

**XTP048** 

### ML605 System Monitor and USB

October 2010



### **Revision History**

| Date     | Version | Description  |
|----------|---------|--|
| 10/05/10 | 12.3    | Up-rev 12.2 System Monitor Design to 12.3.<br>Added USB hardware.<br>Added <u>AR38127</u><br>Added ARxxxxx |
| 07/23/10 | 12.2    | Up-rev 12.1 System Monitor Design to 12.2.<br>Updated SI Labs USB UART Drivers URL                         |

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### **Overview**

- Virtex-6 System Monitor Capability
- Xilinx ML605 Board
- ML605 Setup
- Running the System Monitor
- ML605 System Monitor Measurements
- Download ML605 System Monitor Design

- Compile ML605 System Monitor Design
- References

### **Virtex-6 System Monitor Capability**

- Available in all Virtex-6 Devices
- On-Chip Temperature Measurement (± 4°C)
- On-Chip Power Supply Measurement (± 1%)
- JTAG Accessible
  - Usable before, during, and after configuration
- Accessible from User Logic
- Programmable Alarms
- User Accessible Analog-to-Digital Converter

- 10-bit resolution
- 200 kSPS (kilo-samples per second)
- Digital Averaging

### Xilinx ML605 Board





### **ISE Software Requirements**

Xilinx ISE 12.3 software





- Power on the ML605 board for UART Drivers Installation
- Connect two USB Type-A to Mini-B cables to the USB JTAG and USB UART connectors on the ML605 board
  - Connect these cables to your PC



#### Install USB UART Drivers

#### - CP210x VCP Win XP S2K3 Vista 7.exe



**EXILINX** 

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

| System Prop       | perties  | ? × |
|-------------------|--|-----|
| Systen<br>General | n Restore Automatic Updates Remote<br>Computer Name Hardware Advanced  |     |
| Device I          | Manager<br>The Device Manager lists all the hardware devices installed<br>on your computer. Use the Device Manager to change the<br>properties of any device.                  |     |
|                   | Device Manager   |     |
| Drivers           | Driver Signing lets you make sure that installed drivers are<br>compatible with Windows. Windows Update lets you set up<br>how Windows connects to Windows Update for drivers. |     |
|                   | Driver <u>Signing</u> <u>W</u> indows Update   |     |
| Hardwar           | re Profiles  |     |
| $\gg$             | Hardware profiles provide a way for you to set up and store<br>different hardware configurations.  |     |
|                   | Hardware <u>P</u> rofiles  |     |
|                   | OK Cancel App!   | y   |

- Expand the Ports Hardware
  - Right-click on Silicon Labs
     CP210x USB to UART
     Bridge and select Properties



**EXILINX** 

| <ul> <li>Under Port Settings tab         <ul> <li>Click Advanced</li> <li>Set the COM Port to an open Com<br/>Port setting from COM1 to COM4</li> </ul> </li> </ul>  | Silicon Labs CP210x US           | SB to UART Bridge (COM11) Properties       ? ×         Driver       Details       Power Management         Bits per second:       9600       •         Data bits:       8       •         Parity:       None       •         Stop bits:       1       • |
|--|----------------------------------|---|
| Advanced Settings for COM11  | <u>?</u> ×                       | Flow control: None  |
| ✓ Use FIFO buffers (requires 16550 compatible UART)         Select lower settings to correct connection problems.         Select higher settings for faster performance.         Receive Buffer: Low (1)               High (14)               High (16) | OK<br>Cancel<br>Defaults<br>(14) | Advanced <u>R</u> estore Defaults   |
| COM <u>P</u> ort Number:   |                                  |   |
| COM <u>P</u> ort Number: COM2 ▼  |                                  |   |

