Using the DLP® LightCrafter™ to Trigger CCD Cameras from The Imaging Source®

This document describes how to use the DLP LightCrafter with the global trigger function of industrial USB, FireWire, and GigE CCD cameras from The Imaging Source (http://www.theimagingsource.com).

As shipped, the DLP LightCrafter trigger output is an open drain type with a 10 kΩ internal pull-up resistor. This works well with cameras accepting a standard TTL level trigger input. However, some cameras with global trigger capability require a minor hardware change on the DLP LightCrafter system board in order to function correctly. Such is the case with the industrial USB, FireWire, and GigE CCD cameras from The Imaging Source.

The Imaging Source makes available a document which describes how to use the trigger and digital I/Os on their cameras (http://www.theimagingsource.com/downloads/dxxxxbfxxtrigio.en_US.pdf). The section 'Trigger input-hardware and timing' shows that the trigger input is optically isolated (opto-coupled). This camera trigger input requires somewhat more current than a normally configured LightCrafter trigger output can provide. This means that it is necessary to make a minor hardware change on the DLP LightCrafter system board in order to trigger these cameras properly.

The hardware change, see Figure 1 and Figure 2:

(a) Install a 0 Ω resistor (jumper) across R295 (normally unpopulated).

Trigger Connection setup, see Figure 3 and Figure 4:

(a) Connect PIN 1 (EXT_TRIG_VCC) of connector J7 on the system board to the center conductor of the BNC jack on the back of the camera (Trigger_in).

(b) Connect PIN 3 (TRIG_OUT_CON) of connector J7 on the system board to the shield of the BNC jack on the back of the camera (ground).

(c) This connection is made through a properly constructed adapter from the LightCrafter system board edge connector J7 to a coax cable (50 Ω or 75 Ω).

The two cameras below have been tested with DLP LightCrafter after doing the changes described above. The LightCrafter is able to properly trigger the cameras.

1. The Imaging Source FireWire CCD MONO camera, model DMK 21BF04 - http://www.theimagingsource.com/en_US/products/cameras/firewire-ccd-mono/dmk21bf04/
2. The Imaging Source FireWire CCD COLOR camera, model DFK 21BF04 - http://www.theimagingsource.com/en_US/products/cameras/firewire-ccd-color/dfk21bf04/

