ANALOG DEVICES

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ADF7030-1 EZ-KIT User Guide

EVALUATION KIT CONTENTS

Two ADF7030-1 daughter boards (EV-ADF70301-915AZ, EV-ADF70301-868BZ, EV-ADF70301-433AZ, or EV-ADF70301-169BZ)
Two antennae
Two ADuCM3029 EZ-KIT boards (ADZS-UCM3029EZLITE)
Two LCD shield boards for the ADuCM3029 EZ-KIT board
Two 3.6 V batteries
Three USB cables
One J-Link Lite emulator
One universal 5 V dc power supply

SOFTWARE AND EQUIPMENT NEEDED

ADF7xxx EZ-KIT Design Suite
    Contains the ADF7030-1 Design Center, a powerful tool for evaluation, performance analysis, and configuration of the ADF7030-1
IAR Embedded Workbench® and Segger®
    For embedded development and debug with the ADuCM3029 and the ADF7030-1

GENERAL DESCRIPTION

The ADF7030-1 EZ-KIT® is an evaluation and development system for the ADF7030-1 high performance, sub-GHz, RF transceiver. Four EZ-KIT models are available for the ADF7030-1, covering various frequency ranges (see Table 1).

Each ADF7030-1 EZ-KIT allows fast and thorough evaluation of the ADF7030-1 radio and provides a platform for host processor code development using the ADuCM3029 EZ-KIT mother board (ADZS-UCM3029EZLITE).

The ADF7030-1 EZ-KIT consists of the following:

• RF daughter boards.
• Antennae for over the air packet error rate testing.
• ADuCM3029 EZ-KIT mother board and LCD shield for evaluation and development with the ADF7030-1. The ADF7030-1 daughter boards plug into this mother board.
• ADF7030-1 Design Center, a graphical user interface (GUI) for evaluation of the ADF7030-1. The GUI can be used for configuring the ADF7030-1, evaluating transmit and receive operation, and transmitting and receiving packets.

Table 1. Available ADF7030-1 EZ-KIT Models

Model	Frequency
ADF70301-915EZKIT	902 MHz to 928 MHz
ADF70301-868EZKIT	863 MHz to 876 MHz
ADF70301-433EZKIT	433 MHz to 434 MHz
ADF70301-169EZKIT	169 MHz

ADF7030-1 EZ-KIT PHOTOGRAPH

Figure 1.

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REVISION HISTORY

6/2016—Revision 0: Initial Version

EVALUATION KIT CONTENTS

Table 2 describes the items common to every ADF7030-1 EZ-KIT, while the items unique to each EZ-KIT are described in Table 3, Table 4, Table 5, and Table 6.

Table 2. Items Common to Every ADF7030-1 EZ-KIT

Item	Qty	Description
ADZS-UCM3029EZLITE	2	ADuCM3029 EZ-KIT board. This is the mother board to which the ADF7030-1 daughter board connects.
LCD adapter board	2	LCD shield board for the ADuCM3029 EZ-KIT board.
Saft LS14250	2	3.6 V primary lithium-thionyl chloride (Li-SOCl2) battery for powering the ADuCM3029 EZ-KIT board when not connected to the PC.
USB cable	3	Used to connect the ADuCM3029 EZ-KIT board to the PC for use with the ADF7030-1 evaluation software. Also provides power to both the ADuCM3029 EZ-KIT and the ADF7030-1 daughter board.
J-Link Lite emulator	1	Provides serial wire debug capabilities for the ADuCM3029.
Universal 5 V dc power supply	1	Alternative option to the USB for powering the ADuCM3029 EZ-KIT and the ADF7030-1 daughter board.

Table 3. Items Unique to ADF70301-915EZKIT

Item	Qty	Description
EV-ADF70301-915AZ	2	ADF7030-1 daughter boards. See Table 7 for further details.
ANT-916-CW-HWR-SMA	2	Quarter wavelength whip monopole antenna from Linx Technologies, Inc. Frequency range = 900 MHz to 930 MHz.

Table 4. Items Unique to ADF70301-868EZKIT

Item	Qty	Description
EV-ADF70301-868BZ	2	ADF7030-1 daughter boards. See Table 7 for further details.
ANT-868-CW-HWR-SMA	2	Quarter wavelength whip monopole antenna from Linx Technologies. Frequency range = 853 MHz to 883 MHz.

Table 5. Items Unique to ADF70301-433EZKIT

Item	Qty	Description
EV-ADF70301-433AZ	2	ADF7030-1 daughter boards. See Table 7 for further details.
ANT-433-CW-HWR-SMA	2	Quarter wavelength whip monopole antenna from Linx Technologies. Frequency range = 418 MHz to 448 MHz.

Table 6. Items Unique to ADF70301-169EZKIT

Item	Qty	Description
EV-ADF70301-169BZ	2	ADF7030-1 daughter boards. See Table 7 for further details.
FW.80.SMA.M	2	Quarter wavelength whip monopole antenna from Taoglas. Frequency range = 169 MHz.

