INDIAN INSTITUTE OF TECHNOLOGY MADRAS
Chennai 600 036

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Ref: ELE/RADA/017/2019

Senior Manager (Project Purchase) Date: 14.06.2019

Open Tender No: ELE/RADA/017/2019

Due Date: 24.06. 2019, 3pm

No Pre-Bid meeting

Technical Bid opening meeting on 24.06. 2019, 4 PM at the Department of Electrical Engineering, IIT-Madras.

Dear Sir/Madam,

On behalf of the Indian Institute of Technology Madras, offers are invited for **the fabrication, BOM procurement and population of a DA (5 units) and DFE (10 units) PCBs** conforming to the specifications given in Annexure I.

Vendor who can fabricate multilayer high-speed and high density PCBs and assemble the board need to respond to the tender.

Instructions to the Bidder

I. **Preparation of Bids:** - The tenders should be submitted under two-bid system (i.e.) Technical bid and Financial bid.

II. **Delivery of the tender:** - The tender shall be sent to the addresses mentioned below, either by post or by courier so as to reach our office before the due date and time specified in our schedule. The offer/bid can also be dropped in the tender box on or before the due date and time specified in the schedule.
The tender box is kept in the office of the:

The Senior Manager,
Project Purchase,
IC & SR Building 2nd floor,
I.I.T. Madras,
Chennai – 600 036.

III. **Opening of the tender:** - The offer/bids will be opened by a committee duly constituted for this purpose. The technical bids will be opened first and will be examined by a technical committee which will decide the suitability of the bids as per our specifications and requirements. All bidders will be invited for opening of technical bids. With respect to opening the financial bid, only technically qualified bidders will be called.

IV. **Prices:** - The price should be quoted in net per unit (after breakup) and must include all packing and delivery charges to **Department of Electrical Engineering.** The offer/bid should be exclusive of taxes and duties. The percentage of tax & duties should be clearly indicated separately. IIT Madras is eligible for concessional GST and relevant certificate will be issued, if applicable.

In case of import supply, the price should be quoted without custom duty. IIT Madras is exempted from levy of IGST on Imports and eligible for concessional custom duty (not exceeding 5%) and the price should be quoted on EX-WORKS and CIP basis indicating the mode of shipment.

V. **Agency Commission**: - Agency commission, if any, will be paid to the Indian agents in rupees after receipt of the equipment and its satisfactory installation. Agency Commission will not be paid in foreign currency under any circumstances. The details should be explicitly shown in the tender document even in the case of 'Nil' commission. The tenderer should indicate the percentage of agency commission to be paid to the Indian agent. The foreign Principal should indicate the percentage of payment and it should be included in the basic price quoted originally (if any).

VI. **Terms of Delivery**: - The item should be supplied to the **Department of Electrical Engineering, IIT Madras** as per the Purchase Order. In case of import supply, the item should be delivered at the cost of the supplier to our Institution. The Installation/Commissioning should be completed as specified in our important conditions.

VII. **Technical Bid Opening:** The technical bid will be opened on **24.06.2019** at 4 p.m. at the **Department of Electrical Engineering, IIT-Madras** and the financial bids of those tenders who are technically qualified will be opened on the same/later date under intimation to them.

VIII. **IIT Madras** reserves the full right to accept / reject any tender at any stage without assigning any reason.

Yours sincerely,

The Senior Manager (Project Purchase)
IC&SR Building, I.I.T. Madras,
Chennai – 600 036.

SCHEDULE

Important Conditions of the tender

1. The due date for the submission of the tender is **24.06.2019, 3 pm.**

The offers / bids should be submitted in two bids systems (i.e.) Technical bid and financial bid. The Technical bid should consist of all technical details / specifications only. The Financial bid should indicate item-wise price for each item and it should contain all Commercial Terms and Conditions including Taxes, transportation, packing & forwarding, installation, guarantee, payment terms, pricing terms etc. The Technical bid and financial bid should be put in separate covers and sealed. Both the sealed covers should be put in a bigger cover. The Open Tender for supply of **"DA and DFE PCB Fabrication"** should be written on the left side of the Outer bigger cover and sealed.

2. **EMD: -** The **EMD in the form of account payee DD for Rs 100,000 value of the item in favor of Registrar IIT Madras should be enclosed in the cover containing Technical bid.** Any offer not accompanied with the EMD shall be rejected summarily as non-responsive.

   The EMD of the unsuccessful bidders shall be returned within 30 days of the end of the bid validity period. The same shall be forfeited, if the tenderers withdraw their offer after the opening during the bid validity period. The Institute shall not be liable for payment of any interest on EMD. EMD is exempted for Micro and Small Enterprises (MSE) as defined in MSE Procurement Policy issued by Department of Micro, Small and Medium Enterprises (MSME).

   When no local agent, the foreign vendor can submit demand draft equal to* Rs 100,000 *or wire transfer the amount to our account as detailed in the attachment (Annexure II) and enclose the proof with the Technical bid.

3. **Performance Security: -** The successful bidder should submit Performance Security for an amount of 5% of the value of the contract/supply. The Performance Security may be furnished in the form of an Account Payee DD, FD Receipt from the commercial bank, Bank Guarantee from any nationalized bank in India. **The performance security should be furnished within 21 days from the delivery of the purchase order.**

   Performance Security in the form of Bank Guarantee:- Incase the successful bidder wishes to submit Performance Security in the form of Bank Guarantee, the Bank Guarantee should be routed through the Beneficiary Bank to the end user bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee from a Nationalized Bank of India.
   The Bank Guarantee should remain valid for a period of sixty days beyond the date of completion of all contractual obligations of the supplier including the warranty obligations.

4. **Indian agent:** If an Indian agent is involved, the following documents must be enclosed:
   Foreign principal's proforma invoice indicating the commission payable to the Indian Agent and nature of after-sales service to be rendered by the Indian Agent.
   - ✔ Copy of the agency agreement with the foreign principal and the precise relationship between them and their mutual interest in the business.

5. Documentary proof required:
    a. **Please indicate details of prior FPGA boards (or similar complexity of at least 18 layers) that have been fabricated by the vendor. Vendors lacking such prior experience (of at least 5 prior boards of similar complexity) will be disqualified.**
    b. **Please include proof that the firm has existed for at least 5 years.**
    c. **Please explicitly indicate all relevant Fabrication details, such as where the board will be fabricated.**
    d. **Please explicitly indicate the details as to where the board will be assembled.**

6. **Validity:** Validity of Quotation not less than 90 days from the due date of tender.

7. **Delivery Schedule**: - The tenderer should indicate clearly the time required for delivery of the item. In case there is any deviation in the delivery schedule, liquidated damages clause will be enforced or penalty for the delayed supply period will be levied.
   Normally the delivery should be in 8 weeks from date of PO (or as specified in Annexure 1 whichever is earlier). If there is delay, the penalty will be @1% per week of delay subject to a max of 10% of the value of purchase order and if the delay is more than 10 weeks, the PO would be cancelled and liquidated damages will be enforced.

8. **Risk Purchase Clause**: - In the event of failure of supply of the item/equipment within the stipulated delivery schedule, the purchaser has all the right to purchase the item/equipment from other sources on the total risk of the supplier under risk purchase clause.

9. **Advance Payment:** No advance payment is generally admissible. In case of specific percentage of advance payment is required, the Foreign Vendor has to submit a Bank Guarantee equal to the amount of advance payment and it should be routed through the Beneficiary Bank to the end user Bank. Otherwise, the Indian Agent of the foreign vendor has to submit a Bank Guarantee through a Nationalized Bank of India.

10. **On-site Installation**: - The equipment or machinery has to be installed or commissioned by the successful bidder within 15 to 20 days from the date of receipt of the item at site of IIT Madras (as applicable).

11. **Late offer**: - The offers received after the due date and time will not be considered. The Institute shall not be responsible for the late receipt of Tender on account of Postal, Courier or any other delay.

12. **Acceptance and Rejection**: - I.I.T. Madras has the right to accept the whole or any part of the Tender or portion of the quantity offered or reject it in full without assigning any reason.

13. **Do not quote the optional items or additional items unless otherwise mentioned in the Tender documents / Specifications.**

14. **Disputes and Jurisdiction**:

Settlement of Disputes: Any dispute, controversy or claim arising out of or in connection with this PO including any question regarding its existence, validity, breach or termination, shall in the first instance be attempted to be resolved amicably by both the Parties. If attempts for such amicable resolution fails or no decision is reached within 30 days whichever is earlier, then such disputes shall be settled by arbitration in accordance with the Arbitration and Conciliation Act, 1996. Unless the Parties agree on a sole arbitrator, within 30 days from the receipt of a written request by one Party from the other Party to so agree, the arbitral panel shall comprise of three arbitrators. In that event, the supplier will nominate one arbitrator and the Project Coordinator of IITM shall nominate on arbitrator. The Dean IC&SR will nominate the Presiding Arbitrator of the arbitral tribunal. The arbitration proceeding shall be carried out in English language. The cost of arbitration and fees of the arbitrator(s) shall be shared equally by the Parties. The seat of arbitration shall be at IC&SR IIT Madras, Chennai.

a. **The Applicable Law:** This Purchase Order shall be construed, Interpreted and governed by the Laws of India, Court at Chennai shall have exclusive jurisdiction subject to the arbitration clause.
b. Any legal disputes arising out of any breach of contact pertaining to this tender shall be settled in the court of competent jurisdiction located within the city of Chennai in Tamil Nadu.

20. All Amendments, time extension, clarifications etc., will be uploaded on the website only and will not be published in newspapers. Bidders should regularly visit the above website to keep themselves updated. No extension in the bid due date/ time shall be considered on account of delay in receipt of any document by mail.

Acknowledgement: - It is hereby acknowledged that the tenderer has gone through all the conditions mentioned above and agrees to abide by them.

SIGNATURE OF TENDERER
ALONG WITH SEAL OF THE
COMPANY WITH DATE

Annexure I

Technical Specifications

Please provide an explicit compliance table for all the points below with justification as applicable.

a. Please indicate prior FPGA boards (of similar complexity of at least 18 layers) that you have fabricated. Vendors without prior experience (of at least 5 prior boards) of similar complexity will be disqualified. Documentary evidence of the same should be provided.
b. Firm should have existed for at least 5 years
c. Explicitly indicate the Fab details and its technical capabilities, where the board will be fabricated.
d. Explicitly indicate the plant details and its technical capabilities, where the board will be assembled.
e. Firm must have prior experience in fabrication of PCB boards of similar complexity for 5G/4G applications. IITM may ask for documentary evidence for the same.
f. The assembly facility should be in India **OR** there should be a local office in India:
    i. Where IITM can ship the required components (FPGA's, Transceivers)
    ii. Which takes care of the shipment/customs of the parts (if required), boards to the required fab/assembly plant.
    iii. Which delivers the finished boards to IIT Madras in time.
        1. **IITM will NOT take responsibility of the shipment or the customs duty/procedure either for any items in the entire process.**
        2. The vendor should factor the shipment/custom clearance time in the proposal and will be evaluated as such.
g. The assembly plant should be ready for some basic rework as the case arises

The final evaluation will be based on both the evaluation of the technical expertise of the firm and the financial bid with a weightage ratio of 8:2, i.e., 80% weightage to the technical expertise and 20% on the financial bid.

