

# **CERIATONE**

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## **A M P L I F I C A T I O N**

# **2202**

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## **20W Amplifier**

User's Manual

Thank you for the purchase of your Ceriatone guitar amplifier!

Here, we hope to explain how best to use your new amp.

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### **1) About the JCM800 2202 amplifier**

Our British series of amplifiers has been overwhelmingly popular, and is still the backbone of our amplifier line. One of the most popular models in this series is the JCM800 2203/2204. This amplifier is based on the British amplifiers built in the late 1970s and 1980s. Their iconic sound is signature to countless records, ranging from blues, to classic rock, fusion, and heavy metal.

However, after countless requests we decided to offer a compact, low-wattage, yet feature-laden version of these “master volume” amps. As such, we proudly present the 20W 2202. In addition to standard “Master Volume” features, we’ve added Boost, Fat, and Bright switches, a Resonance control, a Post-Phase Inverter Master Volume, and a rear-mounted Pussy Trimmer™. *Phew!*

You’ll notice our version holds true sonically, but adds modern features including external bias measurement and adjustment, an effects loop.

Most of all, we hope the 2202 becomes an integral part of your tone equation to exhilarate your playing and music.

Rock on!

- Nik Azam

## 2) QUICK SETUP (for instant gratification)



- 1) Plug your guitar using a 1/4" instrument cable into the INPUT on the right of the front panel
- 2) Plug a suitable power cable from the amp's rear panel MAINS cable inlet to your wall power receptacle
- 3) Plug the amp into your speaker cabinet using 1/4" speaker cable
- 4) Set the IMPEDANCE SELECTOR to match the impedance of your speaker cabinet
- 5) Set the rear PUSSY TRIMMER™ control to 12:00 (clock face)
- 6) Set all rotary tone and gain controls on the front panel to 12:00 (clock face)
- 7) Set PPIMV control at just above minimum
- 8) Set front panel POWER switch in the ON position (UP position, with adjacent STANDBY switch in the "STANDBY" mode) for 30 seconds to allow tube filaments to warm up
- 9) Set front panel STANDBY switch to "ON" mode (UP position)
- 10) **ROCK!!!!!!**

### 3) FRONT PANEL CONTROLS



From left to right:

- 1) **POWER** 2-way toggle switch
- 2) **STANDBY** 2-way toggle switch
- 3) **INDICATOR LED**
- 4) **PPIMV control**
- 5) **DEEP** control
- 6) **PRESENCE** control
- 7) **BASS** control
- 8) **MIDDLE** control
- 9) **TREBLE** control
- 10) **FAT** 2-way toggle switch
- 11) **MASTER** control
- 12) **BOOST** 2-way toggle switch
- 13) **GAIN** control
- 14) **BRITE** 3-way toggle switch
- 15) **INPUT** 1/4" instrument jack



**POWER** two-way toggle switch powers the 2202 on and off. With the toggle switch in the DOWN position, the amp is OFF. In the UP position, the 2202 is ON.

**STANDBY** applies high voltage to the vacuum tube anodes (and screen grids) during use of the amp. To ensure long tube life, first power the unit on with the STANDBY toggle switch in DOWN position for approximately 30 seconds. You can then switch to UP (“ON”) to use the amp. With the toggle switch in the DOWN position, the amp is in STANDBY mode. In the UP position, the amp is in OPERATE mode

**INDICATOR** will illuminate when the amp is powered by turning the front panel POWER toggle switch to the ON position. If INDICATOR does not turn on, check your power cable connections, and then the fuse on the rear of the unit.

**PPIMV** is a unique master volume control that sits after the phase inverter (hence the name “post phase inverter master volume”). Unlike most master volume, this maintains the distortion, harmonic content, and feel of a cranked amplifier. If installed, use this in conjunction with the MASTER control to balance overall volume, feel, compression, and power amplifier breakup.

**DEEP** adjusts the low frequency response of the power amplifier using negative feedback. Use this control to add girth and thump to your tone. As the PPIMV is turned down, this will have less of an effect.

