jtag调试器

主要是关注如何支持多个JTAG DEVICE(chaining multiple targets)

1. 公共需求

In order to chain targets, the devices must support the following:

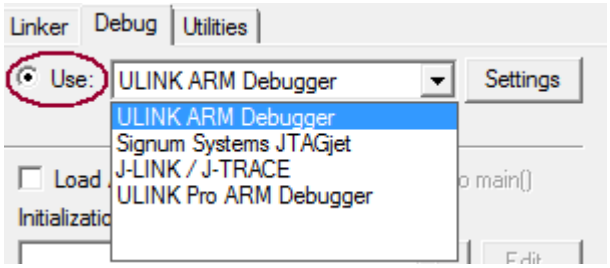
- BYPASS register.
- The IDCODE instruction must immediately follow a reset of the Test Access Port (TAP).
- Bit 0 of ID Code must be 1.
- In CAPTURE-IR state, the fixed value 1 must be loaded into the IR.

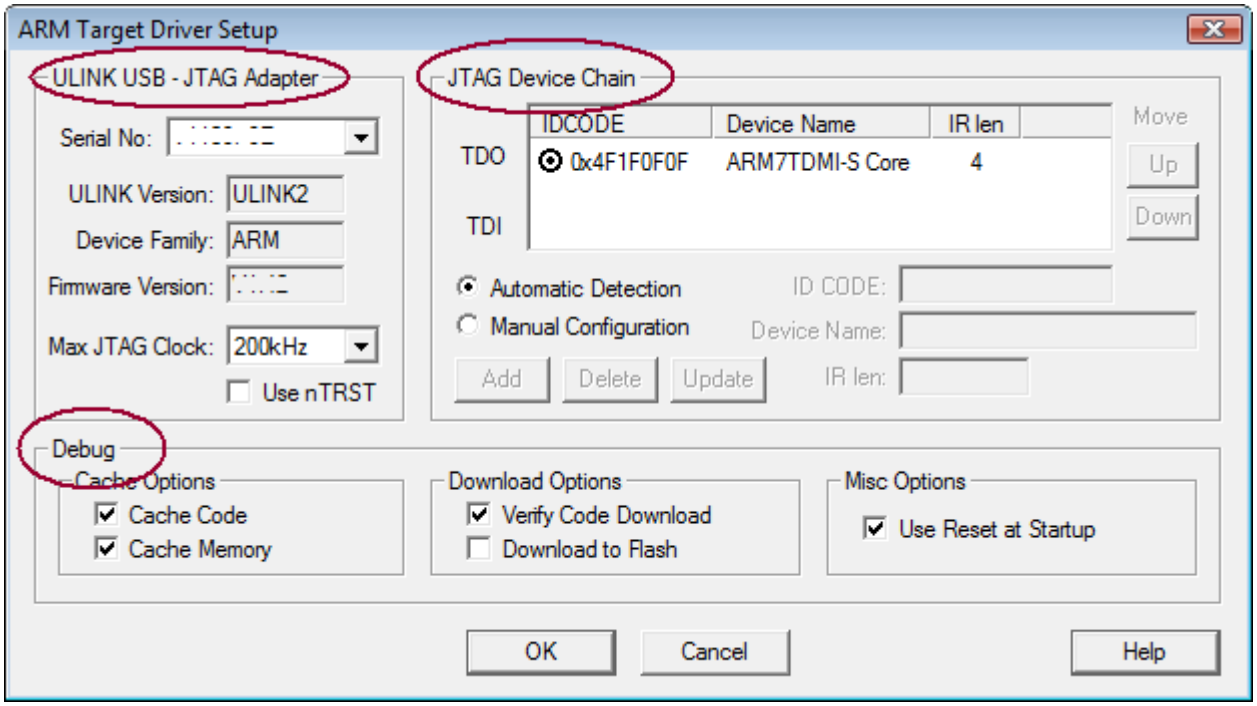
