MAXQ USB-to-JTAG Evaluation Kit

Evaluates: Programming Interface for MAXQ Microcontrollers

General Description

The MAXQ® USB-to-JTAG evaluation kit (EV kit) is a pre-programmed interface board that acts as a USB-to-JTAG programming and debugging adapter for MAXQ micro-controllers. With the included board, included 10-pin JTAG interface cable, and a (user supplied) standard A-to-Mini-B USB cable, the EV kit can be used with compatible software tools running on a host PC to load and debug code on programmable MAXQ microcontrollers. Software packages that support the USB-to-JTAG adapter include IAR Embedded Workbench® IDE for C programming, Maxim's free MAX-IDE for assembly-based projects, and the Microcontroller Tool Kit (MTK) utility for loading and verifying precompiled Intel hex format files.

EV Kit Contents

♦ **MAXQ USB-to-JTAG Evaluation Board**

♦ **JTAG Interface Ribbon Cable**

Features

♦ **3.3V JTAG Port Interface**

♦ **Easily Load Code and Debug Using USB-to-JTAG Interface**

♦ **USB-to-JTAG Interface Provides In-Application Debugging Features**

♦ **Step-by-Step Execution Tracing**

♦ **Breakpointing by Code Address and Data Memory Address**

♦ **Register and Data Memory View and Edit**

Ordering Information

PART	TYPE
MAXQUSBJTAG-KIT#	MAXQ USB-to-JTAG EV Kit

#Denotes a RoHS-compliant device that may include lead that is exempt under the RoHS requirements.

Component List

DESIGNATION	QTY	DESCRIPTION
C1, C2, C3	3	0.1µF -20%/+80%, 16V capacitors (0603)
C4	1	1µF ±10%, 6.3V capacitor (0603)
C5	1	4.7µF ±20%, 6.3V capacitor (0603)
D1	1	Green surface-mount LED Lite-On IT LTST-C190GKT
D2	1	Red surface-mount LED Lite-On IT LTST-C190CKT
J1	0	Not populated
J2	1	2 x 5, 0.100in-spaced header (JTAG) Molex 90131-0125

DESIGNATION	QTY	DESCRIPTION
J3	1	USB mini-B connector Hirose Electric UX60-MB-5ST
R1, R2	2	680Ω ±5%, 1/10W resistors (0603)
U1	1	Low-power LCD microcontroller (56 TQFN-EP*) Maxim MAXQ2000-RBX+
U2	1	FTDI USB-to-UART converter FTDI FT232RL
U3	1	LDO linear voltage regulator (+2.5V output) (6 SOT23) Maxim MAX6329ZLUT+
—	1	PCB: MAXQUSBJTAGEVKIT#, REV B/REV C

*EP = Exposed pad.

+Denotes a lead(Pb)-free/RoHS-compliant package.

For pricing, delivery, and ordering information, please contact Maxim Direct at 1-888-629-4642, or visit Maxim's website at www.maximintegrated.com.

19-5185; Rev 1; 11/10

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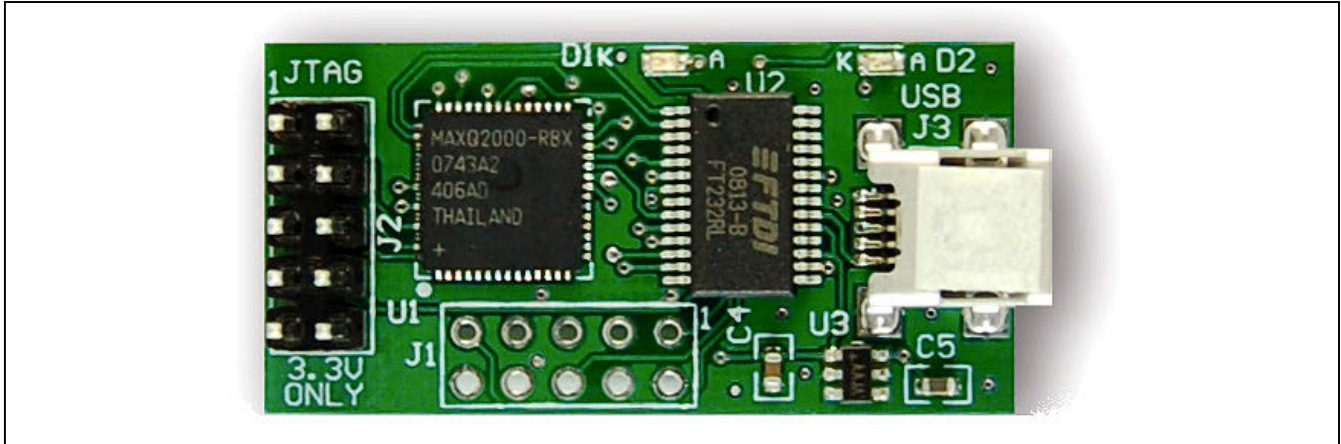## Evaluates: Programming Interface for MAXQ Microcontrollers

