EQF 810

Audio Equalizer

Reference Manual

speck electronics

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Introduction

General

Thank you for purchasing our EQF 810 Equalizer. The EQF 810 has operational features that are easy to understand and you should be up and running in no time. If you have any questions regarding the EQF 810 or any Speck product, do not hesitate to contact Speck Electronics.

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The EQF 810 is a four band parametric equalizer and two variable filters housed in a 1/2 rack space chassis that covers the audio spectrum from a low 20Hz all the way up to 25kHz. It is well suited in audio applications for professional recording, sound contracting, touring, or any application where equalization is required.

Connect the EQF 810 to virtually any line level source: balanced, unbalanced, or mixer inserts. The EQF 810 has high headroom that will handle balanced signals up to +28dBu.

The EQF 810 design uses I.C. operational amplifiers for the active electronics. All equalizer bands use state variable filter topologies and the variable filters use a 2nd order Butterworth design. The line inputs are active-balanced and the outputs are switchable between active-balanced or Jensen Transformer-balanced.

The EQF 810 is available in 2 versions;

- The Model EQF 810-NA designed to operate with 100 and 120 VAC mains power.
- The Model EQF 810-EU that is designed to operate with 220, 230 or 240 VAC mains power.

Standard accessories

The EQF 810 is supplied with the following list of accessories:

- **Operations Manual**
- **Power cord** (North American version only)
- **(4) rubber bumpers** - used for table top mounting or stacking multiple units.
- **(3) 6-32 x ½" machine screws** - supplied to mount the EQF 810 to an optional rack shelf.

Operator Safety Summary

Power source

The EQF 810 is intended to operate from an AC power source that does not apply more than 120 Volts RMS (Model EQF 810-NA) or 240 Volts RMS (Model EQF 810-EU) between the supply conductors. Always make certain that the power cord matches the operating voltage shown on the rear panel.

Do not remove covers or panels

To avoid personal injury, do not remove the top cover of the EQF 810 and never operate without the cover panel properly installed. If it becomes necessary to remove the cover panel for service or to change the mains operating voltage, always disconnect the power cable before proceeding.

The EQF 810, with its internal power supply, contains voltages that can cause serious injury or death. Refer all repairs to a qualified service technician, or directly to Speck Electronics.

Specifications

	Normal	Maximum
Input Level	+4 dBu	+28dbu

	Normal	Maximum
Output Level:		
(Active Balanced)	+4 dBu	+28dbu
(Transformer Balanced)	+4 dBu	+24dBu

Input Impedance	30K Ohms
Output Impedance	
(Active Balanced)	60 Ohms
(Transformer Balanced)	600 Ohms
Output Distortion(THD+n) 22Hz to 22KHz @ +4dBu	
(Active Balanced)	.0016%
(Transformer Balanced)	.0025%

Frequency Response

Test Conditions:
- AP balanced +4dBu signal connected to input.
- All Boost/Cut controls set to “0”
- LP and HP filters enable switches set “out”
- 4 Band EQ enable switch set “in”
- Shelf switches set “out”
- AP analyzer connected at output

Measured at active balanced output	5Hz(-0.25dB) to 68kHz(-0.5dB) 2Hz(-.25dB) to 149kHz(-3dB)
Measured at transformer output	10Hz(-0.25dB) to 68kHz(-0.5dB) 10Hz(-.25dB) to 148kHz(-3dB)

Residual Noise Measurement

Test Conditions:
- AP balanced signal connected to input.
- AP Generator set “Off”
- All Boost/Cut controls set to “0”
- LP filter, HP filters, and Equalizer enable switches set “in”
- Shelf switches set “out”
- Transformer - Active output switch set “out”
- AP analyzer connected at output

Residual Noise Measurement (10Hz-80kHz)	-89 dBu
Power requirements	9 Watts
Dimensions	HxWxD = 8.6" x 1.75" x 11" (218mm x 44mm x 280mm)
Shipping weight	Approximately 7 lbs (3.2Kg)

ALL MEASUREMENTS WERE PERFORMED WITH AN AUDIO PRECISION TEST SET.

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Installation

General

The following information should give you the basics on how to install the EQF 810. The proper installation of the EQF 810 as part of a larger system requires a clear understanding of audio wiring, AC distribution, grounding, and shielding techniques.

When the EQF 810 is being installed into a larger system, it may be necessary to retain the services of someone experienced in these matters.

