

**Government of India  
Bhabha Atomic Research Centre  
Ion Accelerator Development Division**

**Ref: BARC/IADD/DNM/2021/21036**

Date: 22/11/2021

**Subject:** Inviting quotations for ‘Design, fabrication, testing and supply of timer card electronics.’ as per the technical specification attached.

Dear Sir/Madam,

On behalf of the President of India, quotations are invited for “Design, fabrication, testing and supply of timer card electronics” for LEHIPA facility at IADD, BARC Terms & conditions are given below.

S. No.	Description of the Job	Quantity
1.	Design, fabrication, testing and supply of timer card electronics	4 Sets

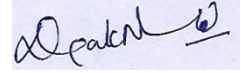
**Tender Type: Two-Part tender**

**Terms & Conditions:**

1. The supplier should submit separate **technical quote (sealed)** and **financial quote (sealed)** in one **main sealed envelope** for the above described job. Single part quote will be rejected. Taxes shall be quoted separately.
2. The quotation must reach The Head, Ion Accelerator Development Division by **03/12/2021 (5:00 pm)** and must be sent in a sealed envelope super scribed with the reference number and the due date given above **through India Post (Ordinary/Speed) only**.
3. The address on the envelope should read:

Head,  
Ion Accelerator Development Division,  
Van De Graaff Building,  
BARC, Trombay,  
Mumbai – 400 085.  
**(Kind Attn: Shri. Deepak N Mathad, SO/D)**
4. The bidder shall complete the job at the earliest after the work order is issued to the bidder. The finished components shall be delivered by the bidder at Ion Accelerator Development Division, BARC, Trombay, Mumbai – 400 085.
5. Head, Ion Accelerator Development Division reserves the right to accept/reject any or all quotations without assigning any reason.
6. Delivery charges, if any must be clearly mentioned in the offer. Quotation must also indicate the **validity of the offer, GSTN and PAN** of the party without which the quotation shall be considered invalid.
7. Drawings/sketches must be returned along with the offer.
8. The quotation has to be signed by the authorized person with the company seal.

9. Payment will be made after satisfactory completion of work on production of bill, delivery challan and advance stamped receipt. It may be noted that IT @ 2% shall be deducted from your bills.
10. In case of any technical clarifications, the suppliers may kindly contact **Deepak N Mathad**, SO/D, IADD on telephone no. **022-2559 6893** or via e-mail to **deepaknm@barc.gov.in**.



Encl: Technical specification.

Deepak N. Mathad  
SO/D, IADD

**Technical Specifications for tender Ref. No. BARC/IADD/DNM/21036, due on**  
**03/12/2021**

**1. Requirement of the job:**

Layout design and fabrication of PCB, component purchase and mounting, testing and supply of timer card electronics. The supplier shall prepare detailed designs from the textual and/or block diagrams provided by the indenting officer and then fabricate the PCBs. The module shall be supplied to the indenting officer after assembling and testing is completed at the supplier's site.

**2. Description of the timer card electronics:** Please refer to Annexure-I.

**Quantity:** 4 sets.

- **NOTE:** One set of timer card electronics shall be fabricated end-to-end (along with enclosure) and sent to BARC for testing purposes. The performance of the test module will be evaluated and the changes, if any, will be communicated at this stage before fabrication of the subsequent sets. No major component change will be there.
- Most of the ICs and other components used shall be surface mount type.
- The PCBs shall be housed inside a 2U height, 19" rack mountable chassis fabricated with good quality material providing EMI/EMC shielding. The chassis should have cutouts and engravings for signal input/output, power supply, switches, etc. Please refer to Annexure-I for more details.

**3. Job execution procedure and scope of work**

Following procedure will be adopted after the work order is placed.

**3.1) Up on receiving the work order, the indenter will provide the following to the supplier for initiation of the job.**

- i. Detailed specifications of the boards to be developed.
- ii. Part Nos. of major components/ICs to be used will be provided.
- iii. The indenter shall provide the basic schematic.
- iv. If required, the indenter will provide design guidelines such as placement, guard traces, etc for certain critical areas on the board.

**3.2) Fabrication of test modules**

One set of timer card electronics shall be fabricated end-to-end (along with enclosures) and sent to BARC for testing purposes. The performance of the test module will be evaluated and the changes, if any, will be communicated at this stage before fabrication of the subsequent sets. No major component change will be there.

**3.3) Fabrication of multilayer PCB**

The firm shall be responsible for the fabrication of multilayer PCB, after freezing the schematic/circuit diagram, with the following requirements.

