CodeLoader 4 Operating Instructions

User's Guide

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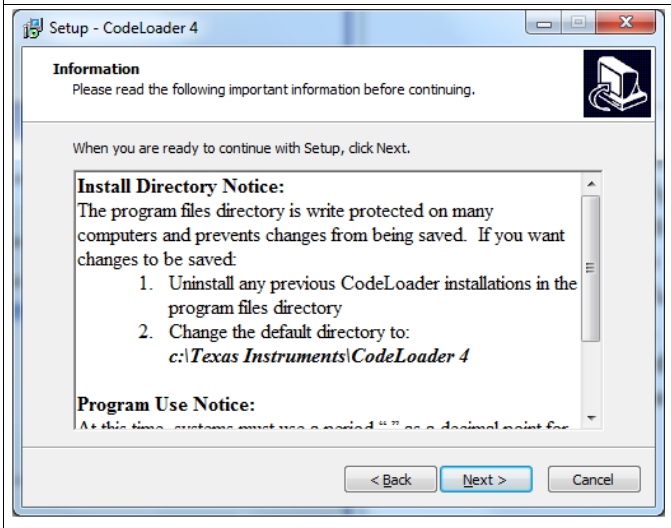
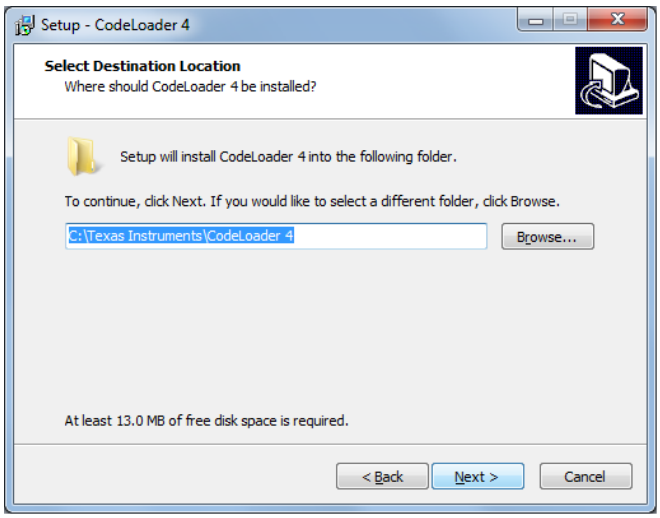
1 Introduction

CodeLoader is a program that allows the programming of a very wide variety of Texas Instruments devices, including the entire LMX and LMK series. Although the primary prupose of Codeloader is programming of the EVM board, it is also useful for other purposes such as creation/verification of the correct registers to send, automated measurements, or just better understanding of a particular device.

2 CodeLoader Setup

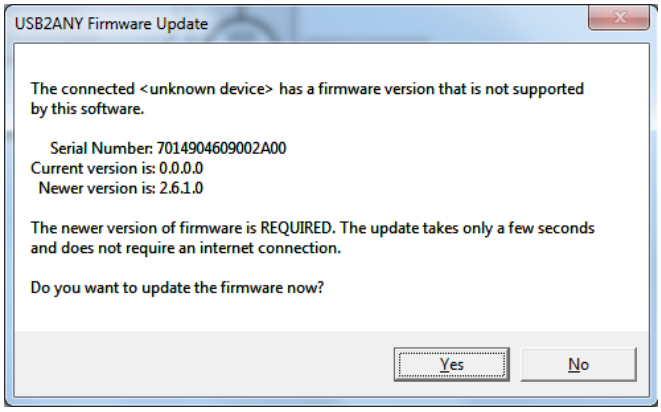
Table 1.

