Apollo2 EVB
Quick Start Guide

Doc ID: QS-A2-1p00

Revision 1.0

June 2017

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Revision 1.0, June 2017

Table of Content

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1. Introduction

This document provides guidance in setting up the Apollo2 Evaluation Board (EVB), revision 1.0, to get started executing code examples, measuring power consumption in various configurations, and beginning software development. This initial board release supports 3.3V operation only.

2. Documentation Revision History

Rev #	Date	Description
1.00	Jun 2017	Document initial public release

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3. Overview of the Apollo2 EVB

The Apollo2 EVB features Arduino-compatible headers and an integrated J-Link debugger:

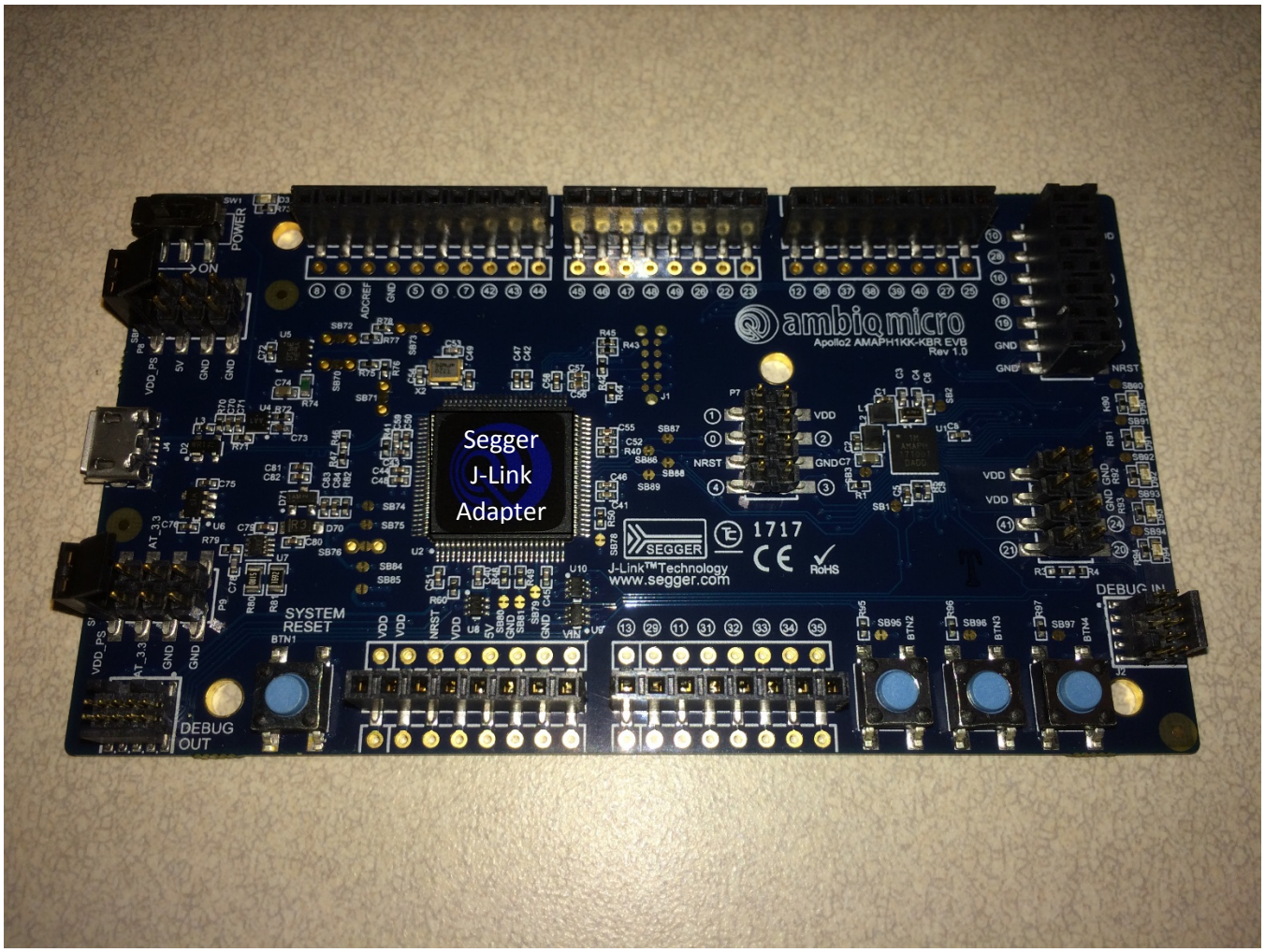

Figure 1. Apollo2 EVB

This EVB has these additional features:

