



VAE demo quick start guide for Lattice HDR-60

Overview

This demo shows the capabilities of IntelliVision Video Analytics Engine in FPGA. Demo tracks the objects on the scene and generates an intrusion and counting events.

Hardware requirements

- ✓ Lattice HDR-60 Base Board
- ✓ Lattice Nanovesta Sensor Board
- ✓ External power supply
- ✓ DVI/HDMI monitor
- ✓ USB Type A Male-Male cable
- ✓ PC
- ✓ Ethernet cable (for version 2.1 and newer)

Software requirements

- ✓ Lattice ispVM tool. It comes with Lattice ispLever or Lattice Diamond suite.
- ✓ IntelliVision VAE control software (for version 2.1 and newer)
- ✓ Microsoft .NET Framework 4.0 (for VAE Ethernet management)

VAE Demo features

- ✓ Color video with 1280x720 resolution
- ✓ 60 fps
- ✓ Input video from Aptina 720p High Dynamic Range sensor
- ✓ Tracking up to 16 objects simultaneously
- ✓ Object intrusion notification
- ✓ Objects counting

Lattice HDR-60 board installation

The following steps should be made for setting up the board for VAE demo:

1. Connect a HDMI monitor to the HDMI output connector on Lattice HDR-60 board. DVI monitor can be connected using HDMI to DVI converter.
2. Connect the USB cable from your PC's USB connector to the upper USB port on J12 on the HDR-60 Base Board.
3. Connect the 12V power adapter cable to the J10 power connector.



Figure 1. Lattice HDR-60 board connection.

Note: for detailed installation instructions of Lattice HDR-60 board please refer to [EB59 HDR-60 Base Board User's Guide](#).

Demo setup

For running Demo you should have Lattice ispVM tool preinstalled. Usually it is a part of Lattice ispLever or Lattice Diamond suite, but it can be installed as a standalone product. Demo bitstream can be downloaded into FPGA directly or to the flash memory.

From bitstream

For direct downloading do the following steps:

1. Launch ispVM tool.
2. Click the *Options* → *Cable and I/O port setup* option. Select cable type as *USB2* and then press *Autodetect* button. If the autodetection is successful, the following dialog will be displayed:

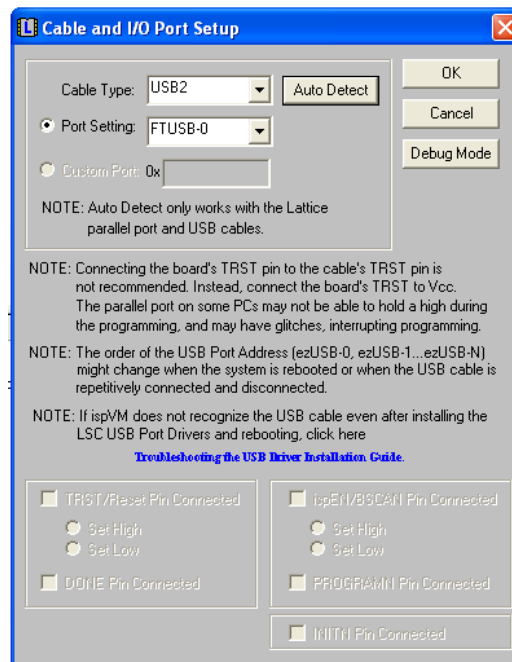


Figure 2. USB cable setup.

3. Close the *Cable and I/O port setup* window and click *Scan* button in the toolbar or press F2 key. The LFE3-95/70 device should appear in the device list.
4. Double click on LFE3-95/70 device and select LFE3-70EA.

