

GENERAL

The LRS Model 125 is a general purpose high speed logic unit whose extremely flexible design suits it for a wide range of applications both in particle physics and low energy nuclear physics. The four inputs of the Model 125 are direct-coupled and fully overload protected; the unit may therefore be used with input signals from any of a very wide range of signal sources, of amplitudes from a few hundred millivolts to one hundred volts, of any rise time from sub-nanosecond up without limit, and of any duration from a few nanoseconds up without limit. While the unit is typically used with standardized logic signals from other high speed modules, its input characteristics by no means restrict it to these signals, and it may be used successfully with unshaped fast or slow PM pulses or amplifier outputs directly. For highest time resolution, preshaping by means of a discriminator (such as LRS Model 121 or 108D) is required.

Input logic is direct-coupled complementary. The presence of a signal is indicated by a negative input voltage of -250 mV or greater; absence of a signal is indicated by an input voltage of 0 volts or more positive. The front panel Coinc. Level switch selects the number of inputs required to trigger an output. It may be set from one to four. (A separate OFF position is also provided, which is useful in set-up and testing to kill the output of the channel regardless of inputs). The various logical possibilities afforded by this arrangement are detailed under the Coincidence Logic heading. Note that all inputs are interchangeable and equivalent, and the logic that a given input performs (i.e. Coincidence or Inhibit, or Yes or No) is controlled by the polarity of the input. With four logic inputs and this single switch, sixteen distinct types of input logic are possible, as determined by the switch setting and the number and polarity of input signals connected. This degree of flexibility with such a small number of inputs is not possible in AC coupled systems or in systems which do not take full advantage of the possibilities offered by complementary logic.

When the input conditions of a Model 125 are satisfied, the unit delivers a set of simultaneous output pulses of preset duration and standard amplitude. Output duration is independent of input amplitude and input duration. Therefore a Model 125 logic need not be followed by a discriminator for optimum time resolution. The output duration of the 125 is also independent of input and output rate up to the maximum rate capability of the unit (125 MHz).

The output duration of the 125 can be continuously preset over a very wide time range. This is a unique and important convenience feature of the instrument, considerably facilitating set-up. Further, the Model 125 produces one and only one output pulse each time the input conditions are satisfied; multiple pulses or pulse trains are never produced, no matter how long or how large the input pulses may be. This feature gives the experimenter complete logical freedom in choice of input and output pulse durations, and eliminates one common and annoying characteristic of most fast logic systems. (Gated pulse bursts for special purposes can be produced by the 125 when desired; see Gated Pulse Burst Generation below.)