

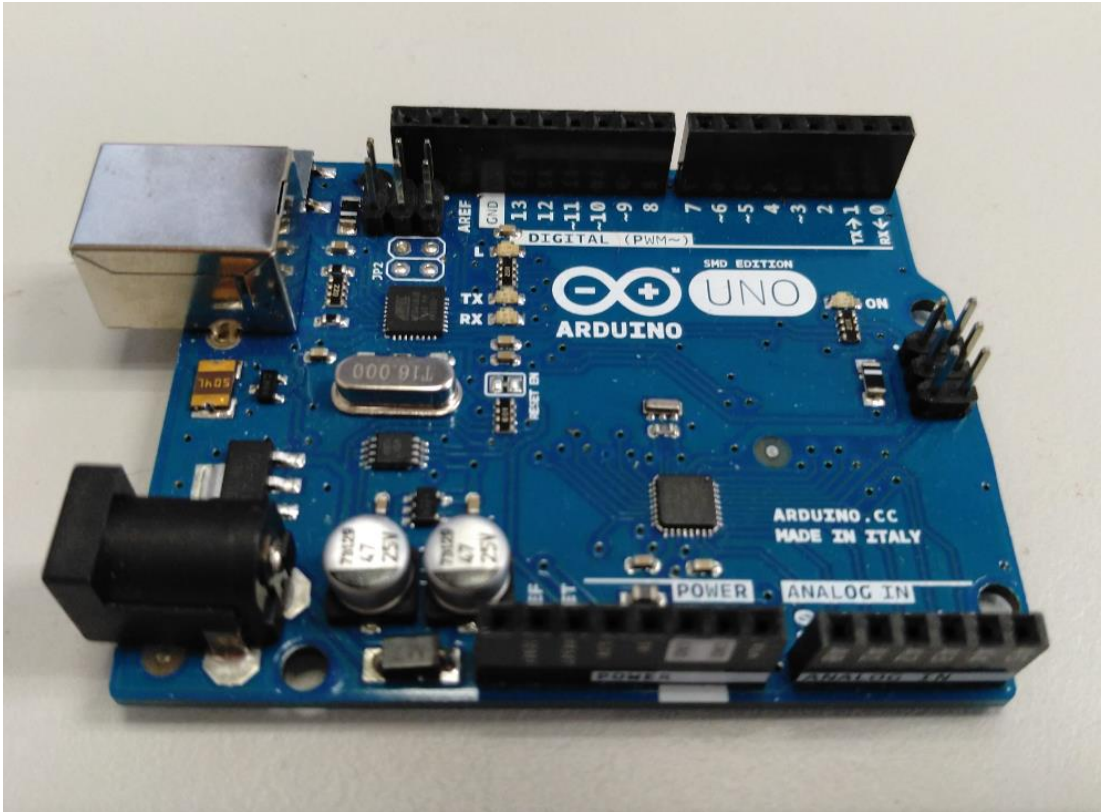
Co-Win 2.0
Automatic Weather Station
Information and guideline

11/1/2019

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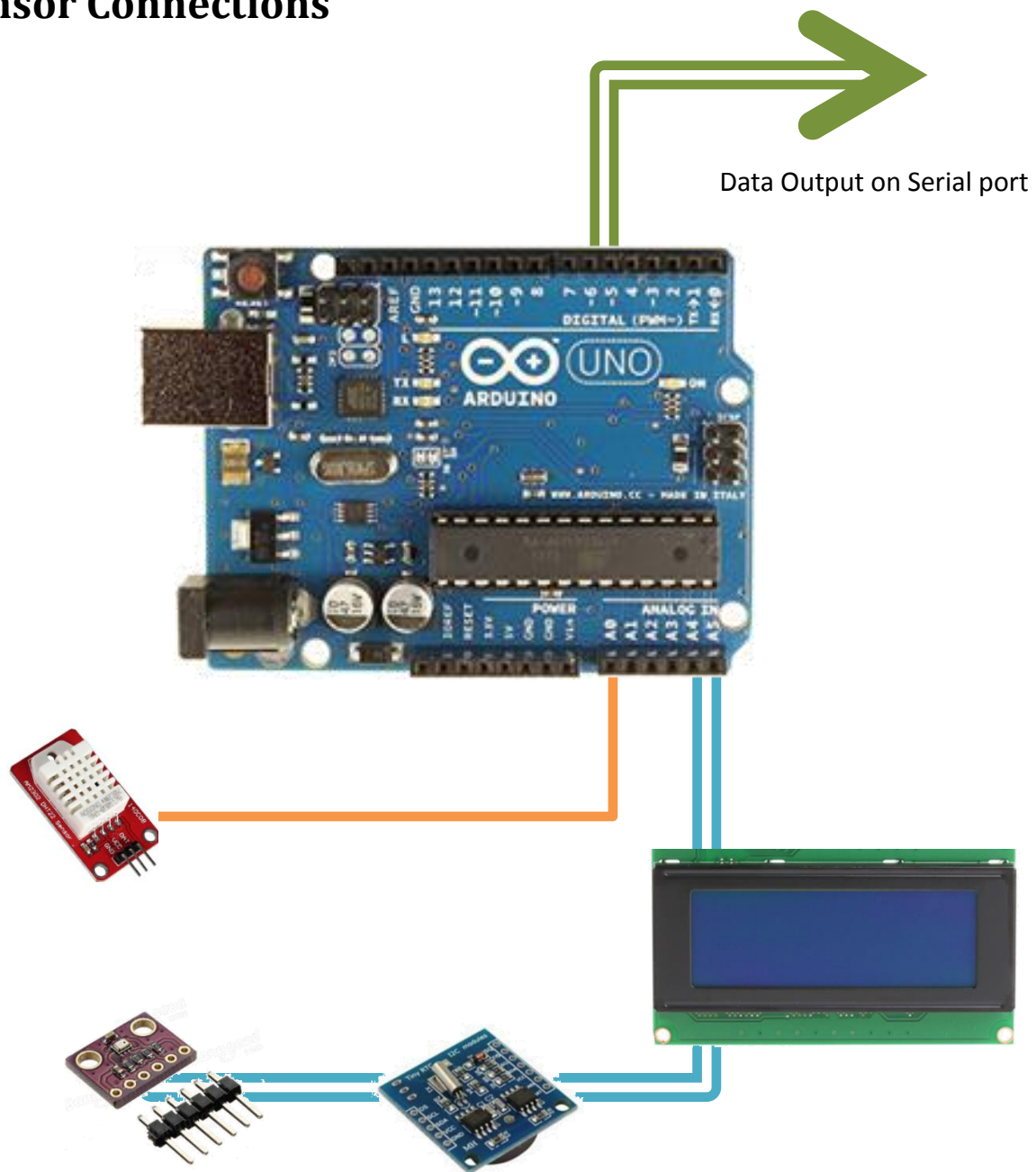
Arduino



