

Government of India  
Bhabha Atomic Research Centre  
Control Instrumentation Division

Ref : CnID/AMIS/SSS/203

Date : 13.6.2018

Minor fabrication \_ invitation to quote  
Last date of receiving Quotation : 04/07/2018

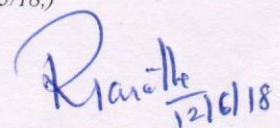
**Sub: Minor Fabrication** - Invitation of Quotation for fabrication, assembly & supply of "Acoustic emission (AE) preamplifier and DC DC Converter" as per attached specification confirming to technical specification number: ( CnID/AMIS/SSS/002 Dated 22/05/18 ) . Qty: Refer Annexure II (Clause 4.0 Deliverables)

Dear Sir/Madam,

1. Quotations are invited for fabrication, assembly & supply of "AE preamplifier and DC DC Converter" as per attached specification confirming to technical specification number: (CnID/AMIS/SSS/002 Dated 22/05/18) Qty: Refer Annexure II (Clause 4.0 Deliverables)
2. Bidder shall quote for deliverables as per technical specifications.
3. No Free Issue material is involved.
4. Quotation are invited on the letter head with official seal ( Rubber Stamp ).for the above mentioned job. The quotation should contain the details such as 1: Validity of offer 2: Terms & conditions of offer 3: PAN , GST , Registration details 4: Delivery time schedule 5: Price break up itemwise 6: Delivery charges if any The quotation has to be signed by authorized person with company seal..
5. Item intended to be fabricated / procured in this work is required for R & D purpose hence GST @ 5 % will be applicable and GST certificate will be provided by BARC for the same
6. **The quotation must reach The Head, Control Instrumentation Division by : 04/07/2018 and must be sent in a sealed envelope super scribed with the reference number & the due date given above. Courier are not allowed in BARC premises, the quotation shall be sent by speed post/registered post only.**
7. The address on the envelop should read: The Head,  
Control Instrumentation Division,  
BARC, Trombay, Mumbai - 400 085.  
(Kind Attn: S. S. Shetty, SO/G)
8. The bidder shall complete the job within 3 months from the date of firm work order issued to the bidder. The finished components shall be delivered by the bidder at Control Instrumentation Division, BARC, Trombay, Mumbai - 400 085.
9. Head, Control Instrumentation Division reserves the rights to accept / reject any or all quotations without assigning any reason.
10. Delivery charges if any must be clearly mentioned in the offer. Quotation must also indicate the validity of offer. Quotation must also indicate the VAT no and PAN no of the party.
11. Drawings / Sketches must be returned along with the offer.
12. Payment will be made by cheque only after satisfactory completion of work on production of bill, delivery challan and advance stamped receipt. It may be noted that IT @ 2% and surcharge on tax at 15% shall be deducted from your bills.

Encl.:

1. Annexure-I (General Specifications)
2. Annexure-II (Technical Specification No: - CnID/AMIS/SSS/002 Dated 22/05/18.)
3. Drawings

  
(P. P. Marathe)  
Head, CnID

## Annexure I

Technical Specification No: - *CnID/AMIS/SSS/002 Dated 22/05/18,*) No of pages : one

### General Specifications

#### **1.0 Quality surveillance, inspection and inspection report:**

- 1.1 All work covered by the specifications shall be subject to quality surveillance by the purchaser or his authorised representatives for which purpose the fabricator shall allow access at all reasonable times during manufacture to :
  - 1.1.1 The premises in which work is being carried out.
  - 1.1.2 The dwgs. and / or tooling involved.
  - 1.1.3 Gauges, instruments etc. required for inspecting the work.
- 1.2 Inspection and tests shall be carried out by the fabricator as per the requirements detailed in the drawings and these specifications.
- 1.3 The fabricator shall submit three copies of inspection reports to the purchaser for approval.
- 1.3 Components found unsatisfactory as to workmanship or material shall be removed by fabricator and replaced by components which are satisfactory.
- 1.4 The finished components shall not be despatched prior to approval by our engineer.

#### **2.0 Raw Material :**

- 2.1 The fabricator has to quote with material cost.

