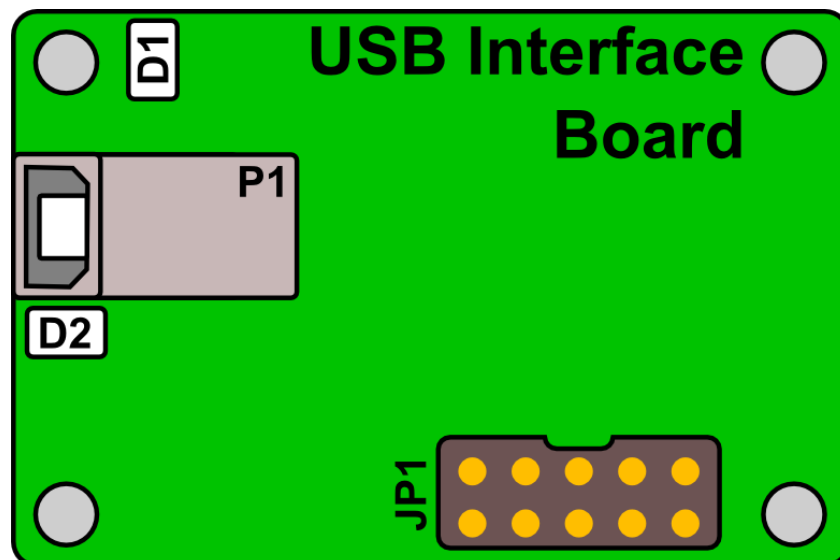# National Semiconductor

USB <--> uWire Interface Board Instructions

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National Semiconductor Corporation
Precision Timing Devices

Table of Contents

General Description

The USB2UWIRE-IFACE Interface Board simplifies evaluation of National Semiconductor LMX and LMK Evaluation Boards by enabling the user to establish a USB connection from the CodeLoader 4 programming software to an evaluation board.

The package consists of a USB cable, a USB <--> uWire interface board, and a 5 inch cable for connecting to an LMX or LMK evaluation board.

All LMK evaluation boards work with this USB <--> uWire interface board. The following LMX evaluation boards may not work with this interface: LMX2350, LMX2352, LMX2353, LMX2354, LMX2364, LMX2470, LMX2471, and LMX2604. The reason for incompatibility is discussed in the section, *Using the USB <--> uWire interface board with the "exception" boards*, and includes a work-around solution.

Kit Contents

One (1) USB <--> uWire Interface Board Instructions (this document)
One (1) USB cable
One (1) 5 inch, 10 pin cable CodeLoader jumper cable
One (1) USB <--> uWire Interface Board

Please find CodeLoader4 for download at:
http://www.national.com/analog/timing/codeloader/

Installation / Quick start

1) Install the CodeLoader 4 software
2) Connect the USB <--> uWire interface board to the PC.
   - Upon connecting the interface board to the PC, LED (D1) will turn solid green to confirm power to the interface board.
   - LED (D2) will blink green while the USB device is waiting to be loaded/enumerated by the driver. Once loaded (after installing driver) LED (D2) will turn solid green.
3) Connect the USB <--> uWire interface board to the evaluation board with the 5 inch cable.
4) Start the CodeLoader 4 software.
5) Select desired part from list (Ex: LMK03000C).
6) Enable USB mode from CodeLoader's "Port Setup" tab.
7) Program Device.
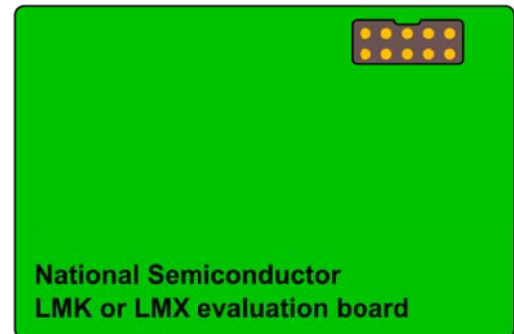   - CTRL+L, or
   - Keyboard Control → Load Device.
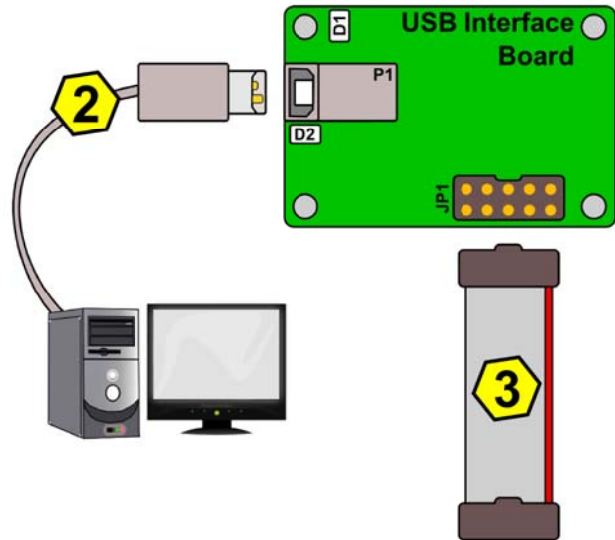

