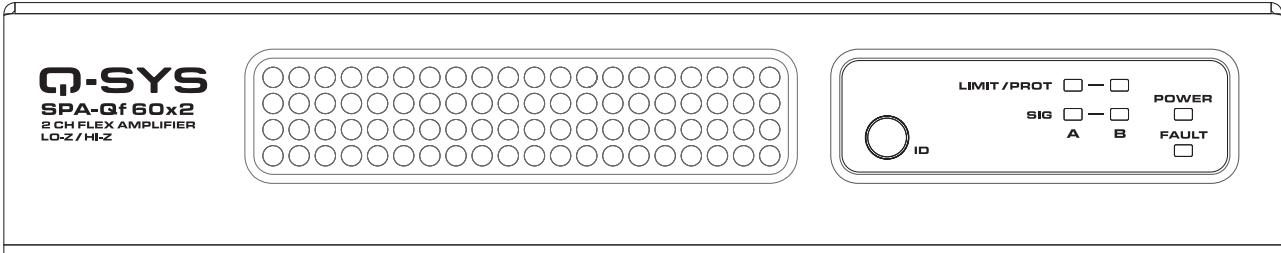


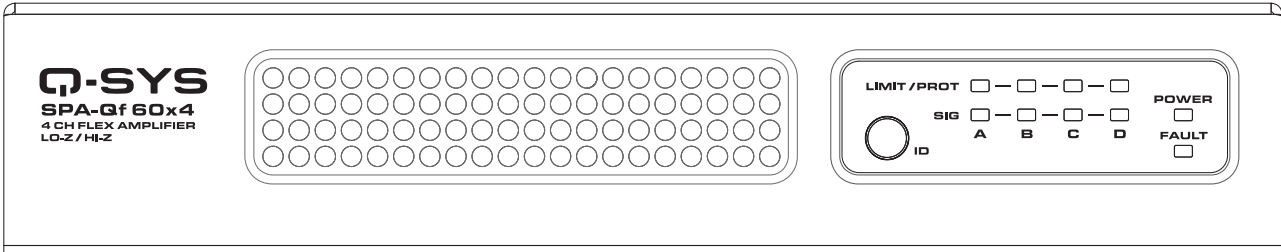
Hardware User Manual



Q-SYS SPA-Qf Series Network Amplifiers



SPA-Qf 60x2
2-Channel Amplifier with FlexIO



SPA-Qf 60x4
4-Channel Amplifier with FlexIO



EXPLANATION OF TERMS AND SYMBOLS

The term “**WARNING**” indicates instructions regarding personal safety. Failure to follow them may result in bodily injury or death.

The term “**CAUTION**” indicates instructions regarding possible damage to physical equipment. Failure to follow them may result in equipment damage to equipment that may not be covered under the warranty.

The term “**IMPORTANT**” indicates instructions or information that are vital to the successful completion of the procedure.

The term “**NOTE**” indicates additional useful information.



The lightning flash with arrowhead symbol in a triangle alerts the user to the presence of uninsulated dangerous voltage within the product’s enclosure that may constitute a risk of electric shock to humans.



The exclamation point within a triangle alerts the user to important safety, operating, and maintenance instructions in this manual.



IMPORTANT SAFETY INSTRUCTIONS



WARNING: TO PREVENT FIRE OR ELECTRIC SHOCK, DO NOT EXPOSE THIS EQUIPMENT TO RAIN OR MOISTURE.

- **Elevated Operating Ambient** – If installed in a closed or multi-unit rack assembly, the ambient operating temperature of the rack environment may be greater than room ambient. Ensure that the maximum allowed operating temperature is not exceeded – see the "Environmental" on page 3.
- **Reduced Air Flow** – Installation of the equipment in a rack should be such that the amount of air flow required for safe operation of the equipment is not compromised.

1. Read, follow, and keep these instructions.
2. Heed all warnings.
3. Clean only with a dry cloth.
4. Do not install near heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
5. Only use attachments/accessories specified by the manufacturer.
6. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as power supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
7. Do not submerge or use this apparatus in or near water or liquids.
8. Do not use any aerosol spray, cleaner, disinfectant or fumigant on, near or into the apparatus.
9. Adhere to all applicable, local codes.
10. Consult a licensed, professional engineer when any doubt or questions arise regarding a physical equipment installation.
11. To reduce the risk of electric shock, power cord shall be connected to a mains socket with a protective earthing connection.
12. Protect the power cord from being walked on or pinched, particularly at plugs, convenience receptacles, and the point where the power cord exits from the apparatus.
13. The appliance coupler, or the AC mains plug, is the AC mains disconnect device and shall remain readily accessible after installation.
14. Keep the ventilation opening free of dust or other matter.
15. Do not block any ventilation opening.
16. Install in accordance with the manufacturer’s instructions.

仅适用于海拔 2000m 以下地区安全使用

仅适用于非热带气候条件下安全使用

Maintenance and Repair



WARNING: Advanced technology, e.g., the use of modern materials and powerful electronics, requires specially adapted maintenance and repair methods. To avoid a danger of subsequent damage to the apparatus, injuries to persons and/or the creation of additional safety hazards, all maintenance or repair work on the apparatus should be performed only by a QSC authorized service station or an authorized QSC International Distributor. QSC is not responsible for any injury, harm or related damages arising from any failure of the customer, owner or user of the apparatus to facilitate those repairs.

Cleaning



WARNING: Liquids entering the housing may damage the internal electronics. Keep liquids away and do not use any solvents or chemicals to clean this product. Clean only with a soft, slightly damp or dry cloth.

FCC Statement

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 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.
- Consult the dealer or an experienced radio/TV technician for help.

Environmental

- **Expected Product Life Cycle:** 20 years
- **Normal Ambient Operating Temperature Range:** -10°C to 35°C
- **Storage Temperature Range:** -20°C to 60°C
- **Relative Humidity:** 5 to 85% RH, non-condensing



NOTE: Reduced amplifier output can be expected when the ambient temperature exceeds 35°C. Amplifier will shut down when the hardware temperature exceeds 73°C.



