PHYCHIPS

RED JET

RAIN RFID Reader/Writer
For Printer Specification

V0.1.0 2022-02-17

Contents

Revision History

Version	Date	Page	Description
1.0.0	2022.02.17		Initial Release

1 Overview

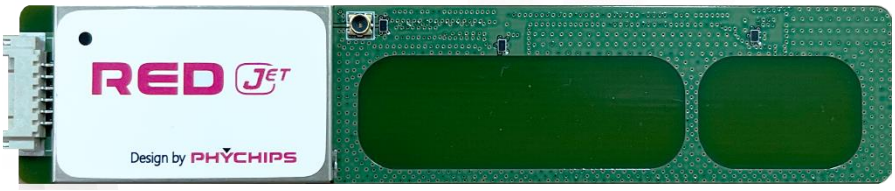


Figure 1 RED JET

RED JET is a UHF RFID Reader hybrid module which integrates high performance UHF RFID reader module. UHF RFID reader chipset uses PR9200 of PHYCHIPS which integrates 900MHz radio, baseband processor, industry standard enhanced Cortex-M0 MCU, memory (64K Flash & 16K SRAM) and many other features. This module is fully compliant with ISO18000-6C/EPC Global Gen II reader protocol and provides all functions of PR9200. It has superior performance, small form factor and advantages in time-to-market. The RED JET includes automatic Tx leakage cancellation to improve reader's performance and compensate sensitivity for some variation according to the surrounding environment. Also, it helps a developer adopt the proper antenna and realize the optimized RFID reader system more easily and quickly.

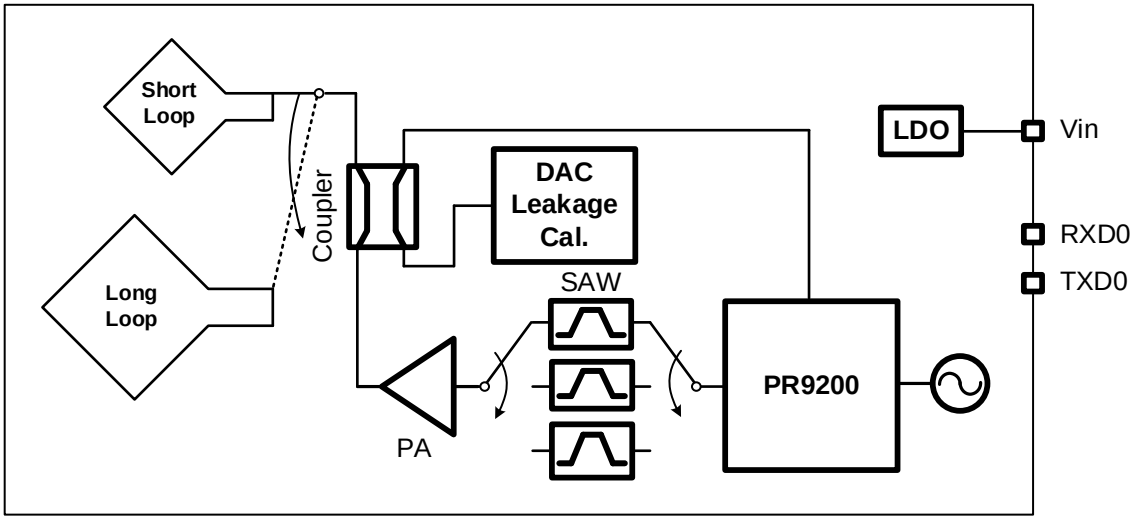


Figure 2 Block Diagram

2 Electrical Specification

2.1 Absolute Maximum Ratings

No.	Item	Unit	Test Condition	Specification			Remark
				min	Typ.	max	
1	Supply voltage: Vin	V	-	-	-	5.5	
3	Storage temperature	°C	-	-40		85	

2.2 Functional specification

No.	Item		Unit	Test Condition	Specification			Remark
					min	Typ.	max	
1	Frequency Range		MHz		860		960	
2	Tx Max. Power		dBm				25	
3	Tx Dynamic Range		dB			21		
3	Spurious		dBm		Meet to local regulation: Korea (KC) US (FCC 15C) Japan (ARIB STD-T107)			
4	DC Power		V			5.0		
5	Operating Temperature		°C		-20		70	
6	Operating Humidity		%		0		90	
7	Current	Power Down	uA	Active current is measured at 25dBm with 50ohm load			20	
		Idle	mA				20	
		Active				530		

2.3 Firmware Default Function

No.	Item	Status	Remark
1	Firmware Version NOTE1	RED_JET_v1.0.0 or later	
2	Region	-	
3	Frequency Hopping	ON	
4	Q	Dynamic Q	
5	Modulation Type	DSB-ASK	
6	Back Link Frequency(BLF)	250 kHz	

NOTE1. It can be changed according to the customer's request.

