

4302 dual 24 dB/octave filter 1/10 decade steps

The Model 4302 Dual Filter is a high performance, low priced, general purpose filter for use in the laboratory as well as in multiple channel data acquisition applications. Covering the 10 Hz to 1 MHz frequency range, the 4302 consists of a pair of identical 24 dB/octave filter channels, each of which can be used as a high pass or a low pass filter with selectable gain of 1 or 10. The two filter channels can be connected in series to produce a single 24 dB/octave bandpass, a 48 dB/octave high pass, or a 48 dB/octave low pass filter, with selectable gain of 1, 10, or 100. Butterworth (Normal) or Bessel (Pulse) modes can be selected by front panel switches. Frequency and

pulse response curves are shown below. AC/DC input coupling switches on the front panel make it possible to use one or both channels as AC or DC coupled low pass filters. In the AC mode, large DC offsets can be accommodated, and the filter will have a low frequency cutoff at approximately .07 Hz.

Specifications of the 4302 are uniformly outstanding. Of particular interest are its very low distortion — .005% at 20 volts peak to peak output, 25 μ volts self noise, 100 dB outband rejection performance, and 100 dB crosstalk attenuation. Frequency accuracy is $\pm 3\%$ of setting.

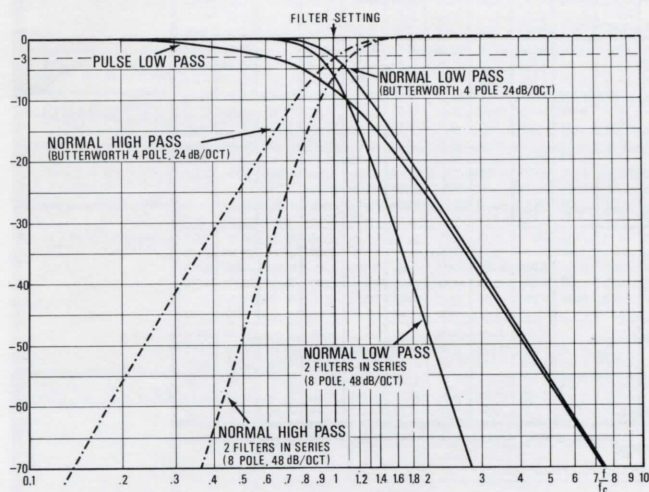
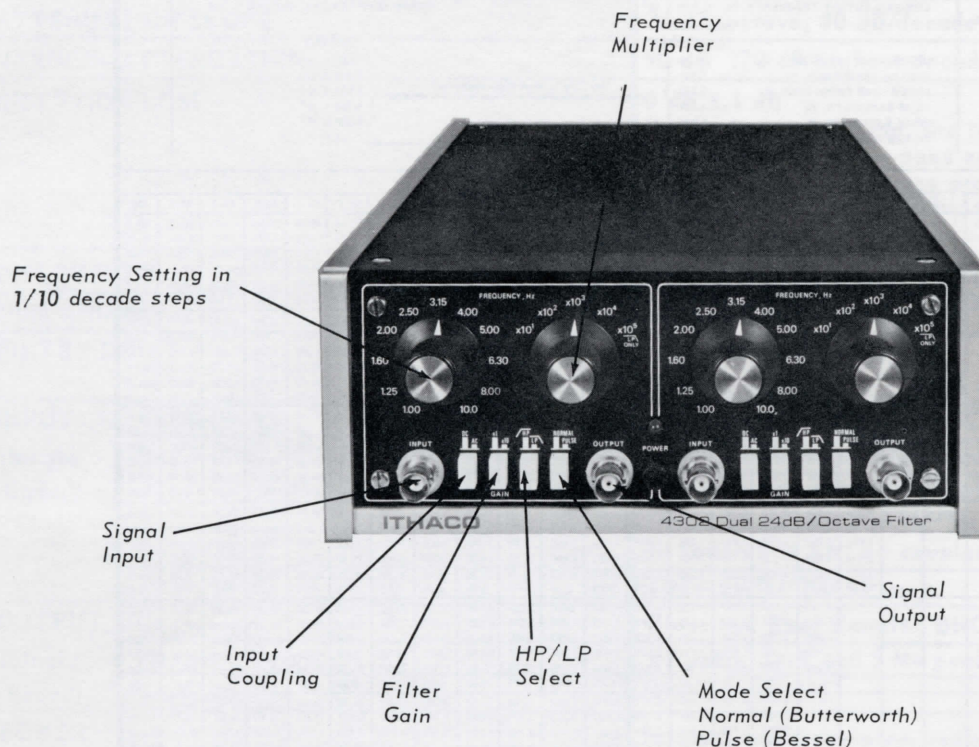


