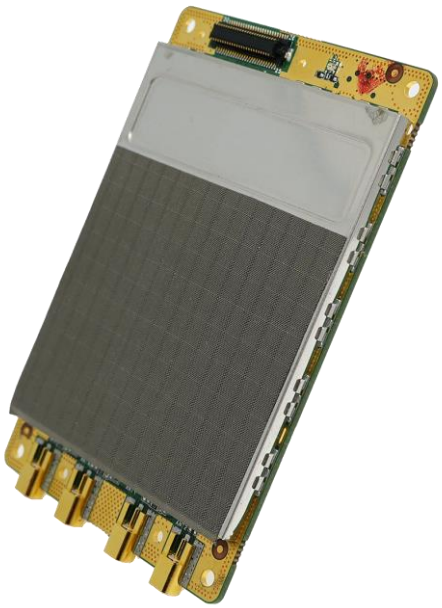
4-Port UHF RFID Reader Module

- RM300 Plus -



User Manual

V1.0

Revision History

Date	Change Description	Version
20240719	First Published Version	V1.0

Preface

About This Manual

Thank you for purchasing the Unitech product.
This manual explains how to install, operate and maintain our product.
No part of this publication may be reproduced or used in any form, or by any electrical or mechanical means, such as photocopying, recording, or information storage and retrieval systems, without permission in writing from the manufacturer. The material in this manual is subject to change without notice.

Regulatory Compliance Statements

FCC Warning Statement

This device has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation. This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference with radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference with radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

–Reorient or relocate the receiving antenna.
–Increase the separation between the equipment and receiver.
–Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
–Consult the dealer or an experienced radio/TV technician for help.

1. This transmitter must not be co-located or operating in conjunction with any other antenna or transmitter.
2. This device complies with FCC RF radiation exposure limits set forth for an uncontrolled environment. To maintain compliance with FCC RF exposure requirements, avoid direct contact to the transmitting antenna during transmitting.
3. Any changes or modifications (including the antennas) made to this device that are not expressly approved by the manufacturer may void the user's authority to operate the equipment.
4. Operation of transmitters in the 5.925-7.125 GHz band is prohibited for control of or communications with unmanned aircraft systems.

FCC Label Statement

This device complies with part 15 of the FCC rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference.
2. This device must accept any interference received, including interference that may cause undesired operation.

RF Radiation Exposure Statement

For body contact during operation, this device has been tested and meets FCC RF exposure guidelines when used with an accessory that contains no metal and that positions the handset a minimum of 1.0 cm from the body.

Use of other accessories may not ensure compliance with FCC RF exposure guidelines.

IC Statements

This device complies with Industry Canada licence-exempt RSS standard(s). Operation is subject to the following two conditions:
(1) this device may not cause interference, and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil est conforme aux CNR d'Industrie Canada applicables aux appareils radioexempts de licence. L'exploitation est autorisée aux deux conditions suivantes:
(1) l'appareil ne doit pas produire de brouillage, et
(2) l'utilisateur de l'appareil doit accepter tout brouillage radioélectrique subi, même si le brouillage est susceptible d'en compromettre le fonctionnement.

Under Industry Canada regulations, this radio transmitter may only operate using an antenna of a type and maximum (or lesser) gain approved for the transmitter by Industry Canada. To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the equivalent isotropically radiated power (e.i.r.p.) is not more than that necessary for successful communication.

Conformément à la réglementation d'Industrie Canada, le présent émetteur radio peut fonctionner avec une antenne d'un type et d'un gain maximal (ou inférieur) approuvé pour l'émetteur par Industrie Canada. Dans le but de réduire les risques de brouillage radioélectrique à l'intention des autres utilisateurs, il faut choisir le type d'antenne et son gain de sorte que la puissance isotrope rayonnée équivalente (p.i.r.e.) ne dépasse pas l'intensité nécessaire à l'établissement d'une communication satisfaisante.

