PRO AUDIO
TELONICS
932 E Impala Ave
Mesa, AZ 85204-6699 USA
(480) 892-4444 Fax (480) 892-9139
email: proaudioinfo@telonics.com

Multi-Taper © "Foot Pedal"Audio Control System

Patented

Typical FP-100 Configuration

Multi-Taper © "Foot Pedal" Audio Control System

General Description:

This "pedal" is actually a family of advanced technology volume and/or audio effects control systems based upon a series of revolutionary technologies developed by Telonics, Inc. This system takes the mechanical form of a conventional foot pedal which can be configured with the axle/pivot point installed in what has historically been called "high" or "low" configuration (although this historical terminology is still used, the actual physical height is "low" regardless of the pivot point chosen). It can be used as a foot pedal of the simplest form; however it contains technical capabilities which far exceed those of any currently available audio dynamics control device. The basic model includes accurate emulations of virtually all audio tapers of mechanical potentiometers ("pots") used in the past, as well as the audio control "taper" of all popular electronic foot pedals. It also includes one or more recently developed tapers which add capabilities related such things as gain and sustain – which have not been available to musicians in the past. (Additional replica tapers or custom tapers can be factory installed via the USB port). Tapers are selectable by means of a digital switch on the side of the unit near the input and output jacks. This patented control system does not utilize potentiometers, encoders or light devices of any type. There are no components to physically wear out.

It incorporates the latest technology in low-noise, analog high headroom amplification - in a class with the latest exceptional dynamic response studio-grade amplifiers, while preserving the warmth of vintage tone. Like all Telonics equipment, it is fully analog. The signal chain is never digitized, therefore A/D or D/A noise is Not added to your signal. The FP-100 system does not modify your tone (unless you load down your pickup with the Impedance Control). In terms of frequency response, it is "flat", or "transparent". You may "think" it boosts the high frequency response, but it Does Not. It simply allows you to hear what has always been there, but was attenuated by your system prior to installing the FP-100. It is fully buffered, preventing noise from externally connected tuners and other devices from entering the signal chain as well as providing safety from system malfunction due to shorted or intermittent cables. A full-time tuner output allows tuning with the pedal in any position, including the "off"/minimum position. It is factory programmed via a miniature USB port. Subsequent software updates and additional capabilities may be uploaded via this USB port. The FP-100 is machined from solid aluminum billet block. It will not skate around the floor with normal foot movement. It is designed to accept most popular pedal bar brackets and attachment devices. A patented blue LED pedal-board light also indicates both proper power and that it is operating within acceptable parameters. The light can also indicate abnormal operation through an internal error code reporting system.

An optional ***micro-miniature remote sensor is available which assumes full control of the pedal in terms of treadle movement*** when plugged in. This remote control system opens limitless possibilities, from mechanical control by instruments, to usage by musicians who have a physical impairment and have been prevented from playing until now. (A remote sensor will be supplied *at no charge* to individuals who suffer a physical impairment which can be aided by this remote control device).

Its internal circuitry is well-behaved in terms of power supply connection, interruption or disconnection, thereby minimizing noise which might annoy listeners or possibly damage speaker systems. This is no garage-shop hobbyist toy. It is the culmination of years of research, designed

and hand-built in the U.S.A. by leading and internationally recognized aerospace engineers, technicians, assemblers and musicians in a state-of-the-art facility in Mesa, Arizona by Telonics, Inc., an established leader in scientific instrumentation and communications since the 1970's. Dependability, long-term reliability, performance and value are paramount in this pedal/system. Service, support and advice is always as close as the telephone or e-mail.

Telonics, Inc. is well known by scientists world-wide for the manner in which we stand firmly behind our products on a personal basis. Please contact us with any questions you might have, we invite design comments and are open to any and all suggestions:

dave@telonics.com sophie@telonics.com stacy@telonics.com
TEL: 480 892-4444 ext. 122 or ext.102 FAX: 480 892-9139
www.telonics.com

Mechanical

Pedal:

Material: CNC milled 6061-T6 Aluminum with hardened bearing surfaces
Axles are oil-hardened (O1) tool steel, 55-60 C-scale Rockwell

Finish: Heavy hard anodized (Mil-A-8625 Type II, Class 2, 0.002")

Lettering: Laser-engraved (all markings are burned through the hard anodize coating. No paints or inks are used on the product, markings will not smear or wear off.)

Outline Dimensions: 10.6L x 3.7W x 2.4H in. (27L x 9W x 6.1H cm)

Weight: 2.35 lb (1.06 kg)

Optional External Sensor:

Size: 0.8L x 0.9W x 0.125H in. maximum
(20.3L x 22.9W x 3.2H mm) maximum

Connector: ¼" TRS male "Stereo Plug" (Tip-Ring-Shield/Sleeve)

Mechanical Adjustments:

Axle Position – History and Considerations:

In order to discuss the differences between what have been traditionally called "high" and "low" pedals, one must first define whether we are discussing old, traditional pot pedals (and some of the very early "light" pedals), or, the newer generation of electronic pedals.

Historically, the early pedals were, indeed made in a truly "high" and "low" version, and in fact, the high version was indeed "taller" than low version – which prompts the discussion regarding longer and shorter legs, brushing the undercarriage of the steel with a knee, etc.

BUT, often overlooked is the fact that the axle in older "high" pedals was/is positioned farther forward on the pedal than the "low" models.

Disregarding the actual pedal height factor, and more important to many players, is that having the axle/pivot point at a different point directly influences the RANGE of MOTION of the players ankle for the same angle range of the movable top/treadle on the pedal. As a result, the two types of pedals have a different feel. Think of it as a children's teeter-totter. The older "high" pedals are more like a normal teeter-totter with the pivot point close to the middle.
The older "low" pedals are more like a teeter-totter with the axle moved back toward the back (or toward your heel on the pedal). Also note that as you move the axle farther and farther back (toward the heel) with the pedal in the fully "heel down" condition, two things happen:

1. The heel of your foot gets lower and lower respect to the front of your foot, and,
2. You get a leverage effect. Depending upon how far back the axle is placed. You no longer have a one-to-one relationship, that is, if you move the back of the pedal 1/8 of an inch, the front of the pedal moves more than 1/8th of an inch…….

Fast forward to the new generation of electronic pedals.

