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Supply of PXI express based Data Acquisition System

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TECHNICAL SPECIFICATION for the supply of PXI express BASED DATA ACQUISITION SYSTEM

1. Scope

The tender is invited for the supply of PXIe (Peripheral Component Interconnect (PCI) eXtensions for Instrumentation Express) based Data Acquisition (DAQ) System as per the following technical specification. The scope of supply consists of two sets of Instrument chassis, embedded controller and data acquisition cards with essential accessories and driver software support.

2. Technical Specifications

2.1	Instrument Chassis	Quantity: 02 Nos.
1	AC power supply	230V +/- 10%, 50Hz
2	Bus type	PXI Express
3	Number of Slots	8 slots or more with minimum 2 hybrid slot
4	Slot types	Must be able to accommodate minimum two 3U PXI hybrid modules, PXI Express modules as specs below and PXI express controller as specs below for this system configuration
5	Minimum Per Slot Bandwidth	2GB/s dedicated bandwidth or higher
6	Dimensions	3U 19 inch rack mountable
7	Form Factor	Standard PXIe 3U
8	Cooling	Forced air cooling with inbuilt fan(s)
9	Operating temperature	5 °C to 50 °C or better specification
10	Standards and Compliance	The product should meet the international safety standard related to electrical equipment and EMI/EMC.
11	System Reference Clock out	10 MHz reference clock out
12	External Clock Source In	10 MHz external clock In
13	Mandatory Accessories:	Rack Mount kit and Power cord

2.2	Embedded Controller	Quantity: 02 Nos.
1	Bus type	Fully compatible with PXI Express specification
2	Processor	2.4 GHz quad core processor or better
3	Operating system and Drivers	Supply of Windows 10 Professional or higher. Controller should also be capable of real time operating system deployment. Vendor shall specify the RTOS support and the programming method for RTOS.
4	Hard Drive storage	500 GB or larger Solid State Drive
5	RAM (DDR-4 or better)	8GB or larger
6	System Data transfer throughput/ bandwidth with controller	Controller interface with PXI express system throughput rate of 8 GB/s or better
7	Ethernet interface	Two 10/100/1000 Base-T Port, RJ-45 connector
8	Display port	1 Number
9	GPIB (IEEE 488 controller)	1 Number
10	Hi-Speed USB (3.0) Port	2 Numbers or more

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11	PXI Trigger Bus Input /Output	Required – with SMB interface or equivalent
12	Accessories:	For controller: 20” LCD Monitor or higher, USB keyboard, Optical Mouse.
13	Dimension	3U PXI express module to fit in PXIe chassis
14	Operating Ambient temperature range	5 °C to 50 °C or better specification
15	Relative Humidity range	10 % to 90 %, non-condensing

2.3	Simultaneous sampling Digitizer Module type 1	
1	Total number of Analog In (AI) channels	48
2	Number of AI channels per card	4 or 8 numbers of differential channels
3	Bus Type	PXI Express
4	ADC Resolution	16 bits
5	Sampling rate	Simultaneous sampling at rate of 1.25 MS/sec/channel or higher
6	Input Impedance	$\geq 10 \text{ G}\Omega$ in parallel with input capacitance $\leq 100 \text{ pF}$
7	Input coupling	DC
8	Input Voltage range	$\pm 10\text{V}, \pm 5\text{V}$ selectable
9	Over voltage Protection	$\pm 20 \text{ V}$ or higher
10	Input buffer	8k Samples or more
11	Data transfers	DMA, Programmed IO
12	External clock and External trigger	Provision for external clock and external trigger for synchronous operation
13	Analog Out channel	2 Numbers with 16 bit resolution
14	Digital In/Out channel	16 channel Individually programmable as In or Out
15	Driver should be compatible with the Operating system	Windows 10 or higher
16	Mandatory Accessories:	(1) Shielded connection box for connection of acquisition signals to DAQ Modules (2) Shielded cables for connection of modules to Connection box.

