

TS3USBCA420 EVM User's Guide

The TS3USBCA420 is a passive 4:1 mux capable of switching differential or single-ended signals on the SBU terminals of a USB Type-C connector to four different interfaces. This guide describes how to bring up the EVM and configure to evaluate the performance of the TS3USBCA420.

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1 Introduction

The EVM comes with SMP connectors to interface to each transmission signal of the mux with jumpers to configure the device through GPIO settings, and optional header for I2C interface.

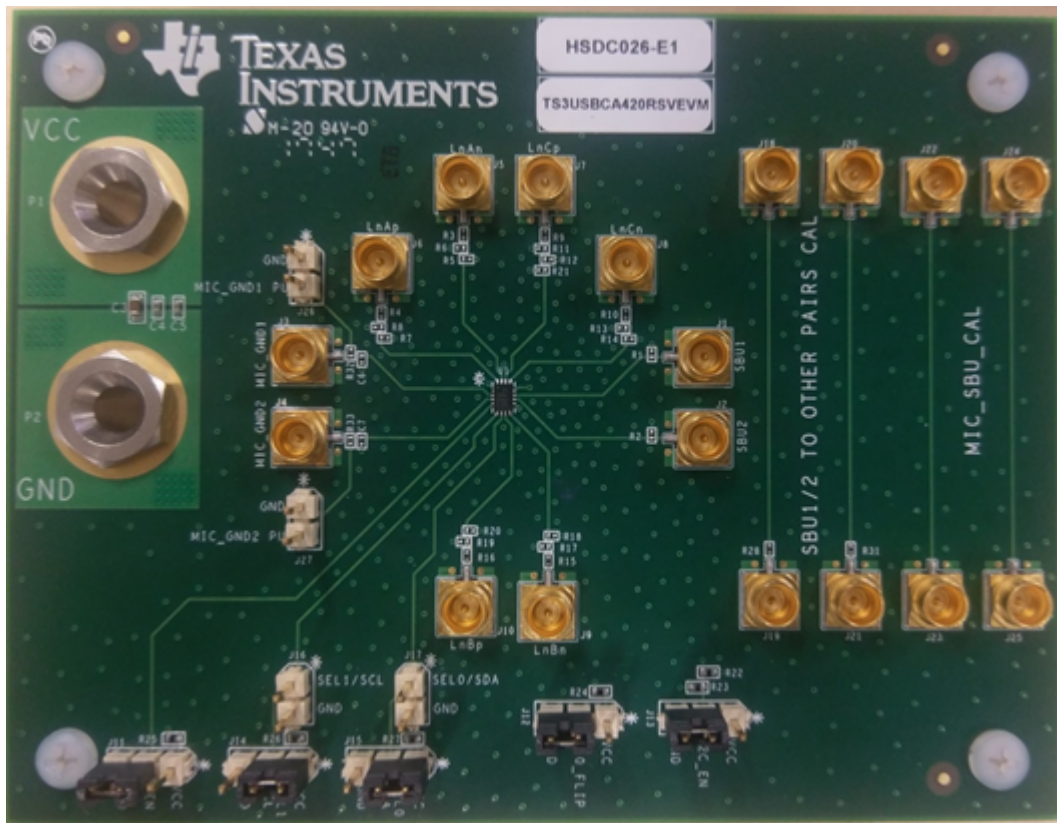


Figure 1. TS3USBCA420EVM

The TS3USBCA420EVM is designed to interface directly to test equipment to evaluate the switching performance of the device. Figure 2 is an example test set-up.

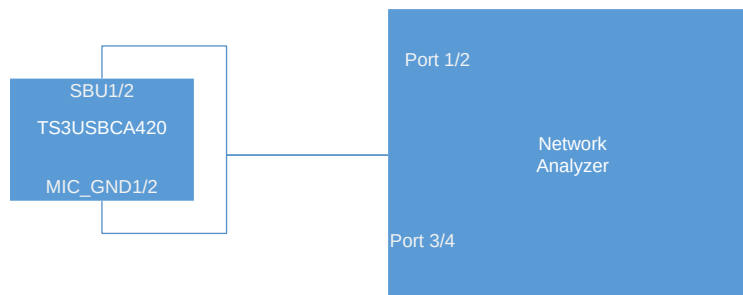


Figure 2. Example Test Board Setup

2 TS3USBCA420EVM Configuration

This section provides the configuration options available in the TS3USBCA420EVM.

