

Domoticz MicroPython Projects - Block Diagrams - <Have Fun/>

Addendum to the [Domoticz Homeautomation Workbook](#).

By rwbl

Introduction

Purpose

To explore how to use the MicroPython programming language running on embedded hardware, the Microcontroller Unit MCU, interfacing with the Domoticz Home Automation System.

The core of the projects uses the Raspberry Pi Pico W, with actuators & sensors, acting as a Web Server to communicate with the Domoticz Home Automation System.

The projects can function as a base for projects or to trigger ideas for use.

The intention is to provide some practical guidance and not to explain Domoticz nor programming languages.

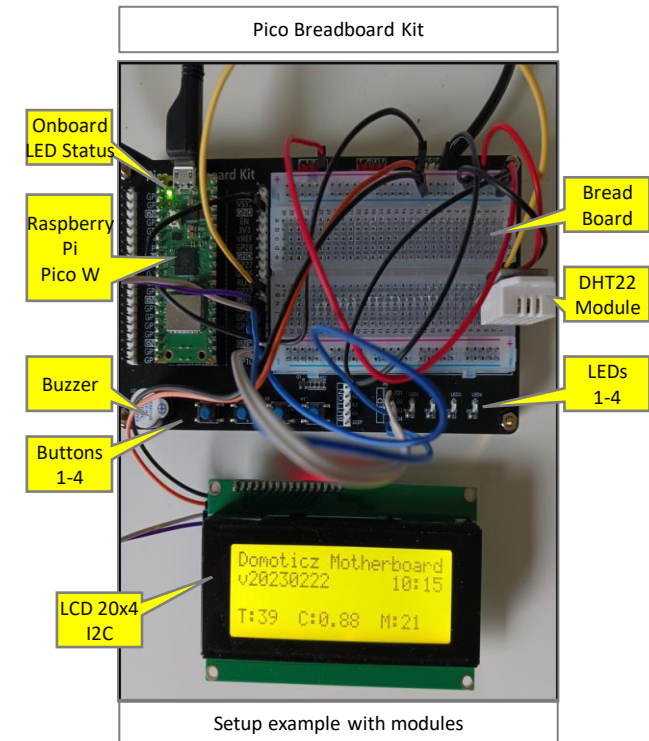
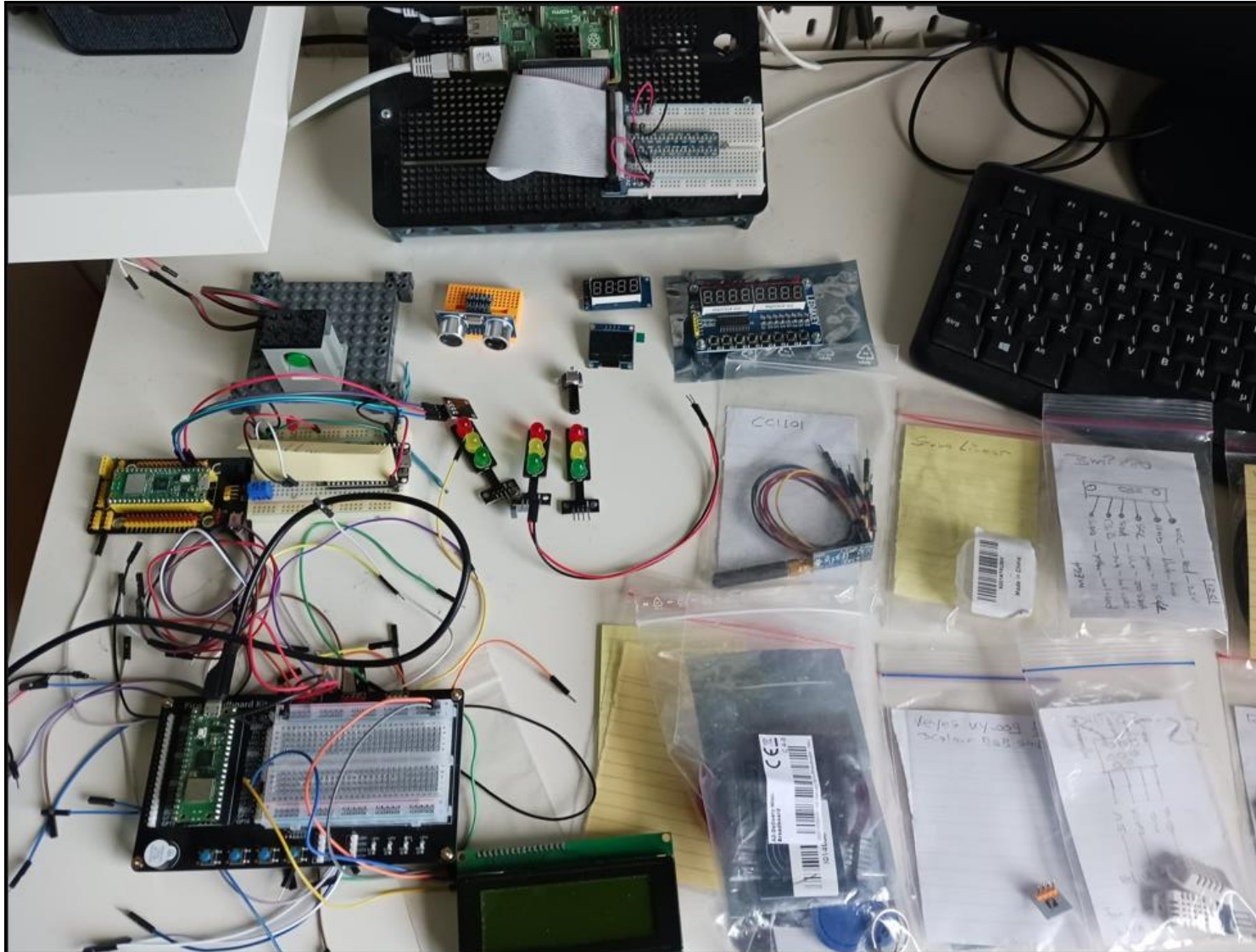
Prerequisites

Basic knowledge of

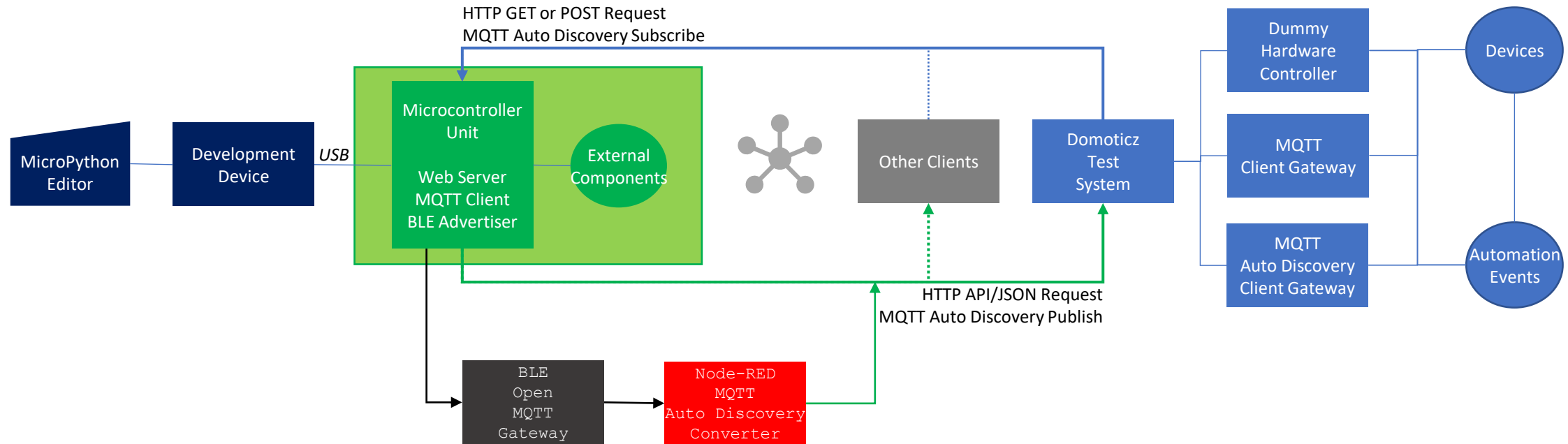
- Domoticz Home Automation System.
- Domoticz Automation Event system dzVents & Lua.
- Programming languages Python and MicroPython.
- Raspberry Pi Pico / Pico W and ESP microcontrollers.
- Thonny Integrated Development Environment.
- JavaScript Object Notation (JSON).
- Message Queuing Telemetry Transport MQTT and MQTT Autodiscover.

Workbench

Overview of the Author's workbench

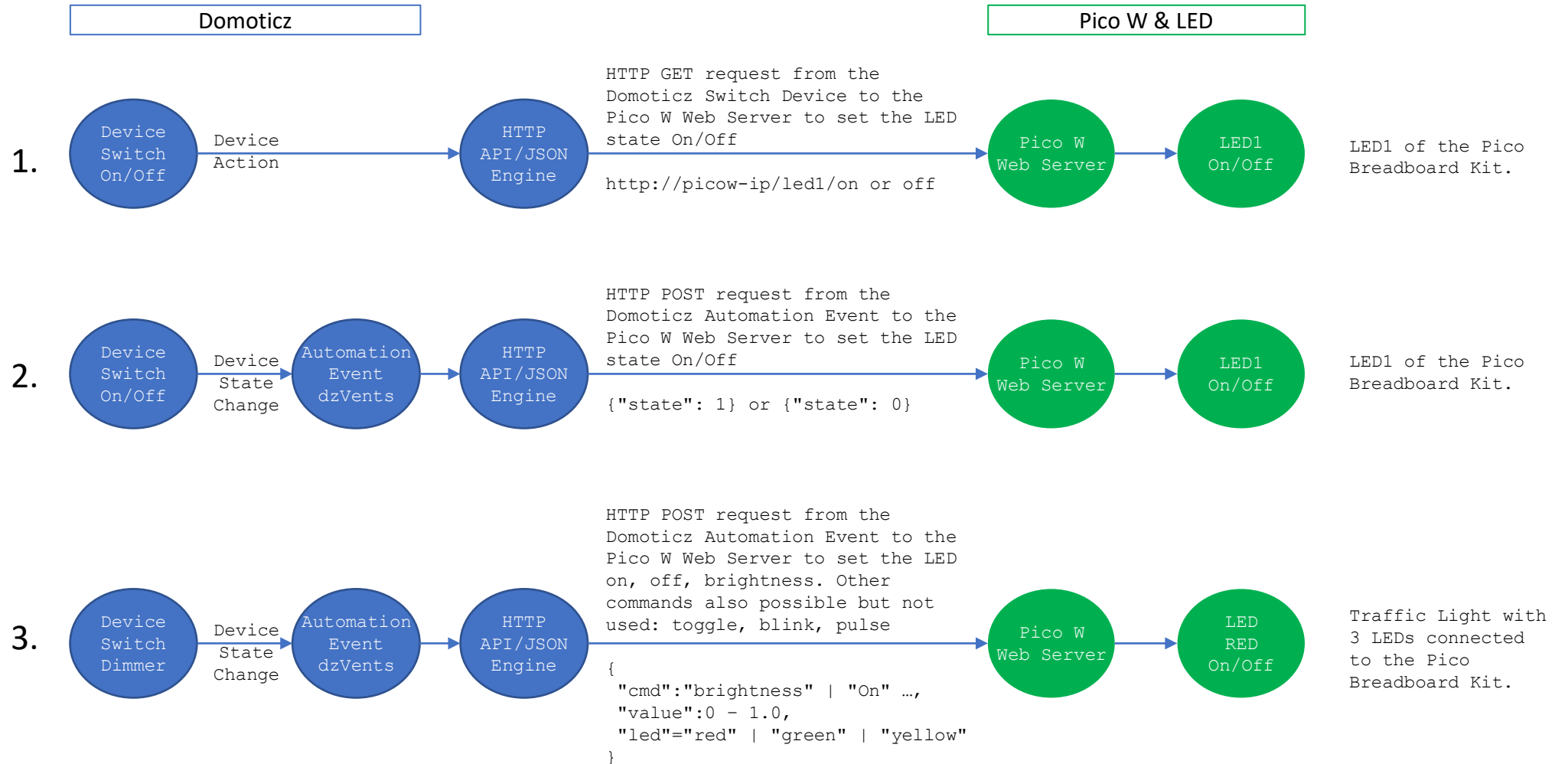


Blockdiagram Setup



Project LED Control

Domoticz Switch Device triggers Device On/Off/Brightness Action to set the Pico W LED1 of the Pico Breadboard Kit.



Project LED Control – Device On/Off Action

Domoticz Switch Device triggers Device On/Off Action to set the Pico W LED1 of the Pico Breadboard Kit On/Off.

Domoticz Hardware Dummy

Idx	Name	Enabled	Type	Address	Port	Data Timeout
3	VirtualSensors	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

Create Virtual Sensor

Name: LED1 Control

Sensor Type: Switch

OK Cancel

Device created

Idx	Hardware	ID	Unit	Name	Type	SubType	Data
16	VirtualSensors	00014060	1	LED1 Control	Light/Switch	Switch	On

Device Widget

LED1 Control On


Last Seen: 2023-02-23 19:12:58
Type: Light/Switch, Switch, On/Off

Log Edit Timers Notifications

Idx: 16

Name: LED1 Control

Switch Type: On/Off

Switch Icon:  Default icon

On Delay: 0 (Seconds) 0 = Disabled

Off Delay: 0 (Seconds) 0 = Disabled

On Action: <http://picow-ip/led1/on>

Off Action: <http://picow-ip/led1/off>

Protected: ☐

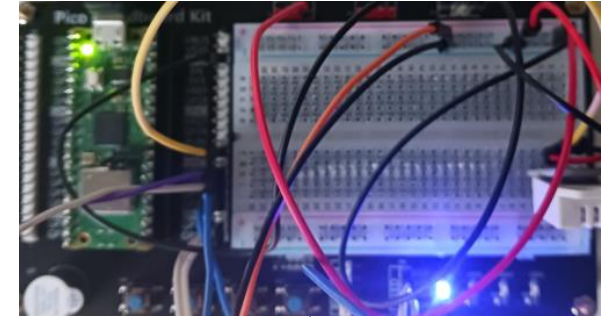
Description: Control the Raspberry Pi Pico W LED1 via HTTP GET request to the Pico W running as a Webserver (MicroPython).

Edit Switch Device Properties with HTTP GET request actions set to switch the Pico W LED1 On / Off

On/Off Action Command:
<http://picow-ip/led1/on> or <http://picow-ip/led1/off>

Device HTTP On / Off Actions to Pico W Web Server

Pico W with Breadboard Kit & LED1 On



Thonny - Pico W Web Server MicroPython Script & Log

```
Thonny - C:\Users\user\projects\homeautomation\domoticz\domoticz-microcontroller-workbook\Chapter1\Raspberry Pi Pico W\Projects\LEDControl\Source...
File Edit View Run Tools Help
New Ctrl-N
This computer
C:\Users\user\projects\homeautomation\domoticz\domoticz-microcontroller-workbook\Chapter1\Raspberry Pi Pico W\Projects\LEDControl\Source...
ledcontrol.py
config.py
ledcontrol.events
ledcontrol.py
Raspberry Pi Pico
lib
config.py
Shell
>>> %Run -c $EDITOR_CONTENT
LEDControl v20230220
Network - Connected
Network - IP = picow-ip
Network Client connected from picow-ip
HTTP Command: /led1/~off
HTTP Response: {"status": "OK", "title": "/led1/off", "message": "Off"}
Network Client connected from picow-ip
HTTP Command: /led1/on
HTTP Response: {"status": "OK", "title": "/led1/on", "message": "On"}
MicroPython (Raspberry Pi Pico) - COM11
```


Project LED Control - Custom Event

Domoticz Switch Device State Change triggers Automation Event to set the Pico W LED1 of the Pico Breadboard Kit On/Off.

Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
3	VirtualSensors	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

Create Virtual Sensor

Name: LED1 Control

Sensor Type: Switch

OK

Cancel

Domoticz Devices

Idx	Hardware	ID	Unit	Name	Type	SubType	Data
16	VirtualSensors	00014060	1	LED1 Control	Light/Switch	Switch	On

Device Widget

LED1 Control

On

Last Seen: 2023-02-23 19:12:58

Type: Light/Switch, Switch, On/Off

Log

Edit

Timers

Notifications

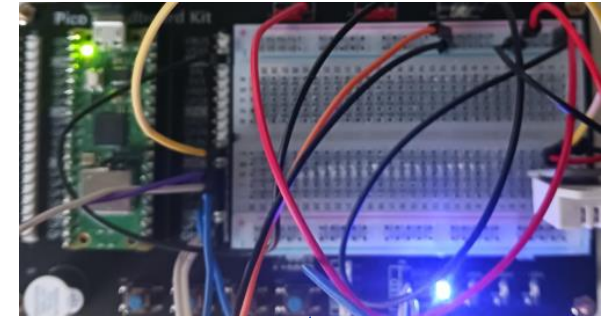
```
1 #!/usr/bin/env python3
2 # Pico W LED Control
3
4 import sys
5 import time
6 import requests
7
8 # Domoticz API
9 URL = "http://192.168.1.100:8080"
10 USER = "admin"
11 PASS = "password"
12
13 # LED Control
14 LED_ON = "/led1/on"
15 LED_OFF = "/led1/off"
16
17 def getCommand(request):
18     # Split the decoded request string into a list
19     data = str(request.decode()).split(CRLF)
20     # Check if there is data to get the first item
21     if len(data) > 0:
22         # Split the command string into 3 list with 3 items
23         cmd = data[0].split(SPACE)
24         # Check and get the 2nd item
25         if len(cmd) == 3:
26             cmd = cmd[1]
27         # Return the command, i.e. /led1/on etc.
28         print(f'HTTP Command: {cmd}')
29         return cmd
30
31 # Main
32 print(f'{NAME} (VERSION)')
33
34 # Connect to the network and listen for incoming connections
35 server = catNetwork()
```

Domoticz Automation Event dzVents triggered by state change of the Domoticz Switch device (IDX=16).

The event submits a HTTP GET request to the Pico W Web Server to switch the LED1 On/Off.

Device HTTP On / Off Actions to the Pico W Web Server

Pico W with Breadboard Kit & LED1 On



Thonny - Pico W Web Server MicroPython Script & Log

```
1 #!/usr/bin/env python3
2 # Pico W LED Control
3
4 import sys
5 import time
6 import requests
7
8 # Domoticz API
9 URL = "http://192.168.1.100:8080"
10 USER = "admin"
11 PASS = "password"
12
13 # LED Control
14 LED_ON = "/led1/on"
15 LED_OFF = "/led1/off"
16
17 def getCommand(request):
18     # Split the decoded request string into a list
19     data = str(request.decode()).split(CRLF)
20     # Check if there is data to get the first item
21     if len(data) > 0:
22         # Split the command string into 3 list with 3 items
23         cmd = data[0].split(SPACE)
24         # Check and get the 2nd item
25         if len(cmd) == 3:
26             cmd = cmd[1]
27         # Return the command, i.e. /led1/on etc.
28         print(f'HTTP Command: {cmd}')
29         return cmd
30
31 # Main
32 print(f'{NAME} (VERSION)')
33
34 # Connect to the network and listen for incoming connections
35 server = catNetwork()
```

Project DHT22 - HTTP API/JSON

Pico W samples DHT22 sensor data and triggers updating the Domoticz Temp + Humidity device.

Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
3	VirtualSensors	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

Create Virtual Sensor


Name:

Sensor Type:

Domoticz Devices

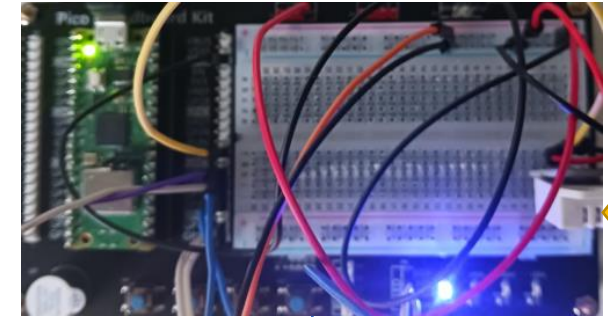
Idx	Hardware	ID	Unit	Name	Type	SubType	Data
15	VirtualSensors	1405F	1	DHT22	Temp + Humidity	THGN122/123/132, THGR122/228 /238/268	17.0 C, 58 %

DHT22 17° C / 58%

 Normal, Dew Point: 8.68° C
Last Seen: 2023-02-24 15:57:26

Pico W Web Server HTTP API/JSON GET request to Domoticz to update the device.
Example HTTP URL:
<http://domoticz-ip:8080/json.htm?type=command¶m=udevice&idx=15&nvalue=0&svalue=17;58;0>

Pico W with Breadboard Kit & DHT22



Get DHT22 Data

Thonny - Pico W Web Server MicroPython Script & Log

```
Thonny - C:\Users\pico\Documents\domoticz\micropython\workbook\Chapters\Raspberry Pi Pico W\Projects\DHT22\Source\dht22domoticz.py @ 50:1
File Edit View Run Tools Help
dht22domoticz.py
23 import json
24 from machine import Pin
25 from utime import sleep
26 # DHT22 micropython internal lib
27 from dht import DHT22
28 # Configuration (must be uploaded to the PicoW)
29 import config
30
31 # Constants
32 VERSION = "PicoW-DHT22toDomoticz v20230224"
33
34 CRLF = chr(13) + chr(10)
35 SPACE = chr(32)
36
37 # Init the LED objects led using data from config.py
38 # Create the onboard LED object to indicate controller is up and network connected
39 ledstatus = Pin("LED", Pin.OUT)
40 ledstatus.off()
41 # Create the led object indicating dht22 measurement in progress
42 led = Pin(config.PIN_LED1, Pin.OUT)
43
44 # DHT22
45 ## DHT22 Signal Pin GP22 #Pin 29
46 PIN_DHT22 = 22
47
48 ## DHT22 measurement sampling rate in seconds
49 SAMPLING_RATE_DHT22 = 60
50
51 ## DHT22 ID of the Domoticz TempHum device
52 IDX_DHT22 = 15
53 ## URL Domoticz
54 ## Note the idx of the domoticz device ( see GUI > Setup > Devices)
55 ## The svalue is added in the main loop after getting the data from the DHT22 module.
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Project DHT22 - Custom Event

Pico W samples DHT22 sensor data and triggers Automation Event to update the Domoticz Temp + Humidity device.

Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
3	VirtualSensors	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

Create Virtual Sensor

Name: DHT22

Sensor Type: Temp+Hum

OK

Cancel

Domoticz Devices

Idx	Hardware	ID	Unit	Name	Type	SubType	Data
15	VirtualSensors	1405F	1	DHT22	Temp + Humidity	THGN122/123/132, THGR122/228 /238/268	17.0 C, 58 %

DHT22

Normal, Dew Point: 8.68° C
Last Seen: 2023-02-24 15:57:26

17° C / 58%

Log

Edit

Notifications

```
1 -- picow_dht22_customevent.dzvents
2 -- Listen to picow webserver request custom event command and update the temp+hum dev
3 -- 20230225 rmb1
4
5 -- Test:
6 -- http://192.168.1.179:8080/json.htm?type=command&param=customevent&event=DHT22&data={
7 -- [{"
8 2023-02-24 16:33:03.190 Status: dzVents: Info: Handling Domoticz custom event for: "
9 2023-02-24 16:33:03.190 Status: dzVents: Info: ----- Start Internal script: picow_d
10 2023-02-24 16:33:03.191 Status: dzVents: Info: [{"isXML"}=false, [{"isSystem"}=false,
11 2023-02-24 16:33:03.191 Status: dzVents: Info: [{"t":19,"h":58,"s":0}
12 2023-02-24 16:33:03.192 Status: dzVents: Info: t=19,h=58,s=0
13 2023-02-24 16:33:03.192 Status: dzVents: Info: ----- Finished picow_dht22_customevent
14 ]}
15
16 local IDX_DHT22 = 15
17 local CUSTOM_EVENT_NAME = "DHT22"
18
19 -- return {
20 --   CustomEvents = { CUSTOM_EVENT_NAME }
21 -- },
22 --   data = {},
23 --   logging = {},
24 --   execute = function(domoticz, triggeredthen)
25 --     if (triggeredthen.isCustomEvent) then
26 --       domoticz.log(triggeredthen)
27 --       domoticz.log(triggeredthen.data)
28 --       local data = triggeredthen.json
29 --       domoticz.log(string.format("t=%d,h=%d,s=%d", data.t, data.h, data.s))
30 --       domoticz.devices[IDX_DHT22].updateTempHum(data.t, data.h, data.s)
31 --       -- Take any other action based on temp or hum or hum_stat
32 --     end
33 --   end
34 -- }
35 }
```

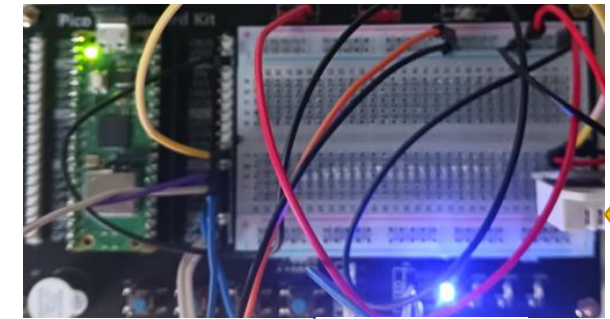
Domoticz Automation Event dzVents
Trigger: Custom Event

Pico W Web Server HTTP API/JSON POST request to Domoticz Automation Event to update the device.

Example HTTP URL:

[http://domoticz-ip:8080/json.htm?type=command¶m=customevent&event=DHT22&data={\"h\": 58, \"t\": 17, \"s\": 0}](http://domoticz-ip:8080/json.htm?type=command¶m=customevent&event=DHT22&data={\)

Pico W with Breadboard Kit & DHT22



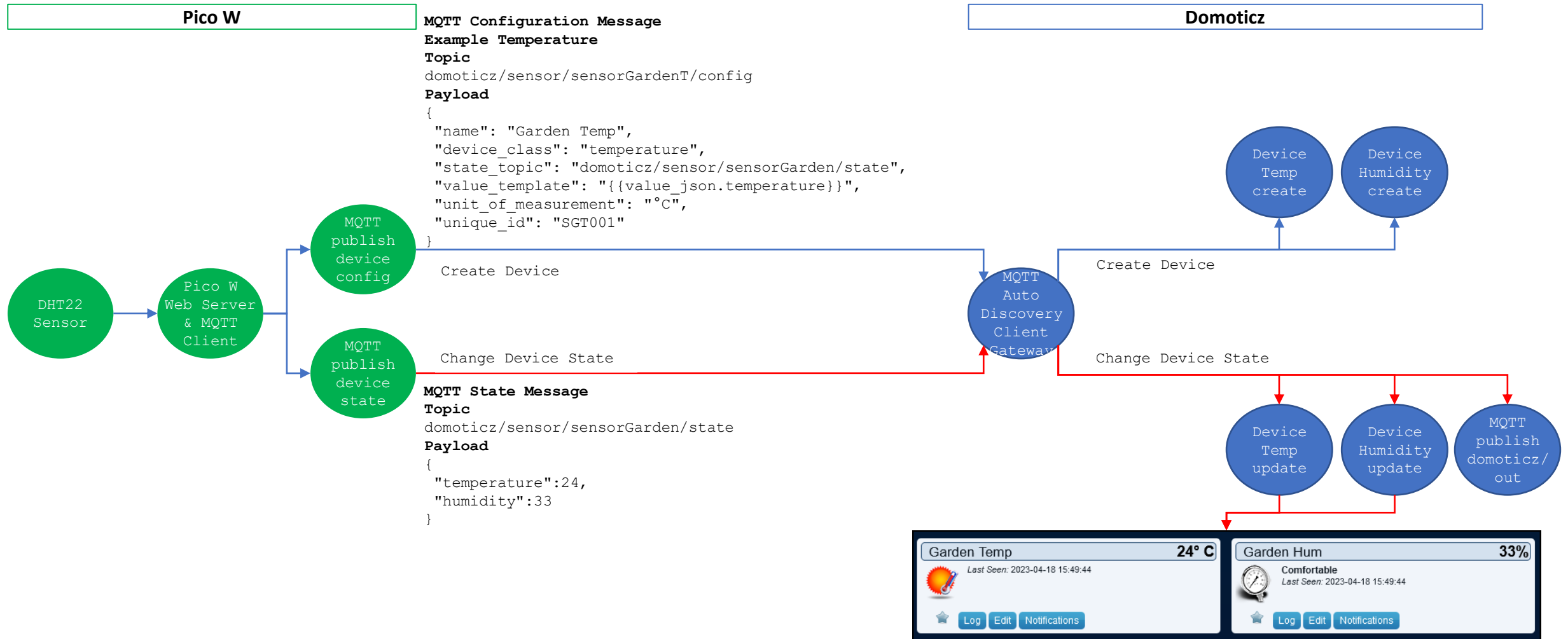
Get DHT22 Data

Thonny - Pico W Web Server MicroPython Script & Log

```
1 dht22domoticz.py
2
3 import json
4 from machine import Pin
5 from utime import sleep
6 # DHT22 module internal lib
7 from dht import DHT22
8 # Configuration (must be uploaded to the picow)
9 import config
10
11 # Constants
12 VERSION = "Picow-DHT22toDomoticz v20230224"
13
14 CRLF = chr(13) + chr(10)
15 SPACE = chr(32)
16
17 # Init the LED objects led using data from config.py
18 # Create the onboard LED object to indicate controller is up and network connected
19 ledstatus = Pin("LED", Pin.OUT)
20 ledstatus.off()
21 # Create the led object indicating dht22 measurement in progress
22 led = Pin(config.PIN_LED1, Pin.OUT)
23
24 # DHT22
25 # DHT22 Signal Pin GP22 #Pin 29
26 PIN_DHT22 = 22
27
28 # DHT22 measurement sampling rate in seconds
29 SAMPLING_RATE_DHT22 = 60
30
31 # DHT22 ID of the Domoticz TempHum device
32 IDX_DHT22 = 15
33 # URL Domoticz
34 # Note the id of the domoticz device ( see GUI > Setup > Devices)
35 # The swalue is added in the main loop after getting the data from the DHT22 module.
36 # http://192.168.1.179:8080/json.htm?type=command&param=customevent&event=DHT22&data={\"h\": 58, \"t\": 17, \"s\": 0}
37
38 # Main loop
39 while True:
40     # Read data from DHT22
41     dht22 = DHT22(PIN_DHT22)
42     (temp, hum) = dht22.read_data()
43     # Send data to Domoticz
44     data = {\"h\": hum, \"t\": temp, \"s\": 0}
45     url = \"http://192.168.1.179:8080/json.htm?type=command&param=customevent&event=DHT22&data={\"h\": 58, \"t\": 17, \"s\": 0}\"
46     req = urllib.request.Request(url)
47     response = urllib.request.urlopen(req)
48     # Log the response
49     print(response.read().decode('utf-8'))
```

Project DHT22 - MQTT Autodiscover

Pico W publishes MQTT Config & State Messages to Domoticz MQTT Auto Discovery Client Gateway.



Project LCD LED Control

Domoticz Switch Device State Change triggers Automation Event to set the Pico W LED1 & LCD2004 display.

Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
3	VirtualSensors	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

Create Virtual Sensor

Name:

Sensor Type:

Domoticz Devices

Idx	Hardware	ID	Unit	Name	Type	SubType	Data
16	VirtualSensors	00014060	1	LED1 Control	Light/Switch	Switch	On

Device Widget

LED1 Control On

Last Seen: 2023-02-23 19:12:58
Type: Light/Switch, Switch, On/Off

```
10 #!/usr/bin/env python3
11 # Domoticz Automation Event dzVents triggered by state
12 # change of the Domoticz Switch device (IDX=16).
13
14 -- Domoticz
15 -- For tests the trigger is an switch type onoff
16
17 URL_SERVER = 'http://pico-w-ip'
18 CMD_LED_ON = '{"state":"on"}'
19 CMD_LED_OFF = '{"state":"off"}'
20
21 RES_HTTP = 'RES_PICO_W_LCDLEDCONTROL'
22 LOG_MARKER = 'LOG_PICO_W_LCDLEDCONTROL'
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Project LCD Motherboard

Domoticz sends RPi Motherboard sensor data to set the LCD 20x4 I2C display connected to the Pico W.

