



# 8-SOURCE 8-ZONE DISTRIBUTED WHOLE HOUSE AUDIO SYSTEM

Model: Matrix88 User Manual



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# Safety

**WARNING!** TO REDUCE THE RISK OF FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS APPLIANCE TO RAIN OR MOISTURE.

**CAUTION!** TO REDUCE THE RISK OF SHOCK, DO NOT REMOVE THE COVER, NO USER SERVICABLE PARTS INSIDE. REFER SERVICE TO A DAYTON AUDIO AUTHORIZED DEALER.

## IMPORTANT SAFETY INSTRUCTIONS

- Read and keep these instructions.
- Heed all warnings and follow all instructions contained within this manual.
- Do not use this unit near water.
- Clean only with dry cloth.
- Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
- Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
- Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
- Protect the power cord from being walked on or pinched particularly at plugs, convenience receptacles, and the point where they exit from the unit.
- Only use attachments/accessories specified by the manufacturer.
- Unplug this unit during lightning storms or when unused for long periods of time.
- Refer all servicing to qualified service personnel. Servicing is required when the unit has been damaged in any way, such as when the power-supply cord or plug is damaged, liquid has been spilled, or objects have fallen into the unit, the unit has been exposed to rain or moisture, does not operate normally, or has been dropped.
- Operate the unit only with the voltage specified on the rear. Fire and/or electric shock may result if a higher voltage is used.
- Do not modify, kink, or cut the power cord. Do not place the power cord in close proximity to heaters and do not place heavy objects on the power cord and/or the unit itself, doing so may result in fire or electrical shock.
- Do not touch the speaker terminals as electric shock may result.
- Ensure that the safety ground terminal is connected to a proper ground. Never connect the ground to a gas pipe, as a severe explosion and/or fire may result.
- Be sure the installation of this product is stable, avoid unlevel surfaces as the product may fall and cause injury, property damage, electrocution and/or fire.
- Note that when the unit is turned off, it is not completely disconnected from the AC power outlet. Do not open the cover.

**FCC COMPLIANCE STATEMENT:** This device complies with Part 15 of the FCC rules. Operation is subjected to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void your authority to operate the equipment.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment.

The distance between user and products should be no less than 20cm.

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 instructions, 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.



# Overview

## System Overview

The Matrix88 is an app controlled 8 source, 8 zone audio matrix perfect for creating a custom distributed audio system, or for retrofitting an existing multichannel amplifier to have app control. The Matrix88 offers an extensive list of features for both commercial and residential installations, making it both easy to set up for the installer, and easy to use for the end user. Line level zone outputs offer the flexibility of using the amplifiers or powered speakers that are most appropriate for each zone, even allowing usage of existing equipment. A variety of audio inputs and wireless audio streaming support make listening to your favorite music or audio programs a breeze. The Matrio Control app offers total control over the system, and also allows full customization of zone and input names for simple usage by the end user after setup.

### **The Matrix88 Kit includes the following components:**

- 1 x Matrix88 Master Controller/Amplifier
- 1 x Rack Mounting Kit
- 1 x Ethernet Cable
- 1 x RS232 (serial) to USB Cable
- 1 x Quick Start Guide

The following optional accessories are available and can be purchased separately.

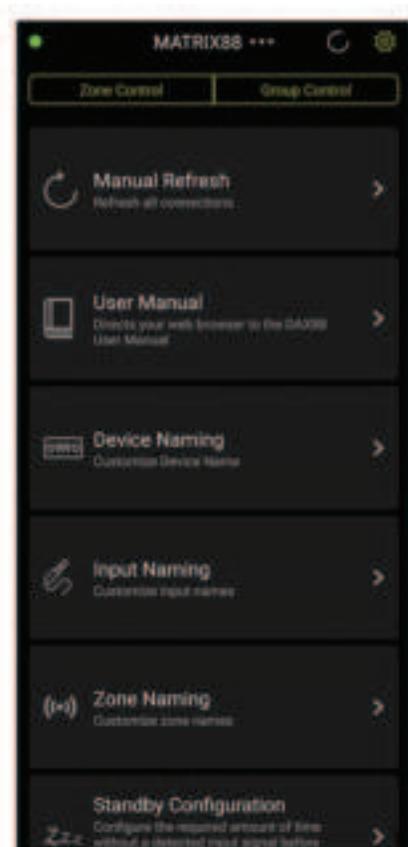
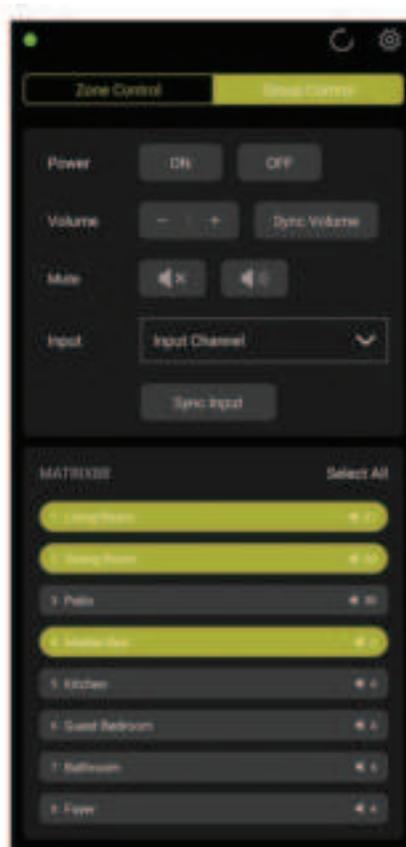
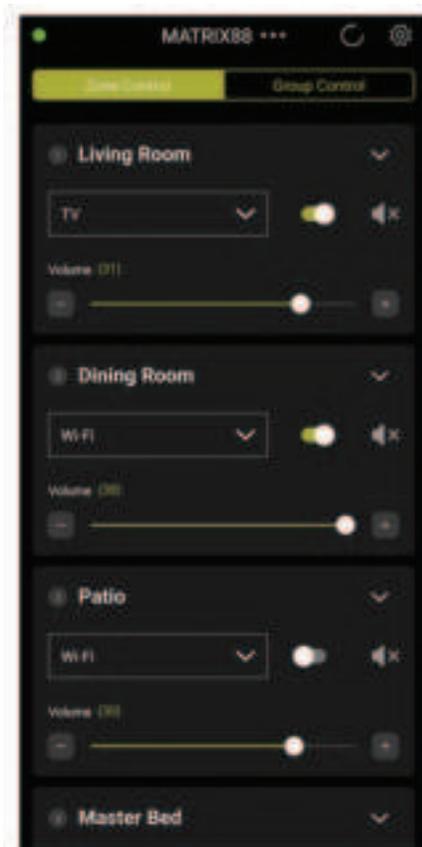
- **DAX88KP** – Wall Mountable Keypads that will allow control of all basic functions for each zone, such as volume, source selection, and bass/treble adjustment
- **DAX88IR** – IR Remote Control for operating Matrix88 Keypad functions

