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SDP-S Controller Board

FEATURES

USB-to-serial engine
Peripherals exposed
  SPI
  TWI/I²C
  GPIO
USB 2.0 PC connectivity
PC software stack and base firmware provided

GENERAL DESCRIPTION

This user guide describes the EVAL-SDP-CS1Z system demonstration platform-serial (SDP-S) controller board from Analog Devices, Inc. The SDP-S controller board is part of the Analog Devices system demonstration platform (SDP). The SDP consists of a series of controller boards, interposer boards, and daughter boards. SDP controller boards provide a means of communicating with the system under evaluation from the PC. Interposer boards route signals between two connectors. Daughter boards are a collection of product evaluation boards and Circuits from the Lab™ reference circuit boards. The SDP-S is used as part of the evaluation system for many Analog Devices components and reference circuits. The primary audience for this user guide is the system engineer who seeks to understand how to set up the SDP-S board and begin USB communications to the PC.

The SDP-S board is designed to be used in conjunction with various Analog Devices component evaluation boards and Circuits from the Lab reference circuits as part of a customer evaluation environment. The SDP-S provides USB connectivity through a USB 2.0 high speed connection to the computer, allowing users to evaluate components on this platform from a PC application. The SDP-S is based on a USB-to-serial engine, which has SPI, I²C, and GPIO lines available, with a 120-pin small footprint connector.

This user guide provides instructions for installing the SDP-S hardware (EVAL-SDP-CS1Z board) and software onto a computer. The necessary installation files are provided with the evaluation daughter board package. The Getting Started section provides software and hardware installation procedures, PC system requirements, and basic board information. The Evaluation Board Hardware section provides information on the EVAL-SDP-CS1Z components. The EVAL-SDP-CS1Z schematics are provided in the Evaluation Board Schematics section.

For more information about the SDP-S board, go to www.analog.com/sdp.

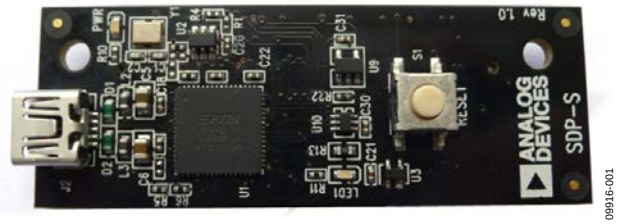

Figure 1. Picture of EVAL-SDP-CS1Z

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REVISION HISTORY

8/11—Rev. 0 to Rev. A

Removed SDRAM Memory from Features Section 1
Removed SDRAM Memory from Product Overview Section ... 3

7/11—Revision 0: Initial Version

PRODUCT OVERVIEW

The SDP-S board includes the following:

- USB-to-serial engine
- 1 × 120-pin small footprint connector
  - Hirose FX8-120P-SV1(91), 120-pin header
- Peripherals exposed
  - SPI
  - TWI/I²C
  - GPIO

PACKAGE CONTENTS

The EVAL-SDP-CS1Z board package contains the following:

- EVAL-SDP-CS1Z board
- 1 m USB Standard-A-to Mini-B-cable

Contact the vendor where the SDP-S board was purchased, or contact Analog Devices if anything is missing.

TECHNICAL OR CUSTOMER SUPPORT

Analog Devices customer support can be reached in the following ways:

- Visit the SDP homepage at www.analog.com/sdp
- Email processor questions to psa.support@analog.com
- Visit the Analog Devices Wiki page at www.wiki.analog.com/sdp
- Visit the EngineerZone for community technical support at ez.analog.com.
- Phone questions to 1-800-ANALOGD
- Contact your Analog Devices local sales office or authorized distributor.
- Send questions by mail to
  Analog Devices, Inc.
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ANALOG DEVICES WEB SITE

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Visit MyAnalog.com to sign up. If you are a registered user, simply log on. Your user name is your email address.

GETTING STARTED

This section provides specific information to assist with using the SDP-S board as part of the user's evaluation system.

The following topics are covered:

- PC configuration
- USB installation
- Powering up/powering down the SDP-S

PC CONFIGURATION

For correct operation of the SDP board, the user's computer must have the following minimum configuration:

- Windows XP Service Pack 2 or Windows Vista®
- USB 2.0 port

When removing the SDP-S board from the package, handle the board carefully to avoid the discharge of static electricity, which can damage some components.

USB INSTALLATION

Perform the following tasks to safely install the SDP-S board onto the computer. There are two stages in the software application installation procedure. The first stage installs the application software. The second stage installs the .NET Framework 3.5 and the necessary drivers.

Installing the Software

1. Run the application installation file provided. The first stage installs the application GUI and the necessary support files onto the computer.
2. Immediately following the application installation, the .NET Framework 3.5 and the driver package for the SDP board are installed. If the .NET Framework 3.5 is already preinstalled on the computer, this stage is skipped and Step 2 consists of a driver package installation only.

