ARM Development Tools 2012

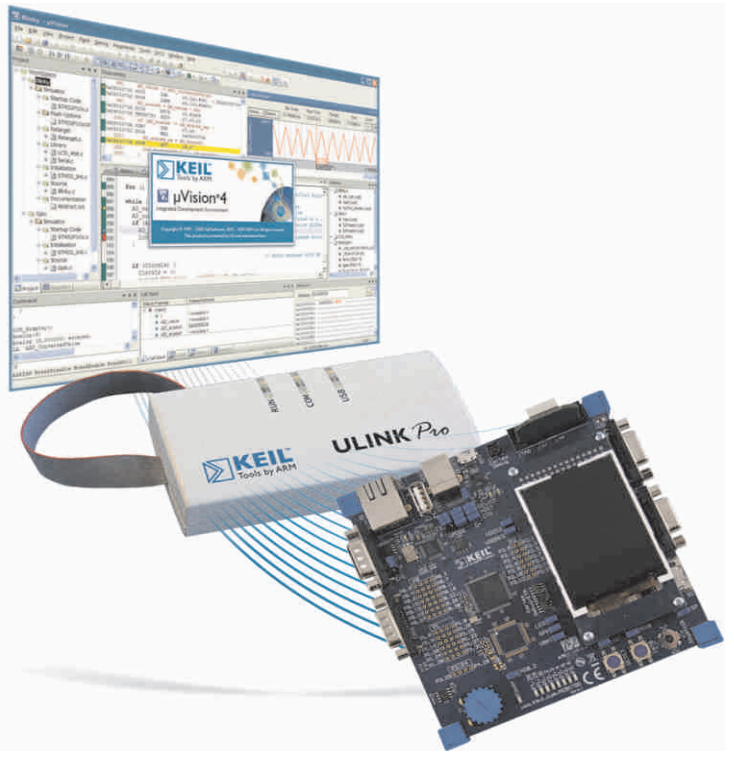
for ARM Microcontrollers and Application Processors

Keil MDK-ARM Microcontroller Development Kit

The Keil™ MDK-ARM™ is the complete solution for software development of embedded applications for ARM® processor-based microcontrollers. It combines the ARM C/C++ Compiler, the µVision® IDE, and the RTX Real-Time Operating System, as well as middleware libraries. Together with ULINK™ debug adapters and evaluation boards, MDK-ARM provides a powerful development platform.

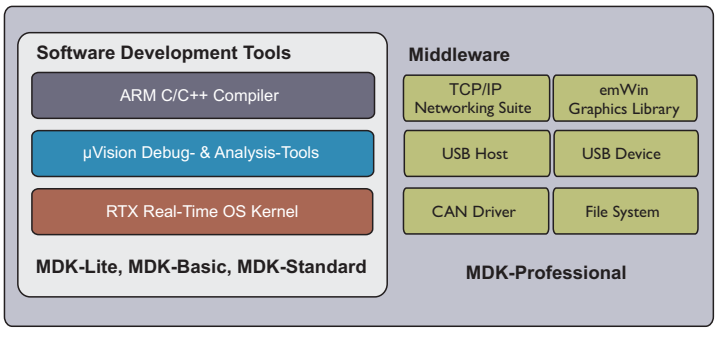
- The ARM C/C++ Compiler has been the reference compiler for the ARM architecture since 1990. It is continually developed and optimized, together with the ARM processors, to combine high performance with small code size and a compact C-library for embedded systems.
- Keil µVision is an integrated development environment with a project manager, editor, and debugger included. The integrated Device Database® configures the compiler, linker, debugging and programming parameters. A detailed overview of more than 900 supported ARM processor-based microcontrollers is available at www.keil.com/dd.
- The MDK-ARM Professional edition adds middleware libraries for file systems, graphical displays and communication protocols for TCP/IP, USB, and CAN.
- MDK-ARM is CMSIS compliant. CMSIS is a vendor independent programming standard for ARM Cortex™-M microcontrollers and has been adopted by Cortex-M silicon vendors. In addition, CMSIS includes a digital signal processing library optimized for the Cortex-M4 processor family.

