

SNAPPER Digital Camera Guide

DataCell Limited

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Part Information

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Introduction

This section describes details specific to each of the most popular cameras supported.

DALSA CA-DX

This section applies to the Dalsa CA-Dx series of line scan cameras.

SERIAL CONFIGURATION

The RS-232/RS-422 jumper selection does not matter, as the CA-Dx series of cameras do not use serial communications.

CONNECTING TO SNAPPER-DIG16

For cameras manufactured before 1996, use cable [CBL-68-DALSA-CAD-A-3M](#) to connect the camera to Snapper. However for cameras manufactured after 1996, use Snapper cable [CBL-68-DALSA-A-3M](#). This is necessary due to Dalsa changing the pinout of the OS1/OS2 and control connectors during 1996.

For cameras manufactured in 1996, the location of the LineEnable signal must be determined. If it is output on OS1/OS2 then use [CBL-68-DALSA-A-3M](#).

The year of manufacture can be determined from the first two digits of the camera serial number.

Connect: the 25 way socket labelled "Control" to the 25 way plug on the back of the camera; the 20 way IDC connector labelled "OS1" to the OS1 socket on the back of the camera; similarly for the OS2 where fitted; the 25 way plug labelled PSU should be connected to a suitable power supply (the power pins are the same as the camera itself); and the 68 way end to the Snapper.

DALSA CL-CX

This section applies to the Dalsa CA-Dx series of line scan cameras.

SERIAL CONFIGURATION

The RS-232/RS-422 jumper selection does not matter, as the CL-Cx series of cameras do not use serial communications.

CONNECTING TO SNAPPER-DIG16

For cameras manufactured before 1996, use cable [CBL-68-DALSA-CLC-A-3M](#) to connect the camera to Snapper. However for cameras manufactured after 1996, use Snapper cable [CBL-68-DALSA-A-3M](#). This is necessary due to Dalsa changing the pinout of the OS1/OS2 and control connectors during 1996.

For cameras manufactured in 1996, the location of the LineEnable signal must be determined. If it is output on OS1/OS2 then use [CBL-68-DALSA-A-3M](#).

The year of manufacture can be determined from the first two digits of the camera serial number.

Connect: the 25 way socket labelled "Control" to the 25 way plug on the back of the camera; the 20 way IDC connector labelled "OS1" to the OS1 socket on the back of the camera; similarly for the OS2 where fitted; the 25 way plug labelled PSU should be connected to a suitable power supply (the power pins are the same as the camera itself); and the 68 way end to the Snapper.

HAMAMATSU C4742

This section applies to the Hamamatsu C4742 camera.

SERIAL CONFIGURATION

The RS-232/RS-422 jumper selection does not matter, as the C4742 cameras do not use serial communications.

CONNECTING TO SNAPPER-DIG16

To connect the C4742 camera to Snapper use the Snapper cable [CBL-68-37D-A-1M](#) or CBL-68-37D-A-2M. The 37 way D end goes to the Digital Video connector on the camera head, and the 68 way end to the Snapper.

To connect the C4742-95 camera to Snapper use the CBL-68-HAM-A-2M cable.

To connect the Camera Head to the Camera Control Unit (CCU) use the standard C4742 cable.

CAMERA HEAD SETTINGS

The *MODE* switch should be set to 0 to allow the Snapper to control the camera. The settings of *EXPO TIME* and *SHUTTER DELAY* are not controlled by the Snapper and should be set to the usual values.

CAMERA CONTROL UNIT SETTINGS

The *SHUTTER* switch to *ENB* to allow the Snapper to control the camera. Also the internal switch SW1-2 must be set to *OFF* to get the correct active area. See Hamamatsu's instructions for details on how to do this. The settings of *GAIN*, *OFFSET* and *SHADING* are not controlled by the Snapper and should be set to the usual values (suggested initial values to try are 0, 0 and *OFF*).

HAMAMATSU C4880

This section applies to the Hamamatsu C4880 camera.

SERIAL CONFIGURATION

The C4880 camera supports both RS-232 and RS-422 serial levels. For RS-232 levels use Snapper cable CBL-68-C4880-232-2M; for RS-422 levels use CBL-68-HAM-A-2M. Set the Snapper-Dig16 serial control jumper accordingly.

CONNECTING TO SNAPPER-DIG16

To connect the Camera to the Snapper with RS-232 levels, use the Snapper cable [CBL-68-C4880-232-2M](#). If using RS-422 levels (preferred) use Snapper cable CBL-68-HAM-A-2M. In both cases the 68 way SCSI-2 connector is fitted to the Snapper-Dig16, and the other to the CCU.

On both cables there is a BNC TTL trigger input connector. On the CBL-68-HAM-A-2M cable there is also a BNC TTL output trigger.

To connect the Camera Head to the Camera Control Unit (CCU) use the standard C4880 cable.

KODAK MEGAPLUS 1.4 & 4.2

This section applies to the Kodak Megaplug 1.4 and 4.2 cameras. A separate section covers the Megaplug 1.4i, 1.6 and 1.6i cameras.

SERIAL CONFIGURATION

The RS-232/RS-422 jumper selection does not matter, as these MegaPlus cameras do not use serial communications.

CONNECTING TO SNAPPER-DIG16

To connect the Camera to the Snapper use the Snapper cable [CBL-68-37D-A-1M](#) or CBL-68-37D-A-2M. The 37 way D end goes to the Digital Video connector on the CCU, and the 68 way end to the Snapper. The Kodak supplied cable is not required.

To connect the Camera Head to the Camera Control Unit (CCU) use the standard Kodak cable.

CAMERA CONTROL UNIT SETTINGS

The *MODE* switch should be set to *Computer* and the *SHUTTER* switch to *Off* to allow the Snapper to control the camera. The settings of *EXPOSURE*, *GAIN* and *BLACK LEVEL* are not controlled by the Snapper and should be set to the usual values (suggested initial values to try are *100ms*, *+6dB* and *Fixed*). Note that for maximum update rate use a 10ms exposure, and then adjust the lens aperture to obtain a good picture.

Conversely for best image sharpness stop down the aperture and adjust the exposure to obtain a good picture.

KODAK MEGAPLUS 1.4I, 1.6 & 1.6I

This section applies to the Kodak Megaplus 1.4i, 1.6 and 1.6i cameras. A separate section covers the Megaplus 1.4 and 4.2 cameras.

SERIAL CONFIGURATION

The RS-232/RS-422 jumper selection should be changed to match that of the camera. If a camera supports both signal levels, use of RS-422 is recommended.

CONNECTING THE MEGAPLUS 1.6 TO SNAPPER-DIG16

To connect the Camera Control Unit (CCU) to the Snapper use a standard AIA cable such the one supplied by Kodak, or Snapper cable [CBL-68-AIA-A-6M](#). The cable can be connected either way round.

To connect the Camera Head to the CCU use the standard Kodak cable.

There is no need to connect to the serial port on the CCU because the camera can be controlled from the front panel of the CCU. However, if serial control is required from the host machine, connect a serial cable between the 9 way D-type on the CCU and a suitable comms port. The Kodak 1.6 User's Manual shows the required pinout. The switch on the back of the CCU should be set to RS-232.

HOW TO CONNECT THE MEGAPLUS 1.4I OR 1.6I TO SNAPPER-DIG16

To connect the Camera Head to the Snapper use the Kodak AIA cable which has an additional 9 pin D-type connector. Connect the 9 pin D-type to either COM1 or COM2 on the PC, and the AIA connector with the D-type to the Snapper-DIG16. Connect the AIA connector without the D-type to the Camera Head.

PULNIX TM1000, TM1001, TM9700 & TM9701

This section applies to the Pulnix TM1000, TM1001, TM9700 & TM9701 cameras.

SERIAL CONFIGURATION

The RS-232/RS-422 jumper selection does not matter, as these Pulnix TM1000, TM1001, TM9700 & TM9701 cameras do not use serial communications.

CONNECTING TO SNAPPER-DIG16

To connect the Camera to the Snapper use one of the Snappers cable [CBL-68-PULNIX1000-2M](#) or [CBL-68-PULNIX1000-ADP](#). The 68 way end of both these cables connects to the Snapper. The cable CBL-68-PULNIX1000-2M is designed to connect directly to the 31 way connector on the Pulnix, while the cable CBL-68-PULNIX1000-ADP is an adapter for use with the Pulnix cable part 30DG-02.

CAMERA SETTINGS

Recommended rear panel switch settings are the rotary switch set to *0*, and where fitted the *NSP/DSP* switch to *NSP* and the *NRM/ASY* switch to *ASY*.

XILLIX MICROIMAGER 1400

This section applies to the Xillix MicroImager 1400 camera.

SERIAL CONFIGURATION

The RS-232/RS-422 jumper selection does not matter, as the CL-Cx series of cameras do not use serial communications.

CONNECTING TO SNAPPER-DIG16

To connect the Camera Control Unit (CCU) to the Snapper use the Snapper cable [CBL-68-XILLIX1400-3M](#). The 50 way end goes to the Digital Video connector on the CCU, and the 68 way end to the Snapper. The Xillix cable is not needed.

