

MCU Development environment setup

 ${\sf Device \ Development} > {\sf Tuya \ Development \ Boards} > {\sf Tuya \ Sandwich}$

Evaluation Kits > Development Guide

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1 Overview

The main control board in the Tuya Sandwich Evaluation Kits supports two non-Graffiti manufacturing development boards:

- Arduino UNO
- ST Nucleo

Arduino is the most popular open source hardware in the world and an excellent hardware development platform. Arduino's simple development method allows developers to pay more attention to creativity and implementation, and complete their own project development faster, which greatly saves the cost of learning and shortens the development cycle.

Arduino UNO version can follow the Arduino Official Tutorial for operation.

ST Nucleo uses STM32Nucleo-G071RB as the main control. Its development method is fully compatible with Arduino. Therefore, we need ST driver support in the development environment and install the Arduino IDE. This article explains in detail the **development environment of ST Nucleo** under Windows.



2 Download Arduino IDE

Arduino IDE (click to download) is software used to write Arduino programs. After writing the programs, you can upload them to Tuya Sandwich Development through this software. Execute in the board.



- 3 Install STlink driver
 - Windows system: click to download.

After the driver is downloaded, run the installation as an administrator, connect the Micro-USB to the computer and the development board, open the computer device manager and the following figure appears, indicating that the driver installation was successful



Note: Micro-USB cable must have data transmission function

4 Arduino IDE configuration

The main control board of the Tuya Sandwich Evaluate Kit is STM32Nucleo-G071RB, which is not supported by default in the Arduino IDE. So we should use the following operations to make the Arduino IDE support our development board.

4.1 Install support of Development board

Path: Menu bar-File-Preferences



Figure 1: 微信截图 _20200212173846.png



Preferences			\times
Settings Network			
Sketchbook location:			
D:\Documents\Arduino			Browse
Editor language:	English (English) v (requires restar	rt of	Arduino)
Editor font size:	12		
Interface scale:	Automatic 100 🐳 (requires restart of Arduino)		
Theme:	Default theme v (requires restart of Arduino)		
Show verbose output during:	compilation upload		
Compiler warnings:	None 🗸		
Display line numbers	Enable Code Folding		
✓ Verify code after upload	Use external editor		
Check for updates on star	tup 🔽 Save when verifying or uploading		
Use accessibility feature	s		
Additional Boards Manager UF	Ls: lino/BoardManagerFiles/raw/master/STM32/package_stm_index.json 🔲		
More preferences can be edit	ed directly in the file		
C:\Users\envyr5\AppData\Loca	l\Arduino15\preferences.txt		
(edit only when Arduino is r	ot running)		
	01	ĸ	Cancel

Figure 2: 微信截图 _20200212173914.png

Fill in the following URL and click ox:

https://github.com/stm32duino/BoardManagerFiles/raw/master/STM32/package_stm_index.
json

Select Tools-> Evaluate Kit -> Board Manager to install the corresponding development board. The main control of Tuya Sandwich Evaluate Kit is STM32Nucleo-G071RB,so enter STM32 in the search box, and clickInstall.



