



# XILINX

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## VC707 Si570 Programming

October 2012

XTP190

# Revision History

Date	Version	Description
10/23/12	4.0	Recompiled for 14.3. Added AR52368.
07/25/12	3.0	Recompiled for 14.2. Added ChipScope Frequency Monitor. Added AR50886.
05/25/12	2.1	Added FMC Si570.
05/08/12	2.0	Recompiled for 14.1.
04/12/12	1.1	Minor updates.
03/09/12	1.0	Initial version for 13.4.

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# VC707 Si570 Programming Overview

- **Xilinx VC707 Board**
- **Software Requirements**
- **Setup for the VC707 Si570 Programming**
- **Programming the Si570**
- **Correcting the Frequency**
- **Programming the FMC Si570**
- **References**

# VC707 Si570 Programming Overview

## ➤ Description

- The VC707 board has a Silicon Labs Si570 Programmable Oscillator that defaults to 156.25 MHz. Via the IIC bus, the frequency of this device can be changed. This tutorial shows how to change the output frequency of this device.





# ISE Software Requirements

## ➤ Xilinx ISE 14.3 software

- Apply [AR52368](#)



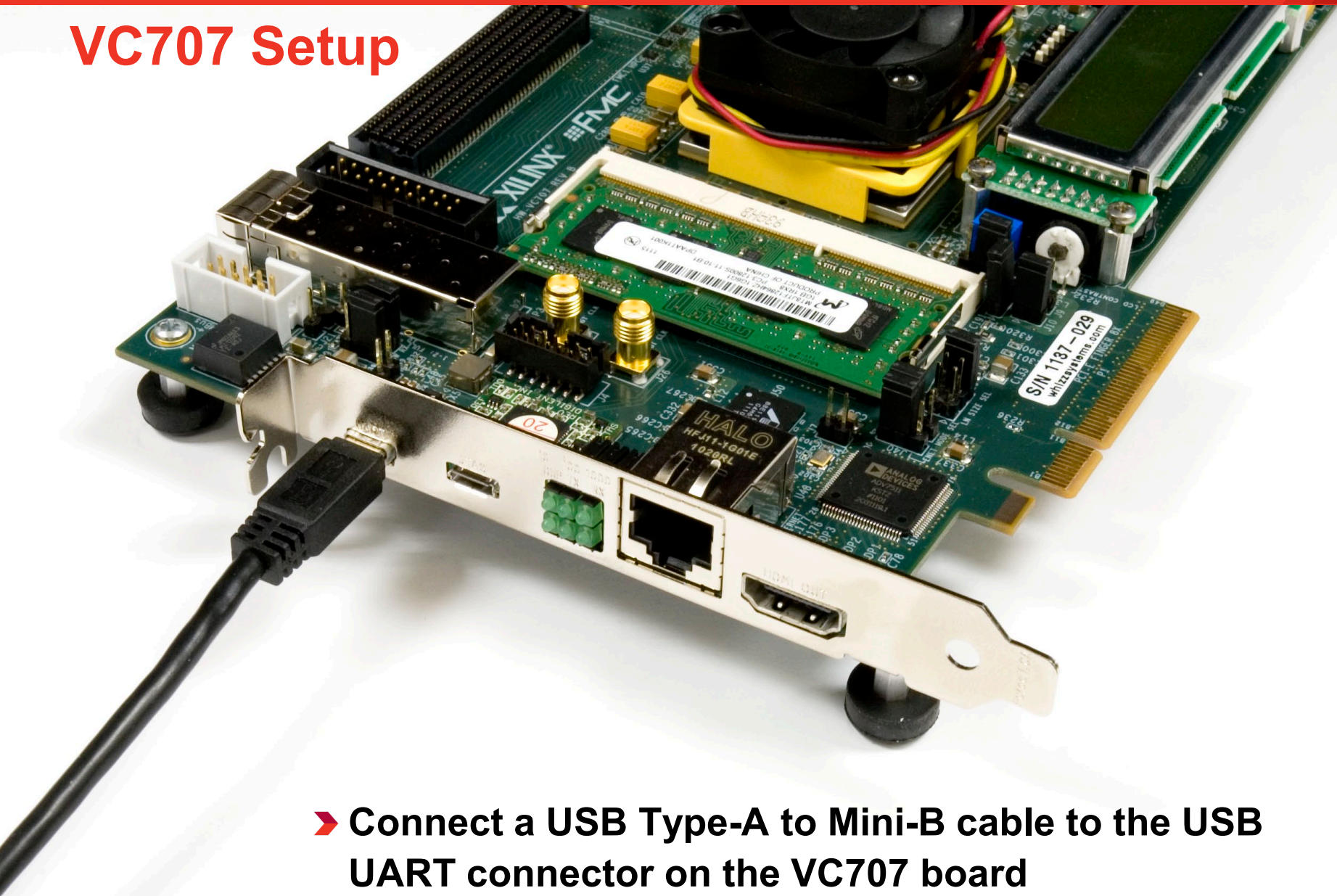
# ChipScope Pro Software Requirement

➤ Xilinx ChipScope Pro 14.3 software





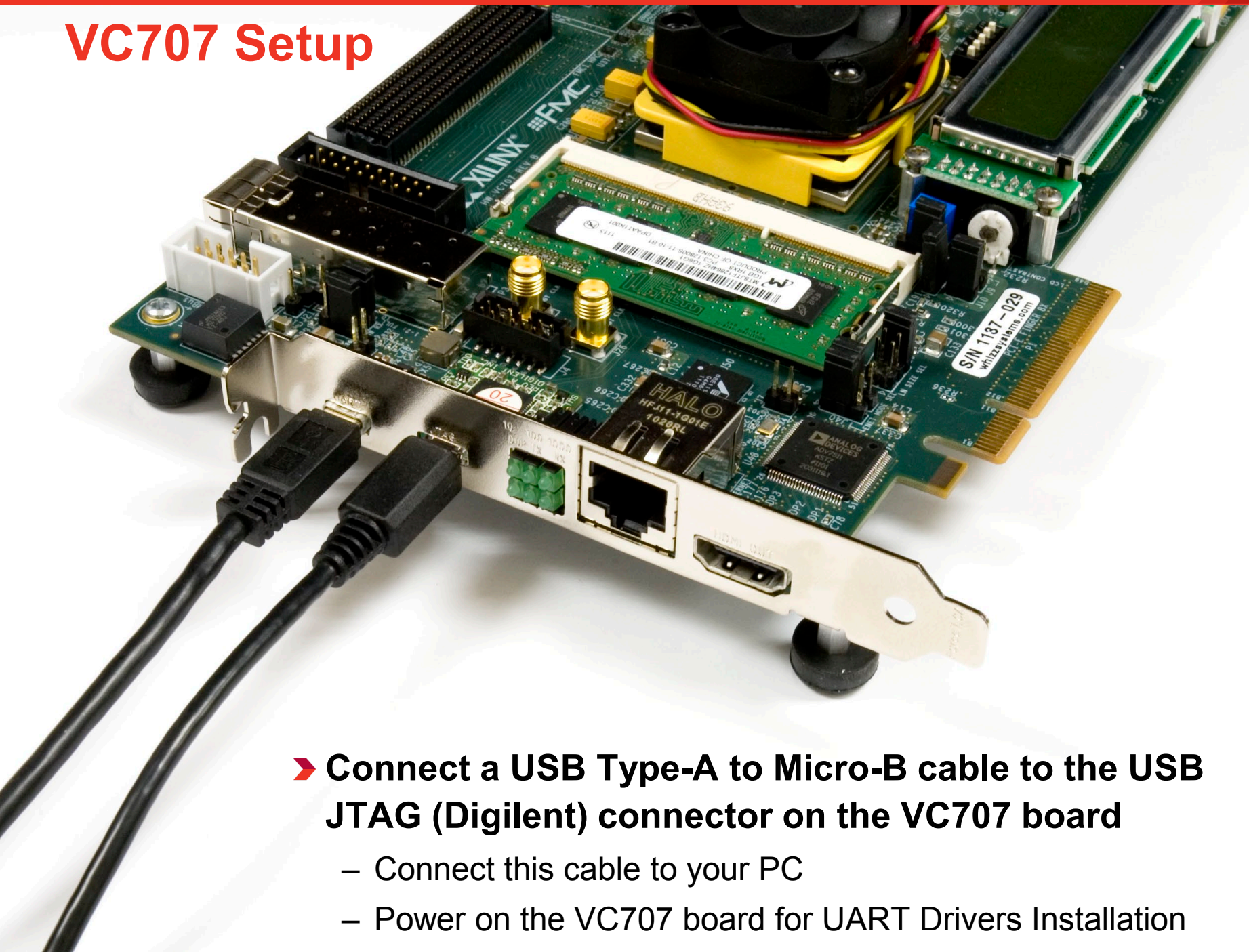
# VC707 Setup



- **Connect a USB Type-A to Mini-B cable to the USB UART connector on the VC707 board**
  - Connect this cable to your PC



# VC707 Setup

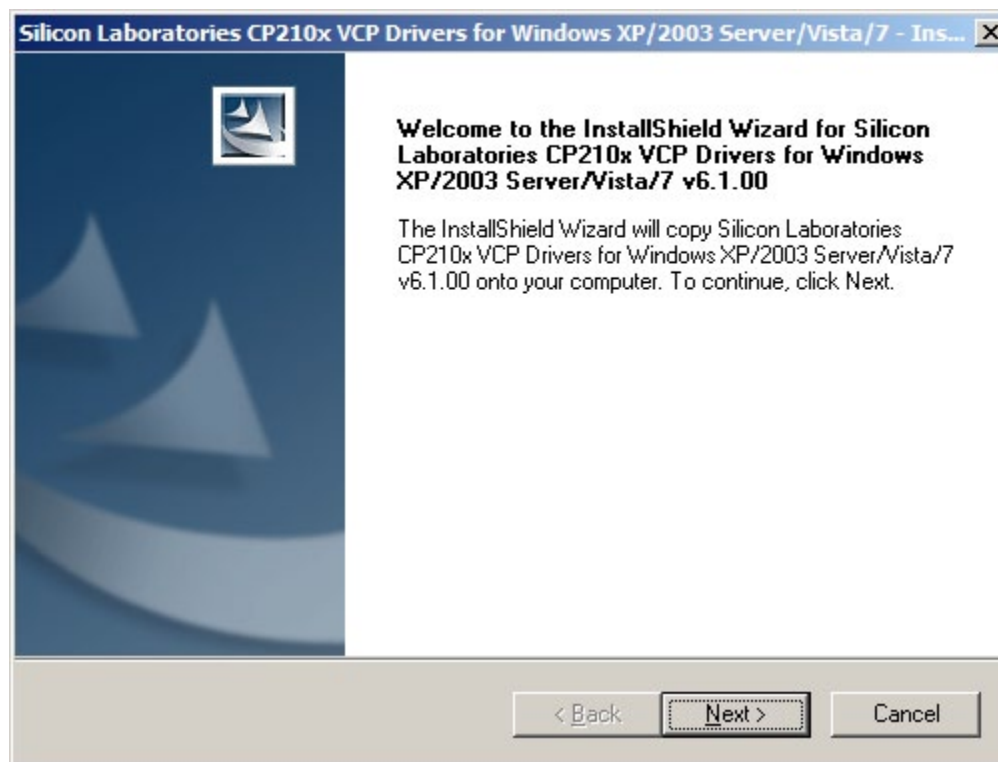


- **Connect a USB Type-A to Micro-B cable to the USB JTAG (Digilent) connector on the VC707 board**
  - Connect this cable to your PC
  - Power on the VC707 board for UART Drivers Installation

# VC707 Setup

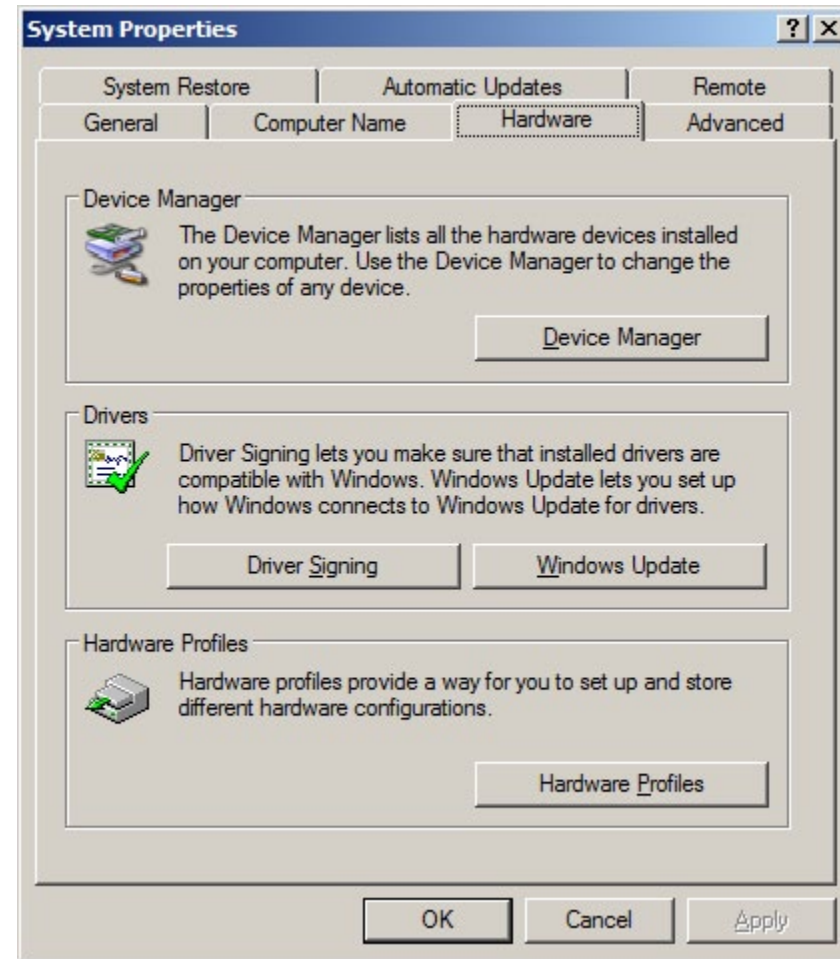
## ➤ Install USB UART Drivers

- CP210x\_VCP\_Win\_XP\_S2K3\_Vista\_7.exe



# VC707 Setup

- Reboot your PC if necessary
- Right-click on My Computer and select Properties
  - Select the Hardware tab
  - Click on Device Manager

