

Cloud Module Guide

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1. Introduction

The cloud module can be used to run SAM circuits without the need for a laptop or desktop computer. Your cloud module will have to be nearby for the initial set up, but after that you can set up circuits from the app, and then push them to your cloud module from anywhere in the world.

For the video tutorial, see the link at the top of www.samlabs.me/cloud

Note 1: You will be required to be running at least version 1.0.3 of the SAM app, for the cloud module to work correctly. You can check your version number by opening the SAM app and going to SAM > About SAM. The latest version is available from <http://samlabs.me/app>

Note 2: We only support one cloud module per user. If you add a second cloud module to your account, the first one will be overwritten.

2. First time setup

2.1. Getting acquainted with the hardware

Dongles

If you received a cloud module as part of a SAM Pro kit, you will have found that the kit came with three dongles: 2 identical Bluetooth dongles and one Wi-Fi dongle with 802.11n written on it. One of the Bluetooth dongles and the Wi-Fi dongle are needed for the cloud module. Please insert them into the USB ports as shown in figure 2.1, with the Wi-Fi dongle on the left, and the Bluetooth dongle on the right.

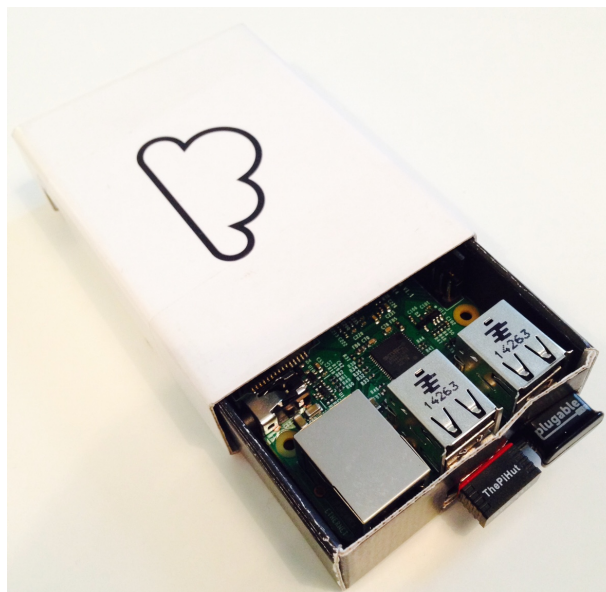


Figure 2.1: cloud module dongles

Charging cable

You will also have received a 50cm micro USB charging cable in the box, this must be used to connect the cloud module to power – the cloud module must be plugged in at all times. We recommend that you power the module directly from a mains socket via an adapter, rather than through a USB hub or from a laptop, as the current provided may be insufficient to guarantee correct functionality.

SD card and LEDs

On the opposite side of the cloud module from the USB dongles, there is a micro SD card slot. For the cloud module to function, this SD card must be loaded with the SAM Cloud image and inserted correctly. The SD card should be inserted as shown in figure 2.2. To remove it, push it into the module, and it will pop out. For instructions on how to burn the SAM Cloud image onto the SD card, see section 2.2. To the left of the SD card are two small LEDs (one green, one red); see section 6.1 to find out more about how to interpret these LEDs.

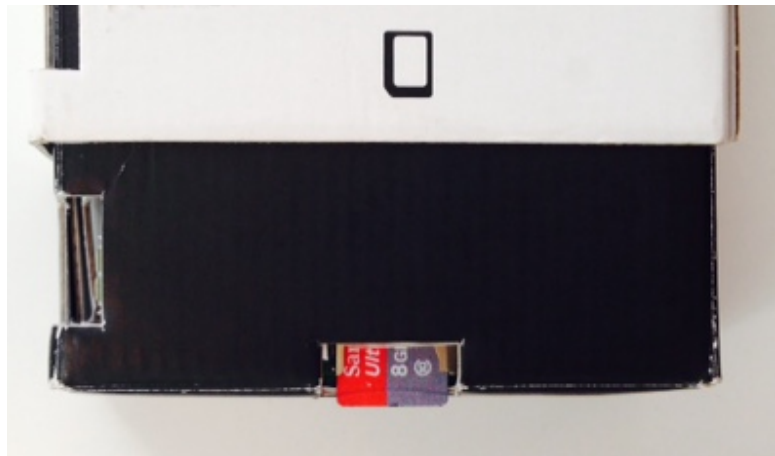


Figure 2.2 cloud module SD card

2.2 Burning the cloud module image onto the SD card

You will need to perform this step if:

1. You received your kit before October 2015, and the cloud module came with a blank SD card
2. You have corrupted your SD card and need to flash a new image. For example, if you remove the SD card while the cloud module is switched on
3. You would like to update your cloud module to the latest version

Requirements:

- You will need 10GB free space on your computer to burn the cloud module image
- Internet connection to download the cloud module image

Instructions:

1. Go to <https://samlabs.me/cloud> and download the cloud module burner for your platform
2. Remove the SD card from the cloud module by pressing the card into the cloud module. The SD card will bounce back out
3. Slot the SD card into the included SD card reader, and place it into your USB port
4. For Mac and Windows, run the cloud module burner (takes 20mins - 1hr depending on the internet speed)
 - For Linux, or if the cloud module burner does not run on your machine, follow the alternative instructions outlined for each platform on <https://samlabs.me/cloud>
5. Once the image has been successfully burned, eject the SD card from your computer, and remove it from your laptop
6. Take the SD card out of the SD card reader and push it back into the cloud module, as shown in figure 2.2.
7. You are now ready to proceed to the next step!

3. Pairing the cloud module with your account

1. Connect your cloud module to the power supply via the micro USB cable provided
2. Wait until the cloud module fully boots and appears on the SAM app (about 30 seconds)
3. Pair with the cloud module by clicking on the module, and selecting the tick as shown in figure 3.1.

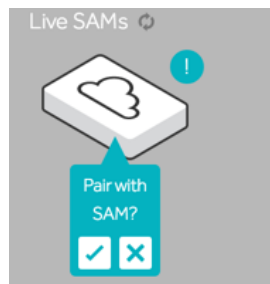


Figure 3.1 Pairing cloud module

4. After successful pairing drag and drop it onto the board and double click to see the settings menu. You are now ready to proceed to step 4 and configure the cloud module Wi-Fi.

4. Configuring Wi-Fi for the cloud module

4.1 Initial Wi-Fi Set up

1. Once you have dragged your cloud module onto the board for the first time, select your Wi-Fi network from the drop down in the settings menu and enter your credentials as shown in figure 4.1. Press 'Connect' to submit

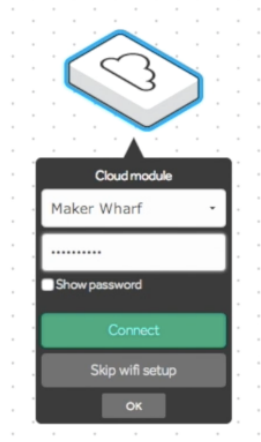


Figure 4.1 Cloud module WiFi

2. Once you have entered successful Wi-Fi credentials, the cloud module will automatically reboot into a new mode. The whole process takes around 90 seconds.

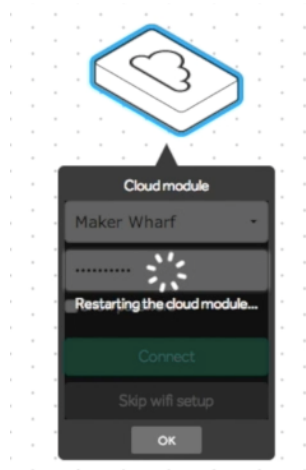


Figure 4.2. Cloud module reboot

3. After successful Wi-Fi configuration and reboot, a notification in the bottom right will inform you that your cloud module is online (figure 4.3) , and the module will have a new settings menu when you double click on it (figure 4.4).

