



Kemper Profiling Amplifier

The Basics & Profiling Guide

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The Basics

Okay, so what did I just buy?

First of all, thank you for choosing the Kemper Profiling Amplifier — KPA for short. We’ve no doubt that once you realize everything it can do, you’ll be as thrilled with it as we are. We designed the Kemper Profiling Amplifier to be a complete solution for all your guitar playing needs. You can use it just like you would a regular amplifier, or you could use it as a multi-effects unit or even as the front end for your guitar-based studio.

Nearly all digital guitar amps available today offer the same features — simulations of classic and modern guitar amplifiers and stomp boxes, usually with some digital and studio effects thrown in for good measure. The KPA is the first digital guitar amp that doesn’t simply include digital versions of guitar amps, but lets you make a “profile” of your own guitar amp to use inside the KPA — as well as load profiles of other guitarists’ amplifiers into your KPA, which gives you not just a simulation, but their exact digital sound!

We hope you’ll find operating the KPA straightforward, but if you need more information please check out the three included guides. We call the guide you’re reading *Kemper Profiling Amplifier: The Basics* because it will show you around and give you all the information you need to get started and find your own tone. We recommend that you read through this with your guitar and your KPA right in front of you. This way you can instantly try out what you’ll just have learned. The *Kemper Profiling Amplifier: Profiling Guide* will help you become an expert in creating your own amp profiles and is a must read if you want to add your own amps and guitar rigs. The *Kemper Profiling Amplifier: Reference Manual* contains a reference to every single parameter of the Kemper Profiling Amplifier.

We update our documentation on a regular basis. The latest and greatest can be found here:

www.kemper-amps.com/start/

We recommend you check back frequently. But before we start to explore the exciting possibilities of this technical miracle let’s have a word about what sets the KPA apart from all the other amps: The Profiling process!

What is profiling?

Do you have a favorite setting on a favorite amp that produces your favorite sound? Would you like to be able to get that identical sound from the KPA, and not have to bring your amp to the rehearsal, gig or studio? The method by which you can get that favorite sound into the KPA is what we call “profiling”.

If you want a more technical description: the KPA analyzes the sonic characteristics of a reference amplifier. This process allows it to faithfully recreate the characteristic sound of virtually any guitar amp, and adopt the behavior and interaction of the components of the analyzed amplifier.

Maybe you're thinking *“what if, after the KPA does its analysis, I'm not entirely satisfied with the results?”* Don't worry, we provide a complete set of parameters that allow you to control the way the tubes sound and react to further define and modify the profile. When you're finished profiling and tweaking, you'll have exactly what you want.

With the KPA it doesn't take a rocket scientist to match the sound of the original amp — or even enhance the original sound by using onboard features. And the KPA doesn't just capture the sound of your guitar amp head alone; you can also capture the sound of the cabinet and the microphones (including the microphone distance and angle). This means that the complex sound of a specific setup can be analyzed, recreated and stored. In other words, the resulting KPA profile is all you'll need to take your entire guitar rig with you everywhere you go.

Getting started

Okay, enough talk — let's plug in and get playing!

1. Connect your guitar to the INPUT on the right side of the front panel.
2. Connect the MAIN OUTS on the rear side to the inputs of your mixer.
3. Power the unit on by bringing the chicken head switch to the BROWSE position.

Immediately after the startup screen you will be prompted to set the time and date and enter your name. That's it! It's time to start browsing presets and playing some guitar.

More on connecting your gear

The KPA is equipped with a studio-grade analog input section followed by a state-of-the-art A/D stage to get the best possible sound. Once your guitar signal has been processed, the high-quality D/A stage ensures that you'll get the best sound quality into your speaker rig. You'll notice that the KPA offers multiple inputs and outputs in both analog and digital formats, which we'll describe in more detail down below. We included all this connectivity so you can use the KPA as a central hub in your studio to connect your guitar to a variety of other amps, effects and recording gear and use the KPA to switch among them.

In case you have any hum-related issues in your studio or stage, we provide ground lift switches for the analog outputs.

If you want to use the KPA on stage you can connect a power amp to the MONITOR OUTPUTS.

If you want to make your own profiles you will need to connect your reference amplifier using the DIRECT OUT and the LOOP RETURN inputs. More details on profiling are provided both later in this manual, and in more detail in the *Profiling Guide*. In addition, the DIRECT OUTs can be used in conjunction with the LOOP RETURNS to connect to the effects loop of an external amp, or to connect any external effect unit, such as your favorite stomp box.

You can connect two pedals to control parameters such as volume or individual stomp parameters. Finally, the KPA comes with USB connectors so you can connect it to your computer to transfer data and update the firmware.

Choose your rig

A complete signal chain is called a “rig”. Rigs consist of three sections located in the upper half of the panel. The signal flow begins with the Input stage, and then moves through the three processing sections at the top of the front panel of controls, and finally the Master stage. The order of the sections from left to right represents the signal flow inside the KPA. Each section consists of three to four modules.

Each of the buttons in the signal flow gives you a unique and intuitive way to manage your sound. By pressing a corresponding button, you activate each module or section. Holding the button a little bit longer will focus the module and show its parameters in the display. In the lower line of the display you see up to four parameters that can be controlled by the soft knobs underneath. Tweak the knobs to change your sound. If this module offers more than four parameters, you can navigate between pages using the Page buttons. If you want to return to the main page, press EXIT.

If you changed a parameter setting, but want to return to the previous value, you can use the UNDO button on the left side of the display. It will always revert your most recent action. The REDO button will revert the action of the UNDO button.

In *Browse* mode you can select the desired rig using the RIG buttons on the right side of the front panel.

The LEFT and RIGHT buttons will advance in single steps, while the UP and DOWN buttons will change rigs in larger steps. You can also use the BROWSE knob above the right side of the display to see eight rigs simultaneously, as well as scroll through the list of all available rigs. You can change the sequence of rigs by using the soft button “Sort by ...” to sort them by date or author, and then load the selected rig with soft button “Load”.

Once you have found a rig that you like, you can use the soft knobs underneath the display to change the gain and the EQ of the rig. These controls display their current value on the LED collar around the knobs.

Stomps

The first section, labeled “STOMPS”, is for your stomp box effects. This section offers four stomp box slots which are represented by the four buttons labeled A, B, C, and D. Here you can place the built-in stomp effects in any order and configuration you’d like. These effects are applied before the signal reaches the STACK section.

◆ Stomp LED color coding

You’ll notice that the stomp LEDs aren’t simply lit green or not, but have many different colors. That’s because these LEDs use color to help you identify which kind of algorithm is being used for each stomp.

Stomp algorithms are color coded like this:

Distortion	Red
Wah	Orange
Chorus	Blue
Phaser & Flanger	Purple
Compressor	Cyan
EQ	Yellow
Delay	Green
Effect Loop	White

You can change the algorithm for a stomp that is shown in the display by rotating the TYPE knob above the left side of the display to scroll through the available algorithms. The BROWSE knob above the right side of the display can be used to select items from lists of “local presets” that are available for every stomp. Local presets are settings for a specific type of module (stomps and effects), stored independent from the rig itself.

Finally, you can select more stumps and effects in the EFFECTS section, and change the settings of the delay and reverb using their dedicated knobs.

Stack

In the middle of this signal flow, you'll find the "stack" section with the buttons for AMPLIFIER, EQ (equalizer) and CABINET. The stack section represents the raw virtual guitar amplifier as defined by the profile.

In the stack section, you can freely combine amps and cabinets by holding their respective buttons to bring them into focus, and then scroll through the available local presets using the BROWSE knob.

