Daking Audio

Daking Audio FET Compressor II Manual

VERSION 4.4

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Safety Considerations

1. Read, follow and keep these instructions.
2. Heed all warnings.
3. Do not use this equipment in or near water. Do not place liquids on or near the device because the device might be damaged during a spill.
4. Clean only with a soft dry cloth.
5. Do not block any ventilation openings. Install in accordance with the manufacturer's instructions.
6. Use only Daking supplied power supplies to prevent damage to your device or create safety hazards.
7. Do not install near any heat sources such as radiators, heat registers, stoves, or other apparatus (including amplifiers) that produce heat.
8. Do not defeat the safety purpose of the polarized or grounding-type plug. A polarized plug has two blades with one wider than the other. A grounding-type plug has two blades and a third grounding prong. The wide blade or the third prong are provided for your safety. If the provided plug does not fit into your outlet, consult an electrician for replacement of the obsolete outlet.
9. Protect the power cord and all connecting cables from being walked on or pinched particularly at plugs, receptacles, and the point where they exit from the device.
10. Only use attachments/accessories specified by the manufacturer.
11. Unplug this device when unused for long periods of time.
12. Refer all servicing to qualified service personnel. Servicing is required when the apparatus has been damaged in any way, such as when a power-supply cord or plug is damaged, liquid has been spilled or objects have fallen into the apparatus, the apparatus has been exposed to rain or moisture, does not operate normally, or has been dropped.
13. Do not overload wall outlets and extension cords as this can result in a risk of fire or electric shock.

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1 Daking Audio FET Compressor II Manual

1.1 About Daking Audio

Congratulations! You've purchased a FET II Compressor/Limiter, a very high end piece of gear! The FET II uses all discrete transistor Class A circuits, the best transformers and printed circuit board mounted switches. Signal capacitors are precision polypropylene or ultra low-leakage electrolytic types. Our boards are assembled on a mil-spec assembly line. The chassis are stainless steel for maximum RF and hum rejection and a long lasting finish. Every unit is hand finished, tested, burned in, and tested again in a second facility.

Also, we just couldn't stand to use plastic knobs, so we designed our own anodized, engraved aluminum knobs that give a much more precise and quality feel. I designed my gear to be gear you'd own for life, not some passing fancy you'd leave in the dust once you figured what the good stuff sounds like. This IS the good stuff.

-Geoff Daking

1.2 Quick Start Guide

1.2.1 Don't read the manual!

Most of you will already know how to use a compressor perfectly well and might be even a little offended at the idea of reading the instruction manual. So don't read it. This manual is not for you.

This manual *is* for someone that knows enough to buy the very best (Daking of course!), but doesn't have a lot of experience using recording gear.

You might be a bass player who just got a DAW and wants more control over your dynamics in your home studio. You might be a student that just got a check from Mom & Dad and wants to go buy something nice for yourself.

You might be the guy standing ankle-deep in a pool of salt water, trying to yank the grounding pin off your mixer's power cord so you can plug it into your 2-prong ungrounded outdoor outlet.

This manual is especially for you!

Whenever you see the Duh! Guy, you can be assured that most professionals will already know this stuff. Be sure to explain this stuff to your friends in a snotty and

condescending tone, so you too can be part of the tradition of know-it-all engineers and recordists!

1.2.2 Basic Set Up

Your compressor can be used in a variety of different ways and patched into the signal chain of many different set-ups. The FET II can be used while you are tracking a microphone, while you are mixing tracks down, and in mastering scenarios.

1. Patch the output of your line-level audio device (like an insert send on your console) to the Line Input jack on the rear of the compressor. If you use a ¼" connector, you will get +14 dB of gain.

2. Patch the Line Output on the rear of the compressor to the input of your line-level audio device (like the insert return on your console)

3. Flip the Mode Switch to the left so the compressor is in Compress/Limit mode

4. Plug the power supply into a grounded outlet, preferably with AC line filtering, surge suppression and voltage regulation.

5. Attach 25-Pin D-Sub cable on the power supply to the back of the compressor

6. Get compressin'!

1.2.3 Back Panel

Line Out: XLR, line level

Line Input: XLR or ¼"connector. XLR at line level. ¼" jack boosts 14dB in gain

Stereo Link: XLR or ¼": DC-only side chain control for stereo linkage of two compressors. Just connect two compressors together with a ¼" instrument cable for stereo operation. Never connect this jack to an audio input or output!

D-Sub: Power connection

1.2.4 Front Panel

VU Meter: Input, Output and Gain Reduction

Threshold Knob

Ratio Knob

Attack Knob

Release Knob

Make-up Gain Knob

3-Way Meter Switch

3-Way Mode Switch

1.3 The Power Supply

1.3.1 D-Sub 25 pin connector.

Your FET II Compressor uses an external power supply with a DB 25 connector with all the pins wired. External power supplies offer many advantages over internal power supplies like reducing hum from 50 or 60 cycle power sources and improving the safety of the equipment you are using.

