

APPLICATION NOTE 4027

How to Update the Firmware in the MAXQ Serial-to-JTAG Board

Abstract: This application note lists the steps required to load firmware onto a MAXQ® serial-to-JTAG development board. The serial-to-JTAG board allows programming and debugging of any MAXQ processor. Maxim occasionally releases updates to this board's firmware. The steps given in this article allow developers to load the new firmware and remain current with the latest changes.

All MAXQ microcontrollers use the JTAG interface for debugging and system programming because of the interface's low cost and simplicity. For convenience, a serial-to-JTAG adapter board is provided so any MAXQ microcontroller can connect to an RS-232 serial port. Many third-party vendors also use this adapter board to connect to MAXQ microcontrollers in their Integrated Development Environments (IDE). Two IDE examples for MAXQ microcontrollers are the IAR Embedded Workbench® and CrossWorks by Rowley Associates.

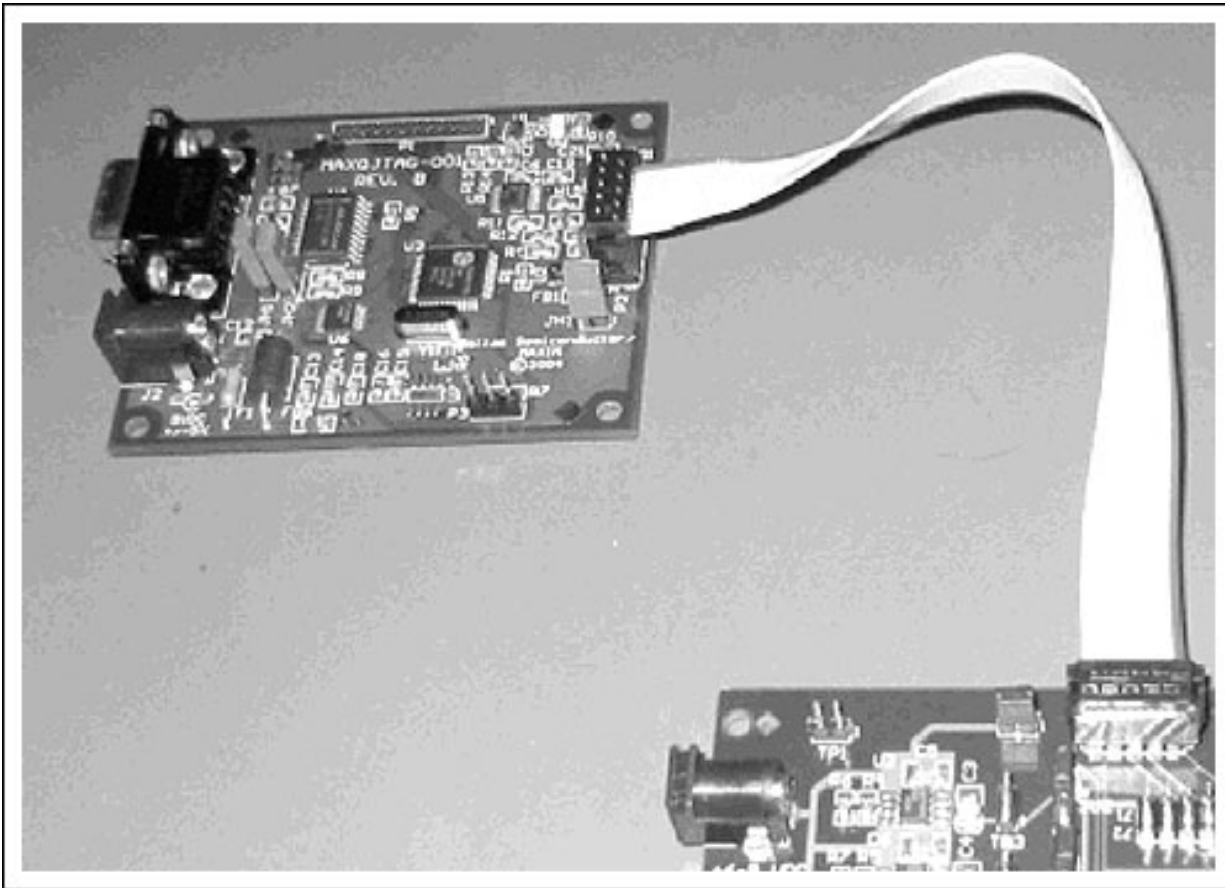


Figure 1. The MAXQ serial-to-JTAG board.

