

2 Channel Instrument Preamplifier / EQ / DI
Owner's Manual Rev. A

GRACE design

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1 Welcome

If you're reading this, you are probably a working musician or audio professional of some kind. You've spent years honing your craft with long, lonely hours spent strumming, picking, tweaking, bowing, thumping and plucking. Maybe you tour the world or just play the local pub. You've gotten up on stage tired, given more than you thought you had and driven home barely awake but your soul ablaze and still singing. You have friends and bandmates out there that you rely on like family. Some of your friends, maybe the very best ones, are made of wood, steel, glue, bone and strings. And now you can welcome Felix 2 to the latter category.

Regardless of where and how and why you play, from here on out when you look down at that stage floor, it will be down there shining back up at you, making you sound better and your job easier.

While this is not the most complicated piece of gear you've ever operated, it does come with a great deal of flexibility and setup options, which means we highly recommend you have a good look at this owner's manual to familiarize yourself with the finer points. Once you overcome the learning curve (easy, we promise), you'll find Felix 2 to be intuitive, powerful and really quite user friendly.

Most of all, we made this preamp so you can make great music. So read this manual and then get back to work!

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2 Safety Information

- Indoor use only
- Ordinary Protection: This equipment should not be exposed to dripping or splashing.
- Avoid placing objects filled with liquids, such as vases or glasses, on this equipment.
- Class II Equipment (double insulated type)
- Electrical rating: 100-240V~ 50-60Hz 10W
- Mains supply voltage fluctuations are not to exceed ±10% of the nominal supply voltage.
- Pollution Degree 2
- Installation (Over voltage) Category II for transient over voltages.
- Maximum Relative Humidity: <80%
- Operation temperature range: 10 °C to 40 °C
- Storage and transportation temperature range –40 °C to 70 °C
- Maximum altitude: 3000m (9843 ft)
- Equipment suitable for continuous operation
- Weight: 3.2lbs

3 Safety Marking Symbols

Caution: Read Accompanying Documents



This symbol, located on the equipment and in this manual, refers to important instructions. Read this manual thoroughly before operating this equipment.

Warning: Electrical Shock Hazard



This symbol, located on the equipment and in this manual, indicates the potential for electrical shock hazard.

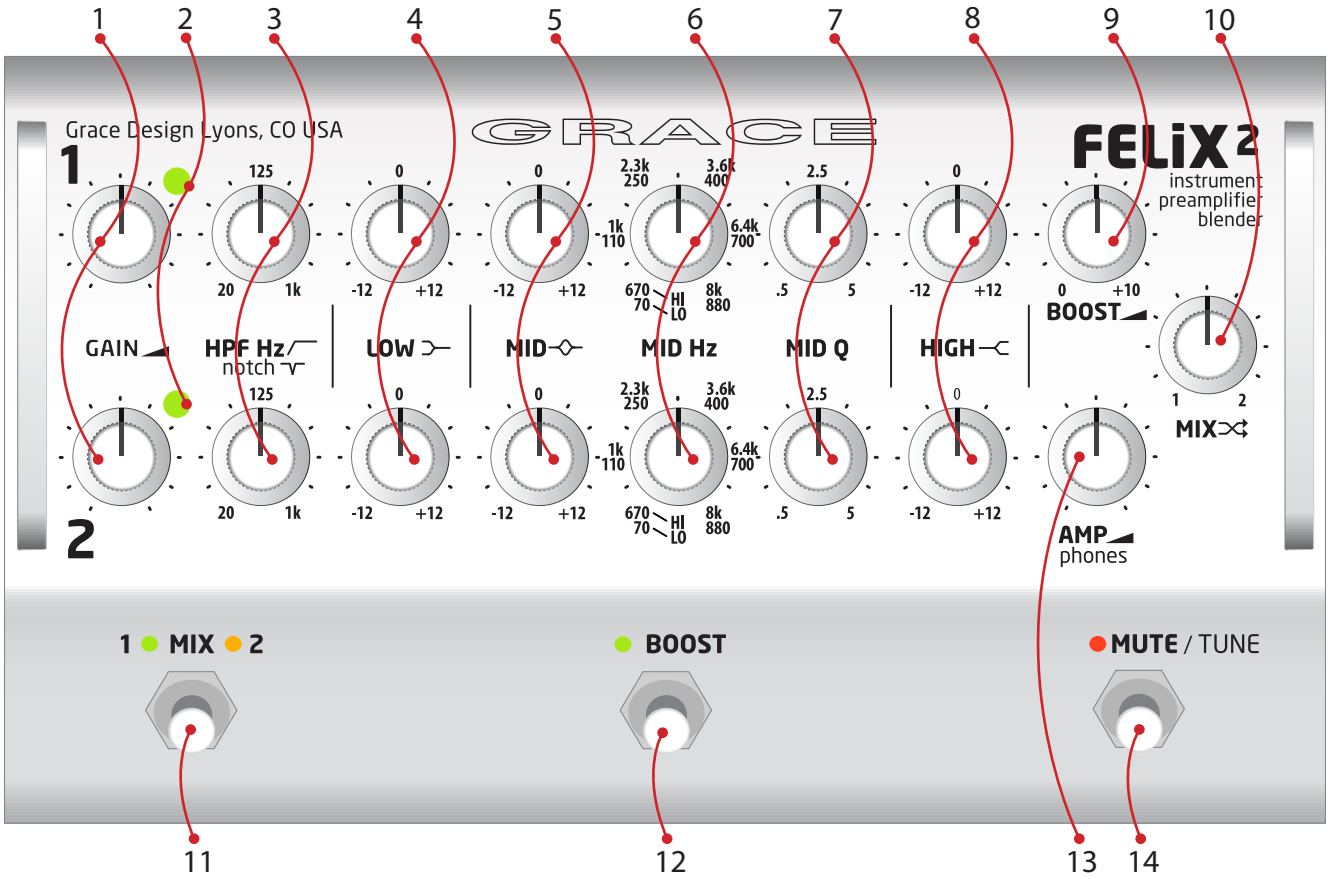
Service Information

The Grace Design Felix 2 contains no user serviceable components. Contact Grace Design for repair and upgrade information. In the event that your Grace Design Felix 2 needs to be returned to the factory, contact us for a return authorization number.

4 Features

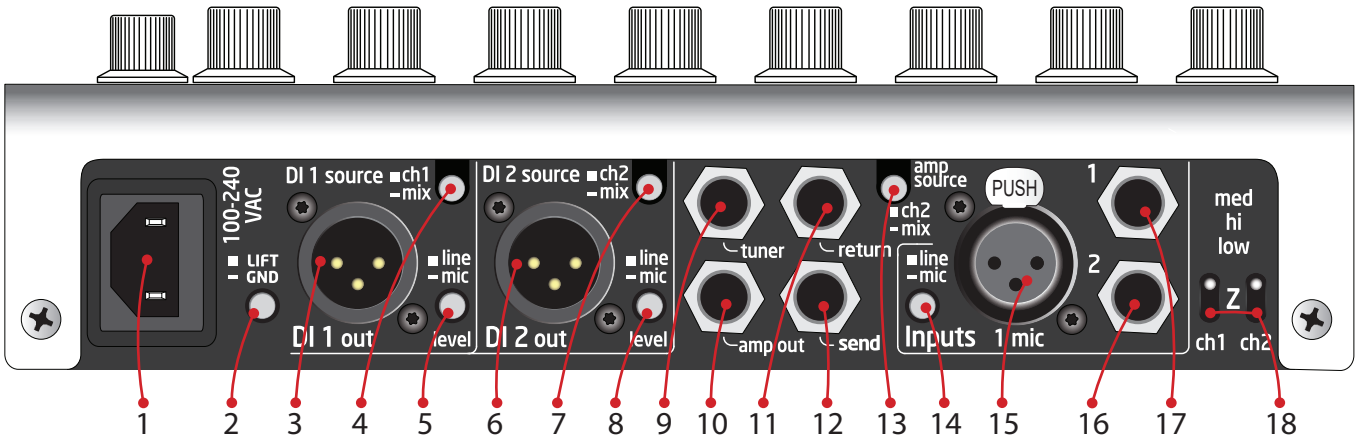
- Open, musical and detailed instrument and mic preamplification for discerning artists and engineers like yourself
- 2 channel audio path with MIX output option
- Stereo or Dual Mono FX loops via TRS send and TRS return
- Studio quality microphone preamplifier built-in with no electrolytic capacitors in the signal path
- Ultra precision 0.5% thin film resistors used in the signal path
- Careful power supply design and grounding for professional level headroom and line driving ability
- Dual ground isolated DI outputs with high quality, low distortion, fully shielded transformers
- Super rugged 1/4" connectors with heavy duty metal bushings
- Powerful, independent EQ on both channels – hi and low shelving and full parametric midrange
- LOW and HIGH shelving controls each have 2 range (corner frequency) settings via internal jumpers
- Mid frequency control has two ranges 70-880Hz / 670 - 8kHz
- 20Hz-1kHz sweepable HPF on both channels, can also be set as high Q notch filter
- A / B footswitch for multiple instrument configurations or soloing different pickups
- Mute/ tune footswitch mutes all outputs except dedicated tuner out and headphone output
- Boost footswitch for variable 10dB level boost (global)
- DI outputs sources are configurable - CH1 (mix or CH1) CH2 (mix or CH2)
- Dedicated level controlled stereo stage amp output (configurable as CH1 or MIX and CH2)
- Dedicated tuner out, remains active when unit is muted
- 1/8" stereo headphone jack, remains active when unit is muted
- Side panel switches for 48V, phase reverse, mid Hz range select, HPF/notch select, 12V and A/B mode select
- 12V mic input power available on CH1 and CH2 1/4" inputs
- Phase reverse switch for each channel
- Variable phase control option on CH2
- 3 input impedance settings on each channel – CH1 10K, 1MEG, 10MEG / CH2 332K, 1MEG, 20MEG accommodating a wide range of pickup types
- Mic stand flange mount screw holes for mounting Felix 2 on a mic stand - Atlas Sound AD-11B and 6-32 X 3/8" pan head phillips stainless steel screws not included
- Universal 100-240 AC power supply with standard IEC cable – works anywhere in the world!
- Full 5 year transferable warranty / built for a long, happy life on the road
- Designed and built by us in Lyons, CO, USA