3 Description

RED JET supports a DC/signal connector interface to your HOST.

3.1 Pin diagram

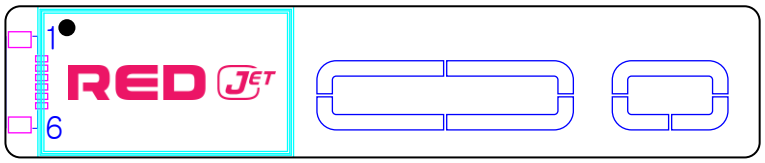


Figure 3 Pin diagram

3.2 Pin description

No.	Pin Name	Description
1	NC	No Connection
2	RS232_RX	Host RS232 RX port or UART0 Output (3.3V)
3	RS232_TX	Host RS232 TX port or UART0 input (3.3V)
4	NC	No Connection
5	GND	Ground
6	Vin	DC Power for Reader

3.3 Connector description

- ✓ Connector type : 1.25mm pitch wire to board wafer connector
- ✓ Model part Number : 12505WS-06 or 12505WR-06 [Yeonho]
- ✓ Housing for this wafer is 12505HS-06 [Yeonho]

3.4 Antenna

3.4.1 Antenna specification

No.	Item		Unit	Specification			Remark
				min	Typ.	max	
1	Size	Short loop	mm^2		15 x 9		
		Long loop			33.25 x 9		
2	Operation Frequency NOTE1		MHz	860		960	
3	Return Loss		dB		-15.0		
4	Antenna Gain NOTE1	Short loop	dBi		-15.0		
		Long loop			-22.0		
6	Polarization				Linear		
7	Impedance		Ω		50		

NOTE1. The operating frequency and antenna gain may be changed by environment.

3.4.2 Radiation Pattern

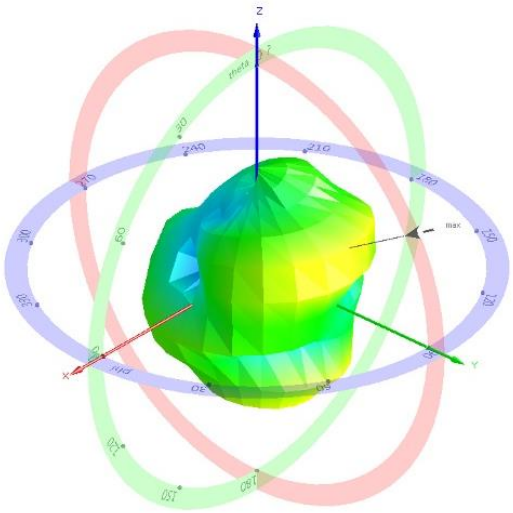


Figure 4 Short loop antenna

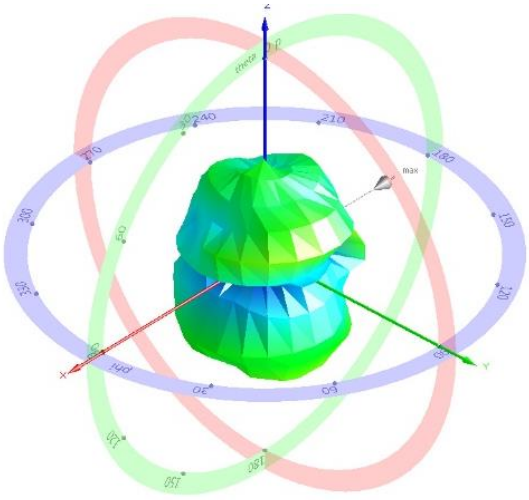


Figure 5 Long loop antenna

4 Application Circuit

4.1 Power Supply

DC power to operate RED JET is to supply for 3.6V LDO.

