

## Embedded Development Tools

During the last 12-months Keil has continued to improve its software development tools for MCU devices. For 2010, we have expanded our range to include tools for Linux development on ARM® applications processors.

The new Eclipse-based **Development Studio 5 (DS-5)** supports ARM Linux development on ARM9™, ARM11™, and Cortex™-A applications processors.

**MDK-ARM** together with the ULINKpro adapter introduces new Trace and Analysis Tools for Cortex-M MCU devices, enabling you to measure performance and code coverage.

Keil **C51 Version 9** and Keil **C166 Version 7** now include the µVision4 IDE/Debugger and support the latest 8051 and XC16x devices.

## ULINKpro Debug and Trace Unit

The new ULINKpro adapter introduces unique streaming technology to transfer uninterrupted trace information directly to your PC, enabling advanced analysis and optimization of your applications.

Features	ULINKpro	ULINK2
Run control debug (ARM & Cortex-M)	Yes	Yes
Memory + Breakpoint (while running)	Yes	Yes
Data Trace (Cortex-M3/M4)	Yes	Yes
Instruction Trace (Cortex-M3/M4)	Yes	-
<b>Performance</b>		
CPU Clock speed	200MHz	200MHz
JTAG Clock speed	50MHz	10MHz
Memory read/write	1MByte/s	25KByte/s
Data Trace streaming (UART mode)	-	1Mbit/s
Data Trace streaming (Manchester mode)	100Mbit/s	-
ETM Trace streaming	800Mbit/s	-
<b>Analysis Tools</b>		
Logic Analyzer	Yes	Yes
Performance Analyzer	Yes	-
Execution Profiler	Yes	-
Code Coverage	Yes	-

More information: [www.keil.com/ULINKpro](http://www.keil.com/ULINKpro)

**DS-5**  
Application Edition for Linux

**ULINKpro**  
Fast Debug and Trace Unit

**Keil Cx51 and C166**  
Latest Devices and Features

**RTOS & Middleware**  
New Features and Improvements

**MDK-ARM for ARM & Cortex MCU**  
Development



# 2010

# DS-5 Application Edition for ARM Linux

Download  
FREE  
6 month trial  
www.keil.com

## DS-5 Application Edition

DS-5 Application Edition provides an integrated, powerful, and easy-to-use interface for Linux application development on ARM9, ARM11, and Cortex-A application processors.

DS-5 accelerates software development on Linux and Android platforms by providing a powerful development environment, fast simulation models, and intuitive analysis tools. DS-5 delivers a professional user experience for developing, debugging, and optimizing Linux applications helping to maximize productivity.

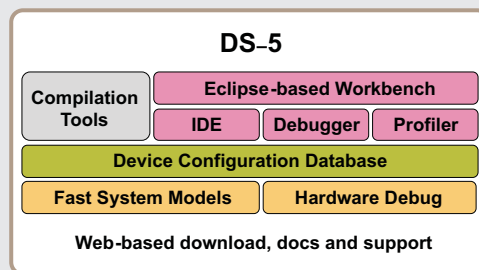
DS-5 is designed to be used with target hardware or with the integrated Cortex-A8 simulation model.

## DS-5 Free Trial

DS-5 Application Edition is available as a fully functional, trial version until the 30 September, 2010. It can be installed on Windows or Linux hosts and requires no license key.

Download from [www.keil.com/ds5](http://www.keil.com/ds5)

## DS-5 Features



- **Eclipse IDE:** with source editor and project manager
- **Compiler:** GNU-based compilation tools
- **Debugger:** Fully featured graphical application debugger
- **Simulator:** Fast simulation model of a Cortex-A8 SoC
- **Examples:** Linux application and shared library examples