Effects

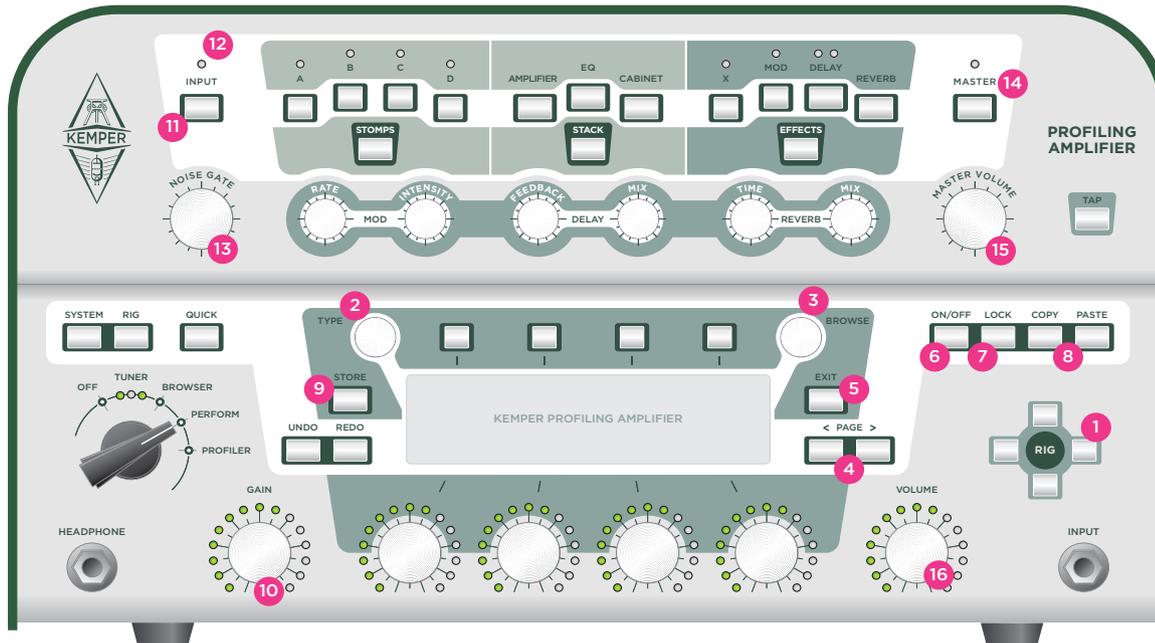
Here, you can add more built-in effects to the signal, after it has passed through the amplifier and virtual cabinet. The delay and reverb module in the effects section have a fixed position and purpose. The knobs underneath the signal flow give you direct access to the EFFECT MIX of the delay and reverb, as well as for DELAY FEEDBACK and REVERB TIME.

The X and MOD modules offers you a further choice of effects. We recommend you place a modulation effect into the MOD module, if you intend to use one in your rig, as you have direct access to its RATE and INTENSITY parameters with the line of knobs underneath.

- ✓ The stomp, stack and effect section can be stored as an individual local preset. To recall an entire stomp, stack or effect section, hold the respective section button and browse through the local section presets using the BROWSE knob.

Front Panel controls

We already mentioned some of the buttons and knobs in the previous section, when we showed you how to adjust the various effects and settings within the upper half of the front panel. Below is a short explanation of what all of the front panel controls do.



Rig navigation section (1)

Here you can navigate through the rigs. LEFT and RIGHT buttons will switch sequentially, while the UP and DOWN buttons will change in larger steps. A newly-selected rig is instantly recalled.

Type knob (2)

When an effect or stomp is in the focus, the TYPE knob will select between different types of effect algorithms. For example, in stomp edit this knob will select distortions, compressor and modulations among others.

- ✓ When you switch between similar effects types, you will notice that parameters common to these effects will retain their values; this is to make the choice of algorithm easier. For example, you can make a dedicated setting for a Wah effect, and then step through the various Wah types; the effect will change, but settings for the various ranges and Wah pedal control will remain the same. You can also switch the type between phaser and flanger, to check the different impact of these two algorithms, and the modulation scheme will remain unchanged.

Browse knob (3)

When you've got an effects module in focus, this knob selects between the local presets. In other words, it chooses between different presets for distortion stomps, reverb settings, etc. When this knob is turned, the display shows a list of available settings; and further turns will select between them. In *Performance* mode, the BROWSE knob can be used to quickly browse the list of available performances. In *Browse* mode this knob can be used to quickly browse the list of available rigs.

Page navigation (4)

When a module is in focus, these buttons will switch between pages if more than one page is available for a given module.

Exit button (5)

This button is used to return to the “play” page. Also, you can use EXIT to cancel an operation.

On/Off button (6)

This button switches the currently selected module or section on and off. The light of the module or section button shows you if a module is active or bypassed. You can also switch a module on and off by pressing the module button itself.

Lock button (7)

The LOCK button will keep a section or a module from being changed when you make rig changes. In other words, if you want to preserve all the settings for a section, press the Lock button. Once a section is locked, no matter what other sections (or modules) you change, the parameters of the locked section will remain unchanged.

Let's say you want to lock a Wah effect on stomp A. To do this, choose or dial your desired Wah effect and press LOCK, while the Wah effect is still in focus. Now you can switch rigs as often as you want. The Wah will stay on stomp A until you unlock it again.

Another example would be to lock the reverb in its bypassed state, to make sure that all the rigs will sound dry for the rest of the session. To do this, bring the reverb into focus by pressing REVERB for half a second. Then switch it off, and press LOCK. This way, you can prevent the reverb from being switched on by the next change of rig.

You can also use the lock function creatively to find new combinations between several sections. For example: you can lock the stack section once you have found your favorite amp/cabinet combo, and then switch rigs, so you can try this amp with stomp and effects from other rigs.

Locking a module will prevent it from being changed when you select a different rig. However, you can still edit and recall presets for locked modules: Simply select a locked module - and adjust its settings accordingly.

To get an overview about the lock state of the modules: press and hold LOCK, and the status of the button LEDs will change - all locked modules will be lit, while all non-locked modules remain unlit. To lock or unlock individual modules, press their respective buttons while holding the LOCK button.

Copy and paste buttons (8)

Use the COPY and PASTE buttons to grab a module and copy its data to another similar location. For example, you can copy and paste the settings of one stomp to another, either within the same rig, or another rig entirely. To do this, select a module and press COPY. Next, select a destination module and press PASTE. Voilà!

In general, you can use common sense to determine if the KPA will let you copy settings from one module to another. For example, you cannot copy the reverb settings to the amp module. However, it is possible to copy a Stomp to slot X or MOD in the effects section. Go ahead and try whatever you want; you will be alerted if what you're attempting is not possible.

Store button (9)

Use the STORE button on the left side of the display to save any changes you have made to a module or rig.

Pressing Store within an edit page will give you the option to save either the settings of the currently-selected module as a local preset, or to save the entire rig. Make your choice and on the next page, choose between three different options using the soft buttons. “Replace” will overwrite the currently-selected rig with the new version. “Store as ...” will save the rig under a new name, and “Rename” will allow you to change the name of the rig, and then replace the current one with it.

In the next step you are able to edit the name of the rig.

Soft Button #1	Insert a space to the left of the selected character.
Soft Button #2	Clear the selected space or character.
Soft Knob #1	Toggle between upper case and lower case letters.
Soft Knob #4	Scroll through the available characters.

Press STORE again to complete the procedure.

Gain knob ⁽¹⁰⁾

The GAIN knob controls the amount of distortion and covers an extremely wide range from ultra-clean to totally distorted. The GAIN control allows for the same large range on all profiles, even if the original amp has a more limited gain range.

The gain parameter compensates for the loss in level with any amount of gain reduction. You can turn the gain value to zero for every amp profile and the result will be a totally undistorted and uncompressed sound that has the same perceived loudness as the fully distorted version.

Speaking of clean sounds, let's talk about *perceived loudness* in respect to gain level. With distorted sounds, the perceived loudness is often determined by the amount of distortion, not by the level of the guitar. On the other hand, the perceived loudness of an undistorted, purely clean sound often depends on the type of pickups of your guitar. Our level compensation feature for clean sounds might emphasize such differences in level.

So, if you notice that your guitar is too low or too high in volume when you turn the gain down to zero, adjust the "Input Clean Sens" parameter. This adjusts the sensitivity of the clean input so that the clean sound has the same loudness as the distorted version. Setting the correct input sensitivity is crucial if you want to get the most out of your Kemper Profiling Amplifier.

Input button ⁽¹¹⁾

Press this button to enter the input section where you set the input sensitivity for your guitar. There are two parameters in this section: "Clean Sens" and "Distorted Sens". Each one can be modified using a dedicated soft knob. The NOISE GATE, with its dedicated knob, also belongs to the input section.