**PRESENCE** adjusts the high frequency response of the power amplifier using negative feedback. Use this control to add sparkle and clarity to your tone. As the PPIMV is turned down, this will have less of an effect.

**BASS** adjusts low frequencies

**MIDRANGE** adjusts the mid frequency response

**TREBLE** adjusts the high frequency response

**FAT** switch revoices the frequency response of the TREBLE control, turning it into a sort of Mid Boost like our OTS series. You'll notice a thicker, more vocal midrange response with this engaged. Push toggle to the RIGHT to engage.

**MASTER VOLUME** sets the overall volume

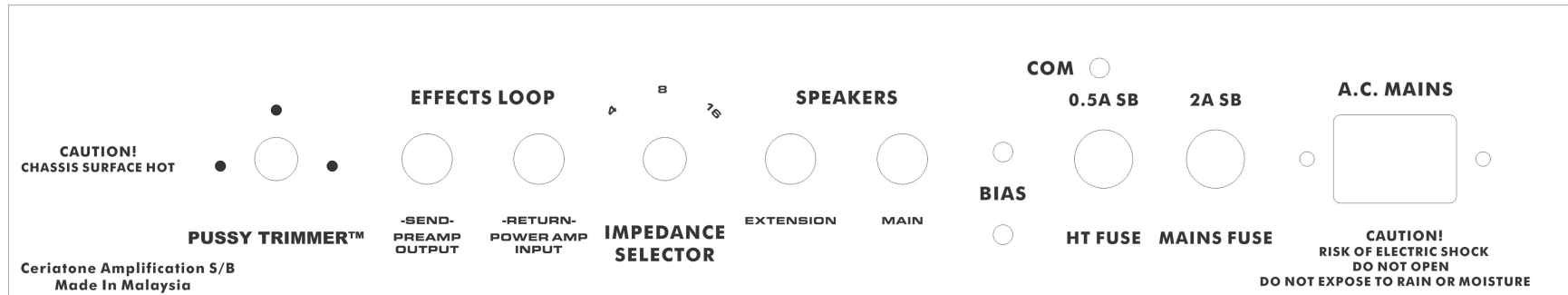
**BOOST** is another feature inspired by our OTS series. This switch lifts the tonestack from the circuit (like the aforementioned "PAB" or "Preamp Boost" switch) and increases gain and harmonic content. Push toggle to the LEFT to engage.

**GAIN** adjusts the amount of distortion in the amplifier

**BRITE** is a 3-way toggle switch inspired by our Hot-Rodded Plexi series. It changes the value of the bright capacitor across the GAIN control. This will have a direct impact on both gain and high frequency content. In the center, there is no bright cap and this is most similar to our stock 2203/2204. Left engages a large 0.001uF capacitor, which will add a fair amount of grit. Right engages a 100pF cap, which will add a subtle sparkle to your tone. Note that the BRITE switch will become less obvious as GAIN is increased.

**INPUT** is a ¼" jack for instrument cables. Plug your guitar in here.

## 4) REAR PANEL CONTROLS



- 1) **PUSSY TRIMMER™** control
- 2) **SEND** ¼" instrument jack
- 3) **RETURN** ¼" instrument jack
- 4) **IMPEDANCE SELECTOR** three-way rotary selector
- 5) **SPEAKERS** ¼" speaker jacks (x2)
- 6) **BIAS TESTS** probe jacks (x2)
- 7) **COM** probe jack
- 8) **HT FUSE**
- 9) **MAINS FUSE**
- 10) **MAINS** IEC cable inlet

**PUSSY TRIMMER™** allows you to further fine tune the gain and saturation of the 2202. Turning this control down can reduce the possible saturation and gain. We recommend turning this up to about 2:00 for the standard gain and response. If it's too much and too hard to control, you can reign things in by turning the PUSSY TRIMMER down. If you take steroids, jump out of planes, and wrestle bears you can just go ahead and crank the PUSSY TRIMMER all the way to the max (clockwise).