#### **3.0 Delivery:**

- 3.1 The bidder shall deliver the finished components after approval by our engineer within **8 weeks** from the date of firm purchase order is issued to bidder to CnID, BARC, Mumbai-400085. In case not meeting delivery schedule then request for delivery extension prior to delivery deadline be submitted for approval.4.1 The fabricator shall not sub-contract any or all the work without written consent from the purchaser  
The fabricator shall be responsible to the purchaser for all work of the sub contractor of the fabricator, if at all allowed by the purchaser.

#### **5.0 Taxes:**

- 5.1 GST @ 5 % work is required for R & D purpose hence GST @ 5 % will be applicable and GST certificate will be provided by BARC for the same

#### **6.0 Excise duty: NA :**

#### **7.0 Payment :**

- 7.1 Payment will be made only after satisfactory completion of work and on production of bill, advance stamped receipt & Guarantee/Warrantee Certificate.
- 7.2 It may be noted that Income tax at 2% will be deducted from your bill.

#### **8.0 Confidentiality:**

- 8.1 No party shall disclose any information to 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 the original disclosing party.
- 8.2 "RESTRICTED INFORMATION" categories under section 18 of the Atomic Energy Act, 1962 and "OFFICIAL SECRETS" under section 5 of the official Secrets Act,1923:-  
Any contravention of the above mentioned provisions by any contractor, sub-contractor, consultant, advisor or the employees of a contractor will invite penal consequences under the aforesaid legislation.
- 8.3 Prohibition against the use of BARC's name without permission for publicity purposes:-  
The contractor or sub-contractor, consultant, advisor or the employees engaged by the contractor shall not use BARC's name for Publicity purpose through any public media like press, radio, T.V. or internet without the prior written approval of BARC.  
(vide circular ref: 2/Misc-9/Lgl/2001/92 dated April 30, 2001)

S. S. Shetty  
Indentor

## Annexure II

### **TECHNICAL SPECIFICATION FOR Fabrication , assembly & functional testing of Pre amplifier with DC-DC coupling unit for AE sensors**

**TSP No.-CnID/AMIS/SSS/002 Dated 22/05/18) (Total no of pages 10 ( 8 tech spec with 2 nos schematic dwg )**

#### **1.0 SCOPE OF WORK**

The job involves following activities

1. PCB making as per schematic dwg and assembly of components as listed. It should have provision of holes on the four corner , so as to put it in a enclosure.
2. After PCB fabrication it has to be assembled with Industrial grade components with 1% tolerance resistance be used . use gold plated round DIP Pkg IC socket and SMD components as per the bill of material.
3. The approx size of the prototype amplifier PCB will be approx 70 mm \* 75 mm .\* 55 mm
4. The appropriate size of the DC – DC coupling unit will be approx 70 mm \* 75 mm .\* 55 mm
5. The amplifier should be enclosed in a appropriate sized powder coated Al material boxes with panel mounted BNC connector .
6. The DC-DC coupling unit should be enclosed in a appropriate sized powder coated Al material boxes with panel mounted BNC connector & power connector.

#### **A Functional testing.**

The Assembled amplifier & as well as DC-DC coupling unit should be tested & validated using Std wide / resonant AE sensors as a source signal for functionality . Std wide / resonant AE sensor and associated test equipment such as requisite 28 power supply , High speed Oscilloscope. 200 Mhz / 2Gsa/sec , Function generator (F.G ) for pulse generation , BNC signal cables has to be arranged by the bidder.

**Note . Firstly Prototype of each should bed fabricated , assembled , thoroughly tested and after satisfactorily performance remaining nine number be fabricated , assembled and tested.**

Basic Function test includes testing of the amplifier on interface with DC-DC coupling unit & AE sensor input placed on a test bed and checking its amplified signal on the High speed Oscilloscope & Injecting high speed 400khz pulse of short duty cycle from the F.G on the AE sensor

The basic function test is as follows.

- 1 The assembly should operate on a phantom power supply of 28 V Dc power supply.
2. The assembly should operate satisfactorily on a AE sensor input. giving typical sensor signal o/p in the range of +/- 10 V.
3. Pre amplifier should be able to generate pulse on the AE Sensor for testing it as a actuator.

