

Evaluating the **ADM2490E**—5 kV, Signal Isolated, High Speed, 16 Mbps, ESD Protected, Full Duplex, *iCoupler*, Isolated RS-485 Transceiver

FEATURES

- Full duplex, isolated RS-485/RS-422 transceivers
- Suitable for 5 V or 3 V operation on V_{DD1}
- Suitable for 5 V operation on V_{DD2}
- 16 Mbps data rate
- 32 nodes on bus

APPLICATIONS

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

EVALUATION KIT CONTENTS

- EVAL-ADM2490EEBZ

GENERAL DESCRIPTION

The EVAL-ADM2490EEBZ allows the isolated [ADM2490E](#) 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 [ADM2490E](#) differential bus transceiver is an integrated, galvanically isolated component designed for bidirectional data communication on multipoint bus transmission lines.

The device uses Analog Devices, Inc., *iCoupler*® technology to combine a 2-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 V supply, and the bus side uses an isolated 5 V supply.

EVALUATION BOARD PHOTOGRAPH

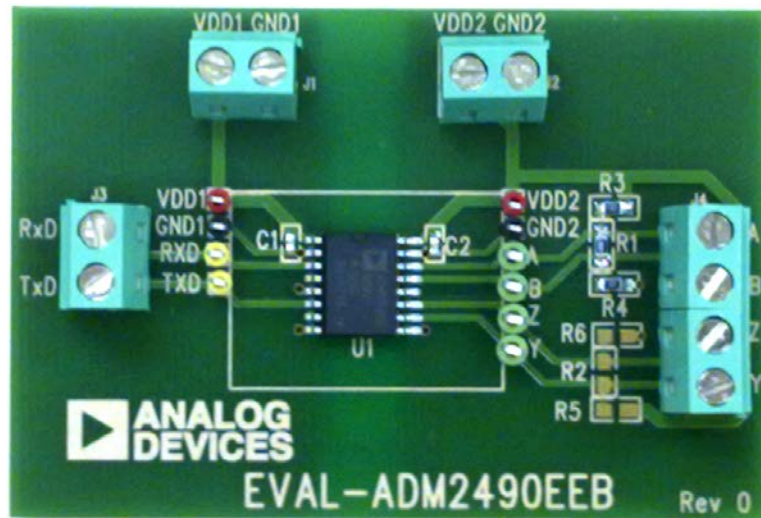


Figure 1.

TABLE OF CONTENTS

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

REVISION HISTORY

2/13—Revision 0: Initial Version

EVALUATION BOARD CONFIGURATIONS

SETTING UP THE EVALUATION BOARD

The EVAL-ADM2490EEBZ allows the isolated [ADM2490E](#) 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 (R_T) of $120\ \Omega$ is fitted on the receiving side of the transceiver, along with a pull-up resistor of $1.3\ \text{k}\Omega$ on the noninverting side and a pull-down resistor of $1.3\ \text{k}\Omega$ on the inverting side for fail-safe operation.

The logic side is suitable for 5 V or 3 V operation on V_{DD1} . There are two 100 nF decoupling capacitors (C1 and C2) fitted between

V_{DD1} and GND_1 and between V_{DD2} and GND_2 , respectively. The bus side is suitable for 5 V operation on V_{DD2} . 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.

To set up the evaluation board for testing, the connections described in Table 1 must be made between two evaluation boards. TxD and RxD serve as the transmitting and receiving lines, respectively.

Table 1. Evaluation Board Connections

Screw Terminal Board	Description
Screw Terminal Board 1	
Y	Noninverting output
Z	Inverting output
A	Noninverting input
B	Inverting input
Screw Terminal Board 2	
A	Noninverting input
B	Inverting input
Y	Noninverting output
Z	Inverting output