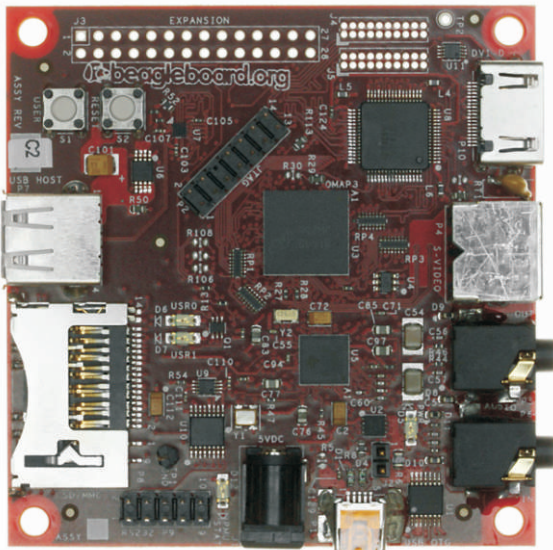
Further information: [www.keil.com/ds5](http://www.keil.com/ds5)

## DS-5 Target Debugging

DS-5 Application Edition enables Linux application debugging using an Ethernet or serial connection to the **gdbserver** debug agent running on the target. No JTAG debug probe is required.

DS-5 enables you to build Linux applications which can be installed and debugged on a target hardware system such as the OMAP3 (Cortex-A8) Beagle Board.

To enable users to begin quickly working with DS-5 and Linux applications, we have produced an SD card image which works on the Beagle Board.



Further information regarding the Beagle Board is available at [www.beagleboard.org](http://www.beagleboard.org).

This SD card image contains a Linux kernel, root file system, and all software needed to immediately boot, run Linux, and browse the web. It also contains all the software needed to connect, install, and debug Linux applications using DS-5.

DS-5 includes **Gnometris**, an example Linux application, and **Libgames-support**, an open-source shared library which can be run and debugged on the Beagle Board, enabling users to start developing Linux applications and to explore the key DS-5 features.

The SD card image, Beagle Board configuration information, and DS-5 Quick Start are available at [www.keil.com/ds5](http://www.keil.com/ds5)

## Cx51

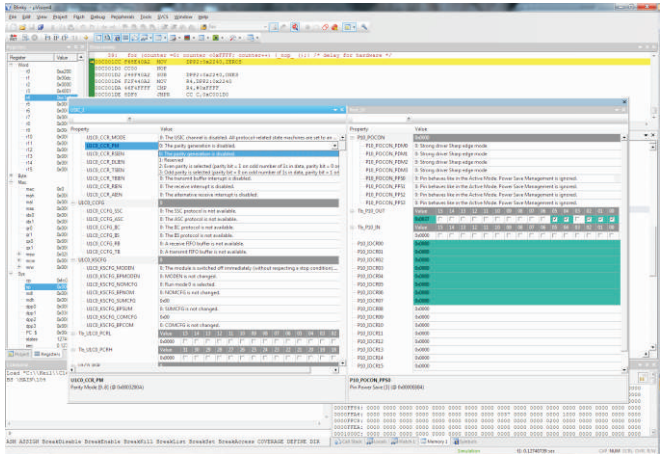
The latest version of Cx51 features the  $\mu$ Vision4 IDE/Debugger. It includes support for numerous new devices and device simulation for Atmel C51RE, Infineon XC8xx, and SiLabs C8051Fxx MCU families.

New Device Support in Cx51 Development Tools		
Evatronix	Configurable 8051 IP	R8051XC2
Infineon	Embedded Power ICs	TLE78xx, XC87x
NXP	General Purpose	LPC93xx, F5xx, F7xx
Nordic	ISM Radio ICs	nRFLUPxx
Nuvoton	General Purpose	NUC5xx, W6813xx
Silicon Labs	Analog Mixed Signal	F58x, F59x
Uniband	Zigbee IC	UZ2410

More information: [www.keil.com/C51](http://www.keil.com/C51)

## CI66

The Keil CI66 tools use the  $\mu$ Vision4 System Viewer windows to provide detailed information for all Infineon XC2000 and XE166 device peripheral. New device support has been added for the latest XC22xx, XC23xx, XC27xx, and XE16x families.