The input section is locked by default. The settings will be relevant for every rig or performance until you decide to unlock it. If you unlock this section, the input settings will be individually saved and recalled per rig. Alternatively, you can leave the input section locked, and create local presets for individual guitars. You can then switch between these presets independently of switching rigs.

- ✓ For example: if you want to use different guitars, you can create an customized local presets for each. When you switch guitars, simply select the respective local input preset, and the rest of the rig will remain unchanged. Remember: the input section is locked by default, therefore changing rigs will not affect it.

◆ Clean Sens and Distorted Sens

Different types of guitars produce different output levels depending on their pickups and string gauge: for example, humbucker pickups generate higher voltages compared to single coils, and active guitars generate even hotter signal levels.

As we already mentioned, you can adjust the volume compensation of the instrument INPUT by setting “Clean Sens” to a level where clean sounds have the same perceived loudness as distorted sounds. “Clean Sens” determines the volume of clean sounds, but not the way the amp or the effects are driven. A low level guitar output stays clean, a hot guitar will still distort more easily.

- ✓ Extremely hot guitars can generate unwanted distortion. To prevent this we recommend a lower “Clean Sens” value.

If you feel that your guitar tends to drive the distortion too hot (or too soft) for the majority of preset rigs, then calibrate your guitar by setting “Distorted Sens”, to the left or right from the neutral zero position.

Input LED (12)

The LED reflects the level of the input signal. Green is OK, yellow is still OK, red is too high.

Noise gate knob (13)

This knob controls the NOISE GATE, which eliminates the noise and hum of your guitar in a very smart way. Turn the NOISE GATE knob to the right, until noise and hum have disappeared; do not turn it beyond that point, as this might alter the sound of your guitar. When set to the appropriate position, you will notice that the noise gate is capable of eliminating noise and hum, even when the strings still sound. There is no need for an additional release control as in classic noise gates. The noise gate settings can be stored as part of a rig.

With the chicken-head set to *Profiler* mode, the noise gate will also work with the connected amplifier, but without interfering with the result.

Master button (14)

This button brings the master settings, such as “Master volume” and “Output Routing”, into focus. The settings are global and are therefore not saved with the rig. Instead, use local settings to store specific adjustments for different clubs, studios or rehearsal rooms.

- ✓ A dedicated soft button allows you to disable the speaker emulation for the MONITOR out, should you wish to connect the KPA directly to a power amp driving a guitar cabinet.

Master volume knob (15)

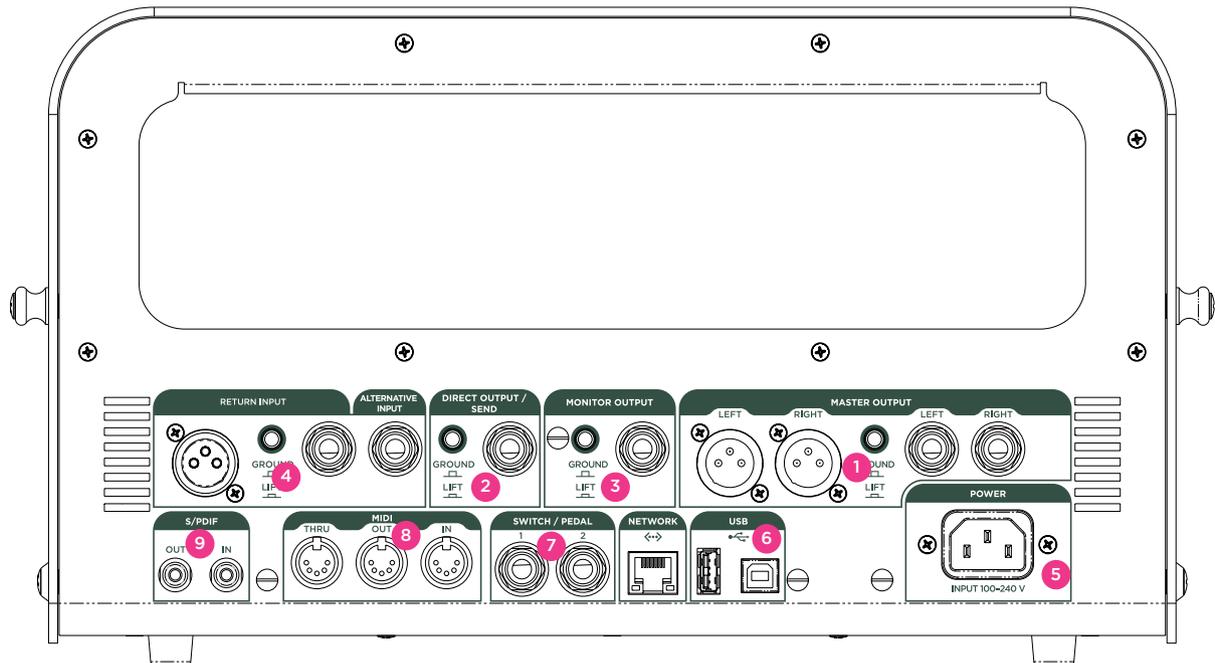
“Master Volume” is always global, and therefore not stored with a rig. To control headphone volume, please use the dedicated soft control in the master section, which can be accessed by pushing the MASTER button. Changing the volume doesn’t affect the color of sound.

Volume knob (16)

VOLUME controls the relative volume of a rig, and is stored as a part of it. Use this control to level out volume differences between rigs. Again, changing the volume doesn’t affect the color of sound.

Back panel overview

Now that we've gone over the front panel, let's give you a basic overview of what you'll find on the back panel.



Master out section ⁽¹⁾

This is your MAIN STEREO out. Use these outputs to connect to a mixing desk in a recording studio, or to the *front of house* mixer in a live situation. These outputs deliver the entire rig: amp, cabinet and all effects. The outputs are symmetrical and you have a choice of XLR or quarter-inch jack. Like all ins and outs it offers a GROUND LIFT to prevent a hum loop.

Monitor Out section (2)

Use this mono output to connect the KPA to a stage monitor with its own level controls. This output also has its own GROUND LIFT.

You can also connect this output to a power amp and a regular guitar cabinet. In this case, you need to switch the cabinet simulation off, using the soft button “Monitor Cab Off” in the master page, to prevent unwanted coloration created by running a speaker-emulated signal through a guitar cabinet.

Direct Output/Send (3)

This carries the direct output signal in glorious mono. The main purpose for this output is to feed signals into the reference amp while profiling. But it can do more than just that: you can also use the DIRECT OUTPUT in combination with the RETURN INPUT to create an effects loop. In this case, the DIRECT OUTPUT becomes a mono send.

If you're not using this output as part of an effects loop, it will carry the original guitar signal. So, if you want to record your guitar dry, connect the DIRECT OUTPUT to the recording device or audio interface input.

Return and Alternative Input (4)

Use these inputs to connect the output of external equipment with your KPA. Their main use is for profiling - use either input as the return from the reference amp. Use the quarter-inch input to take a line-level signal from a digital amp, speaker simulation or subgroup of a mixing desk. Use the XLR INPUT as appropriate, for instance with a microphone. Please note that the KPA's XLR input does not provide phantom power.

As mentioned previously, the RETURN can also be used to create an external, mono effects loop in combination with the DIRECT OUT. Select “Loop Mono” or “Loop Distortion” in one of the stumps to include a hardware effect in your signal flow. In the EFFECTS section (X or MOD) you can also select “Loop Stereo”.

In this case, the RETURN works in combination with the ALTERNATIVE INPUT to achieve a stereo loop return.

Power connector ⁽⁵⁾

Connect this to your wall outlet using the supplied power cable. The internal, universal power supply accepts 100 - 240V AC via the usual IEC inlet.

USB ⁽⁶⁾

Use the USB host port to connect USB sticks for backups and OS updates. See “Updates, backup and sharing sounds” for details.

Pedals and switches ⁽⁷⁾

You can connect a variety of pedals and switches to control several functions. Pedal #2 is the volume pedal by default. When you connect a foot switch, use the parameters in System mode to assign that pedal to perform a variety of functions. Pedal #1 defaults to the control of Wah-type effects.

