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Ibanez Tube Screamer[®] 808

History

The Ibanez Tube Screamer is an overdrive pedal. The most popular use of a tube screamer is to push a tube amp to make it overdrive more. The pedal has a characteristic mid-boosted tone popular with blues players. The "legendary" Tube Screamer has been used by guitarists such as Stevie Ray Vaughan to create their signature sound, and is one of the most popular and most copied overdrive pedals.

Description

When used with a tube amplifier the Tube Screamer increases the gain of the input signal, overloading the preamp and further distorting the signal. When used with a cranked master-volume type tube amplifier, this can result in much higher volumes than before the pedal is engaged if the preamp is not already turned up fairly high. Provided the preamp gain is already turned up, the Tube Screamer will saturate the signal, creating a thickly overdriven tone.

The pedal has an overdrive knob, a tone knob, and a level knob. The drive knob controls the level of distortion, the tone knob adjusts the amount of treble in the sound, and the level knob controls the output volume of the pedal. The pedal can be used on a solid-state amp to try to mimic the sound of a vintage tube amp, although many guitarists prefer to use it to push a tube amp's pre-amp into an overdriven state. The classic Tube Screamer sound includes a "mid-hump," which means that the circuit accentuates frequencies between the bass and treble ranges (mid-frequencies). Many guitarists prefer this sort of equalization, as it helps to keep their sound from getting lost in the overall mix of the band.

Variations

The pedal was produced with many variants. The early incarnations of the TS-808 (with and without hyphen) and TS9 are the most sought after by collectors. Other variants, including the TS10, TS7, and TS5 are less collectible and vary in their reproduction of the original circuit. The TS-9 and TS-808 pedals have been reissued, and according to the company, feature the same circuitry, electronics and design components that helped to shape the famous Tube Screamer sound. Some musicians have a technician perform modifications to the unit to change the sound to their liking. Also, Maxon, who produced the original Tube Screamer pedals for the Ibanez brand in the seventies and eighties, produce their own version of the Tube Screamer. In addition, many of the most highly-regarded overdrive pedals, both mass-manufactured and boutique, owe their heritage to the Tube Screamer circuit.

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Design

Mr. S. Tamura, the designer of the Tube Screamer, used a subtle clipping circuit to create the pedal's sound. He mixed the input signal with the output signal of the clipping circuit, which "preserves the original dynamics of the input signal which otherwise would get lost at the threshold of clipping.": In this fashion, it preserves the "original dynamics of the input signal [and] avoids muddiness and vastly improves clarity and responsiveness." As well, Tamura added a post-clipping equalization circuit with a first-order high-pass shelving filter that "is linearly dependent on its gain", an approach called "progressivity." Characteristic of its clipping is the symmetrical nature.

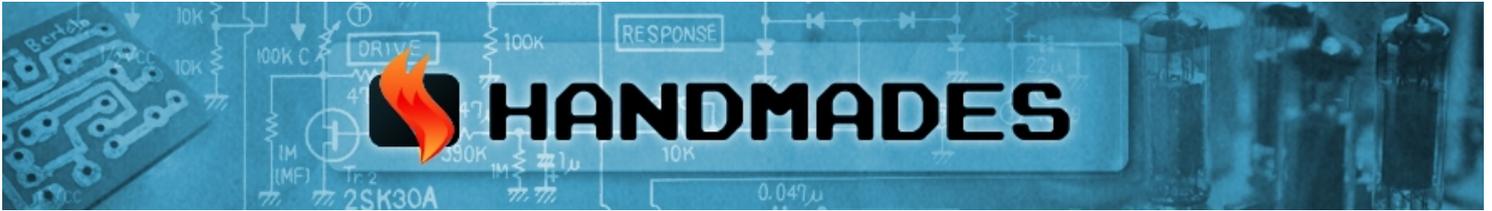
The Tube Screamer uses electronic FET bypass switching. The circuit uses transistor buffers at both the input and the output. The overdrive is produced using a variable gain op-amp circuit with matched diodes in the feedback circuit to produce soft, symmetrical clipping of the input waveform. The overdrive stage is followed by a simple lowpass filter and active tone control circuit and volume control. The TS7 allows switching between "TS9", with the circuit and all relevant component values being identical to the vintage model, to "Hot" mode which introduces an additional gain stage.