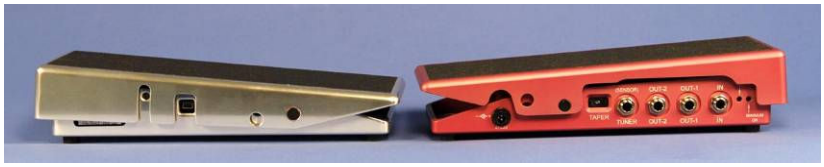
Because they do not have large pots in them, there is no need to build a pedal any higher than the older "low" pedals in order to change the pivot point of the pedal by moving the axle forward or backward. As a result, there is very little difference (only a few millimeters) in what are still sometimes called "low" or "high" models. This varies by manufacturer between their two models. In the case of Telonics pedals, there is no longer a need to produce and stock two models as one pedal covers both conditions; the axle can be moved to either position to suit the player without changing the over-all height to any appreciable degree.

So with Telonics pedals, the aspect of pedal height is no longer applicable with respect to players having longer or shorter legs. The only significant difference between the two axle positions in new pedals is therefore the axle placement. This axle placement becomes important to the player with regard to his or her comfort with respect to his or her preferred/comfortable range of ankle motion.

This has sometimes boiled down to whether the player is younger or older, and whether they prefer to wear shoes (or boots) with low or high heels when they play.

There is a generally accepted common range of motion for the ankle which the majority of players find to be most comfortable. It is therefore necessary to choose an axle position which will correspond to a comfortable range of motion for the type of heel that you prefer to wear while playing, since the heel controls the angle of your ankle when your shoe is in a given position. People generally want their foot to be comfortable when the pedal is at full "heel-down"/when the pedal is at minimum volume. AND, they want their foot to feel comfortable as they continue the pedal's range of motion on through to full "toe-down"/maximum volume position.

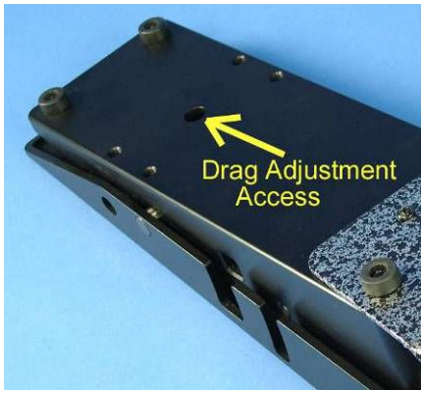
In general we find that people who wear boots to play in (or women with heels) prefer the axle to be in the rearward position (closest to the back of the pedal) – which is commonly still called a "low" pedal. A higher boot or shoe heel raises the back of the player's foot, and placing the axle toward the back of the pedal drops the rear of the treadle a corresponding amount so the foot is not "pointed" as far forward. Unless this is done, the ankle may have to be rotated uncomfortably (for some people) forward when the toe is fully down. As an observation, some players have also remarked that the leverage of such a "low" pedal can feel a bit "touchier" simply because of the leverage change when the axle is moved toward the rear of the pedal.



Players who wear relatively flat soled shoes (or people who play barefoot), typically prefer having the axle/pivot point near the center of the pedal. This type of pedal is still often called a "high" pedal through force of habit or convention. We have also found that standing 6-string guitar players, bass players, fiddlers, etc, typically prefer pedals with the axle placed near the center of the pedal (they also prefer to have and use the Telonics friction lock/clutch so they can easily move their foot on and off the pedal without accidentally changing the volume setting, or have the pedal change due to the stage vibration from woofer vibration or stomping – C6th players also often prefer this type of clutch so they can move their foot on and off the volume pedal when using two feet on their guitar pedals).

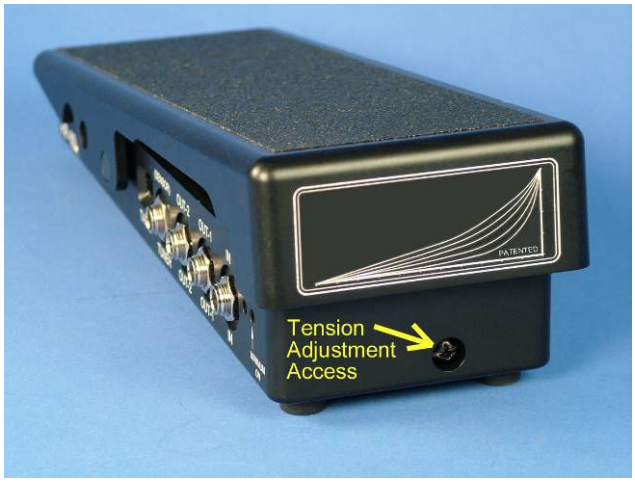
There are certainly more axle considerations, but I hope this information is of some assistance to you. Once you get past "high" or "low" axle placement, you are actually just scratching the surface of important considerations for a professional volume/swell control pedal.

Both **DRAG** (ease of treadle movement) and **TENSION** (treadle return tension) are independently adjustable to suit the user. Please refer to the photos and drawings provided in this document:

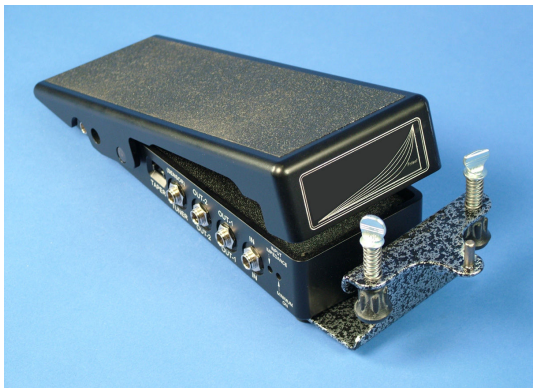


Drag: A 3/16 (0.187) inch "Allen"-type HEX head cap screw located on the bottom of the pedal provides a means of customizing the **Drag** experienced during pedal movement. A 3/16 inch HEX wrench is supplied from the factory for this adjustment. Note that this adjustment is very sensitive. Turning this screw only a slight amount will greatly change the ease of pedal movement. A fraction of a turn Clockwise (CW) will increase drag (make the treadle more difficult to move). Conversely, a small amount of adjustment in the Counterclockwise (CCW) direction will decrease the drag, making the treadle easier to move.