2. Ulink2

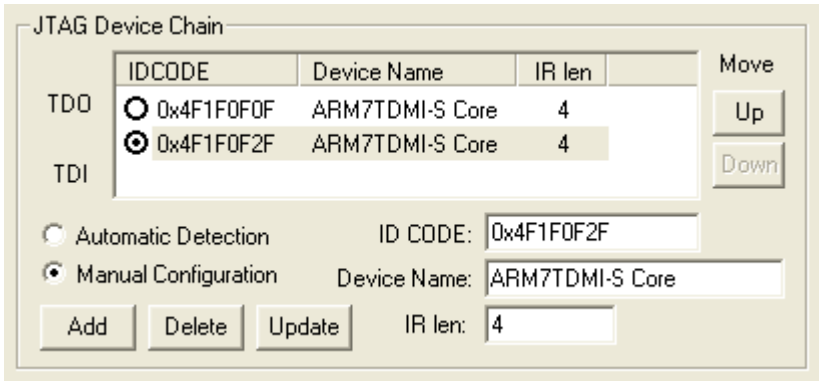
没有明确说支持jtag chain device数量, 只能配合Keil使用

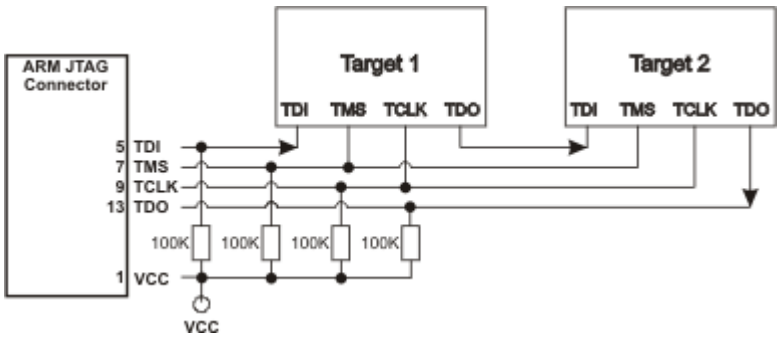
https://developer.arm.com/documentation/101455/0100/Using-ULINK2/Chaining-Multiple-Targets

The results of this scan are displayed in the JTAG Device Chain section of the ARM Target Driver Setup dialog (Project — Options for Target — Debug — Settings).





