

# INSTITUTE FOR PLASMA RESEARCH

An Aided institute of department of Atomic Energy, Govt. of India)  
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## MINOR FABRICATION WORKS ENQUIRY

Office Copy

ENQUIRY NO : IPR/MFW/21-22/127

Date : 15-02-2022

**Due Date : 09-03-2022 13:00 IST**

Please send your offer in sealed envelope specifying Inquiry No, Date & Due Date, ALONG WITH your credentials for the following items:

Important Note:

Please note that e-mail quotations are not acceptable however you may send your queries (if any) to **kirti@ipr.res.in**

Please Ensure that your sealed quotation reaches this office not later than above mentioned due date and time.

Kindly go through the following document properly before Quoting which are available on the IPR web portal i.e., <http://www.ipr.res.in/documents/tenders.html/> attached here with.

1. Technical specification as enclosed.
2. Instruction to the bidders & terms and Condition (refer Form NO: **IPR-MFW-01-V1**)
3. Bidding format (refer Bidding format MFW-Bid.pdf)

GST fro Goods and Services (IGST/CGST/SGST TAX BENEFITS): PLEASE REFER clause no:8 of Form No: **IPR-MFW-01-V1**

QUOTATION SHOULD BE ADDRESSED TO **KIRTI MAHAJAN** ONLY.

Sr.No.	Description	Quantity	Rate
1	Detailed study report on the driver performance test on Preempt RT and normal Linux kernel along with all the developed source code, test application and its detailed documentation as per attached specifications	1	No.

### Free Issue Material

Sr.No.	Description	Quantity	Unit	Value
1	A suitable desktop computer	1.00	No.	75000.00
2	PCIe multi-function data acquisition card	1.00	No.	120000.00

Note : Please quote with complete technical details (Technical Compliance sheet and product data sheet)

Encl:As per attachment

*Kirti*  
15/02/2022  
Sd/-  
KIRTI MAHAJAN  
Scientific Officer-G

# Technical requirement for Characterization of PCIe board Linux driver for real time

## 1. Introduction

Open source real-time Linux driver needs to be developed/adapted for any PCIe multifunction board. In this activity, prospective vendor is supposed to develop/adapt and compare driver performance of multifunction PCIe board, in preempt-RT patched Linux kernel and normal Linux kernel. Requirement of Real-time Linux driver and Multifunction board is given below. A suitable desktop for installing the PCIe card will be provided by IPR as per the approved procedure.

## 2. Technical requirements

Vendor has to provide a detailed technical report showing the performance of the PCIe board driver in Preempt RT patched Linux kernel and normal Linux kernel. Detailed scope of work is described below. Section 2.2 describe the key technical features of the targeted PCIe multifunction board for reference.

### 2.1 Linux driver development requirements

1. Vendor has to select suitable open source Linux kernel version 4.0 or latest, stable version supporting Preempt-RT
2. Use the multifunction PCIe board supporting open source Linux driver provided by IPR along with PC. Linux source code of the PCIe multifunction board will supplied by IPR.
3. Modify the available device driver source code of supplied PCIe board to support the Preempt RT Linux and measure the operating performance using the method defined below in section 3
4. Measure the performance of the same board in the normal Linux kernel using the test method used in the Preempt RT case for preparing a detailed comparison.

### 2.2. PCIe Multifunction board

Multifunction PCIe board will have following IO functions. Below mentioned specifications are indicative only, IPR may supply board with small variation in the specification subject to its acceptability to use.

#### Analog input:

1. Minimum 16 bit, Simultaneous sampling 8 differential input channels
2. ENOB: 13 or more
3. Sampling can be programmable through software configuration
4. Maximum sampling rate will be 100ksps per channel or higher
5. Each sample can be time stamped at the time of acquisition
6. Programmable option for acquisition start using software command or external hardware trigger

#### Analog output:

1. 8 channel, 16bit analog output voltage (differential or single ended)
2. Maximum 100ksps or higher update rate per channel
3. Settling time 100 $\mu$ s or less

*Kint*

#### Digital input/output:

1. Minimum 32 TTL (0 to 5v) digital channel configured as input or output in the group of 4 or less
2. Change of state Interrupt : Detect transition on rising edge or falling edge on input channel and raise interrupt to processor
3. Programmable de-bouncing for each digital input channel from 1 msec to 100 msec
4. Programmable Interrupt on digital input

#### 3. Driver performance test:

Developed/Adapted Linux driver needs to be tested as follows to demonstrate the performance of various functions. All the results of the test should be recorded in the detailed performance report.