5 Top Panel Controls and Features



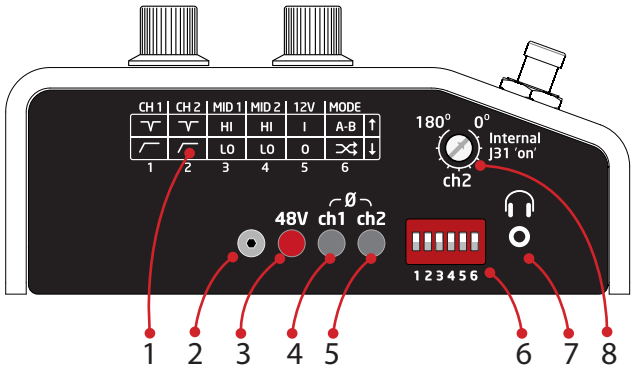
1. Gain controls (CH1&2)
2. Signal / clip LED indicator (CH1&2)
3. High Pass Filter (notch) / Notch filter (CH1&2)
4. Low frequency shelving cut and boost (CH1&2)
5. Parametric Midrange cut and boost (CH1&2)
6. Parametric Midrange frequency select (CH1&2)
7. Parametric Midrange Q factor (CH1&2)
8. High frequency shelving cut and boost (CH1&2)
9. Boost level
10. Mix control
11. A/B footswitch
12. BOOST footswitch
13. Amp / Tuner / Headphone output level
14. MUTE / TUNE footswitch

6 Back Panel Controls and Features



1. Universal 100-240VAC power supply input module
2. DI Ground lift switch
3. CH1 DI output
4. CH1 DI output source select
5. CH1 DI output line / mic level select
6. CH2 DI output
7. CH2 DI output source select
8. CH2 DI output line / mic level select
9. Tuner Output
10. Amp Output
11. Effects Return
12. Effects Send
13. Amp Source Select switch
14. CH1 input mic / line switch
15. CH1 mic input
16. CH2 line input
17. CH1 line input
18. CH1 & 2 input impedance select

7 Side Panel Controls and Features



1. Dip Switch location diagram
2. 'Boot Bumper' 48V switch protector
3. CH1 48V phantom power
4. CH1 phase reverse
5. CH2 phase reverse
6. DIP switch controls
7. 1/8 mini headphone jack
8. CH2 variable phase control

8 Connections

8.1 1/4" INSTRUMENT INPUTS, CH1 & CH2

INPUT 1 - This input is for connecting any instrument pickup, electret mic or line source to CH1. The connector is a standard TRS 1/4" jack wired tip signal, sleeve ground. The ring is used only for 12V power if needed. If you are using this input, remember to select the 'line' setting of the adjacent 'mic/line' switch. We recommend muting Felix 2 before changing the setting of the mic/line switch to avoid pops on the output.

INPUT 2 - This input is for connecting any instrument pickup, electret mic, or line source to CH2. This input can also accommodate two different signals from a dual source pickup system on one TRS 1/4" cable. The connector is a standard

TRS 1/4" jack wired Tip signal to CH2, Ring signal normaled to CH1, and Sleeve ground. If you are using CH1 with this input, remember to select the 'line' setting of the adjacent 'mic/line' switch.

Both CH1 and CH2 line inputs have 3 input impedance settings, selectable from the toggle switch labeled 'Z' . The settings are:

CH1: med - 1MΩ / hi -10MΩ / low – 10kΩ
CH2: med - 1MΩ / hi -20MΩ / low – 332kΩ

Some pickups or sources are more sensitive to preamp input impedances than others. For example, if you use a 'Sunrise' magnetic pickup, they prefer to connect with an input impedance of 1MΩ. If you have an onboard preamp or a lower impedance pickup, the input impedance setting will probably make less of a difference. In any case, we encourage you to try different settings with your pickup or source. The difference may be noticeable or not, and should be set accordingly to what sounds best to you. Always what sounds best to you!

8.2 CH1 XLR MIC INPUT

This input can accommodate any type of microphone, from a SM57 to a large diaphragm condenser or even a ribbon mic if you're feeling fancy. The connector is wired pin 2 positive, pin 3 negative and pin 1 ground. 48V phantom power, if activated, is supplied on pins 2 and 3. If you are using this input, remember to select the 'mic' setting of the adjacent 'mic/line' switch. The side panel phantom power switch should always be set to OFF whenever connecting or disconnecting this input. We recommend muting Felix 2 before changing the setting of the mic/line and 48V switches to avoid pops on the output.

8.3 INSERT SEND AND RETURN

The insert connections are buffered, unbalanced send and return points for connecting outboard effects to Felix 2. Both jacks are TRS connectors, which allows for mono, dual mono or stereo outboard signal processing to be placed in series with the output signal. Configuring these jacks to suit your exact need may require setting internal jumpers J18 and J19 (see page 12 for more details).

8.4 INSERT SEND

The send can be operated as mono, dual mono or stereo. In mono / dual mono, signal from CH1 is on the Tip and signal from CH2 in on the Ring. In stereo

The SEND TRS jack is wired:

- Tip - CH1 or MIX
- Ring - CH2
- Sleeve - Ground

The RETURN TRS jack is wired:

- Tip - CH1
- Ring - CH2
- Sleeve - Ground

NOTE: the inserts will only work if the output you are using 'source' is set to MIX - even if preamp is in A/B mode.

There is an internal jumper that allows the output level of the INSERT send to be adjusted between 0dB, -6dB and -16dB, which helps when interfacing with external effects that have much lower headroom than the Felix 2. The factory setting is -6dB. Configuration of internal jumpers is described in detail on page 12.

8.5 AMP OUT

This output is for sending an unbalanced, non-transformer isolated output to a stage amp or anywhere else you may need an additional unbalanced signal. This output has a level control, which is situated on the right side, bottom row of controls on the top panel. This output is muted when the MUTE / tune footswitch is activated.

When the Amp Out source switch is set for MIX, the output is stereo with CH1 or MIX on the tip and CH2 on the ring. The CH1or MIX is determined by the jumper settings on your insert Send/Receive. When the Amp Out source select switch is set for CH2, then CH2 (pre insert) is sent out on both the Tip and Ring.

To use the jack in mono, simply plug in a TS cable.

8.6 TUNER OUTPUT

This is another unbalanced output which is always active – provided as a dedicated stage tuner out. When the MUTE is activated, your stage tuner will continue to receive signal, allowing you to tune silently. The Tuner output level follows the Amp Out level control and is a mono-summed version of whatever signal is on the Amp Out jack.

8.7 DI OUTPUTS, CH1 & CH2

These two outputs are balanced and transformer isolated for sending signals to a front of house console, monitor console or any mixer or interface. The XLR pinout is: pin 2 positive, pin 3 negative and pin 1 ground.

Each output can be sourced from either its individual channel only (pre insert) or the blend of the two channels, adjusted by the 'MIX' control on the far right of the top panel controls. Source select is via the 'DI source select' switch above each XLR output. Also, each output has an adjacent level setting switch – line and mic – depending on what input this source will be feeding. In the 'mic' setting, the output is padded down -26dB to interface properly with mic inputs at the console, the 'line' setting is not padded for better level matching with line level inputs at the console or interface.

