

Time Amplitude Window Discriminator

Model DIS-1



TWO LEVEL DISCRIMINATION ADJUSTABLE IN TIME AND AMPLITUDE FOR OPTIMAL YIELD

CONVENIENT MULTIPLEXED WINDOW DISPLAY ON SINGLE SCOPE TRACE

EXTERNAL TRIGGER AND GATE FOR CHAINING

Description:

The Model DIS- 1 is an instrument for the separation of single neural spike trains from a multiunit recording containing more than one neural element. The Model DIS-1 produces a window in time as well as amplitude.

The window can be adjusted in height, above or below baseline and anywhere in time up to 5 msec after a trigger point. The trigger point is set by a continuously adjustable level control for either positive or negative slope detection.

The signal and both window levels are multiplexed so that only one channel of the oscilloscope is necessary. Multiplexing eliminates adjusting the oscilloscope levels for drift; also, no Z axis intensification is required.

Two Model DIS-1 may be cascaded for two point discrimination whenever several spikes have very similar waveforms. The Model DIS-1 can be used with the Model AD-3 or 6 Analog Delay series as part of an on-line spike recognition system.

See Application Note. The dual outputs of the AD-3,6 are particularly convenient when two DIS-1 units are cascaded and can be used to allow the second one to look backwards in the waveform. The Model DIS- 1 is of modular construction and slides easily into the Model RP-1 rack mount power supply module cage system.

Specifications:

Input Resistance	10 kilohms
Input Coupling	AC
Input Dynamic Range	8 volts peak to peak
Multiplexed Output Resistance	100 ohms
All Other Outputs	TTL compatible
Signal Polarity	Same as input
Gain	Unity
Bandwidth	20 Hz to 20 kHz (3 db down)
Window Width	20 microseconds
Window Delay	0.05 msec to 5 msec (continuously adjustable)
Window Height	Continuously adjustable
Trigger Threshold Level	Internal plus or minus along signal wave form or an external TTL pulse
Output Trigger Pulse	TTL UL -10 microsecond width
Output Acceptance Pulse	TTL compatible 0.3 millisecond width (internally adjustable)
Power Requirements	±5 volts supplied by the Model RP-1 160 ma and -45 ma
Size	2.8"w x 5.25"h x 7.25"d
Weight	1 lb

Options:

Option (1).... Window discriminator modification allows the External Trigger Input to be used as a trigger inhibitor when working in the Internal Trigger mode. No interference with normal Ext.Trig. Mode. Price Class B

Option (2) Window discriminator modification multiplexes the spike acceptance pulse as a low amplitude negative pulse on the Trigger Out line with the + 5 V TTL trigger pulse, useful for CRT triggering quickly from trigger to acceptance by adjusting scope trigger level, Acceptance OUT TL unchanged. Price Class C

Option (3) With this option two spikes can be discriminated simultaneously with one DIS-1 unit. The instrument operates in normal fashion for one unit but a second acceptance pulse output is provided via a BNC Connector on the rear panel when an input pulse exceeds the upper level of the window at window time. Price Class D

Other BAK equipment frequently used with DIS-1:

AD-3,6	Analog Delay
DD-1	Digital Delay
RG-1	Raster Stepper
DTC-1	Digital Timer Counter

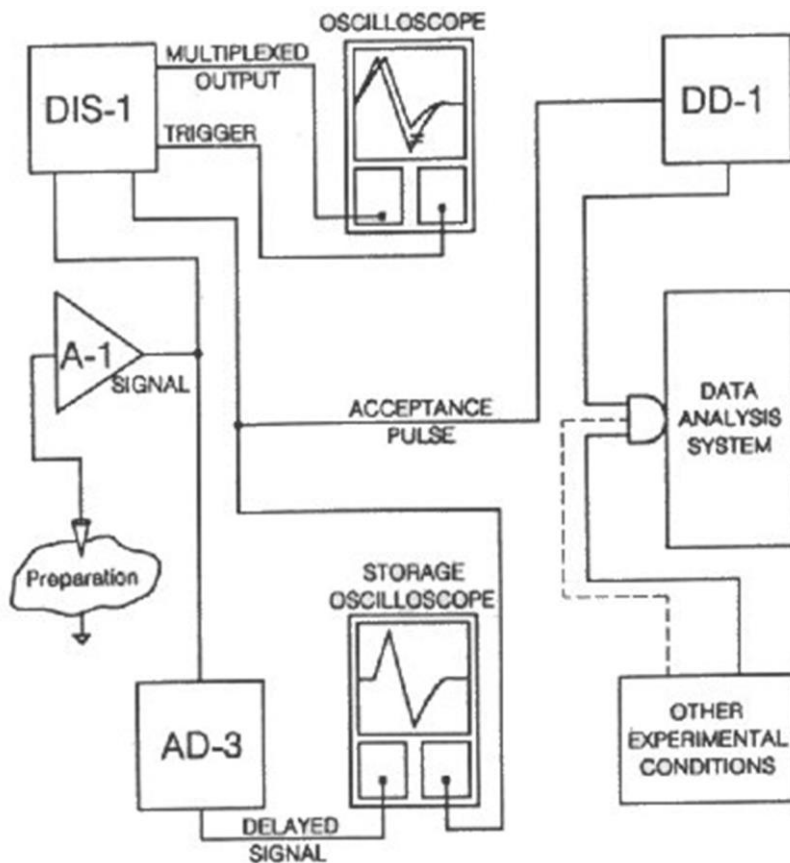
APPLICATION NOTE: SPIKE SORTING SYSTEM

A reliable description of the activity pattern of a single, well-isolated neuron is the key to many important experiments in neurophysiology. Once the quality of the recorded signal has been optimized and enhanced by the proper microelectrodes, amplification, and band pass filtering, the yield is determined by the power and flexibility of the spike discrimination and processing system. The BAK modular signal conditioners have been optimized for this purpose.

The figure below shows the proper inter-connections for discrimination and visual on-line inspection of extracellular unit records. The DIS-1 multiplexed output is viewed on one trace of an oscilloscope triggered by the threshold trigger output of the DIS-1. Small bars in the drawing appear much as shown, indicating the precise upper and lower bounds as well as the adjustable time of the discrimination, set by the user to coincide with the portion of the waveform most distinctive from others exceeding the trigger level.

To be certain that only one unit has passed through the window and that others do not exist with waveforms differing before the trigger, trigger an oscilloscope trace (storage mode is particularly useful) from the acceptance pulse and look at a delayed version of the input to the discriminator which has passed through an Analog Delay (AD-3 and AD-6 dual delays now available). DIS-1's can be easily chained for forward or backward multi-point discrimination.

Other forms of data reduction can greatly enhance on-line appreciation of the course of the experiment and reduce or even eliminate the need for complex computer data processing or taping. The BAK ISI-1 Interspike Interval Convertor generates a dot or level display of the instantaneous frequency of firing (linear) of an accepted unit. The BAK DTC-1 Digital Timer Counter can accurately track both total events and latency from trigger events such as stimuli, with LED display and BCD outputs. The BAK RG-1 Raster Stepper produces direct dot rastering and chart recorder rate profiles plus analog contour displays. The DD-1 Digital Delay can let you look backwards at spike events preceding behavioral criteria, as shown.



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