Fax: + 91-0512-2596620 Phones: + 91-0512-2596622,6088

Indian Institute of Technology Kanpur
Samtel Centre for Display Technologies

Enquiry number: SCDT/FlexE/2015-16/13 Date: 19/10/2015

Quotations from prospective vendors are invited by Samtel Center for Display Technologies, IIT Kanpur for DSP Lock-In Amplifier (with rack mount) and JFET Lock-in Voltage preamplifier must have following minimum technical specifications.

Specification		Company specifications and model number of system	Complies/Does not comply/Not applicable
1. Lock – In – Amplifier			
Signal Channel			
Voltage inputs	Single-ended (A) or differential (A-B)		
Sensitivity (output scale)	1 nV to 1 V (voltage input)		
	1 fA to 1 µA (current input)		
Voltage Input range	10 mV to 1 V (peak).		
Current input range	1 µA or 10 nA (peak)		
Max input before overload	1 V (peak) or 1 µA (peak)		
Input impedance			
Voltage input	10 MΩ + 25 pF, AC (>1 Hz) or DC coupled		
Current input	1 kΩ or 100 Ω to virtual ground		
Gain accuracy	±1 % (<200 kHz), ±2 % (to 2 MHz). Signal amplitude must be less than 30% of input range.		
Noise	2.5 nV/√Hz at 1 kHz (10 mV input range, typ.)		
Harmonic distortion	-80 dB (<100 kHz), -60 dB (>100 kHz)		
CMRR	90 dB at 1 kHz (DC coupled)		
Dynamic reserve	120 dB (typ)		
Reference Channel			
Frequency range	0.001 Hz to 2 MHz		
Timebase	10 MHz In/Out (phase should be able to lock the internal frequency to other similar Lock-in-amp.)		
Input impedance	1 MΩ or 50 Ω		
Phase setting resolution	$(360/2^{32})$ degrees		
Phase noise			
Int. reference	<0.0001° rms at 1 kHz (100 ms, 12 dB/oct)		
Ext. reference (typ)	<0.001° rms at 1 kHz (100 ms, 12 dB/oct)		
Phase drift (typ)	Sine Out to signal In (200 mVrms)		

	<0.002°/°C below 20 kHz (DC coupled)		
	<0.02°/°C below 200 kHz		
	<0.2°/°C below 2 MHz		
Harmonic detection	Detect at N × f_{ref} where N<99 and (N × f_{ref}) < 2 MHz		
Dual F reference	Detect at $f_{dual} = \left\| f_{int} - f_{ext} \right\|$		
	All frequencies must be less than 2 MHz		
Chopper reference	Via Aux Out to lock the chopper to f_{int}		
Demodulator			
DC stability	Digital output values should have no offset drift		
Time constants	1 µs to 30 ks		
Low pass filters	Typical RC-type filters or advanced Gaussian/Phase-Linear filters		
Filter slope	6, 12, 18 or 24 dB/oct rolloff		
Synchronous filter	Available below 4 kHz		
Harmonic rejection	-80 dB		
Low latency output	Rear-panel BlazeX output with <2 µs delay (plus LPF rise/fall times).		
Internal Oscillator			
Frequency	1 mHz to 2 MHz		
Frequency accuracy	25 ppm + 30 µHz (with internal timebase)		
External timebase	10 MHz timebase input/output on rear panel		
Frequency resolution	6 digits or 0.1 mHz (whichever is greater)		
Sine Output			
Outputs	Differential or single-ended		
Output impedance	50 Ω source		
Amplitude	1 nVrms to 2 Vrms (specified amplitude is differential into 50 Ω loads)		
	Output amplitude is halved when used single-ended		
	Output amplitude is doubled into a high impedance load		
Amplitude resolution	3 digits or 1 nV, whichever is greater		
DC offset	±5 V, differential or common mode		
Offset resolution	3 digits or 0.1 mV, whichever is greater		
Output limit	±6 V, sum of DC offset and peak amplitude		
Sync	Logic level sync on rear panel (via BlazeX output)		
Data			
Data channels	4 data channels should be displayed and graphed		
Data sources	Each data channel should be assigned any of these data sources:		
	X, Y, R, Θ, Aux In 1 to 4, Aux Out 1 to 2, X noise, Y noise, Sine Out Amplitude,		

