

TECHNICAL NOTE:

# **TROUBLESHOOTING GUIDE FOR HARRIER CAMERA INTERFACE BOARDS**

**A guide to help identification of system configuration issues**

## **Overview**

Active Silicon provides evaluation kits, quickstart guides and comprehensive product datasheets to enable easy set-up and evaluation of Harrier camera interface boards and related camera products. If difficulties occur, it is likely that these are set-up and configuration issues which can be easily resolved with the help of this guide. The step-by-step diagnostic procedure in this document can be used to diagnose and fix potential set-up and configuration issues.

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### Before starting

The VISCA command protocol is used to control and query the camera/interface board settings. Use of this protocol is essential for identification of many system issues. To use VISCA commands you will need hardware and software to communicate with the camera interface board.

We recommend use of the Active Silicon Harrier evaluation kits

<https://www.activesilicon.com/products/accessories-cables/?fwproduct=evaluation-kit>

and the HarrierControl software, available from the Active Silicon website

<https://www.activesilicon.com/products/harriercontrol-camera-software/>.

Read the quickstart guide for your product. The quickstart guide lists the parts required and explains how to set-up the product correctly.

In the HarrierControl software distribution the readme.txt and help.txt files explain how to use the software.

Please also download and read the datasheet for your product from the downloads section of the relevant Harrier product page.

When reporting issues to Active Silicon, clearly state the product name, serial number and, if possible, the camera interface board firmware version.

Note: when Harrier interface boards start up, the LED will flash the firmware number and then flash green while the board scans for a camera. If the camera scan is unsuccessful, or there is an error, the LED will flash red. The number of flashes indicates the type of error, please consult the datasheet for more information.

### Physical issues

If you have followed the instructions in the quickstart guide and consulted the datasheet, but still have a problem, you should start the troubleshooting process by excluding any physical causes of problems. Check the board/camera and cables for visible physical damage or the presence of foreign material. Check the connectors and their internal pins as these can be damaged by use of an incompatible connector or attempts to insert the connector the wrong way around.

Check that the 30-way KEL micro-coaxial cable is undamaged and securely plugged in at both ends.

Please check that the DIP switch settings are as expected. Most applications do not require the video mode to be set by the DIP switches as the camera will power-up into the same mode set when it was last powered-down.

## Camera/board start-up issues

This section is to be used when there is no video output from the camera on power-up.

1. **Set-up** – Set all DIP switches to OFF then power up the interface board/camera.
2. **Power test** - Does the interface board LED come on?

**YES** ⇒ the board has power. Move on to 3.

**NO** ⇒ there is no power to the system. Carry out the following tests:

- A. Test the power cable/supply by using a different interface board/camera. If the power cable/supply is working, continue to B.
- B. Are the pins inside the interface board header sockets present and straight?  
If yes, continue to C.
- C. Check that the power supply is not shutting down due to excess current drain (e.g. short circuit in the socket due to a bent pin or foreign material elsewhere).  
If not, continue to D.
- D. Check that the components on the interface board are not getting excessively hot.  
If any of the components on the board are getting very hot, the board is likely to be damaged. This can be caused by the presence of contaminants on the camera/board causing short circuits or by wiring up the connections to the board incorrectly. Incorrect wiring often results in permanent damage to the interface board that remains even if the wiring error is corrected.

If the LED on the camera interface board is not on, but the connectors and power supply are ok, please contact Active Silicon support and report the results of the tests listed above ([see the section: 'Technical support and RMA' at the end of this document](#)).

3. **Camera power test 1** – Does the camera make start-up sounds (e.g. movement of the lenses to initialize the zoom function)?

**YES** ⇒ the camera has power. Move on to 4.

**NO** ⇒ there is no power to the camera.

This may be due to a poor KEL microcoax cable connection. Try replacing the cable.

If this does not work, please report these results to Active Silicon support ([see the section: 'Technical support and RMA' at the end of this document](#)).

4. **Camera power test 2** – Are the camera start-up sounds normal (compared to another camera)?

