ARTISAN®
TECHNOLOGY GROUP

Your **definitive** source for quality pre-owned equipment.

Artisan Technology Group
(217) 352-9330 | sales@artisantg.com | artisantg.com

Full-service, independent repair center
with experienced engineers and technicians on staff.

We buy your excess, underutilized, and idle equipment
along with credit for buybacks and trade-ins.

Custom engineering
so your equipment works exactly as you specify.

- Critical and expedited services
- In stock / Ready-to-ship
- Leasing / Rentals / Demos
- ITAR-certified secure asset solutions

Expert team | Trust guarantee | 100% satisfaction

All trademarks, brand names, and brands appearing herein are the property of their respective owners.

Find the *ARM / Keil ULINK2* at our website: ***Click HERE***

ULINK™ Debug Adapters
- Overview
- ULINK Product Comparison

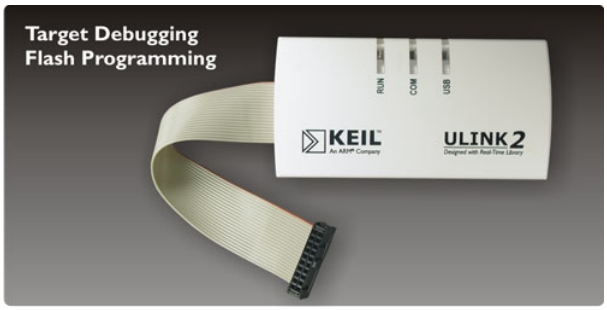
ULINKpro™
- Overview
- Specifications
- Supported Devices
- Knowledgebase Articles
- User's Guide

ULINK2™
- Overview
- Specifications
- Supported Devices
- Knowledgebase Articles
- User's Guide

ULINK-ME™
- Overview
- Specifications
- Supported Devices
- Knowledgebase Articles
- User's Guide

ULINK Accessories
- Isolation Adapter
- 5Volt Adapter

ULINK2 Debug Adapter



The Keil ULINK2 Debug Adapter connects your PC's USB port to your target system (via JTAG, SWD, or OCDS) and allows you to program and debug embedded programs on target hardware.

Features

Get a Quote

- **Supports various ARM7, ARM9, Cortex-M, 8051, and C166 devices**
- **JTAG speed up to 10MHz**
- **Serial Wire Debug (SWD) support for ARM Cortex-M based devices**
- **Serial Wire Viewer (SWV) Data Trace for Cortex-M up to 1Mbit/s (UART mode)**
- **Real-Time Agent with memory R/W during execution, terminal emulation, and serial debug output**
- **Seamless integration with the Keil µVision IDE & Debugger**
- **Wide target voltage range: 2.7V - 5.5V**
- **USB powered (no power supply required)**
- **Plug-and-Play installation using standard Windows USB drivers**
- **Target Connectors**
  - **10-pin (0.05") - Cortex Debug Connector**
  - **20-pin (0.10") - ARM Standard JTAG Connector**

ULINK2 may be used for:

- **On-chip Debugging (using on-chip JTAG, SWD, or SWV),**
- **Flash Memory Programming (using user-configurable Flash programming algorithms).**

Using the ULINK2 adapter together with the Keil µVision IDE/Debugger, you can easily create, download, and test embedded applications on target hardware.

Note

- **ULINK2 support is available in:**
  - **MDK 3.04 or higher,**
  - **C51 8.15 or higher,**
  - **C166 6.06 or higher.**

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Hardware Description
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

ULINK2 User's Guide

The ULINK2 User's Guide describes the Keil ULINK®2 USB-JTAG Interface Adapter and contains detailed instructions for the hardware and software configuration. ULINK2 is a small hardware adapter that connects the USB port of the PC to the JTAG or OCDS debugging port of the target hardware. Use ULINK2 to:

- **Debug and test programs on target hardware.**
- **Program on-chip or external Flash memory of many devices.**

This book contains the following chapters:

- **Introduction gives an overview of the ULINK2 USB-JTAG Adapter features, requirements, limitations, supported devices, and CoreSight™ Technology.**
- **Hardware Description describes the ULINK2 Adapter components, and the start and reset sequences.**
- **Setup ULINK2 shows the ULINK2 connection interfaces, how to install ULINK2, and the configuration settings needed to debug on ARM or Cortex-M devices.**
- **Setup Flash Programming describes the Flash download configuration and explains how to create a new Flash Programming Algorithm. Lists the existing Flash algorithms.**
- **Using ULINK2 describes how to download and debug programs on target devices, and explains target chaining.**
- **Configure Cortex-M Devices for Tracing explains the settings needed for enabling trace by means of certain devices.**
- **µVision Windows shows the trace capturing and displaying capabilities of ULINK2, and the µVision windows used to visualize and analyze data.**
- **Real-Time Agent allows to view and modify the target board's memory contents on-the-fly. Step-by-step instructions explain how to add this feature to the application.**
- **Appendix with information about error messages and a troubleshooting guide.**

Revision History

- **July 2012: Support of debugging multi-core devices. Refer to SW Device.**
- **January 2011: Documentation adapted to µVision4 look and feel.**
- **May 2010: Configure Cortex-M Devices for Tracing added.**
- **April 2010: Appendix with error messages added.**
- **November 2006: Initial revision.**

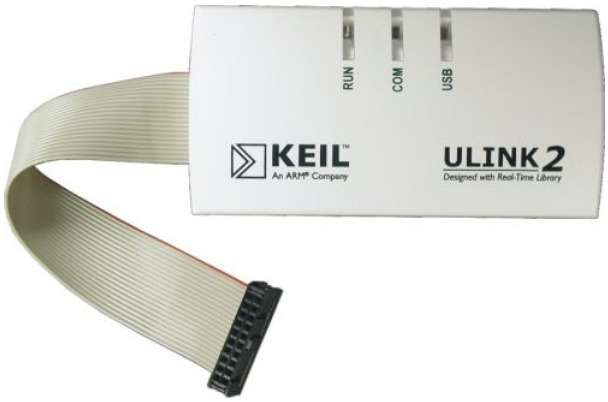
Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Kit Contents
Features
Supported Devices
Supported Protocols
Software Requirements
Limitations
Technical Data
CoreSight Technology
Hardware Description
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Introduction

The Keil ULINK2 USB-JTAG Adapter connects your PC's USB port to your target hardware (via JTAG, OCDS or Serial Wire) and allows you to:

- **Download programs and test them on your target hardware.**
- **Program the on-chip FLASH memory of many devices.**
- **Program external FLASH memory of many target systems.**



ULINK2 Adapter

The Keil µVision® IDE/Debugger is the front-end you use with ULINK2 to create, download, and test embedded applications on target hardware.

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Kit Contents
Features
Supported Devices
Supported Protocols
Software Requirements
Limitations
Technical Data
CoreSight Technology
Hardware Description
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Kit Contents

The ULINK2 USB-JTAG Adapter is distributed in two distinct configurations:

Standard Product

The standard distribution of ULINK2 available from Keil includes the:

1. **ULINK2 USB-JTAG Adapter.**
2. **Adapter cables for:**
   - **ARM devices.**
   - **µPSD devices.**
   - **C16x devices.**
   - **XC16x devices**
   - **C8xx devices.**
   - **Cortex-M 10-pin connector.**
   - **Cortex-M 10-to-20 pin connector.**
3. **USB cable.**

Chip-Specific Product

This customized distribution package is provided with many vendor-specific evaluation boards. Additional adapter cables are excluded.

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Kit Contents
Features
Supported Devices
Supported Protocols
Software Requirements
Limitations
Technical Data
CoreSight Technology
Hardware Description
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Features

The ULINK2 Adapter has the following features:

- **Flash programming via the on-chip debug interface.**
- **Real-time in-circuit emulation using an on-chip debug interface.**
- **Supports debugging on multi-core devices based on Cortex-M microcontrollers.**
- **Three LEDs that display the RUN, COM, and USB status.**
- **A USB interface that provides power and fast PC communication.**

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback

On-Line Manuals
Product Manuals
Document Conventions

ULINK2 User's Guide
Introduction
Kit Contents
Features
Supported Devices
Supported Protocols
Software Requirements
Limitations
Technical Data
CoreSight Technology
Hardware Description
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Supported Devices

ULINK2 supports a wide variety of devices from several companies. The most current list of supported devices is available on the Keil web site.

