

US Pat. No.: 7,825,735

Technology Readiness Level: 6

*Sandia developed prototype has been demonstrated in a relevant environment*

Many applications require detection of both very small and very large signals. High gain detector amplifiers provide low noise but are easily swamped by large signals. Logarithmic amplifiers provide a wide range but contributing to distortion. Auto-ranging circuits lose data when switching between low and high gain. Detecting over a wide range is especially challenging for modern low supply voltage ICs (integrated circuits).

To solve this problem Sandia engineers developed a hybrid detector amplifier that combines a high gain and logarithmic amplifier in one. The hybrid amplifier compensates distortion inside the circuit, so the outputs are suitable for further amplification or datalogging. With two outputs to choose from, a computer, oscilloscope, or datalogger may record signals from the low noise output as signal rises. Then it can instantly switch to recording the wide range output, if necessary. This extends the recording device's useful resolution and range, while preserving signal fidelity.

## TECHNICAL BENEFITS

- Log amplifier-like range with linear outputs
- No data dropouts for auto-ranging
- Simultaneous low noise and wide-range outputs
- High reliability for unknown signal strength
- Greater survivability with single front-end amplifier

## INDUSTRIES & APPLICATIONS

- Photodetectors
- X-ray/Gamma radiation detection
- Optical power meters
- Fiber alignment
- Characterizing laser dynamics (threshold, pre/post pulse)
- High dynamic range, high-speed current sensing

