



THEVA24-RJ45-SET-V1

Hardware Manual

THEVA241A-RJ45-V1



THEVA242A-RJ45-V1



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1. Overview

THEVA24-RJ45-SET-V1 consists of THEVA241A-RJ45-V1 and THEVA242A-RJ45-V1.

THEVA241A-RJ45-V1 is a board equipped with THC241A-P that converts MIPI® CSI-2 to V-by-One® HS.

THEVA242A-RJ45-V1 is a board equipped with THC242A-P that converts V-by-One® HS to MIPI® CSI-2.

These boards can be connected through Ethernet Cable.

As shown here by this example connections.

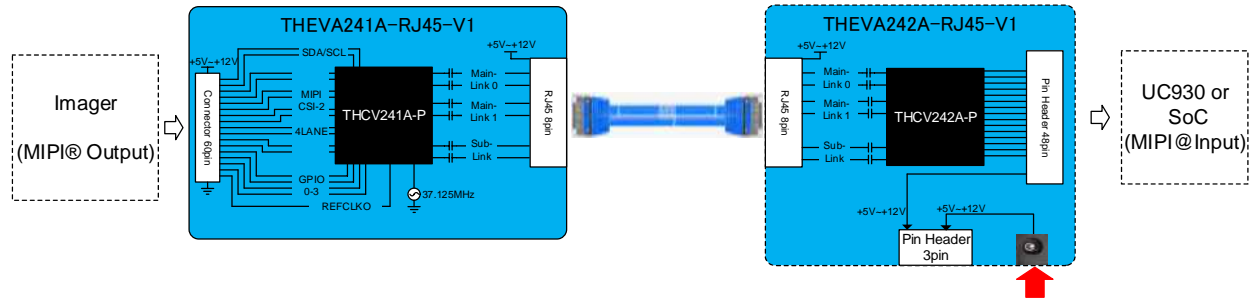


Figure 1 THEVA241A-RJ45-V1 and THEVA242A-RJ45-V1 connection example

2. Connection

Refer to the following figure for the THEVA241A-RJ45-V1 and the THEVA242A-RJ45-V1 connections.

The power supply (+ 5.0V~+12V) of the THEVA241A-RJ45-V1 is supplied from the Ethernet Cable of the THEVA242A-RJ45-V1



Figure 2 THEVA241A-RJ45-V1 and THEVA242A-RJ45-V1 connection

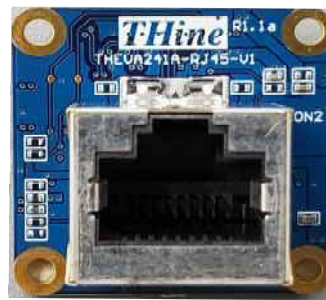
3. Kit/Box Contents.

No.	Item	Qty	Description
1	THEVA241A-RJ45-V1	1	Tx Board with THine THC241A-P MIPI® to V-by-One® HS Transmitter IC
2	THEVA242A-RJ45-V1	1	Rx Board with THine THC242A-P V-by-One® HS Receiver IC
3	Cable	1	2-meter Ethernet Cable (Cat5e / Straight Cable)
4	Spacer	6	M2 4mm x 4pcs / M3 30mm x 2 pcs
5	Screw	10	M2 9mm x 4pcs / M3 4mm x 2pcs / M3 8mm x 4pcs
6	Nut	4	M2 x 4pcs
7	Document	1	

1. THEVA241A-RJ45-V1(TOP)



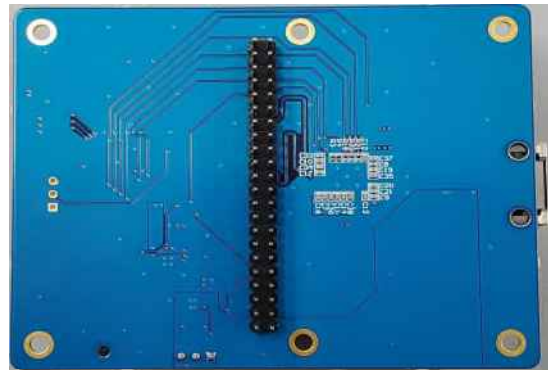
1. THEVA242A-RJ45-V1(BOTTOM)



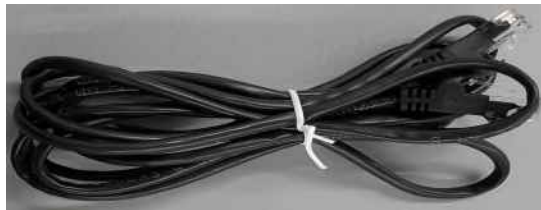
2. THEVA242A-RJ45-V1(TOP)



2. THEVA242A-RJ45-V1(BOTTOM)



3. Ethernet Cable



4. Spacer , 5. Screw , 6. Nut



Figure 3 Kit/Box contents

4. Connection of THEVA241A-RJ45-V1 with Imager through the MIPI[®]

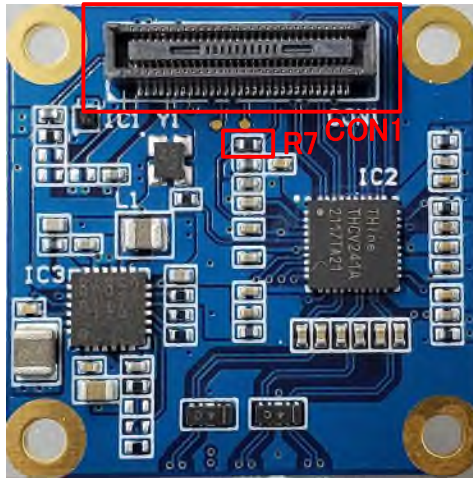
Connection of THEVA241A-RJ45-V1 with THEVA242A-RJ45-V1 through V-by-One[®] HS.

