

Evaluation Board for the ADM2485 Half-Duplex, Isolated RS-485 Transceiver with Transformer Driver

FEATURES

Easy evaluation of the [ADM2485](#)
 Evaluation of the [ADM2485](#) at 16 Mbps
 Easy evaluation of integrated transformer driver

ADM2485 APPLICATIONS

Isolated RS-485/RS-422 interfaces
 Process field bus (PROFIBUS) networks
 Industrial field networks
 Multipoint data transmission systems

EVALUATION KIT CONTENTS

EVAL-ADM2485EB3Z or
 EVAL-ADM2485EB5Z

GENERAL DESCRIPTION

The [ADM2485](#) evaluation board allows the [ADM2485](#) isolated RS-485 transceiver to be quickly and easily evaluated. The evaluation board allows all of the input and output functions to be exercised without the need for external components.

When the [ADM2485](#) is powered by 3.3 V on the logic side, a transformer, TI, is required with a turns ratio of 1:2.2 (DA2304_AL) to step up the 3.3 V to 6 V. This ensures that there is enough headroom for the [ADP667](#) LDO to output a regulated 5 V output (EVAL-ADM2485EB3Z).

If the [ADM2485](#) is powered by 5 V on the logic side, a transformer, TI, is required with a turns ratio of 1:1.5 (DA2303_AL) so that there is enough headroom for the [ADP667](#) LDO to output a regulated 5 V output (EVAL-ADM2485EB5Z).

EVALUATION BOARD

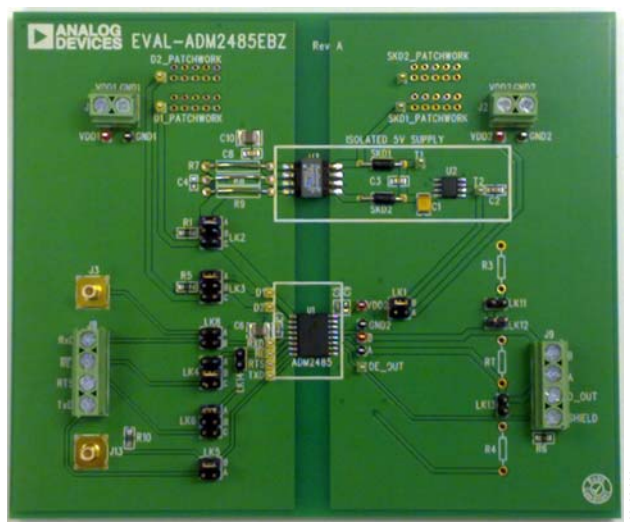


Figure 1.

TABLE OF CONTENTS

Features	1	5 V Half Duplex with Bus Biasing on Receiver Inputs.....	3
ADM2485 Applications	1	Powering the Isolated Side (VDD2)	3
Evaluation Kit Contents.....	1	Choosing a Transformer.....	3
General Description	1	Evaluation Board Schematic and Artwork.....	4
Evaluation Board	1	Ordering Information.....	8
Revision History	2	Bill of Materials.....	8
Evaluation Board Configurations.....	3	Related Links.....	8
3.3 V Half Duplex with Bus Biasing on Receiver Inputs.....	3		

REVISION HISTORY

7/11—Revision 0: Initial Version

EVALUATION BOARD CONFIGURATIONS

3.3 V HALF DUPLEX WITH BUS BIASING ON RECEIVER INPUTS

The EVAL-ADM2485EB3Z board is shipped in a 3.3 V half-duplex configuration without any bus biasing resistors inserted by default. Bus biasing resistors can be fitted on the receiver input by inserting Resistors R3 and R4. Jumpers LK11 and LK13 must be inserted for the bus biasing resistors to be active. Both bus biasing resistors, R3 and R4, must be used together; one cannot be fitted without the other. The default jumper settings are shown in Table 1. The transformer inserted as T1 for the 3.3 V version of the evaluation board is the DA2304_AL with a turns ratio of 1:2.2. The DA2304_AL allows enough headroom for the [ADP667](#) LDO to output a regulated 5 V output.