Much has been made of the opamp chips used in the various versions of the Tube Screamer pedal, and several articles have been written on the subject. The JRC4558D chip is particularly well regarded. In fact, the JRC4558D is used in Analogman's "Silver" modification. Other popular chips included the TL072, RC4558P, and OPA2134. The TA75558, standard in the TS10 alongside the 4558, is regarded as the "ugly duckling of TS opamps."

Yet another variant was the Ibanez Super Tube that featured a fourth Bite knob which provided a harder attack.

Ibanez Tube Screamer ® History from wikipedia, accessed on 23/10/2010 in http://en.wikipedia.org/wiki/Ibanez_Tube_Screamer





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Ibanez Tube Screamer[®] 808 - Construction

Parts List

Semiconductors

- 01 - 4558 - Dual High-Gain Operational Amplifier (IC1)
- 06 - 1N4148 - High-speed switching diodes (D101, D102, D103, D104, D105, D106)
 - * D105 showed in schema but not used on board
- 05 - 2SC1815 - Transistor Silicon NPN Epitaxial (Q101, Q103, Q105, Q106, Q107)
- 02 - 2SK30A - Silicon N-Channel Junction FET (Q102, Q104)
- 01 - 1N4003 - General Rectifier Diode (D108)
- 01 - 4V7/0,5W - Zener 4,7V x 0,5W (D107)
- 01 - LED (LED1)

Resistors (All Resistors are 1/4W or 1/8W, ±5% rating)

- 01 - ?? - Not specified in schema (R119)
- 01 - 22 (R124)
- 02 - 100 (R114, R129)
- 01 - 220 (R108)
- 04 - 1K (R101, R107, R110, R111)
- 01 - 3K6 (R131)
- 01 - 4K7 (R104)
- 07 - 10K (R103, R105, R109, R113, R115, R132, R133)
- 01 - 22K (R122)
- 01 - 51K (R106)
- 04 - 56K (R125, R126, R127, R128)
- 01 - 62K (R121)
- 04 - 510K (R102, R112, R117, R118)
- 04 - 1M (R116, R120, R123, R130)

Capacitors (all ceramic capacitors are above 25V rating. All other capacitors are above 50V rating, unless otherwise marked)

- 01 - 51pF - Ceramic (C104)
- 03 - 1nF - Ceramic (C113, C114, C115)
- 01 - 0.02µF - Polyestiren (C101)
- 03 - 0.047µF - Polyester (C103, C110, C112)
- 02 - 0.1µF - Polyester (C108, C111)
- 02 - 0.22µF - Tantalum (C105, C106)
- 02 - 1µF - Electrolytic Non Polarized (C102, C107)
- 01 - 10µF - Electrolytic (C109)
- 01 - 47µF - Electrolytic (C116)
- 01 - 100µF - Electrolytic (C117)



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Ibanez Tube Screamer[®] 808 - Construction

Parts List (Continued)

Potentiometers

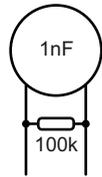
- 01 - 20K-W (TONE)
- 01 - 100K-B (LEVEL)
- 01 - 500K-A (DISTORTION)

Miscellaneous

- 01 - 9V Battery Clip (9V Battery)
- 02 - CR1, CR2 (See Box)
- 01 - DC Power Jack (Ext. DC.)
- 01 - Stereo Jack (INPUT)
- 01 - Mono Jack (OUTPUT)
- 01 - Momentary Switch (S1)

CR1 and CR2 Construction Detail:

Each one is a junction of a 1nF ceramic capacitor and a 100K resistor in parallel



Notes:

