

High Speed Evaluation Board for Half-Duplex M-LVDS Transceivers (ADN4690E, ADN4691E, ADN4694E, and ADN4696E)

FEATURES

Easy evaluation of half-duplex M-LVDS transceivers:

[ADN4690E](#), [ADN4691E](#), [ADN4694E](#), and [ADN4696E](#)

Board layout optimized for high speed signaling

Matched track lengths on M-LVDS input/output differential pairs with controlled 50 Ω impedance tracks

SMB jack inputs/outputs for high-speed connections:

Logic signals RO, \overline{RE} , DE, and DI

M-LVDS bus signals A, B

Power/ground connections through screw terminal blocks

Jumper selectable enable/disable for \overline{RE} and DE

Test points for measuring all signals, multiple ground points to facilitate probing of multiple signals

50 Ω termination resistors across A and B to simulate double-terminated bus

APPLICATIONS

Half-duplex M-LVDS part evaluation

EVALUATION KIT CONTENTS

One each

[EVAL-ADN469xEHDEBZ](#)

[ADN4690EBRZ](#)

[ADN4691EBRZ](#)

[ADN4694EBRZ](#)

[ADN4696EBRZ](#)

GENERAL DESCRIPTION

The EVAL-ADN469xEHDEBZ allows quick and easy evaluation of half-duplex M-LVDS transceivers ([ADN4690E](#), [ADN4691E](#), [ADN4694E](#), and [ADN4696E](#)). The evaluation board allows all of the input and output functions to be exercised without the need for external components. Screw terminal blocks provide convenient

EVAL-ADN469xEHDEBZ

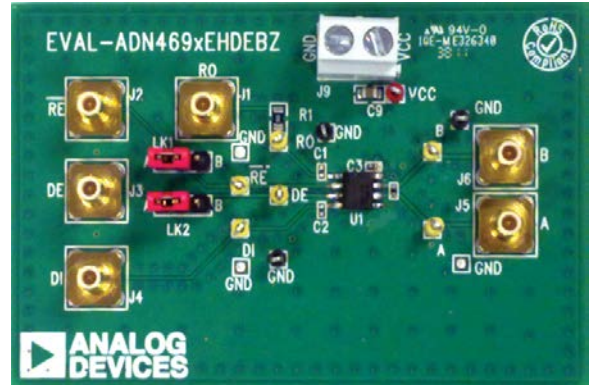


Figure 1.

connections for power and ground, with SMB jack connectors for high speed logic and M-LVDS bus signals.

The evaluation board has an 8-lead SOIC footprint for a half-duplex M-LVDS transceiver from the ADN469xE family (see Table 1).

Table 1. ADN469xE Selection Table

Part No.	Receiver Type	Data Rate	Package	Half-/Full-Duplex	Evaluation Board
ADN4690E	Type 1	100 Mbps	8-lead SOIC	Half	EVAL-ADN469xEHDEBZ
ADN4691E	Type 1	200 Mbps	8-lead SOIC	Half	EVAL-ADN469xEHDEBZ
ADN4692E	Type 1	100 Mbps	14-lead SOIC	Full	EVAL-ADN469xEFDEBZ
ADN4693E	Type 1	200 Mbps	14-lead SOIC	Full	EVAL-ADN469xEFDEBZ
ADN4694E	Type 2	100 Mbps	8-lead SOIC	Half	EVAL-ADN469xEHDEBZ
ADN4695E	Type 2	100 Mbps	14-lead SOIC	Full	EVAL-ADN469xEFDEBZ
ADN4696E	Type 2	200 Mbps	8-lead SOIC	Half	EVAL-ADN469xEHDEBZ
ADN4697E	Type 2	200 Mbps	14-lead SOIC	Full	EVAL-ADN469xEFDEBZ

TABLE OF CONTENTS

Features	1	Setting Up the Evaluation Board.....	3
Applications.....	1	Evaluation with Applications.....	3
Evaluation Kit Contents.....	1	Evaluation Board Schematic and Layout.....	5
EVAL-ADN469xEFDEBZ	1	Ordering Information.....	7
General Description	1	Bill of Materials.....	7
Revision History	2	Related Links.....	7
Evaluation Board Configuration	3		

REVISION HISTORY

4/12—Revision 0: Initial Version

EVALUATION BOARD CONFIGURATION

SETTING UP THE EVALUATION BOARD

The EVAL-ADN469xEHDEBZ allows the [ADN4690E/ADN4691E/ADN4694E/ADN4696E](#) 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. Jumper configurations are shown in Table 2.