MIDI ⁽⁸⁾

Use these ports to connect the KPA to MIDI equipment. You can send MIDI program changes to switch between rigs.

S/PDIF digital I/O⁽⁹⁾

This is a digital input and output that can be used to connect the KPA to other S/PDIF compatible devices such as certain computers and audio interfaces.

Using the tuner

The tuner LEDs above the chicken head knob are always active so you can monitor your tuning while you play. Even when you're not in tuning mode, the LEDs give you general information whether your guitar is in tune or not. If a guitar string is far out of tune, only the outer LEDs will be on. If your string is closer to proper tuning, the middle LED gets brighter. If your string is in tune, only the middle LED will be lit. So to tune your strings, make sure that the white LED in the middle is on, and the surrounding green LEDs are both off.

If you want a far more advanced tuner, you can use the chicken head knob to activate *Tuner* mode. When *Tuner* mode is engaged, a large tuner graphic appears and in addition, unique tuner functions become available:

Mute Signal	This determines whether the audio is sent to the MASTER OUTPUTS or not. To tune your guitar silently, enable "Mute Signal". The signal will then be muted, but only while you're in <i>Tuner</i> mode. This is a neat way to mute the signal temporarily; for example, to avoid unwanted noise when you change guitars.
Master Tune	Use "Master Tune" to adjust the base pitch of the tuner, in case you need to tune your guitar to something other than 440 Hz.

✓ When the *Tuner* mode is enabled, the LEDs become more sensitive to softer levels.

Building a rig

If you have ever used a digital guitar processor before, you will know that building your own rigs is part of the fun! In the KPA you will find it surprisingly easy, as well. Simply bring any module or section into focus, activate it, and select from a range of presets using the BROWSE knob. Tweak to your liking, add spices if necessary. To help get you started, here is a brief overview of the available modules:

Stomp section

This is a mono section. It includes all the built-in stomp box simulations that you can place before (pre-) your virtual amplifier stack. An idle stomp slot can be activated by pressing and holding the corresponding Stomp A/B/C/D button. Once in focus, the soft button “Enable” recalls the default Wah algorithm. Alternatively, use the Type knob to browse through all available stomp algorithms. Selecting an option will recall the stomp and close the list browser.

◆ Stomp Types

There are several types of stomp boxes available in the stomp section, such as various Wah effects ranging from bandpass to comb filters. There are also several distortion stomps available, which were modeled after famous vintage pedals. On top of all this, modulation stomps such as Vintage Chorus, Hyper Chorus, Vibrato, Air Chorus, Flanger, Phaser, Tremolo and Rotary Speaker are included.

Most stomp parameters are self-explanatory, and a detailed overview of all available stomp parameters can be found in the *Reference Manual*.

Stack section

This is your “amplifier stack” consisting of your amplifier profile, speaker cabinet profile, and EQ. Pressing the STACK button and holding it for a short moment will enter the stack edit mode. You can rename the stack using soft button “Rename” or browse through the available stacks using the BROWSE knob.

Amplifier module

Hold the AMPLIFIER button to display the amplifier settings.

◆ Definition

This parameter determines the way the preamp distorts when overdriven. Every guitar amp produces a different kind of distortion. The “Definition” parameter controls the characteristic fingerprint of the preamp. The profiling process automatically sets “Definition” to the position that best represents the reference amp.

Settings on the left of the parameter range	Woody, muted, <i>bluesy</i> , or earthy textures with a limited dynamic range.
Settings in the middle of the parameter range	Fat and creamy textures with a greater dynamic range.
Settings at the right of the parameter range	<i>Sparkling</i> , brilliant, interactive and boutique.

As you can see, by tweaking “Definition”, you can change the preamp distortion characteristic completely. So you could, for example, use this control to modernize the profile of a vintage amp without having to use additional stumps. Alternatively, start with a profile of a modern tube amp and use “Definition” to give it a more vintage sound, when driven.

You can also use “Definition” to align the sound of your guitar to the sound of your amp, if required. Don’t be afraid to experiment until you get the balance that sounds best to you.

◆ Power Sagging

Power sagging models the interaction between the guitar signal and the distortion stage. Often, you hear guitarists talk about how the tubes “breathe” — that’s power sagging.

Increase the amount of “Power Sagging” to emphasize the velocity and energy of crunch sounds. The guitar sound gains additional energy and presence, without raising the perceived volume of the distorted signal.

When you turn “Power Sagging” beyond 50% you will go beyond what can be achieved with an analog tube amp, but without losing any of the natural characteristics of the sound. At full force, “Power Sagging” can make sparkling clean notes sound louder than distorted ones. In other words, you can use power sagging to expand the dynamic range of the original sound. At 0% the original dynamic range is maintained.

◆ Pick

This is another exclusive and unique feature. It allows you to control the level and sharpness of the pick attack independently from the sustained portion of the sound. The result is independent from the amount of distortion. You can use this parameter to make clean sounds even more percussive without using a compressor. With fully distorted sounds you can resurrect the attack phase of any notes that get drowned in the natural compression caused by distortion. This will help you to make the riff cut through the mix more effectively. If you set “Pick” to a negative value you will soften the attack, resulting in a more fluid sound.

◆ Compressor

The compressor in the stack section is different from the others, because it is a part of the simulated amp circuit. In other words, it allows for completely different sounds compared to compressors that are inserted before (pre-) or after (post) the amp section. Distorted signals are not affected by compression; only clean signals will be boosted. The dynamics of your playing are fully retained. Depending on the strength of your picking, you can go from a crunchy sound to a compressed, clean sound. The volume knob on your guitar works exactly as you would expect: for instance, reducing the volume of your guitar will transform a dynamic crunch into a clean, compressed sound with full energy.

✓ You can find more information regarding the remaining amp parameters in the *Reference guide*.

EQ button

Holding the EQ button will bring it into focus. The soft knobs underneath the display control the following parameters for the EQ:

Soft Knob #1	Low frequency range.
Soft Knob #2	Mid frequency range.
Soft Knob #3	Treble frequency range.
Soft Knob #4	Presence.

Cabinet button

The CABINET button brings the cabinet section into focus. You can freely combine cabinets and amps from different profiles to create new stacks, as well as tweak the following three parameters for every cabinet:

◆ High Shift, Low Shift

Both of these parameters influence the characteristic formants of a cabinet profiles. “High Shift” will make the higher formants more prominent, whereas “Low Shift” does the same for the lower frequencies. These controls simulate the effect of changing the size of the cabinet.

◆ Character

Use this parameter to change the overall character of the cab. Turning the knob to the right will enlarge the highs and lows in the frequency response curve. This will result in more presence, but may sound too penetrating at extreme values. Turning it to the left will smooth the differences between the peaks and troughs in the frequency response curve. Of course, this will also flatten the character of the cabinet. To-

wards the left most position, the sound will resemble that of analog cabinet simulations (which often have a very limited frequency response and little character).

Effects section

The Effects section is where you can add stereo effects after (post-) the mono stomsps section and the amp stack. It consists of the following modules:

◆ X

The X stomp can use the same effects as the stomp boxes, but in stereo, which is especially useful with effects like chorus that spread the sound over the stereo image.

◆ Mod

MOD can also use the same effects as the stomp boxes. However, this module is equipped with hardware controls which are designed to work specifically with modulation effects such as Chorus, Flanger, Phaser or Rotary. For this reason we recommend saving this slot for these types of effects. Modulation rate and intensity can be controlled using the dedicated RATE and INTENSITY knobs.

◆ Delay

These are the built-in delay effects. You can determine the stereo placement of the delay signals, the rhythmic values of the repeats, and also the character of their sound. Delay feedback and mix can be controlled conveniently using the dedicated hardware controls.

The Profiling Amplifier provides three types of delays in the DELAY module on the right.

Tap Delay	The delay time is linked to the tempo as selected in RIG settings, or by the TAP tempo button.
Free Delay	Delay time is freely adjustable in milliseconds, and independent from the TAP tempo. The delay time can be changed transparently, with no audible artifacts, which is also true for the tap delay.
Analog Delay	Delay time is adjustable in milliseconds, like in the free delay. However, adjusting the delay time will create those crazy pitch shifts or Doppler effects, known from the good ol' bucket brigade delays.