Connecting the SDP-S Board to the PC

Attach the SDP-S board to a USB 2.0 port on the computer via the Standard-A-to-Mini-B cable provided.

Verifying Driver Installation

Before using the SDP-S board, verify the driver software has installed properly.

Open the Windows Device Manager and verify the SDP-S board appears under **ADI Development Tools**, as shown in Figure 2.

Figure 2. Device Manager

POWERING UP/POWERING DOWN THE SDP-S

The following sections describe how to safely power up and power down the SDP-S.

Powering Up the SDP-S Board

1. Connect the SDP-S board to the daughter evaluation board through the 120-pin mating connector.
2. Power up the daughter board.
3. Connect the USB port on the computer to the SDP-S board.

Powering Down the SDP-S Board

1. Disconnect the USB port on the computer from the SDP-S board.
2. Power down the daughter evaluation board.
3. Disconnect the SDP-S board from the daughter evaluation board.

EVALUATION BOARD HARDWARE

This section describes the hardware design of the EVAL-SDP-CS1Z board.

The following topics are covered:

- LEDs—This section describes the SDP-S on-board LEDs.
- Connector details—This section details the pin assignments on the 120-pin connector.
- Power—This section lists power requirements of the SDP-S and identifies connector power inputs and output pins.
- Daughter board design guidelines—This section provides guidelines on how to design daughter boards for use with the SDP-S.
- Mechanical specifications—This section provides dimensional information.

LEDS

There are two LEDs located on the SDP-S board (see Figure 3).

Power LED (PWR)

The green power LED indicates that the SDP-S board is powered. This is not an indication of USB connectivity between the SDP-S and the PC.

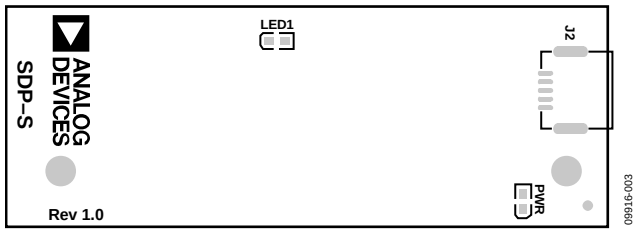


Figure 3. SDP-S Board LEDs

LED1

The orange LED is an LED used as a diagnostic tool for evaluation application developers.

CONNECTOR DETAILS

The SDP-S board contains one Hirose FX8-120P-SV1(91), 120-pin header connector. Through this connector, the peripheral communication interfaces of the USB-to-serial engine are exposed. The exposed peripherals are

- SPI
- I^2C/TWI
- GPIO

Also included on the connector specification are input and output power pins, ground pins, and pins reserved for future use.

Connector Pin Assignments

Table 1 lists the connector pins and identifies the functionality assigned to each connector pin on the SDP-S board.

The pinout of this connector is consistent with other connectors across the SDP family.