The board is powered by connecting a 3.3 V power supply to the screw terminals for VCC and GND. Supply current is typically 16 mA with both driver and receiver enabled, or 1 mA with both disabled. A 10 μ F decoupling capacitor, C1, is fitted at the connector between VCC and GND. The VCC pin of the ADN469xE is fitted with a decoupling capacitor of 100 nF.

An example evaluation of the [ADN4690E/ADN4691E/ADN4694E/ADN4696E](#) driver is shown in Figure 2. A signal generator is connected to DI with an input signal of 50 MHz ([ADN4690E/ADN4694E](#)) or 100 MHz ([ADN4691E/ADN4696E](#)), with a 50% duty cycle and swing of between 0 V and 3.3 V. Jumpers LK1 and LK2 are connected in Position A to disable the receiver and enable the driver. Oscilloscope probes are connected to DI, A, and B.

Similarly, an evaluation of the [ADN4690E/ADN4691E/ADN4694E/ADN4696E](#) receiver is shown in Figure 3. A signal generator capable of applying a differential input signal is connected to J5 and J6, with the input swing between 1 V and 1.2 V (J6 input the inverse of J5 input). Jumpers LK1 and LK2

are connected in Position B to enable the receiver and disable the driver. Oscilloscope probes are attached to RO, A, and B.

EVALUATION WITH APPLICATIONS

Two EVAL-ADN469xEHDEBZ boards can be connected together in a point-to-point configuration as shown in Figure 4. In order to allow part evaluation with a load equivalent to a parallel-terminated bus, the boards have been fitted with 50 Ω termination resistors. For the point-to-point configuration in Figure 4, these should be replaced with resistors of 100 Ω .

A signal generator is connected onto one board's DI input. This board's A and B outputs are respectively connected to the second board's A and B inputs.

Connecting probes to DI on the first board, and A, B, and RO on the second, the propagation of the input signal across the bus and to the receiver output of the second board can be observed and evaluated.

Alternatively, the EVAL-ADN469xEHDEBZ can be connected to an existing bus and a control board as shown in Figure 5 in order to test the performance in the application. In this case, both termination resistors should be removed, as well as the jumpers on LK1 and LK2. Control signals should be connected to RO, RE, DE, and DI.

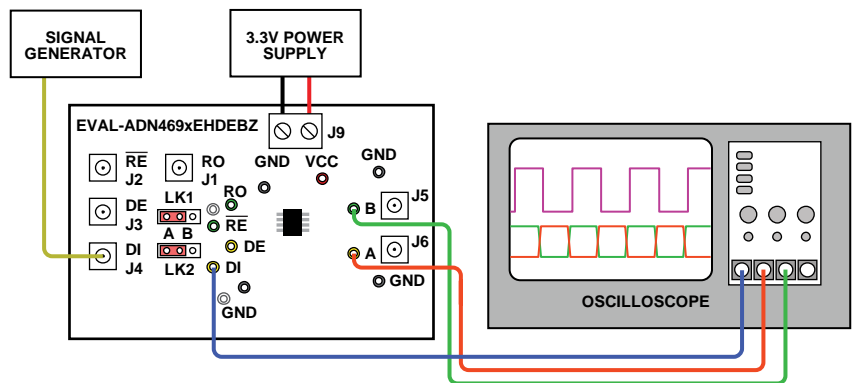


Figure 2. [ADN4690E/ADN4691E/ADN4694E/ADN4696E](#) Driver Evaluation with EVAL-ADN469xEHDEBZ

