

CLR-101B CAMERA LINK™ REPEATER

User's Manual

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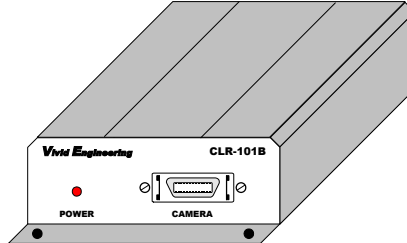
1. Introduction

1.1. Overview

The CLR-101B Camera Link™¹ Repeater supports applications requiring separation between camera and frame grabber in excess of the maximum Camera Link™ cable length (10 meters).

One Camera Link™ cable connects the camera to the CLR-101B, and a second cable connects the CLR-101B to the frame grabber. This solution provides a 20 meter reach between camera and frame grabber using a pair of standard 10m Camera Link™ cables. Up-to three repeaters may be cascaded to support greater distances. CLR-101B incorporates high-speed 85MHz interfaces and is compatible with any Camera Link “Base” configuration camera. “Medium” configuration applications are supported using two repeaters in parallel.

Featuring a sturdy compact enclosure with mounting flange and locking power supply connector, the CLR-101B is well suited for OEM and industrial applications.



¹ The Camera Link™ interface standard enables the interoperability of cameras and frame grabbers, regardless of vendor. The Automated Imaging Association (AIA) sponsors the Camera Link™ program including the oversight Camera Link Committee, the self-certification program, and the product registry. The Camera Link™ specification may be downloaded from the AIA website, found at www.machinevisiononline.org

Camera Link™ is a trademark of the Automated Imaging Association

1.2. Features

- Doubles max distance between camera and frame grabber
- Uses standard Camera Link™ cables (not included)
- Supports Camera Link™ “base” configuration
- “Medium” configuration support using two CLR-101B’s in parallel
- High-speed interfaces support camera clock rates up-to 85 MHz
- Up-to three CLR-101B’s may be cascaded, supporting a 40m reach
- Locking power supply connector
- Flow-through connector positioning
- Sturdy, compact aluminum enclosure w/ mounting flange
- 3-year warrantee
- Cost-effective solution
- Well suited for industrial and OEM applications

1.3. Functional Description

A block diagram of the CLR-101B is provided in Figure 1-1. The CLR-101B regenerates the “base” configuration signal set defined in the Camera Link Specification. The regenerated signals may then be transmitted an additional distance up-to 10 meters over standard Camera Link™ cables.

The CLR-101B incorporates the connectors, signals, pinouts, and chipset in compliance with the Camera Link™ specification. The CLR-101B regenerates all the “base” configuration signals, consisting of video data, camera control, and serial communications.

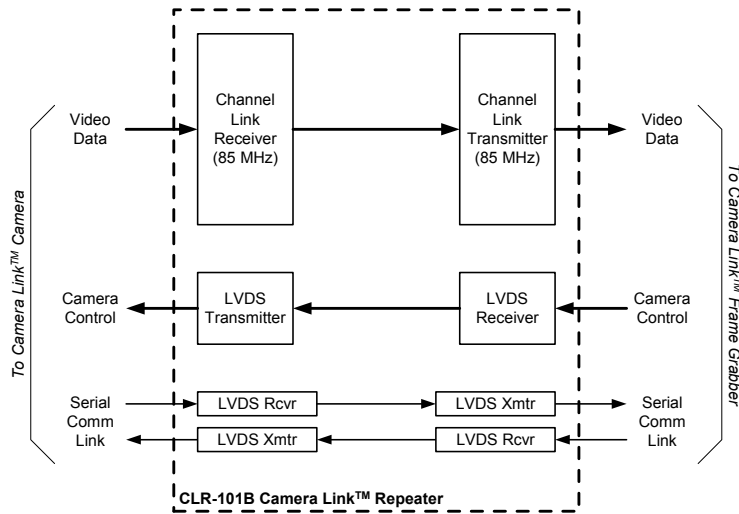


Figure 1-1: CLR-101B Block Diagram

The CLR-101B incorporates high-speed (85MHz) interfaces and is compatible with any “base” configuration camera. “Medium” configuration applications are supported using a pair of CLR-101B’s in parallel. The CLR-101B does not support the Camera Link “full” configuration.