#### **B: Enclosure.**

- 3.1.1 The Pre amplifier should be enclosed in a appropriate sized powder coated Al enclosure with panel mounted BNC connector .



3.1.2 The DC-DC coupling unit should be enclosed in a appropriate sized powder coated Al enclosure with panel mounted BNC connector.

**2.0 GENERAL DESCRIPTION AND REQUIREMENT**

PCB Manufacturing as per schematic , procurement & assembly of components as per bill of material ,Testing & supply.

**3.0 RAW MATERIAL REQUIREMENT**

Raw materials as per Annexure will be purchased by supplier

**4.0 DELIVERABLES.**

S. No.	Description	Qty	Delivery period	Remarks
1.	Pre amplifier with enclosure .	10 Nos	8 wks	Functional testing at firm site
2	DC- DC coupling unit with enclosure	10 Nos		
<p><b>Please Note :</b></p> <p><b>Firstly one prototype each of Pre amplifier and DC-DC coupling unit should be fabricated and tested satisfactorily as per mentioned in the above functional testing clause . On satisfactorily function testing . subsequently remaining nine nos each of the Pre amplifier and DC- Dc coupling unit be fabricated ,assembled &amp; tested.</b></p>				

**5.0 PRICE**

The supplier shall give the cost unit wise separately as given above inclusive of PCB fabrication, Assembly & testing.

- 1. Main Pre amplifier with enclosure
- 2. DC- DC coupling unit with enclosure..

**Spare if any :**

As listed in the bill of material after deducting usage in the PCB fabrication

## **6.0 MANUFACTURE AND WORKMANSHIP**

The manufacturing process and workmanship shall be in accordance with high grade industrial practice. Mutually agreed functional testing procedure and acceptance criteria shall be worked out, if required.

## **7.0 TOOLING.**

All tools like Oscilloscope, Function Generator, soldering station etc., required for manufacture shall be arranged by the supplier.

## **8.0 INSPECTION AND TESTING**

8.1 General: Supplier shall perform all necessary inspection and testing necessary as per the spec to the satisfaction of the purchaser. Supplier shall arrange and /or provide all testing and inspection facilities (gauges, instruments, equipments etc.) required during manufacture of the components, assembly, and shop testing of components. Only calibrated and approved facilities shall be employed for the inspection.

8.2 A systematic record of all inspection and testing carried out by the Supplier shall be maintained and offered to the representative of the Purchaser for review from time to time.

8.3 Inspection by the purchaser or any agency appointed by him shall not relieve the supplier of any of the inspection duties called for herein. If the supplier makes use of any inspection data or services provided by the purchaser, he does so at his own risk and shall have no recourse to the purchaser, should such inspection contain any errors or omissions.

8.4 The facilities and procedures for inspection and testing shall ensure cleanliness, protection against damage to the equipment and shall comply with applicable 'Industrial Safety Codes'.

8.5 Dimensional inspection shall be carried out at 22 °C to 24 °C.

8.6 The Supplier shall carry out and shall be responsible for inspection, testing etc. of all the work sub-contracted by him.

8.7 Supplier shall carry out 100% dimensional inspection of all components. The inspection shall also include all dimensional details indicated in the purchaser's drawing.

8.8 A compliance certificate shall be issued by the supplier indicating that meets the technical specifications.

8.9 Inspection and Test failures: If any component fails to meet any inspection or test requirement of this specification and if the supplier intends to offer the equipment or the part for acceptance, either in failed, reworked or repaired condition, then, he shall notify the purchaser or his authorized representative of his intentions. The rectification or use of the component by the supplier shall be taken up only after the approval of the purchaser. At the discretion of the purchaser, the failed equipment or part may be accepted as deviated part or required to be reworked, repaired, re-inspected and / or re-tested or totally rejected.