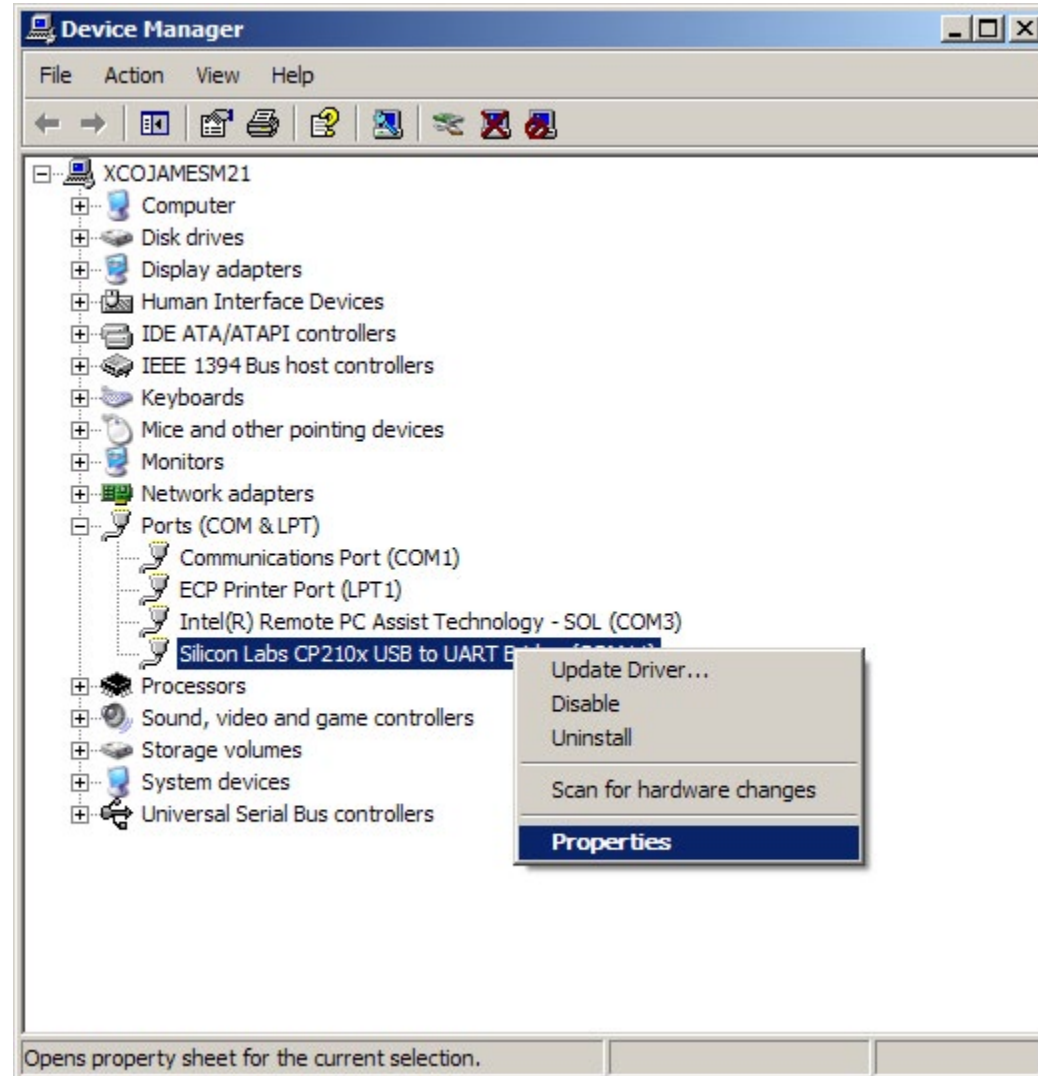


# VC707 Setup

## ➤ Expand the Ports

### Hardware

- Right-click on Silicon Labs CP210x USB to UART Bridge and select Properties

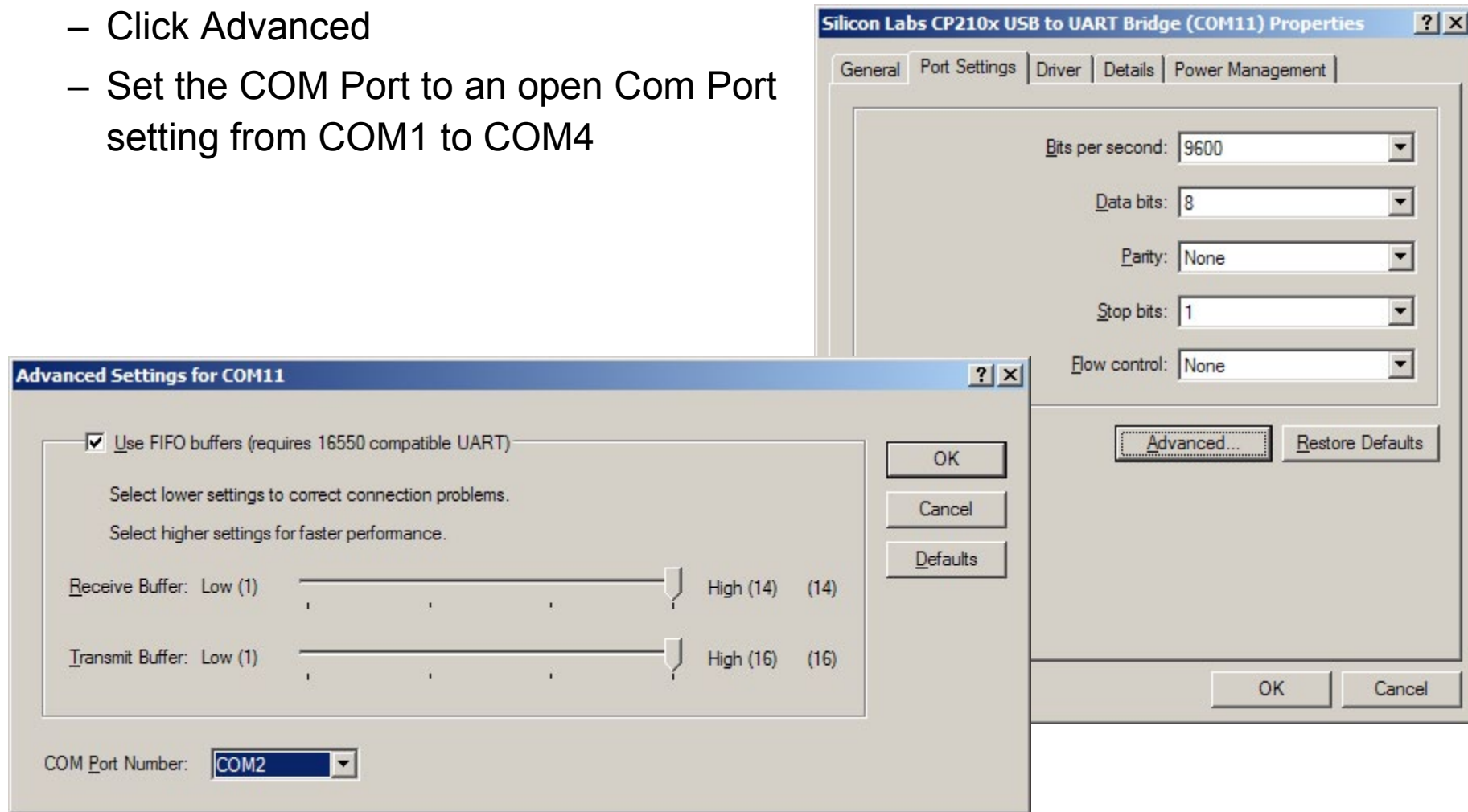




# VC707 Setup

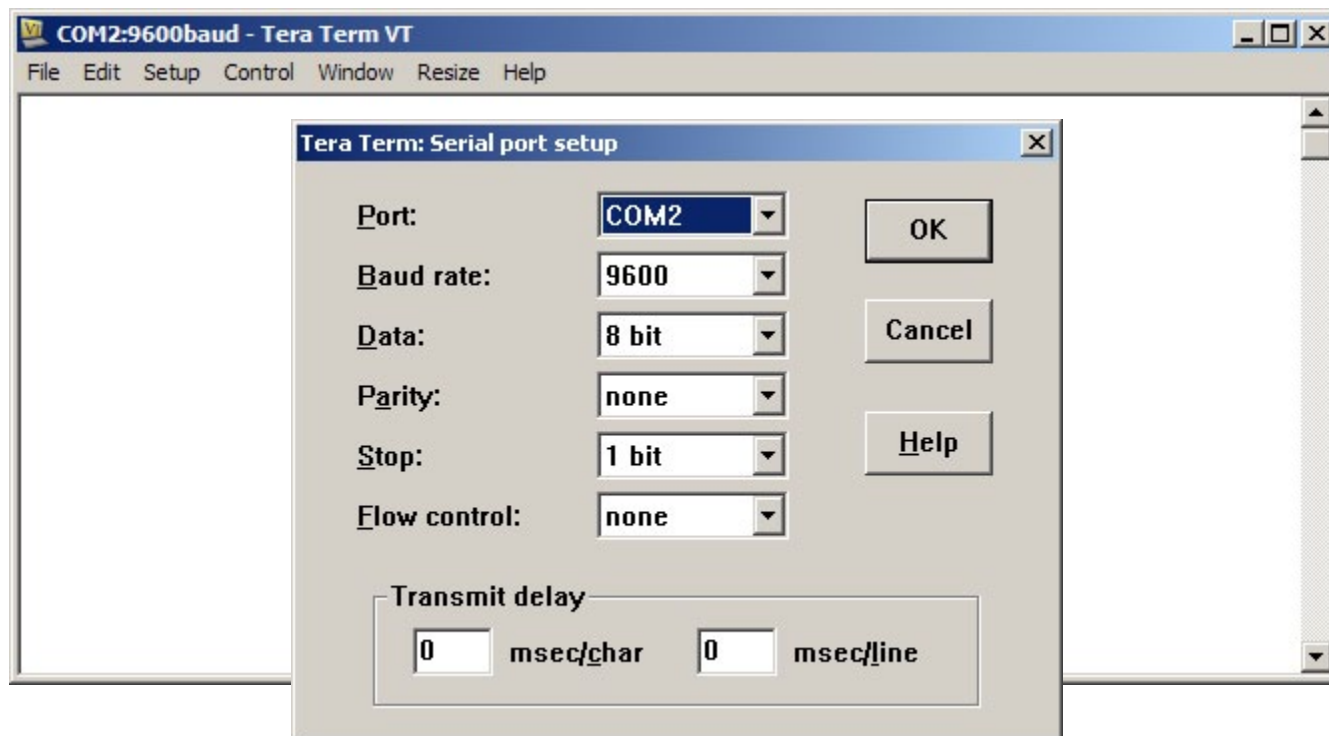
## ➤ Under Port Settings tab

- Click Advanced
- Set the COM Port to an open Com Port setting from COM1 to COM4



# VC707 Setup

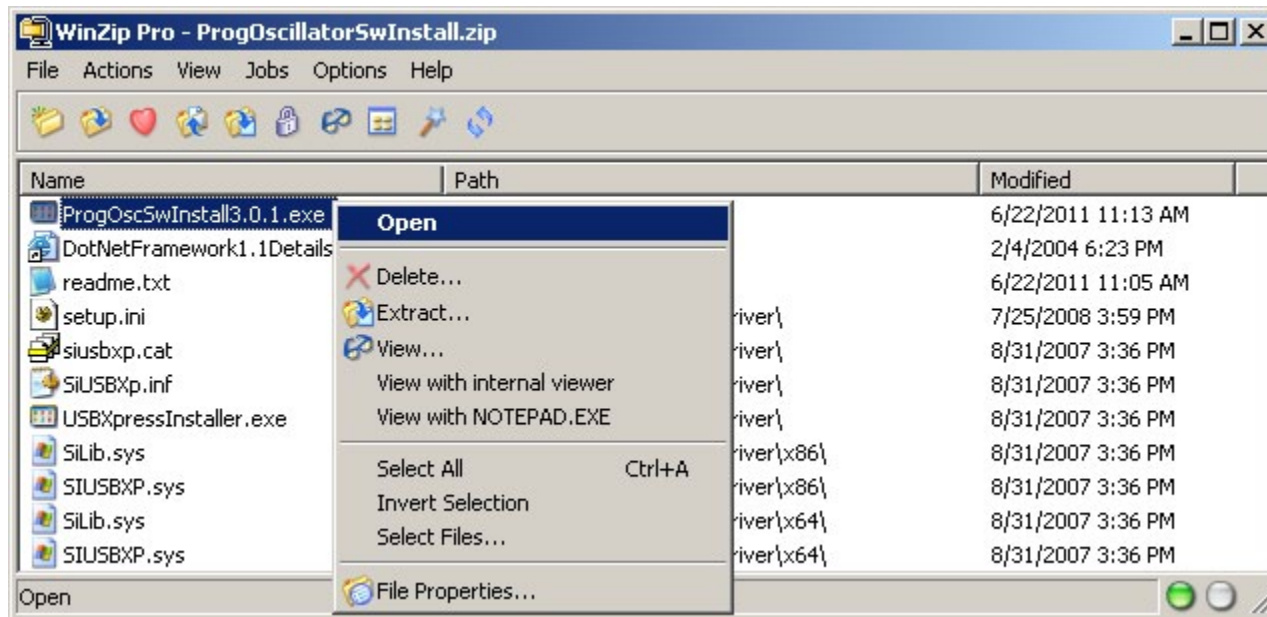
- Board Power must be on before starting Tera Term
- Start the Terminal Program
  - Select your USB Com Port
  - Set the baud to 9600



# Si Labs Programmable Oscillator Calculator

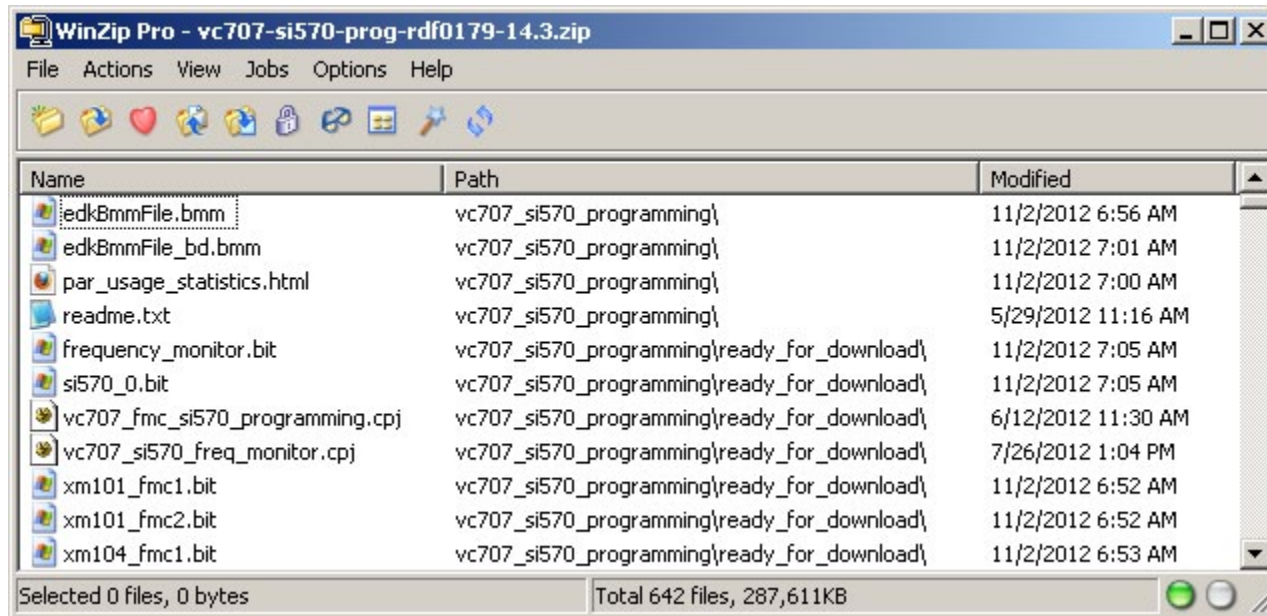
## ➤ Download [ProgOscillatorSwInstall.zip](#)

- Install “ProgOscSwInstall3.0.1.exe” only



# Setup for VC707 Si570 Programming

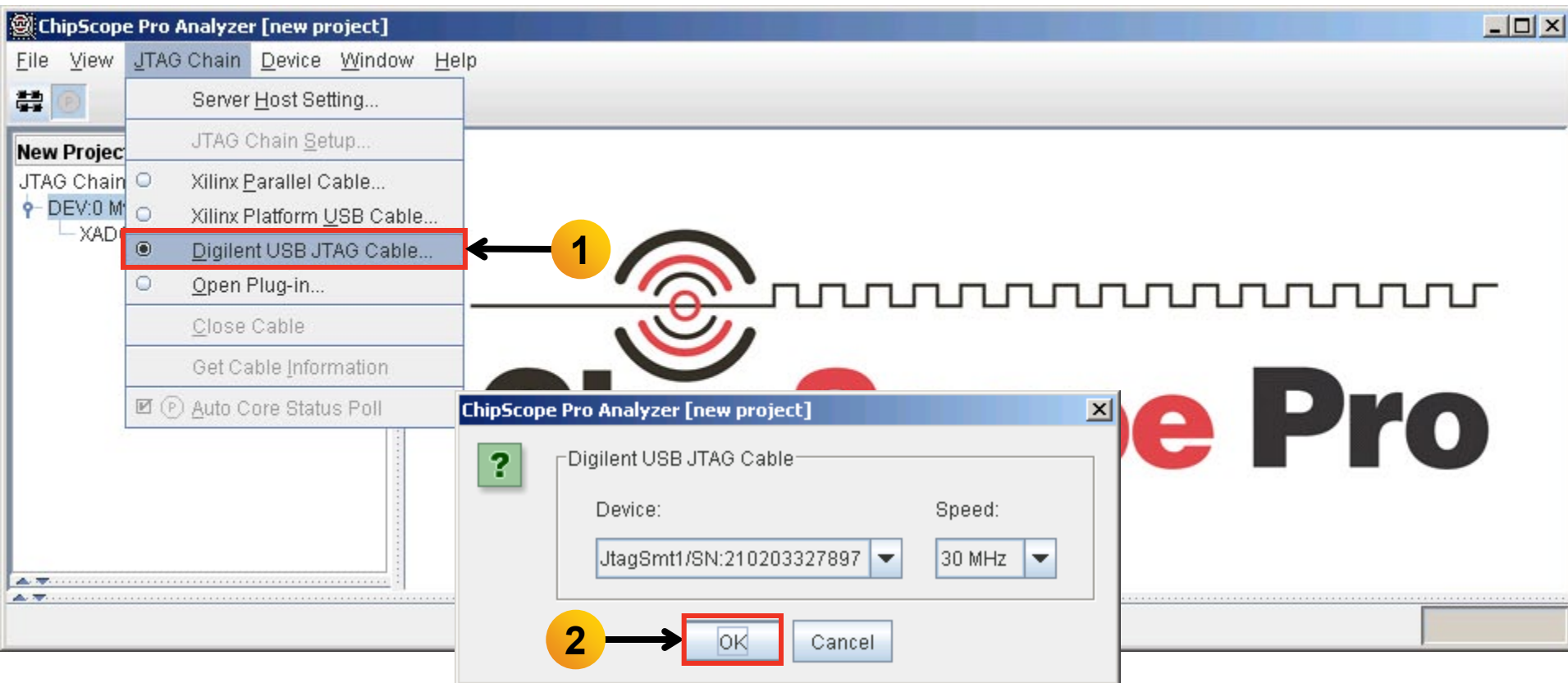
- Unzip the VC707 Si570 Programming Design Files (14.3 CES) to your C:\ drive
  - Available through <http://www.xilinx.com/vc707>





# VC707 Si570 Programming

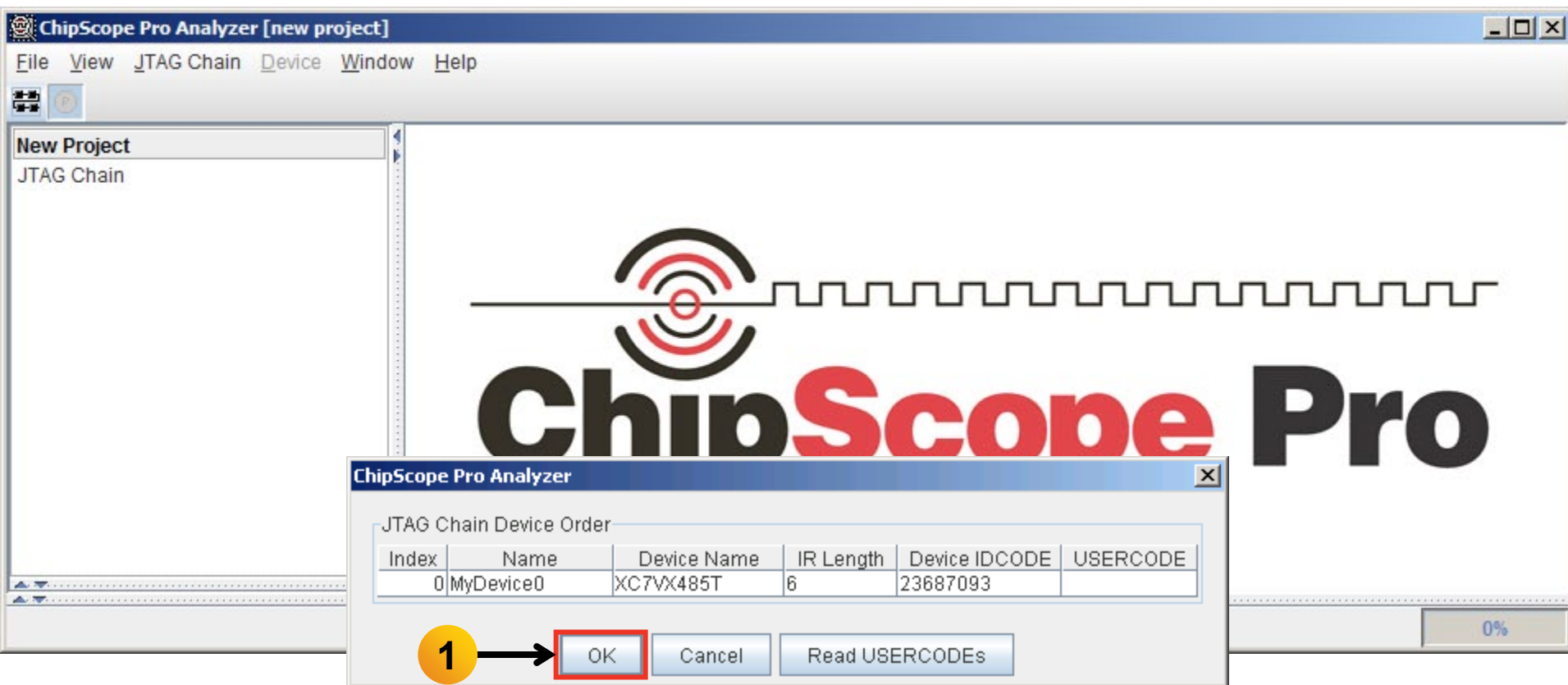
- Open ChipScope Pro and select JTAG Chain → Digilent USB Cable... (1)
- Verify 30 MHz operation and click OK (2)



