

Phillips Scientific

Tri-Mode Discriminator

MODEL 6930

FEATURES

- * *Three Modes of Operation*
 - *Leading Edge Discriminator*
 - *Amplitude and Risetime Compensated*
 - *DE Window Discriminator*
- * *100 MHz Rate Capability*
- * *Independent Lower and Upper Threshold Controls*
- * *Internal Delay Control Compensates for Input Risetimes*
- * *Fast Veto Input for Inhibiting*

DESCRIPTION

The Model 6930 is a 100 MHz discriminator with three modes of operation offering unprecedented versatility in a small rugged aluminum enclosure. This unique circuit can be operated as a conventional Leading Edge Discriminator (LED); an Amplitude Risetime Compensated Discriminator (ARC); or a Window Discriminator (DE). The two thresholds are independently variable with the Lower Level Threshold (LLT) range from -10mV to -1V and the Upper Level Threshold (ULT) range from -25mV to -1V.

An internal delay control is used to shift the LLT timing to occur at the peak of the input pulse for both the ARC and DE modes. Also the delay may be used to eliminate the need for long timing cables often required for coincidence applications.

A three position, locking toggle switch selects the type of discriminator desired.

LED MODE - Functions as a conventional Leading Edge Discriminator. The ULT circuitry is disabled leaving the LLT circuitry active. The threshold range is variable from -10mV to -1V.

ARC MODE - Functions as a dual threshold discriminator which used the low level timing technique to eliminate time walk as a source of error in critical timing applications. An internal delay control compensates for input risetimes as slow as 25nSec.

Set-up Note: Normally the LLT is set to trigger just above any input noise or as low a level possible on the input pulse while in the LED mode. Then when switched to the ARC mode, the ULT is enabled determining the actual firing threshold desired.

DE MODE - Functions as a dual threshold window discriminator with the output firing when the input lies between the LLT and ULT window. An ideal device to make fast decisions on energy cuts early in the system.



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INPUT CHARACTERISTICS

General :

One input connector; 50 ohms $\pm 2\%$, direct coupled; less than 5% input reflection for a 2nSec input risetime; input protection clamps at +.7V and -6V and can withstand ± 2 Amps (± 100 Volts) for a duration of 1 μ Sec with no damage to the input.

LLT Threshold :

Continuously variable from -10mV to -1 Volt, 15-turn screwdriver adjustment; better than $\pm 0.3\%$ / $^{\circ}$ C stability; A front panel test point provides a DC voltage equal to the actual threshold setting.

ULT Threshold :

Continuously variable from -25mV to -1 Volt, 15-turn screwdriver adjustment; better than $\pm 0.2\%$ / $^{\circ}$ C stability; A front panel test point provides a DC voltage equal to the actual threshold setting.

Fast Veto :

One input connector accepts normal NIM level pulse (-500mV), 50 ohms direct coupled; must precede the negative going edge of the input pulse by 5nSec in the LED mode, and 5nSec plus the delay setting in the ARC and **DE** modes to inhibit all channels; 5nSec minimum input width.

GENERAL PERFORMANCE

Delay Control :

Required to shift the timing of the LLT crossing to occur at the peak of the input pulse. One 15-turn screwdriver adjustment compensates for input risetimes from 1.0nSec to 25nSec for the ARC and **DE** modes, stability is better than $\pm 0.1\%$ / $^{\circ}$ C or 10pSec/ $^{\circ}$ C, whichever is greater. To easily set or verify the delay, a test point provides a DC voltage of 100mV/nSec of delay. For proper operation, the input pulse must be longer than the delay setting.

Continuous Repetition Rate :

Greater than 100 MHz for any mode of operation; delay control and width control set at minimum.

Pulse Pair Resolution :

Better than 10nSec, with delay and output width set at minimum.

Input to Output Delay :

Typically 10.5nSec; with delay at minimum setting.

Multiple Pulsing :

One and only one output pulse regardless of input pulse amplitude or duration.

Power Supply : +8 Volts to +16 Volts @ 100mA.

Requirements - 8 Volts to -16 Volts @ 225mA.

An 18", three-wire cable is provided unless otherwise specified.

Note: Since the power supplies are internally regulated, the voltages do not need to be balanced.

Operating Temperature :

0 $^{\circ}$ C to 70 $^{\circ}$ C ambient.

Packaging :

Black anodized aluminum enclosure; 2.25" x 6" x 1.75", (5.72cm x 15.25cm x 4.45cm).

Quality Control :

Standard 36 hour, cycled burn-in with switched power cycles.

Options :

Available with positive input polarity. (Specify when ordering).

BNC connectors are standard. LEMO and SMA female are optional. (Specify when ordering).

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OUTPUT CHARACTERISTICS

General :

Four (4) output connectors; Two normal NIM level outputs, one complemented NIM level, and one positive TTL output. The normal NIM outputs deliver pulses of -16mA (-800mV across 50 ohms). The complement output is quiescently -16mA (-800mV) and goes to 0mA (0Volts), during output. The positive TTL output has an internal pull-up resistor of 82 ohms and will provide +2 Volts across a 50 ohm load or +3.5 Volts across a 1K ohm load. Output risetimes and falltimes are less than 1.5nSec from 10% to 90% levels.

Width Control :

One 15-turn screwdriver adjustment; output width is continuously variable from 5nSec to 250nSec; better than $\pm 0.2\%$ / $^{\circ}$ C stability. Non-updating output regeneration will ignore any new inputs while the output is active.