Figure 1. MAXQ USB-to-JTAG EV Kit Board

Detailed Description

The MAXQ® USB-to-JTAG EV kit is designed to operate as a USB-to-JTAG adapter between programming/debugging tools on the host PC (such as MAX-IDE, MTK, or IAR Embedded Workbench® IDE) and a programmable MAXQ microcontroller. The FT232RL USB-to-UART converter allows the host PC to communicate with the MAXQ2000 on the USB-to-JTAG EV kit over a virtual COM port that is translated into a standard 10-bit, asynchronous, serial protocol running at 115,200 baud. The MAXQ2000 receives commands and data from the PC and handles the task of driving the four JTAG communication lines (TCK, TMS, TDO, and TDI) that connect to another MAXQ microcontroller on a separate kit board.

The MAXQ USB-to-JTAG EV kit has two off-board connectors. The first of these is a standard mini-B USB connector that is used to connect the USB-to-JTAG EV kit to a USB port on the host PC. The MAXQ USB-to-JTAG EV kit is powered directly over the USB cable. The second connector is the standard 10-pin JTAG interface used by all MAXQ microcontroller EV kits, allowing the MAXQ USB-to-JTAG EV kit to be connected to another MAXQ microcontroller using a 2 x 5-pin header, 10-connector ribbon cable. Table 1 defines the pins on the USB-to-JTAG interface.

Power Supplies

The MAXQ USB-to-JTAG EV kit is powered directly from the VBUS supply (typically 5V) on the USB cable. This

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

Table 1. USB-to-JTAG Interface Pin Definitions

HEADER PIN	PIN NAME	DESCRIPTION
1	TCK	JTAG interface: test clock
2, 10	GND	Ground
3	TDO	JTAG interface: test data out
4	VREF	Not connected on this design. JTAG pins are driven at a fixed +3.3V level.
5	TMS	JTAG interface: test mode select
6	$\overline{RST}$	Active-low reset
7	KEY	No connection. This pin can be removed/cut to fit JTAG cables that have been keyed.
8	VP50	Connected to the USB VBUS supply on this design.
9	TDI	JTAG interface: test data in

supply voltage is also provided at pin 8 (VP50) on the outgoing JTAG interface connector, which allows the EV kit on the other end of the JTAG connector cable to also power itself from the USB bus supply if configured to do so.

The FT232RL outputs a regulated +3.3V supply that is, in turn, regulated down to a +2.5V supply by the MAX6329 LDO regulator. These supplies are only designed for use by the components on the MAXQ USB-to-JTAG EV kit and are not meant to power external circuitry.

