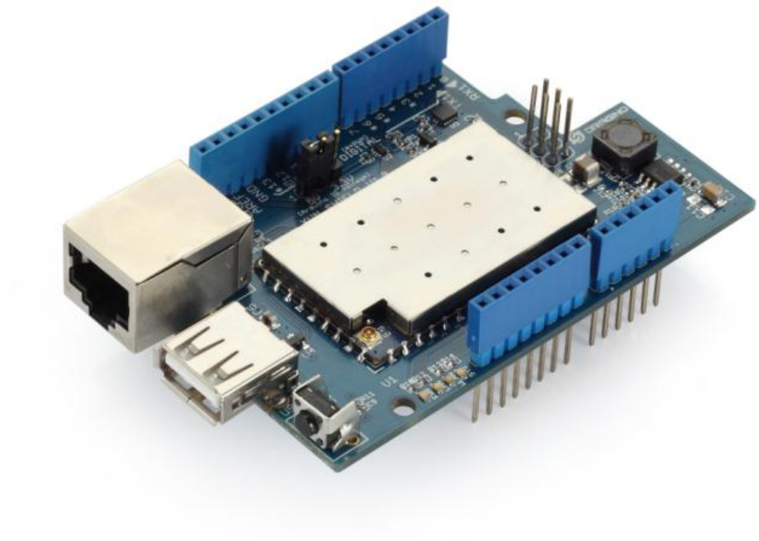


Yun Shield User Manual

VERSION: 1.0

Version	Description	Date
0.1	Initiate	2014-Jun-21
1.0	Release	2014-Jul-08

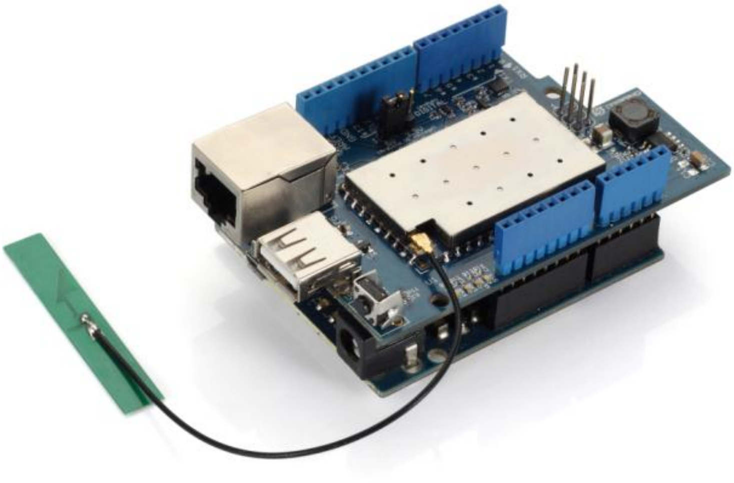
Index:

1 Introduction

1.1 What is Yun Shield

Yun Shield is one of the most powerful shields for Arduino Board. Yun Shield is designed to solve the Internet connectivity and storage issue for Arduino Board.

Yun Shield runs Open Source OpenWrt system (Same system as runs in Arduino Yun) and it is fully compatible with Arduino IDE v1.5.4 or later. Yun Shield is the ideally choice for Arduino Projects which require various internet connections and more storage.



Basically, Yun Shield + Leonardo equally to the official Arduino Yun, but Yun Shield is more flexible because it can work with other Arduino board such as Uno, Duemilanove, Mega etc. And Yun Shield uses external wifi antenna which provides stability and possibility for various environments.

1.2 Specifications

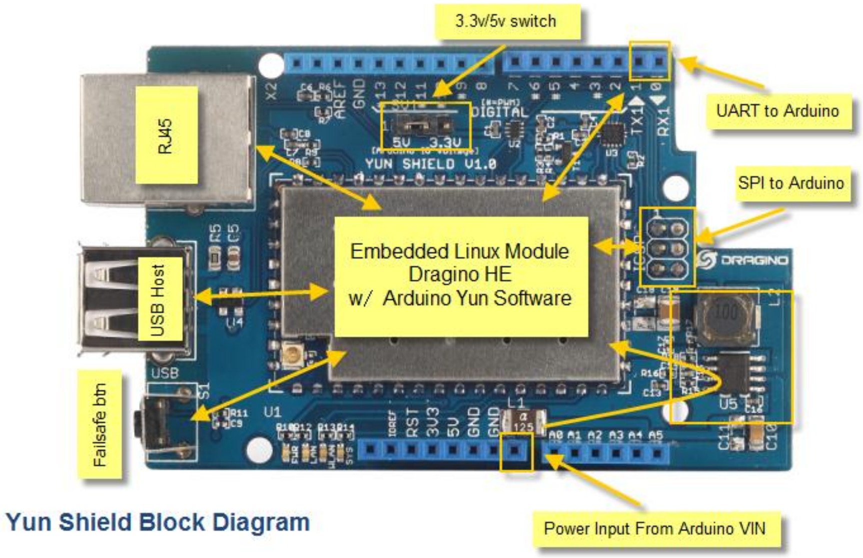
- Processor: 400MHz, 24K MIPS
- Flash: 16MBytes
- RAM: 64MBytes
- Power Input: 4.75v ~ 23v via Arduino VIN pin
- 1 x 10M/100M RJ45 connector
- 150M WiFi 802.11 b/g/n
- External Antenna via I-Pex connector
- 1 x USB 2.0 host connector, used for USB storage or 3G connection
- 1 x Reset button
- Compatible with 3.3v or 5v I/O Arduino.

