# EVBUM2533

# Ezairo® 7111 Hybrid Demo Board User Manual

ON Semiconductor®

www.onsemi.com

EVAL BOARD USER'S MANUAL

## INTRODUCTION

### Purpose

This manual provides information on the configuration and use of the Ezairo7111 Hybrid Demonstrator Board.

### Conventions

Component and pin names are marked by the use of `Monospace Font.`

### Intended Audience

This manual is for engineers, developers, and anyone else who requires technical information about the Ezairo 7111 Hybrid Demo Board.

### Further Reading

For any technical information not covered in this manual, refer to the following documents:

- Promira™ Serial Platform Quick Start Guide (available at totalphase.com)
- Communication Accelerator Adaptor Manual
- Ezairo 7111 Datasheet
- Ezairo Sound Designer Software User Manual

### Board Design

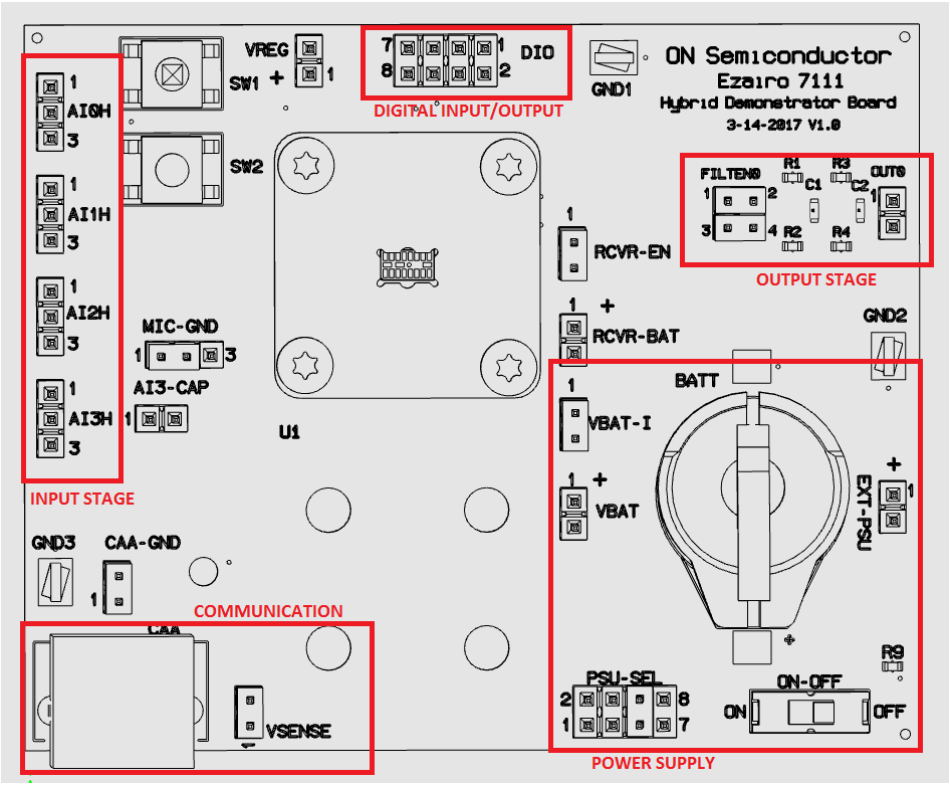



**Figure 1. Ezairo 7111 Hybrid Demonstrator Board Overview**

© Semiconductor Components Industries, LLC, 2017

## GETTING STARTED

### Introduction

This chapter is about setting up the hybrid demonstrator board for use. You have to provide it with power and connect it to your computer. You will also need to manually insert the Ezairo 7111 hybrid into the designated socket. This chapter also describes how to connect the board to your computer using a programming box, and first steps for using the Ezairo Sound Designer software.

To get started, you will need the following:

- Ezairo 7111 Hybrid Demonstrator Board and Ezairo 7111 hybrid sample
- A supported programming box and respective driver installed

NOTE: (For a full list of supported programmers, see Chapter 2.3.1)

- Ezairo Sound Designer Software (available on request from your Account Manager)

### Ezairo 7111 Hybrid Socket

The socket used on the Ezairo 7111 Hybrid Demonstrator Board is designed for easy, tool−free, use. The following are the steps required to ensure the socket is functioning properly.

