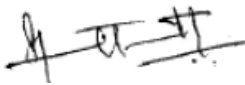
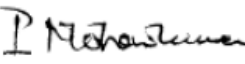




TEP:NTPC:COMM.INT:032 Rev.:00
Date:21-01-04

TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS

Reference No.	Rev No.	Effective Date
TEP:NTPC:COMM.INT:032	00	21-01-04
Title	TECHNICAL SPECIFICATION FOR COMMUNICATION INTERFACE MODULE	
PROJECT	NTPC	
Prepared by	S.Parthasarathy	
Approved by	P.Mohankumar	
Issued and Controlled by	Electronic Shop Electronic System and R&D BAP/BHEL/Ranipet-632 406	
Document Status	☐ Information Copy ☐ Conrolled Copy * It is a control copy only if the mark against the control copy is other than black colour, otherwise it will be an uncontrolled copy. Check for current revision.	
Issued to:	Control Copy No:	



TEP:NTPC:COMM.INT:032 Rev.:00
Date:21-01-04

TECHNICAL SPECIFICATION FOR COMMUNICATION INTERFACE MODULE

Reference No.	Revision No.	Effective Date
TEP:NTPC:COMM.INT:032	00	21-01-04
Record of Revision		
Rev. No.	Effective Date	Remarks
00	21-01-04	--



SCOPE OF SUPPLY

This specification governs the design of PCB artwork complete fabrication, testing, packing and delivery of COMMUNICATION INTERFACE module as per this specification and drawings referred in the enquiry/purchase order.

COMPONENTS OF COMMUNICATION INTERFACE MODULE

One set of INTERFACE module comprise of the following:

- 1 Casing.
- 2 Power supply card.
- 3 Current loop - RS232 Interface card .
- 4 Interface cables.

SPECIAL TECHNICAL REQUIREMENTS

The following are the special technical requirements, which are to be strictly adhered to, in the fabrication of INTERFACE module. Any deviation from these requirements will not be accepted by BHEL, unless prior approval from BHEL has been obtained.

The PCB shall be of glass epoxy FR4 grade with solder masked prints. The PCBs shall be two layer type. The components shall be wave soldered wherever possible. The components labels shall be neatly screen printed on the PCBs. The workmanship and fabrication of the cards shall be as per PRQA : 555 standard of BHEL, Ranipet.

Comment [ES1]:

Selection of components for the card shall strictly meet as per the bill of material. All components used shall be industrial grade. Wherever the BOM indicates non-industrial type component, this specification shall be taken as overriding the BOM. If the supplier makes any deviation from this BOM the same shall be informed to BHEL. Only when this deviation is accepted by BHEL, the same shall be used. Otherwise the deviation will not be permitted.

The PCB layout, components placing and PCB tracks shall be done from EMI reduction point of view. The supplier shall get approval for PCB layout, general arrangement of components in the



PCBs, front facia, general arrangement of casing, cable etc., from BHEL, Ranipet before start of manufacture.

The prototype shall be offered for approval and acceptance by BHEL. Once the prototype is accepted, there shall be no deviation in the dimensions, components used, PCB artwork etc., accepted by BHEL. If the approval from BHEL for any deviation is not obtained, the deviation will be rejected.

The dimension of Power supply card , current loop - RS 232 card and casing shall be as per the technical data.

All male and female connectors to PCBs shall be with non interchangeable locks.

No IC bases shall be used . All other components shall be directly soldered.

* IC bases are permitted for the prototype.

COMMUNICATION INTERFACE MODULE CASING

The casing of INTERFACE module shall be made of Aluminium(2 mm thickness) as per BHEL's drawing and dimensions with fine finishing. All screws used shall be chamfered type and the screw head shall not project above the surface of the casing.

The details of annunciation's shall be neatly printed on the front facia overlay.

Surface of the casing shall be powder coated. The colour of the casing shall be grey.

TECHNICAL DATA OF COMMUNICATION INTERFACE MODULE

DIMENSION OF CURRENT LOOP CARD	:	18×9 cm
DIMENSION OF POWER SUPPLY CARD	:	13×9 cm
DIMENSION OF CASING	:	20×10×6 cm
WEIGHT (approximately)	:	0.75 kg.
OPERATING TEMPERATURE	:	+5°C to +60°C
RELATIVE HUMIDITY	:	95 %



CLASS OF PROTECTION	:	IP 22
MAINS REQUIREMENTS	:	230V 50Hz.

INTERFACING CABLE REQUIREMENT

The external cables shall be of copper, PVC insulated, PVC sheathed copper braided screen. The cable shall be suitable for signalling in the electronic installations where electrical requirements are high and mechanical robustness is required. The screening shall be 100% . The prototype sample shall be subjected to BHEL's approval.

INSPECTION AND TESTING

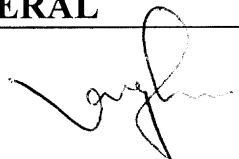
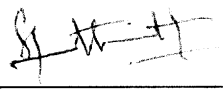
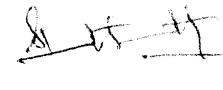
After the assembly is over and all function checks are carried out, the supplier has to inform well in advance to BHEL, the test schedule. The supplier is also required to furnish to BHEL engineer, all the stage inspection record, at the time of inspection by BHEL engineer. The BHEL engineer will inspect all the units to be supplied both visually and functionally.

PACKING

The packing shall be such that vibrations, bumps etc Occurring during transport do not damage the equipment, Suitable padding shall be given to protect the INTERFACE module during transport.



TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS

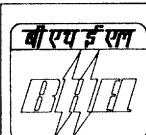
Reference No.	Rev No.	Effective Date
TEP:618:A3 PRINTER	00	15.06.2015
Title	TECHNICAL SPECIFICATION FOR A3 COLOUR LASER PRINTER	
PROJECT	NTPC / GENERAL	
Prepared by	Varghese Paul	
Reviewed by	S Parthasarathy	
Approved by	S Parthasarathy	
Issued and Controlled by	Electronic Shop EDC/ Embedded Systems BAP/BHEL/Ranipet-632 406	
Document Status	☐ Information Copy ☐ Controlled Copy * It is a control copy only if the mark against the control copy is other than black colour, otherwise it will be an uncontrolled copy. Check for current revision.	
Issued to:		Control Copy No:

**TECHNICAL SPECIFICATION FOR A3 COLOUR LASER
PRINTER**

Reference No.	Revision No.	Effective Date
TEP:618:A3 PRINTER	00	15.06.2015

Record of Revision

Rev. No.	Effective Date	Remarks
00	15.06.2015	--



1.0.0 SCOPE OF SUPPLY

The scope of supply includes design, manufacture, testing, packing and delivery of the colour laser printer as per the following technical data.

2.0.0 ENVIRONMENTAL INFORMATION

Ambient conditions

Ambient temperature	: 6 deg. C to 50 deg. C
Humidity	:Max 95%
Location	:Indoor

3.0.0 TECHNICAL DATA

The Printer shall be of the following specification

Width & Media size	– A3 size letter legal executive
Print speed	- 4 PPM Minimum
Printer resolution	- 600X600 DPI Minimum
Memory	- 8 MB RAM or Latest
Printing Method	- Colour and monochrome dry Electro photography
Connectivity	- 10/100BaseT Ethernet, USB 2.0 Minimum

O&M manual & Driver CD's shall also be supplied.

4.0.0 INSPECTION AND TESTING

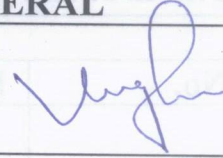
The inspection & testing will be carried out at suppliers works by BHEL / BHEL authorized inspector, based on BHEL purchase order.

5.0.0 PACKING

The equipment shall be properly packed so as to prevent them from damage during transit storage. The packing shall be weather proof and suitable for outdoor storage.



TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS

Reference No.	Rev No.	Effective Date
TEP:EMBS:AIM	01	17.12.2015
Title	TECHNICAL SPECIFICATION FOR ANALOG INPUT MODULE	
PROJECT	NTPC / GENERAL	
Prepared by	Varghese Paul	
Reviewed by	S Parthasarathy	
Approved by	V S Suresh Kumar	
Issued and Controlled by	Electronic Shop EDC/ Embedded Systems BAP/BHEL/Ranipet-632 406	
Document Status	☐ Information Copy ☐ Controlled Copy * It is a control copy only if the mark against the control copy is other than black colour, otherwise it will be an uncontrolled copy. Check for current revision.	
Issued to:	Control Copy No:	



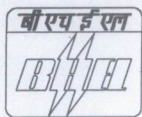
TEP:EMBS:AIM Rev 01
Date:17.12.2015

TECHNICAL SPECIFICATION FOR ANALOG INPUT MODULE

Reference No.	Revision No.	Effective Date
TEP:EMBC:AIM	01	17.12.2015

Record of Revision

Rev. No.	Effective Date	Remarks
00	14.02.2015	Initial release
01	17.12.2015	Power supply is removed from scope of supply.



1.0 SCOPE OF SUPPLY:

The scope of supply includes design, manufacturing, testing, packing and delivery of Analog Input Module with Ethernet interface as per the following technical data.