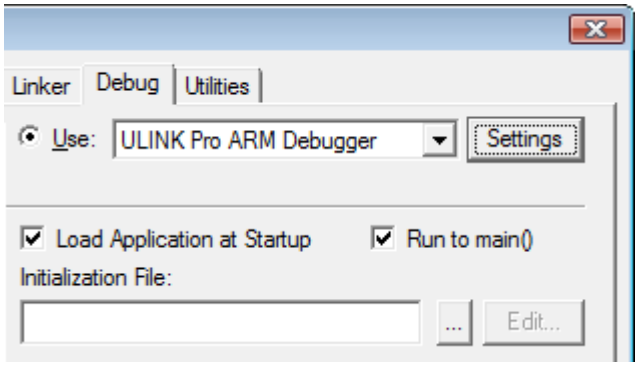


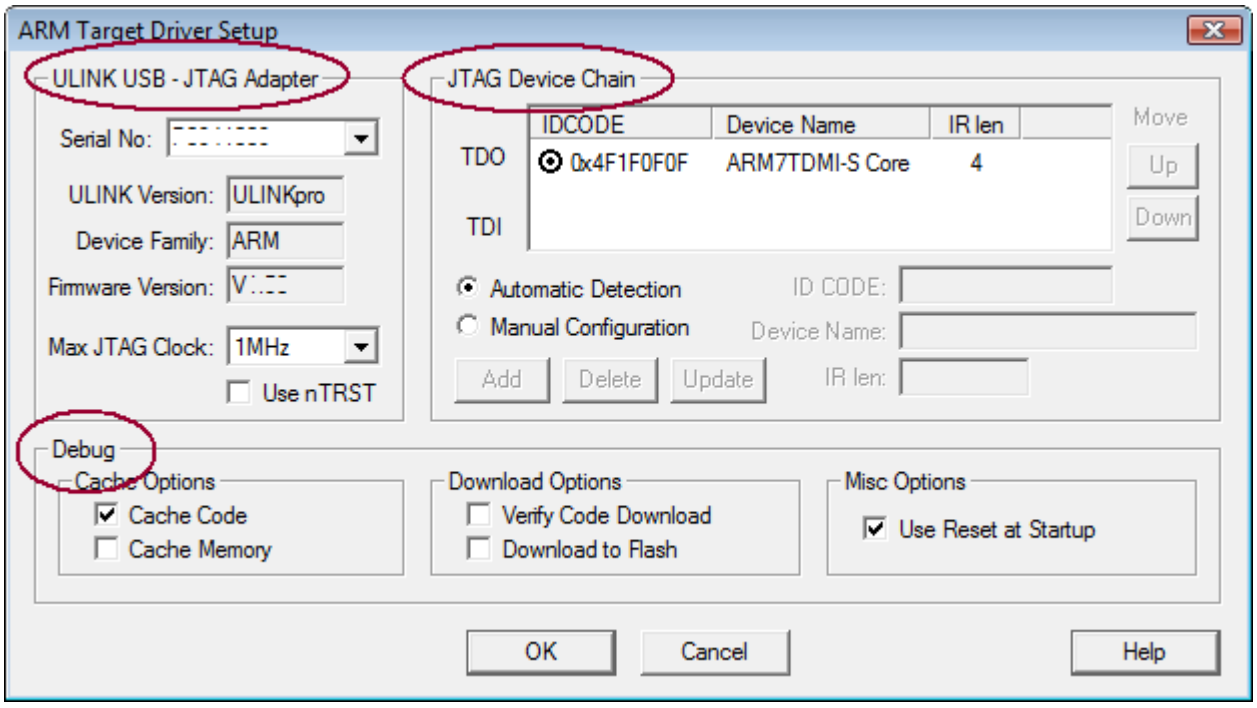


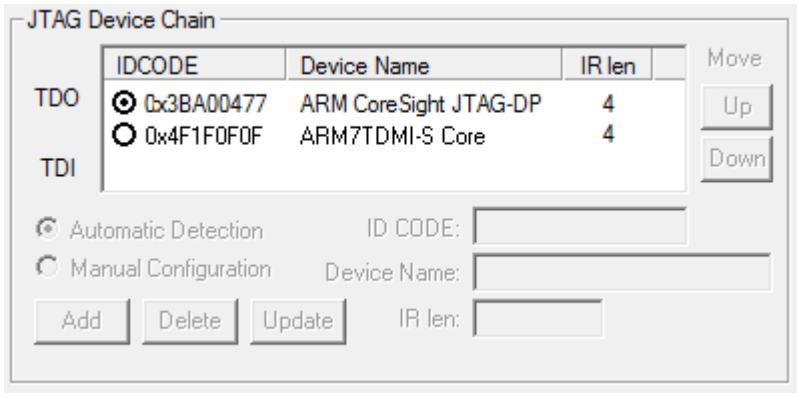
3. Ulink Pro

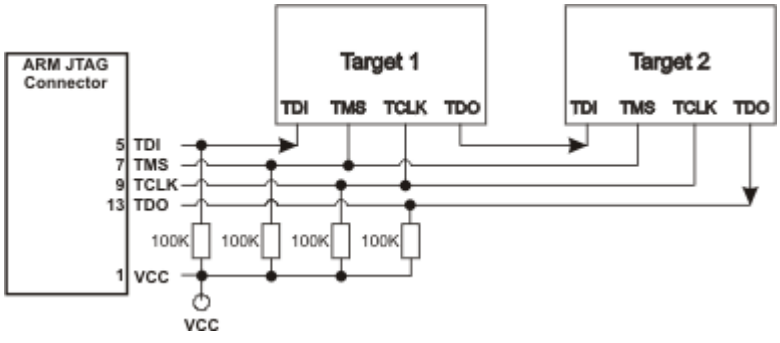
https://developer.arm.com/documentation/101416/0100/Using-ULINKpro/Chaining-Multiple-Targets?lang=en

