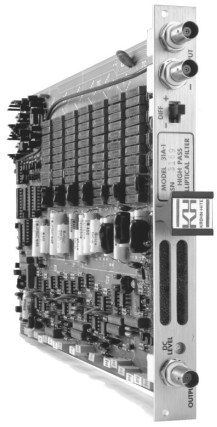
Model 31A

High-Pass Elliptical Plug-In Filter Card

- **Model 31A-1:** 1Hz to 99kHz
- **Model 31A-2:** 0.1Hz to 9.9kHz
- **Model 31A-3:** 0.01Hz to 990Hz
- **Filter Type:** 7-Pole, 6-Zero, Elliptical
- **Attenuation Slope:** 115dB/Octave
- **Stopband Attenuation:** >80dB
- **Selectable Input and Output Gain**
- **Selectable Input Type:** Differential and Single-Ended



DESCRIPTION

The Model 31A Series high-pass, elliptical filter/voltage gain amplifier is one of many plug-in filter cards used in the Models 3905B/3905C/3916B/3916C Programmable Filter Systems chassis.

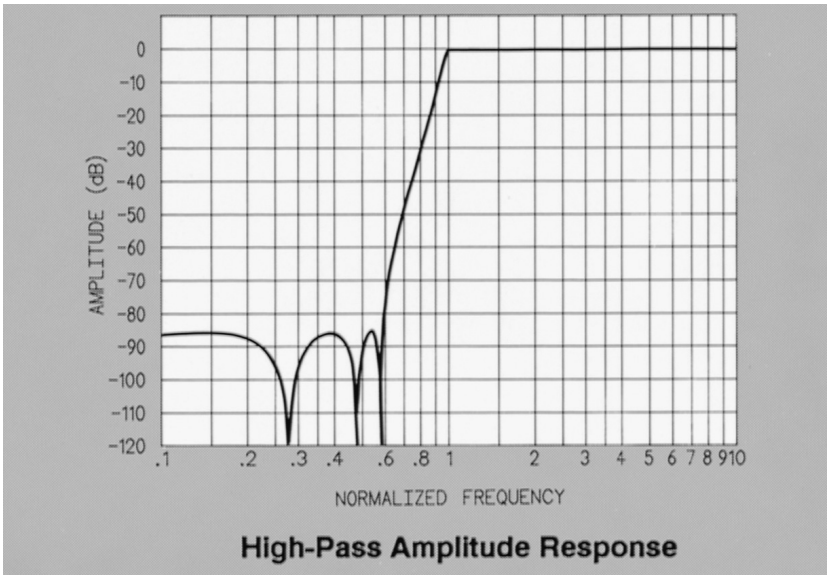
FILTER FEATURES

As an elliptical filter, the Model 31A Series has a tunable cutoff frequency range from 0.01Hz to 99kHz, a rolloff rate of 115dB/octave and a minimum stopband attenuation of >80dB. Passband ripple is typically 0.22dB.

The 31A provides either a single-ended or differential input with a common mode rejection of >60dB. Input gains up to 40dB in 10dB steps and output gains to 20dB are also provided. The 31A will accept input signals of ±10V peak at 0dB gain and has selectable ac or dc coupling. Overload detectors are standard and assist the user in detecting excessive input signals or incorrect gain settings.

AMPLIFIER FEATURES

The 31A is also a programmable voltage gain amplifier for applications that require a low noise amplifier. The amplifier has a bandwidth of 1MHz and gains to 60dB, selectable in 10dB steps, and a wideband noise of <20µV.



High-Pass Amplitude Response

APPLICATIONS

Typical applications for the Model 31A are: removing line related frequencies, enhancing signal-to-noise ratio, distortion testing, low noise pre-amplification and many more. Plug-in cards offering other types of filters with different frequency ranges, slopes and number of channels are also available.

SPECIFICATIONS

Specifications apply at 25°C ±5°C.

FUNCTION: High-pass filter; voltage gain amplifier.

FILTER MODE

Type: 7-pole, 6-zero elliptical.

Attenuation: 115dB/octave.

Passband Ripple: 0.22dB typical, 0.4dB max.

Tunable Frequency Range fc:

Model 31A-1: 1Hz to 99kHz.

