DFR11EQ Digital Signal Processor Specification Sheet

DFR11EQ Digital Signal Processor

A full-featured signal processor designed for sound reinforcement applications, including theaters, conference rooms, meeting halls and houses of worship. The DFR11EQ offers a straightforward computer control interface that makes sense without a software manual or training course. The system also features tamper-proof front panel lockouts and the exclusive ShureLink network, which controls up to 16 units from one computer connection.

The DFR11EQ is a true problem-solver with features including 10 automatic, adaptive, feedback filters, equalizer limiter and delay for challenging acoustical situations.

HARDWARE FEATURES

- Crystal® 20-bit A/D and D/A converters (Analog-to-Digital, Digital-to-Analog) allows 104 dB of dynamic range.
- 48 kHz sampling rate provides flat response to 20 kHz.
- Onboard Scenes can be selected via front panel buttons.
- ½ rack space chassis allows rack mounting of one or two units in a single rack space with no sagging or bending.
- Shure Link Interface allows multiple Shure Link devices to be controlled with a single computer.
- There are no internal batteries. Settings and DSP program are stored in internal EEPROM.
- Electronically balanced input features combination ¼-in. and XLR connector and can be used with balanced or unbalanced outputs.

SOFTWARE FEATURES

- Adaptive Notch Filter algorithm (patent pending) automatically detects feedback and deploys up to 10 narrow band notch filters.
- A tamper-proof equalizer can be switched between 30-band graphic or 10-band parametric equalizer.
- The graphic equalizer is a constant-Q, 30-band, ½-octave graphic equalizer. It can boost up to 6 dB or cut 12 dB for each band.
- The parametric equalizer offers 10 filters with adjustable frequency, up to 6 dB of boost or 18 dB of cut, and up to a two octave bandwidth.
- Independently driven, cross-coupled, balanced ¼-in. and XLR outputs can be used with balanced or unbalanced inputs, without signal loss.
- Input and output levels are +4 dBu/–10 dBV DIP-switch-selectable.
- 88 MHz Motorola® DSP56009 processor engine features full 24-bit internal processing.
- RS-232 interface allows external computer control and firmware updates.
- Internal linear power supply is switchable between 120 and 230 Vac, eliminating the need for a cumbersome external power supply.
- Solid state bypass eliminates unreliable mechanical relays.

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SPECIFICATIONS

Frequency Response
20 to 20 kHz ± 1.0 dB re 1 kHz

Dynamic Range
104 dB minimum, A-weighted, 20 Hz to 20 kHz

Sampling Rate
48 kHz

Digital-to-Analog, Analog-to-Digital Conversion
20 bit resolution

Voltage Gain
-1 dB ± 1 dB (power off)
0 dB ± 2 dB (equal input and output sensitivities)
12 dB ± 2 dB (input -10 dBV, output +4 dBu)
-12 dB ± 2 dB (input +4 dBu, output -10 dBV)

Impedance
Input: 47 kΩ ± 20% actual
Output: 120 Ω ± 20% actual

Input Clipping Level
+18 dBu minimum (at +4 dBu setting)
+4 dBV minimum (at -10 dBV setting)

Output Clipping Level
+18 dBu minimum (at +4 dBu setting)
+4 dBV minimum (at -10 dBV setting)

Total Harmonic Distortion
< 0.05% at 1 kHz, +4 dBu, 20 to 20 kHz

LED Signal Indicators
Clip: 6 dB down from input clipping

Propagation Delay from Input to Ouput
1.0 ms, all filters set to Flat (0 ms delay setting)

Polarity
Input to output: non-inverting
XLR: pin 2 positive with respect to pin 3
1/4-in. TRS: tip positive with respect to ring

Operating Voltage
DFR11EQ: 120 Vac, 50/60 Hz, 75 mA max
DFR11EQJ: 100 Vac, 50/60 Hz, 75 mA max
DFR11EQE: 230 - 240 Vac, 50/60 Hz, 38 mA max

Temperature Range
Operating: -7°C to 49°C (20°C to 140°F)

Fuse
DFR11EQ: 120 Vac. Fuse: 100 mA, 250V time delay
DFR11EQJ: 100 Vac. Fuse: 100 mA, 250V time delay
DFR11EQE: 230 Vac. Fuse: 50 mA, 250 V time delay
In order to change a blown fuse, remove the power cord and pry open the drawer with a flathead screwdriver.
Ratio: ∞ to 1

Dimensions
219 mm x 137 mm x 44.5 mm
8 5/8 in x 5 3/8 in x 1 3/4 in

Weight
930 g (2.05 lbs)

FEEDBACK FILTERS
Ten (10) 1/10-octave adaptive notch filters from 60 Hz to 20 kHz
Deployed to 1 Hz resolution of feedback frequency
Deployed in depths of 3 dB, 6 dB, 9 dB, 12 dB, and 18 dB (12.5 Low Q in graphic EQ mode) attenuation
Filter shape variable between HI Q and LOW Q (see High Q vs. Low Q Filters).

