

Evaluating the HMC7043B 14 Outputs Jitter Attenuator

FEATURES

- ▶ Self-contained board, including [HMC7043B](#) high performance, 3.2 GHz, 14-output fanout buffer, SDP-K1 Arduino interface, and voltage regulators
- ▶ SMA connectors for one clock input, one RFSYNC input, and six clock outputs
- ▶ Windows®-based software allows control from a PC
- ▶ Externally powered by 6V to 14V

EVALUATION KIT CONTENTS

- ▶ EK1HMC7043BLP7F evaluation board

EQUIPMENT NEEDED

- ▶ Windows-based PC with USB port for evaluation software
- ▶ System demonstration platform, [EVAL-SDP-CK1Z](#) (SDP-K1)
- ▶ Power supply (6V to 14V)
- ▶ 50Ω terminators
- ▶ Low noise external CLKIN_{IN} source

DOCUMENTS NEEDED

- ▶ HMC7043B data sheet
- ▶ EK1HMC7043BLP7F user guide

SOFTWARE REQUIRED

- ▶ [Analysis | Control | Evaluation \(ACE\)](#) software (version 1.30 or newer)
- ▶ HMC7043B plugin (version 1.2022.47100 or newer)

GENERAL DESCRIPTION

This user guide describes the hardware and software of the HMC7043B evaluation kit. The evaluation board schematic and printed circuit board (PCB) layout artwork can be found on the EK1HMC7043BLP7F product page at www.analog.com.

The HMC7043B is a high-performance clock buffer for the distribution of ultra low phase noise references for high speed data converters with either parallel or serial (JESD204B type) interfaces. The HMC7043B is designed to meet the requirements of multicarrier GSM and LTE base station designs, and offers a wide range of clock management and distribution features to simplify base band and radio card clock tree designs.

The EK1HMC7043BLP7F evaluation kit is a compact, easy-to-use platform for evaluating all the features of the HMC7043B. All inputs and outputs are configured as differential on the EK1HMC7043BLP7F evaluation board.

Full specifications on the HMC7043B are available in the product datasheet, which must be consulted in conjunction with this user guide when using the evaluation board.

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REVISION HISTORY

10/2025—Revision 0: Initial Version

EK1HMC7043BLP7F EVALUATION BOARD PHOTOGRAPH

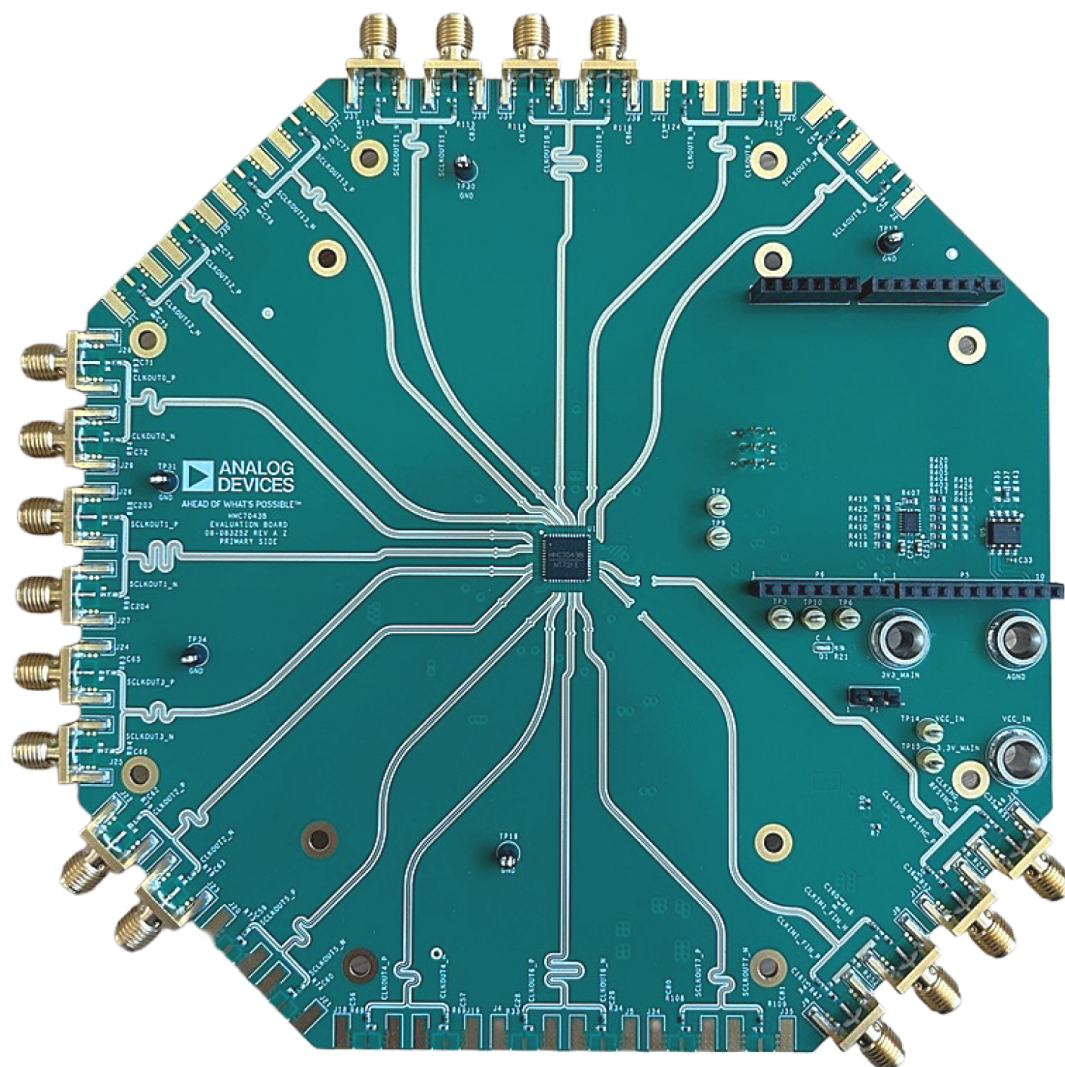


Figure 1. EK1HMC7043BLP7F Evaluation Board Photograph

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GETTING STARTED

SOFTWARE INSTALLATION PROCEDURES

To install the [ACE](#) software and [HMC7043B](#) plugin, perform the following steps:

1. Install the latest version of the ACE software platform.
2. If the HMC7043B plugin appears automatically, proceed to Step 4.
3. Double-click the HMC7043B plugin file, **Board.HMC7043_SDP.1.2025.8300.acezip**.
4. Check that the HMC7043B plugin appears when the EK1HMC7043BLP7F board is attached through the system demonstration platform (SDP) connector to the PC.

EVALUATION BOARD SETUP PROCEDURES

The EK1HMC7043BLP7F board uses a single 6V power supply with VCC_IN and AGND banana plugs by default. The power supply circuitry has an [LT8622S](#) step-down silent switcher 3 with ultralow noise reference.

Details of the power supply circuitry are given in the [Power Supplies](#) section.

To power up the board, perform the following steps:

1. Set the power supply voltage as 6V and the current limit as 2 A.
2. Connect power cables to VCC_IN and AGND (two banana cables)
3. Turn on the power.

To run the software, perform the following steps:

1. Select **Start > All Programs > Analog Devices > ACE**.
2. On the **Select Device and Connection** tab, choose **HMC7043B** and the **HMC7043B board** appears under attached hardware.
3. When connecting the EK1HMC7043BLP7F board, allow 5 sec to 10 sec for the label on the status bar to change.

EVALUATION BOARD HARDWARE

The EK1HMC7043BLP7F requires the SDP-K1 platform that uses the [EVAL-SDP-CK1Z](#).

The EK1HMC7043BLP7F schematics are shown in from [Figure 7](#) to [Figure 18](#).

POWER SUPPLIES

The EK1HMC7043BLP7F board is powered by a 6V power supply connected to the banana plug, VCC_IN, and GND to the banana plug, AGND.

The power supply circuitry has an [LT8622S](#) step-down silent switcher 3 with ultralow noise reference. One LT8622S is used to generate all the supplies for [HMC7043B](#).

SETTING UP THE SIGNAL CONNECTIONS

After setting up the power and PC connections, use the following procedure to set up signal connections:

1. Connect a signal generator to the CLKIN1_FIN_P SMA Connector J11. By default, the reference inputs on the evaluation board are AC-coupled. Terminate the CLKIN1_FIN_N SMA connector J10 with a 50Ω termination. An amplitude setting of 6dBm from the signal generator is sufficient.

2. Connect an oscilloscope, spectrum analyzer, or other lab equipment to any output of the CLKOUTx_P or CLKOUTx_N SMA connectors. Place a 50Ω termination on all unused differential output pairs or power down unused outputs via software.

BYPASSING THE 6V SUPPLY AND THE LT8622

The evaluation board contains one on-board, LT8622S step-down silent switcher 3 with ultralow noise reference to regulate the 6V to 3.3V supply domain. The evaluation board can be configured to bypass silent switchers, which is useful for increasing HMC7043B power consumption efficiency. The evaluation board schematics provided on the EK1HMC7043BLP7F product page at www.analog.com. Bypass the 6V silent switcher for the HMC7043B as follows:

1. Change P1 Jumper position to 2-3 from 1-2 .
2. Remove R14 and L2.

Connect a bench 3.3 V power supply to banana plug, 3V3_MAIN and GND to banana plug, GND. Note that it is recommended to not have the 6V supply connected to the banana plug, VCC_IN of the evaluation board.