2.0 ENVIRONMENTAL INFORMATION

Ambient conditions

Ambient temperature : 6 deg.C to 50 deg.C
Humidity : Max 95%
Location : Indoor

3.0 TECHNICAL DATA

The Analog Input Module shall be of the following specification.

1. ADEM 6017 (Advantech make) or
2. ET- 7017 – 10 or
3. ICPDAS

O& M manual & Driver CD's shall also be supplied.

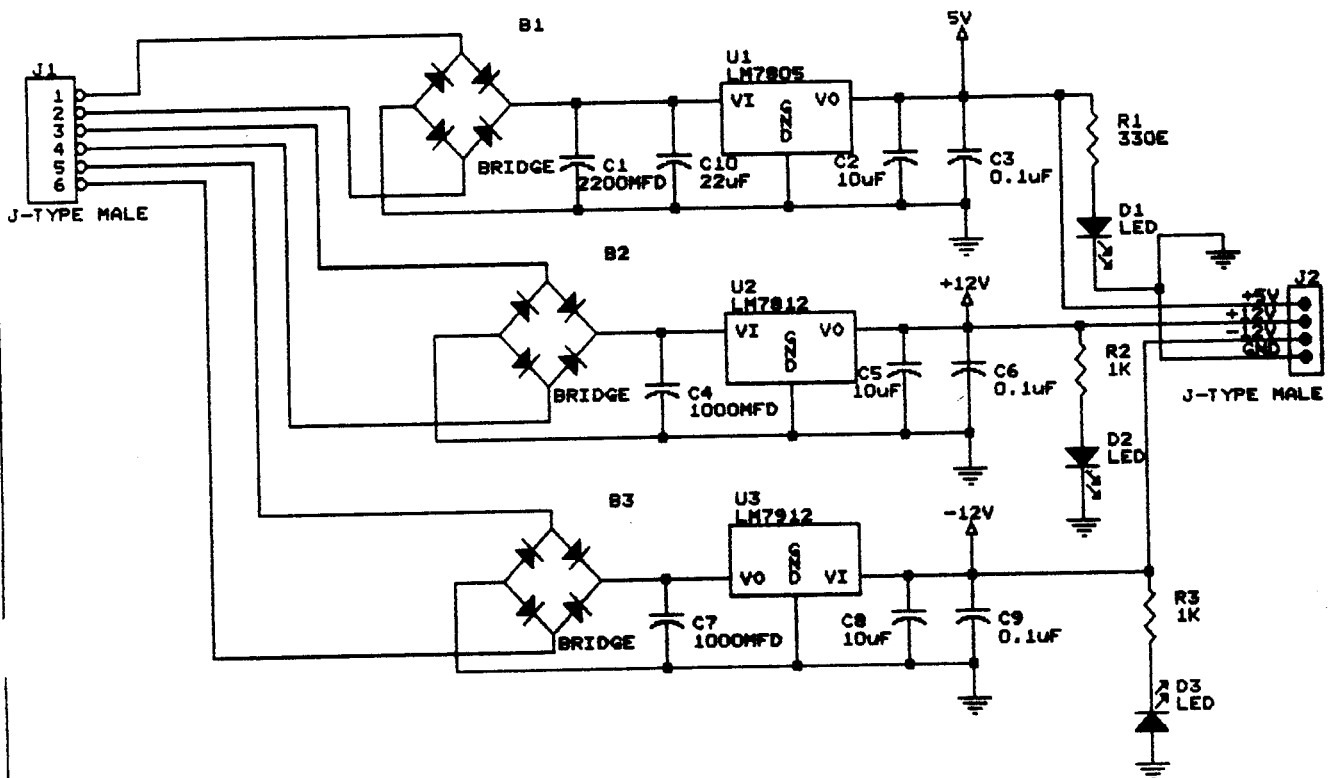
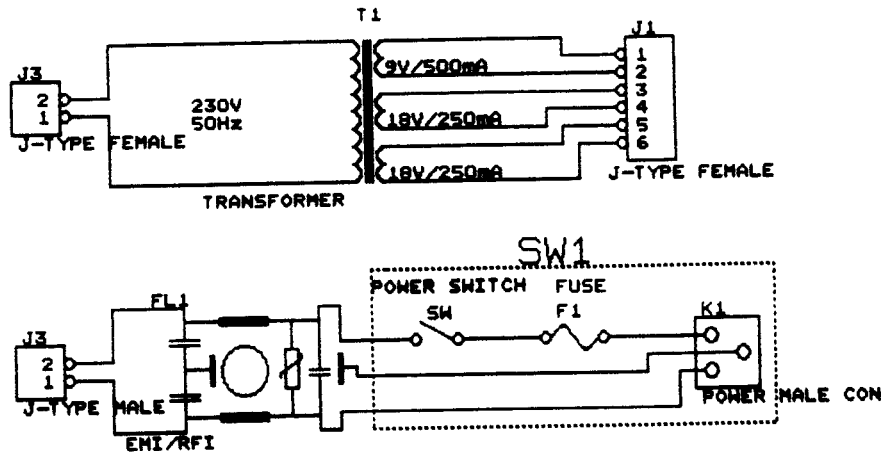
4.0 INSPECTION AND TESTING

The inspection & testing will be carried out at supplier's works by BHEL/BHEL authorized inspector, based on the following documents.

- a. BHEL Purchase order.
- b. BHEL Technical specification.

5.0 PACKING

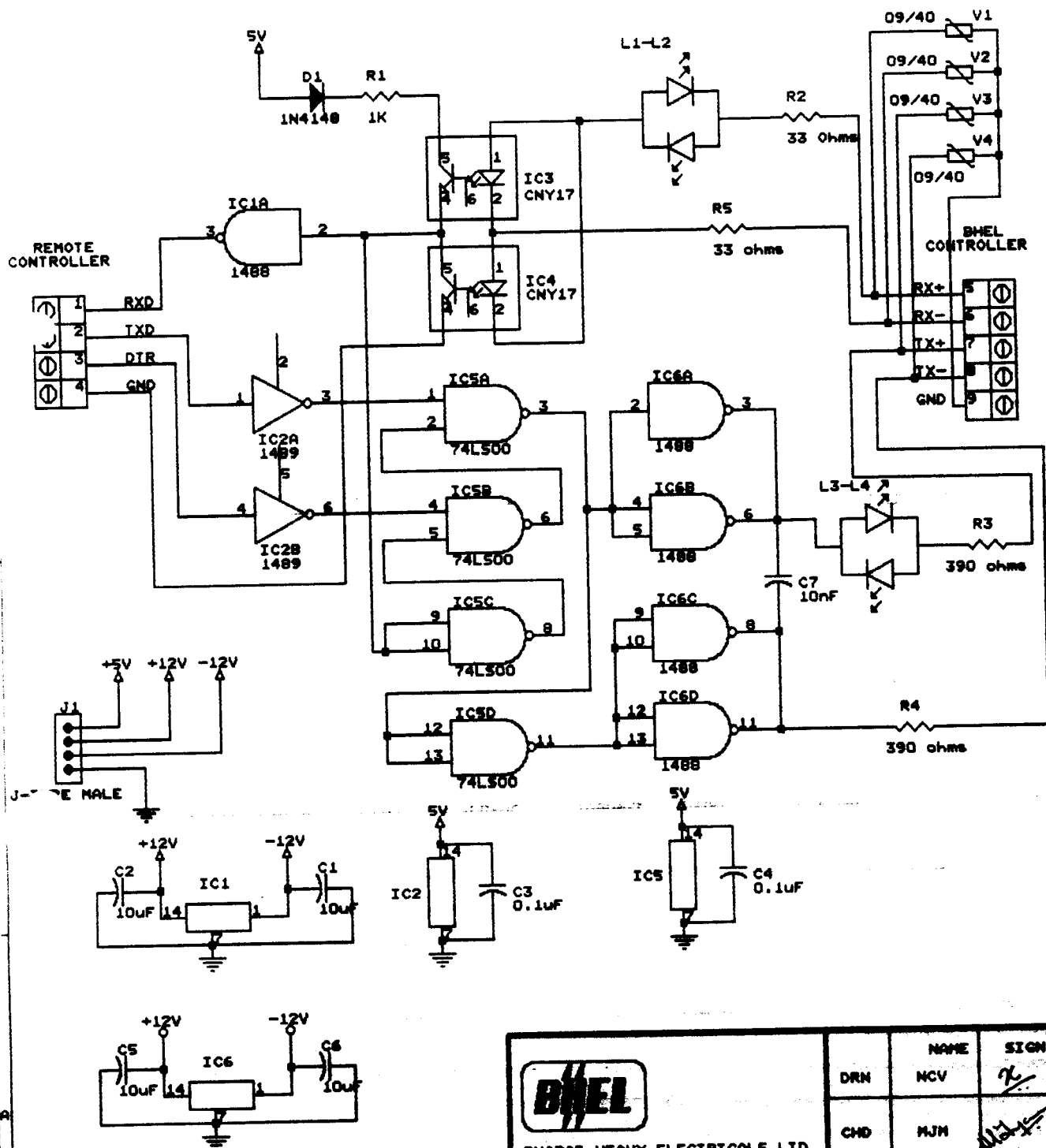
The equipment shall be properly packed so as to prevent them from damage during transit/storage. The packing shall be weather proof and suitable for outdoor storage. Necessary provisions/marks for handling shall be provided. Each packing shall contain a packing slip showing all components, Instruction manual, name of the supplier, brief equipment description, purchase order number, relevant test certificate, serial number of the equipment and destination address.