Technical criterion

	Points (Total 80)
Fabrication and Assembly of 18 layer HDI mixed signal boards (FPGA+ RF)	5
Fabrication and Assembly of PCB boards for 5G applications	10
Turnaround time for PCB fabrication	10
Compliance to the fabrication specifications	35

Production capabilities of the chosen fab and expertise	5
Assembly capabilities	5
Lead time for the assembly of the first PCB board	10

There are two stages:

Stage 1: PCB fabrication: At the end of Stage1, the firm should provide us with a report on the PCBs that were fabricated and proceed with the assembly only after technical approval by the IITM team.

Stage 2: BOM procurement and PCB assembly

The PCB Fabrication cost, BOM cost and Assembly cost should be separated and be explicitly mentioned.

	Compliance Yes/No
Turn around time from the receipt of the PO till the assembly (finished) and delivery of the first board delivered to IIT Madras (as per Stage 1)	**4 Weeks**

The technical details of the PCB Fabrication, BOM and PCB assembly are provided below.

PCB Fabrication

Please provide a compliance table for the following stating Yes/No. **The PCB details have to be provided.** The Gerber files will be provided once the PO is generated.

Fabrication Time	2 Weeks
# of Boards	**5 DA-boards** **10 DFE-boards**

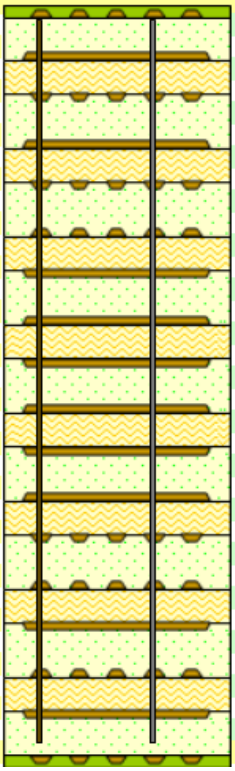
No. of layers	18
Via Technology	Through Hole with back drilling option
Material(Specify clearly whether High Tg or Normal Tg)	Megtron-6
Impedance control (Yes/No) Mention tolerance	Yes
Board thickness (1.6mm/2.4mm/3.2mm/ any other) Mention Tolerance	Entire board must be: 1. 70.97mil thickness over the copper 2. 67.67mil thickness over the laminate 3. 71.97mil thickness over the Soldermask
Copper finish (35 microns/70 microns/ any other)	Copper Thickness: ● Outer Layers: a. Signal Layer Thickness 1.65 mil ● Inner Layers: a. Signal Layer Thickness 0.60 mil b. Power (Including ground) layers 0.60 and 1.2 mil
Min. finished hole dia (mil)	8 Mil Mech and 6 Mil Laser vias
Min. trace width (mil)	3
Min. spacing (mil)	3
Min. Annular ring (mil)	6
Board finish(Hot Air Levelled/ Electroless Ni-Au / Hard Gold / any other)	Enig
PCB Dimension in mm	120X230 - DA Card 200 X 200 - DFE Card
PCB Quantity	**5 of DA-board** **10 of DFE-board**
Delivery time	14 working days
Metal core board	No

Mil Grade	No
Whether Group B Test Report required	No
Solder Mask Colour	Green
Silkscreen Colour	White
RoHS Complaint	Yes
UL Logo Required	Yes
Back Drilling Required	Yes(customer reserves the option to remove this feature)
RF VIAS	No

Stack up requirements of the board (*Material and Stack-up cannot be changed*.)

Customer required thickness	71.97/-9.25 mils Measured: Over mask on plated copper

Layer Image:

Layer	Cu Thick. (mils)	Cu Foil wt (oz)		Lam. Thick. (mils)	Description
1	1.65	.375 oz			Foil .375 oz
				2.76	Prepreg Meatron6 1035(75) 18Gx24
2	0.60	0.5 oz			
				3.00	Core Meatron6 3.00mils 1078 0.5 oz / 0.5 oz HVLP 18.25Gx24.25
3	0.60	0.5 oz			
				3.49	Prepreg Meatron6 1078(72) 18Gx24
4	0.60	0.5 oz			
				3.00	Core Meatron6 3.00mils 1078 0.5 oz / 0.5 oz HVLP 18.25Gx24.25
5	0.60	0.5 oz			
				4.92	Prepreg Meatron6 1035(75)/1035(75) 18Gx24
6	0.60	0.5 oz			
				3.00	Core Meatron6 3.00mils 1078 0.5 oz / 1 oz HVLP 18.25Gx24.25
7	1.20	1 oz			
				3.64	Prepreg Meatron6 1078(72) 18Gx24
8	0.60	0.5 oz			
				2.00	Core Meatron6 2.00mils 1035 0.5 oz / 1 oz RTF 18Gx24
9	1.20	1 oz			
				4.05	Prepreg Meatron6 1078(75) 18Gx24
10	1.20	1 oz			
				2.00	Core Meatron6 2.00mils 1035 0.5 oz / 1 oz RTF 18Gx24
11	0.60	0.5 oz			
				3.64	Prepreg Meatron6 1078(72) 18Gx24
12	1.20	1 oz			
				3.00	Core Meatron6 3.00mils 1078 0.5 oz / 1 oz HVLP 18.25Gx24.25
13	0.60	0.5 oz			
				4.92	Prepreg Meatron6 1035(75)/1035(75) 18Gx24
14	0.60	0.5 oz			
				3.00	Core Meatron6 3.00mils 1078 0.5 oz / 0.5 oz HVLP 18.25Gx24.25
15	0.60	0.5 oz			
				3.49	Prepreg Meatron6 1078(72) 18Gx24
16	0.60	0.5 oz			
				3.00	Core Meatron6 3.00mils 1078 0.5 oz / 0.5 oz HVLP 18.25Gx24.25
17	0.60	0.5 oz			
				2.76	Prepreg Meatron6 1035(75) 18Gx24
18	1.65	.375 oz			Foil .375 oz

Impedance table:

Layer	Structure Type	Coated Microstrip	Target Impedance (ohms)	Impedance Tolerance (ohms)	Target Linewidth (mils)	Edge Coupled Pitch * (mils)	Reference Layers	Modelled Linewidth (mils)	Modelled Impedance (ohms)	CoPlaner Space (mils)
1	Single Ended	Yes	50.00	+/-5	4.75	0.00	(2)	4.75	50.57	
1	Single Ended	Yes	40.00	+/-4	7.50	0.00	(2)	7.50	39.83	
1	Edge Coupled Differential	Yes	80.00	+/-8	5.50	10.00	(2)	5.50	80.03	
1	Edge Coupled Differential	Yes	100.00	+/-10	3.75	10.00	(2)	3.75	99.80	
3	Single Ended	---	50.00	+/-5	3.50	0.00	(4, 2)	3.50	48.89	
3	Edge Coupled Differential	---	80.00	+/-8	4.80	11.00	(4, 2)	4.80	80.05	
3	Single Ended	---	40.00	+/-4	5.00	0.00	(4, 2)	5.00	39.80	
3	Edge Coupled Differential	---	100.00	+/-10	3.25	11.00	(4, 2)	3.25	100.52	
5	Edge Coupled Differential	---	80.00	+/-8	5.50	9.50	(7, 4)	5.50	80.13	
5	Single Ended	---	40.00	+/-4	6.75	0.00	(7, 4)	6.75	39.50	
5	Single Ended	---	50.00	+/-5	4.50	0.00	(7, 4)	4.50	49.80	
5	Edge Coupled Differential	---	100.00	+/-10	4.00	10.00	(7, 4)	4.00	99.22	
6	Edge Coupled Differential	---	100.00	+/-10	4.00	10.00	(4, 7)	4.00	99.22	
6	Single Ended	---	40.00	+/-4	6.75	0.00	(4, 7)	6.75	39.50	
6	Edge Coupled Differential	---	80.00	+/-8	5.50	9.50	(4, 7)	5.50	80.13	
6	Single Ended	---	50.00	+/-5	4.50	0.00	(4, 7)	4.50	49.80	
13	Edge Coupled Differential	---	100.00	+/-10	4.00	10.00	(15, 12)	4.00	99.22	
13	Edge Coupled Differential	---	80.00	+/-8	5.50	9.50	(15, 12)	5.50	80.13	
13	Single Ended	---	50.00	+/-5	4.50	0.00	(15, 12)	4.50	49.80	
13	Single Ended	---	40.00	+/-4	6.75	0.00	(15, 12)	6.75	39.50	
14	Single Ended	---	40.00	+/-4	6.75	0.00	(12, 15)	6.75	39.50	
14	Single Ended	---	50.00	+/-5	4.50	0.00	(12, 15)	4.50	49.80	
14	Edge Coupled Differential	---	80.00	+/-8	5.50	9.50	(12, 15)	5.50	80.13	
14	Edge Coupled Differential	---	100.00	+/-10	4.00	10.00	(12, 15)	4.00	99.22	
16	Edge Coupled Differential	---	100.00	+/-10	3.25	11.00	(15, 17)	3.25	100.52	
16	Single Ended	---	50.00	+/-5	3.50	0.00	(15, 17)	3.50	48.89	
16	Single Ended	---	40.00	+/-4	5.00	0.00	(15, 17)	5.00	39.80	
16	Edge Coupled Differential	---	80.00	+/-8	4.80	11.00	(15, 17)	4.80	80.05	
18	Single Ended	Yes	40.00	+/-4	7.50	0.00	(17)	7.50	39.83	
18	Edge Coupled Differential	Yes	100.00	+/-10	3.75	10.00	(17)	3.75	99.80	
18	Edge Coupled Differential	Yes	80.00	+/-8	5.50	10.00	(17)	5.50	80.03	
18	Single Ended	Yes	50.00	+/-5	4.75	0.00	(17)	4.75	50.57	

This stack-up was created using estimated copper area percentages. (25% signal, 50% mix, 75% plane).
5 mm handling area on all sides

Assembly

1. **We require 5 DA boards and 10 DFE boards to be populated.**

2. The FPGAs, Radio chips and connectors required for the board will be provided by us. The rest of the BOM (as provided in the next section) has to **be procured by the vendor for 5 DA boards and 10 DFE boards.**

3. Assembly schedule of the DA board
    a. Stage1: Two boards:
        i. One Board: Power components
        ii. One Board: All components
    b. Stage2: **Three boards** with all the components. (Stages 2 may have some changes to the board depending on stage 1 testing).

