PLEORA TECHNOLOGIES INC.

iPORT SB-GigE-EV7520A External Frame Grabber
User Guide

Pleora Technologies

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Table of Contents

Chapter 1

About this Guide

This chapter describes the purpose and scope of this guide, and provides a list of complementary guides.

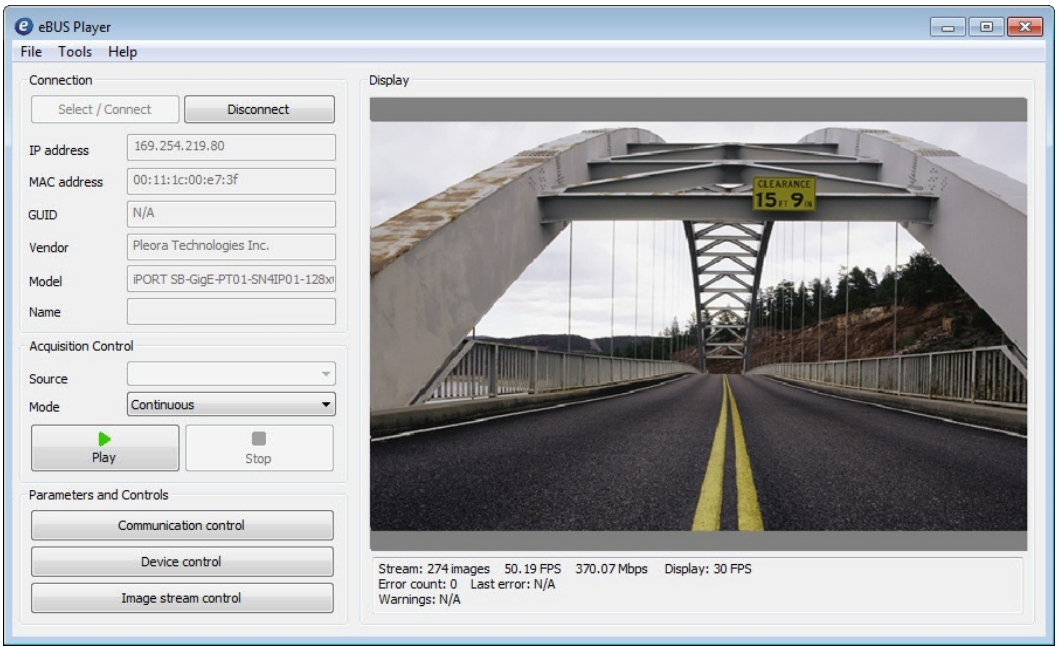
The following topics are covered in this chapter:

What this Guide Provides

This guide provides you with the information you need to connect the SB-GigE-EV7520A to a Sony® FCB-EV7520A block camera and to start using them as a single device. In this guide you can find a product overview, instructions for connecting the block camera and cables, installing the Pleora eBUS™ SDK, establishing a connection between the block camera and SB-GigE-EV7520A, and performing general configuration tasks.

Start Streaming Video

If you want to quickly start streaming video, you can jump to "Confirming Image Streaming" on page 52.



Documented Product Versions

This guide covers the following product versions. The features and functionality documented in this guide may vary if you are using an earlier or later version of the product.

Table 1: Documented Product Versions

Product	Release/version documented in this guide...
SB-GigE-EV7520A	2.0.0
eBUS SDK and eBUS Player	5.1.10

Related Documents

The *iPORT SB-GigE-EV7520A External Frame Grabber User Guide* is complemented by the following Pleora Technologies documents which are available on the Pleora Technologies Support Center at supportcenter.pleora.com:

- *eBUS Player Quick Start Guide* and *eBUS Player User Guide*, available for Windows, Linux, and macOS
- *iPORT Advanced Features User Guide*
- *Configuring Your Computer and Network Adapters for Best Performance* knowledge base article
- *Updating Pleora Firmware* knowledge base article
- *Capturing Ethernet Activity from GigE Vision Devices* knowledge base article

If you are creating your own custom image acquisition software, you can also consult the following guides:

- *eBUS SDK API Quick Start Guides*, available for C++, .NET, Linux, and macOS
- *eBUS SDK API Help Files*, which are installed on your computer during the installation of the eBUS SDK.

The eBUS SDK API Help Files are available in the following locations on your computer:

- **Windows:** C:\Program Files\Pleora Technologies Inc\eBUS SDK\Documentation
- **Linux:** <*installation_directory*>/share/doc/sdk/index.html
- **macOS:** /Library/Frameworks/eBUS.framework/Versions/Current/Documentation/index.html

Further Reading

Although not required in order to successfully use the SB-GigE-EV7520A, you can find details about industry-related standards and naming conventions in the following documents:

- *GigE Vision Standard, version 2.0* available from the Automated Imaging Association (AIA) at www.visiononline.org.
- *GenICam Standard Features Naming Convention, version 2.0* available from the European Machine Vision Association (EMVA) at www.emva.org.
- *Pixel Format Naming Convention*, available from the European Machine Vision Association (EMVA) at www.emva.org.

In addition to the guides listed above, you can consult the *Color Camera Module Technical Manual* for the Sony FCB-EV7520A block camera, available from Sony (D-023-100-11(1), 2018).

Chapter 2

About the iPORT SB-GigE-EV7520A External Frame Grabber

This chapter describes the SB-GigE-EV7520A, including the product models and key features.

The following topics are covered in this chapter:

SB-GigE-EV7520A Models

The SB-GigE-EV7520A is equipped with the parts listed in the following table. Before assembly, ensure that all components are included in the selected package.

Table 2: SB-GigE-EV7520A Models

Order code	Model	Quantity
900-6167	**iPORT SB-GigE-EV7520A OEM Basic Kit**	
	SB-GigE-EV7520A OEM board set on camera bracket assembly for FCB-EV7520A[1]	1
	Mounting screws for block camera	4

Order code	Model	Quantity
900-6168	**iPORT SB-GigE-EV7520A OEM Kit**	
	SB-GigE-EV7520A OEM board set and GPIO board on camera bracket assembly[1] for FCB-EV7520A	1
	GPIO board assembly with flat flex cable and unsoldered 12-pin circular connector	1
	Mounting screws for block camera	4
	30-pin micro-coaxial video/control camera cable	1
	GPIO bracket extension not included	

Order code	Model	Quantity
900-6170	**iPORT SB-GigE-EV7520A Development Kit**	
	OEM board set on camera bracket with GPIO bracket extension assembly[2] for FCB-EV7520A	1
	Flat flex cable	1
	Soldered 12-pin circular connector	1
	30-pin micro-coaxial video/control camera cable	1
	Mounting screws for block camera	4
	Gigabit Ethernet desktop network interface card (NIC)	1
	PoE power injector	1
	Ethernet cables	2
	eBUS SDK USB stick	1

1. Contains assembly #900-6166, which is not an orderable part.

2. Contains assembly #900-6169, which is not an orderable part.

Feature Set

Networked Video Connectivity Solutions	
iPORT External Frame Grabbers	• Highly reliable, 1 Gb/s data transfer rate with low, end-to-end latency • OEM, in-camera board set
eBUS SDK	• eBUS Universal Pro driver • Sample applications, including NetCommand™ sample application, a demonstration of multi-device network connectivity • Driver installation tool • Documentation • eBUS Player application and sample code, demonstrates advanced API features
GigE Vision and GenICam™	• Fully-compliant firmware load • Guarantees delivery of all packets • Comprehensive data transfer diagnostics
Video Formats	
Video acquisition	Digital video interface
Input resolutions	• Full resolution images • 1080p, 25/29.97/30Hz • 1080i, 50/59.94/60Hz • 720p, 25/29.97/30/50/59.94/60Hz
Pixel formats	• Mono8 (8 bits per pixel) • BayerGR8* (8 bits per pixel) • YUV 4:2:2 (16 bits per pixel) • YUV 4:1:1 (12 bits per pixel)
Features	
Gigabit Ethernet-based	• Connection to low-cost, easy-to-use equipment • Compatible with 10/100/1000 Mb/s IP/Ethernet networks • Supports IEEE 802.3 (Ethernet), IP, IGMP v.2, UDP, ICMP (ping), and IEEE 1588 Precision Time Protocol (PTP) • Long reach: 100 m point-to-point, further with Ethernet switches
Multicast capability	• Enables advanced distributed processing and control architectures
Mechanical bracket	• Easy assembly with Sony block cameras

*BayerGR8 pixel format not supported for 1080i 50/59.95/60Hz.

Connectors	
12-pin circular connector	• GPIO • RS-232 serial communication interface • External power (optional)
RJ-45 jack	• Network/computer interface • Power over Ethernet (PoE)
30-pin connector	• Sony block camera interface • VISCA serial command interface • Power for block camera
Characteristics	
Size (without bracket)	37 mm X 37 mm X 34.3 mm
Operating temperature	Commercial**
Storage temperature	-40°C to 85°C
External power supply (when not using PoE)	10 V to 16 V
Power consumption (typical, including block camera)	Up to approximately 7.0 W
MTBF @ 40°C	1,189,775 hours
ECCN	EAR99

** Case and junction temperature limits vary by IC device. Please refer to "Thermal Requirements" on page 35 for specific IC operating temperature specifications and thermal management information.

Sony Block Camera Video Modes

The following table lists the video modes that are available for the SB-GigE-EV7520A.

Some video modes can exceed the 1 gigabit transfer rate limitation, resulting in **BlocksDropped** warnings being returned in the eBUS SDK, which are also displayed in eBUS Player.

Table 3: Sony Block FCB-EV7520A Video Modes

FCB-EV7520A supported video modes	SB-GigE-EV7520A pixel formats			
	Mono8	BayerGR8	YCbCr709_411_8_CbYYCrYY	YCbCr709_422_8_CbYCrY
HD_1080p_30Hz	Yes	Yes	Yes	Yes
HD_1080p_29p97Hz	Yes	Yes	Yes	Yes
HD_1080p_25Hz*	Yes	Yes	Yes	Yes
HD_1080i_60Hz	Yes	*No*	Yes	Yes
HD_1080i_59p94Hz	Yes	*No*	Yes	Yes
HD_1080i_50Hz	Yes	*No*	Yes	Yes
HD_720p_60Hz	Yes	Yes	Yes	Yes
HD_720p_59p94Hz	Yes	Yes	Yes	Yes
HD_720p_50Hz	Yes	Yes	Yes	Yes
HD_720p_30Hz	Yes	Yes	Yes	Yes
HD_720p_29p97Hz	Yes	Yes	Yes	Yes
HD_720p_25Hz	Yes	Yes	Yes	Yes

* If the camera is set to an unsupported video mode (for example, HD_1080p_60Hz, HD_1080p_59p94Hz, or HD_1080p_50Hz), it will be automatically configured to HD_1080p_25Hz upon connection to the SB-GigE-EV7520A. In this situation, it can take up to 25 seconds to connect to the SB-GigE-EV7520A.

Key Sony Block Camera Features

These key Sony block camera features are incorporated into the SB-GigE-EV7520A and are available in the GenICam XML file. More information about these commands can be found in the *Color Camera Module Technical Manual* for the Sony FCB-EV7520A block camera, available from Sony (D-023-100-11(1), 2018).

Some features and options may report **Not available**, depending on how the Sony FCB-EV7520A block camera is configured. For more information see the *Color Camera Module Technical Manual* for the Sony FCB-EV7520A block camera, available from Sony (D-023-100-11(1), 2018).

Table 4: Key Sony Block Camera Features

Feature name	Sony VISCA commands	Description
BackLightCompensation	CAM_BackLightModeInq, CAM_BackLight (On, Off)	Controls the back light compensation mode of the Sony Block. This mode makes the subject appear clearer when the background of the subject is too bright or when the subject is too dark, as a result of operating in auto exposure mode.
BalanceRatioBlue	CAM_BGainInq, CAM_BGain Direct	Controls the ratio of the blue color component. This feature is used for white balancing in manual mode.
BalanceRatioRawBlue	CAM_BGainInq, CAM_BGain Direct	Controls the ratio of the blue color component. This feature is used for white balancing in manual mode.
BalanceRatioRawRed	CAM_RGainInq, CAM_RGain Direct	Controls the ratio of the red color component. This feature is used for white balancing in manual mode.
BalanceRatioRed	CAM_RGainInq CAM_RGain Direct	Controls the ratio of the red color component. This feature is used for white balancing in manual mode.
BalanceWhiteAuto	CAM_WBModeInq, CAM_WB (Auto, Indoor, Outdoor, One Push WB, ATW, Manual, Outdoor Auto, Sodium Lamp Auto, Sodium Lamp, Sodium Lamp Outdoor Auto)	Controls the mode for automatic white balancing between the color channels. The white balancing ratios are automatically adjusted.
ChromaSuppression	CAM_ChromaSuppressInq, CAM_ChromaSuppress	Controls the chroma suppress mode of the Sony Block.
Defog	CAM_Defog	When the surrounding area of the subject is foggy and low contrast, the defog mode will make the subject appear clearer.
DeviceReset	CAM_Initialize Camera	Resets the device to its power up state.
DeviceTemperature	CAM_TempInq	Device temperature in degrees Celsius (C).
DeviceTemperatureSelector		Selects the location within the device, where the temperature will be measured.

Table 4: Key Sony Block Camera Features (Continued)

Feature name	Sony VISCA commands	Description
DigitalZoom	CAM_DZoomPosInq, CAM_DZoom Direct	Sets the zoom position of the Sony Block. The maximum value that this feature can be set to is a function of the **ZoomDigitalLimitCurrent** feature.
DigitalZoomIn	CAM_DZoom Tele (Variable)	Executes the digital zoom in function of the Sony Block. This feature zooms in from the current zoom position to the maximum, or until stopped by the **DigitalZoomStop** command.
DigitalZoomInSpeed	No direct mapping	Controls the digital zoom in speed of the Sony Block. This feature is not directly mapped to a particular Sony Block command, but determines which command is executed by the **DigitalZoomIn** feature.
DigitalZoomOut	CAM_DZoom Wide (Variable)	Executes the digital zoom out function of the Sony Block. This feature zooms out from the current zoom position to the minimum, or until stopped by the **DigitalZoomStop** command.
DigitalZoomOutSpeed	No direct mapping	Controls the digital zoom out speed of the Sony Block. This feature is not directly mapped to a particular Sony Block command, but determines which command is executed by the **DigitalZoomOut** feature.
DigitalZoomRatio	CAM_DZoom Direct	Sets the zoom position of the Sony Block to a particular zoom ratio. The value passed to the **CAM_DZoom Direct** command is equal to 256.
DigitalZoomStop	CAM_DZoom Stop	Stops a digital zoom in or digital zoom out command.
EdgeEnhancement	CAM_ApertureInq, CAM_Aperture Direct	Adjusts the enhancement (aperture) of the edges of objects in the scene. There are 16 levels of adjustment, starting from “no enhancement”.
EventInfraredCutFilter	No direct mapping	Returns the unique identifier of the Sony Block automatic infrared cut filter removal event. It can be used to register a callback function to be notified of the event occurrence. Its value uniquely identifies the type of event received. Automatic infrared cut filter removal events are generated when the SB-GigE-EV7520A receives **CAM_AutoICRAlarmReply** replies from the Sony Block.
EventInfraredCutFilterDropped	No direct mapping	Reports the number of events that were received from the Sony Block and discarded by the SB-GigE-EV7520A. The counter does not wrap around upon reaching its maximum value.
EventInfraredCutFilterState	No direct mapping	Returns whether the Sony Block infrared cut filter is activated.

Table 4: Key Sony Block Camera Features (Continued)

Feature name	Sony VISCA commands	Description
EventInfraredCutFilterTimestamp	No direct mapping	Returns the timestamp of the Sony Block automatic infrared cut filter removal event. This is the timestamp of when the SB-GigE-EV7520A received the event from the Sony Block.
EventNotification	CAM_AutoICRAlarmReplyInq, CAM_AutoICRAlarmReply (On, Off) when **EventSelector** is set to **InfraredCutFilter** or **WideDynamicRange** (if applicable)	Activates or deactivates the notification to the host application of the occurrence of the selected event.
ExposureAuto	CAM_AEModeInq, CAM_AE (Full Auto, Manual, Shutter Priority, Iris Priority)	Controls the automatic exposure mode of the block camera.
ExposureAutoSpot	CAM_SpotAEModeInq, CAM_SpotAE (On, Off)	Controls the spot exposure mode of the Sony Block.
ExposureAutoSpotOffsetX	CAM_SpotAE Position	Controls the horizontal position of the area of the image that is being used in spot exposure mode.
ExposureAutoSpotOffsetY	CAM_SpotAE Position	Controls the vertical position of the area of the image that is being used in spot exposure mode.
ExposureCompensation	CAM_ExpCompModeInq, CAM_ExpComp (On, Off)*	Controls the exposure compensation function of the Sony Block. This function offsets the internal reference brightness level used in auto exposure mode.
ExposureCompensationLevel	CAM_ExpCompPosInq, CAM_ExpComp Direct*	Controls the offset used in the exposure compensation function of the Sony Block.
ExposureCompensationLevelRaw	CAM_ExpCompPosInq, CAM_ExpComp Direct*	Controls the offset used in the exposure compensation function of the Sony Block, in raw units.
ExposureSlowAuto	CAM_SlowShutterModeInq, CAM_SlowShutter (Auto, Manual)	Controls whether the slow exposure (shutter) of the Sony Block is set automatically when the brightness drops.
ExposureSlowResponseTime	CAM_AE_ResponseInq, CAM_AE_Response Direct	Controls the slow auto exposure response speed of the Sony Block.
ExposureTime	CAM_ShutterPosInq, CAM_Shutter Direct	Controls the exposure time (shutter) of the Sony Block.
ExposureTimeRaw	CAM_ShutterPosInq, CAM_Shutter Direct	Controls the exposure time of the Sony Block, in raw units.
Focus	CAM_FocusPosInq, CAM_Focus Direct	Sets the focus position of the Sony Block.

