

# 02.1.2 ARM CORTEX-M winIDEA CONFIGURATION



## **ARM Cortex-M winIDEA Configuration**

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#### 01 CPU Options

Specific CPU Options need to be configured prior to using Trace.

First you need to determine:

- Does the CPU support trace?
- Are CPU trace pins available on target debug connector?
- Does the Debug Adapter and target debug connector match?
- Is the trace license programmed in the BlueBox?

winIDEA Trace Configuration is mainly done in *Hardware menu / CPU Options* dialog in

- SoC tab
- Analyzer tab

This unit describes settings in the CPU Options dialog.

Analyzer Configurations dialog settings are explained in detail in:

- Analyzer Trace unit
- <u>Analyzer Profiler</u> unit

CPU Set	tup								×
Reset	Debugging	Analyzer	SoC Advanced	SoC	CORE0	External W	/DT		
Del	Protoco	SWD	✓ SWD	clock	6000	kHz			
Use	e Cross Trigge	SWD er Channels	or synced Run/S	top	2, 3 for 1	race Trigge	er and Flush		
Tra Ca	ice apture method	SWO Parallel	~						
	Parallel Trace Width	4-bit	~						
	SWO Prescale	8	]	Clock	80000	kHz			

CPU Setup		×
Reset Debugging	Analyzer SoC Advanced SoC CORE0 External WDT	
Operation mode		
	Trace	
Cycle duration	1 ns	
SoC Initialization		
Before start	Default	



#### 02 Debug Protocol Setup

Debug session needs to be established prior to using Trace. First step is to select correct Debug Protocol:

1. Select **SWD** or **JTAG** Debug Protocol according to the Debug connector on the Target in *Hardware menu / CPU Options / SoC tab*.

If SWD Debug Protocol is selected, the default **SWD clock** setting should work in most cases.

2. If JTAG Debug Protocol is selected, set the JTAG Scan Speed in the JTAG tab of the same dialog.

Default Scan Speed should work in most cases.

Read more about this setting in the online Tutorial <u>CPU Specific Architecture Settings</u>.

set Debugg	ing Analyzer SoC Adva	nced SoC CORE0 Extern	nal WDT
Debug			
Due	te al auto	CIMD de de 1000	
Pro	IOCOI SWD V	SWD Clock 1000 KHz	
	JTAG		
	SWD		
Line Course To	Change of the second seco		

			1		Idle TCKS		
	Normal	~ <b>5</b> 00 ~	kHz sca	n speed du	uring initial	ization	
Do not us	e TRST line						
✓ This is the	single devic	e in the JTAG d	hain				
IR Prefix	0	DR Prefix	0				
IR Postfix	0	DR Postfix	0				



#### 03 Operation mode

Open Hardware menu / CPU Options / Analyzer tab:

1. Make sure **Trace** is selected in the **Operation mode** section.

2. **Cycle duration** – Parameter is relevant for ETB On-Chip Trace Capture methods and time-stamp calculation.

Cycle duration is calculated based on the CPU clock.

CPU Setup	×
Reset Debugging Analyzer SoC CORE0 External WDT	
Operation mode Trace	
Code missing from download file should be reader run-time	
Cycle duration 1 ns	



#### 04 Trace Capture method

Trace Capture method is configured in *Hardware menu / CPU Options / SoC tab / Trace section / Capture method.* 

winIDEA displays available Trace Capture methods in the drop-down menu:

- Parallel
- SWO
- Other (optional): MTB, ETB

Depending on the chosen Trace Capture method additional settings are available (Parallel Trace Port Width, SWO Prescale, SWO Clock etc.).

Details about supported trace capture method are available in the microcontroller documentation.

CPU Se	etup					×
Reset	Debugging	JTAG Analyze	er SoC COR	E0 External W	/DT	
De	ebug Protocol	SWD 🗸	SWD clock	6000	кНz	
Us	se Cross Trigger	Channels	ced Run/Stop	2, 3 for Trac	ce Trigger and Flush	
-Tr C	ace Capture method	Parallel V				
	Parallel Trace F Width	4-bit V				
	SWO Prescale	6	Clock	0	kHz	
	ETR Device 0	Destination 0	HEX	Size 0	HEX	
	ETF	Stop trace	recording when	first module is	full 🗸	



#### 04.1 Trace Capture method - SWO

This asynchronous trace is available <u>only in</u> <u>combination with the SWD Debug Protocol</u> as SWO signal is shared with the JTAG TDO pin.

Settings in winIDEA are: 1. Select **SWD Debug Protocol**.

2. Select SWO Trace Capture method.

3. **SWO Clock** – The clock value corresponds to the clock of the SWO trace source, which in most cases represents the CPU clock.

4. **SWO Prescale** – Additionally decreases SWO Clock frequency and must be specified in such a way that the value of Clock/(Prescale + 1) < 10000 kHz.

**TIP:** Once a working trace is established, the Prescale can be lowered to get a higher bandwidth.

CPU Setup	×
Reset Debugging Analyzer SoC CORE0 External WDT	
1 Debug Protocol SWD V SWD dock 6000 kHz	
Use Cross Trigger Channels	
2 Trace Capture method SWO ~	
Parallel Trace Port Width 4-bit	
SWO Prescale 5 Clock 46800 kHz	

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#### 04.2 Trace Capture method - Parallel

Parallel (synchronous) trace is available in conjunction with both debug protocols, JTAG and SWD, and requires from 2 to 5 extra pins depending on the data trace size. Typical implementation is one clock line + 4 data lines.

It features significantly higher trace output bandwidth comparing to the SWO trace, exact time information for recorded events and ETM (when available) support.

Settings in winIDEA are: 1. Select **JTAG** or **SWD Debug Protocol.** 

2. Select Parallel Trace Capture method.

3. Select Parallel Trace Port **Width** depending on the Target microcontroller.

**TIP**: It is recommended to use Parallel Capture method with all (4 data) available pins for trace.

CPU Setup	×
Reset Debugging Analyzer SoC Advanced SoC CORE0 External WDT	
1 Debug Protocol JTAG V SWD clock 6000 kHz	
Use Cross Trigger Channels 0, 1 for synced Run/Stop 2, 3 for Trace Trigger and Flush	
2 Trace Capture method Parallel ~	
3 Parallel Trace Port Width 4-bit ∨	

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#### 05 Trace Line Calibration test

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Note that Trace Line Calibration test is available only with Parallel Trace Capture method.

Trace Line Calibration test is required due to different Trace line lengths.

Open Hardware menu / Tools / Trace Line Calibration and establish Debug session by clicking F5 or pressing *Run* button in the Debug toolbar.

 Click Start button. Indicators "o" and "R" show current and recommended settings.
 Click the Arrow button to copy Recommended values to the Current values.
 Click Apply button. Indicator "O" shows optimized setting.

**TIP:** It is recommended to perform Trace Line Calibration test to measure the clock at which the trace is running.

See also <u>Trace Line Calibration</u> topic in Online Help for more information.







### Further Reading

For more information refer to our online resources:

- Hardware Solutions:
  - On-Chip Analyzer BlueBox <u>lc5700</u>
  - <u>Active Probes</u>
- winIDEA Online help:
  - ARM Cortex <u>Analyzer</u>
  - Trace Line Calibration
- <u>Knowledge Base</u>