

Quick Start Guide

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Pre- Installation

This section describes safety conventions used within this document and provides essential information about amplifier **Models LVC 623 and LVC 2016**. Hereafter referred to as the **LVC 623/2016 Series** except in specific circumstances. Review this material before installing or operating the amplifier.

AE TECHRON is committed to continuous product improvement. Technical progress may result in minor variations between this manual and a particular unit. Any significant changes or customizations will be reflected in future revisions of this manual. Customers are encouraged to promptly add any additional information, about their particular unit, to this manual.

Connecting Power

The LVC 623/2016 uses a 3-wire (grounded) AC line system. At times, the third wire ground may introduce a ground loop into the system.

Each LVC 623/2016 is factory supplied with an appropriate AC cord.



NOTE: Units destined for other parts of the world are shipped without a plug.

Whenever possible connect the power cord to an isolated power circuit with adequate current. Excessive line voltages of more than 11% above the amplifier's rated line voltage will activate the overvoltage protection circuitry. For example, do not exceed a line voltage of 133V AC for units set up for 120V AC operation.

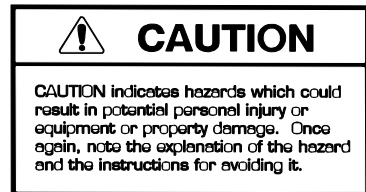
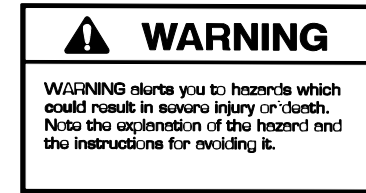
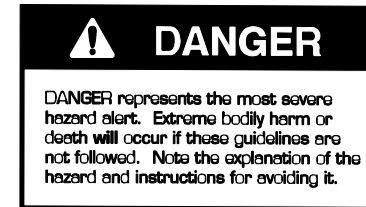
All specifications in this manual were measured using 120V AC, 60 Hz power mains unless otherwise noted. Specifications are derived using a peak main voltage equal to the true peak of a 120V RMS sine wave with all available channels fully loaded. Performance variations can occur at other AC main voltages and line frequencies. In addition, line regulation problems will directly affect the output power available from the amplifier.

A qualified technician can set up your amplifier for different AC main voltages and frequencies by changing the power supply connections on the control board inside the amplifier. The proper procedures are outlined inside the top cover of the amplifier.



Safety Conventions

The LVC 623/2016 amplifiers are a highly sophisticated instrument. Special hazard alert instructions appear throughout this guide. Note the following examples:



NOTE: A Note represents information, which needs special emphasis but does not represent a hazard.

General Description

The **AE TECHRON LVC 623/2016 Series** are dual-channel power supply amplifiers designed for use in low and medium power systems. They accomplish this with extremely low harmonic and inter-modulation distortion and low noise.

All this power is concentrated into a 3.5-inch rack mount package. From the front panel, you can control and monitor the input signals.

- A push button power switch activates an **AMBER “ON”** indicator.
- **GREEN LED** indicator is dim when signal is present and bright when the amplifier is in **OVERLOAD**.

On the back panel:

- Input is connected using bare wires.
- Loads connect to a unique output block, which combines heavy duty binding bolts and dual banana connectors.

Other features include the ability to:

- Switch from Dual Mode to Bridge Mono or Parallel Mono Mode with a 3-position slide switch.
- Select three different gain values for either channel with two more 3-position slide switches located inside the input compartment.

All **AE TECHRON** amplifiers are tested at the factory to assure operation at full efficiency upon delivery. Custom configurations are available, as well as full system implementations.

Parallel-Mono Hookup

Parallel-Mono Mode is intended for driving loads with a total impedance of less than 4 ohms (Section 2.4.2 if the load is 4 ohms or greater). Installing the amplifier in Parallel-Mono Mode is very different from the other modes and requires special attention.

