Model 814FP Pulser

Features

- Fast rise time; variable repetition rate to 2 kHz
- Square wave or tail pulse outputs
- Will not degrade gamma spectrum resolution when used in square wave mode
- Can be calibrated to read directly in units of energy
- Direct and attenuated outputs
- Gold-plated switch contacts
- Disable input for remote or computer gated operation

Description

The CANBERRA 814FP Pulser is a single width NIM module designed to simulate the output from a solid-state or scintillation detector preamplifier combination, thereby providing a means of testing and calibrating the electronics in a nuclear counting system.

The 814FP offers a fast rise time (typically 10 ns) signal and variable repetition rates of up to 2 kHz. Either square wave or tail pulse outputs are selectable. The 814FP is unique in that the square wave output will not degrade the resolution of a gamma spectroscopy system even if it is run simultaneously with a germanium detector. Other tail pulsers introduce an additional pole into the preamplifier/amplifier combination, preventing the amplifier from properly pole/zeroing the system. This results in spectrum broadening, especially on the low energy side.

The 814FP can be calibrated to read directly in terms of energy with the ten-turn precision PULSE HEIGHT potentiometer, NORMalize control and ATTENUATOR switches. The PULSE HEIGHT control has a maximum nonlinearity of +0.25% and the ATTENUATORS use 1% resistors.

Calibration of nuclear spectroscopy systems and multichannel analyzers, evaluation of system stability, measurement of the integral nonlinearity and noise of amplifiers, and selection of delays in coincidence timing systems are typical of the wide range of applications for the CANBERRA 814FP Pulser. The variable repetition rate is also useful in determining the system's count rate performance.

The 814FP offers either a direct output or an attenuated output. When all the ATTENUATOR switches are in the "out" position, the output is direct. Attenuation factors of up to 1000:1 are selectable via two-position switches with gold-plated contacts. These contacts greatly improve both the reliability and the long-term stability of the attenuator section.

A DISABLE input is included on the 814FP for gated operation and is selectable as active High or active Low for interfacing with a wide variety of devices. It is also synchronized with the internal pulse generator to prevent erroneous outputs. The disable feature enables the 814FP to be turned on or off by remote or computer control.

A SYNC output is provided on the front panel for convenient oscilloscope triggering while monitoring either the system output or waveforms from the 814FP.

Phone contact information

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Specifications

INPUTS

- DISABLE – Accepts a dc control signal which enables or disables the pulser output signal. Internally selectable as active HI (>2 V to disable; <1.5 V to enable) or active LO (<1.5 V to disable; >2 V to enable). The DISABLE signal is synchronized to the internal pulse generator to terminate the current pulse at the correct time to prevent erroneous outputs; rear panel BNC.

OUTPUTS

- OUT – Provides attenuated positive or negative tail pulses or square waves; pulse height 0 to ±10 V open circuit (0 to ±5 V when terminated into 50 Ω); rise time <30 ns; fall time constants are independent of output terminations. Attenuation factors of up to 1000 may be selected; Z_{out} = 50 Ω; front panel BNC.
- SYNC – Provides positive- and negative-going pulses for oscilloscope triggering. Positive oscilloscope triggering syncs on the leading edge of the output waveform, while negative oscilloscope triggering syncs on the trailing edge of the output waveform. Sync pulses are approximately ±3.5 V, 0.1 µs wide; Z_{out} = 50 Ω; front panel BNC.

CONTROLS

- PULSE HEIGHT – Front panel ten-turn potentiometer controls output pulse amplitude from 0 to ±10 V, open circuit (0 to ±5 V when terminated into 50 Ω).
- NORM/CAL – Front panel multi-turn potentiometer allows a >2:1 variation of the output amplitude for normalization of the PULSE HEIGHT dial, enabling the user to calibrate the PULSE HEIGHT dial directly in units of energy. Setting the NORM control fully clockwise to the CAL position provides a calibrated 0 to ±10 V output range.
- DECAY – Front panel three-position toggle switch selects one of three decay constants in Tail Pulse mode and multiplier for the RATE control. Maximum frequency is 2 kHz for the 50 µs decay constant, 1 kHz for the 100 µs decay constant, and 100 Hz for the 1 ms decay constant. The Square Wave output may be selected on any range.
- POLARITY – Front panel two-position toggle switch selects POSitive or NEGative output pulse polarity.
- Tail Pulse/OFF/Square Wave – Front panel three-position toggle switch selects the pulser's operating mode: the OFF position disables the output (overrides the rear-panel DISABLE input) and sets the output to 0 V; the Tail Pulse position outputs a tail pulse; the Square Wave position outputs a square wave.
- ATTENUATOR – Four front panel two-position toggle switches select attenuation factors of 2, 5, 10 and 10. Total attenuation is the product of the selected attenuators.
- DISABLE – Internal jumper selects DISABLE HI (>2 V) or DISABLE LO (<1.5 V) mode for rear panel DISABLE input.

INDICATORS

- ON – Front panel LED illuminates when the Tail Pulse/OFF/Square Wave switch is in either the Tail Pulse or Square Wave position and the pulser is not disabled through the rear panel DISABLE input.

PERFORMANCE

- TEMPERATURE STABILITY – ≤±0.01%/°C.
- SUPPLY VOLTAGE STABILITY – ≤+0.01% for a ±1% change in the ±24 volt supply voltages.
- NORMALIZE RANGE – >2:1.
- SWITCHING TRANSIENTS – ≤0.1 V peak-to-peak, ≤20 ns duration.
- INTEGRAL NONLINEARITY – ≤±0.25% of full scale.
- DUTY CYCLE – 50% with square wave output selected.
- RISE TIME – <30 ns.
- FALL TIME – Tail Pulse output: 50 µs, 100 µs or 1 ms, (±10%) selected by front panel switch and independent of output termination; Square Wave output: <30 ns.
- PULSE REPETITION RATE – Range depends on the selected DECAY time: 50 µs: 20 Hz to 2 kHz; 100 µs: 10 Hz to 1 kHz; 1 µs: 1 Hz to 100 Hz; the Square Wave output can be chosen at any range.

POWER REQUIREMENTS

+24 V – 130 mA	+12 V – 60 mA
–24 V – 130 mA	–12 V – 80 mA

PHYSICAL

- SIZE – Standard single width NIM module 3.43 x 22.12 cm, (1.35 x 8.71 in.) per DOE/ER-0457T.
- NET WEIGHT – 1.4 kg (3.1 lb).
- SHIPPING WEIGHT – 2.4 kg (5.3 lb).

ENVIRONMENTAL

- OPERATING TEMPERATURE – 0 to 50 °C.
- OPERATING HUMIDITY – 0-80% relative, non-condensing. Meets the environmental conditions specified by EN 61010, Installation Category I, Pollution Degree 2.

CE

ISO 9001 SYSTEM CERTIFIED