SOFTWARE OPTIONS

There are two camera types available:

| | |
|--------------------------|-----------------------|
| Xillix MI1400 | normal binning option |
| Xillix MI1400 x2 binning | 2x2 binning |

XILLIX PMI

This section applies to the Xillix Programmable MicroImager (PMI) 1400 camera.

SERIAL CONFIGURATION

The PMI camera supports both RS-232 and RS-422 serial comms settings.

If using the PMITEST program available from Xillix, then set the CCU to use RS-232 serial comms. Connect a cable from the 9 way D-Type connector on the CCU to a suitable serial port.

Alternatively, if the users application supports the necessary serial comms protocols, then set the CCU to the AIA setting. Also set the Snapper-Dig16 to use RS-422. In this mode the additional 9 way serial cable is not required.

CONNECTING TO SNAPPER-DIG16

To connect the CCU to the Snapper use the cable provided by Xillix. The 50 way end goes to the Digital Video connector on the CCU, and the 68 way end to the Snapper.

Demo Software

Supplied with the Windows 3.1x/9x/NT and Solaris SDKs there are some example applications which provide simple example applications.

D16 APPLICATION (WINDOWS 3.1X/9X/NT)

Having installed the software (see the Installation Guide) run *d16*.

From the *Snapper Options* Menu select *Snapper Configuration*, and select the appropriate camera from the *Camera Type* list. Then press the *Initialize Snapper* button. From the *Acquisition and Display* Menu click *Live* - this should give an image. If the picture is too dark or too light adjust the lens aperture, *EXPOSURE* and *GAIN* until the picture is good.

Alternatively, if the camera supports exposure control, tick *Snapper Controlled Exposure*. Using the drop down menu, select the required exposure time.

D16OW APPLICATION (SOLARIS 2)

Having installed the software (see the Installation Guide) run *d16ow*. From the *Properties* Menu select *Snapper Setup*, and select the appropriate camera from the *Camera Type* list and press the *Initialize Camera* button. Now click *Live* - this should give an image. If the picture is too dark or too light adjust the lens aperture until the picture is good.

There are currently two separate SDK versions available for use with Solaris 2.3 and Solaris 2.6. The Solaris 2.3 release is purely for maintenance only of existing customers and no further releases will be provided. The Solaris 2.6 release is recommended for all new customers, and is essential for customers using PCI based products.

The *D16OW* application is written using OpenWindows, which although it is no longer supported by Sun on Solaris 2.6, is binary compatible. Therefore Solaris 2.6 users can run the application, but cannot recompile it.

Cable Pinouts

CABLE CROSS REFERENCE TABLE

| Manufacturer | Camera | Snapper Cable |
|---------------------|-------------------|---|
| Basler | L120 series | CBL-68-37D-232-A-2M |
| Dalsa | CL-Cx (pre 1996) | CBL-68-DALSA-CLC-A-2M |
| | CA-Dx (pre 1996) | CBL-68-DALSA-CAD-A-2M |
| | CL-Cx (post 1996) | CBL-68-DALSA- A-3M |
| | CL-Ex (post 1996) | CBL-68-DALSA- A-3M |
| | CA-Dx (post 1996) | CBL-68-DALSA- A-3M |
| Hamamatsu | C4742 | CBL-68-37D-A-2M |
| | C4742-95 | CBL-68-HAM-A-2M (or CBL-68-HAM-A-5M) |
| | C4880 | CBL-68-HAM-A-2M (or CBL-68-HAM-A-5M) |
| Kodak | MegaPlus 1.4 | CBL-68-37D-A-2M |
| | MegaPlus 1.4i | CBL-68-AIA-6M |
| | MegaPlus 1.6 | CBL-68-AIA-6M |
| | MegaPlus 1.6i | CBL-68-AIA-6M |
| | MegaPlus 4.2 | CBL-68-37D-A-2M |
| Pulnix | TM1000 / TM1001 | CBL-68-PULNIX1000-2M (or CBL-68-PULNIX1000-ADP) |
| | TM9700 / TM9701 | CBL-68-PULNIX1000-2M (or CBL-68-PULNIX1000-ADP) |
| Xillix | MicroImager1400 | CBL-68-XILLIX1400-3M |

For pinout information and availability of other cables, please contact DataCell.

CBL-68-37D-A-1M / CBL-68-37D-A-2M

| SNAPPER CONNECTOR (68 way SCSI-2) | SNAPPER SIGNAL NAME | AIA SIGNAL NAME | DIR | CAMERA CONNECTOR (37 D-type skt) |
|---|--------------------------------|----------------------------|------------|--|
| 1 | GND | GND | | 16 |
| 2 | MSB+ | MSB+ | ↔ | 6 |
| 3 | MSB-1+ | MSB-1+ | ↔ | 7 |
| 4 | MSB-2+ | MSB-2+ | ↔ | 8 |
| 5 | MSB-3+ | MSB-3+ | ↔ | 9 |
| 6 | MSB-4+ | MSB-4+ | ↔ | 10 |
| 7 | MSB-5+ | MSB-5+ | ↔ | 11 |
| 8 | MSB-6+ | MSB-6+ | ↔ | 12 |
| 9 | MSB-7+ | MSB-7+ | ↔ | 13 |
| 10 | MSB-8+ | MSB-8+ | ↔ | 14 |
| 11 | MSB-9+ | MSB-9+ | ↔ | 15 |
| 12 | GND | GND | | 35 |
| 13 | MSB-10+ | MSB-10+ | | |
| 14 | MSB-11+ | MSB-11+ | | |
| 15 | MSB-12+ | MSB-12+ | | |
| 16 | MSB-13+ | MSB-13+ | | |
| 17 | TTL_TRIG_1 | N/C | | |
| 18 | TTL_TRIG_2 | N/C | | |
| 19 | MSB-14+ | MSB-14+ | | |
| 20 | MSB-15+ | MSB-15+ | | |
| 21 | IO_A+ | RESERVED | ↔ | 36 |
| 22 | CAM_SER_OUT0 | SER_OUT+ | | |
| 23 | CAM_SER_IN0 | SER_IN+ | | |
| 24 | IO_B+ | FIELD_ID+ | ↔ | 5 |
| 25 | FRAME_EN+ | FRAME_EN+ | ↔ | 3 |
| 26 | LINE_EN+ | LINE_EN+ | ↔ | 2 |
| 27 | IO_C+ | CHNL_0+ | | |
| 28 | IO_D+ | CHNL_1+ | | |
| 29 | STROBE+ | STROBE+ | ↔ | 1 |
| 30 | OUT_A+ | MODE_0+ | ↔ | 17 |
| 31 | OUT_B+ | MODE_1+ | ↔ | 18 |
| 32 | OUT_C+ | MODE_2+ | ↔ | 37 |
| 33 | OUT_D+ | MODE_3+ | ↔ | 19 |
| 34 | GND | GND | | |
| 35 | GND | GND | | 16 |
| 36 | MSB- | MSB- | ↔ | 25 |
| 37 | MSB-1- | MSB-1- | ↔ | 26 |
| 38 | MSB-2- | MSB-2- | ↔ | 27 |
| 39 | MSB-3- | MSB-3- | ↔ | 28 |
| 40 | MSB-4- | MSB-4- | ↔ | 29 |
| 41 | MSB-5- | MSB-5- | ↔ | 30 |
| 42 | MSB-6- | MSB-6- | ↔ | 31 |
| 43 | MSB-7- | MSB-7- | ↔ | 32 |
| 44 | MSB-8- | MSB-8- | ↔ | 33 |
| 45 | MSB-9- | MSB-9- | ↔ | 34 |
| 46 | GND | GND | | 35 |
| 47 | MSB-10- | MSB-10- | | |
| 48 | MSB-11- | MSB-11- | | |
| 49 | MSB-12- | MSB-12- | | |
| 50 | MSB-13- | MSB-13- | | |
| 51 | N/C | N/C | | |
| 52 | N/C | N/C | | |
| 53 | MSB-14- | MSB-14- | | |
| 54 | MSB-15- | MSB-15- | | |
| 55 | IO_A- | RESERVED | | |
| 56 | CAM_SER_OUT1 | SER_OUT- | | |
| 57 | CAM_SER_IN1 | SER_IN- | | |
| 58 | IO_B- | FIELD_ID- | ↔ | 24 |
| 59 | FRAME_EN- | FRAME_EN- | ↔ | 22 |
| 60 | LINE_EN- | LINE_EN- | ↔ | 21 |
| 61 | IO_C- | CHNL_0- | | |
| 62 | IO_D- | CHNL_1- | | |
| 63 | STROBE- | STROBE- | ↔ | 20 |
| 64 | OUT_A- | MODE_0- | | |
| 65 | OUT_B- | MODE_1- | | |
| 66 | OUT_C- | MODE_2- | | |
| 67 | OUT_D- | MODE_3- | | |
| 68 | GND | GND | | |

