WISka Edge Temp / Humidity LoRa Sensor

Item Specifications

Go-IoT Item Id:	WISka Edge Temp / Humidity
Wireless Technology	LoRaWAN® 1.0.3
Wireless Security	LoRaWAN® End-to-End encryption (AES-CTR), Data Integrity Protection (AES-CMAC)
LoRaWAN Device Type	Class A/C (configurable) End-device. (Class B is optional)
Supported LoRaWAN® features	OTAA, ABP, ADR, Adaptive Channel Setup
Supported LoRaWAN® regions	EU433, CN470, IN865, EU868, AU915, US915, KR920, AS923 (Other Regions are optional)
Link Budget	131 dB (SF5) to 151 dB (SF12)
RF Transmit Power	14 dB / 22 dB (Region specific)
Antenna	Internal or External
Battery Type	3.6 V D Size Lithium Battery ER34615 19000mAh Li-$SOCL_2$ non-rechargeable 3.6 Volt
Battery Life	Up to 20 years (15mins reporting @ SF7)
Sensors	
Temperature	Resolution: +- 0.5 °C
Humidity	Resolution: 3 % RH
Air Pressure (if required)	Range: 260 – 1260 hPa Accuracy: ± 1 hPa
Case Style Edge	100 x 100 x 53.25 mm (excluding optional wall mount bracket)
Case Color	ABS – White, Grey, Black – White is Standard

WISka Edge Temperature / Humidity Cases

The DINgo WISka Edge Case is moulded in UL94-V0 ABS and can be supplied in Black, Grey and White with vented wall measuring 100mm x 100mm x53.25mm. The Lid panel is secured by a single screw for ease of assembly. Supplied with a Universal Wall Mount bracket in the same colour.

1 Installation

The WISka Edge can be powered by the following: -

- 19AHr Internal Lithium Non rechargeable Battery

1.1 Connecting the 3.6V Internal Lithium Battery

Ensure the DINgo LoRa Gateway and Dingo LoRa Packet Forwarders have been programmed and powered up.

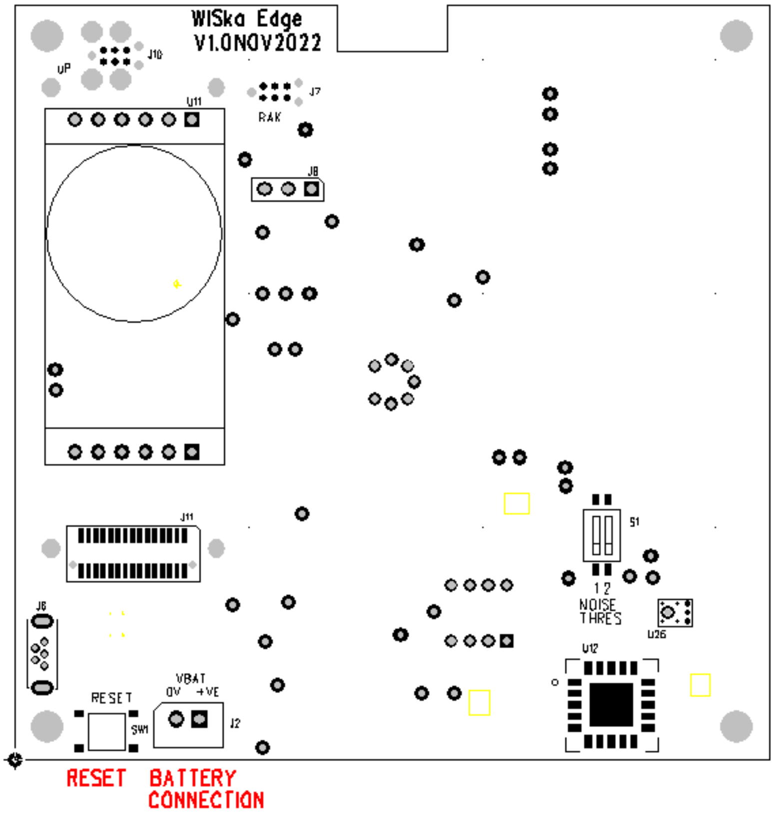
Connection the 2-way battery cable from the base battery PCB into J2

The connector is polarized. Press Reset Switch for 1 second.

LED Operation (if visible)

- WISka Edge is working correctly (power and memory) - single blue flash (5 seconds after reset)
- Connecting to LoRaWAN - single blue flash (12 seconds after reset)
- Connected to LoRa Server – Green LED ON for 1 second

WISka Edge Version 1.0



1.2 Wall Mounting

Install the WISka Edge Sensor with the Silver screw at the top of the case

Screw the mounting nuts to the rear of the WISka Edge Backplate.