**SEND** ¼" instrument jack can be used to directly interface the preamps of the amp, thereby bypassing the power amplifier. Conversely, this is usually used as the SEND of the effects loop. Plug the input of your effects unit, or interface device (ex – C-lator, Klein-ulator) into this jack using ¼" instrument cable.

**RETURN** ¼" instrument jack can be used to directly interface the power amp of the amp, thereby bypassing the preamp and using the amplifier as a power amplifier. Conversely, this is usually used as the RETURN of the effects loop. Plug the output of your effects unit, or interface device (ex – C-lator, Klein-ulator) into this jack using ¼" instrument cable.

**IMPEDANCE SELECTOR** three-way rotary selector. Set to the position that matches the impedance of your speaker cabinet.

***NOTE** – if you are using two speaker cabinets in parallel (ex – two 16 Ohm cabinets), set the impedance selector to half that of a single cabinet (in this case, 8 Ohms).*

**SPEAKERS** ¼" speaker cable jacks. Use a ¼" speaker cable to connect your speaker cabinet to the amplifier using these jacks. If you use one speaker cabinet, either jack is acceptable.

***NOTE** – never turn your amplifier to OPERATE mode ("1" / DOWN position on STANDBY) without connecting the amplifier to a speaker cabinet or suitable dummy load! Failing to do so may damage your amplifier!*

**BIAS TEST** and **COM** multimeter probe jacks – use this for external bias current measurements (see Section 5, Page 8)

**HT FUSE** T500mA fuse – used to protect your amplifier from voltage spikes or excessive current draw. Replace only when necessary.

**MAINS FUSE** 2A slow-blow fuse – used to protect your amplifier from voltage spikes or excessive current draw. Replace only when necessary.

**MAINS** IEC cable inlet – plug a suitable IEC power cable into this inlet to power your amplifier

## 5) TUBE COMPLIMENT AND EXTERNAL BIAS JACKS AND ADJUSTMENT



From left to right:

- V1 – 12AX7/ECC83S (input stage 1 and gain stage 2)
- V2 – 12AX7/ECC83S (gain stage 3 and tonestack driver)
- V3 – 12AX7/ECC83S (phase inverter for power amplifier)
- V4 – JJ 6V6S
- V5 – JJ 6V6S

**BIAS ADJUSTMENT CONTROL IS INDICATED BY THE RED ARROW**

To measure your power tube bias, carefully follow these steps **with the amplifier in OPERATE, MASTER at minimum, and connected to a speaker load (not doing so may damage your amplifier!)**:

- 1) Turn on a digital multimeter (DMM), and set it to read millivolts (mV) in the 100mV range (this will vary from DMM to DMM)
- 2) Plug a black probe into the color-coded jack on your DMM, and do the same for a red probe
- 3) Plug the black probe tip into the **COM** multimeter jack on the rear of the 2202
- 4) Plug the red probe tip into the *top* **BIAS** multimeter jack on the rear of the 2202. This measures bias for the 6V6 closest to V3. Right down the value your DMM reads. You might expect a value between 23mV and 25mV.
- 5) Repeat for the other power tube position by plugging your red probe into the *bottom* **BIAS** multimeter jack.

Okay, now I've measured my bias. Now what?

To calculate bias, there are two pieces of information you need to know: your amplifier's power tube plate voltage, and the published value for maximum plate dissipation for the power tubes used in your amplifier. To save you some time and energy, here are those two values:

- Approximate plate voltage for 2202 amplifiers = 380-390VDC
- Maximum plate dissipation for 6V6s = 14W

...and now some math. The formula for calculating bias is as follows:

$$\frac{\text{maximum plate dissipation}}{\text{amplifier plate voltage}} \times \text{percent of maximum dissipation} \times 1000 = \text{bias current (mA)}$$

In most cases, amplifiers are biased between 50% and 75% dissipation. We bias the 2202 to approximately 23mV-25mV reading on a DMM.