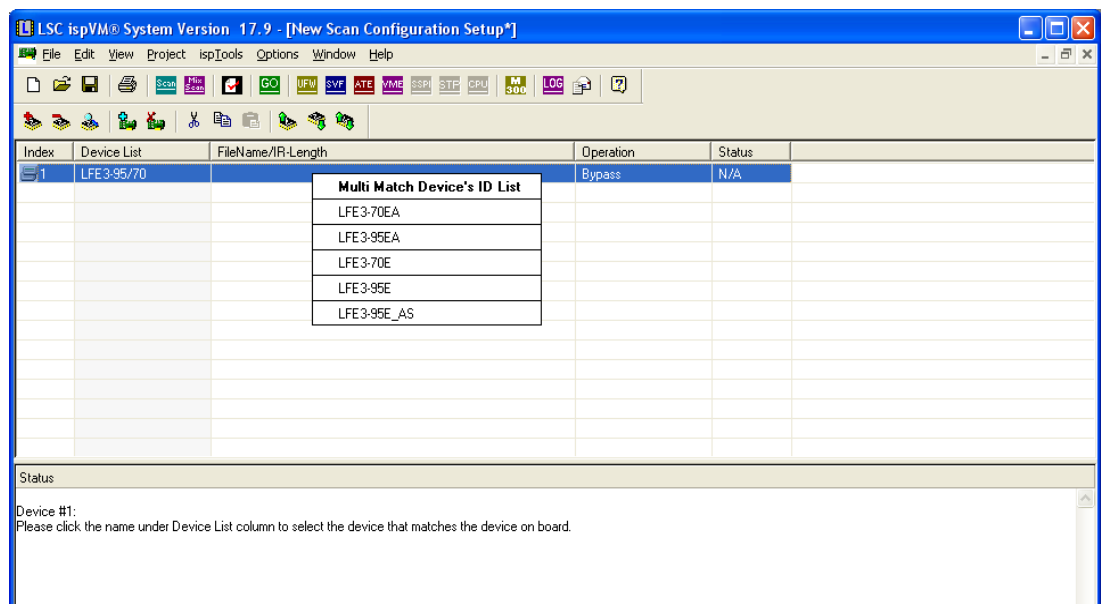


Figure 3. Device selection in ispVM.

5. Click the *Browse* button and select *vae_lv_hdr60_1_1.bit* file. Check if *Operation* field is set to *Fast Program*, then press *OK*.

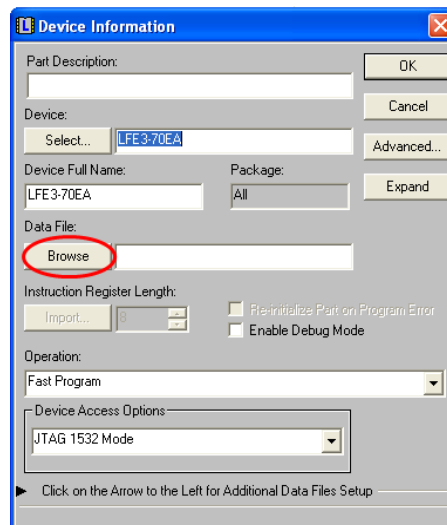


Figure 4. Selection of a bitstream file in ispVM.

6. Download the bitstream into FPGA using *GO* button in the toolbar or by pressing Ctrl-G.

7. After the bitstream is successfully downloaded, the video from Aptina sensor will appear on a display.

Note: for detailed Configuring/Programming instructions of Lattice HDR-60 board please refer to [EB59 HDR-60 Base Board User's Guide](#).

From Flash

In order to download bitstream into the flash memory please follow the next steps:

1. Launch ispVM tool.
2. Click the *Options* → *Cable and I/O port setup* option. Select cable type as *USB2* and then press *Autodetect* button. If the autodetection is successful, Figure 2 will be displayed.
3. Close the *Cable and I/O port setup* window and click *Scan* button in the toolbar or press F2 key. The LFE3-95/70 device should appear in the device list.
4. Double click on LFE3-95/70 device and select LFE3-70EA.
5. After that choose *SPI Flash Background Programming* item in *Device access options* list:

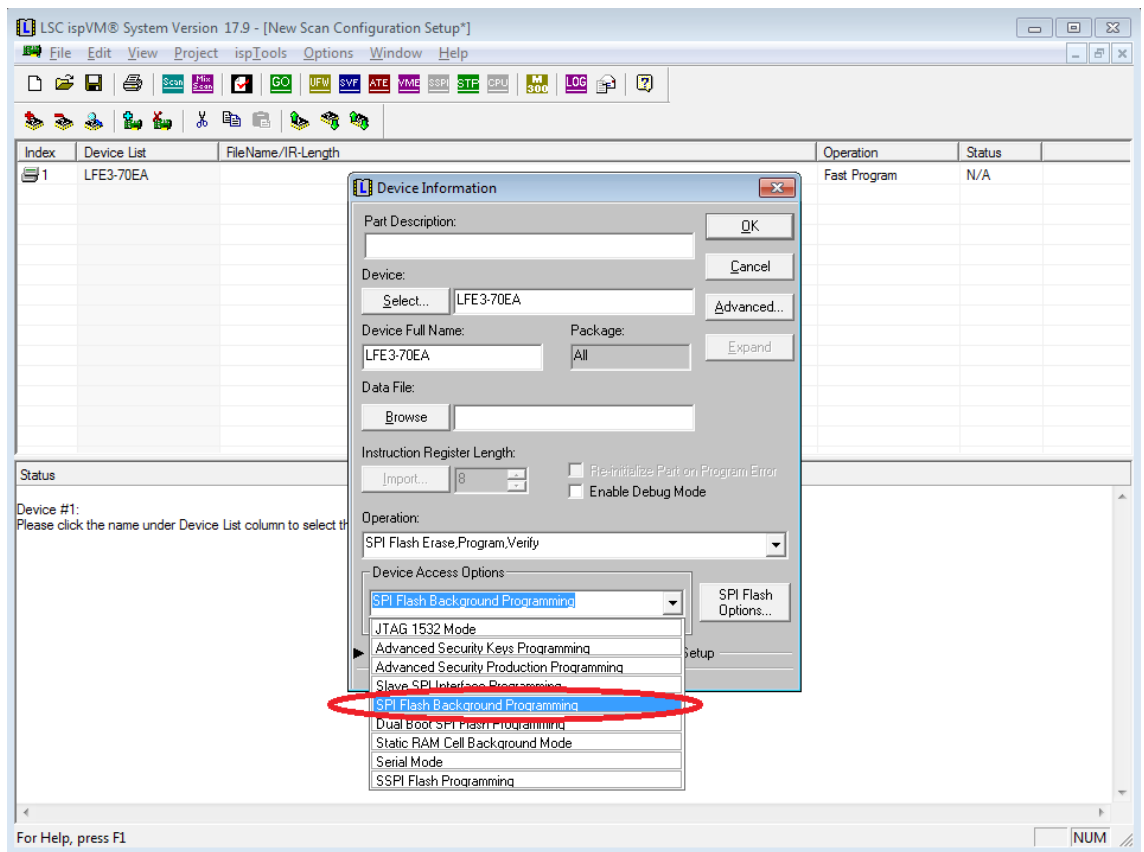


Figure 5. SPI Flash selection for programming.

6. Press *SPI Flash Options...* button and then press *Select* button for flash device selection:

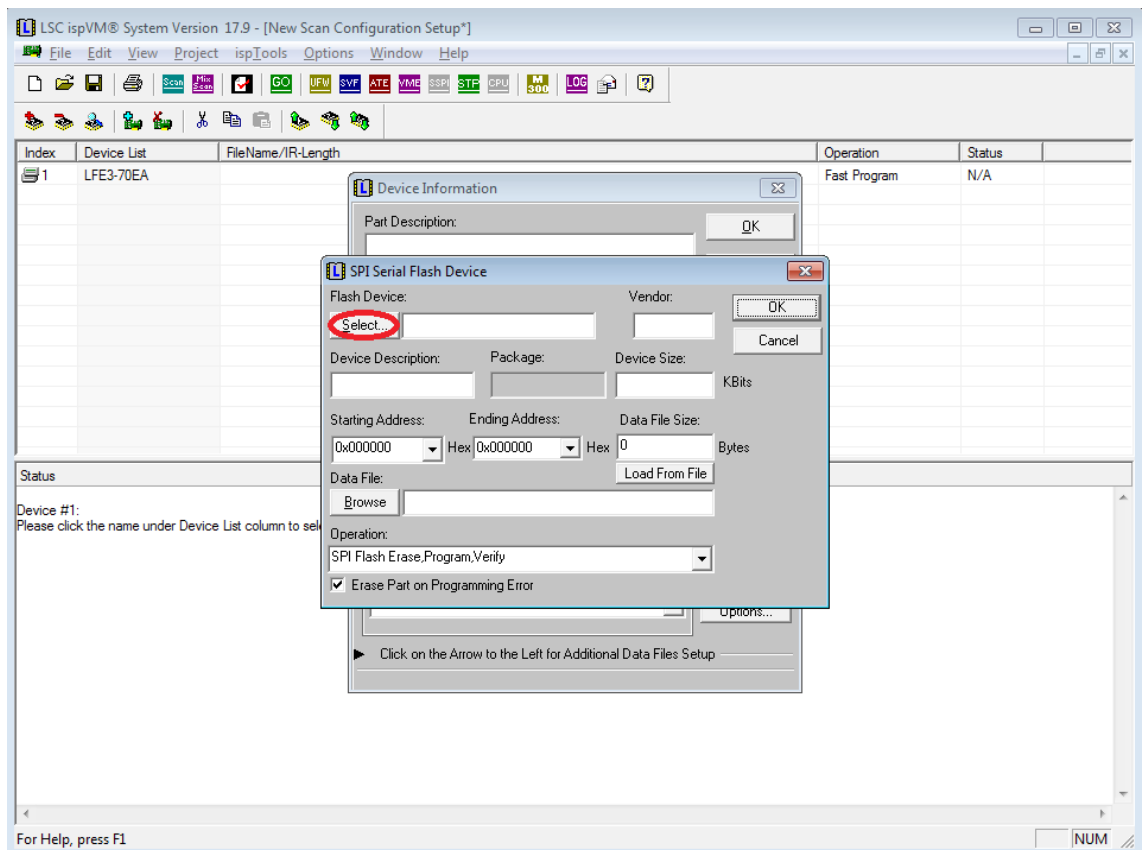


Figure 6. Flash device selection.