(i) the device for operation in the band 5150-5250 MHz is only for indoor use to reduce the potential for harmful interference to co-channel mobile satellite systems;

(i)Les dispositifs fonctionnant dans la bande 5150-5250 MHz sont réservés uniquement pour une utilisation à l'intérieur afin de réduire les risques de brouillage préjudiciable aux systèmes de satellites mobiles utilisant les mêmes canaux.

Devices shall not be used for control of or communications with unmanned aircraft systems

Les dispositifs ne doivent pas être utilisés pour commander des systèmes d’aéronef sans pilote ni pour communiquer avec de tels systèmes.

IC Radiation Exposure Statement

This EUT is compliance with SAR for general population/uncontrolled exposure limits in IC RSS-102 and had been tested in accordance with the measurement methods and procedures specified in IEEE 1528 and IEC 62209. This equipment should be installed and operated with minimum distance 10 mm between the radiator and your body. This device and its antenna(s) must not be co-located or operating in conjunction with any other antenna or transmitter.

Cet appareil est conforme aux limites d'exposition DAS incontrôlée pour la population générale de la norme CNR-102 d'Industrie Canada et a été testé en conformité avec les méthodes de mesure et procédures spécifiées dans IEEE 1528 et IEC 62209. Cet appareil doit être installé et utilisé avec une distance minimale de 10mm entre l’émetteur et votre corps. Cet appareil et sa ou ses antennes ne doivent pas être co-localisés ou fonctionner en conjonction avec tout autre antenne ou transmetteur.

European Conformity Statement

Unitech Electronics co., Ltd herewith declares that the Unitech product is in compliance with the essential requirements and all other provisions of the RED 2014/53/EU directive.
The declaration of conformity is available for download at:
https://portal.Unitech.eu/public/Safetyregulatorystatement

UK Declaration of Conformity (DoC)

Hereby, Unitech electronics co., ltd. declares that the radio equipment type Rugged Handheld Computer is in compliance with UK Radio Equipment Regulations 2017(RER 2017 (SI 2017/1206)).
The full text of the UK declaration of conformity is available at the following internet address: https://www.ute.com

UKCA Mark Warning

CE RF Exposure Compliance

For body-worn operation, this device has been tested and meets the ICNIRP guidelines and the European Standard EN 62209-2, for use with dedicated accessories, SAR is measured with this device at a separation of 0.5 cm to the body, while transmitting at the highest certified output power level in all frequency bands of this device. Use of other accessories which contain metals may not ensure compliance with ICNIRP exposure guidelines.

CE Mark Warning

RoHS Statement

This device conforms to RoHS (Restriction Of Hazardous Substances) European Union regulations that set maximum concentration limits on hazardous materials used in electrical and electronic equipment.

Waste Electrical and Electronic Equipment (WEEE)

Unitech has set up a policy and process to meet the 2012/19/EU concerning electronic waste disposal.

For more detailed information of the electronic waste disposal of the products you have purchased from Unitech directly or via Unitech's resellers, you shall either contact your local supplier or visit us at:
https://portal.Unitech.eu/public/WEEE

Taiwan NCC Warning Statement

低功率電波輻射性電機管理辦法

取得審驗證明之低功率射頻器材，非經核准，公司、商號或使用者均不得擅自變更頻率、加大功率或變更原設計之特性及功能。低功率射頻器材之使用不得影響飛航安全及干擾合法通信；經發現有干擾現象時，應立即停用，並改善至無干擾時方得繼續使用。前述合法通信，指依電信管理法規定作業之無線電通信。低功率射頻器材須忍受合法通信或工業、科學及醫療用電波輻射性電機設備之干擾。應避免影響附近雷達系統之操作。高增益指向性天線只得應用於固定式點對點系統。

注意事項:

1. 使用過度恐傷害視力。
2. 使用30分鐘請休息10分鐘；未滿2歲以下幼兒不看螢幕，2歲以上每天看螢幕不要超過1小時。
3. 減少電磁波影響，請妥善使用。

Note: *Within the 5.25-5.35 GHz band, U-NII devices will be restricted to indoor operations to reduce any potential for harmful interference to co-channel MSS operations.*

Devices shall not be used for control of or communications with unmanned aircraft systems.

