

***MESA/BOOGIE***  
***Formula™Pre***  
***Owner's Manual***

*The Spirit of Art in Technology*



*1317 Ross Street Petaluma, CA 94954*  
*USA*

## Hello from the Tone Farm...

Congratulations on your choice of the Formula Pre-Amp and welcome to the Mesa/Boogie family! We salute your obviously discerning taste in tone and feel sure that this instrument will exceed your expectations and provide you with years of inspiration and service.

The latest in a long line of Mesa all-tube multi-channel pre-amps, the Formula shares common roots with all these earlier rack classics and then goes beyond to capture the best qualities of the Heartbreaker...our roots oriented tribute to the original Mark I. The first amplifier ever to offer guitarists a high gain lead channel that could produce singing sustain at any volume. Thus the little Mark I Boogie earned its place in history as the crucial link between vintage and modern guitar amplification.

# ***Formula™Pre***

## TABLE OF CONTENTS

Precautions _____	0
Overview _____	1
Important Note About Power _____	2
Hook-Up _____	3

### **FRONT PANEL:**

Instrument Input _____	4
Footswitch DIN Jack _____	4
Record Voicing _____	4

### **CONTROLS: (Controls)**

Gain _____	4 & 5
Treble _____	5
Mid _____	6
Bass _____	6
Master _____	6
5 Band Graphic EQ _____	7
Output _____	7
Channel Select _____	8
Power _____	8

### **REAR PANEL:**

A.C. Power Cord Receptacle _____	9
Fuse _____	9
Ground Lift _____	9
Effects Loop & Mix Control _____	10 & 11
External Switch Jacks _____	11
Record Outputs _____	11
Signal Levels _____	11 & 12
Main Outputs _____	12
Tube Bay _____	12 & 13
Tube Task Chart _____	14
Factory Sample Settings _____	15 & 16
Personal Settings Page _____	17 & 18
Parts Sheet _____	19

Your Mesa/Boogie Amplifier is a professional instrument. Please treat it with respect and operate it properly.

**USE COMMON SENSE AND ALWAYS OBSERVE THESE PRECAUTIONS:**

Do not expose amplifier to moisture, rain or water, direct sunlight or extremely high temperatures.

Always insure that amplifier is properly grounded.

Always unplug A.C. power cord before changing fuse or any tubes

When replacing fuse, use only same type and rating

Avoid direct contact with heated tubes.

Insure adequate air circulation around amplifier.

Keep amplifier away from children.

Be sure to connect to an A.C. power supply that meets the power supply specifications listed on the rear panel of the unit.

If there is any danger of lighting occurring nearby, remove the power plug from the wall socket in advance.

To avoid damaging your speakers and other playback equipment, turn off the power of all related equipment before making the connections.

Do not use excessive force in handling buttons, switches and controls.

Remove the power plug from the A.C. mains socket if the unit is to be stored for an extended period of time.

Do not use solvents such as benzene or paint thinner to clean the unit. Wipe off exterior with soft cloth.

Be sure to have the warranty card for this product filled out by the store at which it was purchased and return to Mesa Engineering promptly.

**YOUR AMPLIFIER IS LOUD! EXPOSURE TO HIGH SOUND VOLUMES MAY CAUSE PERMANENT HEARING DAMAGE!**

No user serviceable parts inside. Refer service to qualified personnel.

EXPORT MODELS: Always insure that unit is wired for proper voltage. Make certain grounding conforms with local standards.

**READ AND FOLLOW INSTRUCTIONS OF PROPER USAGE.**

# ***Formula™Pre***

## Operating Instructions

**OVERVIEW:** The Formulas' one space chassis is power packed with features and as you can see, available real estate is used carefully in an effort to retain a clean, simple layout. Three incredible channels reward you with some of the most soulful sounds ever to come out of Mesa/Boogie, let alone in a rack format!

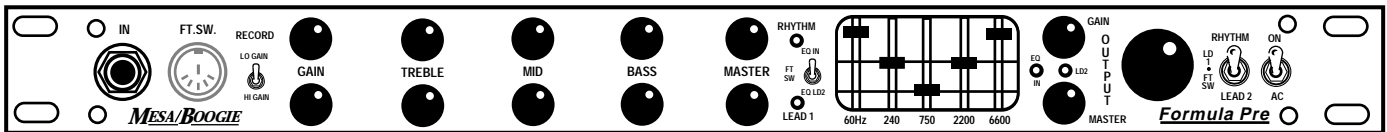
The top Channel 1 (Green/Rhythm) is a lower gain circuit that is undeniably black face in lineage and is capable of pristine clean sounds, full of warmth and character in its lower region of settings. As gain is increased this channel finesses the precarious crossing between clean and pushed with a realm of languid gain that is subservient to expression...served up by subtle changes in pick attack. For more aggressive rhythm work there is a Pull Boost function fitted to the Gain control that increases saturation and this range of sounds allow Channel 1 to grind away for crunch rhythm, or double as a valuable solo channel.

The bottom channel is actually two channels in one, as the rotary controls are shared between Lead 1 (Orange/Vintage) and Lead 2 (Red/Modern). Each of these two channels has its own independant Gain/Master harness - Lead 1 in the same bottom row of controls - and Lead 2s' Gain and Master in a stacked format over to the right of the 5 Band Graphic EQ. Internal changes occur when switching between them which produces a wonderful difference in personality and readjustment of the tone controls is not necessary to achieve two amazing and different lead sounds.

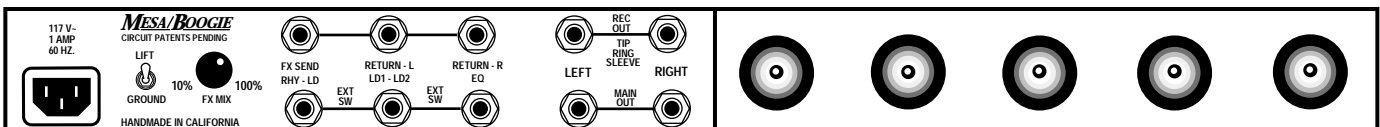
Lead 1 is the more creamy of the two sounds and could best be described as Brown in nature. Set low it purrs, quite capable of furry chording and as the gain is increased a violin-inspired liquid gain voice emerges that soars with emotion. Lead 2 is more urgent and focused by nature and roams defiantly from a stinging low-gain bluesy region on up to a blistering high-gain frontier. Although Lead 2 undergoes internal re-voicing that makes the shared rotary controls work well in both channels with the same settings, we know some players will need extreme differences in these two sounds. Therefore, the 5 Band Graphic EQ may be assigned to Lead 2 automatically every time it is called up via the front panel mini toggle or footswitched at will via the Foot Controller EQ switch.

What really sets the Formula apart from other Mesa Pre-Amps before it, is not the amazing tone and versatility for live applications, but rather that it was - from the inception - a recording pre-amp. A new type of direct RECORD circuit that responds in frequency to dynamic fluctuations in signal strength the same way a power amp and speakers do, proved to be one of the Formula's strongest

### FRONT VIEW: *Formula Pre*



### REAR VIEW: *Formula Pre*



attributes. Directing the emphasis early on in the R & D process toward the recording environment, this new reactive circuit captures the sound - but even more importantly the feel - of a great head and cab set-up.

To assist in seamless interfacing of outboard signal processing for either live or recording applications we have included a Stereo Parallel Effects Loop with a Mix control. The Send is mono and the Returns appear as Left and Right 1/4" phone jacks. The loop handles both line and instrument level signals depending on the settings of the channel Masters, as they control the Sends' level strength, with line level being the preferred choice. Both the Main and Recording Outputs are fed by the effects loop so that when recording direct with your live effects set-up you will retain the processing you are familiar with in the signal sent to the console.

**IMPORTANT NOTE:** Before we go much further, we would like to take a minute to talk about power. Your new Formula Pre-Amp was designed with the utmost consideration given to ensuring that, while it delivers the versatility of three distinct channels, it retains all the warmth and expressiveness of its tube heritage. Rack separates have been criticized in the past as not having the same vibe or soul as self-contained guitar amplifiers. While we view this as a gross generalization, we do subscribe to the idea that any system is only as strong as its weakest link. Many players accidentally get into rack guitar with products that concentrate on effects, processing and programmability, leaving the actual sound of the amplified guitar itself as an afterthought. Usually these stories end with the sale of said gear at a considerable loss and a lingering bad taste for rack gear.

Most likely this is how the separate component world got its negative reputation among some players. Those of us who have used tube rack gear for years know that just as much tone and far more versatility is available with these separate component systems...as long as you follow the golden rule of rack mount guitar. Thou shalt use tube power and tube power only! This is the secret. A great pre-amp is essential, but it is only half of the equation. The expressive nature of an all-tube power section is crucial to achieving the amazing tone and feel, and when comparing separates to self-contained amplifiers this is often overlooked.

For this reason, we strongly recommend that you use your new Formula with one of our four Mesa/Boogie all-tube stereo rack mount power amplifiers. These handbuilt rack classics have been the power behind most touring and recording artists for the last decade - and in fact it was the ancestors of these amps, that first introduced guitarists to rack mount power back in 1982 with the M-180 and M-190 mono blocks. These beasts were the power behind L.A.'s first big session rigs in the early 80's.

Since then, Mesa has led the rack guitar revolution by going stereo, incorporating switchable voicing options and steadily shrinking the packages from four to three to two and finally now, down to an unbelievable one space for the spicy little Stereo 20/20. All these power amplifiers have been designed to give the rack player every measure of tone and nuance found in a self-contained amplifier and more. So save yourself the time and aggravation and try one of these companion instruments first and you'll never miss that combo again.