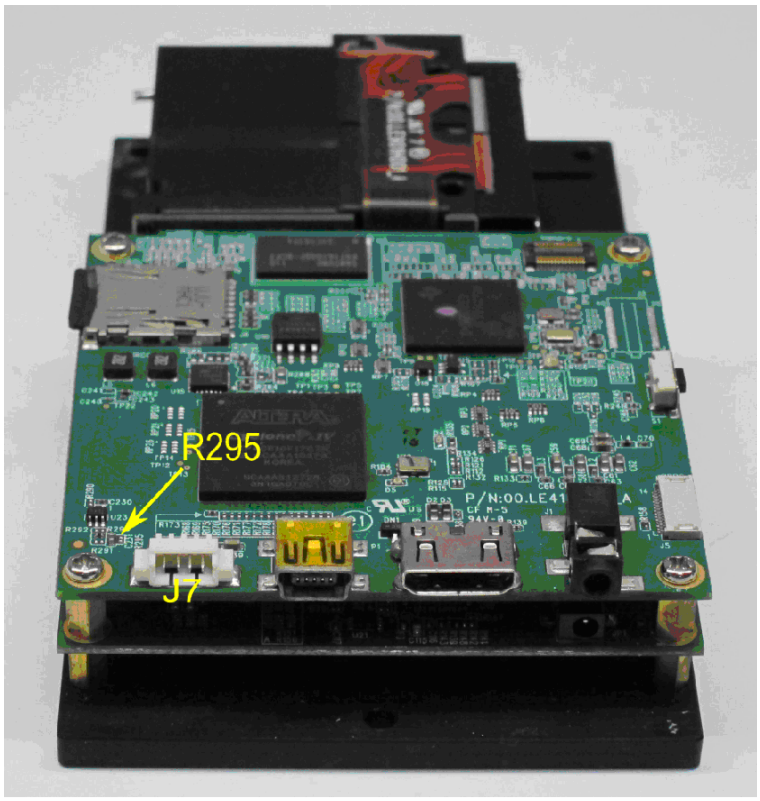

Figure 1. LightCrafter system board, showing location of R295 and J7

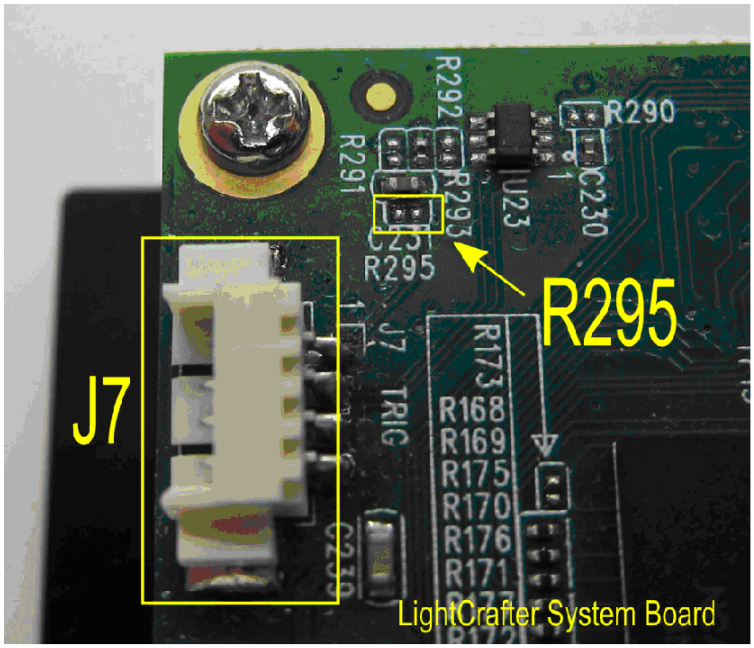

Figure 2. LightCrafter system board close-up, showing location of R295 and J7

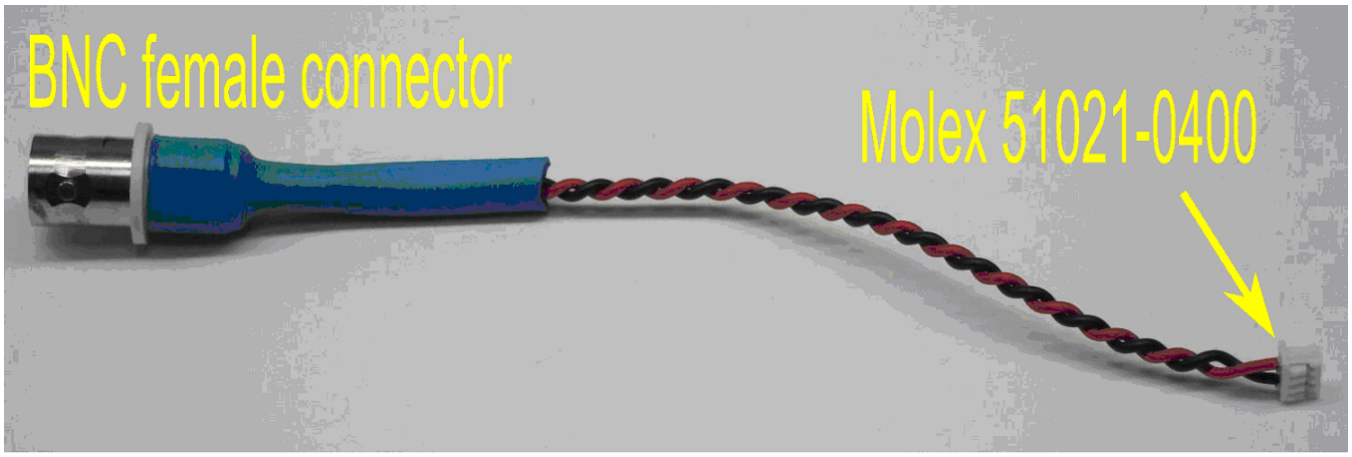

Figure 3. Adapter cable, from LightCrafter J7 to female BNC connector

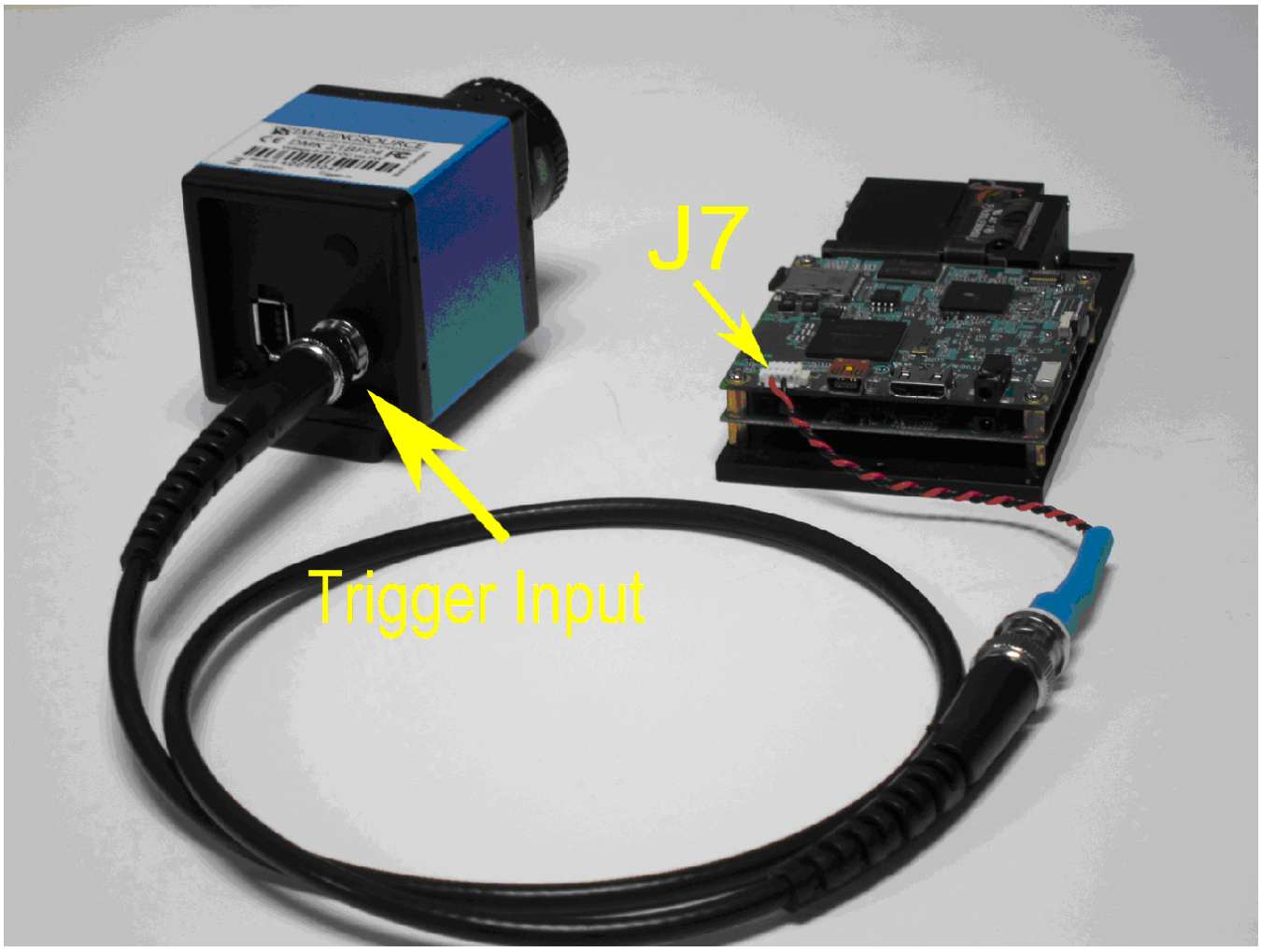

Figure 4. LightCrafter and The Imaging Source camera with trigger cable connected

The following hardware will be helpful:

Trigger Connector (J7) Housing:
Molex part number: 51021-0400
Digi-Key part number: WM1722-ND
http://search.digikey.com/scripts/DkSearch/dksus.dll?WT.z_header=search_go&lang=en&site=us&keywords=wm1722-nd
Crimp
Molex part number: 50079-8000
Digi-Key part number: WM1142CT-ND
(4 each required for the Trigger housing)
http://search.digikey.com/us/en/products/50079-8000/WM1142CT-ND/467835
Crimp Hand Tool
Molex part number: 638190300
Digi-Key part number: WM9984-ND
http://search.digikey.com/us/en/products/638190300/WM9984-ND/2193029

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