

RF-UNO-CORE (PA)

ARDUINO UNO CORE MODULE WITH RF UART

Features

- ATmega328p core module
- Onboard 3.3V LDO
- Standard USB2Serial interface for uploading and debugging
- Onboard 2.4GHz RF Module
- **RF-UNO-CORE** : 0dB RF Module , 20m outdoor distance
- **RF-UNO-CORE-PA**: 20dBm RF Module , 200m outdoor distance
- Remote upload sketch via the native Arduino IDE
- 100% Arduino development environment
- Vertical double row connector, minimum size on the main board

Parameters

MCU: ATmega328p 32K Flash 2K SRAM 10bit ADC

RF: LC-2000-P2P or LC-2000PA-P2P

RF Max Baudrate: 256000bps

Working Voltage : 3.3V with onboard LDO

Input Voltage: DC 4.5 to 12V

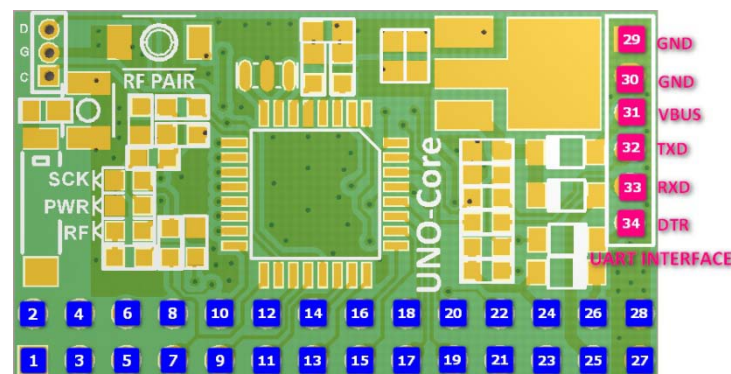
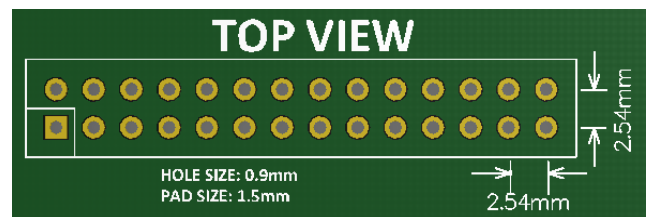
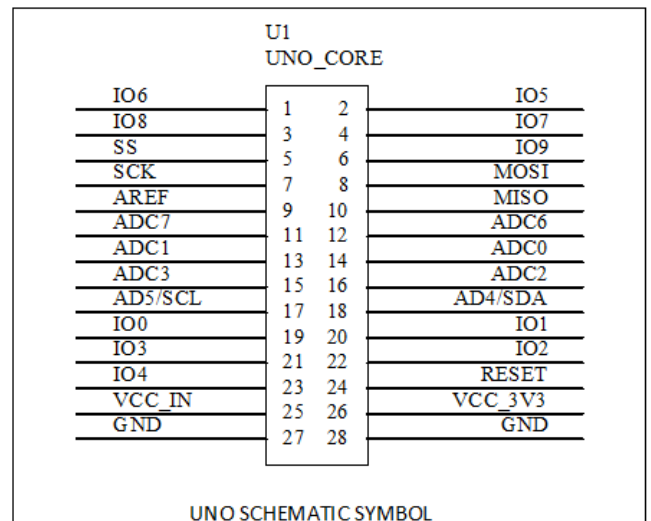
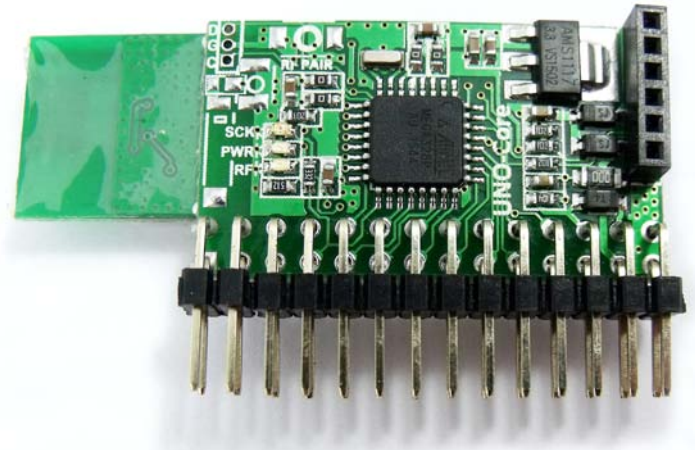
3.3V Output Current : 300mA MAX