NOTE: Q-SYS SPA-Qf amplifiers are convection-cooled and therefore can become warm to the touch. This is normal and expected.

Specifications and Dimensions

Product specifications and dimension drawings for SPA-Qf Series amplifiers can be found online at qsys.com.

RoHS Statements

The QSC Q-SYS SPA-Qf models are in compliance with European RoHS Directive.

The QSC Q-SYS SPA-Qf models are in compliance with "China RoHS" directives. The following table is provided for product use in China and its territories.

	QSC Q-SYS SPA-Qf Models					
部件名称 (Part Name)	有害物质 (Hazardous Substances)					
	铅 (Pb)	汞 (Hg)	镉 (Cd)	六价铬 (Cr(vi))	多溴联苯 (PBB)	多溴二苯醚 (PBDE)
电路板组件 (PCB Assemblies)	X	○	○	○	○	○
机壳装配件 (Chassis Assemblies)	X	○	○	○	○	○

本表格依据 SJ/T 11364 的规定编制。

O: 表示该有害物质在该部件所有均质材料中的含量均在 GB/T 26572 规定的限量要求以下。

X: 表示该有害物质至少在该部件的某一均质材料中的含量超出 GB/T 26572 规定的限量要求。

(目前由于技术或经济的原因暂时无法实现替代或减量化。)

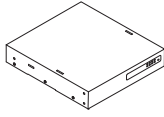
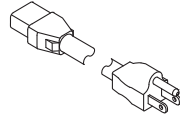
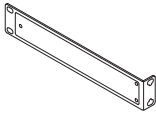
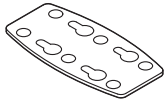

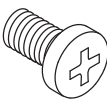


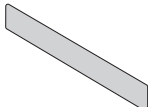
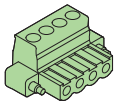
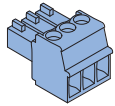
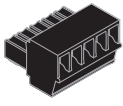


This table is prepared following the requirement of SJ/T 11364.

O: Indicates that the concentration of the substance in all homogeneous materials of the part is below the relevant threshold specified in GB/T 26572.

X: Indicates that the concentration of the substance in at least one of all homogeneous materials of the part is above the relevant threshold specified in GB/T 26572.

(Replacement and reduction of content cannot be achieved currently because of the technical or economic reason.)

What's in the Box

<p>SPA-Qf 60x2 SPA-Qf 60x4</p>  <p>(1x)</p>	<p>AC Power Cord (Type varies by region)</p>  <p>(1x)</p>	<p>Rack Ear CH-001344-00</p>  <p>(2x)</p>
<p>Joining Plate QSC P/N CH-001345-00</p>  <p>(2x)</p>	<p>Rack Ear Spacer CH-001386-00</p>  <p>(2x)</p>	<p>Phillips Pan Head M4 x 7 mm</p>  <p>(6x)</p>
<p>Phillips Flathead M3 x 6 mm</p>  <p>(6x)</p>	<p>Foam Spacer PL-001023-00</p>  <p>(4x)</p>	<p>Rack-Ear Cover Label LB-001138-00</p>  <p>(1x)</p>
<p>SPA-Qf 2-channel (2x, inc. 1 spare) SPA-Qf 4-channel (3x, inc. 1 spare)</p> <p>Euro Plug 3.5 mm, 4 pos, green CO-000649-00</p> 	<p>(3x, inc. 1 spare)</p> <p>Euro Plug 3.5 mm, 3 pos, blue CO-000929-01</p> 	<p>(1x)</p> <p>Euro Plug 3.5 mm, 6 pos, black CO-000928-01</p> 
<p>Warranty TD-000453</p>  <p>(1x)</p>	<p>Safety Information TD-001663</p>  <p>(1x)</p>	

Introduction

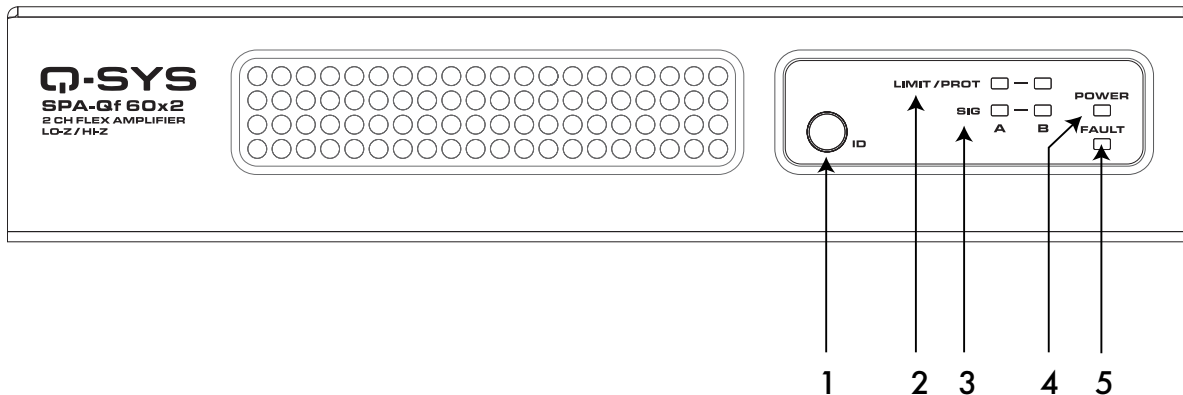
Q-SYS SPA-Qf Series network amplifiers continue the Q-SYS trend of empowered peripherals with a solution that not only delivers low-power amplification to smaller spaces such as meeting and conference rooms, but also supports flexible Q-SYS system configuration and control. With the addition of configurable GPIO, two flex channels (configurable as either mic/line inputs or line outputs) and 70Vrms/100Vrms bridge outputs, the Q-SYS SPA-Qf 60x2 (two channel) and Q-SYS SPA-Qf 60x4 (four channel) provide the utility to extend your processor's connectivity across more spaces, all within a Q-SYS native network amplifier.



