IA-543

ASTRO

ASTRODESIGN, Inc

Contents

1 Before Use

1.1. Introduction

Thank you for purchasing this IA-543 DVI-to-LVDS conversion adapter.
This manual contains details on the operation procedures to be followed when the IA-543 is used, the checkpoints and precautions to be observed, and so on.
Before using the IA-543, please read through these instructions.
After reading the manual, keep it in a safe place for future reference.

1.2. Safety precautions

Improper handling may lead to malfunctioning or accidents. Before using this adapter, be absolutely sure to read through the safety precautions listed below: they will help to ensure that you will operate the adapter correctly.

■ **Meaning of the symbols used in this manual**

WARNING	This indicates an aspect of the adapter, which if it is handled improperly, may result in serious bodily harm (including death or serious injury) and/or impairment of the adapter's original functions.
CAUTION	This indicates an aspect of the adapter, which if it is handled improperly, could result in bodily injury, impairment of the adapter's original functions and/or property damage.
	This indicates that an action is prohibited (that is to say, an action which must not be undertaken). Specific details are provided in the figures or text near .
	This indicates an instruction which must be performed mandatorily. Specific details are provided in the figures or text near.

■ **Observe the following precautions to ensure safe operation.**

WARNING	Do not spill liquids inside the adapter or drop inflammable objects or metal parts into it. Operating the adapter under these conditions may cause a fire, electric shocks and/or malfunctioning.	
CAUTION	Install the adapter in a stable location. Do not stand it on its side. Rises in temperature caused by heat generation may result in malfunctioning.	
	Do not subject the adapter to impact. Doing so may result in malfunctioning. Take sufficient care when moving the adapter.	
	When accuracy is a priority, leave the adapter for about 10 to 15 minutes after turning on its power, and wait until its operation has stabilized before starting to use it.	
	In the unlikely event that trouble has occurred, disconnect the adapter's cables, and contact your dealer or an Astrodesign sales representative.	

1.3. How this manual is configured

This manual contains the operating instructions for the IA-543. Information on the operating methods, precautions and other aspects are presented in the following sections. Please read through this manual to ensure that you will operate the adapter correctly.

1. **Before use**
   The safety precautions, configuration of the manual and packing details of the adapter are described in this section.
2. **Concerning the IA-543**
   A general description of the IA-543 is given in this section.
3. **Appendix**
   Additional information is provided in this section.

1.4. Packing details

The following items are included with this product. Since the use of any other accessories may lead to malfunctioning, be absolutely sure to use the accessories provided.

■ **Standard items**

- IA-543
- IA-543 instruction manual (what you are reading): 1 copy

■ **Optional items**

- AC adapter, SSA0515A9
- The IA-543 is designed to run using a DDC power supply. If a DDC power supply cannot be used, the IA-543 can also be run on the power supplied from this AC adapter.

SSA0515A9 specifications	
Rated output voltage (V)	5
Rated output current (A)	1.7
Input voltage (VAC)	90 to 132 (rating: 100)
Input power line frequency (Hz)	47 to 63 (rating: 50/60)

Plug shape	
EIAJ	RC-5320A
Voltage classification	2
Outside diameter D1	4.0
Inside diameter D2	1.7
Length (L)	9.5
Polarity display symbol	

Fig. 1-4-1 Plug shape

2 Concerning the IA-543

2.1. Outline

The IA-543 (DVI-to-LVDS conversion adapter) converts DVI-D inputs into LVDS and outputs them.

2.2. Features

- **Dot clock frequency in wide band**

  Table 2-2-1 shows the frequency specifications of the input and output dot clocks.

Table 2-2-1 Frequency specifications

Clock mode	DVI input (MHz)	LVDS output (MHz)
1/1	25 to 135	25 to 135
1/2	40 to 165	20 to 82.5 × 2CH

* DVI cable: When a 2-meter cable made by Molex is used

- **Operation using DDC power supply enabled**

  The IA-543 can be run using a DDC power supply. This obviates the need for a power cable, and enables the compactness of the adapter to be retained. If a DDC power supply is not available, use of the AC adapter that is provided as an optional accessory makes it possible to switch over to power supplied from an external source.