7. Choose flash device as shown on Figure 7 and press **OK**:

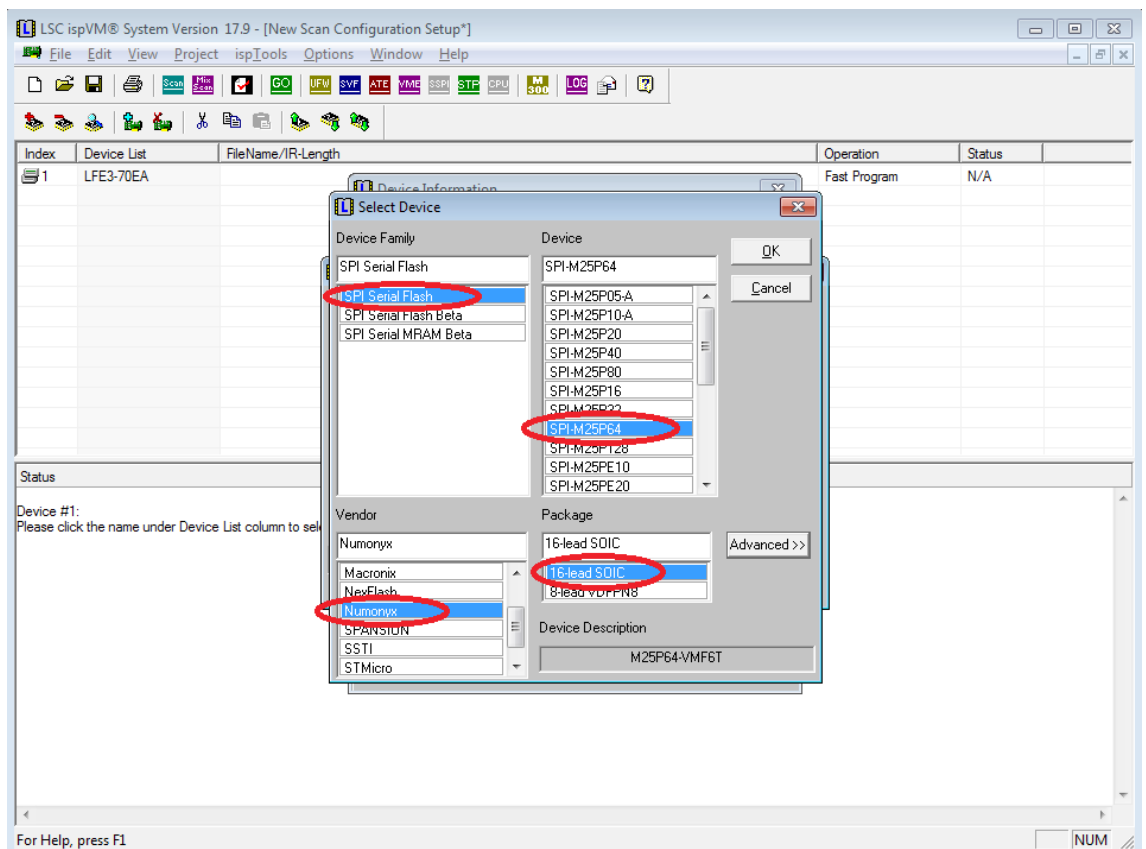


Figure 7. Flash device specification.