Never patch the power supply's D-Sub 25 connector to an audio input or output. You will likely damage your equipment.

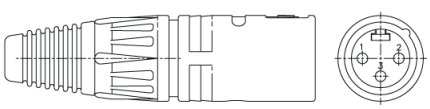
1.4 Back Panel

1.4.1 XLR Connectors and ¼" TRS Connectors

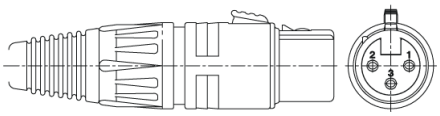
XLR connectors are more expensive, more reliable and offer a stronger connection than ¼" TRS connectors. They also have the option of a locking latch that helps to keep the cable from being pulled out accidentally. If worse comes to worse, you can connect two XLR cables together to make a longer run. The XLR connection is strong enough that you can swing a hand-held microphone around your head like a cowboy for quite a long time before the mic flies off and knocks someone's teeth out.

In general, XLR males are used for Outputs and XLR female are used for Inputs. Makes sense, right? Many people confuse the male and female XLR parts, because the female plug fits into the male plug to join together. The male XLR has 3 pins (male pins…) inside the plug and the female XLR has three holes inside the plug (female holes…). Check out the diagrams below:

Neutrik Male XLR Plug



Neutrik Female XLR Plug



¼" TRS (**T**ip, **R**ing, **S**leeve) cables have male 3 conductor ¼" diameter connectors on both ends. These connectors are cheaper, less reliable and offer less contact area for the electrical connection and are more often the site of intermittent connections. ¼ inch TRS cables are easier to use because you don't have to worry about which end is which, because both plug ends are the same. The TRS plug looks like stereo ¼" headphone plug but carries balanced line level not speaker level like with headphones. A mono ¼" cable (like a guitar cable) is not TRS plug as it is only 2 conductor -it won't work right in any TRS application as it is missing one of the three conductors!

Neutrik 1/4" TRS Plug

1.4.2 Line Input (XLR or ¼" TRS)

The line input accepts a line-level signal, not a mic level or instrument level signal. You can connect to the input of your compressor with an XLR cable or a ¼" TRS cable, but the compressor doesn't treat these two inputs on the same connector the same way. If you use an XLR connector you will get exactly what you expect: a unity gain connection, no gain added. The ¼" TRS connection offers 14 dB of extra gain to help out with lower output pro-sumer (-10 dB) equipment, such as a CD player.

Your compressor is not expecting a microphone-level signal and definitely not a speaker-level signal! If you want to compress a mic signal you need to run the mic into a mic pre-amp first (a Daking Mic Pre is a good choice!), which boosts the gain of the signal from mic level to line level. Then you can send the output of the mic pre into the compressor. Plugging a mic directly into the compressor just won't work. It's kind of like putting a PB & J into a VHS machine: you can do it, but it's a bad idea.

Plugging a speaker level ¼ input into your Daking Compressor may blow it up. This signal is far too hot to work properly with your compressor. If you need to control dynamic range of a speaker, then compress it as a line level, before the signal goes to the amplifier.

1.4.3 Line Output (XLR)

The output signal from your compressor comes from here. If you are connecting your compressor to a patch bay on a console instead of a line XLR input on another piece of gear, you will want to purchase a female XLR to male ¼" TRS adaptor cable to make this easy. The output signal is line level, not mic level, so patching it into a mic pre-amp afterwards is unnecessary and probably will just cause problems.

1.4.4 Stereo Link (Not for Audio!)

The Stereo Link jack is used when you want to use two Daking FET II's for stereo. You need to connect the two units together with a ¼" cable via the stereo link jack on both units. This is basically a connection that causes both units to act in unison to preserve stereo imaging. Otherwise a loud sound on the left triggers gain reduction on the left only, shifting the image to the right. Only DC voltage is used with this jack and it does not carry audio.

Never connect or disconnect the Stereo Link jacks while you are using the unit! Patching while the unit is in operation will blow the ¼ amp internal fuse.

1.4.5 Power supply Connection (25-Pin D-Sub)

This jack feeds the compressor the power it needs from the power supply mentioned earlier. This is NOT for D-Sub audio connections! Contrary to common belief, the compressor will not double as a printer when connected to the printer output from your computer.

1.5 Front Panel

1.5.1 VU Meter

Your compressor is equipped with a wonderful device, called a VU meter. A VU (Volume Unit) meter measures loudness more like the way people hear loudness: as an average of the levels over time (in this case, the last 300 ms.) Typically 0 on a VU is equivalent to -18 dBu full scale, or 18 dB lower than digital audio systems' 0 dB. Most digital recorders and DAWs use PPM or Peak Program Meters to show to loudest part of a sound wave. This is really important for digital because anything that goes above 0 dBu full scale is going to distort and sound horrible.

