

CAMERA INTERFACE BOARD

3G-SDI & HD-SDI (50/75Ω)

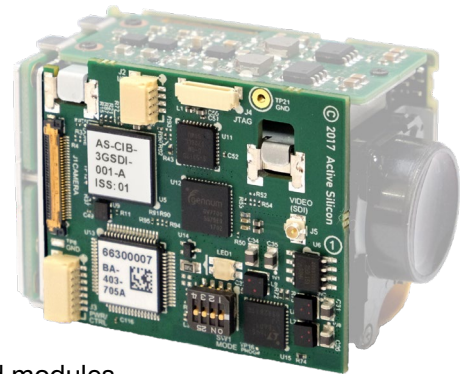
For Tamron and Sony Block Cameras



- **3G-SDI interface for Tamron MP1x10 & Sony EV-series cameras**
- **1080p/1080i/720p high definition video output**
- **Analog composite output (PAL/NTSC/RS-170)**
- **HD-VLC™ mode for long cable length applications**

FEATURES

- 3G-SDI interface solution for the Tamron MP1110M, MP1010M and Sony EV-series (eg. EV7520A) cameras.
- Simultaneous analog video (PAL/NTSC) when in 720p50/59.94/60 modes.
- HD-VLC mode for long length cable applications.
- Ultra-small coax connector with a 50 Ohm output impedance.
- Compatible with 75 Ohm equipment (see description below).
- Supports all HD modes up to 1080p60.
- Compliant with SMPTE 274M and SMPTE 296M.
- Video mode selection switches and built-in test pattern.
- 3.3V CMOS/TTL serial UART comms port for camera control.
- Kits for mounting the interface board to Tamron or Sony cameras available.
- Interface boards and cameras can be purchased as pre-assembled modules.



OVERVIEW

The **Harrier 3G-SDI Camera Interface Board (50/75 Ohm) (AS-CIB-3GSDI-001-A)** is an interface solution from Active Silicon's **Harrier series** of camera interface boards. It provides real-time low-latency 3G-SDI output for the Tamron MP1110M-VC and MP1010M-VC camera, and the Sony EV-series (eg. Sony FCB-EV7520A). In addition, the interface board can provide simultaneous analog output in Standard Definition (SD) video in 720p50/59.94/60 modes with options for cropping or scaling (for 16:9 displays).

This version has a 50 Ohm output connector for ultra-compact OEM applications (the 75 Ohm version has a slightly larger connector). This board remains compatible with 75 Ohm equipment except for applications with very long cable lengths.

On power-up, the camera video mode is selected by the DIP switch settings on the board. The video modes along with other interface board specific functions may also be controlled by serial communications.

There is a built-in test pattern which conforms to the SMPTE RP-219-2002 specification (see Figure 2).

HD Visually Lossless Compression (HD-VLC) is a technique for compressing HD image data into a SD (lower data rate) SDI stream. This allows much greater cable length (three to four times the distance), plus a greater ability to pass through multiple slip rings. A HD-VLC decoder is needed at the other end of the cable to convert back to HD-SDI and other formats (see Active Silicon's "[Harrier SDI Adapter](#)"). HD-VLC output mode can be selected by setting a DIP switch.

There are OEM options (via custom firmware) for meta-data to be inserted into the stream either in the line blanking period or within the video data itself (lower bits used so as not visually noticeable).

In applications where space is at a premium, the interface board may be mounted onto the camera. On the Tamron camera it is mounted on the side of the camera by removing the standard side plate, as shown below in Figure 1. This board can also be mounted on the rear of a Sony EV-7520 camera. Active Silicon can provide special brackets for this purpose (see ordering information).

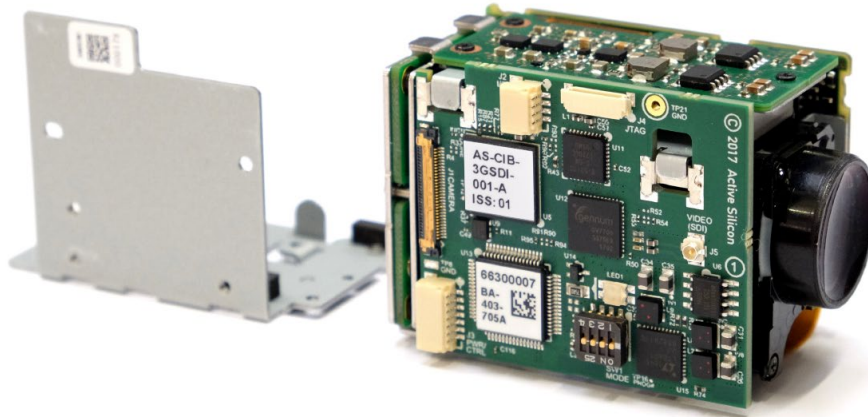


Figure 1: Tamron camera with interface board fitted (replaces side/base bracket).