Laser Information

The Unitech product is certified in the U.S. to conform to the requirements of DHHS/CDRH 21CFR Subchapter J and to the requirements of IEC 60825-1. Class II and Class 2 products are not considered to be hazardous. The Unitech product contains internally a Visible Laser Diode (VLD) whose emissions do not exceed the maximum limits as set forth in the above regulations. The scanner is designed so that there is no human access to harmful laser light during normal operation, user maintenance or prescribed service operations.

The laser safety warning label required by the DHHS/IEC for the Unitech product's optional laser scanner module is located on the memory compartment cover, on the back of the unit.

* Laser information only applies to the products with laser components.

CAUTION! *Use of controls or adjustments or performance of procedures other than those specified herein may result in hazardous laser light. Use of optical instruments with the scanner, including binoculars, microscopes, and magnifying glasses, with will increase eye damage. This does not include eyeglasses worn by the user.*

LED Information

The Unitech product contains LED indicator(s) or LED ring whose luminance is not harmful to human eyes during normal operation, user maintenance or prescribed service operations.

*LED information only applies to the products with LED components.

Storage and Safety Notice

Although charged batteries may be left unused for several months, their capacity may be depleted due to build up of internal resistance. If this happens, they will require recharging prior to use. Batteries may be stored at temperatures between -20°C to 60°C, however they may deplete more rapidly at higher temperatures. It is recommended to store batteries at room temperature.

** The message above only applies to the usage of the removable batteries.*
For the products with non-removable batteries / without batteries, please refer to the specification of each product.

Product Operation and Storage Notice

The Unitech product has applicable operation and storage temperature conditions. Please follow the limitation of suggested temperature conditions to avoid failure, damage or malfunction.

**For applicable temperature conditions, please refer to the specification of each product.*

Adapter Notice

1. Please do not leave the power adapter in the socket when it is not connected to your Unitech product for charging.
2. Please remove the power adapter when the battery is fully recharged.
3. The bundled power adapter that comes with your Unitech product is not meant to be used outdoors. An adapter exposed to water or rain, or a very humid environment can cause damage to both the adapter and the product.
4. Please only use the bundled power adapter or same specification of adapter to charge your Unitech product. Using the wrong power adapter can damage your Unitech product.

** The message above only applies to the product connected to the adapter.*
For the products without using the adapters, please refer to the specification of each product.

Hearing Damage Warning

To prevent possible hearing damage, do not listen at high volume levels for long periods.

Figure 1 – Warning label (IEC 60417-6044)

Worldwide Support

Unitech's professional support team is available to quickly answer questions or assist with technical-related issues. Should an equipment problem occur, please contact the nearest Unitech regional service representative.
For complete contact information please visit the Web sites listed below:

Taipei, Taiwan – Headquarters		**Europe**	
Tel:	+886-2-89121122	**Tel:**	+31-13-4609292
E-mail:	info@hq.ute.com	**E-mail:**	info@eu.ute.com
Address:	5F, No. 136, Lane 235, Baoqiao Road, Xindian District, New Taipei City 231, Taiwan (R.O.C.)	**Address:**	Kapitein Hatterasstraat 19, 5015 BB, Tilburg, the Netherlands
Website:	http://www.ute.com	**Website:**	http://eu.ute.com
China		**Japan**	
Tel:	+86-59-2310-9966	**Tel:**	+81-3-62310896
E-mail:	info@cn.ute.com	**E-mail:**	info@jp.ute.com
Address:	Room401C, 4F, RIHUA International Mansion, Xinfeng 3nd Road, Huoju Hi-tech District, Xiamen, Fujan, China	**Address:**	Tosei Building 3F.,18-10 Nihonbashi-Hakozakicho, Cyuouku, Tokyo, 103-0015, Japan
Website:	http://cn.ute.com	**Website:**	http://jp.ute.com
Asia & Pacific / Middle East		**Latin America**	
Tel:	+886-2-27911556	**Tel:**	+52-55-5171-0528
E-mail:	info@apac.ute.com info@india.ute.com info@mideast.ute.com	**E-mail:**	info@latin.ute.com
Address:	4F., No. 236, ShinHu 2nd Rd., NeiHu Chiu, 114, Taipei,Taiwan	**Address:**	17171 Park Row, Suite 210 Houston, TX 77084USA (Rep.)
Website:	http://apac.ute.com / http://mideast.ute.com	**Website:**	http://latin.ute.com
North America		**Please scan QRCode to visit us:**	
Tel:	+1-714-8916400		
E-mail:	info@us.ute.com / info@can.ute.com		
Address:	6182 Katella Ave, Cypress, CA 90630, USA		
Website:	http://us.ute.com		