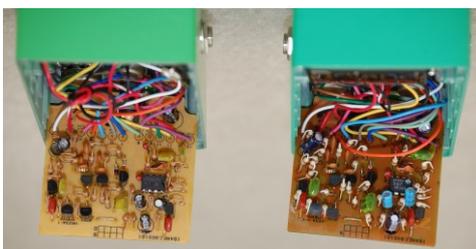
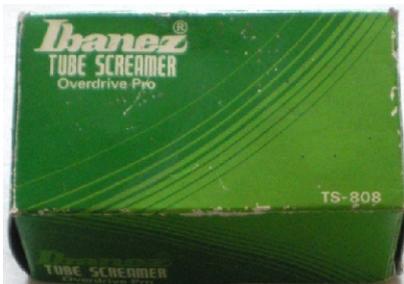
3K6 resistor can be achieved by putting two 1K8 resistors in series.

51K resistors can be achieved by putting one 39K and one 12K resistors in series.

510K resistors can be achieved by putting one 390K and one 120K resistors in series.

51pF ceramic capacitor can be achieved by putting one 39pF and one 12pF ceramic capacitors in parallel.

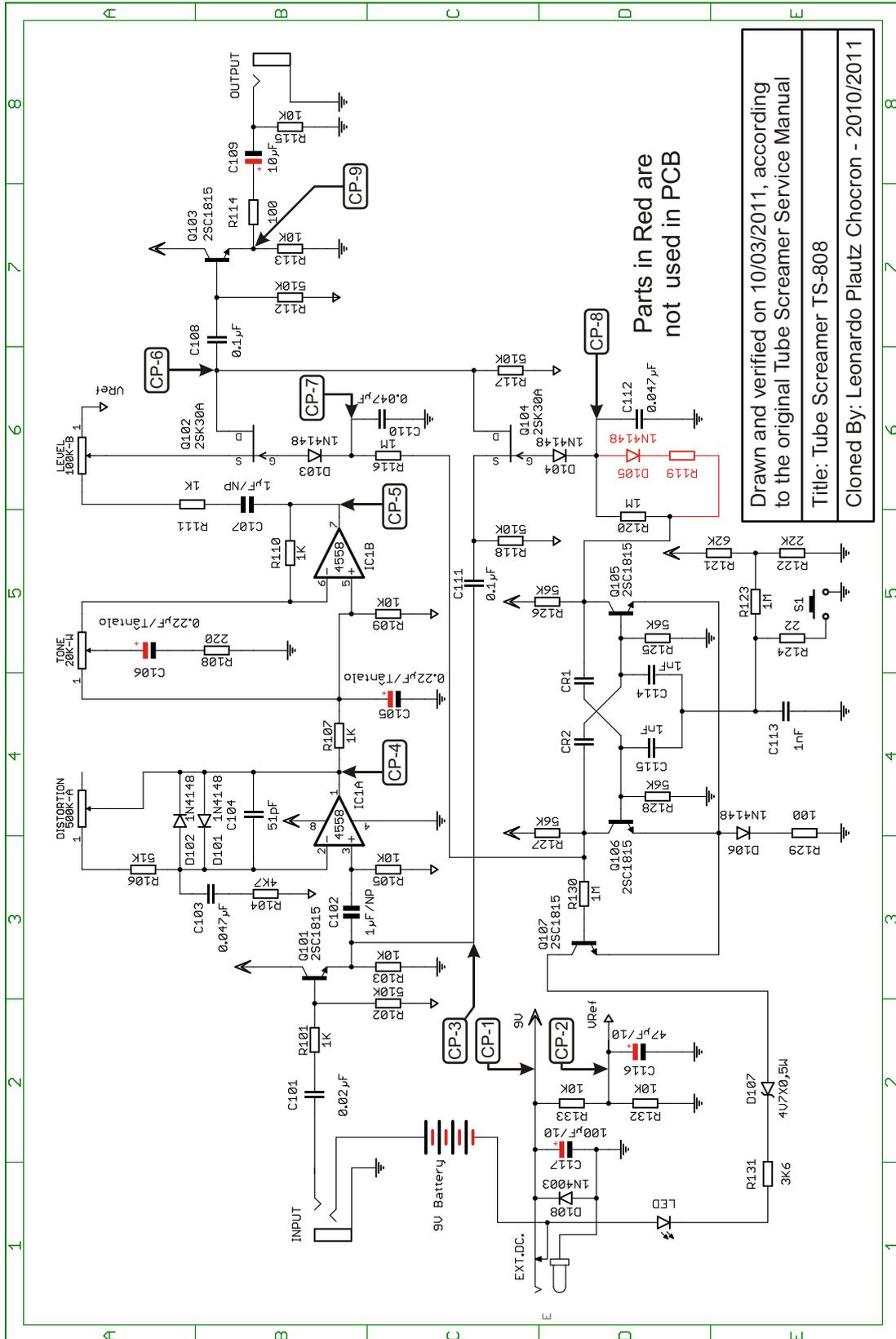
0.02 μ F capacitor can be achieved by putting two 0.01 μ F capacitor in parallel.