CBL-68-37D-232-2M

| SNAPPER CONNECTOR (68 way SCSI-2) | SNAPPER SIGNAL NAME | AIA SIGNAL NAME | DIR | CAMERA CONNECTOR (37 D Type skt) | RS-232 CONNECTOR (9 D Type skt) | TRIG IN (BNC) |
|---|--------------------------------|----------------------------|------------|--|---|--------------------------|
| 1 | GND | GND | | | | Screen |
| 2 | MSB+ | MSB+ | ⇐ | 6 | | |
| 3 | MSB-1+ | MSB-1+ | ⇐ | 7 | | |
| 4 | MSB-2+ | MSB-2+ | ⇐ | 8 | | |
| 5 | MSB-3+ | MSB-3+ | ⇐ | 9 | | |
| 6 | MSB-4+ | MSB-4+ | ⇐ | 10 | | |
| 7 | MSB-5+ | MSB-5+ | ⇐ | 11 | | |
| 8 | MSB-6+ | MSB-6+ | ⇐ | 12 | | |
| 9 | MSB-7+ | MSB-7+ | ⇐ | 13 | | |
| 10 | MSB-8+ | MSB-8+ | ⇐ | 14 | | |
| 11 | MSB-9+ | MSB-9+ | ⇐ | 15 | | |
| 12 | GND | GND | | 16 | | |
| 13 | MSB-10+ | MSB-10+ | ⇐ | 4 | | |
| 14 | MSB-11+ | MSB-11+ | ⇐ | 5 | | |
| 15 | MSB-12+ | MSB-12+ | | | | |
| 16 | MSB-13+ | MSB-13+ | | | | |
| 17 | TTL_TRIG_1 | N/C | ⇐ | | | Centre |
| 18 | TTL_TRIG_2 | N/C | | | | |
| 19 | MSB-14+ | MSB-14+ | | | | |
| 20 | MSB-15+ | MSB-15+ | | | | |
| 21 | IO_A+ | RESERVED | | | | |
| 22 | CAM_SER_OUT0 | SER_OUT+ | ⇐ | | 3 | |
| 23 | CAM_SER_IN0 | SER_IN+ | ⇒ | | 2 | |
| 24 | IO_B+ | FIELD_ID+ | ⇐ | | | |
| 25 | FRAME_EN+ | FRAME_EN+ | ⇐ | 3 | | |
| 26 | LINE_EN+ | LINE_EN+ | ⇐ | 2 | | |
| 27 | IO_C+ | CHNL_0+ | | | | |
| 28 | IO_D+ | CHNL_1+ | | | | |
| 29 | STROBE+ | STROBE+ | ⇐ | 1 | | |
| 30 | OUT_A+ | MODE_0+ | ⇒ | 37 | | |
| 31 | OUT_B+ | MODE_1+ | ⇒ | 18 | | |
| 32 | OUT_C+ | MODE_2+ | | | | |
| 33 | OUT_D+ | MODE_3+ | | | | |
| 34 | GND | GND | | 35 | | |
| 35 | GND | GND | | | 5 | |
| 36 | MSB- | MSB- | ⇐ | 25 | | |
| 37 | MSB-1- | MSB-1- | ⇐ | 26 | | |
| 38 | MSB-2- | MSB-2- | ⇐ | 27 | | |
| 39 | MSB-3- | MSB-3- | ⇐ | 28 | | |
| 40 | MSB-4- | MSB-4- | ⇐ | 29 | | |
| 41 | MSB-5- | MSB-5- | ⇐ | 30 | | |
| 42 | MSB-6- | MSB-6- | ⇐ | 31 | | |
| 43 | MSB-7- | MSB-7- | ⇐ | 32 | | |
| 44 | MSB-8- | MSB-8- | ⇐ | 33 | | |
| 45 | MSB-9- | MSB-9- | ⇐ | 34 | | |
| 46 | GND | GND | | | | |
| 47 | MSB-10- | MSB-10- | ⇐ | 23 | | |
| 48 | MSB-11- | MSB-11- | ⇐ | 24 | | |
| 49 | MSB-12- | MSB-12- | | | | |
| 50 | MSB-13- | MSB-13- | | | | |
| 51 | N/C | N/C | | | | |
| 52 | N/C | N/C | | | | |
| 53 | MSB-14- | MSB-14- | | | | |
| 54 | MSB-15- | MSB-15- | | | | |
| 55 | IO_A- | RESERVED | | | | |
| 56 | CAM_SER_OUT1 | SER_OUT- | ⇐ | | 4 | |
| 57 | CAM_SER_IN1 | SER_IN- | ⇒ | | 8 | |
| 58 | IO_B- | FIELD_ID- | ⇐ | | | |
| 59 | FRAME_EN- | FRAME_EN- | ⇐ | 22 | | |
| 60 | LINE_EN- | LINE_EN- | ⇐ | 21 | | |
| 61 | IO_C- | CHNL_0- | | | | |
| 62 | IO_D- | CHNL_1- | | | | |
| 63 | STROBE- | STROBE- | ⇐ | 20 | | |
| 64 | OUT_A- | MODE_0- | ⇒ | 36 | | |
| 65 | OUT_B- | MODE_1- | ⇒ | 17 | | |
| 66 | OUT_C- | MODE_2- | | | | |
| 67 | OUT_D- | MODE_3- | | | | |
| 68 | GND | GND | | | | |

CBL-68-AIA-A-6M / CBL-68-AIA-3M-NC

| SNAPPER CONNECTOR (68 way SCSI-2) | SNAPPER SIGNAL NAME | AIA SIGNAL NAME | DIR | AIA CONNECTOR (68 way SCSI-2) |
|---|--------------------------------|----------------------------|------------|---|
| 1 | GND | GND | | 1 |
| 2 | MSB+ | MSB+ | ⇄ | 2 |
| 3 | MSB-1+ | MSB-1+ | ⇄ | 3 |
| 4 | MSB-2+ | MSB-2+ | ⇄ | 4 |
| 5 | MSB-3+ | MSB-3+ | ⇄ | 5 |
| 6 | MSB-4+ | MSB-4+ | ⇄ | 6 |
| 7 | MSB-5+ | MSB-5+ | ⇄ | 7 |
| 8 | MSB-6+ | MSB-6+ | ⇄ | 8 |
| 9 | MSB-7+ | MSB-7+ | ⇄ | 9 |
| 10 | MSB-8+ | MSB-8+ | ⇄ | 10 |
| 11 | MSB-9+ | MSB-9+ | ⇄ | 11 |
| 12 | GND | GND | | 12 |
| 13 | MSB-10+ | MSB-10+ | ⇄ | 13 |
| 14 | MSB-11+ | MSB-11+ | ⇄ | 14 |
| 15 | MSB-12+ | MSB-12+ | ⇄ | 15 |
| 16 | MSB-13+ | MSB-13+ | ⇄ | 16 |
| 17 | TTL_TRIG_1 | N/C | | 17 |
| 18 | TTL_TRIG_2 | N/C | | 18 |
| 19 | MSB-14+ | MSB-14+ | ⇄ | 19 |
| 20 | MSB-15+ | MSB-15+ | ⇄ | 20 |
| 21 | IO_A+ | RESERVED | ⇄ | 21 |
| 22 | CAM_SER_OUT0 | SER_OUT+ | ⇄ | 22 |
| 23 | CAM_SER_IN0 | SER_IN+ | ⇄ | 23 |
| 24 | IO_B+ | FIELD_ID+ | ⇄ | 24 |
| 25 | FRAME_EN+ | FRAME_EN+ | ⇄ | 25 |
| 26 | LINE_EN+ | LINE_EN+ | ⇄ | 26 |
| 27 | IO_C+ | CHNL_0+ | ⇄ | 27 |
| 28 | IO_D+ | CHNL_1+ | ⇄ | 28 |
| 29 | STROBE+ | STROBE+ | ⇄ | 29 |
| 30 | OUT_A+ | MODE_0+ | ⇄ | 30 |
| 31 | OUT_B+ | MODE_1+ | ⇄ | 31 |
| 32 | OUT_C+ | MODE_2+ | ⇄ | 32 |
| 33 | OUT_D+ | MODE_3+ | ⇄ | 33 |
| 34 | GND | GND | | 34 |
| 35 | GND | GND | | 35 |
| 36 | MSB- | MSB- | ⇄ | 36 |
| 37 | MSB-1- | MSB-1- | ⇄ | 37 |
| 38 | MSB-2- | MSB-2- | ⇄ | 38 |
| 39 | MSB-3- | MSB-3- | ⇄ | 39 |
| 40 | MSB-4- | MSB-4- | ⇄ | 40 |
| 41 | MSB-5- | MSB-5- | ⇄ | 41 |
| 42 | MSB-6- | MSB-6- | ⇄ | 42 |
| 43 | MSB-7- | MSB-7- | ⇄ | 43 |
| 44 | MSB-8- | MSB-8- | ⇄ | 44 |
| 45 | MSB-9- | MSB-9- | ⇄ | 45 |
| 46 | GND | GND | | 46 |
| 47 | MSB-10- | MSB-10- | ⇄ | 47 |
| 48 | MSB-11- | MSB-11- | ⇄ | 48 |
| 49 | MSB-12- | MSB-12- | ⇄ | 49 |
| 50 | MSB-13- | MSB-13- | ⇄ | 50 |
| 51 | N/C | N/C | | 51 |
| 52 | N/C | N/C | | 52 |
| 53 | MSB-14- | MSB-14- | ⇄ | 53 |
| 54 | MSB-15- | MSB-15- | ⇄ | 54 |
| 55 | IO_A- | RESERVED | | 55 |
| 56 | CAM_SER_OUT1 | SER_OUT- | ⇄ | 56 |
| 57 | CAM_SER_IN1 | SER_IN- | ⇄ | 57 |
| 58 | IO_B- | FIELD_ID- | ⇄ | 58 |
| 59 | FRAME_EN- | FRAME_EN- | ⇄ | 59 |
| 60 | LINE_EN- | LINE_EN- | ⇄ | 60 |
| 61 | IO_C- | CHNL_0- | | 61 |
| 62 | IO_D- | CHNL_1- | | 62 |
| 63 | STROBE- | STROBE- | ⇄ | 63 |
| 64 | OUT_A- | MODE_0- | ⇄ | 64 |
| 65 | OUT_B- | MODE_1- | ⇄ | 65 |
| 66 | OUT_C- | MODE_2- | ⇄ | 66 |
| 67 | OUT_D- | MODE_3- | ⇄ | 67 |
| 68 | GND | GND | | 68 |