没有明确说支持jtag chain device数量, 只能配合Keil使用


Linker
Debug
Utilities
Use:
ULINK Pro ARM Debugger
Settings
Load Application at Startup
Run to main()
Initialization File:
...
Edit...

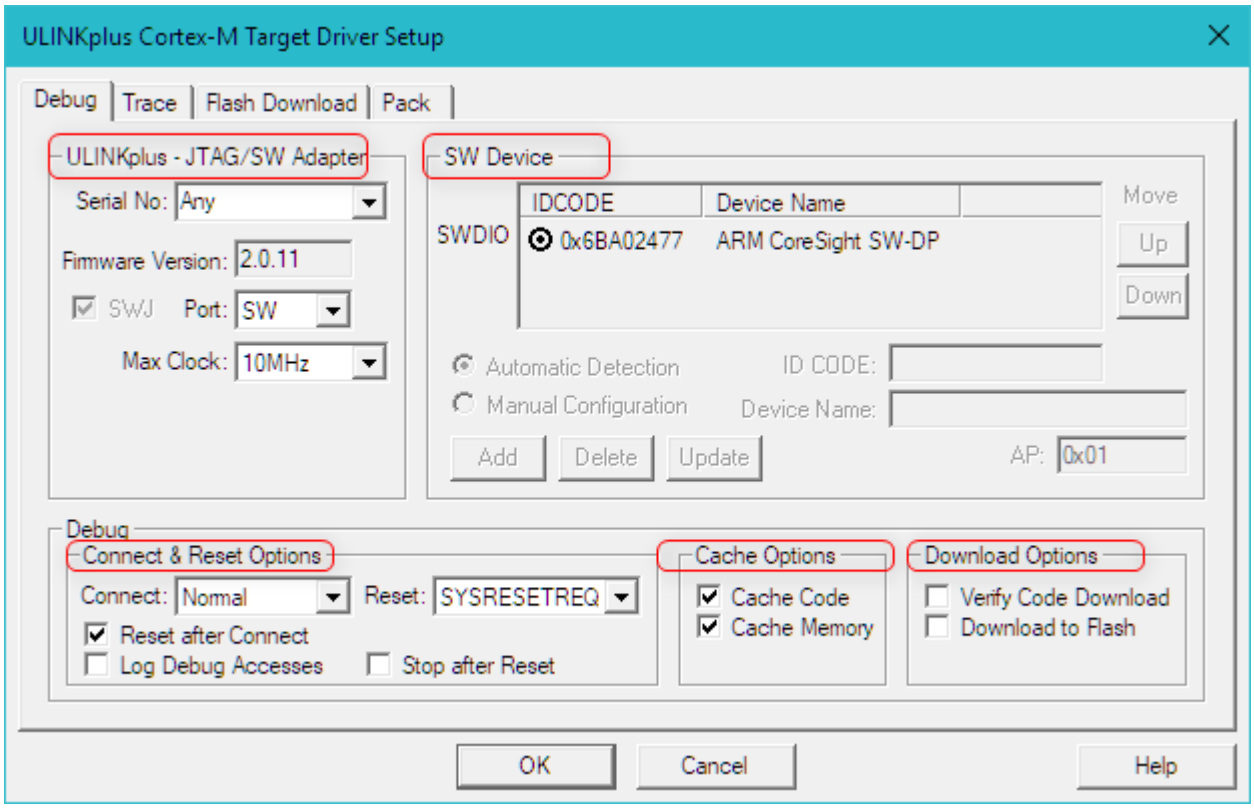

ARM Target Driver Setup
ULINK USB - JTAG Adapter
Serial No:
ULINK Version:
ULINKpro
Device Family:
ARM
Firmware Version:
Max JTAG Clock:
1MHz
Use nTRST
JTAG Device Chain
IDCODE
Device Name
IR len
TDO
TDI
0x4F1F0F0F
ARM7TDMI-S Core
4
Move
Up
Down
Automatic Detection
Manual Configuration
ID CODE:
Device Name:
IR len:
Add
Delete
Update
Debug
Cache Options
Cache Code
Cache Memory
Download Options
Verify Code Download
Download to Flash
Misc Options
Use Reset at Startup
OK
Cancel
Help


JTAG Device Chain
IDCODE
Device Name
IR len
TDO
TDI
0x3BA00477
ARM CoreSight JTAG-DP
4
0x4F1F0F0F
ARM7TDMI-S Core
4
Move
Up
Down
Automatic Detection
Manual Configuration
ID CODE:
Device Name:
IR len:
Add
Delete
Update


ARM JTAG Connector
Target 1
TDI TMS TCLK TDO
Target 2
TDI TMS TCLK TDO
5 TDI
7 TMS
9 TCLK
13 TDO
100K
100K
100K
100K
1 VCC
VCC