5 V HALF DUPLEX WITH BUS BIASING ON RECEIVER INPUTS

The EVAL-ADM2485EB5Z board is shipped in a 5 V half-duplex configuration without any bus biasing resistors inserted by default. Bus biasing resistors can be fitted on the receiver input by inserting Resistors R3 and R4. Jumpers LK11 and LK13 must be inserted for the bus biasing resistors to be active. Both bus biasing resistors, R3 and R4, must be used together; one cannot be fitted without the other. The default jumper settings are shown in Table 1. The transformer inserted as T1 for the 5 V version of the evaluation board is the DA2303_AL with a turns ratio of 1:1.5. The DA2303_AL allows enough headroom for the [ADP667](#) LDO to output a regulated 5 V output.

A termination resistor can be fitted on the receiver input by inserting RT1. The value of the termination resistor should be equal to the characteristic impedance of the cable used. To activate the termination resistor, Jumper LK12 must be inserted.

POWERING THE ISOLATED SIDE (VDD2)

The isolated side, V_{DD2} , of the EVAL-ADM2485EB3Z can be powered through the DA2304_AL, with a turns ratio of 1:2.2, or from an external 5 V source. LK1 is used to switch between the two sources.

The isolated side, V_{DD2} , of the EVAL-ADM2485EB5Z can be powered through the DA2303_AL, with a turns ratio of 1:1.5, or from an external 5 V source. LK1 is used to switch between the two sources.

CHOOSING A TRANSFORMER

There is a built-in transformer on the evaluation board, but there is also the option of using a custom transformer. Jumper LK2 and Jumper LK3 are used to choose the transformer. By inserting Jumper LK2 and Jumper LK3 in Position A, the built-in transformer on the board is selected. Both Jumper LK2 and Jumper LK3 must be in the same position. A custom transformer can be used by inserting Jumper LK2 and Jumper LK3 into Position C. The custom transformer is fitted on D1_patchwork, D2_patchwork, SKD1_patchwork, and SKD2_patchwork.

Table 1. Board Configurations and Jumper Settings

Configuration	Jumpers Fitted	Jumpers Open
Half Duplex Without Bus Biasing, Without Termination Resistor		LK11, LK12, LK13
Half Duplex Without Bus Biasing, with Termination Resistor	LK12	LK11, LK13
Half Duplex with Bus Biasing on Receiver, Without Termination Resistor	LK11, LK13	LK12
Half Duplex with Bus Biasing on Receiver, with Termination Resistor	LK11, LK12, LK13	
Powering the Bus Side Using the Regulator on the Board	LK1 (Position B)	LK1 (Position A)
Powering the Bus Side Using an External Power Supply	LK1 (Position A)	LK1 (Position B)
Using the Transformer on the Board	LK2 (Position A), LK3 (Position A)	LK2 (Position C), LK3 (Position C)
Using a Custom Transformer Fitted on D1_patchwork, D2_patchwork, SKD1_patchwork, and SKD2_patchwork	LK2 (Position C), LK3 (Position C)	LK2 (Position A), LK3 (Position A)
Using the SMA Connector for Rx/D	LK8 (Position A)	LK8 (Position B)
Using the Screw Terminal for Rx/D	LK8 (Position B)	LK8 (Position A)
Using the SMA Connector for Tx/D	LK5 (Position B)	LK5 (Position A)
Using the Screw Terminal for Tx/D	LK5 (Position A)	LK5 (Position B)
$\overline{RE}$ high	LK4 (Position A)	
$\overline{RE}$ low	LK4 (Position B)	
Using the Screw Terminal for $\overline{RE}$	LK4 (Position C)	
RTS High	LK6 (Position A)	
RTS Low	LK6 (Position B)	
Using the Screw Terminal for RTS	LK6 (Position C)	
Tie $\overline{RE}$ and RTS Together (Note Only One Jumper Can Be Inserted, Either LK4 or LK6)	LK14 and (LK4 or LK6)	LK4 or LK6