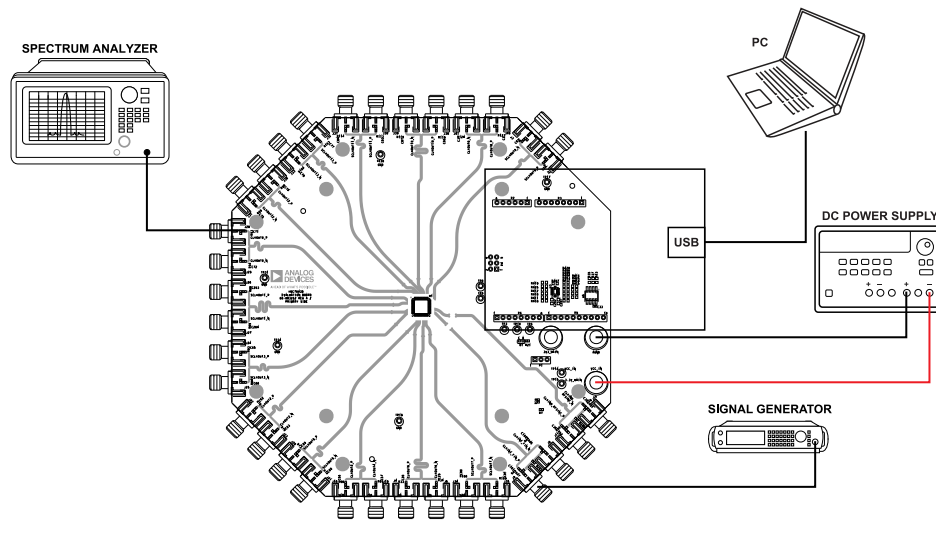


Figure 2. Evaluation Board Setup Diagram

EVALUATION BOARD SOFTWARE

The [ACE](#) software is the main platform that is used to control the EK1HMC7043BLP7F. The [HMC7043B](#) plugin includes user interfaces that relate to the HMC7043B and allow evaluation of the device. Use the following steps to open the main control window for HMC7043B.

1. Launch the ACE application. With the [SDP-K1](#) board connected to the EK1HMC7043BLP7F, the attached hardware appears in the graphical user interface (GUI) as shown in [Figure 3](#).

- 2. Double-click the **HMC7043 Board** icon and the tab shown in [Figure 4](#) appears.
- 3. Double-click the **HMC7043** icon that appears on the board GUI to open the main control window shown in [Figure 5](#).

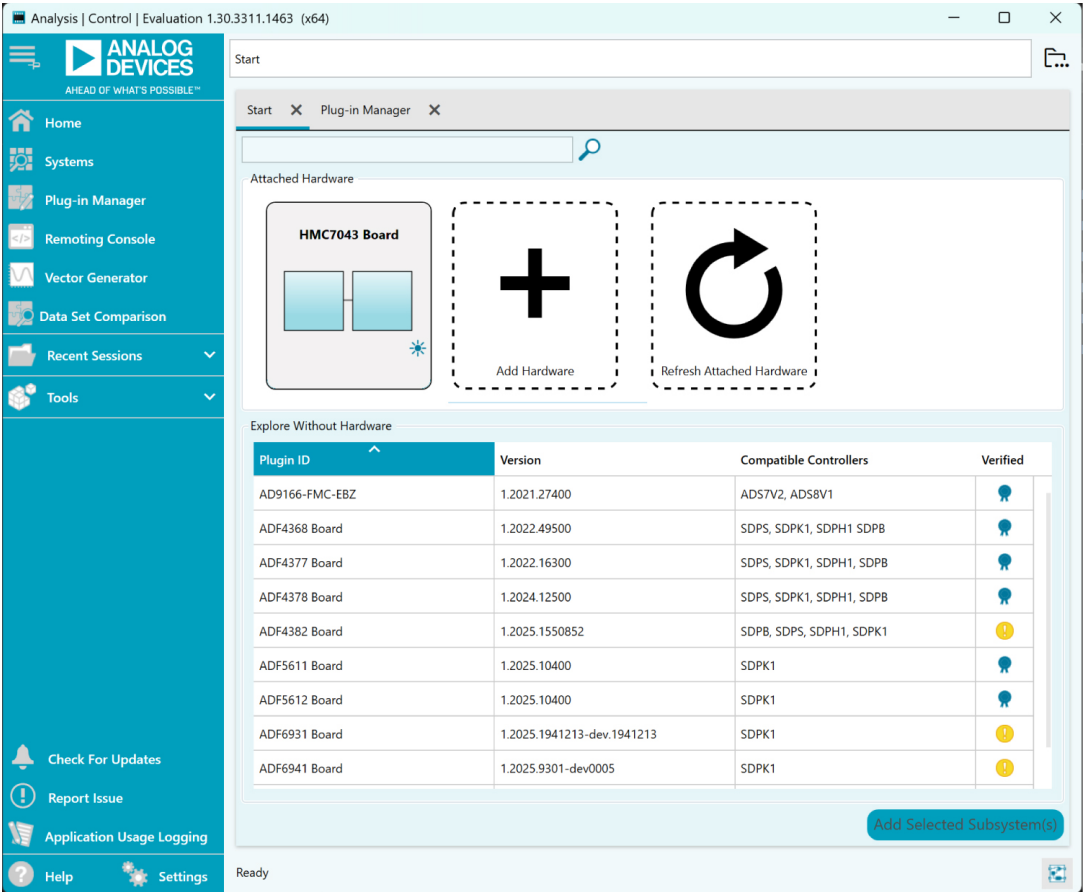


Figure 3. ACE Start Page, Attached Hardware (HMC7043B Evaluation Board)

EVALUATION BOARD SOFTWARE

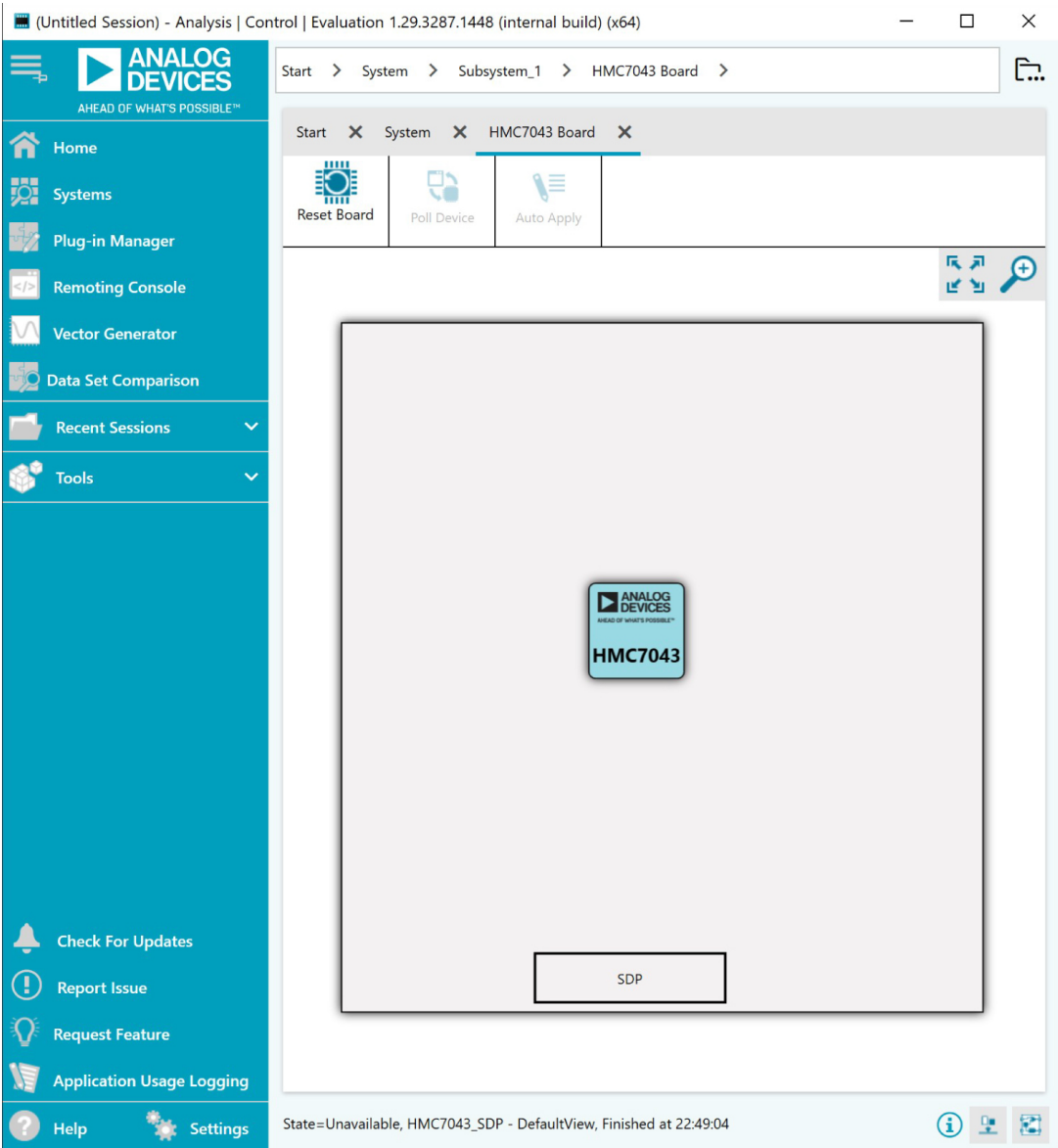


Figure 4. ACE Board Page, Device Selection

EVALUATION BOARD SOFTWARE

MAIN CONTROLS

The main controls are available in the high-level register map shown in [Figure 5](#). To modify registers, perform the following steps:

1. **ACE** plug-in is opened with preconfigured register values which includes reserved register updates. Click **Apply Changes** to upload suggested register settings for initialization.
2. Modify the registers as desired.
3. Click **Apply Changes** to load modified settings to the device. This action loads the updated registers only.