GRAPHIC EQUALIZER

Frequency Bands
30 bands on ISO, 1/3-octave centers

Filter Type
1/3-octave, constant Q

Maximum Boost
6 dB per band

Maximum Cut
12 dB per band, high- and low-pass filters, 12dB/octave nominal

PARAMETRIC EQUALIZER

Frequency Bands
10 bands, variable frequency, variable Q

Boost/Cut Range
+6 dB to -18 dB per band

Q Range
1/40-octave to 2 octave

Shelf/Rolloff Filters
Shelf, +6 to -18 dB per filter
Rolloff, 6dB, 12dB, 18dB, or 24dB per octave nominal

DELAY
Up to 1.3 seconds

LIMITER
Threshold: -60 dBFS to -0.5 dBFS, 0.5 dB resolution
Attack: 1 ms to 200 ms
Decay: 50 ms to 1000 ms
DFR11EQ AUDIO INPUT

**Connector:** (XLR and 1/4-inch combined)  
- **XLR (female)**  
- **1/4-inch phone plug (female)**

**Configuration:** active balanced  
active balanced

**Actual Impedance:**  
- **XLR**: 47 kΩ  
- **1/4-inch**: 47 kΩ

**Nominal Input Level:**  
- **XLR**: +4 dBu (+4 input level)  
- **1/4-inch**: –10 dBV (–10 input level)

**Maximum Input Level:**  
- **XLR**: +18 dBu (+4 input level)  
- **1/4-inch**: +6 dBV (–10 input level)

**Pin Assignments:**  
- Pin 1 = ground  
- Pin 2 = hot  
- Pin 3 = cold  
- Tip = hot  
- Ring = cold  
- Sleeve = ground

**Voltage / Current/Phantom Power Protection?** yes  
yes

**DFR11EQ AUDIO OUTPUT**

**Connector:** (XLR and 1/4-inch separate)  
- **XLR (male)**  
- **1/4-inch phone plug (female)**

**Configuration:** active balanced  
active balanced

**Actual Impedance:**  
- **XLR**: 120 Ω  
- **1/4-inch**: 120 Ω

**Nominal Output Level:**  
- **XLR**: +4 dBu (+4 output level)  
- **1/4-inch**: –10 dBV (–10 output level)

**Maximum Output Level:**  
- **XLR**: +18 dBu (+4 output level)  
- **1/4-inch**: +6 dBV (–10 output level)

**Pin Assignments:**  
- Pin 1 = ground  
- Pin 2 = hot  
- Pin 3 = cold  
- Tip = hot  
- Ring = cold  
- Sleeve = ground

**Voltage / Current/Phantom Power Protection?** yes  
yes

**CERTIFICATIONS**

**DFR11EQ (Version 5)**  
UL Listed and cUL Listed to UL 6500 and CSA E65. Approved under the verification provision of FCC part 15 as a Class B Digital Device.

**NOTE:**

*EMC conformance testing is based on the use of supplied and recommended cable types. The use of other cable types may degrade EMC performance.

*Under extremely abnormal conditions of electrical fast transients on the power line, communication may be interrupted between the DFR11EQ and the controlling PC. The unit will not be damaged; normal operation will resume after the CONNECT button or command is used to restore the connection.

**FURNISHED ACCESSORIES**

- **Power Cable (DFR11EQ5/DFR11EQJ)** 95A8389
- **Power Cable (DFR11EQ5E)** 95A8247
- **Power Cable Clamp** 95A8712
- **5-pin DIN Shure Link Cable** 95A8676
- **Single Mount Rack Bracket** 53A8450
- **Dual Mount Rack Bracket** 53B8442
- **Straddle Bars** 53B8443
- **DFR11EQ Version 5 Software/User’s Guide** 95A8830A
- **CD-ROM**

*NOTE: The power cord and power cable clamp is supplied assembled. If a replacement power cord is needed, a power cord clamp is also required. If not assembled, the power cord clamp should be clamped as close to the female end of the power cord as possible.*