EVALUATION BOARD SCHEMATIC AND ARTWORK

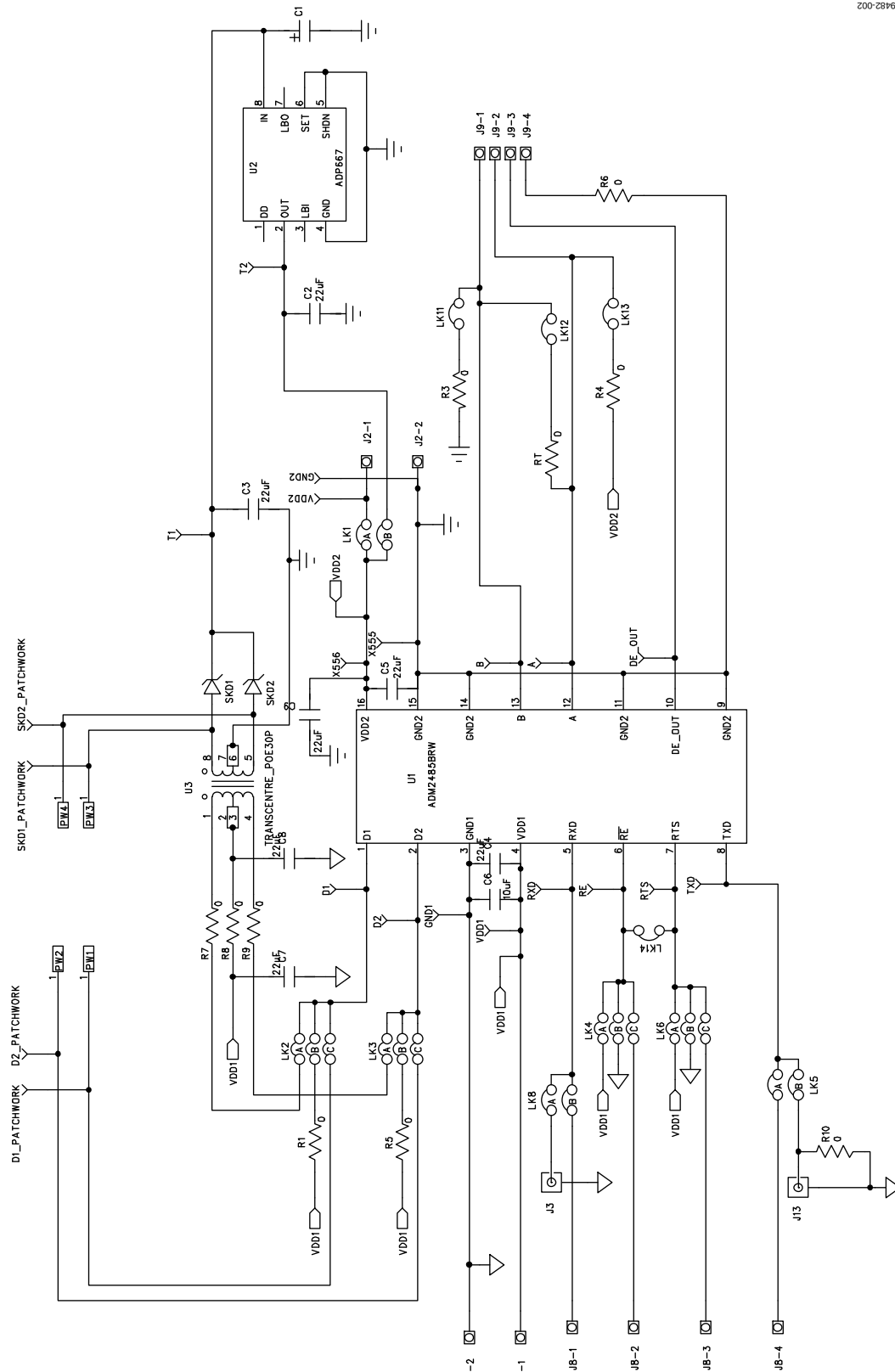


Figure 2. ADM2485 