

# *Ampete*

# 88

**Owner's Manual**

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## **We all...**

... produce electronic waste! It's just a question of time!

We here at Ampete Engineering are not only consumers, like you yourselves, but also engineers of electronic products that we want to place into a modern world. Here it looks at first glance that everything has been invented already. But demands are getting more refined and specific by the day and as in the economics, the sports- or even spiritual world, performance, utility and consistency depend on small changes and nuances in improvements. In other words we are supposed to get better every day. This is not a one way street, it's a huge responsibility in the other hands!

For us it means more than wanting a slice of the pie. It means to review every single product we design for its added values, to anticipate the circumstance you put it into in order to ,simply' be able to maintain it everywhere it has been sold to.

Today our whole life is determined by electronics, at home, on the road, at work or vacation, in supermarkets, concert arenas or even in natural resorts.

Today in general electronics aren't built any longer to last! They're cheap.

For people from the 70ies like us it is a turning point. We grew up in a world where an electronic device is nothing short of a masterpiece. Today 90% of electronic applications are manufactured by using robots or exploitation in countries where `global players` celebrate the abolition of workers protection and minimum salaries. But it doesn't end there.

After an expected life cycle, more or less short, the cheap electronic waste is gonna be ,disposed' of. Dispose might suggest that components like housing, metal and synthetics will be recycled to find their way back into a product. But of course often this is not how it is done!

If you ever heard of 'toxic city' (and I don't mean the fantastic album of a great band) you probably know what we speaking of.

It might surprise you to read this in a manual for an electronic device.

We want to make sure you understand that by purchasing an Ampete Engineering Product you will get a device in which we put all our passion, belief and knowledge and that you get a product in the tradition of many great people before us, for whom electronics were and still are wonderful masterpieces.

But you also purchased a little piece of responsibility. Maintain your Ampete Engineering Product – we will be here to support you, we built this to survive... possibly even us.

In case you should be faced with any issue on any day at any place somewhere in the world, we are here as you would expect us to be.

This is not a promise, it is our view of life.

Thanks for letting us be a part in enabling your musical world.

Yours sincerely,

Ampete

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## **Introduction**

### **Ampete Engineering 88 Amplifier & Cabinet Switching System**

The „Ampete Engineering 88“ Switching System is designed to route several Guitar or Bass Amplifiers to several Speaker Cabinets. It covers several needs, from the demo purpose in Music Shops, Trade Shows or workshops to signal routing and real time switching in Recording Studios or even live music applications. For the first time customers have the chance to choose their favourite under a bunch of amplifiers as well as Manufacturers are able to compare a status of an amp development, prototype or competitor models.

The „88“ product line consists of three different models which can be used as a stand alone unit (88S-STUDIO) or be combined to a massive system of many many amps and cabinets... theoretical up to 99 each!

The whole series can be operated by a central unit as the 88R REMOTE or a MIDI capable device plus in case of the 88S-STUDIO it can be operated via the unit(s) itself at the front panel.

#### **88S: The „Shop“ Switcher (see page 7)**

The 88S is typically used by Music Shops or Trade Shows for demoing purpose, where a central operating unit is needed.

It's a 2-rack unit device giving the possibility to connect 8 amps and 8 cabinets. It has a buffered Instrument Input for a guitar or a bass that will be automatically routed to the amp currently selected. As the 88S has no front panel controls it can only be operated via the 88R remote control.

#### **88S-STUDIO: The „Studio“ Switcher (see page 11)**

The 88S-STUDIO is a 2-rack unit switcher giving the possibility to connect 8 amps and 8 cabinets. It has a buffered Instrument Input for a guitar or a bass that will be automatically routed to the amp currently selected.

Other than the 88S it has front panel controls to select an amp or up to two cabinets directly at the unit itself. Therefore it can be used as a „Standalone“ switcher that does not need necessarily the 88R remote to be operated.

The 88S-STUDIO can be interconnected with other 88S-STUDIO units to build a larger system without the need of a remote control 88R.

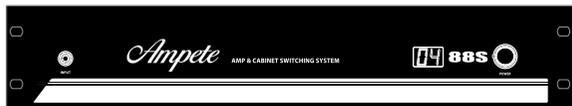
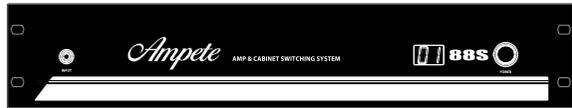
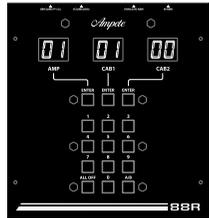
#### **88R: The Remote (see page 13)**

The 88R is the remote controller for the 88 Switching System. It has a numeric keypad for selecting an amp or up to two cabinets. It is connected to the 88S, 88S-STUDIO, or a system containing both via a CAT5 ethernet cable. The 88R is powered via CAT5.

