

# Target Hardware Debug

ULINK2 and ULINK-ME  
Including Real-Time Agent



## ULINK2 – USB / JTAG Adapter

Standard, easy to use USB run control adapter,  
supporting JTAG debug and Flash programming.

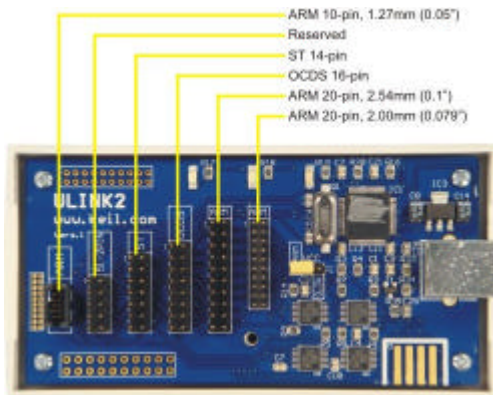
### ■ Features

- Serial Wire Debug and Trace Cortex-M3 and Cortex-M1
- Plug and Play USB Installation
- On-the-fly debugging with Real-Time Agent
- Supports 8, 16 & 32-bit device
- Standard USB connector
- Multiple JTAG connector support
- 110 x 55mm (4 ¼" x 2 ¼ ")



# ULINK2 – USB / JTAG Adapter

Supports multiple architectures and JTAG pin-out schemes.



## 0.100 inch 2 x 10 Connector (existing)

VTref	1	• •	2	VSupply
nTRST	3	• •	4	GND
TDI	5	• •	6	GND
TMS	7	• •	8	GND
TCK	9	• •	10	GND
RTCK	11	• •	12	GND
TDO	13	• •	14	GND
nSRST	15	• •	16	GND
DBGQR	17	• •	18	GND
DBGACK	19	• •	20	GND

Existing connection specification

## 0.100 inch 2 x 10 Connector

### Existing connector with Serial Wire

VTRef	1	● ●	2	VSupply
NC (nTRST)	3	● ●	4	GND
NC (TDI)	5	● ●	6	GND
SWDIO (TMS)	7	● ●	8	GND
SWCLK (TCK)	9	● ●	10	GND
NC (RTCK)	11	● ●	12	GND
SWO (TDO)	13	● ●	14	GND
nSRST	15	● ●	16	GND
DBGRRQ	17	● ●	18	GND
DBGACK	19	● ●	20	GND

Existing connection specification when Serial Wire Technology is mux'ed with JTAG connections

## 0.050 inch 2 x 5 Connector

### includes Serial Wire

VTRef	1	● ●	2	SWDIO / TMS
GND	3	● ●	4	SWCLK / TCK
GND	5	● ●	6	SWO / TDO
KEY	7	● ●	8	NC/EXTb / TDI
GNDDetect	9	● ●	10	nRESET

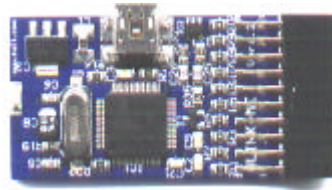
Recommended connector for smallest footprint for either new JTAG connections (no RTCK) and/or Serial Wire Technology

# ULINKME – Low Cost Adapter

Low cost design for evaluation and starter kits, with same functionality as ULINK2.

## Features

- Cortex-M3 Serial Wire Debug and Trace
- Plug and Play USB Installation
- On-the-fly debugging with Real-Time Agent
- Target power via ULINK-ME
- Mini USB connector
- Small and low cost
- ARM 20-pin (0.1") only
- 28 x 80mm (1 ¼" x 3 ¼")



# ULINK2-ME Comparison

Low cost design for evaluation and starter kits, with same functionality as ULINK2.

	ULINK2	ULINK-ME
<b>Performance</b>		
JTAG Clock (MHz)	<=10	<=10
Memory R/W (B/sec)	~28K	~28K
Flash R/W (B/sec)	~25K	~25K
Single-Step – Fast (Ins/sec)	~50	~50
RAM Breakpoints	Unlimited	Unlimited
ROM Breakpoints (ARM7/9)	2 max	2 max
ROM Breakpoints (CortexM3)	6 max	6 max
<b>Features</b>		
Real-Time Agent	✔	✔
USB Connector	Standard	Mini
20-pin (0.1") Connector	✔	✔
20-pin (0.079") Connector	✔	✘ Custom Option
10-pin (0.05") Connector	✔	✘ Custom Option

# Real-Time Agent



## Embedded Debug Challenges

Traditional debugging with run-control halts program execution. The real world does not stop which makes run-stop debugging difficult.

- **Program Halt is not practical in many applications**
  - Mechanical System: depends on movements that cannot be halted
  - Motor Control: may even destroy the hardware due to overloading
  - Communication: time-outs occur when hand-shake is missing
- **Developers need solutions that:**
  - Provide verification and timings for algorithm development
  - Work on standard hardware with minimal overhead
  - Are easy-to-implement and easy-to-use
- **RealView MDK includes**
  - $\mu$ Vision Device Simulation: allows exact analysis of algorithms
  - ULINK2 Real-Time Agent: allows debugging 'on-the fly' without system halt

# Real-Time Agent

Enables target debugging on-the-fly that requires no system halts

## ■ Small C Module

- Adds little overhead to user application ~1,500Bytes R/O
  - Communicates using standard JTAG channel via ULINK2

## ■ On-the-fly Debugging

- Read and Write memory and variable access during program execution
- Set breakpoints while program is running
- Serial I/O (printf) via debug channel

