IP AMP DESIGN GUIDE

Flexible Audio Distribution

Table of Contents

System Overview

Whether your audio distribution project is large or small, the ELAN IP amplifier products provide unprecedented flexibility. ELAN IP enabled audio distribution simplifies audio distribution and enhances the intelligent property by delivering high quality audio over standard networks. Easily scaling from a **Single-Chassis** solution to a decentralized multi-chassis / multi-source implementation, ELAN IP audio distribution meets the needs for projects of just about any size. Because audio is delivered over the network, ELAN IP amplifier products let you place sources and amplifiers where they make the most sense.

This is a complex and detailed document, covering many aspects from design to configuration of the ELAN IP amplifier products. How they should and can be designed as well as how to properly deploy a system will be covered. We realize that not all will read this in its entirety, but the most important take away from this document is an understanding of when to use **Unicast** (Dante Default), when to use **MultiCast** (Dante Advanced) setup and how to best maximize your zones.

IP Enabled Audio Distribution with Dante Audio Networking

ELAN IP amps use Dante® audio networking technology, enabling standard IP networks to transmit high-quality, uncompressed audio with near-zero latency. Dante is the audio networking choice of nearly all professional audio manufacturers, making it the industry standard for digital audio networking.

Dante Audio Networking

» Distributes audio long distances over the network

» Delivers high quality audio with near-zero latency

» Provides lower total cost of ownership than alternative solutions by dramatically reducing cabling and labor costs

» Installs easily using off-the-shelf IT networking equipment and cables, and leverages proven, reliable protocols

» Enables decentralized installations, with sources and amplifiers placed where they make the most sense.

Designed to Meet Your Needs in Any Room

	Multi-Zone Audio Matrix EL-IPD-MTX-8CH	Multi-Zone Audio Extender EL-IPD-AMP-EXT	Multi-Zone Preamp Audio Matrix EL-IPD-PRE-MSI
MODES	Single-Chassis or Multi-Chassis*	Multi-Chassis Only	Single-Chassis or Multi-Chassis*
OUTPUTS	8 Speaker / 4 Preamp	8 Speaker / 4 Preamp	12 Preamp
INPUTS	8 RCA / 1 3.5 / 4 digital	Dante Only	16 RCA / 1 3.5 / 6 digital
SENDING STREAMS *Unicast - each source is streamed separately to each requesting chassis. *MultiCast – each source is counted as a single stream, no matter how many chassis it is sent to.	Unicast (default) = 6 MultiCast = 12	N/A	Unicast (default) = 8 MultiCast = 16
OUTPUTS ZONES	Up to 12	Up to 8	Up to 12

	Local Audio Source EL-IPD-PRE-SSI	Network Audio Card EL-IPD-NAC-EXT	EL-IPD-AMP-2CH	EL-IPD-PRE-SIO
MODES	Multi-Chassis Only	Adds Dante Audio Networking	Single-Chassis or Multi-Chassis	Multi-Chassis Only
OUTPUTS	Dante Only	N/A	1 Zone [Speaker level out (bridgeable) + sub out]	1 zone, Stereo analog out + sub out
INPUTS	RCA / Optical/ Coaxial**	N/A	**Single-Chassis:** RCA/Optical/Coaxial **Multi-Chassis:** RCA/Optical/Coaxial**	RCA / Optical/ Coaxial**
SENDING STREAMS	Unicast (default) = 2 MultiCast = 4	N/A	Unicast (default) = 2 Multicast = 4	Unicast (default) = 2 Multicast = 4

*These are accurate for stereo streams/sources
**One Input, that can be set to the connection type

Multi-Zone Audio Matrix

The Multi-Zone Audio Matrix can be used in a **Single-Chassis** configuration or with other amplifiers and pre-amps within the ELAN IP audio distribution family of products. This is accomplished by adding the optional Dante Audio Networking Card.

EL-IPD-MTX-8CH - Single-Chassis

In **Single-Chassis** Mode, the Multi-Zone Audio Matrix supports up to 13 input sources (4 digital, 8 mono/4 stereo analog RCA and one stereo 3.5mm typically used as the doorbell input from an ELAN System Controller). Each RCA analog input can be configured as left, right or mono.

Eight speaker channels are available (up to four stereo zones or eight mono zones). Four line level outputs can be configured as four mono or two stereo output zones or as sub-woofer out. Each can be configured as left, right, mono or Sub Out. In **Single-Chassis** mode, the Multi-Zone Audio Matrix supports up to 12 individual audio zones.

EL-IPD-MTX-8CH - Dante

Adding the Dante Network Audio Card (EL-IPD-NAC-EXT) allows for additional ELAN Audio over IP devices to be used to add additional sources or zones to the system.

EL-IPD-AMP-EXT - Multi-Zone Audio Extender

The EL-IPD-AMP-EXT Multi-Zone Audio Extender is designed to be used or with other amplifiers and pre-amps within the ELAN IP audio distribution family of products using Dante Audio Networking. **Max of 8 zones.**

The EL-IPD-AMP-EXT Multi-Zone Audio Extender is Dante enabled.

NOTES:

- The EL-IPD-AMP-EXT Multi-Zone Audio Extender cannot be used as a standalone unit.

- It requires another Dante enabled ELAN amplifier (EL-IPD-8CH-MTX Multi-Zone Audio Matrix with the EL-IPD-NAC-EXT Dante Network Audio Card) or Preamp (EL-IPD-PRE-MSI Multi-Zone Preamp Audio Matrix with the EL-IPD-NAC-EXT Dante Network Audio Card or EL-IPD-PRE-SSI).

EL-IPD-PRE-MSI - Multi-Zone Preamp Audio Matrix

The EL-IPD-PRE-MSI Multi-Zone PREAMP Audio Matrix can be used in a stand-alone configuration or with other amplifiers and pre-amps within the ELAN IP audio distribution family of products by adding the optional Dante Audio Networking Card.

EL-IPD-PRE-MSI - Standalone

The EL-IPD-PRE-MSI can be used in stand alone mode paired with external amplifiers to support up to 22 input sources (6 digital, 16 mono/8 stereo analog RCA and one stereo 3.5mm typically used as the doorbell input from an ELAN System Controller).

Each RCA analog input can be configured as left, right or as mono. Twelve line level outputs can be configured as 12 mono or 6 stereo output zones or as subwoofer out. Each can be configured as left, right, mono or sub out.

EL-IPD-PRE-MSI - Dante

Adding the Dante Network Audio Card (EL-IPD-NAC-EXT) allows for additional chassis to be used to add additional sources or zones to the system. Combine with the Multi-Zone Audio Matrix to add additional sources, or use the EL-IPD-PRE-MSI for sources and add additional EL-IPD-AMP-EXT for audio zones.

EL-IPD-AMP-2CH

The AMP-2CH can be used in Single or Multi-Chassis mode. In **Single-Chassis** mode, each input is independent and can be switched from the UI but cannot send or receive streams from other Dante enabled devices. In **Multi-Chassis** mode, this device has one input but can send and receive streams to other Dante devices simultaneously on the network. This AMP will supply one zone of output with a Left, Right speaker output (bridgeable) and a sub-out (Variable only; 100hz crossover).

EL-IPD-PRE-SIO

The EL-IPD-PRE-SIO provides a way to deliver two channel PCM audio from a single input of RCA, Optical, or Coax, and then send it to other Dante enabled IPD units on the network. The SIO also adds one zone output consisting of left/right and sub pre-amp outputs. This allows the option to add another zone remotely and create a distributed audio system. The SIO can send and receive audio simultaneously.

EL-IPD-PRE-SSI - Local Audio Source

The EL-IPD-PRE-SSI Local Audio Source provides a way to deliver two channel PCM audio from a single remote source to an ELAN Dante enabled Audio Matrix over an existing standard local area network. The EL-IPD-PRE-SSI adds an additional source to the ELAN Dante enabled Audio Matrix.

EL-IPD-NAC-EXT - Dante Network Audio Card

The EL-IPD-NAC-EXT enables the ELAN IP amplifiers and pre-amplifiers to be linked in order to share sources and/or audio zones.

The EL-IPD-NAC-EXT Network Audio Card is compatible with the EL-IPD-MTX-8CH Multi-Zone Audio Matrix and the EL-IPD-PRE-MSI Multi-Zone Preamp Audio Matrix.

Applications

EL-IPD-MTX-8CH - Multi-Zone Audio Matrix in Single-Chassis Mode

The EL-IPD-8CH-MTX can be used in stand alone mode to support up to 13 input sources (4 digital, 8 mono/4 stereo analog RCA and one stereo 3.5mm typically used as the doorbell input from an ELAN System Controller).

Each RCA analog input can be configured with another as a L/R pair or individually as mono. Eight speaker channels are available (up to four stereo zones or eight mono zones). Four line level outputs can be configured as four mono or two stereo output zones or as sub-woofer out. Each can be configured as left, right, mono or sub out.
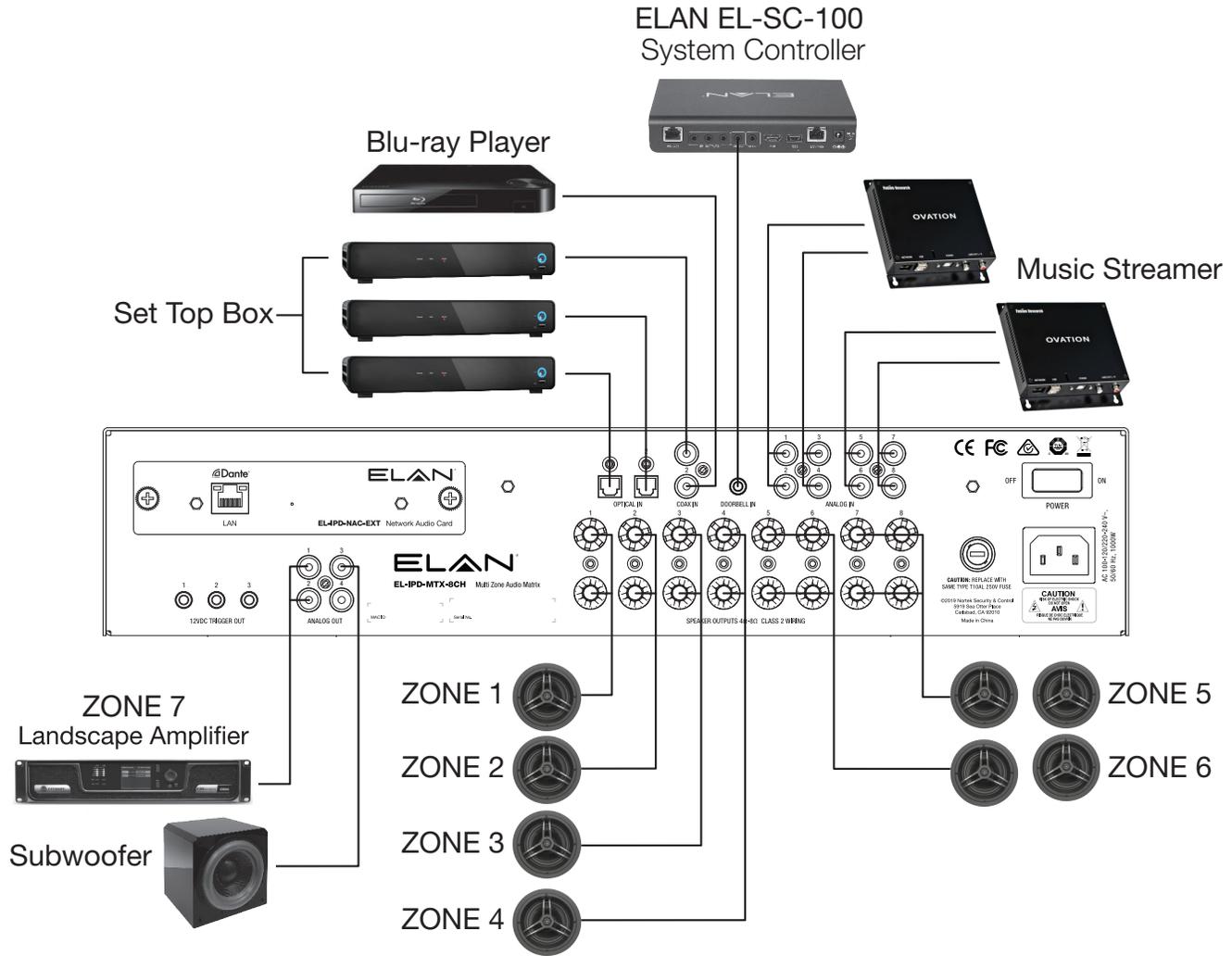
EL-IPD-MTX-8CH - Multi-Zone Audio Matrix - EL-IPD-AMP-EXT Multi-Zone Audio Extender in Dante Mode

Adding the EL-IPD-NAC-EXT -Network Audio Card gives the ability to combine multiple chassis in to one system. Combine the EL-IPD-MTX-8CH Multi-Zone Audio Matrix with the EL-IPD-AMP-EXT Multi-Zone Audio Extender to add up to eight more zones of audio. Using Dante Audio Networking, the two chassis can be linked using standard networking equipment.
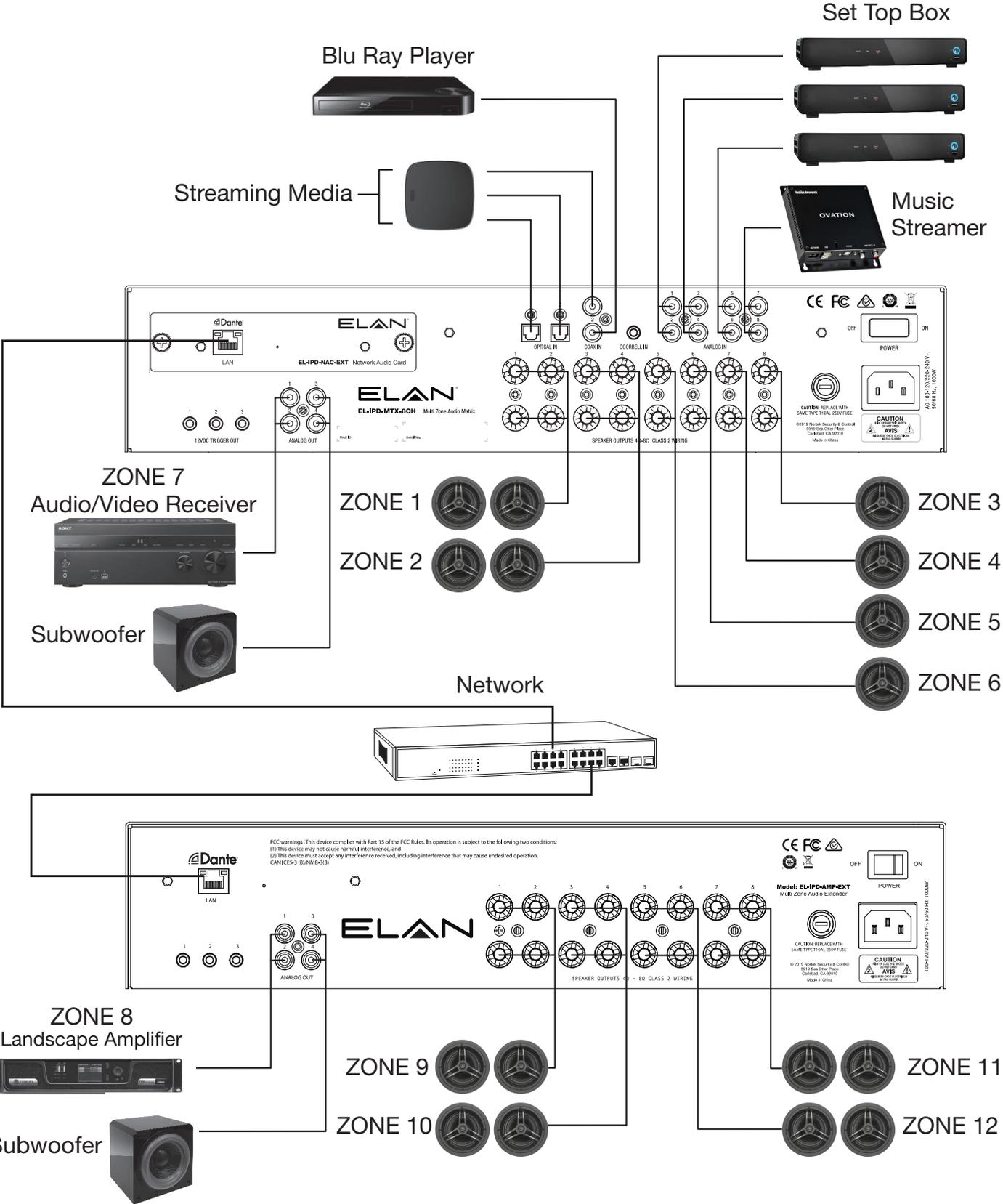
EL-IPD-MTX-8CH - Multi-Zone Audio Matrix in Dante Mode - Multiple Chassis

