



## Precision phase sensitive detector

Precision phase sensitive detectors are finding an increasing application in experimental environments where a small signal has to be retrieved from background noise, often much greater than the signal itself.

The basis of this detector is four precision rectifiers operating as analogue gates. Each passes signals of one polarity and may be dis-enabled by a suitable signal. At any instant only one of the gates will be passing a signal and a d.c. output is obtained by summing and smoothing the outputs from the individual gates. The phase reference is obtained from two  $180^\circ$  out of phase square waves (a and b in the diagram) which should be symmetrical about zero and have an amplitude greater than the largest expected signal.

Performance of the circuit is good, and no switching transients are present at the output. Overall phase response and rejection of quadrature components in the signal are dependent on all the amplifier elements having unity gain. For the highest quality detector, selection of the gain determining resistors will be necessary.

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