

# Digipeater CLB26

CameraLink™ Repeater



**Digipeater CLB 26 User's Manual**

**REV: 1.2**

photon focus

CAMERA  
Link

## **Digipeater CLB26 User's Manual**

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**The Swiss company Photonfocus specializes in the development of CMOS image sensors and corresponding industrial cameras for the Machine Vision, High-End Surveillance and Automotive markets.**

Photonfocus, formed as a Spin-off from the Swiss Research Center for Electronics and Microtechnology (CSEM) in April 2001, is dedicated to making the latest generation of CMOS technology commercially available. Active Pixel Sensor (APS) and global shutter technologies enable high speed applications and applications with high picture contrast (120 dB) to be realized, while avoiding the disadvantages, e.g. image lag, of conventional logarithmic CMOS sensors. LinLog™ Technology was recognized with the Stuttgart Vision 2000 prize for innovation and, more recently, the Photonics Award of Excellence. With these technologies, blooming and smear belong to the past.

With the digital MV-D1024, MV-D752 and MV-D640 camera series, Photonfocus has proven that the image quality of modern CMOS sensors is now appropriate for demanding measurement and automotive applications. The MV-D1024 camera attains full frame rates of up to 150 fps with megapixel resolution; by using the Region Of Interest (ROI) feature, the frame rate can be increased to well over 1000 frames per second. The cameras can be supplied with either an LVDS (RS644) or a CameraLink digital interface.

The product range of Photonfocus is complemented by custom design solutions in the area of camera electronics and CMOS image sensors. Customer specific requirements, such as number of pixels, noise performance, dynamic range or sensitivity, can be implemented and optimized.

PHOTONFOCUS is ISO 9001 certified. All products are produced with the latest techniques in order to ensure the highest degree of quality

PHOTONFOCUS has a worldwide network of distributors available in Europe, the USA and Asia.

For further information about PHOTONFOCUS and its products, please visit our homepage:

<http://www.photonfocus.com>

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## 1 Introduction

The Digipeater CLB26 is designed to overcome problems with image processing systems in which distance is a limitation. A standard CameraLink™ cable can be used to connect a camera to a frame grabber over distances of up to 10m. It frequently occurs, however, that twice this length is required to feed signal cables through the trunking of automation systems. The Digipeater CLB26 regenerates all data signals, including the control and communication signals of the CameraLink™ base version. Thus, standard 10m cables can be used to bridge distances of 20m with no problem. Even connection distances of 30m can be achieved by using high-grade cables (e.g. 3M part number 14B26-SZLB-xxx-0LC).

The Digipeater is delivered in an industry standard housing and can thus be integrated into cable trunking with no problem. For wall or ceiling mounting, two additional attachment variants are offered. Fig. 1 shows the different attachment variants.

Active extenders for CameraLink™ medium and full versions can be made on request.

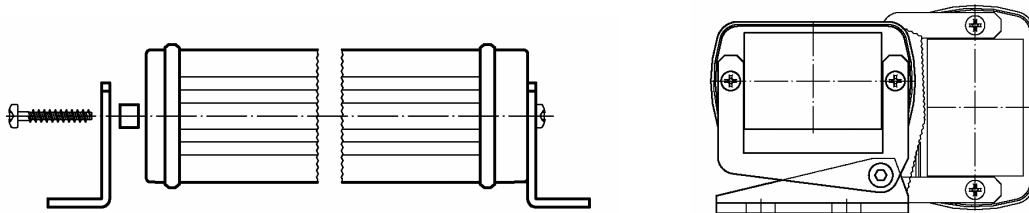


Fig. 1: Attachment variants (left: fix; right: adjustable)

## 2 Connections / Block diagram

Fig. 2 shows a block diagram of the Digipeater. Data from the camera are connected to Port 1. The regenerated data are transmitted on to the frame grabber from Port 2. A power supply with a linear regulator is implemented in the Digipeater to supply the LVDS transceivers.

