



ST-X DSP III SERIES

Owner's Manual

Before operating the unit, please read this manual thoroughly and retain it for future reference.

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Protect your audio investment by using the correct type of wire for Power and Ground.
See **All Wire is not created equal** on Page 6

A new level of Sound Quality

Zapco has a reputation for sound quality that is unsurpassed. It is our dedication to sonic purity and our passion for performance that built that reputation. With all the new amplifiers coming into the market, none has been any threat to Zapco's standing as the premiere amp and processor company for pure sound quality.

Just check out the audio competition scene. The pros know what to use to win. Competition amps however, do not come cheap, and not everyone wants to compete. The challenge then, was to put Zapco's 40 plus years of experience to use in the development of an amplifier that would bring Zapco sound a line of products for every-day use and that everyone could afford. And the studio line is just that amplifier. In the time it has been out it has built a reputation as the best sounding amp in the class.

Of course, not everyone buys strictly by sound (although they should). Maybe it's the wrong color, maybe it's too big... or too small. But one thing is constant. Everyone who hears the studio amps agrees; it sounds better than any other product in the class.

History of the Studio Series

Perfection cannot be achieved. But that does not make its pursuit less valuable. Zapco is committed to making every product we make better than the last. We introduced the ST-X amps in 2013. In 2015 we improved the PCB design and upgraded components to make the sonically improved ST-X II.

Three years ago we introduced the Studio-X SQ amplifier to take affordable sound quality to a new level. We added the proprietary RCA connectors from the Z-LX amplifiers, changed the capacitors to a higher end audio cap, and made a few other small changes. All this takes took the Studio sound to a new level of sonic performance for an affordable amplifier.

For 2019, we brought digital processing to the studio line in DSP/AMPs that can be controlled by PC or by iOS or Android mobile apps. For 2021 we have upgraded the ST-DSP with new features and functions to improve your listening experience. And developed a new aluminum heat sink for improved efficiency and reliability under extreme temperature and hard play.

The Studio-X DSP III Amplifiers

With the new Studio-X DSP amps you get the sound quality that other companies offer only in their big competition amps (and better than many of them) in a compact chassis with 25W RMS/Channel @ 4Ω (ST-68X DSP III), 65W RMS/Channel @ 4Ω (ST-4X DSP III), 100W/Ch. @ 4Ω (ST-6X DSP III) plus the tuning power of the ST Digital Processing System. The on-board DSP provides a wide variety of digital Crossovers, Parametric EQ as well as Signal Delay, Polarity, and gain for each channel. As for analog performance, the Studio X DSP amps give you more than power. These amps have 0.2% THD+noise, over 90dB signal to noise, over 60dB separation, and produce power from 15 Hz to 30 KHz.

Main features of the Studio-X DSP III amplifiers

- 4-Ch or 6-Ch Full Range, Class A/B Amplifier
- On-Board, Full Function, 8-Ch Digital Signal Processing
- HP/LP filters, Signal Delay, Phase (Polarity) control
- 15 Channels of Parametric Equalization on each channel
- Optional BT Streaming (Bluetooth Port for external BT Module)
- High-level Speaker Input
- And of course, Zapco sound quality
- Analog input level controls with 2-stage clip indicators for accurate, distortion free gain settings
- Toslink Optical input for the ST-4X and ST-6X models
- New high efficiency finned heat sink

Before you start your installation

ZAPCO highly recommends that a fuse or circuit breaker be placed within 18" of the battery. Although you will add a fuse or fuse block near the amplifier it is still a possibility that a pinched power wire between the component fuse and the battery could result in a short, or even a fire. The protection device should be placed where it can be accessed easily and all wiring should be routed safely and correctly according to the following guidelines:

- Do not run wiring close to hot or spinning objects.
- Always use wire grommets when routing wire through the firewall or any other metal panels.
- Make sure that the potential for pinched wiring is avoided by routing all wires away from moving objects, including brake, gas and clutch pedals, etc.