NOTE: SPA-Qf Series amplifiers require a Q-SYS Core processor and Q-SYS Designer Software (QDS) version 9.8 and later for configuration and operation. Information about the QDS components related to the SPA-Qf Series amplifiers, including their properties and controls, can be found in Q-SYS Help at help.qsys.com. Or, simply drag an SPA-Qf component from the Inventory into the Schematic and press F1.

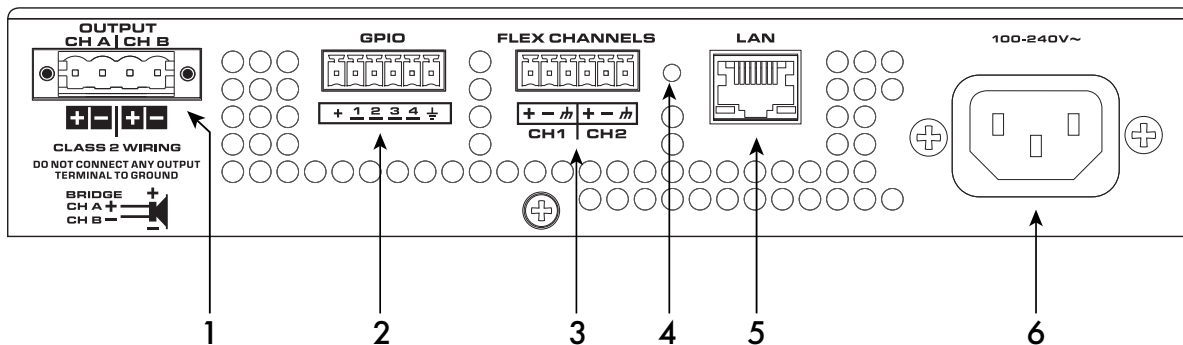
Connections and Callouts

SPA-Qf 60x2 Front Panel



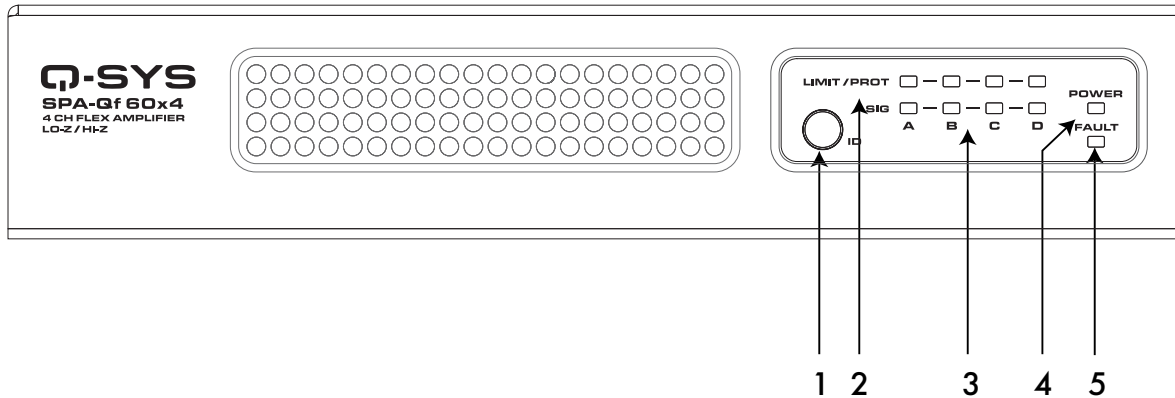
1. **ID Button** – Press to identify this product in Q-SYS Designer Software. (All front panel LEDs will flash.)
2. **Limiters / Protect LEDs** – The channel limiter is activated on input or output (orange) or in protect mode (red). Protect Mode can be caused by shorts, open circuits, and over-temperature conditions.
3. **Input Signal LEDs** – A signal exceeding -50 dBFS is present for the channel (blue). If the amplifier is in Bridge or Parallel mode, only the odd channel LED will illuminate.
4. **Power LED** – The amplifier is on and operational (solid blue) or in standby (slow flashing blue; all amplifier channels are in standby).
5. **Fault LED** – The amplifier is unable to pass audio or is malfunctioning or not properly configured (fast flashing orange). This could be caused by broken audio streams, amplifier fault, or loudspeaker short circuit. Refer to the Status component in Q-SYS Designer Software for fault details.

SPA-Qf 60x2 Rear Panel



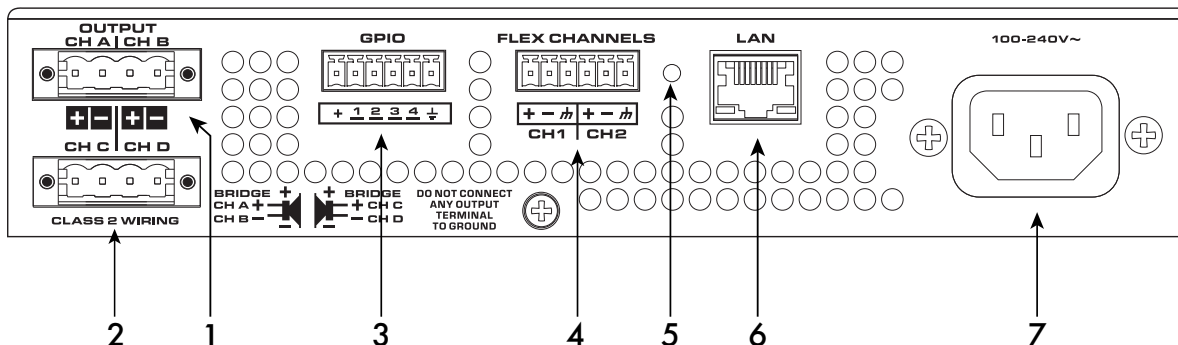
1. **Output Channels A and B** – For connection to loudspeakers. Uses the 4-position green Euro connector.
2. **GPIO** – Pins 1-4 are user-configurable and bi-directional; one 3.3V 100mA power pin; one ground pin. Uses the 6-position black Euro connector.
3. **Flex Channels 1 and 2** – User-configurable audio channels (mic/line input with optional phantom power or line output), balanced or unbalanced. Each channel uses the 2-position blue Euro connector.
4. **Reset Button** – Use the Reset button to restore default network settings and clear the amplifier's password and log file. Before attempting a reset, refer to the [Q-SYS Help](#) for details.
5. **LAN** – RJ45, 1 Gigabit connection to Q-LAN network.
6. **AC Power** – 100-240V~ 50/60 Hz