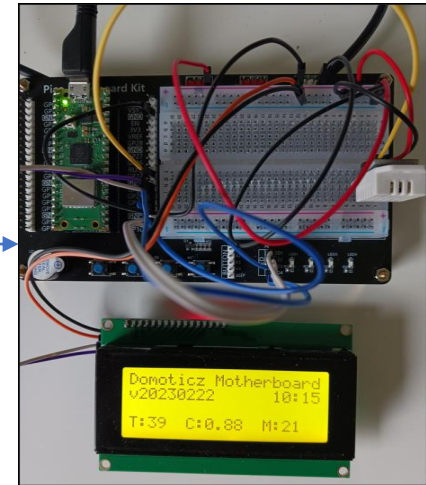
Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
5	RPi Motherboard	Yes	Motherboard sensors			Disabled

Domoticz Devices (selective)

Idx	Hardware	ID	Unit	Name	Type	SubType	
18	RPi Motherboard	0001	1	Internal Temperature	Temp	LaCrosse TX3	38.9 C
26	RPi Motherboard	0000044D	1	CPU_Usage	General	Percentage	0.41%
22	RPi Motherboard	0000044C	1	Memory Usage	General	Percentage	18.35%

Pico W with
Breadboard Kit & LCD 20x4



```
On Off picow_lcdmotherboard
44 -- setSensor(3,5,'T',round(domoticz.devices(IDX_INTERNALTEMPERATURE
45 - local function setSensor(row,col,pre,data)
46   return setText(row,col,string.format('%s%s', pre, tostring(data))
47 end
48 -- [{"internaltemperature"}]= [{"col"}]=5, [{"data"}]= "T:39.4", [{"row"}]=3
49
50
51 - local function getMotherboardData(domoticz)
52   local data = {}
53
54   -- row=1, col=15, data=HH:MM len=5, range = 15+5-1=19
55   data['timestamp'] = setText(1, 15, string.sub(domoticz.time.rawT,
56
57   -- row=3, col=0, data=T:NN len=4, range = 0+4-1=3
58   data['internaltemperature'] = setSensor(3, 0, 'T:', round(domoti
59   -- row=3, col=6, data=C:NN.NN len=5, range = 6+5-1=10
60   data['cpuusage'] = setSensor(3, 6, 'C:', round(domoti
61   -- row=3, col=14, data=M:NN len=4, range = 14+4-1=17
62   data['memoryusage'] = setSensor(3, 14, 'M:', round(domoti
63
64
65
66 --[[
67 data['internaltemperature'] = round(domoticz.devices(IDX_INTERNA
68 data['armclockspeed'] = round(domoticz.devices(IDX_ARMCLOC
69 data['v3dclockspeed'] = round(domoticz.devices(IDX_V3DCLOC
70 data['coreclockspeed'] = round(domoticz.devices(IDX_CORECLOC
71 data['memoryusage'] = round(domoticz.devices(IDX_MEMORYUS
72 data['processusage'] = round(domoticz.devices(IDX_PROCESS
73 data['hddboot'] = round(domoticz.devices(IDX_HDDBOOT)
74 data['hdd'] = round(domoticz.devices(IDX_HDD)
75 data['cpuusage'] = round(domoticz.devices(IDX_CPUUSAG
76 ]])
77
78 -- Test embedding json: r=row 0-3, c=col 0-19, d=data
79 --[[
80 local x = {}
81 x['r']=3
82 x['c']=5
83 x['d']=string.format('T:%s', tostring(data['internaltemperature']
84 data['temp'] = x
85 ]])
86 domoticz.log(data)
87 return data
88 end
```

Domoticz Automation Event dzVents

Trigger: Timer

An event is reading in regular intervals the RPi motherboard data.

The data is converted to a JSON object and sent as HTTP POST request to the Pico W Web Server.

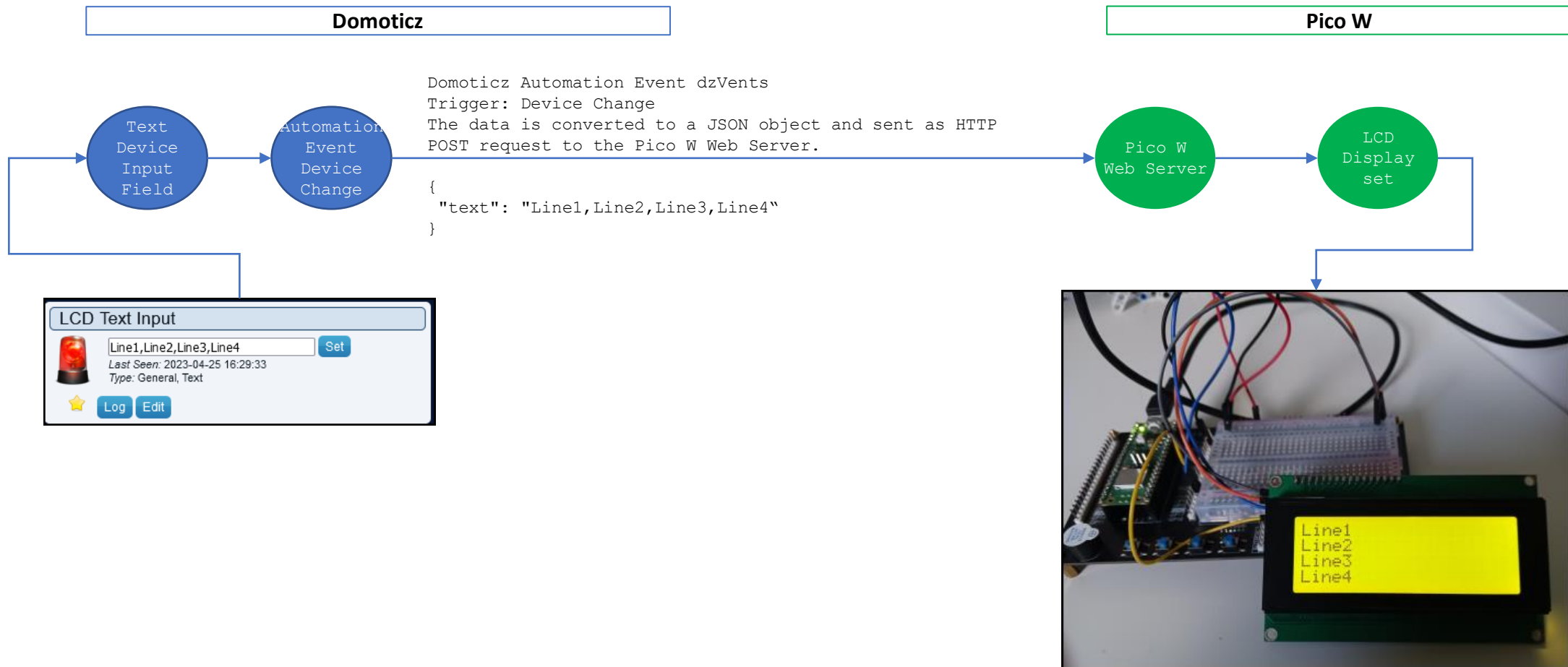
```
{
  ["internaltemperature"]=
  { ["col"]=0, ["text"]="T:38", ["row"]=3},
  ["timestamp"]=
  { ["col"]=15, ["text"]="16:19", ["row"]=1},
  ["memoryusage"]=
  { ["col"]=14, ["text"]="M:21", ["row"]=3},
  ["cpuusage"]=
  { ["col"]=6, ["text"]="C:0.35", ["row"]=3}
}
```

Thonny - Pico W Web Server Script & Log

```
Files
This computer
C:\Daten\projects\homeautomation\
domoticz\
domoticz-microcontroller-workbook\
Chapters\ Raspberry Pi Pico W \
Experiments\LCDMotherboard\ Source
  lcdmotherboard.dzvents
  lcdmotherboard.py
Raspberry Pi Pico
  lcd_api.py
  machine_i2c_lcd.py
  config.py
Shell
>>> %Run -c $EDITOR_CONTENT
Domoticz Motherboard v20230222
aa: [39]
DomoticzTip -
  ed. IP: 192.168.1.108
Network - Client connected from 192.168.1.23
HTTP POST Data from Domoticz:
{'timestamp': {'text': '11:51', 'col': 15, 'row': 1}, 'memoryusage':
ture': {'text': 'T:38', 'col': 0, 'row': 3}}
HTTP Response to Domoticz:
{'status': 'OK', 'title': 'Set LCD', 'message': ''}
```

Project LCD Text Input

Domoticz sends text from a Text Device enabling Input to set the LCD 20x4 I2C display connected to the Pico W.



Inspired by [this](#) Domoticz Forum Post (thanks for sharing).

Project LED Display TM1637

Domoticz sends RPi Motherboard Internal Temperature to set the 4-Digit 7-Segment display connected to the Pico W.

Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
5	RPi Motherboard	Yes	Motherboard sensors			Disabled

Domoticz Devices

Idx	Hardware	ID	Unit	Name	Type	SubType	Value
18	RPi Motherboard	0001	1	Internal Temperature	Temp	LaCrosse TX3	37.0 C

```
picow_tm1637_motherboard_internal_temperature x +
On Off picow_tm1637_motherb
20 HTTP_RES = 'RES_PICOW_LCDLEDCONTROL'
21
22 LOG_MARKER = 'LOG_PICOW_LCDLEDCONTROL'
23
24 TIMER_RULE = "every minute"
25
26 -- Helpers
27 local function round(number, decimals)
28     local power = 10^decimals
29     return math.floor(number * power) / power
30 end
31
32 -- Post Data to the Pico W Webserver.
33 -- The data is a JSON object with the temperature rounded
34 local function HTTPPost(domoticz)
35     local data = {}
36     data['data'] = domoticz.devices(IDX_INTERNAL_TEMPERATURE).value
37     domoticz.log(string.format('device=%s, temperature=%s', data['data'], data['data']))
38     domoticz.log(data)
39     -- Submit remote HTTP POST request to set the tm1637 display
40     domoticz.openURL({
41         url = HTTP_URL,
42         method = 'POST',
43         headers = { ['content-type'] = 'application/json' },
44         postData = data,
45         callback = HTTP_RES,
46     })
47 end
```

Domoticz Automation Event dzVents
Trigger: Timer or Switch
An event is reading in regular intervals the RPi motherboard internal temperature sensor.

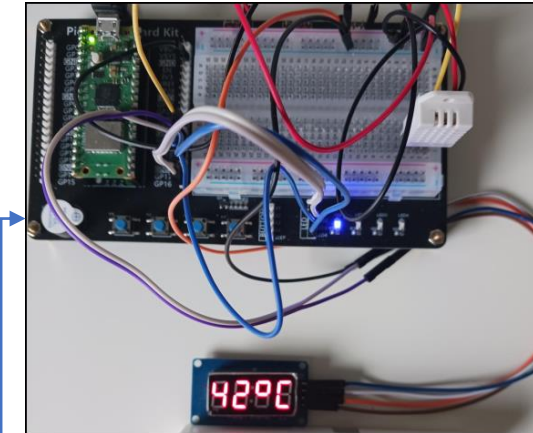
The data is converted to a JSON object and sent as HTTP POST request to the Pico W Web Server.

```
{
  ["data"]=40.900001525879
}
```

Thonny - Pico W Web Server Script & Log

```
tm1637.py
146 # Create the HTTP response JSON object
147 response = {}
148
149 # Init title (holding the command as JSON object)
150 response[config.KEY_TITLE] = getCommand(request)
151 response[config.KEY_STATE] = config.STATE_ERROR
152 response[config.KEY_MESSAGE] = config.MESSAGE_OK
153
154 # TM1637 display set
155 tm.show(' ')
156 sleep(.3)
157
158 # Select the command from the response[config.KEY_TITLE]
159 cmd = response[config.KEY_TITLE]
160 # Get the temperature rounded (no digits)
161 temperature = round(cmd['data'])
162 # Set the display - number only, i.e. 41
163 # tm.number(temperature)
164 # Set the display NN°C
165 tm.temperature(temperature)
```

Pico W with Breadboard Kit & TM1637



Project Servo Control

Domoticz Dimmer Device State Change triggers Automation Event to set the angle of a servo motor connected to the Pico W.

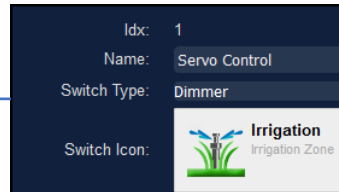
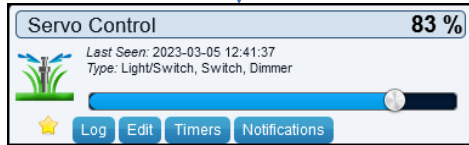
Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
3	VirtualSensors	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

Domoticz Devices

Idx	Hardware	ID	Unit	Name	Type	SubType	
1	VirtualSensors	00014051	1	Servo Control	Light/Switch	Switch	Set Level: 83 %

Device Widget



Edit Set Switch
Type to Dimmer
and Switch Icon
to Irrigation

```
On Off picow_servocontrol
35 LOG_MARKER = 'LOG_PICOW_SERVOCONTROL'
36
37 -- Helpers
38 -- Round to the nearest number
39 local function roundNearest(number)
40     return math.Floor(number + 0.5)
41 end
42
43 -- Post Data to the Pico W Webserver.
44 -- The data is a JSON object with the servo angle and
45 local function HTTPPost(domoticz, angle)
46     local data = {}
47     data['angle'] = angle
48     --data['angle'] = domoticz.devices(IDX_INTERNAL_1)
49     domoticz.log(string.format('device=%s, angle=%d',
50     domoticz.openURL({
51         url = HTTP_URL,
52         method = 'POST',
53         headers = { ['content-type'] = 'application/json' },
54         postData = data,
55         callback = HTTP_RES,
56     })
57 end
58
59
60 return {
61     -- Listen to dimmer device changes and HTTP response
62     on = {
63         devices = { IDX_DIMMER },
64         httpResponses = { HTTP_RES },
65     },
66     logging = { level = domoticz.LOG_INFO, marker = LOG_MARKER },
67     execute = function(domoticz, item)
68         -- domoticz.log(item)
69         if (item.isDevice) then
70             -- Check if state is on, Get the slider
```

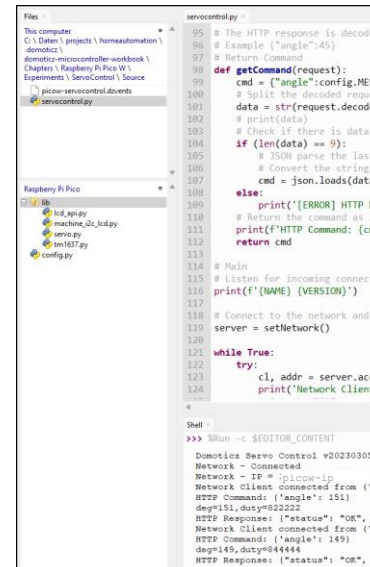
Domoticz Automation Event dzVents triggered by state change of the Domoticz Dimmer device (IDX=1). The servo angle is converted from the dimmer level 0-100% to 0-180 deg. 83% = 149 deg.

The event submits HTTP POST request to the Pico W Web Server to set the servo angle. The post-data is a JSON Object:

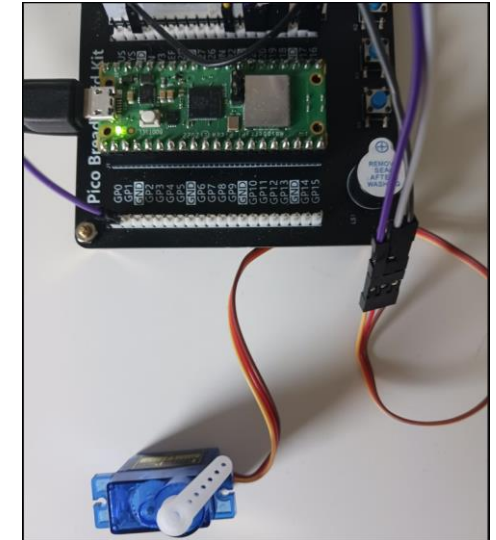
```
{"angle": 149}
```

Device HTTP POST Request to Pico W Web Server

Thonny - Pico W Web Server MicroPython Script & Log



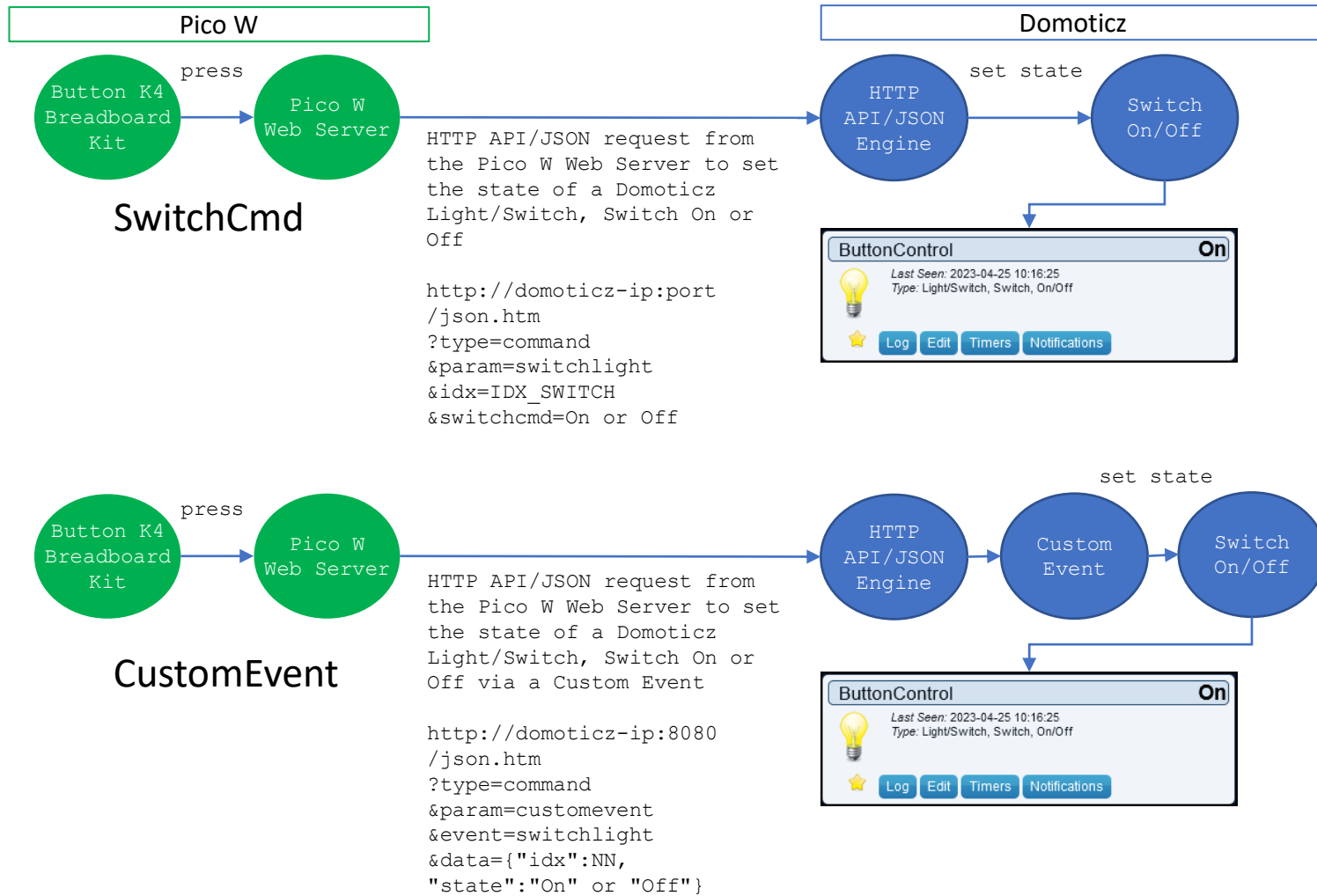
Pico W with Breadboard Kit & Servo Motor SG90