- Low power reference design
- Apollo2 MCU in the BGA package (AMAPH1KK-KBR)
- Multiple power/clock options
- Micro USB connector for power/download/debug

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- Segger J-Link debugger
- Debugger-in / debugger-out ports
- Five user-controlled LEDs
- Three push buttons for application use, plus a reset push button
- Power slide switch with LED power indicator
- Five 8-12 pin Arduino-style headers for pin/power access to shield board(s)
- Multiple test points for power measurements
- CE Mark and RoHS compliant

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4. Debug Interface

Figure 2 shows the Apollo2 EVB set up for standard debug using the on-board J-Link debugger and on-board 3.3V power supply.

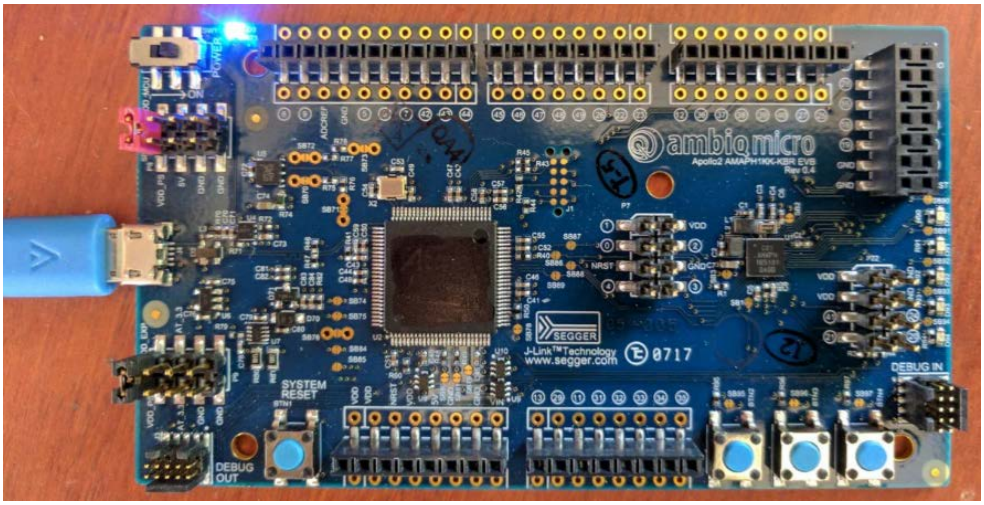

Figure 2. Apollo2 EVB using On-board J-Link Debugger

NOTE: Due to an I/O voltage contention issue with the J-Link processor, the EVB only supports 3.3V operation.

The debug interface is supported by standard J-Link drivers from Segger. Please refer to section 5 “Software Development Tools for the Apollo2 EVB” for more details on J-Link debug support.

This EVB also supports the use of an external Cortex SWD debug interface through a standard 10-pin debug header (DEBUG IN - J2) as shown in Figure 3.

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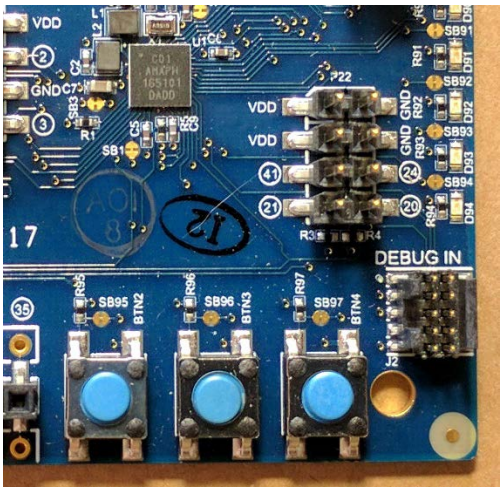

Figure 3. Apollo2 EVB's Cortex DEBUG IN Header (J2)

No jumper changes are required to use an external debug adapter. Simply connect the external debug adapter with a 10-pin ribbon cable connector to the "DEBUG IN" header.