**YES** ⇒ move on to 5.

**NO** ⇒ If the camera continues to make start-up sounds (i.e. repeatedly re-boots) the power supply may not supply enough current to support the peak current required when the camera starts up.

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Check that the power supply maintains a high enough voltage (see camera specification) while the camera is starting up. If the voltage falls below the range specified for the camera, change the power supply to one that can deliver enough current during the camera start-up period.

If the camera is still not working and the supply current is much higher than expected, the camera may be damaged; please report these results to Active Silicon support ([see the section: 'Technical support and RMA' at the end of this document](#)).

### 5. LED test - What color is the LED?

**GREEN** ⇒ the camera has a valid video output. Check the following:

- A. The monitor used may not support the video mode set on the camera (for example, many monitors do not support 1080p30). Try to change the camera video mode to one that the monitor supports using the DIP switch settings (and a power cycle), or a VISCA command (using HarrierControl) and camera reset (if required).
- B. Try a different monitor and cable or validate the cable/monitor with a different camera and the same camera video mode.  
(Note: SDI coaxial cables need to be 75Ω 3G minimum.)

If there is still no video output, please report these results to Active Silicon support ([see the section: 'Technical support and RMA' at the end of this document](#)).

**RED** ⇒ there is an error preventing video output.

- A. If the LED is flashing count the number of flashes and look up the error code in the interface board datasheet. The error code should help you to identify the cause of the issue.
- B. Query the camera interface board with a VISCA command to check the video mode, LVDS setting and health status of the board, and note the results. VISCA commands and responses are camera/board specific, you will need to refer to the technical reference manual / datasheet for your product(s).
- C. A red LED and no video output can be caused by the LVDS mode and video mode being set to an incompatible combination (1080p60/50=Dual LVDS, all other video modes=Single LVDS). Try to set the video mode (and LVDS setting) to correct values using VISCA commands/HarrierControl and a camera reset (if required), or by changing the DIP switch settings and power cycling. If you are using the DIP switches, try setting video modes that use both single and dual LVDS modes (e.g. 1080p60 and 720p60).
- D. Another possible cause of this problem is a poor KEL microcoax cable connection. Try replacing the cable.

If there is still no video output, please report these results to Active Silicon support ([see the section: 'Technical support and RMA' at the end of this document](#)).

## Communication issues

This section is to be used when the communication with the camera is not working.

1. **Set-up:** Check the product documentation and ensure that the DIP switches are set correctly for the communication type that you are trying to use, and (if you have made your own connection to the interface board) that the connector wiring is correct:
  - For serial communication: TX and RX may be the wrong way around.
  - For RS485 communication: the DIP switch setting for cable termination may be incorrect.
  - For USB/UVC communication: you must use a cable that can support 5Gbps (or more) and a Superspeed USB socket (preferably type C).
2. **COM port:** If you are using a COM port with third party software, or HarrierControl in COM port mode, ensure that the correct COM port number for the board/camera is being used. This can be checked using Windows Device Manager. When using the Harrier Evaluation Board, the HarrierCOMPortDiscovery.exe program can be run to list the available COM port numbers and the serial protocol they connect to on the evaluation board.
3. **USB:** To use the Harrier USB Virtual COM port with the Harrier USB/HDMI Camera Interface Board you must install the Harrier USB SDK (Windows only). The virtual COM port number can be identified by noting the active COM port numbers (in Windows Device Manager) with the board/camera connected and disconnected.

As the COM port is virtual, the serial settings (baud rate, etc.) will not affect the communication.

Note: it is not possible to use the Harrier USB Virtual COM port and the physical serial port of the USB/HDMI interface board at the same time – please refer to the datasheet and the section on DIP switch settings for the board. However, it is possible to use the USB virtual COM port and the UVC control at the same time. Note that the virtual COM port should not be used to modify any of the settings that are under UVC control as this can result in the USB software not working correctly.

## No SDI video output

This section is to be used when camera communication is working but there is no SDI video output.

