Low-Additive Jitter, Four-LVDS-Outputs Clock Buffer With Divider EVM

This user's guide describes how to use the CDCLVD1213 evaluation module (EVM) and provides users with guidelines to build their own systems. The EVM schematics and bill of materials are included.

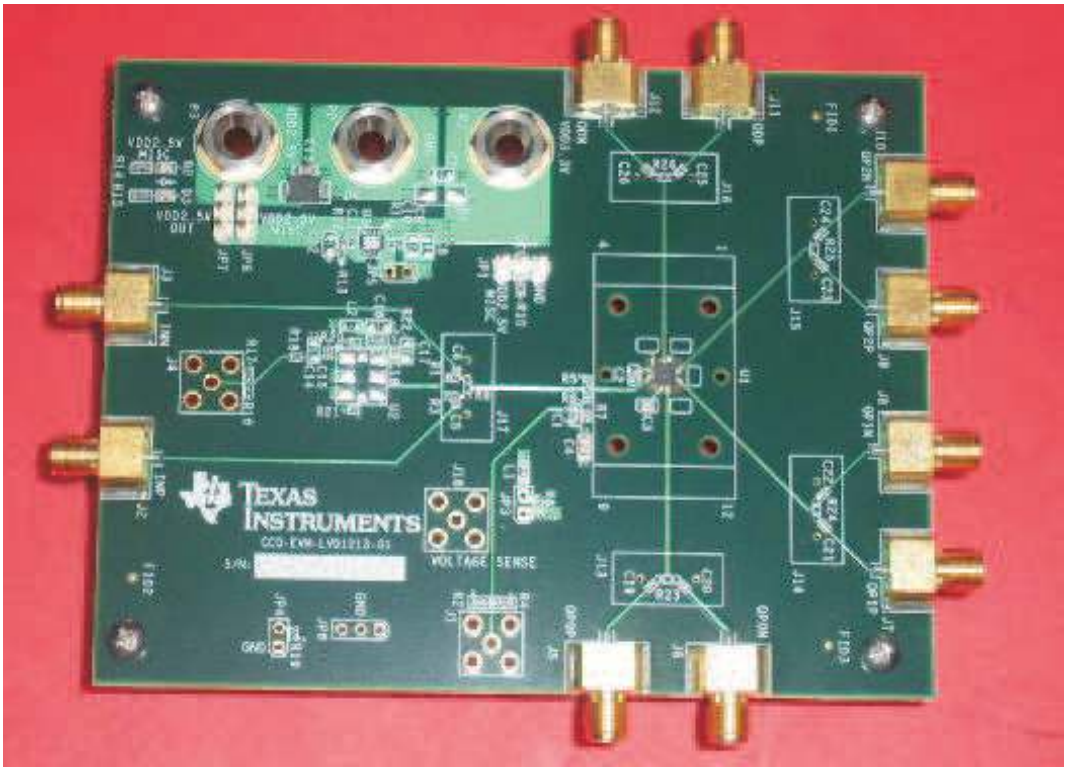

Figure 1. CDCLVD1213 Evaluation Board

1 Features

- Easy-to-use evaluation board to fan out low-phase noise clocks
- Easy device setup
- Fast configuration
- Control pin configurable through jumpers
- Board powered at 2.5 V
- Differential input clocks
- Device and EVM support four LVDS outputs

1.1 General Description

The CDCLVD1213 is a high-performance, low-additive jitter clock buffer with divider. The device has one differential input with internal 140-Ω differential input termination.

The evaluation module (EVM) is designed to demonstrate the electrical performance of the CDCLVD1213. This fully assembled and factory-tested evaluation board allows complete validation of device functionalities. For optimum performance, the board is equipped with SMA connectors and well-controlled 50-Ω impedance microstrip transmission lines.

1.2 Signal Path and Control Circuitry

The CDCLVD1213 supports differential input up to 800 MHz. Each device provides up to three LVDS outputs operating at the input frequency and one output with divide by /1, /2, or /4 frequency.

For more information, see the CDCLVD1213 product data sheet (SCAS897) for details.

