P&E Microcomputer Systems, Inc.

www.pemicro.com

Technical Summary For USB Multilink Universal, Rev. A

(PART# USB-ML-UNIVERSAL)

Supports Freescale: RS08 · HCS08 · HC(S)12(X) · S12Z · ColdFire® V1/ColdFire+ V1 ColdFire V2-4 · Qorivva® MPC55xx/56xx · Kinetis® · Power Architecture PX Series · DSC

Document# PE4534, Version 1.05

1. Introduction
2. Usage of the USB Multilink Universal
3. Driver Installation On Windows XP/2000/2003/Vista/7
4. Connecting To The Target
5. Startup Reset Sequence
6. Firmware Updates/Architecture Selection
7. Interface Libraries
8. Compatible Software
9. Transition To Production Programming

1 Introduction

P&E's USB Multilink Universal interface provides access to debug modes on a wide range of Freescale microcontroller families by communicating between the debug header on a target, and a USB port on a computer. The families of Freescale microcontrollers are supported via the multiple headers located on the USB Multilink Universal. The headers for Ports A-D are dual-row with a .100" pitch, and the headers for Ports F-G are dual-row with a .050" pitch. The pin-outs for these connections and the families that they support are shown below. Please note that Port G, the Kinetis mini-10 connector, is supported but there is no corresponding ribbon cable included. Port E, the 16-pin JTAG/COP connector, is not currently supported.

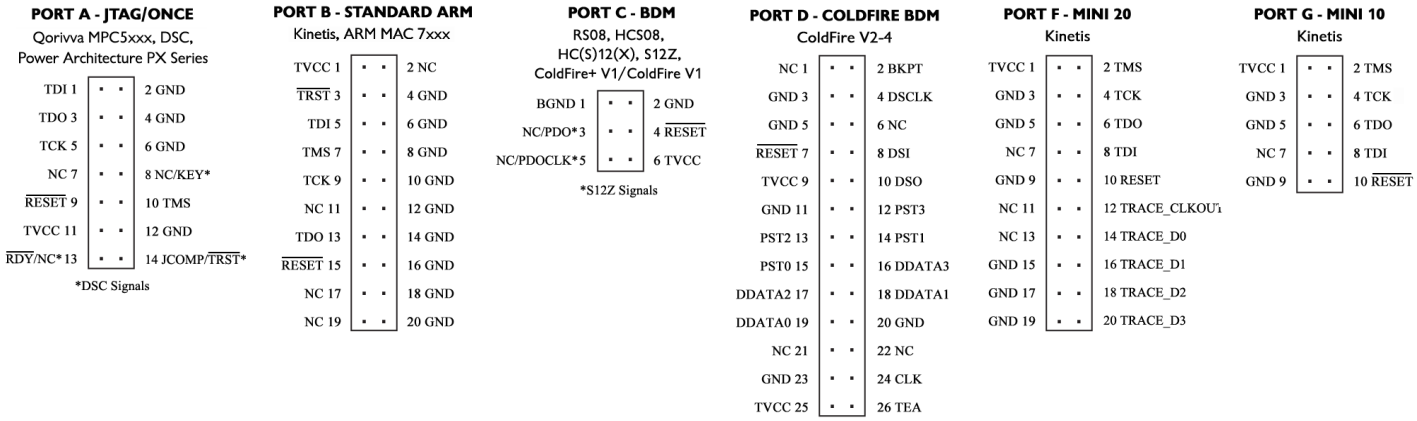

Figure 1-1: USB Multilink Universal Headers

By using the USB Multilink Universal, the user can take advantage of debug modes to halt normal processor execution and use a computer to control the processor. The user can then directly control the target's execution, read/write registers and memory values, debug code on the processor, and program internal or external FLASH memory devices.

©2010 P&E Microcomputer Systems, Inc. Kinetis, Qorivva, and ColdFire are registered trademarks of Freescale Semiconductor, Inc.

2 Usage Of The USB Multilink Universal Interface

The USB Multilink Universal can communicate with RS08, HCS08, HC(S)12(X), S12Z, ColdFire V1/V2/V3/V4, Qorivva MPC55xx/56xx, DSC, Power Architecture PX Series, and Kinetis microprocessors by connecting a ribbon cable between the target's debug header and one of the multiple ports on the USB Multilink Universal. Do not attempt to use multiple ports at once, as this may damage both the target processors as well as the USB Multilink Universal.

The USB Multilink Universal Interface will work with targets whose processor power supply is in the range of 1.6V to 5.25V. The interface derives its power from the USB port and draws less than 1mA from the target.

The USB Multilink Universal has a female type B USB connector. Use a Type A to Type B male-to-male USB cable to connect the interface to the PC.

The USB Multilink Universal is a USB device. If a USB Hub is used, it must be a self-powered hub (i.e. with its own power supply). By default, the USB protocol used is USB 2.0.

