Video Starter Kit Quick Start Guide

Overview

This Quick Start Guide provides a brief overview of the content of the kit and describes the installation of the Xilinx software components that are provided with the Video Starter Kit. This document details how to connect your Video Starter Kit to run a first set of diagnostics.

Powered by the XC4VSX35 device and supported by a rich feature set of video interfaces, this comprehensive Video Starter Kit enables rapid development and debugging of high-performance video processing systems for a wide range of video applications.

Current and future revisions of the users guides and reference designs are provided on the Xilinx website. It is strongly recommended that the user register at the Video Starter Kit web page to ensure access to the latest information and reference designs.

System Requirements

The Video Starter Kit is designed for installation in a standard personal computer system. The host PC should support Ethernet connection for real time video processing from the Xilinx System Generator.

The following minimum system requirement is recommended for the host PC with the motherboards and associated software:

- Windows 2000 or Windows XP operating system

Video Starter Kit Contents

This kit provides an ML402 motherboard populated with a Video IO Daughter Card. It is shipped in a stand-alone case and includes all necessary power supplies, basic cables, and software. See Figure 1.

Hardware

- ML402 SX XtremeDSP™ Evaluation Platform (HW-ML402-USA)
- Video IO Daughter Card (HW-XGI-VIDEO)
- Colored CMOS Image Sensor Camera
- External Power Supply localized to US, UK, or EC.
- S-Video, DVI, Null modem, and two Ethernet cables
- DVI to VGA Adapter

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- Cooler for the XCV4SX35 FPGA
- 32-MB Compact Flash Card preprogrammed for VSK demonstrations

Software

- Xilinx ISE™ 8.2i – 60-day Evaluation
- Xilinx EDK 8.2i – 60-day Evaluation
- System Generator 8.2.01 for VSK (support limited to XC2VP7 and XC4VSX35)
- Video Starter Kit CD (software updates, user manuals, design examples)
- TEMAC evaluation IP with hardware time out

Reference Designs

- System Generator based:
  - Video Interface Blockset
  - Video Processing Pipeline
  - Diagnostics
- HDL based:
  - MPEG-4 Simple Profile Decoder
  - SDI Video
  - DVI, VGA, and Component HDL interface