More details about delay parameters can be found in the *Reference manual*.

◆ Delay LEDs

The delay LEDs will indicate the delay pattern by blinking in sync with the tempo.

◆ Reverb

This is the built-in reverb effect. It includes several room- and hall-type reverbs. The reverb's TIME and MIX parameters can be controlled with the dedicated hardware knobs on the upper half of the front panel.

- ✓ Both delay and reverb tails will even survive rig changes that use different delay and reverb settings. This is called “spill over”.

Tap tempo

◆ Tap button

A number of effects allow timing parameters to be determined by the tempo of the song you play. These include the delay time in the Tap Delay, and the rate parameter of the Phaser, Flanger, Tremolo and other

modulation effects. All factory rigs have the tempo disabled by default, as we cannot know in advance what tempo you are going to need.

When no tempo has been set, these parameters will show you the absolute time values in Hertz or seconds.

There are three ways to activate the tempo:

- Tap the desired tempo on the TAP button.
- Select the specific beats per minute (BPM) using the “Tempo” parameter within the rig menu.
- Send MIDI Clock from another device.

When the tempo is engaged and active, the respective rate parameters of the modulation effects will show you musical values instead of absolute time values.

Between each regular musical value you will find dotted and triplet values. The unnamed values in between will rarely make musical sense, but will allow you to dial through the rates in a fine resolution, even when the tempo is engaged.

You will also find a soft button labelled “Tempo Enable” in the rig menu. Here, you can enable/disable the tempo, as required. To really get the most out of TAP tempo, you can assign a foot switch to this parameter, and simply tap the beat with your foot while you play.

- ✓ If a rig has a set tempo, all tempo related parameters are displayed in note values.

Configure your system preferences

System button

Press SYSTEM to access the “global settings” pages. Global settings remain unaffected when you change to another rig. Parameters in the system menu include “Pedal Settings”, “LED Intensities”, “Display Contrast”, “Time And Date”, among others.

Module button behavior

You have learned that the module buttons have two purposes:

- Switch a module on or off (press button briefly).
- Bringing a module into focus (hold the button for a little while).

If you feel uncomfortable with holding the module buttons to put an effect into the focus, you can change the behavior of the buttons in the system menu by activating “Direct Edit”. In this mode a short push of a module button puts the module into focus, just as the RIG or SYSTEM buttons do.

There are still two ways to switch a module on and off: either bring the effect into focus and use the ON button, or hold the ON button while pressing the module buttons that you want to switch. This procedure will work in any situation. Even while editing one effect, you can switch other effects on and off by holding the ON button while you press the respective module buttons.

Using a MIDI pedal to switch rigs

You can assign a unique MIDI program change number to each rig (up to a maximum 128 rigs). To do so, select a rig in *Browse* mode and press the SYSTEM button. Navigate to the “MIDI Settings” page and locate the “PrgChg Settings” soft button. Press this to see a list of all available assignments.

Rig button

This button is used to access rig-related parameters that are not covered elsewhere on the front panel, for example “Tempo”.

Quick button

The QUICK button calls up a user-selectable page in an instant.

Using performance mode

Editing performances

This mode is for live playing. It allows you to organize rigs in what we call “performances”. Each performance is a collection of five rigs together in one place. This allows you to switch between them quickly and easily, for instance from the verse to the chorus sounds of a song, by using a foot switch or MIDI program change.

You can navigate through the chain of rigs using the rig LEFT and RIGHT buttons.

Use soft button “Get Rig” to choose a rig for the currently-selected slot in the performance, then use the BROWSE knob to scroll through the list of all available rigs. Make your selection with the “Load” button.

Back in the general *Performance* mode screen, press soft button “Arrange Performance” to open up a dialog which allows you to re-order the rigs to your liking. Next, select the slot you would like to move using the appropriate soft buttons (or the LEFT and RIGHT buttons). Finally, “Move Slot” will open up a dialog where you can select a destination. Use “Rename Slot” to choose a meaningful name, such as “verse” or “chorus”.

For more detailed information regarding managing performances please consult the *Reference manual*.

Updates, backup and sharing sounds

The Kemper Profiling Amplifier's operating system can be updated to receive refinements and new features. All you need is an internet connection, a PC or Mac and a USB stick.

Updating the operating system

Please perform the following simple steps to update your KPA to a newer operating system:

You will need to use an **empty** USB stick in order to transfer the files from your Mac or PC to the KPA for the first time. When you connect a USB stick for the first time, the KPA will format it to ensure maximum reliability.

The next step is to download the latest operating system. Updates are free of charge and can be downloaded from the following URL:

www.kemperamps.com/start/

Expand the downloaded .zip archive and search for the update file called "kaos.bin" inside. Copy the file into the "OS Update" folder on the pre-formatted USB stick using your Mac or PC. Next, unmount the USB stick from your computer and plug it into the KPA. Follow the on screen instructions which will appear after a couple of seconds.

Creating and restoring backups

We recommend that you backup your rigs and performances on a regular basis. To do so, please plug the prepared USB stick into your KPA, switch to *Browse* mode, hit soft button "External Storage" and you'll be presented with the following options:

◆ Backup

Use this option to backup your KPA. The backup will contain all user rigs, performances and local presets. If an older backup is already present, it will not be deleted but renamed automatically. To backup, select the soft button “Backup” and wait until you’re notified that the backup has been completed. This procedure can take several minutes. Never remove the USB stick until you’re prompted to do so. All successful backups can be found inside a folder called “Backups” on your USB stick.

◆ Restore

This option restores a backup from your USB stick to the KPA. When multiple backups are detected, the most recent one will automatically be restored. Confirm by selecting the soft button “Restore” and wait until the procedure has been completed. Note that restoring a backup will replace all rigs, performances and local presets with the backup. In order to merge a backup file with the existing content, please proceed as follows:

Importing rigs, performances and local presets

Over time, we will give you access to a mind-blowing variety of the highest quality profiles and rigs. Those and other goodies can be downloaded from our website here: www.kemperamps.com/start/

In order to transfer these files from your Mac or PC to your KPA, please copy them to the directory called “Shared” on your dedicated USB stick. Next, plug the USB stick into the USB slot on the rear panel of your KPA and switch to *Browse* mode. Wait for a couple of seconds and then press the soft button “External Storage.” You will then be presented with an option to import the new content. Importing the content will merge the new data with your existing profiles, rigs and performances.

- ✓ Unlike other platforms, you don’t need to unmount the USB stick, you can simply remove it once the task is completed.
- ✓ In certain cases you may want to merge a backup with the existing content. To do so, copy the backup in question from the “Backups” to the “Shared” folder using your Mac or PC and perform an import as described above.

KPA and MIDI

You can use MIDI to send program changes to switch between rigs. You can send MIDI messages to the KPA either using your computer and a MIDI interface, or by using a dedicated MIDI control pedal.

For more detailed information please consult the *Reference Manual*.

Profiling Guide

Profiling an amp

Now we're getting to the fun stuff! Profiling your own amp, custom digital simulation, or favorite stomp box is what sets the KPA apart from every other digital amplifier out there. We've spent years getting our profiling system to deliver the goods in terms of sound quality, playability, and ease of use — all wrapped in a user-friendly interface. So while there's a lot of science and technology behind the concept of profiling, you'll find that it's quite easy to actually do; this guide can show you the basics and get you started right away.

General considerations

In order to make a profile, the original amplifier (which we will refer to as the “*reference amp*”) has to be connected to the KPA using the DIRECT OUTPUT and the RETURN INPUT on the back. The KPA then sends various tones and signals into the reference amp — it will sound like warbles and static at various pitches and intensities, in other words: not too musical! To get technical for a moment: these dynamically-changing sounds allow the KPA to learn about the nonlinear behavior of the tube architecture and the dimensions of the passive components in the original amp. The KPA then listens to how the reference amp reproduces these sounds and analyzes the results. These characteristics are then recreated in the virtual signal flow of the KPA. Even the characteristics of the speaker cabinet and microphones, including all the frequency buildups and cancellations, are detected and become a part of the profile.