**Note:** Presentation applies to the VC707

# VC707 Si570 Programming

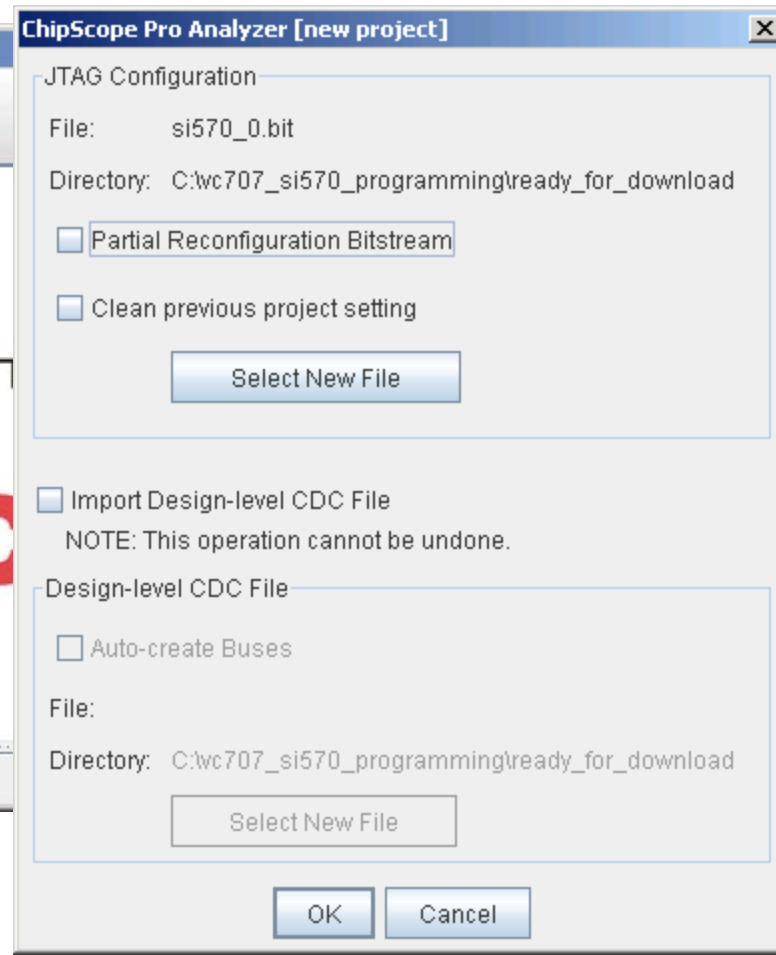
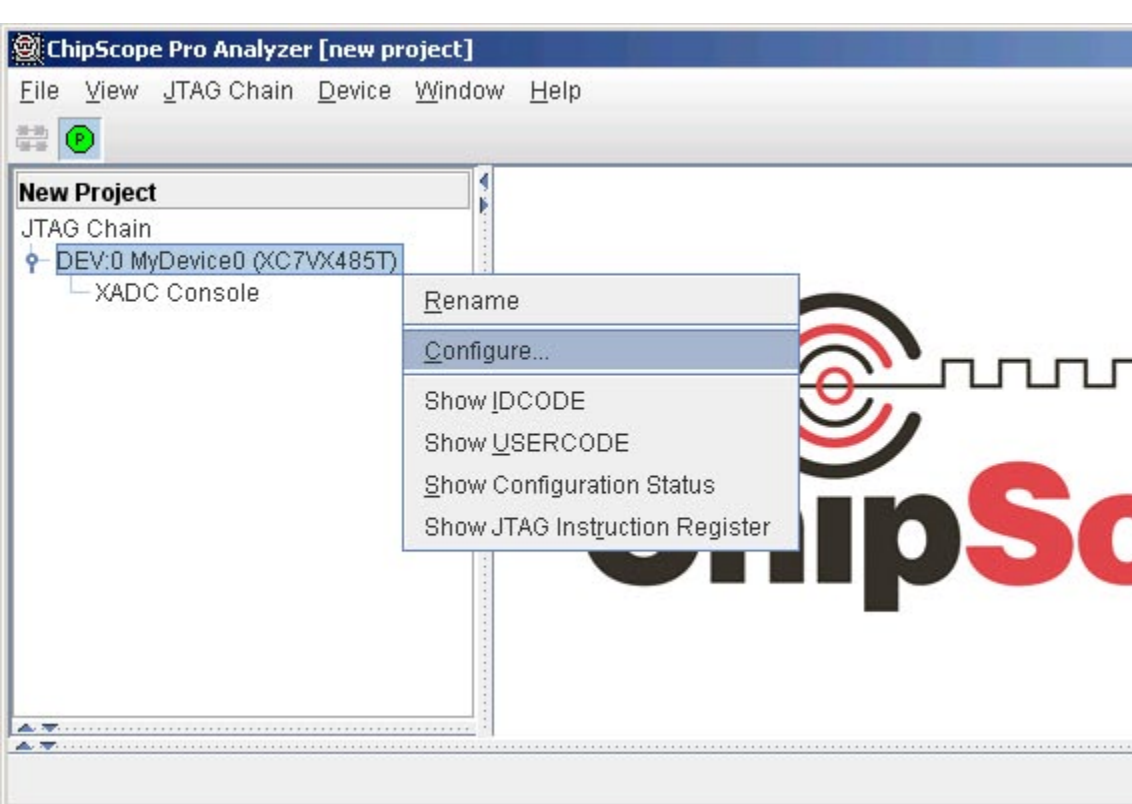
➤ Click OK (1)



**Note:** Presentation applies to the VC707

# VC707 Si570 Programming

- Right-click DEV:0 MyDevice0 (XC7VX485T) and select Configure...
- Select <Design Path>\ready\_for\_download\si570\_0.bit



**Note:** Presentation applies to the VC707

# VC707 Si570 Programming

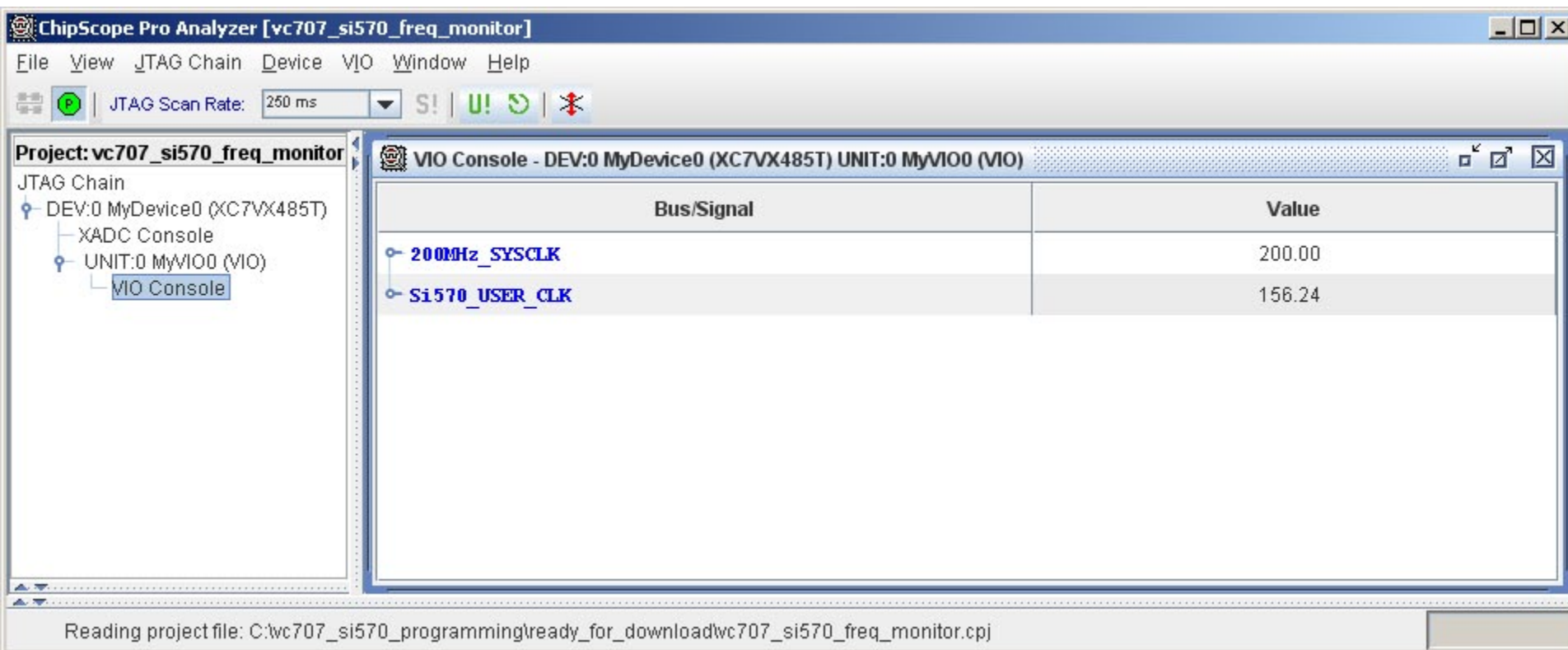
- Select File → Open Project...
- Select <Design Path>\ready\_for\_download\  
vc707\_si570\_freq\_monitor.cpj





# VC707 Si570 Programming

- The VIO Console will now show 200 MHz for the system clock, and 156.25 MHz for the User Clock



The screenshot displays the ChipScope Pro Analyzer interface for a project named 'vc707\_si570\_freq\_monitor'. The 'VIO Console' window is active, showing a table of bus/signal values. The table has two columns: 'Bus/Signal' and 'Value'. The first row shows '200MHz\_SYSCLK' with a value of 200.00. The second row shows 'Si570\_USER\_CLK' with a value of 156.24. The left sidebar shows the JTAG Chain hierarchy: DEV:0 MyDevice0 (XC7VX485T) -> XADC Console -> UNIT:0 MyVIO0 (VIO) -> VIO Console. The status bar at the bottom indicates the project file path: 'C:\vc707\_si570\_programmingready\_for\_download\vc707\_si570\_freq\_monitor.cpj'.

Bus/Signal	Value
200MHz_SYSCLK	200.00
Si570_USER_CLK	156.24

# VC707 Si570 Programming

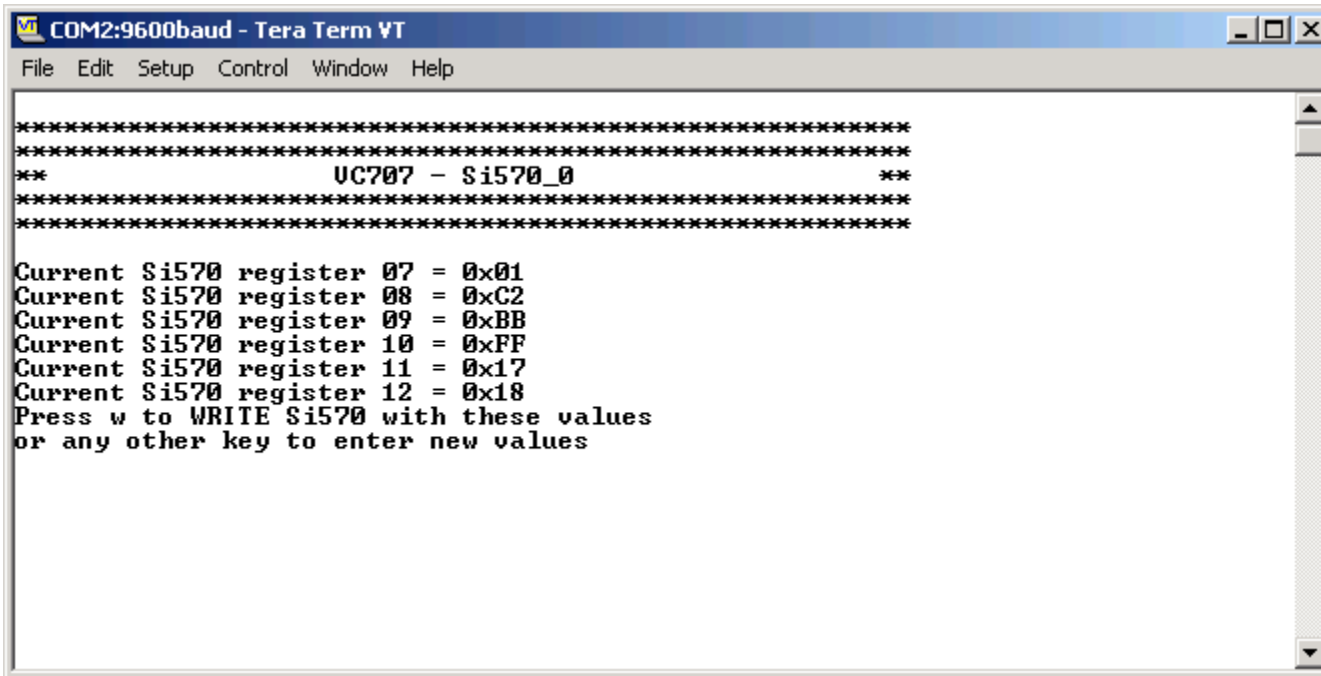
- For this example, Si570\_0 will be reprogrammed from 156.25 to 200 MHz
  - This requires use of the SiLabs Programmable Oscillator Calculator
- To use the SiLabs calculator, the correct fXTAL value for each Si570 must be determined, using this equation:

$$f_{\text{XTAL}} = \frac{F_{\text{out}} \times \text{HSDIV} \times \text{N1}}{\text{RFREQ}}$$

- For this equation,
  - Fout = 156.25, the preprogrammed frequency of the Si570s on the VC707
- We need to determine:
  - RFREQ
  - HSDIV
  - N1
- These can be found by reading back the registers on the Si570

# VC707 Si570 Programming

- The terminal window shows the current register settings for the Si570
  - The power-on values will appear in the terminal window
  - Note the value of 0x01C2BBFF1718



The screenshot shows a terminal window titled "COM2:9600baud - Tera Term VT". The window contains the following text:

```
*****
*****
**                UC707 - Si570_0                **
*****
*****
Current Si570 register 07 = 0x01
Current Si570 register 08 = 0xC2
Current Si570 register 09 = 0xBB
Current Si570 register 10 = 0xFF
Current Si570 register 11 = 0x17
Current Si570 register 12 = 0x18
Press w to WRITE Si570 with these values
or any other key to enter new values
```

**Note:** The values reported by your Si570 may differ from those shown

# VC707 Si570 Programming

- The value, 0x01C2BBFF1718, corresponds to the contents of the Si570's registers, 7 to 12:

Register	Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
7	High Speed/ N1 Dividers	HS_DIV[2:0]			N1[6:2]				
8	Reference Frequency	N1[1:0]		RFREQ[37:32]					
9	Reference Frequency	RFREQ[31:24]							
10	Reference Frequency	RFREQ[23:16]							
11	Reference Frequency	RFREQ[15:8]							
12	Reference Frequency	RFREQ[7:0]							



# VC707 Si570 Programming

- Extract the HS\_DIV and N1 values from 0x01C2BBFF1718:
- HS\_DIV = 0b000 which corresponds to “4”
- N1 = 0b0000111 which corresponds to “8”

Bit	D7	D6	D5	D4	D3	D2	D1	D0
Name	HS_DIV[2:0]			N1[6:2]				
Type	R/W			R/W				

Bit	Name	Function
7:5	HS_DIV[2:0]	<b>DCO High Speed Divider.</b> Sets value for high speed divider that takes the DCO output $f_{OSC}$ as its clock input. 000 = 4 001 = 5 010 = 6 011 = 7 100 = Not used. 101 = 9 110 = Not used. 111 = 11
4:0	N1[6:2]	<b>CLKOUT Output Divider.</b> Sets value for CLKOUT output divider. Allowed values are [1] and [2, 4, 6, ..., $2^7$ ]. Illegal odd divider values will be rounded up to the nearest even value. The value for the N1 register can be calculated by taking the divider ratio minus one. For example, to divide by 10, write 0001001 (9 decimal) to the N1 registers. 0000000 = 1 1111111 = $2^7$

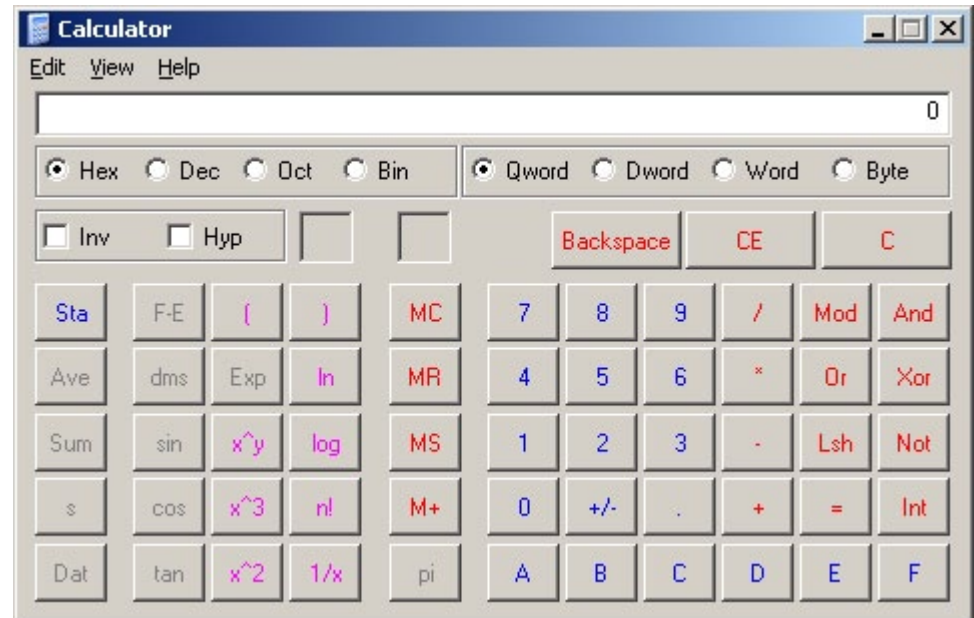
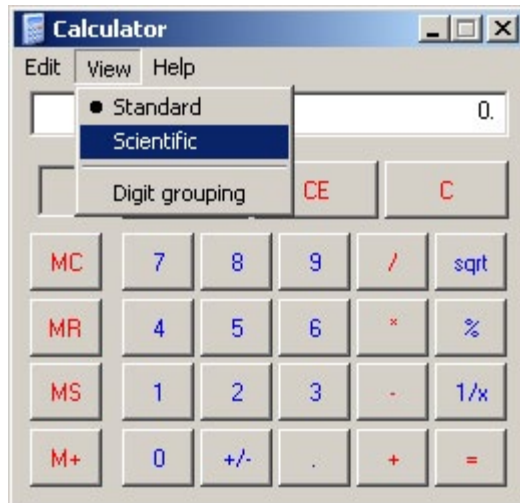
# VC707 Si570 Programming

