

GRI	DATA ACQUISITION PCB CARDS, DATA ACQUISITION COMPUTER AND ACCESSORIES	GRI NO.: GRI/27/05/09-10 DATE : 05.10.2009 PAGE : 1 OF 5
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DATA ACQUISITION SYSTEM:

The Data Acquisition System should consist of Data Acquisition PCB cards, Data Acquisition computer & accessories and Application software.

I. PCI BUS HIGH PERFORMANCE DATA ACQUISITION PCB CARDS:

These cards are required for PC based data acquisition system on PCI bus. These should comprise of signal-conditioning boards along with software drivers & interfacing cables, connector assembly etc. The cards quoted should be of PCI compatible and of latest generation/ architecture. Other specification requirements are:

Item listed in Annexure-1 for a total requirement of one set.

Number of each of cards required: Indicated against each card

1.1 High Resolution PCI A/D Card

01 Nos.

Specifications:

ANALOG INPUT:

Number of channels	: 32 differential analog inputs (Software selectable)
Resolution	: 16 bit
Sampling rate for A/D conversion	: 100 KS/s or more
Conversion time	: Less than 10 μ S
Input Signal Ranges	: Unipolar /bipolar from 1.25V to 10 V or better (Selectable) for each channel
Max. Input Over Voltage	: ± 20 V
Over Voltage Protection	: 25V (Pk – Pk)
Data Transfer Modes	: Software and DMA or Interrupts, bus mastering
Accuracy (DC)	: 0.05 % of FS of the selected range or better ± 1 LSB
Linearity error	: ± 1 LSB
Input Impedance	: At least 10M Ω

DIGITAL I/O: Provision of this feature will be preferred (if this facility ,is not available in A/D card, provision of same in relay card or separate digital I/O and shall also be considered)

Number of channels: TTL/CMOS compatible minimum 12 inputs/output

Data transfers: Programmed I/O

TIMING I/O: 32 bit user configurable timer counter (By cascading two 16 bit counters).

TIME Base Clock frequency Min. 1 MHz

TRIGGER FACILITY: Software, Pacer, ext. Trigger modes be available.

I/O CONNECTOR: Provision of suitable I/O Connectors providing very good noise reduction. Also it is preferable to have BNC connector sockets based analog input terminal board for analog input signals with inter connection between BNC board to DAS board via shielded D-connector. Ribbon cable connector may also be provided for testing of cards etc.

SIGNAL SHIELDING & NIOSE IMMUNITY: In case of driver cards there should be proper protective covers for modules/ sensitive part of circuit/ Connectors to provide signal shielding and noise immunity.

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1. 2 D/A OUTPUT CARD

01Nos.

a) This should be card with isolated multi-channel analog output card for PCI bus.

Specifications:

ANALOG OUTPUT:

No. of channels	:	32- Channel
Resolution	:	12 bits or better
Output ranges	:	- 10 V to + 10 V
Current loop (sink)	:	0 – 20 mA or 4– 20 mA
Throughput (speed)	:	15 kHz or better
Settling time	:	less than 1 msec.
Accuracy	:	± 5 LSB or better
Offset error	:	less than ± 4 LSB
Output Impedance	:	Max. 0.15 Ω
Output protection	:	Short to ground
Isolation	:	At least 1000 V DC
Reset	:	Should retain output values on reset

b.) I/O CONNECTOR: Provision of suitable I/O Connectors providing very good noise reduction like shielded D-connector. Ribbon cable connector may also be provided for testing of cards. This should also include suitable D.C. Supply & external resistance per channel mounted on I/O connector.

1. 3 RELAY OUTPUT CARD :

01 No.

Specifications:

This should be a multichannel relay output board which can be **driven directly from digital output or analog output from above indicated PC cards through compatible connectors.** There should be provision to protect its relay contact points from the surge voltage of inductive loads. Each relay should have LED indication for its on/off status. All output contacts should be accessible through screw terminals.

To avoid overloading of PC power supply the card should have a provision so that driving voltages are jumper selectable to +5V, 12 V or external D.C. Power supply and screw terminal for it.

No. of channels: Minimum 6 relay channels

Relay :

The relays can be power relays or photo coupler isolated solid state relays.

Relay type	:	Power relay / Solid state relay with NO/NC output contacts.
Contact rating	:	AC 250 V , Min. 1A
Turn on/turn off time	:	Max. 800 msec.
Blocking voltage	:	Higher than 550 Volts.

If card doesn't include relays installed on it then relays be quoted separately.

1.4 SOFTWARE:

Party should indicate various software driver packages included as basic scope of supply in above cards. In addition following driver software packages if not covered by std. Scope may be quoted separately.

