High Speed Interface Evaluation Kit

THEVA251-IX-B-V4 User's Guide

THCS251 Evaluation Kit

THine Electronics, Inc.

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Contents

1. Introduction

1.1 Overview

THEVA251-IX-B-V4 is an evaluation board with THCS251 installed. THCS251 is a transceiver IC that aggregates 35-bit I/O and allows full-duplex bidirectional communication between master and slave. THEVA251-IX-B-V4 can be switched between Master and Slave by pin setting of THCS251. A pair of boards set as master and slave can be connected with a LAN cable.

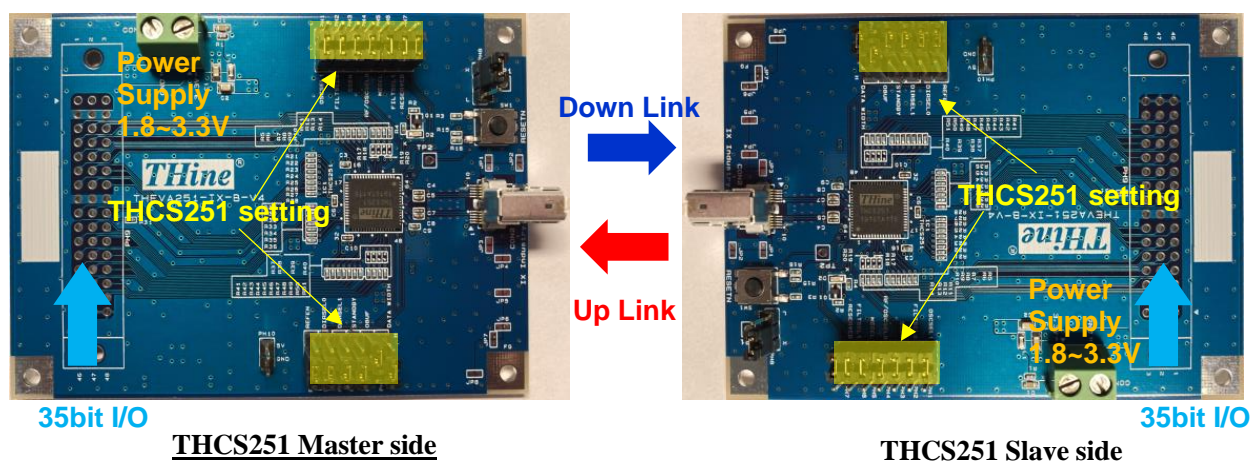48-pin connector for 35bit I/O and LAN cable are not installed or included.

THCS251 Master side   THCS251 Slave side

Figure 1 Top view of THEVA251-IX-B-V4 pair

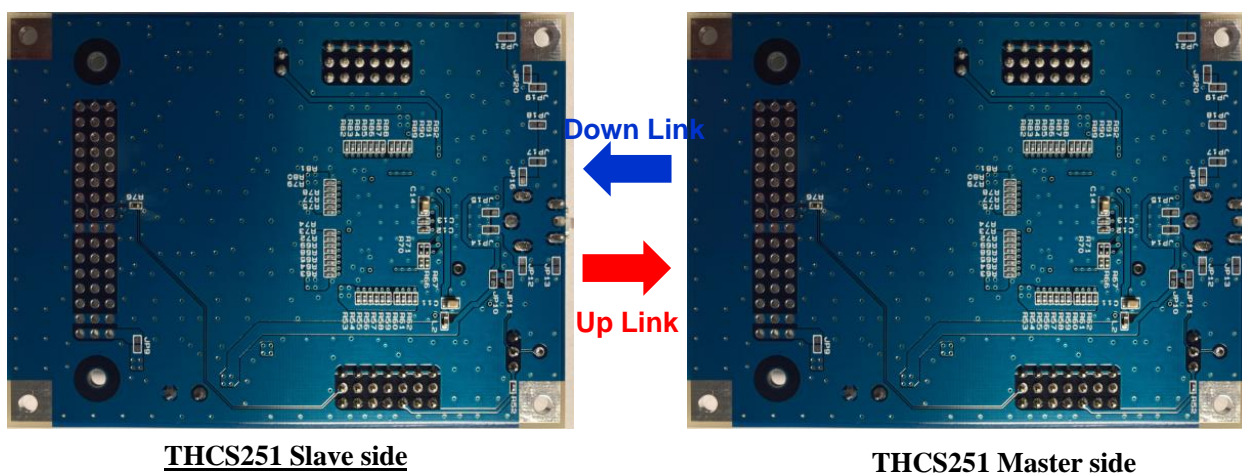THCS251 Slave side   THCS251 Master side

Figure 2 Bottom view of THEVA251-IX-B-V4 pair

This document describes the functions and usage of a pair of boards. If you want to check the operation immediately, see 1.3 Quick Start Guidelines. Communication at a data rate of about 600Mbps is established.

* The LAN cable connector uses the IX61G-B-10P receptacle. Prepare a LAN cable with an IX-B type plug. In addition, a DC power supply and jumper pins are required.

1.2 Contents of evaluation kit

This evaluation kit includes the contents of Table 1.

Product	Article	Quantity
THEVA251-IX-B-V4	THEVA251-IX-B-V4 Board	2

Table 1 THEVA251-IX-B-V4 contents

1.3 Quick start guide

1.3.1 Connect the master and slave boards with jumper pin settings as shown in Figure 3 using LAN cables.

1.3.2 When DC3.3V is supplied to the power supply terminals of both boards, the LED of D1 lights up. The master board THCS251 internal oscillator starts operating at 20MHz and outputs a downlink signal. When this signal is received by THCS251 of the slave board and the internal circuit is locked, an uplink signal is output. When this signal is received by THCS251 of the master board and the internal circuit is locked, communication between the master and slave is established. When communication is established, THCS251 READY = H and D2 LED lights.

