

Evaluation Board for the **ADM2491E** ± 8 kV Signal Isolated, High Speed (16 Mbps), ESD Protected, Full/Half Duplex RS-485 Transceiver

FEATURES

Configurable as half/full duplex, isolated RS-485/RS-422 transceivers

Suitable for 5 V or 3.3 V operation on V_{DD1}

Suitable for 5 V operation on V_{DD2}

16 Mbps data rate

32 nodes on bus

ADM2491E APPLICATIONS

Isolated RS-485/RS-422 interfaces

INTERBUS

Industrial field networks

Multipoint data transmission systems

GENERAL DESCRIPTION

The EVAL-ADM2491EEBZ allows the isolated **ADM2491E** RS-485 transceiver to be easily and quickly evaluated. The evaluation board allows all of the input and output functions to be exercised without the need for external components.

The **ADM2491E** 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., *iCoupler*® 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 5 V supply.

EVALUATION KIT CONTENTS

EVAL-ADM2491EEBZ

EVALUATION BOARD DIGITAL PHOTOGRAPH



Figure 1.

TABLE OF CONTENTS

Features	1	Evaluation Board Configurations	3
ADM2491E Applications.....	1	Setting Up the Evaluation Board.....	3
Evaluation Kit Contents.....	1	Evaluation Board Schematic and Artwork.....	4
General Description	1	Ordering Information.....	6
Evaluation Board Digital Photograph.....	1	Bill of Materials.....	6
Revision History	2	Related Links.....	6

REVISION HISTORY

2/13—Rev. 0 to Rev. A

Changes to Features and General Description	1
Changes to Setting Up the Evaluation Board Section	3

8/11—Revision 0: Initial Version

EVALUATION BOARD CONFIGURATIONS

SETTING UP THE EVALUATION BOARD

The EVAL-ADM2491E EBZ allows the isolated [ADM2491E](#) RS-485 transceiver to be easily and quickly evaluated. The evaluation board allows all of the input and output functions to be exercised without the need for external components.

A termination resistor, RT, is fitted on the receiver inputs; this can be changed or removed, if necessary. The value of the termination resistor should be equal to the characteristic impedance of the cable used; 120 Ω is the standard termination resistor value. Remove RT if 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 VDD1. There is a 100 nF decoupling capacitor, C2, and a 10 nF decoupling capacitor, C1 fitted between VDD1 and GND1. The bus side is suitable for 5 V operation on VDD2. There is a 100 nF decoupling capacitor, C3, and a 10 nF decoupling capacitor, C4, fitted between VDD2 and GND2. See Figure 2.

Refer to [AN-960 Application Note, RS-485/RS-422 Circuit Implementation Guide](#), for an explanation of bus termination and fail-safe biasing.

HALF-/FULL DUPLEX CONFIGURATION

To set up the EVAL-ADM2491EEBZ for full duplex configuration, the jumpers, LK1 and LK2, must be removed. For a half-duplex configuration, these jumpers must be included. LK1 ties B to Y, and LK2 ties A to Z.