1. **Set-up:** Check the product documentation and ensure that the DIP switches are set correctly for your application (HD-VLC = OFF). Most applications do not require the video mode to be set by the 4 video mode DIP switches as the camera will power-up in the same mode set when it was powered-down, hence usually these DIP switches are set to OFF.
2. **Cables:** note that SDI requires 75-Ohm coaxial cable and that the length of the cable over which video can be sent is dependent on the quality of the cable and connection.
3. **LVDS mode:** One common issue is incorrect setting of the LVDS mode. The LVDS mode should be set to DUAL for 1080p50/60/59.94 and SINGLE for every other video mode. This can be checked by VISCA inquiry, or running HarrierControl without command line parameters (when the interface board is connected to the Harrier Evaluation board). If you change the camera video mode using the HarrierControl interactive menu then the LVDS mode will be set correctly. Otherwise use VISCA commands to set both the video mode and the LVDS mode before resetting the camera (if required to change video mode). Once the new mode is set you can check that the settings are correct by using the VISCA commands to query the video mode and the LVDS mode.

## No Analog/CVBS video output

This section is to be used when camera communication is working but there is no Analog/CVBS video output. Please check that the CVBS output is enabled using an appropriate VISCA command.

1. **Harrier 3G-SDI Camera Interface Board** – this interface board scales down 720p video to generate analog/CVBS video. The frequency of the CVBS video output will be the same as the camera video mode (50/60/59.94). Some monitors require that NTSC output is at 59.94Hz and may not work with 60Hz. Using VISCA commands the CVBS output can be enabled/disabled and set to 4:3 or 16:9 (cropped or scaled) output mode.  
The analog video output must be connected to a 75 Ohm terminated analog display/input. Check that the camera video mode is set to a 720p mode that will work on your monitor and that the CVBS output of the interface board is enabled (by sending the correct VISCA command).
2. **Harrier cameras** – most Harrier cameras have a simultaneous CVBS output on a separate camera FFC/FPC connector, please see the documentation for more information. This CVBS video output does not connect to the Analog output socket on the Harrier Evaluation Board
3. **Other cameras** – some cameras can be set to transmit CVBS video on pin 25 of the micro-coaxial KEL cable; if this is the case, the Harrier USB/HDMI and HDMI Camera Interface Boards will connect this output to the Analog output socket on the Harrier Evaluation Board. Check the camera documentation and ensure that the camera is set up correctly to generate CVBS output on pin 25 of the KEL cable connection.

## No USB video output

This section is to be used when camera communication is working but there is no USB video output.

1. **Set-up:** Check the product documentation and ensure that the DIP switches are set correctly for your application. Most applications require the video mode to be set by UVC and setting the video mode using the 4 video mode DIP switches will conflict with this, hence usually these 4 DIP switches are set to OFF. Typically DIP switch 7 is set ON to enable USB communications.
2. **Cables:** note that USB 3 video requires a 5Gbps connection and hence a 5Gbps (or faster) USB cable.
3. **Video mode:** Typically, the UVC application will attempt to set the correct mode on the camera. If the video mode expected by the UVC application and the mode set on the camera do not match, the video may not be displayed. Usually, UVC applications will support video of the same resolution and will tolerate different video frame rates, but this cannot be guaranteed.

## USB/HDMI camera interface board and UVC/Linux support

This section is to be used when using the USB/HDMI interface board or camera with a Linux host.

UVC support on Linux requires a special set of drivers, these are available as standard option with the latest kernel versions/distributions. The links listed below contain information on the UVC drivers for Linux but there may be more up-to-date information available on the web:

<https://github.com/libuvc/libuvc>

<https://www.kernel.org/doc/html/v4.13/media/v4l-drivers/uvcdriver.html>

[https://www.linuxtv.org/wiki/index.php/How\\_to\\_Obtain,\\_Build\\_and\\_Install\\_V4L-DVB\\_Device\\_Drivers](https://www.linuxtv.org/wiki/index.php/How_to_Obtain,_Build_and_Install_V4L-DVB_Device_Drivers)

<http://www.ideasonboard.org/uvic/>

<https://www.ideasonboard.org/uvic/faq/>

<https://stackoverflow.com/questions/25619309/how-do-i-enable-the-uvic-quirk-fix-bandwidth-quirk-in-linux-uvic-driver>