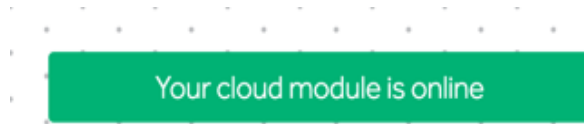


Figure 4.3 cloud module online notification

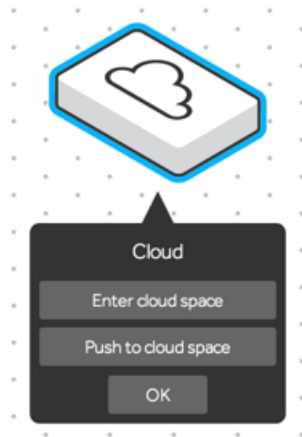


Figure 4.4. Cloud module online settings menu

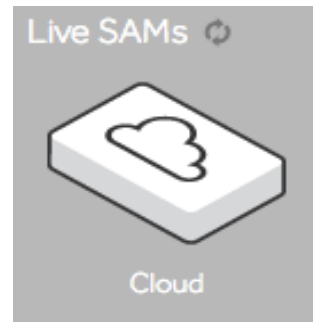


Figure 4.5 Cloud module in Live SAMs

4.2 Changing Wi-Fi configuration settings

If you change the Wi-Fi set up in your home or would like to setup the cloud module in a new location, you can follow the instructions below to update the Wi-Fi credentials on your cloud module:

1. Log into the SAM app
2. Unplug the cloud module and plug it back in
3. Wait until the SAM cloud appears on Live SAMs (figure 4.5)
4. Drag the cloud module onto the board and repeat the steps for connecting to Wi-Fi from section 4.1.

Note that you must drag the module onto the board within 30 seconds of it appearing, otherwise you will see the settings menu from figure 4.4., rather than the one for Wi-Fi set up.

5. Using the cloud module

After setting up the cloud module, you can push any SAM circuit in the SAM app to the cloud module. You can also view what is on the cloud module using the cloud space view.

5.1. Pushing a SAM circuit

Follow these instructions if you'd like one of your SAM circuits to run permanently (until you overwrite it or switch off the cloud module) on the cloud module.

1. Login to the SAM app and load the SAM circuit you would like to run from your cloud module
2. Switch on your cloud module, wait for it to boot and drag it onto the board
3. Note that if you drag the cloud module onto the board within 30 seconds of the connection being established, it will give you the option to configure the Wi-Fi settings. If you have already configured the settings, simply select 'Skip Wi-Fi set up' to view the settings menu in figure 5.1.
4. There are 2 ways to push the SAM circuit to the cloud module:
 - a. If the cloud module is in the Live SAMs, drag it on to the board. Double click on it to open the settings menu, and click on "Push to cloud space" (figure 5.1)

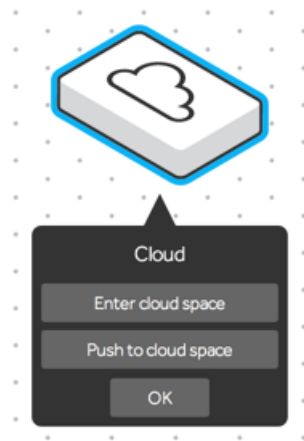


Figure 5.1 Cloud menu



Figure 5.2 Push to cloud icon

- b. Another way to push to the cloud module is to click on the bottom left cloud icon on the board, available when the cloud module is online (figure 5.2)
5. Once you have completed step 4, the circuit will be running on your cloud. You can either switch off your laptop to allow the cloud module to take control, or you can enter cloud space to view the circuit running on the cloud module.

5.2. Cloud Space

To view the circuit that you pushed to the cloud space, you can enter cloud space.

To enter cloud space on the SAM app:

1. Drag the cloud module onto the board
2. Double click on the cloud module to open the popup menu and click on the "Enter Cloud Space" button (first option in figure 5.1)
3. Note that the cloud space is read only and cannot be changed.
 - a. It also disconnects all your SAM modules, so that the cloud module can connect to them.
4. To close the cloud space, click on the "x" on the top right

5.3 Un-pairing your cloud module

Like the SAM modules, the cloud module can be unpaired. For example, you might want to do this if you would like to give the cloud module to a friend. You may also need to un-pair your module if you are experiencing connection issues.