MDK-ARM Editions	MDK Lite	MDK Basic	MDK Standard	MDK Professional
uVision4				
IDE	✓	✓	✓	✓
Debugger/Simulator	32KB	✓	✓	✓
Compiler				
ARM C/C++ Compiler	32KB	256KB	✓	✓
GNU GCC Integration	✓	✓	✓	✓
ARM Processor Support				
Cortex-M0, Cortex-M1, Cortex- M3, & Cortex-M4	✓	✓	✓	✓
ARM7™ & ARM9™	✓	✓	✓	✓
RTOS & Middleware Libraries				
RTX RTOS (Open Source)	✓	✓	✓	✓
Middleware Libraries				✓
3rd Party RTOS Integration	✓	✓	✓	✓



The ULINK Debug & Trace Adapter family enables fast flash programming and debugging of target hardware via the USB interface. ULINK*pro*™ adds streaming trace for Cortex-M series targets and enables features such as performance analysis and code coverage.

Keil designs and manufactures evaluation boards and starter kits to help you evaluate new microcontrollers and get you started with the Keil development tools. All of the Keil boards are ready-to-run, straight out of the box, and include everything you need to get up and running.



Keil RTX is a deterministic real-time operating system with low memory footprint that is optimized for ARM Cortex-M processors.

KEIL™ Tools by ARM

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MDK-ARM Debugger

MDK-ARM allows flexible program debugging on simulation or hardware systems with support for various debug/trace adapters. Cortex-M processor-based microcontrollers allow both: run/stop debugging and on-the-fly execution analysis.

The MDK-ARM debugger integrates several analysis utilities such as instruction trace, logic analyser, code coverage and execution profiling which makes it suitable for software test as well as software certification.

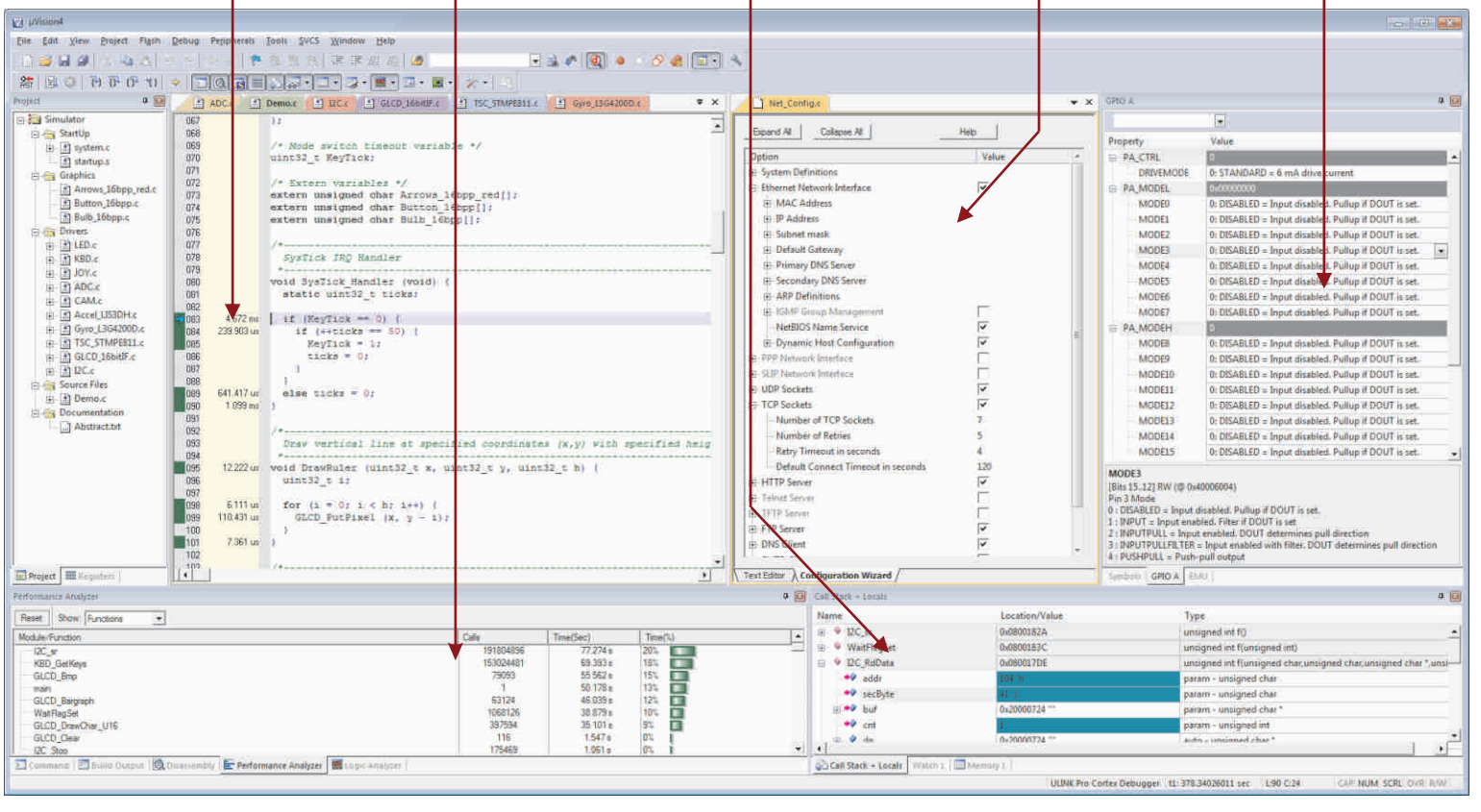
Profiling for C statements and CPU instructions.

