

## **Battery replacement:**

Remove the four screws on the bottom cover to access the battery compartment. If storing the unit for long periods of time the battery should be removed to prevent corrosion of the battery snap. Be sure to place the battery wires along the side of the battery in the battery pocket and use care while replacing the bottom cover.

## **Warranty:**

The FEA OPTI-FET Compressor is fully covered for a period of 5 (five) years and the foot switches are covered for 1 (one) year against defects in material and workmanship. Abuse and neglect are not covered under the warranty. Any modifications or repairs not authorized by FEA voids all warranties. The customer will be responsible for shipping cost to and from FEA Labs for repairs. Contact me before attempting to ship a unit for repair at: [info@fealabs.com](mailto:info@fealabs.com).

All repairs made outside of the warranty period will be very reasonable (usually only the cost of the parts)... your satisfaction is priority one.

Contact FEA Labs at:

[www.fealabs.com](http://www.fealabs.com)

[info@fealabs.com](mailto:info@fealabs.com)

# **FEA OPTI-FET COMPRESSOR**



## About the design:

The FEA OPTI-FET Compressor is designed with both audiophile and studio quality features that many musicians enjoy.

The new audio path has been redesigned with the FEA 3S output amplifier circuit for warm tone and excellent noise rejection that features a “class A” FET output driver. The 3S amplifier utilizes an audiophile grade Texas Instruments™ (formerly Burr-Brown™) SoundPlus™ operational amplifier and a class-A Fairfield™ FET driver for outstanding performance. The operational and FET driver amplifiers are integrated in a unique way to take advantage of the favorable qualities of both types of amplification. This 3S amplifier has selectable modes of operation for a clean or warm tone. The warm tone mode was modeled to match the tone of the original OPTI-FET circuit. The input stage is a high impedance CMOS, hi-fi amplifier buffer with internal RFI protection. The input amplifier has been designed to have minimal signal distortion and noise, with maximum headroom for all input signal levels.

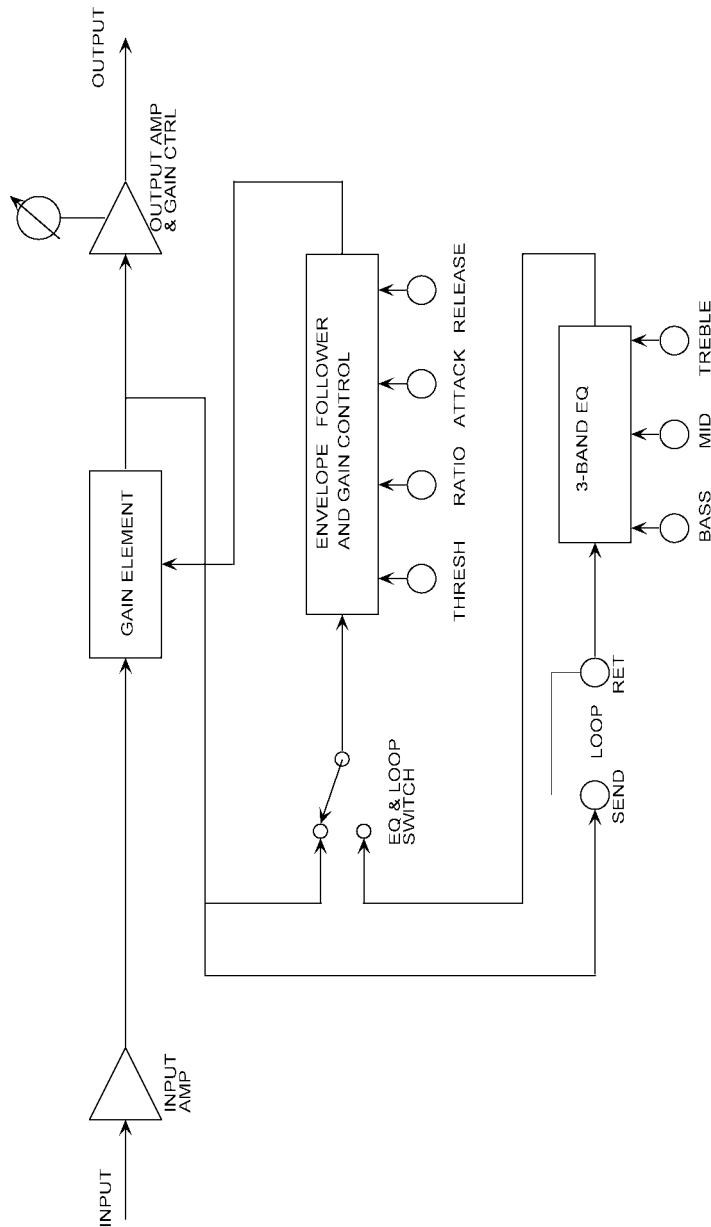
Another feature in the FEA OPTI-FET Compressor is the extensive side-chain control which is not commonly found in most pedal type compressors today. Like many quality studio rack compressors, the OPTI-FET compressor has all of the common controls available to the user to accurately shape his or her tone. Along with the full feature set of side-chain controls, a three band equalizer is available. This EQ only affects the amplitude of frequencies of the signal in the compressor control circuits. This EQ allows the user to modify the threshold setting by frequency band. The OPTI-FET compressor also has a side-chain loop feature, similar to many rack compressors. This allows the user to be more creative with the use of other outboard pedals. Multi-band EQ, or buffered volume pedals are a few that can make this pedal even more versatile when used in the side-chain loop.

