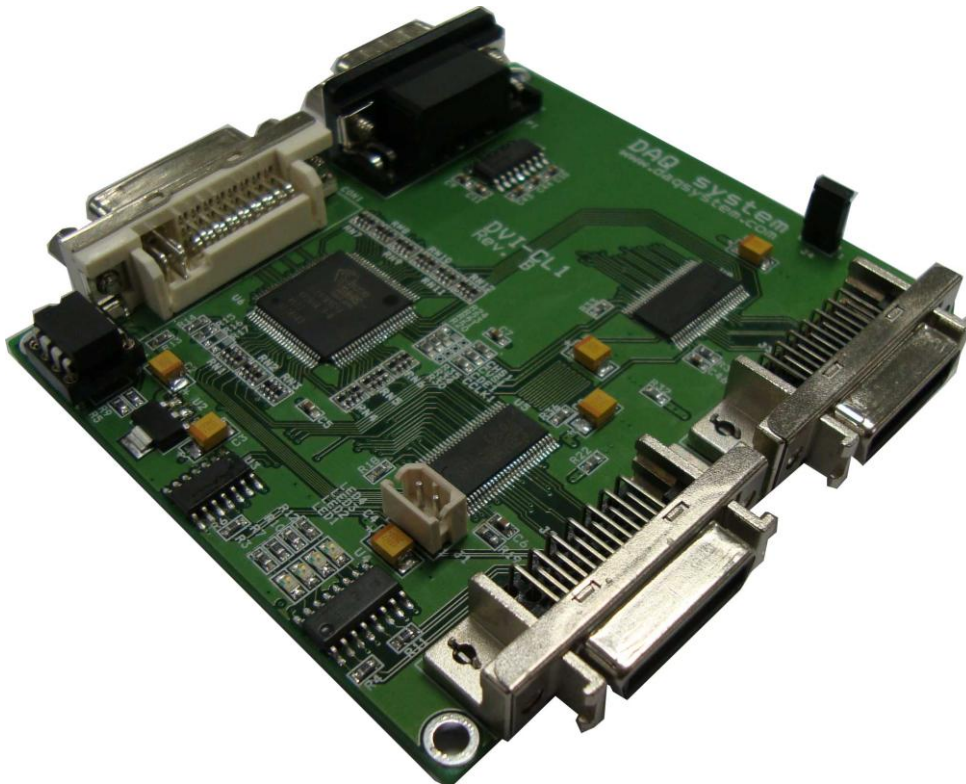


# DVI to Camera Link Interface (DVI-CL01) User's Manual



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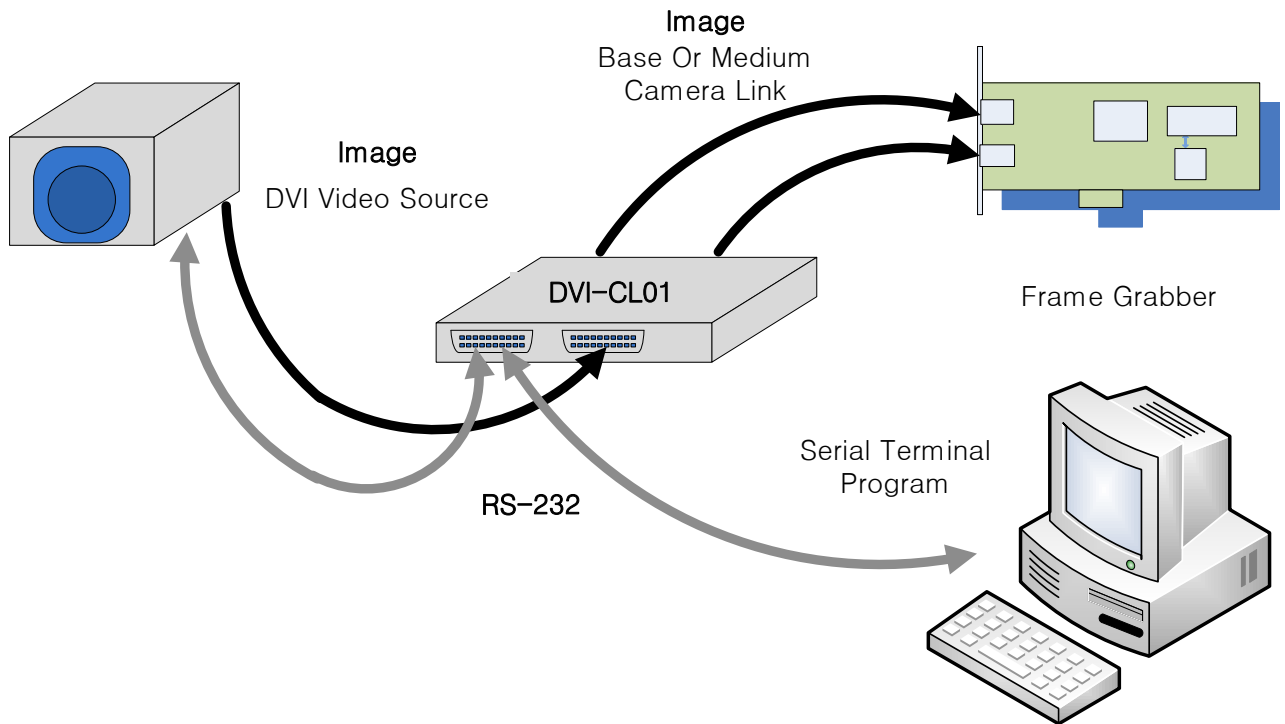
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## 1. DVI-CL01 Introduction

The DVI-CL01 is a converter board from DVI Input signals to Camera Link Output signals.