Test Pattern

A video test pattern output may be selected by (a) driving pin 1 of connector J2 low, or (b) sending the appropriate VISCA command over serial/USB communications.

For interface board operation using extended VISCA serial commands, refer to the Active Silicon Technical Note on [“Extended VISCA Commands”](#).



Figure 2: SMPTE RP-219-2002 test pattern available from the interface board.

CONNECTOR SPECIFICATION

KEL30 Connector (“Camera”) (J1)

The interface board is fitted with a 30-way miniature connector to link to the video output of the camera.

Connector type: KEL USL00-30L

Mating cable: KEL USL20-30SS-010-C (100mm length) or KEL USL20-30SS-005-C (50mm length) 30-way micro-coax cable.
This cable can be supplied with the interface board (see ordering information below).
Other lengths also available subject to minimum order quantities.

Input/Output Connector (“I/O”): 4-way (J2)

An industry standard 4-way connector is fitted for test pattern and reset control, plus VSync out.

Connector type: JST SM04B-SRSS-TB

Mating cable: Suitable cable can be purchased as part of a cable kit (see ordering information).

PIN	SIGNAL	LEVEL	NOTES
1	PGEN#	TTL compatible 5V tolerant.	Input pin with 10K pullup resistor. Active low signalling.
2	SYNC OUT	3.3V CMOS	Default setting vsync active high Alternate configurations selectable by extended VISCA command.
3	GND	0V	GND
4	RESET#	TTL compatible 5V tolerant. Active low signal.	Input pin with 10K pullup resistor. Drive low to reset the camera and interface board.

Note: RESET# is also connected to the camera so it will reset both the interface board and camera.

Power and Control Connector (“PWR/CTRL”): 7-way (J3)

An industry standard 7-way connector is fitted for power, serial control and analog video out connections.

Connector type: JST SM07B-SRSS-TB

Mating cable: Suitable cable can be purchased as part of a cable kit (see ordering information).

PIN	SIGNAL	LEVEL	NOTES
1	Analog SD video out	PAL/NTSC/RS-170 signal levels.	PAL in 720p50, NTSC in 720p60.
2	Analog video GND	0V	Video GND
3	Power GND	0V	GND
4	DC Power In	8.25V to 12.25V	Power supply, nominal 9V.
5	VISCA GND	0V	GND for VISCA Comms.
6	RxD	TTL compatible 5V tolerant.	Serial Control (VISCA). Signalling is active low. (Input to interface board).
7	TxD	3.3V CMOS	Serial Control (VISCA). Signalling is active low. (Output from interface board).

Analog Video Out (Pin 1, J3)

Standard resolution composite analog is simultaneously available in HD modes 720p50 (for PAL) and 720p60/59.94 (for NTSC). There are two options for the analog output, selectable via serial control:

- (a) the 1280 pixel wide HD image can be cropped to 960 wide, by cropping a 120 pixel strip off each side to make a 4:3 aspect ratio Standard Definition (SD) signal, or alternatively
- (b) by pre-warping the image, such that when displayed on a HD monitor in the monitor's stretch-to-fit mode, the original full-width HD signal will be displayed correctly at 16:9 aspect ratio.

Both methods ensure the displayed pixels remain square and that the image is not distorted.

JTAG Connector (J4)

Test connector used in manufacturing for circuit verification.

SDI Output Connector (“Video (SDI)”) (J5)

The interface board is fitted with a Hirose Ultra Small Coaxial 50 Ohm impedance connector. (The HD-SDI driver is matched to 50 Ohm as well).

Connector type: Hirose Ultra Small Coaxial Connector (Receptacle), part number U.FL-R-SMT.

Mating Connector: Various height and cable width options from Hirose:
U.FL-LP-040, U.FL-LP-066, U.FL-LP(V)-040, U.FL-LP-062, U.FL-LP-088.
See Hirose documentation “Ultra Small Surface Mount Coaxial Connectors – 1.9mm or 2.4mm mated height”.
This cable can be purchased as part of a cable kit (see ordering information).

Ground (“GND”) (J6)

Ground pad for optional use as a solder connection point for system grounding.

Connector type: Gold-plated PCB pad.

Video and Control Mode DIP Switch (SW1)

The interface board is fitted with a 4-way DIP switch to select various video output modes.