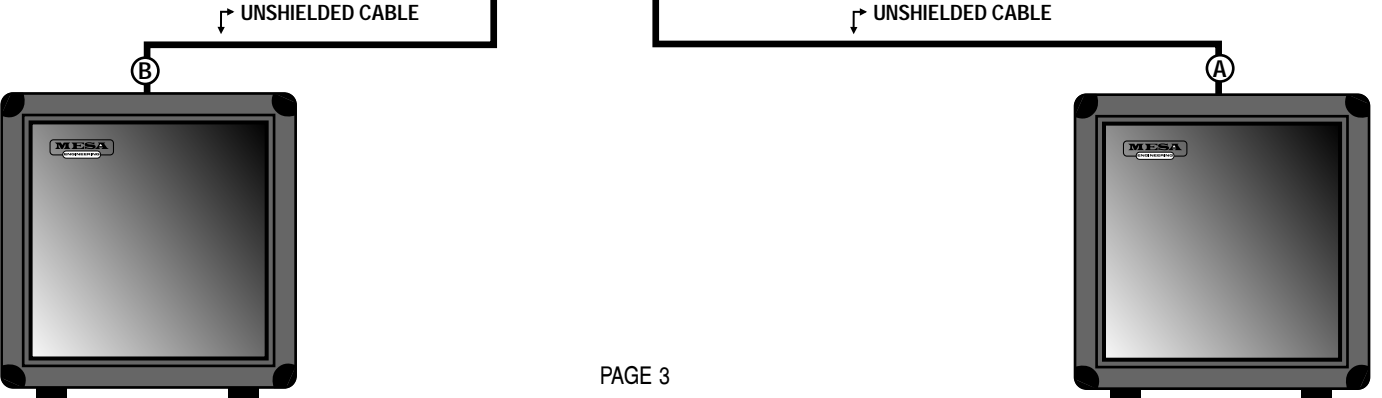
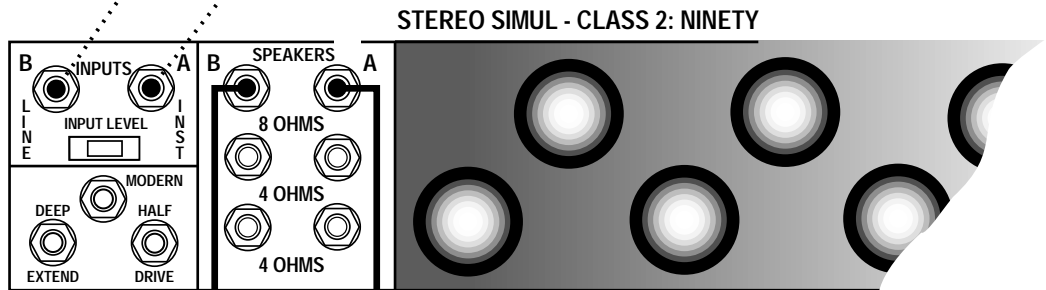
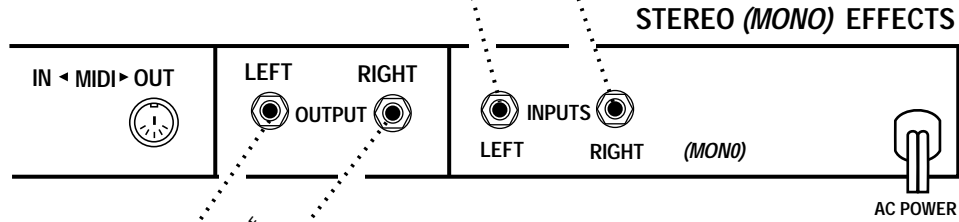
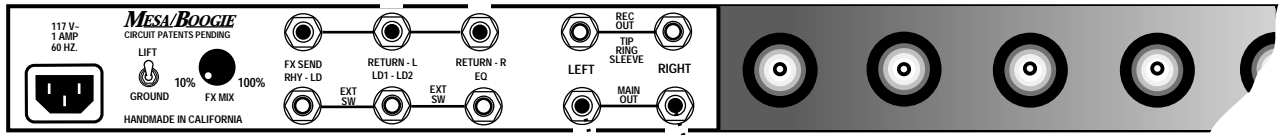
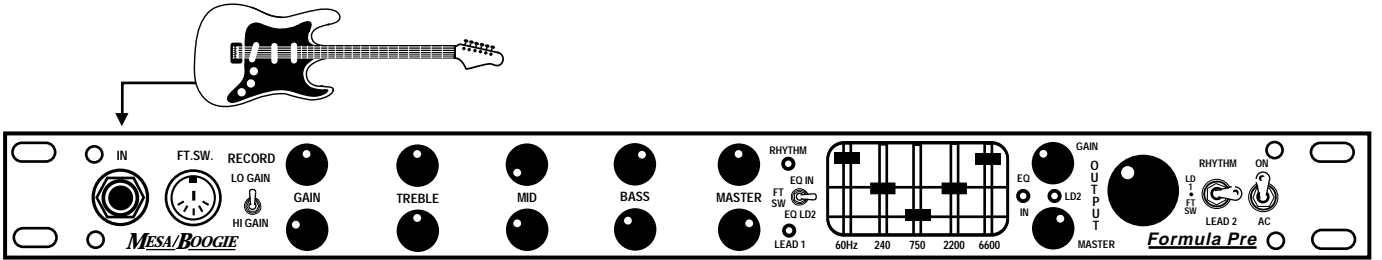
The choices are (In order of popularity);

STEREO SIMUL-CLASS 2:NINETY	- 2 Space / 90 Watts per channel / 8 x 6L6
FIFTY/FIFTY STEREO	- 2 Space / 50 Watts per channel / 4 x 6L6
20/20 STEREO	- 1 Space / 20 Watts per channel / 4 x EL84
COLISEUM 300 STEREO	- 4 Space / 150 Watts per channel / 12 x 6L6

All these power amps are a perfect match for the Formula and each one of them was designed with a style of player and venue combination in mind. Obviously the two more extreme wattage arenas found in the lower power 20/20 and the higher power Coliseum 300 have a slightly narrower window of appeal. The 20/20 finds its home in the studio, small clubs and as a slave to bigger set-ups while the Coliseum is the big guns for the larger venues or heavier styles. The two middleweight amps, Simul-2/90 and Stereo 50/50 are the most popular, versatile and economical pound-for-watt. Therefore we will use these as the reference when we speak of tone and settings throughout this manual. While we used all of the above amplifiers during the R & D process, our favorite amp has always been the Simul-Class 2:Ninety for its silky warmth for solo sounds and sparkling scoop for clean playing.

Now that we have that bit of important info out of the way, let's hook up the Formula to the power amp and run through some possible sounds in the three channels.

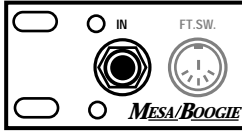
**HOOK-UP DIAGRAM:** Run through the three channels with these settings to get familiar with the character of each channel. For this exercise we have not auto-inserted the 5 Band Graphic EQ to LEAD 2 so that you may hear it unaltered first. Use the EQ switch on the Foot Controller to add and delete the EQ on any of the three channels for now.



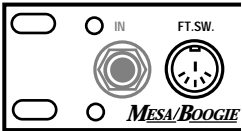
Now that you have a better understanding of the layout and features of your new Formula, we can move on to the individual controls and take a look at their role in obtaining the sounds you want to dial.

## FRONT PANEL:

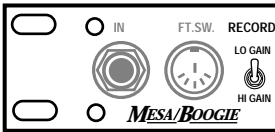
**INPUT:** This 1/4" jack is the instrument Input for the Formula. The input impedance is 1 meg ohm which should be optimum for most all applications where your instrument is feeding only one source. When connecting your instrument to multiple sources you may need to buffer the signal. If you plan to use the Formula in this type of set-up at all times, call us and we can explain how to change the input impedance to better fit your particular application.



**FOOTSWITCH:** This is the 5-pin DIN input for the Formula's 4 button Footcontroller. The Front panel Channel Select toggle (next to Power - left side of chassis) must be in the center position for the Footcontroller to operate. The Footcontrollers' power-up default will be Lead 1 (Orange) before any choices are made. If you ever misplace the cable, most 5-pin DIN or standard midi cables available at most music stores will work fine.



**RECORD VOICING:** Early on in the development process we realized that there was no way to treat the clean direct sounds and the high gain direct sounds the same. In the end we arrived at the conclusion that for each sound to be the real thing, two complete circuits were needed. This mini toggle lets you choose between a circuit voiced specifically for low gain clean sounds and one tailored for high gain lead work.



LO GAIN (up) should be used for clean rhythm playing in the top Rhythm channel. It is voiced so that all the sparkling high end harmonics are retained and a fast dynamic attack is preserved - as well as allowing the sub-lows to pass sounding breathy and warm. You may also prefer the LO GAIN setting

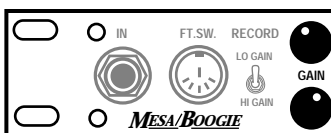
for certain lower gain sounds in the two lead channels to keep the top end a little more up front and attack oriented...this setting works real well for blues type styles.

HI GAIN (down position) is optimized for gain sounds. The right high frequencies are rolled back substantially - to avoid the dreaded buzzy quality that can so often dominate direct guitar sounds - while at the same time the lower attack region is relatively untouched. (Extreme settings at the front end GAIN control will produce natural tube saturation which will affect the attack characteristics substantially.) HI GAIN may also be used to shape the sound when you are using the PULL SHIFT function of the Rhythm (top) channels' GAIN control for either crunch or gainier single note sounds. In this application the EQ and feel will be much better suited than that of the LO GAIN position. The HI GAIN circuit is transformer coupled much like a power amp and therefore reacts similarly in terms of response to the dynamic changes in your playing.

The two circuits provide you with the ability to zero-in on just the right sound and feel for each style of playing. You may feel free to experiment as to the best way to use them for your recording techniques and music. Though they are labeled specifically, many great sounds may be found by cross applying them. Thus the Formula is a dedicated recording pre-amp.

## CONTROLS:

**GAIN:** This is probably the most powerful control on your Formula. There are three of these riding on the front panel: two heading up the two stacked rows of rotary controls and another just to the right of the Graphic EQ. In all three channels, the setting of the GAIN control determines the sensitivity





## CONTROLS: (Continued)

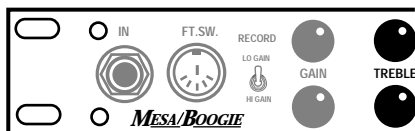
**GAIN: (Continued)** of the front ends' first tube stage and therefore, the overall character of the given channels' sound style. Set low, it allows more of the natural sound of the instrument to come through. Set higher, an increasing amount of natural tube saturation occurs. Run all the way up, it produces overdrive saturation in all channels...with the two LEAD channels being obviously capable of significantly more of this saturation. The amount of saturation is accompanied by tonal coloration as this control is turned upward and the result is a perfect enhancement to the gain. Top end harmonics become more and more recessive as the GAIN is increased and a warmer, more singing nature takes over. This is perfect for liquid high gain solo work in LEAD 1 and the added focus also lends authority and urgency to LEAD 2 for more aggressive rock or metal styles. The lower regions of the GAIN control are perfectly mated to clean sounds in Channel 1 and pushed or bluesy styles in the two LEAD channels.

As the GAIN and inherent saturation are reduced, the high harmonic content returns to its original balance. This is where the Formula shines for bubbly, sparkling clean chording in Channel 1 or less overdriven single note work in LEAD 1 & 2. You will find all three channels' GAIN controls use pots that support a touch sensitive relationship between input signal strength - and gain saturation. These pots were custom built for us with tapers capable of delivering the maximum usable range of musical gain in all ranges. This elusive trait is crucial to a great amps' expressive nature and you will come to love the Formulas' responsiveness in this dynamic dance. We suggest spending some time really exploring the subtleties of this most powerful control. The Rhythm (top) channel of your Formula has a Gain control pot that is fitted with a "Pull Boost". This enables you to restructure the response of the channel for either higher gain rhythm work or single note solo sounds that are in between the regular Rhythm and Lead channels gain-wise.

NOTE: This added gain is achieved in part by allowing the full signal strength to pass the tone control network, rendering them virtually ineffective. Because of additional shaping that takes place elsewhere in the circuit, this is not a problem and the result is a smooth warm medium gain response. If you need more critical shaping power in the "Boost" mode than that of the bypassed tone control string, select the 5 Band Graphic Equalizer and shape your sound there.

Learn the regions of GAIN and the tonal colors they enhance. Slight adjustments make huge differences in the sound. In all of the channels you will find sweet spots on the GAIN control that work with your technique, your guitar and your pick-ups to compliment, embellish and finally define a sound that is all you.

**TREBLE:** As with most guitar amplifiers, the TREBLE control is the strongest of the three rotary tone controls. Because signal enters the tone control string here, its setting determines the strength of the signal sent to the BASS and MID, greatly affecting their role in the tonal blend. Set high, the TREBLE is the dominant force and the effectiveness of the BASS and MID are substantially reduced.