 BHARAT HEAVY ELECTRICALS LTD. BOILER AUXILIARIES PLANT RANIPET-632 406.	DRN	NAME NCV	SIGN <i>[Signature]</i>	DATE 04/12/17
	CHO	MJM	<i>[Signature]</i>	10/12/17
	APPD	SS	<i>[Signature]</i>	01/12/17
	CARD CODE	DRAWING No.:		REV 00

TITLE
INTERFACE MODULE
POWER SUPPLY CARD

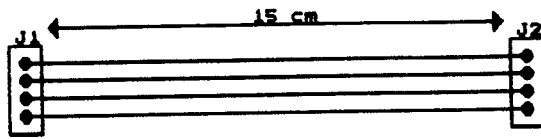
4-00-114-2000



BHARAT HEAVY ELECTRICALS LTD.
 BOILER AUXILIARIES PLANT
 RANIPET-632 406.

TITLE
 INTERFACE MODULE
 CURRENT LOOP CARD

DRN	NAME	SIGN	DATE
CHD	MCV	<i>[Signature]</i>	06/12/92
APPD	MJM	<i>[Signature]</i>	06/12/92
	SS	<i>[Signature]</i>	06/12/92
CARD CODE	DRAWING No.:	REV	
	4-00-114-29397	00	

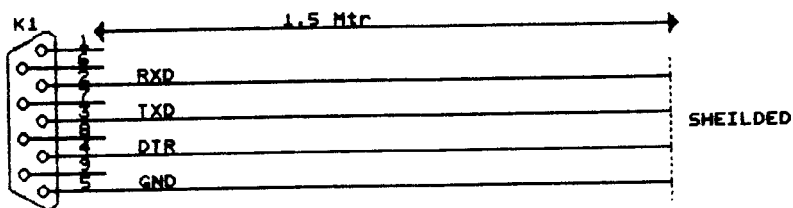


DC POWER CABLE

BILL OF MATERIALS

SNO	PART NAME	DESCRIPTION	QTY	TYPE	MAKE
01	J1, J2	CONNECTOR	02 NOS.	CPU-4WAY (FEMALE)	JALEX / TVS DUPONT
02	—	CABLE	15CM	4-CORE	COMMON

 BHARAT HEAVY ELECTRICALS LTD. BOILER AUXILIARIES PLANT RANIPET-632 406.	DRN	NAME NCV	SIGN <i>[Signature]</i>	DATE 10/11/77
	CHD	MJM	<i>[Signature]</i>	10/11/77
	APPD	SS	<i>[Signature]</i>	10/11/77
TITLE SCHEMATIC DIAGRAM OF DC POWER CABLE	CARD CODE	DRAWING NO.: 4-00-114-25990		REV DO



RS 232C CABLE

BILL OF MATERIALS

SNO	PART NAME	DESCRIPTION	QTY	TYPE	MAKE
01	K1	CONNECTOR	01 NO.	9-PIN D (FEMALE)	HCL / OEN
02	—	CABLE(SHIELDED)	1.5M	4-CORE	COMMON

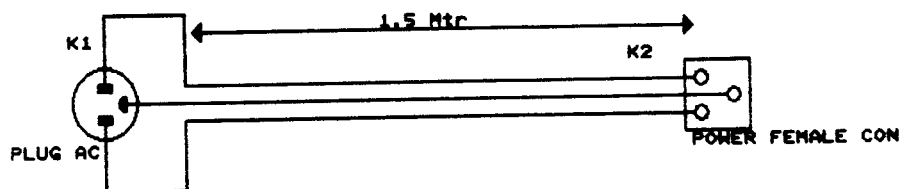


BHARAT HEAVY ELECTRICALS LTD.
BOILER AUXILIARIES PLANT
RANIPET-632 406.

TITLE

SCHEMATIC DRAWING OF

DRN	NAME	SIGN	DATE
DRN	NCV	<i>[Signature]</i>	04/07
CHD	HJM	<i>[Signature]</i>	10/07/77
APPD	SS	<i>[Signature]</i>	10/12/77
DRN	NAME	SIGN	DATE
DRN	NAME	SIGN	DATE



3-CORE MOULDED POWER CABLE

 BHARAT HEAVY ELECTRICALS LTD. BOILER AUXILIARIES PLANT RANIPET-632 406.	DRN	NAME NCV	SIGN. <i>NCV</i>	DATE 01/12/97
	CHD	MJM	<i>MJM</i>	01/12/97
	APPD	SS	<i>SS</i>	01/12/97
TITLE SCHEMATIC DIAGRAM OF AC POWER CABLE		CARD CODE DRAWING NO. 1 4-00-114-293400	REV 00	

SNO	PART NAME	DESCRIPTION	QTY	TYPE	MAKE	REMARKS
01	B1, B2, B3	Bridge Rectifier	03	W04M	MIC	Imported
02	U1	Voltage Regulator	01	LM7805	National	
03	U2	Voltage Regulator	01	LM7812	National	
04	U3	Voltage Regulator	01	LM7912	National	
05	D1-D3	LED	03	5mm(Green)	HP	
06	C1	Capacitor (Electrolytic)	01	2200 μ F / 40V	Phillips	
07	C2, C5, C8	Capacitor (Tantalum)	03	10 μ F/40V	AVX	Imported
08	C3, C6, C9	Capcitor (Multi layer Ceramic)	03	0.1 μ F/100V	AVX	Imported
09	C4, C7	Capacitor (Electrolytic)	02	1000 μ F / 40V	Phillips	
10	C10	Capacitor (Tantalum)	01	22 μ F/40V	AVX	Imported
11	C1,C2,C5,C6	Capacitor Tantalum	04	10 μ F/35V	AVX	Imported
12	C3,C4	Capcitor Multi layer Ceramic	02	0.1 μ F/50V	AVX	Imported
13	R1	Resistor 100PPM MF 1%	01	330E, 0.25W	Thermax	
14	R2, R3	Resistor 100PPM MF 1%	02	1K, 0.25W	Thermax	
15	(U1),(U2),(U3)	Heatsink	03	TO220	Common	
16	T1	Transformer with suitable connectors in both Pri. & Sec. sides.	01	230V/ 9V/ 18V/ 18V, 4.5VA for each Sec. winding.	Common	
17	J1	Connector (Power) - Male	01	6 Way - CPU	Jalex	
18	J2	Connector (Power) - Male	01	4 Way - CPU	Jalex	
19	J3	Connector (Power) - Male	01	2 Way - CPU	Jalex	
20	SW1	Switch with socket suitable for moulded AC power cable.	01	230V, 5A, 50Hz, switch with fuse and Socket	Common	
21	FL1	EMI/RFI Filter	01	230V/50Hz,	ELCOM	

BOM OF POWER SUPPLY CARD

Drg. No.: 4-00-114-29401

Sheet No.: 01 of 01

Rev.00



Bharat Heavy Electricals Limited,
Boiler Auxiliaries Plant.
Ranipet - 632 406

BILL OF MATERIALS FOR POWER SUPPLY CARD

(Ref Drg. No: 4-00-114-29396)

Prepared by	Reviewed by	Approved by	Date
<i>N.C. Vasanthakumar</i> N.C. Vasanthakumar	<i>M. Jayamuruganandh</i> M. Jayamuruganandh	<i>Dr. S. Sekar</i> Dr. S. Sekar	06/12/97

SNO	PART NAME	DESCRIPTION	QTY	TYPE	MAKE	REMARKS
01	B1, B2, B3	Bridge Rectifier	03	W04M	MIC	Imported
02	U1	Voltage Regulator	01	LM7805	National	
03	U2	Voltage Regulator	01	LM7812	National	
04	U3	Voltage Regulator	01	LM7912	National	
05	D1-D3	LED	03	5mm(Green)	HP	
06	C1	Capacitor (Electrolytic)	01	2200 μ F / 40V	Phillips	
07	C2, C5, C8	Capacitor (Tantalum)	03	10 μ F/40V	AVX	Imported
08	C3, C6, C9	Capcitor (Multi layer Ceramic)	03	0.1 μ F/100V	AVX	Imported
09	C4, C7	Capacitor (Electrolytic)	02	1000 μ F / 40V	Phillips	
10	C10	Capacitor (Tantalum)	01	22 μ F/40V	AVX	Imported
11	C1, C2, C5, C6	Capacitor Tantalum	04	10 μ F/35V	AVX	Imported
12	C3, C4	Capcitor Multi layer Ceramic	02	0.1 μ F/50V	AVX	Imported
13	R1	Resistor 100PPM MF 1%	01	330E, 0.25W	Thermax	
14	R2, R3	Resistor 100PPM MF 1%	02	1K, 0.25W	Thermax	
15	(U1),(U2),(U3)	Heatsink	03	TO220	Common	
16	T1	Transformer with suitable connectors in both Pri. & Sec. sides.	01	230V/ 9V/ 18V/ 18V, 4.5VA for each Sec. winding.	Common	
17	J1	Connector (Power) - Male	01	6 Way - CPU	Jalex	
18	J2	Connector (Power) - Male	01	4 Way - CPU	Jalex	
19	J3	Connector (Power) - Male	01	2 Way - CPU	Jalex	
20	SW1	Switch with socket suitable for moulded AC power cable.	01	230V, 5A, 50Hz, switch with fuse and Socket.	Common	
21	FL1	EMI/RFI Filter	01	230V/50Hz,	ELCOM	