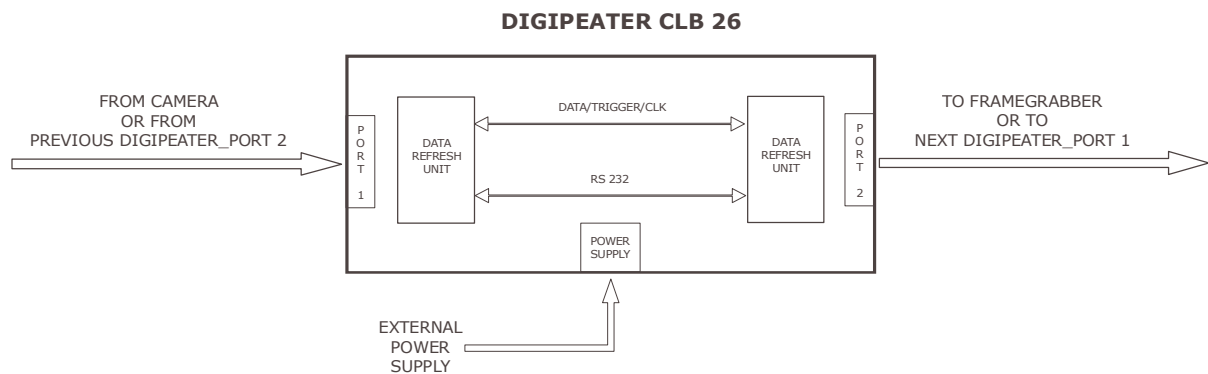


Fig. 2: Block diagram of the Digipeater

### 3 CameraLink™ Interface and Power Supply

The Digipeater has two sockets with signals for data transmission and the control of camera functions as well as one socket for external power supply. The pin assignments for the data and control signals are defined in the CameraLink™ Standard [CLO2000]. Table 1 shows the pin assignments for Port 1 and Table 2 those for Port 2.

**The subminiature circular connector Binder Series 712 is used for power supply. The order number for the Digipeater socket is 09-0408-00-03 (see**

Table 3 and Fig. 3 ). Included with the Digipeater is a power supply plug, for which the order number is 99-0405-70-03.

**Table 1: Pin assignments for the MDR26 socket of the CameraLink™ PORT 1**

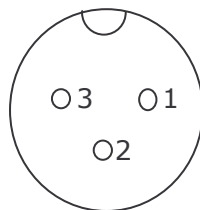
PIN	I/O	Name	Description
1	PW	SHIELD	Shield
2	I	N_CC4	Negative LVDS Input , Control signal CONTROL <not used>
3	I	P_CC3	Positive LVDS Input , Exposure control EXPOSURE
4	I	N_CC2	Negative LVDS Input , external clock for Slave mode MCLK
5	I	P_CC1	Positive LVDS Input , external Trigger signal EXSYNC
6	O	P_SERTOFG	Positive LVDS Output , Serial Communication from the Camera
7	I	N_SERTOCAM	Negative LVDS Input , Serial Communication to the Camera
8	O	P_XD3	Positive LVDS Output , CameraLink™ Data D3
9	O	P_XCLK	Positive LVDS Output , CameraLink™ clock
10	O	P_XD2	Positive LVDS Output , CameraLink™ Data D2
11	O	P_XD1	Positive LVDS Output , CameraLink™ Data D1
12	O	P_XD0	Positive LVDS Output , CameraLink™ Data D0
13	PW	SHIELD	Shield
14	PW	SHIELD	Shield
15	I	P_CC4	Positive LVDS Input , Control signal CONTROL <not used>
16	I	N_CC3	Negative LVDS Input , Exposure control EXPOSURE
17	I	P_CC2	Positive LVDS Input , external clock for Slave mode MCLK
18	I	N_CC1	Negative LVDS Input , external Trigger signal EXSYNC
19	O	N_SERTOFG	Negative LVDS Output , Serial Communication from the Camera
20	I	P_SERTOCAM	Positive LVDS Input , Serial Communication to the Camera
21	O	N_XD3	Negative LVDS Output , CameraLink™ Data D3
22	O	N_XCLK	Negative LVDS Output , CameraLink™ clock
23	O	N_XD2	Negative LVDS Output , CameraLink™ Data D2
24	O	N_XD1	Negative LVDS Output , CameraLink™ Data D1
25	O	N_XD0	Negative LVDS Output , CameraLink™ Data D0
26	PW	SHIELD	Shield
S	PW	SHIELD	Shield

