

Evaluating the ADAR5000 17 GHz to 32 GHz, 4-Way RF Splitter Combiner

FEATURES

- ▶ 4-layer, Rogers RO 4350B
- ▶ 2.92 mm connectors
- ▶ Microstrip traces
- ▶ Through, open, and short calibration paths

EVALUATION KIT CONTENTS

- ▶ ADAR5000-EVALZ evaluation board

EQUIPMENT NEEDED

- ▶ RF network analyzer

GENERAL DESCRIPTION

The ADAR5000-EVALZ is a copper clad, 4-layer printed circuit board (PCB) fabricated from 0.254 mm (10 mil) thick, Rogers 4350B. The central core is prepreg, and there is an unused FR4 layer on the underside, which forms a nominal thickness of 1.574 mm (62 mils). The P1, P2, P3, P4, and SUM ports on the ADAR5000-EVALZ are populated with 2.92 mm, female coaxial connectors, and the corresponding microstrip RF traces have a 50 Ω characteristic impedance. To calibrate board trace losses, a through calibration path is provided between the J7 and J6 connectors. Open and short paths are provided on the J8 and J9 connectors. Refer to [Table 1](#) and [Figure 3](#) for the through calibration path performance.

For full details on the [ADAR5000](#), see the ADAR5000 data sheet, which must be consulted in conjunction with this user guide when using the ADAR5000-EVALZ.

EVALUATION BOARD PHOTOGRAPHS

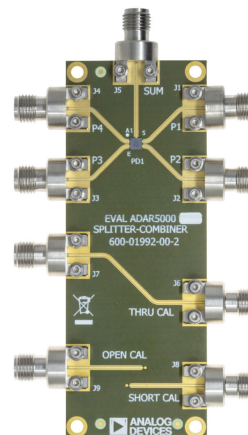


Figure 1. ADAR5000-EVALZ Primary Side

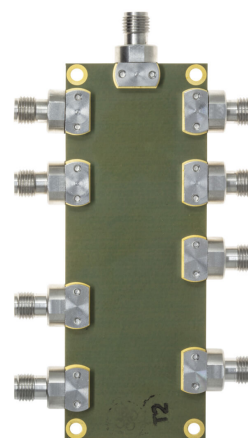


Figure 2. ADAR5000-EVALZ Secondary Side

TABLE OF CONTENTS

Features.....	1	Operating the ADAR5000-EVALZ.....	3
Evaluation Kit Contents.....	1	Evaluation Board Schematic and Artwork.....	4
Equipment Needed.....	1	Ordering Information.....	6
General Description.....	1	Bill of Materials.....	6
Evaluation Board Photographs.....	1		

REVISION HISTORY

3/2023—Revision 0: Initial Version

OPERATING THE ADAR5000-EVALZ

A 2-port network analyzer is required to evaluate the ADAR5000-EVALZ. The through, open, and short lines can be used to de-embed the board trace losses. Table 1 and Figure 3 show the insertion loss and return loss of the through path.

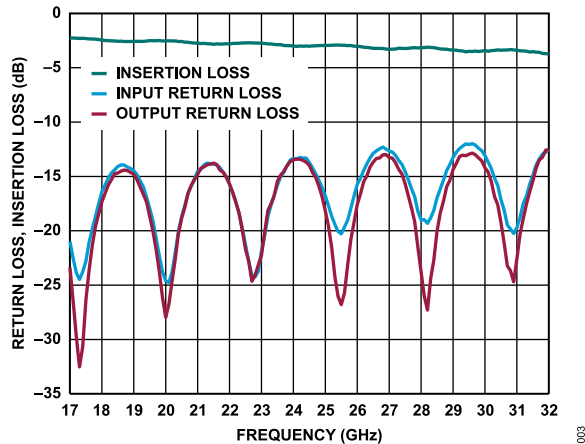


Figure 3. Return Loss and Insertion Loss of the Through Calibration Path, 17 GHz to 32 GHz

Table 1. Insertion Loss of the Through Calibration Path (Continued)

Frequency (GHz)	Insertion Loss (dB)
31	-3.4
31.5	-3.51
32	-3.73

Table 1. Insertion Loss of the Through Calibration Path

Frequency (GHz)	Insertion Loss (dB)
17	-2.26
17.5	-2.32
18	-2.44
18.5	-2.56
19	-2.57
19.5	-2.5
20	-2.52
20.5	-2.58
21	-2.73
21.5	-2.84
22	-2.8
22.5	-2.71
23	-2.75
23.5	-2.88
24	-3
24.5	-3.02
25	-2.95
25.5	-2.93
26	-3.02
26.5	-3.21
27	-3.31
27.5	-3.23
28	-3.15
28.5	-3.21
29	-3.37
29.5	-3.48
30	-3.41
30.5	-3.39

