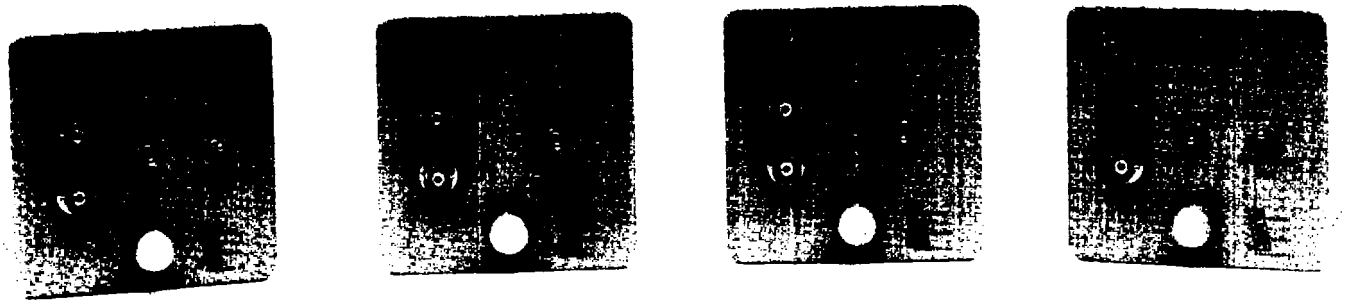
MODELS 116, 117, 118 and 119 LOW-NOISE PREAMPLIFIERS



The Models 124 and 126 Lock-In Amplifiers and the Model 114 Signal Conditioning Amplifier are designed for use with a selection of plug-in preamplifiers that offer a choice of input characteristics permitting virtually any signal source to be matched. Each of the preamplifiers is self-contained and derives power from the instrument with which it is being used. All of the preamplifiers can be either plugged into the lock-in directly or can be operated remotely through the use of the Model 183 Remote Adapter Kit, which consists of a plug-in extender and a ten-foot cable. Longer cable lengths are available at extra cost.

SPECIFICATIONS

The specifications of each preamplifier are listed in the comparison chart shown below. Typical noise figure contours and transfer functions are shown on the following two pages.