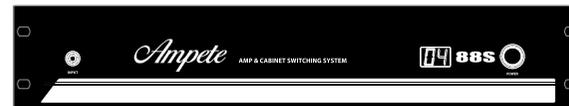
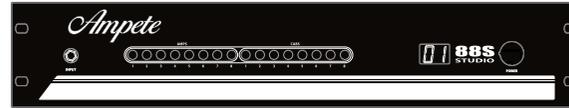
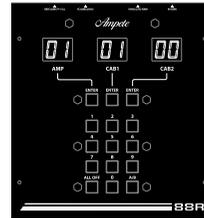
**The following page shows some examples of how the three different models can be combined.**

## 88 SWITCHING SYSTEM EXAMPLE SETUPS

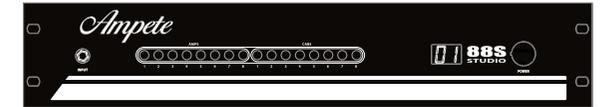
### STANDARD SHOP SETUP



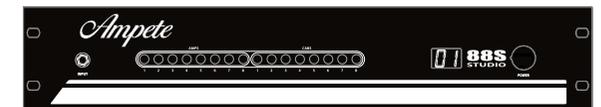
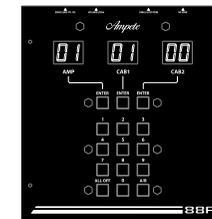
### COMBINED SHOP SETUP



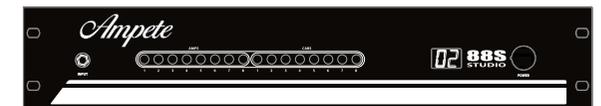
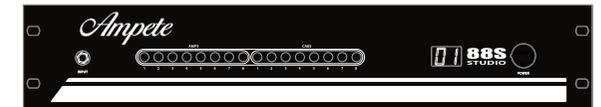
### STUDIO SETUP 1



### STUDIO SETUP 2



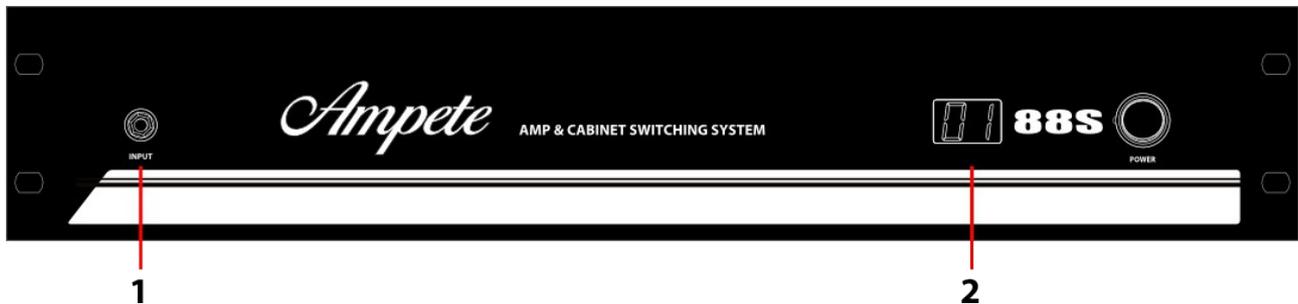
### STUDIO SETUP 3



## 88S

### Features

- 8 amplifiers selectable
- 8 speaker cabs selectable, up to 2 at a time
- optional Line out for driving external power amplifiers when running W/D/W systems
- buffered and unbuffered inputs
- amplifier and cabinet selection without loss in sound, dynamics or noise
- no switching noises
- no switching latency
- protection circuits to prevent amplifiers from damage
- cascadable in conjunction with other 88S, 88R or 88S-STUDIO



### Front Panel

#### 1. INPUT – buffered instrument input

The input features an ultra transparent buffer amplifier, which feeds the line bus with a low impedance signal.

In case of cascading two or more 88S/88S STUDIO each input is equal and can be used to feed the whole system. Please make sure not to use more than one input simultaneously as the signals will be added but the inputs signal level will be decreased dramatically.

NOTE: Because the 88S/88S-STUDIO comes with the unique feature of cascading several units, the LINE BUS is not grounded as long as no instrument is plugged into any of a units input. Hence we recommend to keep an instrument connected to the system, whether the system persists of only one or more 88S/88S STUDIO.