Performance Analyzer for hotspot analysis of functions.

Call Stack with **Variable Watch**

Configuration Wizard for simple configuration

System Viewer shows peripheral values and information



The µVision Debugger is completely integrated into MDK-ARM, and provides visibility and control for application development.

MDK-ARM Middleware

MDK-Professional includes a full featured RTOS and tightly coupled middleware libraries which enable developers to focus on application development, save time, and produce more reliable, scalable systems.

The following table identifies MCU families from popular silicon vendors supported by MDK-Professional middleware components and examples. The middleware can also be adapted for other microcontrollers.

Vendor	MCU family	CAN	File System	TCP/IP	USB Host	USB Device	Graphics
Atmel	AT91SAM3		✓	✓			
	AT91SAM7&9	✓	✓	✓		✓	
Freescale	Kinetis	✓	✓	✓	✓	✓	
NXP	LPC13xx					✓	
	LPC17xx/18xx	✓	✓	✓	✓	✓	✓
	LPC2xxx	✓	✓	✓	✓	✓	
	LPC32xx	✓	✓	✓	✓		
ST	STR7&9	✓	✓	✓	✓	✓	
	STM32Fxxx	✓	✓	✓	✓	✓	✓
Texas Instruments	LM3S	✓	✓	✓			
Toshiba	TMPM3xxx	✓	✓	✓		✓	

MDK-Professional contains optimized drivers for many MCU families.

MDK-ARM Device Support

MDK-ARM supports more than 900 ARM processor-based microcontrollers from 25 different vendors. The integrated Device Database contains all the information you will need to automatically set up parameters for compiler, linker, and debug adapters.

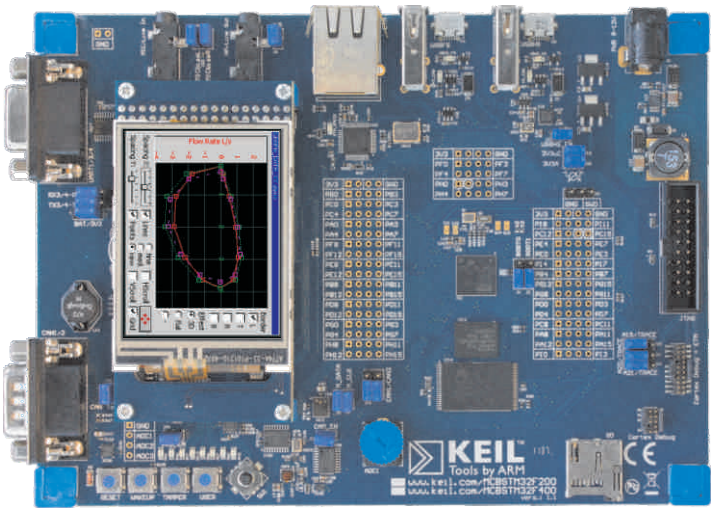
New Device Support:

- Atmel **SAM3S8**
- Energy Micro **EFM32GG, EFM32TG**
- Freescale **Kinetis K10, K20, K60, K61, K70**
- Fujitsu Semiconductors **MP9AFx11, MP9BFx10**
- NXP **LPC1200, LPC1300, LPC1800, LPC4300**
- Milandr **MDR32F1/2/3**
- Texas Instruments **LM4F11x/12x/13x/23x**
- Toshiba **TMPM341, TMPM369**
- ST **STM32F2, STM32F4**

An overview of all supported microcontrollers can be found on www.keil.com/dd. This Device Database also contains example programs and information about the available middleware components.

