

# USER MANUAL: BWE-PONG POLYPHONIC OCTAVER AND NOISE GRABBER MODULE

**Document revision-0 (09-06-2022)**

- Initial release

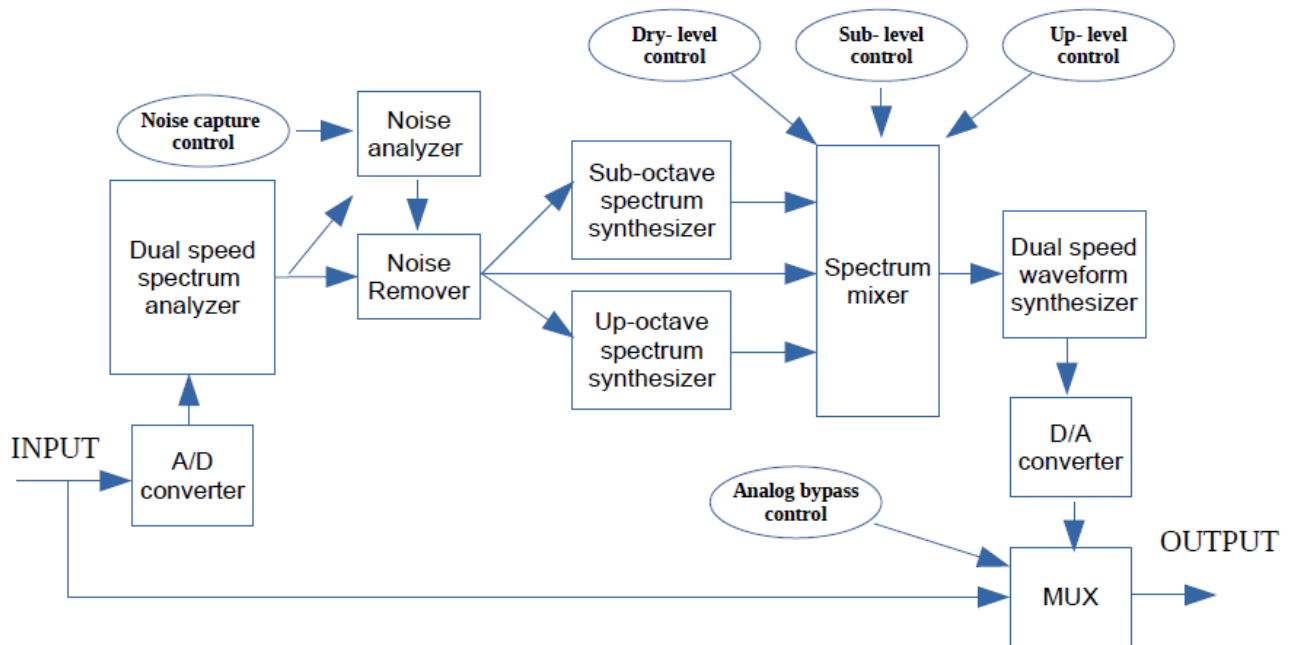
## I. Description

BWE-PONG is an octaver and noise grabber effect module designed for guitar effect pedal application. The octaver effect produce new octave and sub octave sound, while the noise grabber analyze the noise spectrum and uses that information to remove the noise from the original signal. With the noise grabber, the output signal will fade out naturally into the silence without any gating transient.

## II. Features

- Noise grabber function
- Independent controls for dry, sub, and up levels
- Glitch-free tracking
- Low latency
  - Dry output: 10 ms
  - Up octave output: 65 ms
  - Sub octave output: 55 ms
- Zero latency analog-pass-through bypass