[Figure 1-1. DVI-CL01 Connection Usage]

### Features of DVI-CL01

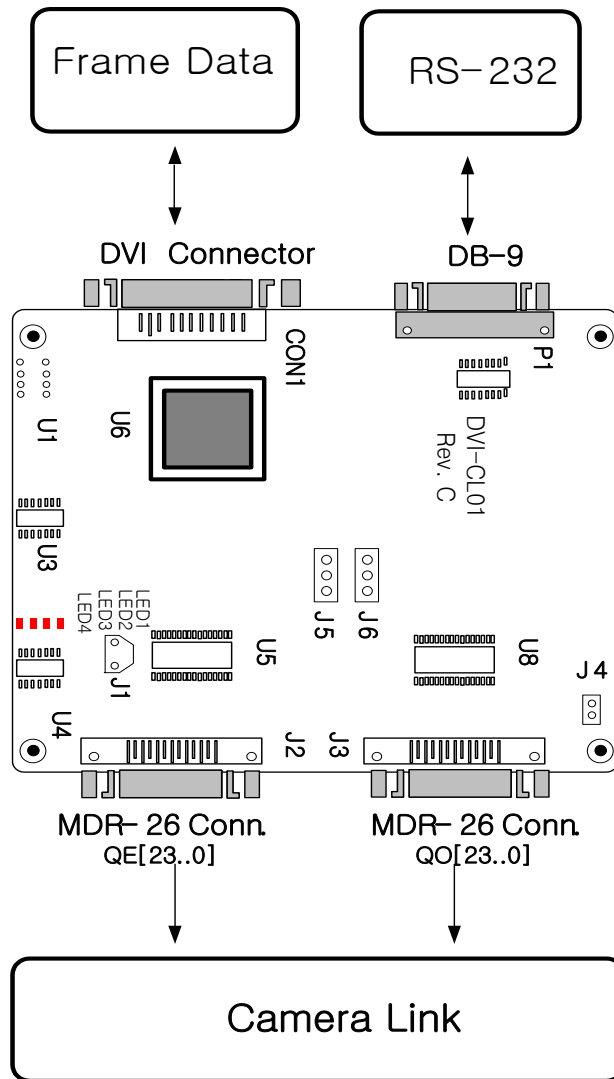
- Selectable 24 or 48 bits Data Output
- Support Standard Camera Link
- Support Maximum 85Mhz Pixel Clock
- Support LVAL, FVAL, DVAL Signals
- SerTFG / SerTC Serial Communication
- Use the DVI Power(+5V)
- Internal EDID

