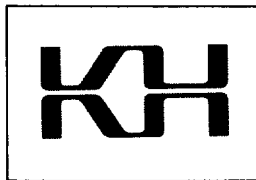


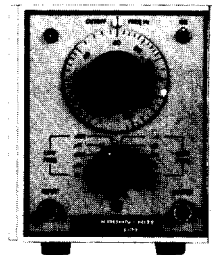
KROHN-HITE CORPORATION



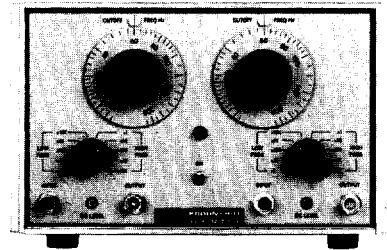
model 3200/3202

20 Hz to 2 MHz  
**SOLID-STATE VARIABLE  
 HIGH-PASS, LOW-PASS,  
 BAND-PASS, BAND-REJECT**  
 models 3200 and 3202

- **All silicon solid-state**
- **Frequency range:** 20 Hz to 2 MHz
- **Frequency response:** Maximally flat (Butterworth) Transient-free (simple R-C)
- **Calibration accuracy:** ±10%
- **Insertion loss:** 0 db
- **Attenuation slope:** 24 db/octave (each channel)
- **Maximum attenuation:** 80 db
- **Hum and noise:** 100  $\mu$ V
- **Floating (ungrounded) operation**
- **DC coupled in low-pass mode**



MODEL 3200



MODEL 3202

THE KROHN-HITE MODEL 3200 Series offers, for the first time, an all solid-state variable electronic filter with High-Pass, Low-Pass, Band-Pass and Band-Reject filtering capabilities plus continuous tuning over the range of 20 Hz to 2 Megahertz! The basic frequency response characteristic of this filter very closely approximates a *fourth-order Butterworth* with maximal flatness for cleanest filtering in the Frequency Domain. To meet the requirements of Time Domain, a switch changes the basic response to *simple R-C* to provide superior pulse or complex (transient) signal filtering.

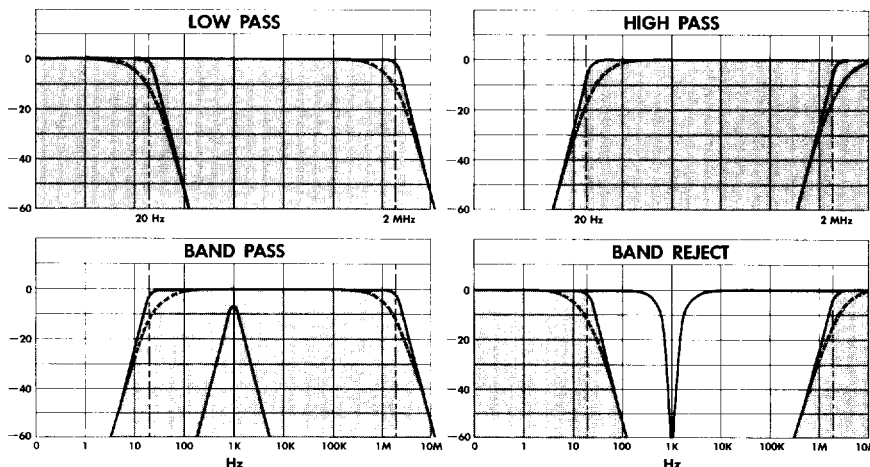
Pass band gain is unity (standard on all Krohn-Hite Filters) and the single-channel attenuation slope is 24 db

per octave. The individual channels of the Model 3202 (or two separate Model 3200 units) may be interconnected to obtain band-pass and band-reject modes or to achieve 48-db-per-octave high-pass or low-pass attenuation slopes. See Specifications.

This filter consists of four cascaded R-C elements coupled by isolating stages into a single channel. A front panel switch selects high-pass or low-pass filter functions. The Model 3200 is a single-channel (High-Pass or Low-Pass) unit; the Model 3202 has two identical channels.

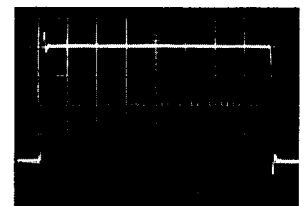
Four package configurations are available: Two Bench Units (illustrated) and two corresponding Rack Mounted Units (Models 3200R and 3202R, respectively). Corresponding Bench and Rack Units are electrically identical; they differ only in package formats.

The Model 3200 Series marks the *first time* that such operational flexibility has been available in Krohn-Hite Filters. When considered with all the other features, instruments of really outstanding value are now available for the engineer or scientist who requires quality variable filter performance.

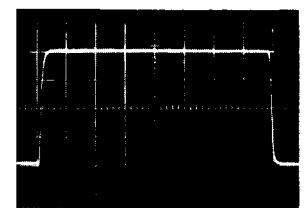


**MULTIFUNCTION RESPONSES** of Butterworth (solid curves) and Simple R-C (dashed curves) show basic 24-db-per-octave attenuation slopes. Interconnection of Low-Pass and High-Pass channels provides tunable Band-Pass or Band-Reject functions and, also, 48-db-per-octave slopes High-Pass or Low-Pass modes. Minimum bandwidth in Band-Pass mode

is approximately one octave with the center frequency located at any point between 20 Hz and 2 Mhz. Model 3202 (and 3202R), with two channels, provides all four functions. Single-channel units, Models 3200 and 3200R provide High- and Low-Pass functions. Two of them may be cascaded for performance identical to Model 3202.



