

USB <--> uWire Interface Board Instructions

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National Semiconductor Corporation Precision Timing Devices



# **Table of Contents**

TABLE OF CONTENTS
GENERAL DESCRIPTION
KIT CONTENTS
INSTALLATION / QUICK START
Detailed USB Driver Install Guide
USING THE USB <> UWIRE INTERFACE BOARD WITH THE "EXCEPTION" BOARDS
TROUBLESHOOTING TIPS
COMMUNICATION TESTS
TROUBLESHOOTING
KNOWN BUGS

### **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
- 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.
- 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).
- 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 3 - Selecting "USB" communication mode.

# **Detailed USB Driver Install Guide**



Figure 4







Figure 6

Installation in progress

Press Continue Anyway to install the

the PC will automatically detect the

1) CodeLoader has been installed

board has been connected to the

2) the USB <--> uWire interface

Once...

driver.

and

computer

USB <--> uWire interface board.



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.

# **Correct this bit position and jumper**

M LMX2470						
<u>File K</u> eyboard Co	ntrols <u>S</u> elect Device	e Options Mode	USB Help			
Port Setup	Registers	Bits/Pins	BurstMode	RF PLL	IF PLL	
Communication	n Mode				LPT Port Setu Clock	up Diagram Dther Pins Ground Fnable ) Address Conflict
Port Address	OLPT2 OLPT	3 C Other 378	ReloarEvery	10 sec	10/14 P	in Connector ( Top View )
C 1 C 2 Data Bit C 1 C 2	C 3 C 4 C 5 C 3 C 4 C 5	• 6 0 7 0 8 0 6 0 7 • 8		12 O 14	Pin 1	
	○ 3 ○ 4 ○ 5	06 07 08	© 10 C 11 C	12 C 14		
0 1 0 2 - TRIGGER	○ 3 ○ 4 ○ 5	06 07 08	○ 10 ○ 11 ○	12 🔿 14		
C1 C 2	○ 3 ○ 4 ○ 5	06 07 08	C 10 C 11 C	12 🖲 14		
COMM Mode: USB	Changed commu	nications mode.				

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.
  - 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.
  - 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 <u>not</u> 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.



igure 10 - USB <--> uvvire PCI diagram.



### Troubleshooting, continued

<u>CodeLoader4 Communication Mode</u> Verify that "USB" is selected in the "Port Setup" tab.

🛃 LMK03000С										
Eile	Keyboard Contro	ls <u>S</u> elect Device	Options	<u>M</u> ode	<u>U</u> SB	<u>H</u> elp				
	Port Setup Registers Bits/Pins		BurstM							
	Communication Mo	de LPT								

Figure 11 - Selecting "USB" Communication Mode.

CodeLoader4 to USB <--> uWire interface board communications

Verify USB communications by selecting, "USB"  $\rightarrow$  "Version" from the menu (see Figure 12).

M LMK03000C	Firmware Version 🛛 🛛 🔀			
File Keyboard Controls Select Device Options Mode USB Help				
Port Setup Registers Bits/Pins Version	v1.3. rev87. 8-3-2006			
Adjust timing	,			
Communication Mode				
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.