Picture	Comments
	Initial Setup Screen
	Installation Notice. This gives information as to what has changed from last installation

Picture	Comments
	Choose the default install directory. It is a matter of opinion as whether this directory should be c:/Program Files/Texas Instruments/CodeLoader 4 or c:/Texas Instruments/CodeLoader 4. The reason driving this opinion difference is that Windows 7 assumes that the user should not be able to manually change the program files directory. This may be the case for many users, however, if the part ini files are either added to or modified in this directory, it will not show up in CodeLoader, which is a massive source of confusion for those who want to do this. One could use the "Virtual Store" directory in Windows 7 and this could be done, although this is a challenge to find this directory. The intention of the Virtual Store is to prevent people from modifying the program files directory so it will not be impacted by different users. For those that feel that this is a good feature, then consider using the Program files directory. However, if one is of the opinion that this Virtual Store in Windows 7 is an idiotic idea and a feature that you never asked for or wanted, then consider installing to the Texas Instruments directory outside of the program files directory as shown in the picture on the left.
	Setup is complete. You may be prompted to restart you computer.

3 USB2ANY Setup

The CodeLoader supports three different programming interfaces of LPT port, USB2UWIRE, and USB2ANY. However, of these three, the only one currently available is the USB2ANY.

Picture	Comments
	USB2ANY The USB2ANY comes with a USB cable, box, and 10 pin connector. If there is a wider connector, this is not needed.
	When you plug in the USB2ANY board, you may get this message. If the software on the USB2ANY board is not up to date, CodeLoader will automatically update it. You will get the following prompts: 1. This message on the left. Select "Yes" to continue. 2. The USB2ANY Firmware Loader box will appear. Select "Update Firmware" 3. CodeLoader willl ask you if you want to update the firmware. Select "Yes".
	4. If you are updating the USB2ANY board, CodeLoader will tell you to disconnect the USB2ANY and then connect this while pressing the BSL button. This is a small hole that can be pressed with a pin or paperclip. The picture on the left shows what this looks like. 5. USB2ANY Firmware Loader will say that USB2ANY is ready for download. STOP pressing the BSL buttion. Then select "Update Firmware". 6. The USB2ANY Firmware Loader should update the USB2ANY board and then it is ready to go.