2 Getting Started

The EVM has self-explanatory labeling and offers almost the same naming convention as used in the data sheet. All words appearing in ***bold italic*** print in this document are the actual labeling on the EVM.

3 Power Supply Connection

Connect the power supply source to the banana plug labeled ***VDD2.5V*** (***P3***), and connect the ground of the power supply source to the ***GND*** (***P2***). Place the jumpers between 2 and 3 for ***JP6*** and ***JP7***. Ensure that LED D2 and D3 are on.

Decoupling capacitors and ferrite beads isolate the EVM power from the device's power pins. Supply voltage of a 2.375-V to 2.625-V range can be used in this EVM.

The EVM has an option of providing 3.3 V (***P1***) and an LDO to convert 3.3 V to 2.5 V. The LDO (***U3***) is unpopulated on the EVM.

4 Input Clock Connection

The inputs can be applied through the SMAs, ***J2*** and ***J3***. These inputs are ac coupled to the device inputs and the common-mode voltage for these inputs after the ac-coupling capacitors are provided externally by ***R7*** (0 Ω) and ***R2*** and ***R4***.

The device input has an internal 140-Ω resistor. So, for 50-Ω characteristics impedance lines, an external 350 Ω is populated at ***R9***.

5 Output Clock

The CDCLVD1213 generates up to four LVDS outputs. Four outputs are available on the EVM through the following SMAs: ***J5*** and ***J6*** for QP0; ***J7*** and ***J8*** for QP1; ***J9*** and ***J10*** for QP2; and ***J11*** and ***J12*** for QD. The LVDS outputs are ac coupled to the respective SMAs. Each output pair has an option of 100-Ω termination on the board (***R23 - R26*** – unpopulated).

Table 1. Divider Selection Table for QD Output

DIV (JP1)	Divider Ratio
0 (GND)	/1
OPEN	/2
1 (VDD2.5VMISC)	/4

6 Onboard Oscillator/VCO

This EVM has an option of oscillator or VCO whose output is directly connected to the inputs of the CDCLVD12313 through ***R1*** and ***R3***. The oscillator (U2) and the associated components are unpopulated on the EVM.

7 The EVM Board Schematic

Figure 2 through Figure 4 show the printed-circuit board (PCB) schematics.

