

Phillips Scientific

Constant Fraction Timing Discriminator

NIM MODEL 715

FEATURES

- * Unexcelled Timing Characteristics
- * Five Totally Independent Channels
- * 100 MHz Operation
- * Both Fast Veto and Bin Gate Inhibiting

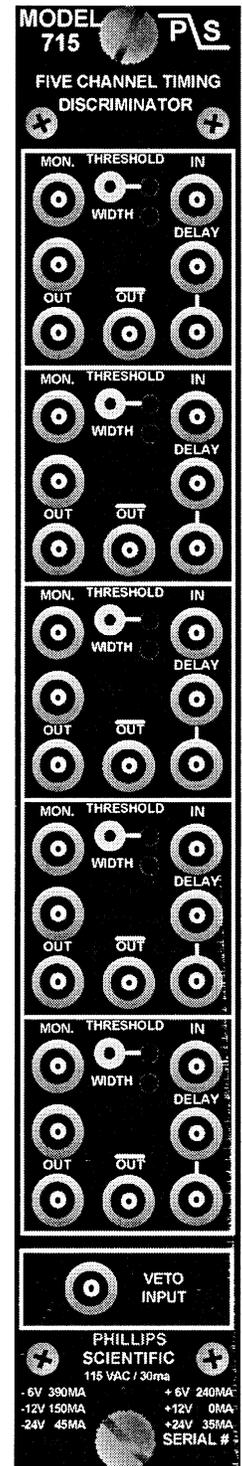
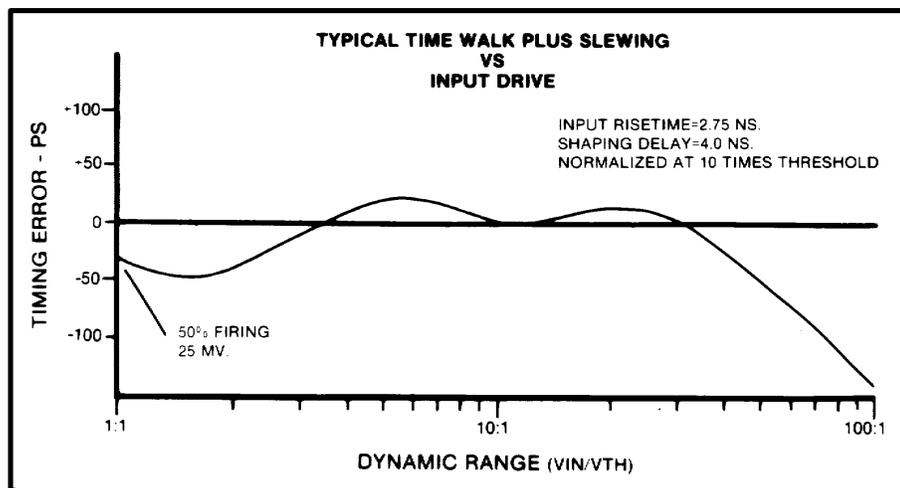
DESCRIPTION

The Model 715 is a high performance, five-channel constant fraction timing discriminator packaged in a single width NIM module. It exhibits typical time walk plus slewing of $\pm 75\text{pSec}$ from threshold to 100 times threshold.

Each channel has independent threshold adjustment, output width adjustment, and shaping delay. The threshold is variable from -25mV to -1V and is monitored from a front panel test point providing a DC voltage ten times the actual threshold setting. The outputs are non-updating with the output width is adjustable from 5nSec to 150nSec . The shaping delay circuit is made complete by connecting the appropriate cable length between two LEMO connectors, allowing the user to optimize time resolution by easily matching the characteristics of each detector. A monitor is also provided to observe the constant fraction shaped pulse to verify that the delay is correct.

A fast veto input allows simultaneous inhibiting of all five channels to reject unwanted events early in the system. Similarly, a bin gate will inhibit the entire module when applied via the rear connector.

The 715 has three individually driven, current switching outputs per channel. Two are normal NIM levels and one complemented. They have typical risetimes and falltimes of 1nSec helping to preserve the excellent timing characteristics. The output transition times and shapes are unaffected by the loading conditions of the other outputs.



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INPUT CHARACTERISTICS

General:

One LEMO connector per channel; 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.

Threshold:

Continuously variable from -25mV to -1Volt, 15-turn screwdriver adjustment; better than $\pm 0.2\%/^{\circ}\text{C}$ stability; 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 overlap the negative going edge of the input pulse plus the shaping delay time 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 10nSec from application of bin gate.

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 -16mA (-800mV across 50 ohms). The complemented output is quiescently -16mA (-800mV) and goes to zero mA (0Volts) during output. Output risetimes and falltimes are less than 1.5nSec from 10% to 90% levels.

CF Monitor:

One LEMO connector output per channel; drives 50 ohm load; permits observation of the shaped constant fraction pulse to verify the shaping delay is optimized for the input pulse.

Width Control:

One control per channel; 15-turn screwdriver adjustment; output width is continuously variable from 5nSec to 150nSec; better than $\pm 0.2\%/^{\circ}\text{C}$ stability, non-updating output regeneration.

GENERAL PERFORMANCE

Shaping Delay:

Requires a 50 ohm coaxial cable; recommended delay range of 500pSec to 100nSec; the maximum delay is limited only by the cable attenuation, a factor of two attenuation can be tolerated without significant degradation of the time resolution; stability is better than 10pSec/ $^{\circ}\text{C}$. The shaping delay time should approximately equal the input risetime plus one nanosecond.

Continuous Repetition Rate:

Greater than 100 MHz; with output width set at minimum. (1nSec shaping delay)

Pulse Pair Resolution:

Better than 10nSec, with output width set at minimum. (1nSec shaping delay)

Input to Output Delay:

Less than 10nSec; with 1nSec shaping delay.

Multiple Pulsing:

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

Power Supply Requirements:

- 6 V @ 390 mA	+ 6 V @ 240 mA
-12 V @ 150 mA	+12 V @ 0 mA
-24 V @ 45 mA	+24 V @ 35 mA
115 VAC @ 30 mA	

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.

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