



Indian Institute of Technology Kanpur

Samtel Centre for Display Technologies

Enquiry number: SCDT/2013-14/03

Date: August 22, 2013

Sealed Quotations are invited for the supply of DSP Dual Phase Digital Lock-In Amplifier, SRS make (SR830) as per the following specifications:-

Signal Channel: Voltage inputs: Single-ended or differential, Sensitivity: 2 nV to 1 V, Current input: 10^6 or 10^8 V/A, Input impedance, Voltage: $10\text{ M}\Omega + 25\text{ pF}$, AC or DC coupled, Current: $1\text{ k}\Omega$ to virtual ground, Gain accuracy: $\pm 1\%$ ($\pm 0.2\%$ typ.), Noise (typ.): $6\text{ nV}/\sqrt{\text{Hz}}$ at 1 kHz $0.13\text{ pA}/\sqrt{\text{Hz}}$ at 1 kHz (10^6 V/A) $0.013\text{ pA}/\sqrt{\text{Hz}}$ at 100 Hz (10^8 V/A), Line filters 50/60 Hz and 100/120 Hz ($Q = 4$), CMRR :100 dB to 10 kHz, decreasing by 6 dB/oct above 10 kHz, Dynamic reserve: $>100\text{ dB}$ (without prefilters), Stability: $<5\text{ ppm}/^\circ\text{C}$

Reference Channel: Frequency range: 0.001 Hz to 102.4 kHz, Reference input: TTL or sine (400 mVpp min.), Input impedance: $1\text{ M}\Omega$, 25 pF, Phase resolution : 0.01° front panel, 0.008° through computer interfaces: Absolute phase error $<1^\circ$, Relative phase error $<0.001^\circ$, Orthogonality: $90^\circ \pm 0.001^\circ$, Phase noise, Internal ref. :Synthesized, $<0.0001^\circ$ rms at 1 kHz, External ref. 0.005° rms at 1 kHz (100 ms time constant, 12 dB/oct), Phase drift: $<0.01^\circ/\text{C}$ below 10 kHz, $<0.1^\circ/\text{C}$ above 10 kHz, Harmonic detection: 2F, 3F, nF to 102 kHz ($n < 19,999$), Acquisition time: (2 cycles + 5 ms) or 40 ms, whichever is larger.

Demodulator: Stability: Digital outputs and display: no drift, Analog outputs: $<5\text{ ppm}/^\circ\text{C}$ for all dynamic reserve settings, Harmonic rejection: -90 dB, Time constants: 10 μs to 30ks (6, 12, 18, 24 dB/oct rolloff). Synchronous filters available below 200 Hz.

Internal Oscillator: Range: 1 mHz to 102 kHz, Frequency accuracy: 25 ppm + 30 μHz , Frequency resolution: $4\frac{1}{2}$ digits or 0.1 mHz, whichever is greater, Distortion -80 dBc ($f < 10\text{ kHz}$), -70 dBc ($f > 10\text{ kHz}$) @ 1 Vrms amplitude, Amplitude: 0.004 to 5 Vrms into $10\text{ k}\Omega$ (2 mV resolution), $50\ \Omega$ output impedance, 50 mA maximum current into $50\ \Omega$, Amplitude accuracy 1 % Amplitude stability 50 ppm/ $^\circ\text{C}$, Outputs: Sine, TTL (When using an external reference, both outputs are phase locked to the external reference.)

Displays: Channel 1: $4\frac{1}{2}$ -digit LED display with 40-segment LED bar graph. X, R, X-noise, Aux 1 or Aux 2. The display can also be any of these quantities divided by Aux 1 or Aux 2. Channel 2: $4\frac{1}{2}$ -digit LED display with 40-segment LED bar graph. Y, θ , Y-noise, Aux 3 or Aux 4. The display can also be any of these quantities divided by Aux 3 or Aux 4. Offset: X, Y, R can be offset up to $\pm 105\%$ of full scale. Expand: X, Y, R can be expanded by 10x or 100x, Reference: $4\frac{1}{2}$ -digit LED display.

Inputs and Outputs: CH1 output: X, R, X-noise, Aux 1 or Aux 2, ($\pm 10\text{ V}$), updated at 512 Hz, CH2 output: Y, θ , Y-noise, Aux 3 or Aux 4, ($\pm 10\text{ V}$), updated at 512 Hz, X, Y outputs (rear panel): In-phase and quadrature components ($\pm 10\text{ V}$), updated at 256 kHz. Aux. A/D inputs 4 BNC inputs, 16-bit, $\pm 10\text{ V}$, 1 mV resolution, sampled at 512 Hz, Aux. D/A outputs: 4 BNC outputs, 16-bit, $\pm 10\text{ V}$, 1 mV resolution, Sine out: Internal oscillator analog output, TTL out: Internal oscillator TTL output, Data buffer: 8k point buffer / two 16k point buffers. Data is recorded at rates to 512 Hz and read through the computer interfaces. Trigger in (TTL): Trigger synchronizes data recording, Remote preamp: Provides power to the optional preamps.

General: Interfaces: IEEE-488.2 and RS-232 interfaces standard with computer control. Power: 40 W, 100/120/220/240 VAC, 50/60 Hz, Dimensions: 17". 5.25". 19.5" (WHD), Weight 23 lbs(approx).

Terms and Conditions

1. Technical and financial details should be in separate envelopes.
2. Maximum educational discounts should be applied.
3. Validity of quotation should be at least for 60 days
4. The Rate offered should be free delivery of IIT Kanpur or ex-godown in case of firms situated outside Kanpur. If items are imported then the firms should quote the price on F.O.B basis.
5. Institute is exempted for payment of Excise Duty under notification No. 10/97
6. Warranty One year parts and labor on defects in materials and workmanship.
7. Quotation should carry proper certifications like proprietary certificate, authorization certificate from manufacturer, etc.
8. The delivery period should be specifically stated. Earlier delivery may be preferred.
9. The indenter reserves the right to withhold placement of final order. The right to reject all or any of the quotations and to split up the requirements or relax any or all of the above conditions without assigning any reason is reserved.

Kindly send the quotation in sealed envelopes latest by 02.09.2013 to the following address;

Room No.305,
Samtel Centre for Display Technologies,
Indian Institute of Technology Kanpur-208016, UP, India.