Unzip the rdf0012.zip file to your C:\ drive

Available through http://www.xilinx.com/ml605

| 🗐 WinZip Pro - rdf0012.zip        |  |                    |  |  |  |  |  |  |
|-----------------------------------|--|--------------------|--|--|--|--|--|--|
| File Actions View Jobs Options He | elp                                    |                    |  |  |  |  |  |  |
| 🏷 🐼 🔇 🚱 🖉 🎽 🥬                     |  |                    |  |  |  |  |  |  |
| Name                              | Path                                   | Modified 🔺         |  |  |  |  |  |  |
| microblaze_0.elf                  | ml605_system_monitor\bootloops\        | 9/23/2010 7:49 AM  |  |  |  |  |  |  |
| 🔊 system.ucf                      | ml605_system_monitor\data\             | 4/23/2010 11:57 AM |  |  |  |  |  |  |
| 🔊 bitgen.ut                       | ml605_system_monitor \etc \            | 2/18/2009 3:36 PM  |  |  |  |  |  |  |
| Jownload.cmd                      | ml605_system_monitor \etc\             | 5/13/2009 11:12 AM |  |  |  |  |  |  |
| ast_runtime.opt                   | ml605_system_monitor\etc\              | 9/10/2009 9:04 AM  |  |  |  |  |  |  |
| 🔊 download.bit                    | ml605_system_monitor\implementation\   | 9/27/2010 12:19 PM |  |  |  |  |  |  |
| 🔊 system.bit                      | ml605_system_monitor\implementation\   | 9/27/2010 12:19 PM |  |  |  |  |  |  |
| 🔊 system.bmm                      | ml605_system_monitor\implementation\   | 9/27/2010 11:49 AM |  |  |  |  |  |  |
| 🗟 system.ncd                      | ml605_system_monitor\implementation\   | 9/27/2010 12:15 PM |  |  |  |  |  |  |
| 🔊 system.pad                      | ml605_system_monitor \implementation \ | 9/27/2010 12:15 PM |  |  |  |  |  |  |
| 🛃 system.par                      | ml605_system_monitor \implementation \ | 9/27/2010 12:15 PM |  |  |  |  |  |  |
| Selected 0 files, 0 bytes         | Total 48 files, 46,390KB               | 🖯 🛈 /i.            |  |  |  |  |  |  |

**EXILINX**.

Download the System Monitor bitstream:

# cd ml605\_system\_monitor\ready\_for\_download xmd





#### Start the Terminal Program

- Select your USB Com Port
- Set the baud to **115200**
- Start after bitstream is loaded

| 🛄 Tera  | a Term - ( | OM2 VT  |               |                    |                            |    |                   |   |   |
|---------|------------|---------|---------------|--------------------|----------------------------|----|-------------------|---|---|
| File Ed | dit Setup  | Control | Window        | Help               |                            |    |                   |   |   |
|         |            |         | Tera Tern     | n: Serial port     | : setup                    |    |                   | × | - |
|         |            |         | <u>P</u> ort  | t:                 | COM2                       | •  | ОК                |   |   |
|         |            |         | <u>B</u> au   | id rate:           | 115200                     | -  |                   |   |   |
|         |            |         | <u>D</u> ata  | a:                 | 8 bit                      | •  | Cancel            |   |   |
|         |            |         | P <u>a</u> ri | ity:               | none                       | •  |                   |   |   |
|         |            |         | <u>S</u> top  | <b>p:</b>          | 1 bit                      | •  | <u>H</u> elp      |   |   |
|         |            |         | <u>F</u> lov  | v control:         | none                       | •  |                   |   |   |
|         |            |         | Г             | ransmit de<br>0 ms | lay<br>sec <u>/c</u> har 0 | ms | sec/ <u>l</u> ine | - | • |

**EXILINX**.

The System Monitor display will appear in the Terminal window

| 🖳 C           | OM2: | 115200 | baud - T | era Term     | VT                             |                                    |  | × |
|---------------|------|--------|----------|--------------|--------------------------------|------------------------------------|--|---|
| File          | Edit | Setup  | Control  | Window       | Resize                         | Help                               |  |   |
| ***<br>*<br>* | **** | ****   | *****    | *****        | ****                           | <del>(xxxx</del><br>Sysl           | **************************************   | - |
| * * * *       |      |        |          |              | === S <u>:</u>                 | ysMon<br>Temp<br>Jccin<br>Jccau    | Internal Sensors =====<br>erature: 43.1 C<br>t : 1.009 U<br>x : 2.494 U                  |   |
| * * * *       |      |        |          |              | ====                           | === B<br>12V S<br>12V C            | pard Sensors ======<br>upply: 12.079 U<br>urrent: 1.723 A                                |   |
| *<br>*<br>*   |      |        |          | ===<br>P     | == Vco<br>l<br>lccint<br>int = | cint )<br>Jshuni<br>t = V:<br>Icci | Power Measurement =====<br>t : 16.4 mU<br>shunt/5mOhm : 3.289 A<br>nt * Vccint : 3.320 W |   |
| *             |      |        |          |              |                                | I                                  | Alarms: OK   |   |
| *<br>**       | **** | ****   | *****    | ()<br>****** | Press<br>*****                 | any I<br>*****                     | Key for Menu Options)<br>************************************                            | • |

