Lock–in Amplifiers

Comparison of various Lock-in Amplifiers ……

There are many Lock-in Amplifiers available in the market. Vin Karola has compiled a comparative chart Listing various make/model lock-in amplifiers. The Table below should come quite handy when deciding to purchase a particular lock-in amplifier.

SR830

SR850

SR844

List of various Lock-in Amplifiers available:

Make/Model	Features	Price Range	Remarks
SRS Model SR830	• 1 mHz to 102.4 kHz frequency range • 256 kHz front-end sampling rate • > 100 dB dynamic reserve (5 ppm/C stability) • Auto gain, phase, reverse, and offset • 0.01 deg phase resolution • Time constant from 10us to 30 ks • GPIB, and RS-232 interfaces	~ $5,200	DSP Lock-in Amplifier with 4 1/2-digit LED display. Power 40 W Input: 100/120/220/240 VAC, 50/60Hz
SRS Model SR850	• 1 mHz to 102.4 kHz frequency range • CRT display, and built-in data analysis • 64,000 point data buffer • Chart recording, numeric display, polar plots • Smoothing, curve fitting, and statistics • Direct printing, and plotting • 0.001 deg phase resolution • >100 dB dynamic reserve • GPIB, and RS-232 interfaces	~ $8,700	DSP Lock-in Amplifier. Power 60W Input: 100/120/220/240 VAC, 50/60Hz
SRS Model SR844	• 25 kHz to 200 MHz frequency range • 80 dB dynamic reserve (5 ppm stability) • Auto gain, phase, reverse, and offset • Internal or external reference • Time constant from 100us to 30 ks • No Time Constant mode • GPIB, and RS-232 interfaces	~ $9,200	RF Lock-in Amplifier For high frequency applications.
Perkin Elmer/ EG&G Model 7265	• 0.001 Hz to 250 kHz frequency range • Voltage and current mode inputs • 10 us to 100 ks output time constants • Quartz crystal stabilized internal oscillator • Harmonic measurements to 65,536F • Dual reference, Dual harmonic, and Virtual Reference modes • Spectral display modes	~$5,300	Dual Phase DSP Lock-in Amplifier
Perkin Elmer/ EG&G Model 7280	• 0.5 Hz to 2 MHz frequency range • Voltage and current mode inputs • 7.5 MHz main ADC sampling rate • 1 us to 100 ks output time constants • Quartz crystal stabilized internal oscillator • Harmonic measurements to 32F • Dual reference, Dual harmonic, and Virtual Reference modes • Spectral display mode	~$13,995	Dual Phase wide bandwidth DSP Lock-in Amplifier. Power 200 VA max 100/120/220/240 VAC, 50/60Hz Required Software included

Perkin Elmer/EG&G
Model 7265

Perkin Elmer/EG&G
Model 7280

Technical Notes

Why use a Lock-in Amplifier?	The main reason for using a Lock-in amplifies is to recover signals from noise.
What does a Lock-in Amplifier Measure?	Using Fourier's theorem, any input signal, including the noise accompanying it, can be represented as the sum of many sine waves of different amplitudes, phases, and frequencies. The phase sensitive detector in the lock-in amplifier multiplies all these components by a signal at the reference frequency.
Peak-to-peak or RMS?	When measuring *sinusoida*l input signals, lock-in amplifiers generally display the measured value in volts r.m.s.. If for example, the lock-in amplifier shows a reading of 100 mV, the components of the input signal at the reference frequency is 100 mV r.m.s., or 283 mV peak-to-peak.
Phase Measurements	Lock-in amplifiers always use degrees as the unit of phase, although in some of the mathematics used, radians are used. Similarly, frequency f is always measured in hertz, although the equations are often simpler if angular frequency, usually termed "ω", is used, where: $\omega = 2 \pi f$
For further information, please see Perkin Elmer catalog	

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