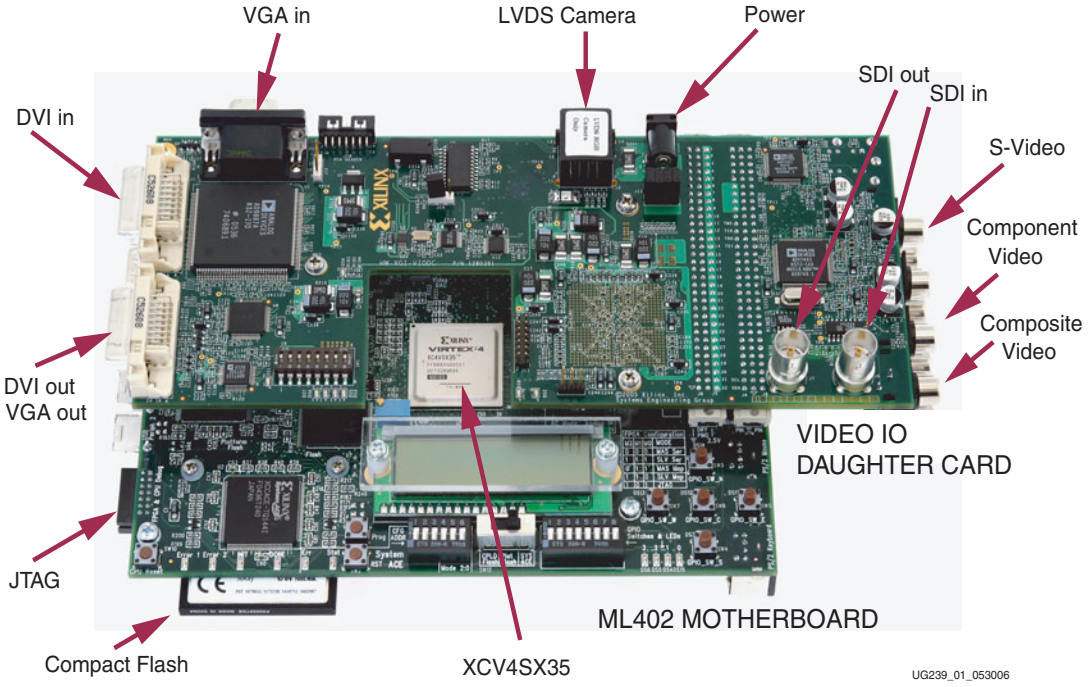

Figure 1: **Video Starter Kit**

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Video Starter Kit Software Installation

Software requirements for the Video Starter Kit depend on the user's preferred design implementation flow.

The recommended software setup lists the tools utilized for Xilinx diagnostic and video flow-through reference designs. Fully integrated and supported by the Xilinx System Generator for DSP software, the Video Starter Kit takes advantage of the new high-speed Ethernet hardware co-simulation capability, Embedded Design Kit (EDK) integration, and DDR memory controller to enable system integration, development, and verification of codecs, IP, and video algorithms in real time.

The minimum software requirement list assumes a non System Generator design entry and only stipulates ISE specific requirements.

Recommended software setup:

- Xilinx ISE 8.2i SP1 or later
- EDK 8.2 SP1 or later
- System Generator 8.2.01 or later

Minimum requirements:

- ISE 8.2i or later

Installation Process

Xilinx Implementation Software

1. Unless the full revision of ISE 8.2i is already installed, use the provided 60-day Evaluation Software installer available in the ISE Embedded Development Kit Wallet. To obtain a Registration ID, register online at www.xilinx.com/swreg.htm and use the Product ID located at the back of the wallet.
2. Download and install ISE 8.2i latest Service Pack from the software download page: http://www.xilinx.com/xlnx/xil_sw_updates_home.jsp
3. Double click on the installer and select `%XILINX%` for your install directory.

Xilinx Embedded Design Kit Software

1. Unless the full release of EDK 8.2 SP1 is already installed, use the provided 60-day Evaluation Software installer available in the ISE Embedded Development Kit Wallet. To obtain a Registration ID, register online at www.xilinx.com/swreg.htm and use the Product ID located at the back of the wallet.
2. Install Service Pack 1 provided on the VSK CDROM in the `<CDROM>/Software/EDK_SP directory`.

IP Update

1. Although not mandatory, it is recommended that you install the latest IP update to take advantage of our latest technology. IP updates are available from the software download page: http://www.xilinx.com/xlnx/xil_sw_updates_home.jsp
2. Unzip the archive in the `%XILINX%` directory.

   The `%XILINX%` directory is where the Xilinx ISE software has been installed.

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System Generator 8.2.01 VSK Update

1. System Generator 8.2.01 is compatible with MATLAB/Simulink R14.2, R14.3, and R2006a. If you do not have a version of MATLAB and Simulink previously installed, request a 30-day evaluation from the MathWorks website: www.mathworks.com/xtremedsp
2. Unless a full version of the System Generator v8.2.01 or later is already installed, use the System Generator VSK 8.2.01 update provided in the `<CDROM>/Software/Sysgen_VSK` directory.

   SysgenVSK is a fully featured version of System Generator limited to target the XCV4SX35 and XC2VP7 devices and the VSK platform.
3. Close all running sessions of MATLAB.
4. Make sure that your MATLAB software is installed in a directory tree which includes NO SPACE.
5. Double click on the executable to install System Generator.

Refer to the *System Generator User Guide* for detailed installation information.

Design Examples and Documentation

Design examples and documentation are provided on the VSK CDROM. It is recommended that the user copy the `<CDROM>/Examples` and `<CDROM>/Documentation` directories to the local drive.

Current and future revisions of the users guides and reference designs are provided on the Xilinx website to ensure that the user always has access to the latest information and the latest files. It is strongly recommended that the user refers to the Video Starter Kit web page to ensure access to the latest documentation and reference designs.

Running the Quick Start Demos

The VSK includes two demonstration programs on the System Ace Flash memory card.

