WHITE PAPER

Network requirements for Axis network audio

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AXIS COMMUNICATIONS

Table of Contents

1 Introduction

This white paper helps you specify what you need from your network to be able to connect an Axis audio system. We list the network requirements depending on which audio management service you choose. The paper also includes a glossary and lists of network ports to use.

2 Glossary of network terms

Table 2.1 Network terms used in this chapter.

Broadcast	A data transmitting method where one sender sends the same information to all receivers in a network at once.
DHCP	Dynamic Host Configuration Protocol, a protocol for automatic assignment and management of IP addresses.
IGMP	Internet Group Management Protocol, a communications protocol used on IPv4 networks to establish multicast group memberships. IGMP is an integral part of IP multicast.
mDNS	Multicast DNS, a zero-configuration protocol to resolve host names and find devices on a network. Bonjour is an example.
MQTT	Message Queuing Telemetry Transport, a standard messaging protocol for the internet of things (IoT). It is used in a wide variety of industries to connect remote devices while leaving a small code footprint and requiring minimal network bandwidth.
Multicast	A data transmitting method that allows communication with multiple receivers in a network. Multicasting reduces network traffic by sending a data stream once to many recipients.
Network port	A number assigned to uniquely identify a virtual connection endpoint and direct data to a specific service, for example HTTP that normally uses network port 80. Network ports are non-physical ports in software.
PoE	Power over Ethernet, a technology that allows switch ports to supply electric power to connected devices. This means that the devices do not need a separate power supply. Follows IEEE 802.3 af/at/bt standards that have different power limits.
RTCP	Real-Time Control Protocol, a protocol that provides out-of-band statistics and control information for an RTP session. It partners with RTP in the delivery and packaging of multimedia data but does not transport any media data itself.
RTP	Real-time Transport Protocol, a packet-based protocol that permits the transfer of real-time data, for example audio and video, between system endpoints.
SIP	Session Initiation Protocol, a signalling protocol used for initiating, maintaining, and terminating communication sessions that include voice, video, and messaging applications. SIP is one of the protocols used in Voice over IP (VoIP).
Switch port	Physical connector in a network switch where a device is connected.

Table 2.1. Network terms used in this chapter. (Continued)

Unicast	A data transmitting method for one-to-one communication in a network. With unicast you need to send multiple streams if you want to send the same information to multiple receivers.
VoIP	Voice over IP, a group of technologies that enables voice communication and multimedia sessions over IP networks.

3 Network requirements and choice of audio management software

The choice of audio management service (AXIS Audio Manager Edge or AXIS Audio Manager Pro) affects how you need to set up your local network and which communication ports you should use.

If you also connect your AXIS Audio Manager Edge sites to the AXIS Audio Manager Center service, you additionally need to verify your firewall settings for internet access by the system.

4 General network requirements

IP address assignment. Axis audio systems support both static and DHCP-assigned IP addresses of the devices. If you use DHCP, we recommend that you always assign the same IP address, which you configure in your DHCP server.

Network switches. Axis devices use Power over Ethernet (PoE) to receive power. PoE can be supplied either by network switches or by midspans. If you use network switches, you might have to enable PoE on the switch ports where the Axis devices are installed. We recommend managed network switches for larger installations.

5 Network requirements for AXIS Audio Manager Edge

AXIS Audio Manager Edge is a serverless solution that you use to configure Axis audio devices into a system and set up sources and zones for music, paging, and other audio. You can also configure schedules and prioritize between sources. You select one device to be the configuration leader. From that device's web interface you launch AXIS Audio Manager Edge, with which you configure and control the system.

Protocols or services.

- The devices use Bonjour discovery (mDNS) to locate other devices on the network. You can also add devices manually.
- MQTT is used to exchange information between the devices. MQTT does not require any extra broker, but the traffic must be allowed on the network.
- For each source (paging source, music streaming source, content type) configured in the system, two network ports are used for audio streaming and control (RTP and RTCP).
- A common clock, on network port 5015, is used to make sure that audio is played synchronized between the devices.

- SIP (VoIP) can be used for paging and interfacing with other systems. If you use SIP, you must allow associated ports and traffic on the network.

Unicast/multicast.

