



# **S5U13U00P00C100 USB 2.0 Adapter Board User Manual**

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# 1 Introduction

This manual describes the setup and operation of the S5U13U00P00C100 USB2.0 Adapter Board. This board was designed as an evaluation interface for connecting Epson LCD Controllers Evaluation Boards to a computer using USB connection.

This user manual is updated as appropriate. Please check the Epson Research and Development Website at [www.erd.epson.com](http://www.erd.epson.com) for the latest revision of this document before beginning any development.

We appreciate your comments on our documentation. Please contact us via email at [documentation@erd.epson.com](mailto:documentation@erd.epson.com).

## 2 Features

The S5U13U00P00C100 USB2.0 Adapter Board includes the following features:

- Header Signals for connecting Epson LCD Controllers Evaluation Boards
- 5V input power (separate power input, not from USB)
- 3.3V power supply available for Epson LCD Controllers Evaluation Boards
- LED power indicator
- Bidirectional voltage translation buffers for the host bus signals, to interface to wide range of host bus voltages

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## 3 Installation

S5U13U00P00C100 board should be connected to the Epson LCD Controllers evaluation board before applying power. To connect the boards, align sockets P1 and P2 on S5U13U00P00C100 board with headers P1 and P2 on the Epson LCD Controllers evaluation board and connect the two boards.

After the boards are connected, 5V power may be connected to S5U13U00P00C100. Once the power is applied, the USB cable from the PC may be connected to S5U13U00P00C100 board.

### 3.1 USB driver

S5U13U00P00C100 USB Adapter board needs the Epson USB driver, S1D13XXXUSB, installed on the host computer.

The driver may be installed prior to connecting the S5U13U00P00C100 board to the USB or at the time of the first connection, when the Windows will detect new hardware and will prompt to install the driver.

#### **Note**

If the board does not work after USB cable is connected, remove the USB cable, remove the power and then connect the power back and reconnect the USB cable.

## 4 Technical Description

### 4.1 Power

S5U13U00P00C100 does not use power from the USB. The boards need an external 5V power supply. The power supply should be able to supply a current up to 2A at 5V.

The external power supply may be connected to PWR1 power jack. This is regular power jack, with a 2.1mm diameter center pin. The positive of the power supply must be on the center terminal.

S5U13U00P00C100 has internal voltage regulator to generate all the internal voltages and also the 3.3V power available for the Epson LCD Controllers evaluation board. The 3.3V power is available on pin 5 of P2 socket.

### 4.2 Host Bus Power

S5U13U00P00C100 has voltage translation buffers for the host bus. The voltage of the host bus may be provided by the Epson LCD Controllers evaluation boards, through pin 11 of connector P1, or it may be provided by the 3.3V voltage regulator on S5U13U00P00C100. The host bus voltage is selected with JP1 jumper.

#### **JP1 - Host Bus Voltage**

JP1 selects the voltage level of the host bus on connectors P1 and P2.

When the jumper is at position 1-2, the voltage level is HIOVDD provided by the Epson LCD Controllers evaluation boards (recommended setting).

When the jumper is at position 2-3, the voltage level is +3.3V.