MCU Development environ the AR Set UNO IDE CONFIGURATION

File Edit Sketch Tools Help Auto Format Ctrl+T Boards Manager sketch_feb12a Auto Format Ctrl+T Arduino AVR Boards void setup() Fix Encoding & Reload Arduino AVR Boards // put your Serial Monitor Ctrl+Shift+H serial Monitor Ctrl+Shift+H void loop() Board: "Nucleo-64" Arduino Duo // put your Board part number: "Nucleo G071R8" Arduino Mega or Mega 2560 // put your Board part number: "Nucleo G071R8" Arduino Mega or Mega 2560 // put your Board part number: "Nucleo G071R8" Arduino Mega or Mega 2560 // put your Board part number: "Nucleo G071R8" Arduino Mega or Mega 2560 // put your Board part number: "Nucleo G071R8" Arduino Mega or Mega 2560 // put your Board part number: "None" Arduino Mega or Mega 2560 // put your Board part number: "None" Arduino Mega or Mega 2560 // put your Board part number: "None" Arduino Mega or Mega 2560 // put your Board part number: "None" Arduino Mega or Mega 2560 // put your Board part number: "None" Arduino Mega or Mega 2560 // put yo	💿 sketch_feb12a	a Arduino 1.8.11	-	
Auto Format Ctrl+T Boards Manager sketch_feb12a Archive Sketch	File Edit Sketch	Tools Help		
sketch_feb12a Fix Encoding & Reload Arduino AVR Boards void setup () // put your Serial Monitor Ctrl+Shift+I > Void loop () { Board: "Nucleo-64" Arduino Mega or Mega 2560 void loop () { Board: "Nucleo-64" Arduino Mega or Mega 2560 // put your Board part number: "Nucleo G071RB" Arduino Leonardo U(S)ART support: "Enabled (generic 'Serial')" Arduino Leonardo USB support (if available): "None" Arduino Mirio USB support (if available): "None" Arduino Mirio Optimize: "Smallest (-Os default)" Arduino Fio Upload method: "STM32CubeProgrammer (SWD)" Arduino BT Programmer: "AVRISP mkII" LilyPad Arduino Burn Bootloader Arduino VSB		Auto Format Archive Sketch	Ctrl+T	Boards Manager
} Arduino Duerinianove of Diecinina void loop() Fii101 / WiFiNINA Firmware Updater Arduino Mega or Mega 2560 Board: "Nucleo-64" Arduino Mega or Mega 2560 U(S)ART support: "Enabled (generic 'Serial')" Arduino Leonardo U(S)ART support: "Enabled (generic 'Serial')" Arduino Leonardo ETH USB support (if available): "None" Arduino Micro USB speed (if available): "Low/Full Speed" Arduino Esplora Optimize: "Smallest (-Os default)" Arduino Ethernet Upload method: "STM32CubeProgrammer (SWD)" Arduino BT Ede Board Info LilyPad Arduino USB Programmer: "AVRISP mkll" LilyPad Arduino Burn Bootloader Arduino NG or older	sketch_feb12a void setup() // put your	Fix Encoding & Reload Manage Libraries Serial Monitor Serial Plotter	Ctrl+Shift+I Ctrl+Shift+M Ctrl+Shift+I	Arduino AVR Boards Arduino Yún Arduino Uno Arduino Duomilanouo er Diocimila
// put your Board part number: "Nucleo G071RB" Arduino Mega ADK } Board part number: "Nucleo G071RB" Arduino Leonardo U(S)ART support: "Enabled (generic 'Serial')" Arduino Leonardo ETH USB support (if available): "None" Arduino Micro USB speed (if available): "Low/Full Speed" Arduino Micro Optimize: "Smallest (-Os default)" Arduino Mini C Runtime Library: "Newlib Nano (default)" Arduino Ethernet Upload method: "STM32CubeProgrammer (SWD)" Arduino BT Get Board Info LilyPad Arduino USB Programmer: "AVRISP mkll" LilyPad Arduino Burn Bootloader Arduino NG or older	} void loop() {	WiFi101 / WiFiNINA Firmware Updater)	Arduino Duemilanove or Diecimila Arduino Nano Arduino Mega or Mega 2560
C Runtime Library: "Newlib Nano (default)" Upload method: "STM32CubeProgrammer (SWD)" Port Get Board Info Programmer: "AVRISP mkII" Burn Bootloader Arduino Ethernet Arduino Fio Arduino BT LilyPad Arduino USB LilyPad Arduino Arduino Pro or Pro Mini Arduino Pro or Info	// put your	Board part number: "Nucleo G071RB" U(S)ART support: "Enabled (generic 'Serial')" USB support (if available): "None" USB speed (if available): "Low/Full Speed" Optimize: "Smallest (-Os default)"	> > > >	Arduino Mega ADA Arduino Leonardo Arduino Leonardo ETH Arduino Micro Arduino Esplora Arduino Mini
Programmer: "AVRISP mkII" > LilyPad Arduino Burn Bootloader Arduino Pro or Pro Mini Arduino NG or older Arduino NG or older		C Runtime Library: "Newlib Nano (default)" Upload method: "STM32CubeProgrammer (SW Port Get Board Info	> D)" >	Arduino Ethernet Arduino Fio Arduino BT LilyPad Arduino USB
		Programmer: "AVRISP mkll" Burn Bootloader	>	LilyPad Arduino Arduino Pro or Pro Mini Arduino NG or older

