



बसु बिज्ञान मन्दिर

BOSE INSTITUTE

P-1/12, C.I.T. Scheme VII-M, Kolkata 700 054

BIDDING DOCUMENTS

For Tender Notice No.

BI-K/E-TEND/01/2018-19

To be addressed to:

The Sr. Prof. & Incharge, Registrar's Office,
Bose Institute, Centenary Building,
P-1/12, CIT Scheme - VII -M
Kolkata - 700054 (INDIA)



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INVITATION TO BIDS

Director, Bose Institute, Kolkata, West Bengal, India invites **online** offers from **foreign/Indian manufacturers** or their Authorized Dealers for "Production, test and support of PCIe40 cards for the ALICE experiment":

Sl. No.	Name of the items	Qty.	Bid security (EMD)
1.	PCIe40 Cards	266	INR 20,10,000.00

- **Details of specifications are enclosed in Annexure - I**
- **Please quote unit price of the cards in the additional folder including the price break up for 266 cards in the said folder. The number of cards may vary in quantity at the time of placing the Purchase Order.**

Sl. No.	Particulars	Date & Time
1.	Date of uploading of NIT & other documents (Online) (Publishing date)	14.5.2018
2.	Documents download start date (Online)	14.5.2018 at 17:00 hrs.
3.	Clarification Start date Queries to be sent to the mail id bjpurchase@jcbose.ac.in	15.5.2018 at 10.00 hrs.
4.	Clarification End date	28.5.2018 at 13:00 hrs.
5.	Pre bid Conference	01.6.2018 at 12:30 hrs.
6.	Amendment (if any) (On line)	05.6.2018 at 17:00 hrs.
7.	Bid submission start date (On line)	07.6.2018 at 16:00 hrs.
8.	Documents download end date (Online)	15.6.2018 upto 17:00 hrs.
9.	Bid Submission closing (On line)	15.6.2018 upto 17:00 hrs.
10.	Last Date of submission of Earnest Money Deposit Including the technical brochure, if any (Off line)	18.6.2018 upto 14:00 hrs.
11.	Bid opening date for Technical Proposals (Online)	19.6.2018 at 13:00 hrs.
12.	Date of uploading list for Technically Qualified Bidder (online)	To be notified later
13.	Date of uploading the final list of Technically Qualified Bidder (online) after disposal of appeals, if any.	To be notified later
14.	Date for opening of Financial Proposal (Online)	To be notified later



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SECTION - A

INSTRUCTION TO BIDDERS

- A. General guidance for e-Tendering :** Instructions / Guidelines for electronic submission of the tenders have been annexed for assisting the vendors to participate in e-Tendering.
1. **Registration of Vendors :** Any vendor willing to take part in the process of e-Tendering will have to enrol and get registered in the Central Public Procurement (CPP) Portal, NIC, GOI through logging on to <http://eprocure.gov.in/eprocure/app> and the vendor is to click on the link for e-Tendering site as given on the above.
 2. **Digital Signature certificate (DSC) :** Each vendor is required to obtain a Class-II or Class-III Digital Signature Certificate (DSC) for submission of tenders as applicable from the approved service provider of the National Informatics Centre (NIC) on payment of requisite amount. Details are available at the Web Site stated in Clause A.1. above. DSC is given as a USB e-Token.
 3. The foreign bidders can directly submit their bid through the e-procurement by obtaining their DSC applicable from NIC, India.
 4. The vendor can search & download N.I.T. & Tender Document(s) electronically from computer once they log on to the website mentioned in Clause A.1. using the Digital Signature Certificate. This is the only mode of collection of Tender Documents.
 5. **Submission of Tenders:** Tenders are to be submitted through online as stated in Clause A.1. in two folders at a time for each bid, one in Technical Proposal & the other is Financial Proposal before the prescribed date & time using the Digital Signature Certificate (DSC). The documents are to be uploaded should be virus scanned copy duly Digitally Signed. The documents will get encrypted (transformed into non readable formats).
5. A. **Technical Proposal:** The Technical proposal should contain scanned copies of the following in two covers (folders).
- (a) **Statutory Cover** containing the following documents :
 - (i) **NIT (Download the NIT & upload the same using digital signature)**
 - (ii) **Registration Certificate for enrolment with the Central Purchase Organization / other Govt. Dept. for quoting on behalf of the foreign principals, as per latest notification of Procurement Policy Division, Department of Expenditure, Ministry of Finance.**
 - (iii) Bidders' Information Form
 - (iv) Bid Form
 - (v) Techno-Commercial Bid Form
 - (vi) Manufacturer's Authorization Form
 - (vii) Bidder's Performance Statement Form
 - (viii) Service Support Details Form
 - (ix) Technical Compliance Statement Form



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- (b) **Non-statutory Cover** containing the following documents :
For indigenous quotes the bidder has to upload requisite registration / tax certificate like TAN, PAN, Trade License, CIN, GST etc.

Note : *Failure to submit any of the above mentioned documents (listed under 5(a) & (b) may render the bid liable to be summarily rejected for both statutory and non-statutory cover.*

5.B. **Financial Proposal :**

- a. The financial bid should contain the Bill of Quantities (BOQ) corresponding to this tender, which is available on the tender webpage as an MS-Excel file.
 - b. This file must be downloaded and opened with MS-Excel. The rate being quoted by the bidder must be entered in the space marked for this purpose in the file. **Quoted rate** will be encrypted under BOQ. **In case quoting any rate in Tender Form, the tender is liable to be summarily rejected.**
 - c. All fields in the BOQ file other than those allocated for the name of the bidder and the rate(s) being quoted are non-editable.
 - d. The BOQ file must be saved after this and should be uploaded using digital signature.
 - e. OPTIONAL ITEMS/Additional Warranty Charge beyond Standard warranty period and training charges (if any) must be separately quoted and uploaded as PDF file.
- **In the BOQ quoted in foreign currency (click to select currency) fill up the applicable column (i.e. 'Ex-works', 'Discount (if any)', 'Freight', 'Insurance', 'other taxes (if applicable)', 'Installation & commissioning charges (if applicable)' and ignore the other column.**
 - **In the BOQ quoted in INR (click to select currency) fill up the applicable column (i.e. 'Basic Rate', 'Discount (if any)', 'GST', 'Other taxes (if applicable)', 'Installation & Commissioning charges (if applicable)' and ignore the other.**
 - **Bidders are requested not to put any percentage (%) in any column of the BOQ.**
 - **As per Govt. Notification # 45/2017 dt.14th November, 2017 (Central tax rate) and 47/2017 dated 14.11.2017 (Integrated tax rate), Scientific Research Institute funded by the Govt. of India, GST will be applicable @5% for the goods used for research purpose, for the bids where GST will be applicable, against DSIR Certificates to be provided by the Institute.**

6. **Earnest Money Deposit :**

- (a). Demand Draft / Bankers Cheque / Bank Guarantee towards Earnest Money (EMD) as prescribed in the N.I.T. should in favour of "Bose Institute, Kolkata" payable at Kolkata.
- (b). Demand Draft / Bankers Cheque / Bank Guarantee towards Earnest Money (EMD) as prescribed in the N.I.T. against each of the instruments in favour of "Bose Institute, Kolkata" payable at Kolkata (original hard copy) **alongwith a covering letter stating the bank details for releasing the said EMD online by the Institute, as per norms** to be submitted to the Purchase Section (Import) at the Centenary Building, P-1/12, CIT Scheme VII-M, Kolkata 700054.
- (c). Bidder must upload copy of valid registration certificate for EMD exemption.



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**THE ABOVE STATED STATUTORY / NON-STATUTORY DOCUMENTS
SHOULD BE ARRANGED IN THE FOLLOWING MANNER**

Click the check boxes beside the necessary documents in the My Document list and then click the tab " Submit Non Statutory Documents' to send the selected documents to Non-Statutory folder.

Next Click the tab "Click to Encrypt and upload" and then click the "Technical" Folder to upload the Technical Documents.

N.B.: Failure of submission of any of the above mentioned documents as stated in Sl. No. A.5.(a). and Sl. No. A.5.(b). And 6 (a) & (b) will render the tenderer liable to be rejected for both statutory & non statutory cover.



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1. Tender Evaluation Committee (TEC) : Evaluation Committee constituted as per Order of the competent authority of Bose Institute, Kolkata.
2. Opening & evaluation of tender : If any vendor is exempted from payment of EMD, copy of relevant Government Order needs to be furnished and uploaded in the portal as PDF file.
3. Opening of Technical Proposal : Technical proposals will be opened either by the Assistant Registrar / Accounts Officer, Bose Institute, Kolkata or their authorized representatives electronically from the website using their Digital Signature Certificates (DSC).
4. Intending tenderers may remain present if they so desire
5. Cover (folder) for Statutory Documents (Ref. Sl. No. A.5.(a).) will be opened first and if found in order, cover (folder) for Non-Statutory Documents (Ref. Sl. No. A.5.(b).) will be opened. If there is any deficiency in the Statutory Documents the bid will summarily be rejected.
6. Decrypted (transformed into readable formats) documents of the non-statutory cover will be downloaded & handed over to the Tender Evaluation Committee.
7. Pursuant to scrutiny & decision of the Tender Evaluation Committee, the summary list of eligible tenderers will be uploaded in the web portals.
8. During evaluation the committee may summon of the tenderers & seek clarification / information or additional documents or original hard copy of any of the documents already submitted & if these are not produced within the stipulated time frame, their proposals will be liable for rejection.
9. **Financial Proposal :**
 - a). The vendor is to quote the rate online in the space marked for quoting rate in the BOQ. For optional items as mentioned in the specifications may be quoted separately in the additional sheet as enclosed in the Financial Cover.
 - b). Only downloaded copies of the above documents are to be uploaded virus scanned & Digitally Signed by the vendor.
 - c). Penalty for suppression / distortion of facts:

If any tenderer fails to produce the original hard copies of the documents on demand of the Tender Evaluation Committee within a specified time frame or if any deviation is detected in the hard copies from the uploaded soft copies, it may be treated as submission of false documents by the tenderer and action may be referred to the appropriate authority for prosecution as per relevant IT Act.
 - (d). Rejection of Bid:

Director, Bose Institute reserves the right to accept or reject any Bid and to cancel the Bidding processes and reject all Bids at any time prior to the award of Contract without thereby incurring any liability to the affected Bidder or Bidders or any obligation to inform the affected Bidder or Bidders of the ground for Institute's action.
 - (e). Award of Contract :

The Bidder whose Bid has been accepted finally (both technical and financial), will be informed by the Institute authority for award of contract.
The notification of award will constitute the formation of the Contract.



