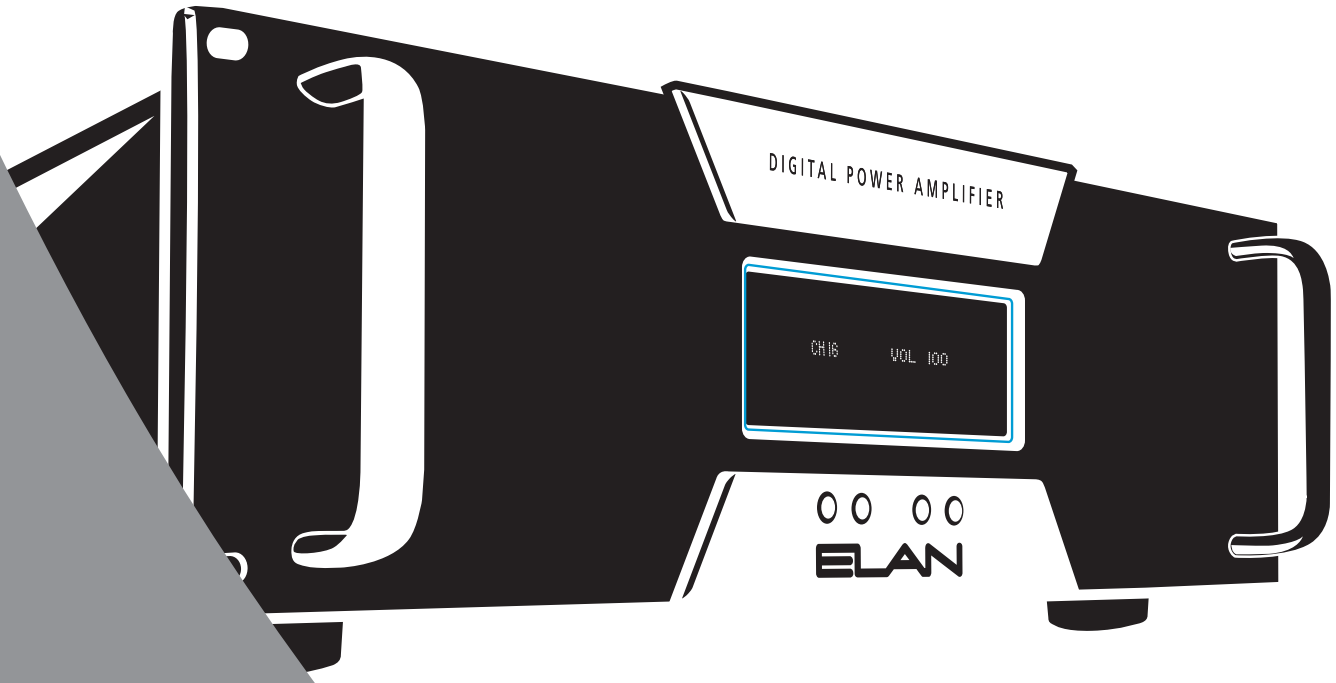
D SERIES

D1650/D1651

16 CHANNEL DIGITAL POWER AMPLIFIER

INSTALLATION MANUAL AND USER'S GUIDE



SIXTEEN CHANNELS OF DIGITAL COOL

ELAN HOME SYSTEMS™

1. INTRODUCTION

Thank You!

Thank you for purchasing this product. The ELAN D1650 Digital Power Amplifier has been designed specifically for custom installers to provide the ultimate solution for multi-room, whole-house applications. Sixteen channels of clean, powerful audio can be combined in dozens of different ways to suit virtually any situation that may be encountered in whole-house distributed audio systems. The D1650 uses an Audio Bus system that allows inputs and outputs to be combined in many ways without the use of extraneous patch cables. 'Class T' Digital technology and ACE™ (Automatic Clip Eliminator™) allow efficient use of power, ensuring clean, accurate audio at all volume levels in any application. Remote triggers and turn-on circuits for each channel enable the installer to integrate this amplifier easily into any ELAN multi-zone system or in stand-alone applications.

The ELAN Story

Located in Lexington, KY, USA, ELAN Home Systems has designed innovative multi-room audio/video systems since 1989. ELAN systems were the first to integrate music, intercom and TV distribution features that used the homeowner's stereos, televisions and telephones to create the whole-house entertainment experience. These systems allow people to move room to room, controlling centrally located equipment with ease

ELAN's product line includes:

- Power Amplifiers
- Zoned Pre-Amps
- Intelligent Keypads
- LCD Color Touch Panels
- In-Wall and In-Ceiling Speakers
- Outdoor Speakers
- System Controllers
- Volume Controls
- Telephone-Based Intercom Controllers
- Video Switchers,
- Digital Music Management Systems
- Accessories for Home Systems Installation

ELAN has introduced nearly 300 new products in the last seven years and has been honored with 42 industry awards in past 5 years!

Safety Concerns

This amplifier is HEAVY! Use caution when lifting the unit. Please ensure that whatever supports this amp is able to hold at least 50 POUNDS safely.

Use only grounded outlets when powering this product. Making any modification to the power cord could cause unsafe operation and will void the manufacturer's warranty.

The D1650 is very powerful and should have its own dedicated 15 Amp AC circuit. If a dedicated circuit is not available, one should be installed by a licensed electrician.

ALL CONNECTIONS SHOULD BE MADE WITH THE AMPLIFIER TURNED OFF AND UNPLUGGED FROM POWER. DAMAGE CAN OCCUR TO EQUIPMENT IF IMPROPER CONNECTIONS ARE MADE!

THIS AMPLIFIER IS NOT BRIDGEABLE! DO NOT TRY TO BRIDGE OR COMBINE OUTPUTS! DAMAGE TO THE AMP WILL OCCUR.

WARNING

RISK OF ELECTRIC SHOCK
DO NOT OPEN!

CAUTION: TO REDUCE THE RISK OF ELECTRIC SHOCK, DO NOT REMOVE COVER (OR BACK). 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) instruction in the literature accompanying the appliance.

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

IMPORTANT SAFETY INFORMATION

Read Information—All the safety and operating information should be read before the appliance is operated.

Follow Information—All operating and use information should be followed.

Retain Information—The safety and operating information should be retained for future reference.

Heed Warnings—All warnings on the appliance and in the operating instructions should be heeded.

Wall Mounting—Mounting of this appliance should be done only by an authorized installer.

Ventilation—The appliances should be situated so that their location or position does not interfere with their proper ventilation. These appliances should never be placed near or over a radiator or heat register. These appliances should not be placed in a built-in installation such as a bookcase or cabinet that may impede the flow of air through the ventilation openings.

Non-Use Periods—Appliances that are left unattended and unused for long periods of time should be de-energized.

Power Sources—The appliances should be connected to a power supply only of the type described in the operating instructions or as marked on each appliance. If you are not sure of the type of power supply to your home, consult your authorized ELAN dealer or local power company.

Grounding or Polarization—These audio products must be connected to a grounding-type alternating-current circuit on a dedicated circuit breaker. This is a safety feature. The green safety wire from the A.C. circuit must be connected.

Water and Moisture—To reduce the risk of electric shock or fire, these appliances 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.

Power Cord Protection—A.C.Power supply circuits should be routed by a certified electrician only, in accordance with the NEC standards.

WARNING
RISK OF ELECTRIC SHOCK
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Water and Moisture—To reduce the risk of electric shock or fire, these appliances 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.

Power Cord Protection—A.C.Power supply circuits should be routed by a certified electrician only, in accordance with the NEC standards.

Telephones—Avoid using a telephone (other than a cordless type) during an electrical storm. There may be a remote risk of electrical shock from lightning. Do not use a telephone to report a gas leak if the leak is in the vicinity of the ELAN electronic equipment because of risk of fire or explosion.

Cleaning—Turn off the circuit breaker to this audio product before cleaning. Do not use liquid or aerosol cleaners. Use a damp cloth for cleaning.