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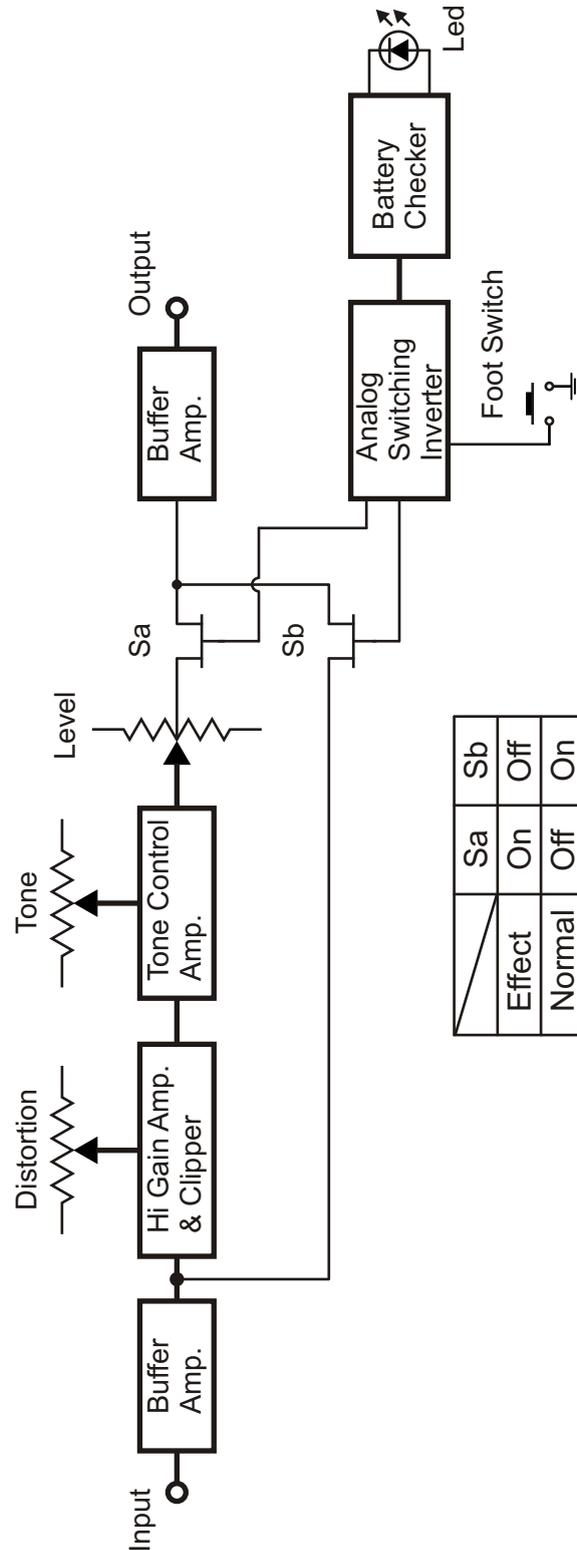
Ibanez Tube Screamer® 808 - Schema





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Ibanez Tube Screamer® 808 - Block Diagram



| | | |
|--------|-----|-----|
| | Sa | Sb |
| Effect | On | Off |
| Normal | Off | On |