When configuring the Felix 2 with the insert FX LOOP, the DI source select should be set to 'MIX'. For setups utilizing the A/B mode and the FX LOOP there is an additional configuration available. By default, both DI outputs are active when in A/B mode. Additionally, there is an internal jumper that allows the DI outputs to be configured for exclusive operation. In this mode, when channel A is active, DI 1 is active and DI 2 is muted and when channel B is active, DI 1 is muted and DI 2 is active. This allows for individual DI outputs for each channel while sharing the FX LOOP. See page 12 for details about how to adjust this jumper setting.

8.8 HEADPHONE OUTPUT

This is a 1/8" mini style stereo headphone jack for monitoring signals via your headphones, IEMs, earbuds etc.. This output level is the same as the amp out, so the top panel amp out level control is used to adjust headphone volume as well. This output remains active when Felix 2 is muted, so you can plug in your IEM's and practice privately during long, boring soundchecks. This can also be very useful for hearing a very detailed and isolated representation of how your EQ settings or variable phase adjustments are working.

8.9 100-240VAC POWER INPUT

Felix 2 is powered by a Class II Universal AC power supply. This means that no matter where your musical wanderings take you, you can plug Felix 2 in to the wall and it will work. And it also means one less wall wart you'll own in your life. All units are shipped with a standard AC cable suitable for the country where it is going. This is a standard, off-the-shelf IEC power cable, so in the event you misplace the one that came with your Felix 2, you can just borrow one from the sound-person or the bass player and go.

9 Operation

9.1 WHERE TO PUT YOUR PREAMP?

Anywhere! It will look very pretty when you first pull it out of his box, but trust us, it's built to stand up to just about any kind of stage abuse you might encounter. All the pots have metal shafts and are securely mounted to the top panel. All the 1/4" jacks have heavy duty metal bushings. The top panel is 1/4" extruded aluminum, and the bottom chassis is appropriately beefy. As you may have surmised by now, the main inspiration for this product was to have studio-grade audio hardware, properly ruggedized to live on the stage floor or mounted to a pedal board.

Also, we have included mounting holes on the underside for a mic stand mounting flange, Atlas Sound AD-11B (which can be found at most larger music gear retailers). This allows Felix 2 to be mounted directly to the top of a mic stand. This mount requires three 6-32 X 3/8" pan head phillips stainless steel screws, which are not included but can be found at any hardware store.

NOTE: the rubber feet can be unscrewed from the bottom panel if needed for using Velcro® to attach the FELiX to a pedal board.

9.2 USING THE XLR MIC INPUT CH1

Before connecting a microphone, make sure the CH1 gain knob is turned all the way down, the side panel 48V phantom power switch is off (pushed out) and the CH1 MIC/LINE switch is pushed in. Then connect your microphone and if 48V is needed, activate it with the side panel 48V switch. Always remember to turn 48V power ON ***after*** connecting your microphone and OFF ***before*** disconnecting your microphone.

Use the top panel CH1 signal / clip indicator to properly set the mic level. The LED will light green with signal present, then will begin to flash red when the channel is 12dB before clipping. Occasional red flashes are ok, but if the LED is mostly red, well then, you better turn it down. There are 2 gain range settings for this input: **low (+17dB to +62dB) and high (+22dB to +63dB)** It is set to **low** at the factory and can be adjusted via internal jumper J32 (see page 12). In general, use the low gain range for instruments or condenser mics and high range for dynamic or ribbon mics.

9.3 INSTRUMENT / LINE INPUTS

These are the inputs you will use for connecting your instrument(s) to Felix 2. There is a wide array of different pickup types in the world: active electronics in an electric bass, passive bridge plate transducers, contact mics, soundhole magnetics, etc... We wanted to make sure Felix 2 brought out the best in all of them and accordingly, there are some useful features that can help make that happen.

Because we designed Felix 2 to play well with a wide array of mics and pickups on a wide array of instruments, the gain control sweep required is more than this single potentiometer can provide. Accordingly, an internal jumper is provided to select between two different gain ranges on the CH1 line input. This range is set to the LOW setting at the factory, which means the jumper is NOT connected and which closely matches the gains of CH1 and CH2.

If you are using a source that requires more gain (e.g. a low output pickup on a delicate acoustic instrument), you may need to set this jumper to the 'HI' position, which shifts the gain range up by 18dB. The CH1 microphone XLR mic input is not affected by this setting.

Adjusting this gain setting jumper is easy to do and we specifically designed the chassis to make it easy to access internal jumpers. Please refer to the jumper diagram and access procedure on page 12. Aren't you glad you're reading this manual? We are, too.



WARNING: Make sure to disconnect the power mains before removing the Felix 2 top panel to make jumper adjustments.

Using a Dual Source Instrument with a Single TRS Cable

The CH2 input can accommodate two different signals from a dual source pickup system on a single TRS 1/4" cable. The connector is a standard TRS 1/4" jack and is wired:

- Tip signal to CH2 input
- Ring signal normaled to CH1 input
- Sleeve to ground

This feature makes using a dual source pickup system very convenient. Assuming your instrument is properly wired with

a TRS output jack, you can simply use a standard TRS cable to connect both sources to Felix 2, then EQ and blend each signal accordingly. The sonic results of this kind of acoustic pickup system can be very excellent.

Input Impedance Selection

Both instrument inputs have 3 different impedance settings:

CH1: med - 1MΩ / hi -10MΩ / low – 10kΩ
CH2: med - 1MΩ / hi -20MΩ / low – 332kΩ

In general, most passive pickups will want to connect to a higher impedance setting, while active pickups probably a lower. Passive pickups generally will have more sensitivity to input impedance, but there are no hard and fast rules. Check with the manufacturer of your particular pickup system to see if they recommend a specific input impedance for their device. Ultimately, as is with so many things like this, the final judge of this setting should be your ears. Impedance mismatches at this stage may not even be audible, or very subtle, or totally apparent. But trust yourself here – nothing will break if you have the wrong setting – just audition the 3 positions of the impedance switch and if one sounds better over the other 2, than that's the correct setting.

12V Power

Both CH1 and CH2 instrument inputs can be used to amplify an electret capacitor microphone. These are common for applications where small microphones are mounted inside acoustic instruments, or lavalier style microphones used somewhere on the outside of the instrument. Normally these microphones will contain very small integrated preamps which require a small voltage to power. So the Felix 2 can send 12V phantom power out on both of these inputs. This is activated via DIP switch # 5 on the side panel.

12V power can be applied to the tip, ring or neither of each channel's input jack. Configuration is done via internal jumpers, described in detail on page 12.

NOTE: this power supply charges up slowly, so you may need to wait a few seconds before signal from your electret mic is present at the input of Felix 2. And, as with 48V phantom power in the XLR mic input, it is always best to make your input connections before applying power at the DIP switch, and power OFF the 12V at the DIP switch before disconnecting your source.

Phase Reverse

Both CH1 and CH2 have phase reverse switches, located on the left side panel, directly next to the 48V phantom power switch. Use these to toggle the polarity of either channel. Experiment with these methodically – one at a time, to find the setting that sounds right. If you are blending two sources on one instrument, you may find that flipping the polarity on one source or the other sounds best. If you are using Felix 2 to toggle between two different instruments, you probably won't need to mess with their polarity.

Phase relationships can be very complicated and discrepancies can result in highly accentuated or de-accentuated bass response of a blended signal. Or it can sound hollowed out and thin or just downright weird. Again, the rule of thumb here is whatever sounds right is probably right.

There may be setup scenarios where the front of house or monitor engineer requires you to try flipping the phase to achieve better phase coherency with other signals in the mix. At the very least, it's good for you to know how to operate these controls and hear them in use with your instruments.

9.4 FILTERING AND EQ

One of the truly defining features of our pal Felix 2 is the very powerful, fully independent EQ / filter controls on each channel. Each channel has identical controls, so the descriptions in this section apply to both CH1 and CH2.

If you haven't used EQ's or filters much, we will provide a basic overview here. But the full science of this process is more than we can cover here, so we strongly recommend some adjunct reading:

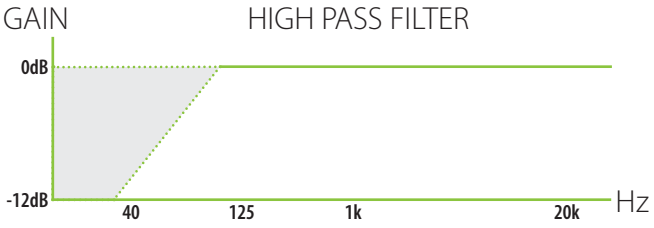
http://en.wikipedia.org/wiki/Equalization

As with all audio processing techniques, the more you know, the better you will sound.

HPF / Notch

This is the next control to the right of the GAIN knob for each channel. To select between HPF and Notch, adjust the left side DIP switch locations # 1 & 2 respectively for channels 1 & 2.

HPF: A High Pass Filter will only allow signal information above its set frequency to pass downstream to the output. This filter employs 12dB per octave roll off and uses a Thomson – Butterworth response for the best combination of passband flatness and time domain response. Yes, that will be on the quiz.