If that sounds a bit complicated, don't worry about it. The important thing to understand is that those weird sounds are how the KPA determines the unique way that your reference amp changes the sound of your guitar dynamically over time. With the information the KPA gets from those weird sounds, it is able to create a digital *profile* of your *reference amp*.

You can also profile solid-state amps and modeling amps, although the results from profiling modeled amps can sometimes be underwhelming. The reason for this is that some emulations try to mimic the typical tube sound using techniques that don't necessarily match the analog reality.

◆ Profiling with effects in the recording chain

Many guitarists get their signature sound by combining distortion pedals, booster pedals and equalizers/filters with a tube amp. If you want to do this, you can keep these in the signal chain during the profiling process — they will all be accurately profiled as a part of the reference amp sound. However, there is one exception: some distortion pedals use a special design that cannot be profiled accurately, for instance the Tube Screamer.

If you do include your effects chain with your amp profile, but are not happy with the result, try again without the distortion pedal. Remember, you can always use one of the modeled distortion pedals in the KPA instead when building your rig.

Other effects should be bypassed during the profiling process because they will adversely affect the result, making it sound less natural and different to the original amp tone. These include: compressors, noise gates, and time/modulation/reverb effects such as delay, reverb, chorus, and so on.

You might also run into trouble when profiling a sound in which both the pre- and power amps of the reference amplifier are driven into distortion. If the resulting profile sounds unsatisfying, try to reduce the volume of the power amp. This will make the result sound somewhat more transparent, without significantly reducing the amount of distortion. The same is true for those modeling amps which offer a separate gain control for pre- and power amp.

The KPA only allows for mono profiling. Stereo profiling is not currently supported, but really, how many *classic* guitar amps feature true stereo circuitry, anyway?

Since the KPA sends its own test-tones into the reference amp during profiling, it should be obvious that the sound of your guitar isn't part of the result. The KPA is designed to react to *any* guitar in an identical way to the reference amp that was profiled.

◆ Monitoring while taking profiles

The output of the reference amp can be monitored through the outputs of the KPA. This way, you can switch between listening to the original reference amp signal and the profiled version using the soft buttons in the profiling mode. In fact, we recommend that in order to avoid any confusion between what you are hearing and what the KPA is profiling, the reference amp should only be monitored using the KPA. To

ensure that you are only hearing your reference amplifier through the KPA, it's a good idea to place the speaker cabinet of the reference amp in a different room (in other words, somewhere you won't hear it) and away from the monitor system you are using for the KPA. Keep in mind that this will not change the result of the profiling process in any way, but will make A/B comparisons between the reference amp and the KPA much easier.

If you want to make profiles of computer-based amp simulations, but without using any kind of external mixer for monitoring purposes, you need to be careful not to create a feedback loop. One easy way to avoid potential feedback loops is by using only headphones to monitor the output of the KPA while profiling. You can also make appropriate settings in your DAW to prevent the output signal of the KPA from being routed back into the KPA.

◆ Considerations regarding noise and hum

If you're profiling a very high-gain sound, you'll probably hear a certain amount of noise from your guitar amp. This is the well-known "high-gain hiss" and nothing unusual. However, if you detect hum, or other noisy artifacts, from your reference amp then you probably have a ground loop. Press the GROUND LIFT switch on the back of the KPA for both the MAIN OUTPUTS and the RETURN INPUT. If that does not solve the problem, try different combinations using the other GROUND LIFT switches. It is important that at least one of the GROUND LIFT switches is *not* pressed to make sure that the KPA has at least one ground connection.

- ✓ Remember that hum and noise is undesirable and might have a negative influence on the profiling process. Often, the best results are achieved by pressing the GROUND LIFT buttons for all outputs except for the DIRECT OUT.

◆ Other considerations

- ✓ Make sure that you are hearing the previously-selected rig in the KPA when you set the A/B comparison to "Kemper amp", and the to "Reference Amp" when you switch to *reference amp*. If you don't, re-connect your *reference amp* to the KPA.
- ✓ Playing back profiles over the MONITOR OUT using a regular guitar cabinet is one of the main features of the KPA, but it is not recommend to use a guitar cabinet as a reference monitor for a profiling session. For

best results it is crucial to do the profiling session in a typical studio setting using linear studio monitors or a PA.

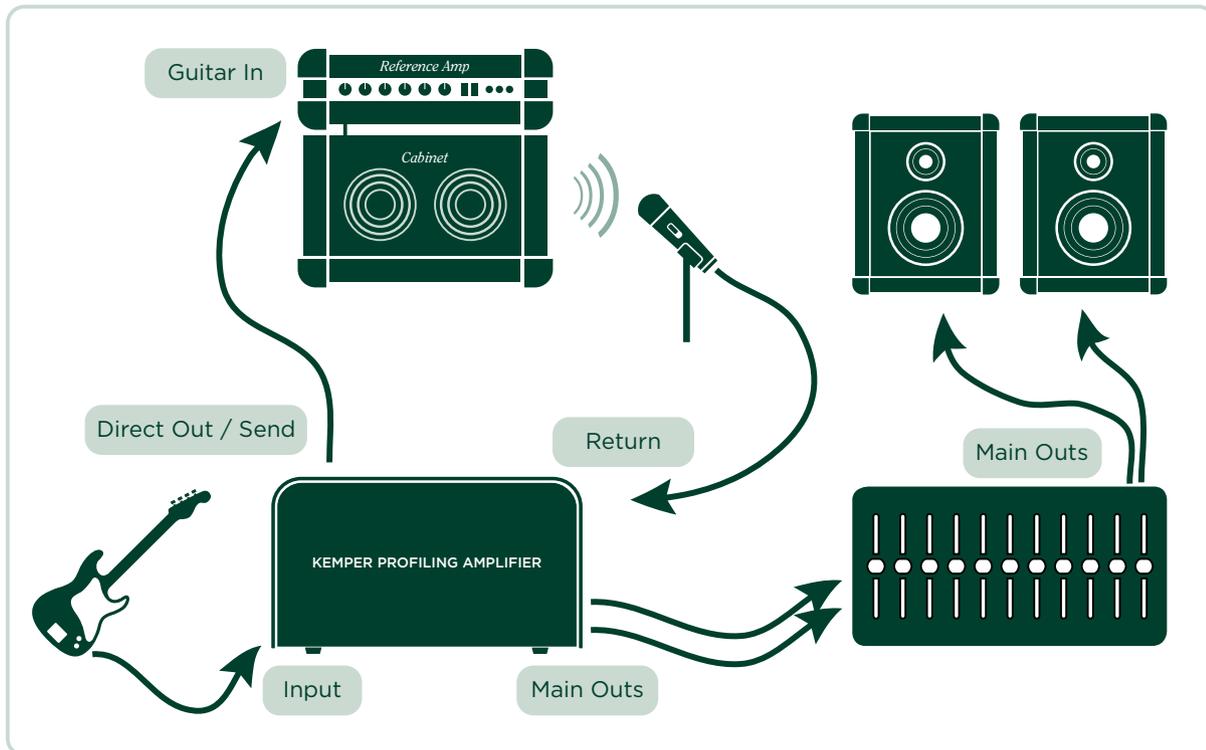
- ✓ If your amp provides a spring reverb, remember to turn it off for the profiling process.

