



Ref No. ELE/ANIL/INO/2016

Date: 29-01-2016

Dear Sirs,

1. Quotation are invited in duplicate for the items as a group specified below/overleaf/enclosed.
2. The quotations duly sealed and superscribed on the envelope with the Reference No. and due date, should be addressed to the undersigned so as to reach him/her on or before the due date.
3. The quotations should be valid for sixty days from the due date and the period of delivery required should also be clearly indicated.
4. If the item is under DGS &D RATE CONTRACT, RC No. and the price must be mentioned. It may be also please be indicated whether the supply can be made direct to us at the Rate Contract price. If so, please send copy of the RC (Please note that we are not Direct Demanding Officers)
5. Relevant literature pertaining to the items quoted with full specifications (and drawing, if any) should be sent along with the Quotations, wherever applicable. Samples if called for, should be submitted free of charges, and collected back at the supplier's expenses.
6. Local Firms: Quotations should be for free delivery to this Institute. If Quotations are for Ex-godown. Delivery charges should be indicated separately.
7. Firms outside Chennai: Quotations should be for F.O.R. Chennai. If F.O.R. consignor station, freight charges by passenger train/lorry transport must be indicated. If Ex-godown, packing, forwarding and freight charges must be indicated.
8. The rate of Sales/General Taxes and the percentage of such other taxes legally leviable and intended to be claimed should be distinctly shown along with the price quoted. Where this is not done, no claim for Sales/General taxes will be admitted at any stage and on any ground whatsoever. The taxes leviable should take into consideration that we are entitled to have concessional Sales Tax applicable to non-Government Educational Institutions run with no profit motive for which a concession. Sales tax Certificate will be issued at the time of final settlement of the bill.
9. Goods should be supplied carriage paid and insured.
10. Goods shall not be supplied without an official supply order.
11. Payment: Every attempt will be made to make payment within 30 days from the date of receipt of bill/acceptance of goods, whichever is later.

Specifications Enclosed

Yours Sincerely,

Anil Prabhakar (Project co-ordinator)

Design and production of RPCDAQ module for the INO project

(Note to the Vendors)

India-based Neutrino Observatory (INO) a multi-institutional mega basic science project

The experiment is to determine neutrino using about 30,000 large area particle detectors called Resistive Plate Chambers (RPCs). The data produced by the RPCs is recorded through about 4 million high speed electronics channels. The experiment will be built in a large cavern located inside a mountain near Madurai.

RPCDAQ module is heart of the data acquisition scheme of the ICAL experiment and is present on each RPC. The module receives 128 differential signals from the front-end and produces signals required by the back-end electronics as well implements data transfer interface. The module needs to be implemented on a right-angled triangular shaped board whose sides are of about 125mm in length. Height of the module with components mounted will be about 25mm. The module is expected to be designed using a mother and piggy board, along with a vertically mounted board for receiving the input signals, other technical specifications of the board are provided in the file RPC_DAQ.docx

Complete design schematics along with detailed information about the restrictions on modules dimensions, technical and dimensional details of the chips and connectors, suggestions on components placement and orientation will be provided. Quotations for module design, production modules, assembly and testing of the modules are being invited.

Technical requirements:

Technical requirements for modifying the existing INO-RPC-DAQ board are as following:

Customer is looking for building few prototypes boards capable of establishing communication link using 10 Gbps Passive Optical Network for the India-based Neutrino Observatory, using Kintex XC7K160T with FBG676 package and an optical interface (SFP+ Transceiver Module) mounted on GTX transceiver block of the FPGA.

Customer has schematics with an Altera+Wiznet+RJ45, which needs to be modified before layout. The technical requirement has been divided into three parts, which are described below.

Mechanical Requirements:

a) Mechanical dimensions. Vendor will be provided with the mechanical design of the board, which must be followed.

b) Thermal management (no active cooling) at board level.

Hardware Requirements:

a) Replace Altera FPGA with the Kintex 7 FPGA.

b) Change from linear regulators to switching regulators.

c) Signal integrity (we will have LVDS signals coming in and going out), and a TDC chip.

d) Replace Wiznet+RJ45 (Ethernet MAC &Phy) with optical module (Small form-factor pluggable transceiver).

Software Requirements:

a) Customer needs an IP for implementing 10 Gbps Passive Optical Network over FPGA with real time data.

b) Tcl or Rtl coding of that IP needs to be provided.

c) IP needs to be flexible enough to be integrated with any other IPs for same device.

Technical documents to be provided to the vendors:

1. Technical document on previous versions RPCDAQ module.
2. RPC_DAQ.docx
3. RPCDAQ Bill of Materials (BOM)
4. RPCDAQ schematics (PDF files)

Post production tests that are envisaged are the following:

1. Signal integrity test (PCB design time)
2. Basic connectivity tests (Post assembly)
3. Testing of interface between FPGA and other devices on board.

Please note the following important points while quoting:

1. The modules will be produced in stages - five during pilot production, about 20 during pre-production, about 400 during engineering prototyping and about 30,000 during final production spanning a period of about 5 years. Therefore the purchase order might span about five years.
2. Item-wise quotation is requested for one-time development (NRE) cost as well as production (assembly and testing) costs for quantities mentioned in (1).
3. Appropriate time-line and delivery schedules should also be mentioned.
4. Separate purchase orders will be placed at each stage mentioned in (1). Whether or not the purchase order will be placed on the same vendor for a future stage depends on satisfactory work done by the vendor for the current stage.
5. For the purpose of quoting, the vendor need not consider the cost of the following two components (a) HPTDC (Reference U10), (b) Bosch SMD085 (Reference S2).
6. Two options for the supply of components are envisaged, (a) IIT Madras/TIFR will provide the entire inventory of components and (b) The components will be imported by the vendor using the import documents provided by IIT Madras/TIFR.
7. Item-wise quotes for both the options given in (6) should be provided.
8. Since the nature of the job involved is somewhat special, it is suggested that the vendors get all the technical and procedural questions cleared during pre-bid meeting before quoting. Pre bid meeting is supposed be held latest by 12th February 2016.
9. Due date for submitting the tender is 26th February 2016.

10. Vendors must mention their list of clients to whom they have executed similar jobs in the recent past.
11. All the work (board design, files, films, PCBs, modules etc.) done as part of this work order will be sole property of IIT Madras.
12. If part number of a passive component is not mentioned in the BoM list, the vendor is free to choose an equivalent one
13. Design of the schematics, PCB modules, manufacturing and assembly of boards and testing are the vendor's responsibility.
14. The stages of the work: Design PCBs, get our approval, manufacture and assemble one board, get our approval and then go for final production (of 5 modules)
15. There is no restriction on number of layers of PCBs. PCBs will be enamel coated. No environmental tests are required on the PCBs or assembled modules.
16. Initial testing will be done by the vendors at their factory. Final testing will need to be performed at IIT Madras/TIFR on actual detector with users help.