

# Quad Sine-Wave Clock Buffer Evaluation Board

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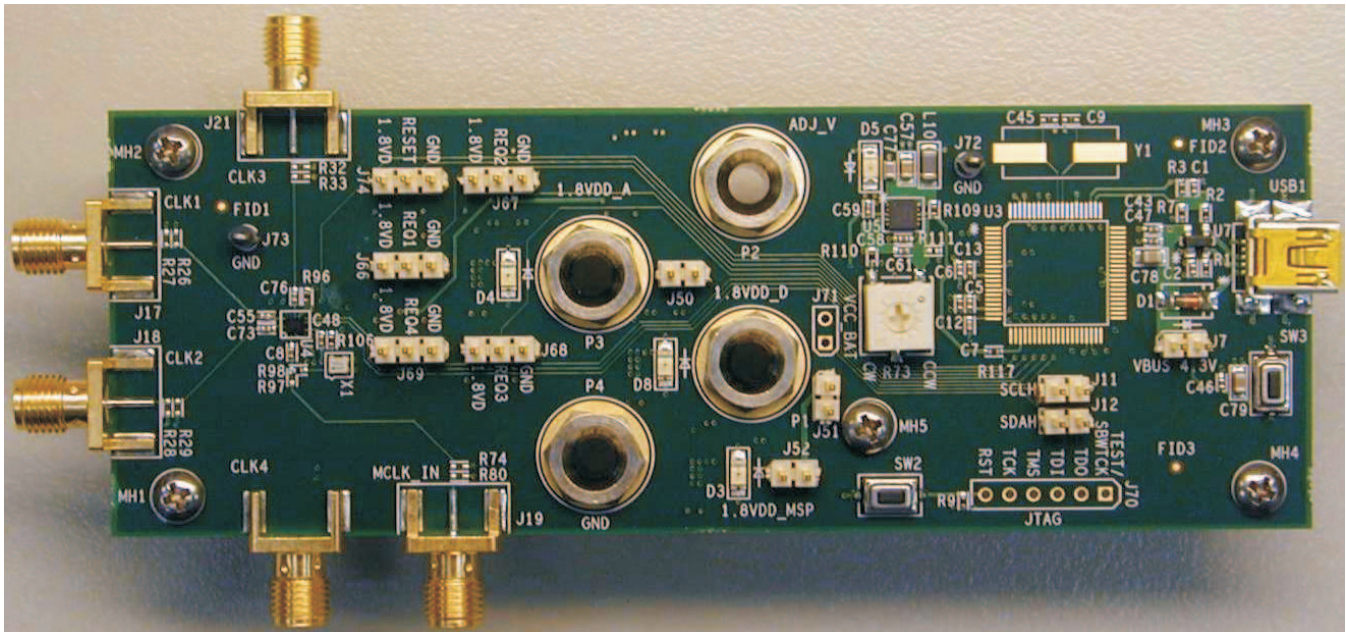
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**Figure 1. CDC3S04 Evaluation Board**

## 1 General Description

The CDC3S04 is a four-channel low-power sine-wave clock buffer. It can be used to buffer a single master clock to multiple peripherals. The four sine-wave outputs (CLK1–CLK4) are designed for minimal channel-to-channel skew and ultralow additive output jitter. Each output has its own clock request input which enables the dedicated clock output. These clock requests are active-high (can also be changed to be active-low via I2C™), and an output signal is generated that can be sent back to the master clock to request the clock (MCLK\_REQ). MCLK\_REQ is an open-source output and supports the wired-OR function (default mode). It needs an external pulldown resistor. MCLK\_REQ can be changed to wired-AND or push-pull functionality via I2C.

This evaluation module (EVM) is designed to demonstrate the electrical performance of the CDC3S04. Throughout this document, the acronym EVM and the phrases evaluation module and evaluation board are synonymous with the CDC3S04 EVM. Figure 1 illustrates the CDC3S04 EVM.

For optimum performance, the board is equipped with 50Ω SMA connectors and well controlled 50Ω impedance microstrip transmission lines.

### 1.1 Features

- Easy-to-use evaluation board to fan out low phase noise
- Easy device setup
- Control pins configurable through jumpers
- Board powered using USB or external supply

## 2 Signal Path and Control Circuitry

The CDC3S04 EVM has a TCXO soldered. If the customer wants to try out a different source then the EVM allows routing the external signal to the CDC3S04. Resistors must be solder or desolder. See [Table 1](#) for each configuration.

