

## 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

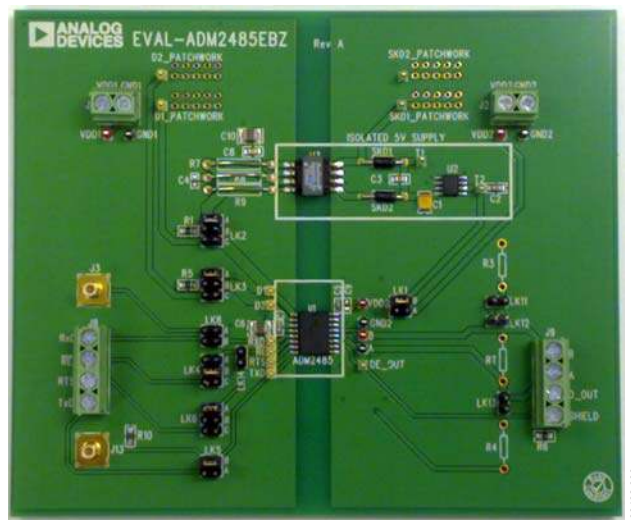


Figure 1.

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**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<sub>DD2</sub>, 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<sub>DD2</sub>, 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

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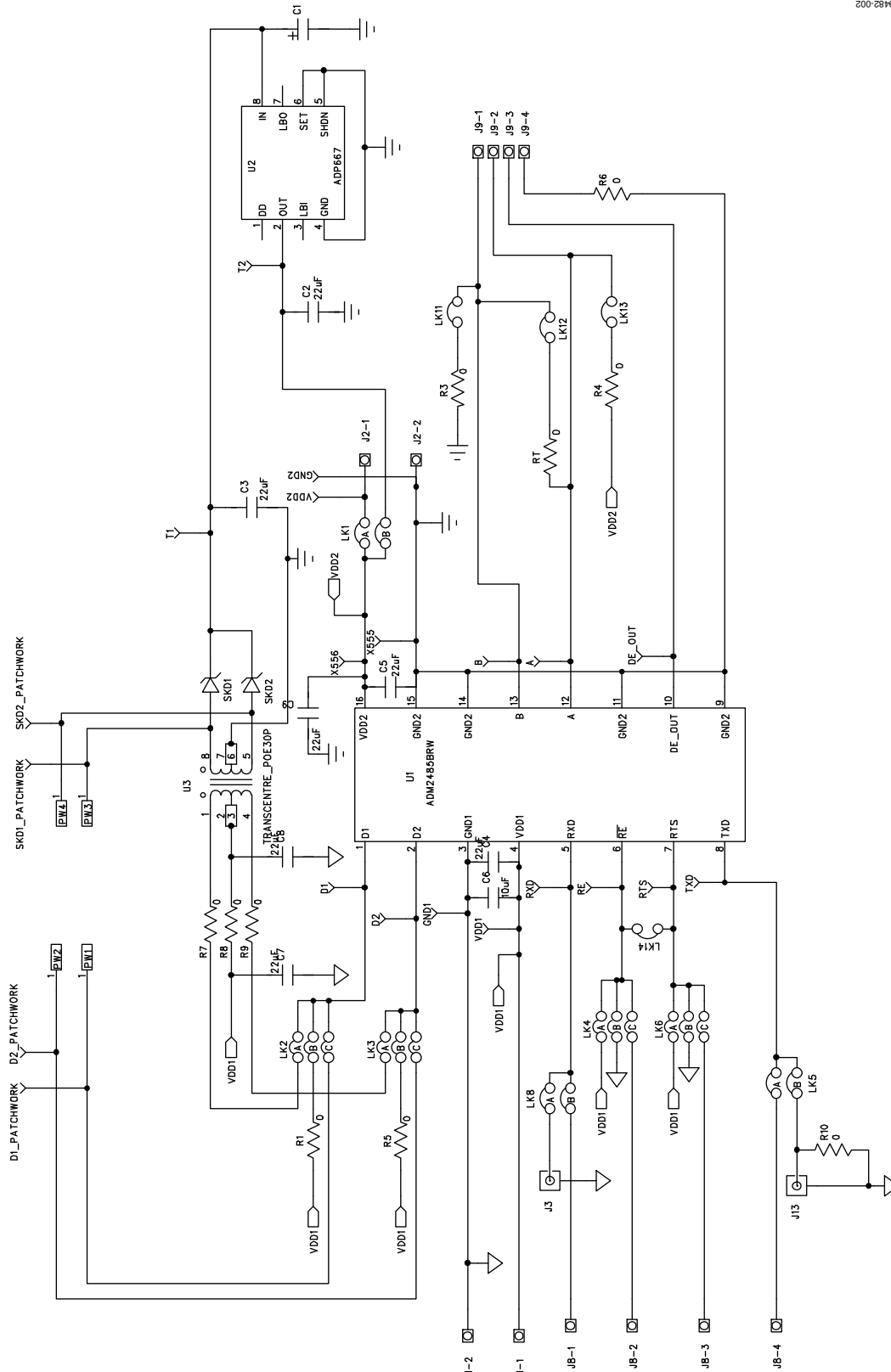


