Evaluation Board User Guide
UG-301

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Evaluation Board for the ADM2484E 5 kV Signal Isolated, ESD Protected, 500 kbps, Half-/Full Duplex, *i*Coupler, Isolated RS-485 Transceiver

FEATURES

- Configurable as a half- or full duplex, isolated RS-485/RS-422 transceiver
- Suitable for 5 V or 3.3 V operation on V_{DD1}
- Suitable for 3.3 V operation on V_{DD2}
- 500 kbps data rate
- 256 nodes on bus

APPLICATIONS

- Isolated RS-485/RS-422 interfaces
- INTERBUS
- Industrial field networks
- Multipoint data transmission systems

EVALUATION KIT CONTENTS

EVAL–ADM2484EEBZ

GENERAL DESCRIPTION

The EVAL-ADM2484EEBZ allows the isolated ADM2484E RS-485 transceiver to be evaluated quickly and easily. The evaluation board allows all of the input and output functions to be exercised without the need for external components.

The ADM2484E differential bus transceiver is an integrated, galvanically isolated component designed for bidirectional data communication on multipoint bus transmission lines.

The device employs Analog Devices, Inc., *i*Coupler® technology to combine a 3-channel isolator, a three-state differential line driver, and a differential input receiver into a single package. The logic side of the device is powered with either a 5 V or a 3.3 V supply, and the bus side uses an isolated 3.3 V supply.

The EVAL-ADM2484EEBZ incorporates extra jumpers to switch in or out added termination resistors on the bus side of the transceiver and can switch between full and half-duplex configurations.

EVALUATION BOARD DIGITAL PHOTOGRAPH

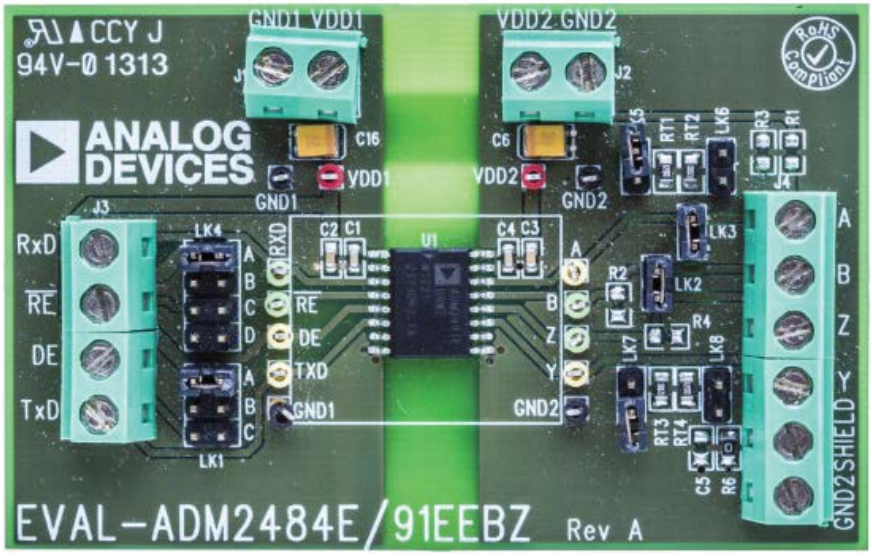


Figure 1. EVAL-ADM2484EEBZ Photo

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REVISION HISTORY

9/2016—Rev. 0 to Rev. A

Changes to General Description Section and Figure 1 1
Changes to Setting up the Evaluation Board Section, Half-Duplex/Full Duplex Configuration Section, and Table 1 3
Added Table 2; Renumbered Sequentially 3
Changes to Figure 2 4
Changes to Figure 3 and Figure 4 5
Changes to Figure 5 6
Changes to Table 3 7

8/2011—Revision 0: Initial Version

EVALUATION BOARD CONFIGURATIONS

SETTING UP THE EVALUATION BOARD

The EVAL-ADM2484EEBZ allows the isolated ADM2484E RS-485 transceiver to be easily and quickly evaluated. The evaluation board allows all input and output functions to be exercised without the need for external components.