BOM OF POWER SUPPLY CARD

Drg. No.: 4-00-114-29401

Sheet No.: 01 of 01

Rev.00

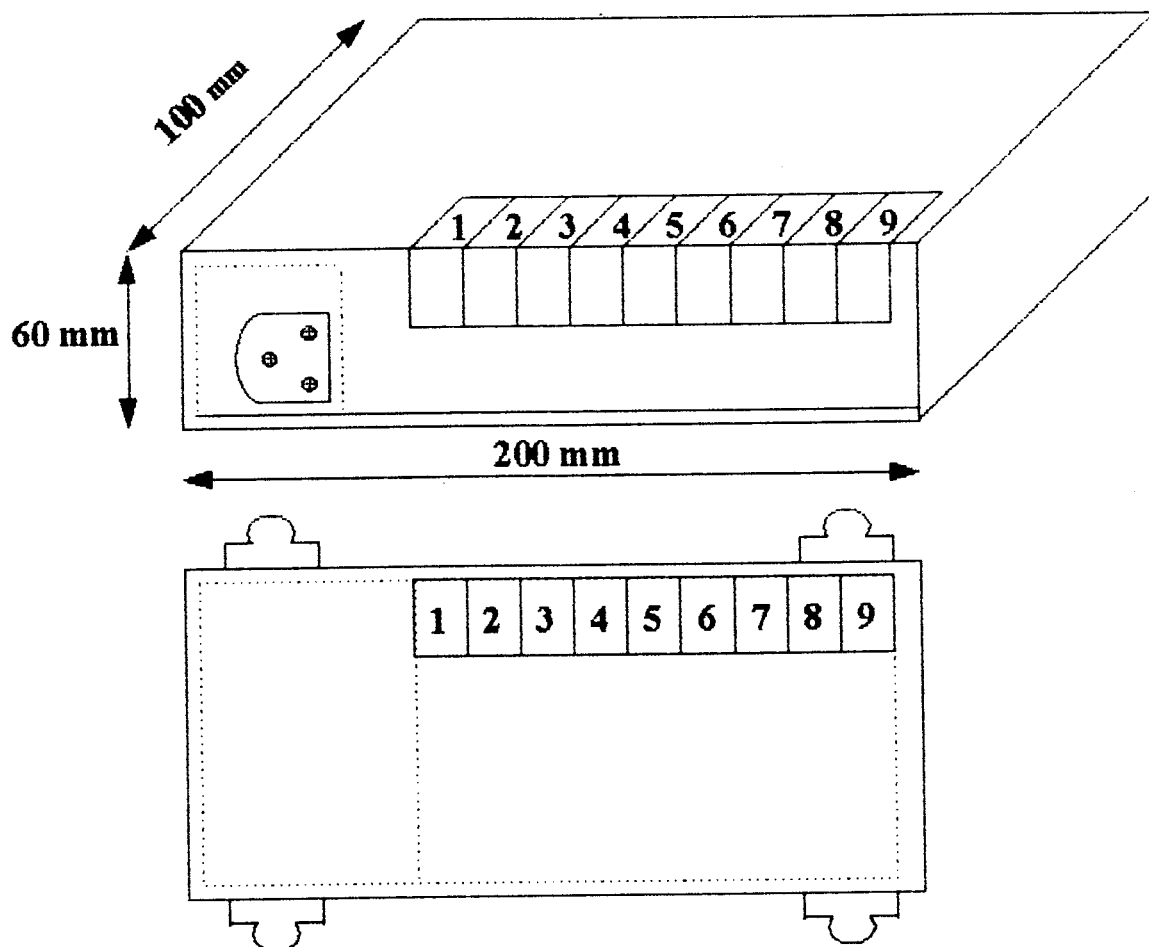


Bharat Heavy Electricals Limited,
Boiler Auxiliaries Plant.
Rampet - 632 406

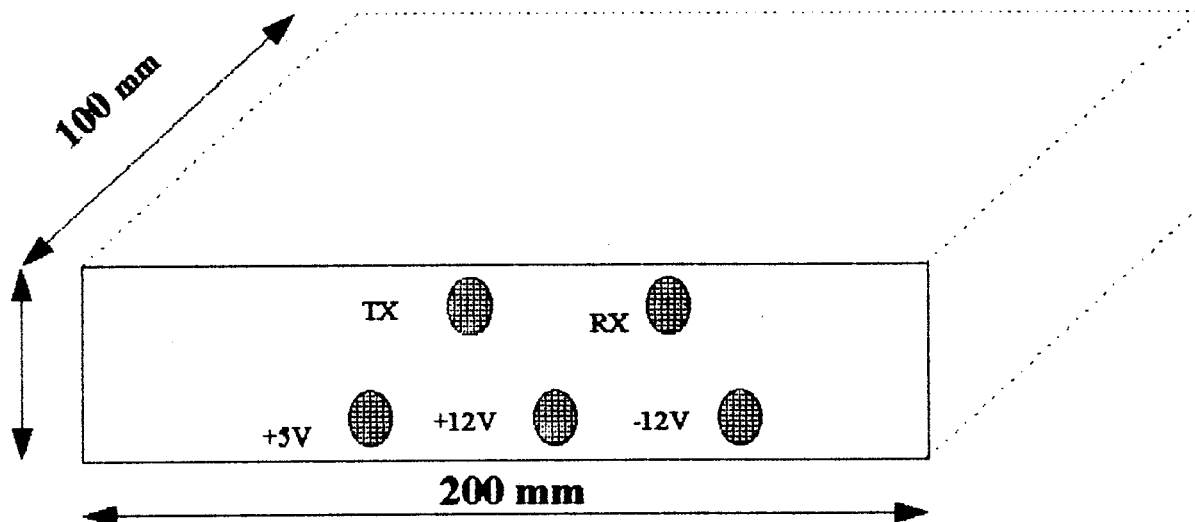
BILL OF MATERIALS FOR POWER SUPPLY CARD

(Ref Drg. No: 4-00-114-29396)

Prepared by	Reviewed by	Approved by	Date
<i>N.C. Vasanth Kumar</i>	<i>M. Jayamuruganathan</i>	<i>Dr. S. Sekar</i>	06/12/97
N.C. Vasanth Kumar	M. Jayamuruganathan	Dr. S. Sekar	



	DRN	NAME NCV	SIGN 	DATE 06/12/97
	CHD	MJM		10/12/97
Bharat Heavy Electricals Ltd., Boiler Auxiliaries Plant, RANIPET - 632 406	APPD	SS		10/12/97
TITLE: COMMUNICATION INTERFACE MODULE CASING	CARD CODE	Drawing no.: 4-00-114-29403		Rev. 00



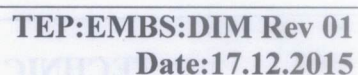
		NAME	SIGN	DATE
	DRN	NCV	<i>NCV</i>	06/12/97
	CHD	MJM	<i>MJM</i>	10/12/97
	APPD	SS	<i>SS</i>	10/12/97
Bharat Heavy Electricals Ltd, Boiler Auxiliaries Plant, RANIPET - 632 406		Drawing no.:		Rev.
TITLE: COMMUNICATION INTERFACE MODULE FRONT FACIA		CARD CODE	4-00-114-29404	00



TEP:EMBS:DIM Rev 01
Date:17.12.2015

TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS

Reference No. TEP:EMBS:DIM	Rev No. 01	Effective Date 17.12.2015
Title	TECHNICAL SPECIFICATION DIGITAL INPUT MODULE	
PROJECT	NTPC / GENERAL	
Prepared by	Varghese Paul	
Reviewed by	S Parthasarathy	
Approved by	V S Suresh Kumar	
Issued and Controlled by	Electronic Shop EDC/ Embedded Systems BAP/BHEL/Ranipet-632 406	
Document Status	☐ Information Copy ☐ Controlled Copy * It is a control copy only if the mark against the control copy is other than black colour, otherwise it will be an uncontrolled copy. Check for current revision.	
Issued to:	Control Copy No:	



Reference No.	Revision No.	Effective Date
TEP:EMBC:DIM	01	17.12.2015

Rev. No.	Effective Date	Remarks
00	14.02.2015	Initial release
01	17.12.2015	Power supply is removed from scope of supply.



1.0 SCOPE OF SUPPLY:

The scope of supply includes design, manufacturing, testing, packing and delivery of Digital Input Module with Ethernet interface as per the following technical data.