SPA-Qf 60x4 Front Panel



1. **ID Button** – Press to identify this product in Q-SYS Designer Software. (All front panel LEDs will flash.)
2. **Limiter / Protect LEDs** – The channel limiter is activated on input or output (orange) or in protect mode (red). Protect Mode can be caused by shorts, open circuits, and over-temperature conditions.
3. **Input Signal LEDs** – A signal exceeding -50 dBFS is present for the channel (blue). If the amplifier is in Bridge or Parallel mode, only the odd channel LED will illuminate.
4. **Power LED** – The amplifier is on and operational (solid blue) or in standby (slow flashing blue; all amplifier channels are in standby).
5. **Fault LED** – The amplifier is unable to pass audio or is malfunctioning or not properly configured (fast flashing orange). This could be caused by broken audio streams, amplifier fault, or loudspeaker short circuit. Refer to the Status component in Q-SYS Designer Software for fault details.

SPA-Qf 60x4 Rear Panel



1. **Output Channels A and B** – For connection to loudspeakers. Uses the 4-position green Euro connector.
2. **Output Channels C and D** – For connection to loudspeakers. Uses the 4-position green Euro connector.
3. **GPIO** – Pins 1-4 are user-configurable and bi-directional; one 3.3V 100mA power pin; one ground pin. Uses the 6-position black Euro connector.
4. **Flex Channels 1 and 2** – User-configurable audio channels (mic/line input with optional phantom power or line output), balanced or unbalanced. Each channel uses the 2-position blue Euro connector.
5. **Reset Button** – Use the Reset button to restore default network settings and clear the amplifier's password and log file. Before attempting a reset, refer to the [Q-SYS Help](#) for details.
6. **LAN** – RJ45, 1 Gigabit connection to Q-LAN network.
7. **AC Power** – 100-240V~ 50/60 Hz

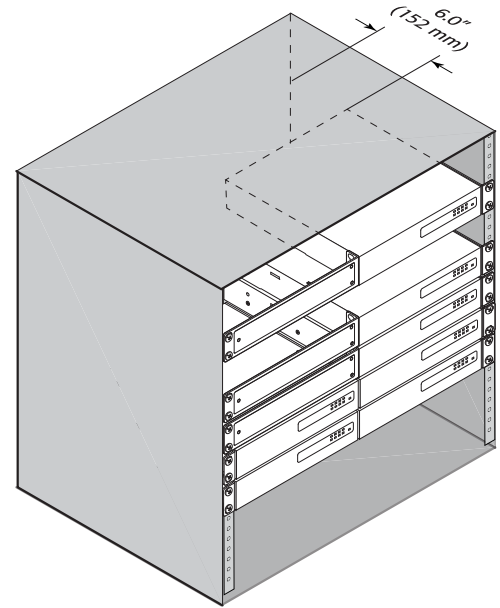
Rack Installation

Ventilation Requirements

There must be at least 6 inches of open space measured from back of amplifier.

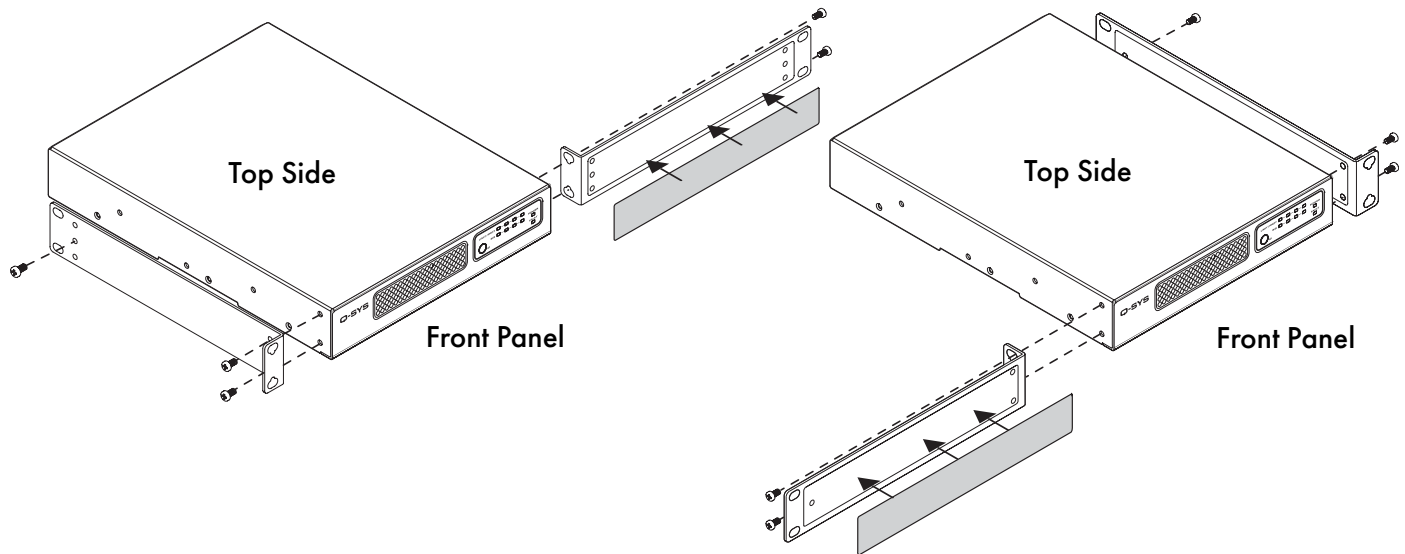


NOTE: To maintain safe operating temperatures, Q-SYS SPA-Qf Series amplifiers contain advanced protection circuitry that reduces output power to lower the operating temperature when needed. Insufficient ventilation may result in the amplifier reducing output power during normal operation (indicated by the Limiter/Protect LEDs illuminating red). To reduce the possibility of thermal limiting, and to allow for proper heat dissipation, keep the space directly to the rear of these amplifiers free of obstacles.