Set low, the opposite occurs and the BASS and MID become dominant, producing a warmer, darker personality. This interaction holds true for all the channels. For this reason we strongly suggest using the TREBLE control with care as it can produce some unwanted qualities in the sound when used without moderation. This especially holds true for clean sounds in Channel 1, where the most beautiful and balanced sounds are found with the TREBLE set somewhere in the middle ranges. This way the BASS control can produce enough lows for a breathier quality and the TREBLE is more sparkling instead of sticking out and becoming harsh.

There are occasions where you might deviate from this scheme and set the TREBLE control in the higher ranges. Because this control is the first in the signal path and is responsible for the amount of GAIN that is fed to the other tone controls, it can be used to further saturate the signal. For extremely high GAIN solo sounds in the two LEAD channels, you may want to experiment with setting the TREBLE pretty high - not maxed - but higher to achieve a more blistering quality for single note work.

In this scenario it is usually helpful to reduce the PRESENCE control setting on the power amp to avoid a buzzy or shrill sound. The top slider of the EQ also helps if the PRESENCE on the power amp is not quite the right frequency, or you are using the DIRECT Output straight into a mixing console and there is no power amp. This added gain can also be used to push the envelope in Channel 1 for overdrive sounds, but you will have to again use care, as it is easy to go over the edge fast.

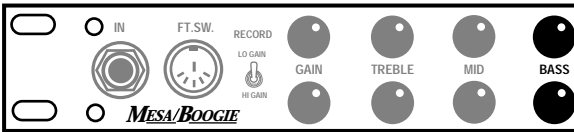
## CONTROLS: (Continued)

**MIDDLE:** This rotary control determines the blend of midrange frequencies in the mix. It is not as powerful as the TREBLE control and therefore, its setting is not as crucial to the blend of most sound styles. Generally speaking, a more resilient, forgiving and easy to play feel is obtained by setting the MID in its lower regions (7:00 to 10:30). Higher settings (11:00 to 3:00) will add punch and definition, especially in higher GAIN sounds where it tends to focus the overdrive more closely on the notes. Extreme settings (3:00 to 5:00) can make the feel a little stiffer and clunkier so you may want to keep this in mind when dialing.



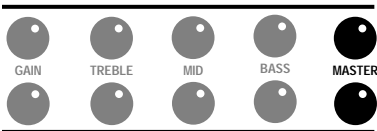
To help lessen this effect when high MID settings are in order you can try increasing the BASS control slightly. There is substantial added GAIN to be had at the top end of this control (between 2:00 and 5:00) and this range can be useful for adding some clip to the Green (Rhythm) channel when the front end GAIN control is also set high. Using the pull “BOOST” mode of the Green channel, this upper range of the MID control allows further saturation of the sound for more liquid or voice like single note lead work. As mentioned earlier, the lower channels’ MIDDLE control is shared by both LEAD 1 and LEAD 2. In general, use moderation with this powerful control. Most of the amazing and balanced sounds in the Formula are found with this control, somewhere in its middle range. Like the GAIN control, there is added gain to be had at the top end of this control can be useful...especially for enhancing the GAIN of Channel 1 for crunch or solo sounds.

**BASS:** This is responsible for the blend of low frequencies in the mix and its effectiveness largely depends on the setting of the TREBLE control. It is last in the signal path and therefore a smaller amount of signal is fed to the BASS when there is a high setting of the TREBLE in place. To obtain the maximum performance from the BASS control try using a range of TREBLE settings between 10:00 and 2:00. Not only does this range allow plenty of signal to make it to the control, but it just so happens to be where the TREBLE reacts most favorably and musically. For certain clean sounds in Channel 1 you may deviate from this scheme to achieve more breath or a warmer jazz sound. For higher GAIN solo sounds in any of the three channels you may need



to run the BASS a little lower to avoid a flubby character in the pick attack. A good rule of thumb might be ; the higher the GAIN - the lower the BASS...because contrary to many manufacturers guitar circuits, your Formula gets fatter - not buzzy - as the GAIN is increased.

**MASTER:** These control the output balance of the three channels and allow a wide range of GAIN settings to be played at many different volume levels. As you have probably noticed there are three of these controls; one at the end of each row of controls and one under the LEAD 2 GAIN control over on the right side of the GRAPHIC EQ . There is no real right or wrong setting for these controls, but again the most balanced sounds are found in the middle ranges of the spectrum ( 9:30 to 2:30 ) and this is our idea of a preferred setting. These controls also perform another function and

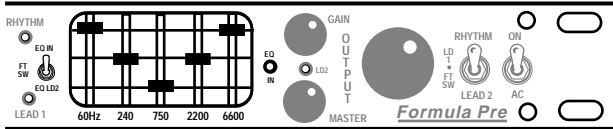


that is to determine the amount of signal fed to the EFFECTS SEND jack. Set low, they produce roughly the equivalent to an instrument level ( smaller / weaker ) signal. Set high the signal is basically a line level ( bigger / hotter ) signal and should be plenty to drive pro quality processing devices.

To effectively remove the MASTER from the circuit of any channel, you may run them all the way up for a different character and use the final LEVEL control to adjust the listening volume. However, keep in mind that this will probably overload the Input stage of any processor you might have in the loop. While it is a great trick for different sounds it makes interfacing effects and switching across the channels quite difficult and might be reserved for times when you only need one sound at a time.

## CONTROLS: (Continued)

**GRAPHIC EQ:** Your new Formula offers even more control over the sound than amplifiers that use only the traditional string of rotary controls by including an on-board 5 BAND GRAPHIC EQUALIZER. This powerful tone shaping tool uses a wide band array focused on the frequencies that are most crucial for electric guitar. The wide band scheme is infinitely friendlier to use than traditional narrow band 1/3 Octave or 31 Band set-ups that are often found in live reinforcement type arenas.



*Classic "V" Curve*

It is also more intuitive than the sweepable parametric type used in the recording domain. With fewer bands covering wider, yet no less effective regions of the spectrum, you can nail down the sounds you are after more quickly. And because it is closer to an interactive format than a notch / boost filter there is less chance of an uneven response. The narrow band or parametric designs work great if you are adept at using them, but if one is unfamiliar with its pitfalls, the result is a sound with big or extreme holes in the mix...bad news for guitarists, who have a hard enough time getting the instrument to feel even across the fingerboard.

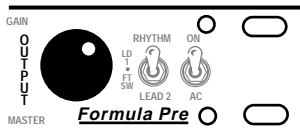
The EQ is accessed manually via the three position mini toggle just to the left of the slider array and can be used in three different ways. (1) To enhance the entire character of the Formula with one curve for all three channels, select EQ IN (toggle up). (2) To either bypass the EQ completely or Footswitch it in or out of any channel at will from the Footcontroller, select EQ OUT / FS (toggle center position). (3) To auto-insert the EQ to LEAD 2, select the EQ / LD2 position (toggle down). This last position enables you to drastically re-voice the second lead channel in order to deviate even further from the voice of LEAD 1.

Because the two channels share duplicate set of rotary controls, the ability to pre-program the GRAPHIC EQ for LEAD 2 and custom tailor it to your sound style - makes the Formulas' two lead channels super versatile. With all the possible combinations you will never have to worry about possible compromises between LEAD 1 and LEAD 2. Just in case you have never used a Mesa/Boogie amplifier in the LEAD channel with the GRAPHIC EQ, we would like to suggest trying one setting that keeps coming up over the years. The setting in the illustration above (or some mild variation of it) is referred to around here as the Classic "V" Curve. It has been used by countless players over the years, many of whom are world class recording / touring artists, as a way to widen and enlarge their sound.

By dipping the mids and boosting the lows and highs in this manner a bigger than life guitar sound can emerge...even from small 1 x 12 cabs, that you can scarcely believe. A word of caution though...it's addicting and once you've heard this bigger sound, don't be surprised if the un-EQ'd sounds don't sound the same to you. Just give it a minute and they will again...you're suffering from an EQ hangover!

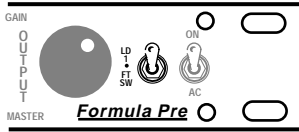
As we said, this setting is optimum for high GAIN lead sounds in the lead channels, but also works well for some people in the clean channel as well. Anyway, whether you're into the giant crunch or not, it's a great way of auditioning the sonic shaping power of the GRAPHIC EQ. And by all means...use your imagination and experiment freely in all the channels.

**OUTPUT:** This larger knob is the final output level control for all three channels of the Formula. After the sounds have been dialed to taste and blended for their respective levels with the individual channel MASTER controls, the entire pre-amp volume level may be controlled here without interrupting the pre-set blend of the channels. And because this control comes at the end of the signal path, adjustments here will not change the signal strength at the Effect Send jack.

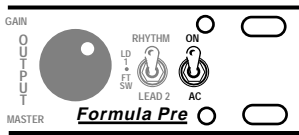


## CONTROLS: (Continued)

**CHANNEL SELECT:** This three position toggle selects the channels manually from the Front Panel so that when you are in the studio you may select sounds without having to connect the Footcontroller. When you wish to use the Foot Controller for live situations, remember to select the middle LEAD 1 position of the CHANNEL SELECT switch. Only in this position will the Footcontroller trigger the channels remotely.



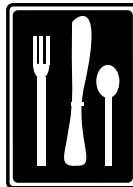
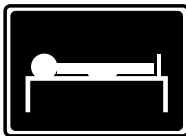
**POWER:** This toggle controls the flow of A.C. Power to the Formula. Be sure to check the voltage rating of the receptacle at which you are connecting the power cord of the Formula. In the United States the rating is 120 volts A.C. Export models are labeled as such and the voltage rating is denoted just above the A.C. power cords' receptacle. Since there are no power tubes to warm up there is no need for a Standby switch and that consideration, along with available space, prompted us to forgo a Standby switch and include only a Power switch.



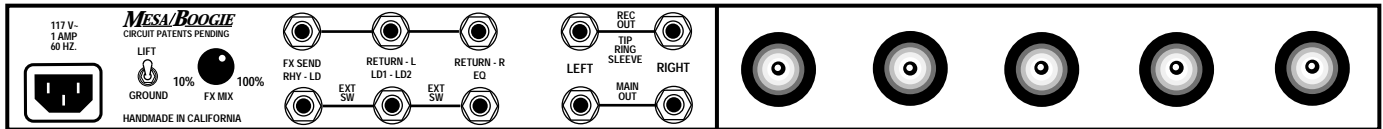
It might be a good start-up practice to get in the habit of turning the OUTPUT controls to zero before switching On the Power. This avoids the possibility of blasting either the console / monitors in a studio - or the power amp / speaker combo in a live rig as the tubes warm up on the last used live sound. A simple practice, but a gear friendly, as well as ear friendly procedure that's sure to be appreciated by all.

Now that we have covered the Controls and Features of the Formulas' Front Panel, let's move on to the Rear Panel section and become familiar with how to patch the Formula to both live rigs and consoles.