Unpacking and inspection

The EQF 810 is delivered in a special, protective shipping container and was carefully inspected both mechanically and electrically before shipment. It should be physically free of mars and scratches and in perfect electrical order upon receipt. To confirm this, the product should be inspected for physical damage that may have occurred in transit. Any damage should be reported to your dealer or delivery company as soon as possible.

Environmental considerations

If installed in an equipment rack that also contains heat producing equipment, adequate ventilation should be provided. This will prolong component life and maximize operational stability.

To insure adequate airflow around the unit and to prevent overheating, do not obstruct the air vents on the side and top.

While the internal circuitry of the EQF 810 is fully shielded by the steel chassis, installation should nevertheless be planned to avoid locating it immediately adjacent to power amplifiers, power supplies, or any source of low frequency electromagnetic emissions.

Grounding the product

The ground pin of the power cord and power inlet are internally connected to the chassis. To avoid electrical shock, plug the EQF 810 into a properly wired AC receptacle. For safety reasons, **do not lift the ground on the power plug by using a ground lift adapter.**

Upon loss of a protective ground connection, all accessible conductive parts, including knobs and controls that may appear to be insulating, can render an electric shock.

Mechanical installation

The location of the EQF 810 should be such that the operator has a clear, unobstructed view of the front panel from his/her normal operating position. The unit should also be within easy reach of the operators normal position in order to facilitate the use of the front panel controls

The ½ rack form factor of the EQF 810 allows a single unit to be mounted on a table top with the (4) rubber bumpers (supplied), multiple units stacked, or two units mounted side-by-side on a 1U rack shelf.

1 rack space (1U) rack shelves are manufactured by:

- Middle Atlantic Products, Model UTR1
- Raxxess, Model UNS1.

Physical placement of adjacent equipment

When attaching the EQF 810 to the rack shelf, it should be secured with (3) 6-32 x ½” machine screws (supplied). Do not use screws that are longer than ½” in length as they could damage the internal circuit board. When a single or multiple EQF 810’s are mounted to the rack shelf, they may be installed into any 19" wide equipment rack that uses standard E.I.A. universal spacing.

Any device that emits a high EMI (Electro Magnetic Interference) or RFI (Radio Frequency Interference) energy field should be treated with suspicion. EMI is considered any unwanted signal which adversely affects the operation of the EQF 810 or the audio system. This subject is discussed in Chapter 4.

Electronic equipment such as power amplifiers, power supplies, video monitors, computers, certain synths, and samplers should be located away from the EQF 810 and its associated audio cables. It may be necessary to alter the positions of certain equipment that you feel would cause buzzes or hums in the audio system.

Cleaning

The front and rear panels are a high quality painted surface and the panel lettering is applied using a silkscreen printing technique.

To clean the front or rear panel, wipe the surface gently using a soft lint-free cloth to avoid scratching the panel or markings. Paper towels are not recommended. Commercially available window cleaner solutions may be used; however, the solution should be applied to the cloth and not the panel to avoid the seepage of liquid to the inside of the enclosure.

Repacking For Shipment

The following information is provided as a general guide for repackaging your EQF 810 for shipment. If you have any questions, contact Speck Electronics at +760-723-4281.

If the product is to be shipped to Speck Electronics for service or repair, contact Speck Electronics for a Return Merchandise Form. When we receive the completed form, a RMA number and shipping instructions will be issued. Place the product in the original container if available.

If the original container is not used, wrap the product in heavy plastic before placing in an inner container. Use plenty of packing material around all sides of the product and protect panel faces with cardboard strips. Mark shipping container with "Delicate Instrument" or "Fragile," and insure the shipment for the proper amount.

Note: Speck Electronics cannot be responsible for equipment that arrives damaged or uninsured.

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Operation

General

We hope to give you basic information on the operation of the EQF 810 and adequately describe its controls, switches, and connectors.

The information in this manual is intended to help with the technical process when using your equalizer. Words alone could not adequately describe how to adjust the controls of an equalizer. Your ears should be your best gauge of how to adjust the equalizer controls to make the sound fit your requirements.

Basic Theory of Equalizers

A parametric equalizer falls into the generic category called a “filter.” A filter is an electronics circuit that allows signals of certain frequencies to be transmitted through a system, while preventing the transmission of other frequency ranges.

There are 3 basic types of passive or active filters; low-pass, high-pass, and bandpass.

