Apollo2 EVB Revision 1.1 Quick Start Guide

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1. Introduction

This document provides guidance in setting up the Apollo2 Evaluation Board (EVB), revision 1.1, to get started executing code examples, measuring power consumption in various configurations, and beginning software development.

2. Document Revision History

Rev #	Date	Description
1.0	Aug 2017	Document initial public release

Table 1: Document Revision History

3. Overview of the Apollo2 EVB

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

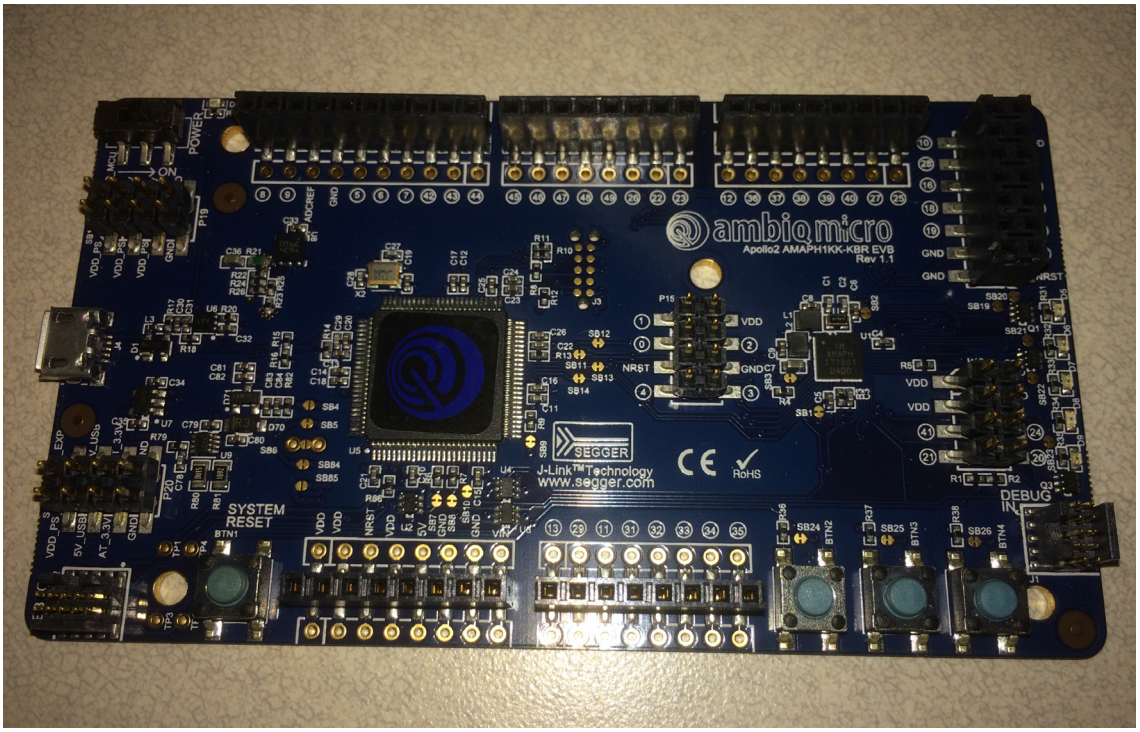

Figure 1. Apollo2 EVB, Revision 1.1

The 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
- 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