Tension: A Phillips-head screw on the front face of the base adjusts **treadle return Tension (lift).** It can only be properly adjusted if the Drag adjustment is fully relieved (set to minimum drag). It exhibits a very wide adjustment range, requiring several turns in either direction to make an appreciable difference. It has been factory adjusted with the *drag* adjustment set to minimum. If you should decide to adjust it, first be sure the Drag screw is turned CCW to minimum drag, make any desired tension adjustment, then re-set the Drag to complete the process**.**



Bracket Interface: The FP-100 is designed to interface with most popular pedal bar brackets which utilize either two screws, or a triangular three hole pattern. The screws which attach the two front feet are slightly longer in order to allow for the thickness of a bracket.

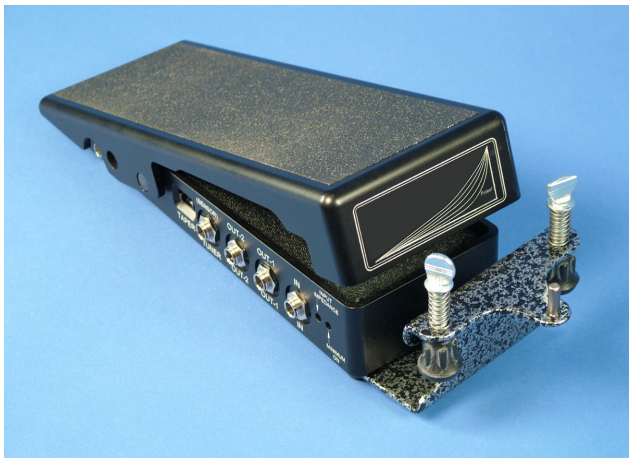


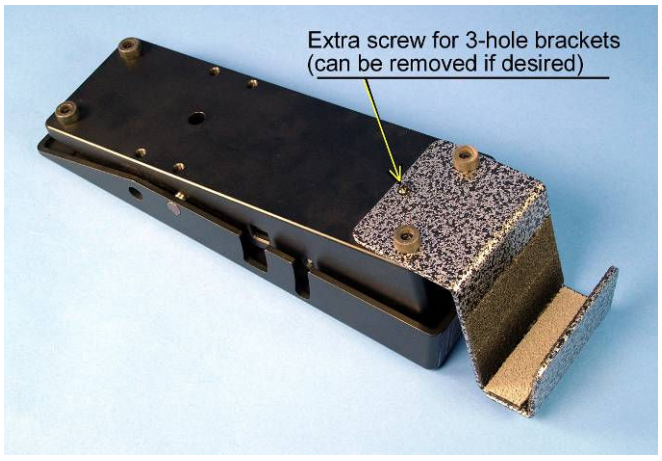
To mount a two-hole bracket, remove the two front feet and mount it using the two screws with the rubber feet still attached (under the bracket).

To attach three-hole brackets, remove both front feet AND the single screw just behind them (slightly toward the center of the pedal). Attach the bracket using all three screws.

Note: This center screw is provided solely for bracket use, it serves no other purpose and can be removed if desired.

Note: The brackets from some manufacturers are not produced with consistent hole pattern location and spacing. In some cases it may be necessary to enlarge a hole or holes, or even re-drill the odd hole in a bracket.





(Refer to the pictures showing various types of pedal bar mounting brackets, no modifications to these brackets were necessary.)

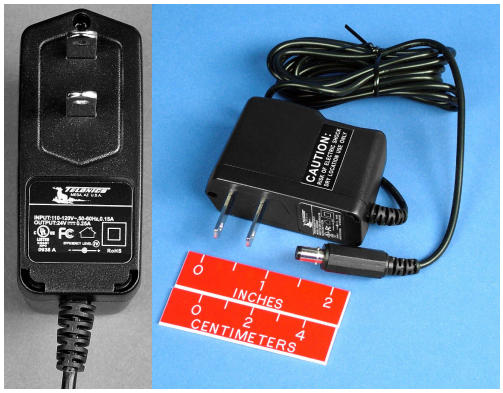
Electrical:

Power Supply: UL and CE approved transformerless switching power supply*

PS-1: 100-120 VAC, 60 Hz (US power)
2.5L x 1.1W x 1.7H in. (63L x 26.6W x 43.3H mm) (typical)
<3.5 oz (<100 g)

PS-2: 90-264 VAC, 47-63 Hz (Worldwide usage)
2.9L x 1.7W x 1.3H in. (74L x 43.5W x 34H mm)
<6 oz (<170 g)

* Note: Two (2) power supply options are available:



1. PS-1 - supplied with a locking plug which firmly attaches to the pedal's power jack (J5) and cannot be pulled out accidentally.

(The PS-1 units plug in 90 degrees to an AC "mains" power strip and occupy only one outlet slot. They are very small, lightweight {<3.5 oz., <100g} and do not emit the 50-60 Hz AC hum-producing electrical fields normally associated with the older transformer-type "wall-wart" power supplies.)

2. PS-2 International model, with interchangeable prongs which snap into place for international use. Supplied with conventional coaxial DC mini-plug end which allows the user to plug and unplug the pedal easily.

(Like the PS-1 units described above, the PS-2 International units do not exhibit the 50-60 Hz AC hum-producing electrical fields normally associated with the older transformer-type "wall-wart" power supplies.)
Still relatively lightweight, the PS-2 power supplies are slightly larger than the PS-1 power supplies.

Jacks and Controls:

NOTE: All inputs and outputs are buffered and isolated such that shorted or Intermittent Cables will not damage the pedal, interfere with other cable functions or adversely effect signal levels.

Inputs:

Monaural models are supplied with a *dual-function input jack (J1, refer to Outline Drawing on page 18) and associated circuitry which will accept a conventional ¼" **TS** plug for conventional unbalanced pickups.
*It will ALSO accept standard **TRS** plugs for BALANCED line inputs (for future very low-noise balance-wound pickups.
In **Stereo** models, input jack J1 accepts a conventional ¼" **TRS** stereo plug.

Monaural (MONO) Models:

IN-Unbalanced: Input jack (J1) accepts standard ¼" **TS**-type audio plug for all conventional unbalanced, high impedance pickups.

