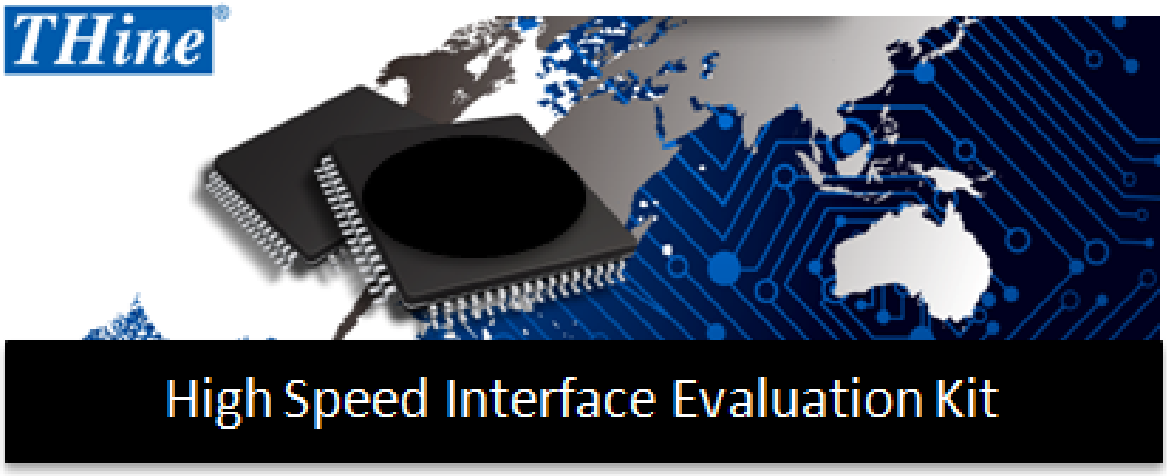
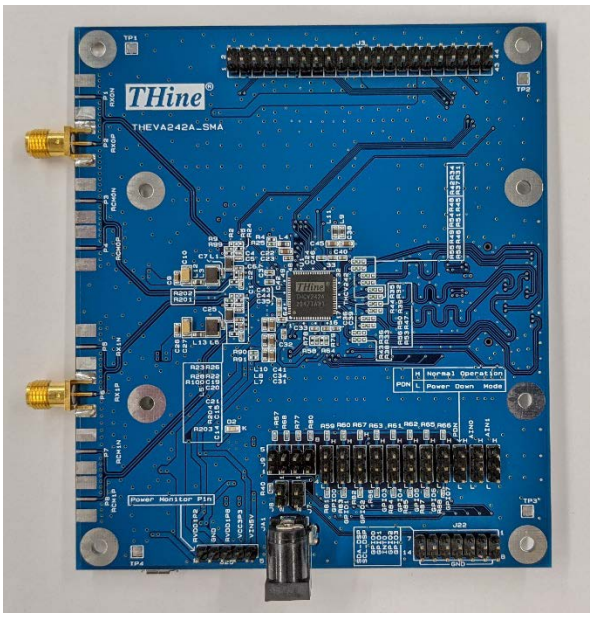


THEVA242A-SMA

- THCV242A/THCV242A-P V-by-One® HS to MIPI® CSI-2 Interface Evaluation Board

Hardware Manual



Contents

1. Over view

THEVA242A-SMA is a board equipped with THCV242A-P that converts V-by-One® HS to maximum 1.5Gbps / lane MIPI® CSI-2 (or MIPI®).

This board can be connected to a V-by-One® HS transmitter (THEVA241A-SMA-STP or THEVA241A-SMA-FFC).

As shown here by this example connections.

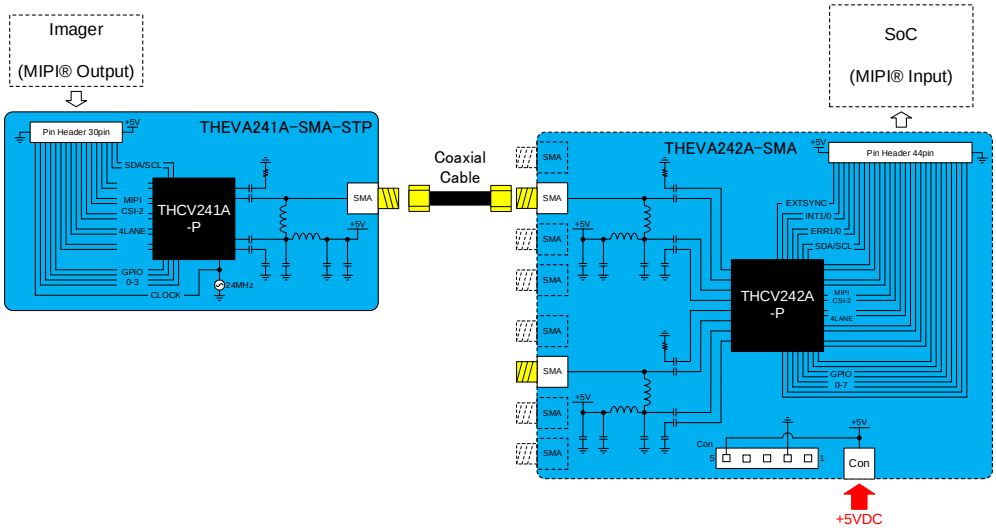


Figure 1 THEVA241A-SMA-STP and THEVA242A-SMA connection example (1-lane)

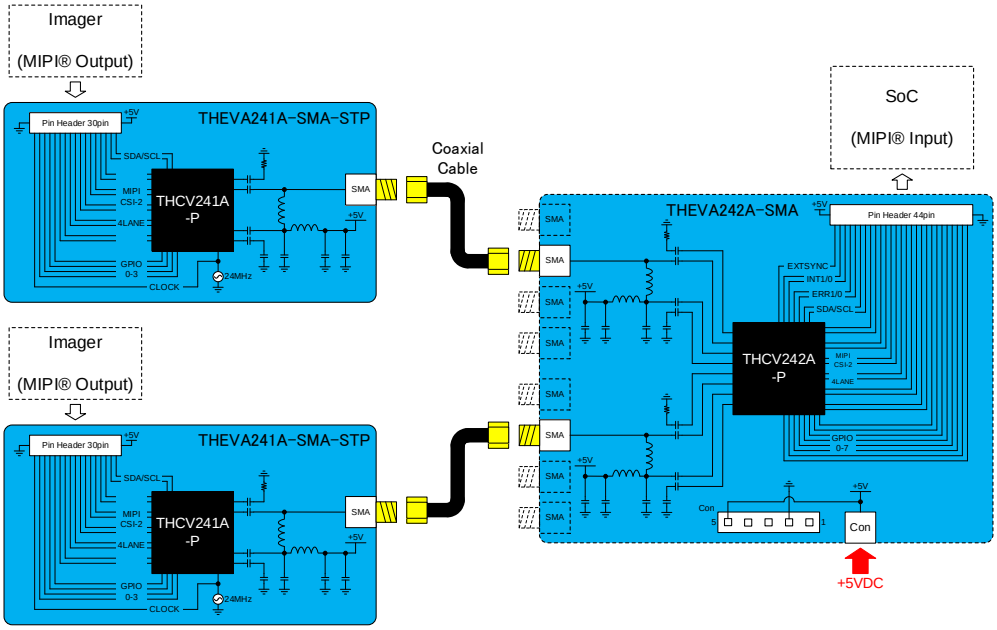


Figure 2 THEVA241A-SMA-STP and THEVA242A-SMA connection example (2-lane)

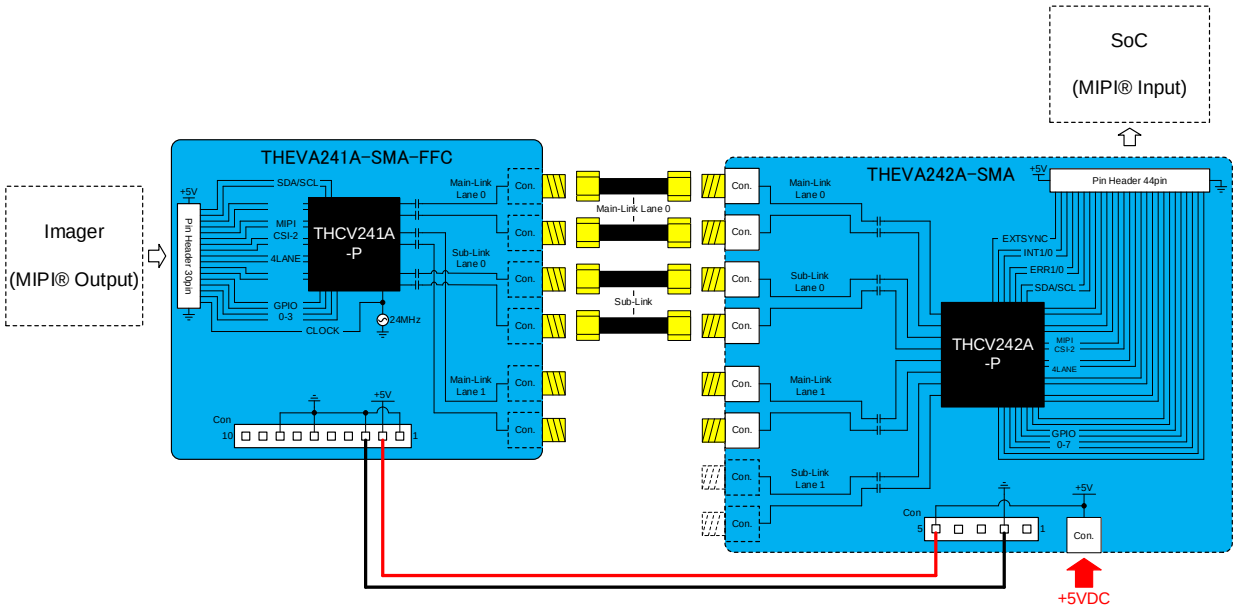


Figure 3 THEVA241A-SMA-FFC and THEVA242A-SMA connection example

2. 1-lane connection with V-by-One® HS transmitter board (THEVA241A-SMA-STP)

Connect J5 of the THEVA241A-SMA-STP and P2 of the THEVA242A-SMA with Coaxial-cable.