Connect the sensor to the THCV241A board with the CON1(60pins) board-to-board connector.

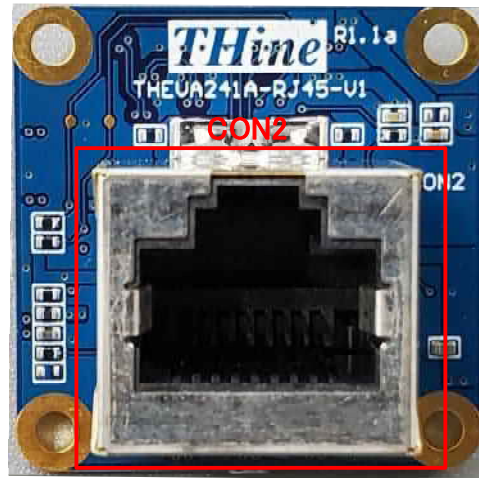
Connect the THCV241A board to the THCV242A board with CON2(RJ45/8pins).

The reference clock (REFCLKI, REFCLKO) uses a 37.125MHz oscillator.

If the Imager does not require an external reference clock, please remove R7 to cut the REFCLKO connection.



TOP Side



BOTTOM Side

Figure 4 Connection the THEVA241A-RJ45-V1 to Sensor and THEVA242A-RJ45-V1

Table 1 CON1 Pins assignment of THEVA241A-RJ45-V1

PIN#	Node name	Type	Description	PIN#	Node name	Type	Description
1	NC	P	+5V Power Supply	31	NC	-	Not connected
2	NC	P	+3.3V Power Supply	32	NC	-	Not connected
3	NC	P	+5V Power Supply	33	NC	-	Not connected
4	NC	P	+3.3V Power Supply	34	NC	-	Not connected
5	T2V9	P	+2.9V Power Supply	35	SLAMODE	PD	Select slave address
6	T1V2	P	+1.2V Power Supply	36	GND	G	Ground
7	T2V9	P	+2.9V Power Supply	37	GND	G	Ground
8	T1V2	P	+1.2V Power Supply	38	GND	G	Ground
9	T1V8	P	+1.8V Power Supply	39	REFCLKO	O	Master clock output
10	NC	-	Not connected	40	NC	-	Not connected
11	GND	G	Ground	41	NC	-	Not connected
12	GND	G	Ground	42	NC	-	Not connected
13	GND	G	Ground	43	GND	G	Ground
14	GND	G	Ground	44	GND	G	Ground
15	XCLR	B	Sensor Clear	45	NC	-	Not connected
16	NC	-	Not connected	46	TCAM_D3_P	MI	MIPI® Positive data input lane3
17	NC	-	Not connected	47	NC	-	Not connected
18	NC	-	Not connected	48	TCAM_D3_N	MI	MIPI® Negative data input lane3
19	GND	G	Ground	49	GND	G	Ground
20	NC	-	Not connected	50	GND	G	Ground
21	CAM_SCL	B	2-Wire Serial I/F SCL	51	TCAM_D0_N	MI	MIPI® Negative data input lane0
22	NC	-	Not connected	52	TCAM_D1_N	MI	MIPI® Negative data input lane1
23	XCE	-	I2C Enable for only IMX327	53	TCAM_D0_P	MI	MIPI® Positive data input lane0
24	GPIO1	B	General Purpose I/O	54	TCAM_D1_P	MI	MIPI® Positive data input lane1
25	XVS	TP	Vertical sync signal of IMX Sensor(TP3)	55	GND	G	Ground
26	GPIO2	B	General Purpose I/O	56	GND	G	Ground
27	CAM_SDA	B	2-Wire Serial I/F SDA	57	TCAM_D2_P	MI	MIPI® Positive data input lane2
28	GPIO3	B	General Purpose I/O	58	TCAM_C_P	MI	MIPI® Positive clock input
29	XHS	TP	Horizontal sync signal of IMX Sensor(TP5)	59	TCAM_D2_N	MI	MIPI® Negative data input lane2
30	NC	-	Not connected	60	TCAM_C_N	MI	MIPI® Negative clock input

Table 2 CON2 Pins assignment of THEVA241A-RJ45-V1

PIN#	Node name	Type	Description
1	TCM_C_P	CB	CML Bi-directional Positive Input/Output (Sub-Link)
2	TCM_C_N	CB	CML Bi-directional Negative Input/Output (Sub-Link)
3	VIN_TX	P	Power supply(+5V~+12V)
4	TX1_C_P	CO	V-by-One®HS Lane1 High-speed CML Positive signal output
5	TX1_C_N	CO	V-by-One®HS Lane1 High-speed CML Negative signal output
6	GND	G	Ground
7	TX0_C_P	CO	V-by-One®HS Lane0 High-speed CML Positive signal output
8	TX0_C_N	CO	V-by-One®HS Lane0 High-speed CML Negative signal output

5. Connection of THEVA242A-RJ45-V1 with UC930 or Application Processor through the MIPI®
 Connection of THEVA242A-RJ45-V1 with THEVA241A-RJ45-V1 through V-by-One® HS.
 Connect the THCV242A-P board to the UC930 or AP with CON2 Pin Header
 Connect the THCV242A-P board with CON1 of RJ45 to the THCV241A board.

