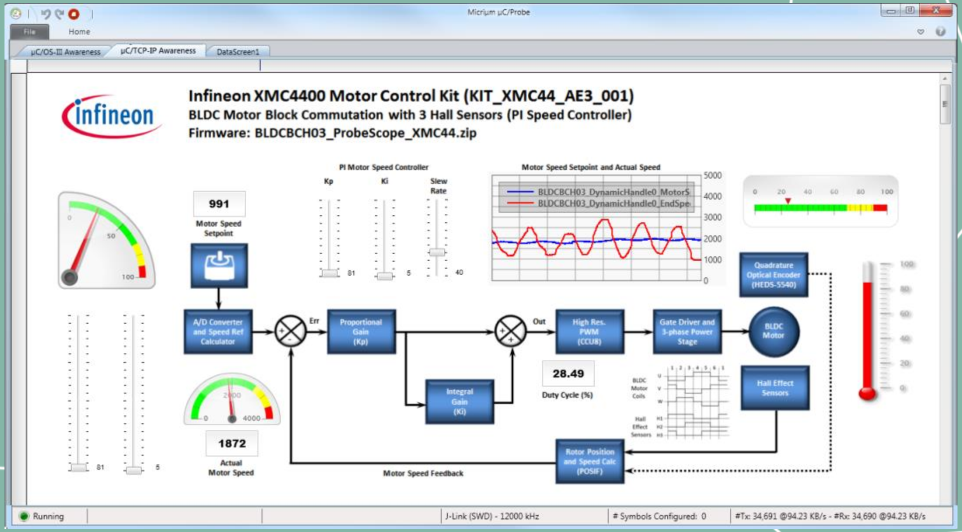
Micrium uC/Probe XMC Getting Started

XMC Microcontrollers

April 2016



Micrium µC/Probe

Infineon XMC4400 Motor Control Kit (KIT_XMC44_AE3_001)
BLDC Motor Block Commutation with 3 Hall Sensors (PI Speed Controller)
Firmware: BLDCBCH03_ProbeScope_XMC44.zip

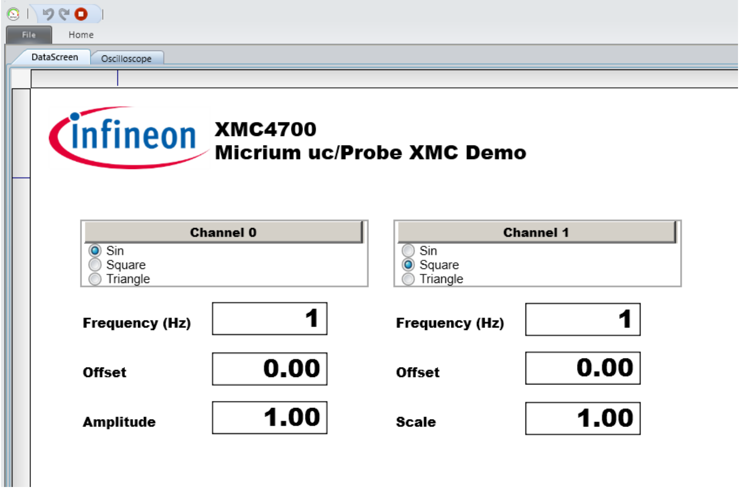
Running | J-Link (SWD) - 12000 kHz | # Symbols Configured: 0 | #Tx: 34,691 @94.23 KB/s - #Rx: 34,690 @94.23 KB/s

Agenda

1. Objective of this tutorial
2. What we need to follow this tutorial?
3. Introduction to Micrium uC/Probe™ XMC™
4. Using the dashboard
5. Using the oscilloscope
6. Other features
7. References
8. Support Material

Objective of this tutorial

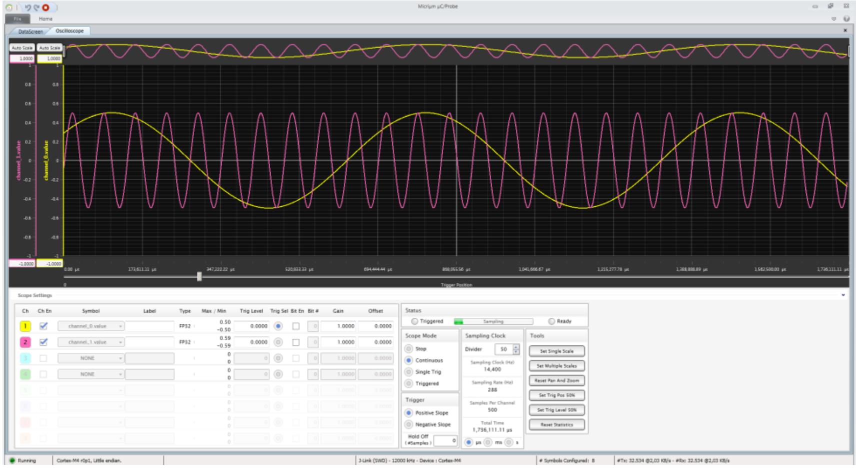
1. Program provided example application to your board
   - Using DAVE™ 4 integrated debugger
   - Using XMC™ Flasher tool
2. Control and monitor your application using the Micrium uC/Probe™ XMC™ dash board
3. Monitor variables using the Micrium uC/Probe™ XMC™ oscilloscope control



XMC4700
Micrium uc/Probe XMC Demo

Channel 0	Channel 1
● Sin ○ Square ○ Triangle	○ Sin ● Square ○ Triangle

	Channel 0		Channel 1
Frequency (Hz)	1	Frequency (Hz)	1
Offset	0.00	Offset	0.00
Amplitude	1.00	Scale	1.00



Ch	Ch En	Symbol	Label	Type	Max / Min	Trig Level	Trig Sel	Bit En	Bit #	Gain	Offset
1	☑	channel_0.value		FP32	0.50 -0.50	0.0000	●	□	0	1.0000	0.0000
2	☑	channel_1.value		FP32	0.59 -0.59	0.0000	○	□	0	1.0000	0.0000
3	□	NONE			0 0	0	○	□	0	1.0000	0.0000
4	□	NONE			0 0	0	○	□	0	1.0000	0.0000

Status: ○ Triggered, Sampling, ○ Ready

Scope Mode: ○ Stop, ● Continuous, ○ Single Trig, ○ Triggered

Trigger: ● Positive Slope, ○ Negative Slope, Hold Off (#Samples) 0

Sampling Clock: Divider 50; Sampling Clock (Hz) 14,400; Sampling Rate (Hz) 288; Samples Per Channel 500; Total Time 1,736,111.11 µs; ● µs ○ ms ○ s

Tools: Set Single Scale, Set Multiple Scales, Reset Pan And Zoom, Set Trig Pos 50%, Set Trig Level 50%, Reset Statistics

Running | Cortex-M4 r0p1, Little endian. | J-Link (SWD) - 12000 kHz - Device : Cortex-M4 | # Symbols Configured: 8 | #Tx: 32.534 @2,03 KB/s - #Rx: 32.534 @2,03 KB/s

What we need to follow this tutorial?

- Software
  - To program the provided example to the target use either of:
    - **DAVE™ version 4**

      Development Platform for XMC™ Microcontrollers.

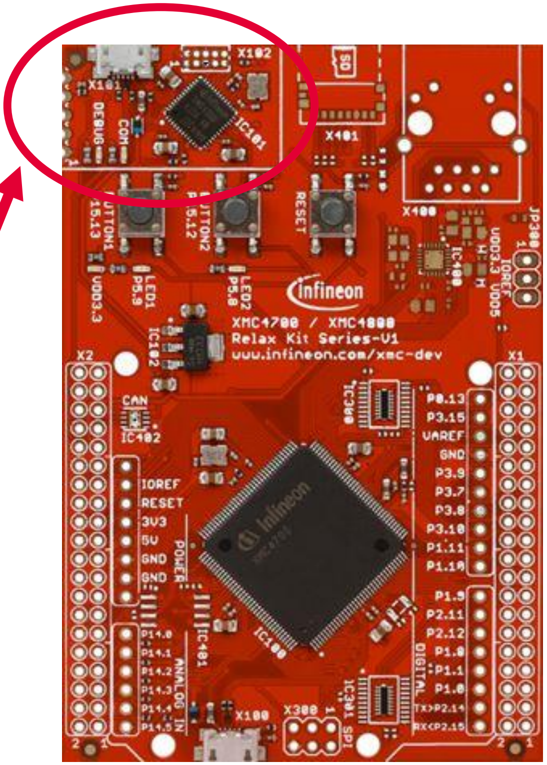
      Go to www.infineon.com/DAVE and download DAVE™ version 4
    - **XMC™ Flasher**

      Free of charge programming tool.
      Go to XMC Software Download and download XMC™ Flasher
  - **Micrium uC/Probe™ XMC™ version 4.0**

    Go to www.infineon.com/ucProbeXMC and download the latest version of Micrium uC/Probe™ XMC™
  - Example application project for DAVE version 4 accompanying this document.

What we need to follow this tutorial?

- Hardware
  - Micrium uC/Probe™ XMC™ supports any of the Infineon XMC boards using the debugger interface.
  - In this tutorial XMC4700 Relax Kit is used featuring
    - XMC4700-F144 Microcontroller based on ARM® Cortex®-M4 @ 144MHz, 2MB Flash and 352KB RAM
    - On-Board Debugger (Segger J-Link)
    - Power over USB
    - ESD and reverse current protection
    - 2 x user button and 2 x user LED
    - Arduino hardware compatible 3.3V pinout
  - On board debugger is used
    - Connect the board to your PC using a micro USB cable.



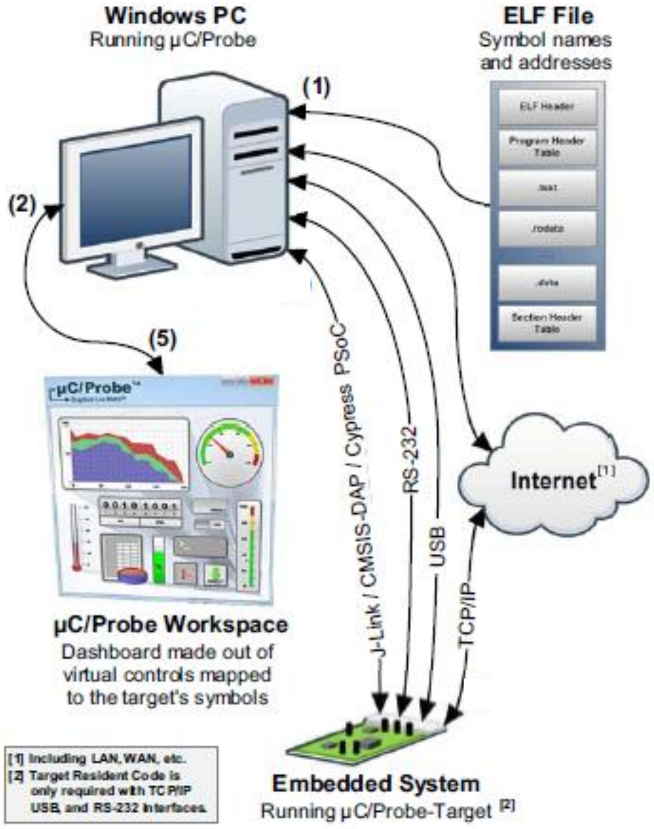
Introduction to Micrium uC/Probe^{TM} XMC^{TM}

› What is Micrium uC/Probe XMC?
  - uC/Probe XMC is a Windows based application that let you control and monitor a running embedded system.
  - Allows easy visual access to the internals of your application using the oscilloscope control, gauges, spreadsheets, LEDs and other widgets.
  - Allows generation of rich visually appealing user interfaces for your applications.
  - Can be used with any toolchain that can generate an ELF file
  - Can connect to the embedded system using SWD/JTAG, UART, Ethernet or USB.
    - SWD communication does not need any target firmware to set or retrieve the values of variables.
    - Other communication interfaces need a C library added to your application to respond to the requests from µC/Probe running on the Windows PC. Library can be obtained at µC/Probe Embedded Target Code.