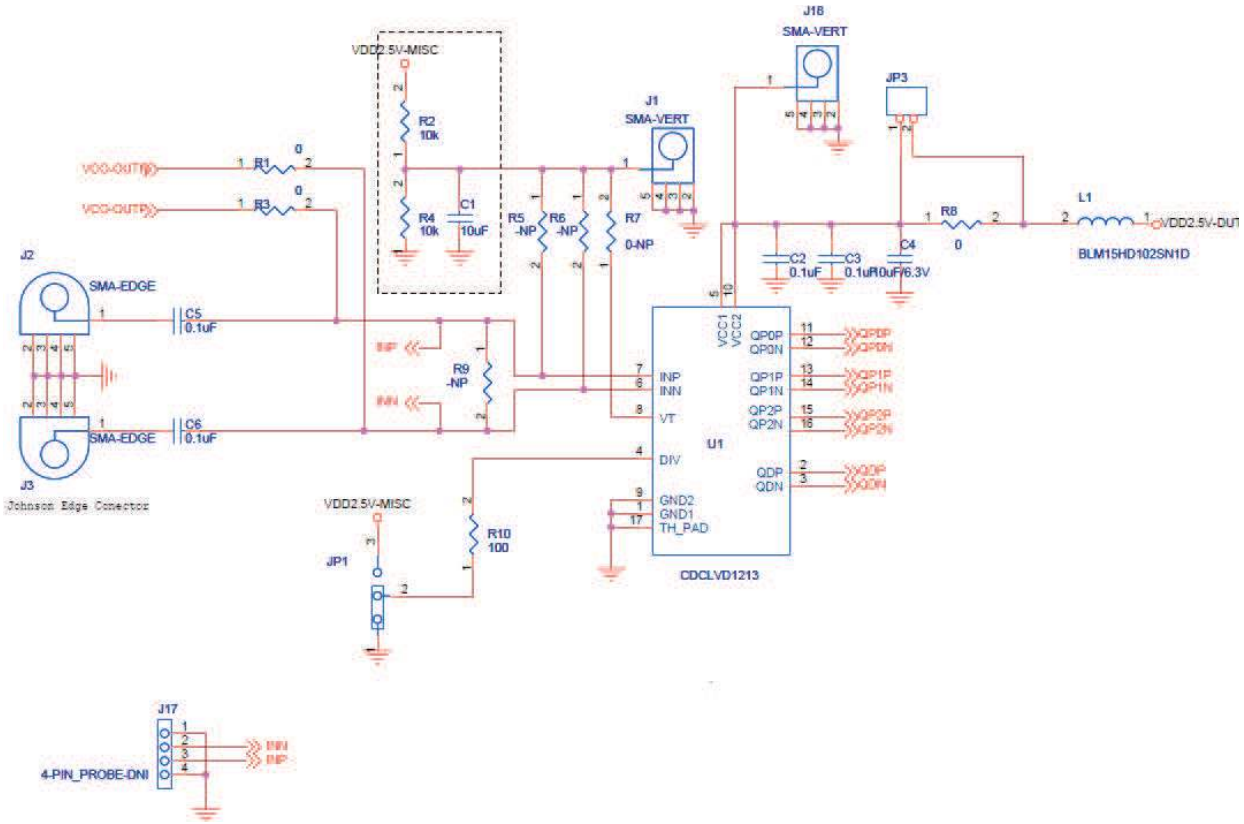

Figure 2. CDCLVD1213EVM – Schematic 1

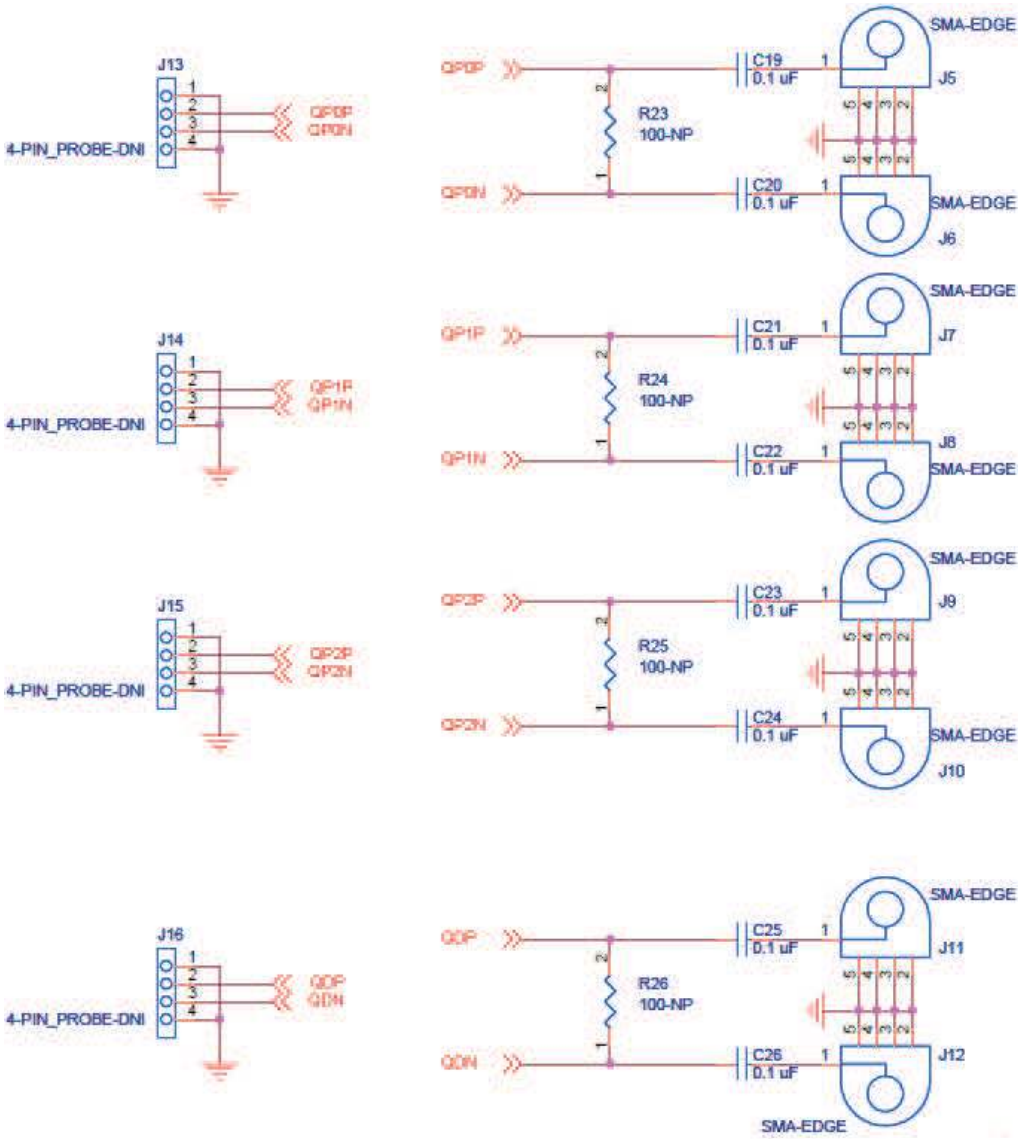

Figure 3. CDCLVD1213EVM – Schematic 2

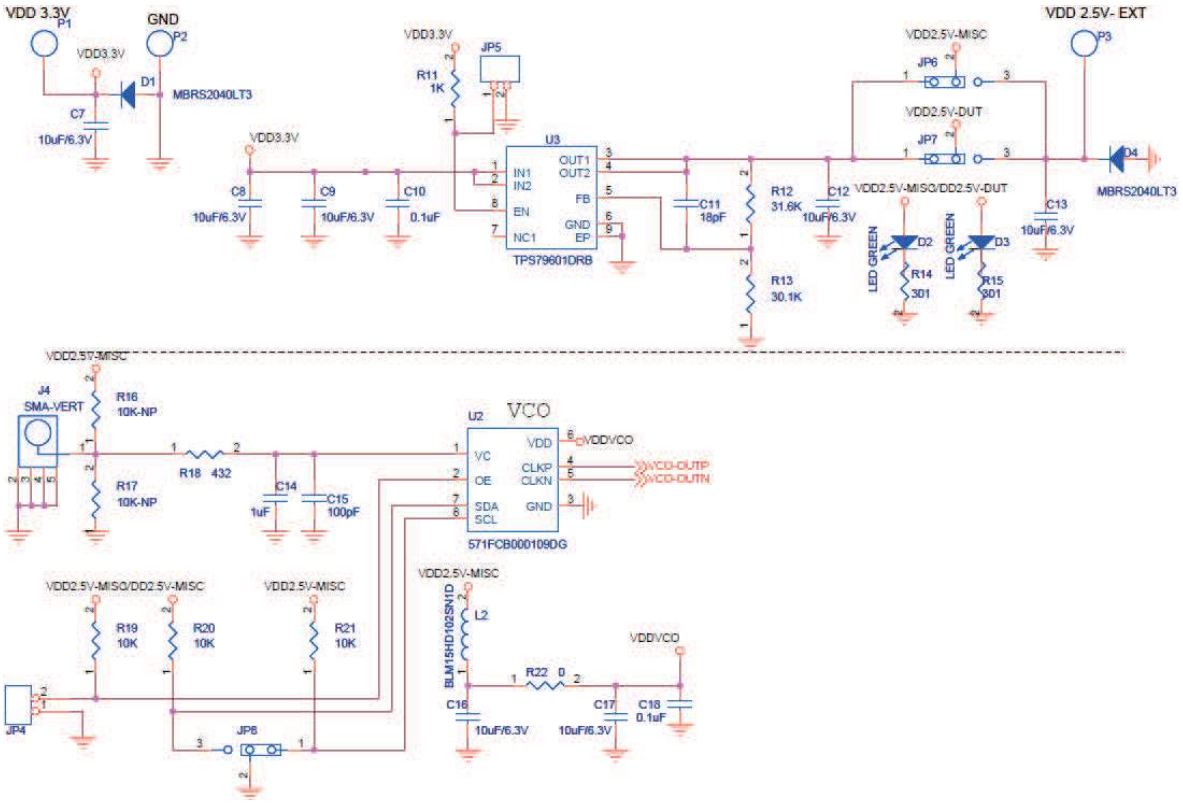

Figure 4. CDCLVD1213EVM – Schematic 3

8 Bill of Materials

Qty	Value	Ref Des	Footprint	Part Category	Manufacturer	Manufacturer Part #
12	0.1µF	C2, C3, C18–C26	0402	Capacitors	Venkel	C0402X7R160-104KNE
1	100pF	C15	0402	Capacitors	Venkel	C0402COG500-101JNE
1	18pF	C11	0402	Capacitors	Murata Electronics North America	GRM1555C1H180JZ01D
1	10µF	C1	0603	Capacitors	Panasonic	ECJ-1VB0J106M
1	1.0µF	C14	0805	Capacitors	Murata Electronics North America	GRM21BR71H105KA12L
8	10µF	C4, C13	0805	Capacitors	Murata Electronics North America	GRM21BR71A106KE51L
3	1 × 2	JP6, JP7	0.1"	Connectors	Samtec	HTSW-150-07-G-S
4	1 × 3	JP1	0.1"	Connectors	Samtec	HTSW-150-07-G-S