- Actel (ARM7/ARM9/Cortex Family)
  A2F200M3F, A2F500M3G, COREMP7, Cortex-M1
- Analog Devices (ARM7/ARM9/Cortex Family)
  ADuC7019, ADuC7020, ADuC7021, ADuC7022, ADuC7023, ADuC7024, ADuC7025, ADuC7026, ADuC7027, ADuC7028, ADuC7030, ADuC7032, ADuC7033, ADuC7034, ADuC7036, ADuC7037, ADuC7038, ADuC7039, ADuC7060, ADuC7061, ADuC7122, ADuC7124, ADuC7126, ADuC7128, ADuC7129, ADuC7229, ADuCM360, ADuCRF101
- ARM (ARM7/ARM9/Cortex Family)
  Cortex-M0, Cortex-M1 (Altera), Cortex-M3, Cortex-M4, Cortex-M4 FPU
- Atmel (ARM7/ARM9/Cortex Family)
  AT91C140, AT91F40416, AT91F40816, AT91FR40162, AT91FR4042, AT91FR4081, AT91M40400, AT91M40800, AT91M40807, AT91M42800A, AT91M43300, AT91M55800A, AT91M63200, AT91R40008, AT91R40807, AT91RM3400, AT91RM9200, AT91SAM3S1A, AT91SAM3S1B, AT91SAM3S1C, AT91SAM3S2A, AT91SAM3S2B, AT91SAM3S2C, AT91SAM3S4A, AT91SAM3S4B, AT91SAM3S4C, AT91SAM3U1C, AT91SAM3U1E, AT91SAM3U2C, AT91SAM3U2E, AT91SAM3U4C, AT91SAM3U4E, AT91SAM7A1, AT91SAM7A2, AT91SAM7A3, AT91SAM7L128, AT91SAM7L64, AT91SAM7S128, AT91SAM7S16, AT91SAM7S161, AT91SAM7S256, AT91SAM7S32, AT91SAM7S321, AT91SAM7S512, AT91SAM7S64, AT91SAM7SE256, AT91SAM7SE32, AT91SAM7SE512, AT91SAM7X128, AT91SAM7X256, AT91SAM7X512, AT91SAM7XC128, AT91SAM7XC256, AT91SAM7XC512, AT91SAM9260, AT91SAM9261, AT91SAM9261S, AT91SAM9263, AT91SAM9M10, AT91SAM9R64, AT91SAM9RL64, AT91SAM9XE128, AT91SAM9XE256, AT91SAM9XE512, SAM3A2C, SAM3A4C, SAM3A8C, SAM3N1A, SAM3N1B, SAM3N1C, SAM3N2A, SAM3N2B, SAM3N2C, SAM3N4A, SAM3N4B, SAM3N4C, SAM3S8B, SAM3S8C, SAM3SD8B, SAM3SD8C, SAM3X4C, SAM3X4E, SAM3X8C, SAM3X8E, SAM3X8H, SAM4S16A, SAM4S16B, SAM4S16C, SAM4S8A, SAM4S8B, SAM4S8C, SAM9G10, SAM9G15, SAM9G20, SAM9G25, SAM9G35, SAM9G45, SAM9X25, SAM9X35
- AustriaMicroSystems (ARM7/ARM9/Cortex Family)
  AS3525
- Cirrus Logic (ARM7/ARM9/Cortex Family)
  CS740110-IQZ, CS740120-IQZ, CS740130-IQZ
- Cypress (ARM7/ARM9/Cortex Family)
  CY8C5246AXI-054, CY8C5246LTI-029, CY8C5247AXI-051, CY8C5247LTI-089, CY8C5248AXI-047, CY8C5248LTI-030, CY8C5365AXI-043, CY8C5365LTI-104, CY8C5366AXI-001, CY8C5366LTI-053, CY8C5367AXI-108, CY8C5367LTI-003, CY8C5368AXI-106, CY8C5368LTI-026, CY8C5466AXI-064, CY8C5466LTI-063, CY8C5467AXI-011, CY8C5467LTI-007, CY8C5468AXI-018, CY8C5468LTI-037, CY8C5566AXI-061, CY8C5566LTI-017, CY8C5567AXI-019, CY8C5567LTI-079, CY8C5568AXI-060, CY8C5568LTI-114
- Ember (ARM7/ARM9/Cortex Family)
  EM351, EM357
- Energy Micro (ARM7/ARM9/Cortex Family)
  EFM32G200F16, EFM32G200F32, EFM32G200F64, EFM32G210F128, EFM32G222F128, EFM32G222F32, EFM32G222F64, EFM32G230F128, EFM32G230F32, EFM32G230F64, EFM32G232F128, EFM32G232F32, EFM32G232F64, EFM32G280F128, EFM32G280F32, EFM32G280F64, EFM32G290F128, EFM32G290F32, EFM32G290F64, EFM32G840F128, EFM32G840F32, EFM32G840F64, EFM32G842F128, EFM32G842F32, EFM32G842F64, EFM32G880F128, EFM32G880F32, EFM32G880F64, EFM32G890F128, EFM32G890F32, EFM32G890F64, EFM32GG230F1024, EFM32GG230F512, EFM32GG232F1024, EFM32GG232F512, EFM32GG280F1024, EFM32GG280F512, EFM32GG290F1024, EFM32GG290F512, EFM32GG295F1024, EFM32GG295F512, EFM32GG330F1024, EFM32GG330F512, EFM32GG332F1024, EFM32GG332F512, EFM32GG380F1024, EFM32GG380F512, EFM32GG390F1024, EFM32GG390F512, EFM32GG395F1024, EFM32GG395F512, EFM32GG840F1024, EFM32GG840F512, EFM32GG842F1024, EFM32GG842F512, EFM32GG880F1024, EFM32GG880F512, EFM32GG890F1024, EFM32GG890F512, EFM32GG895F1024, EFM32GG895F512, EFM32GG940F1024, EFM32GG940F512, EFM32GG942F1024, EFM32GG942F512, EFM32GG980F1024, EFM32GG980F512, EFM32GG990F1024, EFM32GG990F512, EFM32GG995F1024, EFM32GG995F512, EFM32LG230F128, EFM32LG230F256, EFM32LG230F64, EFM32LG232F128, EFM32LG232F256, EFM32LG232F64, EFM32LG280F128, EFM32LG280F256, EFM32LG280F64, EFM32LG290F128, EFM32LG290F256, EFM32LG290F64, EFM32LG295F128, EFM32LG295F256, EFM32LG295F64, EFM32LG330F128, EFM32LG330F256, EFM32LG330F64, EFM32LG332F128, EFM32LG332F256, EFM32LG332F64, EFM32LG380F128, EFM32LG380F256, EFM32LG380F64, EFM32LG390F128, EFM32LG390F256, EFM32LG390F64, EFM32LG395F128, EFM32LG395F256, EFM32LG395F64, EFM32LG840F128, EFM32LG840F256, EFM32LG840F64, EFM32LG842F128, EFM32LG842F256, EFM32LG842F64, EFM32LG880F128, EFM32LG880F256, EFM32LG880F64, EFM32LG890F128, EFM32LG890F256, EFM32LG890F64, EFM32LG895F128, EFM32LG895F256, EFM32LG895F64, EFM32LG940F128, EFM32LG940F256, EFM32LG940F64, EFM32LG942F128, EFM32LG942F256, EFM32LG942F64, EFM32LG980F128, EFM32LG980F256, EFM32LG980F64, EFM32LG990F128, EFM32LG990F256, EFM32LG990F64, EFM32LG995F128, EFM32LG995F256, EFM32LG995F64, EFM32TG108F16, EFM32TG108F32, EFM32TG108F4, EFM32TG108F8, EFM32TG110F16, EFM32TG110F32, EFM32TG110F4, EFM32TG110F8, EFM32TG210F16, EFM32TG210F32, EFM32TG210F8, EFM32TG222F16, EFM32TG222F32, EFM32TG222F8, EFM32TG230F16, EFM32TG230F32, EFM32TG230F8, EFM32TG232F16, EFM32TG232F32, EFM32TG232F8, EFM32TG822F16, EFM32TG822F32, EFM32TG822F8, EFM32TG840F16, EFM32TG840F32, EFM32TG840F8, EFM32TG842F16, EFM32TG842F32, EFM32TG842F8
- Freescale Semiconductor (ARM7/ARM9/Cortex Family)
  MAC7101, MAC7104, MAC7105, MAC7106, MAC7111, MAC7112, MAC7114, MAC7115, MAC7116, MAC7121, MAC7122, MAC7124, MAC7125, MAC7126, MAC7131, MAC7134, MAC7135, MAC7136, MAC7141, MAC7142, MAC7144, MC9328MX21, MCIMX27, MCIMX27L, MK10DN128xxx5, MK10DN32xxx5, MK10DN512xxx10, MK10DN64xxx5, MK10DX128xxx10, MK10DX128xxx5, MK10DX128xxx7, MK10DX256xxx10, MK10DX256xxx7, MK10DX32xxx5, MK10DX64xxx5, MK10DX64xxx7, MK10FN1M0xxx12, MK10FX512xxx12, MK10N512VMD100, MK10X128VMD100, MK10X256VMD100, MK11DN512xxx5, MK11DX128xxx5, MK11DX256xxx5, MK12DN512xxx5, MK12DX128xxx5, MK12DX256xxx5, MK20DN128xxx5, MK20DN32xxx5, MK20DN512xxx10, MK20DN64xxx5, MK20DX128xxx10, MK20DX128xxx5, MK20DX128xxx7, MK20DX256xxx10, MK20DX256xxx7, MK20DX32xxx5, MK20DX64xxx5, MK20DX64xxx7, MK20FN1M0xxx12,

MK20FX512xxx12, MK20N512VMD100, MK20X128VMD100, MK20X256VMD100, MK21DN512xxx5, MK21DX128xxx5, MK21DX256xxx5, MK22DN512xxx5, MK22DX128xxx5, MK22DX256xxx5, MK30DN512xxx10, MK30DX128xxx10, MK30DX128xxx7, MK30DX256xxx10, MK30DX256xxx7, MK30DX64xxx7, MK30N512VMD100, MK30X128VMD100, MK30X256VMD100, MK40DN512xxx10, MK40DX128xxx10, MK40DX128xxx7, MK40DX256xxx10, MK40DX256xxx7, MK40DX64xxx7, MK40N512VMD100, MK40X128VMD100, MK40X256VMD100, MK50DN512xxx10, MK50DX128xxx7, MK50DX256xxx10, MK50DX256xxx7, MK50N512CMD100, MK51DN512xxx10, MK51DX128xxx7, MK51DX256xxx10, MK51DX256xxx7, MK51N512CMD100, MK52DN512xxx10, MK52N512CMD100, MK53DN512xxx10, MK53DX256xxx10, MK53N512CMD100, MK60DN256xxx10, MK60DN512xxx10, MK60DX256xxx10, MK60FN1M0xxx12, MK60FN1M0xxx15, MK60FX512xxx12, MK60FX512xxx15, MK60N512VMD100, MK60X256VMD100, MK61FN1M0xxx12, MK61FN1M0xxx15, MK61FX512xxx12, MK61FX512xxx15, MK70FN1M0xxx12, MK70FN1M0xxx15, MK70FX512xxx12, MK70FX512xxx15, MKL04Z16xxx4, MKL04Z32xxx4, MKL04Z8xxx4, MKL05Z16xxx4, MKL05Z32xxx4, MKL05Z8xxx4, MKL14Z32xxx4, MKL14Z64xxx4, MKL15Z128xxx4, MKL15Z32xxx4, MKL15Z64xxx4, MKL24Z128xxx4, MKL24Z32xxx4, MKL24Z64xxx4, MKL25Z128xxx4, MKL25Z32xxx4, MKL25Z64xxx4