4. Some of the internal frequencies can be calculated depending on the user input. Therefore, other changes are expected when the user interact with certain fields. [Figure 5](#)
5. **Sleep, Pulsor, Restart, Slip, and Reseed** requests can be triggered by the buttons below shown in .
6. Click **Memory Map Side-By-Side** and **Export** to save specific register configuration. It exports the register values to a CSV file.

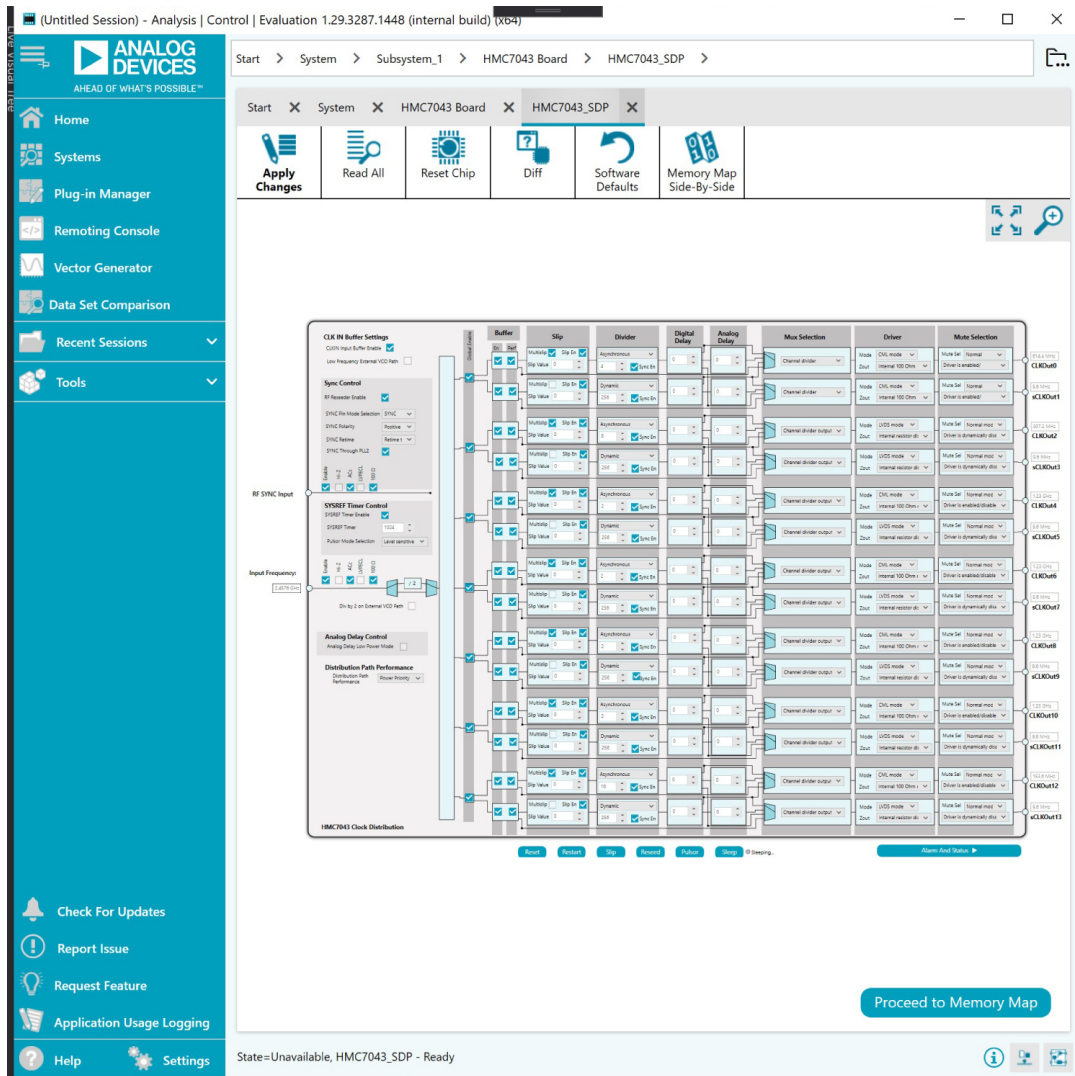


Figure 5. Main Page

EVALUATION AND TEST

To evaluate and test the performance of the [HMC7043B](#), proceed with the following steps:

1. Prepare the hardware and software setup as explained in the [Evaluation Board Hardware](#) section and the [Evaluation Board Software](#) section.
2. Run the software and follow the steps given in the [Evaluation Board Software](#) section to open the main page as shown in [Figure 5](#).
3. Click **Apply Changes**, which provides a clock divided by 4 of the input clock at the CLKOUT0P/CLKOUT0N output.

4. Measure the output spectrum and single sideband phase noise on a spectrum analyzer.

[Figure 6](#) shows a phase noise plot of the SMA CLKOUT0P output equal to 2457.6MHz when it is configured as a fundamental output and LVPECL output buffer. In this measurement, [HMC830](#) is used as external clock source