4. Assembly schedule of the DFE boards
    a. Stage1: Five boards:
        i. One Board: Power components
        ii. **Four Boards**: All components
    b. Stage2: **Five boards** with all the components (Stages 2 may have some changes to the board depending on stage 1 testing).

5. Time Lines for assembly, X-ray and delivery

Board	Stage 1 (Delivery)	Stage 2 (Delivery)
DA	4 weeks from PO	7 weeks from PO
DFE	4 weeks from PO	7 weeks from PO

DA Board

1	No of comps per board	1249
2	No of BGAs per board	7
3	Maximum pin count	1760, 1 mm BGA
4	Minimum BGA pitch	1 mm
5	Total No of points to be soldered (no of Pins)	6000(approx)
6	PTH pins	300
7	Both side assembly	Yes
8	Board Size-	120 X 230 mm
9	Board Thickness	71.97 Mils

10	No of Layers	18
11	Qty-	5 DA boards (as per the schedule in point 3)
12	X-ray verification of the BGA's	Yes. Test results should be provided.

DFE Board

1	No of comps per board	2875
2	No of BGAs per board	15
3	Maximum pin count	1760, 1 mm BGA
4	Minimum BGA pitch	1 mm
5	Total No of points to be soldered (no of Pins)	12,000(approx.)
6	PTH pins	600
7	Both side assembly	Yes
8	Board Size-	200 X 200 mm
9	Board Thickness	71.97 Mils
10	No of Layers	18
11	Qty-	10 DFE boards. (as per the schedule in point 3)
12	X-ray verification of the BGA's	Yes. Test results should be provided.

DA board Bill of Materials (BOM)

1. ***The following BOM is only for ONE board. The appropriate parts for 5 boards should be procured***

2. There could be an approx. 5% increase in the number of decoupling capacitors and termination resistors used.

3. Any items that are non-stocked need to be quoted - either for an alternate part or for the same part including the lead time.

4. We can share the excel sheet of the BOM on email request (**rganti@ee.iitm.ac.in, raviteja@5gtbiitm.in,** Please cc both the email id's).

Item	Reference	Manufacturer Part-number	PCB Footprint
1	CN1	DM3AT-SF-PEJM5	HIROSE_DM3AT-SF-PEJM5
2	C1,C3,C45,C46	CL05A104KA5NNNC	CAPC1005X55N
3	C2,C5	GRM155R61A474KE15D	CAPC1005X55N
4	C4	GRM2165C1H272JA01D	CAPC2012X95N
5	C6	C1206C106J4RACTU	CAPC1005X90N
6	C7,C8	GRM188R61A474KA61D	CAPC1005X55N
7	C9,C10,C207,C208,C441,C443,C476,C613	CL05A104KA5NNNC	CAPC1005X55N
8	C11,C12,C13,C14,C15,C16,C17,C18,C19,C20,C21,C22,C23,C24,C25,C26,C27,C28,C29,C30,C31,C32,C33,C34,C35,C36,C37,C38,C39,C40,C41,C42,C471,C472,C473,C474,C475,C477,C478,C479,C481,C483,C496,C497	CL05A104KA5NNNC	CAPC1005X55N
9	C43,C44	06035C220JAT2A	CAPC1608X90N
10	C47	GJM1555C1H330JB01D	CAPC1005X55N_A
11	C48,C49,C50,C51,C52,C53,C169,C170,C174,C359,C360,C361,C362,C363,C364,C365,C366,C367,C368,C369,C370,C371,C372,C373,C374,C375,C376,C377,C378,C379,C380,C381,C382,C383,C384,C385,C386,C387,C388,C389,C390,C391,C392,C393,C394,C398,C399,C400,C401,C402,C403,C404,C405,C406,C407,C408,C409,C410,C411,C412,C413,C414,C418,C419,C420,C421,C422,C423,C424,C426,C427,C428,C430,C431,C433,C434,C447,C449,C467,C468,C469,C470,C480,C482,C488,C489,C490,C491,C492,C493,C494,C495,C498,C499	CL05A104KA5NNNC	CAPC1005X55N
12	C54,C55,C56,C57,C58,C59,C60,C61,C62,C63,C64,C65,C66,C67,C68,C69,C70,C71,C72,C73,C74,C75,C76,C77,C78,C79,C80,C81,C82,C83,C84	GJM1555C1H330JB01D	CAPC1005X55N_A
13	C85,C87,C89,C94,C95,C96,C97,C98,C100,C105,C107,C109,C110,C118,C119,C120,C121,C137,C138,C153,C154,C155,C156,C157,C158,C500,C501,C502,C503,C504,C505,C506,C507,C508,C509,C558,C559,C560,C561,C562,C563,C564,C565,C566,C567	GRM21BR60J107ME15L	CAPC2012X145N_A

14	C86,C88,C91,C92,C93,C99,C102,C103,C104,C106,C108,C112,C122,C123,C124,C125,C246,C261,C265,C448,C510,C511,C512,C513,C514,C515,C516,C517,C518,C519,C520,C521,C522,C523,C524,C525,C526,C527,C528,C529,C530,C531,C532,C533,C534,C535,C536,C537,C538,C541,C542,C543,C568,C569,C570,C571,C572,C573,C574,C575,C576,C577,C578,C579,C580,C583,C584,C585	CL05A475MR5NQNC	CAPC1005X50N
15	C90,C101,C111,C235,C236,C237,C238,C250,C251,C252,C253	GRM21BR61A476ME15L	CAPC2012X145N_B
16	C113	T530X687M006ATE018	CAPMP7343X430N_A
17	C114,C115,C116,C117,C126,C175	EEF-GX0D471R	CAPMP7343X430N_A
18	C127,C128,C129,C130,C131,C132,C239,C240,C241,C242,C254,C255,C256,C257,C267,C429,C432,C435,C436	CL32B226KAJNFNE	CL32B226KAJNFNE
19	C133	C1206C106J4RACTU	C1206C106J4RACTU
20	C134,C135,C184	C1206C106J4RACTU	C1206C106J4RACTU
21	C136	CL10A106MQ8NNNC	RESC1608X50N
22	C139,C140,C141,C192,C193,C223,C224	UWT0J102MNL1GS	SMD
23	C142,C143,C144,C145,C146,C147,C148,C149,C150,C151,C152	LLL31MR70J475MA01L	CAPC1632X125N_A
24	C159	CL10A226MQ8NRNE	Samsung Electro-Mechanics
25	C160,C161,C162,C163,C164,C165,C166,C167,C168	CL32B226KAJNFNE	CAPC3225X270N
26	C171,C172	C1206C106J4RACTU	RESC2012X50N
27	C173	C1210C105J5RACTU	805
28	C176	GRM21BR60J107ME15L	CAPC2012X145N_A
29	C177	CAPC6050X550N_A	CAPC2012X145N_A
30	C178,C179,C180	C1210C226K9RACAUTO	CC1210
31	C181	CL10C560JB8NNNC	CAPC1608X90N_B
32	RDCM1,RCS1,RCCM1,RASCR1,RPU2,R90,R93,R94,C182,C183,C221	DNI	CAPC1608X90N_B
33	C185	EEE-1EA331UP	SMD
34	C186	CL32B226KAJNNNE	CAPC2012X145N_A
35	C187,C205,C206,C216	CL10B104KB8NNNC	CAPC1608X90N_B
36	C188,C218	C0402C101J5RAC7867	603
37	C189,C190	CL05A475MR5NQNC	603
38	C191	C1210C226K9RACAUTO	1210
39	C194	UCD0J681MNL1GS	CAPAE660X800N_NICHICON
40	C195,C225,C226	UCD0J681MNL1GS	SMD

41	C196,C197,C198	GRM21BR60J107ME15L	CAPC3216X190N_A
42	C199,C200,C201,C202	GRM188R60J476ME15D	1206
43	C203,C204,C213,C215,C231	C1206C106J4RACTU	1210
44	C209	GRM033R60J224KE15D	805
45	C210	C2220C476M4R2CAUTO	CAPC6050X550N
46	C211	GRM188R60J476ME15D	603
47	C212,C214,C232	CL05A104KA5NNNC	1210
48	C217	GRM31C5C1H913JA01L	603
49	C219	GCM1555C1H471JA16D	603
50	C220	12063C105JAT2A	603
51	C222,C227,C228,C229,C230	CL32A107MQVNNNE	1210
52	C233,C243,C244,C245,C248,C258,C259,C260	CL05A104KA5NNNC	
53	C234,C249	GCM155R71H103JA55D	
54	C247	CC0402JRNPO9BN470	CAPC1005X55N
55	C262	CC0402JRNPO9BN471	CAPC1005X55N
56	C263	GCM155R71H103JA55D	CAPC1005X55N
57	C264,C266,C268	C1206C106J4RACTU	CAPC3216X180N
58	C269,C270	C1210C105J5RACTU	CAPC3225X170N
59	C271,C272,C284,C285,C286,C298,C299,C300,C312,C313,C314,C319,C320,C321,C322,C328,C335,C336,C337,C350,C354,C355,C356,C357,C358	TMK105BJ104KV-F	402
60	C273,C278,C283,C287,C292,C297,C301,C306,C311,C316,C317,C318,C323,C329,C334,C339,C344,C349,C351,C352,C353	C1005X5R0J475M	402
61	C274,C275,C279,C280,C288,C289,C293,C294,C302,C303,C307,C308,C324,C325,C330,C331,C340,C341,C345,C346	GRM155R71A474KE01D	402
62	C276,C277,C281,C282,C290,C291,C295,C296,C304,C305,C309,C310,C326,C327,C332,C333,C342,C343,C347,C348	C1005X7R1C683K050BC	402
63	C315,C338,C454,C455,C456,C457,C459,C460,C461,C462	GCM155R71H103JA55D	CAPC1005X55N
64	C395	C0603C102J5RACTU	
65	C396,C416,C417	CL32B226KAJNFNE	
66	C397,C415,C458	C1210C105J5RACTU	
67	C425,C437,C608,C609,C610,C611,C612	C1206C106J4RACTU	
68	C438	CAPC1005X65N	CAPC1005X65N
69	C439,C602	C1210C105J5RACTU	
70	C440	CL05B154KO5NNNC	CAPC1005X65N