2.3. Parts and their functions

2.3.1. IA-543 front panel

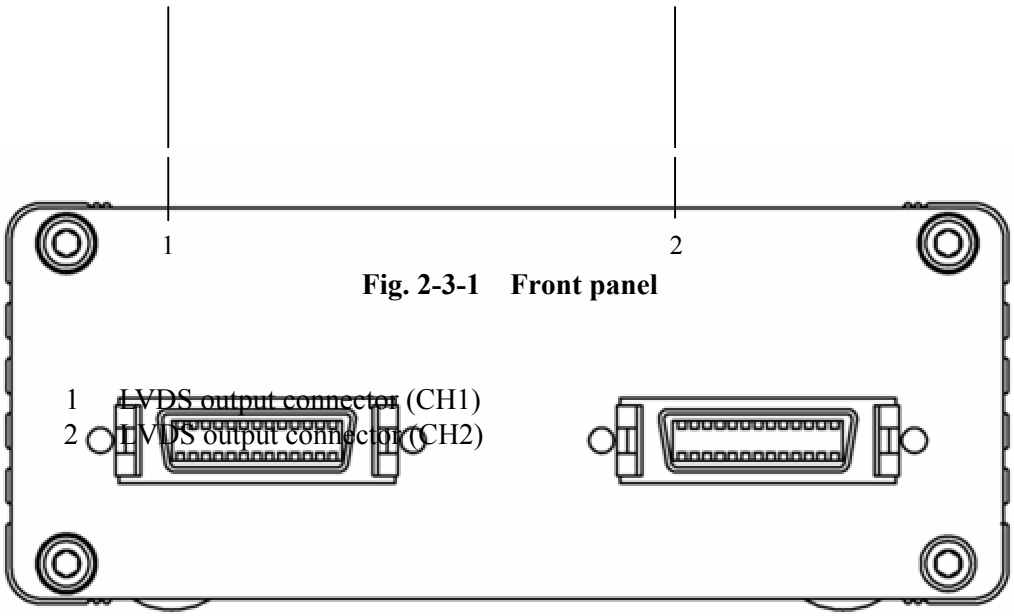
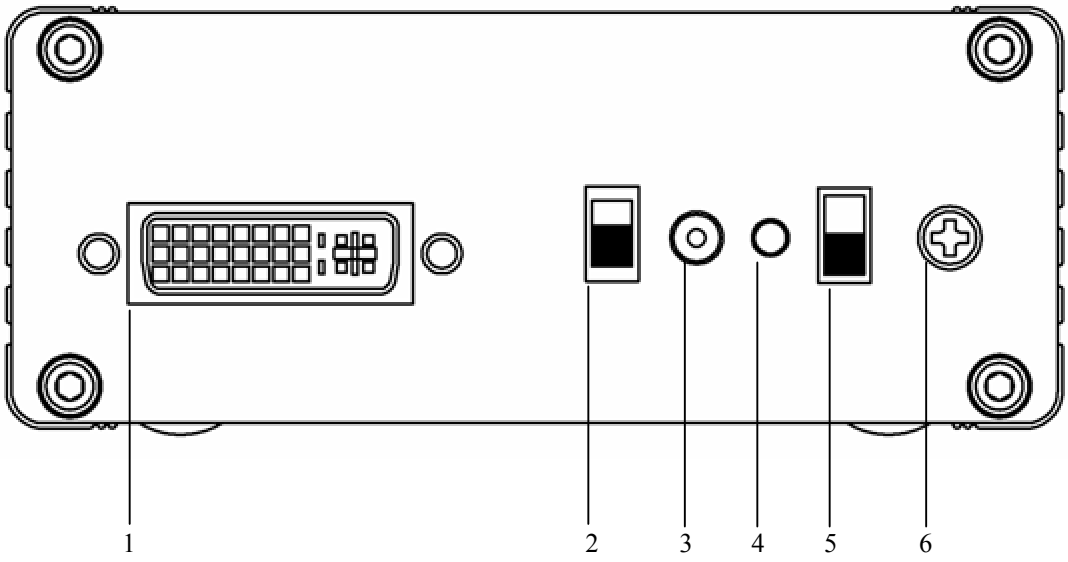


Fig. 2-3-1 Front panel

1 LVDS output connector (CH1)
2 LVDS output connector (CH2)

2.3.2. IA-543 rear panel



1 DVI digital serial connector
2 Clock mode selector switch: For switching the clock mode from 1/1 to 1/2 or vice versa.
3 DC jack
4 LED: Lights when the power is on.
5 Power switch
6 Frame ground (FG): Connect here to share the frame ground of the equipment which is connected to the IA-543.

