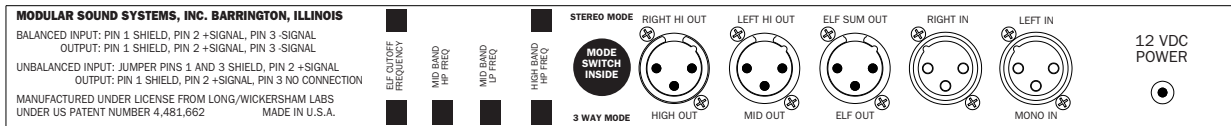
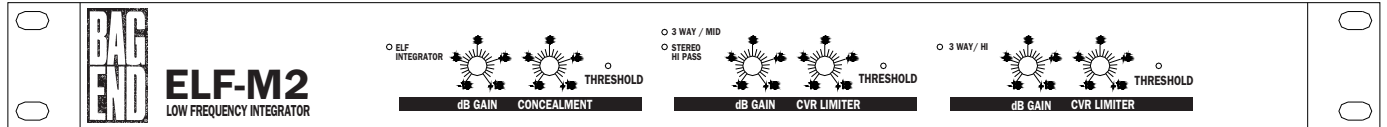


# BAG END

## ELF - M2

### S P E C I F I C A T I O N S



#### GENERAL SPECIFICATIONS

**Input Connectors:**  
XLR female

**Input Configuration:**  
Balanced

**Alternate Input Configuration:**  
Unbalanced

**Max. Input Signal:**  
3 V (+10 dBu)

**Output Connectors:**  
XLR male

**Output Configuration:**  
Unbalanced

**Max. Output Signal:**  
3 V (+10 dBu)

**Nominal Output Impedance:**  
100  $\Omega$

**Min. Suggested Load Impedance:**  
2.5 k $\Omega$

**Power-on Indication:**  
Green LED

**Operating Input Voltage:**  
10.5 - 18.5 VDC

**Operating Current Required:**  
< 100 mA

**Input Voltage Connector:**  
Miniature DC 2.5 mm

**Input Voltage Polarity:**  
Center pin +

#### ELF SPECIFICATIONS

**Max. ELF Gain:**  
10 dB

**Max. ELF Attenuation:**  
10 dB

**ELF Cutoff Frequency Programming:**  
Plug in resistors

**ELF Cutoff Frequency:**  
18 Hz

**ELF Output Mode:**  
Sum in Stereo Mode

**Nominal Concealment Threshold:** 0 dBu Output

**Min. Concealment Threshold:**  
-10 dBu Output

**Max. Concealment Threshold:**  
+10 dBu Output

**Max. Concealment Reduction Capability at 18Hz:** 30 dB

**Concealment Threshold Exceeded Indication:**  
Red LED

**ELF Circuit Noise:**  
< -85 dBu (20 Hz to 20 kHz)

**ELF Dynamic Range:**  
> 95 dB (20 Hz to 20 kHz)  
(bandwidth unweighted)

#### HI PASS SPECIFICATIONS

**Max. Hi Pass Gain:**  
10 dB

**Max. Hi Pass Attenuation:**  
10 dB

**Hi Pass Filter Frequency Programming:**  
Plug in resistors

**Factory Set Hi Pass Filter Frequency:**  
- 3 dB @ 130 Hz / -6 dB @ 97 Hz

**Hi Pass Filter Frequency Range:** 50 Hz to 200 Hz

**Hi Pass Filter Slope:**  
12 dB/octave

**Hi Pass Circuit Noise:**  
< -85 dBu (20 Hz to 20 kHz)

**Hi Pass Dynamic Range:**  
> 95 dB (20 Hz to 20 kHz)  
(bandwidth unweighted)

#### PHYSICAL SPECIFICATIONS

**Enclosure:**  
Black powder coated steel

**Enclosure Mounting:**  
1U EIA rack (1.75")

**Dimensions:**  
1.75" h x 19" w x 5.25" d  
5 cm x 49 cm x 14 cm

**Weight:**  
5 lbs.  
2.3 kg

**Shipping Dimensions:**  
6" x 22" x 12"  
16 cm x 59 cm x 31 cm

**Shipping Weight:**  
7 lbs.  
3.2 kg

#### Applications:

Theatrical Production  
Cinema Reproduction  
Musical Instrument Systems  
Auditorium Sound Systems  
Church Sound Systems  
Portable Sound Systems  
Nightclub Applications