Introduction to Micrium uC/Probe^{TM} XMC^{TM}

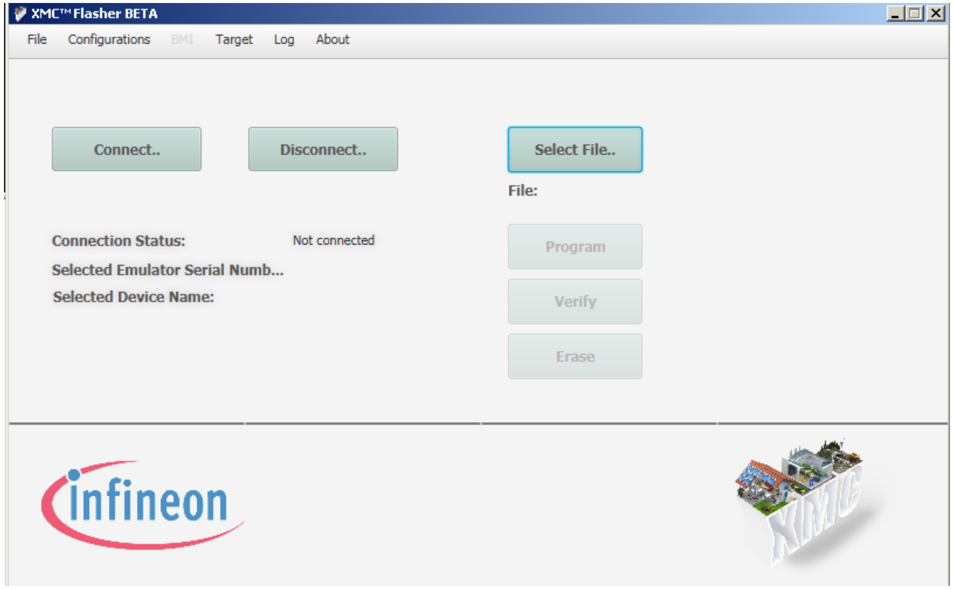
› How it works?

1. Load ELF file
   - uC/Probe^{TM} XMC^{TM} obtains the address of the variables from application ELF file.
2. Configure the communication interface
3. Design your dash board by dragging and dropping widgets
4. Associate a variable to each of the widgets
5. Start uC/Probe^{TM} XMC^{TM}
   - uC/Probe makes requests to read the value of all variables used in the dashboard


Windows PC
Running µC/Probe
ELF File
Symbol names and addresses
ELF Header
Program Header Table
.text
.rodata
.data
Section Header Table
(1)
(2)
(5)
µC/Probe
J-Link / CMSIS-DAP / Cypress PSoC
RS-232
USB
TCP/IP
Internet[1]
µC/Probe Workspace
Dashboard made out of virtual controls mapped to the target's symbols
Embedded System
Running µC/Probe-Target [2]
[1] Including LAN, WAN, etc.
[2] Target Resident Code is only required with TCP/IP USB, and RS-232 interfaces.

Program the application to your target Using XMC™ Flasher

1. Connect your board to the PC using a micro USB cable
2. Start XMC^{TM} Flasher
3. Select the hex file
   - Click on *File* in the menu bar
   - Browse to the location of your file



File:

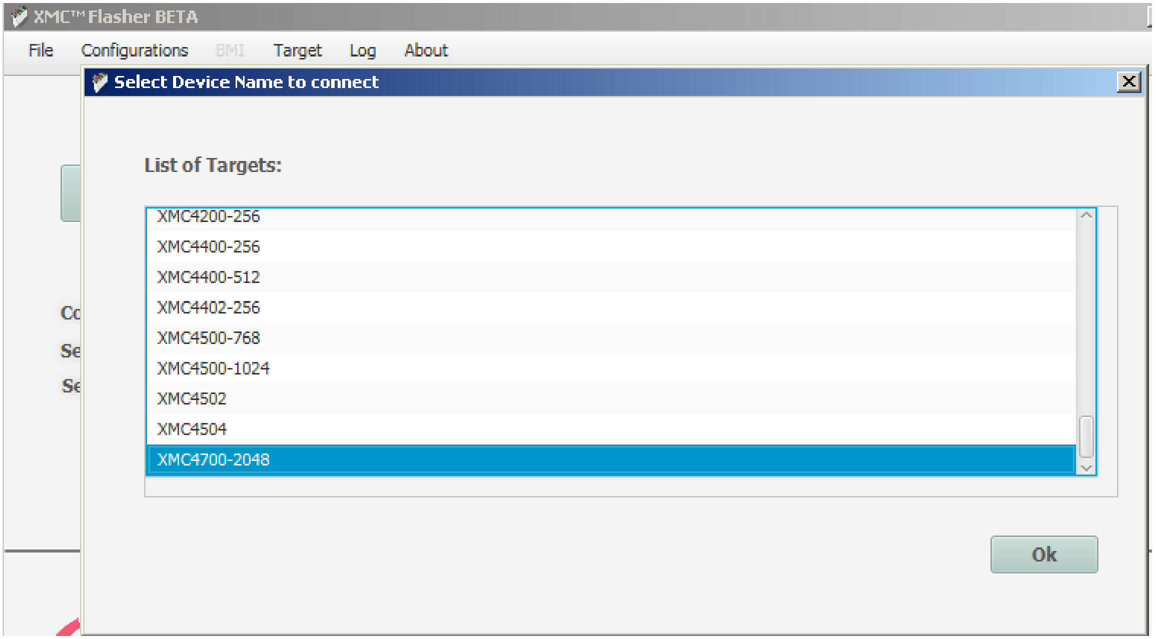
Connection Status: Not connected

Selected Emulator Serial Numb...

Selected Device Name:

Program the application to your target Using XMC™ Flasher

4. Connect to your device
   - Click on *Connect…*
   - Select your device

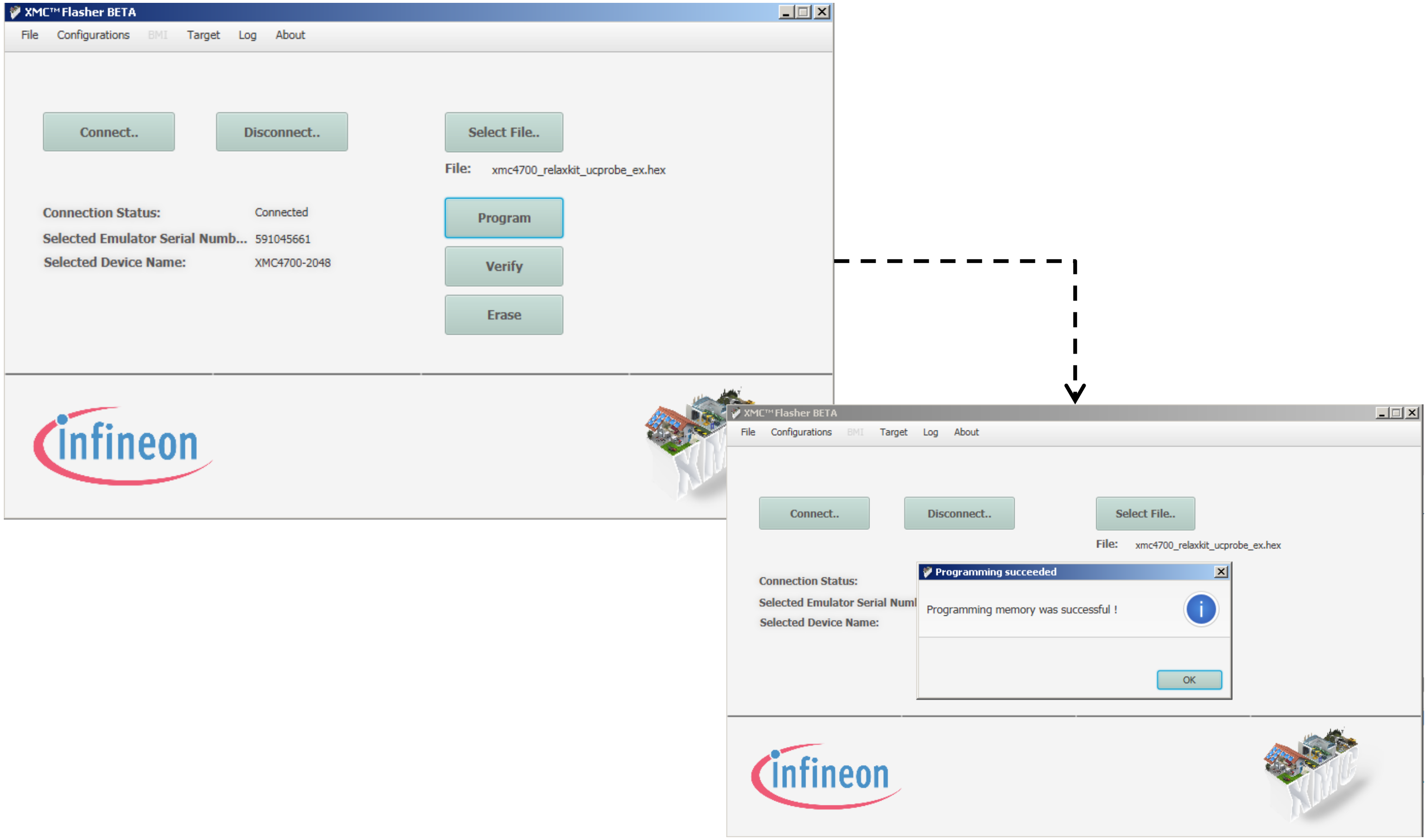


List of Targets:

XMC4200-256
XMC4400-256
XMC4400-512
XMC4402-256
XMC4500-768
XMC4500-1024
XMC4502
XMC4504
XMC4700-2048

Program the application to your target Using XMC™ Flasher

5. Click on Program…



File: xmc4700_relaxkit_ucprobe_ex.hex

Connection Status: Connected

Selected Emulator Serial Numb... 591045661

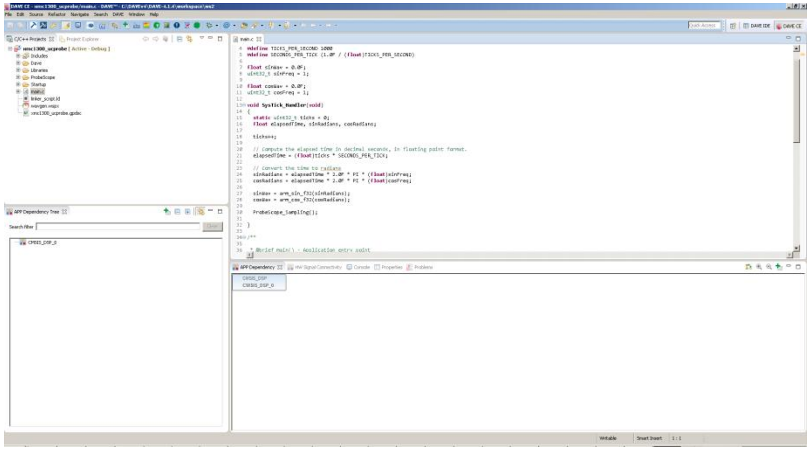
Selected Device Name: XMC4700-2048

Programming succeeded

Programming memory was successful !

