Ethernet Switch Board - 24 Gigabit Ethernet)	2
ES/6600/RTM (Ethernet Switch 7 I/O Rear Transition Module	2
Trunk Processing Modules (TP-6310)	Up to 4
6310/RTM (TP-6310 I/O Rear Transition Module)	Up to 3
6310/RTM/HA/Redundant (TP-6310 I/O Rear Transition Module - Redundant)	1
PS/DC/5K (DC Power Supply Modules)	3
PEM/DC/5K (DC Power Entry Modules)	2
FM/5K (Fan Tray Module)	1
AF/5K (Air Filter)	1
FMR/5K (Auxiliary Fan Tray Module)	1
FPM/5K (DC Fan Tray Power Supply Module)	2
Blank panels (full configuration): Blank panel - panel only Blank panel - baffled filler panel	1 1
Fiber cables (provided by customer) that connect to back of Trunk Processing Module	

Each G860 Branch Gateway is accompanied by an accessories kit, which includes:

- RS-232 straight cable for System Controller Console Terminal (not crossed-over)
- RS-232 straight cable for Ethernet Switch Console Terminal
- CD containing system software and documentation
- CD containing optional Element Management System software

For more information, see *Installing and Operating the G860 Media Gateway*, 03-601918.

G860 Trunk Media Processing Module (TP-6310)

The G860 Trunk Processing Module (TP-6310) is a high-density, hot-swappable, compactPCI resource board with a capacity of 672 DS0 channels, supporting all necessary functions for voice, data, and fax streaming over IP networks.

Note:

The Trunk Processing Module is hot-swappable for redundant systems. However, the board must be locked to be replaced, which takes the board out of service.

The Trunk Processing Module provides STM-1/OC-3 (future) and T3 interfaces through its Rear Transition Module (RTM). The 6310/RTM panel contains Tx and Rx transceivers for:

- 1+1 (total 2) PSTN STM-1/OC-3 interfaces (future)
- 3 (1 active) T3 (3) PSTN interfaces (6 connectors - 3 RX and 3 TX)

The T3 PSTN interface port is an SMB connector with Tx and Rx transceivers.

The 6310/RTM is designed for protection capabilities. The 6310/RTM/HA/Redundant itself does not provide any PSTN ports. The same redundant RTM should be used for both STM-1 (future) and T3 versions.

Slots 7 to 10 are used for up to 4 Trunk Processing Modules (including the redundant TP-6310) according to customer requirements. The corresponding RTMs are located in the rear cage of the G860 in the corresponding slot. The appropriate rear RTMs are located in the rear cage of the G860 in the corresponding slot.

For redundant N:1 protection, the 6310/RTM/HA/Redundant Standby board is provided. It contains no port connections and occupies slot 10.

System controller

The system controller (SC) board controls and monitors the G860 Branch Gateway operation. The SC board incorporates a 650 Mhz UltraSparc processor with 512 MB memory and uses the robust Solaris operating system environment enhanced for advanced high-availability features.

The G860 Branch Gateway contains two SC boards, which are installed into their dedicated slots. Each controller contains an on-board hard disk, which stores the system controller software and configuration and performance database.

The SC board is designed according to PICMG Compact PCI standards for high-availability systems. It supports hot-swap operation, system management, and environmental monitoring. The SC board has two PCI Mezzanine Connectors (PMCs). One is occupied by the SC board with on-board hard disk and the second is reserved for future expansion of board functionality.

The two 10/100 Base-TX redundant Ethernet ports connect the SC board with the two Ethernet Switch boards through cPSB dedicated links in the midplane. The front panel PS2 COM serial port provides RS-232 console connection. The RS-232 console connection can be made through the SC front panel PS2 Com serial port or through the RS-232 serial port on the SA/RTM.

The SC board is accompanied by a Synchronization and Alarm (SA) and Rear Transition Module (RTM) board. The SA board is inserted into the midplane directly behind the main SC board and contains an RS-232 port for connecting to a console terminal.

Cooling system

The G860 Branch Gateway components are cooled by a fan tray unit (FM/5K), located at the left of the card cage. An auxiliary fan tray unit (FMR/5K) is located in the top right-hand corner of the chassis, above the power supply units.

G860 Branch Gateway LEDs

The FM/5K fan tray unit panel contains the system's alarm indicators (LEDs) Alarm Cutoff and Reset Buttons.

The alarm indicators are connected to the fault detection and alarm system provided with the G860. As needed, LEDs indicate critical, major, or minor system faults, as well as system and shelf alarms.

G860 specifications

G860 Branch Gateway dimensions

Dimension	Value
Width	48.3 cm (19-inches)
Height	22.2 cm (8.75-inches)
Depth with projections	36.5 cm (13.7-inches)
Depth without projections	30 cm (11.8-inches)
Weight (fully loaded)	20.45 kg (45.1 lbs)

G860 Branch Gateway power requirements

For Avaya G860 Branch Gateway with Trunk Processing Module, the average power consumption for a full complement of boards is approximately 696 watts (14.5 A at 48 VDC).

Two Power Entry Modules (PEM) are provided for DC connections on the rear of the chassis. Power is required to be between -40.5 and -60 VDC. Each PEM unit contains one input terminal. Each of the DC input terminals is reverse current protected. The input terminals on each of the PEM units provide redundancy protection for the power entry circuitry.

Following are the specifications for DC power input:

- When using DC power as the primary input, ensure that the power supply complies with the safety requirements of Call Agent CAN/CSA-C22.2 No. 60950-00 and UL 60950, and EN 60950.
- For high availability, connect two separate DC power sources to avoid total power failure if one of the DC power sources fails.

Electromagnetic compatibility

The chassis is designed to comply with known EMC/RFI standards, including FCC Part 15, Class B; ICES-003, Class A; EN 55022, Class B; EN 300 386.

Compliance measures include:

- Venting holes for intake and exhaust, sized to provide for blockage of frequencies within the specified range
- Blank panels with contact fingers used for covering empty slots when a configuration requires this
- RFI filters built-in to the DC power inputs, assuring that conductive interference does not reach the power supply modules, or that switching signals generated by the power supply modules do not propagate over the main feed
- Air filters integrate a honeycomb EMI shield in its assembly. The honeycomb structure consists of cells that are engineered to trap and absorb EMI noise while maintaining 95% to 99% aperture for minimal airflow impedance. A gasket installed around the frame makes sure there is conductivity of the frame to the enclosure.

G860 Branch Gateway environmental specifications

Physical protection requirements	Test level
Humidity	5 to 90%
Altitude	-60 to 3048m (10,000 ft)
Drop test, packaged	Drop height: 600 mm
Drop test, unpackaged	Drop height: 75 mm
Earthquake	Zone 4
Office vibration	5-100-5 Hz/0.1g, 0.1 oct/min; 3 axes
Transportation vibration	5-100 Hz, 0.1 oct/min; 100-500 Hz, 0.25 oct/min
Thermal shock	-40 to +25 degrees C/ -40 to 77 degrees within 5 mins +70 to +25 degrees C/ -158 to 77 degrees F within 5 mins

The following summarizes environmental conditions for the G860 Branch Gateway:

- Temperature
  - Extended short-term range for operation: -50C to +55 degrees C; -58 to +131 degrees F
  - Recommended ambient temperature: +5 to +40 degrees C; +40 to +104 degrees F
- Humidity
  - Relative humidity range for operation: 5 to 90%
  - Nominal relative humidity: 70% (wet bulb)
- Lightning protection

In addition to correct earthing, sufficient lightning protection must be included at the site to prevent damage to the equipment. Damage can result either from a direct strike of lightning or from propagated high voltage surges.

To avoid damage caused by lightning surges, installation of equipment should be compatible with Class 3 classification as defined by EN61000-4-5 Annex B, where the surge level may not exceed 2kV.

- Altitude: up to 3048m (10,000 ft)
- Earthquake: zone 4
- Rack requirements
  - Telco rack: 48.3 cm (19-inch)
  - Space: as per GR-63-CORE; maintenance access 762 mm (2 ft 6 in); wiring access 610 mm (2 ft)

Electrical aspects

The main midplane routes all signals and power to and from the plug-in boards residing in the slots, in both the front and rear sections of the chassis. Each slot is equipped with a key on the midplane to match the appropriate board type to prevent inserting a wrong board type into the slot.

G860 related hardware and adjuncts

Ethernet switch

All of the VoIP traffic (media and signaling) is routed between the gateway and the IP network through the Ethernet switch. The gateway board communicates with the Ethernet switch through two redundant 100/1000 mbps cPSB links.

The SC boards communicate with the Ethernet switch through two redundant 100 mbps cPSB links. This configuration ensures redundant operation protection upon failure of any of the communication elements.

Both Ethernet switch boards are interconnected according to the PICMG 2.16 cPSB standard in a dual-star configuration, with one ES board in active mode and the other in standby mode. This configuration ensures full redundant Ethernet routes to all boards in the chassis. Failure of the active ES board automatically switches the second ES board from standby to active mode. Each of the ES boards has two fiber optic or copper Gigabit uplink interfaces for connection to the IP backbone network.

The ES/6600 board provides 24GbE ports, of which five are 1000 Base-T ports for connection to external equipment.

Power supply and power entry module

The power supply has the following features:

- DC input
- Wide range: -40.4 to -72 VDC input

- Active current load sharing on positive outputs (V1, V2 & V3)
- DC input, reverse-polarity protected
- Integral LED status indicators
- Hot-pluggable connector, with staged pin lengths
- Hot swappable
- Optimized thermal management
- No minimum load, any output
- Control and monitoring features

PS/DC/5K PEM technical specifications

- Output:
  - Output power 250 watts maximum, continuous
  - Outputs (V1-V5) +3.3 V at 40 A; +5 V at 40A, +12 V at 5.5 A; -12 V at 1.5 A
  - Temperature coefficient +/- 0.02% / degrees C
  - Controls and signaling TTL
- General characteristics:
  - Efficiency 75% at full load
  - Safety standards EN 60950, UL 1950, CSA 22.2 No. 950
- DC input:
  - PEM/DC Power Entry Module for DC
  - Input -40.5 to -60 VDC

APM/5K and FPM/5K - Advanced Fan Power Module

The Advanced Fan Power Module is the power supply for the fan tray unit. It is provided in a DC version. Two FPM/5K units are provided for redundant protection. The APM/5K and FPM/5K are not hot-swappable.

Element Management System

The Element Management System (EMS) is an advanced solution for standard-based management of gateways within VoIP networks, covering all areas vital for the efficient operation, administration, management, and provisioning of the G860 Branch Gateway. The EMS features a client/server architecture, enabling customers to access the EMS from multiple, remotely located work centers and workstations.

The EMS server runs on Sun Microsystems Solaris.

G860 Branch Gateway high-level capacities

The following table outlines the maximum capacities of G860 for single server and redundant configurations.

Capacity	Single server	Redundant configurations
T3 links non-protected	12	12
T3 links protected		12

Chapter 5: Circuit packs, channel service units, and power supplies

120A channel service unit

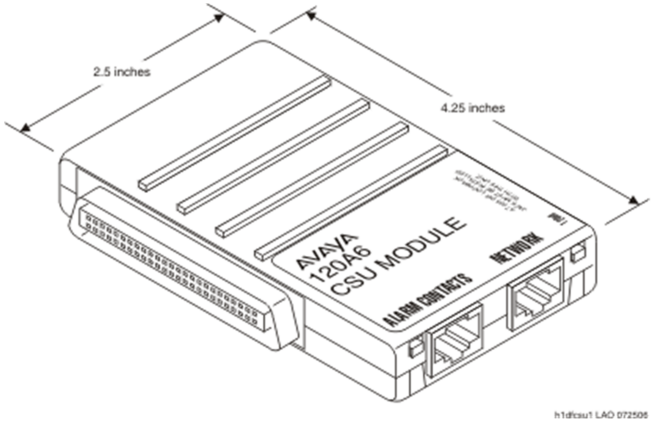
The 120A channel service unit (CSU), when combined with one circuit pack, provides an integrated CSU that:

- Converts digital frames for communications between a local area network (LAN) and wide area network (WAN)
- Provides a barrier for electrical interference from either side of the unit
- Echoes loopback signals for testing the network

The 120A CSU performs similar functions to an external CSU but with the following advantages:

- highly reliable
- uses less equipment and space
- powered by the system
- easy to install and operate

The 120A CSU connects to a DS-1 circuit pack through the I/O connector panel on the back of the cabinet. A modular cable plugs into the CSU module at one end and into a 700A loopback jack, smart jack, or other service-provider interface on the other end.



The following circuit packs support 120A CSU:

- TN464E to TN464HP

- TN2464CP and earlier
- TN767D or TN767E
- TN2313 or TN2313AP

The 120A CSU is supported on DEFINITY, Multivantage, and Communication Manager servers that support TN circuit packs.

650A AC power unit

This global power-factor-corrected supply accepts 47-Hz to 63-Hz AC input, while auto-ranging between 85 VAC and 264 VAC input. The 650A power unit provides 330 watts of total output and multiple DC outputs as follows:

- +5.1 VDC at 28 A
- 5.1 VDC at 1.0 A
- 48 VDC at 4.5 A
- +8- VDC to +14 VDC at 1.6 A (fan-speed control)

  This output (+12 VDC nominal) controls the fan speed. The voltage varies with the ambient air temperature at the inlet below the power supply. If this voltage reaches +14 VDC, the system activates a FANALM signal.
- 115 VDC to –150 VDC at 200 mA (neon bus)

The 650A power unit has three switch-selectable outputs for ringing:

- 20-Hz AC output at 85 V RMS and 80 mA, centered about –48 VDC at 180 mA
- 25-Hz AC output at 72 V RMS and 8 to 80 mA, centered about –48 VDC at 180 mA
- Two 50-Hz AC outputs at 28 V RMS, effectively 56 V, and 220 mA, biased about –48 and 0 VDC at 70 mA balanced

655A power supply

The G650 can use one or two 655A power supplies that can have both AC and DC input power present. Either power supply can provide all the power needed by the G650. When there are two power supplies, they share the power load. One power supply can operate on AC power and the other on DC power. But, if AC power is available, the system always uses AC power. The 655A power supply is:

- The only power supply supported in the G650
- Not backward compatible to other carrier types

If you use only one 655A power supply, place it in slot 0. If you are using two power supplies, place them in slots 0 and 15.

Note:

You can insert or remove a redundant power supply and not affect the G650 if the other 655A power supply is operating.

Detailed description of 655A power supply

655A input power

The 655A power supply can operate on either AC or DC input power. But, if AC power is available, the system always uses AC power. One power supply can operate on AC power, and the other on DC power. The power supplies use AC power first and change to DC power if AC power fails or is not present.

655A AC power

Commercial AC is the primary input power source. Both slot 0 and slot 15 have dedicated AC input. The 655A power supply can operate on AC input that ranges from 90 to 264 VAC at 47 to 63 Hz. The nominal ranges for AC power are:

- 100 to 120 VAC at 50 or 60 Hz
- 200 to 240 VAC at 50 or 60 Hz

655A DC power

-48VDC power can be supplied simultaneously as backup power. One -48VDC power input point is provided on G650 backplane and is distributed through the backplane to each power supply.

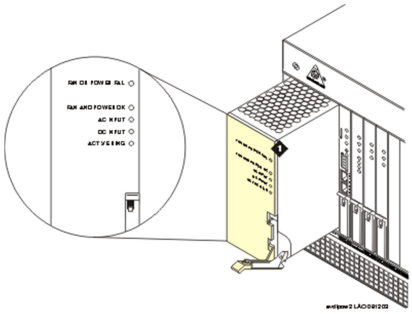
655A power supply LEDs

The five LEDs on the faceplate of the 655A power supply are in a vertical line with the red LED on top. These five LEDs provide the following status:

- Red
  - Lights when there is a failure in either the power supply or the fans. For a G650 with redundant power supplies, a failure in the fan assembly lights this LED on both power supplies
  - Flashes off once per second when the software shuts down the ring voltage output of a power supply
- Yellow
  - Lights when the status of the power supply and fans is uninterrupted
  - Flashes once per second when the software shuts down a single power supply in a carrier with operational redundant power supplies

- Green
  - Lights when there is AC or DC power supply
  - Lights when the power supply causes ringing to G650

For an example of 655A faceplate LEDs, see the following figure.



655A ring generation

The 655A provides either North American ringing (20Hz) or European/International (25Hz) ringing. The 655A also has a setting to provide no ringing. This setting is applicable when the customer supplies a ring generator that is external to the power supply. An example of an external ring generator is the TN2202 French ringing circuit pack.

The 655A power supply provides a physical slide switch to select the frequency of the ring generator. The options are:

- 20Hz: North American
- 25Hz: European and international
- Other: No ringing output. Applicable when an external ring generator is used such as the TN2202 French ringing circuit pack.

You must remove the power supply from G650 when you change the ringing frequency selection. The ringing frequency selection switch is on the back of the power supply.

Only one 655A supplies ringing to G650. The power supply in slot 0 in G650 with an A carrier address is the default for ringing. The system uses this default 655A unless the 655A has failed or the software forces the system to shut down. When a G650 carrier has redundant power supplies, one supply automatically supplies ringing if the other power supply fails.

A 655A provides ringing to only one G650 carrier. For example, the 655A power supplies in carrier A supply ringing to carrier A only. Meanwhile, the power supplies in carrier D supply ringing to carrier D only. If the ring generation in both of a carrier's power supplies fail, no other power supply provides ringing for the carrier.

655A replaceable DC-input fuse

The 655A provides a replaceable 25 ADC-input fuse that protects the DC input from reverse voltage on the -48VDC input. If reverse voltage is applied to G650 and 655A power supply, the 655A fuse will blow open protecting the 655A from damage.

If G650 does not operate on DC input, you need to inspect the fuse by removing the 655A power supply from G650.

The fuse is located on the rear surface of the 655A power supply. A spare fuse is also located on the rear surface.

TN429D incoming call line identification

The TN429 incoming call line identification (ICLID) circuit pack provides eight ports for direct inward/outward dialing (DIOD) trunks. Each port provides a 2-wire interface to the central office (CO) public exchange for incoming calls and outgoing calls. The CO provides caller names and numbers to the circuit pack. The CO displays the names and numbers on digital telephones, DCP and BRI that are equipped with a 32-character or a 40-character alphanumeric display. In the United States, the ICLID supports name and number. In Japan and other countries that comply with ICLID requirements, the ICLID displays the number only.

This ICLID is required for the Japan ANI feature where the calling number passes through to the switch. An in-band detector/converter might be required, go to the Avaya Support website at http://support.avaya.com to open a service request for an in-band detector/converter.

The ICLID provides the required CO disconnect functions and the interface to CAMA/E91.

TN433 speech synthesizer

The TN433 speech synthesizer for Italian provides four ports. These ports retrieve fixed messages for leave word calling, automatic wake up, and attendant console features for the visually impaired. These fixed messages include good morning, time-of-day, and extension number. Each of the ports has touchtone detection. The TN433 speech synthesizer has administrable A-Law and Mu-Law companding capabilities.

TN436B direct inward dialing trunk (8 ports)

The TN436B direct inward dialing (DID) trunk for Australia provides eight ports for DID. These ports are independently connected to a public network. Each port is an interface between a 2-wire analog line from a CO and the 4-wire TDM network in the system. The TN436B DID for Australia has administrable timers.

TN438B central office trunk (8 ports)

The TN438B CO trunk for Australia provides eight ports for loop-start CO trunks. Each of the eight ports has tip and ring signal lead. The TN438B can detect 12-kHz and 50-Hz periodic metering pulses from the CO. Additional features include call still held timing and automatic guard fault-detection circuitry.

TN439 tie trunk (4 ports)

The TN439 tie trunk circuit pack for Australia and Japan provides four ports for 2-wire tie trunks with loop disconnect signaling. The TN439 has administrable A-Law and Mu-Law companding and administrable timers.

TN457 speech synthesizer

The TN457 speech synthesizer for British English provides four ports. These ports retrieve fixed messages for leave word calling, automatic wake up, and attendant console features for the visually impaired. These fixed messages include good morning, time-of-day, and extension number. Each of the ports has touchtone detection. The TN457 speech synthesizer has administrable A-Law and Mu-Law companding capabilities.

TN459B direct inward dialing trunk (8 ports)

The TN459B DID circuit pack for the United Kingdom provides eight ports for immediate-start or wink-start DID trunks. Each port has tip and ring signal leads. Each port is an interface between a 2-wire analog line from a CO and the 4-wire TDM network in the system. The TN459B DID circuit pack has administrable timers and a backward busy circuit that complies with signaling requirements.