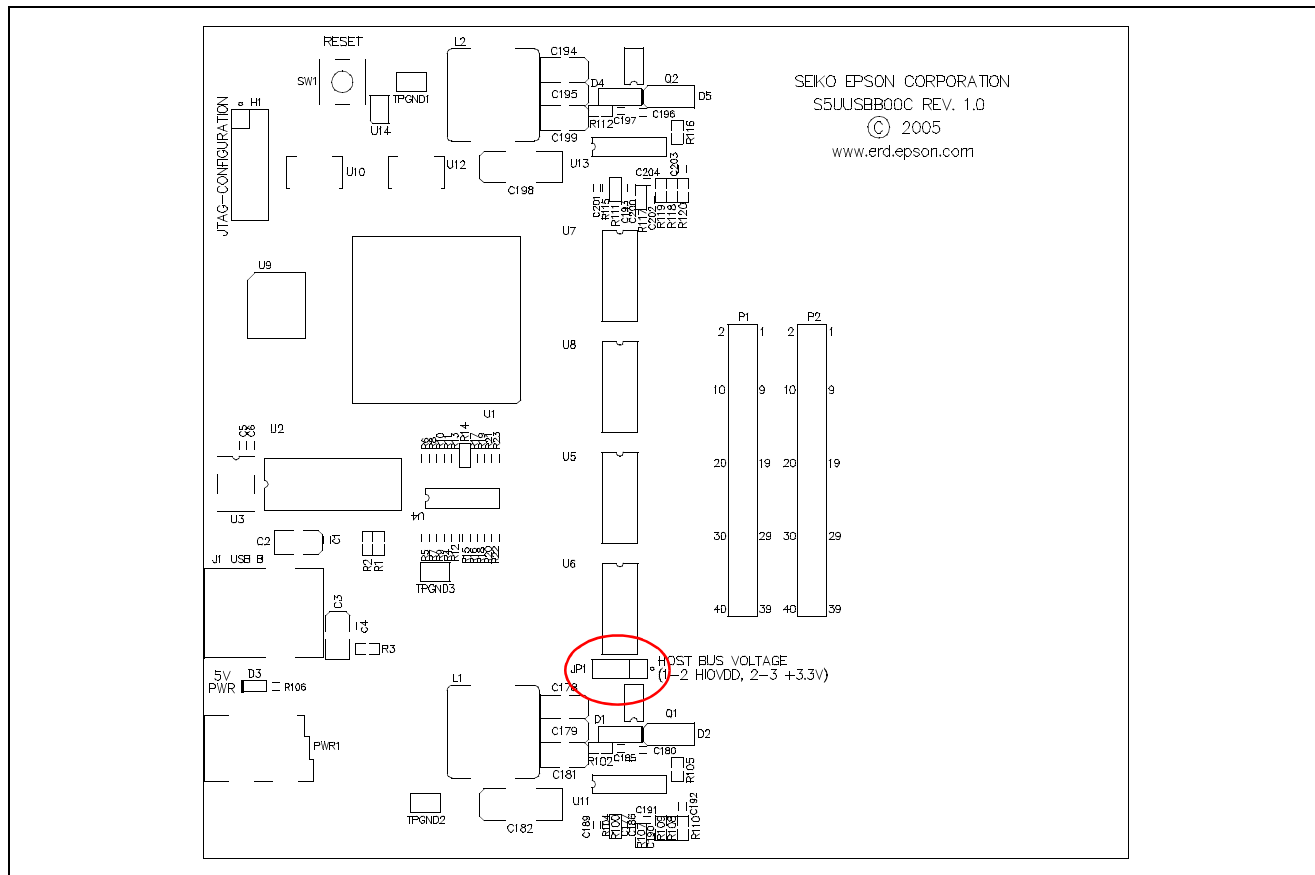


Figure 4-1: Jumper JP1 Location

### 4.3 Status Indicators

S5U13U00P00C100 has a green LED “5V PWR” to indicate when 5V power is present.

The board outputs 2 signals on connector P1 to indicate if the board is working and if the board has completed enumeration on USB. These signals are 3.3 volt, regardless of the host bus voltage selection.

On pin 9 of connector P1 is output the signal ‘Heartbeat’. When the board is working correctly, this is a toggling signal with a frequency around 2Hz. If a LED is used as an indicator, it will be blinking.

On pin 10 of connector P2 is output the signal ‘Enumerated’. This signal goes high when the S5U13U00P00C100 enumerated successfully on the USB. If a LED is used as an indicator, it will turn on upon successful enumeration on the USB.

## 5 Parts List

Table 5-1:

Item	Quantity	Reference	Part	PCB Footprint	Notes
1	59	C1,C4,C5,C7,C8,C9, C10,C11,C12,C13,C28, C32,C33,C36,C37,C40, C41,C44,C45,C48,C49, C52,C53,C56,C57,C60, C61,C102,C103,C104, C105,C106,C107,C108, C109,C110,C111,C157, C158,C159,C160,C161, C162,C163,C164,C165, C166,C172,C173,C174, C175,C176,C180,C185, C186,C196,C197,C200, C205	0.1uF	C0402	Yageo America 04022F104Z7B20D
2	6	C2,C3,C178,C179,C194, C195	10uF 16V T	C3528	Kemet T494B106K016AS
3	65	C6,C14,C15,C16,C17, C18,C19,C20,C29,C30, C31,C34,C35,C38,C39, C42,C43,C46,C47,C50, C51,C54,C55,C58,C59, C82,C83,C84,C85,C86, C87,C88,C89,C90,C91, C92,C93,C94,C95,C96, C97,C98,C99,C100, C101,C137,C138,C139, C140,C141,C142,C143, C144,C145,C146,C147, C148,C149,C150,C151, C152,C153,C154,C155, C156	0.01uF	C0402	Panasonic - ECG PCC103BQCT
4	51	C21,C22,C23,C24,C25, C26,C27,C62,C63,C64, C65,C66,C67,C68,C69, C70,C71,C72,C73,C74, C75,C76,C77,C78,C79, C80,C81,C117,C118, C119,C120,C121,C122, C123,C124,C125,C126, C127,C128,C129,C130, C131,C132,C133,C134, C135,C136,C177,C189, C193,C201	1nF	C0402	Yageo America 04022R102K9B20D
5	10	C112,C113,C114,C115, C116,C167,C168,C169, C170,C171	1uF	C0402	Panasonic - ECG ECJ-0EB0J105M
6	2	C181,C199	4.7uF 10V T	C3528	Kemet T491B475K010AS