CBL-68-DALSA-A-3M

| SNAPPER CONNECTOR (68 way SCSI-2) | SNAPPER SIGNAL NAME | LINE SCAN SIGNAL NAME | DIR | DALSA SIGNAL NAME | TRIGGER (9 way D plug) | CONTROL (25 way D skt) | OS1 (20 way DIN41651 skt) | OS2 (20 way DIN41651 skt) |
|---|--------------------------------|----------------------------------|------------|------------------------------|-------------------------------------|-------------------------------------|---|---|
| 1 | GND | | | GND | | 7 | | |
| 2 | MSB+ | | ⇐ | AD0+ | | | 15 | |
| 3 | MSB-1+ | | ⇐ | AD1+ | | | 13 | |
| 4 | MSB-2+ | | ⇐ | AD2+ | | | 11 | |
| 5 | MSB-3+ | | ⇐ | AD3+ | | | 9 | |
| 6 | MSB-4+ | | ⇐ | AD4+ | | | 7 | |
| 7 | MSB-5+ | | ⇐ | AD5+ | | | 5 | |
| 8 | MSB-6+ | | ⇐ | AD6+ | | | 3 | |
| 9 | MSB-7+ | | ⇐ | AD7+ | | | 1 | |
| 10 | MSB-8+ | | ⇐ | BD0+ | | | | 15 |
| 11 | MSB-9+ | | ⇐ | BD1+ | | | | 13 |
| 12 | GND | | | GND | | 20 | | |
| 13 | MSB-10+ | | ⇐ | BD2+ | | | | 11 |
| 14 | MSB-11+ | | ⇐ | BD3+ | | | | 9 |
| 15 | MSB-12+ | | ⇐ | BD4+ | | | | 7 |
| 16 | MSB-13+ | | ⇐ | BD5+ | | | | 5 |
| 17 | TTL_TRIG_1 | | | | 3 | | | |
| 18 | TTL_TRIG_2 | | | | 6 | | | |
| 19 | MSB-14+ | | ⇐ | BD6+ | | | | 3 |
| 20 | MSB-15+ | | ⇐ | BD7+ | | | | 1 |
| 21 | IO_A+ | | ⇐ | CCLK+ | | 14 | | |
| 22 | CAM_SER_OUT0 | | | | | | | |
| 23 | CAM_SER_IN0 | | | | | | | |
| 24 | IO_B+ | | ⇐ | PVAL+ | | 10 | | |
| 25 | FRAME_EN+ | LINE TRIGGER IN+ | ⇐ | | 1 | | | 17 |
| 26 | LINE_EN+ | LINE START IN+ | ⇐ | LVAL+ | | | 19 | |
| 27 | IO_C+ | | | | 4 | | | |
| 28 | IO_D+ | | | | 7 | | | |
| 29 | STROBE+ | STROBE+ | ⇐ | STROBE+ | | | 17 | |
| 30 | OUT_A+ | EXPOSURE+ | ⇒ | PRIN+ | | 17 | | |
| 31 | OUT_B+ | CLOCK OUT+ | ⇒ | MCLK+ | | 6 | | |
| 32 | OUT_C+ | LINE START OUT+ | ⇒ | EXSYNC+ | | 5 | | |
| 33 | OUT_D+ | | ⇒ | | | | | 19 |
| 34 | GND | | | | | | | |
| 35 | GND | | | | | | | |
| 36 | MSB- | | ⇐ | AD0- | | | 16 | |
| 37 | MSB-1- | | ⇐ | AD1- | | | 14 | |
| 38 | MSB-2- | | ⇐ | AD2- | | | 12 | |
| 39 | MSB-3- | | ⇐ | AD3- | | | 10 | |
| 40 | MSB-4- | | ⇐ | AD4- | | | 8 | |
| 41 | MSB-5- | | ⇐ | AD5- | | | 6 | |
| 42 | MSB-6- | | ⇐ | AD6- | | | 4 | |
| 43 | MSB-7- | | ⇐ | AD7- | | | 2 | |
| 44 | MSB-8- | | ⇐ | BD0- | | | | 16 |
| 45 | MSB-9- | | ⇐ | BD1- | | | | 14 |
| 46 | GND | | | | | | | |
| 47 | MSB-10- | | ⇐ | BD2- | | | | 12 |
| 48 | MSB-11- | | ⇐ | BD3- | | | | 10 |
| 49 | MSB-12- | | ⇐ | BD4- | | | | 8 |
| 50 | MSB-13- | | ⇐ | BD5- | | | | 6 |
| 51 | N/C | | | | | | | |
| 52 | N/C | | | | | | | |
| 53 | MSB-14- | | ⇐ | BD6- | | | | 4 |
| 54 | MSB-15- | | ⇐ | BD7- | | | | 2 |
| 55 | IO_A- | | ⇐ | CCLK- | | 1 | | |
| 56 | CAM_SER_OUT1 | | | | | | | |
| 57 | CAM_SER_IN1 | | | | | | | |
| 58 | IO_B- | | ⇐ | PVAL- | | 23 | | |
| 59 | FRAME_EN- | LINE TRIGGER IN- | ⇐ | | 2 | | | 18 |
| 60 | LINE_EN- | LINE START IN- | ⇐ | LVAL- | | | 20 | |
| 61 | IO_C- | | | | 5 | | | |
| 62 | IO_D- | | | | 8 | | | |
| 63 | STROBE- | STROBE- | ⇐ | STROBE- | | | 18 | |
| 64 | OUT_A- | EXPOSURE- | ⇒ | PRIN- | | 4 | | |
| 65 | OUT_B- | CLOCK OUT- | ⇒ | MCLK- | | 19 | | |
| 66 | OUT_C- | LINE START OUT- | ⇒ | EXSYNC- | | 18 | | |
| 67 | OUT_D- | | ⇒ | | | | | 20 |
| 68 | GND | | | | 9 | | | |