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### **ML605 System Monitor Measurements**

#### 12V Supply

- Voltage, VAUXP[13], VAUXN[13] External Channel
- Current, VAUXP[12], VAUXN[12] External Channel

#### VCCINT

- Voltage Internal Channel
- Current, VP, VN External Channel

#### VCCAUX

- Voltage - Internal Channel

#### Temperature

- Internal Channel



- The System Monitor Design can be compiled with EDK
- Open XPS project <design path>\ system.xmp
- Generate the libraries needed to create the bitstream
  - Select Software →
     Generate Libraries
     and BSPs (1)



- Compile the Software Applications and create the application ELF files
  - Select Software →
     Build All User
     Applications (1)

| 🚭 Xilinx Platform Studio - C:\ml60                                    | 5_system                | _monitor\system.x              | mp    |            |        |              |
|---|-------------------------|--------------------------------|-------|------------|--------|--------------|
| File Edit View Project Hardware                                       | S <u>o</u> ftware       | Device Configuration           | Debug | Simulation | Window | Help         |
| Project   | Softw Softw             | are Platform Settings          |       |            |        |              |
| Platform  | Assigr                  | n Default <u>D</u> rivers      |       |            |        |              |
| Project Files     MHS File: system mbs                                | L <sup>ID</sup> G Gener | ate <u>L</u> ibraries and BSPs |       |            |        |              |
| MSS File: system.mss  | Add S                   | oftware Application Pro        | ject  |            |        |              |
| ····· UCF File: data/system.ucf<br>····· iMPACT Command File: etc/dow | 📥 <u>B</u> uild /       | All User Applications          |       | <b>←</b>   | 1      |              |
| ···· Implementation Options File: etc                                 | Get P                   | rogram Size                    |       |            |        |              |
| Project Options   | 🛐 <u>G</u> ener         | ate Linker Script              |       |            |        |              |
| Device: xc6vlx240tff1156-1     Netlist: TopLevel                      | Libe Clean              | Libraries                      |       |            |        |              |
| Implementation: XPS (Xflow)   | Clean                   | Programs                       |       |            |        |              |
| Sim Model: BEHAVIORAL   | Clean                   | Software                       |       |            |        |              |
|   |                         |                                |       |            |        |              |
| Project Or Applications   | IP Catalog              |                                |       |            |        |              |
| build All User Applications   |                         |                                |       |            |        | <b>v</b> //, |

**EXILINX** 

- Create the hardware design, system.bit, located in
   <project directory> /implementation
  - Select Hardware →
     Generate Bitstream (1)

| ٠    | Kilinx F   | Platfo  | rm Studio  | o - C:\     | ,ml60   | 5_system  | _monitor\syst                              | em.xı | mp    |            |        |       |
|------|--|---|--|-------------|---|---|--|-------|-------|------------|--------|-------|
| File | Edit   | View  | Project  | Hard        | ware  | Software  | Device Configura                           | ation | Debug | Simulation | Window | Help  |
| Proj | ect  |   |  | <b>お</b> 名( | Genera  | ate <u>N</u> etlist   |  |       |       |            |        |       |
| Plat | form   |   |  | H (         | Genera  | ate <u>B</u> itstrea  | m  | ←     | - 1   |            |        |       |
|      | Project<br>MB<br>MS<br>UC<br>MI<br>Bit<br>Project<br>Ne<br>Sin<br>Design<br>Design | ct File:<br>IS File:<br>S File:<br>PACT C<br>plemen<br>gen Opt<br>vice: x<br>tlist: To<br>plemen<br>L: Veril<br>n Mode<br>n Sum | s<br>system.m<br>data/syst<br>command F<br>itation Op<br>otions File:<br>ions<br>ccovlx240t<br>opLevel<br>itation: XP<br>og<br>l: BEHAVIO<br>imary | Kal         | Create<br>Config<br>Launch<br>Clean I<br>Clean I<br>Clean I | e or Import I<br>ure <u>C</u> oproce<br>and Clock <u>W</u> izz<br>and View C<br>Netlist<br>Bits<br>Hardware<br>IP Catalog | Peripheral<br>essor<br>ard<br>ore Licenses |       |       |            |        |       |
|      |  |   |  |             |   |   |  |       |       |            |        | ✓ //i |