The input jack (J1) *ALSO* accepts ***BALANCED*** inputs as follows:

IN-Balanced: In anticipation of forthcoming advances in pickup design, Input jack (J1) also accepts standard ¼" **TRS**-type plugs for both high and low impedance balanced pickups. Its associated circuitry automatically detects the type of input (balanced or unbalanced) and requires no switching or other user intervention.

Stereo Models:

IN-Stereo, unbalanced: Input jack (J1) accepts standard ¼" TRS-type INPUT jack for two independent input signal sources using unbalanced, high impedance pickups. Wiring connections are:

Tip = Left Channel
Ring = Right Channel
Shield = Common signal ground

24VDC (power): J5 is the DC power input jack. It may ONLY be used with a factory supplied power supply. It will accept either the standard smooth-barrel DC power plug, or the optional ¼-turn locking type DC power plug. The non-locking plug makes it easy to remove the power supply for transport, while the locking tabs prevent the plug from being accidentally being pulled loose.

The FP-100 is specifically designed such that unpleasant loud pops which might damage speaker systems are NOT generated when (or if)

the power plug is suddenly pulled out while the amplifier systems are on/live.

OUTPUTS

OUT-1: in monaural models, J2 (refer to Outline Drawing on page 18) is a conventional ¼ inch **TS** jack with its audio output level buffered, and controlled by treadle movement. Audio taper selection is controlled by the taper program preset switch as well as by a user-selected "minimum OFF" setting which the user may adjust for each individual taper.

OUT-2: in monaural models, J3 (refer to Outline Drawing on page 18)) is also a conventional ¼ inch **TS** jack. This jack provides an output which is identical to that of OUT-1, and is normally used to provide a second identical, phase-coherent signal source for players who wish to feed their signal to a second preamp, combo amp or special effects system. (Note: This is Not the case when the expression option is installed – see below.)

In stereo models, J2 and J3 provide individual buffered, analog signal chain outputs for Left and Right Channels respectively.

The EXPRESSION option in Telonics mono pedals:

The EXPRESSION option is an added function and costs extra. It must be installed at the time the pedal is initially built; it cannot be added later! It is installed only in MONO (monaural) pedals, either the mono PRO or the standard mono models.

The expression option essentially adds one additional capability to the pedal: In addition to controlling the normal volume control function, this added DC-control-voltage-output can be used to control any effects unit which is designed to accept a control voltage supplied by an external expression pedal. With the EXPRESSION option installed, as you push the treadle forward, the volume at the output of the pedal is increased in the normal manner; simultaneously the DC expression control voltage from OUT-2 will cause the external effects unit to increase the intensity of its effect.

Effects units that people currently use are ones like the Fractal-Axe, but the Telonics pedal also works well with older equipment as well, such as the Lexicon MPX-1. There are still lots of them around and they can be programmed to use an effects pedal to control them. Most such EFX units can also be programmed as to how fast you want the effect to increase (similar to the way the volume is controlled in all Telonics pedals for minimum and maximum levels). As an example, with the expression option installed, a Telonics pedal could be used to control an instrument's volume, but could also be connected for EXPRESSION output to an external effects unit which is set for tremolo effect. With the pedal in the off position (no volume), the player would have no volume out and no tremolo effect. But, as the pedal's treadle is depressed, the volume will

begin to rise, with a hint of the effect being heard. Then, as the treadle is depressed more, the volume will increase and the tremolo effect will become more pronounced. Toward the full toe-down position, the volume will be nearing maximum and the tremolo will be very pronounced. The pedal will work the same with any effect or any combination of effects you might have programmed into an external effects unit which is designed to be controlled by an external 0-5 VDC control voltage.

The expression voltage supplied by the FP-100 pedal is the industry standard 0 to 5 Volts DC. Make sure your EFX devices will accept this voltage range and work properly with it. The Fractal AXE, the Lexicon MPX-1, and most of the higher-end EFX units are fine with it, but you will need to check the manuals for the particular units you are using.

When the expression option is built into these pedals, the OUT-2 jack is no longer available as an audio output jack, but rather becomes the Expression voltage output jack! As such, it does not perform any other function. In other words, if you wanted to use this pedal as a "splitter" (by connecting your guitar or other signal source to the INPUT jack and using the OUT-1 and OUT-2 to feed two different amplifiers), you sacrifice that capability when you have the Expression option. Thus, if you need a 2nd output jack more than an Expression output, don't order the Expression option. You cannot return a pedal that has the Expression option in it, since the Expression option cannot be removed once it is installed in the pedal.

In summary, adding the EXPRESSION option essentially makes your one pedal do the work of two pedals simultaneously: one volume pedal and one expression pedal. Some players (both steel guitar and 6-string guitar players), appreciate this capability. There is no other pedal which will do all these things.

EXPRESSION: In units with the factory installed Expression option, "OUT-2" is a fully-functioning expression control jack which requires a **TRS** plug. OUT-2 does not provide an audio output when the expression option is installed; it **ONLY** functions as an expression output jack.

Wiring follows industry standard protocol:

Tip = Expression Voltage (Linear) Output (0 - 5 VDC)
Ring = DC Voltage input from external EFX units
(However External Voltage is Not Used by FP-100)
Sleeve = Common DC Ground

NOTE: The DC Expression Control Voltage is at zero volts when the treadle is at Volume Minimum (normally heel-down) and at +5 VDC when the treadle is at Volume Maximum (normally toe-down).

TUNER/sensor: J4 (refer to Outline Drawing on page 18) is a dual-function ¼" jack, providing a full-time TUNER OUTPUT signal, *regardless of pedal position* (¼" **TS**-type). This allows the user to continuously monitor tuning with the pedal in any position, including the full/minimum off position. *This output is buffered and isolated. It will not allow the noise from digital tuners to get back into the system.*

This jack (J4) is *also* used for the optional **Telonics Miniature Remote Sensor** (TMRS). It accepts the ¼" **TRS**-type plug on the TMRS cable and automatically communicates with the sensor when the user chooses to use the TMRS instead of the foot pedal to control volume.
When the remote sensor is plugged into J4 *it automatically assumes full control of the pedal, replacing the control function of the moveable foot platform (treadle).*

NOTE:
In order for the pedal to recognize the sensor, it must be plugged into the (SENSOR)/Tuner jack on the pedal (next to the taper selection switch) - without POWER APPLIED TO THE PEDAL.
The pedal must then be powered up AFTER the sensor cable has been plugged in.