This JTAG board accepts commands from an RS-232 connection, converts these signals to TTL-level signals, and finally translates the commands into the appropriate JTAG commands. These commands can then be accepted by any attached MAXQ microcontroller. To handle this translation, the JTAG board uses the [DS89C430](#) ultra-high-speed, 8051 microcontroller. (**Note:** Earlier versions of the JTAG board may use a [DS89C420](#) 8051 microcontroller, but the instructions found in this application note all still apply.) The DS89C430 microcontroller has internal flash memory which stores the firmware required to perform the command translations. If Maxim releases a new version of this firmware or if the firmware becomes damaged for any reason, it will be necessary to reload it.

There are two things required to update the firmware on the JTAG board.

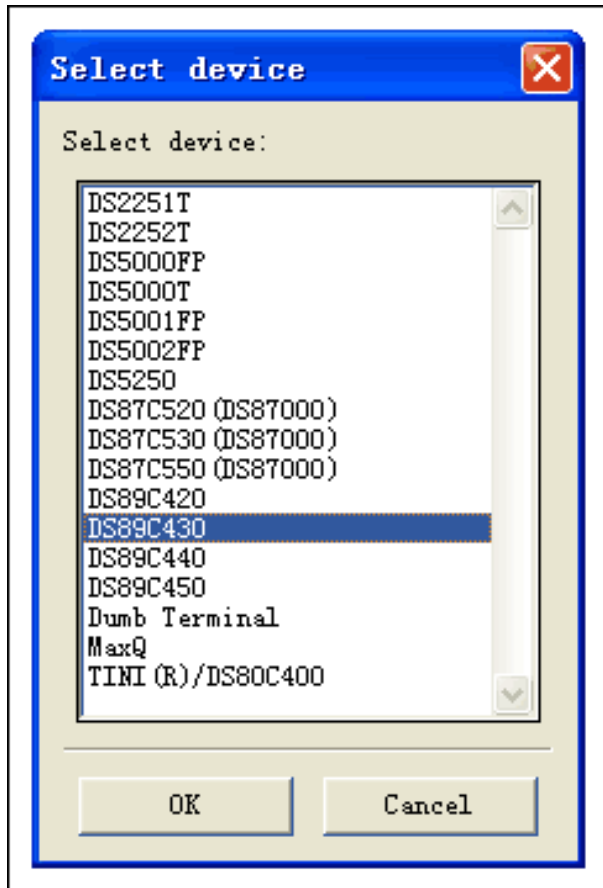
1. The Microcontroller Tool Kit (MTK), Maxim's universal programming software which supports both 8051 and MAXQ

microcontrollers. The tool kit can be [downloaded](#).

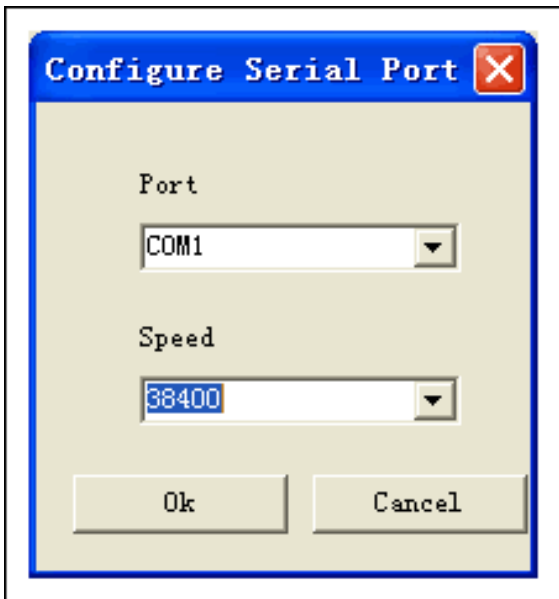
2. A copy of the JTAG board's firmware. The most recent firmware can always be found packaged with the latest version of the MAX-IDE for MAXQ microcontrollers. Although [MAX-IDE](#) is not required to install the firmware, it still must be installed to extract the firmware from the setup file. Once you install MAX-IDE, you can find the JTAG firmware (jtag.hex) in the C:\Program Files\MAX-IDE\Devices\MaxQ\JTAGFirmware directory. MAX-IDE can be [downloaded](#) (ZIP).

Once you have these two pieces of code, you can use the steps below to update the board's firmware.