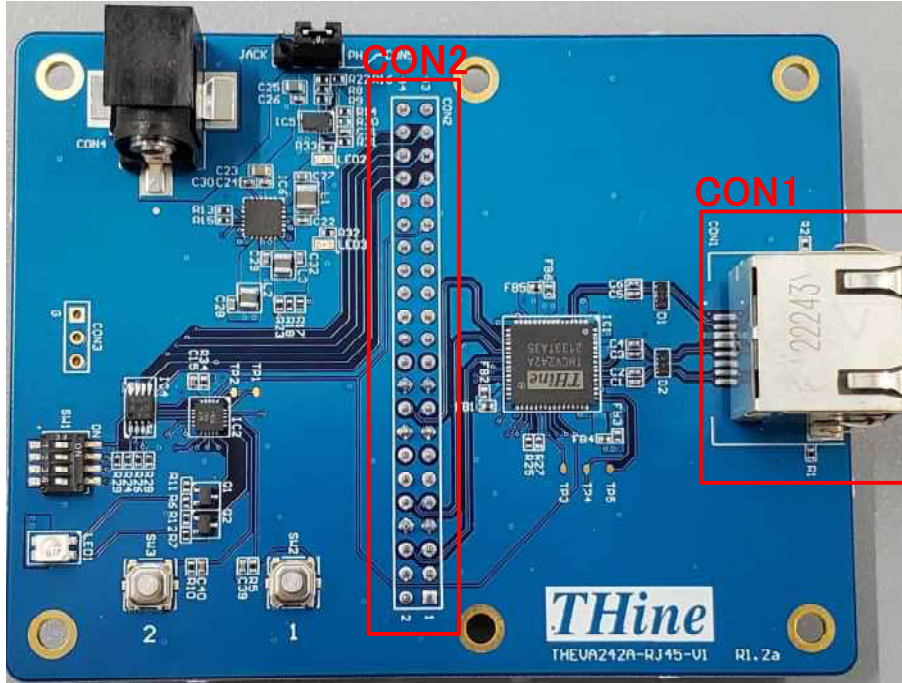


Figure 5 Connection with THEVA242A-RJ45-V1 and UC930 or Application Processor and THEVA242A-RJ45-V1

Table 3 CON1 Pins assignment of THEVA242A-RJ45-V1

PIN#	Node name	Type	Description
1	RCM_C_P	CB	CML Bi-directional Positive Input/Output (Sub-Link)
2	RCM_C_N	CB	CML Bi-directional Negative Input/Output (Sub-Link)
3	VOUT	P	Power supply(+5V~+12V)
4	RX1_C_P	CI	V-by-One®HS Lane1 High-speed CML Positive signal input
5	RX1_C_N	CI	V-by-One®HS Lane1 High-speed CML Negative signal input
6	GND	G	Ground
7	RX0_C_P	CI	V-by-One®HS Lane0 High-speed CML Positive signal input
8	RX0_C_N	CI	V-by-One®HS Lane0 High-speed CML Negative signal input

Table 4 CON2 Pin header assignment of THEVA242A-RJ45-V1

PIN#	Node name	Type	Description	PIN#	Node name	Type	Description
1	OISVDD	NC	Not connected	23	GRB_VPP2	NC	Not connected
2	OISVDD	NC	Not connected	24	GRB_VPP2	NC	Not connected
3	NC	-	Not connected	25	AVDD	NC	Not connected
4	NC	-	Not connected	26	AVDD	NC	Not connected
5	MTXC_N	MO	MIPI® Negative clock output	27	DOVDD	NC	Not connected
6	MTXC_P	MO	MIPI® Positive clock output	28	DOVDD	NC	Not connected
7	GND	G	Ground	29	DVDD	NC	Not connected
8	GND	G	Ground	30	DVDD	NC	Not connected
9	MTX0_N	MO	MIPI® Negative data output lane0	31	AFVCC	NC	Not connected
10	MTX0_P	MO	MIPI® Positive data output lane0	32	AFVCC	NC	Not connected
11	NC	-	Not connected	33	CV242_GPIO2	B	General Purpose I/O
12	NC	-	Not connected	34	MCLK	NC	Not connected
13	MTX1_N	MO	MIPI® Negative data output lane1	35	GRB_PWDN	-	Power supply enable (IC5)
14	MTX1_P	MO	MIPI® Positive data output lane1	36	GRB_RST	-	THCV242APDN Pin Control(option)
15	GND	G	Ground	37	CV242_SCL	B	2-wire Serial I/F clock
16	GND	G	Ground	38	CV242_SDA	B	2-wire Serial I/F data
17	MTX2_N	MO	MIPI® Negative data output lane2	39	CV242_ERR0	O	Internal Error/Status signal monitoring
18	MTX2_P	MO	MIPI® Positive data output lane2	40	CV242_GPIO1	B	General Purpose I/O
19	GND	G	Ground	41	CV242_GPIO0	B	General Purpose I/O
20	GND	G	Ground	42	CV242_INT0	O	Interrupt signal Output
21	MTX3_N	MO	MIPI® Negative data output lane3	43	NC	-	Not connected
22	MTX3_P	MO	MIPI® Positive data output lane3	44	AVDD2	NC	Not connected

※Type symbol

MI : MIPI input, CO : CML Output

MO : MIPI output, CI : CML Input

CB : CML Bi-directional Input/Output

B : 1.8V LVCMOS Bi-directional Input/Output

O : LVCMOS Output

P : Power, G : Ground

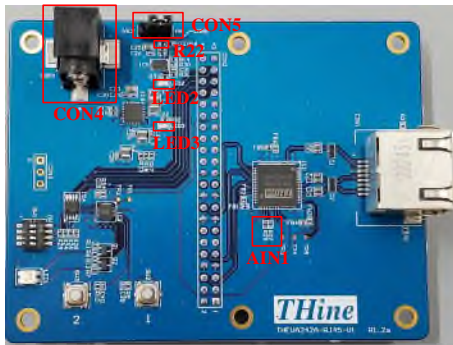
TP : Test Point, PD : Pull Down(External circuit)



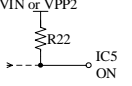
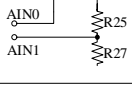
6. Pin setting or option resistor setting of the THEVA242A-RJ45-V1

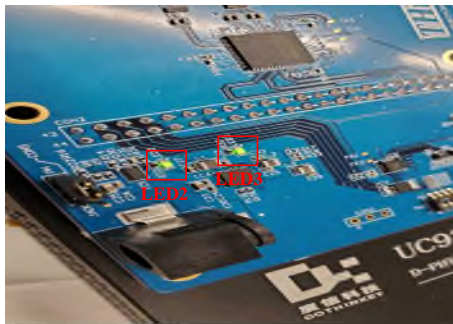
The board has several switchable functions.