1.3.3. In this state, the built-in oscillator 20MHz operates as the sampling clock, and serialization of 30 times is applied when DATAWIDTH = L. Communication is performed at a speed of 600Mbps for both downlink and uplink. *Since this is an internal oscillator of the LSI, the sampling clock and transmission rate may vary up to +/- 20%.
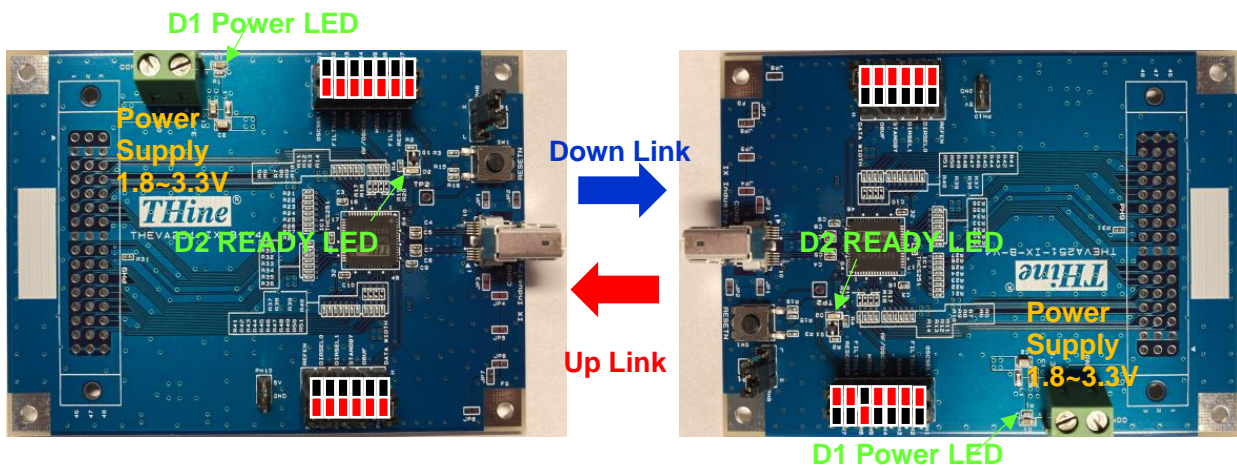

Figure 3 THEVA251-IX-B-V4 Quick start pin setting

2. About each part of the board

2.1 Power Supply

For THEVA251-IX-B-V4, there is a method to supply the desired voltage in the range of 1.7V to 3.6V to the CON1 power terminal block of the master side board and the slave side board. Alternatively, pins 1, 2, and 3 of 48-pin PH9 can be connected to CON1 via JP9 on the bottom of the board, power can be shared from the front and rear circuits via pins 1, 2, and 3 of PH9 is possible.
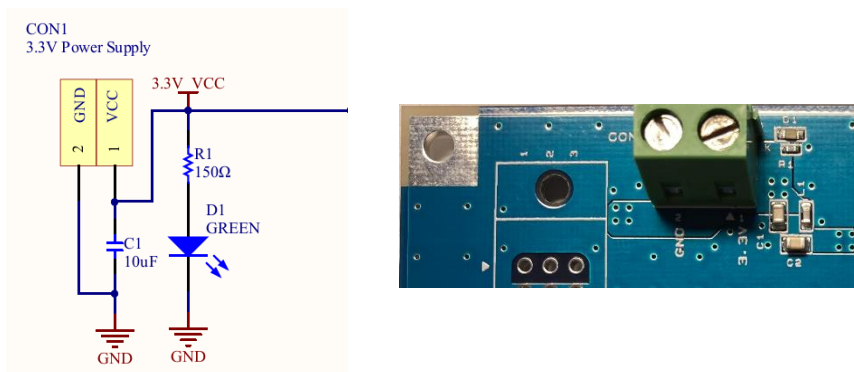

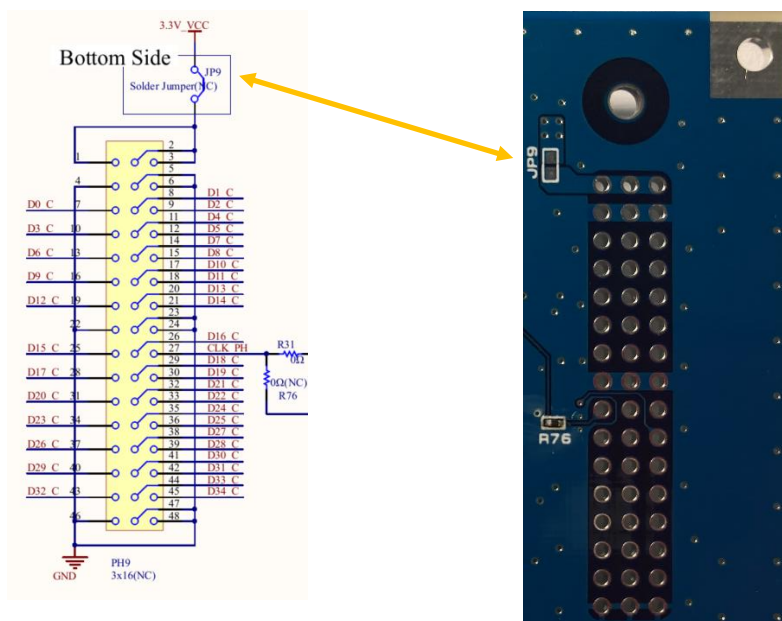**Figure 4 THEVA251-IX-B-V4 Power supply**

Figure 5 THEVA251-IX-B-V4 Power sharing

2.2 Full-duplex high-speed signal connector

The THEVA251-IX-B-V4 high-speed signal inputs and outputs are equipped with IX61G-B-10P receptacles.