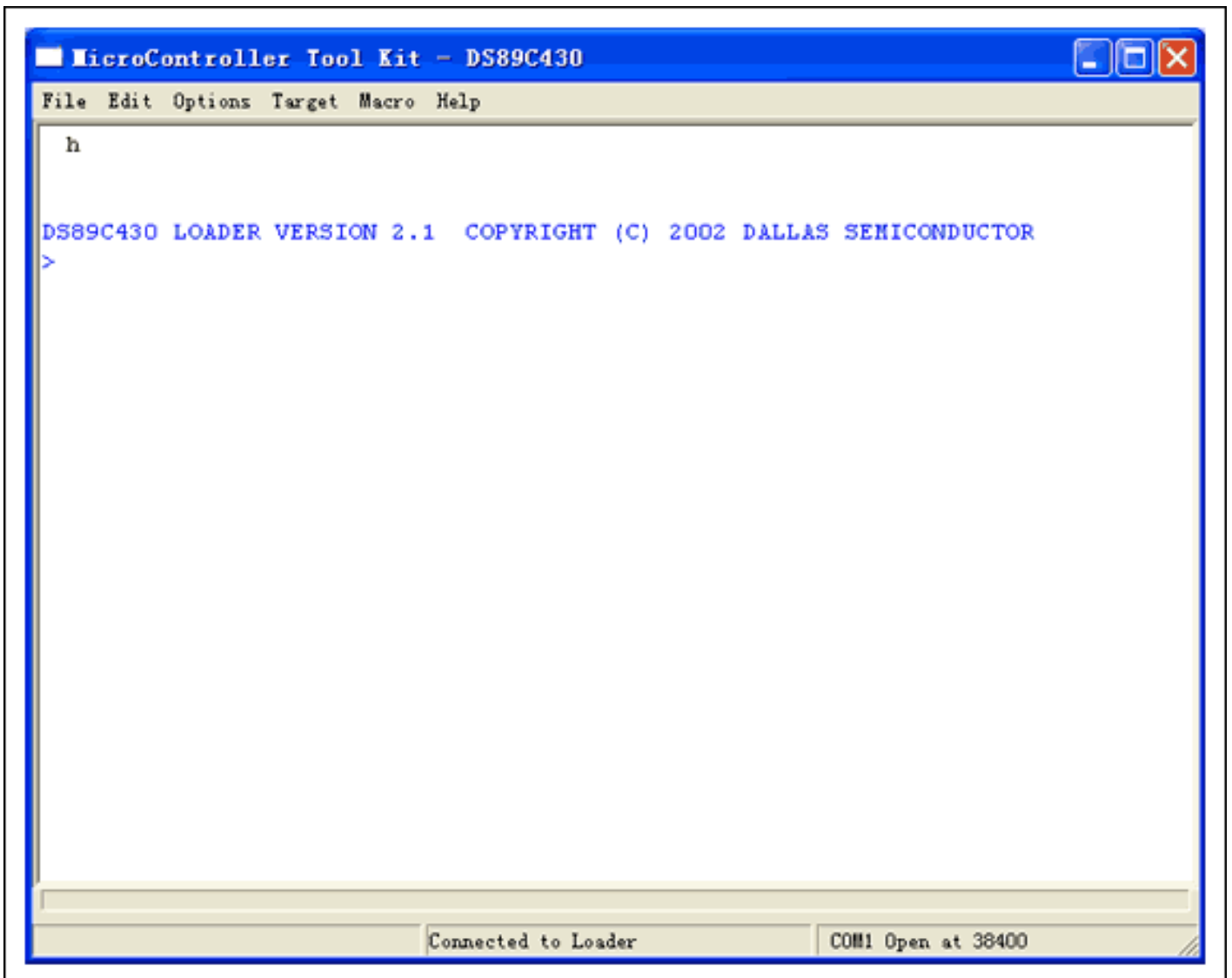
1. Connect a serial cable from the PC's serial port to the JTAG board and power up the board. The JTAG board requires a 5V \pm 5% DC-regulated power supply. Ensure that the connection cable, P2, is disconnected from the JTAG board and the target MAXQ board. The DS1 LED of the JTAG board should turn on when power is applied.
2. Make sure that the jumpers, JH1 and JH2, on the JTAG board are closed.
3. Start MTK and select DS89C430 in the "Select device" screen.



4. Select "Configure Serial Port" in the "Option" menu, and choose the desired serial port and baud rate. Because the DS89C430's boot loader automatically detects the baud rate of the PC side, and because the on-board crystal is 7.37MHz, the maximum baud rate which can be selected is 38400BPS.