See the table and picture.

The indicators on LEDs 2 and 3 are illuminated when 5V and 3.3V power is supplied to the board.



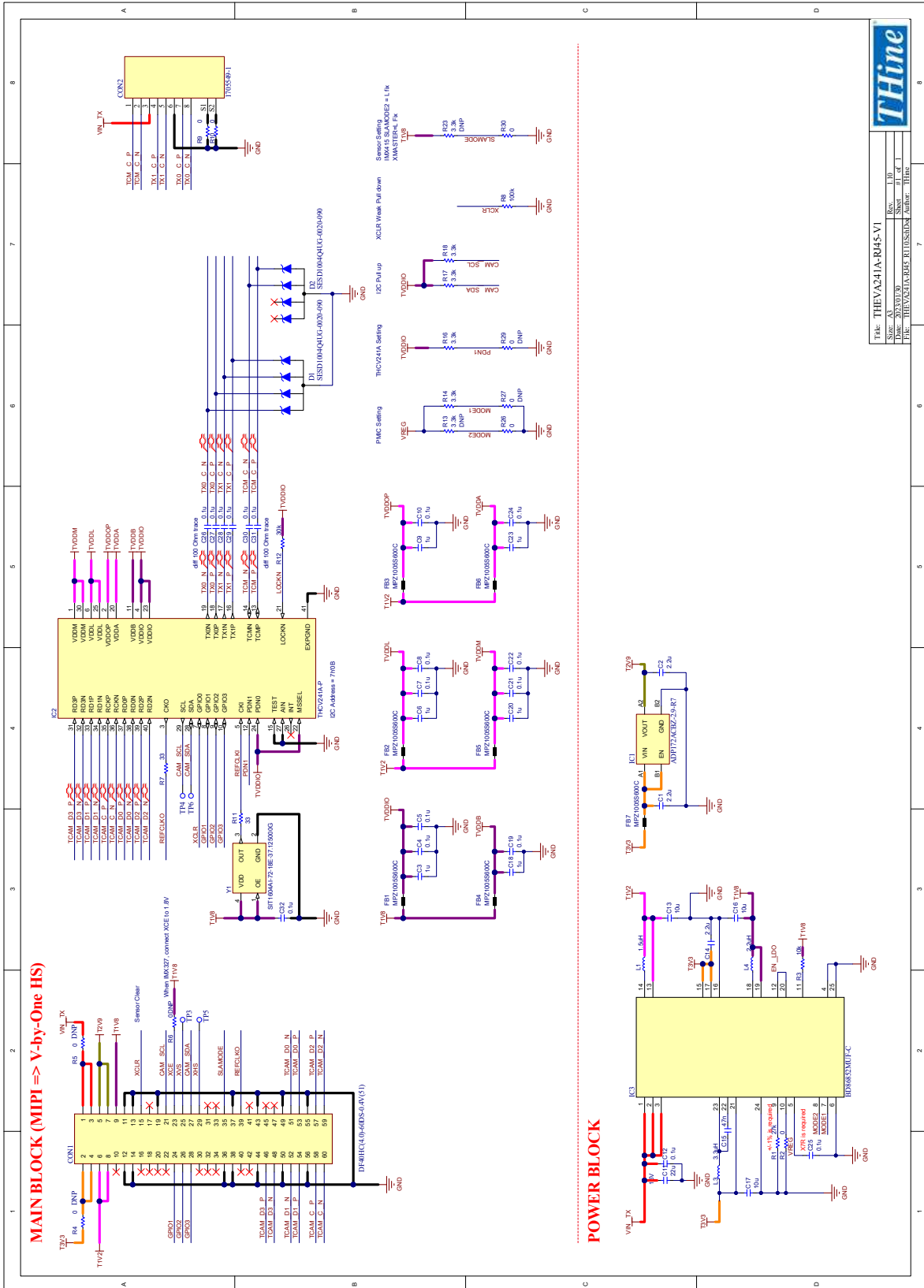
Silk Name	Node Name	Specification.	Description									
CON4	JACK_VIN	2.1mm, 5A	+12V Power Supply Connector Reference AC Adaptor : WA-12200X-1									
CON5	VIN or VPP2		VIN(1-2) : +12V Power Supply from DC JACK(CON4)									
			VPP2(2-3) : +5~10V Power Supply from CON2									
R22	MU960_PWDN		R22 is not Mounted: PWDN signal should come from CON2 R22 is Mounted: Power can be turned on without a PWDN signal									
AIN0, AIN1	CV242_AIN1		<table border="1"> <thead> <tr> <th>AIN0</th> <th>AIN1</th> <th>CV242A-P Slave Address</th> </tr> </thead> <tbody> <tr> <td>H</td> <td>H</td> <td>7'h65</td> </tr> <tr> <td>H</td> <td>L</td> <td>7'h34</td> </tr> </tbody> </table>	AIN0	AIN1	CV242A-P Slave Address	H	H	7'h65	H	L	7'h34
AIN0	AIN1	CV242A-P Slave Address										
H	H	7'h65										
H	L	7'h34										