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<u>GENERAL INSTRUCTIONS</u>
<ul style="list-style-type: none">The bids would be opened in the presence of the bidders who wish to attend the Bid-opening. However, the representative should bring with them a letter of authority from the corresponding bidders, without which, they are not permitted to attend the bid opening.
<ul style="list-style-type: none">The acceptance of the quotation will rest with the competent authority of Bose Institute, Kolkata who does not bind himself to accept the lowest quotation and reserves the right to himself to reject, or partially accept any or all the quotations .
<ul style="list-style-type: none">The offer shall be valid for ninety days from the date of opening of the quotations. No revision in price will be allowed after opening the quotation.
<ul style="list-style-type: none">Unsolicited / conditional / in complete / unsigned digitally tenders shall not be considered.
<ul style="list-style-type: none"><u>Offers that have been blindly copied from the tender specifications are not acceptable and shall be rejected.</u>
<ul style="list-style-type: none">The Bidder / Company should not be in the list of black listed firms by any Govt. Dept. / agencies.
<ul style="list-style-type: none">The price comparison will be decided as per BoQ comparative chart on the date of opening of financial bid.
<ul style="list-style-type: none">Prices are required to be quoted in units. When quotations are given in terms of other units, relationship between two sets of units should be furnished. Quantity discounts, if any should also be indicated. The items should be quoted indicating the serial nos.
<ul style="list-style-type: none">To assess in the examination / evaluation, comparison and post qualification of the bids, purchaser may at its discretion, ask the bidder for a clarification of its bid. The request for clarification and the response shall be in writing and no change in the prices or substance of the bids shall be sought, offered or permitted. Any clarification submitted by the bidder in respect of its bid which is not in response to a request by the purchaser shall not be considered.
<ul style="list-style-type: none">Either the Indian Agent on behalf of the Foreign principal or the Foreign principal can bid directly in a tender but not both. However, the offer of the Indian Agent should also accompany the authorisation letter from their principal. To maintain sanctity of tendering system, one Indian Agent can not represent two different Foreign principals in one tender.
<ul style="list-style-type: none">Please indicate the agents in India, their address, the details of service rendered by them & the percentage of commission payable to them. In normal courses agency commission is not allowed.
<ul style="list-style-type: none">Two or more vendors cannot submit bid quoting the rates on behalf of same OEM.
<ul style="list-style-type: none">The Institute is registered with Department of Scientific & Industrial Research, Govt. of India and thus is exempted from Customs duty vide notification no. 51/96 dated 23.07.1996 and GST exemption as per Govt. of India notification no. 45/2017 and 47/2017 dated 14.11.2017. The present details of registration are no. 11/106/1988-TU-V dt. 23.4.2018 valid upto 31.03.2021.
<ul style="list-style-type: none">The mode of dispatch of the items must be mentioned clearly in the quotation.
<ul style="list-style-type: none">Samples, if called for, shall be submitted free of charge and on no obligation basis.
<ul style="list-style-type: none">The offered delivery period shall have to be strictly adhered to in case an order is placed.



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SECTION B

TERMS & CONDITIONS

1. **Price :**

- Bidders are requested to give their final and best offer. Techno-Commercial Discussions will be held with the Lowest Bidder only, if necessary.
- Vendors, who do not accept our standard commercial terms are liable to be ignored. **A categorical confirmation of acceptance of all our terms and conditions in toto will have to be observed which enable speedy processing of the offers.**
- Pre-conditioned, incomplete offers, not in line with the terms and conditions of the tender documents, are liable to be rejected.

a. **For Foreign Quotation :**

- The price of the goods, quoted FOB/FCA port of shipment should include Export Packing, Loading Charges, Inland Freight, carriage etc. in the shipper country to be paid by the Supplier.
- The price for transportation / carriage and insurance and other costs incidental to delivery of the goods upto the port of despatch (CIF/CIP).
- Prices quoted by the bidder shall remain fixed during the entire period of contract and shall not be subject to variation on any account. A bid submitted with an adjustable price quotation will be treated as non - responsive and rejected.
- Prices charged by the Supplier for Goods delivered and Services performed under the Contract shall not vary from the prices quoted by the Supplier in its bid. Conditional offers indicating changes to price quoted due to price increase / decrease by the principal firm, market fluctuations, foreign exchange fluctuations etc. shall make the bid liable to be cancelled.

b. **For Indigenous Quotation :**

- The price of the goods, quoted (ex-works / ex-factory / ex-showroom / ex-warehouse, or off-the-shelf, as applicable), including all duties and sales and other taxes already paid or payable.
- The amount payable on account of GST should be mentioned clearly. **If there is no explicit mention of taxes in your offer then quoted price will be deemed inclusive of such taxes. No other charges except those mentioned clearly in the quotation will be paid.**



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- Rates should be quoted FOR, Bose Institute, Kolkata inclusive of packing, forwarding, installation and documentation & commissioning charges etc. If ex-works prices are quoted then packing, forwarding, documentation, freight and insurance charges must be clearly mentioned separately. Vague terms like “packing, forwarding, transportation etc. extra” without mentioning the specific amount/percentage of these charges will NOT be accepted. Such offers shall be treated as incomplete and rejected. **Where there is no mention of packing, forwarding, installation and commissioning, freight, documentation, insurance charges, such offers shall be summarily rejected as incomplete.**
- 2. **Period of validity of Bids :**
 - Bids shall remain valid at least for 90 days after the date of bid opening prescribed by the Purchaser.
 - In exceptional circumstances, the Purchaser may solicit the Bidder's consent to an extension of the period of validity.
- 3. **Bid Currencies :** Prices shall be quoted in Indian Rupees or in freely convertible foreign currency wherever possible for comparison.
- 4. **Purchaser's Right to vary Quantities at the Time of Award :** The Purchaser reserves the right at the time of Contract award to increase or decrease the quantity of goods and services originally specified in the Schedule of Requirements without any change in unit price or other terms and conditions. However, the Purchaser reserves the right to call the lowest firm for negotiation in case of increase in quantity.
- 5. **Order acceptance :** The successful bidder should submit acceptance of the Purchase Order immediately but not later than 30 days in any case from the date of issue of the Purchase Order failing which it shall be presumed that the vendor is not interested and his bid security is liable to be forfeited.
- 6. **Patent Rights :** The Supplier shall indemnify the Purchaser against all third-party claims of infringement of patent, trademark or industrial design rights arising from use of the Goods or any part thereof in India.
- 7. **Insurance :** The Goods supplied under the Contract shall be fully insured in Indian Rupees against loss or damage incidental to manufacture or acquisition, transportation, storage and delivery in the manner
- 8. **Transportation :** Where the Supplier is required under the Contract to transport the Goods to a specified place of destination within India defined as Project site, transport to such place of destination in India including insurance, as shall be specified in the Contract, shall be arranged by the Supplier, and the related cost shall be included in the Contract Price.



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9. **Change Orders :**

- The Purchaser may at any time, by written notice given to the Supplier make changes within the general scope of the Contract in any one or more of the following:
 - Drawings, designs, or specifications, where Goods to be furnished under the Contract are to be specifically manufactured for the Purchaser;
 - The method of shipping or packing;
 - The place of delivery; and/or
 - The Services to be provided by the Supplier.
 - The delivery schedule
 - If any such change causes an increase or decrease in the cost of, or the time required for, the Supplier's performance of any provisions under the Contract, an equitable adjustment shall be made in the Contract Price or delivery schedule, or both, and the Contract shall accordingly be amended. Any claims by the Supplier for adjustment under this clause must be asserted within fifteen (15) days from the date of the Supplier's receipt of the Purchaser's change order.

10. **Penalty :**

- If the Supplier fails to deliver any or all of the Goods or to perform the Services within the period(s) specified in the Contract, the Purchaser shall, without prejudice to its other remedies under the Contract, deduct from the Contract Price, as penalty, a sum equivalent to the percentage of the delivered price of the delayed Goods or unperformed Services for each week or part thereof of delay until actual delivery or performance, up to a maximum deduction of the Percentage. Once the maximum is reached, the Purchaser may consider termination of the Contract.
- The applicable rate is 0.5% per week and the maximum deduction is 5% of the contract price.

11. **Applicable Law :** The Contract shall be interpreted in accordance with the laws of the Union of India and all disputes shall be subject to place of jurisdiction at Kolkata.

12. **Right to Use Defective Goods :** If after delivery, acceptance and installation and within the guarantee and warranty period, the operation or use of the goods proves to be unsatisfactory, the Purchaser shall have the right to continue to operate or use such goods until rectifications of defects, errors or omissions by repair or by partial or complete replacement is made without interfering with the Purchaser's operation.

13. **Payment :**

Payments shall be made promptly by the Purchaser normally after submission of the invoice or claim by the Supplier.

a. **For Foreign Payment :**

In case of imports, payments are usually made through Letter of Credit (LC) / wire transfer / FDD wherever applicable. The LC will be opened for 100% value but the payment shall be released partly after despatch and partly after installation & commissioning. 90% of payment will be released on



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shipping documents and remaining 10% on successful installation and commissioning with submission of Performance Bank Guarantee of 10% of the order value. In case of Purchase Order value equivalent to INR 5 Lakh and above, 10% Performance Bank Guarantee (PBG) should be submitted before establishment of the LC/release of the payment.

b. For Indigenous Payment :

- The general conditions of payment for any indigenous items are 100% payment after successful installation & commissioning of the equipment. In case the equipment does not need any installation & commissioning the period shall be reckoned from the date of delivery & inspection. In case of Purchase Order value equivalent to INR 5 Lakh and above, 10% Performance Bank Guarantee (PBG) should be submitted before release of the payment.

14. Delivery :

a. For Foreign Consignment :

- Delivery of the consignment(s) should be made within a maximum of **8 weeks from the date of placement of purchase order unless otherwise specified so.** Within 24 hours of shipment, the supplier shall notify the purchaser and the insurance company by cable/telex/fax/e mail the full details of the shipment including contract number, railway receipt number/ AWB etc and date, description of goods, quantity, name of the consignee, invoice etc. The supplier shall mail the following documents to the purchaser with a copy to the insurance company :
 - 4 Copies of the Supplier invoice showing contract number, goods' description, quantity, unit price, total amount;
 - Acknowledgment of receipt of goods from the consignee(s) by the transporter;
 - Insurance Certificate if applicable;
 - Manufacturer's/Supplier's warranty certificate;
 - Inspection Certificate issued by the nominated inspection agency, if any, and the Supplier's factory inspection report;
 - Certificate of Origin; and
 - Two copies of the packing list identifying the contents of each package.
- The above documents should be received by the Purchaser before arrival of the consignment(s) (except where the Goods have been delivered directly to the Consignee with all documents) and, if not received, the Supplier will be responsible for any consequent expenses.



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b. For Indigenous Consignment :

The delivery of the consignment(s) should be made within 4-6 weeks from the issue of the Purchase Order, unless otherwise specified.

15. Bank Charges : For Foreign Procurement : The bank charges inside India to the applicant account and outside India to the beneficiary account.

16. Installation : Installation should be Free of Cost and should be completed within maximum 07-10 days after delivery of the consignment.

17. Warranty :

- The Supplier shall warrants that the Goods supplied under this Contract are new, unused, of the most recent or current models and that they incorporate all recent improvements in design and materials unless provided otherwise in the Contract. The Supplier shall further warrants that all Goods supplied under this Contract shall have no defect arising from design, materials or workmanship (except when the design and/or material is required by the Purchaser's Specifications) or from any act or omission of the Supplier, that may develop under normal use of the supplied Goods in the conditions prevailing in the country of final destination. The warranty should be comprehensive and on site.
- This warranty shall remain valid at least for 12 months after the Goods or any portion thereof as the case may be, have been delivered to and accepted at the final destination indicated in the Contract, or for 18 months after the date of shipment whichever period concludes earlier
- The Purchaser shall promptly notify the Supplier in writing of any claims arising under this warranty. Upon receipt of such notice, the Supplier shall immediately, within a reasonable period, arrange to repair or replace the defective goods or parts thereof free of cost at the ultimate destination. The Supplier shall take over the replaced parts/goods at the time of their replacement. No claim whatsoever shall lie on the Purchaser for the replaced parts/goods thereafter. In case any component has to be imported the same shall be done on DDU Kolkata basis and the purchaser shall provide the customs duty exemption certificate. If the supplier having been notified fails to remedy the defects within a reasonable period, the purchaser may proceed to take such remedial action as may be necessary, at the supplier's risk and expenses and without prejudice to any other rights, which the purchaser may have against the supplier under the contract.
- Warranty period shall be 12 months from date of acceptance of Goods. The Supplier shall, in addition, comply with the performance and/or consumption guarantees specified under the contract. If for reasons attributable to the Supplier, these guarantees are not attained in whole or in part, the Supplier shall at its discretion make such changes, modifications, and/or additions to the Goods or any part thereof as may be necessary in order to attain the contractual guarantees specified in the Contract at its own cost and expense and to carry out further performance tests. **The warranty should be comprehensive on site.**
- If a different period of warranty has been specified in the 'Technical Specifications' shall stand modified to that extent.
- The necessary warranty certificate in this effect should be furnished along with the consignment.