71	R2,R46,R47,C442	DNI	DNI
72	C444,C607	GRM21BR60J107ME15L	CC0603
73	C445	C0402C101J5RAC7867	CAPC1005X55N
74	C446	C1005X5R1V225M050BC	CAPC1005X65N
75	C450,C451,C452,C453	DNI	DNI
76	C463,C465,C484,C486	CL05A104KA5NNNC	CAPC1005X55N
77	C464,C466,C485,C487	CL05A104KA5NNNC	CAPC1005X55N
78	C539,C540,C544,C545,C546,C547,C548,C549,C550,C551,C552,C553,C554,C555,C556,C557,C581,C582,C586,C587,C588,C589,C590,C591,C592,C593,C594,C595,C596,C597,C598,C599	GRM155R71A474KE01D	
79	C600	12063C105JAT2A	
80	C601	EEE-1EA331UP	
81	C603,C605	CAPC1005X65N	CAPC1005X65N
82	C604	C0402C223J3RAC7867	
83	C606	C0603C102J5RACTU	
84	DS1	HSMF-C155	LED_HSMF-C157
85	D1,D2,D5,D6,D10	SML-LX0603GW-TR	LEDC1608X60N
86	D3,D4	BAT54T1G	SOD3716X135N
87	D7	1N4148X-TP	SODFL1608X77N
88	D8	MBRS240LT3G	DIOM5436X247N
89	D9	MMSZ4680T1G	SOD3716X135N
90	FB1	MMZ1005S121CT000	
91	J1	HDR 1X3	HDR 1X3
92	J2	HDR 1X4	HDR 1X4
93	J3	HDR 1X5	HDR 1X5
94	J4	HDR 1X6	HDR 1X6
95	J5	878321420	878321420
96	J6	HDR 1X3	
97	J7	RJMG2012211A0FR	AMPHENOL_RJMG2012211A0FR
98	J9	DNI	TP_40C
99	J10	SBH11-PBPC-D05-ST-BK	SULLINS_SBH11-PBPC-D05-ST-BK
100	J11,J12	SIT5356-AI-FQ-25N0-40.000000F	TBD
101	J13	HEADER 10X2	
102	J14	469911006	TBD
103	J15	22112032	tbd
104	J16,J17,J18,J19,TP27	DNI	
105	L1,L2	MMZ1005S121CT000	
106	L3	RLF7030T-2R2M5R4	IND_RLF7030

107	L4	RLF7030T-2R2M5R4	IND_RLF7030
108	L5	BLM15BD102SN1D	SM0402
109	L6,L7	XAL4020-152ME	IND_XAL4020-102ME
110	L8	XAL4020-222ME	IND_XAL4020-102ME
111	L9,L10,L11,L12,L13,L14	BLM21PG221SN1D	indc2012x105n
112	L15	SRU1038-3R8Y	IND_SRU1038-1R5Y
113	MH1,MH2,MH3,MH4,MH5,MH6,MH7,MH8		MTG320_500
114	MP1,MP2,MP3,MP4,MP5,MP6,MP7,MP8,MP9,MP10,MP11,MP12,MP13,MP14,MP15,MP16,MP17,MP18,MP19,MP20,MP21,MP22,MP23,MP24,MP25,MP26,MP27,MP28,MP29,MP30,MP31,MP32,MP33,MP34,MP35,MP36,MP37,MP38,MP39,MP40,MP41,MP42,MP43,MP44,MP45,MP46,MP47,MP48,MP49,MP50,MP51,MP52,MP53,MP54,MP55,MP56,MP57,MP58,MP59,MP60,MP61		100S_MP
115	MP62,MP63,MP64,MP65,MP66,MP67,MP68,MP69,MP70,MP71,MP72,MP73,MP74,MP75,MP76,MP77,MP78,MP79,MP80,MP81,MP82,MP83,MP84,MP85,MP86,MP87,MP88,MP89,MP90,MP91,MP92,MP93,MP94,MP95,MP96		200S_MP
116	Q1,Q2	NDS331N	sot95p240x120-3n
117	Q3,Q4,Q5,Q6,Q7	MMBT3904	SOT95P240X130N
118	RADDR1,R82,R83,R99,R101,R121,R122	ERJ-2RKF1002X	603
119	RADDR2	ERJ-2GEJ113X	603
120	RADDR3	ERJ-2RKF1132X	603
121	RPFM1,RFCO1,RPU3,R109,R111,R114,R116,R119	DNI	603
122	RFREQ1,RFREQ3	ERJ-2RKF2612X	603
123	RFREQ2	ERJ-2RKF2872X	603
124	RPWM1,RPD1,RPD2,RPD3,R84,R95,R98,R120	ERJ-2GEJ104X	603
125	RPU1,R104	RESC1005X40N_B	603
126	RSS1	ERJ-2RKF6812X	603
127	RUVLO1	RC0603FR-0723K7L	603
128	RVSET1,RVSET3	ERJ-2RKF1782X	603
129	RVSET2	ERJ-2RKF3162X	603
130	R1	RC0402FR-071KL	RESC1005X40N_VISHAY

131	R3	DNI	
132	R4,R6,R86,R87,R105	ERJ-2RKF1132X	
133	R5,R7	RC0402FR-0720K5L	
134	R8	ERJ-2RKF4701X	
135	R9,R10	RC0402FR-07100RL	RESC1005X40N
136	R11,R12,R276,R280	RC0402FR-071KL	RESC1005X40N_VISHAY
137	R13	504L50R0FTNCFT	
138	R14,R81	ERJ-2RKF2400X	
139	R15,R17,R18,R19,R20	ERJ-2RKF4701X	
140	R16,R302	RC0402FR-07100RL	
141	R21	ERJ-2RKF4701X	
142	R22,R23,R24,R25,R26,R32	ERJ-2RKF4701X	
143	R27,R28,R29,R30,R52,R53	ERJ-2RKF4990X	
144	R31	CRCW040220R0FKED	
145	R33,R49,R50	ERJ-2RKF2610X	
146	R34,R37,R39	ERJ-2RKF4701X	
147	R35,R41,R42,R360	ERJ-2RKF1002X	
148	R36,R48	ERJ-2RKF8061X	
149	R38,R40,R43	ERJ-2RKF2610X	
150	R44,R45,R334,R352,R378	ERJ-2RKF1132X	
151	R51,R124,R126,R131,R133,R242,R359	DNI	
152	R54,R55,R56,R57,R58,R59,R60,R61,R62,R63,R64,R65,R66,R67,R68,R69,R70,R71,R72,R73,R74,R75,R76,R77,R78,R79,R80	ERJ-2RKF12R0X	RESC1005X40N_C
153	R85	ERJ-2RKF6651X	603
154	R88,R89,R106,R107	ERJ-2RKF10R0X	
155	R91,R96,R102,R110,R112,R123	RC0603FR-07160KL	603
156	R92	ERJ-2RKF1132X	603
157	R97	ERJ-2GEJ104X	603
158	R100	ERJ-2RKF1002X	603
159	R103	ERA-2AEB392X	603
160	R108,R127,R128,R134,R135,R285,R286,R287,R288,R289,R290,R298,R299,R305,R339,R341,R351,R354	ERJ-2RKF1002X	
161	R113	RC0603FR-0790K9L	603
162	R115	RC0402FR-0745K3L	603
163	R117	PNM0603E5002BST5	603
164	R118	DNI	603
165	R125,R130,R137	ERJ-2RKF2002X	
166	R129,R136	ERJ-2RKF1213X	
167	R132	RC0402FR-0745K3L	
168	R138	ERJ-2GEJ104X	RESC1005X40N_B

169	R139	ERJ-2RKF3163X	
170	R140,R277,R363,R364	ERJ-2GEJ104X	
171	R141	ERJ-2RKF8661X	RC0402
172	R142,R143,R145,R146,R148,R149, R151,R152,R184,R185	ERJ-1GEJ101C	201
173	R144,R147,R150,R153,R186	ERJ-2RKF2400X	402
174	R154,R155,R156,R157,R158,R159, R160,R161,R162,R163,R164,R165, R166,R167,R168,R169,R170,R171, R172,R173,R174,R175,R176,R177, R178,R187,R188,R189,R190,R191, R192,R193,R194,R195,R196,R197, R198,R199,R200,R201,R202,R203, R204,R205,R206,R207,R208,R209, R210,R211	ERJ-2RKF39R2X	402
175	R179,R180,R212,R213	ERJ-2RKF36R0X	402
176	R181,R214	ERJ-2RKF4990X	402
177	R182,R215	MCR01MZPF1001	402
178	R183,R216	ERJ-2RKF4701X	402
179	R217,R218,R221,R222,R379	RC1005F472CS	
180	R219,R220,R223,R224	ERJ-2RKF22R0X	
181	R225	ERJ-2RKF1132X	RESC1005X40N_C
182	R226,R227	ERJ-2GE0R00X	TBD
183	R228	RC0402FR-07191RL	
184	R229,R241,R292,R293,R294,R295, R296,R297,R300,R301	RC0603FR-07220RL	
185	R230	ERJ-2RKF6041X	
186	R231,R232,R233,R234,R235,R236, R238,R239	RC1005F102CS	
187	R237,R243	RESC1005X40N_B	
188	R240	RC1005F472CS	
189	R244,R245,R246,R247,R248,R249, R250,R251,R252,R253,R254,R255, R256,R257,R258,R259,R260,R261, R262,R263,R264,R265,R266,R267, R268,R269,R270,R271,R272,R273, R274,R275	FC0402E50R0BST1	
190	R278	ERJ-2RKF1331X	
191	R279	ERJ-2RKF1272X	
192	R281,R362,R365	RC0402FR-07100RL	
193	R282	RC0402FR-0738K3L	
194	R283	ERJ-2RKF1403X	
195	R284	ERJ-2RKF2612X	
196	R291,R317,R324	ERJ-2GE0R00X	
197	R303,R304,R306,R307,R308,R309,	ERJ-2RKF4992X	