4 Using CodeLoader

Table 2. Port Setup, Bits/Pins, and PLL Tabs

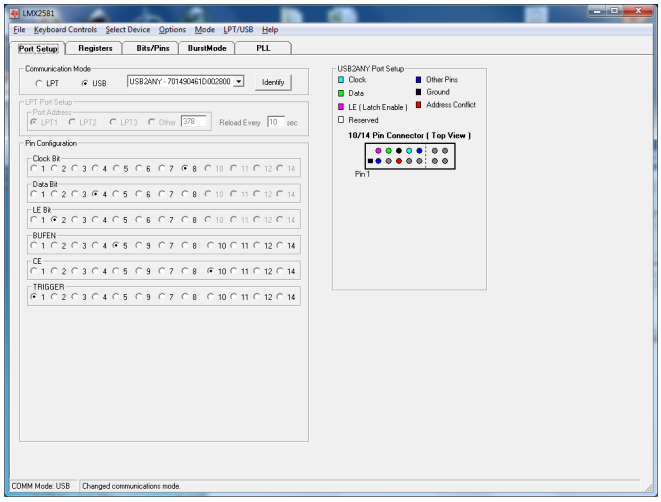
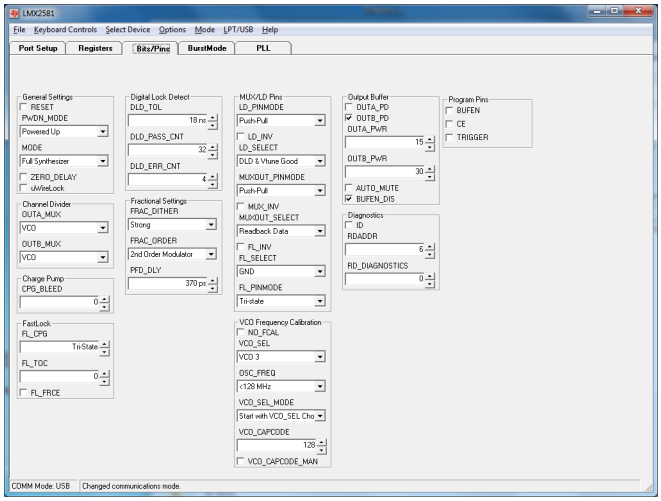
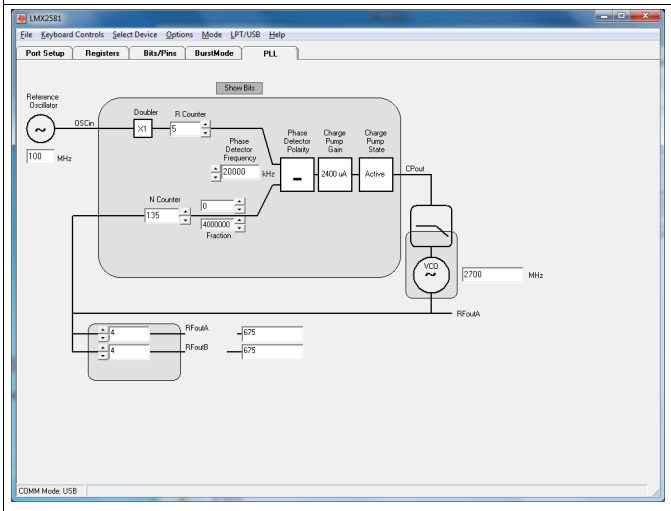
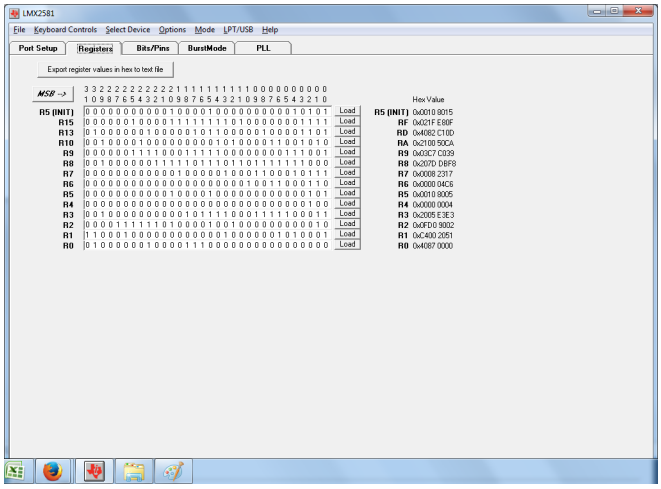
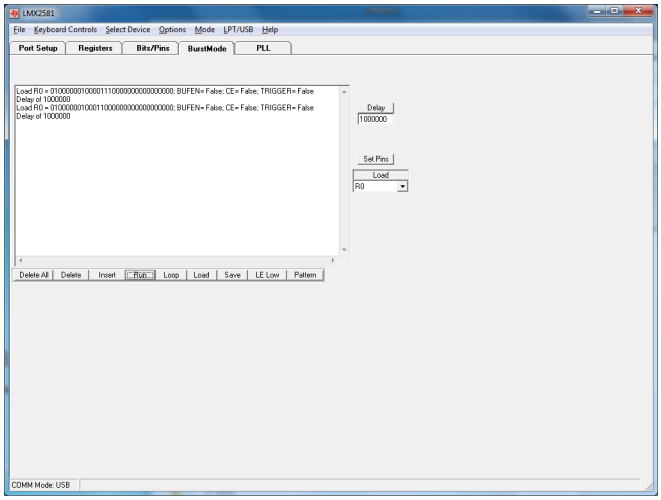
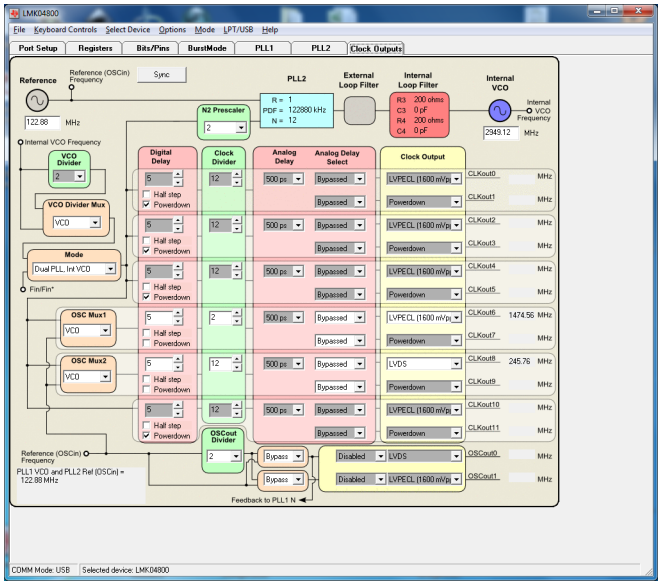
Picture	Comments
	The port setup tab allows the user to direct where the signals are sent. However, with the USB2ANY, the Clock, Data, and LE pins are fixed to 8, 4, and 2 respectively. The other pins can be set to other ports. The TRIGGER pin is used to trigger oscilloscopes and is sent after all registers are loaded. When using the USB2ANY , you can click the "Identify" to see it cause a green LED on the USB2ANY to blink to ensure that there are no communication issues between the CodeLoader and USB2ANY.
	The Bits/Pins page controls the programming words and also pins . You can right mouse click on any programming word to get a register location and some also have a more detailed description.
	The PLL tab can control the frequencies. Sometimes the bits controlled by this page are not on the bits/pins page, but their names can be found by clicking the "Show Bits" box. The cahreg pump polarity, charge pump gain, and charge pump state can be changed by clicking on their values.