Making connections

Connections for profiling a hardware guitar amp

Here are a few typical scenarios for the most common profiling setups:

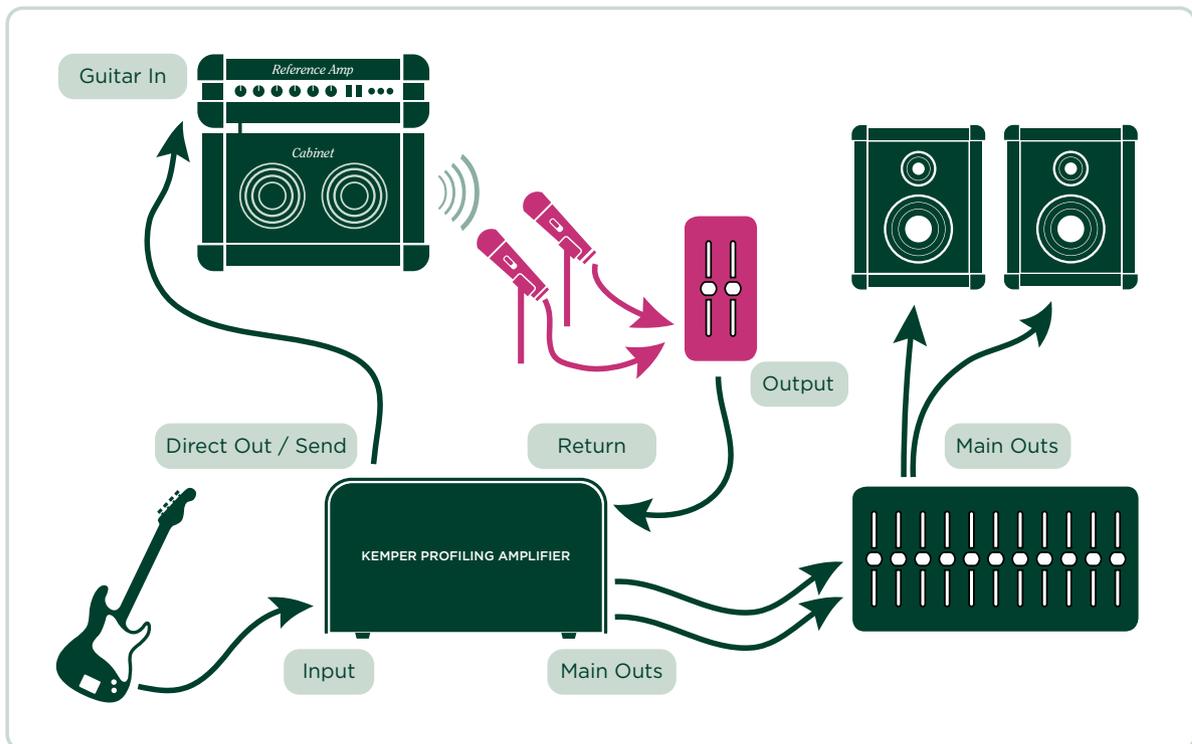
- Connect your guitar to the INPUT jack of the KPA.
- Connect the DIRECT OUTPUT/SEND of the KPA to the guitar input of your hardware amplifier.
- Connect your microphone or microphone preamp to the RETURN INPUT jack of the KPA (use either the XLR or quarter-inch input depending on your microphone or microphone preamp).



The above assumes that you are miking the speaker cabinet connected to your *reference amp*. If you are taking a direct, cabinet-simulated output either from the amp itself, or from a speaker load box such as the Hughes & Kettner Redbox or Palmer boxes, you can connect the line-out from a load box directly to the RETURN INPUT of your KPA.

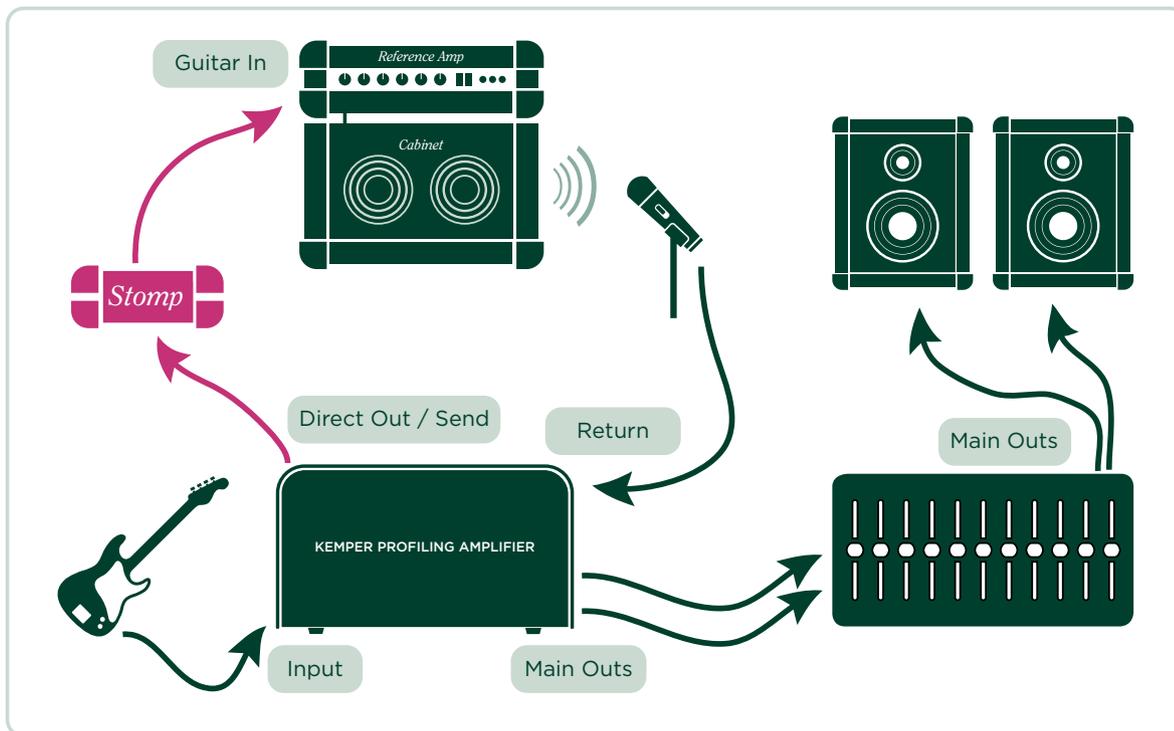
The *reference amp* that you want to profile has to be connected to the KPA in such a way that only the KPA will send and receive the signals. This effectively turns the KPA into a monitoring device.

Avoid any other connections that might lead to confusion and end up corrupting the results. For example, if you want to use several microphones with your *reference amp* you should route the signals of these microphones to a subgroup of your mixer, and then route the output of that subgroup directly to the PROFILING INPUT. You can use the EQ and phase switches on the mixer to optimize the mix. Make sure that the signal is only routed to the KPA and isn't duplicated at the main outs of the mixer.



It's a good idea to make the KPA the central hub for all your guitar recordings and use it as your main switching device. That way you can use all of your favorite amps alongside the internal effects of the KPA. Once you've finished recording, it will only take a few button pushes to preserve the exact sound for future use.

Connections for profiling a combination of amp and stomp box



- Connect your guitar to the **INPUT** of the KPA.
- Connect the **DIRECT OUTPUT/SEND** from the KPA to the input of your stomp box.
- Connect the output of the stomp box to the input of your *reference amplifier*.
- Connect the microphone or microphone preamp to the **RETURN INPUT** of the KPA.

- ✓ The KPA can only accurately profile preamp stomp boxes such as overdrive and distortion pedals, Eqs and filters, tube preamp pedals, and so on. Attempting to profile a delay, reverb or modulation pedal is unlikely to work as expected. In other words: your mileage might vary.

Connections for profiling a computer-based guitar amp simulation

- Connect your guitar to the INPUT of the KPA.
 - Connect the DIRECT OUTPUT/SEND from the KPA to the appropriate input on your computer's audio interface.
 - Route the output of your guitar amp simulation software to a specific hardware output of your computer's audio interface.
 - Connect the output in question to the RETURN INPUT of the KPA.
-
- ✓ When profiling a guitar amp simulation, be sure to switch *off* the noise gate in your guitar amp simulation software.

Taking a profile

Once the *reference amp* is setup just the way you like it, it's time to start profiling. Don't worry, once you read through this guide and tried it for yourself, we are sure you'll agree that profiling is a very simple and straightforward process.

Start by choosing a rig in *Browse* mode. It's a good idea to choose a profile that is somewhat related in character to the *reference amp*. This will give you the chance to compare the existing rig with that of the setup you are about to profile, thereby ensuring that you get a result that is even better suited to your needs.

- ✓ Switch off any effects loop in the rig you have chosen, to prevent your *reference amp* from sitting in the effects loop of its own profile. Effects loops are indicated by the LED color white.

Using other built-in KPA effects in the reference rig while you are profiling is not a problem. Those effects you have engaged will still be audible when you switch to your *reference amp*, so you can configure the KPA's stomp boxes and other effects in the Profiling amp to suit your *reference amp* tone, even before taking the profile. When you have taken the profile and stored it as a part of a new rig, all the stomps and effects that were part of the original rig will be stored also.