IX61G-B-10P TOP　　　　　　　**IX61G-B-10P BOTTOM**

Figure 6 THEVA251-IX-B-V4 High Speed CML I/O connector

2.3 Signal assign of 48pin header
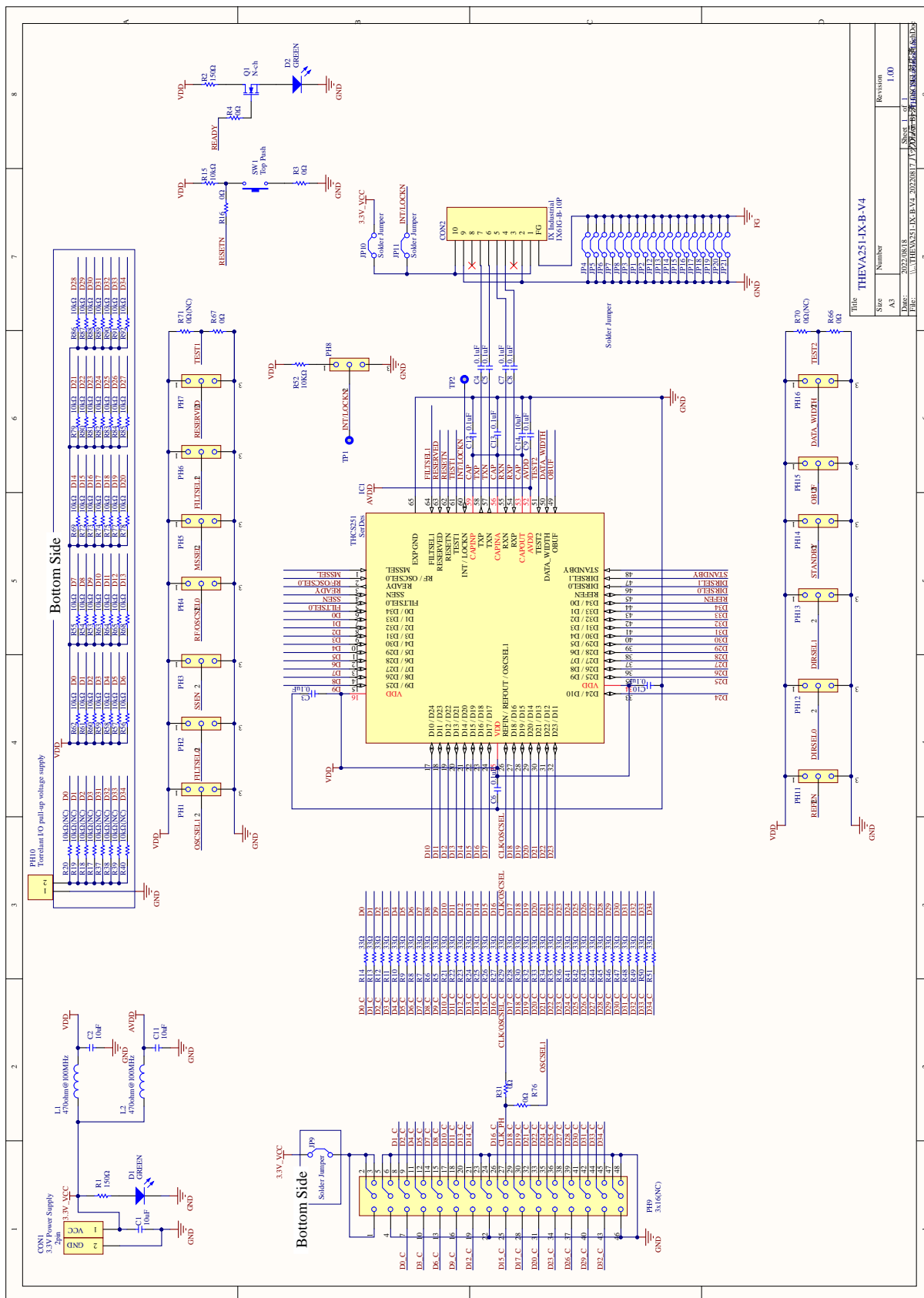
＊PH9 is not mounted.

PH9 48-pin layout has 35 pins for I/O, 1 pin for external REF input (master) / CDR clock output (slave), 3 pins for power supply sharing, and 9 pins for GND. Connect the I/O circuits on the master side and slave side according to the THCS251 mode setting.

Chip Master Side

1	VCC	VCC	VCC	3
4	GND	GND	GND	6
7	D0 / D34	D1 / D33	D2 / D32	9
10	D3 / D31	D4 / D30	D5 / D29	12
13	D6 / D28	D7 / D27	D8 / D26	15
16	D9 / D25	D10 / D24	D11 / D23	18
19	D12 / D22	D13 / D21	D14 / D20	21
22	GND	GND	GND	24
25	D15 / D19	D16 / D18	CLK	27
28	D17 / D17	D18 / D16	D19 / D15	30
31	D20 / D14	D21 / D13	D22 / D12	33
34	D23 / D11	D24 / D10	D25 / D9	36
37	D26 / D8	D27 / D7	D28 / D6	39
40	D29 / D5	D30 / D4	D31 / D3	42
43	D32 / D2	D33 / D1	D34 / D0	45
46	GND	GND	GND	48

Chip Slave Side

48	GND	GND	GND	46
45	D34 / D0	D33 / D1	D32 / D2	43
42	D31 / D3	D30 / D4	D29 / D5	40
39	D28 / D6	D27 / D7	D26 / D8	37
36	D25 / D9	D24 / D10	D23 / D11	34
33	D22 / D12	D21 / D13	D20 / D14	31
30	D19 / D15	D18 / D16	D17 / D17	28
27	CLK	D16 / D18	D15 / D19	25
24	GND	GND	GND	22
21	D14 / D20	D13 / D21	D12 / D22	19
18	D11 / D23	D10 / D24	D9 / D25	16
15	D8 / D26	D7 / D27	D6 / D28	13
12	D5 / D29	D4 / D30	D3 / D31	10
9	D2 / D32	D1 / D33	D0 / D34	7
6	GND	GND	GND	4
3	VCC	VCC	VCC	1