# Overview – App Control

## Dayton Audio Matrio Control Mobile App

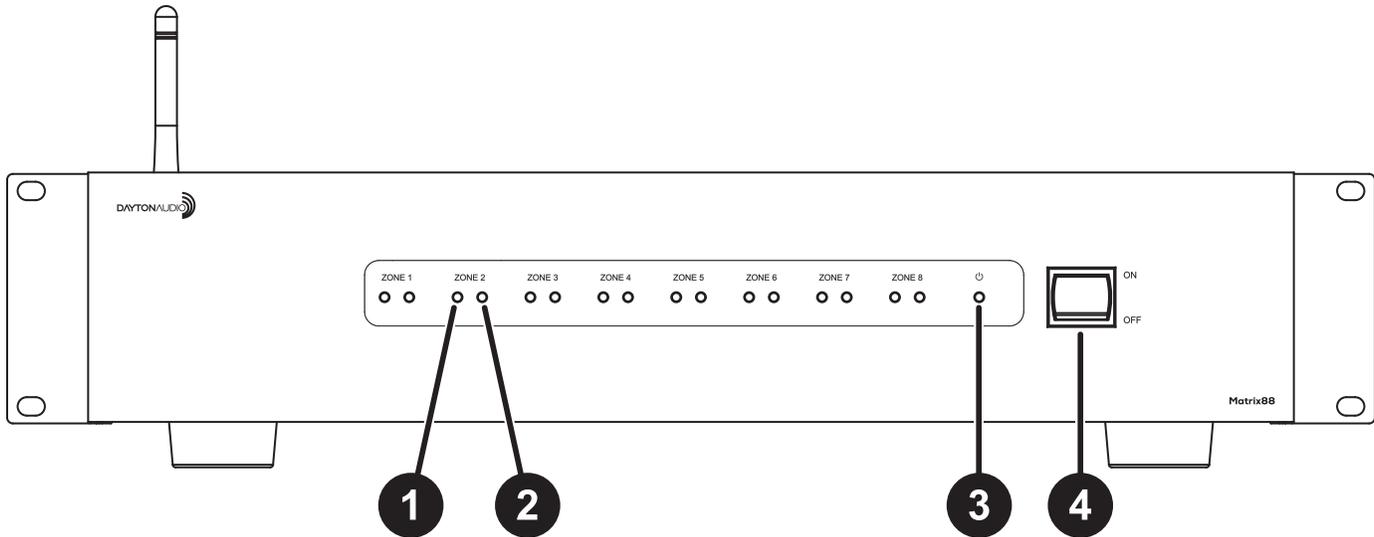
The Dayton Audio Matrio Control app allows for complete control of all of the Matrix88 or DAX88 units on your network. The Zone Control menu allows for individual control over each zone of your system, and the Group Control menu is an advanced feature that lets you send commands to many or all zones at once, even zones that are on separate units. The settings menu has controls for custom naming your inputs, zones, and even the device name. All customization is stored on the Matrix88 or DAX88 itself, which means that end users can open the app and use the system without any knowledge about how the system is wired.

For more detailed information about Matrio Control, see the dedicated Matrio Control section of this guide (p.27) and also download the free app from the iOS or Android app store. The app can be fully explored and experienced in demo mode even without a Matrix88 unit.



# Overview – Front Panel

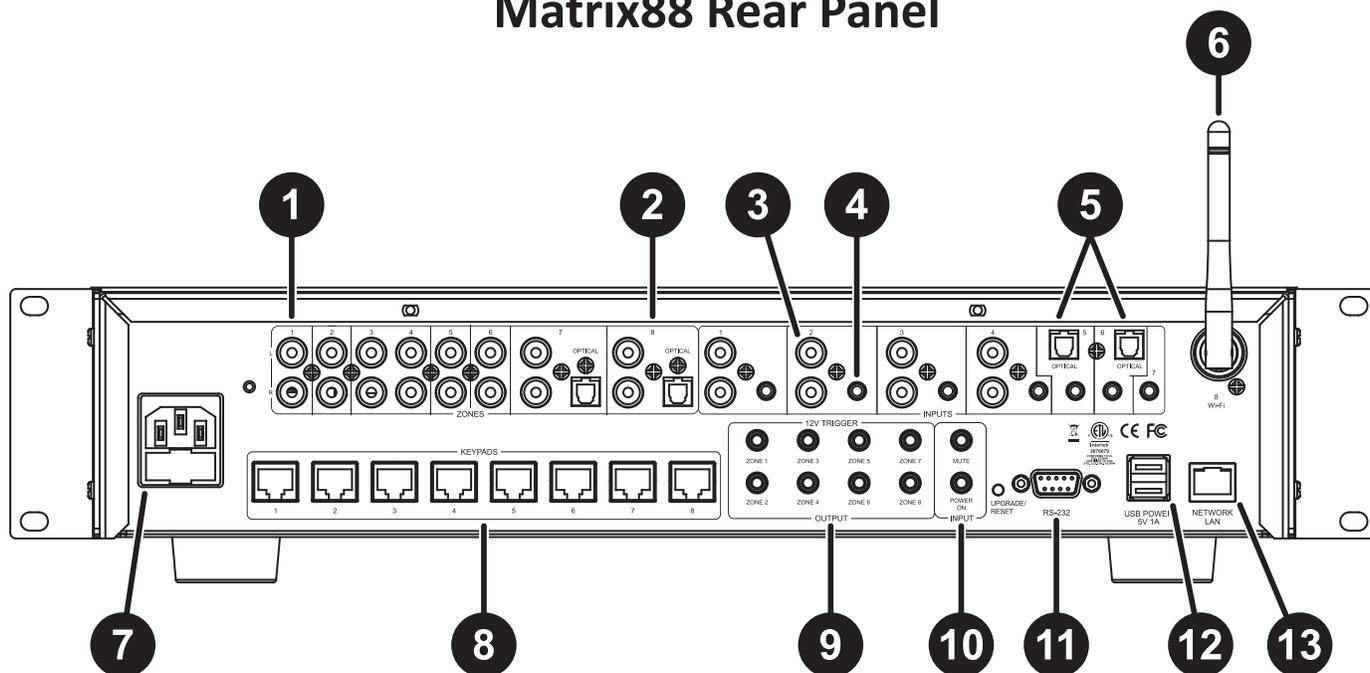
## Matrix88 Front Panel



- 1. Zone Signal LED** – If the input that is assigned to the corresponding zone has audio playing, the LED will be BLUE. The LED will be OFF if the input is not currently playing audio, or the wrong input is selected for the Zone.
- 2. Zone Status LED** – Displays RED if the device's power is on, but the corresponding zone is OFF. This LED displays BLUE if the zone is enabled. Zones can be turned on and off via the Matrio Control app, keypads, inputs triggers or RS232 Control.
- 3. Power LED** – Indicates the power status of the Matrix88. The LED displays RED if the DAX88 is connected to power and the device is switched on, otherwise the LED is off.
- 4. Power On/Off** – Toggles the DAX88 ON and OFF.