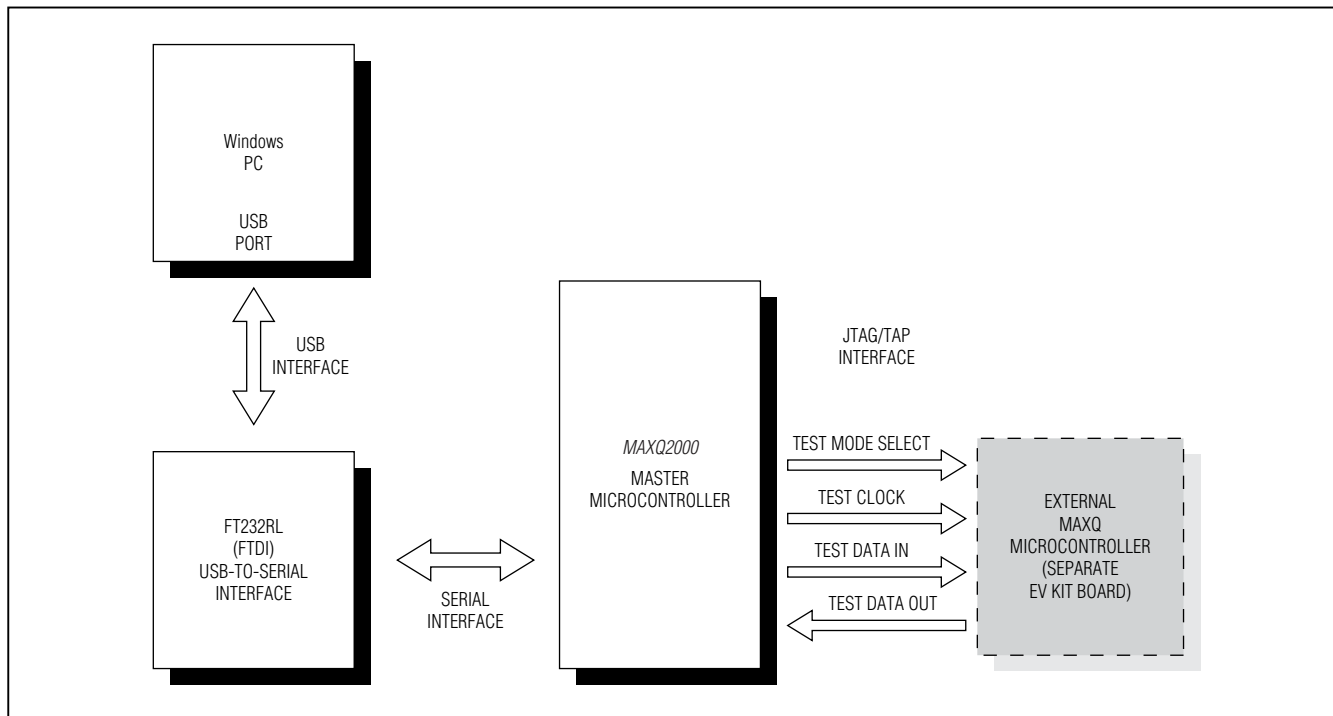## Evaluates: Programming Interface for MAXQ Microcontrollers

Figure 2. MAXQ USB-to-JTAG Communications Interface

Installing the Virtual COM Port (VCP) FTDI Drivers for Windows XP

Note: In the following sections, software-related items are identified by bolding. Text in **bold** refers to items directly from the EV kit software. Text in **bold and underlined** refers to items from the Windows® operating system.

Before the USB-to-JTAG interface on the MAXQ USB-to-JTAG EV kit can be used, the proper drivers must be installed for the FT232RL USB-to-serial converter. The following instructions provide a brief overview of installing the FTDI drivers for PCs using the Windows XP® operating system; for a more in-depth explanation as well as instructions on how to install the FTDI drivers for PCs using the Windows 2000 or Windows 98 operating systems, refer to http://www.ftdichip.com/Documents/InstallGuides.htm.

- Download the latest VCP driver package for Windows XP from the FTDI website at http://www.ftdichip.com/Drivers/VCP.htm. These are also referred to as the combined driver model (CDM) drivers.

- Unzip the driver package into a working directory.

Windows and Windows XP are registered trademarks of Microsoft Corp.

- If you are running Windows XP (with no service packs installed) or Windows XP SP1, disconnect your computer from the Internet at this point. If running Windows XP SP2 or later, **Windows Update** must be configured to ask permission before automatically searching for drivers for a new device. This can be set from **Start→Control Panel→System→Hardware→Windows Update**, as shown in Figure 3.

- Connect the USB connector J3 to a USB port on your PC. The **Found New Hardware Wizard** dialog should automatically appear (Figure 4). Select **No, not this time** to keep the wizard from automatically searching for a driver, and then click **Next** to continue.

- In the following dialog, select **Install from a list or specific location (Advanced)** (Figure 5) and click **Next** to continue.

- Finally, in the search and installation options dialog (Figure 6), select **Search for the best driver in these locations.** and enter the location of the working directory containing the unzipped VCP driver files. Click **Next** to finish installing the driver.

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Figure 3. Configuring Windows Update

- After the first driver installation completes, the **Found New Hardware Wizard** dialog appears a second time (Figure 7). Repeat the previous steps using the same settings and driver file location.

- Once this second driver installation pass has completed, the USB-to-JTAG interface should be installed and ready for use.

