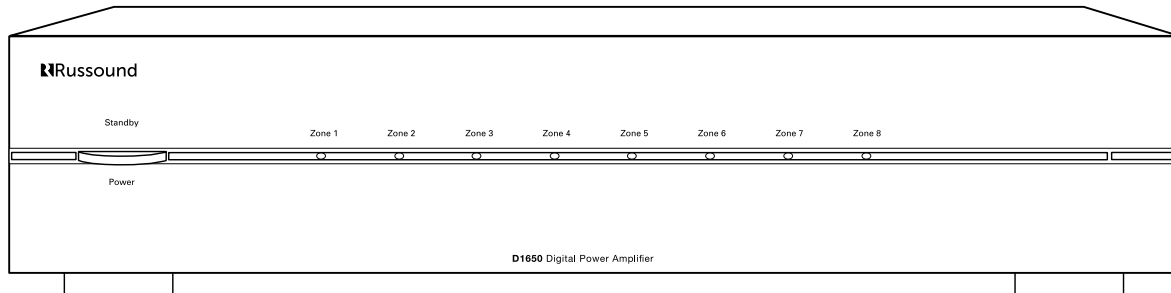


**D850**



**D1650**


# **D850, D1650**


## **Multichannel Digital Power Amplifiers**


### **Installation Manual**


## SAFETY INSTRUCTIONS



 **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 ELECTRIC SHOCK, DO NOT REMOVE THE COVER. NO USER-SERVICEABLE PARTS INSIDE. REFER SERVICING TO QUALIFIED SERVICE PERSONNEL.

 The lightning flash with arrowhead symbol, within an equilateral triangle, is intended to alert the user to the presence of uninsulated dangerous voltage within the product's enclosure that may be of sufficient magnitude to constitute a risk of electric shock to persons.

 The exclamation point within an equilateral triangle is intended to alert the user to the presence of important operating and maintenance (servicing) instructions in the literature accompanying the appliance.

### Safety Instructions

1. Read Instructions - All the safety and operating instructions should be read before the appliance is operated.
2. Retain Instructions - The safety and operating instructions should be retained for future reference.
3. Heed Warnings - All warnings on the appliance in the operating instructions should be adhered to.
4. Follow Instructions - All operating and user instructions should be followed.
5. Water and Moisture - The appliance should not be used near water; for example, near a bathtub, washbowl, kitchen sink, laundry tub, in a wet basement, or near a swimming pool. The apparatus shall not be exposed to dripping or splashing liquids and no objects filled with liquids, such as vases, shall be placed on the apparatus. Do not touch the appliance with wet hands. Do not handle the appliance or power cord with wet or damp hands. If water or any other liquid enters the appliance cabinet, take it to qualified service personnel for inspection.
6. Cleaning - The appliance should be cleaned only as recommended by the manufacturer. From time to time you should wipe off the front and side panels and the cabinet with a soft cloth. Do not use rough material, thinners, alcohol or other chemical solvents or cloths since this may damage the finish or remove the panel lettering.
7. Ventilation - The appliance should be situated so that its location or position does not interfere with its proper ventilation. For example, the appliance should not be situated on a bed, sofa, rug, or similar surface that may block the ventilation openings, or placed in a built-in installation, such as a bookcase or cabinet that may impede the flow of air through the ventilation openings. Place the unit in a well-ventilated location, leaving at least 2 inches (5 cm) of clearance on all sides, top and rear of unit for air flow. If ventilation is blocked, the unit may overheat and malfunction.
8. Heat - The appliance should be situated away from heat sources such as radiators, heat registers, stoves, or other appliances (including amplifiers) that produce heat.
9. Grounding or Polarization - Precaution should be taken so that the grounding or polarization means of an appliance is not defeated.
10. Power Cord Protection - Power supply cords should be routed so that they are not likely to be walked on or pinched by items placed upon or against them, paying particular attention to cords at plugs, receptacles, and the point where they exit from the appliance.
11. Power Sources - The appliance should be connected to a power supply only of the type described in the operating instructions or as marked on the appliance.
12. Main Power Disconnect - The power switch is a single-pole switch. When the switch is in the "Off" position, the appliance is not completely disconnected from the main power. The main power plug is used as the disconnect device and shall remain readily operable. When installing the product, ensure that the plug is easily accessible.
13. Non-Use Periods - The power cord of the appliance should be unplugged from the outlet when left unused for a long period of time.
14. Attachments - Only use attachments/accessories specified by the manufacturer.
15. Carts and Stands - The appliance should be used only with a cart or stand that is recommended by the manufacturer. An appliance and cart combination should be moved with care. Quick stops, excessive

force and uneven surfaces may cause the appliance and cart combination to overturn.