CBL-68-DALSA-CAD-A-3M

| SNAPPER CONNECTOR (68 way SCSI-2) | SNAPPER SIGNAL NAME | LINE SCAN SIGNAL NAME | DIR | DALSA SIGNAL NAME | TRIGGER (9 way D plug) | CONTROL (25 way D skt) | OS1 (20 way DIN41651 skt) | OS2 (20 way DIN41651 skt) |
|---|----------------------------|------------------------------|------------|--------------------------|----------------------------------|----------------------------------|-------------------------------------|-------------------------------------|
| 1 | GND | | | GND | | 7 | | |
| 2 | MSB+ | | ⇄ | AD0+ | | | | 15 |
| 3 | MSB-1+ | | ⇄ | AD1+ | | | | 13 |
| 4 | MSB-2+ | | ⇄ | AD2+ | | | | 11 |
| 5 | MSB-3+ | | ⇄ | AD3+ | | | | 9 |
| 6 | MSB-4+ | | ⇄ | AD4+ | | | | 7 |
| 7 | MSB-5+ | | ⇄ | AD5+ | | | | 5 |
| 8 | MSB-6+ | | ⇄ | AD6+ | | | | 3 |
| 9 | MSB-7+ | | ⇄ | AD7+ | | | | 1 |
| 10 | MSB-8+ | | ⇄ | BD0+ | | | 15 | |
| 11 | MSB-9+ | | ⇄ | BD1+ | | | 13 | |
| 12 | GND | | | GND | | 20 | | |
| 13 | MSB-10+ | | ⇄ | BD2+ | | | 11 | |
| 14 | MSB-11+ | | ⇄ | BD3+ | | | 9 | |
| 15 | MSB-12+ | | ⇄ | BD4+ | | | 7 | |
| 16 | MSB-13+ | | ⇄ | BD5+ | | | 5 | |
| 17 | TTL_TRIG_1 | | | | 3 | | | |
| 18 | TTL_TRIG_2 | | | | | | | |
| 19 | MSB-14+ | | ⇄ | BD6+ | | | 3 | |
| 20 | MSB-15+ | | ⇄ | BD7+ | | | 1 | |
| 21 | IO_A+ | | ⇄ | CCLK+ | | 14 | | |
| 22 | CAM_SER_OUT0 | | | | | | | |
| 23 | CAM_SER_IN0 | | | | | | | |
| 24 | IO_B+ | | ⇄ | PVAL+ | | 16 | | |
| 25 | FRAME_EN+ | LINE TRIGGER IN+ | ⇄ | | | 23 | | |
| 26 | LINE_EN+ | LINE START IN+ | ⇄ | LVAL+ | | 2 | | |
| 27 | IO_C+ | | | | 4 | | | |
| 28 | IO_D+ | | | | 7 | | | |
| 29 | STROBE+ | STROBE+ | ⇄ | STROBE+ | | | 17 | |
| 30 | OUT_A+ | EXPOSURE+ | ⇄ | PRIN+ | | 17 | | |
| 31 | OUT_B+ | CLOCK OUT+ | ⇄ | MCLK+ | | 6 | | |
| 32 | OUT_C+ | LINE START OUT+ | ⇄ | EXSYNC+ | | 5 | | |
| 33 | OUT_D+ | | | | | | | |
| 34 | GND | | | | | | | |
| 35 | GND | | | | 6 | | | |
| 36 | MSB- | | ⇄ | AD0- | | | | 16 |
| 37 | MSB-1- | | ⇄ | AD1- | | | | 14 |
| 38 | MSB-2- | | ⇄ | AD2- | | | | 12 |
| 39 | MSB-3- | | ⇄ | AD3- | | | | 10 |
| 40 | MSB-4- | | ⇄ | AD4- | | | | 8 |
| 41 | MSB-5- | | ⇄ | AD5- | | | | 6 |
| 42 | MSB-6- | | ⇄ | AD6- | | | | 4 |
| 43 | MSB-7- | | ⇄ | AD7- | | | | 2 |
| 44 | MSB-8- | | ⇄ | BD0- | | | 16 | |
| 45 | MSB-9- | | ⇄ | BD1- | | | 14 | |
| 46 | GND | | | | | | | |
| 47 | MSB-10- | | ⇄ | BD2- | | | 12 | |
| 48 | MSB-11- | | ⇄ | BD3- | | | 10 | |
| 49 | MSB-12- | | ⇄ | BD4- | | | 8 | |
| 50 | MSB-13- | | ⇄ | BD5- | | | 6 | |
| 51 | N/C | | | | | | | |
| 52 | N/C | | | | | | | |
| 53 | MSB-14- | | ⇄ | BD6- | | | 4 | |
| 54 | MSB-15- | | ⇄ | BD7- | | | 2 | |
| 55 | IO_A- | | ⇄ | CCLK- | | 1 | | |
| 56 | CAM_SER_OUT1 | | | | | | | |
| 57 | CAM_SER_IN1 | | | | | | | |
| 58 | IO_B- | | ⇄ | PVAL- | | 3 | | |
| 59 | FRAME_EN- | LINE TRIGGER IN- | ⇄ | | | 10 | | |
| 60 | LINE_EN- | LINE START IN- | ⇄ | LVAL- | | 15 | | |
| 61 | IO_C- | | | | 5 | | | |
| 62 | IO_D- | | | | 8 | | | |
| 63 | STROBE- | STROBE- | ⇄ | STROBE- | | | 18 | |
| 64 | OUT_A- | EXPOSURE- | ⇄ | PRIN- | | 4 | | |
| 65 | OUT_B- | CLOCK OUT- | ⇄ | MCLK- | | 19 | | |
| 66 | OUT_C- | LINE START OUT- | ⇄ | EXSYNC- | | 18 | | |
| 67 | OUT_D- | | | | | | | |
| 68 | GND | | | | 9 | | | |

CBL-68-DALSA-CLC-A-3M

| SNAPPER CONNECTOR (68 way SCSI-2) | SNAPPER SIGNAL NAME | LINE SCAN SIGNAL NAME | DIR | DALSA SIGNAL NAME | TRIGGER (9 way D plug) | CONTROL (25 way D skt) | OS1 (20 way DIN41651 skt) | OS2 (20 way DIN41651 skt) |
|---|--------------------------------|----------------------------------|------------|------------------------------|-------------------------------------|-------------------------------------|---|---|
| 1 | GND | | | GND | | 7 | | |
| 2 | MSB+ | | ⇐ | AD0+ | | | | 15 |
| 3 | MSB-1+ | | ⇐ | AD1+ | | | | 13 |
| 4 | MSB-2+ | | ⇐ | AD2+ | | | | 11 |
| 5 | MSB-3+ | | ⇐ | AD3+ | | | | 9 |
| 6 | MSB-4+ | | ⇐ | AD4+ | | | | 7 |
| 7 | MSB-5+ | | ⇐ | AD5+ | | | | 5 |
| 8 | MSB-6+ | | ⇐ | AD6+ | | | | 3 |
| 9 | MSB-7+ | | ⇐ | AD7+ | | | | 1 |
| 10 | MSB-8+ | | ⇐ | BD0+ | | | 15 | |
| 11 | MSB-9+ | | ⇐ | BD1+ | | | 13 | |
| 12 | GND | | | GND | | 20 | | |
| 13 | MSB-10+ | | ⇐ | BD2+ | | | 11 | |
| 14 | MSB-11+ | | ⇐ | BD3+ | | | 9 | |
| 15 | MSB-12+ | | ⇐ | BD4+ | | | 7 | |
| 16 | MSB-13+ | | ⇐ | BD5+ | | | 5 | |
| 17 | TTL_TRIG_1 | | | | | | | |
| 18 | TTL_TRIG_2 | | | | | | | |
| 19 | MSB-14+ | | ⇐ | BD6+ | | | 3 | |
| 20 | MSB-15+ | | ⇐ | BD7+ | | | 1 | |
| 21 | IO_A+ | | ⇐ | CCLK+ | | 14 | | |
| 22 | CAM_SER_OUT0 | | | | | | | |
| 23 | CAM_SER_IN0 | | | | | | | |
| 24 | IO_B+ | | ⇐ | PVAL+ | | 16 | | |
| 25 | FRAME_EN+ | LINE TRIGGER IN+ | ⇐ | | 1 | | | |
| 26 | LINE_EN+ | LINE START IN+ | ⇐ | LVAL+ | | | 19 | |
| 27 | IO_C+ | | | | 4 | | | |
| 28 | IO_D+ | | | | 7 | | | |
| 29 | STROBE+ | STROBE+ | ⇐ | STROBE+ | | | 17 | |
| 30 | OUT_A+ | EXPOSURE+ | ⇒ | PRIN+ | | 5 | | |
| 31 | OUT_B+ | CLOCK OUT+ | ⇒ | MCLK+ | | 6 | | |
| 32 | OUT_C+ | LINE START OUT+ | ⇒ | EXSYNC+ | | 17 | | |
| 33 | OUT_D+ | | | | | | | |
| 34 | GND | | | | | | | |
| 35 | GND | | | | 6 | | | |
| 36 | MSB- | | ⇐ | AD0- | | | | 16 |
| 37 | MSB-1- | | ⇐ | AD1- | | | | 14 |
| 38 | MSB-2- | | ⇐ | AD2- | | | | 12 |
| 39 | MSB-3- | | ⇐ | AD3- | | | | 10 |
| 40 | MSB-4- | | ⇐ | AD4- | | | | 8 |
| 41 | MSB-5- | | ⇐ | AD5- | | | | 6 |
| 42 | MSB-6- | | ⇐ | AD6- | | | | 4 |
| 43 | MSB-7- | | ⇐ | AD7- | | | | 2 |
| 44 | MSB-8- | | ⇐ | BD0- | | | 16 | |
| 45 | MSB-9- | | ⇐ | BD1- | | | 14 | |
| 46 | GND | | | | | | | |
| 47 | MSB-10- | | ⇐ | BD2- | | | 12 | |
| 48 | MSB-11- | | ⇐ | BD3- | | | 10 | |
| 49 | MSB-12- | | ⇐ | BD4- | | | 8 | |
| 50 | MSB-13- | | ⇐ | BD5- | | | 6 | |
| 51 | N/C | | | | | | | |
| 52 | N/C | | | | | | | |
| 53 | MSB-14- | | ⇐ | BD6- | | | 4 | |
| 54 | MSB-15- | | ⇐ | BD7- | | | 2 | |
| 55 | IO_A- | | ⇐ | CCLK- | | 1 | | |
| 56 | CAM_SER_OUT1 | | | | | | | |
| 57 | CAM_SER_IN1 | | | | | | | |
| 58 | IO_B- | | ⇐ | PVAL- | | 3 | | |
| 59 | FRAME_EN- | LINE TRIGGER IN- | ⇐ | | 2 | | | |
| 60 | LINE_EN- | LINE START IN- | ⇐ | LVAL- | | | 20 | |
| 61 | IO_C- | | | | 5 | | | |
| 62 | IO_D- | | | | 8 | | | |
| 63 | STROBE- | STROBE- | ⇐ | STROBE- | | | 18 | |
| 64 | OUT_A- | EXPOSURE- | ⇒ | PRIN- | | 18 | | |
| 65 | OUT_B- | CLOCK OUT- | ⇒ | MCLK- | | 19 | | |
| 66 | OUT_C- | LINE START OUT- | ⇒ | EXSYNC- | | 4 | | |
| 67 | OUT_D- | | | | | | | |
| 68 | GND | | | | 9 | | | |