Screw the WISka Edge mounting bracket to the wall using your preferred mounting holes.

See YouTube video's.

- https://www.youtube.com/watch?v=z_a6ks8bh8c
- https://www.youtube.com/watch?v=VVEPsGjLlfY

2 Sensors

2.1 Temperature Sensor

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating range	T	Operational	-40	25	85	°C
		Full accuracy	0		65	°C
Supply current	$I_{DD,T}$	1 Hz forced mode, temperature measurement only		1.0		µA
	$A_{T,25}$	25 °C		±0.5		°C
Absolute accuracy temperature[7]	$A_{T,full}$	0…65 °C		±0.5		°C
	$A_{T,ext}$[8]	-20 …. 0 °C		±1.25		°C
	$A_{T,ext}$[9]	-40 … -20 °C		±1.5		°C
Output resolution	R_T	API output resolution		0.01		°C
RMS noise	N_T	Lowest oversampling		0.005		°C

2.2 Humidity Sensor

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating range[1]	R_H	For temperatures < 0 °C and > 60 °C see Figure 1	-40	25	85	°C
			0		100	%RH
Supply current	$I_{DD,H}$	1 Hz forced mode, humidity and temperature		1.8	2.8	µA
Absolute accuracy tolerance	A_H	20…80 %RH, 25 °C, including hysteresis		±3		%RH
Hysteresis[2]	H_H	10→90→10 %RH, 25 °C		±1		%RH
Nonlinearity[3]	NL_H	10→90 %RH, 25 °C		1		%RH
Response time to complete 63% of step[4]	$\tau_{63\%}$	90→0 or 0→90 %RH, 25°C		1		s
Resolution	R_H			0.008		%RH
Noise in humidity (RMS)	N_H	Highest oversampling, see chapter 3.6		0.02		%RH
Long term stability	ΔH_{stab}	10…90 %RH, 25 °C		0.5		%RH/ year

2.3 Air Pressure Sensor

Parameter	Symbol	Condition	Min	Typ	Max	Unit
Operating temperature range	T_A	operational	-40	25	+85	°C
		full accuracy	0		+65	
Operating pressure range	P	full accuracy	300		1100	hPa
Supply current	$I_{DD,LP}$	1 Hz forced mode, pressure and temperature, lowest power		2.8	4.2	µA

Temperature coefficient of offset[5]	TCO_P	25…65 °C, 900 hPa		±1.5		Pa/K
				±12.6		cm/K
Absolute accuracy pressure	A^P_{ext}	300. . 1100 hPa -20 . . . 0 °C		±1.7		hPa
	$A_{P,full}$	300 . . . 1100 hPa 0 . . . 65 °C		±1.0		hPa
	A^P	1100 . . . 1250 hPa 25 . . . 40 °C		±1.5		hPa
Relative accuracy pressure V_{DD} = 3.3V	A_{rel}	700 … 900hPa 25 . . . 40 °C		±0.12		hPa
Resolution of pressure output data	R_P	Highest oversampling		0.18		Pa
Noise in pressure	$N_{P,fullBW}$	Full bandwidth, highest oversampling See chapter 3.6		1.3		Pa
				11		cm
	$N_{P,filtered}$	Reduced bandwidth, highest oversampling See chapter 3.6		0.2		Pa
				1.7		cm
Solder drift		Minimum solder height 50µm	-0.5		+2.0	hPa
Long term stability[6]	ΔP_{stab}	per year		±1.0		hPa
Possible sampling rate	f_{sample_P}	Lowest oversampling, see chapter 9.2	157	182		Hz

