Industruino HomeAssistant instructions
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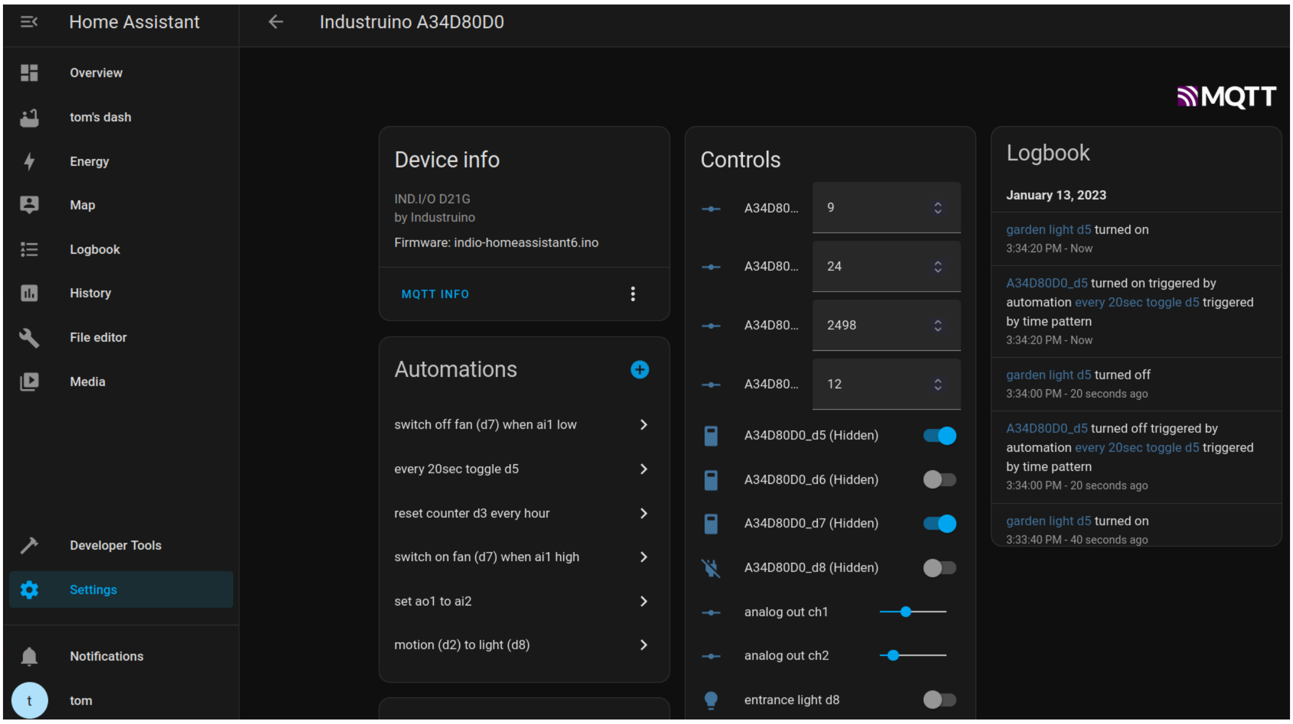
Jan 2023

Hardware:

- Industruino IND.I/O D21G
- Communication module:
  - Ethernet module, or
  - WiFi module

Content:

- HomeAssistant setup
- Industruino IND.I/O setup
- Sending Industruino Configuration to HomeAssistant
- HomeAssistant Configuration
- Example Automations



Device info

IND.I/O D21G
by Industruino

Firmware: indio-homeassistant6.ino

Automations

switch off fan (d7) when ai1 low

every 20sec toggle d5

reset counter d3 every hour

switch on fan (d7) when ai1 high

set ao1 to ai2

motion (d2) to light (d8)

Controls

A34D80...	9
A34D80...	24
A34D80...	2498
A34D80...	12
A34D80D0_d5 (Hidden)	
A34D80D0_d6 (Hidden)	
A34D80D0_d7 (Hidden)	
A34D80D0_d8 (Hidden)	
analog out ch1	
analog out ch2	
entrance light d8	

Logbook

January 13, 2023

garden light d5 turned on
3:34:20 PM - Now

A34D80D0_d5 turned on triggered by automation every 20sec toggle d5 triggered by time pattern
3:34:20 PM - Now

garden light d5 turned off
3:34:00 PM - 20 seconds ago

A34D80D0_d5 turned off triggered by automation every 20sec toggle d5 triggered by time pattern
3:34:00 PM - 20 seconds ago

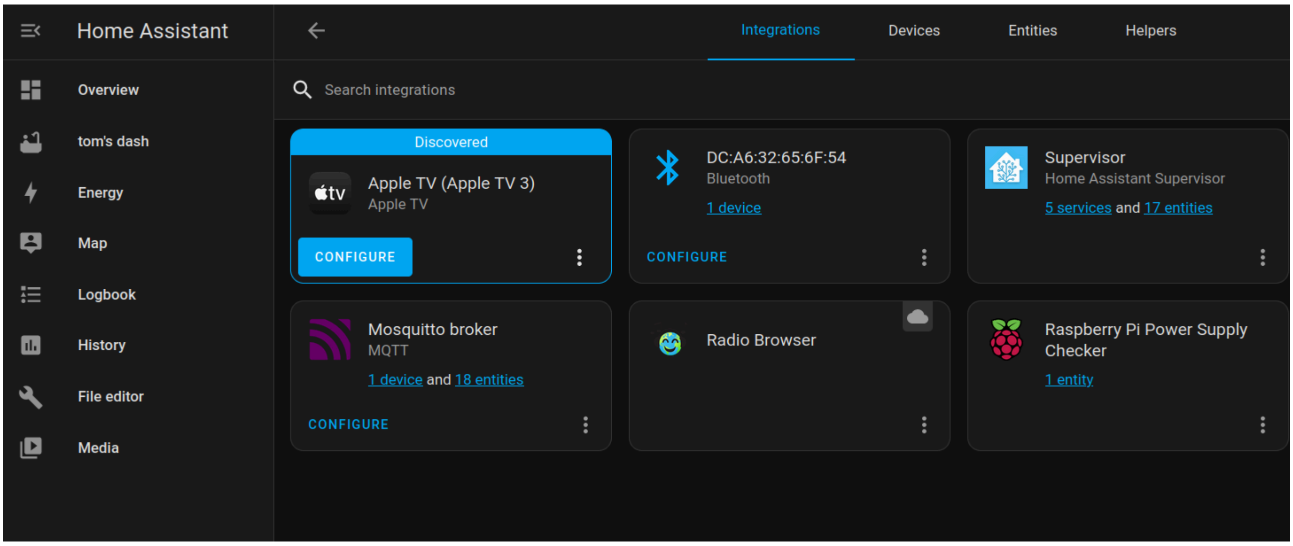
garden light d5 turned on
3:33:40 PM - 40 seconds ago

