Sonoff 4CH Pro on HomeSeer HS3 with MQTT

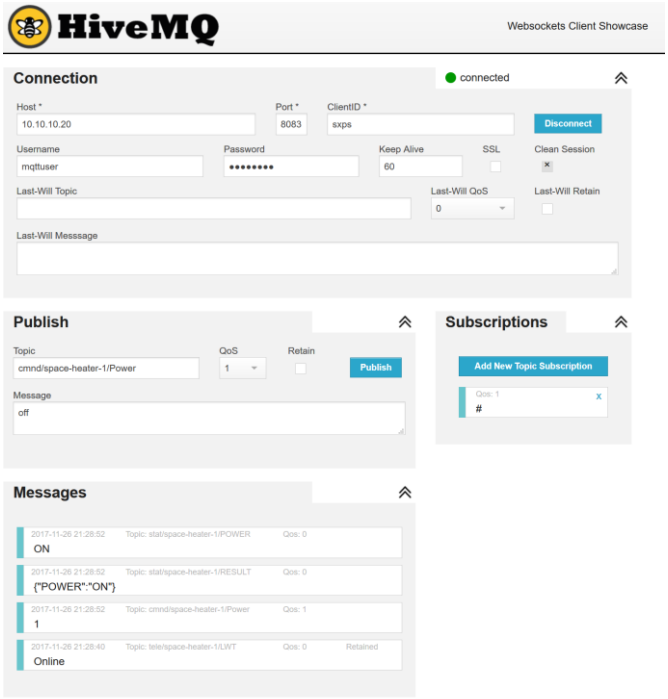
This is a guide for integrating HomeSeer HS3 with the Sonoff 4CH Pro as a Garage Door controller using the mcsMQTT Plugin and the Tasmota firmware. Here is a Wiki that shows how to configure the 4CH Pro's DIP switches for Inching mode, which allows control of a garage door opener. Make these config changes before flashing the Tasmota firmware. Although this guide is intended for HS3 users, Steps 1 & 2 can be followed as a generic "how-to" on setting up an MQTT Broker and flashing the 4CH Pro (or any supported Sonoff device) via WiFi.

Please get yourself familiar with the basics of MQTT. A very good explanation is available here.

Step 1:

Install, configure and test an MQTT Broker.

- Mosquitto is an MQTT Broker that works with the HS3 mcsMQTT Plugin and is installed on an Ubuntu 16.04 server. Here is a guide to follow to set it up. SSL configuration is optional at this point – but it may be needed later if the broker is exposed to the outside world.
- Test and confirm that Publishing and Subscribing works on your broker – as shown in the guide.
- Make sure Websockets is configured on the broker. It will be useful later in troubleshooting by allowing the use of a web based MQTT client to see the messages to/from the broker. Here is a screenshot of the open source HiveMQ websocket client.



- Also confirm that the MQTT Broker is listening on the standard (1883) and websocket (8083) ports.

```
@mqtt:~$ sudo netstat -plnt
Active Internet connections (only servers)
Proto Recv-Q Send-Q Local Address           Foreign Address         State       PID/Program name
tcp        0      0 0.0.0.0:1883            0.0.0.0:*               LISTEN      1208/mosquitto
tcp        0      0 0.0.0.0:8083            0.0.0.0:*               LISTEN      1208/mosquitto
tcp        0      0 0.0.0.0:22              0.0.0.0:*               LISTEN      1135/sshd
tcp6       0      0 :::1883                 :::*                    LISTEN      1208/mosquitto
tcp6       0      0 :::22                   :::*                    LISTEN      1135/sshd
```

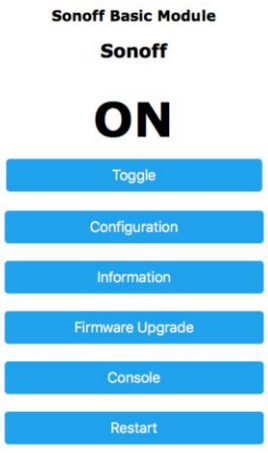
Step 2:

Install and configure Tasmota firmware on the Sonoff 4CH Pro.

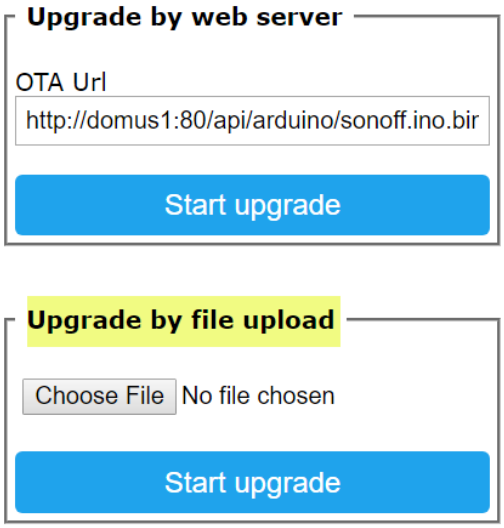
SonOTA allows the flashing of Tasmota firmware via WiFi on a new "out-of-the-box" Sonoff 4CH Pro. This means that soldering a header to the PCB and using an FTDI adapter to flash the ESP8266 is not required. The Tasmota Wiki page is a great source of information. **Note:** As of this writing, SonOTA does not work on a 4CH Pro that has firmware 2.0.0. But it does work on firmware 2.0.1.

A Windows 10 PC was used for the steps below. **Disable all firewalls** on the PC for these steps to be successful.

