

EVM User's Guide: UCD91320

UCD91320EVM User's Guide



Description

The UCD91320EVM development kit is an easy-to-use evaluation module (EVM) for the UCD91320 Power Sequencer device. The EVM includes everything needed to start developing power sequencer solutions alongside the TI Sequencer Studio GUI. This EVM features the UCD91320, as well as 4 on board LDOs to quickly get started sequencing multiple power rails. The EVM also features LEDs to view signal states, footprints for RC filters for margining and for power rail monitoring. Communication with the EVM is easily accomplished using PMBus.

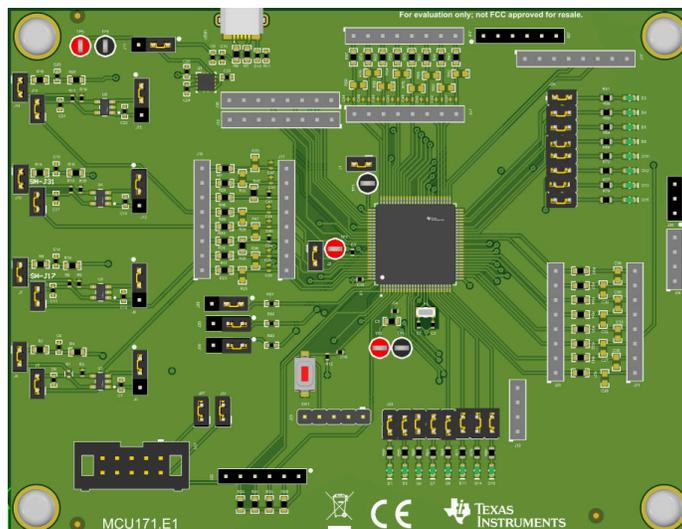
Get Started

1. Order the latest version of the UCD91320EVM on TI.com. The revision number will be clearly marked on the front side of the board.
2. Download the latest version of the TI Sequencer Studio GUI, or use the latest online version by visiting dev.ti.com/guicomposer
3. Review the schematic and hardware notes featured in this user's guide.

4. Begin experimenting with the EVM and GUI, start producing your first power sequencer designs on the UCD91320 device.

Features

- UCD91320SPM device mounted on board
- USB power supply connector
- Easy to access pin headers for every signal on the board
- 4x LDOs for quickly prototyping various power rails: 3.3V, 2.5V, 1.8V, and 1.2V.
- Jumpers to easily enable or disable each on board LDO
- RC filters for margining feedback, footprints for additional passive elements, jumpers to connect the LDO output to the monitoring pins and to off board devices as well.
- Pin header for PMBus connections
- Easy to use jumpers for PMBus address selection, with up to 8 selectable addresses
- On-board LDO to power UCD91320
- Test points for checking the voltage reference, power supply pins, and external power supply monitoring



1 Evaluation Module Overview

1.1 Introduction

The UCD91320EVM ships as a singular PCB. It can be utilized with a micro USB or external power supply. Communicating with the device requires a PMBus interface. We recommend using TI's [USB-TO-GPIO2](#) tool to communicate with this device.

1.2 Kit Contents

- 1x UCD91320EVM

1.3 Specification

The UCD91320EVM is designed to enable users to easily prototype power sequencer designs for the UCD91320 device line. The EVM enables all functionality designed into the device, with headers for monitoring signals, enable pins, margining pins, LGPOs, and more. The EVM also has easy to use footprints to add RC filters to the margining circuit and voltage dividers for the monitoring pins. The monitoring pins have headers available to probe the signal both before and after voltage division. The margining pins have similar headers available to probe the margining signal before and after filtering. The enable pins have headers to probe and they have LEDs connected to allow easy viewing of the signal or more detailed viewing on a probe. The EVM also allows users to supply power with a micro-USB, an external 5V supply, an external 3.3V supply, or via the USB-TO-GPIO2 through its dedicated header. Dedicated test points are included in the board as well to easily check the power supply, voltage reference, and power pins to the device.

The EVM is designed to pair with the TI Sequencer Studio GUI to allow users to quickly get started with sequencer designs. We recommend using the USB-to-GPIO2 device to connect the EVM to the GUI and send new configurations to the UCD91320 device.

1.4 Device Information

Key Devices on this EVM:

- UCD91320 - TI power sequencer IC
- TPS73533 - TI LDO Regulator
- TLV75801 - TI Linear Voltage Regular ICs (4 included on EVM)

2 Hardware

2.1 Power Requirements

The UCD91320 has a recommended positive voltage supply value of 2.9V to 3.6V. The device also has requirements for a 10uF bulk capacitor and 100nF decoupling capacitor between VDD and VSS, which are already populated on the EVM. The BPCAP pin also requires a 0.47uF capacitor connected to ground which is populated on the EVM.

To actually supply the device with power, there are 2 options:

1. Micro-USB cable
2. External power supply
3. USB-TO-GPIO2

The Micro-USB connection includes a path through an LDO to step the voltage down to the correct operating voltage for the UCD91320 device.

When using the external power supply, you can utilize 5V and configure the device jumpers to continue to utilize the same LDO as the Micro-USB supply. Alternatively you can supply the device and bypass the LDO using the jumpers. Please check the jumper configuration section for specifics info on how to configure these correctly.

2.2 Setup

Setup for this device should be minimal out of the box. You can check your jumpers to ensure that they are configured for your selected power supply, then you should be able to plug the device in and power on. The next step is to connect your PMBus interface to begin communicating with the device. At this stage we recommend starting up your TI Sequencer Studio GUI, and plugging in your USB-TO-GPIO2 device in order to get started. At this point you are ready to start sequencing.