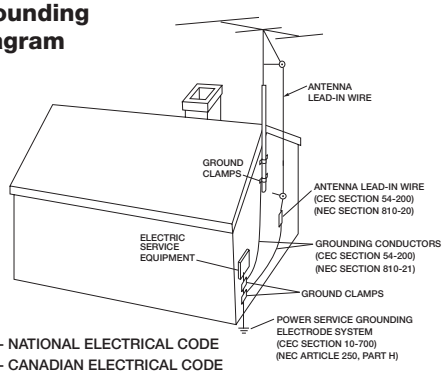
Power Lines—An outdoor antenna should be located away from power lines. When installing an outside antenna system, extreme care should be taken to avoid touching power lines or circuits, as contact with them may be fatal.

Outdoor Antenna Grounding—If an outside antenna or cable system is connected to these audio products, be sure the antenna or cable system is grounded so as to provide some protection against voltage surges and built-up static charges. Section 810 of the U.S. National Electrical Code, and Section 54 of the Canadian Electrical Code, provide information with respect to proper grounding of the mast and supporting structure, grounding of the lead-in wire to an antenna discharge unit, size of grounding conductors, location of antenna-discharge unit, connection to grounding electrodes, and requirements for the grounding electrode. See the grounding diagram (right).

Overloading—Do not overload wall outlets and extension cords, as this could result in fire or electric shock.

Object and Liquid Entry—Never insert objects of any kind through the openings of these appliances, as they may touch dangerous voltage points or short-out parts that could result in a fire or electric shock. Care should be taken so that objects do not fall and liquids are not spilled into the appliance through openings in the enclosure.

Grounding Diagram



NEC - NATIONAL ELECTRICAL CODE
CEC - CANADIAN ELECTRICAL CODE

Servicing—Do not attempt to service these appliances yourself, as opening or removing covers may expose you to dangerous voltage or other hazards. Refer all servicing to qualified service personnel.

Damage Requiring Service—These appliances should be serviced by qualified service personnel when:

- A power supply connection or a plug has been damaged or
- If liquid has been spilled into the appliance or objects have fallen into the appliance or
- The appliance has been exposed to water or moisture or
- The appliance does not appear to operate normally or exhibits a marked change in performance or
- The appliance has been dropped or the enclosure damaged.

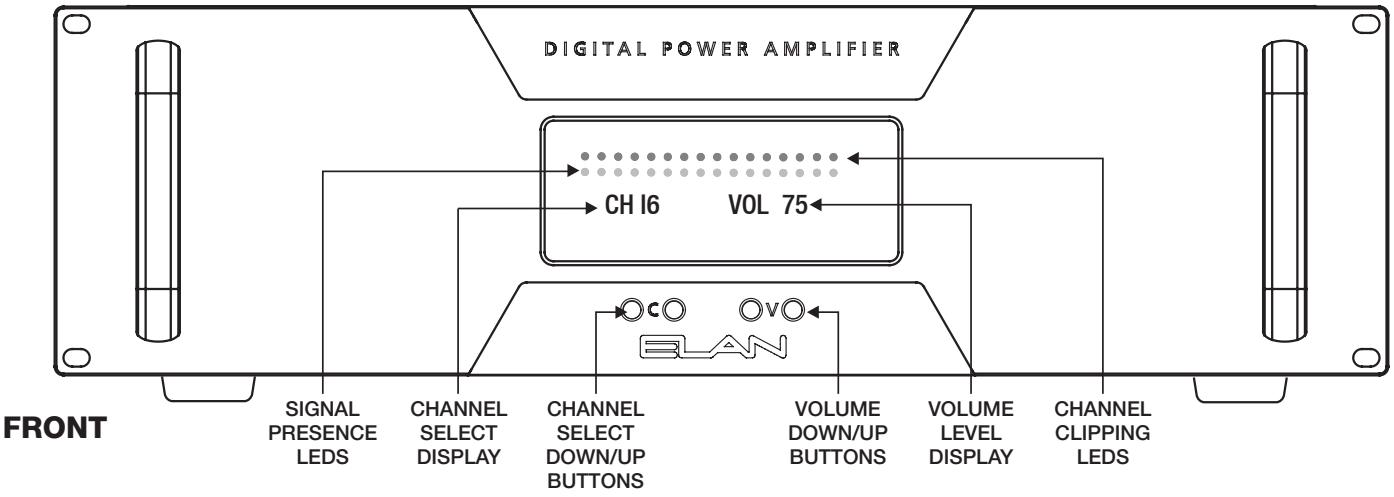
Replacement Parts—When replacement parts are required, be sure the service technician has used replacement parts specified by the manufacturer or that have the same characteristics as the original part. Unauthorized substitutions may result in fire, electric shock, or other hazards. The Master Control Unit battery should be replaced only after turning the power off and only by an authorized installer.

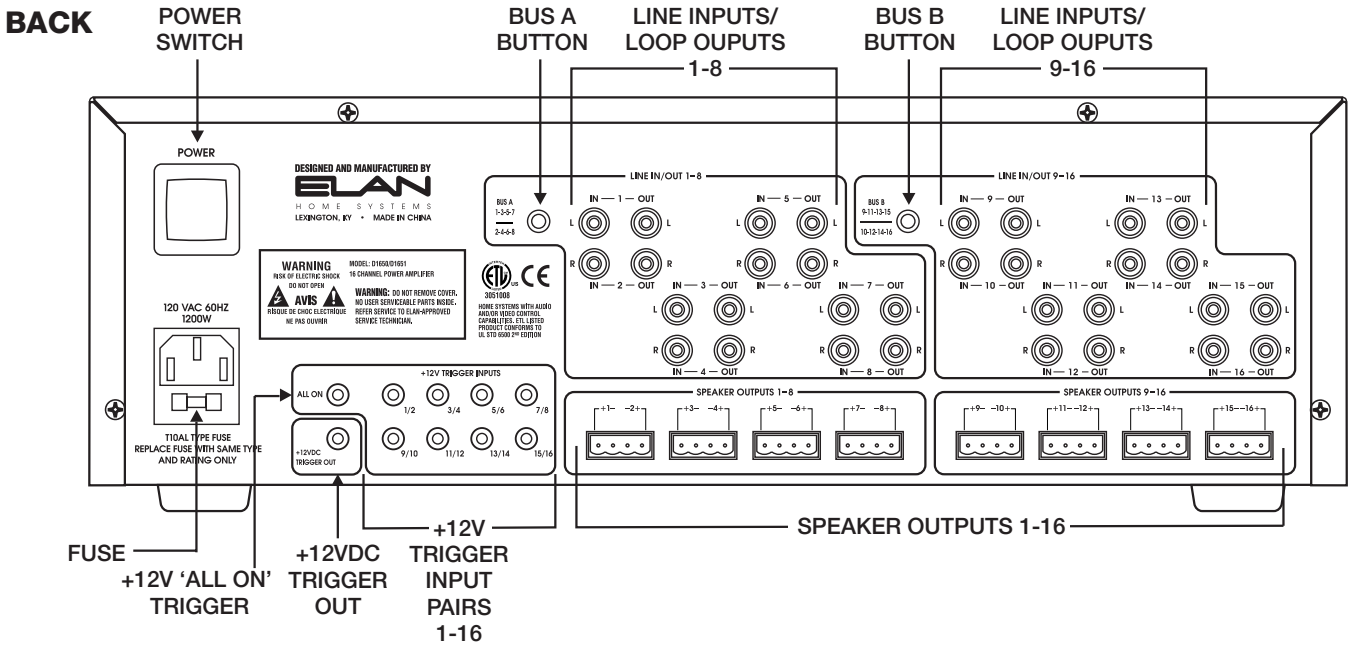
Safety Check—Upon completion of any service or repairs to this audio product, ask the service technician to perform safety checks to determine that the audio product is in proper operating condition.

