

Event Generator Signal Break-out/Break-in Unit

23 April 2003

1 . Description.

The Event Generator Signal Break-out/Break-in Unit allows up to 4 Event Generator signals to be broken-out and buffered to drive an external load, and up to 4 signals to be received from an external source and broken-in to the Event Generator Bus.

The 4 outputs can be configured by component selection to each drive 500 impedance load (to ground) to TTL levels.

The 4 inputs can be configured by component selection to each receive single ended signals or balanced signals. With single ended signals the detection threshold can be set anywhere within the range 0-5V.

2. Specifications.

2.1 Outputs.

Driver device: 74ACT541.

Levels: $V_{hi} > 2.0V$, $V_{lo} < 0.8V$ into 50ohms.

Transition time (0.8V \leftrightarrow 2.0V, 50ohms): $< 5.0ns$ at source.

2.2 Inputs.

Receiver device: AM26LS32 or DS90C032 (LVDS).

Each input line can be individually assembled for single ended or balanced signal.

Levels:

Balanced: as per RS-422 (26LS32) or LVDS(90C032).

Single-ended: Thresholds set to between 0.0 and 5.0V. Hysterises 50mv.

Transition time (0.8V \leftrightarrow 2.0V): $< 20ns$.

Inputs have limited over-voltage protection.

2.3. Power supply.

5V, 300ma.

3.0 Assembly.

The functionality of the board is determined by the components that are placed on the board as well as their value. Select the I/O functionality that is required, then assemble the board with the required components. Here are some suggestions.

3.1 Outputs.

For single ended TTL level outputs to 500,

R1-R16 2200

R47-R62 Leave off (For additional current drive if required)

3.2 Inputs.

For single ended inputs.

3.2.1. Threshold voltage.

The threshold voltage is set by the reference voltage device ZD1 and the voltage dividers set by pairs R29/R30, R31/R32, R36/R34 and R35/R33. The current through these voltage dividers should be set to around 2ma, enough to mask the leakage current into the AM26LS32 devices. If using a reference device (ZD1), make sure that its quiescent current is adequate.

For a threshold voltage of ~1.6V, using an LM4040-2.5 reference (ZD1), set:

R29/R30	680/3300
R31/R32	680/3300
R36/R34	680/3300
R35/R33	680/3300
R38	1800
C1, C2, C3, C4	0.1uF

3.2.2 Input signal routing.

For input signal protection, include the diode devices D1-D8. For single ended operation, only D5 – D8 need be installed.

To limit over voltage currents, inset series resistors R17, R18, R20, R21, R23, R24, R26 and R27 to a suitable value. This value should take into account the current handling capacity if the protection diodes, and the leakage current of the AM26LS32. A typical value would be 1KO.

For single ended operation, each alternate input may need to be grounded. This is done through resistors R19, R22, R28, and R25. To limit ground currents a low value of resistance may be used. A typical value for these would be 100.

For single ended operation with over voltage protection:

Install	Leave off
R17, R20, R23, R26 (1KO)	R18, R21, R24, R27
R19, R22, R28, R25 (100)	
D5-D8	D1-D4

For balanced operation, install only R17, R20, R23 and R26.

Install	Leave off
R17, R20, R23, R26 (1KO)	R19, R22, R28, R25
R18, R21, R24, R27 (1KO)	
D1-D8	

4.0 Using.

4.1. Outputs.

Connect the output cables to the pins on the 8 pin connector J6, via a plug in connector. The odd numbered pins are Signal lines and the even numbered pins are Ground.

Line	Signal	Gnd
1	1	2
2	3	4
3	5	6
4	7	8

Connect the desired Event Generator line pair to the pin pairs on J5 using patch cables or wire wrap wire. The pins are paired horizontally. Note that signal 1 is the pin pair 7/8 on J5, with other pairs following. If inverted signal sense is required, reverse the patch cable order.

4.2. Inputs.

Connect the input cables to the pins on the 10 pin connector J7, via a plug in connector. The odd numbered pins are Signal lines and the even numbered pins are Ground.

Line	Signal	Gnd
1	1	2
2	3	4
3	5	6
4	7	8

Two additional pins on this connector are connected to Ground. These may be used to reduce common mode voltages in the event the inputs are configured for differential signal inputs.

Isolate the Event Generator line from the Event Generator by removing the jumpers for that line on link sets LK1 and LK2. Connect the input signal pin pair on J8 using patch cables or wire wrap wire to the desired Event Generator line pair. The pins are paired horizontally. Note that signal 1 is the pin pair 1/2 on J8, with other pairs following. If inverted signal sense is required, reverse the patch cable order.

Both the input signals and output signals can be monitored by a set of LEDs located adjacent each pair of I/O connectors.

5.0 Modifications.

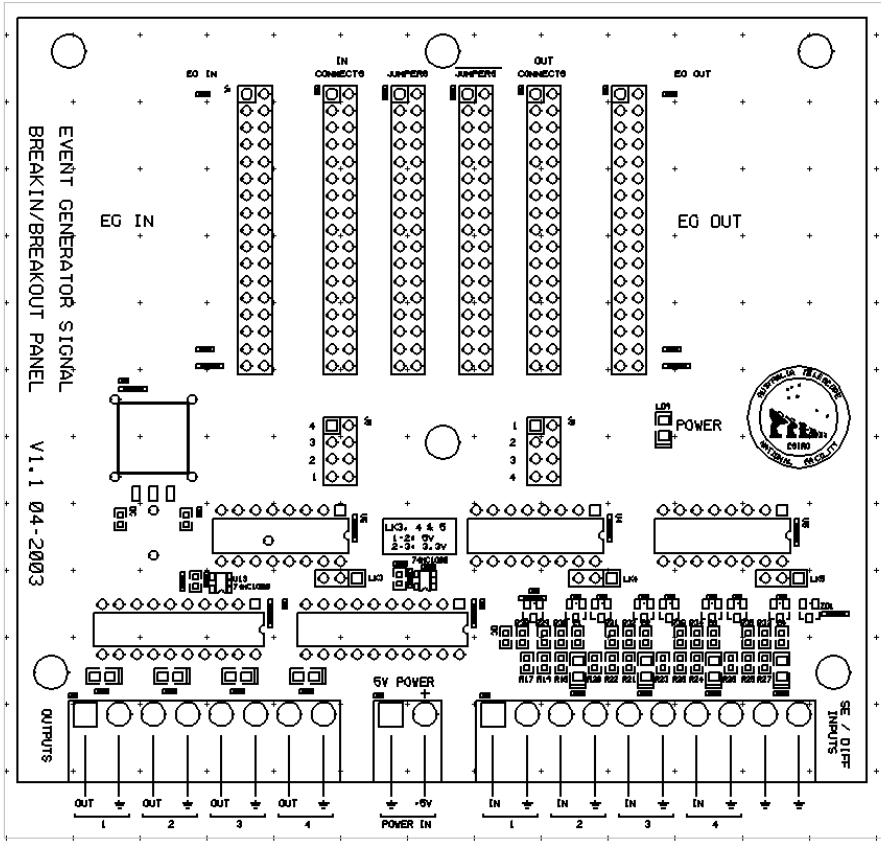
5.1 PCB V1.0.

5.1.1. Voltage reference component wrong pin-out.

This problem only exists if this component is installed on board.

Problem: The PCB symbol ZD1 does not match the component's pin-out.

Fix: Mirror the component pin-out by bending the pins over so that the component is soldered onto the board 'upside-down'. Be careful not to damage the pin by bending them too sharply.



% END %