

These distinctive operating features embody refinements developed through several years of experience with the original LRS direct-coupled, deadtimeless circuits, and give the Model 165 a flexibility, reliability, and performance unmatched by any other available equipment.

The Model 165 is a member of LRS Series 100, an integrated line of high-speed logic instrumentation in which modern circuit design, components, and packaging are combined in instruments of unusually broad usefulness to experimental physicists in both high- and low-energy physics.

SPECIFICATIONS

INPUT CHARACTERISTICS

Logic Inputs:

Four; direct-coupled; impedance 50Ω constant to ± 100 Volts; -600 mV threshold, maximum; reflections $< 7\%$ for inputs of 2 ns risetime; each input has separate enable-disable switch.

Slow (Bin) Gate:

Via rear connector, with rear panel On-Off switch: rise and fall times approximately 50 ns, quiescently above $+4$ volts, clamping to ground inhibits; direct coupled.

Inhibit:

Any input serves as inhibit when driven with complementary signal. Separate fast inhibit input; direct-coupled; rise and fall < 2 ns, front-panel switch permits using inhibit as logic input for 5 Yes operation.

OUTPUT CHARACTERISTICS

Preset Outputs:

Three; one positive (quiescently -32 ± 1 mA, 0 mA during output), two negative (0 mA quiescently, -32 ± 1 mA during output); pulse width equal to overlap of input signals satisfying coincidence requirements.

Overlap Output:

Two; one negative (0 mA quiescently, -32 ± 1 mA during output), one positive (quiescently -32 ± 1 mA, 0 mA during output); pulse width equal to overlap of input signals satisfying coincidence requirements.

Fan-Out:

Maximum of 8-fold, if each output drives two terminated 50Ω inputs.

Duration:

Continuously adjustable 3 to $15,000$ ns in seven ranges (shorter durations by clipping); front-panel seven-position range switch; front-panel ten-turn locking potentiometer as vernier. Ranges: $3-15$, $12-50$, $35-150$, $120-500$, $350-1500$, $1200-5000$, $3500-15000$ ns; jitter on shortest range less than 20 ps rms.

Rise and Fall Time:

1.5 ns typical.

GENERAL

Coincidence Width:

Determined by input pulse durations; total widths from approximately 1 ns up without limit.

Maximum Rate:

150 MHz minimum, input and output.

Double-Pulse Resolution:

6 ns to approximately 7μ s, depending on output pulse duration; given approximately by $T_0/2 + 3$ ns, where T_0 is output pulse duration.

Time Resolution:

Counting rate down by a factor of 100 in 15 ps at either edge of coincidence curve, when two inputs are driven from two outputs of a Model 161 discriminator; in 60 ps when driven from separate discriminators triggered by a single Model IP-1 Instapulser.

Counting Efficiency:

Recovery time typically less than output pulse duration; no deadtime following output pulse at output durations greater than approximately 6 ns.

Input-Output Delay:

Absolute delay, 11 ns; jitter < 20 ps rms.

Multiple-Pulsing:

None; one and only one output pulse of preset duration is produced each time the input conditions are satisfied, regardless of the duration of the input pulses or their overlap.

Packaging:

In conformance with AEC standard for nuclear modules (AEC Report TID-20893); RF shielded AEC #2 module, fitting 6 per bin; dimensions $2.75 \times 8.75 \times 10$ inches deep. Completely compatible physically and electrically with LRS Power Chassis Model 108P, and with any other AEC power bin of any manufacturer.

Power Requirements:

75 mA at $+24$ V, 210 mA at $+12$ V, 280 mA at -12 V.