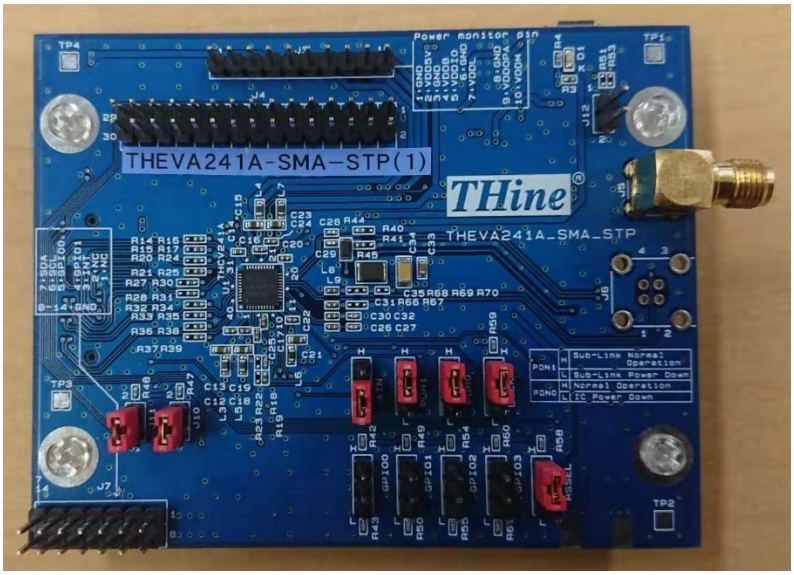
V-by-One HS
High speed and Reduced digital connection concept

THEVA241A-SMA-STP

Hardware Manual



Contents

1. Overview

THEVA241A-SMA-STP is a board equipped with THCV241A-P that converts maximum 1.5Gbps / lane MIPI® CSI-2 (or MIPI®) to V-by-One® HS.

This board can be connected to a V-by-One® HS receiver (THEVA242-SMA).

As shown here by this example connections.

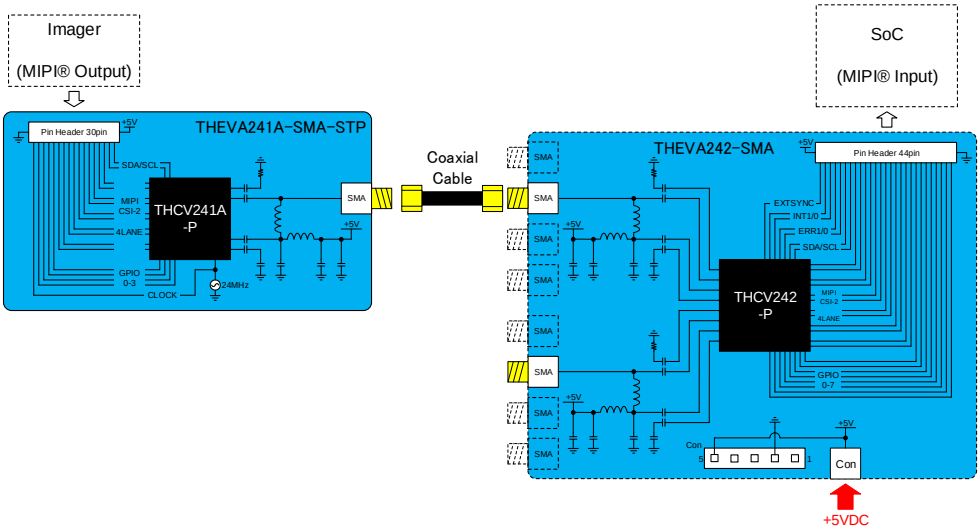


Figure 1 THEVA241A-SMA-STP and THEVA242-SMA connection example (1-lnae)