Industruino device in the HomeAssistant device list

HomeAssistant setup

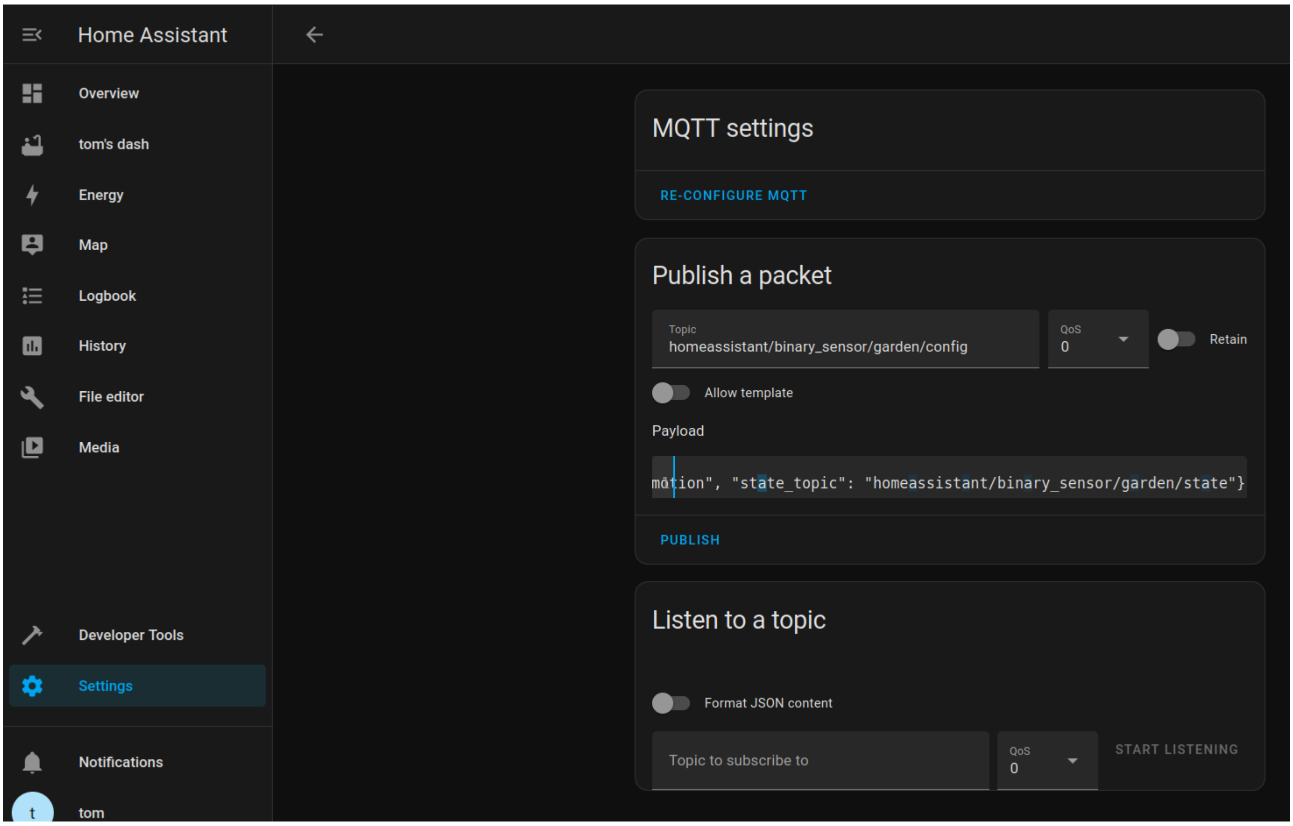
The Industruino will communicate with HomeAssistant (HASS) via the MQTT protocol.
https://www.home-assistant.io/integrations/mqtt/
It is possible to use a public broker, but we only tested with a local broker as recommended by HASS: the Mosquitto MQTT broker add-on. This is available on the HASS OS, but not on the Docker installation.
https://github.com/home-assistant/addons/blob/master/mosquitto/DOCS.md

Go to Settings, Add-ons, MQTT mosquitto broker, install, start
Go to Settings, Devices, Integrations, connect MQTT to HASS
Make sure 'MQTT discovery' is enabled



Go to Settings, People, and create a user indio_mqtt/indio_pwd, allow login, local network only, not admin

To test your setup, go to Settings, Devices, Integrations, click on MQTT configure
Publish a packet to test MQTT discovery: a binary sensor 'garden'
In topic, put: homeassistant/binary_sensor/garden/config
In payload, put: {"name": "garden", "device_class": "motion", "state_topic": "homeassistant/binary_sensor/garden/state"}



Topic
homeassistant/binary_sensor/garden/config

QoS
0

Retain

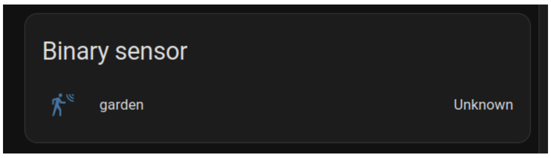
Payload

```
mðtion", "state_topic": "homeassistant/binary_sensor/garden/state"}
```

QoS
0

Click publish

Go to the Overview dashboard and find a card for Binary sensor ‘garden’



Binary sensor

garden Unknown

You can get rid of this bogus sensor by publishing an empty payload to the config topic above.

Make sure this MQTT setup is working before you proceed with the Industruino.

Industruino IND.I/O setup

Follow the standard instructions to add Industruino to the Arduino IDE.
https://github.com/Industruino/documentation/blob/master/indio.md#setting-up-the-arduino-ide

Find the latest Industruino HomeAssistant firmware, and extract the file in your sketchbook folder.
Open the .ino sketch in the Arduino IDE.
Install the needed libraries, listed in the indio-general tab. Note the modifications needed in the standard Ethernet and WiFiNINA libraries.

