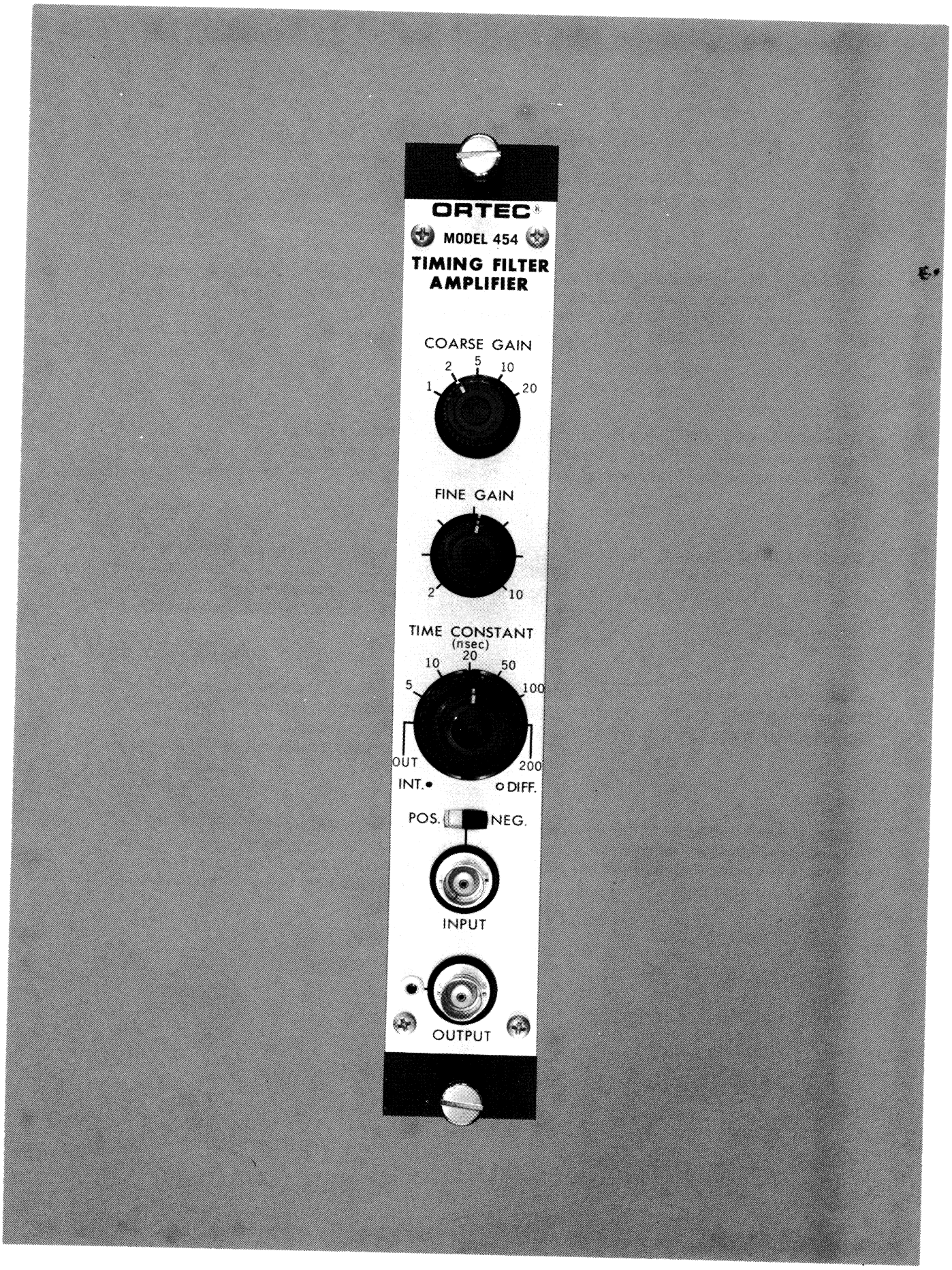
ORTEC
MODEL 454
TIMING FILTER
AMPLIFIER
COARSE GAIN
1
2
5
10
20
FINE GAIN
2
10
TIME CONSTANT
(nsec)
5
10
20
50
100
200
OUT
INT.
DIFF.
POS.
NEG.
INPUT
OUTPUT

ORTEC 454 TIMING FILTER AMPLIFIER

1. DESCRIPTION

1.1 General

The ORTEC 454 Timing Filter Amplifier is a NIM standard module for use where a fast (wide band), variable RC filter amplifier with high drive and variable gain, is needed. Features of the 454 include a wide gain control range, separately selectable RC Integrate and RC Differentiate time constants in the nanosecond region, and drive capability sufficient for use with 50 or 100 ohm systems.