Lightning—For added protection for these audio products during an electrical storm, or when they are left unattended and unused for long periods of time, turn off the circuit breaker, and disconnect the antenna or cable system. This will prevent damage to the audio products due to lightning and power-line surges.

Table of Contents

System Overview





Specifications

Audio Section

Power Rating - RMS

Output Power (16 CH Stereo) . . . . . 60Wrms @ 4 ohms/CH
Output Power (16 CH Stereo) . . . . . 45Wrms @ 8 ohms/CH

Frequency Response . . . . 20 Hz to 20 kHz, -.3dB into 8 ohms
Full Power Bandwidth . . . . . 10Hz to 50 kHz
Signal-To-Noise . . . . . > 102db (A-weighted)
Channel Separation . . . . >-70dB (channel to channel @ 1 kHz)
Total Harmonic Distortion . . . . . < .04%
Dynamic Headroom . . . . . 120W @ 4ohms, 90W @ 8 ohms
Intermodulation Distortion . . . . . < 0.1%
Voltage Gain (AV) . . . . . Continuously Variable from 0 - 24
Slew Rate . . . . . > 20V/microsecond
Input Impedance . . . . . 49 K ohms
Input Sensitivity . . . . . 790Vrms (45W @ 8 ohms)

Connectors

Input/Loop Outputs . . . . . Gold RCA Phono
Speaker Output . . . . . WECO Terminators

Power

AC Power Requirements . . . . . .120 VAC, 1200 Watts
Power Supply . . . . . Ultra-high efficiency toroidal transformer

Triggers

Remote Trigger Inputs . . . . . 5 to 24 Volts AC/DC
Trigger Loop Output . . . . . .+12VDC @0.1A

Dimensions/Weight

Dimensions . 5.25 x 17.0 x 15 (inches)/13.34 x 43.18 x 38.1 (cm)
Rack Face . . . . . 19 X 5.25 (inches)/48.26 x 13.34(cm)
Weight . . . . . 50 lbs/22.68 kg

Features

'Class T' Design

'Class T' allows the D1650 to deliver its full rated power from all sixteen channels simultaneously and is 90% efficient so that the amplifier does not waste energy producing excessive heat.

Dual Stereo Bus

BUS A and BUS B inputs and outputs allow the amplifier to be configured in dozens of different ways to meet the demands of large audio distribution systems. Channels can be assigned to one of two audio busses in order to be split or combined according to situational demands.

Audio inputs can be BUS A, BUS B, Independent, Stereo, or Mono without the use of extraneous patch cables. Additional amplifiers can be connected from the Line outputs of the D1650 to provide greater system expansion.

ACE™ (Automatic Clip Eliminator)

Microprocessor-controlled dynamic leveling circuit eliminates clipping without audio degradation typical with traditional compressor-based clipping circuits. Each amplified output is continuously monitored for signal clipping. Extremely fast transients are ignored but if ACE sees a consistent clipping trend, it turns the respective channel down by one increment. This action is repeated until no more clipping is detected. Once clipping is absent for five seconds, ACE will slowly and unnoticeably begin to restore the original gain settings. This translates into accurate, high quality audio reproduction at all volume levels.

Individual Remote Trigger Inputs/ Trigger Output

Eight +12VDC Trigger Inputs allow each pair of channels to be powered up and muted independently. The +12VDC Trigger Output turns on and mutes additional amplifiers.

Signal Presence and Clipping Indicators

High-visibility blue LED display and front panel Channel Select and Volume Adjustment controls make setup easy. Blue Signal LEDS show when audio is present on each input. Red Clipping LEDS indicate distortion, and make fine tuning the amplifier very straightforward. Five blue LEDs fire downward to softly indicate Power status. The Signal Level and Power LEDs feature adjustable brightness.

Digital Volume Level Set/Lockout

All channel volume levels are matched to within 0.3dB, making volume setup easy, accurate, and repeatable. Volume settings are stored within the D1650's non-volatile memory upon exiting setup. This means that settings are preserved even when a power outage occurs.

A special multi-button key press can be used to lock the volume settings so that they can not be tampered with. The user may view their settings when the system is locked, but is unable to change them.

Advanced Amplifier Protection

Each channel of the D1650 is coupled to its respective WECO speaker terminal via a high power relay. If the processing circuitry senses a fault condition (over heating, shorted output, etc.), it will completely disconnect the amplifier channel from the output load. Faulted conditions will be indicated on the front panel. After finding and correcting the problem causing the fault condition, simply power the unit OFF and back ON to restore operation.

Rack Mount Aluminum Front Panel w/ Rugged Handles (D1651)

Amplifier mounts securely to equipment racks. Handles are invaluable when moving, installing, adjusting or servicing the unit.

'Class T' Digital Technology Explained

The ultimate objective of any audio amplifier design is to make a high fidelity amp with high efficiency and high reliability. There are several basic audio power amp topologies that have been developed to attain these objectives: **Class-A**, **Class-B**, **Class-AB**, **Class-H**, **Class-G** and **Class-D** are the most common. The D1650 utilizes proprietary **Class-T** topology from Tripath™. **Class T** combines the best attributes of several of these designs and minimizes deficiencies in each design, as well.

Class-A, **Class-B** and **Class-AB** amps have been around for over fifty years. Basically, these classifications designate the amount of time that the amp's output devices conduct during one full cycle of a periodic signal. Class-A amps are in a state of conduction 100% of the time. Class-B amps have a complimentary pair of outputs, which are biased so that each output is conducting only 50% of the time. Class-AB amps also have complimentary output pairs but they are biased so that each output is conducting slightly more than 50% of the time: this lowers crossover distortion. The vast majority of audio amps in use today are Class-AB. A well-designed Class-AB amplifier has good linearity (high fidelity) and poor efficiency (less than 50%). **Class-H** and **Class-G** are both voltage-supply varying techniques which are usually applied to Class-AB type, linear amplifiers. These techniques give marginal improvement in efficiency at the cost of a more complex and less reliable power supply.

Class-D amplifiers use output devices which switch on and off at a fixed frequency. This frequency is usually more than ten times higher than the highest frequency to be amplified. A passive filter reconstructs the wave form passing through the amplifier and removes switching artifacts that distort sound. Class D amplifiers use output devices that are either ON or OFF; never in a state of mid-conduction. This mid-conduction state is what causes linear switching amplifiers to be as inefficient as they are (less than 50% efficiency). Class D amplifiers are approximately 85% efficient: a 35% increase!

As mentioned, each of these amplifier designs has drawbacks. Class D amps have tendencies toward high distortion rates. Crossover distortion, ground bounce, and high frequency artifacts create most of the distortion in these designs. Imperfectly matched transistors lead to inexact ON/OFF timing results and crossover distortion issues. Ground Bounce caused by high-current switching of the output transistors manifests itself as noise on the audio output. In some Class D amplifiers, this high-frequency noise is not completely filtered out, resulting in high frequency distortion.

Advantages of Class T Design

Class T is a combination of Adaptive Digital Signal Processing and Spread-Spectrum Switching. This design takes the efficiency of a Class D amp and combines it with the fidelity of a Class AB amplifier by dramatically improving signal integrity.

Class T offers the following improvements over Class D:

1. Class D has a fixed switching input. Class T has an adaptive switching frequency which is dependent upon both input signal frequency and magnitude. Switching artifacts are removed in this way, reducing distortion. The switching signal is constantly being optimized to match the input signal in order to yield the highest possible fidelity.

2. Class D amplifiers have nominal switching frequencies between 200kHz and 300kHz which creates artifacts in the 20 to 50kHz audio band. This can be heard as audible noise. Class T amplifiers have nominal switching frequencies between 600kHz and 700kHz; artifacts from this frequency are not audible.

3. Class T design constantly monitors the output transistors and adaptively corrects for varia tions between and within these transistors. The Class T design also monitors and corrects for ground bounce that the transistors produce when switching large currents.