#### 2. DISPLAY

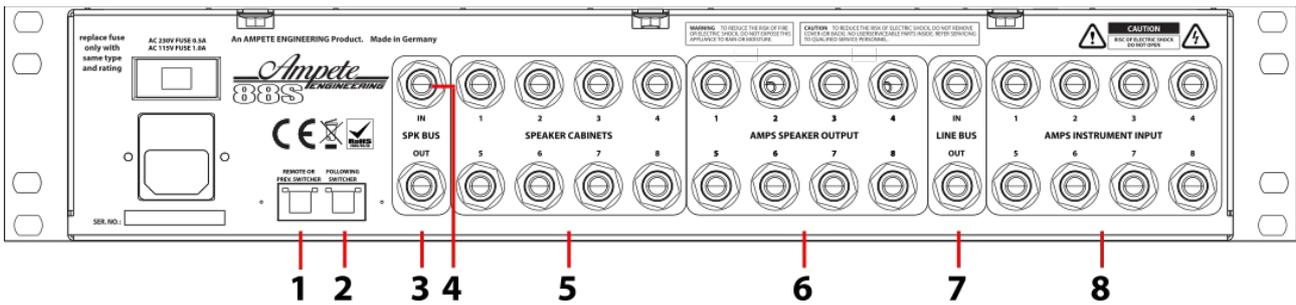
The display shows the number / ID of the 88S/88S-STUDIO in the system.

That way the block of 8 amps / 8 cabs is identified:

ID1: Amp / Cab 1-8; ID2: Amp / Cab 9-16; ID3: Amp / Cab 17-24; ID4: Amp / Cab 25-32 etc.

The ID is configured ex factory by DIP switches in the unit and should only be changed by authorized personnel. In case an existing unit shall be expanded with one or more units, please get in contact with us.

**NOTE: Never use more than one 88S/88S-STUDIO with the same ID in one system.**



## Rear Panel

### 1. REMOTE OR PREVIOUS SWITCHER

RJ45 connector jack for data transmission. Use a standard CAT5 cable in case you extend the system with our remote 88R or another 88S/88S-STUDIO with the next lower ID.

### 2. FOLLOWING SWITCHER

RJ45 connector jack for data transmission. Use a standard CAT5 cable in case you extend the system with another 88S/88S-STUDIO with the next higher ID.

**NOTE: Never connect the jacks (3. REMOTE OR PREVIOUS SWITCHER) of two 88S/88S-STUDIO!**

### 3. SPK BUS

The speaker bus provides the speaker output signal coming from the amps for further 88S/88S-STUDIO units. That way it is achieved that an amplifier connected to switcher 'X' can be played through a cabinet connected to switcher 'Y'. Therefore link the SPK BUS OUT jack of the very first 88S/88S-STUDIO to the SPK OUT IN jack of the next 88S/88S-STUDIO in the system and so on.

In case you've chosen one unit with the optional LINE OUT, configure that particular unit as the No. 1 in the whole system.

**Make sure to use speaker cables only!**

### 4. (optional) LINE OUT

The LINE OUT jack provides a line level signal of the currently selected amp for feeding external effects, power amps or others. It's not intended for mixers or interfaces as it is not frequency compensated.

**NOTE: Even if you are using more cascaded 88S/88S-STUDIO units, only one LINE OUT is necessary for ALL 8, 16, 24 etc. amplifiers.**

### 5. SPEAKER CABINET (1-8)

Connect your speaker cabinets here. No matter which cabinets you choose, from 1x12" to 4x12" with every impedance everything is possible, but consider not to exceed the power handling of the speaker cabinet to avoid any damage to the speakers and/or the amplifier. The 88S/88S-STUDIO does not compensate any impedance issues.

**Make sure to use speaker cables only!**

**6. AMPS SPEAKER OUTPUT (1-8)**

Connect one loudspeaker/cabinet/amp output of each amplifier to one of the jacks 1-8. Be aware that these jacks are **NOT** independent but they correspond to the number of AMP INPUT jacks of your 88S/88S-STUDIO . The maximum power may not exceed 300W. Use speaker cables only!

Make sure to use speaker cables only!

**7. LINE BUS**

Similar to the SPK BUS the LINE BUS provides the instrument signal coming from one of the INPUTs to every 88S/88S-STUDIO in the system and hence every connected amplifier.

Therefor the LINE BUS OUT of the first 88S/88S-STUDIO has to be connected to the LINE BUS IN of the following 88S/88S-STUDIO etc.