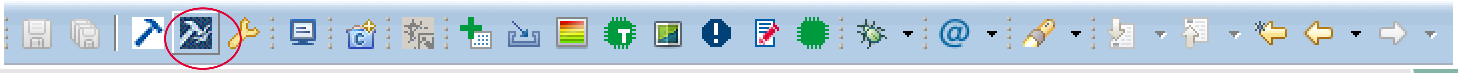
OK

Program the application to your target Using DAVE^{TM} version 4



```
#define TICKS_PER_SECOND 1000
#define SECONDS_PER_TICK (1.0F / (float)TICKS_PER_SECOND)

float sinWav = 0.0F;
uint32_t sinFreq = 1;

float cosWav = 0.0F;
uint32_t cosFreq = 1;

void SysTick_Handler(void)
{
  static uint32_t ticks = 0;
  float elapsedTime, sinRadians, cosRadians;

  ticks++;

  // Compute the elapsed time in decimal seconds, in floating point format.
  elapsedTime = (float)ticks * SECONDS_PER_TICK;

  // Convert the time to radians
  sinRadians = elapsedTime * 2.0F * PI * (float)sinFreq;
  cosRadians = elapsedTime * 2.0F * PI * (float)cosFreq;

  sinWav = arm_sin_f32(sinRadians);
  cosWav = arm_cos_f32(cosRadians);

  ProbeScope_Sampling();

}

/**

 * @brief main() - Application entry point
```

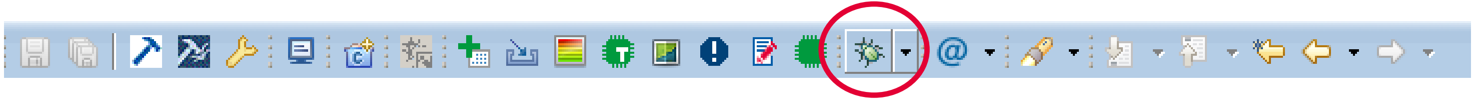
1. Start DAVE^{TM} version 4
2. Import the example project
   - Click on File > Import...
   - Select Infineon > DAVE Project.
   - Click on Next
   - Select Archive File.
   - Click on Browse
   - Browse to the location of the example project and select the zip file
   - Click on Finish
3. Compile the project
   - Click on Rebuild Active Project button in the tool bar



Program the application to your target Using DAVE^{TM} version 4

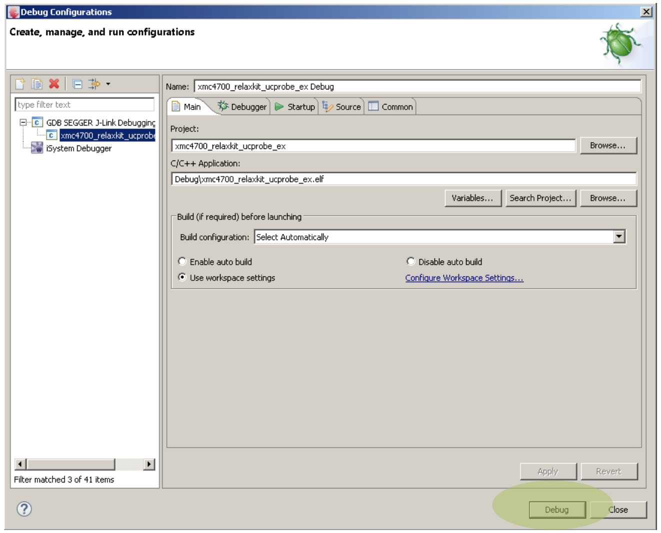
4. Start debugger

   – Click on Debug button in the toolbar



   – Double click on GDB SEGGER J-Link Debugging

   – Click on Debug



Debug Configurations

Create, manage, and run configurations

type filter text

GDB SEGGER J-Link Debugging
xmc4700_relaxkit_ucprobe
iSystem Debugger

Filter matched 3 of 41 items

Name: xmc4700_relaxkit_ucprobe_ex Debug

Project: xmc4700_relaxkit_ucprobe_ex

C/C++ Application: Debug\xmc4700_relaxkit_ucprobe_ex.elf

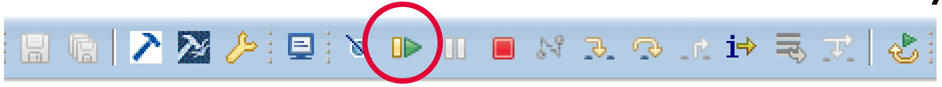
Build (if required) before launching

Build configuration: Select Automatically

○ Enable auto build
○ Disable auto build
● Use workspace settings

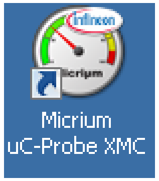
Configure Workspace Settings...

   – The debugger will program your board. In the debugger view click on Resume button in the toolbar to start your application.

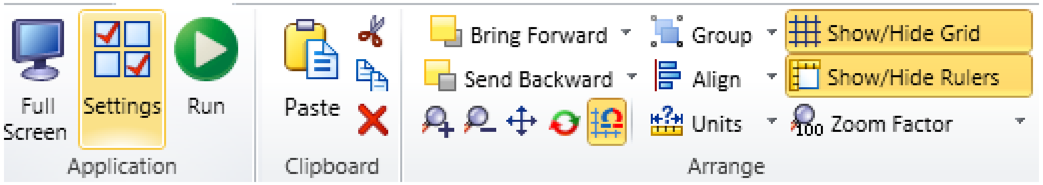


Using Micrium uC/Probe^{TM} XMC^{TM} Dashboard

- This section shows you how to monitor and control your application using the dash board.
  - By having a dashboard for your C code, you will gain a firm understanding of what the embedded system is doing at any given time.
- Use **xmc4700_relaxkit_ucprobe_ex1.zip** example project.

1. Start Micrium uC/Probe^{TM} XMC^{TM}
   - Click on  in your desktop

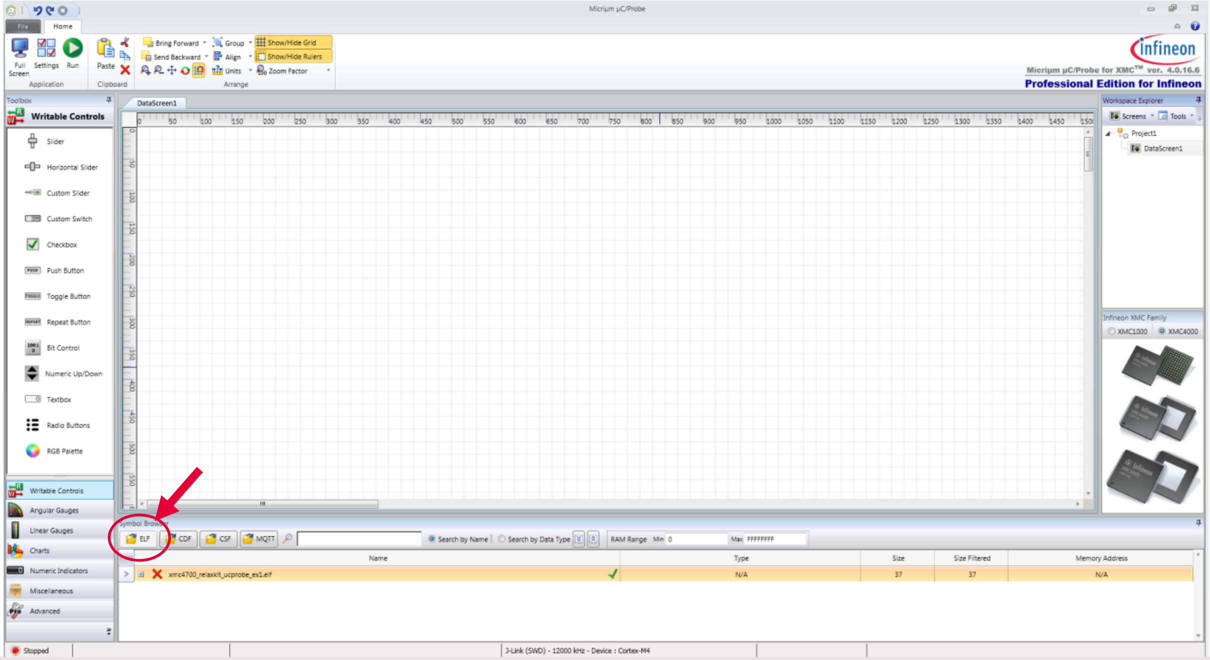
2. Setup communication to board
   - Click on Settings button in toolbar



   - Select Debug Interfaces > J-Link
   - Click Ok

Using Micrium uC/Probe^{TM} XMC^{TM} Dashboard

3. Load an ELF file
   - Click on **ELF** button in Symbol Browser window
   - Browse to the location of the ELF file in the Debug folder of the example project.
   - Select the file. Click **Open**
   - Now you are ready to start designing your graphical UI