4.2 UART

The serial interface is assigned with two wires. RS232_TX is for receiving command from host and RS232_RX is for transmitting response to host. Pin connection is shown as below figure.

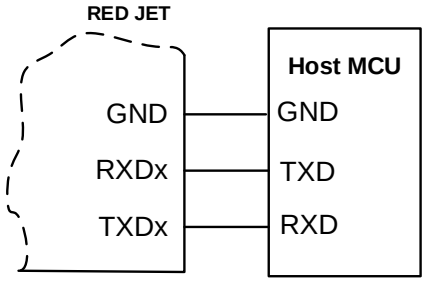


Figure 6 Host MCU connection

5 Utility Overview

RED JET Utility provides a view as shown below

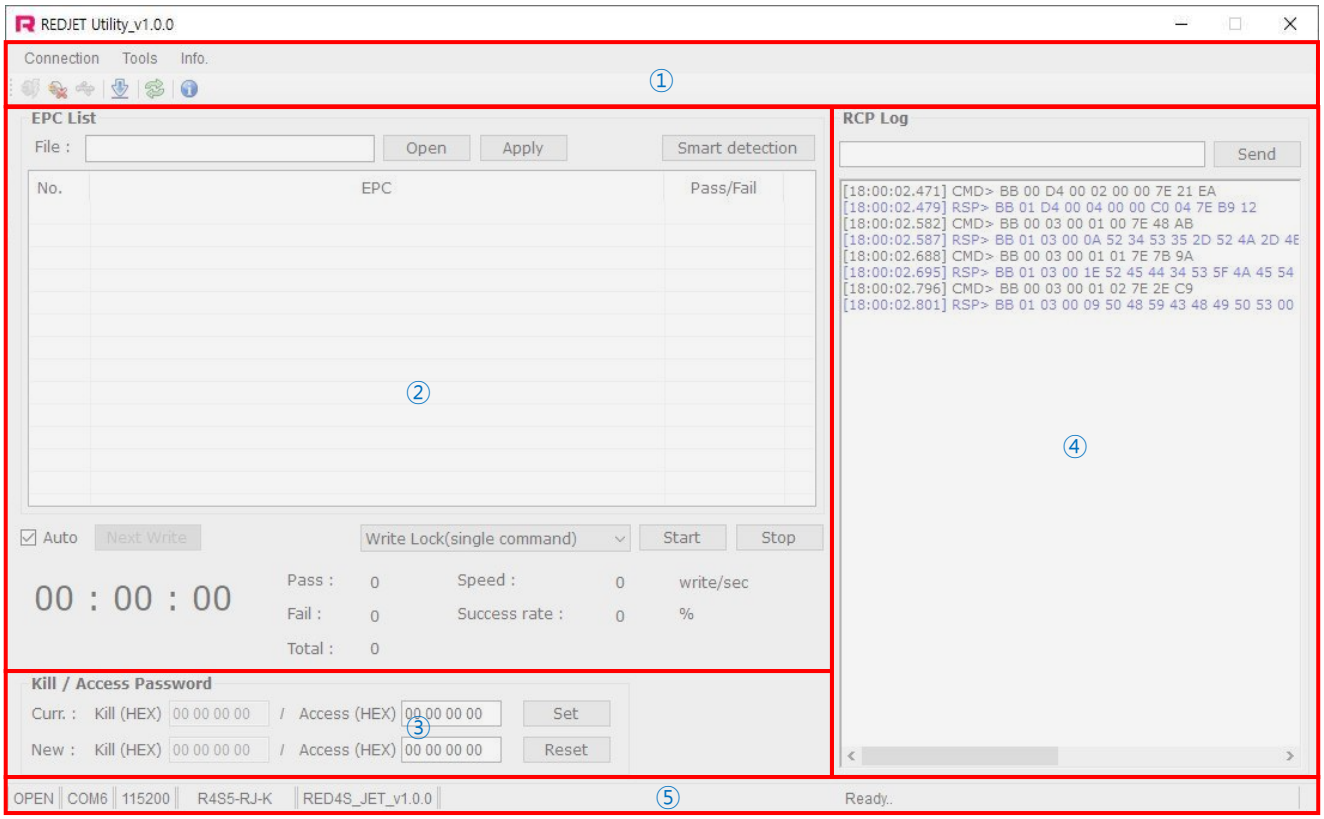


Figure 7 Window GUI RED JET Utility

① Menu bar

Connection: Contains submenu about Module Connection
Tools: Contains submenu about other tools
Info: Contains Information about the GUI

