

# **CERIATONE**

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

**TW Expression**

**"All Access"**

# User Manual

Thank you for the purchase of the Ceriatone TW Expression All Access guitar amplifier!

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

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## 1) About the TW Expression All Access

Ceriatone has offered the sought after Trainwreck Express amplifier, designed by Ken Fischer, for many years, with our take being called the Ceriatone Expression. It has been well received, but it is time to freshen up the model.

The original is known to be a gainy, touch sensitive amp that responds extremely well to guitar volume control, and pick attack. It also blooms and feedbacks beautifully, when one masters the amp.

In our quest to make the amp more versatile, and in line with current needs to better manage volumes, as well to use with multitudes of effects pedals, we have come up with the TW Expression All Access.

Namely, we have added these wonderful new features to the amp:

### **1. Channel Switching**

To allow for Clean Channel, while the OD Channel retains the original circuit

The original design of the amp has an unused 12AX7 triode. We use this triode to achieve the Clean channel, so that the design stays very true to original circuit.

## **2. Buffered Effects Loop**

We have added a transparent buffered loop, so that you can use your favorite pedals with the amp.

## **3. Post PI Master Volume**

For you to better control volumes, to even play in your bedroom!

## **4. Tube / Solid State Rectifier Selection**

A cool addition to be able to have Tube Rectification, which the original TW Expression does not have!

## **5. Voicing and Gain Switches**

Several options to make the amp even more versatile for your enjoyment!

We hope that you find value for money in this update of the classic amp. More importantly, I am confident that the original intent and tones of the classic amp is preserved.

We always strive to bring you the best!

Rock on!

- Nik S Azam

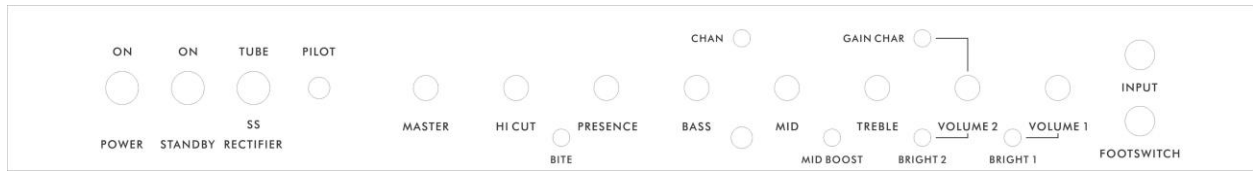
## 2) QUICK SETUP (for instant gratification)



- 1) Plug your guitar using a 1/4" instrument cable into the upper I input on the right of the front panel
- 2) Plug a suitable power cable from the 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 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 VOLUME controls at just above minimum, with PPIMV set to full
- 7) Set front panel POWER switch in the ON position (down position, with adjacent STANDBY switch in the "STANDBY" mode) for 60 seconds to allow tube filaments to warm up. Select the Rectifier to be in SS (Solid State) mode first.
- 8) Set front panel STANDBY switch to "ON" mode
- 9) **ROCK!!!!!!**

### 3) FRONT PANEL CONTROLS



From left to right:

- 1) **POWER** 2-way toggle switch
- 2) **STANDBY** 2-way toggle switch
- 3) **RECTIFIER** 2-way toggle switch
- 4) **INDICATOR** Pilot Light
- 5) **POST PHASE INVERTER MASTER VOLUME (PPIMV)** control
- 6) **HI CUT** control
- 7) **PRESENCE** control
- 8) **Bite** 2-way toggle switch
- 9) **BASS** control
- 10) **CHAN** 2-way toggle switch
- 11) **CHAN LED**
- 12) **MID** control
- 13) **MID BOOST** 2-way toggle switch
- 14) **TREBLE** control
- 15) **GAIN CHAR** 3-way toggle switch
- 16) **VOLUME 2** control
- 17) **BRIGHT 2** 3-way toggle switch

- 18) **VOLUME 1** control
- 19) **BRIGHT 1** 3-way toggle switch
- 20) **INPUT** jack
- 21) **FOOTSWITCH** jack

**POWER** two-way toggle switch powers the amp on and off.

**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 UP position for approximately 60 seconds. You can then switch to DOWN ("ON") to use the amp.

**RECTIFIER** allows you to select Solid State or Tube rectification, for the amp. The tube rectifier used is a GZ34/5AR4. Please put the amp to STANDBY first, before toggling this switch!

**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.

**POST PHASE INVERTER MASTER VOLUME (PPIMV)** is a master volume control that acts after the phase inverter. This allows you to still have preamp and phase inverter distortion, but at lower volumes. When this control is maxed, the PPIMV is bypassed, thus it will be like a stock circuit.

