

## 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
<a href="#">ADF70301-915EZKIT</a>	902 MHz to 928 MHz
<a href="#">ADF70301-868EZKIT</a>	863 MHz to 876 MHz
<a href="#">ADF70301-433EZKIT</a>	433 MHz to 434 MHz
<a href="#">ADF70301-169EZKIT</a>	169 MHz

### ADF7030-1 EZ-KIT PHOTOGRAPH



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

**Table 3. Items Unique to [ADF70301-915EZKIT](#)**

Item	Qty	Description
<a href="#">EV-ADF70301-915AZ</a>	2	<a href="#">ADF7030-1</a> 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
<a href="#">EV-ADF70301-868BZ</a>	2	<a href="#">ADF7030-1</a> 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
<a href="#">EV-ADF70301-433AZ</a>	2	<a href="#">ADF7030-1</a> 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
<a href="#">EV-ADF70301-169BZ</a>	2	<a href="#">ADF7030-1</a> 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](http://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](http://www.analog.com/ADF7030-1).

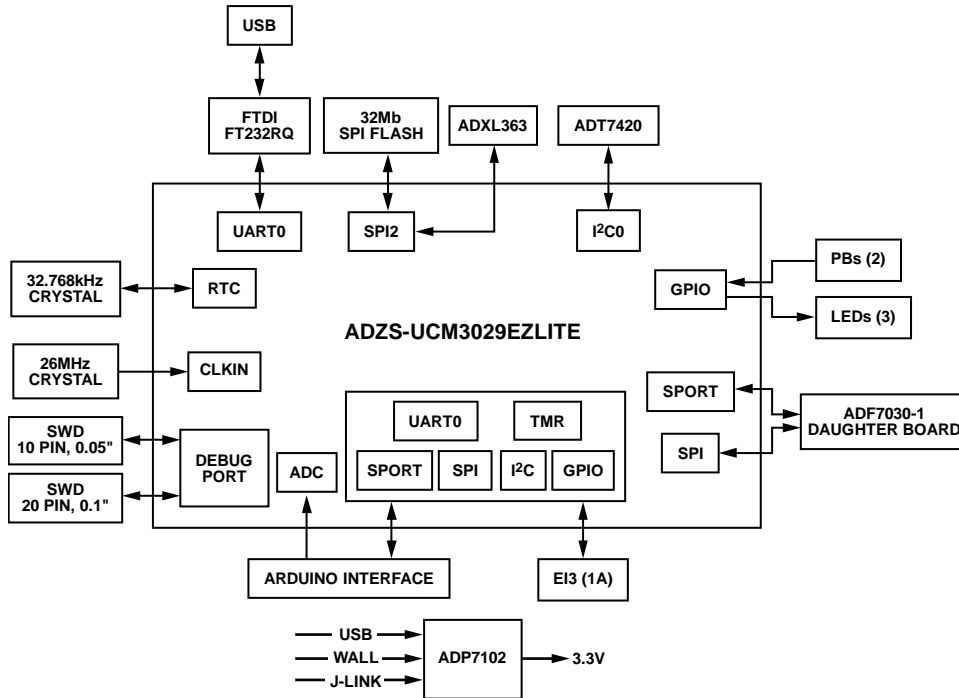


Figure 2. ADuCM3029 EZ-KIT (Mother Board for the ADF7030-1 Daughter Board) Block Diagram

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
<a href="#">EV-ADF70301-915AZ</a>	40-pin LFCSP	862 to 928	XTAL	Separate PA and LNA match	902 to 928	ADF703x40Sxxx
<a href="#">EV-ADF70301-868BZ</a>	40-pin LFCSP	862 to 928	TCXO	Separate PA and LNA match	863 to 876	ADF703x40Sxxx
<a href="#">EV-ADF70301-460BZ</a>	40-pin LFCSP	450 to 470	TCXO	Separate PA and LNA match	Not included	ADF703x40Sxxx
<a href="#">EV-ADF70301-433AZ</a>	40-pin LFCSP	433 to 434	XTAL	Separate PA and LNA match	433 to 434	ADF703x40Sxxx
<a href="#">EV-ADF70301-169BZ</a>	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  $\mu$ F 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.

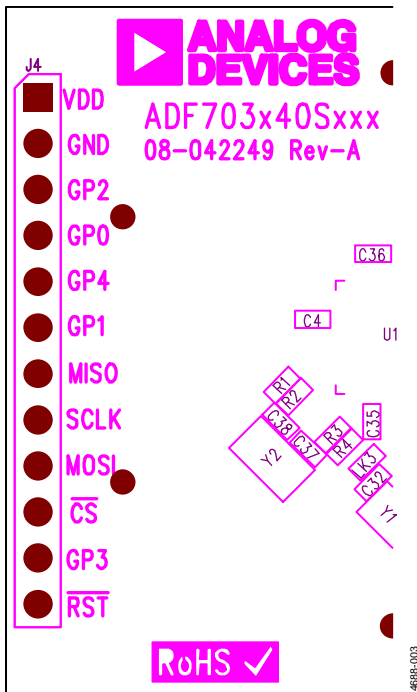


Figure 3. J4 Header on the [ADF7030-1](#) Daughter Board

## 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](http://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](http://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](http://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](#).



#### 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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