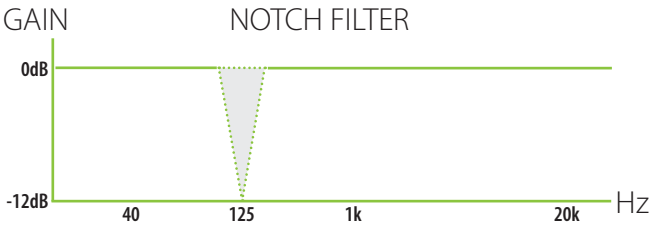


Simply put, use the high pass filter to cut unwanted bass frequencies out of a signal. Usually a HPF is used to eliminate rumble or non-musical low frequency information out of a signal. But this HPF range is from 20Hz to 1.0kHz, so you can make very dramatic filter settings. Some instruments won't have any information below a certain frequency. Fiddle for example only extends its lowest fundamental down to 200Hz. So if you are amplifying a fiddle, you could safely set the HPF at 150 – 200 Hz without hearing much effect in the tonality of the instrument. Whereas a bass can have a low fundamental down around 30Hz, so setting the HPF any higher than that could affect its tonality.

If you are on a stage with an acoustic guitar, and there is lots of low end making you sound bad, or feeding back or both, the HPF might be your first stop to try to control those problems.

Notch: A notch filter is a very sharp and deep cut of a specific

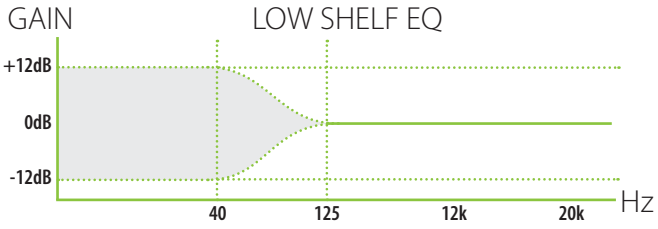
frequency. This is used predominantly to find and remove a specific problem frequency that may be feeding back through stage monitors or amps, or to simply cut out a very specific, narrow unwanted part of an instrument's frequency range. This notch uses the same frequency sweep of 20Hz – 1.0kHz.



Under normal operation, if you don't have a use for a notch filter, we recommend you leave the left side panel DIP switch in the HPF setting. That way, with the HPF set in its fully counter clockwise position, this entire filter control is effectively out of the signal.

Low

The Low control of the Felix 2 preamplifier is fixed at a 125Hz corner frequency with a gain range of -12 to +12dB. This is a fixed shelving type control, which means everything below the 125Hz is boosted or cut. Use this control for cutting and boosting bass frequencies. It's all about the bass.



Also, because certain instruments may react better to a higher corner, we have added a Low control range jumper on the main PCB. Moving this jumper shifts the Low corner frequency up to 250Hz. *This is easy to do!* We specifically designed Felix 2's chassis to make it easy to access internal jumpers. Please refer to the jumper diagram and access procedure on page12. Bravo to you for reading this manual. You get an A.

WARNING: Make sure to disconnect the power mains before opening removing the Felix 2 top panel to make jumper adjustments.

Mid

The mid range section of Felix 2's equalizer is fully parametric, which enables you control the mid range gain, frequency and Q independently. The range of these controls are:

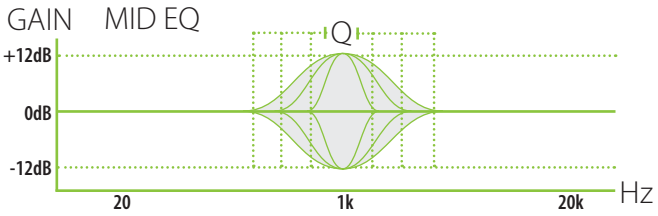
Gain = +/- 12dB,

Freq range LO setting = 70Hz – 880Hz

Freq range HI setting = 670Hz – 8.0kHz

Q = .5 – 5

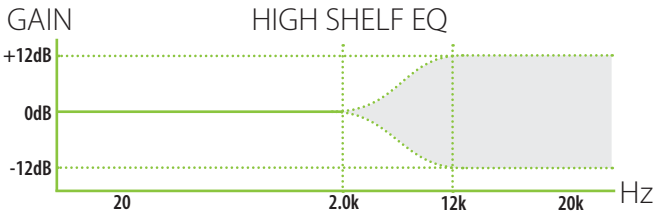
The frequency range can be switched between the LO and HI settings via the left side panel DIP switch locations # 3 & 4. With these two available ranges, the over all range of the mid controls is very wide, which enables targeting of specific sonic areas of a multitude of instrument or pickup types.



Q factor determines the sharpness of the bandwidth of the frequency being adjusted. A higher Q factor setting – turning the Q knob further clockwise - creates a sharper bandwidth and thus a more targeted, surgical EQ adjustment. Alternately, a lower Q factor - turning the Q knob further counter clockwise - creates a broader tonal adjustment.

High

The High control of the Felix 2 preamplifier is set with a 2kHz corner frequency, with a gain range of -12 to +12dB. This is a fixed shelving type control, which means everything above the 2kHz is boosted or cut. Simply put, this is a treble control. If you think your banjo may be too bright, turn this knob counterclockwise. If you think your guitar needs a little more bite, turn this knob clockwise. If you're not sure, then get down there and start turning it one way or the other until it sounds better.



Similar to the Low shelf, we have added a High control range jumper on the main PCB. Moving this jumper shifts the High corner frequency down to 1kHz. Please refer to the jumper diagram and access procedure on page 12.

9.5 OUTPUT CONTROLS AND SETTINGS

Boost

Want to go to eleven? How about twenty? This knob sets the amount your signal is boosted when you activate the 'BOOST' footswitch. Fully counter-clockwise is zero boost added, fully clockwise adds +10dB of boost. The boost is global, so it is added to every signal output leaving Felix 2 – blended or individual channels, amp out or either ISO out, even the headphone out.

This circuit will be set as global, and the boost will be applied to both channel's outputs. However, boost can be defeated on CH1 by setting the internal jumper J3 to "CHANNEL 1 BOOST OFF". This is useful if you are using a microphone in CH1 that you would rather not boost and create havoc in the monitors.

Amp / Phones Output Level

This knob sets the output level of the unbalanced Amp and

tuner outputs on the rearpanel and also of the headphone jack on the right sidepanel. If you are using a stage amp, use this control as your master level. Correct input gain settings for your sources, with the signal LED showing mostly green, should not be adjusted to alter your stage amp level. Rather, use this control to make master level changes.

If you are using the side panel headphone jack with the MUTE switch activated, remember that headphone level adjustments will also affect stage amp level, which could lead to a big nasty sound on stage when un-muting Felix 2 outputs. Simply make a note of your stage amp level before making adjustments to this control while headphone monitoring.

Mix

This control adjusts the mix (or blend) between CH1 and CH2. Before using this control, it's important to verify if the preamp is set to MIX or A/B mode. This setting is toggled via the side panel DIP switch #6. With the switch in MIX mode (the downward position), this control will operate normally as a simple mixer. With this knob turned fully counter-clockwise, the outputs (set to MIX) will be sending 100% CH1. With the knob turned fully clockwise, the outputs will be sending 100% CH2. With the knob centered at 12 o'clock, the outputs with be sending a 50/50 blend of CH1 and CH2.

If the preamp is set to A/B mode via the left side panel DIP switch #6, then this control will have no effect.

Remember, if you intend to blend CH1 and CH2, you must set the DI output(s) or Amp output to 'mix' mode via the pushbutton toggle switches on the rearpanel and make sure your Insert Send jack internal jumper setting (J19) is configured to send MIX.

9.6 FOOTSWITCH CONTROLS

Blend – A/B

This is the far left foot switch on Mr. Felix 2. If the unit is set to blend mode via DIP switch # 6, then this switch will do nothing, and both adjacent LEDs will be permanently illuminated. If the unit is set to A/B mode, then this switch will be used to toggle between CH1 and CH2, with the accompanying amber LEDs lighting and extinguishing accordingly. This toggle mode is exclusive, so if you have CH1 selected, CH2 will be muted and vice versa.

Boost

You guessed it. This switch activates the Boost circuit, at the level you set with the upper row 'boost' knob. For those about to rock, hit this switch first. The LED will light up GREEN for go.

Mute / Tune

This switch mutes all Felix 2 outputs (ISO 1, ISO 2 and AMP) except the tuner and headphone outputs. This enables you to quickly and easily cut your signal to tune or unplug your instrument without having to have the sound person mute your channel. When MUTE / tune is active, the adjacent LED illuminates RED.

9.7 SIDE PANEL CONTROLS

Felix 2 has a lot going on, more than we could fit on the rear and top panels alone. So there are a number of features to be familiar with on the side panel.

CH1&2 Phase Reverse

These two pushbutton toggle switches reverse the polarity of each channel's audio signal. To reverse the polarity of either channel, simply push the toggle in, to return to no polarity reverse, push the toggle again to return it to it's outer position.