4. Debug Interface

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

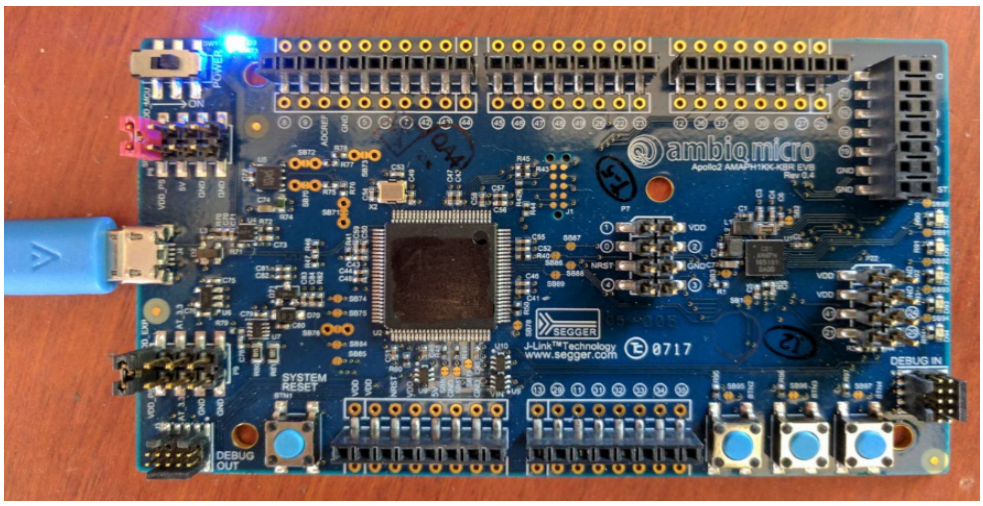

Figure 2. Apollo2 EVB using On-board J-Link Debugger

The debug interface is supported by standard J-Link drivers from Segger. Please refer to “Software Development Tools for the Apollo2 EVB” on page 9 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 - J1) as shown in Figure 3.

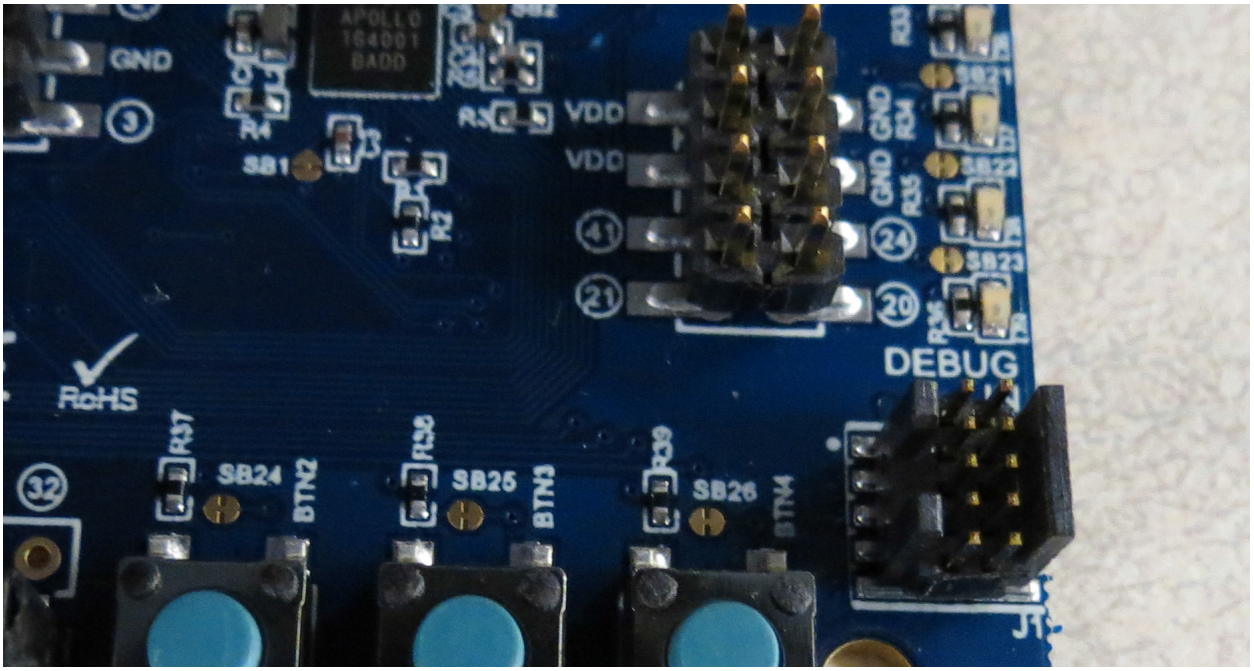

Figure 3. Apollo2 EVB’s Cortex DEBUG IN Header (J1)

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).