16. Wall or Ceiling Mounting - The appliance should be mounted to a wall or ceiling only as recommended by the manufacturer.
17. Location of the Amplifier - Do not mount this unit under a kitchen cabinet. Do not expose the amplifier to direct sun light or heating units as the amplifier internal components' temperature may rise and shorten the life of the components. Avoid damp and dusty places.
18. Object and Liquid Entry - Care should be taken so that objects do not fall and liquids are not spilled into the enclosure through the openings.
19. Servicing - The user should not attempt to service the appliance beyond that described in the operating instructions. All other servicing should be referred to qualified service personnel.
20. Damage Requiring Service - The appliance should be serviced by qualified service personnel when: A. The power supply cord or the plug has been damaged; B. Objects have fallen, liquid has been spilled into the appliance; C. The appliance has been exposed to rain; or D. The appliance does not appear to operate normally; or E. The appliance has been dropped or the enclosure is damaged.



CONFORMS TO  
ANSI/UL STD. 60065  
CERTIFIED TO  
CAN/CSA STD. C22.2  
No. 60065



Note: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the 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 of 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, or consult the dealer or an experienced radio/TV technician for help.

This Class B digital apparatus complies with Canadian ICES-003.

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



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**Introduction**

The Russound D850 and D1650 multichannel digital amplifiers are ideal for use in adding additional power in distributed audio systems. The D850 provides 8 channels of digital amplification while the D1650 provides 16 channels. The channels of both models are arranged in pairs to provide amplification for stereo zones. Both models provide an array of useful features such as bridge mode operation, global and independent zone triggering, audio sense circuitry with adjustable delays per zone, a Bus Input and independent line inputs per zone to meet a wide variety of applications and configurations.

Both models are rated at 50 watts per channel into 8 ohms and 80 watts per channel into 4 ohms. With the stereo/Bridge Mono switch in the Bridge position, channels are combined for a higher powered mono output of 160 watts into 8 ohms. The use of advanced digital amplification circuitry results in a smaller, lighter chassis, with cooler operation than our previous amplifier models.

**Thermal Protection**

All Russound amplifiers are designed with special circuitry to safeguard the amplifier under a thermal overload condition. Thermal protection mode can only engage when the unit has been run at high volume for extended periods of time without adequate ventilation and/or when speaker impedances are below the minimum levels for the amplifier.

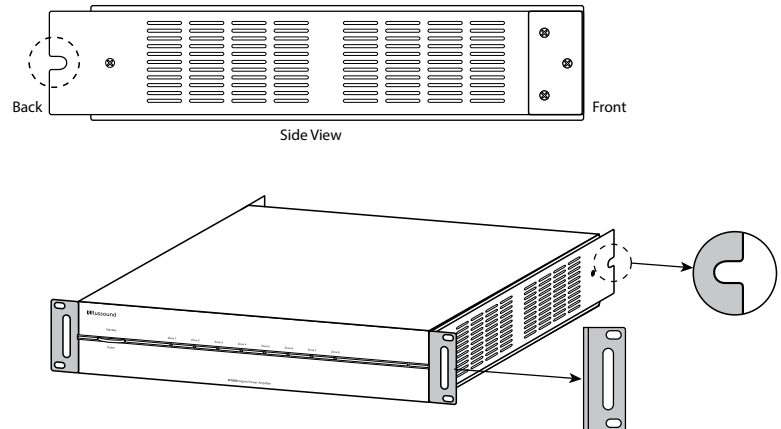
**Protection Circuitry**

All Russound amplifiers are designed with special circuitry to safeguard the amplifier under a short-circuit condition. A faulty speaker can also cause a short circuit condition. The Zone LED will blink rapidly between Red and Blue when the Zone is in short circuit protection.

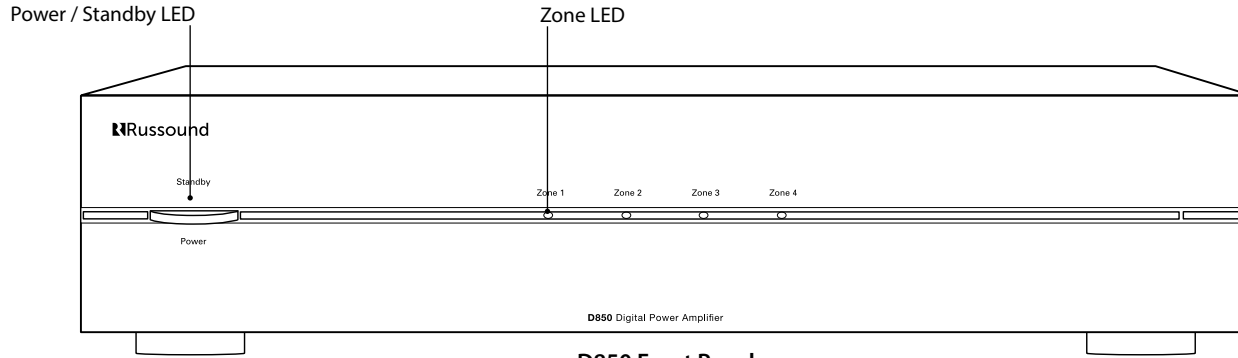
The amplifier will auto-correct itself when the trouble condition has been removed. The amplifier will then resume normal operation.

