**Using AT commands to connect to Azure**

**1.1 Values to be taken from Azure cloud**

Firstly, take a note of few things from Azure cloud that are needed to pass through the AT commands:

1. Registration ID is the Common name of the device certificate. This value is the same as we set in Device ID in [here](https://github.com/MicrochipTech/RNWF11_Beta/blob/main/Azure_Cloud_Setup_Procedure.docx). One can find the value again by going into “Devices” -> select device -> “Connect”. Registration ID is passed in third configuration parameter of MQTTC.

AT+MQTTC = 3,"sn0123C7E756AF138601"

1. Username field is *{idScope}/registrations/{registration\_id}/api-version=2019-03-31*. ID scope of the IoT central application can be found from “Security” -> “Permissions” -> “Device Connection Groups”.

A screenshot of a computer

Description automatically generated

Username is passed in fourth configuration parameter of MQTTC.

AT+MQTTC=4,"0ne00B6AF97/registrations/sn0123C7E756AF138601/api-version=2019-03-31"

1. Set Device template value from JSON file. To get that go to “Device template” -> select the template of your choice -> select “Edit DTDL” -> copy text from ‘@id’. Pass DTMI value in AZUREC command: AT+AZUREC=1, “dtmi:com:Microchip:AVR128DB48\_CNANO;1”.

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**1.2 AT commands to connect to Azure cloud and assigned IoT hub**

Pass following AT commands to connect to Azure cloud (Please refer to AT Command Reference Manual for more details about each of the below command):

*//connect to Home-AP*

1. AT+WSTAC=1,”wsn” *//replace wsn with SSID of your Home AP*
2. AT+WSTAC=2,2 *//Set to the security type of your Home AP*
3. AT+WSTAC=3,”brucenegley” *//replace brucenegley with password of your Home AP*
4. AT+WSTAC=4,0
5. AT+SNTPC=3,"0.in.pool.ntp.org"'
6. AT+SNTPC=1,1
7. AT+SNTPC=2,1
8. AT+TLSC=1,1,"DigiCertGlobalRootG2"
9. AT+TLSC=1,5,"\*.azure-devices.net"
10. AT+TLSC=1,8,1
11. AT+WSTA=1 *//wait till you get a +TIME print. +TIME indicates that the DUT has received the time from SNTP server and TLS handshake can start now.*
12. AT+MQTTC=1,"g2-cert-dps.azure-devices-provisioning.net"
13. AT+MQTTC=2,8883
14. AT+MQTTC=3,"sn0123C7E756AF138601" *// sn0123C7E756AF138601 is registration ID*
15. AT+MQTTC=4," 0ne00B6AF97/registrations/sn0123C7E756AF138601/api-version=2019-03-31" *//Enter you ID scope and registration ID as discussed in previous step*
16. AT+MQTTC=6,60
17. AT+MQTTC=7,1
18. AT+MQTTC=8,3
19. AT+MQTTC=10,1 *//Set to 1 to connect to Azure cloud*
20. AT+AZUREC=1,"dtmi:com:Microchip:WFI32\_IoT\_WM;2" *//Device template of your choice*
21. AT+MQTTCONN=1

After successfully connecting to IoT hub, “+MQTTCONNACK:0, 0” and “+MQTTCONN:1” will be printed. The IoT hub configurations can be seen by giving command “AT+MQTTC”.

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On the IoT Central application, under the device one can see that it’s ‘Connected’ and go to “Raw Data” to see event logs.

**1.3 AT commands to send data to Azure**

To send Telemetry, Property and Commands to the Azure cloud send following AT commands in the same session:

1. AT+MQTTC // This command is used to check with MQTT configuration. The configuration values are required for executing the next command.
2. AT+MQTTC=4,"iotc-a3ff54be-c88e-4eb4-8b0e-4f7f0972b7eb.azure-devices.net/sn0123C7E756AF138601/**?api-version=2021-04-12**" *(The value in YELLOW needs to be replaced with the IOT Hub value which can be retrieved using the AT+MQTTC command. In the output displayed when AT+MQTTC command is given, the parameter number 4 indicates the IOT Hub value which needs to be used. The parameter number 3 indicates the Device ID and it should replace the value in GREEN)*
3. AT+MQTTDISCONN
4. AT+MQTTCONN=1
5. AT+MQTTSUB="$iothub/methods/POST/#",0
6. AT+MQTTSUB="$iothub/twin/PATCH/properties/desired/#",0
7. AT+MQTTSUB="$iothub/twin/res/#",0
8. AT+MQTTPUB=0,0,0,"$iothub/twin/PATCH/properties/reported/?rid=7","{\"LED0\" : 1}" *(setting LED0 to 1, check the event logs with Message type ‘Properties’ to check this Publish message)*
9. AT+MQTTPUB=0,0,0,"$iothub/twin/PATCH/properties/reported/?rid=8","{\"reportRate\" : 0}"
10. AT+MQTTPUB=0,0,0,"devices/sn0123C7E756AF138601/messages/events/","{\"counter\": \"0\"}" *(replace registration ID sn0123C7E756AF138601 with your value. “counter”, “reportRate”, “button\_name”, “LED0”, etc. are identifier name given in the code and may vary depending on your Device template. Identifiers can be found in the “Edit DTDL” section in Device template.)*
11. AT+MQTTPUB=0,0,0,"devices/sn0123C7E756AF138601/messages/events/","{\"buttonEvent\": {\"button\_name\":\"SW0\", \"press\_count\":0}"