- MPEG-4 Demo – demonstrates the Xilinx MPEG-4 decoder.
- VSK Diagnostics Demo – demonstrates the operation of the RGB LVDS camera.

To run these demos, set up the VSK as follows.

Configuration Setup

The Video Starter Kit consists of an ML402 main board and a VIODC that is the upper circuit board which sits atop the ML402. To run the demos, the user has to insert the Compact Flash, connect a VGA monitor, power up the board, and select the demo to run, as described in "MPEG4 Decoder Demo" and "RGB Camera Demo."

1. With power off, insert the Compact Flash memory card into the connector underneath the ML402 board (Figure 2).

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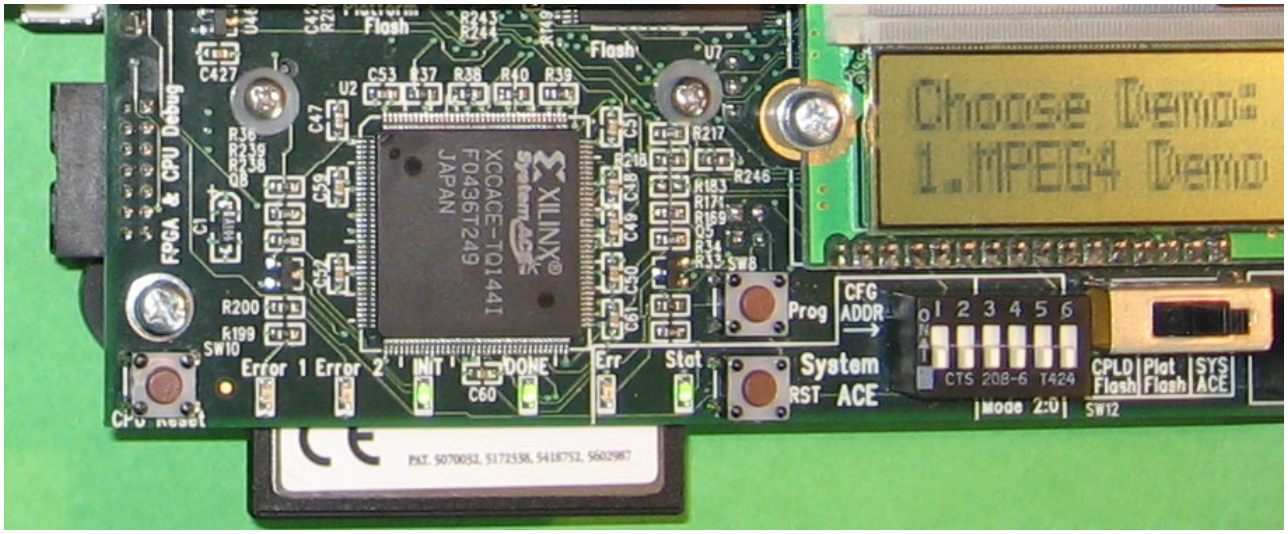

Figure 2: **ML402 Configuration Settings for Configuration from Compact Flash Memory**

2. Verify that the ML402 SW12 boot mode switch is set all the way to the right in the SYS ACE position. This allows the card to be configured from the Compact Flash card controlled by the System Ace controller.
3. Verify that the System Ace CFG ADDR dip switch settings are set to off:off:off (or 000). The CFG ADDR dip switch bits are the three leftmost bits of the System ACE dip switch. This boots the ML402 and VIODC from configuration 0, which contains a bootloader program that allows either of the two demos to be selected. These settings are shown in Figure 2.

MPEG4 Decoder Demo

1. Connect a VGA monitor to the VGA output connector at the back of the ML402 card.
2. Connect the 5V power supply to the ML402 power supply input. The ML402 power supply jack is between the VGA connector and the power switch on the ML402.
3. Switch the power supply on the ML402 to ON. The LEDs on the ML402 and VIODC should turn on, indicating that power is available.
4. Use the GPIO_SW_N and GPIO_SW_S push buttons on the right of the ML402 to select the MPEG4 Demo. The user should see this displayed on both the VGA and LCD displays on the ML402.
5. Use the GPIO_SW_C (center) push button to load the demo. To reload the demo, press the ML402 push button labeled RST, located on the right side of the Compact Flash memory card.