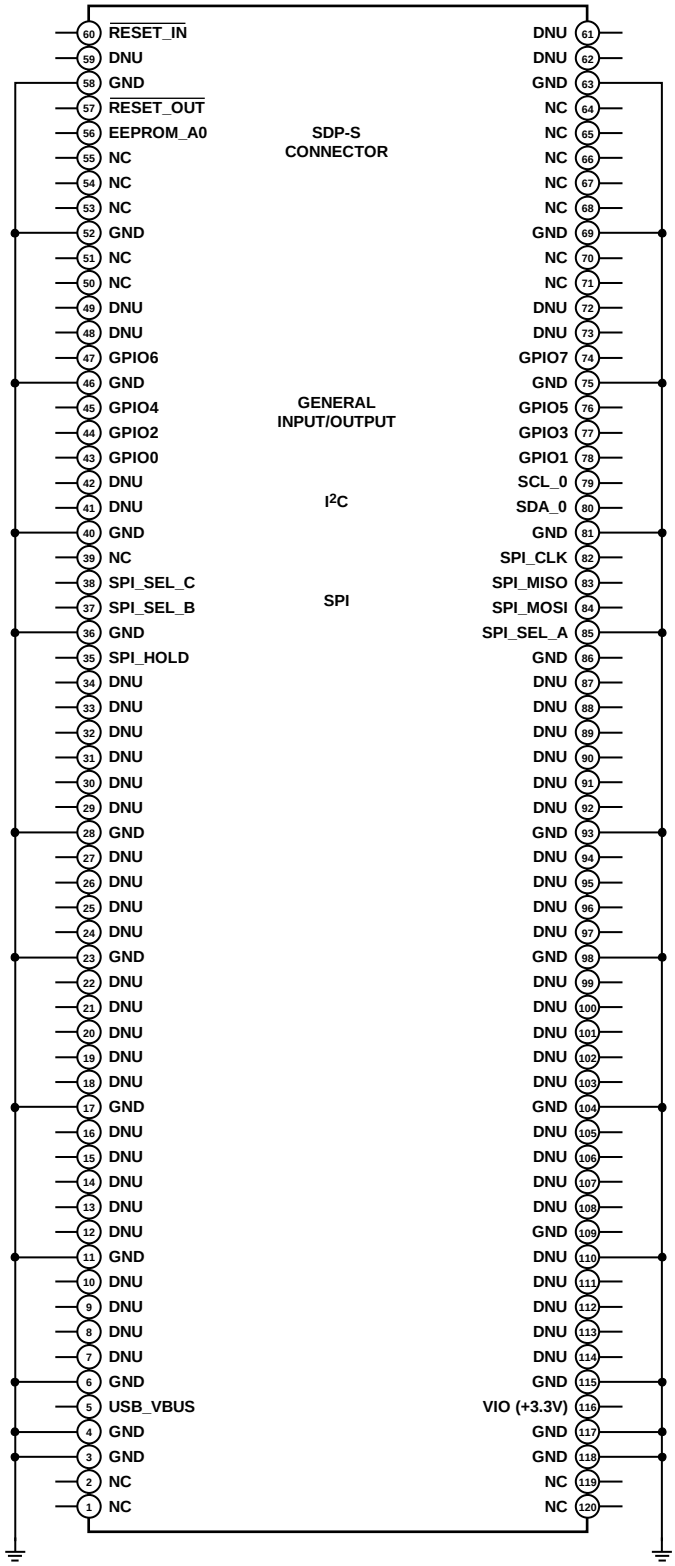
Table 1. 120-Pin Connector Pin Assignments

Pin No.	Pin Name	Description
1	NC	No connect. Leave this pin unconnected. Do not ground.
2	NC	No connect. Leave this pin unconnected. Do not ground.
3	GND	Connect to the ground plane of the daughter board.
4	GND	Connect to the ground plane of the daughter board.
5	USB_VBUS	Connected directly to the USB 5 V supply.
6	GND	Connect to the ground plane of the daughter board.
7	DNU	Do not use. Leave this pin unconnected. Do not ground.
8	DNU	Do not use. Leave this pin unconnected. Do not ground.
9	DNU	Do not use. Leave this pin unconnected. Do not ground.
10	DNU	Do not use. Leave this pin unconnected. Do not ground.
11	GND	Connect to the ground plane of the daughter board.
12	DNU	Do not use. Leave this pin unconnected. Do not ground.
13	DNU	Do not use. Leave this pin unconnected. Do not ground.
14	DNU	Do not use. Leave this pin unconnected. Do not ground.
15	DNU	Do not use. Leave this pin unconnected. Do not ground.
16	DNU	Do not use. Leave this pin unconnected. Do not ground.
17	GND	Connect to the ground plane of the daughter board.
18	DNU	Do not use. Leave this pin unconnected. Do not ground.
19	DNU	Do not use. Leave this pin unconnected. Do not ground.
20	DNU	Do not use. Leave this pin unconnected. Do not ground.
21	DNU	Do not use. Leave this pin unconnected. Do not ground.
22	DNU	Do not use. Leave this pin unconnected. Do not ground.
23	GND	Connect to the ground plane of the daughter board.
24	DNU	Do not use. Leave this pin unconnected. Do not ground.
25	DNU	Do not use. Leave this pin unconnected. Do not ground.
26	DNU	Do not use. Leave this pin unconnected. Do not ground.
27	DNU	Do not use. Leave this pin unconnected. Do not ground.
28	GND	Connect to the ground plane of the daughter board.
29	DNU	Do not use. Leave this pin unconnected. Do not ground.
30	DNU	Do not use. Leave this pin unconnected. Do not ground.
31	DNU	Do not use. Leave this pin unconnected. Do not ground.
32	DNU	Do not use. Leave this pin unconnected. Do not ground.
33	DNU	Do not use. Leave this pin unconnected. Do not ground.
34	DNU	Do not use. Leave this pin unconnected. Do not ground.
35	SPI_HOLD	Detects the ready state of the daughter board for SPI transfer.
36	GND	Connect to the ground plane of the daughter board.
37	SPI_SEL_B	SPI Chip Select B. Use this to control a second device on the SPI bus.
38	SPI_SEL_C	SPI Chip Select C. Use this to control a third device on the SPI bus.
39	NC	No connect. Leave this pin unconnected. Do not ground.
40	GND	Connect to the ground plane of the daughter board.
41	DNU	Do not use. Leave this pin unconnected. Do not ground.
42	DNU	Do not use. Leave this pin unconnected. Do not ground.
43	GPIO0	General-purpose input/output.
44	GPIO2	General-purpose input/output.
45	GPIO4	General-purpose input/output.
46	GND	Connect to the ground plane of the daughter board.
47	GPIO6	General-purpose input/output.
48	DNU	Do not use. Leave this pin unconnected. Do not ground.
49	DNU	Do not use. Leave this pin unconnected. Do not ground.
50	NC	No connect. Leave this pin unconnected. Do not ground.
51	NC	No connect. Leave this pin unconnected. Do not ground.
52	GND	Connect to the ground plane of the daughter board.