## III. Block Diagram



**Figure 1. BWE-PONG Block Diagram**

#### IV. Pinout Diagram and Pin Description

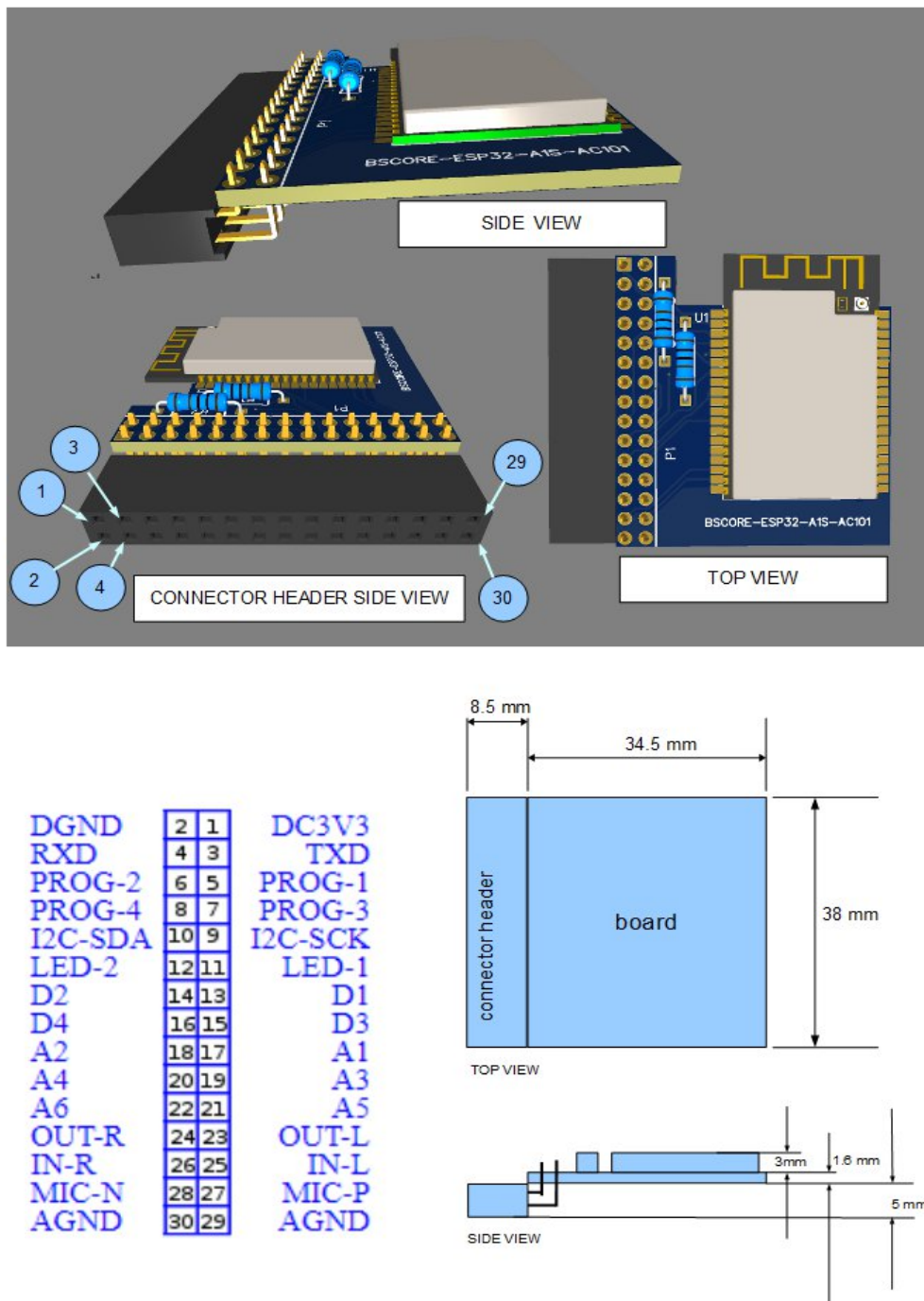


Figure 2. BWE-PONG Module Pinout Diagram

NUMBER	NAME	DESCRIPTION
1	DC3V3	Power supply input +3.3V
2	DGND	Digital ground
3		(UNUSED)
4		(UNUSED)
5		(UNUSED)
6		(UNUSED)
7		(UNUSED)
8		(UNUSED)
9		(UNUSED)
10		(UNUSED)
11	LED-1	Indicator LED
12		(UNUSED)
13	D1	Digital input for bypassing switch
14	D2	Digital input for grabbing switch
15		(UNUSED)
16		(UNUSED)
17	A1	Sub octave level control input
18	A2	(UNUSED)
19	A3	Up octave level control input
20	A4	(UNUSED)
21	A5	Dry level control input
22	A6	(UNUSED)
23	OUT	Audio signal output
24		(UNUSED)
25	IN	Audio signal input
26		(UNUSED)
27	MIC-P	(UNUSED)
28	MIC-N	(UNUSED)
29	AGND	Analog ground
30	AGND	Analog ground

**Table 1. BWE-PONG Module Pin Description**

## V. Electrical Specification

- Power supply voltage: DC 3.3V
- Current consumption: 100 mA (max)
- Absolute instrument input range: 3300 mV(peak-to-peak)
- Instrument input impedance: 20 kOhm
- Output impedance: 1 kOhm