The MPEG4 demo takes a few seconds to load the source video bitstream and then begins decoding the MPEG4 video sequence. The user should see a video of a pan through a cityscape, followed by a clip of the Space Shuttle astronauts. Refer to the *MPEG-4 Simple Profile Decoder Demonstration User Guide (UG234)* for more information about this demo.

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RGB Camera Demo

1. Connect a VGA or DVI monitor to the DVI/VGA output connector on the VIODC card. If a VGA monitor is used, use the VGA/DVI adapter to the VGA cable to the DVI output connector on the VIODC card.
2. Connect the LVDS RGB camera from Irvine Sensors to the RJ45 connector on the VIODC (Figure 3).

   Note: While this connector on the VIODC looks like an Ethernet connector, it is not compatible with Ethernet, and only works with the LVDS RGB camera.
3. Connect the CAT6 cable into the port labeled HOST on the RGB camera.Connect the 5V power supply to the ML402 power supply input. The ML402 power supply jack is between the VGA connector and the power switch on the ML402.
4. Switch the power supply switch on the ML402 to ON. The LEDs on the ML402 and VIODC should turn on, indicating that power is available.
5. Use the GPIO_SW_N and GPIO_SW_S push buttons on the right of the ML402 to select demo 2, VSK diagnostics demo. Then use the center push button to load the demo. To reload the demo, press the ML402 push button labeled RST.