Table 3. Registers, Burst Mode, and FlexGUI Tabs

Picture	Comments
	The port setup tab allows the user to direct where the signals are sent. However, with the USB2ANY, the Clock, Data, and LE pins are fixed to 8, 4, and 2 respectively. The other pins can be set to other ports. The TRIGGER pin is used to trigger oscilloscopes and is sent after all registers are loaded. When using the USB2ANY , you can click the "Identify" to see it cause a green LED on the USB2ANY to blink to ensure that there are no communication issues between the CodeLoader and USB2ANY.
	The BurstMode tab enables the user to load a series of registers in a sequence. To use this, set up the device as desired with the other tabs and then load a register. Then change it to another state and load it again. For instance, these registers are being used to change the R0 register on the LMX2581, which causes the frequency to change.When done setting this up, click the "Run" button.
	CodeLoader also accomondates FlexGUI tabs, such as this one, which are very device specific.

5 Automation

Codeloader can be automated and called through Active X commands using a program such as the Visual Basic tool in microsoft Excel, which will be the example shown here. To do this, the first step is to find the "CodeLdr4x.exe" program and run as administrator. The program will not run, but it will register it so it can be called. Then excel VBA can be used as follows:
2. Create an object pointer as shown:
Set PLLobject = CreateObject(“CodeLoader2x.Application”)
3. Control CodeLoader 2 by calling subroutines that can access various functions such as bits and pins. The table shows these values.