- Extract the RFREQ value from 0x01C2BBFF1718:
  - 02BBFF1718

Register	Name	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
7	High Speed/ N1 Dividers	HS_DIV[2:0]			N1[6:2]				
8	Reference Frequency	N1[1:0]		RFREQ[37:32]					
9	Reference Frequency	RFREQ[31:24]							
10	Reference Frequency	RFREQ[23:16]							
11	Reference Frequency	RFREQ[15:8]							
12	Reference Frequency	RFREQ[7:0]							

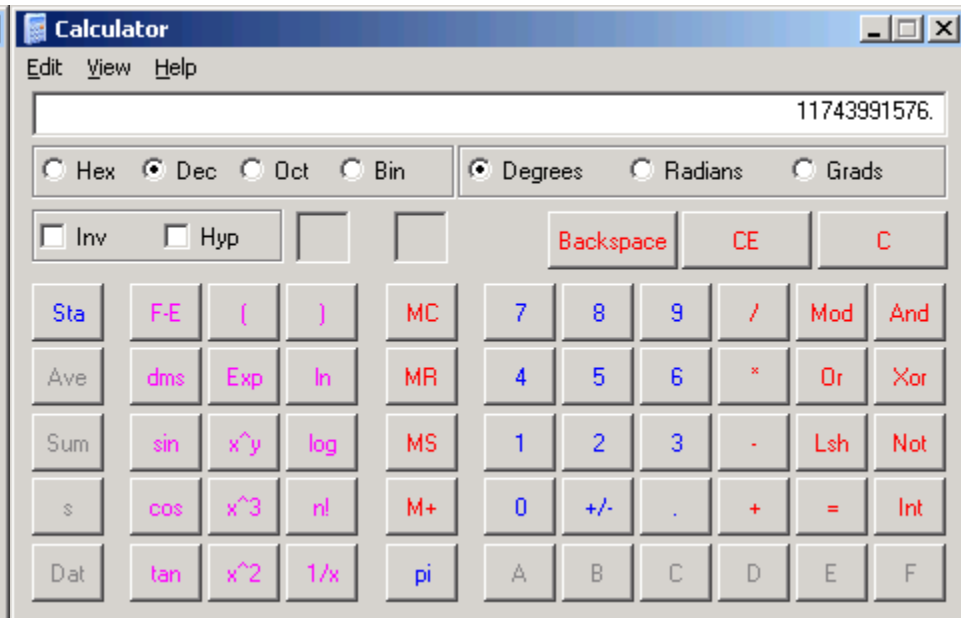
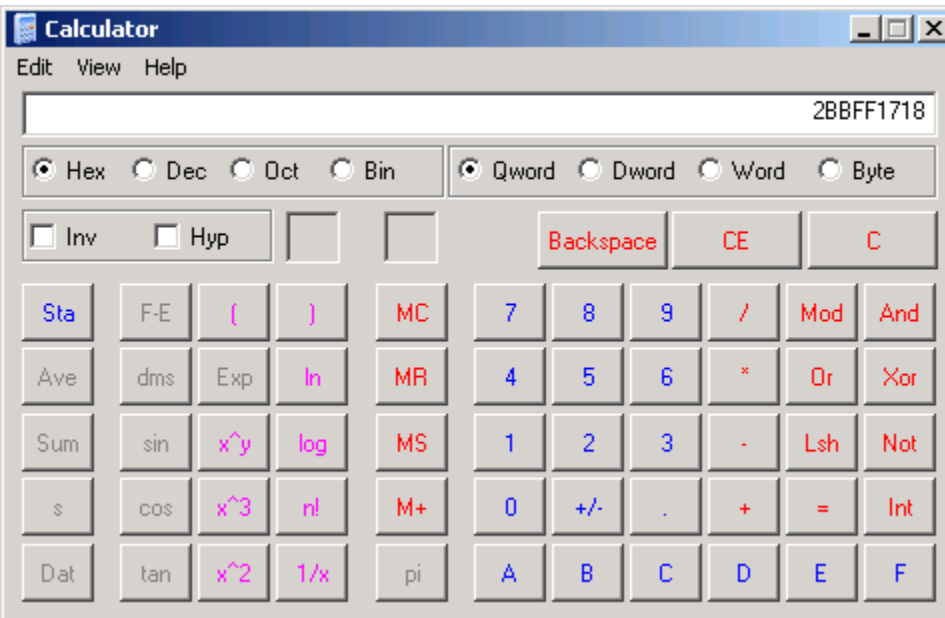
# VC707 Si570 Programming

- Open the Window Calculator
- Set to Scientific and Hex mode:



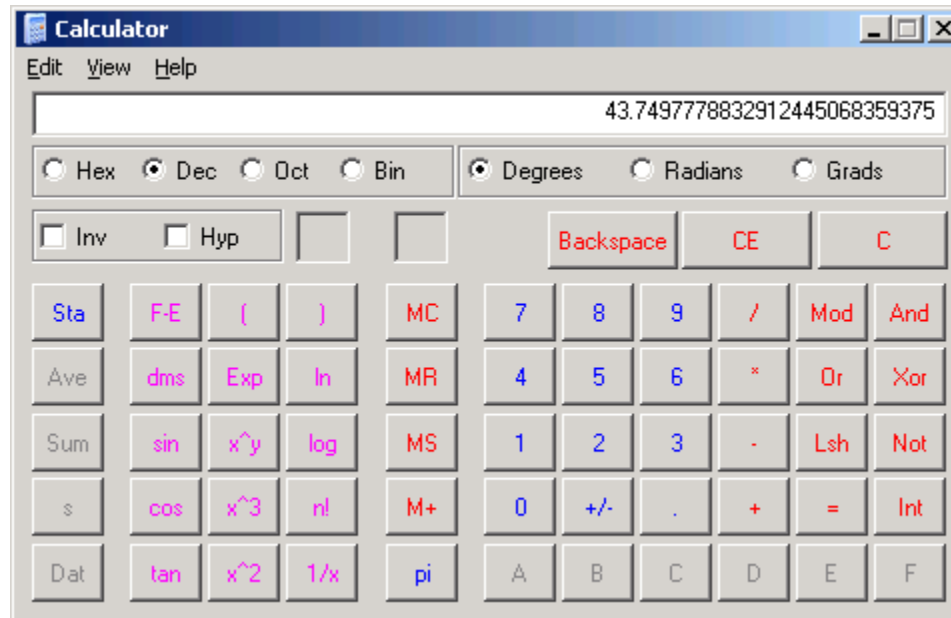
# VC707 Si570 Programming

- Enter or paste the RFREQ value, 02BBFF1718:
- Convert it to Decimal



# VC707 Si570 Programming

- Divide by  $2^{28}$
- This is the value for RFREQ:





# VC707 Si570 Programming

## ➤ For this equation,

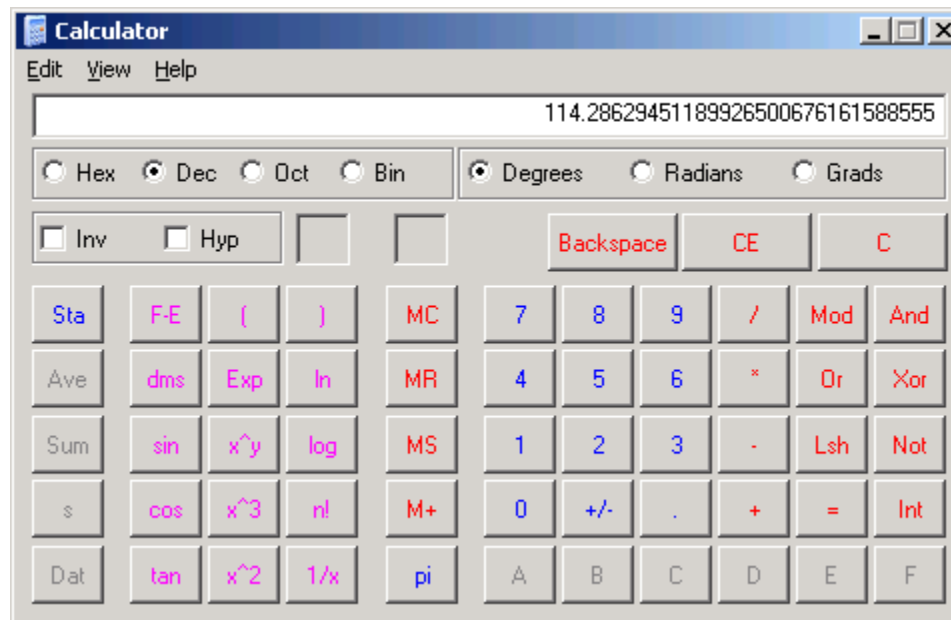
- $F_{out} = 156.25$
- $RFREQ = 43.7497778832912445068359375$
- $HSDIV = 4$
- $N1 = 8$
- $F_{out} \times HSDIV \times N1 = 5000$
- $f_{XTAL} = 5000 / RFREQ$

$$f_{XTAL} = \frac{F_{out} \times HSDIV \times N1}{RFREQ}$$

# VC707 Si570 Programming

## ➤ For this equation,

- Divide **43.7497778832912445068359375** by **5000**
- Take the reciprocal
- **fXTAL = 114.28629451189926500676161588555**
- Ctrl-C to copy this value



# VC707 Si570 Programming

## ➤ Open the SiLabs Programmable Oscillator Calculator

- Select the Si570 and click OK

Programmable Oscillator Software

Select a programmable oscillator series

	Part Number	Frequency Range (MHz)	Tuning Resolution	Output Format	Supply Voltage (V)
<input type="radio"/>	Si598 Si599	10 to 945 970 to 1134	28 PPT	LVPECL LVDS CML CMOS	3.3 2.5 1.8
<input checked="" type="radio"/>	Si570 Si571	1213 to 1417	80 PPT		
<input type="radio"/>	Si514	0.1 to 250	26 PPT	LVPECL LVDS HCSL CMOS	

What would you like to do?

☒ Connect to EVB

☐ Do not connect to EVB

Using the wrong Part Number when connecting to an EVB will result in undefined behavior.  
If connecting to an EVB, use the correct I2C address. The Si57x/9x devices always need the start-up frequency.  
[Click here to use the online XO/VCXO Part Number Lookup tool to get I2C and frequency information.](#)

Software Version: 3.0.1

OK

# VC707 Si570 Programming

➤ Select Options → Advanced...

The screenshot shows the 'Programmable Oscillator Calculator - Si570/1' window. The 'Options' menu is open, showing 'Select Oscillator...', 'Disconnect', 'Advanced...' (highlighted), and 'Exit'. The main interface has three tabs: 'Options', 'Power Supply Control', and 'Help'. The 'Options' tab is active, showing a 'What is the device's start-up frequency?' section with a text box containing '19.440000' and a unit 'MHz', and an 'Apply Definition' button. Below this is a 'Procedure' tab, which is currently selected, showing a large empty text box for 'Here are the device programming details for the new output frequency.' To the right, there are two sections: 'Large Frequency Change' and 'Small Frequency Change'. The 'Large Frequency Change' section has a 'What is the device's new frequency?' text box with '19.440000' and 'MHz', and a 'Create Example' button. The 'Small Frequency Change' section has a 'Current Anchor Frequency' text box, a 'Total PPM Change from Anchor Frequency' text box, and a 'What is the amount in ppm to change the current frequency?' text box with '0.00000'. Below these are 'Add PPM' and 'Subtract PPM' buttons. At the bottom right is a 'Result Log' section with a large empty text box. The status bar at the bottom shows 'disconnected from EVB' and '3:21 PM -- Ready.'

Programmable Oscillator Calculator - Si570/1

Options | Power Supply Control | Help

Select Oscillator...  
Disconnect  
Advanced...  
Exit

What is the device's start-up frequency?

19.440000 MHz

Apply Definition

Large Frequency Change

What is the device's new frequency?

19.440000 MHz

Create Example

Small Frequency Change

Current Anchor Frequency

Total PPM Change from Anchor Frequency

What is the amount in ppm to change the current frequency?

0.00000

Add PPM Subtract PPM

Result Log

Procedure | Divider Combinations | Summary

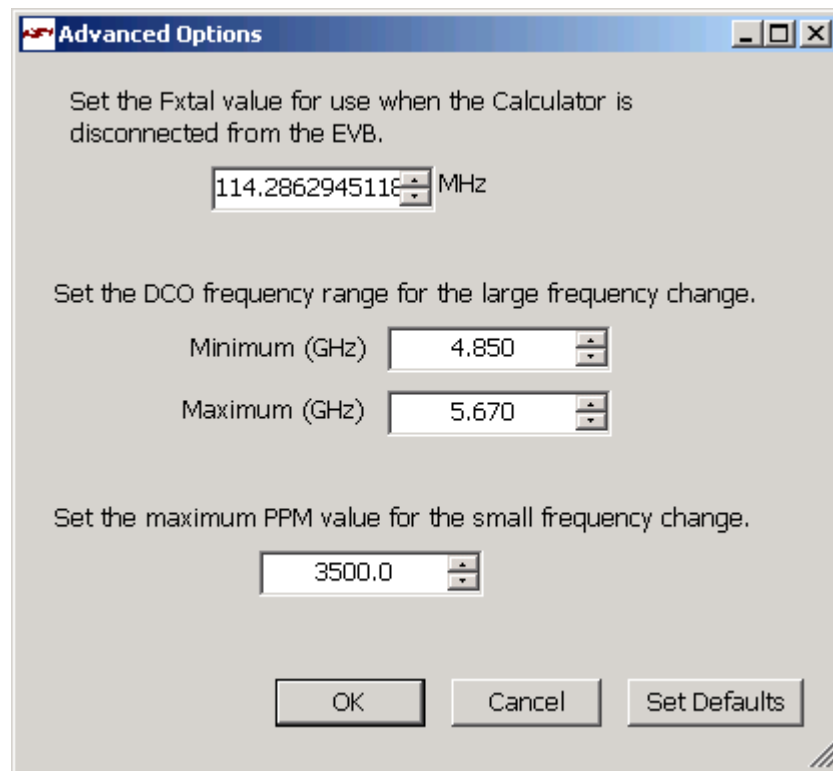
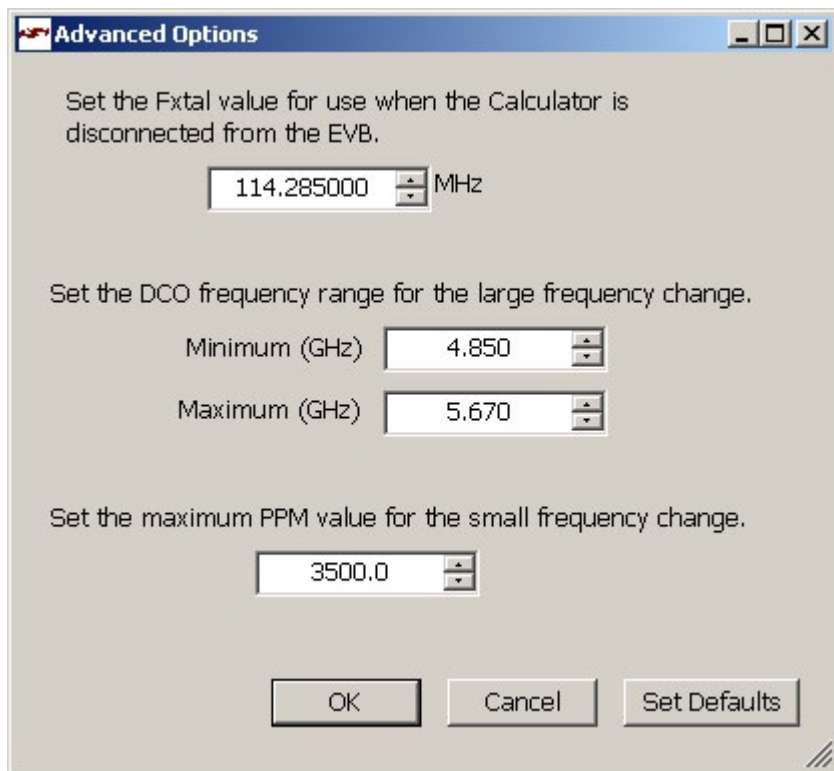
Here are the device programming details for the new output frequency.

disconnected from EVB 3:21 PM -- Ready.

# VC707 Si570 Programming

## ➤ Paste in the value of fXTAL

- The calculator will round the number appropriately
- Click OK





# VC707 Si570 Programming

➤ Enter 156.25 and click the Apply Definition button

The screenshot shows the 'Programmable Oscillator Calculator - Si570/1' window. It has a menu bar with 'Options', 'Power Supply Control', and 'Help'. The main area is divided into three columns. The left column, titled 'Definition', asks 'What is the device's start-up frequency?' and has a text box containing '156.250000' followed by 'MHz' and an 'Apply Definition' button. The middle column, titled 'Large Frequency Change', asks 'What is the device's new frequency?' and has a text box containing '19.440000' followed by 'MHz' and a 'Create Example' button. The right column, titled 'Small Frequency Change', has a 'Current Anchor Frequency' text box with '156.250000 MHz', a 'Total PPM Change from Anchor Frequency' text box, and a question 'What is the amount in ppm to change the current frequency?' with a text box containing '0.00000'. Below these are 'Add PPM' and 'Subtract PPM' buttons. At the bottom right is a 'Result Log' text area. A status bar at the bottom left shows 'disconnected from EVB' and '9:25 AM -- Apply completed'. The bottom left of the main area has tabs for 'Procedure', 'Divider Combinations', and 'Summary', with 'Procedure' selected. Below the tabs is a large text area with the text 'Here are the device programming details for the new output frequency.'

Programmable Oscillator Calculator - Si570/1

Options Power Supply Control Help

**Definition**

What is the device's start-up frequency?

156.250000 MHz

Apply Definition

**Large Frequency Change**

What is the device's new frequency?

19.440000 MHz

Create Example

**Small Frequency Change**

Current Anchor Frequency

156.250000 MHz

Total PPM Change from Anchor Frequency

What is the amount in ppm to change the current frequency?

