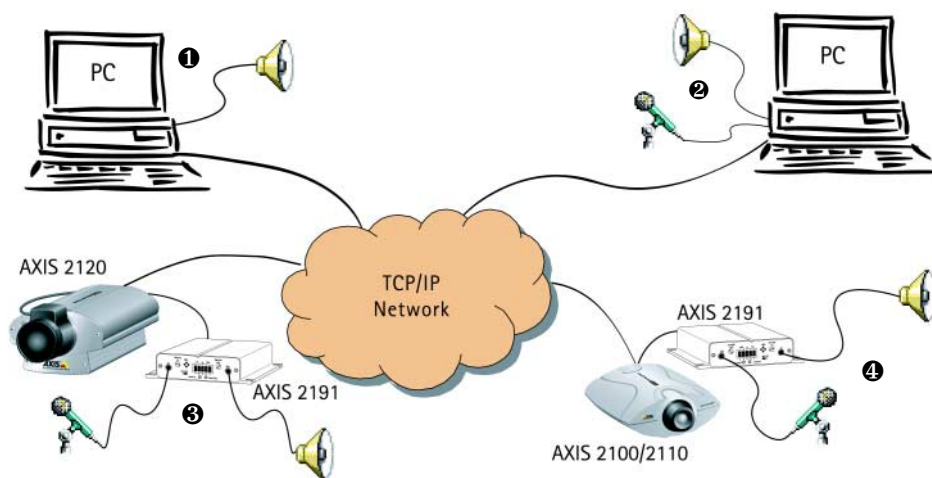# AXIS 2191 Audio Module

Sight, Speech and Sound — over IP!

AXIS
COMMUNICATIONS

The AXIS 2191 Audio Module

The AXIS 2191 Audio Module is an add-on device that provides audio capability to Axis network cameras. The module connects quickly and easily to the serial port of the camera and is configured and controlled via the camera's user interface.

An Axis network camera (❸ or ❹) with an AXIS 2191 Audio Module connected provides live audio and video to browser clients (❶ and ❷) on the network.
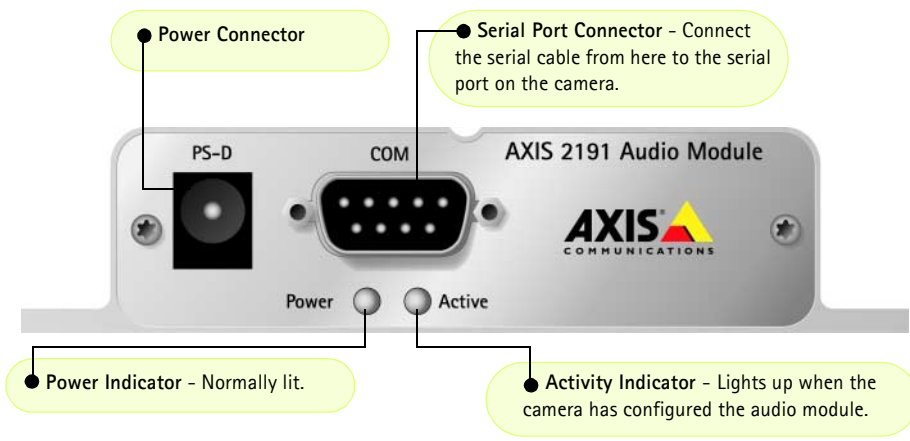
Features and Functions