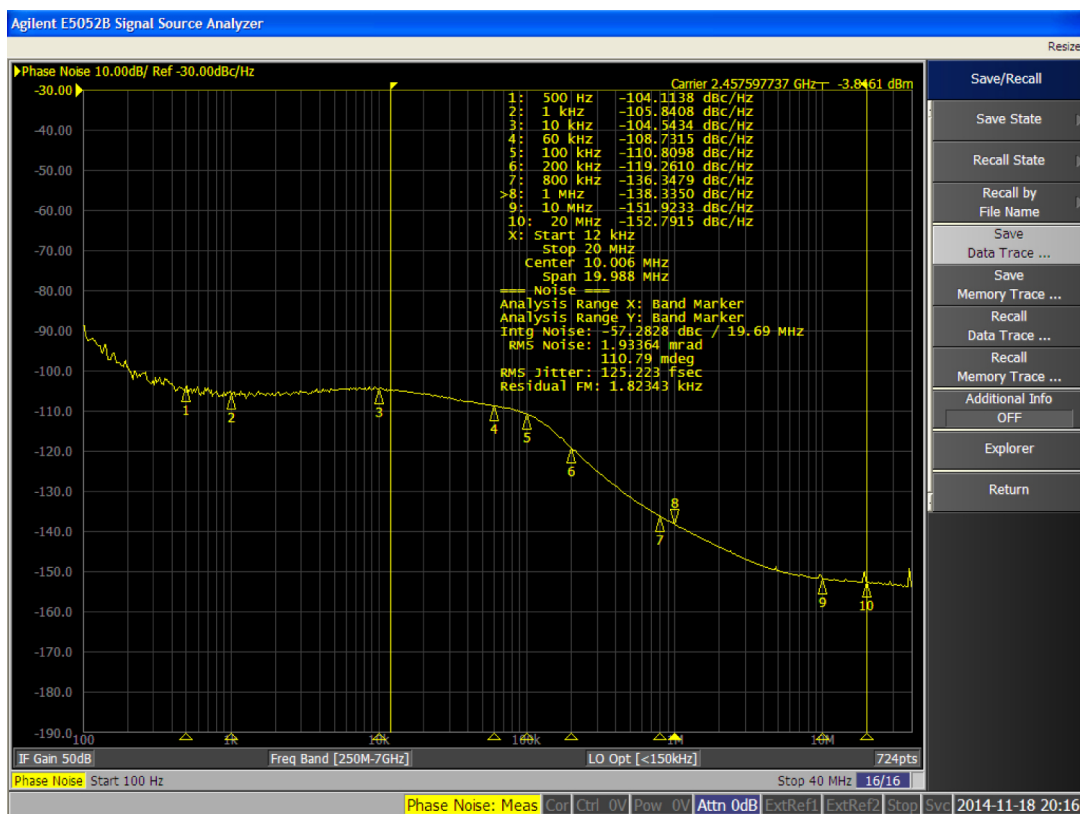


Figure 6. HMC7043B CLKOUT0 Output in LVPECL Configuration and Fundamental Mode

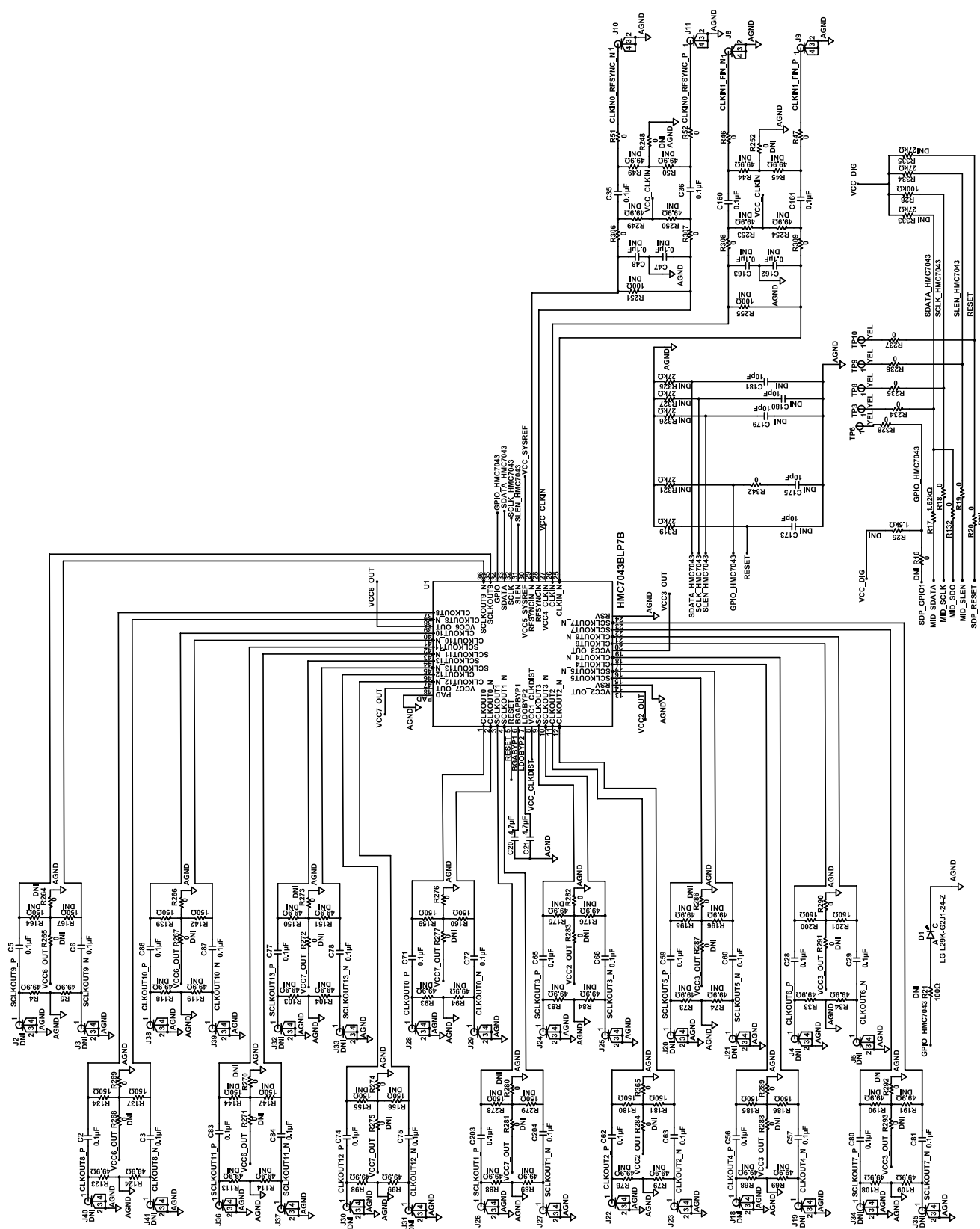




Figure 9. Evaluation Board Schematic, Silent Switcher (Page 4)

EVALUATION BOARD SCHEMATICS AND ARTWORK

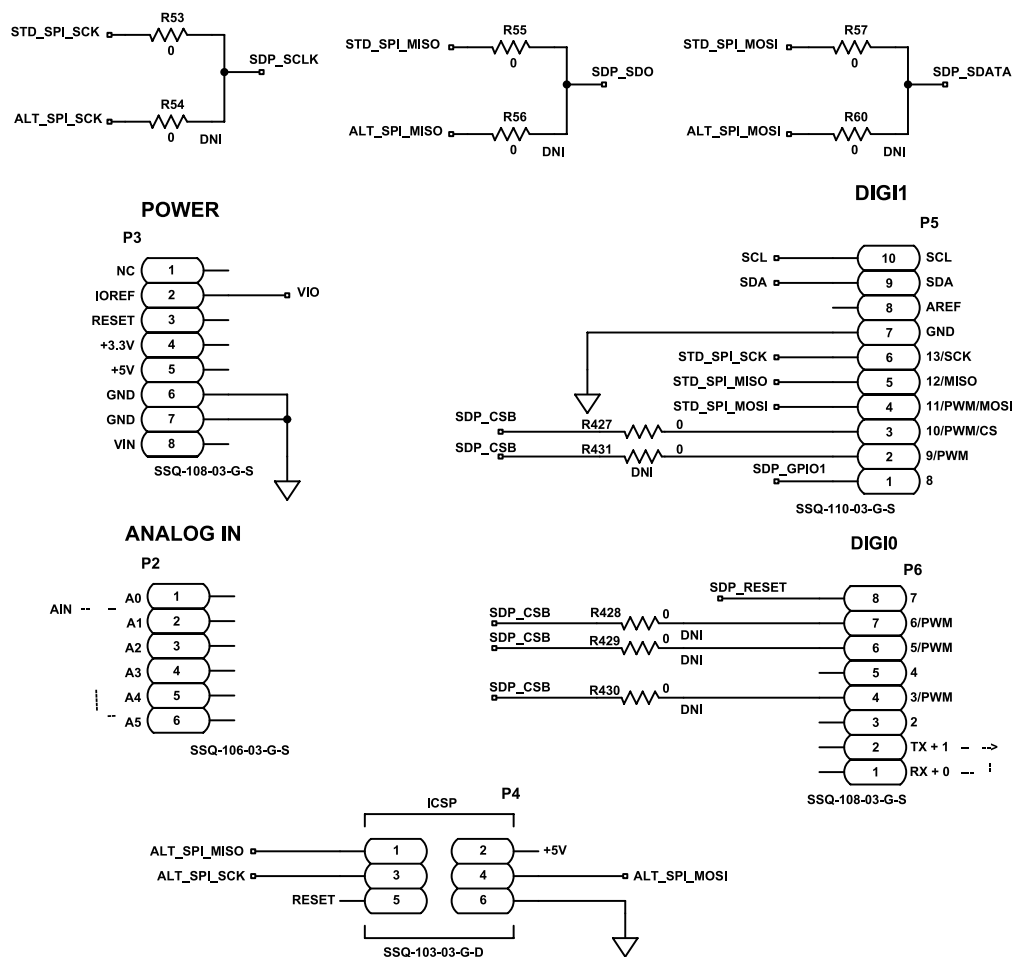


Figure 10. Evaluation Board Schematic, SDP-K1 Interface (Page 5)

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EVALUATION BOARD SCHEMATICS AND ARTWORK