### Init memory with the bootloop ELF

- Update the bitstream (download.bit) with the bootloop ELF (microblaze\_0.elf)
- Select Device
   Configuration →
   Update Bitstream (1)



### Generate System Monitor ACE File (Optional)

- Convert the ELF files to S-record format and create ACE file
  - Select Project →
     Launch Xilinx Bash
     Shell (1)

| 📀 Xilinx Platfor   | rm Studio - C:\ml605_system_monitor\system.xmp  | _ 🗆 🗵 |
|--|---|-------|
| File Edit View   | Project Hardware Software Device Configuration Debug Simulation Window He   | lelp  |
| Project  | Project Options   |       |
| Platform  Platform  Platform  Project Files  MSS File:  UCF File:  MSS File:  VCF File:  Project Opti Device: xx Netlist: To Device: xx Netlist: To MIDL: Verik Sim Model Design Sum  Project Opti Project Verik Sim Model Verik Ver | Export Hardware Design to SDK Archive Project Archive Project Archive Project Archive Project Archive Project Generate Block Diagram Image Generate and View Design Report View Design Summary View Design Summary View Design Summary Nescan User Repositories Launch Xilinx Bash Shell Clean All Generated Files Terminate Running Process Applications P Catalog |       |
| Launch Xilinx Bash   | n Shell   | 🤍 (h  |

### **Generate System Monitor ACE File (Optional)**

#### Generate the ACE file:

cd ready\_for\_download ./genace\_all.sh





#### Download Bitstream

Select Device
 Configuration →
 Download Bitstream
 (1)



- Download the System Monitor ELF with XMD
  - Select Debug →
     Launch XMD (1)



 The first time XMD runs on a project, the XMD Debug options must be set

Please set the XMD Debug Options in Debug->XMD Debug Options before running >

OK

|    | ፍ XMD Debug Options Deprecated                   | × |
|----|--|---|
|    | Processor: microblaze_0 Architecture: MicroBlaze |   |
|    | Connection Type                                  |   |
|    | C Simulator C Hardware C Stub                    |   |
|    |  |   |
|    | JTAG Properties Advanced Options                 |   |
|    |  |   |
|    | Read-Only Memory Addr: Size (in Hex):            |   |
|    |  |   |
|    |  |   |
| ×  |  |   |
| md |  |   |
|    |  |   |
|    |  |   |
|    |  |   |
|    |  |   |
|    | OK Cancel Help                                   |   |
|    |  |   |

**EXILINX**.

📀 Platform Studio

i

 XMD opens and connects to the processor, using the default options

| C:\Xilinx\12.3\ISE_DS\EDK\bin\nt\xbash.exe                       |   |
|--|---|
| Version  |   |
| OptimizationPerformance  |   |
| Interconnect   |   |
| No of PC Prostraints   |   |
| No of Post Oddy (Data Ustabusinta (                              |   |
| No of lugite oddy/Data watchpoints0                              |   |
| Tostwortion Cache Support  |   |
| Instruction Cache Base Addwess 0v5000000                         |   |
| Instruction Cache High Address Øy5ffffff                         |   |
| Rata Cache Support   |   |
| Data Cache Base Address  |   |
| Data Cache High Address0x5fffffff                                |   |
| Exceptions Supportoff  |   |
| FPU Supportoff   |   |
| Hard Divider Supportoff  |   |
| Hard Multiplier Supporton - (Mul32)                              |   |
| Barrel Shifter Supportoff  |   |
| MSR clr/set Instruction Supporton                                |   |
| Compare Instruction Supporton                                    |   |
| Data Gache Write-back Supportoff                                 |   |
|  |   |
| Connected to "MD" target. 1a = 0                                 |   |
| Starting GDB Server for "MD" target (1d = 0) at IGP port no 1234 | - |
|  |   |