If more zones AND sources are needed beyond the capability of a single EL-IPD-MTX-8CH Multi-Zone Audio Matrix, a second can be added to double the number of inputs and zones. By adding the EL-IPD-NAC-EXT - Network Audio Card to both EL-IPD-MTX-8CH Multi-Zone Audio Matrix chassis, they can be connected to add up to 12 more zones and 12 inputs. Multiple chassis can be added to create up to 64 zones of audio.
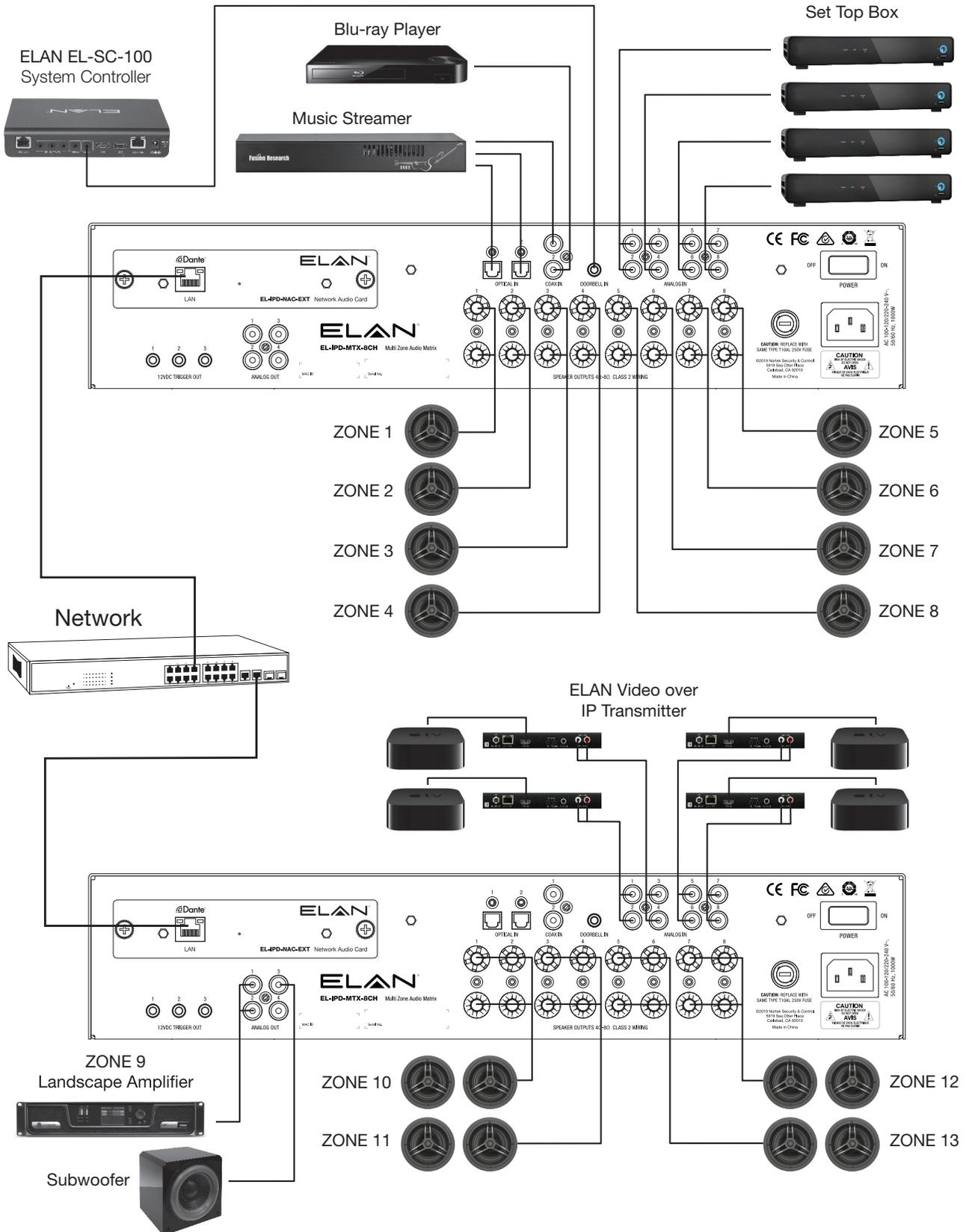
EL-IPD-MTX-8CH - Multi-Zone Audio Matrix - EL-IPD-PRE-MSI Multi-Zone Preamp Audio Matrix in Dante Mode

If more sources are needed beyond the capability of a single EL-IPD-MTX-8CH Multi-Zone Audio Matrix, the EL-IPD-PRE-MSI can be added to increase the number of inputs available. By adding the EL-IPD-NAC-EXT - Network Audio Card to both EL-IPD-MTX-8CH Multi-Zone Audio Matrix and the EL-IPD-PRE-MSI Multi-Zone Preamp Audio Matrix, they can be connected to add up to 12 preamp zones and 22 inputs. Using Dante Audio Networking, the two chassis can be linked using standard networking equipment. All sources and zones are shared as one system.
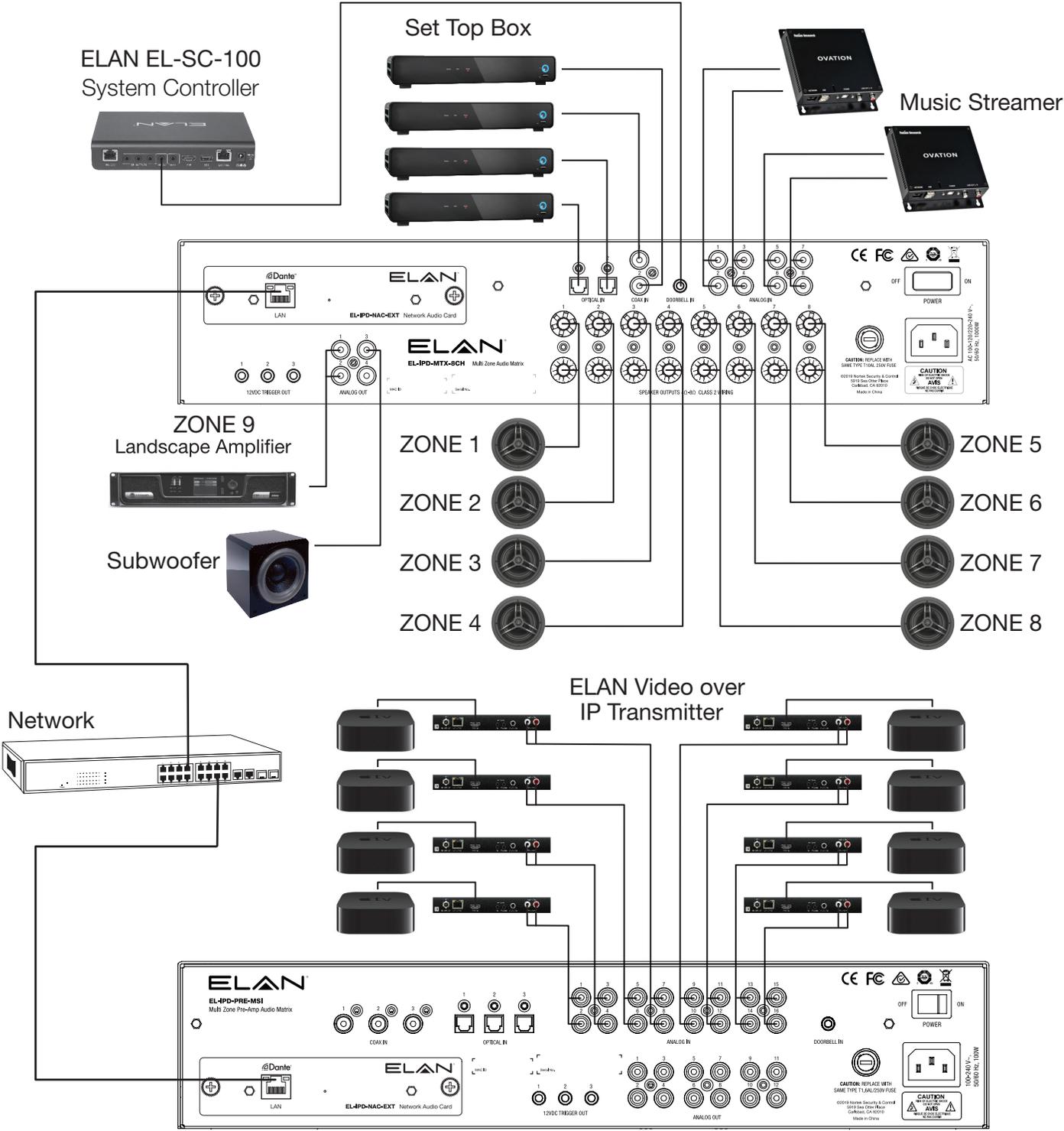
EL-IPD-MTX-8CH - Multi-Zone Audio Matrix - EL-IPD-PRE-SSI Local Audio Source in Dante Mode

If remote sources are needed such as a TV's audio output, the EL-IPD-PRE-SSI Local Audio Source input device can be used to send audio over the network to the EL-IPD-MTX-8CH Multi-Zone Audio Matrix. Using Dante Audio Networking, the two devices can be linked using standard networking equipment. The EL-IPD-PRE-SSI is an additional source added to the direct input sources on the EL-IPD-MTX-8CH.

ELAN EL-SC-100 System Controller

Blu-ray Player

Music Streamer

Set Top Box

ZONE 7 Landscape Amplifier

Subwoofer

ZONE 1
ZONE 2
ZONE 3
ZONE 4

ZONE 6
ZONE 5

Network

Music Streamer
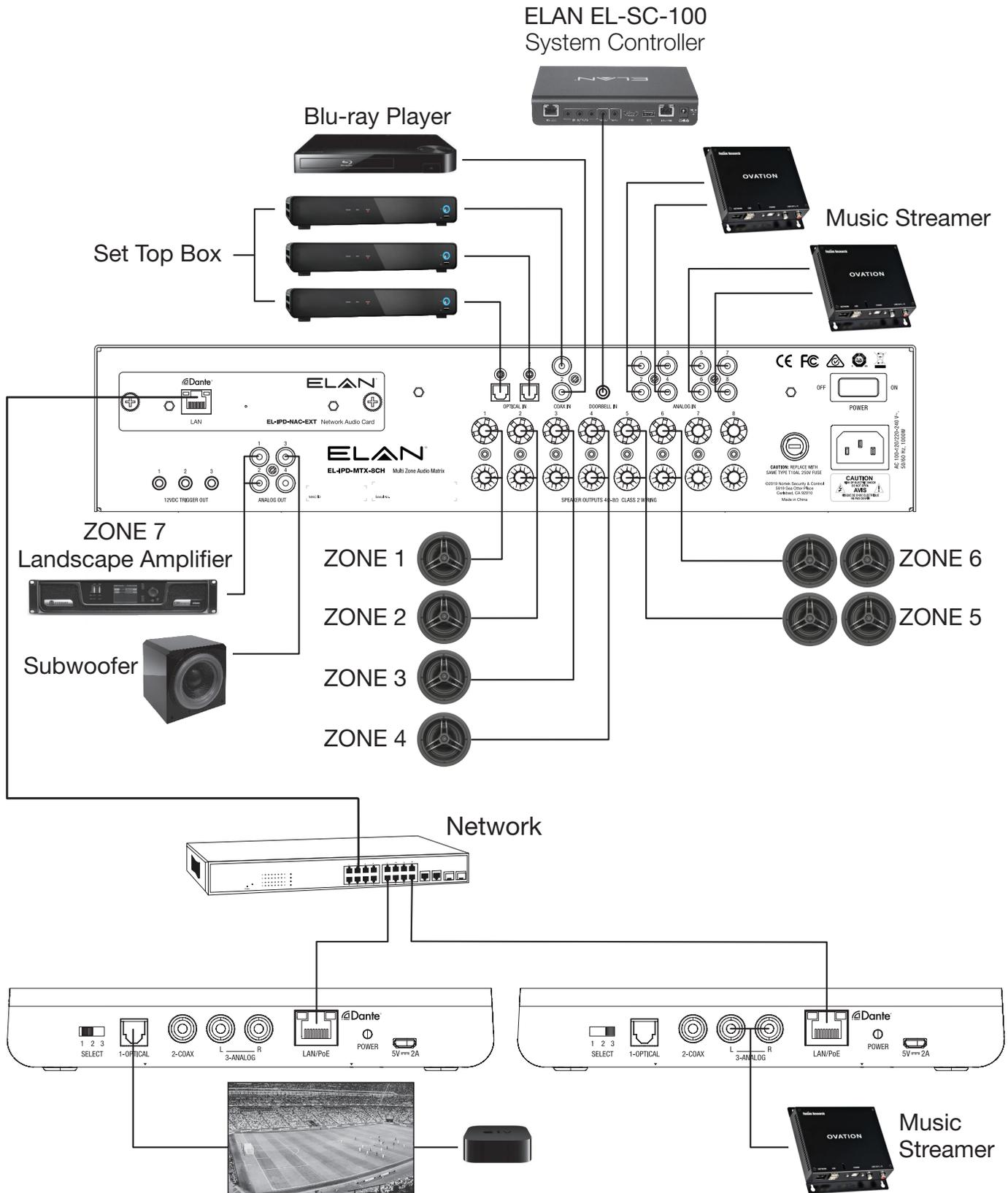
EL-IPD-AMP-EXT - Multi-Zone Audio Extender - EL-IPD-PRE-MSI Multi-Zone Preamp Audio Matrix in Dante Mode