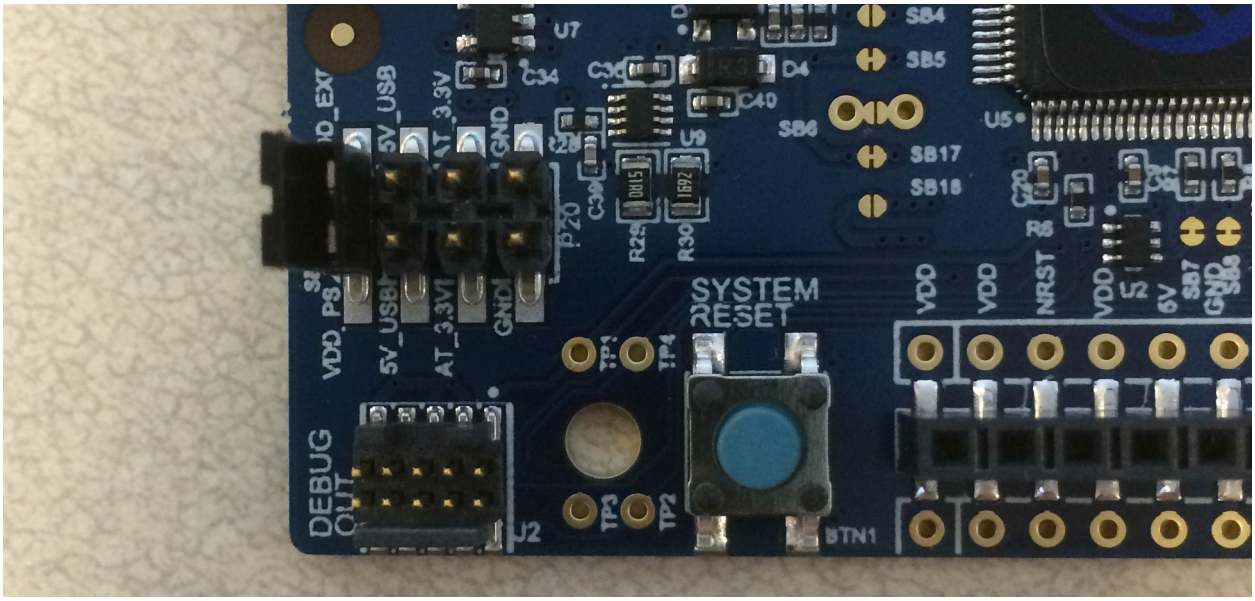

Figure 4. Apollo2 EVB’s DEBUG OUT Header (J2)

To utilize this functionality, use a 10-pin low-pitch standard debug connector to connect the “DEBUG OUT” header (J2) 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 pin 1 of the J2 header is required for the above mentioned automatic switch to occur. Also, if the target VDD doesn't match the onboard voltage (either 3.3V or 2.1V), and to avoid possible voltage level conflicts on the debug I/O port, VDDIO of the J-Link processor may need to be changed to the target voltage by cutting SB5 and shorting SB6.

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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 or newer): https://www.segger.com/downloads/jlink
- 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.

6. Power Supply Options and Measuring Current

There are three power supply options for the Apollo1 EVB:

- Operate at 3.3V as provided by the onboard power supply
- Operate at 2.1V as provided by the onboard power supply
- Provide externally supplied power

Figure 5 shows header P19 which is used to select a power configuration through jumper installations, as well as the option to measure the supply current to the MCU with an ammeter. Solder bridge SB15 can be filled instead of jumpering from pin 1 to pin 2 if current measuring is of no interest.