Figure 2. ADM2485 Evaluation Board Schematic

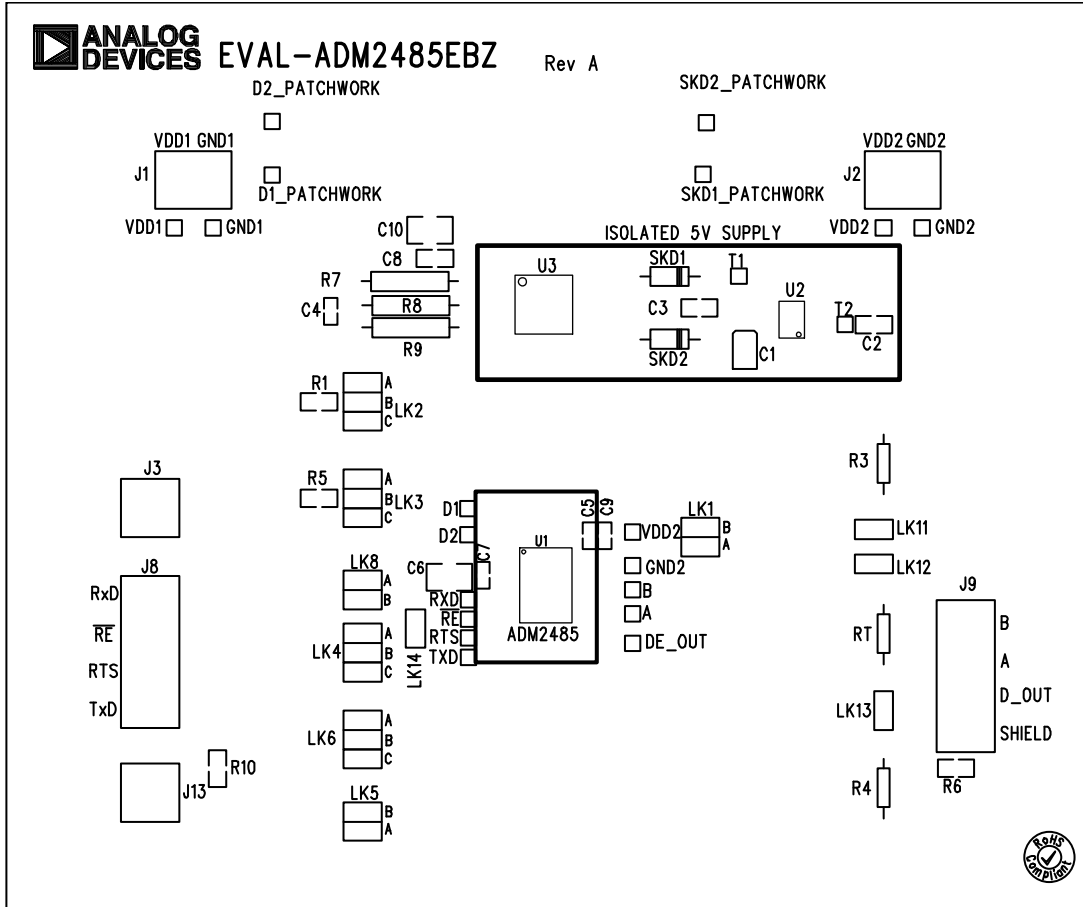
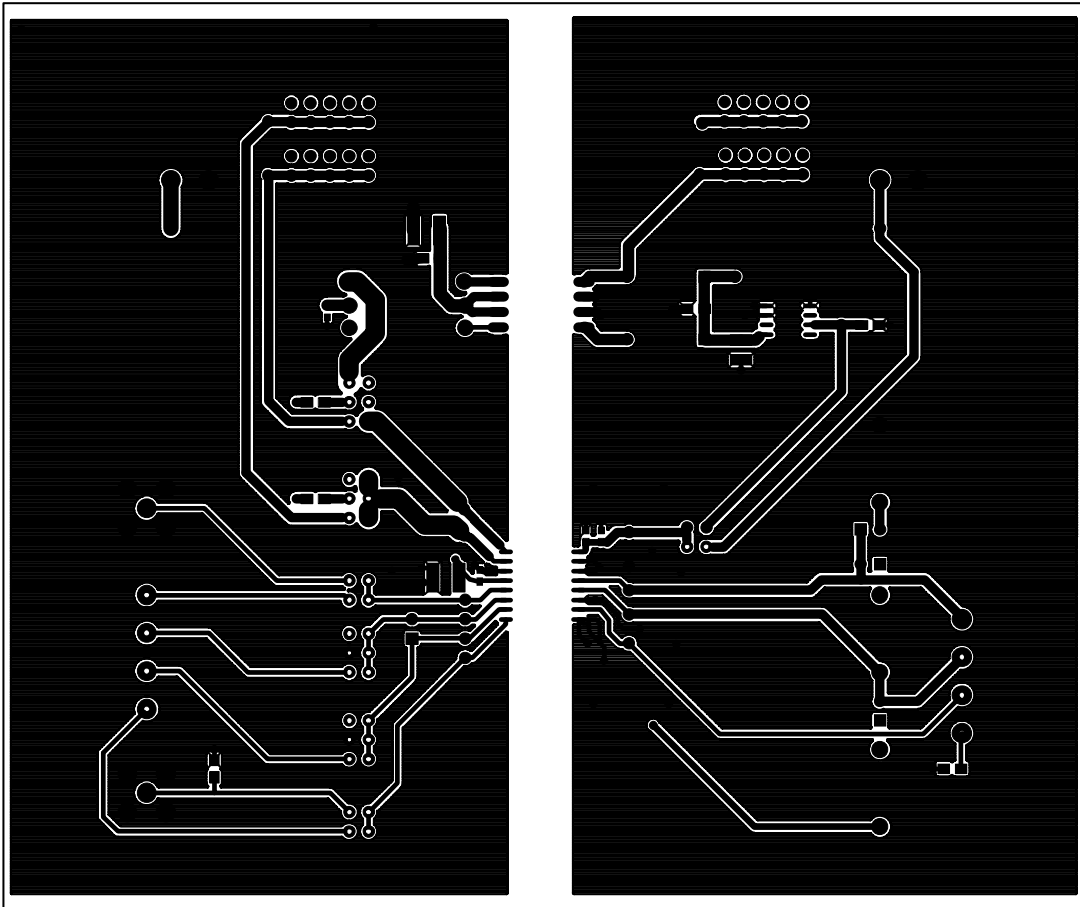


Figure 3. ADM2485 Evaluation Board Silkscreen



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Figure 4. Evaluation Board Components