**Rack Mounting**

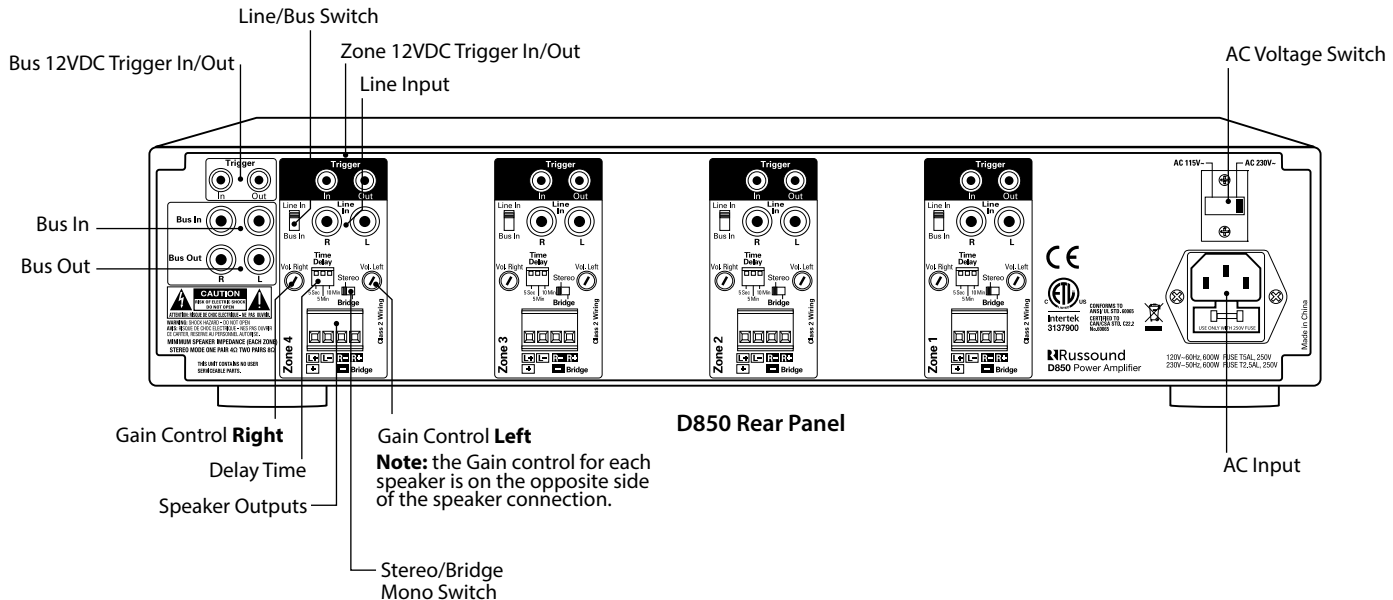
Both amplifiers can be rack mounted using the included rack-mount ears and hardware to attach the ears to the amplifier. The amplifier will take two rack spaces with the feet removed.