	Sine Out DC Level, Reference Phase, or Reference Frequency		
Data history	All data sources should be continually stored at all chart display time scales.		
	The complete stored history of any data source can be displayed at any time.		
Offset	X, Y and R may be offset up to ±999 % of the output scale		
Expand	X, Y and R may be expanded by ×10 or ×100		
Ratio	X and Y may be ratioed by Aux In 3. R may be ratioed by Aux In 4		
Capture buffer	1 Mpoints internal data storage. Store (X), (X and Y), (R and Θ) or (X, Y, R and Θ)		
	at sample rates up to 1.25 MHz. This is in addition to the data histories for the chart display.		
Data streaming	Realtime streaming of data, either (X), (X and Y), (R and Θ), or (X, Y, R and Θ) at sample rate to 1.25 MHz over Ethernet interface		
Scanning	One of the following parameters may be scanned:		
	f_{int}, Sine Out Amplitude, Sine Out DC Level, Aux Out 1 or 2.		
FFT			
Source	Input ADC, demodulator output, or filter output		
Record length	1024 bins		
Averaging	Exponential rms		
Inputs and Outputs			
CH1 output	Proportional to X or R, ±10 V full scale thru 50 Ω		
CH2 output	Proportional to Y or Θ, ±10 V full scale thru 50 Ω		
X and Y outputs	Proportional to X and Y, ±10 V full scale thru 50 Ω		
BlazeX	Low latency output of X, ±2.0 V full scale or logic level reference sync output, either thru 50 Ω		
Aux outputs	4 BNC D/A outputs, ±10.5 V thru 50 Ω, 1 mV resolution		
Aux inputs	4 BNC A/D inputs, ±10.5 V, 1 mV resolution, 1 MΩ input		
Trigger input	TTL input triggers storage into the internal capture buffer		
Monitor output	Analog output of the signal amplifier		
HDMI	Video output to external monitor or TV, 640 × 480, 60 Hz		
Timebase I/O	1 Vrms, 10 MHz clock to synchronize internal reference frequency to other units		
General			

Interfaces	IEEE488.2, RS-232, USB device and Ethernet.		
USB flash	Front-panel slot for USB flash storage of screen shots and data		
Preamp power	9-pin D connector to power preamps		
Power	60 W, 240 VAC, 50 Hz		
Warranty	Minimum 1 year		
2. FET Preamplifier			
The Preamplifier is intended to work with above lock-in amplifier.			
Specification			
Input impedance	100 MΩ + 25 pF		
Inputs	Single-ended or differential		
Maximum input	250 mVrms for overload 100 VDC, 10 VAC damage threshold		
Noise (typ.)	3.6 nV/√Hz at 1 kHz		
	4.0 nV/√Hz at 100 Hz		
	13 nV/√Hz at 10 Hz		
Coupling	AC (0.016 Hz)		
CMRR	90 dB at 100 Hz, 1 V input		
Gain	1, 2, 5, 10 (automatically set lock-in amplifier)		
Full scale input	10 nV to 200 mV		
Gain accuracy	2 % (2 Hz to 100 kHz)		
Gain stability	100 ppm/°C		
Outputs	A (signal, 600 Ω, single-ended)		
	B (shielded ground)		
Maximum output	7 Vpp		
Warranty	Minimum One year		

Terms and Conditions:

1. Please do mention tender number clearly on envelop.
2. Supplier/Vendors should submit technical and financial bid together in separately sealed envelopes.
3. Evaluation will be done on the basis of technical specifications format provided as per our tender notice
4. Supplier who have experienced in lock-in amplifier (with rack mount) and lock-in voltage preamplifier and supplied in the national and international institutions will be preferred.
5. Financial bid will be open only for those, who meet tender technical specification.
6. The format for specification and complies statement is same as provided tender sheet for supplier/vendors for submitting technical specification in their own letter heads.
7. Please send the name and contact details of the person to whom company had supplied a similar systems. Committee may ask for the feedback.
8. Vendors should have to submit the detail's designed as per tender specification.
9. The supplier must have supplied systems to institutions of national and/or international repute.
10. Quotation must indicate FCA/FOB or FOR IIT Kanpur prices.
11. Payment terms & condition is 70% against delivery, 20% after installation and 10% after successful running of equipment for 3 months & approval.

12. Warranty/Guarantee should be clearly mentioned. The Warranty must start from the date of installation at IITK.
13. Installation, demonstration, and training-sessions at IIT Kanpur will have to be provided by the manufacturer or the vendor for the quoted system.
14. Quotation should carry proper certifications like proprietary certificate, authorization certificate from manufacturer, etc.
15. Validity of quotation should be at least for 60 days.
16. Maximum educational discounts should be applied.
17. Institute is exempted for partial custom duty (CD applicable to IIT Kanpur is 5.15%).
18. Institute is exempted from payment of Excise Duty under notification No. 10/97.
19. The delivery period should be specifically stated. Earlier delivery may be preferred.
20. 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 envelope latest by 02/11/2015 to the following address:

To,
Dr. Baquer Mazhari,
Room No.305,
Samtel Centre for Display Technologies (SCDT),
Indian Institute of Technology Kanpur,
Kanpur – 208016, Uttar Pradesh, India