## VI. Typical Application Circuit

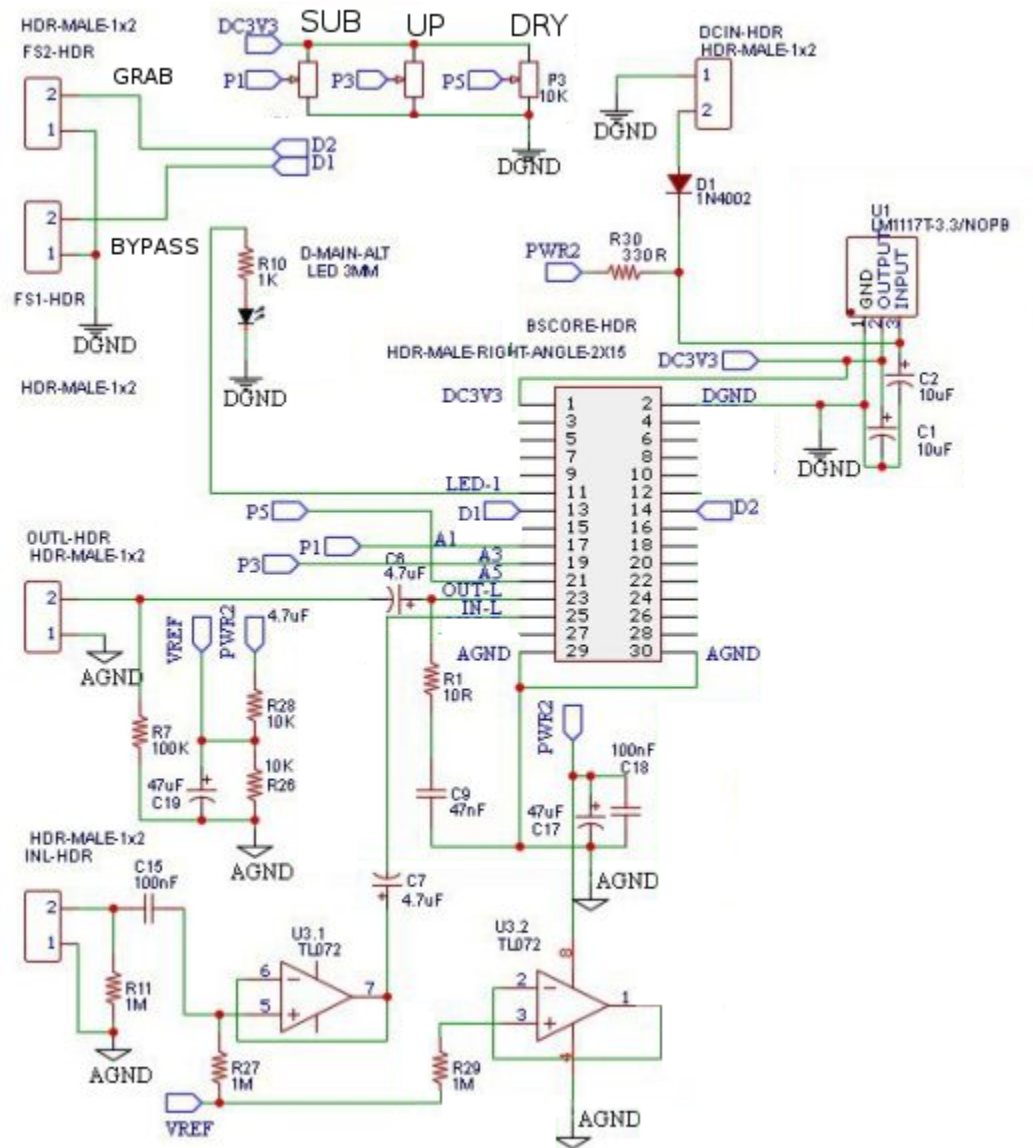


Figure 3. Typical BWE-PONG Pedal Circuit

## VII. Controls

- **BYPASS switch** is used to activate/deactivate the effect by un-bypass and bypass. In tap menu operation, this switch is used to do a single-tap or multi-tap command (see sections IX)
- **NOISE GRAB** switch (see section VIII)
- **SUB knob** controls the sub octave level of the effect output
- **UP knob** controls octave level of the effect output
- **DRY knob** controls the dry level of the effect output

## VIII. Noise Grab Function

PONG has noise grab feature that you can capture the spectrum of any noise that comes with the input, and then use that captured information to remove the noise to produce a very clean output. There are 2 control operation that can be done by the GRAB switch:

1. **Grab.** Do the following steps to grab a new noise profile and apply to the noise remover:
  1. Although not mandatory, it is recommended to bypass the pedal first, so you can hear the noise clearly
  2. Mute all of the guitar strings by touching them with your hand
  3. Keep the noise exposure at maximum, usually by keeping the strings and all ground-connected metal parts untouched, and adjust the guitar position at certain direction
  4. Tap the GRAB switch. Immediately after tapping, the CHECK indicator will blink to indicate that the new noise spectrum is being acquired and analyzed.
  5. Wait until the CHECK indication stop blinking. After it stop blinking then no matter the previous effect state is bypassed or engaged, the effect will switch to engaged state to apply the noise remover.
2. **Grab and Add.** If we just grab a new noise profile at a new guitar position but the noise comes back after the guitar is moved back to the previous position, it means that the noise profile at the new position need to be added to the previous noise profile (from the previous guitar position).