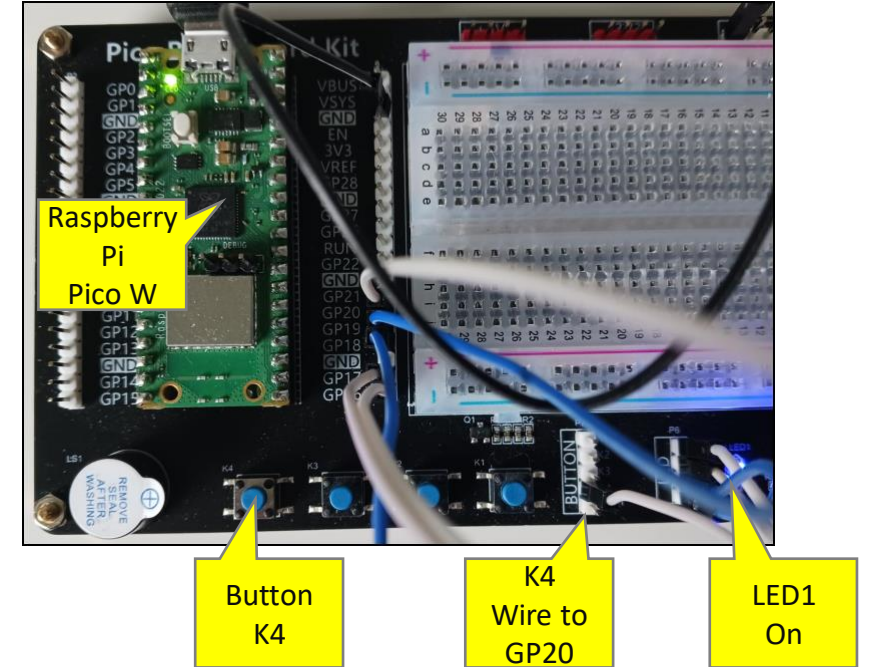
Servo Angle
149 deg

Project Button Control

Pico W with Pushbutton to set the state of a Domoticz Switch On/Off Device.

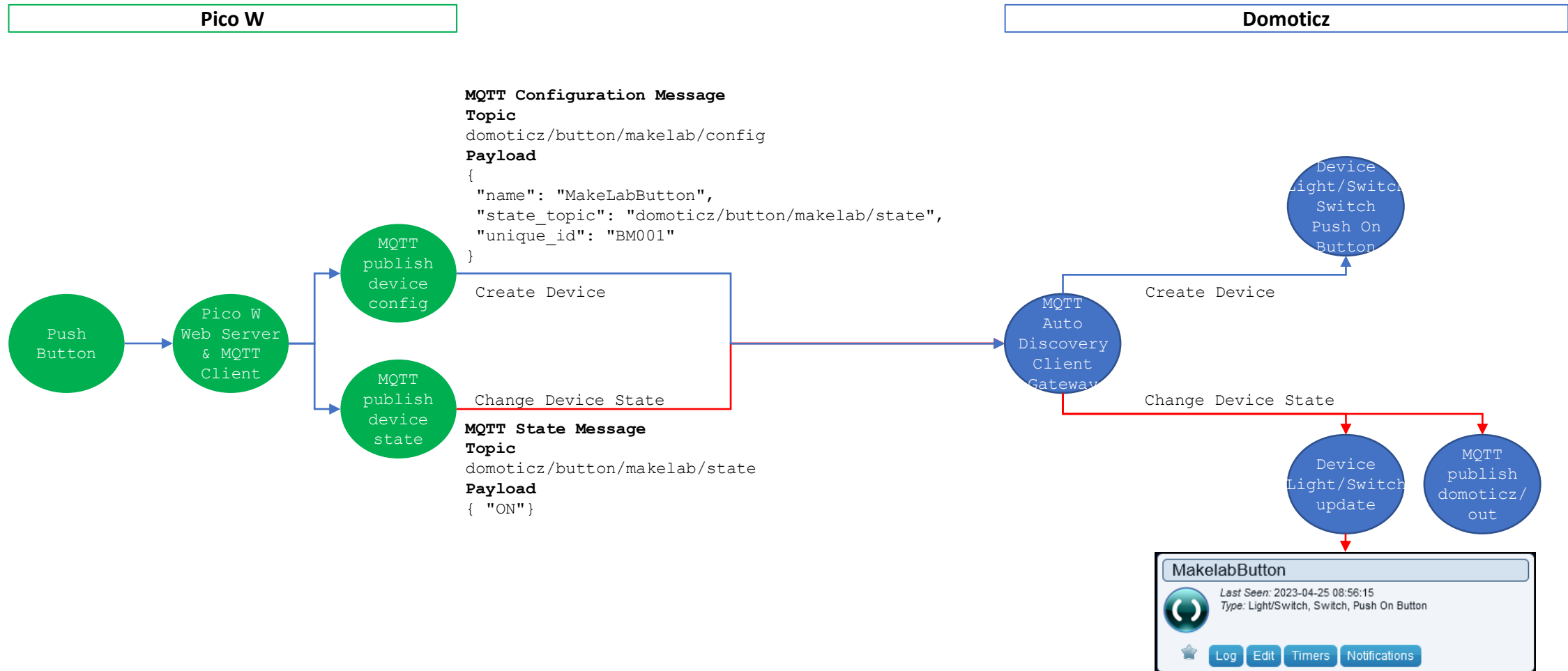


Pico W with Breadboard Kit Button K4 connected



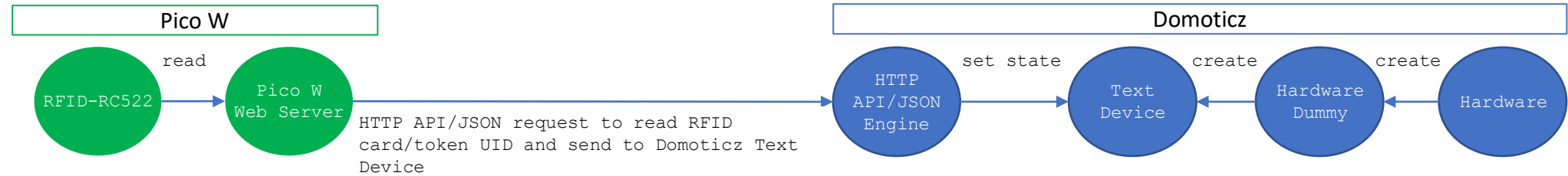
Project Button Control - MQTT Autodiscover

Pico W Push button set state of Domoticz Push On Button Device using Domoticz MQTT Auto Discovery Client Gateway.



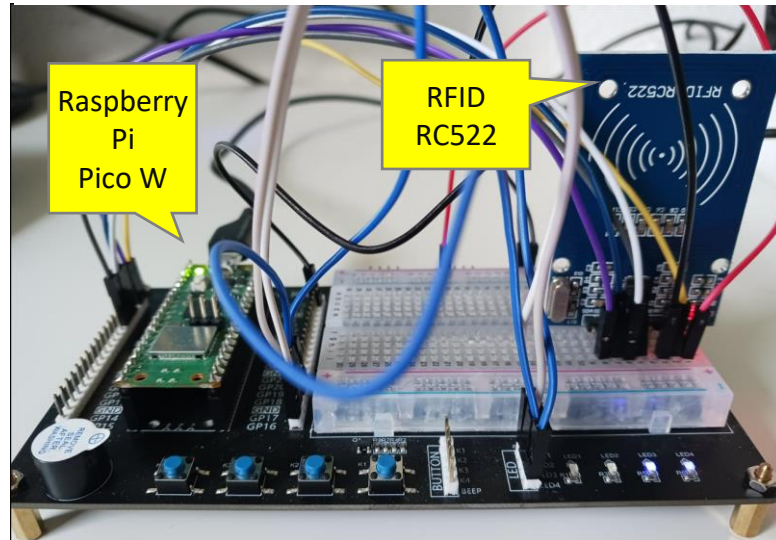
Project RFID Reader

Pico W to read RFID cards/tokens via RFID-RC522 module and send the UID to a Domoticz Text Device.

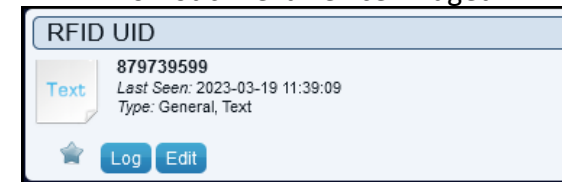


```
http://domoticz-ip:port
/json.htm
?type=command
&param=udevice
&idx=IDX_RFID
&nvalue=0
&svalue=879739599
```

Pico W with Breadboard Kit & RFID-RC522 connected



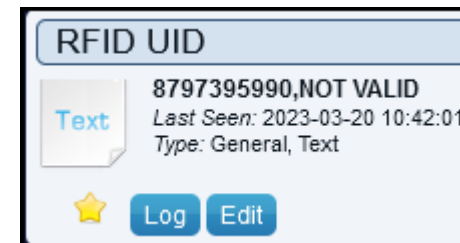
Domoticz Text Device Widget



The RFID card/token UID is:
879739599 (HEX 346FC2CF).
The card type is 10.

Domoticz Text Device Log

Date	
2023-03-19 12:04:31	1446518016
2023-03-19 12:04:26	879739599
2023-03-19 12:04:19	249942437
2023-03-19 11:39:08	879739599
2023-03-19 11:39:04	1446518016
2023-03-19 11:37:42	879739599
2023-03-19 11:37:22	1446518016
2023-03-19 11:32:21	879739599

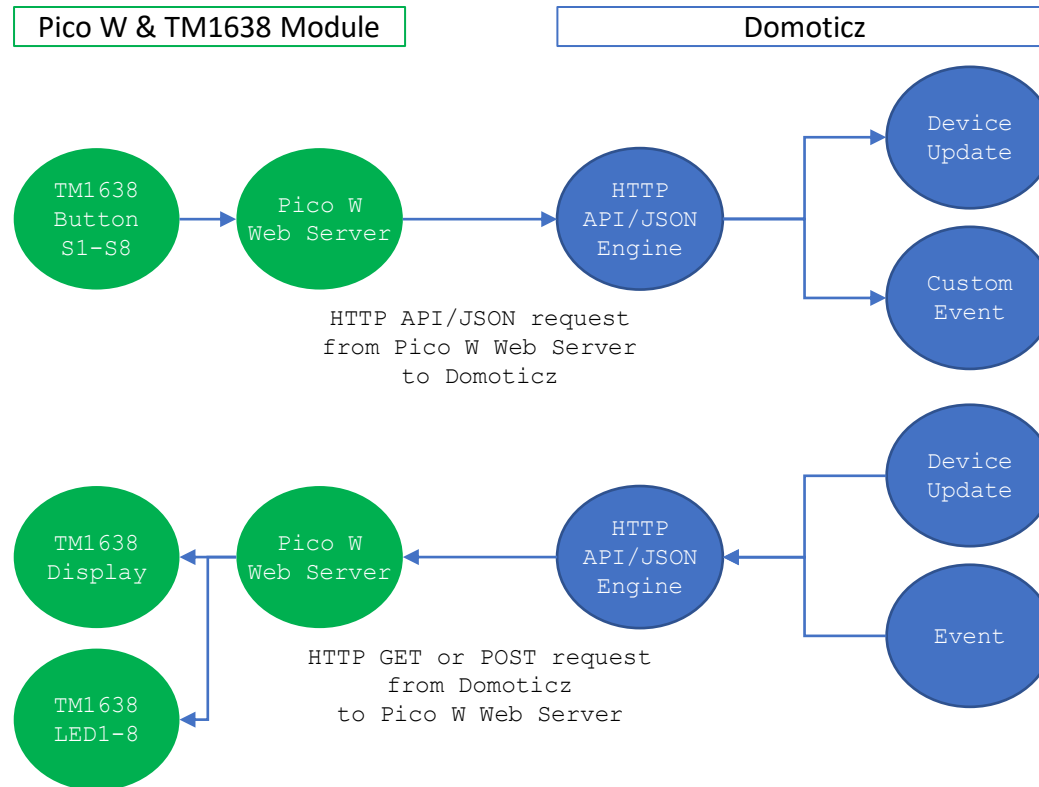


Domoticz Text Device Log with Flag

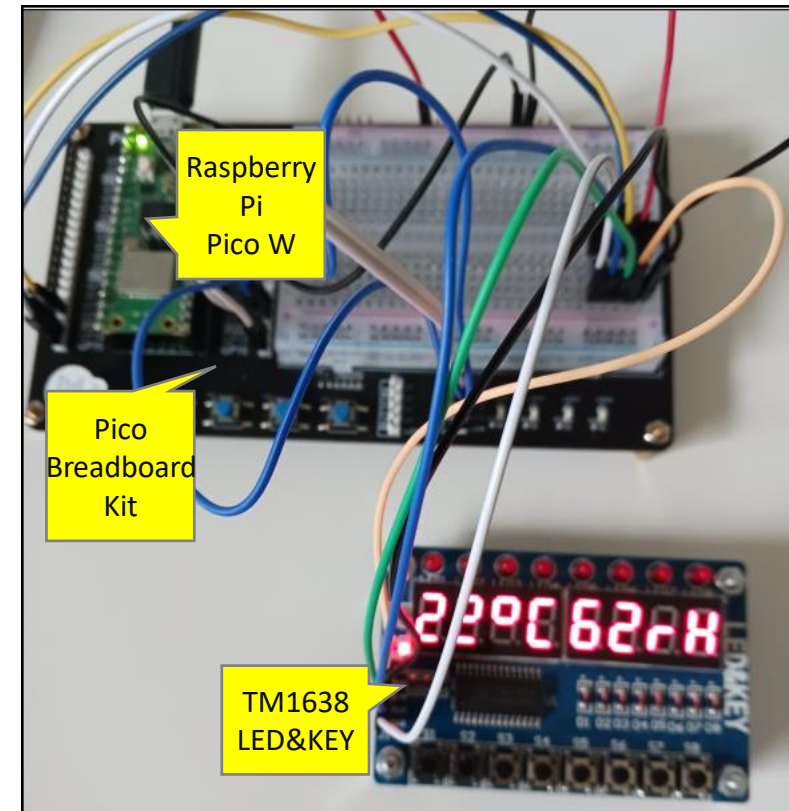
Date	
2023-03-20 10:42:01	8797395990,NOT VALID
2023-03-20 10:42:01	8797395990
2023-03-20 10:41:49	879739599,VALID
2023-03-20 10:41:49	879739599

Project TM1638 LED&KEY

Pico W with TM1638 to trigger Domoticz device action or Domoticz to set TM1638 LED or Display.