8. Click *Browse* button and select the bitstream file. After that click *Load from file* button and then press *OK*:

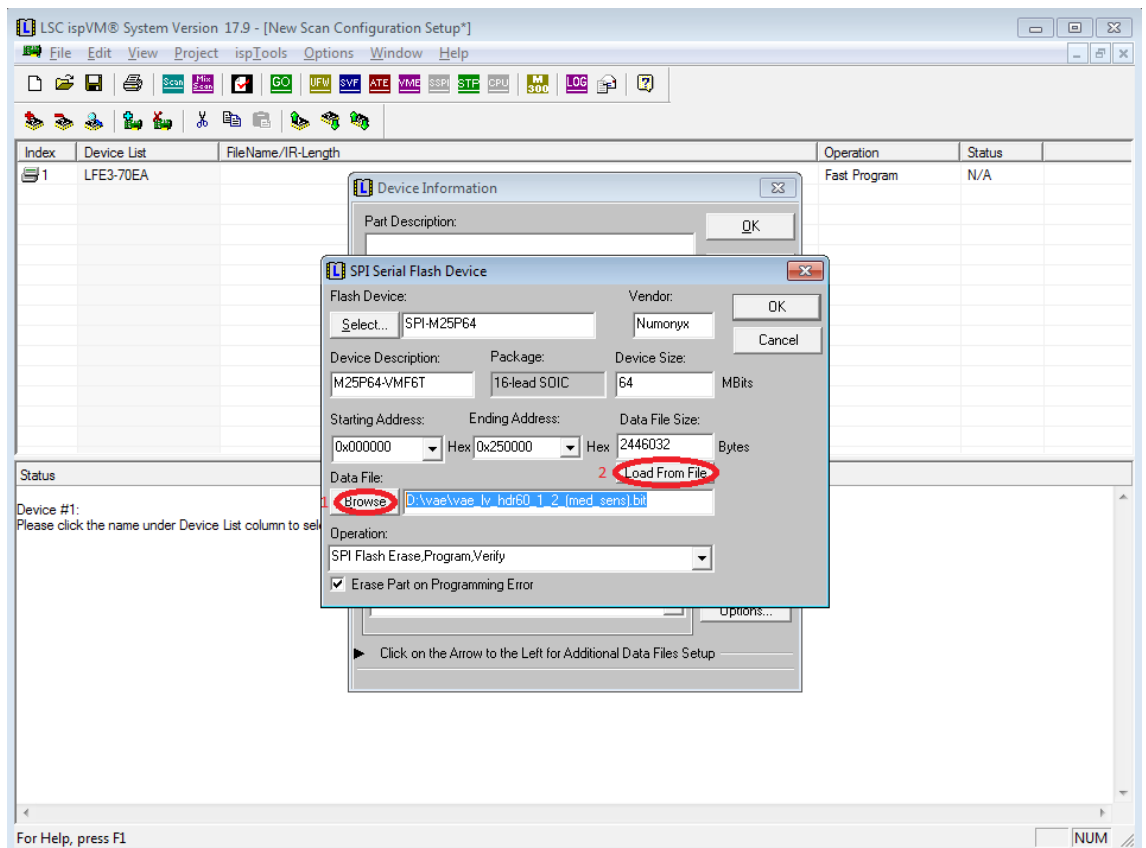


Figure 8. Selection of .bit-file.