2.1 TS3USBCA420EVM Default Configuration

The following headers and shunt placements are provided for default TS3USBCA420 configuration. The EVM is configured to operate in GPIO mode by default. If I2C configuration is desired, JMP13 (I2C_EN) shunt must be changed to shunt pins 1-2 VCC). Options are included in the design to populate pull-up and/or pull-down resistors on each transmission signal, these options are not populated by default.

Table 1. TS3USBCA420 Configuration Pins

Reference Designator	Configuration Signal	Configuration
J11	OEn	SHUNT on pin 2-3 (GND)
J12	410_FLIP	SHUNT on pin 2-3 (Not Connected by Default)
J13	I2C_EN	SHUNT on pin 2-3 (GND)
J14	SEL1/SCL	SHUNT on pin 1-2 (VCC)
J15	SEL0/SDA	SHUNT on pin 1-2 (VCC)
J16	SCL	OPEN
J17	SDA	OPEN
J26	MIC_GND1 100k	OPEN (Not Connected by Default)
J27	MIC_GND2 100k	OPEN (Not Connected by Default)

2.2 TS3USBCA420 Switch Control

Table 2 provides the details of the TS3USBCA420 mux switching as controlled by the SWSEL[1:0] I2C register (See the datasheet for details) or the SEL[1:0] configuration pins.

NOTE: Highlighted configuration only available in I2C mode.

Table 2. Switch Control Pin Level Definitions

SWSEL[1:0] (I2C) / SEL[1:0] Pins	FLIPSEL (I2C) Only	Input Pin	Output Pin
00/LL	0	SBU1	LnBp
		SBU2	LnBn
00/LL	1	SBU1	LnBn
		SBU2	LnBp
01/LH	0	SBU1	MIC/GND1
		SBU2	MIC/GND2
01/LH	1	SBU1	MIC/GND1
		SBU2	MIC/GND2
10/HL	0	SBU1	LnCp
		SBU2	LnCn
10/HL	1	SBU1	LnCn
		SBU2	LnCp
11/HH	0	SBU1	LnAp
		SBU2	LnAn
11/HH	1	SBU1	LnAn
		SBU2	LnAp

2.3 Power

The EVM is designed to operate from an external 3.3-V power supply using standard banana jack plug cables. VCC should be connected to P1 and GND connected to P2. Refer to datasheet for valid operating voltage ranges supported by the TS3USBCA420.

2.4 Calibration Traces

The TS3USBCA420EVM includes calibration traces equal to the input and output trace lengths to the TS3USBCA420 device on the EVM. Cal traces are available for SBU1/2 to Lnx pair as well as MIC to SBU signal pairs