# Overview – Rear Panel

## Matrix88 Rear Panel



- 1. Zone Preamp Outputs 1-6** – Zones 1 through 6 on the Matrix88 are preamplified, analog line level audio zones in the form of stereo RCA jacks. These outputs can be connected to external amplifiers.
- 2. Zone Preamp Outputs 7-8** – Like the previous Zones, Zones 7 and 8 have preamplified, analog line level RCA connections for connecting external amplifiers. These zones also have Optical Toslink outputs for connecting external equipment with a digital Toslink connection.
- 3. Stereo RCA Inputs** – Inputs 1-4 have stereo RCA jacks for connecting any analog input source like TV's, DVD players, Streamers, CD players, etc.
- 4. Stereo 3.5mm Inputs** – Every input 1-7 has a stereo 3.5mm jack for connecting analog input sources such as cell phones, tablets, laptops, wireless receivers, etc.
- 5. Optical Toslink Inputs** – Inputs 5 and 6 feature optical Toslink inputs, which are useful for attaching digital audio sources, such as from a TV, DVD player or wireless streamer. The output of your audio source must be manually set to Stereo PCM if automatic settings do not work.
- 6. Wi-Fi Antenna** – Allows the Matrix88 to be connected to your network wirelessly. Dayton Audio recommends to always use a wired ethernet connection instead of Wi-Fi whenever possible.

## Overview – Rear Panel

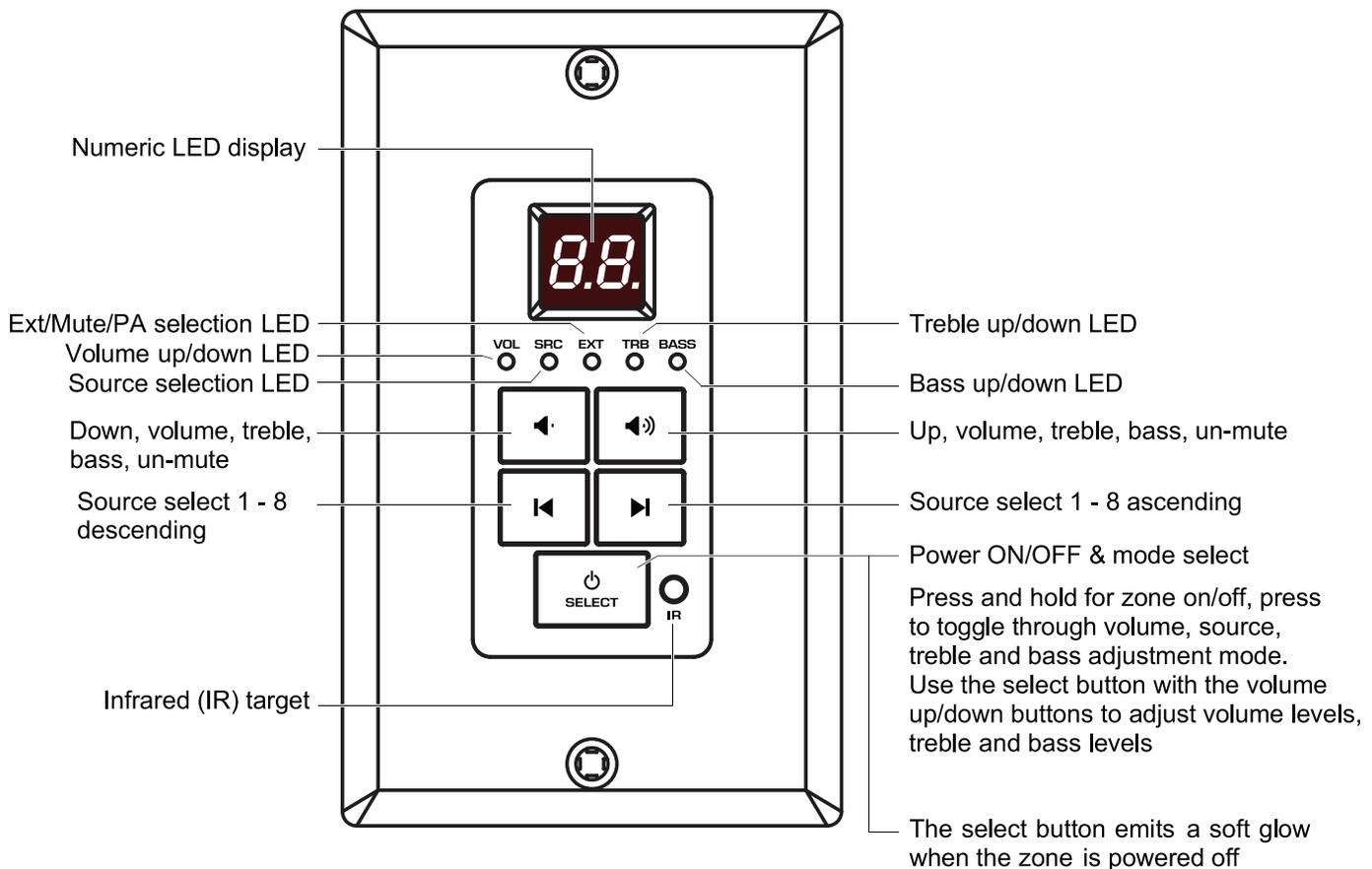
7. **AC Input** – This unit comes with an IEC jack that permits the removal of the AC power cord. This allows flexibility of changing the power cord for different countries. The IEC socket also houses the main fuse holder. Plug the power cord supplied with the amplifier into this socket and to a wall socket or appropriate surge protector.
8. **Keypad Connections** – These RJ45 jacks allow you to connect optional DAX88KP Keypads, which allow per zone control without the use of the mobile app. Note: These ports are labeled 1-8, however the dipswitches on the back of the keypad need configured so they control the correct zone (p.19).
9. **12VDC Trigger Outputs** – Useful for automation systems, each zone has a corresponding 12V trigger that will output 12V when the zone is on, and 0V when the zone is off. This can be useful to trigger the power state of other equipment like external amplifiers, video screens, or anything else with a 12V input trigger that corresponds with that zone (p.25).
10. **12VDC Trigger Inputs** – Applying 12V to the Mute Trigger will mute all zones, and will unmute all zones if the signal is removed (0V). Applying 12V to the Power On Trigger will turn on all zones. The Zones will remain on even when the 12V signal is removed. The power on trigger can be even more useful when combined with the automatic standby function (p.25).
11. **Serial Port for RS232 Control and Device Updates** – This port allows RS232 commands to be sent to and from the DAX88, which can be useful for automation systems. This port can also be used to upgrade the firmware on the Matrix88. See the “RS232 Control” section for more details.
12. **USB Power Outputs** – Useful for powering or charging external devices such as streamers, tablets, etc, these USB ports are for power only and will not transmit any data. The ports are capable of 5V, 1A of output each.
13. **Network LAN Connection** – This RJ45 jack allows the DAX88 to be connected to your network via a standard ethernet patch cable.

# Overview – Keypads

## **DAX88KP – Keypads (Optional)**

The DAX88KP Keypad is designed for ease of use with accessible controls over the corresponding Matrix88 zone. Soft-touch backlit buttons and a backlit LED display provide convenient control of the zone's power status (ON/OFF), source selection, volume, treble, and bass controls. A built-in IR target or external IR target connected to the EXT-IR terminals on the rear of the keypad, relay commands to the Matrix88 main unit through your DAX88IR IR Remote. A DAX88KP will control one zone at a time, which is configurable with dip switches on the back of the keypad.