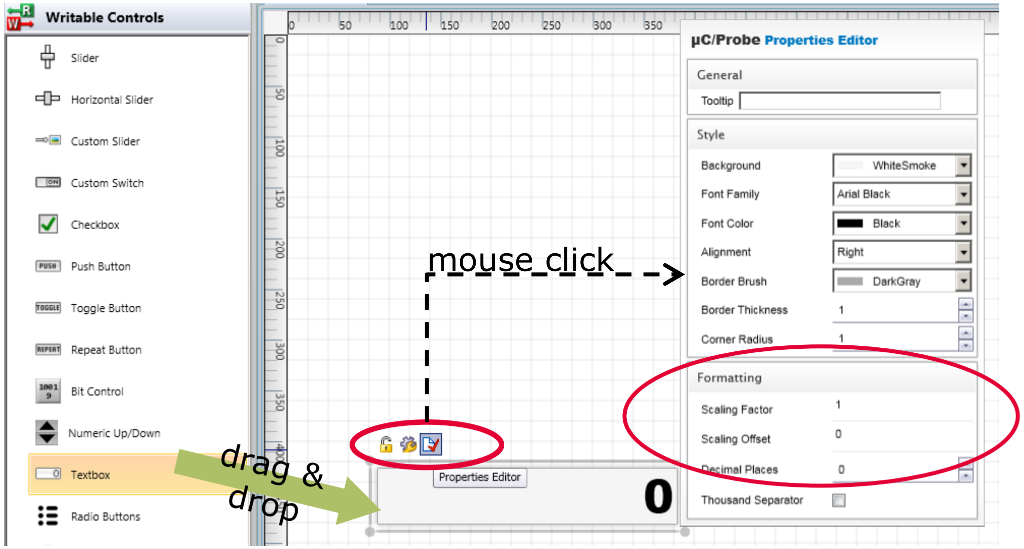
RAM Range Min 0 Max FFFFFFFF

Name	Type	Size	Size Filtered	Memory Address
xmc4700_relaxkit_ucprobe_ex1.elf	N/A	37	37	N/A

J-Link (SWD) - 12000 kHz - Device : Cortex-M4

Using Micrium uC/Probe^{TM} XMC^{TM} Dashboard

4. Drag and drop controls to build your user interface
   - In this example we will monitor and control a global variable of our application.
   - Add a **Textbox** from the Writable Controls. We will use this control to change the value of the variable.
   - In the Properties Editor you could apply scaling to the read value of the form y = scale*x + offset. You can also adjust the Decimal Places. These settings are available for almost all controls.



General

Tooltip

Style

Background: WhiteSmoke

Font Family: Arial Black

Font Color: Black

Alignment: Right

Border Brush: DarkGray

Border Thickness: 1

Corner Radius: 1

Formatting

Scaling Factor: 1

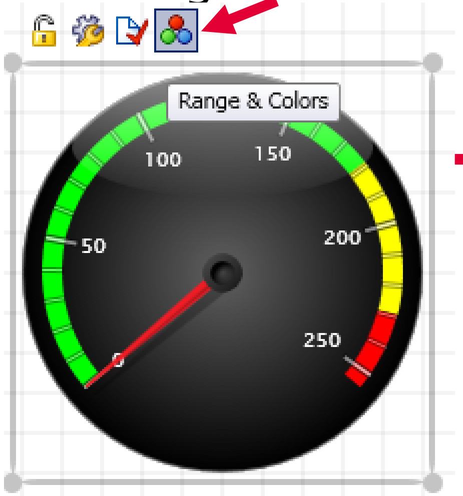
Scaling Offset: 0

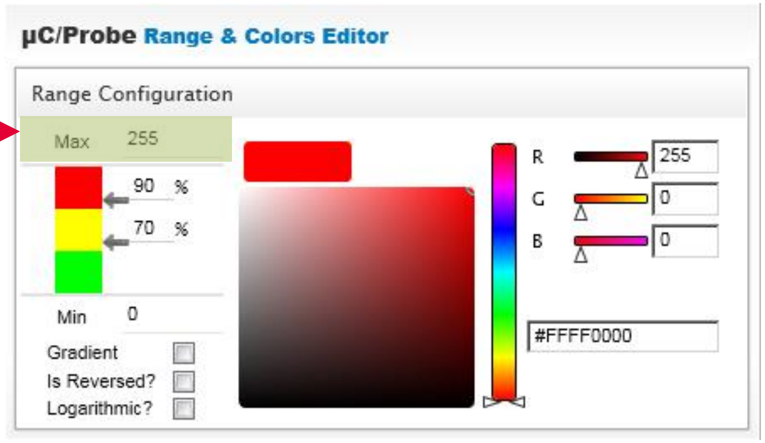
Decimal Places: 0

Thousand Separator: ☐

Using Micrium uC/Probe^{TM} XMC^{TM} Dashboard

- Add a **Radial 1** from the Angular Gauges. We will use this control to monitor the value of the variable.
  - In the Range and Colors of the control select maximum value 255.




µC/Probe Range & Colors Editor

Range Configuration

Max 255

90 %

70 %

Min 0

Gradient □

Is Reversed? □

Logarithmic? □

R 255

G 0

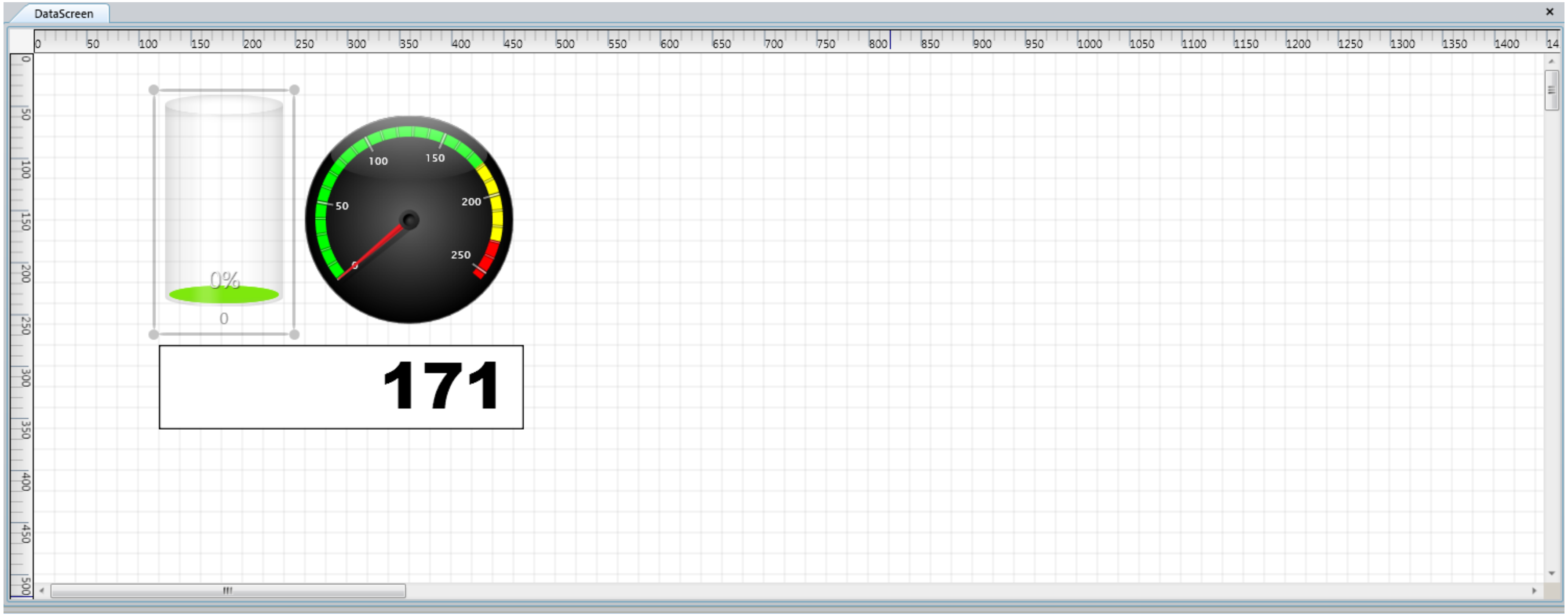
B 0

#FFFF0000

- Add a **Cylinder 1** from the Linear Gauges. We will use this control to monitor the value of the variable.
  - In the Range and Colors of the control select maximum value 255.

Using Micrium uC/Probe^{TM} XMC^{TM} Dashboard

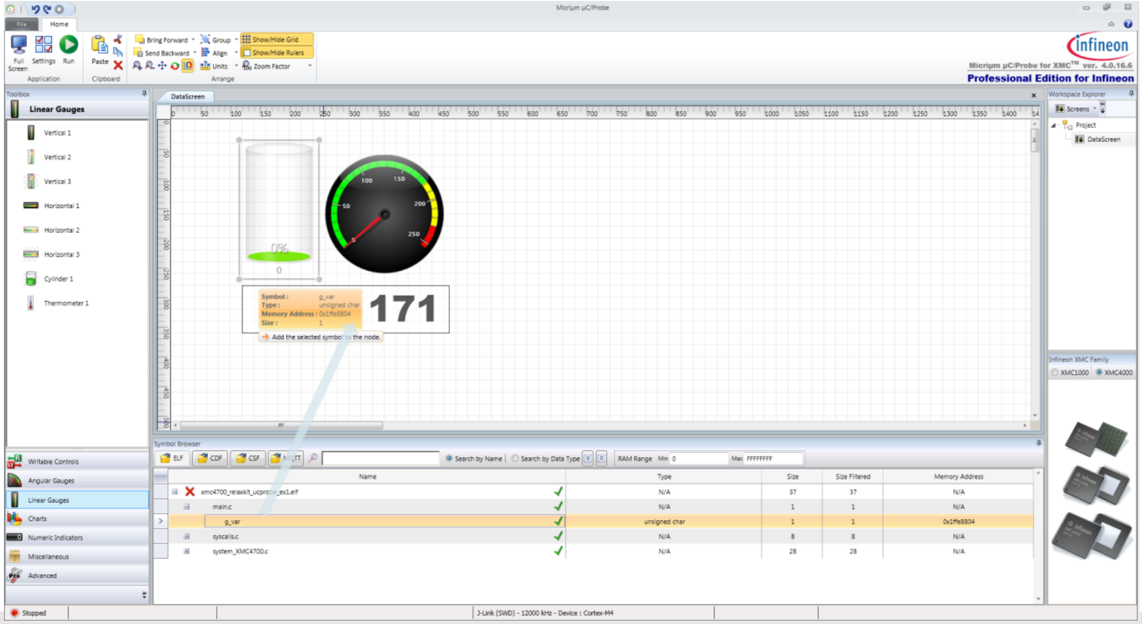
- Your dash board should look like as shown below
- You can always save your workspace by Ctrl-S or File > Save for later use or for sharing.



Using Micrium uC/Probe^{TM} XMC^{TM} Dashboard

5. Associate variables to controls

   - Search for the **g_var** symbol in the Symbol Browser:
     - Either use the search function if you know the name of the variable
     - Or unfold the ELF file and navigate through the modules
   - Drag the **g_var** variable and drop it over the Textbox control
     - Do the same for all the other controls



Symbol : g_var
Type : unsigned char
Memory Address : 0x1ffe8804
Size : 1

Add the selected symbol to the node.