EVALUATION BOARD SCHEMATIC AND ARTWORK

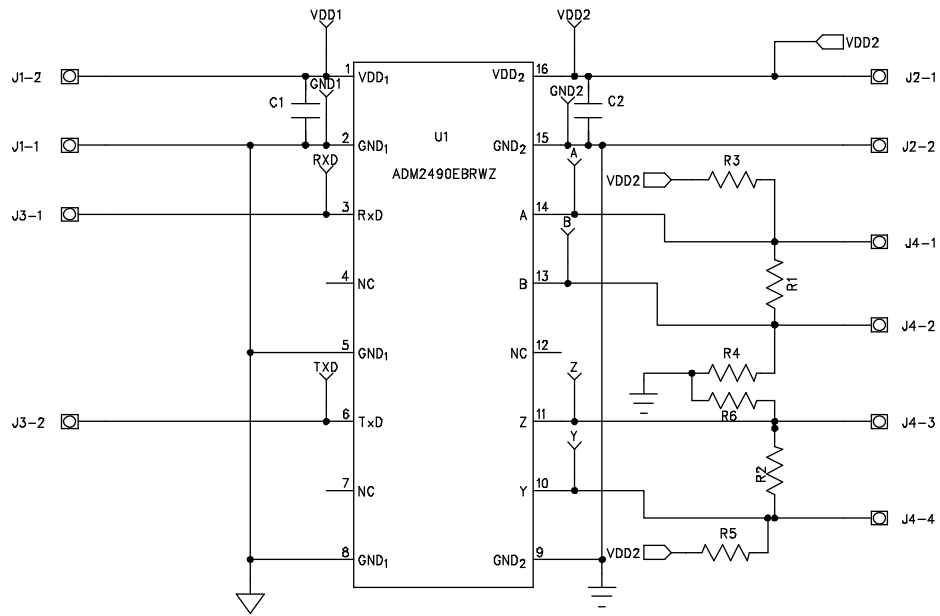


Figure 2. EVAL-ADM2490EEBZ Schematic

11163-002

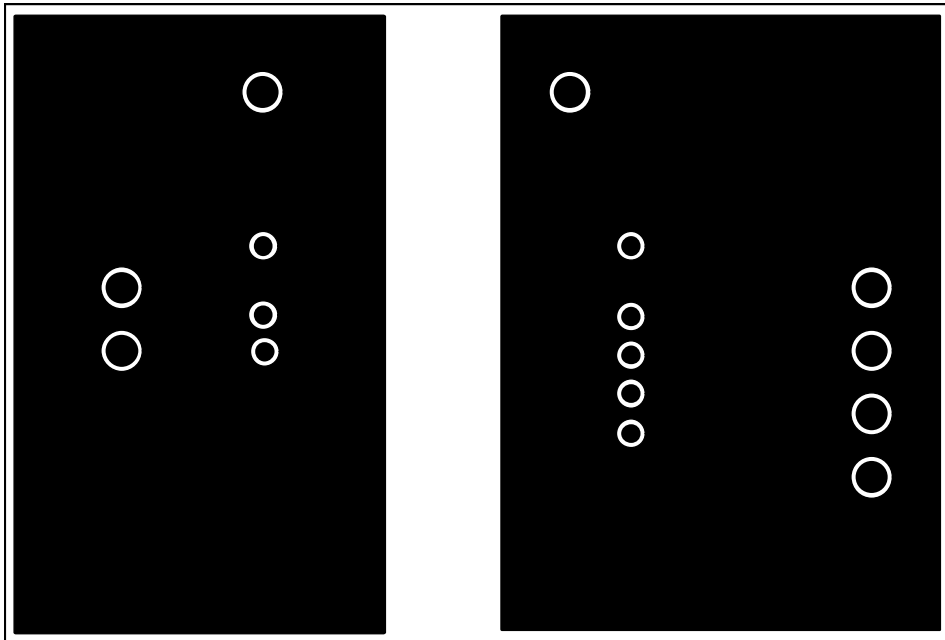


Figure 3. EVAL-ADM2490EEBZ Solder Side

11163-003

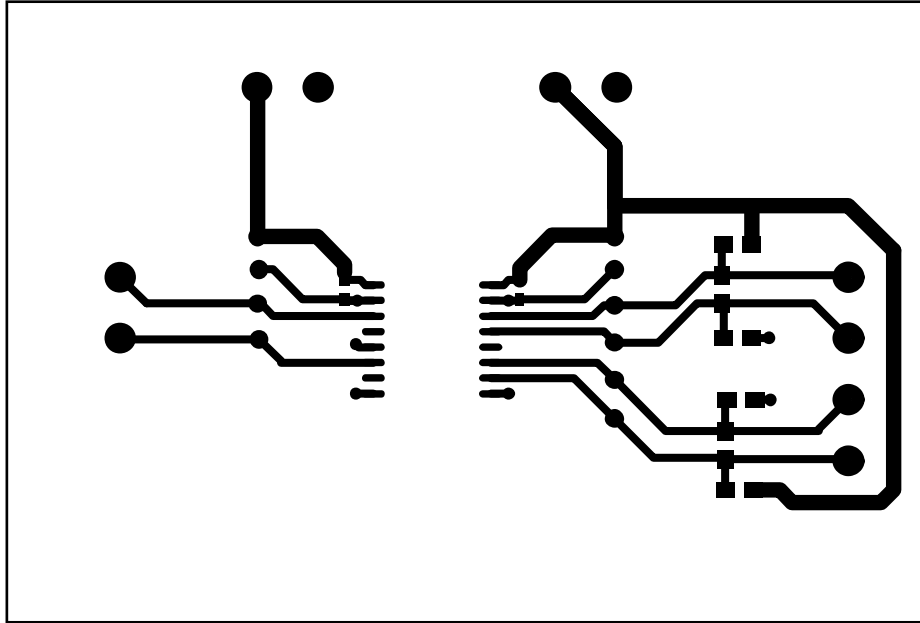


Figure 4. EVAL-ADM2490EEBZ Components

11163-004

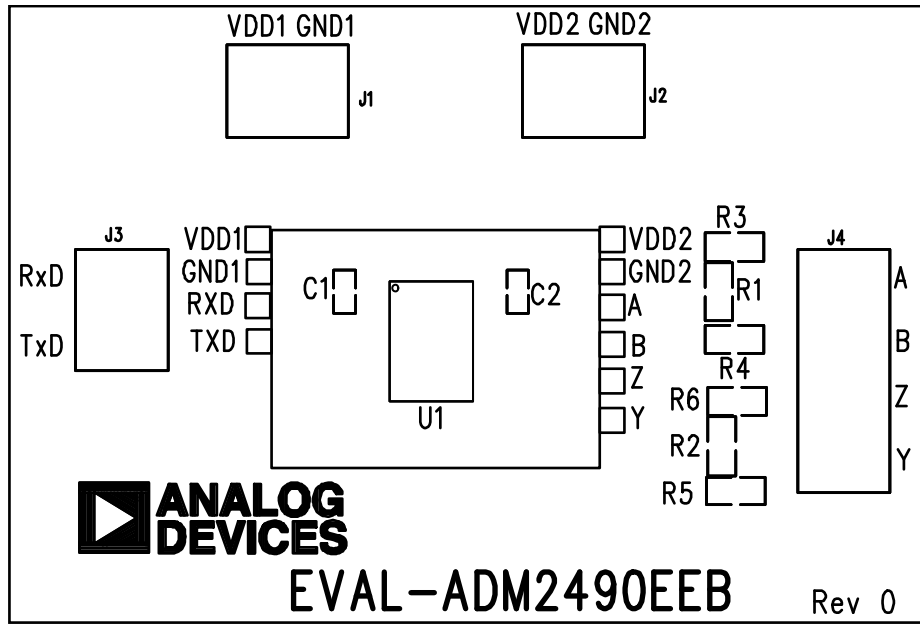


Figure 5. EVAL-ADM2490EEBZ Silkscreen

11163-005

BILL OF MATERIALS

Table 2.

Quantity	Reference Designator	Description	Supplier/Part Number
1	R1	Resistor, 120 Ω , 0805	Tyco Electronics Connectivity/Neohm/CPF0603B120RE1
2	R3, R4	Resistor, 1.3 k Ω , 0805	Tyco Electronics Connectivity/Neohm/CPF0603B1K3E1
3	R2, R5, R6	Resistor, 0805	Do not insert
2	C1, C2	Capacitor, Size 0603, 100 nF	AVX Corporation/06033G104ZAT2A
3	J1, J2, J3	Connector/power, 2-pin terminal block (5 mm pitch)	Lumberg/KRM 02
1	J4	Connector/Power 4, 4-pin terminal block	Lumberg/KRM 04
1	U1	16-lead wide body SOIC	Analog Devices/ ADM2490EBRWZ
2	GND ₁ , GND ₂	Test point, black	Vero Technologies/20-2137
2	V _{DD1} , V _{DD2}	Test point, red	Vero Technologies/20-313137
2	RxD, TxD	Test point, yellow	Vero Technologies/20-313140
4	A, B, Z, Y	Test point, green	Vero Technologies/20-313138

RELATED LINKS

Resource	Description
ADM2490E	Product Page: 5 kV Signal Isolated, High Speed (16 Mbps), ESD Protected, Full Duplex RS-485 Transceiver
AN-960	Application Note: 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.