Using and Understanding the BAE Royaltone pedal

A NOTE ABOUT THE BATTERY AND JACKS:

Your Royaltone Pedal sports two True Bypass footswitches. To further maintain sonic purity, the input and output jacks are not involved in the grounding of the power circuit for the battery or remote power supply in any way. The input jack has an additional, completely isolated set of contacts which switches either the battery or remote supply ON when the plug is inserted. The power remains on as long as the input jack is plugged in, whether the unit's circuits and LEDs are on or off. This eliminates any pops or pulses when activating the stomp switches. *To conserve battery power, remove the input (guitar) cable from the unit when not in use!*

NOW LET'S GET ON WITH IT:

Guitarists each have their own way to use and experiment with a new pedal. That being said, for those seeking to understand what the controls actually do, there lies an expansive multitude of tone colorations that are possible.

The ROYALTONE contains two completely independent circuits. Each can be used separately to shape your tone and distortion, but they can also both be used simultaneously to introduce a whole additional level of tone shaping…

Tone Stack:

The Tone Stack section of the Royaltone is a full, three range tone stack that takes its roots from a combination of vintage Fender, Marshall, and Vox amplifiers. It takes no shortcuts, using carefully selected low noise resistors, film capacitors, and Alpha pots just like you find in fine amplifiers. Guitar tone is highly preserved. The Tone Stack circuitry can provide up to 20 db of gain, depending on frequencies and settings selected.

Turn on the Left stomp switch, and the green LED will come on, activating the Tone Stack. To match the BYPASS setting, set the BASS to minimum, and the MID and TREBLE controls to 9:00 0'clock. From there you can sculpt your tone. You can achieve super warm tone with the BASS control, pop-out presence with the

MID control, and ringing highs with the Treble. To get a midrange cut, leave the MID control at minimum and turn up the BASS and TREBLE controls. Be sure to experiment with the Tone Stack to create a unique sound that is yours.

The chart below shows standard tuning frequencies of a six string guitar, along with the Tone Stack's maximum boost from each of the three controls at all the frequencies. Some lower (sub-harmonic) and upper harmonics are also listed:

String	Note	Frequency (Hz)	BASS	MID	TREBLE
6th	E_2	82.41	10.7 dB	0.5 dB	0 dB
5th	A_2	110	9.7 dB	1.0 dB	0 dB
4th	D_3	146.83	8.4 dB	1.5 dB	0 dB
3rd	G_3	196	6.5 dB	3.7 dB	0 dB
2nd	B_3	246.94	5.7 dB	4.3 dB	0 dB
1st	E_4	329.63	1.6 dB	4.7 dB	0 dB
1st - 12th fret	E_5	659.26	0 dB	6.0 dB	1.7 dB
Harmonics:		40	13.6 dB	0.6 dB	1.9 dB
		500	0.8 dB	5.1 dB	0 dB
		1K	0 dB	7.6 dB	4.1 dB
		2.5K	0 dB	11.6 dB	12 dB
		5K	0 dB	12.5 dB	15.4 dB
		7.5K	0 dB	10.9 dB	15.7 dB
		10K	0 dB	11.8	16.1 dB

Fuzz:

The Royaltone Fuzz takes its cue from the original VOX Tone Bender, a two transistor, Germanium fuzz box. The Royaltone uses a special combination of JFet and low gain BJT transistors, to achieve the right amount of phase-shifted, asymetrical clipping that the Germanium boxes were prized for.

Each of the ATTACK and LEVEL sections of the Fuzz can provide up to 20 dB of gain.

Turn off the Tone Stack and press on the FUZZ switch (Right stomp switch; the red LED will come on). This will bring the ATTACK and LEVEL controls to life. The LEVEL control goes from completely off to max, *and* if you add the Tone Stack, the

Fuzz LEVEL pot controls *both*. You can add as much tone and fuzz as you like – you can reduce the output level without reducing the tone and fuzz. You may or may not hear fuzz at this point – that will be influenced by your guitar and amplifier settings.

> *It is useful to remember that there are three places where gain and overload/distortion/fuzz can be affected: the guitar volume and tone controls, the pedal controls, and the amplifier controls. By realizing this and setting your controls to work together, you can achieve the greatest variation in tone with minimal further adjustments to all your controls. Once you've dialed that in, it also allows you to invoke the effect of the Royaltone by merely controlling your guitar level and touch.*

Higher settings of the ATTACK and LEVEL will generate more fuzz into the amplifier. You will be hearing overload generated by the ROYALTONE itself AND possibly amplifier overload as well (depending on settings).

