

# Owner's Manual

## SPA-3 Stereo Precision Attenuator



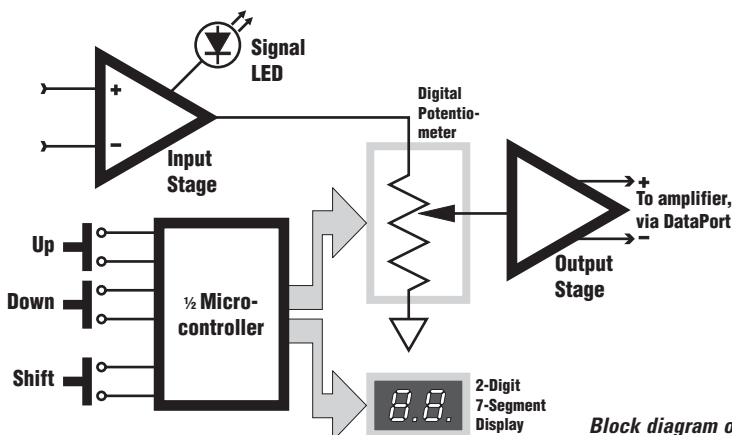
\*TD-000100-00\*  
Rev. B

# SPA-3 STEREO PRECISION ATTENUATOR

## I. DESCRIPTION

The SPA-3 is a stereo precision attenuator accessory for use with DataPort-equipped QSC amplifiers. It mounts directly to the back of two-channel CX, DCA, and PL2 models, but it can be used with the others (PowerLight, ISA, and four-channel CX or DCA amplifiers) by using a DataPort cable and a remote mounting rack. Amplifiers from the ISA series cannot power the SPA-3, so it requires a 15-volt external DC power supply when used with one of them.

SPA-3 SPECIFICATIONS	
<b>GENERAL INFORMATION</b>	
Operating temperature	0–70° C
Input type, each channel	Differential balanced (transformer balancing optional)
Input impedance	28.4 k $\Omega$ balanced, 14.7 k $\Omega$ unbalanced
Output impedance	95 $\Omega$ , quasi-balanced
Maximum RMS output voltage	+18 dBu; 6.2 volts
Equivalent input noise (ref. to max. output level)	less than -100 dB
Dynamic range	116 dB
THD @ 1 volt	< 0.03%
Frequency response	20 Hz–20 kHz, $\pm$ 0.2 dB
Common-mode rejection	>50 dB minimum; >60 dB typical
Power requirements	+15V @ <300 mA via ext. power jack, or from amplifier via pin 9 of DataPort
<b>CONTROLS</b>	
Programming	Pushbutton switches for incremental adjustment: Shift, Up, and Down
<b>INDICATORS</b>	
Attenuation (each channel)	2-digit 7-segment LED display
Signal presence (each channel)	Green LED
0.5 dB indicator (each channel)	Decimal point
<b>CONNECTORS</b>	
Input	Two 3-pin "Euro-style" detachable terminal blocks
DataPort	HD15 male (to amplifier)
External power	2.5 mm coaxial jack; center pin positive
<b>PROGRAMMABLE OPERATING PARAMETERS</b>	
Attenuation	0 to 32 dB in 0.5- or 1.0-dB increments
Bypass	Either channel

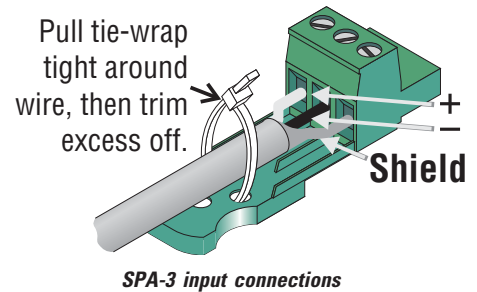


Block diagram of one channel of the SPA-3

## Kit contents

These parts are included along with your SPA-3 module:

Qty	QSC part #	Description
2	CO-000137-00	3-pin "Euro-style" plug w/ strain relief
2	SC-040181-PP	#4-40 × 1 1/8" black screw
1	SC-080051-PP	#8-32 × 5/16" black screw
2	PL-003.65-TW	Small tie-wrap



The screws are for mounting the SPA-3 to an amplifier or accessory bracket (see INSTALLATION), and the two plugs are detachable terminal blocks for the SPA-3's two balanced inputs (see the illustration above).

