

## Functional Description

- 1 Power Switch
- 2 Power Indicator
- 3 Trigger Loop
- 4 Injector Type switch
- 5 Normal or Glitch switch
- 6 Ground connection
- 7 Secondary connector
- 8 Voltage Potentiometer
- 9 Frequency Potentiometer
- 10 Duty / Injector Pulse Width Potentiometer
- 11 Ground connection
- 12 Sine wave output connection
- 13 Variable voltage output connection
- 14 Frequency output connection
- 15 Variable Frequency and Duty output connection
- 16 Fuel Injector output connection
- 17 9V battery connection

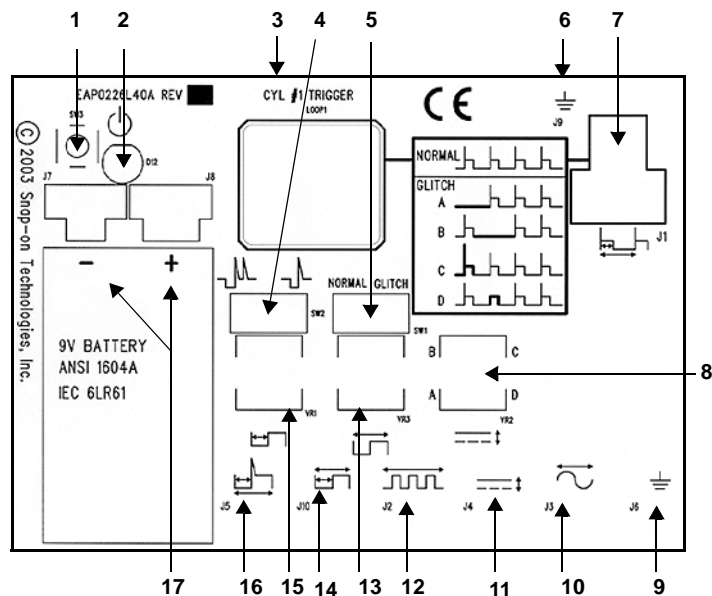


Figure 1: Waveform Demonstration Board outline

## Safety Notice

Refer to your equipment manual for safety and warning messages prior to use.

## 9V Battery

Install the 9V battery (ANSI/NEDA 1604A, IEC, 6LR61) as shown on the board outline (Figure 1).

### Replace the battery:

- If circuit operation becomes erratic.
- If the operating battery voltage drops below 7.0V measured at the battery connector.

## Power Switch and Power Indicator

The unit has two power on modes:

- Mode 1—Automatic shut-off  
The unit will operate for approximately fifteen minutes.
- Mode 2—Continuous operation  
The unit will remain on until the power button is pressed.

### Automatic Shut-off Mode

**To turn the unit on:**

Press the Power switch.

The Power indicator lights.

**To turn the unit off:**

Press the Power switch at any time.

The Power indicator darkens.

### Continuous Operation Mode

**To turn the unit on:**

Press and hold the Power switch for approximately six seconds.

The Power indicator flashes a code, and then continues with a light flashing-pattern at the rate of flash one second on, and three seconds off.

**To turn the unit off:**

Press the Power switch at any time.

The Power indicator stops flashing and darkens.

## Table of Operation

| Output Connection           | Injector Type switch setting | Duty/Injector Pulse Width Potentiometer | Frequency Potentiometer | Voltage Potentiometer | Glitch switch function <sup>1</sup>   |
|-----------------------------|------------------------------|---|-------------------------|-----------------------|---|
| Injector                    | Single spike                 | 1.6mS to 8.3mS                          | 3.5Hz to 57Hz           | N/A                   | Missing Injector event  |
| Injector                    | Double spike                 | 2.9mS to 9.3mS                          | 3.5Hz to 57Hz           | N/A                   | Missing Injector event  |
| Variable Frequency and Duty | N/A                          | 0% to 100%                              | 0Hz to 57Hz             | N/A                   |   |
| Frequency                   | N/A                          | N/A                                     |                         |                       |   |
| Variable Voltage            | N/A                          | N/A                                     | N/A                     |                       |   |
| Sine wave                   | N/A                          | N/A                                     |                         | N/A                   |   |
| Secondary <sup>2</sup>      | Single spike                 | 1.6mS to 8.3mS                          | 415 rpm to 6908 rpm     | Selects Glitch type   | Potentiometer position:<br>A – Missing cyl1<br>B – Missing cyl 2<br>C – High fire cyl 1<br>D – Low fire cyl 2 |
|                             | Double spike                 | Fixed at 1.57mS                         | 415 rpm to 6908 rpm     |                       |   |
| Trigger                     | N/A                          | No effect                               | 104 rpm to 1727 rpm     | N/A                   | Missing event   |

1. A Glitch event occurs approximately every 2 seconds.  
 2. The Secondary output is based on a 4-cylinder vehicle. Synchronization of the Secondary is done in combination with the trigger output. Synchronize on the trigger when trying to view Secondary faults.

## Setup

| Signal                                | Channel | Glitch On/Off | Volts Per Division | Time  | Trigger   | Frequency Range |
|---------------------------------------|---------|---------------|--------------------|-------|-----------|-----------------|
| Variable Frequency                    | CH1     | OFF           | 2.0v               | 2mS   | Pos/2.5   | 5.3Hz – 950Hz   |
| Variable Frequency / Variable voltage | CH1     | OFF           | 2.0v               | 2mS   | Pos/2.5   | 0Hz – 57Hz      |
| Variable Voltage                      | CH1     | ON            | 1.0V               | 500mS | Pos/1.0V  | N/A             |
| Fuel Injector                         | CH1     | N/A           | 10.0V              | 2mS   | Neg/10.0V | N/A             |
| Sine wave                             | CH1     | N/A           | 2.0V               | 2mS   | None      | 0Hz – 57Hz      |
| Secondary                             | TBD     | TBD           | TBD                | TBD   | TBD       | TBD             |
| Trigger                               | TBD     | TBD           | TBD                | TBD   | TBD       | TBD             |

## Usage Tip

**To synchronize to the glitches using the variable voltage output:**

1. Use a 2-channel scope. Setup the Variable voltage output on the trigger-channel, and the signal of interest on the remaining channel.
2. Set the variable voltage output to 2.5V, or potentiometer (POT) positioned midway.
3. Setup the trigger-channel for Falling edge, and adjust the threshold to 1.0V.

The threshold voltage will change if you are trying to trigger on secondary glitch events. This is due to the voltage POT being used to select the event.

4. When a glitch event occurs on the voltage output, the other outputs are glitched as well. The glitch on the other signals will be somewhere near the actual voltage glitch.