4. Ulink Plus

没有明确说可以支持jtag chain, 只能配合Keil使用



5. TRACE32

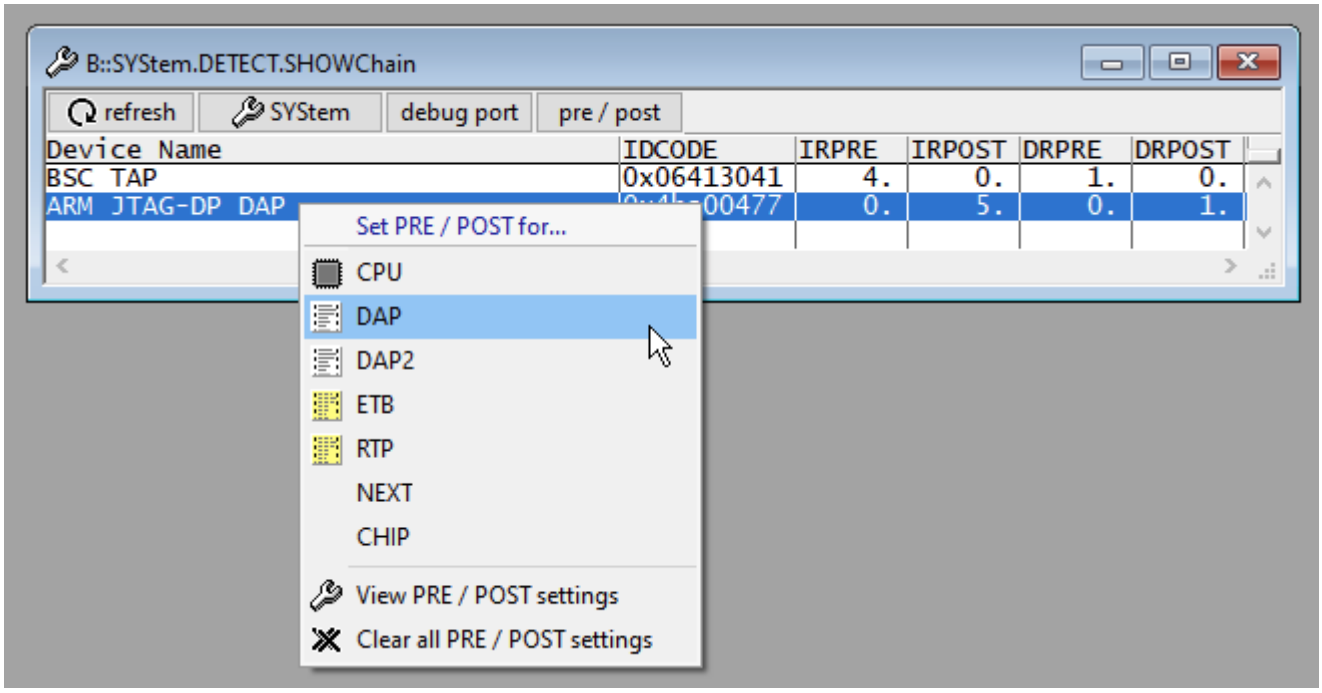
app_jtag_interface.pdf 第23页

在单片系统中，TRACE32可以使用SYStem.DETECTDAP访问DAP中的单根ROM表，对系统进行认证和发现。那么在多芯片系统中是如何实现的呢？

例如，在一个由两个芯片组成的系统中，每个芯片都有自己的DAP和ROM表，这两个DAP连接在雏菊链中，SYStem.DETECT DAP会怎么做？系统是如何识别的？