CBL-68-HAM-A-2M / CBL-68-HAM-A-5M

| SNAPPER CONNECTOR (68 way SCSI-2) | SNAPPER SIGNAL NAME | AIA SIGNAL NAME | DIR | HAMAMATSU SIGNAL NAME | HAMAMATSU CONNECTOR (68 way Blade) | TRIG IN (BNC) | TRIG OUT (BNC) |
|--------------------------------------|---------------------|-----------------|-----|-----------------------|---------------------------------------|------------------|-------------------|
| 1 | GND | GND | | | | | |
| 2 | MSB+ | MSB+ | ↔ | DB0+ | 38 | | |
| 3 | MSB-1+ | MSB-1+ | ↔ | DB1+ | 39 | | |
| 4 | MSB-2+ | MSB-2+ | ↔ | DB2+ | 40 | | |
| 5 | MSB-3+ | MSB-3+ | ↔ | DB3+ | 41 | | |
| 6 | MSB-4+ | MSB-4+ | ↔ | DB4+ | 42 | | |
| 7 | MSB-5+ | MSB-5+ | ↔ | DB5+ | 43 | | |
| 8 | MSB-6+ | MSB-6+ | ↔ | DB6+ | 44 | | |
| 9 | MSB-7+ | MSB-7+ | ↔ | DB7+ | 45 | | |
| 10 | MSB-8+ | MSB-8+ | ↔ | DB8+ | 46 | | |
| 11 | MSB-9+ | MSB-9+ | ↔ | DB9+ | 47 | | |
| 12 | GND | GND | | GND | 55 | | |
| 13 | MSB-10+ | MSB-10+ | ↔ | DB10+ | 48 | | |
| 14 | MSB-11+ | MSB-11+ | ↔ | DB11+ | 49 | | |
| 15 | MSB-12+ | MSB-12+ | ↔ | DB12+ | 50 | | |
| 16 | MSB-13+ | MSB-13+ | ↔ | DB13+ | 51 | | |
| 17 | TTL_TRIG_1 | N/C | | | | Centre | |
| 18 | TTL_TRIG_2 | N/C | | | 30 | | |
| 19 | MSB-14+ | MSB-14+ | ↔ | DB14+ | 52 | | |
| 20 | MSB-15+ | MSB-15+ | ↔ | DB15+ | 53 | | |
| 21 | IO_A+ | RESERVED | | | | | |
| 22 | CAM_SER_OUT0 | SER_OUT+ | ↔ | TXD+ | 66 | | |
| 23 | CAM_SER_IN0 | SER_IN+ | ↔ | RXD+ | 65 | | |
| 24 | IO_B+ | FIELD_ID+ | ↔ | A/D_OVF+ | 54 | | |
| 25 | FRAME_EN+ | FRAME_EN+ | ↔ | VVALID+ | 37 | | |
| 26 | LINE_EN+ | LINE_EN+ | ↔ | HVALID+ | 36 | | |
| 27 | IO_C+ | CHNL_0+ | | DTR+ | 67 | | |
| 28 | IO_D+ | CHNL_1+ | | DSR+ | 68 | | |
| 29 | STROBE+ | STROBE+ | ↔ | PIXCLK+ | 35 | | |
| 30 | OUT_A+ | MODE_0+ | ⇒ | | 58 | | Centre |
| 31 | OUT_B+ | MODE_1+ | | | | | |
| 32 | OUT_C+ | MODE_2+ | | | | | |
| 33 | OUT_D+ | MODE_3+ | | | | | |
| 34 | GND | GND | | | | Screen | |
| 35 | GND | GND | | GND | 21 | | |
| 36 | MSB- | MSB- | ↔ | DB0- | 4 | | |
| 37 | MSB-1- | MSB-1- | ↔ | DB1- | 5 | | |
| 38 | MSB-2- | MSB-2- | ↔ | DB2- | 6 | | |
| 39 | MSB-3- | MSB-3- | ↔ | DB3- | 7 | | |
| 40 | MSB-4- | MSB-4- | ↔ | DB4- | 8 | | |
| 41 | MSB-5- | MSB-5- | ↔ | DB5- | 9 | | |
| 42 | MSB-6- | MSB-6- | ↔ | DB6- | 10 | | |
| 43 | MSB-7- | MSB-7- | ↔ | DB7- | 11 | | |
| 44 | MSB-8- | MSB-8- | ↔ | DB8- | 12 | | |
| 45 | MSB-9- | MSB-9- | ↔ | DB9- | 13 | | |
| 46 | GND | GND | | | | | Screen |
| 47 | MSB-10- | MSB-10- | ↔ | DB10- | 14 | | |
| 48 | MSB-11- | MSB-11- | ↔ | DB11- | 15 | | |
| 49 | MSB-12- | MSB-12- | ↔ | DB12- | 16 | | |
| 50 | MSB-13- | MSB-13- | ↔ | DB13- | 17 | | |
| 51 | N/C | N/C | | | | | |
| 52 | N/C | N/C | | | | | |
| 53 | MSB-14- | MSB-14- | ↔ | DB14- | 18 | | |
| 54 | MSB-15- | MSB-15- | ↔ | DB15- | 19 | | |
| 55 | IO_A- | RESERVED | | | | | |
| 56 | CAM_SER_OUT1 | SER_OUT- | ↔ | TXD- | 32 | | |
| 57 | CAM_SER_IN1 | SER_IN- | ↔ | RXD- | 31 | | |
| 58 | IO_B- | FIELD_ID- | ↔ | A/D_OVF- | 20 | | |
| 59 | FRAME_EN- | FRAME_EN- | ↔ | VVALID- | 3 | | |
| 60 | LINE_EN- | LINE_EN- | ↔ | HVALID- | 2 | | |
| 61 | IO_C- | CHNL_0- | | DTR- | 33 | | |
| 62 | IO_D- | CHNL_1- | | DSR- | 34 | | |
| 63 | STROBE- | STROBE- | ↔ | PIXCLK- | 1 | | |
| 64 | OUT_A- | MODE_0- | | | | | |
| 65 | OUT_B- | MODE_1- | | | | | |
| 66 | OUT_C- | MODE_2- | | | | | |
| 67 | OUT_D- | MODE_3- | | | | | |
| 68 | GND | GND | | | | | |

CBL-68-C4880-232-2M

| SNAPPER CONNECTOR (68 way SCSI-2) | SNAPPER SIGNAL NAME | AIA SIGNAL NAME | DIR | C4880 SIGNAL NAME | C4880 CONNECTOR (68 way blade) | RS-232 CONNECTOR (9 D-type skt) | TRIGGER (BNC) |
|---|--------------------------------|----------------------------|------------|------------------------------|--|---|--------------------------|
| 1 | GND | GND | | | | 5 | |
| 2 | MSB+ | MSB+ | ⇐ | DB0+ | 38 | | |
| 3 | MSB-1+ | MSB-1+ | ⇐ | DB1+ | 39 | | |
| 4 | MSB-2+ | MSB-2+ | ⇐ | DB2+ | 40 | | |
| 5 | MSB-3+ | MSB-3+ | ⇐ | DB3+ | 41 | | |
| 6 | MSB-4+ | MSB-4+ | ⇐ | DB4+ | 42 | | |
| 7 | MSB-5+ | MSB-5+ | ⇐ | DB5+ | 43 | | |
| 8 | MSB-6+ | MSB-6+ | ⇐ | DB6+ | 44 | | |
| 9 | MSB-7+ | MSB-7+ | ⇐ | DB7+ | 45 | | |
| 10 | MSB-8+ | MSB-8+ | ⇐ | DB8+ | 46 | | |
| 11 | MSB-9+ | MSB-9+ | ⇐ | DB9+ | 47 | | |
| 12 | GND | GND | | GND | 55 | | |
| 13 | MSB-10+ | MSB-10+ | ⇐ | DB10+ | 48 | | |
| 14 | MSB-11+ | MSB-11+ | ⇐ | DB11+ | 49 | | |
| 15 | MSB-12+ | MSB-12+ | ⇐ | DB12+ | 50 | | |
| 16 | MSB-13+ | MSB-13+ | ⇐ | DB13+ | 51 | | |
| 17 | TTL_TRIG_1 | N/C | | | | | |
| 18 | TTL_TRIG_2 | N/C | | | | | |
| 19 | MSB-14+ | MSB-14+ | ⇐ | DB14+ | 52 | | |
| 20 | MSB-15+ | MSB-15+ | ⇐ | DB15+ | 53 | | |
| 21 | IO_A+ | RESERVED | | | | | |
| 22 | CAM_SER_OUT0 | SER_OUT+ | ⇐ | | | 2 | |
| 23 | CAM_SER_IN0 | SER_IN+ | ⇒ | | | 3 | |
| 24 | IO_B+ | FIELD_ID+ | ⇐ | A/D_OVF+ | 54 | | |
| 25 | FRAME_EN+ | FRAME_EN+ | ⇐ | VVALID+ | 37 | | |
| 26 | LINE_EN+ | LINE_EN+ | ⇐ | HVALID+ | 36 | | |
| 27 | IO_C+ | CHNL_0+ | ⇐ | DTR+ | 67 | | |
| 28 | IO_D+ | CHNL_1+ | ⇒ | DSR+ | 68 | | |
| 29 | STROBE+ | STROBE+ | ⇐ | PIXCLK+ | 35 | | |
| 30 | OUT_A+ | MODE_0+ | | | | | Centre |
| 31 | OUT_B+ | MODE_1+ | | | | | |
| 32 | OUT_C+ | MODE_2+ | | | | | |
| 33 | OUT_D+ | MODE_3+ | | | | | |
| 34 | GND | GND | | | | | Screen |
| 35 | GND | GND | | GND | 21 | | |
| 36 | MSB- | MSB- | ⇐ | DB0- | 4 | | |
| 37 | MSB-1- | MSB-1- | ⇐ | DB1- | 5 | | |
| 38 | MSB-2- | MSB-2- | ⇐ | DB2- | 6 | | |
| 39 | MSB-3- | MSB-3- | ⇐ | DB3- | 7 | | |
| 40 | MSB-4- | MSB-4- | ⇐ | DB4- | 8 | | |
| 41 | MSB-5- | MSB-5- | ⇐ | DB5- | 9 | | |
| 42 | MSB-6- | MSB-6- | ⇐ | DB6- | 10 | | |
| 43 | MSB-7- | MSB-7- | ⇐ | DB7- | 11 | | |
| 44 | MSB-8- | MSB-8- | ⇐ | DB8- | 12 | | |
| 45 | MSB-9- | MSB-9- | ⇐ | DB9- | 13 | | |
| 46 | GND | GND | | | | | Screen |
| 47 | MSB-10- | MSB-10- | ⇐ | DB10- | 14 | | |
| 48 | MSB-11- | MSB-11- | ⇐ | DB11- | 15 | | |
| 49 | MSB-12- | MSB-12- | ⇐ | DB12- | 16 | | |
| 50 | MSB-13- | MSB-13- | ⇐ | DB13- | 17 | | |
| 51 | N/C | N/C | | | | | |
| 52 | N/C | N/C | | | | | |
| 53 | MSB-14- | MSB-14- | ⇐ | DB14- | 18 | | |
| 54 | MSB-15- | MSB-15- | ⇐ | DB15- | 19 | | |
| 55 | IO_A- | RESERVED | | | | | |
| 56 | CAM_SER_OUT1 | SER_OUT- | ⇐ | | | | |
| 57 | CAM_SER_IN1 | SER_IN- | ⇒ | | | | |
| 58 | IO_B- | FIELD_ID- | ⇐ | A/D_OVF- | 20 | | |
| 59 | FRAME_EN- | FRAME_EN- | ⇐ | VVALID- | 3 | | |
| 60 | LINE_EN- | LINE_EN- | ⇐ | HVALID- | 2 | | |
| 61 | IO_C- | CHNL_0- | ⇐ | DTR- | 33 | | |
| 62 | IO_D- | CHNL_1- | ⇒ | DSR- | 34 | | |
| 63 | STROBE- | STROBE- | ⇐ | PIXCLK- | 1 | | |
| 64 | OUT_A- | MODE_0- | | | | | |
| 65 | OUT_B- | MODE_1- | | | | | |
| 66 | OUT_C- | MODE_2- | | | | | |
| 67 | OUT_D- | MODE_3- | | | | | |
| 68 | GND | GND | | | | 5 | |