LOW NOISE PREAMPLIFIER COMPARISON CHART

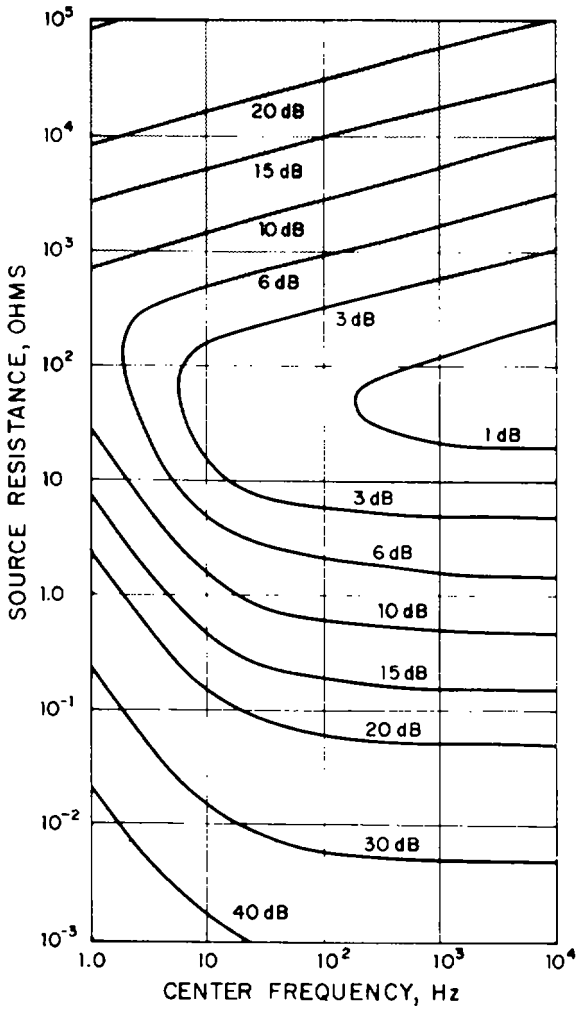
SPECIFICATION		Model 116	Model 117	Model 118	Model 119
Input Z		Selected by front panel switch: Direct: 100 meg. SE/DE Transformer[a]: Low Z SE/DE	100 megohms SE/DE	>10 kilohms SE/DE	Selected by front panel switch: Direct: 100 meg. SE/DE Transformer: Low Z SE/DE
Bandwidth[b]		Direct: 0.2 Hz - 210 kHz Transformer[b]: 1.5 Hz - 10 kHz	0.2 Hz - 210 kHz	0.2 Hz - 210 kHz	Direct: 0.2 Hz - 210 kHz Transformer[b]: 1 kHz - 210 kHz
Noise Figure (1 dB Contour)	R_s	Direct: 4 kilohms - 20 megohms Transformer: 15 ohms - 100 ohms	4 kilohms - 20 megohms	200 ohms 2.5 kilohms	Direct: 4 kilohms - 20 megohms Transformer: 1-10 ohms
	f	Direct: 1 Hz - 210 kHz Transformer: 20 Hz - 10 kHz	1 Hz - 210 kHz	500 Hz - 210 kHz	Direct: 1 Hz - 210 kHz Transformer: 1.5 kHz - 150 kHz
Common Mode Rejection Ratio		Direct: 120 dB at 60 Hz Transformer: 140 dB at 60 Hz	120 dB at 60 Hz	110 dB at 60 Hz	Direct: 120 dB at 60 Hz Transformer: 120 dB at 60 Hz
Full scale sensitivity with Model 124		Direct: 100 nV Transformer: 1 nV	100 nV	10 nV	Direct: 100 nV Transformer: 1 nV
Full scale sensitivity with Model 126		Direct: 1 μV Transformer: 10 nV	1 μV	100 nV	Direct: 1 μV Transformer: 10 nV
Maximum Input Voltage		Direct: ± 200 Vdc Transformer: ± 200 Vdc	± 200 Vdc	± 5 V	Direct: ± 200 Vdc Transformer: ± 200 Vdc
PRICE		$400 *	$250 *	$475 *	$425 *

NOTES: a. May be wired for 1:50 to 1:350 turns ratio. Standard is 1:100.

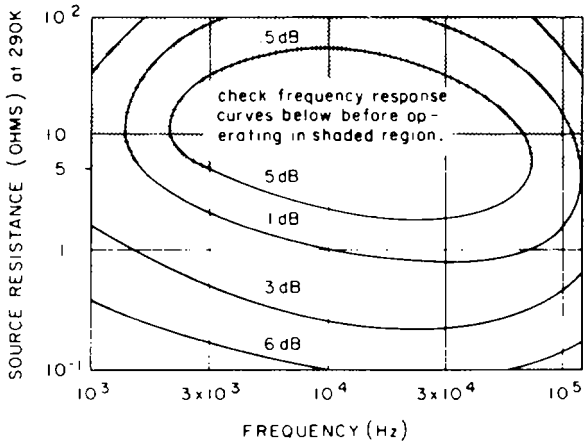
b. Varies with source impedance.

* Price and specifications subject to change without notice.

