# TQP-48

## 4 x 8 Digital Signal Processor

*temporal equalization* tq™





## Overview

The TQP-48 is a 4-input, 8-output digital signal processor that provides full support for Fulcrum Acoustic's FIR-based, Level 1 **Temporal Equalization™ (TQ™)** loudspeaker settings. Fulcrum Acoustic loudspeakers tuned to Level 1 provide a crisper stereo image, greater soundstage depth, more separation between the components of a complex mix, increased resistance to feedback, improved arrayability, more seamless transitions between distributed loudspeakers, and a less fatiguing listening experience at very high SPLs. Level 1 settings are imported to the TQP-48 by means of pre-configured voicing files, which are published on the Fulcrum Acoustic website (www.fulcrum-acoustic.com).

The TQP-48's DSP signal processing library is extensive and utilizes multiple SHARC 32-bit processors. Processing blocks include an 8 x 8 matrix mixer, a full array of graphic and parametric equalization, multiple crossover filter types, an advanced feedback suppressor, auto-levelers, compressors, matrix duckers, limiters, frequency-keyed noise gates, delays of up to 1365 ms on every channel, and signal generators.

All programming is accomplished with Ashly Protea™ NE Software running under Windows, with communication provided by either TCP/IP via standard Ethernet, or RS-232 via a 9-pin D shell connector. Hot-plug software control allows you to plug any processing block into any channel block, even while running live audio; recompiling is not required. Automatic DHCP network IP configuration allows quick and easy network set up, while the lack of front panel controls and multi-level software security with password access assure a tamperproof audio system.

Additional features include 8 channels of programmable 5-volt input or output logic controls, 8 channels of 0-to-5-volt analog level control, front-panel meters, and mute buttons.

## Performance Specifications[1]

**Frequency Response**
20 Hz to 20 kHz, ±0.25 dB

**Dynamic Range**
>114 dB, 20 Hz to 20 kHz, unweighted

**THD+N**
<0.002%, 1 kHz, +20 dBu

**Latency**
48 kHz:   2.21 ms
96 kHz:   1.11 ms

## Analog Audio Inputs

**Input Type**
Active balanced Euroblock

**Input Wiring Configuration**
Positive, Negative, Ground

**Input Impedance**
20 kΩ

**Maximum Input Level**
7.75 Vrms / 20.0 dBu

## Analog Audio Outputs

**Output Type**
Servo-balanced Euroblock

**Output Wiring Configuration**
Positive, Negative, Ground

**Output Impedance**
20 Ω

**Maximum Output Level**
7.75 Vrms / 20.0 dBu

## General

**Mains Connection**
IEC C14 inlet

**Mains Voltage**
90 to 240 VAC, 50 to 60 Hz, 70 W maximum

**Environmental**
40° to 120° Fahrenheit (4° to 49° Celsius), non-condensing

**Dimensions (L x H x D)**
19.0 x 3.5 x 8.5 in / 483 x 89 x 216 mm

**Shipping Weight**
14.0 lb / 6.35 kg

## Digital Audio Hardware

### Sample Rates

48 kHz or 96 kHz
*Level 1 TQ Voicing files available only for 48 kHz sample rate*

### DSP Processing

32-bit floating point SHARC processor array

## Digital Control

### Ethernet Control

10/100 Ethernet with auto-configuration, 8P8C (RJ45) jack

### RS-232 Control

Female 9-pin D-sub jack

### 4-pin Active Remote

4-pin Euroblock for phantom-powered bi-directional remotes

### Logic Inputs

9-pin Euroblock for (8) assignable 5 V logic inputs

### Logic Outputs

Shared with logic inputs
+12 V at 10 mA output high, 100 mA input low

## Analog Control

### Remote Attenuators

10-pin Euroblock for (8) assignable 0 to 5 VDC passive remote attenuators

## DSP Functions

### FIR Filter

384 coefficients @ 48 kHz sample rate

### Automatic Feedback Suppressor

Filter Quantity:   12
Detection Frequency Range:   25 Hz to 20 kHz
Filter Modes:   Floating, restricted, manual, locked
Sensitivity Control:   5 levels
Floating Filter Reset:   5 seconds to 24 hours

### Parametric EQ

10-, 6- 4-, and 2-band

### Graphic EQ

31-band, constant or proportional Q

### Crossover Filters

Type:   Linkwitz-Riley, Notched Linkwitz-Riley, Bessel, Butterworth

### Low-Pass and High-Pass Filters

Type:   Linkwitz-Riley, Notched Linkwitz-Riley, Bessel, Butterworth

### Notch

Bandwidth:   1/64 octave to 4 octaves
Frequency Range:   20 Hz to 20 kHz, 1 Hz increments

### Band-Pass

Bandwidth:   1/64 octave to 4 octaves
Frequency Range:   20 Hz to 20 kHz, 1 Hz increments

### All-Pass

Second-order (-180 degrees)

### Vari-Q LPF and HPF

Type:   Second-order
Frequency Range:   20 Hz to 20 kHz, 1 Hz increments
Filter Q:   Adjustable from 0.267 to 3.047

### Shelving Filters

Type:   Selectable 6 dB/octave or 12 dB/octave
Frequency Range:   20 Hz to 20 kHz, 1 Hz increments
Boost/Cut Range:   -15 dB to +15 dB, 0.1 dB increments

### Additional DSP Blocks

Delay:   Up to 1.365 seconds
Ducker:   Duck at input or in mixer
Gate:   Frequency keyable
Signal Generator:   Sine wave, white and pink noise
Matrix Mixer
Compressor
Limiter
Autoleveler

## Notes

[1] **Performance Specifications**  *Preliminary product information. All specifications are therefore subject to change without notice.*