

### QUICK START

No one likes to read manuals. Everyone likes to plug in and turn on. That's usually OK, and with a very few exceptions, damage is unlikely to result from such procedures with the FPE 13.

If you are using the FPE 13 in an insert loop of a mixer, hook-up is extremely easy. Simply connect them together using a single stereo cable (1/4" TRS) between the mixer's insert loop and the FPE 13's **PATCH I/O** jack. This jack is wired for the tip=send, ring=return convention used by mixer manufacturers.

Anyone familiar with other parametric equalizers will find this one very similar. One word of caution: the **FREQ range** switches can drastically change the center frequency of a given filter. A range of 10Hz to 20kHz may be achieved with the proper operation of the switches and the **FREQ sweep** control. If full boost is applied with a filter **LEVEL** control and a change is made in the setting of the **FREQ range** switch, disastrous results may occur. **BE CAREFUL.**

To operate the filters, set the range switch for the desired multiple frequency band, set the **BW** (bandwidth) control for the desired bandwidth and then boost or cut the desired amount using the filter **LEVEL** control.

**Never connect anything except an APPROVED RANE POWER SUPPLY TO THE THING THAT LOOKS LIKE A TELEPHONE JACK ON THE REAR OF THE FPE 13.** This is an AC input and requires special attention if you do not have an operational power supply **exactly** like the one that was originally packed with your unit. See the full explanation of the power supply requirements elsewhere in this manual.

### SYSTEM CONNECTION

When connecting the FPE 13 to other components in your system for the first time, *leave the power supply for last*. This will give you a chance to make mistakes and correct them before any damage is done to your fragile speakers, ears and nerves.

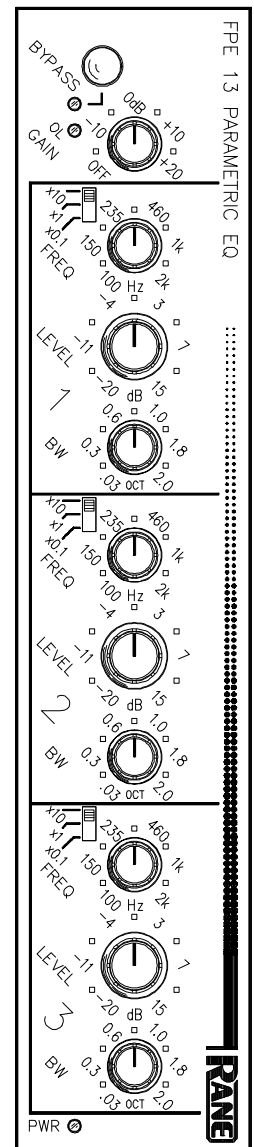
**INPUTS** on the FPE 13 are balanced. This means that standard 3-pin (XLR) connectors on the ends of any good quality cable will work well between your other signal processing and amplification gear. As with all Rane products, pin 2 is used for "hot" or "+" signal polarity, pin 3 is "return" or "-" and pin 1 is signal ground. If unbalanced operation is required, wire your connector so that pins 1 and 3 are shorted together and drive your unbalanced signal into pin 2. Then use the combination of 1 and 3 for signal ground/return. You may use either pin 1 or case for shield ground. (See Rane Note 110 for further information on this subject).

**OUTPUTS.** The FPE 13's Outputs are balanced as well. Again, pin 2 is hot and pin 3 is not. Pin 1 is signal ground. True balanced operation requires only the use of pins 2 and 3 for signal and either case ground (chassis) or pin 1 signal ground for shielding. If unbalanced output is your preference, use pin 2 as signal and pin 1 as return. Use case ground for shield. Again, have a look at Rane Note 110 for more detail.

