

# RFID Reader Solutions



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## IoT

- is the ecosystem of technologies monitoring the status of physical objects, capturing meaningful data
- and communicating that information through IP networks to software applications.

## RFID

- is enabling technology for the IoT
- connects the Internet to the real world
- makes items smart and able to communicate with their environment
- is a framework for a wide range of applications.

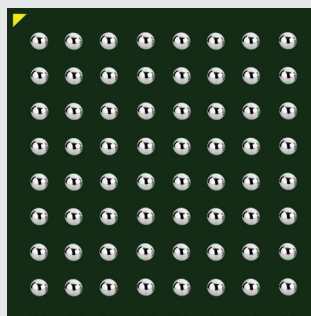
And we, PHYCHIPS, supply the key technology of IoT such as RAIN RFID Reader Chip, Module, Antenna.

## PHYCHIPS FACT SHEET

Foundation	Founded in 2002
CEO	Jinho Ko / Ph.D
Location	Daejeon, Korea
Business Area	RAIN RFID Reader Solutions
	RAIN RFID Reader Chip
Product Lineup	RAIN RFID Reader Module
	RAIN RFID Reader Antenna

## **PR9200**

### **RAIN RFID Reader Chip**



SoC solution for RAIN RFID reader.

Integrated UHF RF, baseband MODEM, ARM Cortex™-M0 Processor, memory[64kB FLASH & 16kB SRAM] etc.

### **Key Features**

- Internal high efficiency PA
- Power consumption: 170mA @ +20dBm
- 32bit low-power high performance ARM Cortex M0
- 64kB embedded flash memory
- 16kB on-chip SRAM

## Specifications

### Highly integrated RAIN RFID Reader SoC

Fully integrated SoC includes RF, MODEM, MCU, PA and Memory  
 Fully support ISO18000-6C & EPC global Gen2 protocol  
 ISO29173-1 RCP support  
 Power consumption : 170mA @ +20dBm  
 3.3V single supply voltage  
 64pin 6mm x 6mm FBGA package

### RF Transceiver

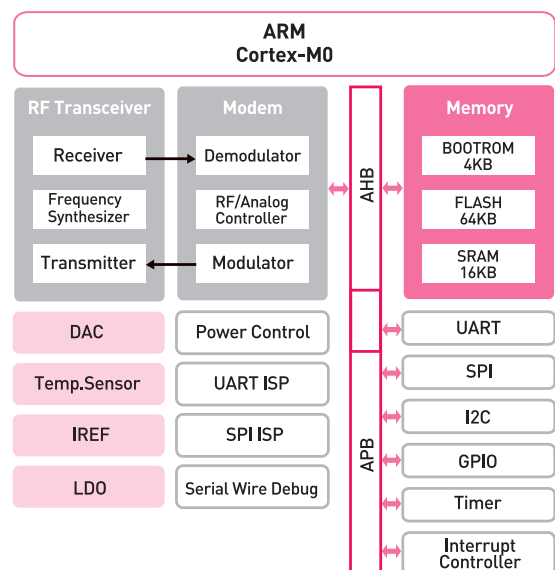
Frequency range : 840MHz ~ 960MHz  
 Direct conversion architecture  
 Highly linear down conversion mixer  
 Automatic gain control  
 DC offset cancellation  
 Tx polar structure without up-conversion mixer  
 Internal high efficiency PA

### Modem

Decoding : FM0, M2, M4, M8  
 Data rate : 40kHz, 80kHz, 160kHz, 320kHz, 640kHz  
 Tx waveform generation using Lookup table

### MCU

32bit low-power high performance ARM Cortex-M0  
 64kB embedded flash memory  
 16kB on-chip SRAM  
 16 GPIOs  
 Two UART  
 I2C master/slave  
 SPI master/slave  
 Two timers  
 In-System Programming



## **RED series**

### **RFID Reader Module**



Superior performance, small form factor and advantages in time-to-market. Applicable for high performance and small-sized mobile RFID reader by its small form factor.