# FRONT AND BACK PANEL

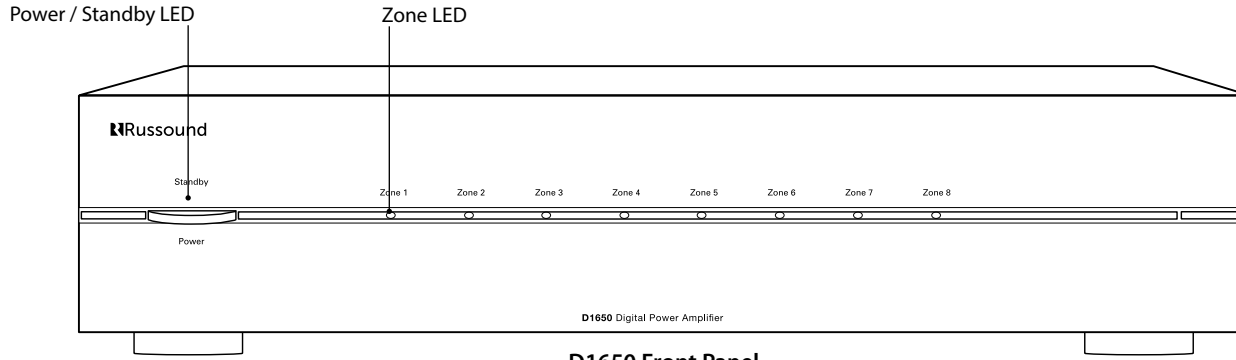


D850 Front Panel

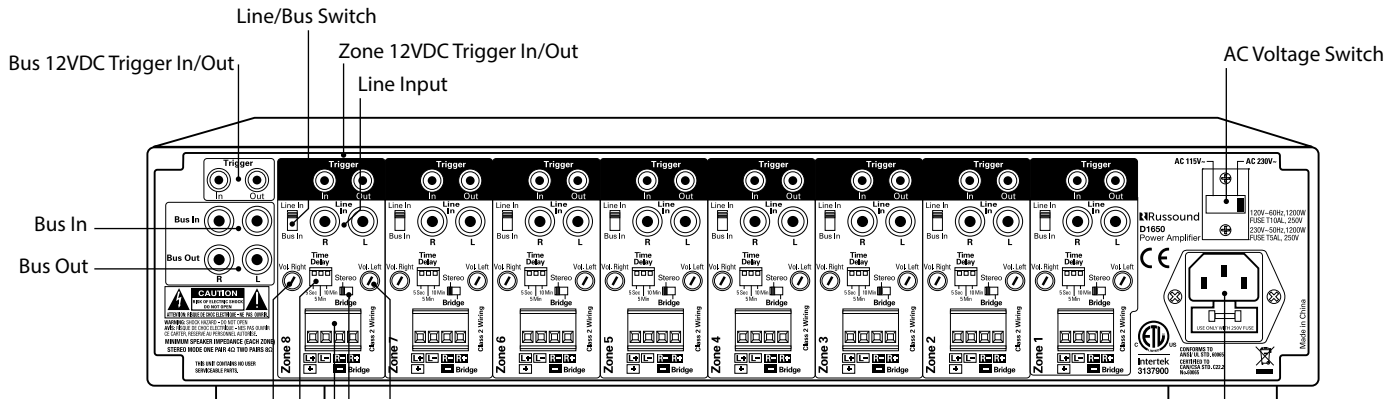


D850 Rear Panel

AC Input



D1650 Front Panel



D1650 Rear Panel

Gain Control **Right**  
Delay Time  
Speaker Outputs

Gain Control **Left**  
**Note:** the Gain control for each speaker is on the opposite side of the speaker connection.

Stereo/Bridge Mono Switch

## BACK PANEL FEATURES

### Power/Standby LED

This LED lights red when any zone is active or the amplifier is in standby mode.

### Zone LED

When a zone is powered on, the corresponding LED lights blue. When a zone is OFF, the LED is off (standby mode). If a short circuit happens on the speaker outputs, the LED will blink fast red and blue.

### Bus 12VDC Trigger In/Out

The Bus 12VDC Trigger In is used to activate all zones that are using the Bus Input and disables other zone triggers or signal sensing on those zones when it is used. When the Bus 12VDC Trigger is used, all Bus-controlled zone LEDs will be blue and active.

If the Bus Trigger In has 12V applied to it, only the 12V Bus Trigger Out will have 12V and the Zone Trigger Outputs will not.

### Bus Input/Output

The bus line input is an optional input that can be used to connect a single source to multiple zones. The bus line output is a passive passthrough of the Bus Input and can be used to daisy chain the source to other amplifiers in the system.

### Line Input

The line audio input for each zone is a dedicated sensing input that will activate the zone when an audio signal from a source is present.

### Line/Bus Switch

Sets the zone input to the Line Input or the Bus Input.

### Speaker Outputs

The minimum speaker impedance is 4 ohms for Stereo Mode and 8 ohms for Bridge Mode.

### Gain Controls

Left and Right gain controls independently adjust the sound level for each channel. When used in Bridge Mode only the Left control is used.

### Power Switch

Turns the amplifier on/off. This switch does not disconnect the main power feed from the amplifier; to disconnect the main power, the power cord must be unplugged from the outlet.

### Fuse Receptacle

Holds a replaceable fuse for AC power input connection. Refer to the specifications on page 10 for the fuse ratings.

### AC Input / Voltage Switch

Voltage is set with a selectable switch for 115V or 230V operation. The AC voltage input for the North American model is 115VAC at 60Hz (International model, 230VAC at 50Hz). This receptacle accepts a 3-prong IEC C14 type connector. A detachable 3-terminal power cord is included. The international models include power cords for the UK, Europe, and Australia.

### Zone 12VDC Trigger In/Out

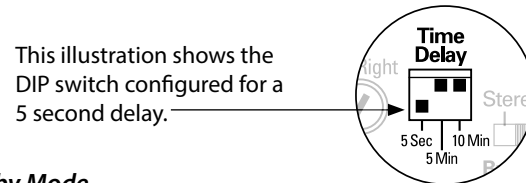
The Zone 12V Trigger In is used to activate a specific zone. The Zone Trigger Out can be used to trigger other 12V devices. The delay and audio sensing are bypassed when the 12V Zone Trigger Input is used. When a Zone Trigger is active, the zone LED will be blue. If no voltage is present in the Zone Trigger, the Zone LED will be off.