TN464HP DS-1 interface, T1 (24 channels) or E1 (32 channels)

The TN464HP circuit pack provides:

- Circuit pack-level, administrable A-Law or Mu-Law companding
- CRC-4 generation and checking (E1 only)

- Stratum-3 clock capability
- ISDN-PRI T1 or E1 connectivity
- Line-out (LO) and line-in (LI) signal leads for unpolarized, balanced pairs
- Support for CO, TIE, DID, and off-premises station (OPS) port types that use any of the following protocols:
  - robbed-bit signaling protocol,
  - proprietary bit-oriented signaling (BOS) 24th-channel signaling protocol, or
  - DMI-BOS 24th-channel signaling protocol
- Support for Russian incoming ANI
- Support for universal, digital, signal level-1equipment in wideband ISDN-PRI applications
- Test-jack access to the DS-1 or E1 line and support of the 120A integrated channel-service unit (ICSU) module
- Support for the enhanced maintenance capabilities of the ICSU. These circuit packs can communicate with Avaya Interactive Response System.
- Downloadable firmware
- Support for echo cancellation

  You can select the echo cancellation capability of the TN464HP on a per-channel basis. The TN464HP DS-1 interface automatically turns off echo cancellation when the interface detects a 2100-Hz phase-reversed tone generated by high-speed modems (56-kbps). But the interface does not turn off echo cancellation when the interface detects a 2100-Hz straight tone generated by low-speed modems (9.6 kbps). Echo cancellation improves a low-speed data call.

  The TN464HP DS-1 interface is intended for customers who are likely to encounter echo. This echo can be over circuits that are connected to the public network. The occurrence of echo is higher if the switch is configured for ATM, IP, or other complex services and interfaces to certain local service providers. These local service providers do not routinely install echo cancellation equipment in all their circuits. A common source of echo is hybrid circuits, where conversions between 2-wire analog circuits and 4-wire digital circuits take place. The TN464HP DS-1 interface cancels echo with delays of up to 96 milliseconds.

TN465C central office trunk (8 ports)

The TN465C CO trunk circuit pack supports multiple countries.

This circuit pack contains, eight analog CO trunk ports, loop-start trunk signaling, 12- and 16-kHz periodic pulse metering (PPM) detection and counting, administrable timers, battery-reversed signaling, and multicountry selectable signaling.

For more information about TN465C, go to the Avaya Support website at http://support.avaya.com.

TN479 analog line (16 ports)

The TN479 analog line circuit pack has 16 ports and supports three ringer loads and three simultaneous ringing ports. Only one telephone can have an LED message waiting indicator. Neon message waiting indicators are not supported. The TN479 supports µ-Law companding.

Note:

This circuit pack is no longer sold.

The following table lists the telephones that TN479 supports and their wiring sizes and ranges.

Telephone	Wire size (metric area/diameter)	Maximum range (feet)
500-type	24 AWG (0.2 mm^2/0.5 mm)	3,000 (914 m)
2500-type	24 AWG (0.2 mm^2/0.5 mm)	3,000 (914 m)
7100-series	24 AWG (0.2 mm^2/0.5 mm)	3,000 (914 m)
7101A	not supported	not supported
7103A	not supported	not supported
8100-series	24 AWG (0.2 mm^2/0.5 mm)	2,500 (762 m)
9100-series	24 AWG (0.2 mm^2/0.5 mm)	2,500 (762 m)

TN497 tie trunk (4 ports)

The TN497 tie trunk circuit pack for Italy has four ports for 2-wire tie trunks with loop disconnect signaling.

Note:

This circuit pack is no longer sold.

Each port can be administered for:

- A-Law or Mu-Law companding timers
- Translatore Giunzione Unscente (TGU) (outgoing tie)
- Translatore Giunzione Entrante (TGE) (incoming tie)
- Translatore Giunzione Interno (TGI) (internal tie)

TN556D ISDN-BRI 4-wire S/T-NT interface (12 ports)

The TN556D ISDN-BRI circuit pack has 12 ports that connect to ISDN-BRI terminals. Each port on a TN556 ISDN-BRI circuit pack has:

- TXT

- TXR
- PXT
- PXR signal leads

Up to eight ports can be used for Adjunct Switch Application Interface (ASAI) links. Each port operates at 192 kbps and has two B-channels and one D-channel.

The TN556D ISDN-BRI circuit pack has a maximum range of up to 1900 feet (579 meters) from the system to the telephone when the circuit pack is connected with a 24-AWG (0.20 mm^2/0.51 mm) wire. The TN556D uses standard ANSI T1.605 protocol. Up to 24 terminals can be connected, where each terminal uses one B-channel and shares the D-channel. The TN556 also has multipoint support. The capacity for the multipoint support depends on the protocol. In countries that do not support Service Profile Identifier (SPID), there is a limitation of one BRI telephone per port.

The TN556D ISDN-BRI circuit pack supports A-Law or Mu-Law companding. The TN556D ISDN-BRI circuit pack also functions as a trunk when connecting to a TE interface, such as a TN2185B in another switch. It can be used for lines and trunks simultaneously. The TN556D ISDN-BRI circuit pack provides end-to-end outpulse signaling when the circuit pack is in tie-trunk mode with a TN2185B ISDN-BRI S/T-TE interface (4-wire, 8 ports) on page 173.

TN574 DS-1 Converter — T1, 24 Channel

The TN574 is supported. TN1654 has replaced TN574.

TN725B speech synthesizer

The TN725B speech synthesizer supports English and is used in the United State.

The TN725B speech synthesizer circuit pack has four ports that send voice message information to telephones. These messages activate leave word calling, automatic wake up, voice message retrieval, and Do Not Disturb features. The ports can detect tones.

TN726B Data Line (8 ports)

The TN726B data line circuit pack has eight serial asynchronous EIA port. These ports have modem interfaces that are connected through asynchronous data units (ADUs) to EIA ports, such as RS-232, on DTE. The TN726B circuit pack uses Mode 2 or Mode 3 data transfer protocol.

Note:

This circuit pack is no longer sold.

The DTE can be adjuncts and peripheral equipment such as:

- data terminals
- printers
- host computers
- personal computers (PCs)
- graphics and fax systems
- and call detail acquisition and processing systems (CDAPSs)

With software-administered system access ports, a TN726B circuit pack connects through a cross-connect field to a TN553 packet data line circuit pack. The TN553 circuit pack then converts mode 2 protocol to mode 3 protocol. Mode 3 protocol transfers the TN726B circuit pack from the packet bus to the TDM bus for EIA connections.

Each port on a TN726B circuit pack has:

- TXT (terminal, transmit, and tip),
- TXR (terminal, transmit, and ring),
- PXT (port, transmit, and tip), and
- PXR (port, transmit, and ring) signal leads.

TN735 MET line (4 ports)

The TN735 MET line circuit pack has four ports that connect to multibutton electronic telephone (MET) sets. Each port has tip and ring signals (analog voice), and digital signals to control terminals such as BT, BR, LT and LR.

Note:

This circuit pack is no longer sold.

TN744E call classifier and tone detector (8 ports)

The TN744 call classifier and tone detector circuit pack has eight ports of tone detection on the TDM bus. The TN744 circuit pack does not support call progress tone generation or clocking. The tone detectors are used in vector prompting, outgoing call management (OCM), and call prompting applications in the United States and Canada. The tone detectors are also used for call classifier options for various countries. The TN744 circuit pack detects special intercept tones that are used in network intercept tone detection in OCM. The TN744 circuit pack also detects tones when a central office (CO) answers a call.

The TN744 circuit pack provides tone generation and detection for R2-MFC direct inward dialing (DID) signaling. DID signaling is used in installations outside the United States. The TN744 circuit

pack supports A-Law and Mu-Law companding. TN744 also allows gain or loss to be applied to pulse code modulation (PCM) signals that are received from the bus. The TN744 circuit pack detects 2025-, 2100-, or 2225-Hz modem answerback tones and provides normal broadband and wide broadband dial-tone detection.

The TN744 circuit pack supports digital signal processing of PCM signals on each port to detect, recognize, and classify tones and other signals. Generation of signaling tones is also supported for applications such as R2-multifrequency code (R2-MFC), Spain MF, and Russia MF. Gain or loss and conferencing can be applied to PCM signals that are received from the TDM bus. Additional support includes DTMF detectors to collect address digits during dialing and A-Law and μ-Law companding.

In normal operation, a port on the TN744 circuit pack can serve as an incoming register for Russia multifrequency shuttle register signaling (MFR). Use the TN744 with the TN429C analog line CO trunk for CAMA/E911.

TN746B analog line (16 ports)

The TN746B analog line circuit pack has 16 ports. Each port supports one telephone. Supported auxiliary equipment includes:

- fax machines
- answering machines
- modems
- amplifier handsets

Note:

This circuit pack is no longer sold.

The TN746B circuit pack supports on-premises building wiring with either touchtone or rotary dialing, and with or without the LED and neon message waiting indicators. The TN746B circuit pack supports off-premises wiring with either DTMF dialing or rotary dialing. Off-premise wiring occurs out-of-building only with certified protection equipment. LED or neon message waiting indicators are not supported off-premises. The TN746B circuit pack provides -48 VDC current in the off-hook state. The ringing voltage is -90 VDC.

The TN746B, along with a TN755B neon power unit per carrier or per single-carrier cabinet, supports on-premises telephones. These telephones are equipped with neon message waiting indicators. The TN746B circuit pack supports three ringer loads. Only one telephone can have an LED or neon message waiting indicator.

TN746B supports A-Law and Mu-Law companding and administrable timers. The TN746B supports:

- Queue warning-level lights that are associated with the direct department calling (DDC) features and the uniform call distribution (UCD) features
- Recorded announcements that are associated with the Intercept Treatment feature

- PagePac paging system for the Loudspeaker Paging feature

Additional support is provided for external alerting devices. These devices are associated with the Trunk Access from Any Station (TAAS) feature, neon message waiting indicators, and modems. Secondary lightning protection is provided on the TN746B circuit pack. The TN746B circuit pack supports up to eight ports ringing simultaneously. The system can achieve the maximum of eight ports ringing simultaneously. To do so, the system uses four ports from the set of ports numbered one through eight and four ports from the set of ports numbered nine through 16.

Combined conversion of Modem Pooling requires a port for each combined resource that is to be supported. One port must be on a TN754 and another port on a TN742, TN746B or TN769 Analog circuit pack.

The following table lists the TN746B-supported telephones and their wiring sizes and ranges:

Telephone	Wire size (AWG)	Maximum range (feet)
2500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
7100 series	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
7101A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
7103A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
8100 series	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
9100 series	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)

TN747B central office trunk (8 ports)

The TN747B CO trunk circuit pack has eight ports for loop-start or ground-start CO, foreign exchange (FX), and wide area telecommunications service (WATS) trunks. Each port has tip and ring signal leads. A port can connect to a PagePac paging system. The TN747B supports the abandoned call search feature in automatic call distribution (ACD) applications, if the CO has this feature. Vintage 12 or greater of the TN747B circuit packs also provide battery-reversed signaling.

TN750C recorded announcement (16 channels)

The TN750 recorded announcement circuit pack records and stores announcements to be played back on demand as part of a calling feature. The TN750 circuit pack has sampling rates of 16, 32, or 64 kilobits per second (kbps). The TN750 circuit pack records announcement messages from on-premises telephones or off-premises telephones. The circuit pack can store up to 128 recorded announcements to a maximum of 8 minutes total. The TN750 circuit pack has 16 channels, and each channel can play any announcement. Up to 25 call connections can listen to each channel.

A total of 10 TN750C circuit packs in a system provides an announcement capacity of 42.6 minutes (at 32 kbps) and 160 ports. In other words, 160 announcements can play simultaneously. The

compression rate, which is adequate for VDN of origin announcements, provides a total capacity of 85.3 minutes. You can use the multiple TN750C circuit packs to allow a more efficient method of providing many types of announcements and provides improved management of integrated announcements.

Note:

The TN2501AP circuit pack replaces the TN750 circuit pack. However, the TN750 circuit pack is still supported.

TN753B direct inward dialing trunk (8 ports)

The TN753B DID trunk circuit pack has eight ports that are used for immediate-start or wink-start direct inward dialing (DID) trunks. Each port has tip and ring signal leads. For the Slovak Republic, vintage 17 (or greater) is required. The TN753B circuit pack supports A-Law and µ-Law companding with vintage 17 or greater.

The Brazil Block Collect Call feature requires TN753B circuit packs.

TN754C DCP digital line (4-wire, 8 ports)

The TN754C DCP digital line circuit pack has eight asynchronous, 4-wire DCP ports that can connect to:

- 7400-series and 8400-series digital telephones
- 302A/B/C attendant consoles
- or data modules

The TN754 circuit pack has administrable A-Law and Mu-Law companding.

The following table lists the TN754-supported equipment and shows each of their wiring sizes and ranges.

Supported equipment	Wire sizes (AWG)	Maximum range (feet)
7400 data modules	24 (0.2 mm^2/0.5 mm)	5000 (1524 m)
7400 data modules	26	4000 (1219 m)
7400 series telephones	24 (0.2 mm^2/0.5 mm)	3500 (1067 m)
7400 series telephones	26	2200 (670 m)
8400 series data modules	24 (0.2 mm^2/0.5 mm)	3500 (1067 m)
8400 series telephones	24 (0.2 mm^2/0.5 mm)	3500 (1067 m)

The TN754 circuit pack provides greater call-handling capacity for high-traffic applications and supports the group paging feature.

Combined conversion of Modem Pooling requires two ports for each combined resource that is supported. One port is on a TN754 circuit pack and another port is on a TN746B circuit pack or a TN769 analog circuit pack.

TN755B neon power unit

The TN755B circuit pack produces 150 VDC to operate neon message waiting lights on terminals that are connected to TN746B analog line circuit packs.

A TN755B circuit pack is required in G650 cabinets that support analog sets with neon message waiting.

This circuit pack and the neon message waiting function are not available on systems that use the TN2202 ring generator circuit pack for France balanced-ringing.

TN760E tie trunk (4-wire, 4 ports)

The TN760 tie trunk circuit pack has four ports. These ports are used for Type 1 or Type 5 4-wire E & M lead signaling tie trunks. Trunk types include automatic, immediate-start, wink-start, and delay-dial. Each port on a TN760 circuit pack has the following signaling leads:

- T
- R
- T1
- R1
- E
- M

The TN760 circuit pack provides release link trunks that are required for the Centralized Attendant Service (CAS) feature and has administrable A-Law and Mu-Law companding. The TN760 circuit pack supports outgoing, Multilevel Precedence and Preemption (MLPP).

Option switches on each TN760 circuit pack port can select the following connections:

- Type 1 E & M standard unprotected format
- Type 1 E & M compatible unprotected format
- Type 1 E & M compatible protected format
- Type 5 single server format

For Belgium, the Slovak Republic, the Commonwealth of Independent States, and the Netherlands, vintage 11 or greater is required.

TN762B hybrid line (8 ports)

The TN762B hybrid line circuit pack has eight ports that connect to multiappearance hybrid analog and digital telephones. The TN762B can connect to 7300-series telephones, MDC-9000 cordless telephones, and MDW-9000 cordless telephone with separate base station and charging stations.

Each port on a TN762B circuit pack has VT and VR (analog voice), CT, CR, P-, and P+ signal leads. P+ signal leads are digital signals that control terminals.

Note:

This circuit pack is not used in a G650 Media Gateway.

TN763D auxiliary trunk (4 ports)

The TN763 auxiliary trunk has four ports. Each port has the following signal leads:

- T
- R
- SZ
- SZ1
- S
- S

The TN763D circuit pack is used to access on-premises applications such as music on hold, loudspeaker paging, code calling, and recorded telephone dictation. The TN763 circuit pack supports external recorded announcement equipment and is administrable to select A-Law or μ-Law companding.

TN767E DS-1 interface, T1 (24 channels)

The TN767 DS-1 interface circuit pack provides a DSX1-level physical interface to the DS-1 facility. The TN767 circuit pack has unpolarized line out (LO) and line in (LI) signal lead pairs.

Note:

This circuit pack is not used in a G650 Media Gateway.

The TN767 circuit pack supports DS-1 rate digital facility connectivity. The circuit pack supports CO, Tie, DID, and off-premises station (OPS) port types. These port types use the robbed-bit signaling protocol. On DEFINITY CSI and SI Servers, this circuit pack supports ISDN-PRI connectivity. For these applications, the signaling D-channel can connect from the TN767 circuit pack to the processor interface by a permanent switched call over the TDM bus.

On S8510 and S8800 Servers, this circuit pack does not directly support D-channel signaling and thus does not directly support ISDN-PRI connectivity. However, the TN767 circuit can indirectly support D-channel signaling provided the central office supports nonfacility associated signaling (NFAS). In this case, you use NFAS administration on the server. This administration associates the D-channel of another T1/E1 circuit pack, usually a TN464, with the TN767 circuit pack.

The TN767 circuit pack communicates with Avaya IVR. The TN767 also provides the enhanced maintenance capabilities of the 120A channel-service unit (CSU) and the enhanced integrated channel-service unit (ICSU).

DS-1 tests include:

- loopback tests at the DS-1 circuit pack edge or the 120A (if used)
- bit error rate (BER) loopback tests at the far-end CSU
- BER 1-way DS-1 facility tests

Other tests include loopback testing specifically designed to locate DS-1 facility faults.

TN769 analog line (8 ports)

The TN769 analog line circuit pack has eight ports, each with tip and ring signal leads.

Note:

This circuit pack is no longer sold.

The TN769 circuit pack supports:

- On-premises or off-premises wiring with either touchtone or rotary dialing and with or without LED or neon message waiting indicators
- Three ringer loads, such as three telephones with one ringer load each
- Up to four simultaneous ports ringing
- Queue warning-level lights that are associated with the direct department calling (DDC) feature and uniform call distribution (UCD) feature
- Recorded announcements for intercept treatment
- Dictating machine for the Recorded Telephone Dictation Access feature
- PagePac paging system for the loudspeaker paging feature
- External alerting devices for the Trunk Access from Any Station (TAAS) feature
- Modems

The TN769 circuit pack does not support off-premises message waiting indicators.

The TN769 circuit pack provides secondary lightning protection and supports μ-Law companding.

Each carrier with neon message indicators requires the TN769 circuit pack, along with a TN755B neon power circuit pack to support neon message waiting indicators. Only one telephone can have an LED or neon message waiting indicator.

Combined conversion of Modem Pooling requires both

- a port on a TN754B circuit pack and
- a port on a TN746B circuit pack or a TN769 analog circuit pack

for each combined resource that is to be supported.

The following table lists the TN769-supported telephones and shows each of their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
2500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
7102 series	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
7101A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
7103A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
8100 series	24 (0.2 mm^2/0.5 mm)	10,000 (3,048 m)
9100 series	24 (0.2 mm^2/0.5 mm)	10,000 (3,048 m)

TN771DP maintenance and test

The TN771DP maintenance test circuit pack performs maintenance functions. These functions include packet bus reconfiguration. This reconfiguration allows diagnosis and correction of recoverable packet bus failures before the link access procedure on the D-channel (LAPD) links fail. LAPD is a link-layer protocol on the ISDN-BRI and ISDN-PRI data link layer (level 2). LAPD provides data transfer between two devices and error and flow control on multiple logical links. LAPD swaps spare leads with the malfunctioning leads to recover packet bus failures that involve up to three malfunctioning leads. Malfunctioning leads, in this case, are one or two data or parity leads and one control lead.

Other maintenance functions include ISDN-PRI testing that originates and terminates loopback tests on ISDN facilities. The testing provides bit and block error rate information that indicates ISDN facility quality.

The TN771DP circuit pack can be updated using the firmware download feature, which requires use of the TN799 C-LAN circuit pack interface.

A TN771DP circuit pack is required for:

- Any CSI system that uses a TN2198 BRI circuit pack. Otherwise, a TN771DP circuit pack is not required. This applies to S8100 in CMC.

- In critical-reliability systems, duplicated server and duplicated port network connectivity (PNC), requires a TN771DP circuit pack in each port network. In standard or high-reliability systems, a TN771DP circuit pack is optional.
- All R system PPNs. For duplex Server, a critical-reliability R system requires a TN771DP circuit pack in each PN. An R system with ATM network duplication requires a TN771DP circuit pack in each PN.
- All CSI models that use a TN2198 BRI circuit pack.

A maximum of one TN771DP circuit pack is allowed in any port network.

A TN771DP circuit pack is never used with the S8100 Server.

TN775C maintenance

The TN775C circuit pack is used in maintenance to monitor power failure signals in an expansion port network (EPN) cabinet. The TN775C circuit pack also monitors the clock, monitors and controls the power supplies and battery charger, and monitors air flow and high-temperature sensors. The TN775C circuit pack provides two serial links to communicate with Expansion Interface (EI) circuit packs. The TN775C also provides an RS-232 interface for connection to an administration terminal. Each circuit pack contains a 3-position switch to control emergency power transfer.

Note:

This circuit pack is not used in a G650 Media Gateway.

The TN775C contains a DC-to-DC power converter. The TN775C is used in maintenance to monitor the processor in an EPN. A Survivable Remote Processor (SRP) supports this EPN.

TN787K multimedia interface

The TN787 multimedia interface circuit pack is used in conjunction with the TN788 multimedia voice conditioner circuit pack. The TN787 provides service circuit functionality for the Multimedia Call Handling (MMCH) feature. This feature provides both voice and multimedia data service between multimedia complex endpoints. Up to six endpoints can conference to a single multimedia call occurrence.

Note:

This circuit pack is no longer sold.