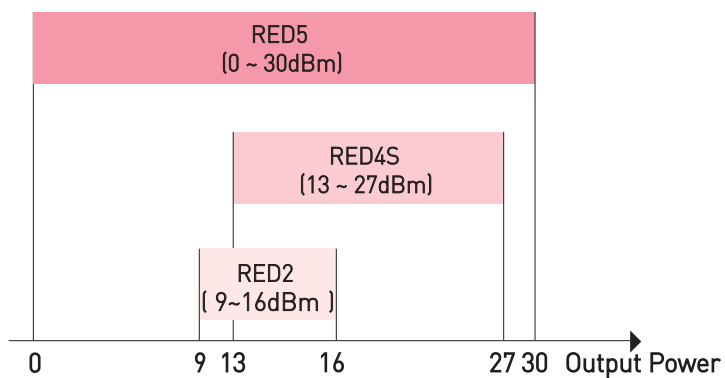
### **Key Features**

- Real-time automatic Tx leakage cancellation offers optimal matching & sensitivity
- Superior multi-tag reading
- No antenna matching required
- Built-in multi protocol S/W
- Free API
- User friendly developer kit
- Small & Cost-Effective
- EPC Gen2 V2
- Secure tag / Sensor tag
- IoT application ready
- Support global RFID band

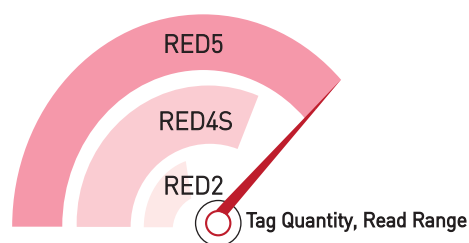
## Specifications

Item	RED2	RED4S	RED5
Reader Chipset	PR9200		
Air Protocol	ISO 18000-6C / EPC Gen2 V2		
Channel Share	Frequency Hopping or LBT (Listen-Before-Talk)		
Modulation	DSB-ASK		
Interface	UART[default] SPI	UART[default]	UART[default] I2C
Ant. Port	1	1	1
Supply Voltage	3.3V [DC±5%]	3.3V [DC±5%]	3.6V [DC±5%]
Output Power Range	9~16dBm	13~27dBm (Japan : 13~23dBm)	0~30dBm
Power Consumption	180mA @ 16dBm CW 20mA @ idle mode	550mA @ 27dBm CW 20mA @ idle mode	1.3A @ 30dBm CW 20mA @ idle mode
Size [W x L x H]	14.0 x 13.0 x 2.5 mm	24.0 x 24.0 x 3.0 mm	24.0 x 24.0 x 3.0 mm

### Products Output Power Range

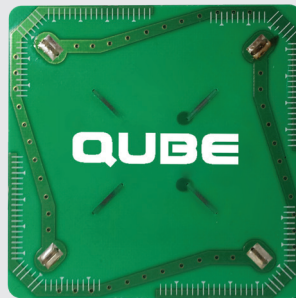
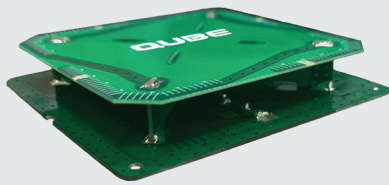


### Products Performance



## QUBE series

### RAIN RFID Reader Antenna



## Key Features

- Square quadrifilar spiral technology
- Wide beamwidth, wide bandwidth
- Low weight, compact size
- Low return loss
- Extremely low frequency shift by platform & user environment
- RoHS compliant

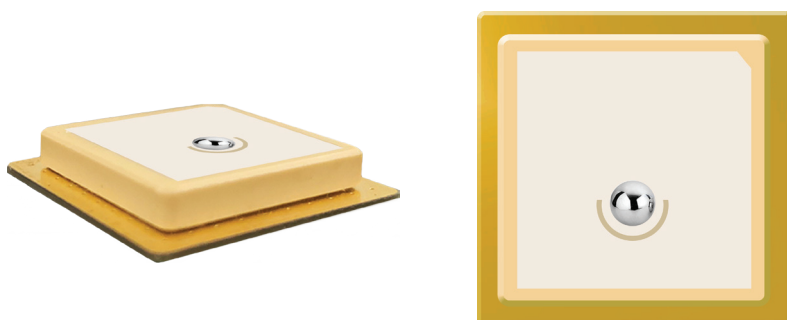
## Standard Products

Product	Size (mm) (W x L x H)	Gain (dBic)	BW (MHz) (-3dB@Peak Gain)	Axial Ratio	Pol.	Weight (g)	Center Freq. (MHz)
QUBE 4010	40 x 40 x 10	0	16	1.3	RHCP	6.5	866, 921
QUBE 6010	60 x 60 x 10	2.5	30	1.3	RHCP	13	866, 921
			24				
QUBE 6015	60 x 60 x 15	3.5	35	1.3	RHCP	14	866, 921
		2.5	30				