3 LoRa Payload Decoder

This will be available via an attachment on the email

```
//   __        _____ ____  _  __    _
//   \ \      / /_ _/ ___|| |/ /   / \
//    \ \ /\ / / | |\___ \| ' /   / _ \
//     \ V  V /  | | ___) | . \  / ___ \
//      \_/\_/  |___|____/|_|\_\/_/   \_\
//
//
//  WISKA simple payload decoder.
//  www.go-iot.io
//  Version 1.7  May 10th 2023

var TYPE_TEMP              = 0x81;  //temp 2 bytes -3276.8°C -->3276.7°C
var TYPE_RH                = 0x82;  //Humidity 1 byte  0-100%
var TYPE_PRESSURE          = 0x94;  //4byte pressure data (hPa)
var TYPE_CO                = 0xBF;  //2 bytes value 0-65535
var TYPE_MODEL             = 0xED;  //12bytes - Sensor Model and Firmware
var TYPE_SENSORS           = 0xEE;  //20bytes - Installed Sensors
var TYPE_DEBUG             = 0xEF;  //4bytes debug EE



function bin16dec(bin) {
    var num=bin&0xFFFF;
    if (0x8000 & num)
        num = - (0x010000 - num);
    return num;
}
function bin8dec(bin) {
    var num1=bin&0xFF;
    if (0x80 & num1)
        num1 = - (0x0100 - num1);
    return num1;
}
function hexToBytes(hex) {
    for (var bytes = [], c = 0; c < hex.length; c += 2)
        bytes.push(parseInt(hex.substr(c, 2), 16));
    return bytes;
}
var decodeWiskaPayload=function(data,port){
    var obj = new Object();
    for(i=0;i<data.length;i++){
        //console.log(data[i]);
        switch(data[i]){
            case TYPE_TEMP: //Temperature
                var temp=(data[i+1]<<8)|(data[i+2]);
                temp=bin16dec(temp);
                obj.temperature=temp/10;
                i+=2;
                break
            case TYPE_RH: //Humidity
                var rh=(data[i+1]);
                obj.humidity=rh;
                i+=1;
                break
            case TYPE_PRESSURE: //External Pressure
                var temp=(data[i+1]<<24)|(data[i+2]<<16)|(data[i+3]<<8)|(data[i+4]);
                obj.pressure=temp/1024;                                                //
                i+=4;
                break
            case TYPE_CO:
                obj.co=(data[i+1]<<8)|(data[i+2]);
                i+=2;
                break
            case TYPE_MODEL:
```

```
                    obj.model = [];
                    for(var j = 0; j < 20; j++)  {
                        obj.model[j] = (data[j]);
                    }
                    i += 20;
                    break
                case TYPE_SENSORS:
                    obj.sensors = [];
                    for(var j = 0; j < 20; j++)  {
                        obj.sensors[j] = (data[j]);
                    }
                    i += 20;
                    break
                default: //somthing is wrong with data
                    i=data.length;
                    break
            }
        }
        return obj;
}

exports.decode = function(bytes,port)
{
        return decodeWiskaPayload(bytes,port);
}
```

4 WISka Edge Temperature / Humidity downlink payload

Downlink payloads are sent on the configured LoRa port + 1.

If configured port is the default (5) then downlink settings should be sent on port 6.

Header byte (0xA8)	**Payload length**	**Settings data**	**Default**	**Settings data**
1 byte	**1 bytes**	n bytes		n bytes

0x41	Sensor Time Base	2 byte time (seconds)	900	4 Bytes HEX
0x42	Send Time	2 byte uplink period	1	4 Bytes HEX
0x43	Temperature	2 byte uplink period	1	4 Bytes HEX
0x4B	Battery	2 byte uplink period	1	4 Bytes HEX

Send a Downlink to Port 6

A803410480

Where A8 = Header Byte
03 = Number of bytes following in settings data
41 = Sensor Time Base
0480 = 1200 in hex

6 Programming the WISka Sensor Firmware

Note: The required Hex file(s) and processor type will be emailed as requested

6.1 Programmer Required

Part Number: ATATMEL-ICE-BASIC - Atmel-ICE Basic Kit - Cost £116.00

https://www.microchipdirect.com/dev-tools/ATATMEL-ICE-BASIC?dfw_tracker=92744-ATATMEL-ICE-BASIC&allDevTools=true&gad=1&gclid=Cj0KCQjwyLGjBhDKARIsAFRNgW_uLncC5ZnaRwQqL8flHOrc49LcKGDmzdoAqEy_UQEbM1FGlZz86T4aAqPeEALw_wcB