Warranty Policy

The following items covered under the Unitech Limited Warranty are free from defects during normal use:

The warranty period is varied from each country. Please consult with your supplier or Unitech local office for actual length of warranty period to your purchased product.

Warranty becomes void if equipment is modified, improperly installed or used, damaged by accident or neglect, or if any parts are improperly installed or replaced by the user.

Table of Contents

Chapter 1 - Overview

1.1 Package

Please make sure the following contents are in the RM300 Plus gift box.
If something is missing or damaged, please contact your Unitech representative.

The Package Contents

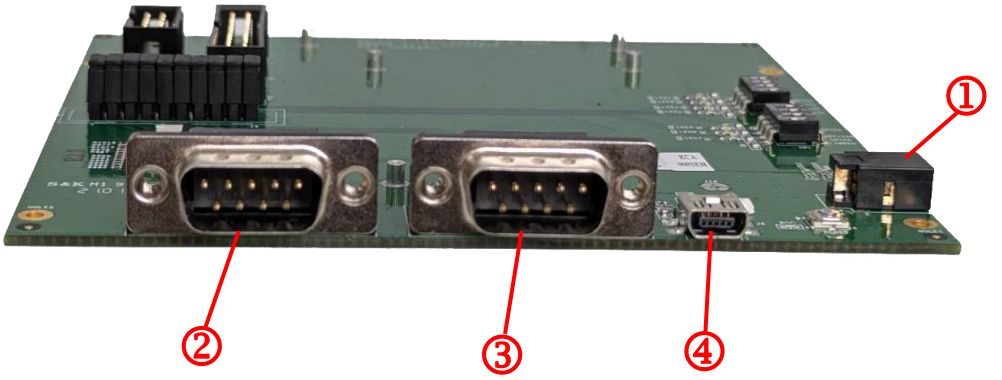
- 4-Port UHF RFID Reader Module
- Interface Board
- Power Adaptor
- Heat Sink
- Antenna
- Antenna Cable
- RFID Tags
- Screws