NOTE: You can use the LINE BUS IN as an unbuffered input when using external preamps.

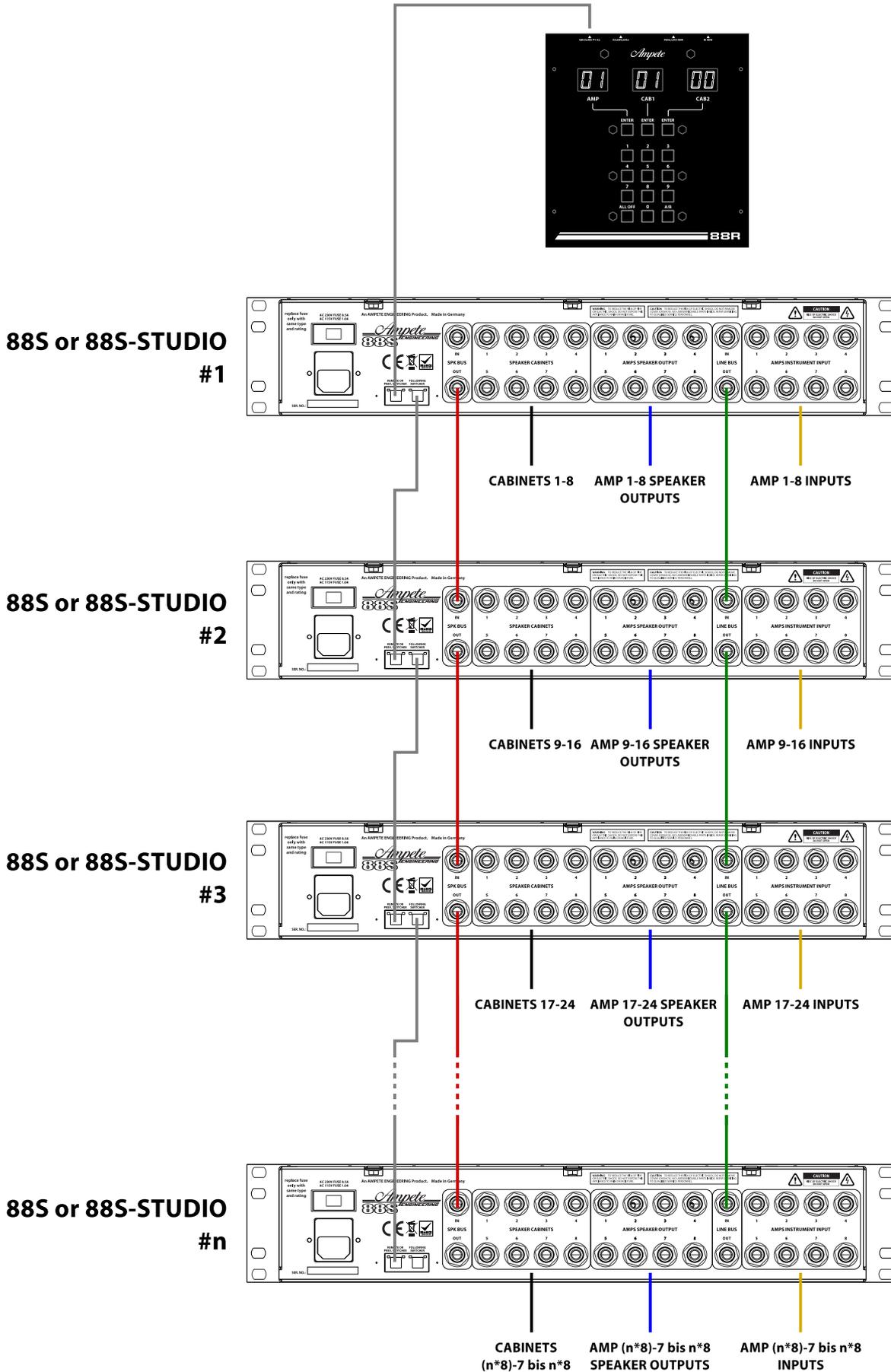
Make sure to use high quality instrument cables only and be aware that the cable lengths between the switchers in the system are summed.

**8. AMPS INSTRUMENT INPUT**

Connect one instrument input of each connected amplifier to one of the jacks 1-8. Best if you proceed the hook up amp by amp (unlike to at first connecting 8 inputs, then the 8 outputs) to avoid mixing up in- and outputs of different amplifiers.