Table 5-1:

Item	Quantity	Reference	Part	PCB Footprint	Notes
7	2	C182,C198	470uF 6.3V T	C7343	Kemet T494D477M006AS CAPACITOR TANT 470UF 6.3V SMT
8	4	C183,C184,C187,C188	10uF	C0805	Panasonic - ECG ECJ-CV50J106M
9	2	C190,C202	15nF	C0402	Panasonic - ECG ECJ-0EF1E153Z
10	2	C191,C204	1.5nF	C0402	Yageo America 04022R152K9B20D
11	2	C192,C203	47nF	C0402	Kemet C0402C473K4RACTU
12	2	D1,D4	LL4148	MiniMELF	Diodes Inc. LL4148-13
13	2	D2,D5	STPS2L30A	SMA	STMicroelectronics STPS2L30A
14	1	D3	5V Power	LED0603	Panasonic - SSG LNJ308G8LRA LED GREEN SS TYPE LOW CUR SMD
15	1	H1	HEADER 6X2		
16	1	JP1	Host IO	SIP3	CONN HEADER VERT 3POS .100 TIN or GENERIC
17	1	J1	USB B Receptacle	USB_B	AMP/Tyco 787780-1
18	1	L1	1.6uH	ETQP6F	Panasonic - ECG ETQ-P6F1R6SFA
19	1	L2	1.2uH	ETQP6F	Panasonic - ECG ETQ-P6F1R2HFA
20	1	PWR1	Power Jack	SMT_PJ00 2BSM	CUI Stack Inc. PJ-002A-SMT
21	2	P1,P2	SOCKET_20x2	HDR2X20	Sullins Electronics PPWN102AFCN
22	2	Q1,Q2	IRF8910	SOIC-8	International Rectifier IRF8910
23	4	R1,R2,R107,R117	2.7K	R0603	
24	1	R3	0	R0603	
25	27	R4,R5,R7,R8,R12,R13, R15,R16,R17,R18,R19, R20,R21,R22,R80,R81, R82,R83,R84,R85,R86, R87,R88,R96,R97,R98, R99	0	R0402	

Table 5-1:

Item	Quantity	Reference	Part	PCB Footprint	Notes
26	64	R6,R9,R10,R11,R23, R24,R25,R26,R27,R28, R29,R30,R31,R32,R33, R34,R35,R36,R37,R38, R39,R40,R41,R42,R44, R45,R46,R47,R48,R49, R50,R51,R52,R53,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, R90,R94,R104,R115	NP	R0402	
27	1	R14	33	R0603	
28	12	R43,R89,R91,R92,R93, R95,R105,R108,R110, R116,R118,R120	4.75K, 1%	R0603	
29	2	R100,R111	510	R0603	
30	4	R101,R103,R113,R114	2.2	R0603	
31	2	R102,R112	10	R0603	
32	1	R106	560	R0402	
33	1	R109	1.78K, 1%	R0603	
34	1	R119	14.3K, 1%	R0603	
35	1	SH1	.100 in. Jumper Shunt		Sullins Electronics Corp. STC02SYAN JUMPER SHORTING TIN
36	1	SW1	SW TACT- SPST	SW_EVQQ W	ITT Industries KSC241J SWITCH TACT SILVER PLT J-TYPE
37	3	TPGND1,TPGND2,TPG ND3	TP_SMT	TP_1206	Keystone 5015 PC TEST POINT MINIATURE SMT
38	1	U1	XC3S1500- 4FG456C	FG456	Xilinx XC3S1500-4FG456C BG456 package; Insight/Memec
39	1	U2	CY7C68001- 56PVC	CY7C6800 1SSOP56	Cypress CY7C68001-56PVXC Cypress direct
40	1	U3	24MHz	CB3_OSC	CTS CB3LV-3C-24M0000-T
41	1	U4	ICS525-01	SSOP_28_ N	Intergrated Circuit Systems ICS525-01RI Insight, All-American, Nu Horizons
42	4	U5,U6,U7,U8	74AVCB164245		TI SN74AVCB164245GR

*Table 5-1:*

Item	Quantity	Reference	Part	PCB Footprint	Notes
43	1	U9	XCF08P	FS48	Xilinx XCF08PFS48C Insight/Memec
44	1	U10	MIC37100-1.8BS	SOT-223	Micrel MIC37100-1.8BS Micrel direct
45	2	U11,U13	L6910	SO-16	STMicroelectronics L6910TR
46	1	U12	MIC37100-2.5BS	SOT-223	Micrel MIC37100-2.5BS Micrel direct
47	1	U14	TPS3801K33D CKR	SOT323-5	Texas Instruments TPS3801K33DCKR IC 2.93V SUPPLY MON SOT-323-5