Table 4: Key Sony Block Camera Features (Continued)

Feature name	Sony VISCA commands	Description
FocusAuto	CAM_Focus (Manual Focus, One Push Trigger, Auto Focus), CAM_AFMode (Normal AF, Interval AF, ZOOM Trigger AF, Active/Interval Time)	Sets the auto focus mode of the block camera.
FocusAutoSensitivity	CAM_AFSensitivityInq, CAM_AF Sensitivity (Normal, Low)	Sets the auto focus sensitivity mode of the Sony Block.
FocusDelay	CAM_AFTimeSettingInq, CAM_AFMode Active/Interval Time	Controls the duration of the delay between the focus periods of the Sony Block in the timed auto focus mode.
FocusDelayRaw	CAM_AFTimeSettingInq, CAM_AFMode Active/Interval Time	Controls the duration of the delay between the focus periods of the Sony Block in timed auto focus mode.
FocusDuration	CAM_AFTimeSettingInq, CAM_AFMode Active/Interval Time	Controls the duration of the focus periods of the Sony Block in timed auto focus mode.
FocusDurationRaw	CAM_AFTimeSettingInq, CAM_AFMode Active/Interval Time	Controls the duration of the focus periods of the Sony Block in the timed auto focus mode.
FocusFar	CAM_Focus (Far(Standard), Far(Variable))	Executes the far focus function of the Sony Block. This feature focuses from the current focus position to the maximum, or until stopped by the **FocusStop** command.
FocusFarSpeed	No direct mapping	Controls the far focus speed of the Sony Block. This feature is not directly mapped to a particular Sony Block command, but determines which command is executed by the **FocusFar** feature.
FocusNear	CAM_Focus (Near(Standard), Near(Variable))	Executes the near focus function of the Sony Block. This feature focuses from the current focus position to the minimum, or until stopped by the **FocusStop** command.
FocusNearLimit	CAM_FocusNearLimitInq	Sets the near focus limit position of the block camera. The decimal delimiter "." is represented by "p" characters in enumeration entries. This feature is mapped to the **CAM_FocusNearLimitInq** and **CAM_FocusNearLimit** commands of the block camera.
FocusNearSpeed	No direct mapping	Controls the near focus speed of the Sony Block. This feature is not directly mapped to a particular Sony Block command, but determines which command is executed by the **FocusNear** feature.
FocusStop	CAM_Focus Stop	Stops a near or far focus command.

Table 4: Key Sony Block Camera Features (Continued)

Feature name	Sony VISCA commands	Description
Freeze	CAM_FreezeModeInq, CAM_Freeze (On, Off)	Captures an image in the memory of the Sony Block so that this image can be output continuously.
Gain	CAM_GainPosInq, CAM_Gain Direct	Controls the gain of the Sony Block. This feature is expressed in steps.
GainLimit	CAM_GainLimitInq, CAM_Gain Gain Limit	Controls the gain limit of the Sony Block in automatic exposure mode. This feature is expressed in steps.
GainLimitRaw	CAM_GainLimitInq, CAM_Gain Gain Limit	Controls the gain limit of the Sony Block in automatic exposure mode. This feature is expressed in steps.
GainRaw	CAM_GainPosInq, CAM_GainPosInq Direct	Controls the gain of the Sony Block. This feature is expressed in steps.
Gamma	CAM_GammaInq, CAM_Gamma	Selects the desired gamma curve of the Sony Block.
Grid	CAM_PrivacyZone (CenterLineOn)*	Controls the grid displayed on the screen.
HighSensitivity	CAM_HighSensitivityInq, CAM_HighSensitivity (On, Off)	Activates the high sensitivity mode of the Sony Block. In this mode, higher sensitivity gain is applied as standard gain increases, reaching a maximum gain level of up to 4x the standard gain.
InfraredCutFilter	CAM_ICRModeInq, CAM_ICR (On, Off)	Controls whether the infrared cut filter of the Sony Block is engaged. Setting **InfraredCutFilter** to **True** corresponds to the **CAM_ICR Off** command.
InfraredCutFilterAuto	CAM_AutoICRModeInq, CAM_AutoICR (On, Off)	Controls the auto ICR mode of the Sony Block. This mode automatically switches the settings needed for attaching or removing the infrared cut filter of the Sony Block.
InfraredCutFilterDarknessLevel	CAM_AutoICRThresholdInq, CAM_AutoICR Threshold	Controls the level of darkness that determines when the infrared cut filter is enabled/disabled in auto ICR mode.
InfraredFocusCompensation	CAM_IRCorrectionInq, CAM_IRCorrection (Standard, IR Light)	Controls the focus compensation of the Sony Block when the infrared cut filter is disabled.
Iris	CAM_IrisPosInq, CAM_Iris Direct	Controls the iris position of the block camera. The decimal delimiter "." is represented by "p" characters in enumeration entries.
IrisRaw	CAM_IrisPosInq, CAM_Iris Direct	Controls the iris position of the block camera in raw units.
LensInitialize	CAM_Initialize Lens	Initializes the zoom and focus of the Sony Block lens.
MultiLineTitleBlinking	CAM_MultilineTitle Title Set1	Controls whether the selected line blinks.
MultiLineTitleClear	CAM_MultilineTitle Title Clear	Resets the settings of the selected line or lines.
MultiLineTitleDisplay	CAM_MultilineTitle (On, Off)	Activates the display of the selected line or lines.
MultiLineTitleFontColor	CAM_MultilineTitle Title Set1	Controls the font color of the selected line or lines.

Table 4: Key Sony Block Camera Features (Continued)

Feature name	Sony VISCA commands	Description
MultiLineTitleOffsetX	CAM_MultilineTitle Title Set1	Controls the horizontal position of the selected line.
MultiLineTitleSelector	Mapped to the line number argument of the CAM_MultilineTitle (Title Set1, Title Set2, Title Set3, Title Clear, On, Off)	Selects the line to configure.
MultiLineTitleText	CAM_MultilineTitle (Tile Set2, Title Set3)	Sets the caption text for the selected line.
Mute	CAM_MuteModeInq, CAM_Mute (On, Off)	Mutes (blanks) the video that is output by the Sony Block.
NoiseReduction	CAM_NRInq, CAM_NR*	Controls the noise reduction level. There are 6 levels of adjustment, starting from “no noise reduction”.
PictureEffect	CAM_PictureEffectModeInq, CAM_PictureEffect (Off, Black & White)	Enables the Sony Block to perform negative/positive reversal of acquired images or to output them as monochrome.
ReverseX	CAM_LR_ReverseModeInq, CAM_PictureFlipModeInq, CAM_LR_Reverse (On, Off), CAM_PictureFlip (On, Off)	Flips the image sent by the Sony Block horizontally (LR reverse). The area of interest is applied after the image is flipped.
ReverseY	CAM_LR_ReverseModeInq, CAM_PictureFlipModeInq, CAM_LR_Reverse (On, Off), CAM_PictureFlip (On, Off)	Flips the image sent by the Sony Block vertically (picture flip). The area of interest is applied after the image is flipped.
SonyBlockAckTimeout	No direct mapping	Controls the amount of time that the SB-GigE-EV7520A waits for an acknowledgment from the Sony Block before timing out and reporting an error. The delay is expressed in ms.
SonyBlockCompletionTimeout	No direct mapping	Controls the amount of time that the SB-GigE-EV7520A waits between the time an acknowledgment is received from the Sony Block and the reception of a completion message, before timing out and reporting an error. The delay is expressed in ms.
SonyBlockDigitalVideoClockPresent	No direct mapping	Reports whether the SB-GigE-EV7520A detects the digital video clock of the Sony Block.
SonyBlockFirmwareVersion	CAM_VersionInq	Reports the firmware version of the block camera connected to the SB-GigE-EV7520A.
SonyBlockModel	CAM_VersionInq	Reports the model of the Sony Block connected to the SB-GigE-EV7520A.
SonyBlockModelID	CAM_VersionInq	Reports the model ID of the Sony Block connected to the Video Interface.

Table 4: Key Sony Block Camera Features (Continued)

Feature name	Sony VISCA commands	Description
SonyBlockSerialComLinkStatus	No direct mapping	Reports the status of the serial communication link between the Sony Block and the SB-GigE-EV7520A.
SonyBlockVideoModeCurrent/ SonyBlockVideoModeNext	CAM_RegisterValue, CAM_RegisterValueInq	**SonyBlockVideoModeCurrent.** Reports the primary video mode of the Sony Block after the last power cycle. The information is retrieved from the Monitoring Mode register of the Sony Block. **SonyBlockVideoModeNext.** Controls the video mode of the Sony Block after the next power cycle. This feature controls the Monitoring Mode register of the Sony Block. The register is set after the Sony Block is power cycled. See "Sony Block Camera Video Modes" on page 8 for the supported video modes.
StatusDisplay	CAM_DisplayModeInq, CAM_Display (On, Off)	Controls the block camera status display.
WDBlackCompensationLevel	CAM_WDParameterInq, CAM_WD On Set Parameter	Controls the blocked-up shadow correction level of the Sony Block.
WDBrightnessCompensation	CAM_WDParameterInq, CAM_WD On Set Parameter (Very dark, Dark, Standard, Bright))	Controls the wide dynamic brightness compensation of the Sony Block.
WDBrightnessLevel	CAM_WDParameterInq, CAM_WD On Set Parameter (0: Dark to 6: Bright)	Controls the wide dynamic brightness level of the Sony Block.
WDCompensationLevel	CAM_WDParameterInq, CAM_WD On Set Parameter (0: Low, 1: Mid, 2: High)	Controls the wide dynamic compensation level of the Sony Block.
WDMode	CAM_WDModeInq, CAM_WD (On, Off, VE On, Set Parameter)	Controls the wide dynamic range mode of the Sony Block.
Zoom	CAM_ZoomPosInq, CAM_Zoom Direct	Sets the zoom position of the Sony Block. The maximum value that this feature can be set to is a function of the digital zoom limit of the camera. **Note:** Before you set this feature, ensure that **TransportLayerControl** > **GigEVision** > **GevGVCPPendingAck** is set to **True** (**Guru** visibility is required). Otherwise an error can occur, since this feature takes longer to apply than others.
ZoomDigital	CAM_DZoomModeInq, CAM_DZoom (On, Off)	Controls whether digital zoom is enabled.

Table 4: Key Sony Block Camera Features (Continued)

Feature name	Sony VISCA commands	Description
ZoomDigitalLimitCurrent/ ZoomDigitalLimitNext	CAM_RegisterValueInq, CAM_RegisterValue	**ZoomDigitalLimitCurrent.** Reports the digital zoom limit of the Sony Block. The limit returned by this feature is a function of the value read from the E-Zoom Max register of the Sony Block after power up. **ZoomDigitalLimitNext.** Defines the digital zoom limit of the Sony Block after the next power cycle. This feature writes to the E-Zoom Max register of the Sony Block.
ZoomIn	CAM_Zoom (Tele (Standard), Tele (Variable))	Executes the zoom in function of the Sony Block. This feature zooms in from the current zoom position to the maximum, or until stopped by the **ZoomStop** command.
ZoomInLimitCurrent/ ZoomInLimitNext	CAM_RegisterValueInq, CAM_RegisterValue	**ZoomInLimitCurrent.** Reports the zoom in limit of the Sony Block. The limit returned by this feature is a function of the value read from the **Zoom Tele Limit** register of the Sony Block after power up or device reset. **ZoomInLimitNext.** Defines the zoom in limit of the Sony Block after the next power cycle or device reset. This feature writes to the **Zoom Tele Limit** register of the Sony Block.
ZoomInSpeed	No direct mapping	Controls the block camera's **Zoom In** speed.
ZoomMode	CAM_DZoomC/SModeInq, CAM_DZoom (Combine Mode, Separate Mode)	Controls the zoom mode of the Sony Block. In combined mode, the Sony Block switches to digital zoom mode after the optical zoom has reached its maximum level, if digital zoom is enabled. In separate mode, optical zoom and digital zoom are operated separately. In this mode, you can use digital zoom magnification from within any level of optical magnification.
ZoomOut	CAM_Zoom (Wide (Standard) and Wide (Variable))	Executes the zoom out function of the Sony Block. This feature zooms out from the current zoom position to the minimum, or until stopped by the **ZoomStop** command.
ZoomOutLimitCurrent/ ZoomOutLimitNext	CAM_RegisterValueInq, CAM_RegisterValue	**ZoomOutLimitCurrent.** Reports the zoom out limit of the Sony Block. The limit returned by this feature is a function of the value read from the **Zoom Wide Limit** register of the Sony Block after power up or device reset. **ZoomOutLimitNext.** Defines the zoom out limit of the Sony Block after the next power cycle or device reset. This feature writes to the **Zoom Wide Limit** register of the Sony Block.
ZoomOutSpeed	No direct mapping	Controls the zoom out speed of the Sony Block. This feature is not directly mapped to a particular Sony Block command, but determines which command is executed by the **ZoomOut** feature.

Table 4: Key Sony Block Camera Features (Continued)

Feature name	Sony VISCA commands	Description
ZoomRatio	CAM_Zoom Direct	Sets the zoom position of the Sony Block to a particular zoom ratio. The first ratio in the enumeration entry corresponds to the optical zoom, while the second one corresponds to the digital zoom. The decimal delimiter "." is represented by "p" characters in enumeration entries. **Note:** Before you set this feature, ensure that **TransportLayerControl** > **GigEVision** > **GevGVCPPendingAck** is set to **True** (**Guru** visibility is required). Otherwise an error can occur, since this feature takes longer to apply than others.
ZoomStop	CAM_Zoom Stop	Stops a zoom in or zoom out command.

* To send these Sony VISCA commands to the camera, use the SB-GigE-EV7520A serial interface. See "Accessing Sony VISCA Commands that are not Mapped to SB-GigE-EV7520A Features" on page 18.

Accessing Sony VISCA Commands that are not Mapped to SB-GigE-EV7520A Features

Some FCB-EV7520A block camera features are not mapped to SB-GigE-EV7520A features. The following table explains how to access these features.

Table 5: Accessing Sony VISCA Commands that are Not Mapped to SB-GigE-EV7520A Features

Camera feature	To use this functionality
CAM_ColorGain, CAM_ColorHue, CAM_ContrastAdjLevel, CAM_ExAperture, CAM_ExAutoICR, CAM_ExColorGain, CAM_ExColorHue, CAM_ExExpComp, CAM_FlickerReduction, CAM_GammaOffset, CAM_HLC, CAM_MD, CAM_MemSave, CAM_MinShutter, CAM_NR (2D/3D), CAM_PrivacyZone, CAM_VE	Access these features by sending the Sony VISCA command to the camera through serial communication. 1. Start eBUS Player and connect to the SB-GigE-EV7520A. 2. If the **Device Control** dialog box is open, close it. Leaving it open can result in a mismatch between the **Device Control** dialog box and the device settings, and will cause a red X to appear in the dialog box. 3. On the **Tools** menu, click **Device Serial Communication**. 4. In the **Port Selection** list, click **Bulk0** in the **Port** list. Leave the speed at the default setting (**Baud9600**). 5. Under **Send As**, select **Hexadecimal**. 6. Beside **Append**, clear the **CR** check box. 7. Under **Transcript**, select **Hexadecimal**. The **Transcript** section shows the transmitted data when you send commands. 8. Type the Sony VISCA command in the **Data** box. Before sending the command, change **8X** to **81**. For example, to set the **CAM_ColorGain** feature to the value 0X0A (which is 10), send the following command: `81 01 04 49 00 00 00 0A FF` For a complete list of serial commands, see the *Color Camera Module Technical Manual* for the Sony FCB-EV7520A block camera (D-023-100-11(1), 2018). 9. Click **Send**. The content of the files being transferred appears under **Transcript**. When the transfer is complete, a brief message appears at the end of the transmitted content in the **Transcript** section.
CAM_Custom, CAM_Memory	Use the SB-GigE-EV7520A userset feature instead of **CAM_Custom** and **CAM_Memory**.
CAM_IDWrite	Use the SB-GigE-EV7520A **DeviceUserID** feature instead of **CAM_IDWrite**.
CAM_Power	Power on/off the SB-GigE-EV7520A.