SW1-4	SW1-3	SW1-2	SW1-1	Video Format	Mode #
-	OFF	OFF	OFF	Default Camera Mode ⁽¹⁾	0
-	OFF	OFF	ON	1080p60 ⁽²⁾ [1080p30 for MP1010]	1
-	OFF	ON	OFF	1080p50 ⁽²⁾ [1080p25 for MP1010]	2
-	OFF	ON	ON	720p59.94 [720p60 for MP1010]	3
-	ON	OFF	OFF	720p50	4
-	ON	OFF	ON	1080i60	5
-	ON	ON	OFF	1080i50	6
-	ON	ON	ON	1080p30 [unused for MP1010]	7
OFF	-	-	-	Uncompressed	-
ON	-	-	-	HD-VLC compressed mode	-

Notes:

- 1) "Default Camera Mode": The camera video mode is changed by VISCA serial commands, followed by a reset (there is also the camera hard reset in the extended VISCA commands which will also serve this purpose). On power-up, the camera will start in the video format/mode that was being used when it was last powered down. VISCA serial commands can then be used to change the video mode.
- 2) Due to the high data bandwidth required, these video modes (above 1080p30) require that cameras **must** be set to dual LVDS mode. For other modes (1080p30 and below) the camera must be set to single LVDS mode. **When using VISCA commands to change camera video mode the LVDS mode must be set correctly, otherwise there will be no video output from the camera.**
- 3) **The DIP switches to select the Video Format are only read on power-up.** Therefore, to change mode using the DIP switches, power down the camera, set the switches and then power up the camera. DIP switches will only be effective for the operating modes supported by the camera currently in use.
- 4) VISCA serial commands can override the video mode set on power-up and can be used to select any of the modes supported by the camera. See note 2).
- 5) There are a number of video formats the camera supports but are not shown in the above list. These may be selected using the external VISCA control, or custom firmware can be generated to redefine the options above for OEMs.
- 6) The table above applies to the Tamron MP1110M-VC and MP1010M-VC. Please contact Active Silicon for details of the default switch functionality for Sony cameras.

Status LED (“LED1”)

The interface board is fitted with a multi-color LED to indicate camera status.

Solid Green: Camera and interface board are powered and working correctly.

Solid Red: The interface board is powered but there is a fault/problem – e.g. no video data is being received; internal power supply voltages outside specification; temperature is over recommended limit.

Serial Control Commands

The camera may be controlled by the serial VISCA commands (pins 6 and 7 on connector J3). The VISCA serial signal is routed through the interface board and on to the camera. However, this serial signal is also connected to the interface board and extended VISCA commands (ones that are not used by the camera) may be used to control the interface board in addition to the camera.

For information on interface board operation using extended VISCA serial commands, refer to the Active Silicon Technical Note on “[Extended VISCA Commands](#)” available from the Active Silicon Website.

For information on camera operation using VISCA serial commands, refer to the camera’s user manual.

CONFORMANCE

3G-SDI: Compliant with SMPTE 274M and SMPTE 296M.

Approvals: The **Harrier 3G-SDI Camera Interface Board (50/75 Ohm)** has been designed to meet EMC and FCC requirements when housed in a suitable enclosure:

CE CE marked and compliant with the relevant EU directives as listed below.

RoHS Conforms to RoHS3, the European Union’s Restriction on Use of Certain Hazardous Substances (RoHS) in Electrical and Electronic Equipment Directive 2015/863/EU.

EMC Compliant with EN 55022:2010 (class A) and EN 55024:2010 in accordance with EU Directive 2014/30/EU Electromagnetic Compatibility.

REACH Compliant with the requirements of REACH (Registration, Evaluation, Authorization and Restriction of Chemicals, EC 1907/2006), the European Union’s chemical substances regulatory framework for Substances of Very High Concern.

UL All printed circuit boards used in this product are manufactured by UL recognised manufacturers and have a flammability rating of 94-V0.

FCC Compliant with FCC Rules for Class A digital devices.