### Applications

- Industrial & Medical & Scientific Imaging
- Machine Vision and Metrology
- Replace the Frame Grabber Camera
- Frame Grabber Board Test

## 2. DVI-CL01 Function

The DVI-CL01 that received image data through a DVI cable interfaces to Camera Link, the names and functions are described below.



[Figure 2-1. DVI-CL01 Block Diagram]

No.	Name	Description and Remark
1	U6	DVI Reciever
2	J1	3.3V Output (When using external power)
3	U5	LVDS 28bit Camera Link (In the Base Mode)
4	U8	LVDS 28bit Camera Link (In the Medium Mode)
5	J4	Base or Medium Camera Link Select

### 3. Functional Blocks Description

- \* If the DVI Input is used an external without using internal DDC, it is used after removing the EEPROM.
- \* 40MHz clock is stable when the DVI input from the outside line gives into.

- (1) The DVI cable is connected to the DVI connector. When on-board power source is not using external Resources(3.3V), 5V power supply is used from the DVI connector.
- (2) After setting the desired resolution camera link cable, connect one or two. In other words, DVI output, Odd, Even, the output pixel is divided into the following modes.  
(48bit Output : J4 open , 24bit Output : J4 short)
- (3) In case of Base Mode, Odd and Even pixel is output to the MDR26 connector. (Refer to Table 1.)

[Table 1. One pixel per Clock Mode Data Mapping]

DATA	One Pixel per Clock Output	
	18bpp	26bpp
BLUE[7..0]	QE[7..0]	QE[7..0]
GREEN[7..0]	QE[15..10]	QE[15..8]
RED[7..0]	QE[23..18]	QE[23..16]

In case of Medium Mode, Even pixel is output in the left side Single Output Connector(J2) like [Figure 2-1], Odd pixel is output in the rest of the right connector(J3), the pixel clock frequency is half of the Base mode. (Refer to Table 2.)

[Table 2. Two pixel per Clock Mode Data Mapping]

DATA	Two Pixel per Clock Output	
	18bpp	26bpp
BLUE[7..0] – Odd	QE[7..0]	QE[7..0]
GREEN[7..0] - Odd	QE[15..10]	QE[15..8]
RED[7..0] - Odd	QE[23..18]	QE[23..16]
BLUE[7..0] – Even	QO[7..0]	QO[7..0]
GREEN[7..0] - Even	QO[15..10]	QO[15..8]
RED[7..0] - Even	QO[23..18]	QO[23..16]

- (4) The RS232 can communicate via the Serial communication parts of Camera Link (SerTFG / SerTC) and Dusb9 pin connector.

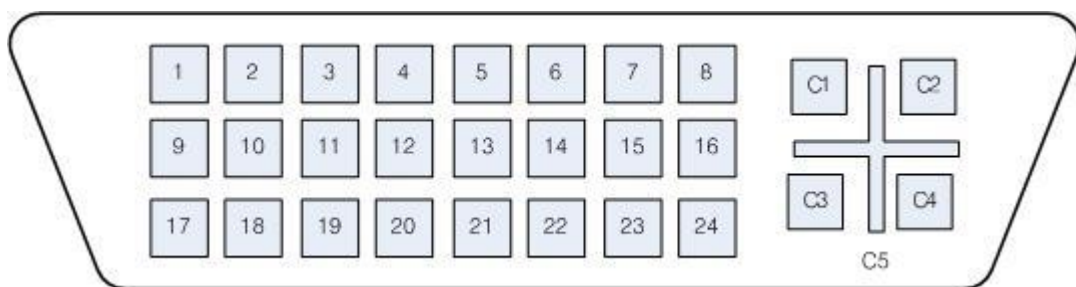
## 4. Connector Pin Map

The DVI-CL01 has four connectors and two jumpers. This chapter describes the connector and jumper function.