Arduino UNO

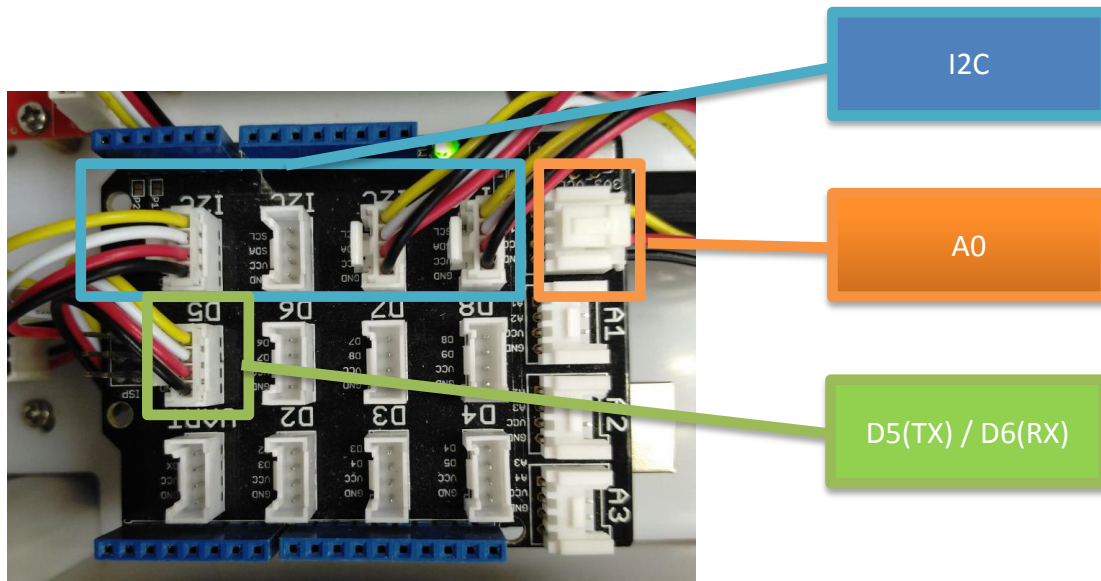
Arduino is an open-source electronics platform based on easy-to-use hardware and software. Arduino boards are able to read inputs - light on a sensor, a finger on a button, or a Twitter message - and turn it into an output - activating a motor, turning on an LED, publishing something online. You can tell your board what to do by sending a set of instructions to the microcontroller on the board.

Sensor Connections

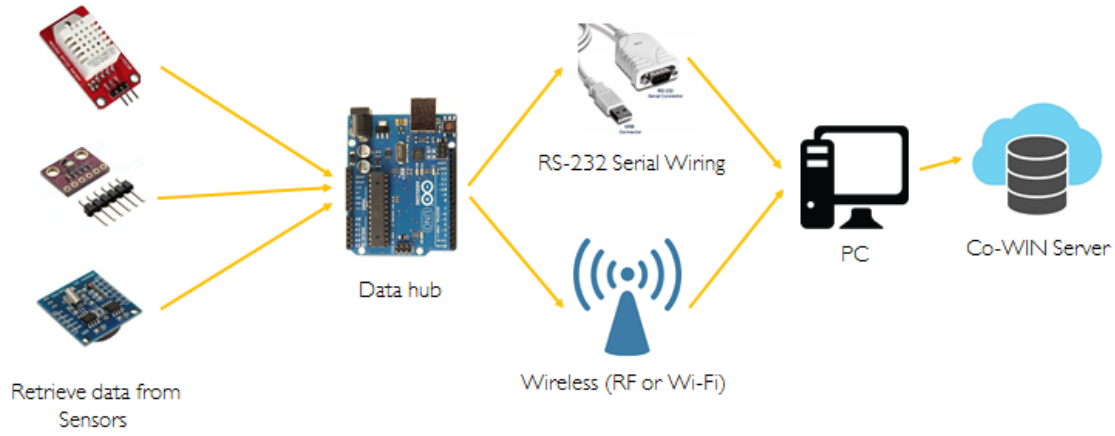


Base shield

A connectors shield is chosen for 'plug and play' installation or replacement of parts. It helps you getting rid of bread board and jump wires.