The power supply (+ 5.0V) is supplied to JA1 of the THEVA242A-SMA.

Power supply of the THEVA241A-SMA-STP is supplied from THEVA242A-SMA via a coaxial cable.

When power is supplied correctly, the green LED lights on both boards.

* The Coaxial-cable and the power supply should be prepared by users.

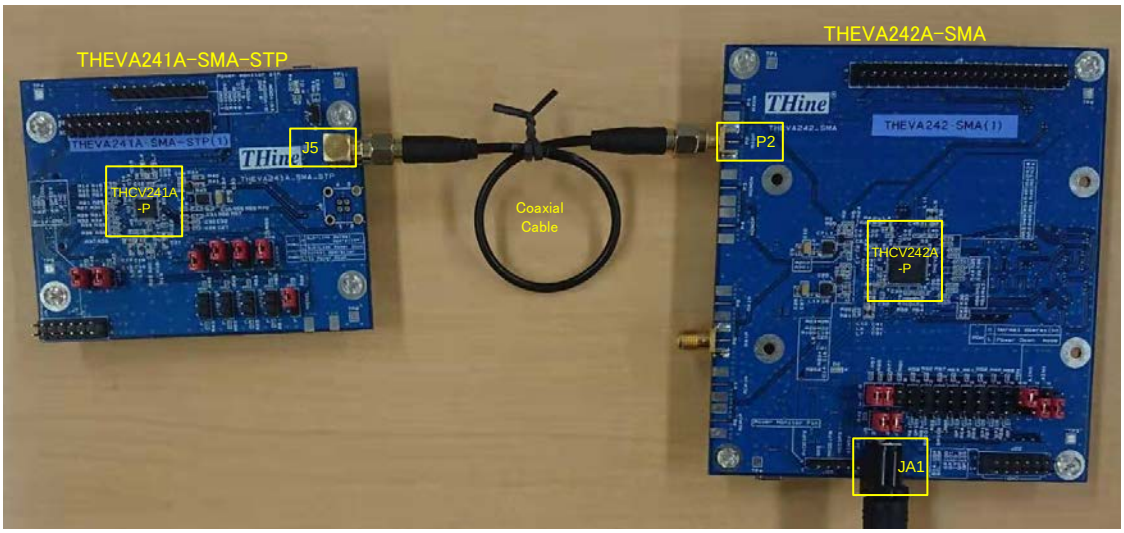


Figure 4 THEVA241A-SMA-STP and THEVA242A-SMA 1-lane connection

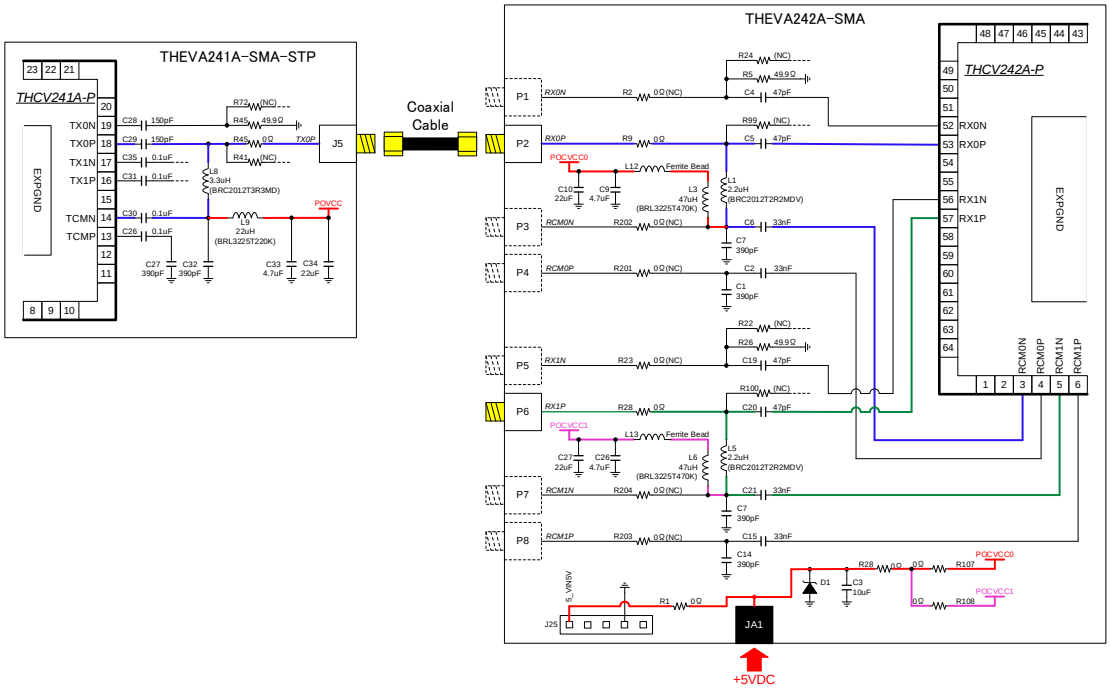


Figure 5 THEVA241A-SMA-STP and THEVA242A-SMA 1-lane connection

2-lane connection with V-by-One® HS transmitter board (THEVA241A-SMA-STP)

When adding 2 lanes, Connect J5 of the THEVA241A-SMA-STP and P6 of the THEVA242A-SMA with Coaxial-cable.

The power supply (+ 5.0V) is supplied to JA1 of the THEVA242A-SMA.

Power supply of the THEVA241A-SMA-STP is supplied from THEVA242A-SMA via a coaxial cable.

When power is supplied correctly, the green LED lights on both boards.

* The Coaxial-cable and the power supply should be prepared by users.

