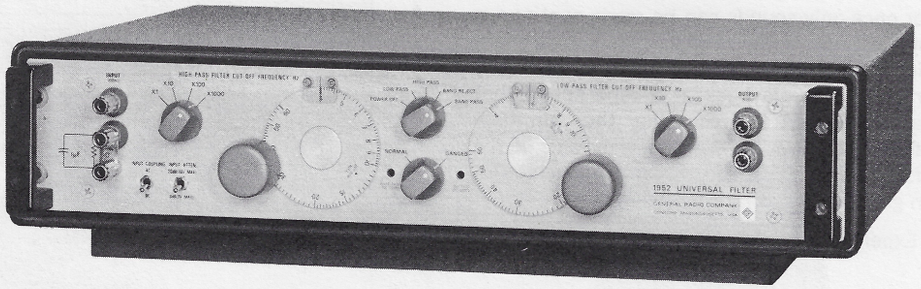
Type 1952 UNIVERSAL FILTER

- 4-Hz to 60-kHz tuning
- low-pass or high-pass, band-pass or band-reject, ganged for easy tuning
- high attenuation rate — 30 db/octave
- line or battery operation



The 1952 Universal Filter will perform as a low-pass, high-pass, band-pass, or band-reject filter at the turn of a panel switch. It consists of a low-pass and a high-pass filter that can be employed singly, in cascade, or in parallel, to provide the assortment of over-all characteristics. The cut-off frequencies of the two filters can be controlled independently or ganged together to provide constant-percentage bandwidth for band-pass or band-reject tuning.

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This filter is of value in many signal-conditioning applications. For example, it can be used to control system bandwidth for reduction of extraneous signals or to evaluate the effect of limited bandwidth upon signal intelligibility and data-transmission accuracy. As a high-pass filter it can reduce power-line-related components, as a low-pass filter control high-frequency noise, or as a notch filter eliminate single-frequency components. The 1952 can also act as part of a spectrum analyzer or distortion meter and, with a random-noise generator, produce controlled bands of noise as test signals. It is recommended as an accessory for the GR 1142 Frequency Meter and Discriminator and the 1561-R Precision Sound-Level Meter.

— See **GR Experimenter** for April 1968.

specifications

FREQUENCY RANGE

Cut-off Frequencies: Adjustable 4 Hz to 60 kHz in four ranges.

Pass-Band Limits: Low-frequency response to dc (approx 0.7 Hz with ac input coupling) in LOW PASS and BAND REJECT modes. High-frequency response uniform ±0.2 dB to 300 kHz in HIGH PASS and BAND REJECT modes.

Controls: Log frequency-dial calibration; accuracy ±2% of cut-off frequency (at 3-dB points).

FILTERS

Filter Characteristics: Filters are fourth-order (four-pole) Chebyshev approximations to ideal magnitude response. The nominal pass-band ripple is ±0.1 dB (±0.2 dB max); nominal attenuation at the calibrated cut-off frequency is 3 dB; initial attenuation rate is 30 dB per octave. Attenuation at twice or at one-half the selected frequency, as applicable, is at least 30 dB.

Tuning Modes: Switch selected, LOW PASS, HIGH PASS, BAND PASS, and BAND REJECT.

Ganged Tuning: The two frequency controls can be ganged in BAND PASS and BAND REJECT modes so the ratio of upper to lower cut-off frequencies remains constant as controls are adjusted. Range overlap is sufficient to permit tuning through successive ranges without the need to reset frequency controls if ratio of upper to lower cut-off frequencies is 1.5 or less.

Minimum Bandwidth: 26% (approx ⅓ octave) in BAND PASS mode.

Null Tuning: In BAND REJECT mode, setting the frequency controls for a critical ratio of upper to lower cut-off frequency (indicated on dials) gives a null characteristic (point of infinite attenuation) that can be tuned from 5 Hz to 50 kHz.

INPUT

Gain: 0 or −20 dB, switch selected. Accuracy of gain is ±1 dB, of 20-dB attenuator is ±0.2 dB.

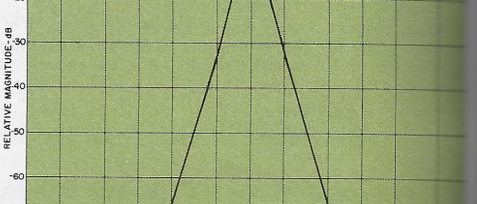
Impedance: 100 kΩ.

Coupling: Ac or dc, switch selected. Lower cut-off frequency (3 dB down) for ac coupling is about 0.7 Hz.

Max Voltage: Max sine-wave input is 3 V rms (8.4 V pk-pk) or 30 V rms with input attenuator at 20 dB. Max peak input voltage for dc coupling is ±4.2 V. For ac coupling max peak level of ac component must not exceed ±4.2 V and dc component must not exceed 100 V. Input can tolerate peak voltages of ±100 V without damage. An LC filter at input limits bandwidth to 300 kHz, thus reducing danger of overloading active circuits at frequencies above normal operating range.

GENERAL

Output: 600-Ω impedance. Any load can be connected without affecting linear operation of output circuit. Temperature coefficient of output offset voltage is between 0 and +4 mV/°C.



Low-pass and high-pass filter characteristics.

Noise: <100 μV in an effective bandwidth of 50 kHz.

Distortion: Max harmonic distortion, with all components in the pass band, for a linear load, is less than 0.25% for open-circuit voltages up to 3 V and frequencies up to 50 kHz.

Power Required: 100 to 125 or 200 to 250 V (switch selected), 50 to 60 Hz, 2.5 W. Or 19.2 V, approx 20 mA from rechargeable nickel-cadmium batteries (not supplied), about 10-h operation. Connections for external battery.

Accessories Supplied: Power cord, bench- or rack-mount hardware.

Accessories Available: Rechargeable batteries (two required) and 1560-P60 Battery Charger.

Dimensions (width x height x depth): Bench, 19 x 3⅞ x 15 in. (485 x 99 x 385 mm); rack, 19 x 3½ x 11¾ in. (485 x 89 x 300 mm); charger, 4¼ x 3¾ x 8 in. (110 x 96 x 205 mm).

Weight: Net, 20½ lb (9.5 kg); shipping, 25 lb (11.5 kg).

Catalog Number	Description	Price in USA
	1952 Universal Filter	
1952-9801	Bench Model	**$1075.00**
1952-9811	Rack Model	**1075.00**
8410-1040	**Rechargeable Battery** (2 req'd)	**12.00**
	1560-P60 Battery Charger	
1560-9660	115 volts	**125.00**
1560-9661	230 volts	**125.00**