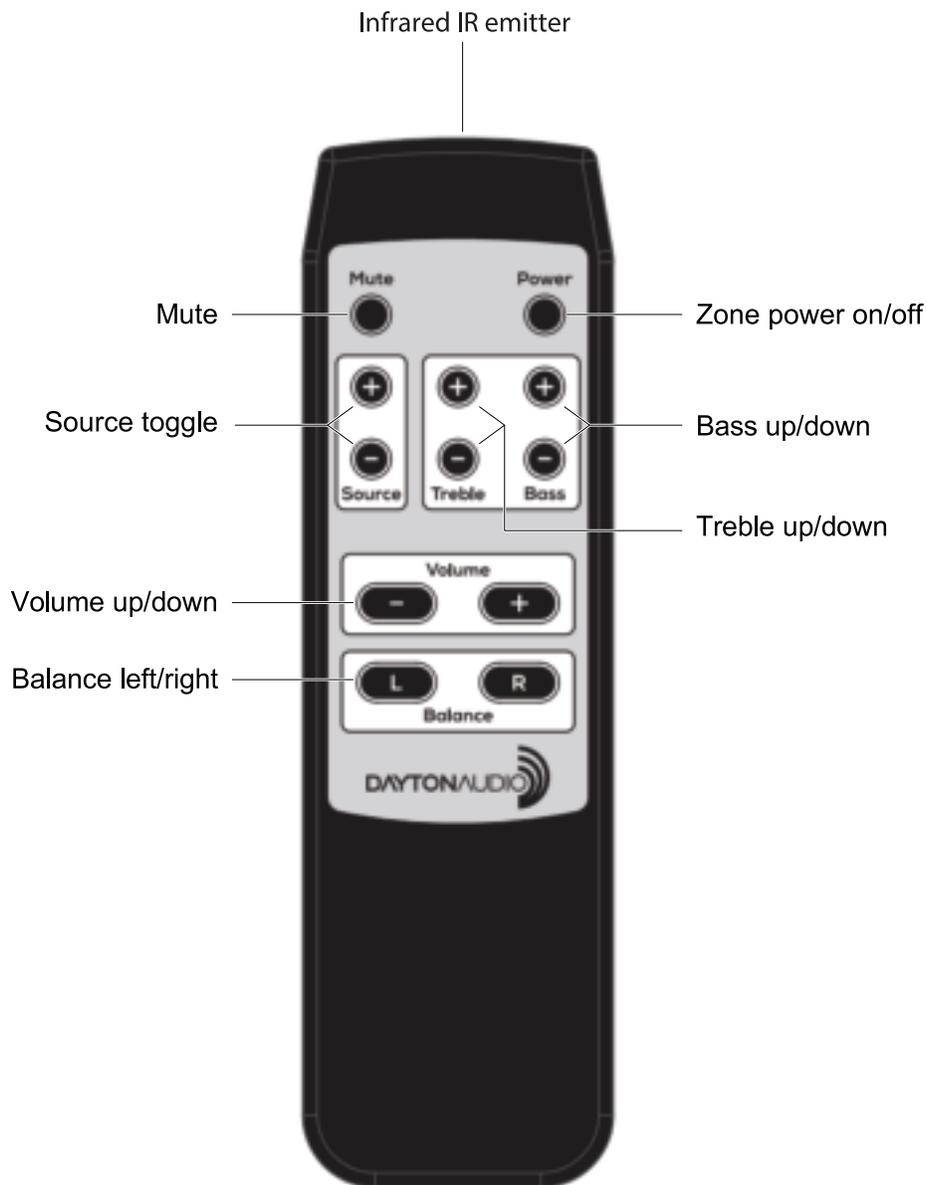
Five LEDs on the keypad face indicate the operational function of the keypad. The EXT LED indicates that the system is receiving a trigger command from an external IR target.



# Overview – IR Remote

## **DAX88IR – IR Remote for Keypads (Optional)**

The DAX88IR Infrared Remote Control provides complete zone control through the built-in IR receiver on the Matrix88's keypads. All keypad functions can be accessed using the DAX88IR. In addition to the keypad functions, the DAX88IR has a mute button to temporarily mute audio in the corresponding zone. Once the mute function is activated the keypad's LED display will flash, indicating the mute status is active. To deactivate mute, press the mute button again on the DAX88IR Remote, or disable mute with the Matrio mobile app.



# Overview – External Devices

## Amplifiers, Streamers and other External Devices

### Zone Outputs

As a line level device meant for distributing audio, the Matrix88 will require external equipment in order to produce sound. Specifically, it will require external amplifiers to power your speakers. The Matrix88 cannot drive speakers directly unless the speaker has a built-in amplifier. The Matrix88 is compatible with any amplifier that has an analog, unbalanced line input, or an optical input accepting stereo PCM. The connector type used on the Matrix88 for output are stereo RCA jacks. However, common adapters can be found at any audio retailer to adapt these outputs to work with 1/8 inch (3.5mm) or 1/4 inch cables.

Examples of common output devices for the Matrix88 are:

- 1) **A multi-channel amplifier that does not have app control** – The Zone Outputs of the Matrix88 can be used as a source for each of the zones on any multichannel amplifier, (p.16) which can be used to bring smart features to an existing amplifier, effectively upgrading your multichannel amplifier to function similarly to a Dayton Audio DAX88.
- 2) **A 70V Amplifier** – Many commercial installations already use amplifiers like this to power many speakers in a row that all play at once and do not require individual control. The Matrix88 can be used as the audio input to an amplifier like this, which can bring app control to an existing installation. This might be especially useful if you intend on expanding a business with existing audio that already works, but you want to add more zones with individual control.
- 3) **Powered Speakers** – With speakers that already have amplification built in, such as studio monitors, party speakers, PA Speakers, etc, the Matrix88 can be easily connected to these speakers analog inputs and used in a larger whole home or business system.
- 4) **Powered Subwoofers** – The Matrix88 can be easily connected to most powered subwoofers, as long as they have analog inputs. In the example above of upgrading an existing 70V Amplifier system, you could use one zone to connect to the 70V amplifier, and another to a powered subwoofer or subwoofer amp to add some oomph to the environment the 70V system is in.
- 5) **Amplifier Flexibility** – In one room, you might only require 50W per channel to power your ceiling speakers. In another room, you might have a 500W amplifier powering some big tower speakers. Unlike multichannel amplifiers, the Matrix88 gives you the flexibility to put the power where you need it, while maintaining control over each zone with the Matrio Control app.

# Overview – External Devices

## **Input Devices**

The Matrix88 has RCA inputs, 3.5mm inputs, and even digital optical inputs to make it a breeze to attach any input device you might have to your Matrix88, such as an external streamer, TV, radio, CD player, turntable or anything else you can think of. The included USB power jacks provide 5V, 1A of power which is enough to power many external streaming devices, such as Airplay receivers, Chromecasts, Alexa Devices and more.

## **Triggers**

The included input and output triggers can be useful for additional automation of your system. For example, your external amplifier, might have input triggers that can turn the device on when it sees a 12V signal. The Matrix88 can output a 12V signal from any zone when it is turned on, which could turn on your external amplifier. Or, perhaps you have a projector screen that you want to come down from the ceiling when zone 4 turns on. If the motor of the screen has a 12V input, this can be easily done. For more information, see the section on Triggers (p.25).