The meter can also be used to determine gain reduction in addition to input and output levels. When the compressor is working the needle will move to the left to show how much the compressor is attenuating (reducing) the gain.

The VU meter can be switched via the 3-way meter switch to provide metering for your input signal, your output signal or the gain reduction that the compressor is providing.

1.5.2 Rotary Switches vs. Potentiometers

Your compressor is equipped with rotary switches which make a big click when you turn them. Switches are more reliable and have a higher tolerance than rotary potentiometers, which are the smooth turning knobs on an electric guitar or your stereo's volume knob.

One of the biggest advantages of switches is that you can reproduce the same settings over and over again. With a rotary pot, you just can't be as precise. You can also set 2 devices exactly the same way when you use switches.

1.5.3 The Threshold Knob

The Threshold knob controls at what level in decibels the compressor starts to work. All signals above Threshold get compressed and those below threshold get left alone. If the knob is set to "0," then all the sounds above 0 dB will be reduced in gain and the sounds below will be untouched. See Figure 1 below.

If you want more compression, then you should lower the Threshold. If you want less compression then you should raise the Threshold.

1.5.4 Ratio Knob

The Ratio knob controls how much attenuation (gain reduction) happens to the signal above the Threshold. The Ratio is a comparison of the input to the output, when the signal is above threshold.

For instance, imagine you have set a 3:1 ratio and set the Threshold to 0 dB. Note in Figure 1 below, the audio input signal rises +9 dB above 0 dB Threshold. As you can see the output signal is only +3 dB above Threshold. The increase of 3 dB input above Threshold yields only 1 dB above the Threshold output.

Higher ratios are easier to hear because they are making a bigger change from the original. So if you are trying to be subtle stick with generally lower ratios. Sometimes of course you will need to use heavy compression to achieve the results that you are after.

Compressors with ratios of 10:1 or higher are usually called limiters. Limiters are often used after preamps to protect recorder inputs from sudden overloads, like intermittent screaming or someone dropping a mic during a live recording. The limiter prevents the recording from being ruined! Limiters can also be used to set a volume limit for a playback system to protect a speaker from damage.