9. Click *OK* and wait for programming completion:

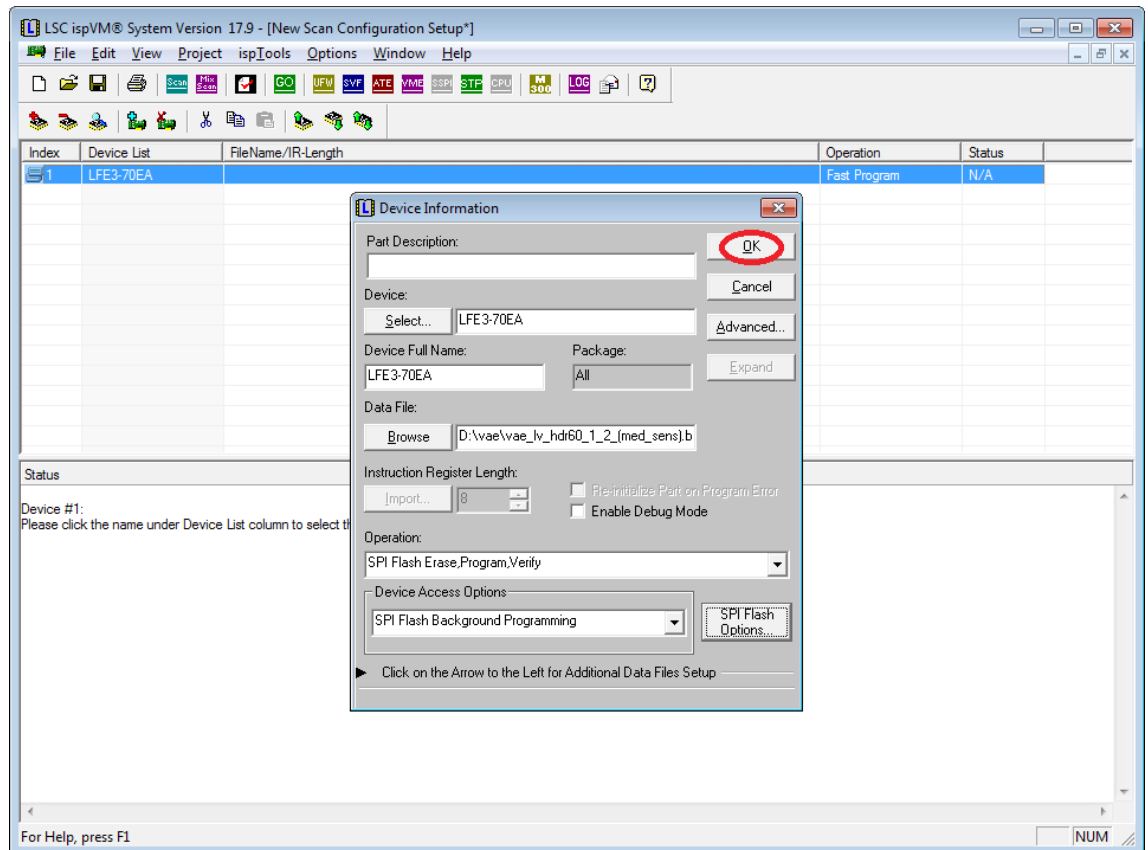


Figure 9. Finishing configuration setup.

10. If the download was successful the following screen appears:

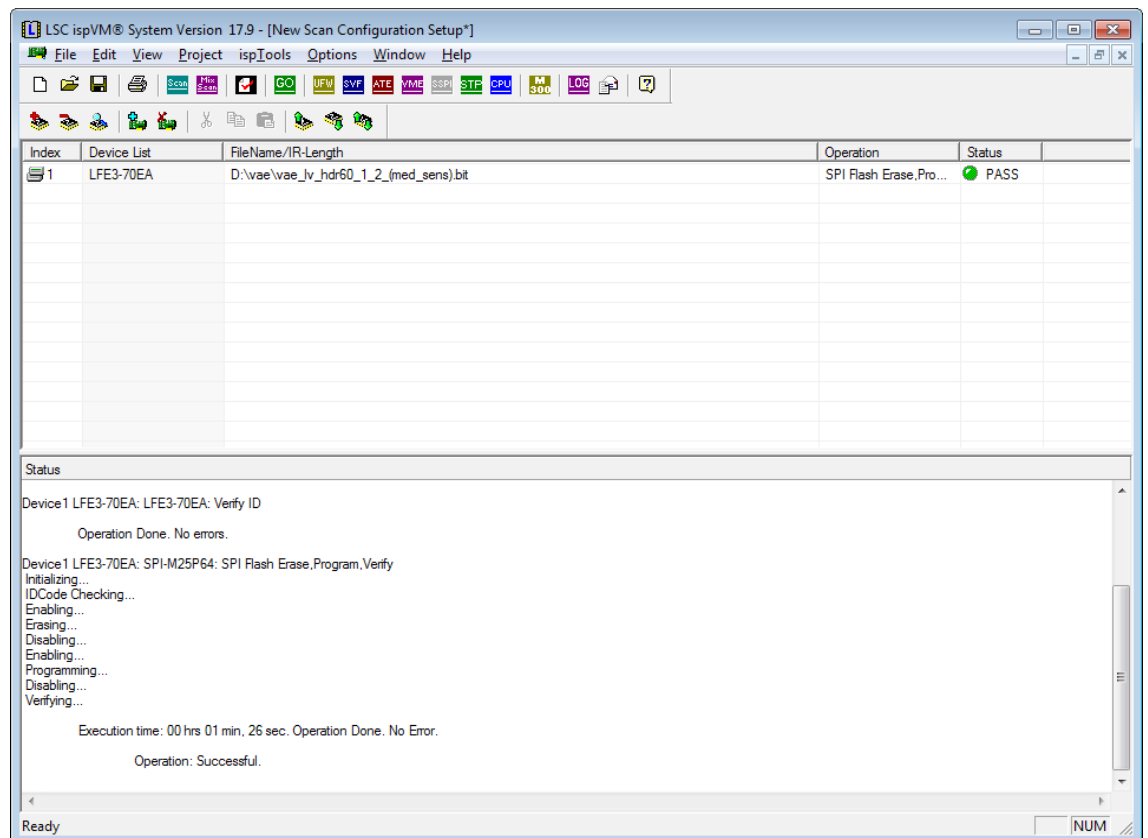


Figure 10. Completion of device configuration.