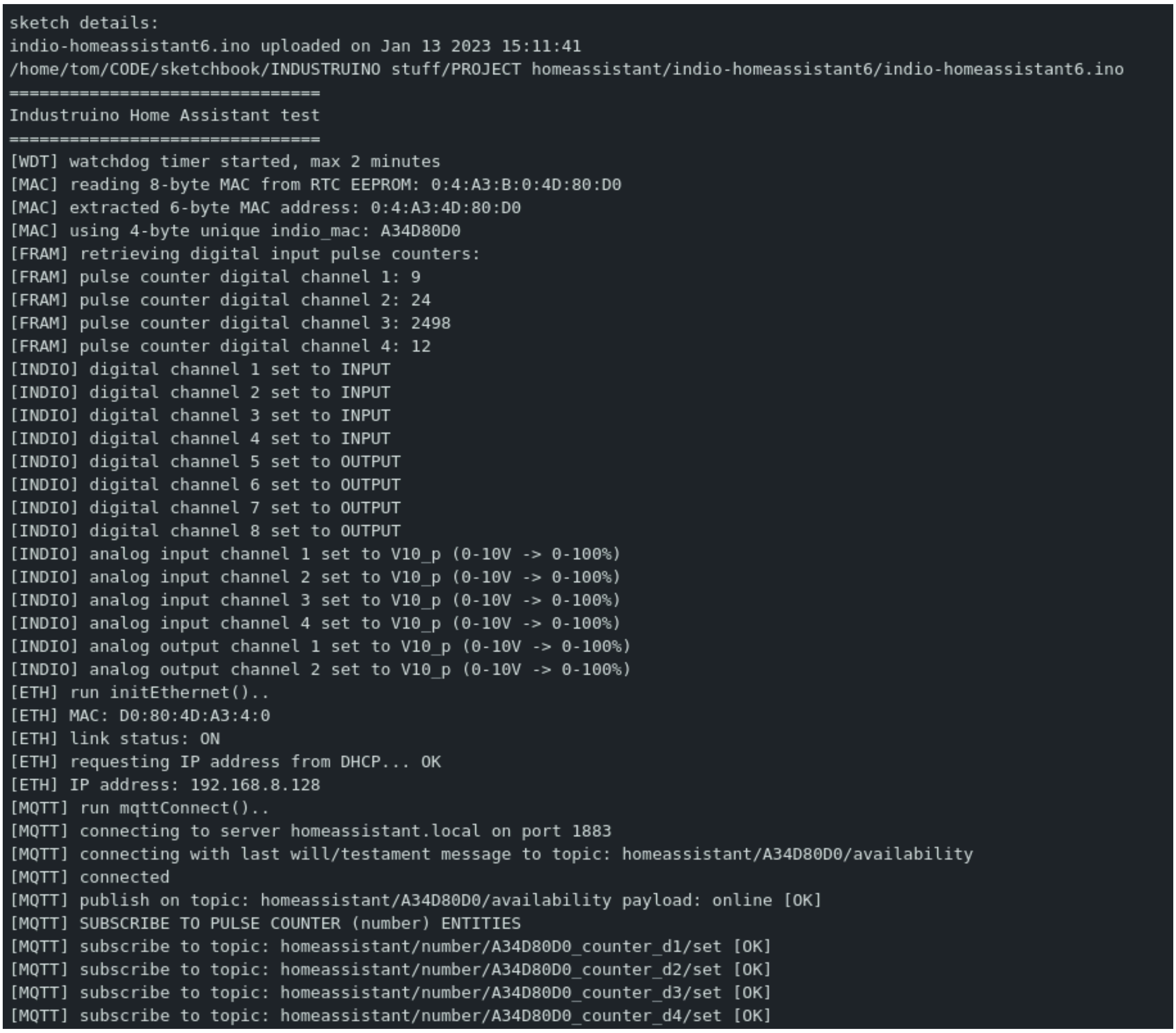
Find the section 'USER CHANGE NEEDED' at the top of the .ino sketch.

If you are using the ETHERNET MODULE:
#define COMM_MODULE 1
In case you do not want to use DHCP, go to the indio-eth.h tab and set USE_DHCP to 0, and edit the static IP address.

If you are using the WIFI MODULE:
#define COMM_MODULE 0
Go to the indio-wifi.h tab and edit your wifi network SSID and password.

Note: MQTT over SSL not tested yet

Compile the sketch, and if successful, upload over USB to your Industruino.
Check the Serial Monitor for troubleshooting information.



```
sketch details:
indio-homeassistant6.ino uploaded on Jan 13 2023 15:11:41
/home/tom/CODE/sketchbook/INDUSTRUINO stuff/PROJECT homeassistant/indio-homeassistant6/indio-homeassistant6.ino
===============================
Industruino Home Assistant test
===============================
[WDT] watchdog timer started, max 2 minutes
[MAC] reading 8-byte MAC from RTC EEPROM: 0:4:A3:B:0:4D:80:D0
[MAC] extracted 6-byte MAC address: 0:4:A3:4D:80:D0
[MAC] using 4-byte unique indio_mac: A34D80D0
[FRAM] retrieving digital input pulse counters:
[FRAM] pulse counter digital channel 1: 9
[FRAM] pulse counter digital channel 2: 24
[FRAM] pulse counter digital channel 3: 2498
[FRAM] pulse counter digital channel 4: 12
[INDIO] digital channel 1 set to INPUT
[INDIO] digital channel 2 set to INPUT
[INDIO] digital channel 3 set to INPUT
[INDIO] digital channel 4 set to INPUT
[INDIO] digital channel 5 set to OUTPUT
[INDIO] digital channel 6 set to OUTPUT
[INDIO] digital channel 7 set to OUTPUT
[INDIO] digital channel 8 set to OUTPUT
[INDIO] analog input channel 1 set to V10_p (0-10V -> 0-100%)
[INDIO] analog input channel 2 set to V10_p (0-10V -> 0-100%)
[INDIO] analog input channel 3 set to V10_p (0-10V -> 0-100%)
[INDIO] analog input channel 4 set to V10_p (0-10V -> 0-100%)
[INDIO] analog output channel 1 set to V10_p (0-10V -> 0-100%)
[INDIO] analog output channel 2 set to V10_p (0-10V -> 0-100%)
[ETH] run initEthernet()..
[ETH] MAC: D0:80:4D:A3:4:0
[ETH] link status: ON
[ETH] requesting IP address from DHCP... OK
[ETH] IP address: 192.168.8.128
[MQTT] run mqttConnect()..
[MQTT] connecting to server homeassistant.local on port 1883
[MQTT] connecting with last will/testament message to topic: homeassistant/A34D80D0/availability
[MQTT] connected
[MQTT] publish on topic: homeassistant/A34D80D0/availability payload: online [OK]
[MQTT] SUBSCRIBE TO PULSE COUNTER (number) ENTITIES
[MQTT] subscribe to topic: homeassistant/number/A34D80D0_counter_d1/set [OK]
[MQTT] subscribe to topic: homeassistant/number/A34D80D0_counter_d2/set [OK]
[MQTT] subscribe to topic: homeassistant/number/A34D80D0_counter_d3/set [OK]
[MQTT] subscribe to topic: homeassistant/number/A34D80D0_counter_d4/set [OK]
```