The TN787 circuit pack provides a TDM-bus interface and a DS-1 adjunct cable interface. The TN787 circuit pack routes the H.221 multimedia information to the DS-1 interface to free more TDM-bus timeslots. Freeing more timeslots allows the system to carry more audio, video, and data bit streams between multimedia complex endpoints. The TN787 circuit pack provides support for multiple port networks (PNs).

TN788C multimedia voice conditioner

The TN788C multimedia voice conditioner circuit pack is used in conjunction with the TN787F/G multimedia interface circuit pack. Together, they provide service circuit functionality for the MMCH feature. This feature provides both voice service and multimedia data service between multimedia complex endpoints.

Note:

This circuit pack is no longer sold.

Note:

A TN788C V1 circuit pack only supports μ-Law companding. A TN788C V2 or later supports A-Law and μ-Law.

The TN788C circuit pack is the audio processor for the Px64 multimedia conference bridge. The TN788C circuit pack contains eight digital signal processors. The processors include four for encoding and four for decoding. Each encoder/decoder pair is assigned to a Px64 endpoint to process its audio channel. Connection to and from the audio of the endpoint is by way of a TN787 multimedia interface port. This connection is through the TDM-bus timeslots.

Each of the eight digital signal processors communicate with the main processor on the circuit pack through eight individual dual-port random access memory (DPRAMs). No read-only memory (ROM) is available on this circuit pack. The DPRAM is used for program download.

TN789B radio controller

The TN789B radio controller circuit pack is an interface between a switch and two Wireless Fixed Base (WFB) radio units. This interface is used for the DEFINITY Wireless Business System. The TN789B circuit pack contains a main processor to handle data line circuit (DLC) and upper medium access (MAC) layers of firmware. The TN789B circuit pack also contains two lower MAC processors, one processor for each radio interface that is referred to as I2 interface.

Note:

This circuit pack is no longer sold.

The I2 link is the connection between the radio controller (RC) and the WFB. The RC supports up to two I2 links. Each link consists of three pairs of twisted-pair cable: the transmit pair, the receive pair, and the local power pair. The transmit pair transfers WFB control and frame information from the RC to the WFB. The receive pair transfers status and frame information from the WFB to the RC. If the RC cannot provide power to the WFB, a third pair, to the WFB, can supply local power. When possible, the transmit pair and the receive pair provide phantom power from the RC to the WFB.

Each TN789B circuit pack includes a standard TDM-bus interface from a system, two radio interfaces to two separate radio units, and two synchronization ports. In addition, two RS-232 interfaces provide for a debug terminal and for setting up the wireless terminal.

TN791 analog guest line (16 ports)

The TN791 is a 16-port analog guest line circuit pack. The TN791 is used for international offers and for offer category B in the United State and Canada. Each of the 16 ports supports one telephone, such as 500 (rotary dial) and 2500 terminals (DTMF dial). The ports also support LED and neon message waiting indicators. A separate power supply is required for neon message indicators.

The TN791 circuit pack supports on-premises wiring with either touchtone or rotary dialing and with or without the LED and neon message waiting indicators.

The TN791 circuit pack supports three ringer loads. Only one telephone can have an LED or neon message waiting indicator. The TN791 supports up to eight ports ringing simultaneously. To achieve this maximum, the system uses four ports from the set of ports numbered one through eight and four ports from the set of ports numbered 9 through 16.

The TN791 circuit pack supports A-Law and µ-law companding and administrable timers. Secondary lightning protection is provided.

The following table lists the TN791-supported telephones and shows each of their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
2500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
6200 type	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
7100 series	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
7101A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
7103A	24 (0.2 mm^2/0.5 mm)	15,200 (4,633 m)
8100 series	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
9100 series	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)

TN792 duplication interface

In a high reliability or critical reliability DEFINITY SI system, a duplication interface copies the contents of the memory from the primary Server to a standby Server. Therefore, the standby Server can take over immediately when the former fails. The TN792 duplication interface (DUPINT) uses the Enhanced M-Bus of the DEFINITY SI TN2404 processor for this memory shadowing function. The Enhanced M-bus supports a 32-bit addressing and data access (versus 16-bit for the M-bus). In this case, the Enhanced M-bus transfers data faster and shadows a larger area of memory than the M-bus. The M-bus is still supported.

Note:

This circuit pack is no longer sold.

You need two TN792 circuit packs, one for the primary control carrier and one for the standby. You can replace TN772 duplication interfaces with TN792s, but you must replace them in pairs. A TN772 circuit pack cannot communicate with a TN792 circuit pack.

A duplicated server optical cable connects the TN792 circuit packs. This cable eliminates the additional electromagnetic emissions that otherwise result from the doubled data rate on the bus. The optical cable interface to the new DUPINT is on the front faceplate of the circuit pack.

The TN792 circuit pack is compatible with the existing duplication cables.

TN793CP analog line with Caller ID for multiple countries (24 ports)

The TN793CP is an analog line, 24-port circuit pack that supports caller ID telephones and caller ID devices that conform to Bellcore Standard GR-30-CORE, Issue 2, and Bellcore-compliant signaling using V.23 Frequency Signal Keying (FSK). This means that the TN793CP supports caller ID devices in the United States and most other countries. Each port can support one of the following:

- Analog telephone, such as a 2500 telephone (DTMF dial)
- Answering machine
- FAX
- Loop-start CO port (used for Communication Manager Messaging)

The TN793CP provides:

- Touchtone or rotary dialing
- Rotary digit 1 recall
- Ground-key recall
- Programmable flash timing
- Selectable ringing patterns
- On-premises LED and neon message waiting
- Caller ID with Call Waiting
- Secondary lightning protection

Warning:

The TN793CP does *not* support the telephones (used primarily in France) that use 50 Hz balanced ringing.

The TN793CP supports on-premises (in-building) wiring. The TN793CP circuit pack supports off-premises wiring with either DTMF or rotary dialing, but LED or neon message waiting indicators are not supported off-premises.

The TN793CP circuit pack, along with a TN755B neon power circuit pack supports on-premise telephones that are equipped with neon message waiting indicators. The TN793CP supports three

ringer loads. Only one telephone can have an LED or neon message waiting indicator. A maximum of 12 ports can be rung simultaneously. To achieve this maximum, the system uses four ports from the set of ports numbered one through eight, four ports from the set of ports numbered 9 through 16, and four ports from the set of ports numbered 17 through 24.

The TN793CP circuit pack supports A-Law and μ-law companding and administrable timers. The TN793 circuit pack supports queue warning level lights. These lights are associated with the direct department calling (DDC) and the uniform call distribution (UCD) features, recorded announcements that are associated with the Intercept Treatment feature, and PagePac paging system for the Loudspeaker Paging feature. Additional support is provided for external alerting devices. These devices are associated with the Trunk Access from Any Station (TAAS) feature, neon message waiting indicators, and modems. The TN793CP provides -48 VDC current in the off-hook state. Ringing voltage is -90 VDC.

The TN793CP supports DTMF sending levels that are appropriate for Avaya Interactive Response.

The multinational support of the TN793CP circuit pack is identical to that of the TN2215 circuit pack. Therefore, the TN793CP allows country-specific transmission selection. The TN793CP is also impedance and gain selectable for multiple countries. For more information on TN793CP, go to the Avaya Support website at http://support.avaya.com and check related documents and knowledge articles.

The following table lists the TN793CP-supported telephones and shows each of their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
2500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
6200 type	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
7100 series (no longer sold)	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
8100 series (no longer sold)	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
9100 series (no longer sold)	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)

TN797 analog trunk or line circuit pack (8 ports)

The TN797 circuit pack provides a combination 8-port analog trunk and line circuit pack for the United State, Canada, and other countries that have the same analog standards. The TN797 circuit pack provides you with the capability to administer any of the eight ports as any of the following trunks or lines:

- loop start or ground start CO trunk
- CAMA E911 trunk
- wink-start or immediate-start DID trunk
- on-premises or an off-premises analog line with or without LED Message Waiting Indication

The TN797 does not support incoming caller ID (ICLID) on the analog trunk to the CO. The TN797 does not support caller ID on the line side to the telephone.

TN799DP control LAN (C-LAN) interface

The TN799DP control LAN (C-LAN) interface provides TCP/IP connectivity over Ethernet or Point to Point Protocol (PPP) to adjuncts the following:

- Avaya Call Management System (CMS)
- INTUITY AUDIX
- Distributed Communication System (DCS)
- printers
- call detail recording (CDR)
- property management systems (PMS)

The C-LAN operates at 10 or 100 mbps and full duplicated server or half duplicated server, both of which are administrable. The C-LAN provides connectionless UDP sockets for IP solutions support. The C-LAN also supports 500 remote sockets, with support for 4-KB UDP sockets. The C-LAN supports variable length ping and the traceroute and netstat network testing commands.

The C-LAN circuit pack provides call control for all IP endpoints that are connected to the S8800 Server using the G600 Media Gateway or G650 Media Gateway. You can use a maximum number of 64 C-LAN circuit packs for each configuration. The number of required C-LAN circuit packs depends on the number of devices that are connected. The C-LAN number also depends on which options that the endpoints use. It might be advantageous to segregate IP voice control traffic from device control traffic as a safety measure.

A CLAN socket is a software object that can connect a C-LAN to the IP Network. A simple calculation determines the default value for C-LAN socket usage of H.323 tie trunks. Divide the total number of H.323 tie trunks that use sharing by 31. Each IP endpoint requires the use of some number of C-LAN sockets. A C-LAN circuit pack supports a maximum of 500 sockets.

The C-LAN differs from an IP Media Processor. The difference is that the C-LAN controls the call, while TN2302AP provides the codecs that are used for the audio on the call.

To keep the firmware on the CLAN circuit pack up-to-date, you can download C-LAN firmware updates from the Web. To take advantage of this downloadable firmware capability, you must already have at least one C-LAN circuit pack in your system. You must also have access to the public Internet. The C-LAN can serve as an FTP or SFTP server for file transfers — primarily firmware downloads. The C-LAN cannot serve as an SFTP client.

With Communication Manager Release 3.1 and later, the C-LAN can also receive firmware downloads from a central firmware depository on an SCP-enabled file server.

For more information on firmware downloads, and instructions for downloading, see http://www.avaya.com/support/.

TN801B MAPD (LAN gateway interface)

The TN801 LAN gateway interface is part of the Multiapplication Platform DEFINITY (MAPD). With TN801, you can perform direct integration of PC-based applications into the switch. The TN801 circuit pack works as the interface for solutions such as Computer Telephony Integration (CTI) and Adjunct-Switch Application Interface (ASAI). The TN801 circuit pack provides:

- packet bus and TDM-bus interfacing
- physical mounting for a CPU
- external interfaces
- mapping of circuit-switched connections between the TDM bus and the expansion circuit pack

TN802B MAPD (IP interface assembly)

The TN802 IP interface circuit pack supports voice calls and fax calls from the switch across a corporate intranet or the Internet. This circuit pack is still supported, but is now replaced with the TN2302AP IP media processor on page 178. The IP trunking software runs on an embedded personal computer that runs Windows NT. The TN802 circuit pack supports IP Solutions, including IP trunking and MedPro (H.323) with IP softphones.

The TN802 IP Interface operates in two modes, IP Trunk and Media Processor (MedPro/H.323). The TN802 defaults to IP Trunk mode. To use the TN802 in MedPro mode, you activate it through administration to use the H.323 trunking feature. MedPro mode is necessary to support IP softphones.

TN1654 DS-1 converter, T1 (24 channels) and E1 (32 channels)

The TN1654 converter installs in place of the conventional fiber. The TN1654 converter supports from one to four T1 or E1 facilities. The TN1654 also provides a total of 92 T1 channels or 120 E1 channels. These channels run in each direction between the processor port network (PPN) and an expansion port network (EPN). This capacity is enough for the EPN to easily support several hundred stations.

The switch architecture provides for EPNs that are remotely located from the PPN. An EPN that is within 5 miles (8 kilometers) of the PPN can be coupled using a multimode fiber-optic cable. EPNs that are within 22 miles (35.4 kilometers) of the PPN can be coupled using single-mode fiber-optic cable. You must use a DS-1 converter complex to connect an EPN when the distance between the PPN and the EPN exceeds a certain distance or private right-of-way is unavailable. The maximum distance is 5 miles (8 kilometers) for a multimode cable or 22 miles (35.4 km) for a single-mode cable. One DS-1 circuit pack is placed on each end of the DS-1 converter complex.

The TN1654 DS-1 converter requires a set of Y-cables to connect to a TN570B Expansion Interface circuit pack.

TN2138 central office trunk (8 ports)

The TN2138 central office (CO) trunk circuit pack provides eight analog loop start CO trunk ports for Italy. Each port has a tip and ring signal lead. The TN2138 has 50-Hz, 12-kHz, and 16-kHz periodic pulse metering (PPM).

Note:

This circuit pack is no longer sold.

TN2139 direct inward dialing trunk(8 ports)

The TN2139 direct inward dialing (DID) trunk for Italy provides eight analog DID trunk ports for analog DID signaling. Each of the eight ports has a tip and ring signal lead.

Note:

This circuit pack is no longer sold.

TN2140B tie trunk (4-wire, 4 ports)

The TN2140B tie trunk is used in Hungary and Italy. The TN2140B provides four ports for 4-wire E&M lead signaling tie trunks. The TN2140 provides continuous E&M signaling and discontinuous E&M signaling. The TN2140 also provides administrable A-Law and µ-Law companding and standard Type 1 and Type 5 signaling. The TN2140B is required for Hungary.

TN2146 direct inward dialing trunk (8 ports)

The TN2146 provides eight analog DID trunk ports for Belgium and the Netherlands. Each of the eight ports has tip and ring signal lead. The TN2146 uses four Dual Subscriber Line Audio processing Circuits (DSLACs). One DSLAC is used for each pair of ports. The circuits are administered to meet trunk transmission characteristics. You can set the DSLACs to either a resistive or complex balance impedance in the voice or AC talk path on the trunk interfaces. The DSLACs convert analog signals to digital signals and vice-versa to match the analog DID trunks to

the digital TDM bus on the system. The TN2146 circuit pack provides either A-Law or Mu-Law companding.

Note:

This circuit pack is not used in a G650 Media Gateway.

TN2147C central office trunk (8 ports)

The TN2147 has eight analog central office (CO) trunk ports. Each port has tip and ring signal leads. The TN2147 uses four (one for each pair of ports) DSLACs. These DSLACs are administered to meet a given transmission and impedance requirement. The DSLACs convert analog signals to digital signals and digital signals to analog signals. These conversions interface the analog CO trunks to the system's digital TDM bus of the system.

The TN2147C provides multicountry signaling based on a trunk type of loop-start, ground-start, or battery reverse loop-start.

TN2181 DCP digital line (2-wire, 16 ports)

The TN2181 circuit pack has 16 DCP ports. These ports can connect to 2-wire terminals such as the 6400-series, 8400-series, and 9400-series digital telephones and the 302C and 302D attendant console. The maximum range of the 8400- and 9400-series terminals using 24-AWG (0.5 mm) wire is 3,500 feet (1067 meters).

The TN2181 circuit pack supports either A-Law or μ-Law companding. The TN2181 also supports the 8400-series data modules.

Note:

This circuit pack is no longer sold.

TN2182C tone clock, tone detector, and call classifier (8 ports)

The TN2182 tone clock integrates the following functions onto one circuit pack for all system reliability configurations:

- tone generator
- tone detection-call classifier
- system clock

- synchronization

Note:

This circuit pack is not used in a G650 Media Gateway.

The TN2182 supports eight ports for tone detection and allows gain or loss applied to PCM signals received from the bus. The TN2182 supports:

- stratum-4 enhanced clock accuracy
- MFC signaling, such as Russia MF
- Russia multifrequency shuttle register signaling (MFR)
- A-Law and Mu-Law companding

The TN2182CP performs the following functions:

- provides continuous cadenced and mixed tones
- allows administrable setting of tone frequency and level
- detects 2025-Hz, 2100-Hz, or 2225-Hz modem answerback tones
- provides normal and wide broadband dial-tone detection

In most configurations, the 2-circuit or 3-circuit pack combination can include either the tone generator, tone detector, and call classifier. This combination can be replaced with this one circuit pack to free one or two port slots.

Use the TN2182CP circuit pack with the TN429D analog line central office trunk for CAMA/E911 and incoming caller ID (ICLID). A TN2182 is required for main processor tone detection or for additional tones to support CCRON, Russian ANI, and others.

TN2183/TN2215 analog line for multiple countries (16 ports)

See TN2215/TN2183 analog line for multiple countries (16 ports) (international offers or Offer B only for US and Canada) on page 176.

TN2184 DIOD trunk (4 ports)

TN2184 is a Direct Inward/Outward Dialing (DIOD) trunk circuit pack used for Germany. The TN2184 circuit pack contains four port circuits. Each circuit interfaces with a 2-wire analog CO trunk with the TDM switching network of the system. Each port allows incoming calls and outgoing calls to include addressing information. The ports receive this information from the CO for incoming calls and send it to the CO for outgoing calls. The TN2184 detects periodic pulse metering (PPM) signals for call-charge accounting on outgoing calls.

The TN2184 combines the features of a CO trunk and a DID trunk. The TN2184 provides both outgoing calls and incoming calls with addressing information in both directions.

Note:

This circuit pack is not used in a G650 Media Gateway.

Note:

This circuit pack is no longer sold.

TN2185B ISDN-BRI S/T-TE interface (4-wire, 8 ports)

The TN2185B supports eight 4-wire ISDN-BRI line S interfaces. Each interface operates at 192 kbps, with two B channels (64 kbps) and one D-channel (16 kbps). The TN2185B interfaces with the LAN bus and the TDM bus to provide the TE side of the BRI interface. The TN2185B is similar to the TN2198 except that the TN2185B is a 4-wire S-interfaces instead of a 2-wire U-interface.

For each port, information communicates over two 64-kbps bearer channels called B1 and B2. Information also communicates over a 16-kbps channel called the demand channel or D-channel. The D-channel is used for signaling. Channels B1 and B2 can be circuit-switched simultaneously or either of them can be packet-switched, but not both at once. The D-channel is always packet-switched. For voice operation, the circuit pack has a Mu-Law or A-Law option that applies uniformly to all circuit-switched connections on the circuit pack. The circuit-switched connections operate as 64-kbps clear channels when in the data mode. The packet-switched channels support the LAPD protocol. However, the TN2185B does not terminate on LAPD protocol. The S-interface does not support switching of both B-channels together as a 128-kbps wideband channel.

The TN2185B has a maximum range up to 18,000 feet (5486 meters) from the system to the NT1 device. In an environment with multiple telephones, the B-channels are shared only on a per-call basis. For example, if Channel B2 is for data, then the use of this channel by one telephone excludes the others from having access to Channel B2. When a device communicates over the D-channel to access B1 or B2, that channel is owned until the call is taken down. The D-channel is always shared among the terminals. The TN2185B circuit pack can be used as an alternative to the TN464 circuit pack or the TN2464 circuit pack.

The TN2185B supports the ability to outpulse in-band DTMF signals or end-to-end signaling.

TN2185B supports QSIG Call Completion but not QSIG Supplementary Services. You can use ISDN-BRI trunks as inter-PBX tie lines that use the QSIG peer protocol.

TN2198 ISDN-BRI U interface (2-wire, 12 ports)

The TN2198 circuit pack is used to connect to the ANSI standard 2-wire U-Interface. The 2-wire interface from the TN2198 connects to an NT1 network interface. The 4-wire interface on the other

side of the NT1 can connect to one or two telephones. Unlike the TN2185 circuit pack, the TN2198 does not provide a trunk-side interface.

The TN2198 contains 12 ports that interface at the ISDN U reference point. For each port, information communicates over two 64-kbps bearer channels called B1 and B2. Information also communicates over a 16-kbps channel called the demand channel, or D-channel. The D-channel is used for signaling. Channels B1 and B2 can be circuit-switched simultaneously. The D-channel is always packet-switched. The TN2198 requires a packet control circuit pack. Each port supports one telephone, such as the 500 rotary dial analog telephone and 2500 DTMF dial telephones.

The D-channel supports the LAPD protocol and is consistent with the CCITT Q.920 recommendations for D-channel signaling.

In an environment with multiple telephones, the B channels are shared only on a per-call basis. For example, if the B2 channel is used for data, then the use of B2 by one telephone excludes the other telephones from having access to the B2 channel. When a device communicates over the D-channel to access B1 or B2, that channel is owned until the call is taken. The D-channel is always shared among the telephones. TN2198 interfaces with the TDM bus and the packet bus in the switch backplane and terminates with 12 ISDN basic access ports.

The TN2198 has a maximum range of up to 18,000 feet (5486 meters) from the system to the NT1 device and uses standard protocol ANSI T1.601. The TN2198 has a 160-kbps line rate that consists of:

- Two bearer channels at 64 kbps each
- A D-channel at 16 kbps
- Framing at 12 kbps
- Maintenance at 4 kbps

The TN2198 supports a maximum of 24 telephones or data modules.

The TN2198 is not offered as a BRI Tie Trunk.

TN2199 central office trunk (3-wire, 4 ports)

The TN2199 central office (CO) trunk circuit pack is designed for use in Russia.