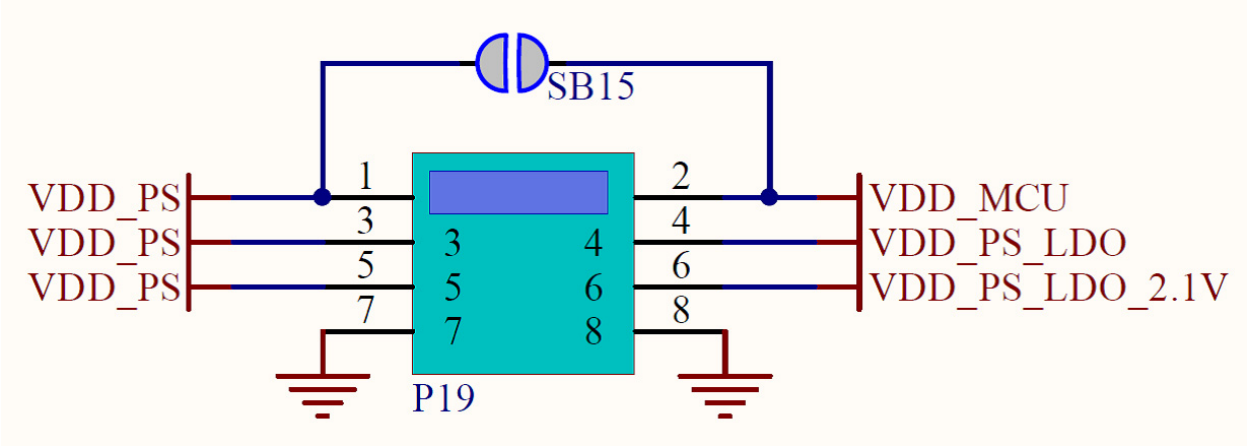

Figure 5. Voltage Selection on Header P19

Table 2 shows valid jumper configurations for P19. All other configurations are invalid. Note that a jumper across pins 7 and 8 is not necessary and does not do anything - the pins are available only for easy access to ground.

Jumper 1-2	Jumper 3-4	Jumper 5-6	Power Source
In	In	Out	3.3V operation from internal regulator
In	In	In	2.1V operation from internal regulator
Out	In	Out	Intended for current measuring across pins 1 and 2 during 3.3V operation from internal regulator
Out	In	In	Intended for current measuring across pins 1 and 2 during 2.1V operation from internal regulator
In	Out	Out	Externally-provided supply voltage within the allowable range (1.755-3.60V) on pin 3 or 5
Out	Out	Out	Intended for current measuring across pins 1 and 2 during externally-provided supply voltage within the allowable range (1.755-3.60V) on pin 3 or 5

Table 2: Jumper Configuration for Power Selections

As an example for setting the jumpers on P19, Figure 6 shows the EVB configured for 3.3V operation with jumper across VDD_PS and VDD_MCU for no current measurement.