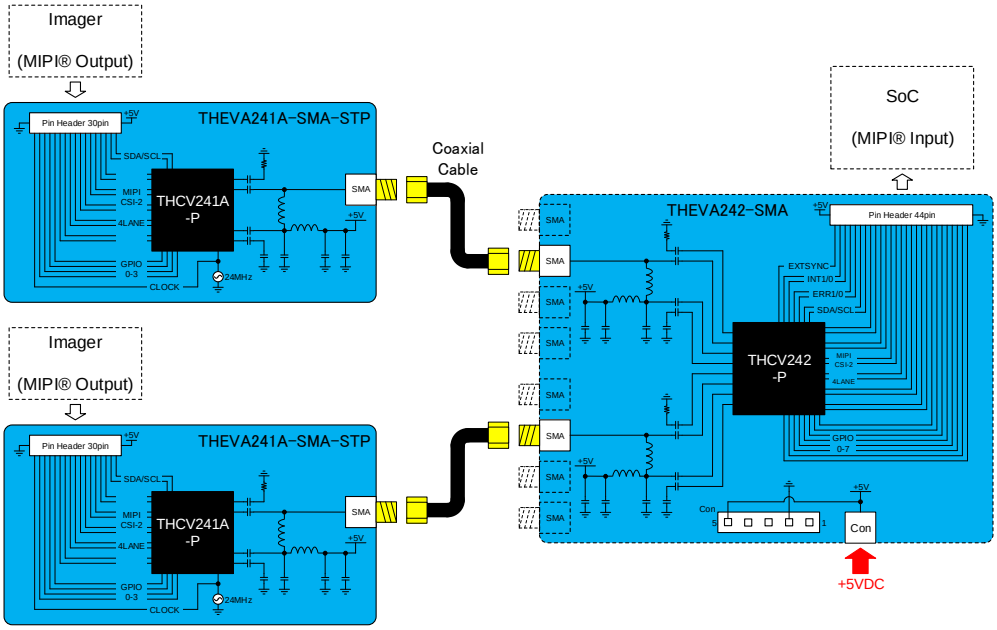


Figure 2 THEVA241A-SMA-STP and THEVA242-SMA connection example (2-lnae)

2. 1-lane connection with V-by-One® HS receiver board (THEVA242-SMA)

Connect J5 of the THEVA241A-SMA-STP and P2 of the THEVA242-SMA with Coaxial-cable.

The power supply (+ 5.0V) is supplied to JA1 of the THEVA242-SMA.

Power supply of the THEVA241A-SMA-STP is supplied from THEVA242-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.