0.00000

Add PPM Subtract PPM

Result Log

Procedure | Divider Combinations | Summary

Here are the device programming details for the new output frequency.

disconnected from EVB 9:25 AM -- Apply completed

# VC707 Si570 Programming

- Set the new frequency to 200 MHz and click the Create Example button

The screenshot shows the 'Programmable Oscillator Calculator - Si570/1' window. It has a menu bar with 'Options', 'Power Supply Control', and 'Help'. The interface is divided into several sections:

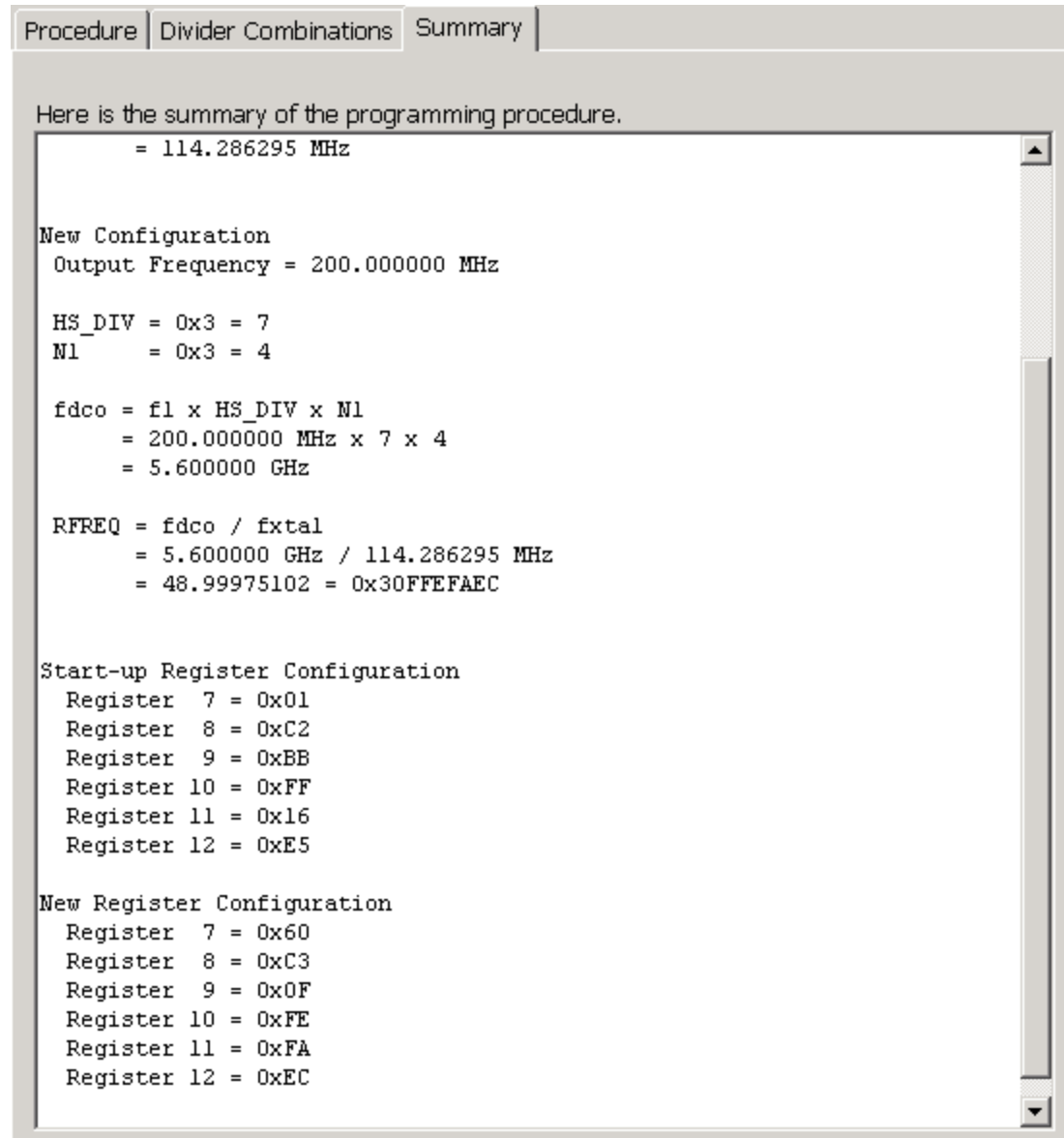
- Definition:** A text prompt 'What is the device's start-up frequency?' is followed by a numeric input field containing '156.250000' and a unit dropdown set to 'MHz'. Below this is an 'Apply Definition' button.
- Large Frequency Change:** A text prompt 'What is the device's new frequency?' is followed by a numeric input field containing '200.000000' and a unit dropdown set to 'MHz'. Below this is a 'Create Example' button.
- Small Frequency Change:** This section contains three input fields: 'Current Anchor Frequency' (200.000000 MHz), 'Total PPM Change from Anchor Frequency' (empty), and 'What is the amount in ppm to change the current frequency?' (0.00000). Below these are 'Add PPM' and 'Subtract PPM' buttons.
- Procedure:** A tabbed interface with 'Procedure', 'Divider Combinations', and 'Summary' tabs. The 'Procedure' tab is active, showing a list of steps. Step 1 is 'Read start-up frequency configuration (RFREQ, HS\_DIV, and N1) from the device after power-up or register reset'. Below this is a table titled 'Registers for the Current Configuration'.
- Result Log:** A large empty text area for logging results.

At the bottom of the window, a status bar displays 'disconnected from EVB' and '9:25 AM -- Program complete!'.

Register	Data
7	0x01
8	0xC2
9	0xBB
10	0xFF

# VC707 Si570 Programming

- Under the summary tab, the new register configurations are shown
- The startup register configurations will vary slightly from the actual device power-on programming



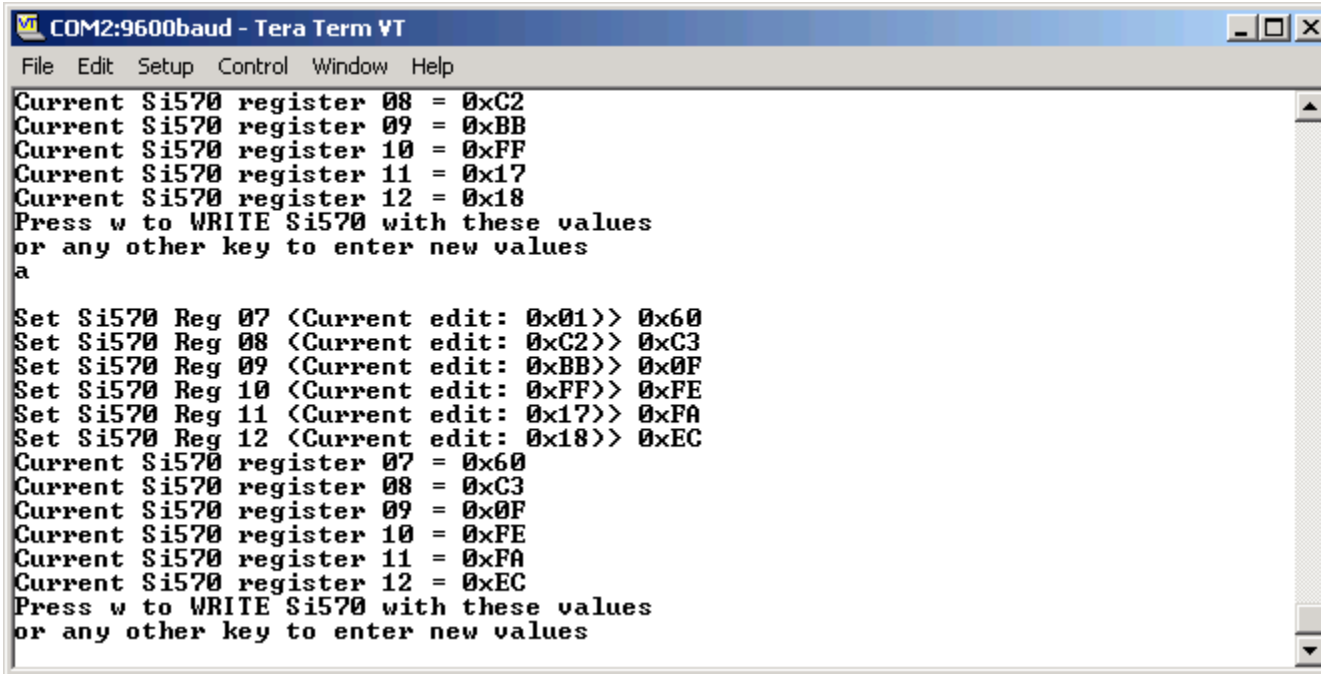
The screenshot shows a software window with three tabs: "Procedure", "Divider Combinations", and "Summary". The "Summary" tab is selected. The text in the window reads:

```
Here is the summary of the programming procedure.  
  
= 114.286295 MHz  
  
New Configuration  
Output Frequency = 200.000000 MHz  
  
HS_DIV = 0x3 = 7  
N1      = 0x3 = 4  
  
fdco = f1 x HS_DIV x N1  
      = 200.000000 MHz x 7 x 4  
      = 5.600000 GHz  
  
RFREQ = fdco / fxtal  
      = 5.600000 GHz / 114.286295 MHz  
      = 48.99975102 = 0x30FFEFAEC  
  
Start-up Register Configuration  
Register 7 = 0x01  
Register 8 = 0xC2  
Register 9 = 0xBB  
Register 10 = 0xFF  
Register 11 = 0x16  
Register 12 = 0xE5  
  
New Register Configuration  
Register 7 = 0x60  
Register 8 = 0xC3  
Register 9 = 0x0F  
Register 10 = 0xFE  
Register 11 = 0xFA  
Register 12 = 0xEC
```

**Note:** Presentation applies to the VC707

# VC707 Si570 Programming

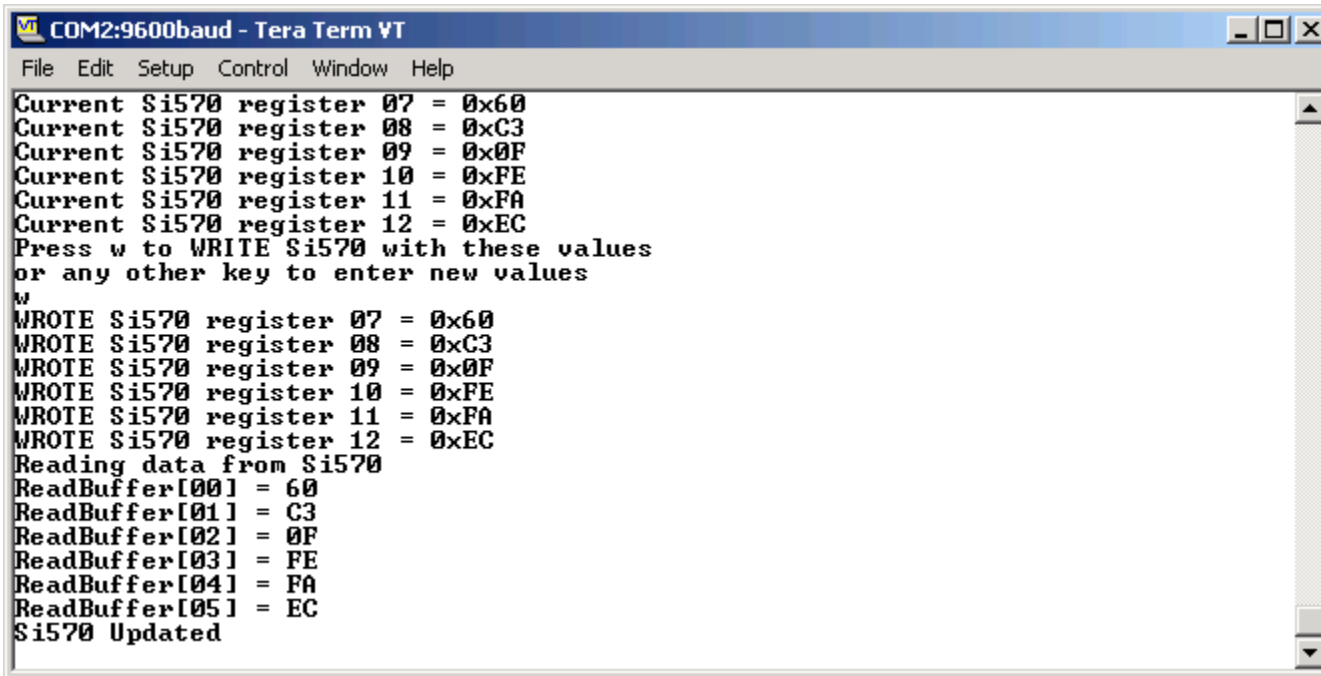
- Press a key to begin entering the newly calculated values
- When done, press “w”



```
COM2:9600baud - Tera Term VT
File Edit Setup Control Window Help
Current Si570 register 08 = 0xC2
Current Si570 register 09 = 0xBB
Current Si570 register 10 = 0xFF
Current Si570 register 11 = 0x17
Current Si570 register 12 = 0x18
Press w to WRITE Si570 with these values
or any other key to enter new values
a
Set Si570 Reg 07 <Current edit: 0x01>> 0x60
Set Si570 Reg 08 <Current edit: 0xC2>> 0xC3
Set Si570 Reg 09 <Current edit: 0xBB>> 0x0F
Set Si570 Reg 10 <Current edit: 0xFF>> 0xFE
Set Si570 Reg 11 <Current edit: 0x17>> 0xFA
Set Si570 Reg 12 <Current edit: 0x18>> 0xEC
Current Si570 register 07 = 0x60
Current Si570 register 08 = 0xC3
Current Si570 register 09 = 0x0F
Current Si570 register 10 = 0xFE
Current Si570 register 11 = 0xFA
Current Si570 register 12 = 0xEC
Press w to WRITE Si570 with these values
or any other key to enter new values
```

# VC707 Si570 Programming

➤ Si570 has been successfully updated



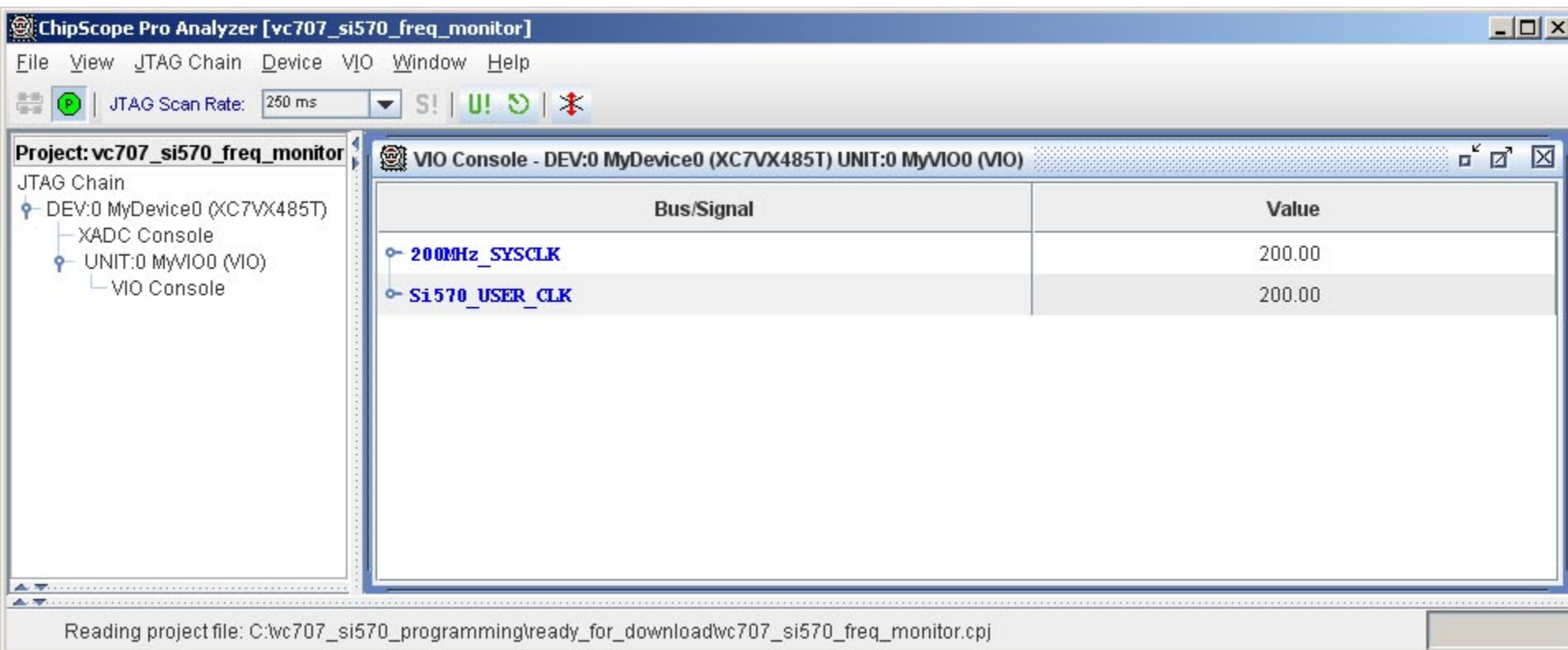
The screenshot shows a Tera Term VT window titled "COM2:9600baud - Tera Term VT". The window contains the following text:

```
File Edit Setup Control Window Help
Current Si570 register 07 = 0x60
Current Si570 register 08 = 0xC3
Current Si570 register 09 = 0x0F
Current Si570 register 10 = 0xFE
Current Si570 register 11 = 0xFA
Current Si570 register 12 = 0xEC
Press w to WRITE Si570 with these values
or any other key to enter new values
w
WROTE Si570 register 07 = 0x60
WROTE Si570 register 08 = 0xC3
WROTE Si570 register 09 = 0x0F
WROTE Si570 register 10 = 0xFE
WROTE Si570 register 11 = 0xFA
WROTE Si570 register 12 = 0xEC
Reading data from Si570
ReadBuffer[00] = 60
ReadBuffer[01] = C3
ReadBuffer[02] = 0F
ReadBuffer[03] = FE
ReadBuffer[04] = FA
ReadBuffer[05] = EC
Si570 Updated
```



# VC707 Si570 Programming

➤ The Si570\_USER\_CLK frequency should now measure ~200.00 MHz



The screenshot displays the ChipScope Pro Analyzer interface for the project 'vc707\_si570\_freq\_monitor'. The JTAG Chain on the left shows the hierarchy: DEV:0 MyDevice0 (XC7VX485T) -> XADC Console -> UNIT:0 MyVIO0 (VIO) -> VIO Console. The VIO Console window on the right shows a table of measured values:

