

CERIATONE

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

JCM 800 2203

100W GUITAR 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 2204 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. While their lineage is in the Plexi Super Lead amplifiers of the late 1960s, the JCM800 2203/2204 provided a modern, updated perspective.

You'll notice our version holds true sonically, but adds modern features including external bias measurement and adjustment, an effects loop. It is worth noting we do not use a PCB for this amplifier, as was done on the original. Our construction method employs handmade turret boards and wiring, as on the original Plexis of the 1960s.

Most of all, we hope the 2203 becomes an integral part of your tone equation to exhilarate your playing and music.

Rock on!

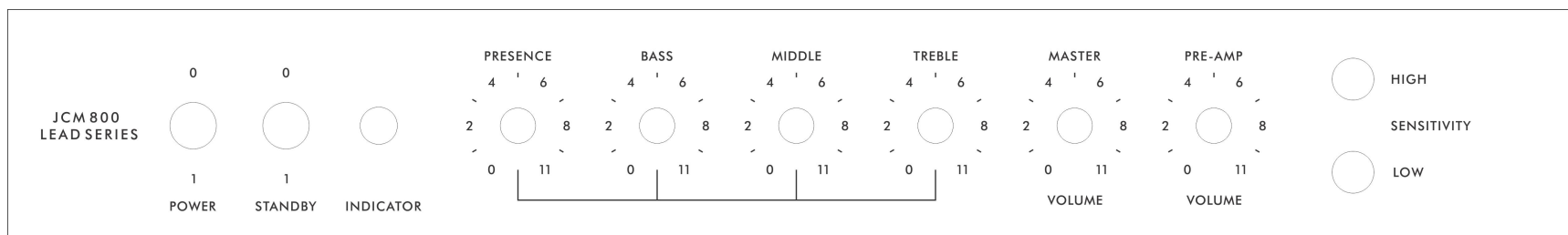
- Nik Azam

2) QUICK SETUP (for instant gratification)



- 1) Plug your guitar using a 1/4" instrument cable into the HIGH on the right of the front panel
- 2) Plug a suitable power cable from the 2203's rear panel MAINS cable inlet to your wall power receptacle
- 3) Plug the 2203 into your speaker cabinet using 1/4" speaker cable
- 4) Set the IMPEDANCE SELECTOR to the match the impedance of your speaker cabinet
- 5) Set all rotary tone and gain controls on the front panel to 12:00 (clock face)
- 6) Set MASTER control at just above minimum
- 7) Set front panel POWER switch in the ON position (down position, with adjacent STANDBY switch in the "STANDBY" mode) for 30 seconds to allow tube filaments to warm up
- 8) Set front panel STANDBY switch to "ON" mode (down position)
- 9) *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) **PRESENCE** control
- 5) **BASS** control
- 6) **MIDDLE** control
- 7) **TREBLE** control
- 8) **MASTER VOLUME** control
- 9) **PREAMP VOLUME** control
- 10) **HIGH and LOW SENSITIVITY** input $\frac{1}{4}$ " instrument jack

POWER two-way toggle switch powers the 2203 on and off. With the toggle switch in the DOWN ("ON") position, the 2203 is on. In the UP position, the 2203 is OFF.

STANDBY applies high voltage to the vacuum tube anodes (and screen grids) during use of the 2203. To ensure long tube life, first power the unit on with the STANDBY toggle switch in UP position for approximately 30 seconds. You can then switch to DOWN ("ON") to use the 2203. With the toggle switch in the UP position, the 2203 is in STANDBY mode. In the DOWN position, the 2203 is in OPERATE mode

INDICATOR will illuminate when the 2203 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.

PRESENCE adjusts the high frequency response of the power amplifier using negative feedback. Use this control to add sparkle and clarity to your tone.

BASS adjusts low frequencies

MIDRANGE adjusts the mid frequency response

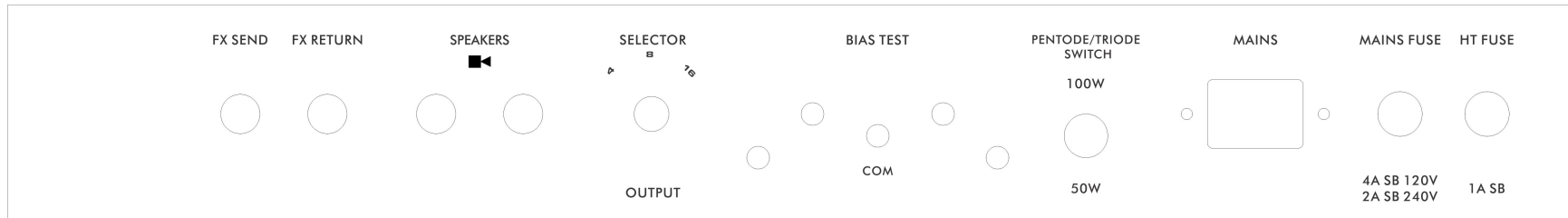
TREBLE adjusts the high frequency response