The TN2199 is a 4-port, 3-wire, loop-start trunk circuit pack that can be used as a:

- DID trunk
- Two-way or one-way incoming or one-way outgoing CO trunk

The TN2199 combines the functionality of a DID trunk and a one-way outgoing CO trunk (DIOD trunk). To accomplish MF shuttle signaling, the TN2199 circuit pack must be combined with a TN744D Call Classifier circuit pack.

The TN2199 circuit pack supports incoming automatic number identification (ANI).

TN2202 ring generator

The TN2202 ring generator circuit pack is designed for use in France.

The TN2202 ring generator circuit pack supplies 50-Hz ringing power. The TN2202 supplies balanced ringing to telephones that connect to the TN2183/TN2215 multicountry analog line circuit pack. A modified backplane allows this balanced ringing. The telephones must be administered for France analog transmission.

The TN2202 plugs into the power unit slot and is required for each carrier that contains analog lines requiring 50-Hz ringing. A carrier backplane that uses TN2202 requires a one-lead modification. This modification is required for all products that are made for France. TN2202 can:

- produce two symmetric voltages (usually 28 V RMS) with respect to ground
- take –48 VDC, –5 VDC, and ground from the backplane
- generate 2 × 28 V RMS with added –48 VDC

TN2207 DS-1 interface, T1 (24 channels) and E1 (32 channels)

The TN2207 circuit pack supports digital signal level 1 (DS-1) rate (24-channel) and E1 rate (32-channel) digital facility connectivity. All TN2207 suffixes support CO, Tie, DID, and off-premises station (OPS) port types that use the following protocols:

- Robbed-bit signaling
- Proprietary bit-oriented signaling (BOS) 24th-channel signaling
- DMI-BOS 24th-channel signaling

The circuit packs also support ISDN-PRI connectivity T1 or E1.

Note:

This circuit pack is not used in a G650 Media Gateway.

In a 24-channel DS-1 mode, a DS-1 interface is provided to the DS-1 facility. The TN2207 circuit packs provide circuit pack-level administrable A-Law and Mu-Law companding, CRC-4 generation and checking for E1 only, and stratum-3 clock capability.

TN2207 provides test jack access to the DS-1 or E1 line and supports the 120A integrated channel-service unit (CSU).

All suffixes have line-out (LO) and line-in (LI) signal leads. The line-out and line-in leads are unpolarized balanced pairs.

TN2207 has additional hardware to support direct cables to a TN787 MMI circuit pack.

TN2209 tie trunk (4-wire, 4 ports)

The TN2209 tie trunk is designed for use in Russia.

The TN2209 tie trunk has four ports used for Type 1 or Type 5 4-wire E&M lead signaling tie trunks. The tie trunks can be one of four types: automatic, immediate-start, wink-start, and delay-dial. The TN2209 provides an interface between these four frequency signaling tie trunk lines and the switch TDM network. Based on TN760D each port has modified E&M signal leads for universal hardware compatibility. The TN2209 provides release link trunks that are required for the Centralized Attendant Service (CAS) feature and has administrable A-Law and Mu-Law companding.

TN2224CP DCP digital line (2-wire, 24 ports)

The TN2224CP is designed for use in the United State, Canada, and international countries for offer B only.

The TN2224 has 24 DCP ports that can connect to 2-wire digital telephones. Such telephones include 2400-series and 6400-series telephones, the 302C and the 302D attendant console, and the Callmaster IV, V, and VI.

The TN2224 supports either A-Law or Mu-Law companding.

The following table lists the TN2224CP-supported telephones and their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
302C/D console	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)
Callmaster-series	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)
2400-series	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)
6400-series	24 (0.2 mm^2/0.5 mm) or 26	3,500 (1,067 m)

TN2215/TN2183 analog line for multiple countries (16 ports) (international offers or Offer B only for US and Canada)

The TN2215 and the TN2183 analog line circuit packs are designed for international offers or for offer B in the United State and Canada.

TN2215 and TN2183 provides 16 analog port interfaces. Each port supports one telephone, such as 500 (rotary dial) and 2500 telephones (DTMF dial) from a tip/ring pair. Each port also sends or receives signaling to and from a device, such as:

- analog telephone

- answering machine
- FAX
- loop-start CO port

TN2215 and TN2183 provides rotary digit 1 recall, ground-key recall, and programmable flash timing. TN2215 and TN2183 provide additional support for selectable ringing patterns, LED message waiting, and secondary lightning protection.

TN2215 and TN2183 supports on-premises wiring with either touchtone or rotary dialing, and with or without the LED message waiting indicators. TN2215 and TN2183 supports off-premises wiring with either DTMF or rotary dialing. LED message waiting indicators are not supported off-premises. Neon message waiting indicators are not supported.

A maximum of six to eight simultaneous ringing ports is allowed depending on the ringing cadence selected. The TN2215 and the TN2183 supports A-Law and Mu-Law companding and administrable timers.

TN2215 and TN2183 also support balanced ringing. When balanced ringing is configured for France, use the TN2202 ring generator circuit pack.

TN2215 and TN2183 support DTMF sending levels that are appropriate for Avaya IVR.

TN2215 and TN2183 are impedance and gain selectable for multiple countries. For more information on TN2215 and TN2183, go to the Avaya Support website at http://support.avaya.com and see current documentation and knowledge articles.

The following table lists the TN2215- and TN2183-supported telephones and their wiring sizes and ranges.

Telephone	Wire size (AWG)	Maximum range (feet)
2500 type	24 (0.2 mm^2/0.5 mm)	20,000 (6,096 m)
6200 type	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)
7102A series	24 (0.2 mm^2/0.5 mm)	3,100 (945 m)
8100 series	24 (0.2 mm^2/0.5 mm)	12,000 (3,657 m)

TN2242 digital trunk

The TN2242 digital trunk circuit pack supports versions of channel-associated signaling and ISDN-PRI signaling. These signaling versions are peculiar to the TTC private networking environment that is used in Japan. The TN2242 supports the special line-coding and framing that are used on 2.048-mbps Japanese trunks. The TN2242 connects the switch with other vendor equipment and with other DEFINITY switches through the TDM device. The TDM device is commonly used throughout Japan for this purpose.

TN2301 logic switch

The TN2301 provides service to the customer when one of the following is true:

- the link to the main processor fails
- the link to the main processor is severed
- the processor or Center Stage Switch (CSS) fails

The TN2301 Survivable Remote Switch (SRS) logic circuit pack connects the expansion port network (EPN) links to the appropriate processor port network (PPN) for call processing. The EPN links can be fiber or T1/E1. This connection is under the control of the TN775C Maintenance circuit pack which monitors the condition of the expansion interface TN570B.

The TN2301 is not used in an ATM-PNC.

TN2302AP IP media processor

The TN2302AP IP Media Processor is the H.323 audio platform and includes a 10/100 BaseT Ethernet interface. TN2302AP provides voice over internet protocol (VoIP) audio access to the switch for local stations and outside trunks. TN2302AP provides audio processing for between 32 and 64 voice channels, depending on the CODECs in use. TN2302AP is compatible with and can share load balancing with the TN2602AP Media Resource 320 circuit pack. See Comparison of TN2302AP Media Processor and TN2602AP IP Media Resource 320 on page 191.

TN2302AP supports hairpin connections and the shuffling of calls between TDM connections and IP-to-IP direct connections. TN2302AP can also perform the following functions:

- Echo cancellation
- Silence suppression
- Fax relay service using T.30 and T.38 standards
- Dual-tone multifrequency (DTMF) detection
- Conferencing

TN2302AP can be updated using the firmware download feature.

The TN2302AP, starting with vintage 32, supports the following conversion resources for codec regarding voice, conversion between codecs, and fax detection:

- G.711, A-law or Mu-law, 64 kbps
- G.723.1, 6.3 kbps or 5.3 kbps audio
- G.729A, 8 kbps audio
- G.729, G.729B, G.729AB

The TN2302AP also supports transport of the following devices:

- Fax, Teletypewriter device (TTY), and modem calls over a corporate IP intranet using pass-through mode
- Fax and TTY calls using proprietary relay mode

Note:

TN2302AP does not support encryption of faxes sent to nonAvaya endpoints.

- 64-kbps clear channel transport in support of BRI secure telephones and data appliances (includes support for H.320 video over IP-connected Port networks)
- T.38 Fax over the Internet (including endpoints connected to nonAvaya systems)
- Modem tones over a corporate IP intranet

Note:

The path between endpoints for modem tone transmissions must use Avaya telecommunications and networking equipment.

For more information, see *Administering Network Connectivity on Avaya Aura® Communication Manager*, 555-233-504.

TN2308 direct inward dialing trunk (8 ports)

The TN2308 uses eight ports for immediate-start or wink-start direct inward dialing (DID) trunks for Brazil. Each port has tip and ring signal leads.

The switch requires the TN2308 to support Brazil Block Collect Call. The TN2308 transmission characteristics comply with the Brazilian telecommunication standards for PBXs.

TN2312BP IP server interface

The TN2312BP IP server interface (IPSI) provides transport of control messages. The messages are sent from the S8510 or S8800 Server to the port networks of server using the customer LAN and WAN. Through these control messages, the server controls the PNs.

An example of the TN2312BP IPSI faceplate is provided in the following figure.

Detailed description of TN2312BP IP server interface

Dedicated and nondedicated network for control messages

You can configure the path for control messages to be over a LAN dedicated to communication between the server and IPSI. In this case, the network for carrying calls, the bearer path, is separate from the dedicated LAN for control messages. The bearer path uses nondedicated LAN of customer, a center stage switch (CSS) configuration, or an asynchronous transmission mode (ATM) network.

You can also configure the path for control messages to use the customer's nondedicated LAN. In this case, the bearer path and control path use the same network.

TN2312BP IPSI capabilities

The TN2312BP IPSI always resides in the tone clock slot on a gateway and uses a 10/100 BaseT interface to connect to:

- The server
- A laptop computer connected to the server through a services port

The IPSI provides the following functions:

- PN clock generation and synchronization for Stratum 4 type II only
- PN tone generation
- PN tone detection, global call classification, and international protocols
- Processing of product serial numbers for license file activation
- Environmental maintenance, only on a G650 Media Gateway

To access the TN2312BP IPSI remotely, use the Telnet and SSH protocols. The TN2312BP IPSI can serve as an SSH client as well, for remote access from the TN2312BP IPSI to Communication Manager server. The C-LAN can also serve as an FTP or SFTP server for file transfers and primarily firmware downloads.

Note:

The IPSI cannot serve as an SFTP client. Additionally, the SSH/SFTP capability is only for the control network interface, not the Services interface.

The IPSI supports the following functions and devices:

- Eight global call classification ports
- Network diagnostics
- Download of SIPI firmware updates using Communication Manager Web pages, the **`loadipsi`** command from the server's Linux command line, or the Software Update Manager.

The TN2312BP IPSI is compatible with G650 Media Gateway and provides environmental maintenance only when it is used in a G650 Media Gateway.

IPSI support for system maintenance

TN2312BP IPSI can only be placed in G650 with a carrier address set to A or B. When set to A, TN2312BP IPSI acts as the serial bus master. The TN2312BP IPSI also provides environmental maintenance for G650. This includes:

- Power supply, cabinet, and ring generator maintenance
- External device alarm detection
- Emergency transfer control
- Customer-provided alarm device control

The TN2312BP IPSI and the 655A power supply provide the following information to G650:

- Environment maintenance:
  - Inlet temperature of G650
  - Exhaust temperature of G650
  - Hot Spot temperature status
  - Voltage, +5, -5, or -48
  - Fan speed
  - Fan alarm
  - Ring status
  - Ring control
  - Ringer Setting
  - Ring Detection
  - Input Power, AC or DC
- External device alarm detection:

  The external device alarm detection uses two external leads. External devices such as an uninterruptible power supply (UPS) or voice messaging system can use these leads to generate alarms. The external device uses Communication Manager alarm reporting capability. Ground potential on either of these leads results in an alarm being generated. You can administer the alarm level, product ID, alternate name, and alarm description for each lead. The alarm levels are major, minor, and warning.
- Emergency transfer control:

  Emergency transfer control provides -48 VDC to operate an external emergency transfer panel. Communication Manager controls the state of the emergency transfer and generates an alarm when the emergency transfer is set to other than auto.
- Customer-provided alarm device control:

  Customer-provided alarm device (CPAD) provides a contact closure across a pair of external leads. These leads can control a customer-provided alarm device or an alarm indicator. The level of alarm can be administered system wide to cause a contact closure. The alarm levels

are major, minor, warning, or none. When the alarm level matches the alarm level that was administered, the TN2312BP IPSI closes this contact for all G650s. This closure occurs by a carrier address set to A. When TN2312BP IPSI is in emergency transfer, it closes this contact to activate the CPAD.

TN2312BP I/O adapters

The TN2312BP IPSI requires an adapter that provides for the alarm input, CPAD, and emergency transfer leads. This adapter also allows the IPSI Ethernet connection to be made to the back of the IPSI slot.

TN2312BP IPSI compatibility

The TN2312BP IPSI can replace the TN2312AP IPSI in the G650 Media Gateways.

However, the IPSI does not provide environmental maintenance for these gateways.

Environmental maintenance requires monitoring of the AuxSig backplane lead cabinet when the TN2312BP is installed in a G650 Media Gateway with Communication Manager Release 2.0. If this lead detects a failure in the power supply or fan assembly, it sends an alarm.

See the following table for IPSI and gateway compatibility.

Gateway	Communication Manager 1.x	Communication Manager 2.0	DEFINITY R10	Environmental maintenance provided by:
G650		Yes		TN2312BP IPSI

Number of IPSI circuit packs per configuration

For configurations where voice bearer is over CSS or ATM, each IPSI typically controls five port networks. Each IPSI achieves control by tunneling control messages over the bearer network to PNs that do not have IPSIs. An IPSI cannot be placed in:

- A PN that has a Stratum-3 clock interface
- A remote PN that is using a DS-1 converter
- A Survivable Remote Expansion Port Network (SREPN)

A simple formula determines the number of IPSI-connected PNs that should support an S8510 or S8800 configuration. Divide the total number of PNs in the configuration by five and add one. The additional IPSI provides fault tolerance. For example, if you have 20 PNs, divide 20 by 5 to get 4, then add 1. You need a minimum of five IPSIs to support the 20 PNs.

For configurations where voice bearer is over IP, there must be one IPSI in each PN.

A direct connect configuration only supports one IPSI-connected PN.

TN2313AP DS-1 interface (24 channels)

The TN2313AP DS-1 port circuit pack interfaces a DS-1 trunk to the switch backplane by port slots that are standard for DEFINITY products. The TN2313AP is compatible with the following:

- previous 24-channel DS-1 circuit packs, including the TN464F, vintage 19, and earlier
- TN2464, vintage 19 and earlier
- TN767E DS-1

Except, the TN2313AP does not provide for packet adjunct capabilities. The TN2313AP supports a variety of applications, including networking of the following:

- DEFINITY switches
- international trunk types
- video teleconferencing
- wideband data transmission

On S8510 and S8800 Servers, this circuit pack does not directly support D-channel signaling and thus does not directly support ISDN-PRI connectivity. However, the TN767 circuit can indirectly support D-channel signaling provided that the central office supports nonfacility associated signaling (NFAS). In this case, use NFAS administration on the server to associate the D-channel of another T1/E1 circuit pack, usually a TN464, with the TN767 circuit pack.

The TN2313AP DS-1 interface can be configured as 24 channels at 1.544 mbps. The TN2313 can supply two 8-kHz reference signals to the switch backplane. These signals can be used by the tone-clock circuit pack to synchronize the system clock and the received line clock.

The TN2313AP is downloadable firmware.

TN2464CP DS-1 interface with echo cancellation, T1/E1

The TN2464CP DS-1 circuit pack is designed for international use in both category A and category B. The TN2464CP has echo cancellation circuitry and firmware download capability. The TN2464CP supports T1 (24-channel) and E1 (32-channel) digital facilities. The TN2464CP has the same functionality as the TN464HP, which is offered in the United States and Canada.

The TN2464CP circuit pack provides:

- Test jack access to the T1/E1 line
- Circuit-pack-level administrable A-law and Mu-law companding
- CRC-4 generation and checking (E1 only)
- Support for the 120A channel service unit module
- CO, TIE, DID, off-premises station (OPS) port types that use robbed-bit signaling protocol, proprietary bit-oriented signaling (BOS) 24th-channel signaling protocol, or DMI-BOS 24th-channel signaling protocol

- Unpolarized, balanced-pair, line-out (LO) and line-in (LI) signal leads
- Support for Russian incoming ANI
- Support for the enhanced maintenance capabilities of the enhanced integrated channel service unit (ICSU)
- Support for Avaya Interactive Response
- Channel-associated signaling protocols for many countries. For current documentation and knowledge articles related to TN2464CP, go to the Avaya Support website at http://support.avaya.com.

To update TN2464CP with the firmware download feature, use the TN799 C-LAN interface.

TN2501AP voice announcements over LAN (VAL)

The TN2501AP is an integrated announcement circuit pack that:

- Offers up to one hour of announcement storage capacity
- Provides shorter backup and restore time
- Is firmware that can be downloaded
- Plays announcements over the TDM bus, similar to the TN750C circuit pack
- Has 33 ports, including
  - One dedicated telephone access port for recording and playing back announcements using port number 1
  - One Ethernet port using port number 33
  - 31 playback ports using port numbers 2 to 32
- Uses a 10-mbps/100-mbps ethernet interface to allow portability of announcements and firmware files over a LAN
- Uses announcement files that are in *.wav* format (CCITT A-law and μ-law, 8 kHz, 8-bit mono)

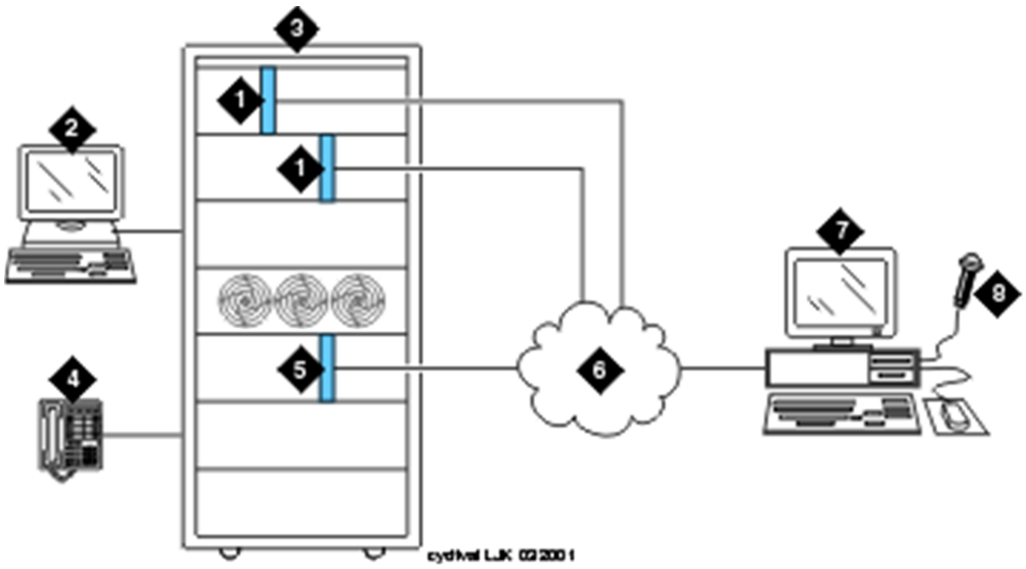
The VAL can serve as an FTP or SFTP server for file transfers — primarily firmware downloads. The VAL cannot serve as an SFTP client.

With Communication Manager Release 3.1 and later, the VAL can also receive firmware downloads from a central firmware depository on an SCP-enabled file server.

For more information on firmware downloads and instructions for downloading, see http://www.avaya.com/support/

TN2501AP voice announcements over LAN configuration

The following figure shows the configuration options for the TN2501AP (VAL) circuit pack within a system.



Number	Description
1	TN2501AP VAL announcement circuit pack
2	System access terminal (SAT)
3	Switch
4	Telephone for recording announcements
5	TN799DP (C-LAN) is required when using IP SAT or VAL Manager.
6	Your LAN (See LAN cable on page 186)
7	Computer or remote recording studio for: • recording and storing announcements • FTP client application
8	VAL Manager application (PC only)
9	Microphone

TN2501AP voice announcements over LAN hardware specifications

The following table contains a list of the required VAL hardware.

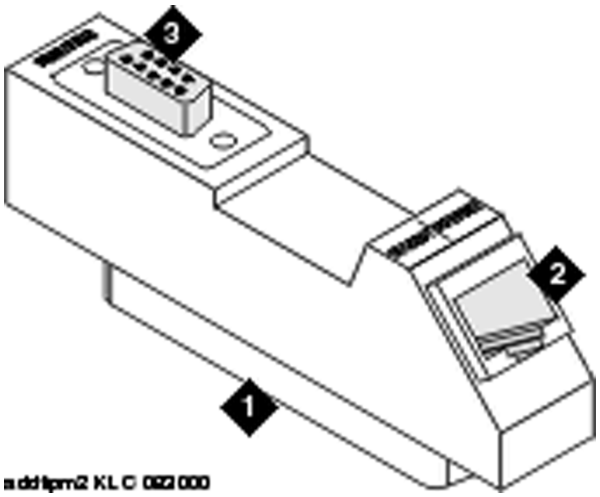
Part	Number
TN2501AP	1
Backplane Adapter on page 186 (Label reads IP Media Processor)	1

To establish LAN connections, the TN2501AP circuit pack requires a:

- Backplane Adapter that attaches to the Amphenol connector on the back of the cabinet, corresponding to the TN2501AP integrated announcement circuit pack slot.
- LAN cable on page 186 that attaches to the Backplane Adapter.