The Industruino LCD will show 3 screens:
Intro with firmware details
Network connection (Ethernet or WiFi)
MQTT connection

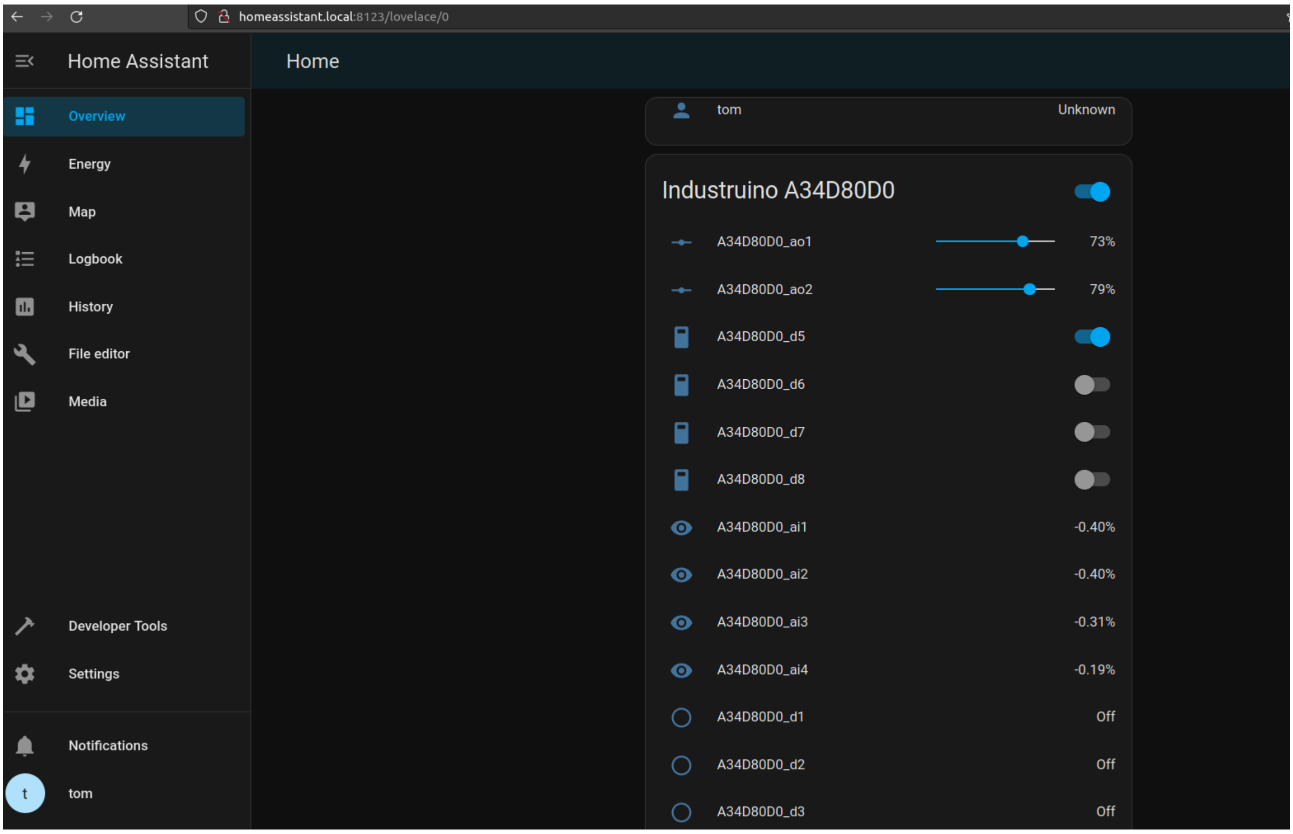
Then it goes to the main screen, showing the I/O data, and the device identifier (6-byte MAC).

Now we are ready to send the Industruino configuration details to HASS by MQTT discovery.

Send Industruino Configuration to HomeAssistant

From the main data screen, press the UP button, you will see the CONFIG PUBLISH screen.
Hold the UP button, and also press the DOWN button to start the publish.
This takes about 20 seconds, and returns to the main data screen.
Now go to the HASS Overview dashboard, and it should show the Industruino device with its MAC identifier, and all the entities created under the device. The entities are named with the MAC identifier, underscore, and I/O channel identifier:

Entity name	HASS type	Industruino I/O
_d1 to _d4	binary_sensor	Digital input channels CH1-4
_counter_d1 to _counter_d4	number	Pulse counter for digital input channels CH1-4
_d5 to _d8	switch	Digital output channels CH5-8
_ai1 to _ai4	sensor	Analog input channels CH1-4
_ao1 to _ao2	number	Analog output channels CH1-2