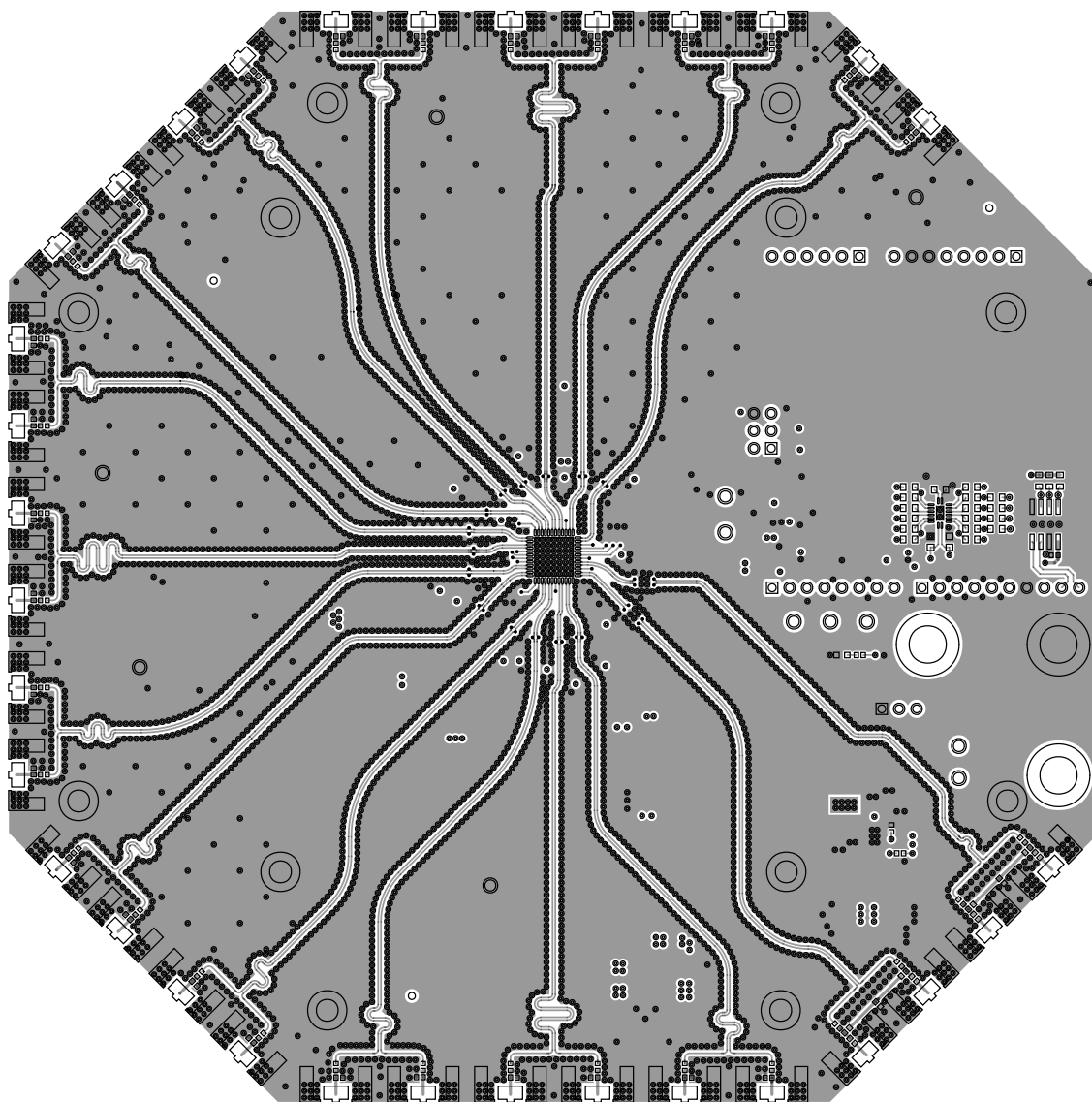


Figure 11. Evaluation Board Layer 1, Primary

EVALUATION BOARD SCHEMATICS AND ARTWORK

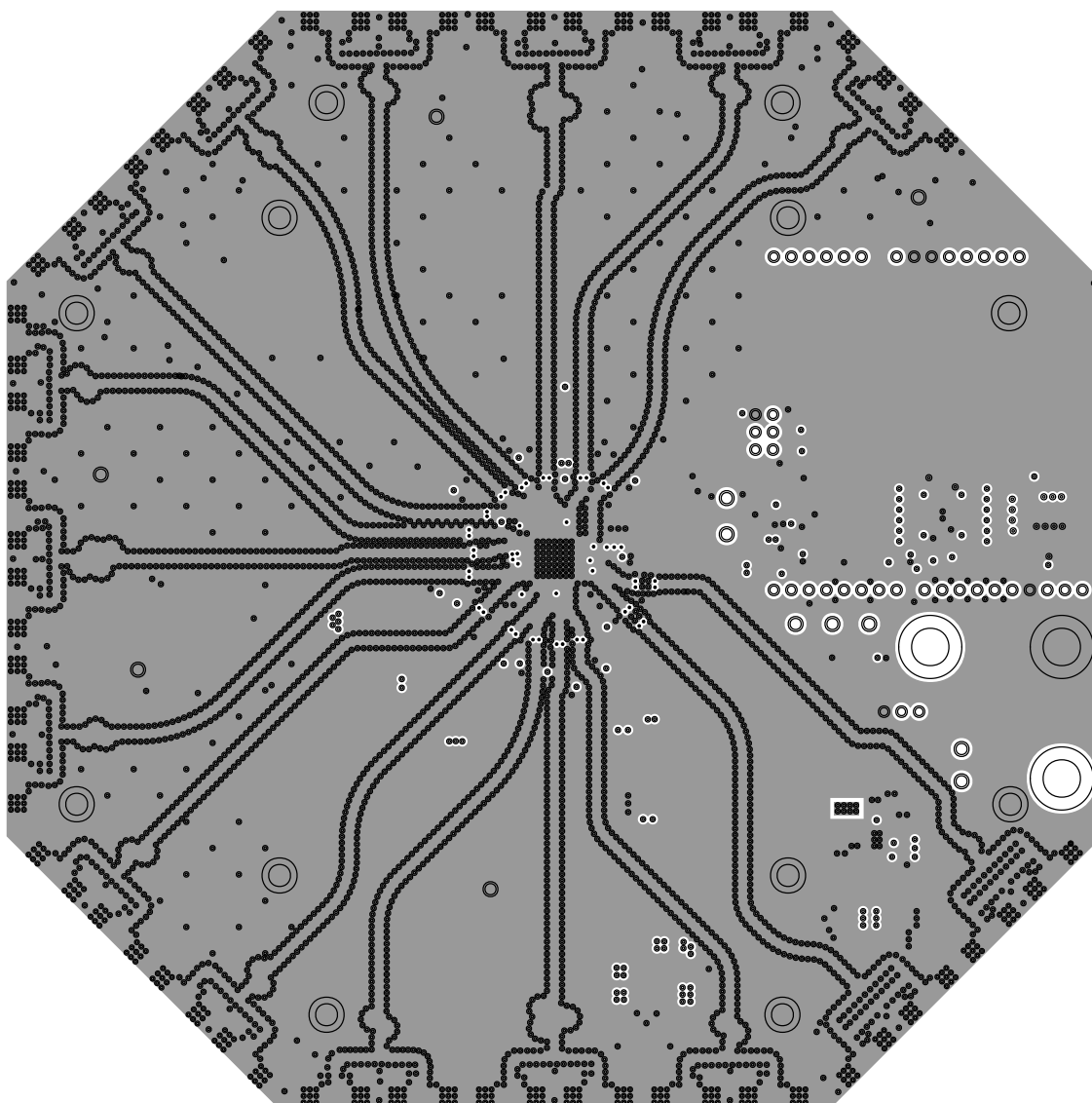


Figure 12. Evaluation Board Layer 2, Ground Plane

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EVALUATION BOARD SCHEMATICS AND ARTWORK

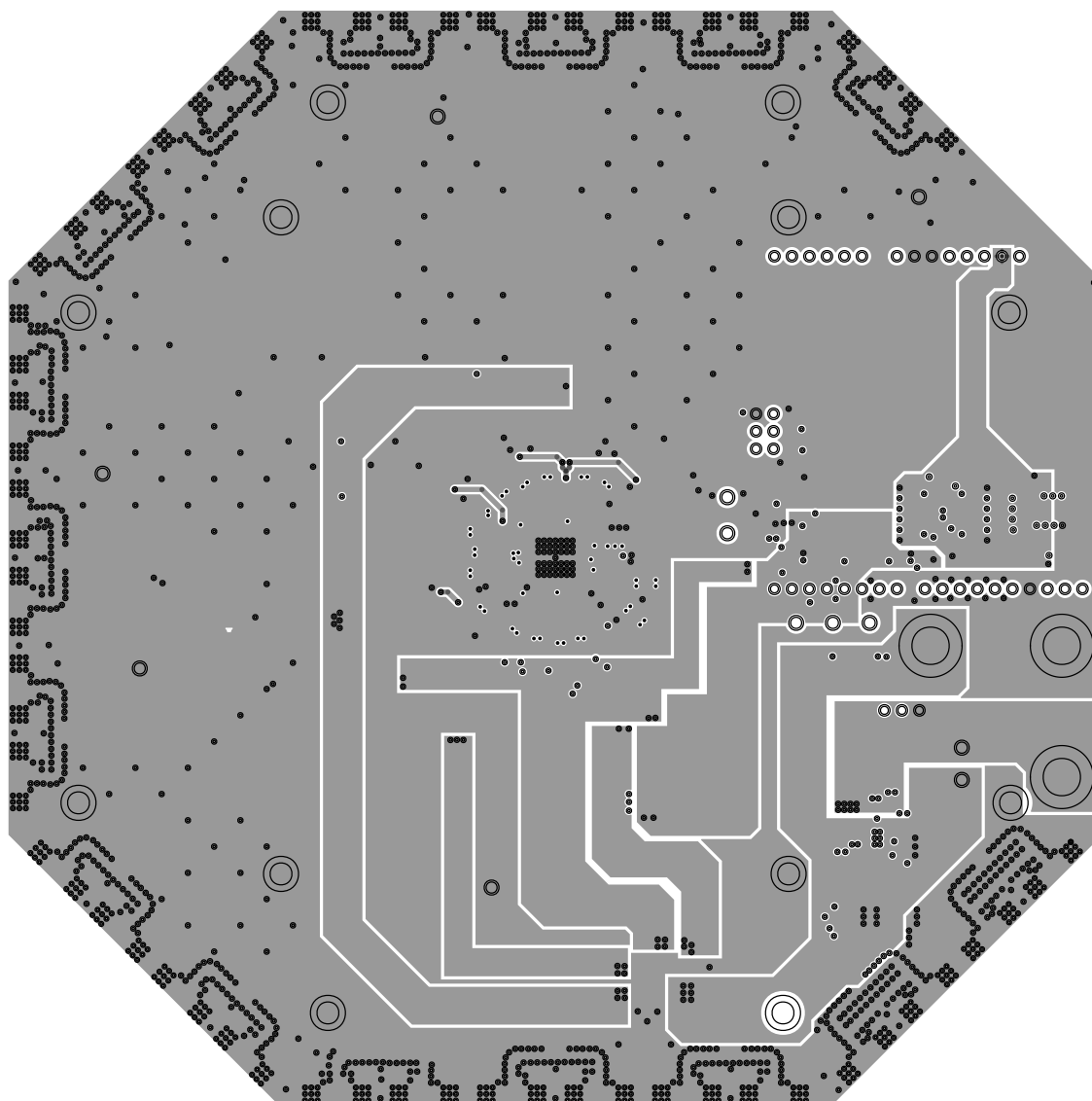
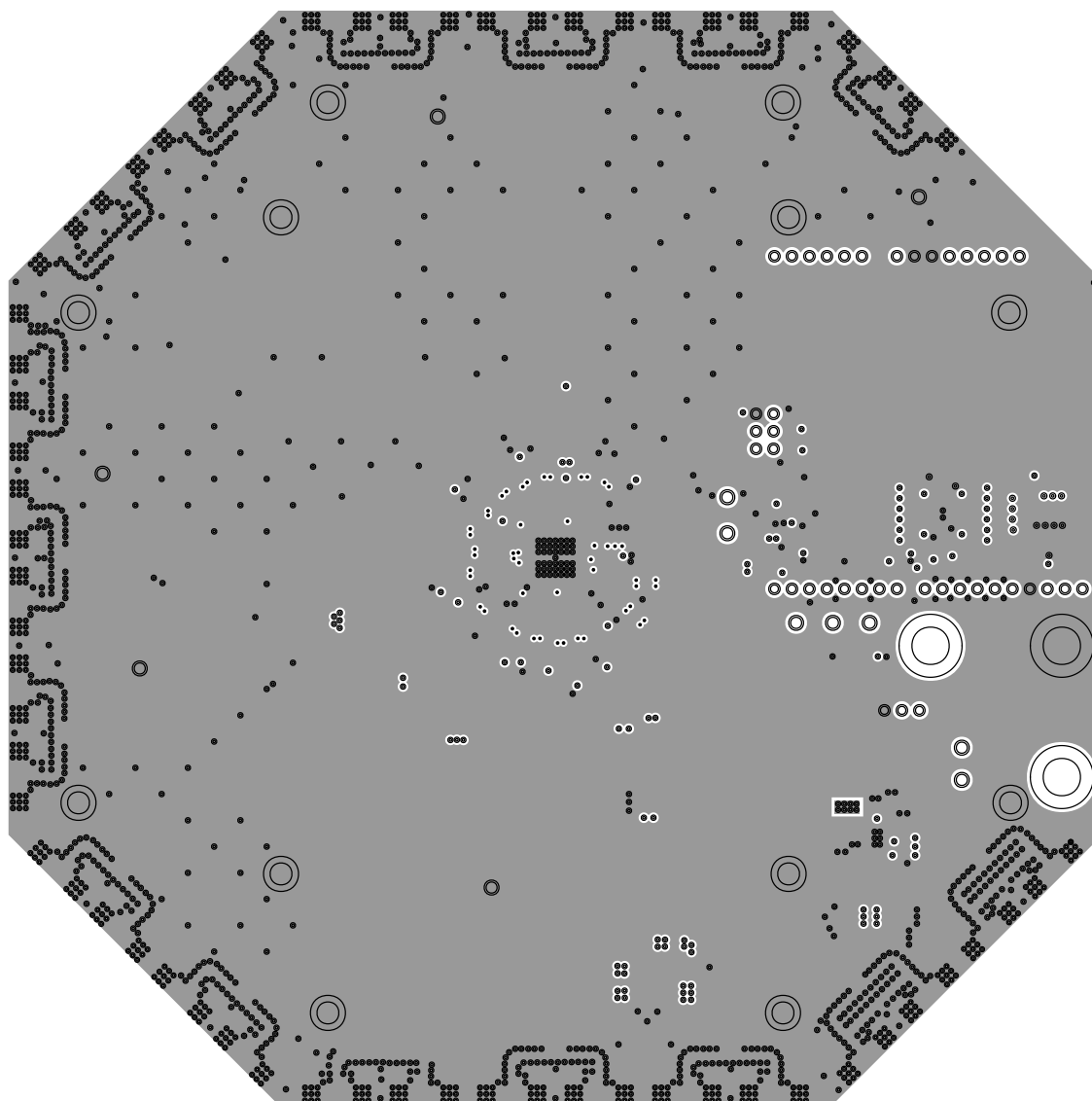