② Operation Window

File Open: Loads the EPC tag list
Smart Detection: Set the optimal antenna and output power
Write mode: Provides functions to auto/manual mode, write/read/lock tag
Operation status display: Operation time, Pass, Fail, Total, Speed, Success rate display

③ Password setting Window

Provides functions to access password setting and reset

④ RCP log Window

Provides functions RCP log display and RCP transmission (for information on RCP, refer to the RCP Manual)

⑤ Status Strip

The Status Strip indicates Comprehensive Information about the Module (Connection state, Part number, REDJET firmware version and REDJET operation status)

5.1 Start-up Guide

To operate REDJET with GUI, follow below step.

STEP1. Connecting REDJET

After the device is recognized, connect REDJET and RED_CTRL.
Plug mini-USB of RED_CTRL to PC using mini-USB cable and check whether POWER LED is ON

STEP2. Start REDJET utility

Open GUI to click “REDJET Utility.exe”

STEP3. Connect to module REDJET

If hardware connection is valid, REDJET utility connect module REDJET automatically.
If utility cannot connect hardware, please follow below step
Click “Connection->Connect” to connect to REDJET through USB-to-UART at main window
GUI will find the Device and synchronize parameters with REDJET module automatically. If the GUI cannot find the device automatically, Click “Connection->Port Setting” and select other Device. Default Baud rate is 115200 bit/s.

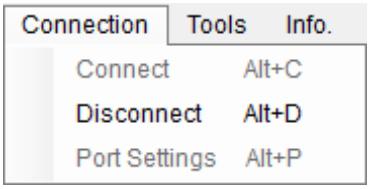


Figure 8 Connection

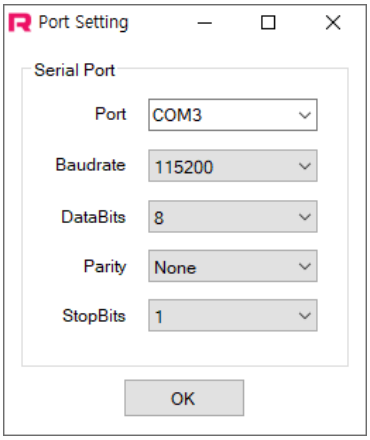


Figure 9 Port setting

If the Device connected successfully, status bar will display “OPEN” state and device number and so on.

Figure 10 Status bar

STEP4. Operate RFID reader

REDJET is ready to read tag. Send command to REDJET using GUI

5.2 Write to tag

5.2.1 Open Tag list directory

Open

Click "Open" button to bring up the EPC list.
(example file directory is “{install_dir}\TagList\Tag list_test.xls“)

