

LeCroy 621AL

Quad Updating 100MHz Discriminator

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NIM Model 621AL

Quad Discriminator

LRS Model 621AL retains the format and operating features of particle physics' most widely used discriminator, the LRS Model 321BL. A new hybrid input stage provides substantial improvement in input characteristics: an almost perfect impedance match to eliminate reflections and consequent multiple-pulsing; a drift-free -30 mV threshold; overload protection to withstand outputs from even the most serious phototube malfunctions; virtually no input dc offset; and a new standard of compactness and reliability. A threshold monitor test point is provided on each channel to permit accurate and reproducible threshold settings using an external DC voltmeter.

Output durations are adjustable from 5 ns to 1 us and are highly stable and independent of input amplitude, duration, and rate. Their long-term stability is excellent, permitting their direct use in critical coincidence applications without any need for external clipping cables. Each channel provides five standard amplitude negative NIM current source outputs and one complementary output. The flexibility resulting from this doubling of the output fan-out capability over previous circuits permits simpler and more efficient logic design. This greatly increased fan-out is achieved by means of a new output circuit design that utilizes very little quiescent power.

The -30 mV threshold offered by the Model 621AL is almost a factor of two lower than that of the most sensitive previous circuits. It will permit experimenters to routinely reverse-terminate photomultiplier anodes. This procedure, coupled with the greatly improved input termination characteristics of the 621AL, greatly reduces the possibility of multiple-pulsing due to input reflections in the system.

The pulse-forming circuit in the Model 621AL is deadtimeless (updating), and the unit may be retriggered during the time an output from a previous input signal is being produced.

The Model 621AL is also available with a bridged, high impedance input (at the expense of one negative output) at additional cost (Model 621AZ).

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INPUT CHARACTERISTICS

Signal Input:	Threshold, -30 mV to -1.0 volt (continuously variable up to -600 mV); front-panel screwdriver adjustment (screwdriver included); $50\ \Omega$ protected to $\pm 5\ \text{A}$ for 0.5 μs , clamping at $\pm 7\ \text{V}$; reflections $< 2\%$ for input pulses of 2 ns risetime; stability $< 0.2\%$ C over 20° C to 60° C operating range; offset $0 \pm 1\ \text{mV}$; threshold monitor has 10:1 ratio of monitor voltage to actual voltage.
Gate:	Slow gate via rear connector and rear panel ON-OFF switch; rise and fall times, approximately 50 ns; clamp to ground from +5 inhibits; direct-coupled.

OUTPUT CHARACTERISTICS

Bridged Negative Outputs:	2 pair; NIM; quiescently 0 mA, -32 mA during output; duration, 5 ns to 1 μs , continuously variable up to 600 ns via front-panel screwdriver control (narrower widths possible at slight expense of amplitude); risetimes and falltimes typically 2.0 ns (max. 2.5 ns), 10% to 90%. Output falltimes slightly longer on wide output durations. Width stability better than $\pm 0.2\%$ C maximum.
Fast Negative Timing Output:	One; NIM; quiescently 0 mA, -16 mA during output. Other characteristics same as above, except risetimes and falltimes are typically $\leq 1.3\ \text{ns}$ (max. 1.6 ns), and minimum width is $\leq 6\ \text{ns}$.
Complementary Output:	One; quiescently -16 mA, 0 mA during output. Other characteristics same as for Fast Negative Timing Output.

GENERAL

Maximum Rate:	110 MHz typical, input and output.
Double Pulse Resolution:	Less than 9 ns.
Time Slewing:	1 ns for input amplitudes 110% of threshold and above.
Input-Output Delay:	9.5 ns typical.
Multiple Pulsing:	None; one and only one output pulse of preset duration is produced for each input pulse, regardless of input pulse amplitude or duration.
Packaging:	In RF shielded AEC/NIM #1 module; Lemo-type connectors.
Power Requirements:	-6 V at 460 mA; + 6 V at 150 mA; -12 V at 165 mA; + 12 V at 20 mA; -24 V at 4 mA.
High Impedance Option:	The Model 621AL is also available with a bridged, high-impedance input (at the expense of one negative output) at additional cost (Model 621AZ).

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