(If you leave the sensor plugged into the pedal after use and the pedal has been powered down, you may simply apply power to the pedal in the normal manner and the sensor will function properly).

CONTROLS and INDICATORS:

INPUT IMPEDANCE: A miniature screwdriver 240 degree rotation adjustment is provided on the right side of the pedal (near the front, immediately forward of the INput jack J1) which controls the input impedance of the low-noise, high headroom input amplifier. **Please utilize the miniature screwdriver adjustment tool provided and *take care to avoid excessive force*.** This control is set to maximum (fully clockwise) as supplied from the factory. In the past, players have unknowingly (and in a few cases knowingly), employed impedance controls as a "poor man's tone control", lowering the input impedance to "load" the pickup and reduce its high frequency response. If desired, that can still be done with these pedals, however the practice "swamps" or reduces the output of the pickup, reduces its resonant characteristics, diminishes its dynamic characteristics and reduces its frequency response. (Some players are accustomed to the resultant "muted" or "nasal" sound quality when their pick-ups are impedance-loaded, and they intentionally use this adjustment to subtly color their sound.)

Musicians tend to get together and compare hardware by substitution and often (if not generally) come to false or unrepeatable and/or confusing conclusions. The equipment being compared (various instruments with different pickups, different amplifiers with varying input impedances, different pedals being using with preamplifiers having impedance controls, etc), will produce differing/inconclusive results with various models and types of pickups, as they will exhibit different characteristics when loaded with the same impedance. This is why a given device may yield wonderful results with one persons' instrument, but has little effect, no effect, or even an adverse effect when used with another instrument.

Its not rocket science, it's just that there may be a large number of complex variables. In such cases, very simple tests can be very misleading.

If you are using a studio-quality preamplifier with proper tonal shelving characteristics such as the Telonics preamps, it is suggested that the user leave this control at the factory setting (maximum clock-wise, very high impedance/little or no pickup loading) and allow the preamplifier to provide control of tonal characteristics without inhibiting the performance of their pickup.

If conventional amplifiers are used, we suggest that this control be used very sparingly, and only after all other tonal possibilities on the amplifier are exhausted. Nonetheless, this control is provided for those players who have played that way for many years and feel that they cannot achieve their individual sound any other way.
Note that this control is both small and delicate. Please utilize the miniature screwdriver adjustment tool provided and *take care to avoid excessive force*. The entire range of adjustment occurs over approximately a 240 degree range. If it were a clock-face, maximum pickup loading would occur at about 8:00 o'clock (fully CCW) and minimum loading at 4:00 o'clock (maximum CW). We suggest that you check and make sure that it is fully clockwise (CW) when not being used. You can watch the pocket clip on the adjustment tool provided with the pedal while turning to get an idea of where it is set.

MINIMUM ON: An adjustment access hole is provided immediately forward of the Input Impedance access hole on the right front corner of the pedal. This adjustment ***controls the minimum level of audio signal which is allowed to pass through the pedal when the control platform is fully back***, or in the MINIMUM sound level position (of course this will reverse if you are using the **Reverse Taper option**). Units are factory adjusted such that the output level appears OFF to the ear of the average player when the pedal is fully back (the most popular adjustment setting for the majority of musicians). The adjustment range of this control is determined by software. (It is normally set correctly at the factory for most users, however it can be easily adjusted by the user using the miniature black screwdriver tool supplied with the pedal.) *Please use the small screwdriver tool supplied, this is a delicate control and can be damaged by using large screwdrivers. It turns easily and only rotates a total of about 240 degrees, DO NOT force it beyond its stops at each end of its rotation.* The adjustment procedure is outlined in the following paragraphs.

HOW TO CHANGE the Minimum ON setting for a given taper:

If you first understand a bit about how the system operates when you change the *minimum on* adjustment, the operation will go much more smoothly.
When the pedal is first powered up, the "brain" inside the pedal "sees" the last setting that someone made with this control. When you select a given taper with the selector switch, it checks its memory for the last setting used with that taper, and implements it. Then it begins to "look at", or check the *minimum on* control to see if you are moving it (It checks for any movement about 60 times each second). If the control is not moved, the brain is "happy" and nothing happens.

> ***Now you want to change the setting.***
> **The brain has been given a rule, that it is to record your new setting 10 seconds after you stop moving the control.**

The *instant* you move the adjustment, the brain starts a 10 second countdown – which is reset to10 *each time you move the control*. When you finally stop moving the control for a 10 second period, the brain writes (what it now "thinks" is) your "final" setting to a memory location associated with the taper you are using. It will then recall this setting each time you select this same taper.

Now that you know the rules for how it works, ***you may not be so surprised when you move the control for the first time and the volume suddenly changes*** initially.
Let's think about why this might happen; initially the volume is set according to the position of your pedal, as defined by the taper you have chosen, and modified further by the last memorized setting of the *minimum on* control which its "brain" pulled from the current taper's memory location. Now you move the control a bit one way or the other. The system immediately adjusts to the new setting!
If you moved the control up, the sound level jumps to the new increased level. Conversely, if you happened to move it down, the sound level abruptly drops to the new level.
Of course after that point, you can select any desired level with great precision. Then if you don't change the control for 10 seconds, the new setting is written to memory and that setting will now be the **new *minimum on*** setting until you decide to change it.

Note that this control is both small and delicate. Please utilize the adjustment tool provided and take care to avoid excessive force. The entire range of adjustment occurs over approximately a 240 degree range. If it were a clock-face, the adjustment range would occur from about 8:00 o'clock (fully CCW) to about 4:00 o'clock (maximum CW). You can listen to the audio volume while turning it with the pedal FULLY BACK, (MINIMUM SOUND position) to determine where it is set.

The FP-100 will "remember" this setting and store it in FLASH memory along with the particular taper you have it set to - 10 seconds after you stop moving the control. That way, when you recall any taper using the TAPER switch (described below), your desired minimum-off setting will be preserved for that taper.

The FP-100 will Also write the setting to memory Immediately if you change the Taper Switch before the 10 second countdown is reached.

TAPER: A means to select the desired audio volume taper is provided in the form of the **taper program preset switch** which selects the desired taper by means of two small buttons on either side of the display window. One button advances the number, the other reduces the number.