# Installation – Before you Start

## Matrix88 Installation

With included feet and rack mount options, the Matrix88 is easy to install in a variety of scenarios. Install the Matrix88 in a well-ventilated location. Make sure that your installation of the Matrix88 does not impede airflow to your connected amplifiers or networking equipment. The Matrix88 should not be placed directly on top of an amplifier or other heat generating equipment, especially if it blocks any vents. Do not expose the unit to excessive dust, do not allow dust to build up on the unit.

### Overview (Read Fully Before Installation)

1. The Matrix88 can be mounted in a standard 19" A/V equipment rack using the included rack mount kit.
2. When possible, test that all of your speakers, amplifiers and input devices are working properly before attaching them to your Matrix88.
3. Plan on installing your Matrix88 in a location where you will have wired network access. This means you can install the Matrix88 near a network switch, or plan to run a Cat6 network wire from your router to the network port of your Matrix88. Although it is possible to configure the Matrix88 to the network using Wi-Fi, it is not recommended for stability. More details about network configuration are found in the sections below. If you connect your Matrix88 wirelessly, it is imperative to have a strong signal.
  - a. Ensure that you have a robust and stable wireless network before installing your Matrix88, even if you are connecting your Matrix88 to your network via ethernet, as interfacing with the device will still happen wirelessly via a phone, tablet, etc. Control of the Matrix88 through the Matrio Control app will not work properly without a working and reliable wireless network. If connecting your Matrix88 wirelessly, your network must support the 2.4Ghz spectrum.
  - b. If you are using a router that was given to you by your internet service provider, consider upgrading to a higher quality router, as ISP provided routers are often not of high quality, especially units that are both modem and router combined.
  - c. Plan to have a secure wireless network with access to the same VLAN that the Matrix88 is connected to, that only trusted phones, tablets, etc will have access to. With the Matrio Control app, any user on the same network as the Matrix88 will be able to make changes to the system via Matrio Control.
4. Use high quality cable for connection of the keypads to the Matrix88. We recommend Cat5e cabling to connect keypads, but you can also use Cat6 or better. Because audio is not transmitted through this cable, the performance of Cat5e at a minimum is adequate. Higher quality ethernet cable will NOT improve audio performance. Buying cabling pre-terminated with RJ45 connectors (ethernet patch cables) might be desirable if you do not want to terminate the wire yourself. Additionally, keypads must be configured using the dipswitches on the back of each keypad. Plugging a keypad into the first keypad port will not make it control zone 1 automatically, you must configure the dip switches.

## Installation – Before you Start

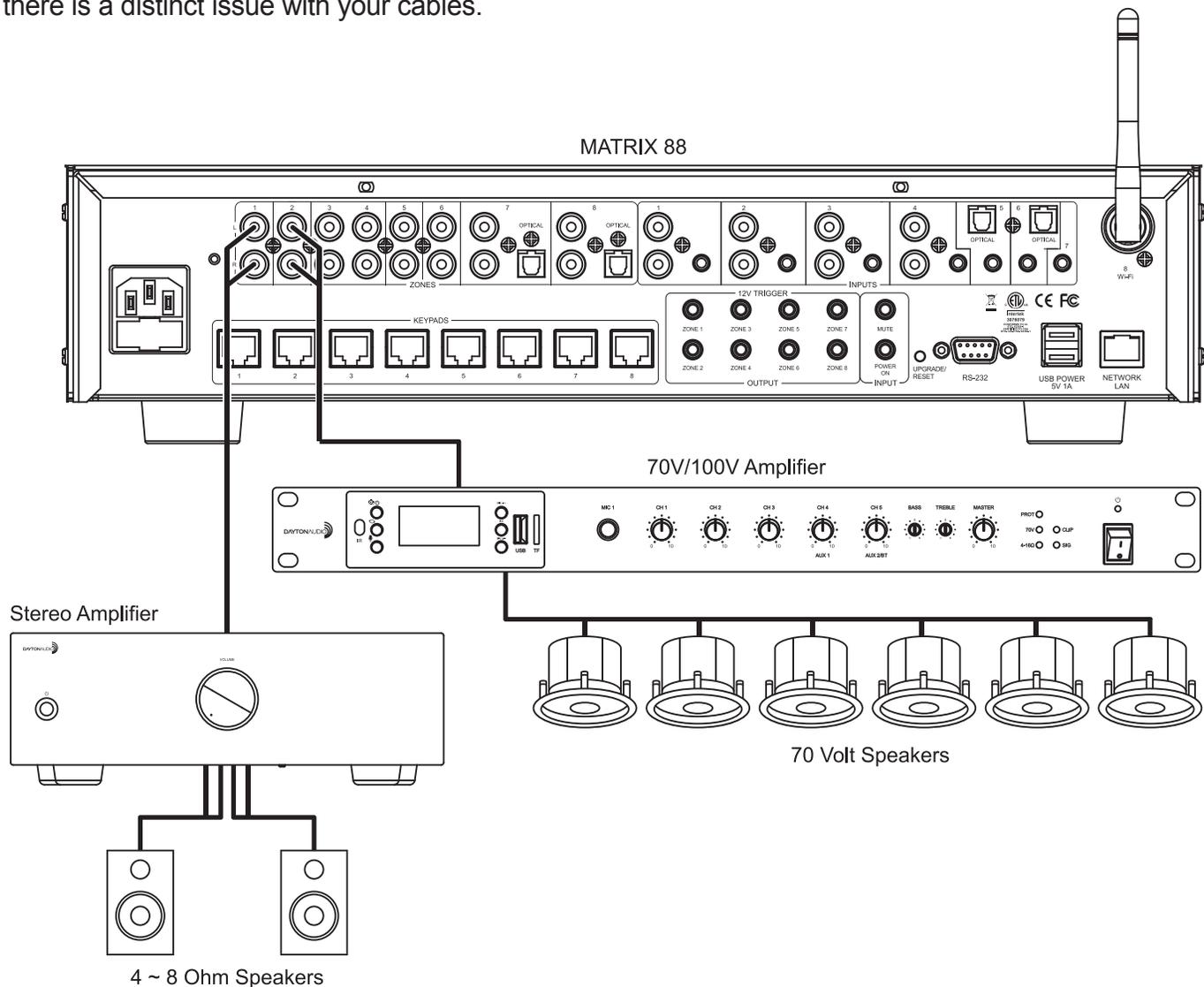
5. Following installation of your Matrix88 unit, amplifiers, speakers, inputs, keypads and other accessories, the power switch on the front of your Matrix88 device will need to be switched to the 'ON' position before it can be used.
6. It is highly recommended to label all of your wires during the installation process, which will make it much easier to fully setup your device in the Matrio Control app following installation.
7. The Matrix88 provides convenient 5W USB-A ports (5V, 1A) to power additional streamers, adapters, tablets, or any other USB powered devices. These USB ports are not an audio input, and will not interface with the Matrix88. These ports will each provide 5W even if both are being used at once.
8. Use high quality amplifiers with the Matrix88. Test all amplifiers before connecting them to your Matrix88.
9. When first turned on, each of the Matrix88's zones will be off, and will need turned on for use. The default matrix routing is that input 1 is routed to zone 1, input 2 is routed to zone 2, and so on. Keep this in mind when you first test your Matrix88 after installation.