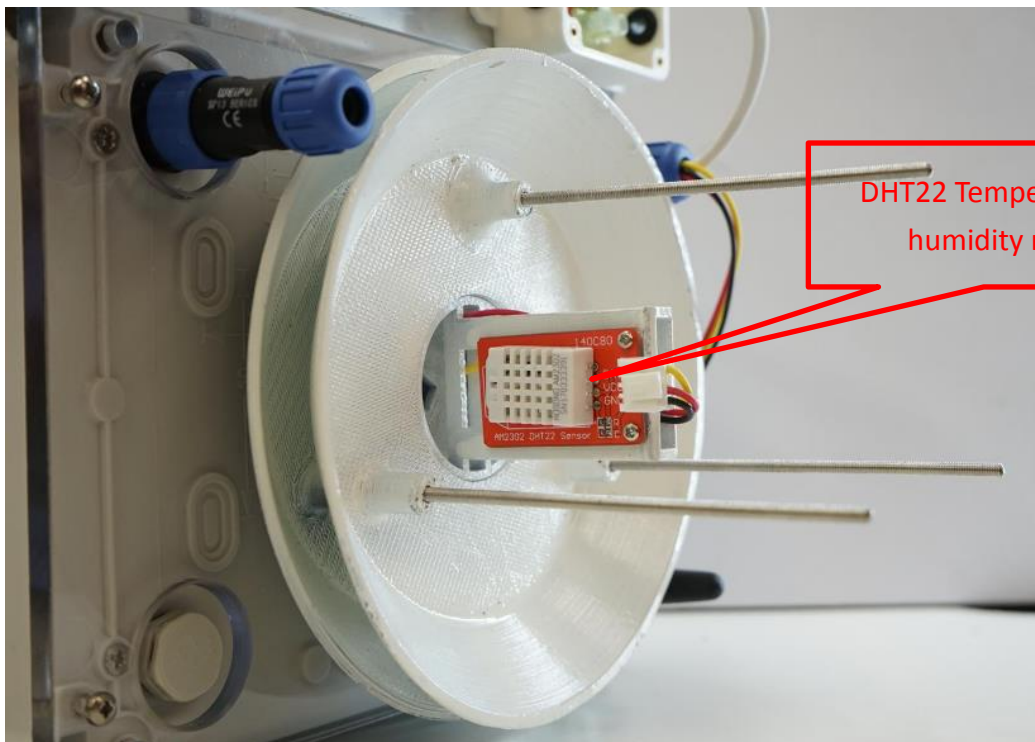


AWS Data Flow



Temperature and humidity sensor DHT22 module

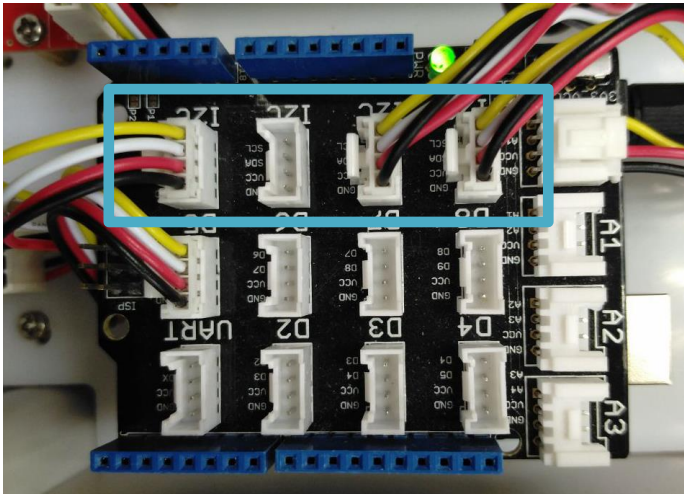
The DHT22 is a basic, low-cost digital temperature and humidity sensor. It uses a capacitive humidity sensor and a thermistor to measure the surrounding air, and spits out a digital signal on the data pin



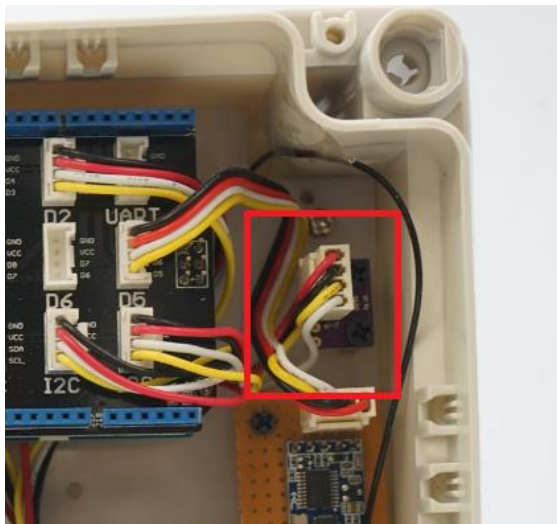
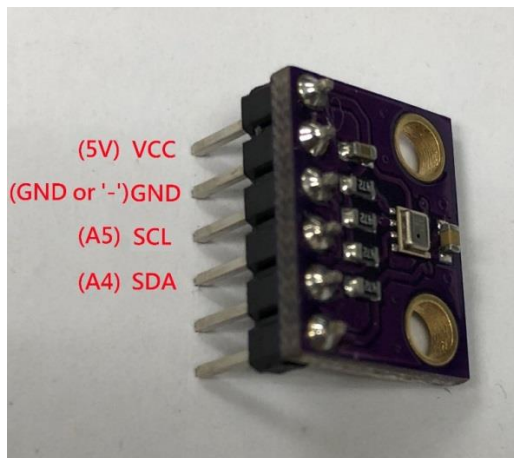
A socket for I2C 3 connection wires are connected to the module for easy replacement.

The DHT22 module is located inside the radiation shield, which can be released from the bottom.

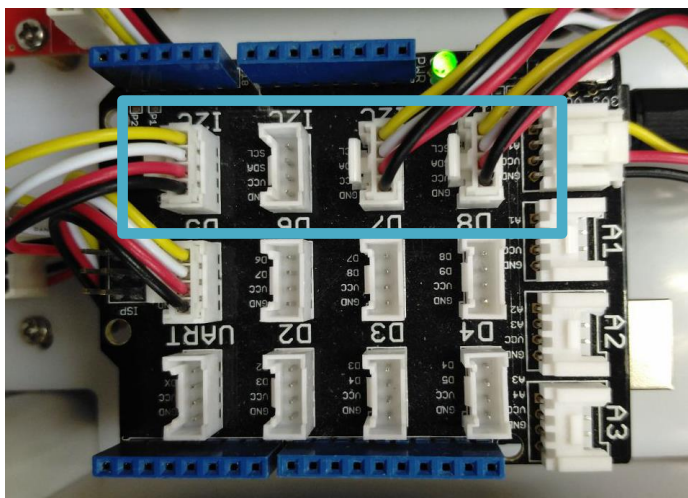
The module can be connected to one of the I2C connector on the base shield.



Pressure sensor BMP280 module

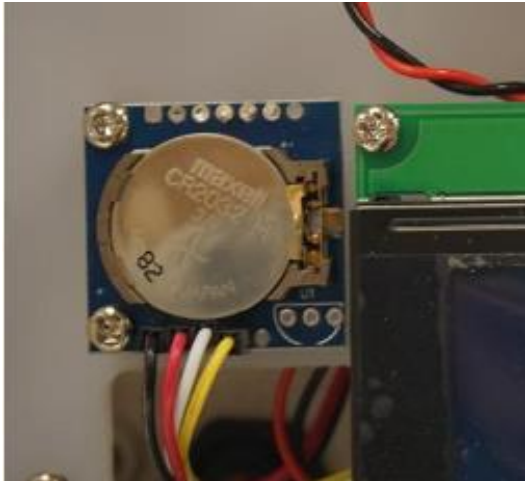


BMP280 is connected via I2C. A random I2C port on the shield can be used.



Real-Time Clock module

DS1307 real-time clock module is used to provide a time keeping capability. This module is connected to the Arduino using I2C connections.