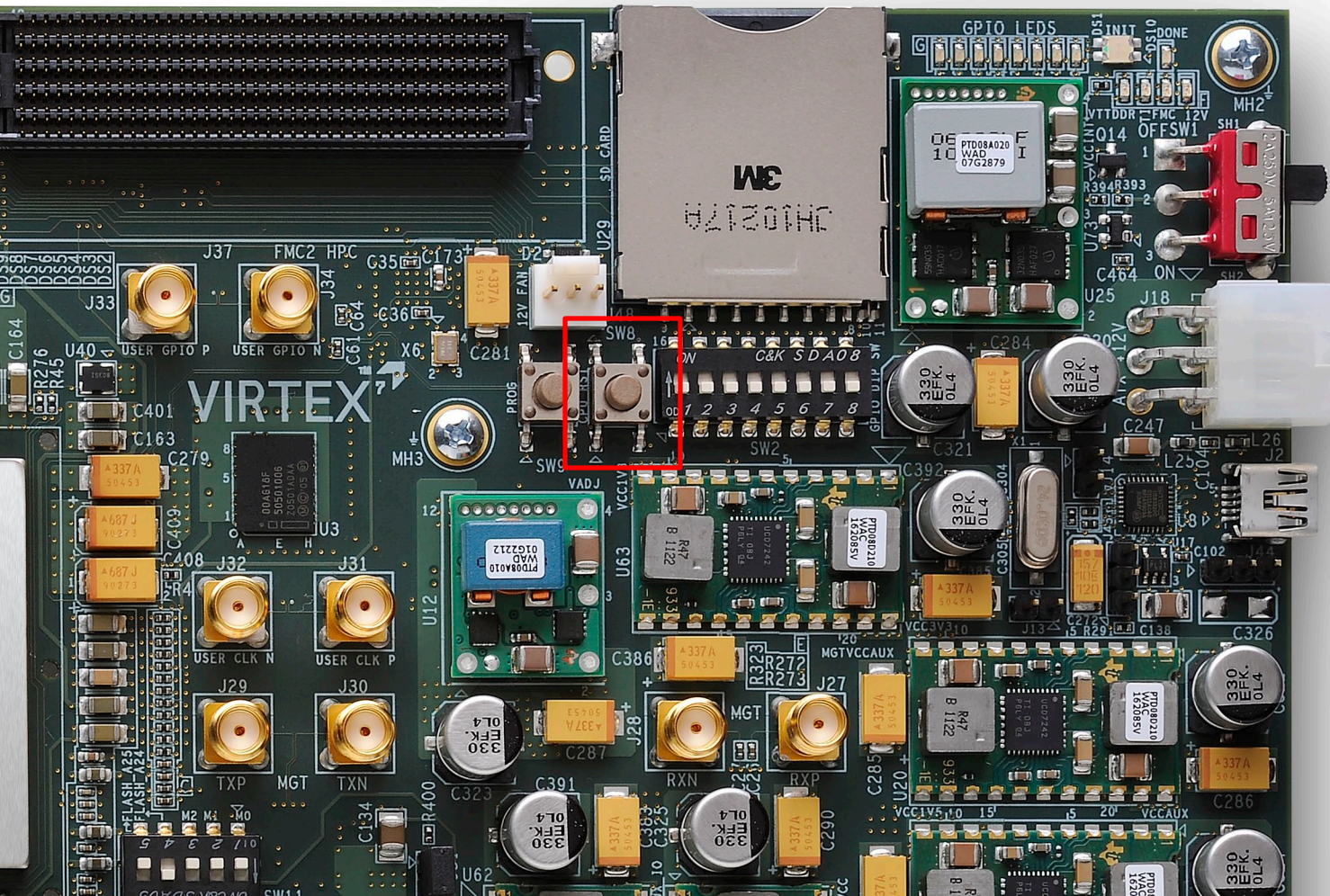
Bus/Signal	Value
200MHz_SYSCLK	200.00
Si570_USER_CLK	200.00

The status bar at the bottom indicates the project file path: C:\vc707\_si570\_programming\ready\_for\_download\vc707\_si570\_freq\_monitor.cpj.

**Note:** Presentation applies to the VC707

# VC707 Si570 Programming

- If needed, press SW8 to reset the MicroBlaze process
  - Instead of reloading the bitstream; also acts as a CPU Reset



# Programming the FMC Si570

# VC707 FMC Si570 Programming Overview

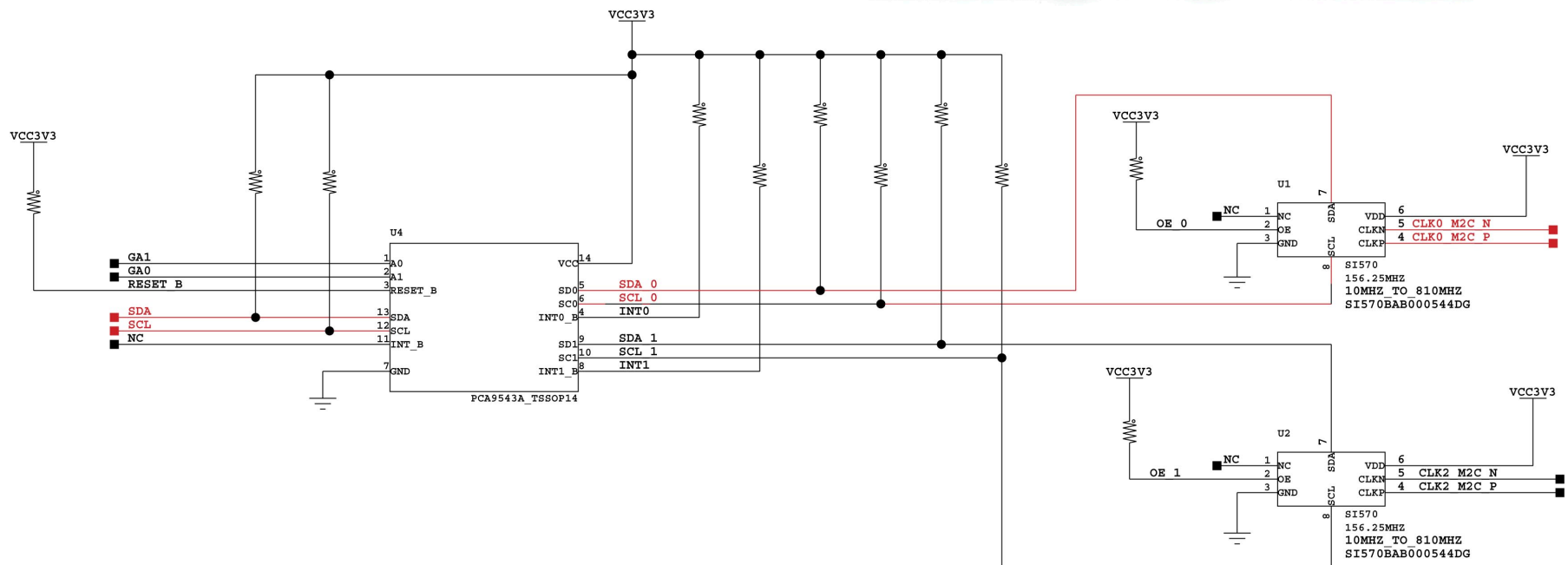
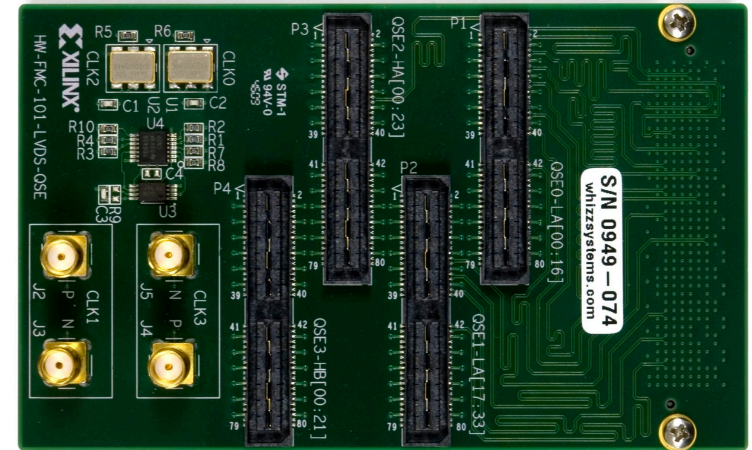
## ➤ Description

- The FMC modules, XM101, XM104, and XM105 have a Silicon Labs Si570 Programmable Oscillator that defaults to 156.25 MHz. Via the IIC bus, the frequency of this device can be changed. This tutorial shows how to change the output frequency of this device.



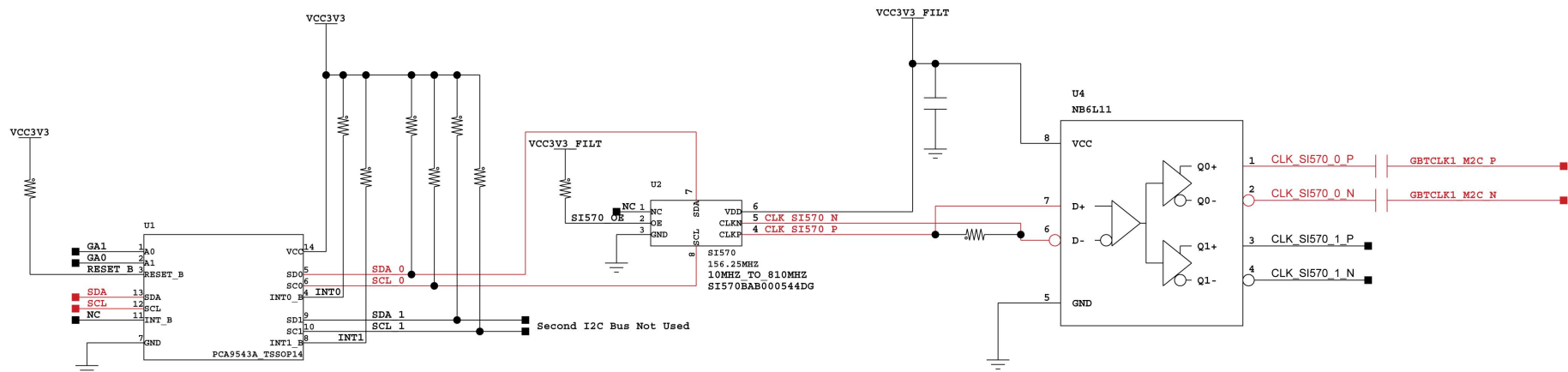
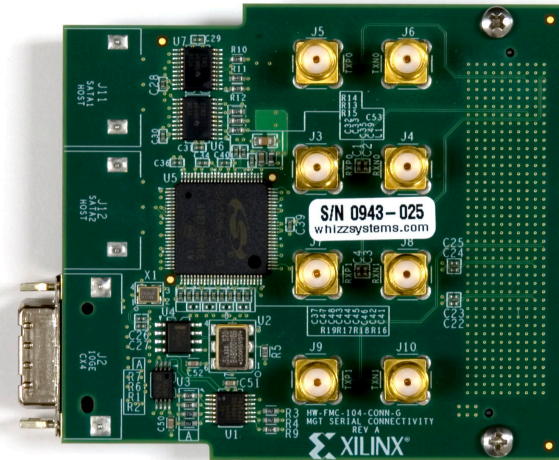
# Xilinx XM101 FMC Module

- The XM101 board uses an on-board IIC switch



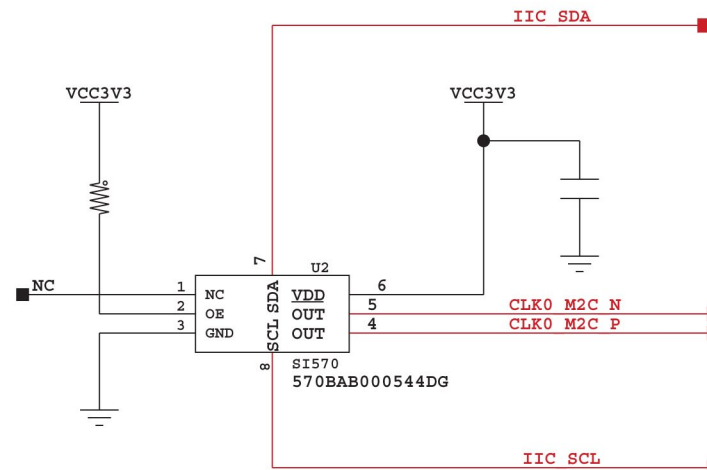
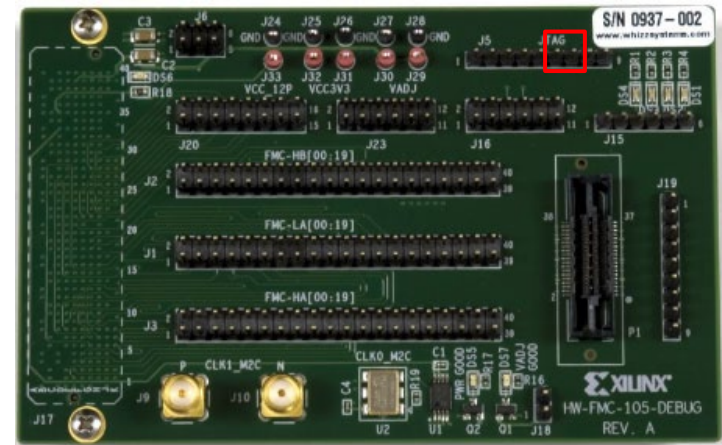


- **The XM104 board has an on-board IIC switch**



# Xilinx XM105 FMC Module

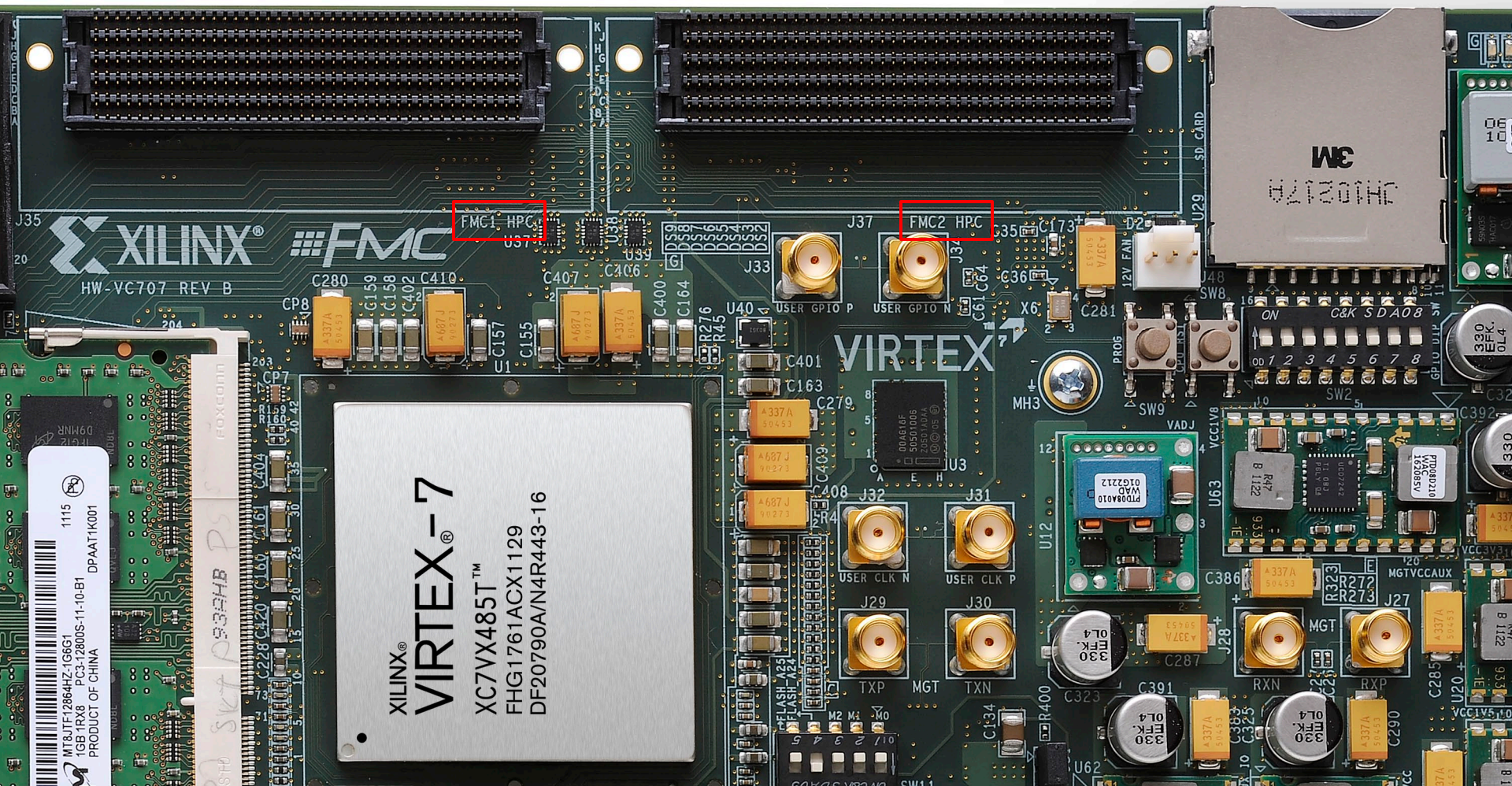
- **The XM105 board has a direct connection to the Si570 IIC**
  - Note: FMC\_TDI and FMC\_TDO (J5, 6 & 7) must be connected during configuration





