

**PRM92K20CE
UHF RFID Module**

User's Manual

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1 Revision History

Version	Date	Description
ADK01	2012.10. 09	Initial Release

2 Introduction

The PRM92x20CE DK consists of PRM92x20CE and PRM9x10C_CTRL board. The PRM9x10C_CTRL board supports DC power supply and PC interface.

PRM92x20CE is UHF RFID reader module using PR9200 and include TCXO.

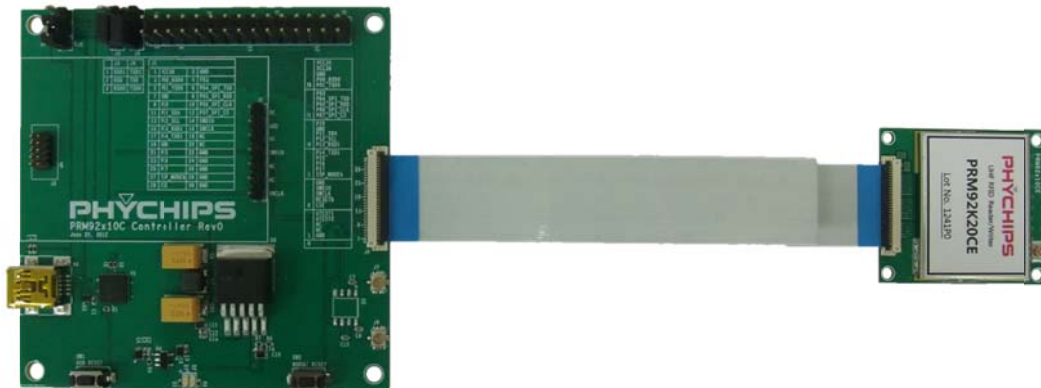


Figure 1 Connection to PRM92x10C_CTRL & PRM92x20CE

2.1 Package configuration

PRM92x20CE DK includes

- PRM92x20CE : RF board
- PRM9x10C_CTRL : PC interface board
- AQUAxxxS_6010 Antenna
- Tag Samples (UPM Short Dipole)
- Mini-USB cable
- FFC cable
- Design Kit Document CD

2.2 Features

PRM92x20CE is reference designed module of PR9200 and low cost components.

PRM9x10C_CTRL is control board that connects Reader Module to PC, supporting USB-to-UART interface and DC power management for reader module.

PRM92x20CE

- EPC Gen2 support
- RCP protocol with CRC
- FCC,EN certified
- PR9200, TCXO, Coupler, Antenna port
- Module size : 30mm x 35mm
- U.FL connector for Antenna port (50ohm)
- 30pin FFC connector (PR9200 full IO including I2C, GPIO)

PRM92x10C_CTRL

- Board size: 70mm x 70mm
- DC power supply to USB
- UART based PC interface
- Mini USB connector
- FFC connector for DC supplement & data interface
- 2.54mm pitch application connector (ALL GPIO)
- SWD support

Firmware & GUI

- RCP protocol with CRC
- Read, Write, access, lock, kill operation
- Bi-directional transfer to host microcontroller
- Bi-directional transfer via I2C interface
- Modular and easy to customize to final use case
- Easy to access to GPIOs

