

Interface Board

User Guide

SUMMARY: The Atmosic Interface Board provides a host computer access to some commonly needed development and debug interfaces on an Atmosic wireless SoC based Evaluation board or other target hardware.



Atmosic™

Interface Board User Guide
February 21, 2024
2382-0018-0054

Table of Contents

1. Overview	3
2. Interface Board Description	3
Appendix - Frequently Asked Questions	9
Revision History	10

List of Figures

Figure 1 - Interface Board Version 011-01 (V2)
Figure 2 - Interface Board Version 011-02 (V3)
Figure 3 - Interface Board Version 011-03 (V4)
Figure 4 - V2 2x10 20-pin Connector Definition
Figure 5 - V3 2x10 20-pin Connector Definition
Figure 6 - J-Link Connector Definition
Figure 7 - Interface Board Version 011-40 (V5)

1. Overview

The Atmosic Interface Board provides a host computer access to some commonly needed interfaces on an Atmosic chip-based DUT, such as:

- Serial Wire Debug (SWD)
- Debug UART
- 4-wire HCI UART or 2-wire for Direct Test Mode (DTM)
- Reset/Powerdown (PWD) and Boot Mode signals

2. Interface Board Description

[Figure 1](#) and [Figure 2](#) show the main components on version 011-01 (V2) and 011-02 (V3), respectively, of the Interface Board.

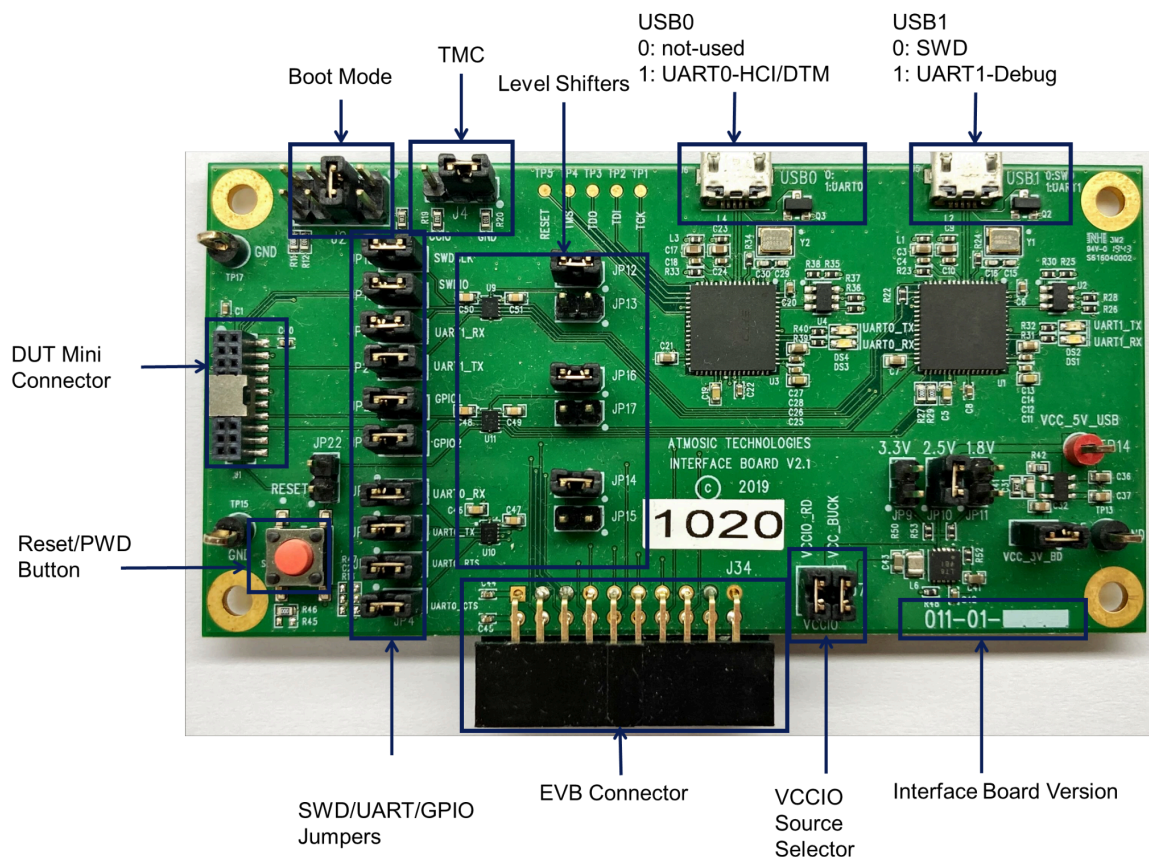


Figure 1 - Interface Board Version 011-01 (V2)