#### Aligning the Clamp

1. Ensure that the rubber plunger sits flush with the top of the grey adapter plate near the end of the range of motion of the clamp
2. With minimal pressure, the clamp should lock into place
3. Ensure that the rubber plunger lines up with the cutout in the grey adapter plate
4. Tighten all nuts fully if adjustment was required.

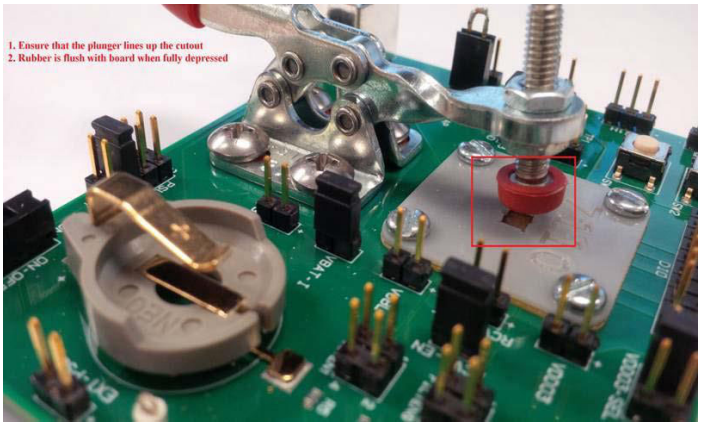



**Figure 2. Aligning the Clamp with the Adaptor Plate**

#### Inserting the Hybrid

1. Open the clamp fully
2. Align the pin 1 marker on the Ezairo 7111 Hybrid with the marker on the adapter plate
3. Insert the hybrid into the socket (ensure the hybrid is fully inserted and level)
4. Fully close the clamp, ensuring it locks into place

NOTE: The clamp should not require more than 1 kg to fully close.

## Power Supply

The Ezairo 7111 Hybrid Demonstrator Board can be powered on using the ON−OFF switch. Power can be supplied to the VBAT pin in one of four ways, as outlined in Table 1 below:

**Table 1. POWER SUPPLY SELECTION**

| PSU_SEL | Power Supply Source |
|---|---|
| Short pin 1 to 2 | CS44 Connector (Pads on bottom of board) |
| Short pin 3 to 4 | 6−Pin DIN (CAA Connector) |
| Short pin 5 to 6 | External Bench Supply (EXT_PSU header) |
| Short pin 7 to 8 | Battery (On board battery holder) |

**Table 2. VBAT SUPPLY**

| Pin Name | Min | Nom | Max |
|---|---|---|---|
| VBAT | 1.05 V | 1.25 V | 2.0 V |

*Communication*

Communication between your computer and the Ezairo 7111 hybrid can be achieved through a programming interface. The following programmers are supported:

- Promira Serial Interface from Total Phase, Inc., driver version 1.3.6
- Communication Accelerator Adaptor (CAA), driver version 1.3
- HI−PRO, driver version 2.0.0.4
- NOAHlink
- DSP programmer version 3

The serial interface can be connected to Ezairo through the 6−pin DIN connector. Alternately, the pads required for communication (SCL, SDA, PSU, GND) are available on the bottom of the board for custom $I^2C$ connectors such as the CS44 connector typically used on hearing aids.

**Figure 3. Evaluation and Development Board Setup**

**Table 3. DIN CONNECTOR PIN−OUT**

| Pin Number | Serial Interface Pin Description |
|---|---|
| 1 | Supply Voltage from the Serial Interface |
| 2 | System Ground |
| 3 | SCL ($I^2C$ Clock) |
| 4 | SDA ($I^2C$ Data) |
| 5 | VBAT (Sense Voltage) |
| 6 | No Connect |

## Ezairo Sound Designer Software

Here are the steps to setting up your product device for use with the Ezairo Sound Designer software:

NOTE: If you are programming the device with your own firmware, please refer to the documentation provided within the Ezairo 7100 Evaluation & Development Kit.