Keil evaluation boards provide a rich set of peripherals and interfaces. Example projects get you started quickly with your application development.

An overview of all Keil evaluation boards can be found on www.keil.com/boards.



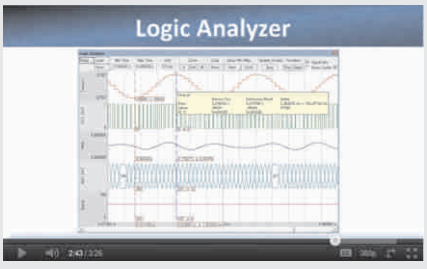
MCBSTM32F200 (Cortex-M3) and MCBSTM32F400 (Cortex-M4) with LCD, Ethernet, Audio, Camera, USB Host/Device, SD, Flash, and RAM.

ULINK Debug/Trace Adapter

The ULINK Debug and Trace Adapters allow real-time and single-step program execution and flash programming. Memory content and variables can be reviewed and modified while the application is running.

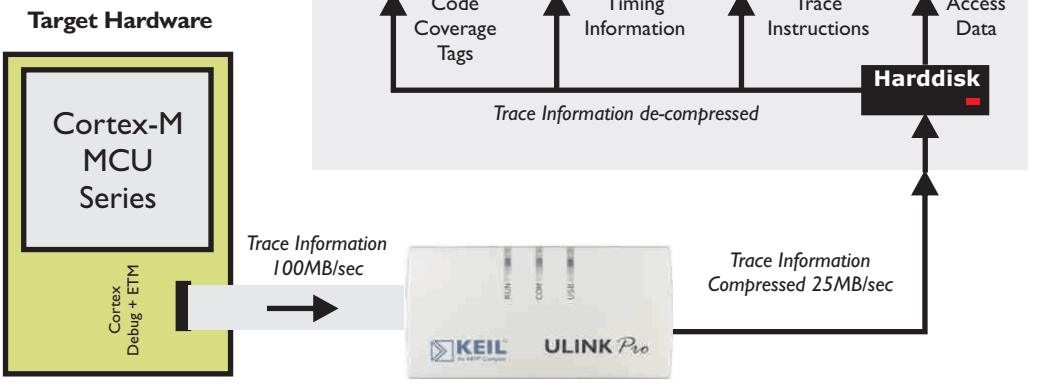
Feature	ULINK2	ULINK*pro*
Flash Write Throughput	25KB/sec	32KB/sec
Access to Memory and Registers	✓	✓
Data Trace Throughput	1 MB/sec	100 MB/sec
Instruction Trace Throughput	-	up to 200MHz
Code Coverage	-	✓
Performance Analysis	-	✓

Video: MDK Professional



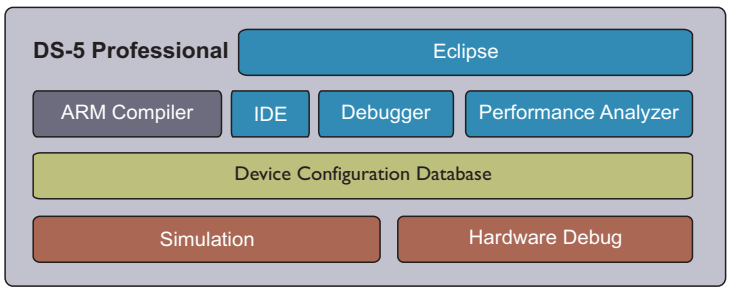
This video shows you how to use the Logic Analyzer in MDK-Professional.

QR code to the video



ULINK*pro* uses Streaming Trace to record the complete program execution. This provides complete code coverage data and timing information.

ARM Development Studio 5 for Application Development



ARM Development Studio 5 (DS-5™) is an Eclipse-based development environment for ARM processor-based systems. DS-5 supports all ARM processors and is the reference tool for Linux/Android™ (application development) and SoC/ASIC (platform bring-up). DS-5 supports the GCC compiler as well as the ARM C/C++ Compiler.