**HI CUT** allows you to fine tune the highs of the amp. When set higher, more and more high frequencies are cut

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

**BITE** allows you to select between 2 Presence capacitor values, ie 0.1uf (Left) and 0.47uf (Right). Stock TW Express amps come with 0.1uf capacitor.

**BASS** adjusts low frequencies

**CHAN** This switch manually switches between Clean and OD channels, without use of the footswitch

**CHAN LED** The LED turns red when you are in the OD channel

**MIDDLE** adjusts the mid frequency response

**MID Boost** is a 2 way switch, that allows for selection of a higher valued Treble capacitor, like in Dumble amps. With the mid boost engaged, you can have a thicker sound, and stock sound when it is off.

**TREBLE** adjusts the high frequency response

**VOLUME 2** sets the overall volume and gain of the OD Channel, ie the stock circuit of the original TW Express.

**GAIN CHAR** this is a 3 way switch that allows different gain levels, useful for you to fine tune the OD channel. Middle is stock TW Express, which is the gainest.

To the Left would be the least gainy, so you can use it for light crunch sounds a la typical Marshall, for example

To the Right would be in between, useful for medium gain sounds.

**BRIGHT 2** is a 3 way selector which selects the bright capacitor value for the OD channel Volume Control. You can select none (Middle), 100pF (Right), or 500pF (Left). These are original values per TW.

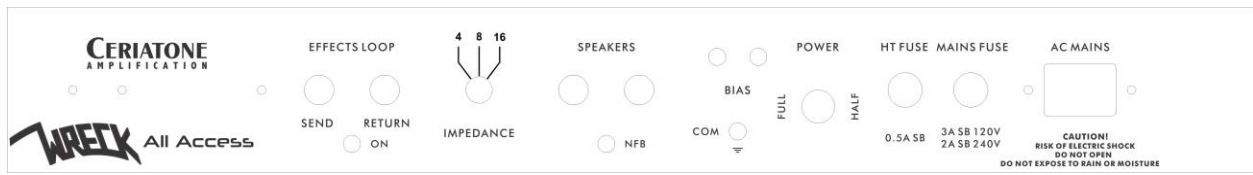
**VOLUME I** adjusts the overall volume and gain of the "CLEAN" channel of the amp.

**BRIGHT 1** is a 3 way selector which selects the bright capacitor value for the CLEAN channel Volume Control. You can select none (Middle), 100pF (Right), or 500pF (Left).

**INPUT I** Plug your guitar in here.

**FOOTSWITCH** Plug the footswitch here to select Channels

## 4) REAR PANEL CONTROLS



From left to right:

- 1) **SEND** 1/4" instrument jack
- 2) **LOOP ON OFF** switch
- 3) **RETURN** 1/4" instrument jack
- 4) **IMPEDANCE SELECTOR** three-way rotary selector
- 5) **SPEAKERS** 1/4" speaker jacks (x2)
- 6) **NEGATIVE FEEDBACK (NFB)**
- 7) **BIAS TEST** probe jacks (x2)
- 8) **COM** probe jack
- 9) **FULL / HALF** 2-way toggle switch
- 10) **HT FUSE**
- 11) **MAINS FUSE**
- 12) **MAINS** IEC cable inlet

**SEND** is the Send jack of the effects loop, which is a SOLID STATE BUFFERED type, in this amp. A 1/4" instrument cable is used, to the Input of your effects.

**LOOP ON OFF** switch is to turn the Buffered Loop on or off.

**RETURN** is the RETURN jack, accepting the Output from your effects, using 1/4" 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!*

**NEGATIVE FEEDBACK (NFB)** is a 3 way switch to select different NFB resistor values: Middle (100K) will be least NFB, so your amp will sound gainiest/loudest at this setting. Left would be most NFB, while Right would be an in between value.

**FULL / HALF** switches the power output of the power amp. HALF mode configures the power tubes to run in triode operation, and this negates any need to reconfigure the IMPEDANCE SELECTOR.

