

दूरभाष :
TELEPHONE :
तार : बार्क-मुंबई, चेम्बूर.
TELEGRAMS : BARC-MUMBAI, CHEMBUR.
फेक्स संख्या : ९१-२२-२५५० ५१५१
FAX NUMBER : 91-22-2550 5151



दॉम्बे,
मुंबई-४०० ०८५.
TROMBAY,
MUMBAI-400 085.

भारत सरकार
GOVERNMENT OF INDIA
भाभा परमाणु अनुसंधान केन्द्र
BHABHA ATOMIC RESEARCH CENTRE

Ref: - BARC/ RTD/SV/MF/ OPA /2018/ 208287

Date 30/10/2018

Enquiry No. – BARC/ RTD/SV/MF/ ~~OPA~~/2018/ 11

Due date 15/11/2018

SUB: PCB design including schematic capture and circuit validation, fabrication, assembly, testing and supply. as per technical specification No.: RTD/S&CS/SV/PCB-A-B/10/18. Quantity: 3 Each for 2 types of PCBs.

Dear Sirs,

Sealed Quotations are invited on behalf of President of India by Head, RTD in sealed envelope for “PCB design including schematic capture and circuit validation, fabrication, assembly, testing and supply. as per technical specification No.: RTD/S&CS/SV/PCB-A-B/10/18 Quantity: 3 Each for 2 types of PCBs.”

- 1. Scope of Work: As per attached specification ((Technical Specification. No.: RTD/S&CS/SV/PCB-A-B/10/18).**
- 2. Work completion and Validity period:** Within 3 (Three) months after confirmation of order. Price should be firm throughout period of contract. The rates quoted shall remain valid for 60 days.
- 3. Price:**

Bidder should quote for the entire job in lump sum (including all taxes and duties) as per our technical specification No.: RTD/S&CS/SV/PCB-A-B/10/18, which involves Two types of PCB's have to be developed, Three numbers of fully assembled and tested PCB's (each type) has to be supplied to BARC, Trombay, Mumbai, Maharashtra. PCB's are named as PCB-A and PCB-B. The quotation should also clearly mention the basic cost and all applicable taxes separately.

- 4. Payment:**

- a) Payment will be made as per rules, after the completion of the work to purchaser's satisfaction against submission of original bill in triplicate and advance stamped receipt. Advance/Part payment cannot be made.
- b) 100% payment shall be made by cheque / ECS (Please furnish details) after completion of job subjected to the satisfaction of purchaser.
- c) **Deduction of Taxes: Income tax @2% and Educational cess as applicable will be deducted from the bill**
- d) A penalty @ 0.5% per week (max. 5%) shall be levied for delay in completion of work.
- e) Payment shall be made only on satisfactory completion of work and on production of bill & advance stamped receipt.

5. Delivery :

All the work shall be completed and delivered to BARC, Trombay, Mumbai, Maharashtra within 3 (Three) months after confirmation of Work Order..

6. Confidentiality clause :

- a) Confidentially:
Party shall not disclose any information to any third party concerning the matters under this contract generally. In particular, any information identified as "Property" in nature by disclosing party shall be kept strictly confidential by receiving party and shall not be disclosed to any third party without the prior consent of the original disclosing party.
This clause shall apply to sub-contractors, consultants, advisors or the employees engaged by the party with equal force.
- b) Restricted information:

Categories under section 18 of the Atomic Energy Act, 1962 and "Official Secrets" under section 5 of the official Secret Act, 1923 - Any contravention of the above-mentioned provisions by any contractor, sub- contractor, consultant, adviser or the employees of a contractor will invite penal consequences under the aforesaid legislation.
- c) Prohibition against use of BARC'S name without permission for publicity purpose:
The contractor or sub-contractor, consultant, adviser or the employees engaged by the contractor shall not use BARC'S name for any publicity purpose through any public media like press, Radio, T.V. or Internet without the prior written approval of BARC.

7. General:

- a) Work extension, if any required, the request letter for the extension shall be forwarded before expiry of contract period to the Engineer-in-charge indicating the current progress and reasons for extension.
- b) Supplier should have GST registration. He should clearly write GST No. and PAN No. in

his quotation, otherwise the quotation will not be considered. **The purchaser is eligible for concessional GST @ 5% for its R&D activities. This activity is coming under R&D. The supplier should consider this rate while quoting. Certificate for concessional GST will be issued by the purchaser.**