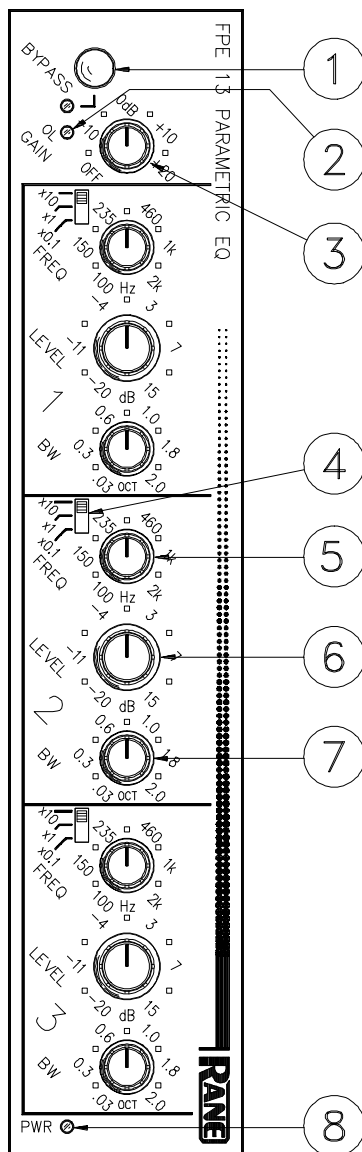
**EXPANDING** the Inputs and Outputs has been accommodated with 1/4" jacks whose tip is connected to pin 2 of the 3-pin connectors, ring is connected to pin 3 and sleeve is connected to pin 1. These 1/4" jacks may be used for primary Inputs and Outputs should you wish to do so. These connectors may also be used for daisy chaining the Inputs so more than one processor can be driven from a single source, but only *one* is an Input; they do not sum. The second Output connector may be used to drive a second processor or amplifier without special cabling.

**PATCH I/O** to channel inserts on most mixers has been made very simple. Connecting a shielded stereo tip-ring-sleeve (TRS) cable between the FPE 13's PATCH I/O and a TRS insert on your console implements this feature.

**SIGNAL LEVELS** applied to the FPE 13 may cover a broad dynamic range. This device has been optimized to operate perfectly with all signal processing and amplification gear. The only signal level problems encountered will be with very low level sources, such as microphones. Do not directly connect mic levels into the FPE 13. Use a mic preamp first.