## REST AREA

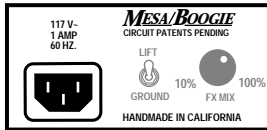


## REAR PANEL:



### A.C. POWER RECEPTACLE:

The Formula Pre - amp uses a removable I.E.C. type power cord to supply the A.C. power. The power cord supplied with your unit should be used whenever possible as we chose it for its snug fit. Because this type of RECEPTACLE is somewhat universal and used in many products both in and out of electronic musical instrument domain, you may use other cords of this type when the one supplied is not available. Should this become necessary, check that the cord is seated all the way into the RECEPTACLE to insure an uninterrupted performance. In the U.S., the proper voltage is 117 volts A.C. (110-120). Always be sure to connect the Formula to its rated voltage to avoid damaging internal circuitry.



It is a good idea to ask when performing in an environment that you aren't sure about...(especially older venues or outdoor events where generators are sometimes used to supply power to the stage) what the incoming voltage rating is. Export models - see label on the unit or ask your Dealer / Distributor about the necessary voltage rating requirements. If you hard wire your live rig and cut all A.C.

cables to length and then need an additional cord for your studio rack or, you simply want a spare for the fabled cord bag - call us and we will be glad to send you one for a nominal charge.

### FUSE:

Because the Formula Pre -amp has no power tubes, it is unlikely you will ever have to replace the FUSE, thus one does not appear accessible from the rear panel. However, for safety reasons the Formula does have an INTERNAL MAIN FUSE located inside the chassis. In the unlikely event that the FUSE should ever blow, it is very easy to replace.

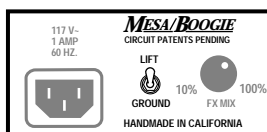
**REPLACING THE INTERNAL FUSE:** Turn the units power off. With your instrument still connected to the input - strum a few chords with the instruments' volume turned all the way up to discharge any current left in the filter capacitors (just in case you accidentally touch one). Unplug the A.C. power cord from its receptacle. With a small Phillips screwdriver, remove the sheet metal screws that secure the lid to the chassis and remove the lid. Looking from the rear of the unit, you will see a small circuit board directly in front of the power transformer with two wires coming from the Front Panel POWER switch. There under a protective plastic cover is the FUSE in its holder. Remove the cover to expose the FUSE. You can use either your hands to remove the old FUSE or a pair of insulated pliers to grab it - but be careful not to squeeze too hard and break the glass. Replace the FUSE with a new one of the same rating and make sure it is a Slo-Blo type FUSE! A Fast-Blo FUSE will not last in this application. Replace the protective cover and set the lid back on top of the unit. Plug the power cord back in and test before securing the lid with the screws.

If all is normal - turn the power back off and put in the screws, tightening them moderately tight. If the unit does not power up, flip the POWER switch back off (remembering to discharge the capacitors again), remove the lid and FUSE cover and verify that the FUSE is securely seated in the FUSE holder. If the replaced FUSE was secure, try another FUSE. If still no power - stop and call us or see an authorized technician.

DO NOT attempt to fix the unit yourself! The FUSE is the only user serviceable part inside your Formula Pre-amp. Domestic U.S.A.Models use: 1 Amp Slo-Blo. For Export Models: see your Dealer / Distributor.

### GROUND LIFT:

This mini toggle lifts the circuit ground from the sheet metal chassis ground. Normally the ground of the circuit is connected to the chassis ground such that there is one common ground. In certain rack applications, whether it be in live rack systems with multiple pre-amps in use, or in a studio environment where the Formula is connected to a console, the common ground scenario actually creates a ground loop. By removing the circuit ground from chassis ground this annoying hum can often be eliminated. There is no right way to use the Formula (grounded or lifted), but if you do not experience any ground related noise it would be preferable to use the unit in the GROUND position (toggle down).

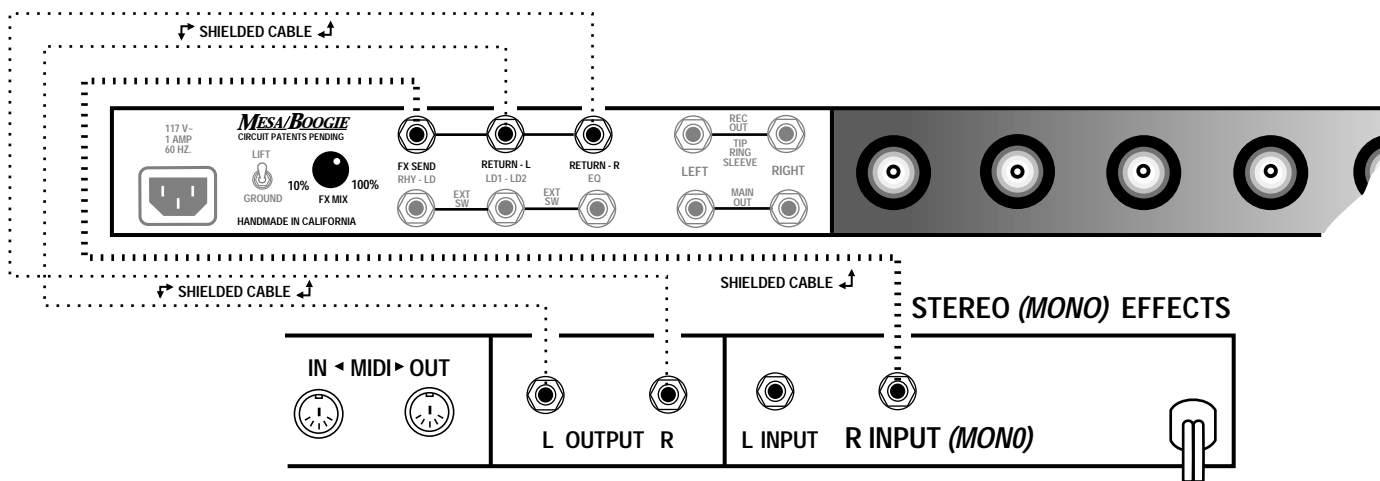


## REAR PANEL: (Continued)

### EFFECTS LOOP & MIX CONTROL:

The Formula handles external signal processing in the same way that most recording engineers do in a pro studio environment. A dry signal (track) is the main source and a second signal is created in parallel, sent through the desired processing and then mixed back in on a separate fader to insure the articulation and clarity of the original signal or track. The Formula's LOOP consists of a mono 1/4" SEND and a pair of 1/4" RETURNS which are labeled LEFT and RIGHT and a rotary FX MIX control. The SEND is the source and the RETURNS become the patch point for the parallel wet (effected) signal. The rotary control (like the second signal faders in the studio) determines the amount of the wet (effects) signal that gets mixed with the dry (un-effected) signal. In this way you can choose to run your signal very wet or keep the signal virtually untouched by the effects, thereby retaining the most articulate and urgent sound and feel.

The MIX control has a range that roams between 10% and 100% of the wet blend. It is not possible to completely remove the parallel signal from the EFFECTS LOOP path with the FX MIX control (this is due to a decision made by us to preserve the maximum tonal



performance while the LOOP is in use). Connect your processors in the following manner as illustrated above: If your processor is a mono device or, you simply wish to process only one side of a stereo harness - you may choose either of the Formulas' EFFECTS LOOP RETURN jacks (LEFT or RIGHT) as they both process the same sound. Just be sure to keep your channels straight as you continue on down the signal chain to the power amp. Once a signal has been fed to the EFFECTS LOOP SEND jack, the unused RETURN jack will not produce a signal at its corresponding MAIN or RECORD OUTPUT jack.

NOTE: When the PARALLEL EFFECTS LOOP is not in use and nothing is connected to the SEND and RETURN jacks, make sure the EFFECTS MIX control is set to 10% (counter-clockwise to stop). This setting ensures the best tone and output gain is possible at all times. If you use your Formula hardwired into the same system all the time, this will not become an issue. However, if you carry the Formula to different studios separately or take it in and out of your rig frequently, it is a good practice to mark your EFFECTS MIX control setting with a grease pencil and "zero-out" this control every time you disconnect your processors. Although the Formula will still produce great sound even if this advice is not followed, attack response characteristics and output levels will be compromised.

Though the Formula Pre - amps' EFFECTS LOOP is the best type for a guitar product to preserve the inherent attack characteristic and overall sound quality and no expense was spared in its development, our tests have resulted in some interesting findings. We have had the best sonic and tactile results by actually bypassing the EFFECTS LOOP altogether and patching outboard gear directly between the pre-amp and the power amp with short, good quality cables. (See Illustration on page 3)

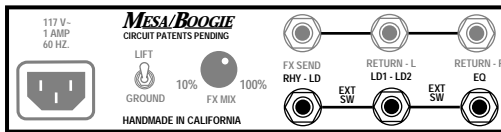
Though this may seem in many ways contradictory to the very concept of - and reason behind - a parallel effects loop...in repeated test situations we found the sound to be more three dimensional and full of punch, body and life than that of the same processing used in the EFFECTS LOOP with equivalent cable lengths. Theoretically (and electronically) this does not make good sense - and in fact should actually cause greater degradation of tone due to the more sensitive impedances present at the MAIN outputs. Nonetheless,

## REAR PANEL: (Continued)

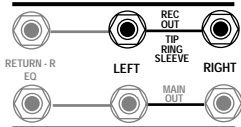
**EFFECTS LOOP: (Continued)** being the tone-first-theory-later design team we have come to be, this patching scheme has worked much to our favor. We have long felt this to be true and in fact included this tip in some of our other products' owners manuals. To verify our findings we recently took a census of TriAxis (Programmable Pre-amp) users among our phone-in customers and touring artists and found that most used their processing between pre-amp and power amp, saving their effects loops for more specific switchable applications. When asked why, in almost every case they said they liked the sound better between the pre-amp and the power amp. So try both ways for your specific application and choose the one that fits your ears and patching requirements best. There is no right or wrong way to interface processing to your Formula, so experiment at will.

**NOTE:** If you intend to record with the Formula's Direct RECORD OUTPUTS and you wish to use the same processing you use in your live rig and print it to a track (s) - you will need to feed the processors from the RECORD OUTPUTS, not the MAIN OUTPUTS. From there you will need to connect either one (or both if stereo) of the processor's OUTPUTS to the console's LINE INPUTS. The signal should be of a adequate level and the blend should be close to what you are used to in your live rig.

**EXTERNAL SWITCH JACKS:** These three 1/4" jacks make it possible to trigger the three channels of the Formula with an external switching device so that it can be used in a midi controlled rack system. In this scheme the channels can be called up under midi programs. The jacks respond to any tip-to-ground latching type switch logic. The Front Panel CHANNEL SELECT toggle switch must be in the center (LEAD) position for the EXTERNAL SWITCH jacks to respond to the external switching source.



**RECORD OUTPUTS:** As mentioned earlier in the Front Panel section of this manual under the RECORD VOICING switch section, the Formula was from its inception, a recording pre-amp. Special emphasis was placed on achieving a direct sound and feel that would enable guitarists to record keeper tracks without the time and hassle normally associated with recording amplified guitar.