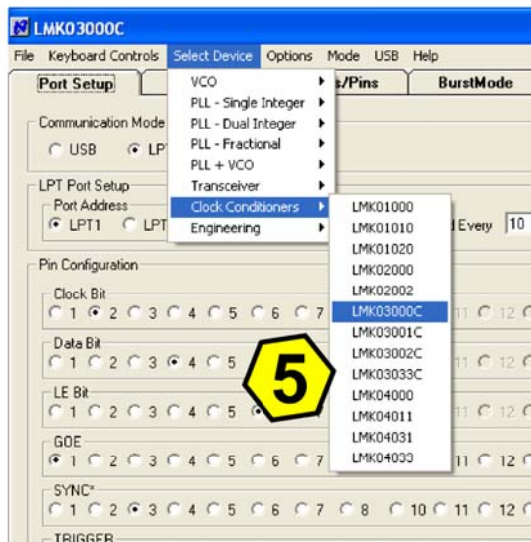Figure 1 - System diagram showing use of the USB <--> uWire interface board.

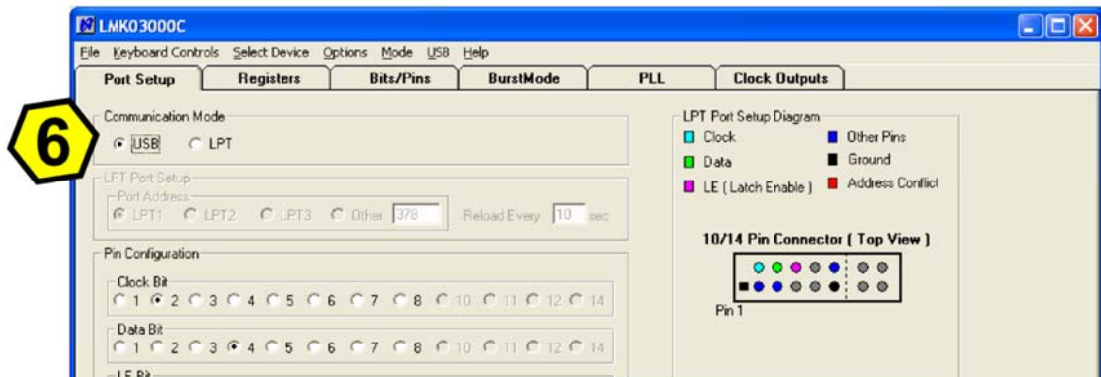Figure 2 - Selecting the evaluation board to be used.

Figure 3 - Selecting "USB" communication mode.

Detailed USB Driver Install Guide

Once…
1) CodeLoader has been installed and
2) the USB <--> uWire interface board has been connected to the computer

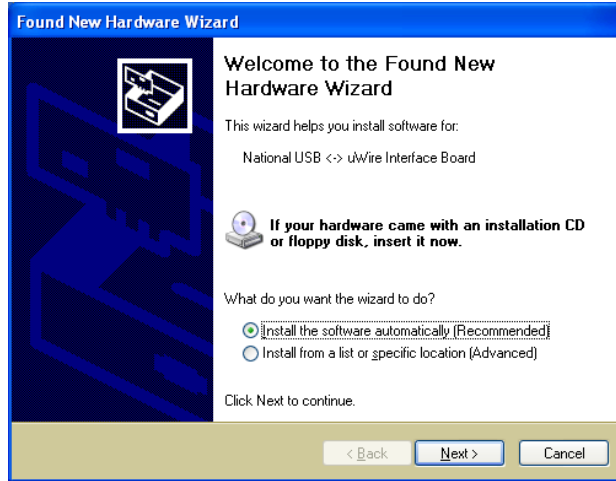the PC will automatically detect the USB <--> uWire interface board.