Response (in low-pass mode) to 1-kHz square wave, with cut-off at 1 MHz. Overshoot is approximately 1 db with Response Switch in "Max. Flat" position.



Response to same square wave with Response Switch in "R-C" position. Note slight rounding of leading edge, but complete removal of overshoot.

# model 3200/3202

## FILTER

### SPECIFICATIONS

#### Functions:

##### Single-Channel

High-Pass — 24 db/octave attenuation slope

Low-Pass — 24 db/octave attenuation slope

##### Two-Channels

Connected in Series

High-Pass — 48 db/octave attenuation slope

Low-Pass — 48 db/octave attenuation slope

Band-Pass — 24 db/octave attenuation slopes

Connected in parallel

Band-Reject — 24 db/octave attenuation slopes

#### Frequency Range:

BAND	MULTIPLIER	FREQUENCY (Hz)
1	1	20 to 200
2	10	200 to 2,000
3	100	2,000 to 20,000
4	1,000	20,000 to 200,000
5	10,000	200,000 to 2,000,000

**Frequency Dials:** Each channel has a one decade frequency dial (calibrated from 19 to 210) and an associated high-pass/low-pass band switch providing 5 multiplier ranges for each function.

**Cutoff Frequency Calibration Accuracy:**  $\pm 10\%$  with "Response" Switch in "Max. Flat" (Butterworth) position; less accurate in "R-C" position. Relative to mid-band level, the filter output is down 3 db at cutoff in "Max. Flat" position, and approximately 13 db in "R-C" position.

#### Bandwidth (See "Input Characteristics"):

Low-Pass Mode — Frequency response from dc to the cutoff frequency set within the range from 20 Hz to 2 MHz.

High-Pass Mode — Continuously adjustable between 20 Hz and 2 MHz with upper 3 db point at approximately 10 MHz.

Band-Pass Operation — Continuously variable within the cutoff frequency limits of 20 Hz to 20 MHz. For minimum bandwidth the high-pass and low-pass cutoff frequencies are set equal. This produces an insertion loss of 6 db, with the -3 db points at 0.8 and 1.25 times the midband frequency.

Band-Reject Operation — Continuously variable within the cutoff frequency limits of 20 Hz and 2 MHz or sharp null at any frequency between 40 Hz and 1 MHz. The low-pass band extends to dc. The high-pass band has its upper 3 db point at approximately 10 MHz. The null is sharper than that of a balanced "parallel T" filter, and is obtained by setting the high-pass cutoff at approximately twice the desired null frequency, and the low-pass cutoff at approximately one-half the desired null frequency.

#### Response Characteristics (selected by rear panel switch):

Butterworth — Each channel exhibits maximally flat fourth order Butterworth response for optimum performance in frequency domain.

Simple R-C — Fourth order R-C response for transient-free time-domain performance.

*Note:* Higher order characteristics may be obtained by cascading individual channels.

**Attenuation Slope:** Nominal 24 db per octave per channel in high-pass or low-pass modes. (see "Functions".)

**Maximum Attenuation:** Greater than 80 db.

**Insertion Loss:** Zero  $\pm \frac{1}{2}$  db to 2 MHz; 3 db at approximately 10 MHz. 6 db in Band-Reject operation.

#### Input characteristics:

Maximum Input Amplitude — 3 v rms up to 2 MHz, decreasing to 1 v rms at 10 MHz.

Maximum DC Component —

Low-Pass Mode: Combined ac plus dc should *not* exceed 4.2 v, peak.

High-Pass Mode: 100 v.

Impedance — 100 k ohms in parallel with 50 pf.

#### Output Characteristics:

Maximum Voltage — 3 v, rms, to 2 MHz (1.5 v, rms, in Band-Reject operation).

Maximum Current — 10 ma (less in Band-Reject operation).

Internal Impedance — 50 ohms, approx. (higher in Band-Reject operation).

**Floating (ungrounded) Operation:** A switch is provided on rear of chassis to disconnect signal ground from chassis ground.

**Hum and Noise:** Less than 100 microvolts, rms.

**Output DC Level Stability:**  $\pm 1$  millivolt per degree C.

#### Front Panel Controls:

CUTOFF FREQUENCY Hz Dial and Multiplier/Function Switch.

POWER-ON Switch.

**Terminals:** Front panel and rear of chassis, one BNC connector for INPUT, one for OUTPUT.

**Power Requirements:** 105-125 or 210-250 volts, single-phase, 50-400 Hz, 15 watts.

**Operating Temperature Range:** 0°C to 50°C.

#### Dimensions and Weights:

Model	Height	Width	Depth	Ship Wgt.	Op. Wgt.
(Bench Models)					
3200	5¼"	4¾"	15¼"	21 Lb.	9 Lb.
3202	5¼"	8⅝"	15¼"	22 Lb.	14 Lb.
(Rack Units)					
3200R	3½"	19"	15¼"	21 Lb.	11 Lb.
3202R	3½"	19"	15¼"	22 Lb.	18 Lb.

*Prices and Specifications are subject to change without notice.*

## KROHN-HITE CORPORATION

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Pioneering in Quality Electronic Instruments