## **9.0 ASSEMBLY AND FUNCTIONAL TESTING.**

9.1 General: Supplier shall carry out shop assembly and inspection of the subassemblies to meet the assembly requirements stipulated in assembly procedure (to be prepared by the supplier and approved by the purchaser), in assembly drawings and in this specification. The supplier shall be responsible for the preparation of complete assembly procedures. These procedures shall be submitted to the purchaser for approval only after the adequacy and completeness of these have been thoroughly

checked, reviewed and approved by the supplier. Approval of these procedures by the purchaser will be for the benefit of purchaser and will not relieve the supplier of his responsibility to carry out the subassembly to meet the requirements of drawings and specification and for the completeness of assembly work. All the results of assembly settings carried out during assembly work shall be permanently recorded on properly designed data sheets. The completed data sheets shall be certified by the supplier prior to furnishing these to the purchaser. Purchaser or his authorized representative will witness all assembly settings and adjustments and shall be informed by the supplier of the intended assembly schedule well in advance of the date of proposed assembly settings etc. Correct interpretation of drawings, specifications, and procedures shall be the responsibility of Supplier.

9.2 Handling of Components: All components shall be handled very carefully using proper protective covers to avoid damage to the components. In particular, utmost care shall be taken while handling the electronic components requiring static electricity protection.

9.3 Deviations from Specifications: Any deviation from the requirements of the drawings and/or this specification shall be reported to the purchaser for consideration. This shall be done after adequate effort and review on the part of supplier to correct the above deviations. The report on the deviation shall fully describe the deviation and shall clearly outline supplier's recommendations as regards acceptance, repair, rework, imposed limitations etc. Any such repair, rework, re-inspection, re-testing, etc. necessary shall be carried out after purchaser's approval at no additional cost and without affecting the delivery dates. Adequate time shall be given to the purchaser for review of the deviations.

## **10.0 QUALITY SURVEILLANCE**

10.1 General: Quality surveillance and expediting, relating to all the aspects of the contract will be carried out by the purchaser or his authorized representative, for which purpose the supplier and his subcontractor shall allow access to the premises in which the work is being carried out, during manufacture, assembly and testing.

10.2 Furnish the latest drawings and/or tooling, gauges, instruments, testing equipment etc. required for inspecting the jobs. Prints of all the latest required drawings and approved procedures shall be made available for inspection and retention, if so desired.

10.3 Produce an inspection plan to the purchaser's satisfaction and notify when checkpoints on the plan are imminent so that the purchaser's representative may be present, if it is so desired.

10.4 The supplier shall be responsible for the inspection of the components that is subcontracted by him.

10.5 Waiving of quality surveillance by the purchaser's acceptance of the items by the purchaser or his authorized agent, shall not relieve the supplier from his responsibility for supplying the items in accordance with specification requirements of this document and purchase order.

## **11.0 SUBCONTRACTING**

The supplier shall not sub-contract any or all the work without the written consent from the purchaser.

## **12.0 PACKING AND SHIPMENT:**

12.1 Packing: After completion of all shop tests and acceptance by the purchaser, the subassemblies shall be thoroughly cleaned, dried, protected from dirt, and with proper protection and with thermocol or plywood sheets and shipped to Purchaser's works, CnID, B.A.R.C., Trombay, Mumbai - 400 085. The Supplier shall be fully responsible for the proper care and handling of

subassemblies during packing and shipment to ensure their arrival at destination without damage to any part.

12.2 Delivery: Delivery of unit shall be made only after obtaining approval in all respect from purchaser. Completed jobs shall be delivered on or before the stipulated delivery period mentioned in Purchase Order/Work Order.

### **13.0 GUARANTEE / WARRANTY:**

All fabricated Assembly and spare components under purchase order/work order shall be guaranteed for a period of 12 months from the date of delivery at purchaser's works.

### **14.0 PURCHASER'S DRAWINGS, SPECIFICATIONS ETC.**

14.1 Purpose: All drawings, specifications, free issue items etc. that may be provided to Supplier by Purchaser are the property of Purchaser and are intended to be complementary and to provide for and comprise everything necessary for the completion of works/supply. These are not to be used for any works or performance other than those for which these have been provided and shall be returned to Purchaser immediately on completion of work/supply, in good condition.

14.2 Property of Purchaser: If during the process of execution of the contract, any improvement, refinement or technical changes and modifications are effected by Supplier, such changes shall not affect the title to the property of Purchaser and all the information, specifications, drawings etc including the improvement/ modifications effected by Supplier shall continue to be the property of Purchaser. Supplier shall not have any claim or rights whatsoever in respect of purchaser's drawings, specifications, prototypes etc. even where improvement, refinement, modifications etc. have been effected by Supplier.