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18. **Training** : The Supplier is required to train the designated Purchaser's technical and end user personnel to enable them to effectively operate the total equipment.
19. **Supporting Equipment** : If equipment will require indigenous supporting instruments/accessories (computer, printer, online UPS etc.) at the time of the installation, the same should be quoted in separate quotation.
20. **Service Facility** : Supplier should mention about the possible service set up in India and how capable they are to provide after sales service.
21. **Force Majeure** :
 - The Supplier shall not be liable for forfeiture of its performance security, liquidated damages or termination for default, if and to the extent that, its delay in performance or other failure to perform its obligations under the Contract is the result of an event of Force Majeure.
 - If a Force Majeure situation arises, the Supplier shall promptly notify the Purchaser in writing of such conditions and the cause thereof. Unless otherwise directed by the Purchaser in writing, the Supplier shall continue to perform its obligations under the Contract as far as is reasonably practical, and shall seek all reasonable alternative means for performance not prevented by the Force Majeure event.
22. **Director, Bose Institute reserves the right to accept or reject any or all tenders either in part or in full. The reasons for rejecting the tender of a prospective bidder will be disclosed only when enquiries are made.**



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Bidder Information Form

[The Bidder shall fill in this Form in accordance with the instructions indicated below. No alterations to its format shall be permitted and no substitutions shall be accepted. This should be done of the letter head of the firm]

Date: [insert date of Bid Submission] Tender No.: [insert number for Invitation for bids]

1. Bidder's Legal Name [insert Bidder's legal name]
2. In case of JV, legal name of each party: [insert legal name of each party in JV]
3. Bidder's actual or intended Country of Registration: [insert actual or intended Country of Registration]
4. Bidder's Year of Registration: [insert Bidder's year of registration]
5. Bidder's Legal Address in Country of Registration: [insert Bidder's legal address in country of registration]
6. Bidder's Authorized Representative Information
Name: [insert Authorized Representative's name]
Address: [insert Authorized Representative's Address]
Telephone/Fax numbers: [insert Authorized Representative's telephone/fax numbers]
Email Address: [insert Authorized Representative's email address]
7. Attached are copies of original documents of: [check the box(es) of the attached original documents]

Signature of the Bidder
Name
Business Address



बसु बिज्ञान मन्दिर
BOSE INSTITUTE

P-1/12, C.I.T. Scheme VII-M, Kolkata 700 054, West Bengal, India

Ref : BI-K/E-TEND/01/2018-19

BID FORM

(to be submitted on the official letterhead of the bidder)

**The Director,
Bose Institute,
P-1/12, CIT Scheme-VII/M,
Kolkata - 700054 (W.B.) India**

Sir,

Having examined the bidding documents the receipt of which is hereby duly acknowledged, I/We agree to furnish required supplies/services in conformity with the Techno-Commercial Bid or such portions thereof at the prices given in the Price Bid on receipt of order for the same.

I/We agree to hold this offer open until _____ and to supply, install and commission the equipment and complete the whole of the work and hand over to the purchaser within the period of _____ weeks, from the date of receipt of intimation from you regarding acceptance of this tender/receipt of supply order.

I/We agree to submit the bank guarantee as specified in the form prescribed by your goodself for the due performance of the contract, if our bid is accepted.

I/We understand that you are not bound to accept the lowest or any bid you may receive.

(_____)
Signature of Bidder
With Office Stamp
Name & Address

Telephone No.:

FAX No.:

E-mail address:

Name & Designation of the Contact Person:



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Ref : BI-K/E-TEND/01/2018-19

TECHNO-COMMERCIAL BID FORM

1.	Tender reference No	:	
2.	Due date of bid submission	:	
3.	Main Item Model No.	:	
4.	Life Expectancy of the Equipment (in years)	:	
5.	Warranty Period (in years)	:	
6.	Delivery Period of the Equipment	:	
7.	Details of Bank Guarantee enclosed as Bid Security :	:	
	Name of the Bank	:	
	Branch	:	
	Address with Phone, FAX & E-mail Nos.	:	
	Amount Rs.	:	
	Valid Upto	:	
8.	Country of the Origin of the Equipment	:	
9.	Bid currency	:	

Contd.....



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Ref : BI-K/E-TEND/01/2018-19

10.	Schedule of Requirements :	:	
I.	Whether agreeing to all the terms and conditions including payment terms as mentioned in the bidding documents		
II.	Port of Shipment		
III.	Approximate Shipment Weight (chargeable weight) in Kg. of the packed consignment		
IV.	Approximate Dimensions/ Volume of the packed consignment		
Note ::			
1.	Adhering to the format given above is a pre-requisite for considering your bid.		
2.	All columns must be filled up.		
3.	Separate list should be attached where required in the same format giving details of each item.		
4.	Please indicate applicability.		
I/we certify that I/We have completely read and understood and agree to all the terms & conditions given in ITB.			

(
Signature of Bidder
With Office Stamp
Name & Address
)



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Ref : BI-K/E-TEND/01/2018-19

MANUFACTURERS' AUTHORIZATION FORM

No. _____

Dated _____

**The Director,
Bose Institute,
P-1/12, CIT Scheme-VII/M,
Kolkata - 700054 (W.B.) India**

Dear Sir:

I/We _____ who are established and reputable manufacturers of _____ having factories at _____ (address of factory) do hereby authorize M/s. _____ (Name and address of Agent) to submit a bid, negotiate and receive the order from you against your tender enquiry.

No company or firm or individual other than M/s. _____ is authorized to bid, and conclude the contract in regard to this business.

I/We hereby extend our full guarantee and warranty as per Clause 15 of the General Conditions of Contract and Clause of the Special Conditions of Contract for the goods and services offered by the above firm.

Yours faithfully,

(Name)

(Name of manufacturers)

Note: This letter of authority should be on the **letterhead of the manufacturer** and should be signed by a person competent and having the power of attorney to bind the manufacturer. It should be included by the Bidder in its techno-commercial unpriced bid.



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BIDDER'S PERFORMANCE STATEMENT FORM
(For a Period of Last 3 Years)

Name of the Firm.....

Order placed by (full address with Tel. No., Fax No. & e-mail address of purchaser)	Date	Description and quantity of ordered equipment	Date of completion of delivery as per Contract/ Actual	Remarks indicating reasons for late delivery, if any	Has the equipment been installed satisfactory? (Attach a certificate from the purchaser/ Consignee)

Place :

Signature :

Date :

Office stamp



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SERVICE SUPPORT DETAILS FORM

Sl. No.	Nature of training imparted	List of similar type equipments serviced in the past 3 years	Address, Telephone Nos., Fax and e mail address of the firm located in Kolkata, if any	Value of minimum stock of consumable spares held at all times.

Signature and Seal of the manufacturer/Bidder.....

Place :

Date :



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TECHNCAL COMPLIANCE STATEMENT FORM

An item-by-item commentary on the Purchaser's Technical Specifications demonstrating substantial responsiveness of the goods and services to those specifications or a statement of deviations and exceptions to the provisions of the Technical Specifications.

ITEM NAME			
Sl.No.	Tender Specifications	Bidder's Specifications	Deviation/ Remarks, if any Including justification

(Technical literature/brochures/manuals should be attached along with this format)

Please note:

1. Compliance/Deviation statement comparing the specifications of the quoted model to the required specifications. This statement should also give the page number(s) of the technical literature where the relevant specification is mentioned.
2. Bids must have supporting documents (technical literature or copies of relevant pages from the service manual or factory test data) for all the points noted above, failure regarding which may result in rejection of bid.
3. In case the bidder furnishes wrong or false information wilfully in the technical compliance chart, such action shall be viewed strictly and the bidders may be blacklisted.
4. Where there is no deviation, the statement should be returned duly signed with an endorsement indicating "No Deviations" .

Signature and Seal of the manufacturer/Bidder.....

Place :

Date :



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Ref : BI-K/E-TEND/01/2018-19

BID SECURITY FORM

(To be executed by a scheduled Bank in India on non-judicial stamp paper)

To
The Director,
Bose Institute,
P-1/12, CIT Scheme-VII/M,
Kolkata - 700054 (W.B.) India

Dear Sir,

Whereas (Name and address of Bidder) (hereinafter called "the Bidder") in response to your Tender Notification No. ----- dated ----- is submitting its bid for the supply of (Name and/or description of the goods) (Hereinafter called "the Bid").

KNOW ALL PEOPLE by these presents that WE (Name of bank) of (Name of country), having our registered office at (Address of bank) (Hereinafter called "the Bank"), are bound unto **Director, Bose Institute, Kolkata, INDIA** (Hereinafter called "the Purchaser") for the sum of (Amount of the Guarantee in Words and Figures) for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors, and assigns by these presents. Sealed with the Common Seal of the said Bank this ____ day of _____ 20 ____.

THE CONDITIONS of this obligation are:

1. If the Bidder withdraws its Bid during the period of bid validity specified by the Bidder on the Bid Form; or
2. If the Bidder, having been notified of the acceptance of its bid by the Purchaser during the period of bid validity:

contd.....



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3. Fails or refuses to execute the Contract Form if required; or
4. Fails or refuses to furnish the performance security, in accordance with the Instruction to Bidders.
5. This guarantee is valid up to(six months from date).

We undertake to pay the Purchaser up to the above amount upon receipt of its first written demand, without the Purchaser having to substantiate its demand, provided that in its demand the Purchaser will note that the amount claimed by it is due to it, owing to the occurrence of one or both of the two conditions, specifying the occurred condition or conditions.

This guarantee will remain in force up to and including forty-five (45) days after the period of the bid validity, and any demand in respect thereof should reach the Bank not later than the above date.

Date:

Signature.....

Place:

Seal of Bankers

(Complete Address/Contact Details with Tel./Fax/email etc)

Witness: 1.

2.



बसु बिज्ञान मन्दिर
BOSE INSTITUTE

P-1/12, C.I.T. Scheme VII-M, Kolkata 700 054, West Bengal, India

Ref : BI-K/E-TEND/01/2018-19

PERFORMANCE SECURITY FORM

(To be executed by a scheduled Bank in India on non-judicial stamp paper)

To
The Director,
Bose Institute,
P-1/12, CIT Scheme-VII/M,
Kolkata - 700054 (W.B.) India

Dear Sir,

Sub: Your Contract No. -----dated -----for

1. You have entered into a contract with reference no as given above with _____ (herein after referred to as the contractor) for the supply, installation, and commissioning of _____ (herein after referred to as stores) for the price and on the terms and conditions contained in the said contract.
2. In accordance with the terms of said contract, the contractor has undertaken to produce a bank guarantee for Rs. _____ (Rupees _____ only) being 10 % of the total value of the said stores supplied to you, for the due fulfilment of its obligations to you for due performance as per the contract during warranty period.
3. In consideration thereof, we hereby expressly, irrevocably and unconditionally undertake and guarantee as principal obligator on behalf of the contractor that in the event you submit a written demand to us that the contractor has not performed according to the contractual obligations included in the said contract, we will pay you on written demand, without demur and without reference to the contractor any sum up to a maximum amount of Rs _____ (Rupees _____ only). Your demand shall be conclusive evidence to us that such payment is due under the terms of the said contract. Payment by us to you will be made within thirty (30) days from receipt of your request making reference to this guarantee and on demand.
4. This guarantee shall not be revoked without your express consent and shall not be affected by your granting any indulgence to the contractor, which shall include but not be limited to postponement from time to time of the exercise of any powers vested in you or any right which you may have against the contractor and to exercise the same in any manner at any time and either to forbear or to enforce any covenant contained or implied in the said contract or any other course or remedy or security available to you, and our Bank shall not be released from its obligations under this guarantee by your exercising any of your rights with reference to matters aforesaid or any of them or by reason of any other act or forbearance or other acts of omission or commission on your part or any other indulgence shown by you or by any other matter or thing whatsoever which under law would, but for this provision, have the effect of relieving our Bank from its obligation under this guarantee.