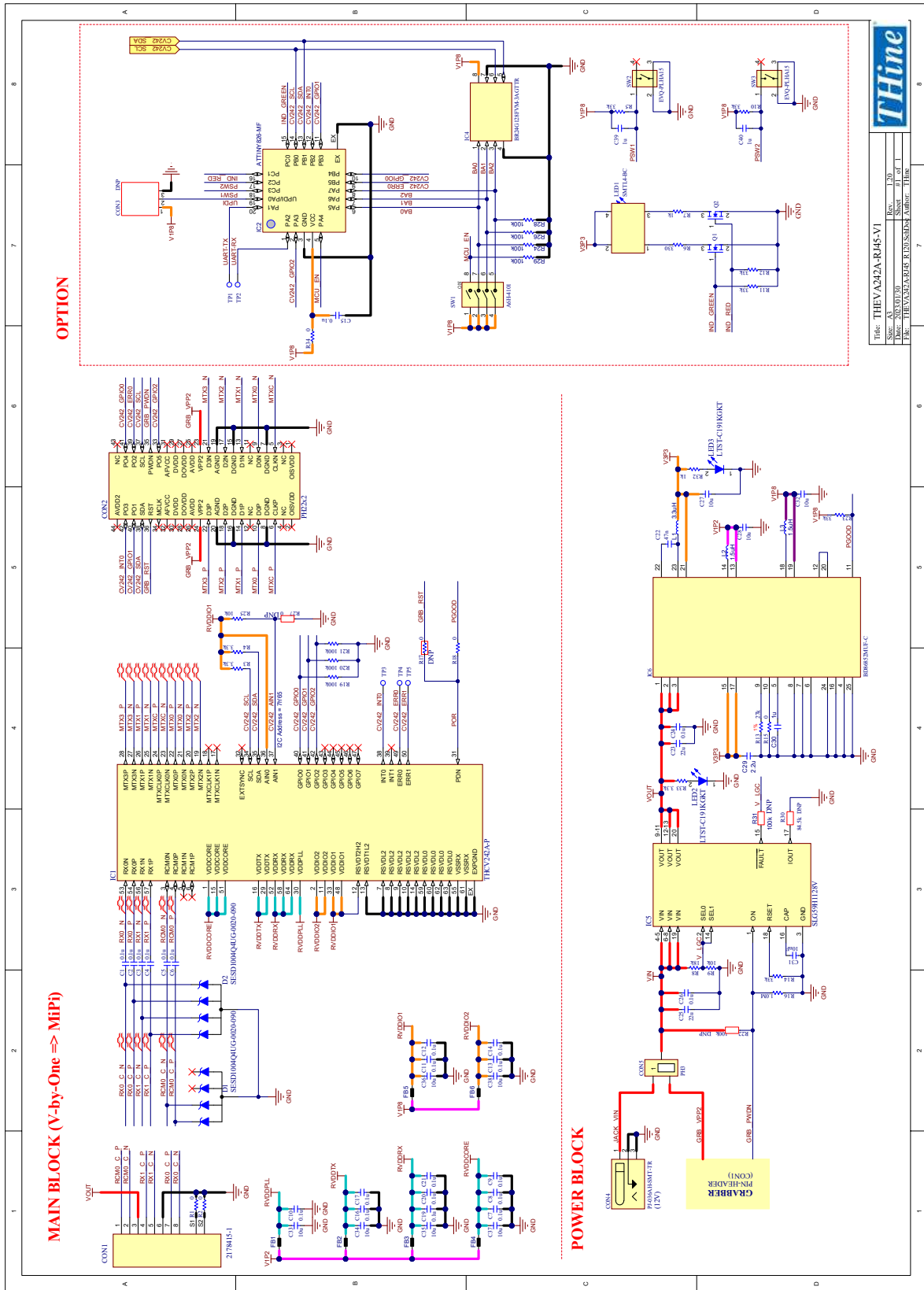
- Power Supply Indicator
 - LED 2 : +5V Output voltage detection LED
 - LED 3 : +3.3V Output voltage detection LED

