

# DSP-4

Digital Signal Processor

ADVANCED SYSTEMS PRODUCTS

With more than three decades of experience pioneering cutting edge audio products, QSC raises the bar once again with the DSP-4 Digital Signal Processing Module. This compact module offers two channels of independent DSP and attaches to the back of most 2-channel DataPort-equipped QSC amplifiers—without occupying any additional rack space.

Capitalizing on the success of our DSP-3, the second-generation DSP-4 provides several enhancements in functionality and performance while also incorporating the universally popular XLR balanced connectors. These enhancements include new A/D and D/A converters for improved signal-to-noise performance and upgraded software that significantly increases the unit's operational characteristics.



## Optimize Your Sound With DSP From QSC

### Powerful

Simple to install, compact, and featuring "set-and-forget" convenience, the DSP-4's powerful processor enables you to perform a wide range of signal processing functions; and with its new A/D and D/A converters, its noise floor improves. Whether you need speaker crossovers, EQ, time delay, or subsonic filters, the DSP-4 is as flexible as your system's needs.

Each channel includes:

- Crossover filtering
- Multiple Parametric EQs
- Shelf filtering
- Multiple Delays (up to 910 ms)
- Compression and limiting
- Precision attenuation
- Mixing
- Tone and noise generation

### Configurable

The DSP-4's processing horsepower is dynamically assignable so you are not limited by a fixed signal chain. Simply use QSC's powerful PC-based *Signal Manager* software to easily configure multiple processing functions and signal flow with "drag-and-drop" tools.

### Cost-effective

The power and flexibility of the DSP-4 eliminates the need for expensive outboard processing gear, reducing cost and installation time for almost any application. The compact DSP-4 also plugs directly into the back of most QSC DataPort-equipped amplifiers for use in systems where rack space is a premium.

Save space and weight by mounting the DSP-4 onto the back of most 2-channel DataPort-equipped QSC amplifiers. Or use multiple DSP-4s as a stand-alone, rack-mounted DSP solution.



1675 MacArthur Boulevard • Costa Mesa, CA 92626 • Ph: 800/854-4079 or 714/957-7100 • Fax: 714/754-6174  
www.qscaudio.com • email: info@qscaudio.com

## SIGNAL PROCESSING FUNCTIONS

- **Multiple Parametric Filters**, assignable anywhere in the signal chain:

Variable Frequency	Bypass all EQs
Variable Gain	Add EQ
Variable Q	Delete EQ
Bypass one EQ	Show Response
- **Multiple Delays**, assignable anywhere in the signal chain:
  - 20.83  $\mu$ sec Incremental
  - 910 msec Maximum (total of all delays)
- **Compressor**, assignable anywhere in the signal chain:

Gain	Release Time
Threshold	Show Response
Ratio	Bypass
Attack Time	
- **Output Peak Limiter**, assignable anywhere in the signal chain:

Gain	Release Time
Threshold	Show Response
Attack Time	Bypass
- **High and Low-Pass Crossover Filters**, assignable anywhere in the signal chain:
  - Butterworth 6, 12, 18, 24 dB per octave slope
  - Bessel 6, 12, 18, 24 dB per octave slope
  - Linkwitz-Riley 12 and 24 dB per octave slope

Bypass one EQ	Delete EQ
Bypass all EQ's	Show Response
Add EQ	Cutoff Frequency
- **High and Low-Pass Shelf Filters**, assignable anywhere in the signal chain:

Variable Corner Frequency	Bypass all EQs
Variable Gain	Add EQ
Variable Q	Delete EQ
Bypass one EQ	Show Response
- **Signal Mute**
- **Attenuation:** 0.1 dB steps
- **Mix Post Crossover Audio** (2→1 Mixer)
- **Signal Splitter**
- **Built-in Noise Generator** (Pink & White)
- **Built-in Variable Frequency Tone Generator**
- **Signal Polarity Reversal**
- **Frequency Response**
- **Clip and Protect Indication** of the amplifier's output
- **Predictive Delay feature** — produces less signal distortion than analog compressor/limiters — especially for fast attack times

## ADDITIONAL FEATURES

### Hardware

- Two independent channels of DSP
- 48 kHz, 24-bit converters
- No turn-on pops or "zipper" noise
- If the memory or hardware fails, unit turns on muted to prevent driver damage
- Host interface via RS-232 or QSCControl Audio Network System via CM16a Amplifier Network Monitor
- Electronically balanced XLR inputs
- Contact closure to trigger preset changes
- Post-DSP output signal for daisy-chaining
- DataPort pass-through compatible with QSCControl
- Selectable input sensitivity: 1.5, 4, 9, 18 Vrms; 6, 14.5, 21.5, 27.5 dBu; 3.5, 12, 19, 25 dBV
- Output signal gain