Figure 13. Evaluation Board Layer 3, Power Plane/Signals

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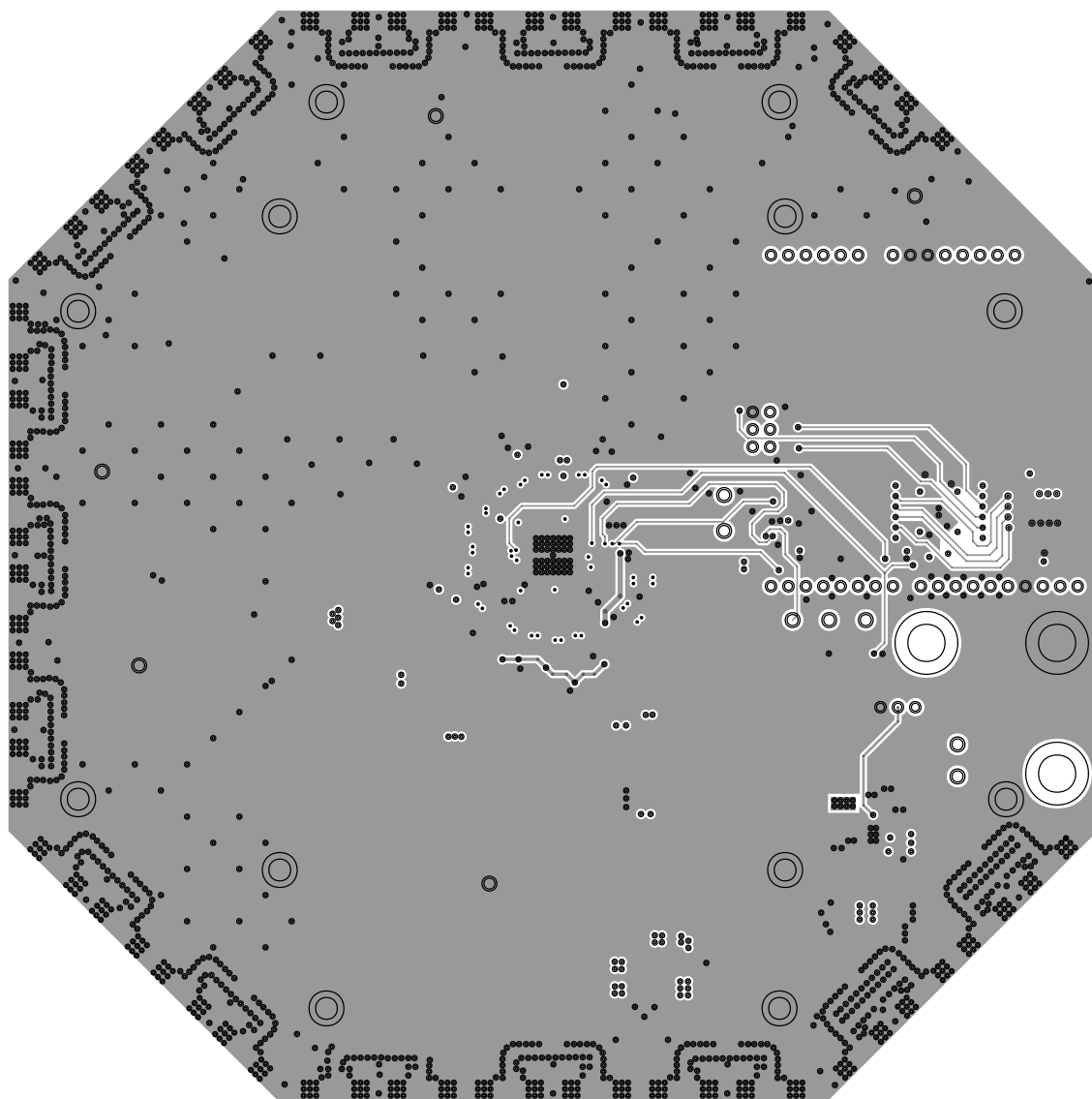
EVALUATION BOARD SCHEMATICS AND ARTWORK



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Figure 14. Evaluation Board Layer 4, GND

EVALUATION BOARD SCHEMATICS AND ARTWORK



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Figure 15. Evaluation Board Layer 5, Signal