Low-pass filter

A low-pass filter is a circuit that passes all low frequency signals and rejects high frequency signals. The crossover point that low frequencies pass through can be either fixed at a specific point or variable.

High-pass filter

A high-pass filter is a circuit that passes all high frequency signals and rejects low frequency signals. The crossover point that high frequencies pass through can be either fixed at a specific point or variable.

Bandpass filter

A bandpass filter is a circuit that will pass only a fixed frequency band and reject signals above and below the selected band.

A parametric equalizer is a very elaborate bandpass filter that offers the ability to control the filter's basic parameters - hence the term “Parametric Equalizer.” These controllable parameters are the bandpass center frequency, the amplitude of the bandpass frequency, and the width of the bandpass frequency. These previously mentioned parameters as found on audio parametric equalizers are commonly known as the sweep control, boost/cut control, and bandwidth (Q) adjust respectively.

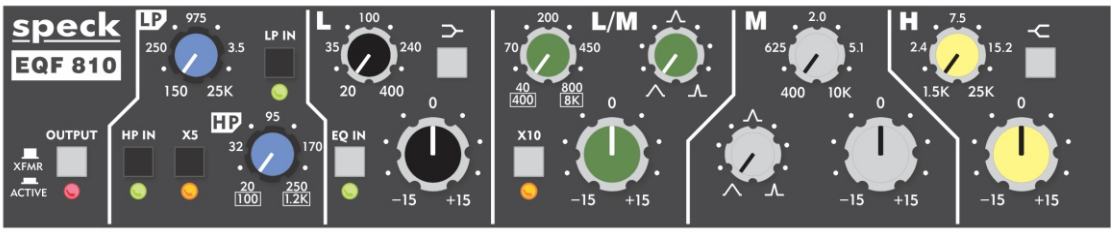
The EQF 810 equalizer utilizes all the previously mentioned parametric controls.

Default Control Settings

Before any attempt is made to operate the EQF 810, it would be a good idea to set all the controls to their neutral positions. This gives you a reference point to work from when adjusting controls and switches. All “Frequency Sweep” and “Bandwidth” controls should be set to their full counter-clockwise setting. All “Boost/Cut” controls should be set to their "0" center detented position. All pushbutton switches should be set to the "Out" position.

When any future reference is made to the controls or switches of the EQF 810, will be assumed that they have been set to their neutral positions.

FRONT PANEL CONTROLS



1. Output Select

This switch will select either a "Transformer-Balanced" or "Active-Balanced" output for the XLR and 1/4" TRS outputs.

A dual colored LED will illuminate indicating that the EQF 810 is powered and active. When the output switch is set to the "XFMR" position, the LED will indicate green. This LED will change from green to red when the switch is depressed to the "ACTIVE" position.

VARIABLE FILTERS

2. High Pass Frequency

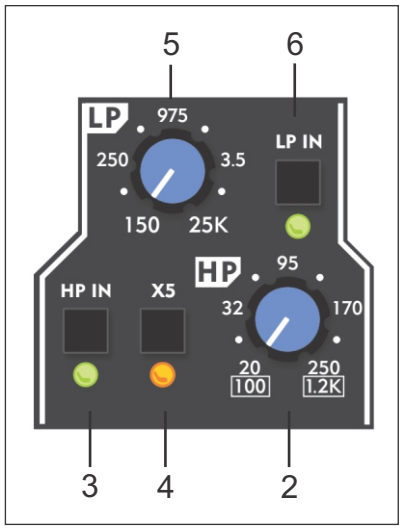
This control adjusts the frequency of the HP filter from 20Hz (Full CCW) to 250Hz (Full CW) with a slope of 12dB/octave for the low range selection or 100Hz to 1.2kHz when the 5X select switch is enabled.

3. High Pass Filter Enable

This switch is used to enable or disable the High Pass filter circuit. In the "out" position, this switch completely bypasses the HP filter circuitry. When this switch is depressed, the HP filter is enabled. A green LED indicates the operation of the filter.

4. High Pass X5 select

This switch selects the frequency range of the high pass filter. In the "out" position, the low range of 20Hz-250Hz is selected. When depressed, this switch selects a range of 100Hz-1.2kHz. A yellow LED illuminates indicating that the 5X frequency multiplier has been enabled.



5. Low Pass Frequency

This control adjusts the frequency of the LP filter from 150Hz (Full CCW) to 25kHz (Full CW) with a slope of 12dB/octave.

