

Phillips Scientific

Tri-Mode Discriminator

NIM MODEL 730

FEATURES

- * Three Modes of Operation
 - Leading Edge Discriminator
 - Amplitude and Risetime Compensated
 - **DE** Window Discriminator
- * Independent Lower and Upper Threshold Controls
- * Internal Delay Control
- * Both Fast Veto and Bin Gate Inhibiting
- * Five Channels In Single Width NIM Module

DESCRIPTION

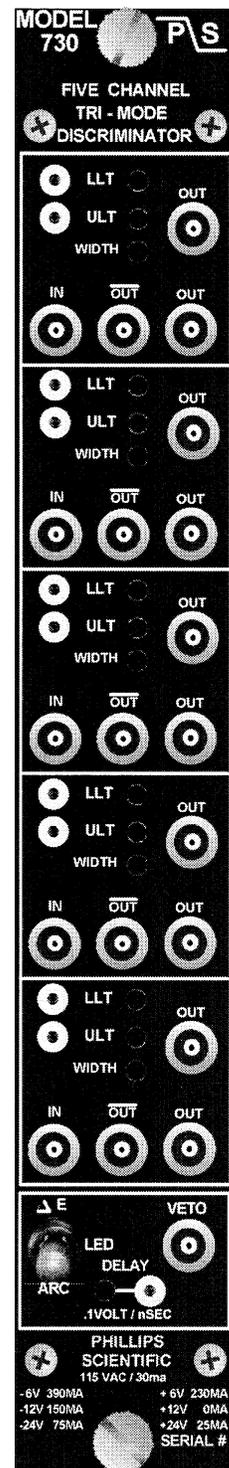
The Model 730 is a five channel discriminator with three modes of operation offering unprecedented versatility and density in a single width NIM module. This unique circuit can be operated as a conventional Leading Edge Discriminator (LED); an Amplitude Risetime Compensated Discriminator (ARC); or a Window Discriminator (**DE**).

Each of the five channels have independent threshold controls for both the Lower Level Threshold (LLT), and Upper Level Threshold (ULT), as well as separate output width adjustments. A fast veto input, mode control switch, and the delay setting adjustment are common to all five channels. The 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 operating mode for 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 -1Volt. **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 25 nSec. 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 LEMO connector per channel; 50 ohms $\pm 1\%$, direct coupled; less than 2% input reflection for a 2.0 nSec input risetime; input protection clamps at +.7V and - 6V and can withstand ± 2 Amps (± 100 Volts) for a duration of 1~~n~~Sec with no damage to the input.

LLT Threshold:

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

ULT Threshold:

Continuously variable from -25mV to -1Volt, 15-turn screwdriver adjustment; better than $\pm 0.2\%$ / $^{\circ}$ C stability; A front panel test point provides a DC voltage ten (10) times the actual threshold setting.

Fast Veto:

One LEMO connector input common to all five channels; 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.

Bin Gate:

Rear panel slide switch enables or disables slow bin gate in accordance with TID-20893. Inhibits entire module within 10 nSec from application of bin gate.

GENERAL PERFORMANCE

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: - 6 V @ 390 mA + 6 V @ 230 mA

Requirement -12 V @ 150 mA +12 V @ 0 mA

-24 V @ 75 mA 115 VAC @ 30 mA +24 V @ 25mA

Note: All currents are within NIM specification limits permitting a full powered bin to be operated without overloading.

Operating Temperature:

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

Packaging:

Standard single width NIM module in accordance with TID-20893 and Section ND-524.

Quality Control:

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

7/96

OUTPUT CHARACTERISTICS

General:

Three (3) LEMO connector outputs per channel; two normal NIM level outputs and one complement output. The normal outputs deliver pulses of -16mA (-800mV across 50ohms). The complement output is quiescently -16mA (-800mV) and goes to 0mA (0Volts), during output. Output risetimes and falltimes are less than 1.5nSec from 10% to 90% levels.

Width Control:

One control per channel; 15-turn screwdriver adjustment; output width is continuously variable from 5nSec to 150nSec; better than $\pm 0.15\%$ / $^{\circ}$ C stability. Non-updating output regeneration will ignore any new inputs while the output is active.

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 common to all five channels, 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.