Figure 6 Basic pins setting and power supply indicator of the THEVA242A-RJ45-V1

7. THEVA241A-RJ45-V1 Schematic

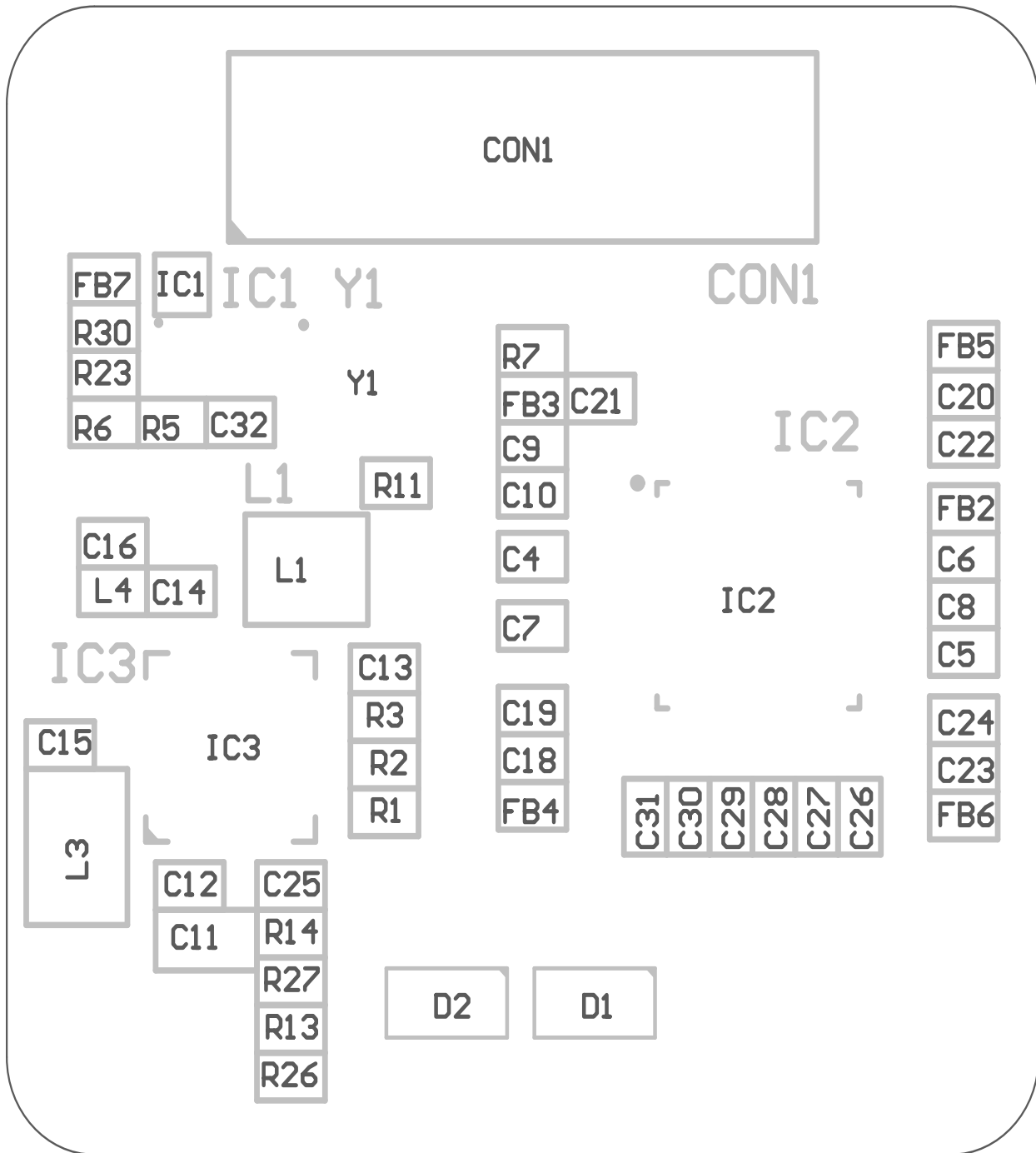


8. THEVA242A-RJ45-V1 Schematic

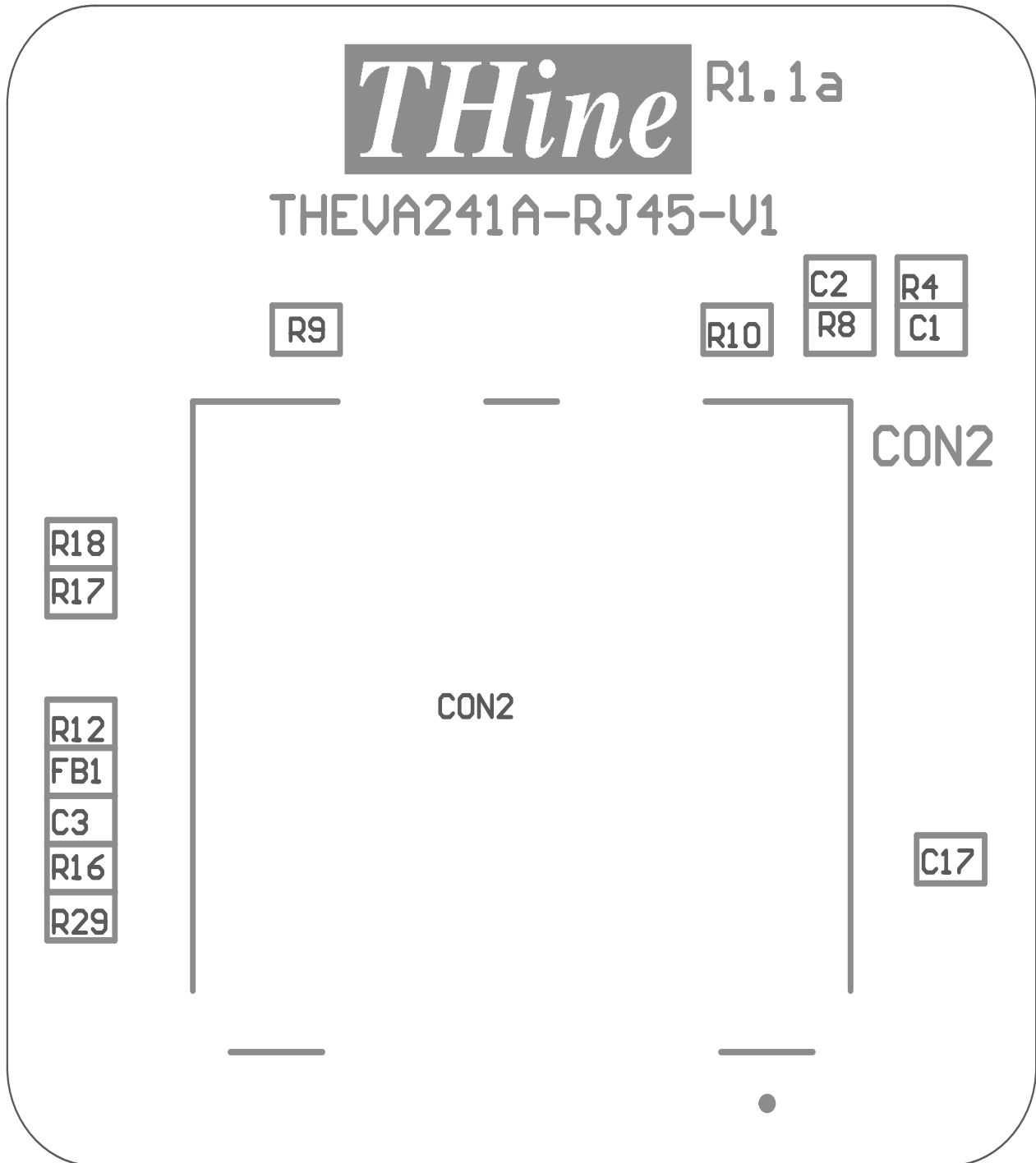


THine	
Titre: THEVA242A-RJ45-V1	REV: 1.00
Stat: 2024/01/30	Stat: 13/01/2024
File: THEVA242A-RJ45-V1.dwg	Auteur: THine