6. Low Pass Filter Enable

This switch is used to enable or disable the Low Pass filter circuit. In the "out" position, this switch completely bypasses the LP filter circuitry. When this switch is depressed, the LP filter is enabled. A green LED indicates the operation of the filter.

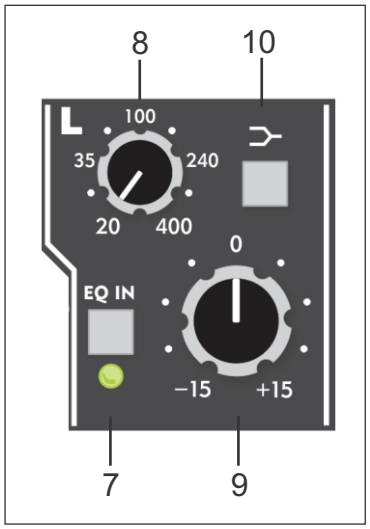
7. Equalizer bypass switch

This switch is used to enable or disable the 4 band equalization circuit. In the “out” position, all equalizer bands are bypassed. When in the bypass position, the active balanced input stage, the active balanced output stage, and the transformer remains operational. This allows the levels to match when comparing the equalized signal to the unequalized signal. A green LED indicates the operation of the equalizer.

L (Low) BAND

8. Low frequency sweep

The low frequency sweep control is used in conjunction with the low boost/cut control and provides continuous adjustment of the center frequency from 20Hz (fully counterclockwise) to 400Hz (fully clockwise). The Bandwidth (Q) of the low band is fixed at 1 octave (Q=1.0)



9. Low boost/cut

The boost/cut control provides a reciprocal volume adjustment of the selected frequency control. This means that whatever frequency is “boosted” with the boost/cut adjusted from its center position clockwise, an identical but opposite result is achieved when that same frequency selection is “cut” from its center position counterclockwise. Once the desired frequency has been selected with the low frequency sweep control, that frequency may be continuously accentuated or attenuated (boost or cut) from 0 to +15dB or -15dB. 0dB (flat) is obtained when this control is set to its center detented position.

10. Peak/Shelf Switch

This switch changes the low frequency band from a peak/dip curve (as shown in Figure 1a) to shelving curve (as shown in Figure 1b).
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Fig. 1a. Shelving Curve

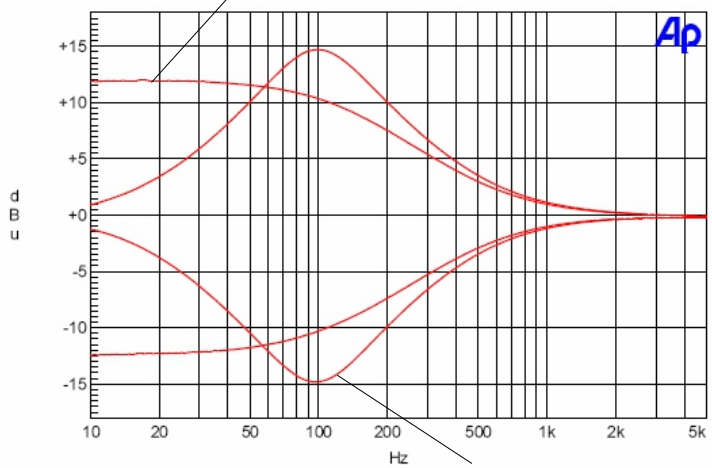


Fig. 1b. Peak/Dip Curve

L/M (Low/Mid) BAND

11. Low/Mid frequency sweep

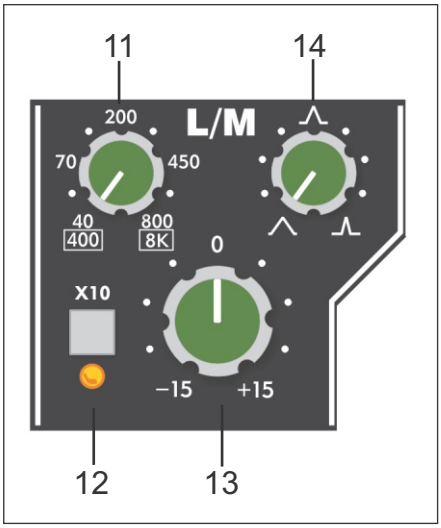
The low/mid frequency sweep control is used in conjunction with its respective boost/cut control and provides continuous adjustment of the center frequency from 40Hz (fully counterclockwise) to 800Hz (fully clockwise) for the low range selection or 400Hz (fully counterclockwise) to 8kHz (fully clockwise) for the mid range selection.