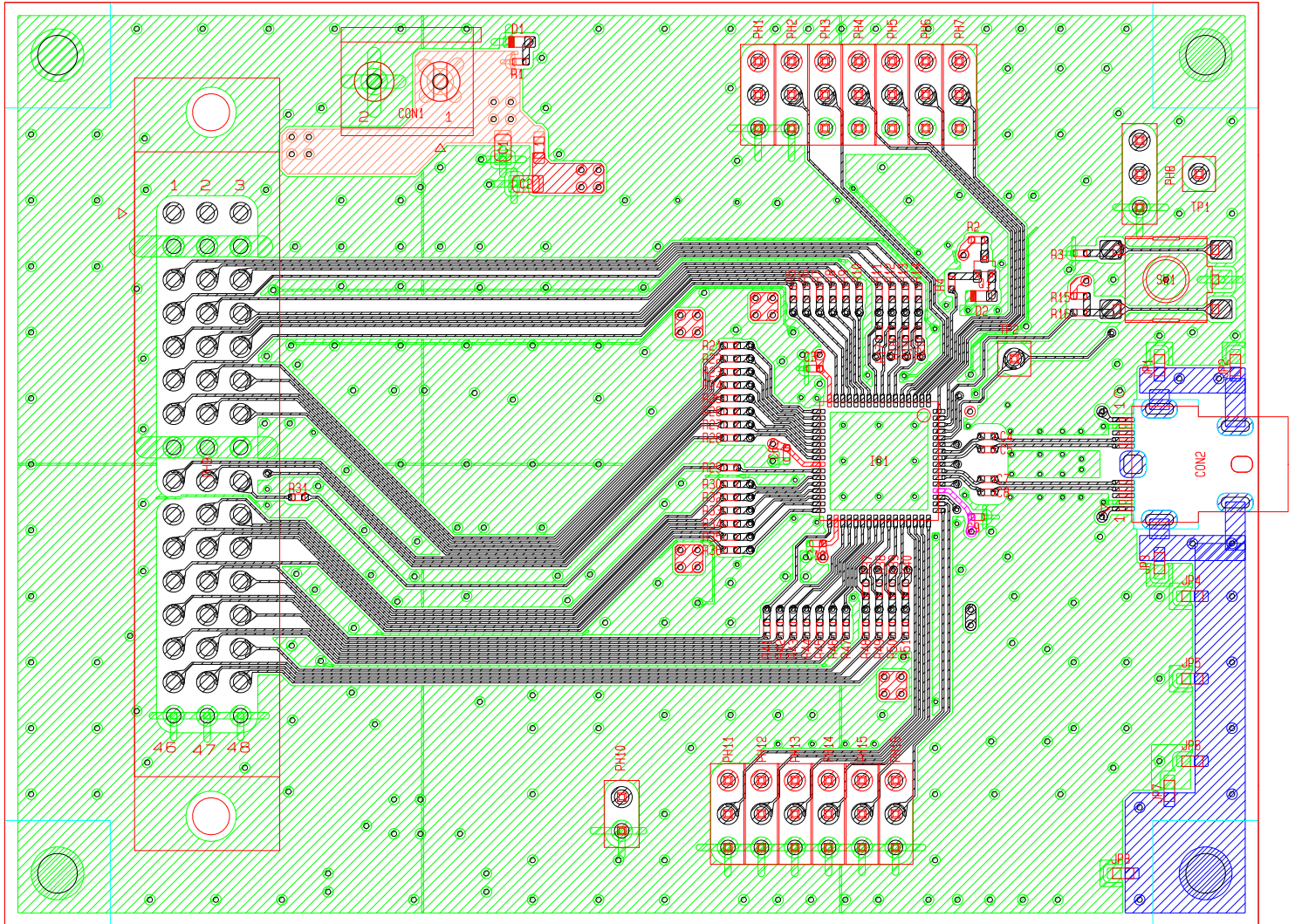**Figure 7 THEVA251-IX-B-V4 Pin header for I/O_PH9**