Chapter 3

SB-GigE-EV7520A Connections

This chapter describes the SB-GigE-EV7520A connections. It includes pinouts for the GPIO, serial, and power connector.

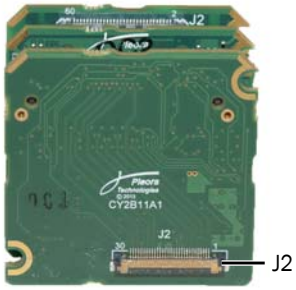
SB-GigE-EV7520A
Shown with the camera bracket and GPIO bracket extension that are used in the development kit

The following topics are covered in this chapter:

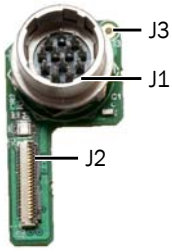
Connector Locations

The following images and table describe the SB-GigE-EV7520A connectors.

GigE PHY Board



Adapter Board (Back)



GPIO Board

The GPIO board, 12-pin circular connector, 20-pin FFC cable, and the 30-pin micro-coaxial cable are included in the SB-GigE-EV7520A OEM Kit and Development Kit (not the OEM Basic Kit). For more information about the SB-GigE-EV7520A models, see "SB-GigE-EV7520A Models" on page 6.

Table 6: SB-GigE-EV7520A Connections

ID	Location	Type	Description
J1	GigE PHY board	RJ-45 Ethernet connector	Interfaces the SB-GigE-EV7520A to Ethernet networks, as specified in IEEE 802.3. The Ethernet interface can operate at 100 or 1000 Mbps, and supports Internet Protocol Version 4 (IPv4). If PoE is enabled, power is supplied to the camera. For more information, see "PoE Powered" on page 32.
J9	GigE PHY board	20-pin external interface	Connects to the GPIO board with a 20-pin FFC cable, providing power and external signals. You can connect a 20-pin FFC cable to the GPIO board or to your own board (for example, if you need optoisolated GPIOs).
J3	GPIO board	GND pad	Prevents EMI when the SB-GigE-EV7520A is used with an isolated enclosure box. For more information, see "Power, GPIO, and Serial Pinouts: 12-Pin Connector on the GPIO Board" on page 27.
J1	GPIO board	12-pin circular connector	Provides power and external signals, such as serial communication and GPIO, to the SB-GigE-EV7520A. Receives 10 V to 16 V of unfiltered DC input. For detailed information, see "Powering the SB-GigE-EV7520A" on page 32.

Table 6: SB-GigE-EV7520A Connections (Continued)

ID	Location	Type	Description
J2	GPIO board	20-pin FFC connector	Connects to the GigE PHY board with a 20-pin FFC cable.
J2	Adapter board	30-pin IDC connector	Connects the Sony block camera to the SB-GigE-EV7520A. **Important:** The 30-pin coaxial board connector is very sensitive and can be damaged if used improperly. See the important information in "Important Precautions for the 30-Pin Micro-Coaxial Connector" on page 24.

Making SB-GigE-EV7520A Connections

To assemble the block camera and SB-GigE-EV7520A, begin by making the power, GPIO, and serial connections. Then, connect the SB-GigE-EV7520A to the block camera with the 30-pin micro-coaxial cable.

Required Items

You require the following items to connect the SB-GigE-EV7520A to the block camera:

- 30-pin micro-coaxial cable
- 20-pin FFC cable
- 12-pin circular connector with GPIO board

For information about how to attach the 30-pin micro-coaxial cable to the block camera, see step 2 of "To connect the SB-GigE-EV7520A to the GPIO board and the block camera" on page 22.

Connecting the SB-GigE-EV7520A to the GPIO Board and the Sony FCB-EV7520A Block Camera

The SB-GigE-EV7520A supplies power to the block camera. It also sends and receives serial signals, which allow you to send Sony VISCA commands to the block camera, such as zoom and focus.

Power is provided to the assembled block camera and SB-GigE-EV7520A through Power Over Ethernet (PoE) or through the 12-pin circular connector, which receives 10 V to 16 V of unfiltered DC input. If you are using PoE, please note that you will require a PoE NIC, PoE switch, or PoE injector.

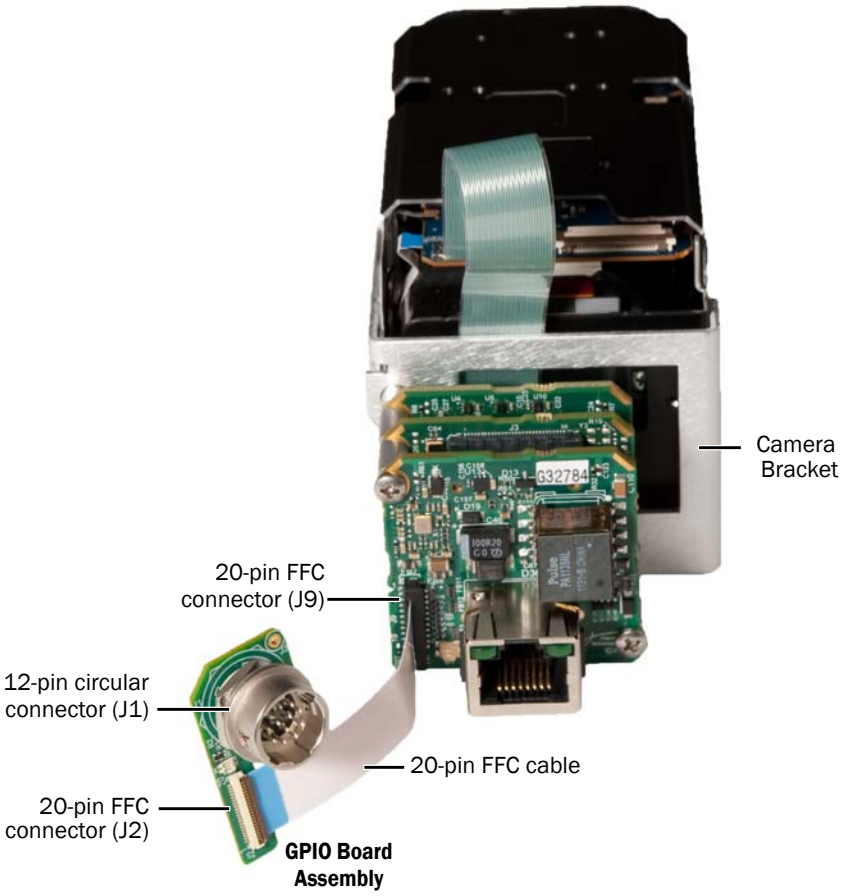
For power consumption information, see "Power Consumption with the Sony FCB-EV7520A Block Camera" on page 33.

Do not connect power to the SB-GigE-EV7520A through PoE or through the 12-pin circular connector until all connections are secure and verified.

To connect the SB-GigE-EV7520A to the GPIO board and the block camera

1. Connect the 20-pin FFC cable to the 20-pin FFC connector (J9) on the GigE PHY board and to the 20-pin FFC connector (J2) on the GPIO board.

   The metallic side of the cable ends should be oriented toward the circuit board in both cases.



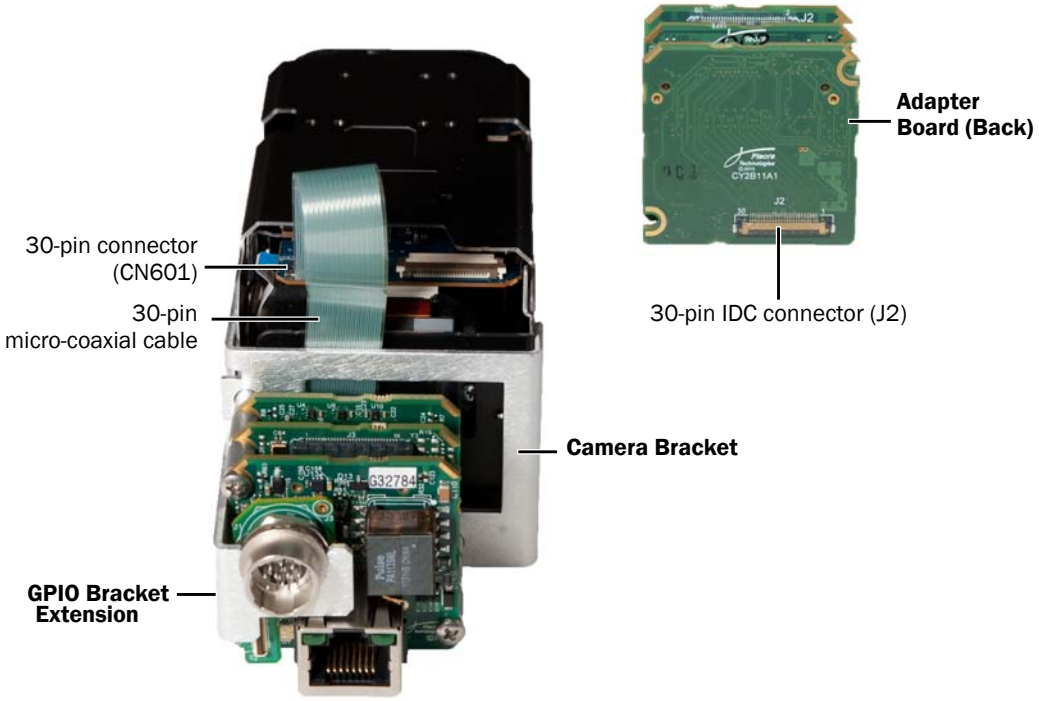
Continued on next page...

2. Connect the 30-pin micro-coaxial cable to the 30-pin micro-coaxial connector (CN601) on the top of the block camera.

Important: The 30-pin coaxial board connector is very sensitive and can be damaged if used improperly. See the important information in "Important Precautions for the 30-Pin Micro-Coaxial Connector" on page 24.

3. Connect the other end of the cable to the 30-pin IDC connector (J2) on the adapter board.

The cable ends should be oriented to allow the metallic side of the cable to touch the metallic side of the connector.



The image above shows the SB-GigE-EV7520A OEM board set mounted on the camera bracket and the GPIO bracket extension.

Important Precautions for the 30-Pin Micro-Coaxial Connector

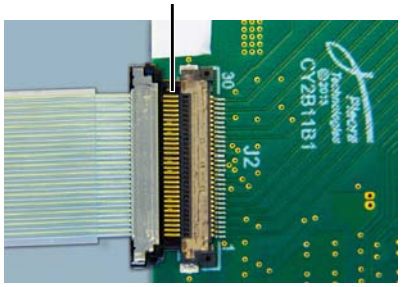
The 30-pin coaxial board connector on the Sony FCB-EV7520A camera provides digital video, control, and power signals. This connector is very sensitive, and can be easily damaged if used improperly with the SB-GigE-EV7520A.

It is important that you use care when inserting and withdrawing the cable connectors from the board connectors. Pleora is not responsible for damage to the SB-GigE-EV7520A if there is evidence of improper use.

To avoid damaging the board and cable connectors, Pleora recommends the following precautions:

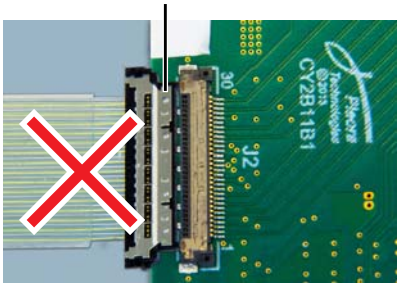
- Ensure the cable connectors are inserted with the correct orientation, as shown below. If the cable connector is inserted with the incorrect orientation, damage to the board and cable connectors will occur.

Gold Contacts



CORRECT when the gold contacts on the cable connector are visible.

Metal Shield



INCORRECT when the metal shield on the cable connector is visible.
NEVER insert a cable connector using this orientation.

- Avoid angled mating and keep the cable connector insertion as straight as possible. When inserting or withdrawing the cable connectors from the board connectors, do not use up-and-down or side-to-side wiggling motions. Doing so could damage the board and cable connectors.
- Do not touch a contact area or tail area of a contact while handling a board or cable connector.
- Avoid bent or contaminated contacts, which could cause reduced electrical performance or a bad connection.
- Avoid the use of excessive external force with a board or cable connector, forcible insertion or withdrawal, large impacts caused by dropping, or pulling the cable.

Note: If your images appear to have a purple hue, there could be a problem with the cable or connector. For more information, see "Images have a purple hue." on page 71.

30-Pin Micro-Coaxial Connector Details

Board Connector

The board connector is made by KEL Corporation, model USL00-30L-C. The SB-GigE-EV7520A uses a similar board connector (KEL Corporation, model USL00-30L-A).

Cable

A cable is required to connect the FCB-EV7520A camera to the Pleora SB-GigE-EV7520A. The recommended cable is made by KEL Corporation, model USL20-30SS-015-CH which has a cable connector at each end. The cable connectors mate with the board connectors.

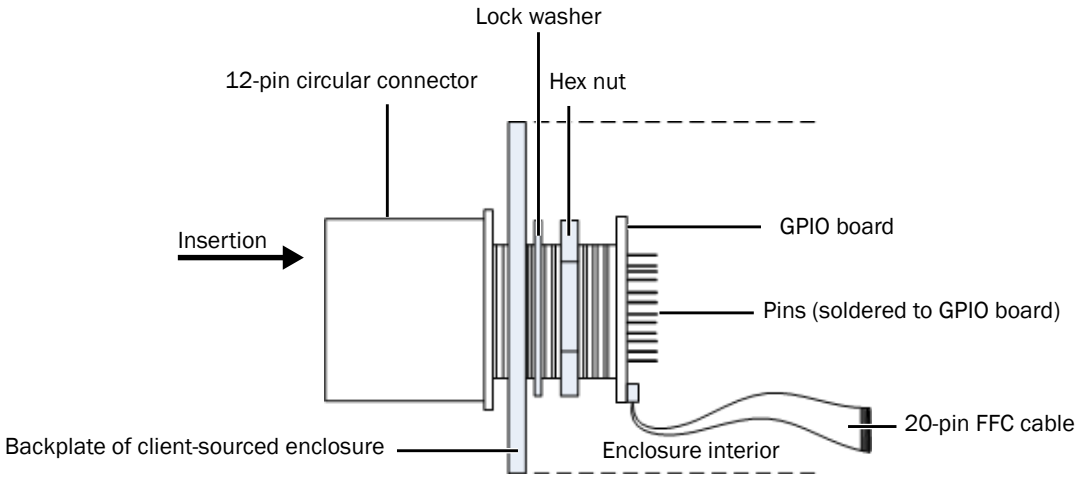
Mounting the Power, GPIO, and Serial Connector to an Enclosure Backplate

This section shows you how to mount the SB-GigE-EV7520A in an enclosure by securing the GPIO board and corresponding 12-pin power, GPIO, and serial circular connector to an enclosure backplate.

If you purchased the Development Kit, the OEM board set is already mounted with a bracket extension, along with the GPIO board and corresponding 12-pin power, GPIO, and serial circular connector.

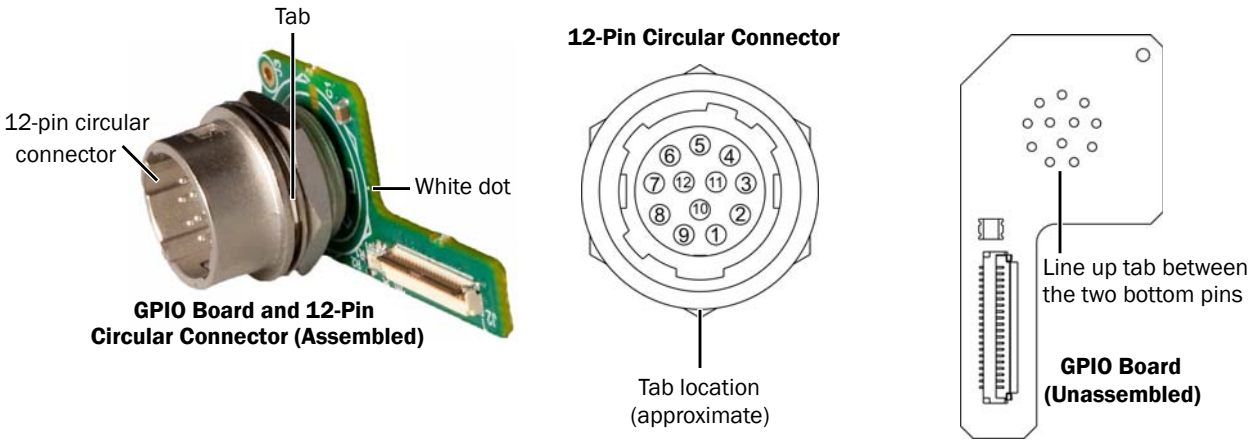
To mount the power, GPIO, and serial connector to an enclosure backplate

1. Insert the 12-pin circular (male) connector through the external side of the backplate.
2. Secure with washer and hex nut.
3. Connect the GPIO board (12 holes) to the base pins of the 12-pin circular connector through the internal side of the backplate.