2.3 Jumper Information

Table 2-1. Jumper Descriptions

Jumper Label	Description
J1	VREF Configuration - J1 allows the user to configure the VREF circuitry depending on whether internal or external VREF is used. When using internal VREF, this jumper should be closed to make use of the VREF bypass capacitor, C3. When using external VREF, this jumper should be unpopulated.
J2	VREF Configuration -J2 allows the user to configure the VREF circuitry depending on whether internal or external VREF is used. When using internal VREF, this jumper should be open. When using external VREF, this jumper can be closed to use the VDD rail on the PCB, or can be left unpopulated to use a voltage reference connected to the test point (TP3).
J3	LDO Output jumper - Used to connect the 3.3V LDO output to the monitoring circuit.
J4	LDO Feedback jumper - Used to connect the UCD91320 Margining output to the feedback pin of the 3.3V LDO
J5	LDO Enable Configuration - Allows the user to select how the 3.3V LDO is enabled using a shunt jumper. 1-2 selects the EN1 signal from the UCD91320, 2-3 selects the 5V power rail to enable the LDO at all times.
J6	LDO Output jumper - Used to connect the 2.5V LDO output to the monitoring circuit.
J7	LDO Feedback jumper - Used to connect the UCD91320 Margining output to the feedback pin of the 2.5V LDO
J8	LDO Enable Configuration - Allows the user to select how the 2.5V LDO is enabled using a shunt jumper. 1-2 selects the EN2 signal from the UCD91320, 2-3 selects the 5V power rail to enable the LDO at all times.
J9	LDO Output jumper - Used to connect the 1.8V LDO output to the monitoring circuit.
J10	LDO Feedback jumper - Used to connect the UCD91320 Margining output to the feedback pin of the 1.8V LDO
J11	5V Power Configuration Jumper - Selects power supply for the device using a shunt jumper. 1-2 selects the Micro-USB connector as the power source. 2-3 selects an external 5V power supply.

Table 2-1. Jumper Descriptions (continued)

Jumper Label	Description
J12	LDO Enable Configuration - Allows the user to select how the 1.8V LDO is enabled using a shunt jumper. 1-2 selects the EN3 signal from the UCD91320, 2-3 selects the 5V power rail to enable the LDO at all times.
J13	LDO Output jumper - Used to connect the 1.2V LDO output to the monitoring circuit.
J14	LDO Feedback jumper - Used to connect the UCD91320 Margining output to the feedback pin of the 1.2V LDO
J15	LDO Enable Configuration - Allows the user to select how the 1.8V LDO is enabled using a shunt jumper. 1-2 selects the EN4 signal from the UCD91320, 2-3 selects the 5V power rail to enable the LDO at all times.
J27	GPIO1 - extra pin to enable connection between GPIO1 and the USB-to-GPIO2 device. Close this jumper to allow the USB-to-GPIO2 to interface with the UCD91320's GPIO1
J28	PMBus Address selector 2 - See PMBus Address Configuration
J29	PMBus Address selector 1 - See PMBus Address Configuration
J30	PMBus Address selector 0 - See PMBus Address Configuration
J31	GPIO2 - extra pin to enable connection between GPIO2 and the USB-to-GPIO2 device. Close this jumper to allow the USB-to-GPIO2 to interface with the UCD91320's GPIO2

2.4 PMBus Address Configuration

PMBus Address Selection

PMBUS_ADDR2	PMBUS_ADDR1	PMBUS_ADDR0	UCD91320 PMBUS Address
L	L	L	0x11
L	L	H	0x13
L	H	L	0x17
L	H	H	0x31
H	L	L	0x33
H	L	H	0x71
H	H	L	0x73
H	H	H	0x77

2.5 Header Information

Table 2-2. Pin Headers

Pin Header Label	Description
J16	Monitoring pins pre-filtering and division. If you'd like to connect external circuitry to view the monitoring value before filtering, use these pins. They line up with the labeled device monitoring pin to the right in J17. J16 contains MON1 through MON7, and MON16.
J17	Monitoring pins post-filtering and division. If you'd like to connect external circuitry to the monitoring pins after filtering, use these pins. These are labeled with the device pin they connect to. J17 contains MON1 through MON7, and MON16.
J18	Monitoring pins pre-filtering and division. If you'd like to connect external circuitry to view the monitoring value before filtering, use these pins. They line up with the labeled device monitoring pin below in J19. J18 contains MON8 through MON15
J19	Monitoring pins post-filtering and division. If you'd like to connect external circuitry to the monitoring pins after filtering, use these pins. These are labeled with the device pin they connect to. J19 contains MON8 through MON15.

Table 2-2. Pin Headers (continued)

Pin Header Label	Description
J20	Margining output pre-filtering. These pins are available for connecting external circuitry to the raw PWM outputs from the margining pins. J20 contains MAR1 through MAR8.
J21	Margining output post-filtering. These pins are available for connecting external circuitry to the filtered margining signals. Each pin lines up with the labeled pins to the left in J22. J21 contains MAR 1 through MAR8.
J22	PMBus signals - 1x6 pin header exposing PMBus data, clock, alert, and control pins. With VDD and GND also pinned out.
J23	Special Function Header - includes pins for the SYNC_OUT pin, VREF+/-, and nReset pins.
J24	PMBus Header - pins out all PMBus signals. The adjacent 2.2kΩ pull up resistors on all 4 PMBus pins. Also note that VDD and GND are pinned out on J24.
J25	ENx Outputs - 2x8 pin header exposing ENx signals from the UCD91320. Can be left open to jump to another pin, or can be closed to illuminate an LED to visually assess pin state.
J26	ENx Outputs - 2x8 pin header exposing ENx signals from the UCD91320. Can be left open to jump to another pin, or can be closed to illuminate an LED to visually assess pin state.
J32 - J38	Additional pin headers with mixed functions to enable connections to all UCD91320 pins.

2.6 Push Buttons

The only push button available on this device is SW1. The SW1 push button is used to reset the UCD91320 device. Note that the RST signal is active low.