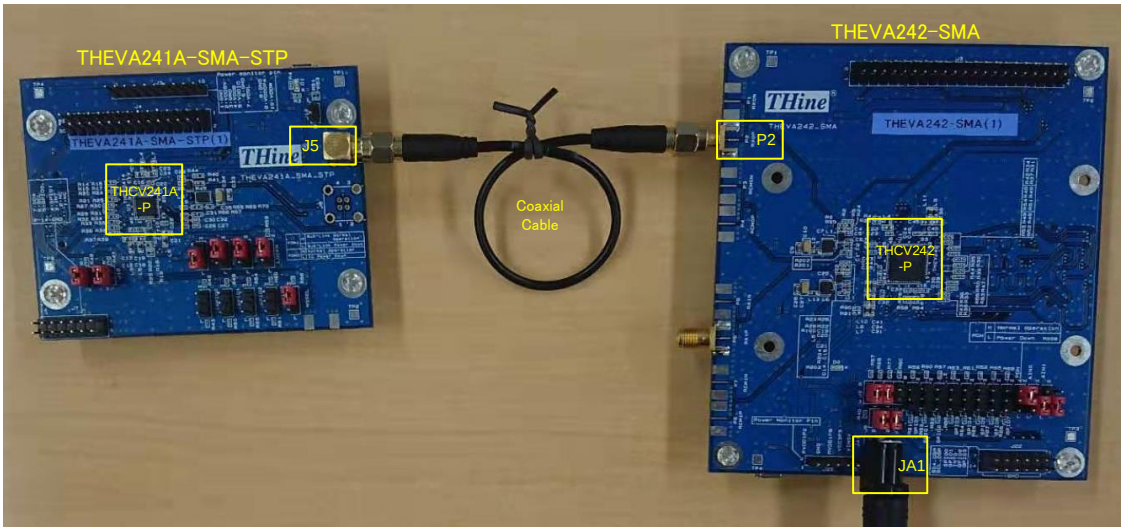


Figure 3 THEVA241A-SMA-STP and THEVA242-SMA 1-lane connection

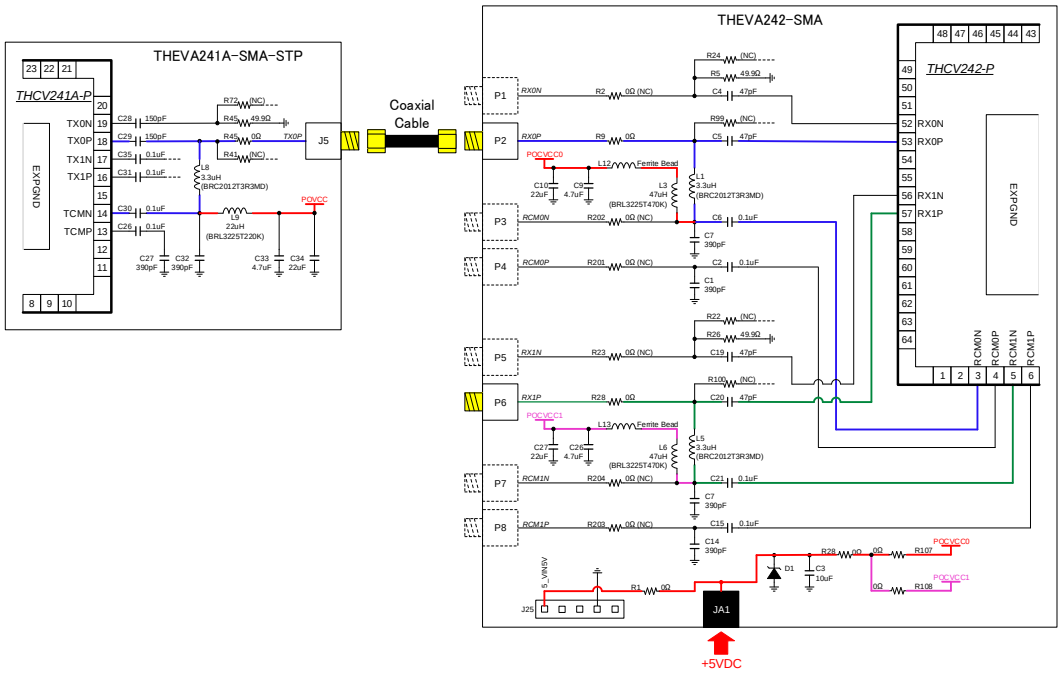


Figure 4 THEVA241A-SMA-STP and THEVA242-SMA 1-lane connection

3. 2-lane connection with V-by-One® HS receiver board (THEVA242-SMA)

When adding 2 lanes, Connect J5 of the THEVA241A-SMA-STP and P6 of the THEVA242-SMA with Coaxial-cable.

The power supply (+ 5.0V) is supplied to JA1 of the THEVA242-SMA.

Power supply of the THEVA241A-SMA-STP is supplied from THEVA242-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.