4. Typical power efficiency with a Class T amplifier is 85% (unreachable by class A-B amps). Typical THD + Noise is less than 0.04% (unreachable by Class D amps.) Truly the best of both worlds!

2. Connections and Applications

Multi-Room Applications

The D1650 is specifically designed for multi-room applications. Virtually every feature was selected to enhance the multi-room experience and simplify the multi-room installation:

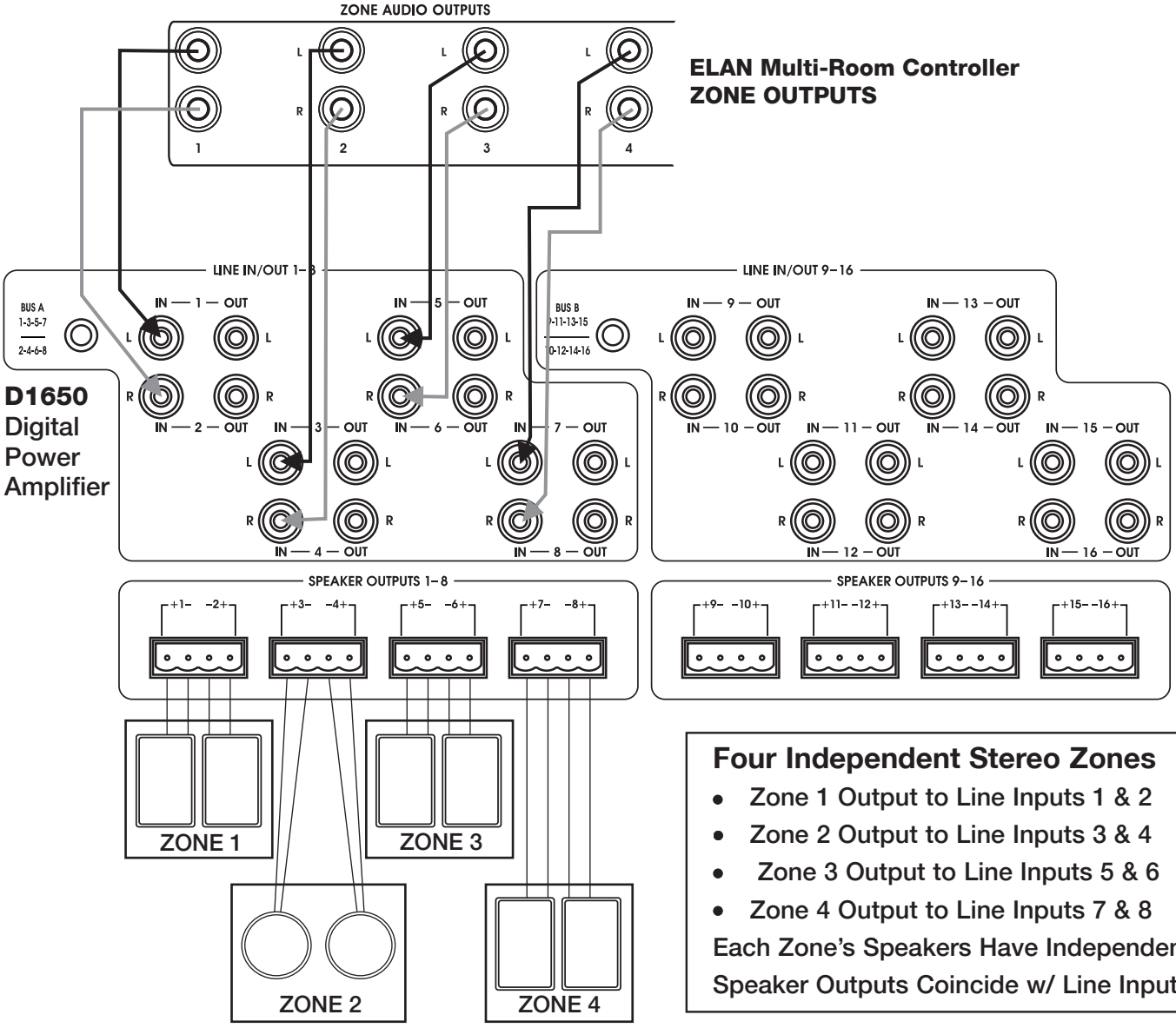
- **Class T Topography** allows all sixteen channels to coexist in the same chassis without overheat ing.
- **Buffered Loop Outputs** allow sharing of sources.
- **Stereo and Mono Bus Modes** make configura tion a logical process.
- **Sixteen Independent Channels** provide audio to a house full of speakers.
- **Triggers** allow for automated functions on a zone-by-zone or system-wide basis.

WIRING CONSIDERATIONS

Speaker Wires	14-18 AWG Speaker Wire
Audio Cables	RCA Type Patch Cables
Triggers	2 Conductor Wire w/ Mono Mini-Plug

Independent Stereo Zones

The D1650 is set up to easily power eight independent stereo zones right out of the box. This is the standard configuration for most multi-zone audio distribution systems. In the drawing below, each pair of speakers will have independent volume control.



Four Independent Stereo Zones

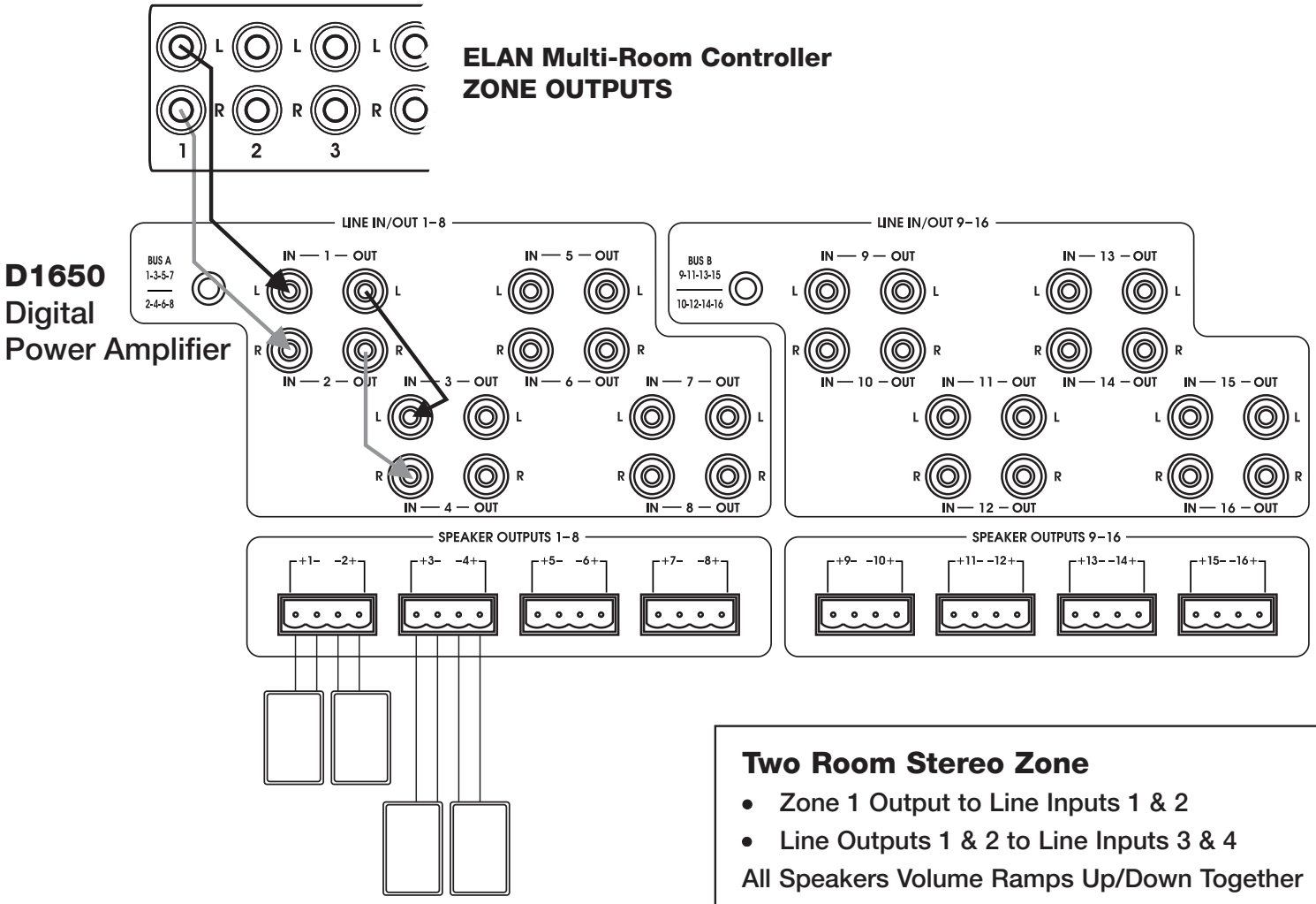
- Zone 1 Output to Line Inputs 1 & 2
- Zone 2 Output to Line Inputs 3 & 4
- Zone 3 Output to Line Inputs 5 & 6
- Zone 4 Output to Line Inputs 7 & 8