Figure 4

Press Continue Anyway to install the driver.

Figure 5

Installation in progress

Figure 6

Installation completed. Press Finish and then CodeLoader may now be started and the USB <--> uWire interface board may be used.

Figure 7

Using the USB <--> uWire interface board with the "exception" boards

The current version v2.0 of the USB <--> uWire interface board will work with all LMK and LMX devices except for: LMX2350, LMX2352, LMX2353, LMX2354, LMX2364, LMX2470, LMX2471, and LMX2604. The reason these devices do not work is because one of the programming lines: "Clock Bit", "Data Bit", or "LE Bit," is placed on bit position 10, 11, 12, or 14. The programming lines must be placed in one of the lower 8 positions.

To correct:
1) Change the violating pin position to one of the lower pin positions which is unused. In the LMX2470 example shown below the "LE Bit" pin can be set to position 1, 3, 4, 5, or 7.
2) Solder a jumper on the evaluation board shorting the new pin position to the old pin position.

Once this has been done, the USB <--> uWire interface board will correctly program the evaluation kit in question.
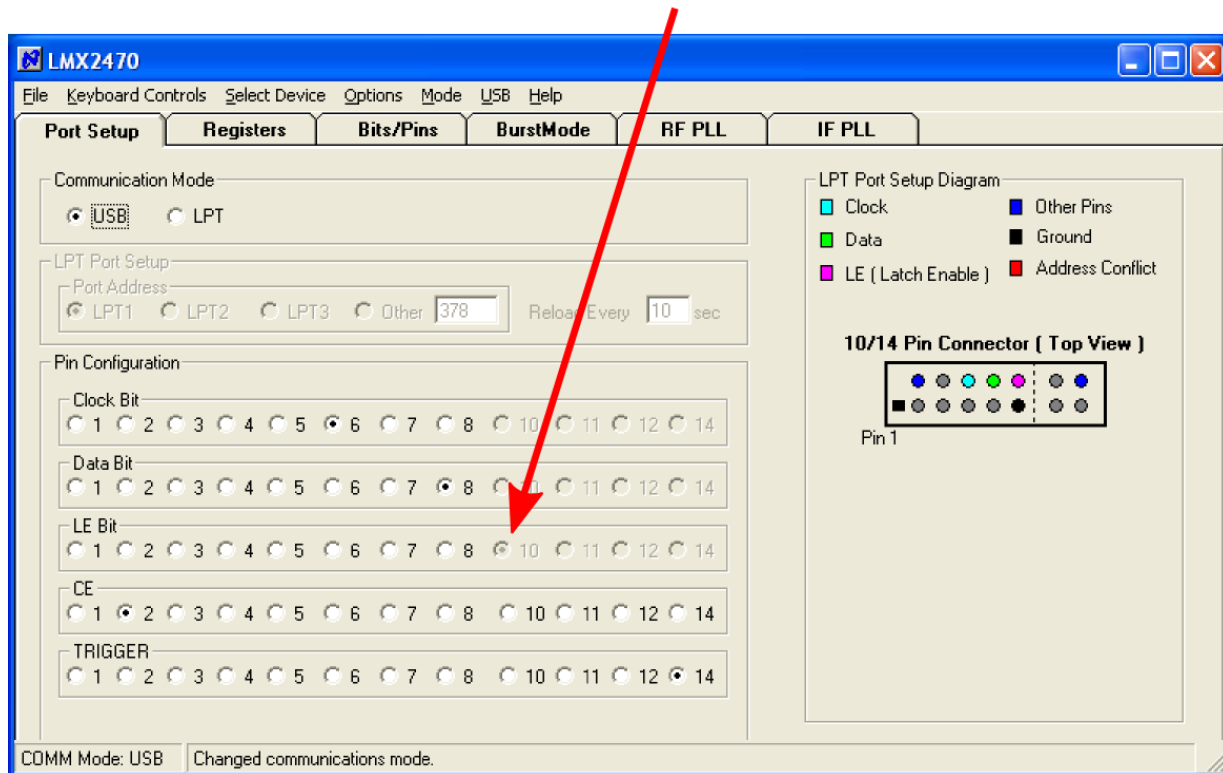

Figure 8 - Correcting the Port Setup to use the USB <--> uWire interface board with the LMX2470 evaluation board.