This is the most sensitive connection when setting up the 88S/88S-STUDIO, **again make sure to use high quality instrument cables!**

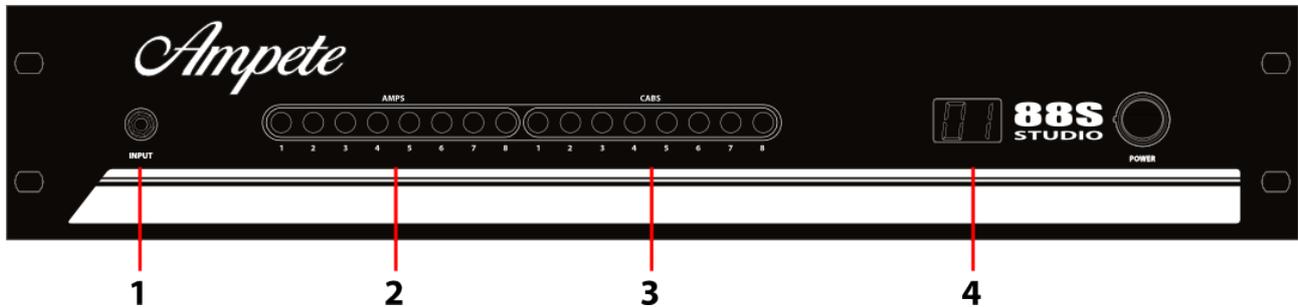
**88S / 88S-STUDIO SYSTEM HOOK-UP**



## **88S-STUDIO**

### **Features**

- 8 amplifiers selectable
- 8 speaker cabs selectable, up to 2 at a time
- optional Line out for driving external power amplifiers when running W/D/W systems
- buffered and unbuffered inputs
- amplifier and cabinet selection without loss in sound, dynamics or noise
- no switching noises
- no switching latency
- protection circuits to prevent amplifiers from damage
- front panel switches for selecting amplifiers and cabinets
- cascadable in conjunction with other 88S, 88R or 88S-STUDIO



### **Front Panel**

#### **1. INPUT – buffered instrument input**

The input features an ultra transparent buffer amplifier, which feeds the line bus with a low impedance signal.

In case of cascading two or more 88S/88S STUDIO each input is equal and can be used to feed the whole system. Please make sure not to use more than one input simultaneously as the signals will be added but the inputs signal level will be decreased dramatically.

NOTE: Because the 88S/88S-STUDIO comes with the unique feature of cascading several units, the LINE BUS is not grounded as long as no instrument is plugged into any of a units input. Hence we recommend to keep an instrument connected to the system, whether the system persists of only one or more 88S/88S STUDIO.

#### **2. AMPS (1-8) – Amplifier selection switches**

Select one of eight possible connected amplifiers by pushing the corresponding illuminated switch. Surely only one amp can be selected at a time. The remaining 7 amps will not be feeded with an input signal and are connected to an internal load to prevent them from any damage.

NOTE: A cabinet has to be chosen first by pressing the corresponding front panel CABS switch.

### 3. **CABS (1-8) – Cabinet selection switches**

Select up to two cabinets at the same time by pushing the corresponding illuminated switch(es).

A CABS button can only be selected with a speaker cabinet hooked up to the corresponding SPEAKER CABINETS jack. Thereby the 88S/88S-STUDIO not only controls if a plug is connected to the SPEAKER CABINETS jack, but also the attached load for its impedance. A low impedance is interpreted as a speaker cabinet, a high impedance could be a non connected cable, a defective speaker cable or even a speaker in form of a ruptured speaker coil etc. In that case the 88S/88S-STUDIO would refuse the selection and state an 'n.c.' in the display for 'no connection'. This way the 88S/88S-STUDIO prevents your amplifier from damage because of running without a load. The display will state an error status (Er).

### 4. **Display**

The display shows the number / ID of the 88S/88S-STUDIO in the system. That way the block of 8 amps / 8 cabs is identified.

ID1: Amp / Cab 1-8; ID2: Amp / Cab 9-16; ID3: Amp / Cab 17-24; ID4: Amp / Cab 25-32 etc.

The ID is configured ex factory by DIP switches in the unit and should only be changed by authorized personnel. In case an existing unit shall be expanded with one or more units, please get in contact with us.

**NOTE: Never use more than one 88S/88S-STUDIO with the same ID in one system.**

## **Rear Panel**

The Rear Panel is exactly the same as for 88S, please see page no. 8

## **Using the 88S-STUDIO with or without the remote 88R**

The 88S-STUDIO was designed after many customer's wish to switch between 8 amps and cabs but without the need for an extra remote control. To achieve that, we wanted to bring the „standalone“ feature of the 444 to the 88S by adding front panel controls.

