Model 2160A
Pulse Shape Discriminator

Features:

● **Optimum particle separation for plastic liquid scintillators (NE 213, BC 501, BC 505)**

● **Useful dynamic range > 500:1**

● **Z-identification for thick surface-barrier detectors**

● **Particle identification with proportional counters and phoswitch detectors: can be directly connected to a 2128 Constant Fraction Disriminator (bridging input)**

● **Needs anode signal only**

● **Count rate capability > 50 khz- with pile up rejection > 500 kHz**

● **DC coupling**

Description:

The Model 2160A provides optimum pulse shape separation for liquid scintillation counters. However the applications are not limited to n/γ separation,- the 2160A can also be used for particle separation with inorganic scintillators, phoswitches, thick SB-detectors and proportional counters.

The dc coupling allows high statistical count rate without affecting resolution, a major problem of conventional designs.

The single width module is easy to use, since only the anode signal is required from PM tubes.

The 2160A can be used to generate identification spectra with a TAC and MCA or an identification signal for one species of particle (see application diagrams).

Specifications:

INPUTS
INPUT - Negative 0 to -5 volts linear signal Zin- 1 k Ohm (bridging input). Protected to -50 volts (limited by dissipation of input resistor).
STROBE INPUT - Negative FAST-NIM signal from 2128A (width -< 50 nsec).

OUTPUTS
INSPECT - Displays output signal of Zero Crossover discriminator: used to set discriminator with walk ADJust control.
FASTOUT - One FAST-NIM output, 800 mV minimum into 50 Ohms.
SLOW OUT - Two outputs, 2 Volts minimum into 50 Ohms.
CONTROLS
STROBE DELAY - Sets strobe of Zero Crossover discriminator.
ADJ - Sets the Zero Crossover discriminator, n, n + γ SWITCH
POSITION n: generates an identification signal.
POSITION n + γ generates identification spectrum.

PERFORMANCE

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INPUT AMPLITUDE RANGE - 5 mV to -5 volts.
Walk ≤ 1 nsec for 100:1 range, Countrate>kHz (limited by internal shaping constant ot 1 usec).

TYPICAL POWER REQUIREMENTS
+6 V 280 mA, -6 V 330 mA*
PHYSICAL
SIZE - Standard single-width NIM module (1.35 X 8.714 inches) per TID-20893
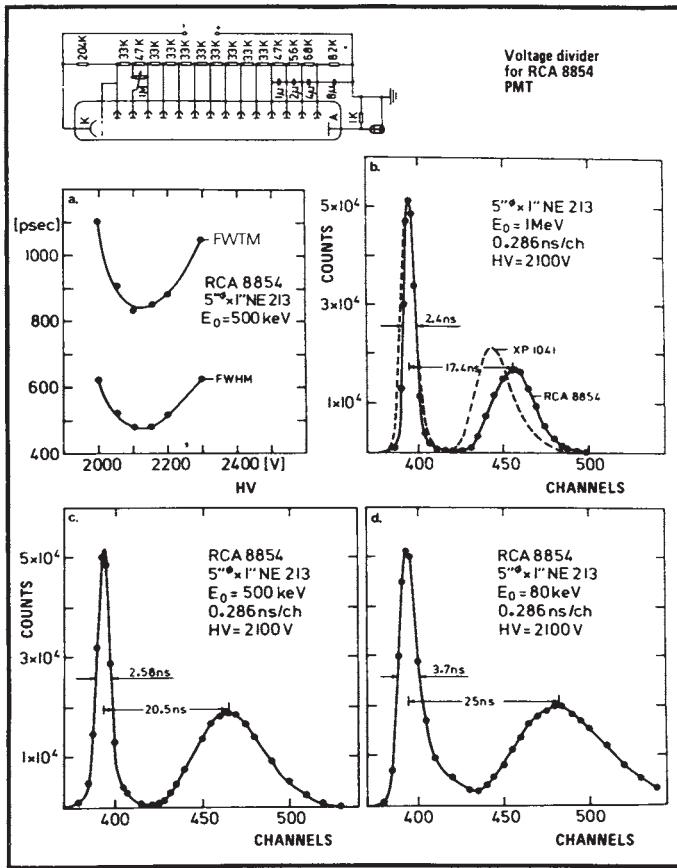NET WEIGHT - 2.0 lbs. (0.9 kg)
SHIPPING WEIGHT - 3.15 kg

Special version using ±12 V available on special request.
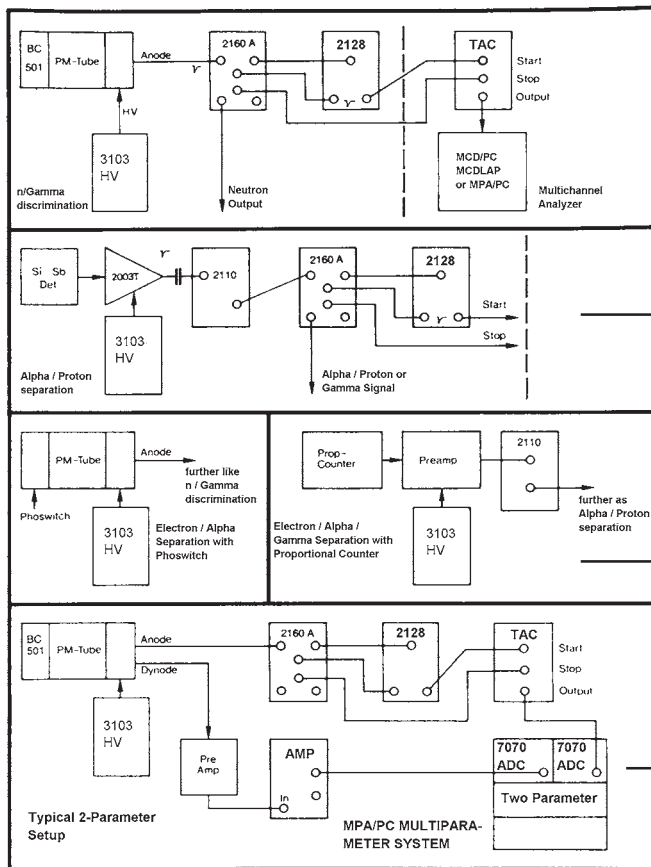* This power exceeds the normal bin allotment of 167 mA for a singlewidth module for the 12V version

REFERENCES
A simple pulse shape discrimination circuit by P. Sperr, et al. Nuclear Instr. & Methods, 1 1 6 (1 974), 55-59.

a.
Time resolution as function of High Voltage

b., c., d.
n-γ-Spectra with different threshold energies

Set-up, test, monitoring or collecting an identification spectrum requires a TAC and Multichannel Analyzer

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Requirements for a typical Dual-Parameter System are:

2 ADC's Model 7070 (or equivalent), MPA/PC Basic System with a small BusBox (SBB), MPA/Multi or MPAWIN Multiparameter Analysis software, 486 computer with color graphics monitor

2160A   Typical Application for 2160A Pulse-Shape Discriminator