通过使用SYStem.CONFIG.DAIRPRE，SYStem.CONFIG.DAIRPOST，SYStem.CONFIG.DADRPRE和SYStem.CONFIG.DADRPOST四个命令设置正确的预位和后置位，在JTAG雏菊链中选择DAP，

要为预位和后置位找到正确的值，可以使用命令SYStem.DETECT.SHOWChain，它打开一个窗口，允许您通过上下文菜单直接从那里设置预/后位：



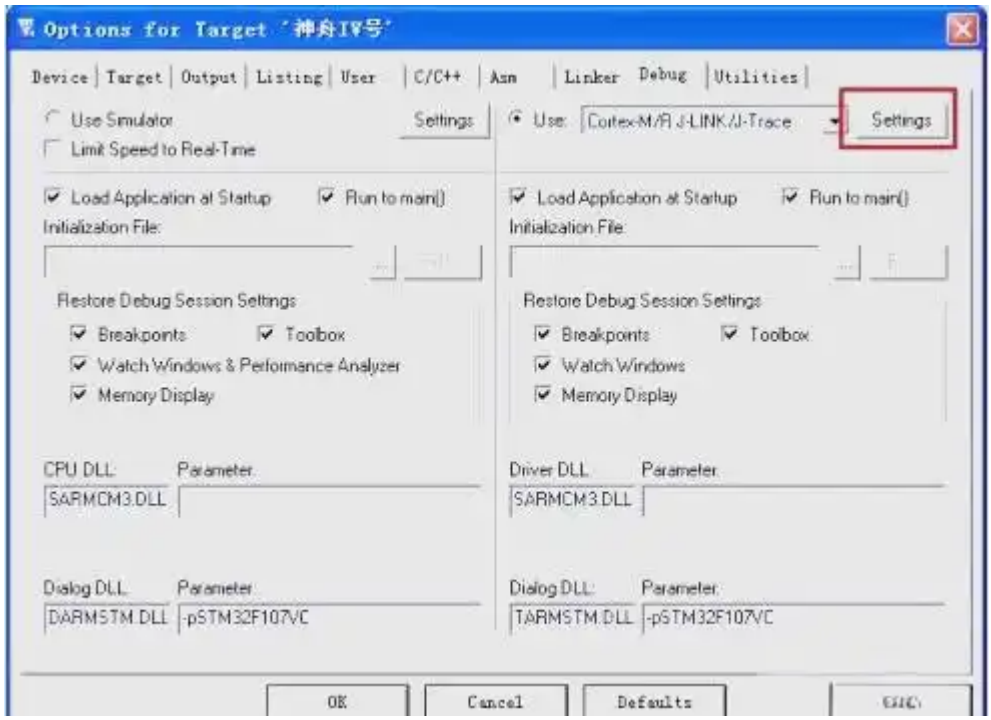
然后SYStem.DETECT.DAP检查DAP它可以使用先前定义的预/后位进行访问。