Pin No.	Pin Name	Description
53	NC	No connect. Leave this pin unconnected. Do not ground.
54	NC	No connect. Leave this pin unconnected. Do not ground.
55	NC	No connect. Leave this pin unconnected. Do not ground.
56	EEPROM_A0	EEPROM A0. Connect to the A0 address line of the EEPROM.
57	$\overline{\text{RESET_OUT}}$	Active low pin for resetting the daughter board. Driven by SDP-S.
58	GND	Connect to the ground plane of the daughter board.
59	DNU	Do not use. Leave this pin unconnected. Do not ground.
60	$\overline{\text{RESET_IN}}$	Active low pin to reset EVAL-SDP-CS1Z board.
61	DNU	Do not use. Leave this pin unconnected. Do not ground.
62	DNU	Do not use. Leave this pin unconnected. Do not ground.
63	GND	Connect to the ground plane of the daughter board.
64	NC	No connect. Leave this pin unconnected. Do not ground.
65	NC	No connect. Leave this pin unconnected. Do not ground.
66	NC	No connect. Leave this pin unconnected. Do not ground.
67	NC	No connect. Leave this pin unconnected. Do not ground.
68	NC	No connect. Leave this pin unconnected. Do not ground.
69	GND	Connect to the ground plane of the daughter board.
70	NC	No connect. Leave this pin unconnected. Do not ground.
71	NC	No connect. Leave this pin unconnected. Do not ground.
72	DNU	Do not use. Leave this pin unconnected. Do not ground.
73	DNU	Do not use. Leave this pin unconnected. Do not ground.
74	GPIO7	General-purpose input/output.
75	GND	Connect to the ground plane of the daughter board.
76	GPIO5	General-purpose input/output.
77	GPIO3	General-purpose input/output.
78	GPIO1	General-purpose input/output.
79	SCL_0	I^2C Clock 0. The daughter board EEPROM must be connected to this bus.
80	SDA_0	I^2C Data 0. The daughter board EEPROM must be connected to this bus.
81	GND	Connect to the ground plane of the daughter board.
82	SPI_CLK	SPI clock.
83	SPI_MISO	SPI master in, slave out data.
84	SPI_MOSI	SPI master out, slave in data.
85	SPI_SEL_A	SPI Chip Select A.
86	GND	Connect to the ground plane of the daughter board.
87	DNU	Do not use. Leave this pin unconnected. Do not ground.
88	DNU	Do not use. Leave this pin unconnected. Do not ground.
89	DNU	Do not use. Leave this pin unconnected. Do not ground.
90	DNU	Do not use. Leave this pin unconnected. Do not ground.
91	DNU	Do not use. Leave this pin unconnected. Do not ground.
92	DNU	Do not use. Leave this pin unconnected. Do not ground.
93	GND	Connect to the ground plane of the daughter board.
94	DNU	Do not use. Leave this pin unconnected. Do not ground.
95	DNU	Do not use. Leave this pin unconnected. Do not ground.
96	DNU	Do not use. Leave this pin unconnected. Do not ground.
97	DNU	Do not use. Leave this pin unconnected. Do not ground.
98	GND	Connect to the ground plane of the daughter board.
99	DNU	Do not use. Leave this pin unconnected. Do not ground.
100	DNU	Do not use. Leave this pin unconnected. Do not ground.
101	DNU	Do not use. Leave this pin unconnected. Do not ground.
102	DNU	Do not use. Leave this pin unconnected. Do not ground.
103	DNU	Do not use. Leave this pin unconnected. Do not ground.
104	GND	Connect to the ground plane of the daughter board.
105	DNU	Do not use. Leave this pin unconnected. Do not ground.