CAUTION

Always use the power switch to turn the power ON or OFF. Turning the power ON or OFF by connecting or disconnecting the cable may damage the adapter.

3 Appendix

3.1. Connector pin layouts

3.1.1. DVI digital serial input connector

- Connector: DVI-I (74320-1004) made by Molex
- Output: TMDS

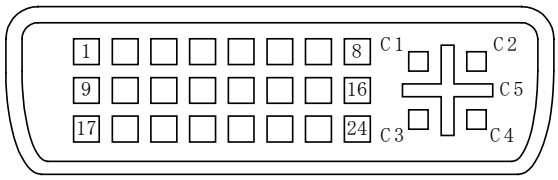


Fig. 3-1-1 Pin layout

Table 3-1-1 Pin numbers

Pin no.	Signal	Pin no.	Signal
1	TMDS DATA2-	16	SENSE
2	TMDS DATA2+	17	TMDS DATA0-
3	TMDS DATA2/4 G	18	TMDS DATA0+
4	-	19	TMDS DATA0 G
5	-	20	-
6	DDC CLK	21	-
7	DDC DATA	22	TMDS CLK G
8	-	23	TMDS CLK+
9	TMDS DATA1-	24	TMDS CLK-
10	TMDS DATA1+	C1	-
11	TMDS DATA1 G	C2	-
12	-	C3	-
13	-	C4	-
14	+5V	C5	-
15	GND	-	-

3.1.2. LVDS output connector

- Connector: 10226-1210-VE made by 3M
- Input: LVDS

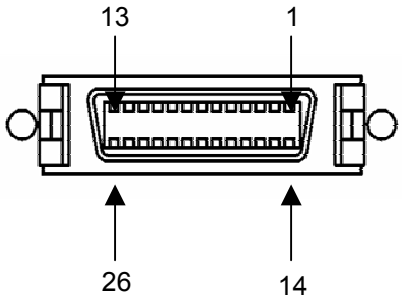


Fig. 3-1-2 Pin layout

Table 3-1-2 Pin numbers

Pin no.	Signal	Pin no.	Signal
1	GND	20	TE-
14	TA-	8	TE G
2	TA G	21	TE+
15	TA+	9	DDC/SCL
3	SENS	22	TCLK-
16	GND	10	TCLK G
4	TB-	23	TCLK+
17	TB G	11	+5V
5	TB+	24	+5V
18	DDC/SDA	12	TD-
6	TC-	25	TD G
19	TC G	13	TD+
7	TC+	26	GND

* The maximum supply current when the +5V voltage is supplied (pins 11, 24) is 0.5A.
* For details on the DDC power supply, refer to "3.3.3 Concerning the DDC power supply."

3.2. Device input pin support

3.2.1. LVDS transmitter device pin support

The table below shows the correspondence between the data output pins of the LVDS transmitter and the RGB data.
LVDS transmitter: THC63LVD103 [THINE]

Table 3-2-1 LVDS device pin support table

Output pin	1 CH	2 CH	Output pin	1 CH	2 CH
TA0	R4	R4	TC4	HSYNC	HSYNC
TA1	R5	R5	TC5	VSYNC	VSYNC
TA2	R6	R6	TC6	DISP	DISP
TA3	R7	R7	TD0	R2	R2
TA4	R8	R8	TD1	R3	R3
TA5	R9	R9	TD2	G2	G2
TA6	G4	G4	TD3	G3	G3
TB0	G5	G5	TD4	B2	B2
TB1	G6	G6	TD5	B3	B3
TB2	G7	G7	TD6	*SW0	*SW2
TB3	G8	G8	TE0	*R0	*R0
TB4	G9	G9	TE1	*R1	*R1
TB5	B4	B4	TE2	*G0	*G0
TB6	B5	B5	TE3	*G1	*G1
TC0	B6	B6	TE4	*B0	*B0
TC1	B7	B7	TE5	*B1	*B1
TC2	B8	B8	TE6	*SW1	*SW3
TC3	B9	B9	-	-	-

- Data indicated by an asterisk (*) is fixed at the "high" or "low" output. The output values can be changed using the DIP switches on the circuit board inside the adapter.
  The "low" output serves as the initial setting.
  For further details, refer to "3.3.4 Concerning the 2 lower RGB bits and switch fixed outputs."