Optional Accessories

- miniUSB Cable
- RS232 Cable

1.2 Product Detail

1.2.1 Interface Board



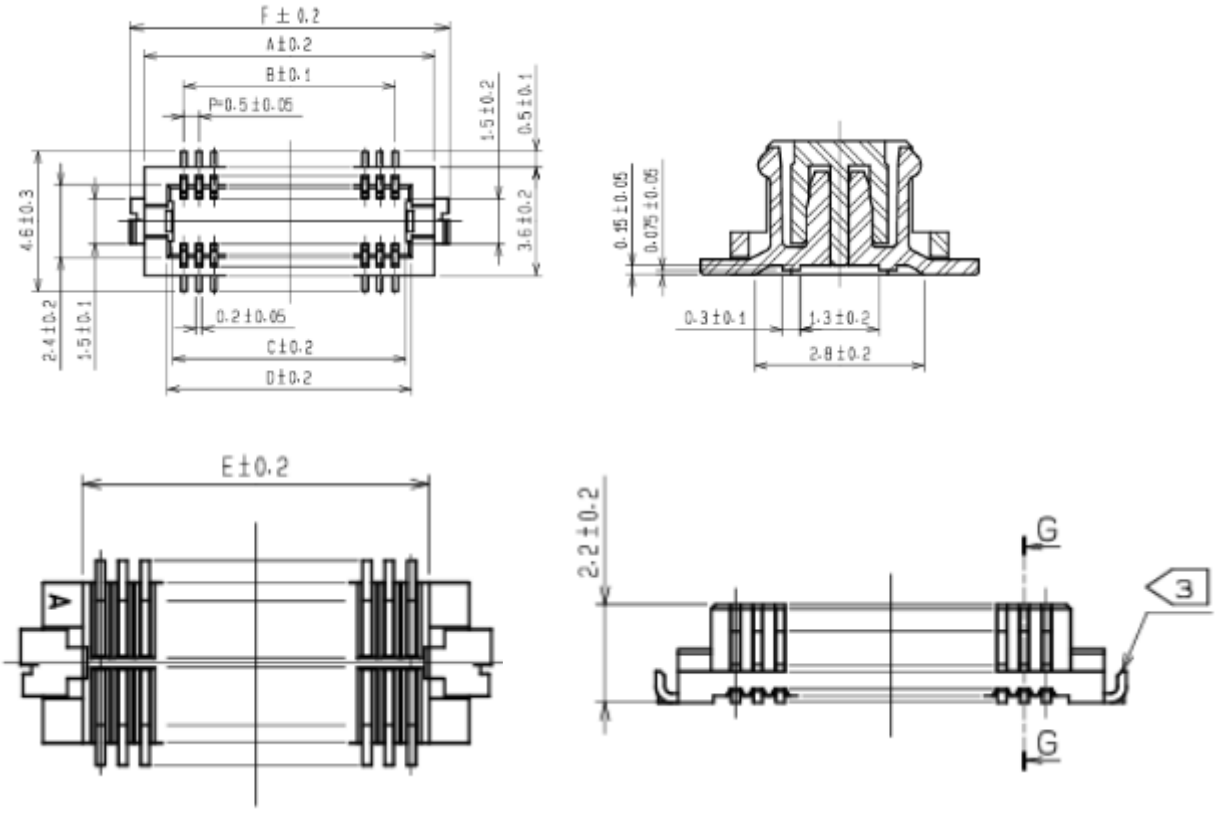
① Power Inlet

② Debug Port

③ UART Inlet

④ miniUSB Port

1.2.2 Dimension



CODE No.	CONTACT	A	B	C	D	E	F
CL537-0189-0-51	50	14.6	12	12.7	13.1	12.8	15.6

1.2.3 Pin Assignment

Pin	Type	Function
1	I	UART_CTS
2	O	UART_RTS
3	O	UART_TX
4	I	UART_RX
5	P	Power / Signal Ground
6	I	BD_RESET
7	I	BD_PWR_EN_N
8	IO	GPIO_6
9	IO	GPIO_5
10	IO	GPIO_4
11	IO	GPIO_3
12	IO	GPIO_2
13	I	DBUG_RX
14	O	DBUG_TX
15	P	Power / Signal Ground
16	P	+5V Power Supply
17	P	+5V Power Supply
18	P	+5V Power Supply
19	P	+5V Power Supply
20	P	+5V Power Supply
21	P	+5V Power Supply
22	P	+5V Power Supply
23	P	+5V Power Supply
24		N/C
25	P	VBUS 5V

Pin	Type	Function
26	P	Power / Signal Ground
27	IO	USB_D-
28	IO	USB_D+
29	P	Power / Signal Ground
30	P	Power / Signal Ground
31	P	Power / Signal Ground
32	P	Power / Signal Ground
33	P	Power / Signal Ground
34	P	Power / Signal Ground
35	P	Power / Signal Ground
36	P	Power / Signal Ground
37	P	Power / Signal Ground
38	P	Power / Signal Ground
39	P	Power / Signal Ground
40	P	Power / Signal Ground
41	P	Power / Signal Ground
42	P	Power / Signal Ground
43	P	Power / Signal Ground
44	P	Power / Signal Ground
45	P	Power / Signal Ground
46	P	Power / Signal Ground
47	P	Power / Signal Ground
48	P	Power / Signal Ground
49	P	Power / Signal Ground
50	P	Power / Signal Ground