2.7 Interfaces

The UCD91320 device must utilize the PMBus interface. TI recommends utilizing the USB-TO-GPIO2 device in order to communicate with the UCD91320. By connecting the USB-TO-GPIO2 device to the J24 header, you can easily interface the TI Sequencer Studio GUI with the UCD91320EVM.

You may also utilize another PMBus host to interface with the device. Please review the [PMBus User's Guide](#) for more information on manually interfacing with the UCD91320EVM.

2.8 Debug Information

The UCD91320EVM utilizes the TI Sequencer Studio GUI in order to apply new configurations to the device, allowing for debug on the EVM.

In order to debug designs using the EVM, we recommend using an external logic analyzer or oscilloscope to probe the device pins and monitor whether the intended voltage sequencing is being produced on the device. The EVM also has LEDs for a convenient high level visual aid for simple signals like the enable pins on the device.

The UCD91320EVM pins out each step of the margining, filtering, LDO inputs and outputs, in order to provide many viewpoints for the device functionality.

2.9 Test Points

The UCD91320EVM offers multiple test points to allow effective monitoring of some on board signals. These test points are described in the table below.

Table 2-3.

Test Point Label	Description
TP1	UCD91320 VREF-
TP2	UCD91320 VDD
TP3	UCD91320 VREF+
TP4	UCD91320 VSS

Table 2-3. (continued)

Test Point Label	Description
TP5	5V external power test point
TP6	GND external power test point

3 Software

3.1 Software Description

Software relating to this EVM is limited to the TI Sequencer Studio GUI, which has a separate GUI users guide. Please refer to this document for detailed descriptions of the GUI functionality.

3.2 GUI Installation

The Sequencer Studio GUI can be downloaded from TI.com, or can be accessed using the GUI composer gallery on dev.ti.com.

3.3 Programming Options

In order to program new configurations to your UCD91320 on the UCD91320EVM, we recommend using the USB-TO-GPIO2 device, sold separately on ti.com.

4 Hardware Design Files

4.1 Schematics

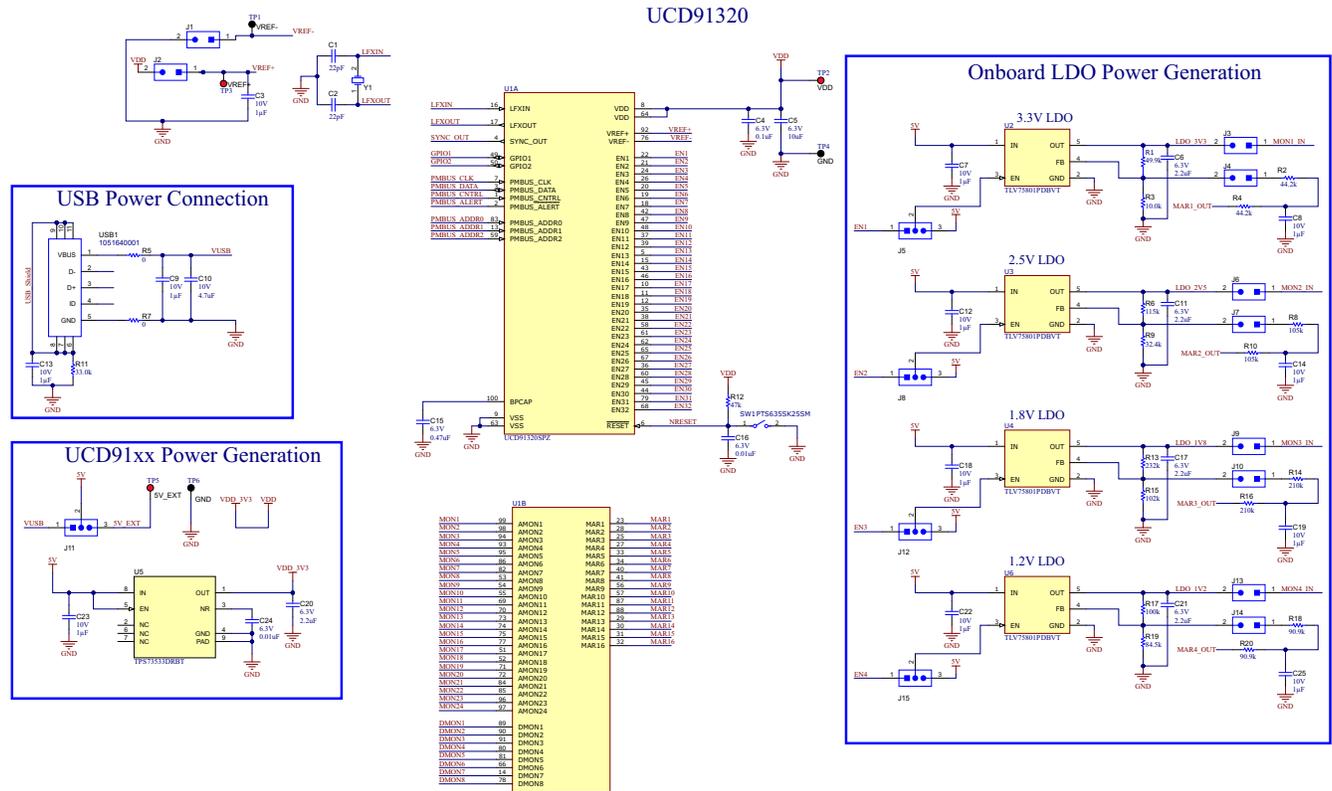
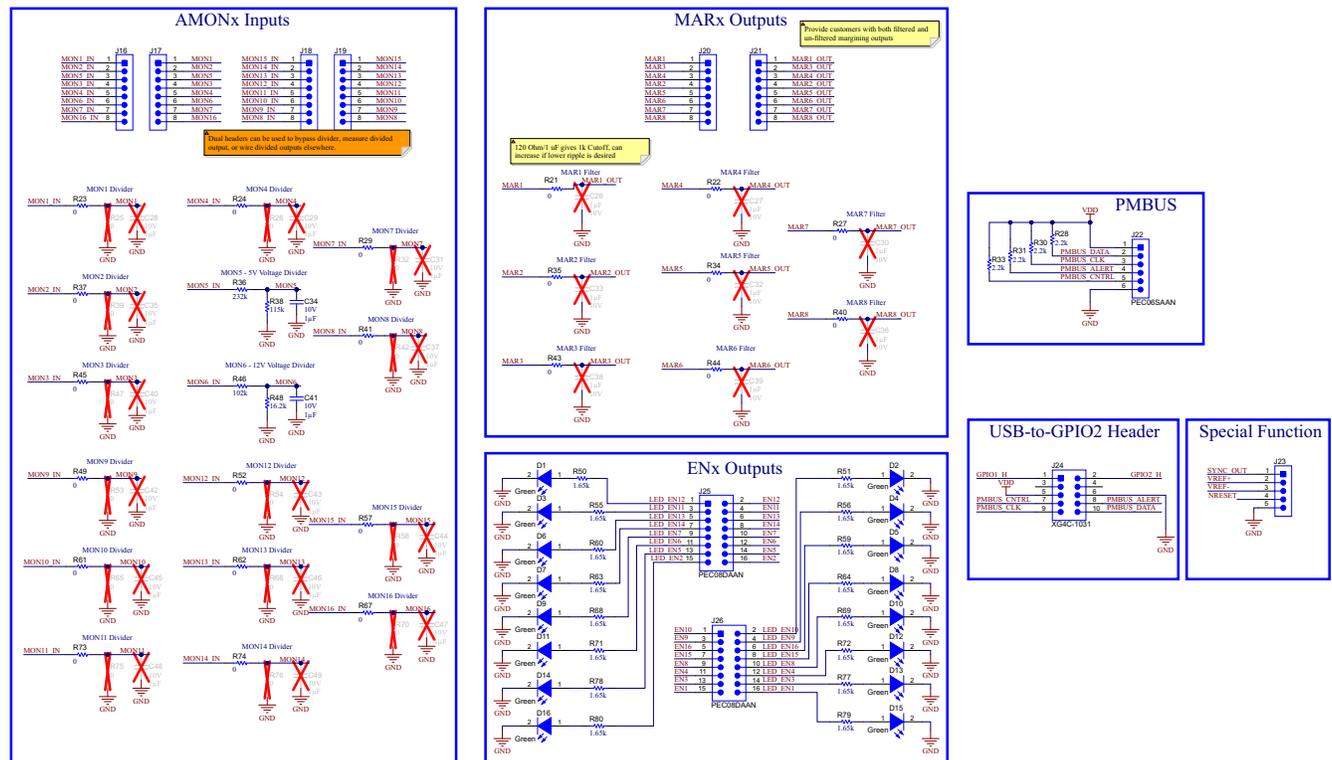