- Easy to install and use
- Runs on Ethernet LANs and/or the Internet
- Built-in omni-directional microphone
- Compatible with most microphones and speakers (not included)
- External microphone via 3.5mm socket or Line-In via the terminal block
- Simple configuration and management via the network camera's administration pages
- Can be used in Full-Duplex, Half-Duplex or Simplex mode (see page 5)
- Push-to-talk button in client user interface in Half-Duplex or Simplex - Talk mode
- Fully adjustable input and output levels
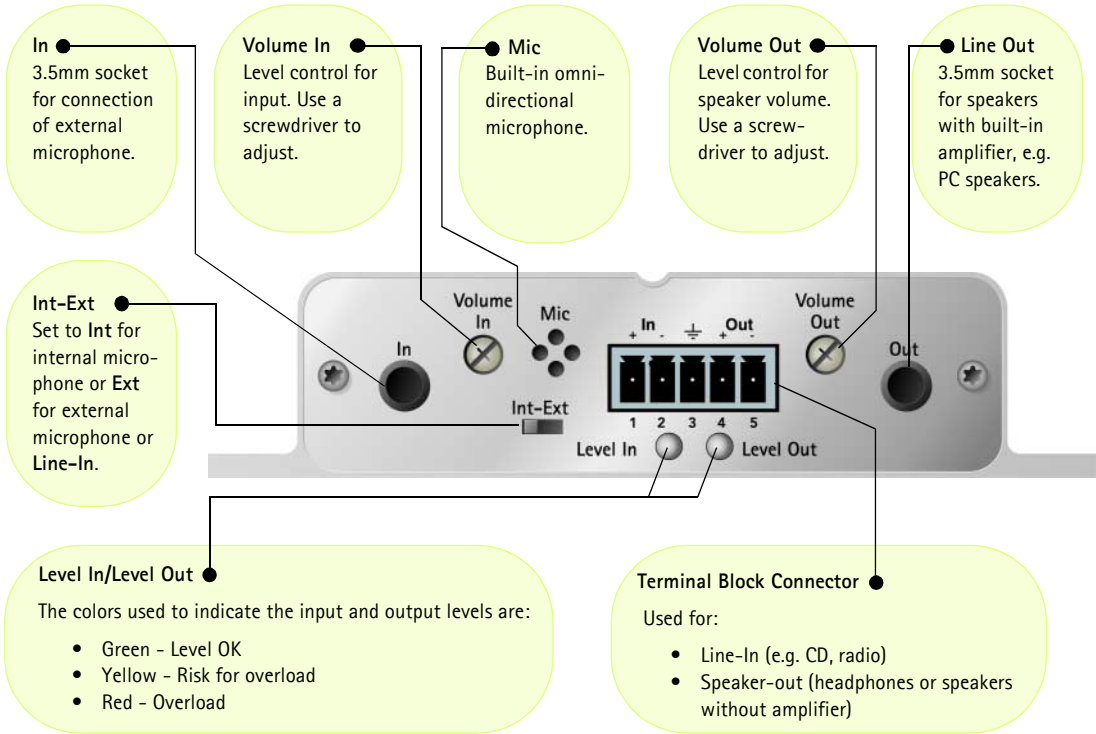- Mute function

Legal Considerations

Video and audio surveillance may be prohibited by laws that vary from country to country. Please check the laws in your local region before using Axis network cameras or the AXIS 2191 Audio Module for surveillance purposes.

The Front Panel

Power Connector

Serial Port Connector - Connect the serial cable from here to the serial port on the camera.

PS-D COM AXIS 2191 Audio Module

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Power Active

Power Indicator - Normally lit.

Activity Indicator - Lights up when the camera has configured the audio module.

The Rear Panel

In
3.5mm socket for connection of external microphone.

Volume In
Level control for input. Use a screwdriver to adjust.

Mic
Built-in omni-directional microphone.

Volume Out
Level control for speaker volume. Use a screwdriver to adjust.

Line Out
3.5mm socket for speakers with built-in amplifier, e.g. PC speakers.

Int-Ext
Set to **Int** for internal micro-phone or **Ext** for external microphone or **Line-In**.

Volume In

Mic

In

Int-Ext

Volume Out

Out

+ In - ⏚ + Out -

1 2 3 4 5

Level In Level Out

Level In/Level Out

The colors used to indicate the input and output levels are:

- Green - Level OK
- Yellow - Risk for overload
- Red - Overload

Terminal Block Connector

Used for:

- Line-In (e.g. CD, radio)
- Speaker-out (headphones or speakers without amplifier)

Installing the Audio Module

Follow the guide below to quickly get your AXIS 2191 up and running. Refer to the illustrations on the previous page for connector details.

❶ Before you start the installation of the AXIS 2191 Audio Module, you must first install your network camera. To do this, please refer to the documentation supplied with your camera. If you intend running the audio module in full-duplex mode, check that the sound card on your computer supports this.

❷ If using an external microphone, connect it to the socket provided. To use an alternative input device, (e.g. CD-player or radio) connect it to Line-In on the terminal block.

❸ Set the selector switch to **Ext** to use an external microphone or device. Otherwise, set to **Int** to use the internal microphone.

❹ Connect a loudspeaker to the 3.5mm socket (amplified speakers only), or to **Out** on the terminal block (speakers with no amplification). Other devices (including headphones) are connected to the terminal block.

❺ Using the supplied cable, connect the audio module's serial port to the network camera's serial port.