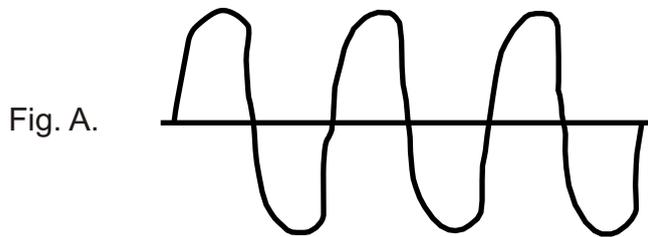


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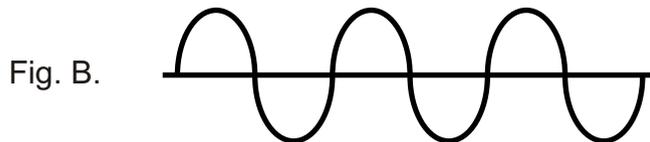
Ibanez Tube Screamer® 808 - Adjustment Procedures

Wave form of output

- 1 - Put 30mV, 1KHz sinewave into INPUT.
- 2 - Set OVERDRIVE control, TONE control and LEVEL control fully CW.
- 3 - Make sure wve form as shown in Fig. A.



- 4 - Set OVERDRIVE control fully CCW.
- 5 - Make sure wave form as shown in Fig. B.

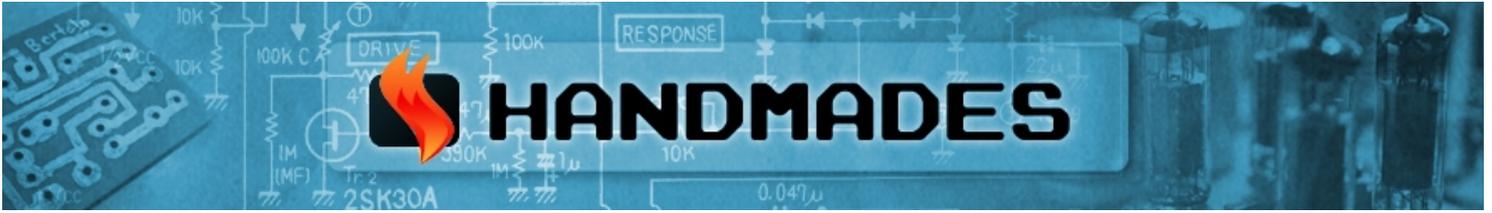


- 6 - Set OVERDRIVE control fully CW ant TONE control fully CCW.
- 7 - Make sure wave form as shown in Fig. C.