3 DK description

3.1 PRM92x10C_CTRL

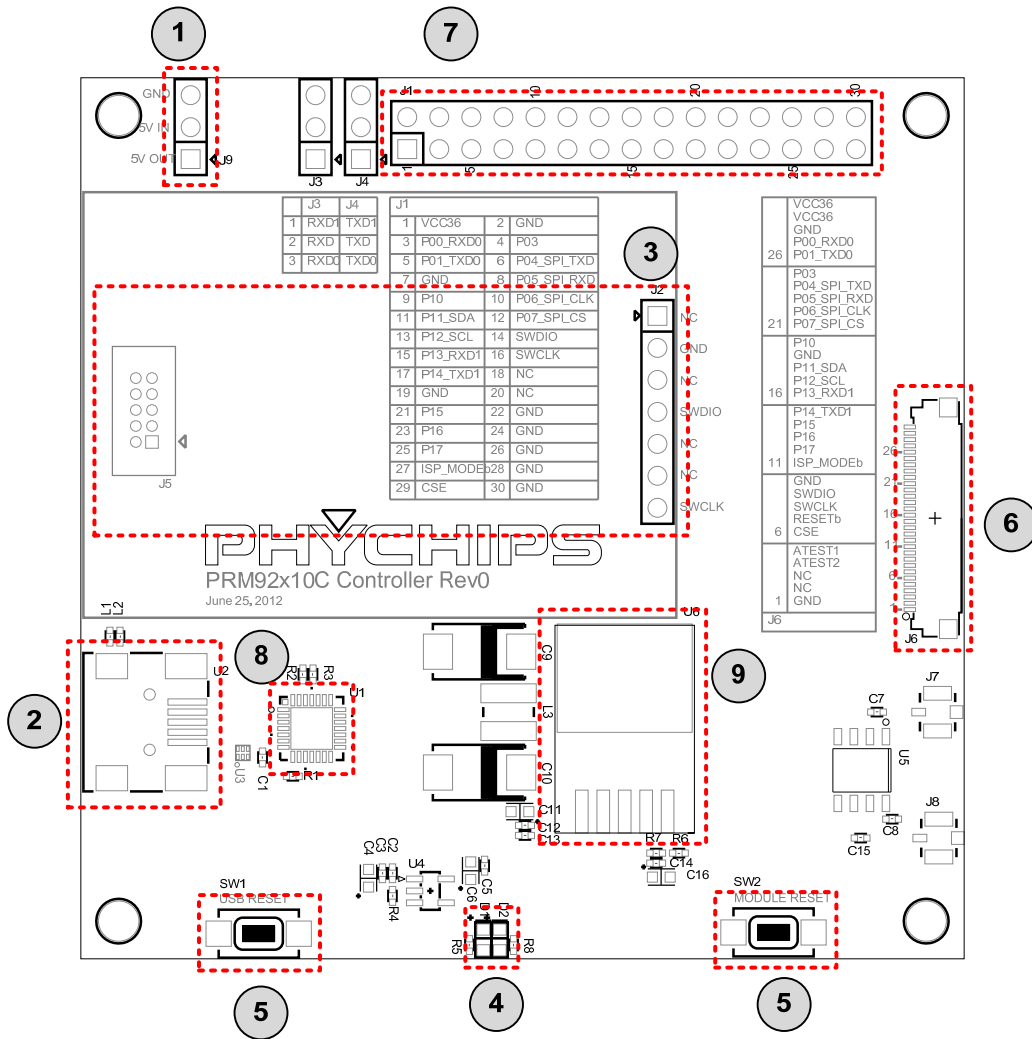
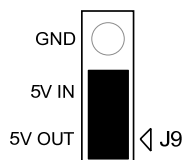


Figure 2

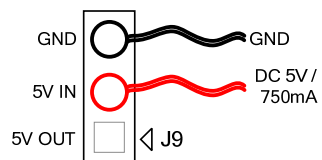
3.1.1 Power connector ①

This is 3-pin connector for power supply to internal LDO of this module (⑨)

If this connector is connected by jumper, PRM92x20CE is powered by USB 5V. Also you can connect external power through this connector pin.



(A) When USB power is used (Default)



(B) When External power is used

Figure 3 Power connector

3.1.2 Mini USB port ②

Connect mini-USB port to PC using mini-USB cable enclosed in the package. PRM92x20CE can connect PC through UART and be supplied DC power.

3.1.3 SWD port ③

In order to debug or firmware download, this SWD port is connected to H/W debugger such as ULINK2 and X-LINK



Figure 4 SWD port

[Notice] SWD port power (3.3V) is provided by ULINK2 or X-LINK adapter. Please check jumper setting of adapter (refer to ULINK2 user's guide, http://www.keil.com/support/man/docs/ulink2/ulink2_hw_jumpers.htm)

3.1.4 LED part ④

PRM9x10C_CTRL has two LED. One indicate POWER, the other indicate ACTIVE. When DC power is normally supplied, "POWER" LED is ON. When RFID reader is ready, "ACTIVE" LED is ON. "ACTIVE" LED is connected to GPIO(P07) of PRM92x20CE and change that function in Firmware

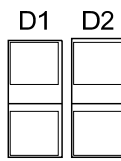
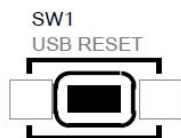


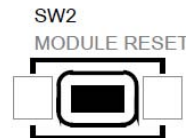
Figure 5 PRM92x20CE_CTRL LED

3.1.5 RESETb button ⑤

This button is used when user want to reset PRM92x20CE and CP2102.



(C) USB Reset



(D) Module Reset

Figure 6 Reset button

3.1.6 FFC connector ⑥

30pin FFC connector has used for interconnection with PRM92x20CE

3.1.7 Application connector ⑦

User can connect GPIO, SPI, I2C through application connector and use PRM92x20CE MCU all IO function. This connector has 2.54mm pitch. Each pin location help user connect IO in many way.