Pin No.	Pin Name	Description
106	DNU	Do not use. Leave this pin unconnected. Do not ground.
107	DNU	Do not use. Leave this pin unconnected. Do not ground.
108	DNU	Do not use. Leave this pin unconnected. Do not ground.
109	GND	Connect to the ground plane of the daughter board.
110	DNU	Do not use. Leave this pin unconnected. Do not ground.
111	DNU	Do not use. Leave this pin unconnected. Do not ground.
112	DNU	Do not use. Leave this pin unconnected. Do not ground.
113	DNU	Do not use. Leave this pin unconnected. Do not ground.
114	DNU	Do not use. Leave this pin unconnected. Do not ground.
115	GND	Connect to the ground plane of the daughter board.
116	VIO (+3.3V)	3.3 V output. 20 mA maximum current available to power the I/O voltage on the daughter board.
117	GND	Connect to the ground plane of the daughter board.
118	GND	Connect to the ground plane of the daughter board.
119	NC	No connect. Leave this pin unconnected. Do not ground.
120	NC	No connect. Leave this pin unconnected. Do not ground.

Each interface provided by the SDP-S is available on unique pins of the SDP-S 120-pin connector. The connector pin numbering scheme is outlined in Figure 4.



NOTES
1. NC = NO CONNECT. DO NOT CONNECT TO THIS PIN.
2. DNU = DO NOT USE. DO NOT CONNECT TO THIS PIN.

Figure 4. 120-Pin Connector Outline

POWER

The SDP-S board is powered by the USB connector. It does not require power to be supplied by the daughter board. The SDP-S board provides 3.3 V at 20 mA on Pin 116 (VIO_3.3) to connected daughter boards as the VIO voltage for the daughterboard. Pin 5 (USB_VBUS) is connected to the 5 V line of the USB connector, providing 5 V ±10% as an output of the SDP board.

DAUGHTER BOARD DESIGN GUIDELINES

The daughter board design guidelines specify the layout, connector positioning, keep out areas, and dimensions of potential daughter boards. This guidance is to ensure that a daughter board can connect to any controller board from the SDP family. Following these guidelines ensures that the connector on the SDP-S or any other controller board in the SDP family can have any one of the available daughter boards physically attached.

Connector Location

The daughter board connector and securing screw holes are located in the top left hand corner. This arrangement for a daughter board is shown in Figure 5.

If a daughter board exceeds these dimensions, it may not be possible to connect it to the other controller or interposer boards in the SDP family. Every effort was made to extend the 5.9 mm dimension as large as possible to allow space for vias between the connector and the edge of the board. These are absolute maximum dimensions and must not be exceeded.

The full specification drawing for the connector location on the daughter board is shown in Figure 6.

The mating daughter board 120-pin connector is the Hirose FX8-120S-SV(21), 120-pin receptacle, FEC 132-4660, Digi-Key H1219-ND. Consult the connector data sheet for full details on the connector. Note that Pin 1 to Pin 60 are placed on the left side of the connector and Pin 61 to Pin 120 are placed on the right side of the connector.