# Installation – Zone / Amplifier Connection

## Zone Connection (Connecting External Amplifiers)

The Matrix88 is a line level device, with 8 stereo zones represented with RCA jacks on the back of the unit that will output line level analog audio signals. RCA outputs can be used to distribute an audio signal to amplifiers, powered speakers, or even a powered subwoofer. Connect one end of a set of RCA cables to your desired zone of the Matrix88, and connect the other end to your amplifier or speaker.

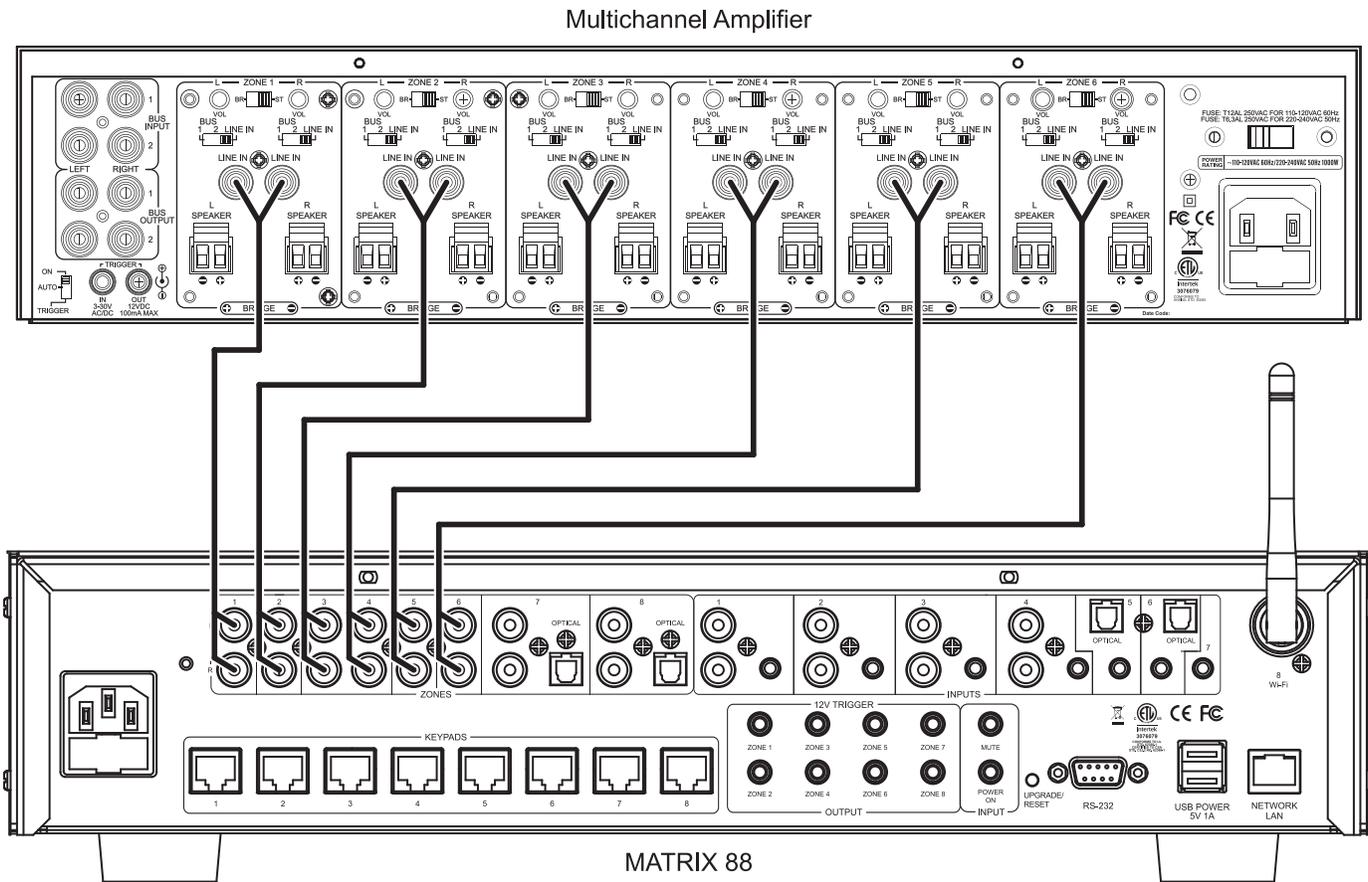
**A Note on Cables:** Use only high-quality, single ended, shielded RCA cables for connecting external amplifiers to the Matrix88. It is not necessary to use esoteric materials or audiophile branded cables for your system. However, there are many RCA cables (often included with devices, rather than individually sold) that are very low quality and can introduce noise into your system. If you are unsure where a set of RCA cables came from, it is fair to try them with your system. But if there are any unexpected issues with sound quality, such as audible noise or distortion, we recommend trying higher quality cables from a reputable company first. Many cables do not have any shielding, use poor quality materials, have poor construction, etc. If the audio quality of your system is good but you want it to be better, we recommend upgrading your speakers or amplifiers, not your cables unless there is a distinct issue with your cables.



# Installation – Zone / Amplifier Connection

## Example - Connecting to a Multichannel Amplifier

A typical use case of the Matrix88 is to connect it to an existing multichannel amplifier to retrofit the device with app controllable features and wireless streaming. These amplifiers often have inputs for each zone of amplification, so each zone output of the Matrix88 can be connected to the zone input of the multi-channel amplifier, and effectively add the network controllable features of the Matrix88 to the amplifier. In this scenario, it is often helpful to connect the output triggers of the Matrix88 to the input trigger of your amplifier, as seen in the trigger section.