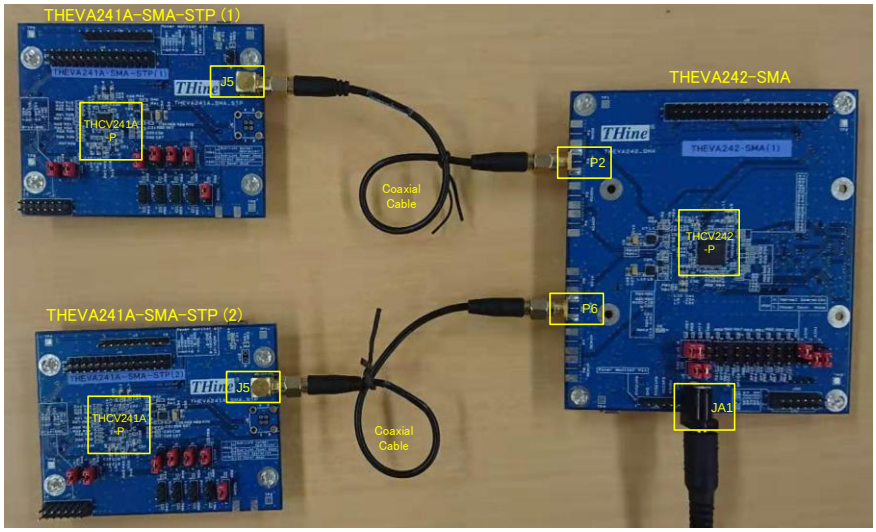


Figure 5 THEVA241A-SMA-STP and THEVA242-SMA 2-lane connection

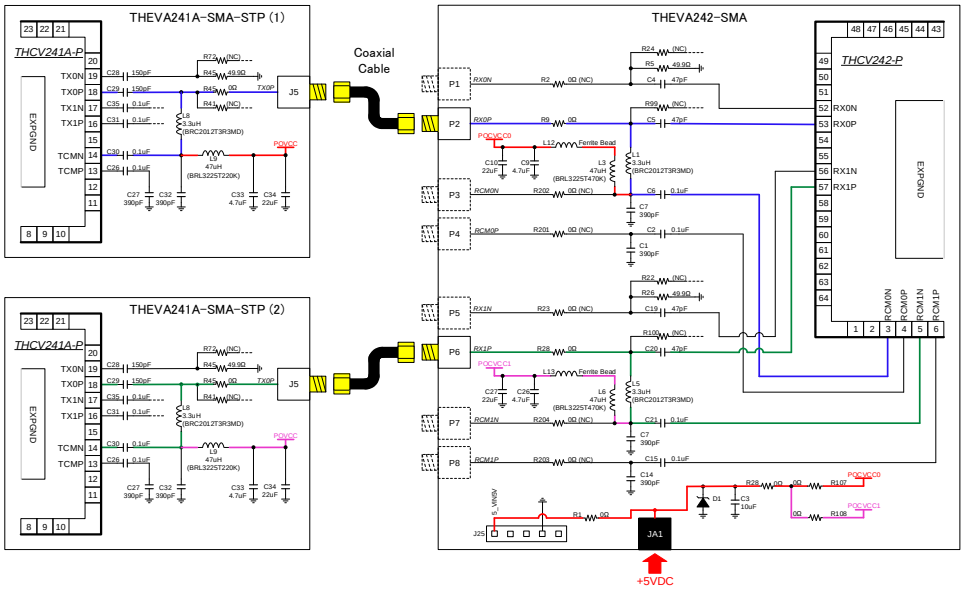


Figure 6 THEVA241A-SMA-STP and THEVA242-SMA 2-lane connection

4. Connection with THEVA241A-SMA-STP and Imager by the MIPI®

J4 pin-header can be used to connect THEVA241A-SMA-STP and Imager.

(J2 on the bottom side can also be used connect Imager. See the schematic on page 8 for details.)

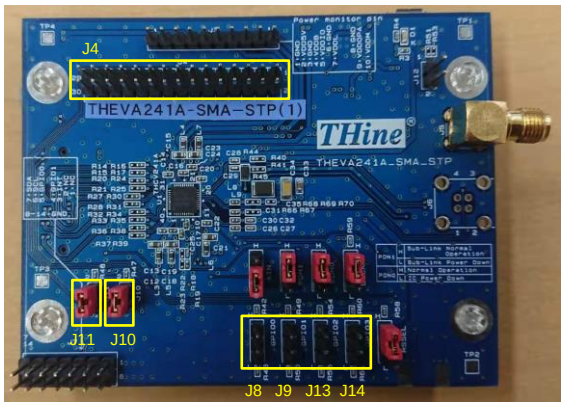
When connecting 2-wire serial (SDA and SCL) to Imager, the J10 and J11 shall be shorted respectively.