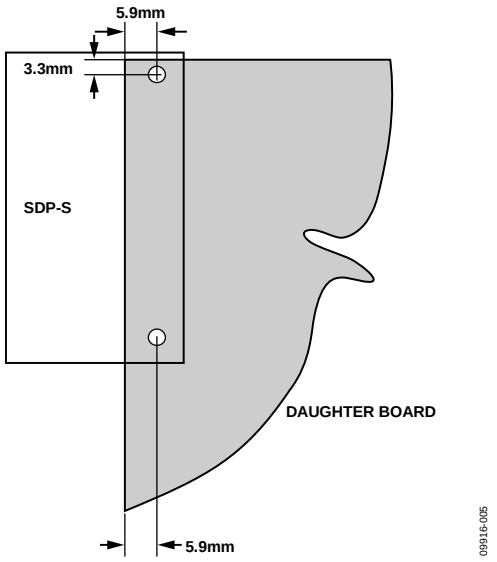


Figure 5. Maximum Board Dimensions for Connector Placement

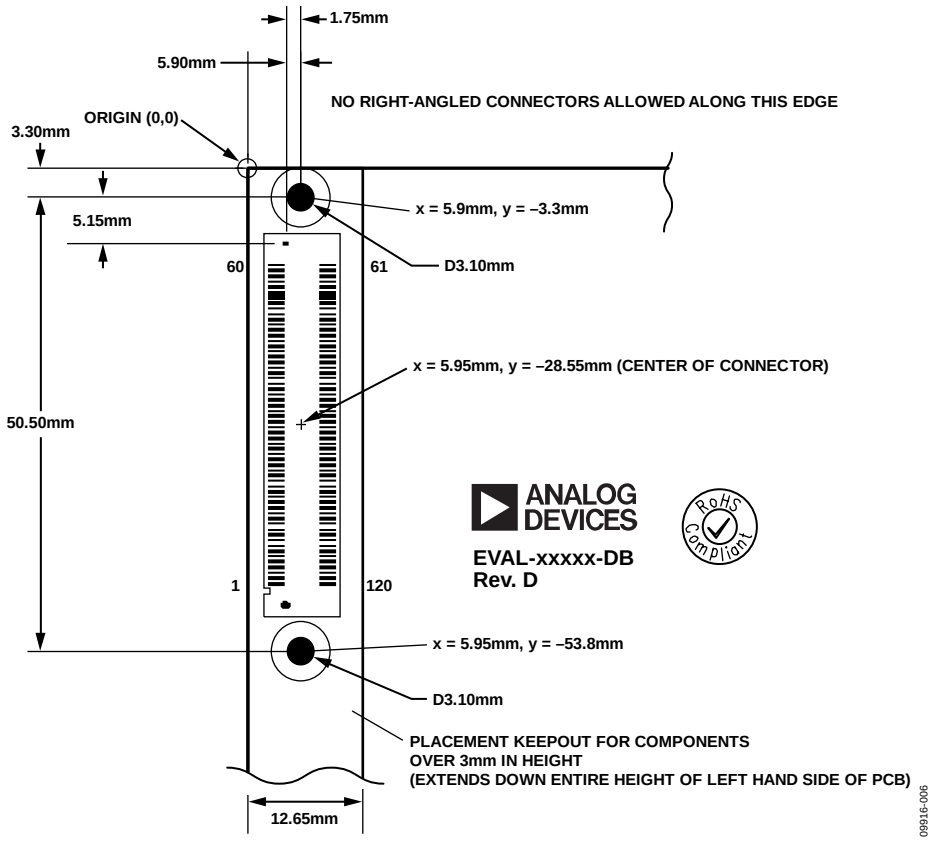


Figure 6. Connector Placement on Compatible Daughter Boards

Keep Out Area

To allow the greatest flexibility for future controller boards, a keep out area is established for components higher that 3 mm. The keep out area is 12.65 mm wide and extends down the entire left side of the daughter board.

Restriction on Right Angle Connectors

Due to the layout of other boards in the SDP family, and their daughter boards, right angle connectors are not allowed on the top and left edges of the daughter boards and (if required) should be placed on the right or bottom edges. A right angle connector describes any connector that requires the connection to protrude over the edge of the board (for example, right angle SMB or screw terminal).

MECHANICAL SPECIFICATIONS

The mechanical specifications of the SDP-S board are 2.36 inch × 0.87 inch (60 mm × 22 mm). The tallest component on the top is approximately 0.17 inch (4.3 mm), and the tallest components on the bottoms are the 120-pin connectors at approximately 0.152 inch (3.86 mm). Refer to Figure 7.