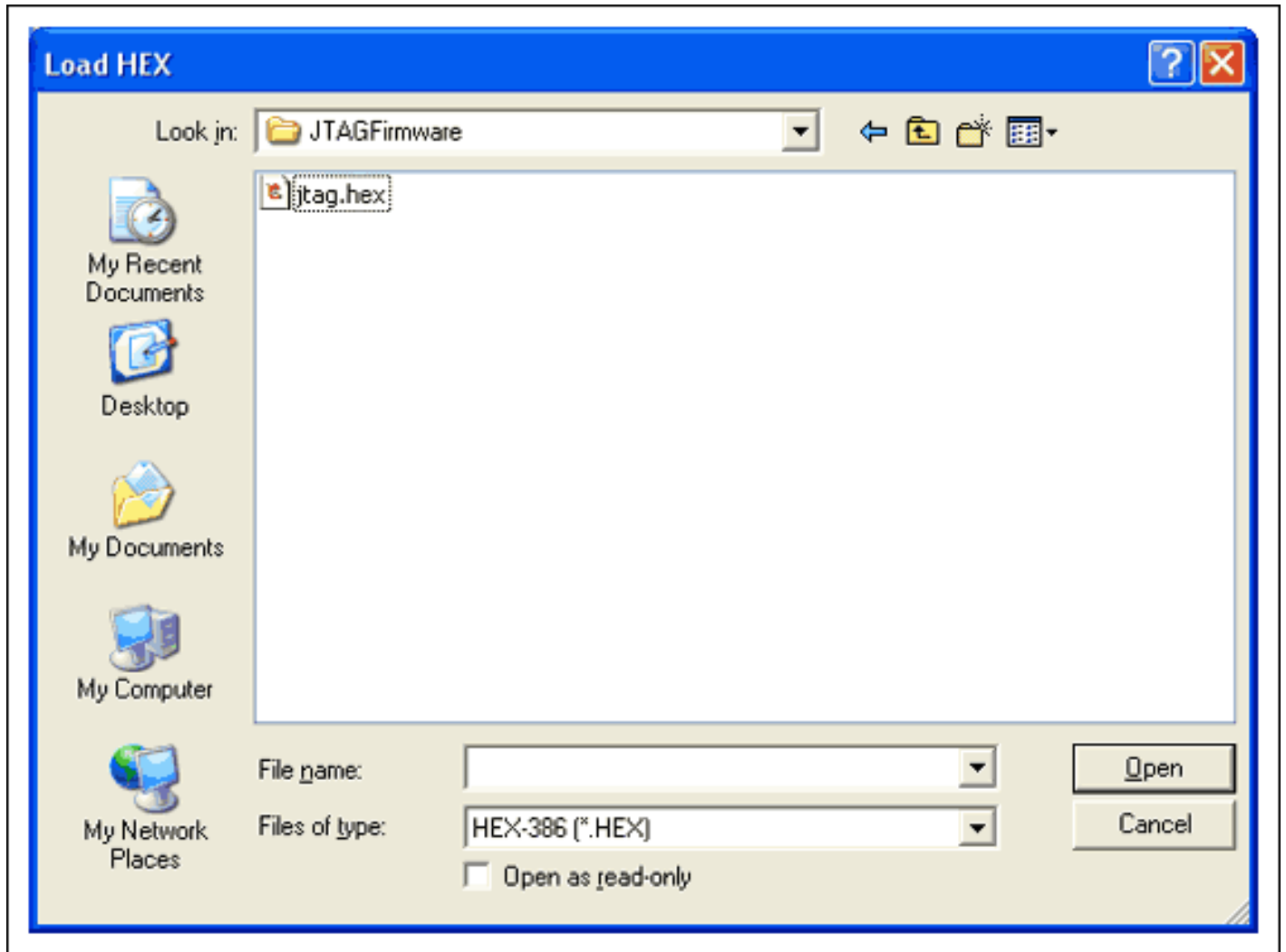


5. Select "Open COMx at 38400 baud" in the "Target" menu. (COMx is the serial port you selected earlier.) Choose "Connect to Loader." You should then see the welcome screen below. (Notice that the DS1 on the JTAG board will turn off while you are connected to the loader.)