Figure 3: a9c5db5af66dcc69391aed590d71709.png

🐵 Boards Manager	\times
Type All v stm32	
 STM32 Cores by STMicroelectronics version 1.8.0 INSTALLED Boards included in this package: Nucleo F207ZG, Nucleo F492ZI, Nucleo F767ZI, Nucleo H743ZI, Nucleo F303RE, Nucleo L496ZG, Nucleo L495ZG-P, Nucleo L4RSZI, Nucleo F401RE, Nucleo F401RE, Nucleo F405RE, Nucleo F403RB, Nucleo F303RE, Nucleo L495ZF, Nucleo L432RE, Nucleo F405RE, Nucleo G71RB, Nucleo F030RB, Nucleo L033RB, Nucleo L073RZ, Nucleo L152RE, Nucleo L452RE, Nucleo L452RE-P, Nucleo L476RG, P-Nucleo WB55RG, Nucleo L031KG, Nucleo L432KC, Nucleo F303RE, Nucleo L432KE, Nucleo L432KE, STM32F0728-DISCOVERY, STM32E7100RB-DISCVL, STM32F407G-DISCOVERV, STM32E7030F4 Demo board, STM32F030F4 Demo board, STM32F030F4 Demo board (16Mhz), STM32F030F4 Demo board (internal RC oscillator), BluePill F103CG (32K), BluePill F103CG, BluePill F103CB, BluePill F103CB, BluePill F103CB, BluePill F103CB, BluePill F103CB, BluePill F103CB, BluePill F103CC (128k), Generic F103RBT6 (Blue Button), Generic F103RBT6 (Blue Button),	~
Clos	se

Figure 4: 微信截图 _20200212174703.png

4.2 Development board configuration

After the development board is installed, the developer can choose the corresponding model according to the type of the development board. The type of the graffiti sandwich development board in the Arduino IDE is displayed as Nucleo-64, and the model is displayed as Nucleo G071RB. So we perform the following configuration:

nift+l nift+M nift+L
Arduino AVR Boards Arduino Vún Arduino Uno Arduino Duemilanove or Diecimila Arduino Nano Arduino Mega or Mega 2560 Arduino Leonardo Arduino Leonardo Arduino Saplora Arduino Esplora Arduino Ethernet Arduino Fio
Arduino BT LilyPad Arduino USB LilyPad Arduino Arduino Pro or Pro Mini Arduino NG or older Arduino Robot Control Arduino Robot Motor Arduino Gemma Adafruit Circuit Playground Arduino Industrial 101 Linino One Arduino Uno WiFi STM32 Boards (selected from submenu) Nucleo-144 Nucleo-64

Figure 5: f52cdc4bae105081bebfd8a286c4e28.png

Path: Menu Bar-Tools- Evaluate Kit



Selection: Nucleo-64

File Edit Sketch	Tools Help				
	Auto Format	Ctrl+T			
	Archive Sketch				
sketch_feb12a	Fix Encoding & Reload				
void setup()	Manage Libraries	Ctrl+Shift+I			
// put your	Serial Monitor	Ctrl+Shift+M			
* *	Serial Plotter	Ctrl+Shift+L			
}	WiFi101 / WiFiNINA Firmware Updater				
			-		
Void 100p() {	Board: "Nucleo-64"	>			1
// put your	Board part number: "Nucleo G071RB"	>		Nucleo F030R8	
3	U(S)ART support: "Enabled (generic 'Serial')"	>		Nucleo F091RC	
,	USB support (if available): "None"	>		Nucleo F103RB	
	USB speed (if available): "Low/Full Speed"	>		Nucleo F302R8	
	Optimize: "Smallest (-Os default)"	>		Nucleo F303RE	
	C Runtime Library: "Newlib Nano (default)"	>		Nucleo F401RE	
	Upload method: "STM32CubeProgrammer (SWD)"	' >		Nucleo F411RE	
	Port	>		Nucleo F446RE	
	Get Board Info		٠	Nucleo G071RB	
	Programmer: "AVRISP mkll"	2		Nucleo G431RB	
	Burn Bootloader	í		Nucleo G474RE	
	bum bootloader			Nucleo L053R8	

Figure 6: 微信截图 _20200212174823.png

Path: Menu Bar-Tools-Board part number

Selection: Nucleo G071RB



MCU Development environ the AR Set UNO IDE CONFIGURATION

File Edit Sketch T	ools Help		
	Auto Format	Ctrl+T	
	Archive Sketch		
sketch_feb12a	Fix Encoding & Reload		
void setup()	Manage Libraries	Ctrl+Shift+I	
// put your	Serial Monitor	Ctrl+Shift+M	
	Serial Plotter	Ctrl+Shift+L	
}	WiFi101 / WiFiNINA Firmware Updater		
<pre>void loop() {</pre>	Board: "Nucleo-64"	>	
// put your	Board part number: "Nucleo G071RB"	>	
,	U(S)ART support: "Enabled (generic 'Serial')"	>	
3	USB support (if available): "None"	>	
	USB speed (if available): "Low/Full Speed"	>	
	Optimize: "Smallest (-Os default)"	>	
	C Runtime Library: "Newlib Nano (default)"	>	
	Upload method: "STM32CubeProgrammer (SWD)"	>	Mass Storage
	Port		• STM32CubeProgrammer (SWD)
	Get Board Info		STM32CubeProgrammer (Serial)
	Programmer: "A\/BISP.mkII"	>	STM32CubeProgrammer (DFU)
	Burn Bootloader	,-	