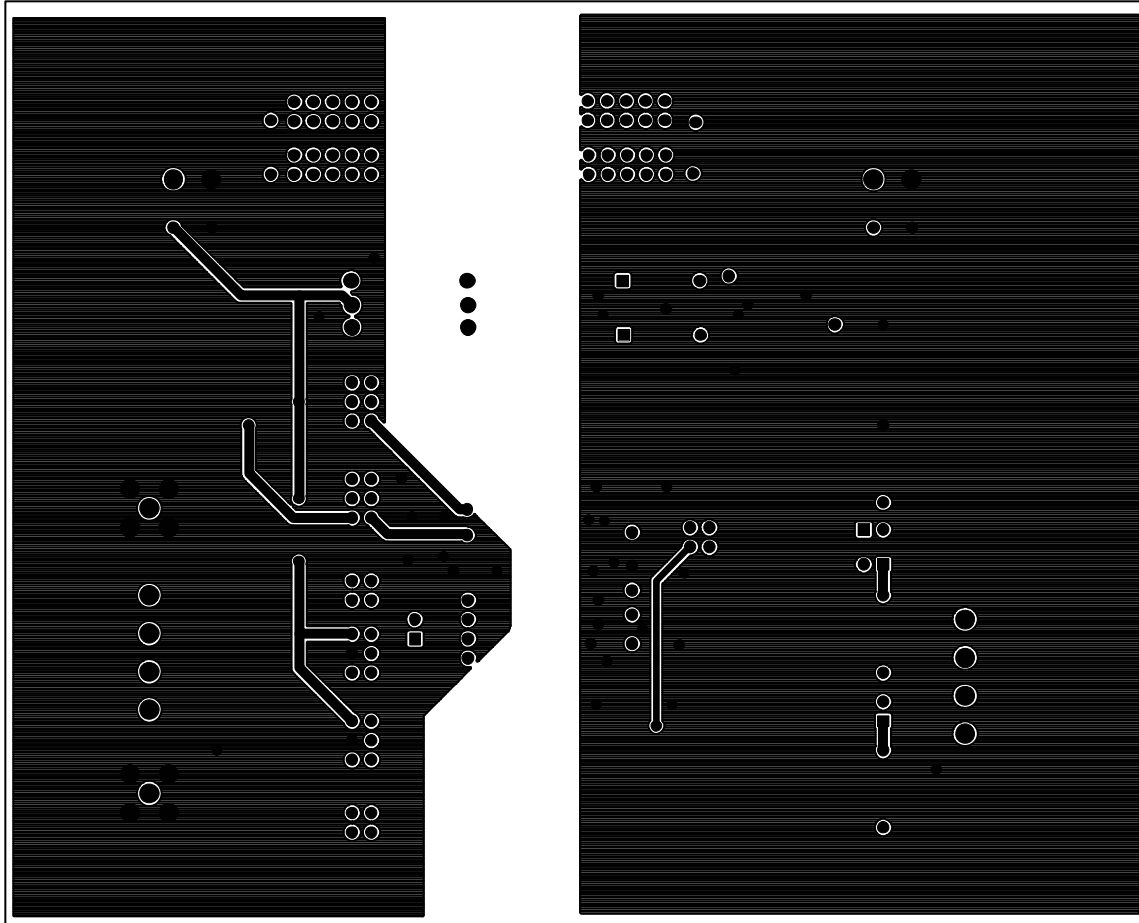


Figure 5. ADM2485 Evaluation Board Solder Side

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**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 $\mu$ F	AVX TAJB226K016R
1	C2	Capacitor, 10 $\mu$ F, 805	Yageo (Phycomp) CC0805KKX7R6BB105
2	C3, C8	Capacitor, 0.1 $\mu$ 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 $\mu$ F, 805	Do not insert
1	C10	Capacitor, 22 $\mu$ 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 <sup>1</sup>	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 $\Omega$	Multicomp MCTC0525B511JT5E
3	R3, R4, RT	Resistor, R1/8W	Not inserted
1	R6	Resistor, 805, 100 $\Omega$	Vishay Draloric CRCW0805100RJNEAIF
3	X2, X3, X557	Resistor, 805	Not inserted
3	R7, R8, R9	Resistor, RES_1/2W_NARROW, 0 $\Omega$	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

<sup>1</sup> Only one header is required per board.

**RELATED LINKS**

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



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## 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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