Figure 4-1. UCD91320EVM Schematic





PCB Number: MCU171
 PCB Rev. E.1



721 Assembly Note

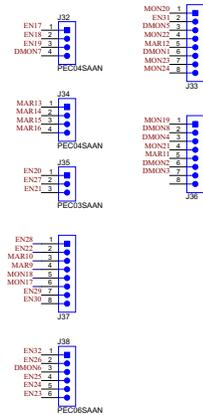
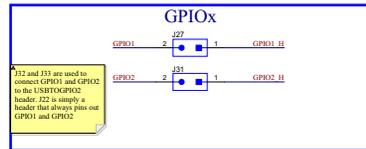
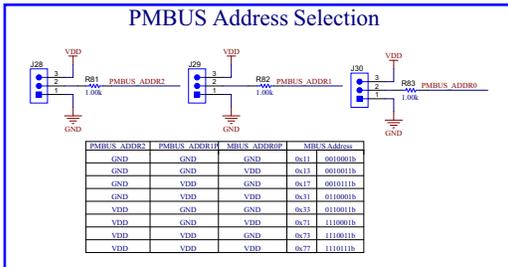
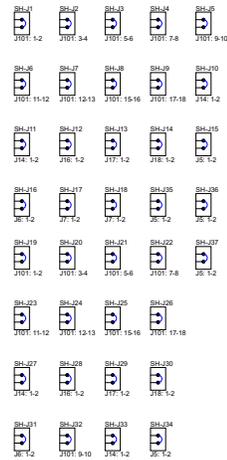
These assemblies are ESD sensitive. ESD precautions shall be observed.

722 Assembly Note

These assemblies must be clean and free from flux and all contaminants. Use of no clean flux is not acceptable.

723 Assembly Note

These assemblies must comply with workmanship standards IPC-A-610 Class 2, unless otherwise specified.