Set the GPIO (J8, J9, J13, and J14) to pull-up or pull-down as required.

The reference clock (CKI, CKO) uses a 24MHz oscillator.

If the Imager does not require an external reference clock, CKO need not be connected.

*The Jumper-Pin should be prepared by users.



Pin#	Pin Name	Type	Pin Name
1	CKO	O	Reference Clock Output
4	RD3P	MI	MIPI® differential data inputs lane3
6	RD3N	MI	
10	RD1P	MI	MIPI® differential data inputs lane1
12	RD1N	MI	
16	RCKP	MI	MIPI® differential clock inputs
18	RCKN	MI	
22	RD0P	MI	MIPI® differential data inputs lane0
24	RD0N	MI	
28	RD2P	MI	MIPI® differential data inputs lane2
30	RD2N	MI	
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	
23,25,27,29	+5V	P	+5V Power Supply
2,3,8,9,14, 19,20,21,26	GND	G	Ground

Figure 7 Connection with THEVA241A-SMA-STP and Imager

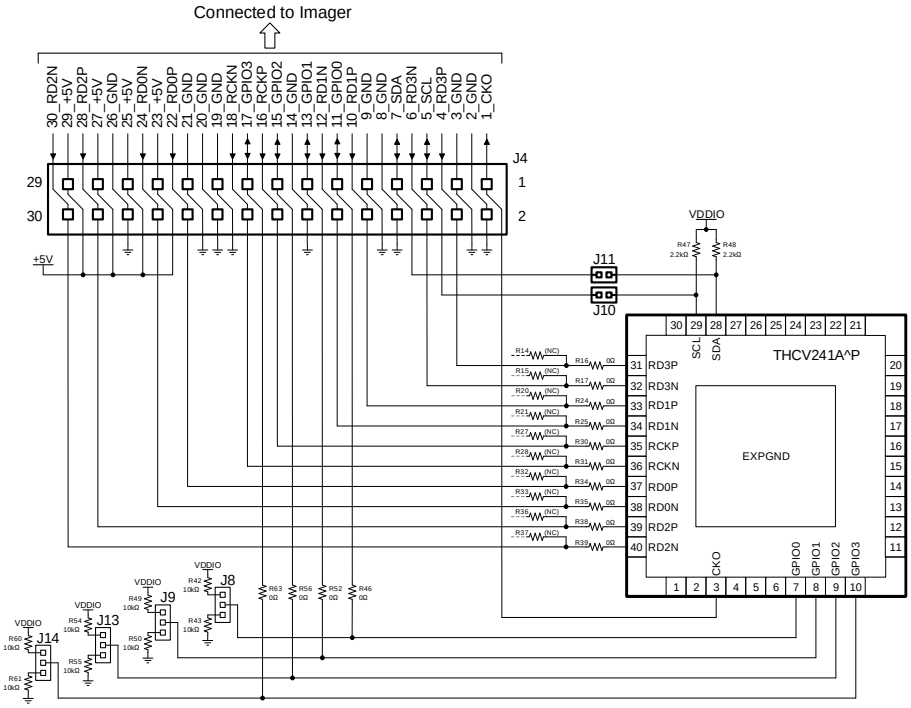
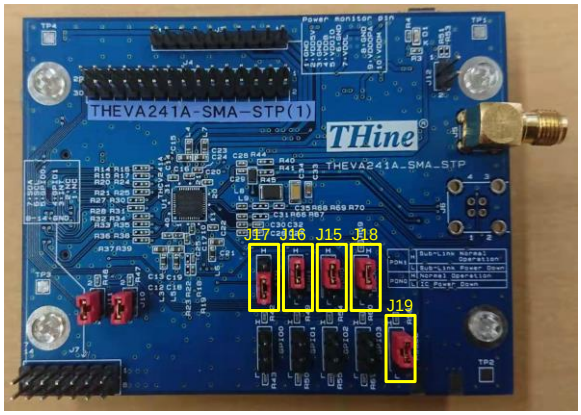


Figure 8 Connection with THEVA241A-SMA-STP and Imager

5. Pin setting of the THEVA241A-SMA-FFC

As shown here by the Pin-settings.