DS-5 Editions	DS-5 Basic	DS-5 Professional
IDE & Compiler		
Eclipse IDE	✓	✓
ARM C/C++ Compiler		✓
GNU GCC Integration	✓	✓
Debugger & Performance Analysis		
Streamline Performance Analyzer	✓	✓
JTAG Debugger & Non-intrusive Trace	✓	✓
Application Debugger	✓	✓
Target Platforms		
System Models	Cortex-A8	Cortex-A, Cortex-A9 & MPCore

The DS-5 debugger allows program test of:

- Real-Time System Models: Platform simulation on the PC allows early start of the software development. System specifications can be optimized towards the requirements while the silicon is designed.
- DSTREAM Debug and Trace Unit: Connects to target hardware directly via JTAG or ETM and allows bare-metal analysis of SoC and ASIC systems.
- Linux gdbserver: Connects to the debug agent of a Linux system via TCP/IP to aid application development.

Video: ARM DS-5 Linux-Debugging

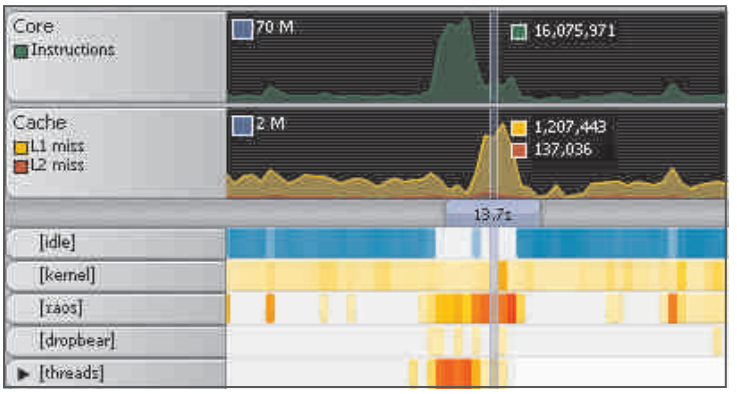
This video will take you through the kernel debug example in DS-5, and include the DSTREAM hardware set-up.

QR code to the video

Streamline Performance Analyzer

The ARM Streamline™ Performance Analyzer is a powerful and cost effective solution for system-wide software analysis and power optimization with the new Energy Probe. Streamline implements a sampling technology in the kernel and allows analysis of multi-threading and multicore systems using a graphical user interface.

Streamline enables optimization of CPU efficiency load-balancing and power.



Timeline view *shows process and thread information over time, matched to SoC performance counters. This enables you to spot thread deadlocks and inefficiencies, as well as hot spots in time.*

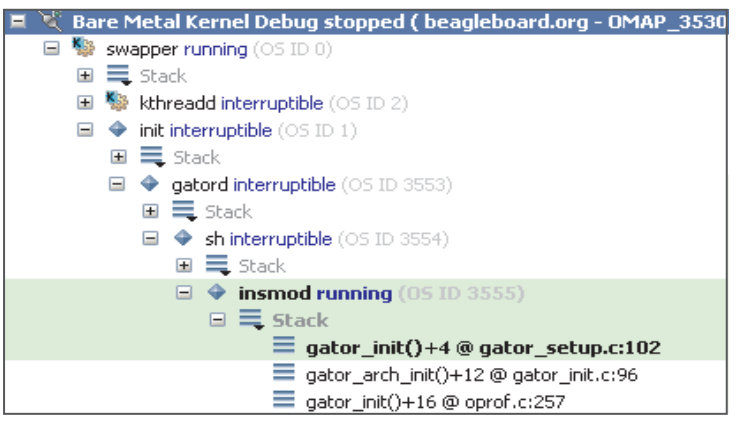
Self Time	Total Time	Stack	Process/Thread/Function Name
0.00%	1.10%	0	[kernel]
0.00%	0.50%	0	[threads 3]
0.00%	0.10%	0	[thread 4]
0.07%	0.07%	? 0	__addsf3
0.03%	0.03%	128	accumulate
0.00%	0.10%	0	[thread 6]

Call Paths: 1 — Self Time: 0 (0.00%)

Path Time	Instances	Function Name	Location
75.07%	5	__addsf3	threads
20.50%	5	accumulate	threads.c:109
1.94%	3	[threads]	<anonymous>

Call paths view *displays the time spent on individual threads and functions. This enables identification of inefficient functions.*

Bare-Metal and Kernel/Driver Debugging



DS-5 supports Linux kernel and driver debugging, and shows resources and dynamically loaded modules.