

## Evaluation Boards for the ADM2482E and ADM2487E Isolated RS-485 Transceivers

### FEATURES

- Easy evaluation of the [ADM2482E/ADM2487E](#)
- Isolated ground plane layout
- Configurable as full duplex or half duplex
- Evaluation of the [ADM2482E](#) at 16 Mbps
- Evaluation of the [ADM2487E](#) at 500 kbps

### ADM2482E/ADM2487E APPLICATIONS

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

### EVALUATION KIT CONTENTS

- EVAL-ADM2482EEB3Z, EVAL-ADM2487EEB3Z,  
EVAL-ADM2482EEB5Z, or EVAL-ADM2487EEB5Z

### GENERAL DESCRIPTION

The [ADM2482E/ADM2487E](#) evaluation boards allow the [ADM2482E/ADM2487E](#) isolated RS-485 transceivers 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.

The [ADM2482E/ADM2487E](#) feature an integrated transformer driver that outputs a pair of square waves to an external transformer to provide isolated power. When the [ADM2482E/ADM2487E](#) are powered by 3.3 V on the logic side ( $V_{DD1}$ ), a transformer, U3, is required with a turns ratio of 1:1.5 (DA2303-AL). This ensures that there is enough headroom for the [ADP3330](#) LDO to output a regulated 3.3 V output (EVAL-ADM2482EEB3Z and EVAL-ADM2487EEB3Z).

When the [ADM2482E/ADM2487E](#) are powered by 5 V on the logic side, a transformer, U3, is required with a turns ratio of 1:1 (GA3157-AL) to give a 5 V input for the [ADP3330](#), which regulates an output of 3.3 V output (EVAL-ADM2482EEB5Z and EVAL-ADM2487EEB5Z).

### FUNCTIONAL BLOCK DIAGRAM

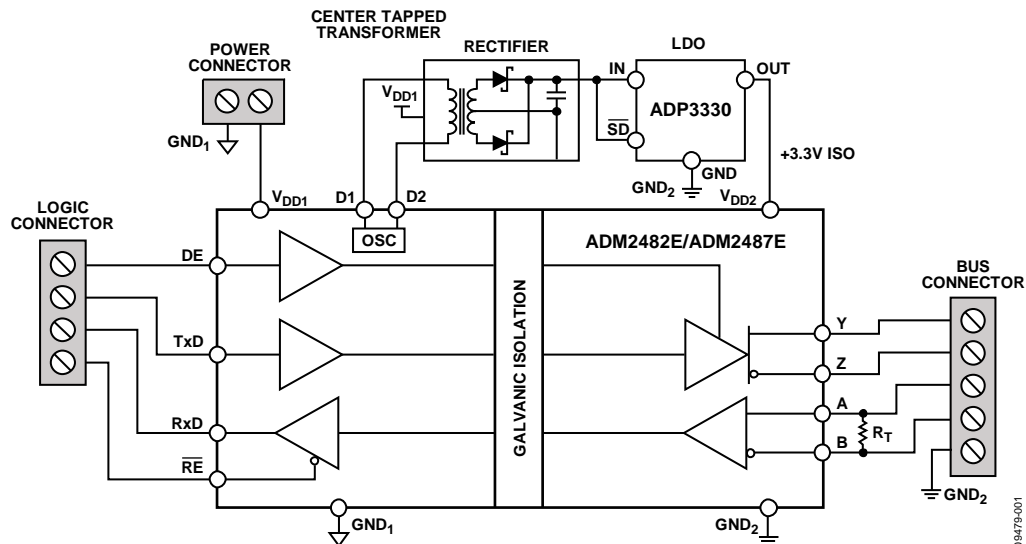


Figure 1.