If more sources are needed beyond the capability of the EL-IPD-MTX-8CH Multi-Zone Audio Matrix, the EL-IPD-PRE-MSI can be used for the inputs. With the optional EL-IPD-NAC-EXT - Network Audio Card to added to the EL-IPD-PRE-MSI Multi-Zone Preamp Audio Matrix, it can be linked to the EL- IPD-AMP-EXT Multi-Zone Audio Matrix.
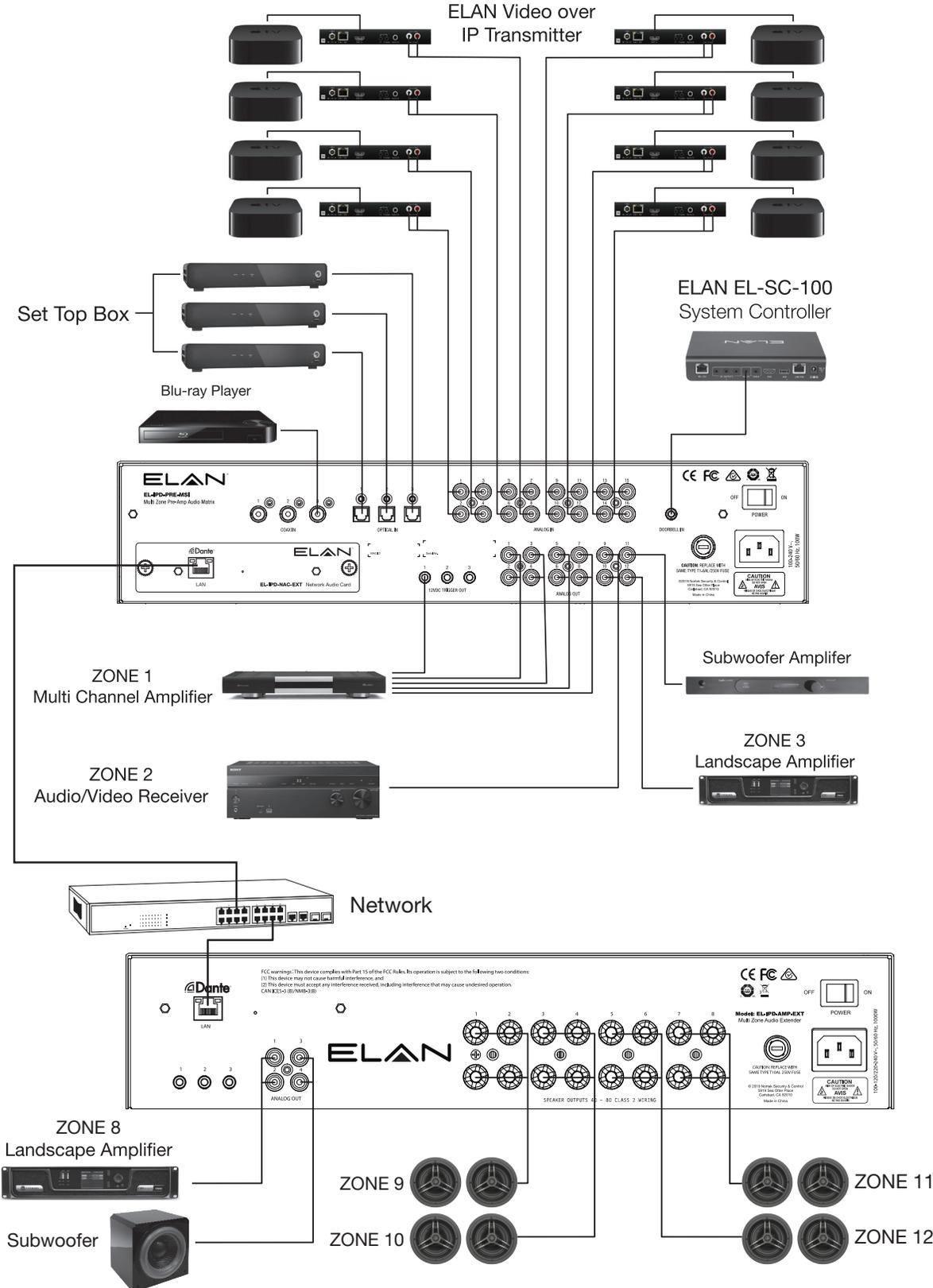
EL-IPD-AMP-EXT - Multi-Zone Audio Extender - EL-IPD-PRE-SSI/SIO Local Audio Source in Dante Mode

If only remote sources are needed such as from a TV's audio or SIO output, the EL-IPD-PRE-SSI Local Audio Source input device can be used to send audio over the network to the EL-IPD-AMP-EXT Multi-Zone Audio Extender. Using Dante Audio Networking, the devices can be linked using standard networking equipment.

ZONE 9
Landscape Amplifier

ZONE 10

ZONE 12

ZONE 11

ZONE 13

Subwoofer

Network

Music
Streamer
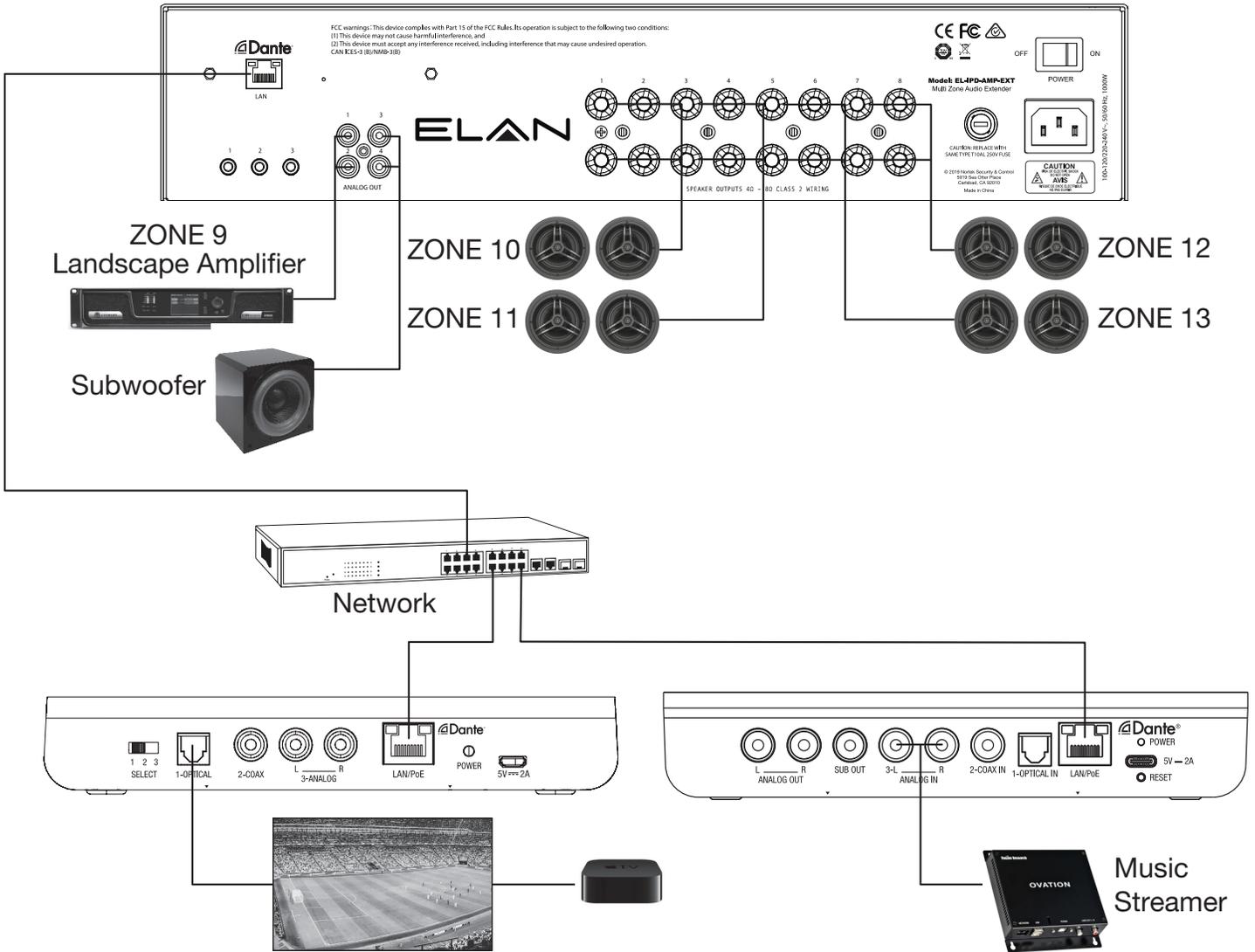
EL-IPD-PRE-MSI - Multi-Zone Preamp Audio Matrix in Single-Chassis Mode

The EL-IPD-PRE-MSI can be used in stand alone mode paired with external amplifiers to support up to 22 input sources (6 digital, 16 mono/8 stereo analog RCA and one stereo 3.5mm typically used as the doorbell input from an ELAN System Controller).

Each RCA analog input can be configured as left, right or as mono. Twelve line level outputs can be configured as 12 mono or six stereo output zones or as subwoofer out. Each can be configured as left, right, mono or sub out.

ELAN Video over IP Transmitter

Set Top Box

ELAN EL-SC-100 System Controller

Blu-ray Player

ZONE 1 Multi Channel Amplifier

Subwoofer Amplifer

ZONE 3 Landscape Amplifier

ZONE 2 Audio/Video Receiver
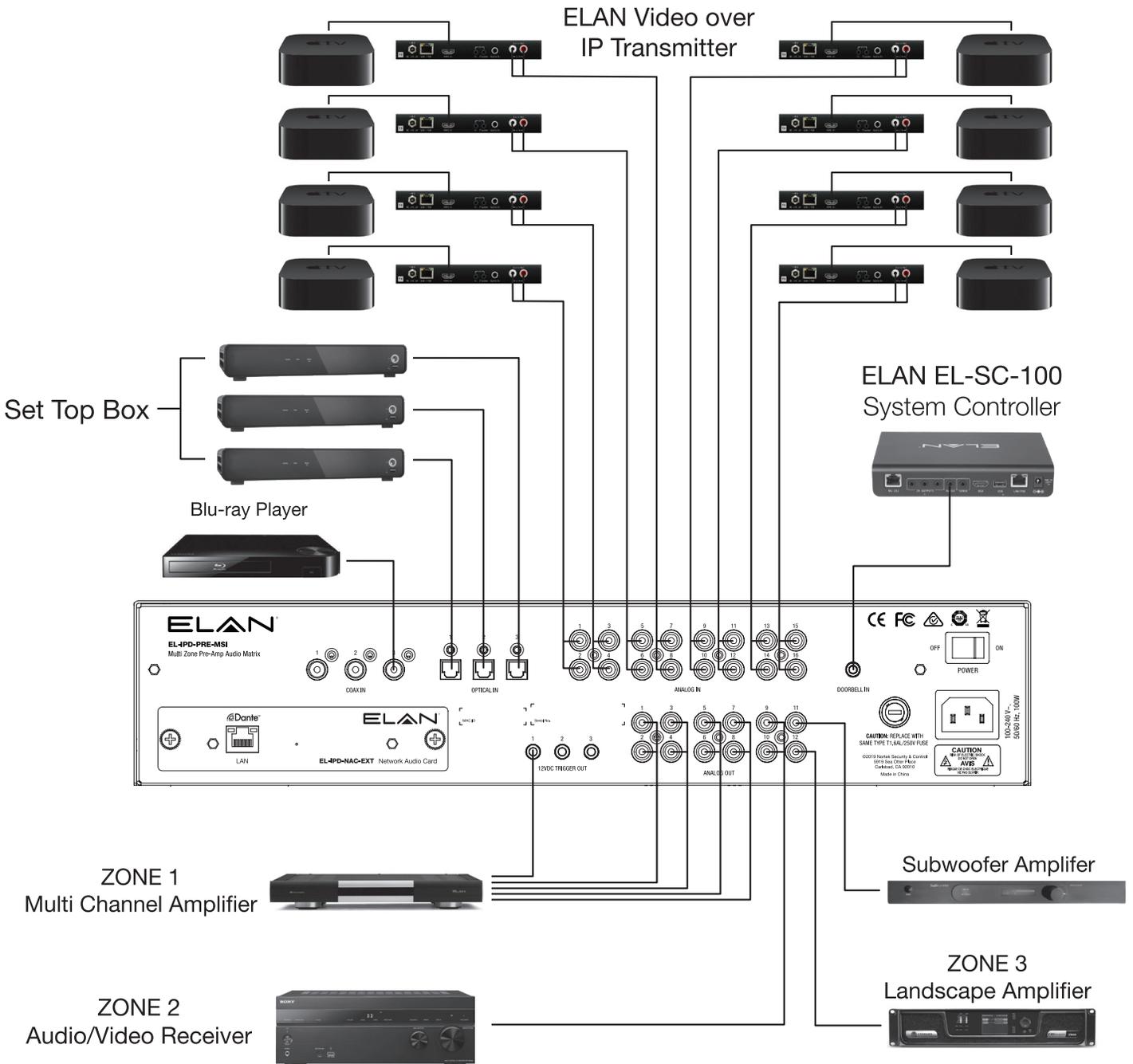
EL-IPD-AMP-2CH - Single-Zone Amplifier in Multi-Chassis Mode

When the AMP-2CH is used in Multi-Chassis mode, it can send and receive a source simultaneously or use the one source (input is a static setting when in Multi-chassis mode). When other IPD devices are part of the system, the sources can be shared across (as seen below).
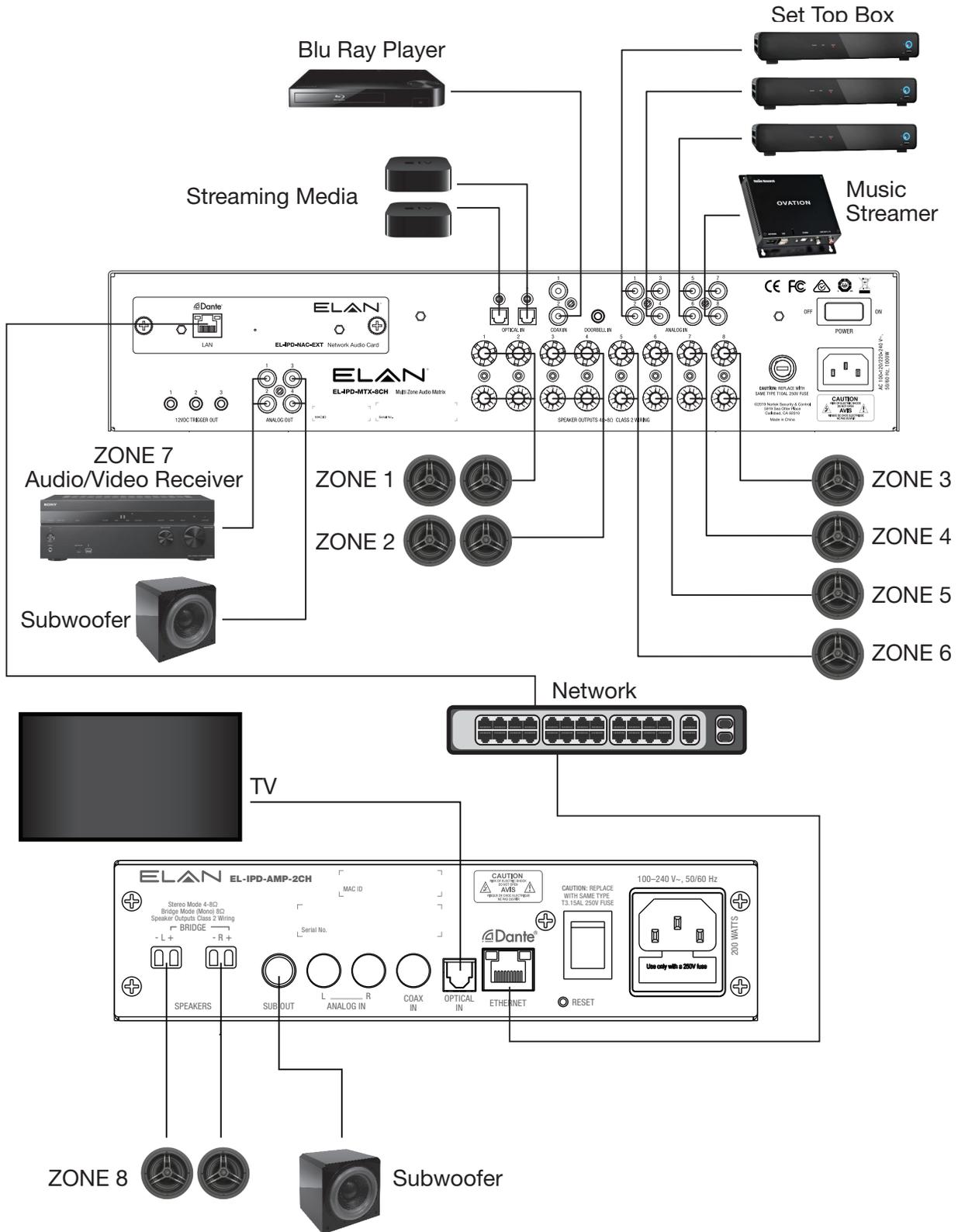
EL-IPD-PRE-SIO - Zone Preamp Output and Source Input