**Table 1. Clock Source**

Component	TCXO on board	External input
<b>R80</b>	Not mounted	Not mounted
<b>R74</b>	Not mounted	Not mounted
<b>R98</b>	0R0	Not mounted
<b>R97</b>	Not mounted	0R0
<b>C8</b>	15 pF	15 pF

### 3 Getting Started

The CDC3S04EVM has self-explanatory labeling and uses similar naming conventions as the CDC3S04 product data sheet ([SCAS883](#)). In this user's guide, all words in **boldface and italic print** reflect the actual labeling on the EVM.

### 4 Power-Supply Connections

The CDC3S04EVM has three pins that require external supply. Those pins are VDD\_ANA, VDD\_DIG and VBAT. These supplies can come from the USB or using an external power supply. See [Table 2](#) for further information.

**Table 2. Supply source**

USB	External Power Supply
R113 = 0R0	J50 OFF
R112 = Not mounted	J51 OFF
J50 ON	P3 = VDD_ANA
J51 ON	P1 = VDD_DIG

Also the CDC3S04 has an LDO build in that generates the supply for the TCXO. This voltage can be generated using the TPS71219 on board or the P2 connector.

### 5 Output Clock

The outputs of the CDC3S04 are available on any of the SMA connectors

**Table 3. Outputs on the CDC3S04EVM**

SMA	Output
J17	CLK1
J68	CLK2
J21	CLK3
J20	CLK4

### 6 Enabling/Disabling Outputs

The CDC3S04EVM has several jumpers that can control the output enable of the CDC3S04.