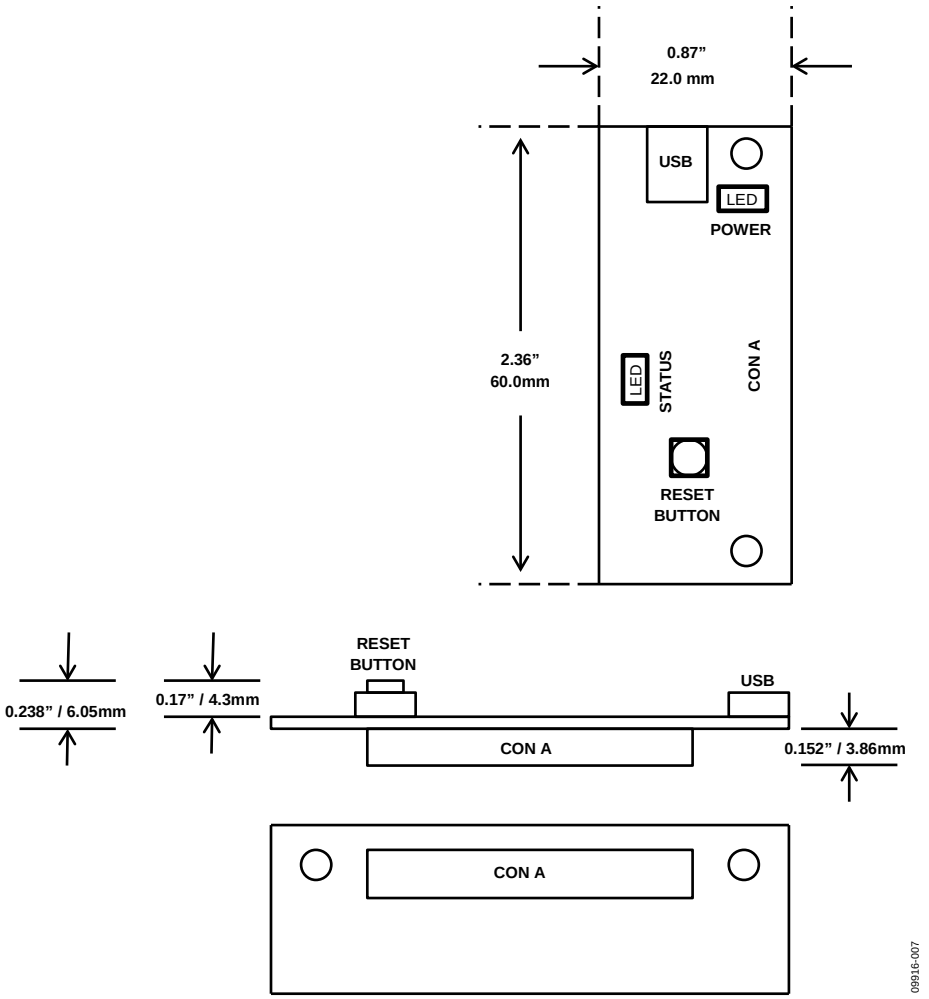


Figure 7. SDP-S Board Mechanical Specifications

EVALUATION BOARD SCHEMATICS

This section provides the schematic drawings for the EVAL-SDP-CB1Z board, which include

- SDP-S—USB-to-serial engine, USB, interface (see Figure 8)
- SDP-S—Connector (see Figure 9)