**EXILINX** 

To execute a memory read, type

mrd 0x0000000

This will read the memory address at the reset vector; the value should be 0xB8000000 as shown below

| <pre>C:\Xilinx\12.3\ISE_DS\EDK\bin\nt\xbash.exe</pre>   |   |
|---|---|
| MMU Type       No_MMU         No of PC Breakpoints       1         No of Read Addr/Data Watchpoints       0         No of Write Addr/Data Watchpoints       0         Instruction Cache Support       on         Instruction Cache Base Address       0x5000000         Instruction Cache High Address       0x550000000         Instruction Cache High Address       0x550000000         Data Cache Support       on         Data Cache Base Address       0x50000000         Data Cache High Address       0x550000000         Pata Cache Base Address       0x56000000         Data Cache High Address       0x66 |   |
| Hard Divider Supportoff<br>Hard Multiplier Supporton - (Mu132)<br>Barrel Shifter Supportoff<br>MSR clr/set Instruction Supporton<br>Compare Instruction Supporton<br>Data Cache Write-back Supportoff   |   |
| Connected to "mb" target. id = 0<br>Starting GDB server for "mb" target (id = 0) at TCP port no 1234<br>XMD% mrd 0x00000000<br>0: B8000000<br>XMD%  | • |

#### Download and run the System Monitor ELF file:

#### dow system\_monitor/system\_monitor.elf

con

| C:\Xilinx\12.3\ISE_DS\EDK\bin\nt\xbash.exe  |          |
|---|----------|
| <pre>XMD% dow system_monitor/system_monitor.elf<br/>Downloading Program system_monitor/system_monitor.elf<br/>section, .vectors.reset: 0x0000000-0x00000007<br/>section, .vectors.sw_exception: 0x0000008-0x00000017<br/>section, .vectors.interrupt: 0x00000010-0x00000017<br/>section, .vectors.hw_exception: 0x00000020-0x00000027<br/>section, .text: 0x41a00000-0x41a0717b<br/>section, .init: 0x41a0010-0x41a0717b<br/>section, .init: 0x41a0717c-0x41a0717b<br/>section, .fini: 0x41a071a0-0x41a071bb<br/>section, .ctors: 0x41a071bc-0x41a071c3<br/>section, .dtors: 0x41a071c4-0x41a071cb<br/>section, .rodata: 0x41a071cc-0x41a07a79<br/>section, .data: 0x41a07a62.0441a07bf</pre> |          |
| section, .jcr: 0x41a07c04-0x41a07c07<br>section, .bss: 0x41a07c08-0x41a0800b<br>section, .heap: 0x41a0800c-0x41a0900b<br>section, .stack: 0x41a0900c-0x41a0a00f<br>Setting PC with Program Start Address 0x00000000<br>System Reset DONE  |          |
| XMD% con<br>Processor started. Type "stop" to stop processor<br>RUNNING> XMD%   | <b>_</b> |

### **Run ML605 System Monitor Design**

The System Monitor display will appear in the Terminal window

| 💆 COM2:115200baud - Tera Term VT  | <u>- 🗆 ×</u> |
|---|--------------|
| File Edit Setup Control Window Resize Help  |              |
| **************************************  | *****        |
| * ====== SysMon Internal Sensors =====<br>* Temperature: 43.1 C<br>* Uccint : 1.009 U<br>* Uccaux : 2.494 U                             |              |
| * ===== Board Sensors =====<br>* 12U Supply: 12.079 V<br>* 12V Current: 1.723 A   |              |
| * ===== Vccint Power Measurement =====<br>* Ushunt : 16.4 mV<br>* Iccint = Vshunt/5mOhm : 3.289 A<br>* Pint = Iccint * Vccint : 3.320 W |              |
| * Alarms: OK<br>*   |              |
| * (Press any Key for Menu Options)<br>************************************  | *****        |