**Table 4. Jumpers to Control the CDC3S04**

Jumper	Function
J66	REQ1
J67	REQ2
J68	REQ3
J69	REQ4
J74	RESET

**7 Bill of Materials**
**Table 5. Bill of Materials**

QTY	Value	Designator	PKG/CASE	Manufacturer	Lot Number
10	0.01uF	C8, C12, C13, C33, C35, C53, C58, C63, C67, C71	0402	Venkel	C0402X7R500-103KNE
15	0.1uF	C4, C5, C6, C16, C34, C36, C49, C54, C64, C68, C72, C55, C73, C75, C76	0402	Venkel	C0402X7R160-104KNE
2	0.22uF	C3, C74	0402	Venkel	C0402X5R6R3-224KNE
1	0.47uF	C7	0402	Murata Electronics North Am	GRM155R61A474KE15D
5	1.0uF	C51, C62, C66, C70, C48	0402	Murata Electronics North Am	GRM155R61A105KE15D
5	10pF	C1, C2, C43, C46, C47	0402	Venkel	C0402COG500-100JNE
3	15pF	C31, C32, C61	0402	Venkel	C0402COG500-150JNE
2	2.2iF	C59, C60	0402	Murata Electronics North Am	GRM155R60J225ME15D
1	10000pF	C14	0603	Tdk Corporation	C1608X7R1H103K
1	10iF	C77	0603	Panasonic	ECJ-1VB0J106M
1	0.1iF	C57	0805	Kemet	C0805C104J5RACTU
10	4.7iF	C41, C42, C44, C50, C52, C56, C65, C69, C78, C79	0805	Venkel	C0805X5R250-475KNE
2	10iF	C11, C15	3216-18 (EIA)	Kemet	B45196H3106K109
1	100K	R73	7.04 x 6.71 x 4.8	Bourns Inc.	3361P-1-104GLF
7	0R0	R98, R106, R108, R112, R113, R114, R115	0402	Panasonic - Ecg	ERJ-2GE0R00X
2	1.00K	R124, R125	0402	Venkel	CR0402-16W-1001FT
1	1.00M	R7	0402	Venkel	CR0402-16W-1004FT
1	1.40K	R3	0402	Panasonic - Ecg	ERJ-2RKF1401X
3	10	R70, R75, R77	0402	Venkel	CR0402-16W-10R0FT
12	10.0K	R79, R94, R95, R99, R100, R101, R102, R103, R104, R109, R116, R123	0402	Rohm	MCR01MZPF1002
1	100K	R8	0402	Yageo America	RC0402FR-07100KL
7	22.1	R107, R117, R118, R119, R120, R121, R122	0402	Panasonic - Ecg	ERJ-2RKF22R1X
1	3.32K	R78	0402	Panasonic - Ecg	ERJ-2RKF3321X
1	30.1K	R111	0402	Venkel	CR0402-16W-3012FT
1	31.6K	R110	0402	Panasonic - Ecg	ERJ-2RKF3162X
2	33.2	R1, R2	0402	Venkel	CR0402-16W-33R2FT
1	33.2K	R105	0402	Panasonic - Ecg	ERJ-2RKF3322X
1	332	R76	0402	Vishay/Dale	CRCW0402332RFKED
1	47.5K	R9	0402	Venkel	CR0402-16W-4752FT
1	5.1K	R96	0402	Venkel	CR0402-16W-5101FT
2	5.62K	R5, R6	0402	Venkel	CR0402-16W-5621FT
1	USB - Mini AB type	USB1	SMT	Jae Electronics	DX3R005HN2E700
1	38.4MHz	X1	4-SMT	KDS	1XXD38400CAA
1	TPD2E001DZDR	U7	4-SOP	Texas Instruments	TPD2E001DZDR
1	LLSD103A-7	D1	Mini MELF	Diodes Inc	LLSD103A-7
5	50	L6, L7, L8, L9, L10	1206	Murata Electronics North Am	BLM31PG500SN1L
1	TPS71219DRCT	U5	10-SON	Texas Instruments	TPS71219DRCT
1	CDC3S04YFFR	U4	20-DSBGA	Texas Instruments	CDC3S04YFFR
3	LED - Green Clear	D3, D4, D8	1206	Lite-On	LTST-C150KGKT
1	LED - Red Clear	D5	1206 (3216)	Cml Innovative Technologies	CMD15-21VRC/TR8
2	PTS635SL25SMTR LFS	SW2, SW3	6mm x 3.50mm	C&K Components	PTS635SL25SMTR LFS
5	142-0701-801	J17, J18, J19, J20, J21	RF SMA EDGE	Emerson Network Power Co	142-0701-801
2	Test Loop - Black	J72, J73	0.1"	Components Corporation	TP-105-40-00
6	1 X 2	J7, J11, J12, J50, J51, J52	0.1"	HTSW-150-08-G-S	K10000012278

**Table 5. Bill of Materials (continued)**

5	1 X 3	J66, J67, J68, J69, J74	0.1"	HTSW-150-08-G-S	K10000012278
4	Banana Plug - Metal	P1, P2, P3, P4	4mm	Emerson Network Power Co	108-0740-001
5	4-40/0.25"- Screws	MH1, MH2, MH3, MH4, MH5		Building Fasteners	PMSSS 440 0025 PH
5	0.75"	MH1, MH2, MH3, MH4, MH5			
14	DNI	C9, C10, R26, R27, R28, R29, R30, R31, R32, R33, C45, R74, R80, R97			
2	DNI	J70, J71			
1	DNI	U3			
1	DNI	Y1			