2.0 ENVIRONMENTAL INFORMATION

Ambient conditions

Ambient temperature : 6 deg.C to 50 deg.C
Humidity : Max 95%
Location : Indoor

3.0 TECHNICAL DATA

Digital Input Module shall be of the following specification.

1. ADAM 6050 (Advantech make)
2. ET – 7050 or
3. ICPDAS

O& M manual & Driver CD's shall also be supplied.

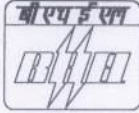
4.0 INSPECTION AND TESTING

The inspection & testing will be carried out at supplier's works by BHEL/BHEL authorized inspector, based on the following documents.

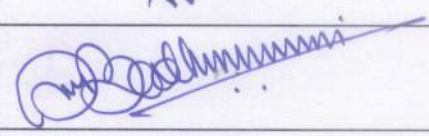
- a. BHEL Purchase order.
- b. BHEL Technical specification.

5.0 PACKING

The equipment shall be properly packed so as to prevent them from damage during transit/storage. The packing shall be weather proof and suitable for outdoor storage. Necessary provisions/marks for handling shall be provided. Each packing shall contain a packing slip showing all components, Instruction manual, name of the supplier, brief equipment description, purchase order number, relevant test certificate, serial number of the equipment and destination address.



TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS

Reference No.	Rev No.	Effective Date
TEP:NTPC:DLPC	00	15.06.2017
Title	TECHNICAL SPECIFICATION FOR INDUSTRIAL COMPUTER	
PROJECT	NTPC / GENERAL	
Prepared by	S Aravind Rajkumar	
Reviewed by	Amit Badhani	
Approved by	Divya S Pai	
Issued and Controlled by	Electronic Shop EDC/ Embedded Systems BAP/BHEL/Ranipet-632 406	
Document Status	☐ Information Copy ☐ Controlled Copy * It is a control copy only if the mark against the control copy is other than black colour, otherwise it will be an uncontrolled copy. Check for current revision.	
Issued to:	Control Copy No:	

**TECHNICAL SPECIFICATION FOR INDUSTRIAL COMPUTER**

Reference No.	Revision No.	Effective Date
TEP:NTPC:DLPC	00	15.06.2017

Record of Revision

Rev. No.	Effective Date	Remarks
00	15.06.17	Original Document

**SCOPE:**

The scope of supply includes design, manufacture, testing, packing and delivery of the industrial grade computers (SBC) as per the following technical data. The bidder shall specifically confirm pointwise and enclosed ANNEXURE shall be submitted along with the offer.

TECHNICAL INFORMATION

- IPC Chassis with Passive Back Plane & Single Board Computer
- 22 inch TFT LCD/LED monitor(analog & DVI) as specified in the indent/ enquiry.
- 101 mechanical key board and Mouse.

1

TECHNICAL DATA FOR INDUSTRIAL PC

Industrial computer of reputed make like IBM/HP/Dell. It shall have following features:

- A. 4U height rack mount chassis with
 - Versatile power supply option
 - Cooling fan with filter of sufficient capacity
 - ATX mother board option
- B. Passive backplane with suitable desktop chassis with minimum 8 ISA slots and 4 PCI slots (6 ISA slots shall be free for BHEL use and shall not have any hindrance for inserting ADDON cards of length 330mm approx).
- C. Minimum 400 W power supply (SMPS- Industrial version).
- D. SBC add-on processor card consisting of:
 - i. Intel Core i5-3570K or better
 - ii. 8 GB (4X2GB) DDR3 800 MHz SDRAM memory
 - iii. SATA interface to support minimum 4 nos of SATA drives
 - iv. 1 x 10/100 Onboard Ethernet facility
 - v. 2 Serial port (should be possible to disable from BIOS)
 - vi. One Parallel port, PS/2, PCMCIA Card slot-1no., Ethernet port
 - vii. Four nos. of on board USB ports (Minimum 2 nos. front accessible)
 - viii. Necessary driver software and documents
 - ix. 16 X DVD +/- RW with Dual layer write capability, Graphics Adaptor
- E. One SATA CD/ DVD ROM drive.
- F. 1TB SATA 7200 RPM 64MB cache 6GB/s HDD.
- G. Dummy covers for covering the CD-ROM bays shall be supplied loose, as they may be removed depending upon our requirement
- H. Operating System: The system shall be pre-loaded with windows 7 operating system software, Licenced Antivirus software .



- I. Windows 7 -32 Bit (original Licensed version) in CD-ROM / DVD
- J. 101 mechanical key board- 1 no
- K. USB based Optical mouse -1 no
- L. 22" TFT LCD/LED Color monitor

NOTE:

- 1. Portion of Hard disk -25% of hard disk shall be partitioned as 'C' drive and remaining portion of Hard disk in the next D and E drives.
- 2. Windows 7 OS (32 Bit) shall be loaded in the system and to be activated before offering for inspection.

ENVIRONMENTAL INFORMATION**Ambient conditions:**

Ambient temperature: 6 °C to 45 °C

Humidity: Max 95% non-condensing

Location: Indoor

INSPECTION AND TESTING

The SBC shall be tested with inspection software like QAPLUS, AMIDIAG Etc which checks all the hardware inside the IPC.

The inspection will be carried out at supplier's works by BHEL/BHEL authorized inspector, based on the following documents.

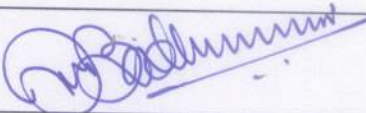
- a. BHEL purchase order.
- b. BHEL Technical specification.

PACKING

The equipment shall be properly packed so as to prevent them from damage during transit/storage. Necessary provisions / marks for handling shall be provided. Each packing shall contain a packing slip showing all components, Instruction manual, name of the supplier, brief equipment description, purchase order number, relevant test certificate, serial number of the equipment and destination address.



TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS

Reference No. TEP:NTPC:IPC	Rev No. 00	Effective Date 15.06.2017
Title	TECHNICAL SPECIFICATION FOR INDUSTRIAL COMPUTER WITH UPS	
PROJECT	NTPC / GENERAL	
Prepared by	S Aravind Rajkumar	
Reviewed by	Amit Badhani	
Approved by	Divya S Pai	
Issued and Controlled by	Electronic Shop EDC/ Embedded Systems BAP/BHEL/Ranipet-632 406	
Document Status	☐ Information Copy ☐ Conrolled Copy * It is a control copy only if the mark against the control copy is other than black colour, otherwise it will be an uncontrolled copy. Check for current revision.	
Issued to:	Control Copy No:	



TECHNICAL SPECIFICATION FOR INDUSTRIAL COMPUTER WITH UPS

Reference No.	Revision No.	Effective Date
TEP:NTPC:IPC	00	15.06.2017

Record of Revision

Rev. No.	Effective Date	Remarks
00	15.06.17	Original Document

**SCOPE:**

The scope of supply includes design, manufacture, testing, packing and delivery of the industrial grade computers (SBC) as per the following technical data. The bidder shall specifically confirm pointwise and enclosed ANNEXURE shall be submitted along with the offer.

TECHNICAL INFORMATION

- IPC Chassis with Passive Back Plane & Single Board Computer
- 22 inch TFT LCD/LED monitor(analog & DVI) as specified in the indent/ enquiry.
- 101 mechanical key board and Mouse.

1

TECHNICAL DATA FOR INDUSTRIAL PC

Industrial computer of reputed make like IBM/HP/Dell. It shall have following features:

- A. 4U height rack mount chassis with
 - Versatile power supply option
 - Cooling fan with filter of sufficient capacity
 - ATX mother board option
- B. Passive backplane with suitable desktop chassis with minimum 8 ISA slots and 4 PCI slots (6 ISA slots shall be free for BHEL use and shall not have any hindrance for inserting ADDON cards of length 330mm approx).
- C. Minimum 400 W power supply (SMPS- Industrial version).
- D. SBC add-on processor card consisting of:
 - i. Intel Core i5-3570K or better
 - ii. 8 GB (4X2GB) DDR3 800 MHz SDRAM memory
 - iii. SATA interface to support minimum 4 nos of SATA drives
 - iv. 1 x 10/100 Onboard Ethernet facility
 - v. 2 Serial port (should be possible to disable from BIOS)
 - vi. One Parallel port, PS/2, PCMCIA Card slot-1no., Ethernet port
 - vii. Four nos. of on board USB ports (Minimum 2 nos. front accessible)
 - viii. Necessary driver software and documents
 - ix. 16 X DVD +/- RW with Dual layer write capability, Graphics Adaptor
- E. One SATA CD/ DVD ROM drive.
- F. 1TB SATA 7200 RPM 64MB cache 6GB/s HDD.
- G. Dummy covers for covering the CD-ROM bays shall be supplied loose, as they may be removed depending upon our requirement
- H. Operating System: The system shall be pre-loaded with windows 7 operating system software, Licenced Antivirus software .