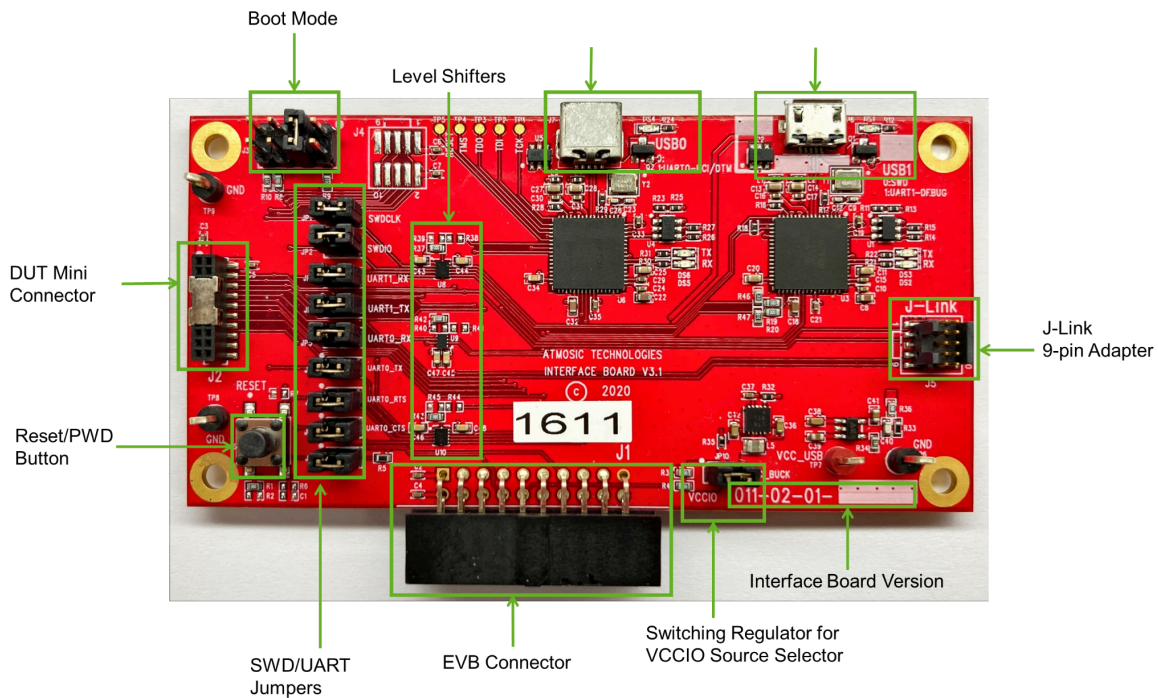


Figure 2 - Interface Board Version 011-02 (V3)

The latest version V4 is shown in [Figure 3](#), it is modified from V3, and the main changes are described in the following.