- c) Sealed envelope containing quotation must reach on or **before 15.00 hrs., /11/2018**
To: Head, RTD Engg. Hall No. 7, BARC, Trombay, Mumbai –400 085.
- d) The envelope **must be sent by “speed post” only** to reach within above mentioned period. Any other mode of delivery is not acceptable.
- e) Following information shall be clearly written on the envelope containing the quotation
Attention: Shri.Shiju Varghese, SO/F, RTD
Ref. no. BARC/ RTD/SV/MF/GR/2018/11 , Due date: ¹⁵/11/2018 till 15:00 hrs.
- f) The Bids will be opened on ~~16-11-~~¹⁶⁻¹¹⁻2018 at 14.00 hrs.
- g) The bidder shall furnish the detailed information regarding whether an ex-employee of BARC is working in their organisation or whether any of their relative is working in DAE/BARC or whether he/she is an ex-employee of DAE/BARC. In case of absence of such information, or wrong information the quotation or contract is likely to be rejected or cancelled.
- h) Proof of ability: A brief list of similar jobs executed, if any, and name of the organization to be furnished.
- i) For any clarification regarding the job bidder shall contact Shri Shiju Varghese **Ph.022-25590551.**


(S.Raghunathan) 30/10/18

Head, Refuelling Technology Division

Cc:

1. Storekeeper, REZ stores
2. RTD office
3. Shri Shiju Varghese, SO/F, RTD

Specification No: RTD/S&CS/SV/PCB-A-B/10/18

Technical specifications for PCB design including schematic capture and circuit validation, fabrication, assembly, testing and supply. Quantity: 3 Each for 2 types of PCBs.

Scope for Minor Fabrication:

Two types of PCB's have to be developed. Three numbers of fully assembled and tested PCB's (each type) has to be supplied. PCB's are named as PCB-A and PCB-B.

A. Detailed Scope for the fabrication work.

1. Fabrication of PCB-A.

- 1.1 BOM (Bill of Materials) for PCB-A is attached in this specification as annexure A.
- 1.2 Hard copy of the schematic will be provided by purchaser along with the purchase order to the successful bidder.
- 1.3 Supplier has to understand the functionality of the circuit and develop the Gerber files and PCB as per specifications provided in the section B of this document.
- 1.4 A 'procurement BOM' has to be prepared by the supplier after doing market survey. If any of the components are not available in the market, alternate components have to be selected in consultation and approval with the purchaser. Additional costs incurred for these changes must be considered in the quotation.
- 1.5 All the procured items should meet the acceptance criteria provided in the section 3 of this document.
- 1.6 Labels and mounting holes on the PCB's shall be carried out with purchaser's approval.
- 1.7 The PCB's should be manufactured, assembled and tested for intended functionality at supplier's premises and each PCB shall also be subjected to 100hrs of burn in test.
- 1.8 Test certificates should be made for each serial number of the PCB's.
- 1.9 Supply of fully functional tested PCB in required quantities to the Purchaser's stores.

2. Fabrication of PCB-B.

- 2.1 PCB-B is having similar functionality and BOM as of PCB-A with slightly different concept. The supplier shall modify the schematic of PCB-A and shall prepare BOM for it, in consultation with purchaser. The change in circuit is that instead two batteries and its charging circuits are in parallel, it would be in series.
- 2.2 Develop the Gerber files and PCB-B as per specifications provided in the section B of this document.
- 2.3 A procurement BOM has to be prepared by the supplier and procure the components after doing market survey. All components have to be selected consultation and approval with the purchaser (BARC).
- 2.4 All the procured components should meet the acceptance criteria provided in the section C of this document.
- 2.5 Labels and mounting holes on the PCB's shall be carried out with purchaser's approval.
- 2.6 The PCB's should be manufactured, assembled and tested for intended functionality at supplier's premises and each PCB shall also be subjected to 100hrs of burn in test.

- 2.7 Test certificates should be made for each serial number of the PCB's.
- 2.8 Supply of fully functional tested PCB in required quantities to the Purchaser's stores.

B. General Specifications of PCBs to be fabricated

- 3.1 Four layers Printed Circuit Boards (PCB)
- 3.2 Finish: ENIG Finish
- 3.3 The dimension is: 110 mm x 110 mm
- 3.4 BLUE SMOBC and White Color Legend
- 3.5 PCB thickness – 2.2mm FR4
- 3.6 DFM: 8/5 mil traces, 0.3mm drill
- 3.7 IP64 compatible
- 3.8 Copper Thickness: 35 microns
- 3.9 Components density on the PCB is approximately 80%
- 3.10 Via plugging with solder mask ink

C. Acceptance criteria for procurement of components & Final supply

- 4.1 Material must be procured in original manufacturers ESD safe packing.
- 4.2 Batch number and date code should be mentioned on packing.
- 4.3 "Certificate of conformance" from the original manufacture.
- 4.4 All the indented functionalities should be demonstrated after the burn-in test of each PCB before supply to BARC.