The EVB also offers the ability to be used as a J-Link debug adapter for any target board that has an Apollo family MCU (Apollo1 or Apollo2).

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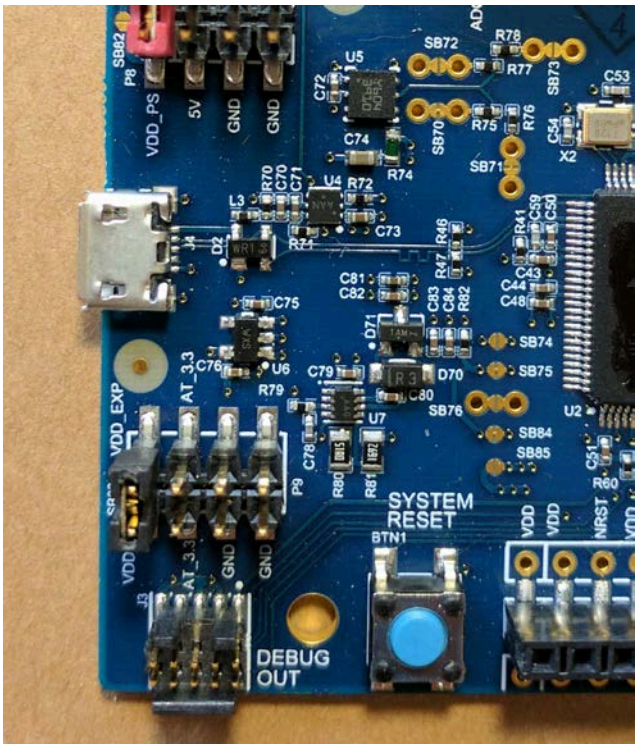

Figure 4. Apollo2 EVB's DEBUG OUT Header (J3)

To utilize this functionality, use a 10-pin low-pitch standard debug connector to connect the "DEBUG OUT" header (J3) on the EVB to the debug header on the target board. The EVB will automatically detect when the "DEBUG OUT" header is connected to another target board and reconfigure the integrated J-Link to connect to this external board rather than the onboard Apollo2.

Note: A voltage on VDD_EXT_DBG (pin 1) through the 10-pin header is required for the automatic switch. Also, to avoid voltage level conflicts on the debug I/O, VDDIO on the J-Link processor will need to be changed to VDD_EXT_DBG by cutting SB5 and connecting SB6 if VDD_EXT_DBG doesn't match the on-board voltage (VDD_PS by default).

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5. Software Development Tools for the Apollo2 EVB

The standard Segger J-Link debug interface is used on the Apollo2 EVB. Please install the latest Beta Segger J-Link software, and configure your preferred development IDE (Keil, IAR, or Eclipse) to use J-Link debug interface.

Links to development tools that support Apollo2:

- SEGGER J-Link Software 6.14 (Beta) or newer: https://www.segger.com/downloads/jlink_beta
- KEIL uVision MDK523 or newer: https://www.keil.com/demo/eval/arm.htm
- New Keil Pack (Also used by Eclipse) at: http://www.keil.com/dd2/pack/#/third-party-download-dialog
- IAR Version 7.80.4 or 8.10.1 or newer: https://www.iar.com/iar-embedded-workbench/tools-for-arm/arm-cortex-m-edition/

Regardless of preferred IDE, please install the Segger J-Link software. All three of the above development environments support J-Link, but you must have the latest J-Link software installed. Most alternate development environments also are supported by J-Link.

Please refer to the AmbiqSuite Getting Started Guide (AMSDKGS) for more details on setting up development IDEs to use J-Link.