4.2 PCB Layouts

Basic block diagram demonstrating the layout of the UCD91320EVM

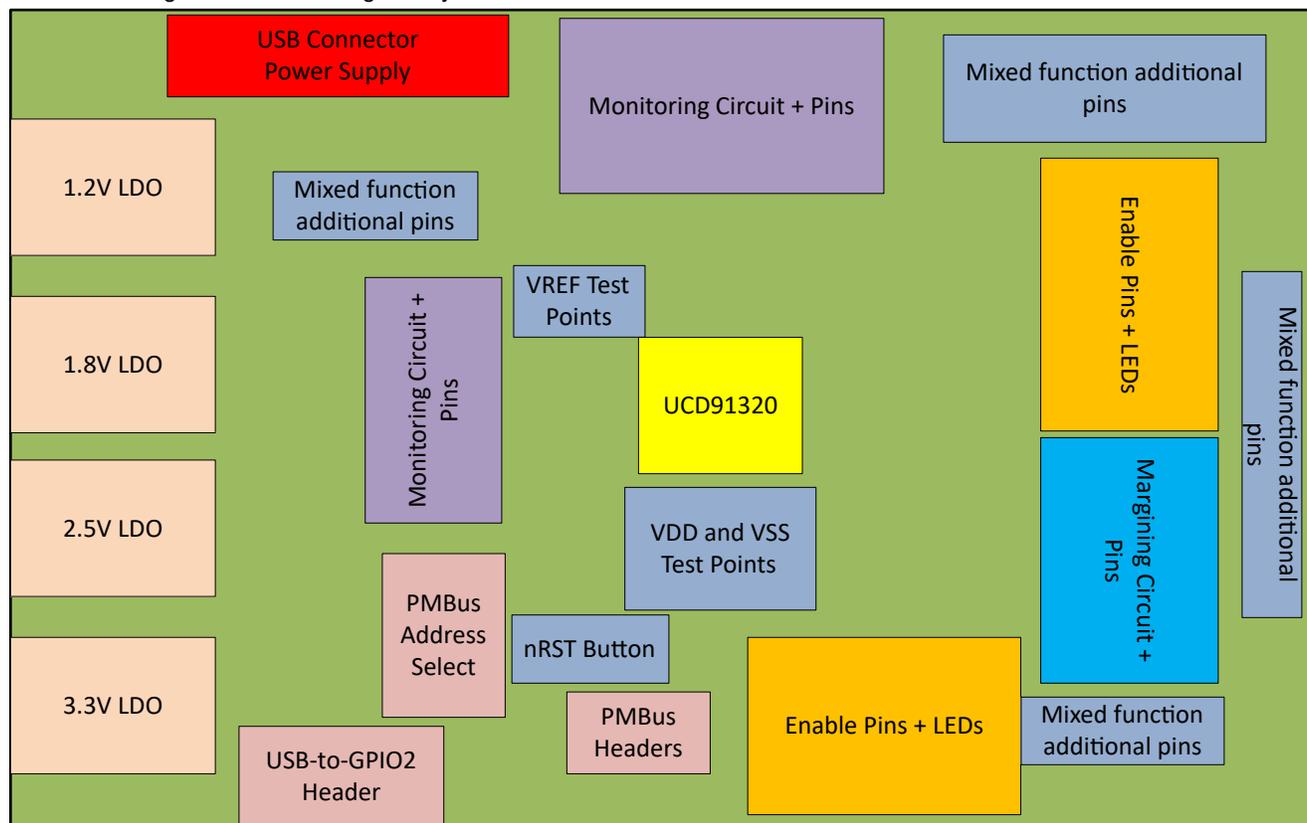


Figure 4-2. UCD91320 Block Diagram

4.3 Bill of Materials (BOM)

Table 4-1. UCD91320EVM Bill of Materials

Designator	Quantity	Value	Description	PackageReference	PartNumber	Manufacturer
!PCB1	1		Printed Circuit Board		MCU171	Any
C1, C2	2	22pF	CAP, CERM, 22 pF, 50 V, +/- 5%, C0G/NP0, 0402	0402	GRM1555C1H220 JA01D	MuRata
C3, C7, C8, C9, C12, C13, C14, C18, C19, C22, C23, C25, C34, C41	14	1uF	CAP, CERM, 1 μF, 10 V,+/- 10%, X7S, AEC-Q200 Grade 1, 0402	0402	GRT155C71A105 KE13D	MuRata
C4	1	0.1uF	CAP, CERM, 0.1 uF, 6.3 V, +/- 10%, X5R, 0402	0402	GRM155R60J104 KA01D	MuRata
C5	1	10uF	CAP, CERM, 10 uF, 6.3 V, +/- 20%, X5R, 0603	0603	GRM188R60J106 ME84	MuRata

Table 4-1. UCD91320EVM Bill of Materials (continued)

C6, C11, C17, C20, C21	5	2.2uF	CAP, CERM, 2.2 uF, 6.3 V, +/- 10%, X5R, 0402	0402	GRM155R60J225 KE95D	MuRata
C10	1	4.7uF	CAP, CERM, 4.7 uF, 10 V, +/- 20%, X5R, 0402	0402	GRM155R61A475 MEAAD	MuRata
C15	1	0.47uF	CAP, CERM, 0.47 uF, 6.3 V, +/- 10%, X5R, 0402	0402	GRM155R60J474 KE19D	MuRata
C16, C24	2	0.01uF	CAP, CERM, 0.01 uF, 6.3 V, +/- 10%, X5R, 0402	0402	GRM155R60J103 KA01D	MuRata
D1, D2, D3, D4, D5, D6, D7, D8, D9, D10, D11, D12, D13, D14, D15, D16	16	Green	LED, Green, SMD	1.7x0.65x0.8mm	LG L29K- G2J1-24-Z	OSRAM
H1, H2, H3, H4	4		Machine Screw, Round, #4-40 x 1/4, Nylon, Philips panhead	Screw	NY PMS 440 0025 PH	B&F Fastener Supply
H5, H6, H7, H8	4		Standoff, Hex, 0.5"L #4-40 Nylon	Standoff	1902C	Keystone
J1, J2, J3, J4, J6, J7, J9, J10, J13, J14, J27, J31	12		Header, 100mil, 2x1, Tin, TH	Header, 2 PIN, 100mil, Tin	PEC02SAAN	Sullins Connector Solutions
J5, J8, J11, J12, J15, J28, J29, J30, J35	9		Header, 100mil, 3x1, Tin, TH	Header, 3 PIN, 100mil, Tin	PEC03SAAN	Sullins Connector Solutions
J16, J17, J18, J19, J20, J21, J33, J36, J37	9		Header, 100mil, 8x1, Tin, TH	Header, 8x1, 100mil, TH	PEC08SAAN	Sullins Connector Solutions
J22, J38	2		Header, 100mil, 6x1, Tin, TH	TH, 6-Leads, Body 608x100mil, Pitch 100mil	PEC06SAAN	Sullins Connector Solutions
J23	1		Header, 2.54mm, 5x1, Tin, TH	Header, 2.54mm, 5x1, TH	PEC05SAAN	Sullins Connector Solutions
J24	1		Header (shrouded), 100mil, 5x2, Gold, TH	TH, 10-Leads, Body 8.5x20mm, Pitch 2.54mm	XG4C-1031	Omron Electronic Components
J25, J26	2		Header, 2.54 mm, 8x2, Tin, Vertical, TH	Header, 2.54 mm, 8x2, TH	PEC08DAAN	Sullins Connector Solutions
J32, J34	2		Header, 100mil, 4x1, Tin, TH	Header, 4x1, 100mil, TH	PEC04SAAN	Sullins Connector Solutions