	R310,R311		
198	R312	ERJ-2GEJ513X	
199	R313,R314,R315,R316,R318,R319, R320,R321,R322,R323,R380,R381, R382,R383,R384,R385	ERJ-2RKF30R0X	
200	R325	ERJ-2RKF1002X	
201	R326,R327,R328,R329,R330,R331, R332,R342,R343,R344,R345,R347	DNI	AXRC05
202	R333,R386	RC1005F472CS	
203	R335,R353	ERJ-2RKF1132X	TBD
204	R336,R337,R338,R340,R349,R350, R355,R356	ERJ-2RKF1002X	
205	R346	ERJ-2RKF30R0X	
206	R348,R366,R367,R368,R369,R370, R371,R372,R373,R374,R375,R376, R377	ERJ-2RKF22R0X	
207	R357	ERJ-2GEJ202X	
208	R358	ERJ-2RKF4222X	
209	R361	ERJ-2RKF1132X	
210	SDA04H1SBD1	SDA04H1SBD1	tbd
211	SMA1	CONSMA001-SMD-G	LINX_CONSMA001-SMD-G
212	TP1,TP2,TP3,TP4,TP5,TP6,TP7,TP8, TP9,TP10,TP11,TP12,TP13,TP14,TP 15,TP16,TP17,TP18,TP19,TP20,TP2 1,TP22,TP23,TP24,TP25,TP26		
213	U2	REF3012AIDBZT	SOT95P237X112-3N_TI
214	U3,U4	SN74AVC1T45DCKR	sot65p210x110-6n
215	U5	MAX16025TE+	WQFN65P400X400X80- 17N_A
216	U6	ISL8272MARIZ	MODULE_ISL8272MAIRZ
217	U7,U12	INA226AIDGS	VSSOP50P490X110-10N
218	U8	ISL85003FRZ-T7A	SON50P300X400X90-13N
219	U9,U13	R131	TBD
220	U10	ZL9101MAIRZ	PQFN130P1500X1500X370- 21N
221	U11	ISL80136IBEAJZ	SOIC127P602X168-9N_A
222	U14	ISL85415FRZ-T7A	SON50P300X400X100-13N
223	U15	ZL9010MIRZ	MODULE_ZL9010MIRZ
224	U16,U17	TPS568215RNNR	VQFN50P360X360X100-18N
225	U18	TLV62568ADRLR	SOTFL50P160X60-6N_A
226	U19	ADP1763ACPZ	QFN50P300X300X80- 17N_T175
227	U25	KSZ9897STXI	TBD
228	U26	MAX15303AA00+CM	QFN50P600X600X80-41N
229	U27	TMP464AIRGTT	VQFN50P300X300X100-

			17N_TI
230	U28	SFEM064GB1EA1TO-I-HG-111-STD	BGA153N50P14X14_1150X1300X100
231	U29,U30	Si5348A-D-GM	QFN64
232	U31	MAX15027ATB+T	DFN50P300X300X80-11N
233	U32	TPS51200DRCT	SON50P310X310X100-11N
234	Y1	MC-306 32.7680K-A0	XTAL_MC-306327680K-A0
235	Y2,Y3	7M48072002	OSCCC250X320X80-4N

DFE board Bill of Materials (BOM)

1. ***The following BOM is only for ONE board. The appropriate parts for 10 boards should be procured***

2. There could be an approx. 5% increase in the number of decoupling capacitors and termination resistors used.

3. Any items that are non-stocked need to be quoted - either for an alternate part or for the same part including the lead time.

We can share the excel sheet of the BOM on email request (**rganti@ee.iitm.ac.in, raviteja@5gtbiitm.in**. Please cc both the email id's)

Item	**Reference**	**MANUFACTURER PART-NUMBER**	**PCB Footprint**
1	C162,C163,C164,C232,C242,C263,C264,C274,C562,C569,C1142,C1362,C1426,C1493,C1494,C1495,C1496,C1497,C1498,C1499,C1500,C1501,C1503,CL05A104KA5NNNC	CL05A104KA5NNNC	CAPC1005X55N
2	CN1	DM3AT-SF-PEJM5	HIROSE_DM3AT-SF-PEJM5
3	C1,C3,C9,C10,C11,C12,C13,C14,C19,C20	CL05A104KA5NNNC	CAPC1005X55N
4	C2,C5	GRM188R61A474KA61D	CAPC1608X87N
5	C4	CL05B272KB5NNNC	CAPC1005X55N
6	C6	CL05A106MP8NUB8	CAPC1005X90N

7	C7,C8,C143,C149,C174,C175,C227,C228,C265,C266,C571,C575,C576,C583,C584,C585,C586,C587,C588,C589,C590,C591,C592,C593,C594,C595,C596,C597,C598,C599,C600,C601,C607,C614,C615,C616,C617,C618,C619,C620,C621,C622,C623,C624,C625,C626,C627,C628,C629,C630,C631,C632,C638,C649,C656,C657,C661,C674,C676,C682,C694,C701,C702,C706,C719,C721,C727,C739,C746,C747,C751,C764,C766,C770,C781,C789,C790,C794,C807,C809,C813,C908,C912,C916,C919,C922,C929,C932,C939,C942,C944,C946,C948,C951,C955,C958,C961,C968,C971,C978,C981,C983,C985,C987,C990,C994,C998,C1001,C1004,C1011,C1014,C1021,C1024,C1026,C1028,C1030,C1033,C1037,C1040,C1043,C1050,C1053,C1060,C1063,C1065,C1067,C1069,C1072,C1076,C1080,C1083,C1086,C1093,C1096,C1103,C1106,C1108,C1110,C1112,C1115,C1119,C1122,C1125,C1132,C1135,C1145,C1147,C1149,C1151,C1155,C1158,C1162,C1165,C1168,C1175,C1178,C1185,C1188,C1190,C1192,C1194,C1197,C1201,C1204,C1207,C1214,C1217,C1227,C1229,C1231,C1233,C1235,C1236,C1237,C1238,C1240,C1241,C1242,C1244,C1246,C1247,C1248,C1249,C1250,C1251,C1252,C1253,C1254,C1255,C1256,C1257,C1258,C1262,C1263,C1264,C1265,C1266,C1267,C1268,C1269,C1270,C1271,C1272,C1273,C1274,C1275,C1276,C1277,C1298,C1299,C1300,C1301,C1302,C1303,C1304,C1305,C1306,C1307,C1308,C1309,C1311,C1312,C1314,C1316,C1317,C1318,C1319,C1320,C1321,C1325,C1326,C1327,C1328,C1329,C1330,C1331,C1332,C1333,C1334,C1335,C1336,C1337,C1338,C1339,C1340,C1361,C1366,C1367,C1368,C1369,C1370,C1371,C1372,C1373,C1374,C1375,C1376,C1377,C1378,C1379,C1380,C1381,C1382,C1383,C1384,C1385,C1386,C1387,C1388,C1390,C1392,C1393,C1395,C1396,C1397,C1398,C1399,C1400,C1401,C1402,C1403,C1425,C1430,C1431,C1432,C1433,C1434,C1435,C1436,C1437,C1438,C1439,C1440,C1441,C1442,C1443,C1444,	CL05A104KA5NNNC	CAPC1005X55N

	C1445,C1446,C1447,C1448,C1452,C1453,C1454,C1455,C1456,C1457,C1458,C1459,C1460,C1461,C1462,C1463,C1464,C1465,C1466,C1467		
8	C17,C18	06035C220JAT2A	CAPC1608X90N
9	C21,C246,C276,C573	C0402C101J5RAC7867	CAPC1005X55N
10	C22,C23,C24,C25,C26,C27	CL05A104KA5NNNC	CAPC1005X55N_A
11	C28,C29,C30,C31,C32,C33,C34,C35,C36,C37,C38,C39,C40,C41,C42,C43,C44,C45,C46,C47,C48,C49,C50,C51,C52,C53,C54,C55,C56,C57,C58	GJM1555C1H330JB01D	CAPC1005X55N_A
12	C59,C60,C61,C62,C63,C64,C65,C66,C67,C68,C69,C70,C71,C72,C73,C74,C77,C78,C81,C82,C85,C86,C89,C90,C91,C92,C134,C135,C136,C137,C139,C140,C141,C142,C645,C660,C667,C668,C677,C679,C690,C705,C712,C713,C720,C724,C736,C750,C757,C758,C767,C780,C793,C800,C801,C810,C1502,C1566	GCM155R71H103JA55D	CAPC1005X55N

13	C93,C95,C97,C102,C103,C104,C105,C106,C108,C113,C114,C117,C119,C126,C127,C128,C129,C321,C322,C323,C324,C325,C326,C327,C328,C329,C330,C379,C380,C381,C382,C383,C384,C385,C386,C387,C388,C556,C572,C673,C680,C718,C725,C763,C768,C806,C811	GRM21BR60J107ME15L	CAPC2012X145N_A
14	C94,C96,C99,C100,C101,C107	GRM21BR60J107ME15L	CAPC2012X145N_A
15	C98	GRM21BR60J107ME15L	CAPC2012X145N_A
16	C109,C115,C154,C161,C172,C293,C294,C295,C296,C308,C309,C310,C311,C639,C640,C641,C642,C643,C651,C652,C653,C654,C663,C664,C665,C671,C684,C685,C686,C687,C688,C696,C697,C698,C699,C708,C709,C710,C716,C729,C730,C731,C732,C733,C741,C742,C743,C744,C753,C754,C755,C761,C772,C773,C774,C775,C776,C784,C785,C786,C787,C796,C797,C798,C804,C837,C856,C878,C906	C2220C476M4R2CAUTO	CAPC6050X550N
17	C110,C111,C112,C116,C118,C120,C130,C131,C132,C133,C144,C304,C319,C331,C332,C333,C334,C335,C336,C337,C338,C339,C340,C341,C342,C343,C344,C345,C346,C347,C348,C349,C350,C351,C352,C353,C354,C355,C356,C357,C358,C359,C362,C363,C364,C389,C390,C391,C392,C393,C394,C395,C396,C397,C398,C399,C400,C401,C404,C405,C406,C541,C554,C565	CL21A475KOFNNNE	CAPC2012X140N_A
18	C121,C252,C253,C283,C284	T530X687M006ATE018	CAPMP7343X430N_A
19	C122,C123,C124,C125	EEF-HX0D471R4 or EEFGX0D471R	CAPMP7343X200N

20	C138,C182,C183,C231,C279,C539,C567,C580,C602,C611,C644,C647,C675,C683,C689,C693,C722,C728,C734,C735,C765,C771,C777,C778,C808,C814,C821,C822,C823,C824,C828,C829,C833,C834,C835,C844,C845,C846,C847,C851,C852,C858,C859,C860,C867,C868,C869,C870,C874,C875,C881,C882,C883,C890,C891,C892,C893,C897,C898,C902,C903,C904,C909,C913,C917,C920,C923,C925,C930,C933,C937,C940,C943,C945,C949,C952,C956,C959,C962,C964,C969,C972,C976,C979,C982,C984,C988,C991,C995,C999,C1002,C1005,C1007,C1012,C1015,C1019,C1022,C1025,C1027,C1031,C1034,C1038,C1041,C1044,C1046,C1051,C1054,C1058,C1061,C1064,C1066,C1070,C1073,C1077,C1081,C1084,C1087,C1089,C1094,C1097,C1101,C1104,C1107,C1109,C1113,C1116,C1120,C1123,C1126,C1128,C1133,C1136,C1140,C1143,C1146,C1148,C1152,C1156,C1159,C1163,C1166,C1169,C1171,C1176,C1179,C1183,C1186,C1189,C1191,C1195,C1198,C1202,C1205,C1208,C1210,C1215,C1218,C1222,C1225,C1228,C1230,C1234,C1239,C1243,C1245,C1259,C1260,C1261,C1310,C1313,C1315,C1322,C1323,C1324,C1363,C1364,C1365,C1389,C1391,C1394,C1427,C1428,C1429,C1449,C1450,C1451	C1210C105J5RACTU	CAPC3225X170N
21	C150,C151,C152,C153	DNI	capc1608x87n
22	C155,C156,C158,C159,C160,C165,C166,C167,C168,C169,C170,C171,C176,C292,C307,C815,C816,C838,C839,C861,C862,C884,C885	GCM155R71H103JA55D	CAPC1005X55N