The factory-supplied volume tapers are as follows:

1 Hilton* LED light pedal ("new type" with small detachable power supply)

2 Goodrich* LED light pedal (green LED model)

3 Goodrich* pot pedal (using Clarostat type EJA1N116P504A)

4 Emmons* factory pot pedal (using classic Allen-Bradley pot, Type J, JAIN200P504AA)

5 Hilton* LED light pedal ("old type" with large permanently attached Motorola power supply)

6 Telonics Special Sustain Taper

7 is like 4, but has added gain at the end of treadle throw.

8 is like 5, but has added gain at the end of treadle throw.

9 Vacant – other taper may be added in this position.

0 is reserved as a programming position and will not respond to pedal movement.

If a given switch position is unused (currently 9), the output will be held to a fixed low volume and will not respond to pedal action.

* Note: Hilton, Emmons and Goodrich are fine companies who produce a good product and stand behind their products in a commendable manner. Their names are included solely for comparison of an electronic characteristic exhibited by one or more of their pedal models; in this case, that characteristic is measured audio volume taper.

Blue Pedal board Light:

The blue light (LED) on the left side of the pedal serves to illuminate the pedal board, but it also serves as a visible error status reporting interface between the user and the microprocessors in the pedal. If your pedal includes error reporting and status capability F2 firmware set version 2.0 or later, it will have a label on the bottom surface which lists the most

important functions. This label, along with an explanation of these functions is shown below:

NOTE: The user may choose to have the <u>blue LED either ON or OFF</u> (other than when it reports a problem by blinking).
The desired condition may be set using the following procedure:

1. With the power plug removed, set the pedal on a flat surface and advance or retard the TAPER switch to position "0" (zero).

2. If you wish the LED to be **normally ON**, tilt the top of the pedal fully forward (maximum ON) and insert the power plug. The blue LED will come ON, and it will normally stay ON from that point forward.

If you wish the LED to be **normally OFF**, unplug the power cord, tilt the top of the pedal fully back (minimum ON) and insert the power plug. The blue LED will not come on, and it will normally stay OFF from that point forward (unless an error is encountered).

You may then advance or retard the TAPER switch to the taper you prefer and use the pedal normally.

Telonics FP-100 LED Error Status Legend

Pulses	Description	
2	Taper 0 or a vacant taper is selected.	
3	FP-100 is upside-down.	
4	Low power supply voltage detected.	
5	Tilt limit exceeded (base is off-level by more than 40°).	
6	Sensor output is out of range.	
7	Taper selection switch error.	label 9019a

Normally, the blue LED indicator is either always ON, or always OFF as described in the previous paragraph. However, in later model pedals, it also serves to notify the user of various conditions.

Error or Fault Reporting: If the internal self-test routines encounter an internal circuitry fault, reporting bad power supply condition or other out of range conditions, the LED will blink rapidly as listed on the chart attached to the bottom surface of the pedal. The various conditions are indicated by the number of times the blue LED flashes.

Groups of two (2) pulses indicate that the **taper program preset switch** on the side of the pedal has been left in an invalid state. These states include Taper 0 (which is used for programming functions and for turning the LED fully ON or fully OFF), or any switch position which does not currently have a valid taper program installed. For example, at the time of this writing, pedals are being shipped from the factory with taper programs installed in switch positions 1 through 8. If the switch is inadvertently left in position 9, the LED will begin to flash two times, pause, then flash two times again, and so on, until the invalid condition is rectified.

Groups of three (3) pulses indicate that the angular reporting system in the pedal "thinks" the pedal is physically upside down. If the pedal is actually NOT upside down, this could indicate that the angular sensing system is seeing a fault.

Groups of four (4) pulses indicate that a low power supply output voltage has been detected. In such case the pedal may not operate properly. This could indicate that the AC (mains) supply is abnormally low or some other electrical problem is reducing the internal voltage seen by the electronics system in the pedal.

Groups of five (5) pulses indicate that the pedal's physical position is out-of-range as determined by the internal angle sensing system. The pedal can be used at least 30 degrees off-axis. This is common with some mounting systems such as seen in older Emmons Push-Pull steel guitars. However if the allowable range is exceeded, this error will be indicated. If this error code were to be indicated while the pedal is perfectly flat on the floor, this would mean a possible problem exists in the angular sensing system.

Groups of six (6) pulses indicate the internal sensing system is providing out-of-range readings. This would likely indicate a problem in the sensing system which would require factory service.

Groups of seven (7) pulses indicate that the system is receiving invalid reading from the taper selection switch. The switch could be possibly be damaged due to water or wear. It should be moved to other valid taper positions in order to determine if the problem may be corrected. The factory should then be consulted.

If your pedal does not have error detection and indication code firmware factory installed, it will still have basic error detection capability, it will simply be internalized with the exception of pedal attitude indication as follows:

Pedal attitude invalid : The pedal is designed to be used on a fairly level floor surface (unless inclined upward and/or cocked slightly sideways when attached to pedal boards or when using an Emmons pedal-board mount). Its attitude control system allows for such usage, but if the pedal is placed in an attitude which exceeds those normal limits, two things happen; first the volume is reduced to a fixed, low volume and secondly, the blue LED will blink rapidly. The unit will revert to normal operation as soon as it is returned to a valid orientation and attitude.

Error code firmware: If your pedal does not currently have the error code reporting firmware, you can utilize the Telonics FP-100 Tool Box Software to determine if it can be installed. Connect the FP-100 to your computer using the Mini-USB Programmable Cable. When you access the tool box, it will automatically check the hardware revision in your pedal. If it utilizes the F2 firmware set, it is capable of operating the error/fault reporting code. The toolbox will automatically check to see if error reporting code is currently installed; if not, it will ask if you wish to have the F2 firmware added. Select YES and it will be automatically downloaded onto your computer hard drive. Next, follow the prompts to update the firmware in the FP-100. The

toolbox will now show that a newer version is available; select NEXT to continue. To program the new firmware into the FP-100, select the newly available firmware file and select PROGRAM. Once the update is complete, select FINISH to return to the main FP-100 Toolbox window.

Signal Path:

Some of the most important aspects of your sound are directly influenced by the signal path from the pickup in your instrument to the initial preamplifier in your system.