1.3 Features

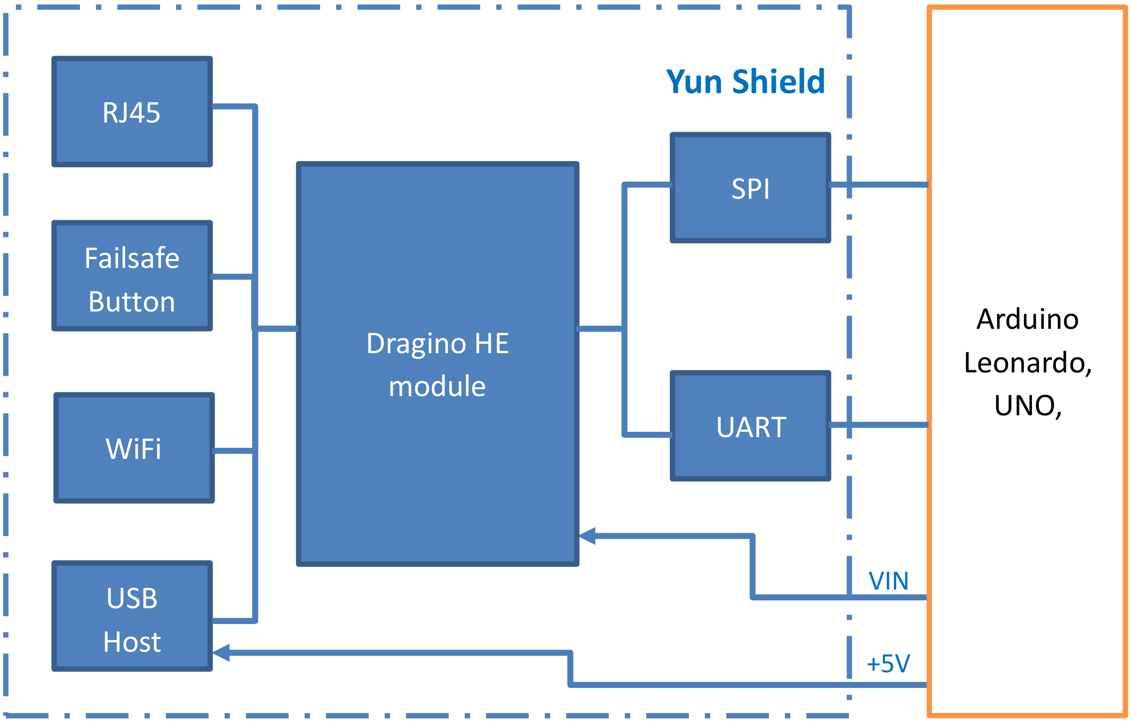
- ✓ Open source Linux (OpenWrt) inside

- ✓ Low power consumption
- ✓ Compatible with Arduino IDE 1.5.4 or later, user can program, debug or upload sketch to Arduino board via Arduino IDE.
- ✓ Managed by Web GUI, SSH via LAN or WiFi
- ✓ Software upgradable via network
- ✓ Built-in web server
- ✓ Support internet connection via LAN port, WiFi or 3G dongle.
- ✓ Support USB flash to provide storage for Arduino projects.
- ✓ Failsafe design provides robustly system.
- ✓ Compatible with Arduino Leonardo, Uno , Duemilanove, Diecimila, Mega

1.4 System Structure



Yun Shield Block Diagram



POWER:

The Dragino HE is the core module of Yun Shield. The HE module requires around 200ma current when in full load, so it is powered by the Arduino **VIN** pins to avoid overheated in the Arduino onboard 5v LDO. So when Yun shield is in used, the Arduino board should be powered by DC port instead of USB port. The DC input can be **7v ~ 15v.**

The USB Host of Yun Shield gets power from the Arduino **+5v** pin, since the +5v from Arduino comes from the +5V LDO, to avoid overheated on the Arduino Board, when the USB host is in used, it is recommended to use **+7v DC**.

Interface:

The RJ45, WiFi, USB Host and Failsafe are connected to the Dragino HE module directly. And the Dragino HE module use SPI and UART to communicate with Arduino Board. Yun Shield is compatible with 3.3v and 5v Arduino board. The **on board jumper SV1** is used to set the SPI and UART to 3.3v or 5v level.

The SPI interface is used to upload the sketches comes from the Arduino IDE. SPI interface only connects to Dragino HE during uploading so the Arduino SPI can still be used to connect to other SPI slave devices.

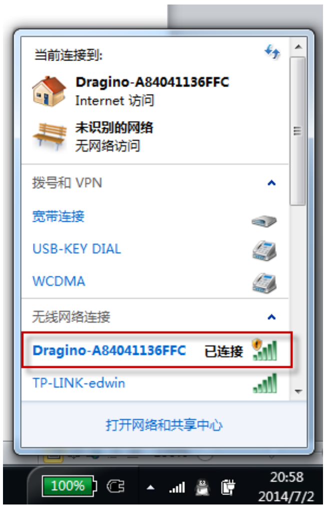
The UART interface is used for the Bridge class in Arduino, there are lots of examples explain how to use the bridge class in the Arduino IDE. It is the core of Yun solution. We must make sure the serial Interface of Arduino is not used by other hardware.

2 Configure Yun Shield

2.1 Find the ip addresses

The Yun Shield has a WiFi interface and a LAN port. Either of them has IP address, can be used for internet connection and device management.

Factory IP of WiFi port



当前连接到:

Dragino-A84041136FFC
Internet 访问

未识别的网络
无网络访问

拨号和 VPN

宽带连接

USB-KEY DIAL

WCDMA

无线网络连接

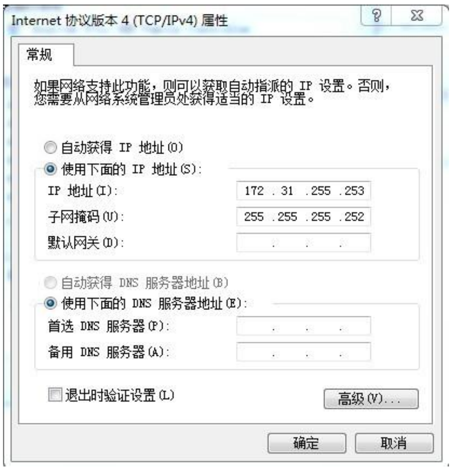
Dragino-A84041136FFC 已连接

TP-LINK-edwin

At the first boot of Yun Shield, it will auto generate an unsecure WiFi network call *Dragino2-xxxxxx*

User can use their laptop to connect to this WiFi network. The laptop will get an IP 192.168.240.xxx and the Yun Shield has the default IP 192.168.240.1

Fall Back IP



Internet 协议版本 4 (TCP/IPv4) 属性

常规

如果网络支持此功能，则可以获取自动指派的 IP 设置。否则，您需要从网络系统管理员处获得适当的 IP 设置。

○ 自动获得 IP 地址(O)
● 使用下面的 IP 地址(S):
IP 地址(I): 172 . 31 . 255 . 253
子网掩码(U): 255 . 255 . 255 . 252
默认网关(D): . . .