**EXILINX**.

#### Start the Terminal Program

- Select your USB Com Port
- Set the baud to 9600
- Start after bitstream is loaded

| шт   | era Te | erm - C | OM2 VT  |               |                  |                        |              |     |     |                 |   |  |
|------|--------|---------|---------|---------------|------------------|------------------------|--------------|-----|-----|-----------------|---|--|
| File | Edit   | Setup   | Control | Window        | Help             |                        |              |     |     |                 |   |  |
|      |        |         |         | Tera Terr     | n: Serial po     | ort set                | up           |     |     |                 | × |  |
|      |        |         |         | Port          | :                |                        | COM2         | •   |     | ОК              | 1 |  |
|      |        |         |         | <u>B</u> au   | d rate:          |                        | 9600         | -   |     |                 |   |  |
|      |        |         |         | <u>D</u> ata  | a:               |                        | 8 bit        | -   |     | Cancel          |   |  |
|      |        |         |         | P <u>a</u> ri | ity:             |                        | none         | -   |     |                 | . |  |
|      |        |         |         | <u>S</u> top  | ):               |                        | 1 bit        | •   |     | <u>H</u> elp    |   |  |
|      |        |         |         | Elov          | v control:       |                        | none         | •   |     |                 |   |  |
|      |        |         |         | Г             | ransmit d<br>0 n | lelay<br>nsec <u>/</u> | <u>c</u> har | 0 r | nse | c/ <u>l</u> ine |   |  |

**EXILINX**.

#### Download Bitstream

Select Device
 Configuration →
 Download Bitstream
 (1)



- Download the System Monitor ELF with XMD
  - Select Debug →
     Launch XMD (1)



XMD opens and connects to the processor, using the default options

| C:\Xilinx\12.3\ISE_DS\EDK\bin\nt\xbash.exe   |   |
|--|---|
| Version  |   |
| Uptimization   |   |
| MMIL TypeNo MMIL   |   |
| No of PC Breakpoints1  |   |
| No of Read Addr/Data Watchpoints0  |   |
| No of Write Addr/Data Watchpoints0   |   |
| Instruction Cache Supporton  |   |
| Instruction Cache Base Houress0x50000000   |   |
| Data Cache Sumort  |   |
| Data Cache Base Address  |   |
| Data Cache High Address0x5fffffff  |   |
| Exceptions Supportoff  |   |
| FPU Support  |   |
| $\begin{array}{c} \text{marg biviaer supportoff} \\ \text{Have Multipliev Support} \\ \text{op} = (Mul22) \end{array}$ |   |
| Bary half pifter Support   |   |
| MSR clr/set Instruction Supporton  |   |
| Compare Instruction Supporton  |   |
| Data Cache Write-back Supportoff   |   |
| Connected to Wahy towart id - 0  |   |
| Connected to "MD" target. 1d = 0<br>Stanting CDR server for "mb" target (id = 0) at TCP rout po 1934                   |   |
| XMDX   | - |
|  |   |

**EXILINX** 

To execute a memory read, type

mrd 0x0000000

This will read the memory address at the reset vector; the value should be 0xB8000000 as shown below

| C:\Xilinx\12.3\ISE_DS\EDK\bin\nt\xbash.exe  |   |
|---|---|
| MMU Type       No_MMU         No of PC Breakpoints       1         No of Read Addr/Data Watchpoints       0         No of Write Addr/Data Watchpoints       0         Instruction Cache Support       on         Instruction Cache Base Address       0x5000000         Instruction Cache High Address       0x5ffffff         Data Cache Support       on         Data Cache Base Address       0x5000000         Data Cache High Address       0x5000000         Data Cache High Address       0x5ffffff         FPIL       Support       off |   |
| Hard Divider Supportoff<br>Hard Multiplier Supporton - (Mul32)<br>Barrel Shifter Supportoff<br>MSR clr/set Instruction Supporton<br>Compare Instruction Supporton<br>Data Cache Write-back Supportoff   |   |
| Connected to "mb" target. id = 0<br>Starting GDB server for "mb" target (id = 0) at TCP port no 1234<br>XMD% mrd 0x0000000<br>0: B8000000<br>XMD%   | - |