1. Measure the data transfer timing from ADC end of conversion to PC memory for single sample from all the channels. This measurement needs to be done for 1 hour and produce the statistics of the timing to understand the variations. During running this experiment, other processes of different priority needs to run for stress testing. Standard stress testing tool needs to be selected in consultation with IPR. Here all the ADC samples needs to be time stamped while they acquired.
2. Measure the DMA data transfer time from ADC all the channels samples to PC memory. This measurement needs to be done for 1 hour and produce the statistics of the timing to understand the variations. During running this experiment, other processes of different priority needs to run for stress testing. Standard stress testing tool needs to be selected in consultation with IPR.
3. Time stamped simultaneous sampling Analog input data reading to a file for 1 hour duration and then find the time stamping variation in the recorded data.
4. Produce Analog output using the data read from Analog input for continuous operation test.
5. Arbitrary wave form generation on Analog output using preprogrammed memory data buffer
6. Reading of Digital input with time stamp. Apply digital input using function generator and find out the maximum frequency of digital input change that can be reliably detected by the Linux Preempt RT and normal Linux kernel.
7. Producing fixed pulse width on DO. Find out the maximum frequency that can be produced on DO using Preempt RT kernel as well as normal Linux kernel.
8. Repeated DI Interrupt latency measurement over 1 hour time and find the variations in measurements. For this test, a square wave of 1Khz frequency should be used on DI to generate interrupt on rising edge.

#### 4. List of deliverables

1. Detailed study report on the driver performance test on Preempt RT and normal Linux kernel.
2. All the developed/adapted driver, test application source code of Preempt-RT and Linux kernel on a disk/USB with detailed source code documentation, user manual and installation manual.
3. Source code documentation should include the normal kernel adaptation and compilation guide for preempt-RT. It should also include the Preempt-RT driver development/adaptation steps in details and compilation guide. Change log or a diff log would be recommended along with the detailed source code documentation.
4. All the free issue material supplied by IPR

#### 5. Other criteria

1. IP rights of the products developed under this project will remain with IPR. IPR can use this work for publication with due credit to the vendor.
2. Vendor should submit compliance statement indicating absolute values instead of mentioning complied or OK in the compliance table.

*Hint*





प्लाज्मा अनुसंधान संस्थान  
( भट, इन्दिरा पुल के पास, गांधीनगर - 382428, गुजरात (भारत)  
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Form No: IPR-MFW-01.V1