### **15.0 INFORMATION / DOCUMENTS TO BE FURNISHED ALONG WITH THE FINISHED COMPONENTS:**

1. PCB related documents such as film, layout, PCB making gebber files etc.
2. Certificate of compliance.
3. Packing list.
4. 12 month warranty certificate .
5. Delivery channel
6. Tax Invoice

Specification : Fabrication , assembly & functional testing of Pre amplifier with DC-DC coupling unit for AE sensors

Item No	Description	Qty	Details
1	Fabrication , assembly & functional testing of Pre amplifier for AE sensors within enclosure	10 Nos	As per schematic Dwg
2	Fabrication , assembly & functional testing of DC-DC coupling unit for AE sensors within enclosure	10 Nos	

**Bill of materials as per dwg for fabrication on the Pre amp and DC-DC coupling unit:**

Item A : Amplifier unit ( qty for 10 Nos) inclusive of component of 5 blank pcb spares .

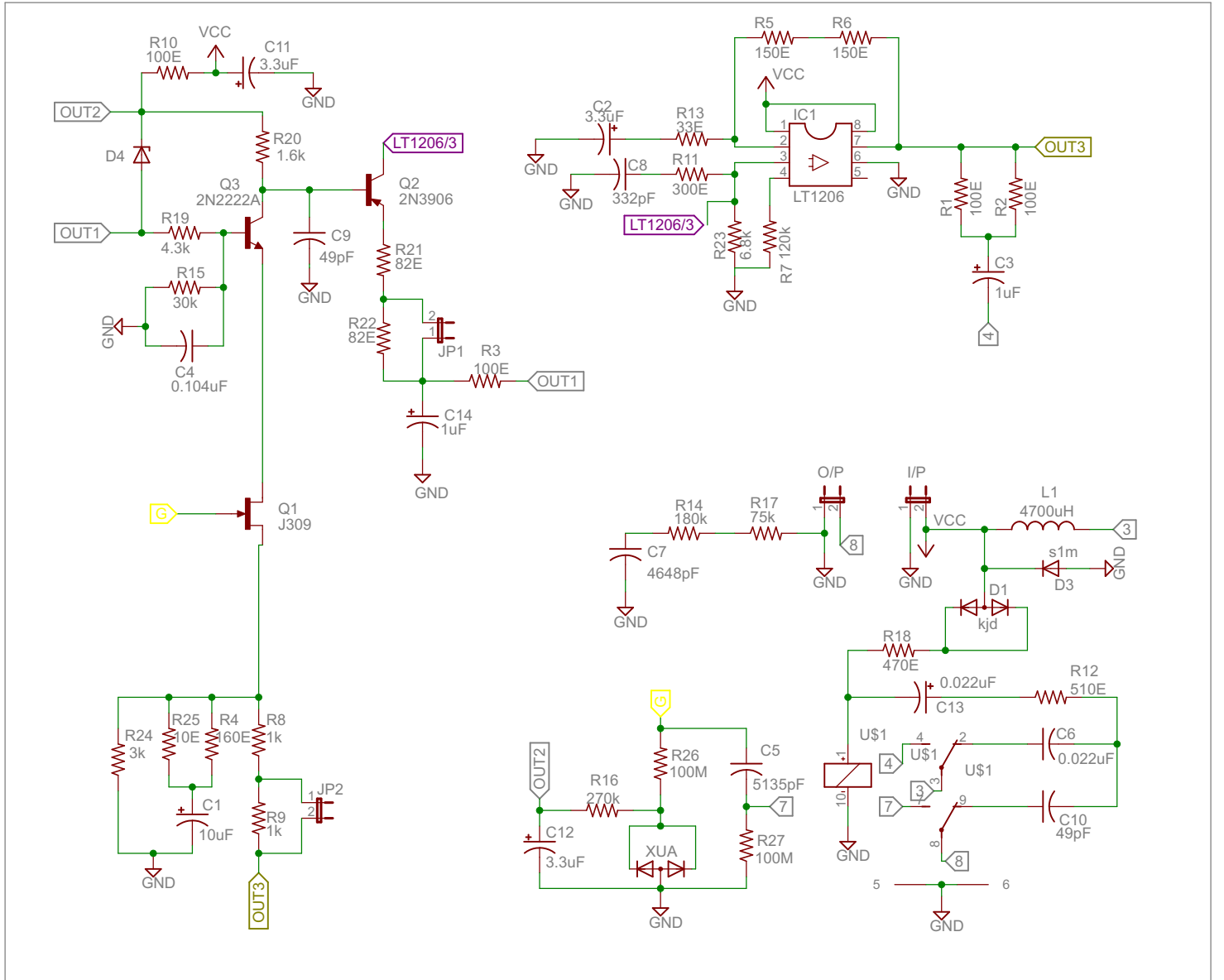
SR.NO.	NAME	TOLERANCE	VALUE	Qty
1a	PCB ( 10 ( assembled & tested )			10
1b	Blank PCB			10
2	LT1206			15
3	ATQ204SA			15
4	Inductor,	5.00%	4700 μH	15
5	SMD RESISTOR	1.00%	100E	60
6	SMD RESISTOR	1.00%	150E	30
7	SMD RESISTOR	1.00%	120k	15
8	SMD RESISTOR	1.00%	1k	30
9	SMD RESISTOR	1.00%	160E	15
10	SMD RESISTOR	1.00%	300E	15
11	SMD RESISTOR	1.00%	510E	15
12	SMD RESISTOR	1.00%	33E	15
13	SMD RESISTOR	1.00%	180k	15
14	SMD RESISTOR	1.00%	30k	15
15	SMD RESISTOR	1.00%	270k	15