Table 4-1. UCD91320EVM Bill of Materials (continued)

R1	1	49.9k	49.9 kOhms ±0.5% 0.063W, 0.1W Chip Resistor 0402 (1005 Metric) Automotive AEC- Q200 Thin Film	0402	RNCF0402DTE49 K9	Stackpole Electronics
R2, R4, R21	3	44.2k	RES, 44.2 k, 1%, 0.1 W, 0603	0603	RC0603FR-0744K 2L	Yageo
R3	1	10.0k	RES, 10.0 k, .1%, .0625 W, 0402	0402	RT0402BRD0710 KL	Yageo America
R5, R7, R23, R24, R27, R29, R34, R37, R40, R41, R44, R45, R49, R52, R57, R61, R62, R67, R73, R74	20	0	RES, 0, 5%, 0.1 W, 0603	0603	RC0603JR-070RL	Yageo
R6	1	115k	RES, 115 k, 1%, 0.063 W, 0402	0402	RC0402FR-07115 KL	Yageo America
R8, R10, R35	3	105k	RES, 105 k, 1%, 0.1 W, 0603	0603	RC0603FR-07105 KL	Yageo
R9	1	32.4k	RES, 32.4 k, 1%, 0.063 W, AEC- Q200 Grade 0, 0402	0402	CRCW040232K4F KED	Vishay-Dale
R11	1	33.0k	RES, 33.0 k, 1%, 0.063 W, 0402	0402	RC0402FR-0733K L	Yageo America
R12	1	47k	RES, 47 k, 5%, 0.063 W, AEC- Q200 Grade 0, 0402	0402	CRCW040247K0J NED	Vishay-Dale
R13	1	232k	RES, 232 k, 1%, 0.063 W, AEC- Q200 Grade 0, 0402	0402	CRCW0402232KF KED	Vishay-Dale
R14, R16, R43	3	210k	RES, 210 k, 1%, 0.1 W, 0603	0603	RC0603FR-07210 KL	Yageo
R15	1	102k	RES, 102 k, 1%, 0.063 W, AEC- Q200 Grade 0, 0402	0402	CRCW0402102KF KED	Vishay-Dale
R17	1	100k	RES, 100 k, 1%, 0.0625 W, 0402	0402	RC0402FR-07100 KL	Yageo America
R18, R20, R22	3	90.9k	RES, 90.9 k, 1%, 0.1 W, 0603	0603	RC0603FR-0790K 9L	Yageo

Table 4-1. UCD91320EVM Bill of Materials (continued)

R19	1	84.5k	RES, 84.5 k, 1%, 0.063 W, AEC- Q200 Grade 0, 0402	0402	CRCW040284K5F KED	Vishay-Dale
R28, R30, R31, R33	4	2.2k	RES, 2.2 k, 5%, 0.1 W, 0603	0603	RC0603JR-072K2 L	Yageo
R36	1	232k	RES, 232 k, 0.5%, 0.1 W, 0603	0603	RT0603DRE0723 2KL	Yageo America
R38	1	115k	RES, 115 k, 0.5%, 0.1 W, 0603	0603	RT0603DRE07115 KL	Yageo America
R46	1	102k	RES, 102 k, 0.1%, 0.1 W, 0603	0603	RT0603BRD0710 2KL	Yageo America
R48	1	16.2k	RES, 16.2 k, 0.5%, 0.1 W, 0603	0603	RT0603DRE0716 K2L	Yageo America
R50, R51, R55, R56, R59, R60, R63, R64, R68, R69, R71, R72, R77, R78, R79, R80	16	1.65k	RES, 1.65 k, 1%, 0.1 W, 0603	0603	RC0603FR-071K6 5L	Yageo
R81, R82, R83	3	1.00k	RES, 1.00 k, 1%, 0.0625 W, 0402	0402	RC0402FR-071KL	Yageo America
SH-J1, SH-J19	2	J101: 1-2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J2, SH-J20	2	J101: 3-4	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J3, SH-J21	2	J101: 5-6	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J4, SH-J22	2	J101: 7-8	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J5, SH-J32	2	J101: 9-10	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J6, SH-J23	2	J101: 11-12	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J7, SH-J24	2	J101: 12-13	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J8, SH-J25	2	J101: 15-16	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J9, SH-J26	2	J101: 17-18	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J10, SH-J11, SH-J27, SH-J33	4	J14: 1-2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J12, SH-J28	2	J16: 1-2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J13, SH-J29	2	J17: 1-2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec

Table 4-1. UCD91320EVM Bill of Materials (continued)