The EL-IPD-PRE-SIO can be used to add one source (input to be set) and/or add one zone output. The zone also has a variable sub output. It can send and receive an audio stream simultaneously.
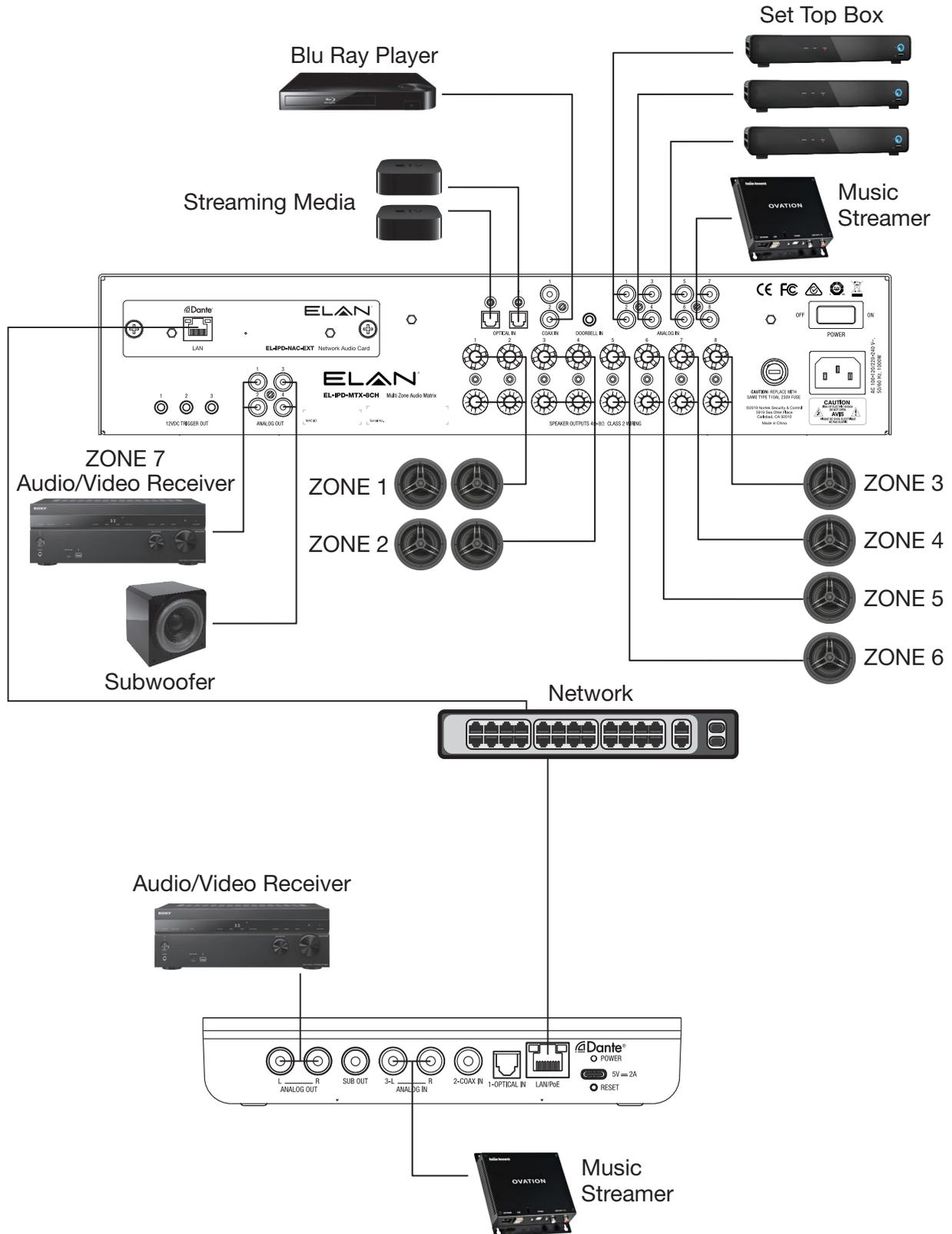
EL-IPD-AMP-2CH - Single-Zone 2 channel AMP in Stand-alone Mode

When the EL-IPD-AMP-2CH is used in Single-Chassis mode (which it can be set up as, even if other Dante products are in the system), the zone can use and switch between all inputs in real time (like a 3x1 switcher). When used in this mode, it is not possible to send or receive sources from other Dante enabled devices. The zone's speaker outputs are bridgeable, and they can support 8 and 4 ohms. Also featured is a variable sub output.

TV

Turntable

Music
Streamer

OVATION

ELAN   EL-IPD-AMP-2CH

MAC ID

Stereo Mode 4-8Ω
Bridge Mode (Mono) 8Ω
Speaker Outputs Class 2 Wiring
BRIDGE
- L +   - R +

Serial No.

CAUTION
RISK OF ELECTRIC SHOCK
DO NOT OPEN
AVIS
RISQUE DE CHOC ELECTRIQUE
NE PAS OUVRIR

CAUTION: REPLACE
WITH SAME TYPE
T3.15AL 250V FUSE

100–240 V~, 50/60 Hz

200 WATTS

Use only with a 250V fuse

@Dante®

SPEAKERS   SUB OUT   L ——— R   COAX   OPTICAL   ETHERNET   RESET
                          ANALOG IN   IN   IN

Network

Speakers   Subwoofer

Functionality Features

The following features are specific to this product line:

Zone Output Configuration

No longer are you held to left/right output per zone or using a dual voice coil in rooms with a single speaker. With the IPD products, you can set a zone to use certain outputs specific to its use. Mono (summed Stereo), Left, Right and Sub channels can be assigned.

Want a room with one speaker or it is desirable to use summed stereo rather than a dedicated left/right? No problem. Don't design your audio zone around the product, design your product around the zone needs.

Audio Ramp

When a zone is either unmuted or powered on, the audio will ramp up, rather than a harsh volume jump. When muted, the volume will decrease to zero immediately.

Mute Rules

If a zone is muted, lowering the volume can be accomplished without unmuting. Then when unmuted, the volume is at the desired level. Rather than unmute at a higher than desired volume, you can lower then unmute.

Raising a volume when a zone is muted will automatically unmute the zone. If you want the audio to be higher, chances are that you desire to hear the audio at that time.

Volume Curve

The volume curve of the IPD series products is specifically tailored to the end user. It offers a non linear curve that allows a lower volume without impacting the high end range.

Equalizer

These products feature a built-in, zone specific EQ. It has six presets, but each preset can be modified and saved. This allows an end user to create and recall a desired curve. Custom curves are set and saved in each zone.

Expandability

There's no need to worry about future system expansion. A source, a zone, or both can be added by adding a SII, SIO or any ELAN IPD audio chassis as the system grows over time (centralized or decentralized).

Zone Specific Volume Parameters

Each zone has three settings for volume that can be adjusted depending on the needs.

Volume Max

Volume Max can be set to limit the volume so that 100% will be a lower volume. When this is set, the volume bar in the user interface will not indicate that this cap has been set. The volume will set to the last known volume, but there are caps on the end that can be adjusted.

Min

Set the zone power up volume Minimum. If the zone powers up with a lower volume than this setting, it will increase the volume to this setting when turned on. This setting is helpful in the event that a zone happened to be set to a volume lower than desired prior to the most recent power down.

Max

Set the zone power up volume Maximum. This setting can be adjusted so that a zone volume will not be higher than this setting after power up. This setting is helpful in the event that a zone happened to be set to a volume higher than desired prior to the most recent power down.

Configuration Basics

Single vs Multi-Chassis

The EL-IPD-MTX-8CH and EL-IPD-PRE-MSI chassis in the ELAN IP Amp family can be used in either **Single-Chassis Mode** or **Multi-Chassis Mode**. The EL-IPD-AMP-EXT and EL-IP-PRE-SSI can only operate in **Multi-Chassis** Mode.

Single-Chassis Mode

Uses the default network card that comes with the unit. With this configuration, the chassis is operating stand-alone. This means it cannot send or receive audio streams from other devices. It must still be controlled via ELAN.

Multi-Chassis Mode

To use **Multi-Chassis Mode** with the EL-IPD-MTX-8CH and EL-IPD-PRE-MSI chassis, you must add the EL-IPD-NAC-EXT Dante enabled network audio card. Before doing so, you must make sure the chassis uses the latest firmware. In **Multi-Chassis Mode**, the unit can send and receive audio streams over the network. Max limit = 64 zones.

Adding Chassis to the Configurator

Once you have the chassis connected to the network and powered on, it can now be added to the configurator. A second Chassis can be imported in the same manner. There are two methods available:

Discovery (AD/AC)

You can use the *Discovery Tab* to add an ELAN IP Amp: **Single-Chassis** or **Multi-Chassis**. In configurator, go to discovery and locate the device. Click **Install**. This method will determine if the device is for single or **Multi-Chassis** and will install the correct driver.

Installable Devic...			Driver	Name	
F8-57-2E-04-6D-... Core Brands, LLC		192.168.0.151	ELAN EL-IPD-PRE-MSI	EL-IPD-PRE-MSI	Install

Manually

Unlike the above method, you will have to select **Single** or **Multi-Chassis**. Go to Media/Zone Controllers, and select the correct driver. **Single-Chassis** if using the default network card (and thus are not sending or receiving streams) or **Multi-Chassis** if equipped with a EL-IPD-NAC-EXT network audio card.

Configuring IPD Devices

After the chassis have been added into configurator, we now have to configure some basic settings.

Setting a Static IP

An ELAN IP Amp chassis, in either mode (Single or Multi), should be set with a Static IP so that communication is more reliable (Not to be confused with a DHCP reservation).

There are two IP's: MCU (for control) and **Dante** (for sending and receiving audio streams). Both should be set to *Static*.

NOTE: The Subnet Mask, Gateway and DNS will be common for both.

Updating firmware

The ELAN IP Amp may need a firmware update. This process can take up to 15 minutes (do not power off during the process).

Any zones configured should be off and stay off during the update process. If an EL-IPD-MTX-8CH or EL-IPD-PRE-MSI, be sure to use the Network card that came with the unit – not the Dante card. If the unit is already installed as **Multi-Chassis**, power down, remove EL-IPD-NAC-EXT card, install factory NIC, then proceed to updating the chassis via the **Update Firmware** button.

Device name

Be sure to set a device name for the chassis when using **Multi-Chassis**. This name will be used in the device tree, as well as the zone configuration page. It is especially helpful when there are several chassis within the configuration.

Low Power Mode

The IPD-MTX-8CH & IPD-AMP-EXT chassis are shipped with *Low Power Mode* enabled. When added to the configurator, the option is disabled. When in *Low Power Mode*, the chassis must wake up before executing any command. Wake up takes about 20 seconds.

If you are using a doorbell, *Low Power Mode* must be disabled. If enabled, the sound of the doorbell will have passed by the time the zones turn on, as if it's not functioning.

Front LED's

The ELAN IP Amp chassis have two Front Panel LEDs. Review the chart below for the meaning of each LED color:

Condition	Amplifier Status	Power/Network Status
Power On, Booting	Off	Solid Blue
Self-Check Failure	Off	Flashing Red
Boot Failure	Solid Red	Solid Red
No Network Found	Off	Solid Amber
Power Off	Off	Off
Chassis in Low Power Mode	Solid Blue	Solid Blue
Chassis in Sleep Mode	Off	Solid Red
Amplifier or Preamplifier Channel Clipping	Solid Amber	Solid Blue
Amplifier Channel in Protection Mode	Solid Red	Solid Blue
Chassis Identify Mode	Flashing Amber	Flashing Blue

LED Flashing

Flashing the LED allows for unit identification. If you have multiple chassis, you may want to identify a specific unlabeled chassis. To do this, select **LED Flash**, and the two front LEDs will begin to blink. Once you have identified the chassis, select **LED Flash Stop**.

Multicast Option (if checked)

This option is found only on Multi-Chassis systems and on chassis that can send sources. Dante can send audio in one of two ways; *Unicast* or *Multicast*. Multicast (this option) is used on larger systems, expanding past the streaming limits of unicast or in systems which the residing network has IGMP enabled. This option **requires** specific networking gear and proper networking setup and planning.

Please refer to the **Advanced Multiple Chassis Configuration** section, starting on pg. 31.

WARNING: DO NOT SELECT THIS OPTION without the proper network gear and setup.

Multicast Option (unchecked)

In default (unchecked) the chassis will transmit via unicast mode, which is a simpler deployment. Transmitting sources in default mode (Unicast) requires only basic networking gear (as opposed to Multicast), setup and configuration but it is limited with regard to the amount of sources that can be streamed simultaneously.

Please refer to the **Multiple Chassis Configuration** section, starting on pg. 27.

EL-IP-PRE-SSI/SIO LED Brightness

This option is only found on the EL-IP-PRE-SSI/SIO device. For example, If the device will be behind a TV in a bedroom, the on-board LED can emit light in a dark room and may be advantageous to lower its brightness.

Resources

Please reference the Integration Notes, User guides, and videos. All of these documents can be found in the ELAN Management Cloud (Management Cloud).

Adding a Source

Add an analog or digital source. When adding an ELAN IP Amp to the configurator, the available sources will automatically be loaded and configured for default stereo use.

Analog

EL_IPD_MTX Source	
Type	Analog ▼
Mode	Stereo ▼
Inputs	MTX-8CH Rack : RCA 7 & 8 ▼
Input Level Gain	0 dB ▼

By default, Analog sources are added in *Stereo Mode*. However, they can be configured for mono use, which would free up an input to add another source.