Be very careful what you insert in your signal path. Unless you have a high grade preamplifier (such as the Telonics preamp series), a high-quality cable (low capacitance), as short as possible, should be connected from the output of your instrument to the input jack (J1) of this pedal. The output of the pedal (J2 or/and J3) should likewise be connected to your amplifier using a short length of high quality, low capacitance cable. You then have a clean, low-noise, purely analog signal path with great signal handling characteristics.

If you insert an effects pedal or other device between the pickup of your instrument and the pedal, you have just prevented yourself from taking advantage of many of the important capabilities of this pedal.

Such devices will not offer the necessary head-room (instantaneous high signal level handling characteristics), nor will they offer low-noise preamplifiers and provide the desired wide-band, airy frequency response. Additionally, and even worse, many such devices are digital in design. (While very good digital front ends 'are' available, they cost thousands of dollars and are only found in the highest grade studio recording equipment.) This means that the lower cost effects units must take the signal from your pickup and run it through a lower performance A/D, or analog-to-digital converter. They then process and/or "model" the digital signal to achieve some desired characteristic (delay, reverb, rotary, chorus, etc). After effect(s) processing they must convert the processed (and degraded) digital signal back to analog form in order to feed it to your amplifier using a D/A, or Digital-to-Analog converter. The A/D and D/A converters do not have the premium signal handling capabilities of the high-end preamplifier designed into this pedal. Although set for unity throughput gain, this pedal sets the stage for everything in your signal chain.

So where "should" you put effect units in your amplifier set-up?

The place for effect hardware devices is in the effects (EFX) loop(s) of your amplifier, NOT in the direct signal path, and most certainly NOT between your pickup and the pedal - not even between the pedal and your amplifier.

Additionally, good, high quality effects units are designed to work in PARALLEL with the analog signal path, this **parallel configuration is also called "FULL WET".** Some of the better effects units (even effects pedals), are now being designed with a "SERIES/PARALLEL" switch inside the unit in order to service the old in-line guitar stomp-box/pedal board applications, while allowing them to work properly in high-end applications such as

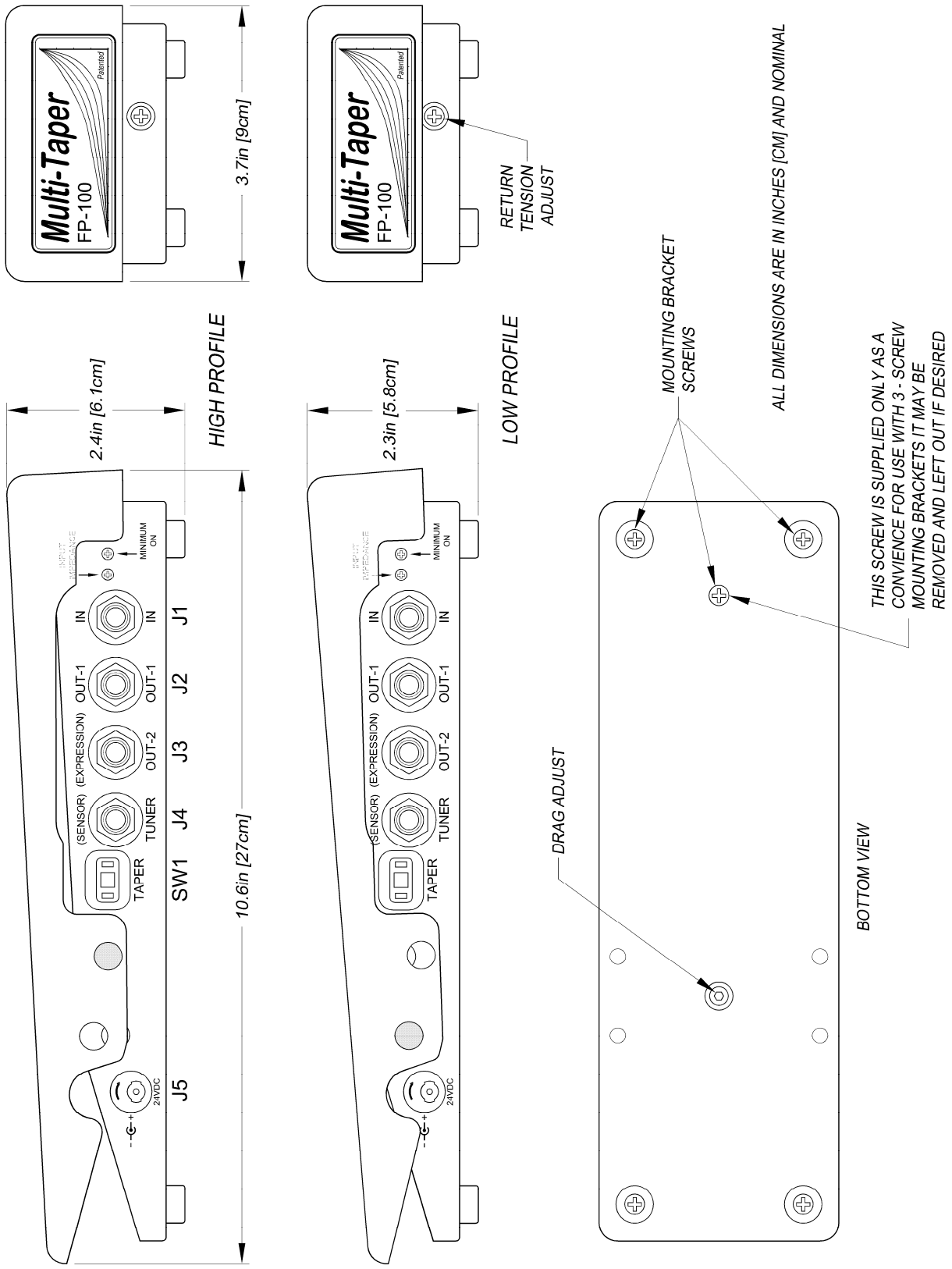
recording-grade preamplifiers and studio boards. The reverb unit called "Mr. Springgy" (which emulates the old spring reverb units) is a typical example. The better effects rack units (such as the Lexicon MX-200), are designed with two (2) sets (or "banks") of effects, both a serial bank and a parallel bank. Setting such EFX units to parallel mode and using them in conjunction with a high quality preamplifier offering parallel EFX loops provides the highest level of audio performance.