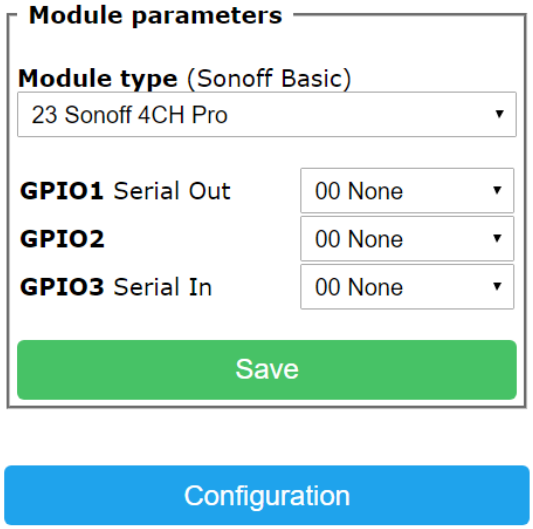
- Add the 4CH Pro to the EWeLink app (Android or iOS) to find the Sonoff firmware version – which is displayed in the "Setting" screen of the device. If it is at 2.0.1 go to the next step . If it is at 2.0.0, wait until the option to upgrade to 2.0.1 shows up in the device on EWeLink and use it to perform the upgrade. It may take hours/days for the upgrade option to show up.
- Download the "sonota.exe" file from here. Using this file eliminates the requirement to download and install any prerequisite software to use SonOTA.
- Run "sonota.exe". This will prompt for your PC's IP Address, your WiFi SSID and your WiFI Password.
- Then it will go through and prompt to reset the 4CH Pro to get it into AP mode. This happens by holding any of the buttons down for 7 seconds and releasing….and immediately repeating this once more until the WiFi LED blinks steadily.
- Connect your PC to the "ITEAD-*" WiFi network which should show up in the list of WiFi networks. The script continues to prompt for next steps.
- After the FinalStage step is complete and the firmware has been flashed to the 4CH Pro – reboot the device and press any button four times in quick succession. This will put the device in AP mode and make a WiFi nework such as "Sonoff-XXXX" show up. Connect to this network – which sould pop up a web page to input your regular WiFI SSID and password.
- Once this is done the 4CH Pro will reboot and connect to your normal WiFi network and should get an IP address via DHCP. To find the IP address of the newly flashed 4CH Pro look at your router or DHCP server's address leases or use an app such as Fing.
- Browse to this IP Address. The Main Menu page shows up:

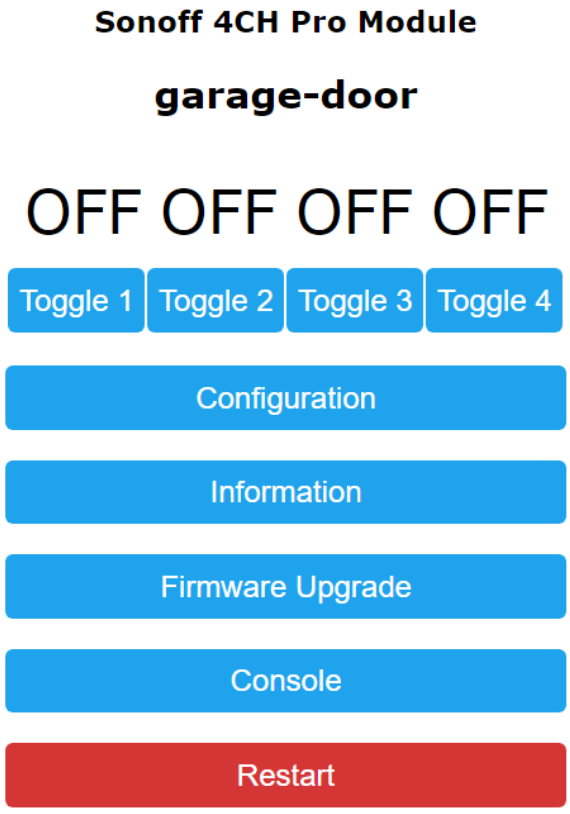


- Download the latest “sonoff.bin” file from here.
- Click on “Firmware Upgrade” and upgrade to the current Tasmota firmware using the “Upgrade by File Upload” option and the “sonoff.bin” file downloaded in the previous step.

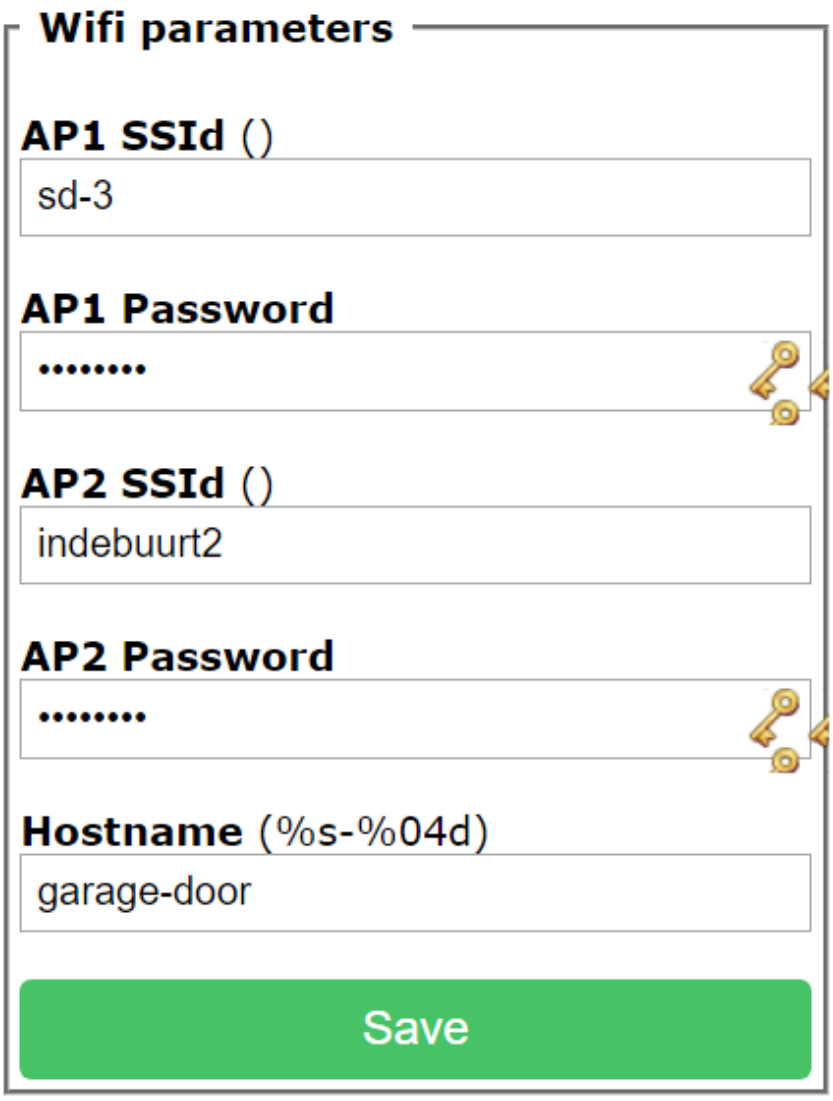


❖ After the 4CH Pro restarts, click on “Configuration > Configure Module”, select “Sonoff 4CH Pro” for Module Type and click “Save”. The main menu should now look like this.