**E** XILINX.

#### Download and run the USB ELF file:

#### dow usb\_hpi\_test/usb\_hpi\_test.elf

con

| C:\Xilinx\12.3\ISE_DS\EDK\bin\nt\xbash.exe            |  |
|---|--|
| XMD% dow usb_hpi_test/usb_hpi_test.elf                |  |
| Downloading Program usb_hpi_test/usb_hpi_test.elf     |  |
| section, .vectors.reset: 0x0000000-0x00000007         |  |
| section, .vectors.sw_exception:_0x0000008-0x0000000f  |  |
| section, .vectors.interrupt: 0x0000010-0x00000017     |  |
| section, .vectors.hw_exception: 0x00000020-0x00000027 |  |
| section, .text: 0x41a00000-0x41a01c1f                 |  |
| section, .init: 0x41a01c20-0x41a01c43                 |  |
| section, .fini: 0x41a01c44-0x41a01c5f                 |  |
| section, .rodata: 0x41a01c60-0x41a022b1               |  |
| section, .sdata2: 0x41a022b2-0x41a022b7               |  |
| section, .data: 0x41a022b8-0x41a052d3                 |  |
| section, .ctors: 0x41a052d4-0x41a052db                |  |
| section, .dtors: 0x41a052dc=0x41a052e3                |  |
| section, .eh_frame: 0x41a052e4-0x41a052e?             |  |
| section, .jcr: 0x41a052e8-0x41a052eb                  |  |
| section, .bss: 0x00000050-0x00000093                  |  |
| section, heap: 0x41a052f0-0x41a092ef                  |  |
| section,stack:_0x41a092f0=0x41a0d2ef                  |  |
| Setting_PC with Program Start Address 0x00000000      |  |
| System Reset DONE                                     |  |
|   |  |
| XMDX con  |  |
| Processor started. Type "stop" to stop processor      |  |
|   |  |
| RUNNING> XMU2   |  |

### Run ML605 USB Design

- The USB Keyboard Demo will appear in the Terminal window
  - Disconnect the keyboard, if needed, and press any key



### Run ML605 USB Design

#### Connect a USB Keyboard

– Press any key

| 💯 COM2:9600baud - Tera Term VT   | - D ×    |
|--|----------|
| File Edit Setup Control Window Resize Help   |          |
| ****** ML605 USB Keyboard Demo ******<br>>>> Please DISCONNECT any USB Keyboard connected to the ML605 <<< |          |
| Press any Key on the PC to continue><br>Loading executable file for USB controller chip.                   |          |
| >>> Please ATTACH a USB Keyboard to the ML605 (Connector J5) <<<<br>Press any Key on the PC to continue>   |          |
|  |          |
|  |          |
|  |          |
|  |          |
|  | <b>_</b> |

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### Run ML605 USB Design

#### • Type:

#### ML605 USB Design

 COM2:9600baud - Tera Term VT
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### References

- Virtex-6 System Monitor
  - Virtex-6 FPGA System Monitor UG370

http://www.xilinx.com/support/documentation/user\_guides/ug370.pdf

- ChipScope Pro Software and Cores User Guide

http://www.xilinx.com/support/documentation/sw manuals/ xilinx12 3/chipscope pro sw cores ug029.pdf

#### EDK Documentation

- Embedded System Tools Reference Guide

http://www.xilinx.com/support/documentation/sw\_manuals/xilinx12\_3/est\_rm.pdf







### **Documentation**

#### Virtex-6

- Virtex-6 FPGA Family

http://www.xilinx.com/products/virtex6/index.htm

#### ML605 Documentation

- Virtex-6 FPGA ML605 Evaluation Kit

http://www.xilinx.com/products/devkits/EK-V6-ML605-G.htm

- ML605 Getting Started Guide

http://www.xilinx.com/support/documentation/boards\_and\_kits/ug533.pdf

- ML605 Hardware User Guide

http://www.xilinx.com/support/documentation/boards and kits/ug534.pdf

ML605 Reference Design User Guide

http://www.xilinx.com/support/documentation/boards and kits/ug535.pdf