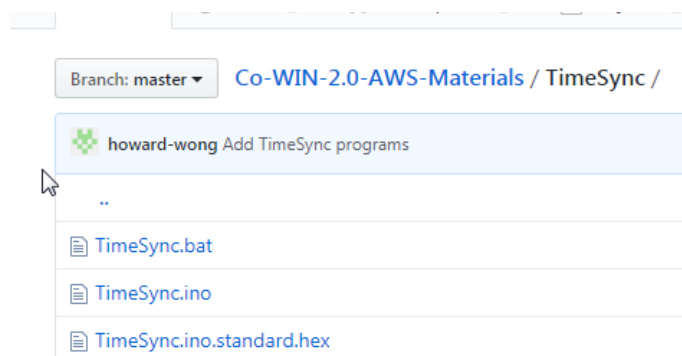


Calibration of the clock via serial port

To calibrate the Real-Time Clock module, we need to write a timesync program to the Arduino first. Then with the Arduino still connected to the PC, we run a script to sync the clock module with PC's clock.

The program files can be found in the TimeSync directory on our github repository.

<https://github.com/hkocowin/Co-WIN-2.0-AWS-Materials>



Use xLoader to write the compiled hex file to Arduino

xLoader is a GUI tool for flashing the hex file to Arduino. It can be downloaded from

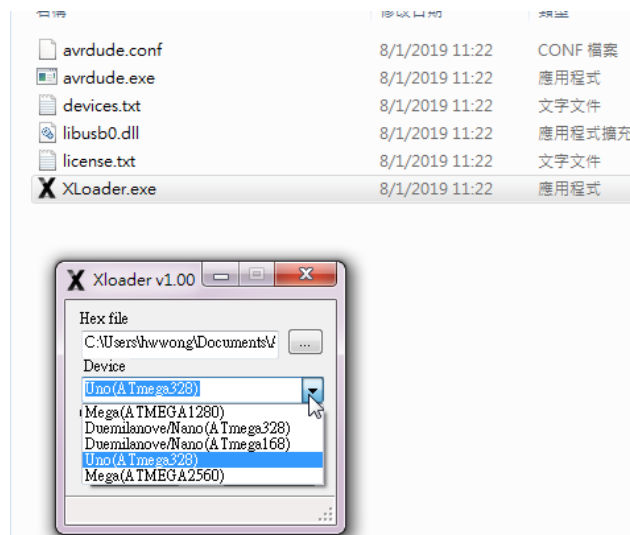
<http://xloader.russemotto.com/>

The HEX file “TimeSync.ino.standard.hex” can be found in the git repository stated above.

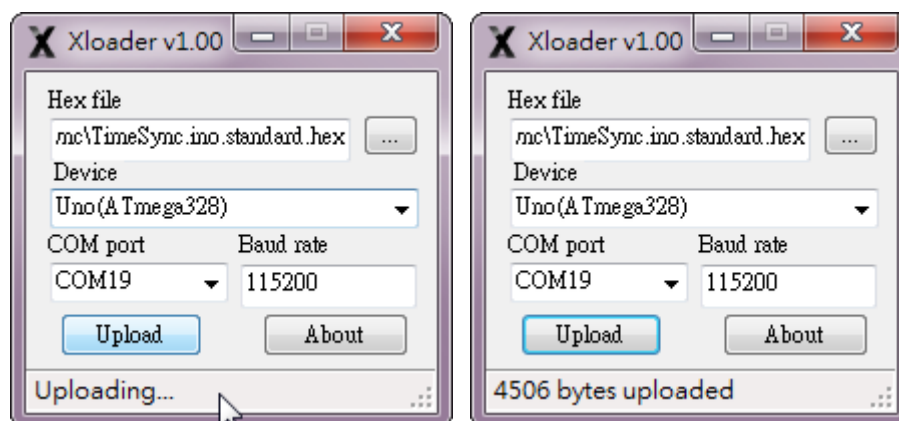
Once the XLoader.zip is extracted, we can run XLoader.exe to open the program.

Find the Hex file on your computer. Then select the right device, we have UNO (ATmega 328) here.

The Baud rate changes according to the Device. No need to modify manually.



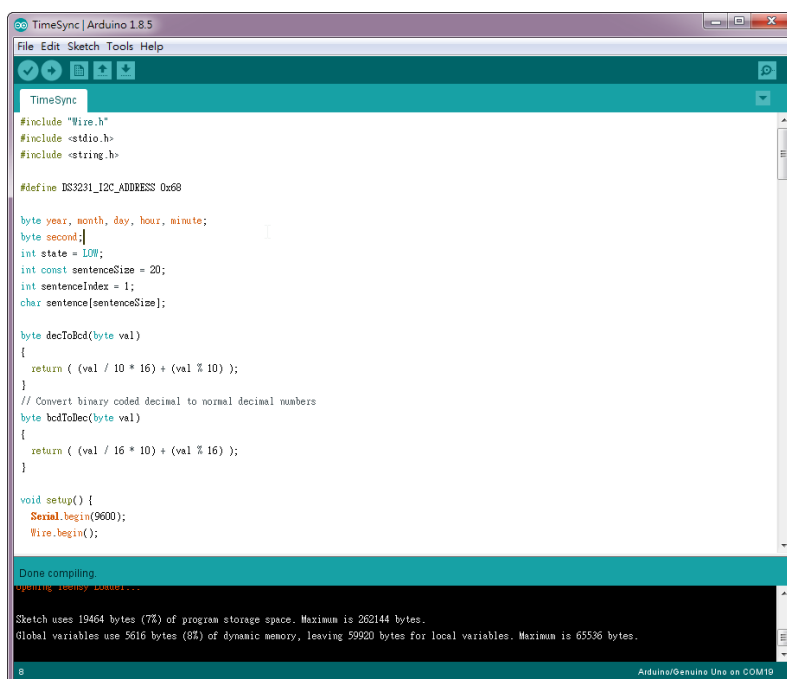
Select the right COM port.



Once it is success, it shows uploaded at the status bar.