❻ Connect power to the audio module.

❼ Check that the power indicators on both the audio module and the camera are lit. Note that the power LED will blink during power-up.

❽ Using a screwdriver, adjust the **Volume In** control so that the **Level In** LED occasionally shows yellow, but not red.

❾ To verify the connection to the AXIS 2191, start Internet Explorer and enter the IP address of the network camera in the location/address field, e.g. 171.1.2.200, as shown here. Configure the audio module from the camera's administration pages, as described in the following section.
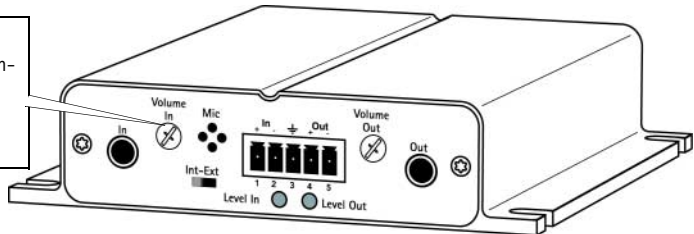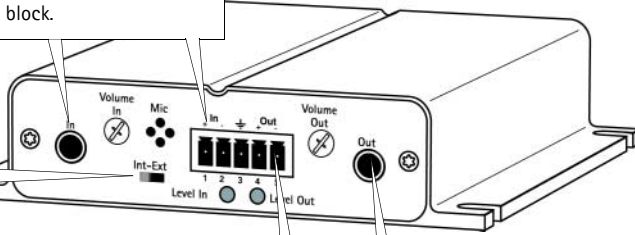
Configuring the Audio Module

The network camera's administration pages provide all the tools required for successfully configuring the AXIS 2191. From the camera's home page, click on the link to **Administration Tools**. A new page containing the tools will open. To complete the configuration of your audio module, follow these instructions:
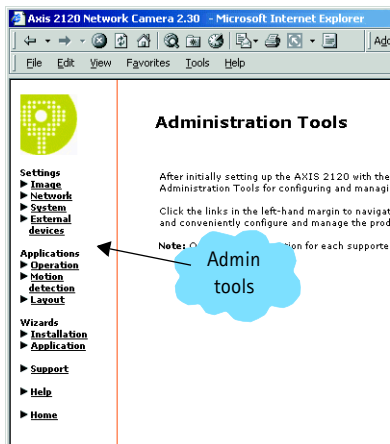

1. From the Admin tools, click **External Devices**. Select the AXIS 2191 Audio Module as the device to use. Click **Save**. **Note:** If you do not see External Devices, then your camera does not have the correct firmware installed and it must be upgraded.

2. Under External Devices, click **Audio**. This opens the configuration page for the audio module (see illustration below).

3. Select the audio mode. This can be:

   • Full-Duplex (Talk and Listen simultaneously)

   • Half-Duplex (Talk and Listen)

   • Simplex - Talk

   • Simplex - Listen

This selection will depend on your application. See page 5 for more information.

4. Enter the number of clients that will be able to access the application at any one time. Use this setting to limit access if you only have limited bandwidth available.

5. If you are using Half-Duplex mode, the **Send** option can be used to send audio from the client currently transmitting to all the other clients, and not just to the server end. Set to **Yes** to enable the function.

6. When using Half-Duplex mode, the **Push-To-Talk** button will be visible. Select the mode to use for this button. Selecting **Toggle** means that when the button is pushed it will remain so until pushed a second time. **Instant** means that the button will remain active (pushed) until released.

7. Adjust the **Volume Out** control until a satisfactory speaker level is heard. The **Level Out LED** can be used to check that there is audio being received. Note that both the control and the LED are on the audio module itself.

The configuration page for the AXIS 2191.
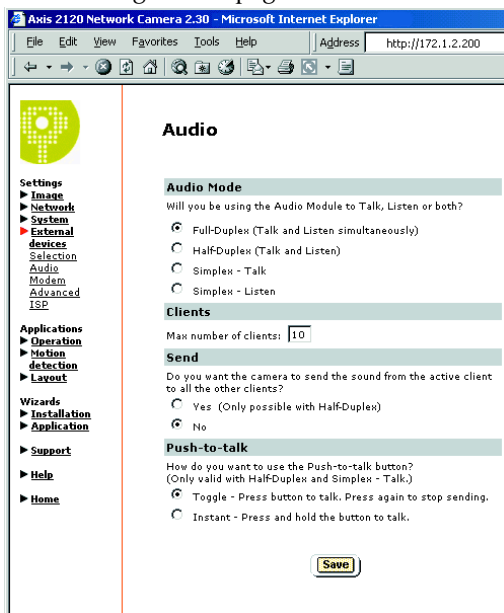
Using the Audio Module with Your Camera

Your audio module is now configured and ready for use with your network camera. Enter your camera's IP-address in Internet Explorer, or click **Home** on the camera's admin page. You should then see the control panel for the AXIS 2191 below the camera image. If no audio controls are visible, check that you have made the correct setting under **External Devices**.