### 4-1. CON1(DVI)

[Figure 4-3] shows the board's CON1 connector pin map.

All of the pin functions are based on the DVI standard, so please refer to the DVI standard document for more description and information.



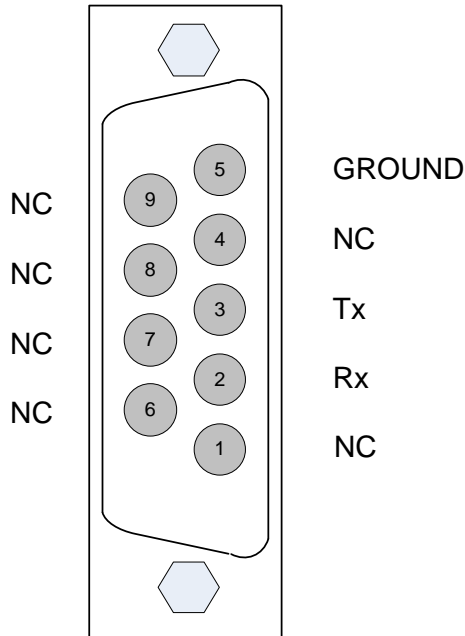
[Figure 4-1. DVI-CL01 CON1 Connector Pin-out]

[Table 3. CON1 Connector Description]

Pin #	Signal	Pin #	Signal
1	TMDS Data2-	16	Hot Plug Detect
2	TMDS Data2+	17	TMDS Data0-
3	TMDS Data2/4 Shield-	18	TMDS Data0+
4	TMDS Data4-	19	TMDS Data0/5 Shield
5	TMDS Data4+	20	TMDS Data5-
6	DDC Clock	21	TMDS Data5+
7	DDC Data	22	TMDS Clock Shield
8	Analog V sync	23	TMDS Clock+
9	TMDS Data1-	24	TMDS Clock-
10	TMDS Data1+		
11	TMDS Data1/3 Shield	C1	Analog Red
12	TMDS Data3-	C2	Analog Green
13	TMDS Data3+	C3	Analog Blue
14	+5V Power (Board Power Source)	C4	Analog H sync
15	GND	C5	Analog Ground

**4-2. P1(DB-9)**

Figure [4-2] shows the DVI-CL01 board's P1 connector pin-map of RS-232 port.



[Figure 4-2. DVI-CL01 D-sub9 Connector Pin-out]

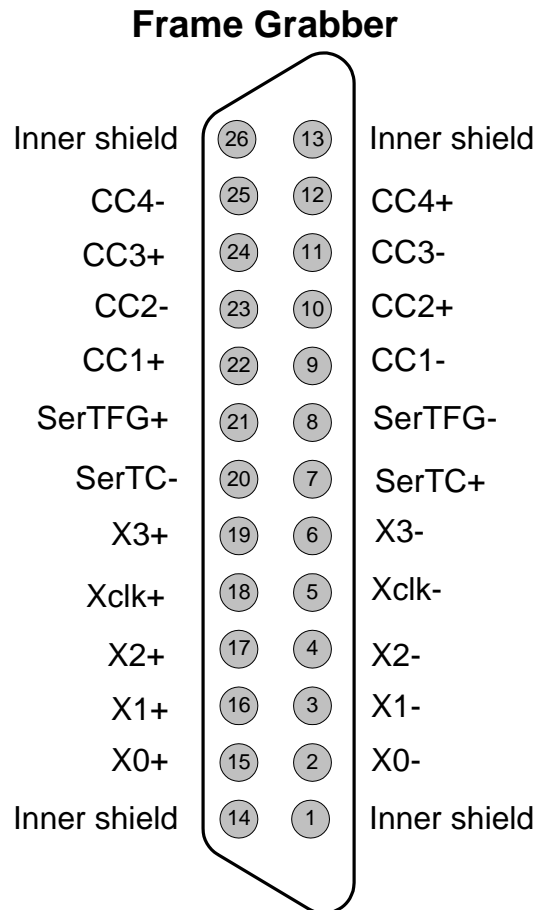
[Table 4. DVI-CL01 D-sub 9Pin Connector Description]