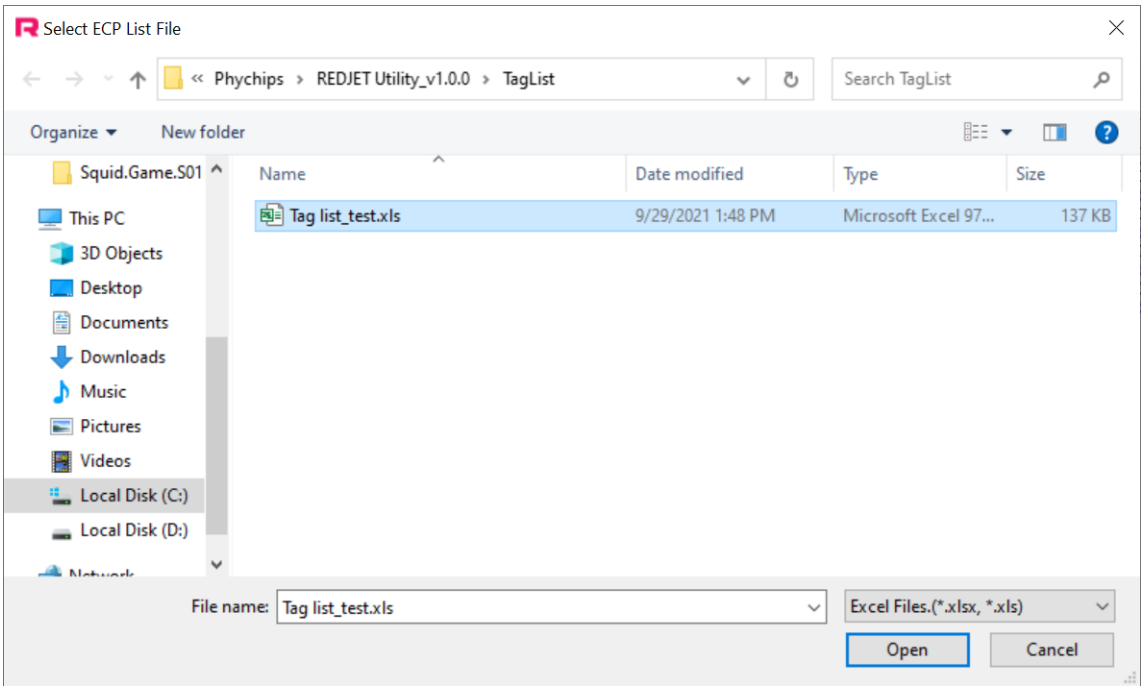


Figure 11 Tag list Directory

5.2.2 Tag read operation

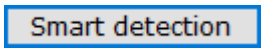
Apply

Click "Apply" button to generate the EPC list.

No.	EPC	Pass/Fail
1	AC40C3FB490C03DF6C8A0001	-
2	AC40C3FB490C03DF6C8A0002	-
3	AC40C3FB490C03DF6C8A0003	-
4	AC40C3FB490C03DF6C8A0004	-
5	AC40C3FB490C03DF6C8A0005	-
6	AC40C3FB490C03DF6C8A0006	-
7	AC40C3FB490C03DF6C8A0007	-
8	AC40C3FB490C03DF6C8A0008	-
9	AC40C3FB490C03DF6C8A0009	-
10	AC40C3FB490C03DF6C8A0010	-

Figure 12 Tag list

5.3 Smart detection



Click "Smart Detect" button to set the optimal antenna and power.

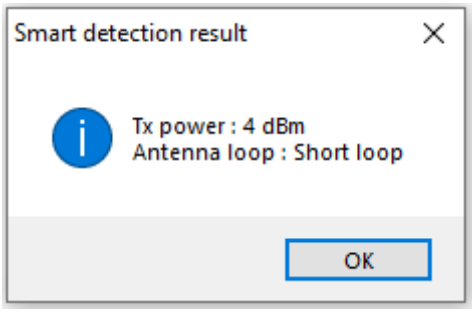


Figure 13 Smart detection result

Report after setting the optimal antenna and power.

6 Documents list

Location: /Documents/Datasheet

Name	Contents
PR9200_LDxxx	PR9200 (SOC) datasheet : Light version
RED JET_spec	RED JET specification

Location: /Documents/Manual

Name	Contents
REDJET_UTM	RED JET Utility manual
REDJET_RCP	RED JET protocol manual
RED_RCP	RED Reader protocol manual

Location: /Documents/ETC

Name	Contents
AZ-9640	Tag datasheet Higgs-3

[NOTE] these documents are subject to be changed according to PHYCHIPS' policy

7 Dimension

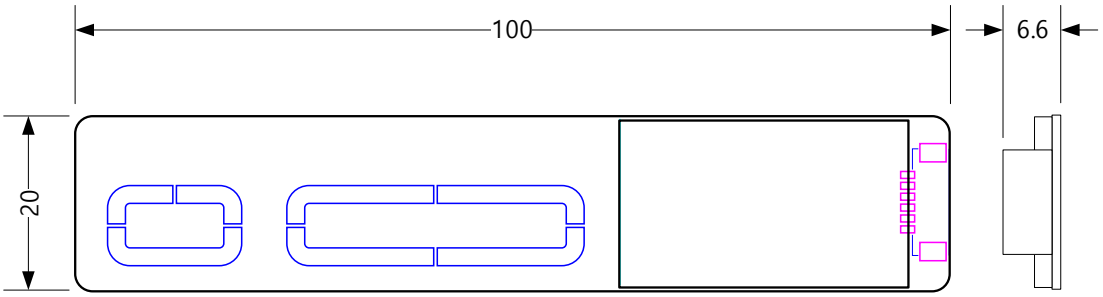


Figure 14 Dimension

8 Contact Information

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