48V Phantom Power

This activates 48V phantom power for the CH1 microphone preamplifier. Phantom power is sent out on pins 2 and 3 of the XLR connector.

DIP Switches

This is a bank of 6 DIP switches, used to activate various modes or settings. Switches 1 & 2 select between CH1 & CH2's HPF or notch setting. Switches 3 & 4 select between CH1 & CH2's mid EQ's frequency range, LO or HI. Switch 5 activates 12V power on the instrument inputs. Switch 6 selects between blend or A/B mode.

DIP switches are hard to adjust, which is good because they probably won't get inadvertently changed, but bad when you actually want to change them. Use the edge of a fingernail, a guitar pic or a toothpick. Whatever you chose, take care not to dig into the plastic too hard. You'll get the hang of it.

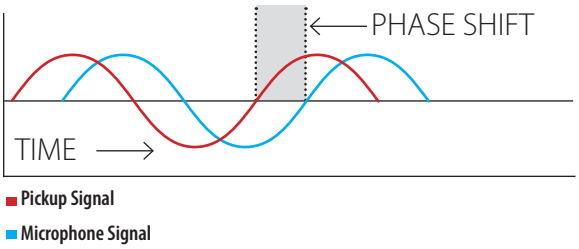
Headphone Jack

This is a standard 1/8" mini headphone jack, suitable for most types of headphones. It is stereo, and follows whatever signal is present at the AMP output. The level control for this is the Amp / phones knob on the right side of the top panel. This output is always active, even if the top panel MUTE / tune switch is activated. This way you can play or practice privately with your headphones on while your stage outputs remain muted. Bandmates will be relieved, sound-people will be happy. Kumbaya.

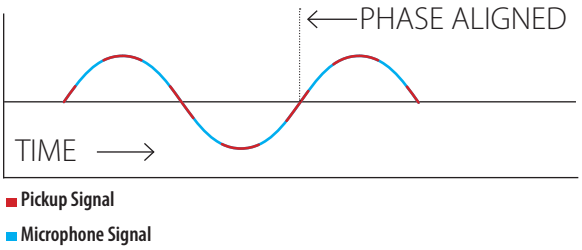
Variable Phase Control

NOTE: This control is not activated from the factory - an internal jumper must be set to turn it on.

This is a new control for FELiX 2 which allows for variable phase adjustment of the CH2 signal to correct phase shift that might occur when blending a microphone in CH1 and a pickup in CH2. Depending on the distance to the sound source, the mic signal might be naturally delayed compared to a pickup signal. The further away the microphone, the greater its time delay can be.



By using the phase control, you can increase the phase delay of CH2 until it comes into phase alignment with the mic signal.

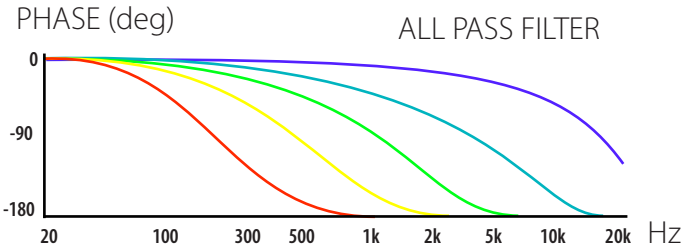


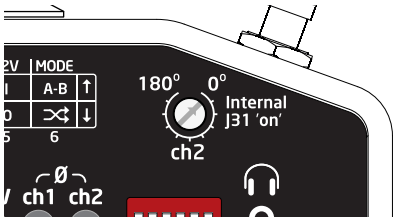
This control is on the left hand side of the chassis. To use it you need to first open up your FELiX and set internal jumper J31 to "ON". ***Please see page 12 for directions on how to do this. It's easy!***

Once the jumper has been set, then you turn this control clockwise to begin adjusting the phase delay of CH2. This is a small recessed trim pot, designed to be adjusted by a small flathead screwdriver.

This control made with an "allpass" filter, which have flat FREQUENCY response but have frequency dependent phase shift. As the frequency of the input signal increases, the phase delay of the output increases. From the plots shown below, you can see that at the maximum setting (10 o'clock) there is about -180 degrees of phase shift at 1000kHz. This is about 0.5ms of delay.

Since sound travels at about a foot per millisecond, this is equivalent to about 6", so if your mic is mounted to your instrument at about 6" from the strings, you would be time aligned with this setting.





Control locations

- 10 o'clock
- 8 o'clock
- 6 o'clock
- 4 o'clock
- 2 o'clock

This control is set be ear! While playing (or better yet with a band-mate playing) and the pot all the way counter-clockwise (0°), slowly begin to turn the pot clockwise. If there is phase shift between the two sources, you should hear them come into phase. They will sound more focused and sturdy. Adjust this control while listening under headphones or IEMs, which allows you to isolate the effect of the control from the direct sound of the instrument.

This contol may make a huge improvement or it may be barely noticeable. Result can vary based on a wide array of variables in your instrument, mic, pickups, and wiring. If it doesn't make a big change, then your system might be just fine the way it is and you can set the jumper back to 'OFF' and fuhgeddaboudit.

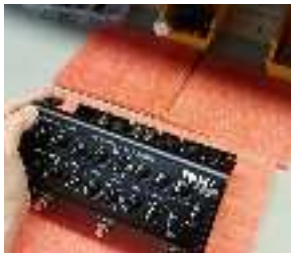
10 Adjusting Internal Jumpers

A bunch of the preamp's settings can be adjusted via internal jumpers. If you are handy with a screwdriver and tweezers, you'll be able to make these changes without a problem. However, *this is not something you should attempt to do on a dark stage or in the back of the tour van.* Directions for disassembling the chassis and accessing the jumpers is as follows:





1. IMPORTANT: Before you do anything, disconnect Felix 2 from the AC power, and disconnect instrument and mic cables and place Felix 2 on a flat stable surface with good lighting.
2. DOUBLE CHECK: Did you completely disconnect the power supply? Ok then.
3. With a #2 phillips screwdriver, remove the 4 chassis screws, located on the outer edges of the front bottom and rear bottom of the aluminum top chassis.
4. Orient the unit so the rearpanel is facing away from you. Carefully pull up on the top chassis and flip it up towards you. This will reveal the top and bottom circuit boards. Do not pull them apart any further than the ribbon cables that connects them will allow. The top should rest easily on the work surface flipped over and in front the bottom chassis.





5. Now refer to the jumper location diagram on the following page to adjust the jumpers you wish.





6. To move a jumper, use tweezers or your fingernails to gently pull the jumper off of its header pins. To reposition the jumper, double check the diagram, then gently press the jumper back down in the correct location.
7. When you are finished adjusting the jumpers, make sure there are no loose jumpers or any other junk lying around inside.
8. Then carefully reassemble the top and bottom chassis, making sure to let the ribbon cable fold easily back in place. If there is any tension or something isn't fitting properly, carefully pull the top and bottom back apart and inspect for interference.
9. Once you have put the unit back together, replace the 4 screws, making sure they go in straight and true. You may need to nudge the top panel back and forth a bit to ensure the holes in the top panel chassis line up evenly with the inner threaded holes.
10. Do not tighten the screws until all 4 are cleanly started in the threads. Take your time and remember, cross-threading is a crime.

If you get stuck or something doesn't look right, call us right away and we'll get you taken care of.

10.1 INTERNAL JUMPER LOCATIONS

Lower PC board Locations

J2 - Sets the CH1 instrument input gain range. Options are LO (3-48dB) and HI (17-62dB). This is set to **LOW** at factory.

J6 and J7- Configures 12V power, which can be applied to either channel's tip, ring, or set to off. Set these according to how your microphone / instrument is wired. This jumper is set to **OFF** at the factory, with the jumper simply pressed down on one pin.

J15 - configures DI output mode when the preamp is in A/B mode and DI source switch is set to MIX. DUAL ISO mode (jumper center and left) keeps both DI outputs active regardless of which channel is selected. EXCLUSIVE output mode (jumper center and right) mutes the inactive channel's DI output. This is set to **DUAL ISO** mode at the factory.

J14 and J17 - These jumpers apply a signal pad to the insert send, one for each channel. There are 3 settings: OFF, -6dB and -16dB. These are set to **-6dB** from the factory.

J18 - Insert Return, can be set to MONO or STEREO, depending on how you want the FX insert to operate. Set to **MONO** at the factory.

J19 - Insert Send CH1, can be CH1 or MIX. Set to **MIX** at the factory.

Upper PC board Locations

J3 - enables / disables the Boost control on CH1. Set to **ENABLE** at the factory.