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DOS DRIVERS:

Driver S/W for Microsoft BASIC and Quick BASIC, Microsoft C++, Borland/Turbo C++ 4.5, Labview

WINDOWS DRIVER – DLL:

Dynamic Link Library driver for Microsoft Windows and Windows NT of latest versions with Visual Basic, Microsoft C++, Visual C++, Borland C++. Complete source code listing be provided for these driver software packages and demo programs.

OPERATING CONDITIONS :

The cards should be able to perform satisfactorily under following operating environmental conditions.

- | | |
|------------------|-------------|
| a) Ambient Temp. | 0 to 50 ° C |
| b) Humidity | 0 to 90 % |

POWER SUPPLY :

These cards(except relay card) will be installed in PCI slots of the PC motherboard and hence will draw power from PC in-built +5 v and $\pm 12V$ DC power supply.

II. END USER APPLICATION /OPERATION SOFTWARE FOR ON-LINE CONTINUOUS VIBRATION MONITORING AND ANALYSIS : 01 No.

Party to provide customer specific software in WINDOWS VC++ or Labview environment, demonstrating integrated performance of operation of all the above cards in addition to data acquisition, data processing (exact requirement of processing will be provided at the time of software development), data display in (trend graph, tabular and bar graph format) , data storage / retrieval (Creating files for data storage/saving & reading data from these files) , data printing, Graphical waveform display/plotting(Plotting – Using Deskjet colour printer and Laser printer) , for analog signal at overall, 50 Hz & 100 Hz frequency generator by suitably sampling of incoming analog signal, simultaneously on all 32 channels , Online data processing to be in both time and frequency mode. Integration of online signal to be in both time and frequency mode. Operation of software should be Window's icon based menus. Data to be stored for each channel for 512 data sets for on-line process. Extensive post processing/ statistical analysis facility. Provision should be there to save & generate and print test report in required tabular & graphical formats for generator testing at test bed.

There should be provision for overall user configurability.

There should be provision for Setup executable program to load and run the program from any other computer of equivalent configuration and having required PCI cards.

There should be provision in the program to restart the program after any interruption(intended or unintended) from the instant of interruption.

III. PC INTEL PENTIUM-IV FOR DATA ACQUISITION SYSTEM 01 Nos.

The main computers installed at site be suitable to be used as data acquisition system for electrical parameters monitoring in control rooms. The computer should have PCI slots. **The computer should be commercial computer or industrial computer.**

These are broad Spec./ features .However if any other features are required to meet above requirement , may please be quoted.

3.0 HARDWARE CONFIGURATION: -

- CPU INTEL CORE 2 DUO PROCESSOR (2 GHZ OR MORE)
- 512KB / 2 MB L2 CACHE (INTEL 865 CHIPSET 400/533/800 FSB)
- 2 GB DDR RAM UPGRADABLE
- LOCAL BUS ARCHITECTURE PCI COMPATIBLE
- 260 (OR MORE) GB IDE HDD
- 8X DVD ROM READ / WRITER
- ON BOARD 10/100 MBPS ETHERNET CONTROLLER CARD

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- 56 KBPS INTERNAL PCI MODEM
- AGP (128 MB or MORE) GRAPHICS CARD WITH RESOLUTION 1600 X 1280
- MATCHING -LOW-EMISSION NON-INTERLACED 17" LCD MONITOR
SUITABLE FOR PIXEL RESOLUTION UPTO 1600 X 1280, DISPLAY SHOULD BE
STABLE AND FLICKER FREE
- USB OPTICAL MOUSE
- STANDARD 104/105 KEYS KEYBOARD .
- PCI I/O EXPANSION SLOTS FOR INSTALLING ADD-ON CARDS MENTION NO. AND
TYPE OF AVAILABLE EXPANSION SLOTS **MINIMUM 02** PCI slots
- OVER ALL HEIGHT OF PC CABINET SHALL BE NOT MORE THAN 400mm
- RTC WITH BATTERY BACK UP
- LATEST ANTI-VIRUS PROTECTION HARDWARE/ SOFTWARE
- LATEST VERSION A4 SIZE HP LASER COLOUR PRINTER (Specify Type & model No.)
- MINIMUM 4 USB PORT (2 FRONT & 2 BACK)
- 8 GB Pen drives (2 Nos.)

OPERATING CONDITIONS :

The system should be able to perform satisfactorily under following operating environmental conditions.

- | | |
|------------------|-------------|
| a) Ambient Temp. | 0 to 50 ° C |
| b) Humidity | 0 to 90 % |

POWER SUPPLY :

It should be operable from Mains of 220 V \pm 20 % at 50 \pm 10 % Hz

3.1 SOFTWARE - Operating System :

01 Set

Windows XP with original CD and Hard copy of documentation and compatible for operation with offered PCI cards, viz : A/D cards, D/A cards etc. One set for two PC's

3.2 ACCESSORIES/ SPARES/ CONSUMABLES :

01 Set

Each set comprising of following -

- a) 1 KVA UPS (HP/APC MAKE(SMART RS 1000 or equivalent): 02 No.
- b) Spare Printer cartridge for laser colour printer : 01 Set (Black & Colour)
- c) Blank CD : 10 Nos.