23	C157,C173,C179,C181,C191,C557,C558,C559,C560,C561,C566,C633,C648,C650,C662,C678,C681,C691,C695,C703,C707,C723,C726,C737,C740,C748,C752,C769,C779,C783,C791,C795,C812,C817,C818,C819,C820,C825,C826,C827,C831,C832,C836,C840,C841,C842,C843,C848,C849,C850,C854,C855,C857,C863,C864,C865,C866,C871,C872,C873,C877,C879,C880,C886,C887,C888,C889,C894,C895,C896,C900,C901,C905,C907,C918,C921,C924,C926,C928,C931,C938,C941,C947,C950,C957,C960,C963,C965,C967,C970,C977,C980,C986,C989,C1000,C1003,C1006,C1008,C1010,C1013,C1020,C1023,C1029,C1032,C1039,C1042,C1045,C1047,C1049,C1052,C1059,C1062,C1068,C1071,C1082,C1085,C1088,C1090,C1092,C1095,C1102,C1105,C1111,C1114,C1121,C1124,C1127,C1129,C1131,C1134,C1141,C1144,C1150,C1157,C1164,C1167,C1170,C1172,C1174,C1177,C1184,C1187,C1193,C1196,C1203,C1206,C1209,C1211,C1213,C1216,C1223,C1226	C1206C106J4RACTU	CAPC3216X180N
24	C184	UWT1C471MNL1GS	CAPR_315X275_150_P
25	C185,C186,C187,C188,C189,C190,C217,C218,C219,C220,C221,C222,C223,C224,C225,C226,C236,C237,C238,C245,C249,C267,C297,C298,C299,C300,C312,C313,C314,C315,C563,C564,C672,C717,C762,C805	CL32B226KAJNFNE	CAPC3225X270N
26	C192,C193,C243	CL21A106KQCLRNC	CC0603
27	C194,C234,C235	GRM32ER61A107ME20L	1210
28	C195,C196,C211,C212,C213,C214,C215,C216	GRM32ER61A107ME20L	1210
29	C197,C198,C199,C250,C251,C281,C282	UWT0J102MNL1GS	CAPAE830X1080N
30	C200,C201,C202,C203,C204,C205,C206,C207,C208,C209,C210	LLL31MR70J475MA01L	CAPC1632X125N
31	C229,C230	CL21A106KOQNNNG	CC0805
32	C233	AMK432BJ477M	1812

		M-T	
33	C239	EMK042CG560JC-W	CAPC1005X55N
34	C240,C241,C278	DNI	CC0603
35	C244	EEE-1EA331UP	CAPAE830X1050N
36	C247,C248	CL10A475KO8NNNC	CC0603
37	C254,C255,C256	C3216X5R1A107M160AC	CC1206
38	C257,C258,C259,C260	GCM32ER70J476KE19L	CC1206
39	C261,C262,C270,C272,C289	CL32B106KOULNNE	CC1210
40	C268	GRM21BR61A476ME15L	CC0805
41	C269	GRM188R60J476ME15D	CC0603
42	C271,C273,C290,C291,C301,C302,C303,C306,C316,C317,C318	CL05A104KA5NNNC	CAPC1005X55N
43	C275	GRM31C5C1H913JA01L	CAPC3216X180N
44	C277	C0402C471J4RACTU	CAPC1005X55N
45	C280,C285,C286,C287,C288	GRM32ER61A107ME20L	CC1210
46	C305	GCM155R71H103JA55D	CAPC1005X55N
47	C320	GCM155R71H103JA55D	CAPC1005X55N
48	C360,C361,C365,C366,C367,C368,C369,C370,C371,C372,C373,C374,C375,C376,C377,C378,C402,C403,C407,C408,C409,C410,C411,C412,C413,C414,C415,C416,C417,C418,C419,C420,C424,C425,C429,C430,C438,C439,C443,C444,C452,C453,C457,C458,C474,C475,C480,C481,C490,C491,C495,C496,C582,C613	GRM155R71A474KE01D	CAPC1005X55N_A
49	C421,C422,C434,C435,C436,C448,C449,C450,C462,C463,C464,C470,C471,C472,C473	TMK105BJ104KV-F	CAPC1005X55N

	,C478,C485,C486,C487,C500,C504,C505,C506,C507,C508		
50	C423,C428,C433,C437,C442,C447,C451,C456,C461,C466,C467,C468,C469,C479,C484,C489,C494,C499,C501,C502,C503	C1005X5R0J475M	CAPC1005X55N_A
51	C426,C427,C431,C432,C440,C441,C445,C446,C454,C455,C459,C460,C476,C477,C482,C483,C492,C493,C497,C498	C1005X7R1C683K050BC	CAPC1005X55N
52	C465,C488	04023D103KAT2A	RESC1005X40N_PEC
53	C543	C0402C223J3RAC7867	CAPC1005X55N
54	C555,C581,C612	C0603C102J4RACTU	capc1608x87n
55	C568	CL10B154KO8NNNC	CAPC1608X90N_D
56	C570	DNP	CAPC1608X90N_D
57	C574	GRM155R61A225KE95D	CAPC1005X65N
58	C579,C610	C0402C181K8RACTU	CAPC1005X55N
59	C646,C655,C692,C700,C738,C745,C782,C788	C0402C272J8RACAUTO	CAPC1005X55N
60	C658,C1232	CL05A104KA5NNNC	CAPC1005X55N
61	C659,C666,C704,C711,C749,C756,C792,C799	VJ0603Y332MXQPW1BC	CAPC1608X87N
62	C669,C670,C714,C715,C759,C760,C802,C803	DNI	CAPC1005X55N
63	L84,L89,L99,L106,L108,L109,L119,L120,L126,L130,L147,L150,L154,L156,L163,L164,L171,L176,L187,L194,L201,L202,L207,L208,L214,L218,L231,L238,L242,L245,L251,L252,C830,C853,C876,C899,C1281,C1282,C1286,C1290,C1291,C1292,C1294,C1295,C1341,C1345,C1349,C1353,C1354,C1355,C1357,C1360,C1407,C1409,C1414,C1417,C1419,C1420,C1423,C1424,C1469,C1472,C1477,C1481,C1482,C1484,C1485,C1486,C1518,C1519,C1520,C1521,C1522,C1523,C1524,	DNI	CAPC0603X33N

	C1525,C1526,C1527,C1528,C1529,C1530,C1531,C1532,C1533,C1534,C1535,C1536,C1537,C1538,C1539,C1540,C1541,C1542,C1543,C1544,C1545,C1546,C1547,C1548,C1549,C1550,C1551,C1552,C1553,C1554,C1555,C1556,C1557,C1558,C1559,C1560,C1561,C1562,C1563,C1564,C1565		
64	C910,C911,C914,C915,C927,C934,C935,C936,C953,C954,C966,C973,C974,C975,C992,C993,C996,C997,C1009,C1016,C1017,C1018,C1035,C1036,C1048,C1055,C1056,C1057,C1074,C1075,C1078,C1079,C1091,C1098,C1099,C1100,C1117,C1118,C1130,C1137,C1138,C1139,C1153,C1154,C1160,C1161,C1173,C1180,C1181,C1182,C1199,C1200,C1212,C1219,C1220,C1221	GRM31CR60J227ME11L	CAPC3216X190N_A
65	C1278,C1279,C1284,C1285,C1287,C1288,C1296,C1297,C1342,C1343,C1347,C1348,C1350,C1351,C1358,C1359,C1405,C1406,C1411,C1412,C1413,C1415,C1421,C1422,C1470,C1471,C1475,C1476,C1478,C1479,C1487,C1488	GJM0335C1HR20WB01D	CAPC0603X33N
66	C1489,C1491	C1210C105J5RACTU	CAPC3225X170N
67	C1490,C1492	CL05A104KA5NNNC	CAPC1005X55N
68	C1517	EEE-1EA331UP	smd
69	C1567,C1568	0.1uF	CAPC1005X55N
70	DS1	HSMF-C155	LED_HSMF-C157
71	D1,D2,D3,D4,D19,D20,D21,D22,D23,D25,D28,D29,D32,D33,D36,D37,D39	SML-LX0603GW-TR	LEDC1608X70N
72	D5,D6	BAT54/SOT	SOT95P240X120-3N
73	D7	1N4148X-TP	SODFL1608X77N
74	D17	MBRS240LT3G	DIOM5436X247N

75	D18	MMSZ4680T1G	SOD3716X135N
76	D24,D27,D31,D35	MBRS240LT3G	DIOM5436X315N
77	FB1	MMZ1005S121CT000	FB_MPZ1005S121ETD25
78	J1	Header 1X3	BERG_1X3
79	J2	Header 1X3	TBD
80	J3	HEADER 3X2	HEADER_3X2_IITM
81	J7	HEADER 2	HEADER_1X2_IITM
82	J8	878321420	Molex_878321420
83	J9	Header 1X3	BERG_1X3
84	J10	RJMG2012211A0FR	AMPHENOL_RJMG2012211A0FR
85	J12	Test point	Test point
86	J18,J19	Test point	Test point
87	J37,J38,J39,J40,J41,J42,J43,J44	HDR 1X3	BERG_1X3
88	J46	SBH11-PBPC-D05-ST-BK	SULLINS_SBH11-PBPC-D05-ST-BK
89	J50,J70	HEADER 5X2	MOLEX_39281103
90	J51	HEADER 3	MOLEX_22-11-2032
91	TP7,TP8,TP9,TP10,TP11,TP12,TP13,TP14,TP15,TP16,TP17,TP18,TP19,TP20,TP21,TP22,TP23,TP24,TP25,TP26,TP27,TP28,TP29,TP30,TP31,TP32,TP33,TP34,TP35,J53,J54,J55,J56	Test points	TP_40C
92	J69	SIT5356-AI-FQ-25N0-40.000000F	SIT5356-AI-FQ-25N0-40.000000F
93	L1,L2	HZ0805E601R-10	TBD
94	L4,L5,L6,L7	BLM21PG221SN1	indc2012x1