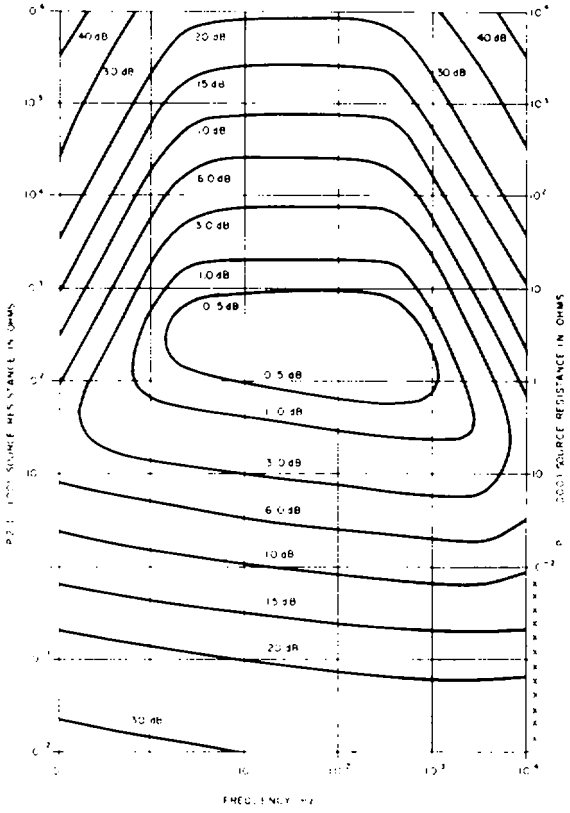
PREAMPLIFIER CHARACTERISTICS



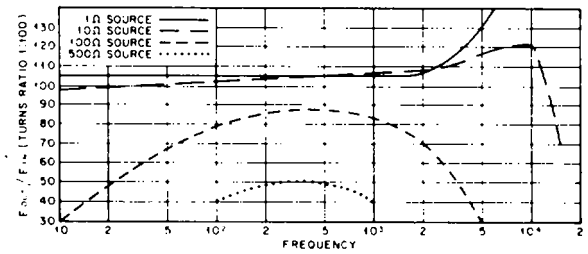
Typical Noise Figure Contours for the Model 116 Operating in the Transformer Mode.



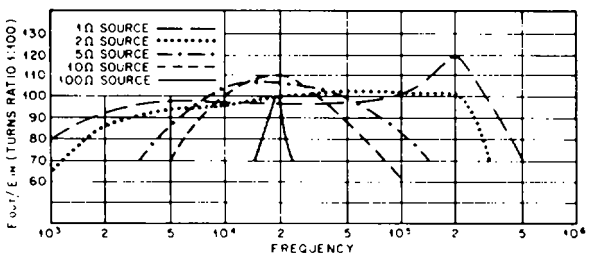
Typical Noise Figure Contours for the Model 119 Operating in the Transformer Mode.



Typical Noise Figure Contours for Model 190 Transformer Plus Preamp.

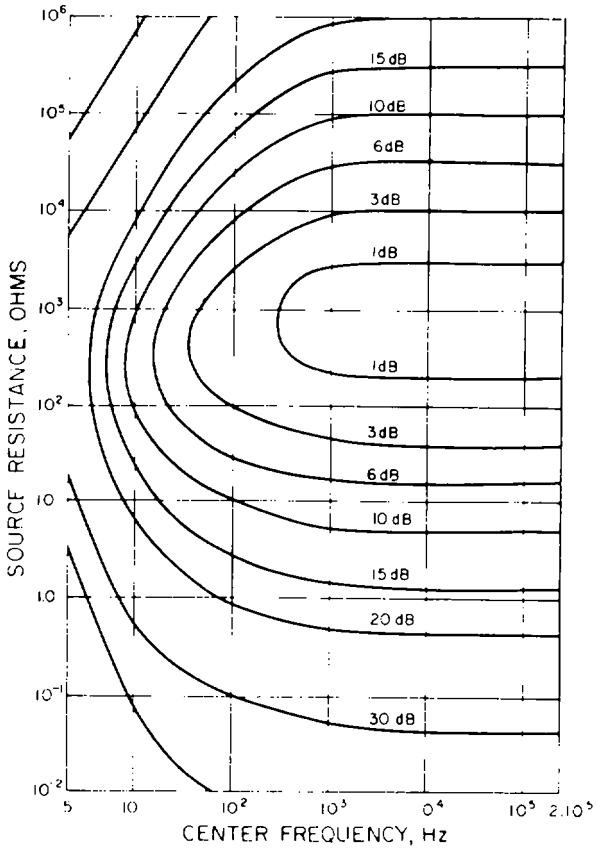


Amplitude Transfer Functions for the Model 116 Operating in the Transformer Mode.