Each Zone's Speakers Have Independent Volume

Speaker Outputs Coincide w/ Line Inputs

Two Room Stereo Zone

By using the D1650's Audio Loop, an additional pair of speakers can be added to a zone.
In this example, both pairs of speakers will ramp volume up and down simultaneously.



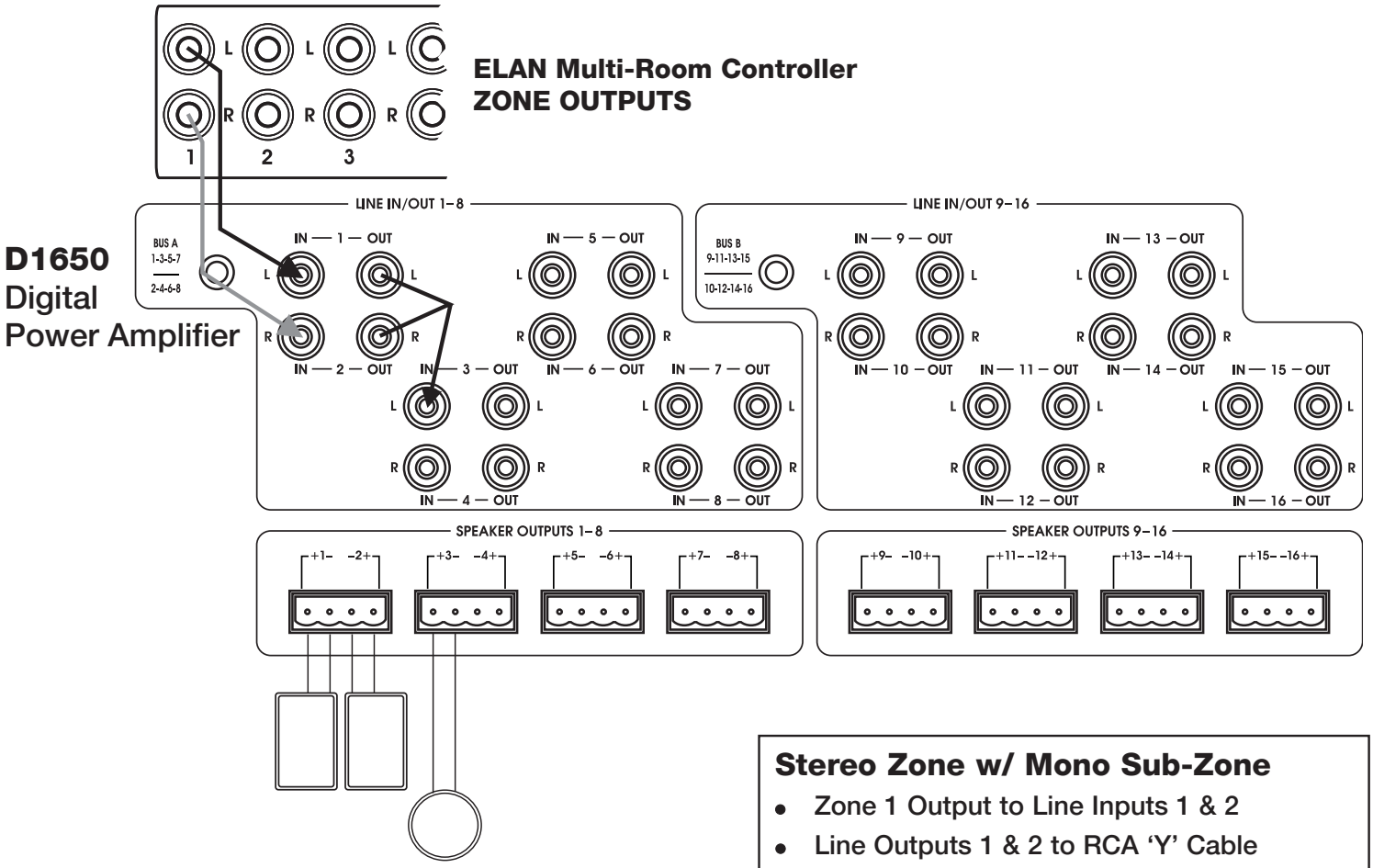
Two Room Stereo Zone

- Zone 1 Output to Line Inputs 1 & 2
- Line Outputs 1 & 2 to Line Inputs 3 & 4

All Speakers Volume Ramps Up/Down Together
Speaker Outputs Coincide w/ Line Inputs

Stereo Zones w/ Mono Sub-Zones

Use the Loop Out Jacks and an RCA 'Y' cable to create Mono sub-zones with Stereo zones. This application is perfect for large rooms with smaller rooms attached such as a Master Bedroom/Master Bath or Kitchen/Laundry Room.



Stereo Zone w/ Mono Sub-Zone

- Zone 1 Output to Line Inputs 1 & 2
- Line Outputs 1 & 2 to RCA 'Y' Cable
- RCA 'Y' Cable to Line Input 3