## II. FEATURES

The heart of the SPA-3 is a Crystal Semiconductor digitally controlled dual-channel gain control. The user controls are pushbuttons for adjusting the amount of attenuation, for bypassing (unity gain), for changing the adjustment increment, and for displaying the firmware version.

Both channels feature electronically balanced input circuitry. The pseudo-balanced outputs connect to the amplifier through the DataPort. The attenuation can be adjusted from 0 to 32 dB and can also be bypassed. A green LED for each channel indicates that its pre-attenuation circuitry is passing a signal. The settings are non-volatile and are retained when the amplifier is turned off.

To improve common-mode noise rejection, an optional XF-1 input isolation transformer can be installed on each channel by a qualified technician.

## III. INSTALLATION

If you do not wish to install XF-1 input isolation transformers, skip ahead to **Connecting inputs**.

### Installing the optional XF-1 input isolation transformers

#### Tools required:

- Soldering iron with fine tip (recommended range 25 to 60 W)
- Desoldering station
- Rosin-core solder (63/37 eutectic type recommended)
- #2 Phillips screwdriver
- Small boxes or compartments (to keep assorted screws during disassembly)

#### Parts required:

Two XF-1 Input Isolation Transformer kits (QSC part number SG-000005-00)

*Note: The capacitor and resistor that come with the XF-1 kit are not needed with the SPA-3.*

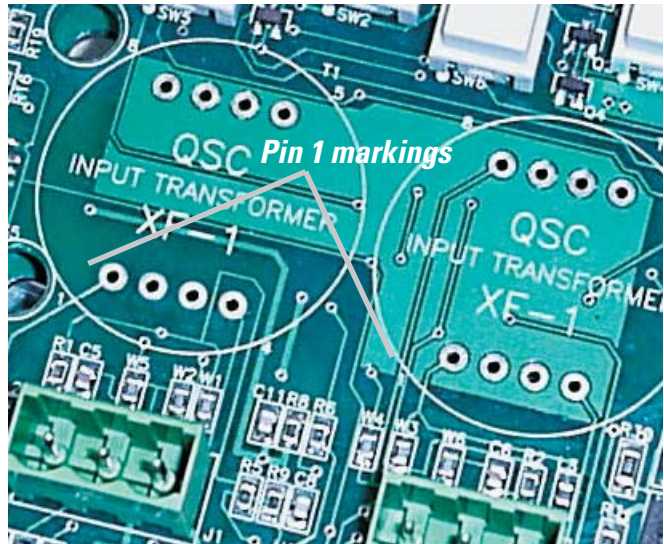
#### Procedure: Opening the SPA-3

CAUTION: Before proceeding, take appropriate steps to minimize the risk of damage from electrostatic discharge (ESD). These include wearing a grounded wriststrap, using an ESD-resistant mat on your work surface, and touching a grounded object before touching or picking up the SPA-3 or its internal circuit boards.