Determining the Virtual COM Port Used by the USB-to-JTAG Interface

To configure programming or development tools (such as MTK, MAX-IDE, or IAR Embedded Workbench) to work with the virtual COM port (VCP) interface provided by the USB-to-JTAG interface, you must determine to which COM port the USB serial port has been assigned by the operating system. To do this, open the **Control Panel** and select **System→Hardware→Device Manager**, and then look in the **Ports (COM & LPT)** section to determine the COM port number assigned to the VCP (Figure 8).

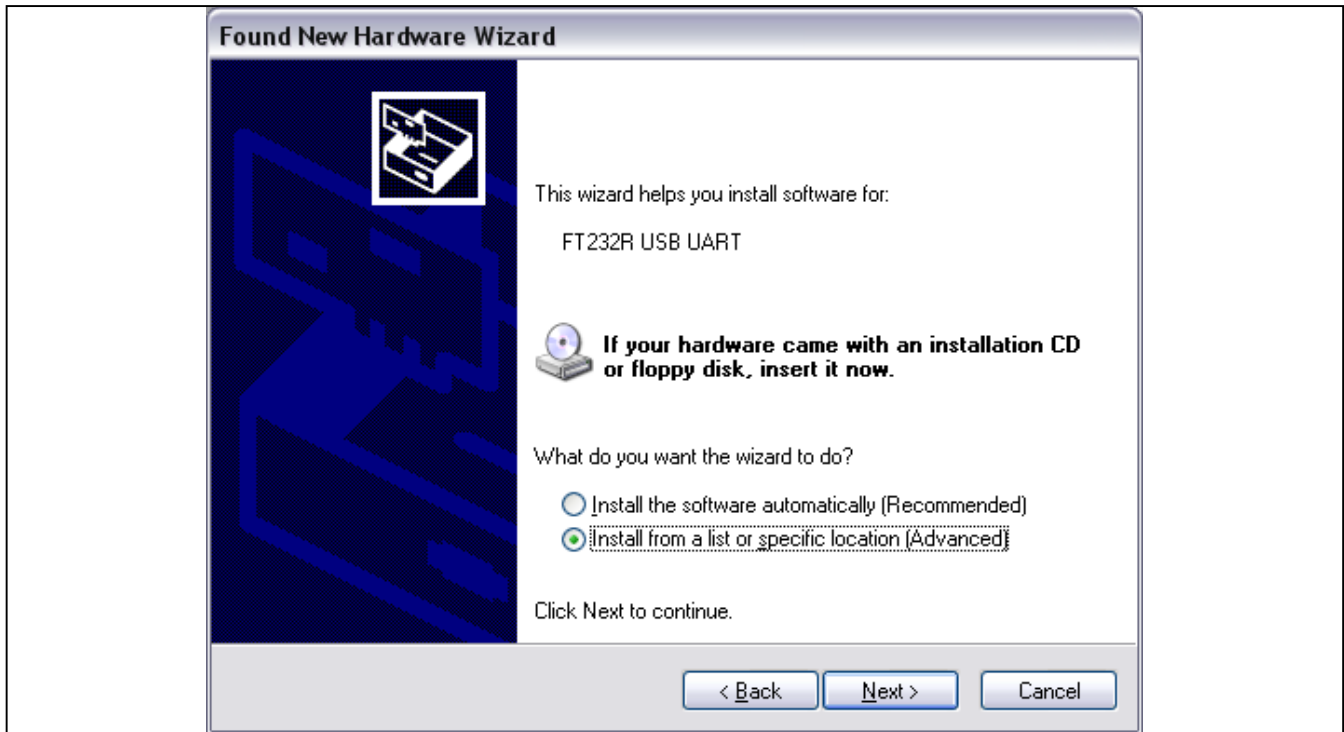Figure 4. Found New Hardware Wizard Dialog

