



WEST BENGAL STATE UNIVERSITY

Berunanpukuria, Malikapur Barasat
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Ref. No: WBSU/Reg/PHYSICS/Quotation/2295/17-18 Date: 23/03/2018

Notice Inviting Quotation for Procurement of Lock-in-Amplifier for the Department of Physics, West Bengal State University.

The University intends to invite rates through sealed quotations for procurement of the following items for the Department of Physics, WBSU from interested agencies or parties or suppliers or distributors or manufacturers.

Details of Items/Specifications:

Serial No.	Name of the Item	Quantity
1	Stanford Research Systems : Model SR830 DSP Dual Phase Lock-In Amplifiers (with rack mount) OR Equivalent	01 No.

Note: - Details Specification is provided in the next page.

The interested agencies or parties or suppliers or distributors or manufacturers of the items in the list, are requested to quote their rates to **The Registrar (Officiating), West Bengal State University, Berunanpukuria, Malikapur, Barasat, 24 Pgs (N), Kolkata-700126**, for supply of the above listed items along with the following documents: a) Copy of Trade License, b) Copy of GST Registration, c) Pan Card, d) Copy of income tax filed in the last financial year, e) Clearance of professional tax. The rates should be all inclusive GST, Duties, Transportation Charges etc. and the warranty of items to be specified. Incomplete, conditional quotations, those received without proper supporting documents and after due date and time will be summarily rejected. The above quote should indicate firmly the type of tax to be charged.

The quotations along with necessary supporting documents in sealed cover super scribed "QUOTATION FOR PROCUREMENT OF LOCK-IN-AMPLIFIER FOR THE DEPARTMENT OF PHYSICS, WEST BENGAL STATE UNIVERSITY" are to be submitted on or before 05.04.2018 up to 3 p.m. positively and will be opened on 06.04.2018 at 2 p.m. in the Dept. of Physics, WBSU. The University reserves the right for cancelling any or all quotations without showing any reasons thereof. The quoted rates should be valid for three months from the date or opening of the quotation and the items are to be delivered to the University campus at Barasat. However the University reserves right to terminate the notice inviting quotations for the above items at any point of time without assigning any reasons thereof.

23/3/18

**Registrar (Officiating),
West Bengal State University**

Copy for information and necessary action to:

- 1) The V.C.'s secretariat, WBSU.
- 2) All members of the purchase and tender committee.
- 3) The HOD, Dept. of Physics, WBSU
- 4) Dr. Subhajit Sarkar, Dept. of Physics, WBSU
- 5) The Registrar's Guard File, WBSU

Registrar (Officiating)
West Bengal State University
Barasat, Kolkata-700126

23/3/18

**Registrar (Officiating),
West Bengal State University**

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Department of Physics
West Bengal State University

Item: Model SR830 DSP Dual Phase Lock-In Amplifiers (with rack mount) with following specifications,
Manufacturer: M/s. Stanford Research Systems, 1290-D, Reamwood Avenue, Sunnyvale, CA 94089, USA

OR

Equivalent

Quantity: 1 no.

Specifications

Signal Channel

Voltage inputs	Single-ended or differential
Sensitivity	2 nV to 1 V
Current input	10^8 or 10^9 V/A
Input impedance	
Voltage input	10 M Ω + 25 pF, AC or DC coupled
Current input	1 k Ω to virtual ground
Gain accuracy	± 1 % (± 0.2 % typ.)
Noise	6 nV/ $\sqrt{\text{Hz}}$ at 1 kHz 0.13 pA/ $\sqrt{\text{Hz}}$ at 1 kHz (10^8 V/A) 0.013 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 at 10 kHz, decreasing by 6 dB/oct above 10 kHz
Dynamic reserve	>100 dB (without prefilters)
Stability	<5 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 M Ω , 25 pF
Phase resolution	0.01 $^{\circ}$ front panel, 0.008 $^{\circ}$ through computer interfaces
Absolute phase error	<1 $^{\circ}$
Relative phase error	<0.001 $^{\circ}$
Orthogonality	90 $^{\circ}$ \pm 0.001 $^{\circ}$
Phase noise	
Int. reference	Synthesized, <0.0001 $^{\circ}$ rms at 1 kHz
Ext. reference	0.005 $^{\circ}$ rms at 1 kHz, 100 ms, 12 dB/oct
Phase drift	<0.01 $^{\circ}/^{\circ}\text{C}$ below 10 kHz, <0.1 $^{\circ}/^{\circ}\text{C}$, 10 kHz to 100 kHz
Harmonic detection	2F, 3F, ... nF to 102 kHz (n < 19,999)
Acquisition time	(2 cycles + 5 ms) or 40 ms, whichever is greater

Demodulator

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

Internal Oscillator

Range	1 mHz to 102 kHz
Accuracy	25 ppm + 30 μHz
Frequency resolution	4 $\frac{1}{2}$ digits or 0.1 mHz, whichever is greater
Distortion	-80 dBc (f < 10 kHz), -70 dBc (f > 10 kHz) @ 1 Vrms amplitude
Amplitude	0.004 to 5 Vrms into 10 k Ω (2 mV resolution), 50 Ω output impedance, 50 mA maximum current into 50 Ω
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	4½-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 (SR830)	4½-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 $10\times$ or $100\times$.
Reference	4½-digit LED display

Inputs and Outputs

CH1 output	± 10 V output of X, R, X-noise, Aux 1 or Aux 2. Updated at 512 Hz.
CH2 output (SR830)	± 10 V output of Y, Θ , Y-noise, Aux 3 or Aux 4. Updated at 512 Hz.
X, Y outputs (rear panel)	In-phase and quadrature components (± 10 V), updated at 256 kHz
Aux. A/D inputs	4 BNC inputs, ± 10 V, 1 mV resolution, sampled at 512 Hz
Aux. D/A outputs	4 BNC outputs, ± 10 V, 1 mV resolution
Sine Out	Internal oscillator analog output
TTL Out	Internal oscillator TTL output
Data 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 pre-amp	Provides power to the optional SR550, SR552 and SR554 preamplifiers

General

Interfaces	IEEE-488.2 and RS-232 interfaces standard. All instrument functions can be controlled and read through IEEE-488.2 or RS-232 interfaces.
Power	40 W, 100/120/220/240 VAC, 50/60 Hz
Dimensions	17" \times 5.25" \times 19.5" (WHL)
Weight	23 lbs.
Warranty	One year parts and labor on defects in materials and workmanship



Terms and Conditions:

- 1) The Lock-in-Amplifier will be used in University for purely academic and research purpose. So maximum educational discount must be given.
- 2) Quotation must be provided on Direct Shipment Basis. (if applicable)
- 3) Payment- By Wire Transfer in USD in advance. (if applicable)
- 4) Quotation must include Air Freight Charges, Insurance and Packaging charges in USD up to CIP Kolkata Airport. (if applicable)
- 5) Custom clearance will be undertaken by the University. (if applicable)
- 6) Unpackaging and successful Installation with demonstrations onsite at free of cost must be done by the Bidder.
- 7) Standard Company Warranty must be provided.