When connecting our amplifiers to pre-wired stock speakers, care must be taken that there are no common connections between left and right speaker wires, i.e. two or more speakers using the same ground connection (very common in pre-85 cars), as this will cause the amplifier to go into immediate protection or may cause damage to the amplifier. Output connections are not common chassis ground. Please follow the hookup instructions in this owner's manual. Any questions should be directed to your local ZAPCO dealer.

Upgrading a Factory Stereo

If you are upgrading a factory stereo, the ST-X DSP amps have a separate speaker level input plug that senses current, so you do not need to run a turn-on wire. However, auto-on is not useful in all cars as the amplifier can come on in some cars even when the stereo is not on, because of the car's electrical system. The ST-X DSP amps have a switch that allows you to defeat the auto-on if you find you do not want to use that function.

All Wire is not created equal

Please do not use CCA wire with Zapco amplifiers

It is easy to think of wire as just wire but the fact is there are major differences between the types of wires being offered today. The price of copper has gone up quite a bit lately, but you will notice that you can still buy heavy primary wire at very reasonable prices. How can this be? Simple... That lower price wire is not all copper, it is CCA wire. CCA stands for Copper Clad, Aluminum. That means it is aluminum wire with a thin coating of copper around the outside of the wire. Does it look like copper wire? Absolutely. But does it conduct electrical current like copper? Absolutely NOT!

If the wire does not say OFC Copper wire or Solid Copper wire do not use it.

Two things can and likely will happen:

- Because CCA wire can not conduct DC electrical current like copper wire can, your amp will not get the current it needs to produce its rated power. That means you get less power and more distortion. It also taxes the amplifier that is trying to make its power, shortening the life of the amp.
- CCA wire corrodes quickly and causes terminals that used to be tight to become loose. This causes arcing when electrons to fly around all the open space lookin for more copper. This causes heat that damages connections and can even eventually melt the terminal blocks on your amplifier.

In short: While CCA wire is excellent for high frequency AC current (like tweeter voice coils), it is absolutely bad for high current 12V DC like power and ground for a car audio amplifier.

We have seen CCA wire become a major cause of amplifier failures as buyers are offered CCA as a low cost alternative to pure copper wire. So always look at the description of the contents of wire that you purchase. When someone offers to save you some money with CCA wire just say "No, thank you". Protect your investment with real copper wire.

Planning your power connections

The power end plates of the Zapco ST-X III amplifiers carry the power connections and the speaker connections and vary somewhat by the number of channels. The main 12-volt power input, the 12-volt turn-on wire, and the main Ground connection are common to both models.

- The main power must be connected the vehicle battery's positive (+) terminal, and a main system fuse should be placed close to the battery
- The main ground or negative must be securely attached to bare metal at the vehicle frame, or other chassis component with a direct connection to the frame

Note: Seat bolts and seat belt bolts are NOT good ground points

- The REM terminal can be connected to the head unit turn-on output wire. If none is available it can be connected to an accessory (ACC) terminal. You should avoid using any ignition-on (IGN) wire, as they can be noisy

Some words about Power and Ground

The second most common cause of under performing amplifiers is insufficient power current or a poor power connection. The most common cause of under performing amplifiers is insufficient ground current or a bad ground connection.

12-volt current: Battery power works only if it travels in a complete circuit from the battery positive terminal to the battery negative terminal. Main power input, of course, is attached to the battery positive terminal. Ground current is returned to the battery through the chassis to the point where the battery is grounded.

The current available for your amplifier to use to produce power will be restricted by the smallest gauge of wire in the circuit and by the weakest physical connection in the circuit.

Wire Size

It's often surprising how many people will obsess about signal wire but routinely provide the amplifier with only a fraction of the current it needs to do its job. The most common wire gauge used in car audio is 10-gauge, and the most common location for amplifiers is in the trunk.