To activate Parallel-Mono Mode:

1. Turn off the amplifier
2. Wait at least 10 seconds
3. Slide the Dual/Mono switch to the left (as you face the back panel).
4. Connect the input signal to Channel 1, and do not use the Channel 2 input

Both outputs will now receive the signal from the Channel 1 input.



NOTE: The channel 2 input and level control are disconnected in Parallel-Mono mode. A signal-feeding channel 2 will have no effect on the output.

To complete connections:

1. Install a jumper wire between the positive (+) outputs of Channel 1 and 2 that is at least 14 gauge in size.
2. Connect the load to the output of Channel 1 as shown below.
3. Connect positive (+) lead from the load to the positive (+) Channel 1 terminal
4. Connect the negative (-) lead from the load to the negative (-) Channel 1 terminal.

Channel 2's Green LED will be bright in parallel-mono mode, this is normal.



NOTE: To prevent damage to the amplifier, remember to remove the jumper between the positive output terminals before changing to Bridge-Mono or Dual modes.

Bridge-Mono Hookup

Bridge-Mono Mode is intended for driving loads with total impedance of 4 ohms or more (see Section 2.4.3 if the load is less than 4 ohms). Installing the amplifier in Bridge-Mono Mode is very different from the other modes and requires special attention.

To activate Bridge-Mono Mode:

1. Turn the amplifier off.
2. Wait at least 10 seconds.
3. Slide the Dual/Mono switch to the right (as you face the back of the amplifier).



NOTE: Both outputs receive the signal from the Channel 1 input with the output of Channel 2 inverted so it can be bridged with the Channel 1 output.

AND



NOTE: The Channel 2 input and level control are disconnected in Bridge Mono mode. A signal-feeding Channel 2 will have no effect on the output.

1. Connect the load across the Channel 1 and 2 positive (+) terminals.
2. Attach the positive lead from the load to Channel 1.
3. Attach the negative lead from the load to Channel 2.

The negative (-) terminals are **NOT** used and should **NOT** be shorted. In addition, the connected load *must be floating referenced to ground*.

Specifications

Specifications are for units in Dual Mode driving both channels into 8-ohm loads, (26 dB = 20 times voltage gain) and operating from 120 VAC, unless otherwise specified.

- “Standard 1 kHz Power” refers to maximum average power in watts at 1 kHz with 0.1% THD.
- “Full Bandwidth Power” refers to maximum average power in watts from 20 Hz to 20 kHz with 0.1% THD.

Performance

Frequency Response: ± 0.1 dB from 20 Hz to 20 kHz at 1 watt.

Phase Response: $\pm 10^\circ$ from 10 Hz to 20 kHz at 1 watt.

Signal to Noise Ratio: At 26-dB gain, better than 105 dB (A-weighted) below full output.

Total Harmonic Distortion (THD): $<0.05\%$ from 20 Hz to 1 kHz, increasing linearly to 0.1% at 20 kHz at full output.

I. M. Distortion: $<0.05\%$ from 410 milliwatts to full output at 26-dB gain, with an 8-ohm load.

Slew Rate: >13 V per microsecond.

Load Impedance: Rated for 16, 8, 4, and 2-ohm use. Safe with all load types, even reactive ones.

Required AC Mains: 60 Hz, 120VAC with 15-20A service. Other voltages are available by special order.

Controls

Front Panel: A push “On/Off” power switch; also, a signal level control for each channel.

Back Panel: A 3-position switch selects Dual, Bridge-Mono, or Parallel- Mono Mode.

Internal: A 3-position switch, located inside at the bottom of the input well, selects 20, 70, or 140-voltage gain for each channel.

Indicators

Amber Enable Indicator shows on/off status of low-voltage power supply.

A Green OVERLOAD indicator for each channel flashes dim green to show a signal is present at the input, and flashes brightly in the rare event distortion of any kind exceeds 0.05%, including input overload.

Input/Output

Input Impedance: Greater than 10 K ohms, balanced, and 5 K ohms, unbalanced.

Output Impedance: Less than 10 milliohms in series with less than 2 microhenries.