- Axis audio systems use multicast, meaning that an audio stream can be sent from one source to many devices while keeping network traffic down. The network switch uses IGMP snooping to determine which devices should receive the stream. To use multicast, you must enable multicast and IGMP snooping in the network switches.
- AXIS Audio Manager Edge uses a single multicast address and different network ports on that address to differentiate between the streams.
- You can configure the system to use unicast instead, but this limits the system size to maximum 20 devices.

6 Network requirements for AXIS Audio Manager Pro

AXIS Audio Manager Pro is intended for larger systems than AXIS Audio Manager Edge, or for more complex use cases. AXIS Audio Manager Pro is a software running on a Windows server or virtual machine.

Protocols or services.

- SIP (VoIP) can be used for paging and interfacing with other systems. If you use SIP, you must allow associated ports and traffic on the network.

Unicast/multicast.

- Axis audio systems use multicast, meaning that an audio stream can be sent from one source to many devices while keeping network traffic down. The network switch uses IGMP snooping to determine which devices should receive the stream. To use multicast, you must enable multicast and IGMP snooping in the network switches.
- All devices must be connected to the same multicast domain as the server that AXIS Audio Manager Pro is installed on. Audio streaming between the server and all the devices uses multicast. AXIS Audio Manager Pro uses one multicast address per stream. The default address range is 239.0.0.0 - 239.0.0.254.

7 Network requirements for AXIS Audio Manager Center

AXIS Audio Manager Center is a subscription-based service for remote management and monitoring of multisite systems using AXIS Audio Manager Edge locally. The hybrid cloud solution uses both cloud-based and on-premises components for a convenient and stable solution. It significantly reduces user workloads, with a single sign-on to schedule announcements, background music, ads, and more for selected audio sites or zones.

In addition to the network requirements for each local audio site (see AXIS Audio Manager Edge), there is a network connection to the cloud service. The communication is initiated by each local audio site

and normally this does not require any addition of firewall rules in the network. The communication uses encryption for security and privacy.

8 Lists of network ports

Table 8.1 AXIS Audio Manager Edge

Port	Usage	Comment
80	HTTP	Default, can be changed by user
332	RTSPS	
443	HTTPS	Default, can be changed by user
554	RTSP	
1883	External MQTT	Default, can be changed by user
1900	UPnP UDP	
3478	SIP STUN/TURN	Optional
4000, 4002, ...	SIP RTP	One "+2" step per call
4001, 4003, ...	SIP RTCP	One "+2" step per call
4242	Site internal MQTT	
5015	Clock	
5060	SIP	Default, can be changed by user
5061	SIP TLS	Default, can be changed by user
5353	Bonjour discovery	
20000, 20002, ...	RTP	One "+2" step per source in the system
20001, 20003, ...	RTCP	One "+2" step per source in the system

Table 8.2 Other ports

Port	Usage	Comment
22	SSH	
123	NTP UDP	Traps
161, 162	SNMP	
10161, 10162	Secure SNMP	Traps

Table 8.3 AXIS Audio Manager Pro

Port	Usage	Comment
443	HTTPS	Web UI of the server. Default, can be changed by user.
5433	System port	Default. If already in use, the next available network port will be used.
6992	System port	Default. If already in use, the Traceview application for capturing server logs will not be able to connect to the AXIS Audio Manager Pro server.
6999	RTP	Multicast audio streaming.
7010	System port	Default. If already in use, the next available network port will be used.
5060	SIP	Default, can be changed by user.
30000 – 31999	RTP	RTP streams for SIP calls.

Table 8.4 AXIS Audio Manager Center. These network ports are used for communication from the AXIS Audio Manager Edge configuration leader to the AXIS Audio Manager Center cloud services.

Port	Usage
443	HTTPS
8883	MQTT

About Axis Communications

Axis enables a smarter and safer world by creating solutions for improving security and business performance. As a network technology company and industry leader, Axis offers solutions in video surveillance, access control, intercom, and audio systems. They are enhanced by intelligent analytics applications and supported by high-quality training.

Axis has around 4,000 dedicated employees in over 50 countries and collaborates with technology and system integration partners worldwide to deliver customer solutions. Axis was founded in 1984, and the headquarters are in Lund, Sweden