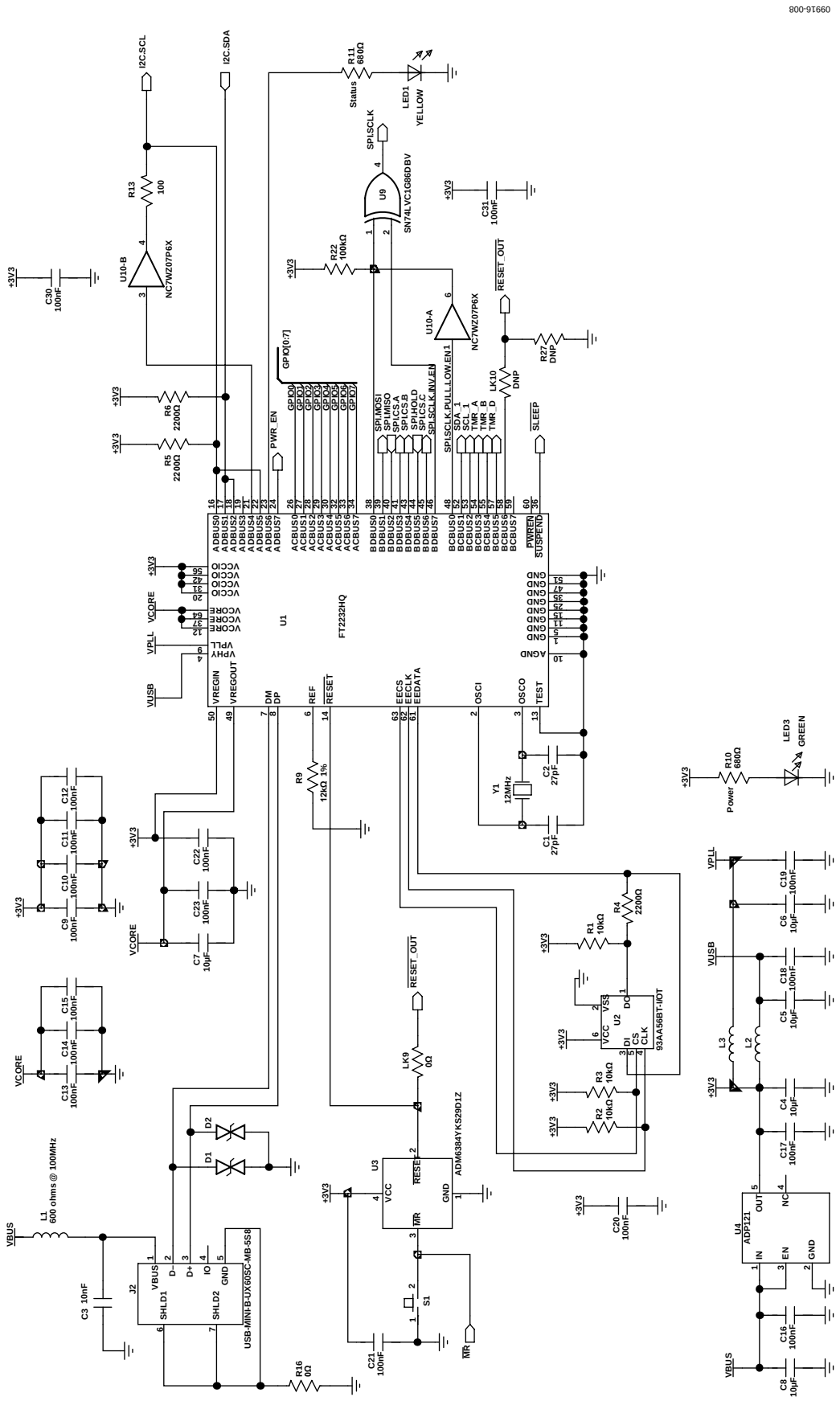


Figure 8. SDP-S—USB-to-Serial Engine, USB, Interface

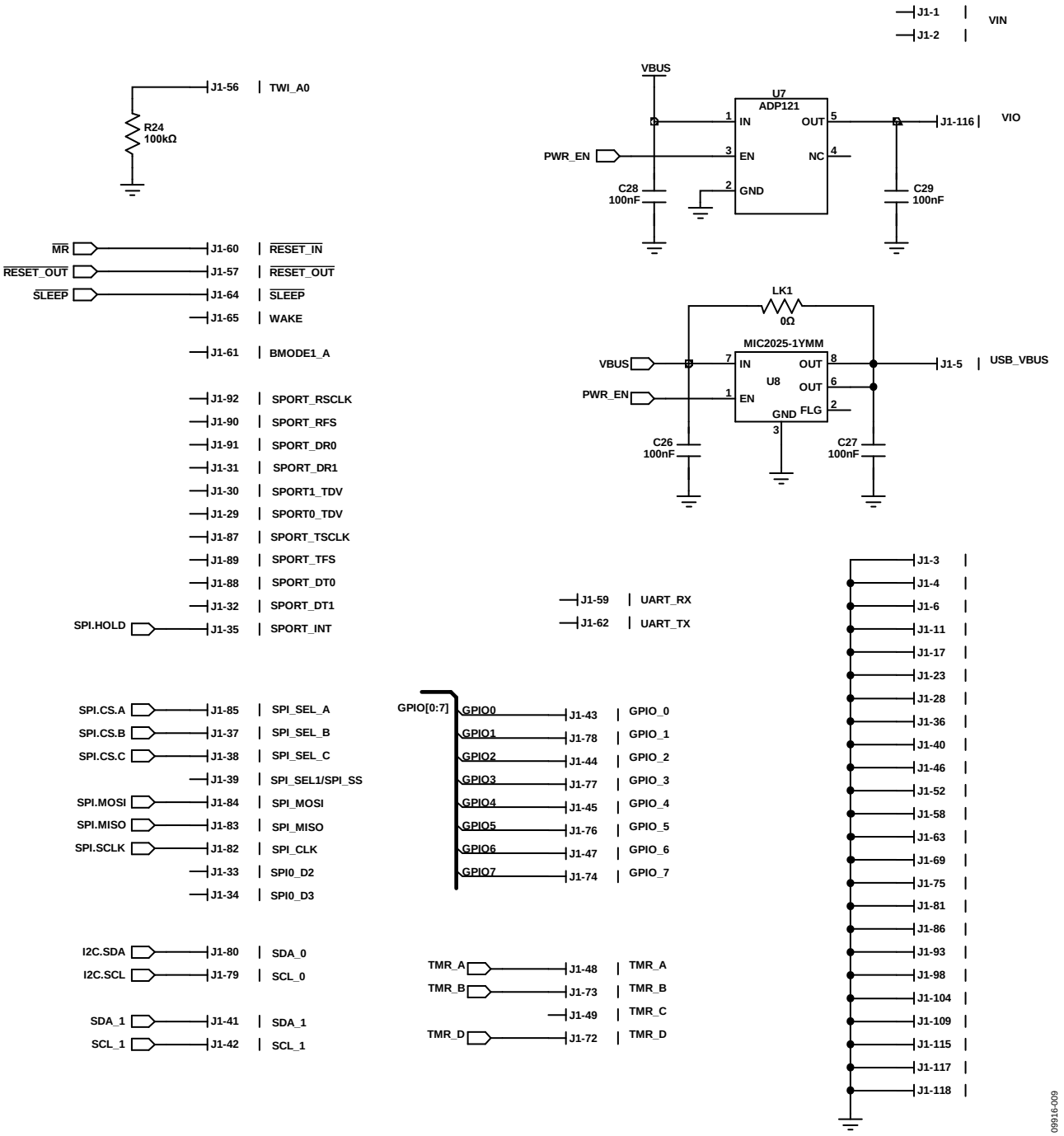


Figure 9. SDP-S—Connector

NOTES

I²C refers to a communications protocol originally developed by Philips Semiconductors (now NXP Semiconductors).

ESD Caution

ESD (electrostatic discharge) sensitive device. Charged devices and circuit boards can discharge without detection. Although this product features patented or proprietary protection circuitry, damage may occur on devices subjected to high energy ESD. Therefore, proper ESD precautions should be taken to avoid performance degradation or loss of functionality.

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Стандарт Электрон Связь

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Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

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