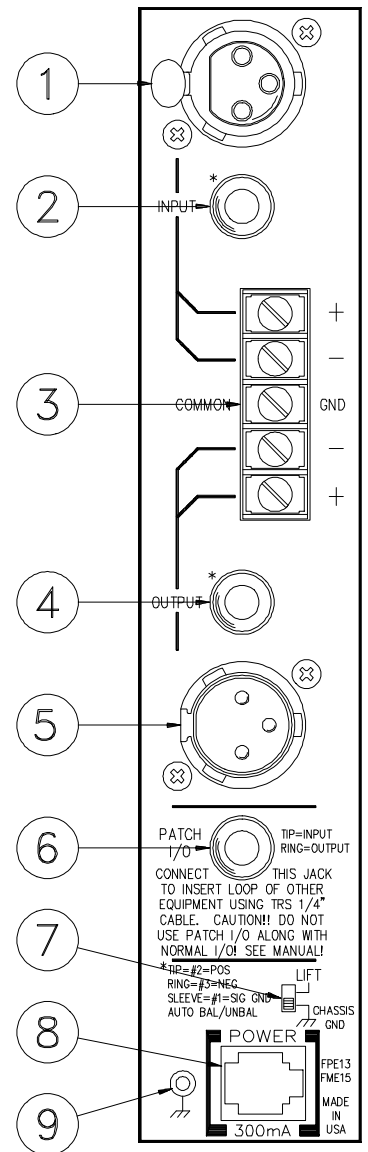
## FRONT PANEL DESCRIPTION



- 1. OVERALL BYPASS SWITCH & INDICATOR.** This pushbutton switch activates the “hard-wire” bypass function. When in its *in* position, all three pins of the Input connector(s) are directly connected to the same pins on the Output connector(s) and the red LED lights. Engaging this switch converts the FPE 13 to a relatively expensive patch cord with pretty lights.
- 2. MASTER OVERLOAD INDICATOR.** This red LED illuminates whenever the input, output, or any of the three parametric filters exceeds a level of 4dB below clipping. Occasional flickering is normal; however, it should not be allowed to light steadily.
- 3. INPUT GAIN CONTROL.** This rotary control increases INPUT gain as it is rotated clockwise. Its range is from OFF at full CCW rotation to +20dB at full CW.
- 4. FREQUENCY RANGE SWITCH.** The calibrations on this three position switch indicate the factor by which the frequency calibrations of the Frequency sweep control (5) should be multiplied. For instance, if the range switch is in the “x0.1” position and the sweep knob is at 460, then the actual center frequency of the filter is 46Hz. The proper operation of this switch in conjunction with the sweep control yields a range of 10Hz to 20kHz.
- 5. FREQUENCY SWEEP CONTROL.** This rotary control increases the center frequency of its filter as it is rotated clockwise. It is calibrated from 100 to 2k, and its exact frequency is determined by the range switch described in (4), above.
- 6. FILTER LEVEL CONTROL.** This rotary control determines the amount of boost or cut applied to the FPE’s passband by its filters. The center detent, cleverly placed at the center of rotation of this control, provides a ground for the filter which completely eliminates the filter’s influence over FPE 13 operation. Rotating this knob clockwise increases the gain at the center frequency of the filter, CCW from center decreases the gain at said center frequency.
- 7. FILTER BANDWIDTH CONTROL.** Calibrated from .03 octaves to 2.0 octaves, this rotary control adjusts the “width” of coverage of each filter. .03 octave (1/30 octave) will yield the narrowest coverage. Bandwidths this narrow are normally reserved for notch feedback control. Higher settings yield smoother curves and are convenient for program sweetening and acoustic compensation.
- 8. POWER LIGHT.** This yellow LED illuminates any time power is supplied to the FPE 13 from a Rane RS 1 or VC 18 single power supply, RAP 10 or FRS 8 multiple power supply. Other power sources could conceivably cause illumination of the LED and several ICs and resistors inside.

## REAR PANEL DESCRIPTION

- 1. 3-pin INPUT Connector.** Pin 2 is positive, pin 3 is negative and pin 1 is signal ground. For unbalanced operation, use pin 2 as hot and pin 1 as return.
- 2. INPUT Expand Connector.** This 1/4" TRS connector parallels the 3-pin connector described in item 1. Tip is positive, Ring is negative and Sleeve is signal ground.
- 3. Terminal Strip INPUT and OUTPUT.** The +, -, and COMMON GND terminals parallel the respective pins in the 3-pin and 1/4" connectors. Used for primary Inputs and Outputs or additional patch connections. Use #6 spades.
- 4. OUTPUT Expand Connector.** This 1/4" TRS connector parallels the 3-pin connector exposed in item 5 below. As before, Tip is hot, Ring is not and Sleeve is signal ground.
- 5. 3-pin OUTPUT Connector.** Pin 2 is positive, pin 3 is negative and pin 1 is signal ground. For unbalanced operation, *do not short any pins to any others*. Active balanced outputs operated in the unbalanced mode use only pin 2 driving the line and pin 1 acting as the return. Pin 3 should be left disconnected. Grounding pin 3 will not cause any damage nor will it impair the sound. It only creates extra work for your audio electrons and is unnecessary.
- 6. PATCH I/O Connector.** This 1/4" TRS jack provides an unbalanced **I** (Input) on its tip and an unbalanced **O** (Output) on its ring. Designed for use with tip=send/ring=return effect loop inserts found on many mixing consoles. This provides an easy means for patching the unit into effect loops as painlessly as possible, using a single 1/4" TRS stereo patch cable. **CAUTION: Use either the PATCH I/O or any of the INPUT and OUTPUT connectors—Do not use both at the same time. These are not summing inputs. Only one at a time may be used.**
- 7. GROUND LIFT Switch.** This switch provides the ability to separate chassis ground and signal ground. Normally, this switch should be in the LIFT position. In some circumstances, moving it to the opposite position eliminates stubborn hum and buzz problems. We realize a scientific explanation would be helpful, unfortunately science doesn't have enough to do with it. If you are tempted to try moving this switch with your power amplifiers turned on and up, **don't be. Always turn your amplifier levels down before changing your grounds around** and then bring them up slowly. Put a speaker re-coner out of work today!
- 8. Remote Power Supply Input.** The unit is supplied from the factory with a Model RS 1 Remote Power Supply suitable for connection to this input jack. The power requirements of the unit call for an 18-24 volt AC center-tapped transformer only. *It is not a telephone jack. Never use a power supply other than the one supplied or a replacement approved by Rane Corporation.* Using any other type of supply may damage the unit and void the warranty. Two years parts and labor is worth safeguarding, don't you think?
- 9. Chassis Ground Point.** A 6-32 threaded hole used for chassis grounding purposes. See the **CHASSIS GROUNDING** note on the last page for details.