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6. Measuring MCU Power Consumption on the EVB

To measure only the current consumed by the MCU you can connect a current meter to the header next to the power switch, P8, by removing the red jumper in Figure 5 below and measure current across these two pins.

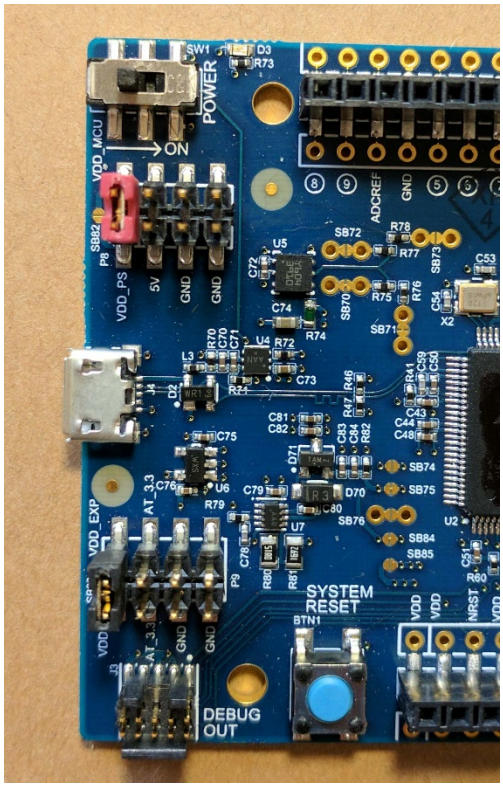

Figure 5. Red Jumper across VDD_PS and VDD_MCU on Header P8

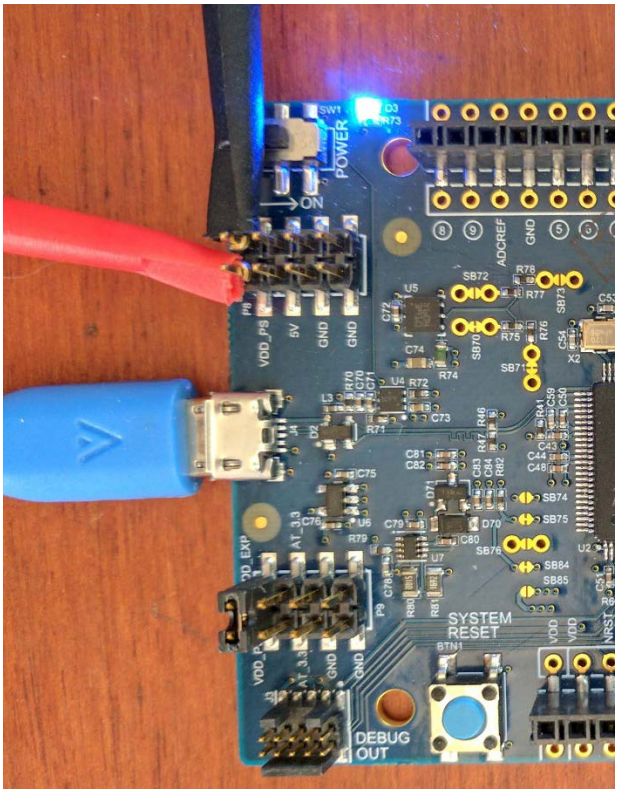

Figure 6. Current Measuring Leads across VDD_PS and VDD_MCU on Header P8

If not measuring power consumption, make sure this jumper is in place connecting VDD_PS (pin 1) and VDD_MCU (pin 2) on P8 to provide the on-board regulated 3.3V supply to the MCU V_{DD}.

This header is also where an external voltage supply can be connected to the MCU, by removing this jumper and provide desired supply to VDD_MCU on P8. Note that if attaching any expansion boards, the voltage to VDD_EXP (pin 2) on P9 must be the same as VDD_MCU on P8. Default jumper settings connect VDD_MCU and VDD_EXP to the same onboard 3.3V regulator. If not connecting any expansion boards then it is not require to match VDD_EXP to MCU V_{DD}.

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Revision 1.0, June 2017

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