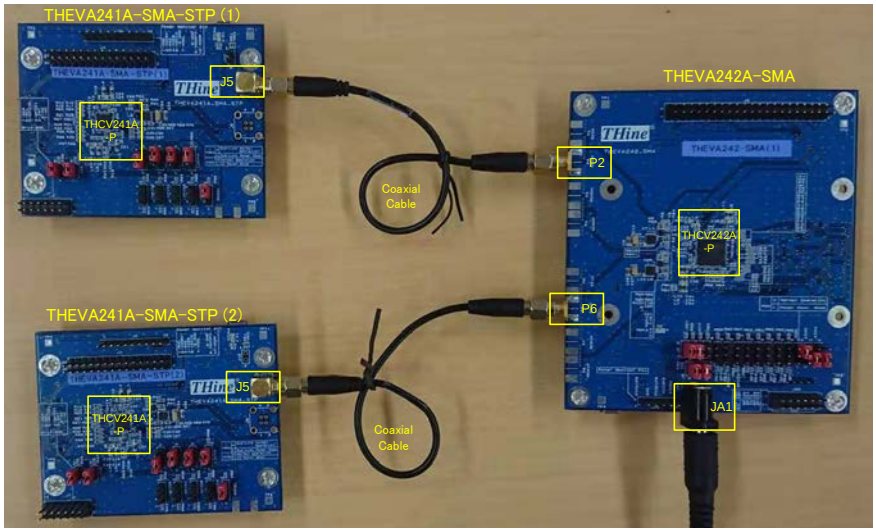


Figure 6 T THEVA241A-SMA-STP and THEVA242A-SMA 2-lane connection

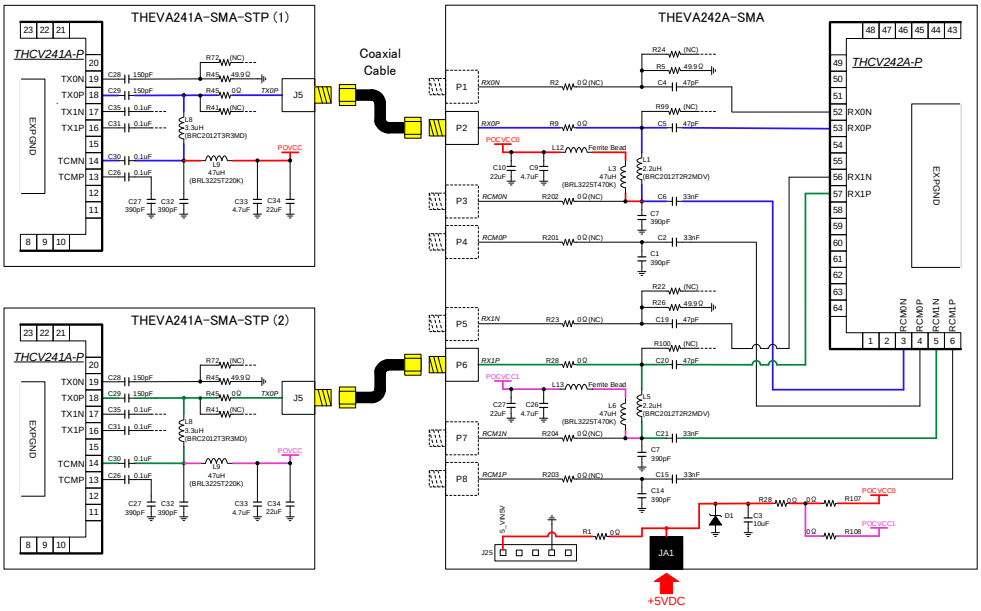


Figure 7 THEVA241A-SMA-STP and THEVA242A-SMA 2-lane connection

3. Connection with V-by-One® HS transmitter board (THEVA241A-SMA-FFC)

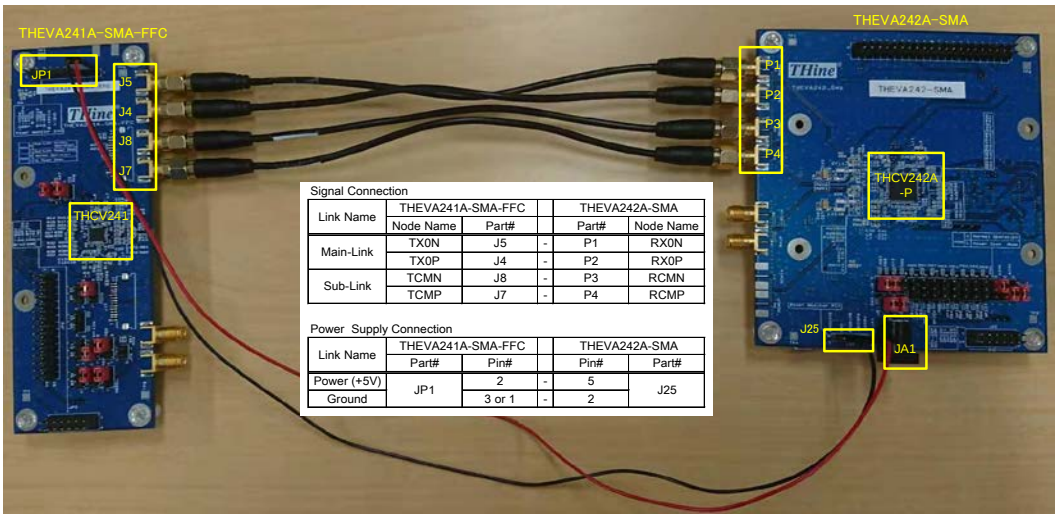
Refer to the following figure for the THEVA241A-SMA-FFC and the THEVA242A-SMA connections.

(It is possible to connect to THEVA231 with this method.)

The power supply (+ 5.0V) is supplied to JA1 of the THEVA242A-SMA.

When power is supplied correctly, the green LED lights on both boards.

*The SMA-Connector, the Coaxial-cable, the DC-cable and the power supply should be prepared by users.



Signal Connection					
Link Name	THEVA241A-SMA-FFC			THEVA242A-SMA	
	Node Name	Part#		Part#	Node Name
Main-Link	TX0N	J5	-	P1	RX0N
	TX0P	J4	-	P2	RX0P
Sub-Link	TCMN	J8	-	P3	RCMN
	TCMP	J7	-	P4	RCMP

Power Supply Connection					
Link Name	THEVA241A-SMA-FFC			THEVA242A-SMA	
	Part#	Pin#		Pin#	Part#
Power (+5V)	JP1	2	-	5	J25
Ground		3 or 1	-	2	

Figure 8 THEVA241A-SMA-FFC and THEVA242A-SMA 1-lane connection

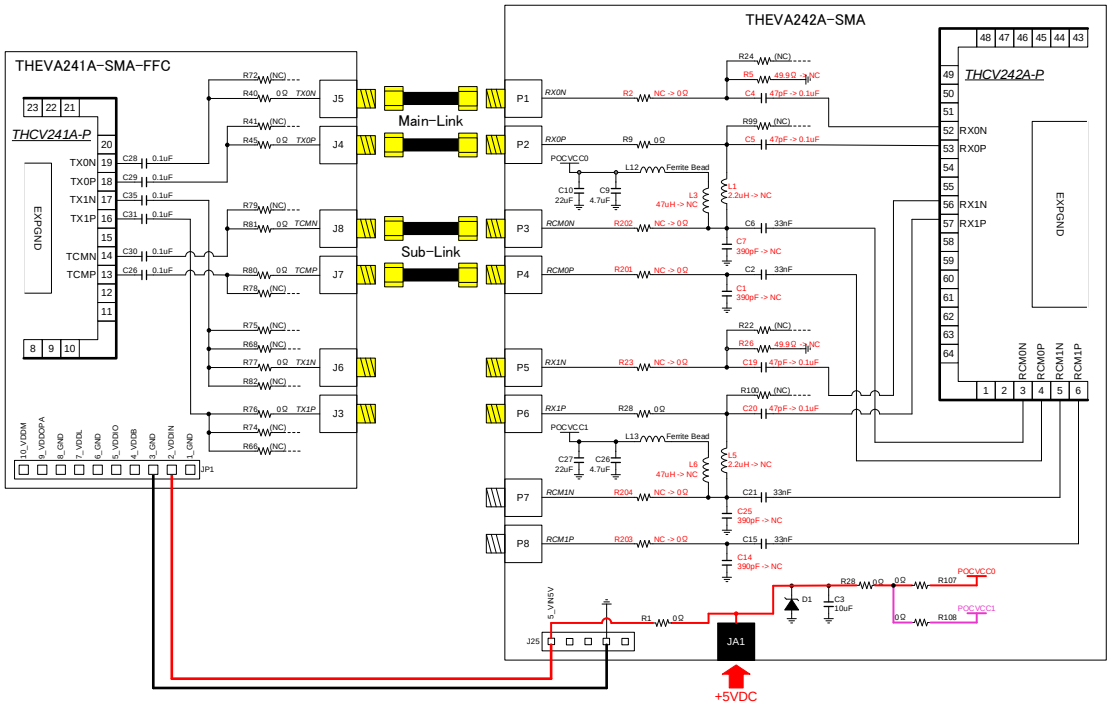
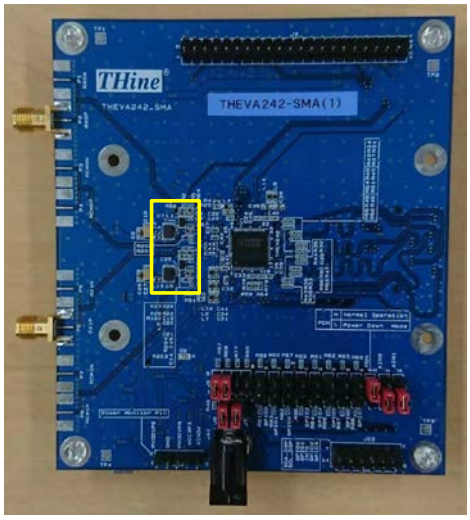


Figure 9 THEVA241A-SMA-FFC and THEVA242A-SMA 1-lane connection

Take note on connecting with THEVA241A-SMA-FFC

When connecting THEVA241A-SMA-FFC and THEVA242A-SMA, some parts need to be changed.

As shown here by this some ports.



When connected to
THEVA241A-SMA-STP
(Default value)

R2, R23, R201, R202, R203,204 : NC

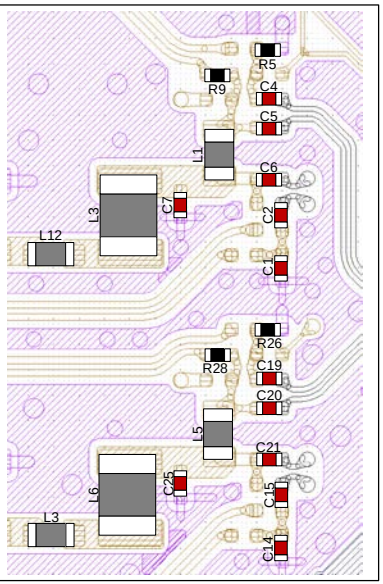
R5, R26 : 49.9Ω

C4, C5, C19, C20 : 47pF

C1, C7, C14, C25 : 390pF

L1, L5 : 3.3uH

L3, L6 : 47uH



When connected to
THEVA241A-SMA-FFC.