- i. Layers: **4** (minimum)
- ii. Laser photo plotting technique to be used.
- iii. Micro drilling
- iv. PCB fabrication with Solder Mask over Bare Copper (SMOBC) / Hot Air Solder Leveling (HASL) technology.

- v. The PCB is very dense consisting of SMD resistors and capacitors, SMD ICs, connectors and other components.
- vi. The PCB should pass all the qualifications and quality control tests including the Bare Board with flying Probe Technique.

### **3.4) Component Procurement**

The supplier shall purchase all the components required in the circuit only from reputed sources. No free issue material shall be provided by the indenter. Components of commercial grade are acceptable. The supplier shall get the final bill of materials approved by the indenter before purchase.

### **3.5) Assembly of components on the fabricated PCB**

The components shall be assembled and soldered on the PCB as per the conditions explained below. The assembly of the PCB shall be with the following setup:

- i. Fully automated SMT setup with pick and place for all standard SMD components.
- ii. Reflow with forced air convection system.
- iii. Minimum three zones of heating profile with independent reflow zones.
- iv. High-resolution microscope visual inspection system.
- v. ESD safe environment.
- vi. ESD safe soldering station for through-hole components and for wiring.

The workmanship should be as per the IPC-A-610D electronic assembly standard.

### **3.6) Fabrication of chassis**

The PCBs shall be housed inside a 2U height, 19” rack mountable chassis fabricated with good quality material providing EMI/EMC shielding. The chassis should have cutouts and engravings for signal input/output, power supply, switches, etc.

## **4. Requirements for testing**

The supplier shall be responsible for functional testing of the individual components before placement on PCB. Continuity testing should be carried out for all traces. Once the components are assembled, the complete module will be tested by the indenter for its functionality at BARC.

## **5. Acceptance criteria**

All the timer output channels (electrical and optical) must have identical behavior for the same set of input conditions.

## **6. Warranty**

All the items fabricated shall have onsite warranty of for a period of **one year** from the date of final acceptance against all manufacturing defects.

## **7. Confidentiality Clause**

No party shall disclose any information to any “Third Party” concerning the matters under this contract generally. In particular, **any information identified as “Proprietary” in nature by the disclosing party shall be kept strictly confidential by the receiving party and shall not be disclosed to any third party without the prior written consent of authorized person from Government.** The term “Third Party” shall include any other group(s) from BARC or DAE. This forbids the fabrication, supply, lease, samples supply, mortgage, free issue or any other form to any party for which the development has not been done.

This clause shall apply to the sub-contractors, consultants, advisers or employees engaged by a party with equal force.

“Restricted Information” categories under Section 18 of the Atomic Energy Act 1962 and “Official Secrets” under Section 5 of the Official Secrets Acts, 1923:

*Any contravention of the above-mentioned provision by any contractor, sub-contractor, consultant, adviser or the employees of a contractor will invite penal consequences under the aforesaid legislation.*

## **8. Supplier Qualification**

Suppliers will be qualified based on technical evaluation. The boards are multi-layered and consist of high speed and high density components in miniature footprints. Some boards are very sensitive to pickup and require proper shielding. Development and testing these boards require sophisticated PCB layout tools, fabrication equipment, component assembly line and test equipments. Testing of these boards also demands a well equipped test lab with high end precision test and measurement instruments at the vendor’s site. It requires qualified engineers to carry out the testing as per the procedure provided by the Indenter.

Evaluation of the supplier’s capabilities will be done based on the information provided by the supplier under the following sub-heads. Purchaser’s experts may visit the suppliers’ facilities for evaluation and for detailed technical discussions.

### **9.1) Design capability and past experience**

Translation of textual design and/or block diagrams into actual circuit diagrams is the most crucial part of the job. The supplier must have qualified design engineers who can do this. The engineers should have carried out design of analog and digital boards with similar complexity in the past. If required the purchaser along with experts will visit the supplier and evaluate the capability of the engineers employed by the supplier. Supplier must give details of jobs (specifically design of circuit from textual/block diagram) undertaken of similar complexity in the past three years for any organization.

### **9.2) Human resource**

The supplier must give the complete detail of human resources employed including Hardware Design Engineers, Software Engineers and Technicians, etc.

### **9.3) Infrastructure**

The supplier must give the details of the infrastructure suitable for this job such as Schematic Capture, PCB layout tools, equipments such as function generator, oscilloscopes. In case the firm does not have these tools and equipments but intend to bring them on rent during the execution of the job then it should be clearly mentioned in the technical quotation.