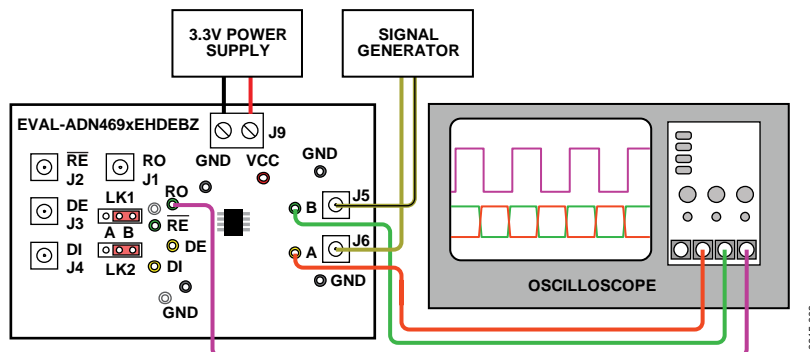


Figure 3. [ADN4690E/ADN4691E/ADN4694E/ADN4696E](#) Receiver Evaluation with EVAL-ADN469xEHDEBZ

EVALUATION BOARD SCHEMATIC AND LAYOUT

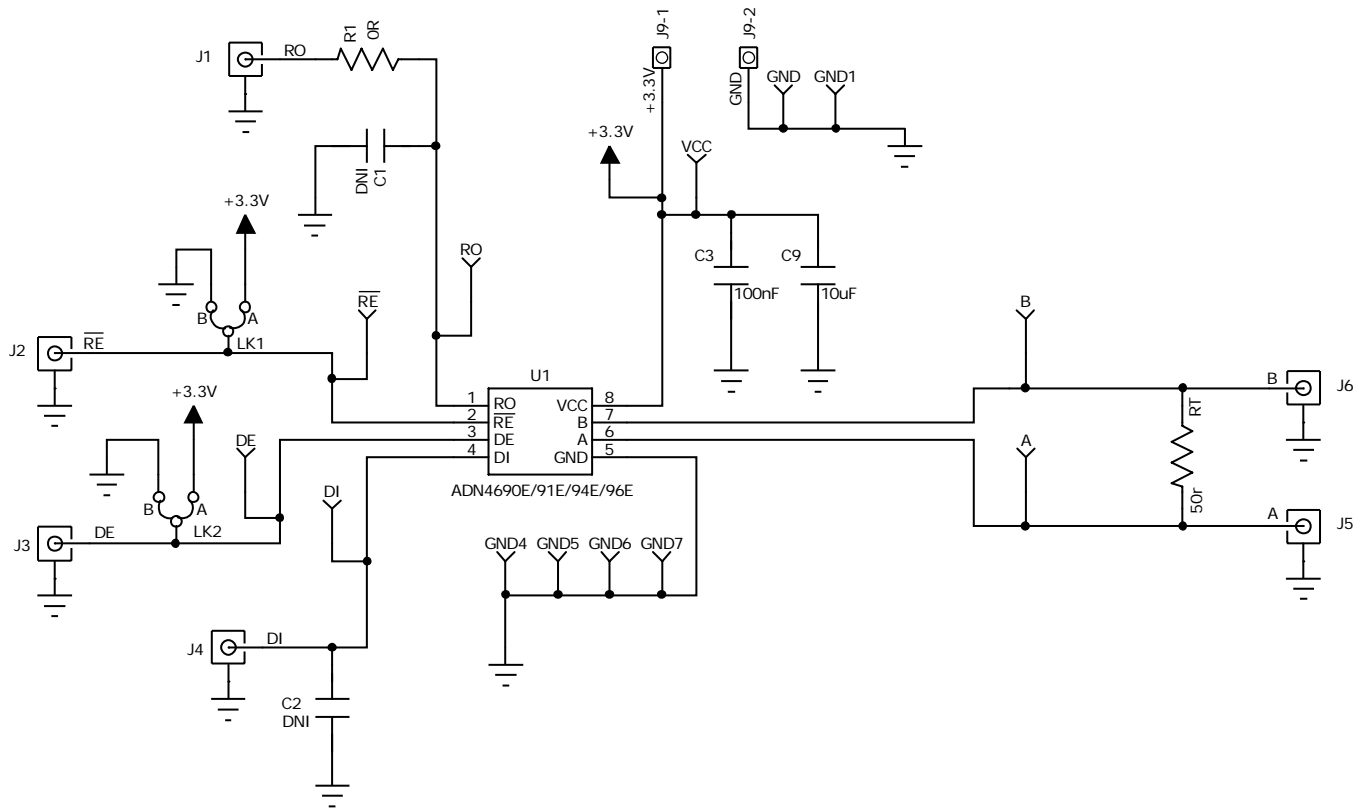


Figure 6. EVAL-ADN469xEHDEBZ Schematic

10615-006

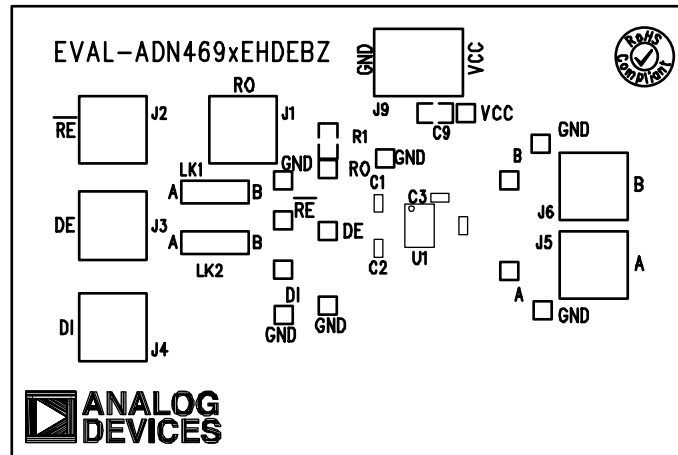


Figure 7. EVAL-ADN469xEHDEBZ Silkscreen

10615-007

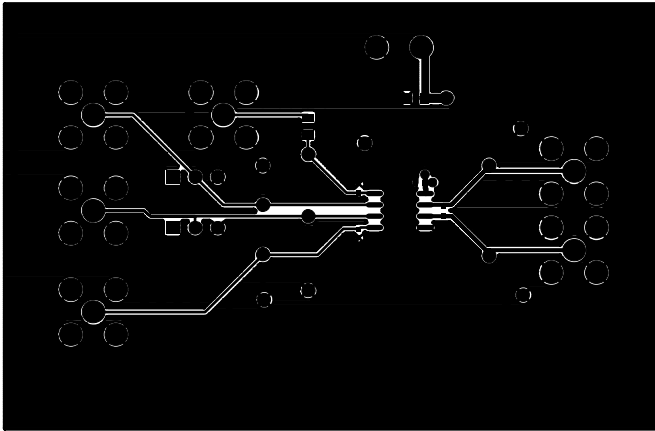


Figure 8. EVAL-ADN469xEHDEBZ Component Side

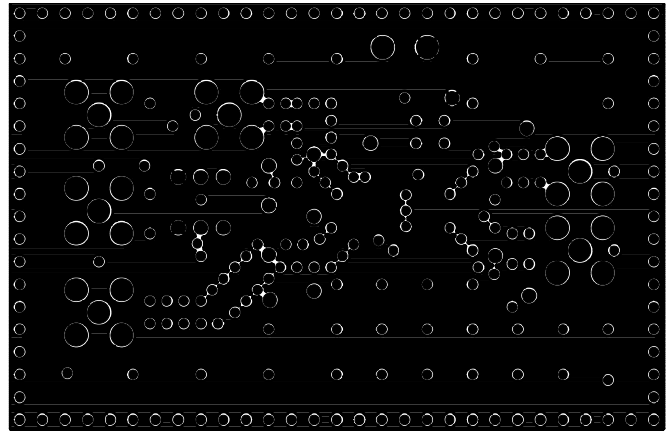


Figure 10. EVAL-ADN469xEHDEBZ Internal Layer 3

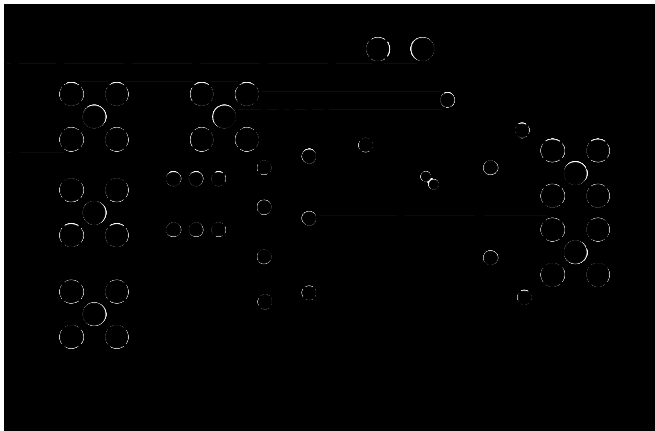


Figure 9. EVAL-ADN469xEHDEBZ Internal Layer 2

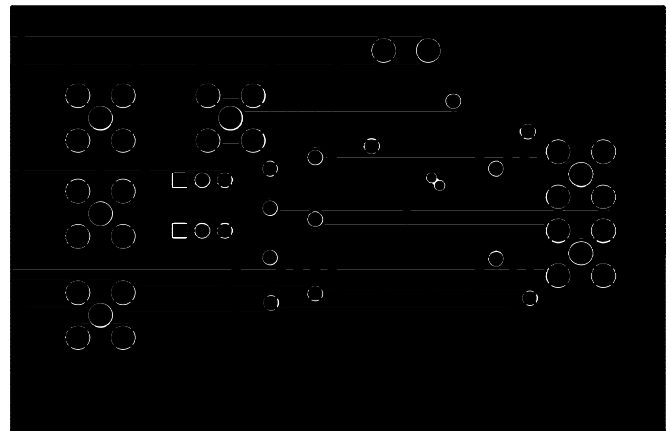


Figure 11. EVAL-ADN469xEHDEBZ Solder Side