Symbol Browser

ELF | CDF | CSF | MQTT | ● Search by Name | ○ Search by Data Type | RAM Range Min 0 Max FFFFFFFF

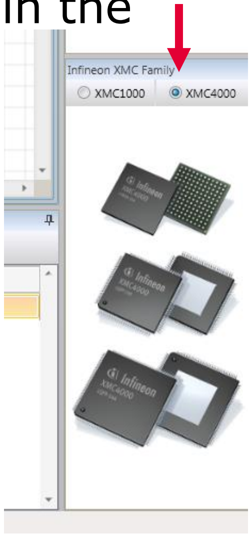
Name	Type	Size	Size Filtered	Memory Address
xmc4700_relaxkit_ucprobe_ex1.elf ✓	N/A	37	37	N/A
main.c ✓	N/A	1	1	N/A
g_var ✓	unsigned char	1	1	0x1ffe8804
syscalls.c ✓	N/A	8	8	N/A
system_XMC4700.c ✓	N/A	28	28	N/A

J-Link (SWD) - 12000 kHz - Device : Cortex-M4

Alternatively you can associate a variable to a control by double clicking on the variable if previously the control was selected by clicking on it

Using Micrium uC/Probe™ XMC™ Dashboard

6. Since we are connecting to a XMC4700 board, select XMC4000 in the Infineon XMC Family window.

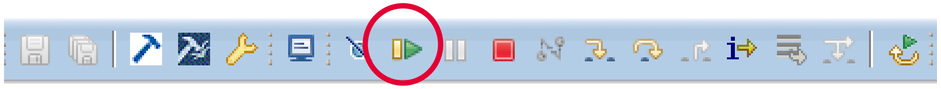


Infineon XMC Family

○ XMC1000 ● XMC4000

7. Before the next step ensure your board is running,

   i.e. not halted by debugger.



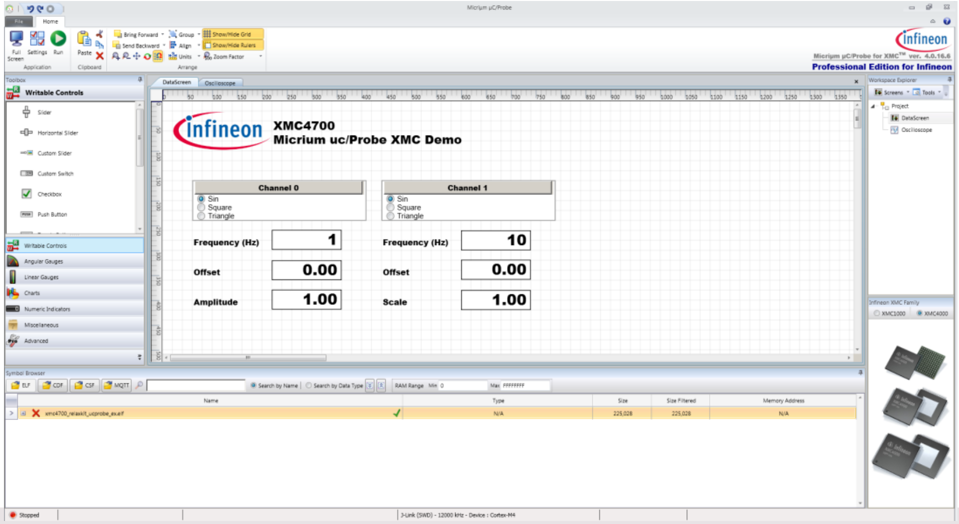
6. Click on Run button in toolbar.
   - The controls visualization will get updated periodically according to the value of the variable **g_var**
   - In this case the application increments the variable **g_var** in a loop.
   - You can also modify the value of the variable in run time.

No programming is required!
No need to instrument your embedded code nor need to write any single line of code in the PC to get insight of your application.

Using Micrium uC/Probe^{TM} XMC^{TM} Oscilloscope control

- In this section will explore the capabilities of the oscilloscope control of Micrium uC/Probe^{TM} XMC^{TM}
- Use **xmc4700_relaxkit_ucprobe_ex2.zip** example project.

1. In this section you will open an existing Workspace (.wspx)
   - Simply double click on the provided .wspx file in the example project.
   - Micrium uC/Probe^{TM} XMC^{TM} will start, showing the panel control for a software “signal generator”.



XMC4700
Micrium uc/Probe XMC Demo

Channel 0
● Sin
○ Square
○ Triangle

Frequency (Hz) 1
Offset 0.00
Amplitude 1.00

Channel 1
● Sin
○ Square
○ Triangle

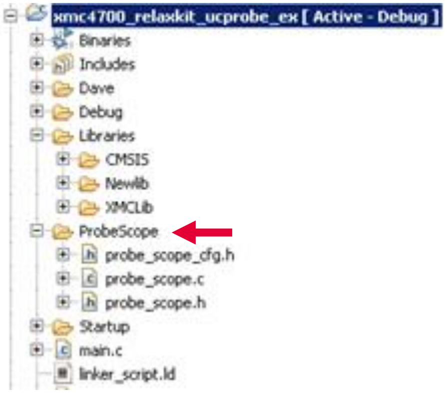
Frequency (Hz) 10
Offset 0.00
Scale 1.00

Using Micrium uC/Probe™ XMC™ Oscilloscope control

2. Add uC/Probe™ XMC™ Embedded Target code

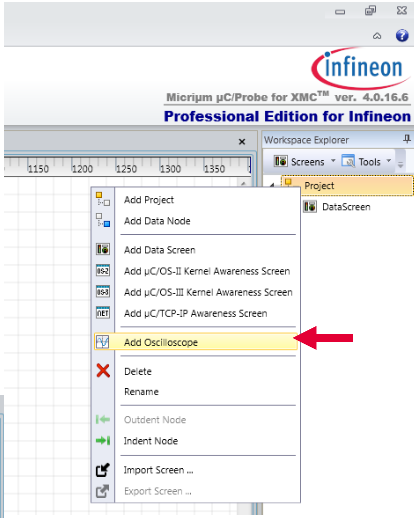
Note: The example application has already this step done for you. Here it is explained as reference for your next projects.

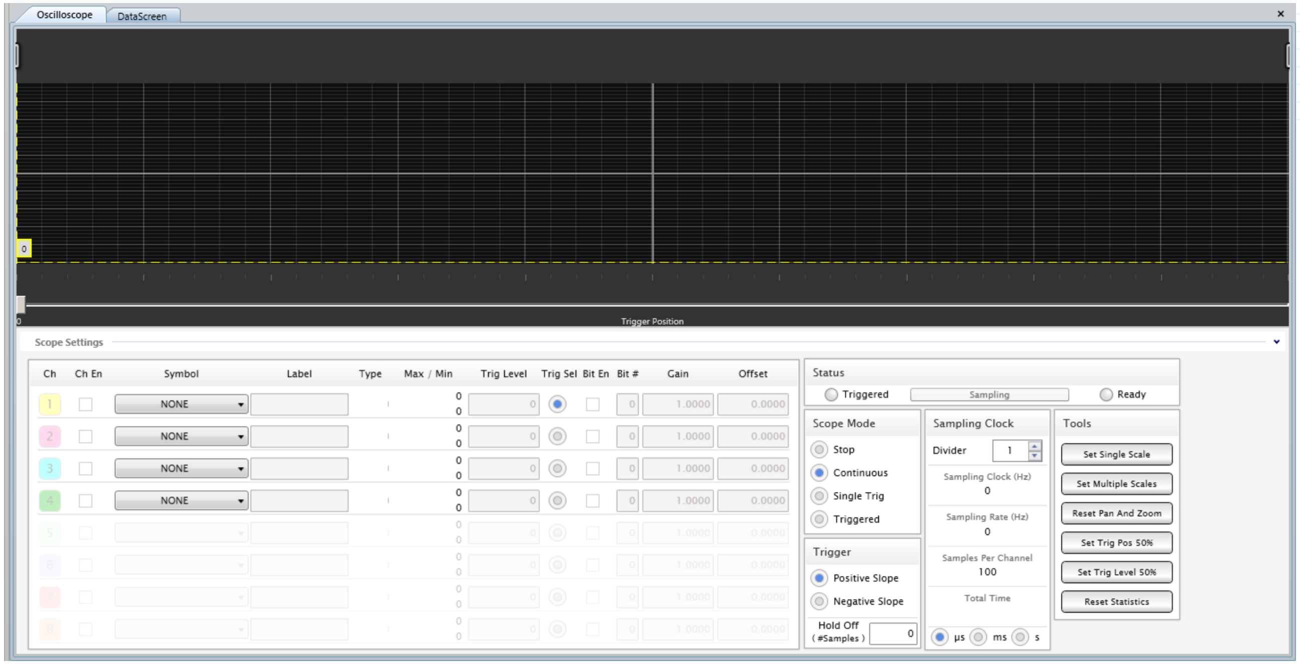
- To use the oscilloscope control, it requires adding to your application the Scope library which is part of the Target Code included in the µC/Probe™ XMC™ download package or can be downloaded from µC/Probe Embedded Target Code.
  - Add folder and adjust the compiler settings, i.e. Include Paths
  - Include probe_scope.h into your application code
- The library provide two functions:
  - **ProbeScope_Init()**
    - Initializes the internals of the Oscilloscope module. It sets the time base indicated as a parameter to the function, i.e. the frequency of calling the sampling function.
  - **ProbeScope_Sampling()**
    - Take a sample of each active oscilloscope channel. This function should be called in periodic function, i.e. control loop or timer ISR like in the example.
- The library can be configured adapting the defines in probe_scope_cfg.h
  - Number of channels
  - Number of sample per channel
    - It determines the length of the waveform, i.e. T = sampling period X number of samples per channel.



Using Micrium uC/Probe™ XMC™ Oscilloscope control

3. Create an oscilloscope
   - Click on Project > Add Oscilloscope
   - A new tab is created in the workspace containing the oscilloscope control.