### Standby

Standby delay can be adjusted to either 5 seconds, 5 minutes, or 10 minutes by using the DIP switches on the rear panel. This delay is selectable per zone. When an audio signal is not present, the amplifier will automatically go into standby mode after the preset period of time.

The default position for the DIP switch is a 5-second delay. The time delay is selected by moving the DIP switch to the down position.

**Note:** One and only one DIP switch must be in the Down position at any time. Activating more than one DIP switch can lead to erratic audio operation.



### Standby Mode

The amplifier will go into Standby mode when audio signal or trigger is not present, and after the minimum delay time has timed out. The amplifier consumes 0.5 Watt or less current while in standby power mode.

### Stereo/Bridge Mono Switch

Sets each zone amplifier for stereo or Bridge mono operation.

### Compatibility with autoformer-based volume controls

The D850 and D1650 amplifiers have been tested to work with all Russound autoformer-based volume controls.

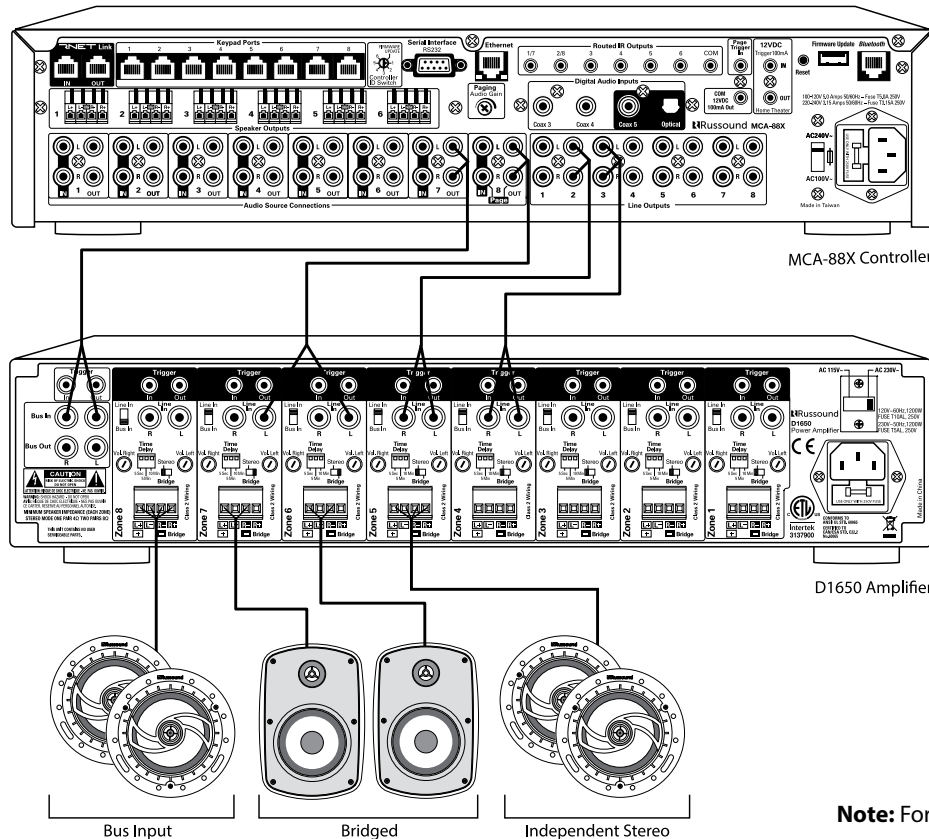
In order to use the D-series amplifiers with auto-former based volume controls, please refer to the Tech Tip on the Russound Dealer Portal titled "Using a D-Series amplifier with autoformer-based volume controls".

## TYPICAL SYSTEM CONFIGURATION

Both the D850 and the D1650 can be configured as the main amplifier for an audio distribution system or home theater system.

When used with an audio distribution preamp, each zone can independently drive one of several different sources by using each zone's individual line audio inputs, or a pair of zones can be Bridge to create a higher powered zone.

When the D1650 is used as a home theater amplifier, up to a 7.1 system can be supported. We recommend bridging the outputs for left, center and right and using stereo mode for both pairs of surround speakers. The remaining zone can be used for powering an additional area such as an outdoor zone.