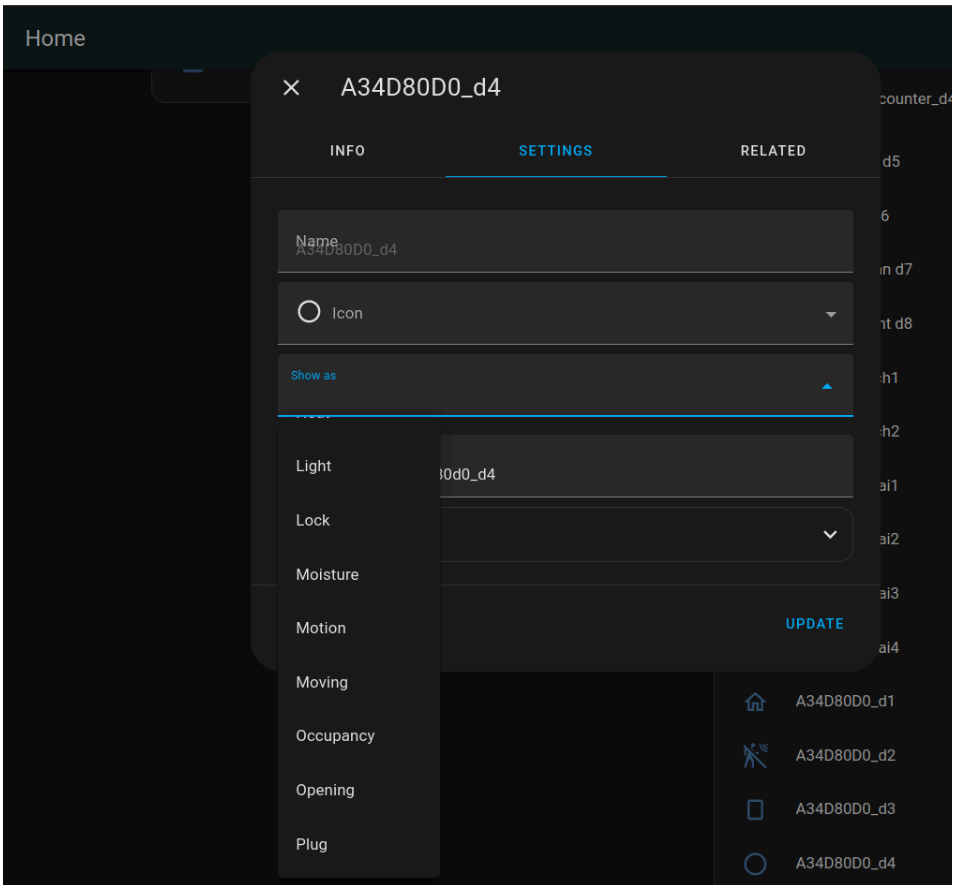
tom	Unknown

Industruino A34D80D0

A34D80D0_ao1	73%
A34D80D0_ao2	79%
A34D80D0_d5	●
A34D80D0_d6	○
A34D80D0_d7	○
A34D80D0_d8	○
A34D80D0_ai1	-0.40%
A34D80D0_ai2	-0.40%
A34D80D0_ai3	-0.31%
A34D80D0_ai4	-0.19%
A34D80D0_d1	Off
A34D80D0_d2	Off
A34D80D0_d3	Off

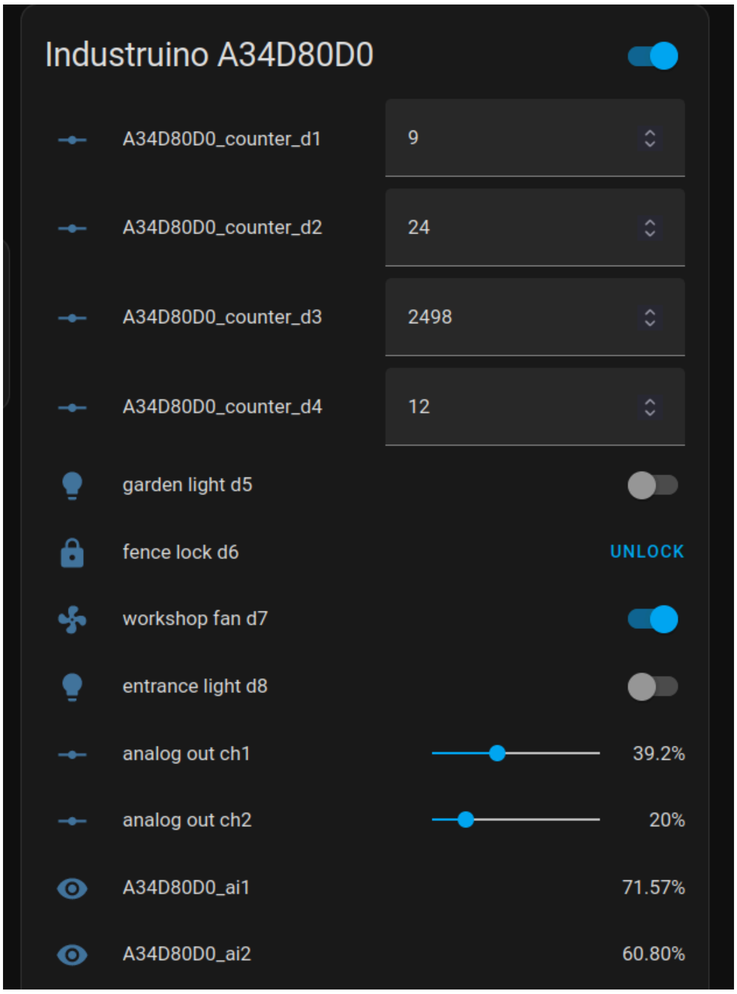
HomeAssistant Configuration

The types and icons of the binary_sensor and switch entities can be changed by clicking on them.