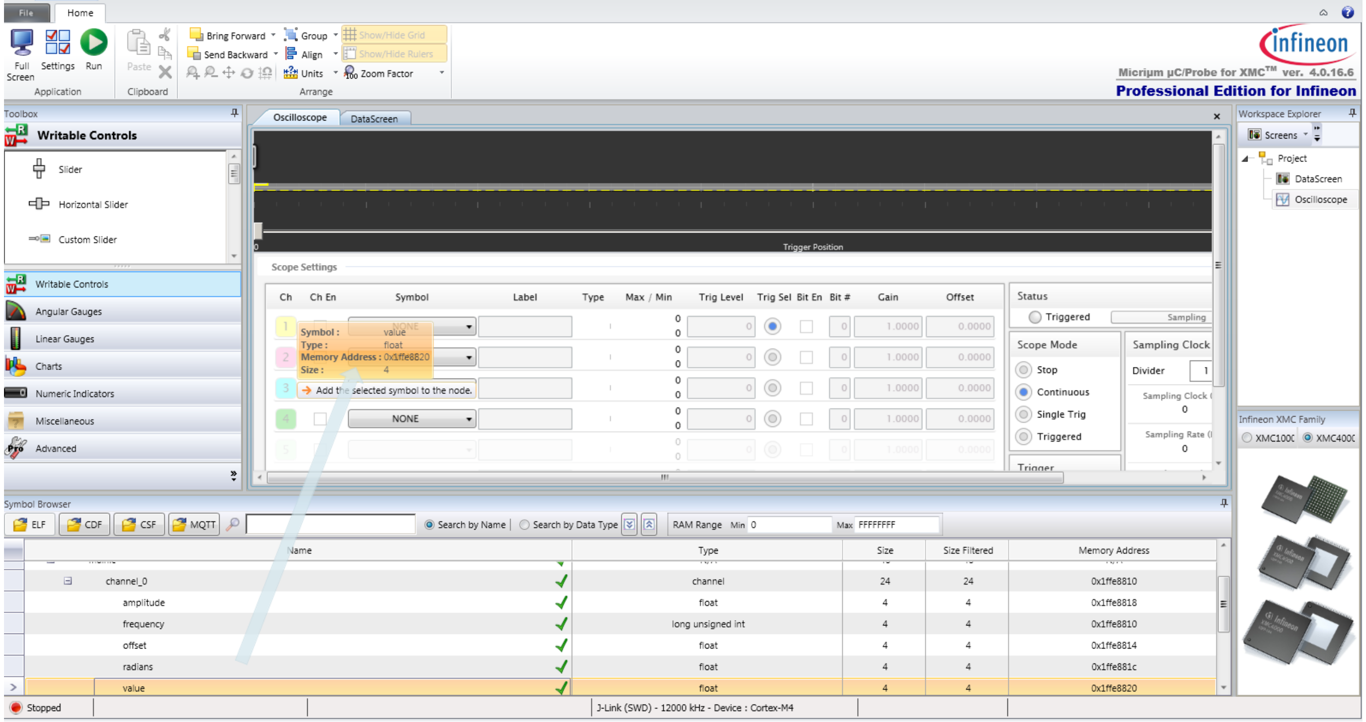




Using Micrium uC/Probe^{TM} XMC^{TM} Oscilloscope control

4. Associate variables to the oscilloscope channels

   – Using the symbol browser drag a drop the variables channel_0.value and channel_1.value to the oscilloscope channels.



Scope Settings

Ch	Ch En	Symbol	Label	Type	Max / Min	Trig Level	Trig Sel	Bit En	Bit #	Gain	Offset
1		NONE			0 0	0	●	□	0	1.0000	0.0000
2					0 0	0	○	□	0	1.0000	0.0000
3					0 0	0	○	□	0	1.0000	0.0000
4	□	NONE			0 0	0	○	□	0	1.0000	0.0000
5					0 0	0	○	□	0	1.0000	0.0000

Symbol : value
Type : float
Memory Address : 0x1ffe8820
Size : 4

→ Add the selected symbol to the node.

Status: ○ Triggered — Sampling

Scope Mode: ○ Stop ● Continuous ○ Single Trig ○ Triggered

Sampling Clock: Divider 1; Sampling Clock 0; Sampling Rate 0

Trigger

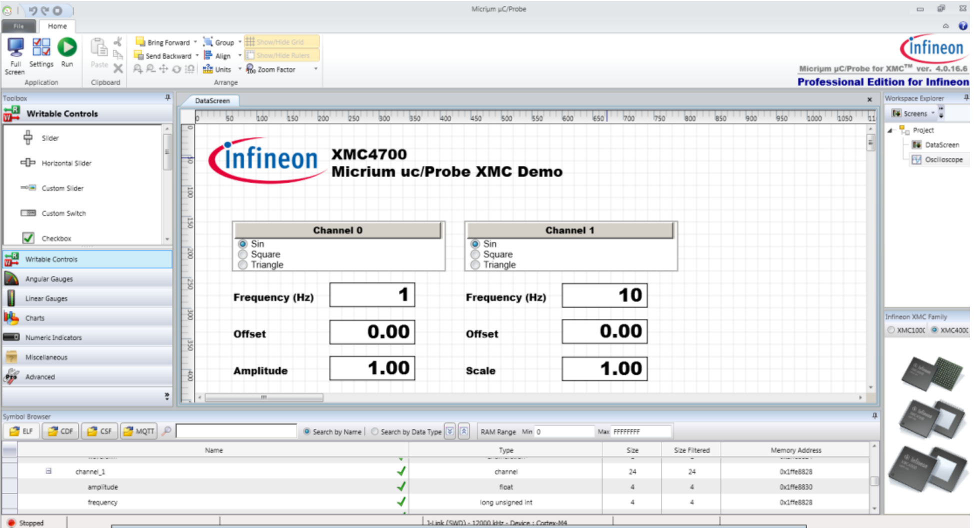
Symbol Browser: ELF CDF CSF MQTT ● Search by Name ○ Search by Data Type RAM Range Min 0 Max FFFFFFFF

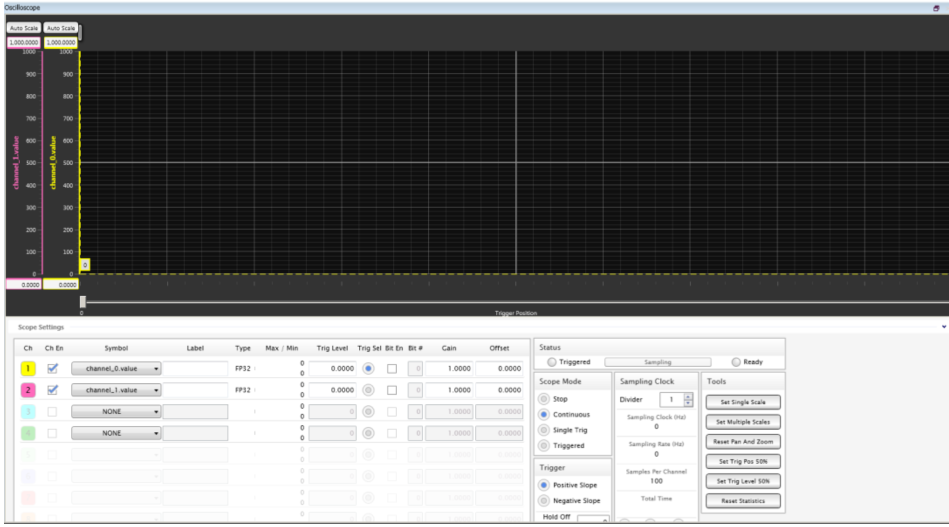
Name	Type	Size	Size Filtered	Memory Address
channel_0 ✓	channel	24	24	0x1ffe8810
amplitude ✓	float	4	4	0x1ffe8818
frequency ✓	long unsigned int	4	4	0x1ffe8810
offset ✓	float	4	4	0x1ffe8814
radians ✓	float	4	4	0x1ffe881c
value ✓	float	4	4	0x1ffe8820

Stopped | J-Link (SWD) - 12000 kHz - Device : Cortex-M4

Using Micrium uC/Probe™ XMC™ Oscilloscope control

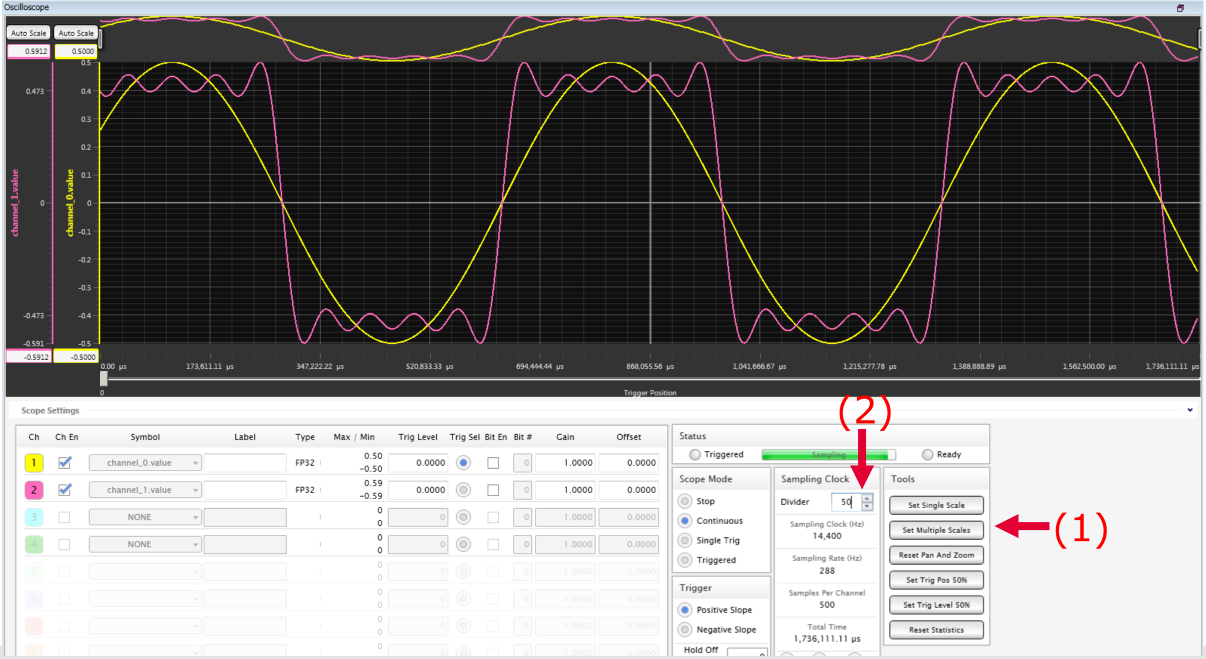
5. Change the layout of the workspace
   - To easily access the controls of the dashboard and simultaneously observe the oscilloscope, right click on the tab **Oscilloscope** and select *Floating*. The oscilloscope window will be detached from the main window of Micrium uC/Probe XMC.





Using Micrium uC/Probe™ XMC™ Oscilloscope control

6. Ensure target is running.
7. Click on Run button in toolbar.
8. Adjust the oscilloscope channel scale
   - Click on **Set Multiple Scales** (1) in Tools to adjust the vertical scale
   - Set the **Sampling Clock Divider** (2) to adjust the time base scale.