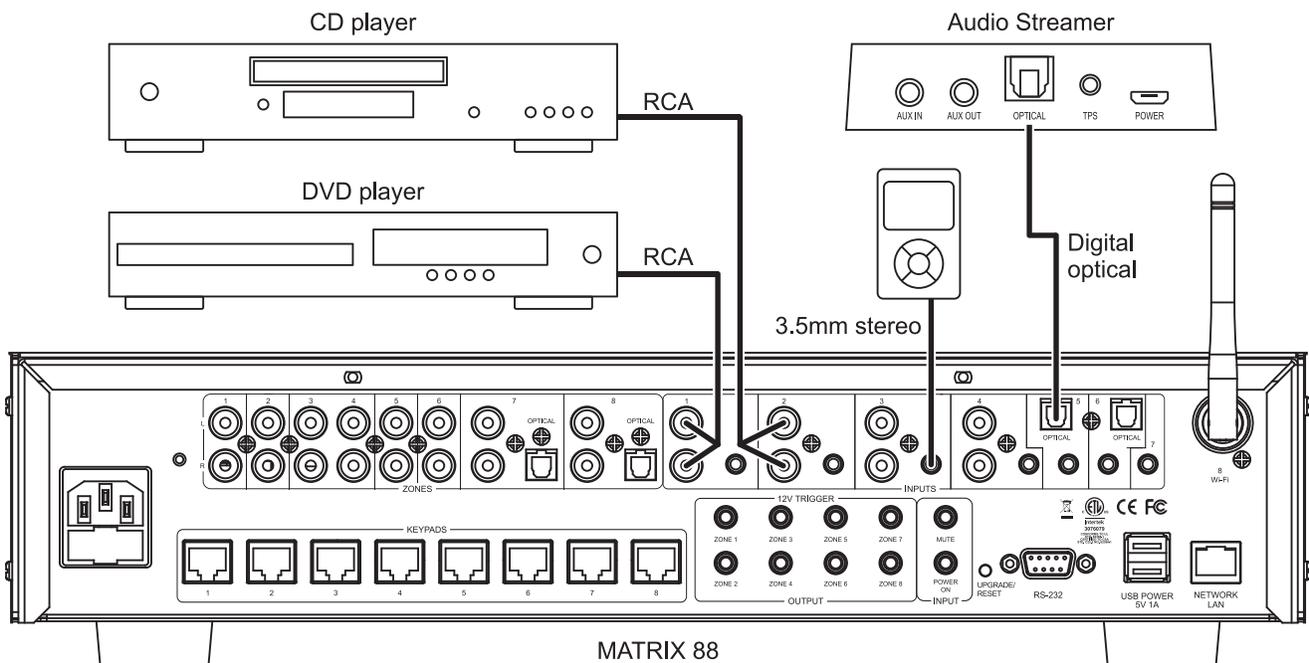


# Installation – Inputs Connection

## Input Connection

The Matrix88 has 8 inputs with a variety of connector types (RCA, 3.5mm, Digital Optical, and wireless streaming). These inputs are part of the device’s matrix, which means any input can be assigned to any zone and changed at any time. For example, one day you might want a different input per each zone for individual listening. The next day, you might want to broadcast your TV audio to every zone so no one misses anything about the big game. With the Matrio Control app, each input can be given a custom name that better describes it and makes it simple for the end user to control. Use only high quality cables for connecting external inputs to the Matrix88.

- **Inputs 1 - 4** are stereo, unbalanced, line level source inputs via RCA style female connectors or a female 3.5mm jack. If both inputs are present, the audio from each will mix together.
- **Inputs 5 - 6** have options for TOSLINK (optical) input, or analog audio input through a 3.5mm jack.
  - If using TOSLINK, make sure to use “PCM-Stereo” or Auto Detect setting on your source device. Your device should be set to auto detect by default and work properly, but if not, you can usually find these settings in settings -> Audio -> S/PDIF or something similar. Refer to the user manual of your source device. You will know if your settings are correct or not, because if they are incorrect, the sound will be digital noise rather than proper audio. Keep the volume of any zones set to this input very low until you have verified the audio is correct and not digital noise.
  - The 3.5mm jack will take priority over the TOSLINK input, meaning that if anything is plugged into the 3.5mm jack, the TOSLINK input will be disabled. These inputs will NOT mix.
- **Input 7** is a 3.5mm jack for analog, stereo audio.
- **Input 8** is Wi-Fi streaming, and is represented on the back of the Matrix88 with a wireless antenna. More information about wireless streaming can be found in the “Wi-Fi Streaming” section of this guide (p.32).

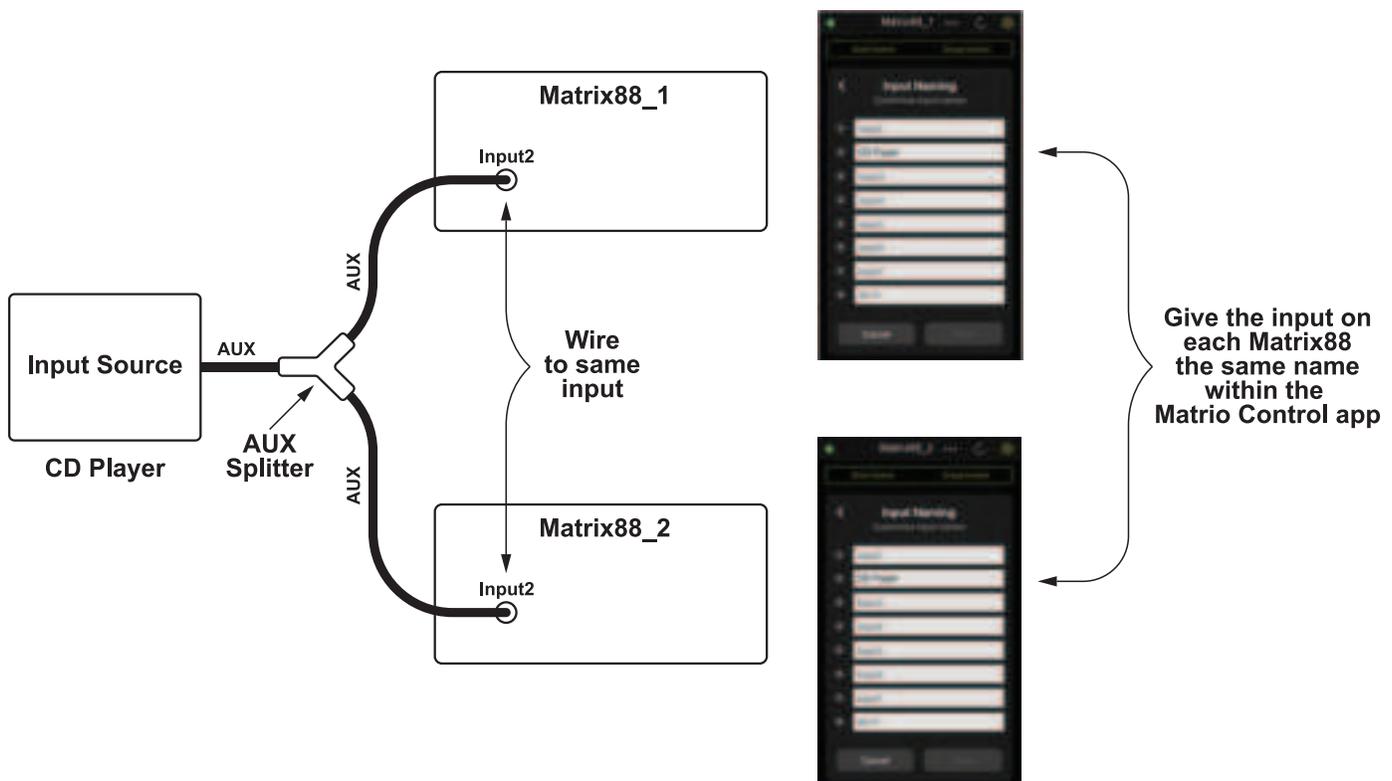


# Installation – Inputs Connection

## Sharing your Inputs to Multiple Matrix88 Units

If you have multiple Matrix88 units and want to use the same input device on all of them, you have a couple of options.

1) The preferred option is to split your input source and route it to both devices. There are many devices and cables available from your Dayton Audio retailer that will split an analog or TOSLINK signal so you can connect it to multiple Matrix88 devices. You will need to name both inputs the exact same name within the Matrio Control app for each Matrix88 unit to ensure that group control input switching works correctly. See the diagram below, which is an example using a CD player as an input connected to Matrix88\_1 and Matrix88\_2 using an aux splitter (male 3.5mm to dual female 3.5mm).