8 Schematic

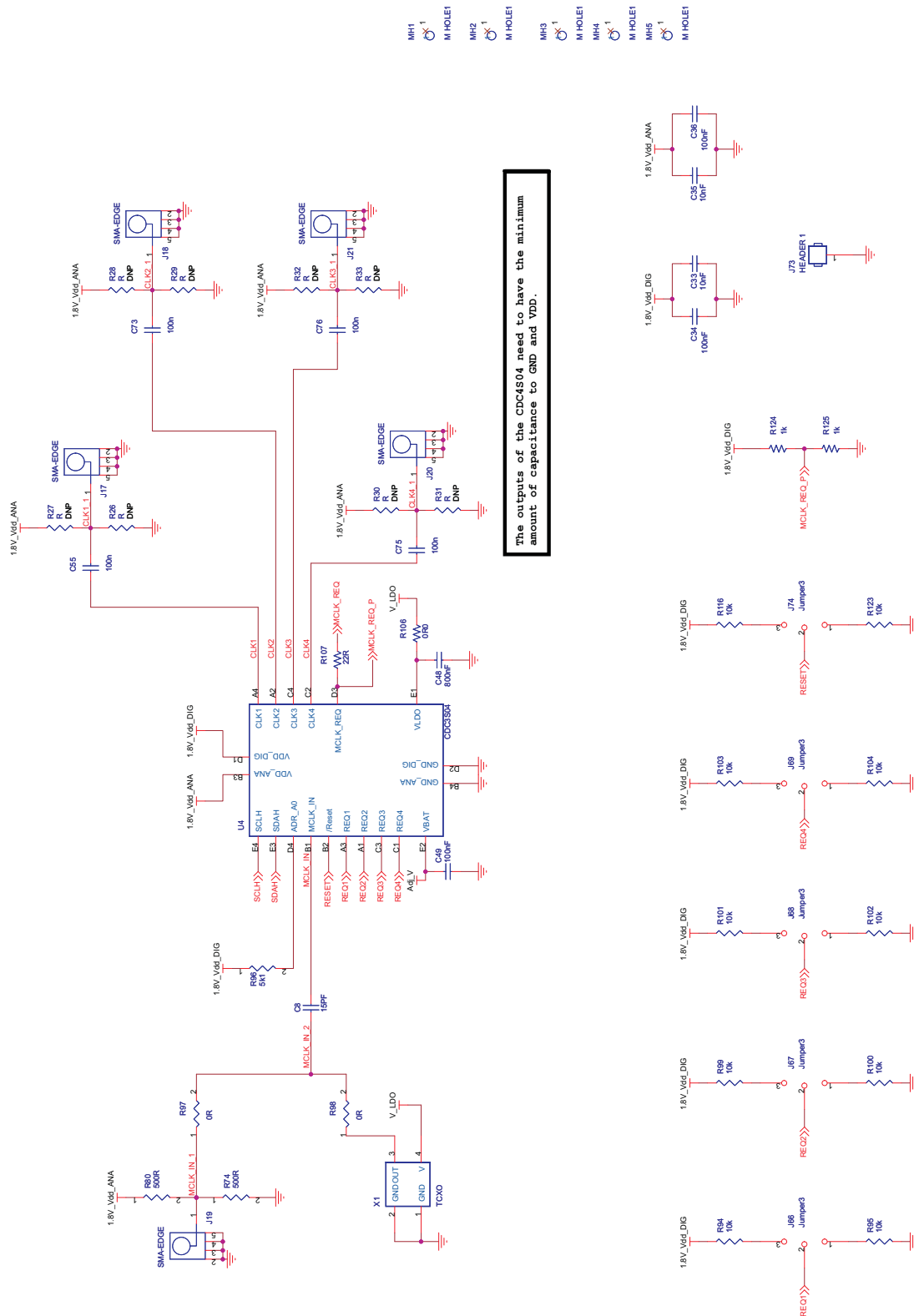