Scope Settings

Ch	Ch En	Symbol	Label	Type	Max / Min	Trig Level	Trig Sel	Bit En	Bit #	Gain	Offset
1	☑	channel_0.value		FP32	0.50 -0.50	0.0000	●	□	0	1.0000	0.0000
2	☑	channel_1.value		FP32	0.59 -0.59	0.0000	○	□	0	1.0000	0.0000
3	□	NONE			0 0	0	○	□	0	1.0000	0.0000
4	□	NONE			0 0	0	○	□	0	1.0000	0.0000
5	□				0 0	0	○	□	0	1.0000	0.0000
6	□				0 0	0	○	□	0	1.0000	0.0000
7	□				0 0	0	○	□	0	1.0000	0.0000

Status
○ Triggered Sampling ○ Ready

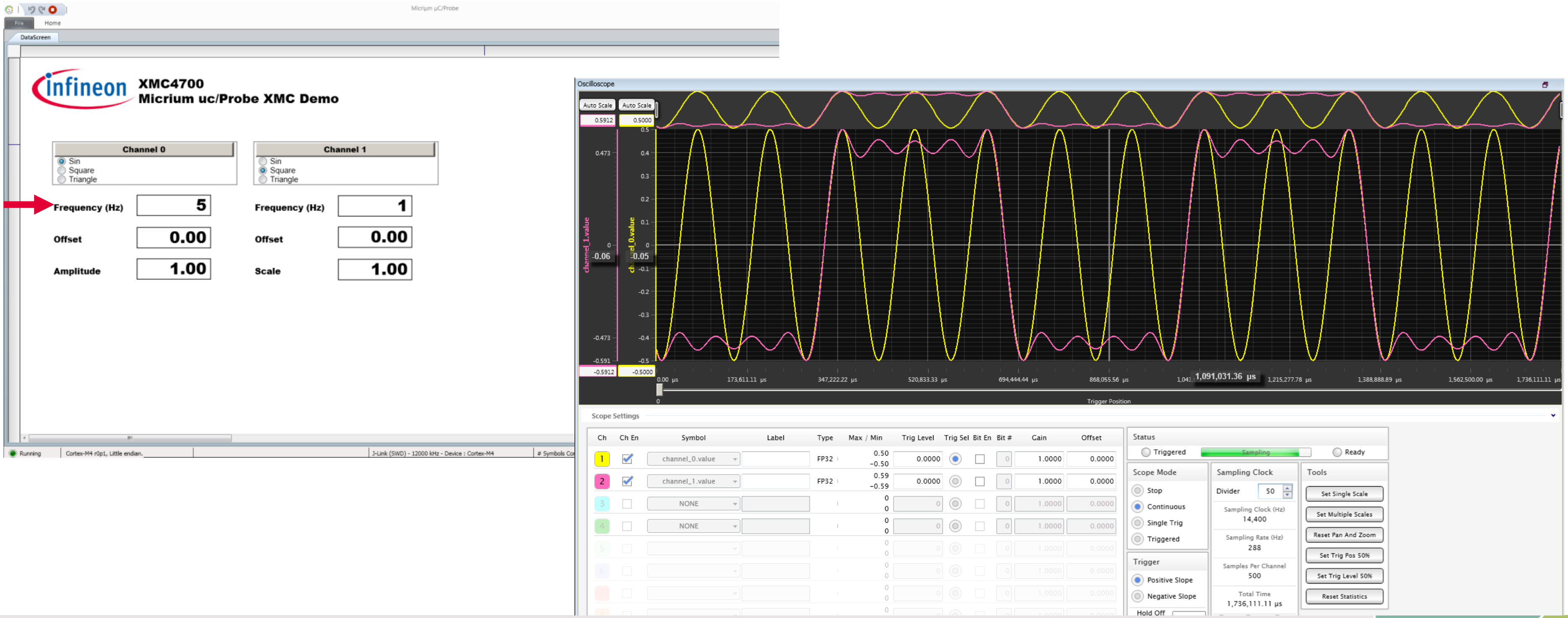
Scope Mode
○ Stop
● Continuous
○ Single Trig
○ Triggered

Trigger
● Positive Slope
○ Negative Slope
Hold Off 0

Sampling Clock
Divider 50
Sampling Clock (Hz) 14,400
Sampling Rate (Hz) 288
Samples Per Channel 500
Total Time 1,736,111.11 µs

Using Micrium uC/Probe™ XMC™ Oscilloscope control

9. Use the dash board to control your application and observe the effect on the oscilloscope.
   - For example, change frequency of the waveform generator channel 0 to 5 Hz. You should observe something similar to the picture below.



XMC4700
Micrium uc/Probe XMC Demo

Channel 0		Channel 1	
● Sin ○ Square ○ Triangle		○ Sin ● Square ○ Triangle	
Frequency (Hz)	5	Frequency (Hz)	1
Offset	0.00	Offset	0.00
Amplitude	1.00	Scale	1.00

Running | Cortex-M4 r0p1, Little endian. | J-Link (SWD) - 12000 kHz - Device : Cortex-M4 | # Symbols Co

Scope Settings

Ch	Ch En	Symbol	Label	Type	Max / Min	Trig Level	Trig Sel	Bit En	Bit #	Gain	Offset
1	☑	channel_0.value		FP32	0.50 -0.50	0.0000	●	□	0	1.0000	0.0000
2	☑	channel_1.value		FP32	0.59 -0.59	0.0000	○	□	0	1.0000	0.0000
3	□	NONE			0 0	0	○	□	0	1.0000	0.0000
4	□	NONE			0 0	0	○	□	0	1.0000	0.0000
5	□				0 0	0	○	□	0	1.0000	0.0000
6	□				0 0	0	○	□	0	1.0000	0.0000
7	□				0 0	0	○	□	0	1.0000	0.0000

Status: ○ Triggered | Sampling | ○ Ready

Scope Mode: ○ Stop ● Continuous ○ Single Trig ○ Triggered

Trigger: ● Positive Slope ○ Negative Slope

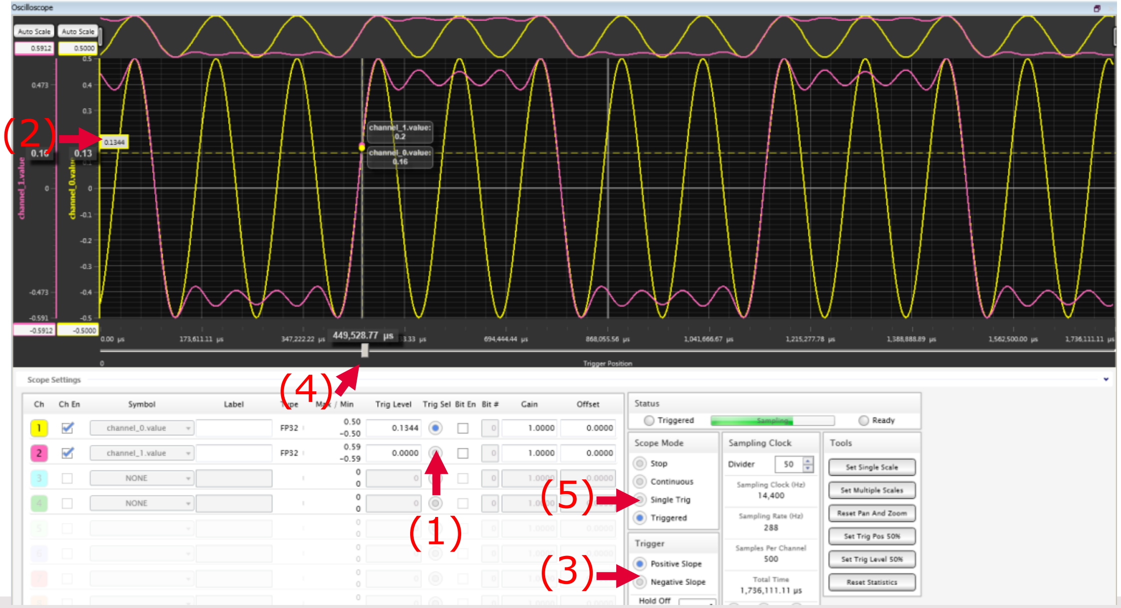
Hold Off

Sampling Clock
Divider: 50
Sampling Clock (Hz): 14,400
Sampling Rate (Hz): 288
Samples Per Channel: 500
Total Time: 1,736,111.11 µs

Using Micrium uC/Probe™ XMC™ Oscilloscope control

10. Oscilloscope trigger options

- One of the main features of the Oscilloscope control is the capability of triggering with the following options:
  - Trigger channel selection (1)
  - Trigger level (2)
  - Rising or falling edge (3)
  - Pre trigger (4)
  - Single trigger or continuous trigger (5)



Scope Settings

Ch	Ch En	Symbol	Label	Type	Max / Min	Trig Level	Trig Sel	Bit En	Bit #	Gain	Offset
1	☑	channel_0.value		FP32	0.50 -0.50	0.1344	●	□	0	1.0000	0.0000
2	☑	channel_1.value		FP32	0.59 -0.59	0.0000	○	□	0	1.0000	0.0000
3	□	NONE			0 0	0	○	□	0	1.0000	0.0000
4	□	NONE			0 0	0	○	□	0	1.0000	0.0000
5	□				0 0	0	○	□	0	1.0000	0.0000
6	□				0 0	0	○	□	0	1.0000	0.0000
7	□				0 0	0	○	□	0	1.0000	0.0000