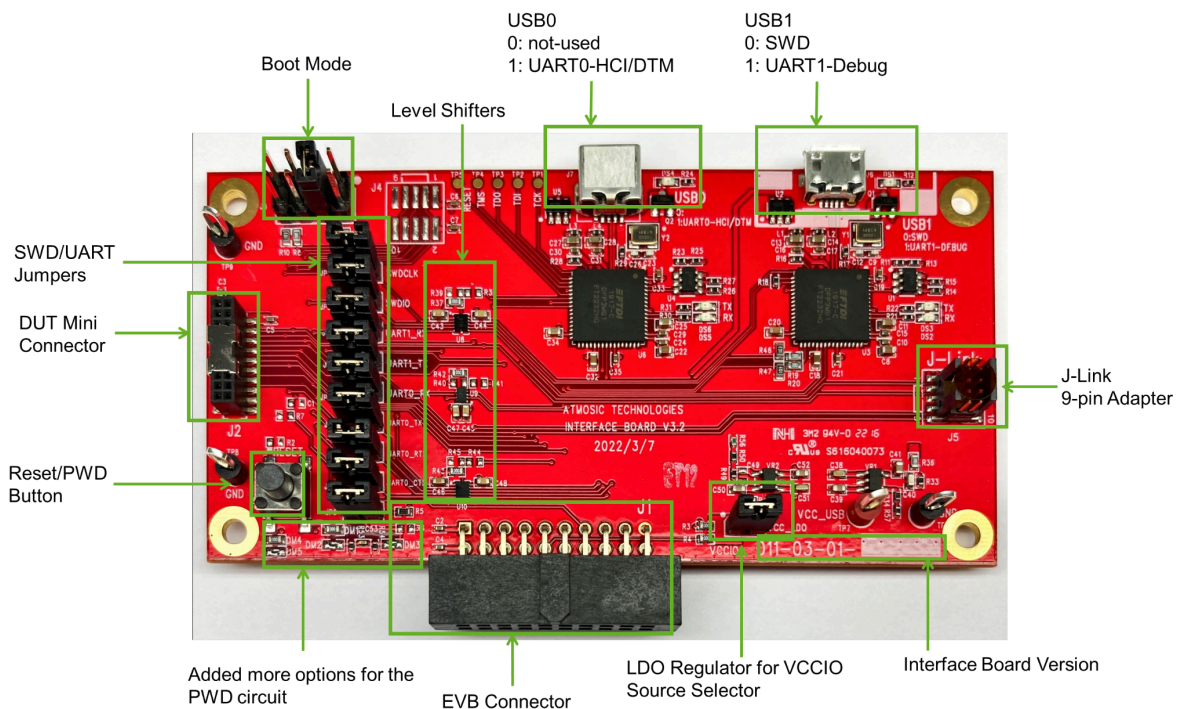


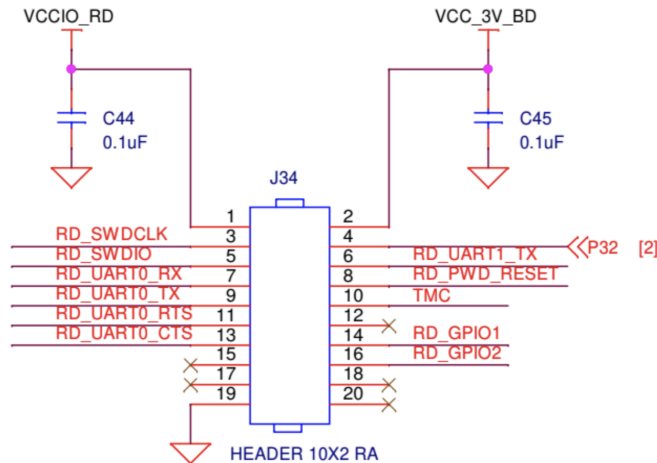
Figure 3 - Interface Board Version 011-03 (V4)

- Interface Board Version: The bottom right corner shows the version of the Interface Board. [Figure 1](#) is an example of 011-01 (V2), [Figure 2](#) is an example of 011-02 (V3), and [Figure 3](#) is an example of 011-03 (V4). The differences between V3 and V4 are:
 - replaced the switching regulator in V3 by LDO regulator in V4, for the VCCIO Source Selector.
 - added more options for the PWD circuit for V4.
- USB0: This is a micro-USB port on V2 (mini-USB port on V3) that is connected to an FTDI FT2232H, which provides two serial ports. This should show up as “Atmosic RDI USB0” in Windows Device Manager, and /dev/ttyUSBxxx in Linux.
 - Port 0: Reserved for internal use
 - Port 1: 4-wire HCI UART or 2-wire DTM to the Atmosic chip
 - On V3, an LED (DS4) will be solid blue when USB0 is connected to power
- USB1: This is a micro-USB port that is connected to an FTDI FT2232H, which provides two serial ports. This should show up as “Atmosic RDI¹ USB1” port in Windows Device Manager, and /dev/ttyUSBxxx in Linux.
 - Port 0: SWD
 - Port 1: Debug UART
 - On V3, an LED (DS1) will be solid blue when USB1 is connected to power
- Boot Mode - Benign Boot, pull high to keep CPU in an idle state during boot.
 - Pins 1-2: Benign Boot
 - Pins 3-4: USB1 FTDI control for use with SDK (Default)
 - Pins 5-6: Reserved for internal use
 - Pins 7-8: Normal Boot
- Board Connectors: There are two options to connect the Interface Board to an Atmosic board:
 - Mini Connector: This is a 1.27 mm pitch 2x10 20-pin Female interface.

¹ Reference Design Interface

- EVB Connector: This is a 2.54 mm pitch 2x20 20-pin Female interface, side launch designed to connect directly to an Evaluation Board (EVB). See [Figure 4](#) and [Figure 5](#) for pin definition.