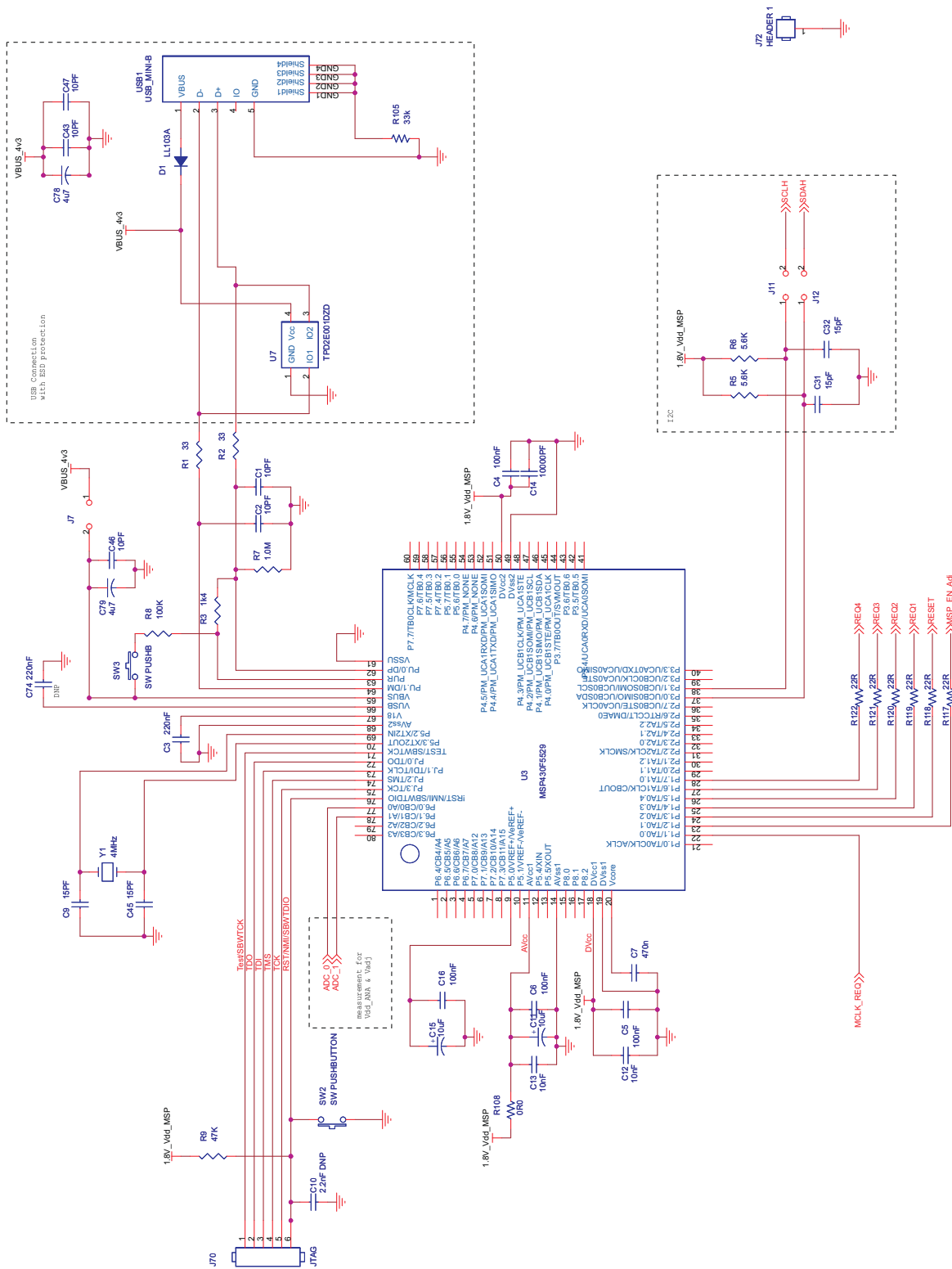