❖ Click on “Configuration > Configure WiFi”, change the Hostname and hit “Save”. Here, the same name was used for Hostname and MQTT Topic in the next section.



- ❖ Click on “Configuration > Configure MQTT” and change the following:

Host: Hostname or IP address of MQTT Broker

Port: Port number of MQTT Broker

Client: Unique Client ID of Sonoff 4CH Pro

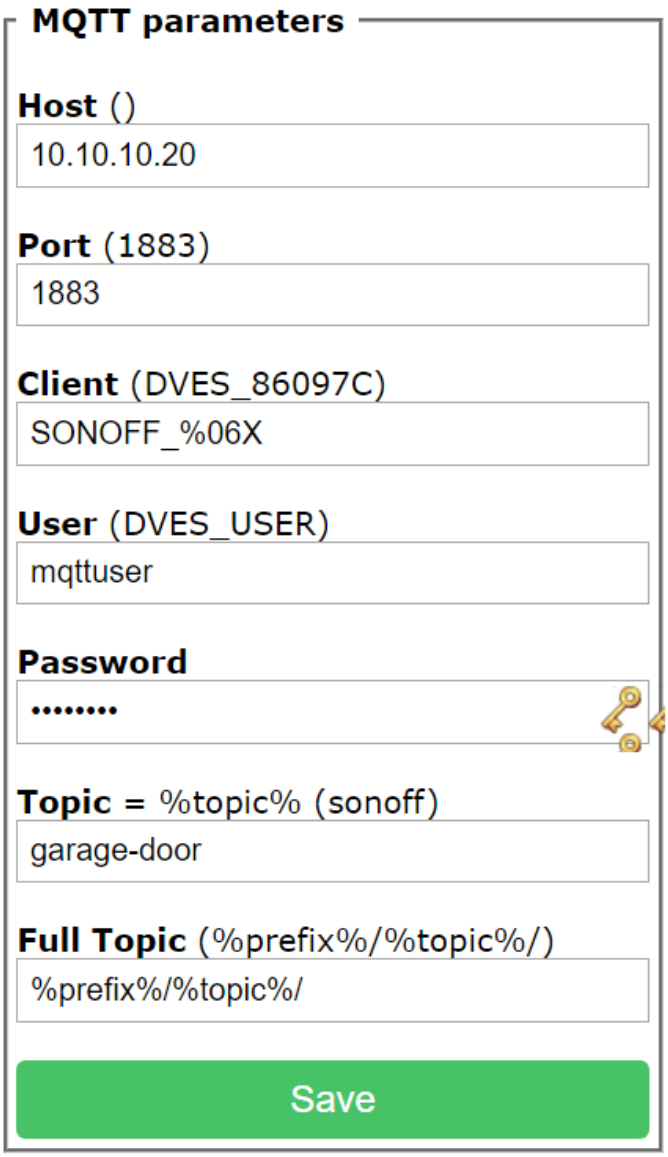
User: Username of MQTT Broker

Password: Password of MQTT Broker

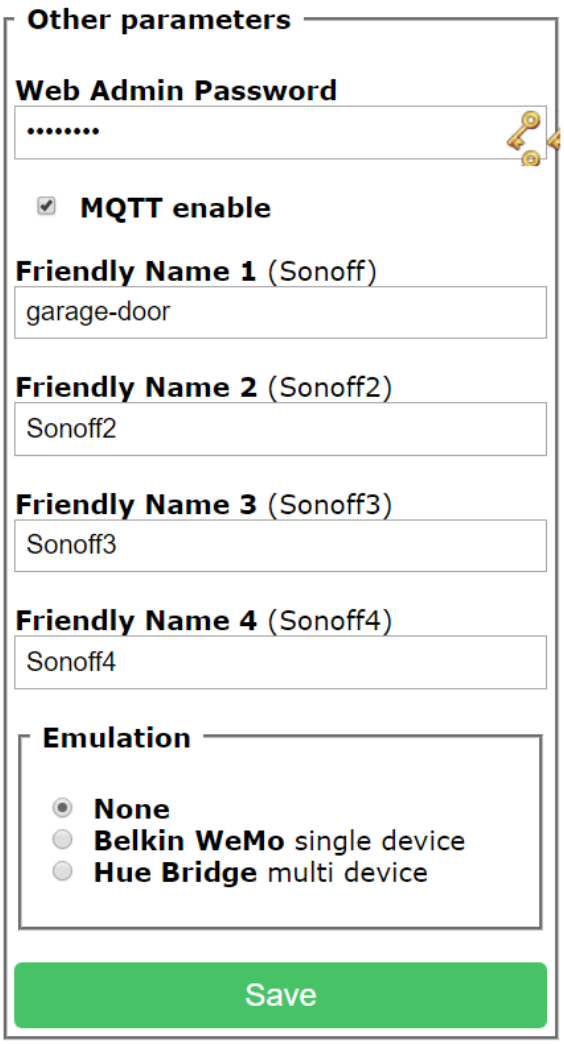
Topic: Unique MQTT Topic of Sonoff 4CH Pro. Here, the same name as Hostname in the WiFi section was used.

Full Topic: Left unchanged

- ❖ Click “Save”



- Click on “Configuration > Configure Other” and:
  - Change the Web Admin Password
  - Make Sure “MQTT enable” is checked
  - Enter the “Friendly Name 1” for the relay that will connect to the the garage door. Here the same name as Hostname and MQTT Topic was used.



- Click “Save”
- A static IP address, subnet mask, gateway and DNS server can be configured for the 4CH Pro by using MQTT commands at the device Console or HTTP URL commands in a browser. The complete Tasmota command reference is here.