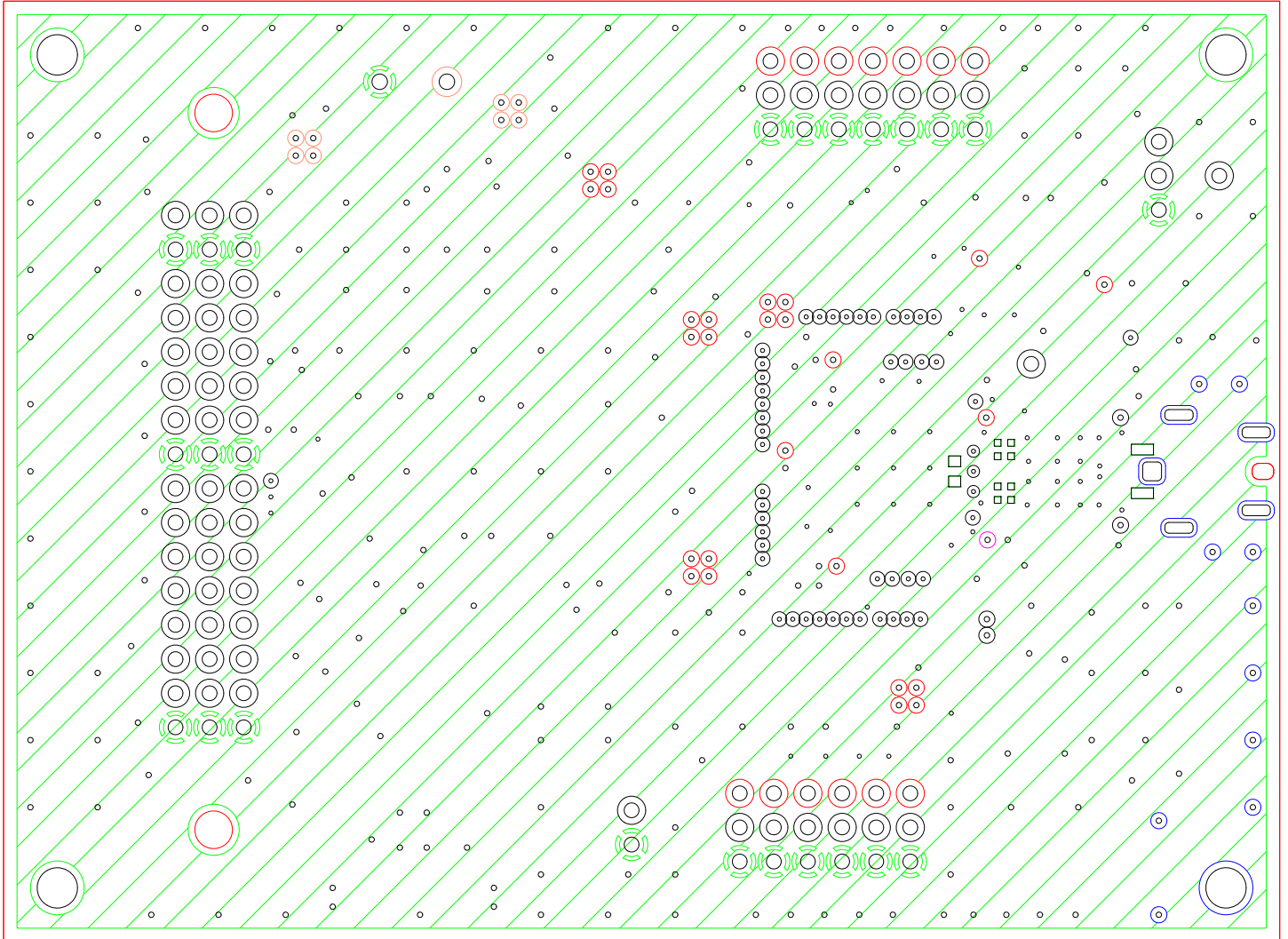
3. Schematic and Layout
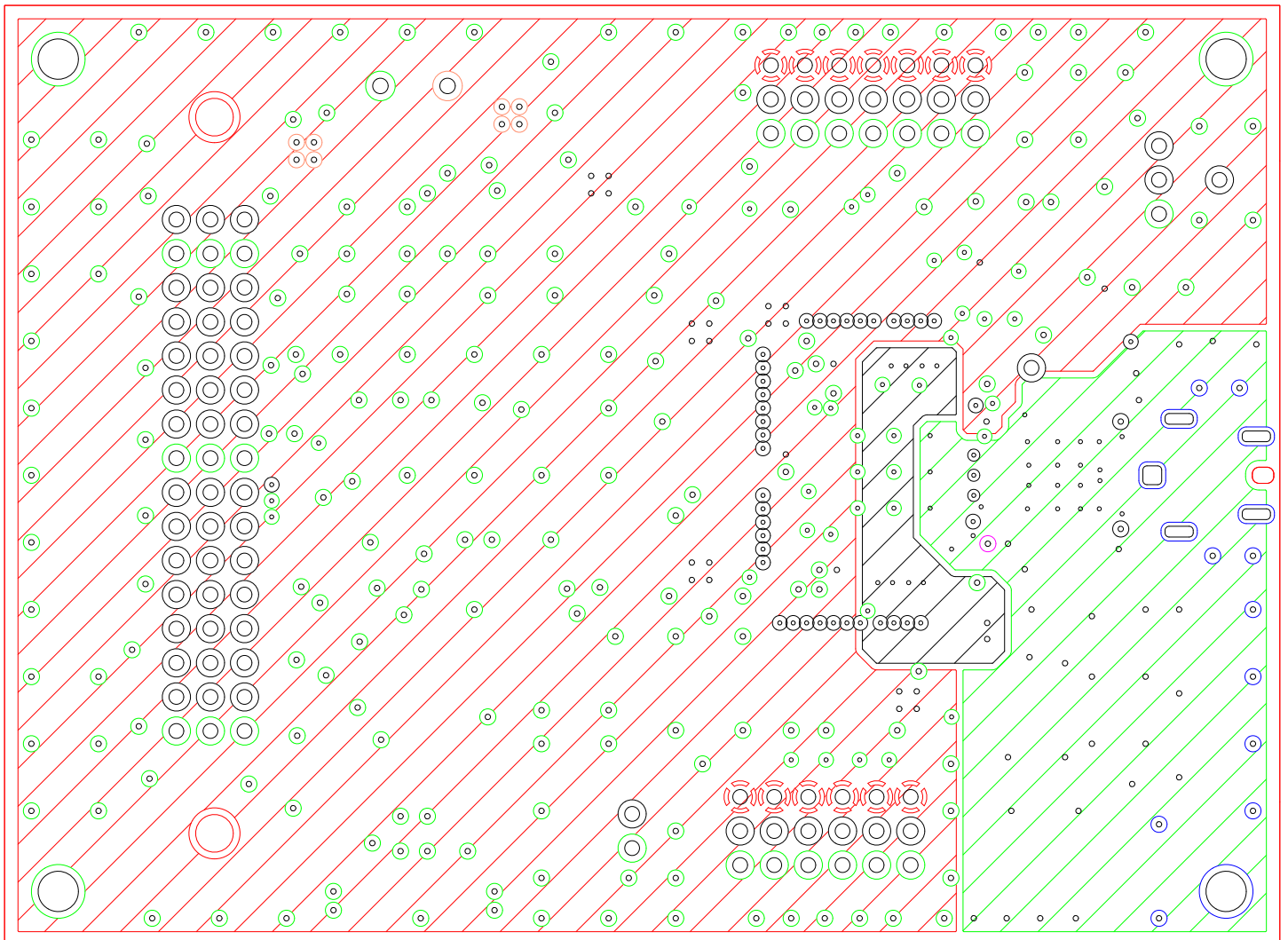
3.1 Circuit diagram.