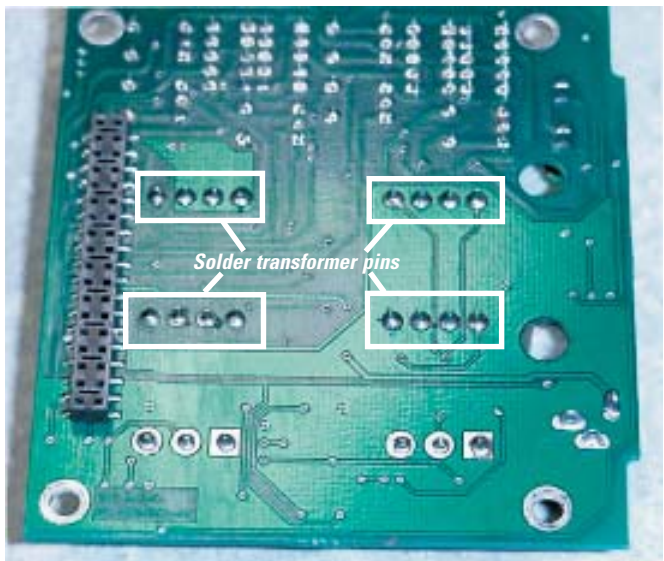
1. On the back of the SPA-3, remove the four screws that secure the cover.
2. Remove the four screws securing the board assembly to the chassis. Carefully remove the two boards from the chassis and gently pull them apart at the connector.

**Procedure: Installing the XF-1 transformer(s)**

1. Remove four  $0\Omega$  resistors at W1, W2, W3, and W4, shown in the photo to right. Save them for possible reuse in Step 2.
2. If there are no  $0\Omega$  resistors at W5 and W6 already, install them using the ones removed in Step 1.
3. The black dot on the top of the transformer indicates which of the eight pins is Pin 1. Note the corresponding Pin 1 markings on the component side of the PC board; these indicate how to orient the transformers. Orient the transformer and insert it into the eight holes on the circuit board. Solder all eight pins. Repeat this for the other transformer.



The locations of the  $0\Omega$  resistors W1–W6, and the locations of pin 1 of the transformers. The transformers mount to this side of the circuit board.



Solder all eight pins of each transformer.



Punch out the two perforated sections of the chassis label.

**Procedure: Finishing the XF-1 installation**

1. Re-assemble the circuit boards.
2. Punch out the two circularly perforated covers on the SPA-3 chassis label. See the photo at left.
3. Re-install the circuit board assembly into the chassis and re-fasten all the screws.



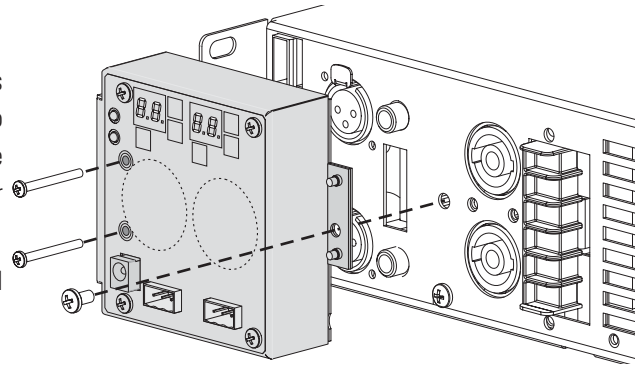
**CAUTION:** Always turn the amplifier off when installing or removing the SPA-3.

### Connecting inputs

The signal wires attach to each “Euro-style” terminal block as shown in the illustration at the top of page 3. Pay attention to signal polarity. Strip the wires approximately 0.35 inch (9 mm). The screw head above each terminal opens and closes its clamp; after inserting the wire in the terminal, tighten the clamp firmly.

If the input signal is unbalanced, use the + terminal for the signal conductor and *both* the - and shield terminals for the shield.

The terminal blocks plug into their respective jacks on the SPA-3.



**Attaching the SPA-3 to the amplifier**

### PowerLight 2 and two-channel CX, DCA amplifiers

Line up the SPA-3’s DataPort connector with the one on the amplifier’s rear panel. Press the SPA-3 onto the amplifier and secure it to the chassis with the three screws included (see the illustration above).