A34D80D0_d4

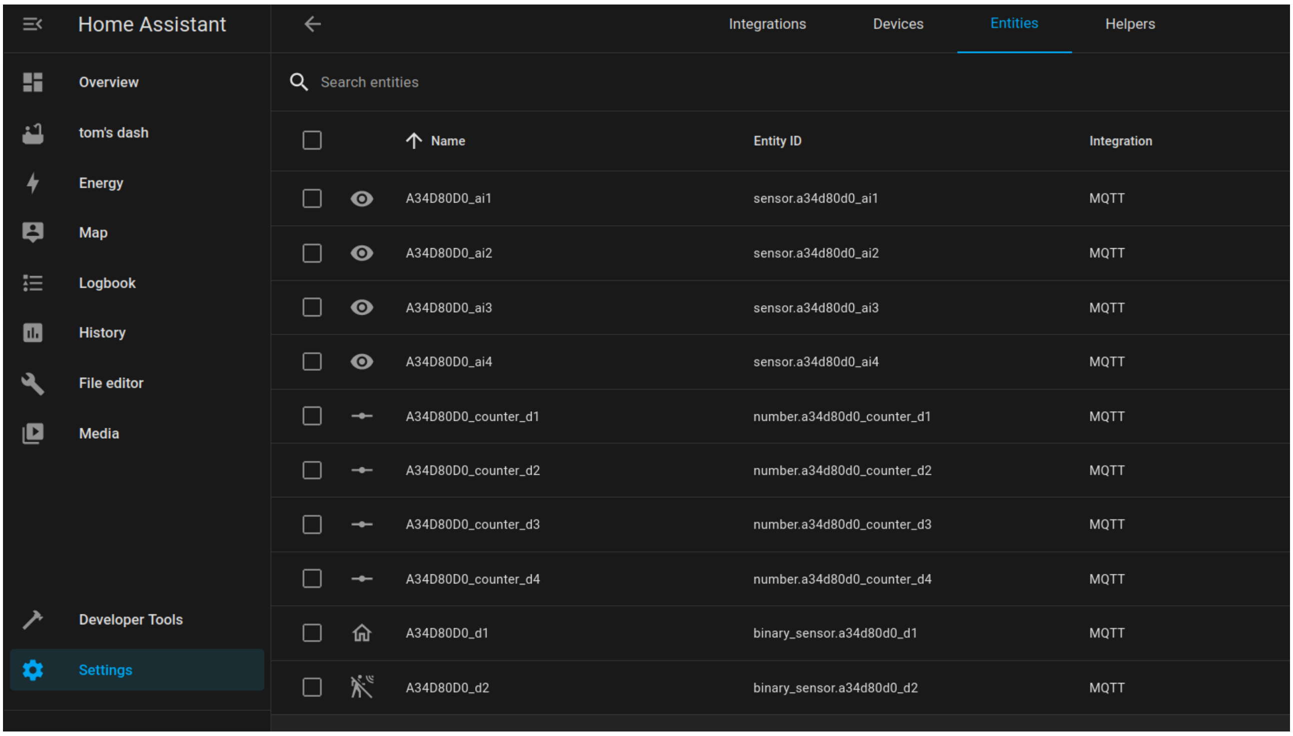
Name: A34D80D0_d4



Industruino A34D80D0

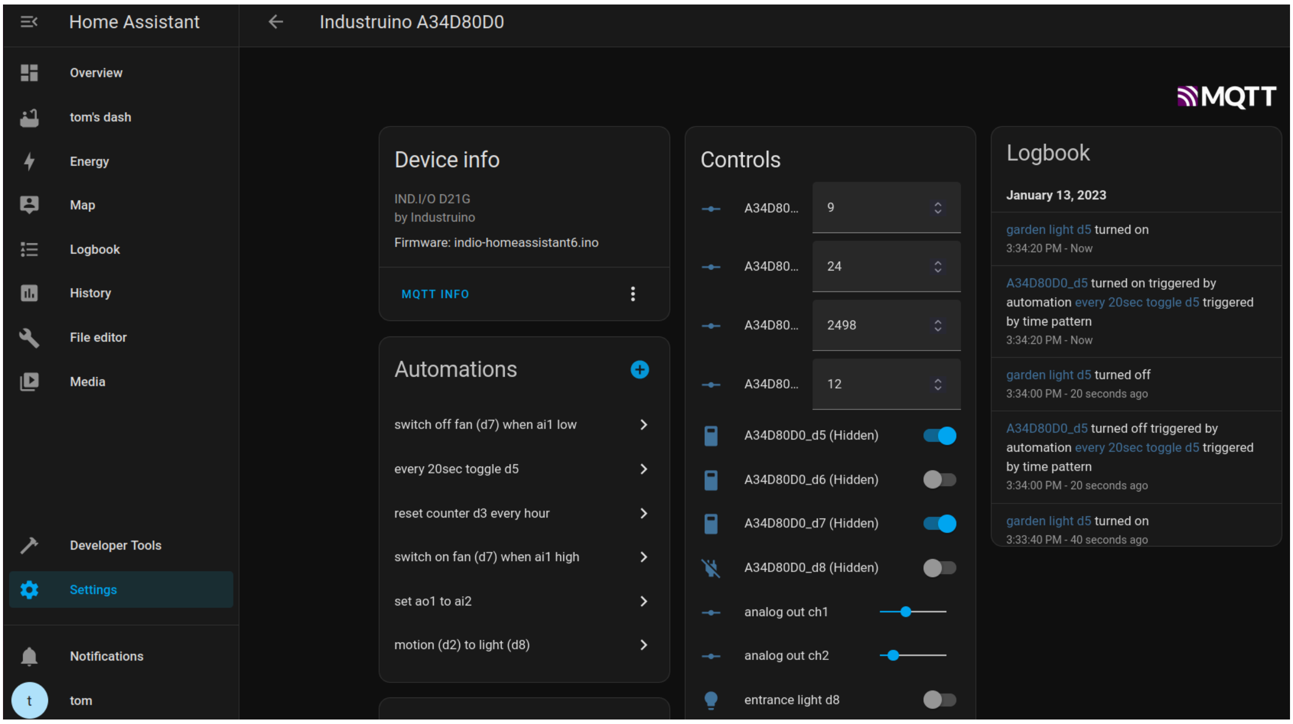
A34D80D0_counter_d1	9
A34D80D0_counter_d2	24
A34D80D0_counter_d3	2498
A34D80D0_counter_d4	12
garden light d5	
fence lock d6	UNLOCK
workshop fan d7	
entrance light d8	
analog out ch1	39.2%
analog out ch2	20%
A34D80D0_ai1	71.57%
A34D80D0_ai2	60.80%

You can also configure the entities via Settings, Devices, Entities



☐	Name	Entity ID	Integration
☐	A34D80D0_ai1	sensor.a34d80d0_ai1	MQTT
☐	A34D80D0_ai2	sensor.a34d80d0_ai2	MQTT
☐	A34D80D0_ai3	sensor.a34d80d0_ai3	MQTT
☐	A34D80D0_ai4	sensor.a34d80d0_ai4	MQTT
☐	A34D80D0_counter_d1	number.a34d80d0_counter_d1	MQTT
☐	A34D80D0_counter_d2	number.a34d80d0_counter_d2	MQTT
☐	A34D80D0_counter_d3	number.a34d80d0_counter_d3	MQTT
☐	A34D80D0_counter_d4	number.a34d80d0_counter_d4	MQTT
☐	A34D80D0_d1	binary_sensor.a34d80d0_d1	MQTT
☐	A34D80D0_d2	binary_sensor.a34d80d0_d2	MQTT

There is also a useful device overview in Settings, Devices where all the related info is shown, including automations.



Industruino A34D80D0

Device info

IND.I/O D21G
by Industruino

Firmware: indio-homeassistant6.ino

MQTT INFO

Automations

switch off fan (d7) when ai1 low

every 20sec toggle d5

reset counter d3 every hour

switch on fan (d7) when ai1 high

set ao1 to ai2

motion (d2) to light (d8)

Controls

A34D80... 9

A34D80... 24

A34D80... 2498

A34D80... 12

A34D80D0_d5 (Hidden)

A34D80D0_d6 (Hidden)

A34D80D0_d7 (Hidden)

A34D80D0_d8 (Hidden)

analog out ch1

analog out ch2

entrance light d8

Logbook

January 13, 2023

garden light d5 turned on
3:34:20 PM - Now

A34D80D0_d5 turned on triggered by automation every 20sec toggle d5 triggered by time pattern
3:34:20 PM - Now

