Polarity indicator

In applications where the polarity of a signal applied to a perfect rectifier needs to be detected, the conventional method is to use a comparator. This system adds undesirable switching noise to the signal, and may oscillate for low-level signals. A small modification, as shown, to a commonly used perfect rectifier circuit offers a more reliable indication of polarity. This circuit will operate with low frequency signals of less than 1mV pk-pk.

The additional voltage drop across D_1 ensures that the transistor switches correctly as the polarity of the input signal changes. Frequency response of this rectifier is not quite so good as the unmodified circuit. The $22k\Omega$ collector pull-up resistor is suitable for driving c.m.o.s. from any logic supply voltage.

For t.t.l., the pull-up resistor should be changed to 3k9 to drive one input. For precision applications, the op-amps should be offset nulled.
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