Two transformer balanced 1/4" TIP-RING - SLEEVE RECORD OUTPUTS jacks are provided, creating a stereo source for your recording needs that can be used in either balanced or unbalanced consoles. These two outputs are fed a signal right after the junction where the EFFECTS LOOP'S RETURN'S join with the original signal so that any processing you have in the LOOP will appear at the RECORD OUTPUTS. The jacks are wired such that if you do not have a console with balanced inputs or you simply do not wish to use the balanced signal, you may connect a regular (shielded) mono 1/4" plug into the RECORD jacks and produce an unbalanced signal. While in most pro studios virtually all signals are balanced, this has no bearing on the quality of performance you can obtain on an unbalanced project or home studio environment. The main difference might be that of a slight roll off in the top end harmonics due to cable capacitance. This is best avoided by maintaining the shortest lengths of cable from the Formula to the console. (This rule applies to all cabling in an unbalanced studio format.)

**NOTE:** These Outputs work in conjunction with the Front Panel RECORD VOICE mini toggle switch which, as discussed earlier, zeroes in on the sound style selected and tunes the voicing accordingly.

**NOTE:** REFER TO FRONT PANEL SECTION - RECORD.

**SIGNAL LEVELS:** The levels present at the RECORD OUTPUTS are determined by the settings of both the individual Channel MASTERS' and the final OUTPUT control. As discussed earlier under OUTPUT in the Front Panel section, settings between 9:30 and 12:30 seem to produce the best results for most all situations. For direct applications in many consoles we have found the 11:00 region to be a good starting point. This region, with similar settings on the individual channel MASTERS, seems to produce a very well behaved SIGNAL LEVEL for most applications. Set the console accordingly and you should have lots of room to adjust for different sounds in all three channels.

## REAR PANEL: (Continued)

### SIGNAL LEVELS: (Continued)

NOTE: Avoid OUTPUT level settings above 1:00 when using the RECORD OUTPUTS as it is possible to overload the RECORD circuitry - as well as the input stage of many consoles - with certain settings of the channels and certain pickups.

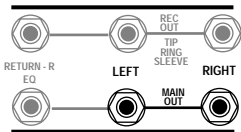
NOTE: When the RECORD OUTPUTS are connected to a console, any loading of the MAIN OUTPUTS by connecting them to a power amp or processor will produce a significant loss in signal at the RECORD OUTPUTS. This is because the MAIN OUTPUTS are not buffered in an effort to retain all the tubular magic produced by the impedance combination that occurs at the Formula's MAIN OUTPUTS and the tube power amp's input. After trying every conceivable buffering scenario with dismal results, we refused to sacrifice one drop of the Formula's luscious tone for this one patching scheme.

If you must connect both RECORD and MAIN OUTPUTS simultaneously - here are some possible options to navigate this toneful patching idiosyncrasy:

- (1) Record in mono and send the live signal in mono by using one of the output channels RECORD OUTPUT and the opposing channels MAIN OUTPUT.
- (2) With one or both of the RECORD OUTPUTS connected to the console, connect the MAIN OUTPUTS to a processor instead of a power amplifier. This will likely reduce the amount of signal loss at the RECORD OUTPUTS quite a bit - because there is less loading effect on the Formula's MAIN OUTPUTS due to most processors' input stages being of a higher impedance.
- (3) Use an external buffering device on the Formula's MAIN OUTPUT(s) to reduce the degree of loading. We plan to offer such a device - Call our Customer Service Dept. for more information about availability of this accessory.

### MAIN OUTPUTS:

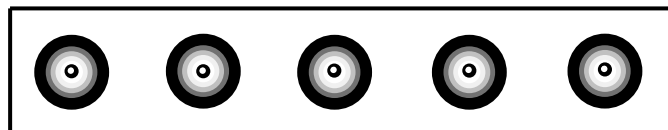
The Formula provides two output channels for feeding signal to either stereo power amplifiers, effects processors (see EFFECTS LOOP - presented earlier in the Rear Panel section of this manual) or even the effects return or power-in stages of self contained amplifiers. Thus the Formula is a stereo capable pre-amp with two identical signals that appear at the MAIN OUTPUTS. For mono applications simply connect either of the MAIN OUTPUT jacks to your power amp or processor. To use both MAIN and RECORD OUTPUTS in a mono scheme simultaneously, connect opposing outputs (one channels' MAIN OUTPUT to your power amp - the other channels' RECORD to your console...see NOTE under RECORD in the Rear Panel section).



The MAIN OUTPUTS are fed signal from the three individual channel MASTERS as well as the final OUTPUT Level control located at the far right on the Front Panel. As mentioned earlier, the channels are controlled simultaneously with the single OUTPUT control, as this potentiometer is actually two synchronous pots in one. To control the output channels separately, they must be sent to two different power sources and then controlled independently from there. In this type of set-up it may be necessary to lift the ground on one of the power sources to prevent a ground loop. This application is most often seen when a pre-amp is used to feed two or more power amps on a large stage where there is need for both back line and stagefront monitor cabinets.

### TUBE BAY:

The Formula uses five 12AX7A type dual triode pre-amp tubes for its' all-tube circuitry which are mounted horizontally and recessed in an easily accessible tube bay. In the unlikely event that you need to replace a tube, you may do so by simply unplugging it from its socket and plugging a new one in. Since the tube sockets grab the pins on the tube rather firmly, it helps to gently



rock the tube back and forth while pulling outward on the tube. When installing the replacement, make sure that the pins on the tube are not bent (you can straighten bent pins with a pair of needle nose pliers) and line them up carefully before inserting the tube.



## **REAR PANEL: (Continued)**

---

**TUBE BAY: (Continued)** Do not force the tube - if it won't go in pretty smoothly - you probably have the tube mis-aligned or possibly one or more of the pins have bent. Forcing the tube could result in damage to the socket. Always inspect the pins on a tube before attempting to insert them into the socket.

NOTE: See the TUBE TASK CHART on the following page for the individual roles each tube plays in the Formula's circuit. Usually it is one tube that is responsible for a malfunction and it is not recommended that you replace all five tubes. Pre-amp tubes - unlike power tubes - can work great for many years and they have been screened and tested for performance and tone before being installed in your unit at the factory. You can feel free to experiment with other pre-amp tubes but if you do, please...do yourself a favor - note which tube was in which tube socket before you take a tube out! By keeping track of this tube placement you will be assured of being able to go back and reference the unit as it was before you changed it...most helpful, we assure you.

NOTE: While any 12AX7A will work in your Formula Pre-amp, the Formula's 6 month Warranty is valid only with original or replacement Mesa tubes in place.

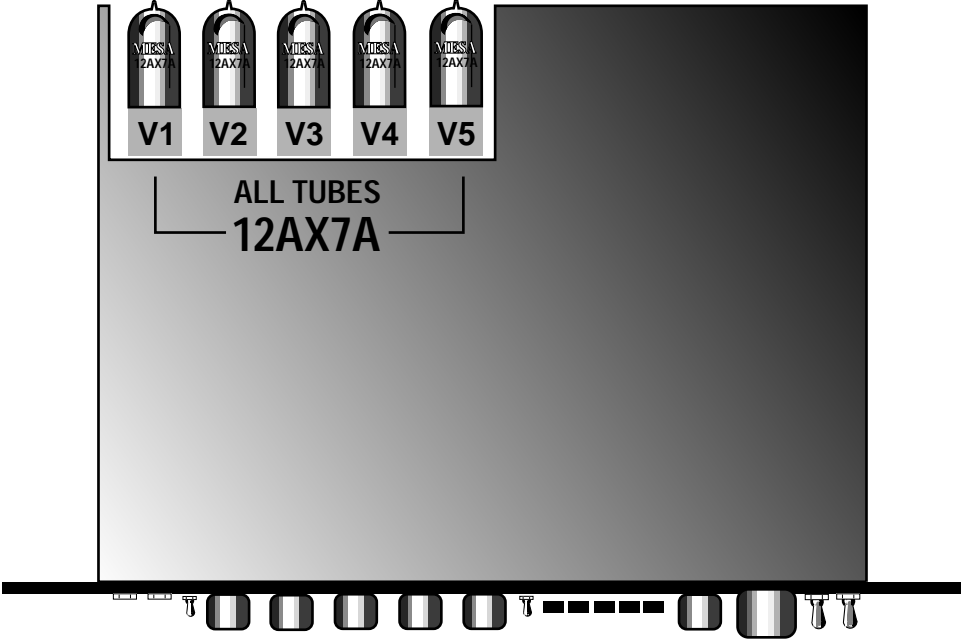
Now that we have reviewed all the features and controls, you are ready for the fun part...exploring the myriad of amazing sounds the Formula is capable of producing. It is our guess that it will exceed your expectations and become an invaluable instrument of expression, adding joy and inspiration to your music. If there are any questions you have unanswered after reading through this manual, feel free to call our Customer Service Department and speak to one of our Product Specialists and they will be delighted to help you with your needs.

We wish you many years of enjoyment with the Formula and hope it adds to your musical fulfillment in both live and recording situations. Cheers...! And once again, Thanks for trusting us to build your amplifier. From all of us at Mesa/Boogie, Enjoy!

# TUBE LAYOUT and TASKS

## *Formula Pre - Top View*

Back Panel of *Formula Pre*



### TUBE ASSIGNMENT

V1 - A = Lead Input  
V1 - B = Rhythm Input

V2 - A = 2nd Rhythm Stage  
V2 - B = Not Used

V3 - A = 2nd Lead Stage (Both Channels)  
V3 - B = 3rd Rhythm Stage

V4 - A = 4th Lead Stage (Both Channels)  
V4 - B = 3rd Lead Stage (Both Channels)

V5 - A = Effects Return (Right)  
V5 - B = Effects Return (Left)

A = Pins 1,2,3  
B = Pins 6,7,8

### DIMENSIONS • SPECIFICATIONS

WEIGHT: 8 lbs

HEIGHT: 1 rack unit - 1 3/4 nches

DEPTH: 13 1/4

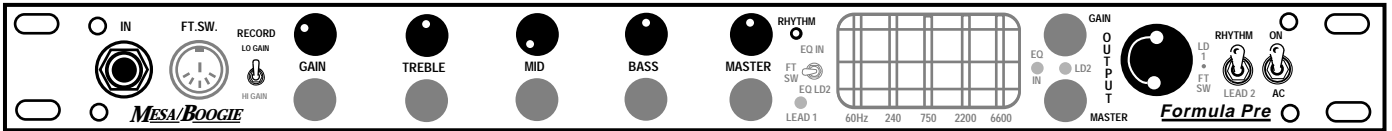
INPUT IMPEDANCE: 1 Meg ohm

POWER REQUIREMENTS: (from AC mains)