Play with the controls to see how they affect your tone.

When using both the Tone Stack and the Fuzz sections, you will find that any of the tone controls, in combination with the ATTACK control will give you excellent, and many different FUZZ results. Increasing the BASS will achieve a warm, sweet fuzz. MID and TREBLE controls will provide cut-through tone with sharper fuzz. As you get closer to the extreme max of the controls, you are supplying very high gain and chronic fuzz, so be careful! With the LEVEL control, you can achieve all this at lower volumes, if desired.

The images on the next page will give you an idea of what the Royaltone's fuzz actually look like. Figure 1 shows a softer, warm fuzz, that matches many of the vintage Germanium boxes. Clipping is on one side only, with some phase distortion as well. Figure 2 shows the same input signal with significantly more ATTACK, resulting in a sharper, cutting fuzz tone. Top clipping is much broader, and now there is also bottom clipping with phase shift as well. Both signals aree an identical 200 Hz sine wave. Actual guitar tones would be much richer and more complex due to the many harmonics generated.

Figure 1: Soft, warm fuzz

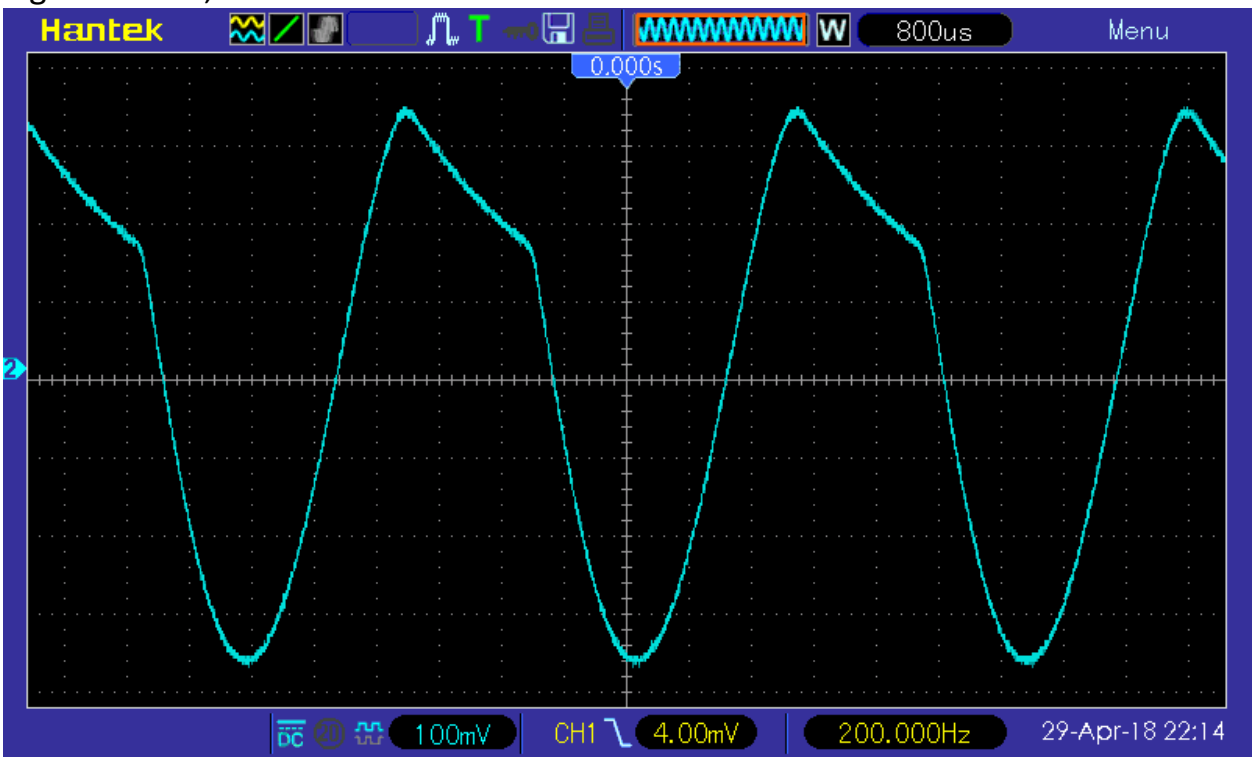
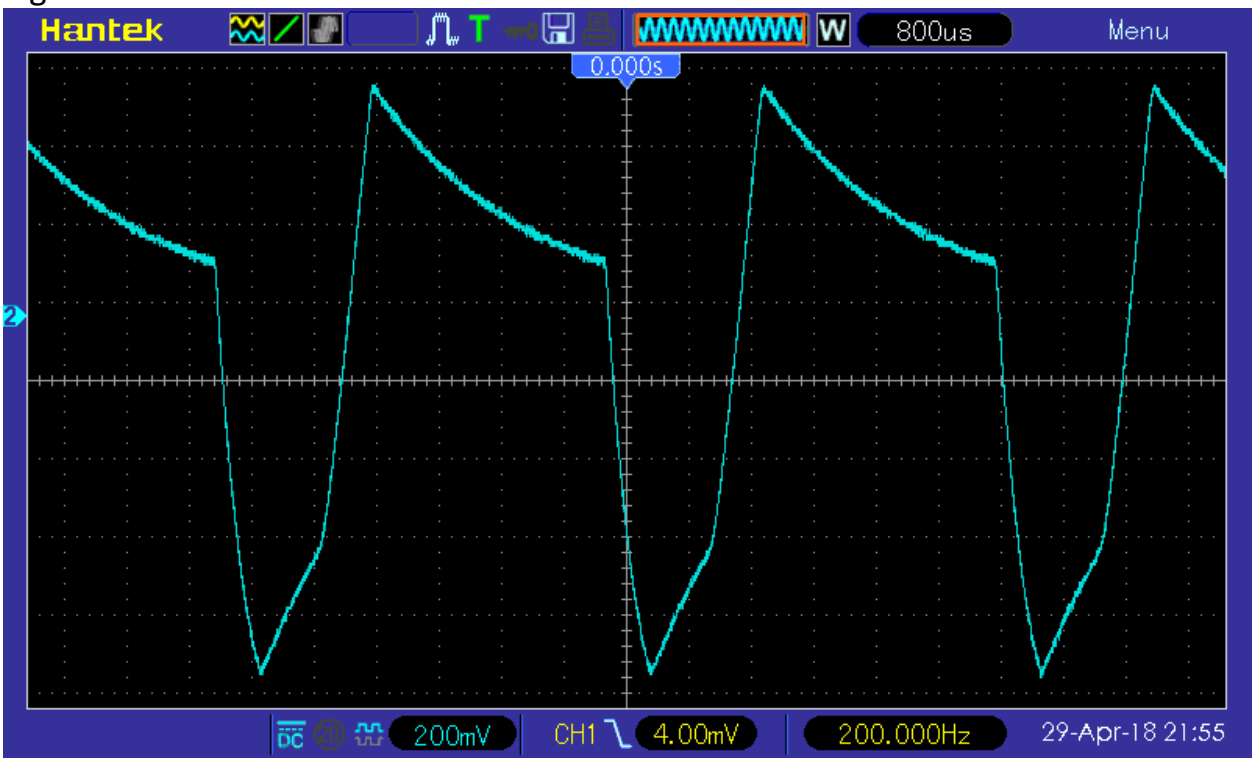


Figure 2: Chronic fuzz



ROYALTONE SPECIFICATIONS:

Circuits & Gain:

1. Tone stack with 3 controls (left switch and green LED):
    a. MID (12.5 dB gain)
    b. BASS (13.6 dB gain)
    c. TREBLE (16.1 dB gain)

2. Tone Bender (Fuzz) with 2 controls (right switch and red LED):
    a. ATTACK (20 dB gain)
    b. LEVEL (20 dB gain)

Circuit Topology:

1. Tone Stack: 3 JFet transistors, as buffers and gain.

2. Tone Bender: 1 JFet and 2 Bipolar transistors .

3. Power Supply: +9 Volts D.C., battery or remote supply (plug is center negative, 2.0mm diameter).

Power draw:

Idle: 7 mA

Max (both sections on): 13 mA

Dimensions: 3 ⅝” WIDE x 6 ¼” DEEP x 3 ⅛” HIGH

92mm WIDE x 159mm DEEP x 80mm HGH