4. Assemble the 12-pin power, GPIO, and serial circular connector to the GPIO board by lining up the pins with the GPIO board.

When oriented correctly, the tab on the 12-pin connector is aligned with the small white dot on the GPIO board, as shown in the following images.

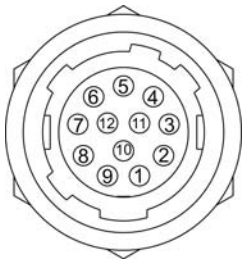


5. Solder the pins of the connector to the GPIO board for a secure connection.

Power, GPIO, and Serial Pinouts: 12-Pin Connector on the GPIO Board

The power, GPIO, and serial pinout descriptions are listed in the following table. For the connector location, see "Connector Locations" on page 20.

Figure 1: 12-Pin Male Circular Connector



The mating connector is a Hirose 12-pin circular connector, part number HR10A-10P-12P(73).

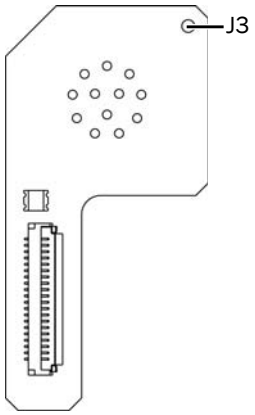
Table 7: 12-Pin Circular Connector Pinouts

Pin	Name	Type	PLC signal name	Notes
1	RET	Power return	N/A	Power ground.
2	VIN	Power input	N/A	Receives 10 V to 16 V unfiltered DC input. See table notes 1, 2, 3.
3	GPIO_IN3	GPIO input	GpioIn3	5 V (default)/3.3 V TTL GPIO input. See table notes 4, 5, 6, 7.
4	GPIO_OUT2	GPIO output	GpioOut2	5 V (default)/3.3 V TTL GPIO output. See table notes 4, 5, 7.
5	GND	Ground	N/A	Signal ground. See table note 8.
6	GPIO_IN2	GPIO input	GpioIn2	Information is the same as pin 3.
7	Reserved	Reserved	N/A	Reserved. Do not connect.
8	GPIO_IN1	GPIO input	GpioIn1	Information is the same as pin 3.
9	GPIO_OUT0	GPIO output	GpioOut0	Information is the same as pin 4.
10	GPIO_IN0	GPIO input	GpioIn0	Information is the same as pin 3.
11	RS232_TX	RS232_Tx	N/A	Mapped to Bulk1 interface. See table notes 4, 5, 9, and 10.
12	RS232_RX	RS232_Rx	N/A	Mapped to Bulk1 interface. Information is the same as pin 11.
Shell	GND_CHASSIS	Ground	N/A	For the purpose of EMI prevention, provide good electrical contact between the connector shell and the enclosure box. If you use an isolated enclosure box, connect it by wire to the GND pad (J3 on the GPIO board). See table note 11.

For a mapping of pins on the 12-pin circular connector and the 20-pin connectors on the GPIO board and the GigE PHY board, see "Mapping of Power, GPIO, and Serial Connector Pinouts" on page 31.

1. Protected by 600 W @ 1.0 ms PP Zener TVS, +/- 16 kV per HBM.
2. Reverse voltage protected.
3. Triple filtering scheme is used to filter EMI and conduct emissions, to pass EMC class-B.
4. Protected by ESD suppressors to IEC61000-4-2, Level 4 (+/-8 kV contact, +/-15 kV air discharge).
5. EMI filtered by 120 Ohm @ 100 MHz, 0.2 A ferrite bead.
6. Internal pull-down 73.2 KOhm.
7. All GPIO inputs and outputs are connected to the level shifter SN74LVC2T45DCUR. For the exact logic levels and driving strength, see the data sheet at www.ti.com/lit/ds/symlink/sn74lvc2t45.pdf.
8. Ferrite bead 0.2 A, 600 Ohm @ 100 MHz to the GND of the GigE PHY board.

9. Uses an 11 Ohm serial resistor.
10. Connected to the RS-232 transmitter/receiver MAX3221CPWR. For more information, see the data sheet at www.ti.com/lit/ds/symlink/max3221.pdf.
11. If you use an isolated enclosure box, it is recommended that you wire the shell of this connector to the ground on the GPIO board.



GPIO Board

The GPIO pins on the 12-pin circular connector (**GPIO_IN[0-3]**, **GPIO_OUT0**, and **GPIO_OUT2**) are mapped to **Line0** through **Line6** of the **DigitalIOControl\LineSelector** feature in the device's XML file. **Line7** (**GPIO_OUT3**) is not available on the 12-pin circular connector. **Line5** (**GPIO_OUT1**) is reserved and cannot be used.

Power, GPIO, and Serial Pinouts: 20-Pin Connector on the GigE PHY Board

The power, GPIO, and serial pinout descriptions are listed in the following table. For the connector location, see "Connector Locations" on page 20.

Table 8: 20-Pin Connector Pinouts

Pin	Name	Type	See table note...
1	RET	Power GND	1
2	RET	Power GND	1
3	RET	Power GND	1
4	VIN/PWR	Power input	1, 2, 3, 4, 5
5	VIN/PWR	Power input	1, 2, 3, 4, 5
6	VIN/PWR	Power input	1, 2, 3, 4, 5
7	GND/EMI_GND	Signal GND	10
8	GPIO_IN0	GPIO input	6, 7, 8, 9

Table 8: 20-Pin Connector Pinouts (Continued)

Pin	Name	Type	See table note...
9	GPIO_OUT0	GPIO output	6, 7, 9
10	GPIO_IN1	GPIO input	6, 7, 8, 9
11	Reserved	GPIO output	6, 7, 9
12	GPIO_IN2	GPIO input	6, 7, 8, 9
13	GPIO_OUT2	GPIO output	6, 7, 9
14	GPIO_IN3	GPIO input	6, 7, 8, 9
15	GPIO_OUT3	GPIO output	6, 7, 9
16	DBG_LED0	Status LED, cathode, OC	7, 13, 14
17	3.3V	Status LED, anode	7, 15
18	RS232_TX	RS232_TX	6, 7, 11, 12
19	RS232_RX	RS232_RX	6, 7, 11, 12
20	GND/EMI_GND	Signal GND	10

1. Maximum 0.5 A per pin, 1.5 A per three pins.
2. Protected by 600 W @ 1.0 ms PP Zener TVS, +/- 16 kV per HBM.
3. Reverse voltage protected.
4. Do not use if powering with PoE. Doing so will cause the SB-GigE-EV7520A to malfunction.
5. Triple filtering scheme is used to filter EMI and conduct emissions, to pass EMC class-B.
6. Protected by ESD suppressors to IEC61000-4-2, Level 4 (+/-8 kV contact, +/-15 kV air discharge).
7. EMI filtered by 120 Ohm @ 100 MHz, 0.2 A ferrite bead.
8. Internal pull-down 73.2 KOhm.
9. All GPIO inputs and outputs are connected to the level shifter SN74LVC2T45DCUR. For the exact logic levels and driving strength, see the data sheet at www.ti.com/lit/ds/symlink/sn74lvc2t45.pdf.
10. Ferrite bead 0.2 A, 600 Ohm @ 100 MHz to the GND of the GigE PHY board.
11. Uses an 11 Ohm serial resistor.
12. Connected to the RS-232 transmitter/receiver MAX3221CPWR. For more information, see the data sheet at www.ti.com/lit/ds/symlink/max3221.pdf.
13. Logical “0” (pulled-down) means that the backup firmware load is used; logical “1” (3.3 V) means that the main firmware load is used.
14. For information about the status LED, see the description of the **Power/Firmware** LED in “Status LEDs” on page 34.
15. Not protected by a fuse; cannot be used as a power output.

Mapping of Power, GPIO, and Serial Connector Pinouts

This section describes how the pins of the 12-pin connector on the GPIO board are directly routed to the 20-pin connectors on the GPIO board and GigE PHY board.

Table 9: 12-Pin Circular Connector to 20-Pin Connector Mapping

Name	Pin on the 12-pin circular connector — *J1 on GPIO Board*	Pin on the 20-pin connector — *J2 on GPIO Board*	Pin on the 20-pin connector — *J9 on GigE PHY Board*
RET	1	20	1
RET	1	19	2
RET	1	18	3
VIN/PWR	2	17	4
VIN/PWR	2	16	5
VIN/PWR	2	15	6
GND/EMI_GND	5	14	7
GPIO_IN0	10	13	8
GPIO_OUT0	9	12	9
GPIO_IN1	8	11	10
Reserved	7	10	11
GPIO_IN2	6	9	12
GPIO_OUT2	4	8	13
GPIO_IN3	3	7	14
GPIO_OUT3	N/C	6	15
DBG_LED0	N/C (to LED)	5	16
3.3V	N/C (to LED)	4	17
RS232_TX	11	3	18
RS232_RX	12	2	19
GND/EMI_GND	5	1	20

Powering the SB-GigE-EV7520A

The SB-GigE-EV7520A can be powered through an external power supply or using Power over Ethernet (PoE).

PoE Powered

The SB-GigE-EV7520A PoE circuitry can draw a maximum of 7.2 W continuously. The SB-GigE-EV7520A uses a maximum of 2.3 W. As a result, at least 4.7 W at 12 V is available for the camera head. The SB-GigE-EV7520A uses isolated PoE circuitry.

Important: If you plan on using zoom for a prolonged period of time, in particular autofocus mode, we strongly recommend that you use an external power supply (not PoE). When the focus feature is in use, the SB-GigE-EV7520A may draw more than 7.2 W. If this occurs for a prolonged period (more than a few seconds), the SB-GigE-EV7520A can overheat and permanent damage can occur.

External Power Supply — Input Signals

The following table lists the input power signals for the SB-GigE-EV7520A from an external power supply using the 12-pin circular connector.

Table 10: Input Signals from the Power and GPIO Connector

Name	Volts (V)	Notes
VIN	10 - 16 V	Efficiency of power circuitry (including drops on Schottky diodes) is flat in this range. Unfiltered DC power from an external power supply through the 12-pin Hirose connector. Reverse voltage protected, up to -30 VDC. The SB-GigE-EV7520A generates all internal power rails from the VIN signal. A resident common mode filter allows the input to be unfiltered, directly from a switching wall plug power supply. Maximum current is 1.5 A, limited by filtering circuitry.
RET	Ground	Ground for VIN.
GND	Ground	0 V relative to other voltages on the SB-GigE-EV7520A.

Power Consumption with the Sony FCB-EV7520A Block Camera

Conditions: External power supply, room temperature. The **FocusAuto** feature is set to **Off**.

Table 11: Power Consumption with External Power Supply

External power	Streaming?	Width	Height	Pixel format	Data rate (Mbps)	Average power (W)
HD_720p_30Hz video mode						
10 V	No	1280	720	N/A	Idle	5.2
	Yes	1280	720	BayerGR8	221	5.3
	Yes	1280	720	YCbCr709_422_8_CbYCrY	442	5.4
12 V	No	1280	720	N/A	Idle	5.2
	Yes	1280	720	BayerGR8	221	5.3
	Yes	1280	720	YCbCr709_422_8_CbYCrY	442	5.3
HD_1080p_25Hz video mode						
10 V	No	1920	1080	N/A	Idle	5.4
	Yes	1920	1080	BayerGR8	415	5.5
	Yes	1920	1080	YCbCr709_422_8_CbYCrY	829	5.6
12 V	No	1920	1080	N/A	Idle	5.4
	Yes	1920	1080	BayerGR8	415	5.5
	Yes	1920	1080	YCbCr709_422_8_CbYCrY	829	5.6

Conditions: PoE, room temperature, Netgear ProSafe M4100-26G-POE switch. The **FocusAuto** feature is set to **Off**.

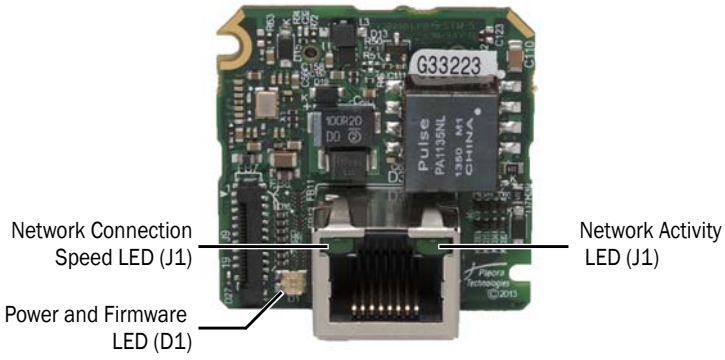
Table 12: Power Consumption with PoE

PoE power	Streaming?	Width	Height	Pixel format	Data rate (Mbps)	Average power (W)*
HD_720p_30Hz video mode						
48 V	No	1280	720	N/A	Idle	6.0
	Yes	1280	720	BayerGR8	221	6.0
	Yes	1280	720	YCbCr709_422_8_CbYCrY	442	6.1
HD_1080p_25Hz video mode						
48 V	No	1920	1080	N/A	Idle	6.0
	Yes	1920	1080	BayerGR8	415	6.1
	Yes	1920	1080	YCbCr709_422_8_CbYCrY	829	6.3

*Power consumption is similar for PoE at 56 V.

Status LEDs

The status LEDs indicate the operating status of the network connection and firmware, as described in the following figure and table.



SB-GigE-EV7520A External Frame Grabber
GigE PHY Board

Table 13: Status LEDs

LED	ID	Description
Power and firmware	D1	**Green.** The SB-GigE-EV7520A is receiving power and the main firmware load is being used. **Yellow.** The SB-GigE-EV7520A is receiving power and the backup firmware load is being used.* **Off.** The SB-GigE-EV7520A is not receiving power. **Note:** The LED on the GPIO board (D1) also shows this status.
Network activity	J1	**Off.** No Ethernet connection. **Green, on.** Ethernet link. **Green, on flashing.** Data is being transmitted or received.
Network connection speed	J1	**Off.** No connection, 10 Mbps connection, or 100 Mbps connection. **Green, on.** 1 Gbps connection.

*For information about the slide switches that are used to specify the firmware load, see "Changing to the Backup Firmware Load" on page 74.

Chapter 4

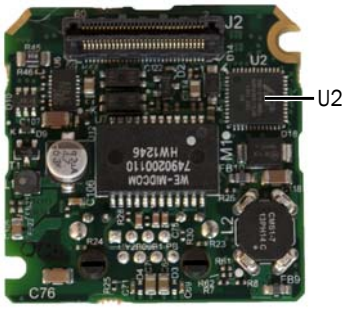
Thermal Requirements

This chapter provides you with the information you need to ensure the optimal operating temperature for the SB-GigE-EV7520A.

You should store the SB-GigE-EV7520A at temperatures between -40° to +85°C.

Ambient and Junction Temperatures

The following images and table outline the components that consume the largest amount of power on the SB-GigE-EV7520A, and that therefore are most likely to be heated beyond an optimal operating temperature. If you are designing a product that exceeds the thermal guidelines outlined in this chapter, you must provide a method to cool these components using a heat sink or thermal pad.



SB-GigE-EV7520A GigE PHY Board

FPGA Board*

Source manufacturer, description, and identification may vary and are subject to change for each connector.

Table 14: Thermal Guidelines

Reference designator	Location	Rating for component on standard Pleora product
U2	GigE PHY Board	Marvell PHY, 88E1510 Ambient: 0° to +70°C Junction: 0° to +125°C Power consumption: ~ 450 mW
U1	FPGA board*	Altera FPGA, 5CEFA4U19C8N Ambient: Not specified Junction: 0° to +85°C Junction-to-case thermal resistance θJC: 5 (° C/W) Junction-to-ambient thermal resistance θJA: • Still Air: 23.6 (° C/W) • 100 ft./min: 19.5 (° C/W) • 200 ft./min: 17.5 (° C/W) • 400 ft./min: 15.9 (° C/W) Case: Not specified Power consumption: ~ 850-1000 mW
U2	FPGA board*	Samsung DDR3, K4B1G1646G-BCH9000 Ambient: Not specified Junction: Not specified Case: 0° to +95°C Power consumption: ~ 100-200 mW

*__Note:__ The FPGA board is the middle board, located between the GigE PHY board and the adapter board.

Chapter 5

Signal Handling

The SB-GigE-EV7520A includes a programmable logic controller (PLC) that lets you control external machines and react to inputs. By controlling your system using the PLC, you can make functional changes, adjust timing, or add features without having to add new hardware.

PLC Programming Signals

For an introduction to the PLC and for detailed information about how PLC signals are handled, see the *iPORT Advanced Features User Guide*, available on the Pleora Support Center at supportcenter.pleora.com.

The following table lists the PLC input and output programming signals that are specific to the SB-GigE-EV7520A, and indicates the pins on which they are available.