12. Low/Mid X10 select

This switch selects the frequency range of the Low/Mid band. In the "out" position, the low range of 40Hz-800Hz is selected. When depressed, this switch selects the mid band of 400Hz-8kHz. A yellow LED illuminates indicating that the 10X frequency multiplier has been enabled.

13. Low/Mid Boost and cut

This control provides 15dB of bell shaped boost or cut for the Low/Mid band frequency range, and is used in conjunction with the Low/Mid frequency sweep adjust. 0dB (flat) is obtained when this control is set to its center detented position.



14. Low/Mid bandwidth adjust

For the Low/Mid band, a continuously adjustable bandwidth control is provided. This control sets the width of the frequency that has been selected on the Low/Mid sweep control. When set fully CCW, the bandwidth is a wide 2.25 octaves (Q=.45). When set fully CW, the bandwidth narrows to .22 octave (Q=4.4). The center position is approximately .4 octaves (Q=2.4).

In addition to the ability to contour low band audio, the low frequency controls may be used to reduce or eliminate low frequency hum or buzz. Low hum is typically 60Hz, whereas buzz is typically 120Hz and 240Hz. If there is a hum or buzz on an audio track, the low sweep control and associated boost/cut control can be used to remove this.

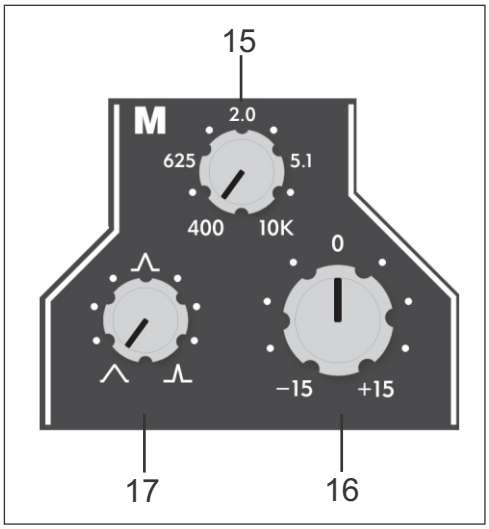
To reduce 60Hz hum, start by setting the bandwidth control to its fully (CW) position, the low frequency sweep control to its fully counterclockwise (CCW) position; this is about 40Hz. Turn the Boost/Cut control fully CCW. Return to the frequency sweep control, and turn clockwise a little until the 60Hz hum has been reduced. This setting is the 60Hz point. Now go back to the Boost/Cut control and adjust as necessary.

In some extreme cases, it may be necessary to use both the low band and the Low/Mid band of equalization in order to remove the undesirable affects of 60Hz or 120Hz hum.

M (Mid) BAND

15. Mid frequency sweep

The mid frequency sweep control is used in conjunction with the mid boost/cut control and provides continuous adjustment of the center frequency from 400Hz (fully counterclockwise) to 10KHz (fully clockwise).



16. Mid boost/cut

This control provides 15dB of bell shaped boost or cut for the Mid band (400Hz to 10kHz) frequency range, and is used in conjunction with the high frequency sweep adjust. 0dB (flat) is obtained when this control is set to its center detented position.

17. Mid bandwidth adjust

For the Mid band, a continuously adjustable bandwidth control is provided. This control sets the width of the frequency that has been selected on the Mid sweep control. When set fully CCW, the bandwidth is a wide 2.25 octaves (Q=.45). When set fully CW, the bandwidth narrows to .22 octave (Q=4.4). The center position is approximately .4 octaves (Q=2.4).

H (High) BAND

18. High frequency sweep

The high frequency sweep control is used in conjunction with the high boost/cut control and provides continuous adjustment of the center frequency from 1.5kHz (fully counterclockwise) to 25kHz (fully clockwise). The Bandwidth (Q) of the High band is fixed at 1 octave (Q=1.0)

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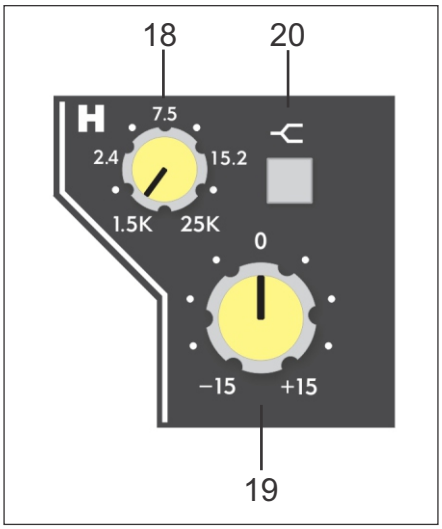

19. High boost/cut

This control provides 15dB of bell shaped boost or cut for the high frequency range (1.5kHz to 25kHz), and is used in conjunction with the high frequency sweep adjust. 0dB (flat) is obtained when this control is set to its center detented position.