MCA-88X Controller

D1650 Amplifier

**Note:** For using signal sensing see page 9

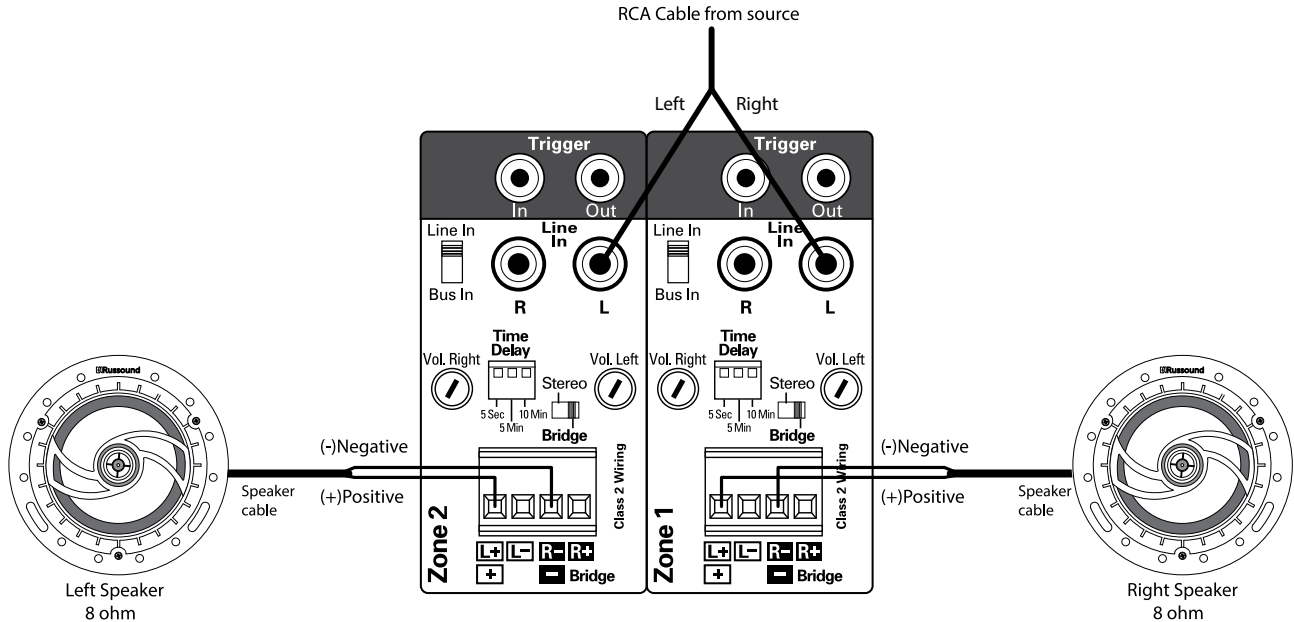
Connections for audio distribution preamp outputs

## BRIDGE MODE OPERATION

When the amplifier is in Bridge mode operation, a single channel (the left) is used to produce a high power mono output. Use one channel pair to amplify the left channel by connecting the left audio signal to the L input of a channel pair, setting the Stereo/Bridge switch to "Bridge" and connecting the speaker as indicated below. Use a second channel pair for the right channel by connecting the right audio signal to the L input of a second channel pair, setting the Stereo/Bridge switch to "Bridge" and connecting the speaker as indicated below.

### Wiring Instructions - Bridge Mode

For Bridged amplifier operation, turn off the power to the amplifier and connect an 8-ohm minimum load; follow the Bridge mode markings on the back of the amplifier: Connect the negative lead (-) of the speaker cable to the R- terminal. Connect the positive lead (+) of the speaker cable to the L+ terminal. Set the Stereo/Bridge Mono switch to Bridge Mono, connect the Line In feed from a source to the Left Line In connection and restore power to the amplifier.



Connections for Bridge mode operation



D850 and D1650 amplifiers have a signal sensing feature which will allow the amp to turn on automatically when a signal from the source is “sensed”. This is useful if the source used with the D850 or D1650 amplifier does not have a 12v trigger option.

There are many factors affecting the signal sensing of the D-series amplifiers, and you can see a few recommendations and common scenarios listed below to help set the levels in the system to best optimize the signal sensing feature.

This information is most useful when feeding a variable line level signal into the amplifier. If the source being used with the amplifier is a fixed line level, the amplifier should turn on and off consistently. If not, then some of the troubleshooting tips below can help.

Keep in mind that the input signal will vary depending on the connected equipment. For example, in the case of using a D-series amp to add additional power to the zone outputs of an MCA multizone controller, the signal can vary from zone to zone, and even from source to source. In this case, the MCA has trim levels for both zones and source to even out the line level signals between the different zones and sources.

Tech Spec: The threshold rating for the signal sensing is 4 millivolts at 1 KHz RMS. This setting means that the sensing is sensitive to low signal levels. As a comparison, an average line-level signal is about 2 volts. (Variable line outputs will vary by nature, so these numbers are approximate.)