Termination resistors (RT1, RT2, RT3, and RT4) are fitted on the receiver inputs; these resistors can be jumpered in or out using Jumpers LK5, LK6, LK7, and LK8 if deemed necessary. RT1 and RT2 are fitted between the A and B receiver input lines, whereas RT3 and RT4 are fitted between the Z and Y receiver input lines.

The value of the termination resistors must be equal to the characteristic impedance of the cable used; 120 Ω is the standard termination resistor value used for all termination resistors. Therefore, depending on the jumper configuration, receiver input/output lines can be terminated by 0 Ω (no termination), 120 Ω (RT1 or RT2 in place), or 60 Ω (RT1 and RT2, or RT3 and RT4). 0 Ω is usually used when the board is connected to a bus that is already terminated at both ends.

The logic side is suitable for 5 V or 3.3 V operation on the VDD1 test point. A 100 nF decoupling capacitor, C2, and a 10 nF decoupling capacitor, C1, are fitted between the VDD1 and GND1 test points. The EVAL-ADM2484EEBZ board also has C6, a 10 µF decoupling capacitor, for the input supply. The bus side is suitable for 3.3 V operation on the VDD2 test point. A 100 nF decoupling capacitor, C3, and a 10 nF decoupling capacitor, C4, are fitted between the VDD2 and GND2 test points. The board also includes C16, a 10 µF decoupling capacitor for the input supply (see Figure 2).

Refer to the AN-960 Application Note, *RS-485/RS-422 Circuit Implementation Guide,* for an explanation of bus termination and fail-safe biasing.

HALF-DUPLEX/FULL DUPLEX CONFIGURATION

To set up the EVAL-ADM2484EEBZ for a full duplex configuration, Jumpers LK2 and LK3 must be removed. For a half-duplex configuration, these jumpers must be included. LK2 ties B to Z, and LK3 ties A to Y.

Table 1. Board Configurations and Jumper Settings

Configuration	Jumpers Fitted	Jumpers Open
Half-Duplex Configuration	LK3 and LK2	Not applicable
Full Duplex Configuration	Not applicable	LK3 and LK2
$\overline{RE}$ High	LK4 (Position A)	LK4 (Position B, Position C, and Position D)
$\overline{RE}$ Low	LK4 (Position B)	LK4 (Position A, Position C, and Position D)
Using the Screw Terminal for $\overline{RE}$	LK4 (Position C)	LK4 (Position A, Position B, and Position D)
DE High	LK1 and LK4 (Position A)	LK4 (Position B and Position C)
DE Low	LK1 and LK4 (Position B)	LK4 (Position A and Position C)
Using the Screw Terminal for DE High/Low	LK1 and LK4 (Position C)	LK4 (Position A, Position B, and Position D)

Table 2. Termination Resistor Jumper Settings

Configuration	Jumpers Fitted	Jumpers Open
Receiver Line Inputs (A and B), 0 Ω Termination	Not applicable	LK5 and LK6
Receiver Line Inputs (A and B), 60 Ω Termination	LK5 and LK6	Not applicable
Receiver Line Inputs (A and B), 120 Ω Termination	LK5 or LK6	LK6 or LK5
Receiver Line Outputs (Z and Y), 0 Ω Termination	Not applicable	LK7 and LK8
Receiver Line Outputs (Z and Y), 60 Ω Termination	LK7 and LK8	Not applicable
Receiver Line Outputs (Z and Y), 120 Ω Termination	LK7 or LK8	LK7 or LK8

