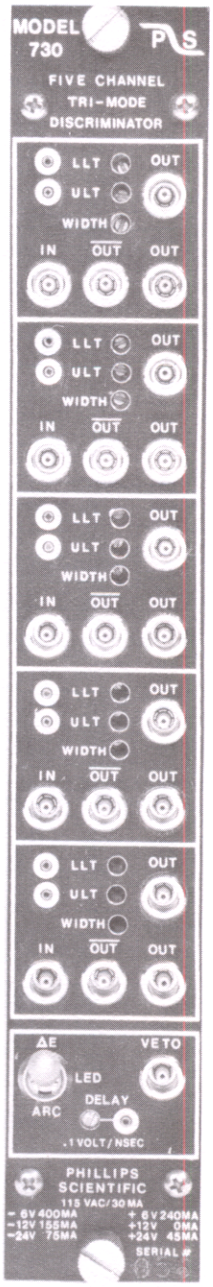
Phillips Scientific

Tri-Mode Discriminator

NIM MODEL 730

FEATURES

- THREE MODES OF OPERATION
  - Leading Edge Discriminator
  - Amplitude and Risetime Compensated
  - ΔE Window Discriminator
- INDEPENDENT UPPER AND LOWER THRESHOLD CONTROLS
- INTERNAL DELAY CONTROL
- FIVE CHANNELS IN A SINGLE WIDTH NIM MODULE
- BOTH FAST VETO INPUT AND BIN GATE



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 and Risetime Compensated Discriminator (ARC); or a Window Discriminator (ΔE).

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 ΔE 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 -10 mV to -1 Volt.

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 fire just above any input noise or as low a level as possible on the input pulse while in the LED mode. Then when switched to the ARC mode, the ULT is enabled determining the firing threshold desired.

ΔE 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 input per channel; 50 ohms ±1% direct coupled; less than 2% input reflection for a 2.0 nSEC input risetime. Input protection clamps at +.7 Volts and -6 Volts and can withstand ±2 amps (±100 Volts) for 1 uSEC with no damage to the input.

LLT Threshold:

-10 mV to -1 Volt; 15-turn screwdriver adjustment; better than +0.3%/°C stability; a front panel test point provides a DC voltage ten times the actual LLT setting.

ULT Threshold:

-25 mV to -1 Volt; 15-turn screwdriver adjustment; better than ±0.2%/°C stability; a front panel test point provides a DC voltage ten times the actual ULT setting.

Fast Veto:

One LEMO connector input common to all five (5) channels; accepts normal NIM level pulse, 50 ohms, direct coupled; must precede negative edge of input by 5 nSEC in LED mode, and 5 nSEC plus the delay setting in the ARC and ΔE modes; 5 nSEC minimum input width.

OUTPUT CHARACTERISTICS

General:

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

Width Control:

One control per channel; 15-turn screwdriver adjustment; outputs continuously variable from 5 nSEC to 150 nSEC range; better than ±0.15%/°C stability. Non-updating output regeneration.

Bin Gate:

Rear panel slide switch enables or disables bin slow gate in accordance with TID-20893. Responds in approximately 10 nSEC to bin gate signal.

GENERAL PERFORMANCE

Delay Control:

Required to shift the timing of the LLT crossing to occur at the peak of the input.
One 15-turn screwdriver adjustment common to all five (5) channels; compensates for input risetimes from 1.0 nSEC to 25 nSEC in the ARC and ΔE Modes less than 0.1%/°C or 10 pSEC/°C stability whichever is greater; a point provides a DC voltage of 100 m/VnSEC of delay. For proper operation, the input pulse must be longer than the delay time.

Continuous Repetition Rate:

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

Input to Output Delay:

Typically 10.5 nSEC with delay control set at minimum.

Multiple Pulsing:

One and only one output pulse regardless of input pulse amplitude or duration for any mode of operation.

Power Supply Requirement:

-6 Volts @ 390 mA	+6 Volts @ 230 mA
-12 Volts @ 150 mA	+12 Volts @ 0 mA
-24 Volts @ 75 mA	+24 Volts @ 25 mA

115 Volts AC @ 30 mA

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

Operating Temperature:

0°C to 70°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.

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