SPECTROSCOPY AMPLIFIER
TYPE: SA 524

Technical Data

Spectroscopy Amplifier Type: SA524 is a high performance nuclear pulse shaping amplifier, ideally suited for use with all types of detectors such as germanium, silicon surface barrier and Si(Li) detectors. This is a single width NIM module with pile-up rejecter (PUR), gated baseline restorer (BLR), auto threshold, diode limited unipolar output, BUSY and count-rate output as some of the key features designed into it. Some of the main applications of spectroscopy amplifier involve nuclear pulse height spectroscopy, nuclear timing spectroscopy, Counting Systems etc.

The input to SA524 can be either positive or negative signal from a detector preamplifier. The output pulses, 0 to 10V for unipolar pulse and ±10V for bipolar pulse, provided on both front and rear panel, are suitable for use with single channel and multi channel pulse height analyzers. When long connecting cables are used between detector preamplifier output and the amplifier input, noise induced in the cable from ground loop currents can reduce the signal to noise ratio thereby causing spectrum degradation. This may be minimized by using amplifier in the differential input mode. Six different shaping time constants are provided for optimizing resolution and count rate performance. To minimize baseline shift due to drift as well as count rate dependent shift at medium and high frequencies a gated baseline restorer (BLR) has been incorporated. Automatic noise threshold stage derives a threshold voltage proportional to the noise level and ensures that BLR gating works just above noise level. The pile up reject output logic pulses may be fed to an associated multi-channel analyzer that can be used to suppress spectrum distortion caused due to piling up of pulses on each other at high counting rates.

SPECIFICATIONS

A. PERFORMANCE

Gain Range : Continuously variable from X4 to X1500.

Pulse Shaping : quasi-gaussian and quasi-triangular.

Shaping time : 0.5, 1, 2, 3, 6 and 10 µs

Input Noise : 5 mv r.m.s with 3 µs shaping time

Overload : Recovers to within 2% of baseline in 15x shaping time from x200 overload.

Integral Non-Linearity : < 0.05% from 0 to 10V.

Crossover Walk : Bipolar zero cross over walk is < ± 3 ns in 50:1 dynamic range.

B. CONTROLS

FINE GAIN : Front panel 10 turns precision potentiometer provides a continuously adjustable, gain factor from 0.5 to 1.5.

COARSE GAIN : Front panel six-position switch selects gain factors of X20, X50, X100, X200, X500 and X1000.

PZ: Adjustment of the PZ cancellation using 20-turn potentiometer on the front panel.

POS/NEG: Front panel toggle switch for selecting either positive or negative input polarity for signals.

ATN : A front panel toggle switch selects an input attenuation factor of X1 or X2.5

SHAPING: Front panel six position switch for selecting shaping times of 0.5, 1, 2, 3, 6 and 10 µs.

TRI/GAUSS : Front panel toggle switch for selecting quasi-gaussian or quasi-triangular unipolar output shape.

BAL : Adjustment to match the gains of normal and differential reference inputs for maximum common mode noise rejection in DIFF mode using 20 turn potentiometer on the front panel.

LIM : A push-button switch on the front panel to prevent oscilloscope input from overloading and thus enabling observation of the baseline in sensitive ranges of the scope.

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Note: Manufactured by Nucleonix systems based on Technology from Bhabha Atomic Research Center, Mumbai.

C. INPUTS :

IN : BNC connector on front panel accepts 0 to 10V of either polarity.

D. OUTPUTS :

UNI: Unipolar output on front panel BNC, full-scale linear range 0 to +10V.

E. POWER CONNECTORS :

NIM standard, as per AEC specifications TID 20893 (Rev) Type AMP 204186-5 or Amphenol connector type 26-159-24P-H (24 pin type) (+24V, -24V, +12V, -12V and ground).

PREAMP POWER :

Rear panel power connector (9 Pin D-Type) provides preamp power (+24V, -24V, +12V, -12V and ground) to the associated preamplifier.

Front view

Rear View