Status: ○ Triggered — Sampling — ○ Ready

Scope Mode: ○ Stop ○ Continuous ○ Single Trig ● Triggered

Trigger: ● Positive Slope ○ Negative Slope

Hold Off

Sampling Clock: Divider 50

Sampling Clock (Hz) 14,400

Sampling Rate (Hz) 288

Samples Per Channel 500

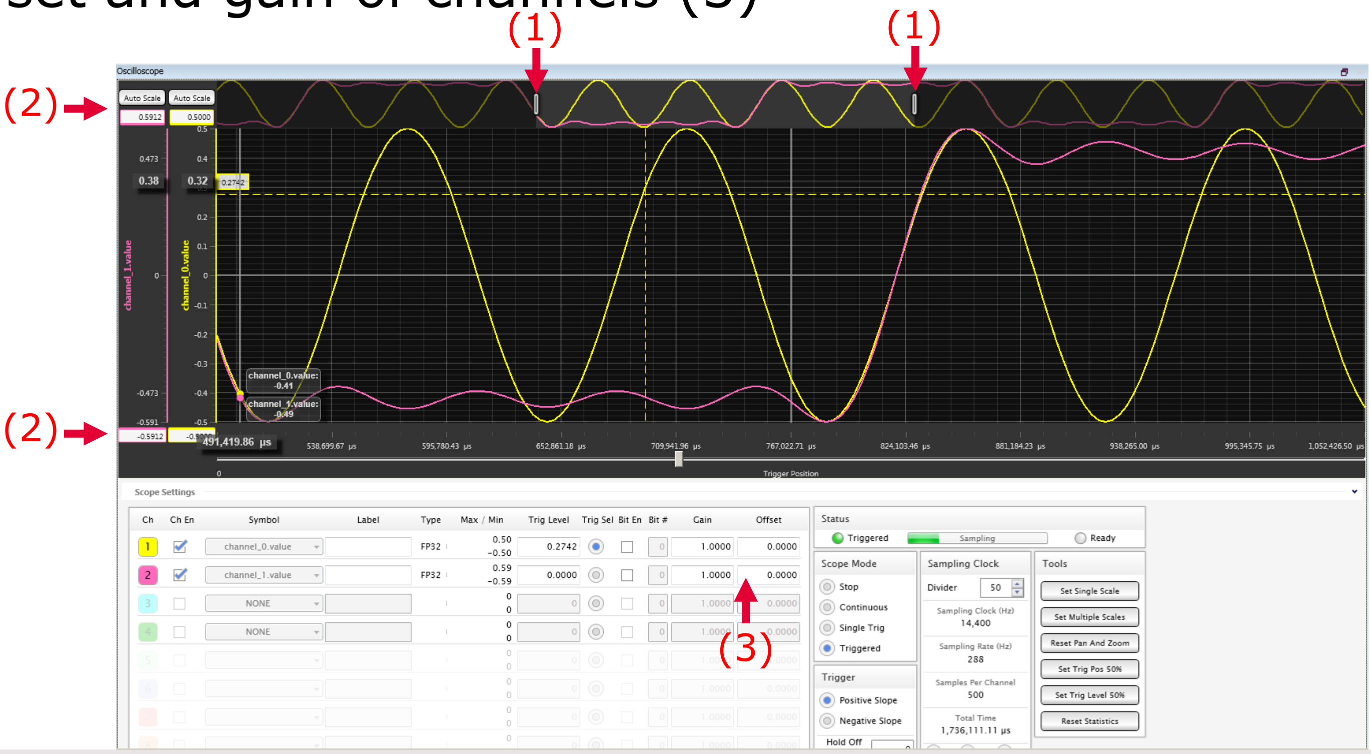
Total Time 1,736,111.11 µs

Tools: Set Single Scale | Set Multiple Scales | Reset Pan And Zoom | Set Trig Pos 50% | Set Trig Level 50% | Reset Statistics

Using Micrium uC/Probe™ XMC™ Oscilloscope control

11. Oscilloscope other features

- Time axis zoom
  - Use the scroll bars in the top area of the Oscilloscope window (1)
- Individual Y vertical channel scale (2)
- Offset and gain of channels (3)



Scope Settings

Ch	Ch En	Symbol	Label	Type	Max / Min	Trig Level	Trig Sel	Bit En	Bit #	Gain	Offset
1	☑	channel_0.value		FP32	0.50 -0.50	0.2742	●	□	0	1.0000	0.0000
2	☑	channel_1.value		FP32	0.59 -0.59	0.0000	○	□	0	1.0000	0.0000
3	□	NONE			0 0	0	○	□	0	1.0000	0.0000
4	□	NONE			0 0	0	○	□	0	1.0000	0.0000
5	□				0 0	0	○	□	0	1.0000	0.0000
6	□				0 0	0	○	□	0	1.0000	0.0000
7	□				0 0	0	○	□	0	1.0000	0.0000
8	□				0	0	○	□	0	1.0000	0.0000

Status: ● Triggered — Sampling — ○ Ready

Scope Mode: ○ Stop ○ Continuous ○ Single Trig ● Triggered

Trigger: ● Positive Slope ○ Negative Slope

Hold Off 0

Sampling Clock
Divider 50
Sampling Clock (Hz) 14,400
Sampling Rate (Hz) 288
Samples Per Channel 500
Total Time 1,736,111.11 µs

Micrium uC/Probe™ XMC™
Other features

- **Data logging control**

  Log the values of any variable(s) in your symbols browser to a CSV file.

- **Microsoft Excel Bridge**

  Map an embedded target's symbol to a cell in Microsoft® Excel®.

- **uC/OS Kernel Awareness**

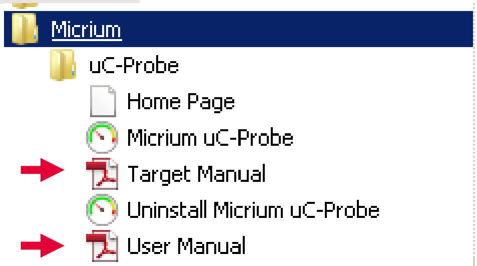
  The µC/OS Kernel Awareness in µC/Probe is a series of pre-built screens that allows you to see the run time behavior of all the µC/OS-II kernel objects used in your embedded application.

- **Terminal Window**

  Interact with your embedded target in a shell-like fashion.

References

- **Micrium uC/Probe™ XMC™ documentation**
  - **Accessible in the Start menu of Windows**
  - **Or in the File tab of the application**



Micrium
uC-Probe
Home Page
Micrium uC-Probe
Target Manual
Uninstall Micrium uC-Probe
User Manual

- **Micrium uC/Probe XMC features**

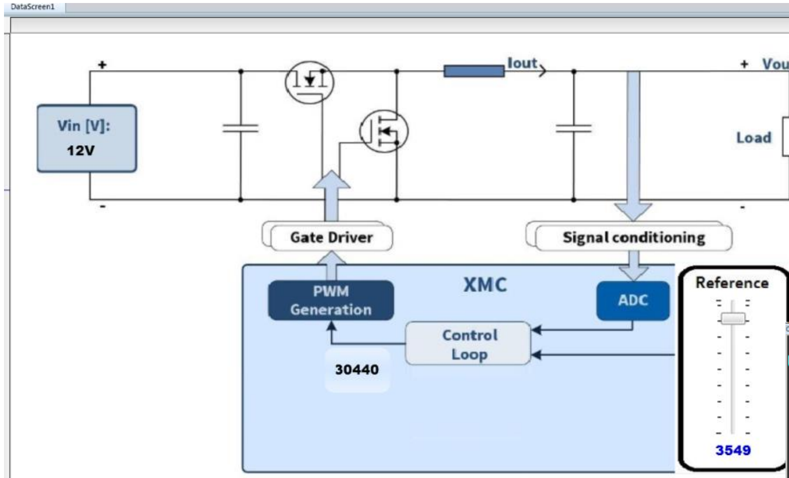
  https://www.micrium.com/tools/ucprobe/features/

- **uC/Probe Oscilloscope Feature: BLDC Design Case Study**

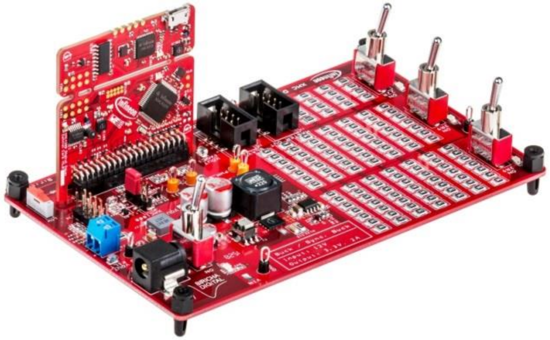
  https://www.micrium.com/new-%C2%B5cprobe-features-simplify-bldc-design/

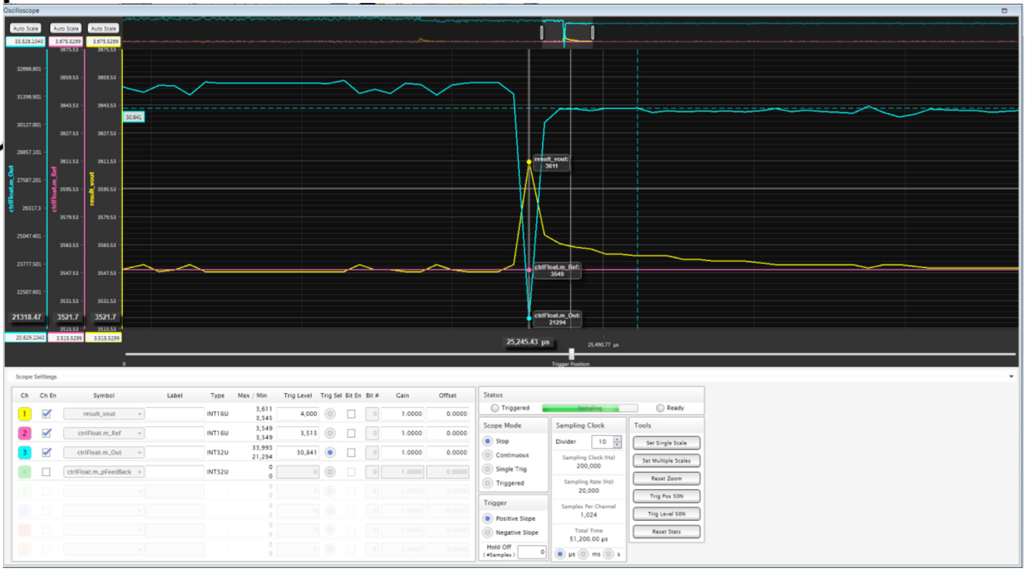
References

uC/Probe™ XMC™ used with XMC™ Digital Power Explorer Kit



Dash board





Scope Settings

Ch	Ch En	Symbol	Label	Type	Max / Min	Trig Level	Trig Sel	Bit En	Bit #	Gain	Offset
1	☑	result_vout		INT16U	3,611 3,545	4,000	○	□	0	1.0000	0.0000
2	☑	ctrlFloat.m_Ref		INT16U	3,549 3,549	3,513	○	□	0	1.0000	0.0000
3	☑	ctrlFloat.m_Out		INT32U	33,993 21,294	30,841	●	□	0	1.0000	0.0000
4	□	ctrlFloat.m_pFeedBack		INT32U	0 0	0	○	□	0	1.0000	0.0000
5	□				0 0	0	○	□	0	1.0000	0.0000
6	□				0 0	0	○	□	0	1.0000	0.0000
7	□				0 0	0	○	□	0	1.0000	0.0000
8	□				0 0	0	○	□	0	1.0000	0.0000

Status: ○ Triggered — Sampling — ○ Ready

Scope Mode: ● Stop ○ Continuous ○ Single Trig ○ Triggered

Trigger: ● Positive Slope ○ Negative Slope

Hold Off (#Samples): 0

Sampling Clock

Divider: 10

Sampling Clock (Hz): 200,000

Sampling Rate (Hz): 20,000

Samples Per Channel: 1,024

Total Time: 51,200.00 µs

● µs ○ ms ○ s

Oscilloscope

Support material:

Collaterals and Brochures Document Info	› Product Briefs › Selection Guides › Application Brochures › Presentations › Press Releases, Ads	› www.infineon.com/XMC
Technical Material Tools Evaluation Board	› Application Notes › Technical Articles › Simulation Models › Datasheets, MCDS Files › PCB Design Data	› www.infineon.com/XMC › Kits and Boards › DAVE™ › Software and Tool Ecosystem
Videos Play	› Technical Videos › Product Information Videos	› Infineon Media Center › XMC Mediathek
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