In addition to the ability to contour high band audio, the high band controls can reduce hiss that is present on low frequency information. If there is high frequency hiss or digital noise on a kick drum or bass track, the high sweep control may be set to its higher clockwise setting (16kHz-25kHz) and its associated boost/cut control “cut” a few dB's. As long as you don't dramatically change the sound of the low frequency audio, this could remove a little noise. Every little bit improves the overall quality of your sound.

20. Peak/Shelf Switch

This switch changes the high frequency band from a peak/dip curve (as shown in Figure 2a) to shelving curve (as shown in Figure 2b).

Fig. 2a. Shelving Curve

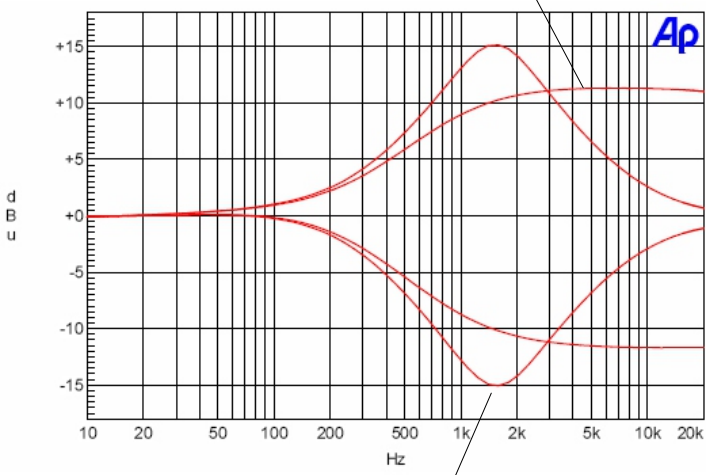

Fig. 2b. Peak/Dip Curve

REAR PANEL

21. Input Connectors

Two types of input connectors are available on the EQF 810: a 1/4” TRS balanced jack and a female XLR connector. These inputs are internally wired in parallel and identical in every aspect except for the connector.

The input 1/4” TRS and XLR **should not** be used at the same time.

The 1/4” jack will accept a balanced TRS plug or a unbalanced mono TS plug. For unbalanced operation a standard mono plug should be used.

22. Output Connectors

The output of the EQF 810 has a balanced 1/4” jack and male XLR connector. These outputs are internally wired in parallel and there is no operational difference between one or the other. The outputs can be either “Transformer-Balanced” or “Active-Balanced” depending on the position of the “Output Select Switch” on the front panel.

The 1/4” TRS and XLR **may** be used at the same time.

The pin configuration for all XLR connectors are:

HIGH	PIN 2
LOW	PIN 3
GROUND	PIN 1

The pin configuration for all ¼” TRS jacks are:

HIGH	TIP
LOW	RING
GROUND	SLEEVE

23. A.C. Power inlet

This AC (mains) power inlet accepts a standard IEC power cord. Before connecting the power cord, make certain that the power cord matches the operating voltage shown on the rear panel.

The EQF 810 power supply operates at mains voltages of 100-120 for the Model EQF 810-NA or 220-240 for Model EQF 810-EU. The mains voltage is set at the factory and marked accordingly on the rear panel.

The ground (Earth) pin of the power inlet is internally connected to the chassis. **For safety reasons, do not lift the ground (Earth) on the power plug by using a ground lift adapter.**

24. Fuse

The AC power inlet has integral fuse holder that uses a 5mm x 20mm slow blow (T) type fuse. To avoid the risk of fire, always replace the fuse with the correct value fuse as marked on the rear panel; .750 amp for the 120V model, or .375 amp for the 230V model.

Fuse Chart				
100 VAC	120 VAC	220 VAC	230 VAC	240 VAC
.750 Amp	.750 Amp	.375 Amp	.375 Amp	.375 Amp

Figure 3.