R2, R23, R201, R202, R203,204 : 0Ω

R5, R26 : NC

C4, C5, C19, C20 : 0.1uF

C1, C7, C14, C25 : NC

L1, L5 : NC

L3, L6 : NC

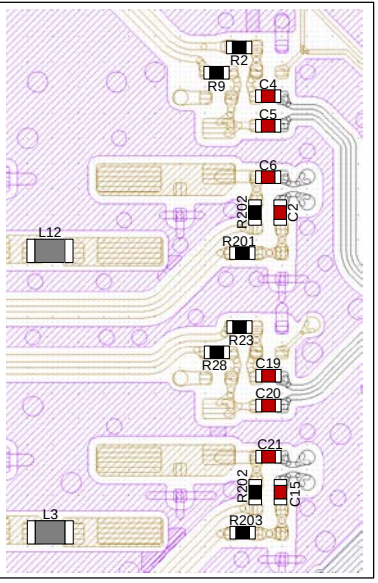


Figure 10 T Changing parts of THEVA242A-SMA

4. Connection with THEVA242A-SMA and SoC by the MIPI®

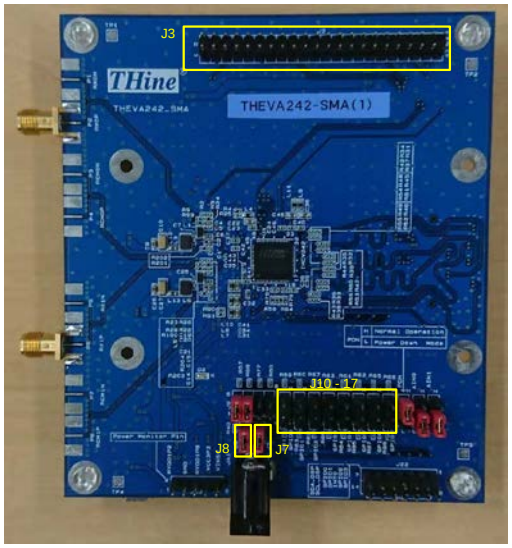
J3 pin-header can be used to connect THEVA242A-SMA and SoC.

(J1 on the bottom side can also be used connect SoC. See the schematic on page 11 for details.)

When connecting 2-wire serial (SDA and SCL) to SoC, the J7 and J8 shall be shorted respectively.

Set the GPIO (J10 to J17) to pull-up or pull-down as required.

*The Jumper-Pin should be prepared by users.



Pin#	Pin Name	Type	Pin Name
1	NC	-	No Connected
4	MTX3P	MO	MIPI® differential data outputs lane3
6	MTX3N	MO	
10	MTX1P	MO	MIPI® differential data outputs lane1
12	MTX1N	MO	
16	MTXCLK0P	MO	MIPI® differential clock outputs lane0
18	MTXCLK0N	MO	
22	MTX0P	MO	MIPI® differential data outputs lane0
24	MTX0N	MO	
28	MTX2P	MO	MIPI® differential data outputs lane2
30	MTX2N	MO	
34	MTXCLK1P	MO	MIPI® differential clock outputs lane1
36	MTXCLK1N	MO	
5	SCL	B	2-wire Serial Interface
7	SDA	B	
11	GPIO0	B	General Purpose Input/Output
13	GPIO1	B	
15	GPIO2	B	
17	GPIO3	B	
31	GPIO4	B	
33	GPIO5	B	
40	GPIO6	B	
42	GPIO7	B	
37	INT0	O	Interrupt signal output. 0: Interrupt occurred / 1 : Steady state
39	INT1	O	
41	ERR0	O	Internal Error / status signal monitoring output
44	ERR1	O	
43	EXTSYNC	B	External Sync input/output for multiple camera syncronization
23,25,27,29	+5V	P	+5V Power Supply
2,3,8,9,14, 19,20,21,26, 32,35,38	GND	G	Ground

Figure 11 Connection with THEVA242A-SMA and SoC

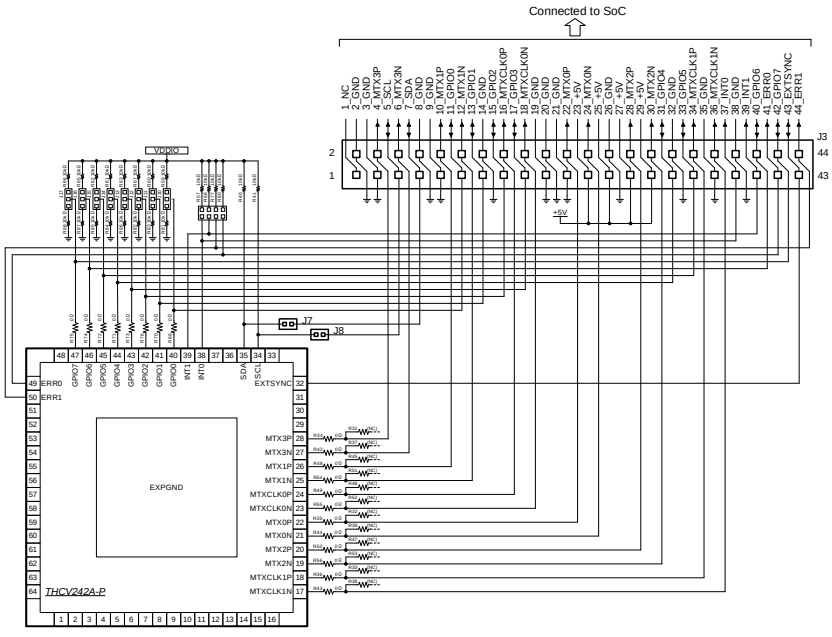
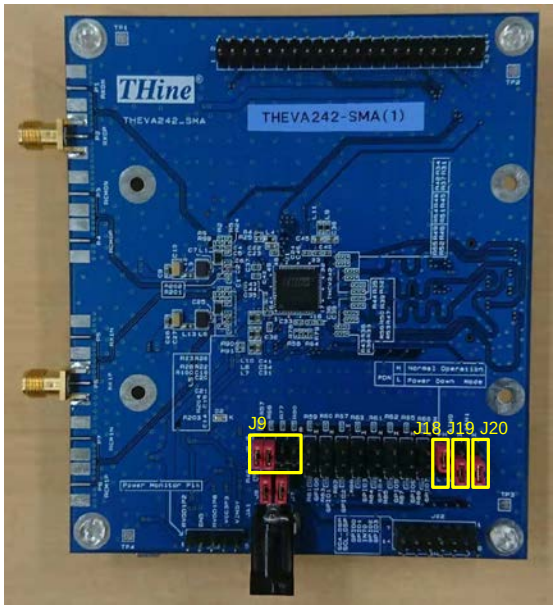


Figure 12 Connection with THEVA242A-SMA and SoC

5. Pin setting of the THEVA242A-SMA

As shown here by the Pin-settings.

*The Jumper-Pin should be prepared by users.



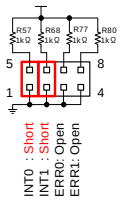
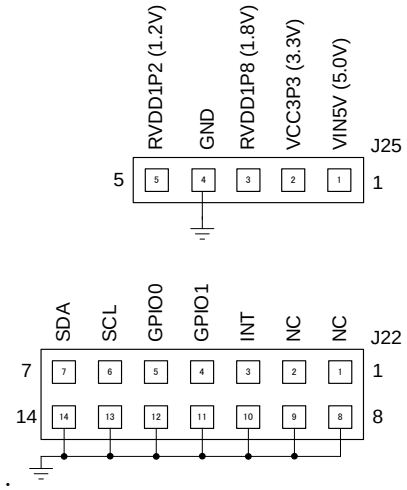
Ports#	Node Name	Def.	Description
J9 (1-5)	INT0		Interrupt signal output. It must be connected with a pull-up resistor.
J9 (2-6)	INT1		
J9 (3-7)	ERR0		Internal Error / status signal monitoring output
J9 (4-8)	ERR1		
J18	PDN		Power Down Low : Power Down Mode High : Normal Operation
J19	AIN0		Device Address Setting for 2-wire Serial Interface [AIN1:AIN0]=00: ID=7'h0B [AIN1:AIN0]=01: ID=7'h34 [AIN1:AIN0]=10: ID=7'h77 [AIN1:AIN0]=11: ID=7'h65
J20	AIN1		

Figure 13 Pin setting of the THEVA242A-SMA

6. Monitor pins

Each power supply can be monitored by the J25 pin-header.

The 2-wire serial, the GPIO, and the INT signal can be monitored by the J22 pin-header.