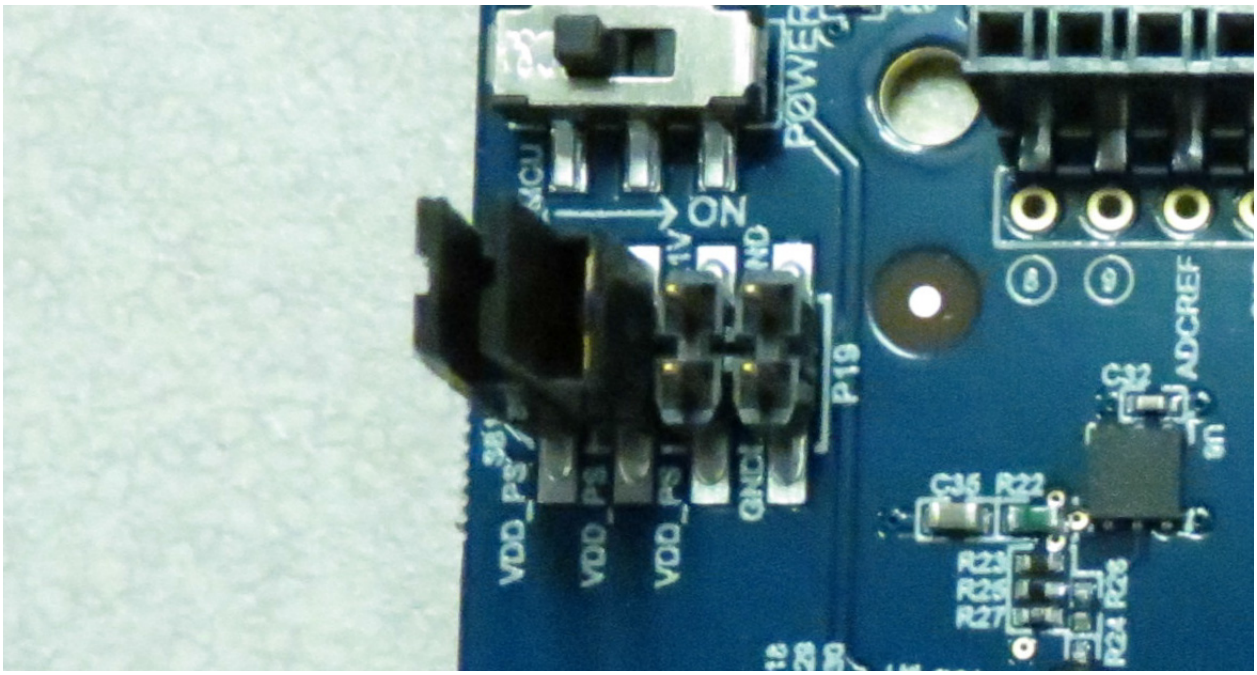

Figure 6. Header P19 Configured for 3.3V Operation - No Current Measurement

Figure 7 shows the EVB configured for 3.3V operation with current measuring leads across VDD_PS and VDD_MCU for current measurement.

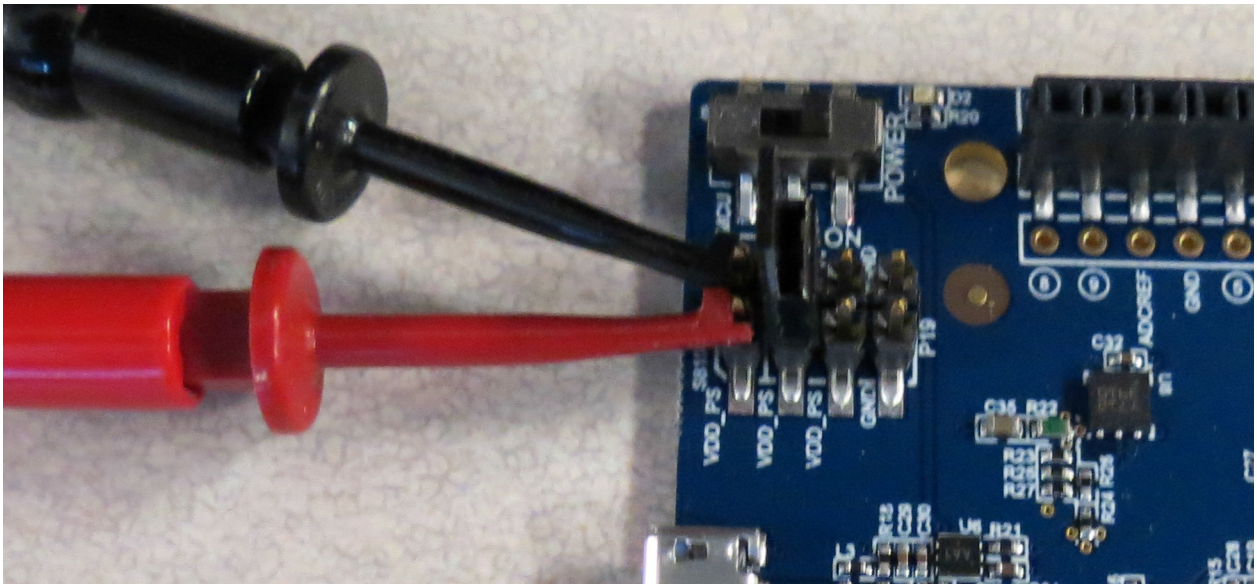

Figure 7. Header P19 Configured for 3.3V Operation - With Current Measurement

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