

Wi-Fi Pmod™ Expansion Board

Quick Start Guide

Renesas Microcontrollers

All information contained in these materials, including products and product specifications, represents information on the product at the time of publication and is subject to change by Renesas Electronics Corp. without notice. Please review the latest information published by Renesas Electronics Corp. through various means, including the Renesas Electronics Corp. website (<http://www.renesas.com>).

Notice

1. Descriptions of circuits, software and other related information in this document are provided only to illustrate the operation of semiconductor products and application examples. You are fully responsible for the incorporation or any other use of the circuits, software, and information in the design of your product or system. Renesas Electronics disclaims any and all liability for any losses and damages incurred by you or third parties arising from the use of these circuits, software, or information.
2. Renesas Electronics hereby expressly disclaims any warranties against and liability for infringement or any other claims involving patents, copyrights, or other intellectual property rights of third parties, by or arising from the use of Renesas Electronics products or technical information described in this document, including but not limited to, the product data, drawings, charts, programs, algorithms, and application examples.
3. No license, express, implied or otherwise, is granted hereby under any patents, copyrights or other intellectual property rights of Renesas Electronics or others.
4. You shall not alter, modify, copy, or reverse engineer any Renesas Electronics product, whether in whole or in part. Renesas Electronics disclaims any and all liability for any losses or damages incurred by you or third parties arising from such alteration, modification, copying or reverse engineering.
5. Renesas Electronics products are classified according to the following two quality grades: "Standard" and "High Quality". The intended applications for each Renesas Electronics product depends on the product's quality grade, as indicated below.

"Standard": Computers; office equipment; communications equipment; test and measurement equipment; audio and visual equipment; home electronic appliances; machine tools; personal electronic equipment; industrial robots; etc.

"High Quality": Transportation equipment (automobiles, trains, ships, etc.); traffic control (traffic lights); large-scale communication equipment; key financial terminal systems; safety control equipment; etc.

Unless expressly designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not intended or authorized for use in products or systems that may pose a direct threat to human life or bodily injury (artificial life support devices or systems; surgical implantations; etc.), or may cause serious property damage (space system; undersea repeaters; nuclear power control systems; aircraft control systems; key plant systems; military equipment; etc.). Renesas Electronics disclaims any and all liability for any damages or losses incurred by you or any third parties arising from the use of any Renesas Electronics product that is inconsistent with any Renesas Electronics data sheet, user's manual or other Renesas Electronics document.

6. When using Renesas Electronics products, refer to the latest product information (data sheets, user's manuals, application notes, "General Notes for Handling and Using Semiconductor Devices" in the reliability handbook, etc.), and ensure that usage conditions are within the ranges specified by Renesas Electronics with respect to maximum ratings, operating power supply voltage range, heat dissipation characteristics, installation, etc. Renesas Electronics disclaims any and all liability for any malfunctions, failure or accident arising out of the use of Renesas Electronics products outside of such specified ranges.
7. Although Renesas Electronics endeavors to improve the quality and reliability of Renesas Electronics products, semiconductor products have specific characteristics, such as the occurrence of failure at a certain rate and malfunctions under certain use conditions. Unless designated as a high reliability product or a product for harsh environments in a Renesas Electronics data sheet or other Renesas Electronics document, Renesas Electronics products are not subject to radiation resistance design. You are responsible for implementing safety measures to guard against the possibility of bodily injury, injury or damage caused by fire, and/or danger to the public in the event of a failure or malfunction of Renesas Electronics products, such as safety design for hardware and software, including but not limited to redundancy, fire control and malfunction prevention, appropriate treatment for aging degradation or any other appropriate measures. Because the evaluation of microcomputer software alone is very difficult and impractical, you are responsible for evaluating the safety of the final products or systems manufactured by you.
8. Please contact a Renesas Electronics sales office for details as to environmental matters such as the environmental compatibility of each Renesas Electronics product. You are responsible for carefully and sufficiently investigating applicable laws and regulations that regulate the inclusion or use of controlled substances, including without limitation, the EU RoHS Directive, and using Renesas Electronics products in compliance with all these applicable laws and regulations. Renesas Electronics disclaims any and all liability for damages or losses occurring as a result of your noncompliance with applicable laws and regulations.
9. Renesas Electronics products and technologies shall not be used for or incorporated into any products or systems whose manufacture, use, or sale is prohibited under any applicable domestic or foreign laws or regulations. You shall comply with any applicable export control laws and regulations promulgated and administered by the governments of any countries asserting jurisdiction over the parties or transactions.
10. It is the responsibility of the buyer or distributor of Renesas Electronics products, or any other party who distributes, disposes of, or otherwise sells or transfers the product to a third party, to notify such third party in advance of the contents and conditions set forth in this document.
11. This document shall not be reprinted, reproduced or duplicated in any form, in whole or in part, without prior written consent of Renesas Electronics.
12. Please contact a Renesas Electronics sales office if you have any questions regarding the information contained in this document or Renesas Electronics products.