Please turn the amplifier to STANDBY before toggling this switch

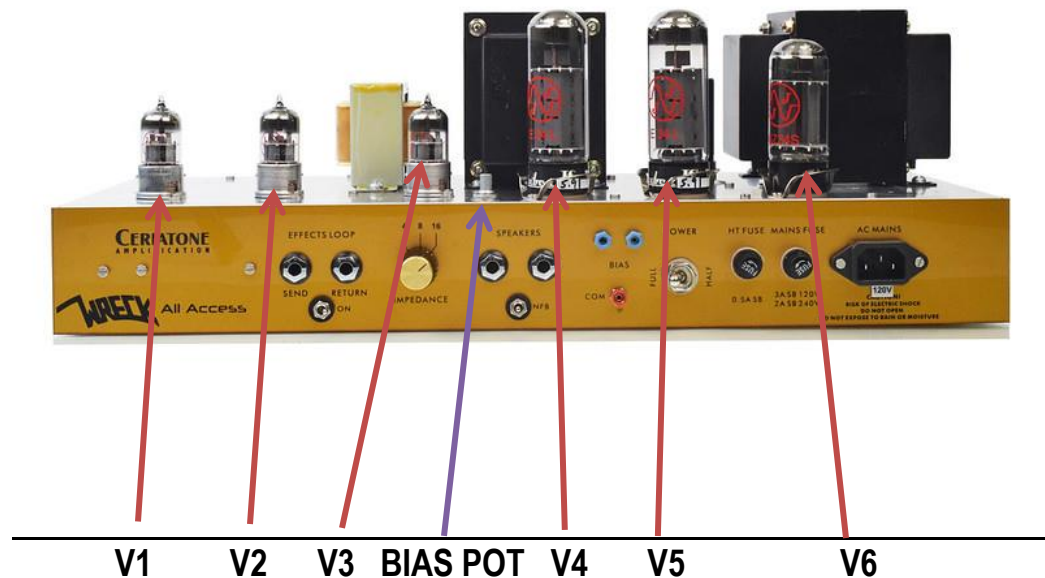
**BIAS TEST** and **COM** multimeter probe jacks – use this for external bias current measurements (see Section 5)

**HT FUSE** 0.5A SLO BLO fuse – used to protect your amplifier from voltage spikes or excessive current draw. Replace only when necessary.

**MAINS FUSE** SLO BLO fuse – used to protect your amplifier from voltage spikes or excessive current draw. Replace only when necessary. 3A is used for amplifiers used with a 120VAC country supply, and 2A is used with 240VAC.

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

## 5) TUBE COMPLEMENT AND BIAS ADJUSTMENT



From left to right:

V1: 12AX7/ECC83 (Input stage Bright and Normal channels)

V2: 12AX7/ECC83 (stage 2 and tonestack cathode follower)

V3L: 12AX7/ECC83 (phase inverter for power amplifier)

V4-V5: EL34 (power tubes)

V6: GZ34 (tube rectifier)

### **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, Rectifier set to SOLID STATE, 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 COM probe jack. This is GROUND in the amplifier.

- 4) Insert the red probe tip into the V4 probe jack on the left. This measures bias for V4.  
Write down your measurement
- 5) Repeat step 4 for V5, Write down your measurement for each

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 and V5 plate voltage for TW Expression All Access amp  
= 400 VDC with Solid State Rectifier chosen
- 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 the amp to approximately 43mV on a DMM, which is 70% dissipation.

An example is as follows:

$$\frac{25W}{400VDC} \times 75\% \times 1000 = \text{about } 43 \text{ mA}$$

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 43mA measures as 43mV on your DMM.

**NOTE** – Only set your DMM to mV for measuring bias on the amplifier. 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 9
- 2) Calculate what bias voltage reading you will set your tubes to (in this case, we will use 43mV)
- 3) Place your red probe in the LEFT **BIAS** jack, and the black probe in the **COM** jack.
- 4) Turn the bias potentiometer shaft SLOWLY until your DMM reads 43mV
- 5) Wait 1 minute
- 6) Recheck all power tube bias measurements
- 7) Readjust bias potentiometer shaft if necessary

Note that, the bias above is when SOLID STATE (SS) rectification is selected. When Tube Rectification is selected, the plate voltages inside the amp will be lower, due to the drop introduced by the tube rectifier.

However, this has already been compensated, for bias, by a resistor inside the amp that changes values when you toggle the Rectifier switch. Hence, you do not have to rebias for Tube Rectifier operation.

### *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 passive?*

- The FX loop is series, and is a buffered solid state type

*Can I substitute different tube types?*

- 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.
- Please use only GZ34/5AR4 for the tube rectifier
- Please use only EL34s for power tubes. While other tubes might work, knowledge, and mods might need be required. Please consult a qualified technician for any mods.

*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 amp, 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.

## 7) How to achieve the original TW Express circuit?

For the original TW Express circuit:

- a) Rectifier – Solid State
- b) Hi Cut – 0 (no cut)
- c) PPIMV - Full (defeated)
- d) Bite - Left (0.1uF)
- e) Channel - OD Channel
- f) Gain Character - Middle (gainiest) None
- g) Mid Boost - Left (Off)
- h) Bright Cap - To Taste
- i) Volume 2 (OD Channel Volume) – To Taste, but try 11-1 o'clock first
- j) NFB – Middle (100K NFB resistor)
- k) Power – Full power

You can also mix and match these settings, to create your own sounds! Enjoy!

## 8) Settings templates

Please resize, and print the templates below, to make your settings templates