Mode

Stereo (default Mode)

Connect the Left and Right channel of the source to the input. Then assign the source to that input within Configurator.

Mono (Optional Mode for MTX-8CH & PRE-MSI)

The benefit of using *Mono* is that it allows you to add another source using the orphaned RCA input. For example, an EL-IPD-MTX-8CH has four analog stereo source inputs. If set to *Mono*, expansion up to eight analog mono sources is available. Be certain to use a stereo to mono coupler. *Do not use a "Y" cable when using a mono input from a stereo source*.

Inputs

By default, the source assignments come predefined to the appropriate analog inputs in Left/Right pairs. If set to *Mono*, you will now have an orphaned RCA input. To add a new *Mono* source location for the unused RCA, right click on **Sources** and select **Add New Source**. Assign the new input to the orphaned RCA.

Input Level Gain

For Analog sources, *Stereo* or *Mono*, set the input gain for the particular source (+/-6 db).

Doorbell

The doorbell input is also *Analog*, but it does differ because it is *Stereo* only. It can be used as another source input (not only for a doorbell input if you were not using a doorbell).

Digital (Optical/Coaxial)

A *Digital* source input, *Optical* or *Coaxial*, can be used if the source is set for PCM (2ch) output. These are *Stereo Only* and do not have an input level adjustment.

EL-IPD-PRE-SSI/SIO (Multi-Chassis only)

Another option for an input is the use of a EL-IP-PRE-SSI, which can add an additional source (even those remotely located). The EL-IP-PRE-SSI allows for one source to be connected to the Multi-Chassis system. It can be *Coaxial*, *Optical* or *Analog* (stereo only) connection type. Set the Input Type Switch on the rear of the EL-IP-PRE-SSI to coincide with the connection type used. The EL-IP-PRE-SSI can send its source simultaneously to a maximum of two separate chassis in Unicast (default) Mode. If there is a need for more than two simultaneous chassis, multi-cast is needed.

» **DO NOT SELECT THIS without the proper multicast network gear and setup** (see in **Advanced Multiple Chassis Configuration**).

Zones

Configuring Zones

By default, zones come pre-configured for Stereo usage. However with an ELAN IP Amp chassis, the zones can be configured in a multitude of ways. A zone can consist of a single output (speaker or pre-amp) or multiple outputs (speaker, preamp or any combination of the two).

By allowing this level of customization, the ELAN IP Amp can truly be configured in a way that optimizes your audio project.

This means that the amount of zones per chassis is dependent on the zone configuration. For example, an EL-IPD-MTX-8CH can have each output set up as an independent zone. The eight speaker outputs (which are 4 ohm stable and able to handle summed-stereo) and four pre-outs add up to 12 independent zones versus the default of six zones (four pairs of speaker outputs and two pairs of pre-outputs).

NOTE: all zones outputs must be contained to a **Single-Chassis** and can not be across multiple chassis.

To configure the zones, begin by navigating to the Chassis, Zones and then Configuration:
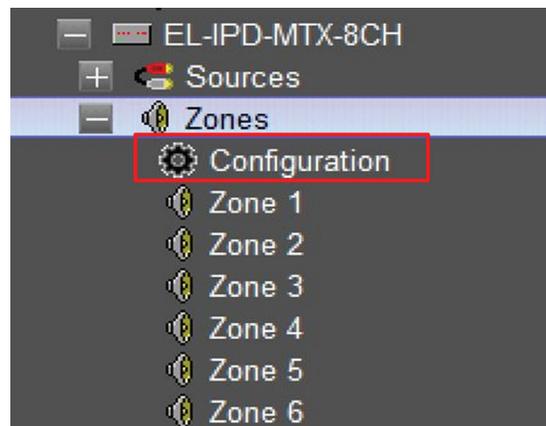
Output & Device (in Multi-Chassis)

Output	Zone	Type	Impedance	Line Level	Gain	Lip Sync Delay
Amp 1	Zone 1	Left	4 Ohms		0 dB	0 ms
Amp 2	Zone 1	Right	4 Ohms		0 dB	0 ms
Amp 3	Zone 2	Left	4 Ohms		0 dB	0 ms
Amp 4	Zone 2	Right	4 Ohms		0 dB	0 ms
Amp 5	Zone 3	Left	4 Ohms		0 dB	0 ms
Amp 6	Zone 3	Right	4 Ohms		0 dB	0 ms
Amp 7	Zone 4	Left	4 Ohms		0 dB	0 ms
Amp 8	Zone 4	Right	4 Ohms		0 dB	0 ms
Pre-amp 1	Zone 1	Subwoofer		Variable	0 dB	0 ms
Pre-amp 2	Zone 6	Mono		Variable	0 dB	0 ms
Pre-amp 3	Zone 5	Mono		Variable	0 dB	0 ms
Pre-amp 4	Zone 6	Right		Variable	0 dB	0 ms

This is read only information that indicates which chassis and which output(s) are being configured. You can select multiple rows to configure multiple outputs of the same zone by using **Shift/Ctrl**.

Zone

Assign a Zone to an Output.

Output	Zone	Type	Impedance	Line Level	Gain	Lip Sync Delay
Amp 1	Zone 1	Left	4 Ohms		0 dB	0 ms
Amp 2	Zone 1	Right	4 Ohms		0 dB	0 ms
Amp 3	Zone 2	Left	4 Ohms		0 dB	0 ms
Amp 4	Zone 2	Right	4 Ohms		0 dB	0 ms
Amp 5	Zone 3	Left	4 Ohms		0 dB	0 ms
Amp 6	Zone 3	Right	4 Ohms		0 dB	0 ms
Amp 7	Zone 4	Left	4 Ohms		0 dB	0 ms
Amp 8	Zone 4	Right	4 Ohms		0 dB	0 ms
Pre-amp 1	Zone 1	Subwoofer		Variable	0 dB	0 ms
Pre-amp 2	Zone 6	Mono		Variable	0 dB	0 ms
Pre-amp 3	Zone 5	Mono		Variable	0 dB	0 ms
Pre-amp 4	Zone 6	Right		Variable	0 dB	0 ms

Zone Output configuration (use shift/ctrl keys for multi-select)

Add a new zone or rename an existing zone. By default, zones are included in a common Stereo format. To modify a zone, right click on the output(s) and select one of the options. For the EL-IPD-MTX-8CH and EL-IPD-PRE-MSI, each output can be defined as its own zone, or up to 12 zones. The EL-IPD-AMP-EXT can be configured for up to eight zones (any combination).

Type

Set the Output type. Options include *Left*, *Right*, *Mono* (blended stereo) or *Subwoofer*.

Output	Zone	Type	Impedance	Line Level	Gain	Lip Sync Delay
Amp 1	Zone 1	Left	4 Ohms		0 dB	0 ms
Amp 2	Zone 1	Right	4 Ohms		0 dB	0 ms
Amp 3	Zone 2	Left	4 Ohms		0 dB	0 ms
Amp 4	Zone 2	Right	4 Ohms		0 dB	0 ms
Amp 5	Zone 3	Left	4 Ohms		0 dB	0 ms
Amp 6	Zone 3	Right	4 Ohms		0 dB	0 ms
Amp 7	Zone 4	Left	4 Ohms		0 dB	0 ms
Amp 8	Zone 4	Right	4 Ohms		0 dB	0 ms
Pre-amp 1	Zone 1	Subwoofer		Variable	0 dB	0 ms
Pre-amp 2	Zone 6	Mono		Variable	0 dB	0 ms
Pre-amp 3	Zone 5	Mono		Variable	0 dB	0 ms
Pre-amp 4	Zone 6	Right		Variable	0 dB	0 ms

Zone Output configuration (use shift/ctrl keys for multi-select)

Left/Right: Set an output to the Left or Right channel in a Stereo zone setting.

Mono (also known as summed stereo): Stereo audio requires a dedicated listening position for your ears to discern the left and right channels which is often lost with distributed audio. But now each area can be designed and set appropriately. In an area with a TV, the couch is typically the primary listening position and would be better suited in stereo.

A kitchen without a dedicated listening position and steady movement would better be served in Mono. This can be accomplished with a single output zone, increasing your zone outputs as well as speakers per output.

Subwoofer: As seen in the image, an output can be set to *Subwoofer*. This setting changes the crossover for the output specific for subwoofer use at 100Hz (only on pre-outputs).

Impedance

4 (Default) or 8 ohm.

Output	Zone	Type	Impedance	Line Level	Gain	Lip Sync Delay
Amp 1	Zone 1	Left	4 Ohms		0 dB	0 ms
Amp 2	Zone 1	Right	4 Ohms		0 dB	0 ms
Amp 3	Zone 2	Left	4 Ohms		0 dB	0 ms
Amp 4	Zone 2	Right	4 Ohms		0 dB	0 ms
Amp 5	Zone 3	Left	4 Ohms		0 dB	0 ms
Amp 6	Zone 3	Right	4 Ohms		0 dB	0 ms
Amp 7	Zone 4	Left	4 Ohms		0 dB	0 ms
Amp 8	Zone 4	Right	4 Ohms		0 dB	0 ms
Pre-amp 1	Zone 1	Subwoofer		Variable	0 dB	0 ms
Pre-amp 2	Zone 6	Mono		Variable	0 dB	0 ms
Pre-amp 3	Zone 5	Mono		Variable	0 dB	0 ms
Pre-amp 4	Zone 6	Right		Variable	0 dB	0 ms

Zone Output configuration (use shift/ctrl keys for multi-select)

The ELAN IP Amp is a 4 ohm stable amplifier. You can confidently connect a 4 ohm load to any number of speaker outputs. By default, this option is set to 4 (not 8). It's set this way, because in the unlikely even that a 4 ohm speaker/load was connected to the output on 8 ohm, it would render the amp's output higher than the stated 80 WPC (@ 8ohm). This could potentially deliver too much power to the speaker (if its maximum happen to be 80wpc in 8 ohm).

If you connected an 8 ohm load while it was set to 4, the only negative aspect would be a slightly lower output volume with no potential damage to any connected speakers.

Line Level

Fixed or *Variable* (Default). Use this to set a pre-amp's output to Fixed or Variable.

Zone Output configuration (use shift/ctrl keys for multi-select)

Output	Zone	Type	Impedance	Line Level	Gain	Lip Sync Delay
Amp 1	Zone 1	Left	4 Ohms		0 dB	0 ms
Amp 2	Zone 1	Right	4 Ohms		0 dB	0 ms
Amp 3	Zone 2	Left	4 Ohms		0 dB	0 ms
Amp 4	Zone 2	Right	4 Ohms		0 dB	0 ms
Amp 5	Zone 3	Left	4 Ohms		0 dB	0 ms
Amp 6	Zone 3	Right	4 Ohms		0 dB	0 ms
Amp 7	Zone 4	Left	4 Ohms		0 dB	0 ms
Amp 8	Zone 4	Right	4 Ohms		0 dB	0 ms
Pre-amp 1	Zone 1	Subwoofer		Variable	0 dB	0 ms
Pre-amp 2	Zone 6	Mono		Variable	0 dB	0 ms
Pre-amp 3	Zone 5	Mono		Variable	0 dB	0 ms
Pre-amp 4	Zone 6	Right		Variable	0 dB	0 ms

Gain +/-12db

This setting is useful for balancing an output to tailor to a room or other outputs.

Zone Output configuration (use shift/ctrl keys for multi-select)

Output	Zone	Type	Impedance	Line Level	Gain	Lip Sync Delay
Amp 1	Zone 1	Left	4 Ohms		0 dB	0 ms
Amp 2	Zone 1	Right	4 Ohms		0 dB	0 ms
Amp 3	Zone 2	Left	4 Ohms		0 dB	0 ms
Amp 4	Zone 2	Right	4 Ohms		0 dB	0 ms
Amp 5	Zone 3	Left	4 Ohms		0 dB	0 ms
Amp 6	Zone 3	Right	4 Ohms		0 dB	0 ms
Amp 7	Zone 4	Left	4 Ohms		0 dB	0 ms
Amp 8	Zone 4	Right	4 Ohms		0 dB	0 ms
Pre-amp 1	Zone 1	Subwoofer		Variable	0 dB	0 ms
Pre-amp 2	Zone 6	Mono		Variable	0 dB	0 ms
Pre-amp 3	Zone 5	Mono		Variable	0 dB	0 ms
Pre-amp 4	Zone 6	Right		Variable	0 dB	0 ms

Lip Sync 0-400ms.

Set an Output Delay.

Zone Output configuration (use shift/ctrl keys for multi-select)

Output	Zone	Type	Impedance	Line Level	Gain	Lip Sync Delay
Amp 1	Zone 1	Left	4 Ohms		0 dB	0 ms
Amp 2	Zone 1	Right	4 Ohms		0 dB	0 ms
Amp 3	Zone 2	Left	4 Ohms		0 dB	0 ms
Amp 4	Zone 2	Right	4 Ohms		0 dB	0 ms
Amp 5	Zone 3	Left	4 Ohms		0 dB	0 ms
Amp 6	Zone 3	Right	4 Ohms		0 dB	0 ms
Amp 7	Zone 4	Left	4 Ohms		0 dB	0 ms
Amp 8	Zone 4	Right	4 Ohms		0 dB	0 ms
Pre-amp 1	Zone 1	Subwoofer		Variable	0 dB	0 ms
Pre-amp 2	Zone 6	Mono		Variable	0 dB	0 ms
Pre-amp 3	Zone 5	Mono		Variable	0 dB	0 ms
Pre-amp 4	Zone 6	Right		Variable	0 dB	0 ms

It is useful for syncing a TV's sound to the video, especially when also sending video over a balun or matrix. It can also be used to sync two zones where a common listening position favors one of the zones and the zones are far enough apart causing a slight echo effect in the listening position. This is more common with outdoor zones.

Maximizing Zones

Speaker Configuration

When considering the number of zones and speakers needed, keep in mind that a zone is not a speaker and a speaker is not a zone. Zones can consist of one speaker output, multiple speaker outputs, preamp outputs or a combination of speaker and preamp outputs. Distributed audio is rarely used where stereo separation is needed, other than a media zone where there is a defined listening area.

Tips:

- When connecting two 8Ω speakers to a single speaker output, the impedance will drop to 4Ω. Be certain to set this correctly in Configurator.

- To maximize the number of zones, consider using a single speaker in bathrooms or other small rooms, or use two speakers connected to one speaker output in Mono.

- Use a preamp output to add a subwoofer to any zone.