1.3 Specifications

Protocol	
RFID	EPCglobal Gen 2 (ISO 18000-6C), DRM
Architecture	
RFID ASIC	IMPINJ E710
Processor	STM32F413VGH6TR
Power	
Voltage	5V VDC
Current Consumption	Scan Mode: 2 A (Max), Idle Modes: 0.2 A (Typical)
Interface	
Connector	50-pin (HRS-DF12 SMT connector)
UART	Baud rates: 9,600 to 115,200 bps, Logic levels: 3.3 / 5 V
USB	USB 2.0 Full Speed (12 Mbps)
GPIO	4 GPIO pins, Logic levels: 3.3 / 5 V
API Interface	Impinj
RF	
Antenna Connector	Four MMCX antenna connectors supporting 4 mono-static antennas, or one bi-static antenna
Frequency	FCC (US) 860-960MHz SRRC (China) 920.5 - 924.5 MHz TELEC (Japan) 916.8 - 923.4 MHz NCC (Taiwan) 922 - 928 MHz
TX power	Adjustable from 5-33 dBm @ +/-1 .0 dBm accuracy
Frequency Stability	±20 ppm
Harmonic	under 65.0dBc
Modulation Depth	90% nominal
Data Encoding	FM0 or Miller code
Bit Rate	Supports uplink data rates of up to 640 Kbps
Performance	
Tag Read Rate	1,000 tags / second
Inventory Reliability	Through anti-collision
Tag Read Distance	15m with a 6 dBi antenna (36 dBm EIRP)
Regulatory Approvals	
Certification obtained: FCC, CE, TELEC, NCC Certifiable: SRRC	

Environmental Compliance	
Temperature Range	Operating: -20 to +60°C; Storage: 30 to + 85°C
Humidity	10% - 85% Non-condensing
Electrostatic	10 KV to antenna conductor with the antenna attached
Shock	2000 G ± 5% for a period of 0.85 ± 0.05msec over three (3) axes (X, Y and Z), two (2) directions per axis at all temperatures
ESD	±2kV (HBM) at pins; receiver pin ±1kV
Physical	
Dimensions	76.5mm (L) x 50mm (W) x 4.2 mm (H)
Software	
Platform support	PC Windows & Android
Development Tools	TagAccess

Note: *The device is restricted to indoor use only when operating in the 5250-5350 MHz / 5945 to 6425 MHz (for LPI) frequency range.*

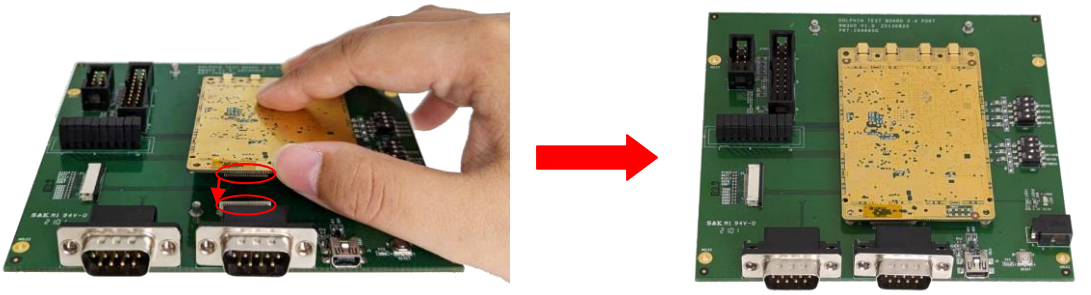
	AT	BE	BG	HR	CY	CZ	DK
	EE	FI	FR	DE	EL	HU	IE
	IT	LV	LT	LU	MT	NL	PL
	PT	RO	SK	SI	ES	SE	UK(NI)
	IS	LI	NO	CH	TR		