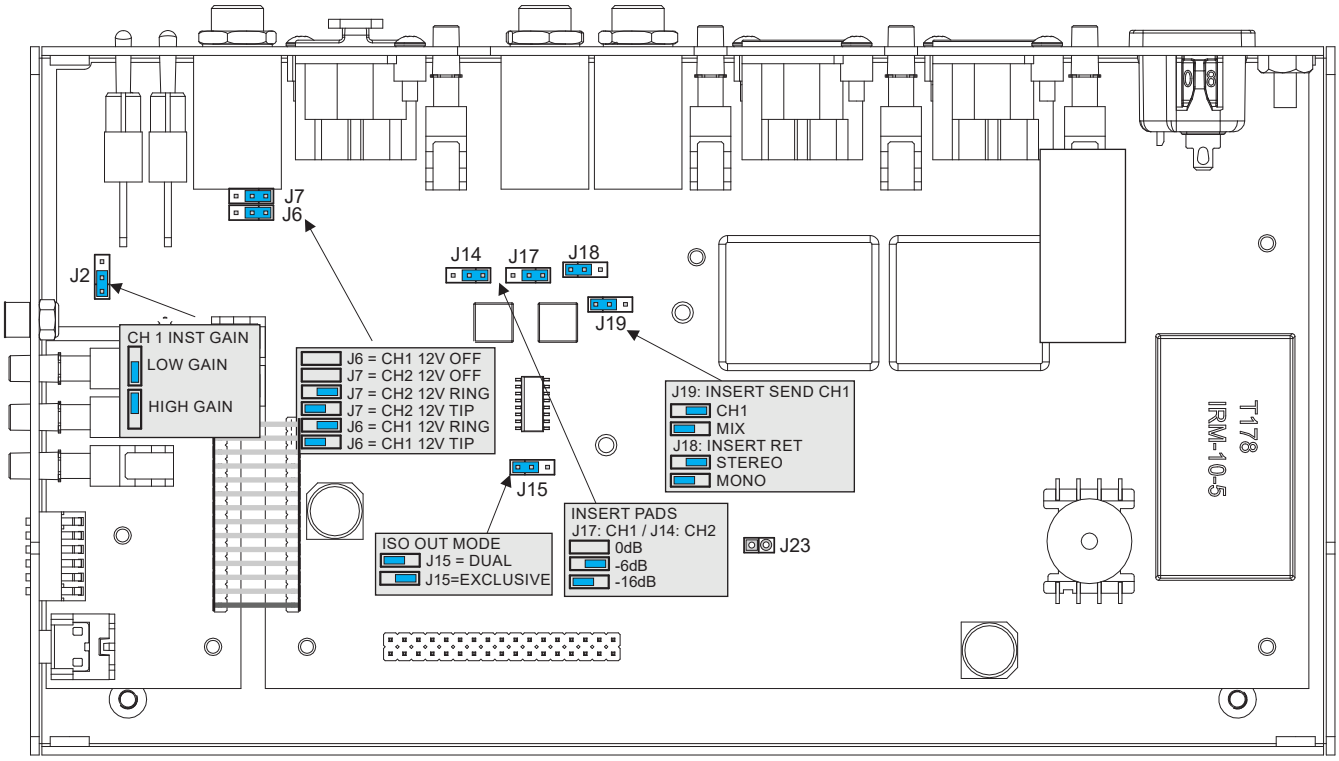
J11 and J13 - adjusts the EQ's high shelf corner frequency at either 1kHz or 2kHz. Set to **2kHz** at the factory.

J25 and J26 - adjusts the EQ's low shelf corner frequency at either 150Hz or 250Hz. Set to **250Hz** at the factory.

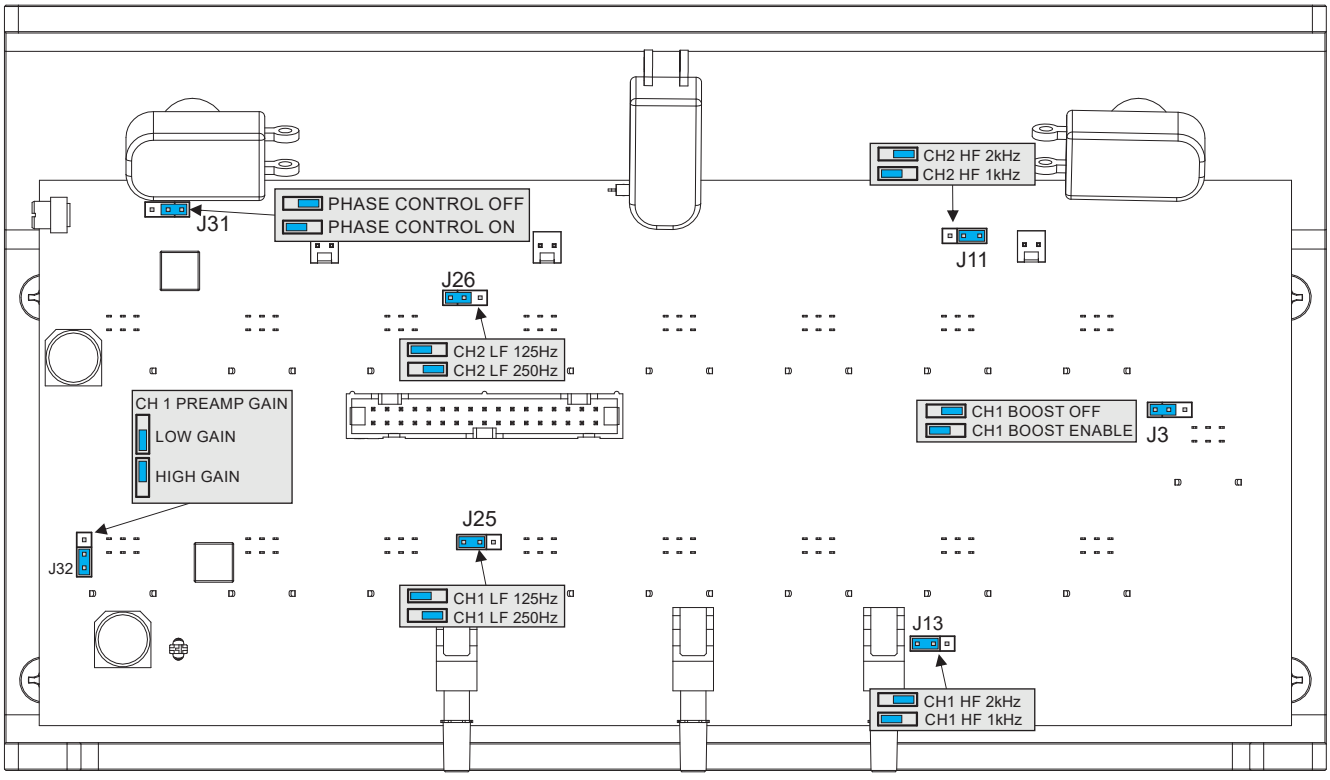
J31 - Activates / deactivates the CH2 variable phase control. Set to **OFF** at the factory.

J32 - Selects CH1 preamp LOW or HIGH gain setting. LOW (+17dB and +62dB) and LOW (+22dB and +63dB). Set to **LOW** at the factory.

Lower Board Jumpers



Upper Board Jumpers



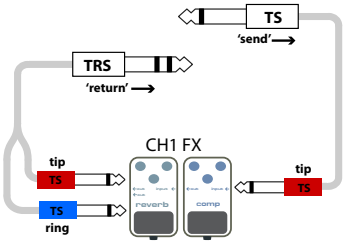
11 FX Insert Connections

The insert send and return jacks are both TRS, with CH1 on the tip and CH2 on the ring.

Insert operation with FELiX in **MIX mode**

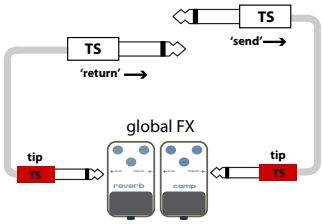
Mono Send / Stereo Return

For using mono in, stereo out FX units • TS plug from 'send' to TS plug to FX input (standard 1/4" cable) • Two TS plugs from stereo FX outputs to one TRS plug to 'return' ('Y' insert cable). Jumper Settings: J19 - MIX / J18 - ST



Mono Send / Mono Return

For using mono FX units • 1/4" TS cable from 'send' to FX input • TS cable from FX to 'return'. FX will be present on any output that has source set to 'MIX'
Jumper Settings: J19: MIX / J18 MONO

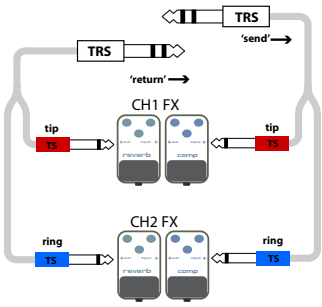


Insert operation with FELiX in **A/B mode**

Dual Mono

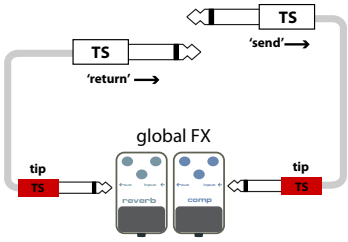
Using seperate mono FX loops for each channel • TRS plug from 'send' to two TS plugs to FX inputs (standard 'Y' insert cable) • Two TS plugs from FX outputs to one TRS plug to 'return' (standard 'Y' insert cable). FX will be present on any output that has source set to 'MIX'. Jumper Settings: J19: CH1 / J18: ST.