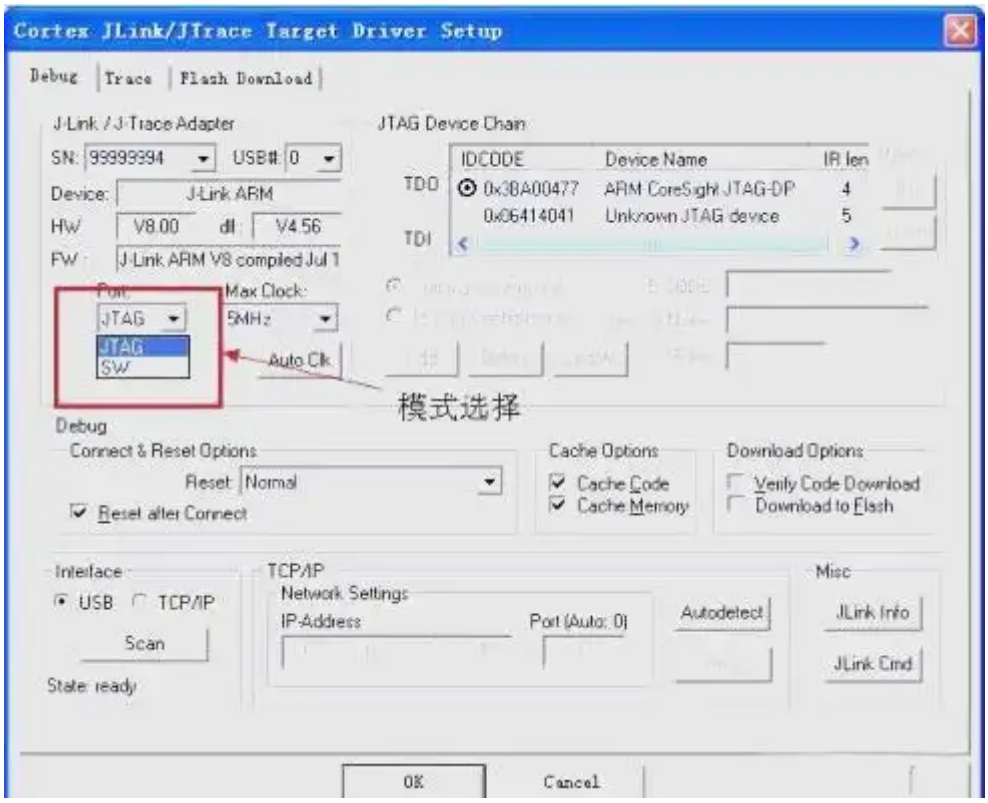
6. JLINK

https://kb.segger.com/UM08001_J-Link_/_J-Trace_User_Guide#Determining_values_for_scan_chain_configuration

https://www.segger.com/products/debug-probes/j-link/?mtm_campaign=kb&mtm_kwd=jlink

J-Link / J-Trace can handle multiple devices in the scan chain. This applies to hardware where multiple chips are connected to the same JTAG connector. As can be seen in the following figure, the TCK and TMS lines of all JTAG device are connected, while the TDI and TDO lines form a bus.





Specification	Max supported value
Number of devices in chain	32
Total IR length	255

One or more of these devices can be CPU cores; the other devices can be of any other type but need to comply with the JTAG standard.