Table 1. Board Configurations and Jumper Settings

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

EVALUATION BOARD SCHEMATIC AND ARTWORK

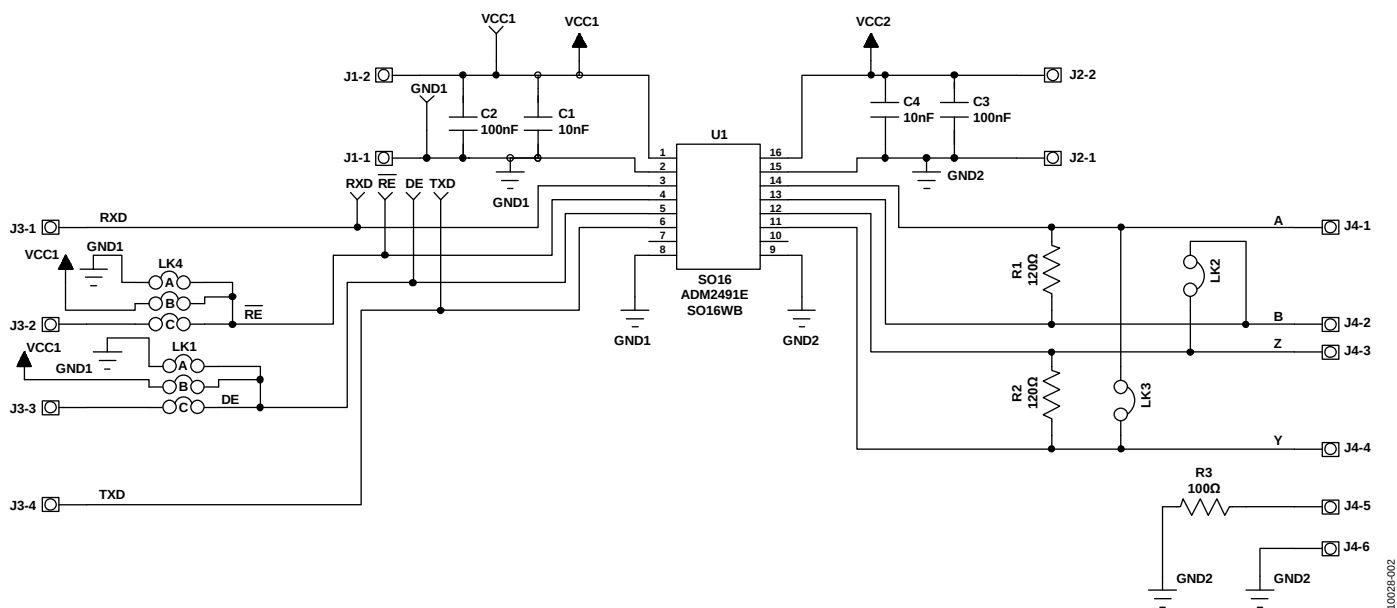


Figure 2. EVAL-ADM2491EEBZ Schematic

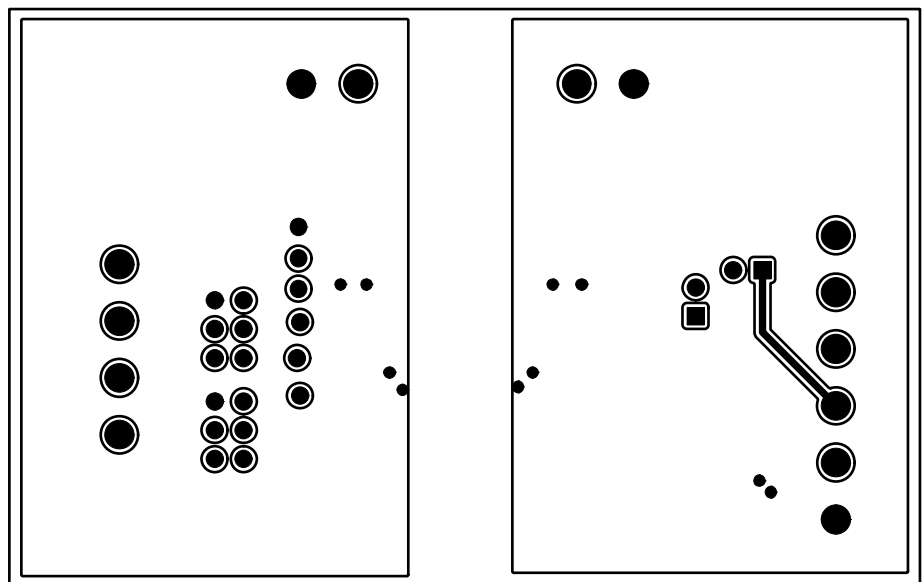


Figure 3. EVAL-ADM2491EEBZ Solder Side

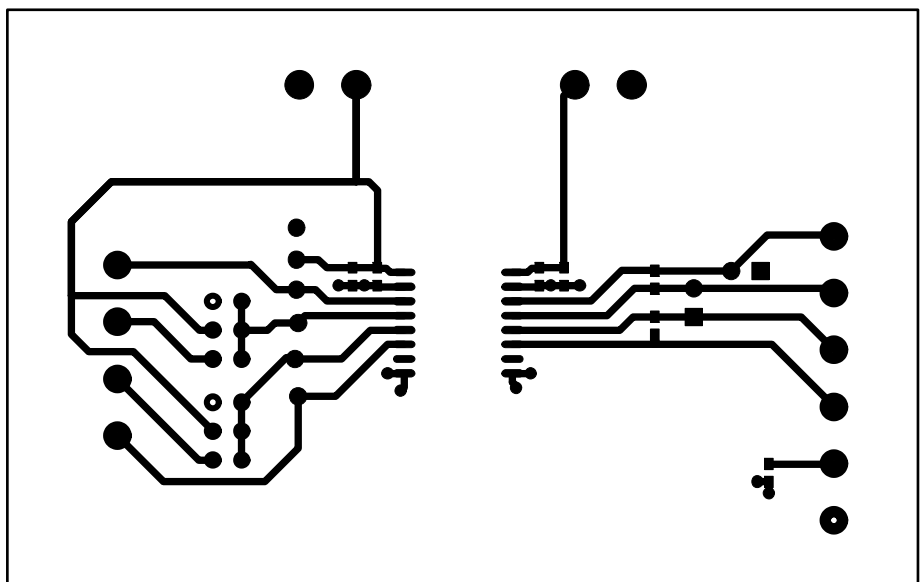


Figure 4. EVAL-ADM2491EEBZ Components

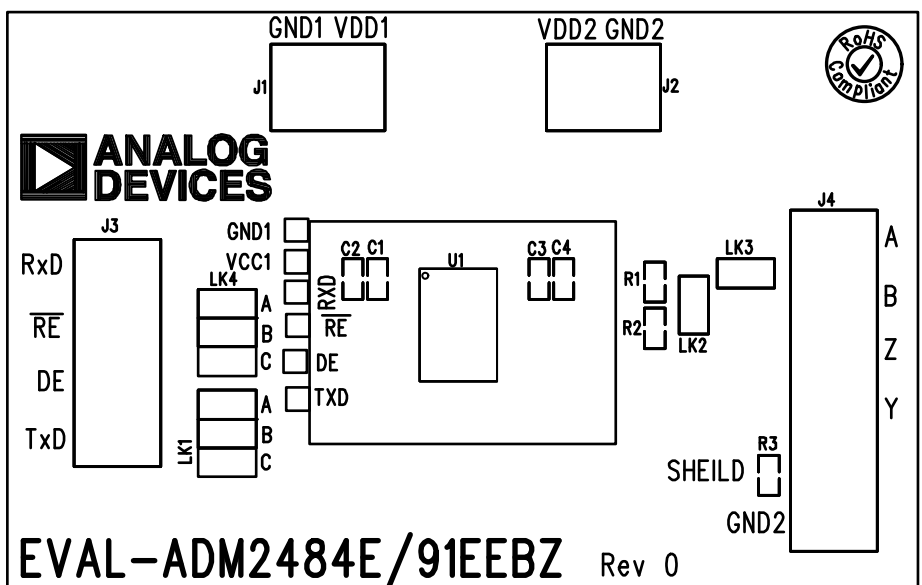


Figure 5. EVAL-ADM2491EEBZ Silkscreen

ORDERING INFORMATION

BILL OF MATERIALS

Table 2.

Quantity	Reference Designator	Description	Supplier/Part Number
2	R1, R2	Resistor, 120 Ω , 0603	Tyco Electronics Connectivity/Neohm/CPF0603B120RE1
1	R3	Resistor, 100 Ω , 0603	Tyco Electronics Connectivity/Neohm/CPF0603B120RE1
2	C1, C4	Capacitor, Size 0603, 10 nF	AVX Corporation/06031C103K4Z2A
2	C2, C3	Capacitor, Size 0603, 100 nF	AVX Corporation/06033G104ZAT2A
2	J1, J2	CON\POWER, 2-pin terminal block (5 mm pitch)	Lumberg/KRM 02
1	J4	CON\POWER, terminal block, PCB, 3-way	Lumberg/KRM 03
1	J3	CON\POWER4, 4-pin terminal block	Lumberg/KRM 04
2	LK1, LK2	Board-to-board connector header, 4-way, 2-row and Jumper $\times 2$	SPC Technology/SPC20499, Harwin/M7566-05
2	LK3, LK4	Board-to-board connector header, 2-way, 1-row and Jumper $\times 2$	Molex/22-28-4020, Harwin/M7566-05
1	U1	16-lead wide body SOIC	Analog Devices/ ADM2491EBRWZ
1	GND1	Test point, black	Vero Technologies/20-2137
1	VCC1	Test point, red	Vero Technologies/20-313137
4	RXD, DE, $\overline{RE}$, TXD	Test point, yellow	Vero Technologies/20-313140

RELATED LINKS

Resource	Description
ADM2491E	5 kV Signal Isolated, High Speed (16 Mbps), ESD Protected, Full/Half Duplex RS-485 Transceiver
AN-960	RS-485/RS-422 Circuit Implementation Guide

NOTES

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.