Below are examples of setting a static IP address, subnet mask, gateway and DNS server using MQTT commands on the 4CH PR Console:

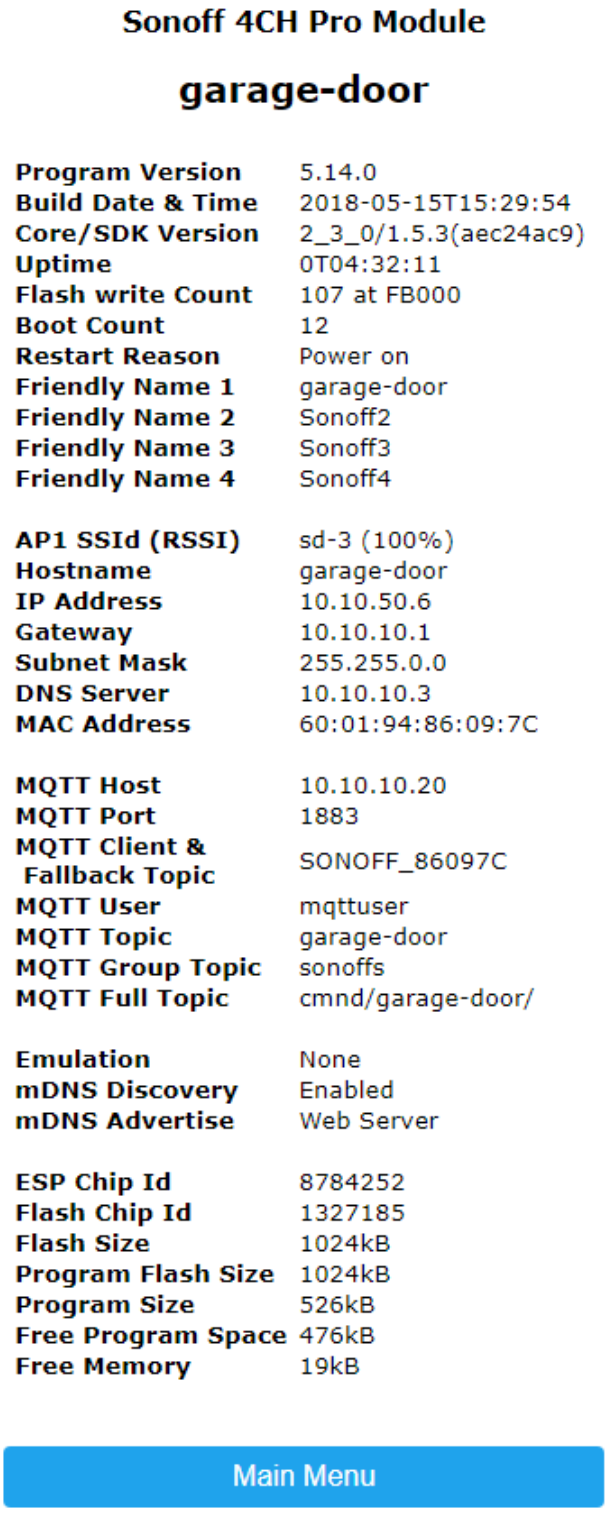
IP Address: **cmnd/space-heater-1/IPAddress1 10.10.50.6**

Subnet Mask: **cmnd/space-heater-1/IPAddress3 255.255.0.0**

Gateway: **cmnd/space-heater-1/IPAddress2 10.10.10.1**

DNS Server: **cmnd/space-heater-1/IPAddress4 10.10.10.3**

❖ Clicking “Information” on the Main Menu should display a screen like this:



Sonoff 4CH Pro Module

garage-door

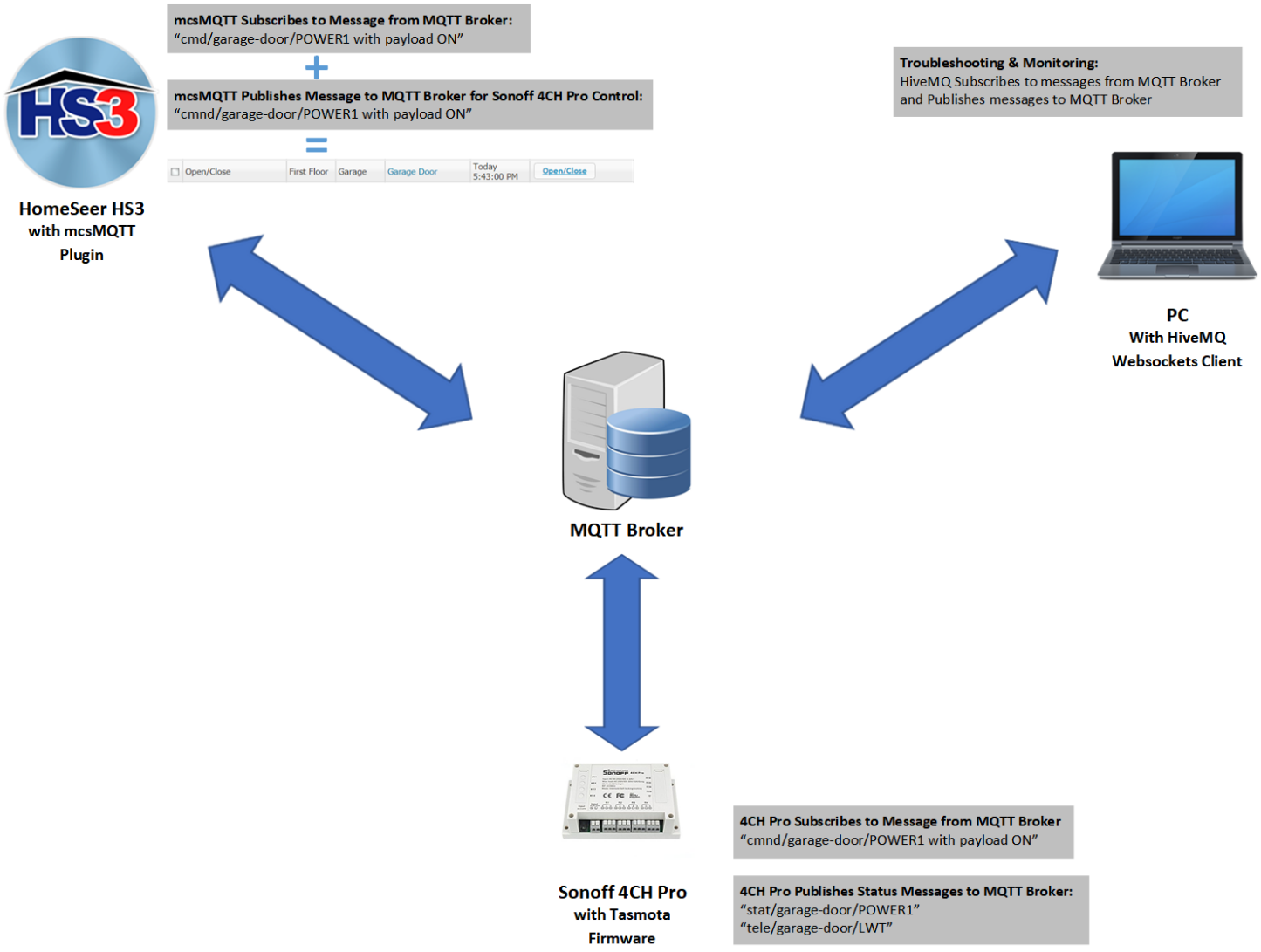
Program Version	5.14.0
Build Date & Time	2018-05-15T15:29:54
Core/SDK Version	2_3_0/1.5.3(aec24ac9)
Uptime	0T04:32:11
Flash write Count	107 at FB000
Boot Count	12
Restart Reason	Power on
Friendly Name 1	garage-door
Friendly Name 2	Sonoff2
Friendly Name 3	Sonoff3
Friendly Name 4	Sonoff4
AP1 SSId (RSSI)	sd-3 (100%)
Hostname	garage-door
IP Address	10.10.50.6
Gateway	10.10.10.1
Subnet Mask	255.255.0.0
DNS Server	10.10.10.3
MAC Address	60:01:94:86:09:7C
MQTT Host	10.10.10.20
MQTT Port	1883
MQTT Client & Fallback Topic	SONOFF_86097C
MQTT User	mqttuser
MQTT Topic	garage-door
MQTT Group Topic	sonoffs
MQTT Full Topic	cmnd/garage-door/
Emulation	None
mDNS Discovery	Enabled
mDNS Advertise	Web Server
ESP Chip Id	8784252
Flash Chip Id	1327185
Flash Size	1024kB
Program Flash Size	1024kB
Program Size	526kB
Free Program Space	476kB
Free Memory	19kB

Main Menu

HomeSeer HS3 can now be configured.

Step 3:

- **HS3-MQTT Broker-Sonoff 4CH Pro Message Flow:**



❖ **Install the HS3 MQTT Plugin and configure initial setup.**

The mcsMQTT Plugin is free and available under the "Lighting and Primary Technology" section of the HS3 Updater. There are many options available with this plugin that are beyond the scope of this guide. Refer to the plugin manual for all the details.

	LutronRA2 Release Info	Plug-in		3.0.0.97	Free to try $59.95 to buy BUY NOW	donmor
	mcsMQTT Release Info	Plug-in	3.4.1.0	3.4.1.0	Free	Michael McSharry
	mcsXap Release Info	Plug-in		3.0.0.69	Free	Michael McSharry

Here are the General and Statistics tabs of the mcsMQTT Plugin Setup page.

❖ Input the MQTT Broker details in the "MQTT Broker Operations" section to connect to it.

Edit/Add | General | Statistics | History | Chart

mcsMQTT Management

Debug File at \Data\mcsMQTT\mcsMQTT.txt	Enable General Debug
Backup Databases at \Data\mcsMQTT	Create mcsMQTT Database Backup on Restarts
mcsMQTT Status Devices	Show Statistics only in mcsMQTT Statistics Tab Show Statistics in HS Devices and mcsMQTT Statistics Tab
Pub-Sub Message History	Retain for 7 Days Retain history of published messages Retain history of Accepted subscribed messages Retain history of not-Accepted subscribed messages Retain history of topics marked with H checkbox on Association tab

MQTT Broker Operations

MQTT Broker Name or IP Address	10.10.10.20
MQTT Broker Port	1883
MQTT Broker Security	None
MQTT Broker caCert File	
MQTT Client Cert File	
MQTT Broker Username	mqttuser
MQTT Broker Password	••••••••
MQTT Broker Connection	Disconnect from MQTT Broker

Inbound (Subscription) Management

Topic Discovery	Discover Published MQTT Messages Listen for Only Accepted Messages
Inhibit Topic Discovery	Disable New Topic Recognition
Echo	Do not process echo of transmitted topics Include transmitted topics in Association tab reception list
JSON Decoding	Decode Payload JSON into individual HS Devices Place full Payload into HS Device Create both Parent full payload and Child JSON keys
Receive Queue Depth	Process no more than 5 received message at a time
Receive Queue Interval	Yield CPU for 50 milliseconds when queue is above depth limit

Outbound (Publish) Management

Default Topic Template	
Default Payload Template	
Default QOS	At Most At Least Exactly
Default Message Retain	Do Not Retain at Broker Retain at Broker
Publish Periodic Status	Every 0 Minutes
Topic Prefix	Add STAT/ prefix to Topic on Device change Add INFO/ prefix to Topic during periodic reporting
HS Device Discovery	Enumerate HS Devices during startup Enumerate HS Devices only with Button
HS Device Enumeration	Enumerate Non-Plugin Devices

Edit/Add | General | Statistics | History

mcsMQTT Statistics

MQTT Broker Online Stats	**Online @ 2018-05-12 17:16:13 for 225 minutes**
Totals Since Powerup	
MQTT Messages Published by mcsMQTT	**6**
MQTT Received & Accepted by mcsMQTT	**5**
MQTT Received & not Accepted by mcsMQTT	**60**
Totals for Today	
MQTT Messages Published by mcsMQTT	**6**
MQTT Received & Accepted by mcsMQTT	**5**
MQTT Received & not Accepted by mcsMQTT	**60**