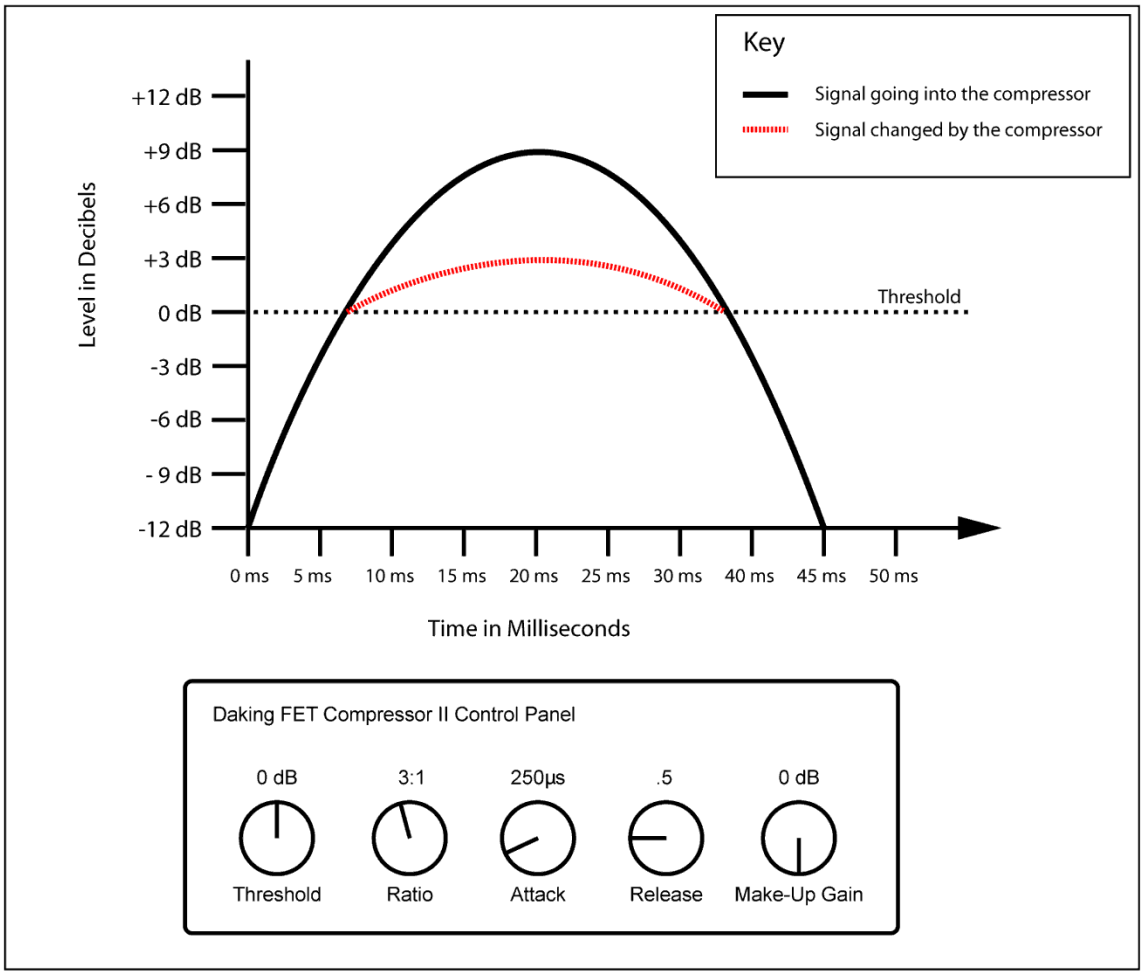


Figure 1. Thresholds and Ratios

1.5.5 Attack Knob

Unfortunately, the Attack knob has nothing to do with using the power supply as a weapon or stopping the guitar player from driving you nuts!

The Attack knob controls how fast the compressor turns on after a signal crosses the Threshold. If the Attack is set slow, the compressor will react slowly to transients above threshold. If the Attack is set fast, the compressor will react the instant the transient exceeds the Threshold. Fast settings are to the left and slower settings are to the right. See Figure 2 below.

If you set the compressor's Attack too fast the transient will be attenuated too much and the power of the instruments will be reduced. When drums sound wimpy or flat, it is often because the Attack settings are too fast. IF you set the Attack to slow, you might miss the transients altogether and not compress the audio enough.

If you have a lot quick explosive peaks, speed up the attack to prevent overloads of downstream devices. If you don't have many fast peaks, use slower settings to level out small dynamic changes in a vocal performance or bass part.

Your Daking compressor is fast enough to control even the most intense transients from drums and percussion.

What the heck does "µ" mean?

µs = micro seconds or 1 millionth of a second

ms = millisesconds or 1 thousandth of a second

1.5.6 Release Knob

There are NO hostages!

The Release knob controls how quickly the compressor stops compressing after the signal drops below the Threshold. See Fig 2 below. The Release control can be used to lengthen sustain times and to blend audio signals together. When Release times are faster, the compression may be less obvious and be more transparent. If Release times are set improperly the compressor may sound as if it is causing the audio to swell, pump or breathe.

The Release times and behavior of a compressor is very important to the signature sound of the unit. Your FET Compressor II has Release times that automatically emulate some of the most sought after vintage compressors in history:

Neve 33609 Auto
A&D • Compex 760 Auto
Fairchild 670 #5
Fairchild 670 #6

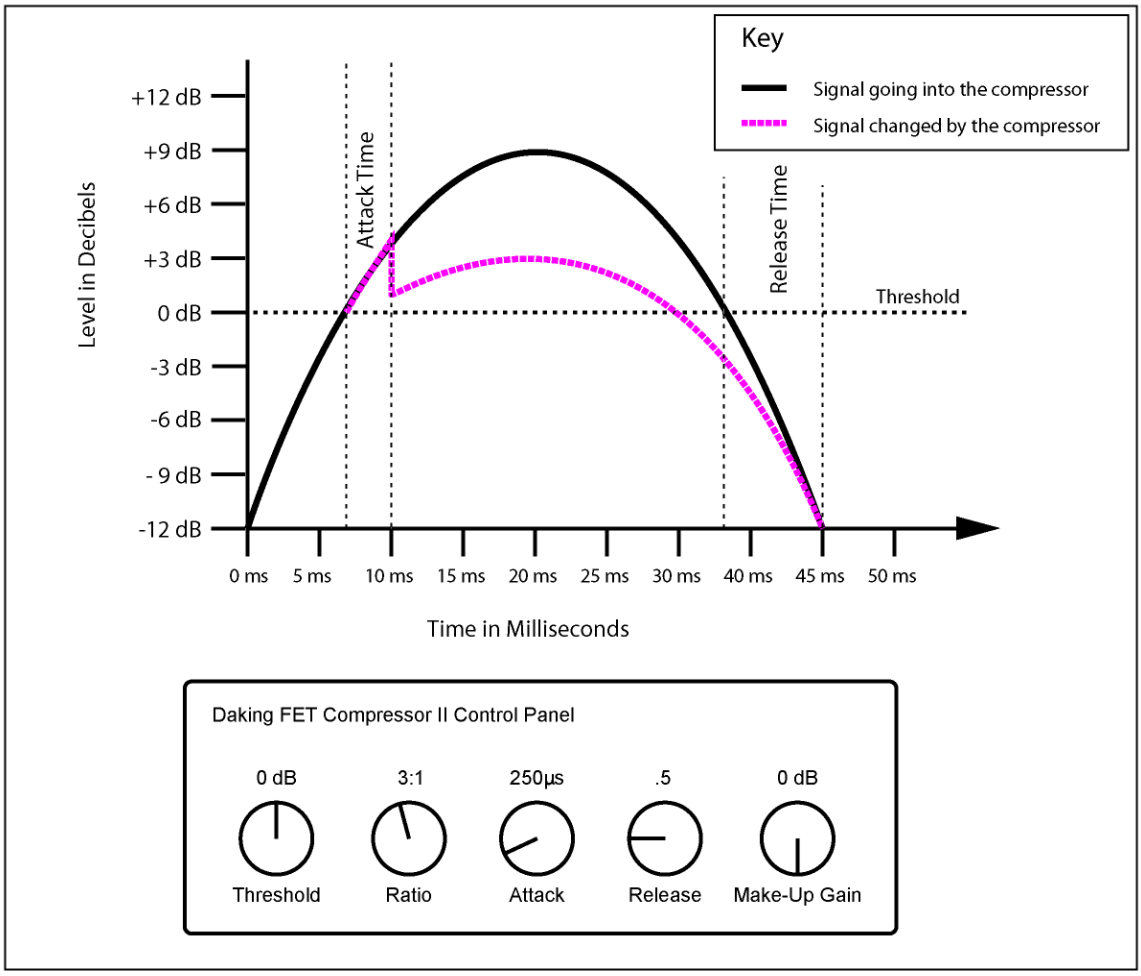


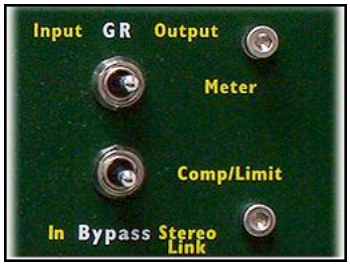
Figure 2. Attack and Release Settings

1.5.7 Make-up Gain Knob

The Make-up Gain control compensates for signal level lost through the process of compression. It is also helpful for raising the apparent average level of a signal (sometimes called the loudness) after removing the radical dynamic changes in level through compression.

After reducing the overall dynamic range of a signal and reducing the potential of peaks or overload, many engineers use the Make-up Gain to boost the level of a compressed vocal into the front of a mix. Similarly, not using the Gain can be used to reduce average level and keep background vocals consistently in background.

1.5.8 3-Way Meter Switch



The meter switch allows you to change what signal you are metering with the VU meter. You can choose, input, output or gain reduction, which shows you how much you are compressing the audio. This meter becomes important when using compression and make up gain to compare the before (input) and after (output).

1.5.9 3-Way Mode Switch

This switch lets you choose between having the compressor turned on, the compressor being bypassed and the compressor being used in Stereo Link Mode. Bypassing is a good way to hear the before and after of what you have done with the compressor and to hear how good or bad your settings are.

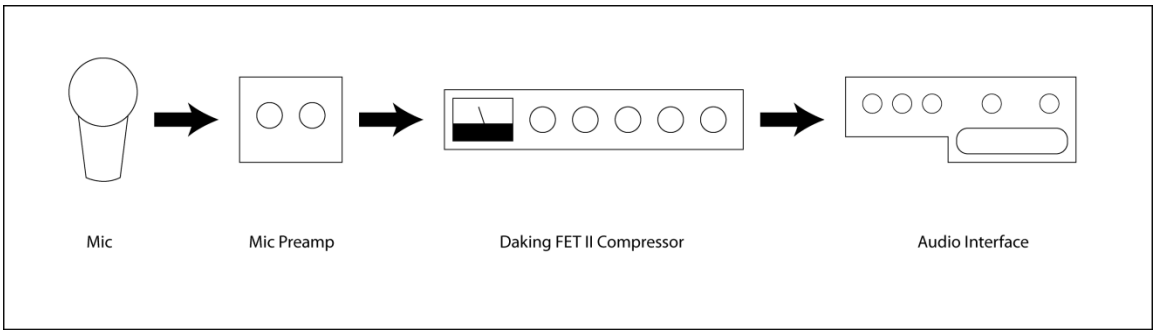
1.5.10 Stereo Link Mode

Your compressor can be used as a single channel compressor or linked together into a stereo pair. Simply attach your two compressors together via the stereo link jacks with a ¼" instrument cable.

1.6 Signal Flow: Patching Into and Out of Your FET II Compressor

1.6.1 Mic Pre to FET II to Audio Interface or Mixer

Nowadays most people are recording digitally into a Digital Audio Workstation (DAW) like ProTools, Cubase or Sonar. Most of the audio interfaces that are available don't have high quality microphone preamps, so many recordists purchase outboard preamps, like Daking's Mic Pre One, to ensure professional quality sound. The mic preamp and compressor are connected inline directly into the audio interface.



The job of the mic pre amp is to raise the level of a mic level signal to line level so that it can be manipulated or recorded. You can't plug a mic into the FET II and hope to get anything useful out of it.