3 TS3USBCA420EVM Schematics

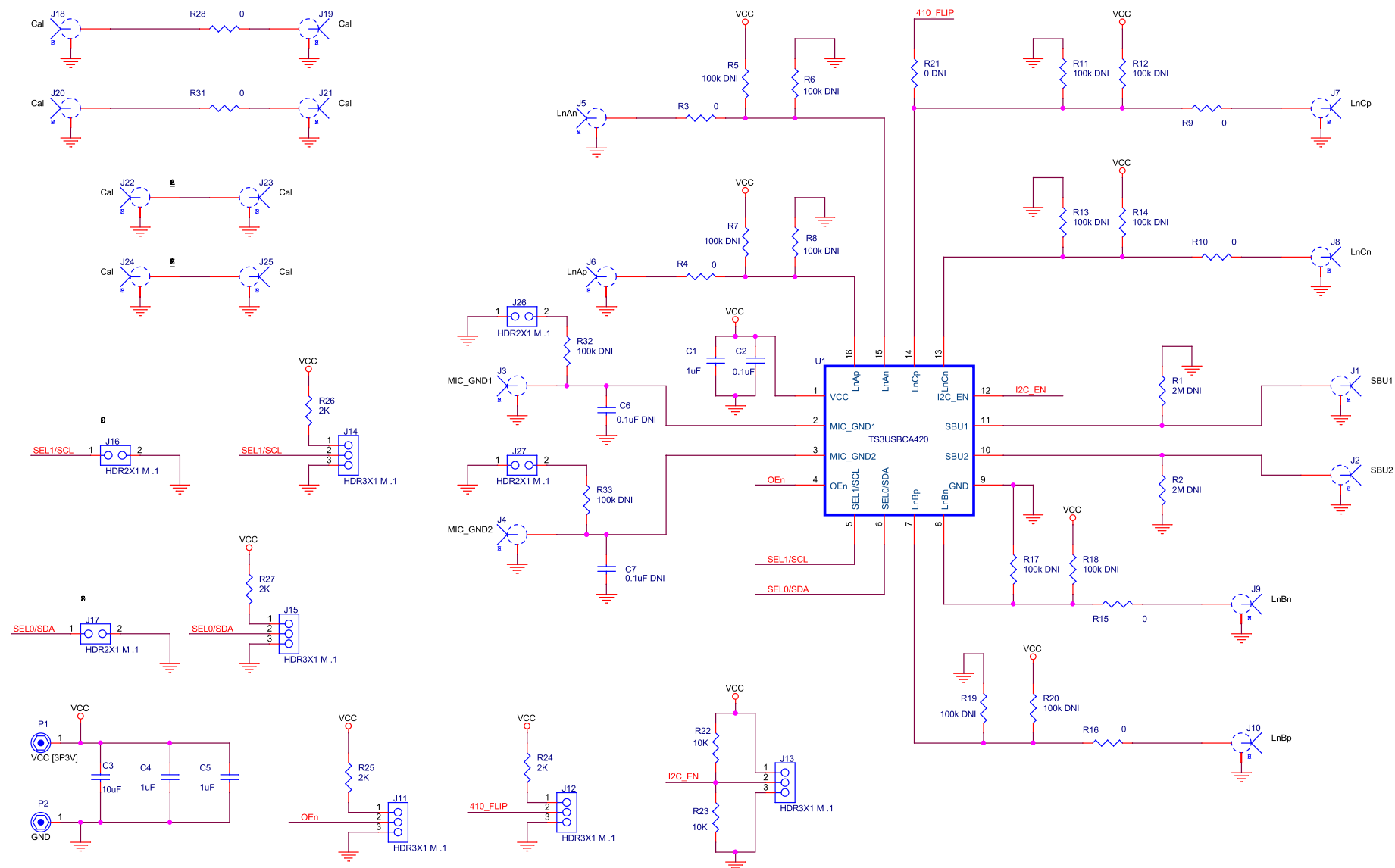


Figure 3. TS3USBCA420 EVM Schematics

4 Bill of Materials

Table 3. Bill of Materials

Item	Quantity	Reference	Description	Manufacturer	Part Number
1	3	C1,C4,C5	1uF	Murata	GRM155R60J105ME19D
2	1	C2	0.1uF	Murata	GRM155R61A104KA01D
3	1	C3	10uF	Murata	GRM188R61C106MA73D
4	0	C6, C7	0.1uF DNI	Murata	GRM033R61A104KE15D
5	18	J1, J2, J3, J4, J5, J6, J7, J8,J9, J10, J18, J19, J20, J21, J22, J23, J24, J25	SMP	Rosenberger	19S101-40ML5
6	4	J11, J12, J13, J14, J15	HDR3X1 M .1	3M	961103-6404-AR
7	4	J11, J12, J13, J14, J15	HDR2X1 M .1	3M	961102-6404-AR
8	1	LB1	THD-47-478-10	Brady	THD-47-478-10
9	2	P1, P2	Banana-Jack	Pomona	3267
10	0	R1, R2	2M DNI	Panasonic Electronic Components	ERJ-1GEJ205C
11	8	R3, R4, R9, R10, R15, R16, R28, R31	0	Panasonic Electronic Components	ERJ-1GN0R00C
12	0	R5, R6, R7, R8, R11, R12, R13, R14, R17, R18, R19, R20, R32, R33	100k DNI	Panasonic Electronic Components	ERJ-1GEF1003C
13	0	R21	0 DNI	Panasonic Electronic Components	ERJ-1GN0R00C
14	2	R22, R23	10K	Panasonic Electronic Components	ERJ-2GEJ103X
15	4	R24, R25, R26, R27	2K	Panasonic Electronic Components	ERJ-2GEJ202X
16	4	SCRW1, SCRW2, SCRW3, SCRW4	NY PMS 440 005 PH	B & F Fastener	NY PMS 440 005 PH
17	4	SHNT1, SHNT2, SHNT3, SHNT4	QPC02SXGN-RC	Sullins Connector Solutions	QPC02SXGN-RC
18	4	STDOFF1, STDOFF2, STDOFF3, STDOFF4	1902E	Keystone	1902E
19	1	U1	TS3USBCA420	Texas Instruments	TS3USBCA420RSV

4.1 Related Documentation

TS3USBCA4 USB Type-C SBU Multiplexer with MIC/AGND, ([SLLSF73](#))

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- *Reorient or relocate the receiving antenna.*
- *Increase the separation between the equipment and receiver.*
- *Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.*
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