Common Practice: The way to get best results from Signal Sensing is to always have a “hot” input signal, or in other words have the Source Input signal turned up as much as possible, and to have the gains of the D-series amplifier set to lower levels. There are going to be a wide variety of variables that will determine how “hot” the input signal is, and every install and every scenario will be different, however if the common practice is to have the input signal turned up, and the amp gains set lower, the signal sensing should be reliable for any given situation.

### Steps to follow:

1. Set the D-series amp gains all the way down.
2. Turn the Source volume level up. Depending on the Source, it is usually best to set the source volume level to about 80-90%, to avoid clipping the signal.
3. Increase the gains of the D-series amp zone until the zone is at the loudest level you would safely recommend for the installation, i.e. louder than what the normal listening level would be.
4. Decrease the volume level of the Source down to normal listening level.
5. Turn the source off. The D-series amp will turn off after the set delay time.
6. Turn the Source back on. The D-series amp will turn back on.
7. See the troubleshooting section on page 11 if necessary.

## TECHNICAL SPECIFICATIONS

### ***D850MC Amplifier***

- Power Output:** 80W /Channel, 1kHz into 4 Ohms, One Zone Driven  
50W /Channel, 1kHz into 8 Ohms, One Zone Driven  
160W, 1kHz into 8 ohms, Bridge
- # of Amplifier Channels:** 8 channels, 4 independent zones
- Signal-to-Noise Ratio:** >90dB A-weighted
- Frequency Response:** 20Hz to 20kHz +1.7/-1dB at 1W output into 8 Ohms
- Input Sensitivity:** 600 mV for 80W @ 1 KHz 4 Ohm One Zone  
700 mV for 50W @ 1 KHz 8 Ohm One Zone
- Input Impedance:** >22k Ohms Line Input
- Trigger Inputs/Outputs:** Bus and Zone @12VDC
- Zone Line Input:** Line or Bus select switch per zone
- Bridge Mode:** Select Stereo or Bridge mode per zone 8 Ohm only
- Speaker Connectors:** Detachable speaker terminals support up to 14awg wire
- Switching Delay:** Three settings, 5 Seconds, 5 minutes, 10 minutes
- Power Requirements:** ***North American Model:***  
100-120VAC 60Hz 600W max  
IEC C14 type connector with 3 terminal  
detachable power cord  
***International Model (D850i):***  
220-240VAC 50Hz 600W max  
IEC C14 type connector with 3 terminal  
detachable power cords for UK, Europe, and Australia
- Fuse Rating:** 100-120V/T5A, 250V US & Canada  
220-240V/T2.5A, 250V Europe
- Dimensions:** 16.81"W x 3.46" H x 16.14"D (42.7 x 8.8 x 41.0 cm)
- Shipping Weight:** 19lbs. (8.6kg)

### ***D1650MC Amplifier***

- Power Output:** 80W /Channel, 1kHz into 4 Ohms, One Zone Driven  
50W /Channel, 1kHz into 8 Ohms, One Zone Driven  
160W, 1kHz into 8 ohms, Bridge
- # of Amplifier Channels:** 16 channels, 8 independent zones
- Signal-to-Noise Ratio:** >90dB A-weighted
- Frequency Response:** 20Hz to 20kHz +1.7/-1dB at 1W output into 8 Ohms
- Input Sensitivity:** 600 mV for 80W @ 1 KHz 4 Ohm One Zone  
700 mV for 50W @ 1 KHz 8 Ohm One Zone
- Input Impedance:** >22k Ohms Line Input
- Trigger Inputs/Outputs:** Bus and Zone @12VDC
- Zone Line Input:** Line or Bus select switch per zone
- Bridge Mode:** Select Stereo or Bridge mode per zone 8 Ohm only
- Speaker Connectors:** Detachable speaker terminals support up to 14awg wire
- Switching Delay:** Three settings, 5 Seconds, 5 minutes, 10 minutes
- Power Requirements:** ***North American Model:***  
100-120VAC 60Hz 1200W max  
IEC C14 type connector with 3 terminal  
detachable power cord  
***International Model (D1650i):***  
220-240VAC 50Hz 1200W max  
IEC C14 type connector with 3 terminal  
detachable power cords for UK, Europe, and Australia
- Fuse Rating:** 100-120V/T10A, 250V US & Canada  
220-240V/T5A, 250V Europe
- Dimensions:** 16.81"W x 3.46" H x 16.14"D (42.7 x 8.8 x 41.0 cm)
- Shipping Weight:** 22.08lbs. (10.0kg)

### **Signal Sensing Problems**

#### **The D-series amp zone does not turn on:**

- Check the input signal path
- Check the audio cable connections between the source and the amp
- If the source is a variable signal, make sure it is turned up