1. Connect the product to your programmer and to your computer, as follows:
   - Connect your input source to the negative and center pins of the 3−pin AI1H header
   - Connect your recording or listening equipment to the output, which is labelled OUT0. You might require an external amplifier to drive headphones from the output
   - You can use SW1 and SW2 (found on the evaluation board) to adjust the volume
   - The maximum input signal range is approximately 2 Vpp (volts peak−to−peak)
2. Power on the board by setting ON−OFF to ON
3. Next, start Sound Designer software by double−clicking on the SD/sounddesigner.exe shortcut, which you will find wherever you installed the Sound Designer software files
4. Choose a workspace. If you do not have a workspace directory available, click Browse and the software allows you to create one. If you click Browse and select a pre−existing directory for your workspace, make sure it is empty. For this example, check Import Sample Workspace, and select E7150SL from the drop−down list. Click OK
5. Open the console window by clicking the Show console icon. The console window displays error and status messages accumulated in this session. We recommend having the console viewable at all times while using Sound Designer software, to get immediate status information
6. Click on Control Panel and then, for this example, double−click the Ezairo7150SL.param sample parameter file to open the demo product library.
7. To connect to the device, go to the SETTINGS window. Select the correct Programmer, and Port if applicable. If you also select Verify NVM Writes, the software burns the settings to the device's Non−Volatile Memory and then immediately reads back the settings to confirm that the values burned to the device match what is being read out of the device. This option requires additional programming time. Next, click on Detect. A successful detection will populate the device information in the Device Info box
8. Use the back button−the arrow in the top left corner−to return to the Control Panel
9. To configure the device for the selected product, click Programmer > Connect. If the connection succeeds, the Connection status symbol appears to the right of the File Name. You can hover over this symbol to view the programmer name and the firmware ID of the device. The connected device must now be configured before you can read, burn or write parameters in Control Panel. Click Programmer > Configure to do this
10. Now you are ready to begin. See Chapter 3, "Modeler" on page 15 of the Ezairo Sound Designer Software User Manual for your next steps in the process of developing a product with Sound Designer software

## Input Stage

The Ezairo 7111 Hybrid Demonstrator Board provides access to four analog audio inputs (`AI0H`, `AI1H`, `AI2H`, `AI3H`). The ground reference for the inputs can be adjusted using the `MIC−GND` header as follows:

**Table 4. INPUT GROUND REFERENCE SELECTION**

| MIC−GND | Input Ground Reference |
|---|---|
| Short pin 1 to 2 | GND_MIC (Note 1) |
| Short pin 2 to 3 | AGND |

1. Use `GND_MIC` reference when input is from a microphone. For other electrical test equipment use `AGND`.

## Output Stage

There is one digital output (RCVR0) available on the board through standard 0.1” header. The direct digital outputs are available on header FILTEN0. Separate RC filter networks are provided to attenuate out−of band noise from the direct digital outputs when connected to high impedance audio measurement equipment (OUT0). The on−board RC filters are enabled by the FILTEN0 headers as described in the following table.

**Table 5. ON−BOARD RC FILTER CONFIGURATION**

| Function | FILTEN0 |
|---|---|
| Disabled | open pins 1 to 2<br>open pins 3 to 4 |
| Enabled | short pins 1 to 2<br>short pins 3 to 4 |

2. To connect receivers or loud speakers (without the RC filter) use headers FILTEN0 pins 1 and 3.

## Digital Input/Output (DIO)

The Ezairo 7111 Hybrid Demonstrator Board contains 5 digital I/O (DIO) signals available on DIO 2x4 header that provide access to a wide variety of interfaces (GPIO, SPI, PCM, $I^2C$, UART, LSAD, clocks). The DIOs are in the VBAT supply domain.