Use Jumper J15 'EXCLUSIVE' for exclusive DI output if you which to toggle between 2 different instruments with their own independent FX loops.



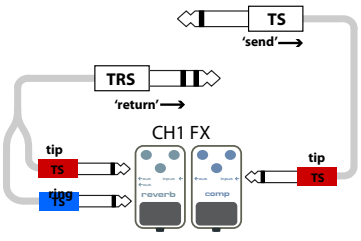
Mono Send / Mono Return

For using mono FX units • 1/4" TS cable from 'send' to FX input • TS cable from FX to 'return'. FX will be present on any output that has source set to 'MIX'
Jumper Settings: J19: MIX / J18 MONO



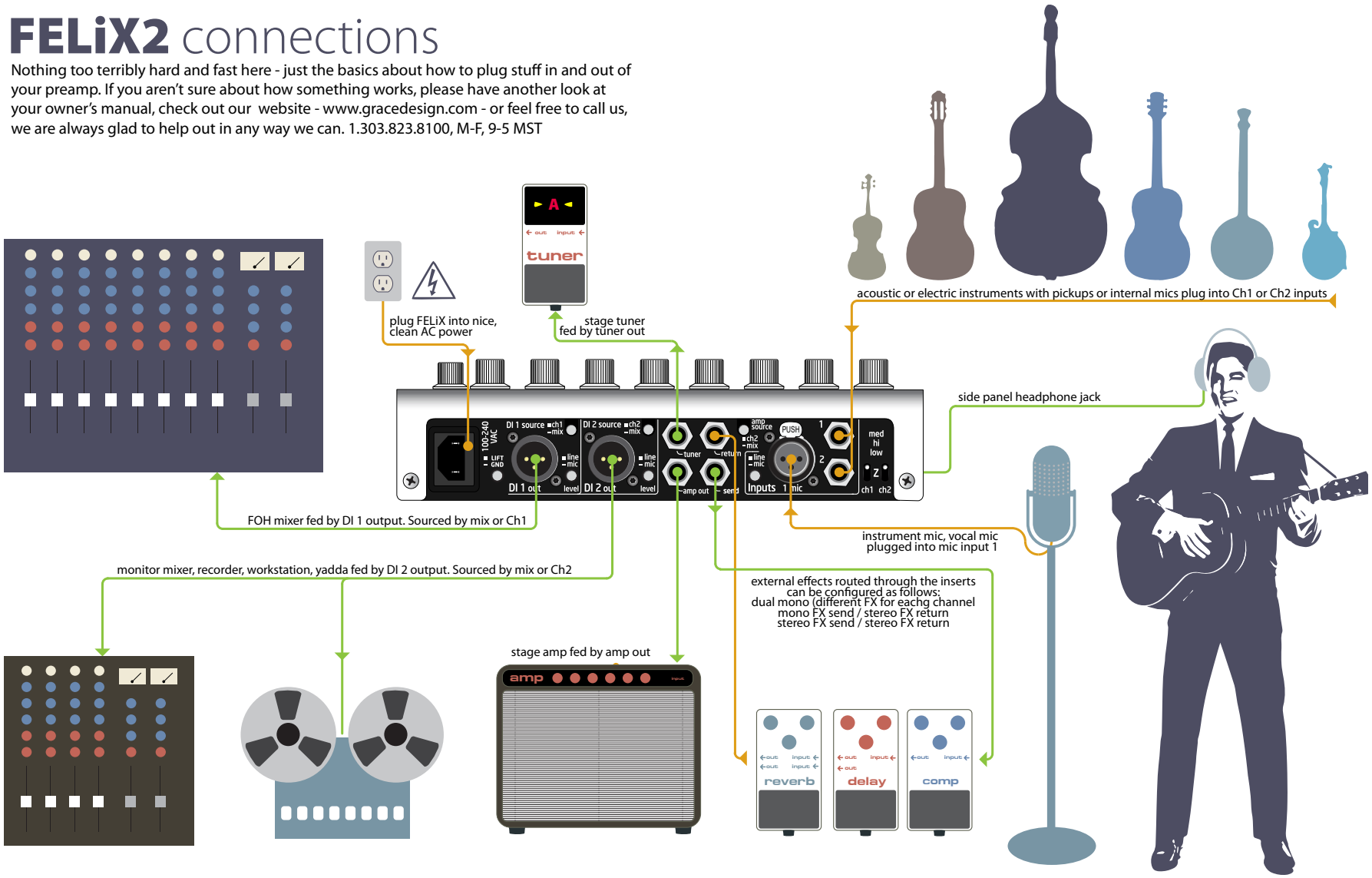
Mono Send / Stereo Return

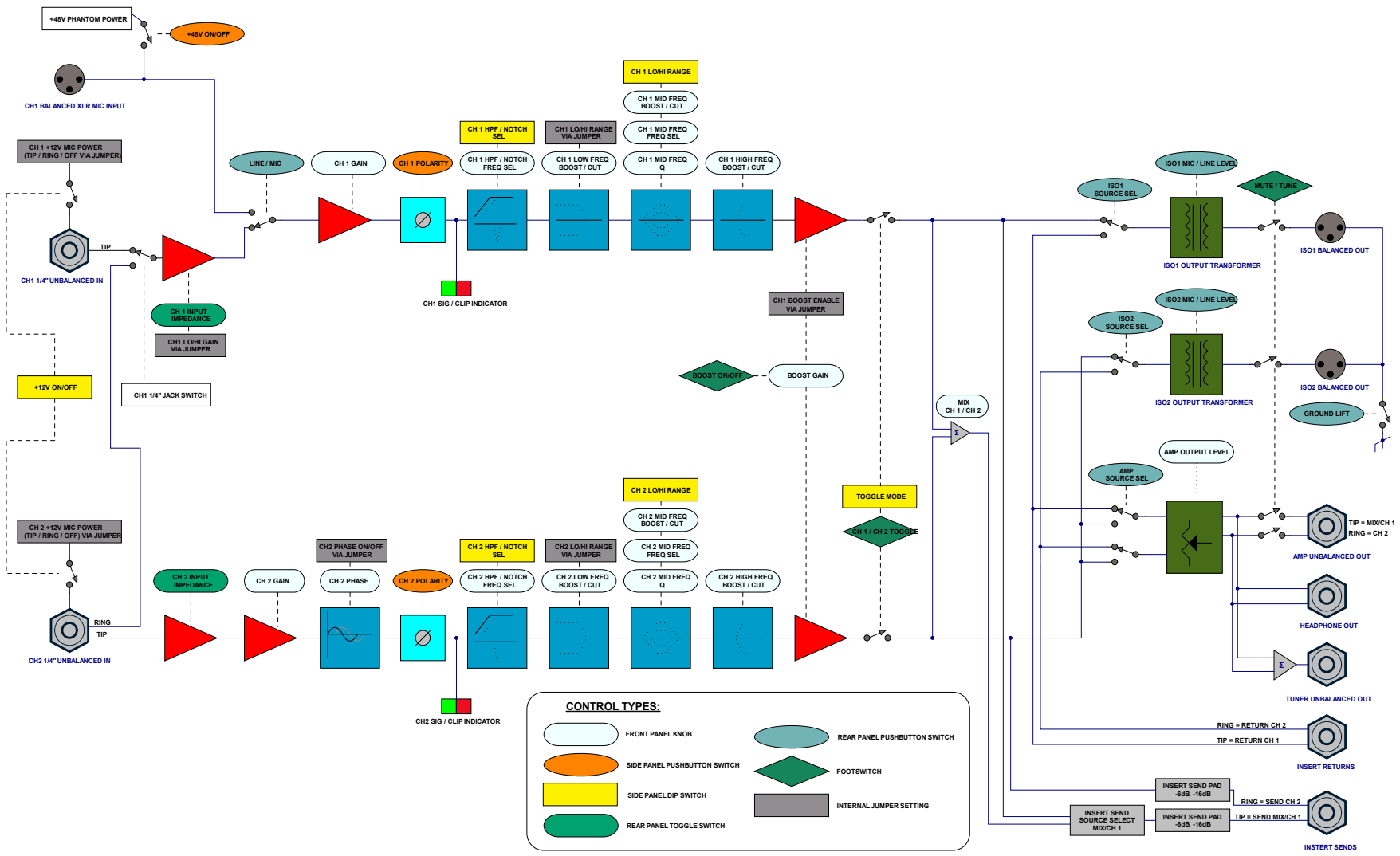
For using mono in, stereo out FX units • TS plug from 'send' to TS plug to FX input (standard 1/4" cable) • Two TS plugs from stereo FX outputs to one TRS plug to 'return' (standard 'Y' insert cable) Jumper Settings: J19 - MIX / J18 - ST