- I. Minimum 600VA UPS of reputed make (double battery)
- J. Windows 7 -32 Bit (original Licensed version) in CD-ROM / DVD
- K. 101 mechanical key board- 1 no
- L. USB based Optical mouse -1 no
- M. 22" TFT LCD/LED Color monitor

NOTE:

- 1. Portion of Hard disk -25% of hard disk shall be partitioned as 'C' drive and remaining portion of Hard disk in the next D and E drives.
- 2. Windows 7 OS (32 Bit) shall be loaded in the system and to be activated before offering for inspection.

ENVIRONMENTAL INFORMATION**Ambient conditions:**

Ambient temperature: 6 °C to 45 °C

Humidity: Max 95% non-condensing

Location: Indoor

INSPECTION AND TESTING

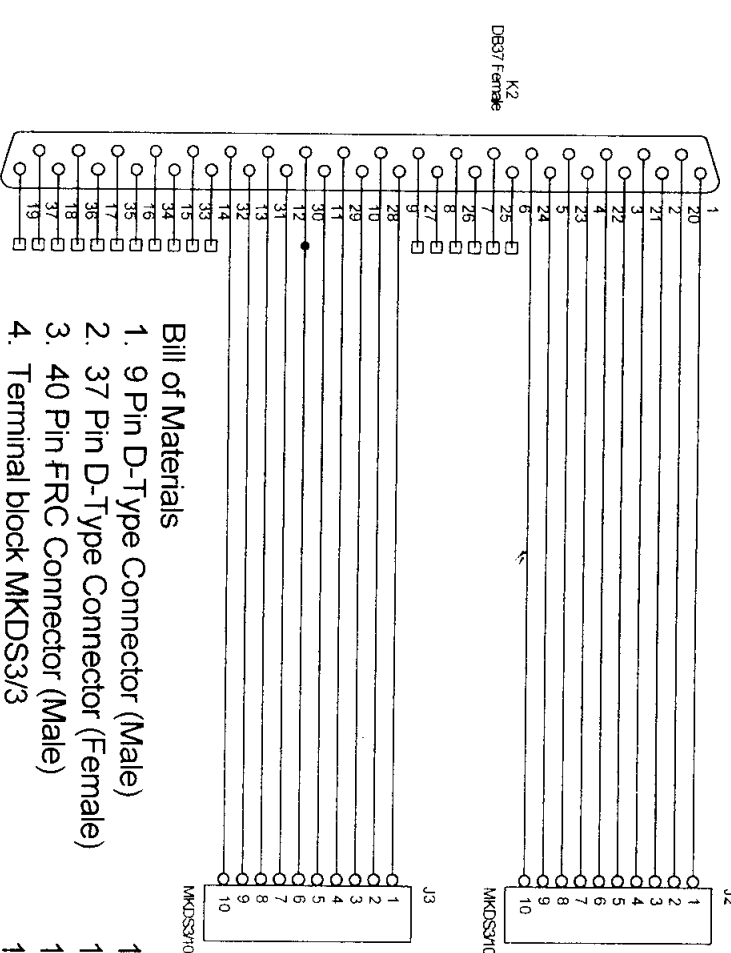
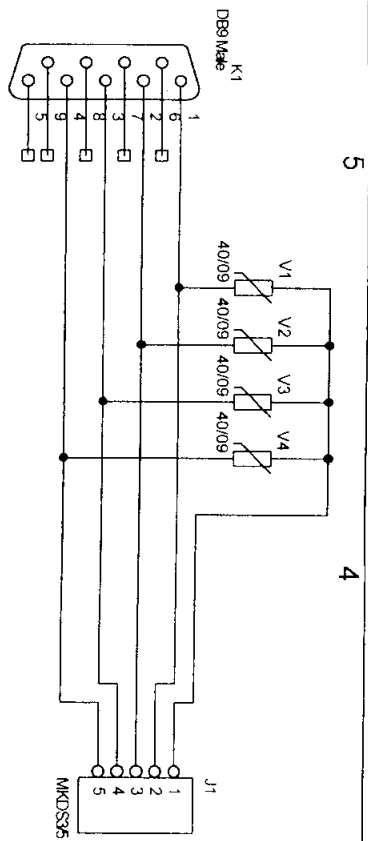
The SBC shall be tested with inspection software like QAPLUS, AMIDIAG Etc which checks all the hardware inside the IPC.

The inspection will be carried out at supplier's works by BHEL/BHEL authorized inspector, based on the following documents.

- a. BHEL purchase order.
- b. BHEL Technical specification.

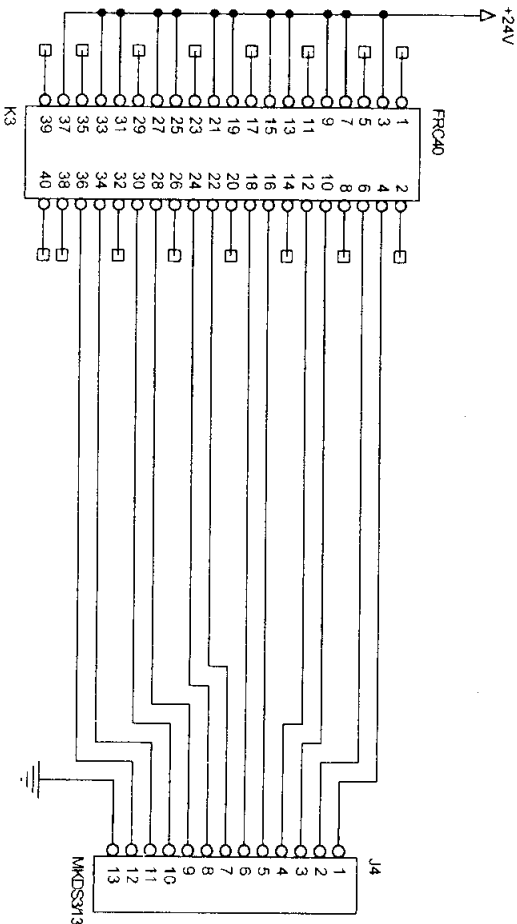
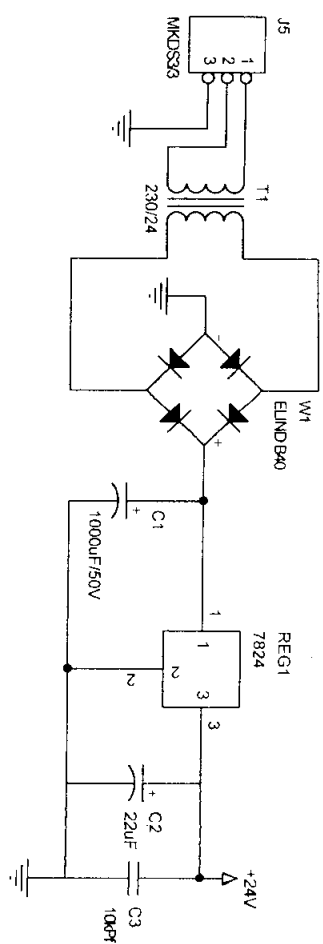
PACKING

The equipment shall be properly packed so as to prevent them from damage during transit/storage. Necessary provisions / marks for handling shall be provided. Each packing shall contain a packing slip showing all components, Instruction manual, name of the supplier, brief equipment description, purchase order number, relevant test certificate, serial number of the equipment and destination address.



Bill of Materials

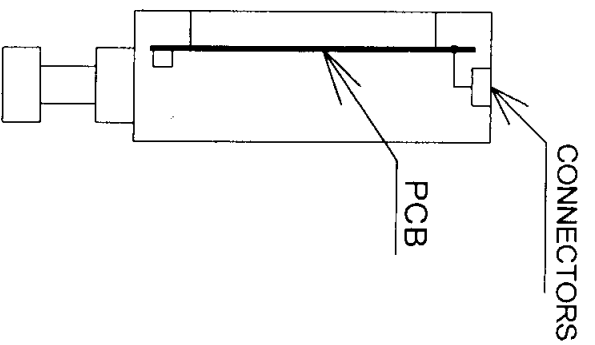
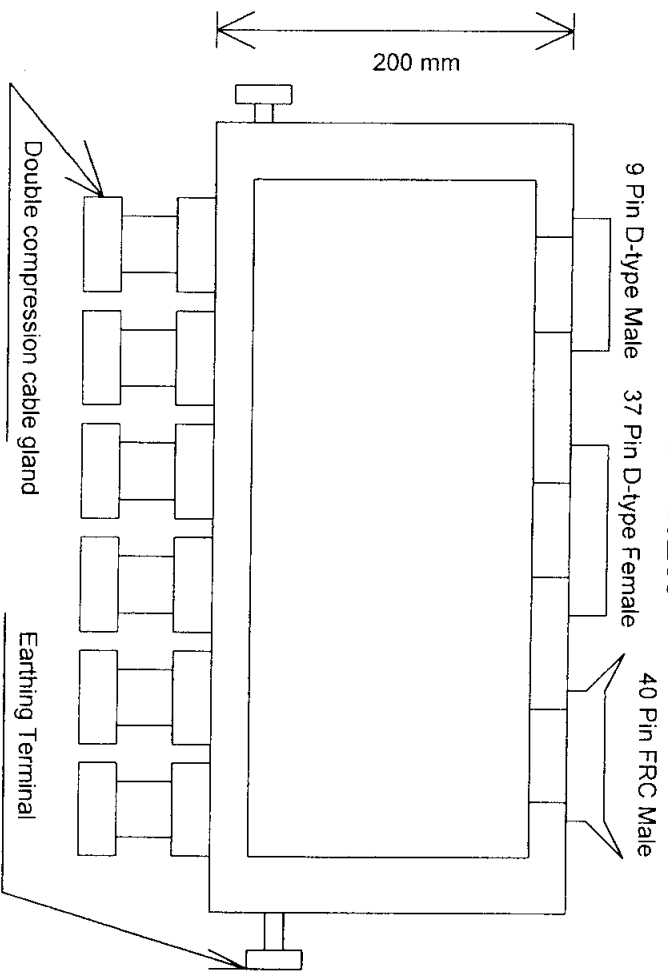
1. 9 Pin D-Type Connector (Male)	1 No.
2. 37 Pin D-Type Connector (Female)	1 No.
3. 40 Pin FRC Connector (Male)	1 No.
4. Terminal block MKDS3/3	1 No.
5. Terminal block MKDS3/5	1 No.
6. Terminal block MKDS3/10	2 Nos.
7. Terminal block MKDS3/13	1 No.
8. MOV 40/09	4 Nos.
9. Transformer 230V/24V, 1A	1 No.
10. Bridge Elind B40	1 No.
11. Voltage Regulator 7824	1 No.
12. Capacitor 1000MFD/50V	1 No.
12. Capacitor 22MFD/50V	1 No.
13. Capacitor 10Kpf/63V	1 No.