There are two LEDs on the USB Multilink Universal interface. The blue LED indicates that the interface is powered and running. The yellow LED indicates that target power has been detected.

Note: If connecting to a ColdFire V2-4 processor which requires synchronous communication, such as the MCF5272 and MCF5206(E), a CABLE-CF-ADAPTER (sold separately) is required.

Note: To avoid improper connections, the red stripe of the ribbon cable should always be oriented towards Pin 1, both on the Multilink port and the target processor header.

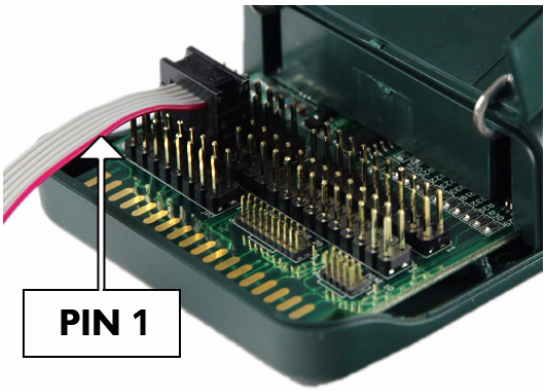

Figure 2-1: Proper orientation of ribbon cables

3 Driver Installation On Windows XP/2000/2003/Vista/7

Before connecting the USB Multilink Universal to the PC, the appropriate drivers need to be installed on the PC. These drivers are automatically installed when installing Freescale's CodeWarrior or any of P&E's recent software development packages. If you have installed a recent version of these then the instructions for manual installation that follow are not necessary. However, Windows 7 users who are installing software distributed before December 28, 2009 will need to obtain the latest version of the drivers and install them manually. A copy of the driver installation program may be downloaded from the "Downloads" section of P&E's "Support Center" located at http://www.pemicro.com. If you are using third-party software, make sure you have a version which supports the USB Multilink Universal Rev. A interface. Once you have obtained the latest version of the driver installation program, please use the instructions below to manually install the drivers.

When the cable is plugged in, the operating system should indicate that it has found a driver for the attached interface. Follow the instructions in the "Found New Hardware Wizard" dialog for having Windows automatically install the driver.

If you connected the Multilink interface prior to installing the drivers, Windows will not have been able to find the appropriate driver and may have disabled the device. If you unplug the device and then plug it in again, Windows will automatically disable it even if you have installed the drivers. To force Windows to attempt to load the driver

again, perform the following steps while the USB Multilink Universal interface is plugged into the computer:

1. Open the Control Panel: Start Button [->Settings] ->Control Panel. (You will not need to select “Settings” on Vista and Windows 7).
2. Double Click the “System” Icon. (Windows 7: “System and Security”)
3. Select the “Hardware” Tab. (Windows 7: “Hardware and Sound”, Windows Vista: skip this step)
4. Click the “Device Manager” Button. (Windows 7: “Devices and Printers -> Device Manager”)
5. The “USB Multilink 2.0” device will be shown with an exclamation point next to it. Double-click this device.
6. Click the “Reinstall Driver…” button and follow the dialog instructions to have Windows automatically install the driver. (Windows 7: First click the “Driver” tab, then select “Update Driver...”)
7. If the hardware still has a yellow exclamation mark next to it, right click on it and select uninstall. The USB Multilink should disappear from the list. Unplug the USB Multilink and then plug it into the PC again. A new Hardware Found dialog will pop up; follow the dialog instructions and have Windows automatically install the driver.

4 Connecting To The Target

The following is the proper connection sequence to connect the PC to the target system via the USB Multilink Universal interface:

1. Make sure the target power is OFF and the USB Multilink Universal is not connected to either the target or the PC
2. Open the Multilink and connect a ribbon cable from the correct Multilink port to the target. Make sure that the ribbon cable is plugged into the target with the proper orientation. PIN 1 is indicated by a 1 next to the port.
3. Connect the USB Multilink to the PC via a USB cable. The Blue LED on the Multilink should become lit.
4. Turn the target power on. The Yellow LED on the Multilink should become lit.

Before disconnecting the setup, turn the target power off.

5 Startup Reset Sequence

Note that if the device does not enter debug mode, the program issues the error message “Cannot enter background mode.” If you receive this message you should check your hardware with a scope, logic analyzer or logic probe. First check for power on, then check to make sure the processor oscillator is running. Finally, look for the startup sequence for your microprocessor that is listed below.

Port A – JTAG/ONCE – Qorivva MPC55xx/56xx, Power Architecture PX Series, DSC

a. RESET (Pin-9) is driven low (to processor).
b. Activity appears on TCLK (Pin-5), TDI (Pin-1) and TDO (Pin-3). (PC software instructs the processor to enable debug mode).
c. RESET (Pin-9) is released by the interface and will go high.
d. Activity appears on TCLK (Pin-5), TDI (Pin-1) and TDO (Pin-3). (Debug activity).