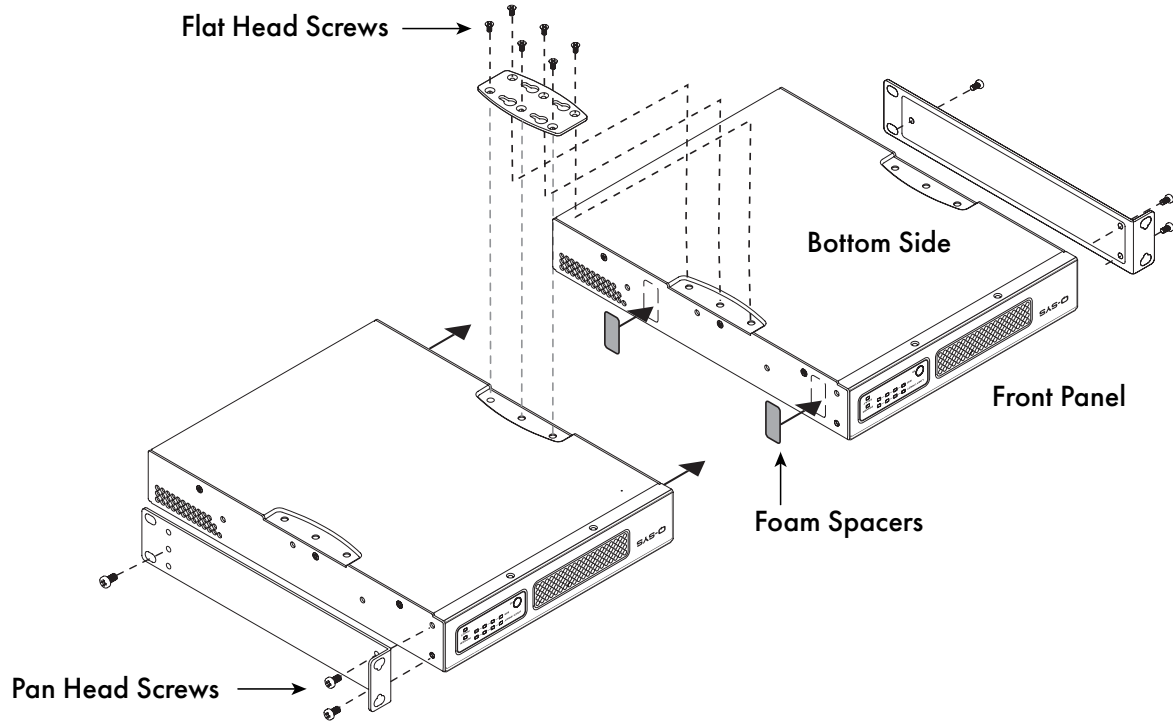
One Amplifier in 19-inch Rack (Left or Right Mount)

Install one amplifier on either the left or right side of a standard 19-inch rack using two (2) rack ears, one (1) rack ear cover label, and five (5) Phillips pan head screws.



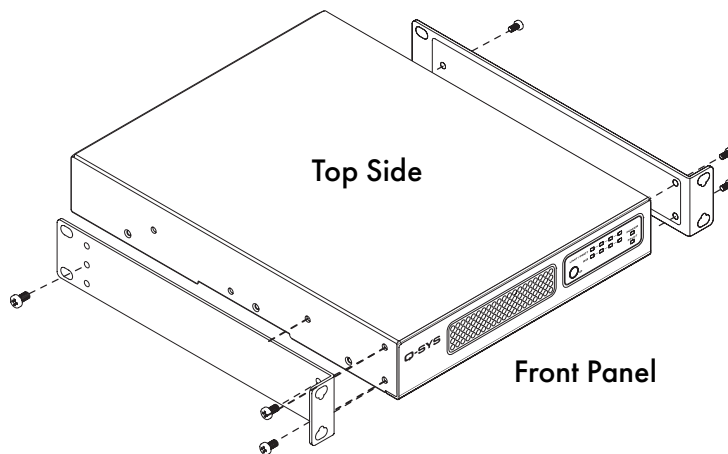
Two Amplifiers in 19-inch Rack

Install two SPA-Qf amplifiers side-by-side using two (2) foam spacers, two (2) rack ears, six (6) Phillips pan head screws, one (1) joining plate, and six (6) Phillips flat head screws.



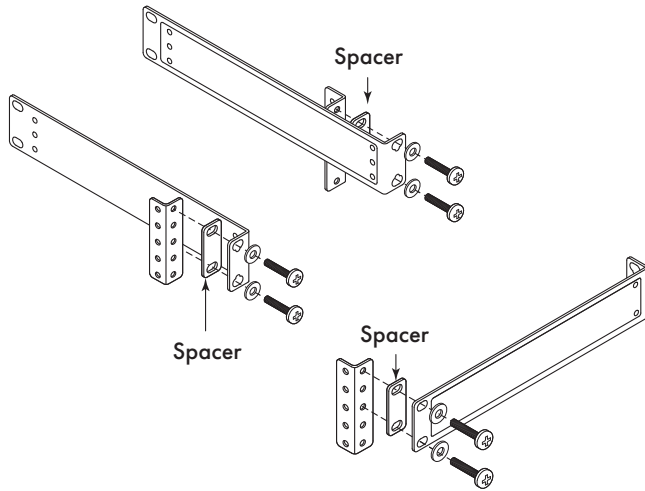
One Amplifier in a Half Rack

Install one SPA-Qf amplifier in a half rack using two (2) rack ears and six (6) Phillips pan head screws.



Optional – Adjusting Front Panel Alignment

To achieve proper front panel alignment with other rack equipment, use the two (2) supplied rack ear spacers. (Rack and rack-mounting screws and washers are pictured but not supplied.)