### PowerLight, ISA, and four-channel CX and DCA amplifiers

An SPA-3 will not physically mount on one of these amplifiers. A DPX-4 accessory bracket, however, can hold up to four SPA-3 units. Use a DataPort cable to connect the SPA-3 to the amplifier. The SPA-3 will draw the power it needs from the DataPort of PowerLight, CX and DCA amplifiers, but if used with an ISA series amplifier, it will require an external 15-volt DC power supply capable of 300 mA, such as a QSC DPX-1.

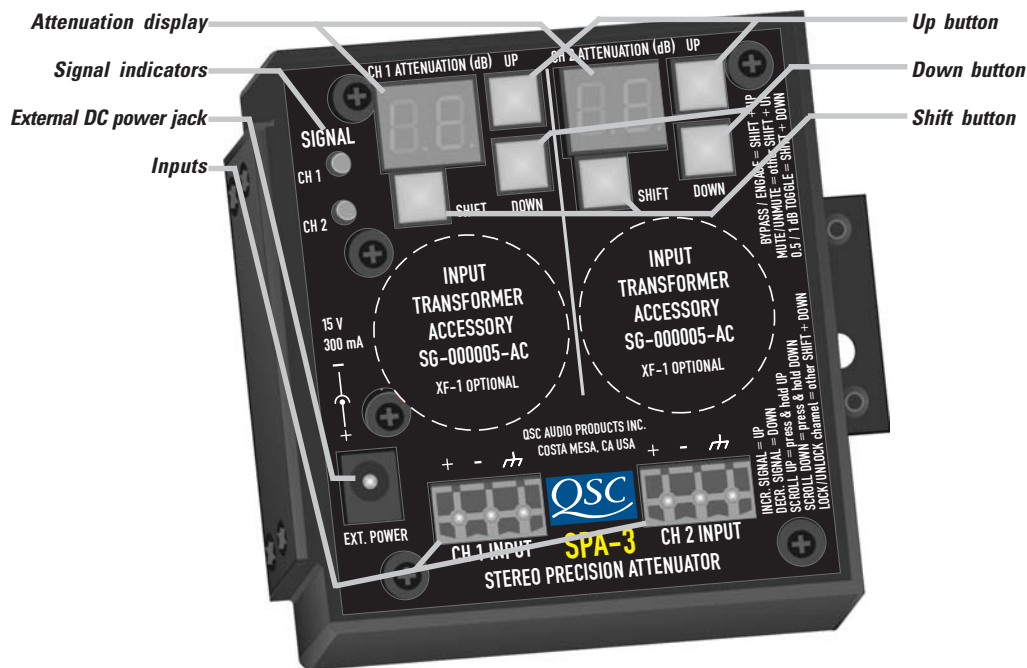
Operation	Press ( <i>n</i> = Channel #)
Increase signal (decrease attenuation)	<b>UP<sub>n</sub></b>
Increase signal (scroll)	Hold <b>UP<sub>n</sub></b>
Decrease signal (increase attenuation)	<b>DOWN<sub>n</sub></b>
Decrease signal (scroll)	Hold <b>DOWN<sub>n</sub></b>
Bypass/engage attenuation (toggle)	<b>SHIFT<sub>n</sub> + UP<sub>n</sub></b>
Increment step toggle (1 or 0.5 dB)	<b>SHIFT<sub>n</sub> + DOWN<sub>n</sub></b>
Display firmware version	<b>SHIFT1 + SHIFT2</b>
Mute Channel 1	<b>SHIFT2 + UP1</b>
Mute Channel 2	<b>SHIFT1 + UP2</b>
Lock Channel 1	<b>SHIFT2 + DOWN1</b>
Lock Channel 2	<b>SHIFT1 + DOWN2</b>

## IV. OPERATION

The table at left shows the button sequences for all possible operations on the SPA-3.

The adjustable range of attenuation on each channel is 0 (no attenuation) to 32 dB. The attenuation changes in real time as you make the adjustments. Half-decibel settings are indicated by the right decimal point of the two-digit display. For example, a display of **18** indicates a setting of 18 dB of attenuation, while **18.** would indicate 18.5 dB. Even when its DC power is removed, the SPA-3 will retain its settings in non-volatile memory.