NB. Exactly which controls will be visible below the image depends on the audio mode you are using. For example, the Push-to-Talk button will not be visible in Full-Duplex mode. Similarly, when using Simplex - Listen mode, only the Speaker controls will be shown. The audio mode is set in the camera's admin tools.

Push-To-Talk

Used in Half-Duplex or Simplex - Talk mode. The button's own mode is set in the camera's admin pages.

Available Bandwidth

Select the bandwidth available for your connection.

Show/Hide Settings

Shows or hides the slider controls and level indicators

Level Adjust IN/OUT

Drag sliders to adjust level.

Mute Checkboxes

Check to mute speaker or microphone.

Using the Different Audio Modes

Full-Duplex

Full-Duplex mode means that you can transmit and receive audio (talk and listen) at the same time, without having to use any of the controls. This is just like having a telephone conversation. The only controls you may wish to use are the mute checkboxes to turn off the sound, and the level sliders, to adjust the input/output levels. This mode requires a full-duplex sound card on your computer. If your available bandwidth is 0.2Mbit/s or less, it is recommended that you use Half-Duplex mode instead.

Half-Duplex

Half-Duplex mode also sends and receives audio in both directions, but only in one direction at a time. This means you must actively transmit with the help of the **Push-to-Talk** button. To speak, press the button (check that the microphone is not muted). When finished speaking, release the button. You will now be receiving audio from the other end of the connection. Note that the Push-to-Talk button can be configured for use in two different ways - **Toggle** or **Instant**. This is set in the camera's admin tools. Half-Duplex mode is best if you only have limited bandwidth available.

Simplex - Talk

Simplex - Talk mode means that only the web-client end of the connection can transmit audio (that is, *to* the AXIS 2191). This could be used, for example, to provide spoken instructions to a person seen in the network camera. This mode also requires you to use the Push-to-Talk button.

Simplex - Listen

Simplex - Listen mode can only receive audio *from* the AXIS 2191 to the web-client. This can be used in remote monitoring, web attractions etc., to provide live audio, as well as video, of a monitored situation.

Troubleshooting

Symptoms	Possible causes	Remedial actions
The network camera cannot be accessed from a browser.	Incorrect camera configuration.	Please refer to the camera's documentation for help on resolving the problem.
	Networking problems.	Check all cables, including the network cable from the camera to the network. See the camera's documentation.
No audio controls below camera image.	The AXIS 2191 is not selected as the external device.	In the camera's administration tools, click on **External Devices** and select the AXIS 2191 Audio Module.
	Wrong camera firmware.	Check the firmware in the camera by checking if **External Devices** appears in the camera's Administration Tools. If not, the camera does not have the correct firmware and it must be upgraded.
No sound from the AXIS 2191 or from a PC trying to access a web page containing audio content.	Incorrect settings or faulty connections.	Check that: • soundcard, speakers and microphone are connected • the Mute button is not pressed • the Int/Ext switch for the input is in the correct position • the input and output levels are correct • all cabling is connected and all power switches are ON
No audio signal from PC to the AXIS 2191 when passing a proxy server.	The Post Content Length set in the proxy server is too low.	Set the value of the Post Content Length in your proxy server to 1MB or more. You may need to contact your system administrator to do this.
No full-duplex function.	Incorrect configuration.	Check the setting in the camera's administration tools. See also page 4.
	Sound card does not support full-duplex.	For information on how to check if your sound card supports full-duplex, please visit www.axis.com and see the support section for Axis camera products.
Poor performance.	Too many users/clients connected.	Try limiting the number of clients allowed to connect.
	Low bandwidth.	Reduce the available bandwidth by changing to a lower setting in the Available Bandwidth selector. Setting a lower bandwidth will reduce any break-up in the sound, but will also increase the transmission delay.
		If running in Full-Duplex mode, try switching to Half-Duplex mode.
Whining or screeching sound from speakers (feedback).	Poor positioning of speakers and/or microphone.	Relocate the speakers or microphone so that they do not point towards each other, and/or lower the volume.
Poor sound on headphones.	Incorrect connection.	Headphones can only be used by connecting them to Speaker-Out on the terminal connector.
The Power indicator LED is not constantly lit.	Faulty power supply.	Verify that you are using an AXIS PS-D power supply.
Your AXIS 2191 works locally, but not externally.	Firewall protection.	Check the Internet firewall with your system administrator.
	Default routers required.	Check if you need to configure the default router settings.