Figure 2. Schematic – (1 of 3)



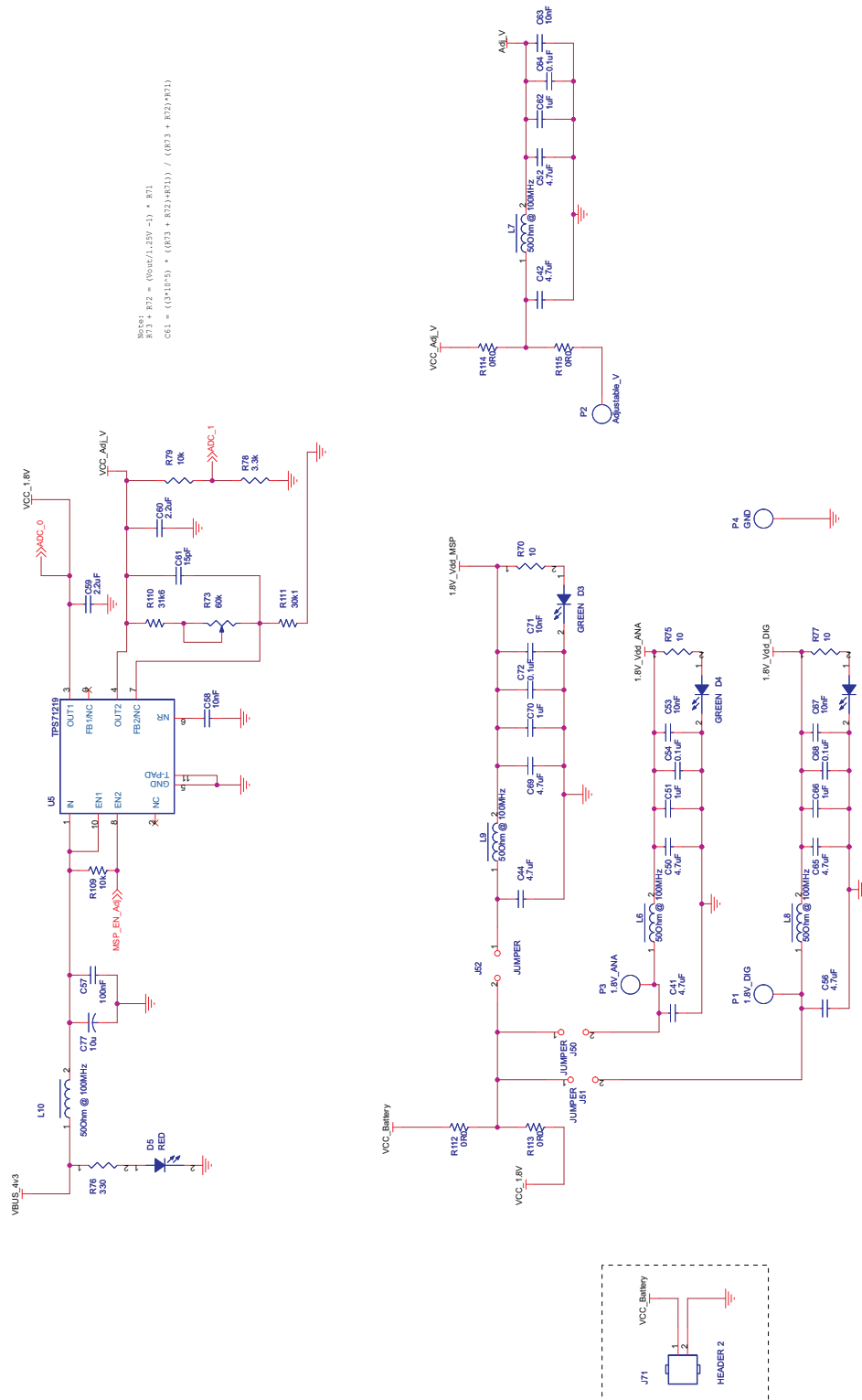


Figure 4. Schematic – (3 of 3)



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## EVM Warnings and Restrictions

It is important to operate this EVM within the input voltage range of 2.2 V to 3.6 V and the output voltage range of 2.2 V to 3.6 V .

Exceeding the specified input range may cause unexpected operation and/or irreversible damage to the EVM. If there are questions concerning the input range, please contact a TI field representative prior to connecting the input power.

Applying loads outside of the specified output range may result in unintended operation and/or possible permanent damage to the EVM. Please consult the EVM User's Guide prior to connecting any load to the EVM output. If there is uncertainty as to the load specification, please contact a TI field representative.

During normal operation, some circuit components may have case temperatures greater than 85°C. The EVM is designed to operate properly with certain components above 85°C as long as the input and output ranges are maintained. These components include but are not limited to linear regulators, switching transistors, pass transistors, and current sense resistors. These types of devices can be identified using the EVM schematic located in the EVM User's Guide. When placing measurement probes near these devices during operation, please be aware that these devices may be very warm to the touch.

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DLP® Products	<a href="http://www.dlp.com">www.dlp.com</a>	Communications and Telecom	<a href="http://www.ti.com/communications">www.ti.com/communications</a>
DSP	<a href="http://dsp.ti.com">dsp.ti.com</a>	Computers and Peripherals	<a href="http://www.ti.com/computers">www.ti.com/computers</a>
Clocks and Timers	<a href="http://www.ti.com/clocks">www.ti.com/clocks</a>	Consumer Electronics	<a href="http://www.ti.com/consumer-apps">www.ti.com/consumer-apps</a>
Interface	<a href="http://interface.ti.com">interface.ti.com</a>	Energy	<a href="http://www.ti.com/energy">www.ti.com/energy</a>
Logic	<a href="http://logic.ti.com">logic.ti.com</a>	Industrial	<a href="http://www.ti.com/industrial">www.ti.com/industrial</a>
Power Mgmt	<a href="http://power.ti.com">power.ti.com</a>	Medical	<a href="http://www.ti.com/medical">www.ti.com/medical</a>
Microcontrollers	<a href="http://microcontroller.ti.com">microcontroller.ti.com</a>	Security	<a href="http://www.ti.com/security">www.ti.com/security</a>
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