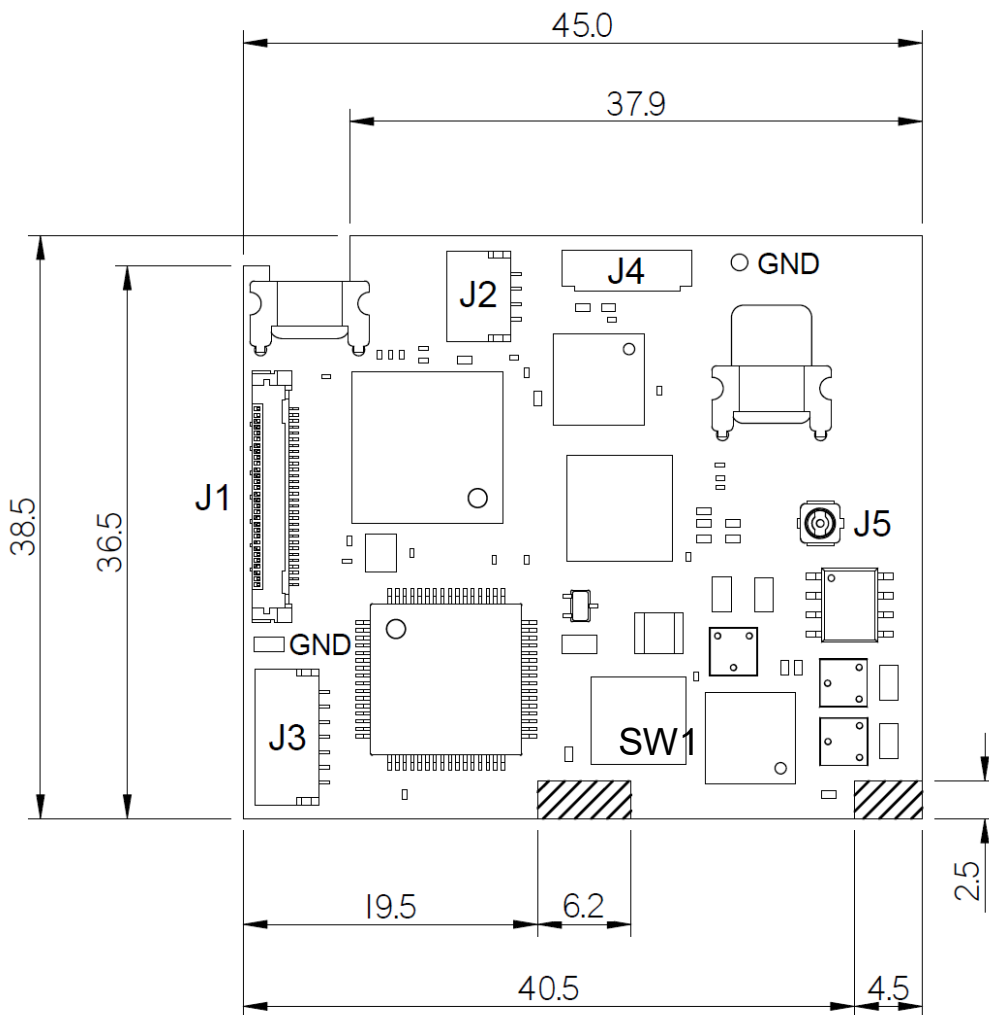


Figure 3: Harrier 3G-SDI Camera Interface Board (50/75 Ohm) (AS-CIB-3GSDI-001-A) mechanical overview (all dimensions in mm)

PHYSICAL AND ENVIRONMENTAL DETAILS

<i>Dimensions:</i>	45mm x 38.5mm.	
<i>Weight:</i>	8g (interface board only, no cables). The Tamron MP1010M-VC/MP1110M-VC camera weights 77g.	
<i>Power Supply:</i>	8.25V to 12.25V	
<i>Power consumption:</i>	1.1 Watt (130mA @ 9V)	Typical current consumption under normal operating conditions. Camera and interface board combined draw typically 410mA @ 9V.
<i>Storage Temperature:</i>	-20°C to +70°C	
<i>Operating Temperature:</i>	-5°C to +60°C (ambient environment).	
<i>Relative Humidity:</i>	10% to 90% non-condensing (operating and storage).	

ORDERING INFORMATION

PART NUMBER	DESCRIPTION
AS-CIB-3GSDI-001-A	3G-SDI output, interface board for the Tamron MP1110M-VC and MP1010M-VC with 50 Ohm impedance output. Analog composite output (when in 720p50/59.94/60 operating modes). Support for HD-VLC compression technology. Board only, no cables included.
AS-CIB-3GSDI-001-1010-A	AS-CIB-3GSDI-001-A supplied mounted on Tamron MP1010M-VC with AS-CIB-USL30-100MM connecting cable fitted.
AS-CIB-3GSDI-001-1110-A	AS-CIB-3GSDI-001-A supplied mounted on Tamron MP1110M-VC with AS-CIB-USL30-100MM connecting cable fitted.
AS-CIB-3GSDI-001-EVAL-A	Evaluation Kit for AS-CIB-3GSDI-001-A interface board. Includes power supply, cabling and PC serial interface (via USB).
AS-CIB-USL30-100MM	30-way micro-coax cable for connecting the interface board (J1) to the camera. Length 100mm. (Manufacturer: KEL, part number: USL20-30SS-010-C)
AS-CIB-USL30-50MM	30-way micro-coax cable for connecting the interface board (J1) to the camera. Length 50mm. (Manufacturer: KEL, part number: USL20-30SS-005-C)
AS-CIB-CBLKIT-001-A	Cable kit for AS-CIB-3GSDI-001-A containing 50 Ohm micro-coax cable, BNC adapter and bare-end control cables for J2 and J3.
AS-CIB-BRK-001-A	Bracket to fit the interface board AS-CIB-3GSDI-001-A to the side of a Tamron MP1x10M-VC camera after removing the original base bracket.



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