Pico W with Breadboard Kit & TM1638 LED&KEY



Project OLED Motherboard

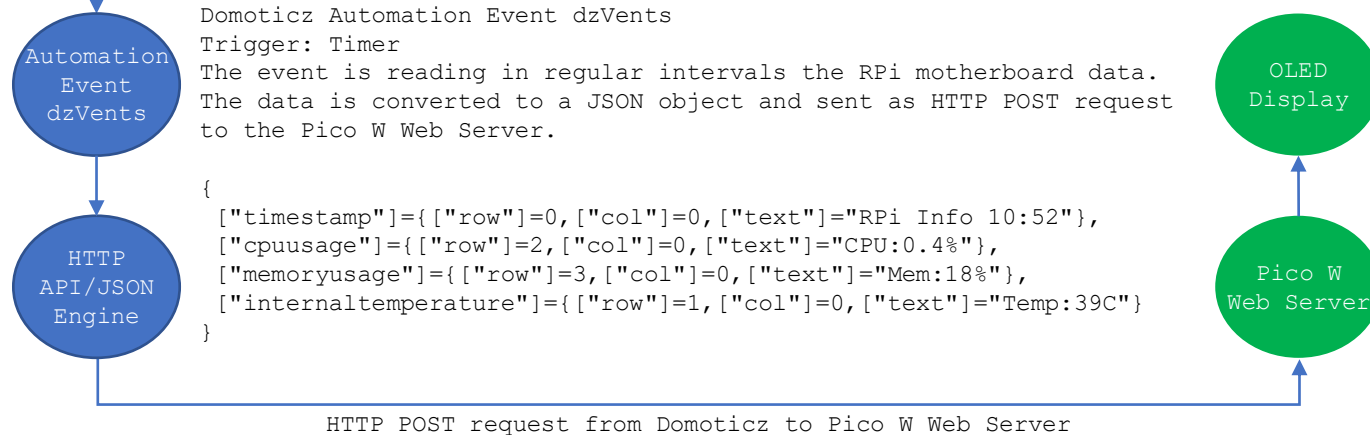
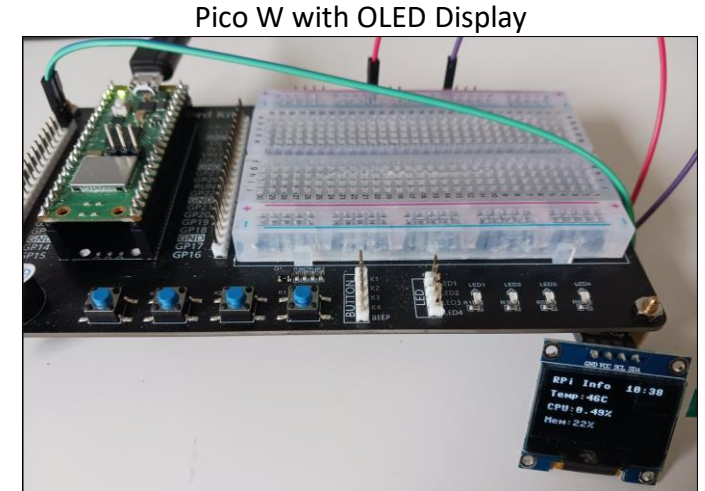
Domoticz sends RPi Motherboard sensor data to set the 0,96" I2C OLED display connected to the Pico W.

Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
5	RPi Motherboard	Yes	Motherboard sensors			Disabled

Domoticz Devices (selective)

Idx	Hardware	ID	Unit	Name	Type	SubType	
18	RPi Motherboard	0001	1	Internal Temperature	Temp	LaCrosse TX3	38.9 C
26	RPi Motherboard	0000044D	1	CPU_Usage	General	Percentage	0.41%
22	RPi Motherboard	0000044C	1	Memory Usage	General	Percentage	18.35%



Project OLED Motherboard /2

*Domoticz sends RPi Motherboard sensor data to set the 0,96" I2C OLED display connected to the Pico W.
The sensor data is displayed in up-to 6 blocks with title & value*

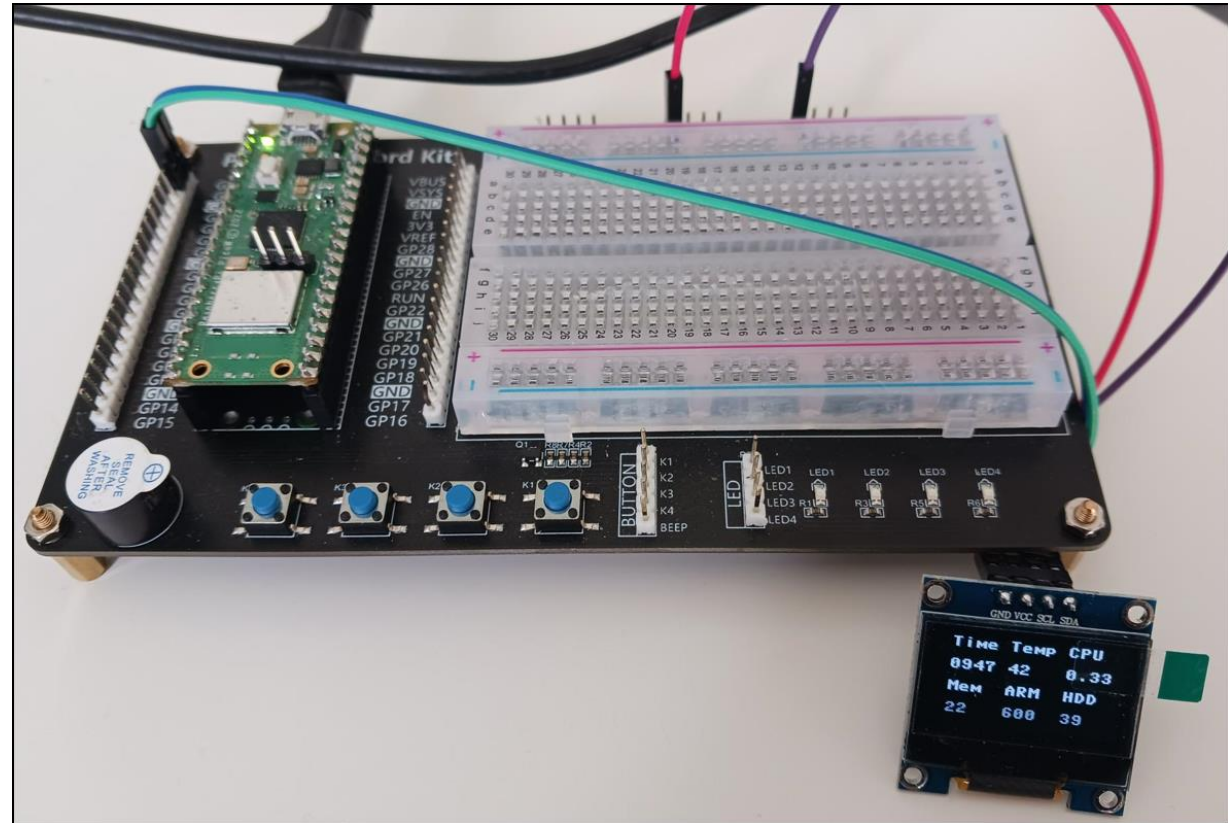
OLED Display 6 Blocks Setup
Each block 2 rows with 4 characters

Col	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Row																
0																
1																
2																
3																

Block Data generated by Domoticz Automation Event.

Example JSON array with 6 blocks:

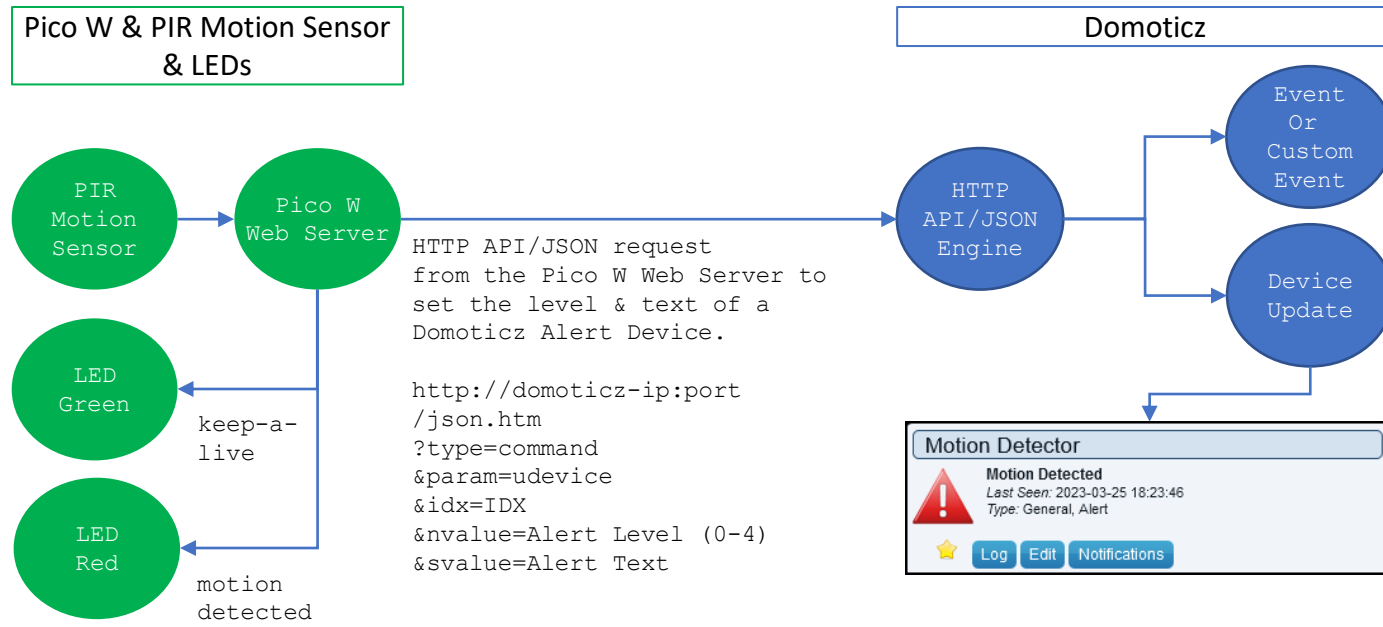
```
[
  {'block': 1, 'title': 'Time', 'value': '0947'},
  {'block': 2, 'title': 'Temp', 'value': 42},
  {'block': 3, 'title': 'CPU', 'value': 0.33},
  {'block': 4, 'title': 'Mem', 'value': 22},
  {'block': 5, 'title': 'ARM', 'value': 600},
  {'block': 6, 'title': 'HDD', 'value': 39}
]
```



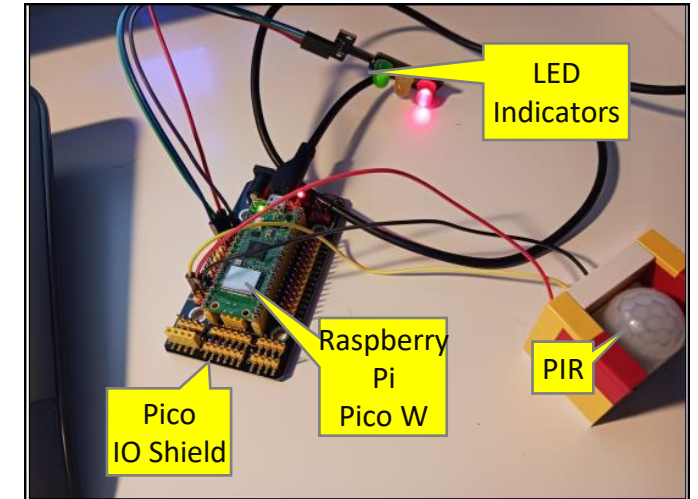
Pico W with OLED Display showing 6 blocks with RPi Motherboard sensor data

Project PIR Motion Sensor

PicoW to detect motion and sent message to a Domoticz Alert sensor.



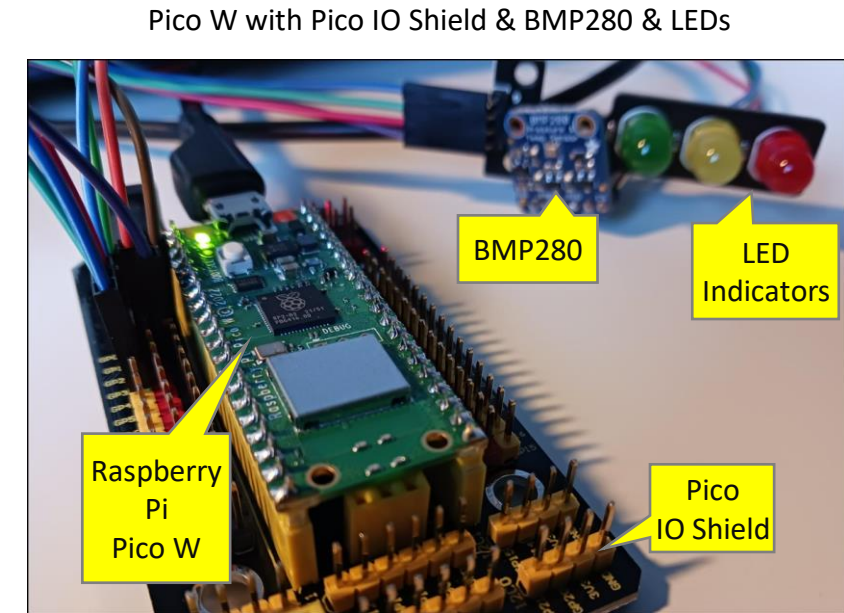
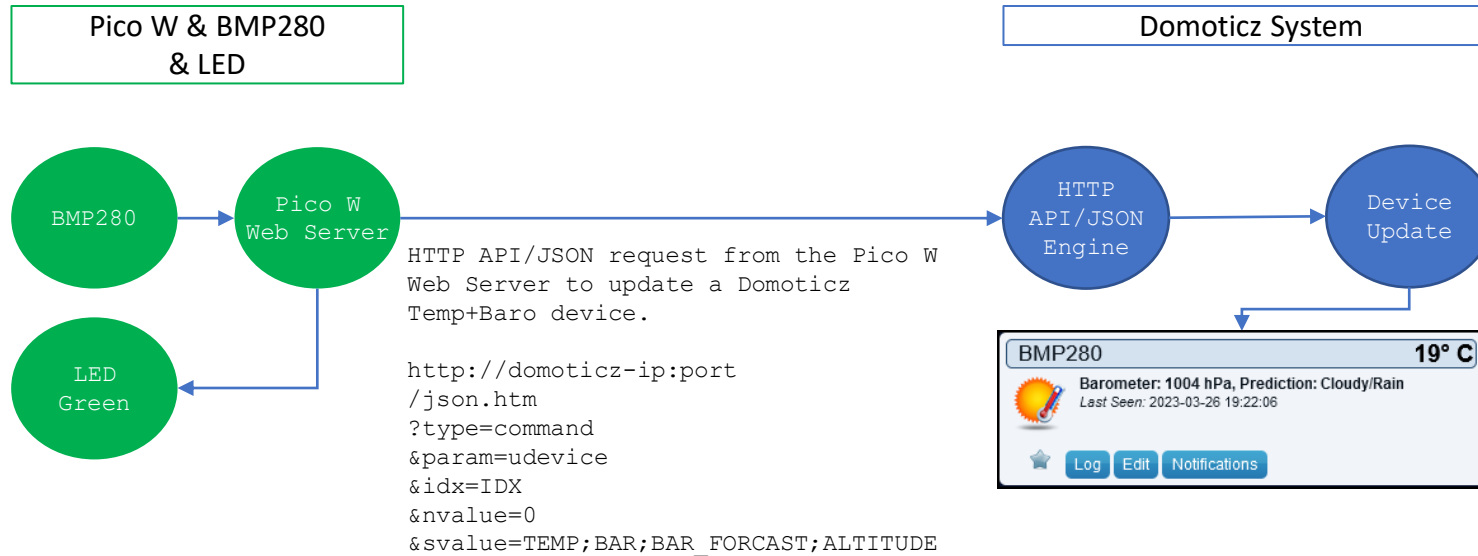
Pico W with PIR connected, and motion detected



Note: The yellow LED from the LED traffic light is not used.