# Ceramic Antenna

## RAIN RFID Reader Antenna



### Key Features

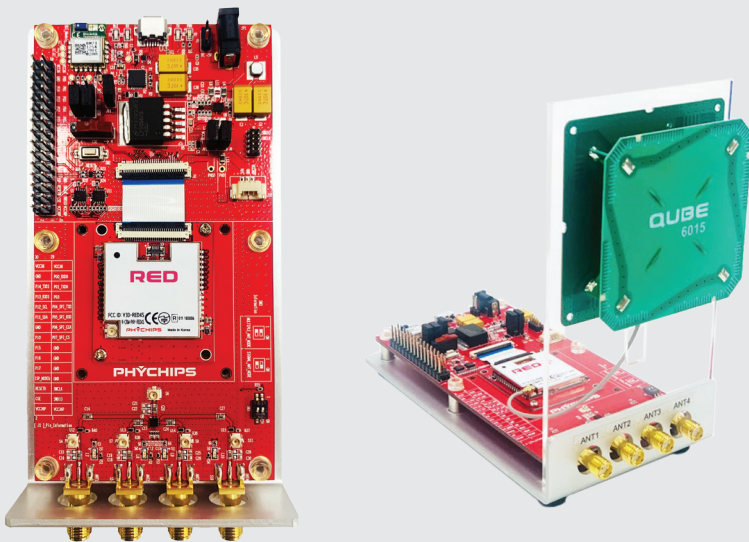
- Flat patch antenna
- Rectangular micro-strip antenna
- Small form factor
- Low return loss
- Uniform dielectric constant
- Offset single-point feeding method
- Operating temperature: -40 ~ 80°C

### Standard Products

Product	Size (mm) (W x L x H)	Gain (dBic)	BW (MHz) [-3dB@Peak Gain]	Axial Ratio	Pol.	Weight (g)	Center Freq. [MHz]
Ceramic 2504	25 x 25 x 04	0	3	< 1.5	RHCP	4	866,921

## RED-DK

### RAIN RFID Developer Kit

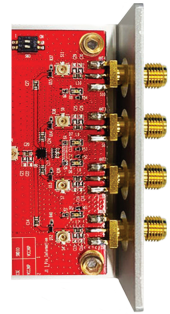


- Upgraded Developer Kit for PHYCHIPS RED series.
- Support 4-antenna port.
- Compatible with RED series of PHYCHIPS.
- USB interface(micro-5pin).
- Included the latest GUI(RED Utility 3.0).

## Key Features

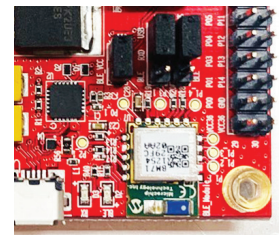
### Multi antenna port

Multi-antenna performance can be confirmed in the evaluation stage using DK  
Support both single antenna mode and multi antenna mode  
Either SMA port or uFL port is available by the configuration of antenna



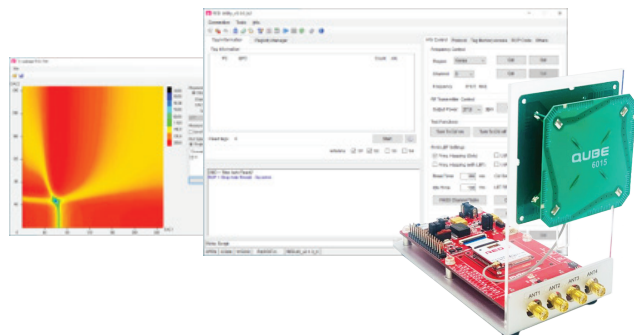
### Included BLE module

Easy to configure the application using BLE as well as USB  
Android API for BLE operation is offered basically



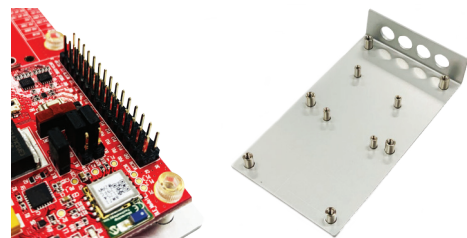
### RED Utility 3.0

Available to all RED series  
Support multi antenna  
Support Virtual COM port

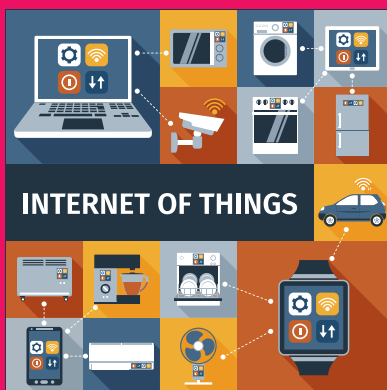


### Others

2.54 pitch GPIO for easy connection to external boards  
Aluminum case  
Improved heat dissipation



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