○ 自动获得 DNS 服务器地址(B)
● 使用下面的 DNS 服务器地址(E):
首选 DNS 服务器(P): . . .
备用 DNS 服务器(A): . . .

□ 退出时验证设置(L)

A fall back IP 172.31.255.254/255.255.255.252 is assigned to Yun Shield's LAN port so user can always access Yun Shield with this ip if their laptop has the IP 172.31.255.253/255.255.255.252.

Detect IP from Arduino IDE

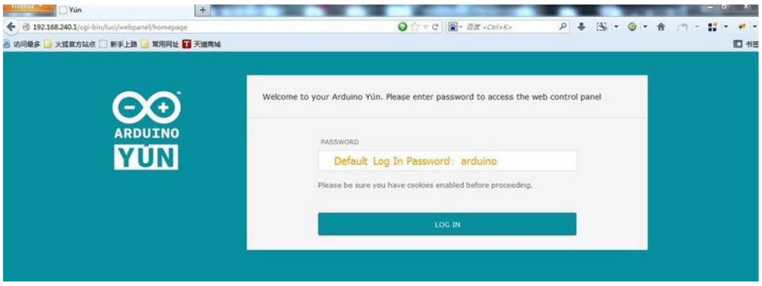
If Yun Shield’s Ethernet port is connected to the uplink router or the WiFi interface is associated to the WiFi router. The PC in the same network can use Arduino IDE to detect Yun Shield’s IP address as described in Detected Yun Shield.

2.2 Configure Method

The Yun Shield runs Open Source Linux system. If user has a PC at the same network as Yun Shield, user can access its system via either **Web Interface** or **Secure Shell (SSH)**.

2.2.1 Access via web interface

The recommended browsers to configure Yun Shield are **Firefox** and **Chrome**. Simply type the IP address into your browser and you will see the log in page of Yun Shield.



192.168.240.1/cgi-bin/luci/webpanel/homepage

Welcome to your Arduino Yún. Please enter password to access the web control panel

PASSWORD

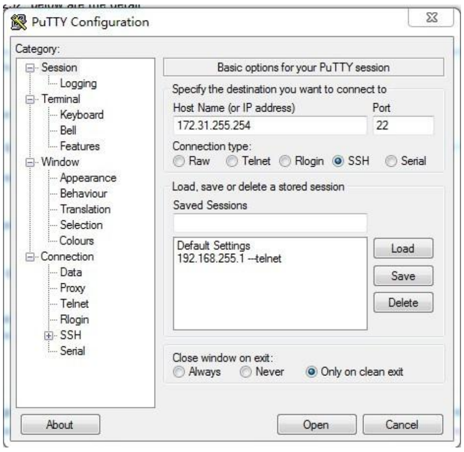
Default Log In Password: arduino

Please be sure you have cookies enabled before proceeding.

Default User name and Password for Yun Shield is root/Arduino.

2.2.2 Access via SSH

Via SSH access, user can access to the Linux system directly and customized the system to support more features and applications.



PuTTY Configuration

Basic options for your PuTTY session

Specify the destination you want to connect to

Host Name (or IP address): 172.31.255.254

Port: 22

Connection type: ○ Raw ○ Telnet ○ Rlogin ● SSH ○ Serial

Load, save or delete a stored session

Saved Sessions

Default Settings
192.168.255.1 --telnet

Close window on exit: ○ Always ○ Never ● Only on clean exit

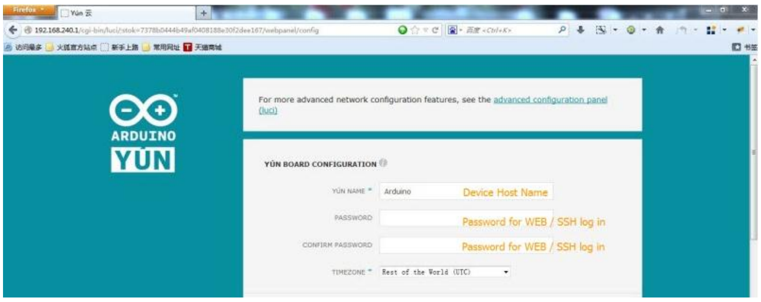
SSH Access:

IP address:	IP Address of Yun Shield
Port:	22
User Name:	root
Password:	Arduino (default)

2.3 Web Configure Pages

2.3.1 General Set Up

After log in, the GUI will show the WIFI / ETH interface status. Click the Configure button and now user can configure the device password and network parameters.



For more advanced network configuration features, see the advanced configuration panel (luci)

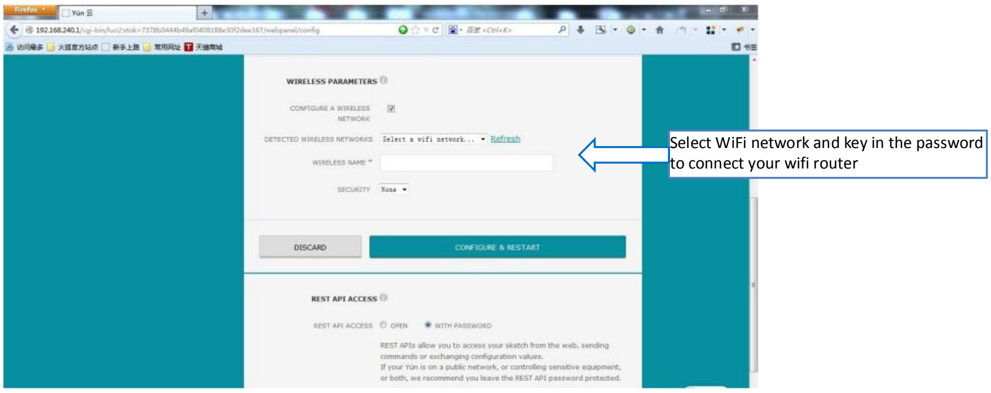
YÚN BOARD CONFIGURATION

YÚN NAME * Arduino — Device Host Name

PASSWORD — Password for WEB / SSH log in

CONFIRM PASSWORD — Password for WEB / SSH log in

TIMEZONE * Rest of the World (UTC)