Figure 7: 7d55f9bdddb2a71afeb6e13c25c5b15.png

Path: Menu bar-Tools-Upload method

Select: STM32CubeProgrammer (SWD)



<u>F</u> ile <u>E</u> dit <u>S</u> ketch	<u>T</u> ools <u>H</u> elp		
sketch_feb12a	Auto Format Archive Sketch Fix Encoding & Reload	Ctrl+T	
void setup() // put your	Manage Libraries Serial Monitor Serial Plotter	Ctrl+Shift+I Ctrl+Shift+M Ctrl+Shift+L	
}	WiFi101 / WiFiNINA Firmware Updater		
<pre>void loop() { // put your }</pre>	Board: "Nucleo-64" Board part number: "Nucleo G071RB" U(S)ART support: "Enabled (generic 'Serial')" USB support (if available): "None" USB speed (if available): "Low/Full Speed" Optimize: "Smallest (-Os default)" C Runtime Library: "Newlib Nano (default)" Upload method: "STM32CubeProgrammer (SWD)"	> > > > > > > > > > > > > > > > > > > >	Select your
	Port Get Board Info	>	Serial ports COM4 COM5
	Programmer: "AVRISP mkll" Burn Bootloader	X	COMO

Figure 8: 0e24f770f882323e26f6e00727b2c87.png

Path: Menu Bar-Tools-Port

Selection: Select the appropriate port according to the connection between the development board and your computer

The rest of the options in the toolbar can keep the default configuration (recommended), or you can change it according to your needs.



5 Download Preparation

The Tuya Sandwich Evaluation Kits uses STM32Nucleo-G071RB as the main control and uses the Arduino IDE to write the STM32 code. You need to download the STM32CubeProgrammer software to download the code to the development board.

Install STM32CubeProgrammer (click to download), under the software installation path The bin file path to the system environment variable.



Figure 9: WXWorkCapture_15816378656916.png



	System Properties	\times	l
	Computer Name Hardware Advanced System Protection Remote		e
t	You must be logged on as an Administrator to make most of these changes. Performance Visual effects, processor scheduling, memory usage, and virtual memory Settings		
	User Profiles Desktop settings related to your sign-in S <u>e</u> ttings		
(-	Startup and Recovery		l
n	System startup, system failure, and debugging information		l
s	Se <u>t</u> tings		
	Enviro <u>n</u> ment Variables		
	OK Cancel Apply		

Figure 10: WXWorkCapture_1581637880842.png

Variable	/ Value	
OneDrive	E:\Onedrive\OneDrive - stu.zucc.edu.cn	
OneDriveCommercial	E:\Onedrive\OneDrive - stu.zucc.edu.cn	
OneDriveConsumer	C:\Users\cxc19\OneDrive	
Path	C:\Users\cxc19\AppData\Local\Microsoft\WindowsApps;D:\c	
TEMP	C\Users\cxc19\AppData\Local\Temp	
TMP	C:\Users\cxc19\AppData\Local\Temp	
New Edit Delete		

Figure 11: WXWorkCapture_15816379332537.png



Edit environment variable	×
%USERPROFILE%\AppData\Local\Microsoft\WindowsApps D:\code\ffmpeg-20190601-4158865-win64-static\bin d:\Program Files\GPAC D:\Programs\Microsoft VS Code\bin	<u>N</u> ew
D:\STM32Cubeprog\bin	<u>B</u> rowse
Input your bin path	<u>D</u> elete
	Move <u>U</u> p
	Move D <u>o</u> wn
	Edit <u>t</u> ext
OK	Cancel

Figure 12: WXWorkCapture_1581638028701.png



6 Summary

At this point, the development environment of the graffiti sandwich development board is completed. We can write the application code in the Arduino IDE and download it to the development board.

Mac OS and Linux support the above solutions at the same time, the STM32CubeProgrammer software needs to be downloaded in the "Ready to Download" section (click to download) to install the driver.