Project BMP280

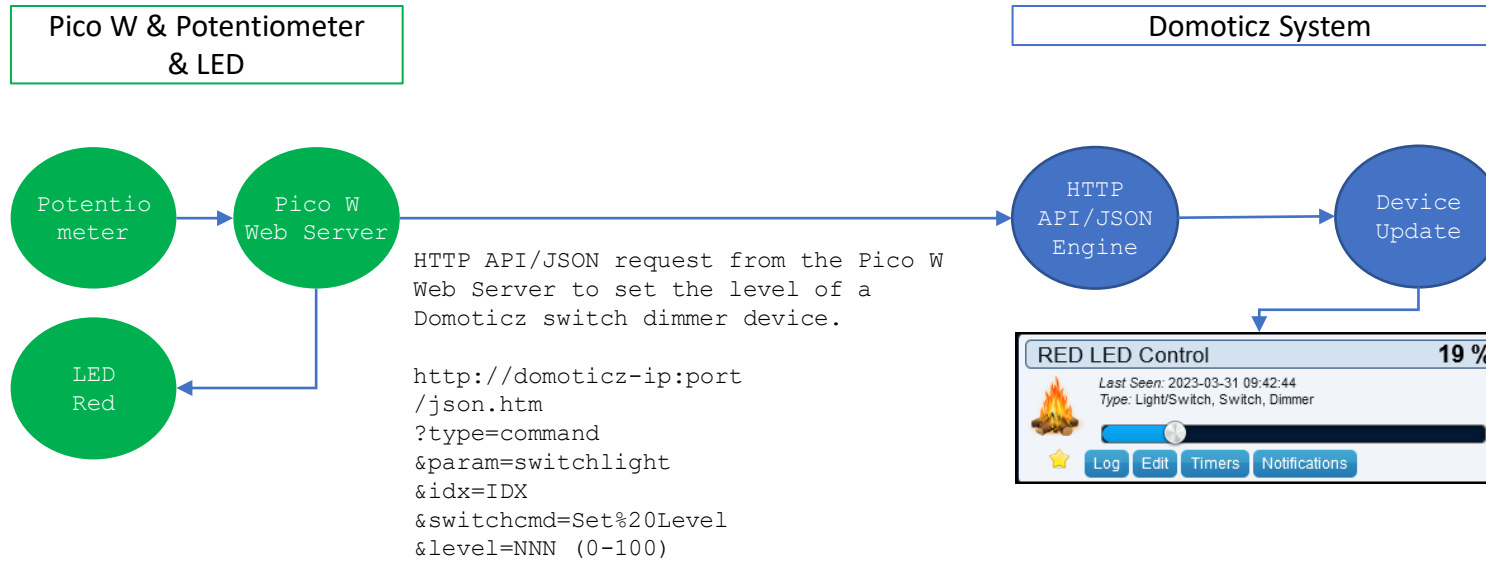
Pico W samples BMP280 sensor data and triggers updating the Domoticz Temp+Baro device.



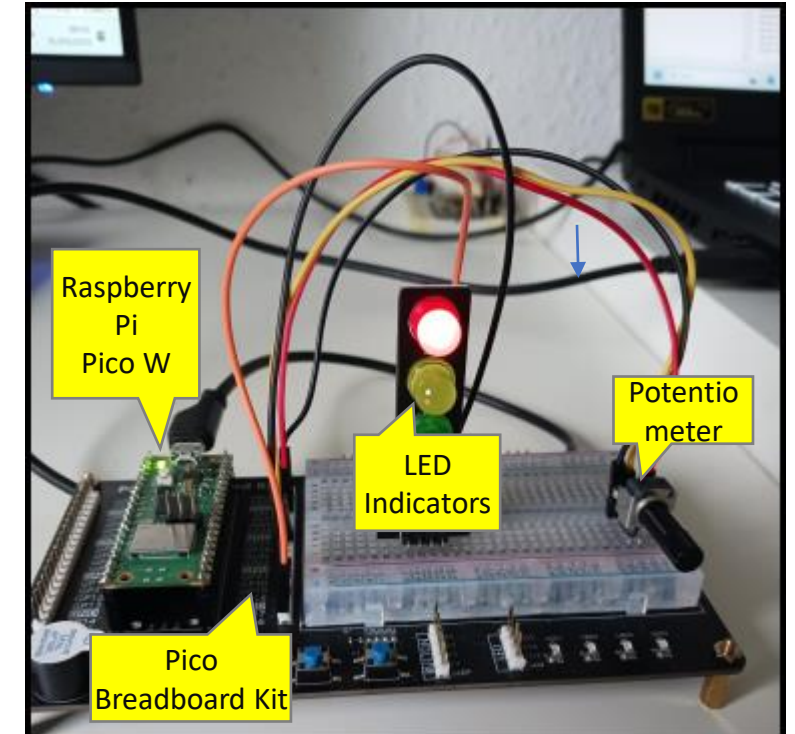
Note: The green LED is used only from the LED traffic light.

Project Potentiometer Dimmer

Pico W to set the level of a Domoticz Switch Dimmer device via Potentiometer.



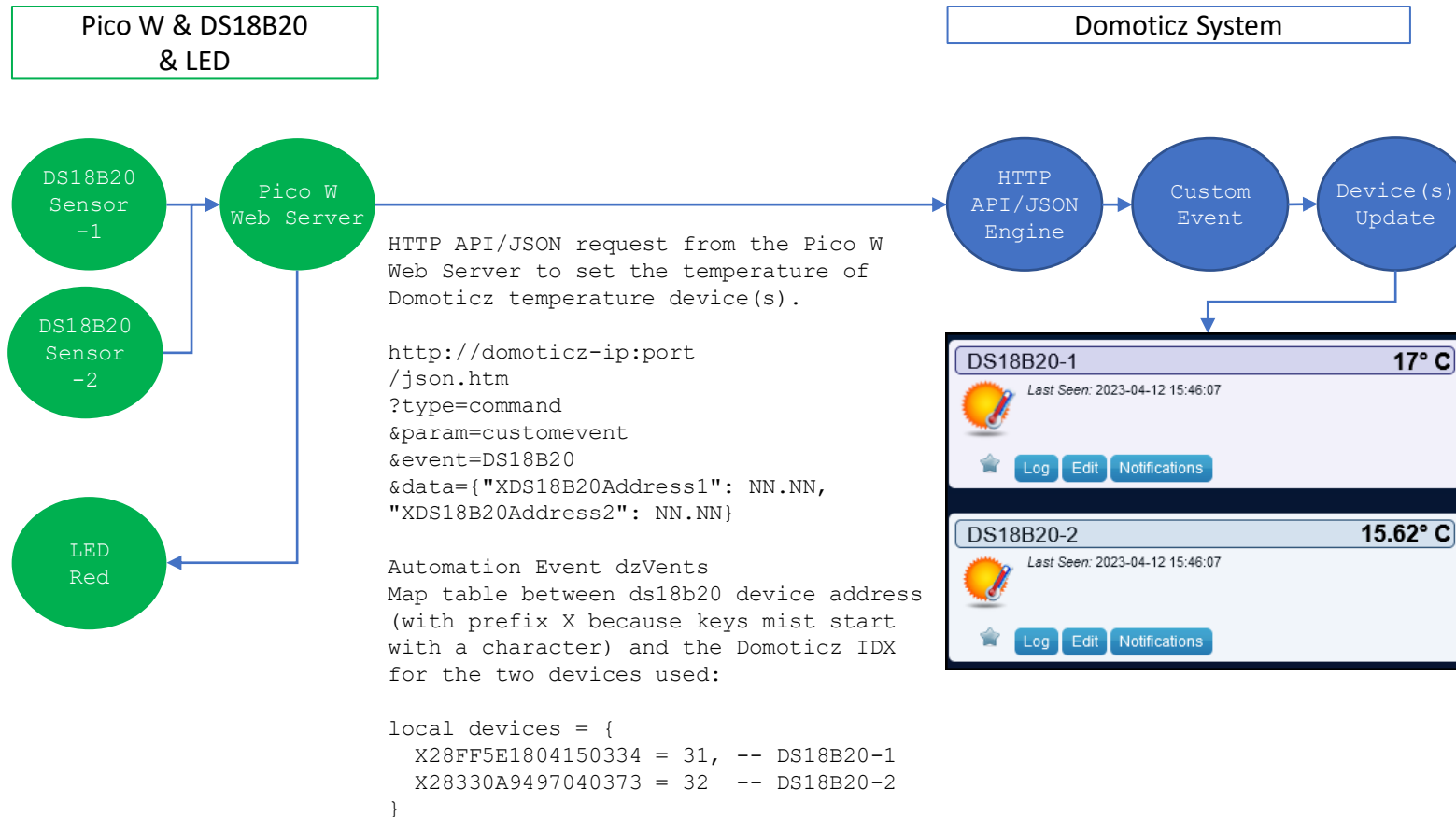
Pico W with Breadboard Kit & Potentiometer & LED



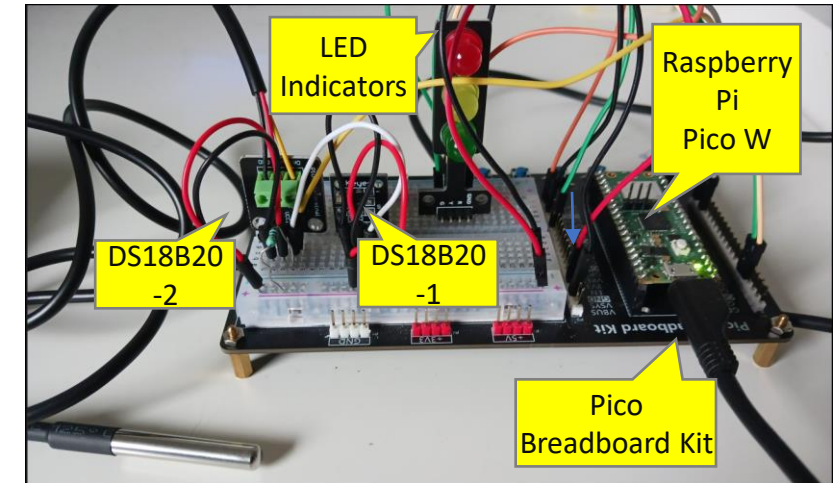
Note: The red LED is used only from the LED traffic light.

Project DS18B20 - Custom Event

Pico W samples DS18B20 sensor data and triggers Automation Event to update the Domoticz Temperature devices.



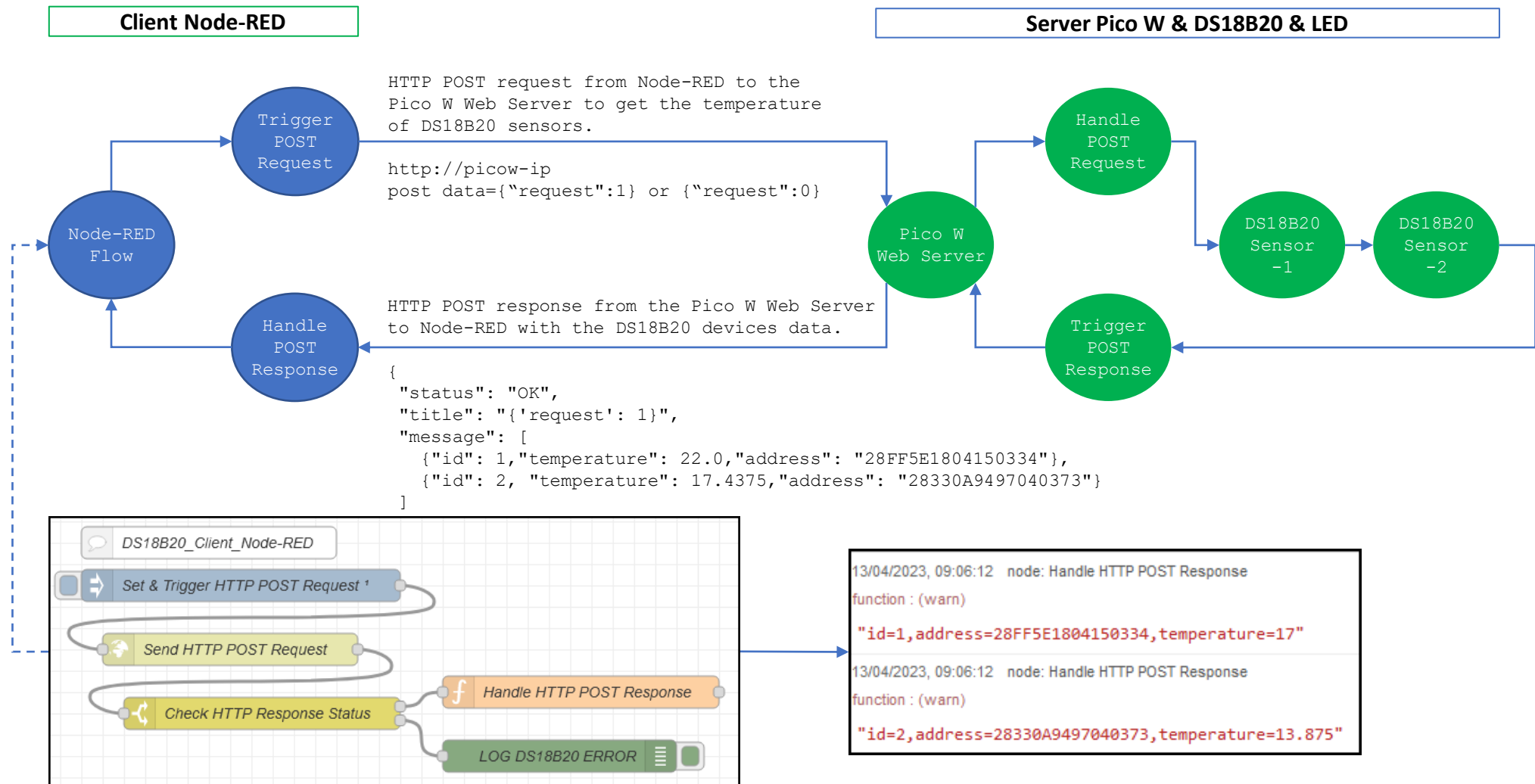
Pico W with Breadboard Kit & DS18B20 & LED



Note: There are two DS18B20 connected (DS18B20-1, DS18B20-2). From the LED traffic light, the red LED is used only.

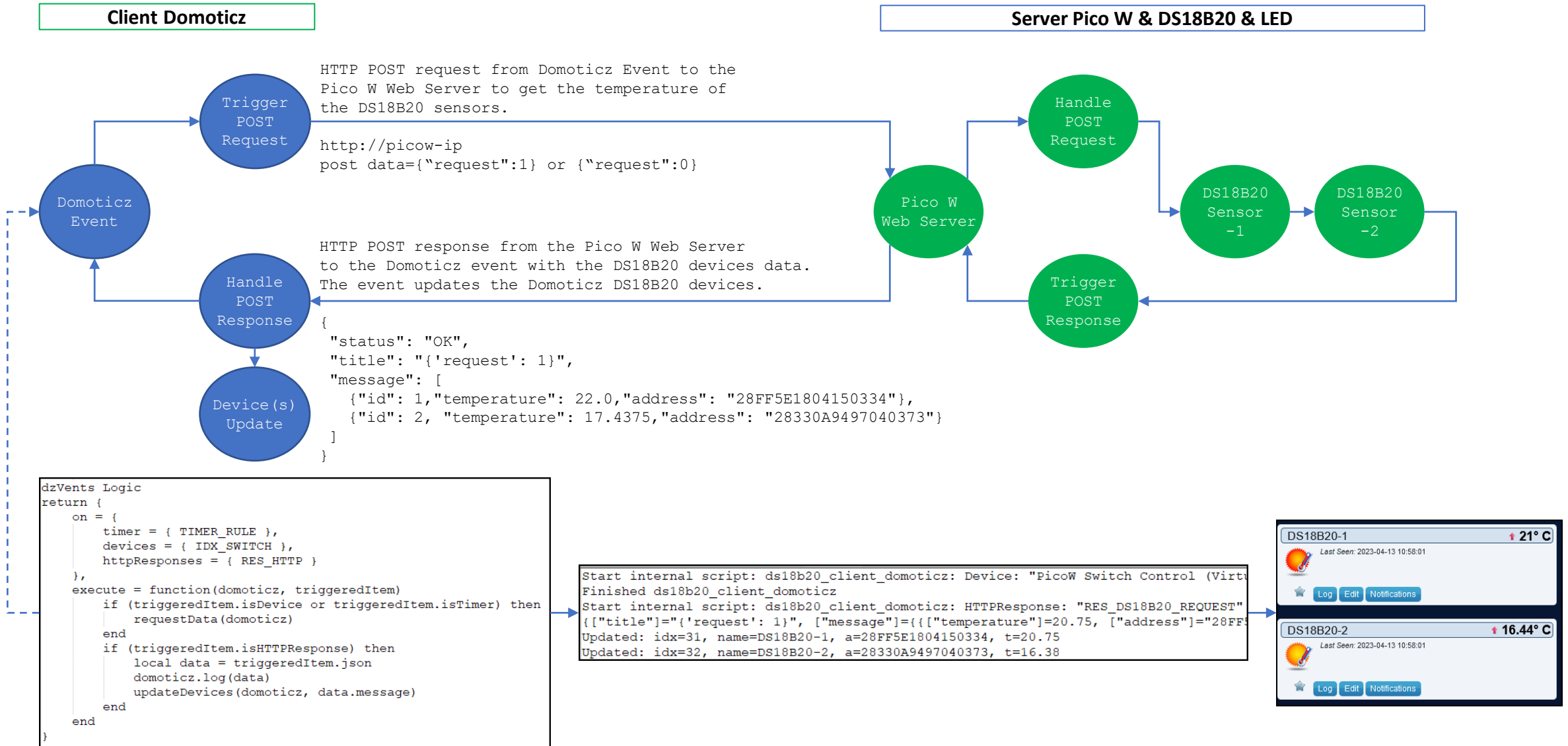
Project DS18B20 - Node-RED (PULL)

Pico W Web Server listens to HTTP POST request from Node-RED and sends response with DS18B20 sensor data.