#### **The D-series amp zone turns on, but not consistently**

- Check the input signal level. It may need to be turned up
- Check the amp gain levels. They may be turned up too high
- Try connecting a tablet or smartphone with a headphone-to-RCA cable into the amp zone input as a test

#### **The D-series amp zone is always on**

- Check for voltage issues and/or ground loops that could be affecting the signal sensing circuit – See Below:

### **Ground Loops and Voltage Problems**

Ground loops in the system with the D-series amp can the reliability of the signal sensing. Voltage introduced into the amplifier by way of ground loops, or EMI-RFI noise, or other electrical noise on the power input, could be interpreted by the signal sensing circuit as an input signal. In this case, the amplifier may not be able to tell the difference between the actual signal and the electrical noise in the system, so the sensing ability of the amplifier may be erratic or unreliable.

There are products on the market to help reduce electrical noise or ground loops, such as a Ground Loop Isolator, which can be used to block or reduce problems with the input signal path and make signal sensing more reliable.

In addition, there are even more considerations such as the length of RCA cables being used (shorter is better) and making sure the amplifier and the sources are on the same power source to reduce ground loops and other electrical issues.

#### **Test Example**

A good way to test the amplifier zone input and signal sensing is to use a portable device such as a tablet or phone. This type of test source is not plugged in to power therefore should not introduce any ground loop or electrical noise.

1. Remove the original source input cables and replace with a headphone-to-RCA cable connected to the portable device.

2. Choose some music to play. An Internet Streaming source (e.g. Pandora) is best because it will play a constant audio stream.

3. Verify that the amplifier zone turns on and off reliably when connecting or disconnecting the RCA cable from the portable device according to the delay period timing that is configured for that zone.

4. If the signal sensing is still not reliable:

5. Disconnect all cables, including speaker connections and RCA connections.

6. Set the delay of Zone 1 to the shortest time setting.

7. Reboot the amplifier.

8. Make sure music is playing on the portable device.

9. Connect the portable device to Zone 1 Line Input Only.

10. The Zone 1 amp should turn on.

### **LED Operation**

**Zone LED is blinking red/blue** - This indicates a short-circuit condition on the wiring. Power down the amplifier and verify all speaker wiring connections both at the amplifier and at the speaker. Make sure no stray strands of wire are touching. When the wiring has been corrected, turn the amplifier back on.

**Zone LED is red** - This indicates an overheating condition. Verify that the amplifier is receiving enough ventilation. Separate the amplifier from other components to allow more ventilation or add a cooling fan if needed.

**Note:** Both of these conditions will auto-correct themselves when the trouble condition has been removed. The amplifier will then resume normal operation.

If you experience more problems or have questions, please contact Russound Technical Support for further assistance at 1-866-888-7466, M-F, 8:30AM-7PM ET.

## LIMITED WARRANTY

The Russound D850 and D1650 Amplifiers are guaranteed against all defects in materials and workmanship for two (2) years from the date of purchase. During this period, Russound will replace any defective parts and correct any defect in workmanship without charge for either parts or labor.

For this warranty to apply, the unit must be installed and used according to its written instructions. If service is necessary, it must be performed by Russound. The unit must be returned to Russound at the owner's expense and with prior written permission. Accidental damage and shipping damage are not considered defects, nor is damage resulting from abuse or from servicing by an agency or person not specifically authorized in writing by Russound.

This Warranty does not cover:

- Damage caused by abuse, accident, misuse, negligence, or improper installation or operation
- Power surges and lightning strikes
- Normal wear and maintenance
- Products that have been altered or modified
- Any product whose identifying number, decal, serial number, etc. has been altered, defaced or removed.

Russound sells products only through authorized Dealers and Distributors to ensure that customers obtain proper support and service. Any Russound product purchased from an unauthorized dealer or other source, including retailers, mail order sellers and online sellers will not be honored or serviced under existing Russound warranty policy. Any sale of products by an unauthorized source or other manner not authorized by Russound shall void the warranty on the applicable product.

Damage to or destruction of components due to application of excessive power voids the warranty on those parts. In these cases, repairs will be made on the basis of the retail value of the parts and labor. To return for repairs, the unit must be shipped to Russound at the owner's expense, along with a note explaining the nature of service required. Be sure to pack the unit in a corrugated container with at least three (3) inches of resilient material to protect the unit from damage in transit.

Before returning a unit for repair, call Russound at (603) 659-5170 for a Return Authorization number. Write this number on the shipping label and ship to:

**Russound**  
ATTN: Service  
1 Forbes Road  
Newmarket, NH 03857

Due to continual efforts to improve product quality as new technology and techniques become available, Russound/FMP, Inc. reserves the right to revise system specifications without notice.









# **D850, D1650**

## **Multichannel Digital Power Amplifiers**

### **Installation Manual**

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Specifications are subject to change without notice.

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