An example is as follows:

$$\frac{14W}{380VDC} \times 65\% \times 1000 = \textit{about 24mA}$$

You might wonder why your DMM is set to millivolts and not milliamps – simply, we have a 1 Ohm resistor placed between your probe jacks and ground to convert a current reading to a voltage reading. That way, a bias current of 24mA measures as 24mV on your DMM.

**NOTE** – Only set your DMM to mV for measuring bias on the amp. Not doing so may damage your DMM.

Now that you know how to calculate bias, all you need to do is:

- 1) Follow steps 1-5 on page 11
- 2) Calculate what bias voltage reading you will set your tubes to (in this case, we will use 24mV)
- 3) Place your red probe in the top **BIAS** jack, and the black probe in the **COM** jack.
- 4) Turn the bias potentiometer shaft SLOWLY until your DMM reads 24mV
- 5) Wait 1 minute
- 6) Recheck all power tube bias measurements
- 7) Readjust bias potentiometer shaft if necessary



## *A FEW COMMENTS ON BIASING*

Due to the nature of vacuum tube amplification, there are inherent risks when biasing your amplifier. Extremely high-voltages are present, and vacuum tubes reach high temperatures during use.

The risk of electrical shock and/or skin burns should ALWAYS be kept in mind. Therefore, bias at your own risk, and only while paying attention and taking all precautionary measures.

Biasing should only be done on a clean workbench with no distractions. Do not wear loose clothing or any jewelry. Take your time, and think carefully before each step.

Again, bias at your own risk. Ceriatone Amplification is not responsible for any damages or injuries resulting from user biasing.

## 6) FREQUENTLY ASKED QUESTIONS

*How do I hook up this thing?*

- See Section 2, beginning on page 3.

*Is the FX loop series or parallel? Active or parallel?*

- The FX loop is series, and is currently parallel. However, we have plans to release an option for a tonally transparent solid-state FX loop. Stay tuned!

*When I plug effects into the effects loop, my tone noticeably changes. Sometimes the effects don't sound quite right. What's the deal?*

- Generally, what you're hearing is a significant mismatching of impedances, and/or an overloading of the effect unit itself. Most rack-mount units have different input impedance than pedals, and thus can *sometimes* function fine without a buffer before them. In addition, *some* of these rack-mounted effects can pad the volume they receive, preventing it from overloading. Pedals do not have proper input impedance or padding ability, and therefore do not play nicely.
- For best results, an effects loop interface like the C-lator or Klein-ulator should be used. These units prevent impedance mismatching, as well as provide the ability to pad down the volume sent to the effects units hence preventing any overloading.

*Can I substitute different tube types for the 12AX7/ECC83s or 6V6?*

- Although you can try 12AT7s, 12AU7s, 5751s without any harm, the design is optimized for 12AX7s, and are therefore the only recommended tube in the preamp positions. Only use 6V6 tubes.

*Do I need to use a matched and balanced phase inverter?*

- It is not necessary. Feel free to experiment with different tubes (of the same type) in your Chupacabra, though!

*I've read that the components used in this type of amplifier are really important. What is inside my amplifier?*

- We use a combination of parts custom-made for us to our specifications (power transformer, output transformer, choke, high-temperature / low-ESR electrolytic capacitors) and those used in our British series (1/2W carbon composition resistors, 1W carbon film resistors, TAD Mustard capacitors, high-voltage silver mica capacitors, Belton tube sockets, and Alpha potentiometers, Cliff jacks). Finally, we occasionally use NOS components from our vast surplus parts collection in locations they work well and complement the voicing or enhance the performance of the amplifier.

*I like to use rack-mounted multieffects units. What is the output level straight from the EFFECTS LOOP SEND jack, -10dB or +4dB?*

- While not exact, -10dB is a better approximation than +4dB. The actual output level will depend on your settings, particularly the volume controls. +4dB is usually reserved for recording/P.A. equipment with balanced connections.

## 7) SETTING TEMPLATES