EVALUATION BOARD SCHEMATIC AND ARTWORK

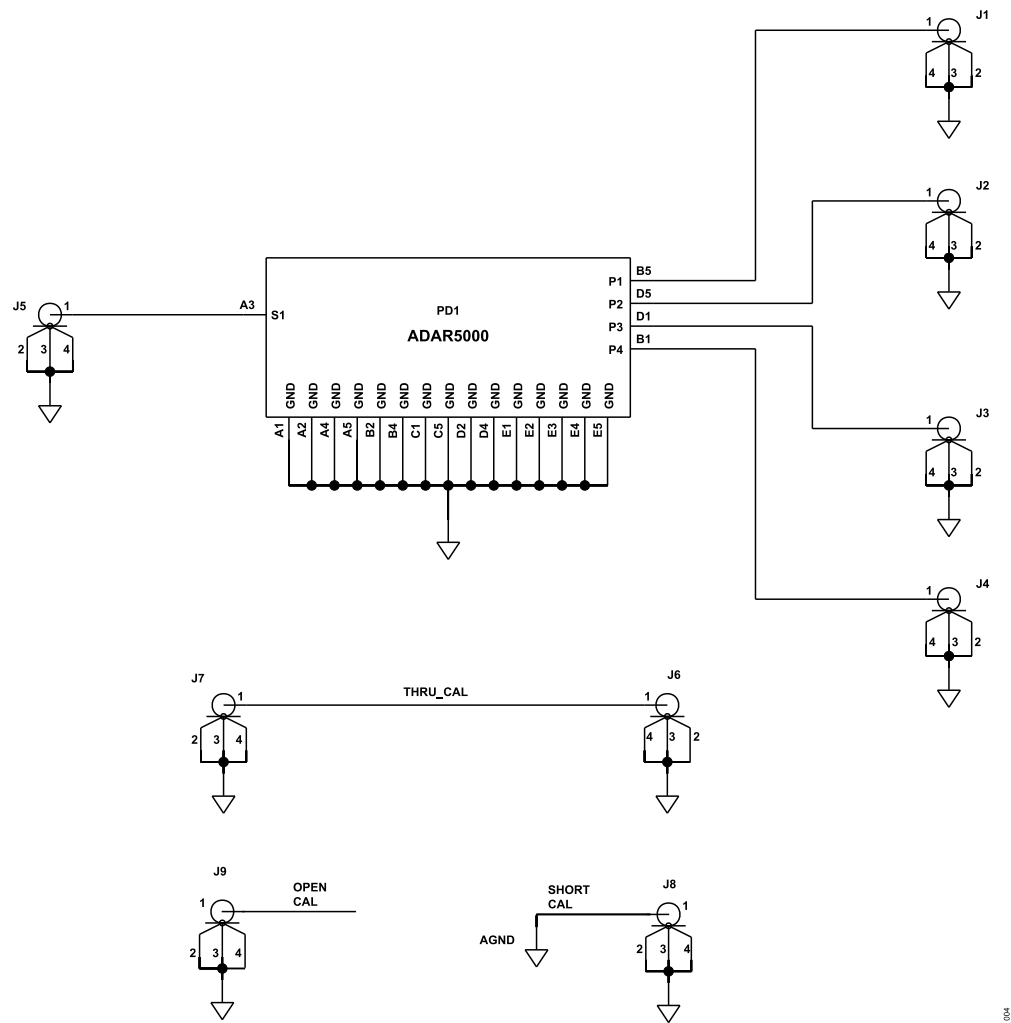


Figure 4. ADAR5000-EVALZ Schematic

EVALUATION BOARD SCHEMATIC AND ARTWORK

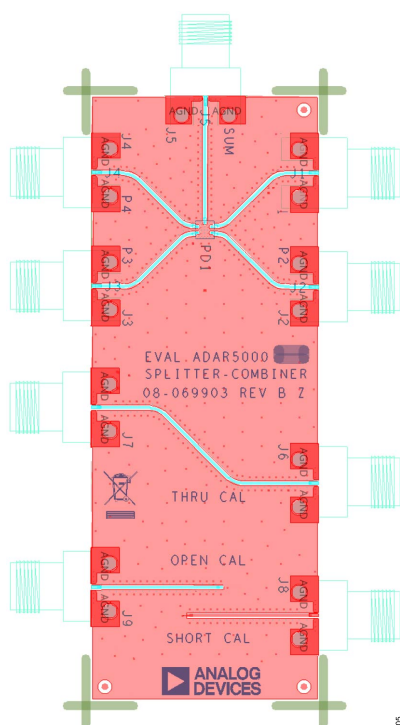


Figure 5. ADAR5000-EVALZ Assembly Drawing

ORDERING INFORMATION

BILL OF MATERIALS

Table 2. Bill of Materials for the ADAR5000-EVALZ

Reference Designator	Description	Manufacturer	Part Number
PD1	17 GHz to 32 GHz, 4-way RF splitter combiner	Analog Devices, Inc.	ADAR5000ACBZ
J1, J2, J3, J4, J5, J6, J7, J8, J9	PCB connectors, end launch, edge-mount, 2.92 mm jack	Signal Microwave	ELF40-001

**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 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.