- Fujitsu Semiconductor (ARM7/ARM9/Cortex Family)
  MB9AF102N, MB9AF102R, MB9AF104N, MB9AF104R, MB9AF111L, MB9AF111M, MB9AF111N, MB9AF112L, MB9AF112M, MB9AF112N, MB9AF114L, MB9AF114M, MB9AF114N, MB9AF115M, MB9AF115N, MB9AF116M, MB9AF116N, MB9AF131K, MB9AF131L, MB9AF132K, MB9AF132L, MB9AF311L, MB9AF311M, MB9AF311N, MB9AF312L, MB9AF312M, MB9AF312N, MB9AF314L, MB9AF314M, MB9AF314N, MB9AF315M, MB9AF315N, MB9AF316M, MB9AF316N, MB9BF104N, MB9BF104R, MB9BF105N, MB9BF105R, MB9BF106N, MB9BF106R, MB9BF112R, MB9BF114R, MB9BF115R, MB9BF116R, MB9BF116S, MB9BF116T, MB9BF117S, MB9BF117T, MB9BF118S, MB9BF118T, MB9BF216S, MB9BF216T, MB9BF217S, MB9BF217T, MB9BF218S, MB9BF218T, MB9BF304N, MB9BF304R, MB9BF305N, MB9BF305R, MB9BF306N, MB9BF306R, MB9BF316N, MB9BF316S, MB9BF316T, MB9BF317S, MB9BF317T, MB9BF318S, MB9BF318T, MB9BF404N, MB9BF404R, MB9BF405N, MB9BF405R, MB9BF406N, MB9BF406R, MB9BF412R, MB9BF414R, MB9BF415R, MB9BF416R, MB9BF416S, MB9BF416T, MB9BF417S, MB9BF417T, MB9BF418S, MB9BF418T, MB9BF500N, MB9BF500R, MB9BF504N, MB9BF504R, MB9BF505N, MB9BF505R, MB9BF506N, MB9BF506R, MB9BF512N, MB9BF512R, MB9BF514N, MB9BF514R, MB9BF515N, MB9BF515R, MB9BF516N, MB9BF516R, MB9BF516S, MB9BF516T, MB9BF517S, MB9BF517T, MB9BF518S, MB9BF518T, MB9BF616S, MB9BF616T, MB9BF617S, MB9BF617T, MB9BF618S, MB9BF618T
- Holtek (ARM7/ARM9/Cortex Family)
  HT32F1251, HT32F1251B, HT32F1252, HT32F1253, HT32F1755, HT32F1765, HT32F2755
- Infineon (8051 Family)
  TLE7809, TLE7810, TLE7824, TLE7826, XC822-1F, XC822M-1F, XC822MT-1F, XC822T-0F, XC822T-1F, XC824M-1F, XC824MT-1F, XC835MT-2F, XC836-2F, XC836M-1F, XC836M-2F, XC836MT-2F, XC836T-2F, XC864-1FRI, XC866-1FR, XC866-2FR, XC866-4FR, XC866L-1FR, XC866L-2FR, XC866L-4FR, XC878-13FF, XC878-16FF, XC878C-13FF, XC878C-16FF, XC878CM-13FF, XC878CM-16FF, XC878L-13FF, XC878L-16FF, XC878M-13FF, XC878M-16FF, XC886-6FF, XC886-8FF, XC886C-6FF, XC886C-8FF, XC886CLM-6FF, XC886CLM-8FF, XC886CM-6FF, XC886CM-8FF, XC886LM-6FF, XC886LM-8FF, XC888-6FF, XC888-8FF, XC888C-6FF, XC888C-8FF, XC888CLM-6FF, XC888CLM-8FF, XC888CM-6FF, XC888CM-8FF, XC888LM-6FF, XC888LM-8FF
- Infineon (ARM7/ARM9/Cortex Family)
  XMC4400-512, XMC4500-1024, XMC4500-768, XMC4502-768, XMC4504-512
- Infineon (C16x/ST10/XC16x Family)
  XC161CJ-16F, XC161CS-32F, XC164CM-16F, XC164CM-4F, XC164CM-8F, XC164CS-16F, XC164CS-16R, XC164CS-32F, XC164CS-32R, XC164CS-8F, XC164CS-8R, XC164D-16F, XC164D-32F, XC164D-8F, XC164GM-16F, XC164GM-4F, XC164GM-8F, XC164KM-4F, XC164KM-8F, XC164LM-4F, XC164LM-8F, XC164N-16F, XC164N-32F, XC164N-8F, XC164S-16F, XC164S-32F, XC164S-8F, XC164SM-4F, XC164SM-8F, XC164TM-4F, XC164TM-8F, XC167CI-16F, XC167CI-32F, XC2210U-4F, XC2210U-8F, XC2220L-12F, XC2220L-20F, XC2220U-4F, XC2220U-8F, XC2224L-12F, XC2224L-20F, XC2230L-12F, XC2230L-20F, XC2232N-24F, XC2232N-40F, XC2234L-12F, XC2234L-20F, XC2234N-16F, XC2234N-24F, XC2234N-40F, XC2236N-16F, XC2236N-24F, XC2236N-40F, XC2237M-104F, XC2237M-56F, XC2237M-72F, XC2238N-24F, XC2238N-40F, XC2261N-24F, XC2263M-104F, XC2263M-56F, XC2263M-72F, XC2263N-16F, XC2263N-24F, XC2263N-40F, XC2264-56F, XC2264-72F, XC2264-96F, XC2264N-16F, XC2264N-40F, XC2265M-104F, XC2265M-56F, XC2265M-72F, XC2265N-24F, XC2265N-40F, XC2267-56F, XC2267-72F, XC2267-96F, XC2267M-104F, XC2267M-56F, XC2267M-72F, XC2268I-136F, XC2268N-24F, XC2268N-40F, XC2269I-136F, XC2285-56F, XC2285-72F, XC2285-96F, XC2285M-104F, XC2285M-56F, XC2285M-72F, XC2286-56F, XC2286-72F, XC2286-96F, XC2287-56F, XC2287-72F, XC2287-96F, XC2287M-104F, XC2287M-56F, XC2287M-72F, XC2288H-136F, XC2288H-200F, XC2288I-136F, XC2289H-136F, XC2289H-200F, XC2289I-136F, XC2298H-136F, XC2298H-200F, XC2299H-136F, XC2299H-200F, XC2310S-4F, XC2310S-8F, XC2320D-12F, XC2320D-20F, XC2320S-4F, XC2320S-8F, XC2321D-12F, XC2321D-20F, XC2330D-12F, XC2331D-12F, XC2331D-20F, XC2336A-56F, XC2336A-72F, XC2336B-24F, XC2336B-40F, XC2338B-24F, XC2338B-40F, XC2361A-56F, XC2361A-56F, XC2361A-72F, XC2361B-40F, XC2361E-104F, XC2361E-136F, XC2363A-56F, XC2363A-72F, XC2364A-104F, XC2364A-56F, XC2364A-72F, XC2364B-24F, XC2364B-40F, XC2365-48F, XC2365-56F, XC2365-72F, XC2365A-104F, XC2365A-56F, XC2365A-72F, XC2365B-40F, XC2365E-136F, XC2368E-104F, XC2368E-136F, XC2387-72F, XC2387A-104F, XC2387A-56F, XC2387A-72F, XC2387C-136F, XC2388C-136F, XC2388C-200F, XC2388E-104F, XC2388E-136F, XC2712X-8F, XC2722X-8F, XC2723X-20F, XC2733X-20F, XC2734X-32F, XC2734X-40F, XC2764X-32F, XC2764X-40F, XC2765X-104F, XC2765X-72F, XC2765X-96F, XC2766X-96F, XC2768X-104F, XC2768X-136F, XC2785X-104F, XC2785X-72F, XC2786X-96F, XC2787X-136F, XC2787X-200F, XC2788X-104F, XC2788X-136F, XC2797X-136F, XC2797X-200F, XE162FM-24F, XE162FM-48F, XE162FM-72F, XE162FN-16F, XE162FN-24F, XE162FN-40F, XE162HM-24F, XE162HM-48F, XE162HM-72F, XE162HN-16F, XE162HN-24F, XE162HN-40F, XE164F-24F, XE164F-48F, XE164F-72F, XE164F-96F, XE164FM-24F, XE164FM-48F, XE164FM-72F, XE164FN-16F, XE164FN-24F, XE164FN-40F, XE164G-24F, XE164G-48F, XE164G-72F, XE164G-96F, XE164GM-24F, XE164GM-48F, XE164GM-72F, XE164GN-16F, XE164GN-24F, XE164GN-40F, XE164H-24F, XE164H-48F, XE164H-72F, XE164H-96F, XE164HM-24F, XE164HM-48F, XE164HM-72F, XE164HN-16F, XE164HN-24F, XE164HN-40F, XE164K-24F, XE164K-48F, XE164K-72F, XE164K-96F, XE164KM-24F, XE164KM-48F, XE164KM-72F, XE164KN-16F, XE164KN-24F, XE164KN-40F, XE167F-48F, XE167F-72F, XE167F-96F, XE167FH-136F, XE167FH-200F, XE167FM-48F, XE167FM-72F, XE167G-48F, XE167G-48F, XE167G-72F, XE167G-96F, XE167GM-48F, XE167GM-72F, XE167H-48F, XE167H-72F, XE167H-96F, XE167HM-48F, XE167HM-72F, XE167K-48F, XE167K-72F, XE167K-96F, XE167KM-48F, XE167KM-72F, XE169FH-136F, XE169FH-200F
- Lapis Semiconductor (ARM7/ARM9/Cortex Family)
  ML674000, ML674001, ML674002, ML674003, ML675001, ML675002, ML675003, ML675011, ML67Q4050, ML67Q4051, ML67Q4060, ML67Q4061, ML67Q5250, ML67Q5260, ML696201, ML69Q6203
- Luminary Micro (ARM7/ARM9/Cortex Family)
  moved to Texas Instruments
- Milandr (ARM7/ARM9/Cortex Family)