Wire Sizing Chart

	←----- Length of Run -----→							
	4 ft	7 ft	10 ft	13 ft	16 ft	19 ft	22 ft	28 ft
0-20 amps	14	12	12	10	10	8	8	8
20-35 amps	12	10	8	8	6	6	6	4
35-50 amps	10	8	8	6	6	4	4	4
50-60 amps	8	8	6	4	4	4	4	2
65-85 amps	6	6	4	4	2	2	2	0
85 -105amps	6	6	4	2	2	2	2	0
105-125 amps	4	4	4	2	2	0	0	0
125-150 amps	2	2	2	2	0	0	0	0

Let's look at a fairly small system. If you use a 50 watt/ch amp (25 amps) for the highs and a 100 watt/ch amp (40 amps) for the woofers, you need at least a 4-gauge and maybe a 2-Gauge wire to provide 65 amps at the trunk. Use the Wire Sizing Chart. Add up the fuse values on the amplifier(s) then choose the proper size wire based on the distance from the car battery to the amplifier location. Always use the same gauge wire for the main ground as you do for the main power. Always make your ground as short as possible and secure it to a clean solid surface, preferably the vehicle frame.

Mounting your ST-X DSP III amplifier

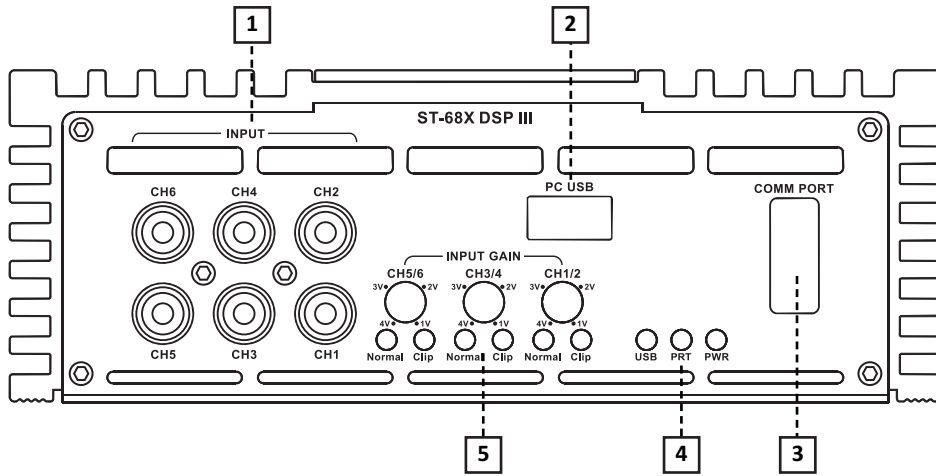
Mounting your Zapco amplifier is easy. Just keep in mind a few guidelines:

- The amplifier can be mounted in any direction, on wood, metal, or carpet
- The metal chassis of the amp can be grounded or left isolated
- The amplifier requires adequate ventilation. Creating power creates heat, and cooling requires air. Position the amplifier with sufficient surrounding area for air supply and keep the end plates clear for future access
- Keep the amplifier out of the engine compartment or other locations that may cause excessive heat or moisture
- Do not mount the amplifier to a subwoofer box or other place that may have excessive vibration

Setting Gains: Gain pots are not volume controls. Before you first turn on your system, you should make sure all gain controls are set to minimum. Gain controls should be used only if absolutely necessary. Turning up gain controls causes increased noise, makes distortion more likely and reduces the dynamic range of your system. If your head unit does not have sufficient output, you will get much better results by investing in a line driver to provide more signal to the amplifier.