WIRELESS PARAMETERS

CONFIGURE A WIRELESS NETWORK ☑

DETECTED WIRELESS NETWORKS Select a wifi network... Refresh

WIRELESS NAME *

SECURITY None

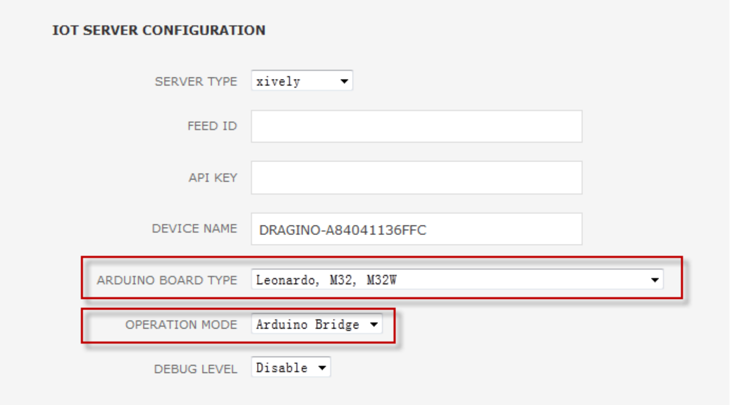
REST API ACCESS

REST API ACCESS ○ OPEN ● WITH PASSWORD

REST APIs allow you to access your sketch from the web, sending commands or exchanging configuration values.
If your Yún is on a public network, or controlling sensitive equipment, or both, we recommend you leave the REST API password protected.

Select WiFi network and key in the password to connect your wifi router

2.3.2 Arduino related set up



IOT SERVER CONFIGURATION

SERVER TYPE	xively
FEED ID	
API KEY	
DEVICE NAME	DRAGINO-A84041136FFC
ARDUINO BOARD TYPE	Leonardo, M32, M32W
OPERATION MODE	Arduino Bridge
DEBUG LEVEL	Disable

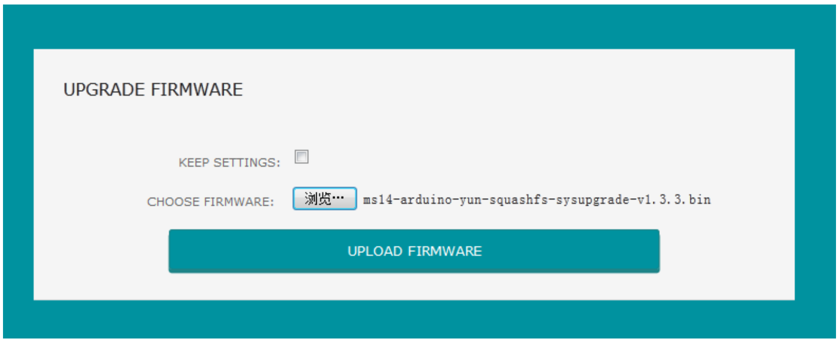
Arduino Board Type: Define the bootloarder/mcu type/ fuse setting during Sketch upload.

Operation Mode: make sure it is in Arduino Bridge mode so the Bridge class for Arduino Yun works.

2.3.3 Upgrade

Yun Shield firmware can be upgraded via the GUI for bug fixes / system improvement or new features.

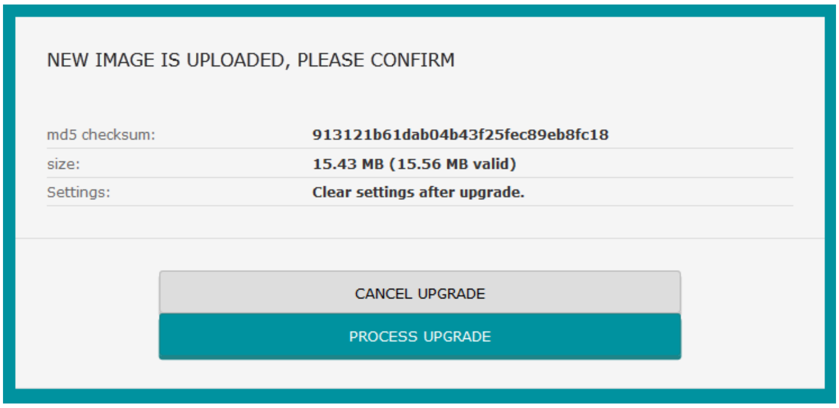
Go to **GUI → Upgrade** page and select the correct firmware to upgrade. The firmware used for web upgrade should be a **sysupgrade** type firmware, user can choose if keep settings or not after upgrade.



UPGRADE FIRMWARE

KEEP SETTINGS: □

CHOOSE FIRMWARE: 浏览… ms14-arduino-yun-squashfs-sysupgrade-v1.3.3.bin



NEW IMAGE IS UPLOADED, PLEASE CONFIRM

md5 checksum:	913121b61dab04b43f25fec89eb8fc18
size:	15.43 MB (15.56 MB valid)
Settings:	Clear settings after upgrade.

Normally it will take about 2 minutes to flash the new firmware. Then all the LEDS will blink together which indicates that the system reboot with the new firmware.

The firmware version info can be check from this link: Yun Firmware Change log

3 Use with Arduino boards

The Yun Shield use SPI for uploading sketch and use UART port for Bridge class to talk to the AVR. While connects Yun Shield to Arduino Board, below points should be checked:

- Whether the Arduino Board is power by DC jack
- If the board type setting is correct in Yun Shield. ()
- If the board type setting is correct in Arduino IDE
- Whether the Arduino SPI and UART is not influenced by other hardware
- Make sure the UART mode is in Arduino Bridge mode.