Surface Mount Under a Table, on a Wall, or Behind a Display

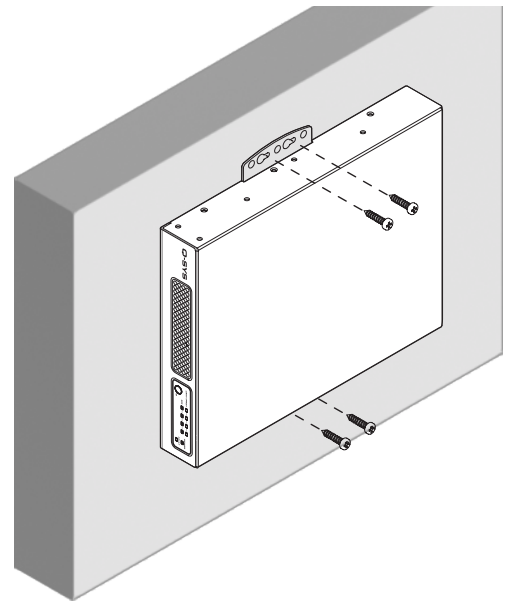
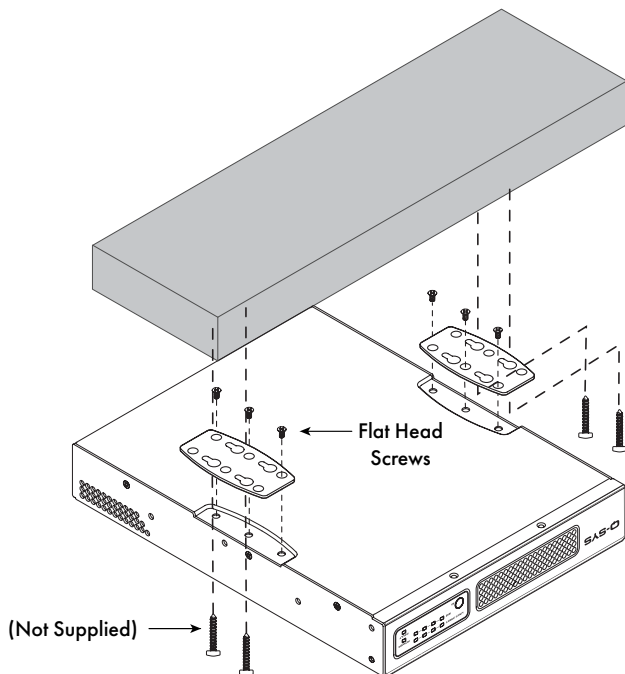
When surface-mounting an SPA-Qf amplifier, use two (2) joining plates, six (6) flat head screws, and four (4) screws for attaching the unit to the surface (not supplied).



NOTE: Orientation of the SPA-Qf unit does not impact thermal performance. However, to prevent thermal limiting of the amplifier, you must adhere to the operating parameters stated in the "Environmental" on page 3. This is especially important when mounting the amplifier behind a display.



CAUTION: When installing the amplifier under a table, consider where individuals will be seated. Continuous skin contact with the amplifier must be avoided.

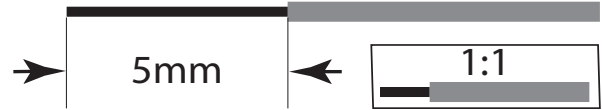


Note: When mounting the amplifier in a vertical orientation, the front and rear panels should be perpendicular to the floor, as shown. This helps prevent dust buildup.

Connections

Wire

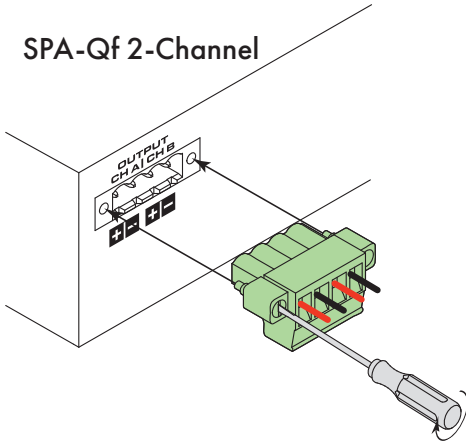
Strip length = 5mm. DO NOT TIN!



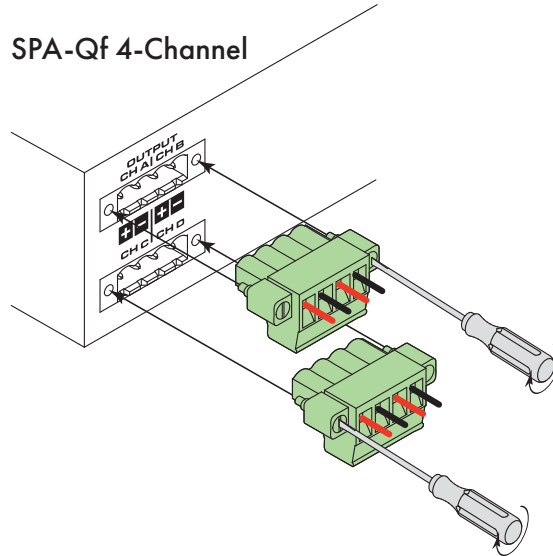
IMPORTANT: Class 2 Wiring.