084774-001

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**REVISION HISTORY**

**8/11—Rev. 0 to Rev. A**

Changed EVAL2482EEB5Z to EVAL-ADM2482EEB5Z, EVAL2487EEB5Z to EVAL-ADM2487EEB5Z, and ADP1710 to ADP3330 Throughout ..... 1  
 Change to Figure 1 ..... 1  
 Changes to Evaluation Board Configurations Section ..... 3  
 Changes to Table 1 ..... 4  
 Change to Figure 2 ..... 5  
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**11/10—Revision 0: Initial Version**

## EVALUATION BOARD CONFIGURATIONS

### 3.3 V EVALUATION BOARD

The EVAL-ADM2482EEB3Z and EVAL-ADM2487EEB3Z are shipped in a 3.3 V full-duplex configuration without any bus biasing resistors inserted by default. The jumper settings are shown in Table 1. The transformer fitted as U3 for the 3.3 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 [ADP3330](#) LDO to output a regulated 3.3 V output.

### 5 V EVALUATION BOARD

The EVAL-ADM2482EEB5Z and EVAL-ADM2487EEB5Z are shipped in a 5 V full-duplex configuration without any bus biasing resistors inserted by default. The jumper settings are shown in Table 1. The transformer fitted as U3 for the 5 V version of the evaluation board is the GA3157-AL with a turns ratio of 1:1. The GA3157-AL is required to give a 5 V input to the [ADP3330](#) LDO, which regulates an output of 3.3 V.

### FULL DUPLEX, BUS BIASING AND TERMINATION RESISTORS ON RECEIVER INPUT

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. All jumper combinations are shown in Table 1.

A termination resistor can be fitted on the receiver input by inserting RT. 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.

### FULL DUPLEX, BUS BIASING AND TERMINATION RESISTORS ON RECEIVER AND TRANSMITTER

Bus biasing resistors can be fitted on the transmitter output as well as on the receiver input. Resistors R3, R4, R2, and R11 and

Jumpers LK11, LK13, LK7, and LK9 must be inserted for this configuration.

A termination resistor can also be fitted on the transmitter output 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 LK10 must be inserted.

### HALF DUPLEX WITH BUS BIASING AND TERMINATION

To configure the evaluation board as half duplex, Receiver Input Pin A must be connected to Transmitter Output Pin Y and Receiver Input Pin B must be connected to Transmitter Output Pin Z. This is accomplished by inserting Jumper LK15 and Jumper LK16.

In this configuration if biasing resistors are inserted, only the resistors on the receiver input, or on the transmitter output should be selected. This is achieved by either inserting resistors R3 and R4 and jumpers LK11 and LK13 (leaving LK7 and LK9 open), or by inserting resistors R2 and R11 and jumpers LK7 and LK9 (leaving LK11 and LK13 open).

Similarly only the termination resistor on the receiver input or on the transmitter output should be selected (e.g. LK12 inserted, LK10 open).