Prepared	S.Parthasarathy	8/11/2001
Checked	M.Jeyamuruganand	8/11/2001
Approved	M.Jeyamuruganand	8/11/2001
BHARAT HEAVY ELECTRICALS LIMITED		
RANIPET - 632 406		

Title		
PCTB SCHEMATIC DIAGRAM		
Size	Document Number	Rev
Cusm	4-00-114-29824	0
Date	Saturday, August 11, 2001	Sheet 1 of 1

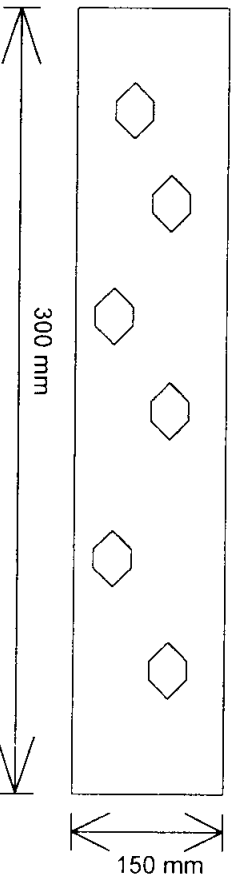
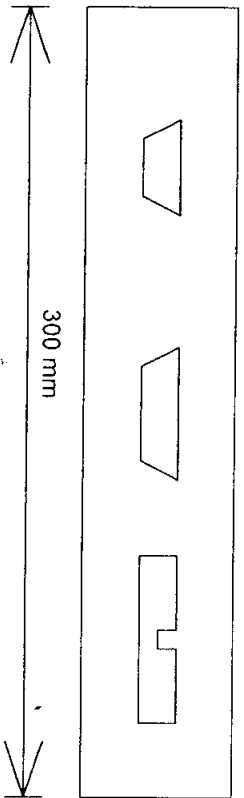
TOP VIEW



NOTE:

1. THE SHEET STEEL THICKNESS SHALL BE 3MM CRCA INCLUDING GLAND PLATE (REMOVABLE TYPE)
2. THE PAINT SHADE SHALL BE 692 OF IS5
3. THE SHEET STEEL SHALL BE POWDER COATED
4. SUITABLE NEOPRENE GASKET SHALL BE PROVIDED BETWEEN THE GLAND PLATE AND CASING.

SIDE VIEW

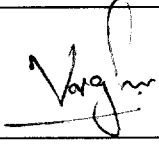
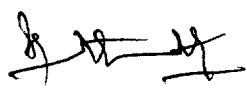
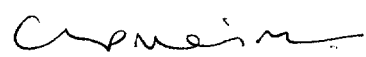


Prepared	S.Parthasarathy	<i>[Signature]</i>
Checked	M.Jeyamuruganand	<i>[Signature]</i>
Approved	M.Jeyamuruganand	<i>[Signature]</i>
BHARAT HEAVY ELECTRICALS LIMITED		
RANIPET - 632 406		

Title PCTB SCHEMATIC DIAGRAM

Size	Document Number	Rev
Custm	4-00-114-29825	0
Date: Monday, August 05, 2001	Sheet	of 1

TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS

Reference No.	Rev No.	Effective Date
TEP:NTPC:PCTB:028	01	20.08.2011
Title	TECHNICAL SPECIFICATION FOR PC TERMINATION BOX	
PROJECT	NTPC	
Prepared by	Varghese Paul	
Reviewed by	S Parthasarathy	
Approved by	K. P. Manimala	
Issued and Controlled by	Electronic Shop EDC/ Embedded Systems BAP/BHEL/Ranipet-632 406	
Document Status	☐ Information Copy ☐ Controlled Copy * It is a control copy only if the mark against the control copy is other than black colour, otherwise it will be an uncontrolled copy. Check for current revision.	
Issued to:	Control Copy No:	

TECHNICAL SPECIFICATION FOR PC TERMINATION BOX

Reference No.	Revision No.	Effective Date
TEP:NTPC:PCTB:028	01	20.08.2011

Record of Revision

Rev. No.	Effective Date	Remarks
00	21.01.2004	--
01	20.08.2011	RS 232 cable added, Current Loop cable connectors changed.

1.0 SCOPE :

The scope of supply covers the Design, Manufacture, Testing Packing and supply of PC TERMINATION BOX as per the Purchase enquiry/Purchase Order drawing.

- PC Termination Box.
- 37 Pin Analog pin Cable with 'D' Type connector.
- 40 Pin FRC connector with FRC connector.
- 4 core current loop cable with 9 Pin 'D' type connector and 5 Pin Phoenix connector.
- RS232 Cable

2.0 TECHNICAL REQUIREMENTS:

The Printed Circuit Board shall be of glass Epoxy FR4 grade with solder masked prints. The components shall be wave soldered wherever possible. The components legends shall be neatly screen printed on the PCBs.

The make of components shall be as per the Bill of materials indicated in the tender drawing.

The PCB shall be manufactured, and the components shall be assembled as per the workmanship standard PR: QA: 555 issued by BHEL Quality department.

The general arrangement and scheme drawings shall be submitted for approval by BHEL.

The item shall be manufactured only after getting approval for the drawings, from BHEL.

3.00 SPECIAL TECHNICAL REQUIREMENTS

37 PIN Analog Cable

1.5 meters length of 37 PIN copper screened cable having 37 PIN male 'D' type connectors at both ends , with good quality dust proof cover. The connection between the PINs at the ends shall be one to one connection.

40 PIN FRC Cable

1.5 meters length of FRC cable crimped with 40 PIN FRC at both ends.

4 CORE CURRENT LOOP CABLE

1.5 meters of 4 core screened cable connected with 9 PIN female 'D' type connector at one end 5 PIN phoenix connector of type MVSTBR 2.5-5.08 at other end with ferrule marking R-,R+,T-,T+ & GND as per the following details.

PIN nos in 'D' type female connector	PIN nos. in Phoenix connector
1	2 (Ferrule marked with R-)
2	1 (Ferrule marked with R+)
3	4 (Ferrule marked with T-)
4	3 (Ferrule marked with T+)
Shield GND	5 (Ferrule marked with GND)

RS 232 CABLE

1.5 meters of screened cable connected with 9 PIN female 'D' type connector at both ends connected as per the following details.

'D' type female connector one end	'D' type female connector other end
PIN no 2	PIN no 3
PIN no 3	PIN no 2
PIN no 5	PIN no 5

4.00 SITE INFORMATION:

Operating Temperature : 0 deg.C to +55 deg.C
Relative Humidity : 99%

5.0.0 INSPECTION

The item will be inspected by BHEL or BHEL's authorized inspection agency at suppliers works before despatch. Only, after getting clearance from BHEL, the item shall be despatched.

6.0.0 PACKING:

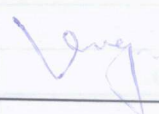
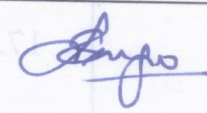
The PC TERMINATION BOX shall be packed suitably so as to avoid damage during transit and storage.



TEP:EMBS:SDS:Rev 01

Date:17.12.2015

TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS

Reference No. TEP:EMBS:SDS	Rev No. 01	Effective Date 17.12.2015
Title	TECHNICAL SPECIFICATION FOR SERIAL DEVICE SERVER	
PROJECT	NTPC / GENERAL	
Prepared by	Varghese Paul	
Reviewed by	S Parthasarathy	
Approved by	V S Suresh Kumar	
Issued and Controlled by	Electronic Shop EDC/ Embedded Systems BAP/BHEL/Ranipet-632 406	
Document Status	☐ Information Copy ☐ Controlled Copy * It is a control copy only if the mark against the control copy is other than black colour, otherwise it will be an uncontrolled copy. Check for current revision.	
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TEP:EMBS:SDS:Rev 01
Date:17.12.2015

TECHNICAL SPECIFICATION FOR SERIAL DEICE SERVER

Reference No.	Revision No.	Effective Date
TEP:EMBC:SDS	01	17.12.2015

Record of Revision

Rev. No.	Effective Date	Remarks
00	14.02.2015	Initial release
01	17.12.2015	Power supply is removed from scope of supply.