The CLR-101B is powered by an external wall plug-in power supply (optional). A locking power supply connector reduces the risk of an accidental disconnect.

1.4. Typical Applications

1.4.1. Standard Base Application

A typical CLR-101B application is shown in Figure 1-2. A Camera Link™ “base” configuration camera is connected to the CLR-101B via a standard 10m Camera Link™ cable. A second 10m Camera Link™ cable is then connected from the CLR-101B to a Camera Link™ frame grabber. This provides a 20 meter reach between camera and frame grabber

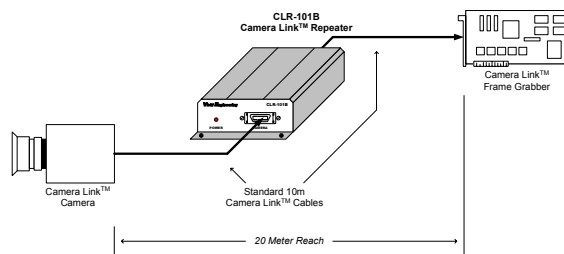


Figure 1-2: CLR-101B Standard Application

1.4.2. 40 Meter Application

Figure 1-3 shows an application in which multiple CLR-101Bs and standard cables are cascaded to provide a 40 meter separation between camera and frame grabber. In this example, a 40 meter reach is achieved using three CLR-101Bs and four standard 10m Camera Link™ cables.

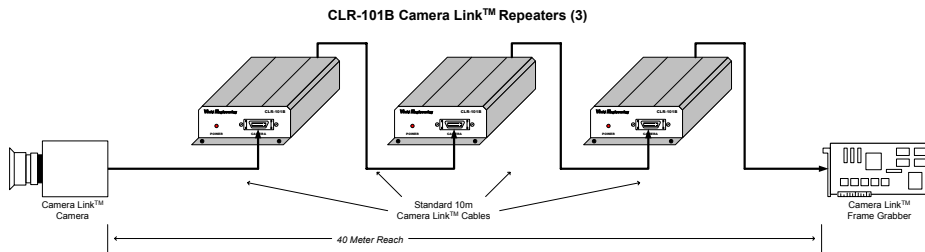


Figure 1-3: CLR-101B 40m Application

1.4.3. Medium Application

CLR-101B medium application is shown in Figure 1-4. Medium configuration, in which two cables connect the camera to the frame grabber, is supported using two CLR-101B's in parallel. A Camera Link™ medium configuration camera is connected to two CLR-101Bs via a pair of standard Camera Link™ cables. A second pair of cables is then used to connect the CLR-101Bs to the Camera Link™ frame grabber

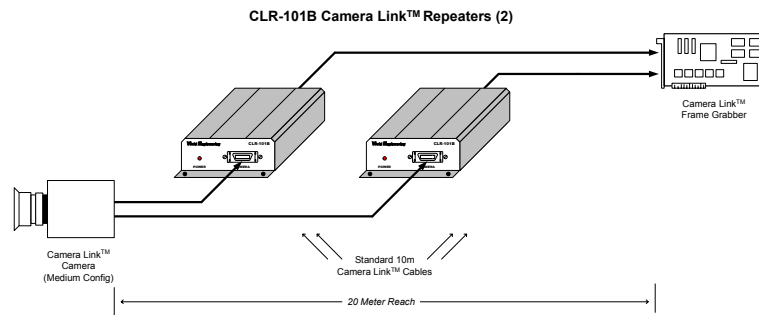


Figure 1-4: CLR-101B “Medium” Application

1.5. Specifications

Table 1-1: CLR-101B Specifications

Feature	Specification
Video Interfaces	Camera Link Spec "base" configuration
Video Connectors	26-pin MDR type
Frequency Range	20 - 85 MHz
Chipset	National Semi. DS90CR287 / DS90CR288A
Power Supply	Optional US/Europe Transformer w/ Outlet Plug Set
Power Jack	Circular locking, Switchcraft p/n TRASM3MX
Power Plug	Circular locking, Switchcraft p/n TA3FLX
Power Requirements	5-7 VDC, 150 mA (typical)
Cabinet Dimensions	3.28" (L) x 1.14" (H) x 4.87" (D), including mounting flange
Weight	7 oz
Operating Temperature Range	0 to 50° C
Storage Temperature Range	-25 to 75° C
Relative Humidity	0 to 90%, non-condensing