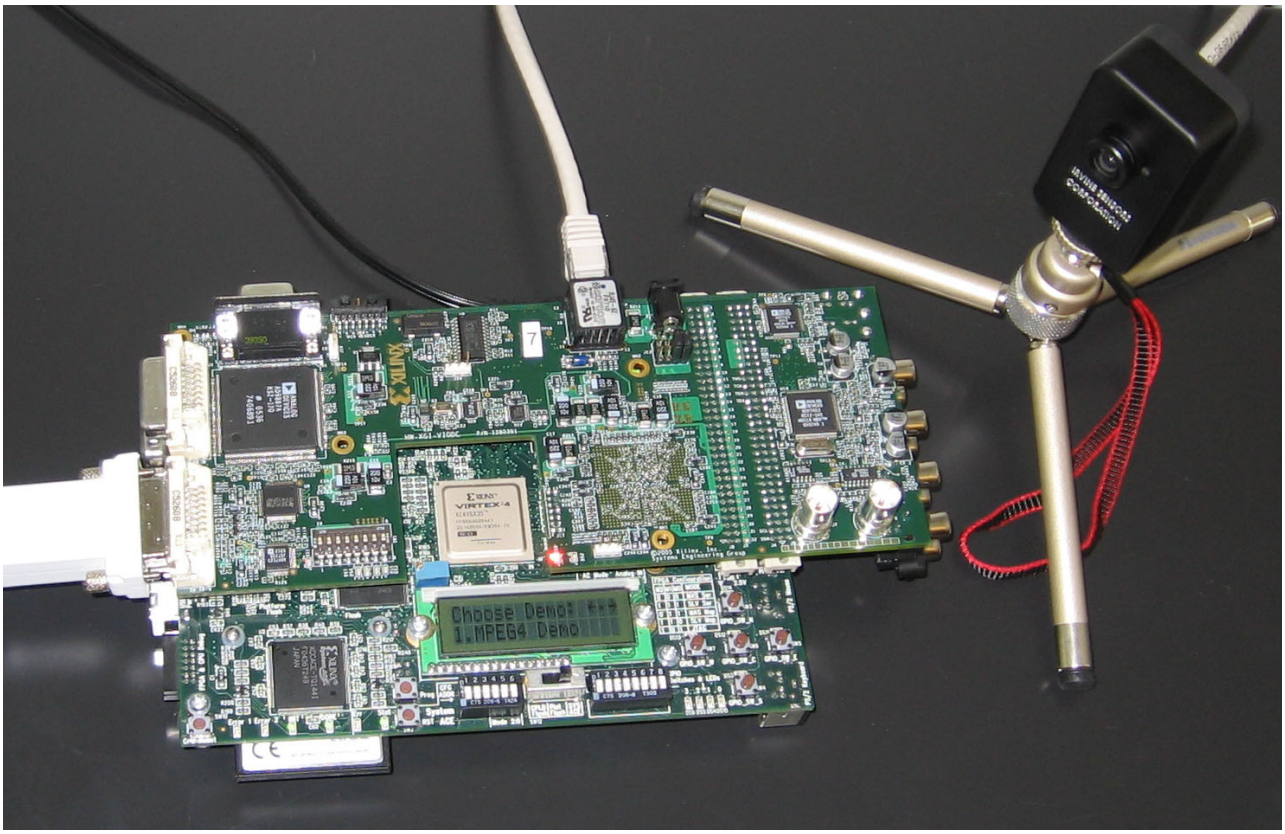

Figure 3: **Connecting the VSK to the RGB LVDS Camera**

After loading the VSK diagnostics, the user should see a color image from the RGB camera on the DVI or VGA monitor. If the video from the camera does not appear, contact Xilinx Support. To demonstrate the other VSK video interfaces, such as component video and DVI input, and for more information on using the VSK diagnostics, refer to the *VSK Diagnostics* chapter in the *Video Starter Kit User Guide (UG217)*.

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Document References

- *Video Starter Kit User Guide* (UG217) – This user guide provides detailed information regarding the kit specifications, software environment using System Generator, supported features, and System Generator-based design examples.

  This user guide is available online at:
  http://direct.xilinx.com/bvdocs/userguides/ug217.pdf

  and on the VSK CD in the Documentation folder:
  `<CDROM>/Documentation/UserGuides`

- *Video IO Daughter Card User Guide* (UG235) – This user guide provides detailed information specific to the video daughter card, its video hardware interfaces, and the image sensor camera.

  This user guide is available online at:
  http://direct.xilinx.com/bvdocs/userguides/ug235.pdf

  and on the VSK CD in the Documentation folder:
  `<CDROM>/Documentation/UserGuides`

- *System Generator User Guide* – This user guide provides detailed information specific to the System Generator software. This user guide is available from MATLAB/Simulink Help menu after System Generator is installed.

  This user guide is available online at:
  http://www.xilinx.com/support/sw_manuals/sysgen_ug.pdf

- Irvine Sensor Color Camera – Multiple documents are included to describe the interface control, product specification, stereo application note, and recommended register settings.

  ISC camera documentation is available on the VSK CD in the Documentation folder:
  `<CDROM>/Documentation/ISC_Camera`

- Analog Device Data Sheet – Data sheets and IBIS models for the ADI components used on the VIODC card are included.

  ADI documentation is available on the VSK CD in the Documentation folder:
  `<CDROM>/Documentation/ADI`

  Data sheets, samples, and evaluation systems can also be found at:
  www.analog.com/video

- HDL-based reference designs:
  - DVI, VGA and Component Video HDL Interface and Demonstration
  - SDI Video Demonstration
  - MPEG-4 Simple Profile Decoder Demonstration
  - DDR Memory Controller Information

    Copy of the reference design documentation is available on the VSK CD in the Examples folder:
    `<CDROM>/Examples`

The latest revisions of all documents and reference designs can be downloaded from the Xilinx website. It is recommended that you check the following website to ensure that you always have the latest information:

http://www.xilinx.com/products/vsk

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Technical Support

Any questions or issues directly related to the operation of the VIODC board should be reported to the Xilinx Support line. Issues found that are due to the VIODC hardware design will be worked out between Xilinx and the appropriate vendor.

Xilinx support is available on the Internet at: www.xilinx.com/support.

For design support on *new* products using ADI components that do not refer to the operation of the VIODC board, contact: av.products@analog.com. Data sheets, samples, and evaluation systems can be found at: www.analog.com/video.

Revision History

The following table shows the revision history for this document.

Date	Version	Revision
11/23/05	1.0	Initial Xilinx release.
12/08/05	1.1	Minor updates.
06/12/06	1.2	Updated.
12/13/06	1.3	Updated software version numbers and Xilinx support link.

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