HARDWARE

ADUCM3029 MOTHER BOARD

A block diagram of the ADuCM3029 mother board is shown in Figure 2. The ADuCM3029 EZ-KIT user guide and board design database is available from the Analog Devices website at www.analog.com/ADuCM3029EZKIT.

ADF7030-1 DAUGHTER BOARDS

Although ADF7030-1 daughter boards are included in the ADF7030-1 EZ-KIT, the boards are also available individually.

The daughter boards plug into the ADuCM3029 mother board, which also comes with the ADF7030-1 EZ-KIT.

The available daughter boards are described in Table 7.

Details on the schematic, layout, and bill of material for each of these boards can be found in the ADF7030-1 design package available at www.analog.com/ADF7030-1.
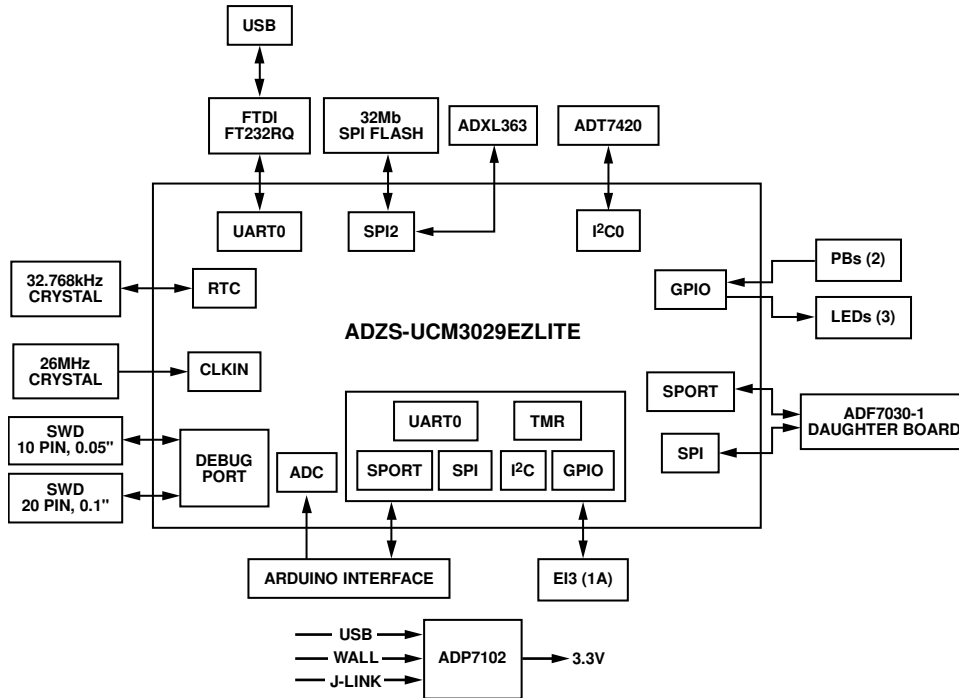
Figure 2. ADuCM3029 EZ-KIT (Mother Board for the ADF7030-1 Daughter Board) Block Diagram

Table 7. ADF7030-1 Daughter Boards

Model	ADF7030-1 Package	RF Match Frequency Range (MHz)	26 MHz Reference Oscillator Type	Matching Topology	Frequency of Included Antenna (MHz)	Printed Circuit Board (PCB) Layout Name
EV-ADF70301-915AZ	40-pin LFCSP	862 to 928	XTAL	Separate PA and LNA match	902 to 928	ADF703x40Sxxx
EV-ADF70301-868BZ	40-pin LFCSP	862 to 928	TCXO	Separate PA and LNA match	863 to 876	ADF703x40Sxxx
EV-ADF70301-460BZ	40-pin LFCSP	450 to 470	TCXO	Separate PA and LNA match	Not included	ADF703x40Sxxx
EV-ADF70301-433AZ	40-pin LFCSP	433 to 434	XTAL	Separate PA and LNA match	433 to 434	ADF703x40Sxxx
EV-ADF70301-169BZ	40-pin LFCSP	169	TCXO	Separate PA and LNA match	Not included	EV-ADF70301-169

HARDWARE SETUP FOR EVALUATION

CONNECTING THE DAUGHTER BOARD

The ADF7030-1 daughter board plugs into the P1, P2, and P3 headers on the ADuCM3029 mother board. Ensure that the mother board is powered down before connecting the daughter board. Take care when connecting and disconnecting the two boards to avoid damaging the headers on each of the boards.

ADF7030-1 DAUGHTER BOARD J4 HEADER

In addition to the main P1, P2, and P3 connection header, the ADF7030-1 daughter board also provides a secondary header that exposes the interface connections between the host processor (ADuCM3029) and the ADF7030-1, as well as VDD and GND. This header provides a useful debug header and also allows the ADF7030-1 daughter board to connect to other host processor mother boards. If using this header as the main communication interface to the ADF7030-1 (instead of using P1, P2, and P3), populate C3 on the ADF7030-1 daughter board with a 10 μF capacitor.