(Note1) "Renesas Electronics" as used in this document means Renesas Electronics Corporation and also includes its directly or indirectly controlled subsidiaries.

(Note2) "Renesas Electronics product(s)" means any product developed or manufactured by or for Renesas Electronics.

(Rev.4.0-1 November 2017)

Corporate Headquarters

TOYOSU FORESIA, 3-2-24 Toyosu,
Koto-ku, Tokyo 135-0061, Japan
www.renesas.com

Trademarks

Renesas and the Renesas logo are trademarks of Renesas Electronics Corporation. All trademarks and registered trademarks are the property of their respective owners.

Contact information

For further information on a product, technology, the most up-to-date version of a document, or your nearest sales office, please visit:
www.renesas.com/contact/.

Wi-Fi Pmod™ Expansion Board

By using this Wi-Fi Pmod™ Expansion Board, the user accepts the following terms, which are in addition to, and control in the event of disagreement, with Renesas' General Terms and Conditions available at <https://www.renesas.com/en-us/legal/disclaimer.html>.

The Wi-Fi Pmod™ Expansion Board is not guaranteed to be error free, and the entire risk as to the results and performance of the Wi-Fi Pmod™ Expansion Board is assumed by the User. The Wi-Fi Pmod™ Expansion Board is provided by Renesas on an "as is" basis without warranty of any kind whether express or implied, including but not limited to the implied warranties of satisfactory quality, fitness for a particular purpose, title, and non-infringement of intellectual property rights with regard to the Wi-Fi Pmod™ Expansion Board. Renesas expressly disclaims all such warranties.

Renesas does not consider the Wi-Fi Pmod™ Expansion Board a finished product and therefore the Wi-Fi Pmod™ Expansion Board may not yet comply with some requirements applicable to finished products, including, but not limited to recycling (WEEE), CE, UL, restricted substances (ROHS), FCC, FEE, and electromagnetic compatibility regulations. Renesas or its affiliates shall in no event be liable for any loss of profit, loss of data, loss of contract, loss of business, damage to reputation or goodwill, any economic loss, any reprogramming or recall costs (whether the foregoing losses are direct or indirect) nor shall Renesas or its affiliates be liable for any other direct or indirect special, incidental or consequential damages arising out of or in relation to the use of this Wi-Fi Pmod™ Expansion Board, even if Renesas or its affiliates have been advised of the possibility of such damages.

Renesas has used reasonable care in preparing the information included in this document, but Renesas does not warrant that such information is error free nor does Renesas guarantee an exact match for every application or parameter to part numbers designated by other vendors listed herein. The information provided in this document is intended solely to enable the use of Renesas products. No express or implied license to any intellectual property right is granted by this document or in connection with the sale of Renesas products. Renesas reserves the right to make changes to specifications and product descriptions at any time without notice. Renesas assumes no liability for any damages incurred by you resulting from errors in or omissions from the information included herein. Renesas cannot verify, and assumes no liability for, the accuracy of information available on another company's website.

Precautions

This Wi-Fi Pmod™ Expansion Board is only intended for use in a laboratory environment under ambient temperature and humidity conditions. A safe separation distance should be used between this and any sensitive equipment. Its use outside the laboratory, classroom, study area, or similar such area invalidates conformity with the protection requirements of the Electromagnetic Compatibility Directive and could lead to prosecution.

The product generates, uses, and can radiate radio frequency energy and may cause harmful interference to radio communications. There is no guarantee that interference will not occur in a particular installation. If this equipment causes harmful interference to radio or television reception, which can be determined by turning the equipment off or on, you are encouraged to try to correct the interference by one or more of the following measures:

- Ensure attached cables do not lie across the equipment.
- Reorient the receiving antenna.
- Increase the distance between the equipment and the receiver.
- Connect the equipment into an outlet on a circuit different from that which the receiver is connected.
- Power down the equipment when not in use.
- Consult the dealer or an experienced radio/TV technician for help.

Note: It is recommended that wherever possible shielded interface cables are used.

The product is potentially susceptible to certain EMC phenomena. To mitigate against them it is recommended that the following measures be undertaken:

- The user is advised that mobile phones should not be used within 10 m of the product when in use.
- The user is advised to take ESD precautions when handling the equipment.