3.1 Connects to Arduino Boards

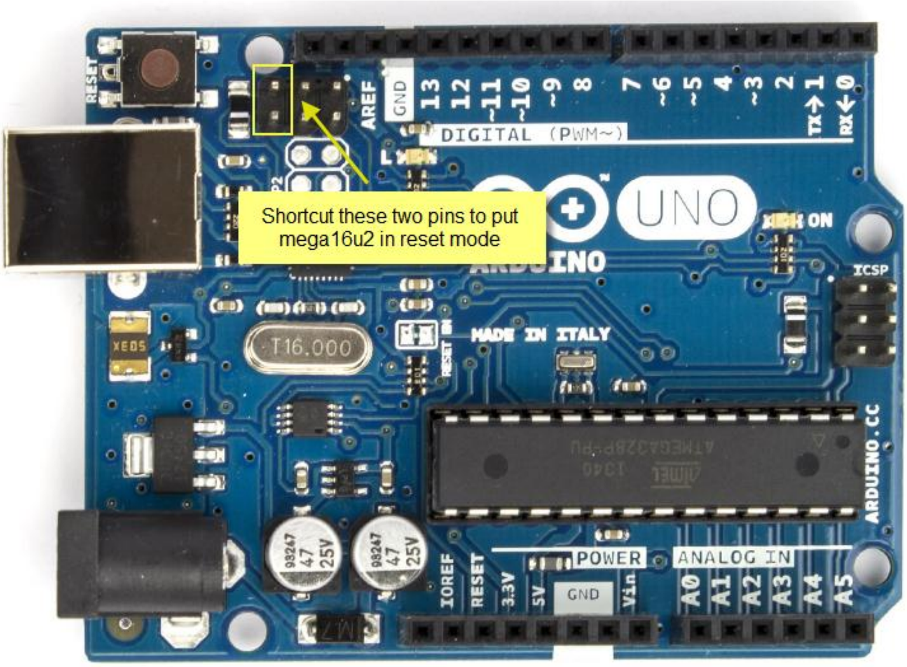
3.1.1 Connect to Leonardo

Simply plug the Yun Shield on top of the Leonardo, and power the Leonardo via DC jack.

In Arduino IDE, the **board type** should select **Arduino Yun.**

3.1.2 Connect to Arduino Uno

1) In UNO, the uart connection between mega328P and mega16u2 will influence the bridge feature with Yun Shield. So we have to disconnect it by set the mega16u2 into reset mode. As below:



Note: USB upgrade/debug won’t work after this change, User will have to upgrade sketch and debug via Arduino IDE via WiFi (see examples)

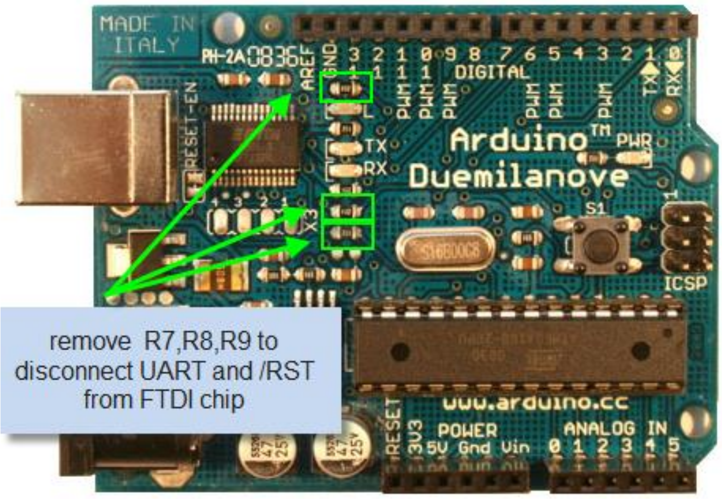
2) Add a “**Uno Yun**” board type in the file: Arduino\hardware\arduino\avr\board.txt. as below and reopen the Arduino IDE:

```
##################################################################
unoyun.name=Arduino Uno -- Dragino Yún
unoyun.upload.via_ssh=true

unoyun.vid.0=0x2341
unoyun.pid.0=0x0043
unoyun.vid.1=0x2341
unoyun.pid.1=0x0001
unoyun.upload.tool=avrdude
unoyun.upload.protocol=arduino
unoyun.upload.maximum_size=32256
unoyun.upload.maximum_data_size=2048
unoyun.upload.speed=57600
unoyun.upload.disable_flushing=true
unoyun.upload.use_1200bps_touch=true
unoyun.upload.wait_for_upload_port=true

unoyun.bootloader.tool=avrdude
unoyun.bootloader.low_fuses=0xff
unoyun.bootloader.high_fuses=0xde
unoyun.bootloader.extended_fuses=0x05
unoyun.bootloader.file=optiboot/optiboot_atmega328.hex
unoyun.bootloader.unlock_bits=0x3F
unoyun.bootloader.lock_bits=0x0F

unoyun.build.mcu=atmega328p
unoyun.build.f_cpu=16000000L
unoyun.build.board=AVR_YUN
unoyun.build.core=arduino
unoyun.build.variant=standard
##################################################################
```

3) Put the Yun Shield on top of Uno and power it via DC jack.

3.1.3 Connect to Arduino Duemilanove/Diecimila

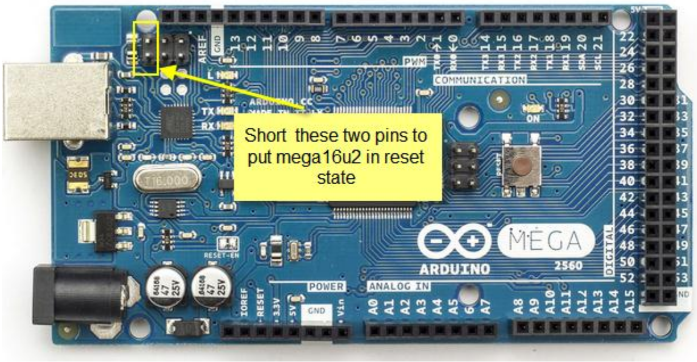
1) In Duemilanove/Diecimila, the mega avr uart interface is connected to the FTDI chip, we have to disconnect them as shown in below picture:



2) Add a "Duemilanove Yun" board type in the file: Arduino\hardware\arduino\avr\board.txt. user can use the UnoYun board type if they has mega328p. for mega328/mega168/mega168p, they can modify the upload.maximum_data_size/ upload.maximum_size and build.mcu accordingly.
3) Put the Yun Shield on top of Duemilanove and power it via DC jack.