<https://help.ubuntu.com/community/Webcam>

When installed correctly, Linux will see the USB camera and the output of DMESG should look like something like this:

```
[15908.268435] usb 2-3: new SuperSpeed Gen 1 USB device number 9 using xhci_hcd
[15908.289269] usb 2-3: New USB device found, idVendor=0403, idProduct=602a, bcdDevice= 0.01
[15908.289274] usb 2-3: New USB device strings: Mfr=1, Product=2, SerialNumber=7
[15908.289278] usb 2-3: Product: Active Silicon Harrier 2030-002
[15908.289281] usb 2-3: Manufacturer: Active Silicon
[15908.289283] usb 2-3: SerialNumber: 1-1595589886-TN2030GS-1
[15908.292370] uvcdriver: Found UVC 1.10 device Active Silicon Harrier 2030-002 (0403:602a)
```

A SuperSpeed USB socket (preferably type C) must be used. If you are using the USB socket to power the camera, the socket must be able to deliver enough current to drive the camera and interface board.

Typically, these types of socket can deliver up to 1500mA or more (7.5W). The USB power supply design varies between PCs and often the only way to really know how much current a USB socket can supply is to measure it. Usually, the USB socket power supply hardware will shut itself down if the current drain is too high, but this cannot be guaranteed.

For cameras that consume 1500mA or less the Harrier USB interface board is configured to report a current requirement of 1494mA. If the camera/board requires more than this, the Harrier USB board will be configured to report that the camera is self-powered (i.e. the device is not powered by the USB socket). Most versions of Linux check the power requirement of attached USB devices. Unfortunately, many USB sockets report a current delivery capability of 900mA even though the socket can actually deliver more current. As a result, Linux may shut down the USB port as it detects that the available USB port current is insufficient to power the device/camera.

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In this situation the DMESE output looks something like this:

```
[14398.060272] usb 2-1: new SuperSpeed Gen 1 USB device number 6 using xhci_hcd
[14398.080900] usb 2-1: New USB device found, idVendor=0403, idProduct=602a, bcdDevice= 0.01
[14398.080906] usb 2-1: New USB device strings: Mfr=1, Product=2, SerialNumber=7
[14398.080910] usb 2-1: Product: Active Silicon Harrier T1110-2
[14398.080913] usb 2-1: Manufacturer: Active Silicon
[14398.080915] usb 2-1: SerialNumber: 1-1602772708-TNMP1110-1
[14398.081203] usb 2-1: rejected 1 configuration due to insufficient available bus power
[14398.081206] usb 2-1: no configuration chosen from 1 choice
```

The Linux system can be modified to ignore the power issue, but the easiest workaround is to change the Harrier USB power configuration to self-powered. You **must ensure** that the socket can actually provide enough power for the camera otherwise it may not work or operate intermittently.

The HarrierControl software can be used to update the USB configuration of the board. The Linux versions of the USB board configuration declare that the board is self-powered and requires less than 900mA so that Linux will allow the USB port to be opened. It is your responsibility to ensure that the USB port can provide enough power for the camera – note: using zoom and focus operations typically increase the current/power consumption and many cameras have a peak current/power consumption at start-up when the camera systems are initialising.

## Technical support and RMA process

After using this guide, if you still have an issue please contact Active Silicon support ([techsupport@activesilicon.com](mailto:techsupport@activesilicon.com)). Please provide us with the following information:

- Product name, serial number and, if possible, the camera interface board firmware version.
- The results of following the steps recommended in this guide and any other observations.

We will analyze your report and advise if there are other actions you could take that could resolve the issue.

If it is determined that the product should be returned to Active Silicon for inspection, please wait for a Return Material Authorization ([RMA](#)) code and instructions before shipping the product back to Active Silicon. This RMA code should be included on all correspondence and shipping labels relating to the product.

Note: to prevent damage, ESD compliant packaging must be used when returning all product.

For more information please see: <https://www.activesilicon.com/support/warranty-repair/>



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