



Relevant Device

This application note applies to the following device:

[BUONO UNO R3](#), [Mega2560](#), [LC-1000R](#), [LC-1000RU](#), [BATT & RF UART Shield](#)

1. The purpose of the experiment

This application note is in order to introduce the wireless temperature acquisition system which is based on the BATT & RF UART shields, the system included one Arduino UNO R3 board , one LC_1000R wireless module, one 900mAh rechargeable battery, and one LC-1000RU transparent wireless UART module. The main content of this article is to present the temperature data acquisition and wireless transmission. The measured temperature range is 0~150°C.

LC-1000R Datasheet: <http://www.inhaos.com/uploadfile/otherpic/UM-LC-1000R-V20-EN.pdf>

LC-1000RU Datasheet: <http://www.inhaos.com/uploadfile/otherpic/UM-LC-1000RU-V10-EN.pdf>

More about BATT & RF UART Shield, please visit: www.inhaos.com

2. Experiment platform

- Hardware platform

One computer, one Arduino UNO R3 board, one LC_1000R wireless module, one LC-1000RU transparent wireless UART module, USB data cable

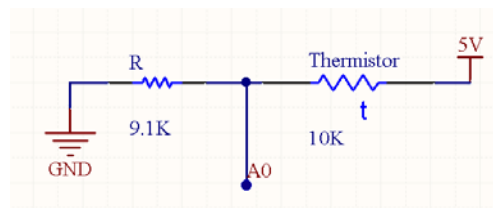
- Software platform

Arduino-1.5.4, Arduino drive for Windows

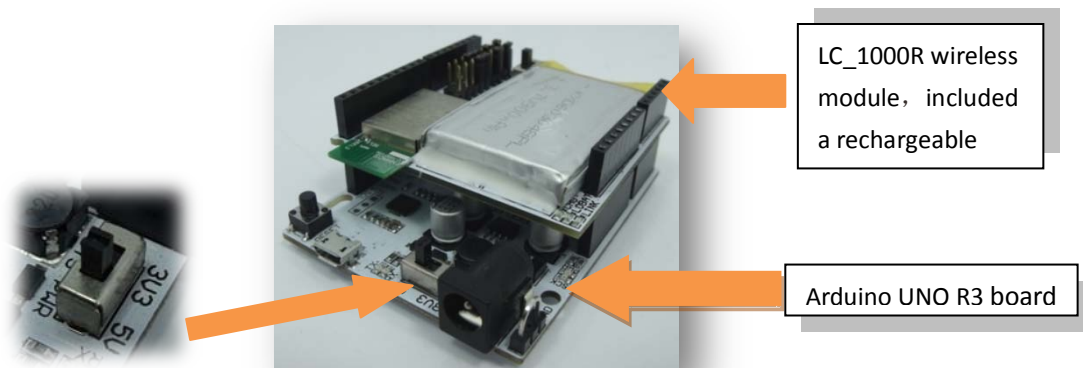
3. Experiment process

1) The LC_1000R wireless module should be directed put on Arduino UNO, and then we can use DuPont cable to connect a NTC sensor between GND and A0 pin, a 9.1K between 5V voltage pin and analog input pin. If you want to achieve Six-way temperature data acquisition, you can set up the A1 to A5 same as A0.

Connection circuit diagram as below:



We should pay attention to the voltage and keep the voltage switch is on the side of 5V.