25. Power Switch

This ON/OFF power switch applies AC (mains) power to the EQF 810.

26. Mains Voltage Selector Switch

If it becomes necessary to change the mains voltage, there is a voltage selector switch inside the EQF 810. The cover must be removed to gain access to the selector switch.

Always remove the power cord from the power inlet (#23) before changing the 115/230 voltage selector.

Take the cover off by removing (6) phillips screws on the sides of the cover, and remove (5) phillips screws on the back of the cover. Do not remove any other internal mounting screws.

Take the cover off and you will see a slide switch mounted on the green circuit board as shown in Figure 4. Beside the switch (#26) are markings in white letters: 115-------230.

If your mains voltage is 100VAC or 120VAC, set the voltage selector switch to the “115” position.

If your mains voltage is 220VAC, 230VAC or 240VAC, set the voltage selector switch to the “230” position.

Replace the cover and change the fuse according to the chart shown in Figure 3, on Page 17.

It is recommended that you remove the factory marking in the small square box below the serial number with a solvent and re-mark the box so it indicates the proper operating voltage.

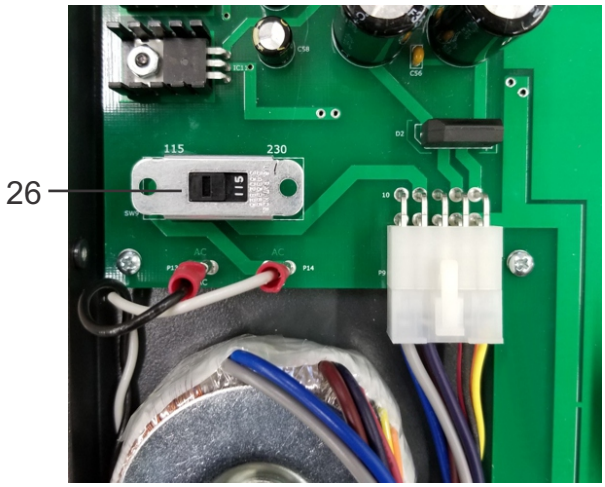

Figure 4

Wiring and Other

General

The following information is not specific to the operation of the EQF 810, but rather general information regarding the “care and feeding” of an audio system.

A general discussion about AC, AC grounding, audio grounding, EMI, and quality wiring is discussed in this section. These subjects are very often overlooked or misunderstood, and should be given consideration when interfacing your equipment to any audio product.

Start simple

A “quality” installation is essential when wiring any audio system. When the time comes to actually interconnect your equipment, proceed slowly. Interfacing the many pieces of electronic equipment to your product and audio system should be a logical, methodical process.

Start by connecting only your headphones or monitor power amp to the mixer, and then add one line signal to the mixer at a time; carefully listening and monitoring your progress. If a problem arises, such as a buzz, hum, intermittent signal, or nonexistent signal, stop at that point and solve the problem before proceeding.

Audio Cable

Due to the high performance of the EQF 810, it is recommended that you use only the highest quality audio cable. A high quality cable by definition, is a cable that provides good mechanical strength, high microphonic noise immunity, high frequency response, low crosstalk and 100% shielding ability. All audio cable used with the EQF 810 should be a 3 conductor foil shield type (2 inner conductors and a shield drain conductor). It is not recommended that the 2 conductor "off the shelf cables" be used.

Connectors

All wire and cable interfaced to the EQF 810 should be terminated with high quality connectors. A 1/4” plug or XL connector should make a positive connection to its respective mating jack and provide adequate strain relief to its cable. All connectors should also have a metal shell to provide 100% shield for exposed conductors.

Feel free to check with Speck Electronics for recommendations when selecting cable and connectors.

AC Distribution and Safety

Proper AC grounding

When you are evaluating voltage and current requirements for your audio system, it is important that your equalizer and/or audio system does not exceed the capacity of your AC service. You should make certain that the earth (green) wire for the AC system makes a reliable earth connection, and determine as best as possible that the AC system is free of noise that could generate unwanted audible sounds or cause problems in microprocessor based equipment.

Quality AC system

When using a larger rack system it is recommended that a dedicated and isolated AC service be provided. This service should have its own AC wires, isolated receptacle, and breaker and not be shared with other unrelated equipment.

Even with an isolated AC system, it may still be necessary to make use of surge protectors, line filters, isolation transformers, or all of the above. Power conditioners should be selected with care, since they sometimes generate undesirable switching noises in audio systems.