MDR32F9Q1I, MDR32F9Q2I, MDR32F9Q3I

- Nuvoton (ARM7/ARM9/Cortex Family)
  M0516LAN, M0516ZAN, M052LAN, M052ZAN, M054LAN, M054ZAN, M058LAN, M058ZAN, MINI51LAN, MINI51ZAN, MINI52LAN, MINI52ZAN, MINI54LAN, MINI54ZAN, NUC100LC1AN, NUC100LD1AN, NUC100LD2AN, NUC100LD3AN, NUC100LE3AN, NUC100RC1AN, NUC100RD1AN, NUC100RD2AN, NUC100RD3AN, NUC100RE3AN, NUC100VD2AN, NUC100VD3AN, NUC100VE3AN, NUC101LC1AN, NUC101LD2AN, NUC101LE3AN, NUC101RC1AN, NUC101RD2AN, NUC101RE3AN, NUC101VC1AN, NUC101VD2AN, NUC101VE3AN, NUC120LC1AN, NUC120LD1AN, NUC120LD2AN, NUC120LD3AN, NUC120LE3AN, NUC120RC1AN, NUC120RD1AN, NUC120RD2AN, NUC120RD3AN, NUC120RE3AN, NUC120VD2AN, NUC120VD3AN, NUC120VE3AN, NUC122LC1AN, NUC122LD2AN, NUC122SC1AN, NUC122SD2AN, NUC122ZC1AN, NUC122ZD2AN, NUC130LD2AN, NUC130LD3AN, NUC130LE3AN, NUC130RD2AN, NUC130RD3AN, NUC130RE3AN, NUC130VD2AN, NUC130VD3AN, NUC130VE3AN, NUC140LD2AN, NUC140LD3AN, NUC140LE3AN, NUC140RD2AN, NUC140RD3AN, NUC140RE3AN, NUC140VD2AN, NUC140VD3AN, NUC140VE3AN, NUC501ADN, NUC710, NUC740, NUC745
- NXP (founded by Philips) (8051 Family)
  P89LPC952, P89LPC954
- NXP (founded by Philips) (ARM7/ARM9/Cortex Family)
  LH75400, LH75401, LH75410, LH75411, LH79520, LH79524, LH79525, LH7A400, LH7A404, LPC1102UK, LPC1110, LPC1111/002, LPC1111/101, LPC1111/102, LPC1111/103, LPC1111/201, LPC1111/202, LPC1111/203, LPC1112/101, LPC1112/102, LPC1112/103, LPC1112/201, LPC1112/202, LPC1112/203, LPC1112LV/003, LPC1112LV/103, LPC1113/201, LPC1113/202, LPC1113/203, LPC1113/301, LPC1113/302, LPC1113/303, LPC1114/102, LPC1114/201, LPC1114/202, LPC1114/203, LPC1114/301, LPC1114/302, LPC1114/303, LPC1114/323, LPC1114/333, LPC1114LV/103, LPC1114LV/303, LPC1115/303, LPC11A11/001, LPC11A12/101, LPC11A13/201, LPC11A14/301, LPC11C12/301, LPC11C14/301, LPC11C22/301, LPC11C24/301, LPC11D14/302, LPC11E11/101, LPC11E12/201, LPC11E13/301, LPC11E14/401, LPC11U12/201, LPC11U13/201, LPC11U14/201, LPC11U23/301, LPC11U24/301, LPC11U24/401, LPC11U34/311, LPC11U34/421, LPC11U35/401, LPC11U35/501, LPC11U36/401, LPC11U37/401, LPC11U37/501, LPC1224/101, LPC1224/121, LPC1225/301, LPC1225/321, LPC1226/301, LPC1227/301, LPC12D27/301, LPC1311, LPC1311/01, LPC1313, LPC1313/01, LPC1315, LPC1316, LPC1317, LPC1342, LPC1343, LPC1345, LPC1346, LPC1347, LPC1751, LPC1752, LPC1754, LPC1756, LPC1758, LPC1759, LPC1763, LPC1764, LPC1765, LPC1766, LPC1767, LPC1768, LPC1769, LPC1774, LPC1776, LPC1777, LPC1778, LPC1785, LPC1786, LPC1787, LPC1788, LPC1810, LPC1820, LPC1830, LPC1833, LPC1837, LPC1850, LPC1853, LPC1857, LPC2101, LPC2102, LPC2103, LPC2104, LPC2104/01, LPC2105, LPC2105/01, LPC2106, LPC2106/01, LPC2109, LPC2109/01, LPC2114, LPC2114/01, LPC2119, LPC2119/01, LPC2124, LPC2124/01, LPC2129, LPC2129/01, LPC2131, LPC2131/01, LPC2132, LPC2132/01, LPC2134, LPC2134/01, LPC2136, LPC2136/01, LPC2138, LPC2138/01, LPC2141, LPC2142, LPC2144, LPC2146, LPC2148, LPC2194, LPC2194/01, LPC2210, LPC2210/01, LPC2212, LPC2212/01, LPC2214, LPC2214/01, LPC2220, LPC2290, LPC2290/01, LPC2292, LPC2292/01, LPC2294, LPC2294/01, LPC2361, LPC2362, LPC2364, LPC2365, LPC2366, LPC2367, LPC2368, LPC2377, LPC2378, LPC2387, LPC2388, LPC2420, LPC2458, LPC2460, LPC2468, LPC2470, LPC2478, LPC2880, LPC2888, LPC2917, LPC2917/01, LPC2919, LPC2919/01, LPC2921, LPC2923, LPC2925, LPC2926, LPC2927, LPC2929, LPC2930, LPC2939, LPC3130, LPC3131, LPC3141, LPC3143, LPC3152, LPC3154, LPC3180, LPC3220, LPC3230, LPC3240, LPC3250, LPC4072, LPC4074, LPC4076, LPC4078, LPC4088, LPC4310, LPC4320, LPC4330, LPC4350, LPC4353, LPC4357, SJA2010
- OKI SEMICONDUCTOR CO.,LTD. (ARM7/ARM9/Cortex Family)
  moved to LAPIS
- ROHM (ARM7/ARM9/Cortex Family)
  BU1511KV2
- Samsung (ARM7/ARM9/Cortex Family)
  S3C2410A, S3C2416, S3C2440A, S3C44B0X, S3C4510B, S3F4A0KR, S3F4A1HR, S3F4A2FR, S3FM02G, S3FN429
- Silicon Laboratories, Inc. (ARM7/ARM9/Cortex Family)
  SiM3C134, SiM3C136, SiM3C144, SiM3C146, SiM3C154, SiM3C156, SiM3C157, SiM3C164, SiM3C166, SiM3C167, SiM3L134, SiM3L136, SiM3L144, SiM3L146, SiM3L154, SiM3L156, SiM3L157, SiM3L164, SiM3L166, SiM3L167, SiM3U134, SiM3U136, SiM3U144, SiM3U146, SiM3U154, SiM3U156, SiM3U157, SiM3U164, SiM3U166, SiM3U167
- Socle Technology Corp. (ARM7/ARM9/Cortex Family)
  PC7130, PC7230
- SONiX (ARM7/ARM9/Cortex Family)
  SN32F706, SN32F707
- STMicroelectronics (8051 Family)
  uPSD3212A, uPSD3212C, uPSD3212CV, uPSD3233B, uPSD3233BV, uPSD3234A, uPSD3234BV, uPSD3253B, uPSD3253BV, uPSD3254A, uPSD3254BV, uPSD3312D, uPSD3312DV, uPSD3333D, uPSD3333DV, uPSD3334D, uPSD3334DV, uPSD3354D, uPSD3354DV, uPSD3422E, uPSD3422EV, uPSD3433E, uPSD3433EV, uPSD3434E, uPSD3434EV, uPSD3454E, uPSD3454EV
- STMicroelectronics (ARM7/ARM9/Cortex Family)
  STA2051, STM32F050C4, STM32F050C6, STM32F050K4, STM32F050K6, STM32F051C4, STM32F051C6, STM32F051C8, STM32F051K4, STM32F051K6, STM32F051K8, STM32F051R4, STM32F051R6, STM32F051R8, STM32F100C4, STM32F100C6, STM32F100C8, STM32F100CB, STM32F100R4, STM32F100R6, STM32F100R8, STM32F100RB, STM32F100RC, STM32F100RD, STM32F100RE, STM32F100V8, STM32F100VB, STM32F100VC, STM32F100VD, STM32F100VE, STM32F100ZC, STM32F100ZD, STM32F100ZE, STM32F101C4, STM32F101C6, STM32F101C8, STM32F101CB, STM32F101R4, STM32F101R6, STM32F101R8, STM32F101RB, STM32F101RC, STM32F101RD, STM32F101RE, STM32F101RF, STM32F101RG, STM32F101T4, STM32F101T6, STM32F101T8, STM32F101TB, STM32F101V8, STM32F101VB, STM32F101VC, STM32F101VD, STM32F101VE, STM32F101VF, STM32F101VG, STM32F101ZC, STM32F101ZD, STM32F101ZE, STM32F101ZF, STM32F101ZG, STM32F102C4, STM32F102C6, STM32F102C8, STM32F102CB, STM32F102R4, STM32F102R6, STM32F102R8, STM32F102RB, STM32F103C4, STM32F103C6, STM32F103C8, STM32F103CB, STM32F103R4, STM32F103R6, STM32F103R8, STM32F103RB, STM32F103RC, STM32F103RD, STM32F103RE, STM32F103RF, STM32F103RG, STM32F103T4, STM32F103T6, STM32F103T8, STM32F103TB, STM32F103V8, STM32F103VB, STM32F103VC, STM32F103VD, STM32F103VE, STM32F103VF, STM32F103VG, STM32F103ZC, STM32F103ZD, STM32F103ZE, STM32F103ZF, STM32F103ZG, STM32F105R8, STM32F105RB, STM32F105RC, STM32F105V8, STM32F105VB, STM32F105VC, STM32F107RB, STM32F107RC, STM32F107VB, STM32F107VC, STM32F205RB, STM32F205RC, STM32F205RE, STM32F205RF, STM32F205RG, STM32F205VB, STM32F205VC, STM32F205VE, STM32F205VF, STM32F205VG, STM32F205ZC, STM32F205ZE, STM32F205ZF, STM32F205ZG, STM32F207IC, STM32F207IE, STM32F207IF, STM32F207IG, STM32F207VC, STM32F207VE, STM32F207VF, STM32F207VG, STM32F207ZC, STM32F207ZE, STM32F207ZF, STM32F207ZG, STM32F215RE, STM32F215RG, STM32F215VE, STM32F215VG, STM32F215ZE, STM32F215ZG, STM32F217IE, STM32F217IG, STM32F217VE, STM32F217VG, STM32F217ZE, STM32F217ZG, STM32F302CB, STM32F302CC, STM32F302RB, STM32F302RC, STM32F302VB, STM32F302VC, STM32F303CB, STM32F303CC, STM32F303RB, STM32F303RC, STM32F303VB, STM32F303VC, STM32F372C8, STM32F372CB, STM32F372CC,