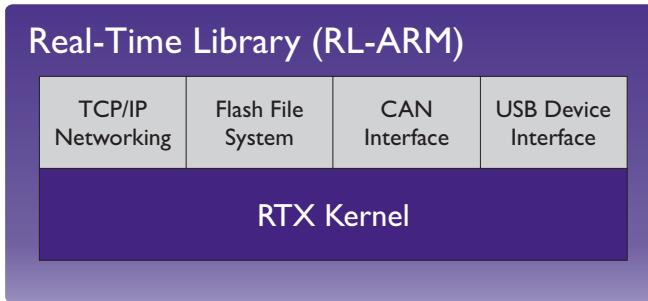


The System Viewer Windows provide detailed information for device peripheral register contents.

More information: [www.keil.com/CI66](http://www.keil.com/CI66)

## RL-ARM Real-Time Library

The Real-Time Library (RL-ARM) solves the real-time and communication challenges of embedded systems based on ARM processor-based MCU devices.



Further information: [www.keil.com/rl-arm](http://www.keil.com/rl-arm)

## RTX Real-Time Kernel

RTX is a royalty-free, real-time kernel specifically developed for the ARM and Cortex-M feature-sets. RTX provides features to manage system resources:

- Applications separated into independent tasks (threads)
- Extensive time control (scheduling, time delay/intervals)
- Deterministic execution times and task scheduling
- Inter-task communication, resource sharing, and memory allocation features with message pools

RTX is provided as fully configurable object code within MDK, and as source code in RL-ARM Real-Time Library.

## TCPnet - Networking Suite

TCP/IP and UDP are easily implemented using the **TCPnet** Networking Suite provided in RL-ARM.

New enhancements to TCPnet include:

- **FTP Client & Server** make it fast and easy to add remote file access functionality to your applications
- **SOAP** support for XML-based data communication
- Compatibility with **BSD** (Berkeley) sockets
- **SNMP** – Simple Network Management Protocol
- Separate **HTTP** user and admin login profiles to allow the implementation of access control levels
- **Multipacket POST** processing buffers requests from a web server

## Flash File System

The Flash File System is designed to be fast, simple, and efficient while allowing you to create, save, read, and modify files. These may be stored in standard Flash ROM or RAM devices, or on SD memory cards using a FAT file system.

New enhancements to RL-Flash include:

- **Power-failure tolerance** ensures file system integrity even if power is lost during a file read or write operation.
- **Wear-levelling** algorithms to the NAND Flash libraries extend Flash device lifetimes.

## USB Interface

The RL-USB uses standard device driver classes that are available with all Windows PCs. No Windows host driver development is required. The USB Device interface uses a generic software layer using RTX kernel features.

**USB Host/OTG** support will be added to RL-USB, allowing your applications to interact with a range of USB devices. For example, reading firmware updates or new data from USB storage devices.

## CAN Driver

The RL-CAN driver provides high-performance functions that transmit and receive CAN messages. The CAN driver interfaces to RTX via mailboxes and memory pools.



*RL-ARM allows you to develop robust applications using a wide variety of communication protocols.*

## MDK-ARM

MDK is the complete software development environment for all ARM and Cortex -M processor-based microcontrollers.



### New Device and Processor Support

- ARM **Cortex-M4** processor including DSP extensions
- ARM **Cortex-R4** processor
- Actel **A2F200/A2F500** SmartFusion devices
- Atmel **SAM3Ux/SAM9Gx** devices
- Energy Micro **EFM32G** family
- Jennic **JN5121/JN5139/JN5148** Zigbee devices
- Nuvoton **NUC14x** series
- NXP **LPC1100/LPC1300/LPC1700** families including device and peripheral simulation
- STMicroelectronics **STM32F100** Value Line
- TI **LM3S1x/LM3S3x/LM3S5x/LM3S9x** families
- Toshiba **TMPM33x/TMPM36x/TMPM37x** series

Latest device support [www.keil.com/dd](http://www.keil.com/dd)

### New Analysis and Optimization Tools

MDK provides extended debug capabilities for Cortex-M devices. You are able to control the CPU allowing program start/stop as well as setting breakpoints and read/write memory contents while the processor is running.