USB CONNECTION

The mini USB connection (P6) on the ADuCM3029 mother board is the main USB communication port connection. This port has the following functions:

- Provides the main COM port for the ADF7030-1 evaluation software.
- Is used for uploading the firmware image code to the ADuCM3029.
- Provides power to the entire ADuCM3029 mother board.

POWER OPTIONS

Power from USB

The USB is the default option for providing power to the ADuCM3029 mother board and the ADF7030-1 daughter board.
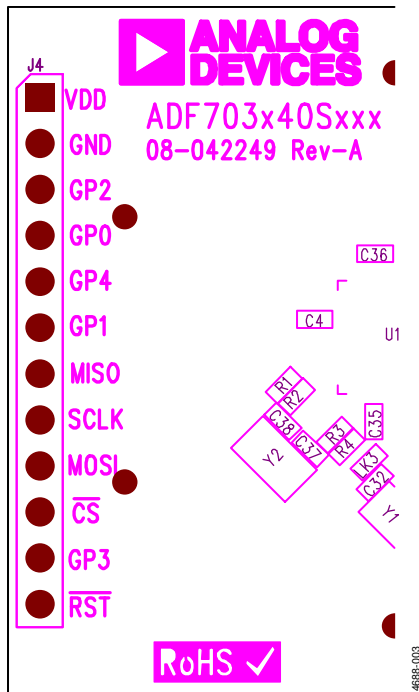
Figure 3. J4 Header on the ADF7030-1 Daughter Board

SOFTWARE

ADF7030-1 DESIGN CENTER

The ADF7030-1 Design Center is a powerful software tool for evaluation, performance analysis, and configuration of the ADF7030-1. It provides a GUI for configuring the ADF7030-1, evaluating transmit and receive operation, and transmitting and receiving packets.

Installation

Download the ADF7xxx EZ-KIT Design Suite from www.analog.com/EVAL-ADF7030-1EZ-KIT. After downloading, double-click the executable to begin the installation. Follow the on-screen prompts until the installation is complete.

Setup

Use the following procedure to set up the evaluation kit:

1. After installing the ADF7xxx EZ-KIT Design Suite software, ensure that the ADF7030-1 daughter board is plugged into the ADuCM3029 mother board. Plug the USB cable into the mini USB port (P6) on the ADuCM3029 mother board, and plug the other end of the cable into the PC on which the software is installed.
2. Start the ADF7xxx EZ-KIT Design Suite software. From the **Start** menu, go to **All Programs**, **Analog Devices**, **ADF7xxx EZ-KIT Design Suite**, and click **ADF7xxx EZ-KIT Design Suite**.
3. The ADF7xxx EZ-KIT Design Suite start screen appears when the program is opened.
4. From the main screen, the user can select the relevant device to evaluate. In this case, select the ADF7030-1.
5. After selecting which device to connect with, a new screen appears with a list of boards to connect with, depending on the number of ADuCM3029 mother boards plugged into the PC. Each of the boards connected to the PC has a board number displayed on the LCD screen. Select one of the boards from the list to connect to, and then click **OK** to begin evaluation in the ADF7030-1 Design Center.

EMBEDDED DEVELOPMENT

The ADuCM302x EZ-KIT board support package (BSP) provides software and documentation in support of the ADuCM3029 mother board. It is available for download from www.analog.com/ADuCM3029EZKIT.

The ADuCM3029 mother board works with the IAR Embedded Workbench software development tools. For more details on IAR, see the IAR website.

The BSP provides comprehensive software support for the ADuCM3029 mother board, which includes drivers and services that demonstrate the on-chip drivers and services. The device driver and services documentation is part of the BSP.

FURTHER INFORMATION

This user guide describes the contents and setup of the ADF7030-1 EZ-KIT. For more information, the following resources are available.

ADF7030-1 DESIGN PACKAGE

The ADF7030-1 design package is a complete documentation and resource package for the ADF7030-1. It is recommended to download this package from www.analog.com/ADF7030-1 as a starting point for evaluation and development. The design package contains manuals, application notes, hardware information, and firmware modules.

ADF7030-1 DATA SHEET

The ADF7030-1 data sheet contains complete specifications and typical performance information for the ADF7030-1 .

ADF7030-1 SOFTWARE REFERENCE MANUAL (UG-1002)

The ADF7030-1 software reference manual (UG-1002) is the detailed programming guide for the ADF7030-1. This document provides a detailed description of how to control the ADF7030-1 transceiver from the host microcontroller. It is intended as a resource for a firmware engineer developing host microcontroller firmware to communicate with the ADF7030-1.

ADF7030-1 HARDWARE REFERENCE MANUAL (UG-957)

The ADF7030-1 hardware reference manual (UG-957) provides a description of the ADF7030-1 radio functionality, hardware features, and application circuit requirements. It is intended as a resource for a hardware engineer designing a PCB that includes the ADF7030-1.

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