EVALUATION BOARD SCHEMATIC AND ARTWORK

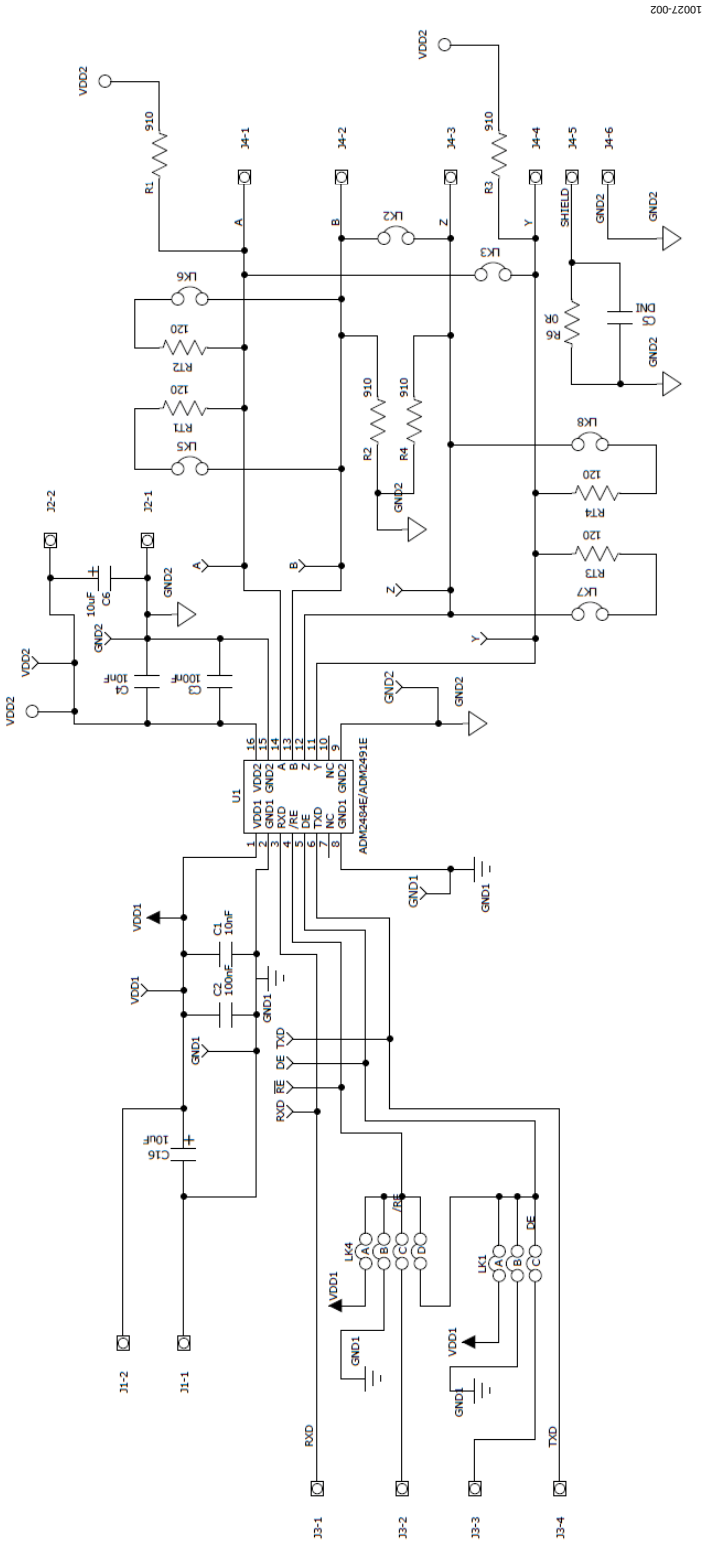


Figure 2. EVAL-ADM2484EEBZ Schematic

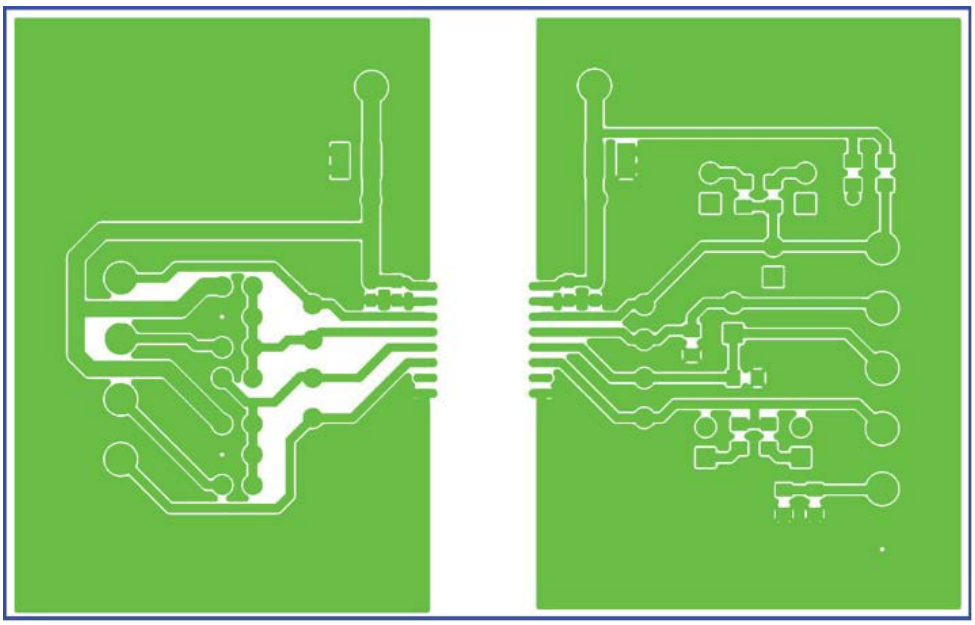


Figure 3. EVAL-ADM2484EEBZ Solder Side

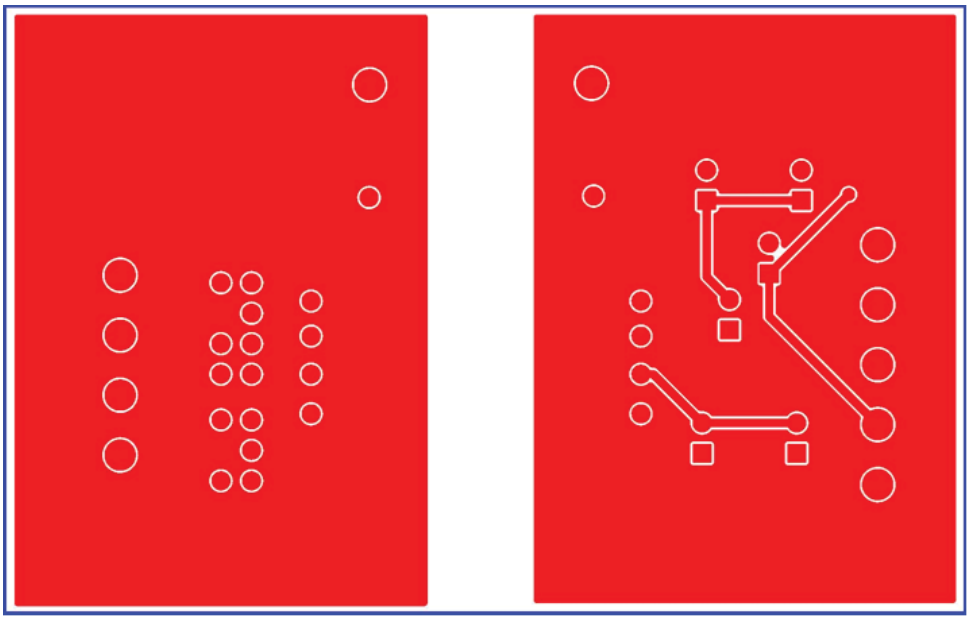


Figure 4. EVAL-ADM2484EEBZ Components

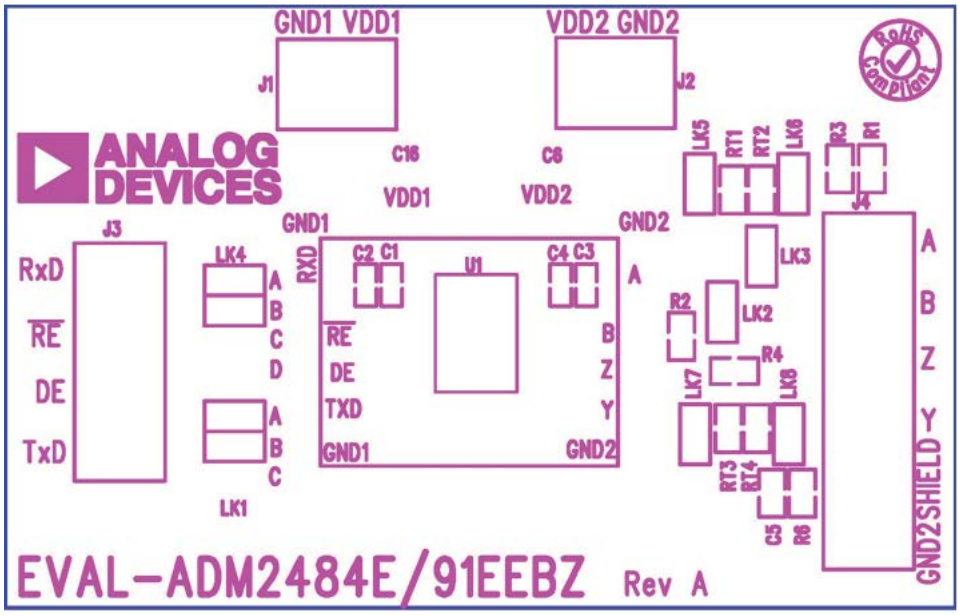


Figure 5. EVAL-ADM2484EEBZ Silkscreen

ORDERING INFORMATION

BILL OF MATERIALS

Table 3.

Quantity	Reference Designator	Description	Supplier/Part Number
1	A	Yellow test point	Vero/20-313140
1	B	Green test point	Vero/20-313138
2	C1, C4	Multilayer ceramic capacitor, 0603	Multicomp/MCCA000147
2	C2, C3	Multilayer ceramic capacitor, 0603	Multicomp/MCCA000255