EVALUATION BOARD SCHEMATICS AND ARTWORK

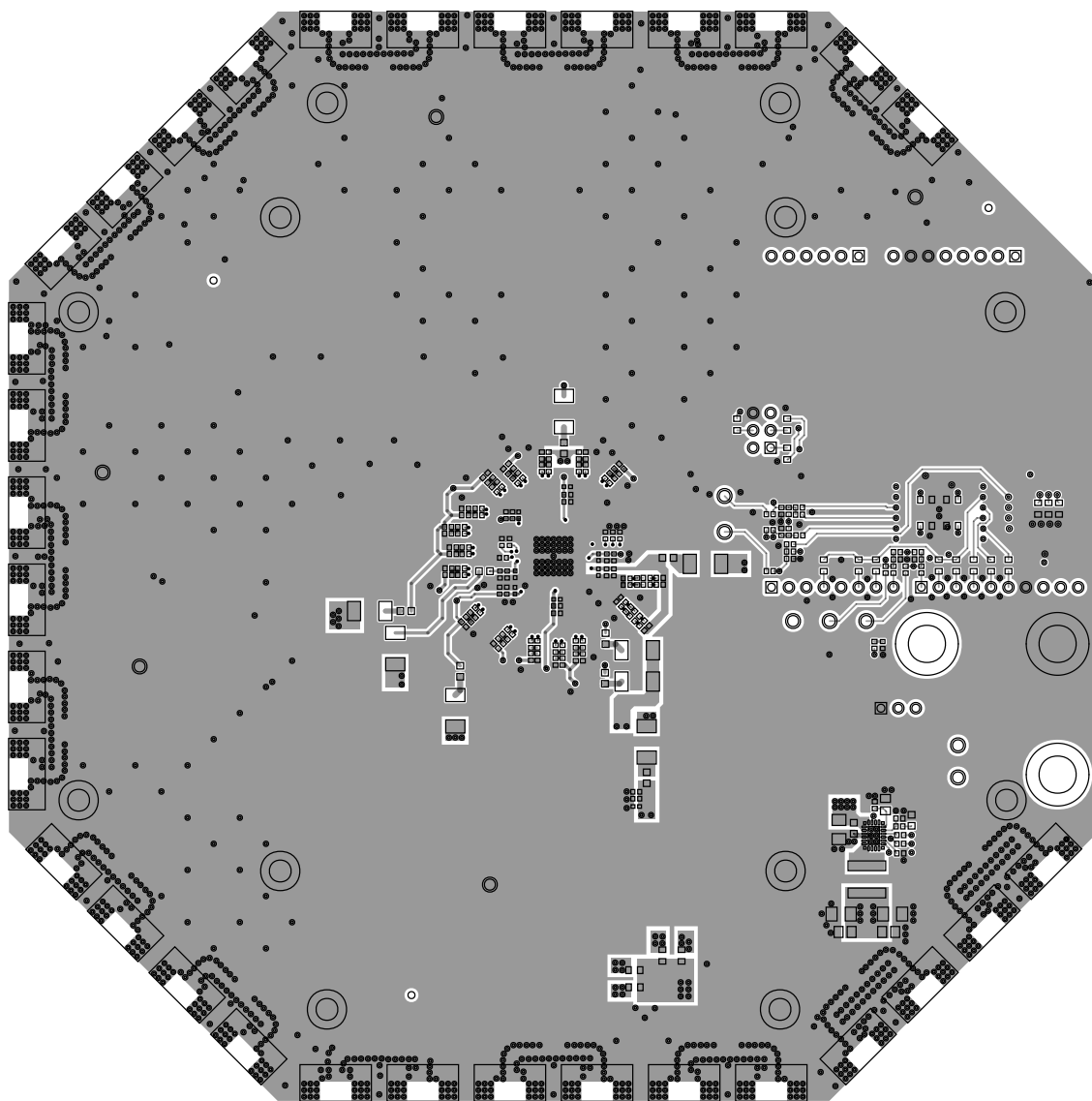


Figure 16. Evaluation Board Layer 6, Secondary

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EVALUATION BOARD SCHEMATICS AND ARTWORK

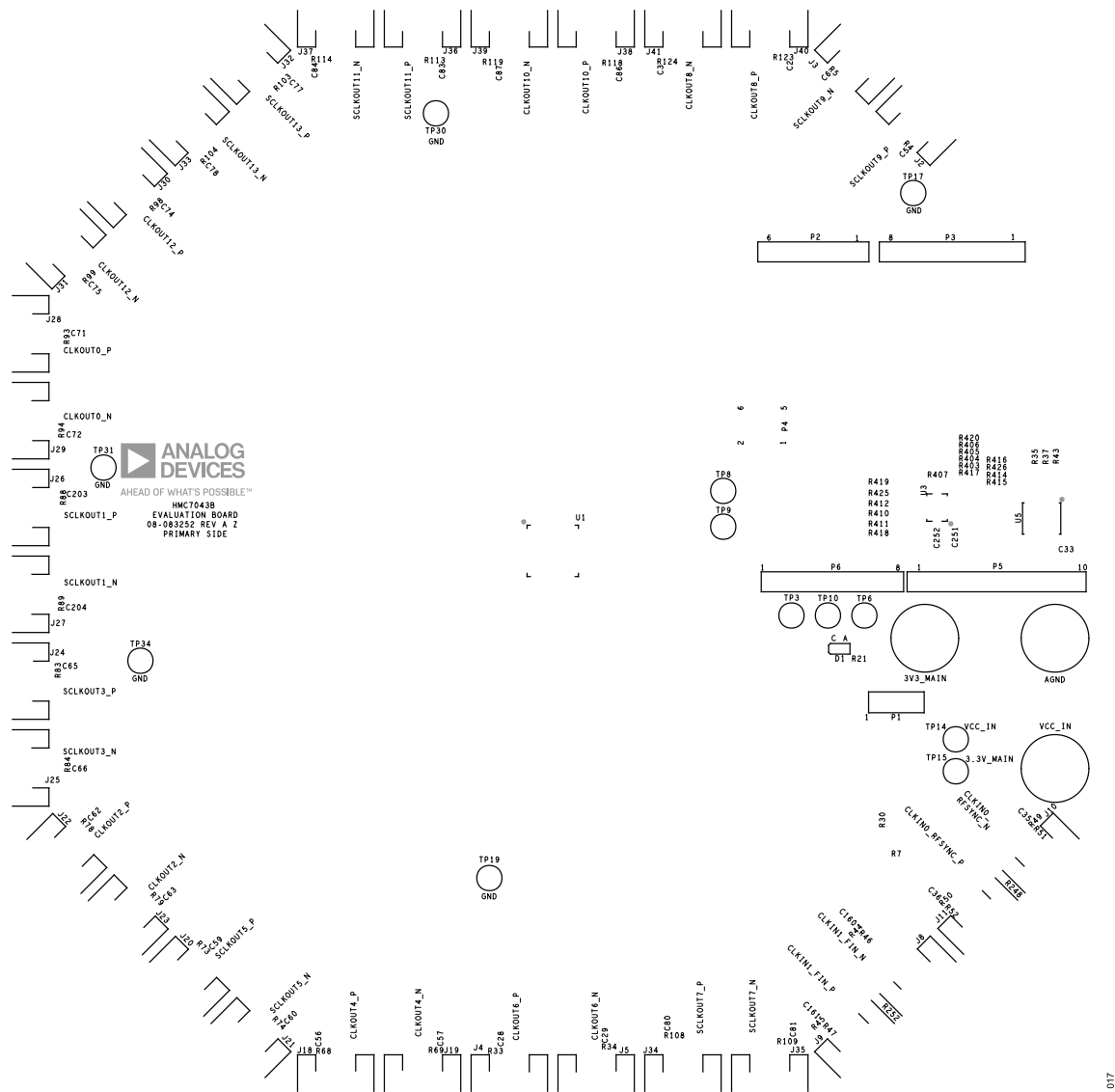
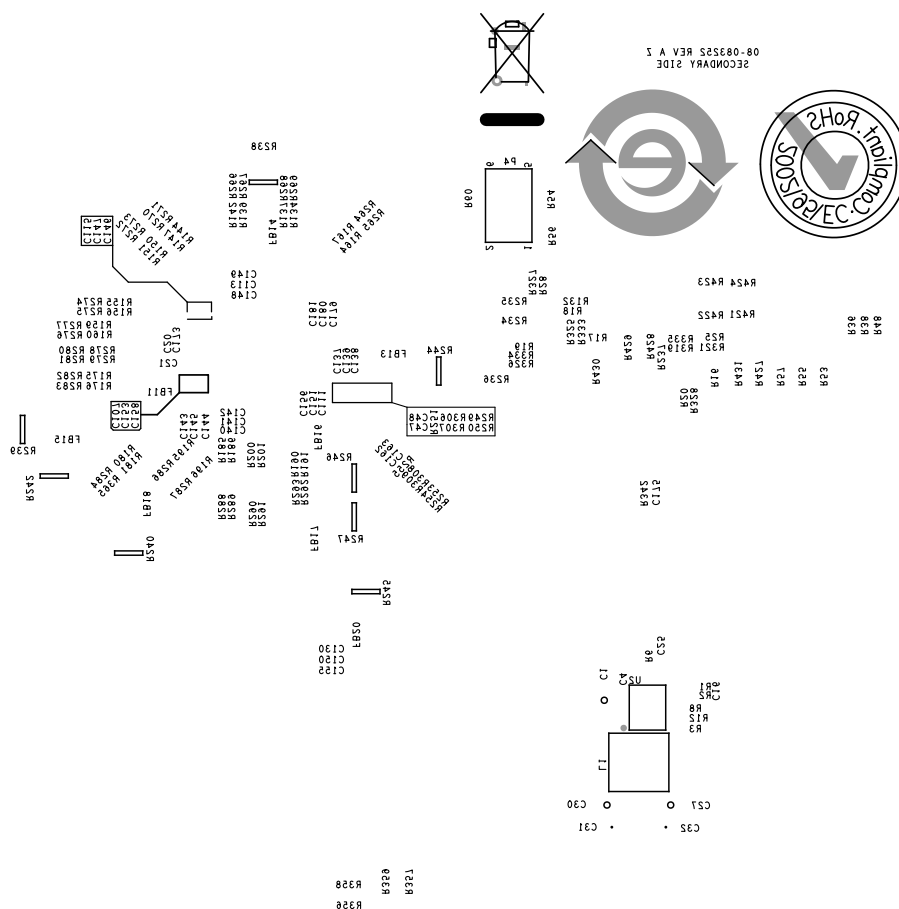