**INSTRUCTIONS TO BIDDERS AND TERMS AND CONDITIONS**

1. The Quotation and any order resulting from this enquiry shall be governed by our Conditions of Work Order and Contractor quoting this enquiry shall be deemed to have read and understood the same completely.
2. Where counter terms and conditions have been offered by the Tenderer, the same shall not be deemed to have been accepted by IPR unless our specific written acceptance thereof is obtained.
3. **Quotation:** Quotation should be submitted in the prescribed QUOTATION FORMAT attached with this Enquiry and the same should be submitted in a sealed envelope super-scribing the same with our enquiry No., date, due date and brief description of item on or before the due date. Late/delayed/incomplete/unsigned quotations will not be considered. Envelopes received without Enquiry number, date, due date and brief description of item may be rejected. The quoted prices should be firm for a period of 90 days from due date for placing order. IPR is not bound to accept lowest rate/s. IPR reserves the right to place on one or more parties. The scope of supply includes insurance by the Contractor.
4. **Specifications:** Goods should be offered strictly confirming to our specifications/drawings. Deviation, if any, should be clearly indicated by the contractor in their quotation. The Tenderer should also indicate the Make/Type number of the goods offered and catalogues, technical literature and samples, wherever necessary should accompany the quotation. Clarification/s on drawings should be obtained before submitting quotation.
5. **Terms of Prices:** Quotation should be submitted on door delivery basis without extra charge wherever possible. For quotations on Ex-Works, Ex-godown basis the approximate packing and forwarding charges should be indicated by the contractor. In the case of local contractors, the goods are to be delivered at our stores free of charge.
- 5.1 In respect of tenders on Ex-works basis, in case the tenderer has not mentioned in the offer packing, forwarding and transportation charges for safe delivery up to Purchaser's site, 2% of the price quoted towards packing (in respect of both local and outstation firms), 1% of the basic price quoted towards safe delivery charges in respect of local tenderer and 3% of the basic price quoted towards safe delivery charges in respect of outstation firm will be added for comparison of offers on safe door delivery at Purchaser's site.
- 5.2 Prices are required to be quoted according to the units indicated in the tender form/Enquiry. When Quotations are given in terms of units other than those specified in the tender form, relationship between the two sets of units must be furnished
6. Tender should be free from Correction and Erasures. Corrections, if any, must be attested. All amounts shall be indicated both in words as well as in figures. Where there is difference between amounts quoted in words and figures, amount quoted in words shall prevail. Unsigned quotations will summarily be rejected. If there is a discrepancy between the unit price and total price, unit price shall prevail.
7. IPR shall be under no obligation to accept the lowest or any tender and reserves the right of acceptance of the whole or any part of the tender or portion of the quantity offered and the tenderers shall supply the same at the rate quoted.
8. **Goods & Services Tax (GST):** The details of Taxes/GST and other levies legally applicable and intended to be claimed should be clearly indicated in the tender. Where this is not done, no claim on these accounts would be admissible later.

**a) GST for Goods (IGST/CGST/SGST TAX BENEFITS):**

IPR is entitled to avail tax benefit as per the following notifications issued by Ministry of Finance, Department of Revenue, Government of India:

(1) No: 47/2017-INTEGRATED TAX (RATE) DATED 14/11/17 for IGST

(2) No: 45/2017-CENTRAL TAX (RATE) DATED 14/11/17 for CGST

And,

IPR is entitled to avail tax benefit as per the following notifications issued by Finance Department, Government of Gujarat:

(1) No. 45/2017-STATE TAX (RATE) DATED 15/11/17 for SGST

As per above notifications IPR will bear only 5% IGST for procurement of goods from outside Gujarat & 2.5% CGST and 2.5% SGST (total 5%) for procurement of goods within Gujarat. Vendors are required to charge tax as per these notifications while quoting/supplying the goods. Deviations, (if any) should be clearly mentioned in the quotation/offer.

Please specify the HSN codes while quoting.

**b) GST for Services:**

As applicable. Specify the SAC codes wherever services are involved.

9. **Delivery Date:** Delivery period is essence of the Contract. Contractor must indicate the firm delivery date by which the goods will be dispatched or delivered by them from the date of our order. Delivery period shall be clearly

An Aided Institute of Department of Atomic Energy, Government of India

परमाणु ऊर्जा विभाग, भारत सरकार का एक सहायता प्राप्त संस्थान



प्लाज्मा अनुसंधान संस्थान

) भाट, इन्दिरा पुल के पास, गांधीनगर - 382428, गुजरात (भारत)