3.1.4 Connect to Arduino Mega2560

1) In Mega2560, the uart connection between mega2560 and mega16u2 will influence the bridge feature with Yun Shield. So we have to disconnect it by set the mega16u2 into reset mode. As below:



2) Add a "**Mega2560 Yun**" board type in the file: Arduino\hardware\arduino\avr\board.txt. as below and reopen the Arduino IDE:

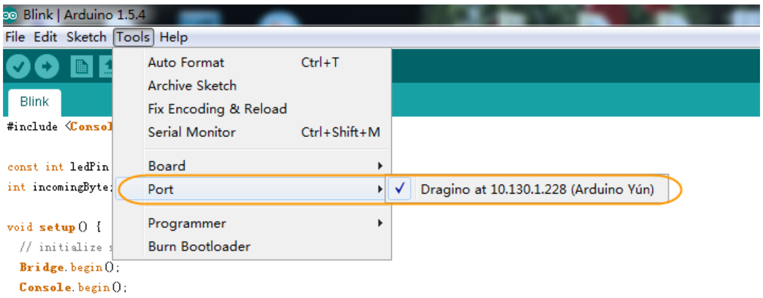
```
##############################################################
```

```
mega2560Yun.name=Arduino Mega 2560 -- Dragino Yún
mega2560Yun.upload.via_ssh=true

mega2560Yun.vid.0=0x2341
mega2560Yun.pid.0=0x0044
mega2560Yun.vid.1=0x2341
mega2560Yun.pid.1=0x003f
mega2560Yun.upload.tool=avrdude
mega2560Yun.upload.protocol=arduino
mega2560Yun.upload.maximum_size=258048
mega2560Yun.upload.maximum_data_size=8192
mega2560Yun.upload.speed=57600
mega2560Yun.upload.disable_flushing=true
mega2560Yun.upload.use_1200bps_touch=true
mega2560Yun.upload.wait_for_upload_port=true

mega2560Yun.bootloader.tool=avrdude
mega2560Yun.bootloader.low_fuses=0xff
mega2560Yun.bootloader.high_fuses=0xd8
mega2560Yun.bootloader.extended_fuses=0xfd
mega2560Yun.bootloader.file=stk500v2/stk500boot_v2_mega2560.hex
mega2560Yun.bootloader.unlock_bits=0x3F
mega2560Yun.bootloader.lock_bits=0x0F

mega2560Yun.build.mcu=atmega2560
mega2560Yun.build.f_cpu=16000000L
mega2560Yun.build.board=AVR_MEGA2560
mega2560Yun.build.core=arduino
mega2560Yun.build.variant=mega
##############################################################
```

3) Put the Yun Shield on top of Mega2560 and power it via DC jack.

3.2 Detect Yun Shield

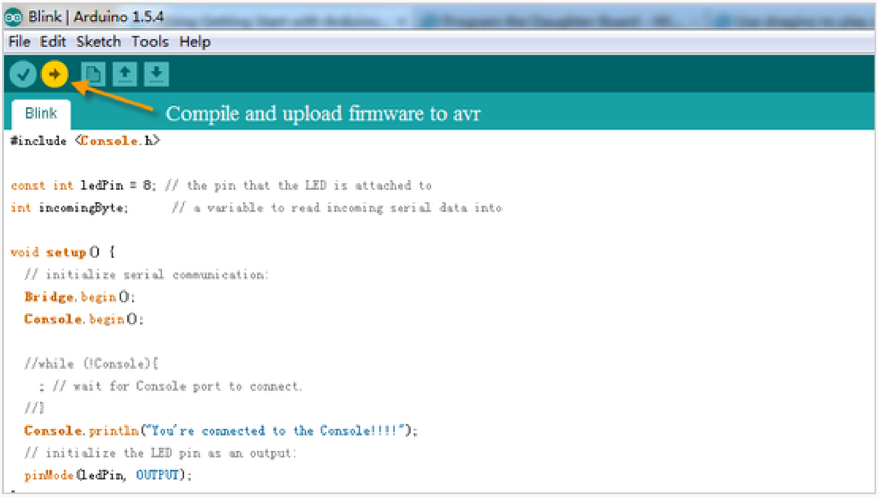
Make sure your laptop and Yun Shield are in the same network. The Yun Shield will broadcast data in this network and the Arduino IDE will receive this data and show the Yun Shield in ***Tools→Port.***



```
#include <Consol

const int ledPin
int incomingByte;

void setup() {
  // initialize
  Bridge.begin();
  Console.begin();
```

3.3 Upload Sketch

1) In the Arduino IDE, choose the correct board type for the AVR module.
2) In Arduino IDE → port, choose the correct port. (should be Arduino Yun port with an ip address)
3) In the Yun Shield GUI → Sensor page, choose the correct board type for upload.
4) Compile the sketch and upload it to the Arduino Board. During upload, The Yun Shield will ask you to key in the password, by default, the password is **arduino**.



Compile and upload firmware to avr

```
#include <Console.h>

const int ledPin = 8; // the pin that the LED is attached to
int incomingByte;      // a variable to read incoming serial data into

void setup() {
  // initialize serial communication:
  Bridge.begin();
  Console.begin();

  //while (!Console){
    ; // wait for Console port to connect.
  //}
  Console.println("You're connected to the Console!!!!");
  // initialize the LED pin as an output:
  pinMode(ledPin, OUTPUT);
```

Compile and Upload sketch in Arduino IDE

3.4 Bridge Library

The Bridge Library simplifies the communication between the Arduino Board and Yun Shield.

Bridge commands from the AVR (Arduino Board) are interpreted by Python on the Yun Shield. Its role is to execute programs on the GNU/Linux side when asked by Arduino, provide a shared storage space for sharing data like sensor readings between the Arduino and the Internet, and receiving commands from the Internet and passing them directly to the Arduino.

There are detail explain and lots of example to show how to use Bridge in the Arduino Official Website. Reference link is: http://arduino.cc/en/Reference/YunBridgeLibrary

4 FAQ

4.1 What is the difference between the official Arduino Yun and Yun Shield?

In Hardware Aspect

Both Arduino Yun and Yun Shield have the same CPU, Memory size and RAM size for the Linux system. The Arduino Yun is an integrated of Linux Part and MCU part, Yun Shield is designed as a shield which can be used with exist Arduino boards.

Basically, The Yun Shield + Arduino Leonardo equally to an Arduino Yun, but Yun Shield is more flexible because it can be used with other Arduino boards such as Arduino Uno, Duemilanove, Diecimila etc.

Yun Shield is duplicable and producible: The design of Yun Shield is open and the most complicate and difficult parts are done in the Dragino HE module. User can purchase the Dragino HE module separately to customized their IoT project and release their variant Yun Solution.