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Ref : BI-K/E-TEND/01/2018-19

5. Notwithstanding anything herein contained, our liability under this guarantee is restricted to Rs _____ (Rupees _____ only) and the guarantee shall remain in force up to and including the _____ day of being reported to us by you and returned to us duly discharged.
6. Unless a demand or claim under this guarantee is made on us in writing on or before the aforesaid expiry date as provided above or unless this guarantee is extended by us all your rights under this guarantee shall be proscribed and we shall be discharged from the liabilities hereunder.
7. This guarantee shall not be affected by any change in the constitution of our Bank or of the contractor or for any other reason whatsoever.

Date:

Signature.....

Place:

Seal of Bankers

(Complete Address/Contact Details with Tel./Fax/email etc)

Witness:

1.

2.



बसु बिज्ञान मन्दिर
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Ref : BI-K/E-TEND/01/2018-19

Annexure- I

Technical Specifications

Production, test and support of PCIe cards for the ALICE experiment

Abstract

This technical specification concerns the supply of an estimated amount of 266 custom designed fibre optic interface PCIe units, called PCIe40.

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1. Indent purpose and Scope of supply

The purpose of the indent is the supply of 266 units of FPGA based PCIe40 Boards with optical I/Os along with Mezzanine cards and other accessories for the ALICE experiment at CERN. The PCIe40 is a complex electronics board with the latest FPGA technology and more than 1700 components. The job includes components procurement, assembly, factory and onsite testing. The successful bidder shall supply the PCIe40 as defined in this technical specification and the documents and drawings attached to it. The supply will be divided into a pre-series and series-production of two or more batches. The indenter reserves the right to split the contract between two contractors. The indenter reserves the right to survey the production site before releasing the purchase order.

1.1 Deliverables Included in the Supply and required quantities

The number of units to be manufactured is estimated to be:

- a) A pre-series to each contractor totalling 30 units;
- b) A first batch to each contractor totalling 80 series-production units;
- c) A second batch to each contractor totalling 156 series-production units.

The contractor shall provide a test data package composed of the following documents:

- i. Quality control record;
- ii. Test reports;
- iii. Certificate of conformity for each card and unit.

The contractor shall provide two years of basic warranty.

Although the PCB and the assembly of all soldered components shall be the same for all boards, the produced units are declined in two configurations. These “flavours” or “types” of the units are different only in the final mechanical assembly, that is, they differ only in the manually placed/populated optical components that go into sockets. The contractor shall manually mount these optical components to produce quantities of units as defined in the following table.

Type 1: “24TX/24RX”: 133 No. boards with 24 optical outputs and 24 optical inputs

Type 2: “00TX/24RX”: 133 No. boards with 0 optical outputs and 24 optical inputs

Note: Bill of Material (BOM) is the same for all the types except the number of optical transceivers and the number of optical ribbon cables to be placed manually.

The multilayer PCBs will be provided to the contractor by the indenter with the full documentation of quality inspection and proof of conformity.

1.2 Activities at the Contractor’s Premises

The contractor shall perform the following activities at their premises:

- a) Quality inspection of the provided PCBs and report the results according to indenter’s instructions;

- b) Ordering of passive and active components for the series-production in trays, reels, and cut tapes long enough for automated placement (manual placement is not allowed);
- c) Input quality control of all components;
- d) Assembly of the components on the PCBs and soldering;
- e) Quality control of the assembled boards;
- f) Production of complete units with the assembled PCBs, heat sink (with thermal gap filter), bracket (face plate), optical transmitters and receivers, and internal optical patch cords;
- g) Tests of the complete units including execution of tests specified by the indenter;
- h) Labelling, packing, and shipping;
- i) Diagnosis and repair or replacement of units during the two years basic warranty period.

The series production shall be preceded by the production of a pre-series. Production of the series shall not start before the indenter has given its formal approval of the pre-series in writing.

Subcontracting of the components assembly is not permitted.

1.3 Items provided by the indenter

The indenter will supply the contractor with:

- a) 268 PCBs for the mother board (possibly to be split between contractors) including 2 pcs spares;
- b) 268 PCBs for the power mezzanines (possibly to be split between contractors) including 2 pcs spares;
- c) Programmable Logic Programmers (PLC) needed to program the FPGAs or microcontrollers;
- d) Test bench for the power mezzanine;
- e) Test bench for the assembled PCIe40 units;
- f) Software and documentation for the execution of the required functional tests.

It is the responsibility of the contractor to perform input quality inspection of PCBs prior to assembly. In case the contractor identifies that any of these PCBs have been damaged during transportation, degraded due to incorrect storage or are of the wrong type, it shall notify the indenter in writing. The damaged components shall not be used for the production of the pre-series nor series-production.

In case PCBs are damaged during the assembly or testing, the contractor can order at its expense additional PCBs at the same cost granted to the indenter. The cost can be obtained by the qualified contractor from the indenter. All PCBs provided by the indenter (working or not) shall be returned to the indenter.

1.3.1 Documents supplied by the indenter

The PCIe units shall be manufactured on the basis of design documentation supplied by the indenter. The following documents are attached to the Technical Specifications:

- a) Schematics;

- b) Bill of Material (BOM);
- c) Pick & Place file and assembly drawings;
- d) Technical drawings for bracket, heat sink and optical patch cords; with reference links and contact information for easy ordering of these components;
- e) Description of the test procedure.

Updated versions will be provided at the award of the contract.

1.3.2 Documents available from the PCB manufacturer

For the PCB of the motherboard:

- a) Analysis of two metallographic cross sections for the motherboard coupon. The cross sections shall be etched in order to highlight the different copper layers. The cross sections shall be on each fabrication panel in the PCIe40 coupons located inside the handling strip of the board, one is in X, the second in Y axis;
- b) Results of an electrical test of each manufactured bare PCB;
- c) Results of an impedance measurement for each manufactured bare PCB by means of test coupon.
- d) coupon.

For the PCB of the mezzanine:

- e) Analysis of metallographic cross section for the mezzanine coupon. The cross sections shall be etched in order to highlight the different copper layers.

1.4 Basic warranty and repair

All units shall be delivered with a basic warranty of two years starting from the date of acceptance by the indenter. During this period, the contractor shall maintain at its premises a test bench and tools that allow for the:

- a) Diagnosis of faults down to the level of the components;
- b) Purchase and replacement of defective components;
- c) Verification of units after the execution of a repair.

The repair turnaround time shall be at most 3 weeks starting from the reception of the broken unit by the contractor to the reception of the repaired unit by the indenter.

1.5 Optional: Extended warranty

The supplier should state whether an extension of the basic warranty (as mentioned in 1.4) for an additional three years (i.e. five years in total) or an additional eight years (i.e. ten years in total) can be offered. The extension of the basic warranty would be ordered by the indenter at least one year before expiry of the basic warranty.

1.6 Modification of initial production volume

The indenter reserves the right to modify the initial quoted number of 266 units at time of the purchase order by plus 25% or minus 25% for the same unit price or lower.

1.7 Additional production

The indenter reserves the right to order at same unit price or lower up to 260 additional units up to 31 Dec 2019 with a maximum delivery lead time of 10 weeks and up to 48 additional units at same unit price or lower up to 31 Dec 2020 with a maximum delivery lead time of 24 weeks. It needs to be foreseen that part of the additional modules will be ordered and paid via different organisations for the same unit price or lower.

2. Performance of the Contract

2.1 Delivery schedule

Once the contractor is notified of the award of the contract, the contractor shall deliver the supply according to the following delivery schedule, once the contractor receives the production version of the technical files:

- a) Delivery of 30 pre-series units (possibly to be split between contractors) within 12 weeks from date of notification of the contract;
- b) Acceptance of the pre-series within 4 weeks by the indenter;
- c) Production and delivery of 80 series-production (possibly to be split between contractors) units within 10 weeks after the acceptance by the indenter of the pre-series;
- d) Acceptance of the 80 units within 8 weeks by the indenter;
- e) Production and delivery of 156 series-production (possibly to be split between contractors) units within 12 weeks after acceptance by the indenter of the first batch;
- f) Acceptance of the 156 units within 10 weeks by the indenter.

For each contractor, the production of the pre-series shall be organized in two steps:

- g) Assemble 2 units to validate each step of the production. The indenter will install the testing tools at the contractor premises and will train the contractor staff. The functional tests will be run jointly by the indenter team and the contractor staff at the contractor premises;
- h) As soon as the first 2 units pass the functional tests, assemble the remaining ones and run the functional test at the contractor premises and at the indenter site. Then all units will be stressed by acceptance tests run at the indenter's site. The series-production will be launched if all units of the pre-series pass all tests.

2.2 Production Process

The contractor shall manufacture the cards according to the Manufacturing Files provided by the indenter as described in sections 1.3 and 5. Deviation from these Manufacturing Files is not allowed. However, it is possible for the contractor to propose improvements to the Manufacturing Files. Those improvements can be either accepted or rejected by the indenter and, if relevant, shall be added to the Manufacturing Files.

2.3 Deviations from this Technical Specification

If the contractor discovers that the contractor has misinterpreted this technical specification, this shall not be accepted as a justification for deviation from the technical

specification and the contractor shall deliver the supply in conformity with this technical specification at no extra cost.

The indenter reserves the right to modify this technical specification. Any change in technical specifications by the indenter and its consequences shall be mutually agreed between the indenter and the contractor.

2.4 Assembly of the units

The unit consists of a motherboard with a large FPGA and its associated logic on which a power mezzanine is mounted. It has a bracket on which are fixed two, four or eight optical patch cords coming from transceivers spread over the board. A passive custom heat sink is mounted on top of the main FPGA of the motherboard.

The power mezzanine is also cooled by several small passive custom heat sinks. Before running the functional tests, the following operations shall be done:

- a) Power mezzanine:
 - i. Mount the heat sinks over the power mezzanine.
- b) Motherboard:
 - i. Fix the bracket to the main board;
 - ii. Assemble the optical patch cords between the optical transceivers and the bracket;
 - iii. Mount the heat sink over the large FPGA;
 - iv. Insert the two SFP+ transceivers;

The power mezzanine shall not be mounted immediately on the main board because it shall be tested individually before (see Section 2.5).

Subcontracting of the component assembly is not allowed.

2.5 Tests

The contractor shall be responsible for the technical conformity of the units supplied to the contractor. Components of the test bench that are not commercially available will be provided free of charge by the indenter and remain the property of the indenter for the duration of the contract. In case of a malfunction of such a device the indenter will provide a replacement unit free of charge.

Two sets of tests are to be performed:

- Basic
- Functional

These are elaborated below.

2.5.1 Basic Tests carried out by the contractor

- a) Assembled Printed Circuit Boards;

The contractor shall individually inspect all parts according to the applicable standards (see section 3.5). All component defects and assembly errors shall be eliminated;
- b) Mechanical Parts

The dimensions of the mechanical parts shall be checked to ensure conformity, i.e. the dimensions shall be within their tolerances, in particular the thickness of the PCB, the height of the heatsink, and the lengths of the optical ribbons;

c) Temperature cycling

Each mezzanine and motherboard will be tested with 2 thermal cycles following the IPC9701A standard (0 °C to 100 °C with 10 minutes dwells at both temperature extremes and an increase and decrease of temperature in the range 10 – 15 °C/min);

d) Flying probes test (basic electrical measurements)

A flying probe test will be run on each main board and power mezzanine after the temperature cycling. After this test, all component defects and assembly errors shall be eliminated.

e) Specific tests for the pre-series

The pre-series will be tested in view of checking the PCB and the quality of assembly. For this purpose, before functional testing, the units will be subjected (unpowered) to 10 thermal cycles following IPC9701A standard (0 °C to 100 °C with 10-minute dwells at both temperature extremes and an increase and decrease of temperature in the range 10 – 15 °C/min).

f) Specific tests for the series-production on a sampling basis

The temperature cycling test described in the bullet above will be performed on one unit chosen randomly from a batch of every 30 units.