2) Open the arduino-1.5.4 software, and writing a program



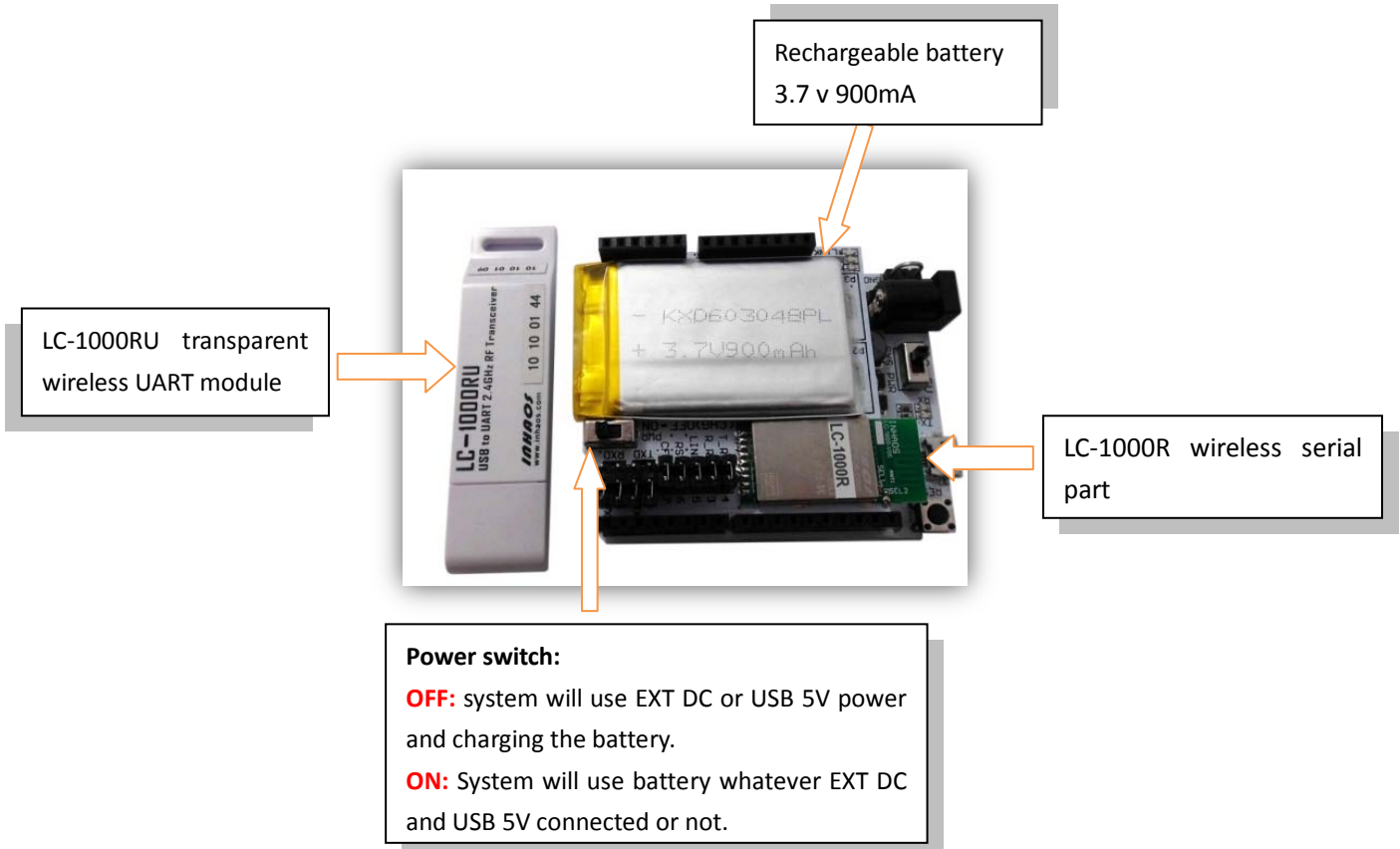
- ✧ Define a temperature conut array: We can define an array for each temperature value, then the program is run, there will output the temperature values. This experiment can measure temperature range 0 ° c ~150 ° c, and its accuracy is 0.1.The array list is as follows:

```
const int temps[] PROGMEM = {
0, 1, 2, 3, 4, 6, 7, 8, 9, 10, 11, 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 24, 25, 26, 27, 28, 29, 30,31, 32, 33, 34, 35,
36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57,58, 59, 60, 61, 62, 63, 64, 65, 66,
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643, 645, 647, 649, 651, 653, 654, 656, 658, 660,662, 664, 666, 668, 670, 672, 674, 676, 678, 680, 683, 685, 687,
689, 691, 693, 695, 697, 700, 702, 704, 706,708, 711, 713, 715, 718, 720, 722, 725, 727, 729, 732, 734, 737, 739,
741, 744, 746, 749, 752, 754, 757, 759,762, 764, 767, 770, 773, 775, 778, 781, 784, 786, 789, 792, 795, 798, 801,
804, 807, 810, 813, 816, 819, 822,825, 829, 832, 835, 838, 842, 845, 848, 852, 855, 859, 862, 866, 869, 873, 877,
881, 884, 888, 892, 896, 900,904, 908, 912, 916, 920, 925, 929, 933, 938, 942, 947, 952, 956, 961, 966, 971, 976,
981, 986, 991, 997, 1002,1007, 1013, 1019, 1024, 1030, 1036, 1042, 1049, 1055, 1061, 1068, 1075, 1082, 1088,
1096, 1103, 1110, 1118, 1126, 1134, 1142, 1150, 1159, 1168, 1177, 1186, 1196, 1206, 1216, 1226, 1237, 1248,
1260, 1272, 1284, 1297, 1310, 1324, 1338, 1353, 1369, 1385, 1402, 1420, 1439, 1459, 1480, 1502 };
```

- ✧ Reset the wireless module



Wireless transmission module as below:



LC-1000R is a wireless UART communication, it have a power down mode , this will help to reduce LC-1000R power consumption a lot, so in the application , we can set LC-1000R in power down mode , and power up before send data. In order to save more power, we can use a low power lib < Sleep_n0m1>, we make ATmega328P into power down mode too. So that we can maximum the reduction of the systems's power consumption, and by doing this it will working for a longer hour after the battery is fully charged.