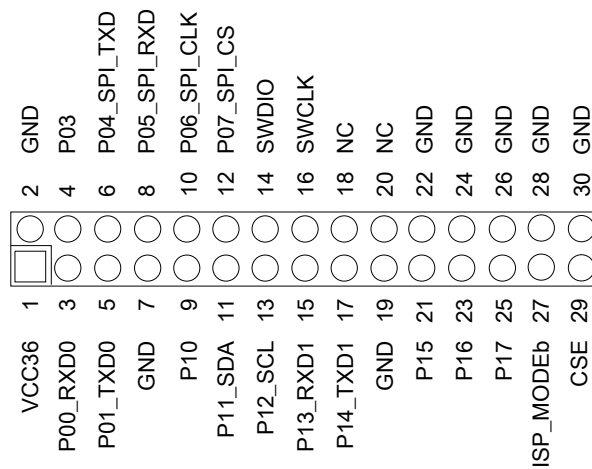


Figure 7 Application connector

3.1.8 USB-to-UART ⑧

PRM92x10C_CTRL use CP2102 (Silicon Labs) as USB-to-UART bridge. In order to connect PRM92x20CE to PC, user must install driver at first time.

3.1.9 LDO ⑨

This LDO make 3.6V power supply voltage for PR9200 and TCXO.

4 Specifications

Parameter	Symbol	Min	Typ	Max	Unit
PRM92x10C_CTRL supply voltage			5		V
PRM92x10C_CTRL output voltage	VDD_36		3.6		V
PRM92x10C Current consumption in active mode	I_{OP}			550	mA
TX output maximum power ¹	P_{OUT}		25		dBm
Frequency range	f_C	917.1		926.9	MHz

1. Current board max power is about 25dBm.

5 Address Information

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[Appendix1] Channel Number Table

1. US band

Channel	Channel Frequency	Channel	Channel Frequency
1	917.10 MHz	26	922.10 MHz
2	917.30 MHz	27	922.30 MHz
3	917.50 MHz	28	922.50 MHz
4	917.70 MHz	29	922.70 MHz
5	917.90 MHz	30	922.90 MHz
6	918.10 MHz	31	923.10 MHz
7	918.30 MHz	32	923.30 MHz
8	918.50 MHz	33	923.50 MHz
9	918.70 MHz	34	923.70 MHz
10	918.90 MHz	35	923.90 MHz
11	919.10 MHz	36	924.10 MHz
12	919.30 MHz	37	924.30 MHz
13	919.50 MHz	38	924.50 MHz
14	919.70 MHz	39	924.70 MHz
15	919.90 MHz	40	924.90 MHz
16	920.10 MHz	41	925.10 MHz
17	920.30 MHz	42	925.30 MHz
18	920.50 MHz	43	925.50 MHz
19	920.70 MHz	44	925.70 MHz
20	920.90 MHz	45	925.90 MHz
21	921.10 MHz	46	926.10 MHz
22	921.30 MHz	47	926.30 MHz
23	921.50 MHz	48	926.50 MHz
24	921.70 MHz	49	926.70 MHz
25	921.90 MHz	50	926.90 MHz

[Appendix2] FCC Certification Requirements

1. Caution

Any changed or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate this equipment.

2. OEM installation guide

- I. OEM integrators must be instructed to ensure that the end-user has no manual instructions to remove or install the module.
- II. This module is to be installed only in mobile or fixed devices. ▪ Mobile device: The device is to be generally used in such a way that a separation distance of at least 20cm is normally maintained between the transmitter's radiating structures and the body of the user or nearby persons. ▪ Fixed devices: The device is physically secured at one location and is not able to be easily moved to another location.
- III. To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational.
- IV. To satisfy FCC exterior labeling requirements, the following text must be placed on exterior of the end product.
- V. An additional permanent label referring to the enclosed module: "Contains Transmitter Module FCC ID: XYZMODEL1" or "Contains FCC ID: XYZMODEL1" must be used. The host OEM user manual must also contain clear instructions on how end users can find and/or access the module and the FCC ID.

3. FCC RF exposure requirements

The antenna used with this module must be installed to provide a separation distance of at least 20cm from all persons, and must not transmit simultaneously with any other antenna or transmitter except in accordance with FCC multi-transmitter product procedures.

4. FCC authorization for this module

If this module is installed in portable devices or the different antenna configurations are used, the FCC authorizations are no longer considered valid and FCCID for module cannot be used on the final product. And the OEM installer will be responsible for re-evaluating the final product including this module and obtaining separate FCC authorization.

5. Information for importation of radio frequency devices in to the United States

To ensure compliance with all non-transmitter functions the host manufacturer is responsible for ensuring compliance with the module(s) installed and fully operational. For example, if a host was previously authorized as an unintentional radiator under the Declaration of Conformity procedure without a transmitter certified module and a module is added, the host manufacturer is responsible for ensuring that after the module is installed and operational the host continues to be compliant with the Part 15B unintentional radiator requirements. Please see CFR47 Part 2 Subpart J Equipment Authorization Procedures, KDB784748 D01 v07, and KDB 997198.

6. User Information

This device complies with Part 15 of the FCC's Rule. Operation is subject to the following conditions;

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

This equipment 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 to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to 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.