ORDERING INFORMATION**BILL OF MATERIALS**

Table 3.

Quantity	Reference Designator	Description	Supplier/Part Number
2	C1, C2	Not placed/optional	N/A
1	C3	Capacitor, 100 nF, 0805	Multicomp/MCCA000274
1	C9	Capacitor, 10 μ F, 0805	AVX/0805ZD106KAT2A
4	A, DE, TXD, Y	Test point, yellow	Vero Technologies/20-313140
4	B, RE, RO, Z	Test point, green	Vero Technologies/20-313138
6	GND (GND1 to GND7)	Test point, black (optional)	Vero Technologies/20-2137
6	J1 to J6	Connector, SMB jack	Multicomp/24-14-2-TGG
1	J9	Terminal block, 2 way	Lumberg/KRM 02
2	LK1, LK2	3-pin (1 \times 3) 0.1" header and shorting block	Harwin/M20-9990346 & M7566-05
1	R1	Resistor, 0 Ω , 0805	Vishay Draloric/CRCW08050000Z0EA
1	RT	Resistor, 100 Ω , 0402	Vishay Draloric /CRCW0402100RFKEAHP
1	U1	8-lead SOIC (not placed)	Analog Devices/ADN4690E, ADN4691E, ADN4694E, or ADN4696E
1	VCC	Test point, red	Vero Technologies/20-313137

RELATED LINKS

Resource	Description
ADN4690E	Product Page, 3.3 V, 100 Mbps, Half-Duplex, High Speed M-LVDS Transceiver with Type 1 Receiver
ADN4691E	Product Page, 3.3 V, 200 Mbps, Half-Duplex, High Speed M-LVDS Transceiver with Type 1 Receiver
ADN4694E	Product Page, 3.3 V, 100 Mbps, Half-Duplex, High Speed M-LVDS Transceiver with Type 2 Receiver
ADN4696E	Product Page, 3.3 V, 200 Mbps, Half-Duplex, High Speed M-LVDS Transceiver with Type 2 Receiver

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.