2. Interface

2.1. Front Panel Connections

The CLR-101B Camera Link™ Repeater front panel is shown in Figure 2-1. The front panel contains a 26-pin MDR video connector for connecting to the camera and an LED power indicator. The MDR-26 connector is a 3M device as specified in the Camera Link Spec. Figure 2-2 identifies the MDR-26 pin positions.

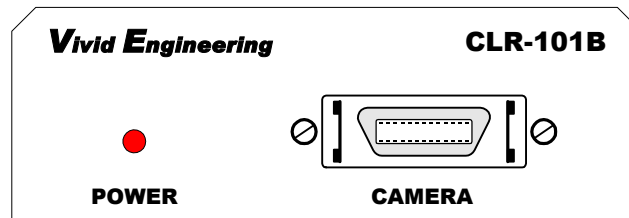


Figure 2-1: CLR-101B Front Panel

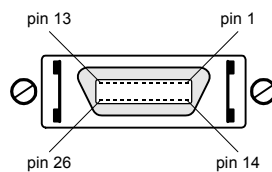


Figure 2-2: MDR-26 Connector Pin Positions

2.2. Rear Panel Connections

The CLR-101B Camera Link™ Repeater rear panel is shown in Figure 2-3. The rear panel contains a 26-pin MDR video connectors for connecting to the frame grabber and a DC power jack. The MDR-26 connector is a 3M device as specified in the Camera Link Spec.

The DC power jack is a circular locking type, Switchcraft p/n TRASM3MX. The DC power jack accepts 5 to 7 volts DC. Power jack pin assignments are shown in Figure 2-4. The mating DC power plug is Switchcraft p/n TA3FLX.

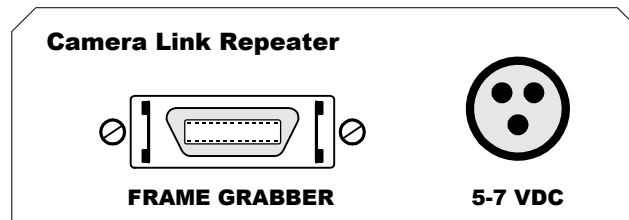


Figure 2-3: CLR-101B Rear Panel

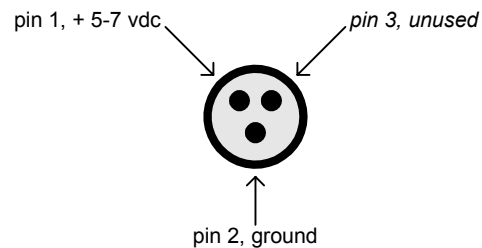


Figure 2-4: Power Jack Pins

2.2.1. Video Connector Signals

The MDR-26 video connector signal assignments comply with the Camera Link™ “base” configuration. The *camera* connector signal assignments correspond to the frame grabber interface defined in the Camera Link Specification. Conversely, the *frame grabber* connector assignments are as defined for the camera interface in the Camera Link Specification. This arrangement provides compatibility with standard Camera Link™ cables.

Table 2-1 identifies the signal assignments for the MDR-26 video connectors.

2.2.2. Cable Shield Grounding

Camera and frame grabber cable “outer” shields are connected to the CLR-101B aluminum case. Case and endplate contacting surfaces are unpainted, providing a Faraday cage to shield internal circuitry. The case is isolated from the CLR-101B circuitry and the cable “inner” shields, avoiding possible safety concerns.

The frame grabber cable “inner” shield connects to circuit digital ground, maintaining signal reference levels between the CLR-101B and the frame grabber.