FELiX2 connections

Nothing too terribly hard and fast here - just the basics about how to plug stuff in and out of your preamp. If you aren't sure about how something works, please have another look at your owner's manual, check out our website - www.gracedesign.com - or feel free to call us, we are always glad to help out in any way we can. 1.303.823.8100, M-F, 9-5 MST




+48V PHANTOM POWER
+48V ON/OFF
CH1 BALANCED XLR MIC INPUT
CH 1 +12V MIC POWER (TIP / RING / OFF VIA JUMPER)
TIP
CH1 1/4" UNBALANCED IN
CH 1 INPUT IMPEDANCE
CH1 LO/HI GAIN VIA JUMPER
CH1 1/4" JACK SWITCH
+12V ON/OFF
LINE / MIC
CH 1 GAIN
CH 1 POLARITY
CH1 SIG / CLIP INDICATOR
CH 1 HPF / NOTCH SEL
CH 1 HPF / NOTCH FREQ SEL
CH1 LO/HI RANGE VIA JUMPER
CH 1 LOW FREQ BOOST / CUT
CH 1 LO/HI RANGE
CH 1 MID FREQ BOOST / CUT
CH 1 MID FREQ FREQ SEL
CH 1 MID FREQ Q
CH 1 HIGH FREQ BOOST / CUT
CH1 BOOST ENABLE VIA JUMPER
BOOST ON/OFF
BOOST GAIN
CH 2 +12V MIC POWER (TIP / RING / OFF) VIA JUMPER
RING
TIP
CH2 1/4" UNBALANCED IN
CH 2 INPUT IMPEDANCE
CH 2 GAIN
CH2 PHASE ON/OFF VIA JUMPER
CH 2 PHASE
CH 2 POLARITY
CH2 SIG / CLIP INDICATOR
CH 2 HPF / NOTCH SEL
CH 2 HPF / NOTCH FREQ SEL
CH2 LO/HI RANGE VIA JUMPER
CH 2 LOW FREQ BOOST / CUT
CH 2 LO/HI RANGE
CH 2 MID FREQ BOOST / CUT
CH 2 MID FREQ FREQ SEL
CH 2 MID FREQ Q
CH 2 HIGH FREQ BOOST / CUT
TOGGLE MODE
CH 1 / CH 2 TOGGLE
MIX CH 1 / CH 2
ISO1 SOURCE SEL
ISO1 MIC / LINE LEVEL
ISO1 OUTPUT TRANSFORMER
MUTE / TUNE
ISO1 BALANCED OUT
ISO2 SOURCE SEL
ISO2 MIC / LINE LEVEL
ISO2 OUTPUT TRANSFORMER
ISO2 BALANCED OUT
GROUND LIFT
AMP SOURCE SEL
AMP OUTPUT LEVEL
TIP = MIX/CH 1
RING = CH 2
AMP UNBALANCED OUT
HEADPHONE OUT
TUNER UNBALANCED OUT
RING = RETURN CH 2
TIP = RETURN CH 1
INSERT RETURNS
INSERT SEND PAD -6dB, -16dB
RING = SEND CH 2
INSERT SEND SOURCE SELECT MIX/CH 1
INSERT SEND PAD -6dB, -16dB
TIP = SEND MIX/CH 1
INSTERT SENDS
CONTROL TYPES:
FRONT PANEL KNOB
SIDE PANEL PUSHBUTTON SWITCH
SIDE PANEL DIP SWITCH
REAR PANEL TOGGLE SWITCH
REAR PANEL PUSHBUTTON SWITCH
FOOTSWITCH
INTERNAL JUMPER SETTING

14 Specifications

GAIN RANGE (Input to DI Output)	
CH1 MIC	Low Gian: 17-62dB 21-62dB / High gain: 22-63dB
CH1 Inst	Low Gain: 3-48dB / High Gain: 17-62dB
CH2 Inst	-1-37dB
Boost	0-9dB
THD+N 1kHz, 22Hz-22kHz BW (MIC Input to DI Output line level out)	
@ 20dB Gain +10dBu out	<0.015%
@ 40dB Gain +10dBu out	<0.015%
@ 60dB Gain +10dBu out	<0.020%
INTERMODULATION DISTORTION - SMPTE/DIN 4:1 7kHz/50Hz (MIC Input to DI Output)	
@ 40dB Gain +10dBu out	<0.05%
NOISE - REFERRED TO INPUT CH1 MIC @60dB Gain 22Hz-22kHz BW	
50Ω source	<-128dB
CMRR @60dB Gain	
100Hz	>55dB
1kHz	>75dB
10kHz	>85dB
FREQUENCY RESPONSE (Input to DI Output)	
Mic input @ 40dB Gain -3dB	20Hz – 65kHz
Inst input @ 20dB Gain -3dB	20Hz – 65kHz
I/O IMPEDANCE	
CH1 MIC Input	8.1kΩ
CH1 Inst Input	HI: 10MegΩ / MED: 1MegΩ / LOW: 10kΩ
CH2 Inst Input	HI: 20MegΩ / MED: 1MegΩ / LOW: 332kΩ
Insert Input	10kΩ
DI Outputs	150Ω
Amp, Tuner, Headphone and Insert Outputs	150Ω
SIGNAL / PEAK LED METER	
Green threshold	-10dBu
Red threshold	+10dBu
MAXIMUM INPUT LEVEL	
CH1 MIC (low gain mode)	+4dBu
CH1 MIC (high gain mode)	1dBu
CH1 Inst	Low Gain: +18dBu / High Gain: 4dBu
CH2 Inst	+20.5dBu
MAXIMUM OUTPUT LEVEL - 100k Ohm load, 0.1% THD	
DI Outputs	Line: +20dBu / Mic: -6dBu
Amp, Tuner, Headphone and Insert Outputs	+22dBu
High Pass Filter / Notch Filter	
High Pass Filter	20Hz – 1kHz @ -12dB/octave
Notch Filter	20Hz – 1kHz, >-35dB, Q>4.0
EQ	
Gain	+/- 12dB
Low Frequency	Low Range: 125Hz Shelving / High Range: 250Hz Shelving
Mid Frequency	Low Range: 70Hz – 880Hz / High Range: 670Hz – 8kHz
Mid Frequency Q	0.5 – 5
High Frequency	Low Range: 1kHz Shelving / High Range: 2kHz Shelving
OUTPUT NOISE 22Hz-22kHz BW @ MIN Gain	
CH1 MIC Input (50 ohms) to DI Output	<-90dBu
CH1 Inst Input to DI Output	<-89dBu
CH2 Inst Input to DI Output	<-98dBu
POWER CONSUMPTION	
100-240VAC 50/60Hz	10 Watts Max
WEIGHT and DIMENSIONS	
3.2lbs	H3.0" x W9.5" x D5.5"
Mic stand flange mount screws (not included)	6-32 X 3/8 pan head phillips stainless steel

15 Cleaning and Maintenance

Your Felix 2 is chassis is constructed out of high quality aluminum and steel. Under normal circumstances, very little maintenance is required to keep it looking good. However, if you find it getting more dirty or dusty than you like, here are some cleaning tips: We recommend using a little shot of Windex™, applied to a clean, dry, lint free cloth. Gently wipe all surfaces, taking care not to allow the cleaning product to build up around or under the knobs.

16 Warranty

- Grace Design warrants this product to be free of defective parts and workmanship for a period of five years. This warranty period begins at the original date of purchase and is transferable to any person who may subsequently purchase the product during this time.
- This warranty excludes the following conditions: normal wear and tear, misuse, customer negligence, accidental damage, unauthorized repair or modification, cosmetic damage and damage incurred during shipment.
- During the time of this warranty, Grace Design will repair or replace, at its option, any defective parts or repair defective workmanship without charge, provided the customer has appropriate proof of purchase and that the product has its original factory serial number.
- In order for Grace Design to provide efficient and timely warranty service, it is important that you mail the completed warranty registration card enclosed with all of our products within 10 days of the original date of purchase. You may also register your product directly with Grace Design by telephone (303-823-8100 Monday-Friday 9:00am to 5:00pm MST), or you can register your product online at www.gracedesign.com.
- This warranty is in lieu of all other warranties whether written, expressed, or implied, INCLUDING ANY WARRANTIES OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE.
- In no event will Grace Design be liable for lost profits or any other incidental, consequential or Exemplary damages, even if Grace Design is aware of the possibility of such damages. In no event will Grace Design's liability exceed the purchase price of the product.
- This warranty gives the customer specific legal rights. The customer may also have other rights, which vary from state to state. Some states do not allow limitations on implied warranties or consequential damages, so some of the limitations of the above may not apply to a particular customer.

17 Manual Revisions

Revision	Page	Change	Date	Initials
A	all	Initial release	03/05/2021	edg