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DEVRS08KA2 Evaluation Board Rev A Technical Summary

v1.02a

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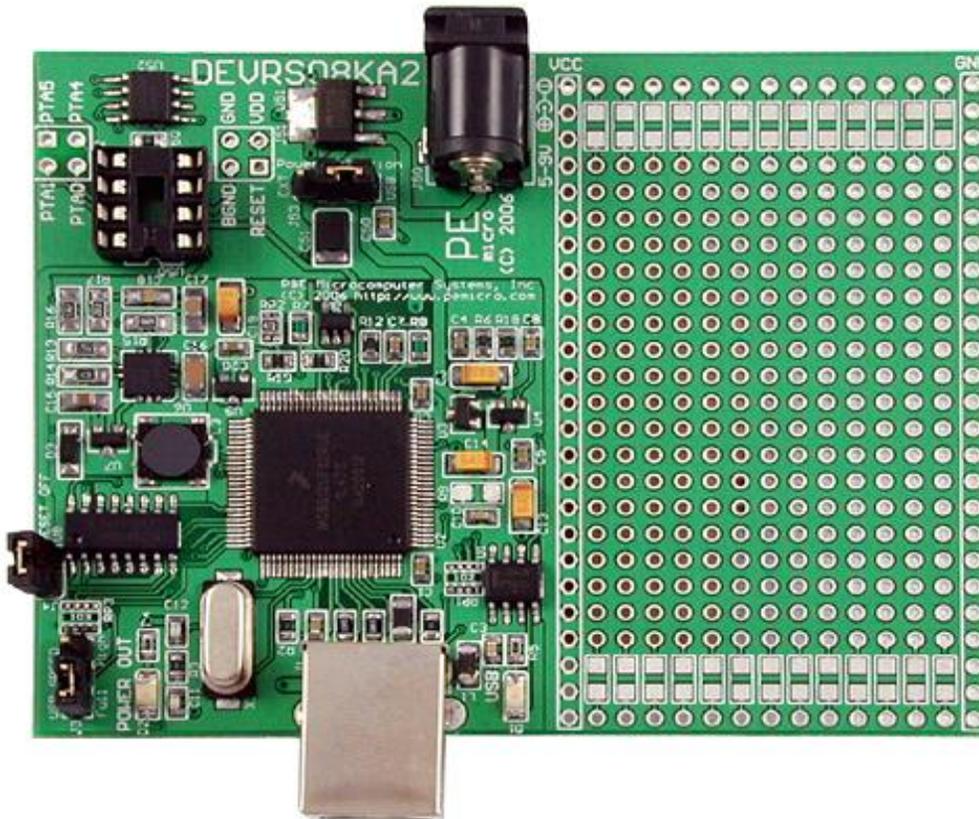


Figure 1. DEVRS08KA2 Evaluation Board

1.0 Introduction

The DEVRS08KA2 is an evaluation board with a resident Freescale MC9RS08KA2 microprocessor. The embedded USB-to-BDM interface acts as a medium between the USB port on a Windows 98SE, Windows 2000, Windows XP or Windows 2003 machine and the background debug module of the resident MC9RS08KA2 CPU. Via the USB-to-BDM interface and the background debug module, one can halt the normal processor execution and use a PC to control the processor. The user can then directly control the target's execution, read/write registers and memory values, debug the code on the processor and program internal FLASH.

2.0 Usage of the DEVRS08KA2 Board

The DEVRS08KA2 has a female type B USB connector. Use a Type A to Type B USB extension cable to connect the interface to the PC.

The DEVRS08KA2 is a high power 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 2.0.

There are two LEDs on the USB-to-BDM interface portion of the DEVRS08KA2 evaluation board. The green LED indicates that the interface has been properly powered and enumerated via the USB port of the PC. The yellow LED indicates that target power has been detected.

3.0 Driver Installation on Windows XP/2000/2003/Vista/7

Before connecting the DEVRS08KA2 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 RS08 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 DEVRS08KA2. Once you have obtained the latest version of the driver installation program, please use the instructions below to manually install the drivers.