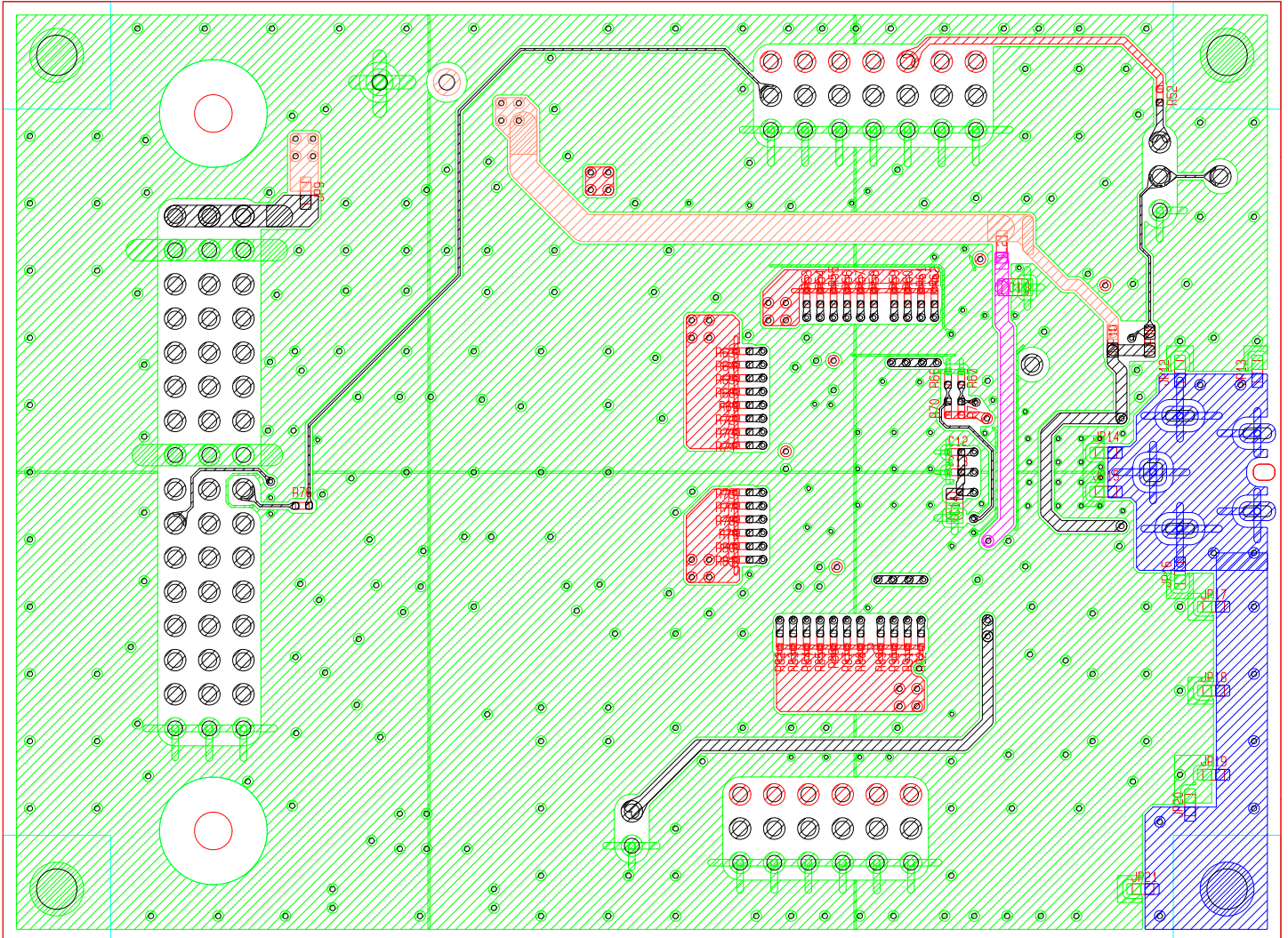
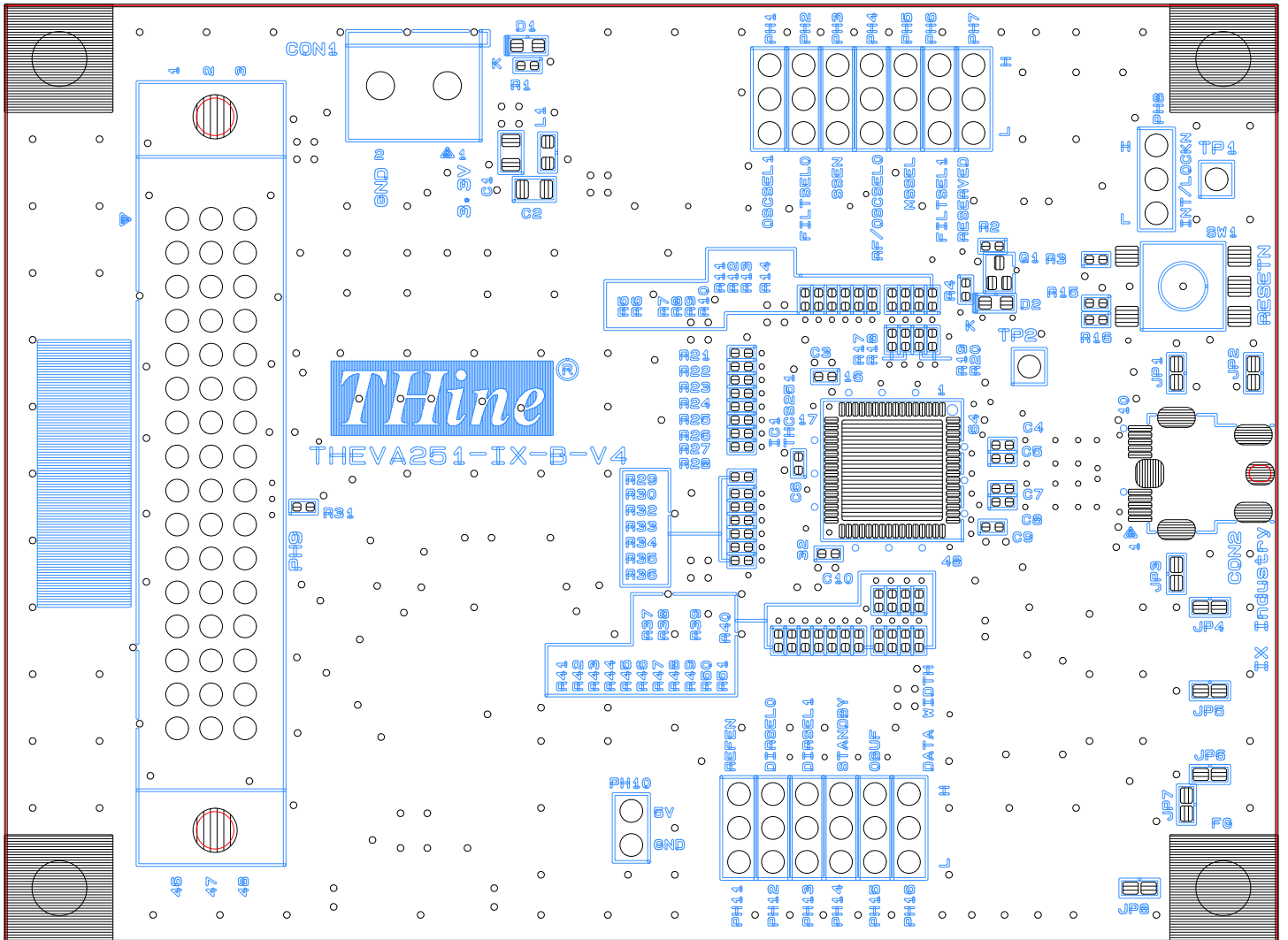## 3.2 Layout