But why not take it one step further? The 88S-STUDIO can not only be used as a standalone 8x8 amp switcher, but it can also be a part of an expandable system. It can be combined with additional 88S-STUDIO units to build 16x16 or 24x24 system with still no need for a remote control.

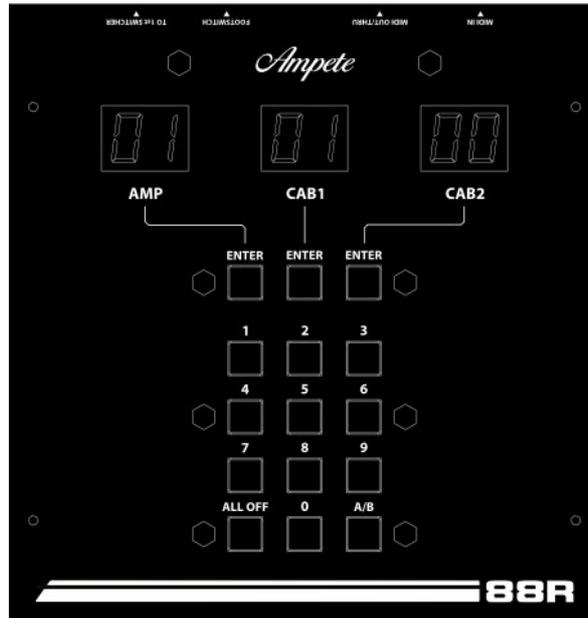
You are free to add an 88R to your system later, which gives you the opportunity to remote control your whole amp rack from your desktop right next to your computer mouse!  
You will still have the visual feedback of the 88S-STUDIO's front panel LEDs in your rack.

Any system of 88S-STUDIO and 88R can also be expanded by adding 88S units.

## **System Hook-up**

please see page no. 10

## 88R



### Features

- numeric keypad
- three double displays for displaying system status
- powered via CAT5
- works with any standard CAT5 cable
- „A/B“ and „ALL OFF“ function
- footswitch jack for A/B function
- MIDI IN / MIDI THRU

### Using the 88R

The 88R remote has no power on/off switch. It is powered via the CAT5 cable connection to the first 88S or 88S-STUDIO switcher in the system, and automatically powers up when connected. (The display shows 'boot' for 2 seconds)

To address an amp or a cabinet simply dial its number on the keypad. During this process the three displays will flash and show the number entered. You can enter 1-digit or 2-digit numbers.

To confirm the number, press one of the three „ENTER“ buttons that correspond to AMP1, CAB1 or CAB2.

If the number is not confirmed within a few seconds the display will return to showing the system status.

Note that for safety reasons the system does not allow you to select an amp without selecting a cabinet first. (see „Error Messages“ below)

If the remote is connected to a 88S/88S-STUDIO system that is already in use, the 88R will update the system status display with the next switching process.

## **Error Messages**

If any errors occur during the operation of the 88 system, the 88R displays will show error messages for two seconds before returning to the system status.

1. 'n.c' (not connected) displayed at CAB1 or CAB2: This means that you tried to activate a cabinet that is not plugged in
2. 'no Cab' shown over the three displays: This means that you tried to activate an amp before selecting a cabinet. Always select a cabinet first!
3. 'n.c' (not connected) shown in all of the three displays: This means that a number was dialed that is not available in the system. For example if your system has two 88S and you tried to activate amp number 17.

## **A/B and Footswitch**

The A/B function toggles between the last and the current system state. The A/B function can also be activated via a latching footswitch connected to the „Footswitch“ jack.

## **ALL OFF**

The „ALL OFF“ key unroutes all amplifiers and cabinets from the system.

## **MIDI**

The 88R features MIDI IN and MIDI THRU connectivity. For switching commands Midi Program Change (PC) or Midi Control Change (CC) messages can be used.

## **SETUP MENU:**

Press and hold A/B to go to the setup menu.

Press 1 for setting the Midi Channel.

Press 2 for setting Control Change Mode.

Set the Midi Channel or CC Mode with the numeric keypad (0 for OMNI), and press any ENTER key to save and return to the previous Menu.

Leave setup with pressing any ENTER key.

**Control Change mode 0:** for simple Control Change messages or multiple Control Change messages

**Control Change mode 1:** for pedal boards that automatically send OFF messages for the Control Changes that are currently activated. In this mode the 88R will switch off all amps and cabinets before reading and switching the Control Change messages. Automatically added OFF messages are ignored.