CBL-68-PULNIX1000-2M

| SNAPPER CONNECTOR (68 way SCSI-2) | SNAPPER SIGNAL NAME | AIA CAMERA SPECIFICATION | DIR | PULNIX SIGNAL NAME | PULNIX CONNECTOR (31 way) |
|---|--------------------------------|-------------------------------------|------------|-------------------------------|---|
| 1 | GND | GND | | | |
| 2 | MSB+ | MSB+ | ↔ | D0+ | 8 |
| 3 | MSB-1+ | MSB-1+ | ↔ | D1+ | 9 |
| 4 | MSB-2+ | MSB-2+ | ↔ | D2+ | 10 |
| 5 | MSB-3+ | MSB-3+ | ↔ | D3+ | 11 |
| 6 | MSB-4+ | MSB-4+ | ↔ | D4+ | 12 |
| 7 | MSB-5+ | MSB-5+ | ↔ | D5+ | 13 |
| 8 | MSB-6+ | MSB-6+ | ↔ | D6+ | 14 |
| 9 | MSB-7+ | MSB-7+ | ↔ | D7+ | 15 |
| 10 | MSB-8+ | MSB-8+ | | | |
| 11 | MSB-9+ | MSB-9+ | | | |
| 12 | GND | GND | | GROUND | 4 |
| 13 | MSB-10+ | MSB-10+ | | | |
| 14 | MSB-11+ | MSB-11+ | | | |
| 15 | MSB-12+ | MSB-12+ | | | |
| 16 | MSB-13+ | MSB-13+ | | | |
| 17 | TTL_TRIG_1 | N/C | | | |
| 18 | TTL_TRIG_2 | N/C | | | |
| 19 | MSB-14+ | MSB-14+ | | | |
| 20 | MSB-15+ | MSB-15+ | | | |
| 21 | IO_A+ | RESERVED | | | |
| 22 | CAM_SER_OUT0 | SER_OUT+ | | | |
| 23 | CAM_SER_IN0 | SER_IN+ | | | |
| 24 | IO_B+ | FIELD_ID+ | | | |
| 25 | FRAME_EN+ | FRAME_EN+ | ↔ | FDV+ | 3 |
| 26 | LINE_EN+ | LINE_EN+ | ↔ | LDV+ | 2 |
| 27 | IO_C+ | CHNL_0+ | | | |
| 28 | IO_D+ | CHNL_1+ | | | |
| 29 | STROBE+ | STROBE+ | ↔ | CLK+ | 1 |
| 30 | OUT_A+ | MODE_0+ | ⇒ | VINIT | 20 |
| 31 | OUT_B+ | MODE_1+ | ⇒ | EN INTEG | 22 |
| 32 | OUT_C+ | MODE_2+ | ⇒ | INTEG | 6 |
| 33 | OUT_D+ | MODE_3+ | | | |
| 34 | GND | GND | | | |
| 35 | GND | GND | | GROUND | 16 |
| 36 | MSB- | MSB- | ↔ | D0- | 24 |
| 37 | MSB-1- | MSB-1- | ↔ | D1- | 25 |
| 38 | MSB-2- | MSB-2- | ↔ | D2- | 26 |
| 39 | MSB-3- | MSB-3- | ↔ | D3- | 27 |
| 40 | MSB-4- | MSB-4- | ↔ | D4- | 28 |
| 41 | MSB-5- | MSB-5- | ↔ | D5- | 29 |
| 42 | MSB-6- | MSB-6- | ↔ | D6- | 30 |
| 43 | MSB-7- | MSB-7- | ↔ | D7- | 31 |
| 44 | MSB-8- | MSB-8- | | | |
| 45 | MSB-9- | MSB-9- | | | |
| 46 | GND | GND | | GROUND | 23 |
| 47 | MSB-10- | MSB-10- | | | |
| 48 | MSB-11- | MSB-11- | | | |
| 49 | MSB-12- | MSB-12- | | | |
| 50 | MSB-13- | MSB-13- | | | |
| 51 | N/C | N/C | | | |
| 52 | N/C | N/C | | | |
| 53 | MSB-14- | MSB-14- | | | |
| 54 | MSB-15- | MSB-15- | | | |
| 55 | IO_A- | RESERVED | | | |
| 56 | CAM_SER_OUT1 | SER_OUT- | | | |
| 57 | CAM_SER_IN1 | SER_IN- | | | |
| 58 | IO_B- | FIELD_ID- | | | |
| 59 | FRAME_EN- | FRAME_EN- | ↔ | FDV- | 19 |
| 60 | LINE_EN- | LINE_EN- | ↔ | LDV- | 18 |
| 61 | IO_C- | CHNL_0- | | | |
| 62 | IO_D- | CHNL_1- | | | |
| 63 | STROBE- | STROBE- | ↔ | CLK- | 17 |
| 64 | OUT_A- | MODE_0- | | | |
| 65 | OUT_B- | MODE_1- | | | |
| 66 | OUT_C- | MODE_2- | | | |
| 67 | OUT_D- | MODE_3- | | | |
| 68 | GND | GND | | | |