		D	05n
95	L9	RLF7030T-2R2M5R4	IND_RLF7030
96	L10	RLF7030T-2R2M5R4	IND_RLF7030
97	L11	BLM15BD102SN1D	INDC1005X55N
98	L12,L13,L54,L55,L56,L57	XEL4020-152ME	IND_XFL4020-152MEC
99	L15	SRU1038-3R8Y	IND_SRU1038-1R5Y
100	L16,L26,L36,L45	BLM18KG121TN1D	INDC1608X75N
101	L17,L19,L27,L29,L37,L39,L46,L48	XAL4020-222ME	IND_XAL4020-102ME
102	L18,L20,L23,L28,L30,L33,L38,L40,L43,L47,L49,L52	BLM18KG471SN1D	INDC1608X95N_B
103	L21,L22,L31,L32,L41,L42,L50,L51	SRP5030T-6R8M	INDM5752X300N_A
104	L24,L34,L44,L53	BLM15AX300SN1D	fb_blm15ag100sn1
105	L25,L35	FBMJ2125HS420-T	indc2012x105n
106	L58,L61	BLM15HD182SN1D	INDC1005X55N
107	L59,L62	BK1005LM182-T	INDC1005X55N
108	L60,L63,L66,L69,L72,L75,L78,L81	BLM15HD182SN1D	INDC1005X55N
109	L64,L67,L70,L73,L76,L79	BLM15HD182SN1D	INDC1005X55N
110	L65,L71,L74,L77,L80	BK1005LM182-T	INDC1005X55N
111	L68	BK1005LM182-T	INDC1005X55N_TY
112	L82,L86,L96,L97,L102,L107,L118,L121,L127,L131,L140,L141,L143,L151,L162,L165,L170,L174,L184,L185,L188,L195,L206,L209,L215,L216,L227,L229,L232,L239,L250,L253	MLG0603S1N3ST000	INDC0603X33N
113	MH1,MH2,MH3,MH4,MH5,MH6,MH7,MH	Mounting hole	MTG320_5

	8		00
114	MP1,MP2,MP3,MP4,MP5,MP6,MP7,MP8,MP9,MP10,MP11,MP12,MP13,MP14,MP15,MP16,MP17,MP18,MP19,MP20,MP21,MP22,MP23,MP24,MP25,MP26,MP27,MP28,MP29,MP30,MP31,MP32,MP33,MP34,MP35,MP36,MP37,MP38,MP39,MP40,MP41,MP42,MP43,MP44,MP45,MP46,MP47,MP48,MP49,MP50,MP51,MP52,MP53,MP54,MP55,MP56,MP57,MP58,MP59,MP60,MP61	Mounting hole	100S_MP
115	MP62,MP63,MP64,MP65,MP66,MP67,MP68,MP69,MP70,MP71,MP72,MP73,MP74,MP75,MP76,MP77,MP78,MP79,MP80,MP81,MP82,MP83,MP84,MP85,MP86,MP87,MP88,MP89,MP90,MP91,MP92,MP93,MP94,MP95,MP96	Mounting hole	200S_MP
116	Q1,Q2	NDS331N	sot95p240x120-3n
117	Q3,Q4,Q5,Q6,Q8	MMBT3904	SOT95P240X130N
118	Q9,Q10,Q11,Q12	SIA906EDJ-T1-GE3	SON65P205X205X80-8N
119	RADDR1,R260,R283,R284,R285,R286,R287,R291,R313,R314,R318,R322,R327,R340,R342,R356,R357,R375,R377,R385,R399,R400,R404,R405,R409,R410,R536,R540,R541,R552,R557,R558,R564,R569,R570,R574,R575,R584,R587,R596,R601,R605,R612,R614,R621,R624,R633,R638,R642,R650,R652,R658,R661,R672,R675,R679,R686,R689,R695,R698,R707,R712,R716,R846,R849,R864,R867,R882,R886,R900,R903,R928,R930	ERJ-2RKF1002X	RESC1005X40N_B
120	RADDR2	ERJ-2GEJ113X	RESC1005X40N_D
121	RADDR3	ERJ-2GE0R00X	RC0603
122	RPFM1,RFCO1,RDCM1,RCS1,RCCM1,RASCR1,RPU2,RPU3,R365,R368,R369,R386,R388,R391,R393,R396	DNI	RC0603
123	RFREQ1,RFREQ3,R531	ERJ-2RKF2612X	RESC1005X40N_PEC

124	RFREQ2	ERJ-2RKF2872X	RESC1005X40N_PEC
125	RPWM1,RPD1,RPD2,RPD3,R352,R359,R370,R372,R397,R517,R518,R521,R572,R581,R609,R618,R646,R655,R683,R692,R719,R720,R725,R727,R728,R733,R735,R736,R741,R743,R744,R749	ERJ-2GEJ104X	RESC1005X40N_B
126	RPU1,R335,R345,R381	ERJ-2RKF1001X	RESC1005X40N_B
127	RSS1	ERJ-2RKF6812X	RESC1005X40N_PEC
128	RUVLO1	ERJ-2RKF2372X	RESC1005X40N_PEC
129	RVSET1,RVSET3	ERJ-2RKF1782X	RESC1005X40N_PEC
130	RVSET2	ERJ-2RKF3162X	RESC1005X40N_PEC
131	Rpu4,Rpu5,R17,R18,R57,R59,R134,R135,R175,R176,R177,R178,R296,R299,R300,R301,R317,R526,R950,R951	ERJ-2RKF4701X	RESC1005X40N
132	R1	RCA04021K00FKEDHP	RESC1005X40N_VISHAY
133	R2	DNP	RESC1005X40N_PEC
134	R3,R216,R217,R917,R918,R919,R920,R960	DNP	RESC1005X40N_C
135	R4,R6,R361,R362,R382,R532,R533,R534,R535,R537,R539,R542,R543,R544,R607,R644,R681,R718	ERJ-2GE0R00X	RESC1005X40N_C
136	R5,R8	RMCF0402FT20K5	RESC1005X40N_D
137	R7	RHC2512FT4K70	RESC6332X70N
138	R9,R10	ERJ-2RKF1000X	RESC1005X40N
139	R11,R12,R453,R486,R520,R527	RC1005F102CS	RESC1005X40N_C
140	R13	RMCF0603JT49R9	RESC1608X55N_A

141	R14,R248,R415,R418,R421,R424,R457	ERJ-2RKF2400X	RESC1005X40N_B
142	R15,R16,R55,R56,R132,R133,R174,R579,R616,R653,R690,R948,R949	ERJ-2GEJ202X	RESC1005X40N_PEC
143	R19,R20,R21,R22,R23,R24,R25,R26,R27,R28,R29,R30,R31,R32,R33,R34,R35,R36,R37,R38,R39,R40,R41,R42,R43,R44,R45,R46,R47,R48,R49,R50,R51,R52,R53,R60,R61,R62,R63,R64,R65,R66,R67,R69,R70,R71,R72,R73,R74,R75,R76,R77,R78,R79,R80,R81,R84,R85,R86,R87,R88,R89,R90,R91,R92,R93,R94,R95,R96,R97,R99,R100,R101,R102,R103,R104,R105,R106,R107,R108,R109,R110,R111,R112,R113,R114,R115,R116,R117,R118,R119,R120,R121,R122,R123,R124,R125,R126,R127,R128,R129,R130,R131,R137,R138,R139,R140,R141,R142,R143,R144,R145,R146,R147,R148,R150,R151,R152,R153,R154,R155,R156,R157,R158,R161,R162,R163,R164,R165,R166,R167,R168,R169,R170,R171,R172,R274,R281,R295,R305,R306	ERJ-2GE0R00X	RESC1005X40N_C
144	R54,R98,R136,R173	ERJ-2GE0R00X	RESC1005X40N_C
145	R185,R186,R187,R188,R189,R190	ERJ-2RKF4701X	RESC1005X40N
146	R191	ERJ-2RKF4701X	RESC1005X40N
147	R192,R193,R194,R195,R200,R215	ERJ-2RKF4701X	RESC1005X40N
148	R196,R197,R198,R199,R219,R220	ERJ-2RKF4990X	RESC1005X40N_PEC
149	R201	RC0402JR-0768RL	RESC1005X40N_C
150	R202,R213,R214	ERJ-2RKF2610X	RESC1005X40N_PEC
151	R203,R210,R211,R454,R487,R927	ERJ-2RKF4701X	RESC1005X40N
152	R204,R205,R212	ERJ-2RKF2610X	RESC1005X40N_PEC
153	R206,R207,R208,R506,R508	ERJ-2RKF1002X	RESC1005X40N_B
154	R209,R218	ERJ-2RKF8061X	RESC1005X

			40N_PEC
155	R221,R222,R223,R224,R225,R226,R227,R228,R229,R230,R231,R232,R233,R234,R235,R236,R237,R238,R239,R240,R241,R242,R243,R244,R245,R246,R247	ERJ-2RKF12R0X	RESC1005X40N_C
156	R249,R250,R251,R252,R253,R254,R255,R256,R257,R258,R259,R845,R848,R863,R866,R881,R884,R899,R902	ERJ-2RKF1000X	RESC1005X40N
157	R261,R262,R263,R264,R265,R266,R267,R268		RESC1005X40N_PEC
158	R269	ERJ-2GEJ513X	RESC1005X40N_B
159	R270,R271,R272,R273,R275,R276,R277,R278,R279,R280,R288,R289,R290,R292,R293,R294	ERJ-2RKF30R0X	RESC1005X40N_PEC
160	R282	DNI	RESC1005X40N
161	R297,R298,R302,R303,R321,R323,R325,R326,R328,R329,R330,R333,R334,R336,R338,R339	ERJ-2RKF22R0X	RESC1005X40N
162	R304,R366,R371,R379,R387,R389,R401,R554,R555,R566,R567,R573,R591,R598,R602,R611,R628,R634,R639,R649,R665,R670,R676,R688,R702,R708,R713,R751,R752,R753,R754,R755,R756,R757,R758,R759,R760,R761,R762,R763,R764,R765,R766,R767,R768,R769,R770,R771,R772,R773,R774,R775,R776,R777,R778,R779,R780,R781,R782,R783,R784,R785,R786,R787,R788,R789,R790,R791,R792,R793,R794,R795,R796,R797,R798,R799,R800,R801,R802,R803,R804,R805,R807,R808,R809,R810,R811,R812,R813,R814,R815,R816,R818,R819,R820,R821,R822,R823,R824,R825,R826,R827,R828,R829,R830,R831,R832,R833,R834,R835,R836,R837,R838,R839,R840,R841,R842,R843,R844,R921,R922	ERJ-2GE0R00X	RESC1005X40N_C
163	R307,R308,R309,R310,R311,R312,R315,R316,R350,R351	RC0603FR-07220RL	RESC1608X55N_A
164	R319	RT0402DRE0712K1L	RESC1005X35N
165	R320	ERJ-2GE0R00X	RESC1005X