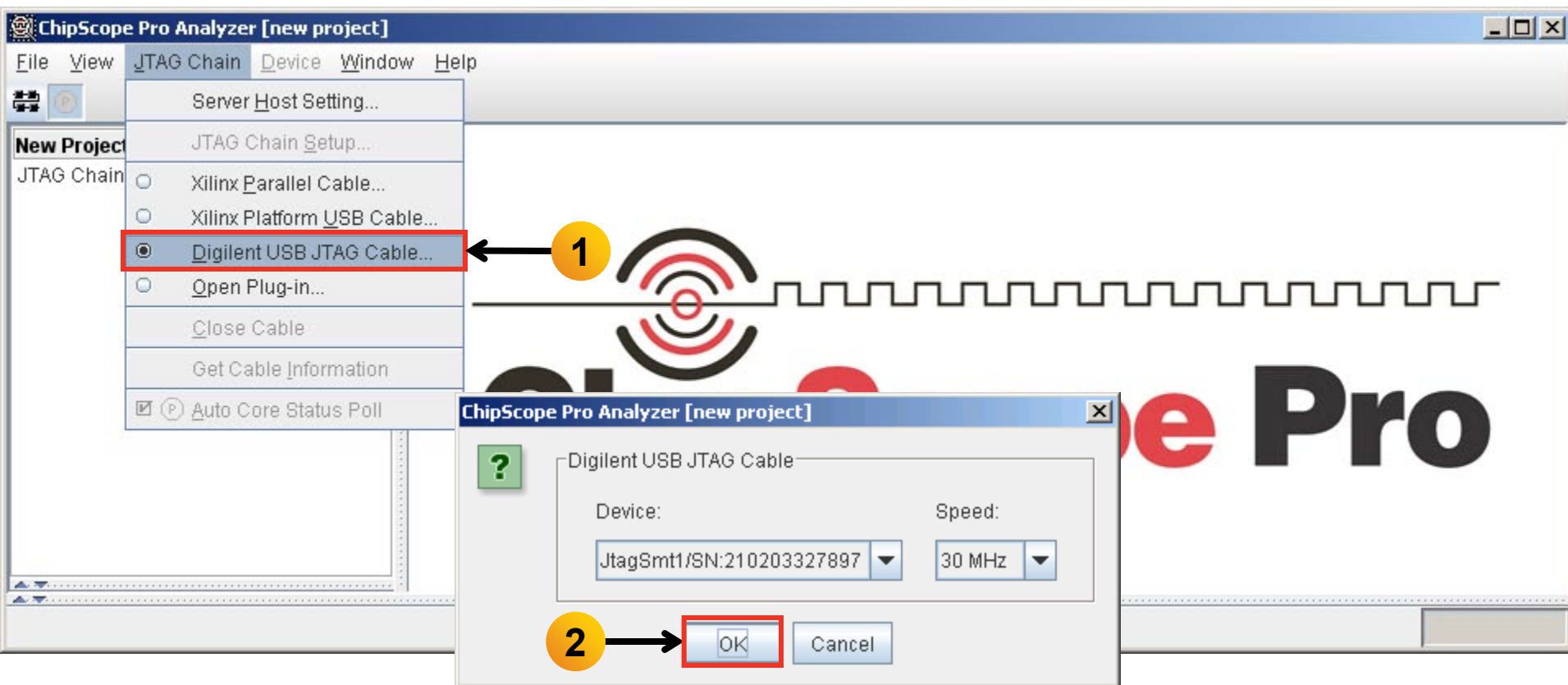
# VC707 FMC Si570 Programming

- Attach your FMC board (XM101, XM104, or XM105) to either the FMC1 HPC or the FMC2 HPC ports on the VC707
  - Turn VC707 power off while installing the FMC boards



# VC707 FMC Si570 Programming

- Open ChipScope Pro and select JTAG Chain → Digilent USB Cable... (1)
- Verify 30 MHz operation and click OK (2)

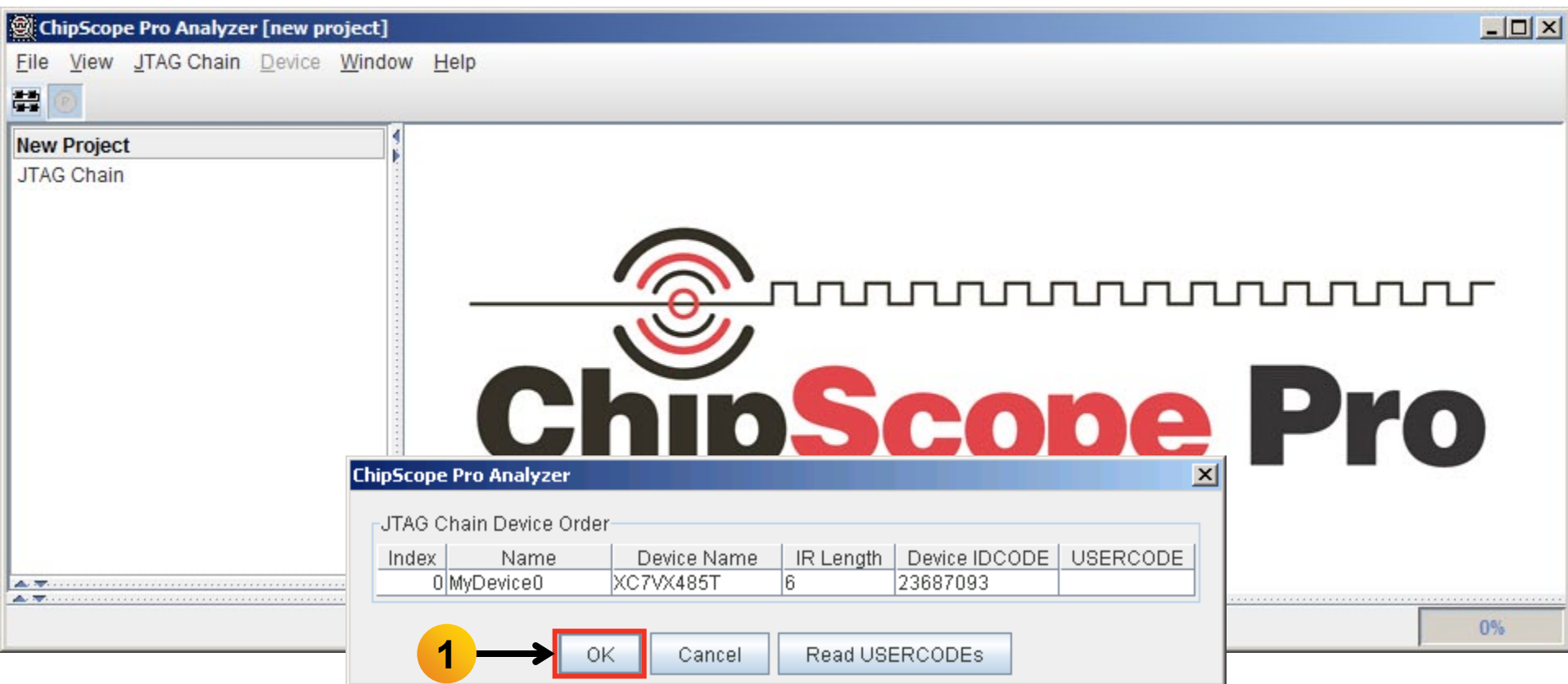


**Note:** Presentation applies to the VC707



# VC707 FMC Si570 Programming

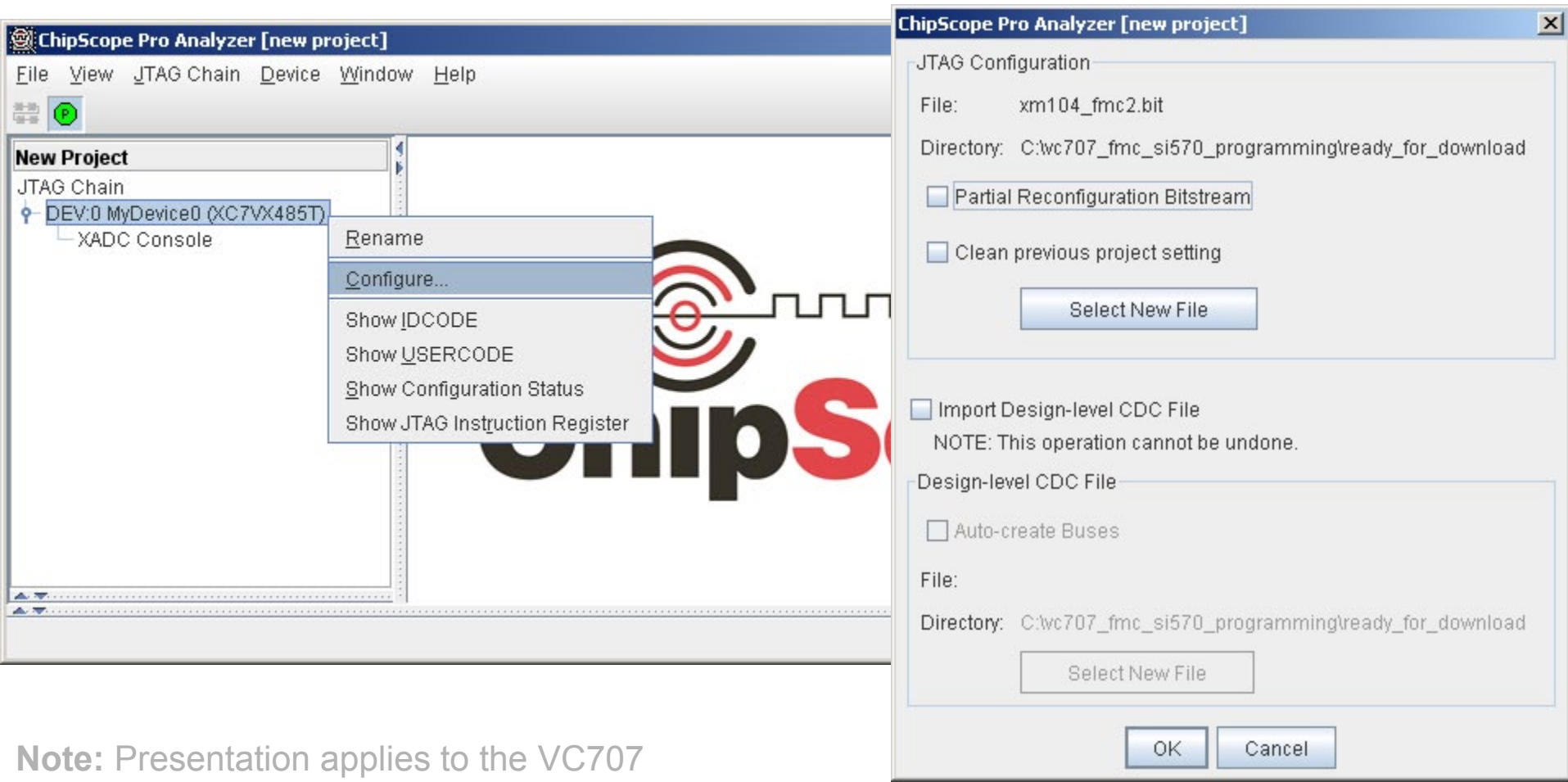
➤ Click OK (1)



**Note:** Presentation applies to the VC707

# VC707 FMC Si570 Programming

- **Right-click DEV:0 MyDevice0 (XC7VX485T) and select Configure...**
  - Select a bitstream that matches your FMC Board / FMC port configuration; e.g. **xm101\_fmc1.bit**, **xm104\_fmc2.bit**, etc.
  - Select <Design Path>\ready\_for\_download\<bitstream>



**Note:** Presentation applies to the VC707

# VC707 FMC Si570 Programming

- Select File → Open Project...
- Select <Design Path>\ready\_for\_download\  
vc707\_fmc\_si570\_programming.cpj





# VC707 FMC Si570 Programming

- The VIO Console will now show 200 MHz for the system clock, and 156.25 MHz for the User Clock
- An XM104 board on FMC2 HPC port shows 156.25 MHz on FMC2\_GBT1

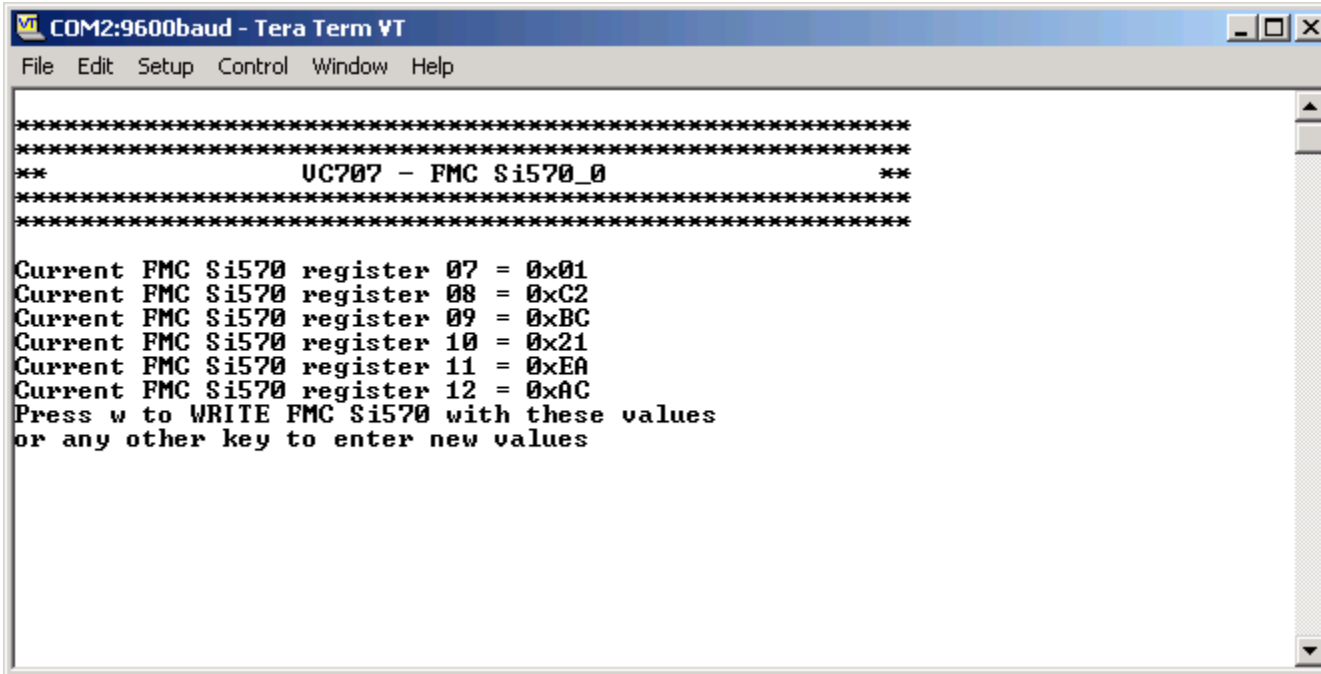
The screenshot displays the ChipScope Pro Analyzer interface for the project 'vc707\_fmc\_si570\_programming'. The VIO Console window is active, showing a table of bus/signal values. The table lists the following signals and their values:

Bus/Signal	Value
200MHz_SYSCLK	200.00
Si570_USER_CLK	156.24
FMC1_GBT1	0.00
FMC1_GBT0	0.00
FMC1_CLK0	0.00
FMC2_GBT1	156.24
FMC2_GBT0	0.00
FMC2_CLK0	0.00

The status bar at the bottom indicates the project file path: C:\vc707\_fmc\_si570\_programming\ready\_for\_download\vc707\_fmc\_si570\_programming.cpj.

# VC707 FMC Si570 Programming

- The terminal window shows the current register settings for the Si570
  - The power-on values will appear in the terminal window
  - Note the value of **0x01C2BC21EAAC**



```
COM2:9600baud - Tera Term VT
File Edit Setup Control Window Help

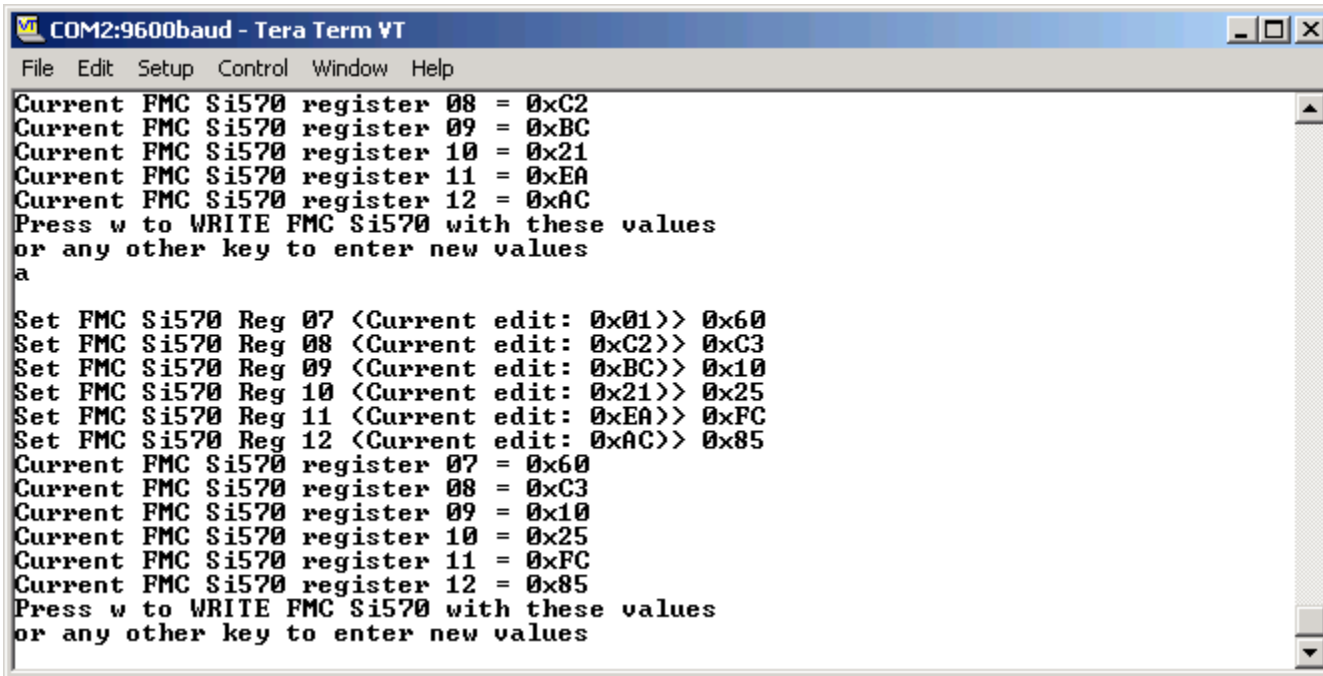
*****
*****
**          UC707 - FMC Si570_0          **
*****
*****

Current FMC Si570 register 07 = 0x01
Current FMC Si570 register 08 = 0xC2
Current FMC Si570 register 09 = 0xBC
Current FMC Si570 register 10 = 0x21
Current FMC Si570 register 11 = 0xEA
Current FMC Si570 register 12 = 0xAC
Press w to WRITE FMC Si570 with these values
or any other key to enter new values
```

**Note:** The values reported by your Si570 may differ from those shown

# VC707 FMC Si570 Programming

- Use the Si570 Calibration procedure, noted earlier in this document to determine the values to enter
- Press a key to begin entering the newly calculated values
- When done, press “w”