❖ **Create and Configure the 4CH Pro Control Device in HS3**

When the Plugin has connected to the MQTT Broker and the Statistics tab shows “Online”,

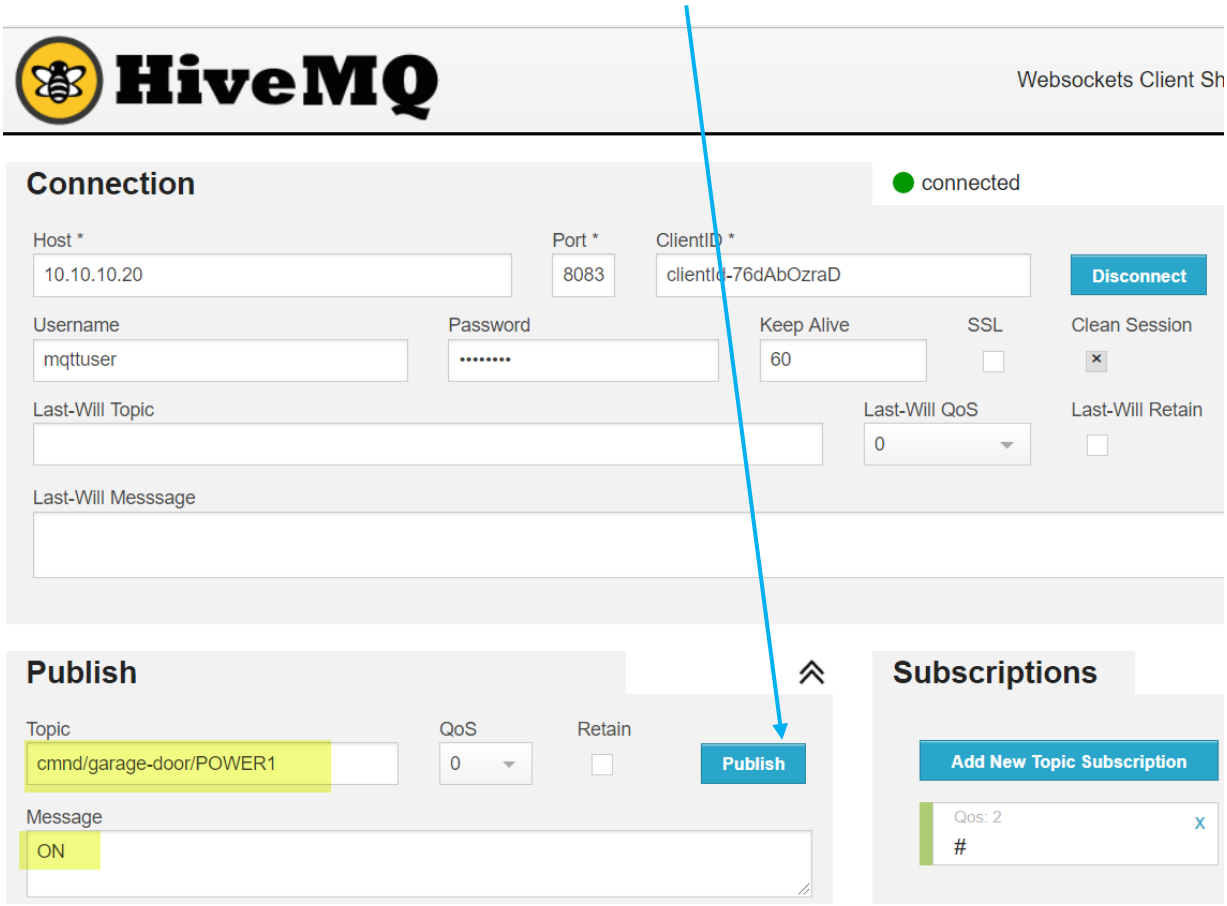
- Send the following MQTT message to the broker from an MQTT client:

  Topic = “cmnd/garage-door/POWER1” Payload = “ON”

  Using the Mosquitto client, this is what the command would look like:

  ```
  mosquitto_pub -h 10.10.10.20 -t "cmnd/garage-door/POWER1" -m "ON" -u "broker-username" -P "broker-password"
  ```

  Using the HiveMQ websockets client, this is what publishing the command would look like:



- Go to the “Associations” tab and refresh the page. The messages from the 4CH Pro that the Plugin has subscribed to (by default the Plugin subscribes to all topics from the Broker) should be seen.
- Click on the “A” checkbox corresponding to the ON Command Topic. This will create a device in HS3 and display the Device Ref # on the same row – as shown below.
- Enter the “**cmnd/garage-door/POWER1**” topic in the Publish field for the device. This is the message that is published by mcsMQTT with payload “**ON**” to toggle the power of Relay 1 of the 4CH Pro. Also check the “H” box to show message history for the device. The Association table should now look like this:

Association Table for Auto Association of MQTT Topic and HS Device

	R	A	Ref	Topic	Payload	H	D	LastDate
0	☐	☑	1373	Dev: |cmnd|POWER1 Sub: cmnd/garage-door/POWER1 Pub: the following Topic on Device command cmnd/garage-door/POWER1	ON	☑	☑	2018-05-23 21:05:18
1	☐	☐		Sub: cmnd/space-heater-1/Power	ON	☐		2018-05-23 19:53:57
2	☐	☐		Sub: stat/garage-door/POWER1	OFF	☐		2018-05-23 21:05:19
3	☐	☐		Sub: stat/garage-door/POWER2	OFF	☐		2018-05-22 15:38:36
4	☐	☐		Sub: stat/garage-door/POWER3	OFF	☐		2018-05-22 21:02:15
5	☐	☐		Sub: stat/garage-door/POWER4	OFF	☐		2018-05-22 15:38:36
6	☐	☐		Sub: stat/garage-door/RESULT:POWER1	OFF	☐		2018-05-23 21:05:19
7	☐	☐		Sub: stat/garage-door/RESULT:POWER2	OFF	☐		2018-05-22 15:38:36
8	☐	☐		Sub: stat/garage-door/RESULT:POWER3	OFF	☐		2018-05-22 21:02:15