Model 31A-2: 0.1Hz to 9.9kHz.

Model 31A-3: 0.01Hz to 990Hz.

Frequency Resolution:

Band	Model	Cutoff Frequency Range (Hz)	Resolution (Hz)
1	30A-1	1-99	1
	30A-2	0.1-9.9	0.1
	30A-3	0.01-0.99	0.01
2	30A-1	100-990	10
	30A-2	10-99	1
	30A-3	1.0-9.9	0.1
3	30A-1	1k-9.9k	100
	30A-2	100-990	10
	30A-3	10-99	1
4	30A-1	10k-99k	1k
	30A-2	1k-9.9k	100
	30A-3	100-990	10

Relative Gain at fc: –0.22dB at 0.99fc nominal.

Cutoff Frequency Accuracy: ±2%.

Bandwidth:

Model 31A-1: dc coupled, fc to upper 3dB cutoff, >500kHz at 1Vrms with 0dB gain.

Model 31A-2 and 31A-3: dc coupled, fc to upper 3dB cutoff, >100kHz at 1Vrms with 0dB gain; ac coupled, 0.32Hz to fc.

Stopband Attenuation: >80dB.

Stopband Frequency (fs): 0.59fc.

Insertion Loss: 0dB ±0.1dB.

Pre-Filter Gain: 0dB, 10dB, 20dB, 30dB, 40dB ±0.1dB.

Post-Filter Gain: 0dB, 10dB, 20dB ±0.1dB.

Input Coupling: ac or dc.

Wideband Noise (RTI with 2MHz BW Detector): min. gain, 1kHz cutoff <400µV, Max fc cutoff, <1mV; Max. gain, <20µV.

Harmonic Distortion: –80dB at 1kHz.

Spurious Components: –80dB below full scale with input source <50 ohms.

DC Stability: Typically ±10µV/°C.

Crosstalk Between Channels: –85dB below full scale with input source <50 ohms.

AMPLIFIER MODE

Bandwidth: dc coupled, dc to >1MHz min. gain, >400kHz max. gain; ac coupled, 0.32Hz to >1MHz.

Insertion Loss: 0dB ±0.05dB.

Gain: 10dB to 60dB in 10dB steps ±0.1dB.

Input: Differential or single-ended +(in phase), –(inverted).

CMRR: >60dB to 10kHz; approximately 50dB at 100kHz.

Sensitivity: 10mV peak with 60dB total gain for 10V peak output.

Maximum Input: ±10V peak at 0dB gain reduced in proportion to gain setting.

Impedance: 1M ohm in parallel with 100pf.

Coupling: ac or dc.

Maximum DC Component: ±100V in ac coupled mode.

Output:

Maximum Voltage (o.c.): 7Vrms to 200kHz; 3Vrms to 500kHz; 1Vrms to 1MHz.

Impedance: 50 ohms.

DC Offset: Adjustable to zero volts.

Harmonic Distortion (1V output): <–80dB (0.01%) to 10kHz; <–60dB (0.1%) to 100kHz..

Wideband Noise (referred to input, 2MHz BW detector): 100µV min. gain; 20µV max. gain.

DC Stability (RTI): Typically ±10µV/° C.

GENERAL

Phase Match Between Channels: 1° typical, 2° max from 1.3fc to 10fc; 2° typical, 4° max from fc to 1.3fc. For like Models in same chassis, otherwise consult factory.

Amplitude Match Between Channels: ±0.1dB typical, ±0.2dB max from fc to 1.3fc; 0.1dB max from 1.3fc to 10kHz, 0.2dB max to 100kHz.

Crosstalk Between Channels: >85dB below full scale with input source <50 ohms.

Switch: For selection of Input, +(in phase), Differential or –(inverted).

Input/Output Connectors: BNC.

Power Requirements: 15 watts.

Weights: 1.75 lbs (.8kg).

Accessories: Operating manual.

OPTIONS

Extended 1 Year Warranty: Part No. EW31A-1, EW31A-2, EW31A-3.

NOTE: Model 31A Series plug-in filter/amplifier cards must be used with 3905B/3905C or 3916B/3916C chassis.

Specifications subject to change without notice.