# Formula™ Pre Factory Sample Settings

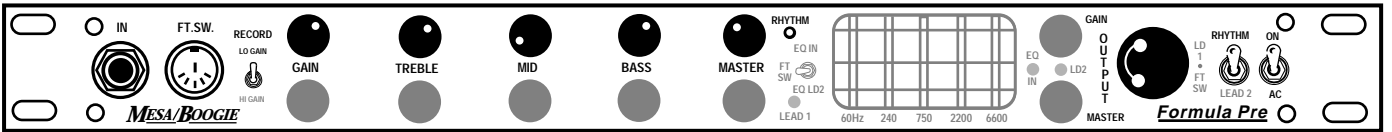
Spanky Clean: Rhythm / Green

Most Pick-ups



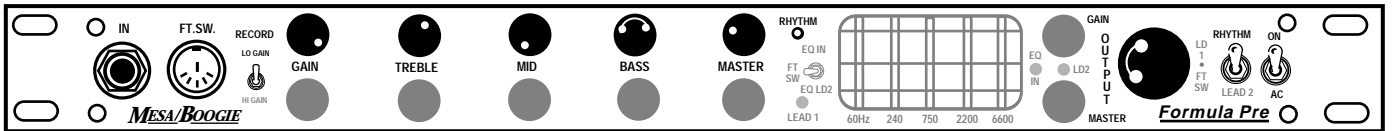
Texas Clean: Rhythm / Green

Neck Single Coil



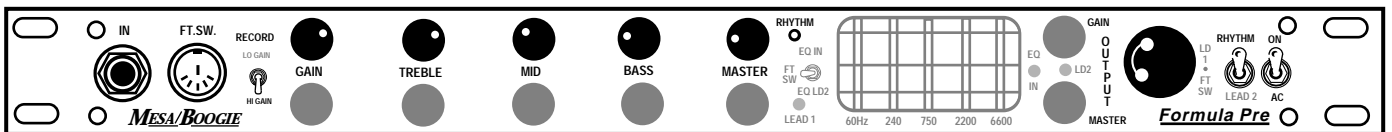
Rock Clean: Rhythm / Green

Most Pick-ups



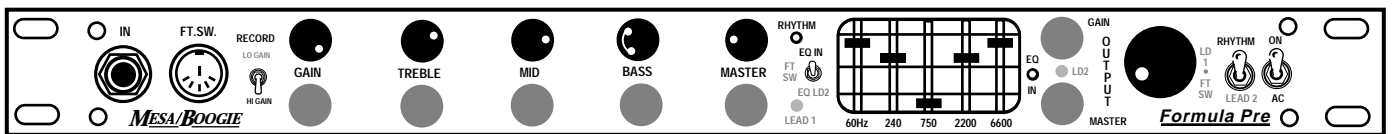
Pushed Blues: (Pull Gain Boost) Rhythm / Green

Neck / Middle / Bridge Single Coil



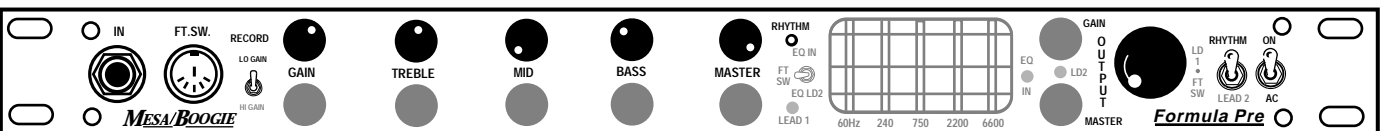
Crunch Rhythm: (Pull Gain Boost) Rhythm / Green

Bridge Humbucker



Mean-No-Master - Clean: Rhythm / Green

Most Pick-ups

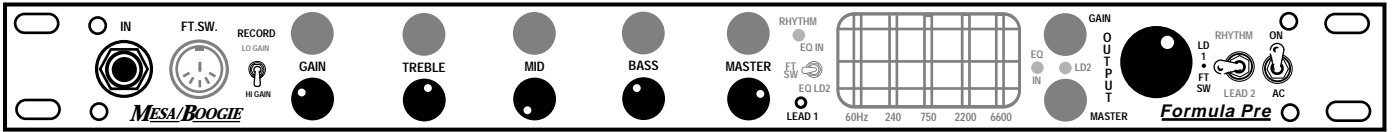


NOTE: Check Levels In Your Outboard Gear - Very Hot Settings!

# Formula™ Pre Factory Sample Settings

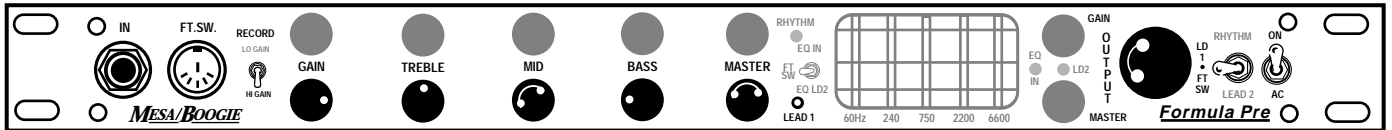
Purring Blues - Lead 1 / Orange

Most Pickups



Liquid Violin Lead - Lead 1 / Orange

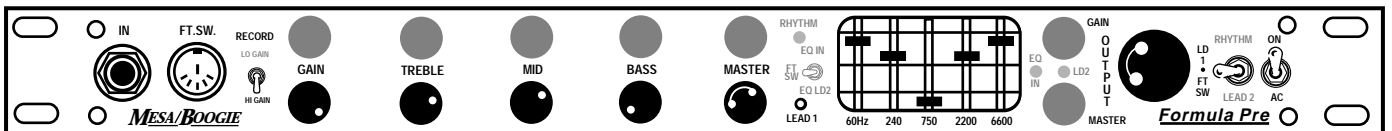
Neck or Bridge - Single Coil



Wide Glide Rock - Lead 1 / Orange

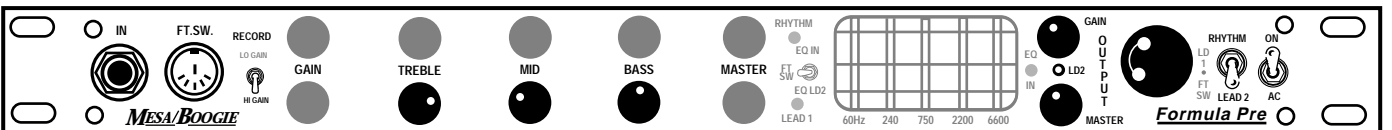
Graphic EQ Optional

Rear Humbucker



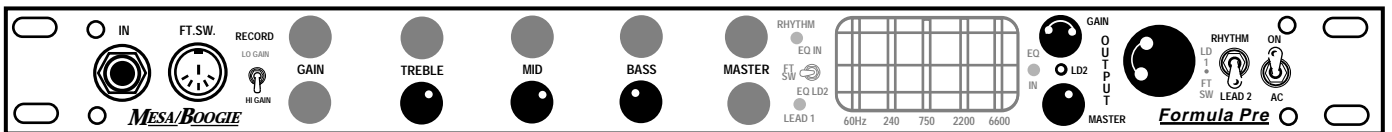
Stinging Blues - Lead 2 / Red

Neck or Bridge - Single Coil



Focus Lead - Lead 2 / Red

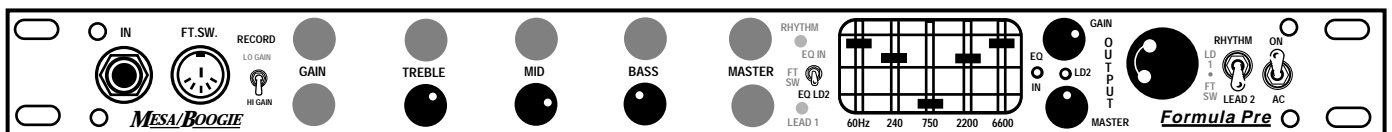
Neck or Bridge - Single Coil



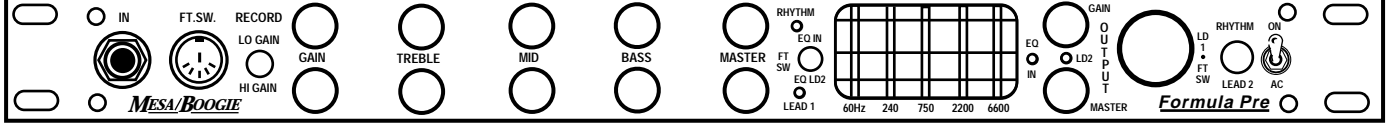
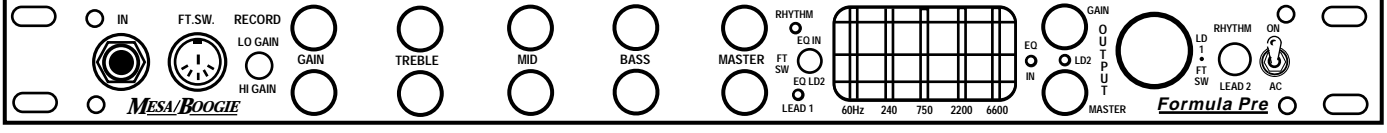
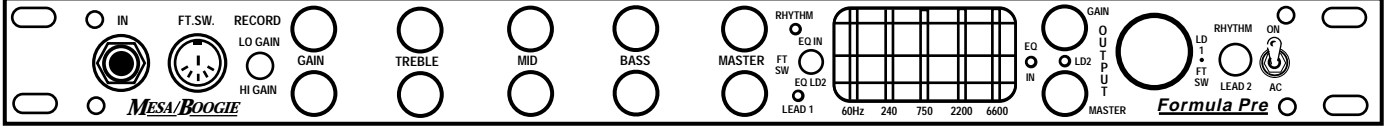
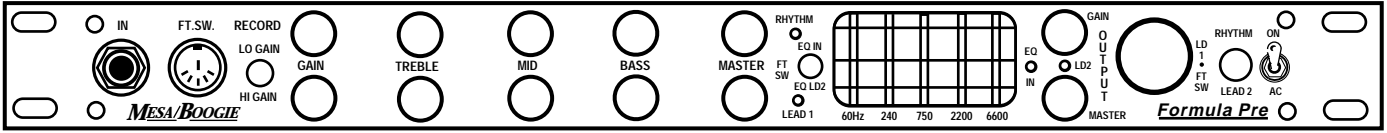
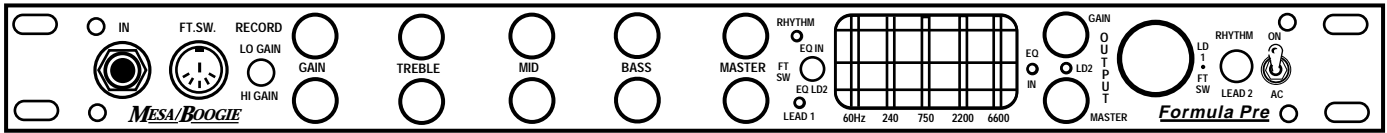
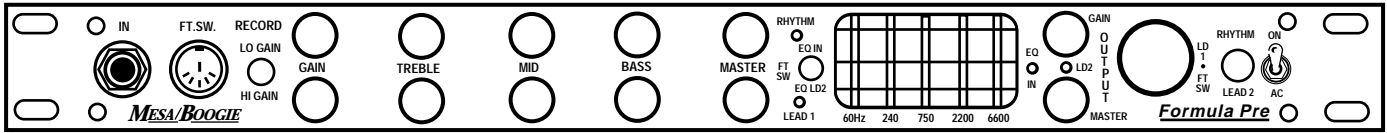
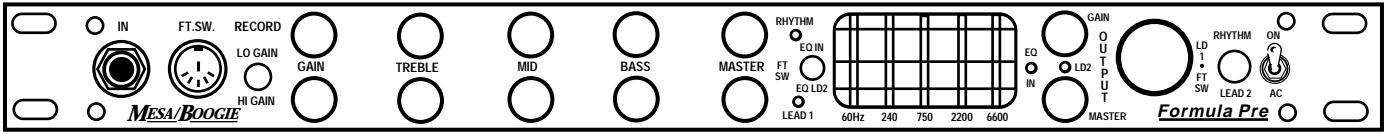
Mondo Crunch - Lead 2 / Red