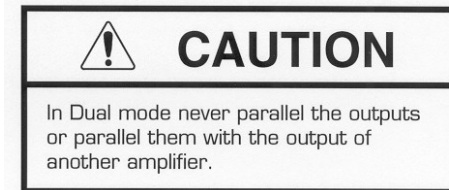
Dual Channel Hookup

In Dual Mode, installation is very intuitive: input Channel 1 feeds output Channel 1, and input Channel 2 feeds output Channel 2.

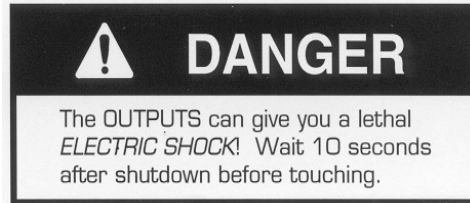
To activate Dual Mode:

1. Turn off the amplifier.
2. Wait 10 seconds for the power supply to discharge.
3. Slide the Dual/Mono switch to the center position.
4. Connect the output wiring.

The high-current output block has three sets of output connectors per channel so multiple loads can be easily connected. Two sets accept banana plugs, while the third set accepts spade lugs or bare wire. Observe correct load polarity and be very careful not to short the two outputs.



8. **Never connect the output to a power supply output, battery, or power main.** These connections will cause serious damage to the amplifier.
9. **Do not permit unqualified personnel to tamper with circuitry.** Do not make unauthorized circuit modifications. Serious damage to the amplifier and/or safety hazards may result.



Connectors

Inputs: Euro-style screw terminals will accept up to 16 gauge bare wire.

Outputs: Unique output bus with dual banana jacks on 3/4 inch centers, and versatile 5-way binding posts.

AC Line: LVC 623 is 120V only, NEMA 30 TT

LVC 2016 is 120V or 230V—not field convertible.

Construction

Material: Black splatter-coat steel chassis with specially designed flow-through front to rear ventilation system with computer-controlled forced air-cooling.

Dimensions: 19 inch (48.3 cm) wide, 3.5 inch (8.9 cm) high, 16 inch (40.3 cm) deep behind front mounting surface, and 2.875 inches (7.3 cm) in front of the mounting surface.



NOTE: Allow 3 inches in back for adequate airflow.

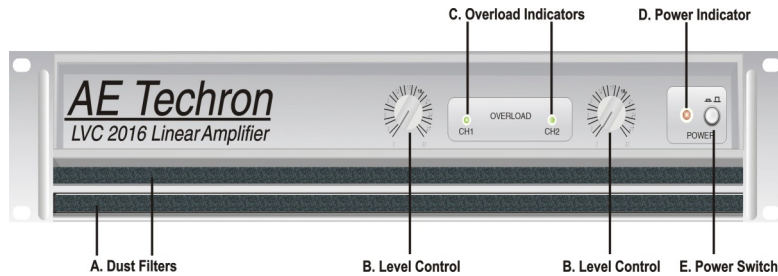
Shipping Weight:

LVC 623	52 lbs. (23.5 kg.) net, 65 lbs. (29.5 kg.)
LVC 2016	52 lbs. (23.5 kg.) net, 65 lbs. (29.5 kg.)

Mounting: Standard 19-inch (48.3 cm) equipment rack with supports for supplemental rear corner mounting. Both front and rear mounting should be used when transporting amplifier.

Front Panel Functions

The following illustration, with captioned call-outs, provides a visual location of the **LVC 623/2016 Series** front panel functions.



A. Dust Filters

The dust filters remove large particles from the air drawn in by the cooling fans. Check the filters regularly to prevent clogging. The filter elements can be easily removed for cleaning by gently pulling them away from the front panel.

B. Level Control

The output level for each channel is set with these controls. Each control has 31 detents for precise adjustment.

C. Overload Indicators

When a large input signal causes an input overload or output clipping, these green indicators glow **brightly**; otherwise, they indicate the presence of a distortion-free signal with a low glow..