#### Features:

18 Hz ELF dual integrator  
CVR hi pass limiting  
ELF Concealment  
Balanced inputs  
Internal frequency modifications  
Convenient front panel controls  
2-way stereo or 3-way mono mode

**Use ELF output with ELF Loudspeakers only.**

BAG END Loudspeakers  
22272 Pepper Road  
Barrington, Illinois  
60010 USA  
Voice 847 382 4550  
Fax 847 382 4551  
www.bagend.com



# ELF-M2

Upon detailed evaluation and analysis of an ELF system, it is clear that the fundamental impression of power and impact is greater with an ELF system when compared to conventional bass systems. This is true even when the two systems will measure the exact same calibrated dB sound pressure level. We believe this is because an ELF system compacts the bass energy into a tight packet aligned with the upper range signal rather than the typical time smears inherent in conventional bass systems. Objectively, the ELF system meets within the Time-Align<sup>®</sup> specification and exhibits superior phase response.

**Description:** The Bag End ELF-M2 system module is a two-channel loudspeaker controller. It is designed for either stereo 2-way operation with a mono sum ELF low frequency output or mono 3-way operation. The ELF-M2 incorporates the ELF dual integrator, frequency dividing, and system protection in an easily operated configuration where the system parameters are internally preset or available on front panel rotary controls.

The front panel controls are uniformly calibrated in even dB increments with a 20 dB control range and are flush mounted so that the control settings are not accidentally changed.

The ELF-M2 operates on 12 Volt DC which insures complete international compatibility and easily allows custom portable and automotive applications.

The ELF-M2 requires no connection to the output of the amplifier. To set the Concealment and CVR Limiter protection thresholds, refer to the amplifiers input sensitivity and adjust the front panel controls accordingly.

The *Guide to ELF Systems* comes with the ELF-M2 and provides complete set up instructions and additional technical information.

**Concealment:** The Concealment circuit is a complimentary technology to the ELF. Set to the proper threshold, it insures that unexpectedly large signals will not overload the system resulting in possible damage or audible distortion. This allows high level operation close to the maximum system capabilities without fear of accidental overload. Concealment is not a band limiter. It dynamically reduces the low frequency extension.

**CVR Limiter:** The Continuous Variable Recovery limiter provides a limiting circuit with a high level of system protection and very minimal audible effects. The CVR circuit provides a fast attack time with a variable recovery time dependent upon the amount of limiting originally called for. In operation, it resembles a human operator who corrects large level changes rapidly, but carefully, and slowly returns the gain to full, anticipating that if reduction was needed then the gain shouldn't be rushed back to full, as it is likely that another reduction is necessary.

**Polarity:** The ELF and Hi pass polarity in the ELF-M2 have been internally set for proper crossover functions. A simple polarity tester may show reversed polarity as referenced to DC. In audio, we listen to AC signals and the best actual polarity determination is made at the crossover point with an asymmetrical signal. Under these conditions, the ELF-M2 will exhibit the correct polarity at crossover and provide the most even blend between the upper range system and the ELF speakers. Reversing the ELF polarity will add energy in the upper bass region near crossover and may mask the lower bass output.

## What is ELF™?

ELF™ (Extended Low Frequency) was invented by Ron Wickersham and Ed Long and represents the first significant advancement in low frequency reproduction since 1953. The ELF™ system insures that the lowest 3 octaves of the audio and sensory spectrum are reproduced acoustically in the same time and frequency relationship as the electrical input to the system.

A fundamentally new approach to low frequency reproduction, the ELF™ employs electronic compensation to the uniform response that a sealed box loudspeaker system exhibits below its resonance frequency. The resultant frequency response can be extended well below the audible range while at the same time greatly reducing the influence of the system resonance. An ELF™ system reproduces each note with precision and uniformity while maintaining a flat frequency and phase response, eliminating the tendency to emphasize the notes around resonance as in conventional bass systems. The patented ELF™ dual integrator provides both a very flat response below resonance and the high frequency roll-off above resonance, for crossover to the midrange driver, without the use of conventional low pass filters and the delay typically introduced by them. An inherent bonus of the process requires the enclosures to be small. For example, a double 10-inch ELF™ system measures only 13" x 13" x 22" (1.5 ft<sup>3</sup>).