Troubleshooting Tips

Communication Tests

Test to see if communication with the evaluation board is working to confirm the device draws current, and when powered down the current draw decreases.

1. Press Ctrl+L to load the part.
2. Toggle any sort of power down or enable bits the device may have from the bits/pins page.
   o Check to observe current changes.

Another test which will check for device communication is to program the lock detect/test pin into a high or low state. The name of the output pin is device dependent, but often is on the same pin as the lock detect feature. The register controlling this feature is often called LD, FoLD, PLL_MUX, or Test.

1. Press Ctrl+L to load the part.
2. Change to "high" and "low" the LD, FoLD, PLL_MUX, or Test register the device may have from the bits/pins page.
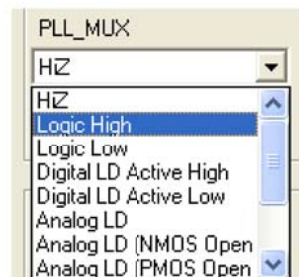   o Check with DMM to observe voltage change on LD or test pin.

Figure 9 - Programming the PLL_MUX of the LMK03000C.

Troubleshooting

If there is apparently no response from the evaluation board under test.

Power to USB <--> uWire interface board
Verify that the green LED (D1) is on. If not, check the cable connection from the USB <--> uWire interface board to the PC.

Be sure not to short out the USB <--> uWire interface board.

USB Enumeration
Verify the green LED (D2) is on and solid. If this LED is blinking, the device is waiting to be recognized by the host PC. It is possible the drivers have not been correctly installed.

Reinstall or install the drivers. The drivers are located in "C:\Program Files\National Semiconductor\CodeLoader 4\USBdriver" if CodeLoader4 was installed to the default directory.
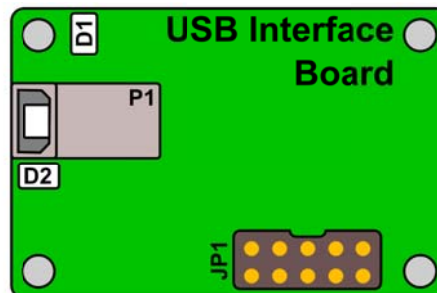

Figure 10 - USB <--> uWire PCB diagram.

Troubleshooting, continued

CodeLoader4 Communication Mode
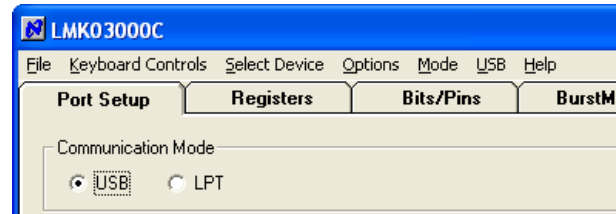Verify that "USB" is selected in the "Port Setup" tab.

Figure 11 - Selecting "USB" Communication Mode.

CodeLoader4 to USB <--> uWire interface board communications
Verify USB communications by selecting, "USB" → "Version" from the menu (see Figure 12).

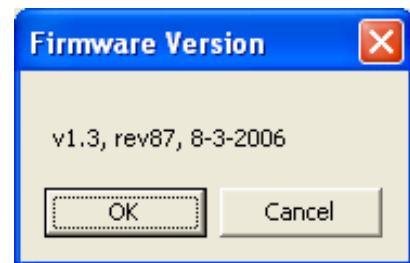

Figure 12 - Checking the USB version

Figure 13 - USB communication successful, version displayed.

If no communication still exists, try...
1. Exiting CodeLoader4.
2. Remove the USB <--> uWire interface board.
3. Reattach the USB <--> uWire interface board, wait for the interface board to be detected.
4. Start CodeLoader4 again.

Only one USB <--> uWire interface board may be attached to a single PC at the same time.

Known Bugs
Plugging in a USB device such as a memory stick may cause CodeLoader 4.1.14 or earlier to crash.