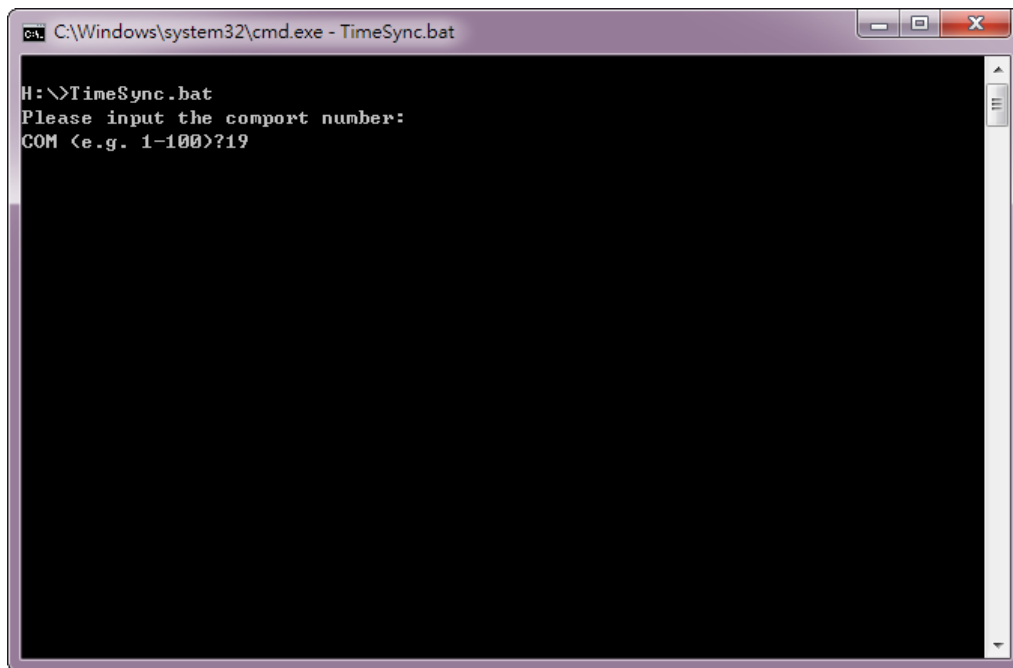
Use Arduino IDE to compile the timesync program yourself

First, open the TimeSync.ino file with the Arduino IDE, the ino file is uploaded to github.com stated above. Then, use the IDE to compile and upload the code.



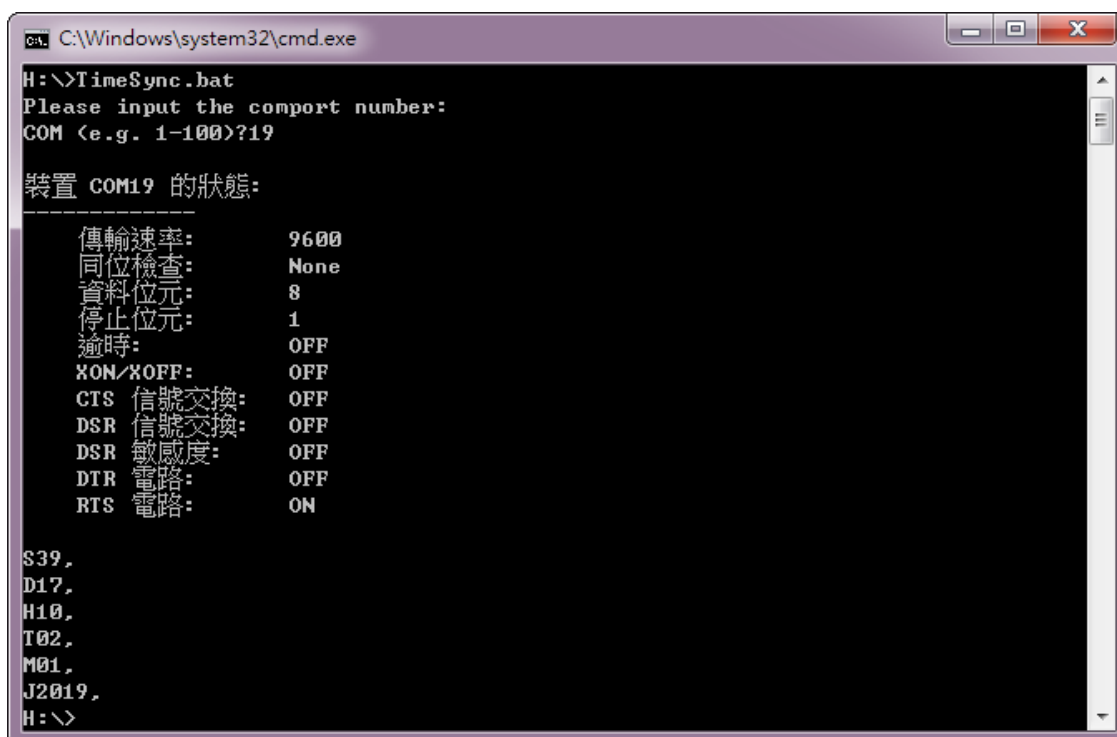
When it runs successfully, keep the Arduino connecting to USB.

Open the command prompt and goto the location of TimeSync.bat and run the script.



```
C:\Windows\system32\cmd.exe - TimeSync.bat
H:\>TimeSync.bat
Please input the comport number:
COM <e.g. 1-100>?19
```

Input the number of comport and hit the Enter key.



```
C:\Windows\system32\cmd.exe
H:\>TimeSync.bat
Please input the comport number:
COM <e.g. 1-100>?19

裝置 COM19 的狀態:
-----
傳輸速率:      9600
同位檢查:      None
資料位元:      8
停止位元:      1
逾時:          OFF
XON/XOFF:      OFF
CTS 信號交換:  OFF
DSR 信號交換:  OFF
DSR 敏感度:    OFF
DTR 電路:      OFF
RTS 電路:      ON

S39.
D17.
H10.
T02.
M01.
J2019.
H:\>
```

If the Arduino exists at the input comport, the timesync process runs.

Reference:

<https://www.instructables.com/id/Synchronise-DS3221-RTC-with-PC-via-Arduino/>

LCD

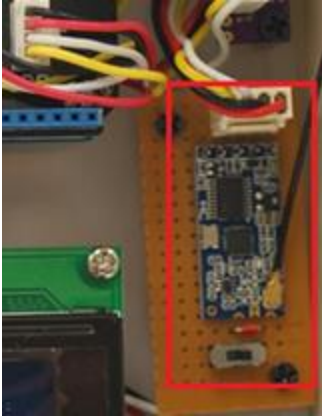
There is a LCD inside the AWS box, the backlight can be turned off by the switch.

The LCD is connecting to the Arduino via I2C. The sensors data are showed on the display.



RF (Optional)

The RF module is used to transmit the data to the PC receiver. It is connected to the digital pins 5(TX) and 6(RX). A receiver module is provided.



A receiver module is connected to the PC USB port.