2.5.2 Functional Tests carried out by the contractor

A functional test for each assembled PCB shall be performed. The indenter will supply the required test equipment to the contractor and the indenter personnel will undertake the training of the contractor's staff in the use of this equipment. The test is performed in two steps. First the power supply mezzanines shall be tested.

i. Test of the power supply mezzanine cards

The mezzanine is inserted in a specific test bench containing up to 4 cards. The test is driven by a PC-server logging the results of the test and the mezzanine information. The duration of the test of 4 cards is estimated to 5 minutes.

ii. Test of the PCIe40 main board equipped with the already tested power mezzanine

The power mezzanine is then mounted on the motherboard and the whole unit is inserted into a rack containing up to 8 units and connected to the PC-server which will drive the test and store the results as well as the board information. The duration of the test of 8 units simultaneously is estimated to 15 minutes.

The flying probe and functional tests cover a majority of the total functionality of the card. All items requiring component changes, re-soldering, etc. shall be classified as untested and shall be passed through the entire test procedures again.

Test Report

A test report shall be provided with every power mezzanine, motherboard and units. The report shall comprise:

- a) The card's serial number;
- b) Manufacturing and test date;
- c) Name of person performing the test;
- d) Reference to or copy of assembly AOI(Automatic_Optical_Inspection) and X-Ray test result;
- e) Reference to PCB batch and serial_numbers (unless identical to card serial number);
- f) Cross-reference to or copy of PCB electrical and impedance test results provided by the PCB manufacturer;
- g) Description of the executed test sequence (e.g. insert, boot, installation of test tools/fiber, functional test, power down, etc.);
- h) Overall test result, as given by functional test;
- i) Detailed report of functional test (user defined) as an attachment.

2.5.3 Tests carried out at the indenter's site

Acceptance tests will be performed at the indenter's site to establish that each unit meets the technical specification and that no damage or changes have occurred during transport. These tests will be run on each unit. They will consist in repeating the functional test and in running Bit Error Rate tests on all the high-speed lanes of the unit (optical links, PCIe) at full speed during 48 hours when the FPGA is dissipating 75% of the maximum power. They will be considered as successful if no error is detected and if all the peripherals on the motherboard behave nominally.

A representative of the contractor is not required for these tests but may be present. In the event of any manufacturing errors found during the acceptance test, the contractor shall correct them. Acceptance of a batch will only be granted after successful tests.

The indenter reserves the right to reject the pre-series and to terminate the contract in the case that more than one unit fails the acceptance test and cannot be repaired by the contractor, independently of whether the units have been or have not been subjected to stress testing in an environmental chamber. The repair turnaround time shall be at most 3 weeks starting from the reception of the broken unit by the contractor to the reception of the repaired unit by the indenter.

The indenter reserves the right to reject entire batch in the case that more 5% of the units within a batch fail the acceptance test and cannot be repaired by the contractor, independently of whether the units have been or have not been subjected to stress testing in an environmental chamber. The repair turnaround time shall be at most 3 weeks starting from the reception of the broken unit by the contractor to the reception of the repaired unit by the indenter.

In the event that during the warranty period, the units do not fully meet this technical specification, the indenter reserves the right to repeat the acceptance tests. Any deviations from the specification shall be corrected by the contractor at his expense.

Long-term tests for the Pre-Series at the indenter's site

- a) Specific tests for the pre-series
The pre-series will be inserted in server class PC and a long-term (one week) continuous acceptance tests will be performed;
- b) Specific tests for the series-production on a sampling basis

The long-term test described in the bullet above will be performed on the unit chosen randomly every 30 units for the extended temperature cycling.

2.5.4 Tests failure

The following procedure shall be followed as soon as defaults are detected:

- a) Open and fill the nonconformity report in electronic form.
It mainly contains the list of failing tests as well as reference to the full test report;
- b) Send the nonconformity report to the indenter and setup a conference call with the indenter's experts of the PCIe40unit;
- c) Send the unit to the indenter when issues cannot be resolved by the conference call. Exhaustive debug procedures will be run by the indenter's experts in order to understand issues;
- d) Send back the unit to the contractor, if it can be repaired, otherwise it is considered as failing the acceptance test and destroyed;
- e) Run the functional test at contractor;
- f) Run the functional and the acceptance tests at the indenter's site;
- g) Close the nonconformity report; this formal operation happens as soon as a decision is taken. The report is distributed to the contractors and to the indenter.

The number of units which pass through this procedure shall not exceed 5% of the units within a batch.

2.6 Contract Follow-Up and Progress Monitoring

The contractor shall assign a person responsible for the technical execution of the contract and its follow-up, as well as a person responsible for the commercial follow-up, throughout the duration of the contract. They shall be able to communicate in English.

The contractor shall send a written progress report to the indenter every two weeks until completion of the contract. All communications and documents shall be in English.

This report shall include all the necessary information, in particular actual progress in comparison to scheduled progress.

2.7 Packing and Shipping

The contractor is responsible for the packing and, where specified by the indenter, for the transport to the indenter. In all cases, the contractor shall ensure that the equipment is delivered to the indenter without damage and any possible deterioration in performance due to transport conditions.

The contractor shall comply with professional regulations in matter of packing and shipping. In particular with the following:

- a) Each assembled and tested unit shall be individually packaged in a metallized ESD protective bag that is closed with an ESD Sensitive Product warning label. The use of pink polyethylene ESD protective bags is not accepted.
- b) Each single unit in its ESD bag shall be placed in an individual cardboard box with appropriate shock absorbing material.
- c) Each assembled unit shall be individually identified and associated with the PCB "test coupon".

2.8 Spare Parts

It is the responsibility of the contractor to provide spare parts for the duration of the warranty period of the units (except for the components supplied by the indenter). Replacements of components (e.g. due to obsolescence) are subject to negotiation with the indenter and shall be approved by the indenter. For the components supplied by the indenter, it is the indenter who will track obsolescence and look for alternative components.

3. Technical Requirements

3.1 General Description

The supply concerns fibre optic interface units in PCIe form factor. Each unit consists of a mezzanine mounted on a motherboard. They house a wide range of active and passive components of several packages types. In addition, the motherboard drives 132 high speed serial links at up to 10 Gbits/s and currents in the PCB up to 60 A. A brief overview of the key parameters and technologies used for the units is given below. Further details can be found in the files listed in section 1.3.

Each unit consists of the following hardware components and technologies:

- a) Standard Gen3 PCI-Express form factor PCB, with 16 lanes edge connector interface,
- b) Intel Arria 10 FPGA (1932 pins BGA package) and fine pitched packages (0.50 mm)
- c) Up to 4 pcs of socket-mounted 12-lane parallel optical transmitters, and up to 4 pcs of socket-mounted 12-lane parallel optical receivers providing up to a total of 48 bidirectional optical links with signalling rates up to 10 Gb/s per link. (These optical components are connected through the PCB lanes directly to the FPGA gigabit transceiver pins.)
- d) These optical components are also referred to as Avago/Broadcom TX and RX Minipods;
- e) 2 SFP+ transceivers with signaling rates up to 10 Gb/s per link;
- f) Various surface mount components with fine pitched packages (incl. QFN packages);
- g) Miniaturized passive components (0201 minimum);
- h) A few pin-through-hole components (e.g. SMA connectors, jumper pins) to be soldered manually;
- i) A power mezzanine board to be produced by the contractor;
- j) Mechanical components, including heat sink, thermal gap pad, bracket, various screws, nuts and washers;
- k) 12-lane connectorised optical ribbon cables with customized lengths connecting the optical transmitters and receivers to the face plate optical adapters.

3.2 Printed Circuit Boards

The key parameters of the *main board* PCB are:

- a) Overall PCB dimensions: 241.3 × 111.15 mm, contoured according to PCI Express Card Electromechanical Specification Revision 3.0;
- b) 14 layers high temperature, low loss material ($E_r < 3.7$ at 5 GHz, $D_f < 0.012$ at 5 GHz);
- c) Maximum overall thickness of (1.57 ± 0.13) mm;
- d) 18/35/70 μm copper;
- e) 50/100 μm core & prepreg;
- f) 0.09 mm min. trace width and clearance;
- g) Differential controlled impedance 85 and 100 Ohms (tolerance $\pm 15\%$);
- h) Single ended controlled impedance 50 Ohms (tolerance $\pm 15\%$);
- i) Full & blind vias, 5 drill groups (1-2, 2-3, 12-13, 13-14, 2-13), vias in pads;
- j) More than 10 000 vias among which 67 % are microvias.

The key parameters of the *power mezzanine* PCB are:

- a) Overall PCB dimension: 90 × 70 mm
- b) 6 layers high temperature, standard FR4 material;
- c) Maximum overall thickness of (1.57 ± 0.13) mm;
- d) 35/70 μm copper;
- e) 250 μm core & prepreg;
- f) 0.125 mm min. trace width and clearance;
- g) Full & blind vias, 3 drill groups (1-6, 1-2, 5-6), vias in pads.

The PCB for the *main board* is the most critical item since it embeds a large number of staggered vias connected to expensive components with 2 000 high density connections. In addition, it has to deal with strong requirements on the impedance and carry high current flow.

The multilayer PCB is provided by the indenter (see section 1.3). The contractor shall be responsible for the quality inspection of the received PCBs and take the responsibility for the accepted ones.

Any PCBs to be held in stock for more than one month shall be dried out and sealed in appropriate moisture barrier bags with a small bag of desiccant inserted. The IPC standard 1601 shall be applied.

3.3 Material

3.3.1 Material and Components Purchasing

The contractor shall purchase all materials and components exactly as specified in the BOM listed in the Manufacturing Files. The selected components are RoHS compliant (see Section 3.5). No alternative components shall be used without the indenter's written approval. The contractor shall procure components from official distributors. It shall not procure component from brokers without a written agreement from the indenter.

The components are:

- a) Intel Arria10 FPGA (the fibre optic interface PCIe unit is a project which is followed by the Intel Company. Please specify that Arria10 FPGAs are for the project ALICE when negotiating with the official distributor);
 - b) Broadcom “Minipod” optical transmitters and receivers (socket mounted);
 - c) Surface mounted (SMD) integrated circuits;
 - d) Surface mounted (SMD) discrete devices such as resistors, capacitors, diodes, transistors, ferrites;
 - e) Connectors and sockets;
 - f) Custom heat sink from Japan company, PCIe40_V2b_Heat_Sink:
 - o Alpha Company Ltd.
 - o 256-1 Ueda
 - o NUMAZU-City
 - o 410-0316 SHIZUOKA JAPAN
 - o Contact: Mr Takashi Yanagidaira Tel: +81 55 966 0789
 - o Email: t-yanagi@micforg.co.jp;
1. Optical patch cords (PCIe40_V2b_Optical_Patch_Cords);
 - o Sylex, s.r.o.
 - o Mlynskéluhy 31
 - o 821 05 BRATISLAVA 2
 - o SLOVAKIA;
 - o Contact: Michal Vincze, Tel: +421 2 4820 1828
 - o Email: mvincze@sylex.sk
 - o Web: sylex.sk
 2. Bracket (a.k.a.face plate), (PCIe40_V2b_Face_Plate);
 - o L.T.I. (Loire TolerieIndustrielle)
 - o 1, rue Gutenberg
 - o 42340 VEAUCHE
 - o FRANCE.
 - o Contact: Tel: +33 4 77 94 37 23
 - o Email: lti.tolerie@wanadoo.fr;
 - o Web: www.lti.fr

The testing of standard components (that is all non-customised components ordered from electronic distributors) is not required. However, the contractor shall check that the correct components have been received.