Backplane Adapter

The following figure shows the Backplane Adapter (label reads IP Media Processor).



Number	Description
1	Amphenol connector attaches to the back of the switch cabinet, corresponding to the TN2501AP circuit pack's slot.
2	RJ-45 LAN cable connection • 10 mbps uses Category 3 cable • 100 mbps uses Category 5 cable
3	This connector is not used for VAL.

LAN cable

The TN2501AP circuit pack does not include cables to connect the circuit pack to your LAN. The following table lists the cable category and connection port.

Ethernet connection speed	Cable	Connection description
10 mbps	Category 3	Connects through the RJ45 jack (See the figure on page 186),
100 mbps	Category 5	Connects through the RJ45 jack (See the figure on page 186),

TN2602AP IP Media Resource 320

The TN2602AP IP Media Resource 320 provides high-capacity voice over Internet protocol (VoIP) audio access to the switch for local stations and outside trunks. The TN2602AP provides audio processing for the following types of calls:

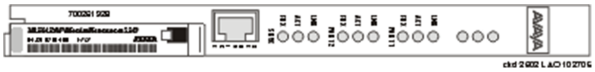
- TDM-to-IP and IP-to-TDM — for example, a call from a 4602 IP telephone to a 6402 DCP telephone
- IP-to-IP — for example, a non-shuffled conference call

The TN2602AP IP Media Resource 320 circuit pack has two capacity options, both of which are determined by the license file installed on Communication Manager:

- 320 voice channels, considered the standard IP Media Resource 320
- 80 voice channels, considered the low-density IP Media Resource 320

Only two TN2602AP circuit packs are allowed per port network.

TN2602AP IP Media Resource 320 faceplate



Detailed description of TN2602AP IP Media Resource 320

Load balancing

Up to two TN2602AP circuit packs may be installed in a single port network for load balancing. The TN2602AP circuit pack is also compatible with and can share load balancing with the TN2302 and TN802B IP Media Processor circuit packs. Actual capacity may be affected by a variety of factors, including the codec used for call and fax support.

Note:

The maximum number of time slots available for a port network is 484. Therefore, when a port network uses two TN2602AP circuit packs for load balancing, each with 320 voice channels, the total number of voice channels available is 484.

Bearer duplication

Two TN2602AP circuit packs may be installed in a single port network (PN) for bearer duplication. In this configuration, one TN2602AP is an active IP media processor and one is a standby IP media processor. If the active media processor fails or connections to it fail active connections failover to the standby media processor and remain active. This duplication prevents active calls in progress from being dropped in case of failure. The interchange between duplicated circuit packs affects only the PN in which the circuit packs reside.

Note:

The 4606, 4612, and 4624 telephones do not support the bearer duplication feature of the TN2602AP circuit pack. If these telephones are used while an interchange from active to standby media processor is in process, calls may be dropped.

Virtual IP and MAC addresses to enable bearer duplication

Duplicated TN2602AP circuit packs in a PN share a virtual IP and virtual MAC address. These virtual addresses are owned by the currently active TN2602. In addition to the virtual IP address, each TN2602 has a real IP address. All bearer packets sent to a PN that contains duplicated TN2602AP circuit packs, regardless of whether the packets originate from TN2602s in other PNs or from IP phones or gateways, are sent to the virtual IP address of the TN2602 pair in that PN. The TN2602AP circuit pack that is active receives those packets.

When failover to the standby TN2602 occurs, a negotiation between TN2602s to determine which TN2602 is active and which is standby takes place. State-of-health, call state, and encryption information is shared between TN2602s during this negotiation. The newly-active TN2602AP circuit pack sends a gratuitous address resolution protocol (ARP) request to ensure that the LAN infrastructure is updated appropriately with the location of the active TN2602. Other devices within the LAN update their old mapping in ARP cache with this new mapping.

Requirements for bearer duplication

- The Communication Manager license file must have entries for each circuit pack, with the entries having identical voice channels enabled. In addition, both circuit packs must have the latest firmware that supports bearer duplication.
- Duplicated TN2602AP circuit packs must be in the same subnet. In addition, the Ethernet switch or switches that the circuit packs connect to must also be in the same subnet. With the shared subnet, the Ethernet switches can use signals from the TN2602AP firmware to identify the MAC address of the active circuit pack.

  This identification process provides a consistent virtual interface for calls.

Combining duplication and load balancing

A single port network can have up to two TN2602AP circuit packs only. As result, the port network can have either two duplicated TN2602AP circuit packs or two load balancing TN2602AP circuit packs. However, in a Communication Manager configuration, some port networks can have a duplicated pair of TN2602AP circuit packs and other port networks can have a load-balancing pair of TN2602AP circuit packs. Some port networks can also have single or no TN2602AP circuit packs.

Note:

If a pair of TN2602AP circuit packs previously used for load balancing are re-administered to be used for bearer duplication, only the voice channels of the circuit pack that is active can be used. For example, if you have two TN2602 AP circuit packs in a load balancing configuration, each with 80 voice channels, and you re-administer the circuit packs to be in bearer duplication mode, you will have 80 instead of 160 channels available. If you have two TN2602 AP circuit packs in a load balancing configuration, each with 320 voice channels, and you re-administer

the circuit packs to be in bearer duplication mode, you will have 320 instead of 484 channels available.

TN2602AP IP Media Resource 320 features

The IP Media Resource 320 supports hairpin connections and the shuffling of calls between TDM connections and IP-to-IP direct connections. TN2602AP IP Media Resource 320 can also perform the following functions:

- Echo cancellation
- Silence suppression
- Adaptive jitter buffer (320 ms)
- Dual-tone multifrequency (DTMF) detection
- AEA Version 2 and AES media encryption
- Conferencing
- QOS tagging mechanisms in layer 2 and 3 switching (Diff Serv Code Point [DSCP] and 802.1pQ layer 2 QoS)
- RSVP protocol

The TN2602AP IP Media Resource 320 circuit pack supports the following codecs for voice, conversion between codecs, and fax detection:

- G.711, A-law or Mu-law, 64 kbps
- G.726A-32 kbps
- G.729 A/AB, 8 kbps audio

The TN2602AP also supports transport of the following devices:

- Fax, Teletypewriter device (TTY), and modem calls using pass-through mode
- Fax, V.32 modem, and TTY calls using proprietary relay mode

  Note:

  V.32 modem relay is needed primarily for secure SCIP telephones (formerly known as Future Narrowband Digital Terminal (FNBDT) telephones) and STE BRI telephones.
- T.38 fax over the Internet, including endpoints connected to nonAvaya systems
- 64-kbps clear channel transport in support of firmware downloads, BRI secure telephones, and data appliances

The TN2602AP supports SRTP media encryption.

Firmware download

The TN2602AP IP Media Resource 320 can serve as an FTP or SFTP server for firmware downloads to itself. However, this capability is activated by and available for authorized services personnel only.

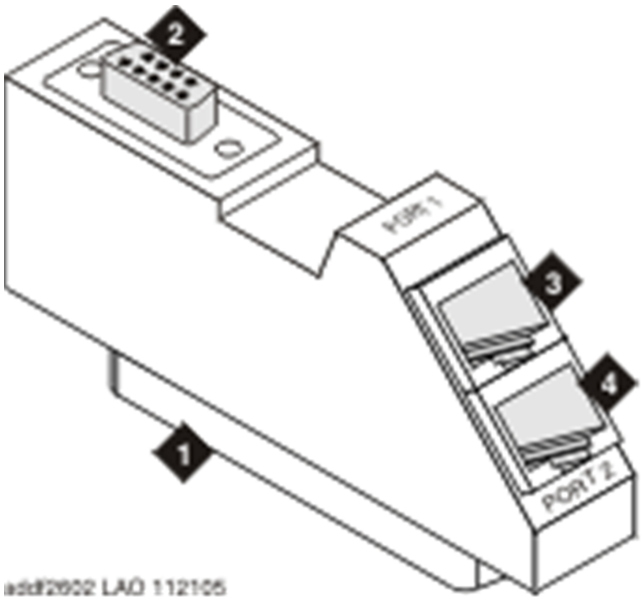
I/O adapter

The TN2602AP IP Media Resource 320 circuit pack has a services Ethernet port in the faceplate. The TN2602AP circuit pack also requires an input/output adapter that provides for one RS-232 serial port and two 10/100 Mbs Ethernet ports for LAN connections (though only the first Ethernet port is used). This Ethernet connection is made at the back of the IP Media Resource 320 slot.

Note:

The TN2302AP can also use this I/O adapter.

TN2602 IP Media Resource 320 I/O adapter



Number	Description
1	Amphenol connector to backplane connector corresponding to TN2602AP slot
2	RS-232 connector for services
3	Port 1: RJ45 LAN cable connection for 100 mbps CAT5 cable
4	Port 2: RJ45 LAN connection for future use (do not use)

Comparison of the TN2602AP and TN2302AP circuit packs

The following table compares key features of the TN2602AP IP Media Resource 320 circuit pack and the TN2302AP Media Processor circuit pack.

Supported Features	TN2302AP Media Processor (V10 and later)	TN2602AP IP Media Resource 320 (standard and low density)
VoIP Media Processing Channels	64 (G.711)	320 (standard) or 80 (low density), based on license
License control	no	yes
T.38 Fax Interoperability	yes	yes
Fax Pass Through	yes	yes
Fax Relay – Proprietary	yes	yes
Modem Pass Through	yes	yes
Modem Relay – Proprietary	yes	yes
TTY Pass Through	yes	yes
TTY Relay	yes	yes
Clear channel	yes	yes
Echo Cancellation	yes (32 ms full tail)	yes (128 ms tail, 24 ms window)
DTMF Detection/Generation	yes	yes
Communication Manager can load balance between multiple boards	yes	yes
Bearer duplication	no	yes
AEA.2, AES media encryption	yes (use of AES reduces channel availability by 25%)	yes (use of AES does not reduce channel availability)
Resiliency to DOS attacks	yes	yes
Firmware download	yes (requires C-LAN)	yes (self-downloadable)
Reporting and recovery from bad/corrupt embedded SW	yes	yes
Built-in test support • Sanity confirmation at boot • Loop back tests • Shallow IP and TDM loop back mode	yes	yes

Table continues…

Supported Features	TN2302AP Media Processor (V10 and later)	TN2602AP IP Media Resource 320 (standard and low density)
• Embedded firmware self test routines upon board initialization		
Ping test support	yes	yes
VoIP engine monitoring	yes	yes
VoIP engine resets	yes	yes
Trace route support	yes	yes.For additional information on trace route, including limitation with the TN2602AP circuit pack, see the Maintenance documentation.
RS232 port user interface	yes	yes
Enable/disable FTP & Telnet services	Enable/disable Telnet only in V58 and later.	yes
Enable/disable SFTP and SSH services	no	yes
Service access	RS232 port out the back – no password required	Faceplate services Ethernet port or RS232 port in the back. VxWorks shell access. Password protected
Ethernet ports	A single 10/100mbps Ethernet port out the back. Uses an adapter.	Two 10/100mbps Ethernet ports. Only one used. Uses an adapter to access both ports.
Codecs	• G.711 (64 channels maximum, unencrypted; 48 channels maximum, encrypted) • G.729B and G.723.1 (32 channels maximum, unencrypted; 24 channels maximum, encrypted)	• G.711 (320 channels maximum, unencrypted or encrypted) • G.729A, G.729AB, (320 channels maximum, unencrypted or encrypted) • G.726A (320 channels maximum)

TN2602AP IP Media Resource 320 hardware requirements

The TN2602AP IP Media Resource 320 feature requires the following hardware:

- TN2602AP circuit pack with one 10/100BaseT Ethernet port for services access
- Media Resource 320 adapter with one RS-232 serial port and two 10/100BaseT Ethernet ports
- Slot in the gateway that is CAT5 compliant.

- A CAT5 or equivalent cable, supplied by the customer

The TN2602AP works in the G650 Media Gateways (cabinets/carriers) supported by Release 3.1 of Communication Manager. G650 is the preferred gateway for TN2602AP IP Media Resource 320.

TNCCSC-1 PRI to DASS converter

The TNCCSC-1 circuit pack converts ISDN-PRI to a Direct Access Secondary Storage (DASS) interface. DASS is a 2-mbps interface that uses a 75-Ohm coaxial transmission facility. One TNCCSC-1 circuit pack can support two TN464 DS-1 interface circuit packs. A Y-cable and an 888B 75-Ohm coaxial adapter connect to the public network facility.

TNCCSC-2 PRI to DPNSS converter

The TNCCSC-2 circuit pack converts ISDN-PRI to a Digital Private Network Signaling System (DPNSS) interface. DPNSS is a 2-mbps interface that uses a 75-Ohm coaxial transmission facility. One TNCCSC-2 circuit pack can support two TN464 DS-1 interface circuit packs. A Y-cable connects to the public network facility.

TNCCSC-3 PRI to DPNSS converter

The TNCCSC-3 circuit pack is the same as the TNCSSC-2 circuit pack, except that the TNCSSC-3 has a 120-Ohm twisted pair interface.

TN-C7 PRI to SS7 converter

The TN-C7 converter provides a gateway interface between the TN464 circuit pack and the public signaling network. The TN-C7 integrates DASS, DPNSS, and SS7 into a single circuit pack type. The TN-C7 supports international service provider call center customers. The TN-C7 converter is not designed for operation in the United State or Canada.

TN-CIN voice, fax, and data multiplexer

The TN-CIN provides QSIG and private networking transparency on demand across a switched network. The TN-CIN integrates circuits over a single separate digital link. The circuits include up to three G.728 LD-CELP voice or fax circuits, six CAFT voice or fax circuits, and two data circuits. The three or six voice or fax circuits are presented as a G.703 E1 data stream that uses either QSIG peer-to-peer or channel-associated signaling.

All voice or fax circuits support low bit rate voice compression at 8 to 16 kbps when the circuits use CAFT. When circuits use LD-CELP, all voice or fax circuits support the same voice compression at

16 kbps. LD-CELP voice compression supports FAX at V.29 (7200 bps). CAFT voice compression supports FAX at V.27ter (4800 bps). The Composite port supports V.11 and V.35 at speeds up to 128 kbps.

The TN-CIN features an on-demand voice networking mode for use with time-based communications links like ISDN. A high-speed data port is available for data applications. This port uses V.24 or V.11 or V.35 at up to 115.2 kbps synchronous or V.24 at up to 115.2 kbps asynchronous. The port also incorporates dynamic bandwidth allocation, also known as variable data clocking. A low-speed V.24 data port of up to 96 kbps synchronous or 57.6 kbps asynchronous is available for data applications.

Chapter 6: Media modules

MM312 DCP Media Module

Avaya MM312 Media Module provides 24 Digital Communications Protocol (DCP) ports with RJ-45 jacks. The MM312 supports simultaneous operation of all 24 ports. Each port can be connected to a 2-wire DCP telephone. The MM312 does not support 4-wire DCP telephones.

The MM312 is supported only in the G350 Branch Gateway.

The MM312 supports the following loop length:

- 5500 feet (1676 meters) over 0.65 mm (.025 in.) wire (22 AWG)
- 3500 feet (1067 meters) over 0.5 mm (.02 in.) wire (24 AWG)
- 2200 (671 meters) over 0.4 mm (.016 in.) wire (26 AWG)

Danger:

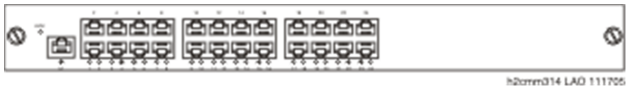
The ports on the MM312 are intended for in-building use only. Telephone lines connected to those ports are not to be routed out-of-building. Failure to comply with this restriction could cause harm to personnel or equipment.

MM314 LAN Media Module

The Avaya MM314 Media Module provides:

- 24 Ethernet 10/100 Base-T Ethernet access ports with inline Power over Ethernet (PoE).
- One Gigabit Ethernet Small Form-Factor Pluggables (SFP) GigaBit Interface Converter (GBIC) slot which supports any of the following SFP GBICs: 1000-SX, 1000-LX, 1000-ELX or 1000-TX.

The MM314 is supported only in the G350 Branch Gateway.



The MM314 supports 48VDC inline power provided over standard category 5 UTP cables, up to 100 meter range, on each PoE port.

The MM314 supports the following features:

- Priority power budgeting with configurable priorities
- Automatic load detection on ports
- Automatic device discovery
- Enable/disable port powering option
- Port monitoring
- Automatic recovery from overload shutdown

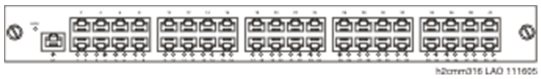
Automatic recovery from no-load shutdown

MM316 LAN Media Module

The MM316 LAN media module provides:

- 40 Ethernet 10/100 Base-T Ethernet access ports with inline Power over Ethernet (PoE).
- One Gigabit Ethernet copper port for server connection or uplink to another switch or router.

The MM316 is supported only in the G350 Branch Gateway.



The MM316 supports 48VDC inline power provided over standard category 5 UTP cables (up to 100m range) on each PoE port.

The MM316 supports the following features:

- Priority power budgeting with configurable priorities
- Automatic load detection on ports
- Automatic device discovery
- Enable/disable port powering option
- Port monitoring
- Automatic recovery from overload shutdown
- Automatic recovery from no-load shutdown

The MM316 is compatible with ACM version 2.0 and later and G350 Branch Gateway firmware version 25.0.0 and later.

MM710B E1/T1 media module

Note:

This information applies to the MM710 as well.

The MM710B E1/T1 media module terminates an E1 or T1 trunk. The MM710 has a built-in Channel Service Unit (CSU) so an external CSU is not necessary. The CSU is only used for the T1 circuit.

The MM710B features:

- ISDN PRI capability (23B+D or 30B+D)
- Trunk signaling to support US and International CO or tie trunks
- Echo cancellation in either direction

Figure 7: The MM710B media module

MM711 analog media module

The MM711 provides analog trunk and telephone features and functionality.

Related links

MM711 ports on page 197
Other MM711 features and functionality on page 198

MM711 ports

The administrator can configure any of the eight ports of the MM711 as follows:

- Central office trunk, either loop start or ground start
- Analog Direct Inward Dialing (DID) trunks, either wink-start or immediate-start
- 2-wire analog Outgoing CAMA E911 trunks for connectivity to the PSTN
- MF signaling is supported for CAMA ports
- Analog, tip/ring devices, such as single-line telephones with or without LED message waiting indication

Related links

MM711 analog media module on page 197

Other MM711 features and functionality

- Three ringer loads, which is the Ringer Equivalency Number (REN), for the following loop lengths for all eight ports.
  - 20,000 feet (6096 meters) with 0.65 mm wire
  - 16,000 feet (4877 meters) with 0.5 mm wire
  - 10,000 feet (3048 meters) with 0.4 mm wire

  At .1 or less ringer loads, the supported loop length is 20,000 feet (6096 meters) with 0.65 mm, 0.5 mm and 0.4 mm wire.
- Up to eight simultaneously-ringing ports

  Note:

  The Branch Gateway achieves this number of ports by staggering the ringing and pauses between two sets of up to four ports.
- Type 1 Caller ID
- Ring voltage generation for a variety of international frequencies and cadences

Figure 8: The MM711 media module

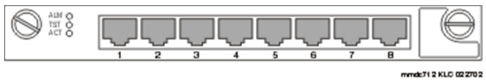
Related links

MM711 analog media module on page 197

MM712 DCP Media Module

Use the MM712 DCP Media Module to connect up to eight two-wire Digital Communications Protocol (DCP) voice terminals.

The MM712 is supported in the G700, G450, G430, and G350 Branch Gateways.



Hardware interface

Signal timing specifications for the MM712 support TDM bus timing in receive and transmit modes. The gateway supplies only +5 VDC and –48 VDC to the MM712 Media Module. Any other required voltages must be derived on the module.

MM712 provides loop range secondary protection. The MM712 is also self-protecting from an over-current condition on a tip and ring interface. The MM712 supports the following loop length:

- 5500 feet (1676 meters) over 0.65 mm (.025 in.) wire (22 AWG)
- 3500 feet (1067 meters) over 0.5 mm (.02 in.) wire (24 AWG)
- 2200 (671 meters) over 0.4 mm (.016 in.) wire (26 AWG)

Danger:

The ports on the MM712 are intended for in-building use only. Telephone lines connected to those ports are not to be routed out-of-building. Failure to comply with this restriction could cause harm to personnel or equipment.

MM714 analog media module

The MM714 analog media module provides four analog telephone ports and four analog trunk ports.

Note:

The four analog trunk ports *cannot* be used for analog DID trunks. Instead, the four analog telephone ports must be used.