# 6 Schematics

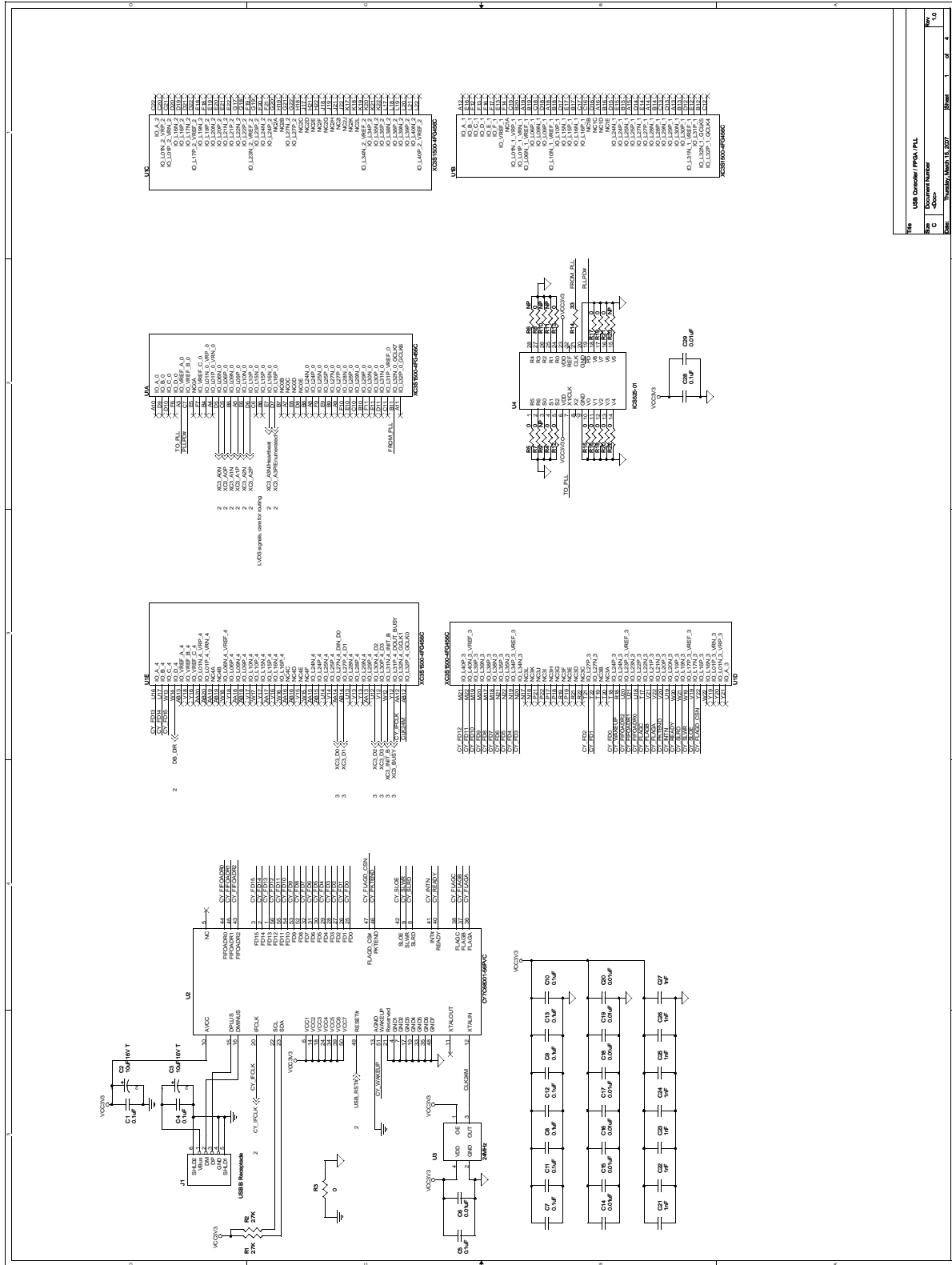


Figure 6-1: SID13U00P00C100 Schematics (1 of 4)