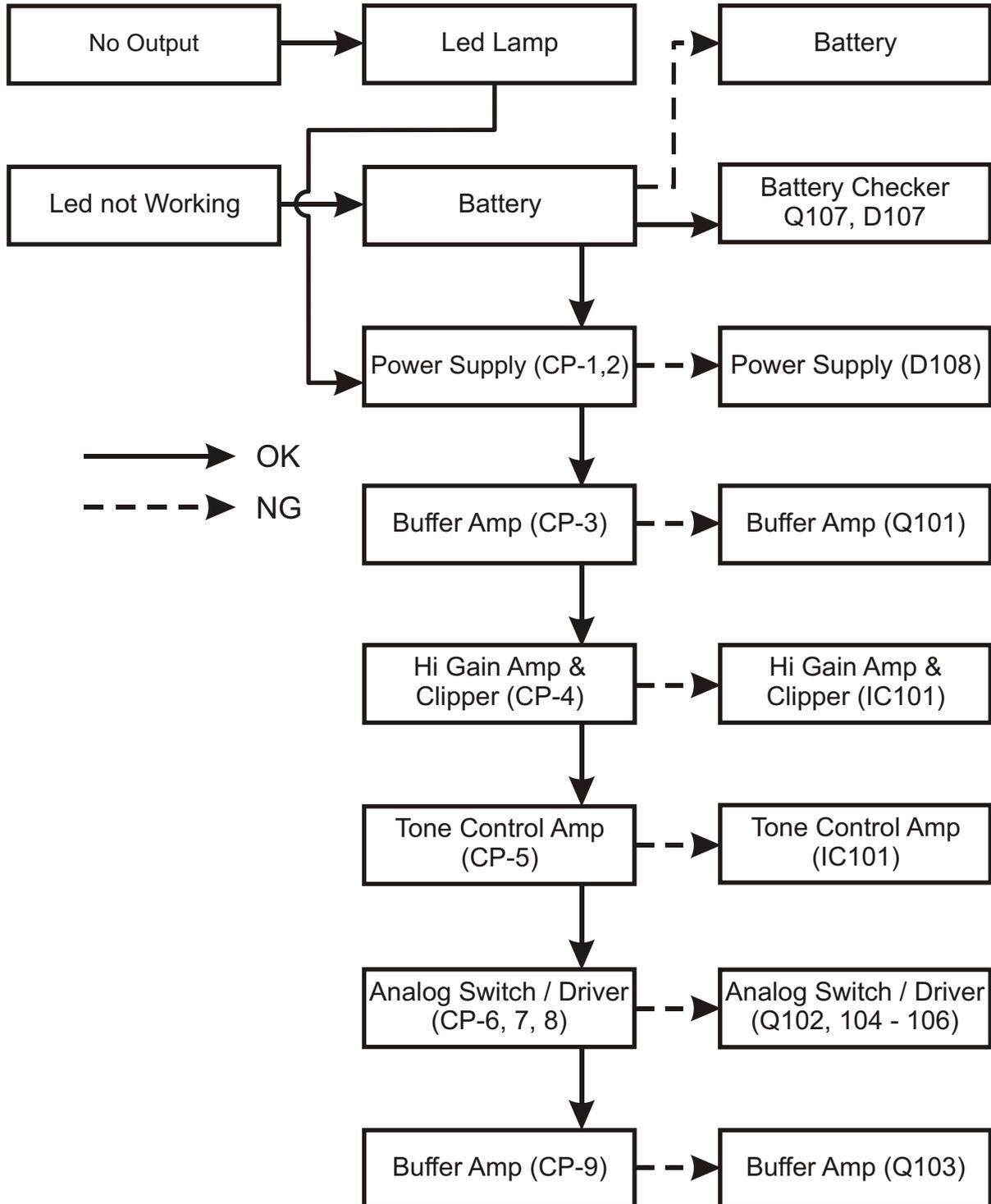
- 8 - Set OVERDRIVE control fully CCW.
- 9 - Make sure wave form as shown in Fig. D.





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Ibanez Tube Screamer[®] 808 - Trouble Shooting



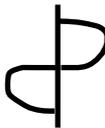
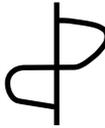
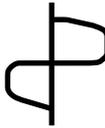


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Ibanez Tube Screamer® 808 - Wave Form at CP's

Remark: Signal of CP is the wave
Inputting a sine wave signal to input

V: Voltage
S: Signal

| CP-1 | CP-2 | CP-3 | CP-4 | CP-5 | CP-6 | CP-7 | CP-8 | CP-9 | | | | | | | | |
|-------|--------|---|---|---|---|--|-------|--------|-----|-----|--|-------|--------|-----|-----|---|
| V | V | S | S | S | S | V | V | S | | | | | | | | |
| 9 | 4,5 |  |  |  |  | <table border="1"> <tr> <td>E. ON</td> <td>Normal</td> </tr> <tr> <td>5,5</td> <td>0,5</td> </tr> </table> | E. ON | Normal | 5,5 | 0,5 | <table border="1"> <tr> <td>E. ON</td> <td>Normal</td> </tr> <tr> <td>0,5</td> <td>5,5</td> </tr> </table> | E. ON | Normal | 0,5 | 5,5 |  |
| E. ON | Normal | | | | | | | | | | | | | | | |
| 5,5 | 0,5 | | | | | | | | | | | | | | | |
| E. ON | Normal | | | | | | | | | | | | | | | |
| 0,5 | 5,5 | | | | | | | | | | | | | | | |



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Ibanez Tube Screamer® 808 - Boards

Ready to Transfer