Basic Cables Needed:
(2) Microphone Type Cables (Female XLR to Male XLR)
(1) Female XLR to Male ¼" TRS Balanced Cable

Here are the steps:

1. After making sure that phantom power isn't turned on and that your studio monitors are muted, patch a microphone to the mic preamp with a mic cable (XLR Female to XLR Male).
2. Patch out of the mic preamp to the input jack on the FET II, preferably with another mic cable (XLR Female to XLR Male). Note: If you can't use a mic cable, a TRS to TRS balanced line cable is recommended. You will get an addition 14 dB of gain at the input.
3. Patch out of the FET II in the line input on your interface or your mixer. Use a XLR Female to ¼" TRS Male cable. Make sure that you aren't going into another mic preamp! You will likely end up with a distorted signal. On some gear the mic input and the line input are both in a combo jack that accepts both XLR and ¼" plugs. The ¼" is the line input.
4. Turn on phantom power (if needed) and set levels.

1.6.2 Connecting Via a Single Insert Jack

On many live and hybrid mixers, inserts are patched via a single insert jack using a special insert cable. The insert cable for the FET II (see Figure 3 below), often called a 'Y' cable, consists of a ¼" TRS plug on one side and 2 XLR plugs on the other side, one male and one female.

The tip of the TRS plug is wired to the 2 pin of the Male XLR plug (usually the white or left plug if marked) and the ring of the TRS is wired to the 2 pin of the Female XLR connector (usually the red or right plug if marked.) The sleeve of the TRS plug is wired to both pins 1 and 3.

The tip of the TRS plug is the "send" and the ring of the TRS plug is the "return." A really good way of remember this stuff is:

Red, Right, Returning and Ring all start with "R."

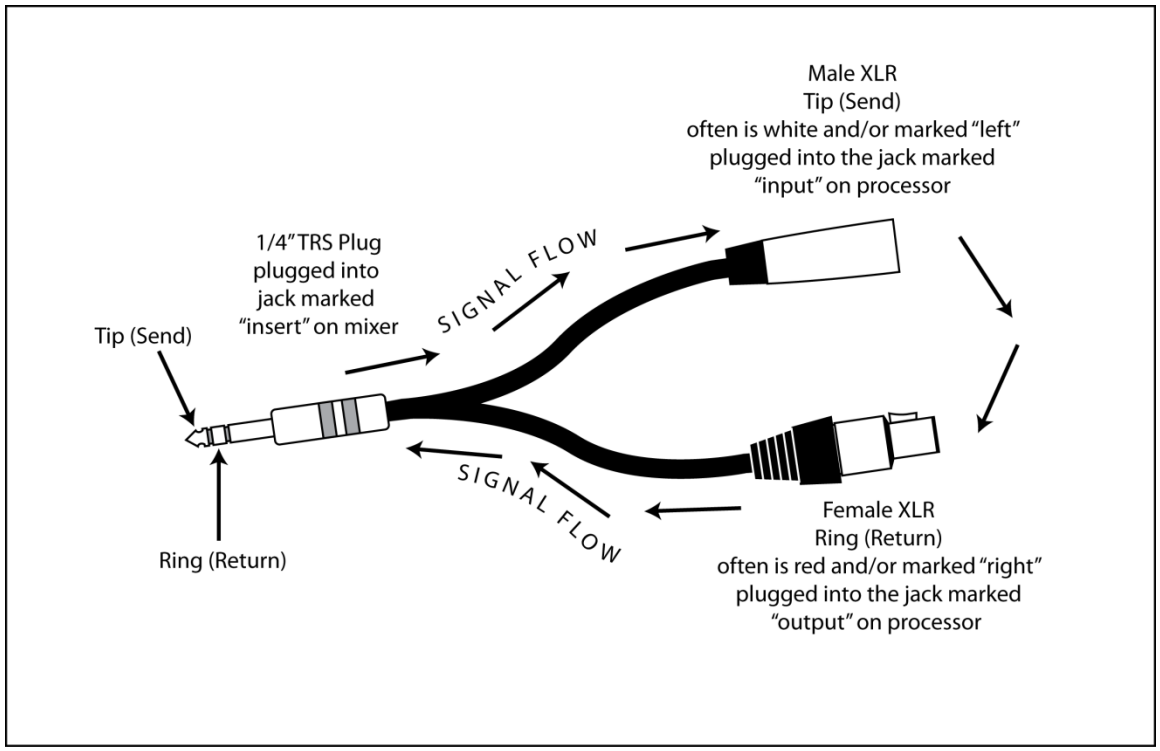
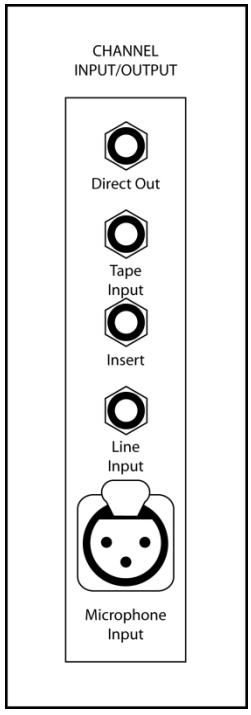


Figure 3. FET II Insert 'Y' Cable



On the familiar RCA plugs used on home theater equipment, the red plug is always the right side. 'Y' cables often use the same color scheme because usually the cable was intended to split a stereo signal into two mono signals: left and right. When you use this 'Y' cable as an insert cable the tip side is the send side and the ring side is the return side. This cable is BOTH an output and an input!