1	C5	Capacitor (do not insert)	Not applicable
2	C6, C16	16 V polarized capacitor	KEMET/B45196H3106K209
1	DE	Yellow test point	Vero/20-313140
4	GND1, GND2, GND3, GND4	Black test point	Vero/20-2137
2	J1, J2	Terminal block, 2-way	Lumberg/KRM02
1	J3	Terminal block, 4-way	Lumberg/KRM04
1	J4	Terminal block, 6-way	Lumberg/KRM06
1	LK1	6-pin (3 × 2), 0.1 in. header and shorting block	Harwin/M20-9983646
6	LK2, LK3, LK5, LK6, LK7, LK8	Jumper block, 2-pin, 0.1 in. spacing	Harwin/M20-9990246
1	LK4	8-pin (4 × 2), 0.1 in. header and shorting block	Harwin/M20-9983646
4	R1, R2, R3, R4	Resistor, 0805 (do not insert for ADM2491E)	Multicomp/MC 0.1W 0805 1% 910R
1	R6	Thick film resistor, 0805	Vishay Draloric/CRCW08050000Z0EA
1	RE	Green test point	Vero/20-313138
4	RT1, RT2, RT3, RT4	Thick film resistor, 0805	Multicomp/MC 0.1W 0805 1% 120R
1	RXD	Green test point	Vero/20-313138
1	TXD	Yellow test point	Vero/20-313140
1	U1	ADM2484E/ADM2491E	Analog Devices/ADM2484EBRWZ, ADM2491EBRWZ
2	VDD1, VDD2	Red test point	Vero/20-313137
1	Y	Yellow test point	Vero/20-313140
1	Z	Green test point	Vero/20-313138

RELATED LINKS

Resource	Description
ADM2484E	5 kV Signal Isolated, ESD Protected, 500 kbps, Full/Half Duplex RS-485 Transceiver
AN-960	RS-485/RS-422 Circuit Implementation Guide

NOTES



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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