Ports B, F, G – ARM JTAG– Kinetis

a. RESET is driven low (to processor).
b. Activity appears on TCLK, TDI and TDO (PC software instructs the processor to enable debug mode).
c. RESET is released by the interface and will go high.
d. Activity appears on TCLK , TDI and TDO (Debug activity).

Port C – BDM

RS08, HCS08, S12Z, ColdFire V1

a. Debug activity is seen on BKGD (Pin-1).

HC12

a. BKGD (Pin-1) and RESET (Pin-4) are pulled low by the interface.
b. After 5 milliseconds, RESET (Pin-4) is released and goes high.
c. After 10 milliseconds, BKGD (Pin-1) is released and goes high.
d. After 20 more milliseconds, debug activity is seen on BKGD (Pin-1).

Port D – Coldfire V2/V3/V4

a. BKPT (Pin-2), DSI (Pin-8), and DSCLK (Pin-4) signals are driven low.
b. RESET (Pin-7) is driven low for 20+ milliseconds and released.
c. After RESET is released and if the processor has correctly entered background mode, the PST0 (Pin-15), PST1 (Pin-14), PST2 (Pin-13) and PST3 (Pin-12) lines should all be driven high by the processor.
d. Activity (changing signals) is seen on the DSI, DSO, and DSCLK signals. The activity on the DSCLK and DSI lines is generated by the PC and the activity on the DSO line is generated by the processor.

Port E – JTAG/COP (Not yet supported)

6 Firmware Updates/Architecture Selection

The USB Multilink Universal uses firmware updates to change between modes of operation to support different families of Freescale microcontrollers. Older versions of P&E's software and Freescale's CodeWarrior are not able to automatically configure the USB Multilink Universal when the target is switched to a different family of microcontrollers. If you are not using the latest version, please contact us to determine if you are eligible for a discounted upgrade to the latest version of P&E software. You may also download a manual configuration utility for the USB Multilink Universal from the Support Center or USB Multilink Universal product page on our website:

http://www.pemicro.com/support/downloads_find.cfm

7 Interface Libraries

P&E produces a set of interface libraries which allow the user to directly control the USB Multilink Universal from any Windows Development environment which can interact with a DLL. The interface libraries come with examples for controlling the Multilink interface from Microsoft Visual C as well as Borland Delphi. More details can be found on the Interface Libraries page on the P&E website:

http://www.pemicro.com/products/product_processor.cfm?category=9

8 Compatible Software

In addition to support from Freescale Codewarrior and other third party software, each of the families supported by the USB Multilink Universal is supported by a variety of software from P&E, including flash programmers, debuggers, and test application packages . Details can be found in the “Products” section at www.pemicro.com.

9 Transition To Production Programming

The USB Multilink Universal is intended for development and is not designed to accomodate the demands of production programming. However, P&E’s Cyclone programmers are specifically engineered to withstand the rigors of a production environment and will provide a seamless transition from the USB Multilink Universal. More information is available at: http://www.pemicro.com/cyclone

10 High-Speed USB Multilink Universal Interface - Coming Soon

P&E is developing a high-speed version of the USB Multilink Universal called the USB Multilink Universal FX. It will have enhanced communications speed and other features. Keep an eye on our website at **www.pemicro.com/universal** for information about the USB Multilink Universal FX.

Мы молодая и активно развивающаяся компания в области поставок электронных компонентов. Мы поставляем электронные компоненты отечественного и импортного производства напрямую от производителей и с крупнейших складов мира.

Благодаря сотрудничеству с мировыми поставщиками мы осуществляем комплексные и плановые поставки широчайшего спектра электронных компонентов.

Собственная эффективная логистика и склад в обеспечивает надежную поставку продукции в точно указанные сроки по всей России.

Мы осуществляем техническую поддержку нашим клиентам и предпродажную проверку качества продукции. На все поставляемые продукты мы предоставляем гарантию .

Осуществляем поставки продукции под контролем ВП МО РФ на предприятия военно-промышленного комплекса России , а также работаем в рамках 275 ФЗ с открытием отдельных счетов в уполномоченном банке. Система менеджмента качества компании соответствует требованиям ГОСТ ISO 9001.

Минимальные сроки поставки, гибкие цены, неограниченный ассортимент и индивидуальный подход к клиентам являются основой для выстраивания долгосрочного и эффективного сотрудничества с предприятиями радиоэлектронной промышленности, предприятиями ВПК и научно-исследовательскими институтами России.

С нами вы становитесь еще успешнее!

Наши контакты:

Телефон: +7 812 627 14 35

Электронная почта: sales@st-electron.ru

Адрес: 198099, Санкт-Петербург, Промышленная ул, дом № 19, литера Н, помещение 100-Н Офис 331