Single Output

| Zone 1 | Zone 2 | Zone 3 | Zone 4 | Zone 5 | Zone 6 | Zone 7 | Zone 8 |
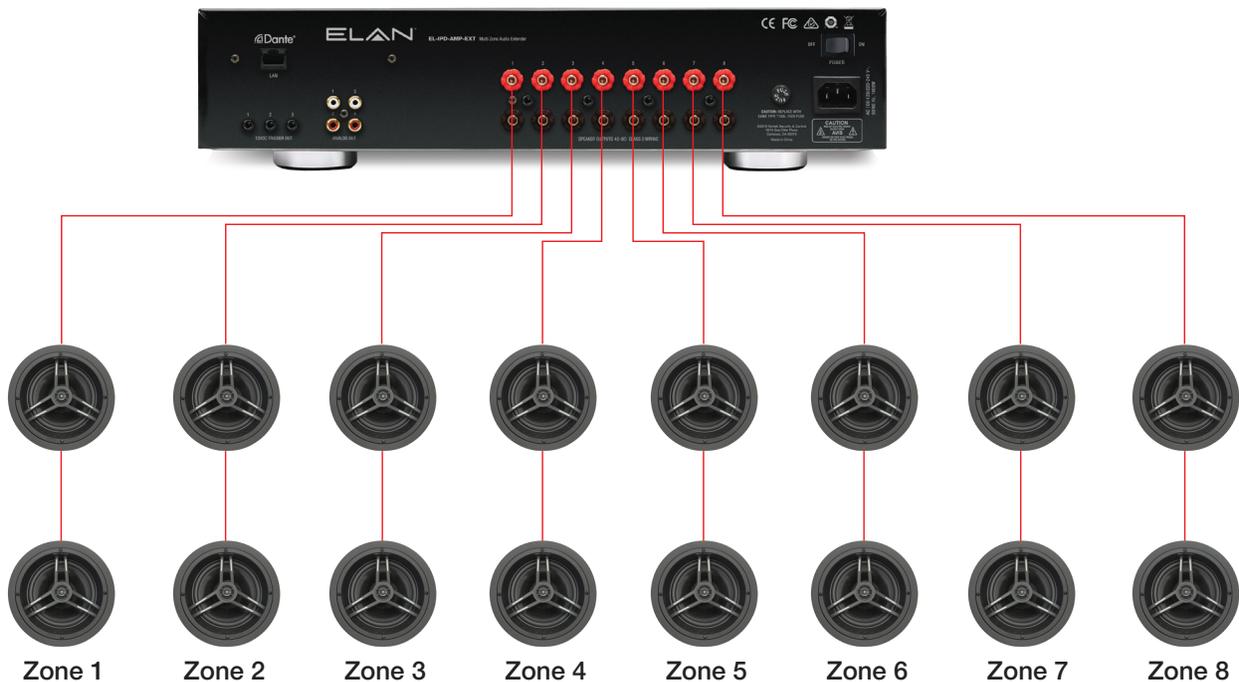
A single output (Speaker or Pre-Amp) can be used as a zone. A single output, when set to Mono, will blend the left and right channels together for a blended stereo output.

Typical use cases: Kitchen, Outdoor audio, single speaker zone (bathroom, laundry room or hallways) and other common areas with no listening position.

Sometimes a zone's main purpose is not for audio. Hearing the doorbell or an audio page equally can be considered more desirable in some areas that are not chosen for audio, thus adding more zones and more speakers to a project.

Stereo Output (Default)

Zone 1   Zone 2   Zone 3   Zone 4

Multiple output

Zone 1   Zone 3

Zone 2   Zone 4   Zone 5   Zone 6
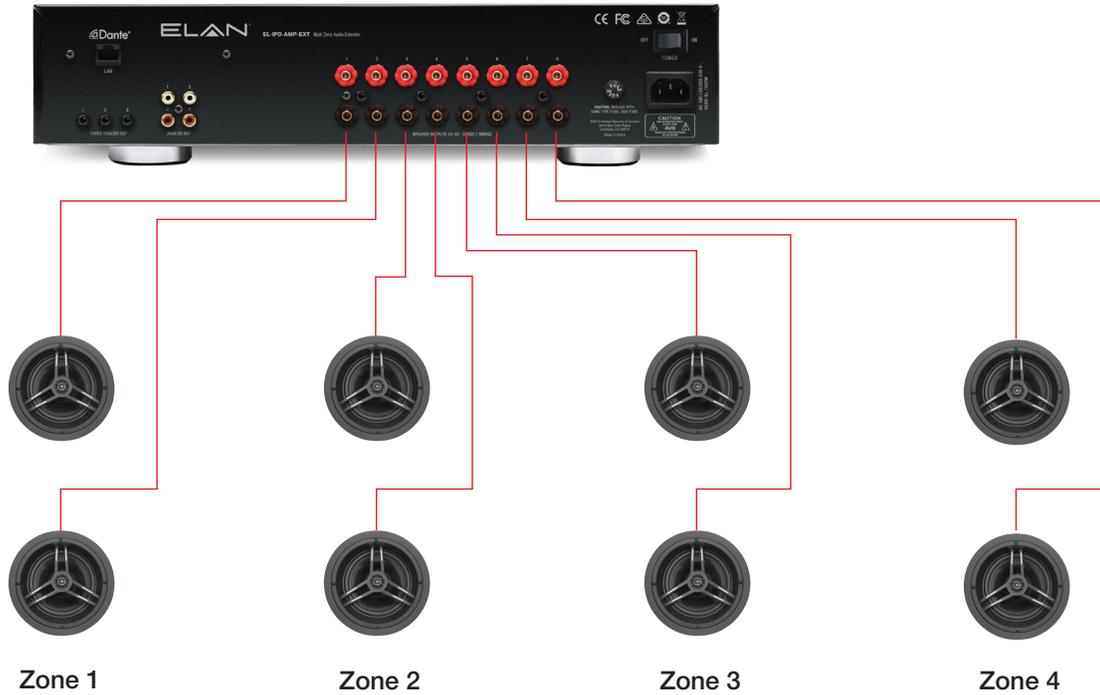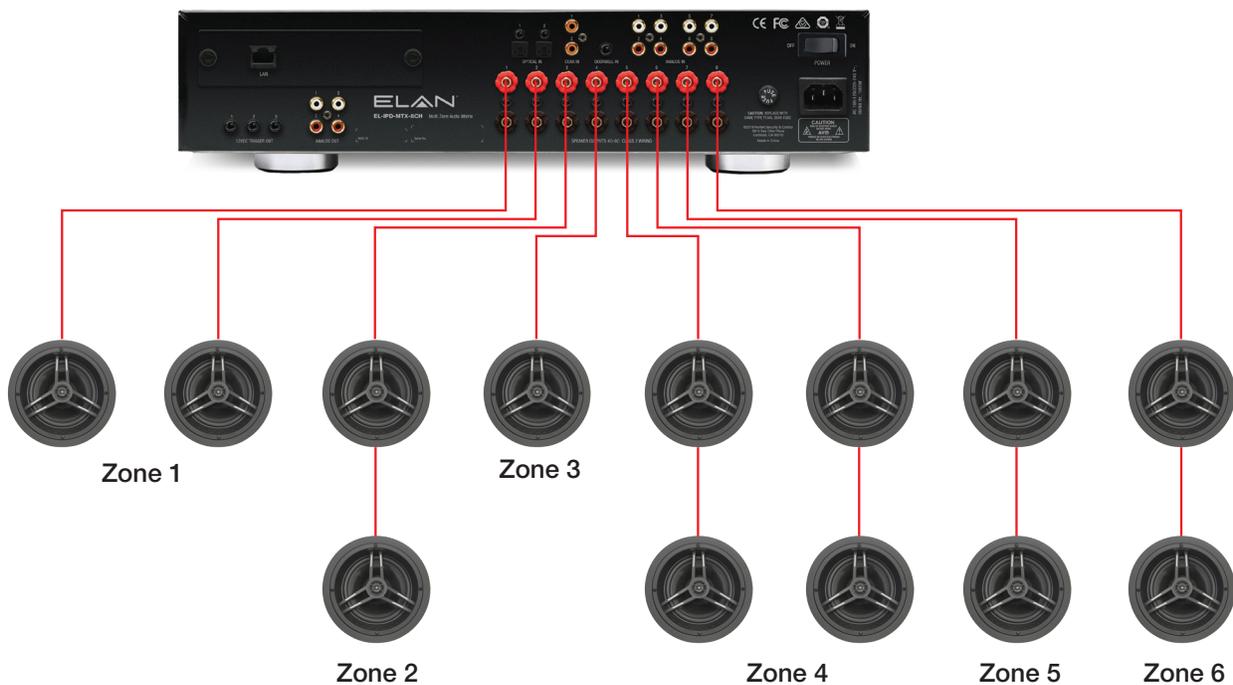
Pre-Out Configuration

The ELAN IP Amp pre-outs are configurable just like the speaker outputs. They can be used in conjunction with a zone that has speaker outputs or can be used as a separate zone. They can be set to a *Fixed* or *Variable* output as well. Common uses include:

Pre-out zone / 70 volt / AVR

If we set the output to its own zone with the pre-outs set to variable, we will be able to control the volume because the pre-outs are feeding an external amplifier. We can also set the output(s) to *Fixed*. It can also be used as a single output, such as the speaker outputs or with two for Stereo or any combination.

OR

Sub output

Using a pre-out for a sub is also common. This can be done easily by setting the output to the zone it will join. Typically, you will set this to be a *Variable* output. The gain adjustment is useful for setting the bass level after the sub has been positioned. When sent to Sub, the crossover frequency is set to 100Hz.

Multiple Chassis Configuration – Dante Default (Unicast)

The default Multi-Chassis operating mode is set to use Unicast streaming. This requires much less network configuration and lower equipment requirements, but it comes with a lower limitation for sending streams. This configuration can support an average of four chassis. Of course, design and application play a large part.

Unicast Overview

When a chassis requests a non-internal source (all sources for the EL-IPD-AMP-EXT), it requests the source from the hosting chassis. If the hosting chassis has an available transmit stream, it will then send the source to the chassis using one of the available streams.

The chassis can then internally distribute the source as needed. For instance, if the chassis has four internal zones (with two requesting the same source). The source is sent to that chassis once, therefore using one of its available streams (not two).

If another chassis requests the same source, that source is sent again to the new chassis using another stream for the same source. Each source can use more than one stream, depending on its use. As a system gets larger, it's much more efficient to send audio via Multi-cast.

Chassis Unicast sending capabilities:

- » EL-IPD-MTX-8CH – 6 stereo streams
- » EL-IPD-PRE-MSI – 8 stereo streams
- » EL-IPD-PRE-SSI/SIO – 2 stereo streams

Example 1: Sending the same source to 2 different chassis

In this example, we show that sending the same source to two different chassis counts as separate streams.
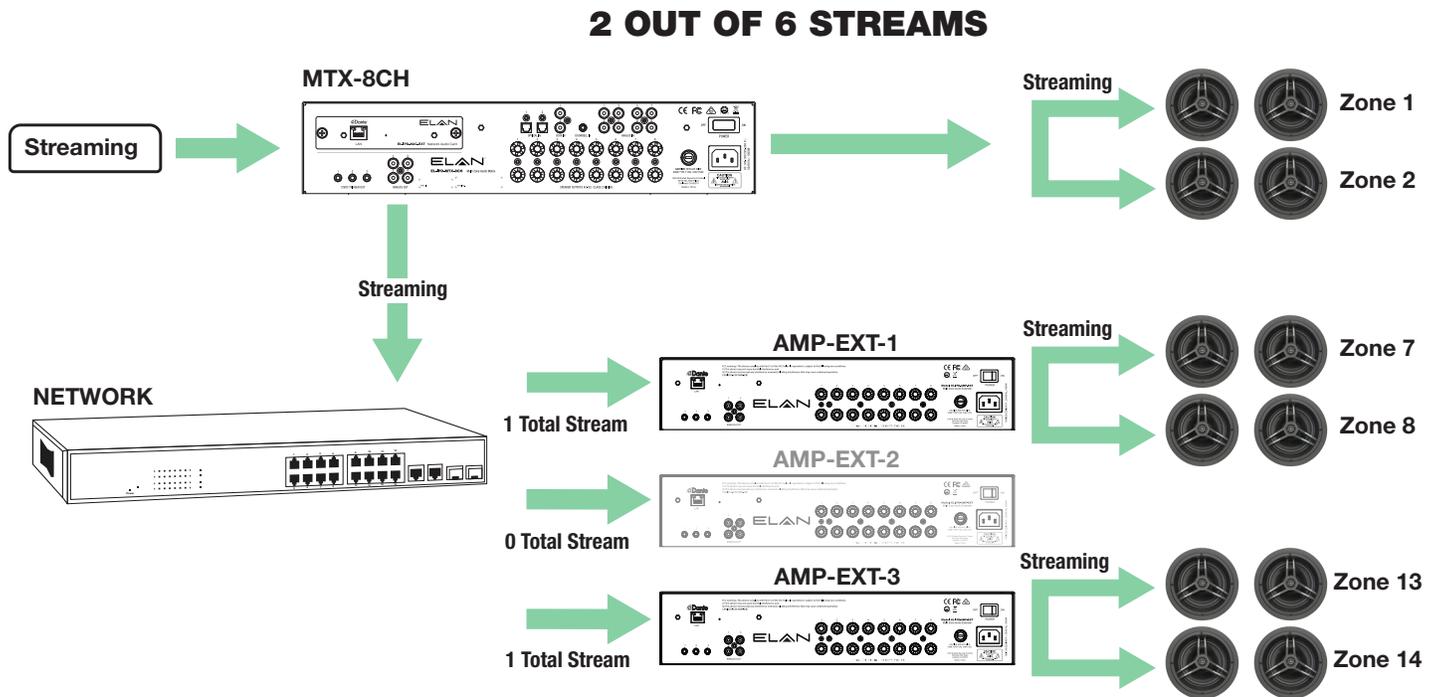
In this example, the **Source 1 (Streaming)** is sent to each *chassis* that requested audio.

Example 2: Sending Multiple Sources

In this example, the limit of available streams has been reached.

6 OUT OF 6 STREAMS

Source 1
Apple TV

Source 2
Cable

Source 3
Streaming

MTX-8CH

AMP-EXT-1

2 Total Streams

Cable   Apple TV   Streaming

Network

2 Total Streams   AMP-EXT-2

AMP-EXT-3

2 Total Streams

Streaming — Zone 1
— Zone 2
Apple TV — Zone 3
— Zone 4
Apple TV — Zone 5
— Zone 6
Apple TV — Zone 7
Cable — Zone 8
Cable — Zone 9
— Zone 10
Streaming — Zone 11
Streaming — Zone 12
Cable — Zone 13
— Zone 14
Apple TV — Zone 15
Apple TV — Zone 16

By adding multiple sources we can see how the stream limits are affected, in this case we max out at 6

Example 3: Streaming Past the Limits

In this example, displayed is an extreme case of the amount of streams each chassis would require.

WARNING: This example will <u>NOT</u> work. Refer to the resolution displayed on the next page.

12 OUT OF 6 STREAMS

By scaling up the sources and distributions, we can now see how streams are affected.