Stable and Flexible WiFi performance: Arduino Yun use chip antenna design, if there is a shield on top of the Arduino Yun, the wifi will be greatly shielded and lead to a poor wifi performance. Instead, Yun Shield use external Antenna design, user can connect different type of antennas to the i-pex connector of Yun Shield, this make the installation is more flexible and possible to transfer the signal to several km distance.

In Software Aspect

The Yun Shield software is derived from Arduino Yun with some bugs fixed; feature added and support more board types.

4.2 Is Yun Shield compatible with a variant Arduino Board?

If the Arduino board is a variant from the boards described in Support Board Type, then it should be compatible. Below is the check list for the compatibility.

- ✓ The variant has 7~15v power in the VIN pin to power the Yun Shield.
- ✓ The variant has same definition and position of SPI pins in the ICSP header as the official board.
- ✓ The variant has same definition and position of D0 and D1 pins in the ICSP header in the official board.
- ✓ Check whether there are ICs connected to the SPI and UART of the AVR and evaluate if they will influence the communication between Yun Shield and the AVR MCU.

The system structure section well explains the working principle of Yun Shield, if user still not sure if Yun Shield is compatible with their board or having trouble in the compatibility. Then can send the board info to support@dragino.com and our support team will review and check it.

4.3 Arduino IDE doesn't detect Yun Shield

Check below points if this issue happens:

- ✓ The Arduino IDE version is 1.5.4 or later
- ✓ Your PC and Yun Shield are in the same network.
- ✓ If Yun Shield boot in advance than Arduino IDE, this may happen. So try to power off/on the Yun Shield and check again.

4.4 How to reset the Yun Shield to factory default?

4.5 Where can I find the source code of Yun Shield?

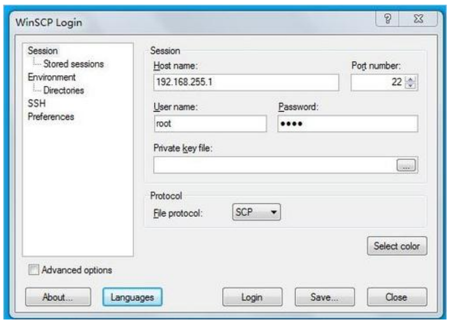
The Yun Shield source can be found at: https://github.com/dragino/linino

4.6 How to Upload, Download or Edit files in Yun Shield

Yun Shield has a built-in Linux system and support SCP protocol. User can upload, download or edit the Linux files using SCP tools.

In windows OS, the scp tool is winscp. Install it and log into Yun Shield as below:

- ✧ Host Name: Yun Shield IP address
- ✧ User Name: root
- ✧ Password: arduino (default)
- ✧ Protocol: SCP



WinSCP Login

Session

Host name: 192.168.255.1

Port number: 22

User name: root

Password: ••••

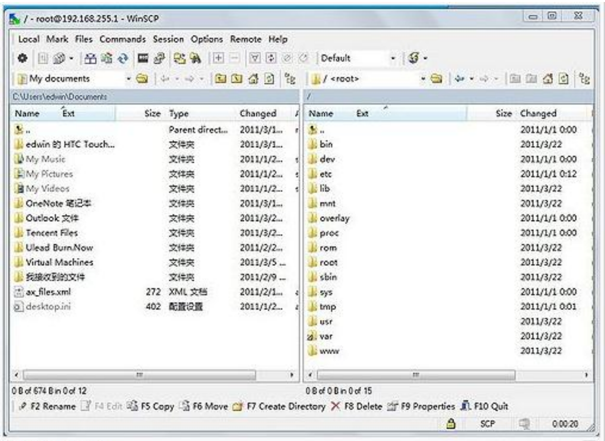
Private key file:

Protocol

File protocol: SCP

□ Advanced options

The log in process will alter two warning, just ignore it. After log in, a management panel will appear. The left part of this panel is your PC's directories and the right part shows the directories of Yun Shield, you can upload/download files by dragging, or double click the files to modify its content.



C:\Users\edwin\Documents

Name	Ext	Size	Type	Changed	A
..			Parent direct...	2011/3/1...	r
edwin 的 HTC Touch...			文件夹	2011/3/1...	
My Music			文件夹	2011/1/2...	s
My Pictures			文件夹	2011/1/2...	s
My Videos			文件夹	2011/1/2...	s
OneNote 笔记本			文件夹	2011/3/1...	
Outlook 文件			文件夹	2011/3/2...	
Tencent Files			文件夹	2011/3/2...	
Ulead Burn.Now			文件夹	2011/2/2...	
Virtual Machines			文件夹	2011/3/5 ...	
我接收到的文件			文件夹	2011/2/9 ...	
ax_files.xml		272	XML 文档	2011/2/1...	a
desktop.ini		402	配置设置	2011/1/2...	a

0 B of 674 B in 0 of 12

/

Name	Ext	Size	Changed
..			2011/1/1 0:00
bin			2011/3/22
dev			2011/1/1 0:00
etc			2011/1/1 0:12
lib			2011/3/22
mnt			2011/3/22
overlay			2011/1/1 0:00
proc			2011/1/1 0:00
rom			2011/3/22
root			2011/3/22
sbin			2011/3/22
sys			2011/1/1 0:00
tmp			2011/1/1 0:01
usr			2011/3/22
var			2011/3/22
www			2011/3/22

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WinSCP Panel

4.7 How to recover the Yun Shield

User may lost access to the Yun Shield by accidently change the Linux configure files to in correct setting, lost password or other caused. He or she is still able to recover the Yun Shield system by using the Failsafe u-boot of Yun Shield. An instruction in Windows is as below:

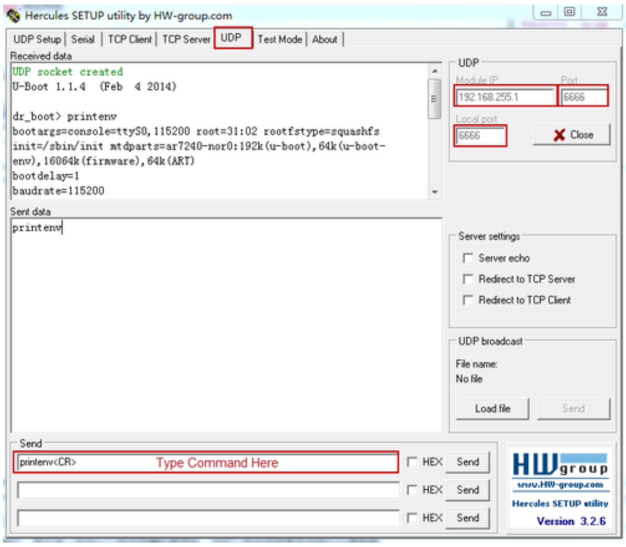
An instruction in Windows is as below:

Set up TFTP server

Download the tftp server (recommend tftp32d.exe). And download the latest Yun firmware from http://www.dragino.com/downloads/index.php?dir=motherboards/ms14/Firmware/Yun/. The firmware we need is the ***kernel*** and ***rootfs-squashfs*** files. Put these firmware files and tftp32d at the same directory. Start the tftp server.