Clicking on the Ref # button will bring up the page below. Make sure that "**Button**" is selected for Control/Status UI and **0 OFF, 1 ON and 2 TOGGLE** is listed in the Device VSP List

Start with Either Existing Device Ref or Subscribe Topic

Ref: 1373 | Sub: cmnd/garage-door/POWER1 | Delete Sub and Ref

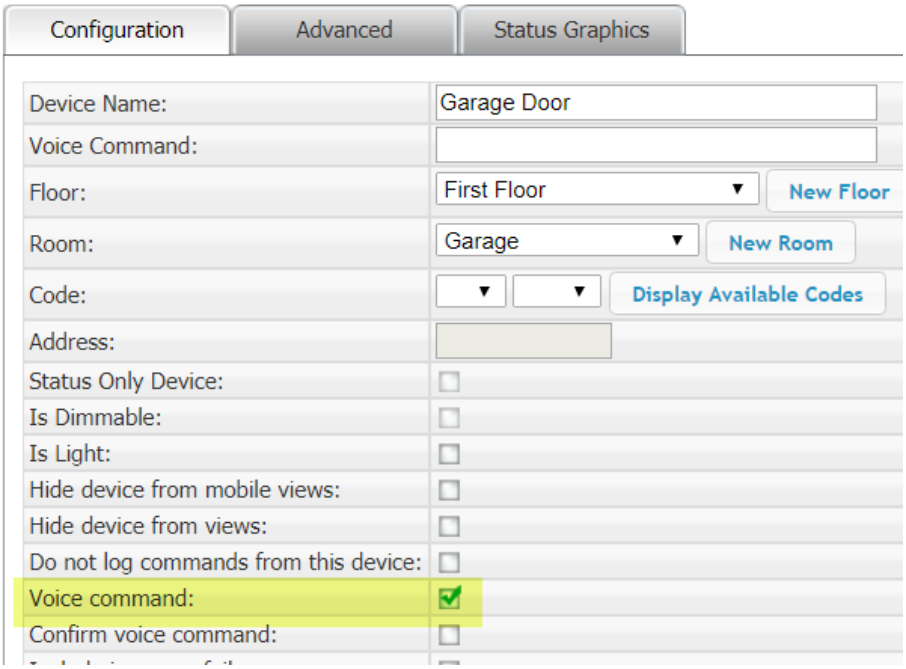
Edit Setup or Edit of Subscription (Inbound) to a MQTT Topic

MQTT Subscribe Topic	cmnd/garage-door/POWER1
Payload RegEx Match Pattern	
Payload RegEx Replace Pattern	
Payload RegEx Operation	◉ Replace Match Pattern with Replace Pattern ○ Extract Match Pattern
Low Pass Filter	Filter sensitivity of 1 (range is 0.00 to 1.00 (most sensitive))
Expression	
Add Rate Device	☐ Create a HS Rate Device with rate sensitivity of 0.75 (Range 0.00 to 1.00) ○ Per Second ○ Per Minute ◉ Per Hour
Add Accum Device	☐ Create a HS Accum Device ○ No Reset ○ Accumulation Since Midnight ◉ Delta Since Midnight
Settings for Plugin Device	
HS Device Publish Topic	cmnd/garage-door/POWER1
HS Device Control/Status UI	○ Unspecified ◉ Button ○ Number ○ Text ○ List ○ ColorPicker
HS Device VSP List	0 OFF 1 ON 2 TOGGLE
HS Device MISC Properties	☐ NO_STATUS_DISPLAY ☑ NO_GRAPHICS_DISPLAY ☐ AUTO_VOICE_COMMAND ☐ SET_DOES_NOT_CHANGE_LAST_CHANGE ☑ SHOW_VALUES ☐ STATUS_ONLY
Publish Payload Template	
Publish QOS	○ At Most ○ At Least ◉ Exactly
Publish Retain Flag	◉ Do not retain ○ Retain at broker
Settings for Non-Plugin	

Because all three buttons options would send the same **ON** payload to momentarily turn on/off the power of the 4CH Pro relay connected to the garage door, the choice was made to edit the status/control text of the HS3 device created to show only one button with text “Open/Close”. The buttons and text can also be left unchanged. The resulting control device looks like this:

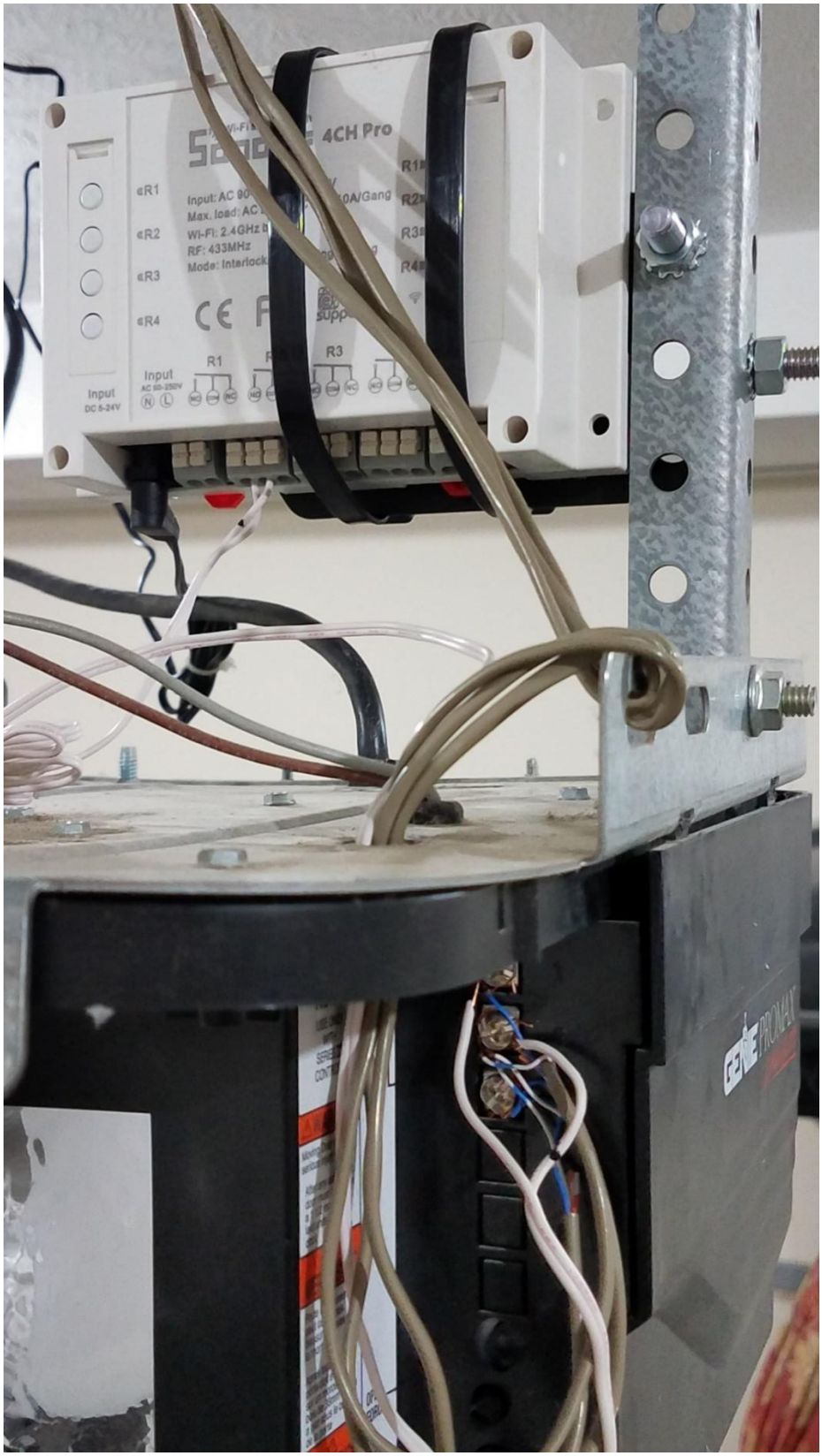
An Ecolink Z-Wave Tilt Sensor is utilized to monitor actual status of the garage door – and the HS3 device looks like this:

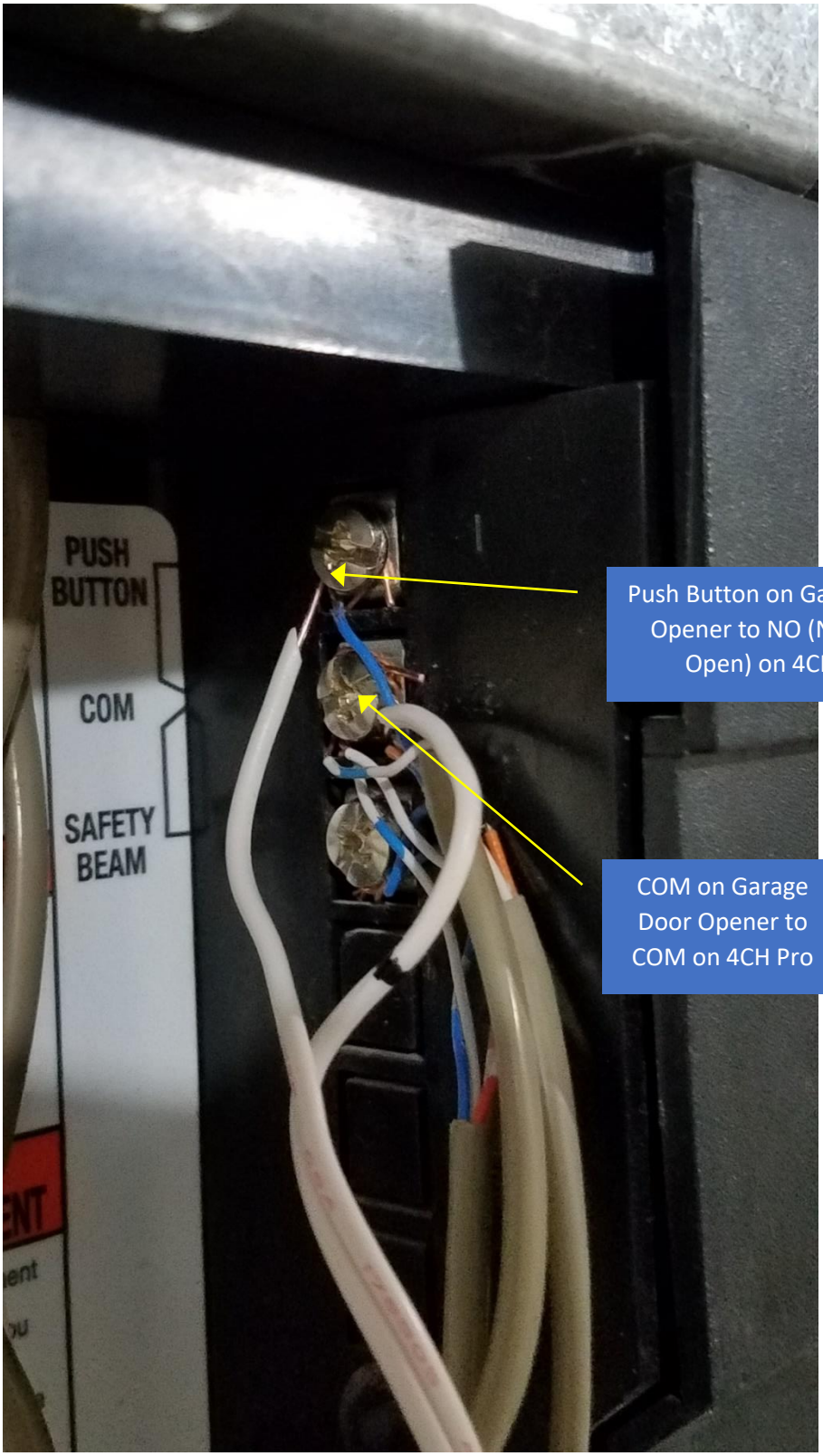
Voice enabling the control device by checking the “Voice Command” option…



….will allow an Amazon Echo to discover the device and be available for a voice command such as “Alexa, turn on the garage door”

Here are pictures of the installed Sonoff 4CH Pro and its connections to the garage door opener:





Enjoy!!

-taylormia