Table 15: PLC Signal Usage

PLC signal	PLC equation usage	Associated pin/signal
Pb0Fval	Input	Deserialized VSYNC signal from block camera.
Pb0Lval	Input	Deserialized HYSNC signal from block camera.
Pb0Dval	Input	Deserialized DE signal from block camera.
Pb0Spare	Input	Internally tied to GND on block camera.
GpioIn0	Input	Pin 10 (GPIO_IN0) on the 12-pin circular connector.
GpioIn1	Input	Pin 8 (GPIO_IN1) on the 12-pin circular connector.
GpioIn2	Input	Pin 6 (GPIO_IN2) on the 12-pin circular connector.
GpioIn3	Input	Pin 3 (GPIO_IN3) on the 12-pin circular connector.

Table 15: PLC Signal Usage (Continued)

PLC signal	PLC equation usage	Associated pin/signal
BufferWM0	Input	No associated pin.
Grb0AcqActive	Input	No associated pin.
PlcCtrl0	Input	No associated pin.
PlcCtrl1	Input	No associated pin.
PlcCtrl2	Input	No associated pin.
PlcCtrl3	Input	No associated pin.
GpioOut0	Input, output	Pin 9 (GPIO_OUT0) on the 12-pin circular connector.
GpioOut2	Input, output	Pin 4 (GPIO_OUT2) on the 12-pin circular connector.
PlcFval0	Input, output	No associated pin.
PlcLval0	Input, output	No associated pin.
PlcTrig0	Input, output	No associated pin.
PlcTimestampCtrl	Input, output	No associated pin.
Timer0Trig	Input, output	No associated pin.
Timer0Out	Input	No associated pin.
Timer1Trig	Input, output	No associated pin.
Timer1Out	Input	No associated pin.
Counter0Reset	Input, output	No associated pin.
Counter0Inc	Input, output	No associated pin.
Counter0Dec	Input, output	No associated pin.
Counter0Eq	Input	No associated pin.
Counter0Gt	Input	No associated pin.
Counter1Reset	Input, output	No associated pin.
Counter1Inc	Input, output	No associated pin.
Counter1Dec	Input, output	No associated pin.
Counter1Eq	Input	No associated pin.
Counter1Gt	Input	No associated pin.
Rescaler0In	Input, output	No associated pin.
Rescaler0Out	Input	No associated pin.
Delayer0In	Input, output	No associated pin.
Delayer0Out	Input	No associated pin.
Event0	Input, output	No associated pin.
Event1	Input, output	No associated pin.

Table 15: PLC Signal Usage (Continued)

PLC signal	PLC equation usage	Associated pin/signal
Event2	Input, output	No associated pin.
Event3	Input, output	No associated pin.
ActionTrig0	Input	No associated pin.
ActionTrig1	Input	No associated pin.

Chapter 6

Bulk Interfaces

The SB-GigE-EV7520A has two bulk interface ports available for serial communication.

The Bulk0 interface is reserved for communication and VISCA commands between the SB-GigE-EV7520A and the Sony FCB-EV7520A block camera. The interface is preconfigured for optimal settings; the settings cannot be altered using the GenICam browser, but can be altered programmatically. However, we strongly recommend that you do not change the settings.

If you need to send VISCA commands directly over the Bulk0 interface, you should not use the same commands as the ones mapped by the SB-GigE-EV7520A. For example, the **Zoom** feature uses the **CAM_ZoomPosInq** and **CAM_Zoom** VISCA commands. If you use the same VISCA command that is already mapped to these GenICam features, the SB-GigE-EV7520A can become unsynchronized with the Sony block camera. This method should be specifically reserved for features that are not mapped to the GenICam interface of the SB-GigE-EV7520A. For a list of VISCA commands that are in use, see "Key Sony Block Camera Features" on page 9.

The Bulk1 interface supports an RS-232 interface for communication with external system elements. The Bulk1 interface is available on the 12-pin circular connector.

The interface supports:

- 8-bit data transfer
- 1 start bit
- Programmable stop bit(s): 1 or 2
- Parity: Even, odd, or none
- Baud rates:
  - Predefined rates: 9600, 14400, 19200, 28800, 38400, 57600, 115200
  - Programmable
- Loopback mode from downstream to upstream

The following GenICam features are available for serial communication configuration.

Table 16: GenICam Features Available for Serial Communication

Feature	Description
BulkSelector*	Selects the Bulk interface to configure.
BulkBaudRate*	Selects a predefined baud rate or programmable option.
BulkBaudRateFactor*	Programs a user-defined baud rate.
BulkBaudRateValue	Represents the actual baud rate computed from the **BulkBaudRateFactor** feature. Only available when **BulkBaudRate** is set to **Programmable**.
BulkLoopback*	Receives serial data sent from a host computer application to the video interface and loops it back to the host computer application.
BulkNumOfStopBits*	Selects a stop bit option (either 1 or 2).
BulkParity*	Selects a parity option (None, Even, or Odd).
BulkUpstreamFifoWatermark*	Sets the level of upstream FIFO at which a GigE Vision event is generated.
SonyBlockAckTimeout**	Controls the amount of time that can pass during which the SB-GigE-EV7520A waits for an acknowledgment from the Sony block camera. If the amount of time that passes is more than the configured amount, the SB-GigE-EV7520A times out and reports an error. The time duration is expressed in ms.
SonyBlockCompletionTimeout**	Controls the amount of time that can pass between when the SB-GigE-EV7520A receives an acknowledgment from the Sony block camera and when the SB-GigE-EV7520A receives a completion message. If the amount of time between the acknowledgment and the completion message is more than the configured amount, the SB-GigE-EV7520A times out and reports an error. The time duration is expressed in ms.
SonyBlockSerialComLinkStatus**	Reports the status of the serial communication link between the Sony FCB-EV7520A block camera and the SB-GigE-EV7520A. This feature appears in the **Status** category in the **Device Control** dialog box, whereas the other features in this table appear under **PortCommunication**.

* These features apply to Bulk1.

** These features only apply to Bulk0, which is reserved for communication with the Sony FCB-EV7520A block camera; the settings are preconfigured and should not be changed.

Chapter 7

Installing the eBUS SDK

This chapter describes how to install the eBUS SDK, and also provides information about installing the required driver.

The following topics are covered in this chapter:

Installing the eBUS SDK

You can install the Pleora Technologies eBUS SDK on your computer to configure and control your SB-GigE-EV7520A.

The eBUS SDK includes:

- Pleora's eBUS Player application, which allows you to control the SB-GigE-EV7520A parameters and view video from the FCB-EV7520A connected to the SB-GigE-EV7520A.
- An extensive library of sample applications, with source code, to create working applications for device configuration and control, image and data acquisition, and image display and diagnostics.
- Drivers that optimize the performance of your system.

It is possible for you to configure the SB-GigE-EV7520A using other GenICam compliant software, however, this guide provides you with the instructions you need to use the Pleora eBUS Player application.

Installing the eBUS Universal Pro Driver

The eBUS SDK includes a GigE Vision driver that enhances existing general-purpose drivers shipped with NICs, increases image acquisition throughput and performance, decreases latency and jitter, and minimizes CPU utilization.

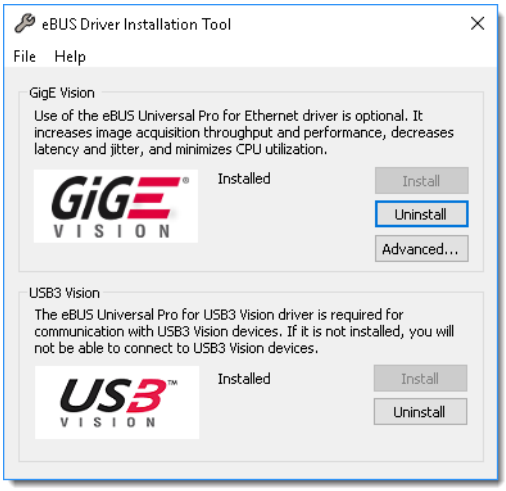
The USB3 Vision driver, which is available during the installation of the eBUS SDK, is for use with USB3 Vision compliant devices, such as the Pleora SB-U3 External Frame Grabber.

The drivers are selected for installation by default during the eBUS SDK installation process. If you choose not to install the drivers (or want to uninstall either driver), you can use the eBUS Driver Installation Tool.

To use the eBUS Driver Installation Tool

1. Click **Start** > **All Programs** > **eBUS SDK** > **eBUS Driver Installation Tool**.
2. Under **GigE Vision**, click **Install** or **Uninstall**.

   After a moment the driver status changes. If you are installing a driver, the driver is installed across all network adapters on your computer.



3. Close the eBUS Driver Installation Tool.

   You may be required to restart your computer.

To see the versions of the installed drivers, click **Help** > **About**.

Chapter 8

Configuring Your Computer's NIC

When using the SB-GigE-EV7520A and connected block camera, you may observe high data rates (above 800 Mb/s) that are close to the physical limit of Gigabit Ethernet (1000 Mb/s). This chapter provides guidance on how to configure your SB-GigE-EV7520A to maximize the performance of your system.

The following topics are covered in this chapter:

Configuring the NIC for Communication with the SB-GigE-EV7520A

For optimal performance, we recommend that you enable jumbo packets (also known as jumbo frames) and set the receive descriptors (also known as receive buffers) to the maximum available value.

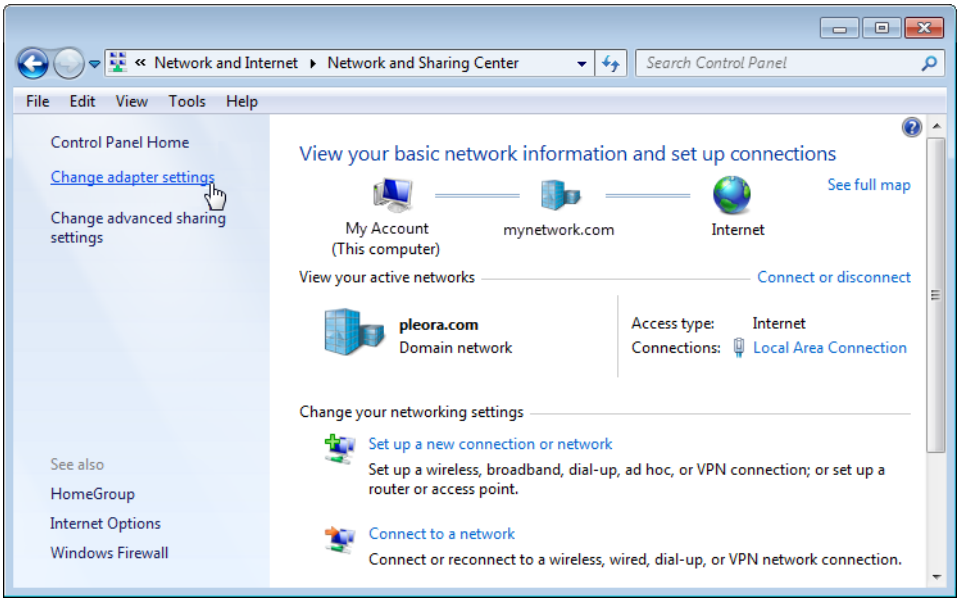
The instructions in this section are based on the Windows 7 operating system. The steps may vary depending on your computer's operating system.

To configure the NIC for optimal performance

1. In the Windows Control Panel, click **Network and Internet**.

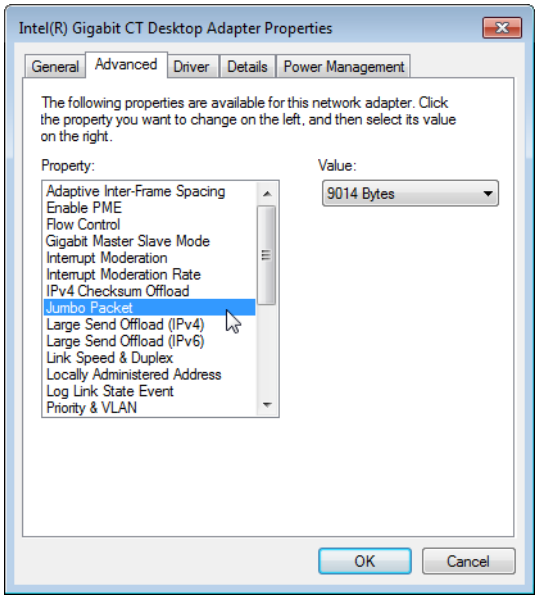
2. Click **Network and Sharing Center**.

3. In the left-hand panel, click **Change adapter settings**.



4. Configure the NIC for jumbo packets (more often referred to as jumbo frames) and set the NIC's **Receive Buffers** (**Receive Descriptors**) to the maximum available value. Using jumbo packets allows you to increase system performance. However, you must ensure your NIC and GigE switch (if applicable) support jumbo packets.

   To complete this task, right-click the NIC and click **Properties**. Then, click **Configure**. The exact configuration procedure, as well as the jumbo packet size limit, depends on the NIC.



5. Close the open dialog boxes to apply the changes and close the Control Panel.

Calculating the Required Bandwidth

To calculate the approximate bandwidth that is required, use the following formula. Keep in mind that this calculation results in an approximate value, and does not take into account Ethernet, IP, UDP, and GigE Vision overhead. Note that each image is broken up into many packets, which should be considered when determining overhead.

PayloadSize (MB) x 8 x Frames Per Second = Bandwidth (Mbps)

PayloadSize is automatically calculated by the device, based on the selected image settings, which include **Width**, **Height**, **OffsetX**, **OffsetY**, **PixelSize**, and any padding that has to be added to the image payload. To see the **PayloadSize**, open eBUS Player, connect to the SB-GigE-EV7520A, and then click **Device control**. **PayloadSize** appears in the **TransportLayerControl** category.

For example, for an SB-GigE-EV7520A configured to use HD_720p_60Hz with a **PayloadSize** of 1.84 MB, the equation would look like this:

1.84 MB x 8 x 60 Hz = 883.2 Mbps

Understanding the Effect of the Features on Bandwidth and Performance

This section provides a summary of the features that you can adjust to maximize the bandwidth and performance of your system. For detailed information about maximizing your performance, see the *Configuring Your Computer and Network Adapters for Best Performance* knowledge base article available on the Pleora Support Center (supportcenter.pleora.com).

Width, Height, and Pixel Format

The **Width**, **Height**, and **PixelSize** have a direct effect on the bandwidth that is used between the SB-GigE-EV7520A and the computer. Increasing the width and the height of the image will result in larger frames being streamed from the SB-GigE-EV7520A.

Interpacket Delay

Burst traffic from the Sony block camera can cause **AUTO_ABORT** or **MISSING_PACKET** errors. To avoid these errors, you can increase the interpacket delay (**TransportLayerControl\GevSCPD**) to spread the burst effect. The interpacket delay is the time the SB-GigE-EV7520A waits before sending each packet of an image. If **GevSCPD** is set too high, then you may observe that the **BlocksDropped** (part of the **Status** statistics in the **Image Stream Control** dialog box) is increasing.

Acquisition Frame to Skip

If the SB-GigE-EV7520A drops frames because of high bandwidth usage (close to 1 Gigabit), you can reduce the bandwidth by adjusting the **AcquisitionControl\AcquisitionFrameToSkip** feature.

You can set this feature to **2** to skip two frames and then send one frame, resulting in one out of every three frames being sent, for example.

Packet Size

To decrease the CPU resources required to reassemble full frames, you can increase the **GevSCPSPacketSize**. Doing so increases the size of each packet, resulting in fewer packets, thereby reducing the amount of CPU that is used for packet reassembling. Depending on the **GevSCPSPacketSize** you choose, you may need a NIC that supports jumbo packets.

You can also set the **AutoNegotiation** feature to **True**, which allows the eBUS SDK to negotiate the largest packet size that the computer can receive. When acquisition starts, you can see the value that was negotiated for the **GevSCPSPacketSize** feature.

On some occasions, your computer may display a **Connection Lost** error. This can occur when a NIC does not properly support jumbo packets. If this occurs, you can either disable jumbo packets on the NIC or disable the **AutoNegotiation** feature and set the **DefaultPacketSize** manually.

Please note that if you execute the **DeviceReset** command, the **GevSCPSPacketSize** is reset to **576**. To avoid this limitation, you can set the **GevSCPSPacketSize** manually or override this feature using the User Set. The User Set is a feature that lets you save the changes you make to your SB-GigE-EV7520A settings (and ensures that the change is maintained when power cycling the SB-GigE-EV7520A). For more information about User Sets, see the *eBUS Player User Guide*.

Chapter 9

Connecting to the SB-GigE-EV7520A and Configuring General Settings Using eBUS Player

After you have set up the physical connections to the SB-GigE-EV7520A and installed the eBUS SDK, you can start eBUS Player to configure image settings to ensure images are received and displayed properly. You can also configure the buffer options to reduce the likelihood of lost packets.

eBUS Player is documented in more detail in the *eBUS Player User Guide*. The *iPORT SB-GigE-EV7520A External Frame Grabber User Guide* provides you with the eBUS Player instructions and overviews required to set up and configure general settings for the block camera and SB-GigE-EV7520A.

The following topics are covered in this chapter:

Confirming Image Streaming

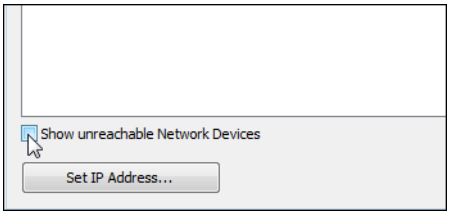
After the SB-GigE-EV7520A is physically connected to the computer, use eBUS Player to stream images from the camera.