Using the AVR Port (not the SAM port on the Programmer) – 10way connector

- Pin 2 – GND
- Pin 3 – UPDI
- Pin 4 – VTG
- Pin 6 – nSRST

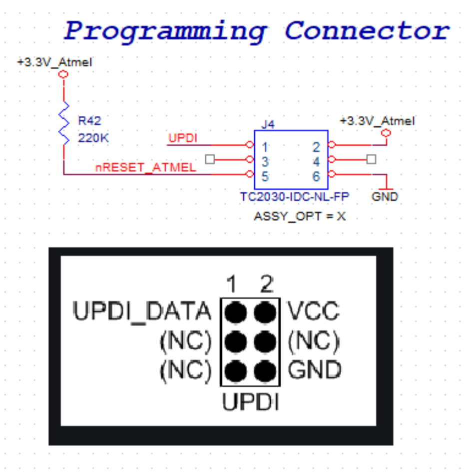
6.2 Software Required

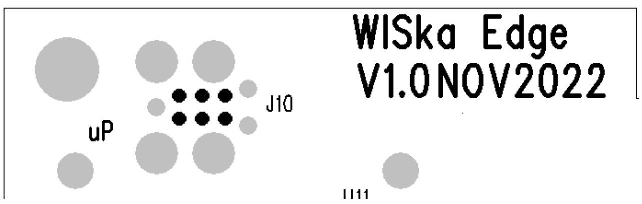
Install the following software for Windows 10 or Windows 11

Microchip Studio for AVR and SAM Devices

https://www.microchip.com/en-us/tools-resources/develop/microchip-studio

6.3 Programming Connection on WISka





6.4 Programming Cable Required

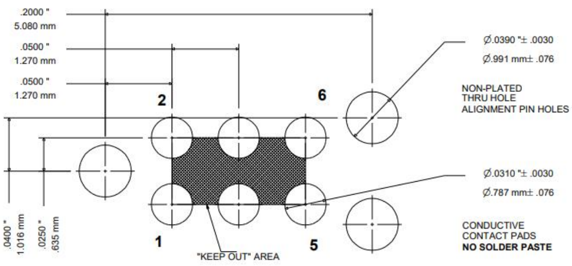
TC2030-ICESPI-NL No Leg Cable for use with Atmel-ICE - $59

https://www.tag-connect.com/product/tc2030-icespi-nl-no-leg-cable-for-use-with-atmel-ice

Information Only

TC2030-ICESPI-NL Connections

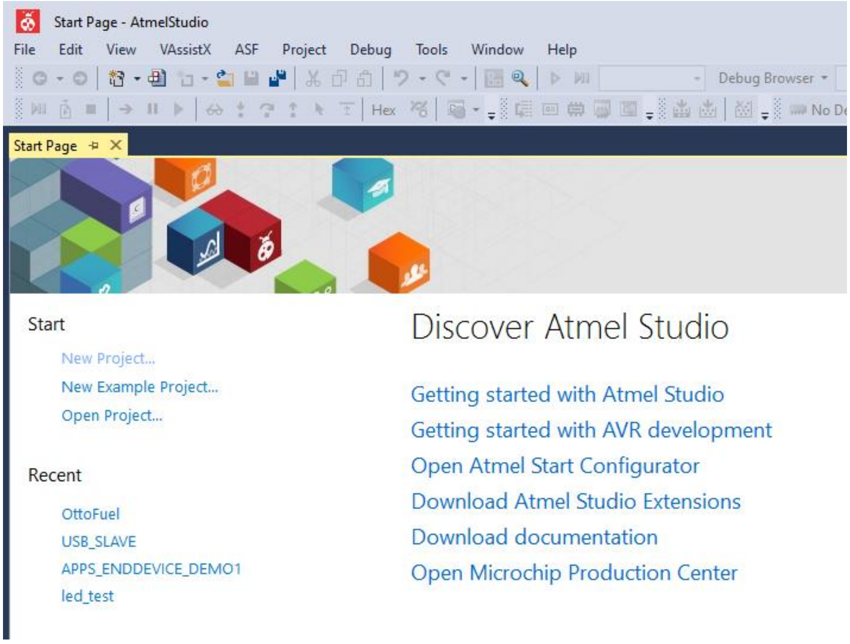
TC2030	SPI	PDI	aWire	10-pin IDC
1	MISO	PDI_DATA	DATA	3 TDO
2	VTGS	VTref	VTG	4 VTG
3	SCK			1 TCK
4	MOSI			9 TDI
5	/RESET	PDI_CLK		6 nSRST
6	GND	GND	GND	2 GND