Command	Command Description	Example
GetPrgmBits BIT	For the BIT specified, gets the VALUE specified. Some Bits are displayed on the Bits/Pins page, while others are not displayed, but are in the part-specific initialization file.	PLLobject.SetPrgmBits("FoLD")
GetPrgmBitValue BIT	Very similar to SetPrgmBits, but instead of setting the binary value, it gets the actual value, if different. For instance to set the prescaler to 16, you would get 16 with this command, but 0 or 1 with SetPrgmBits, depending on the PLL used.	PLLobject.SetPrgmBits("RF_A")
GetPrgmPins PIN	Gets program PIN State State. Valid states are 0 for logic low and 1 for logic high. The pin name is visible on the Bits/Pins page.	PLLobject.SetPrgmPins("EN_RF")
GetVCOFrequency PLL	For the PLL specified, gets the VCO operating FREQUENCY in MHz.	PLLobject.SetVCOFrequency("RF PLL")
GetOSCinFrequency PLL	For the PLL specified, gets the Crystal Reference operating FREQUENCY in MHz.	PLLobject.SetOSCinFrequency("RF PLL")
LoadPart	Loads all register values into the PLL.	PLLobject.Loadpart
Maximize	Maximizes CodeLoader Window	PLLobject.Maximize
Minimize	Minimizes CodeLoader Window	PLLobject.Minimize
RestoreSetup SETUP	Loads a Saved SETUP	PLLobject.RestoreSetup “MySetup.mac”
SelectPart PART	Selects the specified PART from the menu.	PLLobject.SelectPart “LMX2330”
SelectTab TAB	Sets the TAB specified as the active tab.	PLLobject.SelectTab “RF PLL”
SetPDFrequency PLL , FREQUENCY	For the PLL specified, this command sets the phase detector FREQUENCY in KHz.	PLLobject.SetPDFrequency “RF PLL” , 30
SetMode INDEX	Selects a mode that has been previously saved. The INDEX is an integer.	PLLobject.SetMode 1
SetPrgmBits BIT, VALUE	For the BIT specified, sets the VALUE specified. Some Bits are displayed on the Bits/Pins page, while others are not displayed, but are in the part-specific initialization file.	PLLobject.SetPrgmBits “FoLD”,2
SetPrgmBitValue BIT, VALUE	Very similar to SetPrgmBits, but instead of setting the binary value, it sets the actual value, if different. For instance to set the prescaler to 16, you would use 16 with this command, but 0 or 1 with SetPrgmBits, depending on the PLL used.	PLLobject.SetPrgmBits “FoLD”,2
SetPrgmPins PIN, STATE	Sets program PIN to the selected State. Valid states are 0 for logic low and 1 for logic high. The pin name is visible on the Bits/Pins page.	PLLobject.SetPrgmPins “RFEn”, 1
SetVCOFrequency PLL,FREQUENCY	For the PLL specified, sets the VCO operating FREQUENCY in MHz.	PLLobject.SetVCOFrequency “RF PLL”, 900
SetOSCinFrequency PLL,FREQUENCY	For the PLL specified, sets the Crystal Reference operating FREQUENCY in MHz.	PLLobject.SetOSCinFrequency “RF PLL”, 900

```
Here is some VBA Code as an example:
Sub main()
' This syntax below is critical
'The Dim and Set Keywords are very necessary
Dim PLLobject As Object
Set PLLobject = CreateObject("CodeLoader2x.Application")
' Chooses the LMX2330 Part
PLLobject.SelectPart "LMX2330" '
Programs FoLD Pin Output to RF Lock Detect
PLLobject.SetPrgmBits "FoLD", 4
' Set the Xtal Frequency to 14.4 MHz
PLLobject.SetOSCinFrequency "RF PLL", 14.4
' Set the Phase Detector Frequency to 30 KHz
PLLobject.SetPDFrequency "RF PLL", 30
' Selects the RF PLL Tab
PLLobject.SelectTab "RF PLL"
'Tunes the PLL to 800 to 900 MHz
For i = 800 To 900
PLLobject.SetVCOFrequency "RF PLL", i * 1
Next i
Range("A1").Value = PLLobject.GetOSCinFrequency("RF PLL")
Range("A2").Value = PLLobject.GetPDFrequency("RF PLL")
Range("A3").Value = PLLobject.GetVCOFrequency("RF PLL")
Range("A4").Value = PLLobject.GetPrgmBits("FoLD")
Range("A5").Value = PLLobject.GetPrgmBitValue("RF_A")
MsgBox ("PLL Active X Exercise Finished")
End Sub
```

6 Debugging

Debugging may vary, but here are some systematic procedures that can be followed:
1. See that CodeLoader is talking to the USB2ANY board by making the LED light flash by clicking "Identify" on the port setup page
2. Try to communicate with the device using the simplest fail-proof commands. For instance, toggle the output of the Ftest/LD pin high and low or use the software powerdown bit (not pin) to program the device up and down. For the power-up/powerdown test, you can typically see a difference in the current consumptions and also the DC bias levels on the OSCin and Fin pins.
3. Program the Ftest/LD pin to show the N and R divider outputs and see what the device interprets these input frequencies to be.

Revision History

Changes from Original (August 2008) to A Revision **Page**

- Changed recommended install directory. 2
- Added Instructions on how to install and program the USB2ANY board. 4
- Changed Changed Default example to the LMX2581 and with the USB2ANY board. 5
- Added Debugging tips. 8

NOTE: Page numbers for previous revisions may differ from page numbers in the current version.

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