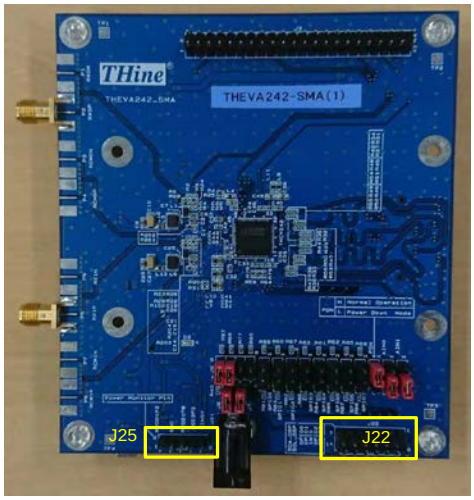
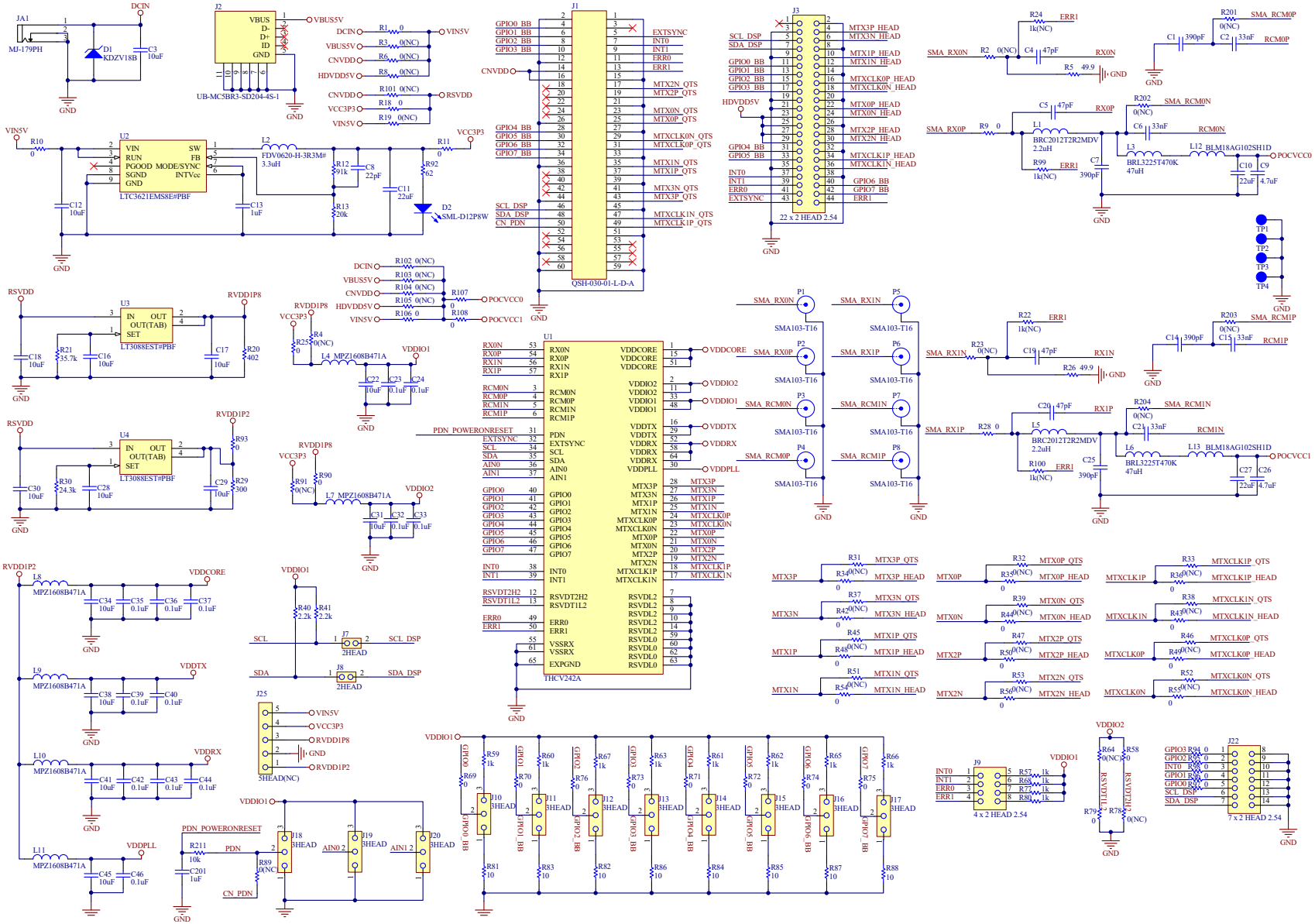