Parts List

List of on-line shops:

<https://www.digikey.hk>

<https://www.mouser.hk>

<https://hkcn.rs-online.com>

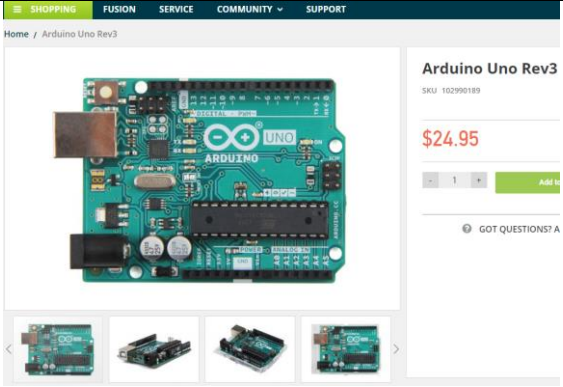
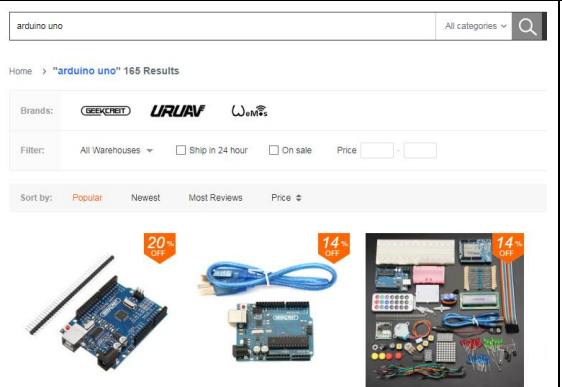
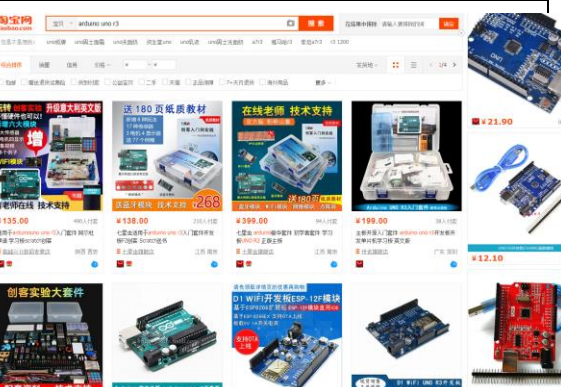
<https://www.seeedstudio.com/>

<https://www.sparkfun.com>

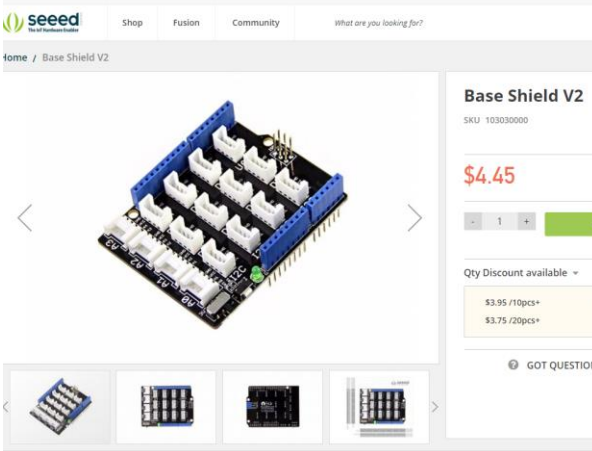
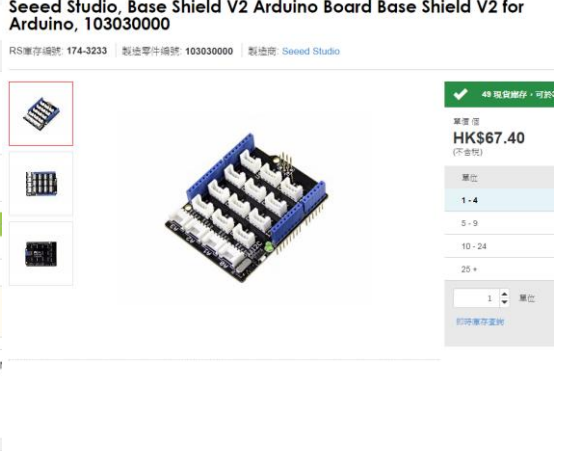
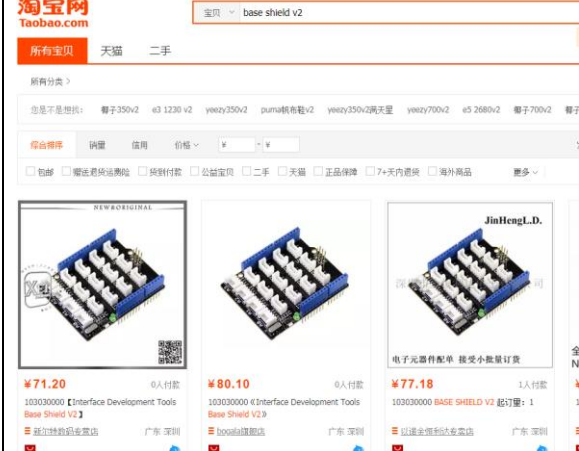
<https://www.banggood.com>

<https://world.taobao.com/>

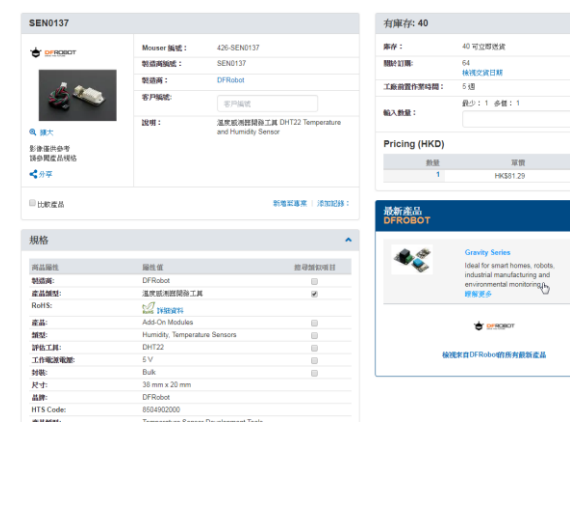
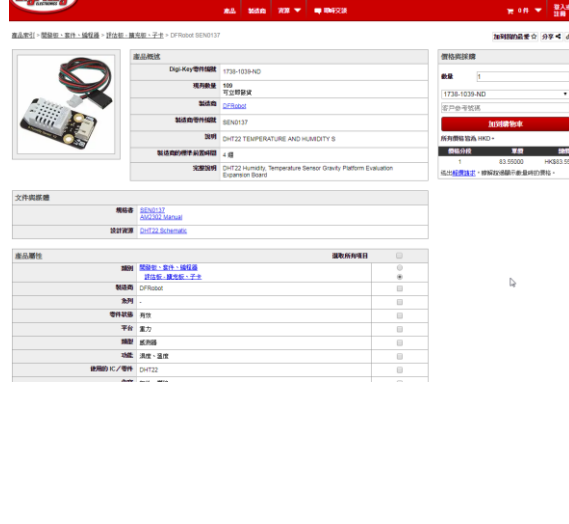
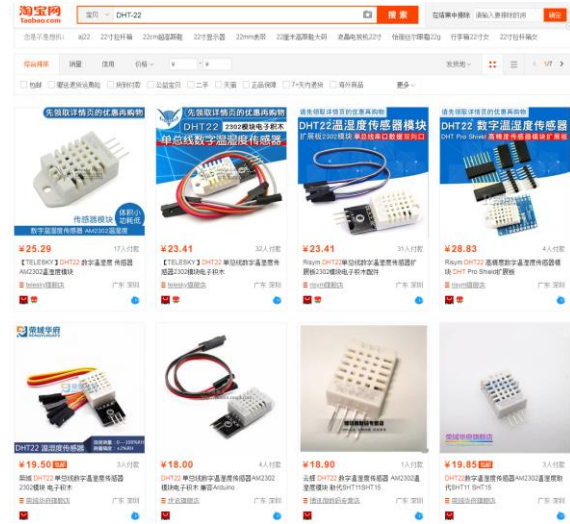
Arduino Uno R3