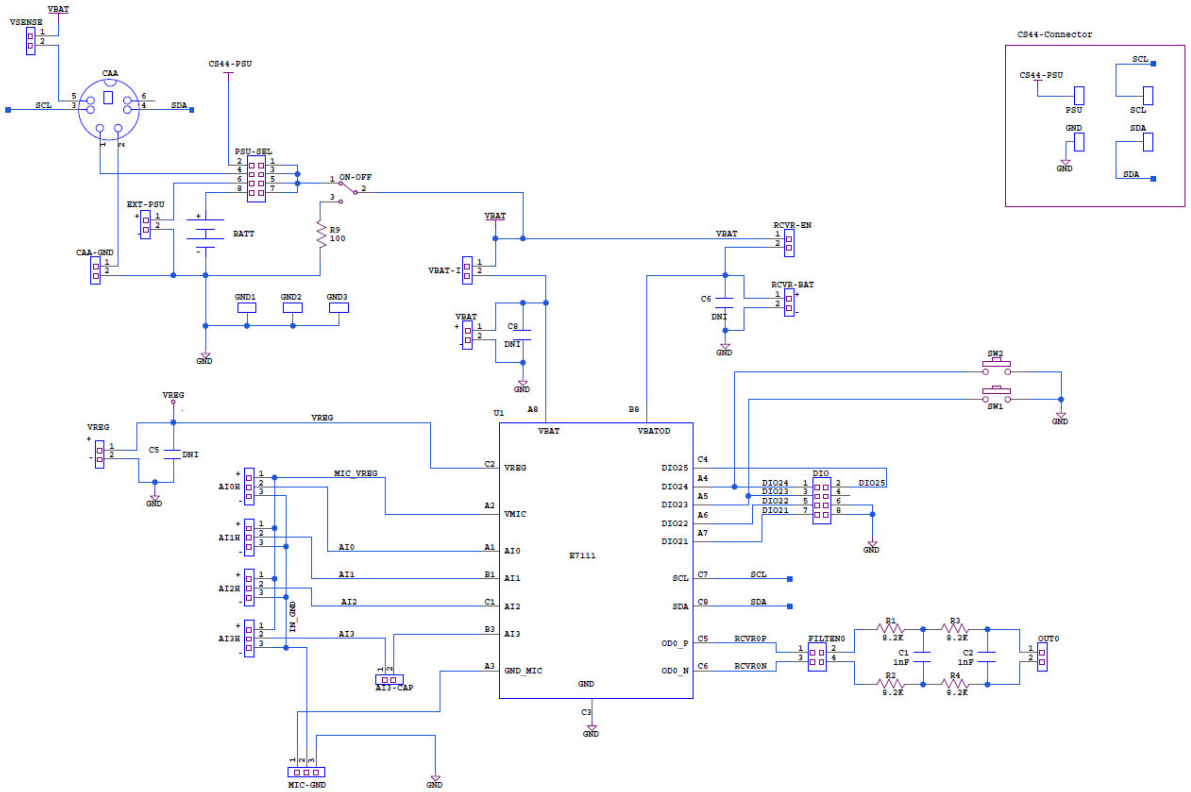
**Table 6. DIO REFERENCE DOMAINS**

| DIOs | DIO Header Pin | Reference Domain |
|---|---|---|
| 21 | 7 | VBAT |
| 22 | 5 | VBAT |
| 23 | 3 | VBAT |
| 24 | 1 | VBAT |
| 25 | 2 | VBAT |

The Ezairo 7111 Hybrid Demonstrator Board also has two momentary switches that can be used as momentary hard pull−downs on DIO24 (SW2) and DIO23 (SW1).

# APPENDIX A

## Schematic




EZAIRO is a registered trademark of Semiconductor Components Industries, LLC (SCILLC) or its subsidiaries in the United States and/or other countries.

**onsemi**, ONSEMI, and other names, marks, and brands are registered and/or common law trademarks of Semiconductor Components Industries, LLC dba "**onsemi**" or its affiliates and/or subsidiaries in the United States and/or other countries. **onsemi** owns the rights to a number of patents, trademarks, copyrights, trade secrets, and other intellectual property. A listing of **onsemi**'s product/patent coverage may be accessed at www.onsemi.com/site/pdf/Patent−Marking.pdf. **onsemi** is an Equal Opportunity/Affirmative Action Employer. This literature is subject to all applicable copyright laws and is not for resale in any manner.