D. Power Indicator

This amber indicator lights when the amplifier is connected to AC power and turned “On”.

E. Power Switch

This push button is used to turn the amplifier “On” and “Off”. When turned on, the output is muted for about four seconds to protect your system from start-up transients.

Making Connections

Before beginning the installation of your amplifier, please check the following:

- ✓ Remove all power from the unit. **Do Not** have the AC cord plugged in.
- ✓ Turn input level control down (fully counter clockwise).

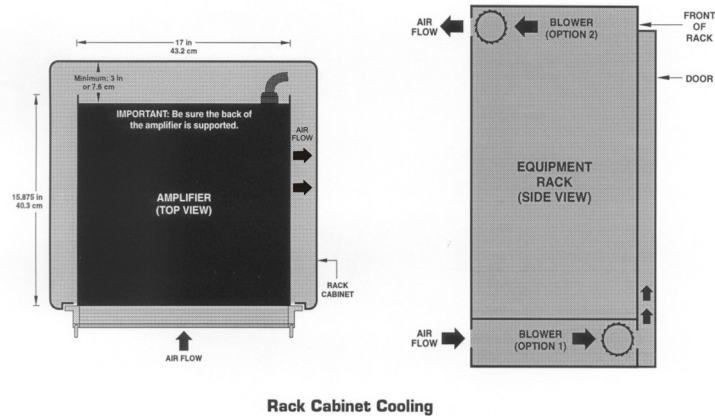
The input and output jacks are located on the back panel. Use care in making connections, selecting signal sources, and matching loads. During hookup, take the following precautions:

1. **Use only shielded cable on inputs.** The higher the density of the shield (the outer conductor), the better the cable. Spiral wrapped shield is not recommended.
2. **The output wire and connectors should be heavy enough** to carry the intended current to the load.
3. **Use good quality connectors** with proper strain relief.
 - Do not use connectors that have any tendency to short circuit.
 - Do not use connectors that can be plugged into AC power receptacles.
4. **Keep unbalanced input cables as short as possible.** Avoid lengths greater than 10 feet.
5. **Do not run signal (input) cables together with high level wiring** such as load (output) wires or AC cords (lowers most hum and noise).
6. **Do not short the ground lead of an output cable to the input signal ground.** Oscillations may result.
7. **Operate the amplifier from proper AC current.** Supply voltage must be 50 or 60 Hz (depending on model) and no more than 10% above or below the selected line voltage. Failure to comply with these frequency limits may damage the unit and result in unreliable operation.

Cooling

NEVER block the air vents in the front or sides of the amplifier. These amplifiers **DO NOT** need to be mounted with space between them. If you must leave open spaces in a rack for any reason, close them with blank panels or poor airflow will result. Allow for airflow of at least 75 cubic feet (2.1 cubic meters) per minute per unit. Additional airflow may be required when driving low-impedance loads at consistently high output levels.

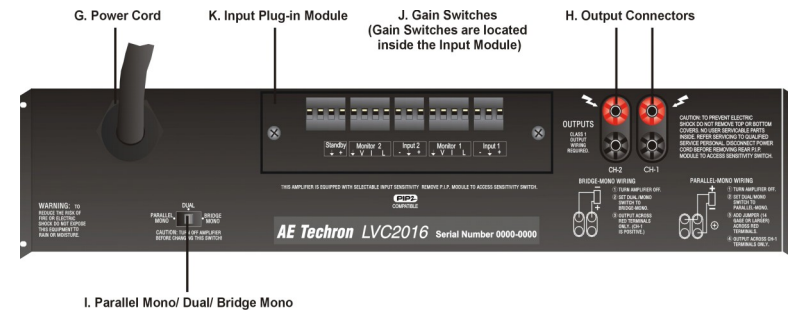
When mounting the amplifier in a rack cabinet, the back wall of the rack should be at least 3 inches (7.6 cm) away from the back of the amplifier chassis as shown below.