Related links

MM714 ports on page 199
MM714 line ports on page 199
Other MM714 features and functionality on page 200

MM714 ports

The MM714 provides you with the capability to configure any of the four trunk ports as:

- A loop start or a ground start central office trunk with a loop current of 18 to 120 mA
- A two-wire analog Outgoing CAMA E911 trunk, for connectivity to the PSTN. MF signaling is supported for CAMA ports.

Related links

MM714 analog media module on page 199

MM714 line ports

The MM714 provides you with the capability to configure any of the four telephone ports as:

- A wink-start or an immediate-start DID trunk
- Analog tip/ring devices such as single-line telephones with or without LED message waiting indication

Related links

MM714 analog media module on page 199

Other MM714 features and functionality

- Three ringer loads, which is the Ringer Equivalency Number (REN), for the following loop lengths for all eight ports.
  - 20,000 feet (6096 meters) with 0.65 mm wire
  - 16,000 feet (4877 meters) with 0.5 mm wire
  - 10,000 feet (3048 meters) with 0.4 mm wire

  At .1 or less ringer loads, the supported loop length is 20,000 feet (6096 meters) with 0.65 mm, 0.5 mm and 0.4 mm wire.
- Up to four simultaneously-ringing ports
- Type 1 caller ID and Type 2 caller ID
- Ring voltage generation for a variety of international frequencies and cadences

Figure 9: The MM714 media module

Related links

MM714 analog media module on page 199

MM714B analog media module

The MM714B analog media module provides all the features provided by the MM714 (see MM714 analog media module on page 199), and in addition provides an emergency transfer relay.

Related links

MM714B and ETR on page 200

MM714B and ETR

In the event of system failure, the MM714B provides emergency transfer relay (ETR) services by connecting trunk port 5 and line port 4.

Figure 10: The MM714B media module

Related links

MM714B analog media module on page 200

MM716 analog media module

The MM716 provides 24 analog ports supporting telephones, modem, and fax. These ports can also be configured as DID trunks with either wink-start or immediate-start. The 24 ports are provided via a 25 pair RJ21X amphenol connector, which can be connected by an amphenol cable to a breakout box or punch-down block.

Related links

MM716 ports on page 201

Other MM716 features and functionality on page 201

MM716 ports

The MM716 provides you with the capability to configure any of the 24 ports as:

- Analog tip/ring devices such as single-line telephones with or without LED message waiting indication
- A wink-start or an immediate-start DID trunk

Related links

MM716 analog media module on page 201

Other MM716 features and functionality

- Three ringer loads, which is the Ringer Equivalency Number (REN), for the following loop lengths for all 24 ports.
  - 20,000 feet (6096 meters) with 0.65 mm wire
  - 16,000 feet (4877 meters) with 0.5 mm wire
  - 10,000 feet (3048 meters) with 0.4 mm wire

  At .1 or less ringer loads, the supported loop length is 20,000 feet (6096 meters) with 0.65 mm, 0.5 mm and 0.4 mm wire.
- Up to 24 simultaneously-ringing ports
- Type 1 caller ID
- Ring voltage generation for a variety of international frequencies and cadences

The MM716 is compatible with Avaya Aura® Communication Manager release 3.1 and higher, and Branch Gateway firmware version 29.x.x and higher.

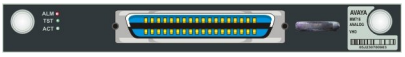


Figure 11: The MM716 media module

Related links

MM716 analog media module on page 201

MM717 DCP media module

The MM717 DCP media module provides 24 DCP ports of two-wire DCP functionality exposed as a single 25-pair amphenol connector. The DCP ports are exposed by connecting the module via a standard amphenol cable to a punch-down block with RJ-11 jacks. The MM717 allows you to use one of the smaller media module slots for a large number of DCP telephones.

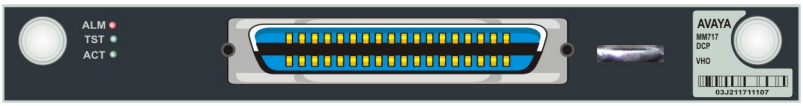


Figure 12: The MM717 media module

MM720 BRI media module

The MM720 BRI media module provides eight ports with RJ-45 jacks that can be administered either as BRI trunk connections or BRI endpoint (telephone and data module) connections.

Note:

The MM720 BRI media module cannot be administered to support both BRI trunks and BRI endpoints at the same time. However, the MM720 BRI Media Module supports combining both B-channels together to form a 128-kbps channel. Communication Manager 3.1 enables combining B-channels, using BONDing, to form a higher bandwidth connection. Finally, if the MM720 BRI Media Module is administered to support BRI endpoints, it cannot be used as a clock synchronization source.

For BRI trunking, the MM720 BRI media module supports up to eight BRI interfaces to the central office at the ISDN TE reference point. Information is communicated in two ways:

- Over two 64-kbps channels, called B1 and B2, that can be circuit-switched simultaneously
- Over a 16-kbps channel, called the D-channel, that is used for signaling. The MM720 occupies one time slot for all eight D channels.

The circuit-switched connections have an A- or Mu-law option for voice operation. The circuit-switched connections operate as 64-kbps clear channels when in the data mode.

For BRI endpoints, the MM720 BRI media module supports up to 16 BRI stations and data modules that conform to AT&T BRI, World Class BRI, and National ISDN NI1/NI2 BRI standards. The MM720 BRI media module provides -40 volt phantom power to the BRI endpoints.

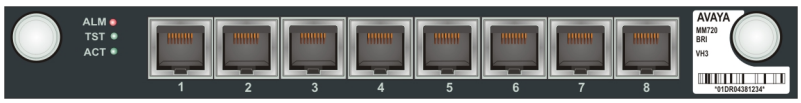


Figure 13: The MM720 media module

MM721 BRI media module

The MM721 Basic Rate Interface (BRI) media module contains eight ports. You can administer these ports either as BRI trunk or BRI endpoint connections, such as a telephone and data module.

Note:

You cannot administer the MM721 BRI media module to support both BRI trunks and BRI endpoints at the same time. You can utilize all eight ports on the MM721 for just stations or just trunks. You cannot use a mixture of ports for both applications.

For BRI trunking, the MM721 BRI media module supports up to eight BRI interfaces to the central office at the ISDN S/T reference point.

For BRI endpoints, each of the eight ports on the MM721 BRI media module supports integrated voice and data endpoints for up to 2 BRI stations or data modules or both. The MM721 BRI media module provides -48 volt phantom power to the BRI endpoints.

The MM721 BRI media module supports 4-wire S/T ISDN BRI on each interface.

The MM721 BRI media module communicates information in two ways:

- Over two 64-kbps channels called B1 and B2. You can circuit-switch these channels simultaneously
- Over a 16-kbps channel called the D-channel that is used for signaling

The circuit-switched connections have an A-law or Mu-law option for voice operation. In the data mode, circuit-switched connections operate as 64-kbps clear channels.

The MM721 supports the G450 and G430 Branch Gateways with Communication Manager Release 6.2.

The MM721 supports the G450 and G430 Branch Gateways with Communication Manager Release 6.0.1 build 31_18_1.

You can also use the MM721 to support the G700 and G350 Branch Gateways with Communication Manager Release 5.2.1 build 30_17_2.

- In non-native admin mode, the system displays the MM721 media module as MM720X for the Communication Manager Release 6.0.1 build 31_18_1 and Release 5.2.1 build 30_17_2.
- In admin mode, the system displays the MM721 media module as MM721 with Communication Manager Release 6.2 and later. The changes on the system display on upgrading the system.

Note:

If you replace the MM720 media module, first uninstall the MM720 media module before installing the MM721 media module.

The following table provides the MM721 media module display information on different Communication Manager releases.

Release	5.2.1/6.0.1 and earlier	5.2.1 SP7/6.0.1 SP1	6.2 and later
Administer	MM720 (non-native admin)	MM720 (non-native admin)	MM721 (Native)
Insert	MM721	MM721	MM721
Result	No Board	MM720X	MM721

MM722 BRI media module

The MM722 BRI media module provides two 4 wire S/T ISDN BRI 2B+D access ports with RJ-45 jacks. Each port interfaces to the central office at the ISDN T reference point. Information is communicated in the same manner as for the MM720. See MM720 BRI media module on page 202.

Figure 14: The MM722 media module

Note:

The MM722 media module does not support BRI stations or combining both B channels together to form a 128-kbps channel.

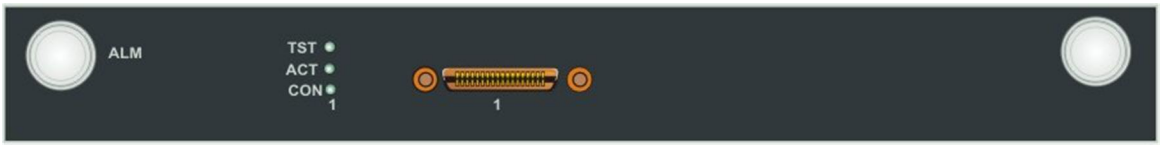
MM340 E1/T1 data WAN Media Module

The Avaya MM340 Media Module provides one WAN access port for the connection of an E1 or T1 data WAN. The MM340 may be deployed as an interface to an IP-routed private enterprise network or as an interface to an Internet service provider.

MM340 E1/T1 data WAN Media Module is not supported in the G700 and G430 Branch Gateways.

MM342 USP data WAN Media Module

The Avaya MM342 Media Module provides one USP WAN access port. The MM342 may be deployed as an interface to an IP-routed private enterprise network or as an interface to an Internet service provider.



MM342 is not supported in the G700 and G430 Branch Gateways.

The MM342 supports the following WAN protocols:

- EIA530
- V.35/ RS449
- X.21

For these connections, one of the following cables is necessary:

- Avaya Serial Cable DTE V.35 (USP to V.35)
- Avaya Serial Cable DTE X.21 (USP to X.21)

MM760 VoIP Media Module

The Avaya MM760 VoIP Media Module is a clone of the motherboard VoIP engine. MM760 provides additional 64 VoIP channels with G.711 compression.

MM760 VoIP Media Module is supported only in the G700 Branch Gateway.

Detailed description of MM760 VoIP Media Module

The capacity of the MM760 is 64 G.711 TDM/IP simultaneous calls or 32 compression codec, G. 729, G.726, or G.723, TDM/IP simultaneous calls. These call types can be mixed on the same resource. In other words, the simultaneous call capacity of the resource is 64 G.711 equivalent calls.

Note:

Some customers might want an essentially nonblocking system. You must add an additional MM760 Media Module if the customer uses more than two MM710 Media Modules in a single chassis. The additional MM760 provides an additional 64 channels.

Ethernet interface

The MM760 must have its own Ethernet address. The MM760 requires a 10/100 Base T Ethernet interface to support H.323 endpoints for DEFINITY IP trunks and stations from another G700 Branch Gateway.

Voice compression

The MM760 has resources for compression and decompression of voice for G.711 (A-Law and Mu-Law), G.729 and 729B, G.726, and G.723 (5.3K and 6.3K).

The VoIP engine supports the following functionality:

- RTP and RTCP interfaces
- Dynamic jitter buffers
- DTMF detection
- Hybrid echo cancellation
- Silence suppression
- Comfort noise generation
- Packet loss concealment
- SRPT media encryption

The MM760 also supports the following types of transmissions:

- Fax, Teletypewriter device (TTY), and modem calls over a corporate IP intranet using pass-through mode
- Fax and TTY calls using proprietary relay mode

  Faxes sent to nonAvaya endpoints cannot be encrypted.
- 64kbps clear channel transport in support of BRI Secure Phone and data appliances
- T.38 Fax over the Internet (including endpoints connected to nonAvaya systems)
- Modem tones over a corporate IP intranet

Note:

The path between endpoints for fax and modem tone transmissions must use Avaya telecommunications and networking equipment.

For more information, see *Administering Network Connectivity on Avaya Aura® Communication Manager*, 555-233-504.

Chapter 7: Telephony Interface Modules

IG550 supports the following telephony interface modules:

- TIM508 Analog
- TIM514 Analog
- TIM516 Analog
- TIM518 Analog
- TIM510 E1/T1
- TIM521 BRI

Related links

TIM510 E1/T1 Telephony Interface Module on page 211

TIM508 analog media module

The TIM508 Analog Telephony Interface Module provides eight analog telephone ports. You can alternatively administer some or all of the ports as analog DID trunks.

TIM508 line port configuration

The TIM508 provides the capability to configure any of the eight line ports as:

- A wink-start or an immediate-start DID trunk
- Analog tip/ring devices such as single-line telephones with or without LED message waiting indication

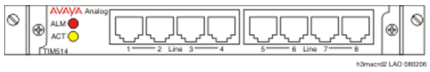
TIM508 also supports:

- Three ringer loads, which is the ringer equivalency number for up to 2,000 feet (610 meters) for the four station ports

- Up to eight ports ringing simultaneously
- Type 1 caller ID and Type 2 caller ID for line ports
- Ring voltage generation for a variety of international frequencies and cadences

TIM514 analog telephony interface media module

The TIM514 Analog Telephony Interface Module provides four analog telephone ports and four analog trunk ports. You can only use the four analog line ports, ports 1 through 4, for analog DID trunks. The four analog trunk ports, ports 5 through 8, must not be used in this way.



TIM514 trunk port configuration

The TIM514 provides the capability to configure ports 5 through 8 as:

- A loop start or a ground start central office trunk with a loop current of 18 to 120 mA
- A two-wire analog Outgoing CAMA E911 trunk, for connectivity to the PSTN. MF signaling is supported for CAMA ports
- Direct Inward/Outward Dialing (DIOD) for Japan only

TIM514 line port configuration

The TIM514 provides you with the capability to configure ports1 through 4 as:

- A wink-start or an immediate-start DID trunk
- Analog tip/ring devices such as single-line telephones with or without LED message waiting indication

TIM514 also supports:

- Three ringer loads, which is the ringer equivalency number for up to 2,000 feet (610 meters) for all four line (station) ports
- Up to four ports ringing simultaneously
- Type 1 caller ID and Type 2 caller ID
- Ring voltage generation for a variety of international frequencies and cadences

TIM516 analog media module

The TIM516 Analog Telephony Interface Module provides 16 analog telephone ports.

TIM516 line port configuration

The TIM516 provides the capability to configure any of the line ports as:

- Analog tip/ring devices such as single-line telephones with or without LED message waiting indication

Note:

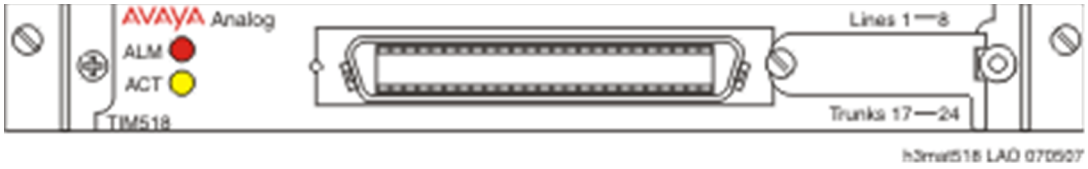
The TIM516 does not support Off Premise Stations (OPS) or DID/DIOD trunks.

TIM516 also supports

- Three ringer loads, which is the ringer equivalency number for up to 2,000 feet (610 meters) for all sixteen ports
- Up to 16 ports ringing simultaneously
- Type 1 caller ID and Type 2 caller ID for line ports
- Ring voltage generation for a variety of international frequencies and cadences

TIM518 analog media module

The TIM518 Analog Telephony Interface Module provides eight analog telephone ports and eight analog trunk ports. Some or all of the line ports can be administered as analog DID trunks instead.



TIM518 line port configuration

The TIM518 provides you with the capability to configure any of the first eight line ports as:

- A wink-start or an immediate-start DID trunk
- Analog tip/ring devices such as single-line telephones with or without LED message waiting indication

TIM518 trunk port configuration

The TIM518 provides the capability to configure ports 9 through 16 as:

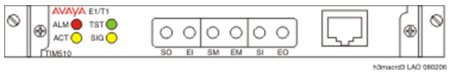
- A loop-start or a ground-start central office trunk with a loop current of 18 to 120 mA
- A two-wire analog Outgoing CAMA E911 trunk, for connectivity to the PSTN. MF signaling is supported for CAMA ports.

TIM518 also supports:

- Three ringer loads, which is the ringer equivalency number for up to 2,000 feet (610 meters) for all eight ports
- Up to eight ports ringing simultaneously
- Type 1 caller ID and Type 2 caller ID for line ports
- Type 1 caller ID for trunk ports
- Ring voltage generation for a variety of international frequencies and cadences

TIM510 E1/T1 Telephony Interface Module

The TIM510 T1/E1 Telephony Interface Module terminates a T1 or E1 trunk. The TIM510 has a built-in Channel Service Unit (CSU) so an external CSU is not necessary. The CSU is only used for the T1 circuit.



TIM510 supports the following features:

- DS-1 level support for a variety of E1 and T1 trunk types
- Trunk signaling to support United States and international CO or tie trunks
- Echo cancellation in either direction

Related links

Telephony Interface Modules on page 208

TIM521 BRI Telephony Interface Module

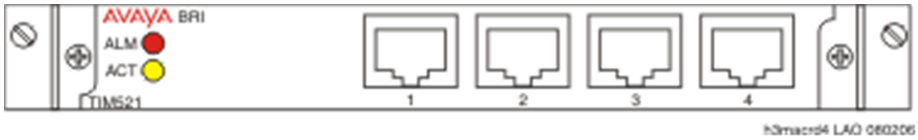
The TIM521 BRI Telephony Interface Module provides four ports with RJ-45 jacks that can be administered as BRI trunk connections.

The TIM521 supports up to four BRI interfaces to the central office at the ISDN TE reference point. Information is communicated over each port in two ways:

- Over two 64-kbps channels, called B1 and B2, that can be circuit-switched simultaneously
- Over a 16-kbps channel, called the D-channel, that is used for signaling. The TIM521 occupies one time slot for D-channel use, regardless of whether one, two, three, or four D-channels are in use.

The circuit-switched connections have an A-law or Mu-law option for voice operation. The circuit-switched connections operate as 64-kbps clear channels when in the data mode.

Each port interfaces to the central office at the ISDN T reference point.



Note:

The TIM521 module does not support BRI stations, video endpoints, or combining both B channels together to form a 128-kbps channel.

Juniper Physical Interface Modules for serial and WAN connectivity

For more information on optional Juniper Physical Interface Modules, see *J2320, 2350, J4350 and J6350 Services Router Getting Started Guide*, Release 8.4.

Chapter 8: Deskphones and softphones

For information about supported deskhphones and softphones, go to http://support.avaya.com/CompatibilityMatrix/Index.aspx.

Chapter 9: Avaya Video Telephony Solution

Avaya Video Telephony Solution integrates premier video capability from Radvision and Polycom into Avaya IP Telephony. The solution provides both point-to-point and multipoint capability giving users improved collaboration capability for real-time decision making.

Related links

Scopia XT Video Conferencing solutions on page 216
Third-party video endpoints on page 220

Video endpoints registered to Session Manager or Communication Manager

SIP and H.323 Avaya one-X® Communicator

Avaya one-X® Communicator R6.1 with Service Pack 7 is a full installer containing usability improvements and product interoperability enhancements with other Avayaproducts.

Following installation upgrades are supported from:

1. R6.1 SP5
2. R6.0 SP3
3. R5.2 SP5

NoteAvaya one-X® Communicator for Mac OS is not part of UC All Inclusive entitlements. It is ordered separately per guidelines outlined in the Offer Definition document found on the Avaya Sales/Partner Portal.

Related links

Avaya Video Telephony Solution on page 214

Avaya Flare® Communicator for iPad Devices

Avaya Flare® Communicator for iPad Devices enables you to log in to your company's server and make and receive telephone calls from your telephone extension via your iPad device.

From the application on your iPad device, you can:

- Send email messages and instant messages
- Access your call history
- access your Aura and local contacts
- Perform an enterprise search
- Manage your presence status

Avaya Flare® Communicator for iPad Devices provides enterprise users with simple access to all the communication tools in a single interface.

You must have wireless access to your company's network to use Avaya Flare® Communicator for iPad Devices.

Related links

Avaya Video Telephony Solution on page 214

Avaya Communicator for iOS

Avaya Communicator for iOS provides enterprise users with simple access to all the communication tools in a single interface.

Avaya Communicator for iOS enables you to log in to your company's server and make and receive telephone calls from your telephone extension via your iPad device. From the application on your iPad device, you can:

- Send email messages and instant messages.
- Access your call history.
- Access your Avaya Aura®Avaya Aura and local contacts
- Perform and Enterprise search.
- Manage your presence status.

Related links

Avaya Video Telephony Solution on page 214

Avaya Flare® Communicator for Windows

Avaya Flare® Communicator for Windows enables you to log into your company's server and make and receive voice calls from your telephone extension by using your computer.

Using the Avaya Flare client, you can:

- Send email messages and instant messages
- Access your call history
- Access your Avaya Aura® and Microsoft Outlook® contacts

- Perform an Enterprise search
- Manage your presence status

Avaya Flare® Communicator for Windows provides Enterprise users with simple access to all the communication tools in a single interface. You must have access to your company's network to use Avaya Flare® Communicator for Windows.