			40N_C
166	R324,R331,R332,R341,R343,R344	DNI	RESC1005X40N_C
167	R337	ERJ-2RKF4701X	RESC1005X40N_C
168	R355,R721,R722,R729,R730,R737,R738,R745,R746	ERJ-2RKF8661X	RESC1005X40N
169	R360	ERJ-2RKF6651X	RESC1005X40N_PEC
170	R363,R364,R383,R384	ERJ-2RKF10R0X	RESC1005X40N_PEC
171	R367	ERJ-2RKF1243X	RESC1005X40N_PEC
172	R373,R395	ERJ-2GEJ104X	RESC1005X40N_B
173	R376,R923,R924,R925,R929	ERJ-2RKF1002X	RESC1005X40N_B
174	R380	ERJ-2GEJ392X	RESC1005X40N_PEC
175	R390	ERJ-2RKF9092X	RESC1005X40N_PEC
176	R392,R408	RC0402FR-0745K3L	RESC1005X40N_C
177	R394	PTN0805E5002BST1	RESC2013X84N
178	R403,R407,R412,R586,R594,R623,R631,R660,R668,R697,R705	ERJ-2RKF2002X	resc1005x40n_b
179	R406,R411	ERJ-2RKF1213X	RESC1005X40N_PEC
180	R413,R414,R416,R417,R419,R420,R422,R423,R455,R456,R516,R519,R528	ERJ-2RKF1000X	RESC1005X40N
181	R425,R426,R427,R428,R429,R430,R431,R432,R433,R434,R435,R436,R437,R438,R439,R440,R441,R442,R443,R444,R445,R446,R447,R448,R449,R458,R459,R460,R461,R462,R463,R464,R465,R466,R467,R468,R469,R470,R471,R472,R473,R474,R475,R476,R477,R478,R479,R480,R481,R482	ERJ-2RKF39R2X	RESC1005X40N_PEC
182	R450,R451,R483,R484	ERJ-2RKF36R0X	RESC1005X40N_PEC

183	R452,R485	ERJ-2RKF4990X	RESC1005X40N_PEC
184	R504	ERJ-2RKF4222X	RESC1005X40N_PEC
185	R510	ERJ-2GE0R00X	RESC1005X40N_C
186	R524	ERJ-2RKF1331X	RESC1005X40N_B
187	R525	ERJ-2RKF1272X	RESC1005X40N_PEC
188	R529	RC0402FR-0738K3L	RESC1005X40N_C
189	R530	ERJ-2RKF1403X	RESC1005X40N_PEC
190	R538	RMCF0805JT200K	RESC2012X65N_SEM
191	R545,R546,R547,R548,R549,R551	ERJ-2RKF1000X	RESC1005X40N
192	R550,R563	ERJ-2RKF1022X	RESC1005X40N_PEC
193	R553,R556,R565,R568	ERJ-2RKF2000X	RESC1005X40N
194	R559,R560,R561,R562	ERJ-2RKF1000X	RESC1005X40N
195	R571,R585,R593,R597,R608,R622,R630,R635,R645,R659,R667,R671,R682,R696,R704,R709,R806,R817	ERJ-2BWFR100X	RESC1005X40N_D
196	R576,R610,R647,R684	TNPW04028K76BEED	RESC1005X40N_D
197	R577,R615,R648,R687	RC0603FR-0722K1L	RESC1608X37N_A
198	R578,R613,R651	DNI	RESC1005X40N_PEC
199	R580,R617,R654,R691,R723,R731,R739,R747	RC0402FR-0743K2L	RESC1005X40N_PEC
200	R582,R583,R619,R620,R656,R657,R693,R694	DNI	RESC1005X40N
201	R588,R625,R662	DNI	RESC1005X40N_B
202	R589,R626,R663,R700	RC1206FR-0756KL	RESC1005X

			40N_E
203	R590,R627,R664,R701	RC0603FR-0714KL	RESC1608X37N_A
204	R592,R629,R666,R703	RC0402FR-076K34L	RESC1005X40N_PEC
205	R595,R632	DNI	RESC1608X37N_A
206	R599,R636,R669,R673,R710	RC0603FR-0737K4L	RESC1608X37N_A
207	R600,R637,R674,R711	DNI	RESC1005X40N_PEC
208	R603,R640,R677,R714	RC0402FR-0721K5L	Yageo
209	R604,R641,R678,R715	ERJ-8RQJR47V	Panasonic
210	R685	DNI	RESC1005X40N_PEC
211	R699	ERJ-2RKF1002X	RESC1005X40N_B
212	R706	DNI	RESC1005X40N_PEC
213	R724	ERJ-2RKF1503X	RESC1005X40N_PEC
214	R726,R734,R742,R750	RC0402FR-07130KL	RESC1005X40N_PEC
215	R732,R740,R748	ERJ-2RKF1503X	RESC1005X40N_PEC
216	R847,R850,R865,R868,R883,R885,R901,R904	RC0805FR-0714R3L	RESC2012X60N_PEC
217	R851,R852,R853,R854,R855,R856,R857,R858,R859,R860,R861,R862,R869,R870,R871,R872,R873,R874,R875,R876,R877,R878,R879,R880,R887,R888,R889,R890,R891,R892,R893,R894,R895,R896,R897,R898,R905,R906,R907,R908,R909,R910,R911,R912,R913,R914,R915,R916	3600BL14M100	FIL_3600BL14M050
218	R947	ERJ-2RKF2001X	PANASONIC
219	R952,R953,R954	ERJ-2RKF8061X	RESC1005X40N_PEC
220	R955,R956,R957,R958	ERJ-2RKF1213X	RESC1005X40N_PEC

221	R959	ERJ-2GE0R00X	RESC1005X40N_C
222	R961	ERJ-2GE0R00X	RESC1005X40N_C
223	R962,R963,R964,R965,R966,R967,R968,R969,R970,R971,R972,R973,R974,R975,R976,R977,R978,R979,R980,R981,R982,R983,R984,R985,R986,R987,R988,R989,R990,R991,R992,R993	ERJ-2RKF1002X	RESC1005X40N_PEC
224	SMA1	CONSMA001-SMD-G	LINX_CONSMA001-SMD-G
225	SW1	SDA04H1SBD	SW_SDA04H1SBD
226	TP36	DNI	TP_40C
227	TP37,TP38,TP39,TP40,TP41,TP42,TP43,TP44,TP45,TP46,TP47,TP48,TP49,TP50,TP51,TP52,TP53,TP54,TP55,TP56,TP57,TP58,TP59,TP60,TP61	DNI	
228	U2	REF3012AIDBZT	SOT95P237X112-3N_TI
229	U3,U6,U7	SN74AVC1T45DCKR	sot65p210x110-6n
230	U8	MAX16025	WQFN65P400X400X80-17N_A
231	U9	SFEM064GB1EA1TO-I-HG-111-STD	BGA153N50P14X14_1150X1300X100
232	U11	TMP464AIRGTT	VQFN50P300X300X100-17N_TI
233	U12	KSZ9031RNXIC	QFN50P700X700X90-49N_T510
234	U14,U72,U73,U77,U78,U82,U83,U87,U88	ADP1763ACPZ	QFN50P300X300X80-17N_T175
235	U16	ISL8272M/73MARIZ	MODULE_ISL8272MAIR

			Z
236	U17,U24	INA226AIDGSR	VSSOP50P490X110-10N
237	U18	ISL85003FRZ	SON50P300X400X90-13N
238	U19,U25	R131	R131
239	U22	ZL9101MAIRZ	PQFN130P1500X1500X370-21N
240	U23	ISL80136IBEAJZ	SOIC127P602X168-9N_A
241	U26	ISL85415FRZ	SON50P300X400X100-13N
242	U29	ZL9010MIRZ	MODULE_ZL9010MIRZ
243	U31	TPS568215RNNR_0	VQFN50P360X360X100-18N
244	U41	MAX15027ATB+T	DFN50P300X300X80-11N
245	U44	TPS51200DRCT_0	SON50P310X310X100-11N
246	U45	MAX15303	QFN50P600X600X80-41N
247	U47,U48,U50,U51	TCA9555RTWR	QFN50P400X400X80-25N_E
248	U49	PCA9306DCTR	VSSOP50P310X90-8N
249	U52	AD9528BCPZ_0	TSSOP65P640X120-14N_A
250	U57,U63	NC7WZ16P6X	SOT65P210X110-6N_B

251	U58	AD9528BCPZ_0	QFN50P1000X1000X100-73N_AD
252	U64,U66,U68,U70	ADP5054ACPZ	LFCSP50P700X700X80-49N
253	U74	ADM7154ACPZ-1.8	DFN50P300X300X80-9N_AD
254	U75,U80,U85,U90	TPS62136RGXT	VQFN50P200X300X100-11N
255	U76,U81,U86,U91	ADP7158ACPZ-3.3	SON50P300X300X85-11N
256	U79,U84,U89	ADM7154	DFN50P300X300X80-9N_AD
257	U102	Silicon Labs	TBD
258	U103		VQFN50P360X360X100-18N
259	Y1	MC-306 32.7680K-A0	XTAL_MC-306327680K-A0
260	Y2	7M48072002	OSCCC250X320X80-4N
261	Y3	ECS-250-20-33-CKM-TR	

Annexure II

CENTRE FOR INDUSTRIAL CONSULTANCY & SPONSORED RESEARCH (IC&SR)
INDIAN INSTITUTE OF TECHNOLOGY MADRAS
CHENNAI 600 036

B NAGARAJAN
JOINT REGISTRAR (IC & SR)

Project Accounts
July 22, 2016

TO WHOMSOEVER IT MAY CONCERN

In connection with project, **US currency may be transferred to CANARA BANK, IIT - MADRAS Branch** with the following details.

FOR TRANSFER OF CURRENCY US DOLLAR

Please Credit in USD **(THROUGH)**

JP MORGAN CHASE, NEW YORK
SWIFT CODE: CHASUS33

For Credit to

USD ACCOUNT No: 001-1395969, of CANARA BANK INTERNATIONAL DIVISION MUMBAI

For Further Credit to

ACCOUNT NO: **2722101001741 of IIT Chennai – Swift Code: CNRBINBBIIT OF THE REGISTRAR, IIT, MADRAS**

JOINT REGISTRAR (IC & SR) i/c
संयुक्त कुलसचिव (आई.सी. एवं एस.आर.)
JOINT REGISTRAR (IC & SR)
आई.आई.टी. मद्रास
I.I.T. MADRAS

This is to certify that the particulars furnished are correct.

For Canara Bank

Senior Manager
Canara Bank - IIT Madras branch

एस.अरविंदन
S.ARAVINDAN
वरिष्ठ प्रबंधक Senior Manager
S.P.No.31649

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