If your rack has a door, provide adequate airflow by installing a grille in the door or by pressurizing the air behind the door. Wire grilles are recommended over perforated panels. A good choice for pressurizing the air behind the rack cabinet door is to mount a "squirrel cage" blower inside the rack (Option 1 above). Mount the blower so it blows outside air into the space between the door and front of the amplifiers, pressurizing the "chimney" behind the door. This blower should not blow air into or take air out of the space behind the amplifiers.

Back Panel

The following illustration, with captioned call-outs, provides a visual location of the **LVC 623/2016 Series** back panel functions.



G. Power Cord

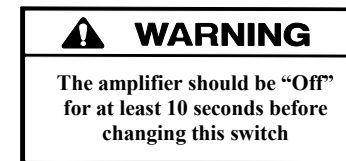
North American units set up for 120 VAC, 60 Hz power are shipped with a grounded 125 volt, 30 amp NEMA TT30P plug; units shipped outside North America are provided without a plug.

H. Output Connectors

This high-current output block is provided for output connection. Its connectors accept banana plugs, spade lugs or bare wire.

I. Parallel Mono/ Stereo/ Bridge Mono

This switch is used to select one of three- output modes; Parallel Mono, Stereo or Bridge Mono.



J. Gain Switches

These three-position switches are used to select a voltage gain of 20, 70 or 140 gain for each channel.

K. Input Plug-in Module

The versatility of plug-in modules makes it easy to customize the input, and other functions of the amplifier, to your needs.


Mounting

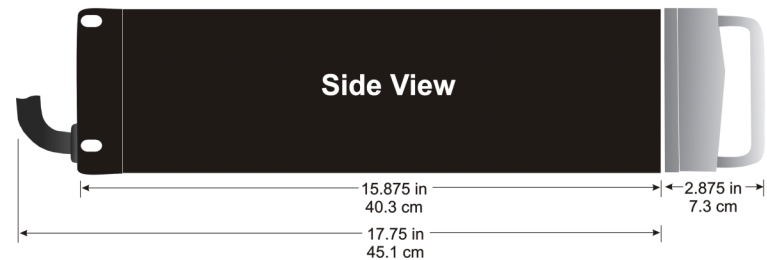
The LVC 623/2016 is designed for standard 19-inch (48.3 cm) rack mounting and "stack" mounting without a cabinet. For optimum cooling and rack support, multiple units should be stacked directly on top of each other.



 WARNING
To reduce the risk of <i>ELECTRIC SHOCK</i> or <i>FIRE HAZARD</i> , DO NOT expose the LVC 623/2016 to rain or moisture.



 CAUTION
Always support the back of the unit. Provide extra support if the unit will be transported.



Mounting Dimensions

Installation

This section describes general guidelines for installing the **Model LVC 623/2016 Series Amplifiers** with special emphasis on system installations.

Unpacking

Every **AE TECHRON Model LVC 623/2016** is carefully inspected and tested prior to leaving the factory. Carefully unpack and inspect the unit for damage in shipment. Besides the amplifier, you should find this manual and mounting hardware in the package.

- 1) Inspect the crating for **ANY** signs of damage.
 - a. Make written notes of any damage for future reference.
 - b. If damage is found notify the transportation company immediately
 - c. Save the shipping carton and packing materials as evidence of damage for the shipper's inspection.
 - d. If severe damage is apparent, **DO NOT** proceed until a representative of the shipping company is present.
- 2) Uncrate/unpack the amplifier
- 3) Save the packing materials for later use in transporting **or** shipping the unit.

AE TECHRON will cooperate fully in the case of any shipping damage investigation. In any event, replacement-packing materials are available from **AE TECHRON**.



NOTE: Never ship this unit without proper packaging.