11. Disconnect power adapter cable from board and then plug it in. The demo bitstream from flash should be downloaded and video from Aptina sensor will appear on the display.

Ethernet connection setup

In order to enable ethernet communication with VAE please follow the next steps:

1. Setup the Host ethernet connection as follows: IP Address – 192.168.55.XX (except 192.168.55.10 because FPGA has such IP), subnet mask – 255.255.255.0.
2. After that you can connect your Host device to Lattice HDR60 board using ethernet cable as shown on Figure 11. Please check the connection speed: only 1Gbit/s is supported.

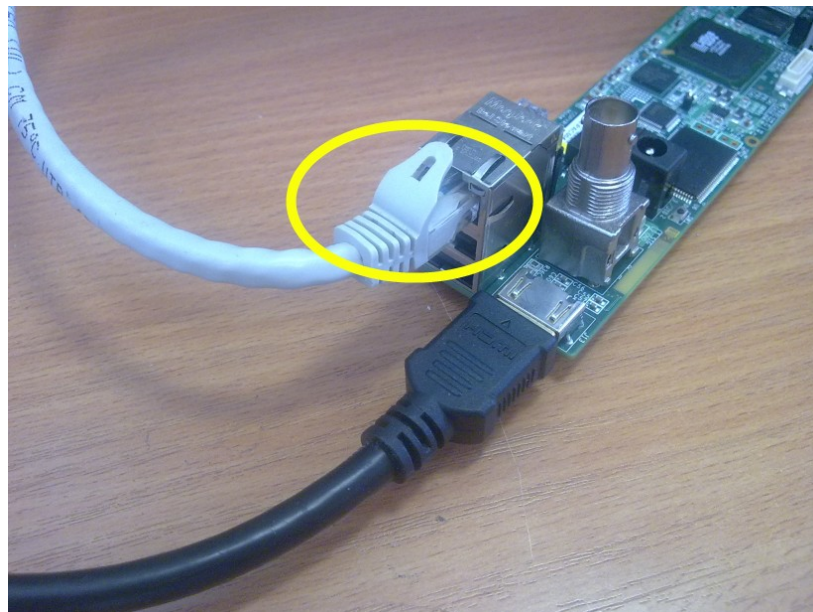


Figure 11. Ethernet cable connection

Note: in order to check whether FPGA MAC layer is initialized correctly, please do the following steps (this is unnecessary procedure. use it only in case the demo application fails to start):

1. Check if the Ethernet connection is enabled and the connection speed is 1Gbps.
2. Then run Windows Command Line tool. After that send ping packet to the FPGA “*ping 192.168.55.10*”.
3. FPGA won’t respond. It’s OK. Then execute “*arp -a*”. If the MAC layer is initialized successfully you will see the FPGA IP address 192.168.55.10 in the ARP table.

Running Demo

For version 2.0 and earlier

- ✓ After the bitstream is successfully downloaded, a red intrusion bounding box and a yellow counter line will be displayed on the top of a video stream. If an object enters the intrusion area, a notification sign will appear in the right top corner of the screen for 2 seconds.

- ✓ If an object passes through a yellow counter line, a yellow arrow will appear at the top-center of the screen for 2 seconds.
- ✓ If camera tampering or camera rotation is detected, a green box will appear in the left top corner for 2 seconds and the background will be relearned.

For versions 2.1 - 2.3

VAE Demo version 2.1 and newer incorporates Ethernet controller for management of engine parameters and reading objects/events information.

Recommended setup steps.

Preparation:

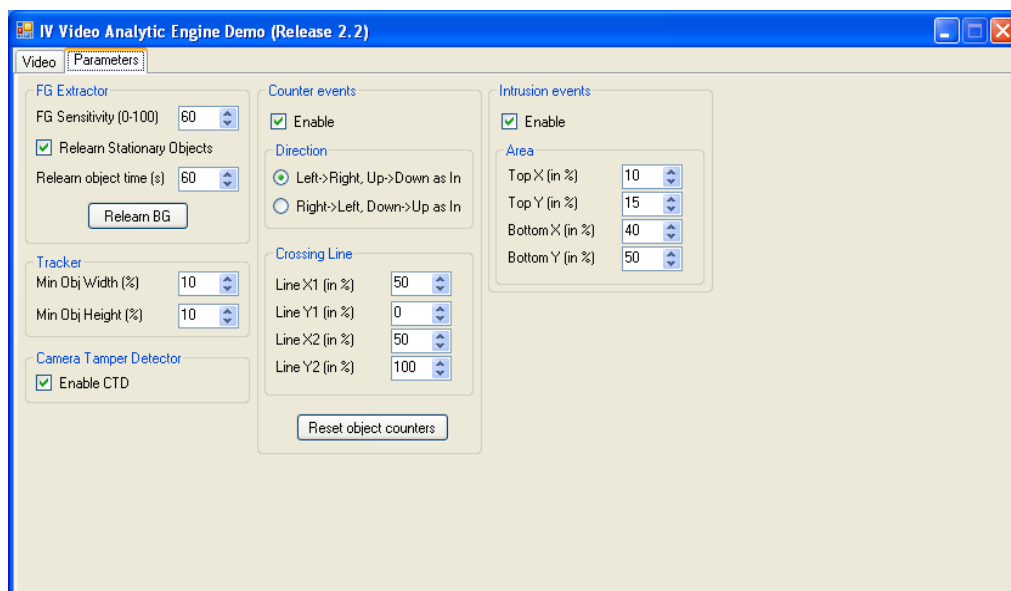
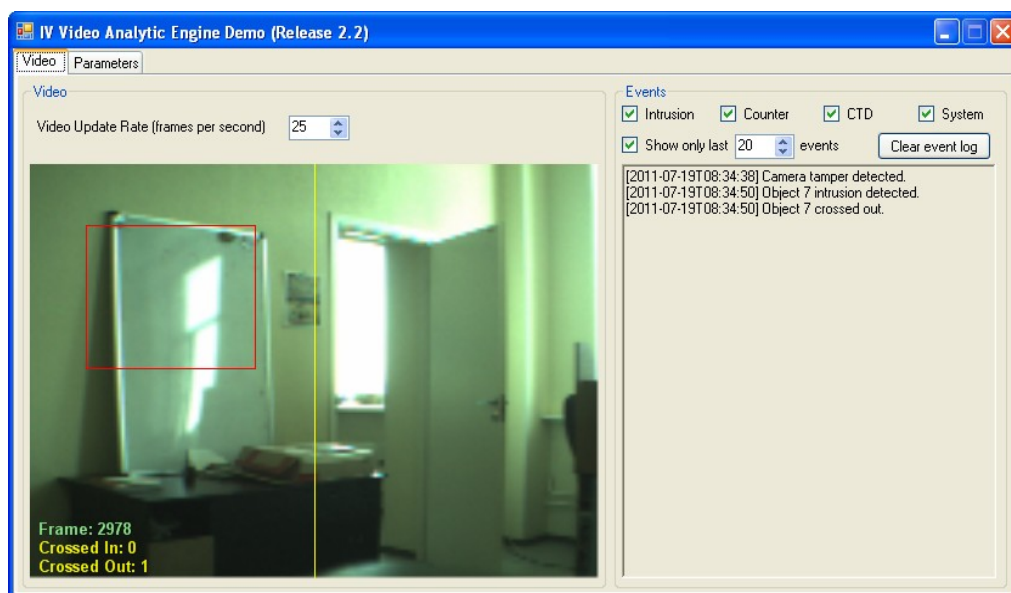
1. Make sure a PC for demo has
 - a. 1.5+ GHz processor
 - b. 1+ GB RAM
 - c. OS Windows XP or 7
 - d. Gigabit (!) Ethernet connection (100 Megabit is not supported) configured to IP 192.168.55.1, Mask 255.255.255.0
 - e. Microsoft .NET 4.0 Runtime installed
2. HDR-60 board has VAE firmware version 2.3 (vae_lv_hdr60_2_3.bit) loaded into Flash memory. Instruction how to load firmware into Flash can be found in section "Demo setup" -> "From Flash"
3. Connect HDR-60 board via Cat5 or Cat6 Ethernet cable to Gigabit port of PC
4. Connect LCD monitor to HDMI output of HDR-60 board

Running demo:

1. Power on HDR-60 board. Wait for video to show on the monitor
2. Run VAE Control Panel application (vae_control.exe). Green indicator "Connection established" has to appear in the left bottom corner of "Video" tab. If Red/Pink indicator appears instead of Green then something does not work properly

To try to run demo in case it does not work:

1. Re-check Preparation points
2. Close VAE Control Panel application
3. Power off HDR-60 board
4. Repeat "Running demo" steps 1 and 2

Figure 12. VAE management via Ethernet (*Parameters* tab).Figure 13. VAE management via Ethernet (*Video* tab).

Revision History

Date	Version	Revision
06.04.11	1.1.0	Initial release.
12.04.11	1.2.0	CTD event description was added.
19.04.11	1.2.1	Flash programming was added.
21.07.11	2.2.0	VAE management via Ethernet was added.
26.03.12	2.3.0	Instructions to run Demo were added