PCBA Size: 20 x 35mm

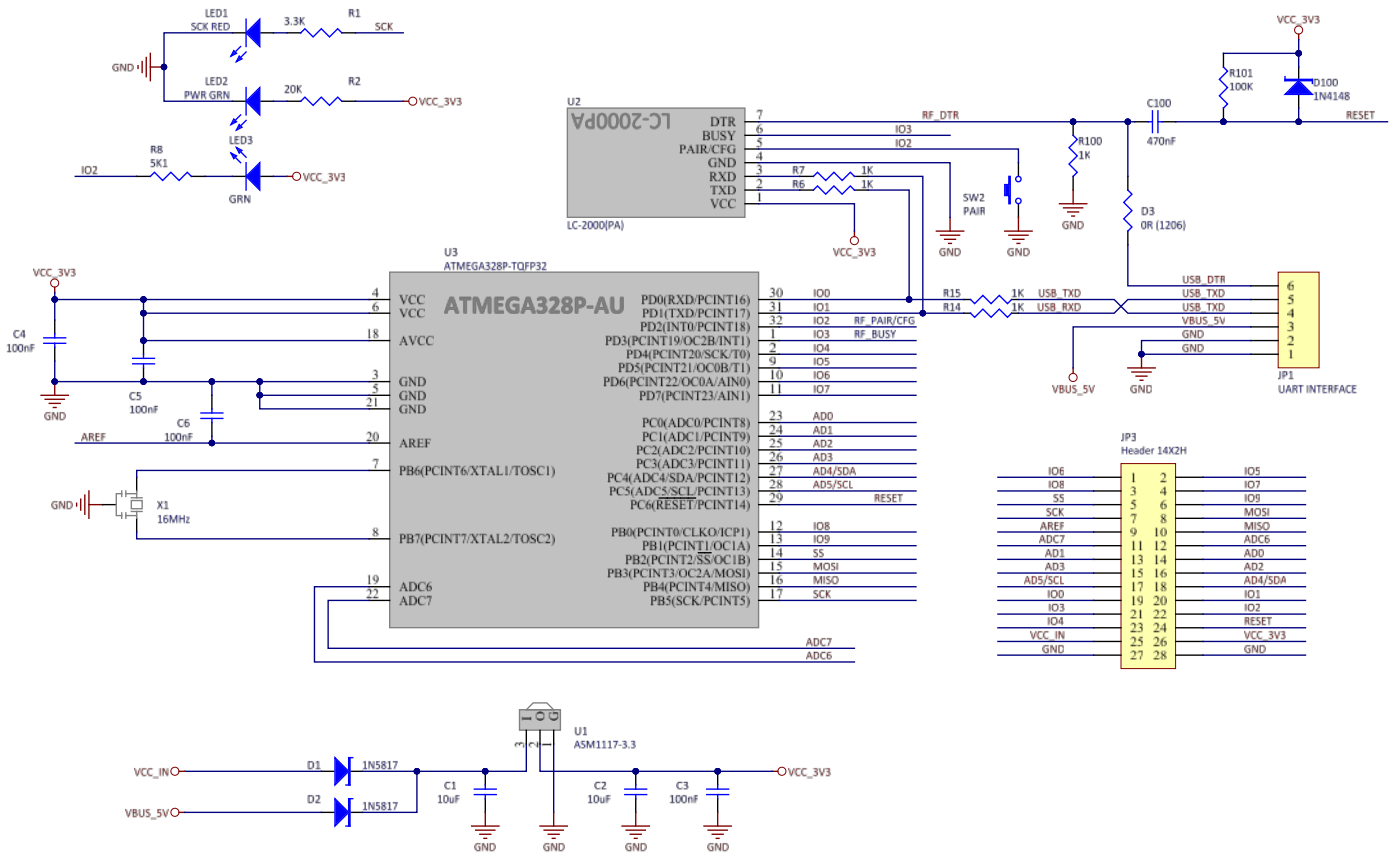
Bootloader preprogramming : Arduino UNO R3