Evaluation Board Schematic

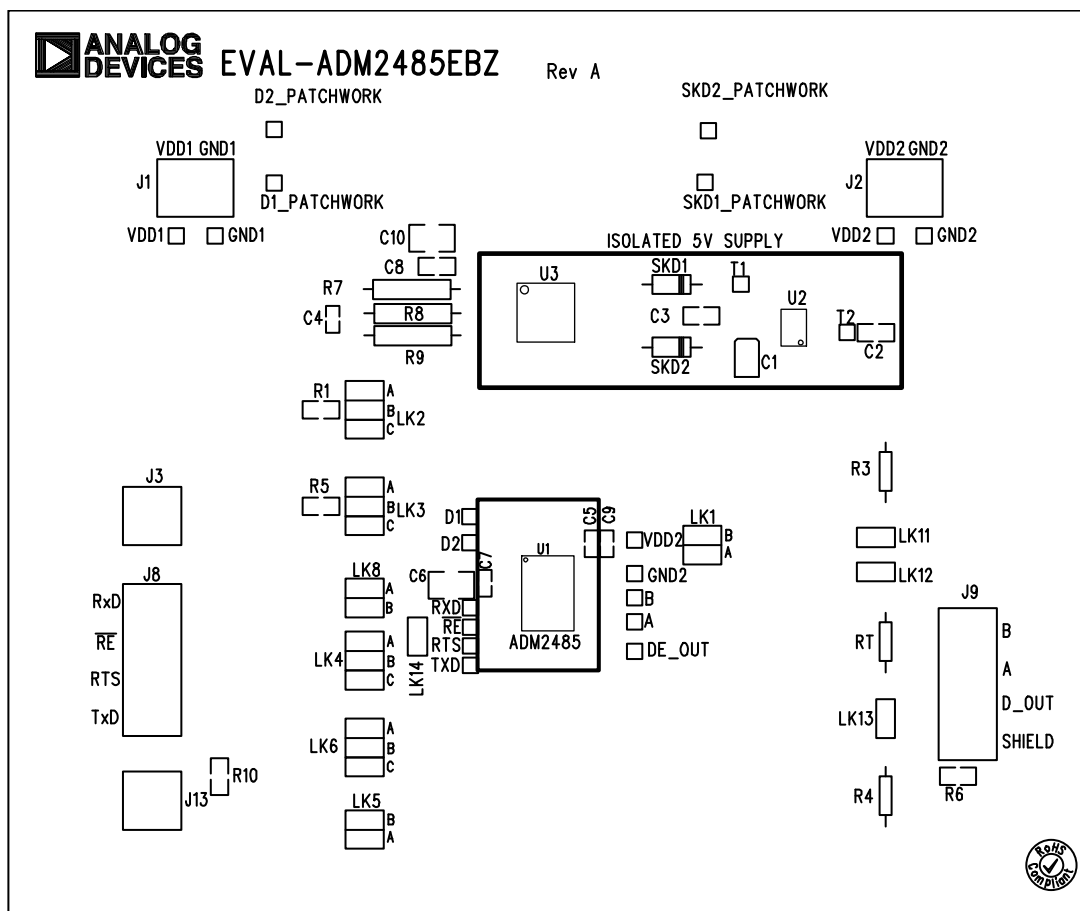


Figure 3. ADM2485 Evaluation