D. Notes to supplier

- 5.1 Supplier need not to supply any kind of software for the above. However, any hardware needed to fabricate and test above PCB's have to be arranged by the supplier.
- 5.2 Circuit diagram will be provided along with PO. The firm should submit non-disclosure agreement that the design and circuit diagram will not be utilized by the firm for any other purpose.
- 5.3 Finalization of PCB layout has to be done in consultation with BARC. Discussions regarding finalization of PCB layout and final drawing has to be carried out with purchaser.
- 5.4 PCB found Defective/Faulty at the time of testing has to be replaced by the supplier.
- 5.5 Delivery period should not be greater than 3months (12 weeks)
- 5.6 Supplier has to make the tested PCBs ready and call for the inspection at least 15 days before the due date for the delivery.
- 5.7 In-case any fabrication errors are detected during inspection, supplier has to rectify those within the delivery period.
- 5.8 Complete supply includes all schematic drawings in pdf format, final BOM with address of source and design files (Gerber) for fabrication in a CD.
- 5.9 The supplier shall quote lump sum cost for the complete work. Applicable taxes shall be mentioned separately.

Annexure A

(BOM for PCB-A for cost estimation purpose)

1	PRINTED CIRCUIT BOARD POWER PCB	PWR PCB	1	
2	TANTALUM ELECTROLYTIC CAPACITOR 47uF, 10%, 10V	C21	1	AVX TAJC476M010
3	TANTALUM CAPACITOR 220uF, 20%, 25V	C20	1	AVX TPSD227M025
4	CERAMIC MULTILAYER CAPACITOR 68nF, 10%, 16V	C1,C2	2	YAGEO CC0603KRX7R7BB683
5	CERAMIC MULTILAYER CAPACITOR 10uF, 10%, 50V	C3,C9,C17	3	YAGEO CC0603KRX7R9BB106
6	CERAMIC MULTILAYER CAPACITOR 10uF, 10%, 25V	C12, C16	2	YAGEO CC0603KRX7R8BB106
7	CERAMIC MULTILAYER CAPACITOR 4.7uF, 10%, 16V	C4	1	YAGEO CC0603KRX7R7BB475
8	CERAMIC MULTILAYER CAPACITOR 33nF, 10%, 10V	C6	1	YAGEO CC0603KRX7R6BB333
9	CERAMIC MULTILAYER CAPACITOR 4700pF, 10%, 16V	C7	1	YAGEO CC0603KRX7R7BB472
10	CERAMIC MULTILAYER CAPACITOR 30uF, 10%, 25V	C5,C8 C19	3	YAGEO CC0603KRX7R8BB306
11	CERAMIC MULTILAYER CAPACITOR 0.68uF, 10%, 16V	C10,C18	2	YAGEO CC0603KRX7R7BB684
12	CERAMIC MULTILAYER CAPACITOR 0.1uF, 10%, 25V	C11,C15 C23, C24	4	YAGEO CC0603KRX7R8BB104
13	CERAMIC MULTILAYER CAPACITOR 1uF, 10%, 25V	C13,C14	2	YAGEO CC0603KRX7R8BB105
14	CERAMIC MULTILAYER CAPACITOR 100pF, 10%, 25V	C22	1	YAGEO CC0603KRX7R8BB101
15	RESISTOR 680 , 1%, 1/4W * R9,R10, R15,R16,R26 THRU R30	*	9	VISHAY CRCW1206680RFKEA
16	RESISTOR	R24	1	VISHAY

	309K, 1%, 1/4W				CRCW1206309KFKEA
17	RESISTOR 100K, 1%, 1/4W	R25	1	VISHAY CRCW1206100KFKEA	
18	RESISTOR 60K	R1	1	VISHAY CRCW120660KFKEA	
19	RESISTOR 20K, 1%, 1/4W	R2	1	VISHAY CRCW120620KFKEA	
20	RESISTOR 27.4K, 1%, 1/4W	R3	1	VISHAY CRCW120627K4FKEA	
21	RESISTOR 2M, 1%, 1/4W	R4	1	VISHAY CRCW12062M0FKEA	
22	RESISTOR 499K, 1%, 1/4W	R5	1	VISHAY CRCW1206499KFKEA	
23	RESISTOR 10K, 1%, 1/4W	R6	1	VISHAY CRCW120610KFKEA	
24	RESISTOR 350K, 1%, 1/4W	R7,R8 ,R21,R22	4	VISHAY CRCW1206350KFKEA	
25	RESISTOR 0.91K, 1%, 1/4W	R11,R13,R14 R17,R19,R20	6	VISHAY CRCW1206910RFKEA	
26	High Power Current sense chip resistor 0.1 OHMS, 1%, 1W	R12,R18	2	BOURNS CRA2010FZR100ELF	
27	RESISTOR 47K, 1%, 1/4W	R23	1	VISHAY CRCW120647KFKEA	
28	10K OHMS NTC THERMISTORS	T1,T2	2	MURATA NCP18XH103J03RB	
29	10V, ZENER DIODE	Z1	1	ON SC MMSZ5240BT1G	
30	ZENER TRANSIENT VOLTAGE SUPPRESSOR	Z2	1	ON SC 1N6267A	
31	BIDIRECTIONAL TVS DIODE	D1,D2	2	LITTLE FUSE SMBJ40CA	
32	BIDIRECTIONAL TVS DIODE	D3,D4	2	LITTLE FUSE SMBJ10CA	
33	HIGH CURRENT SCHOTTKY RECTIFIER	D5,D6	2	CENTRAL SC CMPSH1-4	