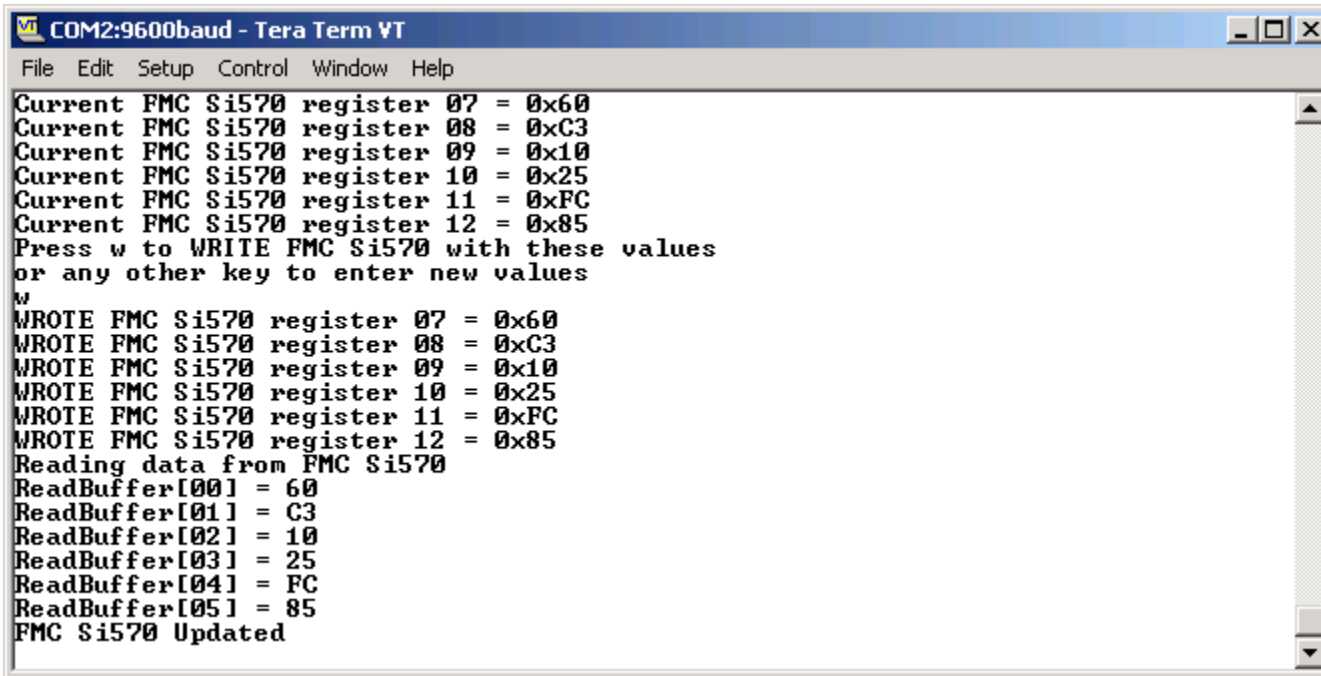


```
COM2:9600baud - Tera Term VT
File Edit Setup Control Window Help

Current FMC Si570 register 08 = 0xC2
Current FMC Si570 register 09 = 0xBC
Current FMC Si570 register 10 = 0x21
Current FMC Si570 register 11 = 0xEA
Current FMC Si570 register 12 = 0xAC
Press w to WRITE FMC Si570 with these values
or any other key to enter new values
a
Set FMC Si570 Reg 07 <Current edit: 0x01>> 0x60
Set FMC Si570 Reg 08 <Current edit: 0xC2>> 0xC3
Set FMC Si570 Reg 09 <Current edit: 0xBC>> 0x10
Set FMC Si570 Reg 10 <Current edit: 0x21>> 0x25
Set FMC Si570 Reg 11 <Current edit: 0xEA>> 0xFC
Set FMC Si570 Reg 12 <Current edit: 0xAC>> 0x85
Current FMC Si570 register 07 = 0x60
Current FMC Si570 register 08 = 0xC3
Current FMC Si570 register 09 = 0x10
Current FMC Si570 register 10 = 0x25
Current FMC Si570 register 11 = 0xFC
Current FMC Si570 register 12 = 0x85
Press w to WRITE FMC Si570 with these values
or any other key to enter new values
w
```

# VC707 FMC Si570 Programming

➤ Si570 has been successfully updated



The screenshot shows a Tera Term VT window titled "COM2:9600baud - Tera Term VT". The window contains the following text:

```
File Edit Setup Control Window Help
Current FMC Si570 register 07 = 0x60
Current FMC Si570 register 08 = 0xC3
Current FMC Si570 register 09 = 0x10
Current FMC Si570 register 10 = 0x25
Current FMC Si570 register 11 = 0xFC
Current FMC Si570 register 12 = 0x85
Press w to WRITE FMC Si570 with these values
or any other key to enter new values
w
WROTE FMC Si570 register 07 = 0x60
WROTE FMC Si570 register 08 = 0xC3
WROTE FMC Si570 register 09 = 0x10
WROTE FMC Si570 register 10 = 0x25
WROTE FMC Si570 register 11 = 0xFC
WROTE FMC Si570 register 12 = 0x85
Reading data from FMC Si570
ReadBuffer[00] = 60
ReadBuffer[01] = C3
ReadBuffer[02] = 10
ReadBuffer[03] = 25
ReadBuffer[04] = FC
ReadBuffer[05] = 85
FMC Si570 Updated
```

# VC707 FMC Si570 Programming

➤ The XM104 board on FMC2 HPC port now shows 200 MHz

The screenshot displays the ChipScope Pro Analyzer interface for the project 'vc707\_fmc\_si570\_programming'. The VIO Console window is active, showing a table of bus/signal values. The JTAG Chain on the left lists the device hierarchy: DEV:0 MyDevice0 (XC7VX485T) -> XADC Console -> UNIT:0 MyVIO0 (VIO) -> VIO Console. The status bar at the bottom indicates the project file path: C:\vc707\_fmc\_si570\_programming\ready\_for\_download\vc707\_fmc\_si570\_programming.cpj.

Bus/Signal	Value
200MHz_SYSCLK	200.00
Si570_USER_CLK	156.24
FMC1_GBT1	0.00
FMC1_GBT0	0.00
FMC1_CLK0	0.00
FMC2_GBT1	200.00
FMC2_GBT0	0.00
FMC2_CLK0	0.00

**Note:** Presentation applies to the VC707

# VC707 with FMC XM Boards

# VC707 with FMC XM Boards

## ➤ VC707 with XM101 in FMC1 HPC port

The screenshot displays the ChipScope Pro Analyzer interface for a project named 'vc707\_fmc\_si570\_programming'. The main window is titled 'VIO Console - DEV:0 MyDevice0 (XC7VX485T) UNIT:0 MyVIO0 (VIO)'. It features a table with two columns: 'Bus/Signal' and 'Value'. The table lists several signals and their current values:

Bus/Signal	Value
200MHz_SYSCLK	200.00
Si570_USER_CLK	156.24
FMC1_GBT1	0.00
FMC1_GBT0	0.00
FMC1_CLK0	156.24
FMC2_GBT1	0.00
FMC2_GBT0	0.00
FMC2_CLK0	0.00

The left sidebar shows the JTAG Chain hierarchy: DEV:0 MyDevice0 (XC7VX485T) -> XADC Console -> UNIT:0 MyVIO0 (VIO) -> VIO Console. The status bar at the bottom indicates the project file path: 'C:\vc707\_fmc\_si570\_programming\ready\_for\_download\vc707\_fmc\_si570\_programming.cpj'.



# VC707 with FMC XM Boards

## ➤ VC707 with XM101 in FMC2 HPC port

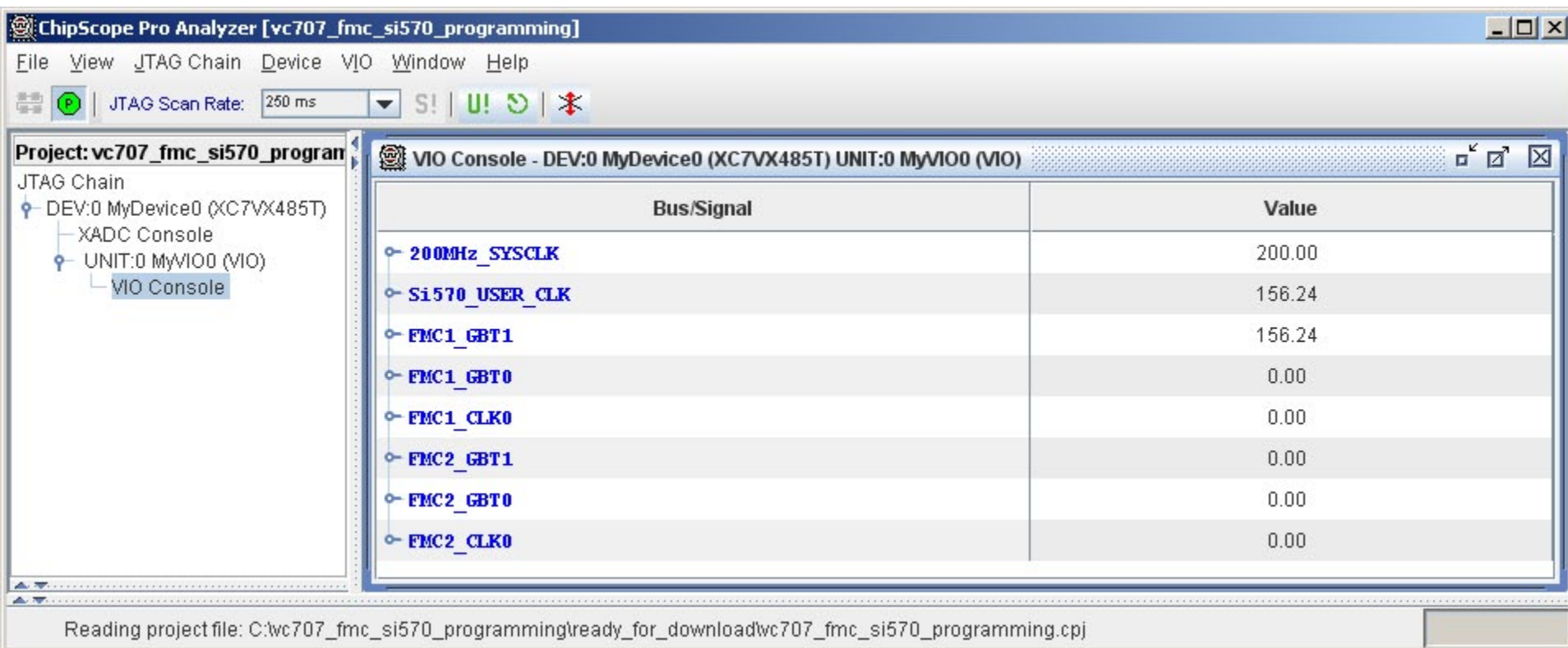
The screenshot displays the ChipScope Pro Analyzer interface for a project named 'vc707\_fmc\_si570\_programming'. The main window is titled 'VIO Console - DEV:0 MyDevice0 (XC7VX485T) UNIT:0 MyVIO0 (VIO)'. It features a table with two columns: 'Bus/Signal' and 'Value'. The table lists several signals and their corresponding values:

Bus/Signal	Value
200MHz_SYSCLK	200.00
Si570_USER_CLK	156.24
FMC1_GBT1	0.00
FMC1_GBT0	0.00
FMC1_CLK0	0.00
FMC2_GBT1	0.00
FMC2_GBT0	0.00
FMC2_CLK0	156.24

The left sidebar shows the JTAG Chain hierarchy: DEV:0 MyDevice0 (XC7VX485T) -> XADC Console -> UNIT:0 MyVIO0 (VIO) -> VIO Console. The status bar at the bottom indicates the project file path: 'C:\vc707\_fmc\_si570\_programming\ready\_for\_download\vc707\_fmc\_si570\_programming.cpj'.

# VC707 with FMC XM Boards

## ➤ VC707 with XM104 in FMC1 HPC port



The screenshot displays the ChipScope Pro Analyzer interface for a project named "vc707\_fmc\_si570\_programming". The main window shows the "VIO Console - DEV:0 MyDevice0 (XC7VX485T) UNIT:0 MyVIO0 (VIO)" window, which lists various bus signals and their current values.

**Project: vc707\_fmc\_si570\_programming**

**JTAG Chain**

- DEV:0 MyDevice0 (XC7VX485T)
  - XADC Console
  - UNIT:0 MyVIO0 (VIO)
    - VIO Console

**VIO Console - DEV:0 MyDevice0 (XC7VX485T) UNIT:0 MyVIO0 (VIO)**

Bus/Signal	Value
200MHz_SYSCLK	200.00
Si570_USER_CLK	156.24
FMC1_GBT1	156.24
FMC1_GBT0	0.00
FMC1_CLK0	0.00
FMC2_GBT1	0.00
FMC2_GBT0	0.00
FMC2_CLK0	0.00

Reading project file: C:\vc707\_fmc\_si570\_programming\ready\_for\_download\vc707\_fmc\_si570\_programming.cpj

# VC707 with FMC XM Boards

## ➤ VC707 with XM104 in FMC2 HPC port

The screenshot displays the ChipScope Pro Analyzer interface for a project named 'vc707\_fmc\_si570\_programming'. The 'VIO Console' window is active, showing a table of bus/signal values. The table lists signals such as 200MHz\_SYSCLK, Si570\_USER\_CLK, FMC1\_GBT1, FMC1\_GBT0, FMC1\_CLK0, FMC2\_GBT1, FMC2\_GBT0, and FMC2\_CLK0, along with their corresponding values. The status bar at the bottom indicates the project file path: 'C:\vc707\_fmc\_si570\_programming\ready\_for\_download\vc707\_fmc\_si570\_programming.cpj'.

ChipScope Pro Analyzer [vc707\_fmc\_si570\_programming]

File View JTAG Chain Device VIO Window Help

JTAG Scan Rate: 250 ms

Project: vc707\_fmc\_si570\_program

JTAG Chain

- DEV:0 MyDevice0 (XC7VX485T)
  - XADC Console
  - UNIT:0 MyVIO0 (VIO)
    - VIO Console

VIO Console - DEV:0 MyDevice0 (XC7VX485T) UNIT:0 MyVIO0 (VIO)

Bus/Signal	Value
200MHz_SYSCLK	200.00
Si570_USER_CLK	156.24
FMC1_GBT1	0.00
FMC1_GBT0	0.00
FMC1_CLK0	0.00
FMC2_GBT1	156.24
FMC2_GBT0	0.00
FMC2_CLK0	0.00

Reading project file: C:\vc707\_fmc\_si570\_programming\ready\_for\_download\vc707\_fmc\_si570\_programming.cpj

# VC707 with FMC XM Boards

## ➤ VC707 with XM105 in FMC1 HPC port

The screenshot displays the ChipScope Pro Analyzer interface for a project named 'vc707\_fmc\_si570\_programming'. The 'VIO Console' window is active, showing a table of bus signals and their values. The table lists signals such as 200MHz\_SYSCLK, Si570\_USER\_CLK, FMC1\_GBT1, FMC1\_GBT0, FMC1\_CLK0, FMC2\_GBT1, FMC2\_GBT0, and FMC2\_CLK0. The values for these signals are 200.00, 156.24, 0.00, 0.00, 156.24, 0.00, 0.00, and 0.00 respectively. The status bar at the bottom indicates the project file path: 'C:\vc707\_fmc\_si570\_programming\ready\_for\_download\vc707\_fmc\_si570\_programming.cpj'.

ChipScope Pro Analyzer [vc707\_fmc\_si570\_programming]

File View JTAG Chain Device VIO Window Help

JTAG Scan Rate: 250 ms

Project: vc707\_fmc\_si570\_program

JTAG Chain

- DEV:0 MyDevice0 (XC7VX485T)
  - XADC Console
  - UNIT:0 MyVIO0 (VIO)
    - VIO Console

VIO Console - DEV:0 MyDevice0 (XC7VX485T) UNIT:0 MyVIO0 (VIO)

Bus/Signal	Value
200MHz_SYSCLK	200.00
Si570_USER_CLK	156.24
FMC1_GBT1	0.00
FMC1_GBT0	0.00
FMC1_CLK0	156.24
FMC2_GBT1	0.00
FMC2_GBT0	0.00
FMC2_CLK0	0.00

Reading project file: C:\vc707\_fmc\_si570\_programming\ready\_for\_download\vc707\_fmc\_si570\_programming.cpj

# VC707 with FMC XM Boards

## ➤ VC707 with XM105 in FMC2 HPC port

The screenshot displays the ChipScope Pro Analyzer interface for a project named 'vc707\_fmc\_si570\_programming'. The 'VIO Console' window is active, showing a list of bus signals and their corresponding values. The JTAG Chain on the left identifies the device as 'DEV:0 MyDevice0 (XC7VX485T)' and the unit as 'UNIT:0 MyVIO0 (VIO)'. The status bar at the bottom indicates the project file path: 'C:\vc707\_fmc\_si570\_programming\ready\_for\_download\vc707\_fmc\_si570\_programming.cpj'.

Bus/Signal	Value
200MHz_SYSCLK	200.00
Si570_USER_CLK	156.24
FMC1_GBT1	0.00
FMC1_GBT0	0.00
FMC1_CLK0	0.00
FMC2_GBT1	0.00
FMC2_GBT0	0.00
FMC2_CLK0	156.24



## References

# References

## ➤ FMC XM101 Documentation

- FMC XM101 LVDS QSE Mezzanine Card
  - <http://www.xilinx.com/products/boards-and-kits/HW-FMC-XM101-G.htm>
- FMC XM101 LVDS QSE Mezzanine Card User Guide
  - [http://www.xilinx.com/support/documentation/boards\\_and\\_kits/ug538.pdf](http://www.xilinx.com/support/documentation/boards_and_kits/ug538.pdf)

## ➤ FMC XM104 Documentation

- FMC XM104 Connectivity Card
  - <http://www.xilinx.com/products/boards-and-kits/HW-FMC-XM104-G.htm>
- FMC XM104 Connectivity Card User Guide
  - [http://www.xilinx.com/support/documentation/boards\\_and\\_kits/ug536.pdf](http://www.xilinx.com/support/documentation/boards_and_kits/ug536.pdf)

## ➤ FMC XM105 Documentation

- FMC XM105 Debug Card
  - <http://www.xilinx.com/products/boards-and-kits/HW-FMC-XM105-G.htm>
- FMC XM105 Debug Card User Guide
  - [http://www.xilinx.com/support/documentation/boards\\_and\\_kits/ug537.pdf](http://www.xilinx.com/support/documentation/boards_and_kits/ug537.pdf)



# References

## ➤ Silicon Labs

- Si570 Data Sheet

- <http://www.silabs.com/Support%20Documents/TechnicalDocs/si570.pdf>

## ➤ ChipScope Pro

- ChipScope Pro Software and Cores User Guide

- [http://www.xilinx.com/support/documentation/sw\\_manuals/xilinx14\\_3/chipscope\\_pro\\_sw\\_cores\\_ug029.pdf](http://www.xilinx.com/support/documentation/sw_manuals/xilinx14_3/chipscope_pro_sw_cores_ug029.pdf)



# Documentation

# Documentation

## ➤ Virtex-7

- Virtex-7 FPGA Family

- <http://www.xilinx.com/products/silicon-devices/fpga/virtex-7/index.htm>

## ➤ VC707 Documentation

- Virtex-7 FPGA VC707 Evaluation Kit

- <http://www.xilinx.com/products/boards-and-kits/EK-V7-VC707-G.htm>

- VC707 User Guide

- [http://www.xilinx.com/support/documentation/boards\\_and\\_kits/ug885\\_VC707\\_Eval\\_Bd.pdf](http://www.xilinx.com/support/documentation/boards_and_kits/ug885_VC707_Eval_Bd.pdf)