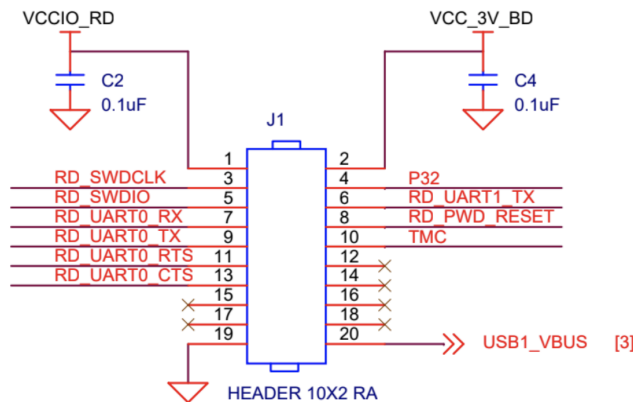
■ V2 Pin Definition:



Sullin SFH11-PBPC-D10-RA-BK

Figure 4 - V2 2x10 20-pin Connector Definition

■ V3 Pin Definition:



Sullins SFH11-PBPC-D10-RA-BK

Figure 5 - V3 2x10 20-pin Connector Definition

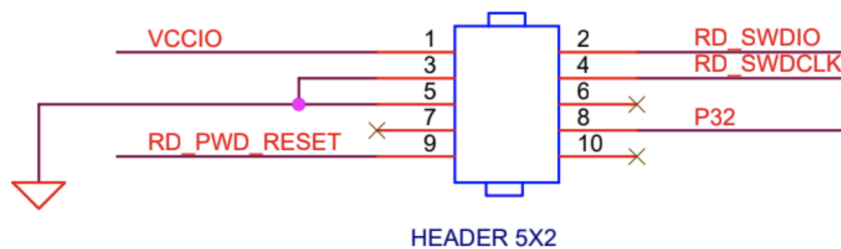
- VCCIO Source Selector: These jumpers allow the user to either drive or use the IO supply on the Atmosic board. There are 2 valid modes determined by J7 pins 1-3 on V2 and J10 on V3:

- Shorted: VCCIO is supplied by the Interface board to the Atmosic board (Default)
- Open: VCCIO is supplied by the Atmosic board

J7 pins 2-4 should always be shorted on V2 and have been replaced with a 0 Ω resistor on V3.

- Level Shifters: These are level shifters to provide voltage isolation between the FTDI FT2232H and the Atmosic chip. There are a total of 3 level shifters, each with its own output enable and disable jumpers.
 - Level Shifter 1 is for SWD and Debug UART
 - Level Shifter 2 is for other signals from the USB1 FTDI chip
 - Level Shifter 3 is for HCI UART/DTM
- SWD/UART/GPIO Jumpers: These jumpers allow the user to disconnect individual signals between the level shifters and the board connectors.
- Reset/PWD Button & Jumper: Used to Reset/PWD the Atmosic chip. The jumper is loaded by default for SDK use as it allows control from the USB1 FTDI chip. On V2, JP22 must be open to use the button.
- J-Link 9-pin Adapter (only on V3): This is a 1.27 mm 9-pin male Samtec FTSH connector that works with the J-Link 9-pin Cortex-M Adapter.

[Figure 6](#) shows the pin definition:



Samtec FTSH-105-01

Figure 6 - J-Link Connector Definition

The latest version V5 is shown below. It is modified from V4, and the main changes are described in the following:

- Added resistor options for internal VDDIO or external VDDIO use. Default is still the same as version 4.
- Added 1.8V voltage option for VCCIO. Default is still 2.5V.
- Interface Board Version: It is moved to the center of the board in version 5.
- The color is matte black in version 5.