SH-J14, SH-J30	2	J18: 1-2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J15, SH-J34, SH-J35, SH-J36, SH-J37	5	J5: 1-2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J16, SH-J31	2	J6: 1-2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SH-J17, SH-J18	2	J7: 1-2	Shunt, 100mil, Gold plated, Black	Shunt	SNT-100-BK-G	Samtec
SW1	1		SWITCH TACTILE SPST-NO 0.05A 12V	SMT_SWITCH_T ACT_6MM1_3MM 7	PTS635SK25SM	C&K Components
TP1, TP4	2		Test Point, Compact, Black, TH	Black Compact Testpoint	5006	Keystone Electronics
TP2, TP3	2		Test Point, Compact, Red, TH	Red Compact Testpoint	5005	Keystone Electronics
TP5	1		Test Point, Multipurpose, Red, TH	Red Multipurpose Testpoint	5010	Keystone Electronics
TP6	1		Test Point, Multipurpose, Black, TH	Black Multipurpose Testpoint	5011	Keystone Electronics
U1	1		UCD91320SPZ	LQFP100	UCD91320SPZ	Texas Instruments
U2, U3, U4, U6	4		Linear Voltage Regulator IC 1 Output 500mA SOT-23-5	SOT-23-5	TLV75801PDBVT	Texas Instruments
U5	1		500mA, Adjustable, Low Quiescent Current, Low- Noise, High- PSRR, Single- Output LDO Regulator, DRB0008A (VSON-8)	DRB0008A	TPS73533DRBT	Texas Instruments
USB1	1		Receptacle, USB 2.0, Micro B, 5 Position, R/A, SMT	Receptacle, USB 2.0, Micro B, 5 Pos, 0.65mm Pitch, R/A, SMT	1051640001	Molex
Y1	1		Crystal, 32.768 KHz, 12.5 pF, SMD	SMD, 2-Leads, Body 3.2x1.5mm	X1A0001410014	Epson
C26, C27, C30, C32, C33, C36, C38, C39	0	1uF	CAP, CERM, 1 uF, 10 V, +/- 10%, X7R, AEC-Q200 Grade 1, 0603	0603	LMK107B7105KA HT	Taiyo Yuden

Table 4-1. UCD91320EVM Bill of Materials (continued)

C28, C29, C31, C35, C37, C40, C42, C43, C44, C45, C46, C47, C48, C49	0	1uF	CAP, CERM, 1 μF, 10 V,+/- 10%, X7S, AEC-Q200 Grade 1, 0402	0402	GRT155C71A105 KE13D	MuRata
FID1, FID2, FID3	0		Fiducial mark. There is nothing to buy or mount.	N/A	N/A	N/A
R25, R26, R32, R39, R42, R47, R53, R54, R58, R65, R66, R70, R75, R76	0	0	RES, 0, 5%, 0.1 W, 0603	0603	RC0603JR-070RL	Yageo

5 Additional Information

5.1 Trademarks

All trademarks are the property of their respective owners.

6 Related Documentation

6.1 Supplemental Content

Please see the TI Sequencer Studio GUI User's Guide for more information on using the GUI paired with this EVM.

7 References

- 1) [UCD91320 Datasheet](#)

Revision History

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

DATE	REVISION	NOTES
December 2025	*	Initial Release

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2. *Limited Warranty and Related Remedies/Disclaimers:*
 - 2.1 These terms do not apply to Software. The warranty, if any, for Software is covered in the applicable Software License Agreement.
 - 2.2 TI warrants that the TI EVM will conform to TI's published specifications for ninety (90) days after the date TI delivers such EVM to User. Notwithstanding the foregoing, TI shall not be liable for a nonconforming EVM if (a) the nonconformity was caused by neglect, misuse or mistreatment by an entity other than TI, including improper installation or testing, or for any EVMs that have been altered or modified in any way by an entity other than TI, (b) the nonconformity resulted from User's design, specifications or instructions for such EVMs or improper system design, or (c) User has not paid on time. Testing and other quality control techniques are used to the extent TI deems necessary. TI does not test all parameters of each EVM. User's claims against TI under this Section 2 are void if User fails to notify TI of any apparent defects in the EVMs within ten (10) business days after delivery, or of any hidden defects with ten (10) business days after the defect has been detected.
 - 2.3 TI's sole liability shall be at its option to repair or replace EVMs that fail to conform to the warranty set forth above, or credit User's account for such EVM. TI's liability under this warranty shall be limited to EVMs that are returned during the warranty period to the address designated by TI and that are determined by TI not to conform to such warranty. If TI elects to repair or replace such EVM, TI shall have a reasonable time to repair such EVM or provide replacements. Repaired EVMs shall be warranted for the remainder of the original warranty period. Replaced EVMs shall be warranted for a new full ninety (90) day warranty period.

WARNING

Evaluation Kits are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems.

User shall operate the Evaluation Kit within TI's recommended guidelines and any applicable legal or environmental requirements as well as reasonable and customary safeguards. Failure to set up and/or operate the Evaluation Kit within TI's recommended guidelines may result in personal injury or death or property damage. Proper set up entails following TI's instructions for electrical ratings of interface circuits such as input, output and electrical loads.

NOTE:

EXPOSURE TO ELECTROSTATIC DISCHARGE (ESD) MAY CAUSE DEGRADATION OR FAILURE OF THE EVALUATION KIT; TI RECOMMENDS STORAGE OF THE EVALUATION KIT IN A PROTECTIVE ESD BAG.

3 Regulatory Notices:

3.1 United States

3.1.1 Notice applicable to EVMs not FCC-Approved:

FCC NOTICE: This kit is designed to allow product developers to evaluate electronic components, circuitry, or software associated with the kit to determine whether to incorporate such items in a finished product and software developers to write software applications for use with the end product. This kit is not a finished product and when assembled may not be resold or otherwise marketed unless all required FCC equipment authorizations are first obtained. Operation is subject to the condition that this product not cause harmful interference to licensed radio stations and that this product accept harmful interference. Unless the assembled kit is designed to operate under part 15, part 18 or part 95 of this chapter, the operator of the kit must operate under the authority of an FCC license holder or must secure an experimental authorization under part 5 of this chapter.