The Wi-Fi Pmod™ Expansion Board does not represent an ideal reference design for an end product and does not fulfill the regulatory standards for an end product.

Renesas Microcontrollers

Wi-Fi Pmod™ Expansion Board

Contents

1. Introduction.....	2
2. Product Overview	2
3. Pmod™ Interface.....	2
3.1 Overview.....	2
3.2 Pmod™ Pin Diagram	3
3.3 Pin Descriptions and Directions	3
3.4 Connector CN1 Pin Assignment.....	3
3.5 Electrical Specification	3
3.6 Module Control	4
4. Device Region	4
4.1 Default Region Setting	4
4.2 Region Configuration.....	4
5. Note.....	4

1. Introduction

This document provides an overview of the Wi-Fi Pmod™ Expansion Board from Renesas that uses the SX-ULPGN Ultra-Low Power Wi-Fi module.



Figure 1. Wi-Fi Pmod™ Expansion Board

2. Product Overview

Wi-Fi Pmod™ Expansion Board provides a quick and easy way to interface with the Silex SX-ULPGN module.

More information about Silex SX-ULPGN module can be found on the Silex website:

<https://www.silextechnology.com/connectivity-solutions/embedded-wireless/sx-ulpgn>

3. Pmod™ Interface

3.1 Overview

The Wi-Fi Pmod™ Expansion Board provides an interface using a 12-pin Digilent Pmod™ compatible connector (CN1).

This provides access to:

- A high-speed UART interface (HSUART1)
- A high-speed UART interface (USUART2)
- An external wakeup interrupt pin (GPIO_IOE1)
- A mode reset pin (CHIP_PWD_L)
- VDD and GND connections for module power.

Pmod™ is registered to Digilent Inc. and its specification can be found at the link below:

<https://reference.digilentinc.com/reference/pmod/specification?redirect=1>

3.2 Pmod™ Pin Diagram

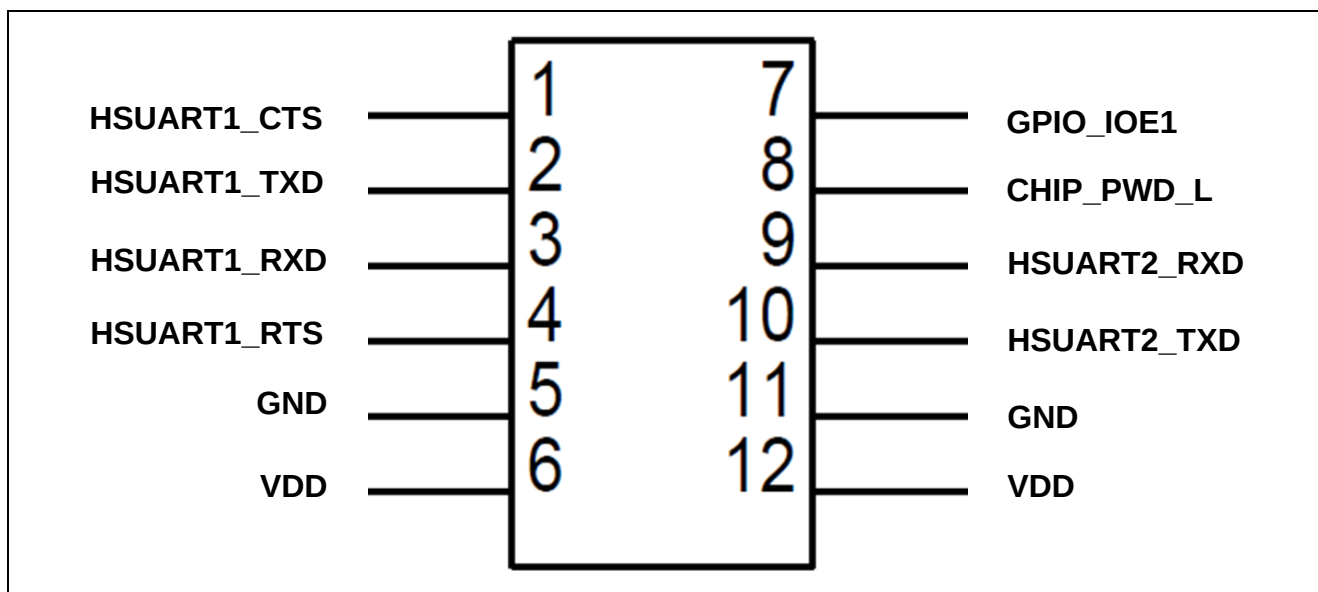


Figure 2. Pmod™ Pin Diagram

3.3 Pin Descriptions and Directions

Pin Name	Description	Direction
HSUART1_TXD	Hi-speed UART1	TXD Input
HSUART1_RXD	Hi-speed UART1	RXD Output
HSUART1_CTS	Hi-speed UART1	CTS Output
HSUART1_RTS	Hi-speed UART1	RTS Input
HSUART2_RXD	Hi-speed UART2	RXD Input
HSUART2_TXD	Hi-speed UART2	TXD Output