Figure 6 Normalized Response

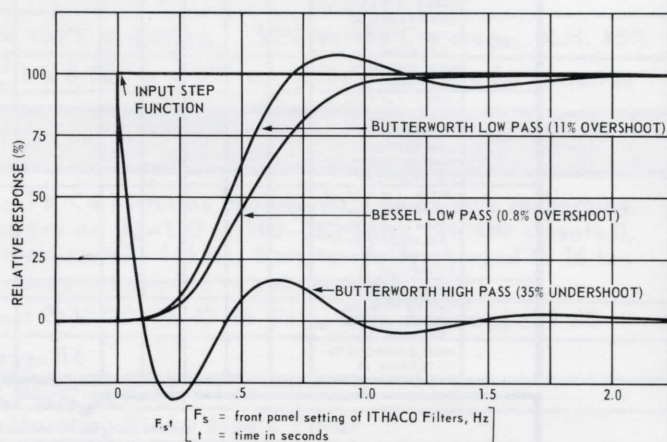


Figure 7 Step Response of 4 Pole Filter

4302 specifications (per channel)

FILTER MODES		Low-Pass (Normal)	4 pole Butterworth LP for maximum flat amplitude response
		Low-Pass (Pulse)	4 pole LP with maximum flat time delay (approaches Bessel)
		High-Pass (Normal)	4 pole Butterworth HP (upper -3 dB at approx. 950 kHz (-4 dB typical at 1 MHz)
FREQUENCY SETTINGS		1.00, 1.25, 1.60, 2.00, 2.50, 3.15, 4.00, 5.00, 6.30, 8.00, 10.0	
FREQUENCY RANGES		MULTIPLIER	FREQUENCY RANGE
		$\times 10^1$	10 - 100 Hz
		$\times 10^2$	100 - 1 kHz
		$\times 10^3$	1K - 10 kHz
		$\times 10^4$	10K - 100 kHz
		$\times 10^5$	100K - 1 MHz
CORNER FREQUENCY ACCURACY		$\pm 3\%$ (NORMAL: -3.01 dB; PULSE: -8.36 dB) except 100 kHz to 1 MHz Typical frequency response between 100 kHz and 1 MHz will be within ± 2 dB of ideal response shown in Figure 6.	
ATTENUATION SLOPE		24 dB/octave; 80 dB/decade each filter. Cascade for 48 dB/octave low-pass or high-pass: For 48 dB/octave low-pass, set filters equal. Cutoff frequency is 10% lower than setting (Figure 6). For 48 dB/octave high-pass, set filters equal. Cutoff frequency is 10% higher than setting (Figure 6).	
MAXIMUM ATTENUATION		Better than 100 dB to 100 kHz. Typically 80 dB at 1 MHz (Measured at $\times 10$ gain, 10 Hz LP)	
VOLTAGE GAIN		Switch selectable 1 or 10; $\pm 3\%$	
DISTORTION (Typically)		$\times 1$ gain: Less than .03%, 1 kHz $\times 10$ gain: Less than .005%, 1 kHz (20V pp, no load or 10V pp into 600 Ω)	
HUM AND NOISE		Less than 75 μ V rms (100 kHz NBW) $\times 1$ gain (both referred to input) Less than 25 μ V rms (100 kHz NBW) $\times 10$ gain	
INPUT	Modes	AC (.07 Hz cutoff), DC; selected by front panel switching	
	Maximum Input Voltages (Diode Protected Input)	DC Mode: 20V pk to pk for linear operation AC Mode: ± 200 VDC and 20V pk to pk signal	
	Impedance	22M Ω //30 pF	
	Connector	BNC on front panel	
OUTPUT	Maximum Output Swing	20V pk to pk, no load; 10V pk to pk into 600 Ω	
	Impedance	600 $\Omega \pm 1\%$, DC coupled	
	Offset	Less than 50 mV typical	
	Connector	BNC on front panel	
POWER		88 - 110 VAC 104 - 130 VAC 192 - 240 VAC 220 - 260 VAC	50 - 400 Hz, 4 Watts voltage range may be selected by reversing card in fuse holder
FUSE		125 mA, Slow Blow	
ENVIRONMENT		0°C to +55°C Operating; -55°C to +85°C Storage; R.H. 95%	
DIMENSIONS		3.5" high \times 8.5" wide \times 13" deep	
WEIGHT		6 lbs, 10½ oz.	
ACCESSORIES		Model RM-1 Rack Mounting Kit for Two Filters Model RM-2 Rack Mounting Kit for Single Filter	