Steps for Patching with an Insert Jack and Cable:

1. Patch the TRS side of the Insert or 'Y' cable into the jack marked "insert" on the patch bay of your mixer. If you had signal playing through the channel at the time, this cable will break the connection, and you shouldn't hear anything. If you touch the tips of the other two plugs together, you will get signal back.

2. Plug the connector marked "tip" or "send" or simply in white into the input connector.

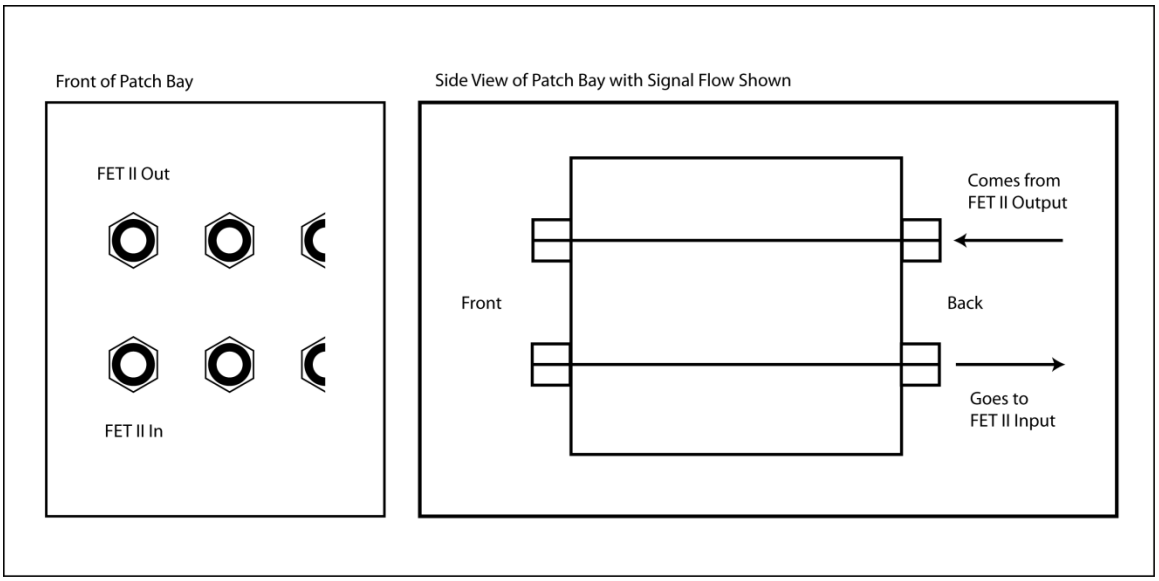
3. Plug the connector marked "ring" or "return" or that is in red into the output connector.

1.6.3 Via a Patch Bay

In most professional setups, processors are racked and then installed as part of a patch bay system. This makes it easier to make connections, because you don't need to go behind the rack to plug and unplug cables.

Patch bays are usually made up of modules with 2 jacks in the front, one over the other, and two jacks (or solder terminals, or DB25, etc) on the back. For the sake of this manual, we'll assume you're using a ¼" TRS patch bay with jacks on the front and back.

You want to choose an isolated module or set the module to be isolated. Sometimes this is as simply as rotating a module in the patch bay. See the manual for your patch bay. You want the top jack to connect the front and the back and the bottom jack to connect the front and the back, but for the top not to be connected to the bottom.



Cables Needed:
(1) XLR Male to ¼" TRS Male
(2) XLR Female to ¼" TRS Male

Steps:
1. Patch from the bottom back jack on the patch bay module to the input on the FET II using the ¼" TRS to XLR Male cable.

2. Patch to top jack of the patch bay module from the output of the FET II using the XLR Female to ¼" TRS cable.

3. Now you can patch into the compressor from the front of the patch bay. Simply run a patch cable from your source and into the bottom

jack on the module and then run from the top jack on the module to wherever the signal needs to go.

1.6.4 Stereo Setup as a Bus Compressor for Mixing or Mastering

The purpose of the Stereo Link mode for bus compression is to make sure that both compressors compress in unison. This prevents the stereo image from shifting to the left or right when one side of the stereo field is compressed and the other side is not.

You will need two FET II's to do bus compression for stereo and they will need to be linked via the Stereo Link connections on the back of the units.