Related links

Avaya Video Telephony Solution on page 214

Avaya Communicator for Windows

Avaya Communicator for Windows provides automatic integration with Avaya Aura® Conferencing 7.0. Avaya Communicator for Windows, you can:

- Access the Web Collaboration features by clicking the **Collaboration** button in the main window.

  Note:

  If you are the moderator or have presenter privileges, you can host the web collaboration session.

- View a graphical representation of the conference and its participants.
- Manage the conference using the built-in moderator controls when you are logged in as the moderator.

If you have Avaya Aura® Conferencing 7.0, you can start Adhoc conferences with Avaya Communicator for Windows. You can also merge Adhoc conference with MeetMe conferences. You must have access to your company's network to use Avaya Communicator for Windows.

Related links

Avaya Video Telephony Solution on page 214

Scopia XT Video Conferencing solutions

Scopia® XT Video Conferencing systems incorporate the latest video communications technology, including dual 1080p/60fps video channels, H.264 high profile for bandwidth efficiency, H.264 scalable video coding (SVC) for error resiliency, and Apple iPad device control.

Related links

Avaya Video Telephony Solution on page 214
Scopia clients on page 217
Scopia environments on page 218

Scopia clients

The various Scopia® clients are as follows:

Related links

Scopia XT Video Conferencing solutions on page 216
Scopia® XT Telepresence on page 217
Scopia® XT5000 Room System on page 217
Scopia® XT4200 Room System on page 217
Scopia® XT Meeting Center Room System on page 218
Scopia® Control on page 218
Scopia XT Executive 240 on page 218
Scopia® Video Gateway for Microsoft Lync on page 218

Scopia® XT Telepresence

This platform delivers an immersive telepresence experience customizable to the requirements of individual rooms and customer needs. Installed and configured by a worldwide network of channel partners, the Scopia XT Telepresence Platform provides a cost-effective and highly flexible approach.

Related links

Scopia clients on page 217

Scopia® XT5000 Room System

Scopia XT5000 is the only system available that incorporates dual 1080p/60fps live video and content, HD audio, H.264 High Profile, Scalable Video Coding technology, and multi-party calling. It is an all-in-one video conferencing solution that offers a highly intuitive user interface and a sleek and elegant design.

Related links

Scopia clients on page 217

Scopia® XT4200 Room System

The Scopia XT4200 offers cost-effective HD video communications with many features that are either unavailable or costly upgrades in other vendor offerings. The Scopia XT4200 includes dual 720p/60fps live video and content, HD audio, H.264 High Profile, and Scalable Video Coding, dual-display support, and a wide-angle camera. The user interface is designed for simplicity and has optional Multi-Touch control via an Apple iPad tablet.

Related links

Scopia clients on page 217

Scopia® XT Meeting Center Room System

The Scopia XT Meeting Center is powered by the Radvision Scopia XT5000 video conferencing system—the only system available that includes dual 1080p/60fps live video and content, HD audio, H.264 High Profile, Scalable Video Coding, and embedded multi-party calling. The Scopia XT Meeting Center integrates single or dual 55” 1080p premium displays in a specially designed cart for turnkey implementation. The system is easy to use and its modern design complements any conference room.

Related links

Scopia clients on page 217

Scopia® Control

Scopia Control is the first Apple iPad tablet application for control of video conferencing room systems. The application has a highly intuitive user interface that virtually eliminates the learning curve for a video conferencing system. First time users can initiate calls, control their video conferencing systems, and moderate meetings without any training.

Related links

Scopia clients on page 217

Scopia XT Executive 240

The Scopia XT Executive 240 integrates the advanced Scopia XT video conferencing platform with a high resolution 24-inch LED display. The system offers optional embedded multi-party conferencing for impromptu group meetings, unique HD 1080p for highly detailed content-sharing and available simultaneous 1080p video. H.264 High Profile and H.264 Scalable Video Coding (SVC) deliver bandwidth efficient, high performance video collaboration over real world networks.

Related links

Scopia clients on page 217

Scopia® Video Gateway for Microsoft Lync

Scopia® Video Gateway for Microsoft Lync is a video network device that enables you to make video calls between the Lync Clients and H.323 video endpoints. H.323 video endpoints are physical endpoints: meeting rooms equipped with room systems and personal endpoints located on a desktop.

Related links

Scopia clients on page 217

Scopia environments

The various Communication Manager Release 6.3-supported Scopia environments are:

Related links

Scopia XT Video Conferencing solutions on page 216

Scopia® Management iView

Scopia Management (iVIEW) delivers management, control, and scheduling for robust video application management. Scopia Management provides a single access point for managing all video conferencing devices including Radvision and third party endpoints, infrastructure devices such as MCUs and gateways, and call control applications such as gatekeepers and SIP agents. Administrators can detect and monitor their devices, remotely configure, control, and upgrade them. Scopia Management's scheduling capability offers scheduling, resource reservation, and control from a single point.

Scalability and redundancy is delivered for large enterprises and service providers, including the unique Virtual MCU feature for distributed deployments. With Scopia Management's Virtual MCU, virtual conference rooms are created for simple access across the deployment.

Related links

Scopia environments on page 218

Scopia® ECS Pro Gatekeeper

Radvision's high-performance, standards-compliant H.323 Enhanced Communication Server (ECS) Gatekeeper provides an intelligent, advanced backbone management system for IP telephony and multimedia networks.

ECS provides gatekeeper functionality and everything required to simply and easily define, control, and manage voice, video and data traffic over IP networks – no matter how large or complex. ECS ensures optimal bandwidth utilization to deliver carrier-grade, best quality call completion and collaborative video communications over any network and any protocol.

Related links

Scopia environments on page 218

Scopia Desktop server

Scopia Desktop server includes built-in presence, invitation, and firewall traversal features to ensure call connectivity and quality videoconferencing. Additionally, Scopia desktop Server supports advanced videoconferencing features, such as continuous presence video, H.239 data collaboration, PIN protected meetings, conference moderation, full authentication and authorization, and SIP point-to-point communication between Scopia desktop clients.

Related links

Scopia environments on page 218

Scopia PathFinder

Scopia PathFinder is a complete firewall and NAT traversal solution that enables secure connectivity between enterprise networks and remote sites. PathFinder maintains the security and advantages of firewall and NAT over networks and allows seamless integration with existing video conferencing systems. PathFinder handles Firewall and NAT problems without upgrading devices or without compromising security.

Related links

Scopia environments on page 218

Third-party video endpoints

Polycom® HDX video endpoints configured as SIP endpoints utilize the Avaya Aura® Session Manager User Registration feature and Avaya Aura® Communication Manager operating as an Evolution Server. Communication Manager Evolution Server is connected to Session Manager via a SIP signaling group and associated SIP trunk group.

Related links

Avaya Video Telephony Solution on page 214
Polycom HDX 6000, 7000, and 8000 Series Room Telepresence Solutions on page 220
Polycom RMX 1000 on page 221
Polycom RMX 1500 on page 221
Polycom RMX 2000 on page 221
Polycom RMX 4000 on page 221
Polycom Gatekeepers on page 222
Polycom® DMA 7000 support on page 222
Polycom® VVX support on page 223

Polycom® HDX 6000, 7000, and 8000 Series Room Telepresence Solutions

Advanced solutions bring HD video, voice, and content sharing capabilities to conference rooms, classrooms, and meeting spaces across the enterprise.

- Fully standards-compliant, compatible with over 2 million video systems deployed
- High-definition video quality, up to 1080p
- Bandwidth-efficient, using up to 50% less bandwidth than competitive solutions with H.264 High Profile
- Multiple ways to share HD content to fit the needs of any participant
- Legendary HD audio quality, including conversational Polycom® StereoSurround™ technology

Related links

Third-party video endpoints on page 220

Polycom® RMX® 1000

The Polycom® RMX® 1000 conference platform provides high performance video and audio conferencing to small-to-medium-sized organizations and branch sites within the enterprise.

The Polycom® RMX® 1000 supports up to twenty concurrent video or audio endpoints and is ideal for organizations that require a robust and cost-effective multipoint conferencing solution. An extension of the powerful and scalable RMX 2000, the RMX 1000 conference platform offers many easy-to-use features that enable integration of video conferencing with communications mainstream.

Related links

Third-party video endpoints on page 220

Polycom® RMX® 1500

The Polycom® RMX® 1500 real-time multimedia conferencing platform RMX® 1500 extends the power of video, audio, and content collaboration to the network edge, including branches, small offices, remote sites, and teleworkers.

Related links

Third-party video endpoints on page 220

Polycom® RMX® 2000

The Polycom® RMX® 2000 is an advanced conferencing platform with inbuilt intelligence, including dynamic resource allocation, network flexibility, reliability, and cost-effective scalability. When integrated with UC products, Polycom® RMX® 2000 provides intuitive, high-quality multipoint conferencing capabilities to end-users and unparalleled flexibility and control to administrators.

Related links

Third-party video endpoints on page 220

Polycom® RMX® 4000

Polycom® RMX® 4000 is a redundant and scalable conference platform that delivers more than a thousand audio calls, hundreds of desktop video deployments, and process-intensive immersive telepresence.

This platform is ideal for large organizations, such as global businesses, service providers, educational institutions, and governments.

This platform offers amazing video quality of up to 1080p, ease-of-use, and conference customization to maximize experience. When combined with Polycom DMA 7000, Polycom 4000 provides scalability and redundancy features along with rich user experience.

Related links

Third-party video endpoints on page 220

Polycom® Gatekeepers

Gatekeepers are an essential part of H.323 IP networks when gateways or an MCU is deployed. Gatekeepers offer service functionality to seamlessly use gateways and MCUs, while providing bandwidth management, address translation, and other services.

Related links

Third-party video endpoints on page 220

Polycom® DMA 7000 support

Communication Manager supports Polycom® DMA (Distributed Media Application) 7000, also known as RealPresence Virtualization Manager.

You can configure Polycom® DMA 7000 with Communication Manager. Communication Manager acts as an H.323 gatekeeper and uses H.323 trunks to connect to Polycom® DMA. In this configuration, you can also have other Polycom® video endpoints and RMX MCU H.323 configured to Polycom® DMA 7000, which is connected to Communication Manager through H.323 trunks. The Polycom® DMA gatekeeper replaces the Polycom® CMA gatekeeper.

In a configuration that includes Polycom® DMA, all Polycom® endpoints and MCUs must be registered to Polycom® DMA. You cannot have some Polycom® endpoints registered to DMA and some registered to Communication Manager or Session Manager.

The Avaya Aura® and Polycom® DMA configuration supports only audio-mute and resume mid-call features.

Note:

Polycom® DMA replaces Polycom® CMA only for the gatekeeper functionality. The management application is provided by the Polycom® CMA gatekeeper.

Related links

Third-party video endpoints on page 220

Polycom® VVX support

Polycom® VVX 1500 is a video conferencing media phone with a touch screen. Polycom® VVX 1500 supports:

- H.323 and SIP protocols
- H.263 and H.264 video standards
- G.722, G.722.1 and G.722.1C audio codecs
- 6-line call appearances

Polycom® VVX 1500 integrates with Avaya Aura® by:

- Registering directly to Avaya Aura® Session Manager
- Registering to Polycom® DMA, which is registered to Communication Manager

Polycom® VVX supports the following mid-call features:

- Mute video and resume
- Mute audio and resume
- Hold and resume
- Blind transfer for audio
- Warm transfer for audio

Note:

Mid-call features do not work with Polycom® VVX 1500 that is H.323-registered to Polycom® DMA.

Related links

Third-party video endpoints on page 220

Chapter 10: Avaya Wireless Solutions

W310 WLAN Gateway

The W310 WLAN Gateway uses Light Access Points (LAP) and provides a standard-based infrastructure and a new solution for wireless applications. W310 provides a rich feature set in the security, mobility, and management area and a lower overall cost of ownership for medium and large enterprises or a hotspot service provider. Instead of adding functionality to the Access Points, W310 serves as a WLAN Gateway that centralizes the Access Point features, while reducing the Access Points to simpler, cheaper devices responsible for only basic functions.

Note:

W310 WLAN Gateway supports AP600 access points (an AP-4, AP-5, or AP-6 that has been upgraded for Light AP support) if the access points have the most recent firmware.

Note:

W310 WLAN Gateway provides wireless mobility service totally independent of Communication Manager and the servers that support Communication Manager. The W310 WLAN Gateway has *no* interaction with Communication Manager-based systems. For wireless applications that use Communication Manager for call-handling, see W310 WLAN Gateway for Seamless Communications on page 226 or Extension to Cellular and Off-PBX Station on page 230.

W310 WLAN Gateway chassis

The chassis features:

- 16 10/100BaseT Ethernet ports (ports 1 through 16), connected with a Category 5 copper cable with RJ-45 termination for 100Base-T ports. Use all eight wires in the cable. The maximum copper cable length connected to a 10/100Base-T port is 100 m (328 ft)
- Two SFP GBIC copper or fiber ports
- A console port
- Fixed ports and buttons, including:
  - Port LEDs for each Ethernet port

- 11 LEDs for additional system function
- Left and right LED select buttons

You require the following customer-supplied equipment:

- An SFP GBIC (Small Form Factor Pluggable Gigabit Interface Converter), using LC or MT-RJ fiber cables or RJ copper cables, depending on the GBIC type.
- APC (Advanced Power Conversion PLC) front end AC-DC power shelf
- One APC 800W PSU
- 2 Power cables (20 AWG or thicker) to connect the APC power shelf to W310 switches. Cables must have terminals suitable for M3.5 screws

Voice-Enabled Wireless Local Area Network Infrastructure

The Avaya infrastructure centralizes much of the WLAN intelligence in a gateway platform. This provides integration into the enterprise network and solves the problems that plague wireless communication today.

- Management: Reduces deployment complexities and management
- Security: Increases security by maintaining a single entry point
- Superior infrastructure for Voice over IP: Supports subnet and Virtual Local Area Network (VLAN) roaming for enhanced inbuilding mobility and higher voice quality Low-cost Avaya W110 Light Access Points (LAPs) enable dense deployments required for in-building mobility
- Investment Protection: New features can be centrally stored for easy W110 upgrades

Avaya W310 WLAN Gateway Features

- IP Multicast filtering
- Terminal and modem interface
- Wireless services
- LAN services
- Multiple Virtual Local Area Networks (VLANs) per port
- RADIUS protocol for security
- 802.1w Rapid Spanning Tree Protocol
- 802.1X Port Based Network Access Control (PBNAC)
- 802.3af-2003 Power over Ethernet
- Seamless roaming
- Policy management

- Stations Power Saving
- MAC Access Control List
- Multiple Service Set Identifiers (SSIDs)
- User group monitoring
- W110 Controller
- Wireless applications

For more information, see the following:

- *Avaya W310 WLAN Gateway Installation and Configuration Guide*, 21-300041
- *Avaya W310/W110 Quick Setup Guide Using the CLI*, 21-300178
- *Avaya W310/W110 Quick Setup Guide Using the W310 Device Manager*, 21-300179
- *Wireless AP-4, AP-5, and AP-6 User Guide*, 555-301-708, Issue 3

W310 WLAN Gateway specifications

The following table lists the site requirements of the W310 WLAN Gateway.

Description	Value
Ambient working temperature	0-40°C (32 - 104°F)
Humidity	5-95% relative humidity (not condensing)
DC input voltage	50 to 57 VDC
DC input current	8 A
DC isolation	1500 V RMS with respect to protective ground
AC input voltage	100 to 240 VAC, 50/60 Hz
AC input current	4 A
AC power dissipation	400 W maximum

A readily accessible listed safety-approved protective device with a 15A rating must be incorporated in series with building installation AC power.

W310 WLAN Gateway for seamless communications

The W310 WLAN Gateway supports the Seamless Communications offer on an S8300D, S8510, or duplicated server. Seamless Communication supports converged cellular, Wireless Local Area Network (WLAN), Internet Protocol (IP), and Session Initiation Protocol (SIP) phone service. With seamless communication, you can use the Motorola CN620 Mobile Office Device to experience seamless wireless phone mobility between on-premises and off-premises. The W310 WLAN Gateway, along with the Wireless Services Manager and W110 Lite Access Points (LAPs), combine

with a Communication Manager server and a Global System for Mobile Communication (GSM) cellular network to provide seamless communications service.

The following additional devices are used with the support of W310 WLAN Gateway seamless communications:

- Wireless Services Manager
- W110 Lite Access Points

W310 WLAN Gateway characteristics for seamless communication

An S8510 or S8800 Server can support a maximum of 64 W310 WLAN Gateways. An S8300D Server can support up to 50 W310 WLAN Gateways. Each W310 WLAN Gateway can, in turn, support up to 16 W110 LAPs. One W310 WLAN Gateway can support up to 1024 users. However, the actual number of seamless communications users that a server can support is limited to its SIP trunk capacities and licensing of SIP and CCS users.

W310 WLAN Gateway centralizes and performs many of the functions of the access points, such as seamless mobility, security policy enforcements, enforcement of QOS, and the supply of Power over Ethernet (PoE).

In addition, the W310 WLAN Gateway has the following characteristics:

- Dimensions (H x W x D): 1.75-inches (44 mm) x 19-inches (48.3 cm) x 17.7-inches (45 cm)
- Layer 2 switching
- Fits in a EIA-310-D standard 19-inch rack.
- 16 10/100 Ethernet ports with PoE (802.3af)
- 8 10/100 Ethernet ports without PoE (not currently available for use)
- Supports up to 16 non-LAP heavy access points, such as Avaya AP-4, AP-5, and AP-6 models once the device has been migrated to LAP functionality

  Note:

  W310 WLAN Gateway can support only 10 heavy access points at 15 Watts per port.
- One 2-GB Ethernet port to support redundancy or stacking (not currently available for use)
- One RS-232 serial port for command-line access
- Supports 64 wireless endpoints per LAP
- Supports 320 simultaneous voice sessions
- Supports 20 simultaneous VoIP (802.11a) calls per LAP
- 100 meter maximum distance to access points

- Two LEDs per 10/100 port to indicate PoE status and link status
- One LED for power and one LED for the 2-GB Ethernet port
- Supports RADIUS server and Active Directory authentication
- Supports firmware download to the W310 WLAN Gateway and from the W310 WLAN Gateway to the W110 LAP

Wireless Services Manager for Seamless Communications

Wireless Services Manager (WSM) handles dispatch calling (communication between walkie talkies), a function allows Motorola CN620 handsets to communicate using the push to talk communications style while in the WLAN. The WSM also manages the CN620 handset administration and initialization sequences and serves as a SIP proxy and registrar for WLAN SIP signalling. The WSM consists of the WSM SIP Proxy/Registrar software, Dispatch software, and a V120 Sun server.

WSM communicates with the server over SIP trunk groups. For the S8510 and Duplicated Servers, the SIP trunk groups are connected over the CLAN board. For the S8300D Server, the SIP trunk groups are connected over a G700 Ethernet port.

Wireless Services Manager characteristics for Seamless Communication

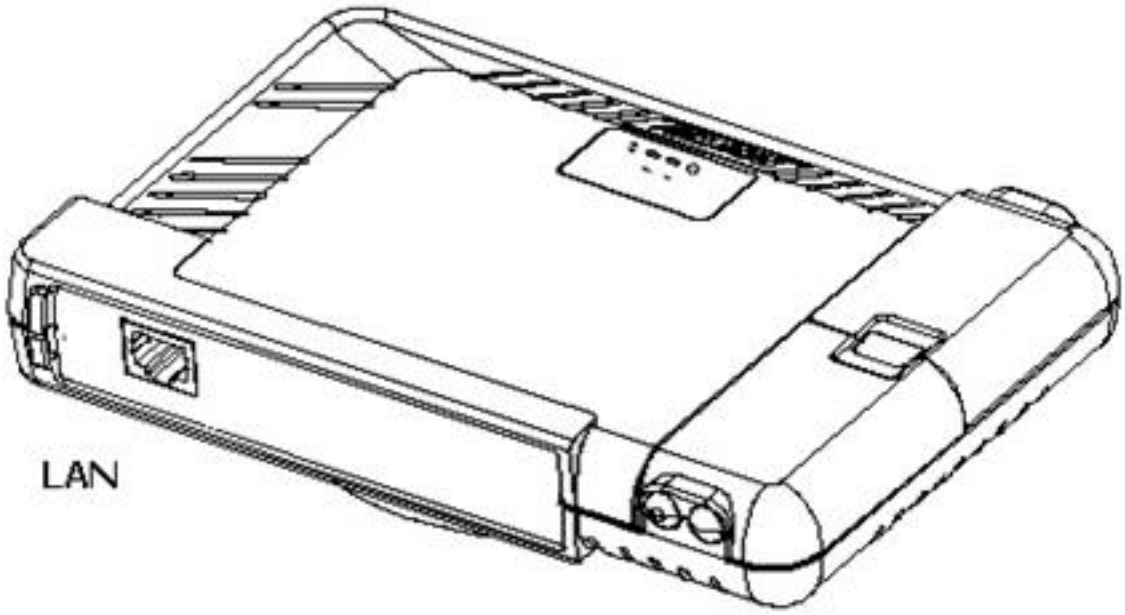
The V210 Sun server has the following characteristics:

- 650 MHz ultraSPARC server
- 4-GB memory
- Two 36-GB hard drives

W110 Light Access Point for seamless communications

The W110 Light Access Point (LAP) is an access point that operates the radio cards necessary for wireless transmission and reception. W110 supports Seamless Communications and can be used only with a W310 WLAN Gateway.