There are two ways to un-pair the cloud module

1. If the cloud module is online (i.e. the settings menu looks like it does in figure 5.1), you can un-pair using the SAM app, by clicking on My SAMs > Edit Modules > "x" button on the cloud module (as shown in figure 5.3)

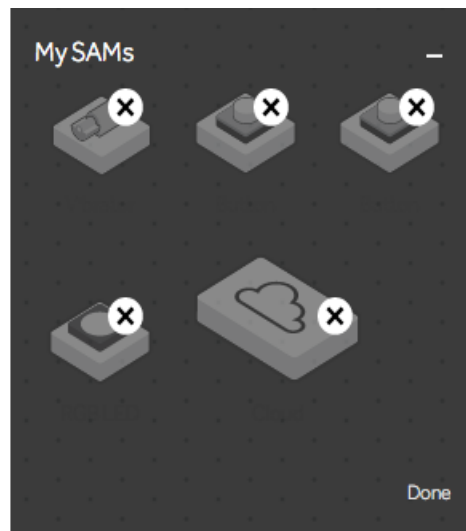


Figure 5.3 Un-pairing cloud module while online

2. If the cloud is offline, carefully open the box that houses the cloud module.

- a. Pull out the small piece of black plastic that sits between the last two pins on the top row on the cloud module (it's called the 'jumper'), when the USB ports are on the right



Figure 5.4 Jumper on (paired)



Figure 5.5 Jumper off (un-paired)

- b. Reconnect the cloud module to the power source and wait for it to boot up (with the jumper disconnected from the module as shown in figure 5.5)
- c. Set up the cloud by following the instructions starting at section 3, and place the black jumper back into position as shown in figure 5.4 once you have reached the end of section 3.

5.4 Skip Wi-Fi setup



Figure 5.6 Skip Wi-Fi set-up

When restarting the cloud module after setting it up with Wi-Fi credentials, there is a 30s period on startup, which allows the Wi-Fi credentials to be changed.

If you drag the cloud module onto the board in this time, the Wi-Fi setup will start, and you can setup your Wi-Fi credentials. If you don't want to do this, then click on 'Skip Wi-Fi setup' as shown in figure 5.6.

6. Troubleshooting

6.1 Cloud module LED states

On the front of your cloud module, you will see two small LED that start blinking when the module is initially connected. The colour of these LEDs will tell you what the state of the cloud module is, and are therefore very helpful for troubleshooting and following the set up process.

Cloud module lights	Description
Initial sporadic red blinking and green blinking	When first plugged in, the cloud module sporadically blinks red and blinks green to startup (about 30s)
Both lights off	Cloud module application is starting up
Blinking red	Cloud module started, and is waiting to pair (see section 3)
Blinking red and blinking green	Cloud module has been paired, and Wi-Fi can be setup (see section 4)
Green on only	Cloud module is set up and is online
Green on, red blinking	Cloud module is running, but there was a problem with the connection to the internet e.g. Wi-Fi credentials not set, or there is an internet disruption
Red on only	Something went wrong during setup or startup. See the troubleshooting section
Green Blinking	Something went wrong when trying to connect to Wifi – restart your cloud module and reconfigure Wifi settings

6.2 Known sporadic glitches

Solid Red light

Solve by rebooting the cloud module, as follows:

1. Unplug the cloud module
2. Take out the Wi-Fi and Bluetooth USB dongles from the cloud module
3. Plug the Wi-Fi and Bluetooth USB dongles back into the cloud module
4. Plug the cloud module back in
5. If it does not work, try unplugging and plugging in the cloud module again
6. If this still does not fix it, you can try burning a new cloud module image. Follow the burning instructions above

Red light flickering on starting up, but never fully boots

This is most likely because the cloud module does not have enough power to operate. If you are powering it through a USB port on your computer, please try and plug it into a mains socket

Red light blinking red

If the cloud module is blinking red, but you can't see it in the software, you will have to un-pair it. Follow the un-pairing instructions in section 5.3.

Cloud module blinks (appears and disappears) in the SAM app when trying to set up

Sometimes the Bluetooth can be unstable when trying to connect to the cloud module. To fix this, follow the "Solid Red light" reboot instructions above

No Wi-Fi networks show up when trying to connect cloud module to Wi-Fi

Occasionally the app is unable to discover local Wi-Fi networks. The solution is to restart your computer.

7. Frequently Asked Questions

Can I use my cloud module remotely?

You must have your cloud module next to you for initial set-up, but once it is configured once, there is no need for it to be nearby, and as long as it is connected to Wi-Fi, you can push circuits to it from anywhere in the world!

Do I have to be logged in to use the cloud module?

Yes, for obvious security reasons, only the user that has configured the cloud module and paired it with their account can access it and push circuits to it. If you are not logged in, you will not be able to access your cloud.