3.2.1 L1(TOP)pattern
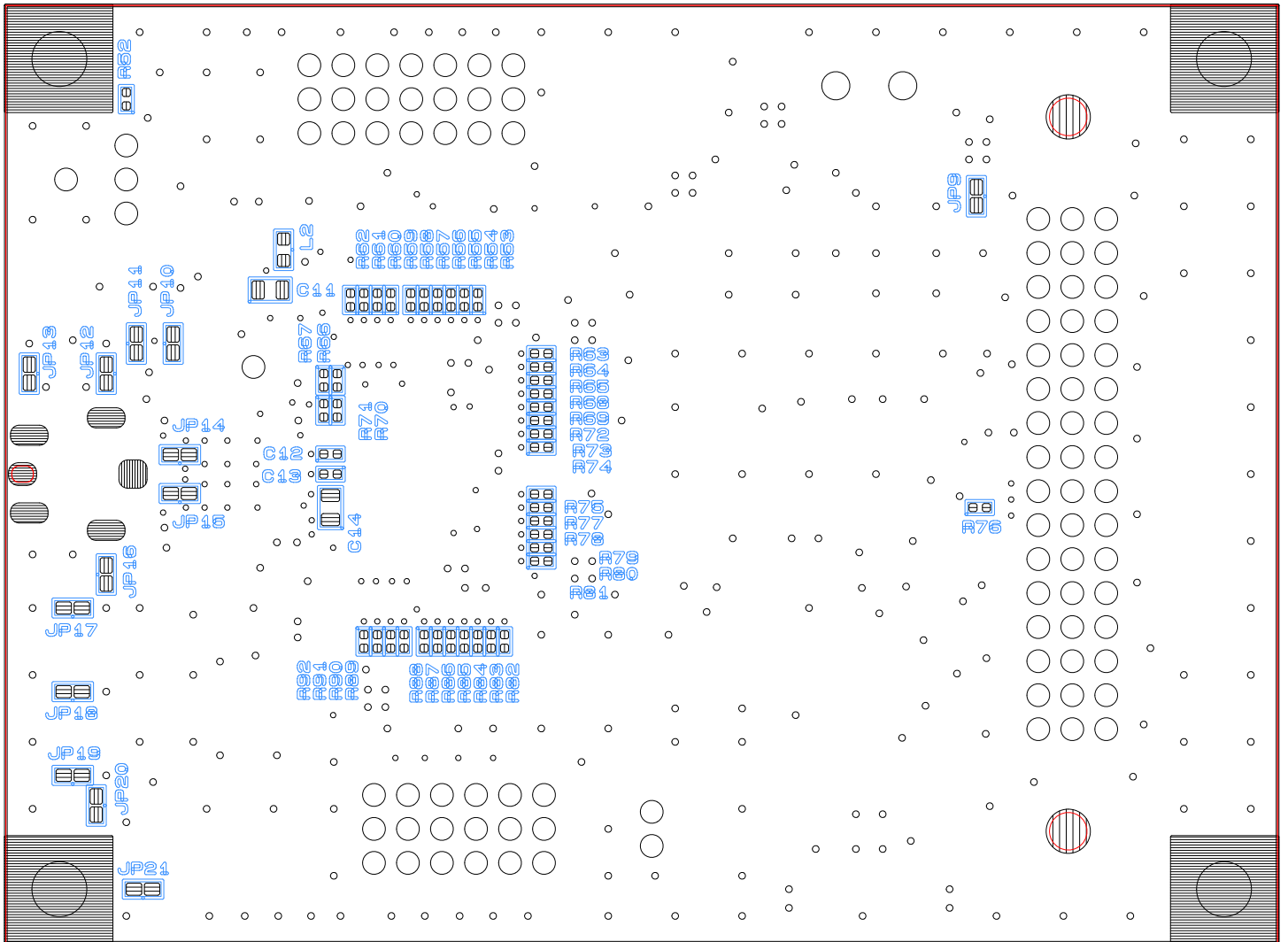
3.2.2 L2 pattern
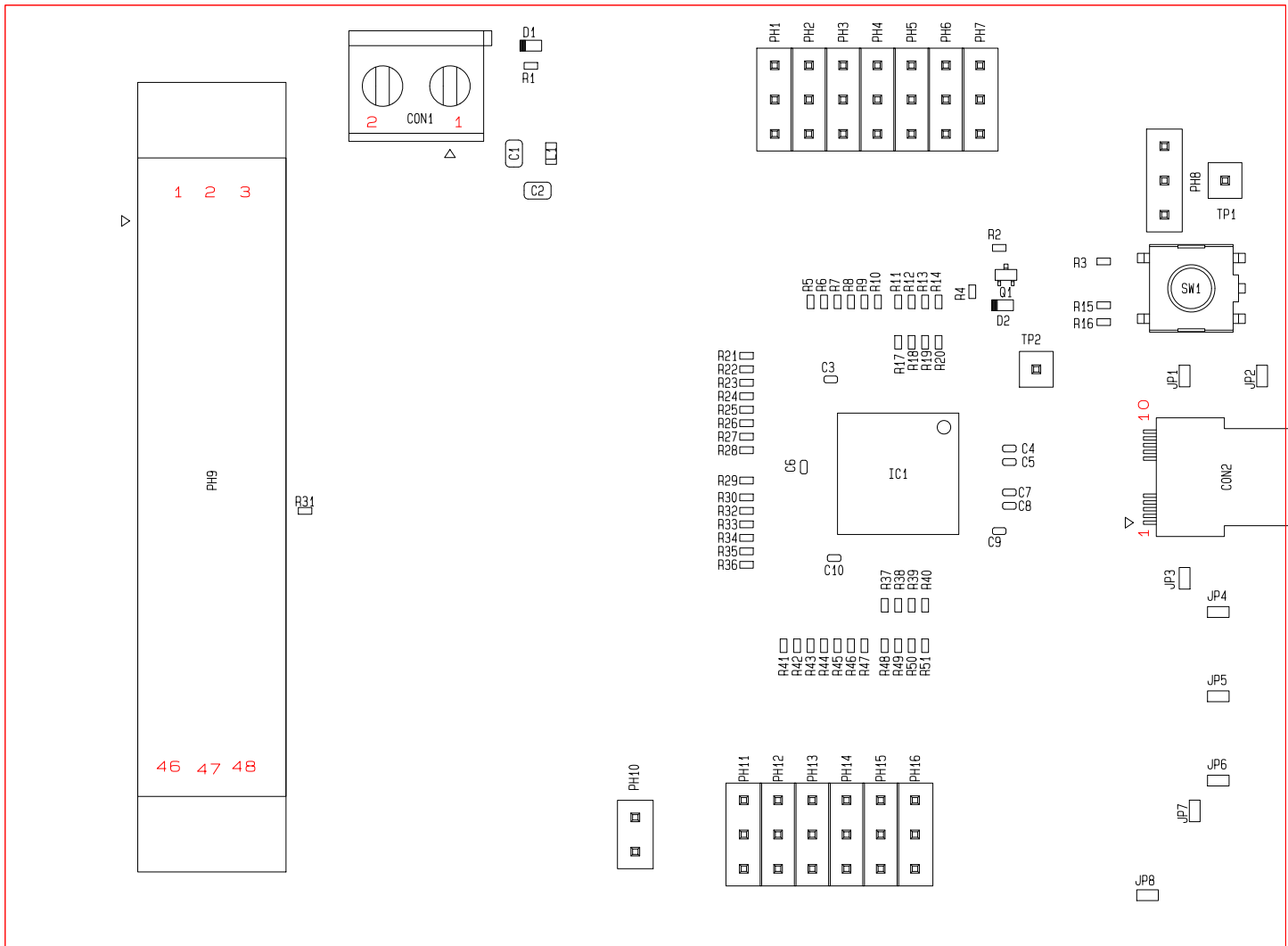
3.2.3 L3 pattern
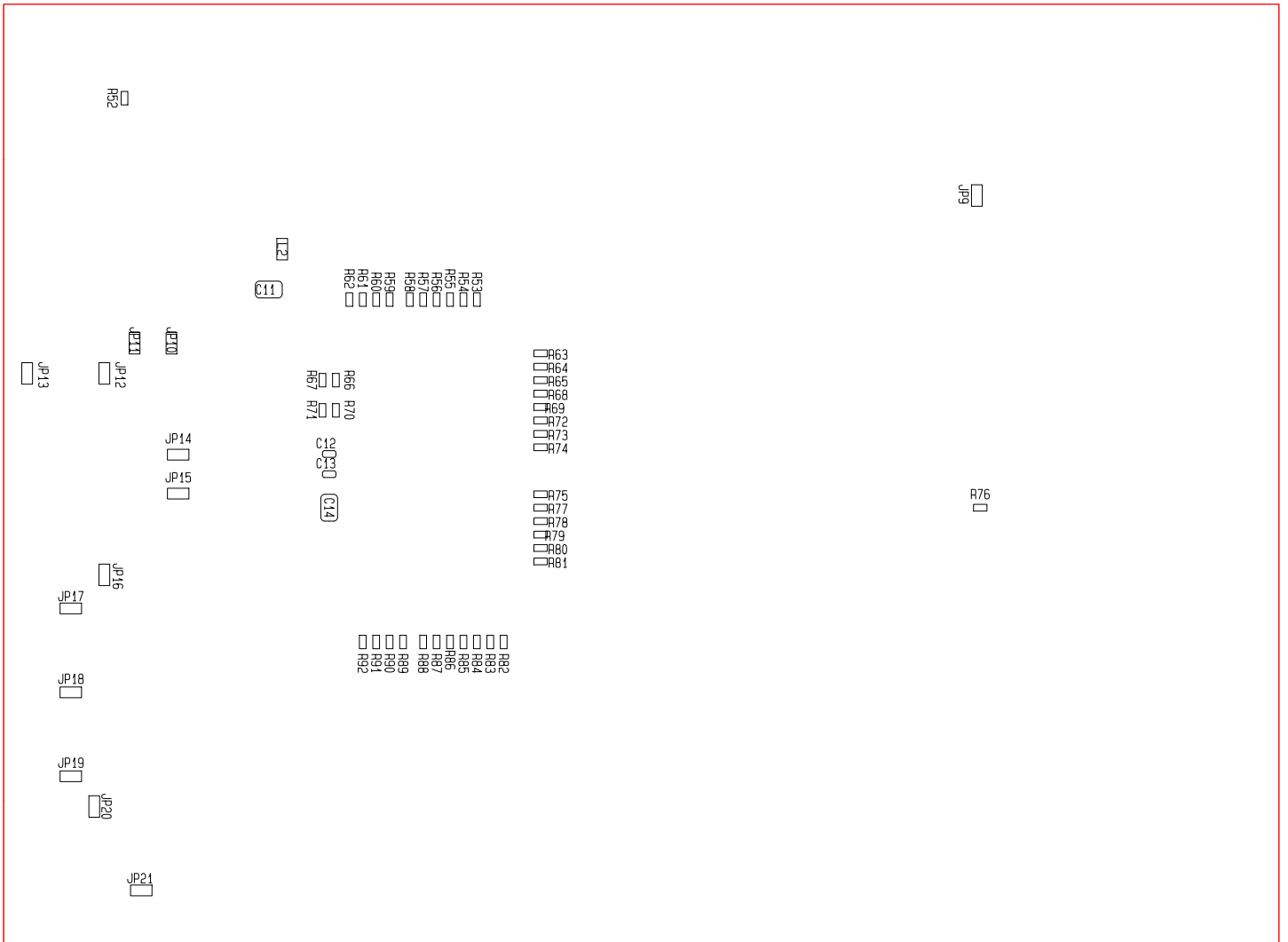
3.2.4 L4 pattern