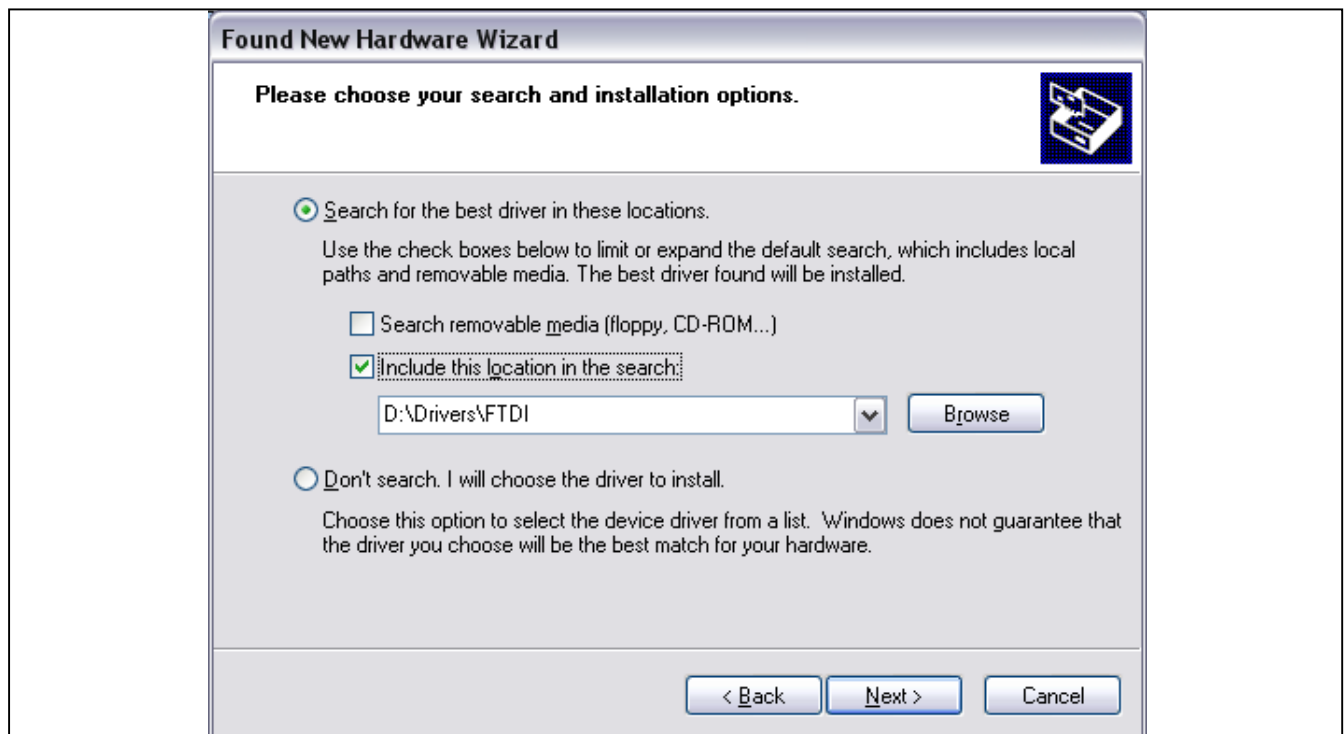*Figure 5. Driver Installation*

Figure 6. Selecting Driver File Location for Installation

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