Pin Descriptions

Pin No.	Symbol	I/O	MCU Function	Arduino Function	RF Pin
1	IO6	DIO	PD6/AIN0	#D6	
2	IO5	DIO	PD5/OC0B/T1	#D5	
3	IO8	DIO	PB0/CLKO/ICP1	D8	
4	IO7	DIO	PD7/AIN1	D7	
5	SS	DIO	PB2/SS/OC1B	#SS/D10	
6	IO9	DIO	PB1/OC1A	#D9	
7	SCK	DIO	PB5/SCK	SCK/D13	
8	MOSI	DIO	PB3/OC2A/MOSI	#MOSI/D11	
9	AREF	AI	AREF	AREF	
10	MISO	IO	PB4/MISO	MISO/D12	
11	ADC7	DIO/AI	ADC7	A7	
12	ADC6	DIO/AI	ADC6	A6	
13	ADC1	DIO/AI	PC1/ADC1	A1/D15	
14	ADC0	DIO/AI	PC0/ADC0	A0/D14	
15	ADC3	DIO/AI	PC3/ADC3	A3/D16	
16	ADC2	DIO/AI	PC2/ADC2	A2/D16	
17	ADC5	DIO/AI	PC5/ADC5/SCL	A5/D18	
18	ADC4	DIO/AI	PC4/ADC4/SCL	A4/D17	
19	IO0	DIO	PD0/RXD	D0/RX	RF-TXD
20	IO1	DIO	PD1/TXD	D1/TX	RF-RXD
21	IO3	DIO	PD3/OC2B/INT1	#D3	RF-BUSY
22	IO2	DIO	PD2/INT0	D2	RF-PAIR/CFG
23	IO4	DIO	PD4/SCK/TO	D4	
24	RESET	DI	PC6/RESET	RESET	
25	VCC IN	P	DC 4.5 to 12V IN		
26	VCC 3V3	P	3.3V OUT, need to Limit current within 300mA		
27,28	GND	P	GND		
29 to 34	UART	---	JP1 UART INTERFACE, Connected to USB2Serial Light For Uploading sketch		



System Block Diagram



Notes:

1, In the application, here have two way to provide power to RF-UNO-CORE(PA):

- (1), Connected 4.5 to 12V to JP3-Pin25 (VCC_IN) , the onboard LDO will regulate the power to 3.3V , and can be provide max 300mA via JP3-Pin26 (VCC_3V3) to periphery device, Please if the LDO become heat , user have to reduce the 3.3V periphery load , otherwise it may damaged the module.
- (2), Connected a 3.3V to JP3-Pin26 (VCC_3V3) , and left JP3-Pin25 (VCC_IN) floating.

2, In the application, here have two way to upload sketch to RF-UNO-CORE(PA):

- (1), Connected a USB to UART (UC-2102) to JP1, and upload sketch via Arduino IDE.
- (2), Connected a LC-2000(PA)-P2P Master to PC , and upload sketch by remote.
- (3), Since the JP1 and LC-2000(PA)-P2P module are share the TXD and RXD pin, when

Since the JP1 and LC-2000(PA)-P2P share the MCU UART pin (D0/D1) and the upload sketch need to using the UART , so here is some limit for upload sketch:

- 1, During remote uploading operation, the JP1 can not connected to the USB to Serial cable, otherwise the download maybe failed.
- 2, During the RF is connected (the LED on the RF Module is OFF) , it can not upload sketch via JP1, if you need to upload sketch via JP1, please disconnected RF connection (turn off the Master side of LC-2000), and then upload sketch via JP1 , after uploaded sketch, then repowered the Master side of LC-2000 , they will link again automatic.

About Digital IO

The LC-2000(PA)-P2P are connected to MCU via below IOs:

MCU **D0** RXD <-> TXD LC-2000_Pin2

MCU **D1** TXD <-> RXD LC-2000_Pin3

MCU **D2** <-> RF_PAIR/CFG LC-2000_Pin5

MCU **D3** <-> RF_BUSY LC-2000_Pin6

In the application , the D2/D3 only can used for LC-2000, user can be operation PAIR/CFG function by D2 and read D3 status to get RF BUSY status. The Arduino reference code as below:

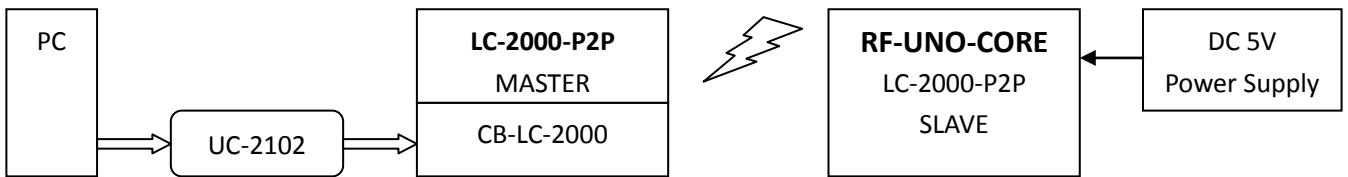
```
1
2#define RF_PAIR 2
3#define RF_BUSY 3
4
5void setup() {
6  // put your setup code here, to run once:
7  pinMode( RF_PAIR, OUTPUT );
8  digitalWrite( RF_PAIR, HIGH );
9  pinMode( RF_BUSY, INPUT );
10
11  Serial.begin(115200);
12}
13
14void loop() {
15  // put your main code here, to run repeatedly:
16  Serial.println( "Hello Arduino!" );
17  delay(100);
18}
```

Step by Step for remote upload sketch

Components list:

- (1) RF-UNO-CORE * 1
- (2) LC-2000-P2P Master * 1
- (3) CB-LC-2000 * 1
- (4) 5V Power for RF-UNO-CORE

Step1: Connection LC-2000-P2P Master to the PC, power 5V to RF-UNO-CORE



Make sure the RF-UNO-CORE and LC-2000-P2P Master is paired, after powered the LC-2000 LED should be off, if not paired the LED will be light.