Signal Path Discussion Summary:

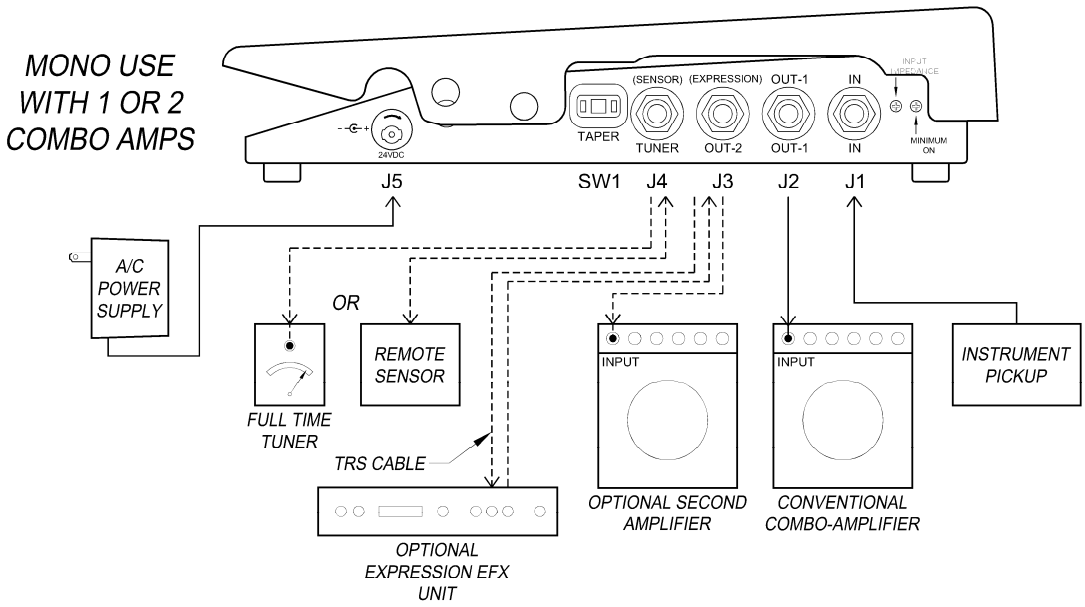
In summary, if you have a conventional amplifier, connect your pedal directly between your instrument and the input of your amplifier. Do not insert effects units, impedance matching boxes or any type of preamplifier device between the instrument and the pedal.

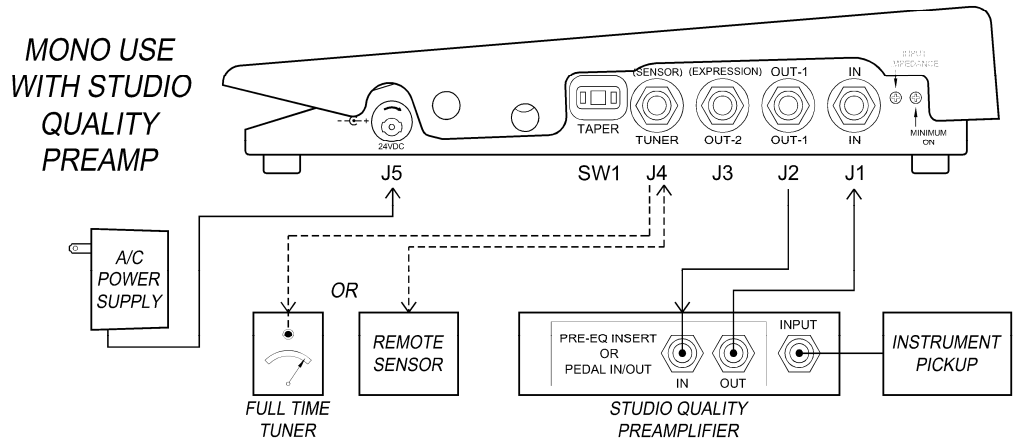
If you have a high (studio) quality preamplifier which provides input circuitry equal to that of this pedal, connect your instrument directly to the input of the preamplifier, then insert the pedal (using two cables, one IN and one OUT) in the INSERT/Pre-EQ EFX loop of your preamplifier (this point inserts the pedal in the signal chain immediately after the first stage of amplification and prior to the EQ/tone shaping circuitry. The Telonics preamplifier series provides a pair of IN and OUT jacks specifically for this purpose as well as providing a separate EFX loop (mono or stereo) for parallel-mode effects units).

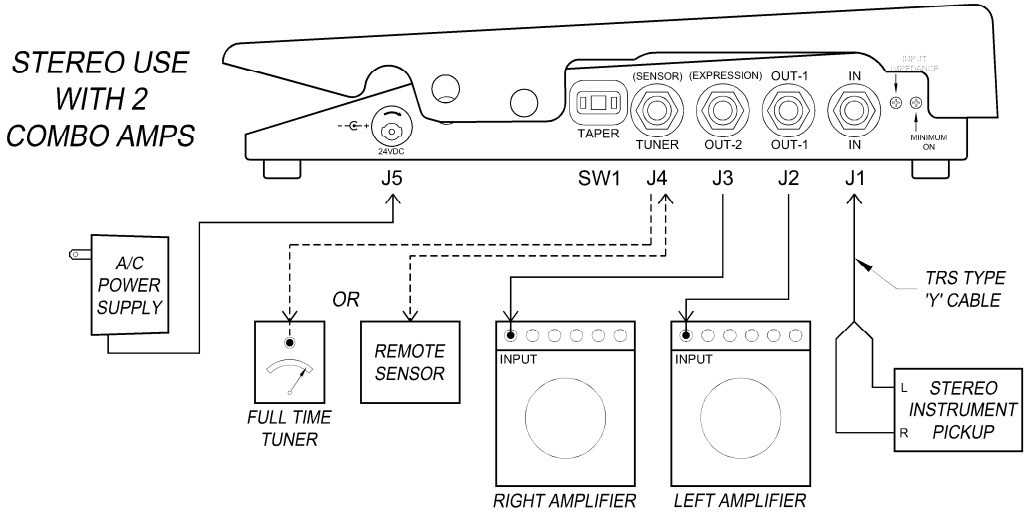
Outline Drawings



Quick Connection Diagram







Model # Selection