Figure 17. Evaluation Board Silkscreen, Top Side

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analog.com



ORDERING INFORMATION

BILL OF MATERIALS

Table 1. Bill of Materials

Reference Designator	Description	Value	Manufacturer	Part Number
3.3V_MAIN	LED low current, red	SML-P11VTT86	Rohm	SML-P11VTT86R
3V3_MAIN, AGND, VCC_IN	Connector-PCB, banana jack, female, non-insulated, through-hole, swage, 0.218in length	575-4	Keystone Electronics	575-4
C1	Capacitor tantalum, 6.8μF, 50V, 10%, 7343-31	6.8μF	Kyocera	TAJD685K050RNJ
C8, C9, C10, C27, C30	Ceramic capacitor, 22μF, 10V, 20%, X6S, 0603	22μF	Murata	GRM188C81A226ME01
C107, C111, C113, C115, C130, C138, C140, C143	Ceramic capacitor, 1μF, 16V, 10%, 0402, low ESR	1μF	TDK	C1005X6S1C105K050BC
C11, C12	Ceramic capacitor, 100μF, 6.3V, 20%, X5R, 0805	100μF	Murata	GRM21BR60J107ME15K
C13	Ceramic capacitor, 0.1μF, 35V, 10%, X7R, 0402, AEC-Q200, low ESR	0.1μF	TDK	CGA2B3X7R1V104K050BB
C137, C142, C144, C146, C149, C155, C156, C158	Ceramic capacitor, 1000pF, 50V, 10%, X7R, 0402, AEC-Q200, low ESR	1000μF	TDK	CGA2B2X7R1H102K050BA
C2, C3, C5, C6, C28, C29, C35, C36, C56, C57, C59, C60, C62, C63, C65, C66, C71, C72, C74, C75, C77, C78, C80, C81, C83, C84, C86, C87, C139, C141, C145, C147, C148, C150, C151, C153, C160, C161, C203, C204	Ceramic capacitor, 0.1μF, 16V, 10%, X7R, 0402	0.1μF	KEMET	C0402C104K4RACTU
C16	Ceramic capacitor, 0.022μF, 25V, 10%, X7R, 0402	0.022μF	Murata	GRM155R71E223KA61D
C20, C21	Ceramic capacitor, 4.7μF, 6.3V, 20%, X5R, 0402	4.7μF	Murata	GRM155R60J475ME87D
C25	Ceramic capacitor, 1μF, 25V, 10%, X8R, 0805	1μF	TDK	C2012X8R1E105K125AC
C251, C252	Ceramic capacitor, 0.1μF, 25V, 10%, X8R, 0603	0.1μF	TDK	C1608X8R1E104K080AA
C33	Ceramic capacitor, 0.1μF, 16V, 10%, X7R, 0402, AEC-Q200	0.1μF	Murata	GCM155R71C104KA55D
C4	Ceramic capacitor, 1μF, 6.3V, 10%, X7R, 0603	1μF	KEMET	C0603X105K9RACTU
D1	Diode hyper bright low current LED, green	LG L29K-G2J1-24-Z	OSRAM Opto Semiconductors	LG L29K-G2J1-24-Z
FB11, FB13, FB14, FB15, FB16, FB17, FB18, FB20	Inductor chip ferrite bead, 0.30Ω maximum, DC resistance, 0.5A	120Ω at 100MHz	Würth Elektronik	74279262
J8, J9, J10, J11, J22, J23, J24, J25, J26, J27, J28, J29, J36, J37, J38, J39	Connector-PCB, jack assembly, end launch, SMA, 62mil, board thick for 30 and 10 mils board thick use ALT symbols	142-0701-851	Cinch Connectivity	142-0701-851
L1	Inductor shielded power	3.3uH	Coilcraft, Inc.	XAL4030-332MEC
L2	Inductor shielded power, 33NH, 30%, 1MHz 4.7A 0.009Ω, DC resistance, 0603, AEC-Q200	33nH	TDK	TFM160810ALTA33NNTAA
P1	Connector-PCB 3 position male unshrouded, single row, straight tip, 2.5mm pitch, 5.84mm post height, 5.08mm soldier tail	TSW-103-08-T-S	Samtec	TSW-103-08-T-S
P2	Connector-PCB receptacle, 25mil square post, 2.54mm pitch	SSQ-106-03-G-S	Samtec	SSQ-106-03-G-S
P3, P6	Connector-PCB receptacle, 25mil square post, 2.54mm pitch	SSQ-108-03-G-S	Samtec	SSQ-108-03-G-S
P4	Connector-PCB receptacle, 25mil square post, dual row 2.54mm pitch	SSQ-103-03-G-D	Samtec	SSQ-103-03-G-D
P5	Connector-PCB receptacle, 25mil square post, 2.54mm pitch	SSQ-110-03-G-S	Samtec	SSQ-110-03-G-S
R1	Resistor surface-mount device (SMD), 1.5KΩ, 1%, 1/16W, 0402, AEC-Q200	1.5kΩ	Stackpole Electronics, Inc.	RMCF0402FT1K50

ORDERING INFORMATION

Table 1. Bill of Materials (Continued)

Reference Designator	Description	Value	Manufacturer	Part Number
R10, R13, R14, R18, R19, R22, R46, R47, R51, R52, R132, R234, R236, R237, R266, R269, R274, R276, R282, R289, R290, R306, R307, R308, R309, R328, R342, R365	Resistor SMD 0Ω, jumper, 1/10W, 0402, AEC-Q200	0Ω	Panasonic	ERJ-2GE0R00X
R4, R5, R33, R34, R68, R73, R74, R103, R104, R108, R109, R123, R124	Resistor SMD, 49.9Ω, 1%, 1/10W, 0402, AEC-Q200	49.9Ω	Panasonic	ERJ-2RKF49R9X
R12	Resistor SMD, 78.7kΩ, 1%, 1/10W, 0603, AEC-Q200	78.7kΩ	Panasonic	ERJ-3EKF7872V
R134, R137, R139, R142, R159, R160, R180, R181, R185, R186, R200, R201	Resistor SMD, 150Ω, 1%, 1/10W, 0402, AEC-Q200	150Ω	Panasonic	ERJ-2RKF1500X
R15	Resistor SMD, 1Ω, 1%, 1/6W, 0402, AEC-Q200	1Ω	Panasonic	ERJ-2BQF1R0X
R17	Resistor SMD, 1.62kΩ, 1%, 1/10W, 0402, AEC-Q200	1.62kΩ	Panasonic	ERJ-2RKF1621X
R2	Resistor SMD, 402Ω, 1%, 1/10W, 0402, AEC-Q200	402Ω	Panasonic	ERJ-2RKF4020X
R235	Resistor SMD, 0Ω, jumper, 1/10W, 0402, AEC-Q200	0Ω	Panasonic	ERJ-2GE0R00X
R238, R239, R240, R242, R244, R245, R246, R247	Resistor SMD, 0Ω, jumper, 2010, AEC-Q200	0Ω	Vishay	CRCW2010000Z0EF
R28	Resistor SMD, 100kΩ, 1%, 1/5W, 0402, AEC-Q200, anti-surge	100kΩ	Panasonic	ERJ-PA2F1003X
R3	Resistor SMD, 53.6kΩ, 1%, 1/16W, 0402	53.6kΩ	YAGEO	RC0402FR-0753K6L
R30	Resistor SMD, 11kΩ, 0.1%, 1/10W, 0603, AEC-Q200, high reliability	11kΩ	Panasonic	ERA-3AEB113V
R319, R334	Resistor SMD, 27kΩ, 5%, 1/10W, 0402, AEC-Q200	27kΩ	Panasonic	ERJ-2GEJ273X
R356, R357, R358, R359	Resistor SMD, 0Ω, jumper, 1/3W, 0603, AEC-Q200	0Ω	Vishay	CRCW06030000Z0EAHP
R36, R37, R48	Resistor SMD 100kΩ, 1%, 1/10W, 0603, AEC-Q200	100kΩ	Vishay	CRCW0603100KFKEA
R53, R55, R57, R403, R404, R405, R406, R410, R411, R412, R417, R418, R420, R423, R425, R427	Resistor SMD 0Ω, jumper, 1/10W, 0603, AEC-Q200	0Ω	Panasonic	ERJ-3GEY0R00V
R407	Resistor SMD, 10kΩ, 1%, 1/10W, 0603, AEC-Q200	10kΩ	Panasonic	ERJ-3EKF1002V
R6	Resistor SMD, 33.2kΩ, 1%, 1/16W, 0402, AEC-Q200	33.2kΩ	Vishay	CRCW040233K2FKED
R69, R98, R99	Resistor SMD, 49.9Ω, 1%, 1/10W, 0402, AEC-Q200	49.9Ω	Panasonic	ERJ-2RKF49R9X
TP3, TP6, TP8, TP9, TP10, TP14, TP15	Connector-PCB, test point, yellow	Yellow	Components Corporation	TP-104-01-04
TP17, TP19, TP30, TP31, TP34	Connector-PCB, test point, black	Black	Keystone Electronics	5006
U1	IC-Analog Devices, high-performance, 3.2GHz, 14-output clock distributor prelim	HMC7043BLP7B	Analog Devices, Inc.	HMC7043BLP7B
U2	IC-Analog Devices, 18V 2A, 4A step-down silent switcher 3 with ultralow noise difference	LT8622SAV#PBF	Analog Devices	LT8622SAV#PBF
U3	IC, low volume dual supply 4-bit translator	FXL4TD245BQX	Fairchild Semiconductor	FXL4TD245BQX
U5	IC, 32kb serial EEPROM	24AA32A-I/SN	Microchip Technology	24AA32A-I/SN

ORDERING INFORMATION

**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 Analog Way, Wilmington, MA 01887-2356, U.S.A. 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. All Analog Devices products contained herein are subject to release and availability.

