

CLR-101 CAMERA LINK™ REPEATER

User's Manual

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1. Introduction

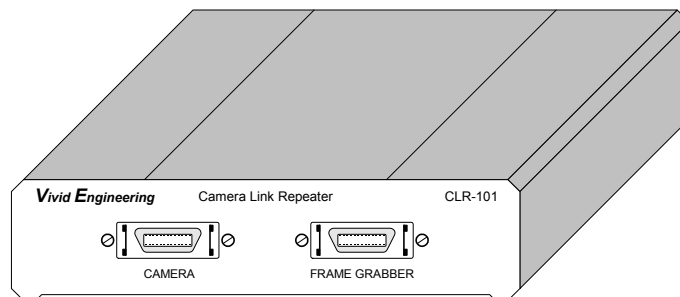
1.1. Overview

The CLR-101 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-101, and a second cable connects the CLR-101 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. Additional CLR-101s and cables may be added, as required, to support greater distances.

The CLR-101 supports the Camera Link™ “base” configuration. “Medium” configuration applications are supported using two CLR-101s.

Housed in a sturdy, compact aluminum enclosure, the CLR-101 Camera Link™ Repeater is well suited for industrial environments.



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” configurations
- “Medium” configuration support using two CLR-101s
- May be cascaded for greater distances
- Sturdy, compact aluminum enclosure
- External power supply included
- 3-year warranty
- Cost-effective solution

1.3. Functional Description

A block diagram of the CLR-101 is provided in Figure 1-1. The CLR-101 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-101 incorporates the connectors, signals, pinouts, and chipset in compliance with the Camera Link™ specification. The CLR-101 regenerates all the “base” configuration signals, consisting of video data, camera control, and serial communications.

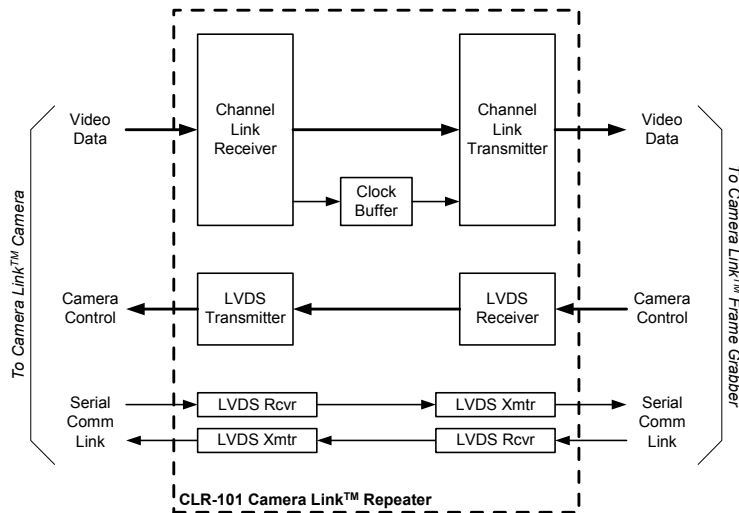


Figure 1-1: CLR-101 Block Diagram

The CLR-101 is also compatible with second Camera Link™ cable used in the Camera Link™ “medium” configuration, enabling a pair of CLR-101s to be used as a repeater in medium configuration applications.

The CLR-101 is powered by an external wall plug-in power supply (included).

1.4. Typical Application

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

This example uses a single CLR-101 to regenerate the Camera Link™ signals. Additional CLR-101s and cables may be added, as required, to further increase separation.

Medium mode configurations, in which two cables connect the camera to the frame grabber, are supported using two CLR-101s.

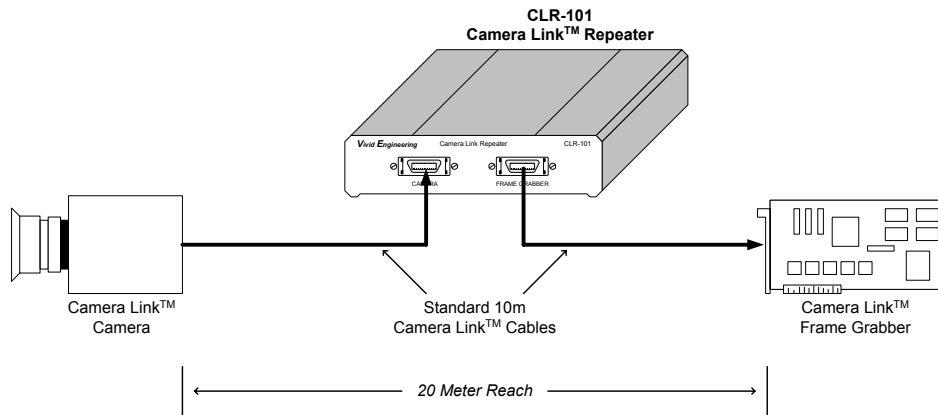


Figure 1-2: CLR-101 Typical Application

1.5. Specifications

Table 1-1: CLR-101 Specifications

Feature	Specification
Video Interfaces	Camera Link Spec "base" configuration
Video Connectors	26-pin MDR type
Frequency Range	20 - 66 MHz
Chipset	National Semi. DS90CR285 / DS90CR286A
Power Supply	External 6 VDC Wall Transformer
Power Jack	2.1 x 5.5 mm, center-positive
Power Requirements	230 mA at 6 VDC (typical)
Cabinet Dimensions	5.28" (L) x 1.12" (H) x 4.13" (D)
Weight	10 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-101 Camera Link™ Repeater front panel is shown in Figure 2-1. The front panel contains two 26-pin MDR video connectors; one for connecting to the camera and one for connecting to the frame grabber. The MDR-26 connectors are 3M p/n 10226-55G3VC as specified in the Camera Link Spec. Figure 2-2 identifies the MDR-26 pin positions.