Project DS18B20 - Domoticz (PULL)

Pico W Web Server listens to HTTP POST request from Domoticz and sends response with DS18B20 sensor data.



Project Stepper Motor – Selector Switch Angle Move

Domoticz Selector Switch Device State Change triggers Automation Event to move the Stepper Motor by Angle.

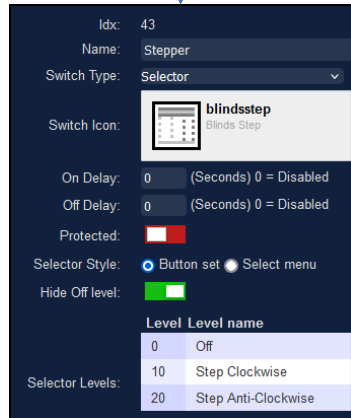
Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
3	VirtualSensors	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

Domoticz Devices

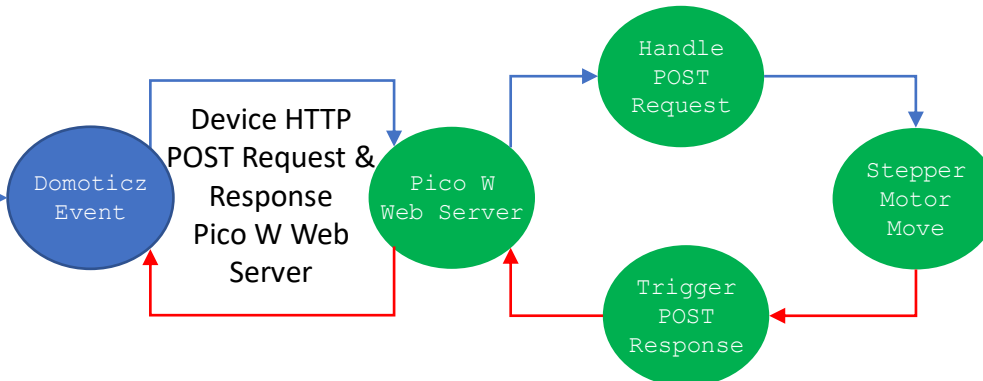
Idx	Hardware	ID	Unit	Name	Type	SubType	
43	VirtualSensors	0001407B	1	Stepper	Light/Switch	Selector Switch	Set Level: 20 %

Device Widget



Device properties with

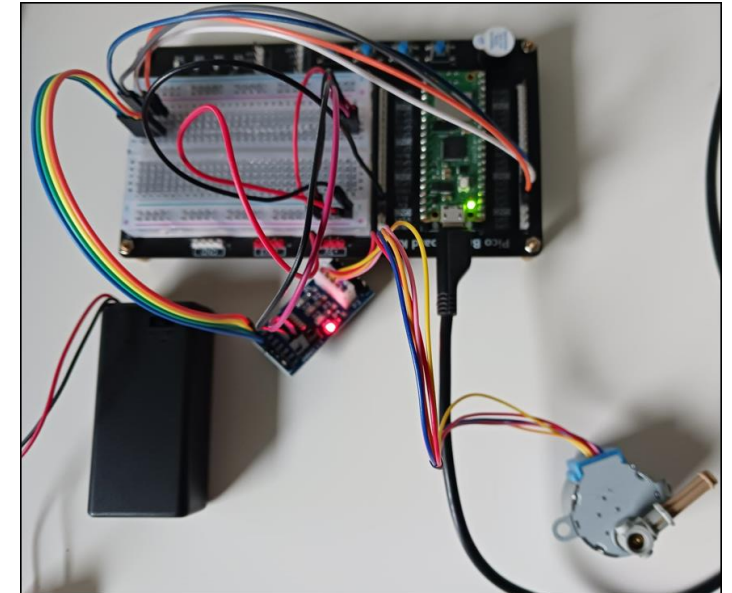
- custom icon
- 3 levels; Off level hidden.



Domoticz Automation Event dzVents triggered by state change of the Domoticz Selector Switch device (IDX=43). The stepper angle moves 5° (hardcoded in the Automation event script). The event submits HTTP POST request to the Pico W Web Server to move the stepper motor by the angle specified.

The post-data is a JSON Object:
{ "angle": 5 } or { "angle": -5 }

Pico W with Breadboard Kit & UNL2003 driver & 28BYJ-48 stepper motor



Project Stepper Motor - Blind Simulation

Simulate Domoticz Blind Device State Change triggers Automation Event to move the Angle of a Stepper Motor.

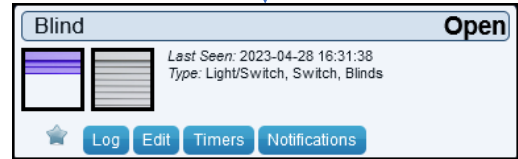
Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
3	VirtualSensors	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

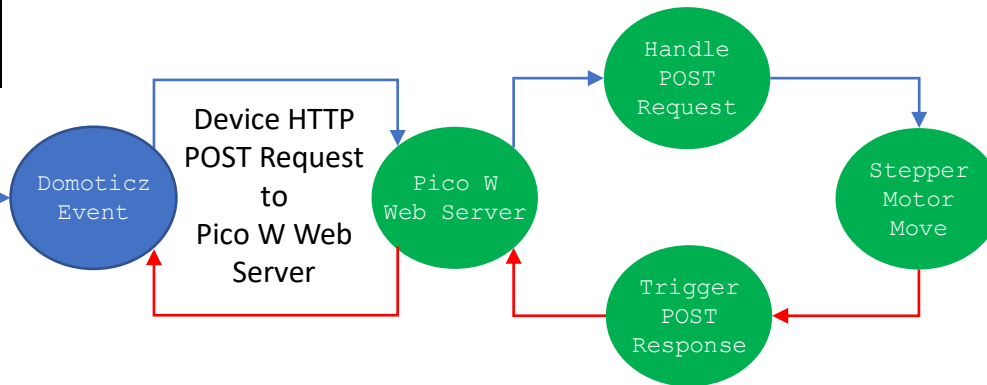
Domoticz Devices

Idx	Hardware	ID	Unit	Name	Type	SubType	Open
42	VirtualSensors	0001407A	1	Blind	Light/Switch	Switch	Open

Device Widget



Idx: 42
Name: Blind
Switch Type: Blinds

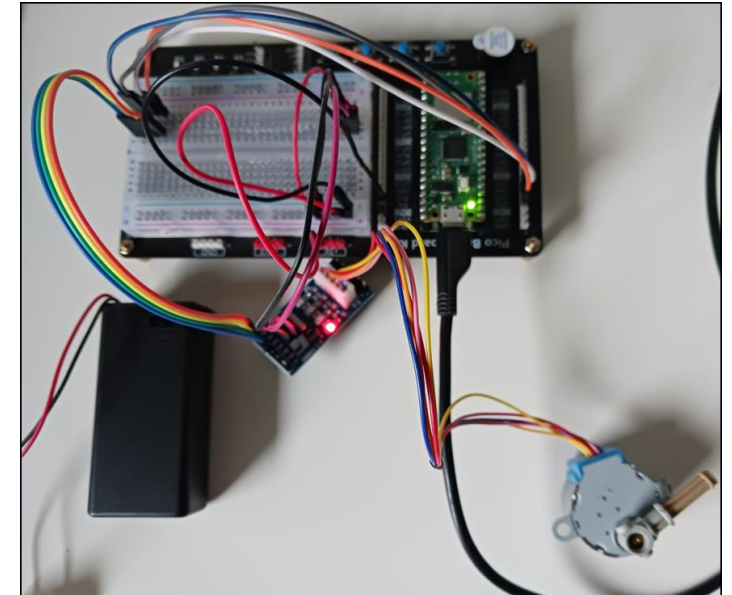


Domoticz Automation Event dzVents triggered by state change of the Domoticz Blinds device (IDX=42).
The stepper angle to move is for state Open 180° and Closed -180°.
The event submits HTTP POST request to the Pico W Web Server to move the stepper motor by the angle specified.

The post-data is a JSON Object:
{ "angle": 180 } or { "angle": -180 }

Note: Instead of using the command "angle", the command "rotate" N times is another possibility.

Pico W with Breadboard Kit & UNL2003 driver & 28BYJ-48 stepper motor



Project Stepper Motor – Timer Run Stop

Domoticz Selector Switch State Change triggers Automation Event to run or stop a Stepper Motor.

Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
3	VirtualSensors	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

Domoticz Devices

Idx	Hardware	ID	Unit	Name	Type	SubType	Off
43	VirtualSensors	0001407B	1	Stepper	Light/Switch	Selector Switch	Off


Device Widget

Stepper **Run Clockwise**

Last Seen: 2023-05-06 17:55:18
Type: Light/Switch, Selector Switch, Selector

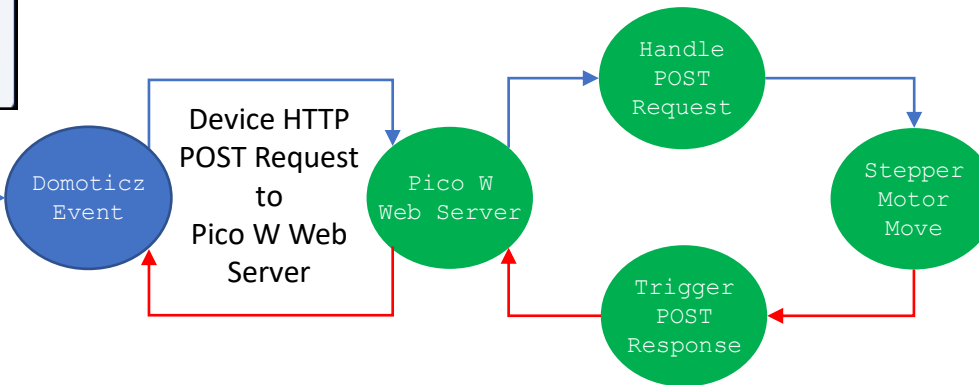
[Stop](#) [Run Clockwise](#) [Run Anti-Clockwise](#)

[Log](#) [Edit](#) [Timers](#) [Notifications](#)

Idx: 43
Name: Stepper
Switch Type: Selector
Switch Icon: 

On Delay: 0 (Seconds) 0 = Disable
Off Delay: 0 (Seconds) 0 = Disable
Protected: ☒
Selector Style: ☒ Button set ☐ Select menu
Hide Off level: ☒

Level	Level name
0	Stop
10	Run Clockwise
20	Run Anti-Clockwise



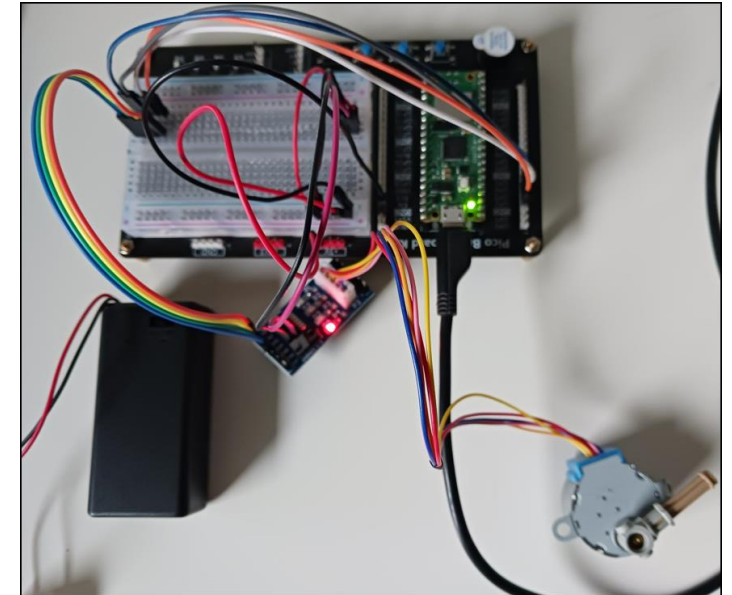
Domoticz Automation Event dzVents triggered by state change of the Domoticz Selector Switch device (IDX=43).

The event submits HTTP POST request to the Pico W Web Server to run or stop the stepper motor.

The post-data is a JSON Object depending action:

- Stop = {"command"="stop"}
- Run Clockwise = {"command"="run", "direction"=1}
- Run Anti-Clockwise = {"command"="run", "direction"=-1}

Pico W with Breadboard Kit & UNL2003 driver & 28BYJ-48 stepper motor



Project Distance Sensor - HTTP API/JSON

Pico W samples Distance sensor HC-SR04 data and triggers updating the Domoticz Distance device.


Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
3	VirtualSensors	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

Domoticz Devices

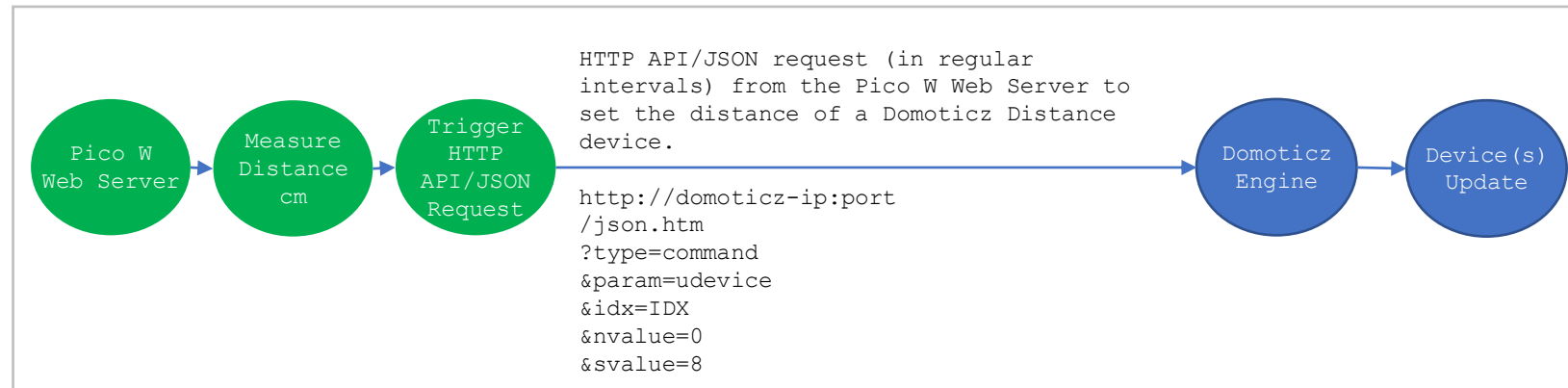
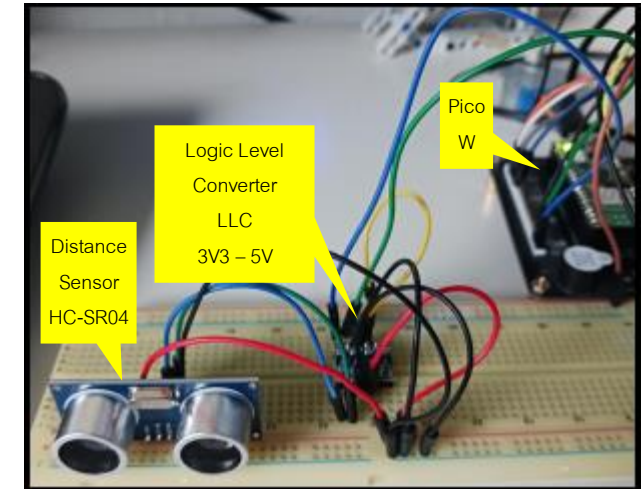
Idx	Hardware	ID	Unit	Name	Type	SubType	
44	VirtualSensors	00082044	1	Distance	General	Distance	8.0 cm