STM32F372R8, STM32F372RB, STM32F372RC, STM32F372V8, STM32F372VB, STM32F372VC, STM32F373C8, STM32F373CB, STM32F373CC, STM32F373R8, STM32F373RB, STM32F373RC, STM32F373V8, STM32F373VB, STM32F373VC, STM32F405RG, STM32F405VG, STM32F405ZG, STM32F407IE, STM32F407IG, STM32F407VE, STM32F407VG, STM32F407ZE, STM32F407ZG, STM32F415RG, STM32F415VG, STM32F415ZG, STM32F417IE, STM32F417IG, STM32F417VE, STM32F417VG, STM32F417ZE, STM32F417ZG, STM32L151C6, STM32L151C8, STM32L151CB, STM32L151QC, STM32L151QD, STM32L151R6, STM32L151R8, STM32L151RB, STM32L151RC, STM32L151RD, STM32L151V8, STM32L151VB, STM32L151VC, STM32L151VD, STM32L151ZC, STM32L151ZD, STM32L152C6, STM32L152C8, STM32L152CB, STM32L152QC, STM32L152QD, STM32L152R6, STM32L152R8, STM32L152RB, STM32L152RC, STM32L152RD, STM32L152V8, STM32L152VB, STM32L152VC, STM32L152VD, STM32L152ZC, STM32L152ZD, STM32L162QD, STM32L162RD, STM32L162VD, STM32L162ZD, STM32W108C8, STM32W108CB, STM32W108CC, STM32W108CZ, STM32W108HB, STR710FZ1, STR710FZ2, STR711FR0, STR711FR1, STR711FR2, STR712FR0, STR712FR1, STR712FR2, STR715FR0, STR730FZ1, STR730FZ2, STR731FV0, STR731FV1, STR731FV2, STR735FZ1, STR735FZ2, STR736FV0, STR736FV1, STR750FL2, STR750FV0, STR750FV1, STR750FV2, STR751FR0, STR751FR1, STR751FR2, STR752FR0, STR752FR1, STR752FR2, STR755FR0, STR755FR1, STR755FR2, STR755FV0, STR755FV1, STR755FV2, STR910FAM32, STR910FAW32, STR910FAZ32, STR910FM32, STR910FW32, STR911FAM42, STR911FAM44, STR911FAM46, STR911FAM47, STR911FAW42, STR911FAW44, STR911FAW46, STR911FAW47, STR911FM42, STR911FM44, STR912FAW42, STR912FAW44, STR912FAW46, STR912FAW47, STR912FAZ42, STR912FAZ44, STR912FAZ46, STR912FAZ47, STR912FW42, STR912FW44

- Texas Instruments (ARM7/ARM9/Cortex Family)
  LM3S101, LM3S102, LM3S1110, LM3S1133, LM3S1138, LM3S1150, LM3S1162, LM3S1165, LM3S1166, LM3S1332, LM3S1435, LM3S1439, LM3S1512, LM3S1538, LM3S1601, LM3S1607, LM3S1608, LM3S1620, LM3S1621, LM3S1625, LM3S1626, LM3S1627, LM3S1635, LM3S1636, LM3S1637, LM3S1651, LM3S1751, LM3S1776, LM3S1811, LM3S1816, LM3S1850, LM3S1911, LM3S1918, LM3S1937, LM3S1958, LM3S1960, LM3S1968, LM3S1969, LM3S1B21, LM3S1C21, LM3S1C26, LM3S1C58, LM3S1D21, LM3S1D26, LM3S1F11, LM3S1F16, LM3S1G21, LM3S1G58, LM3S1H11, LM3S1H16, LM3S1J11, LM3S1J16, LM3S1N11, LM3S1N16, LM3S1P51, LM3S1R21, LM3S1R26, LM3S1W16, LM3S1Z16, LM3S2110, LM3S2139, LM3S2276, LM3S2410, LM3S2412, LM3S2432, LM3S2533, LM3S2601, LM3S2608, LM3S2616, LM3S2620, LM3S2637, LM3S2651, LM3S2671, LM3S2678, LM3S2730, LM3S2739, LM3S2776, LM3S2793, LM3S2911, LM3S2918, LM3S2919, LM3S2939, LM3S2948, LM3S2950, LM3S2965, LM3S2B93, LM3S2D93, LM3S2U93, LM3S300, LM3S301, LM3S308, LM3S310, LM3S315, LM3S316, LM3S317, LM3S328, LM3S3634, LM3S3651, LM3S3654, LM3S3739, LM3S3748, LM3S3749, LM3S3826, LM3S3J26, LM3S3N26, LM3S3W26, LM3S3Z26, LM3S5632, LM3S5651, LM3S5652, LM3S5656, LM3S5662, LM3S5732, LM3S5737, LM3S5739, LM3S5747, LM3S5749, LM3S5752, LM3S5762, LM3S5791, LM3S5951, LM3S5956, LM3S5B91, LM3S5C31, LM3S5C36, LM3S5C51, LM3S5C56, LM3S5D51, LM3S5D56, LM3S5D91, LM3S5G31, LM3S5G36, LM3S5G51, LM3S5G56, LM3S5K31, LM3S5K36, LM3S5P31, LM3S5P36, LM3S5P3B, LM3S5P51, LM3S5P56, LM3S5R31, LM3S5R36, LM3S5T36, LM3S5U91, LM3S5Y36, LM3S600, LM3S601, LM3S608, LM3S610, LM3S6100, LM3S611, LM3S6110, LM3S612, LM3S613, LM3S615, LM3S617, LM3S618, LM3S628, LM3S6420, LM3S6422, LM3S6432, LM3S6537, LM3S6610, LM3S6611, LM3S6618, LM3S6633, LM3S6637, LM3S6730, LM3S6753, LM3S6911, LM3S6918, LM3S6938, LM3S6950, LM3S6952, LM3S6965, LM3S6C11, LM3S6C65, LM3S6G11, LM3S6G65, LM3S800, LM3S801, LM3S808, LM3S811, LM3S812, LM3S815, LM3S817, LM3S818, LM3S828, LM3S8530, LM3S8538, LM3S8630, LM3S8730, LM3S8733, LM3S8738, LM3S8930, LM3S8933, LM3S8938, LM3S8962, LM3S8970, LM3S8971, LM3S8C62, LM3S8G62, LM3S9781, LM3S9790, LM3S9792, LM3S9971, LM3S9997, LM3S9B81, LM3S9B90, LM3S9B92, LM3S9B95, LM3S9B96, LM3S9BN2, LM3S9BN5, LM3S9BN6, LM3S9C97, LM3S9CN5, LM3S9D81, LM3S9D90, LM3S9D92, LM3S9D95, LM3S9D96, LM3S9DN5, LM3S9DN6, LM3S9G97, LM3S9GN5, LM3S9L71, LM3S9L97, LM3S9U81, LM3S9U90, LM3S9U92, LM3S9U95, LM3S9U96, LM4F110B2QR, LM4F110C4QR, LM4F110E5QR, LM4F110H5QR, LM4F111B2QR, LM4F111C4QR, LM4F111E5QR, LM4F111H5QR, LM4F112C4QC, LM4F112E5QC, LM4F112H5QC, LM4F112H5QD, LM4F120B2QR, LM4F120C4QR, LM4F120E5QR, LM4F120H5QR, LM4F121B2QR, LM4F121C4QR, LM4F121E5QR, LM4F121H5QR, LM4F122C4QC, LM4F122E5QC, LM4F122H5QC, LM4F122H5QD, LM4F130C4QR, LM4F130E5QR, LM4F130H5QR, LM4F131C4QR, LM4F131E5QR, LM4F131H5QR, LM4F132C4QC, LM4F132E5QC, LM4F132H5QC, LM4F132H5QD, LM4F230E5QR, LM4F230H5QR, LM4F231E5QR, LM4F231H5QR, LM4F232E5QC, LM4F232H5QC, LM4F232H5QD, TMS470MF03107, TMS470MF04207, TMS470MF06607, TMS470R1A128, TMS470R1A256, TMS470R1A288, TMS470R1A384, TMS470R1A64, TMS470R1B1M, TMS470R1B512, TMS470R1B768
- Toshiba (ARM7/ARM9/Cortex Family)
  TMPA900CMXBG, TMPA910CRAXBG, TMPM061FWFG, TMPM320C1DFG, TMPM321F10FG, TMPM322F10FG, TMPM323F10FG, TMPM324F10FG, TMPM330FDFG, TMPM330FWFG, TMPM330FYFG, TMPM332FWUG, TMPM333FDFG, TMPM333FWFG, TMPM333FYFG, TMPM341FDXBG, TMPM341FYXBG, TMPM342FYXBG, TMPM360F20FG, TMPM361F10FG, TMPM362F10FG, TMPM363F10FG, TMPM364F10FG, TMPM365FYXBG, TMPM366FDFG, TMPM366FWFG, TMPM366FYFG, TMPM369FDFG, TMPM369FDXBG, TMPM369FYFG, TMPM369FYXBG, TMPM370FYDFG, TMPM370FYFG, TMPM372FWUG, TMPM373FWDUG, TMPM374FWUG, TMPM376FDDFG, TMPM376FDFG, TMPM380FDFG, TMPM380FWDFG, TMPM380FWFG, TMPM380FYDFG, TMPM380FYFG, TMPM382FSFG, TMPM382FWFG, TMPM384FDFG, TMPM390FWFG, TMPM395FWAXBG, TMPM440F10XBG, TMPM440FEXBG
- Triad Semiconductor (ARM7/ARM9/Cortex Family)
  TSX-1001
- Zilog (ARM7/ARM9/Cortex Family)
  ZA9L