3.2.5 TOP side silk and resist

3.2.6 BOTTOM side silk and resist

3.2.7 TOP side implementation

3.2.8 BOTTOM side implementation

3.2.9 Dimensions

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4. BOM

Designator	Description	Value	Quantity	P/N
C1, C2, C11, C14	Cap. 2012	10uF	4	GRM21BB31C106KE15L
C3, C4, C5, C6, C7, C8, C9, C10, C12, C13	Cap. 1005	0.1uF	10	GRM155B31E104KA87D
CON1	Terminal_Block	2pin	1	282836-2
CON2	IX Industrial	10pin	1	IX61G-B-10P
D1, D2	LED	GREEN	2	SML-D12P8W
IC1	QFN64	Max. 4Gbps	1	THCS251
JP1, JP2, JP3, JP4, JP5, JP6, JP7, JP8, JP9, JP10, JP11, JP12, JP13, JP14, JP15, JP16, JP17, JP18, JP19, JP20, JP21	Jumper(NC)	Solder Jumper	21	
L1, L2	Coil, 1608	470ohm@100MHz	2	MPZ1608B471ATA00
PH1, PH2, PH3, PH4, PH5, PH6, PH7, PH8, PH11, PH12, PH13, PH14, PH15, PH16	Header 3	1x3	14	TCHM13-70-003S-803R
PH10	Header 2	1x2	1	TCHM13-70-002S-803R
PH9	Header 48	3x16(NC)	1	PCN10-48P-2.54DSA
Q1	MOSFET	N-ch	1	SSM3K16FS
R1, R2	Res. 1005	150Ω	2	RK73H1ETTP1500F
R15, R52, R53, R54, R55, R56, R57, R58, R59, R60, R61, R62, R63, R64, R65, R68, R69, R72, R73, R74, R75, R77, R78, R79, R80, R81, R82, R83, R84, R85, R86, R87, R88, R89, R90, R91, R92	Res. 1005	10kΩ	37	RK73H1ETTP1002F
R17, R18, R19, R20, R37, R38, R39, R40	Res. 1005	10kΩ(NC)	8	RK73H1ETTP1002F
R3, R4, R16, R31, R66, R67, R76	Res. 1005	0Ω	7	RK73Z1ETTP0
R5, R6, R7, R8, R9, R10, R11, R12, R13, R14, R21, R22, R23, R24, R25, R26, R27, R28, R29, R30, R32, R33, R34, R35, R36, R41, R42, R43, R44, R45, R46, R47, R48, R49, R50, R51	Res. 1005	33Ω	36	RK73H1ETTP33R0F
R70, R71	Res. 1005	0Ω(NC)	2	RK73Z1ETTP0
SW1	Push SW	Top Push	1	SKHMQKE010
TP1, TP2	Test Point(NC)	Through hole	2	

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