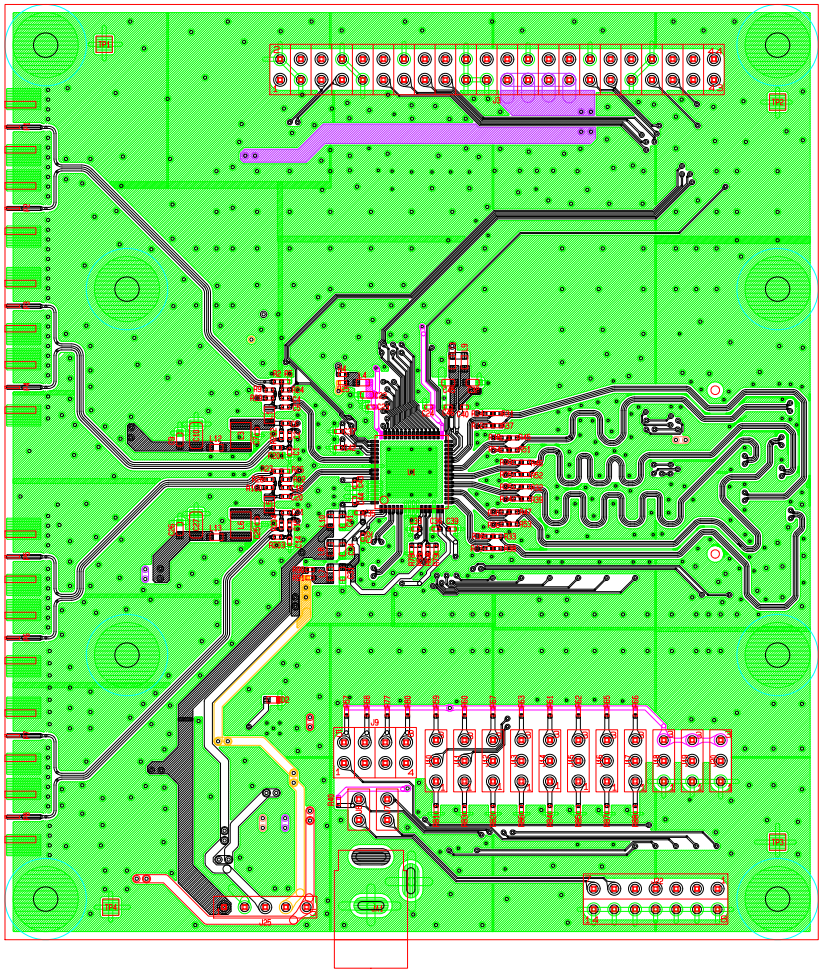
Figure 14 Monitor pins

7. THEVA242A-SMA Schematic

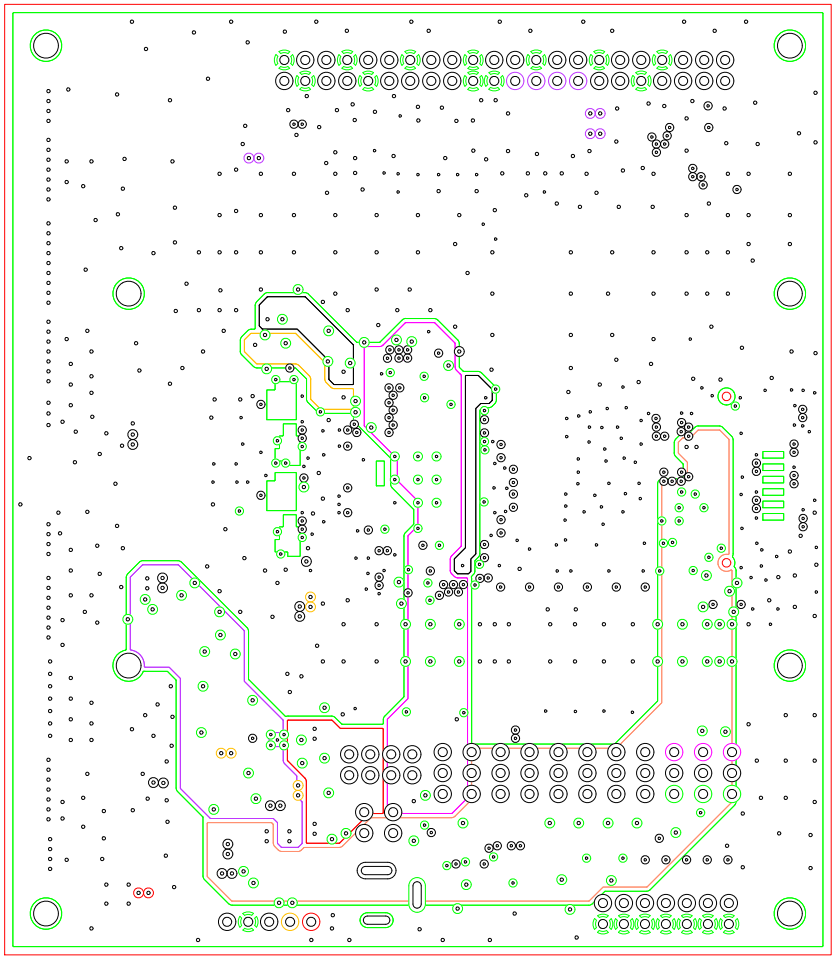


8. THEVA242A-SMA Layout

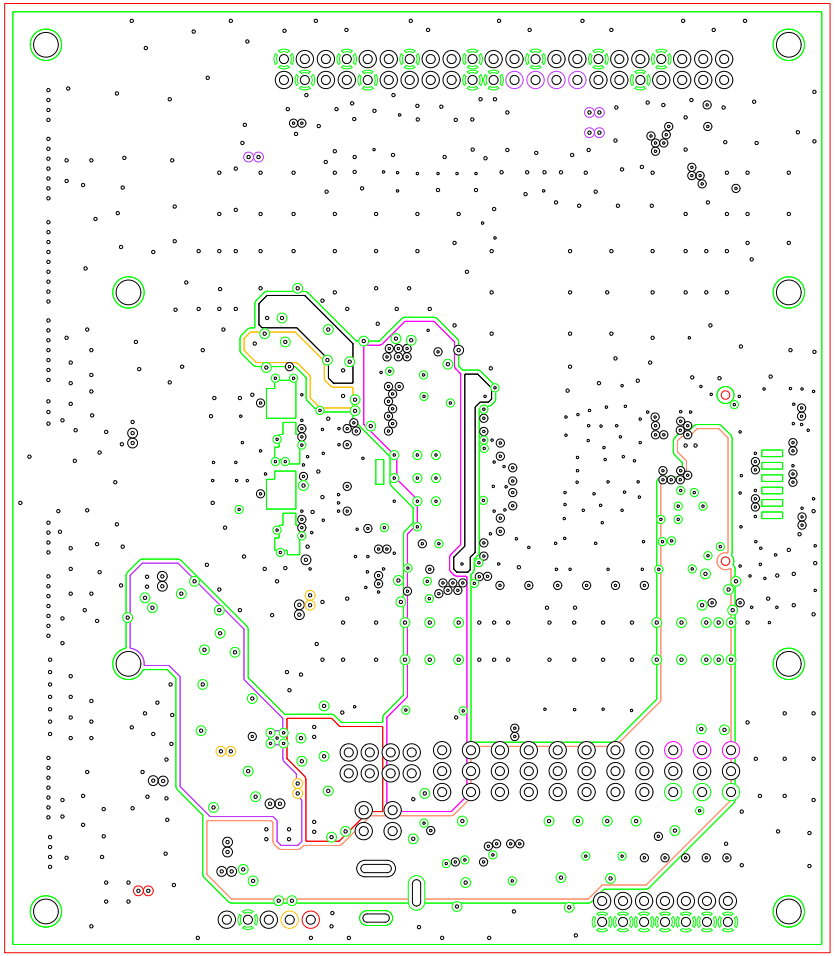
- L1 (Top) pattern



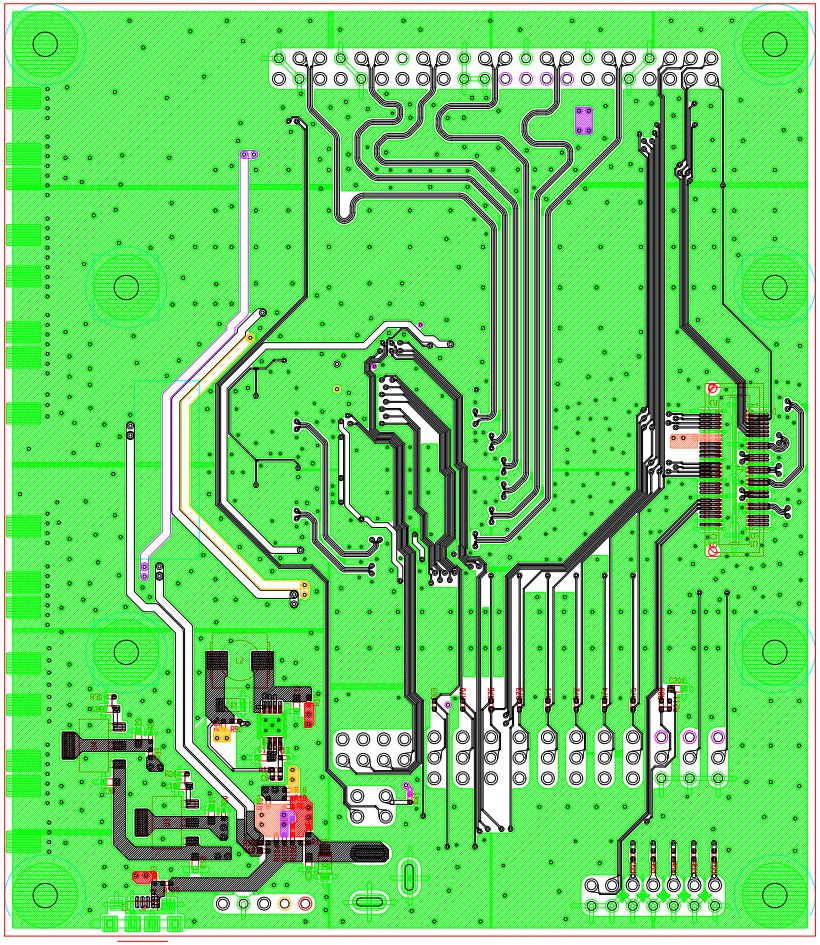
- L2 pattern



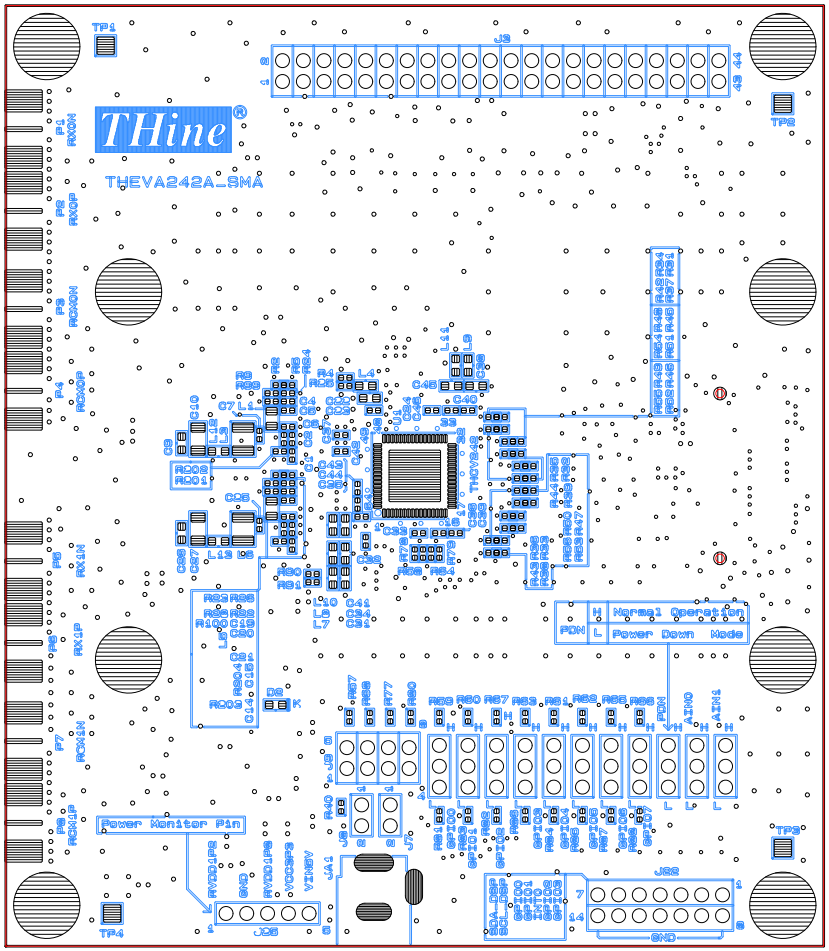
- L3 pattern



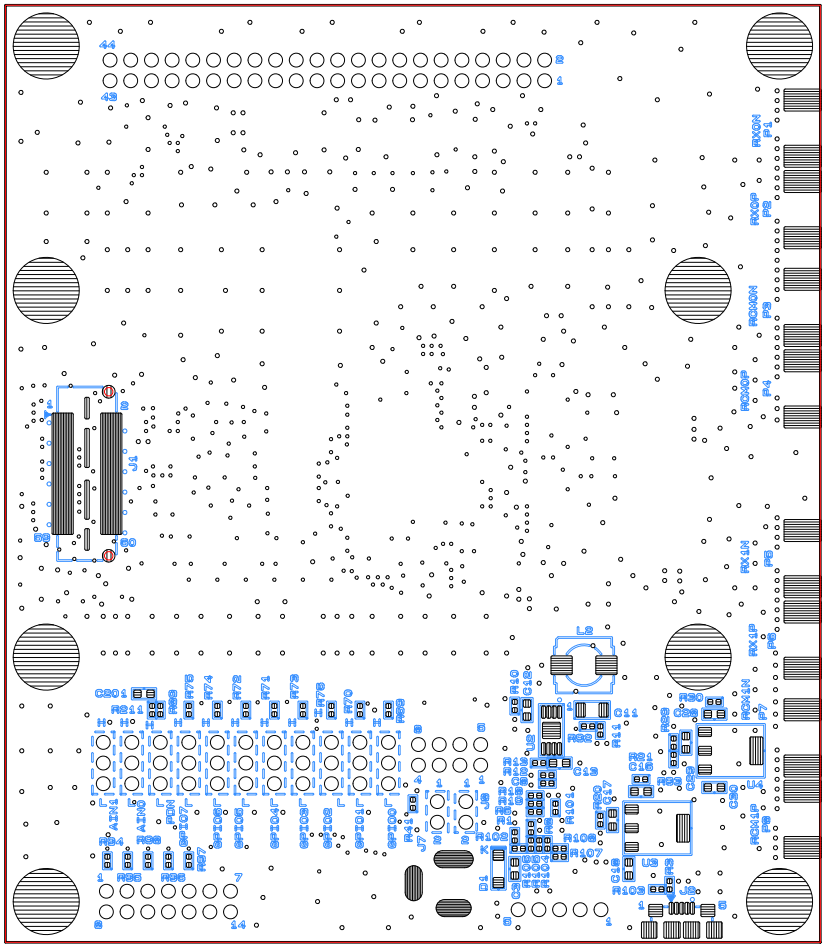
- L4 (Bottom) pattern



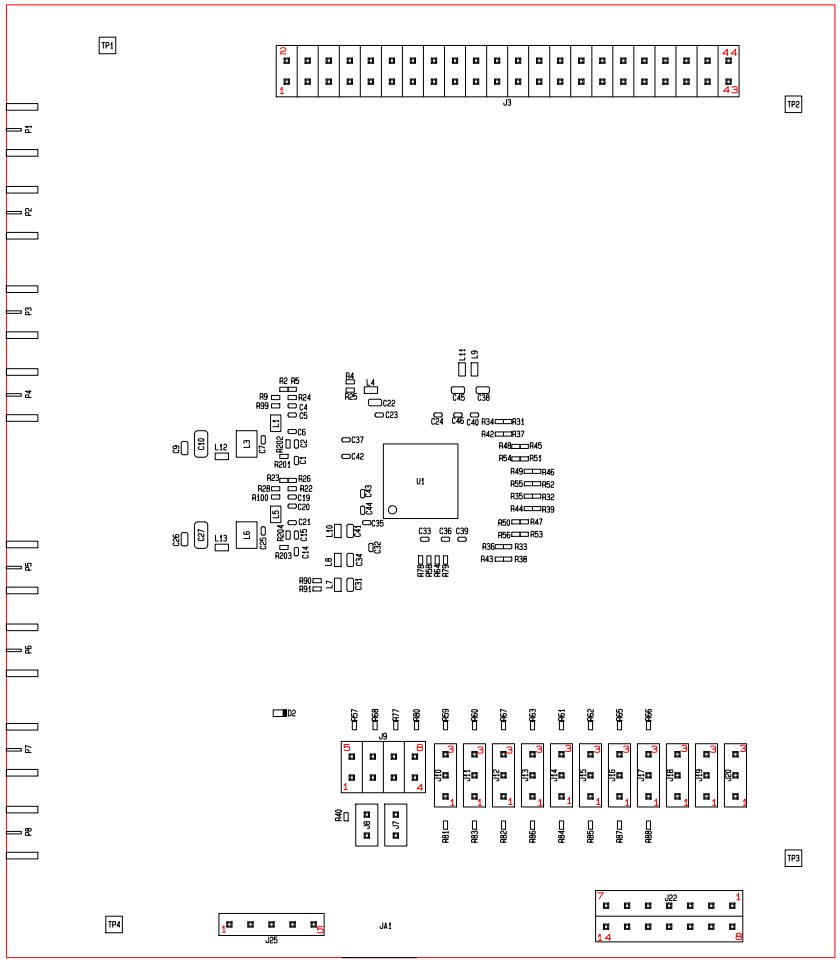
- Top Side Silk



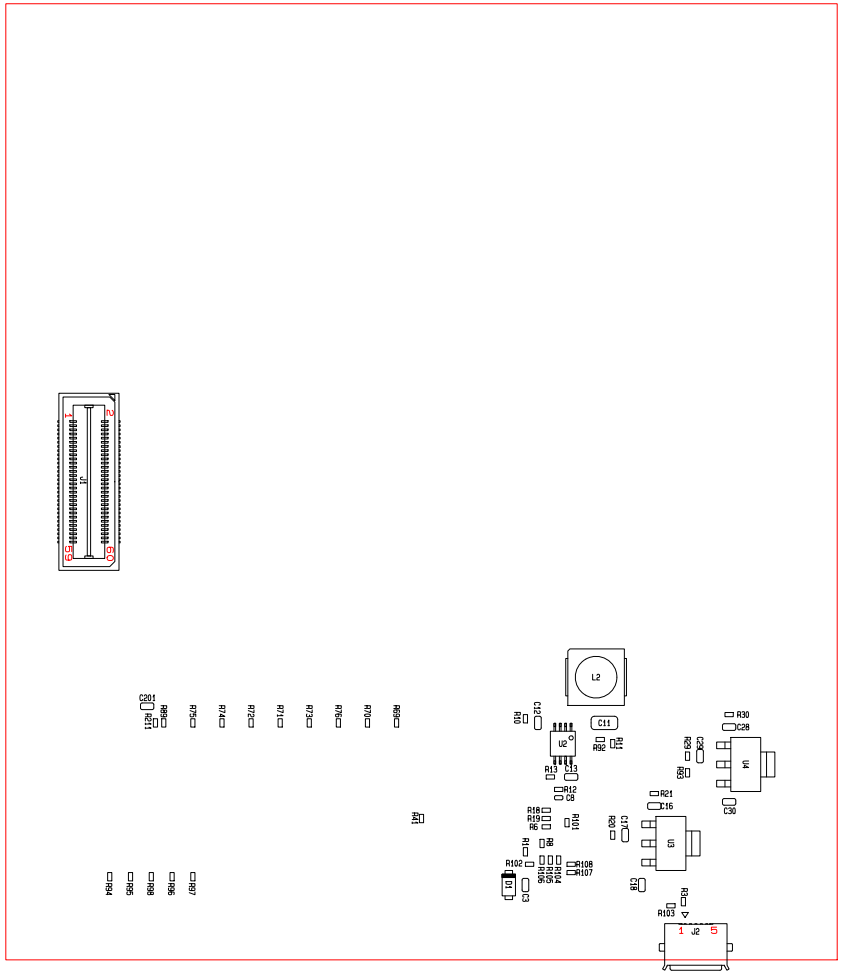
- Bottom Side Silk



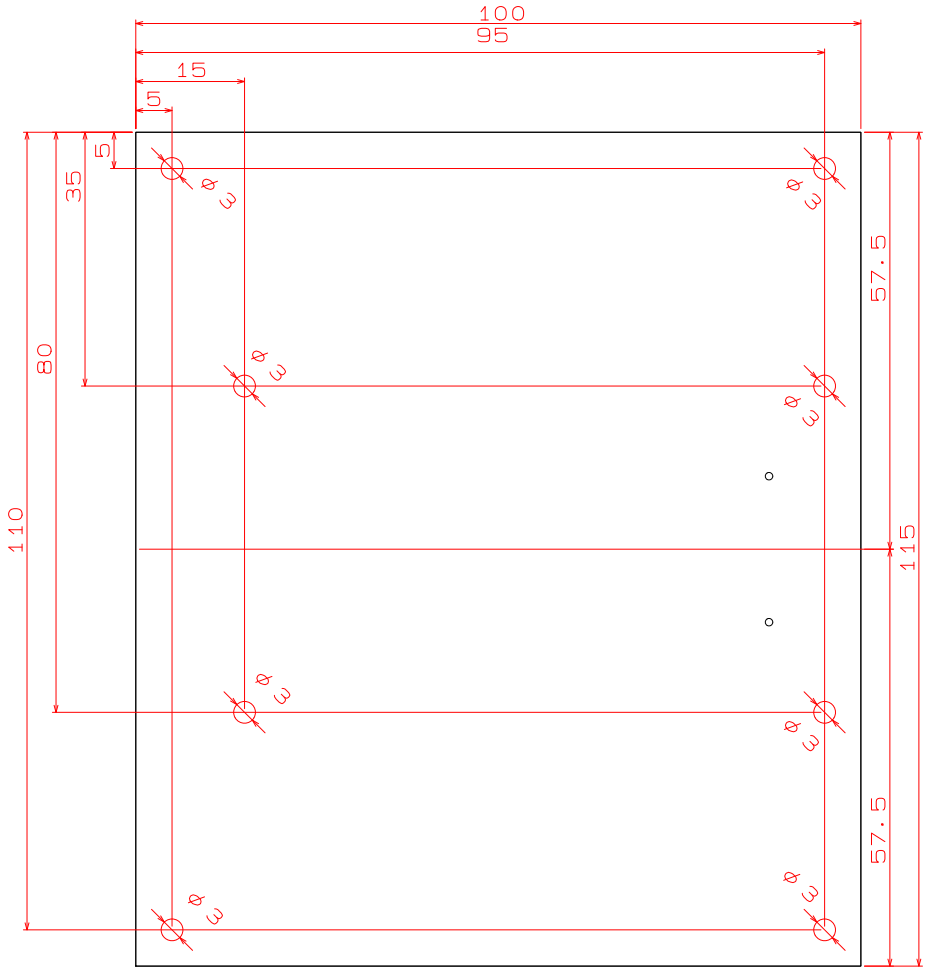
- Top Side Implementation diagram



- Bottom Side Implementation diagram



- Dimensions



9. THEVA242A-SMA Bill of Material

	Designator	Parts type	Quantity	Parts name	Specification	Value
	C1, C7, C14, C25	Capacitor	4	GRM1552C1H391JA01D	50V/1005	390pF
	C2, C6, C15, C21	Capacitor	4	CGA2B3X7R1H333K050BB	50V/1005	33nF
	C4, C5, C19, C20	Capacitor	4	GRM1552C1H470JA01D	50V/1005	47pF
	C8	Capacitor	1	GRM1552C1H220JA01D	50V/1005	22pF
	C9, C26	Capacitor	2	GRM188R61E475KE11D	25V/1608	4.7uF
	C10, C11, C27	Capacitor	3	GRT31CC81C226ME01L	16V/3216	22uF
	C3, C12, C16, C17, C18, C22, C28, C29, C30, C31, C34, C38, C41, C45	Capacitor	14	GRM188R61E106MA73D	25V/1608	10uF
	C13, C201	Capacitor	2	GRM188B31E105KA75D	25V/1608	1uF
	C2, C6, C15, C21, C23, C24, C32, C33, C35, C36, C37, C39, C40, C42, C43, C44, C46	Capacitor	13	GRM155B31H104KE14D	50V/1005	0.1uF
	D1	Zener diode	1	KDZVTR18B	-	
	D2	LED	1	SML-D12P8WT86	-	
	J1	Connector	1	QSH-030-01-L-D-A	-	
	J2	USB 2.0 micro	1	UB-MC5BR3-SD204-4S-1-TBNMP	-	
	J3	Pin header	1	TCHM23-70-044S-803R	2.54 mm pitch 22 pin X 2 row	
	J7, J8	Pin header	2	TCHM13-70-002S-803R	-	
	J9	Pin header	1	TCHM23-70-008S-803R	2.54 mm pitch 4 pin X 2 row	
	J10, J11, J12, J13, J14, J15, J16, J17, J18, J19, J20	Pin header	11	TCHM13-70-003S-803R	-	
	J22	Pin header	1	TCHM23-70-014S-803R	-	
	J25	Pin header	1	TCHM13-70-005S-803R	2.54 mm pitch 5 pin X 1 row	
	JA1	DC jack	1	MJ-179PH	-	
	L1, L5	Inductor	2	BRC2012T2R2MD	-	2.2uH
	L2	Inductor	1	RLF7030T-3R3M4R1	-	3.3uH
	L3, L6	Inductor	2	BRL3225T470K	-	47uH
	L4, L7, L8, L9, L10, L11	Ferrite beads	6	MPZ1608B471ATA00	-	