## **Control Change Table**

(0 = OFF, 127 = ON)

80 to 96: Amplifier 1 to Amplifier 24

104 to 111 Cabinet 1 to Cabinet 8 as CAB1

112 to 119 Cabinet 1 to Cabinet 8 as CAB2

## **Program Change (PC):**

### **Edit:**

Send PC that you want to edit. Select desired combination of Amp/Cabs. Displays shows „.“ in the lower right corner to indicate the presets has been changed but not saved. Press+hold A/B to save.

To discard the changes press „ALL\_OFF“ (Note: you can not go into setup menu unless you save or discard).

## **Troubleshooting**

**Problem: No signal when an amplifier is chosen.**

Make sure all amp inputs and speaker outputs are properly connected. Never mix amp in- and outputs to different amplifiers!

**Problem: No amp can be selected.**

Check if a cabinet has been selected first.

**Problem: No cabinet can be selected.**

Check if the chosen cabinet and cable is connected properly. Also check the cable and/or speakers for any defects.

**Problem: No function when switching via MIDI on 88R**

Check if you are sending on MIDI channel 1 (see page 14)

## **A word on impedances**

When it comes to impedances and matching of valve amplifiers and speaker cabinets, there have been written a lot of words and there have been told many opinions, myths and beliefs. And as it is so often in our world, all of them are in between the truth and the untruth. Some more, some less. Don't expect mine to be the only truth! But I give you some arguments on hand, why it is not necessary to match your amp and cabinet and why your amplifier will not get damaged when the load does not match the impedance switch setting.

Let's start with one of the most often heard opinions. Some claim that a mismatch between amplifier and cabinet causes the valves to wear out quicker or can cause damage to the output transformer and/or valves while at the same time advertising their amplifiers to work with any kind of valves, doesn't matter if EL34, 6L6, KT66, KT88 etc.

Don't get me wrong that this is not possible, but the matching between amplifier and cabinet isn't isolated on the secondary winding of the output transformer and the speaker. It's an interaction between valves, primary winding of the output transformer, secondary winding of the output transformer and speaker. It starts with a certain impedance each valve type has and which would require (if we go on with the argumentation) a specific primary winding and thus again an impedance of the output transformer to be 'matched'. The output transformer itself not only transforms the voltage, it also transforms the impedance. It continues to the output transformers secondary winding (with another you know what) and ends with the speaker (sorry, but yes...).

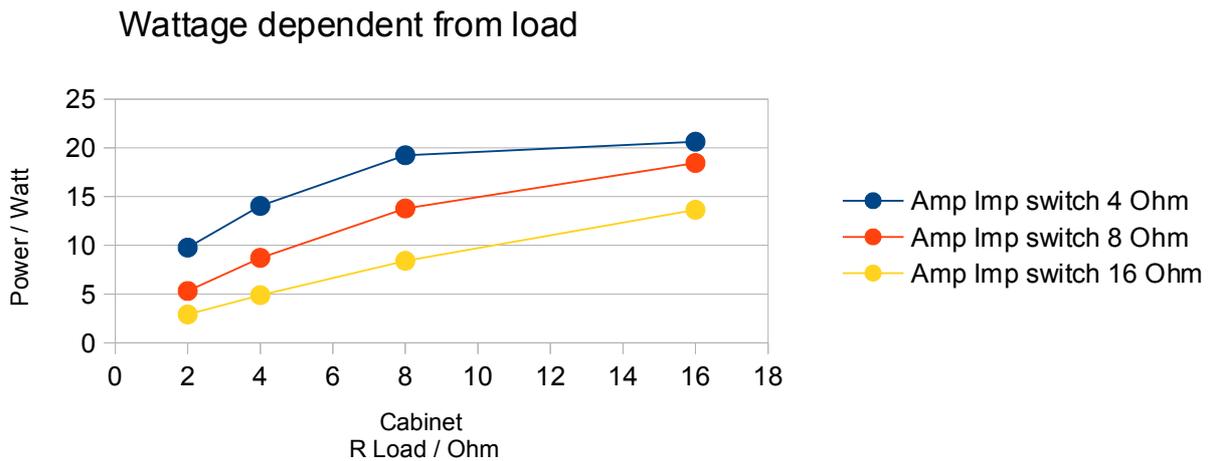
As mentioned above, this is not a one way street, it's an interaction, which means the speaker influences the power amplifier and the power amplifier influences the speaker. Surely this is not a linear process, it is dependend on frequency, power or wattage, electric and even mechanic speaker specifications.