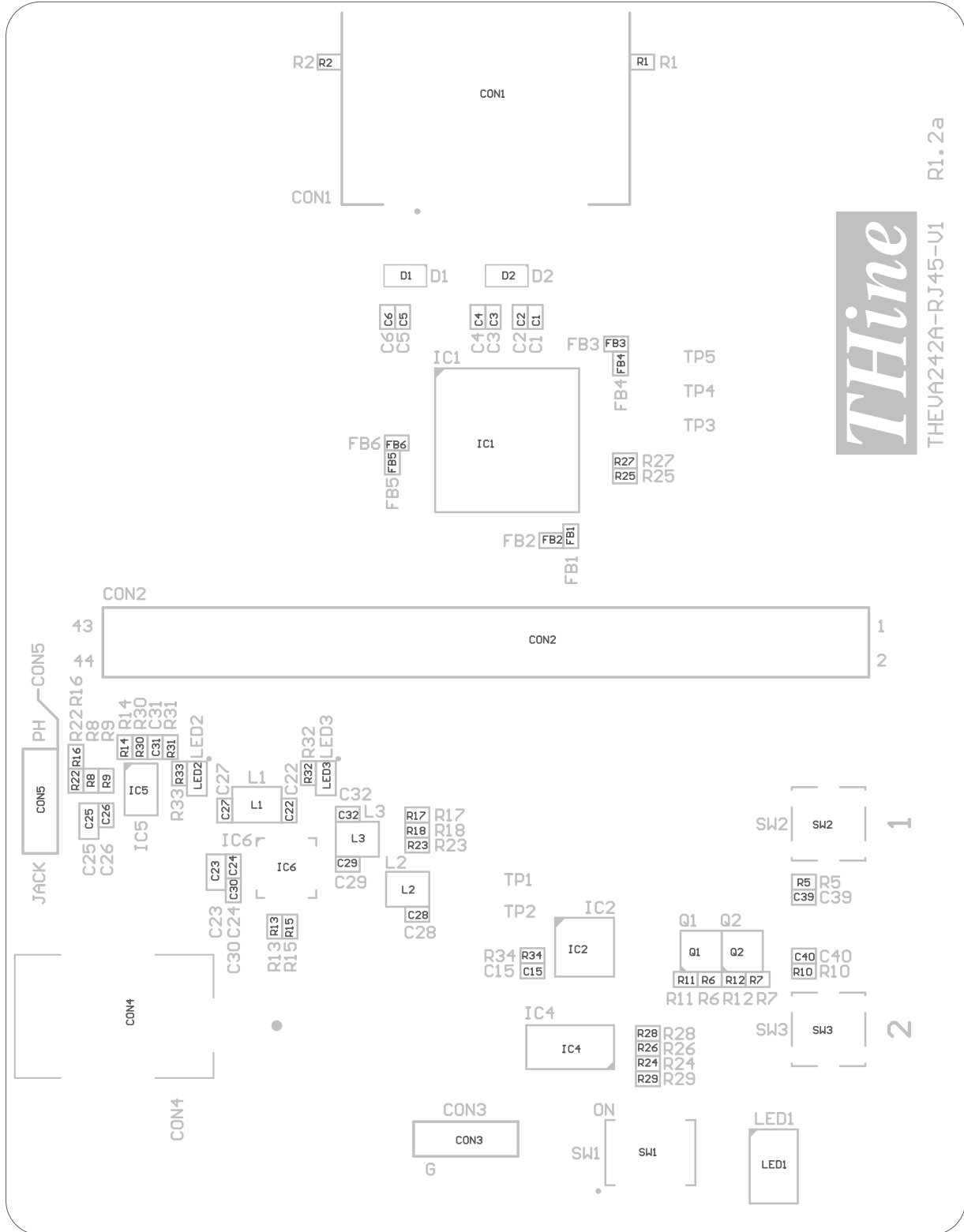
9. THEVA241A-RJ45-V1 Location of parts on PCB(TOP Side)