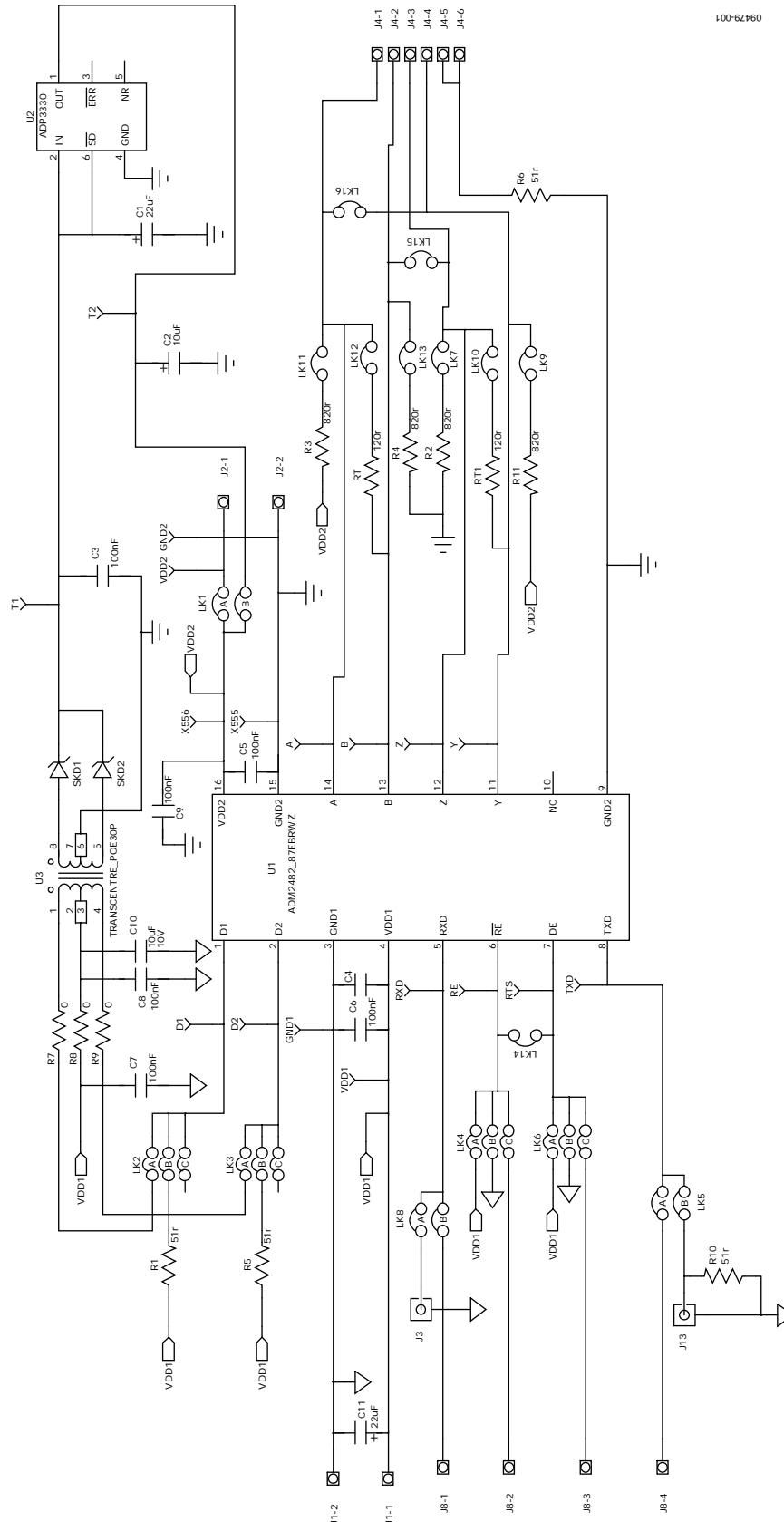
### POWERING UP THE BUS SIDE

The bus side can be powered using either the regulator built into the board or by using an external power source. Jumper LK1 allows the user to select between these two methods. By inserting Jumper LK1 into Position A, the board can be powered using an external power source. Inserting Jumper LK1 into Position B selects the built-in regulator to supply the bus side.

**Table 1. Board Configurations and Jumper Settings**

| <b>Configuration</b>  | <b>Jumpers Fitted</b>                | <b>Jumpers Open</b>                  |
|---|--------------------------------------|--------------------------------------|
| Full Duplex Configuration   |                                      | LK 15, LK16                          |
| Half-Duplex Configuration (A Connected to Y, B Connected to Z)                                | LK15, LK16                           |                                      |
| No Biasing Resistors  |                                      | LK7, LK9, LK11, LK13                 |
| Bus Biasing Resistors on A/B only   | LK11, LK13                           | LK7, LK9                             |
| Bus Biasing Resistors on Y/Z only   | LK7, LK9                             | LK11, LK13                           |
| Bus Biasing Resistors on A/B and Y/Z (Full Duplex)  | LK7, LK9, LK11, LK13                 | LK 15, LK16                          |
| No Termination Resistors  |                                      | LK10, LK12                           |
| Termination Resistor on A/B only  | LK12                                 | LK10                                 |
| Termination Resistor on Y/Z only  | LK10                                 | LK12                                 |
| Termination Resistors on A/B and Y/Z (Full Duplex)  | LK10, LK12                           | LK 15, LK16                          |
| 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)<br>LK3 (Position A) | LK2 (Position C)<br>LK3 (Position C) |
| 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)                     |                                      |
| DE High   | LK6 (Position A)                     |                                      |
| DE Low  | LK6 (Position B)                     |                                      |
| Using the Screw Terminal for DE   | LK6 (Position C)                     |                                      |
| Tie $\overline{RE}$ and DE 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