The power test may refer to: [Arduino_AN_140002_PowerSaveTest_EN](http://www.inhaos.com/download.php)
<http://www.inhaos.com/download.php>

LC-1000R pin setting as below.

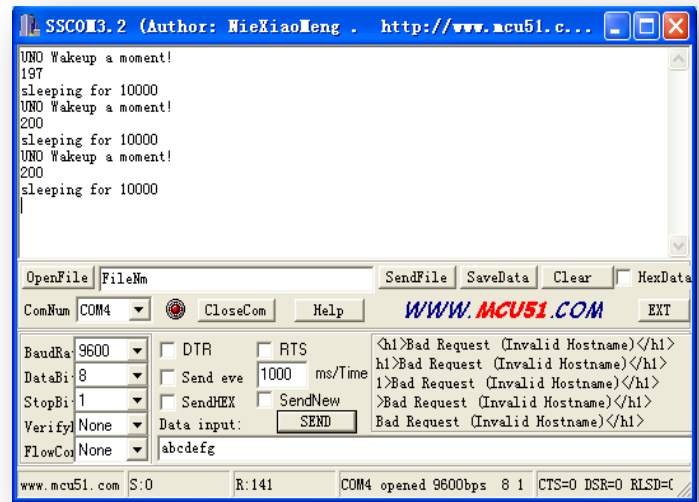
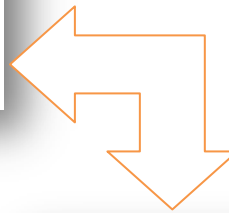
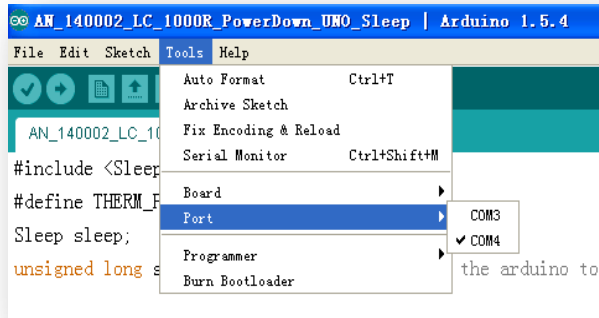
```
int LC_1000R_CFG = 7 ;
int LC_1000R_RST = 6 ;

void setup() {
  pinMode(LC_1000R_CFG ,OUTPUT) ;
  pinMode(LC_1000R_RST ,OUTPUT) ;
  pinMode(13, OUTPUT);
  digitalWrite(LC_1000R_CFG , HIGH);
  LC_1000R_RESET() ;
  delay(100) ;
}
```

✧ Setting the COM part: We should pay more attention to setting the serial part .Unless we select the same

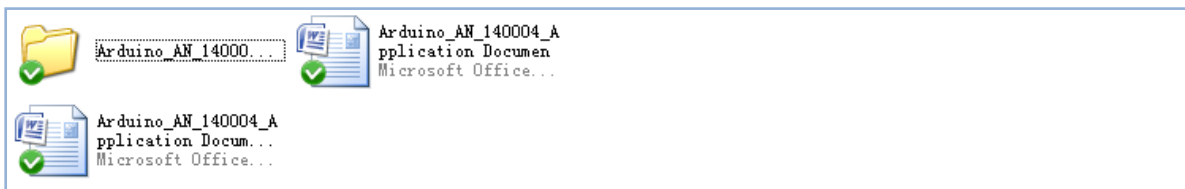


serial port that can we carry out data transfer.



- 3) We can use a USB data cable connect circuit board to a computer, and then the program can be downloaded. After this we can put the LC-1000RU into a computer USB port and check up the COM part .If everything is ok that the data can be transmitted wirelessly.
- 4) Open COM, we can see on the screen display over UNO wake up prompt/temperature values/sleeping prompt. We can get the true temperature by means of the displayed temperature value divided by 10.

We provide all of the programs about this experiment:



4. Matters needing attention

- When we use the local serial port, we should set the baud rate to 9600.If the baud rate is not set up correctly that the wireless communication will not be performed.
- After power on, if we wish the system stability, we should reset the LC_1000R wireless module.

5. Result



- Set LC-1000R into power down mode if no data need to send.
- Set Arduino main controller into power down mode and wakeup periodic.
- Get through the wireless data transmission, we can capture the real-time temperature by thermistor and then appears on the computer.

6. Contact us

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