If you need any help please contact the indenter for a possible list of suppliers.

The contractor is asked to provide the sources of all components at time of the bid.

3.3.2 Traceability

The contractor shall at the end of the production period provide in a spread-sheet file the date, code and specific reference (manufacturer) of each component used for the execution of the production. This allows, upon discovery of a faulty component,

ascertaining whether the whole production is affected or not. Certificate of Conformance (CoC) must be provided from the original manufacturer for the active components.

3.3.3 Storage

The indenter requires a strict procedure to be applied to protect all components in goods reception and storage areas. This is particularly important for surface mounted devices. The components shall be stored in conditions that minimize the growth of oxides on surfaces to be soldered and held in sealed bags or boxes containing dry desiccant (e.g. Silica Gel). In addition, before mounting, components shall be dried 24 hours in a stove.

3.4 Assembly work

3.4.1 Assembly of the Printed Circuit Boards

The assembly of the PCBs will consist of placing and soldering of surface mounted components on both sides of the cards followed by the manual soldering of a few pin-through-hole components. The application of the IPC Standards Class 2 (see Section 3.5) shall be fully respected, especially for the following points:

- a) Handling Electronic Assemblies;
- b) Component Installation Location/Orientation;
- c) Soldering Acceptability Requirements;
- d) Cleanliness Acceptability Requirements;
- e) Marking Acceptability Requirements;
- f) Surface Mount Assemblies Acceptance Requirements.

The cards shall be soldered using lead-free solder and shall be RoHS compliant. Either reflow or vapour phase soldering shall be used.

In any of the two cases, thermal profiling is required by sacrificing a main and a power mezzanine board in the test soldering procedure needed for the thermal profile investigation. For such test soldering, thermally equivalent dummy of the FPGA (e.g a functionally faulty one, or thermal dummy available from the component manufacturer) can be used.

3.4.2 Cleaning

Both sides of the assembly shall be cleaned and a test for ionic residues is required (IPC/EIA J-STD-001, Cleanliness Designator C-22). Also, after rework or repair, cards shall be cleaned to meet the Cleanliness Designator C-22.

3.4.3 Identification

Each assembled card shall be individually identified with a QR code. It shall include the batch number and a unique identification number for each card, as well as its version if modifications are made during the manufacturing period. The unit number will be the same as the mother board number. Its associated power mezzanine card will be stored in a data base describing the associations.

3.5 Applicable Standards, Rules, and Regulations

The supply shall comply with CERN and European regulations, including but not limited to:

3.5.1 Applicable International Standards

Hazardous material content for substances listed in the RoHS Directive shall be within the limits defined in EU Directives 2011/65/EU and 2012/19/EU and relevant amendments.

The contractor must have a valid ISO 9001:2008 series certification appropriate to the subject of the specification. The same regulations apply for sub-contracts.

For the assembly of the units, the following international industrial standards shall be followed and met:

1. IPC Standard IPC-A-610 (Class 2);
2. IPC Standard IPC/EIA J-STD-001 (Class 2);
3. Cleanliness Designator C-22 (both sides of assembly to be cleaned; test for ionic residues required).

In case of conflict, IPC-A-610 shall prevail IPC/EIA-J-STD-001.

3.6 Manufacturing and Tooling

The contractor shall follow all the necessary operations and shall have available all the tooling for the proper execution of the contract.

The process and equipment for the main board assembly shall comply with the following steps:

- a) MSL controlled storage of the components and the PCB;
- b) Baking of the components (as per the data sheets) and the PCB (minimum 12h@110°C);
- c) SAC 305 (Tin 97%/Silver3%/ Copper 0.5%) solder paste coalescence test;
- d) SPI (Solder Paste Inspection) in 3D is mandatory in order to guarantee good solder paste deposition
- e) Pick and place and test solder a PCB for a soldering thermal profile investigation shall be made with tooling (solderStar, Datapack, ...) (See also section 3.4.1)
- f) Full AOI (Automated Optical Inspection) control, X-ray inspection, and flying probe test shall be made after thermal stressing of the assembled boards (main board and mezzanine, specific life cycle tests see 2.5).

As a general rule, the components placement shall be fully automated. Manual placing of SMD components (based on assembly drawings) is strictly not permitted. For any exception from automated placement, the contractor shall negotiate with the indenter, and ask for a written agreement. In all cases the Pick&Place file shall rule the components positioning. (Human readable assembly drawings are provided only as a further help.)

3.7 Operational Conditions and Environmental Conditions

The unit will be supplied by a 12 V power supply and can dissipate up to 150 W. The units will be used in server-grade PCs and operated 24/7. The air temperature inside of the PC will be between 10 and 40 °C. During operation, the unit temperature will be at most 35 °C and can exceptionally be higher for short periods of time. The humidity will be 10-80 % non-condensing. The units are expected to operate for 10 years.

3.8 Quality Assurance and Documentation

The following quality assurance operations shall be done:

- a) PCB and components entrance inspection;
- b) 3D SPI;
- c) Full AOI;
- d) X-ray inspection;
- e) Marking of each card with a QR code containing the manufacturer's identifier and the date of manufacturing (year and week);
- f) The staff involved in quality control shall be IPC certified and follow IPC class 3 standards for the following:
 - i. The staff involved in quality control shall be IPC certified and follow IPC class 3 standards for the following;
 - ii. the mezzanine and motherboard assembly;
 - iii. the repair of units.

A written record of these test results shall be presented to the indenter for each card, see also section 3.8.1. It shall bear an individual manufacturer's identifier and the date of manufacturing (year and week).

Description of the tests for the PCIe40_v2b *power mezzanine*, the PCIe40_v2b *main board* and the *fully assembled PCIe40 v2 units* are all described in the Annex with the expected content for control records. Fully detailed technical documentation of the test procedures will be provided by the time of contracting.

3.8.1 Quality control records

All specified tests and measurements carried out during all stages of production, from raw material procurement up to delivery and installation shall be recorded. All cards shall be produced according to ISO 9001 such that complete conformity with the requirements of this specification is achieved.

This process includes individual sub-assembly inspection and test procedures accompanied by written records in electronic format at each stage, and shall allow all faults to be rapidly located, identified and their causes eliminated by the contractor. Any modifications to the material resulting from a systematic manufacturing fault shall be carried out on all cards by the contractor. It cannot be sub- contracted and it shall be done at the contractor's cost.

- a) The contractor shall submit all documents produced in electronic format:
- b) Text documents in Microsoft Word®, or OpenDocument Text (.odt) and/or PDF format;
- c) Schedule in Microsoft Project® or in Microsoft Excel®, or OpenDocument or in PDF format, if needed, OpenDocument formats.

4. Qualification for the assembly of the PCI40 Boards

The potential bidder for the development of the PCIe40 board, the firm shall satisfy the specific criteria as detailed below:

4.1 Type of Firm

- a) In order to qualify for the bid, the respondent shall be a single firm, whose competence and experience cover all the specified technical domains for this project and meeting all the requirements below.
- b) Financial Solvency: The firm must have an annual turnover of rupees 10 Crore for Engineering and manufacturing services (EMS) for last 3 years.
- c) In the case of subcontracting(of only few attachments like brackets, but not the assembly of components on the main board and mezzanine), the Indenter shall be informed of all the proposed subcontractors. The Indenter reserves the right to refuse the participation of a subcontractor. The Indenter reserves the right to audit the proposed subcontractors.

4.2 Administrative Situation

The firm shall

- a) not be involved in bankruptcy proceedings, prosecution for debt, sequestration or any analogous situation arising from a similar procedure provided for in law;
- b) not have made arrangements of any kind with creditors for their benefit;
- c) not have been subject of a judgment for fraud, corruption or any other illegal activity.

4.3 Competence and Experience

- a) The firm shall have proven experience in the field of manufacture of assembly of highly complex PCBs with FPGAs with more than 1000 ball grid array (BGA) connections of 0.5 mm pitch, QFN and QSP packages with a 0.4 mm pitch, and passive components of size 0201, in a highly automated CAM controlled industrial process. Manual placement of components by assembly drawings are strictly forbidden even at lower quantities. (Assembly drawings can be used only in cross-checking and verification).
- b) The firm should have expertise in testing PCBs with FPGAs with at least 1000 ball grid connections of the size 0.5 mm and smaller as well as high speed (10 Gb/s) optical link components or similar.
- c) The firm shall provide at least two references/purchase order of projects that are similar in scope, complexity and volume since 2013. The Indenter reserves the right to verify the references provided.

4.4 Size of the Firm

- a) The firm must have at least 10 technical employees in the field of component assembly of boards and quality testing of such mounted PCBs.
- b) Capability of testing shall cover optical inspections, 3D X-ray imaging (in-house or third- party), as well as the competence of electrical measurements and functional testing of complex, high speed (~10 Gb/s) digital circuits.

4.5 Technical Compliance

The firm shall demonstrate the ability of working according to industrial standards like IPC standard for class 3 PCB assembly.

4.6 Communications

The firm shall make available at least one commercial contact person and one technical contact person for the entire duration of the contract.

5. ANNEXES

Technical Annex to the Technical Specification, including

- a) Technical files for the purchasing of components PCIe40 V2b BOM file budgetary, PCIe40 V2b External Components BOM file budgetary, PCIe40 V2b PowerMezz BOM file budgetary - all attached;
- b) Technical files for the manufacturing / assembly of units (PCIe40 V2b pick&place file, PCIe40 V2b Power Mezz pick&place file, PCIe40 V2b Assembly Drawing file, and PCIe40 V2b Power Mezz Assembly Drawing file) - t.b.d;
- c) Description of the Testing Procedure. – t.b.d.