### Software

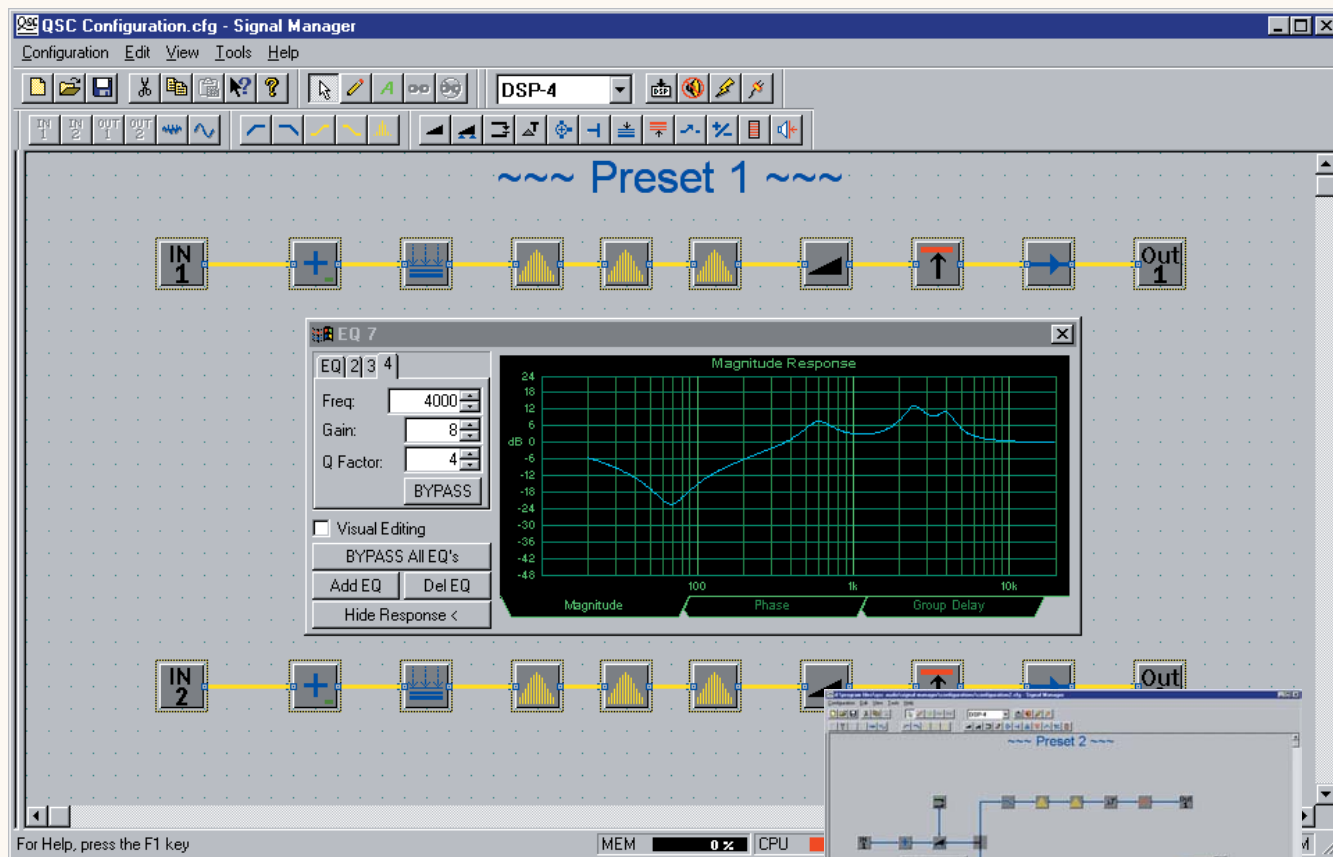
- "Drag-and-drop" configuration software
- DSP processing power and memory is dynamically assigned to signal processing functions — eliminating the limitations imposed by fixed signal chain designs
- Graphical representation of DSP resources
- Firmware upgrades via RS-232
- Hard copy printout of signal flow layout or parameter settings

### System Requirements

- Windows® 98, NT4 (SP6), and 2000 (SP1)\*
- SVGA monitor @ 800 x 600 (min.); 1024 x 768 recommended
- CD-ROM drive
- 32 MB RAM (min.)
- 10 MB free hard disk space (min.)
- Available RS-232 COM port
- Male-to-female 9-pin serial cable (for programming)

\* Windows Me not supported

## DSP-4 CONFIGURATIONS

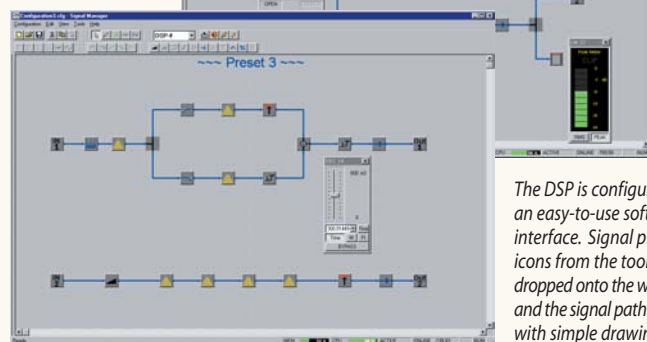


### SIGNAL MANAGER

#### Advanced “Drag-and-Drop” Software Configuration

DSP configuration is made simple with a PC-based “drag-and-drop” software program called *Signal Manager*. Users can access a DSP “toolbox” and simple drawing tools to configure processing functions and signal flow. DSP processing power and memory is dynamically assigned to signal processing functions and any combination of functions may be configured until the total capacity is used. DSP resources are graphically displayed at the bottom of the screen.