	L12, L13	Ferrite beads	2	BLM18AG102SH1D	-	
*	R2, R3, R4, R6, R8, R19, R23, R31, R32, R33, R37, R38, R39, R45, R46, R47, R51, R52, R53, R64, R78, R89, R91, R101, R102, R103, R104, R105, R201, R202, R203, R204	Resistor	32	RK73Z1ETTP	-	0(NC)
	R5, R26	Resistor	2	RK73H1ETTP49R9F	0.1W/1005	49.9
	R1, R9, R10, R11, R18, R25, R28, R34, R35, R36, R42, R43, R44, R48, R49, R50, R54, R55, R56, R58, R69, R70, R71, R72, R73, R74, R75, R76, R79, R90, R93, R94, R95, R96, R97, R98, R106, R107, R108	Resistor	39	RK73Z1ETTP0	-	0
	R12	Resistor	1	RK73H1ETTP9102F	0.1W/1005	91k
	R13	Resistor	1	RK73H1ETTP2002F	0.1W/1005	20k
	R20	Resistor	1	RK73H1ETTP4020F	0.1W/1005	402
	R21	Resistor	1	RK73H1ETTP3572F	0.1W/1005	35.7k
*	R22, R24, R99, R100	Resistor	4	RK73H1ETTP1001F	0.1W/1005	1k(NC)
	R29	Resistor	1	RK73H1ETTP3000F	0.1W/1005	300
	R30	Resistor	1	RK73H1ETTP2432F	0.1W/1005	24.3k
	R40, R41	Resistor	2	RK73H1ETTP2201F	0.1W/1005	2.2k
	R57, R59, R60, R61, R62, R63, R65, R66, R67, R68, R77, R80	Resistor	12	RK73H1ETTP1001F	0.1W/1005	1k
	R81, R82, R83, R84, R85, R86, R87, R88	Resistor	8	RK73H1ETTP10R0F	0.1W/1005	10
	R92	Resistor	1	RK73H1ETTP62R0F	0.1W/1005	62
	R211		1	RK73H1ETTP1002F	0.1W/1005	10k
*	TP1, TP2, TP3, TP4	TP	4	-	2mm X 2mm	NC
	U1	THCV242A-P	1	THCV242A	See datasheet (QFN package)	
	U2	LTC3621EMS8E#PBF	1	LTC3621EMS8E#PBF	See datasheet (MS8E package)	
	U3, U4	LT3088EST#PBF	2	LT3088EST#PBF	See datasheet (ST package)	
	P2, P6	SMA Connector	2	SMA103-T16		
*	P1, P3, P4, P5, P7, P8	SMA Connector	6	SMA103-T16		NC

*Un-mount

10. Notices and Requests

For the Material:

1. The product specifications described in this material are subject to change without prior notice.

2. The circuit diagrams described in this material are examples of the application which may not always apply to design of respective customers. THine Electronics, Inc. ("THine") is not responsible for possible errors and omissions in this material. Please note even if the errors or omissions should be found in this material, THine may not be able to correct them immediately.