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Line No.	Part Name	VALUE	MANUFACTURER	REFERENCE (Manuf. P/N)	Qty /card	REMARKS
Active Components						
1	10M04SC U169		Intel	10M04SCU169C8G	1	
2	2N3904BU		Fairchild	2N3904BU	2	
3	ATMGA128		Microchip	ATMEGA128L-8MU	1	
4	BZX84C-SOT23		Diodes Inc.	BZX84C2V7	2	
5	CPPM_LED-0603		Osram	LG L29K-F2J1-24	13	
6	CPPM_LED-0603		Rohm	SML-311YTT86K	1	
7	CY7C68013A		Cypress	CY7C68013A-56LTXC	1	
8	DIODE_B120-13-F		Fairchild	MBR5130	1	
9	DS1818		Maxim Integrated	DS1818R-5+T&R	1	
10	DS90LV804		Texas Instruments	DS90LV804TSQ/NOPB	2	
11	EPCQ_L_256_512_1024 (Optional)		Intel (Altera)	CPPM_BGA24_6X8	1	
12	FDMC8878		Fairchild	FDMC8878	4	
13	FDV305N		Vishay	SQ2310ES-T1_GE3	3	
14	I2C_SERIAL_EEPROM-CMS		On semiconductor	AT24C02C-XHM-T	1	
15	IDT_830S211_01		IDT	830S21AMI-01LF	1	
16	ISL6115A		Intersil	ISL6115AIBZ	2	
17	LED3C_APTF1616		Kingbright	APTF1616SEEZGQBDC	7	
18	LM2594M33		Texas Instruments	LM2594M-3.3	1	
19	LT1389		Linear Technology	LT1389BCS8-1.25#PBF	1	
20	LT3082		Linear Technology	LT3082EST#PBF	1	
21	LTC2418		Linear Technology	LTC2418CGN#PBF	1	
22	LTC2498		Linear Technology	LTC2498CUHF#PBF	1	
23	LTC2990		Linear Technology	LTC2990CMS#PBF	3	
24	LTC4365		Linear Technology	LTC4365CTS8#TRMPBF	3	
25	MAX13042		Maxim Integrated	MAX13042EEBC+T	3	
26	MAX1619		Maxim Integrated	MAX1619MEE+	1	
27	MAX3378EPD		Maxim Integrated	MAX3378EETD+T	2	
28	MAX3378EPD		Maxim Integrated	MAX3378EEBC+T	2	
29	MAX6820		Maxim Integrated	MAX6820UT+T	2	
30	MAX811		Maxim Integrated	MAX811TEUS+T	1	
31	MAXV_2M2210_F256		Intel	5M2210ZF256C5N	1	
32	MMBT3904-SOT23		Fairchild	MMBT3904	4	
33	OSCILLATOR_MCO-1S3-PE-6P		IDT	XLH730040.078900X	1	
34	OSCIL_LVDS_100MHZ		Epson	Q3805CA100005 EG-2121CA 100 MHZ	1	
35	OSCMHZ_CMOS		Epson	X1G0039510002 SG-210SEH 100 MHZ L	1	
36	OSCMHZ_CMOS		Epson	X1G0039510001 SG-210SEH 125 MHZ L	1	
37	PCA9515		Texas Instruments	PCA9515BDGKR	4	
38	S197_MAX13042		Maxim Integrated	MAX13042EEBC+T	2	
39	S1_10AX115SF45		Intel	10AX115S3F45E2SG	1	Project price negotiated with Intel!
40	S29GL01GS		Cypress	S29GL01GS11FHIV10	1	
41	SC18I602		NXP	SC18I602BIPW,112	1	
42	SI53154		Silicon Labs	SI53154-A01AGM	1	
43	SI53340-QFN16		Silicon Labs	SI53340-B-GM	2	
44	SI53344RHD		Silicon Labs	SI53344-B-GM	1	
45	SI5344		Silicon Labs	SI5344A-B-GM	1	
46	SI5345		Silicon Labs	SI5345A-B-GM	2	
47	SI7106		Vishay Semicon.	SI7106DN-T1-E3	2	
48	SN65LVDS1		Texas Instruments	SN65LVDS1D	1	
49	TCA9517		Texas Instruments	TCA9517DGKR	8	
50	TPD2EUSB30/A		Texas Instruments	TPD2EUSB30ADRTR	1	
51	XTAL_24MHZ		Abracon	ABM8G-24.000MHZ-18-D2Y-T	1	

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52	XTAL_54MHZ		AVX/Kyocera	CX3225SB54000D0FPJC2	3	
Connectors, Sockets, Switches, Jumpers						
53	AFBR_811 or 821		FCI	55714-102LF	8	Sockets for the optical minipods
54	AFBR_703		Molex	74441-0010	2	Socket for the SFP+ optical modules
55	BARCON3P		Harwin	M20-9990346	1	
56	BORNE10P_FR-20A		Samtec	BCS-110-L-S-TE	1	
57	CON10P_CPPM-COUDE_M		Harwin	M40-4011046	1	
58	CON10P_CPPM-VERTICAL_M		Harwin	M40-3011046	2	
59	CON14P-RDUI		Samtec	BCS-107-L-D-TE	1	
60	CON6P-BARC		Samtec	BCS-106-L-S-TE	3	
61	CON8P_CPPM-SILF		Samtec	BCS-108-L-S-TE	1	
62	MOLEX_CONNECTOR_SD50418918XX		Molex	504189-1870	1	
63	MINI_FIT_8		Molex	39-30-0080	1	
64	MINI_USB_B		GCT	USB2066-05-RBHM-15-STB-00-00-A	1	
65	PCOAX-SMAD		Amphenol RF	901-144-8RFX	3	
66	POUSSOIR-4P1		ALPS	SKHHAKA010	2	
67	SWITCHCPPM-8_CMS		Multicomp	MCDHN-08F-T-V	2	
68	SWITCHCPPM-8_CMS		Multicomp	MCDHN-06F-T-V	1	
69	PLOT_RADSSERT-143		Amphenol Industrial	10-737491-001	5	

Inductors						
74	INDUCTANCE-10U,CMS_1812		Laird Technologies	HI1612X560R-10	1	
75	INDUCTANCE_CPPM-0402		Murata	BLM15AX221SN1D	9	
76	INDUCTANCE_CPPM-0402		Murata	BLM15HD102SN1D	1	
77	INDUCTANCE_CPPM-0805		Taiyo Yuden	BRC2012T4R7MD	16	
78	INDUCTANCE_CPPM-1812		Vishay Dale	LQH43CN100K03L	1	
79	INDUCTANCE_CPPM-BOITIER_S		Würth Elektronik	744773047	4	
80	INDUCTANCE_CPPM-BOITIER_S		Eaton Coiltronics	DR74-101-R	1	
81	BLM18EG601SN1		Murata	BLM18EG601SN1D	1	
Capacitors						
83	CAPACITOR-0201	0.0047uF	Murata	GMD033R61A472KA01#	2	
84	CAPACITOR-0201	0.01uF	Murata	GMD033R61A103KA01#	12	
85	CAPACITOR-0201	0.022uF	Murata	GRM033R61A223KE84#	72	
86	CAPACITOR-0201	0.047uF	Murata	GRM033R61A473KE84#	25	
87	CAPACITOR-0201	0.1uF	Murata	GRM033R61A104KE15#	151	
88	CAPACITOR-0201	0.22uF	Murata	GRM033R61A224KE90#	48	
89	CAPACITOR-0201	0.47uF	Murata	GRM033R60J474KE90#	46	
90	CAPACITOR-0201	1uF	TDK	C0603X5R1A474M030BC	37	
91	CAPACITOR-0402	0.1uF	Murata	GRM152R61A104KE19#	187	
92	CAPACITOR-0402	0.1uF /25V	Murata	GRM155R61E104KA87#	43	
93	CAPACITOR-0402	0.22uF	Murata	GMD155R61A224KE12#	8	
94	CAPACITOR-0402	0.47uF	Murata	GRM155R61A474KE15#	1	
95	CAPACITOR-0402	10nF	Murata	GRM155R61A103KA01#	10	
96	CAPACITOR-0402	10uF	Murata	GRM155R60J106ME15#	4	
97	CAPACITOR-0402	12P	Murata	GRM1552C1H120JA01#	2	
98	CAPACITOR-0402	1nF	Murata	GRM155R61A102KA01#	22	
99	CAPACITOR-0402	1uF /16V	Murata	GRM155R61C105KE01D	72	
100	CAPACITOR-0402	2.2nF	Murata	GRM155R61A222KA01#	3	
101	CAPACITOR-0402	2.2uF	Murata	GRM155R61A225KE95#	22	
102	CAPACITOR-0402	4.7nF	Murata	GRM155R61A472KA01#	1	
103	CAPACITOR-0402	4.7uF	Murata	GRM155R61A475MEAA#	18	
104	CAPACITOR-0402	470P	Murata	GRM1552C1H471JA01#	6	
105	CAPACITOR-0402	47nF	Murata	GRM155R61A473KA01#	3	
106	CAPACITOR-0603	2.2uF	Murata	GRM185R61A225KE43#	1	
107	CAPACITOR-0603	22uF	Murata	GRM188R61A226ME15#	20	
108	CAPACITOR-0805	10uF	Murata	GRM219R61C106KA73#	2	
109	CAPACITOR-0805	47uF	Murata	GRM21BR61A476ME15#	45	
110	CAPACITOR-1206	100uF	Murata	GRM31CR61A107ME05#	1	
111	CAPACITOR-1206	47uF	Murata	GRM31CR61A476ME15#	6	
112	CAPACITOR_POL-CASE B	10uF	Kemet	T495B106K020ATE1K0	3	
113	CAPACITOR_POL-CASE D	100uF /20V	Kemet	T495D107K020ATE200	4	
114	CAPACITOR_POL-CASE D	120uF	Kemet	T491D107K010AT	1	
115	CAPACITOR_POL-CASE D	330uF /6.3V	Kemet	T520D337M006ATE015	4	
116	CAPACITOR_POL-CASE D	330uF /2.5V	Kemet	T520V337M2R5ATE009	7	
117	CAPACITOR_POL-CASE D	470uF /2.5V	Kemet	T520V477M2R5ATE009	9	
118	CAPACITOR_POL-CASE D	47uF /20V	Kemet	T491D476K020AT	3	
119	CAPACITOR_POL-CASE D	68uF	Kemet	T491D686K016AT	1	
120	CAPACITOR_POL-CASE E	220uF /2.5V	Kemet	T520V227M006ATE007	6	
121	CAPACITOR_POL-CASE E	330uF		T491D337M006AT	2	
122	CAPACITOR_POL-CASE E	680uF /2.5V	Kemet	T530X687M4ATE4-TR	5	

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123	RESISTANCE-0402	10K	Vishay	CRCW040210K0FKTD	138
124	RESISTANCE-0402	4.22K	Vishay	CRCW04024K22FKTD	2
125	RESISTANCE-0402	27R	Vishay	CRCW040227R0FKTD	21
126	RESISTANCE-0402	3.3K	Vishay	CRCW04023K30FKTD	16
127	RESISTANCE-0402	24R9	Vishay	CRCW040224R9FKTD	61
128	RESISTANCE-0402	1.8K	Vishay	CRCW04021K80FKTD	3
129	RESISTANCE-0402	100R	Vishay	CRCW0402100RFKTD	44
131	RESISTANCE-0402	0.51R	Vishay	RCWE0402R510FKEA	20
132	RESISTANCE-0402	0R	Vishay	CRCW04020000ZSTD	46
133	RESISTANCE-0402	4.7K	Vishay	CRCW04024K70FKTD	6
134	RESISTANCE-0402	200R	Vishay	CRCW0402200RFKTD	1
135	RESISTANCE-0402	30R	Vishay	CRCW040230R0FKED	6
136	RESISTANCE-0402	60.4R	Vishay	CRCW040260R4FKTD	7
137	RESISTANCE-0402	240R	Vishay	CRCW0402240RFKTD	7
138	RESISTANCE-0402	348R	Vishay	CRCW0402348RFKTD	14
139	RESISTANCE-0402	3.9M	Vishay	CRCW04023M90FKED	1
140	RESISTANCE-0402	100K	Vishay	CRCW0402100KFKTD	1
141	RESISTANCE-0402	154K	Vishay	CRCW0402154KFKTD	1
142	RESISTANCE-0402	143K	Vishay	CRCW040143KFKED	1
143	RESISTANCE-0402	3.74K	Vishay	CRCW04023K74FKED	1
144	RESISTANCE-0402	3K	Vishay	CRCW04023K00FKTD	2
145	RESISTANCE-0402	20R	Vishay	CRCW040220R0FKTD	2
146	RESISTANCE-0402	19.1K	Vishay	CRCW040219K1FKTD	1
147	RESISTANCE-0402	1K	Vishay	CRCW04021K00FKTD	26
148	RESISTANCE-0402	2.2K	Vishay	CRCW04022K20FKED	5
149	RESISTANCE-0402	39R	Vishay	CRCW040239R0FKED	8
150	RESISTANCE-0402	43R	Vishay	CRCW040243R0FKTD	2
151	RESISTANCE-0402	4.99K	Vishay	MCS0402MD4991BE100	4
152	RESISTANCE-0402	1K	Vishay	MCS0402MD1001BE100	4
153	RESISTANCE-0402	1.8K	Welwyn	PCF0402PR-1K8BT1	8
154	RESISTANCE-0402	33K	Vishay	CRCW040233K0FKTD	3
155	RESISTANCE-0402	390K	Vishay	CRCW0402390KFKED	1
156	RESISTANCE-0402	4.7K	Vishay	CRCW04024K70FKTD	1
157	RESISTANCE-0402	300R	Vishay	CRCW0402300RFKTD	1
158	RESISTANCE-0402	150K	Vishay	CRCW0402150KFKTD	1
159	RESISTANCE-0402	30K	Vishay	CRCW040230K0FKTD	1
160	RESISTANCE-0402	2.32K	Vishay	CRCW04022K32FKTD	2
161	RESISTANCE-0402	499K	Vishay	CRCW0402499KFKTD	1
162	RESISTANCE-0402	5.1K	Vishay	CRCW04025K10FKTD	1
163	RESISTANCE-0402	20K	Vishay	CRCW040220K0FKTD	1
165	RESISTANCE-0603	0R	Vishay	CRCW06030000Z0TD	2
166	RESISTANCE-0805	49R9	Vishay	CRCW080549R9FKTA	1
167	RESISTANCE-1206	0R	Vishay	CRCW12061K00FKECHP	2
169	RESISTANCE-2010_L	0R003	Vishay	WSL20103L000FEA18	4
170	RESISTANCE-2512	0R010	Vishay	WSL2512R0100FEA18	2
171	RESISTANCE_FSP-2.00K	2.00k	Vishay	CRCW04022K00FKTD	5