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Kit Contents
Features
Supported Devices
Supported Protocols
Software Requirements
Limitations
Technical Data
CoreSight Technology
Hardware Description
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Supported Protocols

ULINK2 supports a wide variety of devices and communication protocols.

- **ARM7 and ARM9 Devices**
  These devices provide JTAG programming and debugging signals (known as Embedded ICE) that are brought out to a 20-pin connector.
- **ARM Cortex-M3 Devices**
  These devices provide JTAG programming and debugging signals (known as Embedded ICE) that are brought out to a 20-pin connector.
- **Infineon C16x Devices**
  These devices (C161U, C165H, and C165UTAH) provide programming and debugging signals (known as OCDS or On-Chip Debugging System) that are brought out to a 16-pin connector.
- **Infineon XC16x Devices**
  These devices (XC161, XC164, and XC167) provide programming and debugging signals (known as OCDS or On-Chip Debugging System) that are brought out to a 16-pin connector.
- **Infineon XC8xx Devices**
  These devices (XC866, XC886, and XC888) provide programming and debugging signals (known as OCDS or On-Chip Debugging System) that are brought out to a 16-pin connector.
- **STMicroelectronics µPSD Devices**
  These devices (µPSD33xx and µPSD34xx) provide JTAG programming and debugging signals that are brought out to a 14-pin connector.

Depending on your device and target hardware configuration, you may be required to connect the one of the supplied target cables to the appropriate Target Connectors.

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback

On-Line Manuals
Product Manuals
Document Conventions

ULINK2 User's Guide
Introduction
Kit Contents
Features
Supported Devices
Supported Protocols
Software Requirements
Limitations
Technical Data
CoreSight Technology
Hardware Description
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Software Requirements

ULINK2 requires the following software versions (or later) be installed on the computer:

- **MDK-ARM — V3.04**
- **C166 — V6.06**
- **C51 — V8.06**

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Kit Contents
Features
Supported Devices
Supported Protocols
Software Requirements
Limitations
Technical Data
CoreSight Technology
Hardware Description
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Limitations

There are a number of limitations when debugging target programs with ULINK2. Many of these are actually limitations of the architecture of the on-chip debugger.

- **ARM7 and ARM9 Devices**
  The Embedded ICE on these devices supports at most two (2) hardware breakpoints in Flash memory. Breakpoints in RAM are unlimited.
- **ARM Cortex-M3 Devices**
  The Embedded ICE on these devices supports at most eight (8) hardware breakpoints in Flash memory. Breakpoints in RAM are unlimited.

For the complete list of features and limitations, refer to the web page ULINK Debugger Comparison.

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Kit Contents
Features
Supported Devices
Supported Protocols
Software Requirements
Limitations
Technical Data
CoreSight Technology
Hardware Description
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Technical Data

Parameter	Description
Supply Voltage	Provided by the USB bus of a PC
I/O Voltage Range[1]	2.7V .. 5.5V
Peripherals	1 × USB Interface 1 × JTAG Interface 3 × LEDs (RUN, COM, USB)
Overall Dimensions	107mm x 57mm x 25mm (4.25" x 2.25" x 1.0").

Note

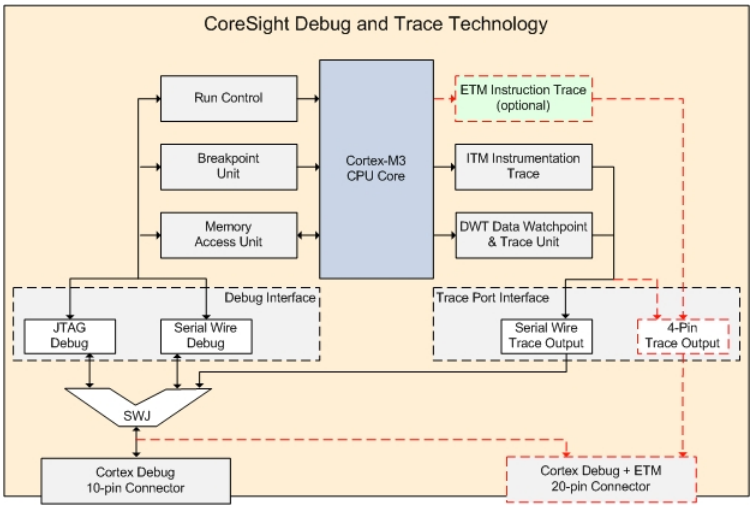
1. 5V operation requires jumper setting VCC-ARM, and power via Debug Connector.

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Kit Contents
Features
Supported Devices
Supported Protocols
Software Requirements
Limitations
Technical Data
CoreSight Technology
Hardware Description
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

CoreSight Technology

CoreSight™ is an on-chip debugging and tracing technology designed by ARM. The device manufacturer can implement CoreSight features in various combinations.



(Though the red-dotted elements can be part of CoreSight, they are not supported by ULINK2.)

CoreSight features can be accessed through a JTAG or Serial Wire interface. Debugging in JTAG and Serial Wire mode at the same time is not possible. Cortex-M processor-based devices can include a:

Debug Interface

The debug interface offers two modes:

- **JTAG Debug is the industry-standard interface that allows device chaining.**
- **Serial Wire Debug is a 2-pin interface with an optional Serial Wire Trace Output. In contrast to JTAG, devices cannot be chained.**

The Debug Interface communicates with the following units:

- **Run Control: allows the user to start, stop, and single-step through the source code.**
- **Breakpoint Unit: allows the user to set breakpoints even while the processor is running.**
- **Memory Access Unit: allows the user to read or write to memory and peripheral registers even while the program is running.**

Trace Port Interface

The Trace Port Interface encodes and provides trace information via two possible interfaces:

- **The Serial Wire Trace Output pin (SWO) can be used in Serial Wire Debug mode only.**
- **The 4-Pin Trace Output has a greater bandwidth than Serial Wire Trace Output and uses 5 functional pins. It is the only way to output ETM trace data. However, the ULINK*pro* USB-JTAG/SW debugger adapter is required to use this feature.**

The Trace Port Interface communicates with the following units:

- **Embedded Trace Macrocell (ETM): can be used for instruction tracing to debug historical sequences, for software profiling, and code coverage analysis. ETM data are output through an extra 4-bit interface (ULINK*pro* required).**
- **Instrumentation Trace Macrocell (ITM): provides application information like debug printf(), RTOS information, unit test, or UML annotation.**
- **Data Watchpoint & Trace Unit (DWT): provides PC sampling, event counters, timing, and interrupt execution information. In addition, it allows Access Breakpoints for up to four memory addresses.**

Serial Wire-JTAG Switch (SWJ)

This switch is used to synchronize the debugger adapter and the CoreSight debug interface. ULINK2 uses this option to generate sequences for switching between Serial Wire Debug and JTAG Debug mode.