ST-68X DSP III Input/Controls

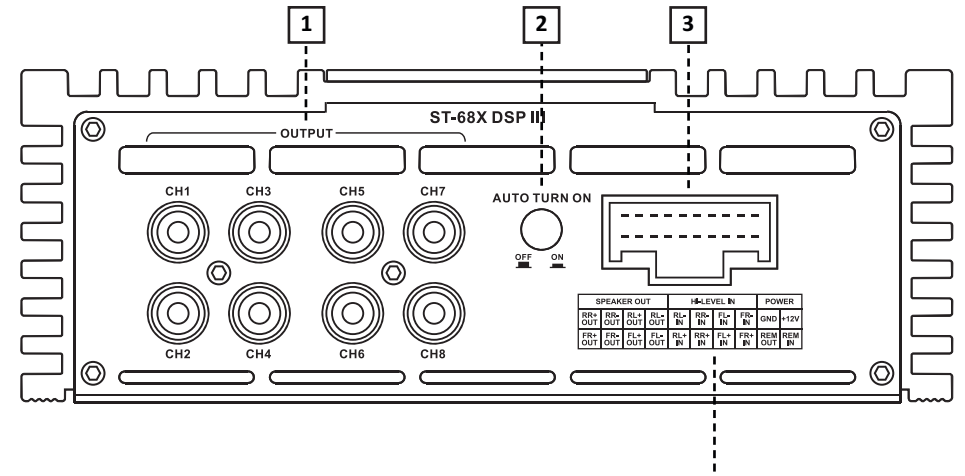
The ST-68X DSP III is a 4-Channel amplifier with on-board Digital processing. The input functions are described below.



- 1• 6 Channels of RCA level inputs for the internal amplifier
- 2• USB Port for PC control connection
- 3• Comm Port for BT modules
- 4• USB, Protection, Power Led
- 5• Analog input level (gain) controls with 2-stage clipping indicators

ST-68X DSP III Output/Speakers

The other side of the ST-68X DSP III with the output functions, Auto turn-on, and the speaker/power connector.

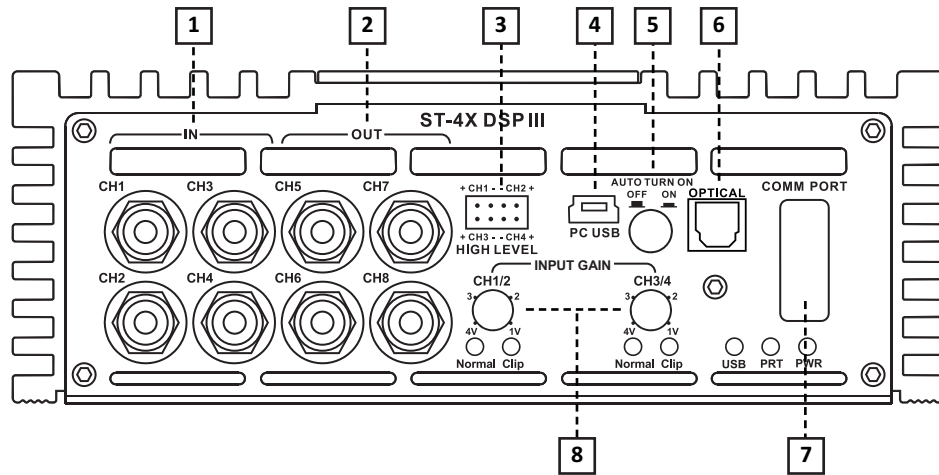


- 1• 8 Channels of processed RCA outputs for external amplifiers
- 2• Auto turn-on selector
- 3• OEM Connector for speaker In/Out and Power