2.4	Simultaneous sampling Digitizer Module type 2	
1	Total number of Analog In (AI) channels	16
2	Number of AI channels per card	4 or 8 numbers of differential channels
3	Bus Type	PXI Express
4	ADC Resolution	16 bits
5	Sampling rate	Simultaneous sampling at rate of 10 MS/sec/channel or higher
6	Input Impedance	$\geq 10 \text{ G}\Omega$ in parallel with input capacitance $\leq 100 \text{ pF}$
7	Input coupling	DC
8	Input Voltage range	$\pm 10\text{V}, \pm 5\text{V}$ selectable
9	Over voltage Protection	$\pm 20 \text{ V}$ or higher
10	Input buffer	8k Samples or more
11	Data transfers	DMA, Programmed IO
12	External clock and External trigger	Provision for external clock and external trigger for synchronous operation

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13	Driver should be compatible with the Operating system	Windows 10 or higher
14	Mandatory Accessories:	(1) Shielded connection box for connection of acquisition signals to DAQ Modules (2) Shielded cables for connection of modules to Connection box.

3. Software Compatibility for above all DAQ hardware

- Embedded Controller shall be equipped with preinstalled operating system Windows 10 Professional 64 bit (English).
- DAQ System should provide programming language compatibility for LabVIEW based software development. The drivers of all the digitizers and controller should be compatible with LabVIEW 2015 or above with provided Windows 10 operating system.

4. Instruction for vendor

- Vendor will be responsible for the supply of the above listed hardware and software with essential accessories and drivers. Vendor should ensure the compatibility of offered Digitizer modules with chassis, controller and application software LabVIEW. Vendor should offer the Instrument chassis such that it offers minimum 2 empty slot in each chassis after arranging the proposed digitizer modules and controller.
- A single vendor for all items above is mandatory. All quoted hardware should be of single manufacturer to assure functional compatibility.
- Vendor has to carry out the installation, configuration and demonstrate data acquisition operation of the system at Institute for Plasma Research (IPR), Gandhinagar.
- Quoted items shall be newly manufactured items. Used or refurbished items are not acceptable.
- Complete documentation is to be supplied including user manuals, datasheets of all supplied system in either hard or soft copies.
- Vendor shall specify if any deviation is there in the quoted item clearly in technical compliance.
- Vendor shall assure post sales technical Support.

5. Acceptance Criteria

- After delivery, Vendor has to carry out the installation, configuration and demonstrate data acquisition operation of the system at IPR, Gandhinagar site within one month from the date of intimation from IPR.
- The functionality of all the deliverable hardware and software should be demonstrated by the vendor for their healthiness/integrated operation at IPR, Gandhinagar.
- Vendor has to demonstrate simultaneous sampling of at least 50% of the specified maximum channel of all modules at specified maximum sampling rate for continuous and lossless acquisition of data in raw format for 10s, and showing the data generation rate of 350 MB/sec or higher for the acquired data.
- Vendor has to demonstrate the differential input configuration, Input ranges selection, programmable sampling rate and other listed features. Vendor has to develop necessary

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software program for such demonstration and submit the source code to IPR at completion of acceptance test.

- Final acceptance will be given after satisfactory installation of hardware and software and their demonstration.

6. Warranty

- The vendor has to provide minimum one year warranty for all the supplied items from the date of acceptance at IPR against all sorts of manufacturing defects, faulty material and poor workmanship.
- Vendor has to provide the certificate of conformance to the tender specification for all the supplied items.

7. Delivery Schedule

- The vendor has to deliver all items at IPR as per purchase order within 3 months from date of purchase order.
- As mentioned in acceptance criteria, Vendor has to complete the functional acceptance testing at IPR, Gandhinagar site within one month from the date of intimation from IPR.

IMP NOTE: Vendor should provide Bill of Material/List of items included in one set and submit it along with the technical bid.