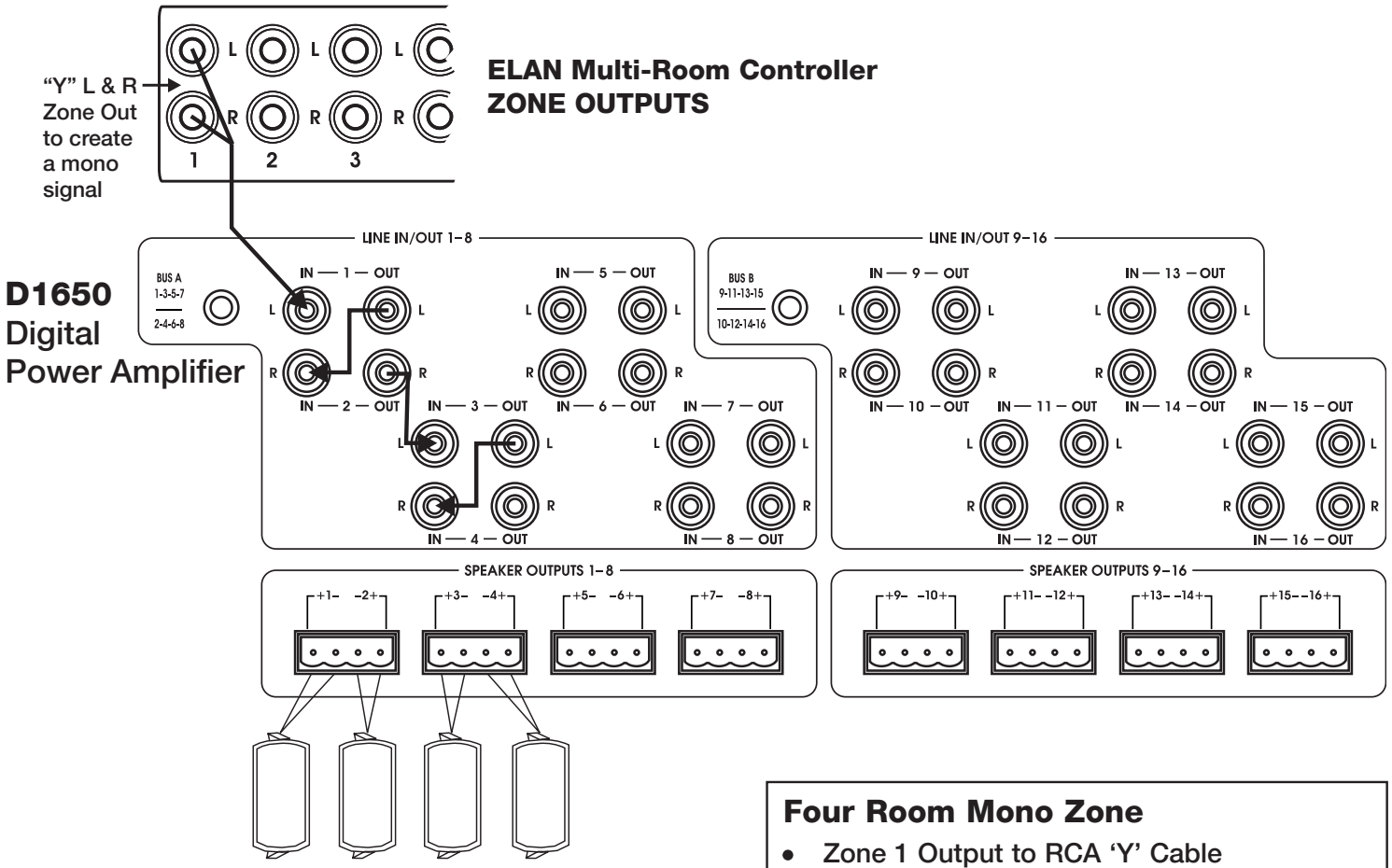
All Speakers Volume Ramps Up/Down Together

Speaker Outputs Coincide w/ Line Inputs

Mono Zones

Use mono zones in areas where there is no distinct, stationary listening area such as hallways, L-shaped rooms, kitchens, and outdoor areas. The use of mono zones also increases the capacity of the amplifier...up to sixteen mono areas can be powered from one D1650.

In this example, four channels of the D1650 are configured in mono to run four speakers



Four Room Mono Zone

- Zone 1 Output to RCA 'Y' Cable
- RCA 'Y' Cable to Line Input 1
- Line Output 1 to Line Input 2
- Line Output 2 to Line Input 3
- Line Output 3 to Line Input 4

All Speakers Volume Ramps Up/Down Together

Speaker Outputs Coincide w/ Line Inputs

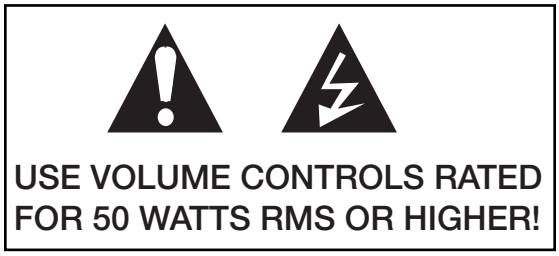
Bus Modes

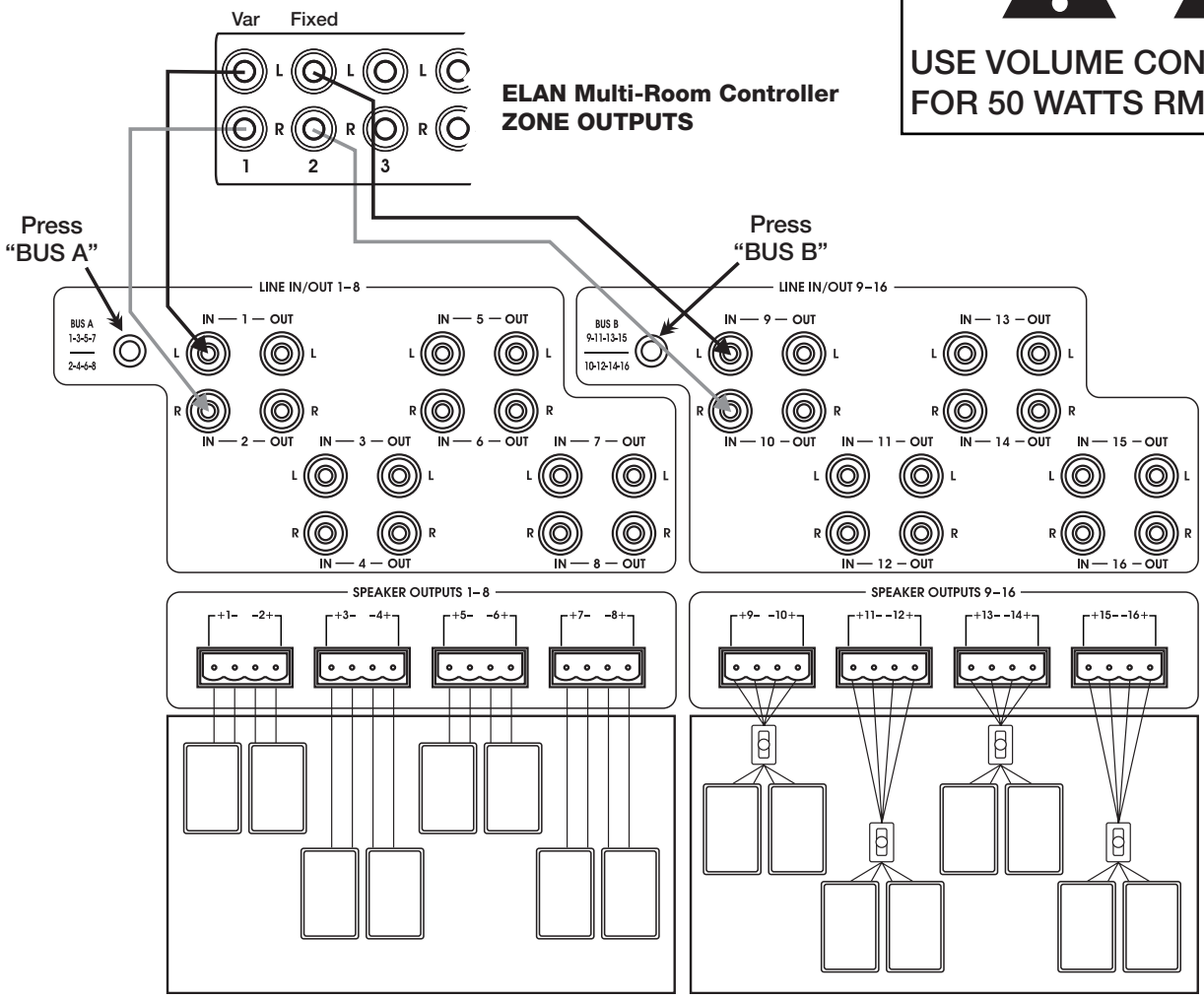
The D1650's unique Bus Mode feature allows multiple amp Inputs to be internally configured to several different Outputs. This increases the amp's flexibility without the use of extraneous RCA patch cables.

Using Bus A, a signal that is sent into Input 1 will come out Speaker Outputs 3,5, and 7. Signals sent to Input 2 will be routed to Outputs 4, 6, and 8.

Using Bus B, a signal that is sent into Input 9 will come out Speaker Outputs 11,13, and 15. Input 10 will be sent to Speaker Outputs 12,14, and 16.

This example shows two "Wide Coverage Zones," one using Variable Outputs from an ELAN Multi-Zone Controller so that all speakers ramp volume up/down together, the other using the Fixed output from an ELAN Multi-Zone Controller and High Power Volume Controls so that each area has independent volume up/down control.