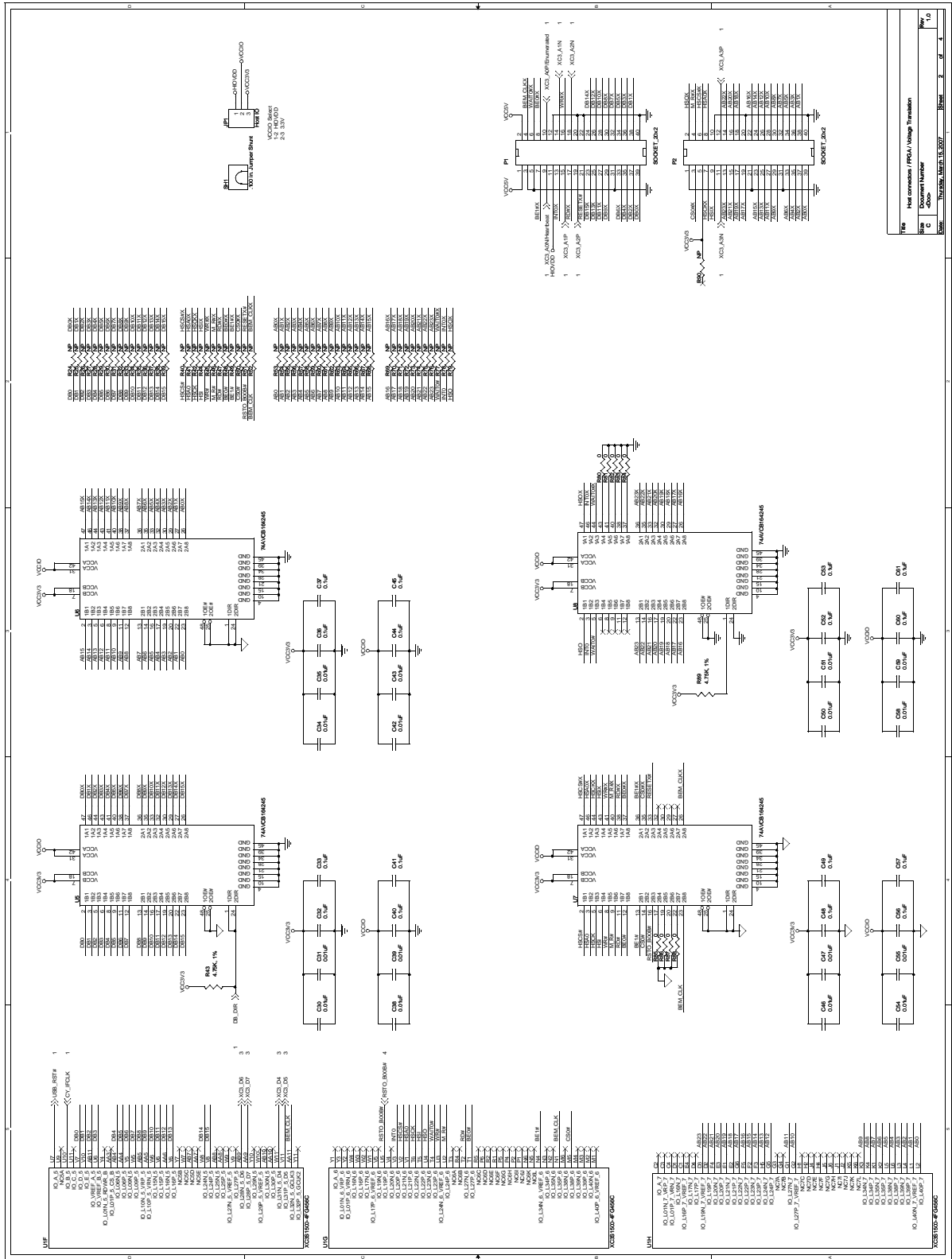


Figure 6-2: SID13U00P00C100 Schematics (2 of 4)