  1. To grab a new noise profile, add to the previous noise profile, and update the noise remover, just do the step 1-3 of the grab operation, then press and hold the GRAB switch until the CHECK indicator blink.
  2. Release the GRAB switch. The CHECK indicator will continue to blink to indicate that the grab-and-add operation is in progress, so wait until it stops blinking.

## IX. Knob's Center-Position Calibration

At the first time the module or the pedal is powered-on, or when the potentiometer knob is replaced or readjusted for maintenance, the center position of the knob reading (by the firmware) need to be calibrated. Use the following steps to do the calibration:

1. From a normal operation (either bypassed or un-bypassed), do a multitap of 10-taps (on BYPASS switch) . Make sure the period between successive taps is not more than 0.5 seconds to be a "single multitap operation". A repetitive 5-blink will be shown by the CHECK indicator to show that the pedal is in the knob calibration operation. Retry the multitap if the CHECK indicator doesn't show it.

2. Turn all the way down the first knob, then turn to the center position. Do the same for all other knobs one by one.
3. Exit the knob calibration operation by one of the following three ways:
  1. Do a triple-tap to accept the adjustment and save the setting
  2. Do a double-tap to cancel the adjustment and apply the default (factory) setting
  3. Do a single-tap to cancel the adjustment and revert back the previous setting

After exit from this menu operation, the CHECK indicator should stop blinking and turned continuously-ON to indicate the normal operation.

END OF USER MANUAL

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