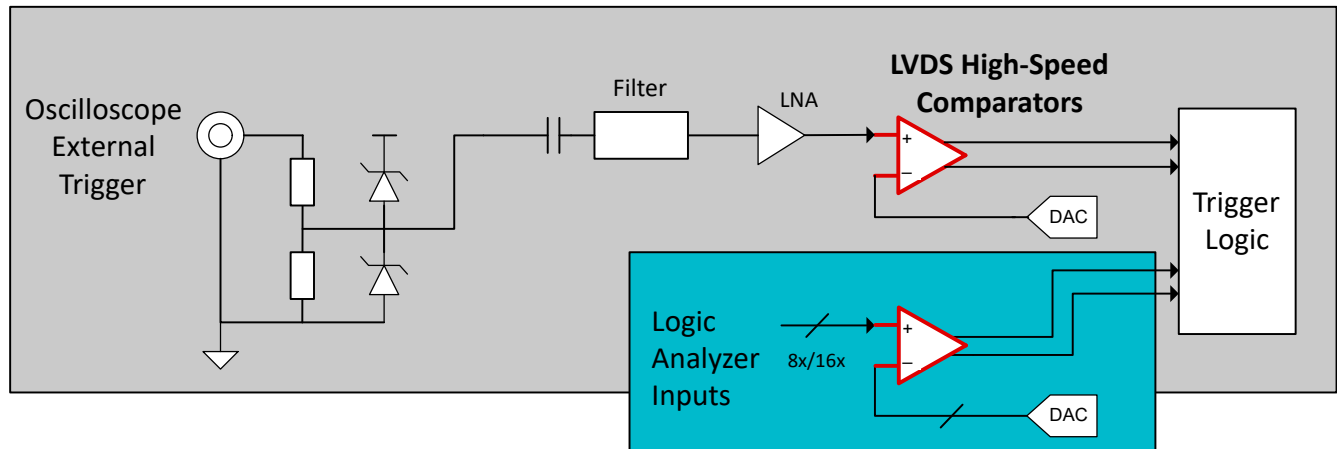


# Improving the Performance of Test and Measurement Equipment with High-Speed Comparators



**Figure 1. Concept Diagram for Test and Measurement Systems**

See more about this use case in this video: [High-Speed Comparators in Test and Measurement](#).

## Design Challenges

- Input signals can be bipolar in nature (contains both positive and negative voltages) and often requires level shifting by the LNA.
- For high-speed waveform capturing, oscilloscopes need to be able to trigger on very narrow pulse widths while maintaining timing accuracy.
- A logic analyzer's speed rating depends on how fast a signal can be detected at the equipment's inputs.
- When high-speed signals need to span large trace lengths or cables, signal restoration is required to maintain signal integrity.

## How High-Speed Comparators Benefit the Systems

- A comparator's ability to operate from split supplies eliminates the need to level shift input signals, greatly simplifying the input signal path.
- High-speed comparator's narrow pulse width *detection* capability with minimum overdrive dispersion enables the capture of events that occur for short periods of time of varying amplitudes with high accuracy.
- Comparators with high-speed front ends and LVDS output stages are well-equipped to capture fast-toggling clocks and data lines.
- Input hysteresis and variable input thresholds allow high-speed comparators to restore signal integrity in the presence of noise and decreased signal strength.

Part Number	Output Type	Min Pulse Width	Overdrive Dispersion	Toggle Frequency	Supply Range
<a href="#">TLV3801 and TLV3811</a>	LVDS	240ps	5ps	3GHz	2.7 to 5.25V
<a href="#">TLV3604 and TLV3605</a>	LVDS	600ps	350ps	1.5GHz	2.4 to 5.5V
<a href="#">TLV3601 and TLV3603</a>	Push-pull	1.25ns	600ps	325MHz	2.4 to 5.5V
TLV3901 (Preliminary)	CML	80ps	5ps	10GHz	3.1 to 5.25V

If you have more questions please ask them on TI's [E2E forum](#).

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