Graphic EQ In

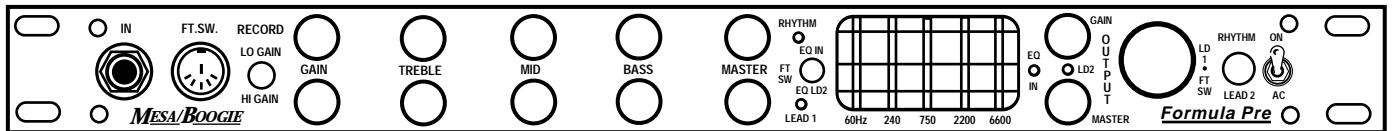
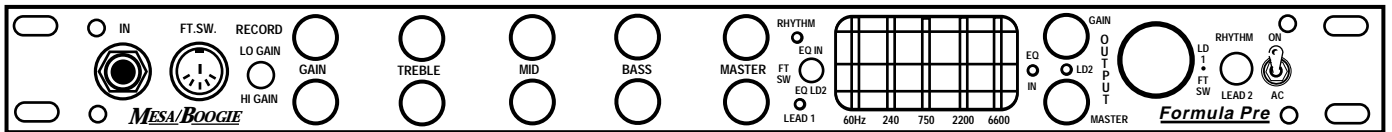
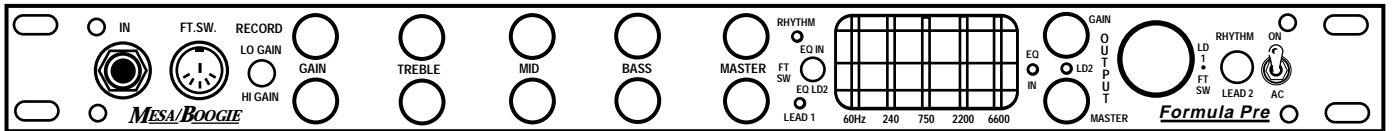
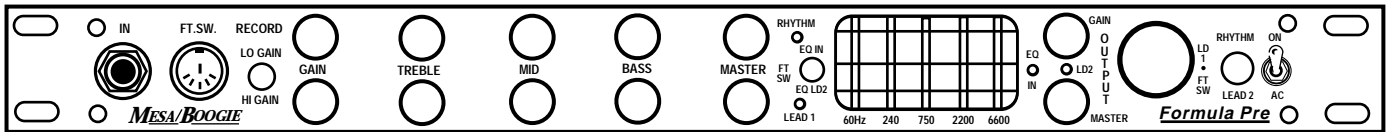
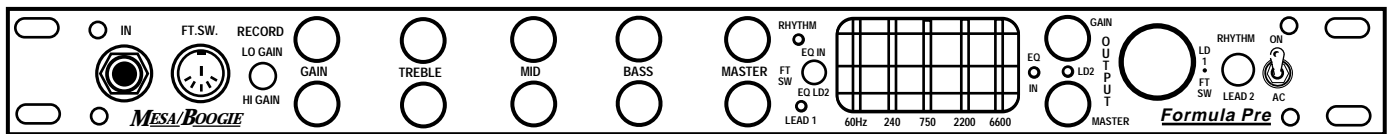
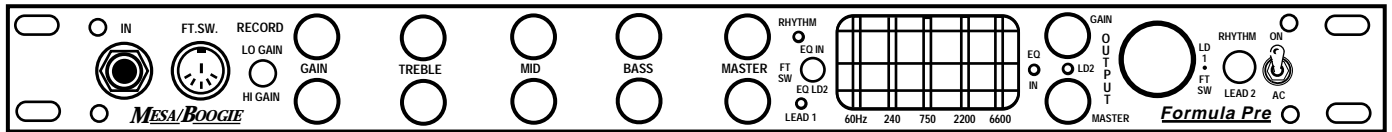
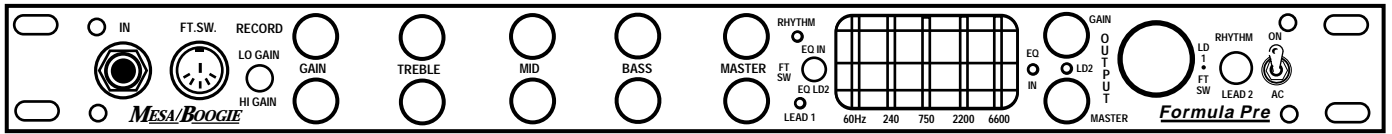
Rear Humbucker



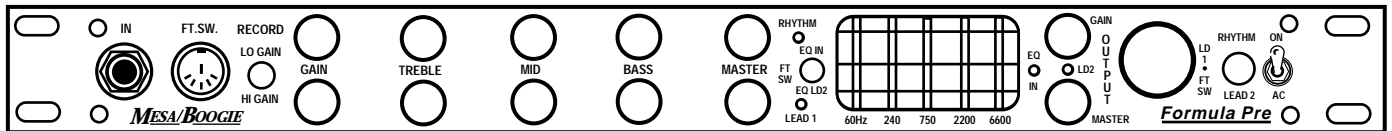
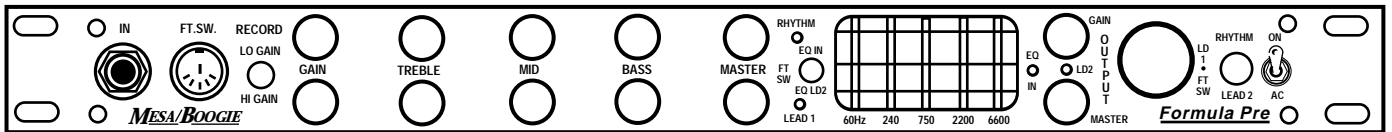
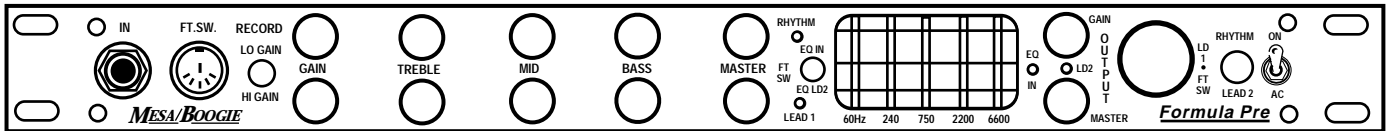
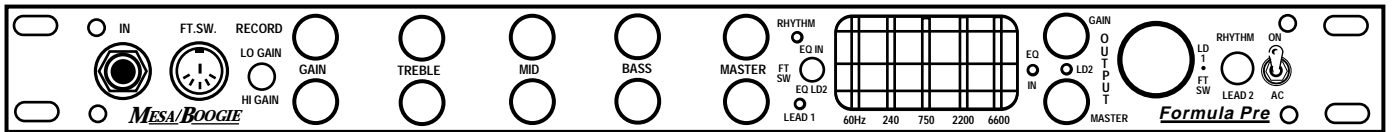
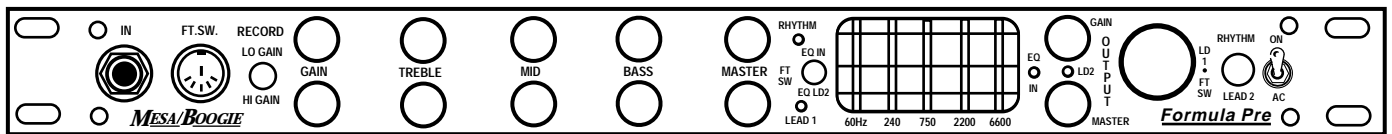
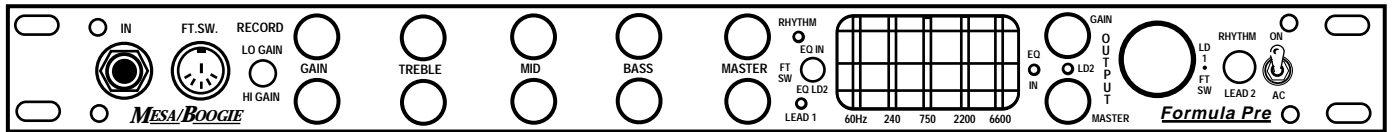
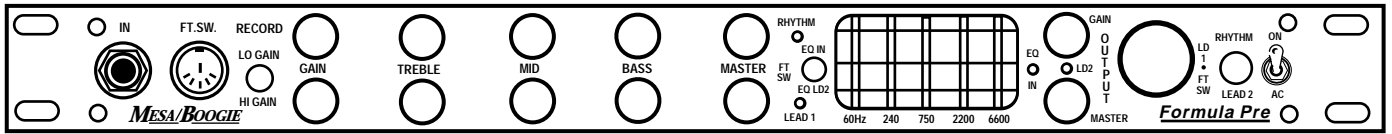
# Formula™ Pre Personal Settings Page



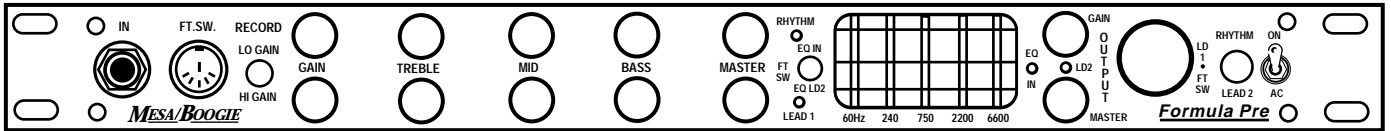
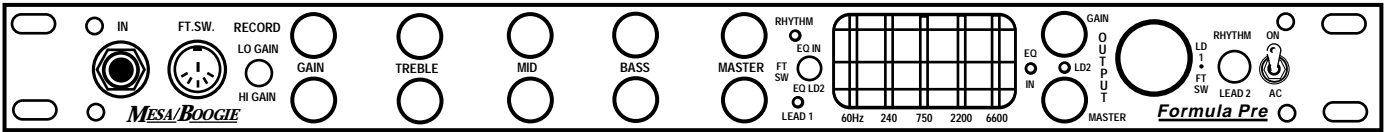
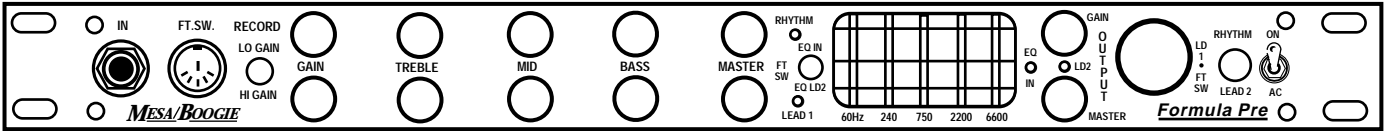
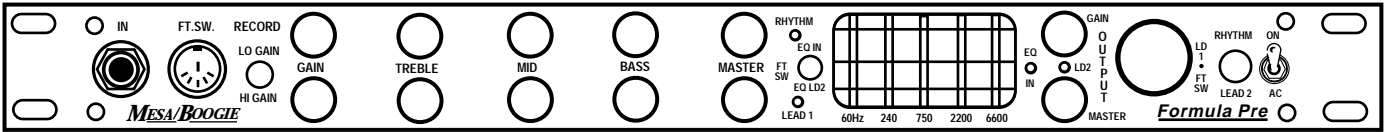
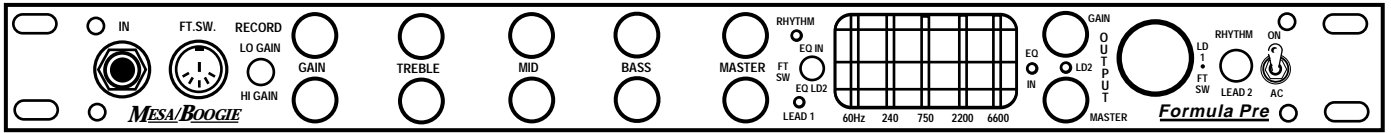
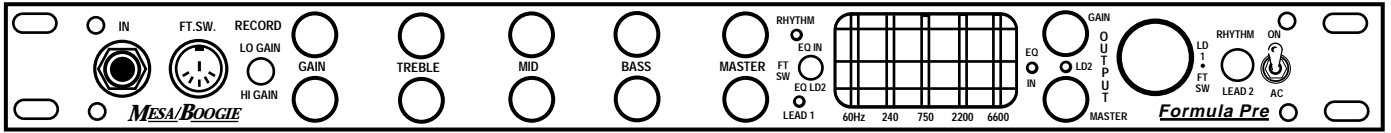
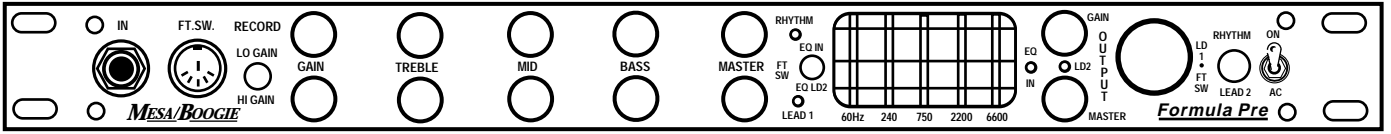
# Formula™ Pre Personal Settings Page