## OPERATING INSTRUCTIONS

Before attempting any equalization of audio with the FPE 13, it is important to optimize the Input GAIN control setting. Improper gain distribution is a common cause of headroom loss in audio systems.

The FPE 13 provides you with an overall BYPASS switch & indicator as well as an OL (overload) LED as useful tools for optimizing gain set-up. The BYPASS switch is most useful for making A-B comparisons, i.e., comparing equalized (Bypass *out*) versus unequalized (Bypass *in*) sound. To be able to do this freely, without danger of system damage, requires you to set the level through the FPE 13 to approximately unity. Failure to do so can produce alarming results.

The gain range of the FPE 13 goes all the way from Off to +20dB. Quite respectable—and enough rope to hang yourself. Since the FPE 13 is always unity gain in Bypass, if you add or reduce Gain (beyond EQ make-up gain) the level differences between Bypass in/out can be startling. Therefore you want to set the GAIN control for equal in/out loudness levels.

To get started, make these initial set-up adjustments: BYPASS Switch “*In*” (= bypassed condition = red LED *on*). GAIN Control Center-Detent Position (unity gain spot). (3) LEVEL Controls Center-Detent Positions (0dB boost/cut).

Next apply a signal to the system. There will be no system gain change because the FPE 13 is in Bypass. Check the OL indicator to be sure it is not lit. If the OL LED is on, turn down the GAIN control until it goes out. Note, however, that the FPE 13 will no longer have unity gain when you switch it out of Bypass.

If the OL LED is not lit, then the center detent position of the GAIN control is the ideal place to start. Do not increase the gain above this point until you do enough cutting with the EQ controls to warrant adding make-up gain. Use the BYPASS switch to set equal loudness.

Release the BYPASS switch and you are ready to start equalizing the system. And since feedback and tone contouring are two of the most common uses for equalization, here are a few words on each.

**FEEDBACK** may be controlled nicely with a device such as the FPE 13. With the range switches you may position all three bands of the equalizer to overlap to remove any acoustic resonances causing you grief. As luck would have it, the top few nodes are usually grouped in such a way that you can't get them all with a conventional parametric. With the FPE 13's overlapping bands, you never have this problem.

A good way to find them is to set the bandwidth for about 1/2-octave, the LEVEL control to full cut, then sweep around with the FREQUENCY knob until you find the first culprit. Once you center on the ring frequency, reduce the amount of cut to a level just below where the feedback comes back. Then reduce the BandWidth to a point where the feedback stays dead and the sound quality comes back to life. Something between 1/30 octave and 1/3 octave usually does the trick.

**TONE CONTOURING** is accomplished with the FPE 13 mainly by ear. This you know how to do. Be careful, though, not to introduce too much boost to the upper bass area to prevent your audience from calling 911. Be aware also that the FPE 13 is capable of boosting signals up to +15dB—a level at which great care should be taken to prevent seismic disturbances.

Happy EQing and have fun.

## IMPORTANT NOTE

### CHASSIS GROUNDING

The FPE 13 is supplied with a rear-mounted ground-lift switch. The unit is shipped with this switch in the “grounded” position, tying circuit ground to chassis ground. If after hooking up your system it exhibits excessive hum or buzzing, there is an incompatibility in the grounding configuration between units somewhere. Your mission, should you accept it, is to discover how your particular system wants to be grounded. Here are some things to try:

1. Try combinations of lifting grounds on units that are supplied with ground lift switches or links.
2. If your equipment is in a rack, verify that all chassis are tied to a good earth ground, either through the line cord grounding pin or the rack screws to another grounded chassis.
3. Units with outboard power supplies, such as the FPE 13, do not ground the chassis through the line cord. Make sure that these units are grounded either to another chassis which is earth grounded, or directly to the grounding screw on an AC outlet cover by means of a wire connected to a screw on the chassis with a star washer to guarantee proper contact.

Please refer to Rane Note 110 (supplied with your FPE 13 and available on request at no charge if you lost your first one) for further information on system grounding.