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2. This product has been solely manufactured for electric design engineers but not for end-users.

3. This product is not radiation-tolerant product.

4. This product is presumed to be used for general electric device, not for applications which require extremely high-reliability/safety (including medical device concerned with critical care, aerospace device, or nuclear power control device). Also, when using this product for any device concerned with control and/or safety of transportation means, traffic signal device, or other various types of safety device, such use must be after applying appropriate measures to the product.

5. This product has been designed with the utmost care to accomplish the purpose of evaluation of IC products manufactured by THine Electronics, Inc. ("THine"); however, THine MAKES NO WARRANTIES OR REPRESENTATIONS WITH REGARD TO ANY PERFORMANCE OR FUNCTION OF THIS PRODUCT IN ANY CIRCUMSTANCES.

6. This product has been manufactured with the utmost care in quality control and product reliability; however, there may be faults or defects with a low but fixed probability, as inevitable phenomenon concerned with semiconductor manufacturing processes. Therefore, customers are encouraged to have sufficiently redundant or error-preventive design applied to the use of the product so as not to have THine's product cause any social or public damage. Neither replacement nor failure analysis of the product is available in any case of defects with the product and/or the product's components.

7. Customers are asked, if required, to judge by themselves on whether this product falls under the category of strategic goods under the Foreign Exchange and Foreign Trade Act.

8. Please Note that even if infringement of any third party's industrial ownership should occur by using this product, THine will be exempted from any responsibility unless it directly relates to the production process or functions of the product.

9. Developing, designing and manufacturing of customers' own products, equipment or system by using of this product is strictly prohibited in any way.