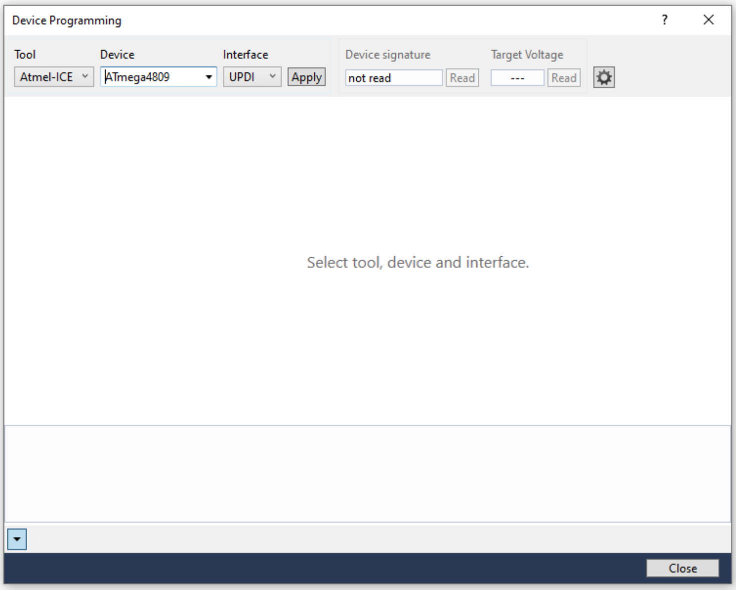
PCB TOP LAYER

6.4 Connect the Atmel-ICE to the USB Port on the Windows PC

Start Microchip Studio (Note: Startup screens will differ)



6.52 Select Tools – Device Programming

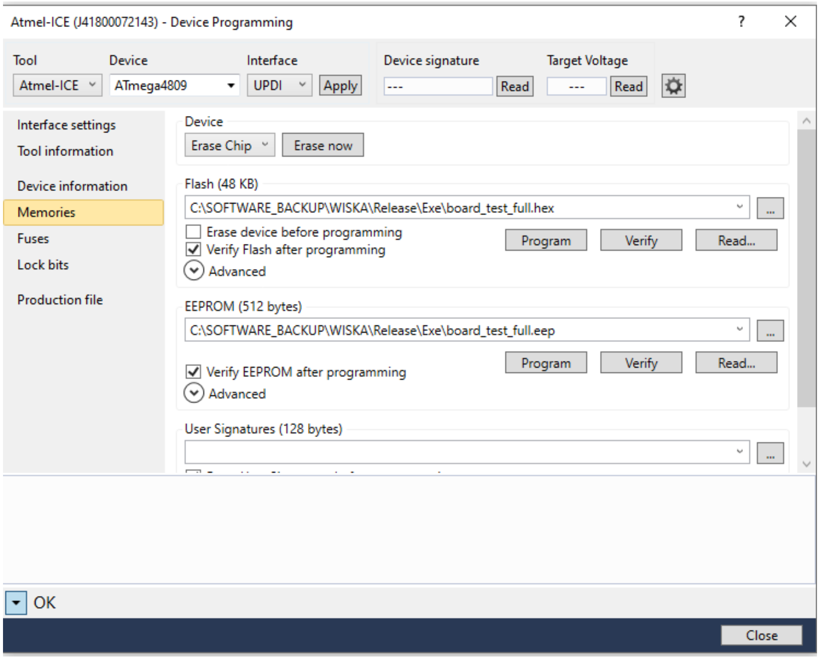


Note: The **Tool** dropdown will display the information on the connected programmer

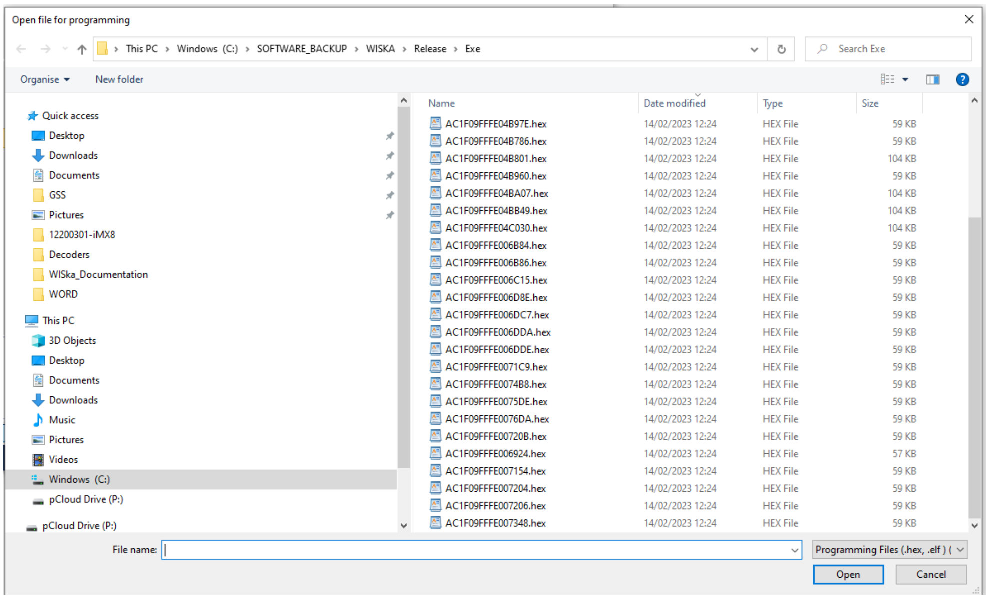
The **Device** dropdown will display the processor type to be programmed.