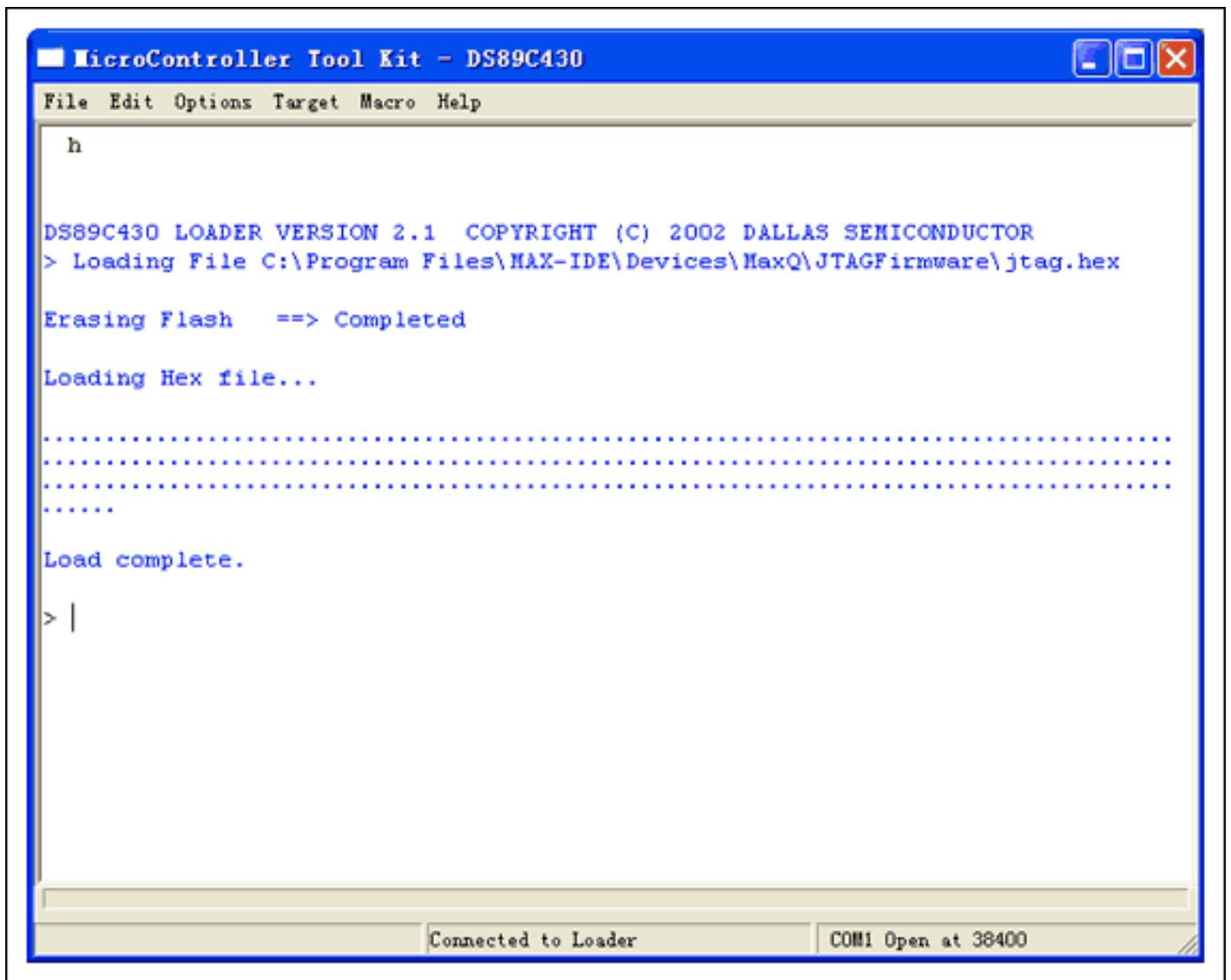


6. Select "Load Flash" in "File" menu, and browse to the folder where the JTAG firmware is located. If you plan to use the firmware that comes with MAX-IDE, you will find it in

the C:\Program Files\MAX-IDE\Devices\MaxQ\JTAGFirmware directory.



7. Select jtag.hex. MTK will automatically begin downloading the firmware into the DS89C430 microcontroller. Once the download completes, you will see output similar to the following.



8. Select "Close COMx" in the "Target" menu to close the serial port. The DS1 LED on JTAG board will then turn on again.

If you followed all the steps listed above, the serial-to-JTAG board will now be programmed with the latest version of the JTAG firmware.

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IAR Embedded Workbench is a registered trademark of IAR Systems AB.

Application Note 4027: www.maxim-ic.com/an4027

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