1.0 SCOPE OF SUPPLY:

The scope of supply includes design, manufacturing, testing, packing and delivery of Serial Device Server as per the following technical data.

2.0 ENVIRONMENTAL INFORMATION

Ambient conditions

Ambient temperature : 6 deg.C to 50 deg.C
Humidity : Max 95%
Location : Indoor

3.0 TECHNICAL DATA

The Serial device server shall be of the following specification.

Part no - PDS – 755CR
Make - ICPDAS

O& M manual & Driver CD's shall also be supplied.

4.0 INSPECTION AND TESTING

The inspection & testing will be carried out at supplier's works by BHEL/BHEL authorized inspector, based on the following documents.

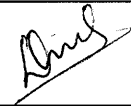
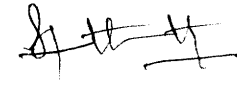
- a. BHEL Purchase order.
- b. BHEL Technical specification.

5.0 PACKING

The equipment shall be properly packed so as to prevent them from damage during transit/storage. The packing shall be weather proof and suitable for outdoor storage. Necessary provisions/marks for handling shall be provided. Each packing shall contain a packing slip showing all components, Instruction manual, name of the supplier, brief equipment description, purchase order number, relevant test certificate, serial number of the equipment and destination address.



TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS

Reference No.	Rev No.	Effective Date
TEP:EMBC:ETHSWITCH	00	14.02.2012
Title	TECHNICAL SPECIFICATION FOR ETHERNET SWITCH	
PROJECT	NTPC / GENERAL	
Prepared by	Varghese Paul	
Reviewed by	Divya S. Pai	
Approved by	S Parthasarathy	
Issued and Controlled by	Electronic Shop EDC/Embedded Systems BAP/BHEL/Ranipet-632 406	
Document Status	☐ Information Copy ☐ Controlled Copy * It is a control copy only if the mark against the control copy is other than black color, otherwise it will be an uncontrolled copy. Check for current revision.	
Issued to:	Control Copy No:	

**TECHNICAL SPECIFICATION FOR ETHERNET SWITCH**

Reference No.	Revision No.	Effective Date
TEP:EMBC:ETHSWITCH	00	14.02.2012
Record of Revision		
Rev. No.	Effective Date	Remarks
00	14.02.2012	Initial release



1.0 SCOPE OF SUPPLY

The scope of supply includes design, manufacture, testing, packing and delivery of the Ethernet switch as per the following technical data.

2.0 ENVIRONMENTAL INFORMATION

Ambient conditions

Ambient temperature	: 6 deg. C to 50 deg. C
Humidity	: Max 95%
Location	: Indoor

3.0 TECHNICAL DATA

The Serial device server shall be of the following specification

1. Minimum of eight Ethernet ports
2. 10/100Mbps
3. Auto speed sensing
4. Plug and play
5. Support for windows platform
6. Suitable power supply adapter for 230V AC input

4.0 Suitable Part numbers and make

1. Netgear FS608
2. D-Link DES-1008A
3. Equivalent Ethernet switch

4.0 INSPECTION AND TESTING

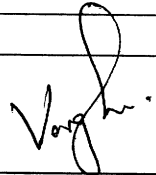
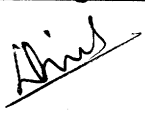
The inspection & testing will be carried out at supplier's works by BHEL / BHEL authorized inspector, based on BHEL purchase order.



5.0.0 PACKING

The equipment shall be properly packed so as to prevent them from damage during transit storage. The packing shall be weather proof and suitable for outdoor storage. Necessary provisions / marks for handling shall be provided. Each packing shall contain a packing slip showing all components, instruction manual, name of the supplier, brief equipment description purchase order number, relevant test certificate, serial number of the equipment and destination address.

TECHNICAL SPECIFICATION FOR BOUGHT OUT ITEMS

Reference No.	Rev No.	Effective Date
TEP:NTPC: WIN 7 PC	00	27.04.2012
Title	TECHNICAL SPECIFICATION FOR INDUSTRIAL COMPUTER (WINDOWS 7)	
PROJECT	NTPC	
Prepared by	Varghese Paul	
Reviewed By	Divya S Pai	
Approved by	S.Parthasarathy	
Issued and Controlled by	Electronic Shop Embedded Systems BAP/BHEL/Ranipet-632 406	
Document Status	☐ Information Copy ☐ Controlled Copy <i>* It is a control copy only if the mark against the control copy is other than black colour, otherwise it will be an uncontrolled copy. Check for current revision.</i>	
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TECHNICAL SPECIFICATION FOR INDUSTRIAL PC		
Reference No.	Revision No.	Effective Date
TEP:NTPC:WIN 7 PC	00	27.04.2012
Record of Revision		
Rev. No.	Effective Date	Remarks
00	27.04.2012	Original Document

SCOPE:

The scope of supply includes design, manufacture, testing, packing and delivery of the industrial grade computers (SBC) as per the following technical data. The bidder shall specifically confirm point –wise and enclosed ANNEXURE shall be submitted along with the offer.

TECHNICAL INFORMATION

- IPC Chassis with Passive Back Plane & Single Board Computer
- 21 inch TFT LCD color monitor as specified in the indent/ enquiry.
- 101 mechanical key board and Mouse.

TECHNICAL DATA FOR INDUSTRIAL PC

- A. 4U height rack mount chassis with
 - Versatile power supply option
 - Cooling fan with filter of sufficient capacity
 - ATX mother board option
- B. Passive backplane with suitable desktop chassis with minimum 8 ISA slots and 4 PCI slots (6 ISA slots shall be free for BHEL use and shall not have any hindrance for inserting ADDON cards of length 330mm approx).
- C. Minimum 400 W power supply (SMPS- Industrial version).
- D. SBC add-on processor card consisting of:
 - i. Intel Core 2 Duo Processor with 2GHz Minimum
 - ii. DDR2 RAM of 2GB minimum
 - iii. SATA interface to support minimum 4 nos of SATA drives
 - iv. 1x 10/100/1000 Onboard Ethernet facility
 - v. 2 Serial port (should be possible to disable from BIOS)
 - vi. One Parallel port
 - vii. Four nos. of on board USB ports(Minimum 2 nos. front accessible)
 - viii. Necessary driver software and documents
- E. One SATA CD/ DVD ROM drive.
- F. One SATA HDD with 500GB minimum
- G. Dummy covers for covering the CD-ROM bays shall be supplied loose, as they may be removed depending upon our requirement
- H. Windows 7 Professional (original Licensed 32 bit version) in CD-ROM
- I. 101 mechanical key board- 1 no
- J. USB based Optical mouse -1 no
- K. 21” LCD TFT Color monitor of make Samsung/ Philips/ acer/ view sonic / any other reputed make.

NOTE:

1. Partion of Hard disk -25% of hard disk shall be partitioned as 'C' drive and remaining portion of Hard disk in the next D and E drives.
- 2 Windows 7 Professional OS shall be loaded in the system and to be activated before offering for inspection.

ENVIRONMENTAL INFORMATION

Ambient conditions:

Ambient temperature: 6 °C to 50 °C

Humidity: Max 95% non-condensing

Location: Indoor

INSPECTION AND TESTING

The SBC shall be tested with inspection software like QAPLUS, AMIDIAG Etc which checks all the hardware inside the IPC.

The inspection will be carried out at supplier's works by BHEL/BHEL authorized inspector, based on the following documents.

- a. BHEL purchase order.
- b. BHEL Technical specification.

PACKING

The equipment shall be properly packed so as to prevent them from damage during transit/storage. The packing shall be weather proof and suitable for outdoor storage. Necessary provisions/marks for handling shall be provided. Each packing shall contain a packing slip showing all components, Instruction manual, name of the supplier, brief equipment description, purchase order number, relevant test certificate, serial number of the equipment and destination address.

COMPONENT CHECK LISTANNEXURE

Name of the Supplier :

Indent/ Enquiry Order No. & Date :

Quantity :

MAKE AND TYPE OF INDIVIDUL COMPONENT OF SYATEM*If it is given in the indent / enquiry specification

Component Description	Make	Type
Industrial PC Chassis		
CPU Card (Mother Board)		
*Additional Mother Board		
Processor		
Back Plane With no. of ISA/PCI Slots		
Power Supply (SMPS 1)		
*Power Supply (SMPS 2)		
Hard Disk Drive -1		
*Hard Disk Drive -1		
RAM		
Floppy Disk Drive		
Compact Disk Drive		
Key Board		
Mouse		
Operating System		
Monitor (Colour)		
Any other Item (Please Specify like RS485/ Duel Ethernet Card)		