Download Hercules utility

Download Hercules, this is the tool we use to transfer commands to Yun Shield in Failsafe mode. Run Hercules and input correct parameters as below:



```
UDP socket created
U-Boot 1.1.4  (Feb  4 2014)

dr_boot> printenv
bootargs=console=ttyS0,115200 root=31:02 rootfstype=squashfs
init=/sbin/init mtdparts=ar7240-nor0:192k(u-boot),64k(u-boot-
env),16064k(firmware),64k(ART)
bootdelay=1
baudrate=115200
```

Sent data: printenv

UDP — Module IP: 192.168.255.1 Port: 6666 Local port: 6666 ✕ Close

Server settings: □ Server echo □ Redirect to TCP Server □ Redirect to TCP Client

UDP broadcast — File name: No file

Send: printenv<CR> Type Command Here □ HEX Send

Protocol:	UDP
Module IP:	192.168.255.1
Port:	6666
Local port:	6666

Connect your PC to Yun Shield

Connect the PC and Yun Shield via an Ethernet cable. Set up PC with below LAN IP **192.168.255.2** and netmask **255.255.255.0**. Disable PC's firewall.

Power up Yun Shield to Failsafe mode

Press the Failsafe button and power up Yun Shield; user will see all the LEDs blink together, release the button after 10 seconds and there are some messages will pop up in the **Hercules** panel, which means the Yun Shield has been in Failsafe Netconsole mode and ready to access commands.

User can type the commands in Hercules to transfer and upgrade Yun Shield to the latest firmware with factory settings.

The commands are as below, replace the xxx with the actually version.

Upgrade Kernel

```
tftpboot 0x81000000 ms14-arduino-yun-kernel-xxx.bin
erase 0x9fea0000 +0x140000
cp.b 0x81000000 0x9fea0000 $filesize
```

Upgrade rootfs

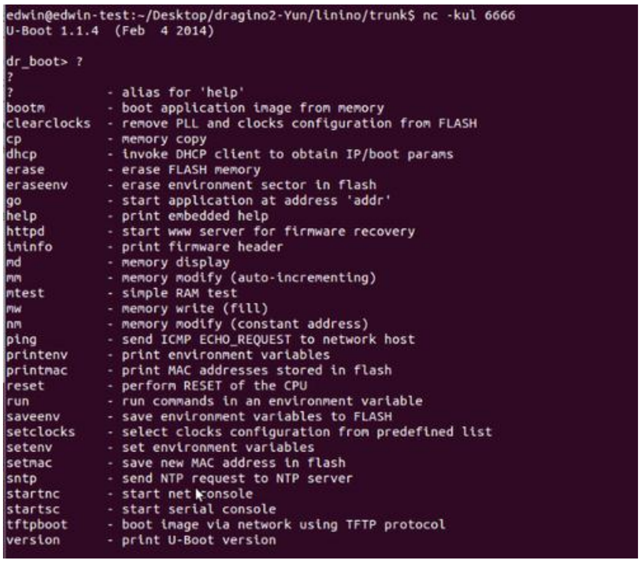
```
tftpboot 0x81000000 ms14-arduino-yun--rootfs-squashfs-xxx.bin
erase 0x9f050000 +0xe50000
cp.b 0x81000000 0x9f050000 $filesize
```

Reset to the new firmware

```
reset
```

Warning: User should use exactly address number in the erase and cp.b shows, wrong address number may properly destroy the boot-loader of Yun Shield and the device won't boot anymore. Or destroy the radio data of Yun Shield which may lead to a poor wifi performance or incorrect MAC addresses.

Recover in Linux is similar with Windows, the mail different is that the tool use in Linux is **nc** and runs with **nc -kul 6666.** Below shows that the Yun Shield has been in Failsafe Netconsole mode and detected by nc.



```
edwin@edwin-test:~/Desktop/dragino2-Yun/linino/trunk$ nc -kul 6666
U-Boot 1.1.4  (Feb  4 2014)

dr_boot> ?
?
?             - alias for 'help'
bootm         - boot application image from memory
clearclocks   - remove PLL and clocks configuration from FLASH
cp            - memory copy
dhcp          - invoke DHCP client to obtain IP/boot params
erase         - erase FLASH memory
eraseenv      - erase environment sector in flash
go            - start application at address 'addr'
help          - print embedded help
httpd         - start www server for firmware recovery
iminfo        - print firmware header
md            - memory display
mm            - memory modify (auto-incrementing)
mtest         - simple RAM test
mw            - memory write (fill)
nm            - memory modify (constant address)
ping          - send ICMP ECHO_REQUEST to network host
printenv      - print environment variables
printmac      - print MAC addresses stored in flash
reset         - perform RESET of the CPU
run           - run commands in an environment variable
saveenv       - save environment variables to FLASH
setclocks     - select clocks configuration from predefined list
setenv        - set environment variables
setmac        - save new MAC address in flash
sntp          - send NTP request to NTP server
startnc       - start net console
startsc       - start serial console
tftpboot      - boot image via network using TFTP protocol
version       - print U-Boot version
```

5 Reference

- ✧ Arduino Yun Bridge Official page
  http://arduino.cc/en/Reference/YunBridgeLibrary

- ✧ Arduino Yun Official Forum
  http://forum.arduino.cc/index.php?board=93.0

- ✧ Reference Board Type File (1.5.6-r2):

- ✧ Yun Shield hardware source

- ✧ Arduino Yun Source Code
  https://github.com/dragino/linino