Zone 1 is a Variable Wide Coverage Zone

- Zone 1 Output to Line Inputs 1 & 2
- Set Zone 1 to VARIABLE on Multi-Zone Controller
- Press BUS A Button

Speaker Outputs 1-8 now assigned to Zone 1

All Speakers Volume Ramps Up/Down Together

Zone 2 is a Fixed Wide Coverage Zone

- Zone 2 Output to Line Inputs 9 & 10
- Set Zone 2 to FIXED on Multi-Zone Controller
- Press BUS B Button

Speaker Outputs 9-16 now assigned to Zone 2

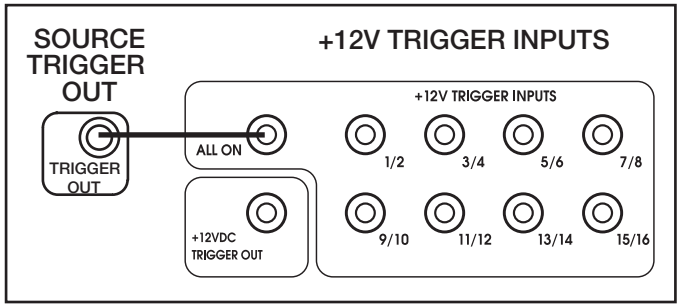
Connect Each Pair of Speaker Outputs to a High Power Volume Control

All Speaker Pairs Volume Ramps Separately w/ High Power Volume Controls.

Triggers

Each channel pair of the D1650 has its own Remote Turn On/Muting circuit. Individual channel pairs can be turned on or muted independently of any others. An "ALL ON" port allows the entire amp to turn on and mute as one unit. The 12 Volt DC Trigger Out can be used to turn-on other equipment, additional amps, or to perform automated functions desired by the user. The Front Display of the D1650 will show **"MUTED!"** when a channel is in Mute.

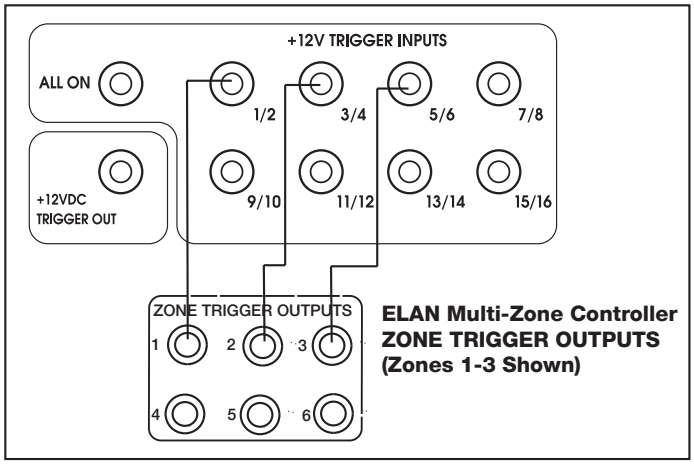
ALL ON



Single Source Mutes/UnMutes All Channels Simultaneously

To Mute/Un-Mute the entire amplifier as one entity, simply connect a system-wide 3-24 Volt AC or DC Triggering Source to the ALL ON Trigger Input. Examples of triggering sources include an ELAN Multi-Zone Controller's SYSTEM TRIGGER OUT or REMOTE OUT, an A/V receiver's switched outlet connected to a power supply, or a +12VDC TRIGGER OUT from another ELAN D Series amplifier.

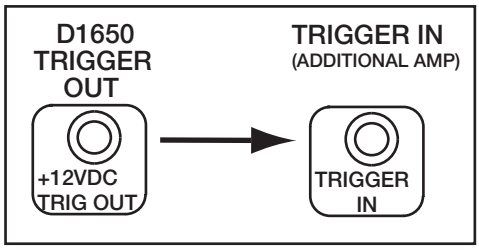
Specific Stereo Pair Triggers



Multi-Zone System Mutes/UnMutes Each Pair of Channels Independently

To Mute/Un-Mute specific stereo pair inputs, a zone-specific Triggering Source can be used. As in the ALL ON example, any 3-24 Volt AC or DC source may be used to trigger these specific inputs. This application gives additional control in advanced systems. Examples include: Zone Specific Trigger Outputs from an ELAN Multi-Zone Controller, multiple A/V receivers triggering separate D1650 inputs, or outboard sensors located in certain areas to trigger specific inputs of the D1650.

+12VDC TRIGGER OUT

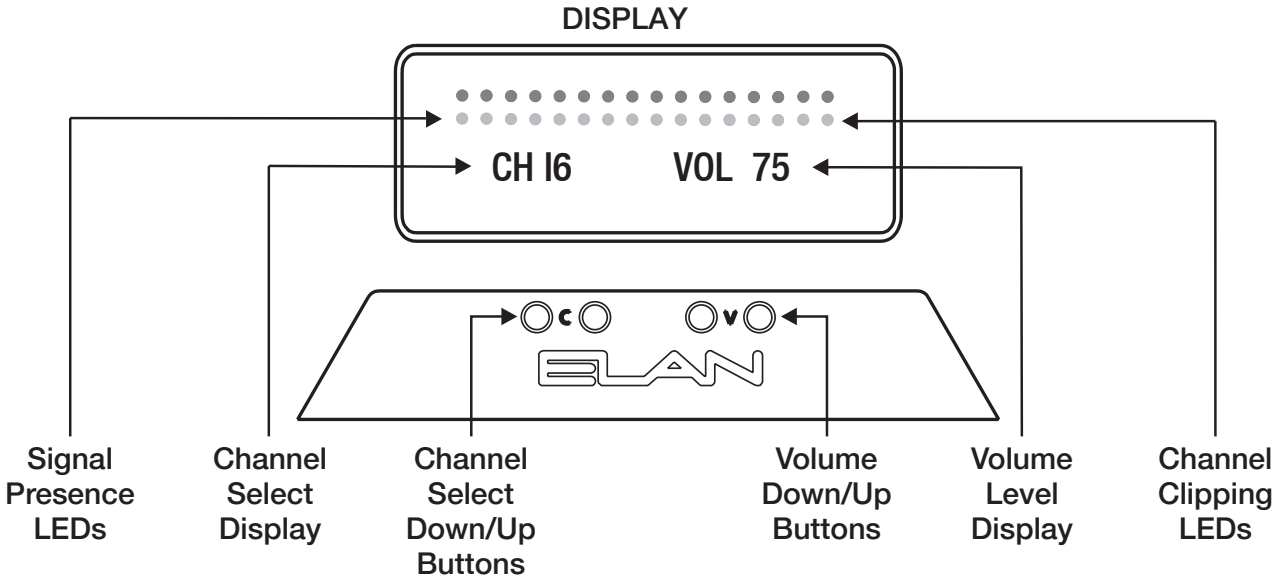


D1650 Turns On Additional Amp w/ +12VDC Trigger Output

Whenever the D1650 is powered On, the +12VDC TRIGGER OUT becomes active. As the name implies, this output sends a +12VDC 100 mA signal to other devices utilizing a trigger. Examples of proper usage of the +12VDC TRIGGER OUT include muting/un-muting another D Series amplifier, Trigger the switched outlets of a Z•Power Controller, or triggering an IR sequence using VIA!® products.

TRIGGER INPUTS ACCEPT 3 TO 24 Volts AC or DC

3. Setup



Setting Channel Levels

The leftmost display on the front of the D1650 shows which channel is selected for adjustment. Pressing C+ or C- will cycle through each individual channel. Once a channel is selected, use the V+ and V- buttons to adjust the channel's Volume Up or Down from 0 to 100 (50 is Factory Default).

Each amp channel can be individually adjusted from the front panel. Pressing the C button will cycle through all the inputs on the amplifier — both Left and Right channels can be adjusted independently. The C button to the left cycles downward, the one on the right cycles upward. When the desired channel is displayed on the front panel, use the V buttons. Again, the V button to the left lowers the volume for that channel, the one on the right raises the volume.