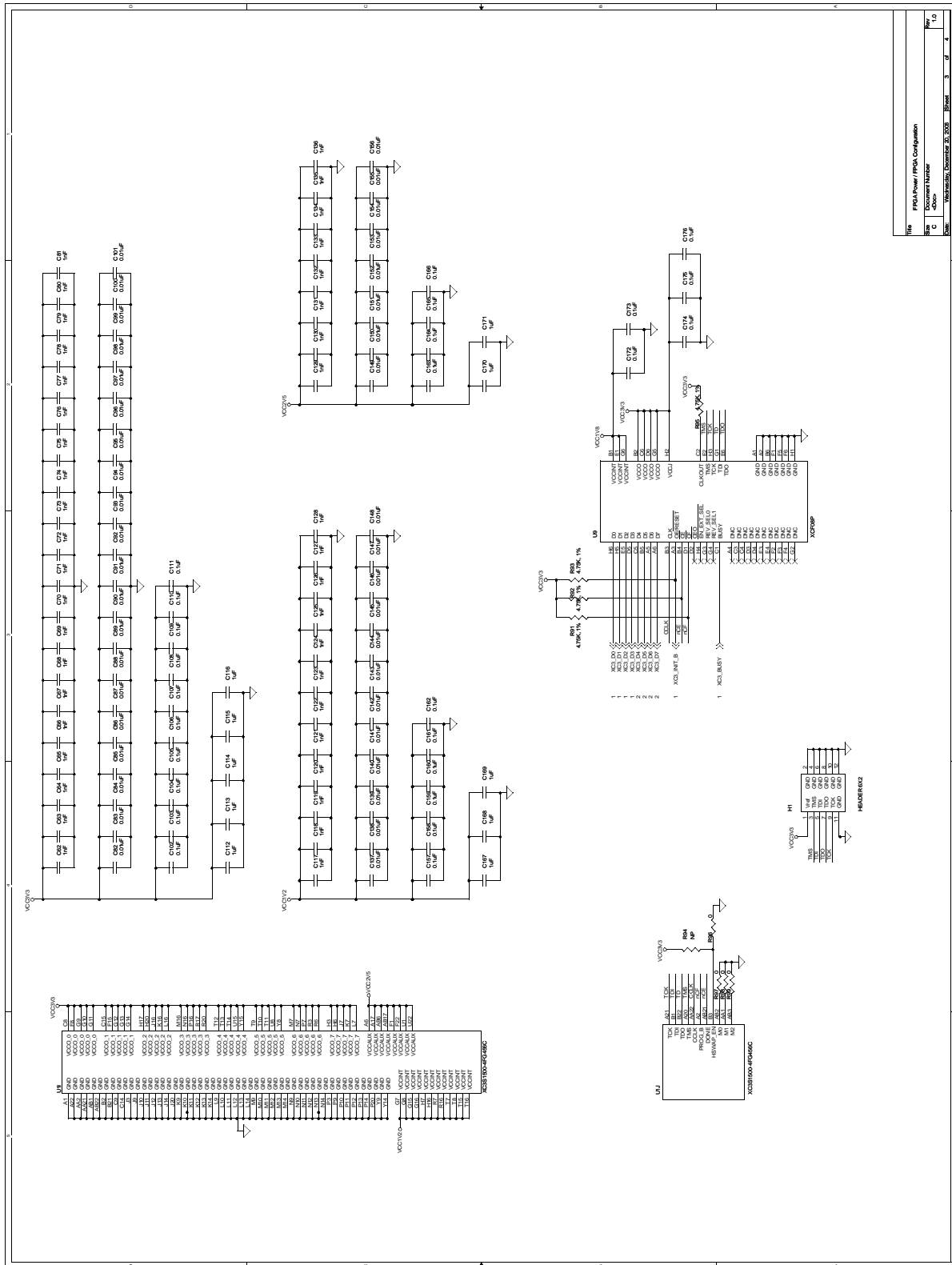


Figure 6-3: SID13U00P00C100 Schematics (3 of 4)