Supplier	SeeedStudio	Banggood	Taobao
	https://www.seeedstudio.com/	https://www.banggood.com	
			
	https://www.seeedstudio.com/Arduino-Uno-Rev3-p-2995.html	https://www.banggood.com/search/arduino-uno.html?sbc=1	https://s.taobao.com/search?q=arduino+uno+r3&type=p&tmhkh5=&spm=a21wu.241046-hk.a2227oh.d100&from=sea_1_suggest&catId=100
Part No.	SKU 102990189	Arduino UNO	Arduino UNO R3
Price	USD 24.95	Start from HKD 30	Start from RMB 12

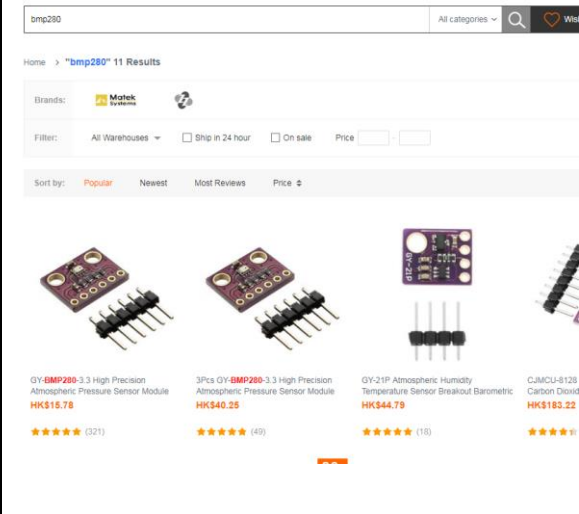
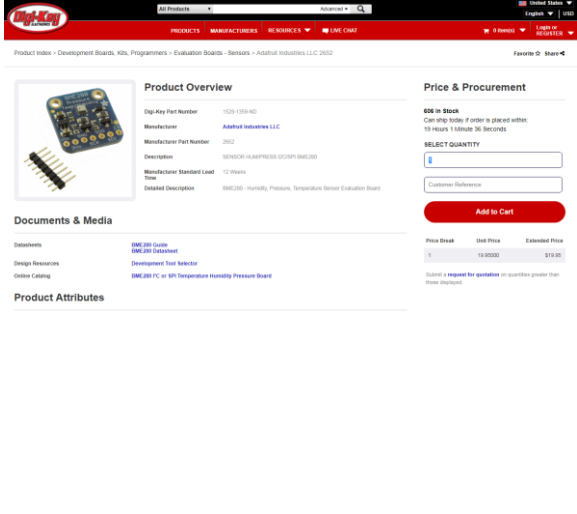

Arduino base shield v2

Supplier	SeeedStudio	RS	Taobao
	<div></div>	<div></div>	<div></div>
	https://www.seeedstudio.com/Base-Shield-V2-p-1378.html		
Part No.	SKU 103030000	174-3233	Arduino base shield v2
	USD 4.45 (HKD 35)	HKD 67.40	Start from RMB 70

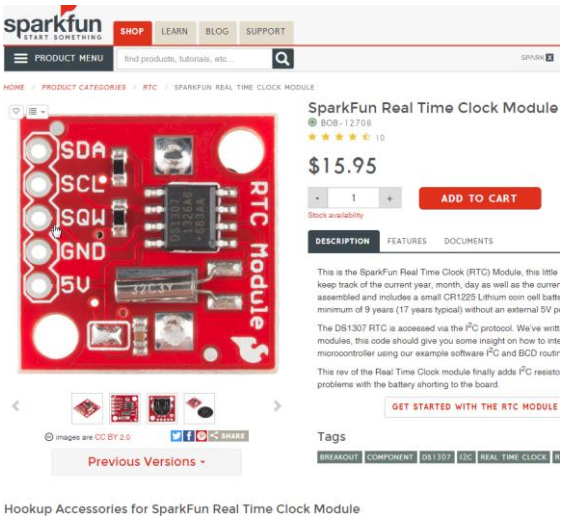


DHT-22 Module

Supplier	Mouser	Digikey	Taobao
			
	https://www.mouser.hk/ProductDetail/DFRobot/SEN0137?qs=sGAEPiMZZMsB9HsreUc%252biftuezEPMTIdely7NYg%2fi8A%3d	https://www.digikey.hk/product-detail/zh/dfrobot/SEN0137/1738-1039-ND/6588461	https://s.taobao.com/search?q=DHT-22&type=p&tmhk5=&spm=a21wu.241046-hk.a2227oh.d100&from=sea_1_searchbutton&catId=100
Part No.	426-SEN0137	1738-1039-ND	DHT-22
	HKD 81.29	HKD 83.55	Start from RMB 14