Board Silkscreen

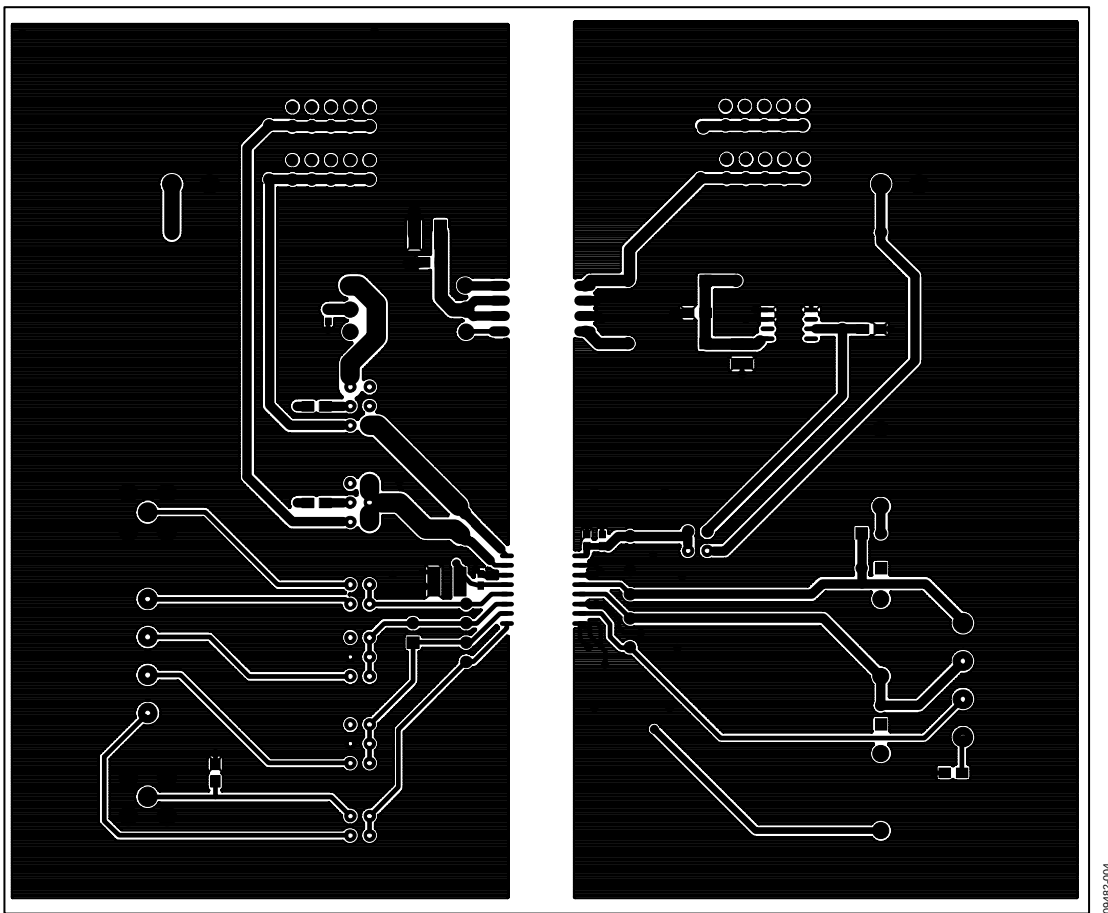
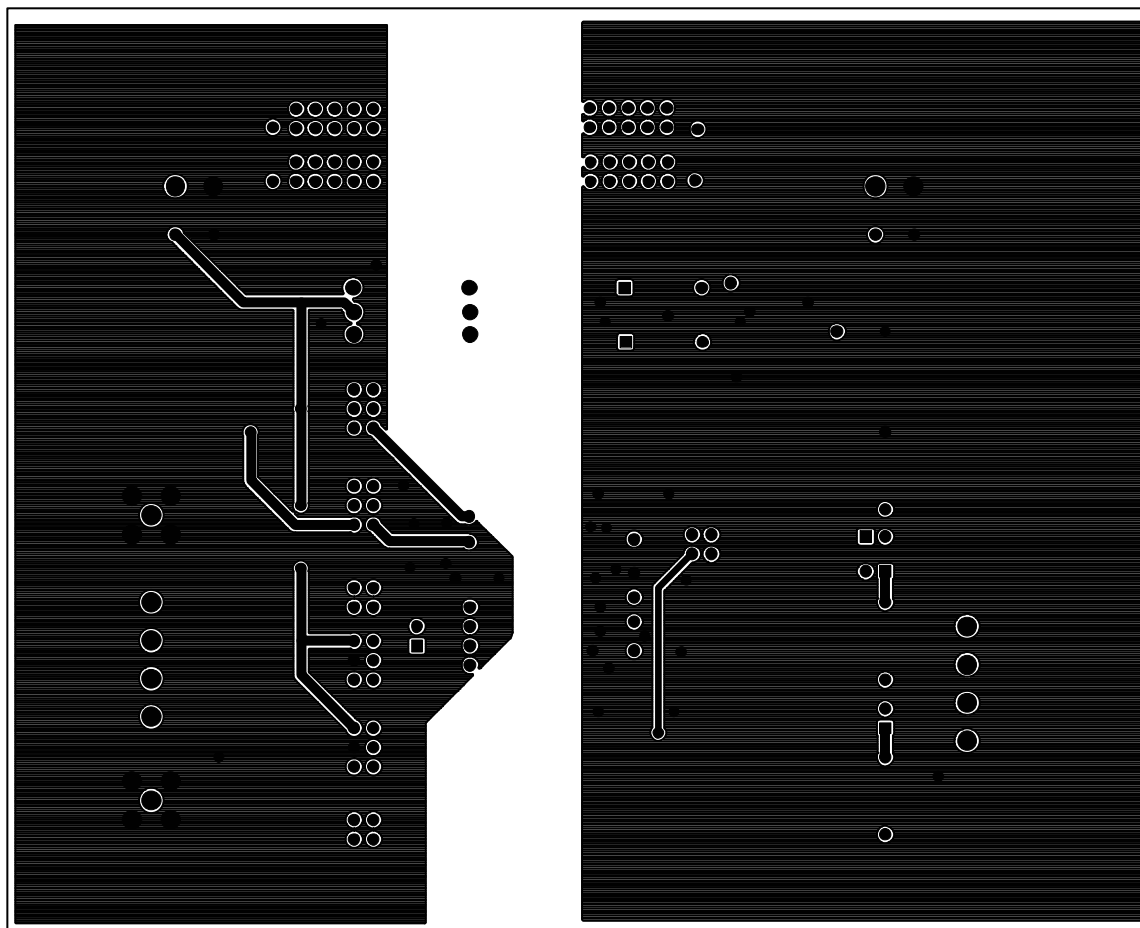