Distance **8.0 cm**

 Last Seen: 2023-05-07 19:18:43
Type: General, Distance

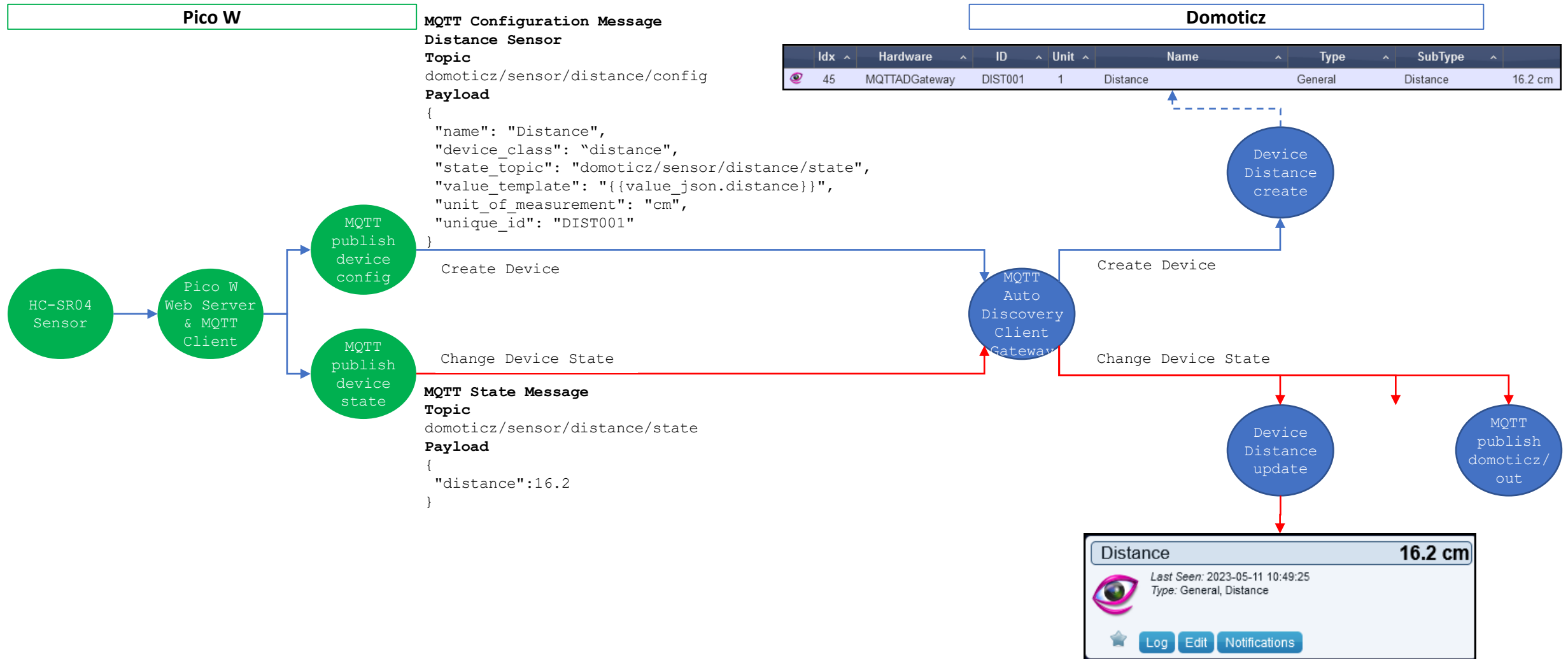
[Log](#) [Edit](#) [Notifications](#)

Pico W with Distance Sensor HC-SR04 and LLC



Project Distance Sensor - MQTT Autodiscover

Pico W publishes MQTT Config & State Messages to Domoticz MQTT Auto Discovery Client Gateway.



Project IKEA VINDRIKTNING Air Quality Sensor – HTTP API/JSON

IKEA VINDRIKTNING Air Quality sensor sends PM 2.5 ug/m3 values to the Pico W to update Domoticz Custom Sensor.

Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
3	VirtualSensors	Yes	Dummy (Does nothing, use for virtual switches only) Create Virtual Sensors			Disabled

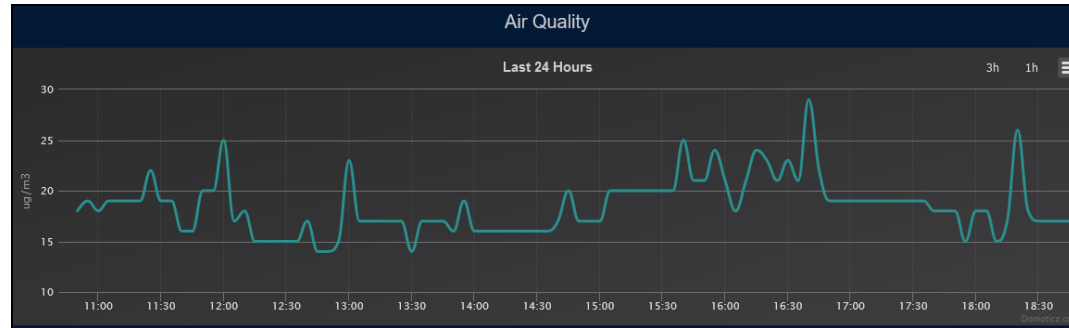
Domoticz Devices

Idx	Hardware	ID	Unit	Name	Type	SubType	
46	VirtualSensors	00082046	1	Air Quality	General	Custom Sensor	18 ug/m3

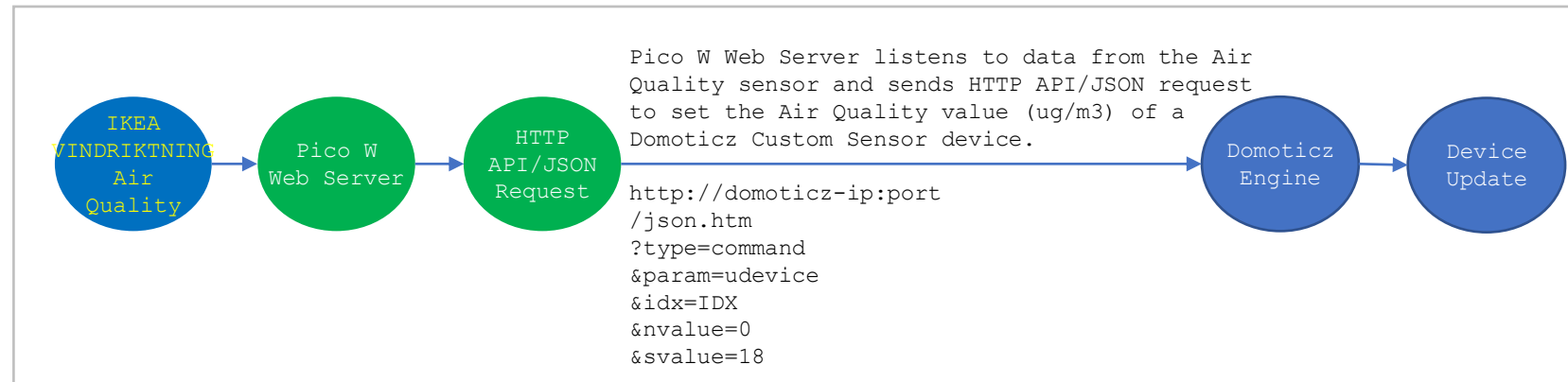
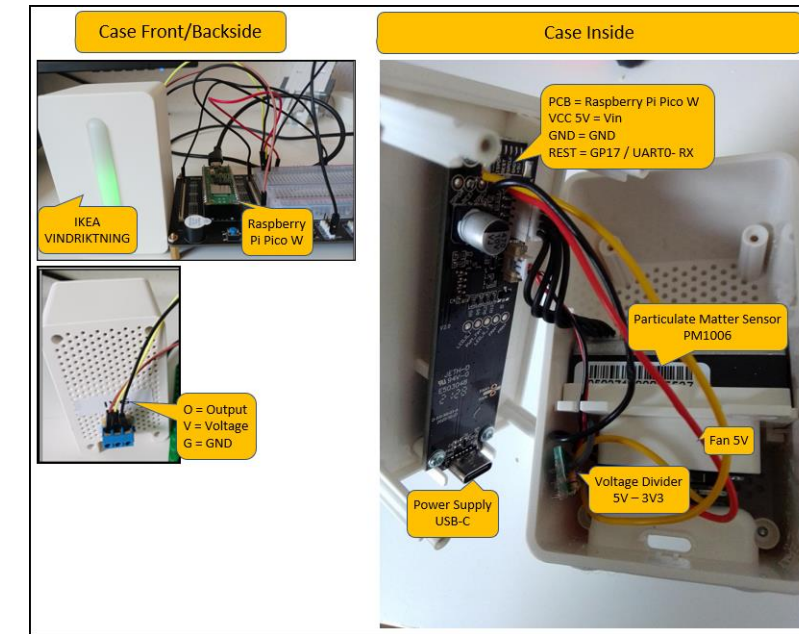
Air Quality **18 ug/m3**

Last Seen: 2023-05-15 10:48:34
Type: General, Custom Sensor

[Log](#) [Edit](#) [Notifications](#)



Pico W with IKEA VINDRIKTNING Air Quality sensor



IKEA® is a trademark of Inter-IKEA Systems B.V.

Project Bluetooth Low Energy - Environment Sensor

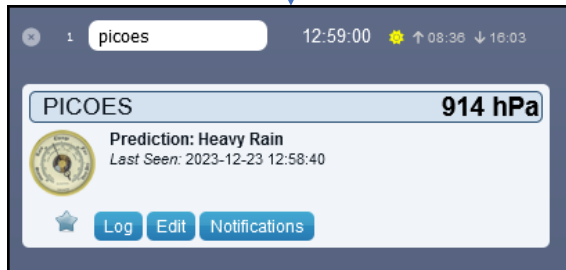
Pico W advertises simulated environment data > OpenMQTTGateway > Node-RED > Domoticz Auto Discovery Client Gateway > Device Temp+Humidity+Baro.

Domoticz Hardware

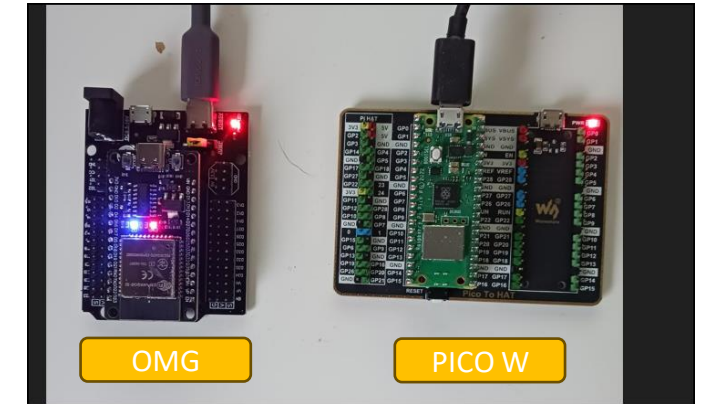
Idx	Name	Enabled	Type	Address	Port	Data Timeout
13	OMGGW	Yes	MQTT Auto Discovery Client Gateway with LAN interface Setup	localhost	1883	Disabled

Domoticz Devices

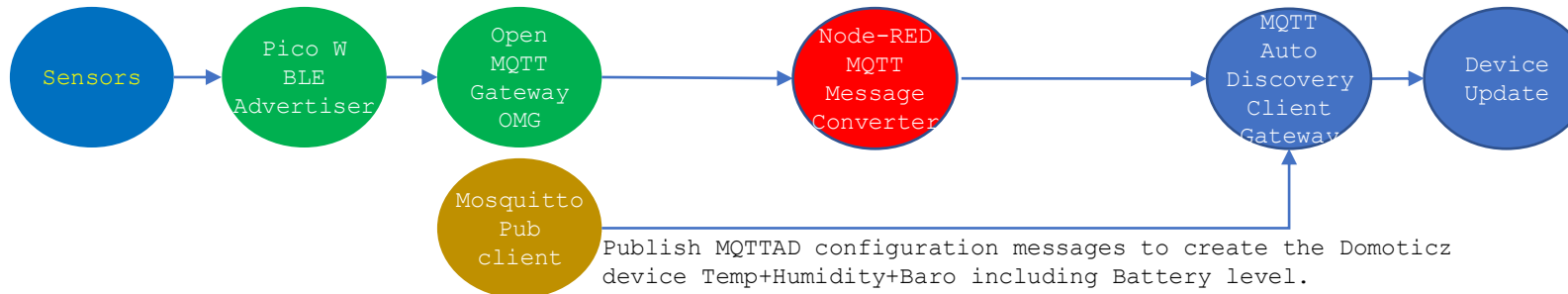
Idx	Hardware	ID	Unit	Name	Type	SubType	Data
38	OMGGW	0001	1	PICOES	Temp + Humidity + Baro	Weather Station	26.3 C, 56 %, 909.0 hPa



Pico W with OMG



Pico W BLE Server advertises sensor data to the OMG. The OMG converts the BLE message to OMG MQTT messages. Node-RED listens to the OMG MQTT message and converts to a Domoticz MQTTAD message. Domoticz to update associated devices.



Project Bluetooth Low Energy - Actuator

Pico W advertises actuator data via OMG > Node-RED > Domoticz Auto Discovery Client Gateway > Device Push On Button.

Domoticz Hardware

Idx	Name	Enabled	Type	Address	Port	Data Timeout
13	OMGGW	Yes	MQTT Auto Discovery Client Gateway with LAN interface Setup	localhost	1883	Disabled

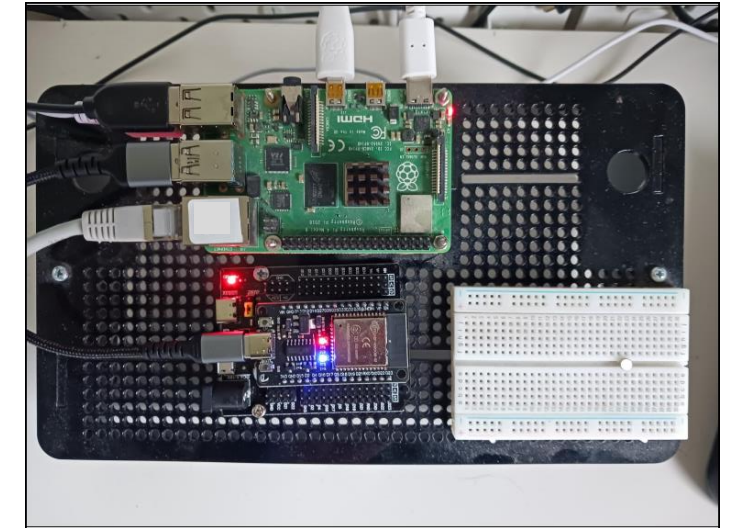
Domoticz Devices

Idx	Hardware	ID	Unit	Name	Type	SubType	
39	OMGGW	K1FFFE	1	Button K1	Light/Switch	Switch	On
40	OMGGW	K2FFFE	1	Button K2	Light/Switch	Switch	On

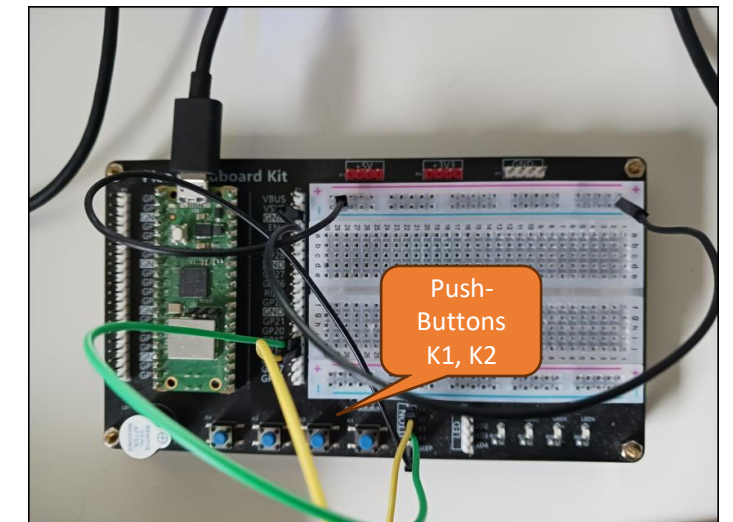
Button K1
Last Seen: 2023-12-31 18:02:25
Type: Light/Switch, Switch, Push On Button
[Log](#) [Edit](#) [Timers](#) [Notifications](#)

Button K2
Last Seen: 2023-12-31 18:02:23
Type: Light/Switch, Switch, Push On Button
[Log](#) [Edit](#) [Timers](#) [Notifications](#)

Raspberry Pi 4 with ESP32-WROOM-32 OMG



Pico W with Pico Breadboard Kit



Pico W BLE Server advertises actuator data to the OMG. The OMG converts the BLE message to OMG MQTT messages. Node-RED listens to the OMG MQTT message and converts to a Domoticz MQTTAD message. Domoticz to update associated devices.