Legal Terms and Conditions

By using the evaluation board discussed herein (together with any tools, components documentation or support materials, the "Evaluation Board"), you are agreeing to be bound by the terms and conditions set forth below ("Agreement") unless you have purchased the Evaluation Board, in which case the Analog Devices Standard Terms and Conditions of Sale shall govern. Do not use the Evaluation Board until you have read and agreed to the Agreement. Your use of the Evaluation Board shall signify your acceptance of the Agreement. This Agreement is made by and between you ("Customer") and Analog Devices, Inc. ("ADI"), with its principal place of business at One Technology Way, Norwood, MA 02062, USA. Subject to the terms and conditions of the Agreement, ADI hereby grants to Customer a free, limited, personal, temporary, non-exclusive, non-sublicensable, non-transferable license to use the Evaluation Board FOR EVALUATION PURPOSES ONLY. Customer understands and agrees that the Evaluation Board is provided for the sole and exclusive purpose referenced above, and agrees not to use the Evaluation Board for any other purpose. Furthermore, the license granted is expressly made subject to the following additional limitations: Customer shall not (i) rent, lease, display, sell, transfer, assign, sublicense, or distribute the Evaluation Board; and (ii) permit any Third Party to access the Evaluation Board. As used herein, the term "Third Party" includes any entity other than ADI, Customer, their employees, affiliates and in-house consultants. The Evaluation Board is NOT sold to Customer; all rights not expressly granted herein, including ownership of the Evaluation Board, are reserved by ADI. **CONFIDENTIALITY.** This Agreement and the Evaluation Board shall all be considered the confidential and proprietary information of ADI. Customer may not disclose or transfer any portion of the Evaluation Board to any other party for any reason. Upon discontinuation of use of the Evaluation Board or termination of this Agreement, Customer agrees to promptly return the Evaluation Board to ADI. **ADDITIONAL RESTRICTIONS.** Customer may not disassemble, decompile or reverse engineer chips on the Evaluation Board. Customer shall inform ADI of any occurred damages or any modifications or alterations it makes to the Evaluation Board, including but not limited to soldering or any other activity that affects the material content of the Evaluation Board. Modifications to the Evaluation Board must comply with applicable law, including but not limited to the RoHS Directive. **TERMINATION.** ADI may terminate this Agreement at any time upon giving written notice to Customer. Customer agrees to return to ADI the Evaluation Board at that time. **LIMITATION OF LIABILITY.** THE EVALUATION BOARD PROVIDED HEREUNDER IS PROVIDED "AS IS" AND ADI MAKES NO WARRANTIES OR REPRESENTATIONS OF ANY KIND WITH RESPECT TO IT. ADI SPECIFICALLY DISCLAIMS ANY REPRESENTATIONS, ENDORSEMENTS, GUARANTEES, OR WARRANTIES, EXPRESS OR IMPLIED, RELATED TO THE EVALUATION BOARD INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTY OF MERCHANTABILITY, TITLE, FITNESS FOR A PARTICULAR PURPOSE OR NON-INFRINGEMENT OF INTELLECTUAL PROPERTY RIGHTS. IN NO EVENT WILL ADI AND ITS LICENSORS BE LIABLE FOR ANY INCIDENTAL, SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES RESULTING FROM CUSTOMER'S POSSESSION OR USE OF THE EVALUATION BOARD, INCLUDING BUT NOT LIMITED TO LOST PROFITS, DELAY COSTS, LABOR COSTS OR LOSS OF GOODWILL. ADI'S TOTAL LIABILITY FROM ANY AND ALL CAUSES SHALL BE LIMITED TO THE AMOUNT OF ONE HUNDRED US DOLLARS (\$100.00). **EXPORT.** Customer agrees that it will not directly or indirectly export the Evaluation Board to another country, and that it will comply with all applicable United States federal laws and regulations relating to exports. **GOVERNING LAW.** This Agreement shall be governed by and construed in accordance with the substantive laws of the Commonwealth of Massachusetts (excluding conflict of law rules). Any legal action regarding this Agreement will be heard in the state or federal courts having jurisdiction in Suffolk County, Massachusetts, and Customer hereby submits to the personal jurisdiction and venue of such courts. The United Nations Convention on Contracts for the International Sale of Goods shall not apply to this Agreement and is expressly disclaimed.