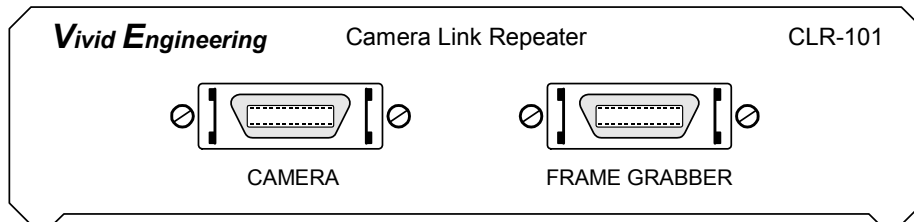


Figure 2-1: CLR-101 Front Panel

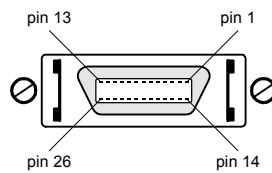


Figure 2-2: MDR-26 Connector Pin Positions

2.1.1. Video Connector Signals

The front panel 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.

2.1.2. Cable Shield Grounding

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

The Camera Link™ Specification recommends that a provision be incorporated into frame grabbers that enable the inner shields be tied to digital ground either directly, or through a parallel R/C network. In CLR-101, the *camera connector* represents the Camera Link™ frame grabber interface. To incorporate this flexibility, the CLR-101 ties the inner shields from the camera connector to digital ground through 0-ohm resistors. If necessary, the 0-ohm resistors may be replaced with a parallel RC network.

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

2.2. Rear Panel Connections

The CLR-101 Camera Link™ Repeater rear panel is shown in Figure 2-3. The rear panel contains a power on indicator, on-off switch, and DC power jack. DC power jack accepts 6 volts DC. Polarity is center-positive.

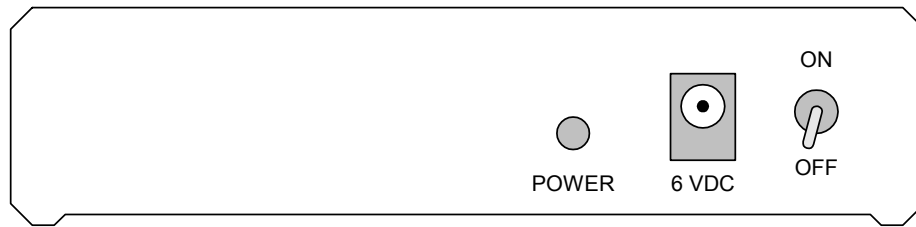


Figure 2-3: MDR-26 Connector Pin Positions

3. Mechanical

3.1. Dimensions

The CLR-101 Camera Link™ Repeater cabinet dimensions are shown in Figure 3-1. Note that the dimensions are for the cabinet only. Connectors, switch, hardware, etc are not included in the measurements.

The CLR-101 is housed in a sturdy aluminum enclosure. The body is extruded aluminum, with detachable front and rear endplates.

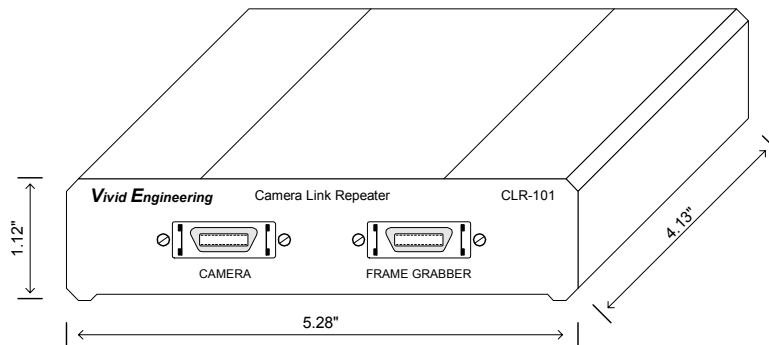


Figure 3-1: CLR-101 Cabinet Dimensions

3.2. External Power Supply

The CLR-101 is powered by an external wall-mount 6 VDC power supply (included). The power supply incorporates a standard 2.1 x 5.5 mm DC power plug. Power plug polarity is center-positive. The power supply is UL and CSA listed.

An EMI filter is located on the power cord near the DC power plug. The filter suppresses EMI emissions, ensuring regulatory limits are not exceeded. **Do not remove the EMI filter.**

The CLR-101 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-101 User's Manual Revision History

Document ID #	Date	Changes
200057-1.0	4/28/03	Initial release of manual