1.2 Input Signals

The input signals are ac-coupled into an impedance of approximately 1000 ohms. This relatively high impedance allows multiple use of the linear input signal. The acceptable amplitude range for the linear input, to retain its linearity, is 0 to 2 volts. These signals may be either positive or negative polarity, selectable with a front panel switch. Protection is provided for input voltages up to ±100V at a 10% duty cycle.

1.3 Gain

The gain for midband frequencies can be set at any value from X2 through X200, using five Coarse Gain selections and a Fine Gain control which is a single-turn potentiometer. The factors are selected to provide range overlap and to assure continuously adjustable gain control throughout the full range.

1.4 Filtering

A seven position concentric switch permits the separate selection of RC Integrate and RC Differentiate time constants. The positions are Out, and 5, 10, 20, 50, 100, and 200 nsec. The Out position for the RC Integrate control is equivalent to an Integrate time constant of less than 2 nsec. The Out position for the RC Differentiate control implies a Differentiate time constant of 5 μsec.

1.5 Output

The linear output pulses are negative for input pulses of the same polarity as selected by the front panel polarity switch, or positive when the input has the opposite polarity. The 454 is capable of driving up to -6 volts into a 50 ohm impedance with no degradation of the performance specifications. Positive output signals are limited to a range from 0 to +0.5V.

1.6 Mechanical

The ORTEC 454 Timing Filter Amplifier is a NIM standard single width (1.35 by 8.714 inches) module, designed in accordance with AEC Report TID-20893 (Rev.). It is intended for installation and operation in a standard enclosure, such as the ORTEC 401A/402A Bin and Power Supply, and obtains all of its required operating power from the power supply.

2. SPECIFICATIONS

INPUT (BNC Connector, Front Panel):

POLARITY: Positive or negative, front panel switch selectable

AMPLITUDE: 0 to 2V, protected to ±20V dc, and to ±100V at 10% duty factor

INPUT IMPEDANCE: Approximately 1000 ohms

GAIN

COARSE GAIN: 5-position switch for selection of X1, X2, X5, X10, or X20

FINE GAIN: Single turn potentiometer, continuous from X2 to X10

NON-LINEARITY: $\leqslant \pm 1\%$

TEMPERATURE STABILITY: $\leqslant 0.025\%/^{o}C$, $20^{o}C$ to $50^{o}C$; $\leqslant 0.1\%/^{o}C$, $0^{o}C$ to $50^{o}C$

PULSE SHAPING

INTEGRATE: 7-position switch, with RC time constants of 5, 10, 20, 50, 100, and 200 nsec and Out (equivalent to 2 nsec)

DIFFERENTIATE: 7-position switch, with RC time constants of 5, 10, 20, 50, 100, and 200 nsec and Out (equivalent to ~5 μsec)

OUTPUT (BNC Connector, Front Panel)

POLARITY: For input polarity same as selected by front panel polarity switch, the output is negative; for opposite input polarity, the output is positive

AMPLITUDE RANGE: +0.5 to -6.0V (linear) onto 50Ω

OUTPUT IMPEDANCE: ~1Ω

RISE TIME: $\leqslant$4.5 nsec with filter Out, or ~2.2 τ_i for other selections

NOISE: For maximum gain, RMS noise referred to the input is $\leqslant$10 μV for $\tau_i = \tau_d$ = 200 nsec, or $\leqslant$50 μV with filters Out

POWER REQUIREMENTS:

+24V	79mA	+12V	42mA
-24V	75mA	-12V	39mA

DIMENSIONS: Standard single-width module (1.35 x 8.714 inches) per TID-20893 (Rev.)