34	3A,40V SCHOTTKY BARRIER SILICON RECTIFIER	D7,D8	2	CENTRAL SC CMSH3-40MA
35	1A, SCHOTTKY BARRIER RECTIFIER	D11	1	NXP PMEG2010AEH
36	2A, SCHOTTKY BARRIER RECTIFIER	D12	1	NXP PMEG6020ER
37	RECTIFIER	D9, D10	2	PHILIPS 1N4007
38	EMI SUPPRESSION FILTER	L1	1	MURATA BNX02201
39	INDUCTOR 6.8uH	L2,L3,L4		WE 74404052068
40	CHIP COILS 4.7uH, 20%	L5		COIL CRAFT XFL4020-472ME
41	LED RED	LED1,LED3	2	KINGBRIGHT KPT-1608HD
42	LED GREEN	LED2,LED4, LED5,LED6, LED7,LED8 LED9, LED10	8	KINGBRIGHT KPT-1608SGD
43	40V,1A SYNCHRONOUS BUCK-BOOST DC/DC CONVERTER WITH PROGRAMMABLE OUTPUT CURRENT	U1	1	LINEAR TECHNOLOGY LTC3114MPFE-1#PBF
44	LOW LOSS POWER PATH CONTROLLER	U2,U3,U6, U7	4	LINEAR TECHNOLOGY LTC4412MPS6#PBF
45	HIGH VOLTAGE 2 AMP MONOLITHIC LI-ION BATTERY CHARGER	U4,U5	2	LINEAR TECHNOLOGY LTC3650IMSE- 4.2#PBF
46	HIGH CURRENT , MICROPOWER 600KHz	U8	1	LINEAR TECHNOLOGY

	DC/DC CONVERTER			LT1308BIS8
47	ULTRA HIGH SPEED DUAL BUFFER	U9, U10		FAIRCHILD NC7WZ07P6X
48	REMOTE 8 BIT I/O EXPANDER FOR I2C BUS	U11		PHILIPS SC PCF8574T
49	P CHANNEL ENHANCEMENT MODE POWER MOSFET	Q1	1	FAIR CHILD FQPF22P10
50	DUAL P CHANNEL MOSFET	Q2A & Q2B, Q3A & Q3B	2	VISHAY Si4909DY-T1-GE3
51	N CHANNEL POWER MOSFET	Q4,Q5	2	IOR IRLZ44ZL
52	METAL OXIDE VARISTOR	V1,V2,V3	3	LITTLE FUSE V10H35PL5T5
53	METAL OXIDE VARISTOR	V4 THRU V9	6	WE 820572711
54	FUSE, 4A, 125V	• F1	1	LITTLE FUSE 39614000440
55	PCB MOUNT DPDT SWITCH	SW1	1	ELCTROSWITCH A223K12KCG-M8
56	MINIFIT JR DUAL ROW RECEPTACLE HOUSING	JP1	1	MOLEX 5557-10R-210
57	MINIFIT JR VERTICAL HEADER ASSEMBLY	JP1	1	MOLEX 44068-10BB
58	2 PIN MALE CONNECTOR	JP2	1	VH CONNECTORS B2P-VH
59	7x2 IDC FEMALE CONNECTOR	JP3	1	FCI 89947-714LF
60	2.5MM FEMALE IDC CONNECTOR WITH STRAIN RELIEF	JP3	2	WE

61	2 PIN JUMPER POST	J1,J2	2	FCI/OEN 8614-00-02-1-Y0-8
62	5V, DPDT RELAY	RL1, RL2	2	AXICOM V23105A5001A201
63	3.7V Li Ion Protected RECHARGABLE BATTERY, 3400mAH	B1,B2		ORBITRONIC/EQVT
64	DUAL THM POLARISED HOLDER	B1, B2	2	KEYSTONE 534-1049P

*****END*****