32
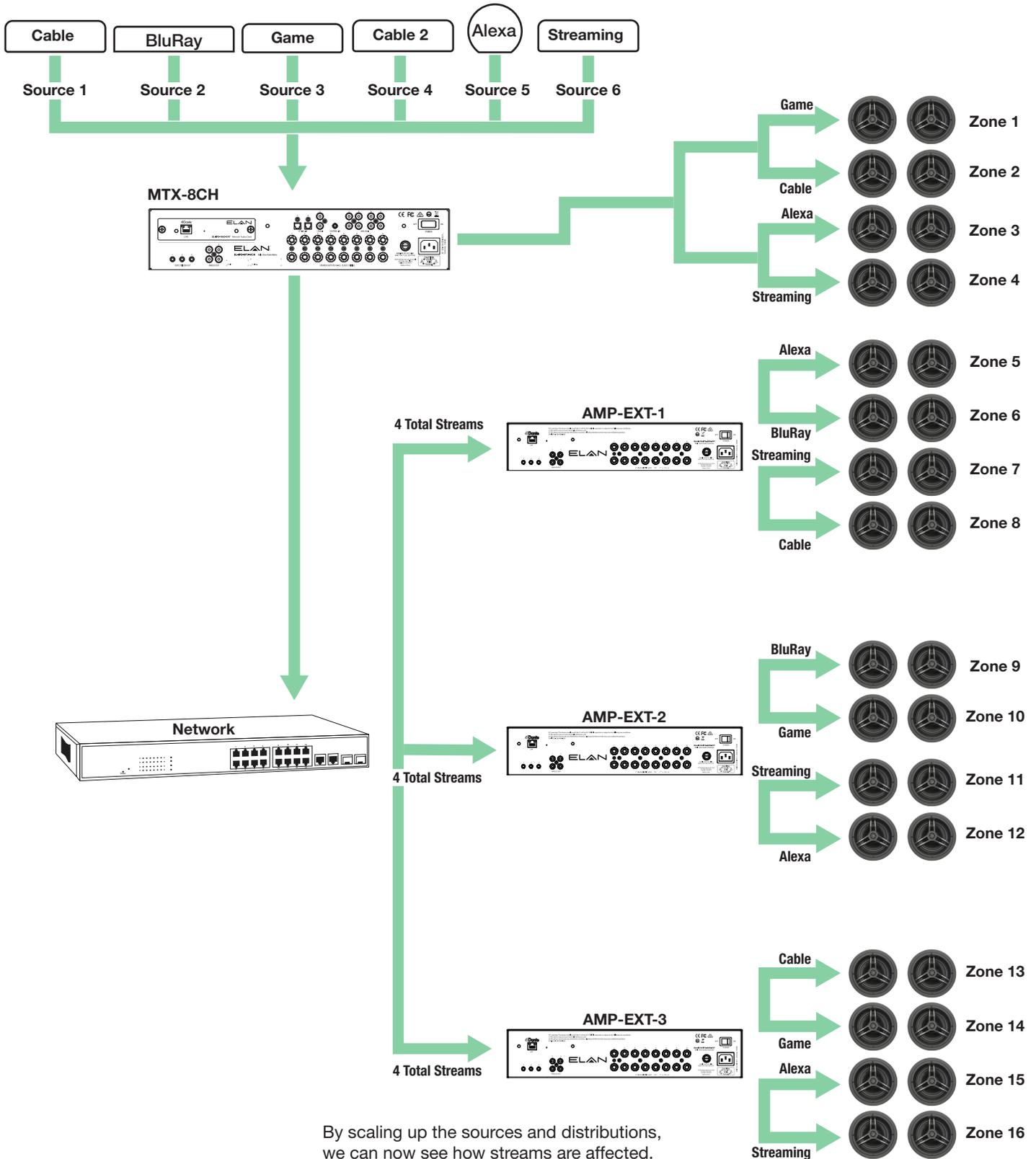
Example 4: Designing Around the Limits

Adding an EL-IPD-MTX-8CH or EL-IPD-PRE-MSI to increase the streaming ability

In this example, we swap an EXT-3 for an MTX to gain more source streams. We can now achieve the desired result.

6 OUT OF 6 STREAMS

Here we can see how design can affect the results and in this case, replacing an EXT for an MTX made the previous scenario possible.

Another resolution option would be to go to Multicast (see page 31)

6 OUT OF 6 STREAMS
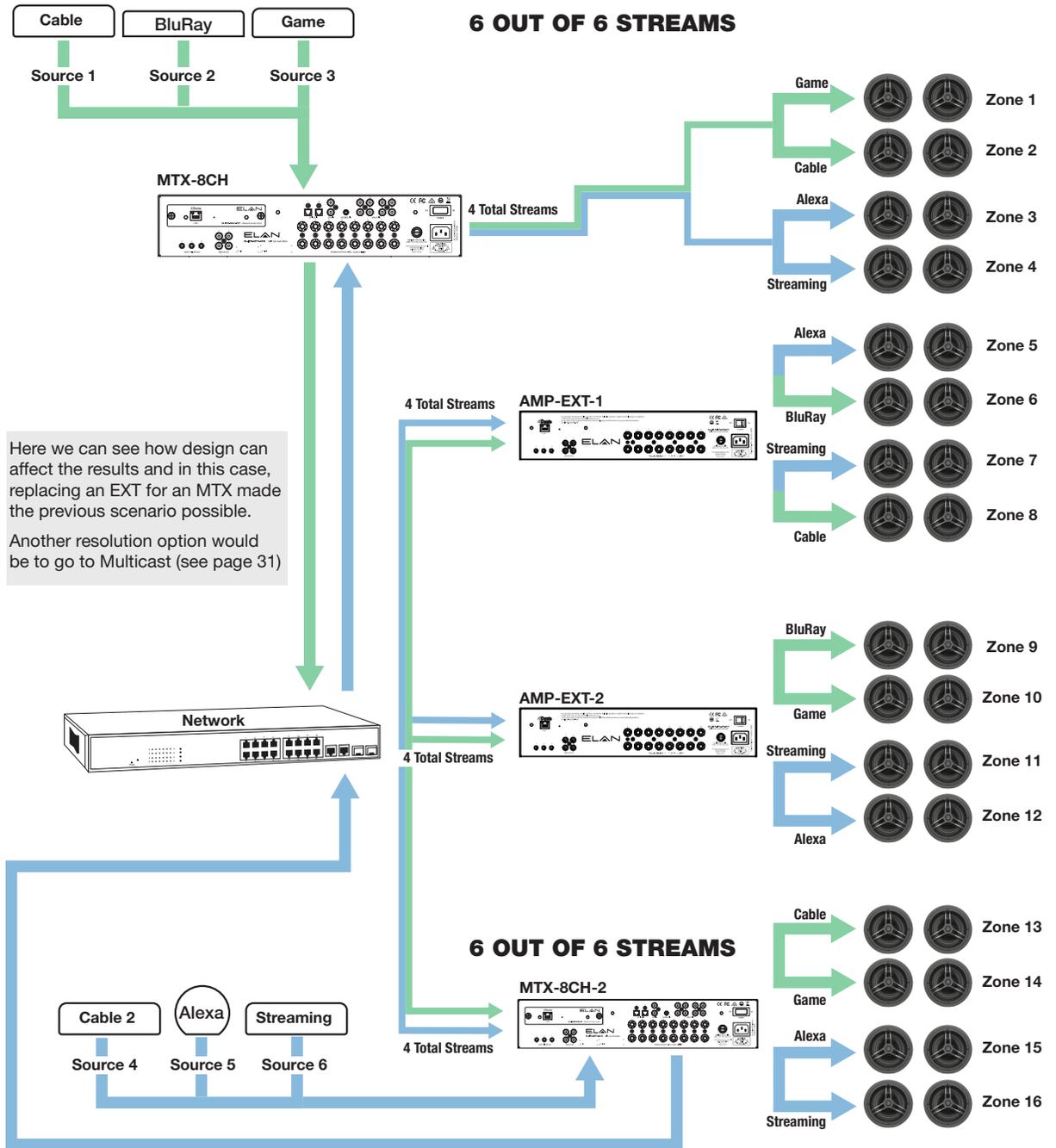
Unicast network settings:

- » Disable Green Ethernet, if applicable
- » Do not use a EEE switch
- » 10/1000 (gigabit) network switch

Common Mistakes:

- » Having Multicast devices, most notably video over IP, on the same switch/subnet as an ELAN IP audio chassis running in unicast.
- » Cascading switches degrading network performance - see Best Practices.
- » Hitting/exceeding the stream limits. When in Unicast (default) mode, be certain to plan the design before deployment.

Advanced Multiple Chassis Configuration – Dante Multicast

Multicast Overview

Similar to how VIP operates, each source can be sent to multiple endpoints using only one of the available streams. This is much more efficient. It is unlike Unicast, which needs to send the same stream to each chassis separately using another stream and increasing network traffic. However, Multicast does require specific networking gear that can handle the necessary configuration (limit of 64 zones).

Multicast is needed on larger systems because it can handle 5+ chassis, as opposed to the four in which Unicast is suited (design dependent). If you have an eight chassis **Multi-Chassis** system and would like to simultaneously send the same three sources to each chassis, three streams will be used. With Unicast, this would require 21 streams, therefore it could not be accomplished. This is also known as *Fanout*.

Hardware requirements:

» Layer 2/3 switches for all connected IPD devices

Chassis Multicast Sending Capabilities:

» EL-IPD-MTX-8CH – 12 stereo streams

» EL-IPD-PRE-MSI – 16 stereo streams

» EL-IPD-PRE-SSI/SIO – 4 stereo streams

Example 1: One source sent across 3 extender chassis'

In this example, one source can be sent to all necessary chassis and only uses one available stream. The Unicast counterpart, although much easier/quicker to deploy, would use three of the available streams.

1 OUT OF 12 STREAMS
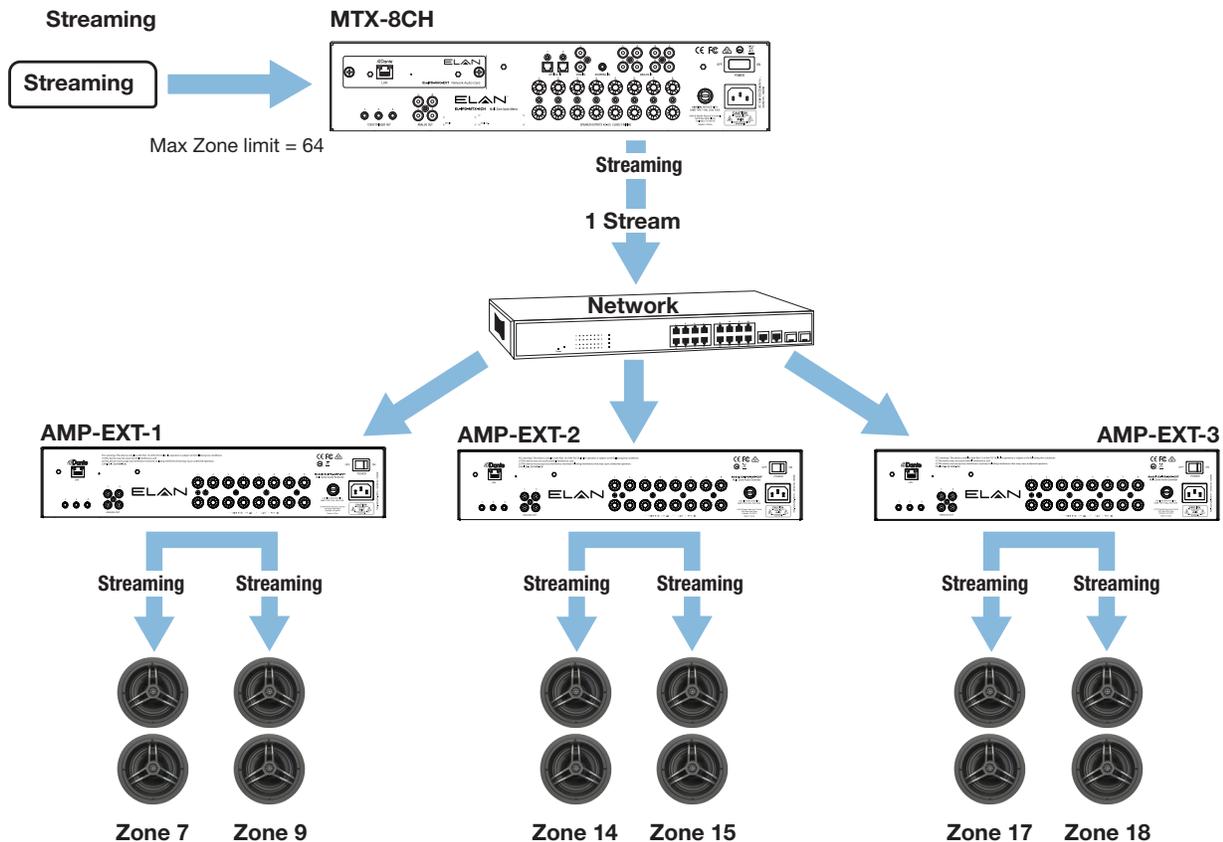
In this example, we send Streaming to three AMP-EXT chassis. In Unicast, this would require three streams to accomplish. But in Multicast, each source only takes one stream, no matter how many chassis receive.

Example 2: Eight sources across 9 extender chassis'

In this example, we can see that this is easily possible using Multi-cast. If in Unicast, this would require more than 40 streams and would inhibit network bandwidth.

8 OUT OF 12 STREAMS
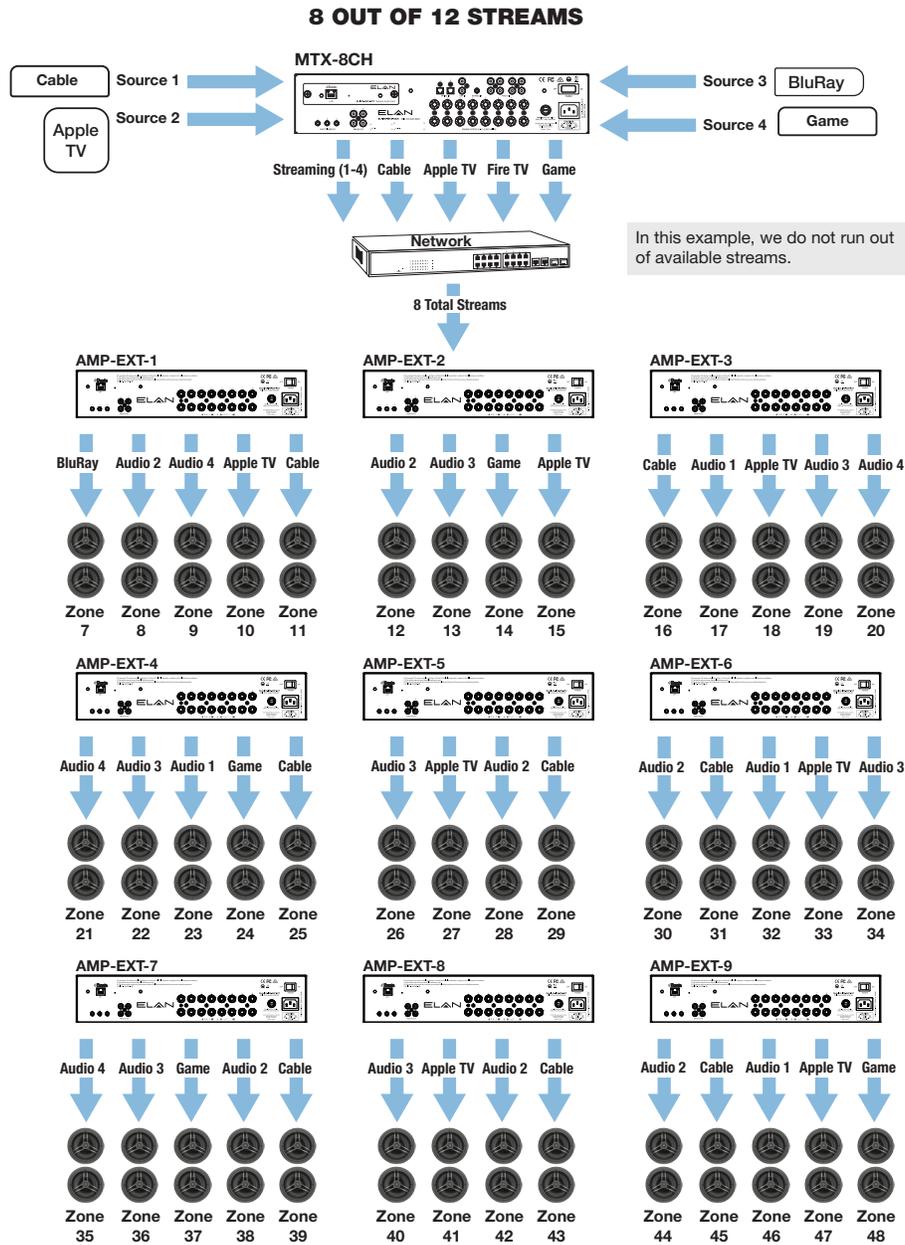
NOTE: You can see Multicast is a better way to distribute the source streams but does require network gear that are able to handle multicast traffic as well as network configuration.