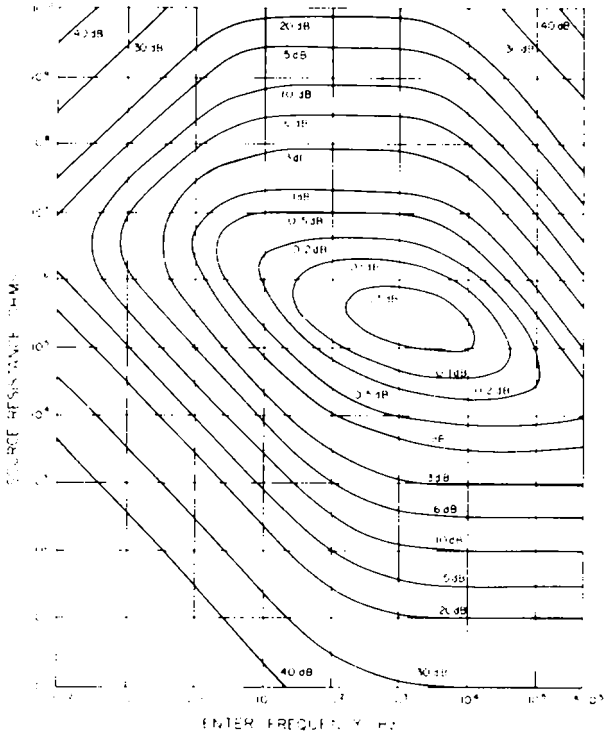


Amplitude Transfer Functions for the Model 119 Operating in the Transformer Mode.

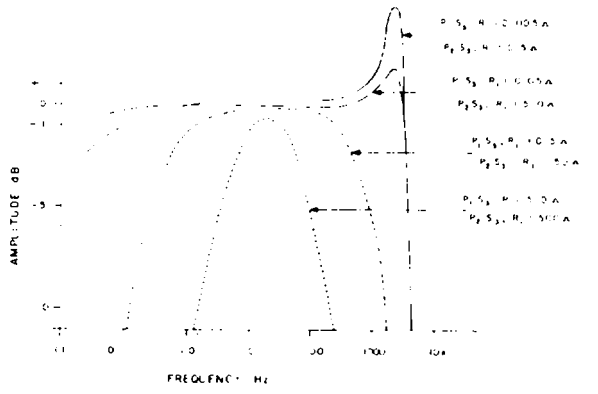
PREAMPLIFIER CHARACTERISTICS



Typical Noise Figure Contours for the Model 118.

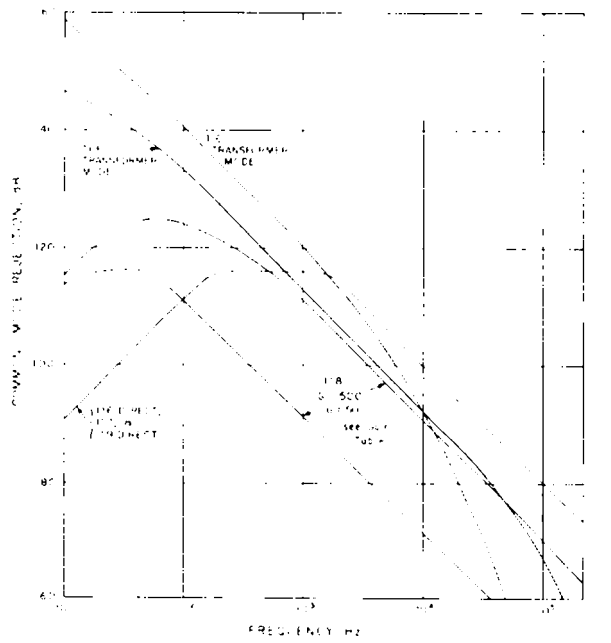


Typical Noise Figure Contours for the Model 117 and the 116 and 119 Operating in the Direct Input Mode.



Transformer Ratios: Primary winding 1 (P_1): Primary winding 2 (P_2): Secondary winding 3 (S_3) = 1:10:1000, with R_1 representing the source resistance.

Amplitude Transfer Functions of the Model 190 Transformer.



Typical Preamplifier Common Mode Rejection Characteristics.