# Institute for Plasma Research

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10. indicated against each item separately.
11. **Price/ Purchase Preference:** Purchase/Price preference to industries will be given as per the policy of the Government of India in force at the time of evaluation provided their offer is in compliance with the conditions of the policy.
12. **Liquidated Damages:** The successful Vendor/Bidder should pay liquidated damages @ ½% (half percent) of the total work order value for the delay of each week in the scheduled date of completion of the work envisaged in the Work Order subject to a maximum of 5% (Five percent) of the total Work Order value.
13. **Inspection:** Goods on its arrival at IPR will be inspected by Stores, and his decision in the matter will be final. However, where the items are required to be inspected at the Contractors Premises, Contractor has to give advance notice regarding readiness of the Goods to enable us to depute our representative for inspection.
14. **Payment:** Payment will be arranged for accepted goods only within 30 days from the date of receipt of goods at IPR and bills in our accounts section, completed in all respects.
15. No correspondence will be entertained within 30 days from the date of receipt of good and bills, whichever is later.
16. **Guarantee:** The Stores offered should be guaranteed for a minimum period of twelve months, from that date of acceptance, against defective Goods, design, workmanship, operation or manufacture. For defects noticed and communicated during the Guarantee period, replacement/rectification should be arranged free of cost within a reasonable period of such notifications. In case where our specifications call for a guarantee period more than 12 months specifically, then such a period shall apply.
17. **Performance Bank Guarantee:** If demanded by IPR, the successful bidder will have to furnish Performance Bank Guarantee for 10% of the order value (basic price) from a Nationalized/Scheduled Bank/State Bank of India, valid throughout the Guarantee/Warranty period. The scheduled banks approved by IPR are Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank. Bank Guarantees submitted other than from banks approved by IPR will not be accepted.
18. **Security Deposit:** If demanded the successful Bidder will have to furnish to the Purchaser an interest free security deposit for 10% (Ten percent) of the order value in the form of Bank Guarantee of an equivalent amount from a nationalized/ scheduled Bank/State Bank of India within 15 days from the date of work order and the said Guarantee should be valid till the goods are accepted by IPR. The scheduled banks approved by IPR are Axis Bank, HDFC Bank, ICICI Bank and IDBI Bank. Bank Guarantees submitted other than from banks approved by IPR will not be accepted. The Security deposit shall be forfeited in case the selected Bidder does not start the work within the time limit specified or fail to complete the work within the stipulated delivery period or fail to comply with any of the terms and conditions in the work order. On successful completion of scope of work and its acceptance by IPR, Contractor should send a letter requesting return of the original BG.
19. The Contractor shall at all times indemnify the purchase against all claims which may be made in respect of the stores for infringement of any right protected by Patent Registration of design or Trade Mark and shall take all risk of accidents or damage, which may cause failure of supply from whatever cause arising and the entire responsibility for sufficiency of all means used by him for the fulfilment of the contract.
20. **Free Issue Material (FIM):** Successful tenderer will have to arrange insurance showing beneficiary as "Institute for Plasma Research" at their risk and cost towards adequate security for the materials/property provided/issued by the Purchaser as Free Issue Material for the due execution of the contract.
21. The Director, IPR reserves the right to accept or reject any quotations fully or partly or to cancel the enquiry without assigning any reason.
22. **Jurisdiction:** The contract shall be governed by the Laws of India for the time being in force. The Courts of Gandhinagar only shall have jurisdiction to deal with and decide any legal or dispute arising out of this Contract.

(This need to be printed in Bidders letter head)

1. Please quote with complete technical details along with technical compliance sheet.
2. Quotation should be submitted in the format given below, else IPR shall not consider the offer by the vendor.

**NAME OF PARTY :** \_\_\_\_\_

**ENQUIRY NO:** \_\_\_\_\_

**QUOTATION No. & DATE :** \_\_\_\_\_

Currency of Quotation: **Indian Rupees**

Sr. No.	Item Description	HSN/SAC Code	Quantity	Unit Rate (Basic)	Packaging & forwarding (P&F)	Applicable GST	Rate (incl P&F and GST)	Total Value
			a	b	c	d	e = b + c + d	f = a * e
1								
2								
3								
4								
5								
6								

Sr. No.	Particular	Remarks
I.	Ex-works / FOR Destination	
II.	Freight	
III.	Insurance	
IV.	Delivery Period	
V.	Payment (IPR terms will apply)	
VI.	Guarantee / Warrantee	
VII.	Validity Period	
VIII.	Discount (if any)	
IX.	Remarks	

Place: Authority Signatory

Date: Company Seal

**Note:**

1. Bidder should submit the copy of GSTIN / ARN Certificate along with the offer
2. Bidder should specify the SUPPLY and SERVICE rates/ charges separately wherever applicable