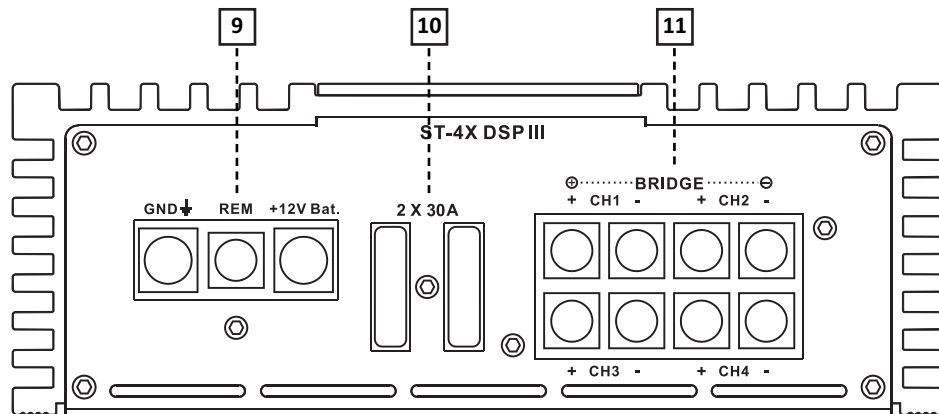
SPEAKER OUT				HI-LEVEL IN				POWER	
RR+ OUT	RR- OUT	RL+ OUT	RL- OUT	RL- IN	RR- IN	FL- IN	FR- IN	GND	+12V
FR+ OUT	FR- OUT	FL+ OUT	FL- OUT	RL+ IN	RR+ IN	FL+ IN	FR+ IN	REM OUT	REM IN

ST-4X DSP III Input/Controls/Output/Speakers

The ST-4X DSP is a 4-Channel amplifier with on-board Digital processing. The input functions are described below.

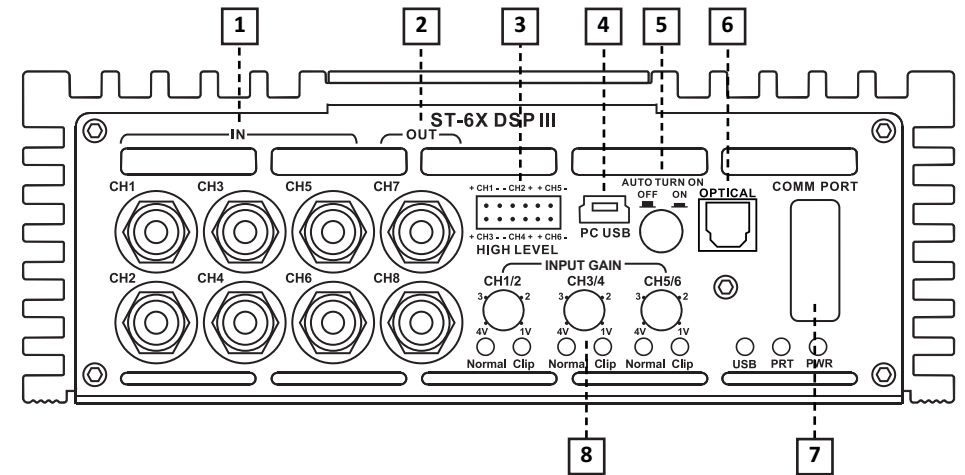


- 1• 4 Channels (1/2 and 3/4) of RCA level inputs for the internal amplifier
- 2• 4 Channels (5/6 and 7/8) of processed RCA outputs for external amplifiers
- 3• 4 Channels High-level OEM input plug
- 4• USB Port for PC control connection
- 5• Auto turn-on switch to turn the system on by signal sensing
- 6• The Toslink connector provides an SPDIF digital input
- 7• Comm Port for BT modules
- 8• Analog input level (gain) controls with 2-stage clipping indicators
- 9• Power (Ground, Rem, +12V Battery) 10• Fuses 11• Speaker terminals