CBL-68-PULNIX1000-ADP

| SNAPPER CONNECTOR (68 way SCSI-2) | SNAPPER SIGNAL NAME | AIA CAMERA SPECIFICATION | DIR | PULNIX SIGNAL NAME | 30DG-02 CONNECTOR (37 way) |
|---|--------------------------------|-------------------------------------|------------|-------------------------------|--|
| 1 | GND | GND | | | |
| 2 | MSB+ | MSB+ | ↔ | D0+ | 8 |
| 3 | MSB-1+ | MSB-1+ | ↔ | D1+ | 9 |
| 4 | MSB-2+ | MSB-2+ | ↔ | D2+ | 10 |
| 5 | MSB-3+ | MSB-3+ | ↔ | D3+ | 11 |
| 6 | MSB-4+ | MSB-4+ | ↔ | D4+ | 12 |
| 7 | MSB-5+ | MSB-5+ | ↔ | D5+ | 13 |
| 8 | MSB-6+ | MSB-6+ | ↔ | D6+ | 14 |
| 9 | MSB-7+ | MSB-7+ | ↔ | D7+ | 15 |
| 10 | MSB-8+ | MSB-8+ | | | |
| 11 | MSB-9+ | MSB-9+ | | | |
| 12 | GND | GND | | GROUND | 16 |
| 13 | MSB-10+ | MSB-10+ | | | |
| 14 | MSB-11+ | MSB-11+ | | | |
| 15 | MSB-12+ | MSB-12+ | | | |
| 16 | MSB-13+ | MSB-13+ | | | |
| 17 | TTL TRIG 1 | N/C | | | |
| 18 | TTL TRIG 2 | N/C | | | |
| 19 | MSB-14+ | MSB-14+ | | | |
| 20 | MSB-15+ | MSB-15+ | | | |
| 21 | IO A+ | RESERVED | | | |
| 22 | CAM_SER_OUT0 | SER_OUT+ | | | |
| 23 | CAM_SER_IN0 | SER_IN+ | | | |
| 24 | IO B+ | FIELD_ID+ | | | |
| 25 | FRAME_EN+ | FRAME_EN+ | ↔ | FDV+ | 3 |
| 26 | LINE_EN+ | LINE_EN+ | ↔ | LDV+ | 2 |
| 27 | IO C+ | CHNL_0+ | | | |
| 28 | IO D+ | CHNL_1+ | | | |
| 29 | STROBE+ | STROBE+ | ↔ | CLK+ | 1 |
| 30 | OUT_A+ | MODE_0+ | ⇒ | VINIT | 17 |
| 31 | OUT_B+ | MODE_1+ | ⇒ | EN INTEG | 18 |
| 32 | OUT_C+ | MODE_2+ | ⇒ | INTEG | 37 |
| 33 | OUT_D+ | MODE_3+ | | | |
| 34 | GND | GND | | | |
| 35 | GND | GND | | | |
| 36 | MSB- | MSB- | ↔ | D0- | 27 |
| 37 | MSB-1- | MSB-1- | ↔ | D1- | 28 |
| 38 | MSB-2- | MSB-2- | ↔ | D2- | 29 |
| 39 | MSB-3- | MSB-3- | ↔ | D3- | 30 |
| 40 | MSB-4- | MSB-4- | ↔ | D4- | 31 |
| 41 | MSB-5- | MSB-5- | ↔ | D5- | 32 |
| 42 | MSB-6- | MSB-6- | ↔ | D6- | 33 |
| 43 | MSB-7- | MSB-7- | ↔ | D7- | 34 |
| 44 | MSB-8- | MSB-8- | | | |
| 45 | MSB-9- | MSB-9- | | | |
| 46 | GND | GND | | GROUND | 23 |
| 47 | MSB-10- | MSB-10- | | | |
| 48 | MSB-11- | MSB-11- | | | |
| 49 | MSB-12- | MSB-12- | | | |
| 50 | MSB-13- | MSB-13- | | | |
| 51 | N/C | N/C | | | |
| 52 | N/C | N/C | | | |
| 53 | MSB-14- | MSB-14- | | | |
| 54 | MSB-15- | MSB-15- | | | |
| 55 | IO A- | RESERVED | | | |
| 56 | CAM_SER_OUT1 | SER_OUT- | | | |
| 57 | CAM_SER_IN1 | SER_IN- | | | |
| 58 | IO B- | FIELD_ID- | | | |
| 59 | FRAME_EN- | FRAME_EN- | ↔ | FDV- | 22 |
| 60 | LINE_EN- | LINE_EN- | ↔ | LDV- | 21 |
| 61 | IO C- | CHNL_0- | | | |
| 62 | IO D- | CHNL_1- | | | |
| 63 | STROBE- | STROBE- | ↔ | CLK- | 20 |
| 64 | OUT_A- | MODE_0- | | | |
| 65 | OUT_B- | MODE_1- | | | |
| 66 | OUT_C- | MODE_2- | | | |
| 67 | OUT_D- | MODE_3- | | | |
| 68 | GND | GND | | | |

CBL-68-XILLIX1400-3M

| SNAPPER CONNECTOR (68 way SCSI-2) | SNAPPER SIGNAL NAME | AIA CAMERA SPECIFICATION | DIR | XILLIX SIGNAL NAME | XILLIX CONNECTOR (50 way) |
|---|----------------------------|---------------------------------|------------|---------------------------|-------------------------------------|
| 1 | GND | GND | | GROUND | 1 |
| 2 | MSB+ | MSB+ | ↔ | DATA1 | 2 |
| 3 | MSB-1+ | MSB-1+ | ↔ | DATA2 | 3 |
| 4 | MSB-2+ | MSB-2+ | ↔ | DATA3 | 4 |
| 5 | MSB-3+ | MSB-3+ | ↔ | DATA4 | 5 |
| 6 | MSB-4+ | MSB-4+ | ↔ | DATA5 | 6 |
| 7 | MSB-5+ | MSB-5+ | ↔ | DATA6 | 7 |
| 8 | MSB-6+ | MSB-6+ | ↔ | DATA7 | 8 |
| 9 | MSB-7+ | MSB-7+ | ↔ | DATA8 | 9 |
| 10 | MSB-8+ | MSB-8+ | ↔ | DATA9 | 10 |
| 11 | MSB-9+ | MSB-9+ | ↔ | DATA10 | 11 |
| 12 | GND | GND | | GROUND | 26 |
| 13 | MSB-10+ | MSB-10+ | ↔ | DATA11 | 12 |
| 14 | MSB-11+ | MSB-11+ | ↔ | DATA12 | 13 |
| 15 | MSB-12+ | MSB-12+ | | | |
| 16 | MSB-13+ | MSB-13+ | | | |
| 17 | TTL_TRIG_1 | N/C | | | |
| 18 | TTL_TRIG_2 | N/C | | | |
| 19 | MSB-14+ | MSB-14+ | | | |
| 20 | MSB-15+ | MSB-15+ | | | |
| 21 | IO_A+ | RESERVED | | | |
| 22 | CAM_SER_OUT0 | SER_OUT+ | | | |
| 23 | CAM_SER_IN0 | SER_IN+ | | | |
| 24 | IO_B+ | FIELD_ID+ | | | |
| 25 | FRAME_EN+ | FRAME_EN+ | | | |
| 26 | LINE_EN+ | LINE_EN+ | ↔ | LINE CLOCK+ | 19 |
| 27 | IO_C+ | CHNL_0+ | | | |
| 28 | IO_D+ | CHNL_1+ | | | |
| 29 | STROBE+ | STROBE+ | ↔ | PIXEL CLOCK+ | 22 |
| 30 | OUT_A+ | MODE_0+ | ⇒ | EXPOSURE+ | 24 |
| 31 | OUT_B+ | MODE_1+ | ⇒ | MODE+ | 17 |
| 32 | OUT_C+ | MODE_2+ | ⇒ | FREQ2+ | 16 |
| 33 | OUT_D+ | MODE_3+ | ⇒ | FREQ1+ | 15 |
| 34 | GND | GND | | GROUND | 18 |
| 35 | GND | GND | | | |
| 36 | MSB- | MSB- | ↔ | DATA1- | 27 |
| 37 | MSB-1- | MSB-1- | ↔ | DATA2- | 28 |
| 38 | MSB-2- | MSB-2- | ↔ | DATA3- | 29 |
| 39 | MSB-3- | MSB-3- | ↔ | DATA4- | 30 |
| 40 | MSB-4- | MSB-4- | ↔ | DATA5- | 31 |
| 41 | MSB-5- | MSB-5- | ↔ | DATA6- | 32 |
| 42 | MSB-6- | MSB-6- | ↔ | DATA7- | 33 |
| 43 | MSB-7- | MSB-7- | ↔ | DATA8- | 34 |
| 44 | MSB-8- | MSB-8- | ↔ | DATA9- | 35 |
| 45 | MSB-9- | MSB-9- | ↔ | DATA10- | 36 |
| 46 | GND | GND | | | |
| 47 | MSB-10- | MSB-10- | ↔ | DATA11- | 37 |
| 48 | MSB-11- | MSB-11- | ↔ | DATA12- | 38 |
| 49 | MSB-12- | MSB-12- | | | |
| 50 | MSB-13- | MSB-13- | | | |
| 51 | N/C | N/C | | | |
| 52 | N/C | N/C | | | |
| 53 | MSB-14- | MSB-14- | | | |
| 54 | MSB-15- | MSB-15- | | | |
| 55 | IO_A- | RESERVED | | | |
| 56 | CAM_SER_OUT1 | SER_OUT- | | | |
| 57 | CAM_SER_IN1 | SER_IN- | | | |
| 58 | IO_B- | FIELD_ID- | | | |
| 59 | FRAME_EN- | FRAME_EN- | | | |
| 60 | LINE_EN- | LINE_EN- | ↔ | LINE CLOCK- | 44 |
| 61 | IO_C- | CHNL_0- | | | |
| 62 | IO_D- | CHNL_1- | | | |
| 63 | STROBE- | STROBE- | ↔ | PIXEL CLOCK- | 47 |
| 64 | OUT_A- | MODE_0- | ⇒ | EXPOSURE- | 49 |
| 65 | OUT_B- | MODE_1- | ⇒ | MODE- | 42 |
| 66 | OUT_C- | MODE_2- | ⇒ | FREQ2- | 41 |
| 67 | OUT_D- | MODE_3- | ⇒ | FREQ1- | 40 |
| 68 | GND | GND | | GROUND | 43 |