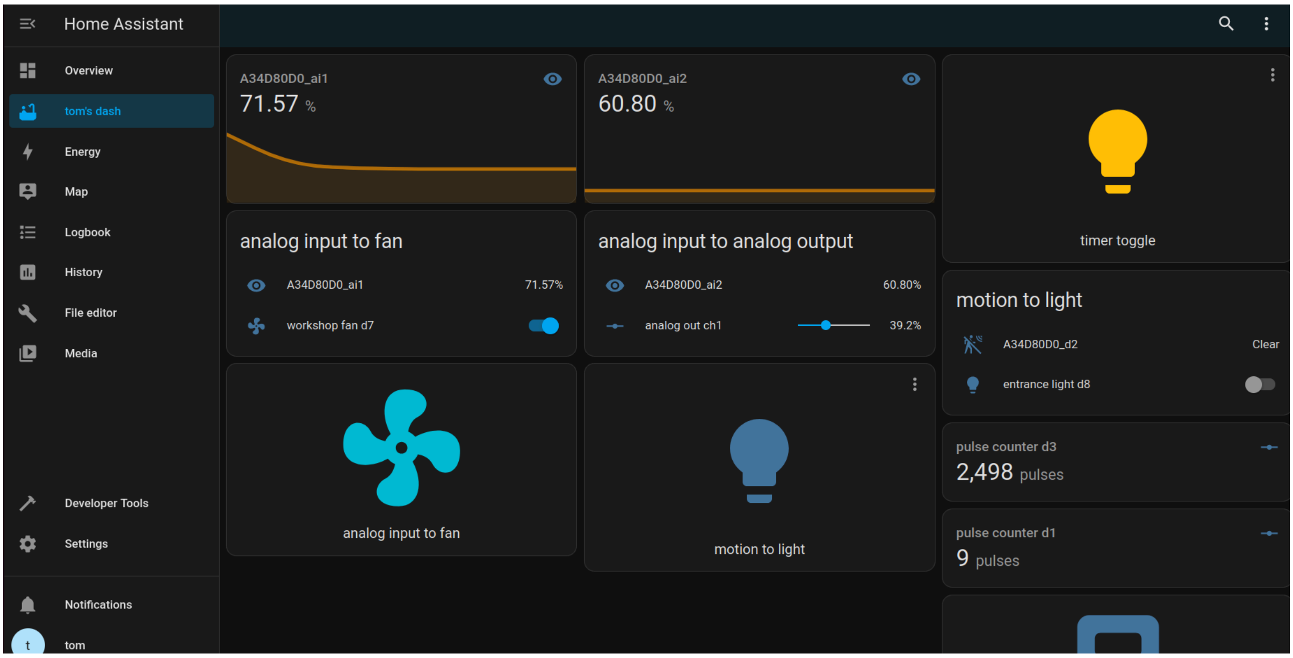
garden light d5 turned off
3:34:00 PM - 20 seconds ago

A34D80D0_d5 turned off triggered by automation every 20sec toggle d5 triggered by time pattern
3:34:00 PM - 20 seconds ago

garden light d5 turned on
3:33:40 PM - 40 seconds ago

The Industruino will publish all state changes of the digital inputs, and publish any changed pulse counters at a minimum interval defined in the firmware as PULSE_COUNTER_PUB_INTERVAL_SEC.

Analog input values are also only published when changed, with a minium interval defined in the firmware as ANALOG_READ_INTERVAL_SEC.
It is also possible to create customised dashboards.



A34D80D0_ai1
71.57 %

A34D80D0_ai2
60.80 %

timer toggle

analog input to fan

A34D80D0_ai1 71.57%

workshop fan d7

analog input to analog output

A34D80D0_ai2 60.80%

analog out ch1 39.2%

motion to light

A34D80D0_d2 Clear

entrance light d8

pulse counter d3
2,498 pulses

pulse counter d1
9 pulses

analog input to fan

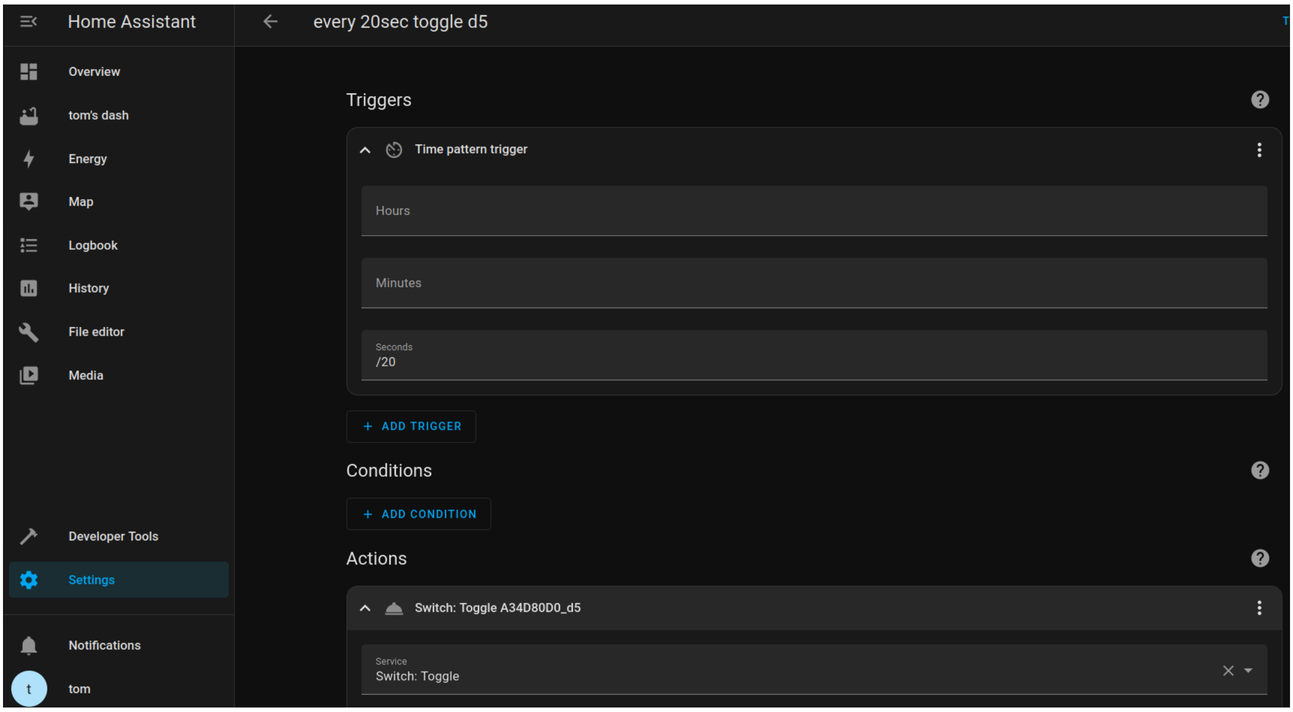
motion to light

Example Automations

Automations are a standard feature of HASS so much more information is available as HomeAssistant documentation. Below we show a few simple automations created via the HASS UI.