Note: If you still have a problem after reading this information, please contact your reseller, or visit www.axis.com and check the support section for Axis camera products.

Technical Specifications

- **Operating temperature**: 40-105°F (5-40°C).
- **Humidity** - 8-80% relative humidity.
- **EMC – CE**: EN55024, EN55022, Class B and EN61000-3-3.
- **EMC – FCC Class A of FCC Rules and Regulations part 15, subpart B.
- **EMC –**
- **Full-duplex audio**: Audio data encoded in ADPCM format at 32kbps, 8 kHz sampling (G.721). Data is sent using HTTP.
- **9-pin D-SUB serial connector**: RS-232.
- **Power Input**: Axis PS-D power supply.
- **Microphone Input:** 1-50mVpp. PC type.

- **Line Out**: Unbalanced, 0.05-1.0Vpp
- **Line Input**: Balanced 0.05-1Vpp. Connect source ground to pin 2 and source signal to pin 1 if the source is unbalanced.
- **Speaker Output**: Balanced, 0.5W. Impedance 8-32 Ohms. Connect directly to speaker without capacitors.
- **Alternative Power**: 12-15VAC, min 10VA, or 15-20VDC, min 7W.
- **Metrics**: Height: 1.1" (27mm), Width: 4.4" (112mm), Length: 4.3" (110mm), Weight: 0.7lb (0.32kg).
- **Maximum number of users:** 10 (on local area network).

Connection Diagram
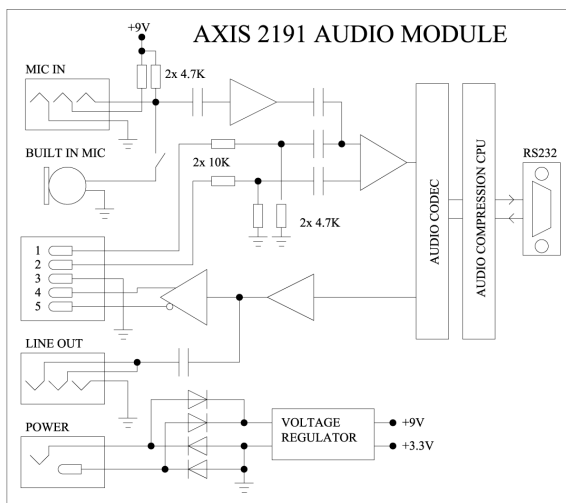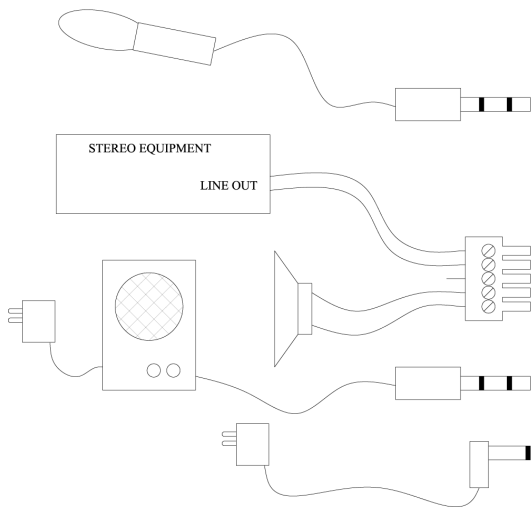
The Audio Module to Camera Serial Cable

The serial cable supplied with your AXIS 2191 is wired as shown in the table below:

Pinouts for the RS-232 Port

Audio	Pin	Pin	Camera	Signal
IN	1	1	IN	CD
IN	2	2	IN	RXD
OUT	3	3	OUT	TXD
OUT	4	4	OUT	DTR
GND	5	5	GND	GND
IN	6	6	IN	DSR
OUT	7	7	OUT	RTS
IN	8	8	IN	CTS
Unused	9	9	IN	RI