Configurations can be downloaded directly to the DSP-4 via an RS-232 serial port or through a QSC Control Audio Network System via a CM16a Amplifier Network Monitor for added simplicity. The software package also offers real-time control and set-and-forget convenience. Configurations can be saved and recalled for future use.



*The DSP is configured with an easy-to-use software interface. Signal processing icons from the toolbar are dropped onto the workspace and the signal path is routed with simple drawing tools.*

### COMPATIBLE AMPLIFIER MODELS

The DSP-4 mounts directly to the back of these models via the DataPort:

- |                          |  |
|--------------------------|--|
| Full Feature             | Version 2 DataPort   |
| • Two-channel CX Series  | • ISA (V2 DataPort – audio only; requires external power supply) |
| • Two-channel DCA Series |  |
| • PowerLight 2 Series    |  |

The following models require a Remote Rack Mounting Bracket:

- |                                     |                      |
|-------------------------------------|----------------------|
| Full Feature (DPX-2 cable required) | Reduced Feature Set  |
| • Four-channel CX Series            | • MX                 |
| • Four-channel DCA Series           | • USA                |
| • PowerLight Series                 | • PLX                |
| • Eight-channel CX Series           | • RMX                |
|                                     | • Non-QSC amplifiers |

## DSP-4 SPECIFICATIONS

Characteristics	Specifications
<b>AUDIO CONVERTERS</b>	24 bit, 48 kHz
<b>FREQUENCY RESPONSE</b>	3 dB below full scale input voltage
<b>XLR Output</b>	20 Hz to 10 kHz ± 0.3 dB
<b>DataPort</b>	20 Hz to 20 kHz ± 0.7 dB
<b>DISTORTION</b>	<0.02% THD+N @ +4 dBu
<b>THROUGHPUT DELAY</b>	1.00 milliseconds (A/D – DSP – D/A)
<b>DYNAMIC RANGE</b>	>104 dB 20 Hz to 20 kHz, 1.5V sensitivity, unweighted
<b>AES-17 -60 dB METHOD</b>	>106 dB 20 Hz to 20 kHz, all other sensitivities, unweighted
	>107 dB 20 Hz to 20 kHz, 1.5V sensitivity, A weighted
	>109 dB 20 Hz to 20 kHz, all other sensitivities, A weighted
<b>INPUT IMPEDANCE</b>	8.3 K Ohm balanced 3.7 K Ohm unbalanced
<b>COMMON-MODE REJECTION</b>	>50 dB minimum 20 Hz to 20 kHz >60 dB typical 20 Hz to 20 kHz
<b>INPUT SENSITIVITY</b> (selectable)	1.5, 4, 9, 18 Vrms 6, 14.5, 21.5, 27.5 dBu 3.5, 12, 19, 25 dBV
<b>CROSSTALK</b> (inter-channel w/in DataPort pair)	>62 dB separation, 20 Hz to 20 kHz
<b>AUDIO INPUT CONNECTORS</b>	Two XLR female (1 for each audio channel) One HD-15 female DataPort* One RS-232 female (PC input)

Specifications subject to change.

Characteristics	Specifications
<b>AUDIO OUTPUT CONNECTORS</b>	Two XLR male (for daisy-chaining each audio channel out) One HD-15 male DataPort amplifier connection
<b>INDICATORS</b>	FRONT: Power (one blue) Signal (one green)
<b>CONTACT CLOSURE INPUT</b>	
<b>Inputs</b>	1 discrete input (pin #9 of RS-232 port)
<b>Configuration</b>	Single-ended input, pull LOW (to GND, pin5) for closure detect
<b>Resistance for closure detect</b>	<150 Ohms
<b>Resistance for open detect</b>	>1.9 K Ohms
<b>TTL compatible thresholds with 9V DC max input</b>	
<b>EXTERNAL POWER REQUIREMENTS</b> (DPX-1 recommended)	15 VDC, 0.3 A Required only for PowerLight, QSC non-DataPort amplifiers, V2 DataPort (audio only) models, or non-QSC amplifiers.
<b>DIMENSIONS</b>	
<b>Height</b>	3.47" (8.81 cm)
<b>Width</b>	3.35" (8.51 cm) without flanges 3.75" (9.52 cm) with flanges
<b>Depth</b>	2.05" (5.21 cm)
<b>WEIGHT</b>	.93 lbs (.42 kg) net 1.3 lbs (.59 kg) shipping
<b>CONSTRUCTION</b>	Steel chassis and back cover

\*DataPort input for use with CM16a Amplifier Network Monitor in QSCControl audio network systems for remote management of QSC amplifiers and other audio devices.



A Remote Rack Mounting Bracket is available to use with PowerLight, 4-channel QSC amplifiers, or for non-DataPort-equipped amplifiers. Designed to be bolted to the rear of an amplifier rack, up to four modules can be mounted to each panel, providing up to **eight** channels of DSP processing in a three rack-unit space.