Sample configurations

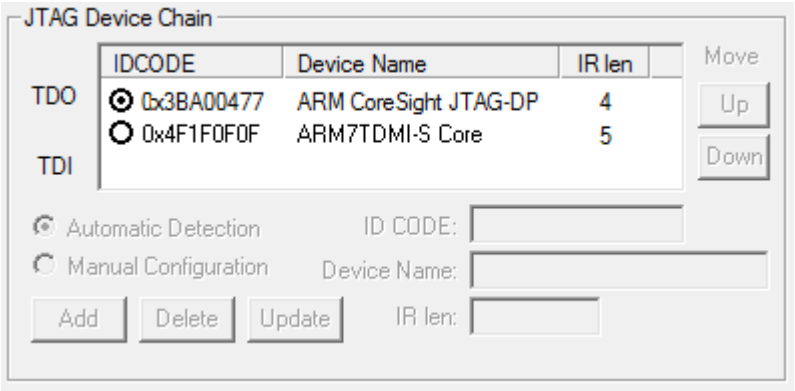
Device 0 Chip(IR len)	Device 1 Chip(IR len)	Device 2 Chip(IR len)	Position	IR len
ARM(4)	-	-	0	0
ARM(4)	Xilinx(8)	-	0	0
Xilinx(8)	**ARM(4)**	-	1	8
Xilinx(8)	Xilinx(8)	**ARM(4)**	2	16
ARM(4)	Xilinx(8)	ARM(4)	0	0
ARM(4)	Xilinx(8)	**ARM(4)**	2	12
Xilinx(8)	**ARM(4)**	Xilinx(8)	1	8

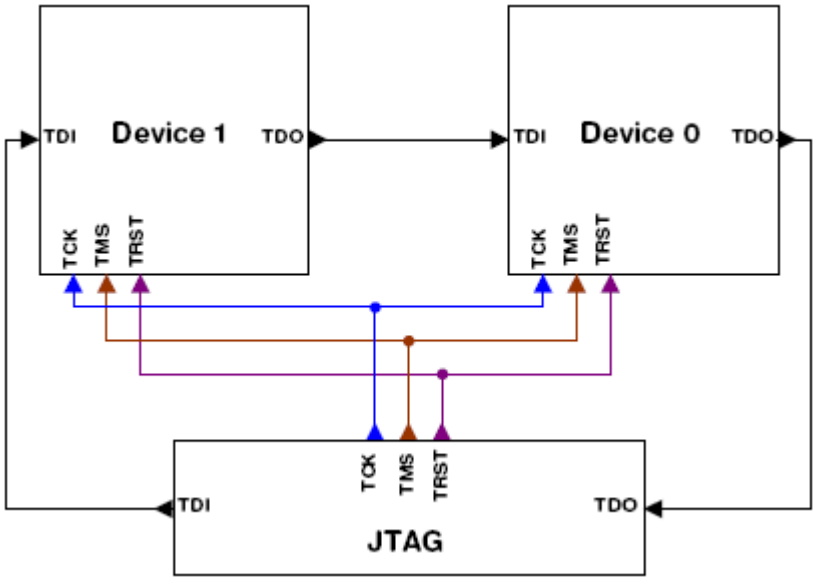
```
//
// JTAG chain:  TDI -> TAP#3 -> TAP#2 -> TAP#1 -> TAP#0
// TAP#3 (ARM DAP): IRLen = 4-bit
// TAP#2 (RISC-V):  IRLen = 5-bit
// TAP#1 (RISC-V):  IRLen = 5-bit
// TAP#0 (custom):  IRLen = 7-bit
//
Connect to TAP#1 (RISC-V):
JTAGConf 7 1  // IRPre = 7, DRPre = 1

Connect to TAP#2 (RISC-V):
```

```
JTAGConf 12 2  // IRPre = 7 + 5, DRPre = 1 + 1
```

KEIL JLINK Chain Devices

https://developer.arm.com/documentation/101453/0100/Use-J-Link-J-Trace/Chain-Devices




```
Connect the control signals in parallel (TMS and TCLK) .
Connect the data signals in series to form a bus (TDO to TDI).
A maximum of 8 chained devices are supported.
```