100-62160

Figure 2. ADM2482E/ADM2487E Evaluation Board Circuit Diagram

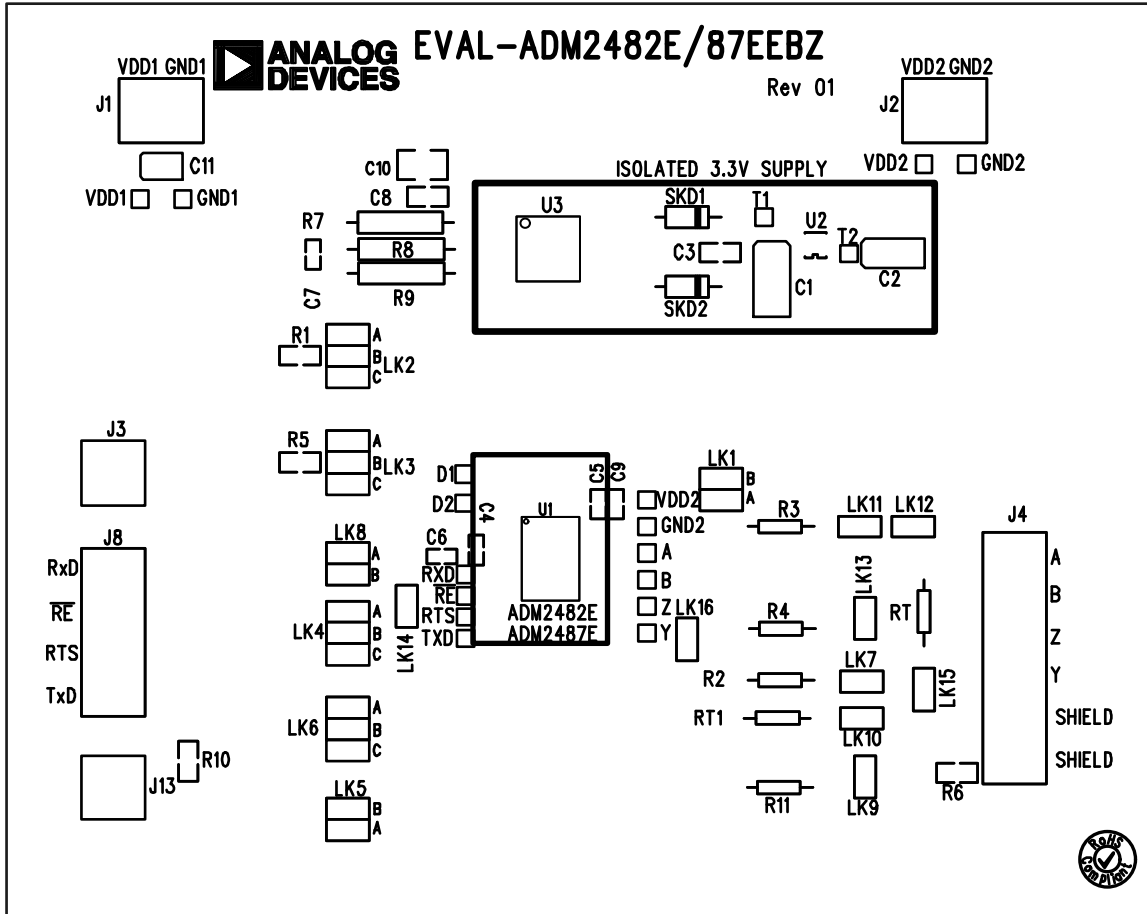