*The Jumper-Pin should be prepared by users.



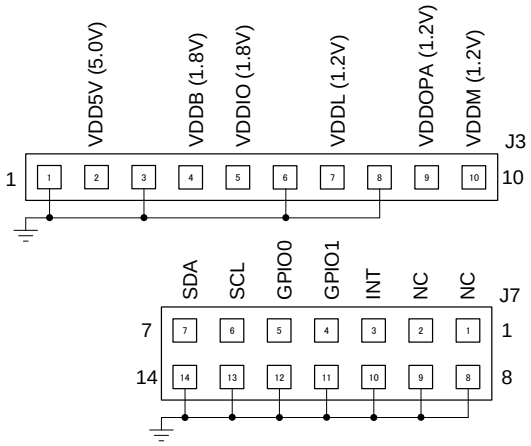
Ports#	Node Name	Def.	Description
J17	AIN		Select Slave Address Low : 2-wire serial Address = 7'b000_1011 High : 2-wire serial Address = 7'b011_0100
J16	PDN1		Sub-Link Power Down Low : Sub-Link Power Down High : Sub-Link Normal Operation
J15	PDN0		Whole IC Power Down Low : Power Down High : Normal Operation
J18	LOCKN		LOCK detect input Negative polarity. If external LOCKN connection is used, it is supposed to be connected to Rx LOCKN with a 30kΩ pull-up resistor.
J19	MSSEL		Sub-Link Master/Slave Select. Low : Sub-Link Master side (inside 2-wire serial I/F is slave) High : Sub-Link Slave side (inside 2-wire serial I/F is master) Sub-Link Master is connected to HOST MCU.

Figure 9 Pin setting of the THEVA241A-SMA-STP

6. Monitor pins

Each power supply can be monitored by the J3 pin-header.

The 2-wire serial, the GPIO, and the INT signal can be monitored by the J7 pin-header.