Go to Settings, Automations&Scenes

1) Create a new automation which will toggle digital output CH5 every 20 seconds.



every 20sec toggle d5

Triggers

Time pattern trigger

Hours

Minutes

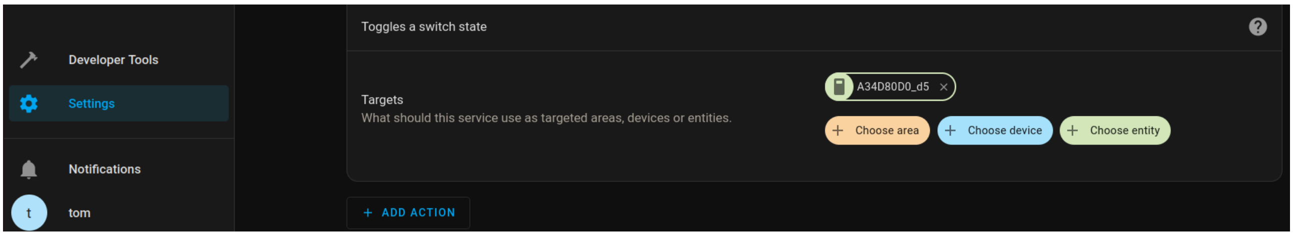
Seconds
/20

Conditions

Actions

Switch: Toggle A34D80D0_d5

Service
Switch: Toggle

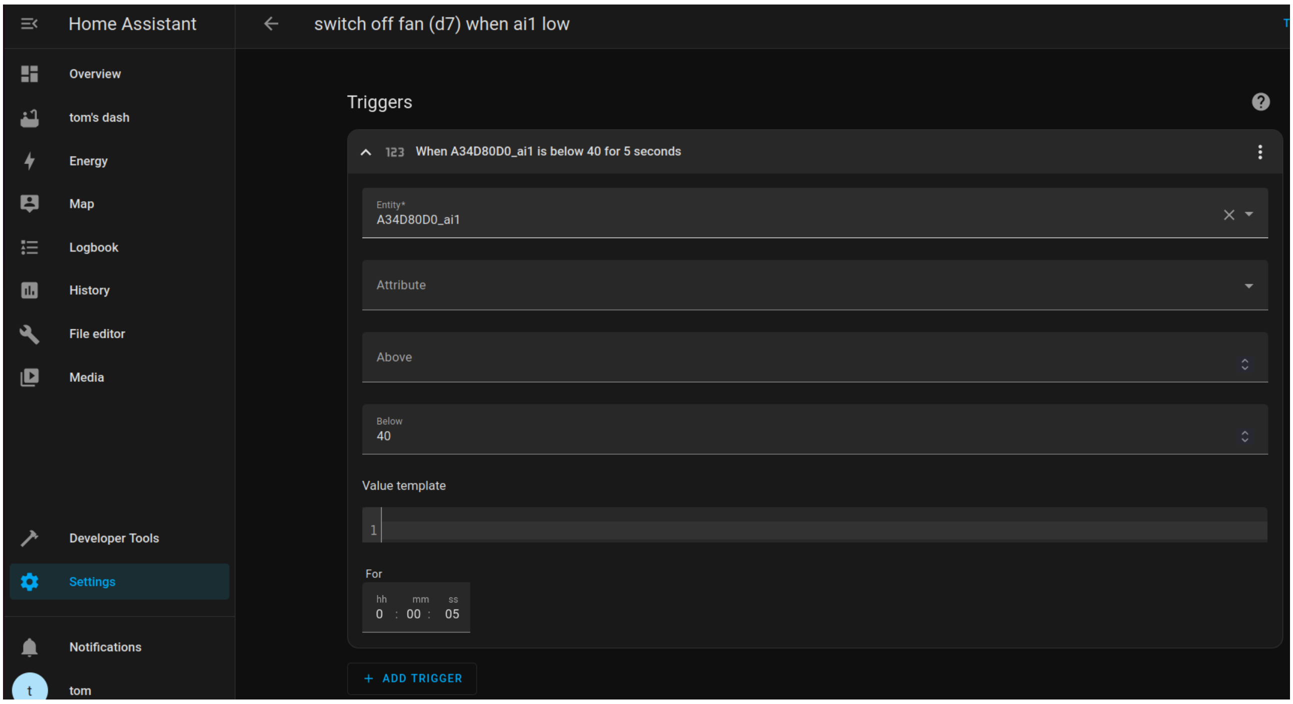


Toggles a switch state

Targets
What should this service use as targeted areas, devices or entities.

A34D80D0_d5

2) Create an automation that will switch off digital output CH7 when analog input CH1 is below 40% for 5 seconds



switch off fan (d7) when ai1 low

Triggers

When A34D80D0_ai1 is below 40 for 5 seconds

Entity*: A34D80D0_ai1

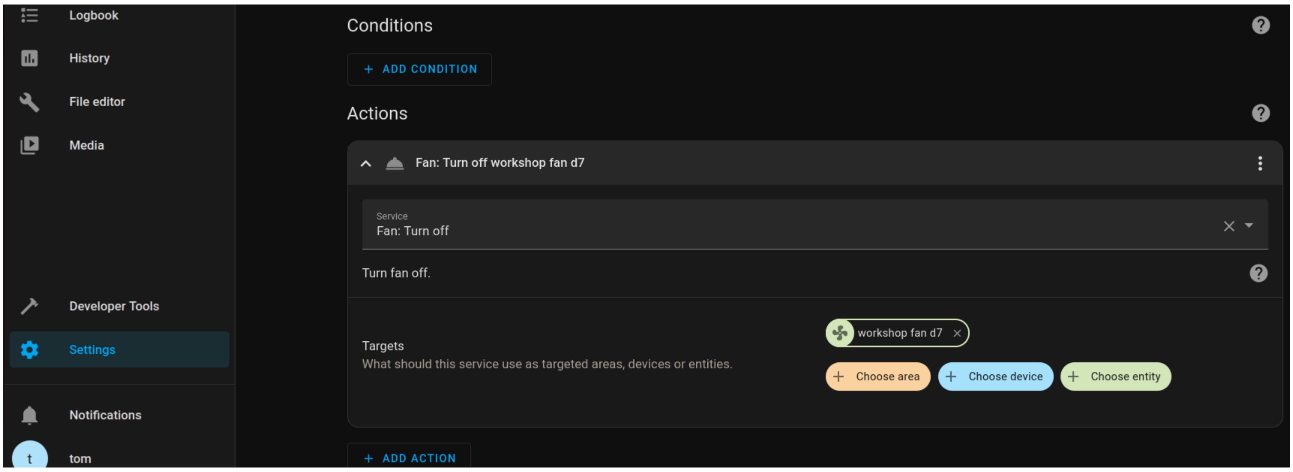
Attribute

Above

Below: 40

Value template

For: hh 0 : mm 00 : ss 05



Conditions

Actions

Fan: Turn off workshop fan d7

Service: Fan: Turn off

Turn fan off.

Targets
What should this service use as targeted areas, devices or entities.

workshop fan d7

Of course you can add any other devices linked to HASS to your automations.