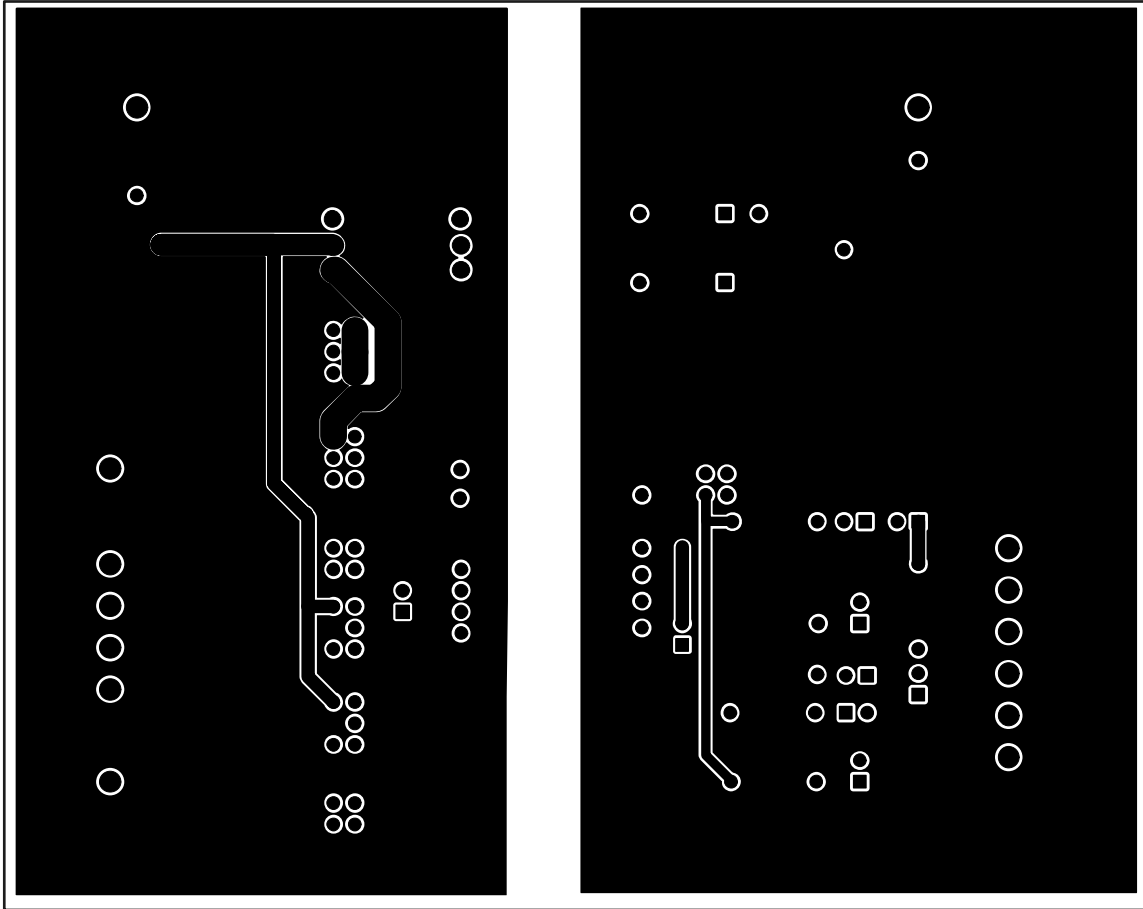
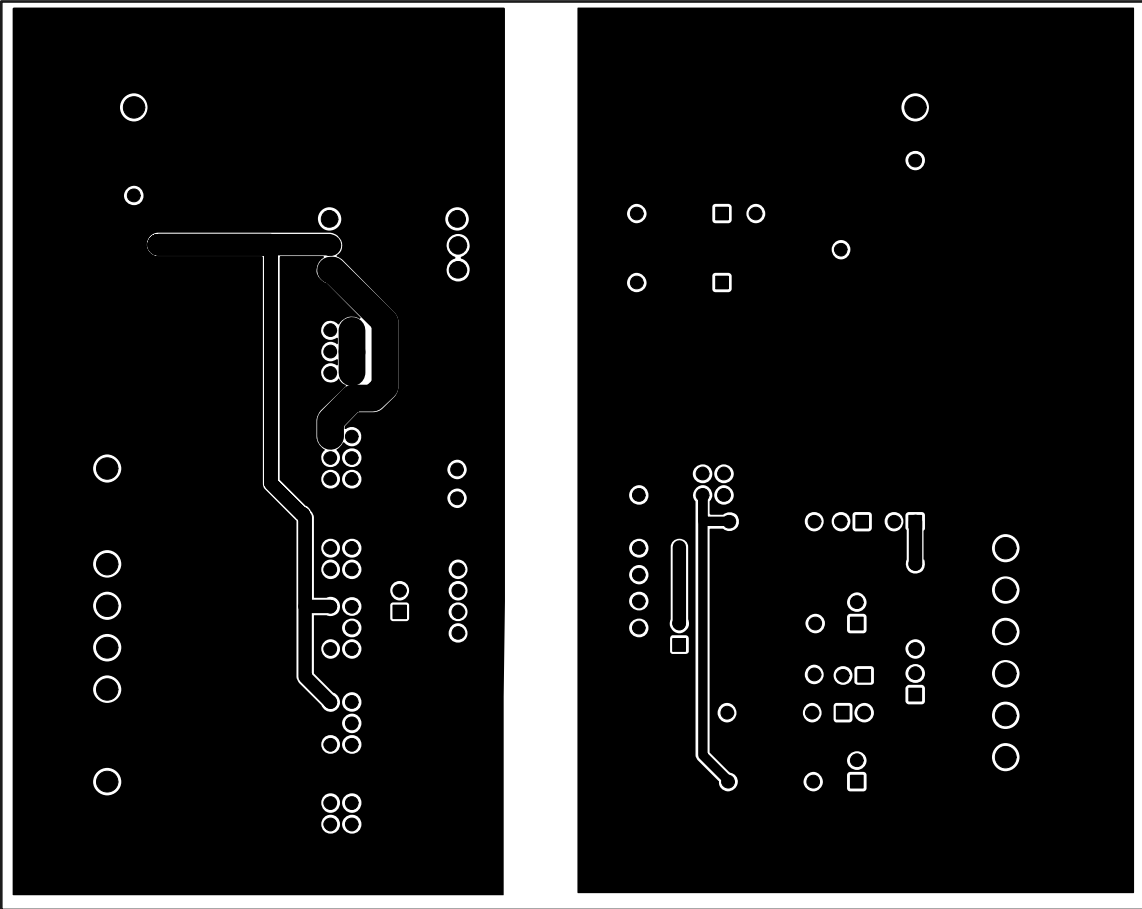