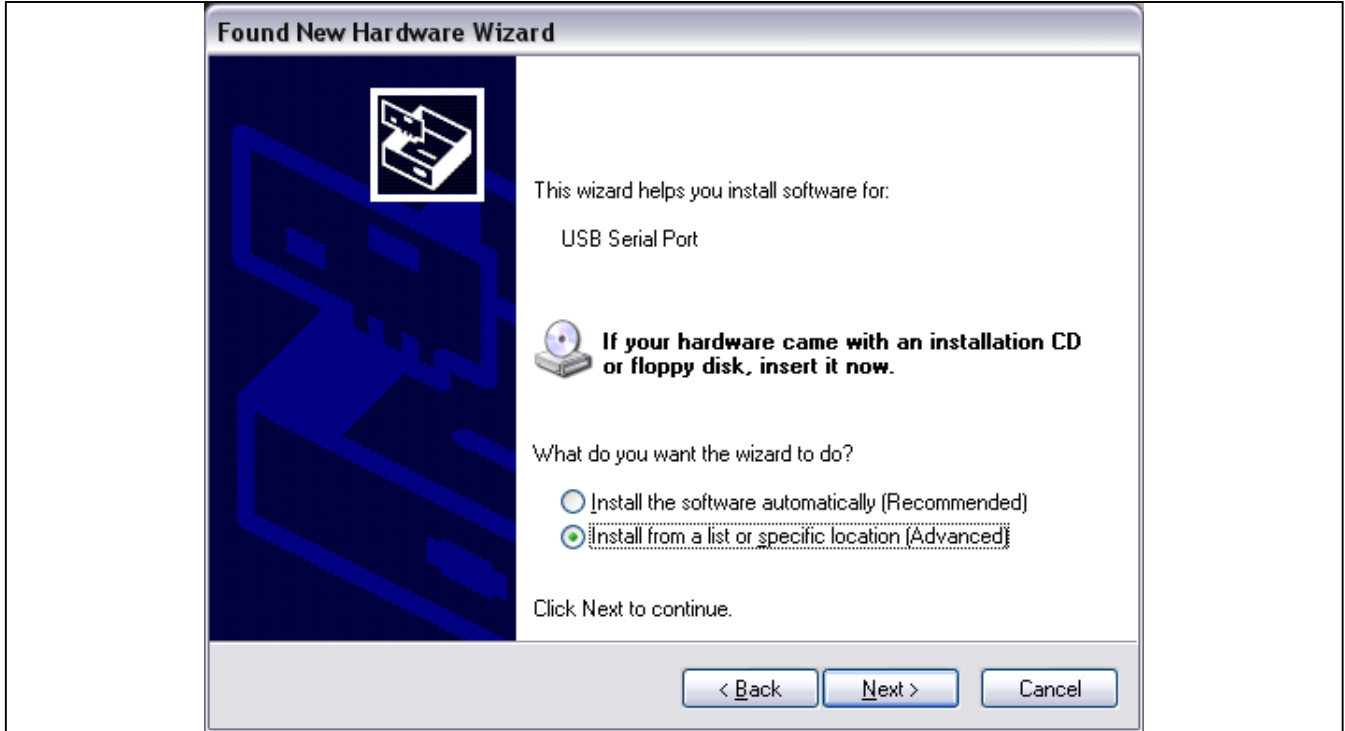## Evaluates: Programming Interface for MAXQ Microcontrollers
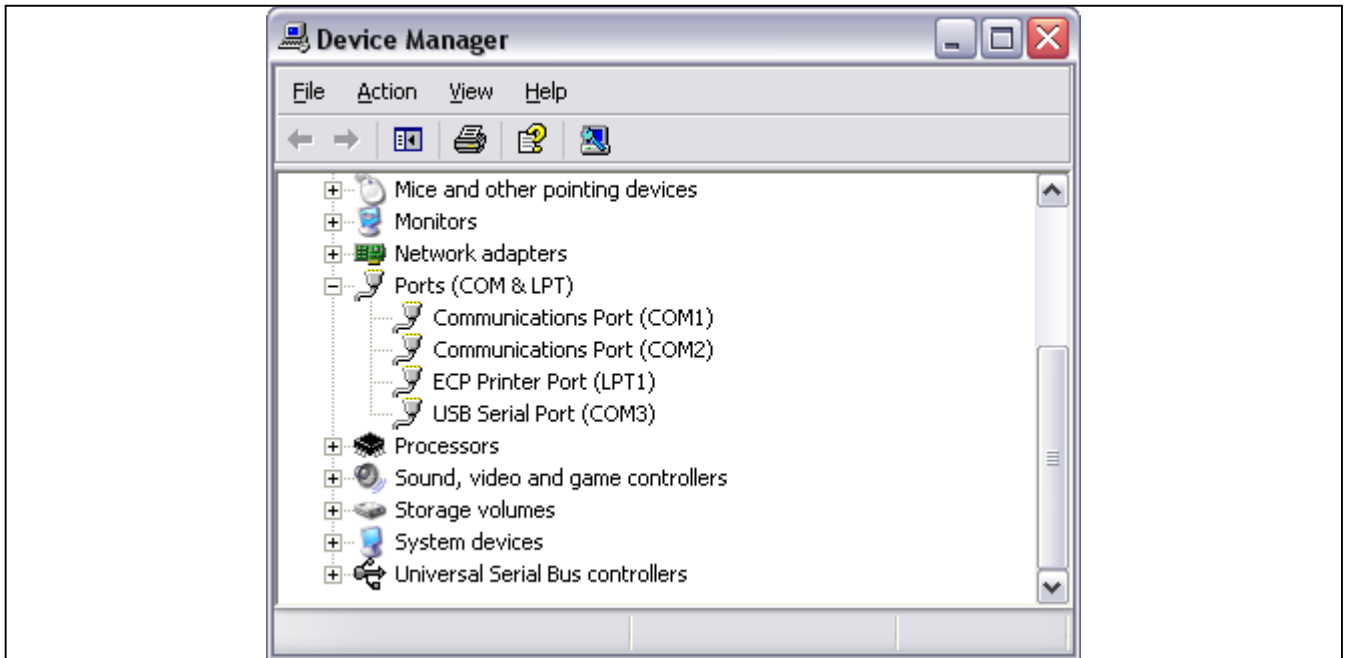