Note

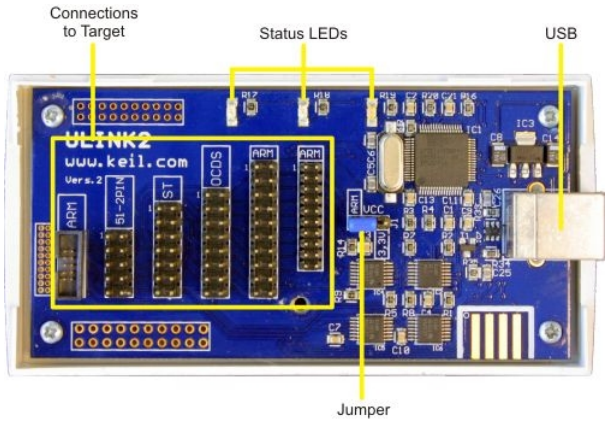
- **Check the manufacturer's device data sheet to read which CoreSight features have been implemented.**

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Hardware Description
USB Interface
LED Indicators
Jumpers
Target Connectors
JTAG Interface Schematics
Start Sequence
Reset Sequence
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Hardware Description

The following illustration shows the important interface and hardware components of the ULINK2 Adapter.



ULINK Adapter (cover off)

In general, there is very little you must do to configure ULINK for your target system. However, you may be required to:

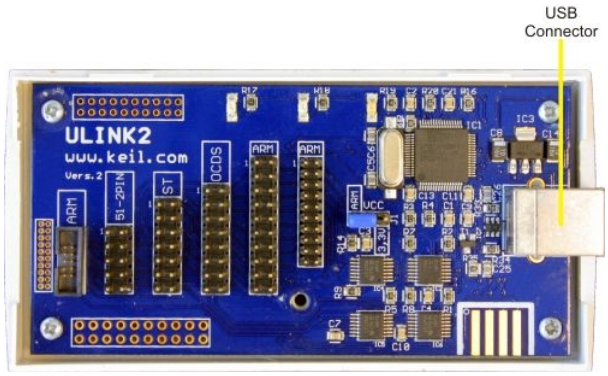
- **Set the ULINK Configuration Jumpers.**
- **Connect the appropriate cable to the Target Connectors.**

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Hardware Description
USB Interface
LED Indicators
Jumpers
Target Connectors
JTAG Interface Schematics
Start Sequence
Reset Sequence
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

USB Interface

The ULINK2 USB Interface uses a standard USB connector to connect to your PC. ULINK2 is a USB-powered device.



ULINK2 Adapter USB Interface

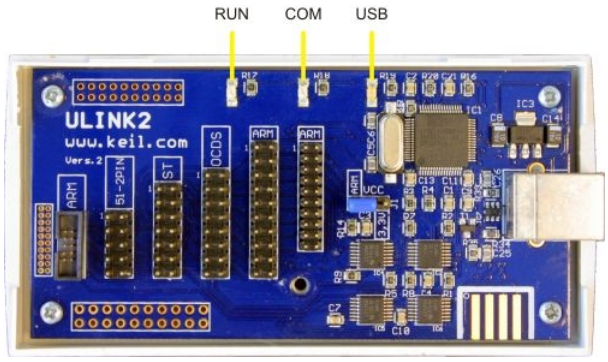
Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Hardware Description
USB Interface
LED Indicators
Jumpers
Target Connectors
JTAG Interface Schematics
Start Sequence
Reset Sequence
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

LED Indicators

The ULINK2 Adapter has the following indicator LEDs.

- **The RUN LED indicates that the target board is executing the program.**
- **The COM LED indicates that there is active communication between the debugger and the target board.**
- **The USB LED indicates that power is present on ULINK.**



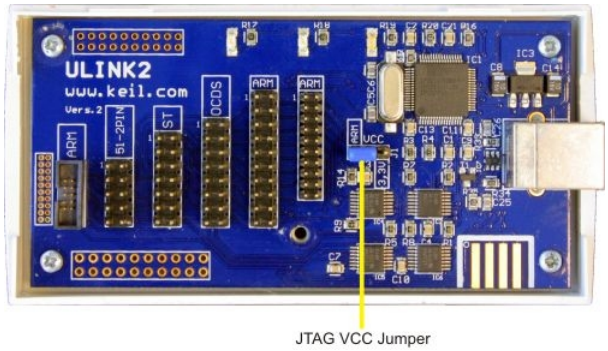
ULINK2 Adapter - LEDs (cover off)

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Hardware Description
USB Interface
LED Indicators
Jumpers
Target Connectors
JTAG Interface Schematics
Start Sequence
Reset Sequence
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Jumpers

ULINK2 has only one set of jumpers: VCC.



ULINK2 Adapter - Jumper (cover off)

The VCC jumper determines the source of VCC power for the JTAG interface.

- **If the target hardware provides VCC to the JTAG interface, set the jumper at VCC to the ARM position.**
- **If the target hardware does not provide VCC to the JTAG interface, set the jumper at VCC to the 3.3V position.**

Related Knowledgebase Articles

- ULINK: SWD COMMUNICATION FAILURE ON STELLARIS BOARD

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
- Overview
- Search
- Contact
- Assistance Request
- Feedback

On-Line Manuals
- Product Manuals
- Document Conventions

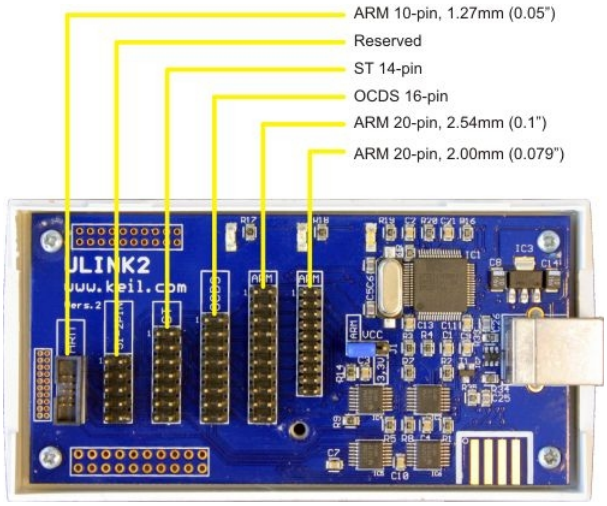
ULINK2 User's Guide
- Introduction
- Hardware Description
  - USB Interface
  - LED Indicators
  - Jumpers
  - Target Connectors
  - JTAG Interface Schematics
  - Start Sequence
  - Reset Sequence
- Setup ULINK2
- Setup Flash Programming
- Using ULINK2
- Configure Cortex-M Devices for Tracing
- µVision Windows
- Real-Time Agent
- Appendix

Target Connectors

ULINK2 provides five JTAG connectors. They support various cable types, which are used for debugging different targets. The connectors provided are:

- **A narrow (2.00mm/0.079") pin spacing) 20-pin connector for ARM targets,**
- **A standard (2.54mm/0.1") 20-pin connector for ARM targets,**
- **A 16-pin connector for Infineon OCDS (JTAG) targets,**
- **A 14-pin connector for STMicroelectronics µPSD targets,**
- **and a 10-pin connector for ARM targets (Mfgr: Don Connex P/N: C42 or Samtec P/N: SHF-105-01-L-D-TH). The Samtec part is available with different options for plating, tail, shroud, and lead style.**

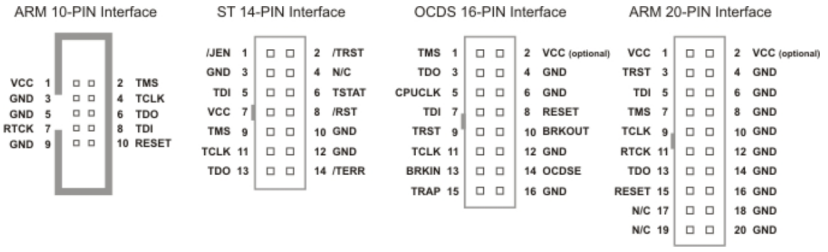
A cable for each connector is shipped with the ULINK2 Standard Product. If you must change cables, then make sure to line up the marker stripe on the cable with pin 1 of the connector. Pin 1 is labeled on the board.



ULINK2 Adapter Connectors (cover off)

ULINK2 supports both JTAG and Serial Wire Mode interfaces. Refer to the appropriate pinout diagram for the ULINK2 adapter connectors to make sure they match your target hardware.

JTAG Interface

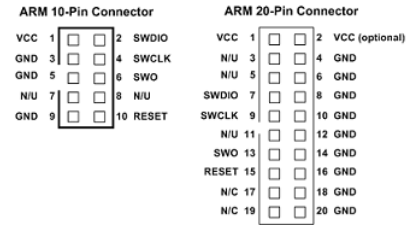


Signal	Connects to...
TMS	Test Mode State pin — Use 100K Ohm pull-up resistor to VCC.
TDO	Test Data Out pin.
RTCK	JTAG Return Test ClocK. (see Note below)
TDI	Test Data In pin — Use 100K Ohm pull-up resistor to VCC.
TRST	Test ReSeT/ pin — Use 100K Ohm pull-up resistor to VCC. TRST is optional and not available on some devices. You may leave it unconnected.
TCLK	Test CLocK pin — Use 100K Ohm pull-down resistor to GND.
VCC	Positive Supply Voltage — Power supply for JTAG interface drivers.
GND	Digital ground.
RESET	RSTIN/ pin — Connect this pin to the (active low) reset input of the target CPU.
CPUCLK	CPU clock (according IEEE Standard 1149.1).
OCDSE	Enable/Disable OCDS interface (Infineon-specific).
TRAP	Trap condition (Infineon-specific).
BRKIN	Hardware break in (Infineon-specific).
BRKOUT	Hardware break out (Infineon-specific).
/JEN	JTAG Enable (STMicroelectronics specific).
TSTAT	JTAG ISP Status (STMicroelectronics specific) (optional).
/RST	Chip reset (STMicroelectronics specific).
/TERR	JTAG ISP Error (STMicroelectronics specific) (optional).