3	Banana Plug - Metal	P2, P3	4mm	Connectors	Emerson Network Power Connectivity Solutions	108-0740-001
3	142-0701-231		RF SMA	Connectors	Emerson Network Power Connectivity Solutions	142-0701-231
10	142-0721-881	J2, J3, J5–J12	RF SMA Edge mount	Connectors	Emerson Network Power Connectivity Solutions	142-0721-881
2	MBRS240LT3G	D4	SMB	Semiconductor Products	On Semiconductor	MBRS240LT3G
2	1000	L1	0603	Filters	Murata Electronics North America	BLM18HD102SN1D
1	TPS79601DRBR	U3	8-SON	Integrated Circuits	Texas Instruments	TPS79601DRBR
2	LED - Green	D2, D3	0603	Optoelectronics	Panasonic - Ssg	LNJ312G8LRA
3	0.0 (Zero Ohm)	R8	0402	Resistors	Panasonic - Ecg	ERJ-2GE0R00X
1	1.00K	R11	0402	Resistors	Venkel	CR0402-16W-1001FT
3	10.0K	R19, R20, R21	0402	Resistors	Rohm	MCR01MZPF1002
1	100	R10	0402	Resistors	Venkel	CR0402-16W-1000FT
1	30.1K	R13	0402	Resistors	Venkel	CR0402-16W-3012FT
1	30.9K	R12	0402	Resistors	Panasonic – Ecg	ERJ-2RKF3092X
1	453	R18	0402	Resistors	Panasonic – Ecg	ERJ-2RKF4530X
1	0.0 (Zero Ohm)	R22	0603	Resistors	Panasonic – Ecg	ERJ-3GEY0R00V
2	10.0K	R2, R4	0603	Resistors	Venkel	CR0603-10W-1002FT
2	301	R14, R15	0603	Resistors	Yageo America	RC0603FR-07301RL
1	CDCLVD1213	U1	16-QFN	Integrated Circuits	Texas Instruments	CDCLVD1213
1	571FCB000109DG	U2	8-SMT	Oscillator	Silicon Labs	571FCB000109DG
10	DNI	R16, R17, R5, R6, R9, R23–26, R7	0402	Resistors		
2	DNI	C5, C6	0402	Capacitors		
1	4-PIN_PROBE-DNI	J13–J17	4_17mil_100	Probe		

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EVM Warnings and Restrictions

It is important to operate this EVM within the input voltage range of -0.2 V to Vcc +0.2 V and the output voltage range of -0.2 V to Vcc +0.2 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 120° 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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