Table 2-1: MDR-26 Connector Assignments

Camera Link Signal Name	Camera Connector Pin # (frame grabber pinout)	Frame Grabber Connector Pin # (camera pinout)	Signal Direction
Inner shield	1	1	N/A
Inner shield	14	14	N/A
X0-	25	2	CAM → FG
X0+	12	15	CAM → FG
X1-	24	3	CAM → FG
X1+	11	16	CAM → FG
X2-	23	4	CAM → FG
X2+	10	17	CAM → FG
Xclk-	22	5	CAM → FG
Xclk+	9	18	CAM → FG
X3-	21	6	CAM → FG
X3+	8	19	CAM → FG
SerTC+	20	7	FG → CAM
SerTC-	7	20	FG → CAM
SerTFG-	19	8	CAM → FG
SerTFG+	6	21	CAM → FG
CC1-	18	9	FG → CAM
CC1+	5	22	FG → CAM
CC2+	17	10	FG → CAM
CC2-	4	23	FG → CAM
CC3-	16	11	FG → CAM
CC3+	3	24	FG → CAM
CC4+	15	12	FG → CAM
CC4-	2	25	FG → CAM
Inner shield	13	13	N/A
Inner shield	26	26	N/A

"FG" = Frame Grabber

"CAM" = Camera

3. Mechanical

3.1. Dimensions

The CLR-101B Camera Link™ Repeater cabinet dimensions are shown in Figure 3-1.

The CLR-101B is housed in a sturdy aluminum enclosure. The body is extruded aluminum, with detachable front and rear endplates. The enclosure incorporates a mounting flange. The flange contains four predrilled holes (0.15" diameter) for convenient equipment mounting. A mounting hole template drawing is provided in Figure 3-2.

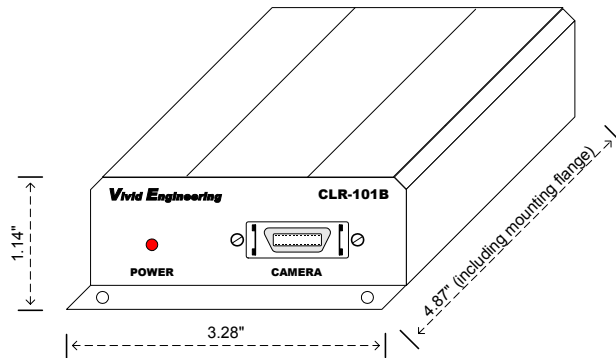


Figure 3-1: CLR-101B Cabinet Dimensions

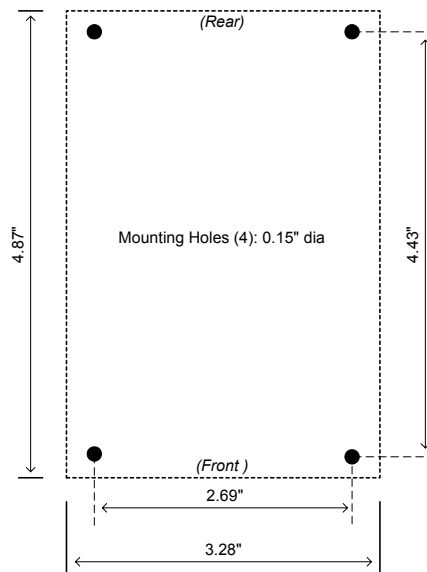


Figure 3-2: Mounting Hole Template

3.2. External Power Supply

The CLR-101B is powered by 5-7 VDC. The circular power jack is a locking type to prevent accidental disconnection. The mating power plug is Switchcraft p/n TA3FLX. Power jack/plug pin assignments are specified in Section 2.2.

The optional multi-nation wall-mount power supply handles a wide power range (90-264 VAC, 47-63 Hz) and comes with a set of outlet plugs suitable for most countries (US, Europe, UK, etc).

The CLR-101B is protected by an internal resettable fuse.

4. Regulatory Compliance

4.1. FCC Compliance Statement

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to Part 15 of the FCC Rules. These limits are designed to provide a reasonable protection against harmful interference when the equipment is operated in a commercial environment. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his/her own expense.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

4.2. Canadian Compliance Statement

This digital apparatus does not exceed the Class A limits for radio noise emissions from digital apparatus set out in the Radio Interference Regulations of the Canadian Department of Communications.

5. Revision History

Table 5-1: CLR-101B User's Manual Revision History

Document ID #	Date	Changes
200608-1.0	9/1/2006	Initial release of manual