Figure 3. ADM2482E/ADM2487E Evaluation Board Silkscreen



09479-004

Figure 4. ADM2482E/ADM2487E Evaluation Board Component Side



09479-005

Figure 5. ADM2482E/ADM2487E Evaluation Board Solder Side



## ORDERING INFORMATION

### BILL OF MATERIALS

Table 2.

| Qty            | Reference Designator      | Description                        | Supplier/Part Number                                     |
|----------------|---------------------------|------------------------------------|--|
| 1              | C1                        | Capacitor, Size 1210, 22 $\mu$ F   | AVX 1210ZD226KAT2A                                       |
| 2              | C2, C10                   | Capacitor, Size 1210, 10 $\mu$ F   | AVX 1210ZC106KAT2A                                       |
| 2              | C3, C8                    | Capacitor, Size 0805, 100 nF       | AVX 08055C104KAT2A                                       |
| 1              | C4                        | Capacitor, Size 0603, 100 nF       | Do not insert  |
| 3              | C5, C6, C7                | Capacitor, Size 0603, 100 nF       | AVX CM105X7R104K16AT                                     |
| 1              | C9                        | Capacitor, Size 0603, 100 nF       | Do not insert  |
| 1              | C11                       | Capacitor, CAP\TAJ_B, 22 $\mu$ F   | AVX TAJB226K016R   |
| 2              | J1, J2                    | CON\POWER                          | Camden CTB5000/2   |
| 2              | J3, J13                   | SMB                                | Radiall R114426000                                       |
| 1              | J4                        | CON\POWER6                         | Wieland Electric 25.161.0653.0                           |
| 1              | J8                        | CON\POWER4                         | Camden CTB5000/4   |
| 1 <sup>1</sup> | LK1 to LK16               | Header, 2 row, 36 + 36 way         | Harwin M20-9983646                                       |
| 2              | LK1, LK5                  | JUMPER_2, JUMPER_2_SWAP_AB         | Harwin M7566-05  |
| 4              | LK2 to LK4, LK6           | JUMPER_3                           | Harwin M7566-05  |
| 9              | LK7, LK9 to LK16          | Jumper, SIP-2P                     | Harwin M7566-05  |
| 1              | LK8                       | JUMPER_2                           | Harwin M7566-05  |
| 4              | R1, R5, R6, R10           | Resistor, 805, 51 $\Omega$         | Multicomp MC 0.1W 0805 5% 51R                            |
| 4              | R2 to R4, R11             | Resistor, R1/8W, 820 $\Omega$      | Multicomp MCCFR0W8J0821A20                               |
| 3              | R7, R8, R9                | Resistor, R1/2W_NARROW, 0 $\Omega$ | Wire Link  |
| 2              | RT, RT1                   | Resistor, R1/8W, 120 $\Omega$      | Multicomp MCCFR0W8J0121A20                               |
| 6              | RE, RTS, RXD, TXD, D1, D2 | Test point                         | Vero 20-313140   |
| 6              | T1, T2, A, B, Y, Z        | Test point                         | Vero 20-313138   |
| 3              | VDD1, VDD2, X556          | Test point                         | Vero 20-313137   |
| 3              | X555, GND1, GND2          | Test point                         | Vero 20-2137   |
| 2              | SKD1, SKD2                | ZPD10, DO35_P, Schottky diode      | Fairchild Semiconductor 1N5817                           |
| 1              | U1                        | RS-485 transceiver, 16-lead SOIC_W | Analog Devices <a href="#">ADM2482EBRWZ/ADM2487EBRWZ</a> |
| 1              | U2                        | LDO, 6-lead SOT-23                 | Analog Devices <a href="#">ADP3330</a>                   |
| 1              | U3                        | SMT power transformer              | Coilcraft GA3157-AL/Coilcraft DA2303-AL                  |

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

### RELATED LINKS

| Resource                 | Description   |
|--------------------------|---|
| <a href="#">ADM2482E</a> | Product Page, 2.5 kV Signal Isolated, ESD Protected, Full/Half Duplex RS-485 Transceiver w/ Transformer Driver (16 Mbps)  |
| <a href="#">ADM2487E</a> | Product Page, 2.5 kV Signal Isolated, ESD Protected, Full/Half Duplex RS-485 Transceiver w/ Transformer Driver (500 kbps) |
| <a href="#">ADP3330</a>  | Product Page, High Accuracy Ultralow I(Q), 200 mA, SOT-23, anyCAP® Low Dropout Regulator                                  |

**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.

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