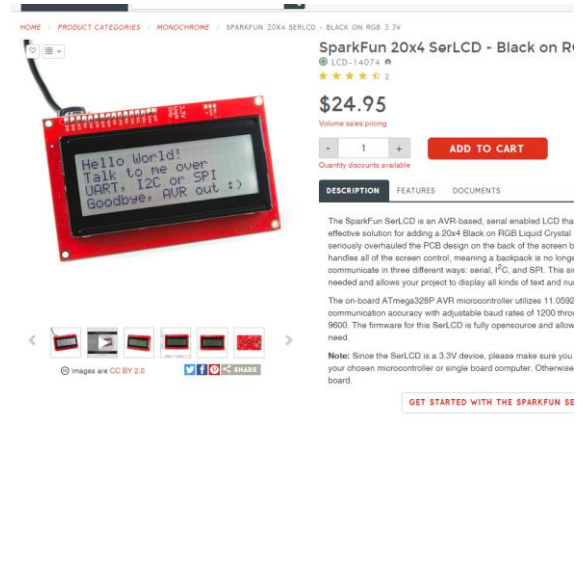


BMP-280 Module

Supplier	Banggood	Digikey	Taobao
	 <p>Search results for BMP280 on Banggood. The page shows 11 results. The top results are:</p> <ul style="list-style-type: none"> GY-BMP280 3.3 High Precision Atmospheric Pressure Sensor Module HK\$16.78 (321 reviews) 3Pcs GY-BMP280 3.3 High Precision Atmospheric Pressure Sensor Module HK\$40.25 (49 reviews) GY-21P Atmospheric Humidity Temperature Sensor Breakout Barometric HK\$44.79 (16 reviews) CAMOU-8128 Carbon Dioxide HK\$183.22 (5 reviews) 	 <p>Product Overview for BMP280 on Digikey. The page shows the product details, including the manufacturer (Adafruit Industries LLC), part number (1528-1359-ND), and price (\$17.20). It also includes a 'Price & Procurement' section with a 'Buy in Bulk' option and a 'Quantity' selector.</p>	 <p>Search results for BMP280 on Taobao. The page shows multiple listings for BMP280 modules, including GY-BMP280 3.3 High Precision Atmospheric Pressure Sensor Module, GY-BMP280 3.3 High Precision Atmospheric Pressure Sensor Module, and GY-BMP280 3.3 High Precision Atmospheric Pressure Sensor Module. The prices range from RMB 8 to RMB 183.22.</p>
	https://www.banggood.com/search/bmp280.html	https://www.digikey.com/product-detail/en/adafruit-industries-llc/2652/1528-1359-ND/5604372	https://s.taobao.com/search?q=BMP280&imgfile=&js=1&stats_click=search_radio_all%3A1&initiative_id=staobaoz_20190107&ie=utf8
Part No.	BMP-280	1528-1359-ND	BMP280
	Start from HKD 16	HKD 170.27	Start from RMB 8

RealTime Clock Module

Supplier	Sparkfun	Digikey	Taobao
	 <p>SparkFun Real Time Clock Module BOB-12708 \$15.95 ADD TO CART</p> <p>DESCRIPTION FEATURES DOCUMENTS</p> <p>This is the SparkFun Real Time Clock (RTC) Module, this little keep track of the current year, month, day as well as the current assembled and includes a small CR1225 Lithium coin cell battery minimum of 9 years (17 years typical) without an external DV p.</p> <p>The DS1307 RTC is accessed via the I²C protocol. We've writ modules, this code should give you some insight on how to int microcontroller using our example software I²C and BCD routr.</p> <p>This rev of the Real Time Clock module finally adds I²C resists problems with the battery shorting to the board.</p> <p>GET STARTED WITH THE RTC MODULE</p> <p>Tags: BREAKOUT COMPONENT DS1307 I2C REAL TIME CLOCK</p> <p>Hookup Accessories for SparkFun Real Time Clock Module</p>	 <p>DS1307 Real Time Clock (RTC) Timing Evaluation Board 1738-1054-ND HKD 38.66</p>	 <p>DS1307 封装-DIP \$0.73 DS1307 封装-SMD \$8.50 DS1307 封装-SMD \$1.39 DS1307 封装-SMD \$3.74 DS1307 封装-SMD \$2.80 DS1307 封装-SMD \$0.28 DS1307 封装-SMD \$2.10</p>
	https://www.sparkfun.com/products/12708	https://www.digikey.hk/product-detail/zh/dfrobot/DFR0151/1738-1054-ND/6588476	https://s.taobao.com/search?q=ds1307&imgfile=&js=1&stats_click=search_radio_all%3A1&initiative_id=staobaoz_20190107&ie=utf8
Part No.	BOB-12708	1738-1054-ND	DS1307
	USD 15.95 (HKD 126)	HKD 38.66	Start from RMB 3

LCD Module

Supplier	Sparkfun	Digikey	Taobao
	 <p>SparkFun 20x4 SerLCD - Black on RGB 3.3V LCD-14074 \$24.95 Volume sales pricing ADD TO CART</p> <p>The SparkFun SerLCD is an AVR-based, serial enabled LCD that is the effective solution for adding a 20x4 Black on RGB Liquid Crystal Display to your project. The SparkFun SerLCD is no longer a backpack, meaning a backpack is no longer needed to interface with the LCD. The SparkFun SerLCD handles all of the screen control, meaning a backpack is no longer needed to interface with the LCD. The SparkFun SerLCD handles all of the screen control, meaning a backpack is no longer needed to interface with the LCD. The SparkFun SerLCD handles all of the screen control, meaning a backpack is no longer needed to interface with the LCD.</p> <p>https://www.sparkfun.com/products/14074</p>	 <p>Digi-Key Components Inc. LCM-S02004DSF 67-1763-ND 647 可立即发货 Lumex OptoComponents Inc. LCD MODULE 20X4 CHARACTER WLED 14 针 Character LCD Display Module Transflective 5 x 8 Dot STN - Super-Twisted Nematic LED - Yellow/Green Parallel 98.00mm x 60.00mm x 12.70mm</p> <p>https://www.digikey.hk/product-detail/zh/lumex-opto-components-inc/LCM-S02004DSF/67-1763-ND/469809</p>	 <p>LCD2004 I2C \$56.00 SHR2004-C 大字符2004 PCB尺寸: 146.0*55.0mm \$15.00</p> <p>https://s.taobao.com/search?q=LCD2004+I2c&imgf ile=&js=1&stats_click=search_radio_all%3A1&initiative_id=staobaoz_20190107&ie=utf8</p>
Part No.	LCD-14074	67-1763-ND	LCD2004 I2C
	USD 24.95 (HKD 197)	HKD 293.85	Start from RMB 20
Remark	*MCU included, with 3 ways communication: I2C, SPI, UART	I2C module may NOT be included	