Set the levels by lowering them all the way down, then raise the volume of any keypads or volume controls to maximum. Slowly adjust Volume Up for this channel until the red clipping LEDS start to light up, then drop the level one or two clicks. Follow this procedure for all channels.

Please Note: Whenever the Front Display is lit (during volume adjustment, for example), ACE clipping elimination circuitry is disabled.

Lockout Mode

The Lockout feature is designed to disable all front panel functions. Use this feature once the system is fine-tuned and ready-to-go. By locking the system's front panel, prying hands cannot ruin carefully set level adjustments or overdrive speakers.

To place the D1650 in Lockout Mode:

1. With the Front Display dark, Press C- and V- simultaneously.
2. Continue pressing C- and V-. The Front Display will show the Volume setting momentarily.
3. Four seconds later, the Front Display will read LOCK. Release the buttons.
4. Follow the same procedure to Unlock the D1650.

Please Note: *If the user tries to change settings while in Lockout Mode, the Front Display will read* ***"VOLUME LOCK IS ON".***

THERE IS NO BENEFIT FROM TURNING THE AMPLIFIER'S LEVELS PAST THE POINT WHERE THEY CAUSE THE RED CLIPPING LEDS TO LIGHT UP.

Factory Default

When your D1650 arrives, it is set to a FACTORY DEFAULT condition. At some point during the life of this amplifier it may be necessary to put the unit back into Factory Default mode. If this unit is moved to a different location or speaker type or load are changed, the FACTORY DEFAULT procedure should be used:

1. Turn the D1650 OFF using the rear Power Switch.
2. Turn the unit back ON. The Front Display will read **ELAN**.
3. Press and hold **C+**, **C-**, **V+**, and **V-** (all the front panel buttons at once) while **ELAN** is displayed.
4. The Front Display will now read "**FACTORY DEFAULT**".

The Factory default settings are:

- All channels Volume defaults to 50.
- Lockout feature is Disabled.
- ACE ™ Automatic Clip Eliminator is Enabled.

Display Brightness Levels

The blue Signal and Power LED brightness levels on the Display can be increased or decreased from the Front Panel. Press and hold **C+** and **V+** to cycle between High, Low, and Off. The red Clipping LEDs will remain at full illumination.

4. Troubleshooting

SYMPTOM	CAUSE	SOLUTION
No Audio From One or More Channels	1. Loose/Bad Speaker Cable Connection	Check Cable Ends at Binding Posts and Speaker Terminals
	2. Break/Short in Speaker Cable	Check Continuity of Each Speaker Cable Using Multimeter. If Short or Open is Indicated, Check Wiring for Proper Connections.
	3. Speaker is defective	Swap with Known Good Speaker
	4. RCA Patch Cable Defective	Swap with Known Good Patch Cable.
	5. Source not Sending Audio	Verify Source is Powered Up and Playing. Check any Tape Monitor Settings on A/V Receiver.
"MUTED!" Flashes on Display, Then Volume Setting	Channel is in MUTE	Make sure triggering device's remote output is connected and producing voltage.
"ERROR!" Message Displayed on Front Panel	Amplifier in Protection Mode	Find short or low-impedance condition. Correct overheating or AC power issues. Once issue is found and resolved, cycle power to D1650. This condition could be caused by 1. 2.,3., and/or 4 above.
Audio "Hum"	1.Ground Potential Difference Between Source Components (Ground Loop)	Plug All Sources into Same AC Outlet.
		Test AC Outlet Using Ground Tester.
	2. Faulty/Damaged Cables	Check Source Equipment Cables For Damaged Cables and Faulty Connections.
	3. Faulty Wiring	Make Sure Any Volume Controls Are Not Hooked Up Backwards.
		Check for Shorts in Wiring (See item 2 in "No Audio…")
Distorted Audio at Normal Volume Levels	1. Input Gain Too High	Reduce Gain to the Channel in Question. Ensure Red Clipping LEDs are not Pulsing or On Constantly.
	2. Defective/Incompatible Speaker	Check for Physical Damage to Speaker
		Check Power Ratings on Speaker Do Not use Speakers Rated for Less than 50 Watts RMS.
	3. Volume Control Miswired	Check for Proper Input/Output connections at Volume Control. INPUT Comes from Amplifier, OUTPUT Goes to Speakers.

Troubleshooting (cont.)

Audio is Unclear, Bass Response Low	Speakers Out of Phase	Verify that + of Amplifier goes to + of Speaker (and – to -) on ALL Speaker Leads.
Incorrect Source Playing on Speakers	1. BUS A and/or BUS B buttons pressed.	Make sure BUS A and/or BUS B buttons in correct position.
	2. Source Connected to Wrong Input of Amplifier	Verify Source Input Connections.
	3. Speakers Connected to Wrong Speaker Outputs	Verify Speaker Connections.
Amplifier Will Not Power Up	1. Power Switch is OFF	Turn it ON. Switch is Located on Back of Unit.
	2. Circuit Breaker Tripped	ELAN Recommends the D1650 be Installed on its Own 15 Amp Circuit Breaker. Placing this Unit on a Circuit Populated by Other Devices can Cause Circuit Breakers to Trip.
	3. Remote Turn-On Miswired	Ensure That Any Remote Turn On Cables are Connected At Both Ends. A Cable Plugged into the D1650 Remote In, but Not Connected to a Sources Remote Out will Remain in Mute Mode.
Audio Very Distorted in Areas Using Volume Controls	1. Impedance-Match Settings Incorrect	Set Impedance-Match Settings Correctly.
	2. Using Incompatible Volume Control	Use Volume Controls Rated for 50 Watts or Higher.

Notes:

Limited Warranty

ELAN HOME SYSTEMS L.L.C. ("ELAN") warrants the D1650/D1651 to be free from defects in materials and workmanship for the period of Two Years (2 Years) from date of purchase. If within the applicable warranty period above purchaser discovers that such item was not as warranted above and promptly notifies ELAN in writing, ELAN shall repair or replace the item at the company's option. This warranty shall not apply (a) to equipment not manufactured by ELAN, (b) to equipment which shall have been installed by other than an ELAN authorized installer, (c) to installed equipment which is not installed to ELAN's specifications, (d) to equipment which shall have been repaired or altered by others than ELAN, (e) to equipment which shall have been subjected to negligence, accident, or damage by circumstances beyond ELAN's control, including, but not limited to, lightning, flood, electrical surge, tornado, earthquake, or other catastrophic events beyond ELAN's control, or to improper operation, maintenance or storage, or to other than normal use of service. With respect to equipment sold by, but not manufactured by ELAN, the warranty obligations of ELAN shall in all respects conform to the warranty actually extended to ELAN by its supplier. The foregoing warranties do not cover reimbursement for labor, transportation, removal, installation or other expenses which may be incurred in connection with repair or replacement.

Except as may be expressly provided and authorized in writing by ELAN, ELAN shall not be subject to any other obligations or liabilities whatsoever with respect to equipment manufactured by ELAN or services rendered by ELAN.

THE FOREGOING WARRANTIES ARE EXCLUSIVE AND IN LIEU OF ALL OTHER EXPRESSED AND IMPLIED WARRANTIES EXCEPT WARRANTIES OF TITLE, INCLUDING BUT NOT LIMITED TO IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

ATTENTION: TO OUR VALUED CONSUMERS
To ensure that consumers obtain quality pre-sale and after-sale support and service, ELAN Home Systems products are sold exclusively through authorized dealers. *ELAN products are not sold online.* **The warranties on ELAN products are NOT VALID if the products have been purchased from an unauthorized dealer or an online E-tailer. To determine if your ELAN reseller is authorized, please call ELAN Home Systems at (859) 269-7760.**

ELAN
HOME SYSTEMS
2428 Palumbo Drive Lexington, KY 40509
www.elanhomesystems.com

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