Serial Wire Mode Interface

The Serial Wire (SW) mode is a different operating mode for the JTAG port where only two pins, TCLK and TMS, are used for the communication. A third pin can be use optionally to trace data. JTAG pins and SW pins are shared.

- **TCLK is SWCLK (Serial Wire Clock)**
- **TMS is SWDIO (Serial Wire debug Data Input/Output)**
- **TDO is SWO (Serial Wire trace Output)**



Signal	Connects to...
SWDIO	Data I/O pin. Use 100K Ohm pull-up resistor to VCC.
SWO	Optional trace output pin.
SWCLK	Clock pin. Use 100K Ohm pull-down resistor to GND.
VCC	Positive Supply Voltage — Power supply for JTAG interface drivers.
GND	Digital ground.
RESET	RSTIN/ pin — Connect this pin to the (active low) reset input of the target CPU.

Additional ARM 10-pin cables with connectors are available directly from Samtec:

- **6" Cable (Samtec P/N: FFSD-05-D-06.00-01-N)**
- **12" Cable (Samtec P/N: FFSD-05-D-12.00-01-N)**

Note

- **ULINK2 is powered through the USB connection.**
- **ULINK2 operates at 3.3V. All JTAG pins are 5V tolerant.**
- **Usually, devices do not include pull-up or pull-down resistors on JTAG nor SW pins. Resistors should be added externally onto the board. However, do not add resistors when the device includes them already.**
- **Some NXP LPC2000 Devices have special pins (RTCK, DBGSEL) that enable the JTAG interface. For example, on the NXP LPC2129 the signal RTCK must be driven low during RESET to enable the JTAG interface. You may want to add jumpers to your hardware to accomplish this.**

Related Knowledgebase Articles

- ULINK: 10-PIN / 20-PIN 1.27MM ARM CORTEX DEBUG CONNECTOR
- ULINK: CONNECTING ULINK2 TO TI/LUMINARY BOARD
- RL-ARM: UNDEFINED SPI SYMBOLS IN FS_LIB.O
- ULINK: JTAG PULL-UP RESISTORS

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
- Overview
- Search
- Contact
- Assistance Request
- Feedback

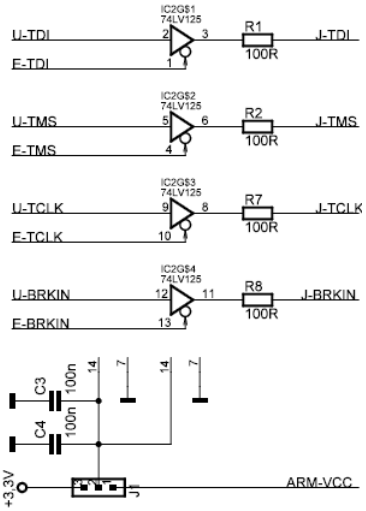
On-Line Manuals
- Product Manuals
- Document Conventions

ULINK2 User's Guide
- Introduction
- Hardware Description
  - USB Interface
  - LED Indicators
  - Jumpers
  - Target Connectors
  - JTAG Interface Schematics
  - Start Sequence
  - Reset Sequence
- Setup ULINK2
- Setup Flash Programming
- Using ULINK2
- Configure Cortex-M Devices for Tracing
- µVision Windows
- Real-Time Agent
- Appendix

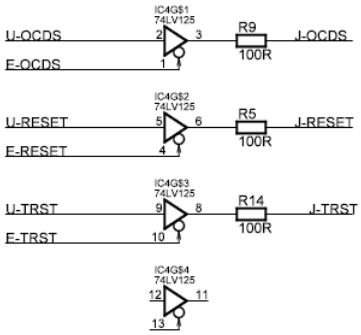
JTAG Interface Schematics

The following schematics show the JTAG interface circuits that are part of ULINK2. The schematics may help you to analyze potential problems with your target hardware.

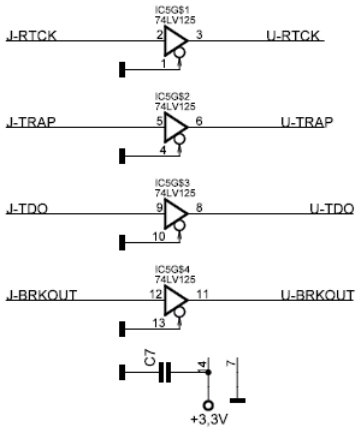
Signal Interface Schematics — IC2



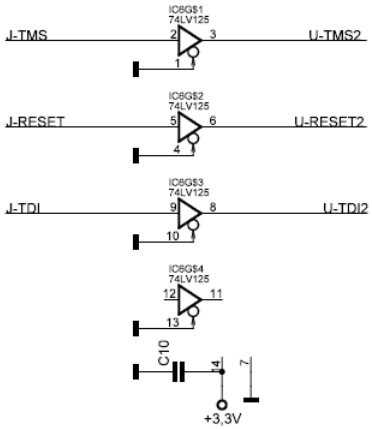
Signal Interface Schematics — IC4



Signal Interface Schematics — IC5



Signal Interface Schematics — IC6



Contact Site Map Press Privacy

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Hardware Description
USB Interface
LED Indicators
Jumpers
Target Connectors
JTAG Interface Schematics
Start Sequence
Reset Sequence
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Start Sequence

ULINK2 performs a number of operations to begin debugging on a target system. The sequence of these operations depends on the target device and the configuration settings in the µVision IDE.

For OCDS and 8051 Devices:

1. **ULINK2 initializes the JTAG interface and detects the Chip ID.**
2. **Some JTAG registers are programmed to Halt after Reset. In this case, ULINK2 drives the JTAG RESET output (pin 8 on the OCDS and ST connectors) low for 2 mSec.**
3. **ULINK2 stops the device.**
4. **If Project — Options — Debug — Load Application at Startup is enabled, ULINK2 downloads the code to the target and performs a Reset Sequence.**
5. **If the Project — Options — Debug — Initialization File text box contains the name of an initialization script, the debug commands in this script file are processed.**

For ARM Devices:

1. **If Use Reset at Startup is enabled, ULINK2 drives the JTAG RESET output (pin 15 on the ARM JTAG connector, pin 8 on the OCDS and ST connectors) low for 50mSec.**
2. **ULINK2 initializes the JTAG interface and detects the Chip ID.**
3. **If Use Reset at Startup is enabled, ULINK2 performs a Reset Sequence.**
4. **ULINK2 stops the device.**
5. **If Project — Options — Debug — Load Application at Startup is enabled, ULINK2 downloads the code to the target and performs a Reset Sequence.**
6. **If the Project — Options — Debug — Initialization File text box contains the name of an initialization script, the debug commands in this script file are processed.**

For Cortex-M Devices:

1. **ULINK2 initializes the JTAG/SW interface and detects the Chip ID. The HW RESET signal may be activated depending on the Connect option selected in Options — Debug — Settings.**
2. **If Reset after Connect is enabled, ULINK2 performs a reset as defined by the Reset option selected in Options — Debug — Settings.**
3. **ULINK2 stops the device.**
4. **If Project — Options — Debug — Load Application at Startup is enabled, ULINK2 downloads the code to the target and performs a reset as defined by the Reset option selected in Options — Debug — Settings.**
5. **If the Project — Options — Debug — Initialization File text box contains the name of an initialization script, the debug commands in this script file are processed.**

Related Knowledgebase Articles

- ULINK: JTAG RESET LINE FOR CORTEX-M3 DEVICES

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Technical Support
Overview
Search
Contact
Assistance Request
Feedback
On-Line Manuals
Product Manuals
Document Conventions
ULINK2 User's Guide
Introduction
Hardware Description
USB Interface
LED Indicators
Jumpers
Target Connectors
JTAG Interface Schematics
Start Sequence
Reset Sequence
Setup ULINK2
Setup Flash Programming
Using ULINK2
Configure Cortex-M Devices for Tracing
µVision Windows
Real-Time Agent
Appendix

Reset Sequence

ULINK2's reset sequence is device-specific. To reset most devices, ULINK2 asserts the JTAG RESET signal (pin 15 on the ARM JTAG connector, pin 8 on the OCDS and ST connectors), then attempts to immediately stop the device.

Some ARM devices do not support an immediate stop after a reset and instruction execution happens before ULINK2 can issue a stop command. For these devices, when ULINK2 gets control, it stops the CPU, and then sets the MCU's program counter (PC) and stack register (CSPR) to simulate an immediate stop after reset.

Side-Effects for ARM Devices

Resetting an ARM device may generate unexpected side-effects. The following Knowledgebase Articles describe these side effects in more detail:

- ULINK: RESET BEHAVIOUR
- ULINK: SINGLE STEP AT RESET APPEARS TO FAIL
- ULINK: ARM DEVICE DOES NOT REACT
- ULINK: RECOVER STR71X WHEN JTAG DISABLE

Copyright © 2013 ARM Ltd and ARM Germany GmbH. All rights reserved.

Artisan Technology Group is an independent supplier of quality pre-owned equipment

Gold-standard solutions

Extend the life of your critical industrial, commercial, and military systems with our superior service and support.

We buy equipment

Planning to upgrade your current equipment? Have surplus equipment taking up shelf space? We'll give it a new home.

Learn more!

Visit us at **artisantg.com** for more info on price quotes, drivers, technical specifications, manuals, and documentation.

Artisan Scientific Corporation dba Artisan Technology Group is not an affiliate, representative, or authorized distributor for any manufacturer listed herein.

We're here to make your life easier. How can we help you today?

(217) 352-9330 | sales@artisantg.com | artisantg.com

ARTISAN® TECHNOLOGY GROUP