Figure 4. Evaluation Board Components



09482-005

Figure 5. [ADM2485](#) Evaluation Board Solder Side

ORDERING INFORMATION

BILL OF MATERIALS

Table 2.

Qty	Name	Description	Supplier/Part No.
1	U1	ADM2485BRWZ, 16-lead SOIC_W	Analog Devices ADM2485BRWZ
1	U3	3.3 V to 6 V transformer/5 V to 6 V transformer	Coilcraft DA2304-AL (3.3 V) and Coilcraft DA2303-AL (5 V)
1	U2	8-lead SOIC	Analog Devices ADP667
2	SKD1, SKD2	ZPD10, DO35	Fairchild Semiconductor 1N5817
1	C1	Capacitor, Taj-B, 22 μ F	AVX TAJB226K016R
1	C2	Capacitor, 10 μ F, 805	Yageo (Phycomp) CC0805KKX7R6BB105
2	C3, C8	Capacitor, 0.1 μ F, 805	AVX 08055C104KAT2A
2	C4, C5	Capacitor, 100 nF, 603	AVX 0603YC104JAT2A
2	C6, C9	Capacitor, 603	Do not insert
1	C7	Capacitor, 0.1 μ F, 805	Do not insert
1	C10	Capacitor, 22 μ F	KEMET B45196E3226K409
2	J1, J2	Connector, power	LUMBERG KRM 02
2	J8, J9	Terminal block, 4-way, CON\POWER4	CAMDEN CTB5000/4
4	LK11, LK12, LK13, LK14	Jumper, SIP-2P	Harwin M7566-05
1	LK1 to LK14 ¹	Header, 2-row, 36 + 36-way	Harwin M20-9983646
2	LK1, LK5	JUMPER-2, JUMPER_2_SWAP_AB	Harwin M7566-05
1	LK8	JUMPER-2	Harwin M7566-05
4	LK2, LK3, LK4, LK6	JUMPER-3	Harwin M7566-05
3	R1, R5, R10	Resistor, 805, 51.1 Ω	Multicomp MCTC0525B511JT5E
3	R3, R4, RT	Resistor, R1/8W	Not inserted
1	R6	Resistor, 805, 100 Ω	Vishay Draloric CRCW0805100RJNEAIF
3	X2, X3, X557	Resistor, 805	Not inserted
3	R7, R8, R9	Resistor, RES_1/2W_NARROW, 0 Ω	Wire link
2	J3, J13	SMB	Vero 20-2137
7	A, B, DE_OUT, SKD1_PATCHWORK, SKD2_PATCHWORK, T1, T2	Test point	Vero 20-313138
8	D1, D1_PATCHWORK, D2, D2_PATCHWORK, RE, RTS, RXD, TXD	Test point	Vero 20-313140
2	GND2, X555	Test point	Vero 20-2137
2	VDD2, X556	Test point	Vero 20-313137

¹ Only one header is required per board.

RELATED LINKS

Resource	Description
ADM2485	Product Page, ADM2485 2.5 kV Signal Isolated, High Speed (16 Mbps), Half Duplex RS-485 Transceiver with Transformer Driver
ADP667	Product Page, ADP667 +5 V Fixed, Adjustable Low Dropout Linear Voltage Regulator

NOTES

NOTES

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 NONINFRINGEMENT 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.