**Table 2: Pin assignments for the MDR26 socket of the CameraLink™ PORT 2**

PIN	I/O	Name	Description
1	PW	SHIELD	Shield
2	O	N_XD0	Negative LVDS Output , CameraLink™ Data D0
3	O	N_XD1	Negative LVDS Output , CameraLink™ Data D1
4	O	N_XD2	Negative LVDS Output , CameraLink™ Data D2
5	O	N_XCLK	Negative LVDS Output , CameraLink™ clock
6	O	N_XD3	Negative LVDS Output , CameraLink™ Data D3
7	I	P_SERTOCAM	Positive LVDS Input , Serial Communication to the Camera
8	O	N_SERTOFG	Negative LVDS Output , Serial Communication from the Camera
9	I	N_CC1	Negative LVDS Input , external Trigger signal EXSYNC
10	I	P_CC2	Positive LVDS Input , external clock for Slave mode MCLK
11	I	N_CC3	Negative LVDS Input , Exposure control EXPOSURE
12	I	P_CC4	Positive LVDS Input , Control signal CONTROL <not used>
13	PW	SHIELD	Shield
14	PW	SHIELD	Shield
15	O	P_XD0	Positive LVDS Output , CameraLink™ Data D0
16	O	P_XD1	Positive LVDS Output , CameraLink™ Data D1
17	O	P_XD2	Positive LVDS Output , CameraLink™ Data D2
18	O	P_XCLK	Positive LVDS Output , CameraLink™ clock
19	O	P_XD3	Positive LVDS Output , CameraLink™ Data D3
20	I	N_SERTOCAM	Negative LVDS Input , Serial Communication to the Camera
21	O	P_SERTOFG	Positive LVDS Output , Serial Communication from the Camera
22	I	P_CC1	Positive LVDS Input , external Trigger signal EXSYNC
23	I	N_CC2	Negative LVDS Input , external clock for Slave mode MCLK
24	I	P_CC3	Positive LVDS Input , Exposure control EXPOSURE
25	I	N_CC4	Negative LVDS Input , Control signal CONTROL <not used>
26	PW	SHIELD	Shield
S	PW	SHIELD	Shield

**Table 3: Pin assignments for the socket of the voltage supply connector**

PIN	I/O	Name	Description
1	PW	VDD	+ 5 V voltage supply
2	PW	GND	Ground
3	PW	VDD2	Reserved


**Fig. 3: Connector socket Nr. 09-0408-00-03 for the voltage supply**

## 4 Technical Data for the Digipeater CLB26

**Table 4: Technical Specifications**

Technical Data Digipeater CLB26	
Cable length	up to 15 m on both sides <sup>(*)</sup>
Digital interface	CameraLink™ Base Version
Maximum Pixel clock frequency	66MHz (cable length minimized)
Minimum Pixel clock frequency	20 MHz( cable length maximum)
Temperature range	0°C to 60°C
Configuration	CameraLink™ Base Version
Voltage	+5 ... +8V DC +/-10%
Power consumption	1W
Data connector	MDR26 (3M 10226-1210VE)
Power connector	Connector Series 712
Dimensions	57 mm x 36 mm x 107 mm
Weight	160 g

(\*) If Pixelclock < 30MHz;

### 4.1 Technical features

- "Power up" failsafe
- active clock regeneration with "zero skew"
- automatic "standby mode" if camera is disconnected or not working
- "Hot Plug" functionality

## 5 Ordering information

**Table 5: Order items for Digipeater and accessories**

Order item	Product description	Part number
Digipeater CLB26	CameraLink™ Repeater for CL-Base-Version	70 25 10.001
Digipeater power supply	Stabilized, linear 5V power supply (220V/50 Hz)with 2 m cable and right-angled power plug	70 50 10.002
Mounting fix Digipeater	Fixed mounting straps	70 25 20.001
Mounting adjustable Digipeater	Adjustable mounting straps	70 25 20.002

## 6 Appendix A – CE Compliance Statement



# CE Compliance Statement

We,

**Photonfocus AG,**

**8853 Lachen, Schweiz**

declare under our sole responsibility that the following products:

<b>Megapixel:</b>	<b>MV-D1024-28-CL-10 MV-D1024-80-CL-8 MV-D1024-160-CL-8</b>
<b>Multiline:</b>	<b>MV-D1024x128-28-CL-10 MV-D1024x128-80-CL-8 MV-D1024x128-160-CL-8</b>
<b>CCIR:</b>	<b>MV-D752-28-CL-10 MV-D752-80-CL-8 MV-D752-160-CL-8</b>
<b>VGA:</b>	<b>MV-D640-33-CL-10 MV-D640-66-CL-10 MV-D640-48-U2-10 MV-D640C-33-CL-10 MV-D640C-66-CL-10 MV-D640C-48-U2-10</b>
<b>Digipeater:</b>	<b>CLB26</b>

are in compliance with the below mentioned standards according to the provisions of „European Standards“ Directive:

**EN 61 000 – 6 – 3 : 2001  
EN 61 000 – 6 – 2 : 2001  
EN 61 000 – 4 – 6 : 1996  
EN 61 000 – 4 – 4 : 1996  
EN 61 000 – 4 – 3 : 1996  
EN 61 000 – 4 – 2 : 1995  
EN 55 022 : 1994**



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July 20, 2004

## **7 Literature**

### **7.1 Files on the web server [www.photonfocus.com](http://www.photonfocus.com)**

[CLO2000] Specifications of the Camera Link Interface Standard for Digital Cameras and Frame Grabbers, October 2000

See: CD x:\english\literature\CameraLinkOfficialOkt2000.pdf

[LOM2000] LVDS Owner's Manual, A General Design Guide for National's Low Voltage Differential Signaling (LVDS) and Bus LVDS Products, 2nd Edition Spring 2000 National Semiconductor

See: CD x:\english\literature\LVDSOwnersManualSpring2000.pdf

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## 10 Revisions and State of Product development

### 10.1 Revisions

**Table 6: Document revisions**

REV	Changes	Date
1.0	First edition	02/12/02
1.1	Complete revision of the document	12/08/03
1.2	CE Compliance Statement integrated	28/07/04

### 10.2 State of Product development

Table 6 shows the correlation between firmware revision (serial number), software revision and revision of the user manual. This table indicates firmware documents and software revisions.

**Table 7: Correlation between firmware, software and user manual**

correlating serial numbers	hardware revision	document revision	remark
8001xxxxxxxx	REV_C	from 1.0	-

## **11 Service information**

### **11.1 Contact for product enquiries and quotations**

For product enquiries and quotations, please contact one of our distributors in your area. A list of distributors can be found at:

[www.photonfocus.com](http://www.photonfocus.com)

### **11.2 Product information, documentation and software updates**

[www.photonfocus.com](http://www.photonfocus.com)

### **11.3 Storage and Transport**

During storage and transport, the digipeater should be protected against vibration, shock, moisture and dust. The original packing protects the digipeater adequately from vibration and shock during storage and transport. Please either retain this packing for possible later use or dispose of it according to local regulations.

### **11.4 Preparing for use**

Remove the digipeater from its packing and ensure that it is complete and undamaged. If any damage has occurred during transport, please immediately contact the transport company and your distributor.

The digipeater is delivered with a 3-pole power plug. Ensuring that the maximum operating voltage is not exceeded, connect the digipeater to a suitable power supply.

## **12 Guarantee conditions**

### **Guarantee claims**

The manufacturer alone reserves the right to recognize guarantee claims. The guarantee will be rendered null and void in the event of unauthorized manipulation, mechanical damage or damage arising from inappropriate use or from mechanical or electrical modifications, especially soldering. The guarantee will also be invalidated if the apparatus is used for purposes for which it was not designed, if it is incorrectly connected or if it is not used according to the operating instructions.

### **Guarantee work**

can only be assured and carried out by the manufacturer.

### **Repair time**

will normally be a maximum of 10 working days for repairs to a device for which a legitimate guarantee claim is made.

### **Claims for damages**

of all kinds, especially those arising from use, are excluded. Liability is limited, in all cases, to the value of our product.

### **In case of damage**

If the equipment is defective, return it, in the original packing and with a copy of the receipt, to the following address:

**Photonfocus AG  
Bahnhofplatz 10  
CH-8853 Lachen**

Important: Include a written description of the fault as well as your full postal address. The equipment will be forwarded in your name to the service department and, in the event of a legitimate guarantee claim, returned to you without freight charges.

### **Safety hints**

The apparatus conforms with approved electro-magnetic standards. Opening the apparatus is not permitted. Furthermore, all guarantee claims will be invalidated by inappropriate use. In all circumstances, the following should be noted:

- The apparatus may only be used for the purpose described.
- The apparatus is only suitable for indoor use. Protect it from moisture and heat.
- The permitted operating temperature range is 0°C to 60°C.
- Never attempt repairs yourself. Repairs may only be carried out by trained expert staff.
- Moreover, every piece of equipment is tested before delivery and has a guarantee symbol attached.
- For cleaning purpose, use only a dry soft cloth. Never use water or chemicals.