# Formula™ Pre Personal Settings Page

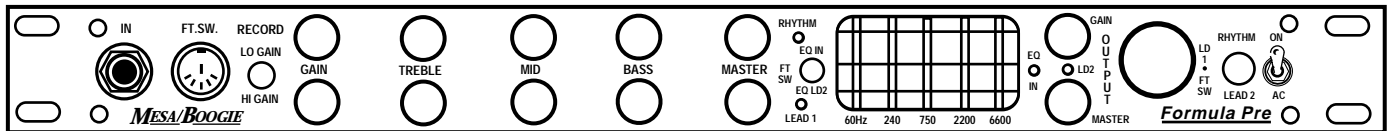
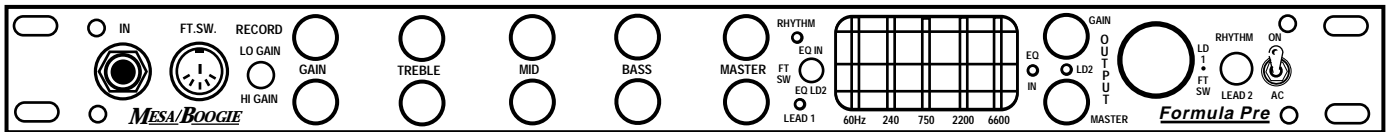
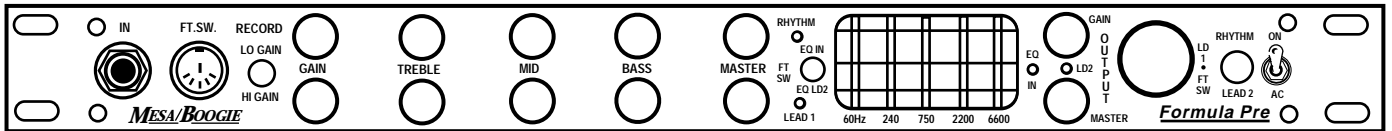
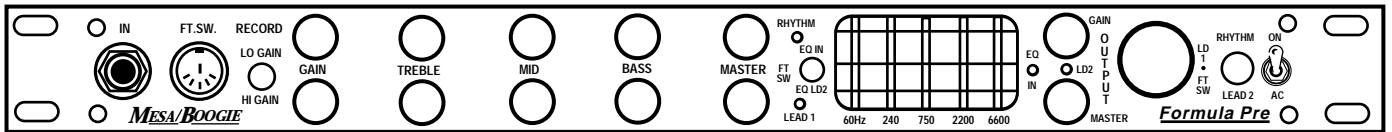
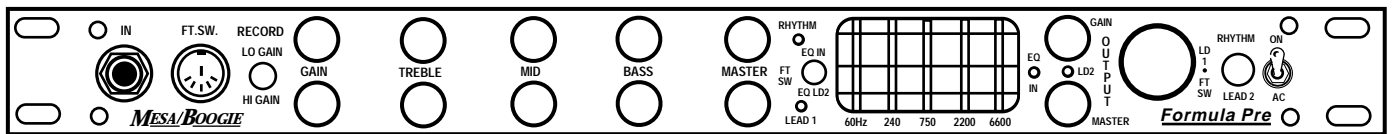
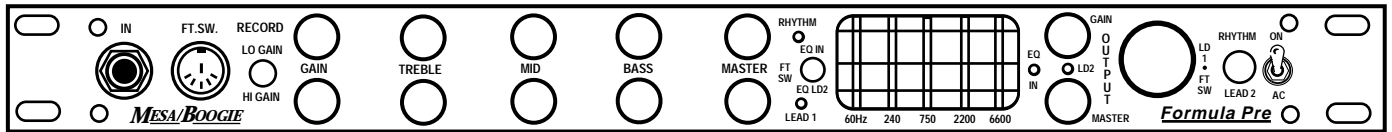
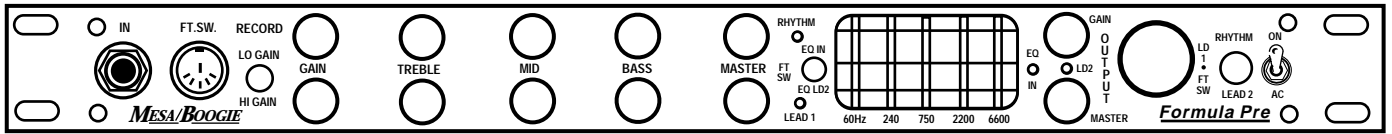


# ***Formula™Pre*** Personal Settings Page

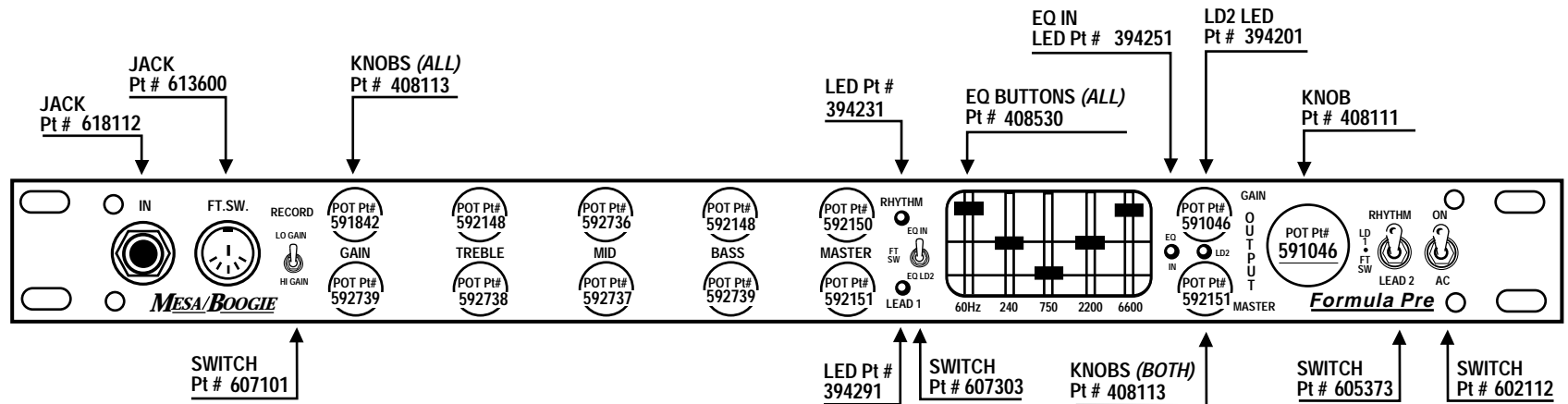




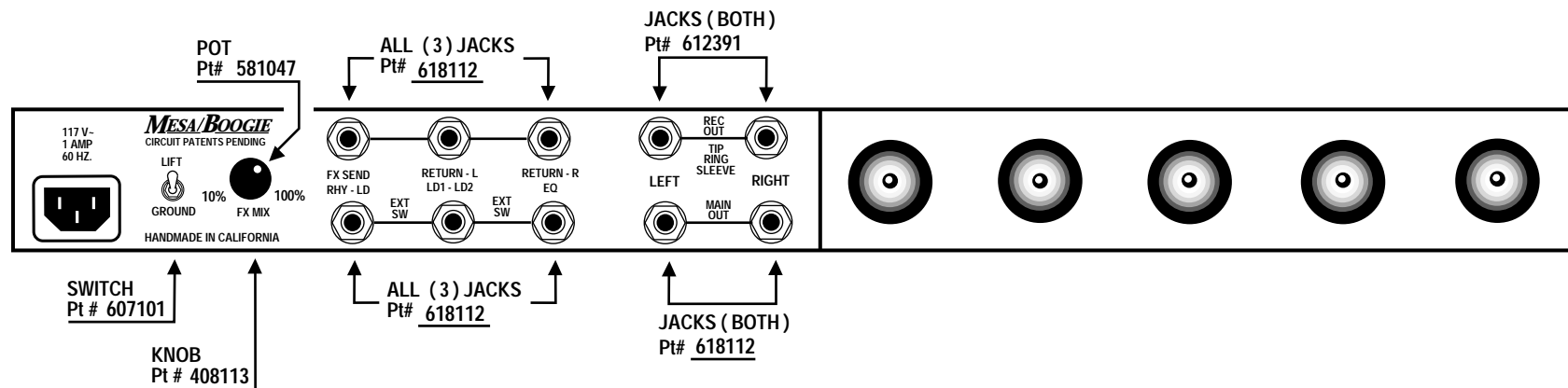
# Formula<sup>™</sup>Pre Personal Settings Page



# Parts Sheet - *Formula* - Front Panel



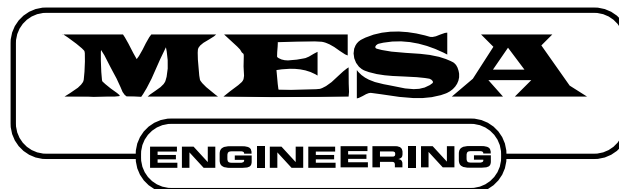
# Parts Sheet - *Formula* - Rear Panel



# ***MESA/BOOGIE***

***The Spirit of Art in Technology***

***Thank you*** for trusting MESA/Boogie to be your amplifier company. We wish you many years of toneful enjoyment from this handbuilt all tube instrument.



*The Spirit of Art in Technology*



*1317 Ross Street Petaluma, CA 94954*

*USA*