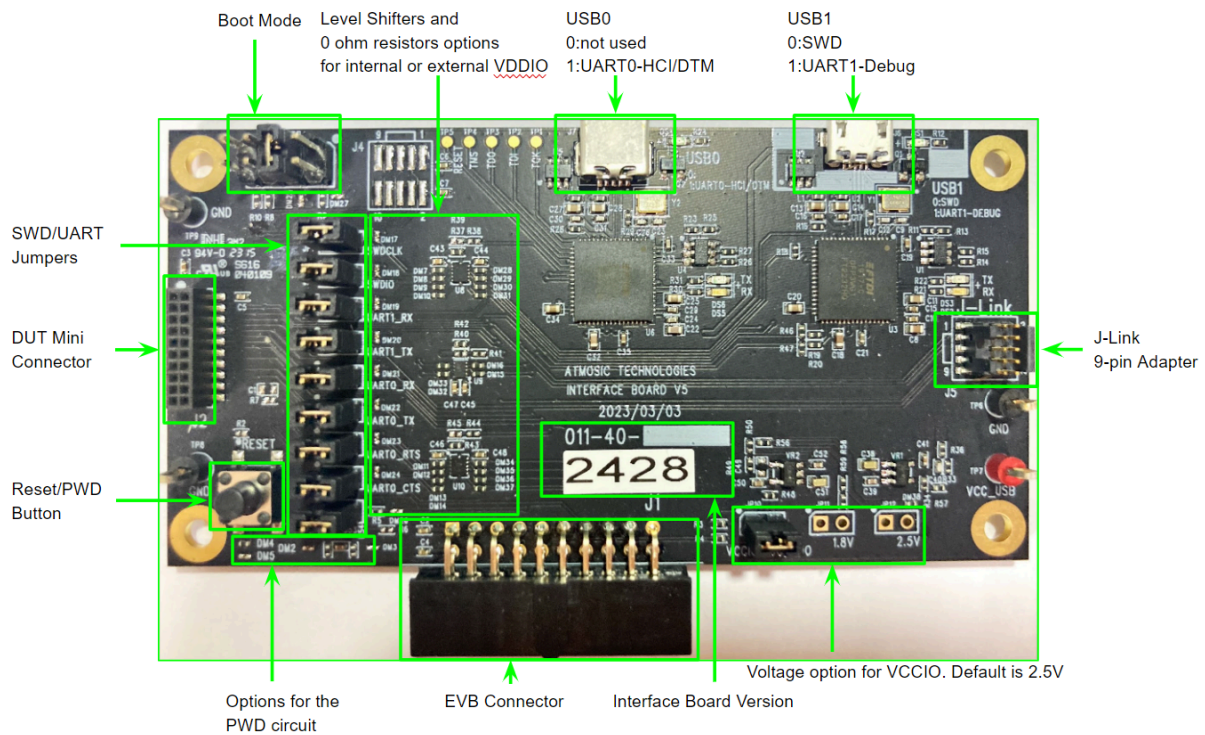


Figure 7 - Interface Board Version 011-40 (V5)

Appendix - Frequently Asked Questions

1) How to supply power to the Interface Board?

There are a few options to power the Interface Board. These options will provide power to both Bucks and the two FTDI chips.

- a) Connect a USB cable to a host computer (default and recommended method). Connecting either USB0 or USB1 will supply the necessary power.
- b) Connect a 5 V supply at the red loop and ground to any black loop
- c) Connect a USB cable to a USB power adapter.

2) Extra currents are seen during power measurements when the Interface Board is connected:

When performing power consumption measurements, sometimes unexpected VCCIO current may be seen. This is due to the weak drive of the bi-directional level shifters used on the board, which have an effective 4 K Ω output resistance.

Disconnecting the various jumpers (SWD/UART) can help isolate which specific line is causing the issue. Leave the jumper disconnected when it is identified.

3) Debug UART lines show garbage characters:

Sometimes the UART lines may not be pulled correctly due to the level shifter's bi-directional nature, which has a 4 K Ω output resistance. This may sometimes cause the initial set of characters to be shown as corrupted.

Revision History

Date	Version	Description
February 21, 2024	0.54	Figure list has been updated, no content change.
November 10, 2023	0.53	Updated with V5 Interface Board information.
June 13, 2022	0.52	Updated <u>Interface Board Description</u> section.
April 14, 2021	0.51	Updated format, no content change.
July 24, 2020	0.50	Initial version created.



ATMOSIC TECHNOLOGIES – DISCLAIMER

This product document is intended to be a general informational aid and not a substitute for any literature or labeling accompanying your purchase of the Atmosic product. Atmosic reserves the right to amend its product literature at any time without notice and for any reason, including to improve product design or function. While Atmosic strives to make its documents accurate and current, Atmosic makes no warranty or representation that the information contained in this document is completely accurate, and Atmosic hereby disclaims (i) any and all liability for any errors or inaccuracies contained in any document or in any other product literature and any damages or lost profits resulting therefrom; (ii) any and all liability and responsibility for any action you take or fail to take based on the information contained in this document; and (iii) any and all implied warranties which may attach to this document, including warranties of fitness for particular purpose, non-infringement and merchantability. Consequently, you assume all risk in your use of this document, the Atmosic product, and in any action you take or fail to take based upon the information in this document. Any statements in this document in regard to the suitability of an Atmosic product for certain types of applications are based on Atmosic's general knowledge of typical requirements in generic applications and are not binding statements about the suitability of Atmosic products for any particular application. It is your responsibility as the customer to validate that a particular Atmosic product is suitable for use in a particular application. All content in this document is proprietary, copyrighted, and owned or licensed by Atmosic, and any unauthorized use of content or trademarks contained herein is strictly prohibited.

Copyright ©2020-2022 by Atmosic Technologies. All rights reserved. Atmosic logo is a registered trademark of Atmosic Technologies Inc. All other trademarks are the properties of their respective holders.



Atmosic Technologies | 2105 S. Bascom Ave. | Campbell CA, 95008
www.atmosic.com