3.2.2. DVI receiver device pin support

- The table below shows the correspondence between the data input pins of the DVI transmitter and the RGB data.
- DVI transmitter: SiI160CT100 [Silicon Image]

Table 3-2-2 DVI device pin support table

1 CH				2 CH			
Output pin	Data	Output pin	Data	Output pin	Data	Output pin	Data
QE0	B2	QE15	G9	QO0	B2	QO15	G9
QE1	B3	QE16	R2	QO1	B3	QO16	R2
QE2	B4	QE17	R3	QO2	B4	QO17	R3
QE3	B5	QE18	R4	QO3	B5	QO18	R4
QE4	B6	QE19	R5	QO4	B6	QO19	R5
QE5	B7	QE20	R6	QO5	B7	QO20	R6
QE6	B8	QE21	R7	QO6	B8	QO21	R7
QE7	B9	QE22	R8	QO7	B9	QO22	R8
QE8	G2	QE23	R9	QO8	G2	QO23	R9
QE9	G3	HSYNC	HSYNC	QO9	G3	-	-
QE10	G4	VSYNC	VSYNC	QO10	G4	-	-
QE11	G5	DE	DISP	QO11	G5	-	-
QE12	G6	CTL1	-	QO12	G6	-	-
QE13	G7	CTL2	-	QO13	G7	-	-
QE14	G8	CTL3	-	QO14	G8	-	-

- Bits 2 to 9 of the data represent the RGB data range since 8-bit RGB data is input to the LVDS transmitter which supports 10 bits.

3.3. IA-543 specifications

3.3.1. Specifications

Dot clock frequency	DVI input *1	Clock mode 1/1: 25～90MHz Clock mode 1/2: 20～82.5MHz × 2CH
	LVDS output	Clock mode 1/1:25～90MHz Clock mode 1/2: 40～165MHz
DVI input		Compliant with DVI 1.0
LVDS output		Compliant with DISM 1.0

*1: Use of the 2-meter cable made by Molex is recommended as the DVI cable.

3.3.2. Ratings

Supply voltage	DC5V
Power consumption	2.5W MAX
Dimensions	100(W)×100(H)×40(D)mm (excluding projections)
Weight	Approx. 0.5 kg
Operating temperature	5 to 40°C
Storage temperature	-10 to 60°C
Humidity	30 to 85%RH (no condensation)

3.3.3. Concerning the DDC power supply

The LVDS output of the IA-543 provides the DDC power (+5V) supply.
The maximum supply current of the DDC power supply is 0.5A.

The DDC power is output as shown below.

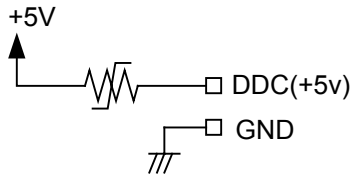


Fig. 3-3-1 DDC power output circuit

CAUTION

- Although the DDC power supply incorporates an overcurrent protection device, it should not be used at current levels exceeding the rating.
- Under no circumstances must power be supplied from the connected device to the DDC power supply. If power is connected, the IA-543 and connected device may malfunction.

3.3.4. Concerning the 2 lower RGB bits and switch fixed outputs

- The 2 lower RGB bits of the LVDS output are used (only when 10 bits are transferred), and the output of switches SW0-3 is fixed at high or low.
  This output can be changed using the DIP switches on the board.
  High is output at ON and low at OFF.
  The initial setting is OFF (low).

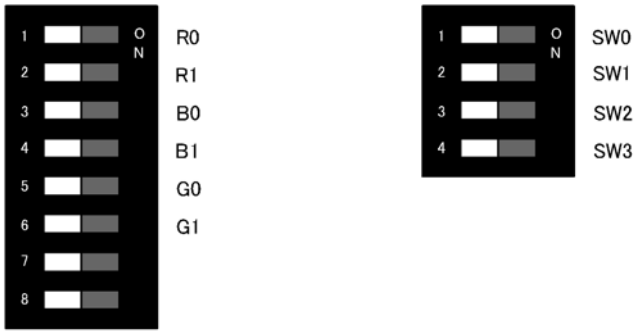


Fig. 3-3-2 DIP switches (when the output is set to low)

3.3.5. Blanking period data mask function

- Due to the specifications of the DVI receiver, the last data in the DISP period is latched to the RGB data in the blanking period, and output.
  By setting the DISP_MASK signal shown below to ON (using the DIP switch on the board), the data in the blanking period can be masked and output as zero.
  The initial setting is OFF.

Fig. 3-3-3 DISP_MASK switch (at OFF setting)