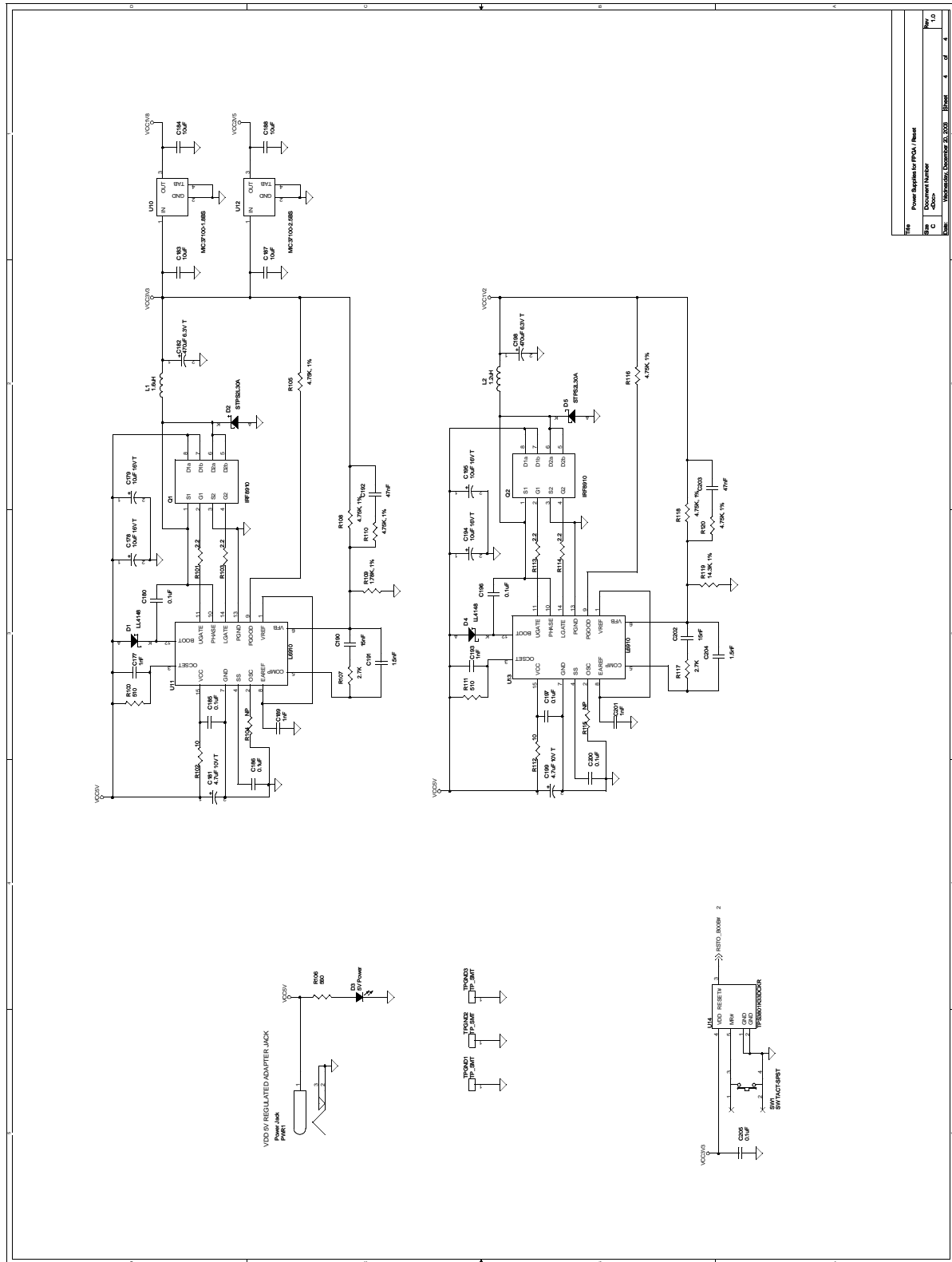


Figure 6-4: S1D13U00P00C100 Schematics (4 of 4)

# 7 PCB Layout

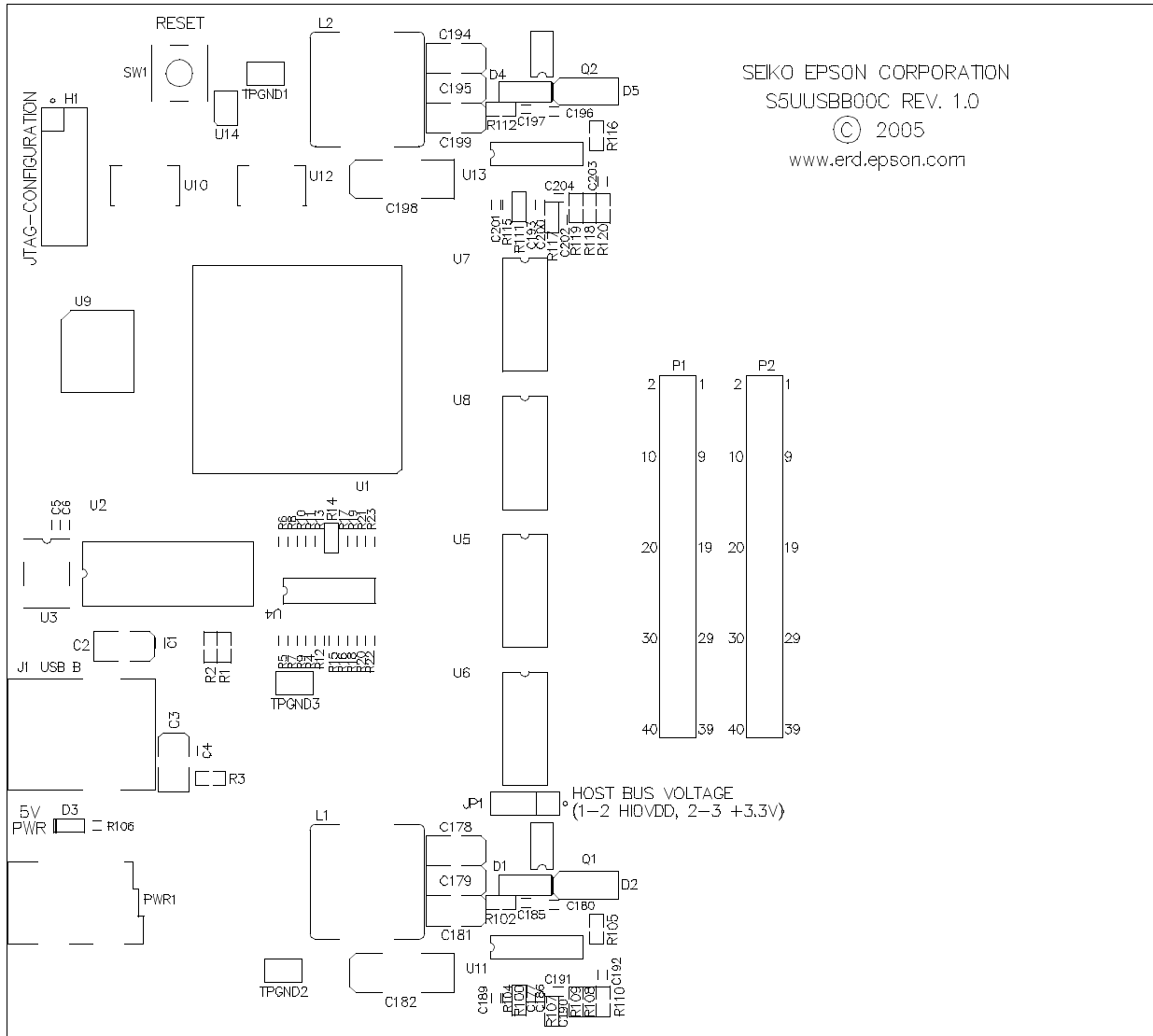


Figure 7-1: S5U13U00P00C100 PCB Layout (Top)