For detailed instructions about how to use eBUS Player, see the *eBUS Player for Windows and Linux User Guide* available on the Pleora Support Center at supportcenter.pleora.com.

To start eBUS Player and connect to the SB-GigE-EV7520A

1. Start eBUS Player from the Windows Start menu.
2. Click **Select/Connect**.

   If the SB-GigE-EV7520A does not appear in the list that appears, click the **Show unreachable Network Devices** check box to show all devices.



3. In the **Device Selection** dialog box, click the SB-GigE-EV7520A and then click **OK**.

If the IP address is not compatible with the SB-GigE-EV7520A, a warning ( ) appears in the **Device Selection** dialog box. Provide the device with an IP address, as outlined in "Providing the SB-GigE-EV7520A with an IP Address" on page 54.

eBUS Player is now connected to the device.

To stream images from the camera

1. Click **Play** to stream live images from the camera.
2. After you confirm that images are streaming, click **Stop**.

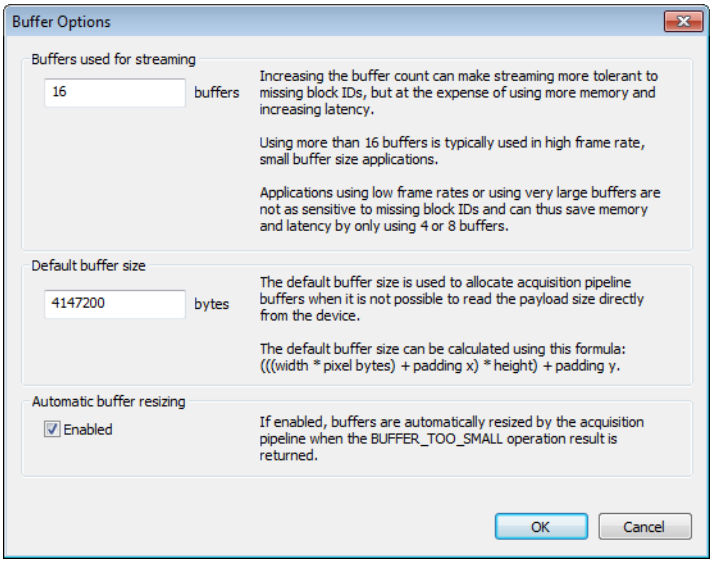
If images do not stream, see the tips provided in "System Troubleshooting" on page 69.

Configuring the Buffers

You can increase the buffer count using eBUS Player to make streaming more robust. A high number of buffers are needed in high frame rate applications, while a small number of buffers are needed for lower frame rates. Latency increases as the number of buffers increases.

To configure the buffers

1. Start eBUS Player.
2. Click **Tools** > **Buffer Options**.
3. Click the buffer option that suits your requirements.
4. Click **OK**.



Default buffer count is 16 buffers.

Providing the SB-GigE-EV7520A with an IP Address

The SB-GigE-EV7520A requires an IP address to communicate on a video network. This address must be on the same subnet as the computer that is performing the configuration and receiving the image stream.

To provide the SB-GigE-EV7520A with an IP address

1. Start eBUS Player.
2. Click **Select/Connect**.
3. Click the SB-GigE-EV7520A.

   If the SB-GigE-EV7520A does not appear in the list, click the **Show unreachable Network Devices** check box to show all devices.

   If the IP address is not compatible with the NIC, a warning () appears in the **Device Selection** dialog box.
4. Click **Set IP Address**.
5. Provide the SB-GigE-EV7520A with a compatible IP address and subnet mask. You can optionally provide a default gateway.

   Note that this information is temporary and is reset when you power down the SB-GigE-EV7520A. To set an IP address that is used permanently, see the next procedure in this guide.

If you are using a unicast network configuration, the management entity/data receiver and the SB-GigE-EV7520A must be on the same subnet. The unicast network configuration is outlined in "Unicast Network Configuration" on page 60.

6. Click **OK** to close the **Set IP Address** dialog box.
7. Click **OK** to close the **Device Selection** dialog box and connect to the SB-GigE-EV7520A.

Configuring the SB-GigE-EV7520A with an Automatic/Persistent IP Address

The Device Control dialog box allows you to configure a persistent IP address for the SB-GigE-EV7520A. Alternatively, the SB-GigE-EV7520A can be configured to automatically obtain an IP address using Dynamic Host Configuration Protocol (DHCP) or Link Local Addressing (LLA). The SB-GigE-EV7520A uses its persistent IP address first, but if this option is set to **False**, it can be configured to attempt to obtain an address from a DHCP server. If this fails, it will use LLA to find an available IP address. LLA cannot be disabled and is always set to **True**.

The SB-GigE-EV7520A can use the persistent IP address each time it is powered up as long as the IP address is valid and there are no IP address conflicts.

To configure a persistent IP address

1. Start eBUS Player and connect to the SB-GigE-EV7520A.

   For more information, see "To start eBUS Player and connect to the SB-GigE-EV7520A" on page 52.
2. Under **Parameters and Controls**, click **Device control**.
3. Under **TransportLayerControl** > **GigEVision**, set the **GevCurrentIPConfigurationPersistentIP** feature to **True**.
4. Set the **GevPersistentIPAddress** feature to an IP address that is compatible with your computer's NIC.
5. Set the **GevPersistentSubnetMask** feature to a valid subnet mask address.
6. Optionally, enter a compatible default gateway in the **GevPersistentDefaultGateway** field.
7. Close the **Device Control** dialog box.
8. Power cycle the SB-GigE-EV7520A and connected block camera.

Instead of power cycling the SB-GigE-EV7520A and connected block camera, you can execute the **DeviceReset** command:

1. In the **Device Control** dialog box, click **Guru** in the **Visibility** list.
2. set **TransportLayerControl** > **GigE Vision** > **GevGVCPPendingAck** to **True**.
3. Click **DeviceControl** > **DeviceReset**.

To automatically configure an IP address

1. Start eBUS Player and connect to the SB-GigE-EV7520A.

   For more information, see "To start eBUS Player and connect to the SB-GigE-EV7520A" on page 52.
2. Under **Parameters and Controls**, click **Device control**.
3. Under **TransportLayerControl** > **GigEVision**, set the **GevCurrentIPConfigurationPersistentIP** feature to **False**.
4. Set the **GevCurrentIPConfigurationLLA** and/or **GevCurrentIPConfigurationDHCP** values to **True**, depending on the type of automatic addressing you require.
5. Close the **Device Control** dialog box.
6. Power cycle the SB-GigE-EV7520A and connected block camera.

Instead of power cycling the SB-GigE-EV7520A and connected block camera, you can execute the **DeviceReset** command:

1. In the **Device Control** dialog box, set **TransportLayerControl** > **GigE Vision** > **GevGVCPPendingAck** to **True**.
2. Click **DeviceControl** > **DeviceReset**.

Configuring the SB-GigE-EV7520A's Image Settings

You can configure the SB-GigE-EV7520A's image settings, which provide the SB-GigE-EV7520A with information about the image coming from the camera. These settings allow the images to appear correctly. The SB-GigE-EV7520A can also generate a unique test pattern, which is useful when testing your device. By default, the SB-GigE-EV7520A streams live video from the connected block camera and the test pattern is disabled.

The image settings are located under **ImageFormatControl** in the **Device Control** dialog box.

Changes that you make to the SB-GigE-EV7520A are not persisted across power cycles, unless you use the **UserSetSave** feature. For information about saving feature settings that will be persisted across power cycles, see the *eBUS Player User Guide*, available on the Pleora Support Center.

To turn the test pattern on or off

1. Start eBUS Player and connect to the SB-GigE-EV7520A.

   For more information, see "To start eBUS Player and connect to the SB-GigE-EV7520A" on page 52.
2. If images are streaming, click the **Stop** button.
3. Under **Parameters and Controls**, click **Device control**.
4. Under **ImageFormatControl**, click a test pattern option (**Off** or **iPORTTestPattern**) in the **TestPattern** list.
5. Close the **Device Control** dialog box.

To change the pixel format

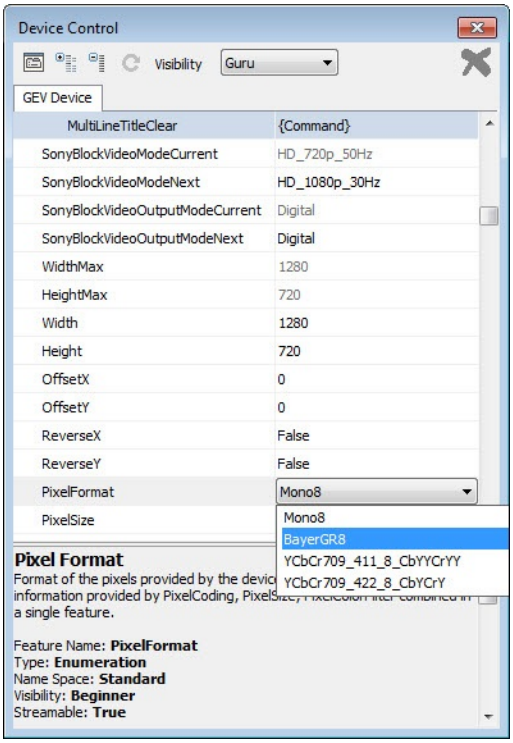
1. Start eBUS Player and connect to the SB-GigE-EV7520A.

   For more information, see "To start eBUS Player and connect to the SB-GigE-EV7520A" on page 52.

2. If images are streaming, click the **Stop** button.
3. Under **Parameters and Controls**, click **Device control**.
4. Under **ImageFormatControl**, set the **PixelFormat** feature to a color format.

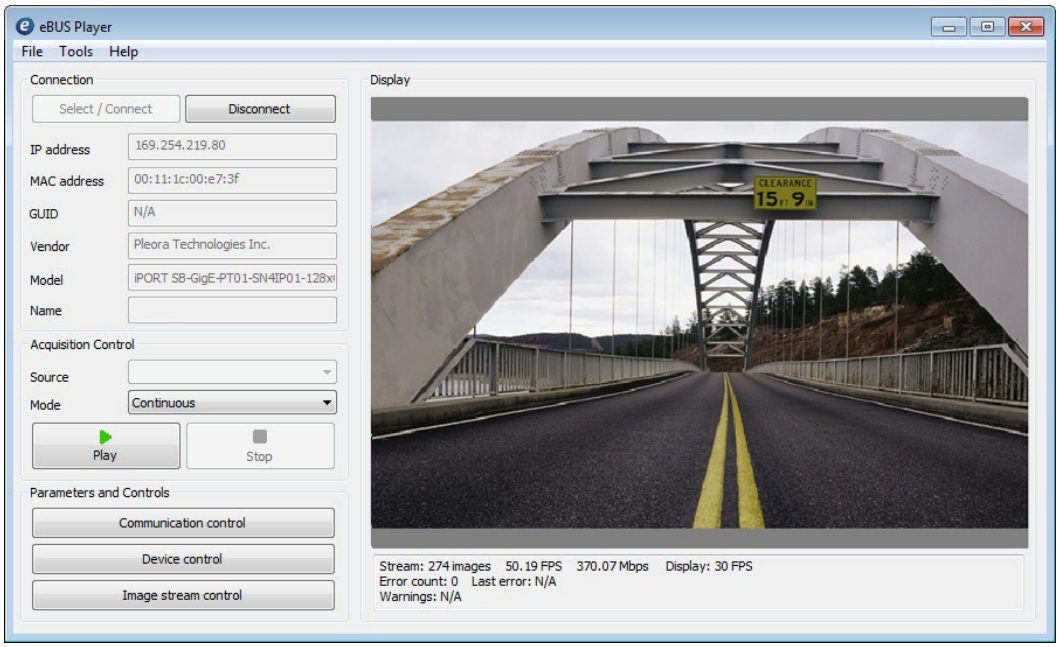
   Notes:

   - If **TestPattern** is set to **iPORTTestPattern**, the only available pixel format is **YCbCr709_422_8_CbYCrY**.
   - The available pixel formats vary, depending on the current video mode (**SonyBlockVideoModeCurrent**). For a table that shows the available pixel formats based on video mode, see "Sony Block Camera Video Modes" on page 8.



5. Close the **Device Control** dialog box.

6. Click **Play** to see the changes.



To configure the image width and height

1. Start eBUS Player and connect to the SB-GigE-EV7520A.

   For more information, see "To start eBUS Player and connect to the SB-GigE-EV7520A" on page 52.
2. If images are streaming, click the **Stop** button.
3. Under **Parameters and Controls**, click **Device control**.
4. Under **ImageFormatControl**, change the **Width** and **Height** to suit your camera.
5. Close the **Device Control** dialog box.

Implementing the eBUS SDK

You can create your own image acquisition software for the SB-GigE-EV7520A. Consult the following guides for information about creating custom image acquisition software:

- *eBUS SDK API Quick Start Guides*, available for C++, .NET, Linux, and macOS
- *eBUS SDK API Help Files*

Chapter 10

Network Configurations for the SB-GigE-EV7520A

After you have connected to the SB-GigE-EV7520A and provided it with a unique IP address on your network, you can configure it for either unicast or multicast.

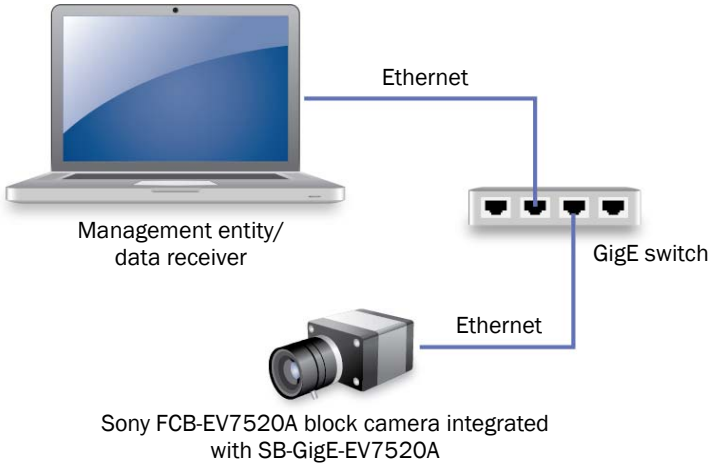
The following topics are covered in this chapter:

Unicast Network Configuration

In a unicast configuration, the SB-GigE-EV7520A is connected to a GigE switch that sends a stream of images over Ethernet to the computer. Alternatively, the SB-GigE-EV7520A can be connected directly to the computer.

The computer is configured as both a data receiver and controller, and serves as a management entity for the SB-GigE-EV7520A.

Figure 2: Unicast Network Configuration



Required Items — Unicast Network Configuration

You require the following items to set up a unicast network configuration:

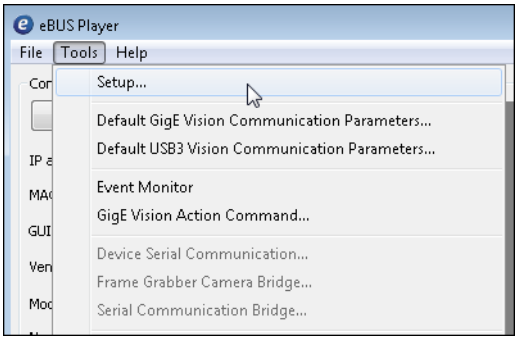
- Sony FCB-EV7520A block camera integrated with the SB-GigE-EV7520A (and cables)
- Power supply or, if using Power over Ethernet, a PoE NIC, PoE switch, or PoE injector
- GigE switch (optional)
- CAT5e or CAT6 Ethernet cables
- Desktop computer or laptop with eBUS SDK installed

SB-GigE-EV7520A Configuration — Unicast Network Configuration

After you have connected and applied power to the hardware components, use eBUS Player to configure the SB-GigE-EV7520A.