3.4 Connector CN1 Pin Assignment

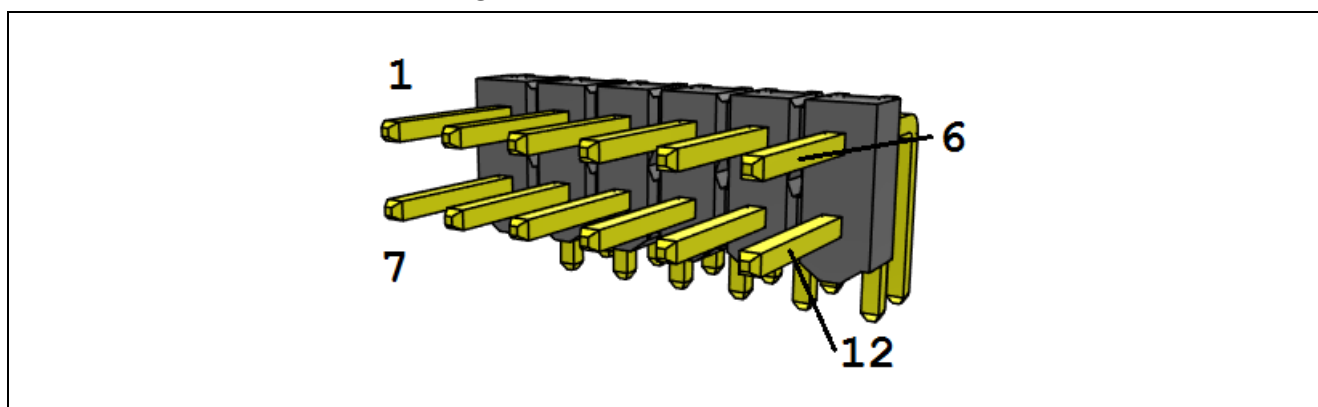


Figure 3. Connector CN1 Pin Assignment

3.5 Electrical Specification

Table 1. Recommended Operating Conditions

Item	Min.	Typ.	Max.
VDD	+2.97 V	+3.3 V	+3.63 V

Please refer to the module data sheet for full electrical specifications.

3.6 Module Control

The high-speed UART interface can be used to communicate with the module using the Silex AT command protocol.

These commands are explained in the following document:

<https://www.silextechnology.com/productspecs/silex-at-command-set-for-sx-ulpgn>

4. Device Region

4.1 Default Region Setting

The device's region code has been preconfigured at the factory to ensure that it meets the compliance requirements of the region that it is shipped to.

Region Options	Product Order Code
EU (CE)	RTK00WFMX0B00000BE
US (FCC)	RTK00WFMX0B01000BE

4.2 Region Configuration

The device's region can be reconfigured using the Silex AT command protocol.

It is the responsibility of the OEM to ensure compliance with all conditions if using Silex certifications. In particular, the OEM product must ensure if the module is to be configured for US use that the end user cannot change the regulatory setting/the country code.

The specific commands required for changing the module's country code are discussed in a separate Silex application note:

<https://www.silextechnology.com/hubfs/Application%20Notes/AppNote-CountryCodeConfigurationforSilexDivers.pdf>

5. Note

Third party links in this document may change at any time and are the responsibility of the third party, not Renesas.

Website and Support

Visit renesas.com/wi-fi-pmod to learn more about using the Wi-Fi Pmod™ Expansion Board with Renesas Synergy, RA, and RX microcontrollers.

Visit renesas.com/support to get technical and sales support.

Revision History

Rev.	Date	Description	
		Page	Summary
1.00	Apr.29.20	—	First release document
1.10	Aug.18.20	—	Updated section 3.1, Overview and corrected pins 9 and 10 in section 3.2, Pmod™ Pin Diagram.

Wi-Fi Pmod™ Expansion Board

Publication Date: Aug.18.20

Published by: Renesas Electronics Corporation

Wi-Fi Pmod™ Expansion Board

Mouser Electronics

Authorized Distributor

Click to View Pricing, Inventory, Delivery & Lifecycle Information:

[Renesas Electronics:](#)

[RTK00WFMX0B00000BE](#) [RTK00WFMX0B01000BE](#)