Figure 7. Secondary Driver Installation

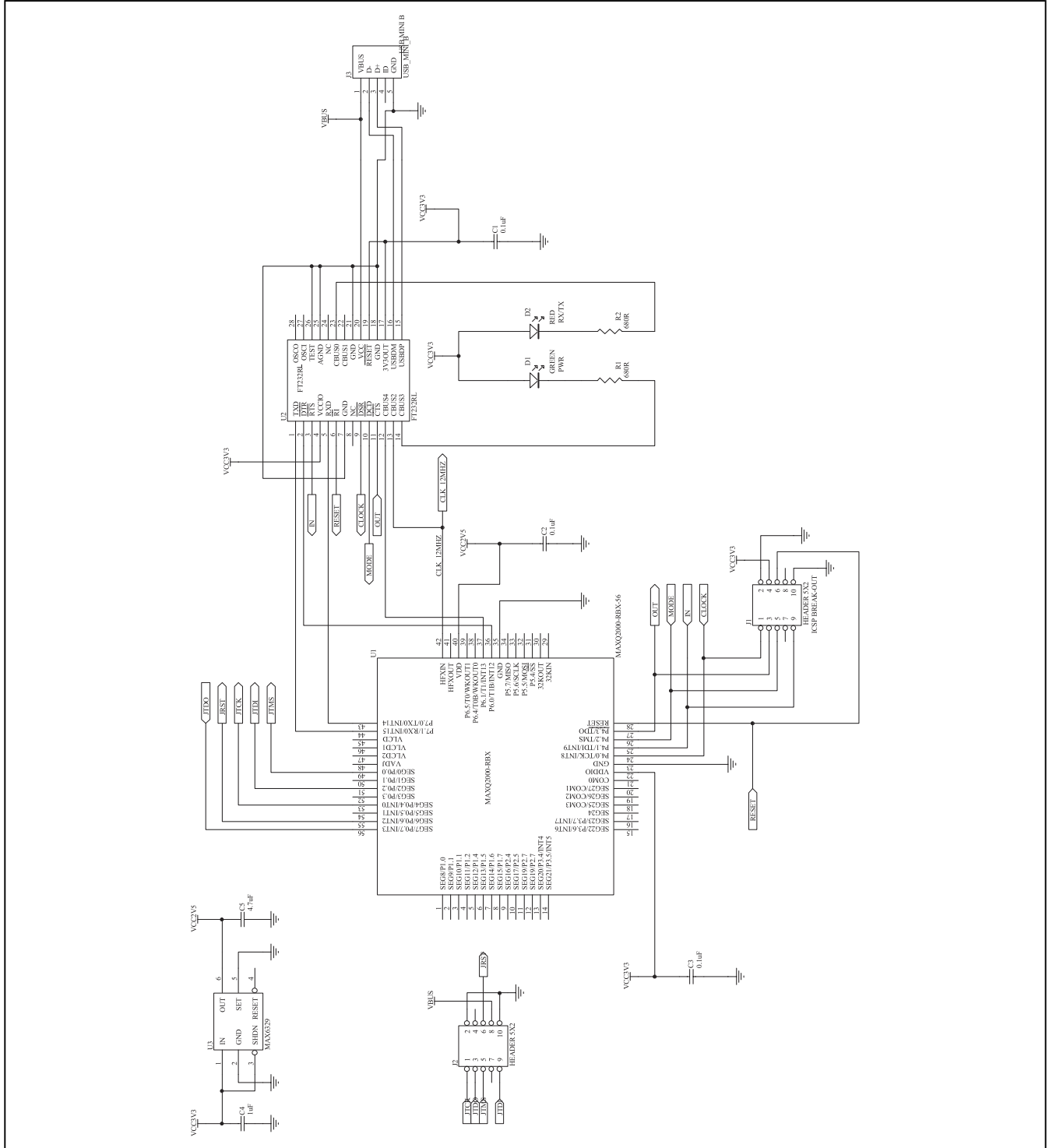Figure 8. USB Serial Port COM Location in Device Manager

Figure 9. MAXQ USB-to-JTAG EV Kit Schematic (Rev B/Rev C)

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Revision History

REVISION NUMBER	REVISION DATE	DESCRIPTION	PAGES CHANGED
0	3/10	Initial release	—
1	11/10	Updated the *General Description*	1

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