The Luna Optoelectronics™ AOI's (analog optical isolators) used in the FEA OPTI-FET Compressor utilize a combination formula for the photocell to overcome limitations found in other traditional optical components affecting reaction and recovery times. This fast current monitored AOI allows the side-chain in the compressor to accurately control the dynamics of the compression. The purely resistive photo element in the AOI exhibits less noise and distortion than most

## Technical Specifications:

<input type="checkbox"/> <b>ATTACK:</b>	<b>2mS to 150mS</b>
<input type="checkbox"/> <b>RELEASE:</b>	<b>50mS to 1S</b>
<input type="checkbox"/> <b>RATIO:</b>	<b>1.5:1 to 20:1</b>
<input type="checkbox"/> <b>THRESHOLD:</b>	<b>-47dBu to ∞</b>
<input type="checkbox"/> <b>Make-up GAIN:</b>	<b>-4 to 23dB</b>
<input type="checkbox"/> <b>Side-chain EQ Freq:</b>	<b>LOW 30Hz, MID 250Hz, HIGH 2KHz</b>
<input type="checkbox"/> <b>Maximum Input:</b>	<b>13dBu</b>
<input type="checkbox"/> <b>Maximum Output:</b>	<b>13dBu</b>
<input type="checkbox"/> <b>Residual Output Noise:</b>	<b>-52dBu from 10Hz-20kHz (un-weighted) with no compression and output gain set to maximum. **This is the absolute worst case noise scenario.**</b>
<input type="checkbox"/> <b>Frequency Response:</b>	<b>20Hz – 20KHz -2dB</b>
<input type="checkbox"/> <b>Input Impedance:</b>	<b>1M ohm</b>
<input type="checkbox"/> <b>Output Impedance:</b>	<b>3K ohm</b>
<input type="checkbox"/> <b>Current Consumption:</b>	<b>Approx. 30mA</b>
<input type="checkbox"/> <b>Battery Life:</b>	<b>Approx. 17 hours continuous use</b>
<input type="checkbox"/> <b>Power adapter (optional):</b>	<b>9VDC 2.1mm negative center pin</b>

## Block Diagram:



designs using a VCA (voltage controlled amplifier). A good number of audiophiles advocate that only high-quality passive components should be utilized in the audio signal path and this is one application that I would have to agree with them.

The dual rail power supply in the OPTI-FET Compressor is built on its own discrete circuit board to physically separate it from the audio circuits. The power supply is over filtered two times to assure exceptionally clean power for the signal circuitry. This power supply provides 18Volts (+9V and -9V) to the compressor circuit board to provide plenty of headroom for the signal. The power supply was designed to provide separate power for all of the side-chain control circuitry. This assures that any natural electrical noise that the compressor side-chain control circuitry generates will not bleed into the signal circuitry. I have not seen this approach to power distribution in any of the other manufacturer's guitar effects. Is it overkill? Maybe...but I feel that it is absolutely crucial to eliminate every bit of noise where possible.

*Frank E. Appleton (FEA)*

## Features:

- **THRESHOLD, RATIO, ATTACK, RELEASE and GAIN controls.** The control ranges for the ATTACK and RELEASE have been optimized for use on both bass and guitar.
- The compressor exhibits soft-knee compression at lower RATIO settings and hard-knee at maximum RATIO settings. The COMP LED indicates when the THRESHOLD has been reached. This LED does not indicate the RELEASE response.
- The compressor side-chain utilizes precision full-wave rectification of the audio signals in the THRESHOLD circuit for accurate envelope tracking. This also reduces the possibility of “pumping” with very low frequencies.
- **ACTIVATE** foot switch places the compressor unit in the signal chain or in Direct Bypass mode. In Direct Bypass mode the signal at the input is directly connected to the output and does not pass through any electronics.
- **EQUALIZER** foot switch enables the three band equalizer controls for the side-chain control circuit. The three band EQ only affects the amplitude of frequencies of the signal in the side-chain control circuit to modify threshold sensitivity by frequency band.
- **LOOP SEND/RETURN** jacks are for placing external processors or EQ's in the compressor side-chain control circuit. These jacks are only active when the **EQUALIZER** foot switch is enabled.
- Internal DIP switches to select the output amplifier mode of operation. The three modes are clean (SW 1&2 off), warm 1 (SW 1 on) and warm 2 (SW 2 on). The warm 2 mode adds a subtle amount more of the dynamic harmonics of mode 1.
- Internal DIP switch for a 12KHz filter for an ‘old school’ tone or to reduce the hiss from pedals proceeding the compressor.
- The audio signal compression is accomplished with only a resistive component (Light Dependent Resistor or Photocell). All resistors in the circuit are low noise metal film type. The

audio signal coupling capacitors are tight tolerance, quiet, multi-layer and metallized polyester film type. The transistors utilized in the audio signal path are popular low noise audiophile grade devices.

- The power supplies onboard voltage charge pump allows the circuitry to operate at 18volts (+9 and –9 volt rails) from a single 9-volt battery or DC power adapter. This allows the audio signal plenty of headroom from active electronic guitars and aggressive playing techniques (i.e. pop and slap).
- The “switch on” power supply current is less than 1 $\mu$ A (micro amp) on the signal ground at the INPUT jack. This is approximately 45,000 times (-93dB) less than the commonly used method of connecting the battery’s negative terminal to ground via the sleeve of the plug inserted into the INPUT jack. The “switch on” sensing method used in the FEA OPTI-FET Compressor keeps nearly all of the circuit’s generated white noise and transient currents out of the INPUT stage signal ground. Extreme measures have been taken to keep the power and signal paths as clean as possible. **NOTE: Unplug the cord from the INPUT jack when not in use to prolong battery life.**