Output Connectors

SPA-Qf 2-Channel

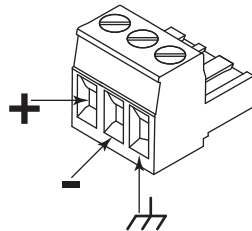


SPA-Qf 4-Channel

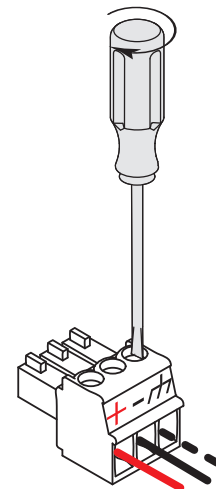
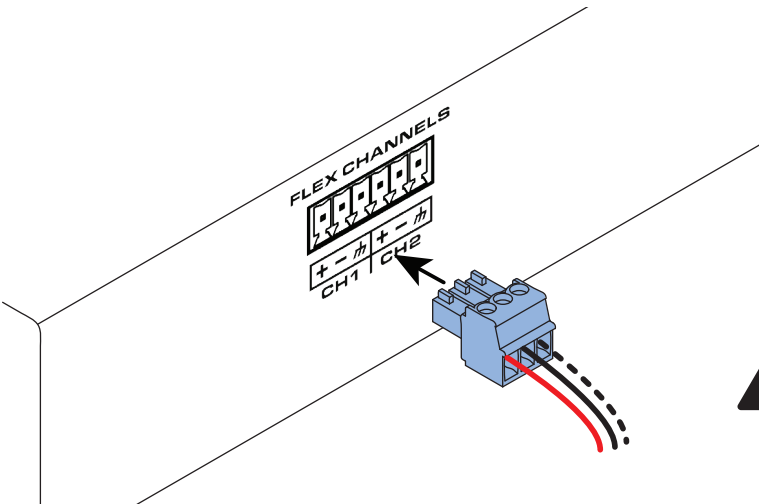
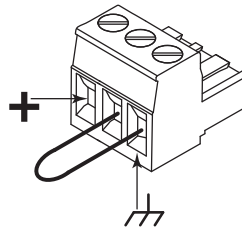


Flex Connectors

Balanced



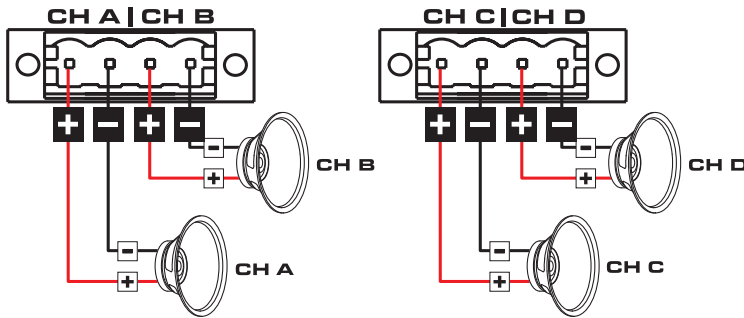
Unbalanced



CAUTION! A single channel consists of three pins. It is possible to plug in a connector that straddles two channels. Be sure that the plugs do not straddle two channels.

Output Modes

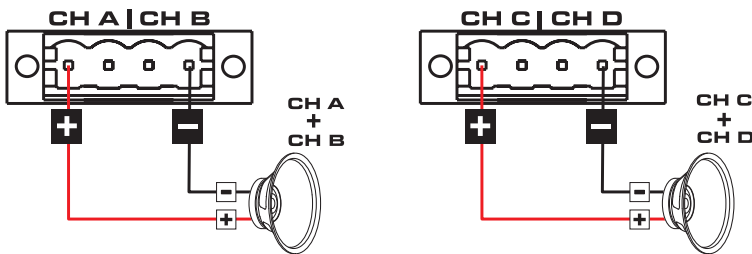
Stereo Mode



CAUTION! Do not connect any output to ground.

4 or 8-ohm Bridged Mode

Configure the bridge mode in Q-SYS Designer Software.



CAUTION! Do not connect any output to ground.

70V / 100V Bridged Mode

Configure the bridge mode in Q-SYS Designer Software.

Recommended/Rated Load Impedance:

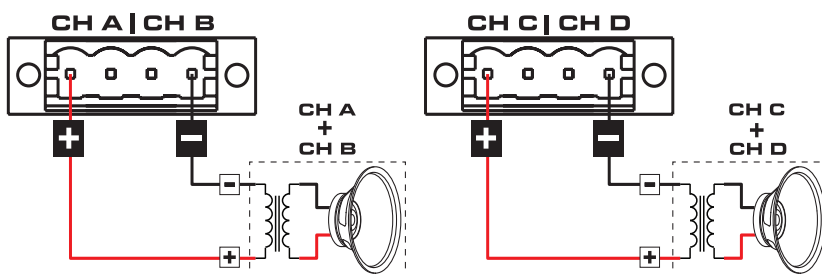
- Lo-Z = 4-8 ohms
- 70V = 42 ohms
- 100V = 83 ohms

Minimum Load Impedance:

- Lo-Z = 2 ohms
- 70V = 25 ohms
- 100V = 50 ohms



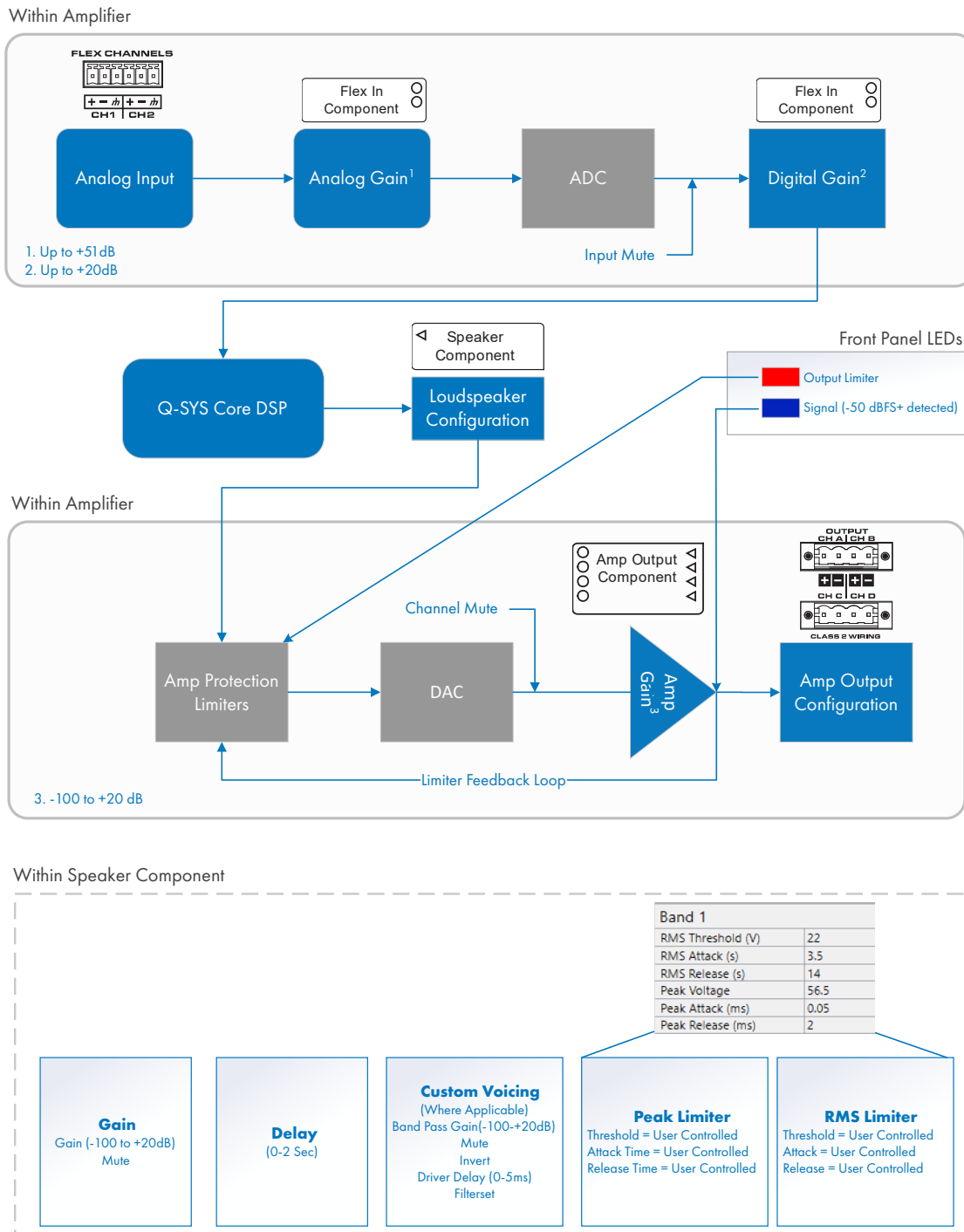
NOTE: Adjustable 80 Hz (high-pass filter) is auto-engaged in bridged 70 V and 100V modes in the Loudspeaker component in Q-SYS Designer Software.



Input to Output Signal Flow

The amplifier's Flex Channels – configurable in Q-SYS Designer Software (QDS) as mic/line inputs or line outputs – are not physically or electrically connected in the amplifier, giving you the flexibility to use any available source in Q-SYS for the amplified outputs and to route the inputs to any output. The following diagram shows where gain, muting, and limiting are applied within the input to output signal flow, as well as the QDS components used to configure parameters.

1. The analog inputs are converted to digital audio in the amplifier. The converted audio is then routed to the Q-SYS Core via Q-LAN (LAN A).
2. The digital signals are brought into the design via the amplifier's Flex Input component. From the Flex Input component, the signals can be sent for processing and can be sent anywhere within the Q-SYS system.
3. In the Q-SYS Core processor, digital audio signals (not necessarily from the amp's inputs) are sent to the Amp Output component.
4. The digital audio is then sent from the Q-SYS Core processor via Q-LAN to the amplifier.
5. Digital signals are converted to analog, amplified, and sent to outputs of the amplifier.



Amp Output Component

The Amp Output component in QDS can have one to four inputs/outputs depending on the amplifier model and its configuration in QDS. The desired configuration is selected in the QDS Properties menu for the amplifier. When the amplifier's configuration is changed, all of the outputs are placed in a "mute all" state. You can un-mute all by clicking the Mute All button in the QDS Amp Output component.

Amplifier Sensitivity

Amplifier sensitivity is set to provide full output voltage swing for the rated power (@8 Ohms), with a 0dBFS PEAK input. This means that MAX DAC Out = MAX AMP Out, with a SINE WAVE (0dBFS = -3dBFS RMS for a sine wave).

For 70V/100Vrms systems, there are gain adjustments required that occur in the Hi-Z speaker block (70/100V Speaker component in QDS). In addition, there is a High Pass Filter (HPF) that is automatically applied at 50Hz to avoid transformer saturation.

Limiters

There are several limiters within the SPA-Qf output:

- Speaker Component Limiters – These have controls exposed to the end user. Refer to the diagram on page 13. Speaker-related limiters are not indicated within the Amp Output block or front panel.
- Amp Protection Limiters – These are not adjustable and are meant only to protect the amplifier from unsafe conditions. Amp protection limiters are slow-moving that adjust over longer periods of time. Indicators for this limiter can be found on the individual amplifier channel or the front of the amplifier.
- DAC Limiters – These limiters engage approximately 1 dB before clipping. It is normal to have some level of DAC clipping during operation. There are no controls over this limiter.

Mutes

- Channel Output Mutes are located within each channel strip of the Amp Output component control panel. Activating this button will turn off the output signal of the DAC.
- Mute All function, found at the top of the Amp Output control panel, will turn off the amplifier switching for all channels.

Gain

There are multiple places within Q-SYS to add gain to your system. Within the amplifier, it is critical to understand that the gain within the Speaker component should typically not be above +10dB. This is due to the dynamic nature of music and the stress that this can put on the output of the amplifier. Speaker component gain above +10dB could trigger the Amp Protection Limiters or DAC Limiters.



Self Help Portal

Read knowledge base articles and discussions, download software and firmware, view product documents and training videos, and create support cases.

qscprod.force.com/selfhelpportal/s/

Customer Support

Refer to the Contact Us page on the Q-SYS website for Technical Support and Customer Care, including their phone numbers and hours of operation.

qsys.com/contact-us/

Warranty

For a copy of the QSC Limited Warranty, go to:

qsys.com/support/warranty-statement/