Details of the Plug In Module

<u>Pin</u>	<u>Function</u>
1, 2,	Available for additional features
3, 4	Standby, When Pins 3 and 4 are shorted, output section of amplifier is forced into standby.
5	Ground pin for use with pins 6, 7, and 8
6	Voltage monitor; will have 1/20th of voltage at output of Channel 2. Pin 6 is inactive when amplifier is used in either mono mode.
7	Current monitor, will have 1 volt for every 3 amps of current at output of Channel 2, pin is inactive when amplifier is used in either mono mode.
8	When in Constant Current -mode provides a user definable maximum current, when in Constant Voltage mode provides a user definable maximum voltage for Channel 2. Uses control voltages of 0 - +8 VDC. Pin is inactive when amplifier is used in either mono mode.
9-11	Balanced input for Channel 2. Pins 9 or 11 can be connected to Pin 10 if an unbalanced input is desired. Pins 9 and 11 are not active when amplifier is used in parallel mono mode.
12	Ground pin for use with pins 13, 14, and 15.
13	Voltage monitor; will have 1/20th of voltage at output of Channel 1, when operated in 2 channel or Parallel Mono mode and 1/40th of the voltage when operated in Bridged Mono mode. Pin 13 is active in all modes of operation.

Details of the Plug In Module cont.

<u>Pin</u>	<u>Function</u>
14	Current monitor, will have 1 volt for every 4 amps of current at output of Channel 1, when operated in 2 channel or Bridge Mono mode. When operated in Parallel Mono mode 1 volt for every 6 amps of output current. Pin 14 is active in all modes of operation.
15	When in Constant Current mode provides a user definable maximum current, when in Constant Voltage mode provides a user definable maximum voltage for Channel 1. Uses control voltages of 0 - +8VDC. Pin 15 is active in all modes of operation.
16-18	Balanced input for Channel 1. Pins 16 or 18 can be connected to Pin 17 if an unbalanced input is desired. Pins 16 and 18 are active in all modes of operation.

The CCPIP Input Card

Channel One Controls

- HD1** When open provides ground lift from chassis.
- J10** Provides AC coupling when open and DC coupling when shorted.
- J11-12** Provides ability to enable or disable the front level controls. (populate only one never both)
- VR1** Adjusts DC offset of Channel 1 of input card (measured at Pin 1 of U4)
- VR3** Adjusts the Channel 1 soft clip circuit:
- ~ 15V (CW) No Clip
 - ~8V (Center) Minimum Clip
 - 0V (CCW) Max. Clip
- VR8** Adjusts common mode rejection for balanced input on Channel 1.
- VR10** Adjusts DC offset of Channel 1 of amplifier (measured at output of amplifier). Should be adjusted if gain of amplifier is changed.

JMPCC1

CV - Puts Channel 1 in Constant Voltage Mode
CC - Puts Channel 1 in Constant Current Mode
(CC or CV must be jumped for channel to operate)

CC1 - Constant Current compensation 1 for Channel 1 connects C 23 and R55

CC2 - Constant Current compensation 2 for Channel 1 connects C27 and R59



NOTE: C18 (Ch.1) C19 (Ch.2) - In parallel with compensation, controls stability and bandwidth when in Constant Current Mode

The CCPIP Input Card

Channel 2 Controls:

- J20** Provides AC coupling when open and DC coupling when shorted.
- J21-22** Provides ability to enable or disable the front level controls. (populate only one never both)
- VR2** Adjusts DC offset of Channel 2 of input card. (measured at Pin 1 of U5)
- VR4** Adjusts the Channel 1 soft clip circuit:
- ~ 15V (CW) No Clip
 - ~8V (Center) Minimum Clip
 - 0V (CCW) Max. Clip
- VR6** Adjusts DC offset of Channel 2 of amplifier (measured at output of amplifier). Should be adjusted if gain of amplifier is changed.
- VR9** Adjusts common mode rejection for balanced input on Channel 2.
- JMPCC2**
- CV** - Puts Channel 2 in Constant Voltage Mode
- CC** - Puts Channel 2 in Constant Current Mode
(CC or CV must be jumped for channel to operate)
- CC1** - Constant Current compensation 1 for Channel 2 connects C24 and R53
- CC2** - Constant Current compensation 2 for Channel 2 connects C26 and R61