10. THEVA241A-RJ45-V1 Location of parts on PCB(BOTTOM Side)



11. THEVA242A-RJ45-V1 Location of parts on PCB(TOP Side)



13. THEVA241A-RJ45-V1 Bill of Material

Part Number	Designator	Value	Manufacturer	Description
CL05A225MP5NSNC	C1, C2, C14	2.2u	Samsung Electro-Mechanics	Capacitor
CL05A105KP5NNNC	C3, C6, C9, C18, C20, C23	1u	Samsung Electro-Mechanics	Capacitor
CL05B104KA5NNNC	C4, C5, C7, C8, C10, C12, C19, C21, C22, C24, C25, C26, C27, C28, C29, C30, C31, C32	0.1u	Samsung Electro-Mechanics	Capacitor
CL10A226MO7JZNC	C11	22u	Samsung Electro-Mechanics	Capacitor
CL05A106MP5NUNC	C13, C16, C17	10u	Samsung Electro-Mechanics	Capacitor
CL05B473KO5NNNC	C15	47n	Samsung Electro-Mechanics	Capacitor
DF40HC(4.0)-60DS-0.4V(51)	CON1		Hirose Electric Co Ltd	CONN RCPT 60POS SMD GOLD
1705549-1	CON2		TE Connectivity AMP Connectors	CONN MOD JACK 8P8C SHLD
SESD1004Q4UG-0020-090	D1, D2		Littelfuse Inc.	TVS DIODE 7VWM 9.2VC 1004/10DFN
MPZ1005S600C	FB1, FB2, FB3, FB4, FB5, FB6, FB7	60ohm	TDK Corporation	FerriteBead
ADP172ACBZ-2.9-R7	IC1		Analog Devices Inc.	IC REG LINEAR 2.9V 300MA 4WLCSP
THCV241A-P	IC2		THine Electronics, Inc.	Mipi to V-by-One HS
BD86852MUF-C	IC3		Rohm Semiconductor	PMIC FOR AUTOMOTIVE CAMERA. BD86
TFM201610ALMA1R5MTAA	L1	1.5uH	TDK Corporation	FIXED IND 1.5UH 2.3A 110MOHM SMD
TFM252012ALMA3R3M	L3	3.3uH	TDK Corporation	FIXED IND 3.3UH 2A 140 MOHM SMD
MLZ1005M2R2WT000	L4	2.2uH	TDK Corporation	FIXED IND 2.2UH 350MA 550MOHM SM
RC0402FR-0727KL	R1	27k	Yageo	Resistor
RC0402JR-070RP	R2, R9, R10, R26, R30	0	Yageo	Resistor
RC0402JR-0710KL	R3	10k	Yageo	Resistor
RC0402JR-070RP	R4, R5, R6, R27, R29	0	Yageo	Resistor
RC0402FR-0733RL	R7, R11	33	Yageo	Resistor
RC0402FR-07100KL	R8	100k	Yageo	Resistor
RC0402FR-0730KL	R12	30k	Yageo	Resistor
RC0402JR-073K3L	R13, R23	3.3k	Yageo	Resistor
RC0402JR-073K3L	R14, R16, R17, R18	3.3k	Yageo	Resistor
SIT1604AI-72-18E-37.125000G	Y1	37.125MHz	SiTime	MEMS OSC XO 37.1250MHZ LVCMOS

14. THEVA242A-RJ45-V1 Bill of Material

Part Number	Designator	Manufacturer	Value	Description
CL05B104KA5NNNC	C1, C2, C3, C4, C5, C6, C7,C8, C9, C10, C11, C12,C13,C14,C15, C16, C17, C19, C20, C21, C24,C26	Samsung Electro-Mechanics	0.1u	Capacitor
CL05B473KO5NNNC	C22	Samsung Electro-Mechanics	47n	Capacitor
CL10A226MO7JZNC	C23, C25	Samsung Electro-Mechanics	22u	Capacitor
CL05A106MP5NUNC	C27, C28, C32, C33, C34, C35, C36, C37, C38	Samsung Electro-Mechanics	10u	Capacitor
CL05A225MP5NSNC	C29	Samsung Electro-Mechanics	2.2u	Capacitor
CL05A105KP5NNNC	C30, C39, C40	Samsung Electro-Mechanics	1u	Capacitor
CL05B103KO5NNNC	C31	Samsung Electro-Mechanics	10nF	Capacitor
2178415-1	CON1	TE Connectivity	Cat5e	RJ45 Connector
JTW-2522	CON2	Hirosugi		Pin header
JTS-2503	CON3	Hirosugi		Pin header
PJ-036AH-SMT-TR	CON4	CUI Devices	-	AC Adaptor
JTS-2503	CON5	Hirosugi		Pin header
SESD1004Q4UG-0020-090	D1, D2	Littelfuse Inc.	-	TVS Diode
MPZ1005S600C	FB1, FB2, FB3, FB4, FB5, FB6	TDK Corporation	MPZ1005S600C	Ferrite bead
THCV242A-P	IC1	THine Electronics, Inc.	-	VbyOne HS to MIPI
ATTINY826-MF	IC2	Microchip Technology	ATTINY826-MF	Micro controller
BR24G128FVM-3AGTTR	IC4	Rohm Semiconductor	128kb	EEPROM
SLG59H1128V	IC5	Renesas		Power switch
BD86852MUF-C	IC6	Rohm Semiconductor	-	PMIC
TFM252012ALMA3R3M	L1	TDK Corporation	3.3uH	Inductor
TFM201610ALMA1R5MTAA	L2, L3	TDK Corporation	1.5uH	Inductor
SMTL4-BC	LED1	Bivar		LED
LTST-C191KGKT	LED2, LED3	Lite-On Inc.		LED
DMN2004WK-7	Q1, Q2	Diodes Incorporated	-	NMOSFET
RC0402JR-070RP	R1, R2, R15, R18, R34	Yageo	0	Resistor
RC0402JR-073K3L	R3, R4, R33	Yageo	3.3k	Resistor
RC0402FR-0733KL	R5, R10, R11, R12, R14, R23	Yageo	33k	Resistor
RC0402FR-07330RL	R6	Yageo	330	Resistor
RC0402JR-071KL	R7, R32	Yageo	1k	Resistor
RC0402FR-0718KL	R8	Yageo	18k	Resistor
RC0402JR-0710KL	R9, R25	Yageo	10k	Resistor
RC0402FR-0727KL	R13	Yageo	27k	Resistor
RC0402JR-071ML	R16	Yageo	1.0M	Resistor
RC0402JR-070RP	R17, R27	Yageo	0	Resistor
RC0402FR-07100KL	R19, R20, R21, R24, R26, R28, R29	Yageo	100k	Resistor
RC0402FR-07100KL	R22, R31	Yageo	100k	Resistor
RC0402FR-0784K5L	R30	Yageo	84.5k	Resistor
A6H-4101	SW1	Omron Electronics Inc-EMC Div	-	Switch
EVQ-PLHA15	SW2, SW3	Panasonic Electronic Components	-	Push switch

15. Notices and requests

Please kindly read, understand and accept this “Notices and Requests” before using this product.

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.