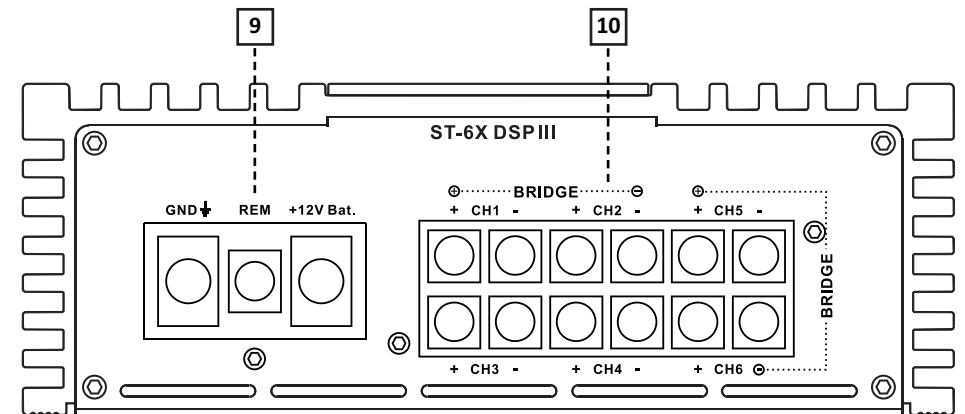


ST-6X DSP III Input/Controls/Output/Speakers

The ST-6X DSP is a 6-Channel amplifier with on-board Digital processing. The input functions are described below.



- 1• 6 Channels (1/2, 3/4, 5/6) of RCA level inputs for the internal amplifier
- 2• 2 Channels (7/8) of processed RCA outputs for external amplifiers
- 3• 6 Channels High-level OEM input plug
- 4• USB port for PC control connection
- 5• Auto turn-on switch to turn the system on by signal sensing
- 6• The Toslink connector provides an SPDIF digital input
- 7• Comm Port BT modules
- 8• Analog input level (gain) controls with 2-stage clipping indicators
- 9• Power (Ground, Rem, +12V Battery) 10• Speaker terminals



Technical Specifications

	ST-68X DSP III	ST-4X DSP III	ST-6X DSP III
Power @ 4Ω:	4 x 25 watts	4 x 65 watts	6 x 100 watts
THD @ Rated Power:	< 0.5%	< 0.5%	< 0.5%
Power @ 2Ω:	4 x 35 watts	4 x 90 watts	6 x 130 watts
Power Bridged @ 4Ω:	-	2 x 180 watts	3 x 250 watts
S/N Ratio:	> 90dB	> 90dB	> 90dB
THD + Noise:	< 0.2%	< 0.2%	< 0.2%
Channel Separation:	> 60dB	> 60dB	> 60dB
RCA:	6 In. / 8 Out	4 In. / 4 Out	6 In. / 2 Out
Input Sens. Low:	1V/4V	1V/4V	1V/4V
Input Sens. High:	4V/8V	4V/8V	4V/8V
Digital Input:	-	Toslink Optical	Toslink Optical
Comm Port:	BT Mod. (opt.)	BT Mod. (opt.)	BT Mod. (opt.)
Auto Turn-On:	Yes	Yes	Yes
Status Led:	Clip/USB/Prt/Pwr	Clip/USB/Prt/Pwr	Clip/USB/Prt/Pwr
Freq. Response ±1dB:	15Hz - 30KHz	15Hz - 30KHz	15Hz - 30KHz
Equalizer:	Parametric, 15-bands	Parametric, 15-bands	Parametric, 15-bands
Delay:	cm/inches/ms	cm/inches/ms	cm/inches/ms
Mute:	Yes, each channel	Yes, each channel	Yes, each channel
Crossover Type:	Butt./ Linkw./Bessel	Butt./ Linkw./Bessel	Butt./ Linkw./Bessel
Dim. (WxHxL):	160 x 57 x 131 mm	160 x 57 x 284 mm	160 x 57 x 450 mm
Overall (WxHxL):	160 x 57 x 156 mm	160 x 57 x 309 mm	160 x 57 x 475 mm

Continuous exposure to excessive sound pressure levels may cause permanent hearing loss. ZAPCO strongly advises that you use common sense when setting volume levels. Everything written in this manual is for the proper use of the products. Some features or specifications could be modified during production to improve the product performance. The technical specifications and functionalities stated here are current as of the time of publication. General instructions and safety warnings are intended in any case to be always effective for this type of product. The latest manual with any updates is always available at www.zapco.com/download



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