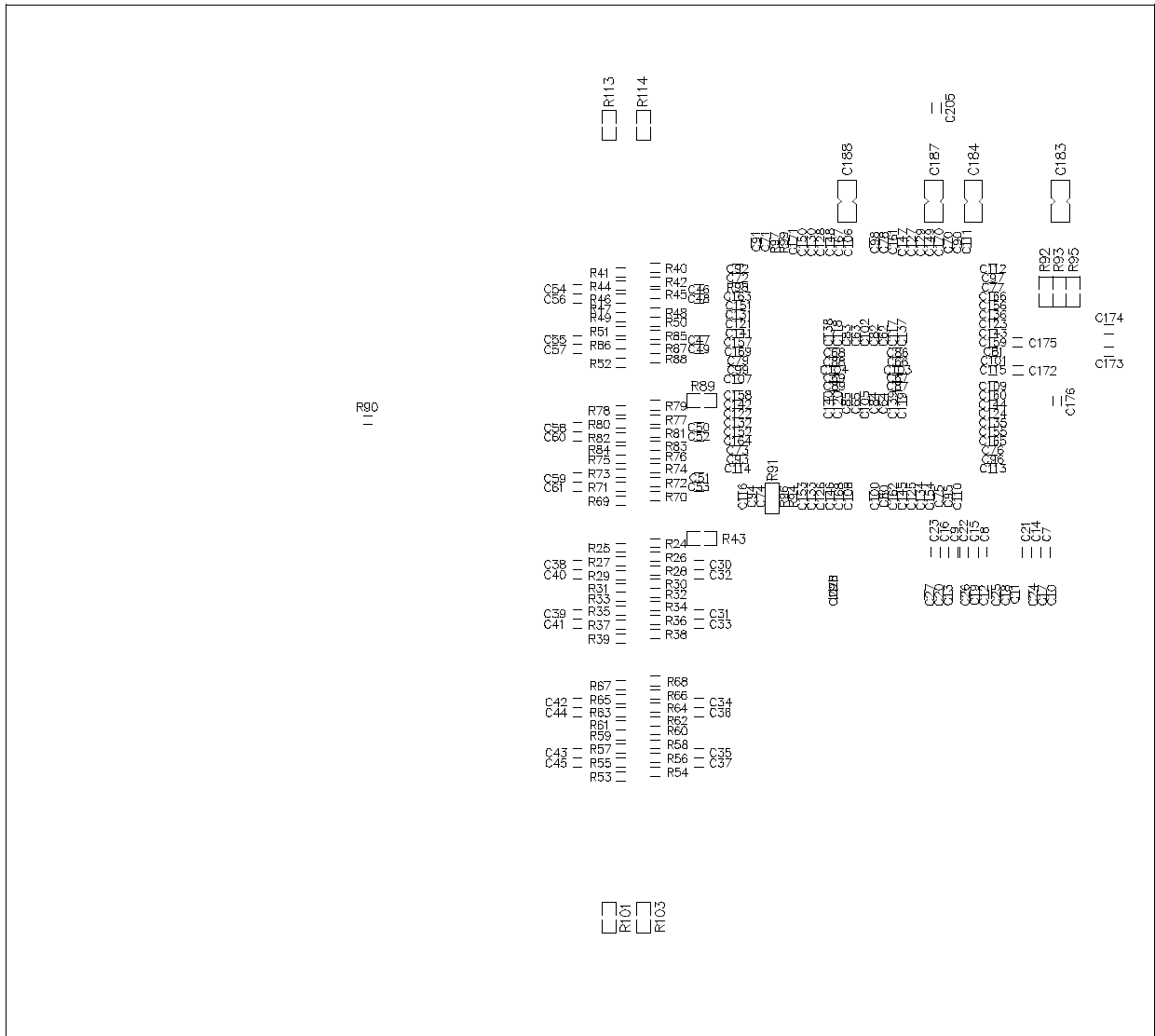


Figure 7-2: S1D13U00P00C100 PCB Layout (Bottom)

## 8 Sales and Technical Support

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### 8.1 Ordering Information

To order the S5U13U00P00C100 Evaluation Board, contact the Epson sales representative in your area and order part number **S5U13U00P00C100**.

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# Change Record

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