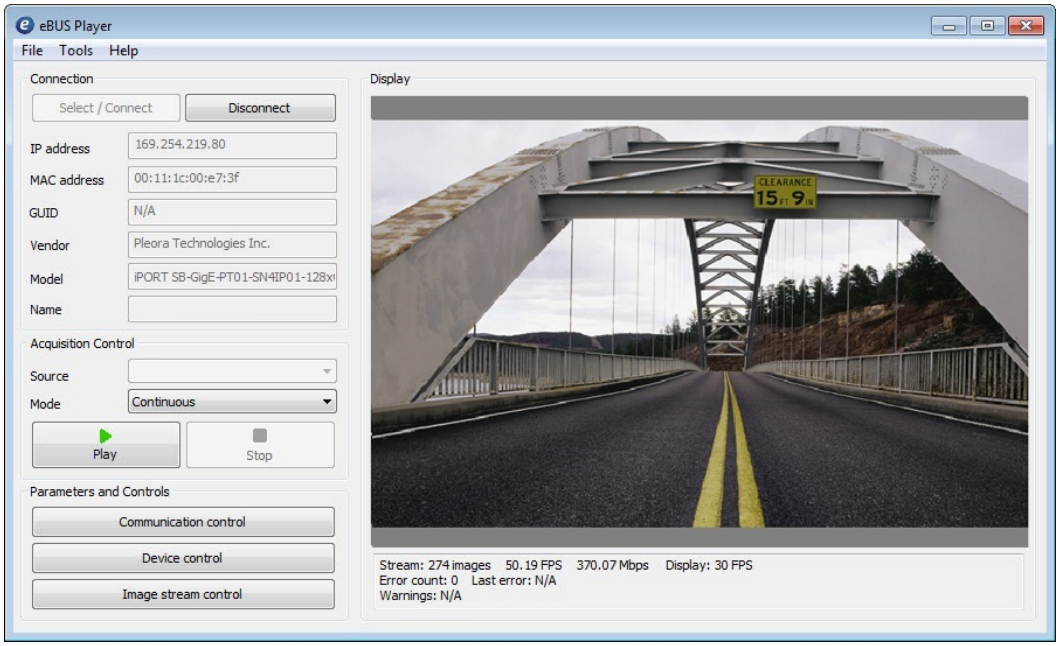
To configure the SB-GigE-EV7520A for a unicast network configuration

1. Start eBUS Player.
2. Click **Tools** > **Setup**.



3. Under **eBUS Player Role**, click **Controller and data receiver**.
4. Under **GigE Vision Stream Destination**, click **Unicast, automatic**.
5. Click **OK**.
6. Connect to the SB-GigE-EV7520A.

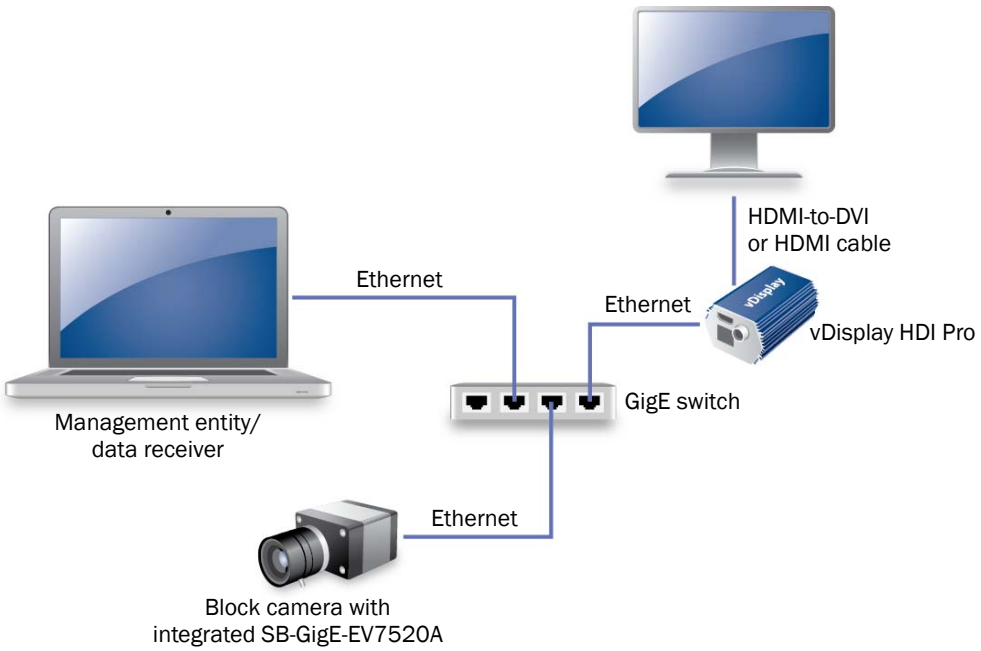
   For more information, see "To start eBUS Player and connect to the SB-GigE-EV7520A" on page 52.
7. Click **Play** to view a live image stream.



Multicast Network Configuration

In a multicast network configuration, the SB-GigE-EV7520A is connected to a GigE switch, and sends a stream of images over Ethernet simultaneously to both a computer and to a vDisplay HDI-Pro External Frame Grabber. Then, the vDisplay HDI-Pro External Frame Grabber converts it to an image stream for display on a monitor.

Figure 3: Multicast Network Configuration



Required Items — Multicast Network Configuration

You require the following items to set up a multicast network configuration:

- Block camera with integrated SB-GigE-EV7520A and cables
- Power supply or, if you are using PoE, a PoE NIC, PoE switch, or PoE injector
- vDisplay HDI-Pro External Frame Grabber and corresponding power supply
- Compatible display monitor
- Cable to connect the vDisplay HDI-Pro External Frame Grabber to the display monitor
- GigE switch
- CAT5e or CAT6 Ethernet cables
- Desktop computer or laptop with eBUS SDK installed

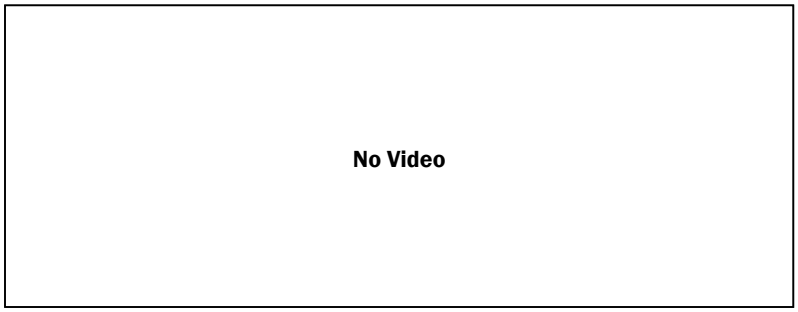
Connecting the Hardware and Power

The following procedure explains how to connect the power, network, and data cables to the vDisplay HDI-Pro External Frame Grabber and SB-GigE-EV7520A.

To connect the network cables and apply power

1. Connect one end of a CAT5e/CAT6 cable to the Ethernet connector on your computer's NIC. Attach the other end to an available port on the GigE switch.
2. Attach one end of the video cable to the display monitor. Attach the other end to the HDI connector on the vDisplay HDI-Pro External Frame Grabber.
3. Connect one end of a CAT5e/CAT6 cable to the vDisplay HDI-Pro External Frame Grabber Ethernet connector. Attach the other end to an available port on the GigE switch.
4. Connect one end of a CAT5e/CAT6 cable to the SB-GigE-EV7520A Ethernet connector. Attach the other end to an available port on the GigE switch.
5. Apply power to the devices.

   The message **No Video** appears on the display monitor.

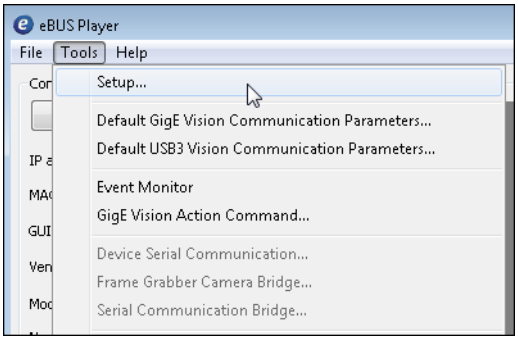


Configuring the Devices for a Multicast Network Configuration

After you have connected and applied power to the hardware components, use eBUS Player to configure the vDisplay HDI-Pro External Frame Grabber and SB-GigE-EV7520A for multicast configuration. You may want to launch two instances of eBUS Player to perform both configurations. Begin by configuring the vDisplay HDI-Pro External Frame Grabber. Then, configure the SB-GigE-EV7520A to transmit images to a multicast IP address and port.

To configure the vDisplay HDI-Pro External Frame Grabber for a multicast network configuration

1. Start eBUS Player.
2. Click **Tools** > **Setup**.



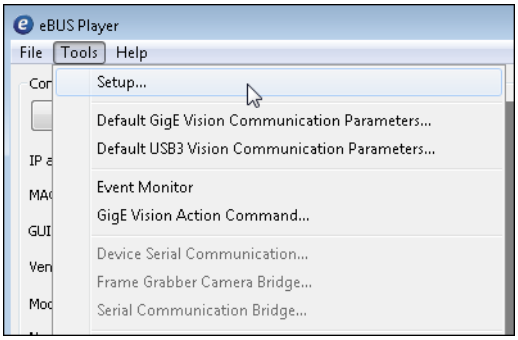
3. Under **eBUS Player Role**, click **Controller**.

   You do not need to specify the **GigE Vision Stream Destination**, as the stream destination is not applicable to a video receiver.
4. Click **OK**.
5. Connect to the vDisplay HDI-Pro External Frame Grabber.

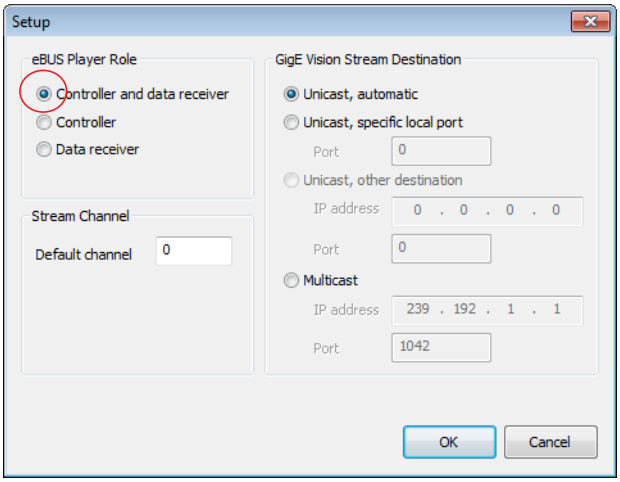
   For more information, see "To start eBUS Player and connect to the SB-GigE-EV7520A" on page 52.
6. Click **Device control**.
7. Click **Guru** in the **Visibility** list.
8. In the **TransportLayerControl** > **GigEVision** category, set **GevSCPHostPort** to a streaming channel port (for example, 1042).
9. Set **GevSCDA** to a multicast address (for example, 239.192.1.1).
10. Close the **Device Control** dialog box.
11. Now, configure the SB-GigE-EV7520A, as outlined in "To configure the SB-GigE-EV7520A for a multicast network configuration" on page 65.

To configure the SB-GigE-EV7520A for a multicast network configuration

1. Start an additional instance of eBUS Player.
2. Click **Tools** > **Setup**.



3. Under **eBUS Player Role**, click **Controller and data receiver**, as shown in the following image.

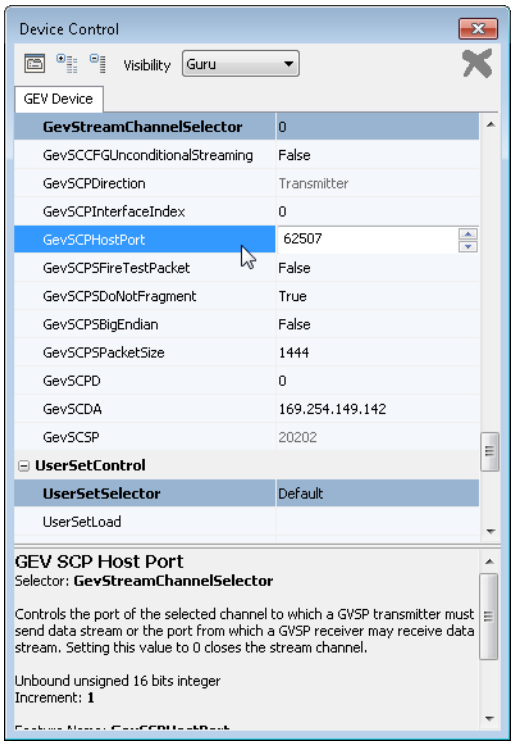


4. Under **GigE Vision Stream Destination**, click **Multicast** and enter the IP address and port number.

   The address and port must be identical to that configured for the vDisplay HDI-Pro External Frame Grabber in step 8 and 9 of "To configure the vDisplay HDI-Pro External Frame Grabber for a multicast network configuration" on page 64.
5. Click **OK**.
6. Connect to the SB-GigE-EV7520A.

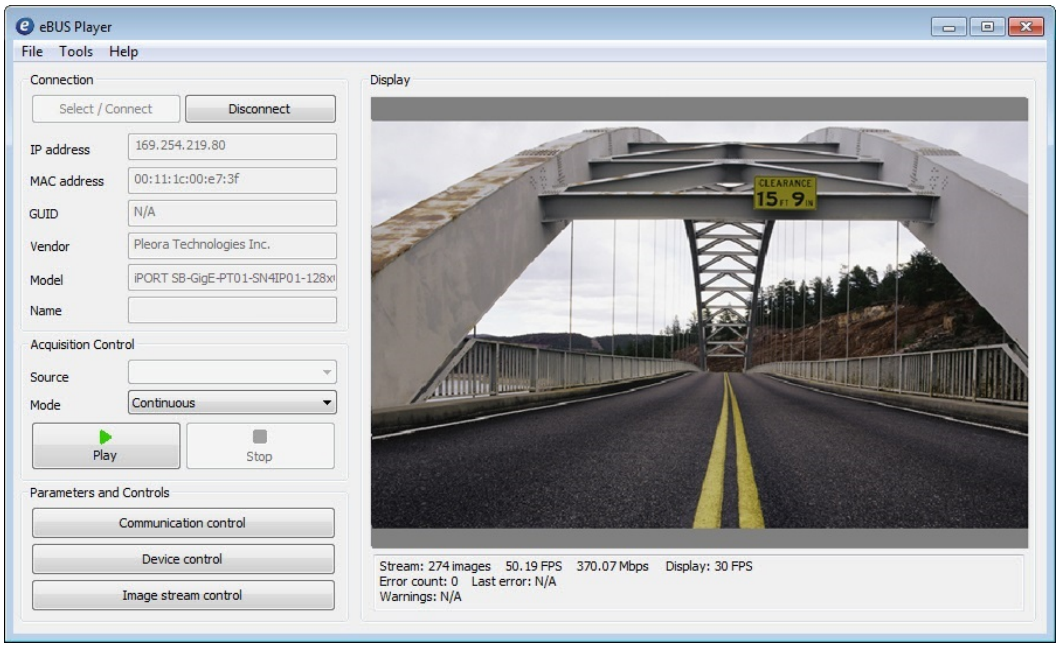
   For more information, see "To start eBUS Player and connect to the SB-GigE-EV7520A" on page 52.
7. Under **Parameters and Controls**, click **Device control**.
8. Click **Guru** in the **Visibility** list.

9. Under **TransportLayerControl** > **GigEVision**, ensure that the port in the **GevSCPHostPort** field and the multicast IP address in the **GevSCDA** field are correct. They are configured automatically to the values set in step 4 of this procedure.



10. Close the **Device Control** dialog box.

11. Click **Play** to view the source image stream both on the computer and the display monitor.



Chapter 11

System Troubleshooting

This chapter provides you with troubleshooting tips and recommended solutions for issues that can occur during configuration, setup, and operation of the SB-GigE-EV7520A with the Sony block camera. It also shows you how to switch between the backup and main firmware loads.

Not all scenarios and solutions are listed here. You can refer to the Pleora Technologies Support Center at supportcenter.pleora.com for additional support and assistance. Details for creating a customer account are available on the Pleora Technologies Support Center.

Refer to the product release notes that are available on the Pleora Technologies Support Center for known issues and other product features.

Troubleshooting Tips

The scenarios and known issues listed in this chapter are those that you might encounter during the setup and operation of your SB-GigE-EV7520A. Not all possible scenarios and errors are presented. The symptoms, possible causes, and resolutions depend upon your particular network, setup, and operation.

If you perform the resolution for your issue and the issue is not corrected, we recommend you review the other resolutions listed in this table. Some symptoms may be interrelated.

Table 17: Troubleshooting Tips

Symptom	Possible cause	Resolution
SDK cannot detect or connect to the SB-GigE-EV7520A	Power not supplied to the SB-GigE-EV7520A, or inadequate power supplied	Both the detection and connection to the SB-GigE-EV7520A will fail if adequate power is not supplied to the device. Re-try the connection to the SB-GigE-EV7520A with eBUS Player. Verify that the Power/Firmware LED (D1 on the GigE PHY board) is green (power on). For information about the LEDs, see "Status LEDs" on page 34. Verify the power connection and ensure 10 V to 16 V is present at the connector.
	Device is not connected to the network	Verify that the network activity LED and network connection speed LED are active (J1 on the GigE PHY board). If these LEDs are illuminated, check the LEDs on your network switch to ensure the switch is functioning properly. If the problem continues, connect the SB-GigE-EV7520A directly to the computer to verify its operation. For information about the LEDs, see "Status LEDs" on page 34.
	The SB-GigE-EV7520A and computer are not on the same subnet	Images might not appear in eBUS Player if the SB-GigE-EV7520A and the computer running eBUS Player are not on the same subnet. Ensure that these devices are on the same subnet. In addition, ensure that these devices are connected using compatible gateway and subnet mask information. You can view the SB-GigE-EV7520A IP address information in the **Available Devices** list in eBUS Player. A red icon appears beside the device if there is an incompatible IP configuration.
Images do not appear and the image count (located beside **Stream** at the bottom of eBUS Player) does not increase when you click **Play**.	The test pattern is off or no video source is available	Turn the test pattern on. Or, connect a video source and ensure that **Status** > **SonyBlockDigitalVideoClockPresent** is **True**.