PCIe40_v2 External Components BOM, budgetary, 23_02_2018

Type 1 boards : "24TX/24RX": PCIe40_v2 boards with 24 optical outputs and 24 optical inputs (i.e.: 2 TX minipods + 2 RX minipods)						
Type 2 boards : "00TX/24RX": PCIe40_v2 boards with 0 optical outputs and 24 optical inputs (i.e.: 0 TX minipods + 2 RX minipods)						
External components for Type 1 PCIe40_v2 boards:						
Line No.	Part Name	Manufacturer	REFERENCE (Manuf. P/N)	Qty	Description	Remarks
1	TX Minipods	FIT (Broadcom, Avago)	AFBR-811FH3Z	2	12-lane parallel optical transmitters	only 2 TX minipods to be supplied with each board
2	RX Minipods	FIT (Broadcom, Avago)	AFBR-821FH3Z	2	12-lane parallel optical receivers	only 2 RX minipods to be supplied with each board
3	Custom set of PRIZM ↔ MPO 12-lane optical patch cords	Sylex, s.r.o	PCIe40_v2b_Patch_Cords	1 set	8 patch cords /set. Each cord has a different length.	Single source, see Technical Specification Point 3.3.1
4	Custom PCIe bracket (faceplate for main board)	L.T.I.	PCIe40_v2b_Face_Plate	1	Double wide custom PCIe bracket	Single source, see Technical Specification Point 3.3.1
5	Custom heat sink (for main board)	Alpha Company, Ltd.	PCIe40_v2b_Heat_Sink	1		Single source, see Technical Specification Point 3.3.1
6	Miscellaneous screws, nuts, and washers		TBD			
External components for Type 2 PCIe40_v2 boards:						
Line No.	Part Name	Manufacturer	REFERENCE (Manuf. P/N)	Qty	Description	Remarks
7	TX Minipods	FIT (Broadcom, Avago)	AFBR-811FH3Z	0	12-lane parallel optical transmitters	no TX minipod required
8	RX Minipods	FIT (Broadcom, Avago)	AFBR-821FH3Z	2	12-lane parallel optical receivers	only 2 RX minipods to be supplied with each board
9	Custom set of PRIZM ↔ MPO 12-lane optical patch cords	Sylex, s.r.o	PCIe40_v2b_Patch_Cords	1 set	8 patch cords /set. Each cord has a different length.	Single source, see Technical Specification Point 3.3.1
10	Custom bracket (faceplate for main board)	L.T.I.	PCIe40_v2b_Face_Plate	1		Single source, see Technical Specification Point 3.3.1
11	Custom heat sink (for main board)	Alpha Company, Ltd.	PCIe40_v2b_Heat_Sink	1		Single source, see Technical Specification Point 3.3.1
12	Miscellaneous screws, nuts, and washers		TBD			

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Line No.	Part Name	VALUE	Manufacturer	REFERENCE (Manuf. P/N)	Qty	REMARKS
Active Components						
1	10M0XSAU169		Intel	10M08SAU169C8G	1	
2	AT24C02C		On Semiconductor	AT24C02C-XHM-T	1	
3	BSC010NE2LS		Infineon	BSC010NE2LSIATMA1	2	
4	BSC050NE2LS		Infineon	BSC050NE2LSATMA1	2	
5	CPPM_LED-0603		Multicomp	MCL-S290YC	8	
6	DIODE_1N4148		Diodes inc.	SD107WS-7-F	2	
7	FDMC8878		Fairchild	FDMC8878	6	
8	LTC2990		Linear Technology	LTC2990CMS#PBF	2	
9	LTC3877F		Linear Technology	LTC3877EUK#PBF	1	
10	LTM4620		Linear Technology	LTM4620AEY#PBF	1	
11	MCP1525		Microchip	MCP1525T-/TT	1	
12	MIC45205		Micrel	MIC45205-1YMP T1	1	
13	MIC45212		Micrel	MIC45212-1YMP T1	2	
14	MMBT3904-SOT23		Fairchild	MMBT3904	3	
15	NPN-BEC4		Nexperia	MMBT2222A	6	
16	OSC50MHZ		Mercury	3H32ET-50.000	1	
17	-		On Semiconductor	2N3904BU	1	
Connectors, Sockets, Switches, Jumpers						
20	BORNE10P_FR-20A		Samtec	TSW-110-14-L-S	1	
21	CON10P_CPPM-VERTICAL_M		Harwin	M40-4011046	1	
22	CON14P-RDUI		Samtec	TSW-107-14-L-D	1	
23	CON2		Harwin	M20-9990246	1	
24	CON6_HARWIN		Samtec	TSW-106-14-L-S	3	
25	CON8P_CPPM-SILM		Samtec	TSW-108-14-L-S	1	
26	PLOT_RADSSERT-183		Amphenol Industrial	10-737583-138	5	
28	SWITCHCPPM-4_CMS		Multicomp	MCDHN-04F-T-V	1	
Inductors						
29	INDUCTANCE_CPPM-0402		TDK	MMZ1005F470CTD25	1	
30	INDUCTANCE_CPPM-0603		Murata	BLM18AG601SN1D	1	
31	INDUCTANCE_CPPM-10X10		Würth Elektronik	744301025	2	
Capacitors						
32	CAPACITOR-0402	0.22uF /16V	Murata	GRM155R61C224KA12#	4	
33	CAPACITOR-0402	1uF	Murata	GRM155R61A105KE01#	12	
34	CAPACITOR-0402	0.1uF	Murata	GRM152R61A104KE19#	42	
35	CAPACITOR-0402	10uF	Murata	GRM155R60J106ME15#	1	
36	CAPACITOR-0402	150pF	Murata	GRM1552C1H151GA01#	2	
37	CAPACITOR-0402	2.2nF	Murata	GRM155R61A222KA01#	3	
38	CAPACITOR-0402	4.7uF	Murata	GRM155R61A475MEAA#	1	
39	CAPACITOR-0402	0.1uF /25V	Murata	GRM155R61E104KA87#	6	
40	CAPACITOR-0402	3.3nF /50V	Murata	GRM155R71H332JA01#	1	
41	CAPACITOR-0402	220pF /50V	Murata	GRM1555C1H221GA01#	1	
43	CAPACITOR-0402	100pF	Murata	GRM1552C1H101GA01#	1	
44	CAPACITOR-0402	4.7uF /10V	Murata	GRM155R61A475MEAA#	1	
45	CAPACITOR-0402	15pF	Murata	GRM1552C1H150GA01#	3	
46	CAPACITOR-0402	47pF /50V	Murata	GRM1555C1H470GA01#	1	
47	CAPACITOR-0402	470pF	Murata	GRM1552C1H471JA01#	4	
48	CAPACITOR-0402	1nF	Murata	GRM155R61A102KA01#	8	

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49	CAPACITOR-0603	10uF /16V	Murata	GRM188R61C106KAAL#	2
50	CAPACITOR-1206	220uF	Murata	GRM31CR60J227ME11#	4
51	CAPACITOR-1206	10uF	Murata	GRM319B31A106ME18#	8
52	CAPACITOR-1206	100uF	Murata	GRM31CR61A476ME15#	8
53	CAPACITOR-1210	22uF /16V	Murata	GRM31CR61C226ME15#	8
54	CAPACITOR-1210	100uF	Murata	GRM32ER61A107ME20#	8
55	CAPACITOR_POL-CASE B	10uF	Murata	T495B106K020ATE1K0	2
Resistors					
57	RESISTANCE-0402	23.2K	Vishay	CRCW040223K2FKTD	2
58	RESISTANCE-0402	10K	Vishay	CRCW040210K0FKTD	25
59	RESISTANCE-0402	6.04K	Vishay	CRCW04026K04FKTD	6
60	RESISTANCE-0402	0R	Vishay	CRCW04020000ZSTD	21
61	RESISTANCE-0402	24R9	Vishay	CRCW040224R9FKTD	6
62	RESISTANCE-0402	1.8K	Vishay	CRCW04021K80FKTD	5
63	RESISTANCE-0402	7.15K	Vishay	CRCW04027K15FKTD	1
64	RESISTANCE-0402	100R	Vishay	CRCW0402100RFKTD	8
65	RESISTANCE-0402	60.4K	Vishay	TNPW040260K4BEED	1
66	RESISTANCE-0402	90.9K	Vishay	TNPW040290K9BEED	1
67	RESISTANCE-0402	82.5K	Vishay	TNPW040282K5BETD	2
68	RESISTANCE-0402	3.16K	Vishay	CRCW04023K16FKTD	1
69	RESISTANCE-0402	1K	Vishay	CRCW04021K00FKTD	17
70	RESISTANCE-0402	20K	Vishay	CRCW040220K0FKTD	8
71	RESISTANCE-0402	2.2R	Vishay	CRCW04022R20FKED	1
72	RESISTANCE-0402	100K	Vishay	CRCW0402100KFKTD	5
73	RESISTANCE-0402	49.9K	Vishay	CRCW040249K9FKTD	5
74	RESISTANCE-0402	7.32K	Vishay	CRCW04027K32FKTD	1
75	RESISTANCE-0402	10.7K	Vishay	CRCW040210K7FKTD	1
76	RESISTANCE-0402	86.6K	Vishay	CRCW040286K6FKTD	6
77	RESISTANCE-0402	115K	TE Connectivity	CPF0402B115KE1	1
78	RESISTANCE-0402	665R	Vishay	CRCW0402665RFKTD	2
79	RESISTANCE-0402	10R	Vishay	CRCW040210R0FKTD	2
80	RESISTANCE-0402	30.1K	Vishay	CRCW040230K1FKTD	1
81	RESISTANCE-0402	7.68K	Vishay	CRCW04027K68FKTD	1
82	RESISTANCE-0402	3.32K	Vishay	CRCW04023K32FKTD	2
83	RESISTANCE-0402	4.64K	Vishay	CRCW04024K64FKTD	1
84	RESISTANCE-0402	100K NTC	Murata	NCP15WF104F03RC	1
85	RESISTANCE-0402	1.69K	Vishay	CRCW04021K69FKTD	2
86	RESISTANCE-0402	1.37K	Vishay	CRCW04021K37FKTD	1
87	RESISTANCE-1206	0.15R	Vishay	WSL1206R1500FEA	6
88	RESISTANCE-1206	0R	Vishay	CRCW12061K00FKECHPVisha	2
89	RESISTANCE-2010_L	0R003	Vishay	WSL20103L000FEA18	5
90	RESISTANCE-2512	0R002	Vishay	WSL25122L000FEA18	2