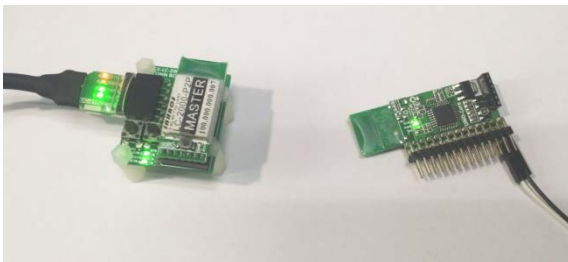
The CB-LC-2000 have two buttons , one is DTR and one is PAIR , press DTR pin to reset RF-UNO-CORE , after press the DTR pin , you should see the SCK LED on RF-UNO-CORE should be fast blink that means the board just reset.

If the RF-UNO-CORE and LC-2000-P2P Master did not paired , long press the PAIR button on both side and the LED on the mould will be blink until paired.

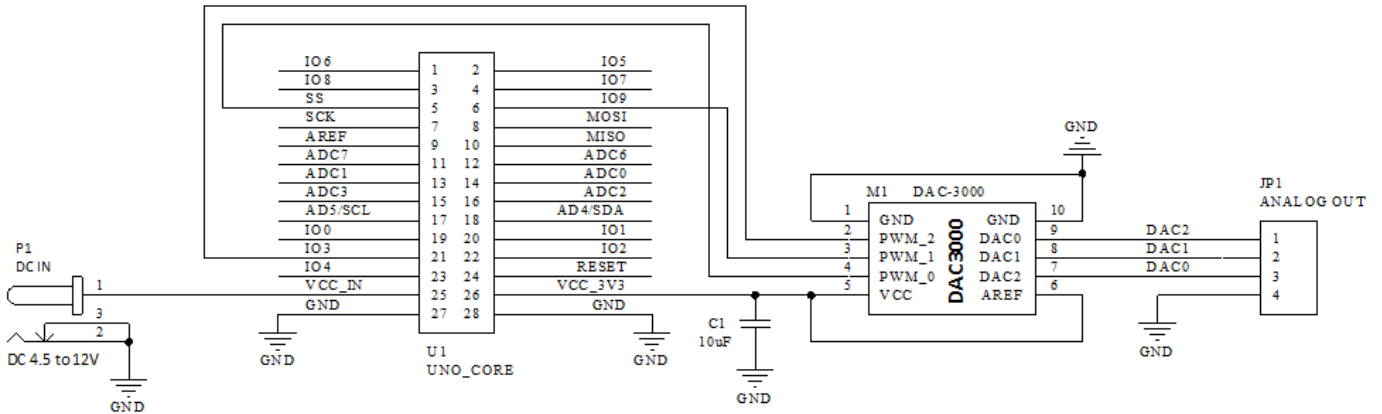
Step2: Open Arduino IDE , select Board: Arduino/Genuino Uno , and the port number for UC-2102.

Step3: Write code, press "Upload" button.

Step4: Done Uploading.



Application Schematic



This schematic is demonstrated how to using UNO Core create 3-ch analog voltage , here we need a PWM to DAC module DAC-3000 , UNO Core use AnalogWrite function to create 3 ch PWM signal and DAC-3000 will converter the PWM to analog output , the output is: $V_{out} = (1-PWM\%) * V_{ref}$. in here the DAC output range is 0 to 3.3V.

The Pin24 (VCC_3V3) connected onboard LDO's output, it will share 3.3V with the module circuit , so the VCC_3V3 Load current have to limited within 300mA , otherwise it will lead the 3.3V unstable , or damaged the module.

The UNO Core have a onboard RF module design(LC-2000) , the LC-2000 is a 2.4GHz RF UART module , it can be make UNO Core communication via 2.4GHz RF connection, but not all version will be install this module, Please notice the description, we have module number as below:

- UNO Core** : without RF Module
- RF UNO Core** : with RF Module

Upload sketch and communication

RF UNO Core can be uploading sketch and communication via 2.4GHz RF connection , user need a USB Dongle on PC side and we call it LC-2000U , we will release this product in Jan.2016.

Both **RF UNO Core** and **UNO Core** have a onboard UART connector , it's a 6-Pin 2.0mm Female connector, user can be use stand USB2Serial Light cable to upload and communication with a 2.5mm to 2.0mm convertor. We also provide **UC-2102** kit for this usage.

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