1.4 Getting Started

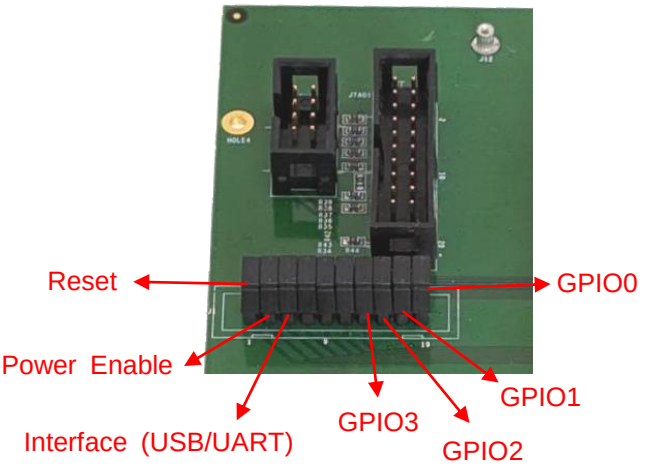
1.4.1 Connect the RM300 Plus to A PC

Before operating the TagAccess software for RFID device development, follow the steps below to connect the RM300 Plus to a PC.

1. Install the TagAccess on your PC.
2. Mount the RM300 Plus UHF RFID Reader Module onto the interface board.



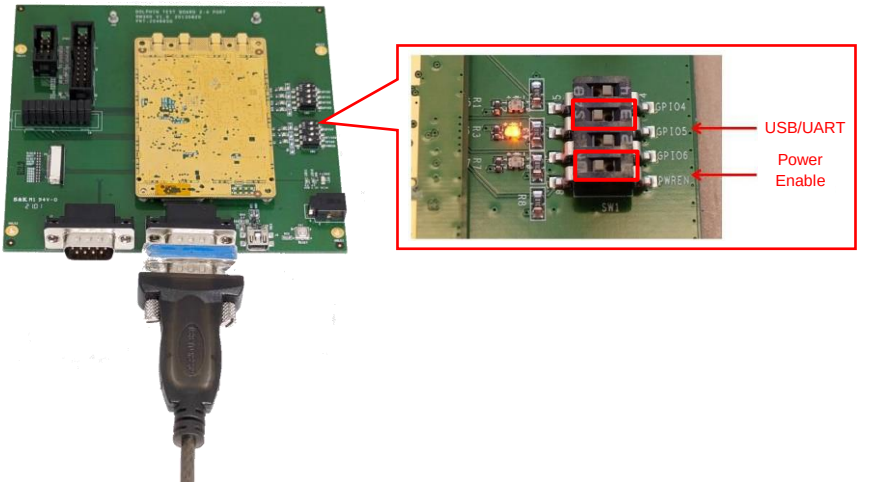
3. Set up the jumper. The jumper settings are defined below.



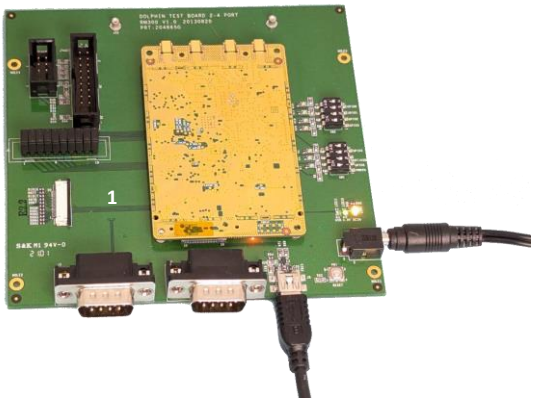
4. Connect the interface board to a PC using either a mini USB cable (default setting) or an RS232 cable, as described in **Options A and B**, respectively.

Options A: Using a miniUSB cable

Options B: Using a RS232 cable



5. Insert the power connector into the power inlet on the interface board, and then plug the power adapter into an electrical socket.



6. Insert the antenna connector into one of the four antenna ports of the RM300 Plus UHF RFID Reader Module. You can connect up to four antennas at the same time.