3.1.2 For EVMs annotated as FCC – FEDERAL COMMUNICATIONS COMMISSION Part 15 Compliant:

CAUTION

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) This device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

FCC Interference Statement for Class A EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

FCC Interference Statement for Class B EVM devices

NOTE: This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- 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.
- Consult the dealer or an experienced radio/TV technician for help.

3.2 Canada

3.2.1 For EVMs issued with an Industry Canada Certificate of Conformance to RSS-210 or RSS-247

Concerning EVMs Including Radio Transmitters:

This device complies with Industry Canada license-exempt RSSs. Operation is subject to the following two conditions:

(1) this device may not cause interference, and (2) this device must accept any interference, including interference that may cause undesired operation of the device.

Concernant les EVMs avec appareils radio:

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes: (1) l'appareil ne doit pas produire de brouillage, et (2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Concerning EVMs Including Detachable Antennas:

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication. This radio transmitter has been approved by Industry Canada to operate with the antenna types listed in the user guide with the maximum permissible gain and required antenna impedance for each antenna type indicated. Antenna types not included in this list, having a gain greater than the maximum gain indicated for that type, are strictly prohibited for use with this device.

Concernant les EVMs avec antennes détachables

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante. Le présent émetteur radio a été approuvé par Industrie Canada pour fonctionner avec les types d'antenne énumérés dans le manuel d'usage et ayant un gain admissible maximal et l'impédance requise pour chaque type d'antenne. Les types d'antenne non inclus dans cette liste, ou dont le gain est supérieur au gain maximal indiqué, sont strictement interdits pour l'exploitation de l'émetteur.

3.3 Japan

3.3.1 *Notice for EVMs delivered in Japan:* Please see http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_01.page 日本国内に輸入される評価用キット、ボードについては、次のところをご覧ください。

<https://www.ti.com/ja-jp/legal/notice-for-evaluation-kits-delivered-in-japan.html>

3.3.2 *Notice for Users of EVMs Considered "Radio Frequency Products" in Japan:* EVMs entering Japan may not be certified by TI as conforming to Technical Regulations of Radio Law of Japan.

If User uses EVMs in Japan, not certified to Technical Regulations of Radio Law of Japan, User is required to follow the instructions set forth by Radio Law of Japan, which includes, but is not limited to, the instructions below with respect to EVMs (which for the avoidance of doubt are stated strictly for convenience and should be verified by User):

1. Use EVMs in a shielded room or any other test facility as defined in the notification #173 issued by Ministry of Internal Affairs and Communications on March 28, 2006, based on Sub-section 1.1 of Article 6 of the Ministry's Rule for Enforcement of Radio Law of Japan,
2. Use EVMs only after User obtains the license of Test Radio Station as provided in Radio Law of Japan with respect to EVMs, or
3. Use of EVMs only after User obtains the Technical Regulations Conformity Certification as provided in Radio Law of Japan with respect to EVMs. Also, do not transfer EVMs, unless User gives the same notice above to the transferee. Please note that if User does not follow the instructions above, User will be subject to penalties of Radio Law of Japan.

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3.3.3 *Notice for EVMs for Power Line Communication:* Please see http://www.tij.co.jp/lstds/ti_ja/general/eStore/notice_02.page

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3.4 European Union

3.4.1 *For EVMs subject to EU Directive 2014/30/EU (Electromagnetic Compatibility Directive):*

This is a class A product intended for use in environments other than domestic environments that are connected to a low-voltage power-supply network that supplies buildings used for domestic purposes. In a domestic environment this product may cause radio interference in which case the user may be required to take adequate measures.

-
4. *EVM Use Restrictions and Warnings:*
 - 4.1 EVMS ARE NOT FOR USE IN FUNCTIONAL SAFETY AND/OR SAFETY CRITICAL EVALUATIONS, INCLUDING BUT NOT LIMITED TO EVALUATIONS OF LIFE SUPPORT APPLICATIONS.
 - 4.2 User must read and apply the user guide and other available documentation provided by TI regarding the EVM prior to handling or using the EVM, including without limitation any warning or restriction notices. The notices contain important safety information related to, for example, temperatures and voltages.
 - 4.3 *Safety-Related Warnings and Restrictions:*
 - 4.3.1 User shall operate the EVM within TI's recommended specifications and environmental considerations stated in the user guide, other available documentation provided by TI, and any other applicable requirements and employ reasonable and customary safeguards. Exceeding the specified performance ratings and specifications (including but not limited to input and output voltage, current, power, and environmental ranges) for the EVM may cause personal injury or death, or property damage. If there are questions concerning performance ratings and specifications, User should contact a TI field representative prior to connecting interface electronics including input power and intended loads. Any loads applied outside of the specified output range may also result in unintended and/or inaccurate operation and/or possible permanent damage to the EVM and/or interface electronics. Please consult the EVM user 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, even with the inputs and outputs kept within the specified allowable ranges, some circuit components may have elevated case temperatures. These components include but are not limited to linear regulators, switching transistors, pass transistors, current sense resistors, and heat sinks, which can be identified using the information in the associated documentation. When working with the EVM, please be aware that the EVM may become very warm.
 - 4.3.2 EVMs are intended solely for use by technically qualified, professional electronics experts who are familiar with the dangers and application risks associated with handling electrical mechanical components, systems, and subsystems. User assumes all responsibility and liability for proper and safe handling and use of the EVM by User or its employees, affiliates, contractors or designees. User assumes all responsibility and liability to ensure that any interfaces (electronic and/or mechanical) between the EVM and any human body are designed with suitable isolation and means to safely limit accessible leakage currents to minimize the risk of electrical shock hazard. User assumes all responsibility and liability for any improper or unsafe handling or use of the EVM by User or its employees, affiliates, contractors or designees.
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