See the illustration on the following page for the location of the buttons, displays, and connections.



*The buttons, displays, and other features of the SPA-3*

## **V. WARRANTY** (USA only; in other countries, see your dealer or distributor)

### **Disclaimer**

QSC Audio Products, Inc. is not liable for any damage to speakers, or any other equipment that is caused by negligence or improper installation and/or use of this amplifier product.

### **QSC Audio Products 3-Year Limited Warranty**

QSC Audio Products, Inc. ("QSC") guarantees its products to be free from defective material and/or workmanship for a period of three (3) years from date of sale, and will replace defective parts and repair malfunctioning products under this warranty when the defect occurs under normal installation and use -provided the unit is returned to our factory or one of our authorized service stations via pre-paid transportation with a copy of proof of purchase (i.e., sales receipt). This warranty provides that the examination of the return product must indicate, in our judgment, a manufacturing defect. This warranty does not extend to any product which has been subjected to misuse, neglect, accident, improper installation, or where the date code has been removed or defaced. QSC shall not be liable for incidental and/or consequential damages. This warranty gives you specific legal rights. This limited warranty is freely transferable during the term of the warranty period.

The customer may have additional rights, which vary from state to state.

In the event that this product was manufactured for export and sale outside of the United States or its territories, then this limited warranty shall not apply. Removal of the serial number on this product, or purchase of this product from an unauthorized dealer, will void this limited warranty.



## VI. TECHNICAL ASSISTANCE & SERVICE

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Only a qualified technician should service your QSC product. There are no user serviceable components inside the unit and the risk of electric shock exists. Also, some components in your unit may require specific QSC replacements.

### Technical Assistance

If you suspect that your SPA-3 is defective, check your system configuration and SPA-3 settings to determine the origin of the problem. Incorrect audio interfacing, poor cabling, or other system-level defects are the most frequent causes of problems in audio systems. For technical assistance beyond the scope of this manual, contact QSC Technical Services. We also offer comprehensive service manuals for many QSC models; contact us for details.

### Factory Service

If your SPA-3 needs factory service, contact QSC Technical Services for return instructions. We will issue you a Return Authorization (RA) number for each unit. QSC cannot be responsible for products that are returned without an RA number.

### Product Return Guidelines

1. Pack the product well for protection during shipment. Upon request, QSC will provide a factory shipping carton and packaging free of charge.
2. Include a copy of the sales receipt, your name, return address, and phone number with your return correspondence. Please include a reasonably detailed description of the defect.
3. Call QSC Technical Services for a Return Authorization number.
4. Mark the Return Authorization number on the outside of the packaging.
5. Ship the product prepaid to QSC Technical Services at the address listed below. We recommend United Parcel Service (UPS).

#### **QSC Technical Services**

1665 MacArthur Blvd.  
Costa Mesa, California 92626 USA

Web: [www.qscaudio.com](http://www.qscaudio.com) (product info and support)  
[www.qscstore.com](http://www.qscstore.com) (service and accessory sales)

E-mail: [tech\\_support@qscaudio.com](mailto:tech_support@qscaudio.com)

Telephone: (800) 772-2834 (USA only)

+1 (714) 957-7150

+1 (714) 754-6175

Fax: +1 (714) 754-6173

Bulletin Board: +1 (714) 668-7567

### Qualified Service Centers

For your convenience, QSC maintains a network of qualified service centers. If you wish to take your QSC product to a local service center, you may call QSC Technical Services for a referral for one near you. However, accessories, input modules, and other peripheral QSC products must be returned to the QSC factory for service.

### International Servicing

For service on QSC products purchased outside of the United States, contact the distributor or dealer in the country where the product was originally purchased. In many countries, the distributor or dealer may also refer you to a qualified service centers. QSC Technical Services can help you contact the distributor in your country.