Pin No.	Pin Name	Description	Remark
1	NC	No Connection	
2	Rx	RECEIVER	
3	Tx	TRANCEIVER	
4	NC	No Connection	
5	GROUND	Ground	
6	NC	No Connection	
7	NC	No Connection	
8	NC	No Connection	
9	NC	No Connection	

**4-3. J2(MDR26)**

[Figure 4-3] shows the DVI –CL01 boards J2 connector pin-map.

All of the pin functions are based on the Camera link standard, so please refer to the Camera link standard document for more description and information.



[Figure 4-3. DVI-CL01 J2 Connector Pin-out]



[Table 5. J2 Connector Description]

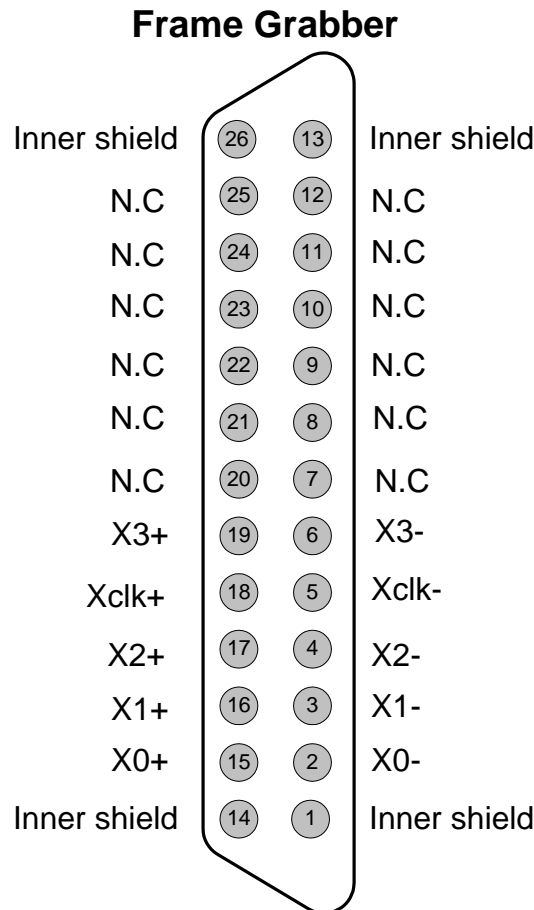
No.	Name	Description	Remark
1	<b>Inner Shield</b>	Cable shield	
2	<b>X0-</b>	Camera link LVDS transmit data0-	
3	<b>X1-</b>	Camera link LVDS transmit data1-	
4	<b>X2-</b>	Camera link LVDS transmit data2-	
5	<b>Xclk-</b>	Camera link LVDS transmit clock-	
6	<b>X3-</b>	Camera link LVDS transmit data3-	
7	<b>SerTC+</b>	Serial to Camera+	
8	<b>SerTFG-</b>	Serial to Frame grabber-	
9	<b>CC1-</b>	Camera Control input 1-	
10	<b>CC2+-</b>	Camera Control input 2+	
11	<b>CC3-</b>	Camera Control input 3-	
12	<b>CC4+-</b>	Camera Control input 4+	
13	<b>Inner Shield</b>		
14	<b>Inner Shield</b>		
15	<b>X0+</b>	Camera link LVDS transmit data0 +	
16	<b>X1+</b>	Camera link LVDS transmit data1 +	
17	<b>X2+</b>	Camera link LVDS transmit data2 +	
18	<b>Xclk+</b>	Camera link LVDS transmit clock +	
19	<b>X3+</b>	Camera link LVDS transmit data3 +	
20	<b>SerTC-</b>	Serial to Camera-	
21	<b>SerTFG+</b>	Serial to Frame grabber +	
22	<b>CC1+</b>	Camera Control input 1+	
23	<b>CC2-</b>	Camera Control input 2-	
24	<b>CC3+</b>	Camera Control input 3+	
25	<b>CC4-</b>	Camera Control input 4-	
26	<b>Inner Shield</b>		