W110 Light Access Point characteristics for seamless communication



W110 LAP has the following characteristics:

- Can be mounted on a wall, ceiling, or desktop
- LEDs to indicate power status, LAN traffic, and wireless traffic
- Support 802.3af-2003 PoE
- Firmware downloadable from the W310 WLAN Gateway
- Up to 16 LAPs for one W310 WLAN Gateway
- Supports 802.11a and 802.11b/g radios

Additional documentation for Seamless Communications

For information on installing Seamless Communications, see

- *Seamless Communications Total Solution Guide*, 21-300041
- *Seamless Communications Configuration Guide*
- *Avaya W310 WLAN Gateway Installation and Configuration Guide*, 21-300041
- *Avaya W310/W110 Quick Setup Guide Using the CLI*, 21-300178
- *Avaya W310/W110 Quick Setup Guide Using the W310 Device Manager*, 21-300179
- *Wireless AP-4, AP-5, and AP-6 User Guide*, 555-301-708, Issue 3
- *Motorola NMS User Guide*

- *Motorola WSN User Guide*

Extension to Cellular and Off-PBX Station

Avaya Extension to Cellular and Off-PBX Station application types provide users with the capability to have one administered phone that supports Communication Manager features for both an office phone and one outside phone. Off-PBX Station application types allow users to receive and place office calls anywhere, any time. Application types are Extension to Cellular, Outboard Proxy SIP (OPS), Seamless Converged Communications Across Network (SCCAN), and Cellular Service Provider (CSP). Extension to Cellular extends office calls to a user's cellular phone. CSP performs the same functions as Extension to Cellular but is sold to a user by their cellular service provider. CSP differs from Extension to Cellular only in that a user of the CSP application type cannot disable the feature. OPS is used to administer a SIP phone. SCCAN offers voice and data access from a single SCCAN handset that is integrated with a desktop phone across the corporate Wireless Local Area Network (WLAN), public Global System for Mobile communication (GSM), and cellular networks. A user can have more than one application type per station.

Through all of these application types, people calling an office phone can reach users even if they are not in the office. With this added flexibility, you can access certain Communication Manager features from any phone device that is outside the office phone network.

You can administer the following types of Avaya phones as the host phone using Extension to Cellular and Off-PBX Station application types:

2402	4606	4630	6408D
2410	4610	6402	6408D+
2420	4612	6402D	6416D+
4601	4620	6408	6424D+
4602	4624	6408+	

The phone listed above support a number of wireless telephone devices including the Motorola CN620 Mobile Office Device. You can administer these phones on Communication Manager using the Administration with Hardware feature. In this way, the actual desk phone does not need to be physically connected.

Except for the purchase of cellular phones and cellular service by a public service provider, neither you nor users need any additional hardware for use of the Extension to Cellular/Off-PBX Station features. You simply administer the feature on the server running Communication Manager.

Chapter 11: Avaya IP DECT Radio Base Station

The IP Digital Enhanced Cordless Telephony (DECT) Radio Base Stations are available with Avaya Aura® Communication Manager. Radio Base Station supports encryption of the communication between handset and base station and authentication of the handset against the base station.

Related links

IP DECT Radio Base Station for 3720 and 3725 Handsets on page 231
IP DECT Radio Base Station for 3701 and 3711 Handsets on page 232

IP DECT Radio Base Station for 3720 and 3725 Handsets

IP DECT radio base station for 3720 and 3725 handsets have the following characteristics:

- Handles up to eight concurrent calls
- Power over Ethernet or local power supply
- Supports Wireless networks of up to 1000 IP DECT Radio Base stations with up to 2000 DECT handsets
- Synchronization for seamless handover done over-the-air
- Master software can run on several base station and is required for Coordination of the over-the-air synchronization, LDAP phonebook access via AIWS, and VoIP interface to the PBX
- Several master software can run parallelly for redundancy, load balancing, and multi-site support
- Web Interface for configuration and software update
- Power over Ethernet or local power supply possible
- Supports two different versions of radio base station, one with internal antennas and one with external antenna
- Supports 3701/3711 IP DECT handsets only in CAP mode

Related links

Avaya IP DECT Radio Base Station on page 231

IP DECT Radio Base Station for 3701 and 3711 Handsets

IP DECT radio base station for 3701 and 3711 handsets have the following characteristic:

- Supports RFP 32, RFP 34 Indoor, and Outdoor Base Station
- Uses Internal antenna (RFP32) and External antenna (RFP34)
- Wall mountable
- Supports 12 slots on the air and 8 channels
- Synchronization via air interface
- Supports generic access profile (GAP)
- Connection Handover according to GAP-standard
- DSAA Authentication of Base and Handset (DECT Standard Authentication Algorithm)
- DSC (DECT Standard Cypher) 64-bit *through-the-air* encryption
- Supports 802.3af standard-based PoE
- Optional region-specific AC and DC power supply

Related links

Avaya IP DECT Radio Base Station on page 231

Appendix A: Specifications for Avaya Branch Gateways

Environmental requirements

Altitude and air pressure

For altitudes above 5,000 feet (1,525 meters), you must reduce the maximum short-term temperature. Reduce this temperature limit by 1 ºF (1.8 ºC) for every 1,000 feet (304.8 meters) of elevation above 5,000 feet (1,525 meters). For example, at sea level, the maximum short-term temperature limit is 120 ºF (49 ºC). At 10,000 feet (3,050 meters), the maximum short-term temperature limit is 115 ºF (46 ºC).

The normal operating air pressure range is 9.4 to 15.2 pounds per square-inch (psi) (648 to 1,048 millibars).

Cabinet dimensions and clearances

Floor plans usually allocate space around the front, ends, and rear of the cabinets for maintenance purposes. Floor area requirements vary between cabinets.

Floor load requirements

The equipment room floor must meet the commercial floor loading code of at least 50 pounds per square foot (242 kilograms per square meter). Floor plans usually allocate space around the front, the ends, and, if necessary, the rear for maintenance access of the gateways. Additional floor support might be required if the floor load is greater than 50 pounds per square foot (242 kilograms per square meter). The following table contains information about weight and floor loading for the battery.

	Weight (pounds)	Floor loading (pounds per square foot)	Notes
Battery			
100-A	maximum 400 (181 kg)	180 (871.2 kg/m^2)	
200-A	maximum 815 (370 kg)	328 foot (1587.5 kg/m^2)	
300-A	maximum 1480 (671 kg)	476 (2303.8 kg/m^2)	
400-A	maximum 1580 (717kg)	625 (3025 kg/m^2)	

Temperature and humidity

Install the DEFINITY equipment in a well-ventilated area. Maximum equipment performance is obtained at an ambient room temperature up to 110 °F (43 °C) for continuous operation and between 40 ˚F and 120 °F (4 °C and 49 °C) for short term operation. Short term operation is not more than 72 consecutive hours or 15 days in a year.

The relative humidity range is 10% to 95% at up to 84 °F (29 °C). Above 84 °F, the maximum relative humidity decreases from 95% to 32% at 120 °F (49 °C). Installations outside these limits might reduce system life or impede operations. The recommended temperature and humidity range is 65 °F to 85 °F (18°C to 29 °C) at 20 to 60% relative humidity.

The following table correlates room temperature with allowable relative humidity.

Recommended room temperature (°F)	Recommended room temperature (°C)	Recommended relative humidity (%)
40 to 84	4.4 to 28.8	10 to 95
86	30.0	10 to 89
88	31.1	10 to 83
90	32.2	10 to 78
92	33.3	10 to 73
94	34.4	10 to 69
96	35.6	10 to 65
98	36.7	10 to 61
100	37.8	10 to 58
102	38.9	10 to 54

Table continues…

Recommended room temperature (°F)	Recommended room temperature (°C)	Recommended relative humidity (%)
104	40.0	10 to 51
106	41.1	10 to 48
108	42.2	10 to 45
110	43.3	10 to 43
112	44.4	10 to 40
114	45.6	10 to 38
116	46.7	10 to 36
118	47.8	10 to 34
120	48.9	10 to 32

System protection

The following types of system protection are provided to keep the switch active and online:

- Overvoltage
- Sneak current
- Lightning
- Earthquake

Protection from hazardous voltages

Protection from hazardous voltages and currents is required for all off-premises trunks, lines, and terminal installations. Both sneak current protection and overvoltage protection from lightning, power induction, and so on, are required.

Overvoltage protection

The following devices protect the system from overvoltage:

- Analog trunks use the 507B Sneak Protector. The local telephone company usually provides overvoltage protection.
- Analog voice and 2-wire DCP terminals can use one of the following types of combined protection against overvoltage and sneak current.

  The terminals can also use the equivalent of one of the following types:

  - Carbon block with heat coil for UL code 4B1C
  - Gas tube with heat coil for UL code 4B1E-W
  - Solid state with heat coil for UL code 4C1S
- DCP and ISDN-BRI terminals use the solid state 4C3S-75 with heat coil protector, or equivalent.

- DS-1, E1, and T1 circuits require isolation from exposed facilities. A CSU (T1), lightwave integration unit (E1), or other equipment provides this isolation.

Sneak current protection

Extraneous power induces sneak current protection to protect building wiring with fuses. The fuses protect wiring between the network interface and trunk circuits. The fuses also protect the circuit packs.

All incoming trunks and outgoing trunks and off-premises station lines pass through the sneak fuses. 507B sneak fuse panels are installed on the system side of the network interface.

Sneak current protectors must be either UL-listed or CSA-certified or must comply with local safety standards. Sneak current protectors must have a maximum rating of 350 milliamperes (mA) and a minimum voltage rating of 600 volts, or as required by local regulations.

Lightning protection

A coupled bonding conductor (CBC) in the cabinet ground wiring protects the system from lightning. The CBC runs adjacent to wires in a cable and causes mutual coupling with the wires. The mutual coupling reduces the voltage difference between the ground and the switch.

Ensure that the CBC connects to a telecommunications cable that is firmly connected to an approved ground. In multiplestory buildings, you must connect the CBC to an approved ground at each floor.

CBC can be any of the following configurations:

- a 10 AWG (5.3 millimeters ^{2}/2.6 millimeters) ground wire
- a continuous cable sheath that surrounds wires within a cable
- six unused pairs of wire within a cable that are twisted and soldered together

CBC connects from the cabinet single-point ground bar in an AC-powered cabinet or the ground discharge bar in a DC-powered cabinet to the terminal bar at the cross-connect field.

When there is an auxiliary cabinet, a 6 AWG (13.3 millimeters^2/4.1 millimeters) wire connects the system cabinet single-point ground block to the Auxiliary cabinet ground block. The ground wire routes as closely as possible to the cables that connect the system cabinet to the Auxiliary cabinet.

If equipment is not present in the Auxiliary cabinet, you must preserve ground integrity. Plug the power supply for this equipment into one of the two convenience outlets on the rear of the gateway. The convenience outlets are fused at 5 A. A dedicated maintenance terminal plugs into the other convenience outlet.

Earthquake protection

For earthquake or disaster bracing, the cabinets must be bolt to the floor. Other areas might require additional bracing. For current documentation and knowledge articles on earthquake or disaster bracing requirements for Avaya-supported hardware or to open a service request, go to the Avaya Support website at http://support.avaya.com.

Appendix B: Optional components for servers

Gateways

	Supported Servers		
Gateway	**S8300D**	**S8510**	**S8800 / HP DL360 G7 / Dell R610 / HP DL360 G8 / Dell R620**
Avaya G250 Branch Gateway on page 65	x	x	x
Avaya G350 Branch Gateway on page 74	x	x	x
Avaya G430 Branch Gateway on page 82	x	x	x
Avaya G450 Branch Gateway on page 95	x	x	x
Avaya G650 Media Gateway overview on page 121		x	x
Avaya G700 Branch Gateway on page 127	x	x	x
IG550 Integrated Gateway on page 107	x	x	x
G860 Branch Gateway on page 138			x

Media modules

	Supported Configurations	
Media module	**S8300D with a Gxxx**	**HP DL360 G7 / Dell R610 / Dell R620 with a Gxxx**
MM312 DCP Media Module on page 195		
MM314 LAN Media Module on page 196		
MM316 LAN Media Module on page 196		

Table continues…

	Supported Configurations	
Media module	**S8300D with a Gxxx**	**HP DL360 G7 / Dell R610 / Dell R620 with a Gxxx**
MM340 E1/T1 data WAN Media Module on page 204		x
MM342 USP data WAN Media Module on page 205		x
BROKEN LINK: MM710 T1/E1 Media Module	x	x
BROKEN LINK: MM711 Analog Media Module	x	x
MM712 DCP Media Module on page 198	x	x
BROKEN LINK: MM714 Analog Media Module	x	x
BROKEN LINK: MM716 Analog Media Module	x	x
BROKEN LINK: MM717 DCP Media Module	x	x
BROKEN LINK: MM720 BRI Media Module	x	x
MM721 BRI media module on page 203	x	x
BROKEN LINK: MM722 BRI Media Module	x	x
MM760 VoIP Media Module on page 205	x	x

Circuit packs

Power circuit packs

	Supported Servers	
Circuit Packs	**S8510**	**S8800 / HP DL360 G7 / Dell R610 / HP DL360 G8 / Dell R620**
655A power supply on page 147	x	x
650A AC power unit on page 147		
The 120A CSU is supported on DEFINITY, Multivantage, and Communication Manager servers that support TN circuit packs. on page 146	x	x
TN2202 ring generator on page 175	x	x
TN755B neon power unit on page 159	x	x

Line circuit packs

	Supported Servers	
Circuit Pack Name	**S8510**	**S8800 / HP DL360 G7 / Dell R610 / HP DL360 G8 / Dell R620**
TN479 analog line (16 ports) on page 153	x	x
TN556D ISDN-BRI 4-wire S/T-NT interface (12 ports) on page 153	x	x
TN746B analog line (16 ports) on page 156	x	x
TN754C DCP digital line (4-wire, 8 ports) on page 158	x	x
TN762B hybrid line (8 ports) on page 160	x	x
TN769 analog line (8 ports) on page 161	x	x
TN791 analog guest line (16 ports) on page 165	x	x
TN793CP analog line with Caller ID for multiple countries (24 ports) on page 166	x	x
TN797 analog trunk or line circuit pack (8 ports) on page 167	x	x
TN2181 DCP digital line (2-wire, 16 ports) on page 171	x	x
TN2183/TN2215 analog line for multiple countries (16 ports) on page 172	x	x
TN2185B ISDN-BRI S/T-TE interface (4-wire, 8 ports) on page 173	x	x
TN2198 ISDN-BRI U interface (2-wire, 12 ports) on page 173	x	x
TN2224CP DCP digital line (2-wire, 24 ports) on page 176	x	x
TN2215/TN2183 analog line for multiple countries (16 ports) (international offers or Offer B only for US and Canada) on page 176	x	x
TN2224CP DCP digital line (2-wire, 24 ports)	x	x

Trunk circuit packs

	Supported Servers	
Circuit Pack Name	**S8510**	**S8800 / HP DL360 G7 / Dell R610 / HP DL360 G8 / Dell R620**
TN429D incoming call line identification (ICLID) on page 150	x	x
TN459B direct inward dialing trunk (8 ports) on page 151	x	x

Table continues…

	Supported Servers	
Circuit Pack Name	**S8510**	**S8800 / HP DL360 G7 / Dell R610 / HP DL360 G8 / Dell R620**
TN436B direct inward dialing trunk (8 ports) on page 150	x	x
TN464HP DS-1 interface, T1 (24 channels) or E1 (32 channels) on page 151	x	x
TN465C central office trunk (8 ports) on page 152	x	x
TN747B central office trunk (8 ports) on page 157	x	x
TN753B direct inward dialing trunk (8 ports) on page 158	x	x
TN760E tie trunk (4-wire, 4 ports) on page 159	x	x
TN763D auxiliary trunk (4 ports) on page 160	x	x
TN767E DS-1 interface, T1 (24 channels) on page 160	x	x
TN1654 DS-1 converter, T1 (24 channels) and E1 (32 channels) on page 169	x	x
TN2140B tie trunk (4-wire, 4 ports) on page 170	x	x
TN2146 direct inward dialing trunk (8 ports) on page 170	x	x
TN2147C central office trunk (8 ports) on page 171	x	x
TN2184 DIOD trunk (4 ports) on page 172	x	x
TN2199 central office trunk (3-wire, 4 ports) on page 174	x	x
TN2207 DS-1 interface, T1 (24 channels) and E1 (32 channels) on page 175	x	x
TN2209 tie trunk (4-wire, 4 ports) on page 176	x	x
TN2242 digital trunk on page 177	x	x
TN2308 direct inward dialing trunk (8 ports) on page 179	x	x
TN2313AP DS-1 interface (24 channels) on page 183	x	x
TN2464CP DS-1 interface with echo cancellation, T1/E1 on page 183	x	x

Control circuit packs

	Supported Servers	
Circuit Pack Name	**S8510**	**S8800 / HP DL360 G7 / Dell R610 / HP DL360 G8 / Dell R620**
TN744E call classifier and tone detector (8 ports) on page 155	x	x
TN771DP maintenance and test on page 162	x	x
TN775C maintenance on page 163	x	x
TN799DP control LAN (C-LAN) interface on page 168	x	x
TN2182C tone clock, tone detector, and call classifier (8 ports) on page 171	x	x
TN2302AP IP media processor on page 178	x	x
TN2312BP IP server interface on page 179	x	x
TN2464CP DS-1 interface with echo cancellation, T1/E1 on page 183		
TN2464CP DS-1 interface with echo cancellation, T1/E1 on page 183		
TN2602AP IP Media Resource 320 on page 187	x	x

Service circuit packs

	Supported Servers	
Circuit Packs	**S8510**	**S8800 / HP DL360 G7 / Dell R610 / HP DL360 G8 / Dell R620**
TN433 speech synthesizer on page 150	x	x
TN725B speech synthesizer on page 154	x	x
TN787K multimedia interface on page 163		
TN788C multimedia voice conditioner on page 164		
TNCCSC-1 PRI to DASS converter on page 193	x	x
TNCCSC-2 PRI to DPNSS converter on page 193	x	x
TNCCSC-3 PRI to DPNSS converter on page 193	x	x
TN-C7 PRI to SS7 converter on page 193	x	x
TN-CIN voice, fax, and data multiplexer on page 193	x	x

Application circuit packs

	Supported Servers	
Circuit Packs	**S8510**	**S8800 / HP DL360 G7 / Dell R610 / HP DL360 G8 / Dell R620**
TN750C recorded announcement (16 channels) on page 157		
TN801B MAPD (LAN gateway interface) on page 169	x	x
TN2501AP voice announcements over LAN (VAL) on page 184	x	x

Wireless circuit packs

	Supported Servers	
Circuit Packs	**S8510**	**S8800 / HP DL360 G7 / Dell R610 / HP DL360 G8 / Dell R620**
TN789B radio controller on page 164	x	x

Avaya telephone devices

All telephones listed in Deskphones and softphones can be used with any server that supports Communication Manager Release 3.0 and later.

Appendix C: PCN and PSN notifications

PCN and PSN notifications

Avaya issues a product-change notice (PCN) in case of any software update. For example, a PCN must accompany a service pack or a patch that needs to be applied universally. Avaya issues product-support notice (PSN) when there is no patch, service pack, or release fix, but the business unit or services need to alert Avaya Direct, Business Partners, and customers of a problem or a change in a product. A PSN can also be used to provide a workaround for a known problem, steps to recover logs, or steps to recover software. Both these notices alert you to important issues that directly impact Avaya products.

Viewing PCNs and PSNs

About this task

To view PCNs and PSNs, perform the following steps:

Procedure

1. Go to the Avaya Support website at http://support.avaya.com.

   Note:

   If the Avaya Support website displays the login page, enter your SSO login credentials.

2. On the top of the page, click **DOCUMENTS**.
3. On the Documents page, in the **Enter Your Product Here** field, enter the name of the product.
4. In the **Choose Release** field, select the specific release from the drop-down list.
5. Select the appropriate filters as per your search requirement. For example, if you select Product Support Notices, the system displays only PSNs in the documents list.

   Note:

   You can apply multiple filters to search for the required documents.

Signing up for PCNs and PSNs

About this task

Manually viewing PCNs and PSNs is helpful, but you can also sign up for receiving notifications of new PCNs and PSNs. Signing up for notifications alerts you to specific issues you must be aware of. These notifications also alert you when new product documentation, new product patches, or new services packs are available. The Avaya E-Notifications process manages this proactive notification system.

To sign up for notifications:

Procedure

1. Go to the Avaya Support Web Tips and Troubleshooting: eNotifications Management page at https://support.avaya.com/ext/index?page=content&id=PRCS100274#.
2. Set up e-notifications.

   For detailed information, see the **How to set up your E-Notifications** procedure.

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