When the development board is plugged in, the operating system should indicate that it has found a driver for the attached "USB Multilink 2.0". 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 DEVRS08KA2 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.

4.0 Using a USB Hub

The DEVRS08KA2 is classified as a high-power USB device which is powered from the USB bus. A high-power device requires that if a USB hub is used, it must be a self-powered hub. This means that the hub has a separate power supply from which it derives its operating power (as opposed to deriving its power from the PC). It must be able to supply 500mA per port (a high power USB device may derive up to 500mA from the port).

5.0 Configuring the DEVRS08KA2 Board for operation

a. Providing power to the embedded USB-to-BDM interface and the MC9RS08KA2 resident microprocessor

The embedded USB-to-BDM interface draws its power from the USB port of the PC. Once the USB cable is plugged into the Type B connector on the DEVRS08KA2 evaluation board, the green LED should light up indicating that the USB device has been properly powered up and enumerated.

The rest of the on-board resources, including the MC9RS08KA2 processor, can use one of the two available power sources determined by the setting on the “Power Selection” J53 header. The USB-to-BDM interface is capable of providing a 3.3 Volt power source capable of supporting a current draw of up to 250mA. On the other hand, a 5-9 Volt center-positive external power supply can also be used for providing

power to the MC9RS08KA2 processor. The jumper on the “Power Selection” header should be placed in the EXT. position to power up the processor from the external power supply, or in the USB position to use the USB-to-BDM interface power output.

b. Connecting the RESET signal from USB-to-BDM interface to MC9RS08KA2 processor.

To ensure the ability to connect to the MC9RS08KA2 processor via the USB-to-BDM interface, please make sure that the “RESET OFF” J3 header is populated. This connection allows the user to establish communication with the resident processor via the USB-to-BDM interface and perform in-circuit debugging as well as FLASH programming procedures. **Once the final firmware has been programmed into the FLASH of MC9RS08KA2, this jumper should be unpopulated to allow for stand-alone operation of the processor.**

c. Using the 8-pin DIP socket to insert and debug the MC9RS08KA2 processor.

The 8-pin DIP socket gives the user the ability to program and debug the MC9RS08KA2 processor in a DIP8 package. In order to do so, the user should insert the DIP8 target processor into the U50 socket and un-mount the U52 SOIC8 MC9RS08KA2 processor.

6.0 Connecting to the target

The following is the proper connection sequence to connect the PC to the MC9RS08KA2 processor via an embedded USB-to-BDM interface.

- 1) Make sure that the target power is OFF by removing the jumper from “Power Selection” header, and that the DEVRS08KA2 is not connected to the PC.
- 2) Set all jumpers to configure DEVRS08KA2 for proper operation. Please, refer to the “Configuring the DEVRS08KA2 Board For Operation” section of this manual for more details.
- 3) Connect the DEVRS08KA2 to the PC via a USB extension cable. The Green LED on the USB-to-BDM interface part of the board should illuminate.
- 4) Turn the target power on by setting the jumper on the “Power Selection” header in a desired manner. The yellow LED on the USB-to-BDM interface part of the board should illuminate.

Before disconnecting the setup, turn the target power off.

7.0 Interface Libraries

One of the products P&E produces is a set of interface libraries which allows the user to directly control the P&E USB Multilink/Cyclone PRO Interfaces from any Windows Development Environment which can interact with a DLL. The interface libraries come with examples for controlling the USB-to-BDM interface or any P&E USB-ML-12/Cyclone PRO hardware interfaces from Microsoft Visual C as well as Borland Delphi. Details of the libraries for the MC9RS08 (UNITRS08) may be found at <http://www.pemicro.com>.

P&E also has a Linux version of the UNITRS08 drivers. Contact P&E for more details.

8.0 Firmware Updates

The latest version of the firmware for the USB-to-BDM interface is included in P&E software development kits. When the debugger or programmer is ran, if it detects that the USB-to-BDM interface firmware needs to be updated, it will ask the user's permission to do this. If given, the update happens automatically.