16	SMD RESISTOR	1.00%	75k	15
17	SMD RESISTOR	1.00%	470E	15
18	SMD RESISTOR	1.00%	4.3k	15
19	SMD RESISTOR	1.00%	1.6k	15
20	SMD RESISTOR	1.00%	82E	30
21	SMD RESISTOR	1.00%	6.8k	15
22	SMD RESISTOR	1.00%	3k	15
23	SMD RESISTOR	1.00%	10E	15
24	Resistor	1.00%	100M	30
25	SMD capacitor	20.00%	10uF	30
26	SMD capacitor	10.00%	3.3uF	30
27	SMD capacitor	10.00%	1uF	30
28	SMD capacitor	1.00%	49pF	15
29	SMD capacitor	5.00%	0.104uF	15
30	SMD capacitor	10.00%	0.022uF	30
31	SMD capacitor	1.00%	5135pF	15
32	SMD capacitor	5.00%	332pF	15
33	SMD capacitor	1.00%	4648pF	15
34	TWO PIN JUMPER			15
35	DIODE		(KJD)	15
36	DIODE		05 XUA	15
37	DIODE		S1M	15
38	DIODE		Z4	15
39	FET		2SJ309	15
40	TRANSISITOR		2N2222	15
41	TRANSISITOR		2N3906	15
42	BNC CONNECTOR			45
43	ENCLOSURE-approx 75X70X55mm material ALuminum			15

**Item B : DC- DC coupling unit for 10 Nos inclusive of component of 5 blank pcb spares**

SR. NO.	NAME	VALUE	Qty
1a	<b>PCB ( 10 ( assembled &amp; tested )</b>		10
1b	Blank PCB )		10
2	INDUCTOR	3300 $\mu$ H , 0.5A 10%	45
3	BNC CONNECTOR	FEMALE	30
4	FUSE	100mA , 250V	15
5	FUSE BASE		15
6	CAPACITOR	0.1 $\mu$ F , 10 %	15
7	CAPACITOR	2.2 $\mu$ F , 63V 5%	15
8	CAPACITOR	4.7 $\mu$ F , 50V 10%	15
9	RESISTOR	100E , 1/4w , 1%	15
10	RESISTOR	1K , 1/4w , 1%	15
11	RESISTOR	330E , 1/4w , 1%	15
12	BANANA SOCKET PIN , RED	RED	15
13	BANANA SOCKET PIN , BLACK	BLACK	15
14	DIODE	1N4007	15
15	ENCLOSURE approx (75X70X55 )mm Material Alumium		15



PREAMP CIRCUIT SCHEMATIC

# DC-DC COUPLING UNIT SCHEMATIC