**(Note)** For more information, refer to Camera Link Standard Specification.

**4-4. J3(MDR26)**

[Figure 4-4] shows the DVI –CL01 boards J3 connector pin-map.

All of the pin functions are based on the Camera link standard, so please refer to the Camera link standard document for more description and information.



[Figure 4-4. DVI-CL01 J3 Connector Pin-out]

[Table 6. J3 Connector Description]

No.	Name	Description	Remark
1	<b>Inner Shield</b>	Cable shield	
2	<b>X0-</b>	Camera link LVDS transmit data0-	
3	<b>X1-</b>	Camera link LVDS transmit data1-	
4	<b>X2-</b>	Camera link LVDS transmit data2-	
5	<b>Xclk-</b>	Camera link LVDS transmit clock-	
6	<b>X3-</b>	Camera link LVDS transmit data3-	
7	<b>N.C</b>	No Connection	
8	<b>N.C</b>	No Connection	
9	<b>N.C</b>	No Connection	
10	<b>N.C</b>	No Connection	
11	<b>N.C</b>	No Connection	
12	<b>N.C</b>	No Connection	
13	<b>Inner Shield</b>		
14	<b>Inner Shield</b>		
15	<b>X0+</b>	Camera link LVDS transmit data0 +	
16	<b>X1+</b>	Camera link LVDS transmit e data1 +	
17	<b>X2+</b>	Camera link LVDS transmit data2 +	
18	<b>Xclk+</b>	Camera link LVDS transmit clock +	
19	<b>X3+</b>	Camera link LVDS transmit data3 +	
20	<b>N.C</b>	No Connection	
21	<b>N.C</b>	No Connection	
22	<b>N.C</b>	No Connection	
23	<b>N.C</b>	No Connection	
24	<b>N.C</b>	No Connection	
25	<b>N.C</b>	No Connection	
26	<b>Inner Shield</b>		

#### 4-5. J1 Jumper Setup

J1 Setup



[Figure 4-5. J1 Connector Pin-out]

**Notice) When using external power, you can apply 3.3V. It is best to use a DVI standard power supply.**

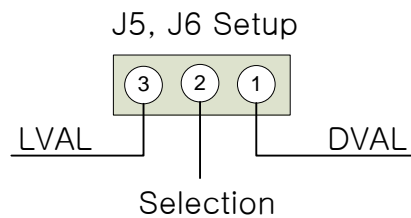
#### 4-6. J4 Jumper Setup

Open : Use Two Pixels(48-bits). For Medium Camera Link

Use the first Pixel QE[23..0], second Pixel QO[23..0]

Short : Use one Pixel(24-bits) per clock mode using the QE[23..0].

#### 4-7. J5, J6 Jumper Setup



[Figure 4-6. J4 Connector Pin-out]

1 - 2 Connection : Use the DVAL (Data Valid) for valid signal

2 - 3 Connection : Use the LVAL (Hsync) for valid signal

**Notice)When J4 opens, J5, J6 are valid.**

**When J4 shorts, J5 is only valid.**