2) All of the Matrix88's zones are line level RCA outputs. One of these zones could be used to route the desired audio source from your first Matrix88 into your second Matrix88. For example, if you are streaming music using the Wi-Fi input of your first Matrix88, set either zone 7 or 8 of your first Matrix88 to input 8 (Wi-Fi), and then connect zone 7 or 8 to one of the inputs on your second Matrix88. This will effectively share the desired input between your devices if the correct zone on your main Matrix88 is turned on.

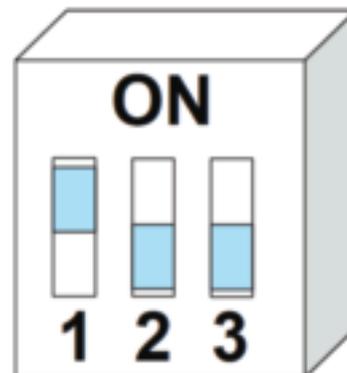
# Installation – Keypads

## Keypads

In addition to control via the Matrio Control app, each individual Matrix88 zone can be controlled with keypads that can be mounted into a standard single-gang wall plate. Up to 8 keypads (one per zone) can be installed directly to the Matrix88 via the 8 RJ45 jacks (also known as an ethernet jack). Keypads offer convenient control for volume, source input, bass and treble. The keypads also feature an IR sensor that can be used with the DAX88IR Remote Control to control a keypad wirelessly.

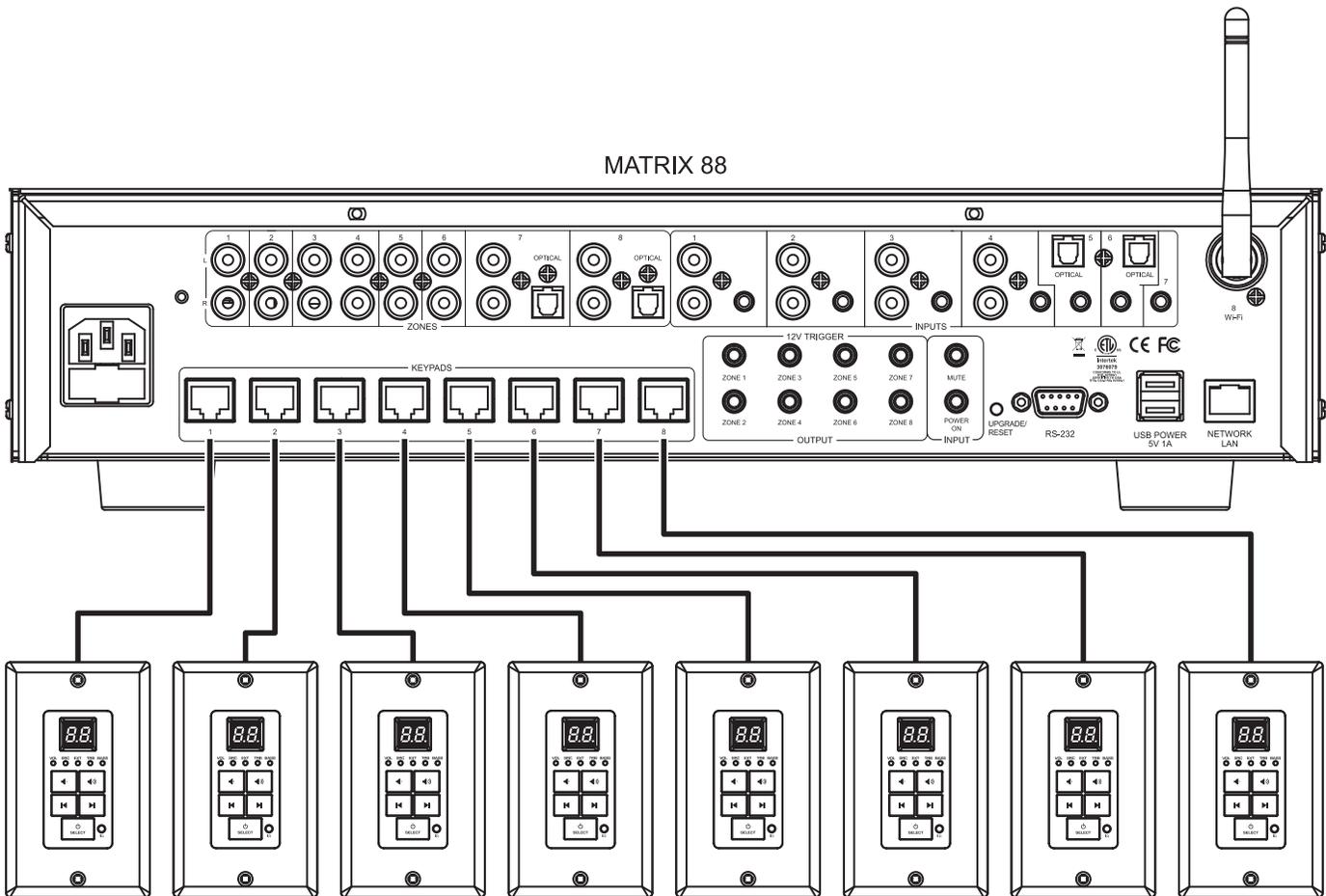
- 1) Use high quality Cat5e/6 cable between the Matrix88 and DAX88KP keypads. Proper installation techniques will guarantee that the keypads will work properly up to 600 feet from the Matrix88. The use of RJ45 (typical ethernet) connectors on the keypads and keypad hub means that pre-terminated cables can be easily sourced, and the equipment to terminate Cat5e/6 cable yourself can be easily found, if necessary.
- 2) Use standard electrical boxes or low voltage rings to mount the keypads.
- 3) **The switches on the back of the keypad must be configured so they control the correct zone.** Although the Matrix88's keypad jacks are labeled with 1 – 8 for each of the eight zones, the dip switches on the back of the keypads must be set so they correspond to the correct zone like the chart below shows. Plugging the keypads into the 1 – 8 labels of the hub does NOT determine which zone each keypad controls. Setting the dip switches gives each keypad a distinct address. The up position is 'ON', whereas the down position is 'OFF' This chart is also found on each keypad for ease of installation. The example on the right has the correct settings for "Zone 3". **IMPORTANT:** If you do not complete this step for each keypad, your keypads will not control the correct zone.

Zone	1	2	3
Zone 1	ON	ON	OFF
Zone 2	ON	OFF	ON
Zone 3	ON	OFF	OFF
Zone 4	OFF	ON	ON
Zone 5	OFF	ON	OFF
Zone 6	OFF	OFF	ON
Zone 7	OFF	OFF	OFF
Zone 8	ON	ON	ON



# Installation – Keypads

- 4) If you are crimping your own RJ45 jacks, the 'B' configuration should be used. This is the 'standard' configuration, and is how a typical ethernet patch cable you would buy from a retailer is wired.
- 5) A standard IR target can be attached to the back of the keypad to the green port with labels +5V, GND, and Data. This can be useful if you want to be able to point the remote a different direction than where the keypad is.



DAX88KP - Keypad