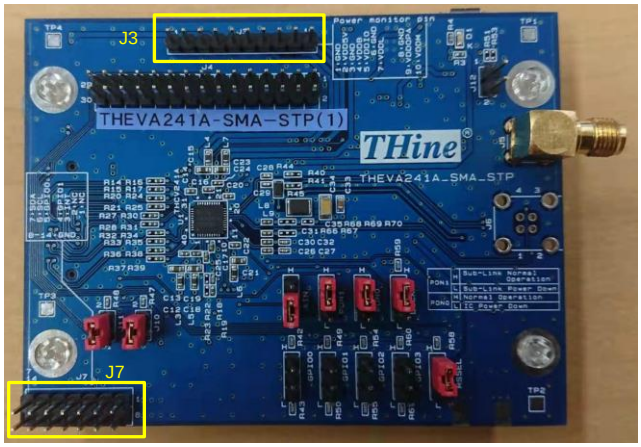
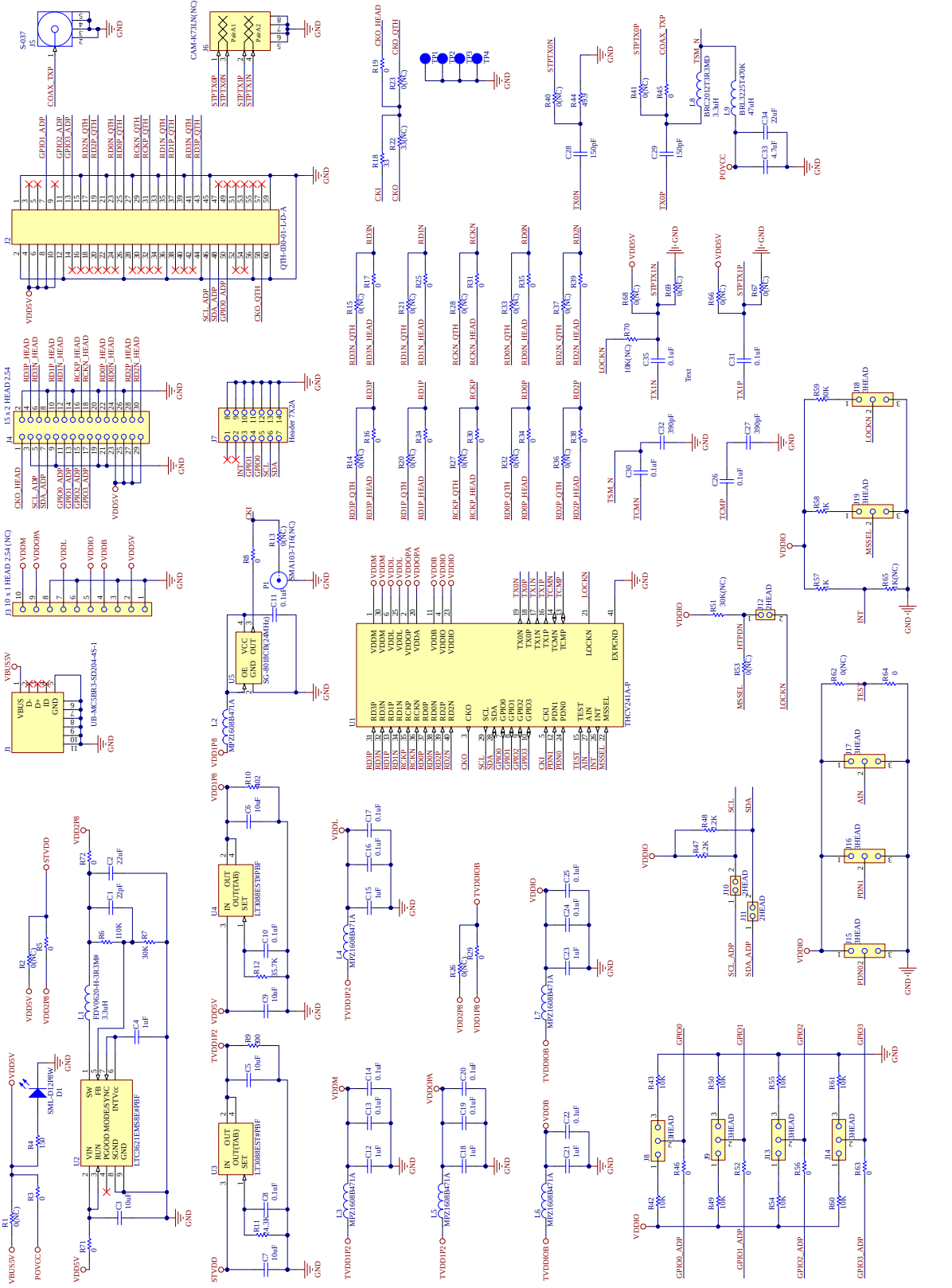