- ✓ If you prefer a pure sound with no effects, you can either switch any stomps and effects off prior to profiling, or choose a rig with no active stomps and effects.

Next, turn the chicken-head to the *Profiler* position. At this point, you will still hear the previously selected rig. Use the soft buttons to switch between the *reference amp* and the KPA/profile.

◆ Output levels

Set the output level of the *reference amp* to roughly the same level as the internal sound of the KPA. You can check level differences by switching back and forth between the current rig and your *reference amp*. You can adjust the incoming volume of your *reference amp* with the "Profiling Return Level" parameter. If the master LED turns red when you play your *reference amplifier*, the level is too hot. Once the profiling procedure is finished, the KPA will fine tune the monitoring volume automatically so there will be no difference in perceived loudness.

Please remember to leave a few decibels of headroom in your microphone preamps and the rest of the signal chain. The test signals can get a bit louder than a regular guitar signal, and might cause clipping in your signal chain if you don't leave enough headroom. Be sure to watch your level meters while the profiling is in progress, just to be sure there are no overloads.

Press the soft button labeled “Next”.

On this page you can inform the KPA whether the sound you want to profile is *clean* or *distorted* by pressing the appropriate soft buttons. If your *reference amp* has a clean sound you can set the KPA to “Clean”. In truth, this step isn't strictly necessary; the KPA will detect if the reference amp is clean automatically during the profiling process. However, if you already know you're profiling a clean amp, setting the KPA to “Clean” before you begin profiling will ensure that no extremely loud signals are sent to the *reference amp*.

Why might you want to do this? Remember, a clean amplifier has a wider dynamic range than a distorted amp (because amp distortion also has a compressing effect), so pressing “Clean” can save your monitoring equipment and your ears. To profile a distorted sound, press — you guessed it — “Distorted”. You can also use the EQ in this page to further shape the sound of the reference amp before you start profiling.

As soon as you select “Start profiling”, the KPA will send measurement signals (those weird sounds we talked about at the beginning of this guide) to the reference amp.

Refining the profile

What if the profile isn't perfect? Maybe the characteristics of the distortion behavior don't match exactly, or perhaps some frequency ranges are more prominent than others? In these rare cases, never fear! If the automatic profiling process was unable to catch all the nuances of the reference amp, you can use the “Refine profile” function.

Simply press “Refine profile” and play your guitar for about 20 seconds. This is no time for a meaningful solo - you need to play several chords, with attitude! This will generate intermodulation in the distortion that the KPA needs to do its refining. In particular, you may find that slightly crunchy sounds will benefit from the Refine profile process. Be sure to strum especially hard so that the KPA has a chance to analyze the transients.

With completely clean sounds you don't need to worry about refining the distortion characteristics, so "Refine profile" isn't available. If you find that the profile offers a wider dynamic range, and a higher volume in the transients compared to the original, the reason is probably that the original sound was, in fact, slightly distorted. This would have caused a small amount of compression, thereby affecting the result of the profiling process. In such a case, simply repeat the whole procedure, but without using the "Clean" option.

Power amp tubes generate a different type of overtone structure than preamp tubes. They distort with a harsher sound, because the negative feedback in the power amp circuit linearizes the tube amplification. This makes the distortion curve edgier. If you notice in the A/B comparison that the *reference amp* produces more high frequency distortion when light distortion is applied, you should set the "Tube Shape" parameter to about 9.0, to get the same behavior from the profile.

When you feel that you have refined the profile enough, press the blinking soft button to stop the process. Now make another A/B comparison to check the result. Repeat the process if necessary as many times as needed.

The resulting profile

Once you are happy with the result of the profiling, you can store the sound in the KPA as a new rig. We highly recommend that you save the profile before you start modifying its parameters to preserve the original settings.

Congratulations! You have added a new amp and a new cabinet to your KPA's arsenal. You are now free to combine each of them with other amps or cabinets in the KPA to create new hybrid stacks.

You will notice that the GAIN knob is automatically set to the same (audible) position as the *reference amp* and the amp volume is the same as the other amp volumes to make it easy to compare different amps. The actual gain range of the KPA is probably much larger than your original amp. This means that you can play the new profile from ultra clean to super distorted, even if you couldn't do so on the reference amp itself.

In those situations where the reference amp was clean, the GAIN knob will be set to the minimum position, while retaining all of the original volume. Of course, you'll have no trouble turning up the GAIN knob

to distort this sound if you want to! Inside the KPA, the “Preamp Definition” parameter has been set to the center position, and can be modified at any time.

When it comes to crunch or high-gain sounds, the “Preamp Definition” value is automatically set to a position that matches the reference amp. You can thus identify the virtual age of the *reference amp* and even modify it on-the-fly.

When you create a new profile, “Power sagging” is set to zero by default. By increasing the amount of power sagging, you can increase the dynamic range of your profile. This can be especially useful if you have profiled a reference amp that had a distorted sound with a limited dynamic range.

✓ **Tip:** If you set “Power sagging” to the two O’clock position, and set “Preamp Definition” a little higher than its original setting, you can make the profile of a great reference amplifier sound even better, and more dynamic, than the original!

The sound of the reference amp’s equalizer circuitry becomes an intrinsic part of the profile, but the actual settings of the equalizer knobs are not replicated. We assume that the sound of the reference amp is exactly the tone that you want to achieve, hence the equalizer in the KPA is set to a neutral state, leaving you free to tweak the sound to your taste.

To make another amp profile, just press the soft button labeled “Create New Profile”. See? We told you it was easy!

◆ Profiling a rotary speaker cabinet

The Kemper Profiling Amp already ships with some rotary speaker profiles and rigs which were captured from the real thing, but if you have access to a different brand of rotary speaker, you can take your own profiles, too.

To do this, first set up the rotary speaker as you would in a normal recording situation. Next, connect the whole chain to the KPA, just as you would with a guitar amp. This time, however, two microphones should be used to capture the cabinet - one for the bass rotor, and one for the tweeter horn.

Connect the microphones to a mixer, create a mono mix of the two, and send this to the KPA’s RETURN INPUT. The idea is for both microphones to be captured at the same time, resulting in a single profile. Now, switch your Rotary speaker to high speed and start the profiling procedure. The profiling process will ignore the rotation of the cabinet and only capture the typical sound character. The resulting profile will

probably sound weird and uninspiring on its own, but when you engage the “Rotary speaker” stomp in the MOD module, you’ll hear the rich and animated sound of your original rotary cabinet.

- ✓ **Tip:** Although the profile is captured in mono, you can use the “Rotary speaker” stomp in the MOD or X slot to recreate the typical stereo movement of the signal. The Rotary speaker effect will automatically separate the bass rotor from the tweeter horn.

Under the hood

In case you enjoy reading about technical details, below is a description of what the KPA is doing during the profiling process:

During the first phase, you will hear white noise with a rising amplitude. The KPA is now collecting data about the frequency response of the *reference amp*. The frequency response will change dramatically as the gain increases. This is how the KPA learns about the circuitry of the *reference amp* and the frequency response of the cabinet. Also, the characteristic impedance curve of the speaker, including its feedback to the power amp, is detected in fine detail.

In the next phase, slowly pulsating white noise is sent to the *reference amp*. The volume of the white noise is set to a level at which the reference amp starts to distort. This is how the KPA learns about the dynamic distortion curve of the tubes in the *reference amplifier*. Using this information, the KPA is able to recreate that curve with the highest possible accuracy. This is also true for transistor-based and digitally-modeled distortions.

In the third step, the KPA sends a complex tonal texture that follows a mathematically-based set of rules to the reference amp. This texture creates unique interference patterns that allow the KPA to take a “fingerprint” of the DNA of the reference amp’s particular sound. The distortion of the speaker, along with the partial pattern of the loudspeaker diaphragm (also known as “cone breakup”) are excited by this tonal mixture. They complete the characteristic interference pattern that the KPA will reproduce faithfully, once the measurements have been taken.

If the *reference amp* is clean, the KPA skips the third phase (because there is no distortion to be measured).