Table 17: Troubleshooting Tips (Continued)

Symptom	Possible cause	Resolution
Images have a purple hue.	The micro-coaxial cable may not be connected properly or the connector may be damaged.	Ensure that the 30-pin micro-coaxial cable is connected properly at both ends. Try using a different 30-pin micro-coaxial cable. Check that the pins on the camera connector or the SB-GigE-EV7520A connector have not recessed, due to improper or over-insertion of the 30-pin micro-coaxial cable. If the connector is damaged on the SB-GigE-EV7520A, contact your Pleora Support representative. **Note:** Careful attention must be paid when connecting the 30-pin micro-coaxial cable to the FCB-EV7520A camera and the SB-GigE-EV7520A, as the connector is only rated to 30 plug cycles for its life span. See "Important Precautions for the 30-Pin Micro-Coaxial Connector" on page 24.
SDK is able to connect, but no images appear in eBUS Player. In a multicast configuration, images appear on a display monitor connected to a vDisplay HDI-Pro External Frame Grabber but do not appear in eBUS Player.	In a multicast configuration, the SB-GigE-EV7520A may not be configured correctly	Images might not appear on the display if you have not configured the SB-GigE-EV7520A for a multicast network configuration. The SB-GigE-EV7520A and all multicast receivers (for example, a vDisplay HDI-Pro External Frame Grabber) must have identical values for both the **GevSCDA** and **GevSCPHostPort** features in the **TransportLayerControl** section. For more information, see "Multicast Network Configuration" on page 62.
	In a multicast configuration, your computer's firewall may be blocking eBUS Player	Ensure that eBUS Player is allowed to communicate through the firewall.
	Anti-virus software or firewalls blocking transmission	Images might not appear in eBUS Player because of anti-virus software or firewalls on your network. Disable all virus scanning software and firewalls, and re-attempt a connection to the SB-GigE-EV7520A with eBUS Player.

Table 17: Troubleshooting Tips (Continued)

Symptom	Possible cause	Resolution
Dropped packets: eBUS Player, NetCommand, or applications created using the eBUS SDK	Insufficient computer performance	The computer being used to receive images from the device may not perform well enough to handle the data rate of the image stream. The GigE Vision driver reduces the amount of computer resources required to receive images and is recommended for applications that require high throughput. Should the application continue to drop packets even after the installation of the GigE Vision driver, a computer with better performance may be required.
	Insufficient NIC performance	The NIC being used to receive images from the GigE Vision device may not perform well enough to handle the data rate of the image stream. For example, the bus connecting the NIC to the CPU may not be fast enough, or certain default settings on the NIC may not be appropriate for reception of a high-throughput image stream. Examples of NIC settings that may need to be reconfigured include the number of Rx Descriptors and the maximum size of Ethernet packets (jumbo packets). Additionally, some NICs are known to not work well in high-throughput applications. For information about maximizing the performance of your system, see the *Configuring Your Computer and Network Adapters for Best Performance* Knowledge Base article, available on the Pleora Support Center. Also see "Calculating the Required Bandwidth" on page 48 and "Understanding the Effect of the Features on Bandwidth and Performance" on page 48.

Table 17: Troubleshooting Tips (Continued)

Symptom	Possible cause	Resolution
Error occurs when saving or loading a User Set in eBUS Player or applications created using the eBUS SDK	The SB-GigE-EV7520A has not responded to the command within the specified amount of time	Enable the Pending Acknowledge feature by setting the **TransportLayerControl > GigEVision > GevGVCPPendingAck** feature to **True** (**Guru** visibility is required). This feature configures the SB-GigE-EV7520A to use pending acknowledgments for commands which may take longer to complete. If you enabled the Pending Acknowledge feature and the problem persists, increase the **AnswerTimeout** value to be equal to or greater than 5000 ms. You can access this feature in eBUS Player by clicking **Default GigE Vision Communication Parameters** on the **Tools** menu.

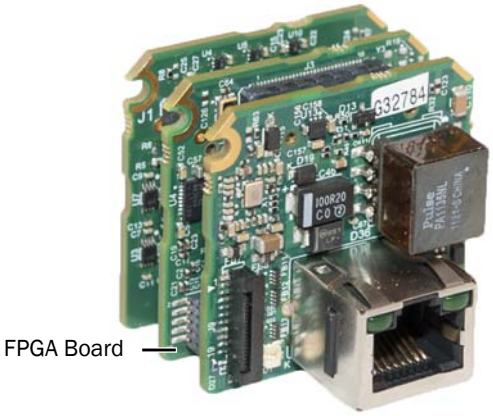
Changing to the Backup Firmware Load

In the event that the main firmware load fails to load, the SB-GigE-EV7520A will start up using the backup firmware load when it is restarted or power cycled.

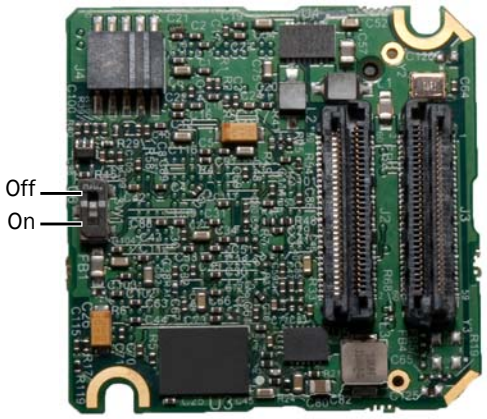
In the rare event that the backup load is not used automatically (as indicated by the fact that eBUS Player will not be able to detect the SB-GigE-EV7520A), you can use the slide switch (**SW1** on the FPGA board) to change to the backup load.

When the switch is in the **Off** position, the main firmware load is being used. When it is in the **On** position, the backup firmware load is being used. Power cycle the SB-GigE-EV7520A for the change to take effect.

After the SB-GigE-EV7520A starts up using the backup load, you can apply a firmware update to the SB-GigE-EV7520A to recover the main load. For more information see the *Updating Pleora Firmware* knowledge base article on the Pleora Support Center (supportcenter.pleora.com).



SB-GigE-EV7520A External Frame Grabber



FPGA Board

To access the slide switch, peel back the small, protective plastic sheet that covers the slide switch.

Chapter 12

Reference: Mechanical Drawings and Material List

This chapter provides the mechanical drawings, and also provides a list of connectors with corresponding manufacturer details.

Three-dimensional (3-D) mechanical drawings are available at the Pleora Technologies Support Center.

The following topics are covered in this chapter:

Mechanical Drawings

The mechanical drawings in this section provide the SB-GigE-EV7520A's dimensions, features, and attributes. All dimensions are in millimeters.

Figure 4: SB-GigE-EV7520A Side View

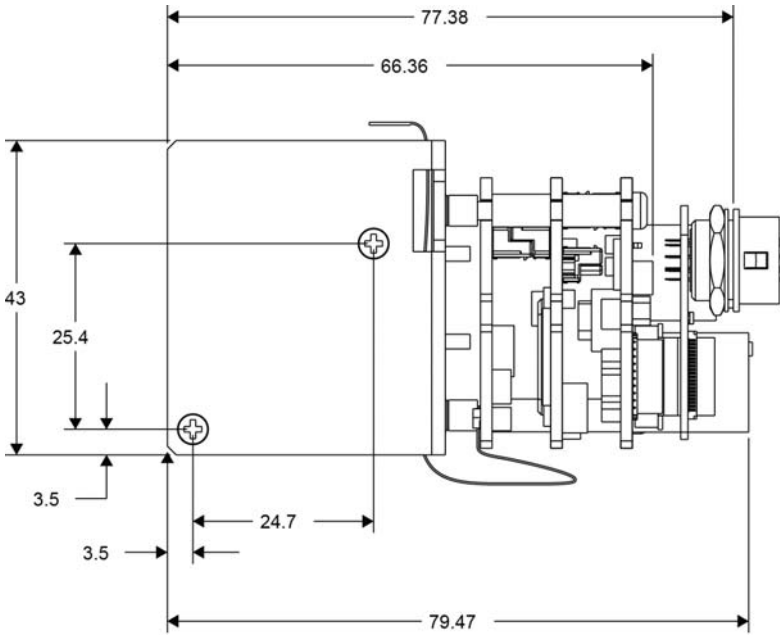


Figure 5: SB-GigE-EV7520A GigE PHY Board Front with Dimensions

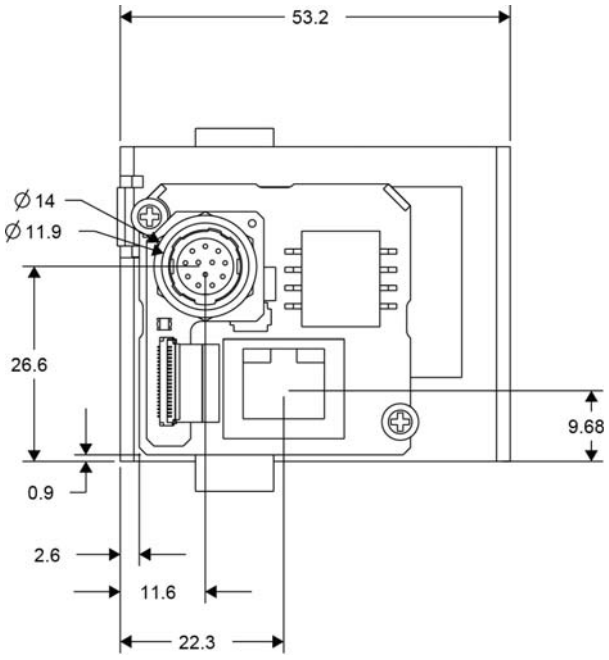


Figure 6: SB-GigE-EV7520A with Bracket Mounting Screw Dimensions

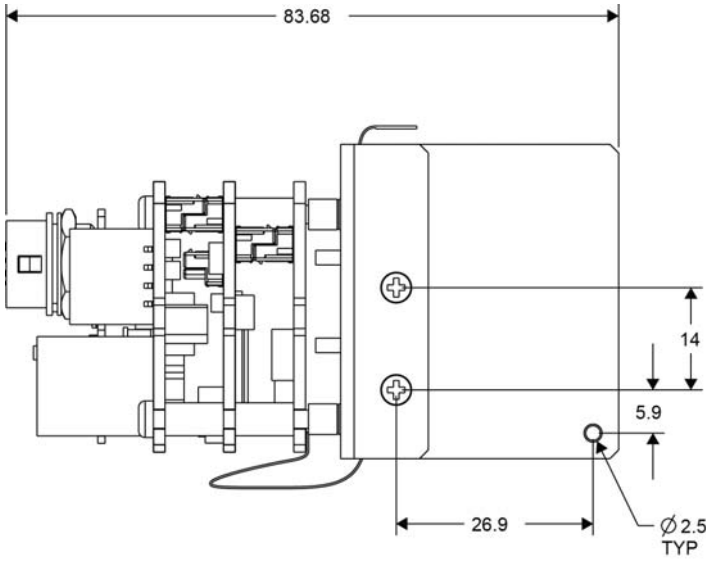


Figure 7: SB-GigE-EV7520A with Brackets Top View

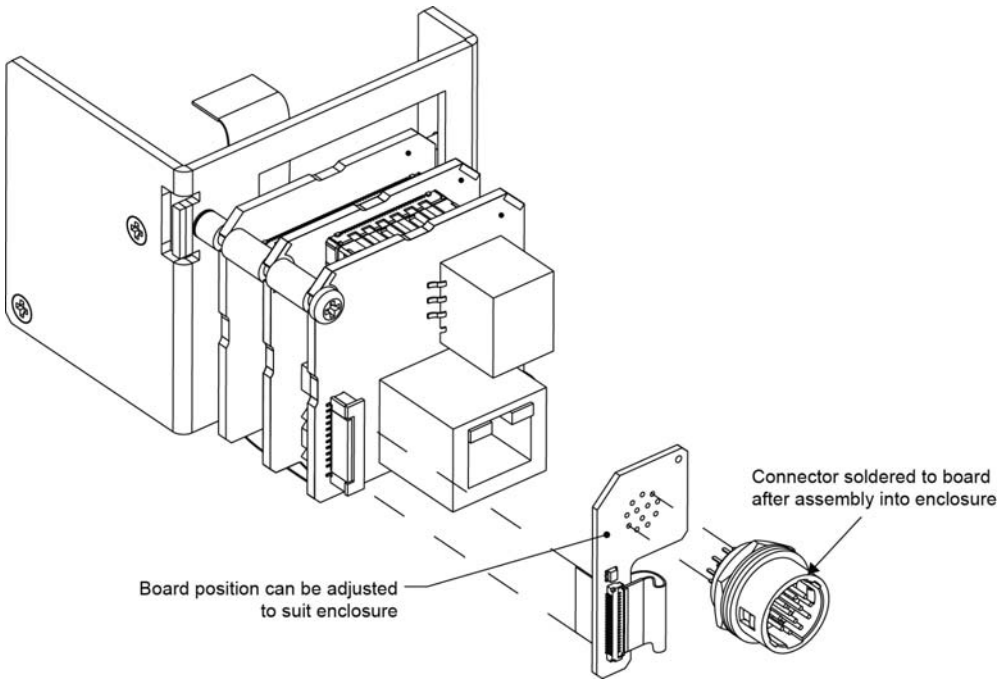
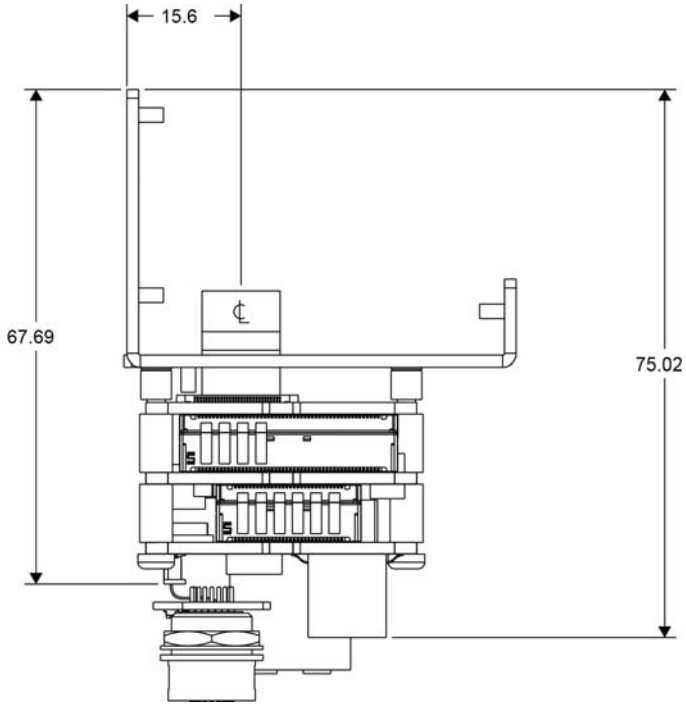


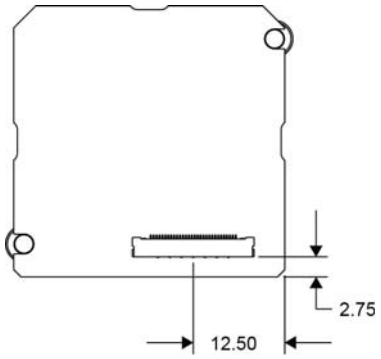
Figure 8: SB-GigE-EV7520A with Brackets Top View



Adapter Board Mechanical Drawing

The mechanical drawing in this section shows the positioning of the adapter board's 30-pin IDC connector. All dimensions are in millimeters.

Figure 9: Adapter Board Back View



Material List

The following table lists the connector details for the SB-GigE-EV7520A.

Table 18: Connector Summary

ID	Location	Description	Manufacturer part number	Manufacturer
J1	GigE PHY board	RJ45 Ethernet jack	RJHSE-3P85	Amphenol
J9	GigE PHY board	20-pin FFC connector	62674-201121ALF	FCI
J1	GPIO board	12-pin circular connector	HR10A-10R-12PB(71)	Hirose Electric Co. Ltd.
J2	GPIO board	20-pin FFC connector	FH33-20S-0.5SH(10)	Hirose Electric Co. Ltd.
J2	Adapter board	30-pin IDC connector for micro-coaxial cable*	USL00-30L-A	Kel Corporation

*For information about the micro-coaxial cable, see "30-Pin Micro-Coaxial Connector Details" on page 25.

Chapter 13

Technical Support

On the Pleora Support Center, you can:

- Download the latest software.
- Log a support issue.
- View documentation for current and past releases.
- Browse for solutions to problems other customers have encountered.
- Get presentations and application notes.
- Get the latest news and information about our products.
- Decide which of Pleora's products work best for you.

To visit the Pleora Support Center

- Go to supportcenter.pleora.com and click **Support Center**.

  If you have not registered yet, you are prompted to register.

  Accounts are usually validated within one business day.