Place programming header onto the programming pins on the WISka Sensor. The programmed header is polarised by 3 x Fixed Pins. Push Down Gently on the 6 x spring loaded pins

6.5 Select Apply – then Select Memories



6.6 Flash (48 KB) Browse the PC for the supplied hex file



6.7 Flash (48 KB) – Select Program

The progress will be displayed on the screen. Ensure the programming header is held correct in place during programming.

Connector the WISka PCB to USB or Battery for power

1. The printed number on the TAG Connect Grey Cable from the programmer should be TC2030-ICESPI-NL-LEMTA ?

2. The same cable is plugged into the AVR Connector - There is a bump on the black connector, so it only fits in one way

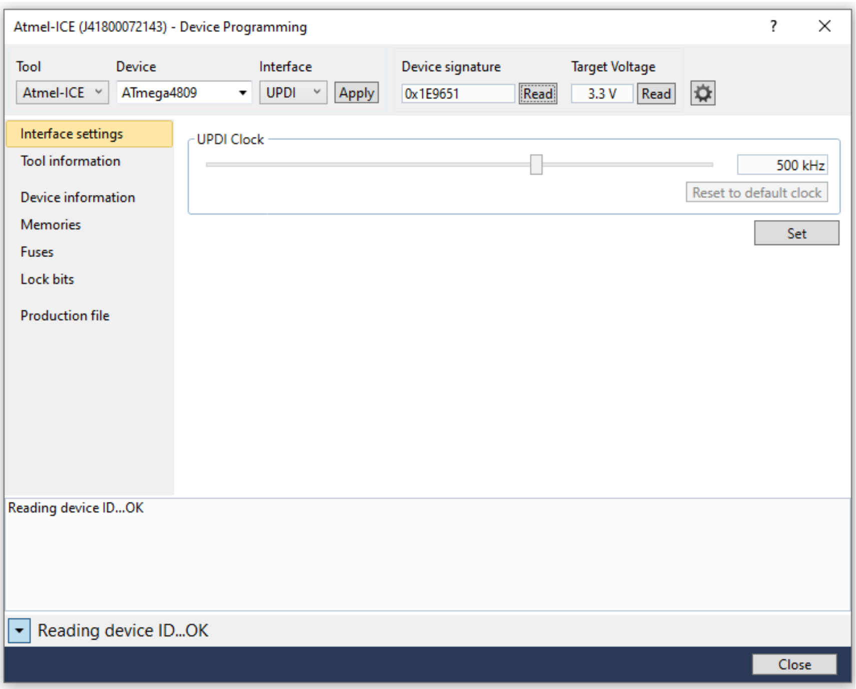
3. Start the program on the PC - Microchip Studio - or Atmel Studio

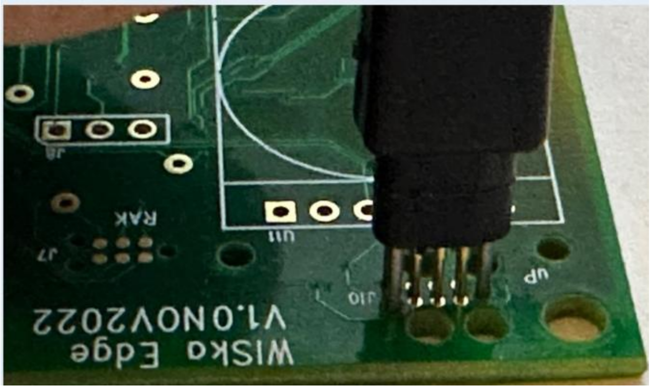
4. Click on "Interface" - Apply button

5. Connect the Spring loaded connector in to the connector as shown below - Be careful as there are three locating hole in the PCB to polarise the programming connector corrector - see below

6. Clink on "Device Signature" - Read button

7. You should see the device signature - 0x!E9651 and Target Voltage of 3.3V - See below

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