AC distribution

When connecting many pieces of electronic equipment to an AC system it is important that the AC is properly distributed. It is better to connect all plugs to a common AC source than to have AC receptacles in different locations.

When installing a large audio system, it may be necessary to consult a qualified electrician that is familiar with the specialized style of electrical wiring required for recording studios.

Clock noise and AC

Clock noise is one of the greatest enemies of the audio racks AC system. If a computer or any microprocessor based device (most samplers and effects are) emits or somehow couples its clock signal with the neutral or earth of its own power cable, it will contaminate your AC system and carry the clock noise into other equipment; almost always with undesirable results.

Safety earth connection

The AC earth connection exists to protect you, your equipment and possibly your building from an electrical disaster. In a properly wired system, if a 120 volt AC wire were to break within your equipment's chassis, it should make contact with the Safety Earth Wire that is connected to the chassis, and blow the fuse or trip the circuit breaker until the problem has been corrected. Given the same circumstances, if the AC safety ground has been defeated with a ground lift or the AC service is incorrectly wired, the equipment's chassis and quite possibly everything attached in that rack would be “live” with 120 volts (220, 230, 240 in Europe)

Electronics earth

In an electronics context, an earth provides a path for unwanted EMI noise to be carried away from your audio equipment. If you disable your earth with a ground lift or do not have a reliable earth connection, the unwanted noise (EMI or RFI), will find an electrical path of least resistance. That will most likely be your audio equipment and would result in unwanted buzzes or hums.

Proper Audio Grounding and Shielding

In order for any audio signal to get from “Point A” to “Point B,” it requires a cable with a minimum of 2 conductors. One conductor is the hot, or high, or whatever you are familiar with; the other conductor is the ground or common. Additionally, all audio wires must be protected from environmental occurrences such as EMI (Electro Magnetic Interference) and RFI (Radio Frequency Interference) with an outer shield. An outer shield protects the 2 inner conductors from outside interference, and prevents that cable from inducing its signal onto adjacent audio cables.

One common misconception is that the shield of a cable should act as the common. This may be acceptable for guitar cords or semi-professional applications, but not for professional applications. The audio signals must be carried only by the 2 inner conductors and the shield must act only to cover these 2 conductors without transmitting the signal from one location to another. It is recommended that the shield be attached to the common (ground) at one connector's end, and the shield not be connected at the other connector's end. It is recommended that all shields be connected at the mixer end, and the shields not be connected at the other ends (synths, effects, power amps, etc.).

If a patchbay is utilized in your mixing system, the rules for shielding change. With a patchbay, normally all shields are connected at the patchbay jacks, and not connected at the mixer or external audio equipment.

EMI and RFI

The occurrence of EMI (Electro Magnetic Interference) and RFI (Radio Frequency Interference) in a contemporary studio system should be of great concern and not overlooked when installing the EQF 810. EMI is defined as any unwanted signal which adversely affects the operation of your audio system.

Stated simply, the undesirable effects of EMI may be perceived as a low frequency smooth sounding 60Hz hum; a low frequency “edgy” sounding 120Hz buzz; or a higher frequency “whine” caused by the timing circuits in microprocessor based devices.

Almost every electronic device generates some amount of EMI emissions. These emissions can be transmitted as electromagnetic radiation or simply conducted though audio cables and power cords. In the same respect, most electronic devices are also very susceptible to the EMI emissions generated by other electronic devices.

Sources of EMI

There are natural and man made sources of EMI that you can't do anything about. These sources include radio, TV, and radar transmitters, as well as motors, lights, and computers. Even the Sun and atmospheric conditions can be contributors to noise that you experience in your audio system.

Reducing EMI

There are generally 3 elements that must be present for EMI to exist. These include the source of the EMI (conducted or radiated), the propagation medium by which EMI is transmitted (directly on the cables or through the air), and the receptor that suffers the adverse affects of EMI. If any of these 3 elements are eliminated or reduced, the EMI interference will be eliminated or reduced.

The more electronic equipment operating within a studio or equipment rack, the higher the EMI emissions. The more audio cable and low level audio equipment that exists within the same proximity, the greater possibility of unwanted noise. The result of EMI in an audio system manifests itself as a buzz, hum, whine, or all three.

The most common EMI occurrence in an audio system is radiated emissions from microprocessors in computers, samplers, and magnetic field sources from transformers and power supplies.