IV. OTHER REQUIREMENTS FOR PC & CARDS:

TEST/CALIBRATION CERTIFICATES :

The party will give test certificate/ detail calibration certificate traceable to national / International standards indicating the validity period and periodicity of calibration recommended for this system.

SPECIAL TESTS :

Party to indicate various tests carried out on cards/PC to ensure its reliability like Burn in test at max. ambient temperatures and humidity conditions indicated in operating conditions above. Test certificates in support of these tests will also be required.

PREDISPATCH INSPECTION AND TRAINING :

Party shall offer the system for pre-dispatch inspection & performance testing and at the same time impart training on various aspects of system

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COMMISSIONING : Party will carry out commissioning of the system at BHEL Haridwar.

GUARANTEE/WARRANTEE: The PC/ Cards be guaranteed/warranted for the performance of at least 12 months period from the date of commissioning.

ANNUAL MAINTENANCE CONTRACT : Party should quote for Annual Maintenance Contract charges for period beyond expiry of the guarantee period.

V. PRE-QUALIFYING REQUIREMENT (PQR) :

Only those vendors (OEMs/ Authorised dealers), who have supplied and commissioned at least one Data Acquisition System including on-line continuous vibration monitoring/ analysis software, in past five years (on the date of opening of tender) and referred system is presently working satisfactorily for more than one year (on the date of opening of tender) after commissioning, should quote. However, if referred system (s) has/had been supplied to BHEL, then the System should be presently working satisfactorily for more than six months (on the date of opening of tender) after its commissioning and acceptance in BHEL.

The following information should be submitted by vendor about the companies where referred system(s) have been supplied. This is required from all the vendor for qualification of their offer.

- a. Name of the customer/company where referred system is installed
- b. Complete postal address of the customer.
- c. P.O.No., date, scope of supply and Month & year of commissioning.
- d. Name and designation of contact person of the customer
- e. Phone, Fax no. and e-mail address of the contact person of the customer
- f. Performance certificate from the customers regarding satisfactory performance of system supplied to them (Original Certificate or Through E-mail directly from customer). The original performance certificate may be returned after verification by BHEL, if required.

VI. GENERAL:

1. Prices should be quoted for individual items separately. However all the items shall be procured from same party only in view of consideration of technical compatibility of these items.
2. Other Hardware/ miscellaneous items like connector block and cables/ribbon cables, bus extenders etc. may also be quoted.
3. Computer quoted should be of a leading brand. Party should mention make, model no. & send technical details of the computer parts & peripherals like Printer, Graphics Adapter Card, Monitor, Hard Disk Drive etc. which have been quoted. Please also send details of software quoted.
4. Party should indicate any other operating/ environmental requirement for safe and trouble-free operation of system and also any specific requirements of the system for continuous operation over prolonged periods as may be required in process monitoring/control applications.
5. Five sets (Hard copies and on CDs) of detailed operation/ maintenance manual including circuit diagrams for main system (motherboard, Graphics Adapter Card, Monitor, Hard Disk Controller)& driver cards be supplied.
6. Party to write the software and demonstrate the performance of cards for their (i.e. A/D Card, D/A Card and Relay Card) simultaneous operation during pre-dispatch inspection of the system. Party to provide complete source code of the programs.

INDENT NO.: C/4100/20095425T

DATED: 05.11.2009

DATA ACQUISITION PCB CARDS, DATA ACQUISITION COMPUTER AND ACCESSORIES

LIST OF ITEMS REQUIRED

SL. No.	ITEM DESCRIPTION	QUANTITY
I	PCI BUS HIGH PERFORMANCE DATA ACQUISITION PCB CARDS	
	High Resolution PCI A/D Card ANALOG INPUT: Number of channels : 32 differential analog	01 No.
	D/A OUTPUT CARD (Number of channels – 32)	01 No.
	RELAY OUTPUT CARD (Number of channels – 6)	01 No.
II	END USER APPLICATION /OPERATION SOFTWARE	01 No.
III	DATA ACQUISITION COMPUTER AND ACCESSORIES	
	PC INTEL DUAL CORE PROCESSOR FOR DATA ACQUISITION SYSTEM	01No.
	SOFTWARES - DOS drivers - Windows drivers - Windows XP with original CD and Hard copy (Operating System)	01 Set
3	ACCESSORIES/ SPARES/ CONSUMABLES Ref. 3.2	01 Set