The evaluation board/kit (research and development board/kit) (hereinafter the "board") is not a finished product and is not available for sale to consumers. The board is only intended for research, development, demonstration and evaluation purposes and will only be used in laboratory/development areas by persons with an engineering/technical training and familiar with the risks associated with handling electrical/mechanical components, systems and subsystems. This person assumes full responsibility/liability for proper and safe handling. Any other use, resale or redistribution for any other purpose is strictly prohibited.

**THE BOARD IS PROVIDED BY ONSEMI TO YOU "AS IS" AND WITHOUT ANY REPRESENTATIONS OR WARRANTIES WHATSOEVER. WITHOUT LIMITING THE FOREGOING, ONSEMI (AND ITS LICENSORS/SUPPLIERS) HEREBY DISCLAIMS ANY AND ALL REPRESENTATIONS AND WARRANTIES IN RELATION TO THE BOARD, ANY MODIFICATIONS, OR THIS AGREEMENT, WHETHER EXPRESS, IMPLIED, STATUTORY OR OTHERWISE, INCLUDING WITHOUT LIMITATION ANY AND ALL REPRESENTATIONS AND WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE, TITLE, NON−INFRINGEMENT, AND THOSE ARISING FROM A COURSE OF DEALING, TRADE USAGE, TRADE CUSTOM OR TRADE PRACTICE.**

**onsemi** reserves the right to make changes without further notice to any board.

You are responsible for determining whether the board will be suitable for your intended use or application or will achieve your intended results. Prior to using or distributing any systems that have been evaluated, designed or tested using the board, you agree to test and validate your design to confirm the functionality for your application. Any technical, applications or design information or advice, quality characterization, reliability data or other services provided by **onsemi** shall not constitute any representation or warranty by **onsemi**, and no additional obligations or liabilities shall arise from **onsemi** having provided such information or services.

**onsemi** products including the boards are not designed, intended, or authorized for use in life support systems, or any FDA Class 3 medical devices or medical devices with a similar or equivalent classification in a foreign jurisdiction, or any devices intended for implantation in the human body. You agree to indemnify, defend and hold harmless **onsemi**, its directors, officers, employees, representatives, agents, subsidiaries, affiliates, distributors, and assigns, against any and all liabilities, losses, costs, damages, judgments, and expenses, arising out of any claim, demand, investigation, lawsuit, regulatory action or cause of action arising out of or associated with any unauthorized use, even if such claim alleges that **onsemi** was negligent regarding the design or manufacture of any products and/or the board.

This evaluation board/kit does not fall within the scope of the European Union directives regarding electromagnetic compatibility, restricted substances (RoHS), recycling (WEEE), FCC, CE or UL, and may not meet the technical requirements of these or other related directives.

FCC WARNING − This evaluation board/kit is intended for use for engineering development, demonstration, or evaluation purposes only and is not considered by **onsemi** to be a finished end product fit for general consumer use. It may generate, use, or radiate radio frequency energy and has not been tested for compliance with the limits of computing devices pursuant to part 15 of FCC rules, which are designed to provide reasonable protection against radio frequency interference. Operation of this equipment may cause interference with radio communications, in which case the user shall be responsible, at its expense, to take whatever measures may be required to correct this interference.

**onsemi** does not convey any license under its patent rights nor the rights of others.

LIMITATIONS OF LIABILITY: **onsemi** shall not be liable for any special, consequential, incidental, indirect or punitive damages, including, but not limited to the costs of requalification, delay, loss of profits or goodwill, arising out of or in connection with the board, even if **onsemi** is advised of the possibility of such damages. In no event shall **onsemi**'s aggregate liability from any obligation arising out of or in connection with the board, under any theory of liability, exceed the purchase price paid for the board, if any.

The board is provided to you subject to the license and other terms per **onsemi**'s standard terms and conditions of sale. For more information and documentation, please visit www.onsemi.com.

## ADDITIONAL INFORMATION

**TECHNICAL PUBLICATIONS**:
**Technical Library:** www.onsemi.com/design/resources/technical−documentation
**onsemi Website:** www.onsemi.com

**ONLINE SUPPORT**: www.onsemi.com/support
**For additional information, please contact your local Sales Representative at** www.onsemi.com/support/sales