Figure 10 Monitor pin

7. THEVA241A-SMA-STP Schematic



8. THEVA241A-SMA-STP Bill of Material

	Designator	Parts type	Quantity	Parts name	Specification	Value
	C1	Capacitor	1	GRM1552C1H220JA01D	50V/1005	22pF
	C2, C34	Capacitor	2	GRT31CC81C226ME01L	16V/3216	22uF
	C3, C5, C6, C7, C9	Capacitor	5	GRM188R61E106MA73D	25V/1608	10uF
	C4, C12, C15, C18, C21, C23	Capacitor	6	GRM188B31E105KA75D	25V/1608	1uF
	C8, C10, C11, C13, C14, C16, C17, C19, C20, C22, C24, C25, C26, C30, C31, C35	Capacitor	18	GRM155B31H104KE14D	50V/1005	0.1uF
	C27, C32	Capacitor	2	GRM1552C1H391JA01D	50V/1005	390pF
	C28, C29	Capacitor	2	GRM1552C1H151JA01D	50V/1005	150pF
	C33	Capacitor	1	GRM188R61E475KE11D	25V/1608	4.7uF
	D1	LED	1	SML-D12P8WT86	-	-
	J1	USB 2.0 micro	1	UB-MC5BR3-SD204-4S-1-TBNMP	-	-
	J2	QTH-030-01-L-D-A	1	QTH-030-01-L-D-A	-	-
	J3	Pin header	1	TCHM13-70-010S-803R	-	-
	J4	Pin header	1	TCHM23-70-030S-803R	-	-
	J5	SMA	1	S-037-TGG	SMA JACK R/A 50 OHM PCB	-
*	J6	HSD	1	CAM-K73LN	-	NC
	J7	Pin header	1	TCHM23-70-014S-803R	-	-
	J8, J9, J13, J14, J15, J16, J17, J18, J19	Pin header	9	TCHM13-70-003S-803R	-	-
	J10, J11, J12	Pin header	3	TCHM13-70-002S-803R	-	-
	L1	Inductor	1	RLF7030T-3R3M4R1	-	3.3uH
	L2, L3, L4, L5, L6, L7	Ferrite beads	6	MPZ1608B471ATA00	-	-
	L8	Inductor	1	BRC2012T3R3MD	-	3.3uH
	L9	Inductor	1	BRL3225T470K	-	47uH
*	P1	SMA Connector	1	SMA103-T16	-	NC
*	R1, R2, R13, R14, R15, R20, R21, R23, R26, R27, R28, R32, R33, R36, R37, R40, R41, R53, R62, R66, R67, R68, R69	Resistor	23	RK73Z1ETTP	1A/1005	0(NC)
	R3, R5, R8, R16, R17, R19, R24, R25, R29, R30, R31, R34, R35, R38, R39, R45, R46, R52, R56, R63, R64, R71, R72	Resistor	23	RK73Z1ETTP	1A/1005	0
	R4	Resistor	1	RK73H1ETTP1500F	0.1W/1005	150
	R6	Resistor	1	RK73H1ETTP1103F	0.1W/1005	110K
	R7, R59	Resistor	2	RK73H1ETTP3002F	0.1W/1005	30K
	R9	Resistor	1	RK73H1ETTP3000F	0.1W/1005	300
	R10	Resistor	1	RK73H1ETTP 4020F	0.1W/1005	402
	R11	Resistor	1	RK73H1ETTP2432F	0.1W/1005	24.3K
	R12	Resistor	1	RK73H1ETTP3572F	0.1W/1005	35.7K
	R18	Resistor	1	RK73H1ETTP33R0F	0.1W/1005	33
*	R22	Resistor	1	RK73B1ETTP330J	0.1W/1005	33(NC)
	R42, R43, R49, R50, R54, R55, R60, R61	Resistor	8	RK73H1ETTP1002F	0.1W/1005	10K
	R44	Resistor	1	RK73H1ETTP49R9F	0.1W/1005	49.9
	R47, R48	Resistor	2	RK73H1ETTP2201F	0.1W/1005	2.2K
*	R51	Resistor	1	RK73B1ETTP303J	0.1W/1005	30K(NC)
	R57, R58	Resistor	2	RK73H1ETTP1001F	0.1W/1005	1K
*	R65	Resistor	1	RK73B1ETTP102J	0.1W/1005	1K(NC)
*	R70	Resistor	1	RK73B1ETTP103J	0.1W/1005	10K(NC)
*	TP1, TP2, TP3, TP4	TP	4	2mmX2mm		NC
	U1	THCV241A-P	1	THCV241A-P	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)	-
	U5	SG-8018CB24.000000MHz TJHPA	1	-	See datasheet	24MHz

*Un-mount

9. 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.

3. This material contains THine's copyright, know-how or other proprietary. Copying or disclosing of the contents of this material to any third party without THine's prior permission is strictly prohibited.

For the Product:

1. This product is solely designed for evaluation purpose, and other purposes including mass production and distribution are not intended.

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.