### **9.4) Sub-contract**

Supplier should list the jobs, which they want to sub-contract. They should also produce the list of sub-contractors.

*Note:*

- 1. During the execution of the work order, the firm should take approval from the indenter on completion of each of the above phase as described under point 3.*
- 2. The quotations should comprehensively indicate the cost of complete development.*

**General conditions:**

1. All intellectual property rights belong to purchaser for work done under this technical specification / work order.
2. Supplier shall maintain the authenticity of drawings or any related drawings/documents provided by the purchaser.
3. All activities would normally be carried with due professional care. However, purchaser shall not be responsible for any loss or personnel accident during execution of the work pertaining to the technical specifications under this work order.
4. Supplier shall collaborate and coordinate all the work sub-contracted to any vendor.
5. The supplier shall return all the documents provided by the purchaser after the completion of the job and delete all these files from its database.
6. No end use statement will be given for the supplied items and spares.
7. **Post supply inspection in respect of supplies made is not permitted. Any offer containing the condition of post supply inspection will be out-rightly rejected. It is therefore mandatory for the bidders, while quoting, to indicate in clear terms the requirement of post supply inspection by any outside agency.**

## Annexure – 1

### Details of major parts and enclosure

NOTE: Any equivalent of the part no. specified may be used.

ICs		
Sl. No.	Part no.	Quantity (nos.)
1	VO2630-X007T	60
2	SN74HCT04D	25
3	SN74HCT08D	10
4	CD74HCT126M	20
5	ISOW7840DWE	35
6	HFBR-1521ETZ	42
7	SN75451BD	50

Capacitors				
Sl. No.	Value	Tolerance	Type	Quantity (nos.)
1	0.1 uF, 50 Vdc	10%	MLCC, SMD	100
2	10 uF, 50 Vdc	10%	MLCC, SMD	50
3	4.7 uF, 50 Vdc	10%	MLCC, SMD	50

Resistors				
Sl. No.	Value (Ohms) & rating	Tolerance	Type	Quantity (nos.)
1	1k, 0.25 W	1%	Thin film, through hole	100
2	500, 0.25 W	1%	Thin film, through hole	100
3	1.5k, 0.25 W	1%	Thin film, through hole	100
4	51, >=0.1W	1%	Thin film, SMD	50

LED		
Sl. No.	Part no.	Quantity (nos.)
1	TLLK4401	100

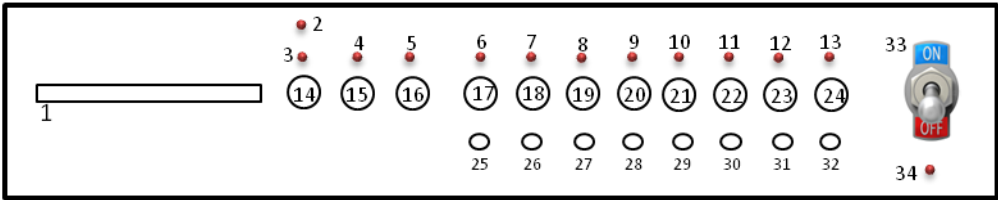
Connectors			
Sl. No.	Part no.	Description	Quantity (nos.)
1	1761028-5	100-pin SCSI connector, PCB mount, right angle	4
2	--	Screw terminal blocks, PCB mount	As per schematic
3	031-5431-10RFX	BNC connector, isolated, right angled.	50

**Other components:**

1. 19", 2U aluminum chassis for housing electronics (Qty: 1 per set)
2. LEDs and LED sockets – as per requirement
3. Line filter with rocker switch, power socket and fuse holder (Qty: 1 per set)
4. Toggle switch – panel mount (Qty: 1 per set)
5. Standard SMPS power supply. **Rating: 5V, ≥ 6A** (Qty: 1 per set)
6. Fans for cooling chassis. (Qty: 2 per set)
7. 100-pin SCSI-II cable, male-male, 2 m (Qty: 1 per set)
8. Jumper short circuit cap connectors – (Qty: 200 nos.)



**Enclosure details:** 19" rack mountable, 2U height aluminum chassis.



**Front panel**



**Back panel**

**Front panel description**

Label	Item
1	100-pin SCSI connector
2 through 13	LED indicators
14 through 24	BNC connectors
25 through 32	Access to optical transmitters
33	Toggle switch
34	LED for +5 V active indication