Basic Cables Needed:
(1) ¼" TS to ¼" TS Jumper Cable

Steps:

1. While the two FET II's are in Bypass mode, connect the two compressors via a ¼" TS – ¼" TS cable patched into the Stereo Link jacks on the panel panels
2. Insert the compressors, or connect them inline as shown above. Use the first compressor for the left side of the program and the second compressor for the right side of the program.
3. Switch the compressors into Stereo Link mode
4. Set the control switches by ear. For most programs you will probably set both compressors the same way at least initially. If one side needs more or less compression, feel free to adjust to suit your needs. The Stereo Link feature will prevent the stereo image from shifting.

1.7 Typical Uses of a compressor

1.7.1 Why do I need a compressor anyway?

Compressors help to control the dynamic range of audio signals. The dynamic range of an audio signal is the difference between the quietest part of a signal and the loudest part of the same signal over the course of the entire song or program. Compressors reduce this difference between loud and soft (signal dynamic range) to keep things more consistent from start to end. In a nutshell, a compressor allows you keep an element of a mix at the level you choose relative to all the other signals you are mixing. Without compression, the guitar solo might fall into the background or the drums might over take the vocals!

1.7.2 Keeping a vocal performance out front

Compression is THE way to get a vocal performance to stay out front and stand out in the mix. The compressor reduces the difference between the

singer's loudest notes and softest notes to make it more consistent. This same idea works also with background vocals to keep them from rising too far out front. A great starting point for vocals is:

Parameter	Value
Threshold	-4 dB
Ratio	5:1
Attack	1 ms
Release	Neve 33609 Auto
Make-up Gain	+6 dB

If the vocalist is extremely aggressive you may need to speed up the attack time (how fast the compressor turns on after threshold is exceeded) to control the transients on plosive consonants like "P," "T," "D," "B", "C," and "K."

If the vocalist is extremely dynamic you may need to increase the Ratio (increase the compression above the threshold) and/or reduce the Threshold (initiate compression at lower levels).

1.7.3 Keeping bass consistent

A compressor is a great tool to use to smooth out a bass guitar track and help to keep the bass audible during the louder parts of the mix. The bottom end of the band is very important! Bass guitar has a tremendous amount of energy and readily overloads tracks. A compressor helps reduce these major energy peaks to keep the bass under control. Try this setting:

Parameter	Value
Threshold	-3
Ratio	3:1
Attack	2
Release	.5
Make-up Gain	+6

1.7.4 Fatten kick drums

A very common use of a compressor is to increase or decrease the sustain of a kick drum sound. Drums have a very fast and very intense transient followed by a quieter sustained sound which is the tone of the drum. A kick drum can be made to sound fuller, by decreasing the peak level (amplitude) of the attack of the drum and increasing the make up gain to achieve a lower but longer (sustain) of the tone of the drum.

Parameter	Value
Threshold	0
Ratio	5:1
Attack	2
Release	.5
Make-up Gain	+6

Speed up the attack of the compressor to attenuate the transient more, slow the attack down to attenuate the transient less.

It's best to try to use the fastest release you can and still achieve the sustain that you are trying to achieve. A release time that is too long can diminish the intensity of the second or third attacks of a fast kick drum pattern, like a $1/16^{th}$ note pattern.

1.7.5 Limiting to preventing overload, clipping and distortion

Limiting uses a very high Ratio with a high Threshold. The idea is to control just the loud peaks. Limiting can be useful in preventing digital distortion, overload of input in gear after the compressor, and tape overload (saturation) from too high an input. Using a very fast Attack time and a high Ratio will ensure that the fastest transients are captured.

A good starting point for limiting is:

Parameter	Value
Threshold	+10
Ratio	20:1
Attack	250 µs
Release	.5
Make-up Gain	0

1.7.6 Pointers and General Principles

Compression is used to reduce the dynamic range of an audio signal.

If you're using a low Threshold, use a low Ratio

If you're using a high Threshold, use a high Ratio

Use the Gain Reduction (GR) setting on the meter to see how much you are attenuating (reducing in gain) the audio signal. Boost the Make-Up Gain by the same amount to yield a new signal that is the same level as the original but with fewer changes to its dynamics.

To set the Attack and Release times turn the Ratio way up so it's easier to hear the compressor working. Set the Attack and Release correctly and then reduce the Ratio to a more reasonable level

1.8 Specifications

Method of Limiting: FET (Field Effect Transistor) used as a variable resistor

Dimensions: 12.25”H x 1.75”W(V) or 1.75”H x 19”W(H)

10.5”D knobs to back of unit

5 lbs-12 ozs

Power: 48volts dc @ 150 ma

Output Drive: transformer balanced

+28dbv @ 1kHz 600½

+26dbv @ 31.5 Hz 600½

Frequency Response: ±1db 10Hz to 56kHz 3db down 63kHz

Noise: -82db 10Hz to 25kHz

Distortion: THD+N 0.033 @ IkHz

Line Input: The XLR input is transformer balanced, has an input impedance >15k½ and accepts input levels to +30dB.

The 1/4” jack has 14dB of gain to accept -10dB input signals.

Stereo Link Connection: Use a 1/4” mono to 1/4” mono cable.