Multicast Settings:

Required on **all** switches/ports across the network with an **ELAN IP Amp** plugged in.

  » IGMP Snooping On

  » Unregistered Flooding On & Fast Leave On

  » Querier set to the root switches IP(same IP used for all switches querier)

If using a single switch network or stacked switches, set the querier to its address. If using multiple switches, chose a master switch and set them all to this address. In this configuration an access point must be placed on a separate switch.

  » Fast Leave On

  » QoS DSCP Setup

35

Networking Details

In this section, we will list information and specifics on network switch brands, as well as a sample of Luxul's Multicast settings.

Ubiquity

- For Multicast deployments, only the USW-EnterpriseXG and USW-Pro series support multicast.

- In Multicast, the slider needs to be put down to 1Mbs and beacon sending enabled for 802.11 devices to work properly.
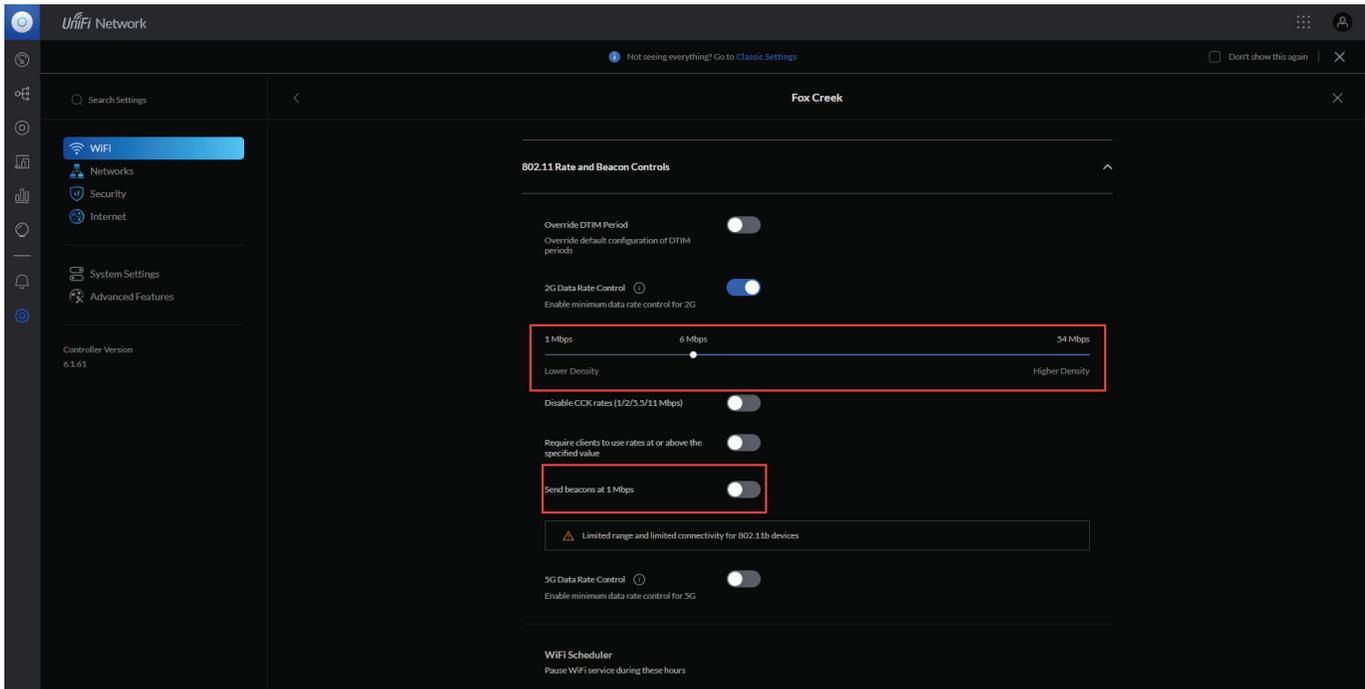
Araknis

- For Multicast Deployments, the DSCP should b set up in this manner:

  » Set **DSCP 8** to **Queue 3**. This is for low priority "reserved" usage.
  » Set **DSCP 46** to **Queue 7**. This is for medium priority Audio traffic.
  » Set **DSCP 56** to **Queue 8**.

Luxul

- For multicast deployments, use the required SW-610 or 510 series switches.

- Luxul fw V1.0.3 (or higher) is required to set up a multicast deployment.

- Be sure to set "Unregistered IPMCv4 Flooding" to *Disabled* on ports that are not connected to an IPD product.

Multicast Switch Setup Example

This must be set in each switch. Setup in a stacked configuration as well, because some settings are not carried over. There are 5 steps in the process (see Steps 1 through 5, pages <u>37-39</u>).

Step 1: IGMP Configuration

» Check Snooping Enabled

» Check Unregistered IPMCv4 Flooding enabled

» Be sure Proxy Enabled is checked

» Check fast Leave on all ports

» Click Save

Step 2: IGMP VLAN Configuration

» Click **Add New IGMP VLAN** if no VLAN table is created.

» Check **Snooping Enabled**.

» Check **Querier Election**.

» Set Querier Address

1. In a single switch setup or Stacked switches:

   » This can be set to 0.0.0.0, or the IP address of the unit(s) (If stacked, they all use the same IP address).

2. In a multi switch setup, select one switch as the main, often the closest to the rack, then set the this switches IP address as the querier address in all the other connected switches.

   » Change *Compatibility* to **Forced IGMPv2**.

   » Set QI to **30** seconds.

QoS Configuration:

QoS, Quality of Service, is a way to prioritize different types of network traffic. There are several methods for optimizing traffic flow. Dante uses Diffserv, otherwise known as DSCP.

DSCP has 64 different types of data to prioritize, and Dante uses four of them:

   » # 56 is given to PTP data (Precision timing Protocol) – Needs Highest priority

   » # 46 is given to Audio data – Needs High Priority

   » # 8 is giving to other Dante data, such as control and monitoring – Needs medium priority.

   » All other values have low priorities.

If QoS is not implemented, you will get sporadic network flow depending on audio streams. You may also experience Wi-Fi instability as well as audio dropouts, because the audio sent is timed. If the timing drifts past the latency of 2ms due to network congestion, it will pause the sending process.

Step 3: Navigate Port Classification

   » Check the box for DSCP based. Checking the top Box will automatically enroll all the ports.

   » Save the configuration.

Step 4: Navigate to DSCP-Based Qos

Change the Qos Class for the DSCP values as shown:

DSCP	QoS Class	Description
0 (BE)	0	All other data
8 (CS1)	5	Control Data
46 (EF)	6	Audio data
56 (CS7)	7	Precision Timing Protocol

» Click Trust on all

» Click save at the bottom

Step 5: Save the Startup Configuration

If the Startup Configuration isn't saved, settings will be lost and Wi-Fi will be lost when the switch restarts (as a lot are scheduled to weekly).

Common Issues

Wi-Fi issues

When a Wi-Fi access point is connected to the same switch as an ELAN IP Amp in Multicast mode, network routing can flood the Wi-Fi and degrade the performance of the link if the hardware and/or network settings are not adhered to. You may be experiencing this condition if you are experiencing loss of the Wi-Fi signal. There are two ways to resolve this issue:

Option #1: Set the network to handle the multicast traffic appropriately.

- Temporarily power down any ELAN IP Amps and EL-IPD-PRE-SSI/SIO.

- With the network congestion removed, you can now make the network settings changes.

- Follow the correct network switch settings for Multicast use on all switches.

  » Follow the correct network switch settings for multicast use on all switches in the project.
  » After the changes have been completed, you can power on the IPD devices.

Option #2: Factory default the IPD chassis (only applicable with no EL-IPD-PRE-SSI/SIO's set to Multicast)

This method is used when non appropriate network gear is used and thus not able to run multicast.

- Press and hold the micro reset button (on the Dante card, or next to the Ethernet connection) until a click is heard (~ 30 seconds). This will reset the chassis back to factory condition.

IMPORTANT: While the chassis is rebooting and before writing down the chassis configuration, uncheck the Multicast box.

- The chassis will need to be written to from the configurator after it comes back online to sync it with the zone settings.

- Make any changes necessary to the network before re-enabling Multicast mode.

Common Multicast issues:

  » **No/intermittent Wi-Fi**: incorrect switch setting or non-compatible hardware
  » **Improper multicast network setup**: IGMP & QoS. See above for Luxul specific settings.
  » **Incorrect network hardware**: To use multicast, the network must be able to handle IGMP and QoS which is found on layer 2/3 switches.
  » **Poor network infrastructure**: Poor cascading, ends, cables

EXAMPLE: An EL-IP-PRE-SSI, for example, is often connected to a small switch located behind the TV which is not layer 2/3. If the connected EL-IP-PRE-SSI is in Multicast mode as the switch cannot handle the traffic and as such will cause flood the switch as well as any other devices connected to that switch. Use a layer 2/3 switch or run another wire for the EL-IPD-PRE-SSI/SIO.

Best Practices

Network setup and deployment: (Unicast and Multicast)

Networking can play a large part in installations, especially as they expand. For proper deployment and system expectations, below are a few of the best practices when designing/deploying a Dante setup. As Dante is sending timed audio through the network, the network must be able to handle that Bandwidth, Routing and the Packet Timing appropriately.

Use Gigabit switches

Each stream can use 6-10 Mb. You can only use 60% of the available space on the port:

- » A 10/100 port can support 6 streams before overwhelming the port.
- » A 10/1000 port can support the full amount of supported streams.

Do not connect an ELAN IP Amp device directly to the router, except in stand alone mode

- » Often, especially ISP provided, a router does not have the ability to route the traffic for Dante appropriately.

If possible, connect all ELAN IP Amp devices to the same switch

- » Best approach, most reliable.
- » This will keep the audio traffic internal to just that switch.
- » Will prevent the degradation that occurs from cascading via copper.

Cascading Switches

- » A Gigabit Cat-6 copper link can handle 800-950MB average.
- » If that switch is also handling Wi-Fi or streaming, it can run out of bandwidth pretty fast.
- » Best approach – fiber link switches if possible.
- » Alternate – Can multi-link a switch via copper if the switch can perform this function. Do not cascade with a single CAT-5E.

Do not use an EEE switch, and be sure green Ethernet is disabled on class 2/3 switches

- » EEE and green Ethernet is not supported by Dante and will not operate correctly. On some layer one switches, it is not possible to turn this off so make sure that the switch is compatible first.

Firmware updating

- » Use the pre-installed NIC card on the EL-IPD-MTX-8CH & EL-IPD-PRE-MSI unit. The firmware can take 15 minutes to install. The chassis will click and go solid blue when complete.
- » Be certain all zones are off before commissioning an update.
- » Do not disturb the chassis after you start the update.

Plan the zone outputs to best suit you needs

- » Now that you have an understanding of the audio streams, you can in some cases reduce the streams by designing the zone layout differently.
- » In most cases, you won't be sending every audio source to every chassis simultaneously. You can potentially design around creating fewer streams to gain a larger footprint in Unicast mode.
- » A Zone outputs must be contained to a **Single-Chassis** and can not be set to go across multiple chassis. For instance, A Zone can have any outputs available on a **Single-Chassis** but cannot use 2 speaker outputs from chassis number 1, and two more from chassis number 2.

Plan EL-IPD-PRE-SSI/SIO use appropriately

- » In Unicast, the EL-IPD-PRE-SSI is limited to sending two simultaneous output streams. If you want to stay in Unicast, plan the use appropriately.

Unicast

NOTE: Can run in Unicast even if the other chassis' are running Multicast.

Unicast

Multicast

Configure PRE-SSI Device ✕

Device Name PRE-SSI-81e307

LED Brightness

100

☐ Enable Multicast Transmit

Enabling multicast switching requires layer 2 managed switches. Make sure the appropriate switch settings have been set prior to enabling this option as multicast traffic can flood your network! If you are unsure of these settings, please refer to the integration note.

OK   Cancel

NOTE: Once set to Multicast, proper network gear and settings are required in order to return this setting back Unicast.

Low power mode

- If enabled, a zone will take up to 20 seconds to power on, but power is saved.

- This will render the doorbell, if equipped, to trigger after the audio is transmitted.

- Know the front panel L.E.D. color code. It will indicate if the chassis is in low power mode.

When do I need Multicast?

- Stream limitations are exceeded, typically over four chassis (depends on system use/design).

- When sending an EL-IPD-PRE-SSI/SIO to more than two chassis simultaneously.

Doorbell

When the doorbell is triggered, only six zones can effectively be triggered on a doorbell chime in the time allotted (or the page may be ending by the time the zone is setup).

You can reduce the operation to make the chimes happen as fast as possible by:

- Setting the delay to **0.0** in the intercom paging settings.

- Not selecting the "Volume control" option in the intercom page settings.

Latency

- We have a 2ms window for allowed latency.

- Audio will mute if the latency is greater than 2ms.

- Caused by network bandwidth, cascading or poor infrastructure.

- Switch configuration, terminations and even patch cables make a difference.

Syncing the Device (EL-IPD-MTX-8CH; EL-IPD-PRE-MSI; EL-IPD-AMP-EXT and EL-IPD-AMP-SIO)

Normally, this is performed automatically when any configuration change is confirmed. But many times, this is incomplete due to packets loss or other network related issues. It is good practice to sync again after any zone output configuration changes are made and if not operating correctly.

Multicast Devices Connected to a Switch with Unicast ELAN IP Chassis

Multicast devices, most notably video over IP, cannot be on the same switch as an ELAN IP audio chassis running in unicast. You can isolate the multicast products on a different physical switch. Be sure to configure the switch settings appropriately.

Common Mistakes

- Inopportune system design, which can play a large part on the functionality/reliability

- Devices out of sync with configurator settings (Sync device option)

- Overloading a cascaded switch link

- Overloading a 10/100 switch port

- Green Ethernet enabled or using a EEE switch

- Connecting chassis directly to a ISP provided router

- Not updating firmware or letting the firmware update complete

- Multicast switch settings

- Non efficient network configuration

- Using Multicast on a network switch that is not layer 2/3 switch

- Querier settings on multi-switch multicast IGMP setups

- QoS setup on multicast setup not completed or completed incorrectly

- No Wi-Fi (caused by improper multicast network settings)

- Running multicast video over IP products on the same switch as a unicast ELAN IP AMP

- When using a stereo source to a mono input, be sure to use a stereo to mono coupler (such as a S2M Series - 1/4W Stereo Phone to mono coupling box). Do not use a "Y" cable.

- Do not use Dante Controller to set a static IP. This will cause the chassis to factory default and need to be re-synced with the controller by pressing the "Sync Device with Configurator" button.