### Data and Event Trace

All Cortex-M3 and Cortex-M4 devices provide data and event trace. MDK provides a number of ways to analyze this information while your system is running:

- **Trace Window** - Displays program flow by capturing timestamps, PC samples, and Read/Write accesses
- **Debug (printf) Viewer** - Displays the *printf*-style output of the Instrumented Trace (ITM)
- **Exceptions Window** - Displays statistical information about program exceptions and interrupt
- **Event Counters** - Display real-time values of specific event counters providing performance indications
- **Logic Analyzer** - Graphically displays changes in variables using captured trace data

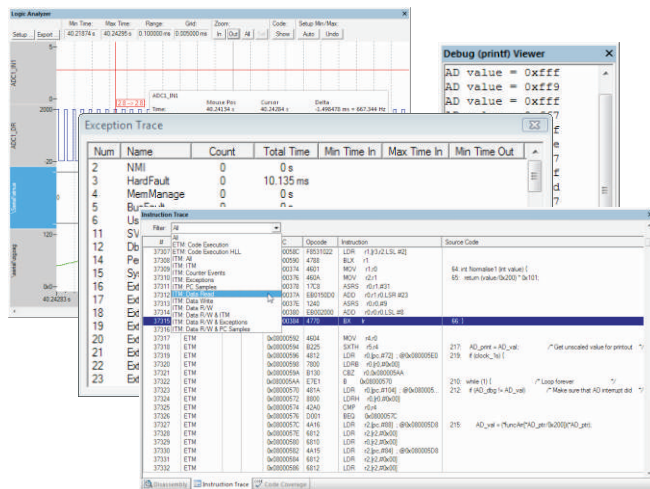
More information: [www.keil.com/arm](http://www.keil.com/arm)

### Instruction Trace

All Cortex-M devices with ETM provide instruction trace. The Keil ULINKpro is the only Trace adapter which streams instruction trace directly to your PC. This enables debugging of historical sequences, execution profiling, and code coverage analysis.

**Code Coverage** identifies every instruction that has been executed, ensuring thorough testing of your application. This is an essential requirement for complete software verification and certification.

ULINKpro allows applications to be run for long periods of time while collecting trace information. This can be used by the **Execution Profiler** and **Performance Analyzer** to identify program bottlenecks, optimize your application, and isolate problems.



Data Trace and Event Windows provide information from the running target.

### New Evaluation Boards

- **MCBNUC1xx** - Nuvoton (Cortex-M0) with 128KB Flash, 16KB SRAM, USB, ADC, UARTs, and GPIO
- **MCB17xx** - NXP (Cortex-M3) with Ethernet, CAN, USB Host/OTG, QVGA LCD, and MicroSD card
- **MCB2929** - NXP (ARM968E-S) with USB Host/OTG, Dual CAN, LIN, and QVGA LCD
- **MCBSTM32C** - ST (Cortex-M3) with QVGA LCD, ETM, USB, joystick, and MicroSD card interface
- **MCBTMPM360** - Toshiba (Cortex-M3) with 512KB Flash, 32KB SRAM, ETM, ADC, UARTs, and 120 GPIO

More information: [www.keil.com/boards](http://www.keil.com/boards)

## Leading Embedded Development Tools...



### For Microcontrollers

- Software development tools for ARM, Cortex, 8051, and C166 MCUs
- RTOS and middleware libraries
- USB-JTAG adapters and evaluation boards



### For ARM Application Processors

- Eclipse based development tools for Linux and Android
- Support for all ARM application processors
- High performance debug and trace probes

## Keil News

The **Versatile Express** development platform provides an excellent environment for prototyping system-on-chip designs based on Cortex processors.

The **DSTREAM** high performance debug and trace unit will be released in Q3,10 for use with DS-5.

**Parasoft C/C++ Test** provides users with a complete quality testing environment designed to be used with MDK and ULINKpro.

Keil will be presenting a number of **Webcasts** focused on helping solve your real-time embedded challenges.

Contact Keil for further information: [www.keil.com/contact](http://www.keil.com/contact)

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