And if this wouldn't be enough, remember that it's called impedance because it alters with the frequency... if you have ever seen the impedance curves of a speaker you know what that means.

There are several ways to 'mismatch', using different speaker impedances is only one possibility. Different valve types or 2 instead of 4 valves are others. But none of them causes the power amp, valves or output transformers to fail.

The diagram below shows some simple measurements (in that particular case taken with our Amp TWO, a 110 Hz, 150mV sine wave, which is similar to the 'A' strings first harmonic of a Humbucker guitar). The amp impedance switch has been set to either 4 (blue color), 8 (orange) and 16 (yellow) Ohm and in every of these settings a reactive load of 2, 4, 8 and 16 Ohm has been attached to the power amp. Let's point out only the two essential characters.

1. When the amp impedance switch and cabinet load are matched, the wattage is nearly identical in either 4, 8 or 16 Ohm case;
2. The higher the load the higher the wattage, or equivalent the lower the load, the lower the wattage.



Is it as simple as that? Yes and No.

No, as mentioned above this is not as linear as it looks at first glance as it is dependend from several parameters.

Yes, because - and this is the main fact for all the 444 users – it will never be the other way round. The Power will not increase when the load impedance is lower than the chosen amp output impedance (surely as long as we are talking about valve driven amplifiers). And not only the wattage will not increase, also the voltage - primary and secondary – decreases with a lower load.

For those who are interested, the current increases. On the primary side it does not exceed the maximum current flowing when the amp impedance switch and load are set to its minimum position (most often 40hm). The current flowing on the secondary side increases slightly about 10-15%.

The 444 is capable of switching 1 or 2 cabinets to any of the connected amplifiers. That means, the load to the amplifiers output will change when the second cabinet is assigned to it. Let's assume your amplifiers impedance switch is set to 16 Ohm, you run a single 16 Ohm cabinet with your amplifier and you add a second 16 Ohm cabinet, then the total load will change to 8 Ohm.

Now refer to the diagram and you see the power of the amplifier drops.

But even if the power decreases by almost one third compared to a matching load, the subjective impression will be the volume is nearly the same (as long as the phases of the speaker cabinets are the same). This is simply because more speakers are now driven by the amplifier. You will notice a slightly different feel, which is caused by a different damping factor the power amp of your amplifier 'sees'.

Hereby a lower impedance from your cabinet will feel more 'loose', a higher impedance will give you a more 'tight' feeling. There is a simple reason for that. As seen before the higher impedance causes the amplifier to emit more power, more 'headroom'. Because the bass frequencies require more power than the higher frequencies, it can be amplified more accurate, more 'tight' as it's often called. The dynamic does not drop when especially palm muted low strings are hit. In contrast there's a natural sag with the lower impedance because of the lowered power.

But don't expect these changes to be drastically, we are talking about nuances in sound. This will be even more hard to notice because the number of speakers has changed.

Having said that, we recommend to undermatch the cabinet load when using 2 cabinets at the same time.

- one or two 16 Ohm Cabinets (=8 Ohm) → Impedance switch 16 Ohm
- one or two 8 Ohm Cabinets (=4 Ohm) → Impedance switch 8 Ohm
- one or two 4 Ohm Cabinets (=2 Ohm) → Impedance switch 4 Ohm

It is also possible to mix cabinets with different impedances, you only have to be aware that the power to the cabinets will be different as well, to be precise it will be twice as high at the cabinet with half the impedance.

- one 16 and one 8 Ohm Cabinet (=5,33 Ohm) → Impedance switch 16 Ohm
- one 8 and one 4 Ohm Cabinet (= 2,66 Ohm) → Impedance switch 8 Ohm

In any case do not exceed the power handling of the speaker cabinet! Be aware of, that the setting of your volume control is not an indicator for the power your amplifier emits.

This is just a rough overview on the interaction between a valve driven power amplifier and a loudspeaker. Believe me, that process is far too complex to put it in such a manual, and to be honest in it's entirety it would exceed my knowledge. And even if the era of valves is long gone, this is why some very few people - including me - are still researching on it.

... and we keep you informed!

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### **88S / 88S-STUDIO**

Dimensions	Front Panel: W 17,2" (438mm), H 3,5" (88mm), D 8,8" (223mm)
	Front Panel: W 19" (482mm)
Weight	10 lbs (4,5kg)
Power consumption	10W max.

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### **88R**

Dimensions	W 6,7" (170mm), H 2,1" (54mm), D 7,1" (180mm)
Weight	2 lbs (1kg)

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Ampete Engineering reserves the right to change specifications, whether it's technical, dimensional or in the owner's manual.

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