MASTER VOLUME sets the overall volume

PREAMP GAIN adjusts the amount of distortion in the amplifier

HIGH and LOW SENSITIVITY INPUT is a $\frac{1}{4}$ " jack for instrument cables. Plug your guitar in here. Use the HIGH SENSITIVITY input for more gain and the traditional JCM 800 sound. Plug in the LOW SENSITIVITY jack for a clean, brighter, and thinner tone. We recommend using the HIGH SENSITIVITY input.

4) REAR PANEL CONTROLS



- 1) **SEND** 1/4" instrument jack
- 2) **RETURN** 1/4" instrument jack
- 3) **SPEAKERS** 1/4" speaker jacks (x2)
- 4) **IMPEDANCE SELECTOR** three-way rotary selector
- 5) **BIAS TEST** and **COM** probe jacks (x5)
- 6) **PENTODE / TRIODE** 2-way toggle switch
- 7) **MAINS** IEC cable inlet
- 8) **MAINS FUSE**
- 9) **HT FUSE**

SEND 1/4" instrument jack can be used to directly interface the preamps of the JCM800, 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 1/4" instrument cable.

RETURN 1/4" instrument jack can be used to directly interface the power amp of the JCM800, 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 1/4" instrument cable.

SPEAKERS 1/4" speaker cable jacks. Use a 1/4" 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!

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).

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

PENTODE / TRIODE switches the power output of the power amp. For the 100W JCM800, TRIODE mode is approximately 50W. TRIODE mode configures the power tubes to run in triode operation, and this negates any need to reconfigure the IMPEDANCE SELECTOR.

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

HT FUSE 1A slow-blow fuse – used to protect your amplifier from voltage spikes or excessive current draw. Replace only when necessary.

MAINS FUSE slow-blow fuse – used to protect your amplifier from voltage spikes or excessive current draw. Replace only when necessary. 4A is used for amplifiers used with a 120VAC country supply, and 2A is used with 240VAC.

5) TUBE COMPLIMENT AND EXTERNAL BIAS JACKS AND ADJUSTMENT



From left to right:

- V1 – JJ 12AX7/ECC83S (input stage 1 and gain stage 2)
- V2 – JJ 12AX7/ECC83S (gain stage 3 and tonestack driver)
- V3 – JJ 12AX7/ECC83S (phase inverter for power amplifier)
- V4 – JJ 6X4L
- V5 – JJ 6X4L
- V6 – JJ 6X4L
- V7 – JJ 6X4L



In this diagram, we have color coded features for simplicity

- 1) Blue arrow – bias adjustment potentiometer
- 2) Green arrow = bias probe jacks (from left to right V4, V5, V6, V7)
- 3) Red arrow = black probe jack, ground (“COM”)

To measure your power tube bias, carefully follow these steps **with the amplifier in OPERATE 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) Insert the black probe tip into the black probe jack (red arrow). This is GROUND in the amplifier.
- 4) Insert the red probe tip into the V4 red probe jack (green arrow) on the left. This measures bias for V4. Write down your measurement
- 5) Repeat step 4 for V5 through V7, moving to each responding red probe jack for each power tube. Write down your measurement for each
- 6) Adjust bias adjustment (blue arrow) SLOWLY until your DMM reads approximately 35mV (see calculations, following page)
- 7) Remeasure V4 through V7 bias, and adjust as needed

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 V4-5 plate voltage for Plexi 100W series amplifiers = 460VDC
- Maximum plate dissipation for EL34s = 25W

...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 100W Plexi series amplifiers to approximately 35mV on a DMM, which is 65% dissipation.

An example is as follows:

$$\frac{25W}{460VDC} \times 65\% \times 1000 = \textit{about 35mA}$$

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 35mA measures as 35mV on your DMM.

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

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.

Even though the bias test points and adjustment is external to reduce risk of electrical shock, all precautions must be taken while biasing.

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

8) 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 6L6GCs?

- 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. Usage of other power tubes (ex – 6550s,

6L6GCs) may be possible, but please first consult Ceriatone Amplification or your local competent amplifier technician.

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.